

**RHINO SOLAR VFD 1 HP & 2 HP SINGLE PHASE MOTOR  
DESIGNED & MANUFACTURED IN INDIA  
60V to 450V DC & 10Amp**



**RMCS-2318**

**Operaing Manual v1.0**

# Rhino Motion Controls

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## Introduction

This solar pump controller continuously monitors system performance and detects a variety of abnormal conditions. In many cases, the controller will compensate as needed to maintain continuous system operation. However, if there is a high risk of equipment damage, the controller will protect the system and display the fault condition. The solar pump controller is a variable-speed motor drive designed to operate various Single phase pump sets, specifically engineered for 1 HP To 2HP Pumps. The RHINO SOLAR PUMP VFD is designed to deliver water in remote locations where access to reliable AC power may be uncertain or non-existent. It is suitable for all locations and operates seamlessly on both

## DC Power:

This series of AC single phase motor drives has abundant features, including a multi-function I/O terminal, V/f control, and auto-torque, auto-slip compensation, and a built-in digital keypad that can be connected to the VFD with an extended wire. During sunny days, the solar pumping system can consistently and efficiently move water. In instances where there are no batteries or other energy storage devices, it is advisable to pump water to a reservoir for future use. Water sources can range from natural bodies like rivers, lakes, and wells to specialized waterways. To manage the pump's operation effectively, an oat switch can be installed in the water tower.. This single phase solar pump drive continuously monitors system performance and detects a variety of abnormal conditions. In many cases, the controller will compensate as needed to maintain continuous system operation. However, if there is a high risk of equipment damage, the controller will protect the system and display the fault condition. The solar pump controller is a variable-speed motor drive designed to operate various AC single phase Induction Pump Sets specifically engineered for 1 HP to 2HP Pumps.

## Features:

- It operates Single Phase Motors
- It can accept DC power ranging from 60 Vdc to 450 Vdc,
- Input Range VDC : 320 to 450 Volts DC
- Continuous and highly efficient MPPT Power Tracking at 99%.
- Ideal for 1HP to 2 HP AC single Induction Motors
- Rated to handle up to 1.5 kW input DC power
- Operating awfully within an ambient temperature range of 0 to 90 degrees Celsius.
- This system prioritizes safety with built-in features such as reverse polarity protection, over-temperature safeguards, under-voltage protection, and overload protection.

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## Wiring Diagram and Pinout of the Drive:

Terminal Name	Description
P+	Positive DC Input from Panel (MC4 Connector)
P-	Negative DC Input from Panel (MC4 Connector)
Motor Wire	Motor Input Red Wire
Motor Wire	Motor Input Black Wire

As per the fig1. The VFD controller has the following connections. The P+ and P- are the power input which needs to be connected with either the battery or the solar power output.

A switch is given in the below to turn on or off the controller.

**This VFD Operates Single Phase Motor And If You Have Two Wires Of Motor Then You Can Connect As Per Below Wiring Diagram.**

