

I get questions often about hydrolock, petcocks, and using a fuel solenoid.

I will address the following issues.

- What is Hydrolock?
- Petcocks.
- There is a failure mode of the vacuum operated petcock
- Why Manual Petcock?
- Some Manual Petcock Options.
- Fuel Shutoff Solenoid with Relay Harness.
- Modifying the OEM Petcock to remove the Vacuum Function.

Hydrolock is a combination of failures unless it is the #6 vac line, which I will discuss later.

- a. Fuel must be available on the carbs. It can come from:
 1. Petcock left in RUN and vacuum function fails.
 2. Manual petcock left in RUN or ON.
- b. One or more Float Needle valves must leak.
 - a. Even with fuel on the carbs, it does not have a path to the cylinder unless an intake valve is open. However, if the float needle valve leaks, fuel will fill the bowl and overflow out the vent hose onto the block. In this situation, it can also overflow into an intake and toward the cylinder. It still needs an open intake valve to get to the combustion chamber.

If you ever try to start your bike, and it goes “UMPH” like it has a dead battery. **STOP. DON'T push the button again!** Take it outside. Remove the spark plugs and then spin the starter. If it has tried to hydrolock, it will shoot gas 6 feet out of the offending cylinder(s). The starter is strong. If you try to start the bike with fuel pooled in the cylinder, the piston will be pushed against the noncompressible fuel. The result will be broken starter gears and possibly much greater damage. Some have even broken the engine housing.

Another way to hydrolock.

A friend purchased a new to him Valkyrie. He had it shipped to me to work on then he came and rode it home. When I took delivery, I attempted to start the bike, and CLUNK. I stopped and pulled the spark plugs, then hit the start button. Fuel shot 6 feet out of multiple cylinders. The petcock was in the ON position. Without the bike running the petcock should have closed. The petcock had failed keeping fuel on the carbs. Apparently, bouncing around on the trailer had caused the floats to bounce, allowing the float needle valves to open. When the engine is running, the fuel is being burned and level is regulated. With the engine off, every time the floats bounced a little fuel was let into the carb bowl. Eventually it overflowed and filled some of the cylinders.

Petcocks

The stock petcock has a vacuum line connected to the #6 intake. When the engine is starting, vacuum opens the petcock and allows fuel to flow to the carbs. When the engine shuts off, the vacuum goes away and the petcock closes. With this configuration you can leave the petcock selected to “RUN” and the vacuum operated petcock will shut off the fuel when you turn off the engine. Though it is a better idea to turn the fuel selector switch to OFF in case the vacuum function fails.

There is a failure mode of the vacuum operated petcock that can allow fuel to flow down the vacuum line into the #6 intake and cause hydrolock.

Why Manual petcock?

The reason some go to a manual petcock is to eliminate the vacuum line.

Some Manual Petcock Options

- a. Pingel Power-Flo High-Volume Petcock 1311-CH.
 - a. Advantages
 1. Manual
 2. High flow
 - b. Disadvantages
 1. Expensive, (about \$150)
 2. Does not connect to the fuel select knob, so you must reach under the seat to switch to reserve.
 3. Less reserve capacity because tube is shorter, but you can swap it with the OEM tube.
- b. OEM petcock from the Honda CBR 600 F3 bike, part number 16950-MAL-601.
 - a. Advantages
 1. Manual only with no vacuum line.
 2. Honda petcock connects to the fuel selector knob just like the stock petcock.
 3. Less expensive than the Pingel.
 - b. Disadvantages
 1. Must be purchased (about \$74)
- c. Modify the OEM petcock to eliminate the vacuum function.
 - a. Advantages
 1. manual only with no vacuum line.
 2. Will connect to the fuel selector knob because it is the stock petcock.
 3. Less expensive, however you may want to purchase a rebuild kit- HONDA 16953-MN5-023 COVER SET, PETCOCK, so you have new diaphragm parts. (About \$50)

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The Valkyrie Riders Cruiser Club (VRCC) web site info on modifying the petcock to manual. It is just a matter of flipping the spring and diaphragm on the vacuum side to make it stay open without vacuum. The fuel selector switch will still work. Then you plug the vac port on the intake, and petcock.

