Solar Pumping Inverter

User Manual

PROPD-2P750/ 2P1500/2P2200/2P4000/4P750/

4P1500/4P2200/4P4000/4P5500/4P7500/4P11K/4P15K/

4P18.5K/4P22K/4P30K/4P37K/4P45K/4P55K/4P75K

Preface

Thanks for using PROPD series of solar pumping inverter.

In order to give the performance of this product and ensure the safety of user and equipment, please read this manual carefully before using, in particular paying more attention to safety recommendation. Besides, please keep this manual for future reference in order to subsequently facilitate the routine inspection and maintenance, and find out the cause of abnormity and treatment countermeasure. If there are any questions or specific requirements during using, please contact the distributors of our company or directly keep in touch with the technology service center of our company.

The manual will be subject to change without any further notification.

CONTENT

Safety Instruction

The safety operation of solar pumping inverter depends on its correct transportation, installation, operation and maintenance. Before these operations, please be sure to pay attention to the safety notices as below:

 Danger: Misuse may cause fire, serious injury to person or even death.

 Warning: Misuse may cause mild or moderate injury to person or damage of equipment.

 Prompt: Point out some useful information.

★ Purchase Inspection

 Warning
1. If the inverter is damaged or missing components, it will not be allowed to install, otherwise accident may occur.

★ Installation

 Warning
1. In order to guarantee good convection cooling effect, the inverter must be installed vertically, and retain at least 10cm space in above and below. 2. As far as possible install it in indoor spaces which possess of vents or ventilation device. It is forbidden to install in direct sunlight place. 3. Do not drop the drilling debris into inverter heat sink inside in case of affecting heat dissipation.

★ Connection

 Danger
1. Connection job must be carried out by qualified electrical professionals, otherwise may cause electric shock or fire. 2. Please confirm the input power supply has been cut off before connection, otherwise may cause electric shock or fire. 3. Earth terminal must be reliably ground; otherwise the inverter shell will have a danger of being electrified. 4. The type selection of PV array, motor load and inverter must be reasonable; otherwise the equipment will be break down.

Warning

1. Please use the fasten terminal of the specified torque, or else it will cause fire.
2. Do not connect the output terminal of the inverter to the capacitor and phase-advanced LC/RC noise filter. It is recommended to use the output reactor when the distance between the inverter and the motor load more than exceeds 100m.

★ Running

Danger

1. In confirmation of correct wiring electricity, otherwise may damage the inverter or start a fire.
2. Please do not change in electricity wiring, otherwise there is risk of electric shock.

Warning

1. Adjust partial control parameters according to the steps indicated by the manual before its first running. Do not change the control parameters of the inverter randomly, or else it will cause damage to the equipment.
2. Because the heat sink's temperature is high during running, do not touch it for a long time, or else it will cause burn.
3. In the condition of altitude over 1000m, the inverter should be derated for use, that is, output current will be de-rated by 10% at every 1500 m increment of height.

★ Others

Danger

1. Maintenance and inspection must be performed by the qualified electric Professionals.
2. Do not dismantle the inverter during electrifying. Conduct maintenance and inspection at least 5 minutes after the power off.
3. It is absolutely forbidden to reconstruct the inverter by oneself, or else it will cause personnel injury or equipment damage.
4. Treat the inverter as industrial waste when processing the abandoned inverter. It is possible that the electrolytic capacitor will explode during incineration and that part of components will produce toxic and harmful gas.

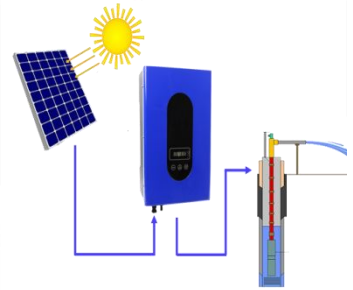
Chapter 1 System Introduction

1.1 Solar Pump System Introduction:

Solar pump system mainly including 4 parts: Solar Array, solar pumping inverter, AC pumping and water storage device. This system can solve the demand of water supplying issue in powerless area and improve their living and production status.

