

DAB SOLAR CONTROLLER

Operation and features

For use with DAB Solar M220SOL series motors



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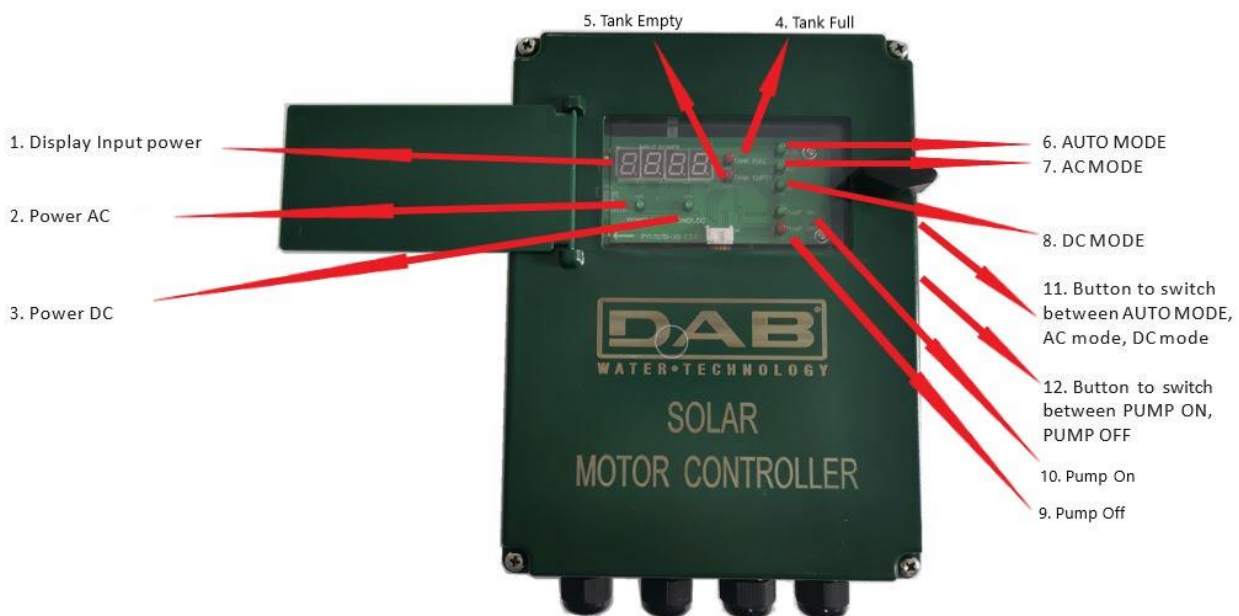
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Solar CONTROLLER

Operation and features

The Solar 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 favored 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 Solar controller is capable of the following features:

- The Solar controller can take signals from two float or pressure 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 Solar controller powers the pump to fill the tank.
- When connected to a pressure switch, the system can operate as pressure system activating when pressure drops in the supply line. When installing as a pressure systems a pressure vessel is required as is the installation of a non-return valve better the pressure switch to ensure smooth operation.
- The Solar controller is suitable for outdoor installation and is weather-proof. However, its location/positioning against direct sun light should be avoided.
- The Solar 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 Solar motor has “no flow” protection when the flow meter is wired to the controller and there is a flow meter restart timer adjustment (10-60min in 10min intervals) on the controller.

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

Mounting the controller 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 Solar 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 Solar 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.

Solar 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.
2. All wiring terminated; no bare wires exposed.
3. Check pump is completely immersed when in a surface water source.
4. Turn any isolator switches to ON position. Open any valves.
5. Mains AC Supply present (if connected) – Indicated by LED light on controller
6. DC Supply present (Solar / Battery) - Indicated by LED light on controller
7. Generator (if connected) is topped up with fuel, generator starts and runs on demand and is connected to Solar controller via “GEN Signal” wire.
8. 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.
 - a. 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.
 - b. 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.
 - c. 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.
 - i. 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.

