

# **iSOLAR CONTROLLER**

## **Operation and features**

**i**CON  
SERIES

**2018**

 **WHITE**<sup>™</sup>  
INTERNATIONAL

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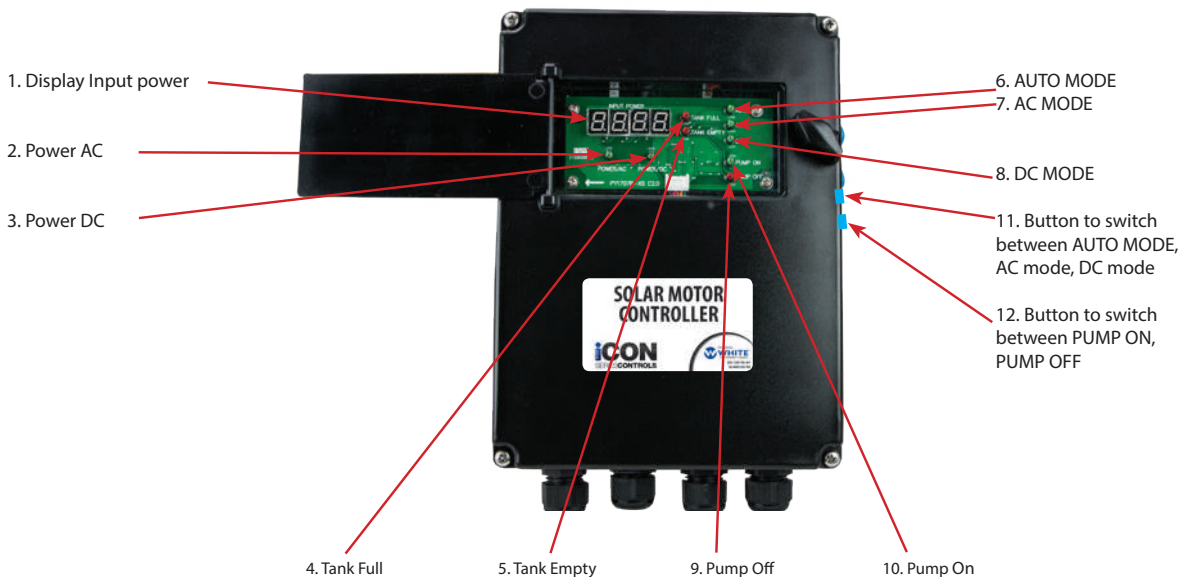
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# iSOLAR CONTROLLER

## Operation and features

The iSOLAR controller is capable of the following functions:

1. Display input power
2. Display of mode of AC
3. Display of mode of DC
4. Display of tank full
5. Display of tank empty
6. AUTO MODE
7. Ability to select the incoming power source. In AC MODE, the incoming power source can be from Mains power supply or a generator.
8. Ability to select the incoming power source. In DC MODE, the power supply can be from either Solar Panels or Battery. However, DC will be the favoured power supply.
9. Pump ON
10. Pump OFF
11. Button to switch between AUTO MODE, AC MODE, DC MODE
12. Button to switch between Pump ON, Pump OFF
13. Flow meter restart timer adjustment (10-60 minutes in 10-minute intervals)
14. Generator off delay timer adjustment (10-60 minutes in 10-minute intervals)



## **The iSOLAR controller is capable of the following features:**

- The iSOLAR controller can take signals from two float switches placed in a tank or similar.
- The high-level float switch signal indicates on SP Monitor that the reservoir/tank is full and at this point the controller stops the pump. When the water level of the storage tank drops, the float drops closed and the pump returns to operation after 10 minutes. Within 10min, the "TANK FULL" signal light remains on and the display starts counting down from "600" to "0." The countdown ends and the "TANK FULL" indicator goes off and the pump system restarts.
- The low-level float switch signal indicates on SP Monitor that the reservoir/tank is empty and at this point the controller starts the pump. When the water wells or pools without water, the water under the float drop and closed, PV monitor "TANK EMPTY" signal indicator light, direct the pump system immediately shut down. When the water level rises, the float rises and falls, and the pump returns to operation after 10 minutes. Within 10 minutes, the "TANK EMPTY" signal light remains on and the display starts counting down from "600" to "0." The countdown is over and the "TANK EMPTY" indicator goes off and the pump system restarts. On power up, if tank is not full, then the iSOLAR controller powers the pump to fill the tank.
- The iSOLAR controller is suitable for outdoor installation and is weather-proof. However, its location/positioning against direct sun light should be avoided.
- The iSOLAR motor has dry run protection. If there is insufficient water for 10 seconds the motor will stop. After 30 seconds the motor will run for 10 seconds looking for water, and if unsuccessful will try again in 30 seconds. If still no water the motor will stop and attempt to restart every 30 minutes.
- The iSOLAR motor has "no flow" protection when the optional flow meter is wired to the controller and there is a flow meter restart timer adjustment (10-60 m in 10m intervals) on the controller.

