

Thank you for your purchase!

## ELECTROLYZER WATER4GAS

DANGER HHO HYDROGEN IS VERY EXPLOSIVE

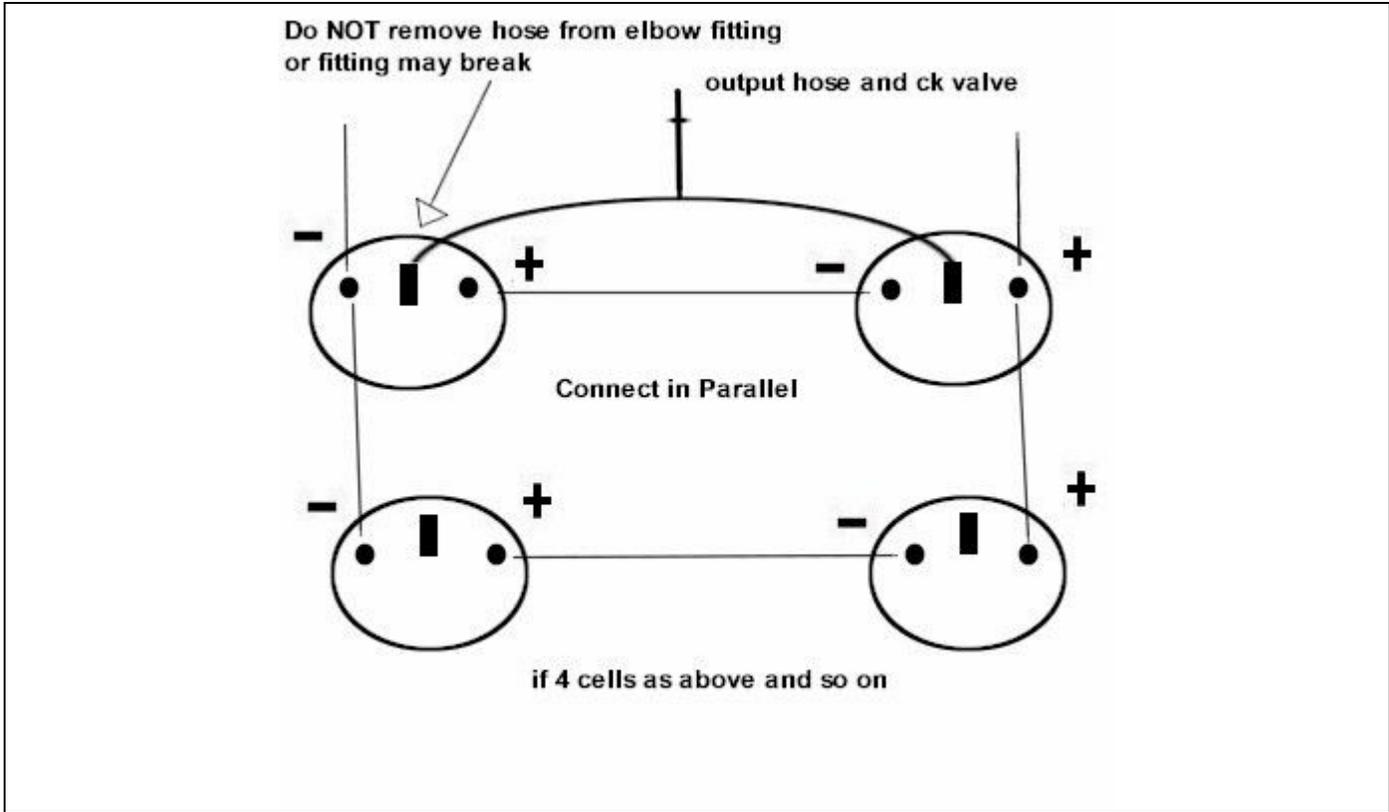
For HHO Production to be successful, a Map enhancer and/or an EFIE need to be installed. The computer needs to be leaned out according to the instructions in book 2 chapter 10 or nor fuel mileage increase will occur.

WE ARE NOT IN ANYWAY LIABLE FOR THE USE OF THIS PRODUCT AND YOU SHOULD HAVE ALREADY READ ALL THE INFO DEALING WITH THE USE & MAINTENANCE OF THIS DEVICE FROM THE WATER4GAS WEBSITE SUCH INFO REQUIRES THE PURCHASING OF THEIR PLANS FROM THEIR WEB SITE WITH THE INSTRUCTIONS. THE INSTRUCTION HEREIN ARE PRELIMINARY IN NATURE AND YOU SHOULD FAMILIARIZE YOURSELF WITH EVERY DETAIL BEFORE PROCEEDING.

If you do not have the Water4Gas books, purchase them from here: <http://water4gas.com/2books.htm?hop=labelas01>

Please read disclaimer:

<http://www.labelasautorepair.com/disclaimer.htm>



## LET'S GET FAMILIAR WITH THE ELECTROLYZER

The Electrolyzer is the heart of the system, that generates HHO and cools down the engine:



Many readers have asked me about Part 4, the **Pressure Release Valve**; seemingly it is the most misunderstood part - so let me explain a bit more. It is there for safety reasons only. In normal operation, it is dormant, inactive. This is a "check valve", meaning it will allow air/liquid flow in one direction only. In our application, we glue it on top of the device **POINTING UPWARD**. It will let air flow **OUT** but not in. Why?

In normal operation the engine sucks all the HHO out of the device. Just in case the engine stops doing that, or for some reason there is blockage of the output hose, we **DO NOT WANT PRESSURE BUILDUP** inside the device, because the HHO might explode. If pressure starts to build up inside (water expands into gas) the **Pressure Release Valve** will release the pressure into the atmosphere (once HHO mixes with air, it will not be explosive any more).

So again, this is a check valve pointing upward - or in other words letting flow out of the device but not in. In normal operation the vacuum inside the device will make sure that the **Pressure Release Valve** stays closed at all times.

