
PWM60A V2.0 - Installation Manual

HHO Hydrogen on Demand Dual Fuel Generator Systems



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Disclaimer

When purchasing this device, you are held responsible for any damage that may occur during installation or operation of this device. The manufacturer or seller are not held liable and hold no responsibility for any personal harm or property damage. Thank you for purchasing PWM60A Automatic Power Device. Please read contents carefully in order to understand the installing and operation procedures before getting started.

Safety Precautions

Read and follow these safety precautions to avoid hazards. If you do not understand these instructions or do not like to work on vehicles, please have a qualified mechanic do the installation for you. Incorrectly installing or using the PWM60A and/or the HHO System may result in serious damage to you and/or your vehicle.

It should take approximately 0,5 hours to install this unit, so ensure that you have enough time to complete the installation. Be sure to work outside, no smoking at any time during the installation; make sure the engine is off and very importantly, not hot.

Your HHO System does not store hydrogen, subsequently there is no fire hazard when installed properly. However water electrolysis generates Hydrogen, an explosive gas, which means that you should **never light a match or smoke near or in front of the generators output** - the water tank could blow up!

Be careful with the generator working when the car is not moving. A small amount of hydrogen can accumulate in the air intake of the motor and could explode if you smoke or use an open flame near it.

Be sure to wear goggles and rubber gloves and only use professional tools; use common sense and general safety procedures used for any work carried out on automotive installations and maintenance.

Parts List

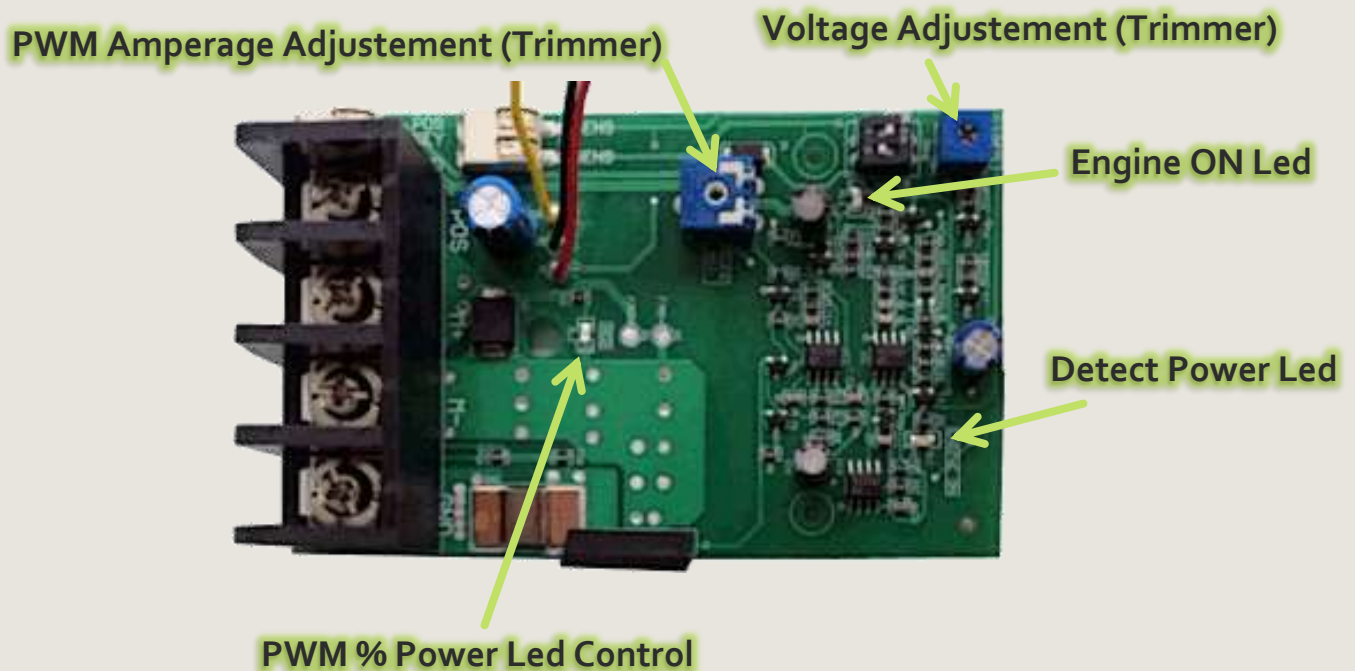
The PWM60A package includes the following items:

