SOLAR PUMP
INSTRUCTION BOOK

WARNING

The controller will be burned out when the open circuit voltage is higher than our setting.

ตัวควบคุมจะถูกเผาไหม้ออกเมื่อแรงดันไฟฟ้าวงจรเปิดสูงกว่าการตั้งค่าของเรา

El controlador se quemara cuando el voltaje del circuito abierto sea mayor que nuestro ajuste.

سيتم حرق وحدة التحكم عندما يكون الجهد الكهربي المفتوح أعلى من إعدادنا.

Controller and Pump Matching Method					
Controller Model	Adaptable Pump	Max. Input Current (A)	Max. Open Circuit Voltage (V)	MPPT Voltage Range (V)	Working Temperature (ºC)
DC-12	Rated 12V Pump	15	<50	30-48	-15-60
DC-24	Rated 24V Pump	15	<50	30-48	-15-60
DC-36	Rated 36V Pump	15	<50	30-48	-15-60
DC-48	Rated 48V Pump	15	<100	60-90	-15-60
DC-72	Rated 72V Pump	15	<150	90-120	-15-60
DC-110	Rated 110V Pump	15	<200	110-150	-15-60

• Application in 12V~110V DC pumps

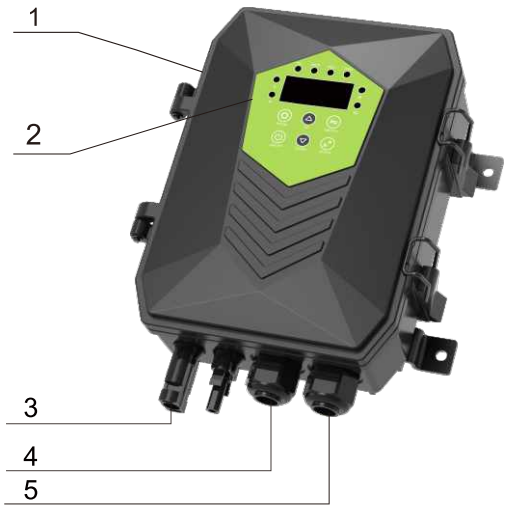
Solar Panel selection

1. Solar Panel Connection Knowledge

The solar panel can be divided into mono-crystalline silicon solar cell, polycrystalline silicon solar cell and thin-film photocell. The Mono type is the most efficient one, but the price is the highest; the thin-film photocell is the cheapest one. Normally, the power of solar cells is 150W per square meter. The open-circuit voltage (Voe) marked on the solar cell means the max electromotive force before working. The voltage will decrease when working, its voltage is called working voltage (Vmp). Common open-circuit voltage is 21V, 36V, 44V etc. It changes along with the change of area and temperature, the lower the temperature, the higher the voltage. Another important index is power. It is proportional to the panel area. There is a need for some solar cells to connect in series if the voltage is not enough, total voltage equals adding each panel's voltage.

The working voltage of the solar cell needs to be selected according to the controller's working voltage, and then to confirm the open-circuit voltage of the solar panel. Then select the solar power according to the pump power after the voltage is confirmed. The power of the solar water pump is input power and the generating efficiency of the solar panel is under 70% normally. In order to ensure the rated working time of 4 hours a day, the solar panel power equals input power multiply 1.5 which is also the minimum power. If the solar panel power is smaller than this value, the pump can not reach its rated flow and head even though it can still work normally. Using more panels for the pump is better if condition permits because that is able to ensure more time for the pump to run and reach the rated flow and head.

Wiring Diagram



1. Nameplate and caution.
2. Operation panel
3. DC electric cable entrance.
4. Pump electric cable entrance.
5. Water level sensor cable entrance.

