

# **ePOWER**

## **SOLAR CHARGE CONTROLLERS**



## **Owner's Manual**

**SMART AUTOMATIC 12/24 VOLT PWM SOLAR CONTROLLER**  
**4 STAGE CHARGING**  
**EN43020 - 20A**  
**EN43030 - 30A**



## **Please Keep This Manual For Future Reference**

For safe and optimum performance, the Enerdrive ePOWER Solar Charge Controller must be used properly. Carefully read and follow all instructions and guidelines in this manual and give special attention to the CAUTION and WARNING statements.

## **Disclaimer**

While every precaution has been taken to ensure the accuracy of the contents of this guide, Enerdrive assumes no responsibility for errors or omissions. Note as well that specifications and product functionality may change without notice.

## **Important**

Please be sure to read and save the entire manual before using your Enerdrive ePOWER Solar Charge Controller. Misuse may result in damage to the unit and/or cause harm or serious injury. Read manual in its entirety before using the unit and save manual for future reference.

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Reminds you that if this manual is in any language other than English although steps have been taken to maintain the accuracy of the translation, the accuracy cannot be guaranteed.

Makes no warranty, either expressed or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose, regarding these Enerdrive products and makes such Enerdrive products available solely on an "as is" basis.

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## Introduction

The ePOWER 20 & 30 Amp Solar Charge Controllers are common positive PWM charge controllers with built in LCD display and USB ports. The multiple load control modes enable them to be widely used on caravans, camper trailers, boats, portable solar panels, commercial street signs etc.

The ePOWER Solar Charge Controller range is built for the toughest Australian conditions using professional level components which have resulted in efficiency, increased reliability and performance.

Standard features of the ePOWER include automatic overload, low battery, overheating and built-in short circuit protection. The ePOWER Solar Charge Controller is well equipped to give you lasting trouble-free operation.

## ePOWER Solar Charge Controller Features

- ◆ PWM Charging
- ◆ Battery Temperature Compensation Function
- ◆ High Reliability
- ◆ Informative Backlight LCD Display
- ◆ Multiple Load Control Modes
- ◆ Battery Type Selectable: Sealed, Gel and Flooded
- ◆ USB Output 2.4A
- ◆ Full Power Operation up to 55 °C

## IMPORTANT SAFETY INFORMATION

This section contains important safety information for the Enerdrive ePOWER Solar Charge Controller. Each time, before using the Enerdrive ePOWER Solar Charge Controller, READ ALL instructions and cautionary markings on or provided with the controller, and all appropriate sections of this guide. The Enerdrive ePOWER Solar Charge Controller contains no user serviceable parts. Opening up the controller will void product warranty. See Warranty section for how to handle product issues.



### WARNING!

#### Failure To Follow These Instructions May Result In Death Or Serious Injury!

- This controller is designed for indoor use only
- Do not disassemble the controller. Please see a qualified person if the unit requires repairing
- Lead acid batteries can be dangerous. Ensure no sparks or flames are present when working near batteries
- Eye protection should always be used.
- Given sufficient light, solar panels will always generate energy even when they are disconnected
- Accidental 'shorting' of the terminals or wiring can result in sparks causing personal injury or a fire hazard. We recommend that you cover up the panel(s) to block all incoming light during the installation. This will ensure that no damage is caused to the Solar Panel or Battery if the wires are accidentally short circuited
- Always install a battery fuse or circuit breaker on each circuit including the solar controller



### WARNING!

#### SHOCK HAZARD. KEEP AWAY FROM CHILDREN!

Avoid moisture ingress. Never expose the unit to snow, water, etc.



### WARNING! EXPLOSION HAZARD!

DO NOT use the Enerdrive ePOWER Solar Charge Controller in the vicinity of flammable fumes or gases (such as gas bottles or large engines).

AVOID covering the ventilation openings. Always operate unit in an open and well ventilated area.

Prolonged contact to high heat or freezing temperatures will decrease the working life of the unit.



## WARNING!

### FIRE AND/OR CHEMICAL BURN HAZARD

When working with electrical equipment or lead acid batteries, have someone nearby in case of an emergency.

Study and follow all the charger manufacturer's specific precautions when installing, using and servicing the controller.

Keep unit away from moist or damp areas.

Avoid dropping any metal tool or object on the controller. Doing so could create a spark or short circuit which goes through the controller or another electrical tool that may create an explosion.



