3SP Solar Deep Well Pump
Instruction Manual

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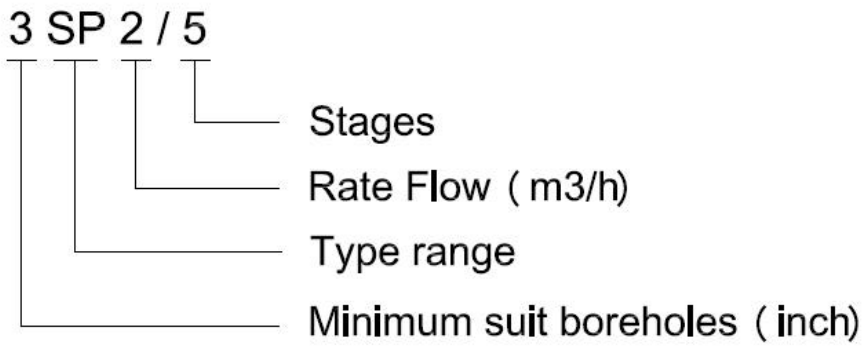
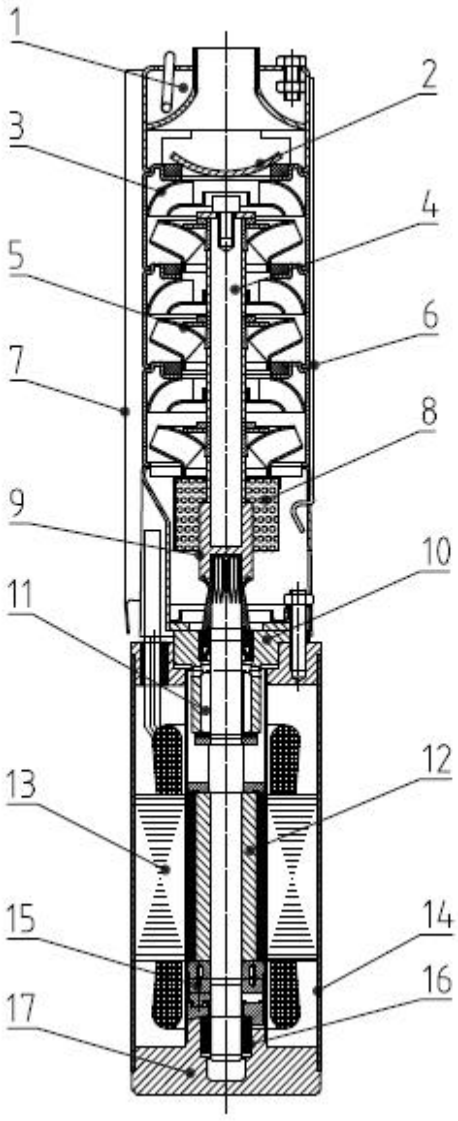
◆ Model Naming Rules



◆ Structure and Materials



NO.	Component	Material
1	Discharge	SUS304
2	Non-return valve	SUS304
3	Guide vanes	PC/SUS304
4	Pump Shaft	SUS304
5	Impeller	POM/SUS304
6	Impeller Fastener	SUS304
7	Cable Cover	SUS304
8	Inter part	SUS304
9	Shaft Coupling	SUS304
10	Upper Bearing Housing	SUS304
11	Upper Bearing	Silicon Carbide
12	PM Rotor	--
13	Stator	--
14	Pump Housing	SUS304
15	Thrust Bearing	Graphite
16	Lower Bearing	SUS304
17	Lower Bearing Housing	SUS304

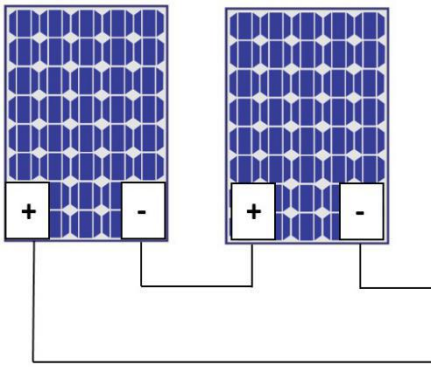
◆ Solar Panels WIRING

Series

To wire solar panels in series, positive of one solar panel is wired to the negative of the next solar panel.

