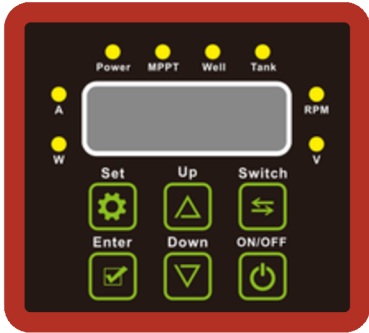




When setting up a solar controller for a water pump, always check that the open circuit voltage (VOC) of your panels does not exceed the controller's voltage limit. Verify the panel VOC on the specification sheet, calculate to ensure it stays within limits, and confirm with a multimeter before connecting. Exceeding this limit can damage the controller and void the warranty.

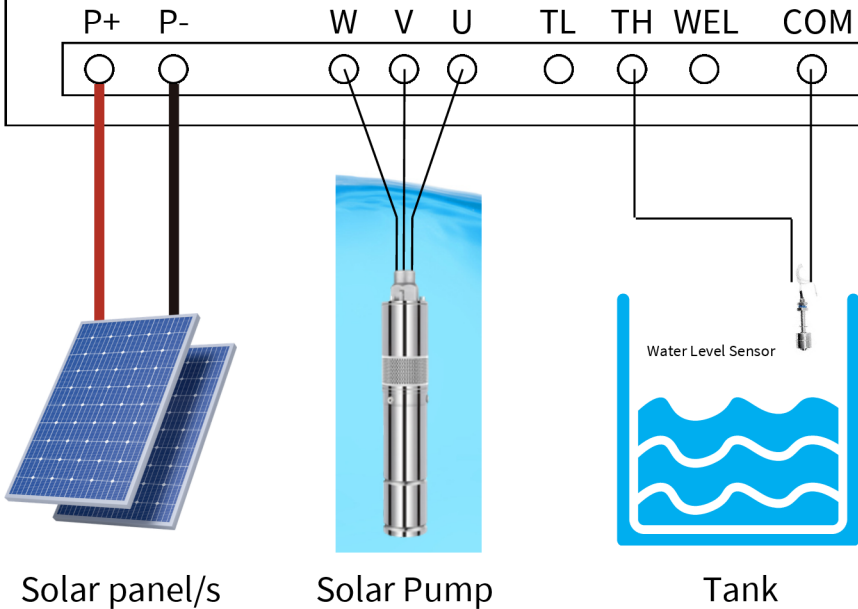
Model	Pump Rating	Max Input Current (A)	Max Open Circuit Voltage (V)	MPPT Voltage Range (V)	Working Temperature (Celsius)
Swala 80	24v / 210w	15	< 50	30 - 48	15 - 60
Swala 100	48v / 500w	15	< 100	60 - 90	15 - 60

## LED Indicator Lights



- Voltage (V): Voltage indicator light
- Speed (RPM): Speed indicator light
- Current (A): Current indicator light
- Power (W): Power indicator light
- Tank: Light on when tank is full
- Well: Light indicates no water in well
- MPPT: Solar energy incoming (blinking)
- Power: Blinking in downtime, solid while running

## Controller Connections



Please connect the three wires from the pump to the controller, ensuring they do not touch each other. **Incorrect wiring may cause the pump to run backwards during testing**, which can loosen the helical rotor inside the pump. If this occurs, you will need to swap the wires to correct the direction. The helical rotor might also need to be tightened again.

We advise against using batteries with these pumps; the correct solar panels are sufficient. Ensure you do not reverse the positive and negative wires from the solar panels, as this will prevent the pump from working. Always make sure the controller box is switched off before wiring.

## Functions

Key Type	Function
Set Key	Manufacturer parameter setting, not opened.
Enter	Manufacturer parameter setting, not opened.
Up	RPM setting key. Each time you press, the RPM will increase for one grade. In fault state, turn off/on the fault display.
Down	RPM setting key. Each time you press, the RPM will decrease for one grade.
Switch	In the operation status, you can circularly switch the display mode in voltage (V) -> speed (RPM) -> current (A) -> power (W).
On/Off	In the running state, you can turn it off. In the stop state, you can turn it on.

## Test Run

Before testing the pump, ensure the controller box switch is turned off. The submersible pumps must always be submerged in water, including at least 15 minutes before the initial run. Water acts as a lubricant for the pump bearings; without proper pre-conditioning, the bearings will not be adequately lubricated, which can cause damage. Always test the pump in a drum filled with water before submerging it into the borehole to check all connections. Never use the power cable to lower the pump.

## Warning

Ensure the controller matches the recommended solar pump and do not use it with pumps from other brands. Using mismatched pumps and controllers from different brands, or opening the motor or tampering with it, will void your warranty. Additionally, be aware that the warranty is valid for 90 days from the date of purchase. In cases where the warranty is voided, replacement parts will need to be purchased at the client's expense.

To enhance performance, keep the controller protected from lightning strikes and direct sunlight, as excessive heat can cause it to overheat. To minimize power loss due to DC voltage drop in copper cables, keep cable runs as short as possible. Use a 2.5mm 3-core cable for distances of 0-30 meters between the pump and controller, and a 4mm 3-core cable for distances of 30-100 meters.

Place your solar panels close to the controller to minimize cable length and enhance efficiency. Use 6mm<sup>2</sup> cable for most connections, but consider thicker cables for longer distances to prevent power loss.

Model	Panel Option 1	Panel Option 2	Panel Option 3
Swala 80	1 x 330w	1 x 400w	
Swala 100	2 x 270w	2 x 330w	2 x 400w

When solar panels are connected in series (positive of one panel to the negative of another), the voltage of the panels will add up while the current remains the same. If you connect the panels in parallel, the voltage remains the same but the current will increase. It's crucial to use a multimeter to check the voltage before powering the system to ensure it does not exceed the maximum input voltage of the controller. Exceeding this voltage can cause irreversible damage to the controller.

## Installation

Attach a durable rope or stainless steel cable to the top of the pump using the mounting hole. Make sure the rope or cable is longer than the depth at which you want to install the pump. This is used to raise and lower the pump. Never use the power cable to do this.

- Do keep the pump underwater at all times when operating.
- Do be careful with wiring.
- Do remove the pump if not used for a long time, and wipe the screw and body with vegetable oil.
- Do make sure the pump has adequate water around it during pumping.
- Don't run without water.
- Do put your solar PV panels in a sunny position facing **true north (Southern Hemisphere)** or true south (Northern Hemisphere). If the panel angle is fixed, then an angle equal to your latitude will be a good compromise.
- Don't run the pump out of the water, even momentarily. It will void the warranty.
- Don't use the pump in dirty water. Premature wear will not be covered by warranty.
- Don't disassemble the pump and control box.
- Don't install the controller in direct sunlight, it needs ventilation to cool.

## Operation Mode

### Pump Start

- Power on to start. Every time connect with electricity, the system boots by default, and pump starts immediately without testing water tank (without any Shutdown conditions).
- Button to start. In shutdown state, press the ON/OFF button to turn on the pump.

## **Pump Stop**

- **Float Switch Mode.** In running state, when the water full switch is closed, the pump immediately stops. (TH signal terminal of the main control board is shorted to the COM terminal, and the Tank light is on). In running state, when the water shortage switch is closed, the pump immediately stops. (WEL signal terminal of the main control board is shorted to the COM terminal, and the Tank light is on)

## ***PV Mode***

In PV mode, the pump setting speed is a maximum speed of 4000RPM. Pump running speed is also determined by the current solar power (Maximum power point tracking). When the solar light enhances, the output power of the solar panel increases, the pump speed increases, and vice versa.

In PV mode, the MPPT indicator flashes. If it flashes faster, it indicates that the current working point is closer to the maximum working point. If the flashing frequency is slower or no flash, it indicates that the maximum power point is being tracked.

Solar power is insufficient, the pump speed will continue to fall, when the speed drops to 600 RPM, the pump stops, and reports P46 faults after 3 seconds.

When solar power is too insufficient to maintain the current system of starting or running, the output voltage of solar panels will drop rapidly.

When the minimum voltage drops to the lowest voltage of the system and lasts for 10s, it will report "PL" fault. Try consecutively 5 times to restart, if it still appears "PL" fault, hold this state for 30 min, then try to start again.

### **Reverse connection protection**

If the positive and negative of power supply is reversed, the controller will continue to alarm.

### **Dry-run protection**

This function refers to the pump pumps out water in the well, the system can automatically detect the anhydrous (without water) state, pump will stop working automatically by set program. Dry-run protection is effective in all working modes. The pump will stand by for 30 minutes to restart (if it meets the starting condition). Start to detect again whether there is water or not, if no water, the pump will stop working automatically; if there is water, it will keep working.

### **Servicing and Maintenance**

After working 3000 hours, the easily damaged parts should be replaced (such as bearing, sealing ring, mechanical seal), or it may cause much more serious damage.

Fault Code	Fault Description	Causes and Solutions of Fault	Recovery Procedure
P0	Hardware Overcurrent	1. Motor model is mismatched, please choose matching pumps 2. UVW three-phase short-circuit connection, please rewire to ensure the normal installation of UVW	Automatically remove after 30s
P43	Phase-lack Protection	UVW three-phase open circuit, please rewire to ensure it reliable contact.	Automatically remove after 30s
P46	Stall Protection	1. Motor model is mismatched, please choose matching pumps 2. Pump extension cord is too long, please reduce the extension cord 3. Power is too low, increase the power supply 4. Pump bearing is stuck, please clean pump bearings	Automatically remove after 30s
P49	Software Overcurrent	1. Water pump bearing stuck, clean pump bearings 2. UVW three-phase short-circuit connection, please rewire to ensure the normal installation of UVW	Automatically remove after 30s
P50	Low Voltage Protection	The input voltage is too low, please distribute power refer to the electrical characteristics.	Voltage return to normal, remove the fault immediately
P51	High Voltage Protection	The input voltage is too high, please distribute power refer to the electrical characteristics.	Voltage return to normal, remove the fault immediately
P48	Dry-run Protection	1. Not all of air in the pump is exhausted, cut off the power, re-power and start the pump drainage after 30 seconds 2. There is no water in the water tank waiting for water, it will restart	Automatically clear after 30 minutes or re-power to clear
P60	High Temperature Protection	The temperature of controller MCU is more than 90°C	Automatically clear after the temperature is normal
E8	Current Sampling Failure	Cut off the power and restart after 30 seconds	Restart the power
PL	Power Shortage	1. No sunlight, waiting for the sunlight to restart 2. Solar panel matching error, refer to the recommendation to match correctly	At the first 5 times, it will remove after 30 seconds, and then 30 minutes to remove
ALARM	Reverse connection protect	Exchange the positive and negative wire	Restart the power