- Solar array consists of solar battery module by serial and parallel connection, absorbing solar radiation energy and providing power.
- The solar pumping inverter transfer the direct current generated by solar array to alternate current to control and regulate the system and driving the pumping.
- Dived by electric motor, the pump draw the water from deep well.

1.2 Solar Pumping Inverter Introduction:



PROPD serial solar pump inverter use the combination of dynamic VI MPPT and V/F, suitable to different of single phase AC water pump with prompt response, high efficiency and stable working features. It can be used to daily living water supplying, agriculture and forestry irrigating, desert controlling, animal water supplying, village and town water supplying, sewage handling engineering and fountain landscape water supplying and other fields.

1.3 Features:

- Wide input voltage range gives more possibilities for accepting different string configuration and different type of PV module.
- Protection class IP65 and fanless design, suitable to various bad outdoor environments.
- Intelligent digital controlling and automatic running, high reliability of data storage

with functions of thunder, over voltage, over current and overload protection.

- Aluminum alloy Structure and LED display control panel, with in-line terminal connector and good looking appearance, have the features of good heat radiation and protection.
- Using advanced IGBT module with high efficiency, low temperature, low noise and long life functions.
- Modularity design is convenient to installation, operation and maintenance, sharply reduced construction and maintenance cost.
- Applied to single phase water pumping in asynchronous motor, freely to set pumping speed range, with control circuit to monitor the upper and lower water level to protect pumping out or spilling.
- Multiple communication mode, include RS485, remote control system available to monitor running status and mode.

1.4 Specification

Solar Pump								SolarArray	AC Pump
Model	Input voltage Range (Voc)	Mppt voltage (Vpp)	Rated Input Current (A)	Out Frequency (Hz)	Out voltage (V)	Out Current (A)	Rated Out Power (kW)	Dc Power (kW)	Rated Power (kW)

PROPD-2P750	250-500	280-450	6.0	0-400	0-220	4.5	0.75	0.825	0.55
PROPD-2P1500		280-450	9.0	0-400	0-220	7	1.5	1.65	1.1
PROPD-2P2200		280-450	13.0	0-400	0-220	10	2.2	2.25	1.5
PROPD-2P4000		280-450	20.0	0-400	0-220	16	3.7	4.5	3
PROPD-4P750	450-750	480-600	4.0	0-400	0-380	2.5	0.75	0.825	0.55
PROPD-4P1500		480-600	5.0	0-400	0-380	3.7	1.5	1.65	1.1
PROPD-4P2200		480-600	7.0	0-400	0-380	5	2.2	2.25	1.5
PROPD-4P4000		480-600	12.0	0-400	0-380	9	3.7	4.5	3
PROPD-4P5500		480-600	17.0	0-400	0-380	13	5.5	6	4
PROPD-4P7500		480-600	22.0	0-400	0-380	17	7.5	8.25	5.5

PROPD-4P11K		480-600	32.0	0-400	0-380	25	11	11.25	7.5
PROPD-4P15K		480-600	41.0	0-400	0-380	32	15	16.5	11
PROPD-4P18.5K		480-600	50.0	0-400	0-380	37	18	22.5	15
PROPD-4P22K		480-600	58.0	0-400	0-380	45	22	27.8	18.5
PROPD-4P30K		480-600	77.0	0-400	0-380	60	30	39	26
PROPD-4P37K	450-750	480-600	96.0	0-400	0-380	75	37	45	30
PROPD-4P45K		480-600	115.0	0-400	0-380	90	45	56	37
PROPD-4P55K		480-600	140.0	0-400	0-380	110	55	68	45
PROPD-4P75K		480-600	191.0	0-400	0-380	150	75	98	65

 Caution: Please be sure to select the appropriate model according to the PV array and motor load.

