

Thank you for selecting the ViewStar AU series solar charge controller. Please read this manual carefully before using the product, paying close attention to the safety information provided.

# ViewStar AU series solar charge controller

## 1. Overview

The ViewStar AU series controller combines innovative PWM technology with an extensive range of electronic safety features to charge and protect your batteries.

## 2. Safety Information

- Read the full instruction manual before you begin the installation.
- There are no parts serviceable by users. Do not disassemble or attempt to repair the controller.
- Mount the controller indoors only. Prevent exposure to the elements and do not allow any contact with water.
- Install the controller in a well-ventilated place to ensure adequate heat dissipation from the controller's heat sink.
- Install appropriate external fuses/breakers as recommended.
- Remove all connections between the controller and the battery / PV array or disconnect the appropriate fuses/breakers before the controller is installed.
- Power connections must remain tight to avoid excessive heating from a loose connection.

## 3. Product Features

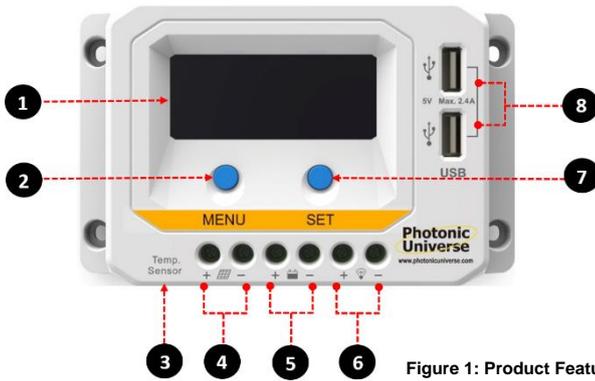


Figure 1: Product Features

①	LCD display	⑤	Battery Terminals
②	MENU Button	⑥	Load Terminals
③	RTS Port*	⑦	SET Button
④	Solar Terminals	⑧	USB Output Ports**

\* Port for an optional remote temperature sensor to measure battery temperature (product code: TEMP\_VS)

\*\* USB output ports are rated at 5VDC/2.4A and feature short circuit protection.

**!** If no remote temperature sensor is connected, the battery temperature will be set to a fixed value of 25°C.

## 4. Wiring

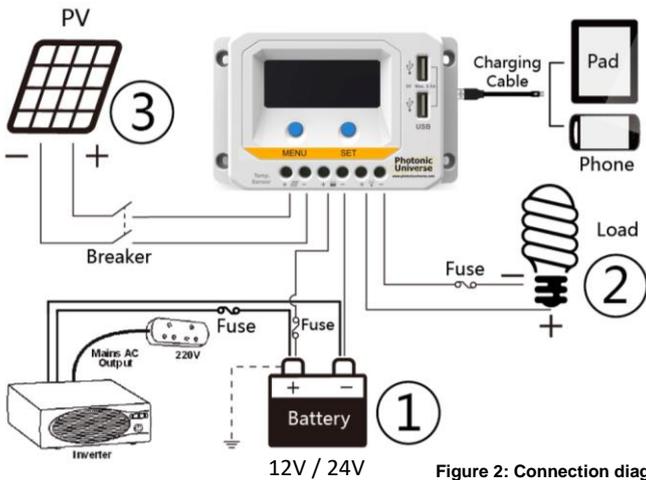


Figure 2: Connection diagram

- 1) Connect components to the charge controller in the sequence as shown above. Pay close attention to the "+" and "-" polarity. Please do not insert the fuse or turn on the breaker during the installation. When disconnecting the system, follow the reverse order.
- 2) After switching on the controller by connecting the battery (step 1 on the diagram), the LCD display should turn on. If not, please refer to section 7. Always connect the battery first, in order to allow the controller to recognize the system voltage.
- 3) The load terminals do not have to be connected if the controller is used for battery charging only. The load terminals are designed for small loads in applications which would benefit from low battery cut off protection.
- 4) The load terminals cannot be used for charging a second battery.
- 5) The battery fuse should be installed as close to battery as possible. The suggested distance is within 150mm.

**!** This is a positive common ground controller. In a standalone off-grid system where grounding is required, any positive connection of solar, load or battery can be earth grounded. However, in a negatively grounded system (such as a vehicle or boat), **DO NOT ground any positive cables to the earth.**

**!** Any inverter or other powerful load must be connected directly to the battery. Do not connect it to the load terminals of the controller.

**!** The controller requires at least 150mm of clearance above and below for proper air flow. Do not mount on combustible surfaces. Ventilation is highly recommended if mounted in an enclosure.

**!** Risk of explosion! Never install the controller in a sealed enclosure with flooded batteries! Do not install in a confined area where battery gases can accumulate.

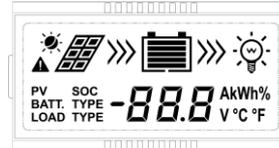
**!** Risk of electric shock! Exercise caution when handling solar wiring. The solar PV arrays with multiple solar panels can produce high voltages when in sunlight, which could be dangerous.

