ROCKSOLAR 1.61HP Hybrid Solar AC/ DC Submersible Pump Kit

User Manual

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1. Introduction

Thank you for choosing the **ROCKSOLAR 1.61HP Hybrid Solar Submersible Pump Kit**. This system is designed to provide reliable water pumping using **solar power and/or AC electricity**, making it ideal for remote areas, farms, irrigation, and off-grid applications.

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2. System Overview

Key Features

- Hybrid operation: **Solar (DC) + Grid/Generator (AC)**
- High-efficiency **1.61HP submersible pump**
- Includes **1760W bifacial solar panels (4× 440W)**
- Built-in **dry-run protection**
- **Maintenance-free** brushless motor design
- Suitable for wells, irrigation, livestock watering, and storage tanks

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3. Technical Specifications

Pump

- Power: **1.61HP**
- Maximum Flow Rate: **17.42– 46.7 GPM**
- Maximum Head: **391ft**
- Maximum Pressure: **174PSI**
- Type: **Submersible**
- Motor: **Brushless DC**

Electrical

- Solar Input: **~1760W recommended**

- AC Input: **150–240V**
- Hybrid Controller: **Automatic switching between AC and DC**

Solar Panels

- Quantity: **4panels**
- Total Output: **1760W**
- Type: **Bifacial**

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4. Package Contents

- 1 × Submersible pump
- 1 × Pump controller (hybrid inverter/controller)
- 4× 440W bifacial solar panels
- Mounting accessories (may vary)
- Cables and connectors
- User documentation

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5. Safety Instructions

⚠️ Important Safety Guidelines

- Do NOT run the pump dry (use water source at all times)
- Ensure proper grounding of electrical components
- Disconnect power before installation or maintenance
- Do not touch electrical parts with wet hands
- Use proper lifting equipment when lowering the pump into a well
- Ensure all wiring complies with local electrical codes

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6. Installation Guide

6.1 Site Preparation

- Ensure well or water source depth is within pump capability
- Verify water level stability
- Prepare a secure mounting area for solar panels

6.2 Pump Installation

1. Attach discharge pipe to pump outlet
2. Secure pump with a **safety rope or cable**
3. Slowly lower pump into well (do not drop)
4. Ensure pump is fully submerged but above sediment level

6.3 Solar Panel Installation

1. Install panels facing **south (in Northern Hemisphere)**
2. Tilt angle: **30–45° recommended**
3. Connect panels in configuration specified (series/parallel as labeled)
4. Route cables to controller

6.4 Electrical Connections

Solar Mode (DC)

- Connect solar panels to controller DC input
- Ensure polarity is correct (+ / -)

AC Mode

- Connect AC input (150–240V) to controller
- Use a circuit breaker for safety

Pump Connection

- Connect pump cable to controller output

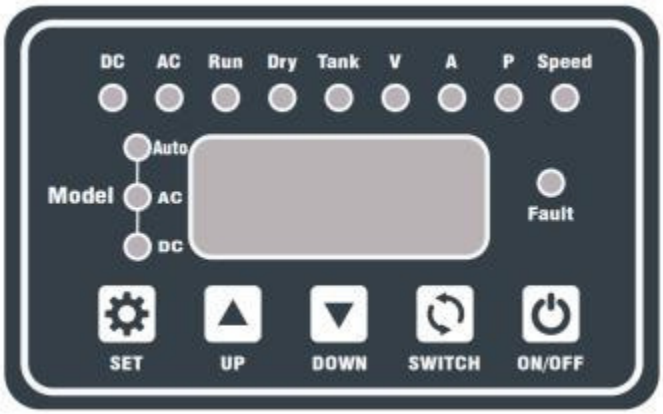
6.5 System Check

- Double-check all wiring
- Ensure all connections are tight
- Power on controller
- Verify system starts correctly