## LIMITATIONS OF USE

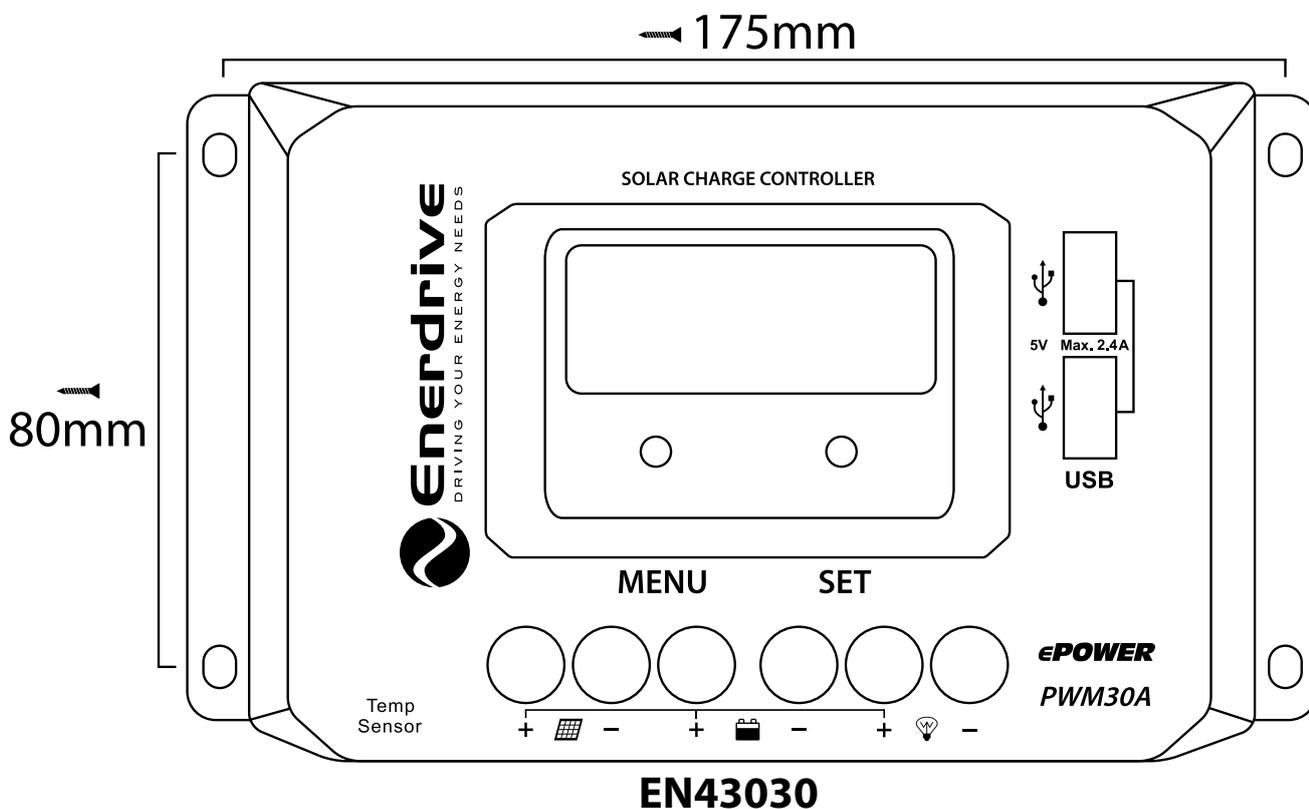
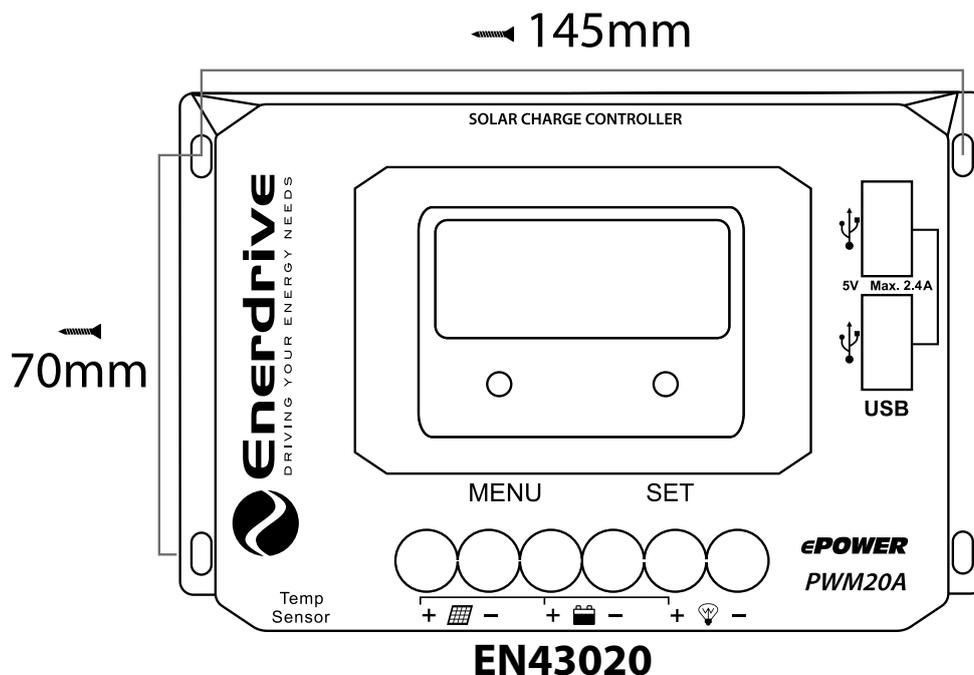
Do not use in connection with life support systems or other medical equipment or devices.