### Single Phase Motor Two Wiring Connections

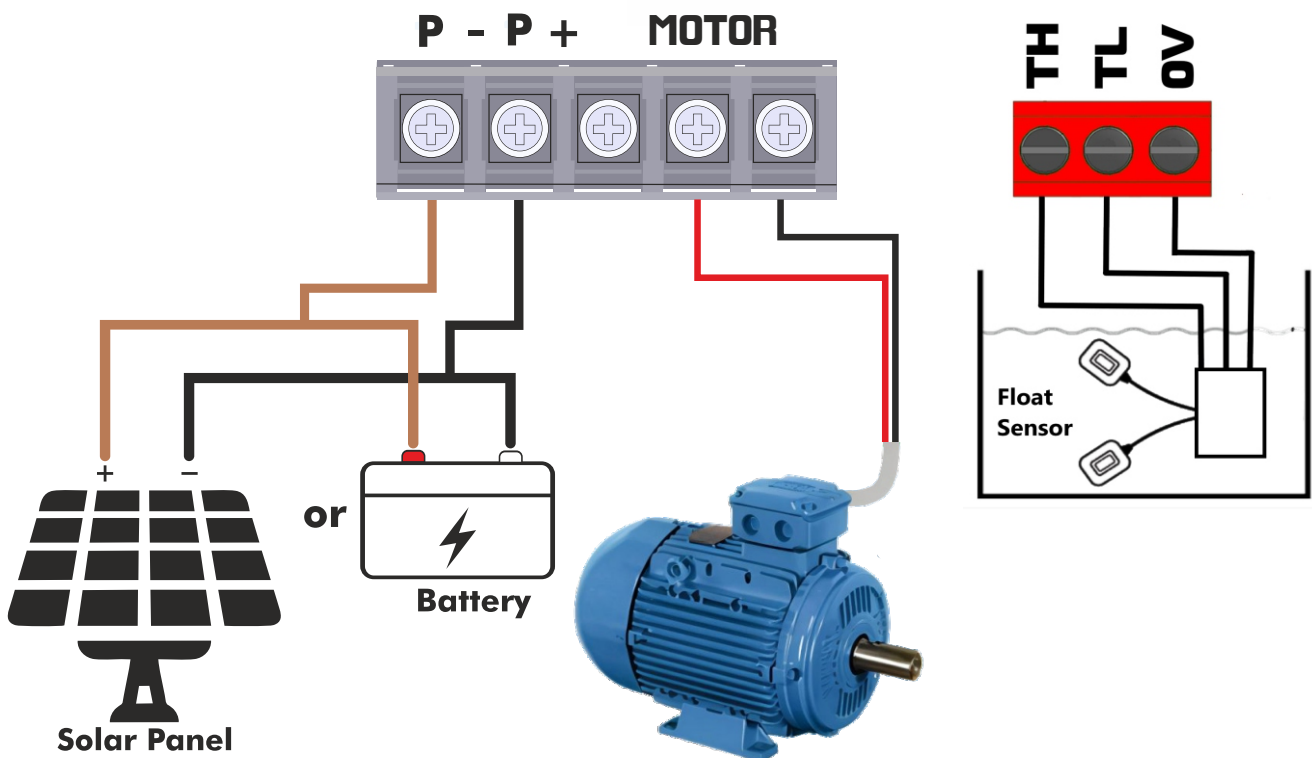


Fig 1

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This VFD Operates Single Phase Submersible Motor And If You Have Three Wires Of Motor Then You Can Connect As Per Below Wiring Diagram.

