WATER HOUSE®
Pumps & Garden

The Little Pump that can!

Continuous Use Amphibious 12v DC Pump and Solar Kit – Installation Instruction Booklet

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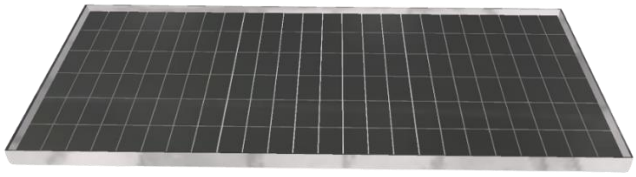
Kit Contents

1.	1 X Solar Panel 50 Watt	
2.	1 X 12 Volt Gel Acid Battery P/N 12 AH 6-CNF-12	
3.	1 X PWM Solar Charge Controller	
4.	1 X 12 Volt Continuous Use Amphibious Pump P/N FL-800	
5.	1 X length of Red and Black Wire	
6.	1 X Fuse	

Effective Placement and Orientation of Solar PV Panels

Panel Direction

Face True North

Shade

Avoid Shade – Shade Reduces Panel Performance

Panel Tilt

Winter Tilt / Inclination Calculation

Multiply Your Southern Latitude by 0.9 and then add 29°.

Summer Tilt / Inclination Calculation

Multiply Your Southern Latitude by 0.9 and then subtract 23.5°

If this is too much effort or cannot be achieved, (Performance will be compromised) use an Average Inclination 35 to 45 degrees Static

Placement and Volt Drop

Try to keep all the Kit components as close together as possible. As the distance increases between components, so should the Copper Conducting wires increase. 6mm² to 10mm². (This is the cross-sectional area of copper conductor)

Solar PV Panel/s Mounting Structures

Always use quality materials to secure your solar PV panel/s

Garden Pole

Garden Wall

Garden Shed Wall / Roof

House Wall

House Roof – If placed on roof, keep maintain an air flow space of minimum 50mm. Unnecessary heat build up under the panel diminishes performance

Solar Charge Controller

Features of the Charge Controller

The features of your charge controller are

1. Charges your battery when your solar panel is exposed to the sun. It does a Bulk Charge and then a Float (Maintenance) charge.
2. Prevents damage to your battery through overcharging
3. Protects your battery from harmfully excessive discharge
4. Controls the load (Acts like a switch turning off your pump if the battery voltage become to depleted
5. Acts as a timer which for **lighting** and a load reduction measure (A time switch is recommended for the pump)
6. It also has a USB charger, which works when you have your LOAD switched ON.

System Connection

Make sure that you connect your wires correctly, Red is + Positive and Black is – Negative. Even if certain suppliers use different colours, one should by deduction, determine which wires, and connection points are + or – (Positive of negative)

Make sure to make good connections at all times.

