VaporWorx

We Give You Gas

WARNING

Working with fuel is dangerous. If fuel is handled improperly it can lead to fires and death. It is imperative above anything else that all appropriate safety measures be used to control the fuel and any ignition sources, including static electricity, heat, sparks, and any other sources. Proper high-pressure fuel lines and connections must be used in accordance to the manufacturer's specifications and routed away from any potential sources of heat, ignition, and protected from mechanical damage. If you are unsure about your work or safety, stop work immediately and consult with a qualified automotive technician and/or safety official.

VaporWorx Ally - KPM fuel module speed control system for use with the KPM Streetfighter 1500HP Fuel Module.

The purpose of the "Ally" system is to allow the OEM PWM Fuel System Control Module/Fuel Pump Pressure Module/Fuel Pump Driver Module/etc. to control one pump in the KPM fuel module while the VaporWorx controller powers the other. When used in this manner the power output of the FSCM typically remains within factory power thresholds, meaning that MIL codes are minimized. FSCM fuel system programming is done as normal since the Ally controller is transparent to the OEM system.

The Ally works by using the FSCM pulsed positive output as a guide for function. Both pumps, powered by separate sources, are under the single control of the FSCM. Hence, the factory feedback and diagnostics remain in place. In this application, both pumps must run at all times.

Voltage boosters can also be used subject to the maximum voltage that the OE FSCM can accommodate. Often the maximum voltage before trouble codes are noted is 16.5v. Note that voltage boosters are typically not effective with high-power pumps. Testing has shown that, for example, a JMS FuelMax will add only 1v at full power and is not considered a useful upgrade.

VaporWorx was founded on Customer Satisfaction and Service. We strive to treat people and our products the way we would want others to treat us and the products we purchase. That is why our roducts are tested thoroughly before they are packaged and shipped. VaporWorx stands behind our products for one full year after purchase with a well-stocked repair facility and quick turnaround times. VaporWorx does not want to be the reason you cannot enjoy your car. The Terms of Warranty and Service are as follows:

Limited Warranty

VaporWorx warrants its products to be free from defects in material and workmanship under normal use and if properly installed for a period of one year from date of purchase. If found to be defective as mentioned above, it will be replaced or repaired if returned along with proof of date of purchase. This shall constitute the sole remedy of the purchaser and the sole liability of VaporWorx to the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall VaporWorx be liable for special or consequential damages. This warranty is only valid on products purchased from VaporWorx or their Authorized Dealers.

Service

In case of malfunction, your VaporWorx component will be repaired free of charges according to the terms of the warranty. When returning VaporWorx components for warranty service, Proof of Purchase must be supplied for warranty verification. After the warranty period has expired, repair service is charged based on a minimum and maximum charge rate. (Contact VaporWorx for current rates).

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The following steps will help to ensure good fuel module operation and long life. Careful attention to wire routing, protection, strain relief, connectors, crimps, etc. will lead to a longer lasting and more reliable installation. Appropriate safety equipment and procedures should also be worn and utilized at all times. A minimum BC rated fire extinguisher must be within reach at all times. Wear protective gloves when handling fuels and do not smoke or have any sources of ignition anywhere in the working area.

1) Disconnect the battery from the vehicle.

2) Note that all of the braid included in the kit is much easier to work with if the ends are sealed with a soldering iron immediately after cutting. The braid can also be cut with a soldering iron.

3) Remove the fuel module from the tank using OEM procedures in order to perform the work safely. Note on most modern applications the fuel level will need to be at or below the point where the low fuel level indicator comes on. Exercise caution as fuel will run out uncontrolled if the liquid level is higher than the tank sealing ring.

4) Using OEM installation procedures, install the fuel module with the fuel level sensor and any other OEM in-tank devices into the tank. Use a new GM green fuel module sealing o-ring.

5) Find a suitable **flat** surface to mount the VaporWorx pulse width modulation controller (black box) near the vehicle battery. It is imperative that the box be mounted as close and **directly to the battery** as practical. If not connected directly to the battery controller malfunction will result. Do not mount the controller and any wiring near sources of heat such as exhaust systems, radiators, etc. The cooler the electronics are during operation, the longer their expected life will be. #8 x ¾" screws are provided for mounting. Confirm that the screws will not penetrate fuel tanks, lines, electrical, or any other systems during installation.

6) Connect the supplied black 8ga x 4' long wire from the controller BAT/PUMP- to the battery negative terminal. **Do not chassis ground.** Controller malfunction will result. Excess length should be trimmed to keep wiring lengths minimal without causing excessive strain. Ring terminals are included in the kit and must be securely installed. Heat shrink tubing is provided to insulate the ring terminal similar to that of the one already installed on the wire. Attach, but to not tighten the nut on the VaporWorx controller. The negative wire to the pump will be attached later.