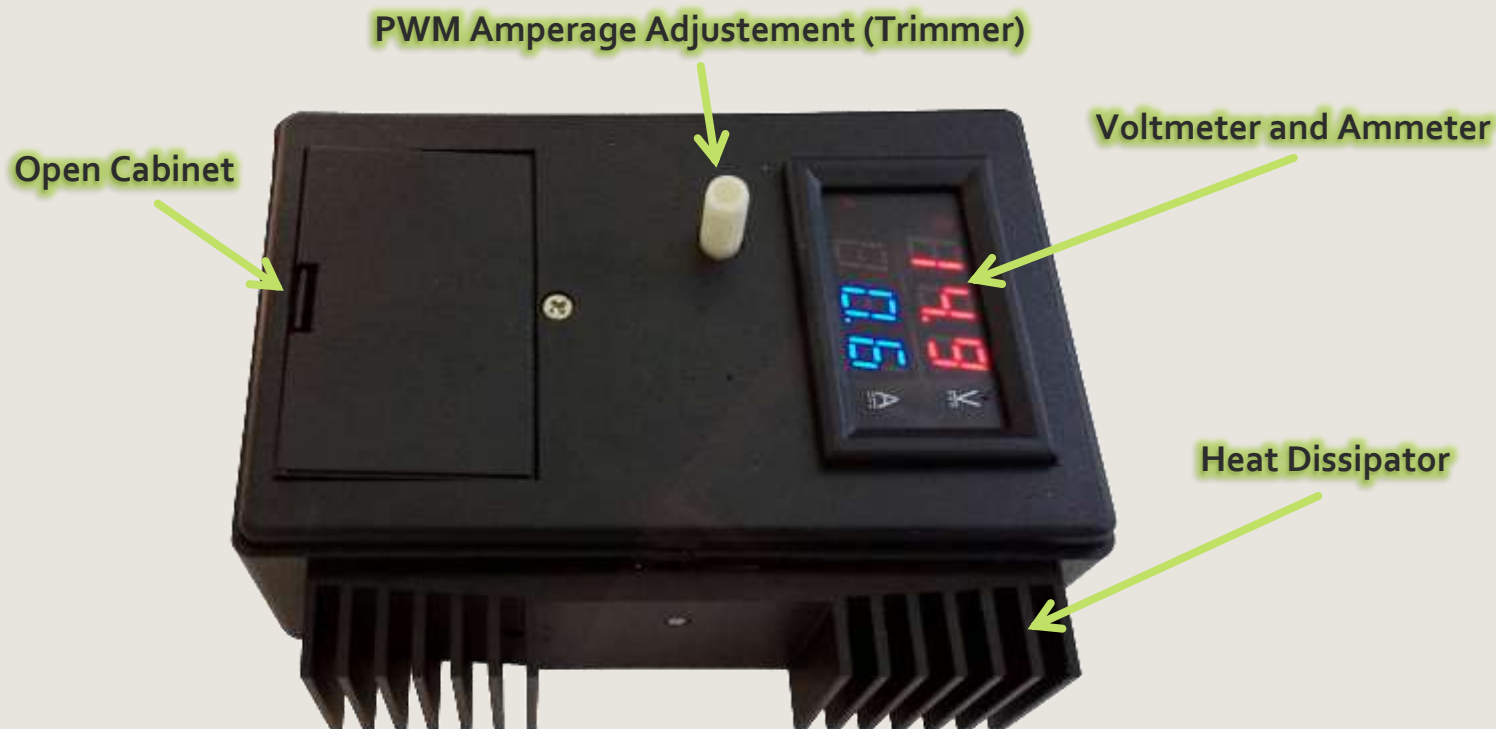
- 1 PWM60A Automatic Power Switch Detection
- 4 Yellow Crimp Terminals.



