

HYDROGEN ASSIST DEVELOPMENT

TRANSFORMING ENGINES OF YESTERDAY INTO THE *HYBRIDS* OF TOMORROW

LESS TIME AT THE PUMP
MORE MONEY IN YOUR WALLET

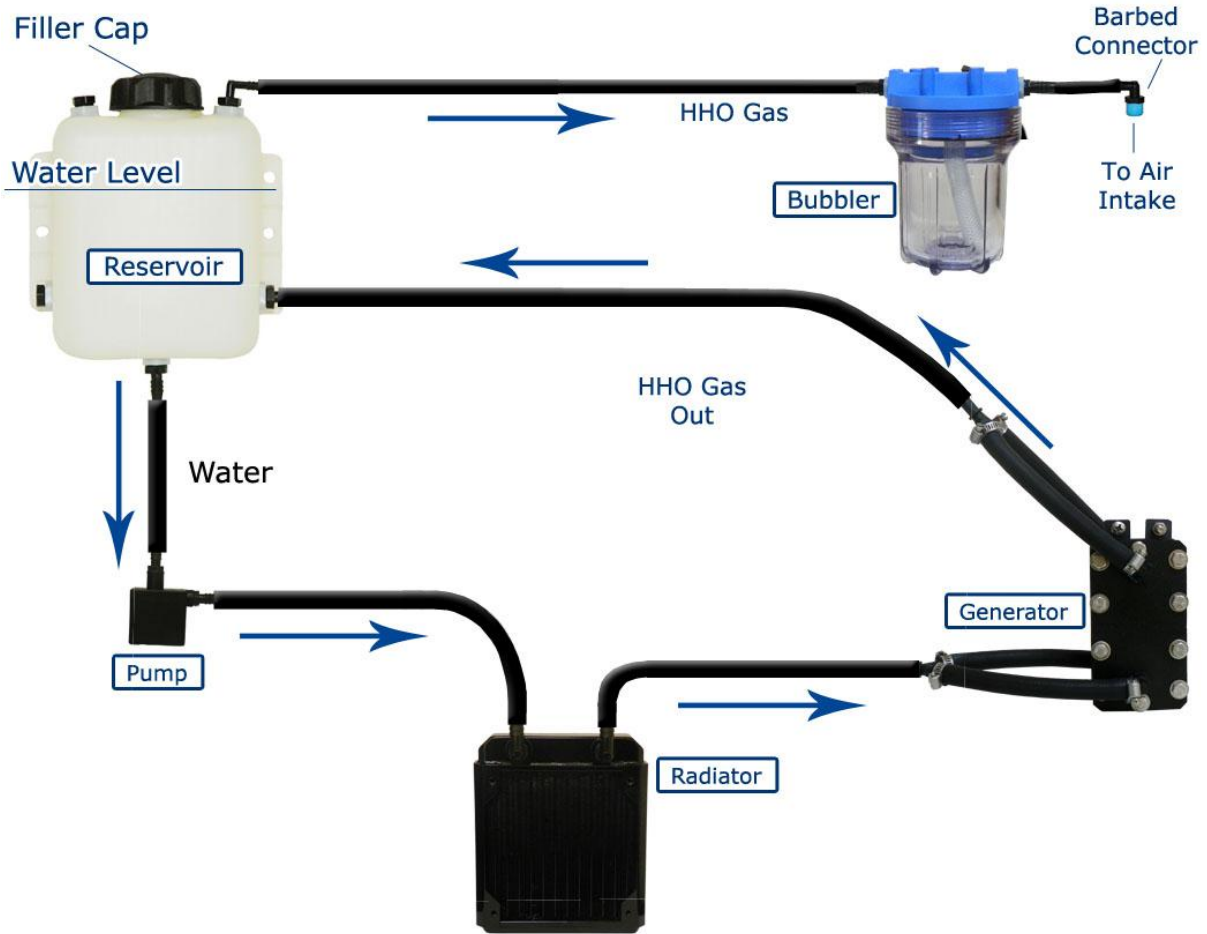
SAVE UP TO **40%** ON FUEL



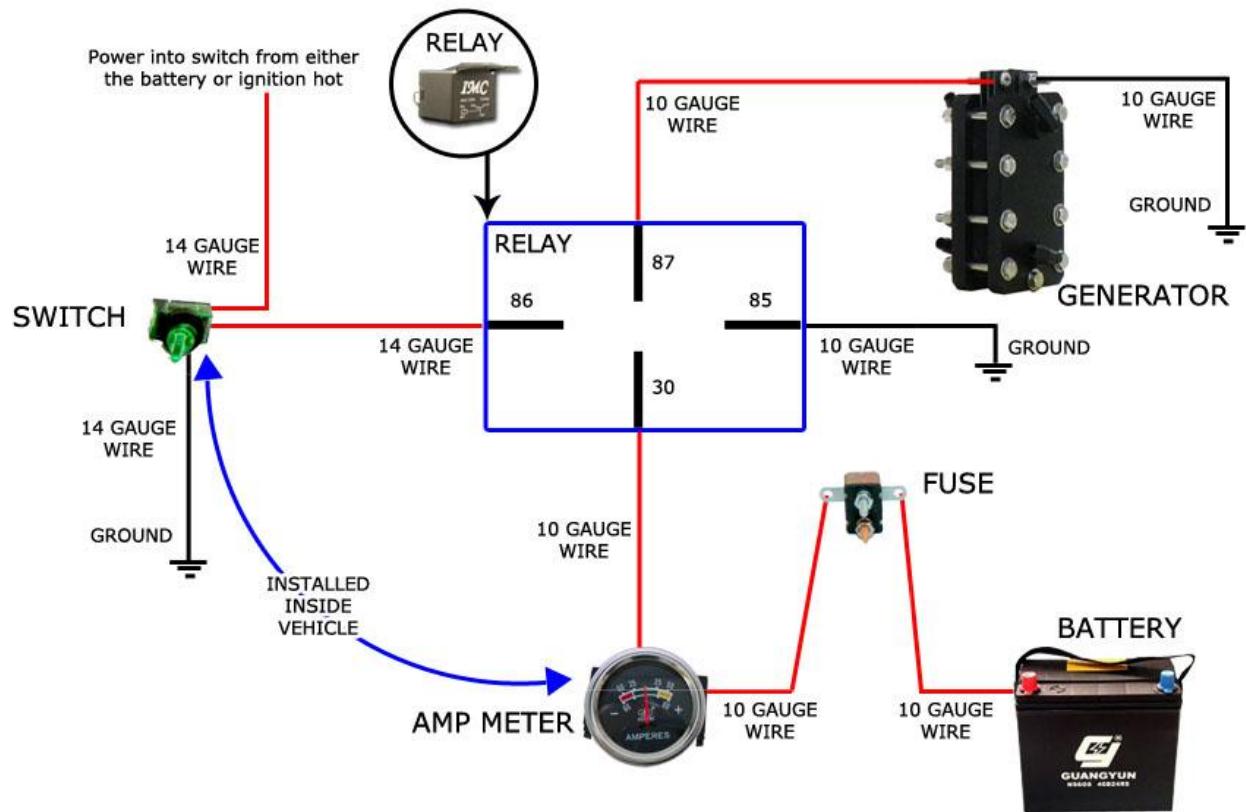
Hydrogen Assist Development

Installation Guide

Extreme 180 Series HHO Dry Cell Kits



Hose Connection Diagram



Wiring Diagram

Installation Guide

Extreme 180 Hydrogen Dry Cells

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Installation Overview

Start by unpacking the kit and check the contents against the packing list. If any item is broken or missing then contact us immediately via email at hho@safehho.com.

X1 Kit

- 1 – Titanium 4 Plate , 3 Cell Dry Cell Generator



X2 Kit

As above with:

- 1 – Titanium 6 Plate, 5 Cell Dry Cell Generator



X3 Kit

As above with:

- 1 – Titanium 6 Plate, 5 Cell Dry Cell Generator



X4 Kit

As above with:

- 1 – Titanium 8 Plate, 7 Cell Dry Cell Generator



X5 Kit

As above with:

- 1 – Titanium 10 Plate, 9 Cell Dry Cell Generator



X5 Kit

As above with:

- 1 –Double Titanium 10 Plate, 9 Cell Dry Cell Generator



To get the best from the kit you must follow these steps in order:

1. Determine the best area in the car to install the Dry Cell.
2. Mount the components in this order - do not connect hoses or wiring yet, it is easier to mount everything first then connect wiring/hoses.
 - a. Dry cell generator
 - b. Bubbler and reservoir
 - c. Relay
 - d. Fuse
 - e. On/Off switch
 - f. Ammeter
3. Next connect the wiring using the Wiring Diagram, see page 2.
4. Now connect your hoses as in Connection Diagram see page 1.
5. Lastly mix up the distilled water and electrolyte mixture – fill up the generator and fill up the reservoir 1 ½” from the top. The bubbler is to be filled 1/3 from the bottom with water from the tap.
6. Turn the car On and check the current on the ammeter
7. If you have purchased a Volo, install chip now. See instructions link on page 17.
8. Warm up the car for 5-10 minutes before carrying out final adjustments.