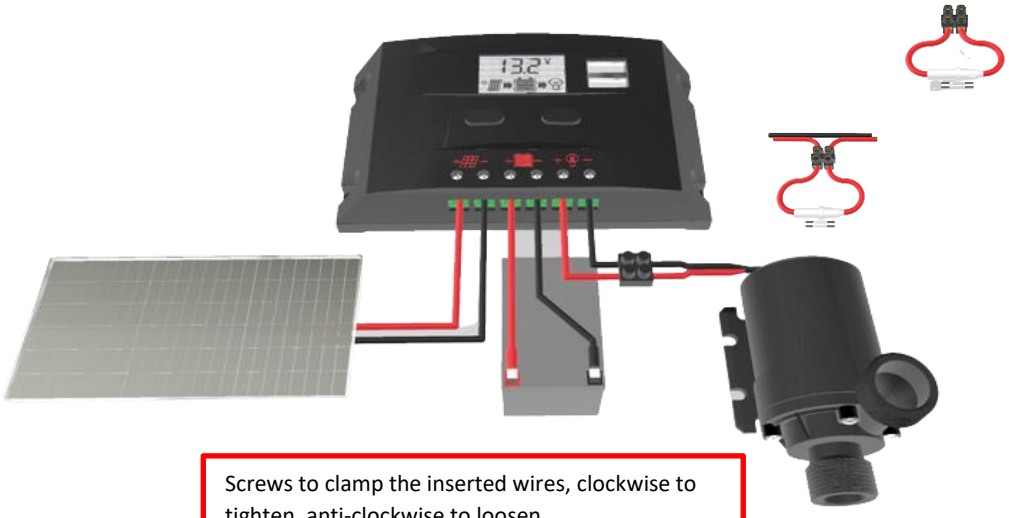
Fuses

A fuse installation on each of the Positive wires is a requirement

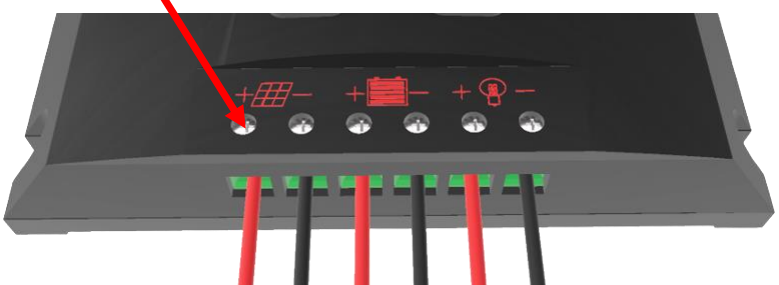
Water house has made it easy for the installer to install the fuses, by pre connection the standard fuse to a connector block.

In the diagram depicting the connections of the major devices, Solar Panel, Charge Controller battery and pump you need to install the fuses closest to the source as possible. Instal a fuse for safety especially of the Battery circuit

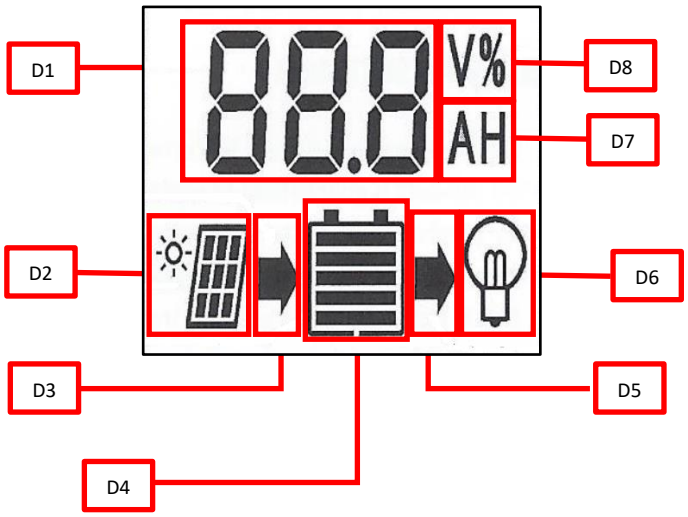
Conductor Thickness – Measured in cross Sectional Conductor surface Area. Recommended from 6mm² to 10 mm² Depending on Distance



Screws to clamp the inserted wires, clockwise to tighten, anti-clockwise to loosen.



Digital Display



D1 Numeric Display of Voltage (Mostly), Parameter Setting such as Battery Type and Time Switch Parameters

D2 Indication for a Solar Panel. Indicates that a Solar PV Panel is connected to the Controller. No Solar PV Panel Symbol Indicator, means that the Solar Panel is either Not Connected or the Solar PV Panel is not receiving Sun Light

D3 Charging Indicator – This Symbol indicates that the Solar PV Panel is charging the battery. If this indicator is not visible, this means that the battery voltage is too low for charging. If the Indicator Flickers, then the Battery is charged and in Floating State.

D4 The bars in the battery indicator, provide a sense on how much charge your battery has. Zero Bars – Battery has no Charge, 5 Bars the battery is fully charged, use this in conjunction with D3 and check whether the battery is in Floating Charge State.