Controller

LED Lamp Instructions In Panel

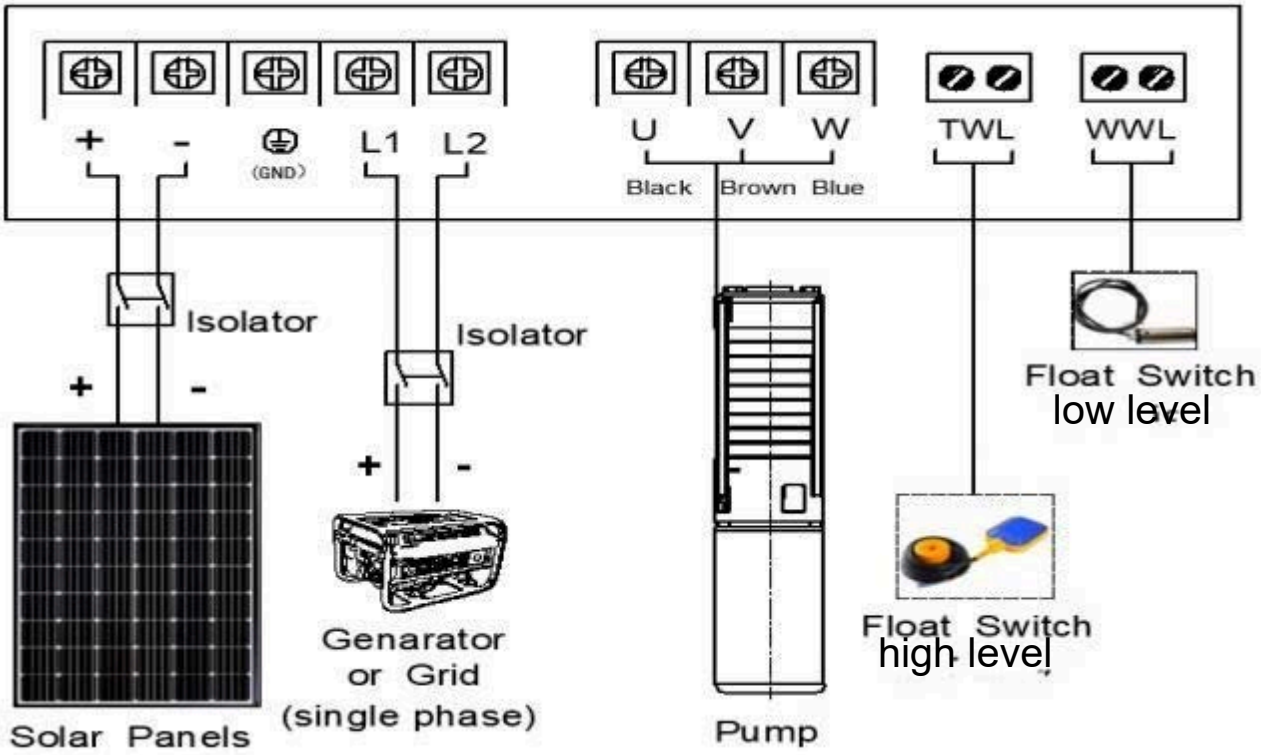
◆ LED【 **DC**】: DC power supply, the indicator is on; :
◆ LED【 **AC**】AC power supply, the indicator is on;
◆ LED【 **Run**】 : Controller is turned on, the indicator lights up,Associated with 【**ON/OFF**】
◆ LED【 **Dry**】 : Alarm for pump dry protection, Associated with **WWL** terminals Or **low power** ;



◆ LED【 **Tank**】 : Alarm for Water tank full protection , Associated with **TWL** terminals;
◆ LED【 **V**】 : When this indicator light is on, Voltage is displayed;
◆ LED【 **A**】 : When this indicator light is on, Current is displayed;
◆ LED【 **P**】 : When this indicator light is on, Power value is displayed;
◆LED【 **Speed**】 :Whenthisindicatorlight is on, Speed is displayed;

◆ LED【 **Fault**】 :AlarmforVariousfault;
◆ LED【 **Model- - Auto**】 :**AUTOMODE:**IntelligentselectionofDCorACpower,DCfirst.
In **AUTO Model**, AC power is being used, and Led 【**Model--AC**】 flashes once every 3S;
In **AUTO Model**, DC power is being used, and Led【**Model--DC**】 flashes once every 3S;
◆ LED 【**Model--AC**】:**ACMODE**:powersuppliedfromaGeneratororMainspower;
◆ LED【**Model--DC**】:**DCMODE:**powersuppliedfromaSolarArrayorBatterystorage;
◆Press 【**SET** 】, Select power supply mode,**AUTO**、**AC or DC MODE**.
◆Press 【**SWITCH** 】, check the 【**V**】, 【**A**】, 【**P**】, 【**Speed**】cycle.