Chapter 2 Installation and wiring

2.1. Purchase Inspection

Our company has rigid quality assurance system in product manufacturing, package, etc. If any abnormity is found, please immediately contact the distributors of our company or directly keep in touch with the technology service center of our company. We will solve the problems for you immediately. Once you get the product, please confirm the following items:

Inspection item	Inspection method
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	If necessary, inspect with screwdriver

2.2 Size and Weight

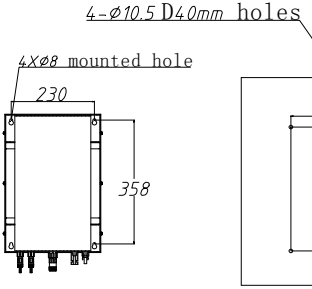
Model	Dimension (H×W×D mm)	Weight(Kg)
PROPD-2P750	395×261×190	≤11
PROPD-2P1500	395×261×190	≤11

PROPD-2P2200	395×261×190	≤11
PROPD-2P4000	395×261×190	≤11
PROPD-4P750	395×261×190	≤11
PROPD-4P1500	395×261×190	≤11
PROPD-4P2200	395×261×190	≤11
PROPD-4P4000	395×261×190	≤11
PROPD-4P5500	430×305×190	≤25
PROPD-4P7500	430×305×190	≤25
PROPD-4P11K	430×305×190	≤25
PROPD-4P15K	430×305×190	≤25

PROPD-4P18.5K	430×305×190	≤25
PROPD-4P22K	690×585×225	≤38
PROPD-4P30K	690×585×225	≤38
PROPD-4P37K	690×585×225	≤38
PROPD-4P45K	690×585×225	≤38
PROPD-4P55K	740×600×230	≤48
PROPD-4P75K	740×600×230	≤48

 Caution: This product is a hanging installation; please make sure to install back to withstand the weight of the inverter.

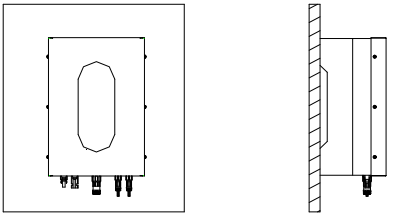
2.3 Fixed on the wall



Holes Figure

Figure of drilling dimension

Correct installation



Fix with 4XM6
expansion bolts

2.4 Check list of Package

After opening the package, please check the contents in the box. It should contain the following items:

1

2

3

4

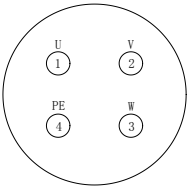
5

6

Item	Name	Quantity
1	PROPD	1
2	Motor output Conector	1
3	Sensor Conector	1
4	Rs485 Conector	1
5	Installation and Operation Manual	1
6	expansion screw	4

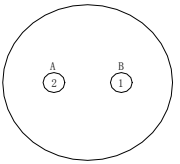
Chapter 3 Pump System Connection

3.1 Motor output connection



MOTOR

3.2 Communication connection



RS485

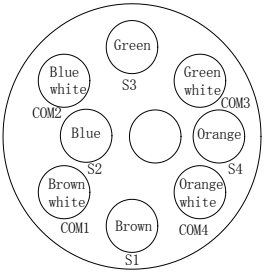
3.3 Sensor Connection

By default, the sensor switch is closed, when are you going to use well and tank sensors, you must open the sensor switch.

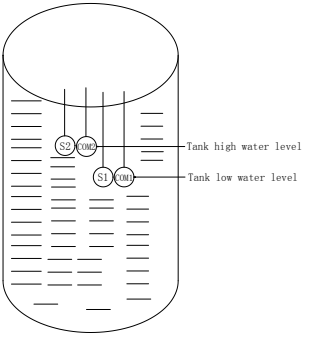
If the sensor switch is closed ,before pump running ,you can press RUN + STOP/RST key

simultaneously to open the sensor switch, the sensor switch status will be from 0 to1,you can press "SHIFT" key to see the sensor switch status.

If the sensor switch is on, before pump running ,you can press RUN + STOP/RST key simultaneously to close the sensor switch, the sensor switch status will be from 1 to 0,you can press "SHIFT" key to see the sensor switch status.



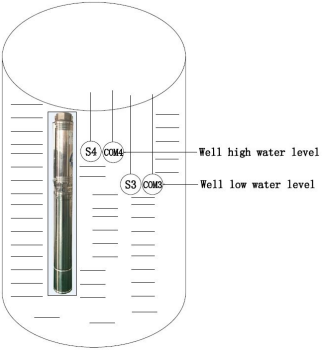
SENSOR



S1 S2 in tank

Caution: If the sensor switch is on , when you do not use tank sensors, you must break off the connection between S1 and com1, break off the connection between S2 andCom2, takes all the sensors off the tank. Otherwise it will break out fault code "E025".