## Submersible Pump Wiring Connections

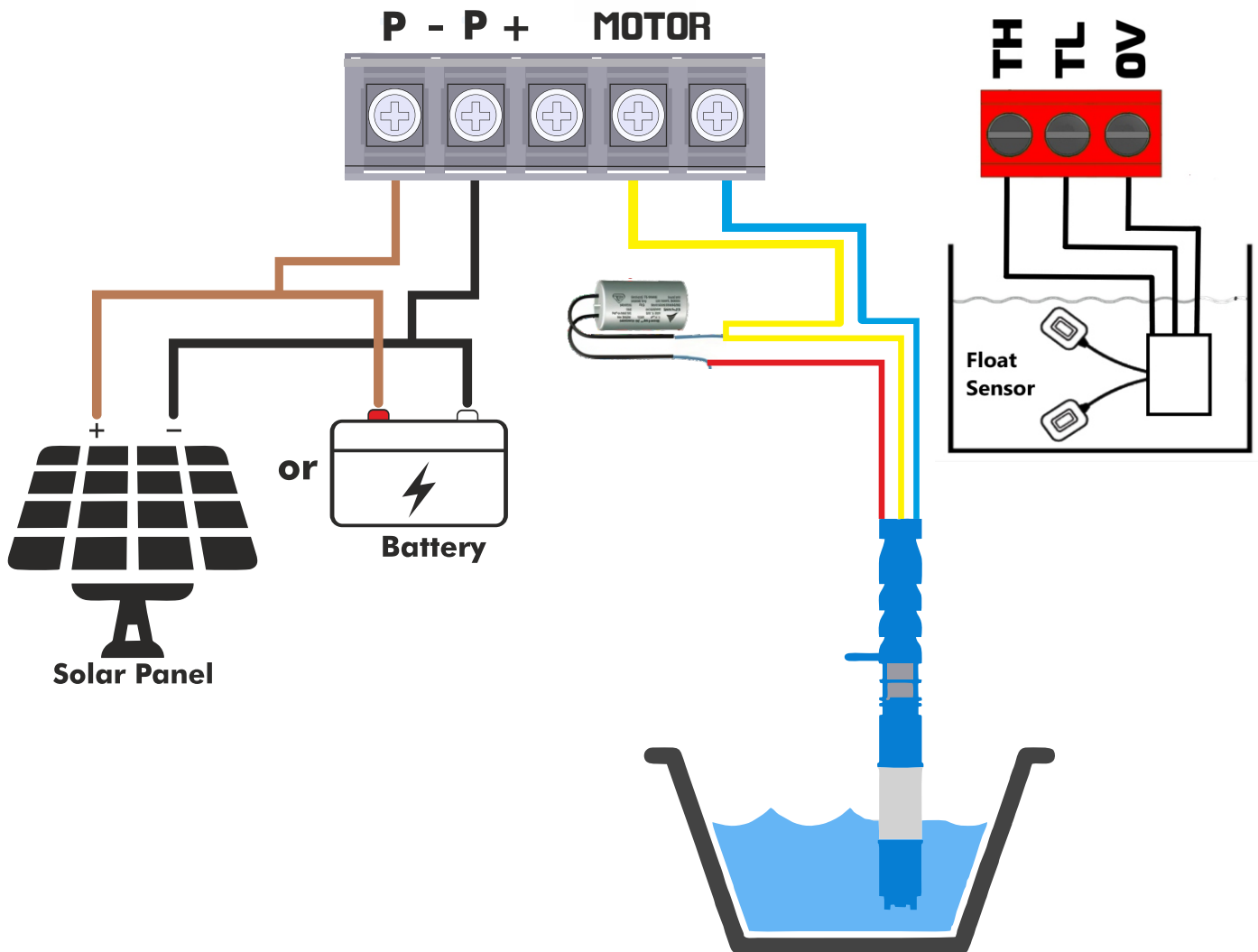


Fig 2

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## Motor and Power connection:

Buttons	Description
Set	Saves the parameter to the memory
Enter	Moves to the next parameter
Up	Increases the parameter value
DOWN	Decreases the parameter value
Switch	Changes the LED segment display parameters as per the above
On/Off	To turn on and off the inverter

As per the **fig 1**. The VFD controller have following connections. The P+ and P- are the power input which needs to be connected with either the battery or the solar power output.

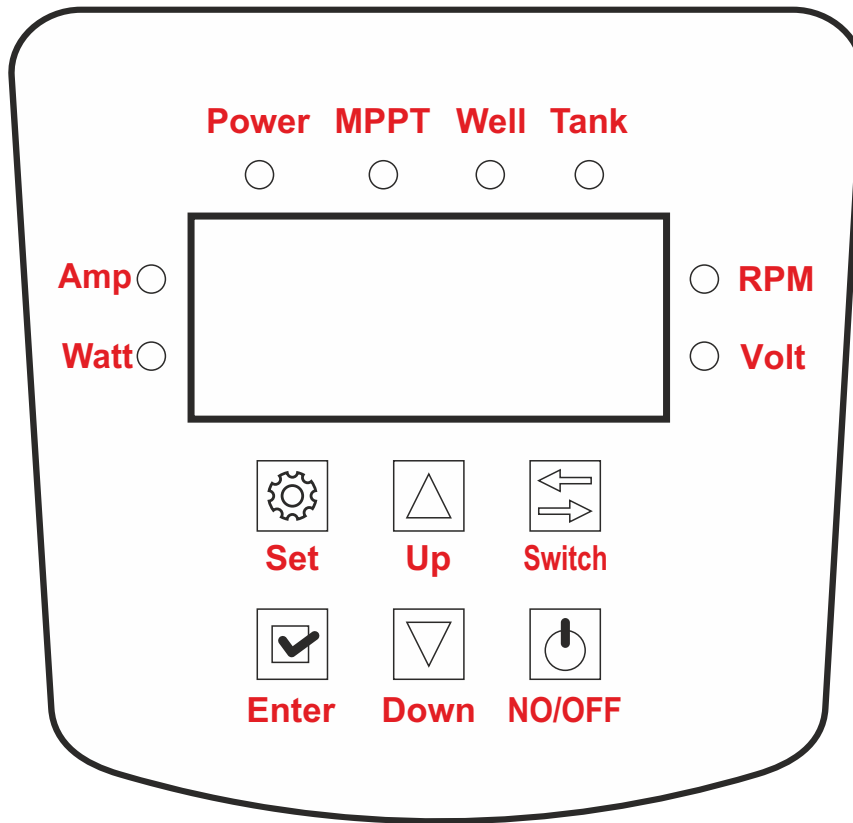
The other connection are for the float switch if you are using one. The TH and TL are for the input of water level high and low signal.

