

# USER MANUAL

## Surface Solar Pump (Helical Rotor Type)



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**ROTO ENERGY SYSTEMS LIMITED**

Plot No 31, Sector - Ecotech XII, Greater Noida - West, Gautam Buddha Nagar, Uttar Pradesh,  
India - 201308

Tel: +91 (0) 120 2567946

E-mail: [info@rotoenergy.com](mailto:info@rotoenergy.com)

Fax: +91 (0) 120 2567911

Website: [www.rotoenergy.com](http://www.rotoenergy.com)

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Scope:  
- all models of Surface Helical Pumps for capacity ranges of 0.5 HP to 1 HP

*Refer the support section for any clarifications regarding this document*

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# CONTENTS

This manual consists of installation, commissioning and troubleshooting process for **Roto Energy Systems Limited** solar product offering namely – Solar Surface Helical Pumps.

The manual is intended for the use by technicians, contractors and other stakeholders that are involved in deployment and operation of Roto Energy Systems Limited products on field.

The following is covered in this document:

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# 1. General information

## i. Introduction

We wish to express our sincere thanks to you for choosing our product Solar Surface Helical Pump, manufactured and supplied by ROTO ENERGY SYSTEMS LIMITED.

It is scientifically designed and built to give you long and dependable service. Carefully selection of material and manufacturing assures you a satisfactory performance as per the pump rating. The pump will give you years of trouble-free performance if it is handled with due care.

Roto Energy Systems Limited make energy efficient and environmentally friendly solar Surface Helical pumps satisfies the requirement for handling clear cold and fresh water. It is designed for best in class efficiency which helps in solving the water problem for irrigation, houses, as well as for livestock or other water requirements.

'ROTO ENERGY SYSTEMS LIMITED' Solar Submersible Pumps are easy to install, however detailed installation and operation manual is on following pages, for easy understanding and comprehensive first-hand information on these pumps.



Follow safety instructions carefully. Improper use and operation may cause lethal electrical shocks and/or damage to equipment.



Our products are meant for pumping water and they do not have any significant effect on environment during their use, if properly selected and used as per instructions given in the manual. Customers are advised to dispose

Of unusable components through appropriate disposal agencies to avoid the harmful impact (if any) on environment.

## ii. Instructions

Purchasers are cautioned to go through carefully the detailed instructions given for proper installation, use and servicing of the product and genuine spare parts as detailed in company's published literature, manuals, pamphlets or other official publications. Any deviation, if made by the customers, will void the warranty obligations and/or manufacturer's liability, if any, for any compensation consequential or otherwise. Use of trained mechanics will get you better results.

'ROTO ENERGY SYSTEMS LIMITED' Solar Surface Helical Pump sets are assured to give delivery output as per the specifications. However, if the specifications and instructions are not followed correctly, the life of pump may reduce and also the performance of pump may get hampered and to avoid this, pumps should be installed in fully developed and cleared bores.

The pumps are for clear and cold fresh water for drinking purpose.

During installation and while starting the system, hand gloves should be worn for safety purposes.

### i. Warning

Always take help of a qualified mechanic/electrician while commissioning and starting the system for the first time.

Ensure that the pump is properly connected with the motor.

Ensure all electric joints as well as connections are water proof and covered.

Install pump set properly as per the rated head range.

Before going for any service of the system, disconnect the power supply.

Ensure that pump set is never run in dry condition (using dry run protection provision in controller)

## 2. Technical specifications

### I. Specifications (Solar Surface Helical Pumps):

0.5 HP to 1 HP

Discharge Capacity Range: 13 LPM to 45 LPM ( $0.8 \text{ m}^3/\text{h} - 2.5 \text{ m}^3/\text{h}$ )

Head Range: Up to 40 m

### II. Application:

Agriculture/Sprinklers/Drip Irrigation/Rural & Urban water supply schemes/ High-rise building/Livestock/Fountains/Fishery Ponds Water Circulation etc.

