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# IH: Carburetor, Intake Manifold & Exhaust - Sub-01R

## Keihin Butterfly Carb (non CV) Functions, Adjustments, Tuning

See also in the Sportsterpedia:

- [Keihin Butterfly Carb Basic Information](#)
- [Rebuilding the Keihin Butterfly Carb](#)
- [Keihin Butterfly Carb Identificaton](#)
- [See TSB #694 for introduction information on the Keihin butterfly carb.](#)

Click the link to view the TSB page in the Sportsterpedia. Then click on the "Y" next to #694 to view / download the PDF.

For Late 1976-1987 Sportsters.

If you are opening up your carb for the first time, you need three things:

1. A FSM (Factory Service Manual) for your year model.
2. A factory Parts Catalog.
3. A good rebuild kit (new rubbers all through a carb make a big difference to it's performance)

The L76-78 Keihin butterfly carbs worked the best and had more adjustment to them. <sup>1)</sup>

They had no choke cam, a deeper frost plug in the top and a wider range in them.

Another factory fix was to seal the frost plug in the top with silicone to be sure they weren't leaking.

To find out which later carb you have;

On 79 or later Keihin butterfly carbs, measure the venturi. 34mm = Sportster, 38mm = big twin. <sup>2)</sup>

You can cut two pieces of cereal/Kleenex box cardboard, 34mm and 38mm wide and each a few inches long each.

See which best fits the most narrow part (throat) of the venturi.



## Choke

On L76-78 Keihin carbs, the choke system is standalone with a choke plate and an actuating rod. On 79-up carbs, the choke system is composed of a choke, actuating rod and a fast idle cam.

The choke is manually operated by pulling out the choke handle (if pulled out gently it stops at each position).

### 76-78 models:

The choke has 3 basic positions

1. Fully closed (full choke for cold startup).
2. Partially open.
3. Fully open (off for normal operating temp).

### 79-87 models:

The choke has 4 basic positions <sup>4)</sup>

1. Full choke for cold startup (knob all the way in).
2. Choke out a little (maybe 1/2").  
(choke plate is still fully open but the fast idle cam moves the throttle valve to the fast idle position)
3. Pull choke out a little more and the plate is half open and valve opens a little more.
4. Choke all the way out, plate is fully closed and valve is in the highest idle position

Check your butterfly shaft also. If its loose, the bushings are worn and you'll be sucking air. <sup>5)</sup>

## Low Speed System (idle circuit)

The low speed system affects idle up thru about half throttle (idle, low and intermediate speeds when the throttle valve is closed or only partially open). <sup>6)</sup>

**76 only;** At idle, fuel enters the slow jet where it is metered.

**77-up;** At idle, fuel enters the main jet where it is metered and enters the slow jet where it is metered again.

Then fuel enters the slow jet bleed tube to mix with air from the slow air passage.

The fuel mixture is regulated by adjusting the low speed mixture screw.

When the throttle valve is closed, fuel mixture flows into the venture mostly through the idle port.

As the throttle valve gradually opens, fuel mix discharge is transferred to the bypass. So the slow jet bleed tube is actually part of the slow jet.

## Overall Tuning Procedure

### The usual method to set idle mixture/speed is:

1. Set idle MIXTURE screw to 7/8 turns out. Get the bike hot. Set idle at comfortable speed with the idle SPEED screw.
2. Adjust the idle MIXTURE screw to the point where engine runs the fastest. This is optimum mixture.
3. Adjust idle SPEED screw again to get desired idle speed.

### Observations from Hopper of the XLFORUM: <sup>7)</sup>

I have found that the spring on the idle speed screw tends to creep the idle speed back up if you try to adjust the idle just that little bit slower.

So, I adjust the idle speed screw right down too slow, then nudge it up slightly faster until I get the speed I want, then it stays there.

According to Joe Minton's article, and I have found this to be true on my bike:

- If your bike idles best with the idle mixture screw less than ½ turn open, you need a smaller low speed fixed jet.
- If your bike idles best with the idle mixture screw more than 1-1/4 turns open, you need a larger low speed fixed jet.

This is real important. It also is the way to stop "carb farts" – spitting back or backfiring through the carb.

If your Ironhead has aftermarket free-flowing exhaust and an air filter on it,

It will almost certainly need a larger low speed fixed jet, and most likely a bigger main jet too.

But it is the low speed jet that affects the dreaded carb farts.

Main jet affects mixture at wide open throttle and if left lean can overheat the engine, or burn holes in pistons.

### Further explanation from IronMick of the XLFORUM;

If the carb is old and dirty the pilot screw passage may be gummed up such that you will not be able to "gently seat" the pilot screw reliably. <sup>8)</sup>

If this is the case remove the carb from the bike and clean it up. Some guys try to do carb work with the carb in the bike. This is generally a very bad idea.

In the pilot screw passage there should be, in this sequence: screw, spring, washer, o-ring. Often, POs have installed these parts in the wrong sequence; remember that the purpose of the washer is to protect the O-ring from being damaged by the spring.

The screw usually comes out easily. The other parts may require some work.

The best technique is to stick a pipe cleaner in the hole, twist it around, and, like magic, out come the other parts on the end of the pipe cleaner.

- The pilot screw adjustment mainly affects the idle speed operation of the engine.<sup>9)</sup>  
This is when the engine is actually idling, and when you release the throttle while riding.  
If the pilot screw is too lean you get backfire in the exhaust when you throttle down, and white looking spark plugs.  
If it is too rich you get black sooty exhaust and black sooty spark plugs.  
Either situation has serious consequences for engine longevity if left unresolved.

The mixture screw does not have a large range of adjustment, if you're running lean, you may need to increase the low speed jet size.

(after you have eliminated all other contributing factors)

**Note:** 1966 to 1978 Sportster carbs do not have the O-ring and washer in the pilot screw passage.

1. You need to have easy access to the pilot screw, easy enough to reliably judge "screw it in until gently seated".  
Loosen the front fuel tank mount bolt, remove the rear fuel tank mount bolt and prop the rear of the fuel tank up on a piece of 2x4.  
(on some bikes this will not be necessary)
2. With the engine cold (so you do not burn your fingers) turn the pilot screw in clockwise until it is gently seated.  
Count the number of 1/4 turns as you do it; write the number down. Back it out to the original setting. You may need to return reliably to this setting after experimenting.  
The "normal" starting point for this process is 1-1/4 turns out (according to the 79-85 FM) or 1-1/2 turns out (according to usual practice).  
**Note:** An old HotXL magazine article recommends for Keihin butterfly carbs between 1/4 and 1-1/4 turns out.  
My experience is that this works best. If you are more than 1-1/4 turns out, your pilot jet is too small.
3. The engine must be at full warm up. It will have very hot parts. To avoid burned fingers, have a well lighted and comfy place to work.
4. Set the engine idling at about 1000 RPM.  
You want it to be idling at the slowest speed that is consistent with a smooth idle so that you can hear or feel slight changes.
5. Turn the pilot screw in clockwise until the engine idle becomes worse; tending to stall.  
Count the number of 1/4 turns as you do this.  
Then turn the pilot screw out counter clockwise until the engine idle gets good, then becomes worse, tending to stall.  
Count the number of 1/4 turns as you do this.
6. The best setting for your bike will be somewhere between these two settings.

The FSM says to use the leanest setting (most screwed in) consistent with a good idle quality. Some guys say to go between the two settings.

It should be between 1/2 and 1-1/2 turns out from gently seated. If it is not within this range you should change the slow jet.

7. You may have to adjust the idle speed.
8. Make sure that the spark plugs are clean, then ride the bike.
9. I usually go for a half hour or so ride outside the city, then ride home with the last 10 minutes at city riding speeds (so that it is on the "idle port", not the "idle transfer ports", the "mid range port", or the "main jet" [see carb diagrams in FM].  
Hopefully the plugs will come out a nice medium gray or tan color. If they are too dark you can screw it in another 1/4 turn; too light screw it out 1/4 turn, and try the ride again. (See also [Reading Spark Plugs](#) in the REF section of the Sportsterpedia.)
10. If they are really light or really dark the problem is not with the pilot screw setting.  
For example, too light might mean an intake or exhaust leak, and too dark might mean the pilot jet is too large (among other possibilities).
11. My experience with this process is that after making a change I have to clean the plugs and go for a good ride (say, an hour or so) before I can trust that the new results are reliable.