If you don't want to use the float switch then you can manually turn on and off the VFD controller from the switches. For that you will require to short the TL and OV terminals of the VFD.

Name	Description	Unit
Input Dc Voltage	Shows Input Voltage	Volt (V)
Motor phase current	Show Input Current Of The Motor	Ampere (A)
Motor Running Power	Show The Power Required By The Motor	Watt (W)
Drive Temperature	Show Drive's Temperature	Celsius (C)

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Motor and Power connection:



Button	Description
Set	Saves the parameter to the memory
Enter	Moves to the next parameter
Up	Increases the parameter value
Down	Decreases the parameter value
Switch	Changes the LED segment display parameters as per the above
On/Off	To turn on and off the inverter

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## Drive Parameters :

Parameter	Name	Description	Default value
P1	MPPT tracking start offset	MPPT tracking start level	4
P2	No load frequency	Frequency at no load error	40
P3	Switchover Frequency level	Frequency at which open loop switched to closed loop	10
P4	Startup torque command	The torque setting for open-loop star up	240
P5	Motor peak current limit	sets the peak current the motor coil	250
P6	Motor Type	Sets the inductance of the motor coil	1
P7	PI loop overall gain	Peak gain setting for the PI loop	515
P8	Hold time for FOC synchronization	Sets the hold time during syncing of the motor from open loop to closed loop	40
P9	Torque limit setting	Maximum torque command given to FOC loop	480
P10	V/F motor rated voltage	Voltage at the rated frequency	220
P11	V/F motor rated frequency	The rated frequency of the motor	50
P12	Select closed loop operation type	FOC-0, V/F-1	1

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## Service and Support

Service and support for this product are available from the Rhino Motion Controls website (<http://www.rhinomc.com>). ([www.robokits.co.in](http://www.robokits.co.in)) **and our customer service email: [info@rhinomc.com](mailto:info@rhinomc.com), [support@robokits.co.in](mailto:support@robokits.co.in) One-Year Warranty against manufacturing defects.**

Rhino Motion Controls (rhinomc.com) warrants its products against defects in materials and workmanship for a period of 1 Year from shipment delivery. During the warranty period, Rhino Motion Controls will either, at its option, repair or replace products which proved to be defective.

## Exclusions

The above warranty does not extend to any product damaged by reasons of improper or inadequate handling by the customer. improper or inadequate customer wirings, unauthorized modification or misuse, or operation beyond the electrical specifications of the product and/or operation beyond environmental specifications for the product.

## Obtaining Warranty Service

To obtain warranty service, please contact our customer service department at [info@rhinomc.com](mailto:info@rhinomc.com) or [support@robokits.co.in](mailto:support@robokits.co.in). before returning the product for service. Please make sure that you have gone through this entire installation manual and datasheet. Before deciding that your product is liable for replacement or repair under this 1-year warranty, the customer shall prepay shipping charges for products returned to Rhino Motion Controls for warranty service, and Rhino Motion Controls shall pay for the return of products to customers.

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