D5 Battery Discharge Indicator

D6 Load ON / OFF

D7 Amp / Hrs

D8 Volts

Charge Controller Buttons

Configure your Charge Controller for Use

Display and Understanding the use of the Buttons on the faceplate of your Charge controller

There are two buttons on the faceplate of your Charge Controller, namely the Left-Hand Side Button (LHS-B) (sometimes referred to as the Menu Button and the Right-Hand Side Button (RHS-B)

Left Hand Side Button (LHS-B)

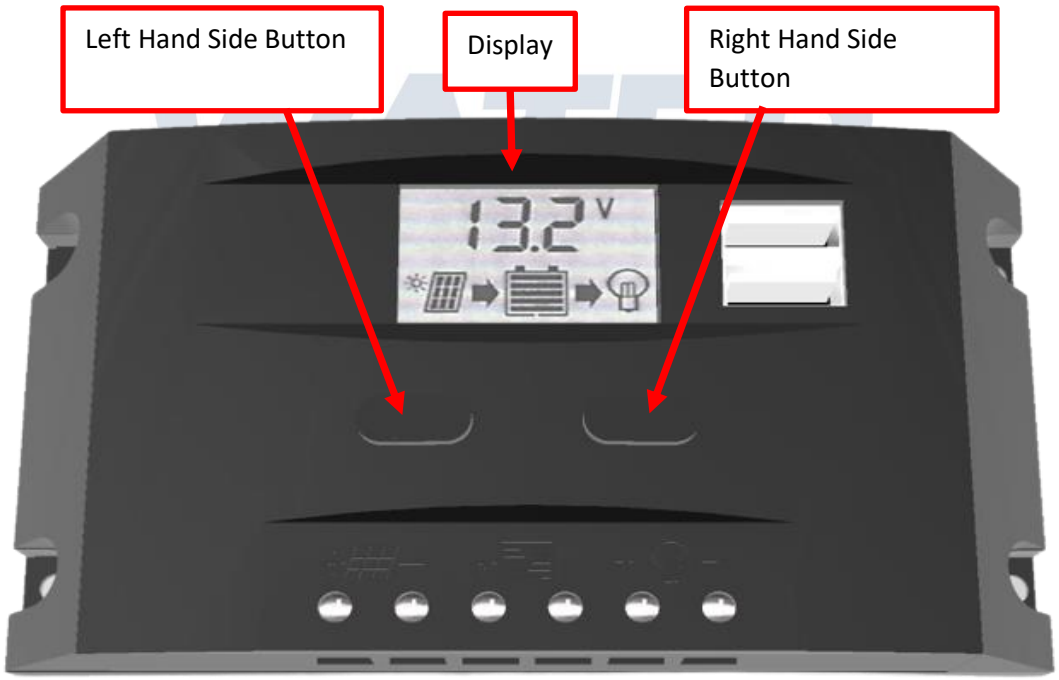
4 functions – Menu and Select (enter programming mode) / and Change Setting / Deselect (Exit Programming Mode)

1. The left-hand side button is used as a method to scan through the 6 states of the charge controller. (see table of States and Settings)
Simply press it one press at a time to scroll through the different screen displays.
The different screens provide information about the current setting of the charge controller.
2. The left-hand side button is used as a setting + (Plus / Increase) function when in programming mode, to change a setting upwardly. For each button depression, the setting is charged incrementally upwardly. ((The Right Button Does the opposite))
3. Selection Function - To enter programming mode
4. To exit programming mode, if a setting has been changed, the new setting will be saved. or if no setting was made, it allows you to exit without making any change as well.

Right Hand Side Button (RHS-B)

1 Function – Changing setting downwardly

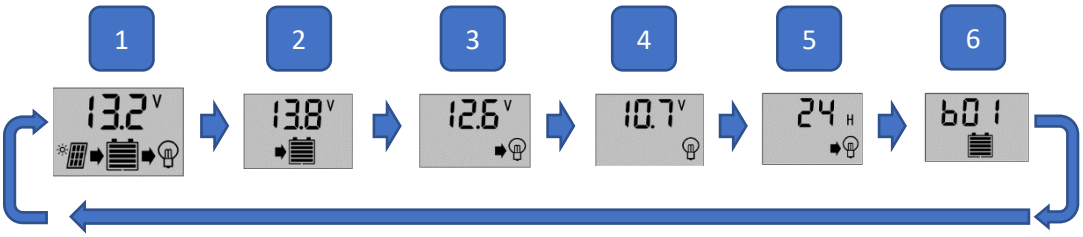
1. The right-hand side button is used as a setting - (Negative / Reduce / Diminish / Decrement / Downwardly adjust) function when in programming mode, to change a setting downwardly. For each button depression, the setting is charged incrementally downwardly. ((The left-hand button does the opposite))



