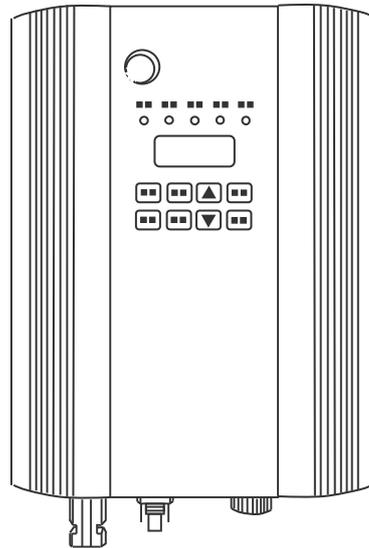
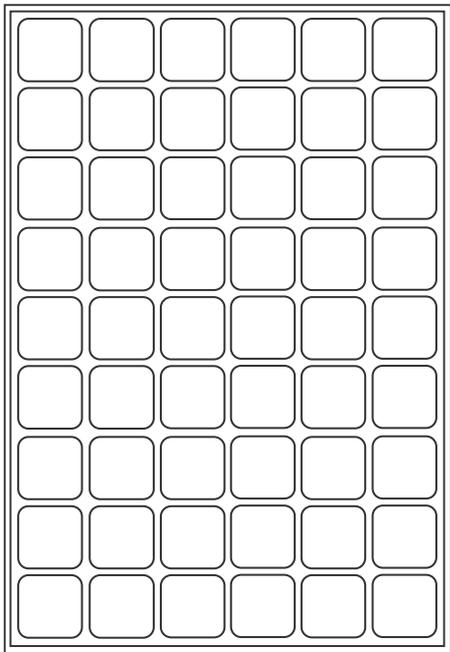


Solar DC Pumping Controller

PSD600 Operation Manual



Infinite Solar Energy

Preface

Thank you very much for using the PSD series of solar DC pumping controller produced by Sunny International Power Corp.

To ensure safety of user and equipment, taking full advantage of product performance, please read this manual carefully before installation and usage.

In order to facilitate the routine inspection and maintenance of the controller, and know the countermeasure of troubleshooting and reason of abnormality, please keep the manual properly.

If questions arise during usage or additional support and special request are needed, please contact our technical support directly.

Content in this manual may change without prior notice.

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Safety Instruction

Safe operation is only achieved by correctly transport, install, operate and maintain the product. Before proceeding, please read through the following notices. There are three types of safewarning:



Danger: Misuse may cause fire, serious injure to human or even death.



Warning: Misuse may damage equipment or cause light to medium damage to human.



Note: Useful information.

◆ Purchase Inspection



Warning

1. Do not install the controller if it is damaged or with missing parts. Otherwise may cause accidents.

◆ Installation



Warning

1. To ensure a good convective cooling effect, the controller must be installed vertically with at least 10 cm space left at the top and bottom.
2. Recommended for indoor installation where has ventilation equipment. Do not install it in direct sunlight.
3. Do not let the drilling dust fall into the controller cooling fin or fan during installation to ensure good heat dissipation.

◆ Connection



Danger

1. Wiring must be performed by qualified electric professionals, or else may cause electric shock or fire.
2. Please confirm input power has already been cut off before wiring and connection, or else may cause electric shock or fire.
3. Earth terminal must be reliably grounded, or else controller enclosure may be electrified.
4. The selection of solar array, motor and controller shall be reasonable, or else the controller may be damaged.

**Warning**

1. Please use fasten terminal with specified torque, or else may cause fire.
2. Do not connect capacitor or phase-advanced LC/RC noise filter with controller output.

◆ Running**Danger**

1. Make sure all the wiring and connection are correct before powering on, or else may damage combiner box or cause fire.
2. While powered on, please do not change wiring and connection, or else may cause electric shock.

**Warning**

1. Before the first operation, please adjust the function parameters according to the steps indicated in manual. Do not change the function parameters of the controller freely, or else it may cause damage to the equipment.
2. The temperature of radiator is high during running, and it should not be touched for a long time, or else it may cause burn.
3. In case of altitude over 2000m, the controller should be derated for use, i.e. the output current will be derated by 10% for every 1500m increase in height.

◆ Others



1. Maintenance and inspection must be performed by a qualified electrician.
2. Do not dismantle the controller during operation. The controller must be powered off at least 5 minutes before conducting maintenance and inspection, and this is to avoid the residual voltage of electrolytic capacitor in major loop causing personal injuries.
3. It is absolutely forbidden to reconstruct the controller by oneself, as this can cause personal injury or equipment damage.
4. The controller should be treated as industrial waste when being abandoned. During incineration, the electrolytic capacitor is possible to explode and some parts may produce toxic and harmful gas.