## 5. Operation

### 5.1 Button Functions

Button	Function
MENU button	Browse interface / Set parameters
SET button	Load ON/OFF / Clear error / Enter into Set Mode / Save data

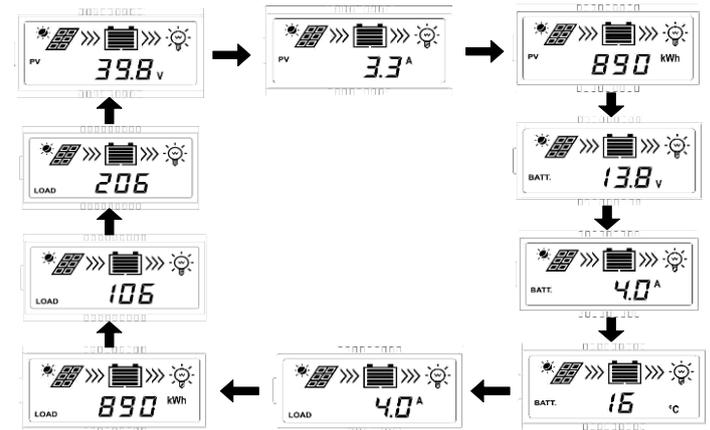
### 5.2 LCD Display



#### > Status Description

Item	Icon	Status
PV array		Day
		Night
		No charging
		Charging
Battery	<b>PV</b>	PV Voltage, Current, Power
		Battery capacity, charging in progress
	<b>BATT.</b>	Battery voltage/ current/ temperature
Load	<b>BATT. TYPE</b>	Battery type
		Load ON
		Load OFF
	<b>LOAD</b>	Load Voltage/ current/ mode

#### > Browse Interface



#### NOTE:

- 1) When the controller is idle, the LCD display will automatically cycle through all screens, with the exception of the following two (Load timer 1 / Load timer 2):



- 2) Resetting energy counters: under the PV power interface, press the SET button and hold for 5s until the value flashes. Press the SET button again to clear the value.
- 3) Temperature setting: In the battery temperature interface, press the SET button and hold for 5s to switch settings.

### 5.3 Load mode setting

Under the load mode setting interface, press the SET button and hold for 5s until the number flashes, then press MENU button to set the parameter and press SET to confirm.

1**	Timer 1	2**	Timer 2
100	Light ON/OFF	2 n	Disabled
101	Load will be on for 1 hour after sunset	201	Load will be on for 1 hour before sunrise
102	Load will be on for 2 hours after sunset	202	Load will be on for 2 hours before sunrise
103~113	Load will be on for 3~13 hours since sunset	203~213	Load will be on for 3~13 hours before sunrise
114	Load will be on for 14 hours after sunset	214	Load will be on for 14 hours before sunrise
115	Load will be on for 15 hours after sunset	215	Load will be on for 15 hours before sunrise
116	Test mode	2 n	Disabled
117	Manual mode (Default load ON)	2 n	Disabled

**NOTE:** When the Timer 1 is set to Light ON/OFF, Test mode or Manual mode, the Timer 2 will be disabled and will show "2 n".

#### 5.4 Battery Type

##### > Operating Steps

Under the Battery Voltage interface, press the SET button and hold for 5s to proceed to the Battery Type setting interface. After choosing the battery type by pressing the MENU button, wait for 5s or press the SET button again to modify the battery type.

##### > Battery Type



**NOTE:** Please refer to the battery voltage parameters for each battery type.

### 6. Protection features

Function	Details
<b>PV Reverse Polarity</b>	The controller is protected against reverse PV polarity. No damage to the controller will happen as a result. If you accidentally connect the PV incorrectly, correct the wiring mistake to resume normal operation.
<b>Battery Reverse Polarity</b>	The controller has full protection against the reverse polarity of the battery connection, no damage to the controller will happen as a result. In case of accidental incorrect connection, correct the mistake to resume normal operation.
<b>Battery Over Voltage</b>	When the battery voltage reaches the voltage set point of Over Voltage Disconnect, the controller will stop charging the battery to protect the battery from overcharging.
<b>Battery Over Discharge</b>	When the battery voltage reaches the voltage set point of Low Voltage Disconnect, the controller will stop discharging the battery (cut off the load if any load is connected to the load terminals) to protect the battery from deep discharging.
<b>Battery Overheating</b>	The controller detects the battery temperature through an external temperature sensor (optional). If the battery temperature exceeds 65°C, this will automatically trigger the overheating protection. The controller will stop working and resume only below 55°C.
<b>Controller Overheating</b>	If the temperature of the controller heat sinks exceeds 85°C, the overheating protection will be triggered automatically. The controller will resume normal operations when the heat sink temperature falls below 75°C.
<b>Load Short Circuit</b>	The controller is fully protected against load wiring short-circuits. Once the load shorts (more than 2.5 rated current), the load short protection will be triggered automatically and the load terminals will switch off. The controller will then attempt to switch them on again: <ul style="list-style-type: none"> <li>Short circuit once, the load output will be OFF for 5s;</li> <li>Two short circuits, the load output will be OFF for 10s;</li> <li>Three short circuits, the load output will be OFF for 15s;</li> <li>Four short circuits, the load output will be OFF for 20s;</li> <li>Five short circuits, the load output will be OFF for 25s;</li> </ul> After five automatic load reconnection attempts, if the problem still remains, the load output will be switched OFF permanently. The fault must be cleared by restarting the controller, or waiting for one night-day cycle (night time > 3 hours).
<b>Load Overload</b>	If the load current exceeds the maximum load current rating of the controller, the controller will disconnect the load. This protection will be triggered in the following scenarios: <p>Load current <math>\geq 2.5</math> times rated current</p> <ul style="list-style-type: none"> <li>Load current 1.02-1.05 times rated current for 50s;</li> <li>Load current 1.05-1.25 times rated current for 30s;</li> <li>Load current 1.25-1.35 times rated current for 10s;</li> <li>Load current 1.35-1.5 times rated current for 2s.</li> </ul> Overloading must be cleared up through reducing the load and restarting the controller, or waiting for one night-day cycle (night time > 3 hours).