# iSOLAR CONTROLLER INSTALLATION

## WARNING

- The power supply from any DC or AC supply can cause serious harm or death from electrocution.
- Apply appropriate safety procedures when working on or with any system component.
- Only suitably qualified personal should be involved in the electrical connection / disconnection and handling of the equipment. Off-grid electrical equipment is subject to applicable state, national and country electrical standards.
- The iCON Solar Motor contains capacitors that must be allowed to discharge before handling
- Allow a minimum of 1 MINUTE for stored energy to dissipate before handling the motor.
- The Solar panels will create electrical energy when exposed to light. Assume all panel cables are “live” at all times and handle with appropriate safety equipment and procedures.

## Caution

Isolate all electrical sources before commencing any installation, servicing or repair on any component in the installation.

The iCON Control module is used to switch AC and DC power supplies and can automatically start a connected generator or switch between DC (Solar) or AC (Generator / Mains) power sources at ANY time.

Ensure all energy sources and generator starting circuit is properly locked-out before working on the system.

## Electrical Component Selection

When using DC power such as supply from Solar Panels, any switches, contactors, sensors, meters, recorders used in the electrical connection and monitoring of the installation MUST BE selected according to the Input power available and rated for DC POWER supply.

## Control Panel Mounting

The iCON Control Panel is IP65 Rated however it is recommended that the panel is not mounted in direct sunlight.

Mounting the controller Facing SOUTH and behind the Solar Panel array is often a good way to protect the panel. Consideration should be given to mounting the control panel inside a steel cabinet (not included) to allow for easy access to isolation switches and termination of supply feeds and input control feeds.

## Earthing

As most Solar installations are –off-grid, particular attention must be paid to earthing of the controller and pump motor. Follow the instructions in the controller manual and legislated electrical requirements for your area.

## Switching between DC and AC supplies

The iSOLAR controller can be manually switched between a DC power supply and AC supply or the controller will perform the change when in AUTO mode.

During the switch over the controller in the iSOLAR 4” motor runs through an automatic discharge process to dissipate the electrical charge contained in the capacitors fitted to the electrical motor. This process cannot be sped up.

If the pump is not running when there is a suitable input power supply, firstly check the display panel to see if the changeover is taking place before further investigation.

The controller is biased to DC supply when in Automatic mode.

# iSOLAR CONTROLLER

## Controller Operating Instruction

1. Before operating any components in the system preform a visual inspection of the installation for damage cause by weather events, stock, pests or human interference. Solar panels should be clean and not in shade.
  - All wiring terminated, no bare wires exposed.
2. Check pump is completely immersed when in a surface water source.
3. Turn any isolator switches to ON position. Open any valves.
4. Mains AC Supply present (if connected) – Indicated by LED light on controller
5. DC Supply present (Solar / Battery) - Indicated by LED light on controller
6. Generator (if connected) is topped up with fuel, generator starts and runs on demand and is connected to iSOLAR controller via “GEN Signal” wire.
7. Select **MODE** the Controller is required to operate in using the TOP BUTTON on the right-hand side of the controller. Each time the button is pushed, the controller cycles through one of the operating modes indicated by the LED light on the display panel.
  - i. AUTOMATIC MODE – Controller selects the power source and uses this to run the pump depending on input signals. Bias is always DC power source. When the system is using AC power, the AC led light pulses in 30 sec intervals, the system is using DC power, the DC led light pulses in 30 sec intervals.
  - ii. DC MODE - Controller only uses DC power source and uses this to run the pump depending on input signals and available power from Solar Panels or Batteries.
  - iii. AC MODE - Controller only uses AC power source and uses this to run the pump depending on input signals and available power from grid supply or generator.
    - a. Note, only one AC power supply can be used, either Grid Supplied AC 240V power or Generator supplied AC 240V power.

**CAUTION** – When switching between modes, the motor needs to dissipate the energy stored within the internal capacitors. This process takes 1 minute. Repeated switching between modes will restart the dissipation cycle, causing extended delays before the pump will run.
8. Push PUMP ON button on the left-hand side of the controller which is the BOTTOM BUTTON. LED light indicates pump on. Controller will start pump using selected power supply provided,
  - i. The input energy is sufficient to run the motor
  - ii. Motor has finished power dissipation cycle if required
  - iii. The input signal devises indicate the unit should run. This would include,
    - a. WWL – Well water level is “open” indicating sufficient water around pump (when fitted)
    - b. TWL – Tank water level indicates tank requires filling (when fitted)
    - c. TWL – Pressure switch indicates system pressure is low (when fitted)
    - d. TWL is bridged meaning pump runs when input energy sufficient.
9. To stop pump, push **PUMP OFF** button on the right-hand side of the controller which is the **BOTTOM BUTTON**. LED light indicates pump off.
10. When finished with the system, turn any electrical isolating switches and valves to the off position. Lock Out equipment from use as per your site-specific procedures.