Technical Specifications

- Direct connection from Battery Input to HHO CELL generator, without external relays;
- 60A Max Power supply;
- 60A External Automotive Fuse;
- Dual LED meter: Voltmeter + Ammeter, 5 to 40V, 60A;
- Automatic detection of battery voltage and auto configuration for: +12V/+24V power supply;
- Quad operational chip sensor with 1% tolerance Zenner voltage detector;
- Auto power ON when the Engine is running;
- 1 Second delay PWM control, after Engine ON is detected;
- Auto Power OFF when Engine is turned OFF;
- Soft PWM startup to the max Ampere out power supply;
- Embedded trimmer for PWM control: from 0% to 100% HHO CELL power supply;
- Logical IC sensor, MUST be powered with 2 wires DIRECT from the battery;
- Embedded 4 way power barrier: Positive, Gnd, CELL - OUT, CELL + OUT;
- Optional Water tank sensor switch embedded on system;
- Compact black ABS cabinet + Alluminium dissipator for the 60A Mosfet.





Pulse Width modulation

Pulse Width Modulation, is a method of transmitting information on a series of pulses, changing the frequency, rather than a continuously varying analog signal. It will allow you to control the amperage going into the generator in a very easy way. This ability keeps the cell running at cool operating temperatures and prolongs the life of the cell while increasing the HHO output

Efficiency: HHO generators will run cooler than standard linear power amps, requiring substantially less heat sink mass;

Amperage control: the control of the amperage going into the generator will be very easy to control. The ability to control the amperage keeps the cell running at cool operating temperatures and prolongs the life of the cell while increasing the HHO output.



Main Features of the PWM60A

The PWM60A is an electronic device designed for making the automatic power supply of the HHO System without the need for relays or picking up the signal from the alternator/ignition key, making the system safer to use and easier to install. In general the new PWM60A will work based on the voltage of the car/truck:

- Engine is stopped – voltage in car/truck is 12V or 24V – PWM is not working;
- Engine is working – voltage in car/truck is 13,8V or 27,6V – PWM is working.

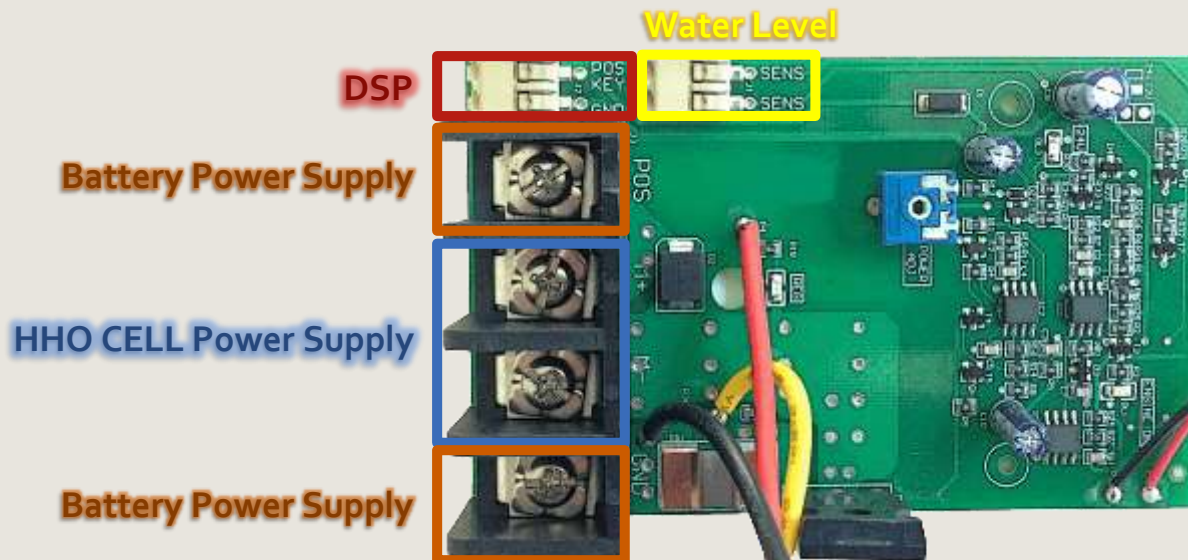
The PWM60A autodetect when the car engine is running and automatically switches ON the HHO System, without any additional requirements. The device will automatically power OFF when the car engine is turned OFF or not running. **Due to the different characteristics of each alternator in each car model we just need to set the voltage starting/stopping point of the PWM.**

The PWM is also capable to control a water level sensor inserted in the water tank turning the system OFF when the level drops from a certain point.