## INSTALLATION

Mount the HHO **Water4Gas** device in the engine compartment. It should be mounted flat and level, and secured in such a manner as to assure that it cannot bounce around when the vehicle hits bumps etc. Position the device so that it can easily be accessed and can be conveniently removed and filled with water, or cleaned, serviced or inspected.

**IMPORTANT: INSTALL THE DEVICE AWAY FROM HOT AREAS** as much as possible. If you're not sure where that is, Harbor Freight Tools has a digital non-contact thermometer for under \$7 (item 93983-2VGA). Use this tool to locate the coolest available place in the engine area.

I cannot give you an exact number here for what is “too hot”, because there is a combination of heating factors here: weather, engine, and the electrolysis process itself. All I can tell you that in two cases the Electrolyzer mostly melted and only the glass survived. In both cases this occurred as a result of (1) too much heat radiated by the engine through the air to the Electrolyzer, and (2) too much electrolyte. There is a situation called Thermal Runaway, where an increase in temperature changes the conditions (in this case the rise in electrical current) that causes a further increase in temperature - leading to a destructive result.

You can prevent this from happening by:

1. Use **ONLY DISTILLED WATER**. Filtered water are **NOT** distilled water!
2. Starting with no more than ½ teaspoon of baking soda, and add gradually only when you're sure no excess heat is being generated.  
**NOTE:** On stainless steel rods and washer electrolyzers, you can use up to 3 tablespoons of baking soda per each 32 oz jar.
3. Install away from heat. If this is not possible block the engine heat as much as possible by placing a heat shield (bubble wrap covered by aluminum foil) between the Electrolyzer and the engine. Leave at least 1-2” air space around the Electrolyzer.

A mounting bracket can be easily fashioned from copper and/or galvanized plumber’s strap. (Not supplied.) In other cases a small rubber pad (not supplied and usually not necessary) and/or two bungee cords (supplied) may be adequate.

Rarely there may be vehicles that do not have enough space in the engine compartment to mount the device. A possible solution is to use the area in front of the radiator. Fasten the device to the car's frame or **anything other the radiator, belts or moving parts**, and make sure that it does not touch the radiator.

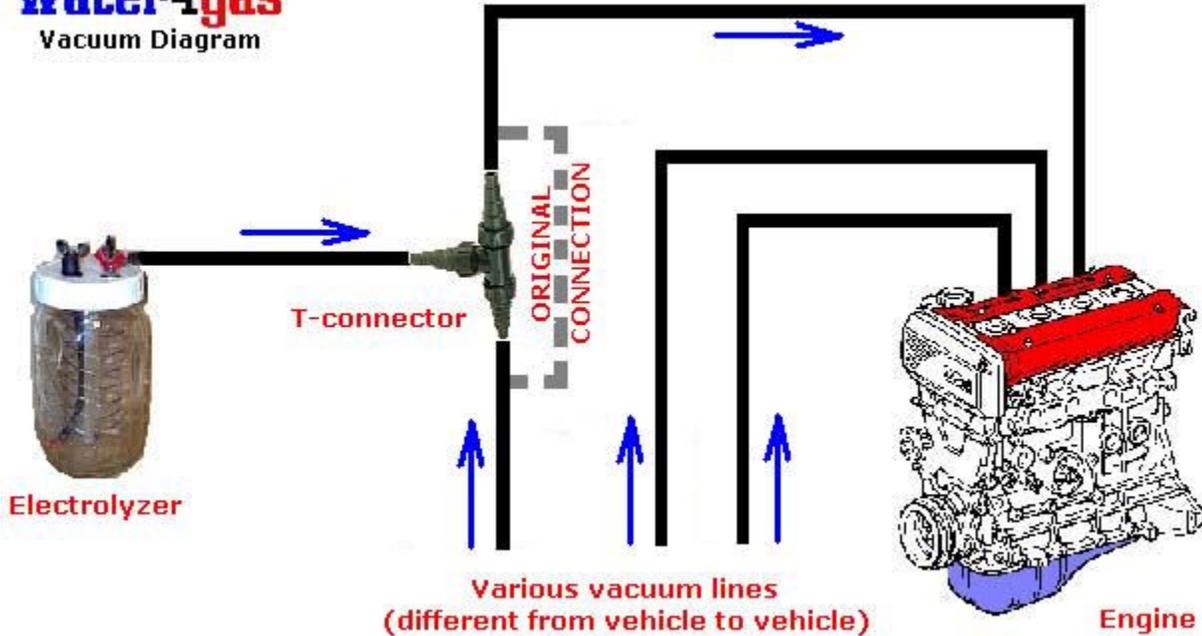
That's it for the mechanical installation and location. Now let's move for connections and supply lines. The HHO **Water4Gas** device is operated by vacuum pressure from your vehicle’s engine, plus 12 Volt supply from your vehicle’s electrical system.

## **STEP 1. VACUUM CONNECTION**

As shown in the vacuum diagram below, vacuum lines are supplied from the engine to various car systems, and you should best use the system (“System X” in the diagram) that gets the highest vacuum. The idea is to suck the HHO into a place such as the carburetor or the intake manifold, where it can be

automatically mixed with the existing fuel/air mixture.