See article from <https://www.valkyrieriders.com> attached at the end of this article.

Using a manual only petcock will require you to turn off the fuel each time you park the bike unless you install a fuel solenoid. With the Fuel Solenoid you can leave the petcock in RUN.

Fuel Shutoff Solenoid with Relay Harness

This fuel shutoff is Mounted on the carbs as close to the fuel rails as possible. The idea is to shut off the fuel when the engine is not running and limit the amount of fuel available to cause hydrolock.



It is debated whether there is enough fuel in the fuel rails and tubing to still run into a cylinder and cause hydrolock. I have not tried to measure it. I just run a fuel solenoid as part of my defense strategy. I also have installed new high quality Float Needle Valves.

A positive fuel shutoff is a vital component of preventing hydrolock on a Valkyrie. At Valkyrie Carbs and Custom, we custom build an electric solenoid fuel shutoff harness with a relay.

We are using the “safety circuit” 12V connection to trigger the relay. When the key is turned on, if the safety circuit is satisfied, 12V energizes the relay. The relay then routes power from the battery and energizes the fuel solenoid. The fuel solenoid will remain energized until any shutoff signal is received. The safety shutoff signals such as the ignition key, kill switch, bank angle sensor, kickstand sensor, deenergize the fuel solenoid and stop fuel flow.

To use the fuel shut off, simply start the bike as you usually do. The solenoid will energize when you turn on the key. It will turn off with any signal that shuts down the bike.

I hope you find this information useful.

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If you wish to purchase a Fuel Shutoff Solenoid with Relay Harness, you can purchase it on our website.

<https://valkyriecarbsandcustom.com/ols/products/fuel-shutoff-solenoid-with-relay>

Here is a link to the whole website and all our products, and downloads:

www.valkyriecarbsandcustom.com

Here is the article about modifying the OEM petcock.

Article written by Gryphon Rider. From the Valkyrie Rider Cruiser Club Forum

<https://www.valkyrieriders.com>

Member



Modifying the OEM fuel petcock to remove vacuum function

« on: January 25, 2012, 04:19:20 PM »



Quote



Posts: 5232



I thought I'd put this all in one post for easy reference.

Why would you modify the OEM fuel petcock to remove vacuum function? Can you relate to these symptoms?

2000 Tourer

Calgary,
Alberta

Someone is riding down the highway and the bike starts to sputter just like it does when you need to switch to reserve, only he hasn't ridden that far yet. He switches to reserve and is able to go a little farther before the bike starts to slow down again. When he pulls over and idles on the side of the highway, the engine recovers and he is good to go for a couple more miles, then the problem repeats.



If this problem started soon after doing work involving your fuel tank or the various hoses connected to it, it is possible that you have kinked the tank's vent hose. You can test this by opening the fuel filler, then closing it with something between the tank and the cap to prevent the cap from sealing, such as a soda straw, plastic coffee stir stick, or a zip tie used for wire bundles. Another possible cause is a problem with the vacuum hose that runs to the fuel valve, such as a disconnection or leak.

Barring those issues, the problem is caused by a small tear in the vacuum diaphragm within the fuel petcock. Think of the vacuum operated valve as a second shut-off downstream from the manual valve (although they are actually one assembly). The vacuum shut-off is normally held closed by a spring. When the engine is running, engine vacuum overcomes the force of the spring and pulls open the valve, allowing fuel to flow. If there is a small tear in the vacuum diaphragm, there is only enough vacuum to partly open the valve. This may not be a problem when the fuel tank is full,

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because the weight of the gas overhead means more fuel pressure, which helps to overcome the spring, and fuel can flow. Once the fuel is down to a lower level, there is no longer enough fuel pressure to help overcome the spring, and the valve starts to close.