In this case:

- Output voltage multiplies by the number of panels. eg; 2 x 44.5 VOC = 88.5 Voc
- Output watts multiplies by the number of panels. eg; 2 x 300W = 600W
- Output amps remains the same as a single panel. eg; 8.8 ISC (A)

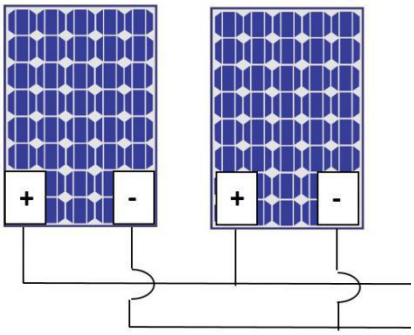


Parallel

To wire solar panels in parallel, the positives of each solar panel are wired together and the negatives of each solar panel are wired together.

In this case:

- Output voltage remains the same as a single panel. eg; 44.5 VOC
- Output watts multiplies by the number of panels. eg; 2 x 300W = 600W
- Output amps multiplies by the number of panels. eg; 2 x 8.8 ISC (A) = 17.6 ISC (A)



Combination of Series and Parallel

To wire solar panels in combination, wire two or more strings (panels wired in series) in parallel.

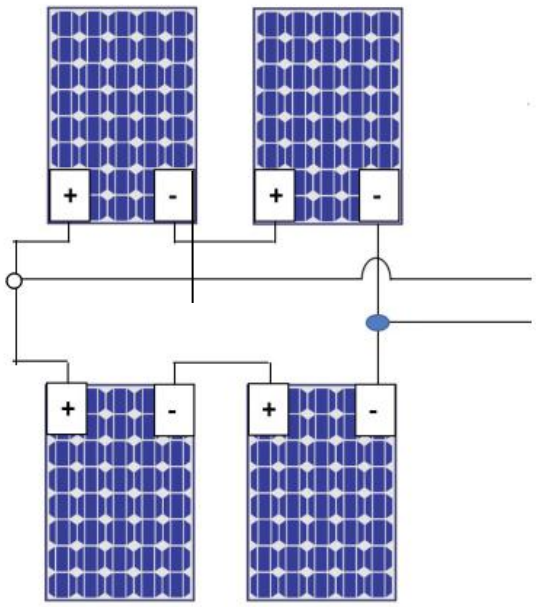
In this case:

- Output voltage multiplies by the number of panels in a string.
- Output watts multiplies by the number of panels in one series multiplied by the number of strings.
- Output amps are as per series connection multiplied by the number of strings.

In this example

each string of two panels = 89 VOC, 600W, 8.8SC (A)

Output Voltage = 89 x 2 strings= 178 VOC
Output Watts = 2 panels x 300W x 2 strings =1200W
Output Amps = 8.8 ISC (A) x 2 strings = 176. ISC (A)