Chapter 1 Products Introduction

1.1 Introduction of Solar Pumping System

Solar pumping systems produced by Sunny International Power Corp can be applied to living water supply, agricultural irrigation, forestry irrigation, desert control, pasture animal husbandry, island water supply, and waste water treatment, and so on. In recent years, with the promotion of the utilization of new energy resources, solar pumping systems are more and more applied in civil engineering, city squares, green parks, tourist destinations, resorts and hotels, as well as fountain landscape in residential areas.

The system consists of a solar array, a DC pump and a solar DC pumping controller (see figure 1-1). Based on the design philosophy that it is better to store water than electricity, there is no energy storing device such as storage battery in the system.

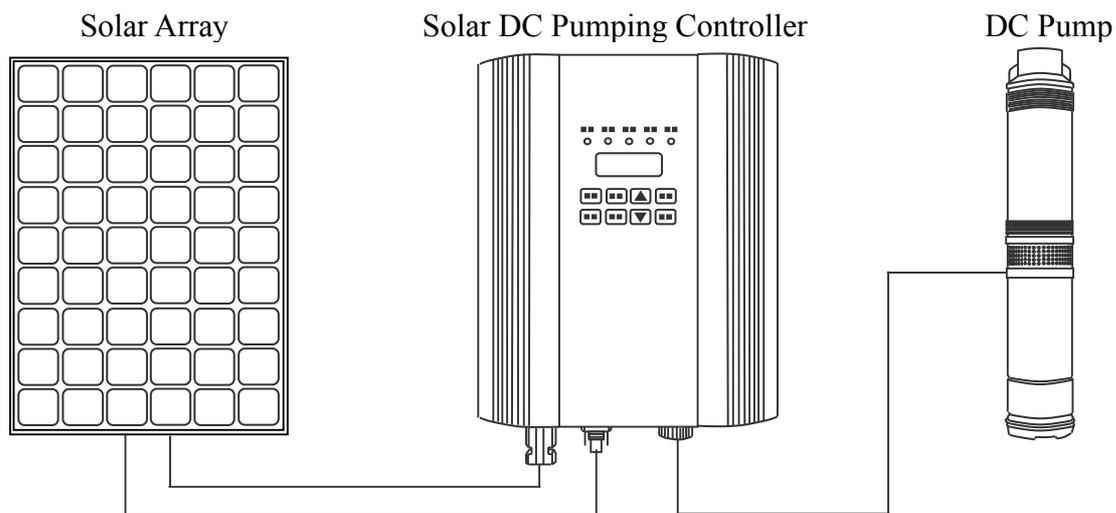


Fig.1-1 Solar Pumping System

The solar array includes many solar panels connected in series and in parallel, it absorbs sunlight radiation and converts it into electrical energy, providing energy source for the whole system. The solar DC pumping controller controls and adjusts the system operation and converts the DC produced by the solar array into AC in order to drive the pump, it adjusts the output frequency in real-time according to the solar radiation to implement the maximum power point tracking (MPPT). The pump,

driven by brushless DC motor, can draw water from deep wells or river, lake to fill into the storage tank or reservoir, or directly connect to irrigation system, fountain system, etc.

1.2 Product Features

Based on years of development and experiment, our self-developed PSD solar DC pumping controller (figure 1-2) has the following features:

- ◆ High efficient brushless DC motor requires less solar array. Rich social benefits.
- ◆ Optional centrifugal pump for big flow and helical rotor pump for high lift.
- ◆ High efficient semiconductor device used in main circuit. High reliability. Up to 98% conversion efficiency of controller.
- ◆ Independent intellectual property of dynamic VI maximum power point tracking (MPPT) algorithm. Fast response and good stability. 99% MPPT efficiency.
- ◆ Full automatic operation. Complete protection functions. Integrated with water level monitor to prevent overflow and dry running.
- ◆ Full aluminum alloy case. IP52 protection grade. Ambient temperature: $-20\sim+60^{\circ}\text{C}$.



Fig. 1-2 PSD series Solar DC Pumping Controller

1.3 Controller Specifications

◆ Nameplate and type description

The product's nameplate is located under lower right of the controller, which contains

the important information such as product series, voltage, power grade, software version and hardware version that will provide important basis for product application, maintenance and after service.