Electrical Connections



Parameter Setting

Step 1: Enter the setting interface.

- Press and hold【 **SET**】and 【**SWITCH**】at the sametime for 3 seconds. After 5 seconds countdown, H00 will be displayed

Step2: Enterparameterchangepassword（Defaultpassword H00-12 ）

Note:pleaseentercorrectpasswordbeforeanyparameterchangeprocess,or change will useless .

- Press 【 **SET**】 to enter H00, and adjust H00 value to 12 through 【**UP**】 and 【**DOWN**】
- Press and hold 【 **SET**】 for 3 seconds to save the parameters and return to H00

Note： Shortpress 【 SET】 toreturntoH00directly,buttheparameterisnotsaved and does not work.

Step 3: Set various parameters, such as speed, power, etc

Note:VariousparametercodesH00~H09,refertotable1.

- After set H00 value to 12 and save it. Adjust parameter H01-H09 through up and down.
- Press 【 **SET**】toenterHxx,andadjustHxxvaluethrough【**UP**】and【**DOWN**】
- Pressandhold 【 **SET**】 for3secondstosavetheparametersandreturntoHxx

Note： Shortpress【SET 】 to return to Hxx directly, but the parameter is not saved and does not work.

Step4: Exittheparametersettinginterface

- Short Press the 【**SWITCH**】 Exit the setting interface

Note： No operation in the setting interface for 2min, it will exit automatically

Step5: Restorefactoryparameters（Default H00-10 ）

- Set H00 to 10 and save,For specific operation, refer to **step 2**.