## Technical specification

- The iSOLAR controller is a microcontroller, designed, developed and manufactured for the DAB ICON SOLAR pump.
- It is suitable for simultaneous AC and DC incoming power supplies.
- Manually or automatically switchable between two power supplies depending on solar irradiation.
- IP65 weatherproof enclosure.
- Suitable for up to 2.2 kW (3 hp) pumps.
- AC voltage input range 90 – 280 VAC. **Terminals L N & GRD**
- DC voltage input range 55 – 380VMPP (440VOC) DC for BIA-M110SOL.  
**Terminals + - & GRD**
- DC voltage input range 90 – 380VMPP (440VOC) DC for BIA-M240SOL.  
**Terminals + - & GRD**
- Input connections for 1 or 2 float switches. **TWL & WWL**
- Input connection for pressure switch. **WWL**
- Input connection for matching flow meter. **FLOW SIGNAL -> REF. Setting flow meter function (on next pg)**
- Indication for power on, input power, pump on, pump off, water tank full or tank empty.
- Auto operation via 1 or 2 float switches.
- Auto operation via pressure switch.
- Auto off via flow meter.
- Auto starting of generator via volt free contacts. **GEN SIGNAL** • Manual operation.
- Auto switching from AC to DC supply with DC bias. DC switching point is 55/90V depending on motor.

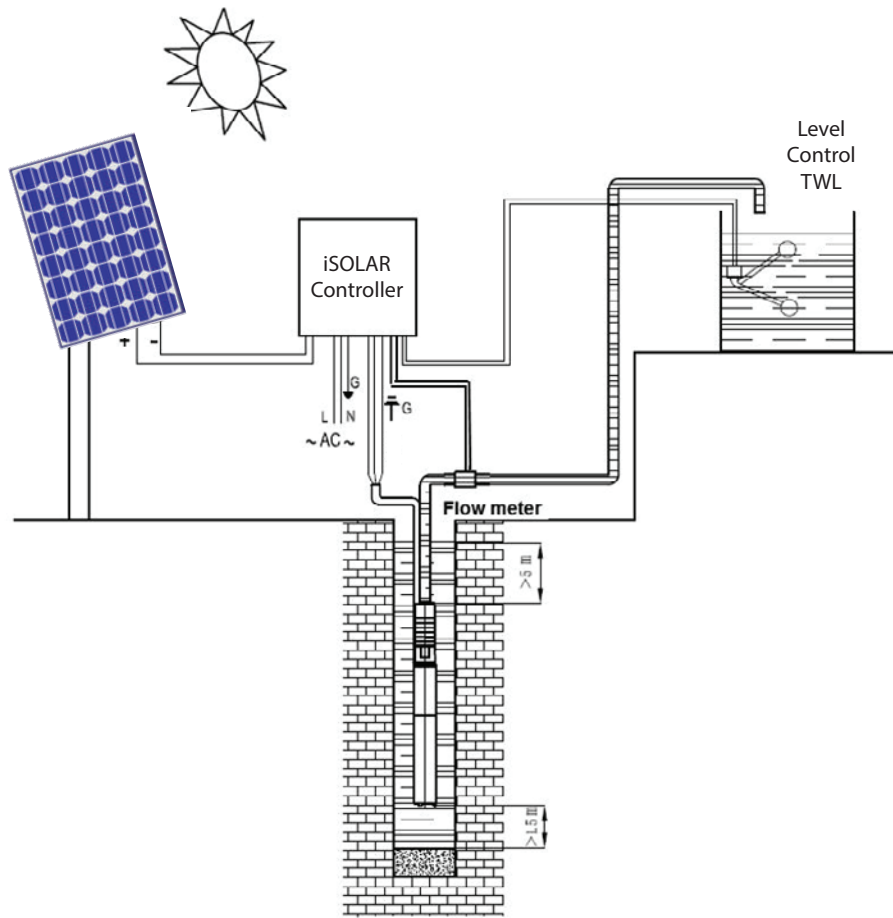
## TIMER ADJUSTMENTS

1. Analogue dial for flow meter restart timer. If no flow meter used, set dial to zero. If flow meter fitted, dial can be set from 10 minutes to 60 minutes in 10-minute intervals before restart is attempted after zero flow is detected.
2. Analogue dial for generator off delay. If no generator used, set dial to zero. If generator used, dial can be set from 10 minutes to 60 minutes in 10-minute intervals before the generator shuts down when DC voltage falls below the changeover level. Requires a generator that is able to accept signals from the ISOLAR controller.