Electrical Connections

The PWM60A device is splitted in 4 different working zones:

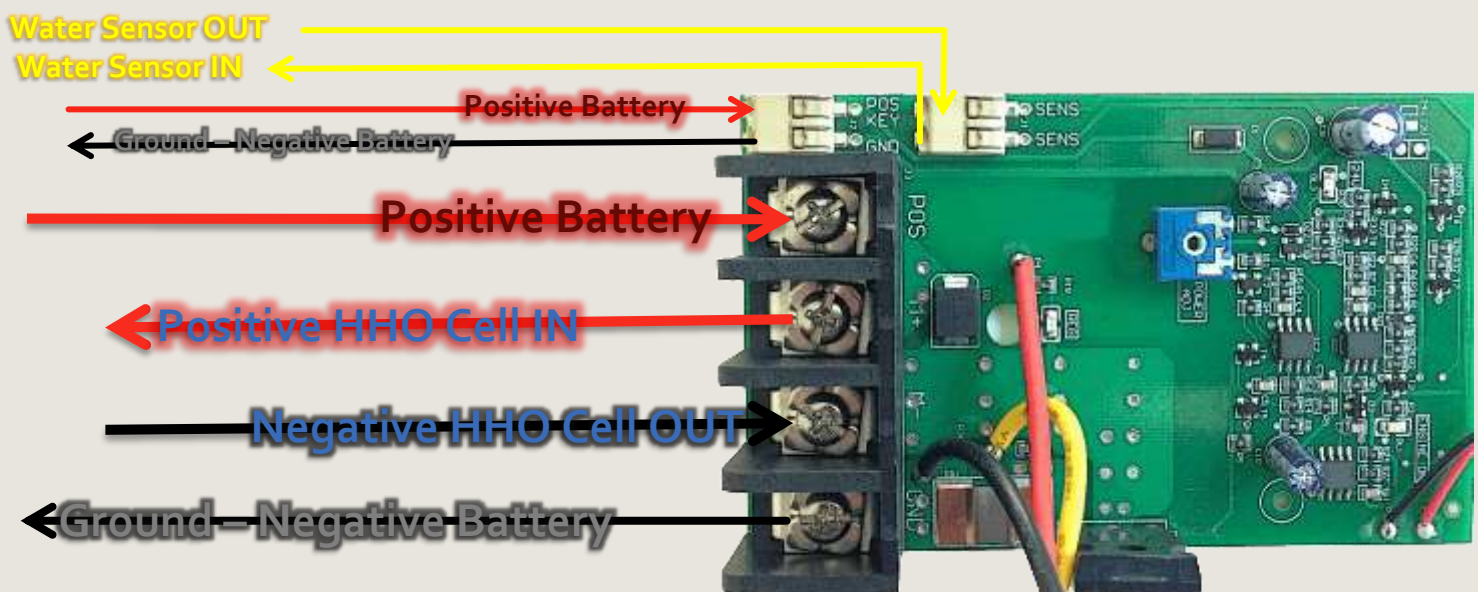
- 1) DSP Voltage detector and Car engine running sensor;
- 2) PWM power supply to HHO CELL;
- 3) Battery power supply to PWM;
- 4) PWM power supply to Water Level Sensor.