Parameter Code And Default Value

Table 1

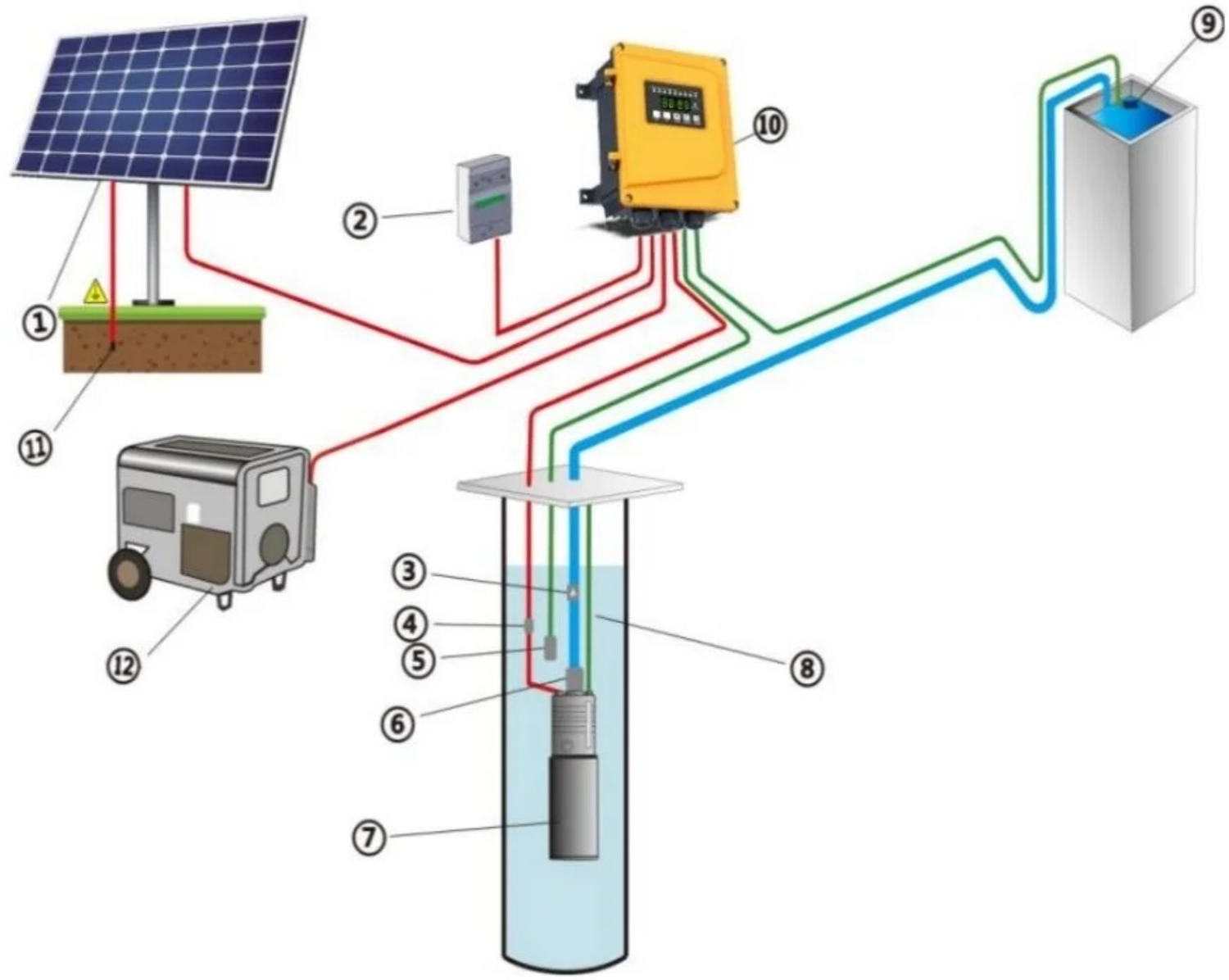
Code	Interpretation	Adjustable range		Default value
H00	10： Restore the factory settings or 12:Change the parameter password	0-12		0
H01	High voltage protection value	450		450V
H02	Low voltage protection value	50		50V
H03	Maximum speed	2500-4200RPM		4000RPM
H04	Tank full recovery time(TWL)	30-1800S		600S
H05	Recovery time of dry protection(WWL)	30-1800S		600S
H06	Recovery time of dry protection(Low power)	300-1800S		1 8 00S
H07	Maximum DC input power	0.5HP	300-750	750W
		0.75HP	300-1000	1 0 00W
		1HP	500-1200	1 2 00W
		1.5HP	500-1800	1 8 00W
		2HP	500-2200	2200W
		3HP	500-3000	3000W

Alarm and Fault code

Table 2

Code	I nterpretation	Causes and Solutions
P50	Low voltage protection	◆The Voltage below the requirement
P51	High voltage protection	◆The voltage exceeds the requirement
P48	Dry protection	◆Water shortage in well, low power ◆**WWL** “closed ”.
P45	Tank Full	◆Water tank full ,**TWL** “Open”.
P02	PFC protection	◆PCB fault, need to return to factory for inspection
P09	U phase over current	◆**Controller U phase output over current or cable too longer**
P10	V phase over current	◆**Controller U phase output over current or cable too longer**
P11	W phase over current	◆**Controller U phase output over current or cable too longer**
P43	Phase Missing Protection	◆Phase loss of controller output; ◆The wiring between the motor and the controller is loose. ◆The cable is damaged and needs to be replaced. ◆ The motor may be damaged. Please check the motor resistance between every 2 items of UVW,exceed 15% is not allowed
P44	Short circuit protection	◆ Short circuit of cable or terminal between motor and controller; ◆ the motor or cable is damaged; ◆The pump is blocked or jammed; remove the jam
P46	Stall Protection	◆ check whether the connection between the pump body and the motor is smooth； motor bearing damage, need to replace the bearing ◆Low Power
P60	Controller High Temperature	◆ Keep good ventilation and heat dissipation near the controller
P20	Abnormal fan	◆ The fan is damaged or jammed; remove the jam or replace the fan
E10	PCB component failure	◆PCB damaged, need to return to factory for inspection
E00	Power mode error	◆ Power mode error,please chose **Atuo** mode ◆ AC/DC wrongly connected.The **L1 / L2** terminals of the controller correspond to AC power, **+/-** correspond to DC power