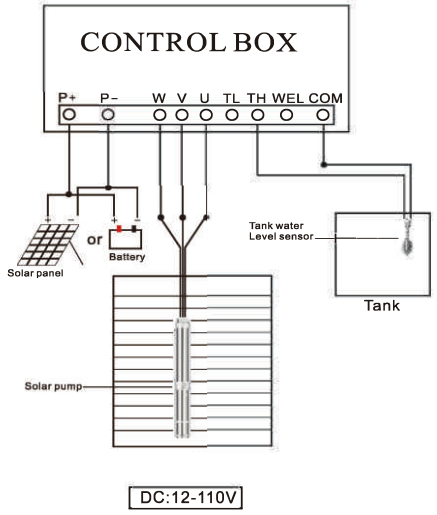
Please connect the pump to the controller making sure they do not touch each other.

Later when we test the system, if the wiring is incorrect, the pump will run backwards and you will only have to swap over two wires to get it running correctly.

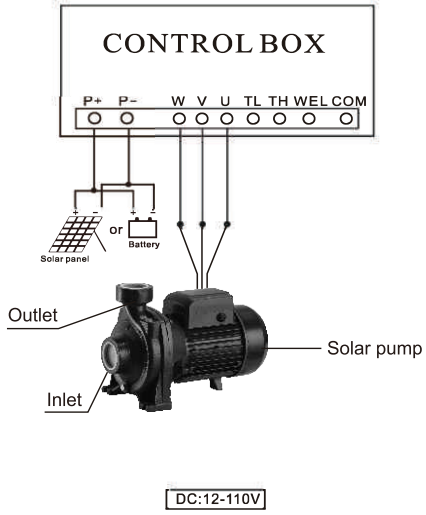
When connecting with battery, make sure the polarity is correct, plus to plus, minus to minus.

Caution: If wiring a battery, be very careful not to reverse or short the terminals.

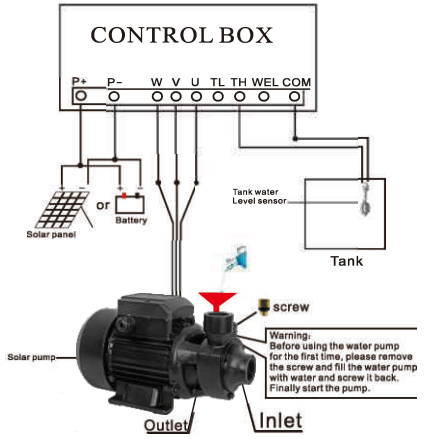
We advise you remove all metal wrist bands or watches before you start. Solar PV panels when connected together can also produce a lot of energy, so caution must be exercised here as well. A dark cloth to shade the panels is good precaution to reduce the power output.



DC:12-110V



DC:12-110V



WARNING

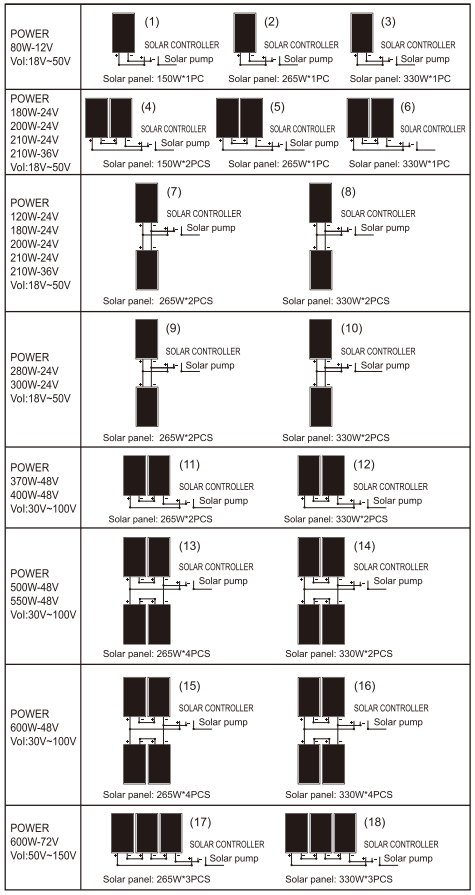
The controller must match with the recommended solar pumps. Please do not use the controller for other pump s. If the pump problem is caused by this reason, we do not bare any responsibility. For the perfect performance and long-life working, the controller should be kept away from strike, shake, sunshine, salt mist , oil mist and etc. Because of the power loss from cable, please try to use the shortest cable. While using longer cable , the cable connecting controller and solar panels should be over $4mm^2$ (Do not use single core cable) . While the cable between controller and pump is within 30m, the cable should be at least $2mm^2$. While over 30m, the cable should be at least $4mm^2$.