1. 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,
 - a. The input energy is sufficient to run the motor
 - b. Motor has finished power dissipation cycle if required
 - c. The input signal devises indicate the unit should run. This would include,
 - d. WWL – Well water level is “open” indicating sufficient water around pump (when fitted)
 - e. TWL – Tank water level indicates tank requires filling (when fitted)
 - f. TWL – Pressure switch indicates system pressure is low (when fitted)
 - g. TWL is bridged meaning pump runs when input energy sufficient.
2. 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.
3. 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

- a. The Solar controller is a microcontroller, designed, developed and manufactured for the DAB SOLAR pump.
- b. It is suitable for simultaneous AC and DC incoming power supplies.
- c. Manually or automatically switchable between two power supplies depending on solar irradiation.
- d. IP65 weatherproof enclosure.
- e. Suitable for up to 2.2 kW (3 hp) pumps.
- f. AC voltage input range 90 – 280 VAC. Terminals L N & GRD
- g. 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
- h. Input connections for 1 or 2 float switches. TWL & WWL
- i. Input connection for pressure switch. WWL
- j. Input connection for matching flow meter. FLOW SIGNAL -> REF. Setting flow meter function (on next pg.)
- k. Indication for power on, input power, pump on, pump off, water tank full or tank empty.
- l. Auto operation via 1 or 2 float switches.
- m. Auto operation via pressure switch.
- n. Auto off via flow sensor.
- o. Auto starting of generator via volt free contacts. GEN SIGNAL
- p. Manual operation.
- q. 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 SOLAR controller.