SYSTEM INSTALLATION DIAGRAM



1. Solar Panel Array
2. SPD (DC-600V), Surge Protection Device (Optional)
   SPD (AC-275V), Surge Protection Device (Optional)
1. Check valve (Optional)
2. Wiring waterproof assembly
3. The Low-Level Float (For Well, Optional)
4. Sacrificial Anode (Optional)
5. Water Pump End and BLDC Motor
6. Safety rope
7. The High-Level Float (For Tank, Optional)
8. External controller
9. Grounding pile (Optional)
10. Generator (Single phase 220V)

Distance Between Controller And Pump

The farthest installation distance between controller and motor is 80m. The further installation distance may lead to control failure. In addition, the cable between the motor and the controller will cause power loss. For long distance installation, please thicken the cable specifications as required.

Installation Of The Float

The Low Level Float

◆ The low-level float fitted into the **WWL** terminal to prevent dry running.

◆ When the water level rises the pump will restart after a 10-minute delay,The display shows the countdown of delay time.

The High Level Float

◆ The High-Level float fitted into the **TWL** terminal to prevent the tank is full.

◆ To prevent the pump from starting and stopping frequently, adjust the float to a suitable swing range.

◆ When the float “closed”, the pump will restart after a 10-minute delay,The display shows the countdown of delay time.

SPD(Surge Protection Device)

The Surge Protection Devices protect the system from lightning. Where lightning damage is likely to occur, SPD must be effectively installed and the system must be effectively grounded.

Please select suitable SPD,AC and DC mode, and the voltage specification should not be lower than the maximum voltage of the system.

Extension Cable Specifications

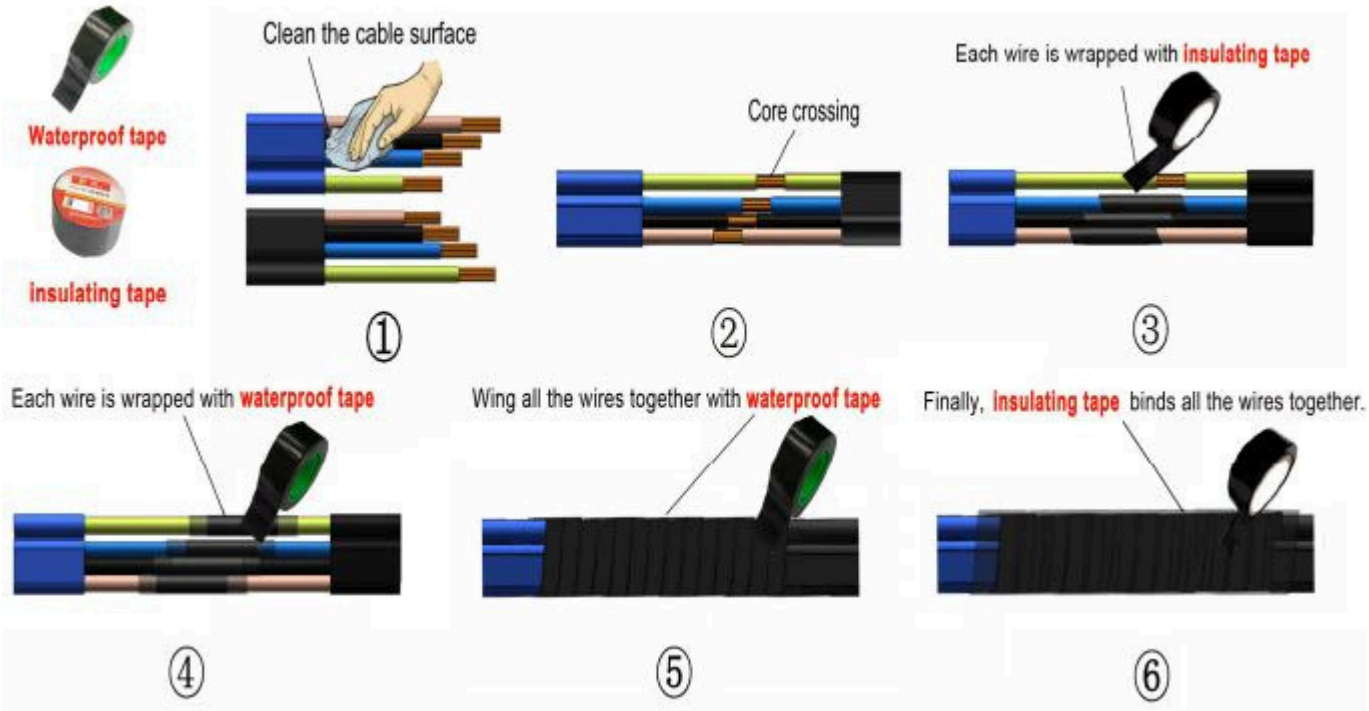
Locate the solar array and the controller as close to your water source as possible. it is important that energy losses are minimised to ensure performance expectations are met.