Controller is not to be used by persons with reduced physical or mental capabilities or lack of knowledge and experience. Not to be operated or used by children.

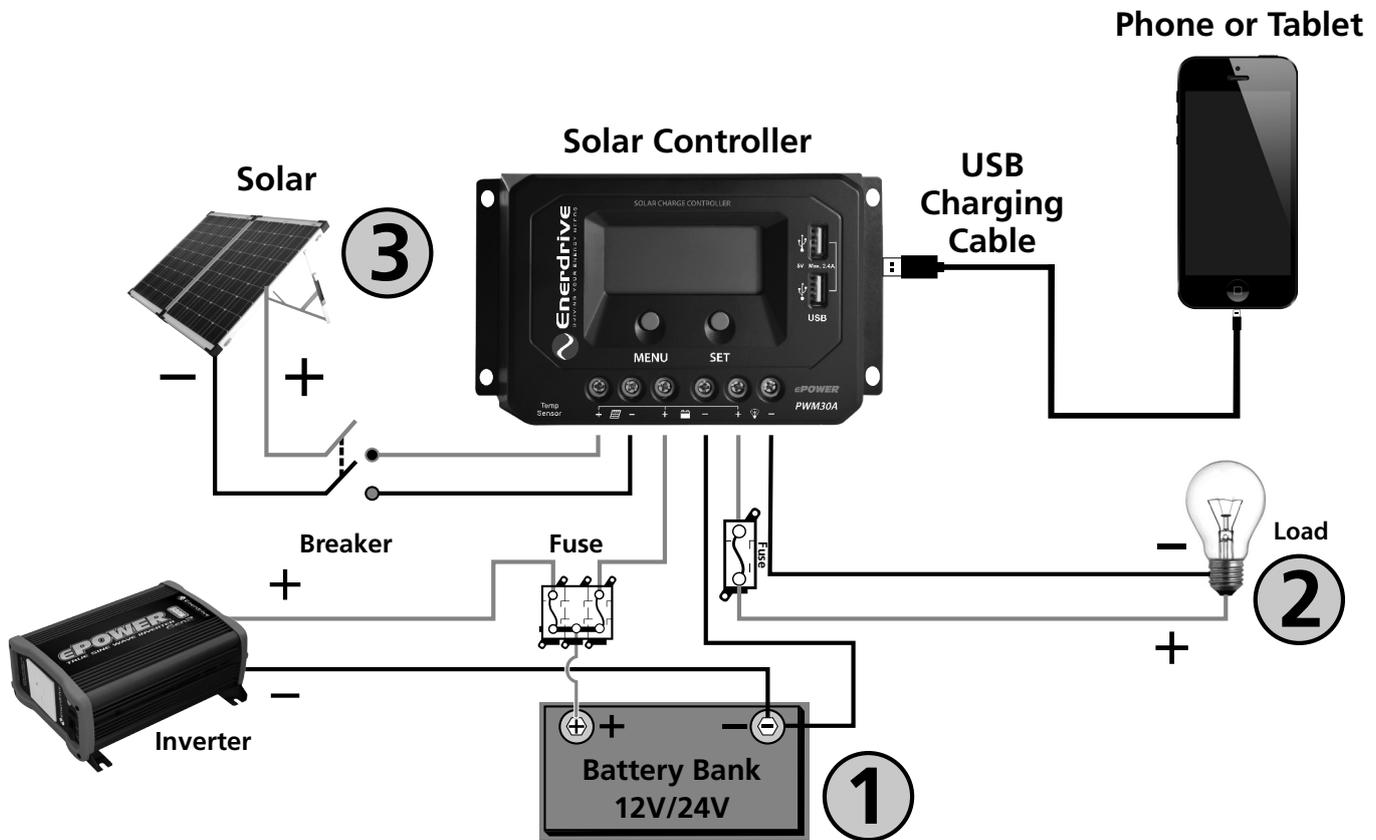
Avoid dropping any metal tool or object on the controller. Doing so could create a spark or short circuit which goes through the controller or another electrical tool that may create an explosion.

