SOLAR POWER PUMP SYSTEM

USER MANUAL

MODEL:4SBY7.0/95-D110/1500

CONTENTS

#NOTES FOR SAFE OPERATION 2

1、How It works 3

2、4SBY7.0/95-D110/1500 4

2.1 Material of Parts 4

2.2 Pump Specification 4

2.3 Pump Performance 5

2.3.1 Pump Performance Chart 5

2.3.2 Pump performance Curve 5

3、Controller General Information 6

3.1 Features 6

3.2 Technical parameters 7

3.3 Wiring diagram 8

3.4 Operation panel 8

3.4.1 LED indicator 9

3.4.2 Button operations 9

3.5 Wiring instructions 10

3.5.1 Total Diagram of Terminals 10

4、Solar Panel Configure and Connection way 11

Configured by 30~36Vmp(37~44Voc)Solar Panel 11

5、Mechanical and Electrical Installation 12

5.1 Overheat Protection 12

5.2 Location Selection 12

NOTES FOR SAFE OPERATION

■ BEFORE INSTALLATION

WARNING

- O Do not install or operate damaged controller/pump or with missing parts.
- O Ensure only qualified personnel to operate the system.Otherwise it may cause product damage or personal injury.
- O Use correct PV panel configuration and cable size following the technical guide strictly. Otherwise,it may influence pump performance even result in damage to pump and controller.
- O Maximum submersibie depth of pump should≤40 Mtrs.Otherwise,pump body may deform and the flow and head performance may reduce due to the high water pressure.

■ INSTALLATION

CAUTION

- O Install the controller in nonflammable material like metal.Otherwise it may cause a fire.
- O The protective cabinet must prevent from moisture,insect or dust accumulation,which may cause abnormal working condition of controller.
- O The protective cabinet needs to set vents to ensure ambient temperature is below 45℃. High temperature will damage the controller components.
- O Use antistatic wrist strap while doing wiring.DO NOT touch the control board with hand directly.Static electricity on human body will cause breakdown on some components instantaneously.
- O Ensure PV array's positive(PV+) and negative(PV-)are connected to controller's PV+and PV- terminals correspondingly.
- O Ensure pump's U V W wires are connected to controller's U V W terminals correspondingly. Otherwise,the motor will run in reverse,and cannot give normal flow and head.
- O DO NOT make pump's U V W wires short circuit.It may cause the fuse blow out.
- O CONNECT EACH TERMINAL TIGHT.Otherwise,the large contact resistance and the operating current will cause the terminal to heat up severely.
- O Make sure every joint of extension cable is tight and well waterproof.

WARNING

- O Using dc breaker and surge protection device for safe purpose.Surge may cause big instantaneous current and make the fuse blow out.
- O DO NOT touch any terminals at energized condition.

■ OPERATION

CAUTION

- O Do not open or remove the front cover of controller during running.
- O In order to test the pump,the maximum DRY-RUN time should < 15 seconds.
- O If the pump turning is reversed,change any two lines of pump's UVW wires.

■ MAINTENANCE AND INSPECTION

WARNING

- O Only qualified or authorized professional personnel can maintain,replace and inspect the system, Otherwise it may cause damage or personal injury.
- O Wait at least 10 minutes after the power failure,or ensure there is no residual voltage before carry out maintenance and inspection.Otherwise it may cause damage or personal injury.

■ AFTER-SALES

O If failing to follow above necessary instructions,resulting in damage to the system or personnel,it's not available to enjoy free warranty service from supplier.

1、How It Works

Solar pumping system serves to provide water in remote applications where electrical grid power is either unreliable or unavailable BLDC solar pump controller can direct use the DC power from PV array and drive the Brushiess DC pumps. In sunny days,the pumping system can continuously pump water there is no need of batteries or other energy storage devices.It's recommended to pump water to a reservoir for storage.

A float switch can be installed in the water tower to control the pump operation.And install a low-level probe in well to detect the well water so that pump will stop when there is no water Figure 1 shows a typical diagram of the solar pumping system.including major parts and components.