The distance between the pump and the controller shall not exceed 80m, and the cable shall not be less than 2.5mm2

Extension cable Jointing

The effective contact and waterproof of the joint of the cable extension line are the necessary conditions for the pump system to work for a long time. The wrong method may lead to electric leakage, and cause the pump system can not work or corrosion, and even cause personal injury.

The factory provides an effective wiring method and material, please follow the steps in the picture.



Solar Array Installation

Warning

• The power supply from a DC power source such as solar panels can cause **SERIOUS HARM** or **DEATH** from electrocution
• Use appropriate safety procedures when working on any system component
• Only suitable qualified personnel should carryout electrical connection /disconnection
• Off-grid electrical equipment is subject to applicable regional and national electrical standards
• Always treat solar panels as **LIVE** and handle with care
• Use correctly rated electrical cable and connectors

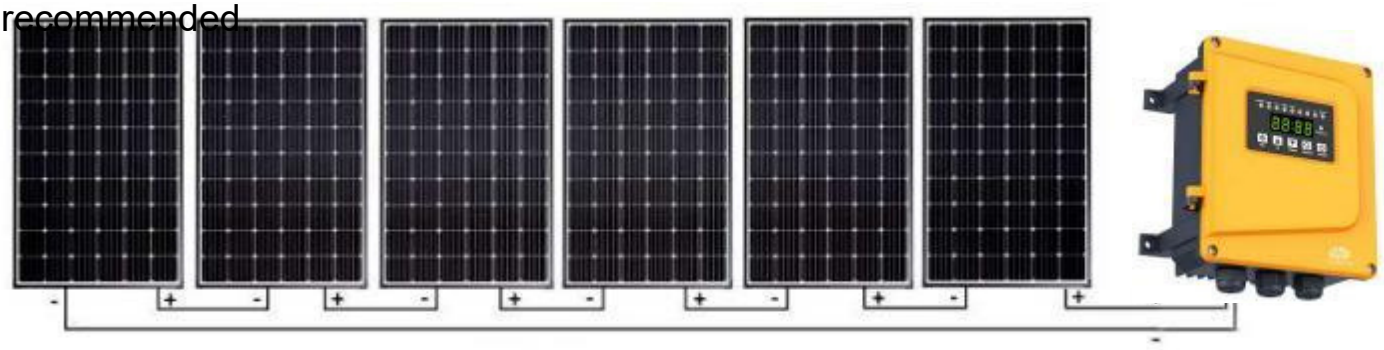
Solar Panel Glossary of Electrical Terms

Table 4

Term	Definition
V OC(V)	Volts open circuit,nothing connected
V mp(V)	Volts maximum power point,under load
I sc(A)	Amps short circuit
Imp or Impp(A)	Amps maximum power point

Solar Panel Connection(Recommended in series for the Pumps)

In order to make the system more safe and effective, the maximum DC input current of this series of pumps is limited to 10A. Therefore, Solar panel parallel system can not play the maximum efficiency. In General, solar panels in series are recommended.