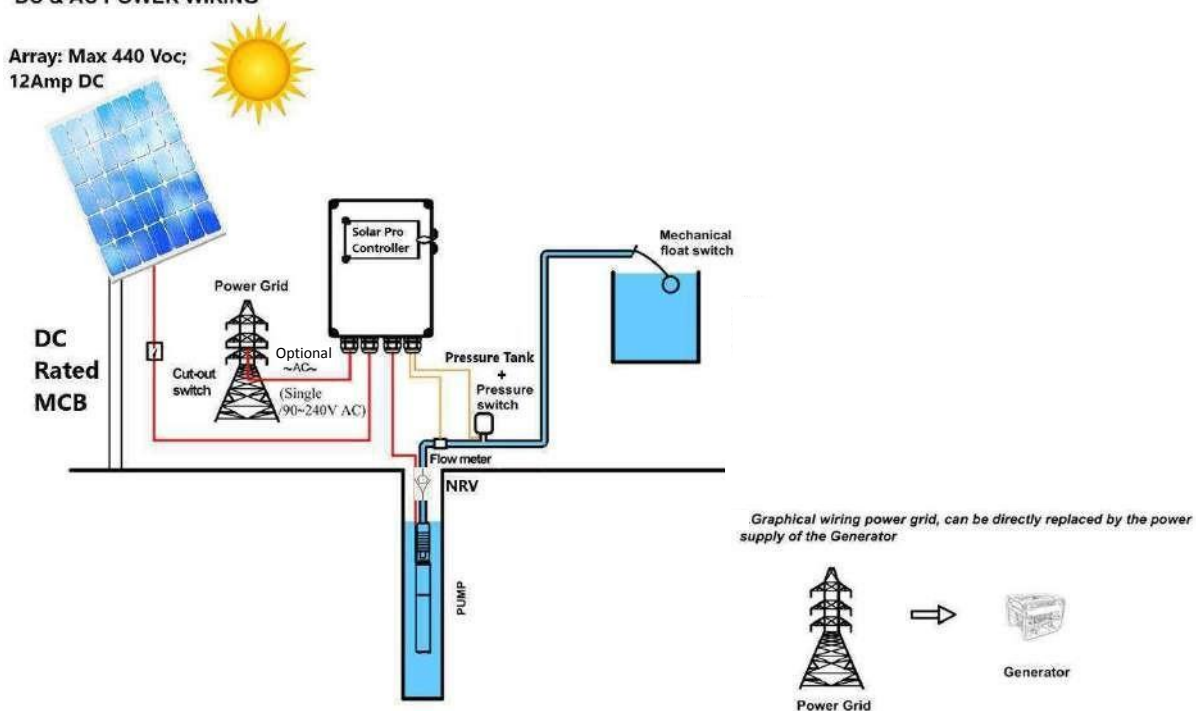
Best practice Installations

Option: 1

System using Mechanical float switch, Pressure switch, Flow sensor, Pressure tank, Non-Return Valve

- Pressure switch requires use of pressure tank and Non return valve.
- System guarantees longest operational life
- Backup power supply support