# INSTALLATION OPTIONS

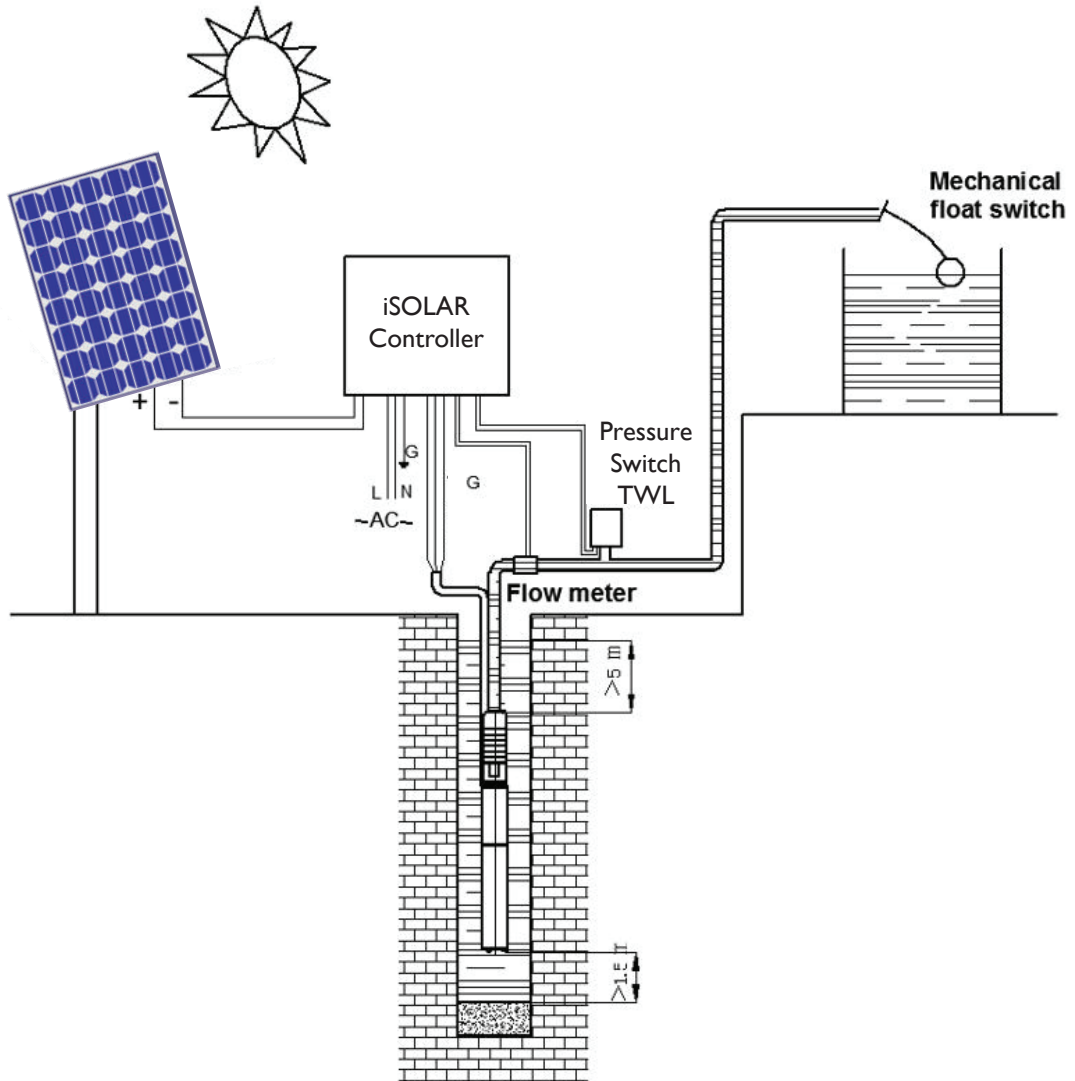
## 1. Electric Float Switch (One Or Two)