## Mounting the Device

The Solar Controller is best mounted on a vertical surface for maximum cooling efficiency. To mount the unit, use self-tapping screws and mount the unit via the four screw holes supplied and affix to a flat surface.



# Wiring Connections

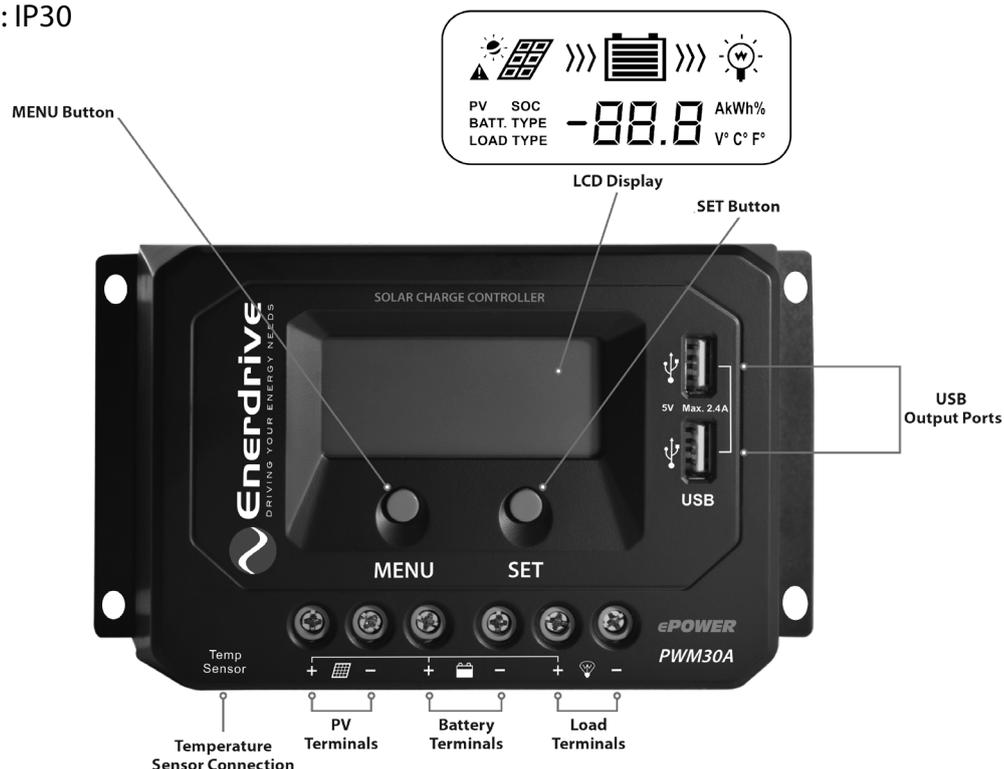


1. Connect components to the charge controller in the sequence as shown above (1,2,3) and pay particular attention to the "+" and "-". Please don't insert the fuse or turn on the breaker during the installation. When disconnecting the system, the order will be reversed, (3,2,1).
2. The battery fuse should be installed as close to the battery as possible. The suggested distance is within 150mm.
3. Always connect the battery first, in order to allow the controller to recognize the system voltage.
4. Power up the controller and confirm that the LCD screen turns on. If the screen does not power up, refer to page 14 **TROUBLESHOOTING**.
5. The ePOWER Solar Charge Controller is a common Positive Controller.