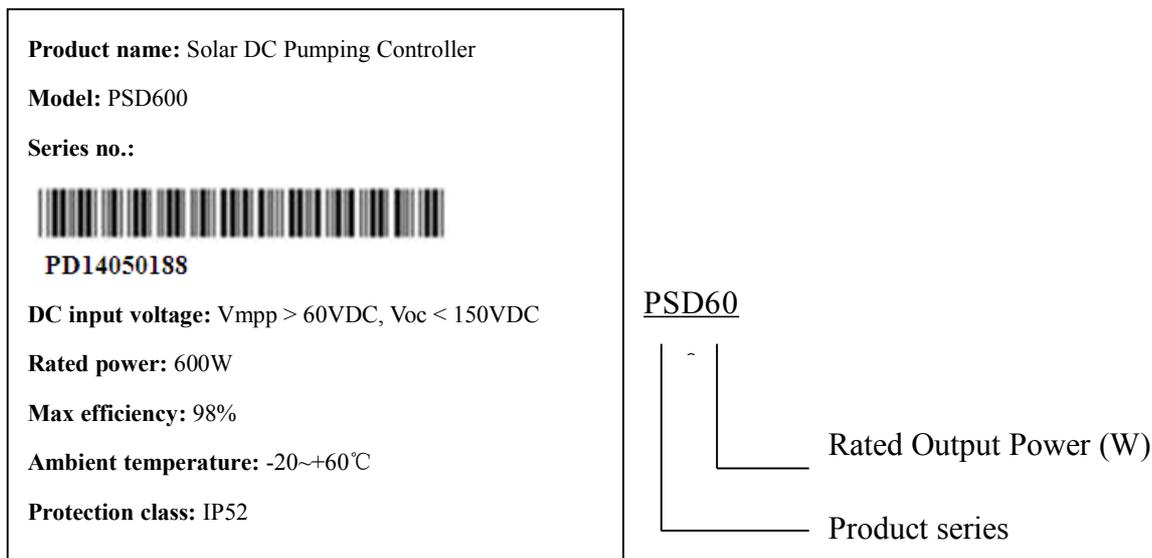


Fig. 1-3 Product nameplate and type description

 **Warning:** Do not tear off the product's nameplate label.

◆ **Product specification and technical index**

Model	Rated voltage of adapting motor	Max. DC input power	Max. open circuit voltage	Recommended MPP voltage	Rated output power	Rated output current	Output frequency
PSD600	48V	1000W	150VDC	60-120VDC	600W	13A	0 ~ 110Hz

 **Note:** Maximum output frequency of the controller is limited by DC input voltage. When DC input voltage is low(e.g.60V), the controller may not output its maximum output frequency.

 **Warning:** Please be sure to select the appropriate model according to the solar array and motor load.

Chapter 2 Installation and Wiring

2.1 Purchase Inspection

Our company has rigid quality assurance system in product manufacturing and packing. If any abnormality is found, please contact directly keep in touch with our technology service center. We will solve the problems for you as early as possible.

Once you get the product, please confirm the following items:

Inspection items	Inspection methods
Consistency with ordered product	Inspect the product's nameplate label
Damage or exfoliation phenomenon	Inspect whole appearance
Completeness of main machine and accessories	Check carefully according to the product list
Looseness of fastening parts such as screw	Check with screwdriver when necessary

2.2 Dimension and Weight

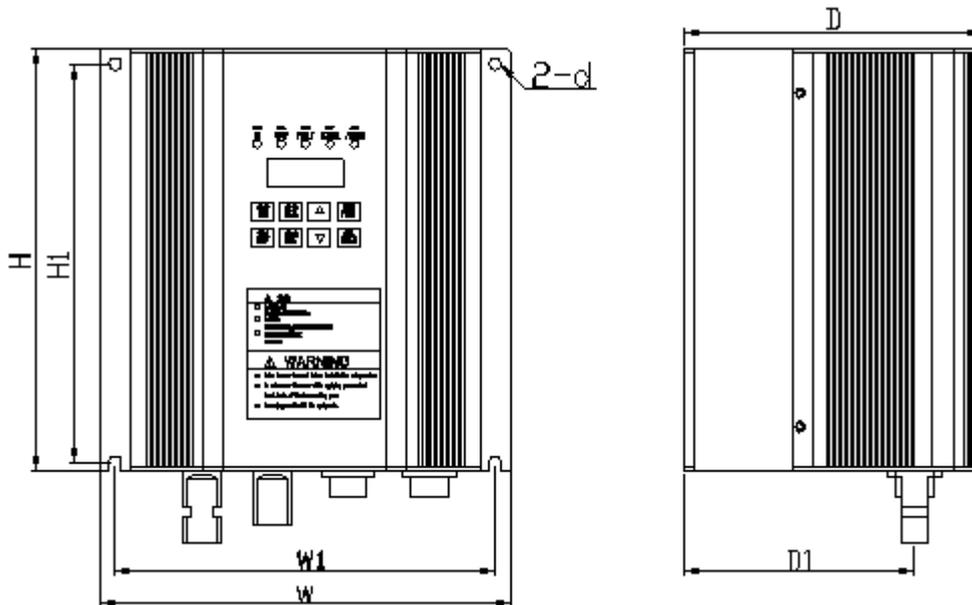


Fig. 2-1 Product appearance and installation dimension

Machine Model	Appearance and installation dimension (mm)							Weight (kg)
	W	H	D	W1	H1	D1	d	
PSD600	202.0	244.0	146.0	187.0	232.0	113.0	6.0	3.6

Warning: PSD series solar DC pumping controller is for wall mount installation. Please ensure that the mounting back can support the weight of the controller.

Warning: To ensure good cooling effect, please use vertical installation for the controller. If vertical installation cannot be applied, please make sure the tilt angle is no more than 10°.

2.3 Wiring Diagram

◆ Enclosure sockets

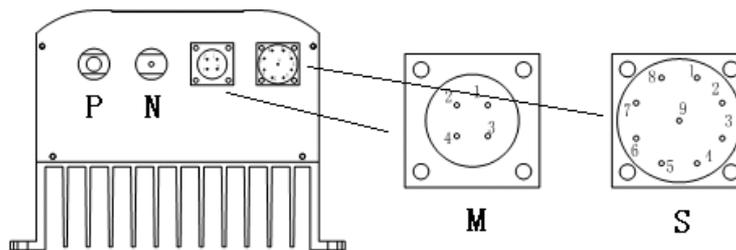
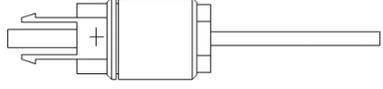
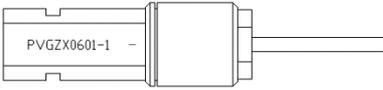
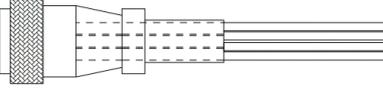
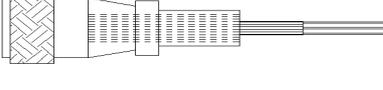


Fig. 2-2 PSD product wiring diagram

Socket	Terminal description
P	DC input
N	
M	AC output
S	Water level float input

◆ External sockets

Left side connection	Plug	Right side wire description	Connection description

P		One-strand, black	Connect to positive side of solar array	
N		One-strand, black	Connect to negative side of solar array	
M		Four-core wire	Yellow green wire	Connect to protective ground wire (yellow green)
			Red wire	Connect to U phase of motor (black)
			Yellow wire	Connect to V phase of motor (brown)
			Blue wire	Connect to W phase of motor (blue)
S		White three-core wire	Black wire	Connect to ground signal wire
			Red wire	Connect to well signal wire
			Yellow wire	Connect to tank signal wire



Warning: Please connect the wires according to the instruction, incorrect connection may lead to abnormal operation of system.

◆ Instruction of Water Level Float

PSD series of solar DC pumping controller can work with water level floats for well and tank. Water level float for well is used for warning of low water level of well, water level float for tank is used for warning of full water tank.

Water level float has Normally-Open type and Normally-Close type. The difference is as the picture showed below. Whether water level float is for well or for tank, **we recommend the Normally-Open type of water level float**, which will contribute to the fault diagnosis of water level float.

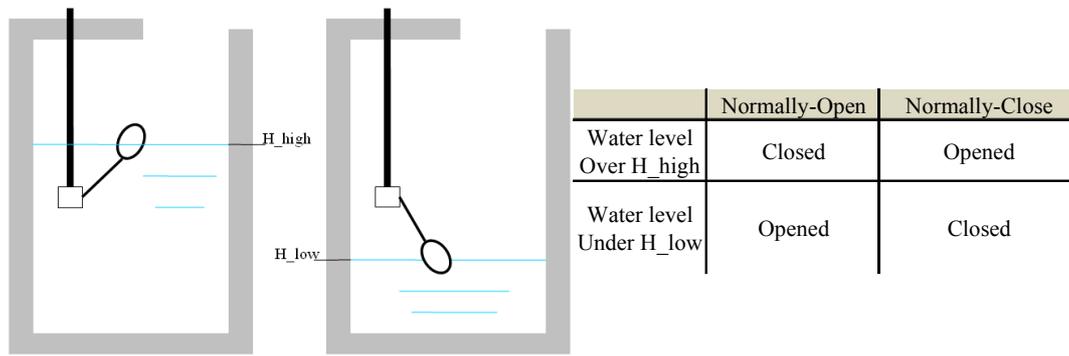


Fig. 2-3 Water level float types

● **Float fault:** The water level float may not work properly if the wire is in a bad connection or the signal wire is disconnected due to wearing wire.

● **Water level float for well:** If use Normally-Close type, the signal wire will always be disconnected no matter the water level is normal or the float is broken. So when the float is broken, and water level in well is too low, the pump may get damaged due to dry running since the controller judges the water level is normal.

Use Normally-Open type, no matter the water level is too low or the float is broken, the controller can judge the water level abnormal and stop the operation to protect the pump.

● **Water level float for tank:** If use Normally-Close type, the signal wire will always be disconnected no matter the water level is too high or the float is broken. So when the float is broken, and water level in tank is normal, the system will stop operation since the controller judges the water level is too high.

Use Normally-Open type, the system will still produce water even when the float is broken, but the system will not report abnormal when the water tank level is too high.

When user finds there is overflow from water tank, please examine the float condition.



Warning: To ensure stable operation of system, please choose cable size according to our recommendation as below.

◆ **Recommended cable size**

Model	Solar Array Cable (P, N) (mm ²)	Earth Wire (PE) (mm ²)	Pump Cable (U, V, W) (mm ²)	Water Level Float Wire (S) (mm ²)
PSD600	2.5	2.5	≥2.5	0.5 ~ 1.5

 **Note:** Ambient temperature condition for the above-recommended wire size is $\leq 60^{\circ}\text{C}$.

2.4 Earthing Instruction

- **Purpose:**

1. Ensure the safety of operator.
2. Lead the lightning surge to the ground when the controller is struck by lightning.

- **Method:**

Connect the AC output earth wire with pump earth wire.

Chapter 3 Operation Control

3.1 Panel Layout and Instruction

Solar DC pumping controller uses LED display operation panel which is shown as the figure below, it includes 5 LED lights and 5-digit 8-SEG nixie tubes and 8 keys in 2 rows.

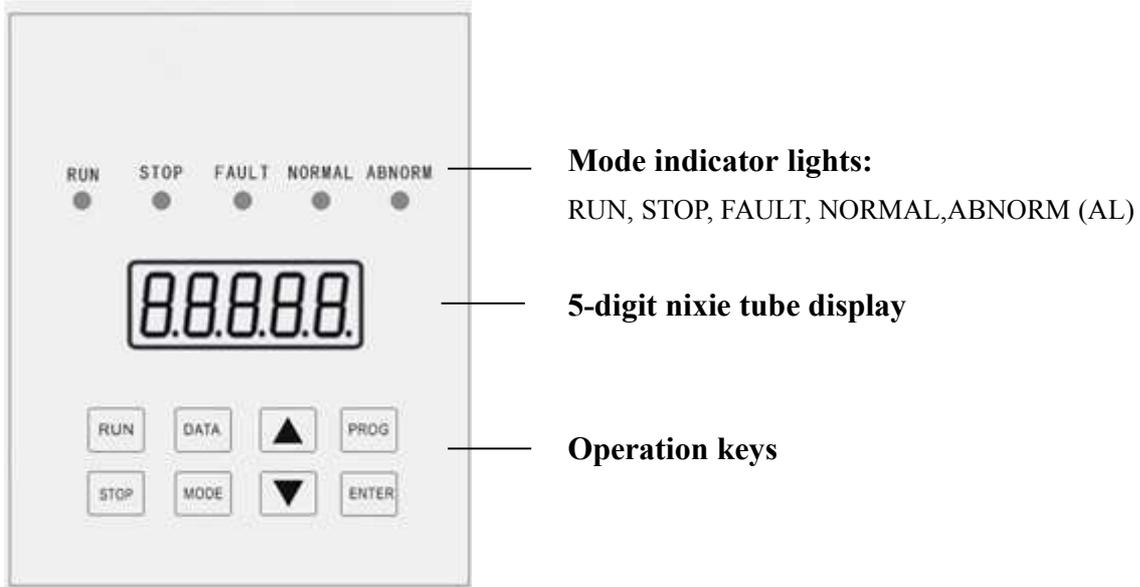


Fig. 3-1 Keyboard layout and name of each part

Indicator Light & Key	Name	Function Description	
RUN	Running indicator light	Green	Bright: Controller is running
STOP	Stopping indicator light	Red	Bright: Controller is stopped
FAULT	Fault indicator light	Red	Bright: System fault
NORMAL	Normal indicator light	Green	Bright: System normal
ABNORM	Abnormal indicator light	Red	Bright: Water level in tank or well is abnormal
	Run key	Control the start of the controller.	
	Stop key	Control the stop of the controller.	
	Data inquiry key	Not being used.	
	Mode switch key	1. Switch the contents to be displayed during data viewing.	

Indicator Light & Key	Name	Function Description
		2. Switch the digit to be modified during data modifying.
	Increasing key	1. Increase parameter number or its value in control parameter display status. 2. Increase output frequency or display current running data upward in running data display status according to operation mode.
	Decreasing key	1. Decrease parameter number or its value in control parameter display status. 2. Decrease output frequency or display current running data downward in running data display status according to operation mode.
	Programming key	Enter or quit from the control parameter display status.
	Enter key	1. Confirm the content to be viewed or modified. 2. Confirm and save the parameter value when the parameter is modified.
 + 	Reset key combination	Press the key combination to restore normal operation in protection status.

3.2 Panel Operation

◆ Display status

There have 2 statuses on the operation display panel: running data display, control parameter display. The default status is running data display. Press the  key to enter the status of control parameter display, and press the key again to return to the running data display status.