## Air/Fuel Mixture Adjustment

### Low speed / idle mixture screw:

Other names include the idle mixture screw or the pilot screw. <sup>10)</sup>

You may get smoother running by adjusting this screw as it adjusts the flow of gasoline at idle. <sup>11)</sup>

The idle mixture screw is held in place by a spring on top of the carburetor near the intake mounting flange on all models.

- On 76-78 carbs, the screw and it's spring is sticking up in plain site.  
76 carbs didn't come with a seal on the mixture screw. It was added thru a service bulletin in December of 1976. <sup>12)</sup>  
The ID of the seal (27355-76) was a little small and it was suggested to enlarge the hole slightly for the screw.  
It was to be placed between the spring and the carb body. This still leaves the spring being able to cut the seal.
- On 79 carbs, the screw is inside a towered boss under a limiter cap.  
The limiter cap can be removed to adjust the mixture screw. However, with the cap on, the mix can still be adjusted with the limits of the cap.  
A washer between the seal (O-ring) and the spring was added in 79 to protect the rubber O-ring from damage from the spring.
- On 80-up carbs, the screw is inside a towered boss under a (non removable) plug.  
The plug can be removed by drilling a small hole through it and using a small screwdriver to pop it out.  
Wrap a piece of tape around the drill bit as a guide so you won't drill into the mixture screw.

To adjust it, turn the screw in (clockwise) until lightly seated (do not over-tighten), then back it out 7/8 turns. <sup>13)</sup>

From there;

- Turning the screw in (clockwise) leans the mixture.
- Turning the screw out (counter-clockwise) richens the mixture.

The pilot screw tuning is dependent on your slow speed jet size. <sup>14)</sup>

Needing it too far in or out for proper mixture will indicate the need for a smaller or larger low speed jet.



## Idle Speed Adjustment

The idle speed adjuster is just a butterfly stop screw and it adjusts the movement on the return of the throttle cable. <sup>18)</sup>

Adjust the throttle stop screw to make the engine idle at the desired speed with the throttle closed. <sup>19)</sup>

### Notes:

Never set idle adjustment to the lowest possible speed. An extremely low idle causes bearing wear oil consumption and slow speed acceleration.

By ear, idle as slow as it will go, then speed it up a healthy bit.

Recommended idle speed per the -78 FSM is 700-900 RPM. <sup>20)</sup>

However, below 900 is not suggested by most owners. Some have had bearing failure with lower idle settings.

The -85 up to the -90 FSMs raised the idle requirement to 900-950 RPM.

There have been many arguments pertaining to the need for the engine to have a slow Potato, Potato sound "or it ain't a Harley".

Well a Sportster is a Harley, make that a high revving Harley (unlike the slower revving BTs), and a Sportster is not meant to be idled that low.

Forget about the peer pressure or berating of the higher RPM and tune your Sportster for performance and longevity as it was meant to be. <sup>21)</sup>

Turning the screw clockwise opens the throttle plate (faster idle).

Turning the screw counterclockwise closes the throttle plate (slower idle).

- Slow idle adjustment (76-up):
  - Make final adjustment on low speed screw after the engine is at operating temperature with the choke fully open (choke knob in).



- Turn screw in and then out to see if the engine picks up speed or runs smooth.
- Both startup and overall performance will be better with the idle mixture set slightly on the rich side.
- Readjust the throttle stop screw as needed to get the correct idle speed.
- Fast idle adjustment (79-up): <sup>22)</sup>
  - Pull the choke to the second position.
  - Turn the fast idle adjusting screw in or out to set the fast idle at 1500 RPM.

Throttle Stop Screw (idle speed adjuster): <sup>23)</sup>



## Choke Shaft and Plastic Parts (76-E78)

Kits were available from the MoCo for 76-78 FX & FL carbs to adapt for a fast idle cam. It was also available as a replacement for 79-up carbs.

The Choke Shaft Kit is (27045-78) and the Plastic Parts kit (27046-78) as shown below (with the parts list including 3 springs, 2 clips and 2 washers).



The ball under the choke lever drive must ride in the detents on the bottom of the choke lever drive.

## Fast Idle Cam (79-up)

The fast idle cam operates in conjunction with the choke to progressively raise the idle speed as the choke disc closes. <sup>24)</sup>

Engine speed is increased as the choke knob is pulled out.

By moving the choke knob, the choke and fast idle can be adjusted for a cold or warm engine.

This should be set to 1500 RPM with the bike fully warmed up.

When the choke lever is pulled out 1/4" to 1/2", it is in the fast idle position. <sup>25)</sup>

After starting with full choke you push it in to this setting until it is warmed up [a few minutes] then push it in the rest of the way.



## Slow Jet

Other notable names include the pilot jet or idle jet.

## Rubber bung

### L76 Sportster carbs;

The very first 1976 style Keihin carbs do not use the rubber plug beneath the slow jet. <sup>28)</sup>

They do not have the tiny hole going sideways through the carb body from the slow jet housing to the main jet housing.

So they need to suck gas up direct from the float bowl though the exposed slow jet. The slow jet was a 100 and the main was a 140 <sup>29)</sup>.

Check if your carb has that small hole drilled in the body.

If you look down into the hole where the slow jet sits it will be visible in the wall on the side where it can lead to the main jet.

If it does not have that hole, that carb does not use the rubber plug and can cause you to have to screw the idle mix too far open.

### 77-up carbs;

The slow jet is under the rubber bung in the pic above. You take out the rubber bung, then unscrew the small brass jet with a screw driver that is a tight fit. <sup>30)</sup>

The rubber bung is essential. The bike will run really rough if it comes loose or falls out.

Looking at the carb upside down the passage will be drilled below the main jet and above the pilot jet. <sup>31)</sup>

With the plug installed, the pilot jet draws fuel from and through the main jet.

You must run with the plug in place or the main jet will be bypassed by the drilled passage and it will run very rich.

### Correction of Lean Mixture Problems Due to the Rubber Bung

Sometimes, the black plug in the low speed jet is too long and should be trimmed off to allow more fuel in the low speed side. <sup>32)</sup>

Trim off as much as needed to still hold it in without falling out. Per TSB #707, correct by either modifying or replacing the plug.<sup>33)</sup>

Either cut a plug so it is 5mm (.20") from shoulder to tip or replace it with a new plug (27385-76). Refer to bulletin 694 for disassembly and assembly procedure to remove and replace plug.

Screaming Eagle Keihin carbs do not use the rubber bung.

Interestingly, the original big twin models all had this plug when they swapped from the Bendix to the Keihin carb.<sup>34)</sup>

It is not clear why the L76 Sportster carb was different.



35)



36)

## Slow jet

You might have to grind the sides off a screwdriver to get it to go up inside the hole to the jet.

If you have anything other than factory original exhaust and air filter, you will most likely need to go up one or two sizes in slow speed jet.

If your idle mixture screw works best more than 1-1/4 turns open, you need a bigger low speed jet.

If your bike spits back through the carb at all, you need a bigger low speed jet.

If your slow jet is too small, the engine misfires on acceleration.<sup>37)</sup>

Click here for [Keihin butterfly carb standard jet sizes](#) installed in Sportster carbs in the Sportsterpedia.

Fitting an 80 model carb, for instance, will make it run much better. Later 79-onwards and those with 34mm carbs have smaller jets.

JP Cycles and others sells a range of jets so you can take them up in small increments until you get it right.

The smaller jets on the later models seem to come in smaller increments.

## Drilling out a jet.

You can drill the low speed jet out from 75 to 80 using a set of jet drills.

You drill the jet very carefully, one size at a time by hand, twirling the jet down over the drill gradually.

Do not use an electric drill, it will make a big hole and possibly break the drill bit.