Engineering Comparison of Water Sources					
Parameter	Pond	Water Tank	Reservoir	Lake	River
Water Level Stability	Low (seasonal fluctuation)	High (controlled)	Medium–High	Medium	Low (varies continuously)
Static Head Calculation	Variable	Fixed	Semi-variable	Variable	Highly variable
Suction Conditions	Easy (shallow depth)	Easy	Moderate	Moderate	Difficult (flow + variation)
NPSH Availability	Good	Excellent	Good	Good	Unstable
Flow Availability	Limited	Limited	High	Moderate	Continuous
Pump Type Suitable	Surface / Submersible	Booster / Centrifugal	Submersible / Vertical Turbine	Submersible	Centrifugal / Vertical Turbine
Filtration Need	High	Low	Medium	Medium	Very High
Reliability for Irrigation	Low–Medium	Medium	High	Medium	High (if managed)

### III. Features:

- Light weight and compact.
- Highly efficient pumps, capable of pumping water at higher heads with lower power consumption.
- Can pump water up to 75 meters per stage.
- Unique design of coupling leading to reduction in axial thrust on motor shaft
- Better surface finish hence better efficiency and consistent performance.
- Aesthetically appealing.
- Long life of the pumps
- Easy assembling, dismantling and repairing due to lesser number of pump parts and its design.
- Can be installed with HDPE/UPVC/GI pipes.
- Inhouse Stator Rubber design, manufacturing and testing with legacy of 55 Years of Roto Pumps.
- Best Quality Pump Rotors & Stators with in house standard room for calibration, coordinate measuring



NOTE — If the characteristic of water differs from these specifications (mentioned above), the pump constructional details shall be agreed between the manufacturer and the user. In such cases, the characteristics shall be specified in the order.



To guard against installing a pump in aggressive or abrasive water, it is suggested that an analysis of the river/pond water or any other source of water where the pump has to be installed should be submitted

machines, chemical lab, Rheometer for fluid viscosity analysis, PMI machine and ultrasonic machine for raw material testing.

- Solar Pump Sets occupies very less space.
- Efficient operation resulting in financial benefits.

### IV. Quality of water which can be pumped:

As standard production, the pumps are designed to pump clear cold water. Clear, cold water shall mean water having the characteristics specified below:

- Turbidity : 50 ppm (silica scale), Max
- Chlorides : 500 ppm, Max
- Total solids : 3 000 ppm, Max
- PH value : 6.5 to 8.5
- Temperature : 33°C, Max (\*<25°C Water temp. will impact the pumping performance)
- Specific gravity: 1.004, Max
- Hardness : 300, Max

to an authorised testing authority prior to installation of the pump. Damage to the pump caused by abrasive or aggressive water is not covered by the guarantee. The water analysis parameters specifications listed above are intended as a guide only (This guide is NOT an indication of safe drinking water. A water analysis for this purpose should be undertaken separately by the customer) as various combinations of these items and others may act as a corrosive fluid,

### 3. Installation

- Ensure that proper selection of the pump set is done based on site conditions.
- Note the name plate details and ensure that suitable pump is being connected with corresponding motor and accessories.

#### i. Unpacking:

- Unpack the pump from the box carefully so that the pump is not damaged. Remove the Pump from box by opening it.



- Check and note the serial number of the pump.
- Check pump for visible signs of damage. Check pump bodies for cracks or other physical defects if any. If there are any physical

damage to the unit, do not use it. Damages may have resulted in internal problems. In case of damage first make suitable repairs, from the qualified & authorized person only, before using the pump.

#### ii. Priming

- Prime the pump as given instructions below



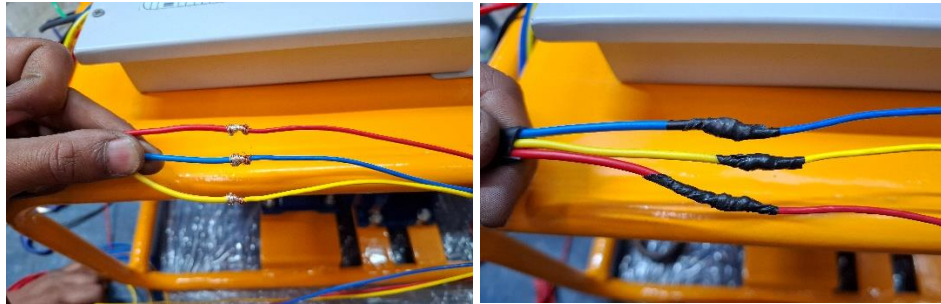
iii. Suction Delivery pipe connection and pump set installation:

- Delivery pipe and fittings must be suited to the maximum pressures available from the pump.
- Connect suction and delivery pipe as given instructions below

We recommend to always use ISI / BIS Certified accessories to avoid malfunctions due to incorrect installation.