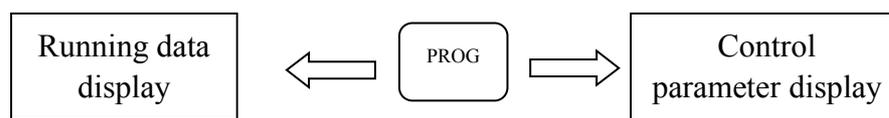


Fig. 3-2 Diagram for display status switching

◆ **View running data**

Operation	Description	Display
Initial status: Current running data ↓  ↓  ↓  ↓  ↓  ↓  ↓  ↓ 	Display current running data Output frequency of the controller	Example:  Indicate: 90.00Hz
	Display current running data Input voltage of the controller	Example:  Indicate: 120V
	Display current running data Input current of the controller	Example:  Indicate: 5.0A
	Display current running data Output power of the controller	Example:  Indicate: 570W
	Display current running data Output voltage of the controller	Example:  Indicate: 50V
	Display current running data Output current of the controller	Example:  Indicate: 11.5 A
	Display current running data Controller temperature	Example:  Indicate: 35°C
	Display current running data Motor rotating speed	Example:  Indicate: 2700rad/min
	Display current running data Output frequency of the controller	Example:  Indicate: 90.00Hz

◆ **View or modify the control parameters**

Operation	Description	Display
Initial status: non-control parameter display ↓  ↓  or  ↓  ↓	Enter the parameter modification interface Display parameter 0	 Indicate: Pr.0
	Select the parameter to be viewed and modified Display parameter number	Example:  Indicate: Pr.31
	Confirm to view and modify the parameter. Display parameter value	Example:  Indicate: 0

Operation	Description	Display
 or  ↓  ↓ 	Change parameter value	Example:  Indicate: 1
	Confirm and save the parameter value Display next parameter number	Example:  Indicate: Pr.32
	Quit from the parameter display mode Display current running data	Example:  Indicate: 0.00Hz

 **Note:** When controller is operating, the control parameters can only be read. The control parameters can be modified after the controller stops operation.

◆ **Change target frequency during operation**

Operation	Description	Display
Initial status ↓  ↓  ↓  or  ↓ 	Display current running data Output frequency of the controller	Example:  Indicate: 30.00Hz
	Enter the parameter modification interface Display the current target frequency	Example:  Indicate: 30.00Hz
	Switch the digit to modify (unit, decade, hundred)	Example:  Indicate: the blinking digit can be modified
	Modify the target frequency	Example:  Indicate: change to 50Hz
	Confirm the change and save the target frequency Display current operation frequency of the controller	Example:  Indicate: 50Hz

 **Note:** The modification can be only applied when Pr.33 value is 0

3.3 Function Parameter Description

Number	Name	Scope	Description	Factory set value
Pr.0	Mode of parameter setting	0 ~ 2	0: Parameter can be read and written. Other parameter values cannot be modified until Pr.0 is modified as 0. 1: All parameters can only be read. 2: Restores all parameters to factory values.	1
Pr.1~Pr.30	Records of fault type and fault information	Read only	Each fault information is stored in 3 parameters as fault type, motor input voltage when fault happened, pump operating frequency when fault happened. The controller can store the last 10 groups of fault information. For example, Pr.1~Pr.3 are the information of the first fault. Pr.1 records the fault type, Pr.2 records the motor input voltage, Pr.3 records the pump operation frequency. Pr.4~Pr.6 are the information of the next fault, and so on. Please refer chapter 4 to see the fault code description.	no
Pr.31	Well float setting	0~2	0: Not use water level float. 1: Normally-Open well water level float. 2: Normally-Close well water level float.	0
Pr.32	Tank float setting	0~2	0: Not use water level float. 1: Normally-Open tank water level float. 2: Normally-Close tank water level float.	0
Pr.33	Control model setting	0~1	0: Press RUN key to run while the target frequency can be changed manually. 1: Full-automatic operation.	1
Pr.34	Start delay time	1~6000	Start delay time when power on or shutdown	30s

 **Note:** After modifying the parameter in the table above, the next operation cannot be performed until the controller has been reset.

3.4 Initial Settings Before First Operation

Below operations must be performed by qualified electricians to ensure safety.

To make sure the pump is not reverse running, please refer chapter 2.3 to connect the wires, and confirm again before first operation, according to the pump type, there are 2 ways to confirm:

Helical rotor pump	Put the water inlet in the water, power on and observe the water outlet. If no water comes out, exchange any pair of pump cable connections with the controller. If there is water yield, keep the correct wiring.
Centrifugal pump	<ol style="list-style-type: none"> 1. Power on when the sunshine is sufficient. 2. Observe the water yield when pump is steady working. 3. Exchange any pair of pump cable connections with the controller. 4. Observe the water yield when pump is steady working. 5. Choose the wiring with more water yield.

When using water level float, user needs to modify the related control parameter of the selected water level float type. Below instruction is only for the users who need to install water level floats.

Step	Debugging Content	Instruction
1	Modify the control parameter as read-write parameter	Press “STOP” to stop the operation when power on. Modify Pr.0 value as 0.
2	Modify the setting of well water level float	<ol style="list-style-type: none"> 1. Modify Pr.31 value as 1 if using Normally-Open type water level float for well. 2. Modify Pr.31 value as 2 if using Normally-Close type water level float for well.
3	Modify the setting of tank water level float	<ol style="list-style-type: none"> 1. Modify Pr.32 value as 1 if using Normally-Open type water level float for tank. 2. Modify Pr.32 value as 2 if using Normally-Close type water level float for tank.
4	Modify the control parameter as read only	Modify the Pr.0 value as 1 before resetting the controller..



Warning: Please do not modify the control parameters of the controller freely, or else it can cause abnormal operation.

Chapter 4 Fault Diagnosis

4.1 Fault Codes Description and Countermeasure

SUNNYPOWER PSD series solar DC pumping controller has complete protection functions. When system fault occurs, the controller will take protection countermeasures: The general protection measure is stopping the driving signal output (jump stop) immediately and not allowing the controller to restart in a while.

When fault or protection occurs, the controller operation panel will automatically display the blinking fault code in the last 2 digit nixie tubes. If the first 1 digit nixie tube displays “P”, it means the fault or protection requires the controller to reset to restore normal operation. User can shut off the power supply and then power on the controller until the internal power supply is off, or press the “RESET” key combination to reset. If the fault still exists after resetting, please contact the manufacturer to report the fault and get a solution.

When the fault or protection has been cleared after resetting, the controller will automatically proceed with the restart countdown. During this time, the fault code will appear in the first 2 nixie tubes, and the last 3 digit nixie tubes will display the restart countdown time, when the countdown time arrives 0, fault code display will disappear automatically and then the controller is in running data display status.

CODE	Code Description	Possible Cause	Countermeasures
	Over-voltage	Too high input voltage	Inspect solar array voltage
	Under-voltage	Low input voltage weak sunlight intensity	Inspect solar array voltage
	Over-current	Too large pump load Low solar array voltage Motor stalling	Change to low-power pump load Inspect solar array voltages Inspect the pump
	Overload	Too large load	Reduce the highest operation frequency
	Over-current of the internal module	Output short-circuit or grounding module damaged	Inspect the wiring Ask manufacturer for help

EE	Over-temperature of the module	Air duct blocked Too high temperature	Clear the air duct or improve the ventilation condition
EA	AC CT fault	Device or circuit damaged	Ask manufacturer for help
EB	DC CT fault	Device or circuit damaged	Ask manufacturer for help
EF	Step out fault	Device or circuit damaged	Ask manufacturer for help
EE	Phase loss fault	Output circuit broken	Inspect the output wires of motor
FE	Locked-rotor fault	Pump stuck	Inspect the pump
EEEE	Communication fault	Device or circuit damaged	Reset Ask manufacturer for help

4.2 Other Codes Description

CODE	Code description	Relevant description
EEEEU	Parameter initialization	Return to normal after resetting
EEEEC	Important parameter modification	Return to normal after resetting
EE600	Controller model	E:48V rated voltage 600: 600W rated power
EE30	Start delay time	Countdown of the restart: 30 seconds
EE650	Well water level is too low	When well water level becomes normal, system will restart after 600seconds
EE6FF	Tank water level is too high	When tank water level becomes normal, system will restart after 600seconds

4.3 Fault Inquiry and Resetting

The controller can record the fault codes of the latest 10 times. The information can help finding the fault cause. Fault information is stored together with the control parameter Pr.1~Pr.30. Please refer to panel operation method to search and find out the fault information.

When the controller fault occurs, please press  and  reset key combination together, or cut off the power supply to restore normal operation.



Warning: Before resetting, complete check up on the fault cause is required.

Otherwise the controller may get damaged.



Warning: The reset should be delayed for 5 minutes when the machine is overloaded and overheated.

4.4 Other Faults and Inspection

◆ Controller does not work when powered on

1. Observe the indicator light on the operation board is on or off.
2. If indicator light is off, check the DC input wires whether they are reverse-connected or badly connected.
3. If indicator light is on, cut off controller's input wires and check if the input voltage is abnormal.

◆ High operation frequency but no water yield

1. Confirm the wires are firmly connected.
2. Check if the installation water head is more than the pump's maximum lift head.
3. Check if the pump is reverse running or not.
4. Check if there is any dirt like sand in the pump.
5. Check if the water pipe is smooth or not.

◆ Water flow not meeting the target

1. Check the solar array configuration has met the design requirements or not.
2. Check if the pump is reverse running or not.
3. Check the operation voltage when system is working steady, see if it's close to the real MPP voltage of solar array, if not, cut down the power and restart the controller.