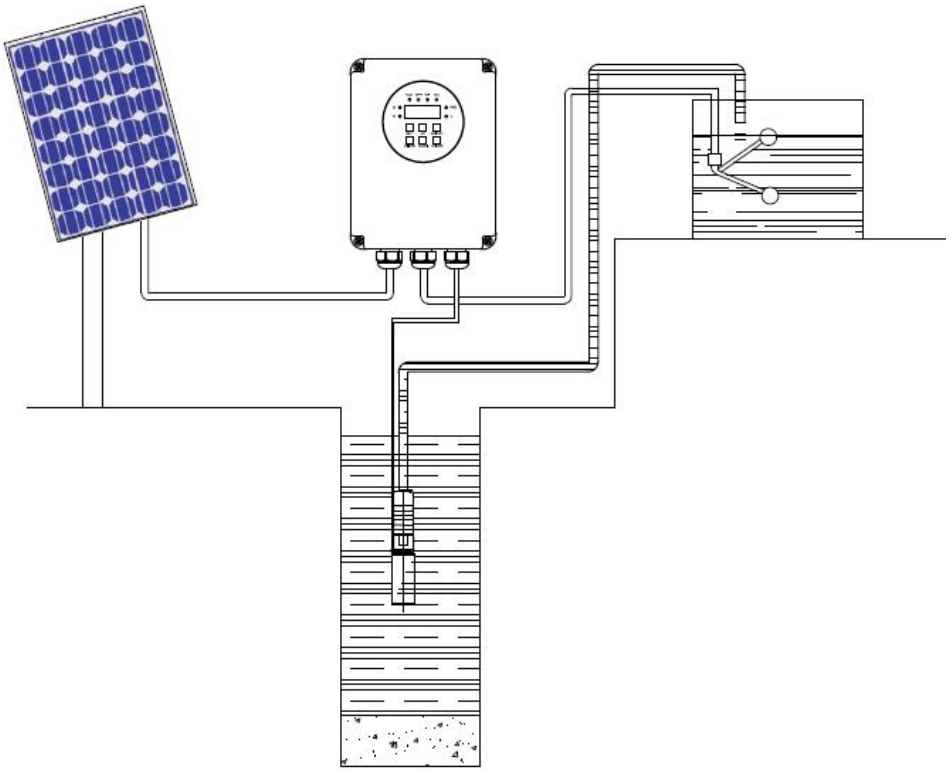
Recommend Selection of solar panel

Pump Model	Controller Model	Maximum Voltage (VOC)	Recommended solar panels	
3SP2-3	**PY-24**	48	one 300W solar panel.（Voc≈45V,Vmp≈37.6）	300X1
3SP2-5	PY-48	96	2 pieces of 300W solar panels parallel（Voc≈90V,Vmp≈75V）	300X2
			2 pieces of 250W solar panels parallel（Voc≈74V,Vmp≈60V）	250X2
			8 piece of 85W solar panels, each 4 pieces first in parallel, then the series. （Voc≈86V,Vmp≈70V）	85X4X2
3SP2-7	PY-72	150	3 pieces of 300W solar panels in series（Voc≈135V,Vmp≈112V）	300X3
3SP2-9	PY-96	180	4 pieces of 300W solar panels in series.（Voc≈178V,Vmp≈150V）	300X4
			4 pieces of 250W solar panels in series.（Voc≈150V,Vmp≈120V）	250X4

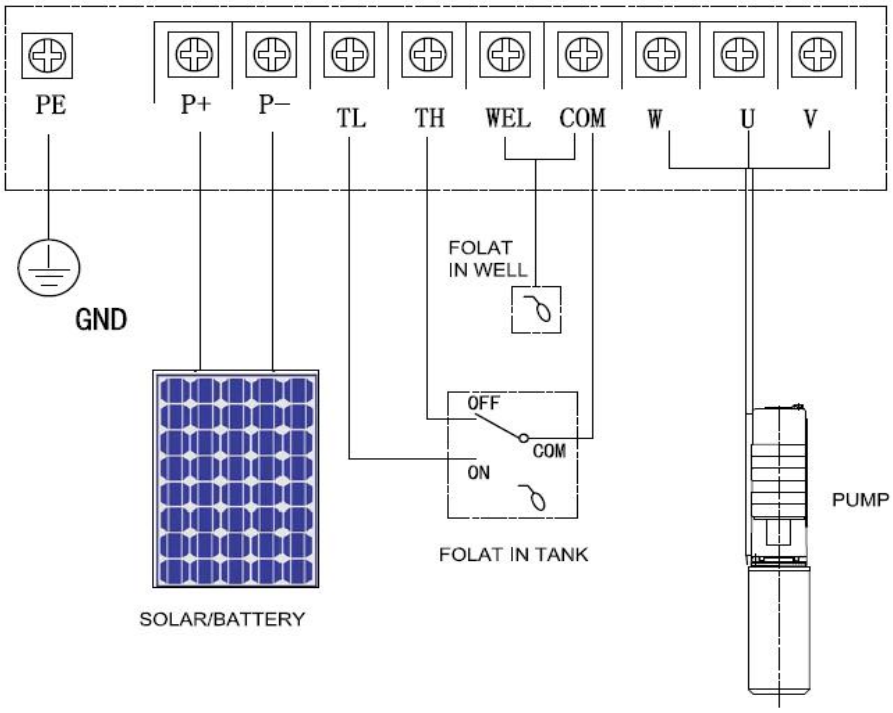
Note:The open circuit voltage of the solar power supply system shall not exceed the maximum input voltage of the PCB.