# INSTALLATION OPTIONS

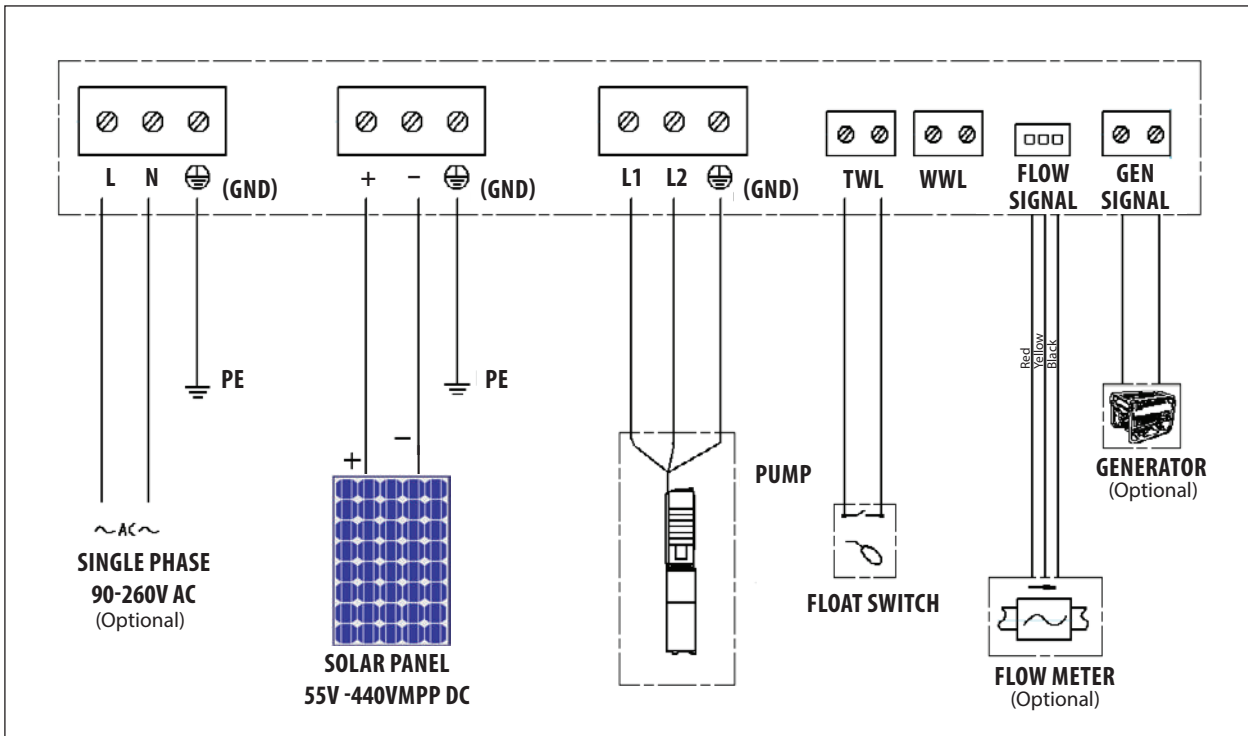
## 2. Mechanical Float Switch



# iSOLAR CONTROLLER

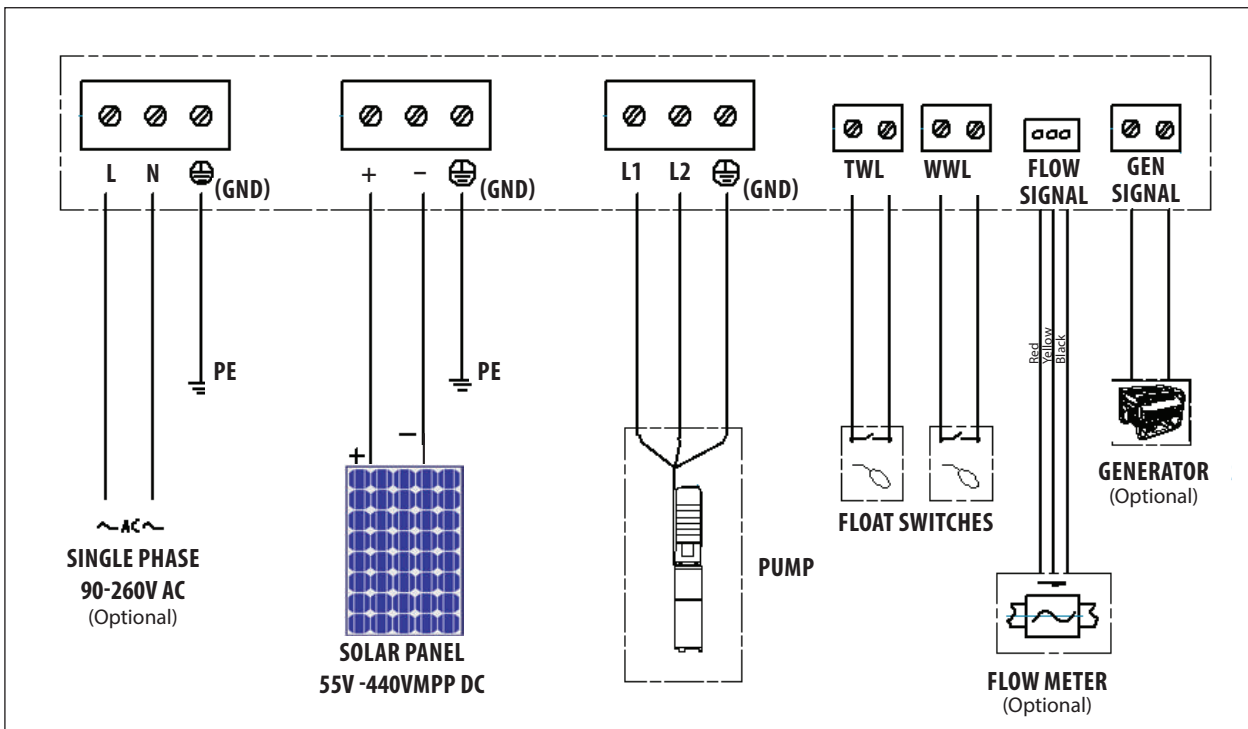
## Electrical Connections

### 1. With One Float Switch.



TWL = TARGET TANK WATER LEVEL      WWL = WELL WATER LEVEL  
 USE 3 WIRE FLOAT SWITCHES WIRED FOR TANK FILL (OPEN ON RISE - BLACK AND BLUE WIRES)