## water4gas Vacuum Diagram



## VACUUM CONNECTION – DUAL SUPPLY

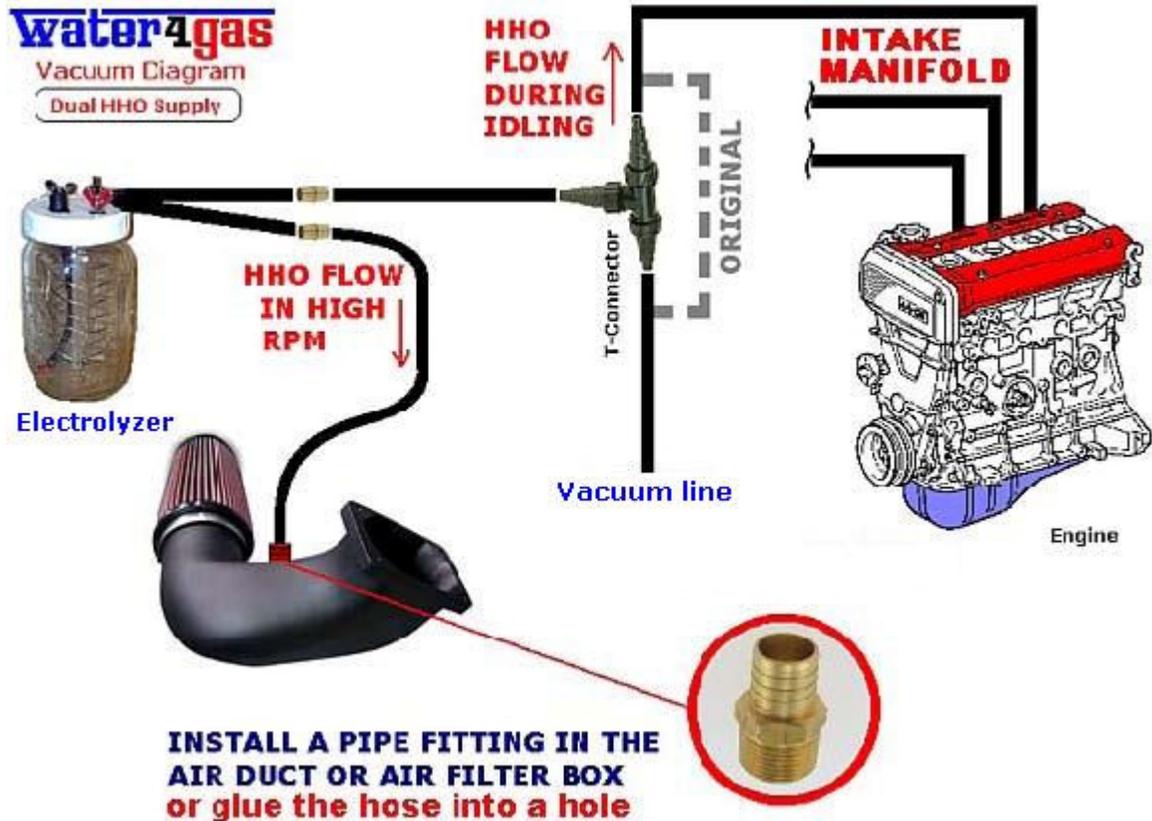


Note: For some unknown reason, several readers thought that "dual supply" means one output hose to the vacuum - and the other output to the fuel line... No, no, no! Both connections are to the air/vacuum connections of the engine. Never connect HHO into the fuel lines!

The reason for the dual supply (dual HHO output) is that when the engine is idling, there is a high vacuum pressure in the intake manifold. This pressure drops when you accelerate or rev up the engine to higher RPM. At that moment, more vacuum is available in the air intake for sucking up the HHO gas into the engine. It may save a bit more gasoline but I don't find it critical, so it's up to you if you want to use the dual supply.

Switching between supply lines happens by itself and no control mechanism is necessary.

Refer to the Vacuum Diagram below. In this setup a SECOND line is connected from the device to the air intake of the engine. Use a universal vacuum line T-Connector (second one not provided) to make the connection. To connect the second pipe to the air intake or air filter housing, use a brass fitting (Harbor Freight sells 5 "Brass Couplers", item 34704-0VGA, for \$1.99, that's 40 cents apiece, see photo).



In later models we have built this duality right into the system, so you should have two vacuum hoses coming out of the device. That's why you only get one Vacuum-T Connector, because the other one is not necessary. Connect one output to the carb/intake manifold, and the other one to the air filter. If you're not using the other output, plug it with a bolt or rubber cap.

Optionally, drill a 3/16" hole and glue a plastic coupling (barb coupling used for irrigation) into the duct or filter housing.

Some people install one-way valves ("check valves") on both supply lines, i.e., on the two outputs of the second T-connector. But in our experience MPG was better without the valves (seemingly the valves obstruct free flow so less HHO reaches the engine). If you wish to experiment with those, check valves are available from aquarium supply stores for about \$2. See list of suppliers in chapter "Maintenance".

**CAUTION: DO NOT USE THE BRAKES VACUUM LINE.** This is usually a very thick black hose that connects between the engine and the Brake Vacuum Booster (usually a large drum on the firewall on the driver side):

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**Don't mess with this line**

but if you do, put **METAL CLAMPS** on both sides of the T-connector, then make sure there are no leaks!



**Vacuum Brake Booster**

Bill Lang says you can use the brakes line, just make sure to prevent all possible leaks by placing metal clamps on the hose where you spliced it.

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With the engine briefly on, you should be able to detect substantial vacuum pressure coming from the line you are connecting to. If you want to know exactly, and especially if you're going to install more than one device, a good vacuum gauge is available at Harbor Freight Tools for about \$10 ([www.harborfreight.com](http://www.harborfreight.com) or phone 843-676-2603), see more details in the chapter "Maintenance".



Connect the vacuum line from the device, to a vacuum line that runs to the intake manifold. Make the connection as close as possible to the intake manifold. If the vehicle has a carburetor, make the connection at or below the base of the carburetor. Frequently in older vehicles, there are spare ports available for this purpose. The PCV valve\* line usually makes a good connection. Vehicles with EFI (Electronic Fuel Injection) should also be connected at or near the intake manifold.

Positive Crankcase Ventilation valve, or PCV valve, is a one-way valve that ensures continual refreshment of the air inside a gasoline internal combustion engine's

crankcase.