7) Perform the same for the 8ga red BAT+ fused wire included in the kit. The Battery+ ring terminal has been installed. Cut to length and terminate the controller end using the provided 8ga ring terminal and heat shrink like that in Step 4. Tighten the BAT+ nut on the VaporWorx controller to 10-inlbs. **DO NOT OVERTIGHTEN THE NUT.**

8) Plug the two-cavity GT150 connector with the red/grey wires into the mating connector on the VaporWorx controller. Install the protective braid and route it to the area around the FSCM. The red wire will not be used.

9) The 20ga grey wire in Step 6 ties in to the FSCM fuel pump + wire. **It may be tied in anywhere along the length of the FSCM Pump + wire.** For GM chassis with OEM ZL1 fuel modules this is usually the heavy gauge grey wire that goes to the fuel module #1 plug cavity. In some applications the FSCM fuel pump + wire may be a different color. See Photo 1.

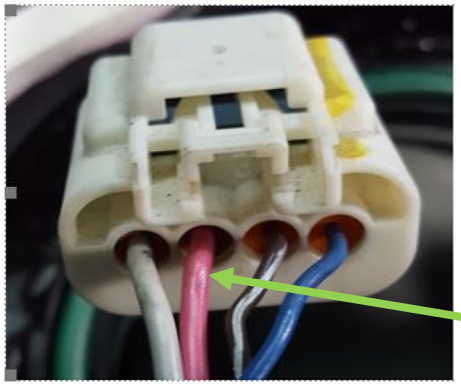


Photo 1.
OEM fuel module wiring plug.
From Left to Right:
Grey = Pump+
Pink = Pump –
Brown/White = fuel level sensor low reference.
Blue = fuel level sensor output

Remove the OEM Pump - / Pink wire only. The Pump – color may be different on some models.

NOTE: FSCM wiring may be different colors. Refer to an OEM shop manual determine the Pump + and Pump – wiring colors. The signal must be a positive voltage pulse.

10) Exercising caution, strip approximately ½" from the heavy gauge FSCM Pump + wire. Do not cut the FSCM wire.

11) Cut and strip the 20ga grey wire to the appropriate lengths, slip 2pcs ½" long shrink tubing onto the braid, then secure the wire to the FSCM grey wire by soldering. Seal the connection with rubberized tape and apply the heat shrink to the ends of the 20ga grey braid to keep them from fraying.

12) For most chassis, the Pump – wire is a heavy gauge pink wire that goes to the fuel module #2 plug cavity. If the wiring is a different color, confirm that the wire is Pump -. Remove this wire from the plug body by performing the following:

    a. Remove the blue cap on the end of the fuel module plug by prying up on its bottom or sides.
    b. Using a jeweler's screwdriver, gently pry the locking tab away from the terminal. Once sufficiently moved, the wire will pull out of the plug body. Do not over-pry the locking tab or it will break. See Photo 2.

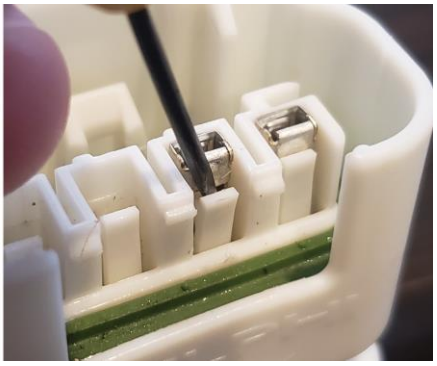


Photo 2. Gently pry the locking tab back to release the Pump - terminal from the plug body. The wire and terminal will slide out the opposite side of the plug.

13) Route the long VaporWorx 10ga red wire to the white fuel module plug. One end has a terminal already installed and will be inserted into the #2 cavity where the Pink Pump – wire was removed.

14) Route the long VaporWorx 10ga black wire from the VaporWorx controller to the KPM ground stud on top of the fuel module hat. The terminal installed goes to the BAT/PUMP- stud on the VaporWorx controller. Shared with the Bat- wire, tighten the nut to 10 in-lbs. **DO NOT OVERTIGHTEN THE NUT.**

15) The OEM PINK pump negative and the VaporWorx pump negative will attach to the KPM ground lug. Secure the negative wiring to the KPM ground stud by tightening the nut. Be sure that there is no excessive strain applied to the connections and that the wiring does not contact sharp edges, sources of heat, etc.

16) Install the suppled braided loom over the VaporWorx 10ga wiring (and 20ga grey if desired) along with 2x ½" long pieces of heat shrink tubing. Cut the braid to the appropriate length using a soldering iron or hot knife to reduce fraying.