### 2. With Two Float Switches



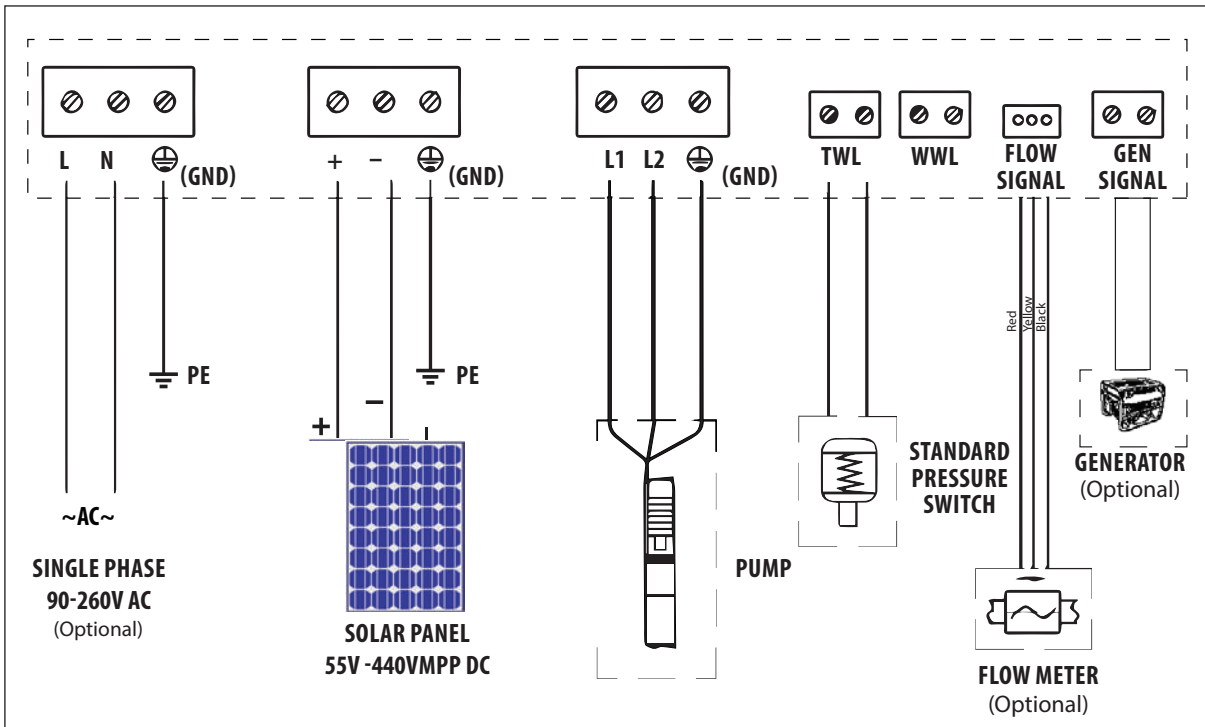
TWL = TARGET TANK WATER LEVEL      WWL = WELL WATER LEVEL  
 BOTH FLOAT SWITCHES NEED TO BE 3 WIRE TANK FILL (OPEN ON RISE, BLACK AND BLUE WIRES)  
 GENERATOR CONTACT WILL CLOSE IF NO AC AND DC DROPS BELOW 90V.

**FOR ALL WIRING OPTIONS ONLY ONE AC INPUT SOURCE CAN BE USED BY THE CONTROLLER – USE 240V AC MAINS SUPPLY or GENERATOR unless the Generator has an Auto Transfer System (ATS) to manage the switch over. Consult your Generator manual.**