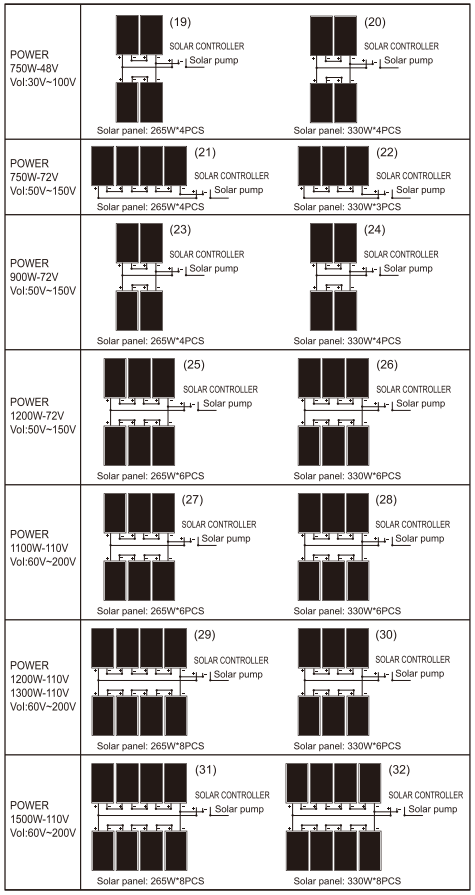
internal wiring diagram

Tips1: Do not reverse the positive and negative of power, otherwise it will not work.

Tips2: Before you start wiring the controller box, switch must be in the Off position.

Solar panel recommendation for 24V- 11OV DC solar pump





Solar Panel Description:

150W
Max power: 1 5 0W
Short Circuit Current :9A
Open Circuit Voltage: 22V
Max Power Current: 8.4 A
Max Power Voltage: 1 8 V

265W
Max po we r: 265W
Short Circuit Current: 8. 7A
Open Circuit Vol tage:3 6.6V
Max Power Current: 7.6 8A
Max Power Voltage:3 0.6V

330W
Max power: 33 0W
Short Circuit Current : 9. 33A
Open Circuit Voltage: 45.64V
Max Power Current: 7. 1 5 A
Max Power Volt age: 34.28 V

Tips:

When it's series connection, the voltage is added , but the current is' t changed; when it's parallel connection , the voltage is unchanged, but the current is added.

Before the power is on, you must use the instrument to detect the open circuit voltage of solar panels, or apply for series ,pa rallel knowledge 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.

Operation Panel

1. LED Indicator Light

- Voltage(V): Voltage indicator light.
- Speed(RPM): Speed indicator light.
- Current(A):Current indicator light.
- Power(W): Power indicator light.
- Tank: Light when tank is filled with water.
- Well: Light indicates no water in well.
- MPPT: Solar energy running lights (twinkling).
- Power: Light twinkles at downtime, light is constant in running.

2. Key Operation

Key Type	Function
Set Key	➢ Factory parameter setting, unopened
Enter	➢ Factory parameter setting, unopened
Up	➢ Running speed setting key, each time you press it, the speed will increase by one gear.
Down	➢ Running speed setting key, each time you press it, the speed will decrease by one gear.
Switch	➢ In the running status interface, switch the display mode. The display mode is cyclically switched between voltage (V) -> speed (RPM) -> current (A) -> power (W).
On/Off	➢ In the running state, press the key to stop; And in the stop state, press the key to start.