- Complete Low voltage circuit for input sensors

DC & AC POWER WIRING

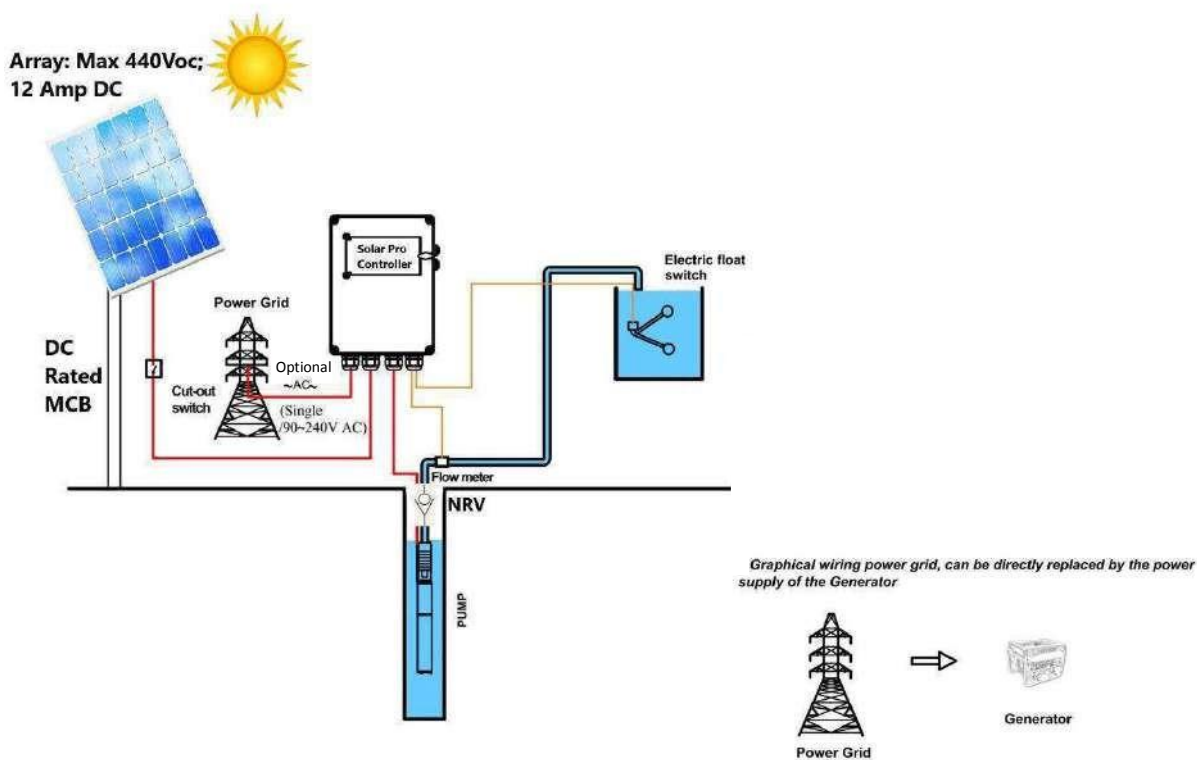


Option: 2

System using Electronic float switch, Flow sensor, Non-Return Valve

- Electronic Float activates system, extra protection with flow sensor
- System guarantees longest operational life
- Backup power supply support