If the sensor switch is on, when you do not use tank sensors and well sensors, you can press RUN + STOP/RST key simultaneously to close the sensor switch.



S3 S4 in well

Caution: If the sensor switch is on , when you do not use well sensors, you must connect S3 to com3, connect S4 to Com4, otherwise it will break out fault code “E026”.

If the sensor switch is on, when you do not use tank sensors and well sensors, you can press RUN + STOP/RST key simultaneously to close the sensor switch.

Table3.1

Socket	Terminal instructions	Connection description
DC input	PV+ (red wire)	The PV array the anode
	PV- (black wire)	The PV array the cathode
AC output	MOTOR-1(red wire) u phase	The motor u phase ac input
	MOTOR-2(red wire) v phase	The motor v phase ac input
	MOTOR-3(red wire) w phase	The motor w phase ac input
	MOTOR-4(yellow green wire)	Protection earthed

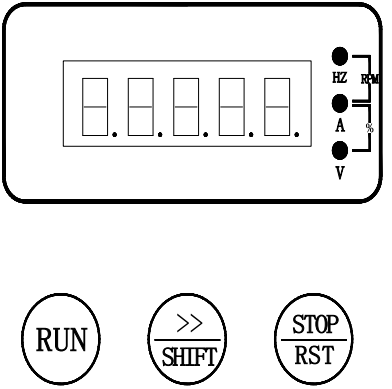
Water level sensor input	S1(Brown wire)	Tank low water level
	Com1(Brown-white wire)	Tank low water level
	S2 (Blue wire)	Tank high water level
	Com2(Blue-white wire)	Tank high water level
	S3 (Green wire)	Well low water level
	Com3(Green-white wire)	Well low water level
	S4 (Orange wire)	Well high water level
	Com4(Orange-white wire)	Well high water level
RS485 communication	RS485-A	Selective assembly
	RS485-B	Selective assembly

Prompt: If RS485 communication function is needed, please contact our company's products distributors or directly contact our technical service center.

Caution: When you do not use tank sensors, you must break off S1 and com1, break off S2 and Com2, otherwise it will break out the fault code “E025”.

Caution: When you do not use well sensors, you must connect S3 to com3, connectS4 to Com4, otherwise it will break out the fault code “E026”.

Chapter 4 HMI Platform



4.1 Led Display

Table 4.1

Display content	Functiondescription
Current Indicator LED(A)	1. When displaying PV out current, the LED light. 2. When displaying AC output current, the LED light.
Voltage Indicator LED(V)	When displaying bus voltage, the LED light.
Frequency Indicator LED(Hz)	1. When displaying running frequency, the LED light. 2. When displaying given frequency, the LED light.

Input Power Indicator LED(VA)		When displaying input power, voltage and current indicator LED light
Running LED Display	Running Frequency	Display running frequency
	Bus Voltage	Display PV voltage
	Input Power	Display PV output power
	DC Input Current	Display PV output Current
	AC Output Current	Display AC output Current
Stop LED Display	Given Frequency	Display given frequency
	Bus Voltage	Display PV voltage
	Sensor swtich	Display Sensor switch status
Err LED Display	See table 5.1	See table 5.1

4.2 Key Description

Table 4.2

Key Symbol	Key description	Function description
RUN	Running Command key	Given running command
SHIFT	Right Shift key	Single-click, LED display next data, the display order as follow: 1. When running, the order: Running frequency, bus voltage, input power, DC input, current, AC output Current. 2. when stopping, the order: given frequency, bus voltage

Key Symbol	Key description	Function description
STOP/RST	Stop/Rst	1. When running, press down the key, controller stop running 2. When Err, push down this button reset, fault elimination
RUN+STOP/RST	Sensor switch key	Every time pressing the two keys simultaneously, the sensor switch state will tip.If the sensor switch status is 0, it will change to be 1. If the sensor switch status is 1, it will change to be 0.