*NOTE: If using an inverter, or have a load larger than the load output of the solar controller, connect the inverter and/or large load/s directly to the battery.*

## Features

- 4 Stage charging ensures the battery is charged to the optimum level (Bulk, Absorption, Equalisation and Float)
- Advanced MCU control pulse width modulated (PWM) technology
- Programmable for Gel, AGM and Conventional Flooded batteries
- Built in regulator to prevent your battery from being overcharged. Overcharging occurs when the charge voltage is unregulated. This can result in premature battery failure
- In built regulator prevents your battery from being under charged. In the solar energy field, battery undercharging often occurs, especially on some conventional Lead Acid batteries. This unit provides an automatic equalization feature for deeply drained conventional Lead Acid and AGM batteries, as well as providing a cycling automatic equalizing feature every 28 days
- The Solar Controller can be connected to the battery permanently to keep the battery fully charged by using a process called "floating". This means the controller will stop charging when the battery is full and will automatically start charging the battery as required. This process will also reduce water loss and help prevent the battery from 'drying out'
- Protects the battery from discharge at night. Under low light or no light conditions the solar panel voltage could be less than the battery voltage. The unit contains a special circuit which prevents current flowing back from the battery and into the solar panel
- LCD display design, dynamically displays device's operating data and working condition including solar/battery/load information
- Dual USB ports (5VDC/2.4A combined Max output) allow power supply charge for electronic equipment
- Remote Temperature Sensor (RTS) port built-in. Optional sensor probe available PN# EN43-TEMP (Temp compensation will be fixed at 25°C without the RTS installed).
- Multiple protections against reverse polarity, short circuit, over temperature, over voltage, etc.
- IP Rating: IP30