DC & AC POWER WIRING

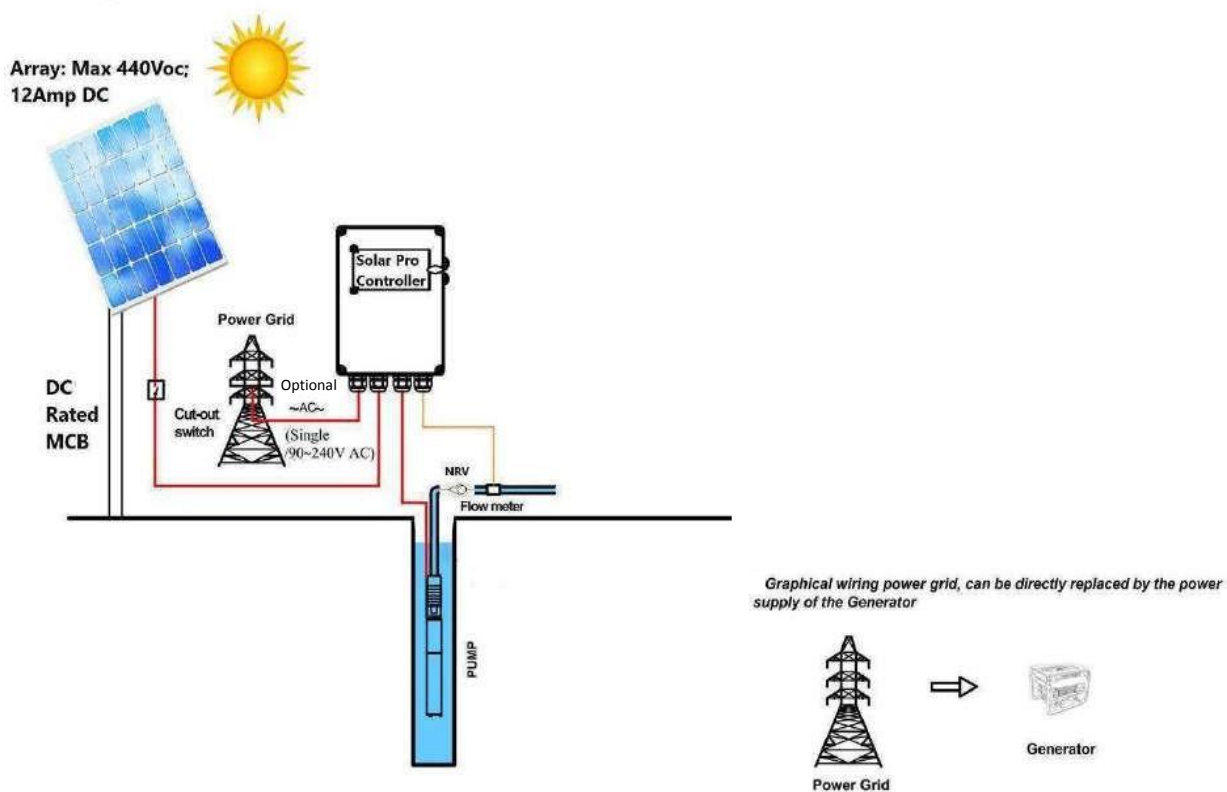


Option: 3

System using Non-Return Valve and Flow sensor

- System runs as long as power is available, shuts off with zero flow
- Continues to restart using timer in control
- System guarantees longest operational life
- Backup power supply support

