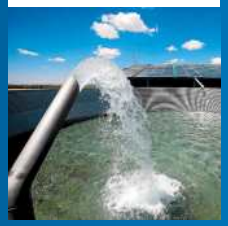
THE SOLAR WATER
PUMPING EXPERT

INNOVATOR &
PIONEER

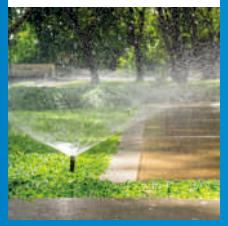
Manual for Installation and Operation

pick it up
ready to go,
system in a box

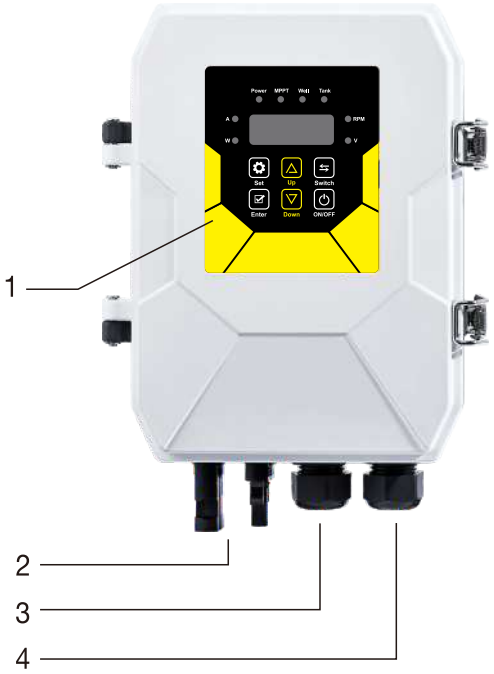


plug it in
easy wiring, save time,
solve your problem

pump water
from any source:
pond, stream, well



THE SOLAR WATER
PUMPING EXPERT



1.Operation panel

2.DC electric cable entrance

3.Pump's cable entrance

4.Water level sensor cable entrance

LED indicator function description

A light on: displays input current, unit is ampere
W light on: displays input power, unit is watt
V light on: displays input voltage, unit is volt
Rpm light on: displays working speed, unit is rpm

Power light on: DC input, the controller powers on and the screen lights up
WELL light on: When the well is short of water, the screen displays fault code E-12, the pump stops working
TANK light on: When the water tank is full, the screen displays fault code E-13, the pump stops working
MPPT light on: The controller will track the maximum power point of the solar system in real time to maximize the utilization of the solar system.

Key Operation

Key Operation	Function
 Set Key	Factory setting parameter, Do not open.
 Enter	Factory setting parameter, Do not open.
 Up	Running speed setting key, each time it is pressed, the speed increases by one level.
 Down	Running speed setting key, each time it is pressed, the speed decreases by one level.
 Switch	In the operation status, you can circularly switch the display mode in voltage(V) -> speed(RPM) -> current(A) -> power(W)
 ON/OFF	Start or stop pump manually.

Parameters of controller

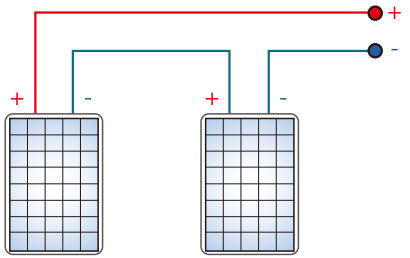
Controller Model	DC-24V	DC-48V	DC-72V	DC-96V	DC-110V
Adaptable Pump	24V DC pump	48V DC pump	72V DC pump	96V DC pump	110V DC pump
Max Input Current	<17A	<17A	<17A	<17A	<17A
Min working voltage	18V	30V	50V	60V	60V
MPPT	30-48V	60-90V	90-120V	110-150V	110-150V
VMP	24-48V	48-96V	72-144V	110-192V	110-192V
VOC	<55V	<105V	<160V	<210V	<210V
Protection voltage under battery mode	20V	40V	60V	80V	80V
Working Temp	-15 ~ +60°C	-15 ~ +60°C	-15 ~ +60°C	-15 ~ +60°C	-15 ~ +60°C
Dimension	251*190*100mm	251*190*100mm	251*190*100mm	251*190*100mm	251*190*100mm
Net weight	1.5kg	1.5kg	1.5kg	1.5kg	1.5kg

Caution:

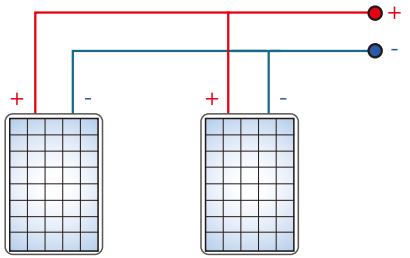
Before the power is on, you must use the instrument to detect the open cireuit voltage of solar panels, or apply for series, parallelknowledge to calculate the solar panel open circuit voltage, The open-circuit voltage of solar array must be less than the maximum input voltage of the controller, otherwise it will cause irreversible damage.