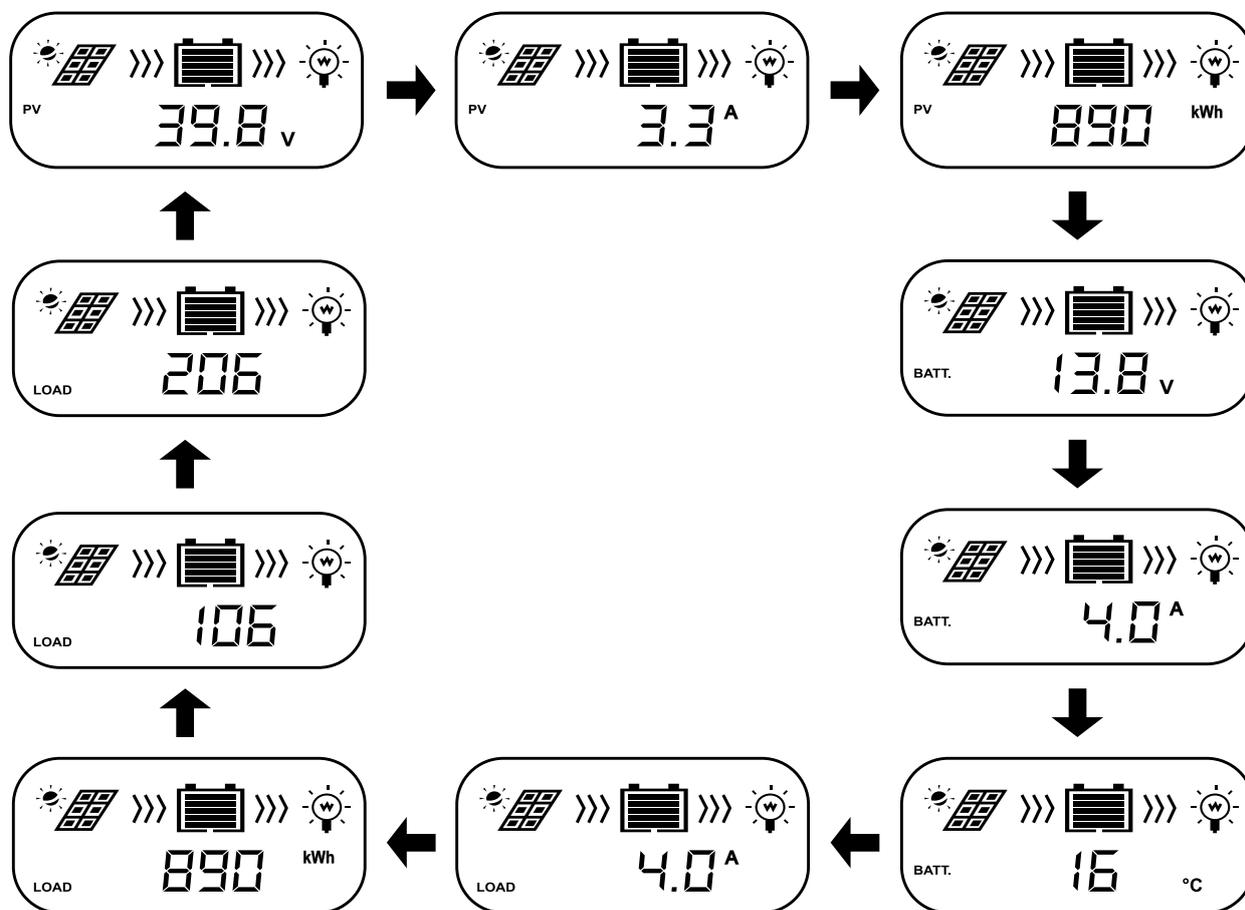
## Operation: Battery Function

| Button      | Function   |
|-------------|--|
| MENU Button | <ul style="list-style-type: none"> <li>• Browse through screens</li> <li>• Setting parameter</li> </ul>                                    |
| SET Button  | <ul style="list-style-type: none"> <li>• Load ON/OFF</li> <li>• Clear error</li> <li>• Enter into SET Mode</li> <li>• Save data</li> </ul> |

## Status Display

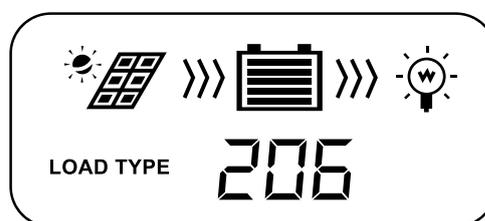
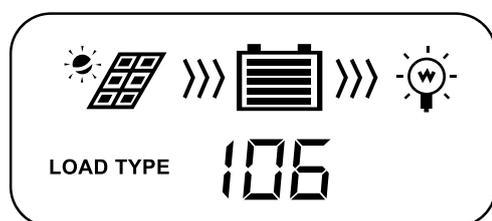
| Item     | Icon  | Status                                |
|----------|---|---------------------------------------|
| PV Array |  | Day                                   |
|          |  | Night                                 |
|          |  | Not Charging                          |
|          |  | Charging                              |
|          | PV  | PV Voltage, Current, Power            |
| Battery  |  | Battery Capacity, In Charging         |
|          | BATT.   | Battery Voltage, Current, Temperature |
|          | BATT. TYPE  | Battery Type                          |
| Load     |  | Load ON                               |
|          |  | Load OFF                              |
|          | LOAD  | Load Voltage, Current, Load Mode      |

## Browse Interface



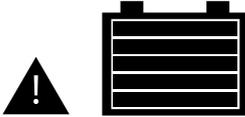
### NOTE

1. When the unit is powered up with no solar input, the screen will automatically cycle, but the following two screens will not display.



2. **Accumulative power zero clearing:** Under the PV power screen, press the **SET** button and hold for 5 seconds and the value will blink. Press the **SET** button again to clear the value.
3. **Setting temperature on the controller:** Under the battery temperature screen, press the **SET** button and hold on for 5 seconds to switch between Fahrenheit or Celsius.

## Fault Indication

| Status                 | Icon  | Description  |
|------------------------|---|--|
| Battery over discharge |    | Battery level shows empty, battery frame blink, fault icon blink         |
| Battery over voltage   |    | Battery level shows full, battery frame blink, fault icon blink          |
| Battery overheating    |    | Battery level shows current value, battery frame blink, fault icon blink |
| Load failure           |  | Load overload <sup>1</sup> , Load short circuit                          |

1. When the load current reaches 1.02–1.05 times, 1.05–1.25 times, 1.25–1.35 times and 1.35–1.5 times more than the nominal value, the controller will automatically turn off the loads in 50s, 30s, 10s and 2s respectively.