Test Running

Before you test the pump, the controller box switch must be in an off position. The submersible pump must be under water at all times and should have been pre-conditioned for at least 15 minutes. Water is the lubrication for the pump and if it is not

"pre-conditioned" properly, the bearings will not be adequately lubricated. Do not attempt to test the pump even for a moment while not being submerged, otherwise permanent damage will occur. You will need a large container then the pump won't pump it dry in seconds. Never use the power cable to raise or lower the pump.

1. 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.

2. Attention

Do keep the pump under water 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. Wipe with vegetable oil.

Do make sure the pump has adequate water around it during pumping. Don't run without water.

Do put your solar PY 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.

Operation Mode

1. Pump Start

1) 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).

2) Button to start

In shutdown state, press  to tum on the pump, without testing water the button tank (without any Shutdown conditions).

3) Water shortage to start

If the system boots but the pump stops and water shortage switch is closed, the pump immediately starts. (TL signal terminal of the main control board is shorted to the COM terminal).

1) 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)

2) Dry Pumping Shut Down

If the water pump continuous working for a period of time, and the power is less than the set power at the current speed and continues for 20s, the pump will stop immediately and report P48 fault. After 30 minutes, the fault is cleared.

3) Button to Stop

In running state, press the button  to tum off the pump.

3. Pump Operation

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

1) DC mode (battery)

In DC (battery) mode , the pump speed is adjustable, range of 1000 - 4000RPM. The default setting speed is 4000RPM for submersible pump and 3000RPM for surface pump. The speed can be set  or  keys, and the speedan be by the increased (or decreased) by pressing the increment(or decrement)button.

With the pump running, DC (battery) supply voltage will continue to decline to prevent excessive discharge, when the voltage is lower than the corresponding electrical protection voltage, the pump stops working.

Model	Protection Voltage(V)
DC-12	20
DC-24	20
DC-36	20
DC-48	40
DC-72	60
DC-110	80

2) PV Mode

In PV mode , the pump setting speed is similar to DC mode, and the maximum speed (4000RPM for submersible pump and 3000 RPM for surface pump)limit is effective.

Pump running speed is also determined by the current solar power(Maximum power point tracking). When the solar light enhances, the output power of 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, pump stops, and reportsP46 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 system and lasts for 1Os , 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.

4. Reverse connection protect

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

5. Dry-run protection

This function refers to the pump pumps out water in the well , the system can automatically detect the anhydrous state , pump will stop working automatically by set program. Dry-run protection is effective in all working modes. Pump will Standby for 30 minutes to restart the work (meet the start condition). Start to detect again whether there is water or not , if no water , stop working automatically ;if there is water, keep working.

Servicing and Maintenance

1). 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.

2). If the pump didn't use for long time, please scrub it, place at dry and ventilated place and keeping properly.

Fault Information and Troubleshooting Method

Fault Type			
Fault Code	Fault Description	Causes and Solutions of Fault	Recovery Procedure
PO	Hardware Overcurrent	- Motor model is mismatched, please choose matching pumps. - 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 rewiring to ensure it reliable contact.	Automatically remove after 30s
P46	Stall Protection	- Motor model is mismatched , please choose matching pumps - Pump extension cord is too long, please reduce the extension cord - Power is too low, increase the power supply - Pump bearing is stuck, please clean pump bearings	Automatically remove after 30s
P49	Software Overcurrent	- Water pump bearing stuck, clean pump bearings - 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, emove the fault immediately
P48	Dry-run Protection	- Not all of air in the pump is exhausted, cut off the power, re-power and start the pump drainage after 30 seconds - 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	- No sunlight, waiting for the sunlight to restart - 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

NOTE: