



**SOLAR POWER PUMP SYSTEM**

**USER MANUAL**

**MODEL: 4SSPC19/87-AD220/3KW**

## CONTENTS

1、 DC Solar Panel Module Selection Guide .....	2
1.1 Solar Panel Connection Description and Recommendations .....	2
2、 Wiring Diagram .....	3
3、 Operating Environment and Electrical Characteristics .....	4
4、 Operation Panel .....	5
4.1 LED Indicator .....	5
4.2 Key Operation .....	6
5、 Pre-use Inspection .....	7
6、 Pump Operation Mode.....	8
6.1 Water Pump Startup .....	8
6.1.1 Power-on Startup .....	8
6.1.2 Push-button Power-on Startup .....	8
6.1.3 Tank Water Shortage Activation .....	8
6.1.4 Tank Full Start .....	8
6.2 Pump Shutdown .....	8
6.2.1 Float Signal Stop .....	8
6.2.2 Water Shortage Shutdown .....	8
6.2.3 Push the Button to Turn off the Machine.....	8
6.3 Pump Operation .....	9
6.3.1 DC Mode (battery) .....	9
6.3.2 PV Mode .....	9
6.4 Speed Setting .....	9
7、 AC/DC Switching Strategy (the power supply input needs to be connected to both solar and AC power sources).....	10
7.1 Solar Power Supply Independent Power Supply.....	10
7.2 Simultaneous AC and DC Power Supply .....	10
7.3 Solar DC Power Supply Switching to AC/DC Simultaneous Power Supply Conditions .....	10
7.4 AC/DC Simultaneous Power Supply Switching to Solar DC Power Supply Conditions .....	10
7.5 AC Monitoring .....	10
8、 User Advanced Menu Settings .....	11
9、 Maintenance and Repair .....	14
10、 Fault Alarms and Troubleshooting Instructions .....	15
11、 4SSPC19/87-AD220/3KW Pump Description .....	18
12、 Solar Panel Configure and Connection way.....	19

### 11、4SSPC19/87-AD220/3KW Pump Description

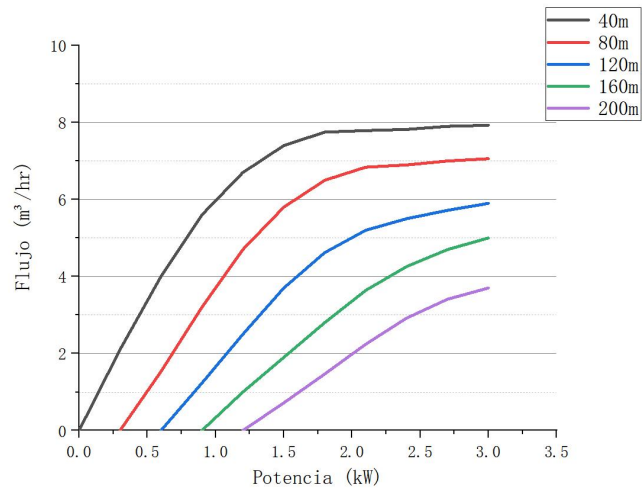
#### 11.1 Material of Parts

Parts of Pump	Description of Material
Motor	Full Oil Permanent Magnet Brushless DC Motor (Without Hall)
Outlet / Inlet	304 Stainless Steel
Pump Body	304 Stainless Steel
Motor Body	304 Stainless Steel
Impeller	304 Stainless Steel and Nylon
Screw	304 Stainless Steel
Cable	3 Cores / 2 Meters / 2.0mm <sup>2</sup>

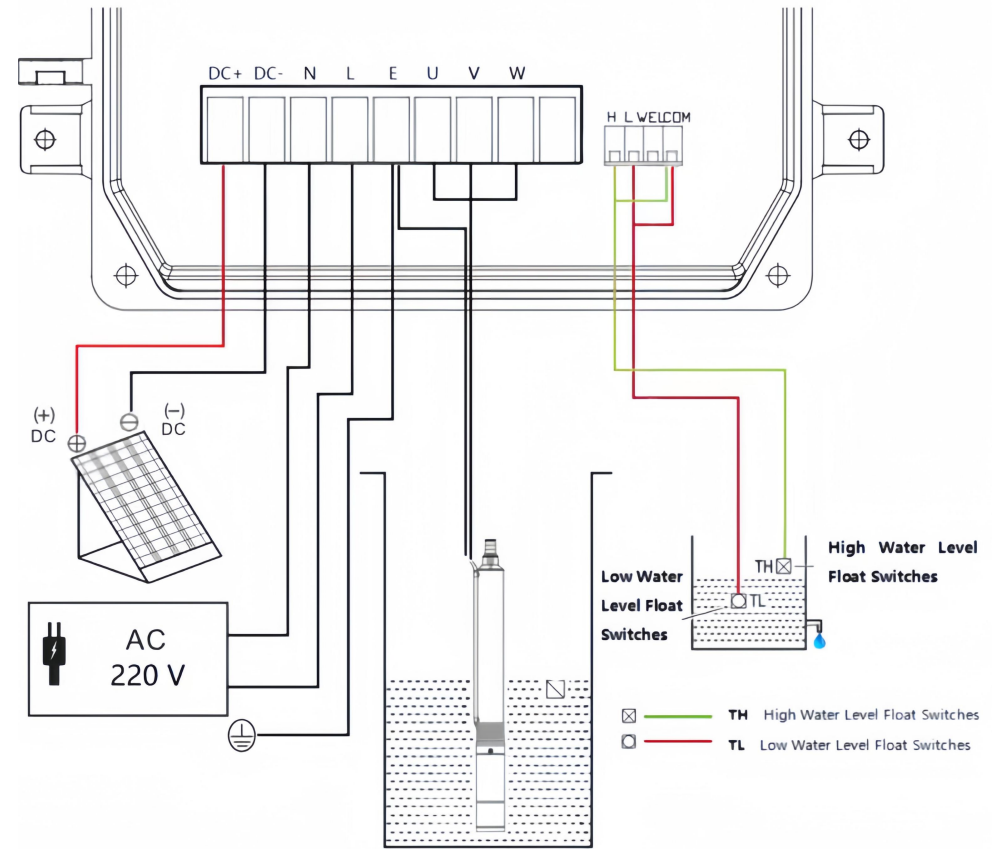
#### 11.2 Pump Specification

Item	Parameter Values
Rated Voltage	220 VDC/VAC
Rated Power	3 KW
MAX. Flow	19 m <sup>3</sup> /h
MAX. Head	87 Mtrs.
Outlet Size	2 inch
Outline Size	4 inch

#### 11.3 Pump Performance Curve



### 2、Wiring Diagram



AC and DC models AC220 water pump system wiring diagram

PL	Low voltage protection / Underpower	1.Voltage input is too low, refer to the electrical characteristics of the corresponding model for normal power distribution. 2.Incorrectly selected solar panels, refer to the recommendations for the correct selection.	The first 5 times will be cleared automatically after 30s. Then try to start it again 30 minutes later.
P51	High voltage protection	Voltage input is too high, refer to the electrical characteristics of the corresponding model for normal power distribution.	Voltage returns to normal. Clear immediately.
P48	Dry-run protection	1.The air inside the pump is not discharged, cut off the power supply, 30 seconds later to re-power and start the pump drainage. 2.No water in pool, wait for water source, restart.	The first 3 times will be cleared automatically after 60s, after that, it will be decided by the time set by P1.9, after the time is reached, the fault will be cleared and restarted.
P60	High temperature protection	MCU temperature in the controller exceeds 85° c	Automatically clears when temperature is normal.
P46	Stall protection	1.Mismatch of motor models, select matching pumps. 2.Water pump extension cord is too long, reduce the extension cord. 3.Power supply too low, increase power supply Water pump bearing seized, clean water pump bearing.	The first 5 times will be cleared automatically after 30s. Then try to start it again 10 minutes later.

## 4、 Operation Panel



### 4.1 LED Indicator

- Voltage Display Indicator (V): Lights up in voltage display mode, otherwise goes out.
- Speed Display Indicator (RPM): Lights up in speed display mode, otherwise goes out.
- Current Display Indicator (A): Lights up in current display mode and goes out otherwise.
- Power Display Indicator (W): Lights up in power display mode and goes out otherwise.
- Tank Full Indicator (Tank): Lights up when the tank is full, otherwise goes out.
- Well Bottom Water Shortage Indicator (Well): Lights up when there is a lack of water in the bottom of the well, otherwise it goes out.
- Solar Mode Running Lamp (MPPT): lights up when solar powered, otherwise goes out.
- Power and Operation Indicator (Power): flashes when the pump is stopped, and is always on when it is running.

## 9、 Maintenance and Repair

- The electric pump must be replaced with wearing parts once (e.g. bearings, seals, mechanical seals, etc.) after a total of 3,000 hours of operation, otherwise the damage to the machine parts will cause greater losses.
- If the pump is not used for a long time, it should be cleaned and dried, and placed in a ventilated dry place for proper storage.

## 5、 Pre-use Inspection



- Before use, should check whether the electric pump is intact, each connection has no loosening and seepage, oil leakage phenomenon, cable and so on, there is no accidental damage such as touching pressure scratches, and megohmmeter to measure the insulation resistance of the electric pump, cold should be greater than 2M.
- If the length of the cable with the pump is not long enough to be connected, the wire diameter must be larger than the original wire diameter. The joints should be sealed with waterproof tape.
- Before the official use of electric pumps connected to the power supply to check whether the startup, operation is normal, the pump working direction is counterclockwise, pay attention to a short time to turn a little, in the absence of water is strictly prohibited to run, check whether the electric pump steering is correct. Three-phase electric pump, such as steering is not right, transfer any two lines in the power input line can be connected.
- Installation of electric pump lifting, should be in the hole ring string rope, is strictly prohibited to lift the cable line lifting electric pump, but from the bottom of the water should be more than 1 meter, in order to prevent sediment inhalation, damage to mechanical seals and impellers and other components.

P0.5	Dry-running power point 1 Depending on the model, corresponding to different speeds.	High speed model 2400rpm Regular speed model 2000 rpm
P0.6	Dry-running power point 2 Depending on the model, corresponding to different speeds.	High speed model 3600 rpm Regular speed model 3000 rpm
P0.7	Dry-running power point 3 Depending on the model, corresponding to different speeds.	High speed model 4800 rpm Regular speed model 4000 rpm
P0.8	Dry-running power point 4 Depending on the model, corresponding to different speeds.	High speed model 6000 rpm Regular speed model 5,000 rpm
P0.9	Set start-up speed, 1000-6000 rpm	
P1.0	Power-on default operation command values and mode settings 0: Automatic mode, pump shutdown state after power on. 1: Automatic mode, power on for the pump running state. 2: Manual mode, the run command value after power up will be equal to the last user operated command. (If the user's last operation was to start the pump, the command to power up the next time after disconnection is equal to run, and if the last operation was to shut down the equipment, the command to power up the next time after disconnection is equal to shut down.)	
P1.1	Maximum limiting power	Unit: W

### 6.3 Pump Operation

The pump performs a DC (battery) and PV (solar) power supply mode recognition for 20S each time it is started, and then switches to the corresponding mode of operation. During the recognition process, the set speed is invalid

#### 6.3.1 DC Mode (battery)

- In DC (battery) mode, the water pump speed is adjustable from 1000-6000 RPM. The default set speed is 6000 RPM, and you can set the speed by using the  or  keys, and every time you press the incremental (or decremental) key, the set speed is increased (or decreased) by one step.
- With the operation of the pump, the DC (battery) supply voltage will continue to drop, in order to prevent excessive discharge, when the voltage is lower than the corresponding electrical protection voltage, the pump stops working.

Model	Protection Voltage (V)
JL-197K1500-220V	160

#### 6.3.2 PV Mode

- In PV mode, the water pump speed setting is similar to DC mode, with a maximum speed (6000RPM) limit in effect. The water pump operating speed is also determined by the current solar panel power. The system tracks the maximum power of the solar panel (i.e., MPPT) in real time, and when the sunlight is enhanced and the solar panel output increases, the water pump speed increases, and vice versa.
- In PV mode, the MPPT indicator flashes to show. The faster its blinking frequency is, the closer the current work is to the maximum operating point; if the blinking frequency is slower or does not blink, it means that it is currently climbing to track the maximum power point.
- Solar power is not enough, the water pump speed will continue to drop, when the speed drops to 600rpm, the water pump stops, reported P46 fault. The first 5 times, 10S attempt to start, the latter 10min retry to start.
- When the solar power is insufficient to maintain the current system startup or operation, the solar panel output voltage will drop rapidly. When the voltage drops to the lowest voltage of the system and lasts for 10ms, the low power fault "PL" is reported. For the first 5 times, try to start after 10S, and retry to start after 10min.

### 6.4 Speed Setting

Power-on default startup speed (factory mode adjustable), user can set the speed, no memory after power-off (need to memorize factory mode adjustable).

## 7、AC/DC switching strategy

8. (the power supply input needs to be connected to both solar and AC power sources)

### 7.1 Solar Power Supply Independent Power Supply

When solar light is strong, switch to solar power independent power supply.

### 7.2 Simultaneous AC and DC Power Supply

When solar light is weak, switch to AC/DC simultaneous power supply.

### 7.3 Solar DC Power Supply Switching to AC/DC Simultaneous Power Supply Conditions

DC working state, detects that the working power is less than the judgment value (judgment anti-shaking time 60S), switch to AC working.

### 7.4 AC/DC Simultaneous Power Supply Switching to Solar DC Power Supply Conditions










- AC and DC power supply at the same time, when the solar voltage is detected to be higher than the set voltage, and the switching waiting time is up. Switch to solar work. The waiting time is 15 minutes when the light rises and 30 minutes when the light falls.
- AC and DC power supply at the same time, AC power failure, switch to solar DC power work.

### 7.5 AC Monitoring

When the solar working voltage can not meet the independent power supply, the AC power is in the power-off state, timed to monitor whether the AC power is incoming or not, and the incoming call switches to the AC power work. Wait for 5 minutes to monitor once, then wait for 15 minutes to monitor once, and then every 30 minutes to monitor whether the AC power is incoming or not. When the shutdown button is pressed and the pump is shut down, the AC power is monitored immediately.

Model	Simultaneous power supply switching solar DC voltage (switching above this voltage)	Solar DC power switching to AC power (switching below this power)	Waiting time for switching to solar DC when light is rising
JL-197K1500-220V	220V	0.25KW	15

## 8、User Advanced Menu Settings

1. Long press the Setup button  in normal mode to enter and long press the Setup button  to exit.
2. Entering the menu displays the menu number. Eg: P0.0, press the up  down  button briefly to adjust the menu number. Press the confirmation  button. Enter the menu and display the menu contents. See the table below for the meaning of the contents. Press the Setting  or Confirmation  button to return to the menu. Note: In case the password is passed. Short press the setting  button to abandon the setting and return, short press the confirmation  button to save the setting and return.
3. Factory password. Menu contents can only be changed if the factory password is correct. The menu contents will blink when the password is correct. Indicates that changes are allowed. See P0.0 for the factory password.
4. Restore factory settings, after the factory settings password is correct, the settings will be restored to the factory settings, see P0.0 for details.

Menu Number	Menu Content	Note
P0.0	Password 12: Obtaining modification privileges 21: Reset to default factory settings	
P0.1	Pump type or motor change 1: Impeller 0: Screw (no power Speed to determine water shortage)	
P0.2	Power supply mode 0: Automatic recognition 1: DC Mode 2: Solar mode	
P0.3	Difference between voltage protection and recovery	2-40V
P0.4	Undervoltage protection value	80-300V


## 6、 Pump Operation Mode

### 6.1 Water Pump Startup

#### 6.1.1 Power-on Startup

Every time you power up, without connecting the float, the system defaults to power on and start (need to memorize the factory mode adjustable). When float is connected, the system will start according to the float signal.

#### 6.1.2 Push-button Power-on Startup

The pump can be started by pressing the run button . The float signal is connected and starts according to the float signal

#### 6.1.3 Tank Water Shortage Activation

When the system is on and the pump is in the shutdown state, after WELL and COM are disconnected, the TL signal end of the main control board is closed, then the pump will start immediately, and without the TL closure signal, wait for 15 minutes.

#### 6.1.4 Tank Full Start

When the system is turned on and the pump is in the shutdown state, after TH and COM are disconnected, the TL signal end of the main control board is closed, then the pump will start immediately, and without the TL closure signal, wait for 15 minutes.

### 6.2 Pump Shutdown


#### 6.2.1 Float Signal Stop

- When the water pump is running, the pump stops immediately when the tank full switch is closed (Tank light is on).
- When the well water shortage switch is closed (Well light is on) while the pump is running, the pump stops immediately.

#### 6.2.2 Water Shortage Shutdown

The water pump works continuously for a period of time, if the current power is less than the set power at the current speed and lasts for 20s, it stops immediately and reports P48 fault. After the recovery time set in the menu, restart the motor, the default recovery time is 10 minutes.







#### 6.2.3 Push the Button to Turn off the Machine.

With the pump running, stop the pump by pressing .

P1.2	Motor steering setting 0: Default steering 1: Opposite of the default turn	Unit: W
P1.3	The DC voltage is higher than this voltage threshold. Switching from AC to DC operation. With anti-shaking time 60S.	
P1.4	If the DC power is lower than this power threshold, the DC power will be switched to AC power. There is anti-shaking time 60S.P1.5 is set, AC power work to P1.5 (unit minutes) time, before switching to DC power.	
P1.5	Setting the minimum operating time of AC power prevents frequent switching between AC and DC power.	Unit: Minutes
P1.6	Cumulative controller power-up time (display only)	
P1.7	Accumulated motor runtime (display only)	
P1.8	Power limitation in AC mode	Unit: W
P1.9	Software dry pumping protection (Dry-run protection) Failure recovery time	Unit: Hours



**4.2 Key Operation**

Key Name	Functionality
 Set button	<ul style="list-style-type: none"> <li>➤ Factory parameter settings, not open.</li> </ul>
 Enter button	<ul style="list-style-type: none"> <li>➤ Factory parameter settings, not open.</li> </ul>
 Up button	<ul style="list-style-type: none"> <li>➤ Speed setting key, each press increases the Speed by one stop.</li> </ul>
 Down button	<ul style="list-style-type: none"> <li>➤ Speed setting key, each press decreases the Speed by one stop.</li> </ul>
 Switch button	<ul style="list-style-type: none"> <li>➤ In the running status interface, switch the display mode. The display mode switches cyclically between voltage (V) -&gt; speed (RPM) -&gt; current (A) -&gt; power (W).</li> </ul>
 On/off button	<ul style="list-style-type: none"> <li>➤ In the running state, press the key to stop.</li> <li>➤ In the shutdown state, press the key to start.</li> </ul>

**10. Fault Alarms and Troubleshooting Instructions**

Fault Type			
Trouble code	Fault description	Failure causes and solutions	Recovery process
P0	Hardware overcurrent	1.Mismatch of motor models, select matching pumps. UVW has shorted connections in three phases, rewire and make sure UVW is installed properly.	The first 5 times will be cleared automatically after 30s. Then try to start it again 30 minutes later.
P43	Output phase loss protection	Motor UVW three-phase presence of disconnection, power off and rewire to ensure that the UVW contact is reliable.	The first 5 times will be cleared automatically after 30s. Then try to start it again 30 minutes later.
P44	Blocking protection	Check the pump impeller for the presence of foreign objects and the motor load for abnormalities	
P45/P47	Out-of-step protection/ Overspeed protection	1.Mismatch of motor models, select matching pumps. 2.Water pump extension cord is too long, reduce the extension cord. 3.Water pump bearing is stuck, clean water pump bearing.	

### 3、 Operating Environment and Electrical Characteristics

Electrical Specifications of the Electric Control and Specifications of the Suitable Water Pump	
Electric Control Model	JL-197K1500-220V
Pump Specifications	Rated 220V Water Pump
Rated Power (Kw)	3KW
MAX.Current (A)	17.0A
MAX.Voltage (V)	DC:430V/AC:280V
MIN.Voltage (V)	DC:80V/AC:85V
Solar Operating Voltage VMP (V)	200-290V
Environment ( ° C)	-15-60° C

 **Caution**

Be sure to test the open-circuit voltage of the solar panel with an instrument before powering up, or apply series connection to calculate the open-circuit voltage of the solar panel. The open-circuit voltage of the solar panel must not exceed the maximum input voltage of the controller, otherwise it will cause irreversible damage.

P59	Abnormal power supply mode selection	When the controller selects the power supply mode set in P0.2, the corresponding power input cannot be detected, then this fault code will be reported, please check whether the power supply mode selection matches the controller wiring.	Automatically cleared after fault recovery
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## 1、DC Solar Panel Module Selection Guide

### 1.1 Solar Panel Connection Description and Recommendations

#### A. Solar panel selection:

Recommended total solar panel power: (1.2-1.3) times the rated power of the water pump.

Recommended optimal operating voltage for solar panels: (1.0-1.4) times the rated voltage of the water pump.

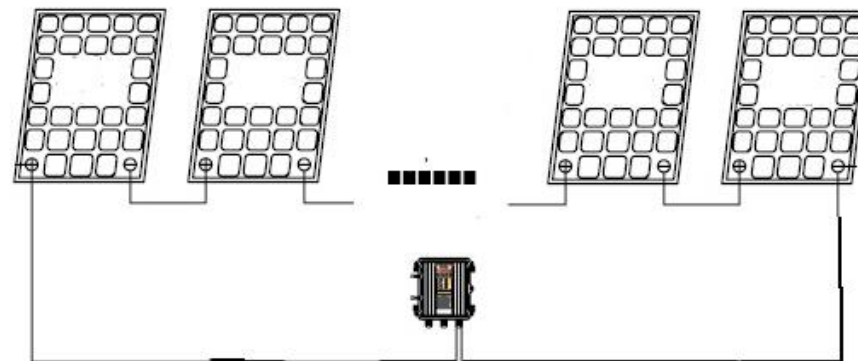
B. For the AC/DC AC220 solar controller described in this product, when selecting and installing solar panels, the solar panels should be connected in series, and make sure that the open-circuit voltage (Voc) of the solar panels is less than the maximum limit of the controller's operating voltage after connecting the solar panels.

#### Safety Instructions:

Controller in the operating state, it is strictly prohibited to touch or plug the power cord and the output motor cable, any operation involving touch and installation must be carried out in the controller under complete power failure (i.e., the input power supply is completely cut off).

## 12、Solar Panel Configure and Connection way

Configured by 36Vmp(44Voc) Solar Panel



#### INPUT:

Solar Panel VMP= 36 Vdc  
 Solar Panel VOC= 44 Vdc  
 Solar Panel Power $\geq$  550 W  
 Solar Panel Quantity= 8 PCS

#### OUTPUT:

VMP= 288 Vdc  
 VOC= 352 Vdc  
 Power $\geq$  4400 W(MAX)