Buy 2 small jets, and a good drill index (number, letter, fractional or the metric equivalent).<sup>38)</sup>

Drill out the small jet one size at a time until you become too rich. Drill out the remaining jet 1 size down.

The right size slow speed jet is the most important factor in getting a good idle, starting, running up to

half throttle and stopping carb farts.  
This is a slow jet and jet hand-drill (or pin vise).



## Mid-range Circuit / Idle Transfer Ports

As the throttle valve opens, the air / fuel mixture from the slow jet is drawn into the venturi through the idle transfer ports.

When the throttle valve uncovers the midrange port, raw fuel from the float chamber is also drawn into the engine.

Another thing that affects low speed running, mostly as you crack the throttle open from idle, is the bypass ports. <sup>40)</sup>

This is a row of four tiny holes in the top of the carb, just in front of the idle mixture hole, directly below the idle mixture screw.

As the throttle butterfly opens, each of these extra holes is progressively uncovered by the butterfly and fuel begins to flow out of it.

So as the throttle opens from idle, more gas is allowed in to match the extra air flowing in.

The ports in the carb venturi are made active as follows as you open the throttle: <sup>41)</sup>

1. Idle port, controlled by pilot screw
2. 1st of 4 idle transfer ports are active at idle.
3. Next 3 idle transfer ports are exposed one by one as the throttle plate opens.
4. Mid-range port is next.
5. Main jet port is last.

Theoretically only one is active at a time, but there is some overlap.

Make sure these holes are not plugged with gunge. Take out the idle mixture screw and squirt carb cleaner in there.

Also squirt carb cleaner on the side inside the carb throat. Carbon and fuel deposits tend to build up there.

The manual says not to put solid objects in those tiny holes in the soft pot metal carb body. But if you were desperate you could poke a bristle from a wire brush in there, very carefully.

And don't lose the bristle down the manifold, it will wreck your engine, being hardened spring steel.

### Correction of Air Leakage at Carburetor Body Plugs

As a precautionary measure to eliminate possible air leakage, apply an adhesive type sealer, such as Harley-Davidson Seal-All, to the two welch plugs in top of carb.<sup>42)</sup>

Apply a minimal amount only to the joints between the edges of the plugs and the casting.



## Main System (high speed circuit)

The main system functions at intermediate and high speeds as the throttle valve opens further.<sup>45)</sup>

Fuel is metered by the main jet and enters the main jet bleed tube where it mixes with air entering through the main jet air passage.

This air/fuel mixture then enters the venture from the main nozzle.

### Main Jet

The main jet has no adjustment. Fuel is metered by the main jet during high speed operation.

The main jet is the big brass one next to the rubber plug. It is right there when you take off the float bowl.

Click here for [Keihin butterfly carb standard jet sizes](#) installed in Sportster carbs in the Sportsterpedia.

If you have aftermarket pipes and or air filter, you will probably need to increase the size of the main jet to make sure it is not lean at high speeds.

The main jet only influences half to full throttle operations.

If you are having low speed or mid range problems, it is unlikely to be the main jet. Look at the low speed jet or other issues.

All year Keihin jet locations:



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## Installing an Adjustable Main Jet (L76-87)

There is an adjustable main jet available from J&P Cycles or others.

These work great and you don't have to fool around jet guessing whether you have the right size main jet or not.

They are simple to adjust. Just wind it up to about 65 MPH and run it in until it misses and back it out about a full turn. <sup>47)</sup>

This kit can be purchased online. It comes with an installation guide and index pointer.

The tool marks inside of the float bowl (as installed) for drilling the proper sized hole to thread in the adjustable main jet.

The kit can be purchased online.

PDF instructions - <http://www.vtwinmfg.com/instructions/35/35-0369.pdf>

### Keihin (non-cv) adjustable main jet (L76-87 Sportsters)



**Fully adjustable for max tuning ability**

This replaces the main jet (has to be removed).

The float bowl has to be removed to install the adjustable main jet.

A guide tool is included with the kit to install the new jet to properly index the carburetor float bowl.

A index pointer is installed in the guide, bowl reinstalled and the pointer is pushed down from inside the venturi to dimple the bowl.

The bowl is once again removed and a 1/16"-1/8" pilot hole is drilled followed by a 15/64" bit.

After checking for burrs, removing the index tool and guide and cleaning up, the adjustable jet is installed in the float bowl.

(partially unscrew the small "T" handle so that the needle in the adjustable jet is not exposed to accidental damage)

Remove the nut from the adjustable jet, insert the jet through the 15/64" hole drilled earlier.

Then re-tighten the bowl and gently screw in the "T" handle to the needle seat and then back it out 4 turns.

Finer tuning can be achieved by reading the spark plugs and small adjustments to the "T" handle.

This adjustable jet eliminates the chore of carrying and continually changing different main jets with every change in exhaust system or air cleaner.

The hole in the bowl for the "T" handle jet has to be indexed correctly in order for this to work.

The adjustable main jet is designed to operate in conjunction with a 1.80 main jet included with the kit.

Make sure you record or remember the number of turns off the seat and back off the "T" handle before removing the float bowl later.

This will help prevent needle / jet interference when the float bowl is reinstalled.

For initial adjustment (standard pipes and A/C) it's recommended that the adjustment needle be backed out four (4) turns from the seat. The adjustable jet set screw is turned in, towards the float bowl to lean the fuel/air mixture and out from the float bowl to richen the mixture.

Check plugs frequently after jet adjustment, exhaust or A/C to avoid too lean or too rich conditions.



## Accelerator Pump System

Contrary to rumor, all Keihin butterfly carbs factory installed on Sportsters did have an accelerator pump. There is a diaphragm at the bottom, where the bulge in the casting is.

The pump pushrod sticks up inside the rubber diaphragm. The bent end of the accel pump rod engages in a small curved slot in the black plastic knob.

The accelerator pump uses sudden throttle openings (rapid acceleration) to quickly inject raw fuel into the venturi to provide extra fuel for smooth operation. <sup>48)</sup>

Rapid throttle action during the first half of throttle travel pushes the pump rod down, flexing the diaphragm.

The flexing action forces raw fuel past a check valve and into the venture.

The check valve prevents backflow during this stroke.

The spring under the diaphragm then returns it to it's original position.

Then a new supply of fuel flows in under the diaphragm from the float chamber awaiting the next acceleration.

The accel pump rod pushes on the rubber / fabric diaphragm in the pump housing. <sup>49)</sup>

A series of check valves in the bowl let the action of the diaphragm take gas from the bowl and force it thru the pump jet and into the throat of the carb.

The amount of gas flowing out of the spray bar depends on the difference in pressure between the float bowl and the carb throat.

When you open the throttle suddenly and the engine is running at low RPM, air moving through the wide open carb will be slow.

The pressure difference won't be much and it will lean out.

The mixture strength that gives smooth running at cruise and gives good gas mileage is on the lean side and isn't best for max power.

Between the normally lean cruising mixture and the fact that you are leaning it out more by yanking the throttle open at low RPM, your engine isn't going to work too well.

That's where the accelerator pump comes in. When you open the throttle at low RPM, the accel pump forces gas into the throat of the carb.

By the time the carb is at app 1/4 throttle, the pump travel is used up and no longer part of the circuit.

At 1/4 throttle, the velocity thru the carb is high enough that the accel pump isn't needed.

The accelerator pump is operated by a rod attached to a spring loaded bell crank mounted on the throttle butterfly shaft.

When you open the throttle, the spring is wound up and forces the rod down. How far the rod travels determines how much gas is forced into the carb's throat.

### **Correction of Faulty Accelerator Pump Operation**

With engine warm and running at idle, remove air cleaner cover and see if any fuel is leaking from accelerator pump nozzle due to the accelerator pump rod being too long. <sup>50)</sup>

Correct by removing the rod as detailed in bulletin 694 and shortening to 59.50mm. (2.34").

Caution: Do not over-shorten because this will affect pump action and cause poor acceleration.