Chapter 5 Troubleshooting

Table 5.1

Fault Code	Fault Name	Fault Reasons	Troubleshooting
E001	Inverter U phase protection	1. Acceleration time too short 2. This IGBT of the phase is damaged	1. Prolong the acceleration time 2. Ask for technical support 3. Peripheral troubleshooting
E002	Inverter V phase protection		
E003	Inverter W phase protection		
E004	Acceleration over current	1. Acceleration time too short 2. PV input voltage is low 3. Inverter power is too small	1. Prolong the acceleration time 2. The voltage adjusted to a normal range 3. Select inverter with a lager power
E005	Deceleration over current	1. Acceleration time too short 2. The load inertia torque of the load is large 3. inverter selection is too small	1. Prolong the deceleration time 2. Select inverter with a lager power
E006	Constant-speed Over current	1. Load mutation or abnormal 2. PV input voltage is low 3. Inverter power is too small	1. Check load mutation or abnormal 2. The voltage adjusted to a normal range 3. Select inverter with a lager power

Fault Code	Fault Name	Fault Reasons	Troubleshooting
E007	Acceleration overvoltage	1. PV input voltage is high 2. Start the rotating motor	1. The voltage adjusted to a normal range 2. Avoid to start the rotating motor
E008	Deceleration Over voltage	1. Deceleration time too short 2. There is an external force during running dragging the motor to work 3. Input voltage is high	1. Prolong the Deceleration time 2. Cancel the external power 3. The voltage adjusted to a normal range
E009	Constant-speed Over voltage	1. PV input voltage is high 2. There is an external force during running dragging the motor to work	1. Select inverter with a lager power
E010	Bus voltage low	1. PV input voltage is low	1. The voltage adjusted to a normal range
E011	Motor over load	1. The motor rated current set incorrectly 2. Load is too large or motor rocked router 3. Inverter selection is too small	2. Setting the parameters correctly 3. Reduce load and check the conditions of motor and mechanical 4. Select inverter with a lager power
E012	Inverter over load	1. Acceleration time too short 2. Start the rotating	1. Prolong the acceleration time 2. Avoid to start the rotating

Fault Code	Fault Name	Fault Reasons	Troubleshooting
		motor 3. PV input voltage is too low 4. Load is too large	motor 3. Check grid voltage 4. Select inverter with a lager power
E014	Output open-phase	Three-phase output of inverter is unbalanced during motor-running	1. Peripheral troubleshooting 2. Checked and confirm the motor three-phase winding to be normal
E015	Sink overheat	1. Ambient temperature is too high 2. IGBT module damaged	1. Lower the ambient temperature 2. Replace the IGBT module
E018	485 Communication timeout	1. Set the baud rate incorrectly 2. Using serial communication error 3.Communication int errupt for a long time	1. Set the appropriate baud rate 2. Press STOP/RST for restoration 3. Check the communication cable
E019	Current zero drift detection fault	1. Control panel connector poor contact 2. Auxiliary power supply damage 3. Hall device damage 4. Abnormal amplifying circuit	1. Check the connector, plug wire again 2. Ask for technical support 3. Ask for technical support 4. Ask for technical support
E021	Memory failure	1. Parameters reading and writing err 2. EEPROM chips	1. Press STOP/RST for restoration 2. Ask for technical support

Fault Code	Fault Name	Fault Reasons	Troubleshooting
		damage	
E025	Full-water warning	1. S1, S2 sensor fault 2. Tank water level reaches the high water level	1.Check sensor connection, if do not use tank sensors, break off the connection of S1 and COM1,S2 and COM2 2. If you use the well sensors, the well water level arrive to high water level, so you stop to store water
E026	Well level low warning	1. S3, S4 sensor fault 2. Well water level reaches the low water level	1. Check sensor connection, if do not use well sensors, please connect S3 to COM3, S4 to COM4 2. If you use the well sensors, the well water level arrive to low water level, so you must stop to pump water
E027	PV output power is low	Output frequency lower than or equal with lower limit of pi output frequency, and continues this status until arrives at 300s delay time of weak light	Check the lower limit of pi output frequency