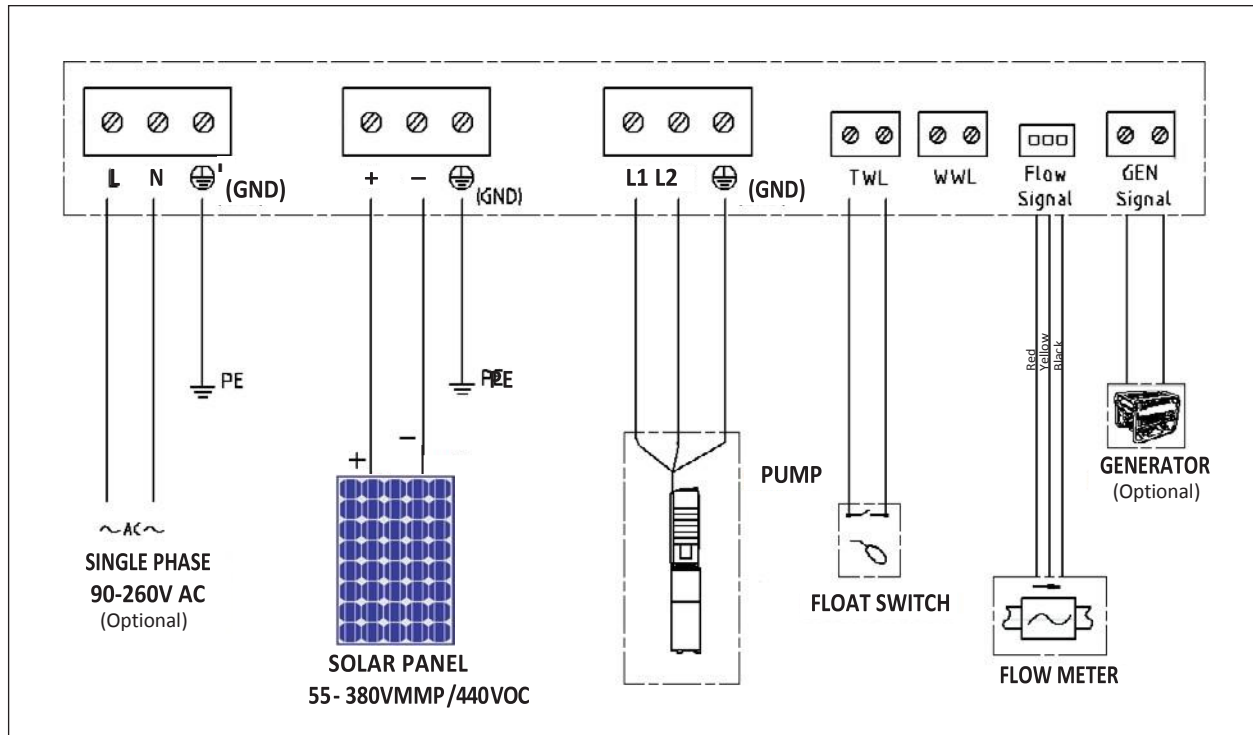
DC & AC POWER WIRING



Solar CONTROLLER

Electrical Connections

1. With One Float Switch.

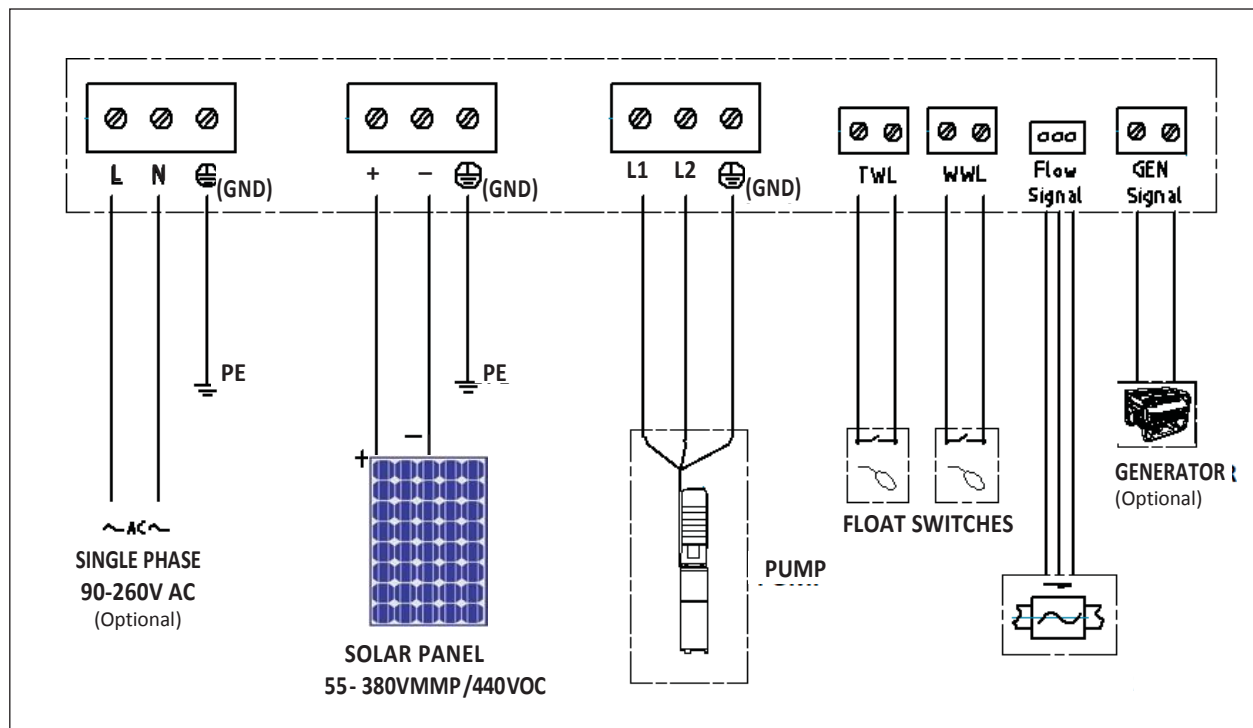


TWL = TARGET TANK WATER LEVEL

WWL = WELL WATERLEVEL