Chapter 5 Service and Maintenance

5.1 Routine Inspection and Maintenance

Affected by ambient temperature, humidity, dust, vibration and aging internal device, the controller may have some potential problems during operation. To make sure the controller can run steadily for longer time, keeping at least a yearly inspection is necessary.

◆ Requirement of Inspection and Maintenance

1. The inspection must be performed by professional technician, and the power supply of the controller should be cut off when necessary.
2. Avoid leaving any extra metal parts in the controller, or else it can cause damage to the equipment.
3. Electrical insulation test has been performed on the controller before factory delivery, so user does not have to carry on a withstand-voltage test.
4. If it is necessary to conduct insulation test on the controller, all the input and output terminals must have reliably short circuits. It is forbidden to conduct insulation test on a single terminal. Please use the 500V megohm meter to conduct the test.
5. It is forbidden to use the megohm meter to test the control circuit.
6. When conducting insulation test on motor, you have to dismantle the connections between motor and controller.

◆ Main Points for Inspection and Maintenance

Please use the controller in recommended environment of the manual. Inspection and maintenance shall be proceeded as the following table.

Inspect Frequency		Inspection Item	Inspection Content	Judgment Standard
Routine	Regular			
√		Operation environment	1. Temperature, humidity 2. Dust, air	1. Temperature < 60°C 2. Humidity < 90%, no dew condensation 3. No peculiar smell, nor flammable and combustible gas

Inspect Frequency		Inspection Item	Inspection Content	Judgment Standard
Routine	Regular			
	√	Cooling system	1.Installation environment 2.Radiator	1. Installation environment with good ventilation 2. Radiator air duct not blocked
√		Controller body	1.Vibration, temperature rise 2.Noise 3.Wire, terminal	1. Stable vibration, normal temperature of the shell. 2.No abnormal noise and peculiar smell 3.Fastening screw not loose
√		Motor	1. Vibration, temperature rise. 2.Noise	1.Steady running and normal temperature 2.No abnormal and uneven noise
√		Input and output parameter	1.Input voltage 2.Output current	1.Input voltage in the specified range 2.Output current under the rated value.

5.2 Inspection and Replacement of the Damageable Part

◆ Filter Capacitor

Pulsating current of the main circuit will influence on the performance of the aluminum electrolytic filter capacitor, the impact depends on the environment temperature and working condition. In normal condition, the controller shall replace its electrolytic capacitor every 10 years. When the filter capacitor's electrolyte leaks, safety valve bursts out or the capacitor main body expands, it shall be replaced immediately.

5.3 Storage and Warranty

◆ Storage

If the controller is not used temporarily or stored for long time after purchasing, please pay attention to the following points:

1. Avoid placing the controller in high temperature or humid and vibrating place or with metal dust, ensure good ventilation.
2. When controller is long time no used, the internal filter capacitor performance will decline. It is necessary to power on the controller every 2 years to restore the performance of the filter capacitor, and the controller can be checked at the same

time. When power is on, it is necessary to increase the voltage through a DC power supply, and the power-on time should be not less than 5 hours.

◆ Warranty

The warranty of the controller is three years. When any fault or damage occurs on the product, within the warranty period, our company will provide free maintenance. After the warranty time, we can provide lifetime paid warranty service.

Certain maintenance charge will be considered during warranty period if the fault is caused by the following reasons:

1. Operating against the manual or surpass the standard specification
2. Fix and modification without factory's permission.
3. Poor preservation
4. Using the controller in an unusual way.
5. Machine damage caused by fire, salt corrosion, gas corrosion, earthquake, storm, flood, lightning, abnormal voltage or any other act of providence.



Note: Warranty only covers the body of the controller.

Warranty Card

Client name		Contact person	
Client address		Telephone number	
Product model		Date of purchase	
Machine serial number		Warranty length (from the factory delivery date)	
Distributor (Seal)			

Packing List

- 1) Main machine, 1 PC
- 2) Operation manual (including warranty card), 1 PC
- 3) Plug of the positive side of the solar array, 1 PC
- 4) Plug of the negative side of the solar array, 1 PC
- 5) AC output plug, 1 PC
- 6) Water level float plug, 1 PC

Warranty Agreement

1. The warranty of the controller is three years. When any fault or damage occurs on the product during normal use according to the manual, within the warranty period, our company will provide free maintenance. After the warranty time, we can provide lifetime paid warranty service.
2. The warranty time starts from the product's factory delivery date, and the controller serial number is the only reference to determine the warranty period.
3. Certain maintenance charge will be considered during warranty period if the fault is caused by the following reasons:
 - a) Operating against the manual or surpass the standard specification.
 - b) Fix and modification without factory's permission.
 - c) Poor preservation.
 - d) Machine damage caused by fire, salt corrosion, gas corrosion, earthquake, storm, flood, lightning, abnormal voltage or any other act of providence.