Solar Panel Wiring

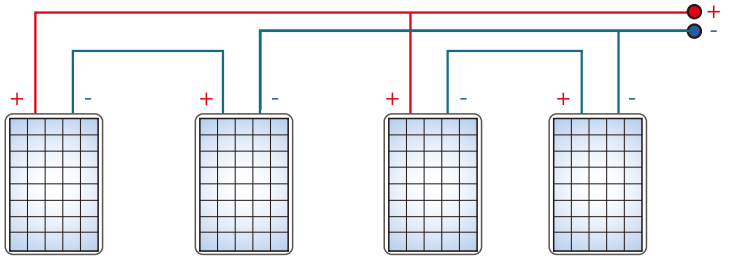
Series



Parallel



Series And Parallel



Notice: Solar panel power = Pump power ×1.3

1.3 is a factor,considering the solar strength is not enough in the morning, afternoon or cloudy day.The factor between(1.2 - 1.5) according different area or actual usage status

24V Pump working voltage range:24-48V,VOC can not exceed 55V

48V Pump working voltage range:48-96V,VOC can not exceed 105V

72V Pump working voltage range:72-144V,VOC can not exceed 160V

96V Pump working voltage range:96-192V,VOC can not exceed 210V

110V Pump working voltage range:110-192V,VOC can not exceed 210V

Extension cable recommendation

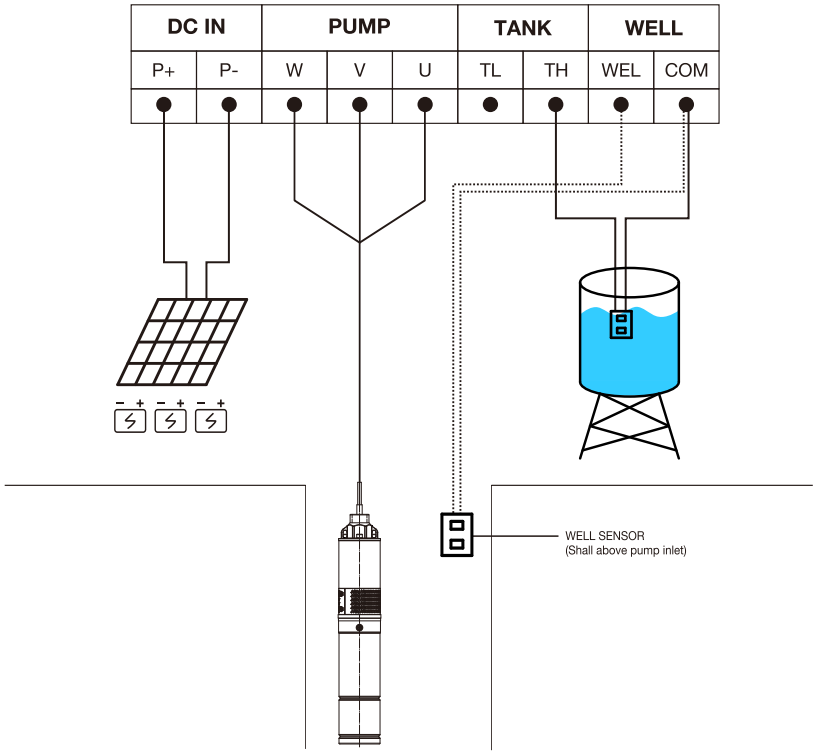
Pump Extension Cable - Specification Sheet

Pump Voltage	Cable length (m)												Voltage drop ratio
	25m	50m	75m	100m	125m	150m	175m	200m	225m	250m	275m	300m	
DC-24V	6mm²	10mm²	16mm²	20mm²	/	/	/	/	/	/	/	/	<7%
DC-48V	2.5mm²	4mm²	6mm²	10mm²	16mm²	16mm²	/	/	/	/	/	/	<7%
DC-72V	2.5mm²	4mm²	6mm²	6mm²	10mm²	16mm²	16mm²	16mm²	/	/	/	/	<7%
DC-96V	2.5mm²	2.5mm²	4mm²	6mm²	6mm²	10mm²	10mm²	10mm²	10mm²	16mm²	16mm²	16mm²	<7%
DC-110V	2.5mm²	2.5mm²	4mm²	6mm²	6mm²	10mm²	10mm²	10mm²	10mm²	10mm²	16mm²	16mm²	<7%