Maintenance

Once installed your Extreme HHO generator will work in the background – you will notice a slight increase in the acceleration. You may also notice a slightly higher idle at first, but most car computers will compensate for this quickly. Check your water levels every time you fill up with fuel, until you get an idea of how much water it uses. Top off reservoir with distilled water no more than 1 ½” from the top.

NOTE: In areas of cold or freezing climate you must use a 20-40% solution of 90% grade, or better, Isopropyl alcohol mixed with Current solution, to prevent the HHO Generator from freeze-up during cold weather. Important to remember when using alcohol in your water, be sure to increase the amount of electrolyte.

We recommend you record your fuel consumption between fill-ups (2-3 complete fill-ups) for several weeks BEFORE fitting the generator, then install it and repeat the test. Don't estimate – measure your fuel usage to get an accurate value and then let us know your savings. EPA ratings are based on 55 mph and often times are estimated mileage, making actual mileage very different. Actual mileage will reflect in the savings on a tank of gas from full to empty.

Getting Started

The first task is to fit the electrical components and connect all the wiring. See Wiring Diagram on page 2.

Wiring the System

Use the included wires for the installation, noting the two wire sizes on the Wiring Diagram on page 2.

CAUTION: DO NOT CONNECT THE SYSTEM TO THE BATTERY UNTIL THE VERY LAST ACTION.

DO NOT MOUNT NEAR THE EXHAUST OR OTHER HIGH HEAT SOURCE AS RADIANT HEAT WILL DAMAGE YOUR SYSTEM. ONLY MOUNT IN AN AREA WHERE IT IS WELL VENTILATED

Route all wires away from moving parts; fan blades, belts, alternators, turbos and so on, and do not allow them to touch hot engine parts, especially around the exhausts. Only use the fuses we supply as anything higher could damage your kit or even the wiring and void your warranty.

Take your time to route the wires in line with the normal wiring standards, as you may be showing people your installation as an example of our technology. Make sure they see a well-planned and finished installation and help to give a good name to this new industry.

It is best at this point to double check all your connections before turning the system on.

Finish laying out the wiring and connecting electrical items. When completed and all connections have been double checked, connect the system to the battery. This will finalize wiring your system properly.

Multi-Meter Fitting

Use a multi-meter to test voltages and make sure the ON/OFF switch and relay are working correctly. Test to see if there is a voltage at the generator. Don't worry, no HHO gas will be produced until the generator is filled with electrolyte – it is an open circuit until water is put in. You just have to make sure voltage is reaching the cell and it turns on and off with the ON/OFF switch.

CAUTION: DO NOT proceed any further until you are sure the system is connected correctly. It is extremely important that the system gets wired as instructed by our wiring diagram. Any variance from these instructions could result in unit failure and engine damage. Hydrogen Assist Development takes no responsibility for improper installation of any of our products.

Relay Connections

See Wiring Diagram on page 2.

1. Fit the relay/solenoid on a stable location and connect the wiring as shown in the Wiring Diagram.
2. Connect the larger gauge primary power wire to terminals 30, 85 and 87, and connect the smaller gauge wire to terminal 86.
3. Terminal 30 connects to the auto reset circuit breaker in the line to the battery.
4. Terminal 87 connects direct to the dry cell electrode.
5. Terminal 85 connects to ground. A solid ground is essential for proper operation of unit.
6. Terminal 86 connects to the ON/OFF switch.
7. Fit the auto reset circuit breaker in a suitable stable location adjacent to the relay and connect to the relay. **NOTE:** This fuse is self-setting after it has operated, it does not need replacing.