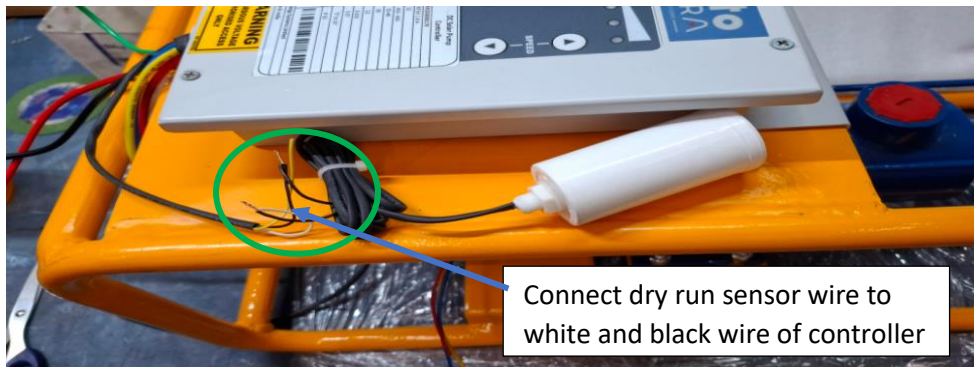
iv. Motor cable connection with controller: -

- Please connect R (Red), Y (Yellow), B (Blue) wire coming from controller to motor wire as per below picture



v. Controller Connections:

- For dry run protection - white and black wire from the controller to be connected with suitable sensor.



- The sensor to be placed at the edge of suction pipe and install put suction pipe edge in to the water source as per the picture below



- For delivery to overhead tank - use yellow and black wire to connect with float sensor
- Connect MC4 connector of SPV Module to MC4 Connector of the Controller



## 4. Operation

For an end user, operating the system is quite straightforward.

Following are the key points:

- Please check the PV module configuration before connecting input DC supply to the controller, it should be as per controller specification.
- Once DC supply connected to the controller then switch on the controller and start the pump
- If system fails to run, report the issue on the telephone number provided. Serial number and model of the pump along with the Invoice serial number should be kept handy while reporting the issue.
- If there is a fault on the LCD display/LED then please follow steps given in the controller manual.
- Alternatively, end user may report the issue to their respective system integrators/dealer who in turn can report the issue to Roto Energy System Limited.

### i. Precautions

Apart from the precautions mentioned in the rest of the sections, the following should be followed for correct and hassle-free operation:

- Handle the pump with care. Follow instructions on packaging carefully for correct handling.
- If the system is not run for a long duration of time, proper overhauling should be done before starting the system again. The rotating parts must be checked before use.
- If the pump is not to be installed and operated soon after arrival, store it in a closed, clean, dry and well-ventilated room. Protect the pump from moisture, heat, dust, dirt and foreign bodies. The pump should not be exposed to direct sunlight. After a long period of storage, the pump should be inspected and pump stator should be properly lubricated (a small amount of edible oil can pour in NRV) before put into operation.
- Ensure that pump never runs in dry condition as it will result in pump damage (Suitable dry run sensor to be connected with the controller so as to ensure dry run protection).

## 5. Fault identification and troubleshooting

<b>Problem</b>	<b>Root Causes</b>	<b>Solutions / Actions / Cures</b>
<b>No water delivered</b>	Priming or air in the suction pipe	Please check the suction pipe and ensure that a properly installed foot valve is in place There should not be any blockage in the suction pipe The pump should prime properly
	Motor rotating in reverse direction	The direction of rotation of the motor should clock wise from the drive end If the motor rotates in the wrong direction, interchange any two-phase wires to reverse the direction of rotation
	Delivery valve	Check delivery valve; it must be in the open condition before start the pump
	Broken pump coupling or shaft	Please check the motor input current. If it is equal to the no-load current, kindly contact the toll-free number for further assistance
	Pump Jammed	Dismantle the pump housing and apply an appropriate lubricant, such as edible oil, to the pump rotor to ensure smooth operation.
<b>Discharge is lower than the rated discharge</b>	Input power to motor	Check the weather. If it is cloudy outside, please wait until it clears. Once the sun intensity increases, more power will be received and the discharge will increase. Check for any shadow on the PV module. If shading is present, reposition the module to ensure direct sunlight exposure Check for dirt on the PV module. If it is dirty, clean it before operation
	Water temp.	Please check the water temperature. If it is below 25°C, the discharge may reduce by up to 40% of the rated value, depending on the water temperature. This is due to the characteristics of the rubber stator
	Blockage in the suction pipe	Check the suction pipe for any blockage. If any unwanted object is found, please remove it

## 6. Support

**For sales related enquiry:**

Visit [www.rotoenergy.com](http://www.rotoenergy.com)

**For service support:**

Call Number: +91 (0) 120 2567946

**If you are business customer:**

To monitor and manage your systems, go to [solarpump-manager.com](http://solarpump-manager.com) and log in with the credentials provided to you.

**For other queries:**

Send an email to [info@rotoenergy.com](mailto:info@rotoenergy.com)

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