◆ Wiring Diagram

Installation diagram

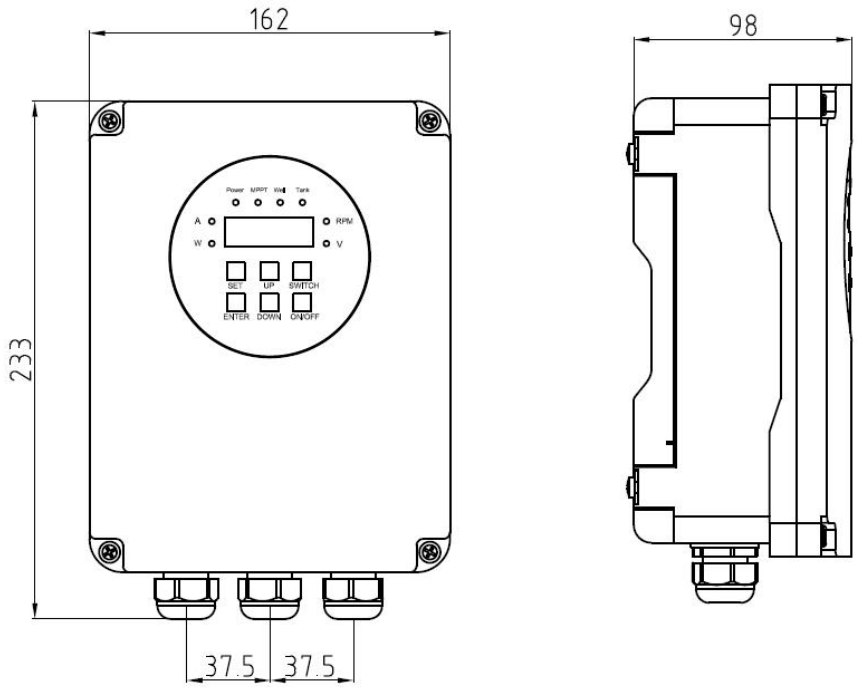


Controller wiring diagram

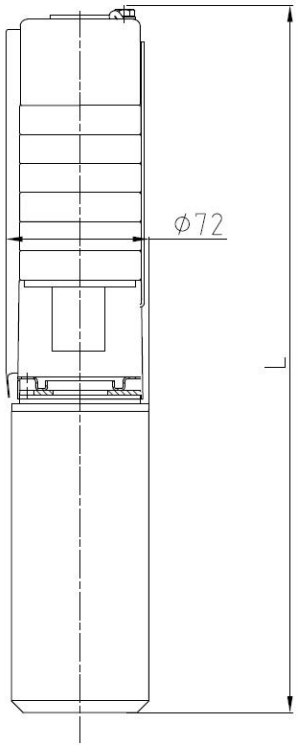


◆ Dimensions

Controller



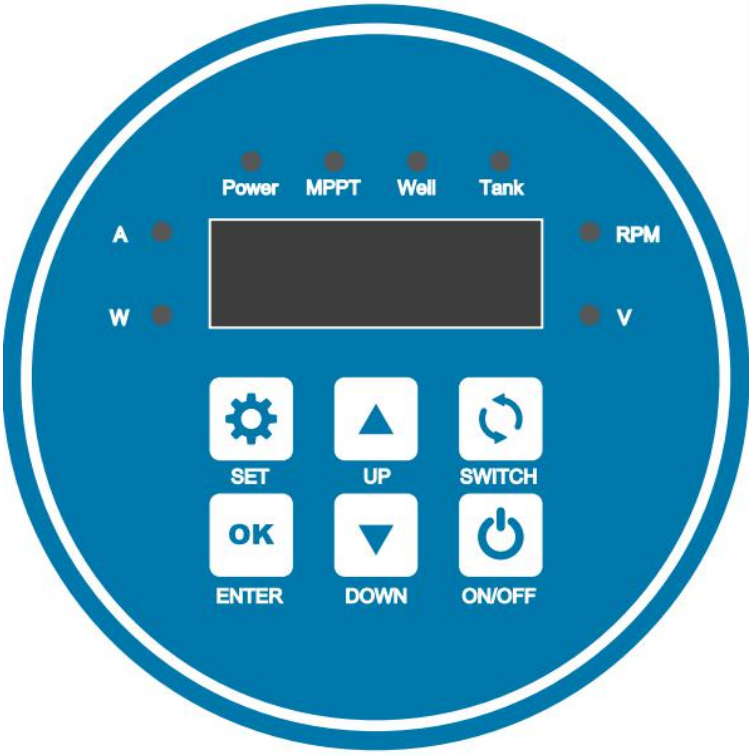
Motor



Model	L(mm)
3SP2/3	400
3SP2/5	440
3SP2/7	480
3SP2/9	520

◆ Operation Panel

1. LED Indicator Light



- Voltage(V): Voltage indicator lights.
- Speed(RPM): Speed indicator light.
- Current(A):Current indicator light.
- Power(W): Power indicatorlight.
- 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 constent in running.

2. Key Operation

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.

◆ Check before using

1. Before using, you should check whether the solar water pump is in good condition, such as joint loose, and cable damaged, and you should apply megger to check the insulation resistance, which should be larger than 50MΩ when the engine in cold state.
2. If the cable length needs to be lengthened, the diameter of extension cable should be larger than the original cable. And the joint need to seal with mackintosh.
3. You should check whether the pump can start or operate normally before using. Check whether the rotation direction of pump is anticlockwise or not. Note that a short turn, check the pump steering is correct. In the absence of water, operating is strictly prohibited. If the rotation direction of three phase pump is wrong, exchange any two wires of power supply input wire on the controller.
4. When installation, the pump should be hung on the rope and it is strictly prohibited to lift the pump through its cable. The submerged depth should one meter more than bottom in case of the sediment suction of sand damage the mechanical seal and impeller.

◆ Operation Mode

1. Pump Start

1) Power on to start

Every time it connect with electricity, the system default boot, and pump start immediately without testing water tank (without any Shutdown conditions).

2) Button to start

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

3) Water Shortage to 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).