<b>Damaged RTS</b>	If the temperature sensor is short-circuited or damaged, the controller will be charging or discharging the battery at the default temperature 25°C as a safety precaution.
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### 7. Troubleshooting

Faults	Possible reasons	Troubleshooting
The LCD is off	Battery connection is broken or it is connected with the wrong polarity	Confirm that PV and battery wire connections are both correct and tight
Wire connection and battery polarity is correct, LCD is still off	Battery voltage is lower than 9V, or a fuse between the battery and controller is blown	Please check the voltage of the battery. At least 9V voltage is required to start the controller. Check the fuse and replace if required.
LCD display is on, but the controller shows night time during the day	Solar panel is disconnected or connected with a reversed polarity; low solar voltage	Disconnect the solar panel and check its voltage with a multimeter. Check the polarity and reconnect to solar terminals of the controller.
Interface blinking	Battery voltage higher than over voltage disconnect voltage (OVD)	Check if the battery voltage is too high, and disconnect the solar module
Interface blinking	Battery low voltage disconnect	Load output is off, the battery is being charged with all available power. Disconnect other loads from the battery (if there are any)
Interface blinking	Battery Overheating	The controller will stop charging the battery automatically. When the battery cools down, the charging will resume.
Interface blinking	Over load or Short circuit	Remove or reduce the load and then reconnect it. Restart the controller if there have been 5 unsuccessful connection attempts.

### 8. Technical Specifications

Item	VS1024AU	VS2024AU	VS3024AU
Nominal system voltage	12V / 24V DC Auto		
Battery input voltage range	9V~32V		
Rated charge/discharge current	10A@55 °C	20A@55 °C	30A@55 °C
Max. PV open circuit voltage	50V		
Battery type	Sealed (default) / Gel / Flooded		
Equalize Charging Voltage	Sealed:14.6V/ Gel: No/ Flooded:14.8V		
Boost Charging Voltage	Sealed:14.4V/ Gel:14.2V/ Flooded:14.6V		
Float Charging Voltage	Sealed/Gel/Flooded:13.8V		
Low Voltage Reconnect Voltage	Sealed/Gel/Flooded:12.6V		
Low Voltage Disconnect Voltage	Sealed/Gel/Flooded:11.1V		
Self-consumption	$\leq 9.2\text{mA}/12\text{V}$ ; $\leq 11.7\text{mA}/24\text{V}$		
Temperature compensation coefficient	$-3\text{mV}/^\circ\text{C}/2\text{V}$ (25 °C)		
Charge circuit voltage drop	$\leq 0.29\text{V}$		
Discharge circuit voltage drop	$\leq 0.16\text{V}$		
LCD temperature range	$-20^\circ\text{C} \sim +70^\circ\text{C}$		
Working environment temperature	$-25^\circ\text{C} \sim +55^\circ\text{C}$ (Product can work continuously at full load)		
Relative humidity	$\leq 95\%$ , N.C.		
Enclosure	IP30		
Grounding	Common Positive		
USB output	5VDC / 2.4A (combined)		
Overall dimension	142x85x41.5 mm	160x94.9x49.3 mm	181x100.9x59.8 mm
Mounting dimension	130x60mm	148x70mm	172x80mm
Mounting hole size	$\Phi 4.5\text{mm}$		
Terminals	4mm <sup>2</sup> / 12AWG	10mm <sup>2</sup> / 8AWG	16mm <sup>2</sup> / 6AWG
Net weight	0.22kg	0.35kg	0.55kg

Above values are based on a 12V system at 25 °C. Double these values for a 24V system.

### 9. Warranty

This product is covered by a 1 year warranty. The warranty is invalid under the following conditions:

- 1) Damage from improper use or use in an unsuitable environment.
- 2) Solar or load current, voltage or power exceeding the rated value of controller.
- 3) The controller working temperature exceeds the maximum temperature as per specifications.
- 4) User disassembly or attempted repair of the controller without permission.
- 5) The controller is damaged due to natural elements such as lightning.
- 6) The controller is damaged during transportation and shipment.
- 7) Contact with water, liquid, grease or other chemicals and substances.

**This user manual is subject to changes without prior notice.**