17) Replace the removed PINK Pump - wire from the module plug with the VaporWorx 10ga red wire. Insert this terminal into the #2 plug cavity with an audible click, and re-install the blue plug cap. Allow for sufficient length to reach the fuel module plug easily. See Wiring Diagram for reference. Wiring schedule:
    a. Cavity 1: FSCM Pump + for Pump #1
    b. Cavity 2: VaporWorx Pump + 10ga Red for Pump #2
    c. Cavity 3: Fuel level sensor low reference (brown/white)
    d. Cavity 4: Fuel level sensor output (blue)

    NOTE: It does not matter which is Pump #1 or Pump #2. Both pumps tie into a common manifold and hence have no practical distinction.

18) Crimp the ¼" x 10/12ga ring terminal to the PINK Pump - wire removed earlier. Use heat shrink to seal the crimp. Route the finished wire to the ground stud on the top of the KPM hat.

19) Route the VaporWorx 10ga black wire to the KPM ground stud. Using the supplied ring ¼" x 10/12ga terminal, crimp the terminal to the VaporWorx 10ga black wire, seal the crimp with heat shrink, and attach it along with the PINK Pump – wire to the KPM ground stud. Tighten the nut on the stud to secure both wires.

20) Cut the VaporWorx 10ga red wire to the appropriate length to reach the Pump + terminal on the controller. Slide a ½" long piece of heat shrink tubing on to the wire. Using the supplied #6 x 10/12ga ring terminal, crimp the terminal to the wire and seal with heat shrink. Attach the ring terminal to the Pump + terminal and tighten to 10-inlbs. **DO NOT OVERTIGHTEN THE NUT.**

21) Confirm that the three nuts that secure the heavy gauge wiring have be tightened to 10-inlbs. **DO NOT OVERTIGHTEN THE NUT.**

22) Align the braided loom and heat shrink that is routed from the controller to the KPM fuel module. Heat the shrink tubing to secure it to the loom.

23) Secure all wiring using zip ties, clamps, etc.

Refer to Photo 3 and Wiring Diagram 1 for the following steps.

24) Plug the white fuel module wiring plug into the KPM 1500 fuel module.

25) The assembled top hat should look similar to Photo 3.