## LOAD MODE SETTING Operating Steps:

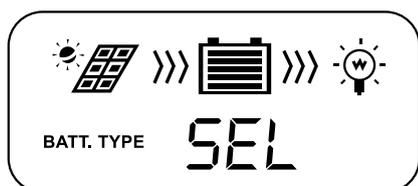
Under the load mode setting screen, press the **SET** button and hold on for 5 seconds until the number begins flashing, then press the **MENU** button to set the parameter, then press the **SET** button to confirm.

| 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 after sunset | 202 - 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                                      |

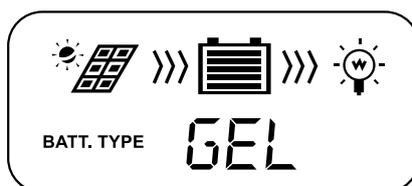
*NOTE: Please set the Light ON/OFF, Test mode and Manual mode via Timer 1. Timer 2 will be disabled and display "2 n".*

## BATTERY TYPE Operating Steps:

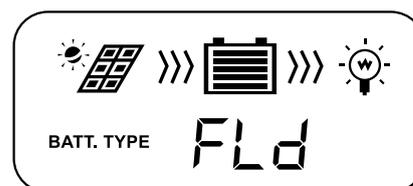
Under the Battery Voltage screen, press the **SET** button and hold for 5 seconds to enter the Battery Type Menu. Choose the battery type by pressing the **MENU** button, and then press the **SET** button to select the chosen battery type.



1. Sealed (AGM)



2. GEL



3. FLOODED (default)

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

## Protection

| Protection                | Conditions   | Status  |
|---------------------------|--|---|
| PV Reverse Polarity       | When the battery is connected correctly, the PV Polarity can be reversed.  | The controller is not damaged   |
| Battery Reverse Polarity  | When the battery is not connecting, the Battery Polarity can be reversed.  | The controller is not damaged   |
| Battery Over Voltage      | The battery voltage is above the OVD   | Stop charging   |
| Battery Over Discharge    | The battery voltage is below the LVD   | Stop discharging  |
| Battery Over Heating      | Temperature sensor is higher than 65°C   | Output is OFF   |
|                           | Temperature sensor is higher than 55°C   | Output is ON  |
| Controller Over Heating   | Temperature sensor is higher than 85°C   | Output is OFF   |
|                           | Temperature sensor is higher than 75°C   | Output is ON  |
| Load Short Circuit        | Load current 2.5 times the rated current<br>one short circuit, the output is OFF 5s;<br>Two short circuit, the output is OFF 10s;<br>Three short circuit, the output is OFF 15s;<br>Four short circuit, the output is OFF 20s;<br>Five short circuit, the output is OFF 25s;<br>Six short circuit, the output is OFF | Output is OFF.<br>Clear the fault: RESTART<br>the controller or wait for<br>one night-cycle<br>(night time > 3 hours) |
| Load Overload             | Load current 2.5 times rated current<br><br>1.02-1.05 times, 50s,<br>1.05-1.25 times, 30s,<br>1.25-1.35 times, 10s,<br>1.35-1.5 times 2s   | Output is OFF.<br>Clear the fault: RESTART<br>the controller or wait for<br>one night-cycle                           |
| Damaged RTS (Temp Sensor) | If the RTS is either short circuited or damaged  | Controller will operate at a standard 25°C  |

## Troubleshooting

| Faults   | Possible Reasons                     | Troubleshooting   |
|--|--------------------------------------|---|
| The LCD Screen is off during the day when sunshine falls on the PV modules                           | PV array disconnection               | Confirm that PV cable connections are correct and tight   |
| Cable connection is correct, LCD Screen not displayed  | 1). Battery voltage is lower than 9V | 1). Please check the voltage of battery<br>At least 9V is required to activate the controller<br>2). Check the PV input voltage which should be higher than the battery voltage |
| Icon blinking<br> | Battery over voltage                 | Check if the battery voltage is higher than the OVD (over voltage disconnect voltage) point, and disconnect the PV  |
| Icon blinking<br> | Battery over discharged              | When the battery voltage is restored to or above LVR (low voltage reconnect voltage) point, the load will recover   |
| Icon blinking<br> | Battery over heating                 | The controller will automatically turn the system off. When the temperature reduces below 50°C, the controller will resume  |
| Icon blinking<br> | Over load or short circuit           | Reduce the output loads and/or check load terminal connections  |

