

Manual for Installation and Operation

pick it up

ready to go,
system in a box



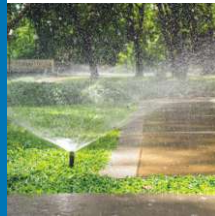
plug it in

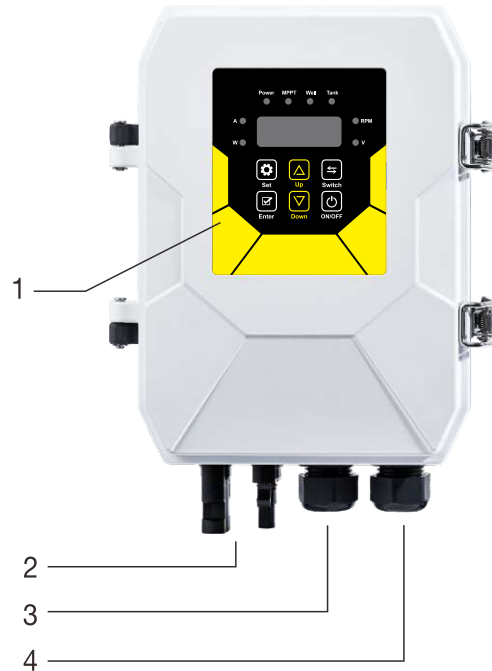
easy wiring, save time,
solve your problem



pump water

from any source:
pond, stream, well





- 1.Operation panel
- 2.DC electric cable entrance.
- 3.Pump`s cable entrance.
- 4.Water level sensor cable entrance.









LED Indicator Light

- Voltage (V): In display mode of Voltage,Pilot lamp will be lighting.
- Speed (V) : In display mode of Speed,Pilot lamp will be lighting.
- Current (A) : In display mode of Current,Pilot lamp will be lighting.
- Power (W) : In display mode of Power,Pilot lamp will be lighting.
- Tank : When tank is full,Pilot lamp will be lighting.
- Well : When well is shortages of water,Pilot lamp will be lighting.
- MPPT: In solar power supply,Pilot lamp will be lighting.
- Power : When pump works,Pilot lamp will be always lighting.

Key Operation



| Key Operation | Function |
|---|---|
|  Set Set Key | Factory setting parameter, Do not open. |
|  Enter Enter | Factory setting parameter, Do not open. |
|  Up Up | RPM setting, each time you press, the RPM will increase for one grade. In fault state, turn off/on the fault display. |
|  Down Down | RPM setting, each time you press, the RPM will decrease for one grade. |
|  Switch Switch | In the operation status, you can circularly switch the display mode in voltage(V) -> speed(RPM) -> current(A) -> power(W) |
|  ON/OFF ON/OFF | Start or stop pump manually. |

Parameters of Controller



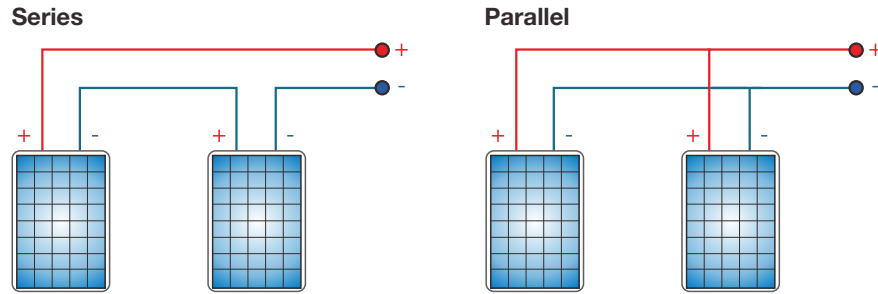
| Controller | Adaptable Pump | Max Input Current(A) | VOC(V) | Working Voltage Range(V) | Working Temperature (°C) |
|------------|----------------|----------------------|--------|--------------------------|--------------------------|
| DC24 | 24V Pump | 15 | <50V | 24 - 48V | -15 - 60 |
| DC48 | 48V Pump | 15 | <100V | 48 - 96V | -15 - 60 |
| DC72 | 72V Pump | 15 | <150V | 72 - 144 | -15 - 60° |
| DC96 | 96V Pump | 15 | <200V | 96 - 192 | -15 - 60 |
| DC110 | 110V Pump | 15 | <200V | 110 - 192 | -15 - 60 |