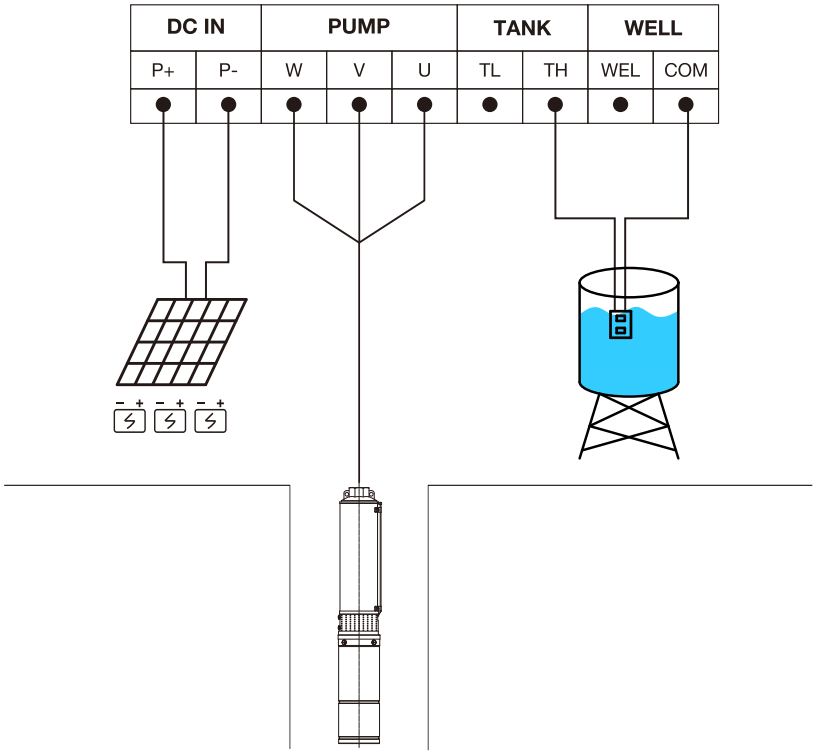
Float switch Extension Cable - Specification Sheet

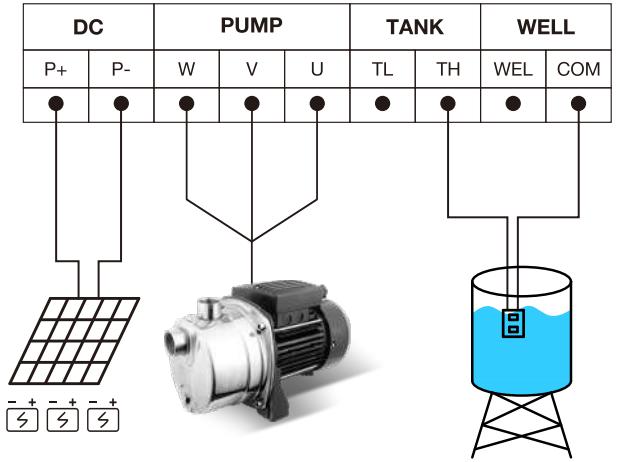
Extension cable length	Cable diameter
＜1000m	0.2mm²
≥1000m	0.5mm²

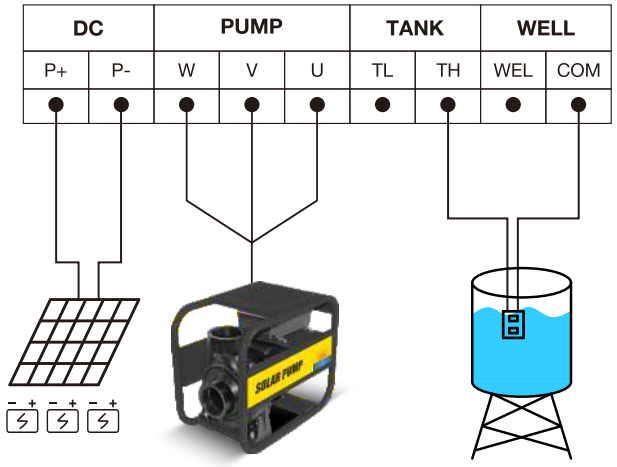
Solar Screw Pumps Wiring



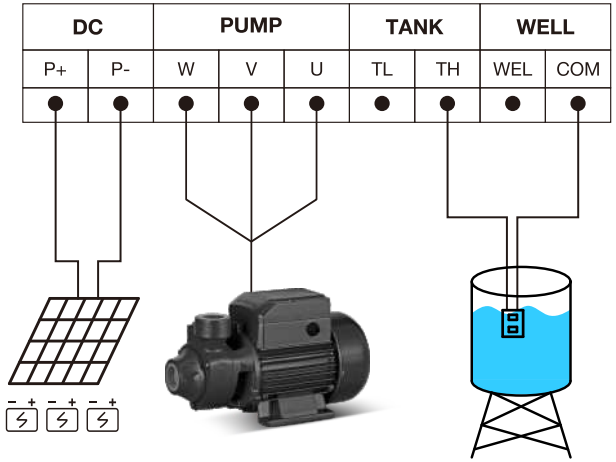
Solar Well Pumps Wiring

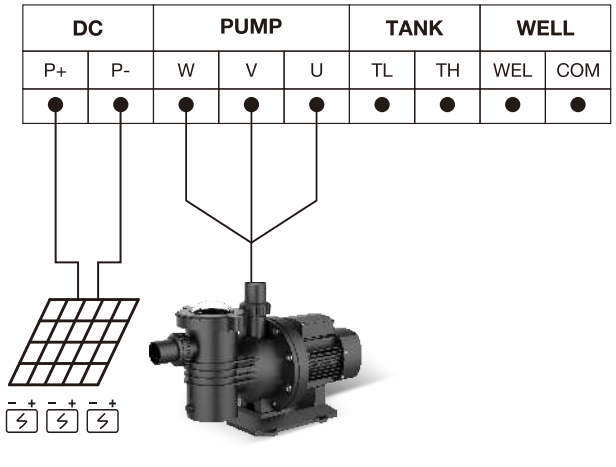






Solar Surface Pumps Wiring





Test Run

1.Before testing the pump, the control box switch must be in the off position. Submersible pumps must always be under water and should be preconditioned for at least 15 minutes. Water is the lubricant for the pump and if it is not properly "preconditioned", the bearings will not be adequately lubricated. Do not attempt to test the pump without being submerged in water, even for a short while. Doing so will cause permanent damage. You will need a large container so the pump will not drain it dry in a few seconds. Never use the power cord to raise or lower the pump.

2. Use the mounting holes to attach a durable rope or stainless steel cable to the top of the pump. Make sure the length of the rope or cable is greater than the depth where you want to install the pump. This is used to raise and lower the pump. Never use a power cord to do this.

Note

Always keep the submersible pump underwater during operation. Always be careful when wiring. If not in use for a long time, remove the pump and wipe the screws and pump body. Wipe with vegetable oil. Always make sure there is enough water around the pump during pumping. Never operate without water. Always place the solar panel in a sunny location, facing due north (southern hemisphere) or due south (northern hemisphere). If the panel angle is fixed, an angle equal to your latitude will be a good compromise.

1.Power on and start

Every time the power is on, the system will remain in its pre power outage state. If it is in the off state before power outage and still in the off state after power on, if it is in the working state before power outage and still in the working state after power on

2. Button to start

In the off state, press the button on/off to turn on the water pump without water testing the water tank

3.Float Switch Mode

In the running state, when the water tank floats up, the pump stops immediately. (The TH signal terminal of the main control board is short-circuited to the COM terminal, and the Tank light is on)
In the running state, when the well float drops, the pump stops immediately. (The WEL signal terminal of the main control board is short-circuited to the COM terminal, and the Well light is on)

4. No-load operation shutdown

When the pump works continuously for a period of time and the power is lower than the set power at the current speed for 20 seconds, the pump will immediately shut down and report a P48 fault.
After the water shortage detection delay time is over, the fault will be cleared. The water shortage detection delay time will increase gradually. (30s-15min-1h-6h-12h)

5. Button to start

In the running state, press the button on/off to turn off the pump

6. Pump operation

Every time the pump is started, it will identify the DC (battery) and PV (solar) power supply modes for 10 seconds, and then switch to the corresponding mode. The speed setting during the identification process is invalid.