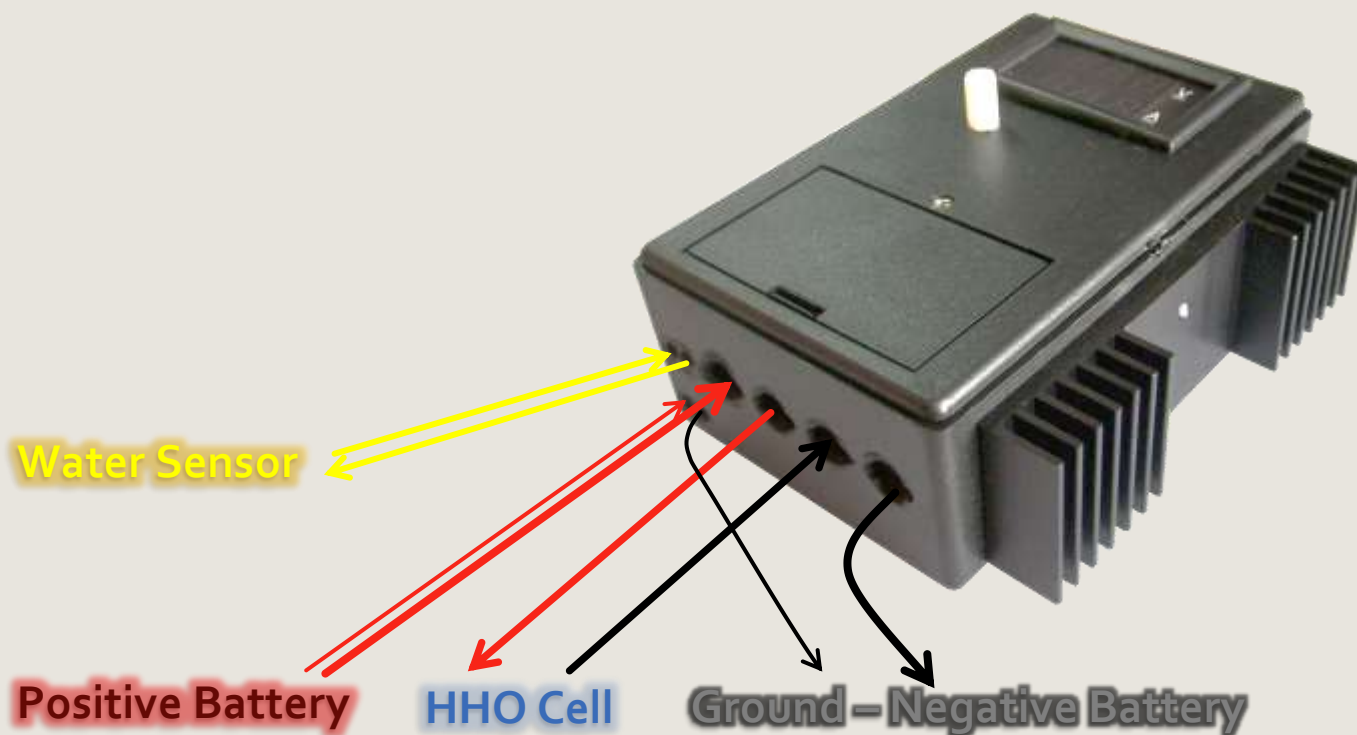


Important 1: The cables for the DSP Voltage detector must always be connected directly to the battery terminals using the two 0,5 mm diameter wires included in the kit. They should be independent of the cables of the Battery Power supply

Important 2: The distance between the PWM60A and the HHO DryCell must be the shortest possible in order not to have voltage losses in the circuit that could compromise the DSP Voltage detection (car Engine ON).

Please refer to the illustration below for typical configuration of the electrical connections of the PWM60A:





Amperage Control

Electrolysis of water is the decomposition of water molecule (H_2O) into oxygen (O_2) and hydrogen (H_2) gases due to an electric current passing in the water. Electrolysis of pure water requires excess energy in the form of potential to overcome various activation barriers. Without the excess energy the electrolysis of pure water occurs very slowly or not at all. This is in part due to the limited self-ionization of water. The efficacy of electrolysis is increased through the addition of an electrolyte (such as a salt, an acid or a base).