Menu / System State / Parameter Changes

Menu
Viewing and Setting
Note the Cyclical Nature of the Screen Display Navigation

Left-Hand Side Button Moves you through the various Displays



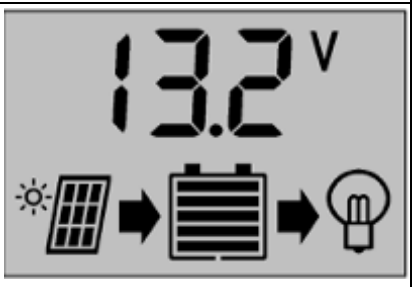
1

View System State

As pictured at right, the Floating Charge Voltage is showed, and when it is in floating mode, the arrow between the solar panel and battery icons in the display will flash.
When the battery reaches the floating voltage, the controller will maintain the voltage values by PWM charging mode to avoid overcharge.
It must be noted that different battery types have different bulk and float programs. Make sure you have the correct battery type setup as a parameter in your charge controller, as in item number 6 of this table.

Important
No solar Panel Icon on the display means that either your solar panel is not connected, or it is short circuited.

Before you start using your pump, leave the battery charging for about a day of two. Always switch off your load as described in 1.1 of this table when you are bringing your battery/s up to a serviceable level. (The little lamp bulb Icon will disappear when you have switched off your load / Pump.

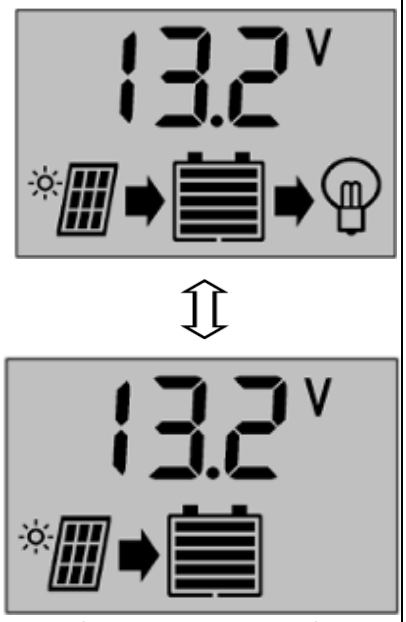


View System State Display

1.1

Switching the Load ON and OFF
(The **Load** in this case the Pump)

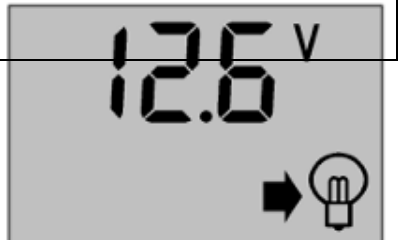
As pictured at right.
You can use the Left-Hand Side Button (LHS-B) on the faceplate to switch ON or switch OFF the load in the default interface. To do this, you do not have to enter the parameter set mode to do this single operation.
All you have to do, to switch off the LOAD (Your Pump) Is to press the Right-Hand Side Button (RHS-B). You will see the Light bulb icon Switch on and off for each press of the RHS-B button.
(Additionally, it is interesting to note that the other method works as well, LHS-B for > 5 Seconds, Press the LHS-B once, Hold the RHS-B down to save the setting.) Described Below.

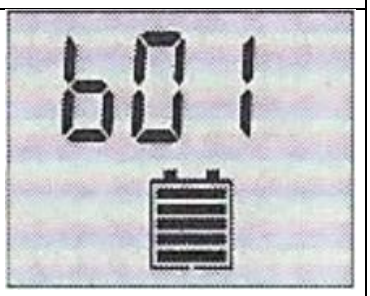


Switching your Pump ON and OFF

Setting Parameters Method

The controller will Indicate the default entry “battery voltage” interface after the unit is correctly powered-on. This is the main interface.