7.DC Mode (Battery)

In DC (Battery) mode, the pump speed is adjustable from 1000-4000RPM. The default speedsetting for submersible pumps is 4000RPM, and the default speed setting for surface pumps is 3600RPM.
The speed can be set using the up and down keys, and the speed can be increased (or decreased) by pressing the up and down keys.
As the pump runs, the DC (battery) supply voltage will continue to drop to prevent over-discharge. When the voltage is lower than the corresponding electrical protection voltage, the pump stops working.

Model	Protection Voltage(V)
DC24	20V
DC48	40V
DC72	60V
DC96	80V
DC110	80V

Pump Operation

8.PV mode

In PV mode (4000RPM for submersible pumps and 3600RPM for surface pumps), speed limit is effective. The running speed of the water pump is also determined by the current solar power (maximum power point tracking). When the sunlight is stronger, the output power of the solar panel increases and the speed of the water pump increases,
and vice versa. In PV mode, the MPPT indicator flashes. The faster the flashing frequency, the closer the current working point is to the maximum working point. The slower the flashing frequency or no flashing indicates that the maximum power point is being tracked.
If the solar power is insufficient, the speed of the water pump will continue to decrease. When the speed drops to 600RPM, the water pump stops and reports a P46 fault after 3 seconds. When the solar power is insufficient to maintain the current system startup or operation,
the output voltage of the solar panel will drop rapidly. When it drops from the minimum voltage to the minimum voltage of the system and lasts for a period of time, a "PL" fault will be reported. Try to restart 5 times in a row. If the "PL" fault still occurs, keep this state for 30 minutes and try to restart again.

9. Reverse connection protection

If the positive and negative poles of the power supply are connected in reverse, the controllerscreen has no display and is not functioning.

10. Dry-run protection

This function is that the controller determines whether there is water shortage by detecting the speed, current, output power and other states of the water pump. The water shortage detection delay time is 30s,15min, 1 hour, 6 hours, 12 hours, and the maximum can be superimposed to 12 hours. If it is confirmed that there is water, it can be restarted after power off. The fault code is automatically eliminated and the water pump works again.

11.Maintenance and care

After the pump has worked for 3000 hours, the wearing parts (such as bearings, seals, mechanical seals) should be replaced, otherwise it may cause more serious damage.
If the pump is not used for a long time, it should be cleaned, placed in a dry and ventilated place, and properly stored.

Error Code And Solutions

Fault Code	Reasons	Causes	Solutions	Recovery process
P0	Hardware Over-current	Motor mismatch	Choose matching motor	The fault code will be automatically cleared after 30s
		U, V, W are short-circuited	Re-wiring correctly	
P43	Phase loss protection	U, V, W are open circuit	Re-wiring correctly	The fault code will be automatically cleared after 30s
P46	Stalling protection	Motor mismatch	Choose matching motor	The fault code will be automatically cleared after 30s
		Motor extension cable is too long	Reduce cable length or increase cable diameter	
		Supply power is too low	Increase power supply	
		Pump bearing stuck	Clean or repair bearings	
P49	Software Over-current	Pump bearing stuck	Clean or repair bearings	The fault code will be automatically cleared after 30s
		U, V, W are short-circuited	Re-wiring correctly	
P50	Low voltage protection	Low input voltage	Increase input voltage	After the voltage input becomes normal Clear automatically immediately
P51	High voltage protection	High input voltage	Reduce input voltage	
P48	Dry-running protection	The air in the pump is not fully exhausted	Cut off the power, then power on again after 30s and start the pump to drain water.	The default is def (the recovery time increases from 30s-15min-1h-6h-12h). or power on again
		Water source is short of water	Wait for water to return, the pump will restart	
P60	High temperature protection	Temperature of controller'MCU more than 90°C	Reduce temperature	Automatically clear after the temperature returns to normal
PL	Power shortage	Sunlight is not enough	Pump will re-start untill sunlight supply back	Within the first 5 times, the fault code will be automatically cleared after 30s. If it happens more than 5 times in a row, the time will be extended to 30 minutes.
E-11	The MOS drive voltageis abnorma	/	Replace the new circuit board	/
E-12	Well water shortage protection	Water shortage in wells	When the water level in the well rises and exceeds the float, the controller starts the recovery time countdown. After the countdown ends, the WELL light goes out, and the pump restarts.	The default is def (the recovery time increases from 30s-15min-1h-6h-12h). or power on again
E-13	Water tank full protection	Water tank is full	When the water level in the water tank drops and the float falls, the controller starts the recovery time countdown. After the countdown ends, the TANK light goes out, and the pump restarts.	The default value is 300 seconds. Customers can press the UP or DOWN button to modify the set value according to actual water usage conditions.