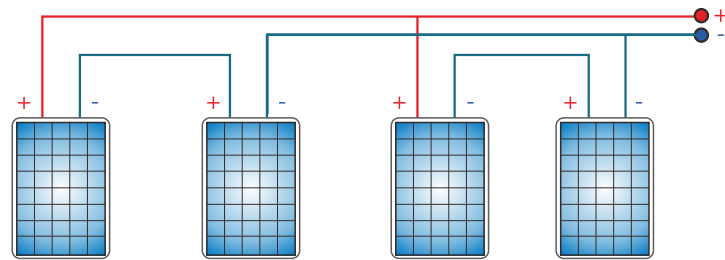
Caution:

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

Solar Panel Wiring



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 to different area or actual usage status



- 24V Pump working voltage range: 24-48V, VOC can not exceed 50V
- 48V Pump working voltage range: 48-96V, VOC can not exceed 100V
- 72V Pump working voltage range: 72-144V, VOC can not exceed 150V
- 96V Pump working voltage range: 96-192V, VOC can not exceed 200V
- 110V Pump working voltage range: 110-192V, VOC can not exceed 200V

Cable Size



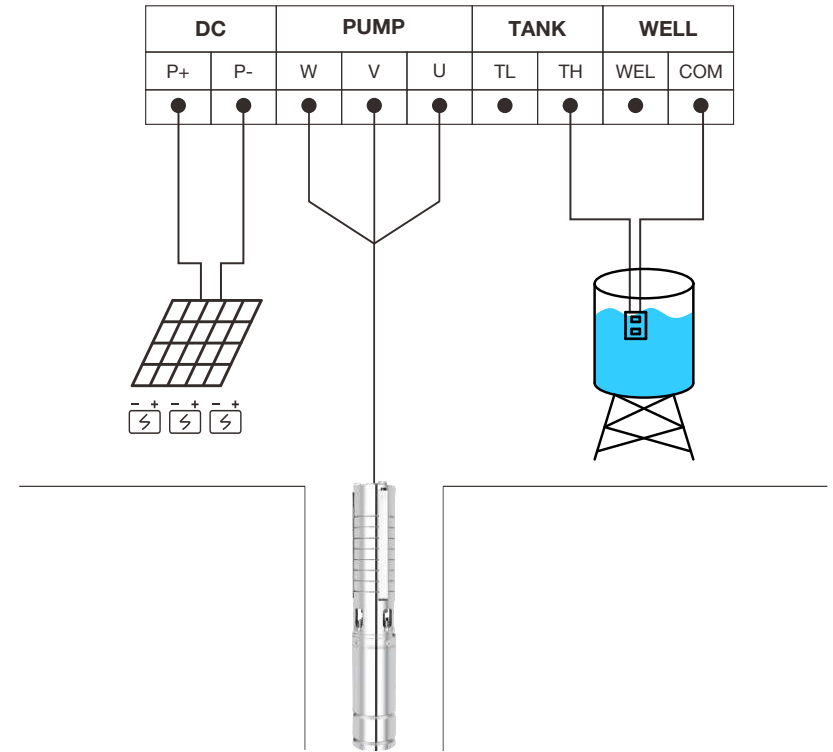
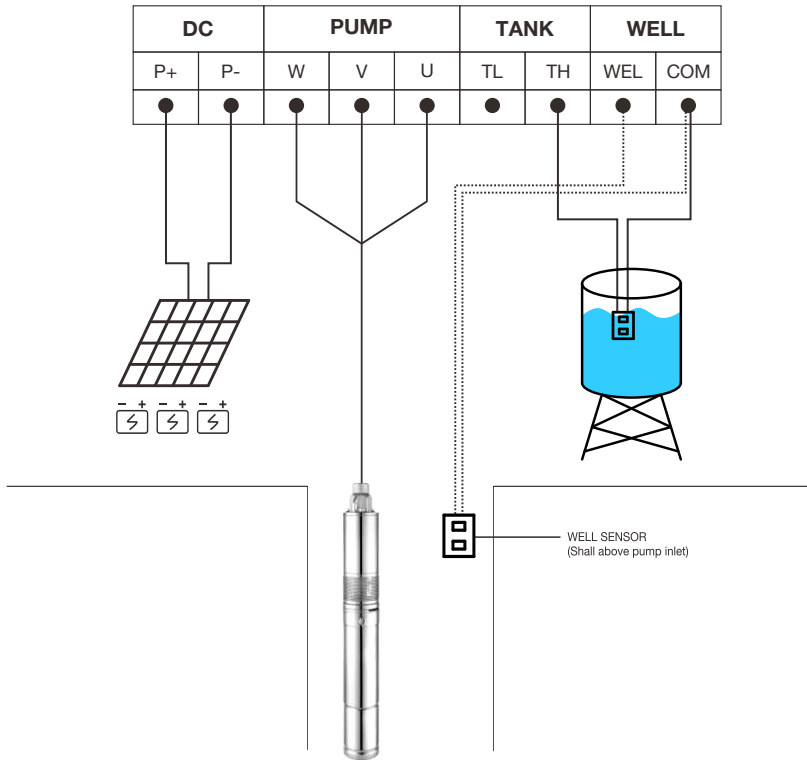
Cable size recommendation