Viewing and Setting Parameters	Using the Left-Hand Side Button (MENU) one press at a time, will in turn cycle through the parameters that are set. If there are parameters at a particular display that might need to be set, do the following left button sequence. Press the Left-Hand Side Button (Menu) for > (more than) than 5 seconds. You will notice that the numbers start flashing. At this time you can make the desired change, in the selected parameter interface screen, if required. These setting will be discussed further on in this text. To return to the parameter setting interface displays; Press the Press the Left-Hand Side Button for more than 5 seconds again. (The parameter numbers stop flashing) Setting value will be conserved by controller.	
2 Viewing and Setting Float Voltage	As pictured at the right. The floating charge voltage is showed. When the battery reaches the floating voltage, the controller will maintain the voltage values by PWM charging mode to avoid overcharge. Press the Left-Hand Side Button for more than 5 seconds. The numbers will start flashing, this means that the device is ready to accept the change. Pressing the Left-Hand Side Button, one press at a time, increments the setting, one decimal digit at a time / Pressing the Right-Hand Side Button, one press at a time, Decrements the setting parameter one decimal digit at a time. To complete and conserve, the new setting of floating voltage values and use the SET、MENU button to adjust the parameter; calling off the parameter interface after long press the button MENU again. (The numbers stop flashing) The floating voltage value will be conserved by controller. Caution – Do Not change these settings without the knowledge, as you can damage your Battery by setting these parameters to the incorrect values.	 **Float Voltage**
3 Viewing and Setting Under-voltage Protection	As pictured at right, the value for under-voltage protection is showed. The controller will cut off load circuit when batter voltage is lower than this value, in order to avoid over discharge of the battery. long press the button MENU （>5seconds， numbers start flashing）to enter the setting interface of under-voltage protection and use the SET、MENU button to adjust the parameter; long press the button MENU again (The numbers stop flashing) to call off the parameter interface after finish setting. Setting value will be conserved by controller.	 **Under Voltage Protection**
4	As pictured at right, the recovered voltage is showed. After the controller performs the function of under-	

Under-Voltage Recovery	voltage protection, the output of the load will be recovered as soon as the battery voltage recovers to higher than the under-voltage value. Hold the Left-Hand Side Button for more than 5 seconds， numbers start flashing. To change the values, Left Hand Side Button, increases the setting value or Right Hand Side Button reduces the setting value. To Enter/Save the setting interface of recovery after undervoltage; Hold the Left-Hand Side Button for more than 5 seconds (The numbers stop flashing). Setting value will be conserved by controller.	**Under-Voltage Recovery**
5 Turning the Load ON and Turning the Load OFF state	As shown in the display picture at the right, the interface of load mode is displayed, and different numbers represent different load modes. 24 H represents Normal Mode; the load is always in power under the fault-free circumstance. 1 H to 23 H represents a Light Sensor Control together with a Time Control Mode. When in this mode (1 H – 23 H), the controller will switch ON the load after darkness and will Turn the load OFF the load after the amount of the set hours has elapsed. 0 H represents Light Control Mode; Load will switch ON after darkness (Sunset) and then the Load will be switched OFF at dawn (Sunrise). Hold the Left-Hand Side Button for more than 5 seconds, the numbers start flashing to activate the setting interface of load working modes and use the Right-Hand Side or Left Hand Side buttons to increase or decrease to adjust the parameter; Hold the Left-Hand Side Button for more than 5 seconds again. The numbers stop flashing and the setting value will be conserved by controller.	 **the Load ON and Turning the Load OFF state**
6 Viewing and setting of battery types	As pictured at right, different numbers represent different types of Battery. **b00**：Lithium battery (other controls parameters need to be adjusted to match the battery) **b01**: Sealed battery (default type for the controller) **b02**: Vented battery **b03**：Gel battery Hold the Left-Hand Side Button for more than 5 seconds ， numbers start flashing）at this interface to activate the battery type and use the Left Hand Side Button or the Right hand side button to adjust the parameter; Hold the Left-Hand Side Button for more than 5 seconds The numbers stop flashing. Setting value will be conserved by controller.	