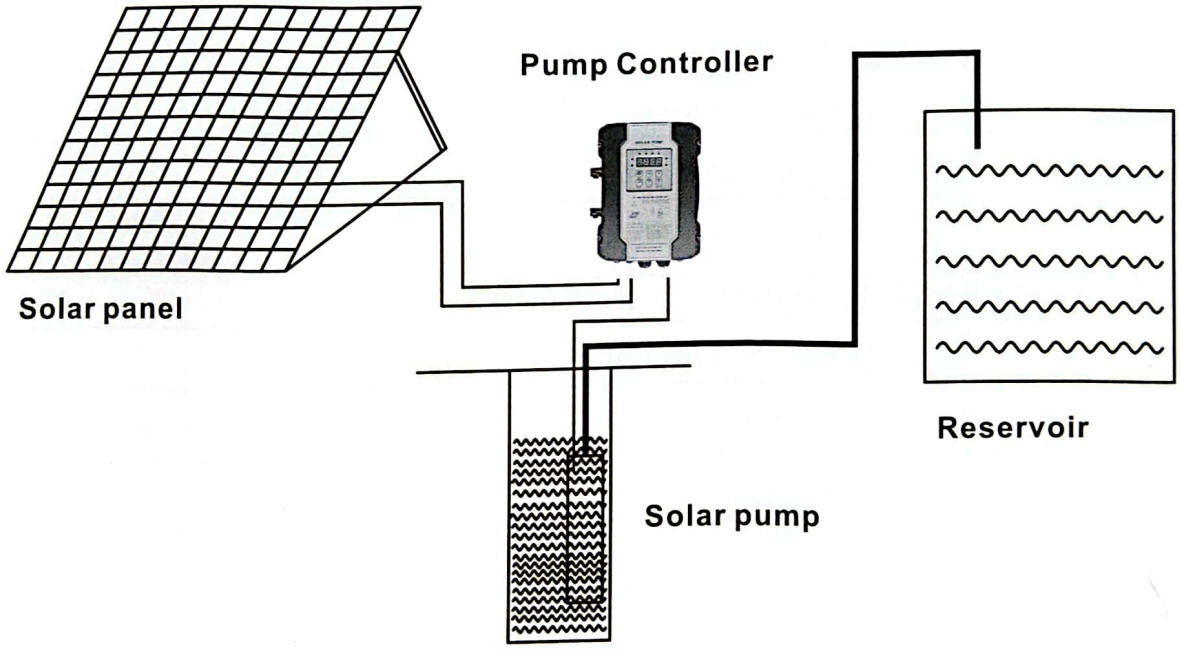


Figure 1. Solar pumping system

Consists of:

- Solar panel
- Solar Pump Controller
- Solar Pump
- Well Water Level Switch
- Tank Water Level Switch

2、4SBY7.0/95-D110/1500 PUMP DESCRIPTION

2.1 MATERIAL OF PARTS

PARTS OF PUMP	DESCRIP TION OF MATERIAL
Motor	Full Oil Permanent Magnet Brushless DC Motor(Without Hall)
Controller	32bit MCU/FOC/Sine Wave Current/MPPT
Controller Shell	Die-cast Aluminum
Outlet/Cylinder	Brass
Pump Body	Stainless Steel
Motor Body	Stainless Steel
Impeller	Plastic
Screw	Stainless Steel
Cable	3 Cores/2 Meters/2.0MM^2

2.2PUMP SPECIFICATION

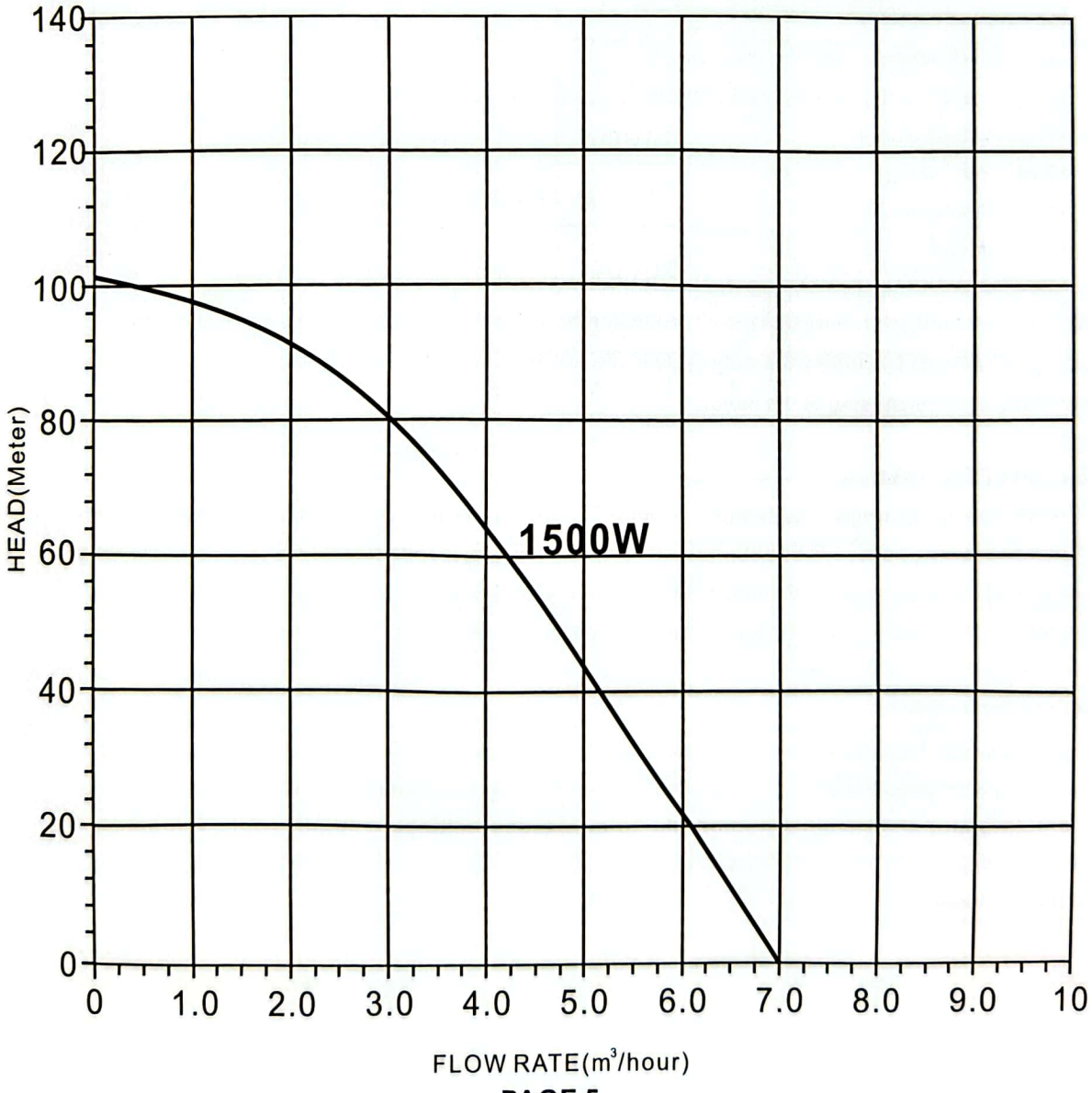
ITEM	PARAMETER VALUES
Rated Voltage	110 VDC
Rated Power	1500 W
Maximum Flow	7.0m^3/h
Maximum Head	95Mtrs.
Outlet Size	1.25 inch
Outline Size	4 inch

2. 3 PUMP PERFORMANCE

2.3.1 Pump Performance Chart

Head (m)	0	20	30	40	50	60	70	80	90	100
Flow (m^3/h)	7.0	6.1	5.5	5.1	4.7	4.2	3.6	3.0	2.0	0

2.3.2 Pump Performance Curve



3、Controller General Information

3.1 FEATURES

The solar pump controller is designed with the high standard of reliability expected of products.The controller attempts to drive the pump and motor to deliver water even under adverse conditons. reducing output as necessary to protect the system components from damage. and only shutting down in extreme cases. Full operation is restored automatically whenever abnormal conditions subside.

Inspection

Before you begin.inspect the solar pump controller unit.Verify that the part number is correct and no damage has occurred during transit.

NOTE:Solar pump controller is the component of solar pumping system which has other two components,PV array and Brushiess DC pump.

Protection Features

Electronic monitoring gives the controller the capability to monitor the system and automatically shut down in the event of

- Dry well conditions-with low level switch
- Bound pump-with auto-reversing torque
- High Voltage Surge
- Low Input Voltage
- Open motor circuit
- Short circuit
- Over heat

NOTE: This controller provides motor protection by preventing motor current from exceeding rating current and by limiting the duty cycle in the event of low water level.This controller does not provide over temperature sensing of the motor.

System Diagnostics

The solar pump controller continuously monitors system performance and detects a variety of abnormal conditions In many cases,the controller will compensate as to maintain continuous system operation; however,if there is high risk of equipment damage,the controller will protect the system from the fault condition. If possible. the controller will try to restart when the fault condition subsides.

Motor Soft-Start

Normally.when there is a demand for water and power is available,the Solar pump controller will be operating Whenever the solar pump controller detects a need for water,the controller always"ramps up" the motor speed while gradually increasing motor voltage.resulting in a cooler motor and lower start-up current compared to conventional water systems,This will not harm the motor due to the controller's soft-start feature

Over Temperature Fold back

The solar pump controller is designed for full power operation from a solar array in ambent temperatures up to 45℃.In excess of 45℃ temperature conditions,the controller will reduce output power in an attempt to avoid shutdown. Full pump output is restored when the controller temperature cools to a safe level.

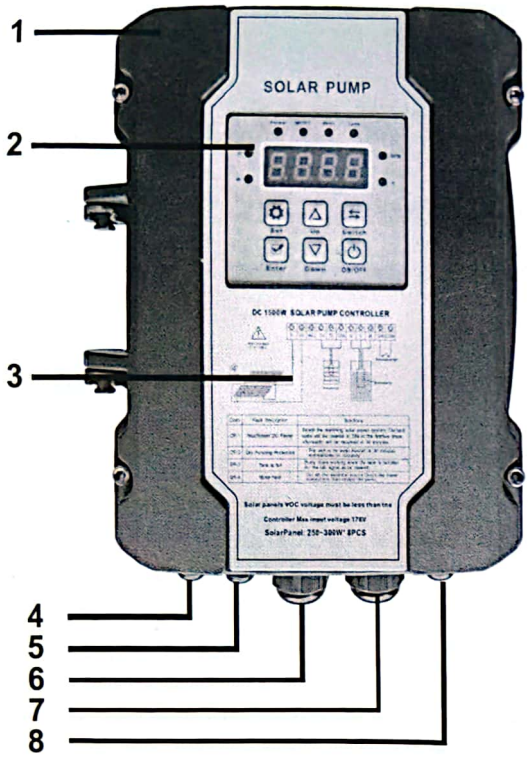
Level Control Switch

The solar pump controller can access two water level switches(well level sensor and tank level sensor) to detect remotely and control the pump automatically.Level switch for solar pump controller is optional,not mandatory.

3.2 TECHNICAL PARAMETERS

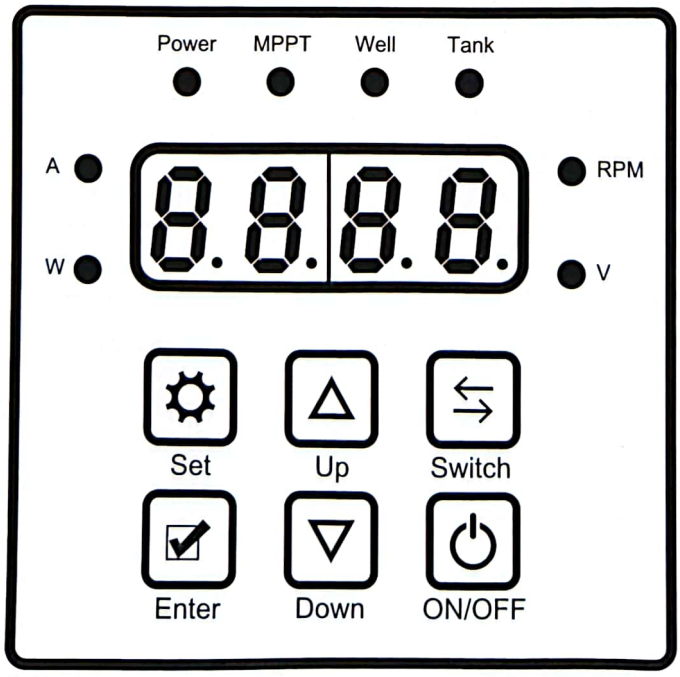
ITEM		TECHNICAL PARAMETERS
VOLTAGE	Rated Voltage	110 VDC
	MOSFET Voltage	200 VDC
	Under Protection Voltage	60 VDC
	Over Protection Voltage	176 VDC
CURRENT	Rated Current	12 A
	Over Protection Current	14 A
	Peak Protection Current	18 A
MCU and Controller Mode		32bit MCU/FOC/Sine Wave Current/ MPPT
Shell		Die-casl Aluminum
Dimension		252mm*200mm*106mm
Weight		2.1kg
Cooling Mode		Heat Dissipation by fans
Operating temperature		-10℃ - +80℃(Suggest 0℃ - +60℃)
Storage conditions		-20℃ - +80℃/5~85%RH(No condensation)

3.3 WIRING DIAGRAM



1. Company logo.
2. Operation panel.
3. Nameplate.
4. Power supply.
5. Borehole water level.
6. Tank water level.
7. Motor wire.
8. External switch.

3.4 OPERATION PANEL



1. LED indicator

•Voltage indicator (V): on in voltage display mode; otherwise off.

•Speed indicator (RPM); on in speed display mode; otherwise off.

•Current indicator (A): on in current display mode; otherwise off.

•Power indicator (W): on in power display mode; otherwise off.

(Full tank indicator (Tank): on when the tank is full; otherwise off.

•Well bottom water shortage indicator (Well): on when there is shortage of water at the well bottom; otherwise off.

•Solar mode running indicator (MPPT): on when solar power is running; otherwise off.

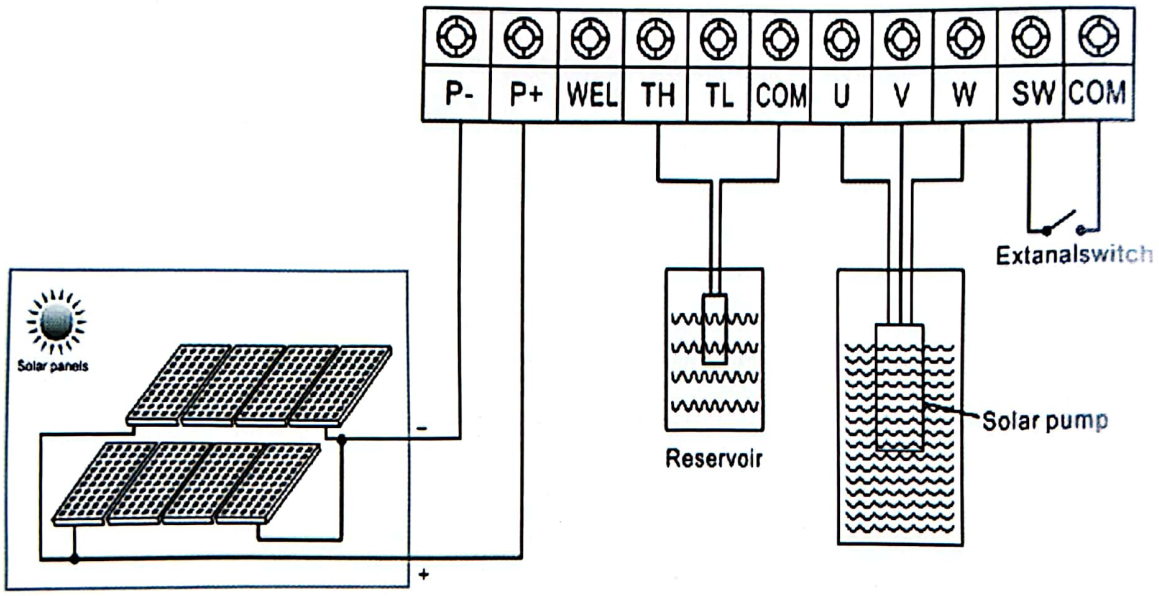
•Power and operation indicator (Power): flashes when the pump stops, and stays on during running.

2. Button operations

Button name	Functions
Set Set	Factory parameter setting, not open.
Enter Enter	Factory parameter setting, not open.
Up Up	Speed setting button: each time you press it, the speed increases by one level. In case of any fault, turn off/call up the fault display.
Down Down	Speed setting button: each time you press it, the speed decrease by one level.
Switch Switch	In the running status interface, switch the display mode. The display mode is cyclically switched among voltage (V) -> speed (RPM) -> current (A) -> power(W).
ON/OFF ON/OFF	In the running state, press the button to stop the pump. In the down state, press the button to start the pump.