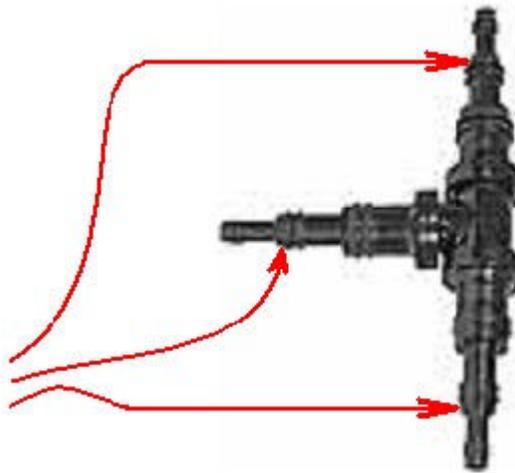
[photo from: Wikipedia.com]

**WARNING: DO NOT SHORTEN THE VACUUM LINE between the engine intake and the jar. Keep the line (hose) at least 4 ft long. This length must be kept to enhance safety and prevent damage to the device.**

A universal vacuum line T-Connector is provided as well as a length of vacuum hose to make the connection. A wide range of vacuum fittings is readily available at any auto parts store (plastic fittings will do for this use).

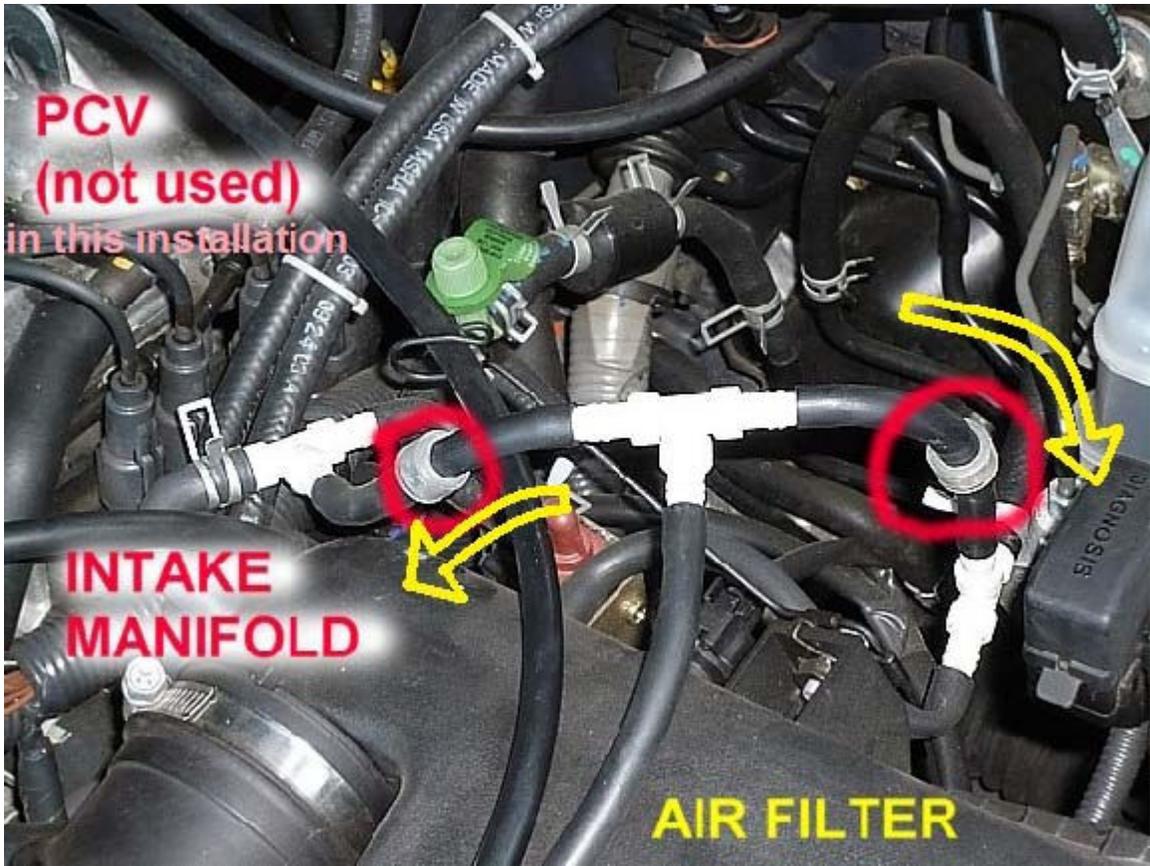
Note that the Universal Vacuum T-Connector is...well, universal. Its edges are usually too small for the hose, and should be trimmed (edge cut off) with a knife (see picture below). In my experience cutting off exactly 0.4 inch did the trick. This is recommended because the small opening obstructs gas flow for nothing. This is not mandatory, yet it will help improve performance.

**Cut at shown places for a 1/4" hose. Cut larger or smaller sections, according to the hoses you're using at each end.**



The photo below shows the hose connection setup I used in the Toyota Corolla. The vacuum-T at the center receives a SINGLE HHO FEED from the Electrolyzer. It then feeds (to the right) the air filter box, and (to the left) the intake manifold. The PCV hose is not used in this case and will be connected later on to the PCV Enhancer. The parts encircled in red are the two check valves that I removed from the Electrolyzer outputs and moved forward to here (doing the same function here of preventing backflows).

The reason behind this setup was that I found the air filter very close to the manifold, and eliminated the extra hose. Just an idea for you. Didn't save money because I had to buy 2 extra T's for \$4, but I think it's neat and easy to maintain.



The yellow arrows in the photo above indicate the correct direction of the check valves (in the red circles).

## STEP 2. ELECTRICAL:

### SEVERE WARNING

**Incorrect electrical installation might cause hazardous conditions. Especially dangerous is to hook up the Electrolyzer straight to the battery, or in any such way that it will keep producing HHO while the engine is off (accumulating HHO might cause an explosion when the engine is started up). YOU MUST NOT ACCUMULATE HHO WHEN THE ENGINE IS OFF!!!** If you are uncomfortable with (or lacking knowledge of) the electrical part of your vehicle, for your own safety, the safety of your passengers and the integrity of your vehicle, you **MUST** refer this part of the installation to a professional.

**I can recommend two types of professionals for this job:**

**Auto-sound installers (the guys that install stereo, CB radios, alarms, etc). They are very knowledgeable with the vehicle's electrical systems and its relays, fuses and wiring, they can easily calculate wiring thickness and amperes, etc.**

- 1. Any professional AUTO ELECTRICAL TECHNICIAN who's familiar with your type of vehicle.**

**Optionally use the "Safer Electrical Installation" described below. For about \$25 in parts you can achieve maximum safety.**

### HELPFUL HINT

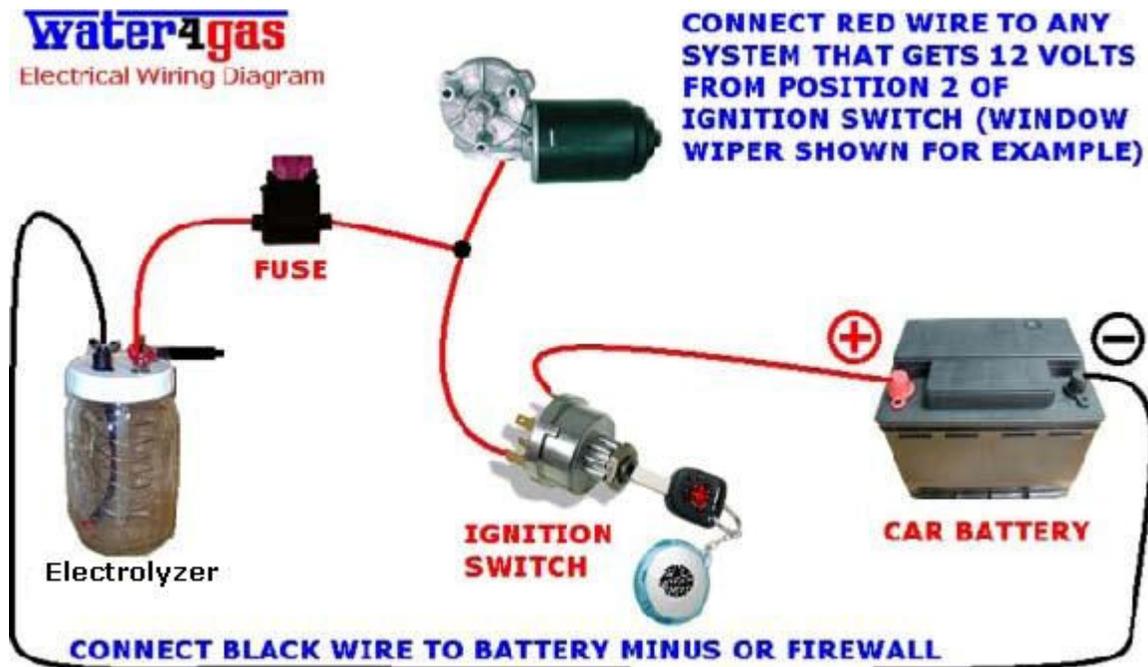
You may find this a useful resource for electrical information: [www.AHDOL.com](http://www.AHDOL.com) - the Automotive Hobbyists Digital Online Library (AHDOL) - provides **FACTORY WIRING DIAGRAMS** upon request, for vehicles sold in North America between 1984 and 2007. Cost of complete vehicle diagrams per vehicle is **\$11.99** and is guaranteed to be delivered, via email, within 24 hours.

The Electrolyzer is normally designed to operate on 12 Volts. Refer to the wiring diagram below. If you're not sure consult your auto mechanic (electric), or contact us for help.

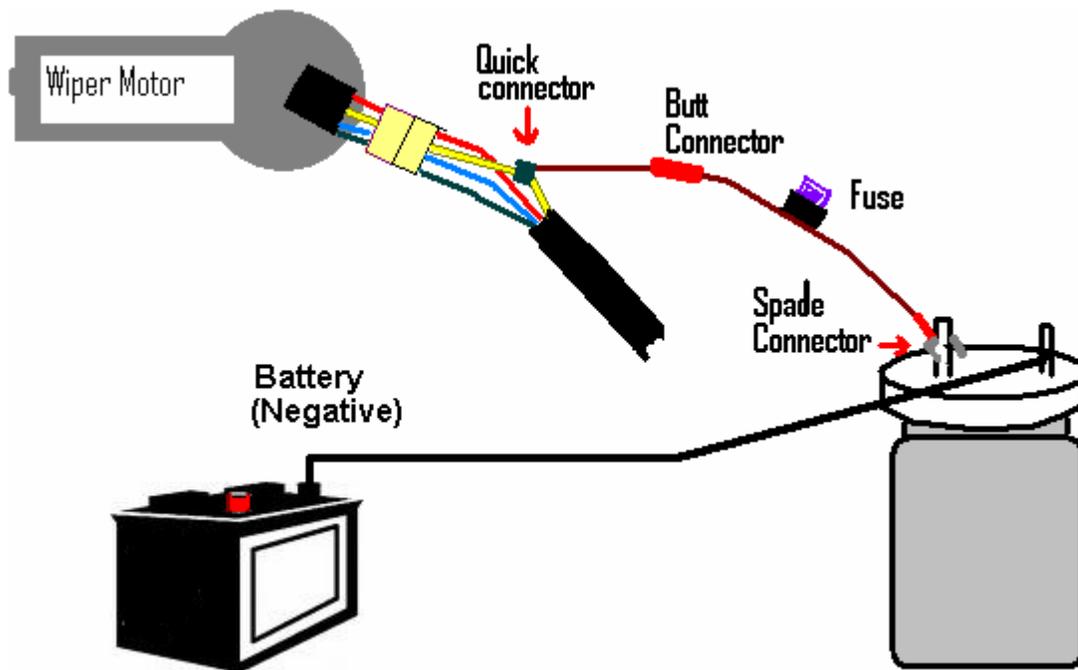
1. Connect the black terminal of the device to the **negative** terminal of the vehicle's battery, using the wire **WITHOUT FUSE** (black wire). If the battery is too far, connect it to the **firewall** or extend the wire all the way to the battery.
2. Identify a point in your vehicle's electrical system which has a 12 Volts (positive) present **ONLY WHEN THE ENGINE IS ON** (Position 2 of the Ignition Switch), such as the starter solenoid, window wiper motor, or similar circuit.
3. Turn the switch off and take out the key. Connect positive (12 Volts) to the red terminal of the device, using the **FUSED** wire supplied (red), to the point you've identified above.
4. To protect the wiring from long term damage, you can now put the newly installed wires into what's called "split flex tubing", see photo. You can find it in all major hardware stores such as Ace, Home depot. Don't buy it online (\$5 +S&H) because in the shop it's only 99 cents for 10 ft.

NOTES:

- In most newer vehicles the fuses are located in a box, in the engine compartment. I just plug the wire into the fuse holder and reinsert the fuse. Usually it is a 10 Amp or 15 Amp ignition circuit, that I use. In some older cars where there was no fuse box to connect to, the wiper motor was found most useful as a supply point. I just splice into the SWITCHED 12 Volts and it works well.
- In some cars the electrical system may be in reverse (RED wire to the body of the car, or to the battery itself). If it gets confusing, consult an auto electrician who is familiar with your specific model.



The diagram below displays more details on an electrical connection to the Windshield Wiper Motor (wire color codes could be different):



## SAFER ELECTRICAL INSTALLATION

**PROBLEM:** I never forget to turn off the ignition switch. However, a couple of readers have forgotten to switch off the power (the Electrolyzer was on all night), and either caused a small explosion when the engine was turned on - or have drained the battery.

**SOLUTION:** The next diagram shows an optional electrical connection, preventing Electrolyzer operation **unless the engine is on:**

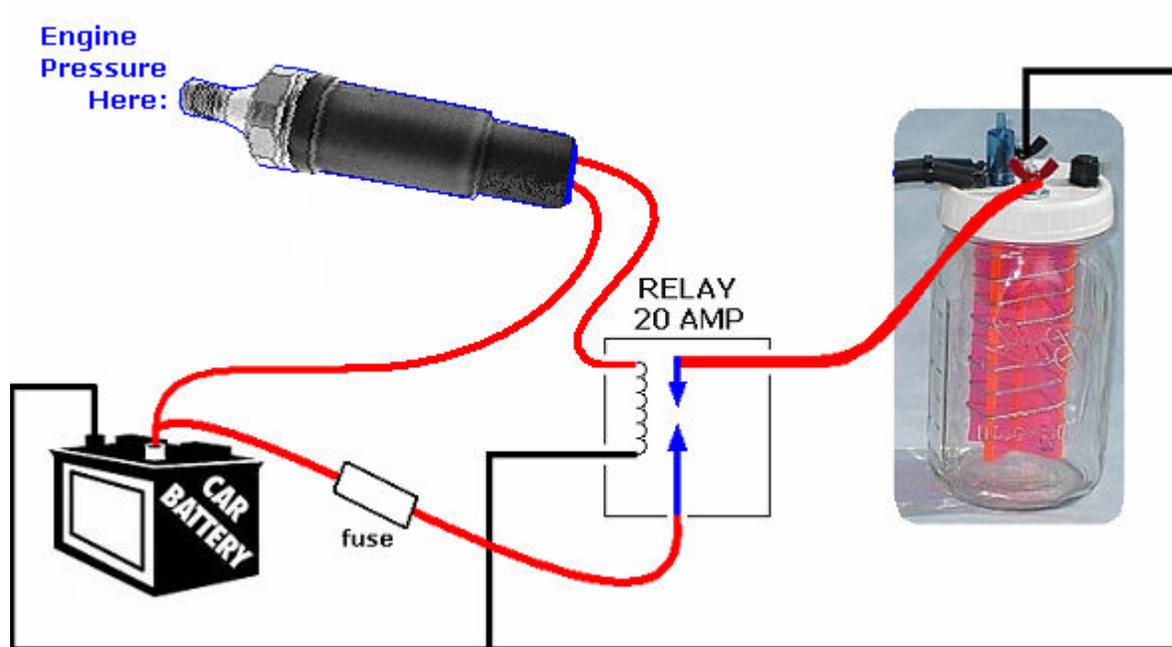
- The 12 Volts power is supplied directly from the battery
- A vacuum switch senses that the engine is ON
- The vacuum switch activates a relay
- The relay connects the 12 Volts to the Electrolyzer.

This arrangement is good only if you have vacuum, which means:

1. You are not on a diesel, and
2. You have connected to the vacuum port of your engine (and not to the air intake only).

Question: What to do if you don't have vacuum?

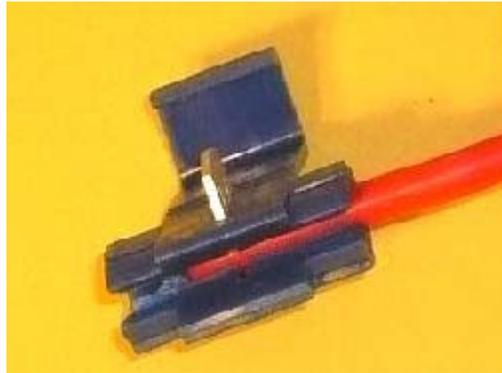
Answer: replace the vacuum switch with an automotive OIL PRESSURE SWITCH. This type of switch should cost a few dollars only. If you Google "oil pressure switch" with your vehicle's model, you will find them starting at about \$1-\$3 and up. However, such a switch should ONLY be connected to the engine by an experienced mechanic, to prevent risk of leak or losing oil pressure. Then, you can follow up and complete the electrical connection yourself, per the diagram below:



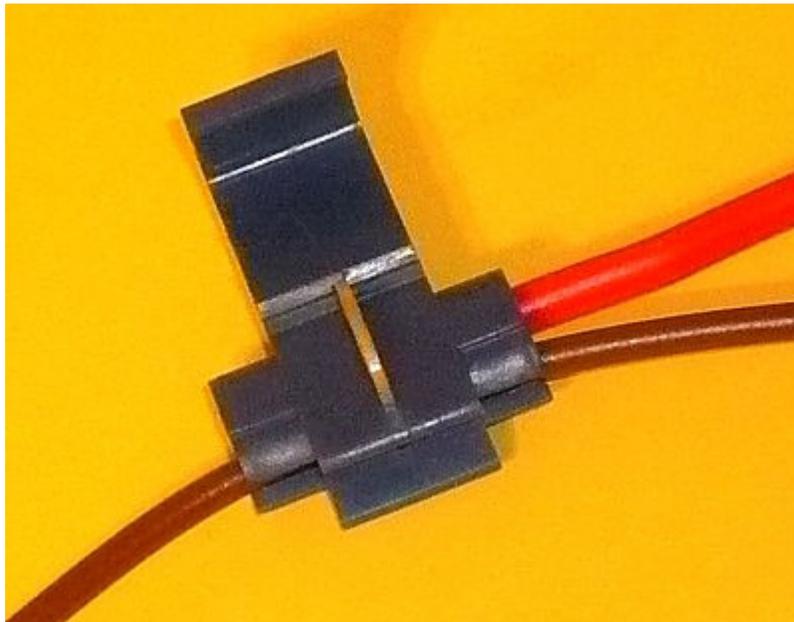
## HOW TO USE THE QUICK SPLICE CONNECTORS

The quick splice connectors that may be provided with a typical kit are a real time and effort savers for the electrical connection. The procedure below will teach you exactly how to use them.

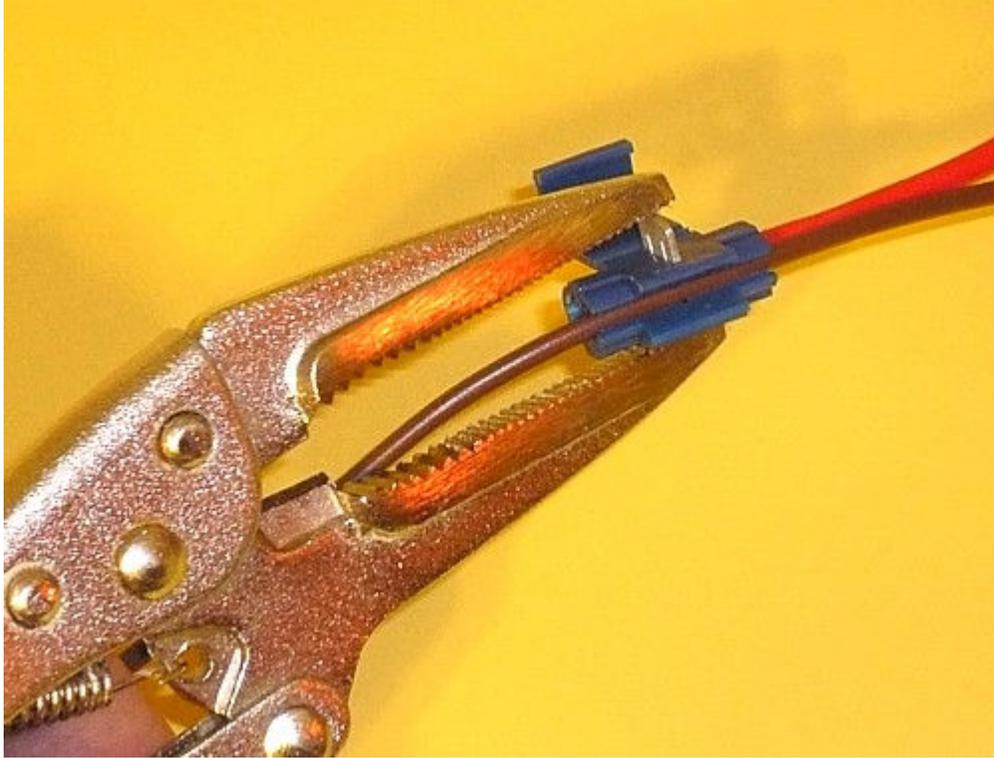
1. Insert the wire that you are adding, the new wire (red shown but it could be either the red or black) into the rear slot of the splice connector. Note that it will only fit from the right hand side when the connector is positioned as shown:



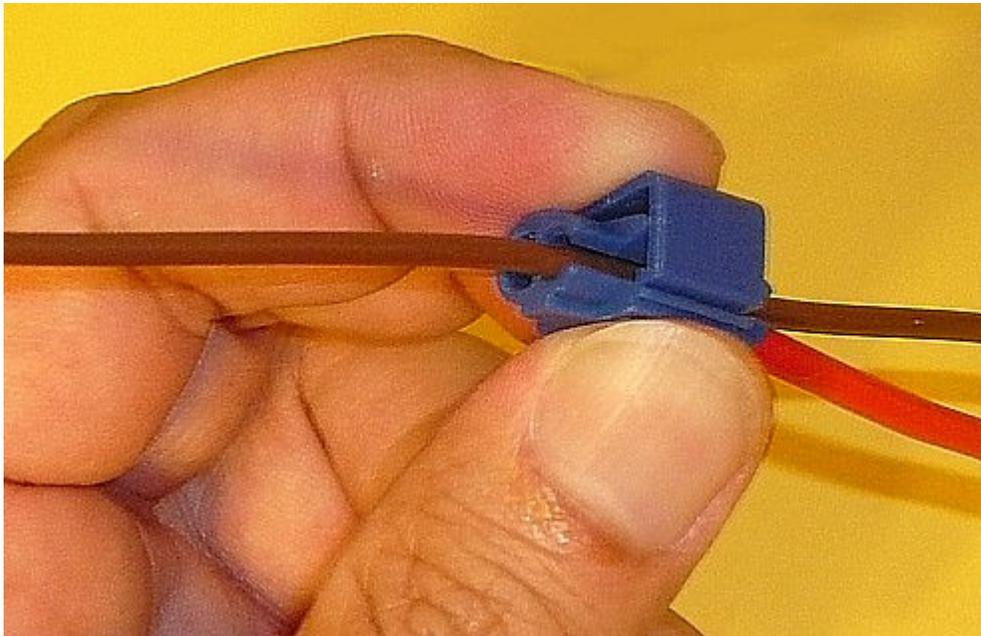
2. Insert the wire you wish to splice to (brown wire shown for example) into the front slot of the connector as shown:



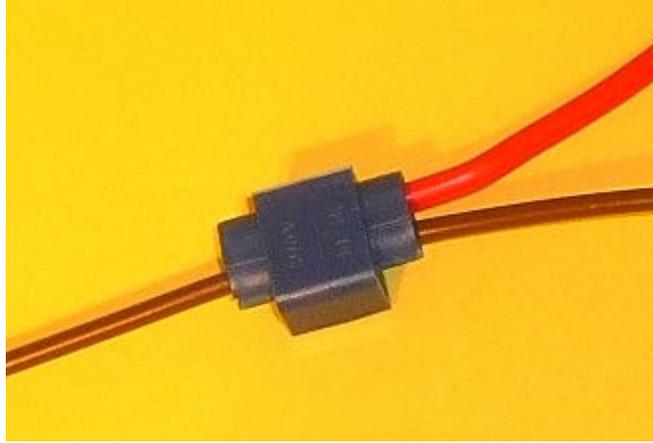
3. Using pliers press the metal connector onto the wires. This will cut through the insulation of both wires and make a firm electrical connection between them, all in one action:



4. Close the folding cover of the connector by hand as shown:



5. The final connection will look like this:



The installation will now look something like this. Note the absence of bottom support – the jar is hanging on the edge of the washer fluid reservoir. Never fell down no matter the road/speed. The bungees are pretty tight but still allow for easy removal of the device without removing any of the bungees.



**STEP 3. FINAL SETUP:**

Fill the jar with DISTILLED WATER, leaving 1" of free space at the top. Add ¼ teaspoon of Electrolyte (pure Baking Soda). Close the jar.

Adding 1 teaspoon of Electrolyte will generate much more HHO (hydrogen-oxygen mixture) but may blow the 5A fuse, in which case you should replace it with a higher rating fuse (15 Amps works for us, see notes on fuse selection below). **THE JAR MAY GET HOT. THE JAR WON'T CRACK - BUT LET IT COOL OFF BEFORE ADDING COLD WATER OR ATTEMPTING ANY MAINTENANCE ACTION.**

Inspect the installation visually. Make sure all electrical connections are tight (HAND FORCE ONLY) and the lid is screwed tight on the jar.

## FUSE SELECTION

We have found the 5 Amps useful for moderate production of HHO – using ¼ teaspoon of Electrolyte for 1 quart of water (with 12 Volts it will draw about 1-1.3 Amp). For higher HHO production mix 1 flat teaspoon of Electrolyte into 1 quart of water, and replace the fuse with a 8 Amps to 15 Amps fuse (the device will draw 2-3 Amps in idling).

You may choose to experiment with up to 1.5 teaspoons of Baking Soda (per Quart) **but watch out for possible device overheating, especially in hot weather!!!** If the device overheats, lower the ratio of Electrolyte to water.

## STEP 4. ADJUSTMENT:

1. Start with NO electricity, by taking out the fuse or leaving one of the terminals disconnected (make sure it doesn't touch metal parts of the car to prevent fuse blowout).
2. Turn the Vacuum Adjustment Valve (sometimes called "Bubbler Cap" or just "Bubbler") fully CLOCKWISE. Then turn it half-turn COUNTER-CLOCKWISE.



Vacuum  
Adjustment  
Valve

3. Turn the engine and watch the bubbling action coming out of the lower end of the thin tubing inside the device (here by the way is the great advantage of having a strong glass jar instead of metal or non clear plastic – total transparency and visibility!) Gradually turn the Vacuum

Adjustment Valve and watch the bubbling action in the jar. Adjust the valve until there is a small amount of bubbling action.

4. Turn off the engine.
5. Connect the electricity by putting the fuse on and making sure all connections are tight (hand force only).
6. Start the engine again and watch the electrolyzing action between the spiral electrodes. A yellowish gas (HHO) will start forming and flow toward the top of the jar.
7. Within a short time (roughly 30 seconds), you will notice that the engine starts to sound quite differently. It will sound smoother and quieter. Its RPM may be unstable for a couple minutes. This is normal – the HHO is starting to change the combustion cycle and cancels the pinging – and the engine is now adjusting to the changes.
8. In some of our road experiments we've noticed better performance and higher MPG with the bubbling totally shut off, but as far as I know it's safer to leave some bubbling even if very low, because it keeps the HHO moist at all times.

The developer told me: tune ZERO BUBBLING in HHO mode, and LOW BUBBLING in H2O mode (electricity off).

Do your tests and please tell us the results. The broader the experiment base, the more certainty there will be on the best overall tuning.

Congratulations! Your HHO **Water4Gas** system is now ready to go! Enjoy it.

This manual is based on the experiences of many clients and friends. Yet it is never complete as we keep learning all the time. Please send us as many feedbacks, experiences and solutions as you have found - for the benefit of others. Thank you!

Refer to the rest of this manual for recommended road test methods, fine tuning, troubleshooting and maintenance.