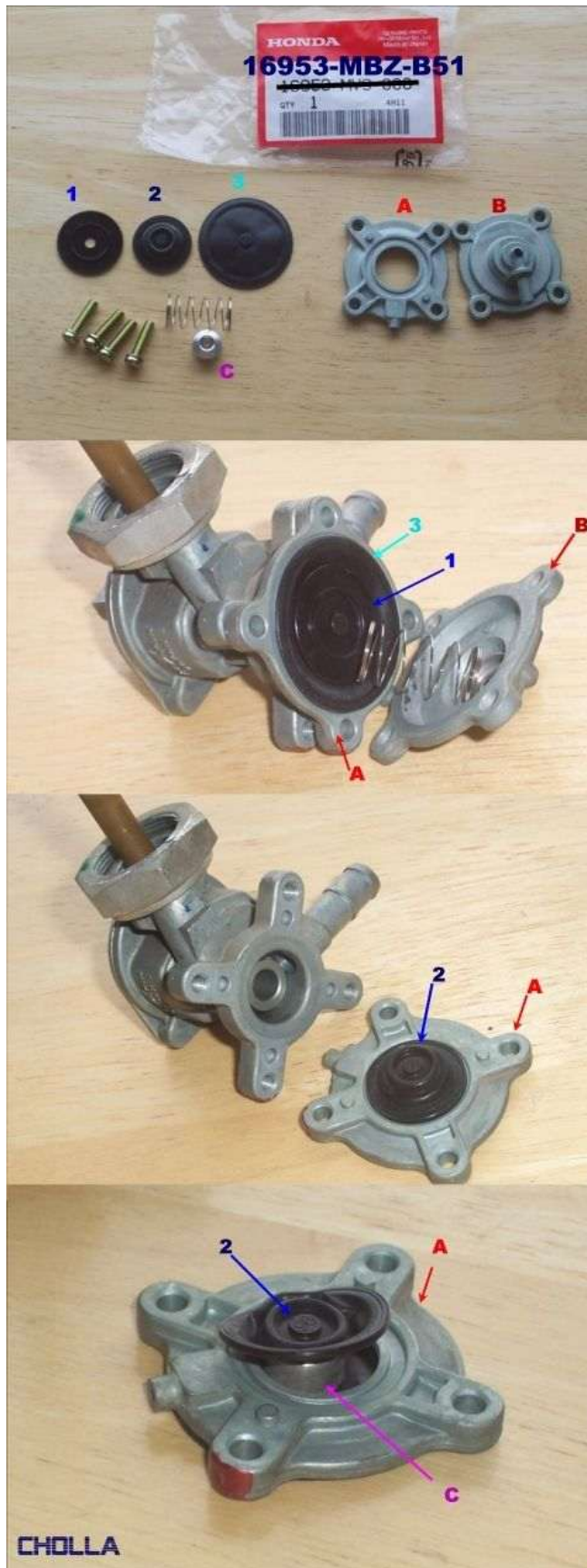
Normally, this problem is solved by installing the rebuild kit, called "COVER SET,rooster" part number 16953-MBZ-B51, which goes for \$28-40 at US dealerships, and was \$45 at my local Canadian dealership in 2009. If you don't want to spend the money right away, or you want to be able to ride while you are waiting for the kit, you can do the modification described below.

What the modification does is move the spring so it holds OPEN the vacuum valve so fuel is always allowed to flow. **Please note that this modification will do NOTHING to prevent hydro-lock.** In fact, if your vacuum shutoff is working properly right now, keeping it intact is BETTER than eliminating it. If you get in the habit of manually turning your valve off all the time regardless of the function of the vacuum shutoff, you eliminate one of several possible causes of hydro-lock. If you perform this modification, you NEED to practise this habit.

The following instructions assume that you have access to the back of the fuel valve. When I did it I had the valve removed from the tank already, so I don't know how hard it is to do with the valve in place. If the valve is on the bike, be sure it is in the off position. In either case, ensure there are no sources of ignition and your work area is well-ventilated. The four photos are from someone else's online instructions (~~I forget where I got them, so let me know and I'll add the link~~ see note at bottom*) for installing the rebuild kit, but should help you picture the parts. The hand-drawn sketches are by me.