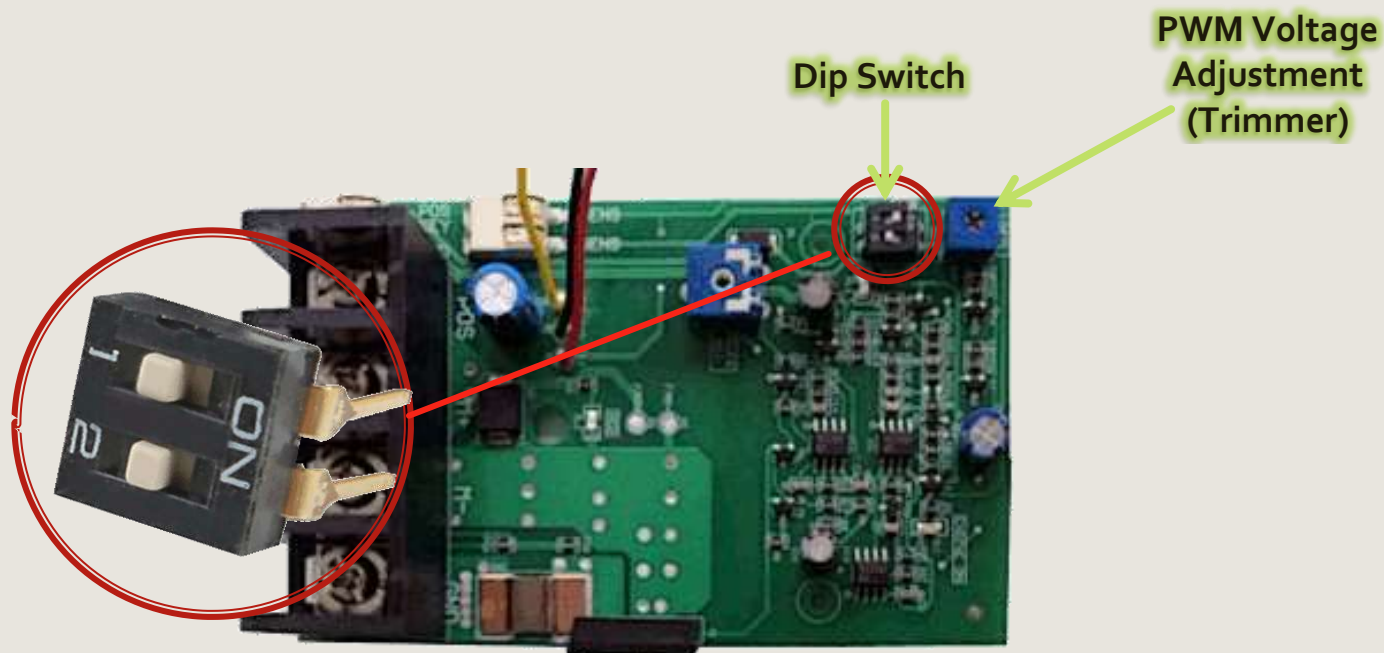
The electrolyte should be added to the water the first time that you use the system, and also when refilling, but in lower quantities.

The more electrolyte you add to the water, the more amperage you will have in the system and also more HHO gas will be produced. But, **it is false to assume that a higher HHO gas production will mean a higher fuel savings**. There is an optimum point for all internal combustions engines. **The maximum amperage of the PWM will be set by the electrolyte concentration in the water. The PWM will only control the amperage below this value.**



Working Voltage Setup

As mentioned before the PWM60A auto detects when the car engine is running and automatically switches ON the HHO System, without any additional requirements. The device will automatically power OFF when the car engine is turned OFF or not running. **Due to the different characteristics of each alternator in each car model we just need to set the voltage starting/stopping point of the PWM.**



In the Dip Switch we can control the water level sensor circuit (1 SENS) and the PWM Voltage Adjustment circuit (2 GATE).

Important: The PWM auto switch is set always on 13,6 V as default mode. In some cars, especially the more modern one with strong alternators, this value is sufficient for the PWM and HHO system to work correctly along with other electric equipments (ex: lights, radio, air conditioning, ...). In other cars the alternator is not strong enough to have all equipments running above the operational working voltage and the results is that the PWM will not start working and we will have 3 lights flashing. In this case we will need to set manually the voltage starting point:

- Put the engine working with all car electrical devices running at the same time in order to have the maximum amperage load for the alternator. You will have the 3 pwms lights flashing and the pwm will be not working.
- In the Dip Switch place the button # 2 forwards near the letters "ON".
- In the PWM Voltage Adjustment turn slowly the trimmer to the left in order to reduce the voltage starting point. Stop turning when the 3 lights stop flashing and are steady. The pwm and the HHO system should be now working perfectly.



- d) Stop the engine and verify if the PWM stops working. If the PWM is still working then turn slowly the PWM Voltage Adjustment trimmer to the right until the PWM stops working.
- e) Turn the engine ON and verify that the PWM starts working after a few seconds.