Control Switch and Ammeter Installation

1. Fit the ON/OFF switch and ammeter and bracket in a suitable location in the dashboard and connect to a suitable fuse like the wiper fuse.
2. **Connect the supply to the ON/OFF switch to a car 15amp fuse which is live only when the engine is running. Ensure power to the fuse is off when the engine is turned off. Double check this. Failure to do this could leave the generator running all the time and damage your engine.**
3. Connect the other side of the switch to solid ground adjacent to the fuse.
4. Connect the ammeter to the heavy duty relay/solenoid, as in the Wiring Diagram on page 2.
5. For example, connect to the Rear Wiper Fuse Selected

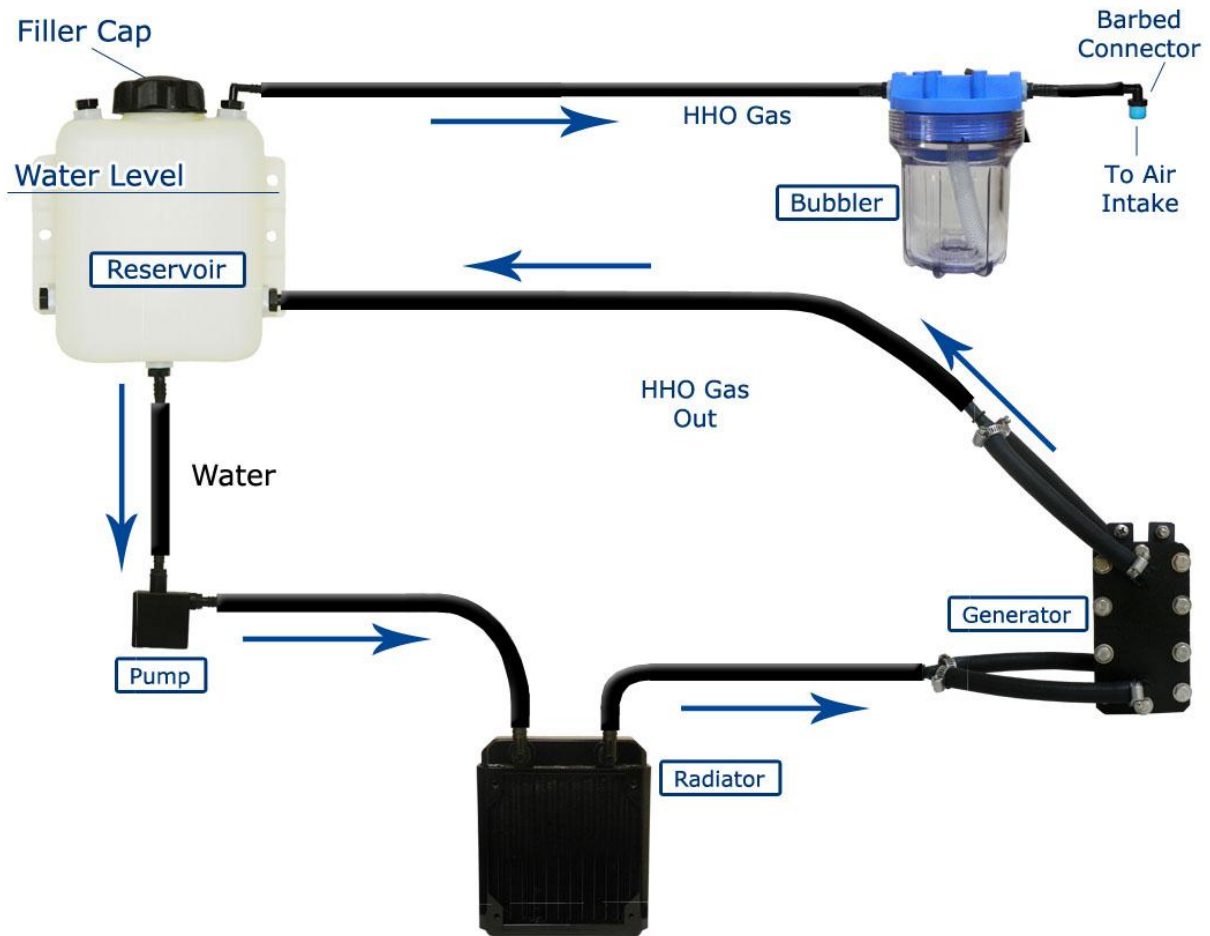
Install HHO Generator, Reservoir and Bubbler

Find the best location for the HHO Generator, nearest the engine if possible. You can fit it close to the radiator as below but sometimes you may have to move things around, but keep away from moving parts like belts, fans and accessories. The reservoir should be fitted to a stable location, such as the firewall or the side of the engine bay. The bubbler should be fitted lower than the reservoir to ensure a good flow of gas.