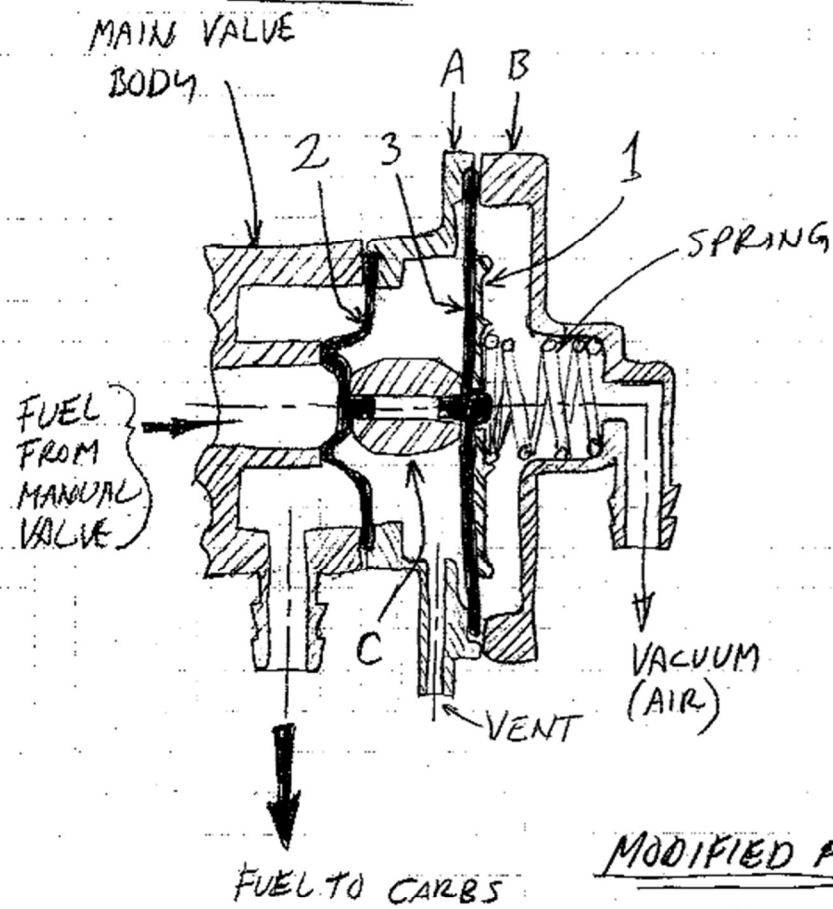
1. Remove the vacuum hose, four screws, and the cover.
2. Remove the spring (to be used later) and the black plastic disk (#1 in photos) that separates the spring from the large diaphragm (#3).
3. Push the middle of the small diaphragm (#2) so that it is away from the valve body hole that it is designed to seal against.
4. Reassemble, being careful to have the edges of the diaphragms in their proper positions, and with the spring in position between the small diaphragm and the valve body.
5. Devise a method to plug the vacuum hose so you don't lean out your fuel mixture or, in the event of a leak in the small diaphragm (#2), risk having fuel travel through the vacuum hose to the engine, possibly causing hydro-lock.
6. The leftover black plastic disk can be used as a shim to stop something on your Harley from rattling.

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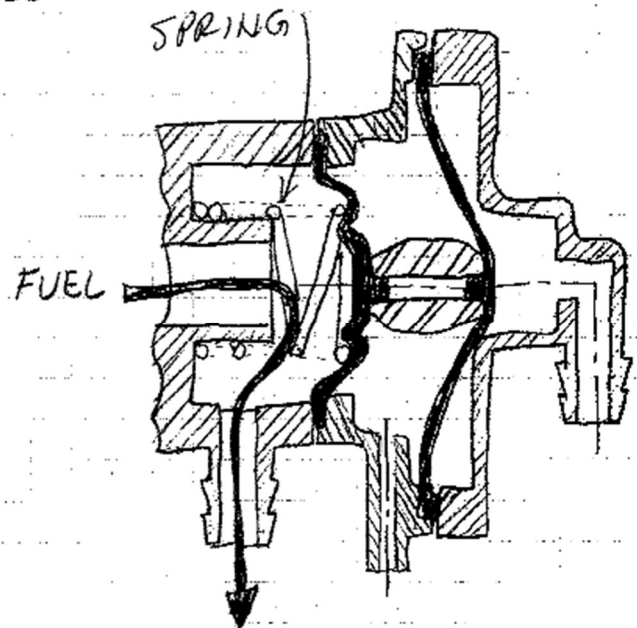