Errors / Problems and Issues

Error / Issue	Remedy

Battery is not connected	unclamp connection of battery and reconnect to battery
Battery voltage too low	Pre-charge the battery Check to see whether your charge controller is set up for your battery Type.
The external fuse in the battery connection cable has blown	Replace the external fuse
Battery is defective	Unclamp all connections, connect a proper battery with correct polarity and reconnect the solar panel and loads.
Load can't be operated or has only operated for a short time/ Load is not connected	Reconnect loads
Battery voltage too low to provide energy	Wait till battery is charged
Load output is switched off due to excessive load current	Reduce load current, if necessary switch off or disconnect loads Check load levels in the appliance or device you have connected
Load output is switched off due to short circuit at load output	Disconnect loads, correct the cause of the short circuit, reconnect loads.
Battery is not charged	Solar panel is not connected
Solar panel is not connected	Connect the solar panel.
Solar panel connected with incorrect polarity	Connect the solar panel with the correct polarity
Short circuit at solar panel input	Correct the cause of the short circuit
Rainy or sunshine can't provide power for battery	Wait for a sunshine day
Battery is not connected	Reconnect battery
Battery is not charging quickly enough	Check Panel Direction – Should be True Northerly Direction (Use Google Maps to orientate your property to the direction, north is the top of the Map. Your Panel is in the shade Your Panel is in the shade for most or part of the day. Your Panel is not the correct size in Watts. Very Important – Maximum Watts for this Charge Controller is 120 Watts You are experiencing low charge rates from one season to the next. Check to see whether your charge controller is set up for your battery Type. Your panel and your battery are not sized for your use expectancy.
Your system is experiencing low charge rates from one season to the next.	Change the tilt of your panel to the solar formula provided. **Formula for calculating panel Tilt for Seasonal Sun Migration** **Winter** Multiply Southern Latitude by 0.9 and then add 29°. **Summer** Multiply Southern Latitude by 0.9 and then subtract 23.5°
Your system is experiencing low charge rates at different times of the day	Your Panel is in the shade Your Panel is in the shade for most or part of the day. Move your Solar Panel to a sunny location which provides maximum hours. Your system will under-perform markedly.
To locate any errors that the System is able to detect automatically	Refer to the Section Display Panel.

New System Best Practice

Once your system is installed and connected and It always makes sense to leave the battery to charge for a day or two, before you apply the load. You can switch off your load by setting the load to an OFF state on your charge controller, or disconnect the load for two days.

Pump

Pump Installation

1. Do not run the pump dry. It needs water to cool its windings. The pump will burnout if adequate cooling is not available.
2. Install the pump, in a pond or fish tank or hydroponic system, such that there is always a water supply available to the pump.
3. The pump will CAVITATE if it sucks water and air, which will noticeably destroy the pumps inner components.
4. Do not lift the suction pipe out of the water while the pump is running, it will cavitate and destroy your pump.
5. If you install your pump externally (Not using it in the submersible role) make sure your pump is installed below the level of the bottom of your pond. This will ensure that your pump will always be primed. Centrifugal Pumps are not self priming.
6. When fitting the piping to your pump, make sure that the joins are well made, without the possibility of leaks.
7. Always make sure the suction side of the pump has a connection which does not allow air, or and Air/ Water mixture
8. It is always best to have a position in the pool, pond or fountain which allows a secure immoveable positioning of the pump.
9. The suction should not draw water from the absolute bottom of the Water feature, Pond, Fountain, Fish tank, hydroponic system.
10. A filter is recommended.
11. Dirt and debris can wear out and damage your pump shortening its lifetime. Most pump manufacturers supply spare impellers and shafts which can be replaced to maintain the pump in good working order.
12. Clean the filter regularly. Be attentive to the flow of water in the system and if you notice that it is performing poorly, Clean the Filter or remove any obstacle preventing water from being sucked into the pump.
13. Install a sieve or leaf trap, or skimmer to your pumping circuit. Make sure that leaves and debris are regularly removed.
14. A small sand filter can be used to remove small particulate matter form your pond water.

For further illustration, watch our basic setup video here: https://youtu.be/ivb4-Nk5wb4

If you have any further questions, please contact us on shop@waterhouse.co.za or 011 466 8250