In series solar panel system, VOC,Vmp and Power are calculated as follows:

- VOC of System = VOC of each solar panel × Number of solar panels;
- Vmp of System = Vmp of each solar panel× Number of solar panels ;
- Power of System = Power of each solar panel ×Number of solar panels
- Current of System = Current of each solar panel

Motor and Controller Input Energy Limitations:

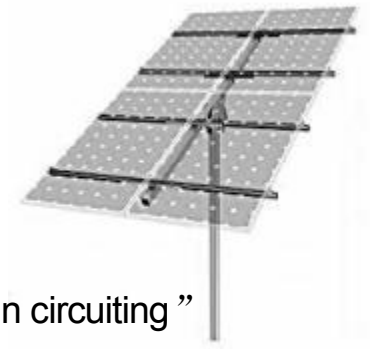
Table 5

Motor& Controller	AC		SOLAR / DC			Solar panels (440W)	
	Voltage	Max. Current	Vmp	Max. VOC	Max. Current	Accept	best
0.8HP	150-240	10A	60-380	450	10A	(2-10) Pcs	(2-3) Pcs
1.34HP	150-240	10A	60-380	450	10A	(2-10) Pcs	(3-4) Pcs
1.61HP	150-240	10A	60-380	450	10A	(2-10) Pcs	(3-5) Pcs
2.41HP	150-240	12A	60-380	450	10A	(2-10) Pcs	(4-6) Pcs
3HP	150-240	12A	60-380	450	10A	(2-10) Pcs	(5-7) Pcs
4HP	150-240	12A	60-380	450	10A	(2-10) Pcs	(7-10) Pcs

*The pump system must not exceed the allowable **VOC** voltage , otherwise, it will cause pump damage and even personal damage.Damage caused by incorrect voltage is not Warranty.*

Solar Array Installation Considerations:

- The installation direction of solar panels must be determined according to the installation position. Generally, in the southern hemisphere, the solar panels should face north. In the northern hemisphere, it should face south.
- The solar panel angle should correspond to the latitude of the site. Consult the instructions supplied with the solar array to assist your decision regarding the best angle for your situation.



- Any shading whatsoever will reduce the solar panel(s) performance so locate the
- panels with this in mind. Panel shadowing is like “open circuiting” a panel.
- Dust or bird droppings will impair the array energy output. Keep panels clean.
- Ensure the array is earthed to ground in the event of lightning strike.

7. Operation

Automatic Mode

- System prioritizes **solar power**
- Switches to **AC backup** when solar is insufficient

Startup

1. Turn on controller
2. Pump will start automatically when power is available
3. Monitor initial operation for 5–10 minutes

Normal Operation

- Pump runs during sunlight hours (solar mode)
- AC backup ensures continuous operation if connected

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8. Maintenance

Routine Checks (Monthly)

- Inspect wiring and connections
- Clean solar panels (dust reduces efficiency)
- Check water output performance

Pump Maintenance

- Minimal maintenance required
- Remove and inspect annually if used in dirty water

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9. Troubleshooting

Issue	Possible Cause	Solution
Pump not starting	No power input	Check solar/AC connections
Low water output	Low sunlight or blockage	Clean panels / inspect pipes
Pump stops suddenly	Dry-run protection activated	Check water level
Controller error	Wiring issue	Restart and verify connections
No AC backup	AC not connected	Check AC wiring and breaker

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10. Storage

- Store in a **dry, cool place**
- Disconnect all power sources
- Clean pump before storage
- Avoid freezing conditions

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11. Warranty

- Pump: **5-year warranty**
- Solar Panels: **30-year linear output warranty**

Warranty does not cover:

- Improper installation
- Electrical damage
- Physical damage or misuse

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12. Support

For technical support or replacement parts:

- Website: **rocksolar.ca**
- Email: **support@rocksolar.ca** (example placeholder)
- Keep your purchase receipt for warranty claims

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13. Quick Start Checklist

- ✅ Install pump in water
- ✅ Connect solar panels
- ✅ Connect controller
- ✅ (Optional) Connect AC backup
- ✅ Turn on system
- ✅ Verify water flow