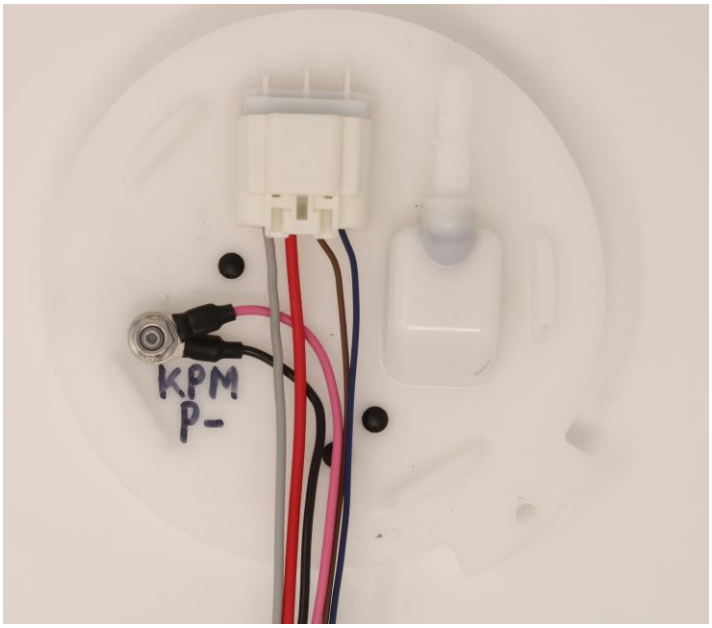


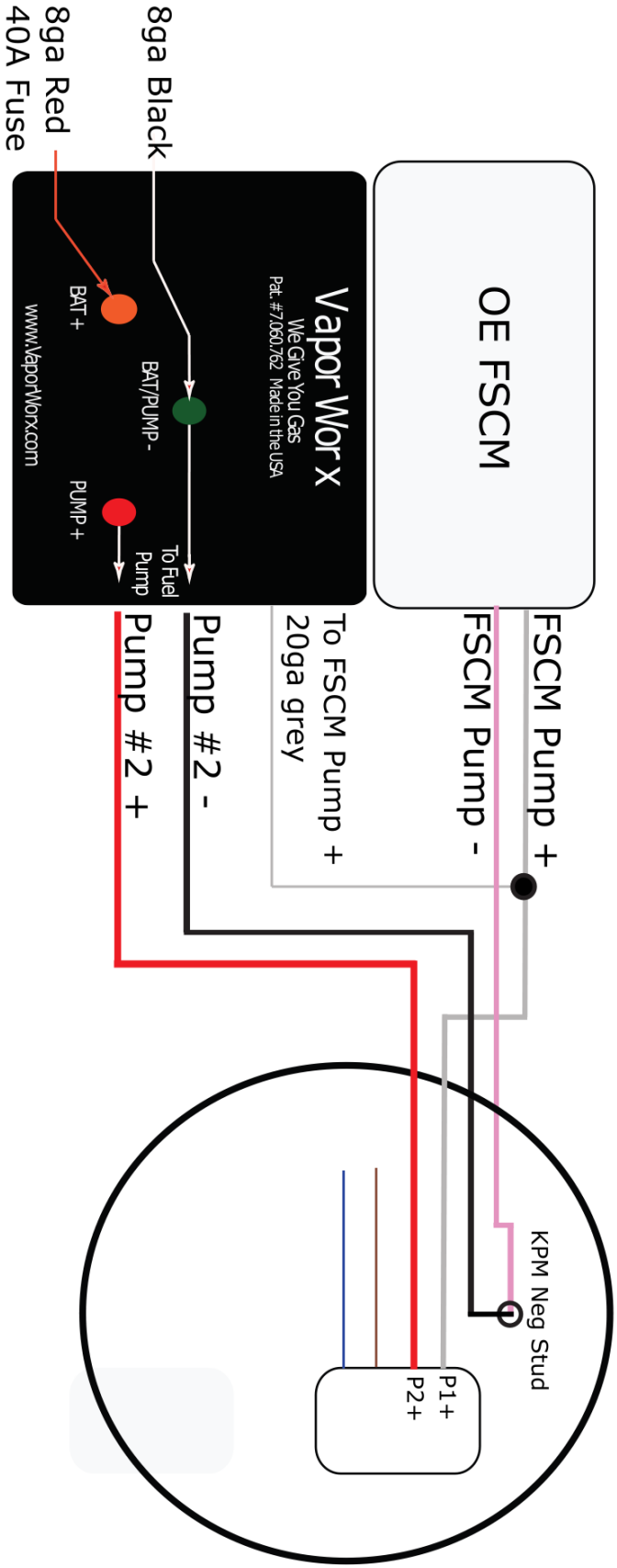
Photo 3. Top hat wiring showing the white fuel module electrical plug used for the Pump + circuits, and the two Pump wires connected to the KPM ground stud.

Pink = FSCM Negative to KPM stud
Grey = FSCM Positive to Pump #1+
Red = VaporWorx PUMP+ to Pump #2+
Black = VaporWorx BAT/PUMP- to KPM stud
Brown/White = Fuel level sensor low ref.
Blue = Fuel level sensor output.

NOTE: FSCM wiring may be different colors. Refer to an OEM shop manual determine the Pump + and Pump – wiring colors.

Preparation Required Prior to Engine Startup

1) The VaporWorx controller is tuned to work with the OE FSCM. No further VaporWorx controller tuning is needed.
2) Reconnect the battery
3) Insert the 40A fuse into the fuse link. A small spark during insertion is normal if the battery is connected.
4) Confirm that all wiring is connected per Diagram 1 and that the fuel lines are properly attached and sealed.
5) Put fuel into the tank.
6) Re-attach the battery.
7) Connect a pressure gauge to the engine fuel rail or monitor via the vehicle OBDII port.
8) Turn on the ignition switch. The fuel system should turn on for 1-2 seconds during the prime cycle. Turn off the ignition.
9) If the fuel level in the tank is above the white bucket reservoir (usually 3+ gallons for modern OEM tanks), the ignition may be immediately cycled on again to continue to prime the fuel system. Continue cycling until pressure is obtained.
10) If the fuel level in the tank is below the top of the white bucket/reservoir, after the first prime cycle wait 30 seconds before cycling again. Repeat the 30 second cycle until pressure is obtained.
11) Check for leaks and repair as required.
12) If no leaks are found, start the engine and confirm the fuel pressure meets specified demand.
13) If a very large injector is used (100#/hr+) it is possible that the OEM FSCM may react to the pulses generated by injector operation. Often the FSCM smooths out the pulses from a functional standpoint. However, visually using a gauge or via HPTuners/OBDII datalogging, large pressure spikes may be seen. These spikes make it difficult to determine actual fuel pressure. A fuel pulse damper offered by Radium Engineering has shown to reduce the pulses.



Wiring Diagram 1. VaporWorx KPM 1500 Fuel Module Wiring Layout.