# iSOLAR CONTROLLER

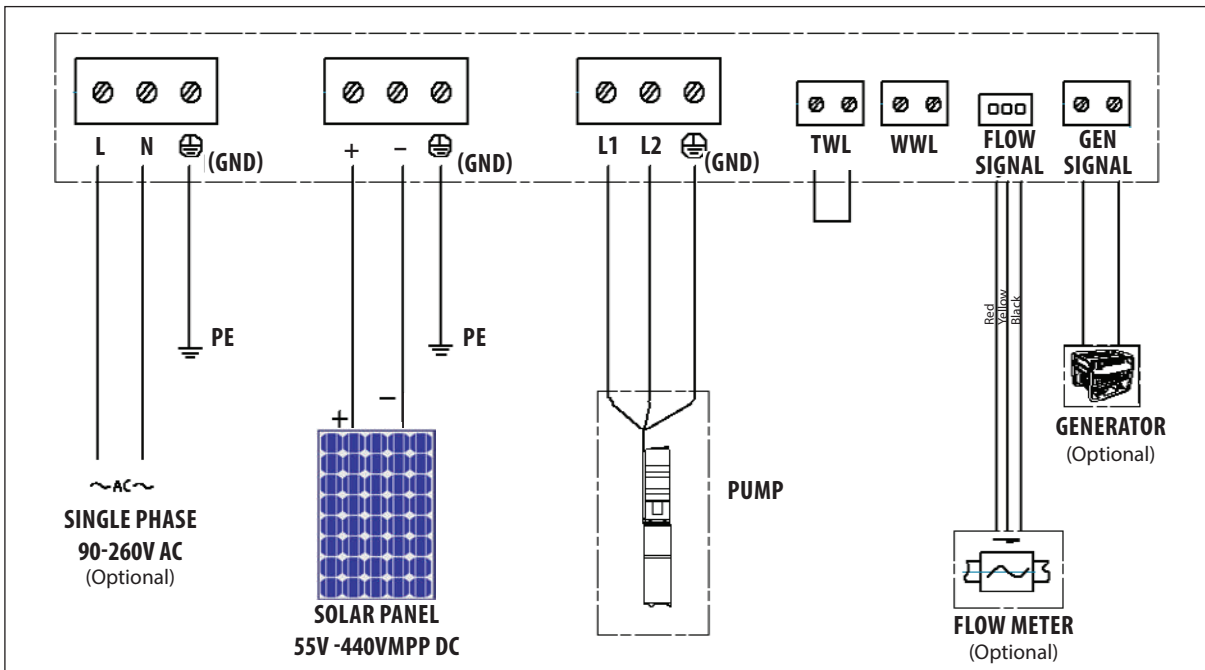
## Electrical Connections

### 3. Pressure Switch



FOR PRESSURE SWITCH CONTROL, USE A NORMAL PRESSURE SWITCH OF SUITABLE RANGE – SWITCH OPENS ON PRESSURE RISE

### 4. No Switches



#### GENERAL NOTES FOR ALL SET UP CONFIGURATIONS

- NORMAL PRESSURE SWITCH ON TWL
- REVERSE ACTING PRESSURE SWITCH ON WWL WITH JUMPER ON TWL
- GENERATOR CONTACT WILL CLOSE IF NO AC AND DC DROPS BELOW 90V.

FOR ALL WIRING OPTIONS ONLY ONE AC INPUT SOURCE CAN BE USED BY THE CONTROLLER – USE 240V AC MAINS SUPPLY or GENERATOR unless the Generator has an Auto Transfer System (ATS) to manage the switch over. Consult your Generator manual.