3.5 WIRING INSTRUCTIONS

3.5.1 TOTAL DIAGRAM OF TERMINALS

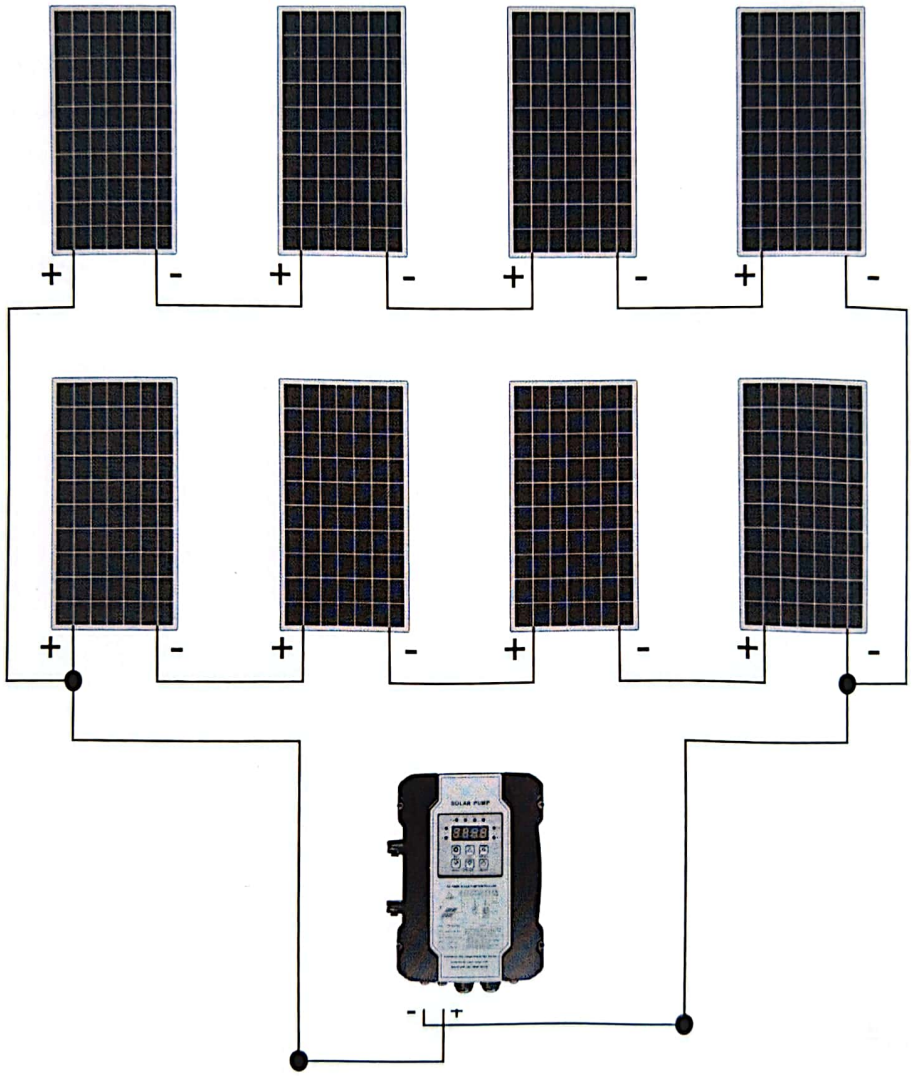


TERMINALS	CONNECT WITH
● PV+	PV panel positive
● PV-	PV panel negative
● U V W	Pump motor U/V/W wires
● TL & TH & COM	Tank water level sensor
● WEL&COM	Well (borehole) water level sensor

4、Solar Panel Configure and Connection way

Configured by 30~36Vmp(37~44Voc)Solar Panel

panel:250~300W



INPUT:

Solar Panel VMP=30~36Vdc

Solar Panel VOC=37~44Vdc

Solar Panel Power≥ 250W

Solar Panel Quantity=8PCS

OUTPUT:

VMP=30~36Vdc

VOC=37~44Vdc

Power≥ 2000W(MAX)

5.Mechanical and Electrical Installation

5.1 Overheat Protection

If in the outdoor,the controller shall be installed in a well ventilated place,and avoid direct Sunlight and rain.Extremely high temperature may cause the controller stop to protect Itself.Using dc breaker and surge protection device for safe purpose.Surge may cause big instantaneous current and make the fuse blow out.

5.2 Location Selection

The solar pump controller is intended for operation in maximum ambient temperatures up to 45 C .In order to avoid overheating caused by the failure,it is recommended to install the controller in a shadow position.

The solar pump controller must be installed into a control box which has a tight enclosure to avoid direct sunshine.rain,dust,moisture,animais,plants.etc.The control box should have a bottom gland plate for installing wire cord or conduit .