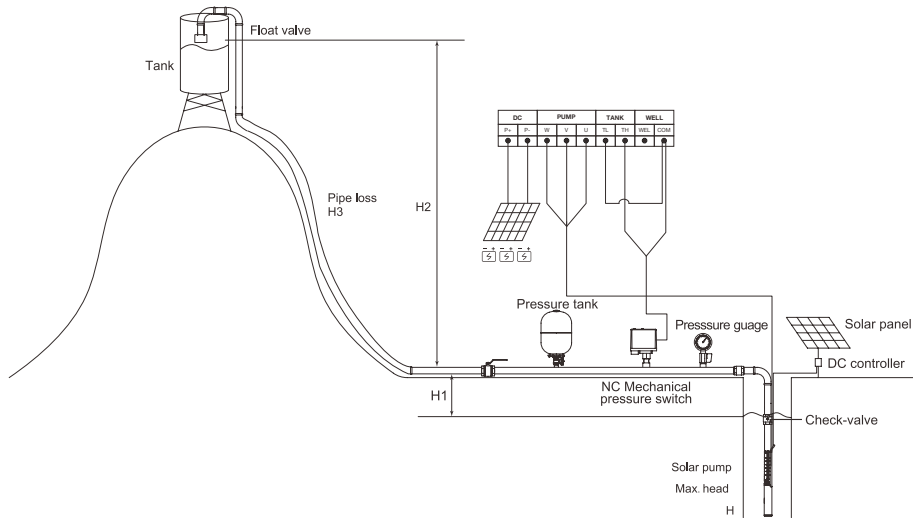
| Pump Voltage | Cable length (m) | | | | | | | | | | | |
|--------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 0-15 | 16-30 | 31-45 | 46-60 | 61-75 | 76-90 | 91-105 | 106-120 | 121-135 | 136-150 | 151-175 | 176-200 |
| 24V | 4mm ² | 6mm ² | 10mm ² | 16mm ² | 16mm ² | 25mm ² | 25mm ² | 35mm ² | 35mm ² | 35mm ² | 50mm ² | 50mm ² |
| 48V | 2.5mm ² | 4mm ² | 6mm ² | 10mm ² | 10mm ² | 16mm ² | 16mm ² | 25mm ² | 25mm ² | 25mm ² | 35mm ² | 35mm ² |
| 72V | 2.5mm ² | 4mm ² | 6mm ² | 6mm ² | 10mm ² | 10mm ² | 10mm ² | 16mm ² | 16mm ² | 16mm ² | 25mm ² | 25mm ² |
| 96V | 2.5mm ² | 2.5mm ² | 4mm ² | 4mm ² | 6mm ² | 6mm ² | 10mm ² | 10mm ² | 10mm ² | 10mm ² | 16mm ² | 16mm ² |
| 110V | 2.5mm ² | 2.5mm ² | 4mm ² | 4mm ² | 6mm ² | 6mm ² | 10mm ² | 10mm ² | 10mm ² | 10mm ² | 16mm ² | 16mm ² |

Solar Helical Rotor Pump Installation



Solar Centrifugal Pump Installation





Remarks

- 5 - - 0: Standard polarity for switch
- 5 - - 1: Opposite polarity for switch

1. At OFF state
2. Press Set show C99
3. Switch to C88
4. Press Enter(8 times)
5. Show 5 - - 0
6. Press UP show 5 - - 1
7. Press Enter to save

Float switch detection time: 300s(default time)
Short circuit :TL,COM

H1: Height from water level to NC Mechanical pressure switch

H2: Height from NC Mechanical pressure switch to Tank

H3: Pipe loss

Limit

$H2 < P1$:

NC Mechanical pressure switch min pressure bar (Start value)

$H - H1 - H3 < P2$:

NC Mechanical pressure switch max pressure bar (Stop value)

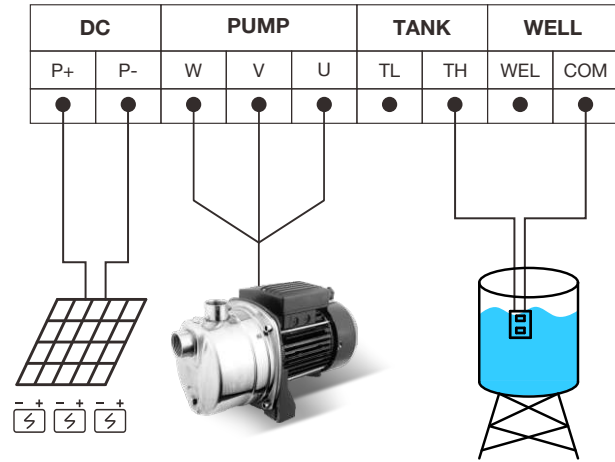
Example

NC Mechanical pressure switch: 3.0 - 4.5 bar

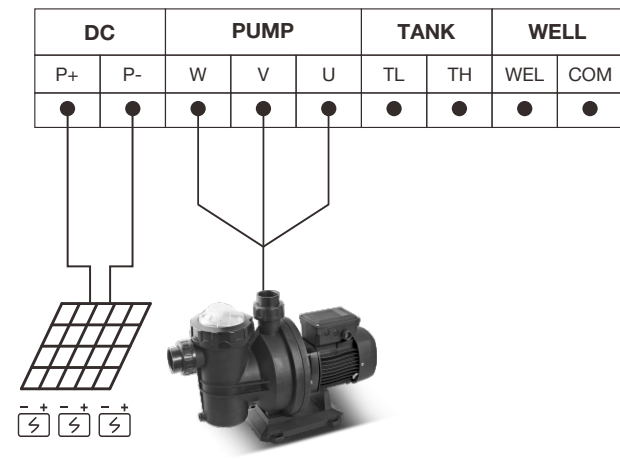
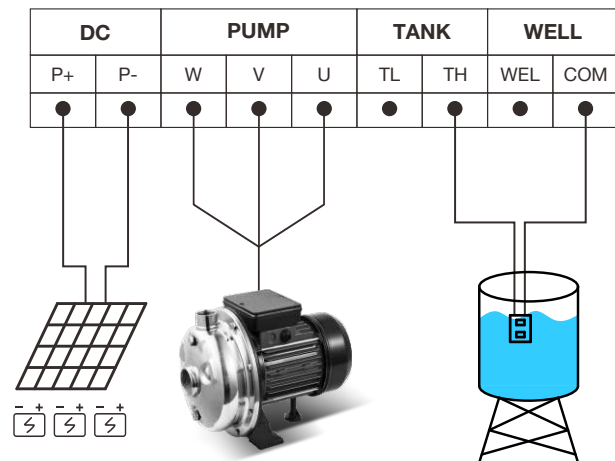
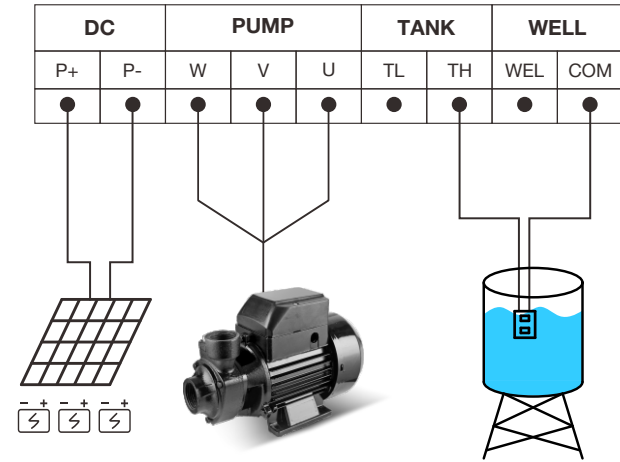
$H - H1 - H3 > 4.5 \text{ bar}$

$H2 < 3.0 \text{ bar}$

Solar Surface Pump Installation



Solar Surface Pump Installation





Pump Start

1.Power on to start

Every time pump power on,the system default boot and pump start immediately without testing water tank.