## **Tuning the Accel pump**

### **Accel Pump Check Valves**

Keihin carbs have 2 check valves in the accel pump circuit. <sup>51)</sup>

1. The inlet check ball.

It's captive in the pump cover pn (27364-76}. You can hear it when you shake the cover.

2. The outlet weighted needle (this is the one that resembles a float inlet valve).

This valve is captive in the bowl casting (inside the spray nozzle). You can hear it when you shake the bowl.



In 77-up carbs using float bowl 27384-77;

The weighted needle keeps fuel from dribbling out of the discharge jet into the air stream when the pressure in the carb mouth drops too far below atmospheric pressure.

It does the same thing in L76 carbs plus it does one more thing. It renders the accel circuit inoperable on slow movement of the pump diaphragm.

The L76 carbs use bowl 27395-76 or 27395-76A.

In the first pic below, there are two bowls; a -76A bowl on the left and a -77 bowl on the right. 2nd pic is a closeup of the -76A.

You can see a little hole in the passage from the pump to the nozzle. It's on -76 and -76A bowls only. The -77 don't have that hole. Additionally, -76 bowls use a #100 (.040") discharge nozzle, -76a bowls use a #80 (.032") and -77 bowls use a #45 (.018") nozzle.



52)



53)

## Accel Pump Jet

How fast the pump's gas is delivered to the carb depends on the strength of the spring pushing on the pump rod and the size of the pump jet.

You can control the rod throw, and therefore the volume with the limit screw (or the one you've added on later carbs).

You can control the rate of delivery with the size of the pump jet. However, the volume and delivery rate aren't the only things you can control.

There are two pump jet sizes, 60 and 80. Like the idle jet, the number is also the size of the orifice in hundredths of a millimeter.

The 60 is better than the 80. A 50 may be better still. <sup>54)</sup>

The size of the jet determines how long it takes to deliver one squirt of gas. The bigger the jet, the shorter the squirt will last.

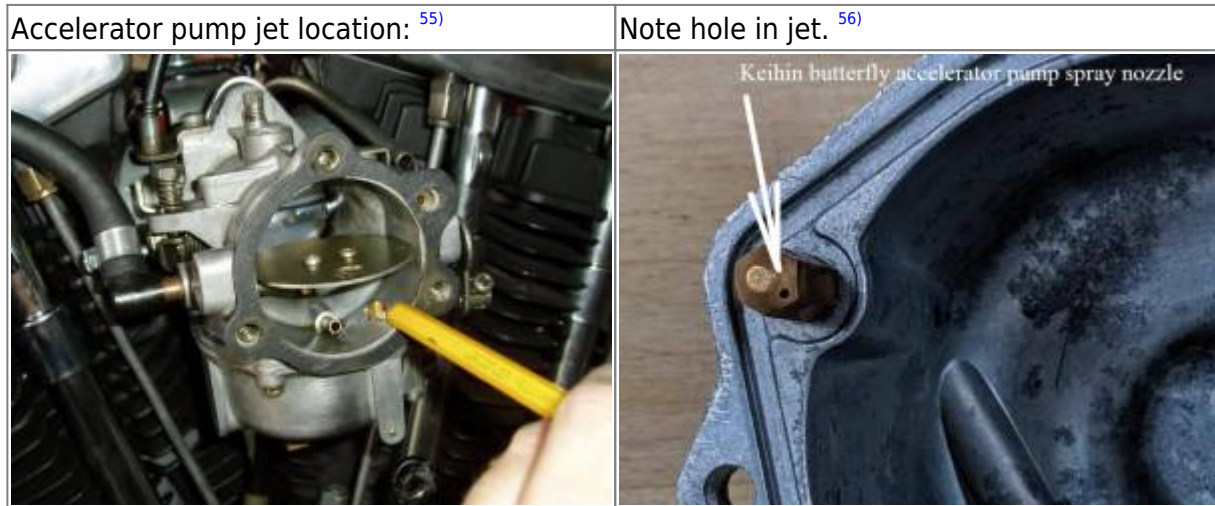
A small jet will spray it's gas into the carb when the carb is opened slowly.

A larger jet will let it dribble along the floor of the carb where it won't do a lot of good.

You can't buy the jet unless you buy the float bowl as they are not sold separately.

And you can't get the earlier -77 anymore (outside of occasional NOS or Ebay items). But you can solder up the 80 and re-drill to a smaller size.

A #76 drill bit will give you an app size 50 jet. You may have to clean the solder out of the large hole but that's easily done.



## Accelerator Pump Adjusting Screw

Early Keihins had a screw to control the pump rod throw and thus the amount of gas delivered to the carb.

Later carbs don't have the screw but they still have the hole the screw went in.

You can run a screw in there and gain some control over how much the accel pump actually pumps. The screw adjusts how much gas is pumped out by the accelerator pump each time you crank the throttle in the first 1/4 to 1/2 of throttle opening.

Some have ran for years with no screw in here, which works fine and gives maximum fuel every time you crank it.

However, if you put one in and set it to the factory 1/4" gap, maybe it will save a little gas.

Note: If you have a 79 or later carb, the front side will look a little different from the one below due to the fast idle linkage between the choke and throttle butterfly.

The amount of fuel injected by the accel. pump is adjusted by means of the rocker arm adjusting screw, <sup>57)</sup>

(dependent on the stroke of the rod and and how far open the throttle was when you opened it the rest of the way).

Factory adjustment is 6mm (app 1/4") between the end of the screw and the stop.

The adjusting screw should be through a hole in the top of the black plastic knob and limits the amount the knob can turn before it hits a stop.

Back the screw out for more fuel (more rotation) and in for less fuel (less rotation).

More rotation equals more gas pumped, equals better pick up but lower gas mileage in traffic.

The rocker arm spring controls stroke duration and is adjustable by means of three locating notches in the accel pump rocker arm (center pos. is standard).

The choke on the '77 is the butterfly and linkage at the left in the second pic. The cable is disconnected for service.

79 and later have various different linkages here for high idle speed when the choke is used and various others.

The accelerator pump adjusting screw is missing in the second pic below. Once removed, it gives full pump stroke all the time.

Early accelerator pump adjusting screw. <sup>58)</sup>	Accelerator pump adjusting screw removed. <sup>59)</sup>	Later pump mech assembly, no screw.
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## Check the pump nozzle aim

The accel pump nozzle is pressed in the and part of the float bowl assembly.

L76 float bowl (27395-76A) with short accel pump nozzle.

77-78 float bowl (27395-77) with short accel pump nozzle.

79-85 float bowl (27890-78) with tall accel pump nozzle.

## 79 and later 34mm Keihin butterfly carbs

Do not re-aim the 79-up accelerator pump as recommended in Joe Minton's magazine article below. <sup>60)</sup>

The accel pump jet in 79-up carbs is taller and right up to the height of the choke plate.

So there is no need for the extra notch in the plate and or to adjust the aim of the nozzle.

The spray does not atomize as it passes thru the venturi, so that if it is aimed too far to the rear or front that cylinder will get all of the fuel.

If you re-aim the jet so that the stream is aimed at the middle of the manifold, then virtually all of the fuel will go to the front cylinder.

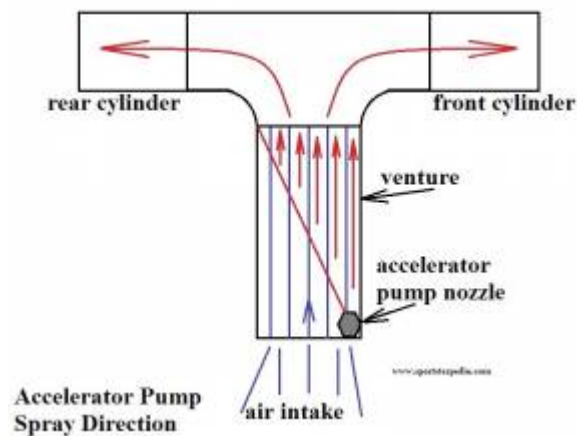
Also, the front cylinder spark plug gets very dark brown, almost black, while the rear cylinder plug is a nice light tan.

This is under riding conditions where the accelerator pump is used a lot, like in-city riding with lots of short bursts of acceleration.

In the diagram below, the black represents the venturi, the red represents the stream of fuel from the accelerator pump jet, and the blue represents the air stream.

As long as the jet is aimed directly at the rear cylinder roughly equal amounts of fuel will be directed to each cylinder by the force of the air stream.

So, if you are running a Keihin butterfly carb, the fuel should go thru the middle of the cutout in the choke plate with the choke fully open.



61)

## 76-78 38mm Keihin's

This is based on recommendation noted in Joe Minton's article "Tuning HD's Keihin Carburetors".

The nozzle needs to be aimed so the squirt goes through the little cutout in the choke butterfly disc and does not hit the choke disc and splatter.

The jet of gas can hit the choke butterfly in the open position, so big blobs of unmixed fuel can get sucked in.

It may not fire down the manifold throat as some have observed, because the throttle is not far enough open to allow that.

There is a small notch in the choke butterfly.

The accelerator pump jet needs to be rotated so the squirt of fuel goes exactly through that notch (when the choke is open).

The squirt should hit the throttle butterfly dead center just above the two spindle screws.

The nozzle is a press fit into the bowl and may be tight after being there so many years.

See the point in the third pic below where the squirt of gas should end up.

(from the pump jet, through the tiny notch in the open choke and into the center of the throttle butterfly)

Due to limited space, you can use a 5mm short socket turned with pliers or a box end wrench to turn the nozzle.

Do not use pliers or an open end wrench on the jet itself.

The tool has to contact all six sides of the base of the jet (otherwise, because it is in there so tight, you risk wrecking it)

### Caution:

It is possible to break the nozzle when trying to remove it. Replacements from J&P etc. may still be available.

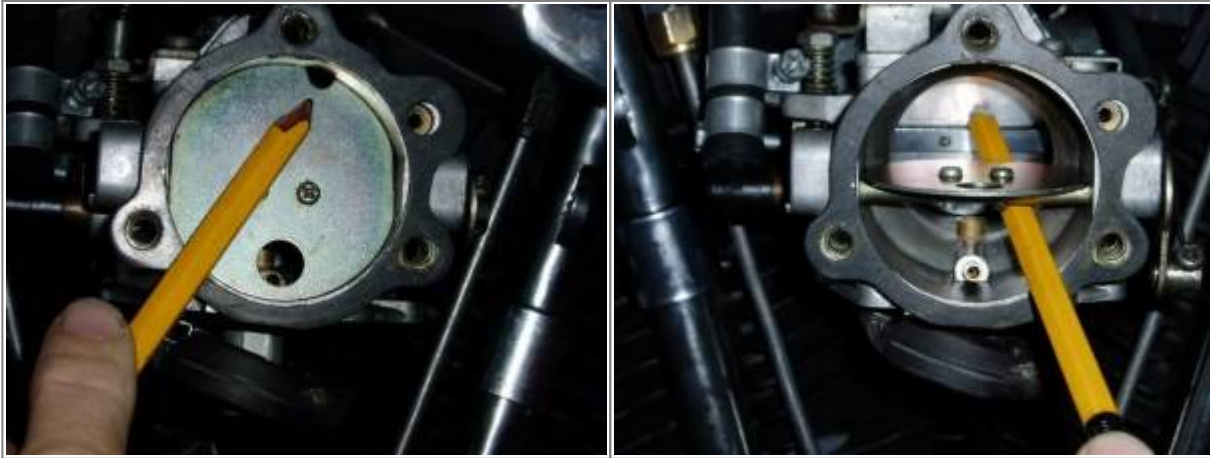
As a precaution, you can heat the float bowl gently and evenly. <sup>62)</sup>

The aluminum will expand more than the brass nozzle, so the fit will become loose and make it easier to turn the nozzle.

You can heat it with a heat gun, a good hairdryer or even drop the float bowl in a pot of boiling water for a few minutes to heat it up.

Choke butterfly notch. <sup>63)</sup>

Accel pump spray path. <sup>64)</sup>



The jet below was aimed too far to the left hitting the choke butterfly and heading toward the back cylinder in unmixed blobs of fuel.

The pencil shows the direction the jet hole was facing before adjustment.

Before adjusting (factory position). <sup>65)</sup>



The jet position was then adjusted with a small crescent wrench to rotate it to the right. The pencil below shows the new direction of the hole in the jet.

This lined the gas stream up with the notch in the choke butterfly perfectly when reassembled.

Note: The pencil point is to the right of the jet hole. The spray direction is in line with the lefthand edge of the pencil.

The black tube in the second pic below on the float bowl is the overflow tube.

**Caution:**

Make sure you plumb a line to this that goes past your bottom frame rail to dump gas and fumes. Any wiring that that may get too hot / catch fire doesn't need gas nearby.

After adjusting. <sup>66)</sup>

Accelerator pump from the outside.  
(see caution above) <sup>67)</sup>



## Andrews High Flow Accelerator Pump (Keihin butterfly)

79-up 34mm Keihin carbs will not fill there accelerator pumps as quickly as the 76-78 38mm ones. <sup>68)</sup>

The earlier pump would refill in about 1/2 second. The later one takes three seconds.

The earlier pump will allow you to get by the choke and will help you catch the engine if you let the clutch out too fast at a red light.

The main difference is the pump housing. The early accel pump passages had both an inlet and an outlet hole for gas routing.

The Andrews pump is reportedly the same as Harley part (27364-76) for the early 38mm Keihins.

Actually, if you can find a 38mm pump and drill the hole in your carb body, you'll have the old style accel pump.

On 1980-1988 Keihin carbs, the stock accelerator pump is restricted by eliminating the check valves in the pump. A high flow accelerator pump puts them back. <sup>69)</sup>

The result is increased fuel flow through the pump and greatly improved low end and mid range throttle response.

The Keihin butterfly carb already has an accelerator pump, so the Andrews high-flow pump body just replaces the stock one on the bottom of the float bowl. <sup>70)</sup>

There is one on the [V-twin website](#) called the Flowmaster accelerator pump.

It has a V-twin part number of 35-9050, Manufacturer Keihin, Part Number: 269050.

*Flowmaster carb accelerator pump kit improves throttle response on Keihin carburetor models with a greater volume of fuel from the pump circuit.*

Makes since as Andrews used to make the Flowmaster carb.

The pump is listed as out of stock and has been since at least of march 2018 yet the listing is still up. In fact and according to the V-twin website, it's been discontinued and no replacement is listed.

Installation instructions from Andrews is [here](#).

Features: <sup>71)</sup>

- Improves throttle response
- Larger fuel volume/discharge
- Fits 79-89 H-D using Keihin carburetor (except Flowmaster and CV carbs)

- Easy to install
- Fits 79-89 H-D with Keihin carb
- Dimensions: 5"x3"x1"; 0.3 pounds

A high flow accelerator pump is also a great all around upgrade for these carbs. <sup>72)</sup>



73)



74)

### How the High Flow Accelerator Pump should be installed: <sup>75)</sup>

1. Remove float bowl from carburetor. There are four screws holding it in place. It is not necessary to remove the entire carburetor from the engine to install your new high flow accelerator pump.
2. Clean any fuel residue from the bowl assembly and remove the stock accelerator pump housing. It is held in place with three screws but one of them already has been removed with the bowl.
3. Position the bowl upside down for drilling a single hole through the bottom.
4. Any drill of approximately 1/16 diameter will be quite satisfactory. The exact location for this hole is already marked with a dimple on the bottom of the float bowl casting as shown in photo below.



76)

5. Feed the drill through until it breaks out into the float chamber. Don't worry if the hole breaks into either a cross drilled passage or through the actual bottom of the bowl. The location is not critical as long as fuel can feed through into the accelerator pump.
6. Thoroughly clean any drill chips from the bowl. There is a small bypass hole in the bottom of the bowl which does not have to be plugged. Several earlier magazine articles have recommended plugging this hole but there will be no

measurable benefit from doing so.

7. Install the new accelerator pump housing onto the bowl with the two shortest screws of the original three.

Make sure that the two small O-ring seals are installed;

One into a recess in the pump housing.

The second into a recess into the bottom of the bowl casting.

8. If the accelerator pump jet needs to aimed differently, now is the time to do this.

With a small adjustable wrench, carefully reposition the pump jet by gently turning it in the bowl casting (it's a press fit).

9. Reinstall the bowl and pump assembly back onto the carburetor body to complete the job.

The extra fuel from the larger capacity pump should result in smoother, quicker throttle response especially off idle or at low RPM.

## Alternative using CV accelerator pump

It looks like Keihin made all these covers so any of the basic raw castings can have additional operations incorporated to be used in any of their many configurations. <sup>77)</sup>

The stock pump cover for non CV Harley carbs (2-2) uses the same passage for supply and pump shot.

The high flow cover uses separate passages for supply and pump shot (4-2).

It also contains a loose check ball in the passage.

The stock cover is not easily owner modified to incorporate separate passages and check ball (2-2).

The Keihin CV pump cover (4-1) (left in center photo) is a high flow cover just as the Andrews.

The only difference is the (4-1) cover has an extra counter-bore compared with stock non CV.

The CV cover is made with packing bore in cover.

The non CV is made with packing bore in bowl body.

It seems the CV (4-1) cover can be made to work in a non CV if (2) square packing are used, one in cover and one in carb body.

Note: All orifices in covers are the same.



78)



79)





## Float Level Adjustment

Fuel from the gas tank passes through the fuel valve and into the float chamber which causes the float to rise. <sup>81)</sup>

The float valve (attached to the float) rises with it and seals off the fuel from the tank once the level rises to a pre-determined level.

This pre-determined level is set manually by bending the tang on the float.

Check the float level using the specs in the FSM for setting the float level.

And check it every time you dismantle the carb (as the last thing before putting it back together). After checking the float level, then carefully put it back together.

Replace the screws:

It's best to replace the original Phillips screws for the bowl with stainless steel socket head screws.

The measurements in the FSM are a reference point that will keep the OEM float within a fully open and fully closed position.

Using aftermarket parts, you may have to adjust some.

With carb in bike, you can put a small catch tin under it and turn on the gas and move the float until the flow of gas actually stops.

(with no smoking or flames of course)

Procedure:

### 76-78 Sportster carbs

Two positions of the float valve must be set; The valve fully closed and The valve fully open.

Setting the closed position lower will tend to make the carb act lean at low speed.

Setting it higher can cause rich running, flooding and dribbles out the overflow line.

Equally important is to set the wide open float setting by bending the other metal tag on the float by the pivot.

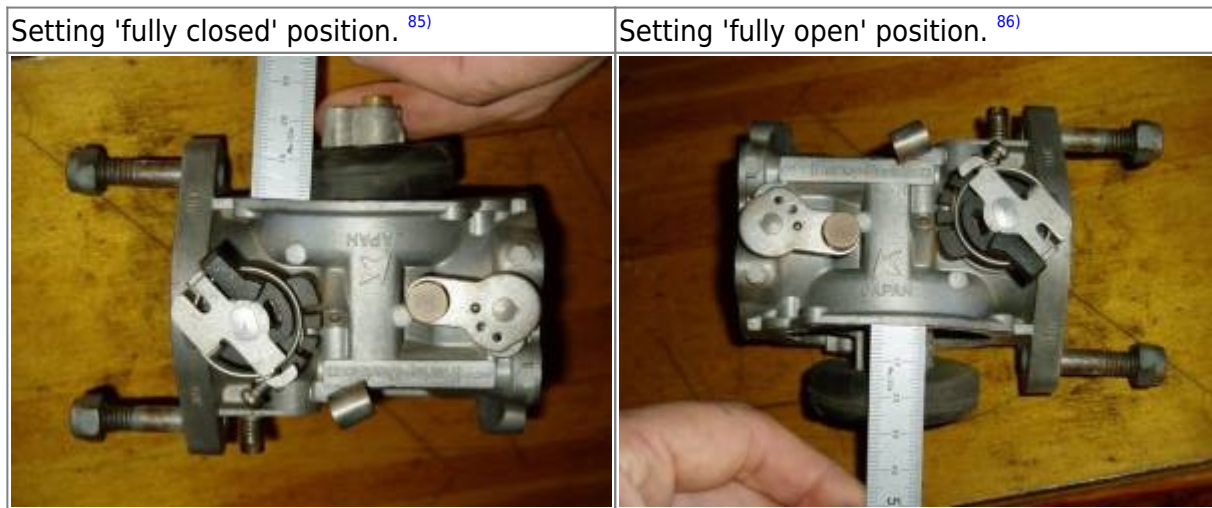
This makes sure the float needle fully opens at full throttle openings and allows full fuel flow without starvation.

It also stops the float hitting the bottom of the float bowl and possibly getting damaged.

If the gas level is too far off, you will not be able to tune the carb. <sup>82)</sup>

1. **Fully closed measurement:** Tip the carb upside down so the float assembly is facing up. Measure from outside surface of the float to flat mounting surface of the carb body casting. Measurement: 9/16" to 5/8" (14mm-16mm).<sup>83)</sup>
2. **Fully open measurement:** Next turn the carb over (right side up). Measure from the same surfaces as above (outside surface of the float to flat mounting surface of the carb body casting). Measurement: 1-3/32"-1-3/16" (28mm-30mm).<sup>84)</sup>

The MoCo sold a float level gauge (94752-77) for measuring or you can use a ruler or caliper. The actual adjustments are made by carefully bending the two tabs of the metal clip on the float assembly until these two dimensions are achieved.



## 79-87 Sportster carbs

There is only one measurement to set with these.

Turn the carb body sideways as shown below.

The valve should be fully closed with a measurement of .63"-.67" (16mm-17mm) from the top of the float to the bowl mounting surface.<sup>87)</sup>



<sup>88)</sup>

# Heat Spacer

[Click here to see Heat Spacer / Insulator Block](#) on the main IH carb page.

## Vacuum Ports (83-up)

### **VOES port.**

The VOES port delivers vacuum to the Vacuum Operated Electric Switch. The Evap port on 83 model carbs also doubles as the VOES port.

The port is drilled near the idle transfer ports in the top of the venture on the 83 carb (left side eying from the A/C).

The port is drilled into the intake manifold flange on 84-up models (right side eying from the A/C).

### **Evap port.**

You may have noticed a second vacuum port on 84 and up Keihin butterfly carbs. It feeds vacuum to the Evaporative Emission Controls on California models only.

The Evap port is drilled near the idle transfer ports in the top of the venture (left side eying from the A/C) and on the 83 carb, it also doubles as the VOES port.

The purpose of the port is to prevent fuel hydrocarbon vapors from escaping into the atmosphere. <sup>89)</sup> (in compliance with California Air Resources Board (CARB) emissions regulations at the time of manufacture and on California models only)

There is a black plug over the evaporative port on all 1983-up Keihin butterfly carbs.

The evaporative port is normally plugged off on models without the vacuum canister.

If you are not running a VOES or an EVAP canister, both ports can be safely plugged off.

Just be aware they are both potential air leaks if the plug deteriorates and should be inspected for leaks periodically.

When the engine is not running, any pressure build-up of hydrocarbon vapors are directed thru a vapor valve and are stored in a charcoal canister.

At start-up, a vacuum line from the carb will purge (or draw off) the vapors in the canister and send them to the engine thru the 'extra' vacuum port on the carb.

The vapor valve prevents gas from escaping thru the vapor vent line when the engine is tipped over a certain angle.

A large diameter hose purges the canister with fresh air from the air cleaner thru the A/C backing plate.