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STOCK SETUP

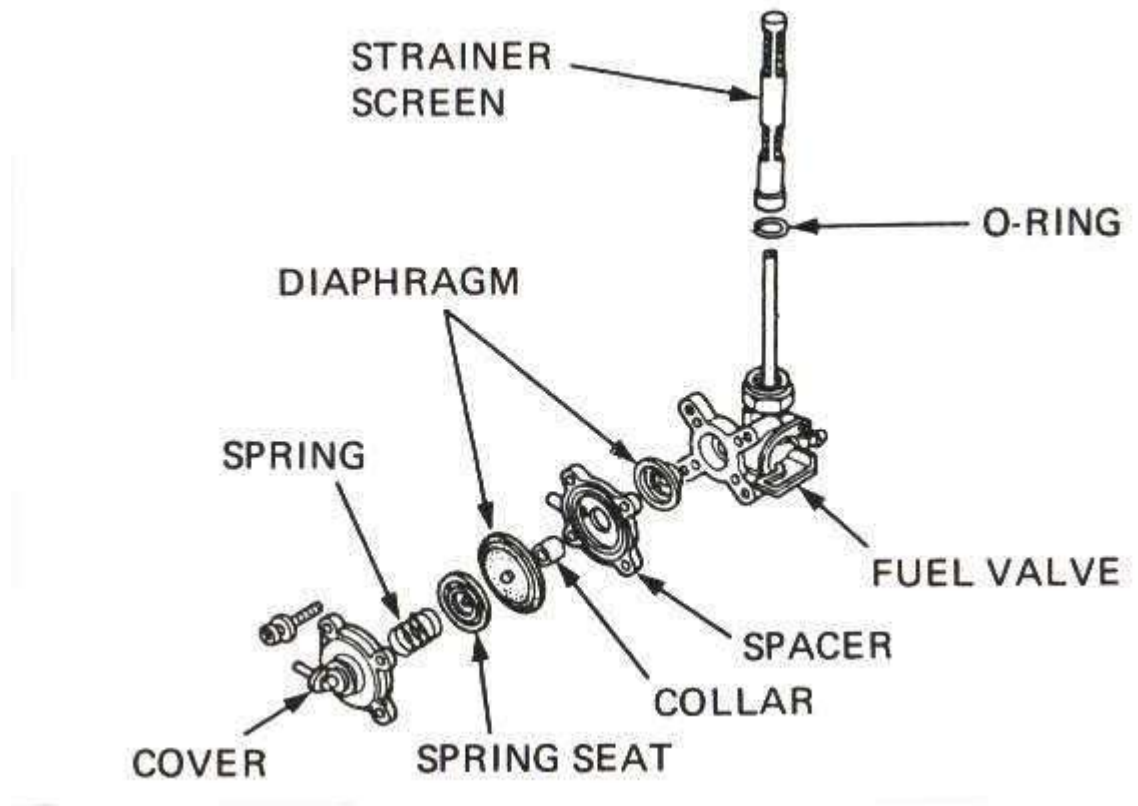


MODIFIED FOR FULL MANUA



Another visual of the normal assembly of a similar valve:

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*After using the clue provided by NITRO, below, I have found that the photos were provided on October 2, 2008 by Cholla on the VOAI message board, linked to here: <http://valkyrie-owners.com/SMFORUM/index.php?topic=7055.0>

« Last Edit: December 06, 2012, 11:45:27 AM by Gryphon Rider »

Article written by Gryphon Rider. From the Valkyrie Rider Cruiser Club Forum
<https://www.valkyrieriders.com>

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