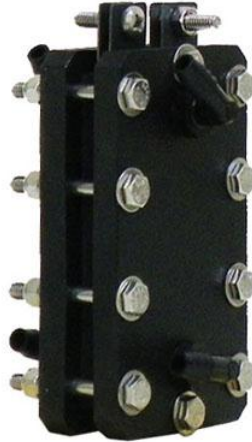
Many cars have space in front of the radiator and can be securely mounted to the steel chassis. This can be generally accessed by removing the plastic grille on the front of the vehicle. If possible, we recommend that all generators and bubblers be mounted under the hood of the vehicle.

Note: A rear mount installation is common in certain vehicles. If you feel there is not enough room in the front of your vehicle, contact technical support for further assistance.

Connection Diagram



HHO Generator



1. Find suitable location for HHO generator that places the upper return nozzle (on HHO) lower than return nozzle on tank. Make sure to mount HHO reservoir tank upright. The generator unit can be mounted on a slight grade if necessary, but we recommend that you mount the generator as straight up and down as possible for proper operating levels.

Note: Remember that terminal posts are on the top side of generator unit. We have designed our unit to be easy to hook up. Terminal posts are clearly marked for positive/negative connections. Connecting these in reverse order will dramatically lessen the fill of the generator and void the warranty.

2. Mount in a place that these posts will not come into contact with any metal object. This would short the system, and could cause damage to your vehicle.

With a car the most popular places are between the radiator and grille or just inside the engine compartment on either side of the radiator.

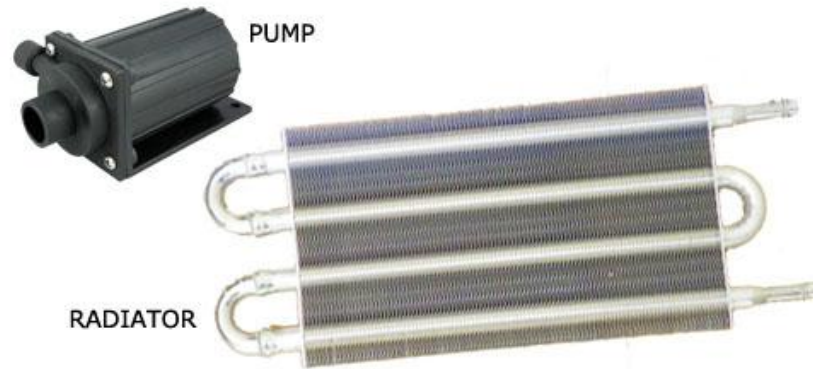
Reservoir



Installing the Reservoir

1. Find a place for your reservoir that is convenient for checking levels and filling with water. An example is shown above.
2. The reservoir **must be mounted above the generator** and natural gravity will keep the water system circulating.
3. Like the electrical circuit, make sure the hoses are secured and routed away from all moving parts and kept clear of exhaust manifolds and pipes and hot engine parts. Use plastic ties to keep everything neat and tidy.
4. Mount mixer tank/reservoir in upright, stable location on fire wall, or braced on either interior fender area of engine compartment, or mount in front of radiator, behind grille of vehicle.
5. Measure hose lengths needed, and make sure that these lines are not resting against any part of the engine, or near pulleys or belts, as they may interfere with operation of your motor. Connect black hoses from mixer tank to generator.
6. All Extreme 180 HHO cells have dual 3/8" (8mm) input and return fittings. (see hose connection diagram page 1)
7. It is important to mount your unit with the orientation of connection taps in the upright position. Our mixer tank is designed for a universal installation with the ability to mount your generator in basically any orientation to the tank and still be able to achieve a proper operation of the unit

8. Install the unit, and mixer/bubbler in an area where the lowest level of engine heat resides. Included with your purchase is a cooling system that consists of a pump and radiator. Try to place the radiator in a location where the outside air will be able to assist in cooling unit.



Installing the Cooling System

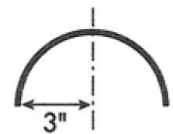
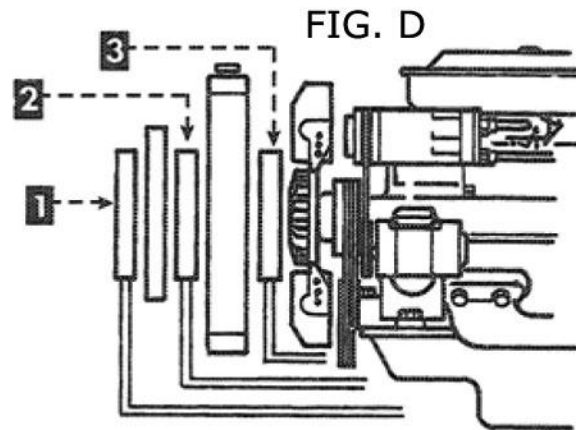
Cooler Mounting Positions

The cooler may be mounted horizontally or vertically. The oil cooler relies upon air flow for cooling. Shown here are the three suggested locations for the cooler in relation to the air conditioner condenser and radiator.