2. Pump Stop

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 work 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 ON/OFF to turn 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 second, 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. The speed can be set by the UP or DOWN keys, and the speed can be 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	Minimum battery protection voltage(V)
PY-24	20
PY-48	40
PY-72	60
PY-96	80

2) PV Mode

In PV mode, the pump setting speed is similar to DC mode, and the maximum speed (4000 RPM), 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 not, it indicates that the maximum power point is being tracked.

Solar power is insufficient, the pump speed will continue to fall, when the speed drop to 600 RPM, pump stops, and report P46 faults after 3 second.

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, 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.

◆ Fault Information and Troubleshooting Method

Fault Type			
Fault Code	**Fault Description**	**Causes and Solutions of Fault**	**Recovery Procedure**
P0	Hardware Overcurrent	➢ Motor model is mismatch, please choose matching pumps ➢ UVW three-phase short-circuit connection, please rewiring to ensure the normal installation of UVW	Automatically remove after 30s
P43	Phase Protection	UVW three-phase open circuit, please rewiring to ensure it reliable contact.	Automatically remove after 30s
P46	Stall Protection	➢ Motor model is mismatch, 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 Over current	➢ Water pump bearing stuck, clean pump bearings ➢ UVW three-phase short-circuit connection, please rewiring 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	➢ Not all of air in the pump is exhausted, 10s automatically restart, repeat 2 times; ➢ 2 were reported P48,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 removal after 30 seconds, and then 30 minutes to removal
ALARM	Reverse connection protect	Exchange the positive and negative(P+、P-) wire	Restart the power

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