## Specifications

| Item   | EN43020                                 | EN43030                 |
|--|---|-------------------------|
| Nominal system voltage   | 12/24 VDC                               | 12/24 VDC               |
| Battery input voltage range  | 9V ~ 32V                                | 9V ~ 32V                |
| Rated charge/discharge current   | 20A@55°C                                | 30A@55°C                |
| Max. PV open circuit voltage   | 12V - 25VOC/24V - 50VOC                 |                         |
| Battery type   | Sealed (Default) / Gel/ Flooded         |                         |
| Bulk/Absorption Charging Voltage   | Sealed: 14.4V/ Gel:14.2V/ Flooded 14.6V |                         |
| Equalize Charging Voltage  | Sealed: 14.4V/ Gel:14.2V/ Flooded 14.8V |                         |
| Float Charging Voltage   | Sealed/ Gel/ Flooded: 13.8V             |                         |
| Low Voltage Reconnect  | Sealed/ Gel/ Flooded:12.6V              |                         |
| Low Voltage Disconnect   | Sealed/ Gel/ Flooded:11.1V              |                         |
| Self consumption   | 12V; 18mA/24V; 14.5mA                   |                         |
| Temperature compensation coefficient   | -18mV/°C >25°C@12V / -36mV/°C >25°C@24V |                         |
| Charge circuit voltage drop  | 0.29V                                   |                         |
| Discharge circuit voltage drop   | 0.16V                                   |                         |
| LCD temperature range  | -20°C+70°C                              |                         |
| Working environment temperature<br>(Controller will produce 100% output at 55°C) | -25°C+55°C                              |                         |
| Relative humidity  | 95% N.C.                                |                         |
| Enclosure  | IP30                                    |                         |
| Grounding  | Common Positive                         |                         |
| USB output   | 5VDC/2.4A (Total)                       |                         |
| Overall dimension  | 160 x 95 x 50mm                         | 181 x 101 x 60mm        |
| Mounting dimension   | 148 x 70mm                              | 172 x 80mm              |
| Mounting hole size   | Ø4.5mm                                  | Ø5.0mm                  |
| Terminals  | 10mm <sup>2</sup> /8AWG                 | 16mm <sup>2</sup> /6AWG |
| Net weight   | 0.35kg                                  | 0.55kg                  |

## Warranty Statement



### 2 Year Limited Warranty

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

The limited warranty program is the warranty that applies to all Enerdrive products, and it sets forth all the responsibilities of Enerdrive. There is no other warranty, other than those described herein. Any implied warranty of merchantability of fitness for a particular purpose of the Enerdrive product is limited in duration to the duration of this warranty.

This Enerdrive product is warranted, to the original purchaser only (proof of purchase is required), to be free of defects in materials and workmanship for two years from the date of purchase\* without additional charge. The warranty does not extend to subsequent purchasers or users other than OEM applications.

This Enerdrive product is not intended for commercial use. This warranty does not apply to damage to units from misuse or incorrect installation/connection. Misuse includes wiring or connecting to improper polarity power sources.



### 3 Year Pro Rata Support Program

In addition to our standard 2 years warranty, we offer a further 3 years of support with our pro-rata service program. In the event of an out of warranty product issue we can upgrade you with a new product for a fraction of the new price. With repair on many products becoming harder and harder these days, this program provides our customers with the greatest peace of mind possible.

### Return and/or Repair Policy

If you are experiencing any problems with your unit, please contact our customer service department at [support@enerdrive.com.au](mailto:support@enerdrive.com.au) or Phone 1300 851 535 before returning product to retail store. After speaking to a customer service representative, if products are deemed non-working or malfunctioning, the product may be returned to the purchasing store within 30 days of original purchase. Any defective unit that is returned to Enerdrive within 30 days of the date of purchase will be replaced free of charge.

If such a unit is returned more than 30 days but less than two years from the purchase date, Enerdrive will repair the unit or, at its option, replace it, free of charge. If the unit is repaired, new or reconditioned replacement parts may be used, at manufacturer's option. A unit may be replaced with a new or reconditioned unit of the same or comparable design. The repaired or replaced unit will then be warranted under these terms for the remainder of the warranty period. The customer is responsible for the shipping charges on all returned items back to Enerdrive.

### **Limitations**

This warranty does not cover accessories, such as adapters and batteries, damage or defects result from normal wear and tear (including chips, scratches, abrasions, discolouration or fading due to usage or exposure to sunlight), accidents, damage during shipping to our service facility, alterations, unauthorized use or repair, neglect, misuse, abuse, failure to follow instructions for care and maintenance, fire and flood.

If your problem is not covered by this warranty, contact our Support Team at [support@enerdrive.com.au](mailto:support@enerdrive.com.au) or phone 1300 851 535 for general information if applicable.

### **Service Contact Information**

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