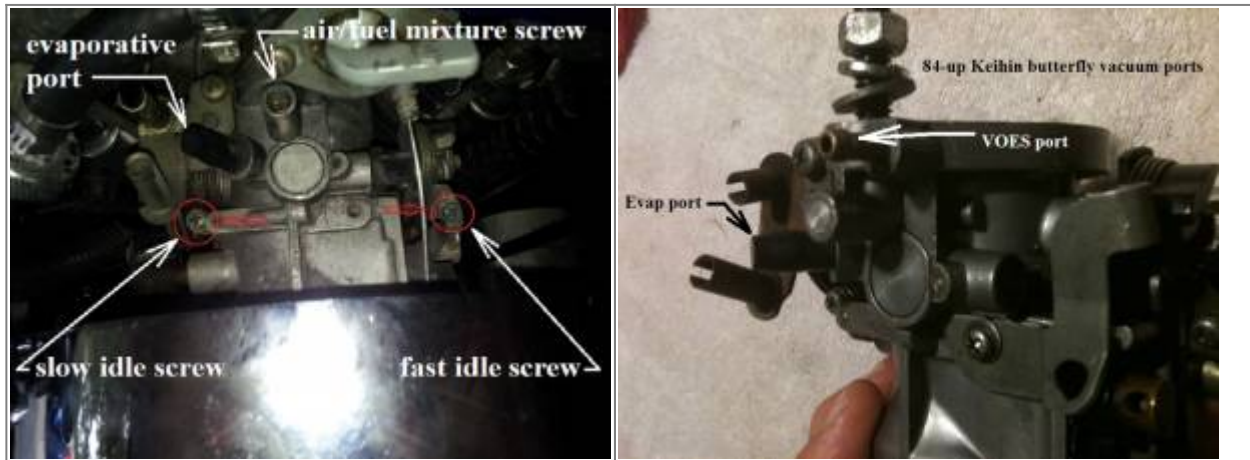
The vapor valve is mounted on the right downtube (in an upright position to work properly).

The canister is mounted on the left downtube (positioned below the carb to work properly).

The line to the gas tank on XLX and XLH models is hooked to the vent tube on the bottom of the tank.

On XLS models, it's hooked to the vent on the gas filler neck.

1983 Keihin butterfly - single vacuum port. <sup>90)</sup>	1984-up Keihin butterfly - dual vacuum ports. <sup>91)</sup>
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## Troubleshooting

92) 93)

Most carburetor problems really are electrical, just like the old timers always say. (Hopper)

## Altitude and Ambient Temps

A Carb works by mixing air and fuel into a vaporous mixture. We want the ideal mixture so the bike runs well. <sup>94)</sup>

Unfortunately it's not quite simple as a carburetor mixes air by a set volume to set the amount of fuel. The amount of oxygen density in that set amount of air varies and this is what gives variations in mixture due to differing conditions.

The required air / fuel mixture changes depending on the conditions.

Max power for acceleration is around 12.5 parts air to one part fuel.

Chemically correct or stoichiometric is 14.7:1

A rich mixture misfire usually needs about 6-7:1

A lean mixture misfire usually needs over 20:1

We want to try and get the most fuel in there that we can but the limiting factor is the amount of oxygen that we can fit in there and give the correct ratio.

A number of things have an effect on the amount of oxygen we can get in there.

Just like you run out of breath at altitude because of lack of oxygen, so does your bike.

- Carburetor modification kits (including jet(s) and an accelerator pump stop screw) were made available for 1200cc, 1340cc and 1000cc models to provide leaner fuel mixtures when operating at elevations above 4000 feet sea level. <sup>95)</sup>
  - Normally, leaner fuel/air mixtures are required for proper engine operation as the elevation above sea level increases. The decreased jet sizes and accelerator pump modifications should be installed where there is evidence of a rich condition causing loss of smooth combustion, stumbling on acceleration or such other carburetor issues at high altitudes.
  - High Altitude Kits:

- 1978 1/2 FLH-1200 (27094-78).  
Consisted of a 160 main jet, 72 slow jet and a label for the downtube.  
In addition to installing the parts on the carb, the FLH-1200 models required changing the position of the accelerator pump spring pre-load position.  
The spring should go in the top (#1) position as opposed to the #3 (std) position on the pump lever.
- FX/FXE/FXS-1200 (27095-78).  
Consisted of an accelerator pump screw and a label for the downtube.  
Install and adjust the accel pump stop screw to extend 1/8" past hole in lever.
- XLH/XLCH/XLCR-1000 (27096-79).  
Consisted of a 160 main jet, an accelerator pump screw and a label for the downtube.  
Install and adjust the accel pump stop screw to extend 1/8" past hole in lever.
- FLH-80, 1340cc, (27093-78).  
Consisted of a 155 main jet and a label for the downtube.

**Note**, any motorcycle modified for high altitude operation must be converted back to standard if operated at altitudes below 4000 feet.

An overly lean condition can cause engine damage.

The air pressure or barometric pressure is higher at sea level than at high altitude.

The more pressure we have means the more oxygen in the same amount of air.

Example:

The bike is jetted for the correct mixture at sea level. Then you go up the mountains.

The higher the altitude, the less oxygen, and the richer the bike will run.

The opposite is also true.

Hotter Air = Less Oxygen → Richer Mix <sup>96)</sup>

Colder Air = More Oxygen → Leaner Mix

Higher Barometric Pressure (Low Altitude) = More Oxygen → Leaner Mix

Lower Barometric Pressure (Higher Altitude) = Less Oxygen → Richer Mix

Higher Humidity = Less Oxygen → Richer Mix

Lower Humidity = More Oxygen → Leaner Mix

## Fuel overflow

The overflow tube is a safety feature in case the float needle does not prevent flow and the bowl gets full. <sup>97)</sup>

It prevents the fuel from being pushed out of the carb float bowl, into the carb / manifold, and filling the cylinders (or crankcase) with the overflowing fuel.

It also serves to keep the pressure in the bowl at atmospheric level. A bend or kink in the overflow line can allow pressure to build in the bowl.

Usually a piece of hose is installed on the fitting on the bottom of the bowl and then ran between the engine and (79-83 - generator or 84-85 oil filter).

You can check for an overflow problem by installing a clear hose on the bowl fitting and run the hose up

taller than the carb.

Then watch for gas to rise in the hose with the engine running at different throttle levels.



98)



99)

### Check for:

- **Worn or stuck or improper float valve.**

- If gas overflows when you turn the gas on, rap the side of the float bowl sharply with a small wrench or pliers.

This may dis-lodge what is causing the hang up. If that does not work, remove the float bowl and float and do a close inspection. <sup>100)</sup>

- Replacing the float needle is usually one of the first thoughts but that may not always be the answer.

If you replaced the float needle with a new one from a kit, that could be the problem. Try re-installing the old one.

It's good to check the float height every time you remove the float bowl, as the last step before re-installing.

It is too easy to touch the float a little too hard and set it off. <sup>101)</sup>

- If the problem is crud, then it can often be fixed at least temporarily by partially emptying the float bowl. <sup>102)</sup>

While running, shut off the fuel valve, run the bike until it begins to sputter, then turning on the fuel.

The sudden rush of fuel may dislodge the crud and you are good to go for a while. This can be done either while riding or while just idling.

This should wash out debris in the float valve / seat.

- **Damage or debris around valve seat.**

- **Too high float level.**

See [Float level adjustment](#) above.

- **Worn float mounting tabs, float pin or loose float retaining screw.**

- **Cracked or damaged overflow tube in the float bowl.**

- Check for a leak at the bottom of the stand tube in the float bowl. <sup>103)</sup>

With the float bowl in hand, fill the bowl with anything (water if you don't want gas in your mouth) and blow into the stand tube.

Look for bubbles around the base of it. If it bubbles, you can epoxy it.

Get it good and clean first, and rinse it off with alcohol before epoxy, and it will hold up for a

decent amount of time.

If the tube will come out then you can epoxy it even easier. Just put a ring of epoxy around the end of the tube.

While holding the bowl upside down, insert the tube upwards so you do not drip epoxy into the hole.

Twist it a bit, stand the bowl upright and make sure you have a good ring of epoxy around the tube at the bottom.

- **Damaged bowl gasket / O-ring.**
- **Loose bowl screws.**
- **Warped bowl to carb surface.**

## Poor Idle

### Check for:

- **Float setting too low.** See [Float level adjustment](#) above.
- **Improper idle mixture adjustment:**  
See [Overall Adjusting Procedure](#) above.
- **Damaged mixture screw.**
- **Clogged bypass or idle ports.**
- **Clogged slow jet.**
- **Loose slow jet.**
- **Air leaks.** See "[Testing for air leaks](#)" below.
- **Excess or sloppy fuel from accelerator pump.**
- **Improper fast idle adjustment on 79-up carbs:**
  - A fast idle can be caused by the idle not being set when the bike is HOT. <sup>104)</sup>
  - A fast idle can also be caused by an advance mechanism that is not functioning correctly.
- **Mechanical issues with choke or throttle shaft / parts.**
- **Erratic Idle Due to Fuel Vaporization** (especially in stop and go or at stoplights)
  - Insure the fuel hose isn't touching a head / cylinder to add extra heat to the fuel.
  - Consider installing a heat spacer between the carb and manifold.  
See [Heat Spacer / Insulator Block](#)

## Poor acceleration

### Check for:

- **Improper idle mixture adjustment:** See [Overall Adjusting Procedure](#) above.
- **Clogged accelerator pump system.** (I.E. check valves in brass nozzle, check ball in bowl / cover, worn / torn pump diaphragm).
- **Clogged bypass (idle transfer) ports.**
- **Clogged or too small of a slow jet / bleed tube.**
- **Float setting too low.** See [Float level adjustment](#) above.

# Hard Starting

## Check for:

- **Improper idle mixture adjustment:**  
See [Overall Adjusting Procedure](#) above.
- **Choke not adjusted properly / not operating properly.**
- **Clogged jets or internal passages in the carb..**
- **Wrong float setting.**  
See [Float level adjustment](#) above.
- **Fuel valve on tank not turned on.**
- **Loose bowl screws.**
- **Wrong float setting.**

## Rich or Lean?

A lean idle mixture will have idle hang before settling in after a throttle blip. <sup>105)</sup>

A rich idle mixture will have idle dip low and then increase after a throttle blip.

A good setting will have rpm drop to idle and just sit there.

Drag pipes are not helpful. Great for wide open but not so great for anything else.

## Running Lean

The main causes of carb farts are lean mixture, retarded spark and tight pushrod clearances. <sup>106)</sup>

During the mid 1979 model season, HD makes a recommendation to dealers for corrective measures regarding the carburetion and [ignition system](#) on (1100, 1200 and 1340cc) models with emissions control design changes. They operate with leaner air/fuel mixtures and are more sensitive to carburetor mixture settings / ignition spark. <sup>107)</sup>

Irregular running and spit-back are symptoms of an excessively lean mixture.

- Check that the intake manifold seals, band clamps are installed properly.
- The air cleaner mounting bracket must be adjusted and tightened properly per the FSM with no air leakage at the carburetor mounting flange.
- The air cleaner backing plate must be flat against the carburetor flange gasket surface.
- Check for intake and exhaust leaks. If these are not absolutely sealed up all other efforts are a complete waste.
- **Symptoms:**
  - Spitting / backfire thru the carb.
  - Inconsistent idle. <sup>108)</sup>
  - Slow return to idle. <sup>109)</sup>
  - Increasing idle.Once it heats up a bit the leak starts and without countering it with more gas it dies.



If the mixture thins, the engine starves and tries to pull more fuel and the leaner it gets the faster the idle until it quits.

- Backfiring can be caused by bad plugs. <sup>110)</sup>

Use standard OEM style plugs and buy a box of them until you get it sorted out.

If you have electronic ignition, you must use resistor plugs.

Start with a small gap, .025 and increase gap as you are able, electronic can go as high as .045.

- Air / exhaust gas blowing out the carb is a timing issue. An intake valve may be open when it should be closed. <sup>111)</sup>

You'll need to pull the gearcase (cam) cover and check the timing marks on the cams.

If you have not had this cover off before, be sure to remove the pushrods first.

- Running hot can be caused by vacuum leaks or bad ignition events.

- **Causes:**

- On 1977-up carbs, the rubber plug over the slow jet may be too long causing a lean mixture.
  - See [Correction of Lean Mixture Problems Due to the Rubber Bung](#) above.

- Jets too small.

- Float level too low.

- Leaking gaskets / seals. (intake manifold to head) (intake manifold to carb) (carb to air cleaner)

- Gunk in the carb passages / jets.

- Stopped up or poor flowing air cleaner. Make sure it's getting plenty of air.

If you are running the 72 air cleaner backing plate, the outside of it should fit to the size of the air cleaner.

The 77 and later backing plates had an air horn and they weren't getting enough air.

- Retarded spark timing is usually from a worn out auto advance unit in the ignition allowing too much retard at idle.

- Running the ignition timing slightly advanced is good. <sup>112)</sup>

With points, we used to run them advanced up to 8-10 degrees so that when the points wore, they would still be in an acceptable running time.

With electronic ignition, the timing never changes so 2-4 degrees advanced is about right.

Time it with a light and run the motor up to full advance (about 2500 RPM).

- Pushrod adjustment can also cause it and is easy to check.

- **Testing for air leaks.**

- Test from both sides of the engine, around the joints, between the head and the manifold and between the manifold and the carb).

- You can use WD-40 or unlit propane gas.

- There is no technical need to be concerned about an explosion using propane as long as you do not have any gas leaks.

- Propane is the cleanest choice.

- You have to spray a lot of WD-40 and it will leave a mess.

- For a test, spray some into the air cleaner.

The idle speed will go down, perhaps stall the engine, right away. <sup>113)</sup>

- If there is a leak you will get a slow down of the idle speed.

- Technically, any change (increase or decrease) in RPM would indicate an air leak.

- The propane is nice and neat, and has finer particles so it should find smaller leaks.

- If the idle raises on it's own then let the engine warm up before doing the test. <sup>114)</sup>

When the rpms start to tic up, start spraying around every carb and intake connection to see if you can find the leak.

## Poor road performance

### Low speed

Check for:

- **Improper idle mixture adjustment:** See [Overall Adjusting Procedure](#) above.
- **Loose main jet.**
- **Air leak at intake flange.**
  - See [running lean](#) above.
- **Fuel overflow.**
- **Accelerator pump system not working properly.** See [Accelerator Pump System](#) above.
- **Dirty air cleaner.**

### High speed

Check for:

- **Loose main jet.**
- **Wrong float setting.**
  - See [Float level adjustment](#) above.
- **Clogged / partially clogged fuel filter / strainer.**
- **Clogged main jet or main jet air passage.**
- **Clogged, pinched or collapsing fuel line.**

## Loss of power

Check for:

- **Dirty / clogged air filter.**
- **Broken or damaged throttle cable or linkages.**
- **Clogged jets or internal passages in the carb..**
- **Clogged, pinched or collapsing fuel line.**
- **Dirty fuel tank.**
- **Air leaks.**
  - See [running lean](#) above.
- **Accelerator pump system not working properly.** See [Accelerator Pump System](#) above.

## Burnt / discolored spark plugs

See [Reading Spark Plugs](#) in the REF section of the Sportsterpedia.



Check for:

- **Improper idle mixture adjustment:** See [Overall Adjusting Procedure](#) above.
- **Wrong jetting.**
- **Air leaks.**
  - See [running lean](#) above.
- **Clogged carb passages.**
- **Other**
  - **Wrong plug heat range.**
  - **Wrong timing setting.**
  - **Worn / leaky rings.**
  - **Worn / leaky valves.**

## Poor fuel economy

Check for:

- **Float set too high.**
  - See [Float level adjustment](#) above.
- **Improper idle mixture adjustment:** See [Overall Adjusting Procedure](#) above.
- **Excess fuel from accelerator pump.** See [Accelerator Pump System](#) above.
- **Dirty air cleaner.**
- **Choke not opening fully.**
- **Loose jets.**
- **Clogged bleed tubes.**

## Helpful Links

### Video:

Here are some excellent videos of servicing the pre-CV Keihin Butterfly carbs: <sup>115)</sup>

- [#1 - Tips and tricks.](#)

- #2 - Disassembly and cleaning.
- #3 - Assembly and testing.
- #4 - Testing and start-up.

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