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 WATERLEVEL

BOTH FLOAT SWITCHES NEED TO BE 3 WIRE TANK FILL (OPEN ON RISE, BLACK AND BLUE WIRES)

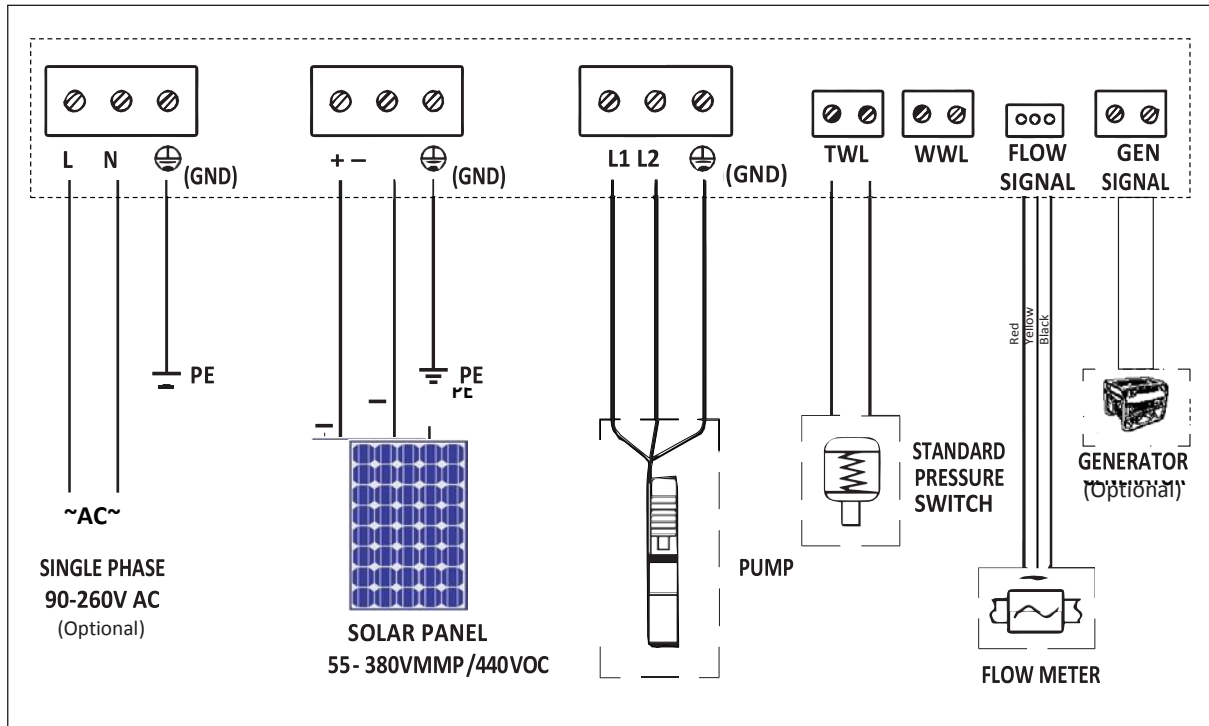
GENERATOR CONTACT WILL CLOSE IF NO AC AND DC DROPS BELOW 90V.