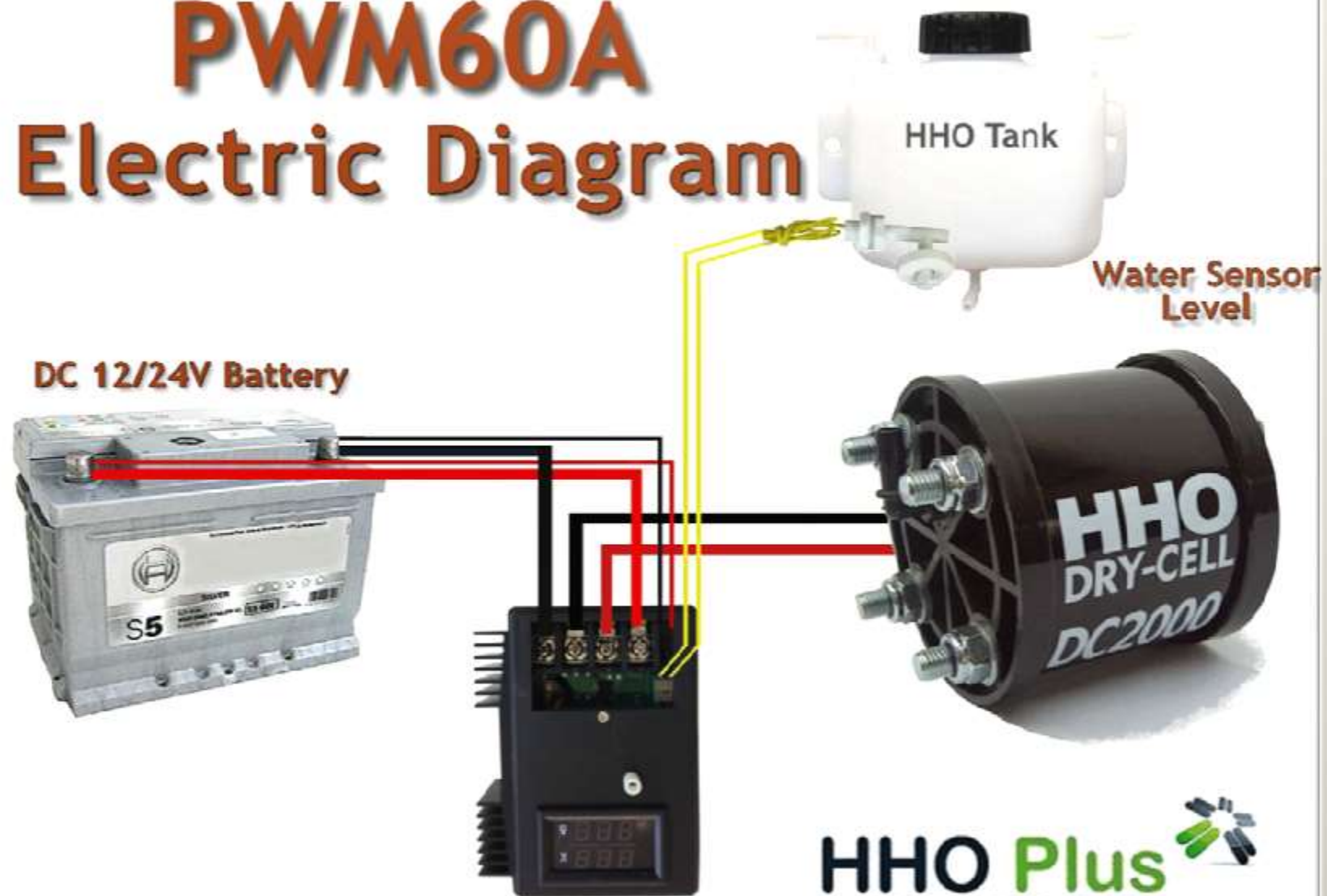
Water Level Sensor

The water level should be placed in a way that, when the water level is above the minimum value, the signal coming from the PWM returns to the PWM. That is, the water level circuit should operate as normally closed (NC). Using our company models, the water level sensor should be placed down (please check last picture on this manual).

The PWM is set as default mode for the scenario of not using the water level sensor. If you are using a water level sensor in your system, then you must place the button #1 of the Dip Switch backwards away from the letters "ON".



PWM60A Electric Diagram



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