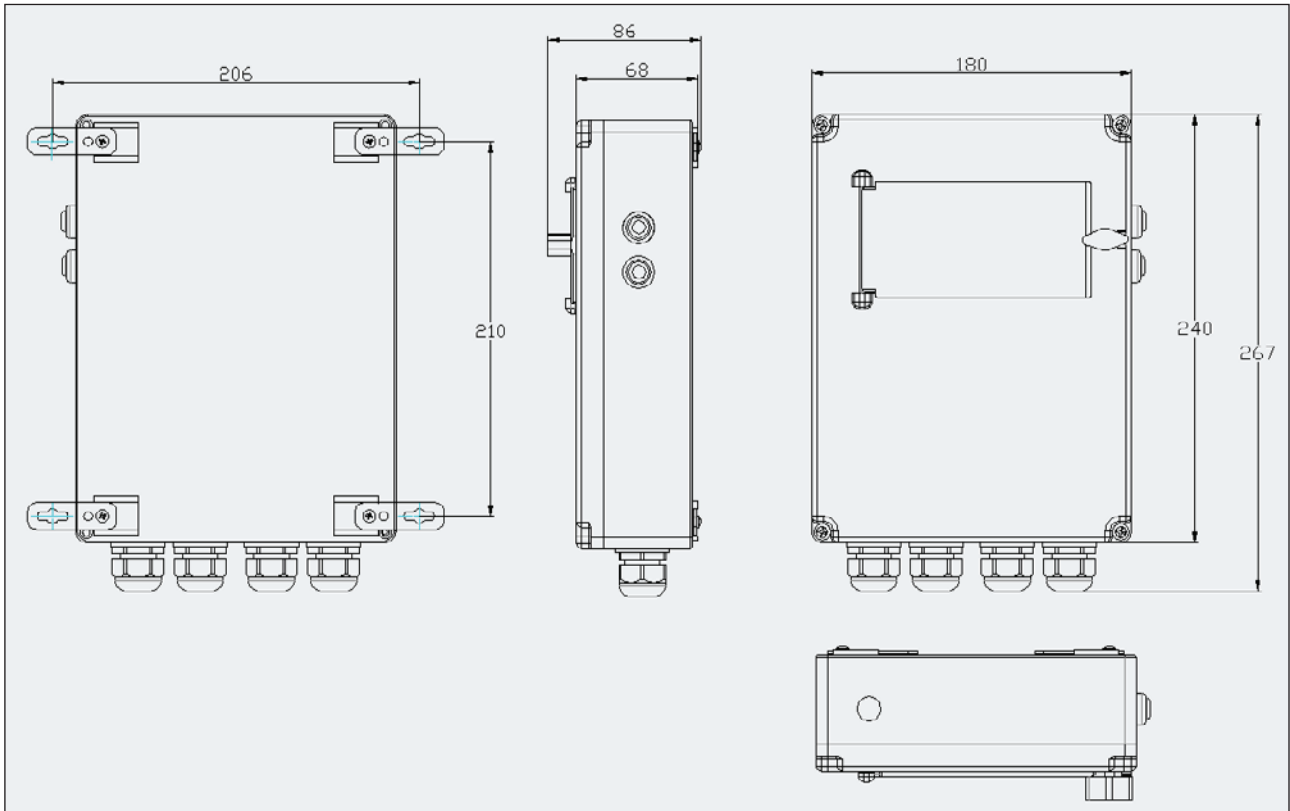
## CABLE SELECTION

Metric Cable		KW (HP)	<b>0.37 (0.5)</b>	<b>0.44 (0.75)</b>	<b>0.75 (1.0)</b>	<b>1.1 (1.5)</b>	<b>1.5 (2.0)</b>	<b>2.2 (3.0)</b>
Stranding	Area mm <sup>2</sup>	Metres	Metres	Metres	Metres	Metres	Metres	Metres
7/0.67	2.5	174	123	91	67	53	36	
7/0.85	4.0	279	197	146	106	85	58	
7/1.04	6.0	417	296	218	159	126	87	
7/1.35	10	701	496	366	268	213	147	
7/1.70	16	1117	791	585	426	339	235	

Select the appropriate sized cable to use from the Energy source to the iCON 4" Motor.  
Ensure when measuring to include depth of bore when fitting motor down a bore or well.

# iSOLAR CONTROLLER

## Dimensions



Dimensions: 267mm (H) x 180mm (W) x 86mm (D)



## 2 YEAR WARRANTY



White International Pty Ltd  
Limited Product Warranties  
TERMS & CONDITIONS

This warranty is given in addition to the consumer guarantees found within the Australian Competition and Consumer Act 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 NZ for goods purchased in New Zealand:

- 1) White International Pty Ltd / White International NZ Ltd (White International) warrant that all products distributed are free from defects in workmanship and materials, for their provided warranty period as indicated on the top or opposite side of this document. Subject to the conditions of the warranty, White International will repair any defective products free of charge at the premises of our authorised service agents throughout Australia and New Zealand if a defect in the product appears during the warranty period. If you believe that you have purchased a defective product and wish to make a claim under this warranty, contact us on our Sales Hotline on 1300 783 601, or send your claim to our postal address or fax line below and we will advise you as to how next to proceed. You will be required to supply a copy of your proof of purchase to make a claim under this warranty.
- 2) This warranty excludes transportation costs to and from White International or its appointed service agents and excludes defects due to non-compliance with installation instructions, neglect or misuse, inadequate protection against the elements, low voltage or use or operation for purposes other than those for which they were designed. For further information regarding the suitability of your intended application contact us on our Sales Hotline on 1300 783 601. If you make an invalid claim under this warranty, the original product will be sent back to you unrepaid.
- 3) This warranty refers only to products sold after the 1st January 2012, and is not transferable to another product type and only applies to the original owner, purchaser or end user, and is in addition to the consumer guarantees found within the Competition and Consumer Act 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 (NZ) for goods purchased in New Zealand.
- 4) Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
- 5) To the fullest extent permitted by law, White International excludes its liability for all other conditions or warranties which would or might otherwise be implied at law. To the fullest extent permitted by law, White International's liability under this warranty and any other conditions, guarantees or warranties at law that cannot be excluded, including those in the Competition and Consumer Act 2010 (Cth), is expressly limited to:
  - (a) in the case of products, the replacement of the product or the supply of equivalent product, the payment of the cost of replacing the product or of acquiring an equivalent product or the repair of the product or payment of the cost of having the product repaired, is at the discretion of White International or a 3rd party tribunal elected under the Competition and Consumer Act 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 (NZ) for goods purchased in New Zealand; and
- 6) To the fullest extent permitted by law, this warranty supersedes all other warranties attached to the product or its packaging.
- 7) In the case of services, supplying the services again or the payment of the cost of having the services supplied again, is at the discretion of White International or a 3rd party tribunal elected under the Competition and Consumer At 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 (NZ) for goods purchased in New Zealand.
- 8) Our warranty commences from the date of purchase of the above mentioned pumps. Proof of purchase is required before consideration under warranty is given. Record your date of purchase in the space below and retain this copy for your records.

Date of Purchase .....

Model Purchased .....

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