2.Button to start

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

3.Water Shortage of start

If the system boot but the pump stop and water Shortage switch is closed,the pump immediately starts.

(TL signal terminal of the main control board is shorted to the COM terminal.)

Pump stop

1.Float switch mode

In running state,when the water full switch is closed,the pump immediately stops.

(Float switch's 2 cables connect TH and COM terminal and the Tank light is on).

2.Low-power protection

If the pump continuously working for a period then the input power is less than the set power under the current speed and continuously working for 20s,The pump will stop immediately and report P48 fault.After 30 mins the fault will be cleared.



Pump operation

Every time start the pump,which will automatically identifies the DC(Battery) or PV(Solar panel) power supply mode for 10 seconds. then switch to the corresponding mode to run.The setting speed is invalid during the identification procedure.

DC Mode(Battery)

In DC mode,the pump speed is adjustable,range from 1000-3000 RPM

The default setting speed is 3000 RPM,The speed can be set by the UP or down keys.

When pump keep running for a long time,DC (battery) power's voltage will be reduced gradually.In order to prevent battery over discharge.when input voltage lower than controller set corresponding protection voltage,pump will stop working automatically.

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

Pump Operation



PV Mode(Solar Panel)

For PV mode,pump speed setting is similar as DC mode,maximum speed is also 3000 RPM.

And solar power will also influence pump's speed.MPPT controller will track solar panels's power.

When sunshine is stronger,The input solar power is increasing,pump speed will be higher and vice versa.

In PV mode,If the MPPT indicator light flashes fast,which means the current working points is closer to the maximum working point.If the flashing frequency is slow or not.which means the maximum power point is being tracked.If solar power is insufficient,the pump speed will be reduced gradually,when the speed drop to 600rpm,the pump stops and reports P46 faults after 30 seconds restart again.

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 10s,

Controller will report "PL" Fault.If it still appears "PL" fault after trying continuously 5 times to restart,Please try to start again after 30 mins.

Reverse connect protection

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

Error Code And Solutions



| ITEM | Fault Code | Reasons | Solutions | Recovery process |
|------|------------|-----------------------------------|--|---|
| 1 | P0 | Hardware Over-current | Q:Motor model is mismatch A:Choose matching one Q:UVW short circuit connection A:Re-wiring correctly | Automatically clears after 30s |
| 2 | P43 | Phase protection | Q:UVW open circuit A:Re-wiring correctly | Automatically clears after 30s |
| 3 | P46 | Stalling protection | Q:Motor model is mismatch A:Choose matching one Q:Pump cable length is too long A:Reduce cable length or increase cable diameter Q:Low power supply A:Increase power supply Q:Pump bearing is stuck A:Clean or repair bearing | Automatically clears after 30s |
| 4 | P49 | Software Over-current | Q:Pump bearing is stuck A:Clean or repair bearing A:UVW short circuit connection Q:Re-wiring correctly | Automatically clears after 30s |
| 5 | P50 | Low voltage protection | Q:Low input voltage A:Re-install panels correctly | Voltage gets right, Automatically clears immediately |
| 6 | P51 | High voltage protection | Q:High input voltage A:Re-install panels correctly | Voltage gets right, Automatically clears immediately |
| 7 | P48 | Dry-running protection | Q:The air is not exhausted totally in the pump A:Power-off and re-start 30s later Q:No water in the well, A:Pump will re-start automatically until water supply back | Automatically clears after 30s or re-power on |
| 8 | P60 | High temperature protection | Q:Temperature of controller MCU more than 90°C A:Reduce temperature | Automatically clears when temperature gets right |
| 9 | E00 - E10 | Current sampling failure | A: Power-off and re-start 30s later | Re-power on to clear |
| 10 | E-11 | The MOS drive voltage is abnormal | return to depot | / |
| 11 | E-12 | WELL | Q:Well is no water,in dry running protection, Well lamp is lighting A:Pump will re-start automatically until water supply back | Automatically clears after 30s or re-power on |
| 12 | E-13 | TANK | Water tank is full | Automatically clears after 30s or re-power on |
| 13 | PL | Power shortage | Q:Sunlight is not enough A:Pump will re-start until sunlight supply back Q:Solar panel matching error, A:Re-choose panels and install correctly | At the first 5 times, automatically clears 30s later, then turn to 30mins |
| 14 | ALARM | Reverse wiring protection | A:Power off and re-wiring correctly. | Power off and re-wiring correctly |