1. In front of AC condenser. 100% efficient.
2. Between AC condenser and radiator. 75% efficient.
3. Between radiator and fan. 60% efficient.

Insure selected mounting position complies with the following installation requirements:

- Keep rubber hoses away from sharp edges, hot exhaust pipes, manifolds, and/or points of wear.
- Do not kink hose or bend it tightly. A bend of less than a 3" radius will put excessive stress on the hose and cause hose failure.
- Cooler should be mounted at least 1" from fans and 6" from exhaust manifolds. When mounting to AC condenser or radiator, foam pads must be used between the cooler and condenser/radiator.
- Do not over-tighten hose clamps. Tighten only until rubber protrudes level with slots in hose clamp. Over-tightening can cause hose failure.
- After two weeks, retighten hose clamps to insure against leakage.



Cooler Installation

1. Place clamps on ends of hose and push hose onto oil cooler fittings. Leave hose in a loop – DO NOT CUT HOSE.
2. Position clamps $\frac{1}{4}$ " – $\frac{3}{4}$ " from end hose. Tighten clamps until rubber protrudes level with clamp slots. DO NOT over-tighten clamps (maximum 25 inch pounds torque). (FIG 1)
3. If mounting oil cooler behind radiator position #3 (FIG D), loosen fan shroud. Cut or drill hole in fan shroud for hose clearance.
4. A) Remove adhesive backing from foam pads.
B) Plate and Fin Cooler – position holes in pad over holes in cooler mounting flange (FIG 2). Tube and Fin Cooler – attach pads to oil cooler (FIG 3).
5. Position oil cooler in desired mounting location with pads facing radiator or air conditioning condenser (FIG 4). Insert rods through cooler and pads, radiator and/or condenser.
6. Install locking buttons. These are permanent and can only be removed by cutting. Tighten to compress the foam pad. Cut off excess mounting rods.

FIG. 1

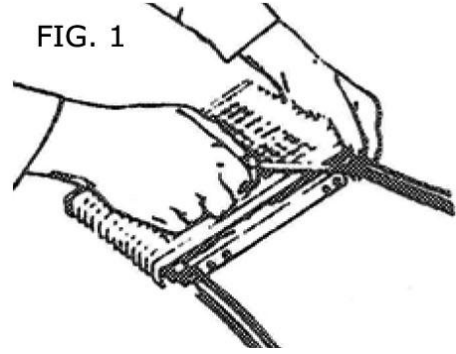


FIG. 2

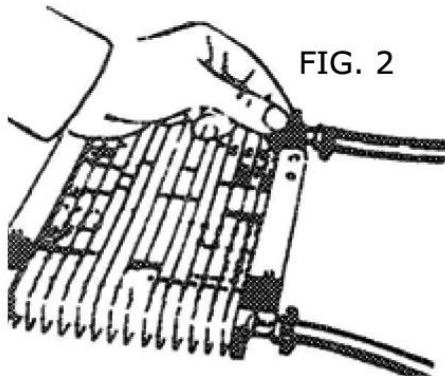
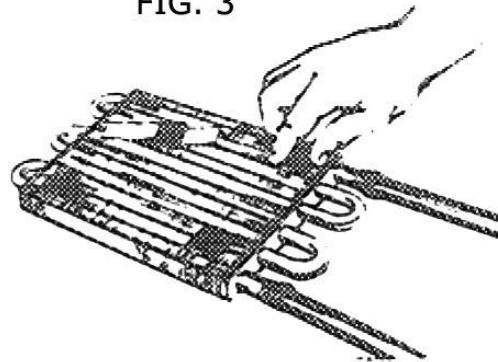


FIG. 3



Bubbler

We suggest that this device be placed lower than your mixer/filler tank in a location where you can easily check the water level.

1. Fill the bubbler $\frac{1}{3}$ full with distilled water for generator. In cold/freezing weather, substitute Isopropyl alcohol for distilled water.
2. We offer a very unique bubbler as per diagram. There is a removable plug to fill/drain. The import line can be removed and serviced if the diffuses stone needs to be serviced or replaced.

Gas Outlet Pipes

1. Run a piece of the supplied $\frac{3}{8}$ " (8mm) tubing from the gas out on the mixer tank to the straight $\frac{3}{8}$ " fitting on the bubbler. [See Hose Connection Diagram on page 1.]

2. Continue running the line from the bubbler to the provided gas inlet fitting, cut to the appropriate length, and attach to the 1/4" (6mm) barbed fitting.

Note: Measure the 3/8" (8mm) black hose to the appropriate length *before* cutting.

Gas from Bubbler into Air Stream

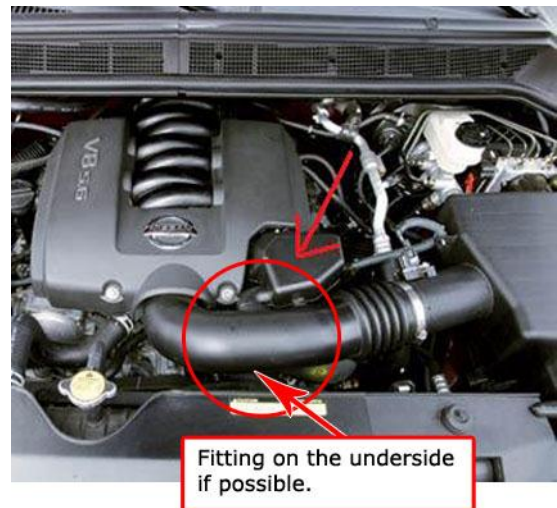
We have included a barbed fitting [1/4" (6mm) npt x 3/8" (8mm) barbed 90] to allow a connection to the air intake. Place it as close as you can to the intake to ensure the best results from the oxy-hydrogen. We recommend placing this fitting on the underside of the intake hose. To get the best from the Extreme 180 unit you need to fit the HHO hose to the air intake at an angle towards the engine, or the gas may not be drawn into the engine by the air flow in the intake pipe.

Note: Hydrogen is 14 times lighter than air, so get the stream close for highest gas increases.

1. You will need to drill a 1/4" (6mm) npt hole to secure this fitting into place. (We suggest that silicone be applied around this fitting to ensure no oxy-hydrogen can escape)
2. Run supplied 3/8"(8mm) line from bubbler to the supplied 3/8" (8mm) barbed by 1/4"(6mm) npt fitting. Again, this should be located near the intake, and coated and sealed with GOOP or 100% Silicone Caulk to stop the loss of oxy-hydrogen.
3. Also, we suggest that if possible install this fitting on the underside of the air intake tube. Hydrogen is so light, that topside installation of this fitting may make the hydrogen not mix thoroughly with incoming air, and you could be getting this fuel to only a few cylinders as a result.
4. **DO NOT** fit the HHO hose directly in the intake manifold as this creates too much vacuum and could cause problems.

Turbo Charger Installation

With a Turbo Charger installation, mount the HHO gas inlet hose about 12" (30.5cm) *before* the Turbo Charger or the pressure will drive the HHO gas back into the dry cell. This is the optimum position as the HHO gas will then mix with the incoming air and then mix with the other fuel as it is drawn into the engine.



Carburetor Models

If your car has a carburetor then insert the HHO hose connector near the carburetor in the air filter housing on the inside of the air filter.

NOTE: The carburetor may need leaning out a little to adjust for the extra HHO being supplied to the engine. Also you may need to advance the ignition slightly. These steps will ensure you get the best from your Extreme 180 HHO kit.

Fuel Injection Cars

With fuel injection engines it is more critical to get the best connector location. Newer cars have a MAF sensor (Mass Air Flow) that measures air flow through the air filter housing. The round opening on this connects directly to the engine via a flexible duct and the throttle plate is on the other side of this hose. You need to insert the barbed inlet piece as close as possible to the throttle plate.

DO NOT insert the hose just in the air filter as the extra HHO gas can upset the MAF sensor. So always insert it between the MAF sensor and the throttle plate.

Installation Tips

Make sure all hoses are securely fitted to barbed connections. You have purchased this device at your own risk, and any results from usage, negative or positive are completely your responsibility. This unit is only as safe as the user. Check the system periodically for refilling. This system does not use a lot of water. Typical water consumption is very low. If you are experiencing the need to refill often, the system is not installed for optimal usage. We encourage all our customers to send pictures of their installations so we may assist in any errors that will reduce production of unit, and your overall savings.

Do not over use the electrolyte. This will spike your amps, melt your wiring, damage your unit, and void your warranty. Please use the electrolyte as directed.

Volo Chip Installation

You can find full details on the specification and installation/setup of your Volo Mileage Chip at these links.



<http://lib.store.yahoo.net/lib/yhst-19807630266082/vp12install.pdf>

Final Phase

You are now ready to fill up the system and switch on for the first time.

One last time – double-check all wiring and hoses to make sure there is nothing loose and nothing is close to moving parts OR the exhausts.

Check you have mixed a fresh batch of electrolyte with **1/4 tsp.** of Sodium Sulfate and 1 gallon of distilled water.

Preparing electrolyte solution:

No other Electrolyte Solution may be used other than Sodium Sulfate or Glacial Acetic Acid.

1. To dissolve sodium sulfate, you have to mix it with warm/hot water. If you attempt to dissolve in cool/cold water it will form into chunks of crystals, and will not be usable.
2. **Mix 1/4 tsp. of sodium sulfate into 8oz (250ml) of warm/hot distilled water.**
3. Stir solution until dissolved. Add solution back into the gallon of distilled water.
4. The water you used to make solution should have been from the fresh gallon of distilled water. Please make sure to shake the solution well to ensure proper mixing.
5. Proceed to fill the mixer tank to **2" (50mm)** below the gas out line (top fitting by cap). Please do not over fill mixer, as this will force water into gas out line and lower production.
6. As you fill up unit, you will see air bubbles escaping from generator. Wait until all bubbles have escaped before turning unit on.
7. We recommend only **1/4 tsp. per gallon** of distilled water for initial generator operation. You can increase this amount at your own discretion.
8. You will use the electrolyte to adjust the overall amperage draw on your electrical system, no more than 1/8 tsp. at a time while attempting to raise the amperage draw. Always check your current amp. If amperage draw is too high, simply remove some of the water from the fill tank, and pour in fresh distilled water.
9. Adjust your unit into the best level of production for you! Keep solution, 2 inches below gas out line.

NOTE: the optimal amp draw for a cell is 18-25 amps. We base this on amperage availability for the average car.

General Tips:

The most important thing to remember when installing our units is that gravity plays a part in gas production. Install the generator as straight as possible.

Always make sure that the fittings on mixer/filler tank are higher than the corresponding fittings on the installed generator. Try to run the lines in the straightest path possible. Any dips or rises in the lines, beyond the natural grade, can decrease the unit's ability to produce gas productivity. When attaching hoses to fittings, we suggest that you lightly lubricate the fittings with Vaseline, so as to allow the hoses to attach without undo force being necessary, especially in colder conditions.

Make certain that all hoses reach last barb of fittings, as to assure proper seal. Hose clamps are included, and are required to ensure a proper seal. Never attempt to turn fittings in generator. These fittings are tap threaded into place and secured internally, attempting to move them from factory placement will void generator warranty and possibly create leak, or complete system failure.

Fill It Up and Turn It On

Ensure you only use distilled water and fill the reservoir and dry cell and add water to the bubbler 1/3 way up. After everything has been running for a while you will only need to top up the reservoir.

Fill the bubbler with plain water as this is there to help filter the HHO gas before it enters the engine. It also protects against any backfire from your engine. Remember to keep this filled about 1/3 way up, and add an alcohol based antifreeze solution in winter in case of freezing weather conditions.

Use a 20-40% solution of 90% grade, or better, Isopropyl alcohol mixed with the current solution, to prevent the HHO Generator from freezing up during cold weather.

Turn It On

Immediately when you start the engine, gas will begin to draw up the hose from the dry cell into the reservoir and then the bubbler. Some cars immediately respond by lowering the idle speed, others don't seem to make any difference to the idle speed.

You should notice that your car's acceleration has improved, but go easy as you can have either power or economy.

Maintenance

Keep your reservoir, bubbler and cell at proper levels at all times. The reservoir will maintain the proper level in the dry cell, and it should be maintained at about 2/3 full of electrolyte solution.

The bubbler should be kept below 1/2 full as if it is over filled this can allow water to be sucked into the engine and cause the motor to misfire.

Measure Your Mileage Savings

Please keep a check on the fuel consumption and let us know your results. We would love to hear of the great savings you get with your Extreme 180 kit, plus the Volo Mileage Chip if you have fitted one.

**Always remember safety first
and the rest will follow.**