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.

Solar CONTROLLER

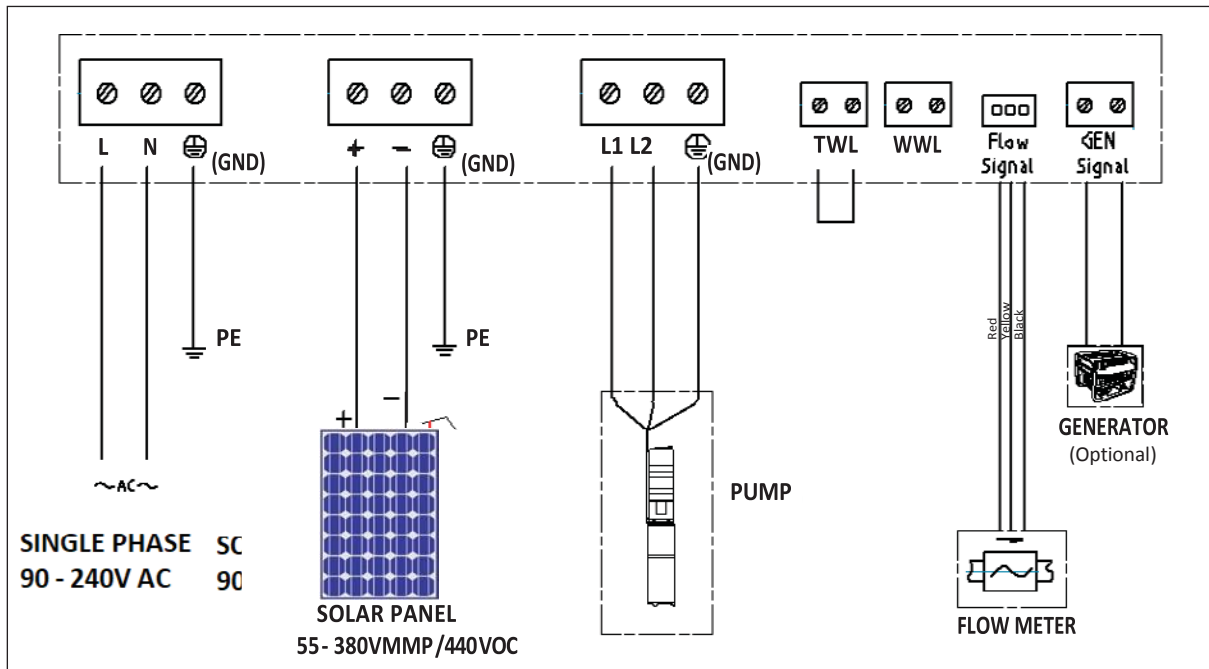
Electrical Connections

3. Pressure Switch



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

4. No Switches



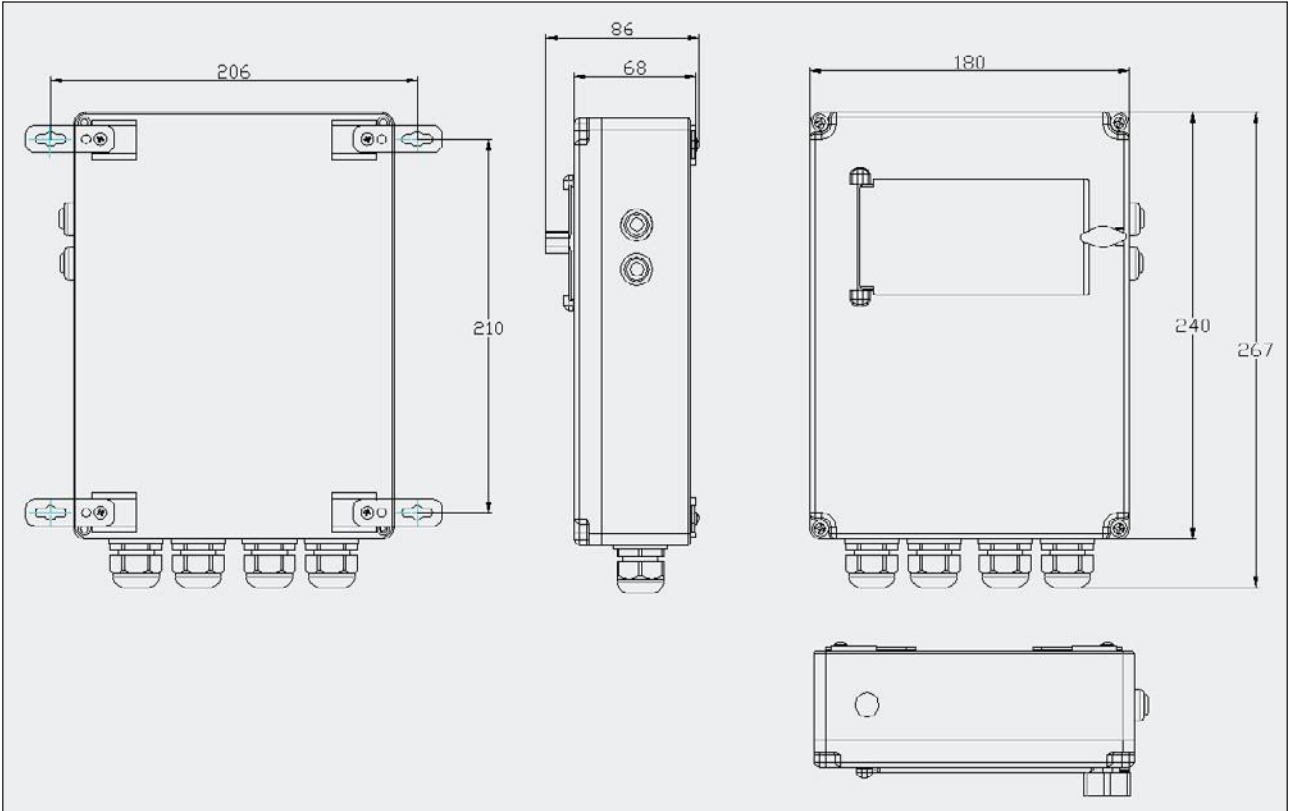
GENERAL NOTES FOR ALL SET UP CONFIGURATIONS

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.

Solar CONTROLLER

Dimensions



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

Notes

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