

# **EPOWER INDUSTRIAL**

## MULTI STAGE BATTERY CHARGER



# **Operation & Owner's Manual**

## **24V, 36V & 48V Models**

Rev: 1.7

## PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE

For safe and optimum performance, the Enerdrive ePOWER Industrial Battery Charger 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 Industrial Battery Charger. Misuse may result in damage to the unit batteries and/or cause harm or serious injury. Read manual in its entirety before using the unit and save manual for future reference.

### Product Numbers - ePOWER Industrial Battery Charger Series

EPI-2430	ePOWER Industrial Battery Charger 24V / 30Amp
EPI-3620	ePOWER Industrial Battery Charger 36V / 20Amp
EPI-4815	ePOWER Industrial Battery Charger 48V / 15Amp
EPI-4835	ePOWER Industrial Battery Charger 48V / 35Amp
EPI-4860	ePOWER Industrial Battery Charger 48V / 60Amp

ePOWER Industrial Battery Charger Owner's Manual 1.7. This manual applicable to all units with serial number prefix EPI.

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# 1. INTRODUCTION

Thank you for purchasing the Enerdrive ePOWER Industrial Battery Charger. With our state of the art, easy to use design, this product will offer you reliable service for providing a multistage battery charger to charge the different types of batteries you have installed in applications such as electric vehicles, fork lifts, floor cleaning machines, golf carts, and electric mobility scooters. This manual will explain how to use this unit safely and effectively. Please read and follow these instructions and precautions carefully.

## **IMPORTANT SAFETY INFORMATION:**

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



## **WARNING**

### **FIRE AND/OR CHEMICAL BURN HAZARD**

- Do not cover or obstruct any cooling fins and/or install in a zero-clearance compartment.



## **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 Industrial Battery Charger in the vicinity of flammable fumes or gases (such as gas bottles or large engines).
- AVOID covering the cooling fins. 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

### **FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DEATH OR SERIOUS INJURY**

- When working with electrical equipment or lead acid batteries, have someone nearby in case of an emergency.
- Study and follow all the battery manufacturer's specific precautions when installing, using and servicing the battery connected to the charger.
- Wear eye protection and gloves.
- Avoid touching your eyes while using this unit.
- Keep fresh water and soap on hand in the event battery acid comes in contact with eyes. If this occurs, cleanse right away with soap and water for a minimum of 15 minutes and seek medical attention.
- Batteries produce explosive gases. DO NOT smoke or have an open spark or fire near the system.
- Never attempt to re-charge a damaged, frozen or non-rechargeable battery.
- Keep unit away from moist or damp areas.
- Avoid dropping any metal tool or object on the battery. Doing so could create a spark or short circuit which goes through the battery or another electrical tool that may create an explosion.
- Battery charger must be plugged in to an earthed and Australian Standards compliant mains supply. If the units power cable is damaged, replace the cable immediately.



## LIMITATIONS OF USE

- Do not use in connection with life support systems or other medical equipment or devices.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision and instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.



## WARNING

- Enerdrive recommends that all wiring be done by a skilled technician to ensure adherence to the best practice standards for on-board DC electrical installations. Failure to follow these instructions can damage the unit and could also result in personal injury or loss of life.



## CAUTION

- Before Beginning Your Unit Installation, Please Consider The Following:
- The unit should be used or stored in an indoor area away from direct sunlight, heat, moisture or conductive contaminants. Do not install the ePOWER Industrial Battery Charger in corrosive environments.
- When placing the unit, allow a minimum of 75mm of space around the unit for optimal ventilation.

## 2. PRODUCT DESCRIPTION

The Enerdrive ePOWER Industrial Battery Charger package includes the items listed below.

- ePOWER Industrial Battery Charger
- IEC 240Vac Power Lead
- Waterproofing grommet for Power Lead
- Owner's manual

## 3. INSTALLATION

- This charger is to be installed in a cool and well ventilated location.
- Although certain models are waterproof, it is recommended to install in a dry location.
- When using in a fixed installation use suitable fasteners (screws or bolts) to secure the charger to a solid surface that can handle the weight and forces when the vehicle is moving.

## 4. OPERATION ILLUSTRATION

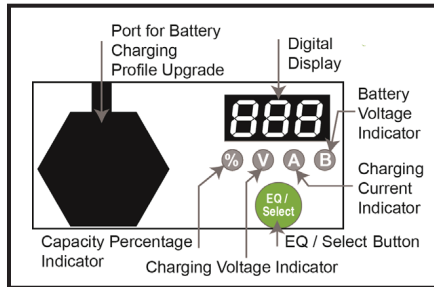
### LED Indicators and Fault Signals:

#### LED Indicators during start up:

In order to find out the installed charging profile in the unit, please follow the steps below.

1. Make sure the DC cables are not connected to the battery.
2. Connect the AC input to the charger and switch on.
3. The charger LED display panel will indicate the battery charge algorithm profile installed.

## LED Indicators and Digital Display:



Charger will enter charging model when connecting to battery & AC input cable. Digital display on the front panel will show in turn: AC XXX (Current AC input voltage), CPU X.XX (corresponding software version number), b\*\*(Current charging profile code).

To change the charging profile, press & hold the Select button for 5 seconds, then press the Select button to choose the desired profile. Once selected, press & hold the Select key for 5 seconds, and the charging profile selection will be completed.  
To start EQ mode, press & hold the Select button for 10 seconds, and display will show EQ mode. The next charging cycle will go into EQ mode. If you want to quit the EQ mode, hold the Select button for 10 seconds. When display shows OFF, the charger will quit the EQ mode.

### Common Mode (Default) & BMS Mode:

- A: The charger enters BMS mode when being connected to lithium-ion battery through Can Bus;
- B: . For safety reason, the charger will flash "bnS" if being reconnected to Lead-acid battery under a BMS mode;
- C: The charger will only charge Lead-acid type battery again if we refresh the charger through USB port with the desired lead acid battery charging profile via USB drive.

### Charging Status Indicator and Status Display

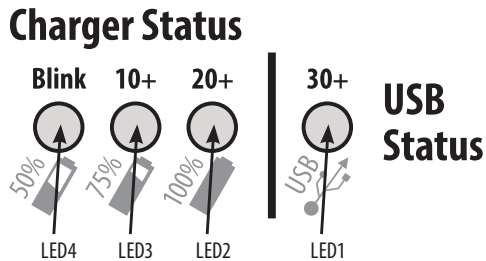
- % Capacity Percentage Indicator: Display shows charging percentage. e.g. 10 20 30...100 (%)
- V Charging Voltage Indicator: Display shows charging voltage. e.g. 24.0 (V)
- A Charging Current Indicator: Display shows charging voltage. e.g. 36.0 (V)

### Additional Battery Voltmeter Function

- B Battery Voltage Indicator. To check battery voltage, disconnect charger AC input and press "Select" button for 1 second. Display shows battery voltage. e.g. 24.0 (V).



## Battery Capacity Indicators:



Capacity	LED2 (100%)	LED3 (75%)	LED4 (50%)
<50%	○	○	★ (Blinking)
>50%	○	★ (Blinking)	●
>75%	★ (Blinking)	●	●
100%	●	●	●

### LED will be showing Battery Charging Profile as below:

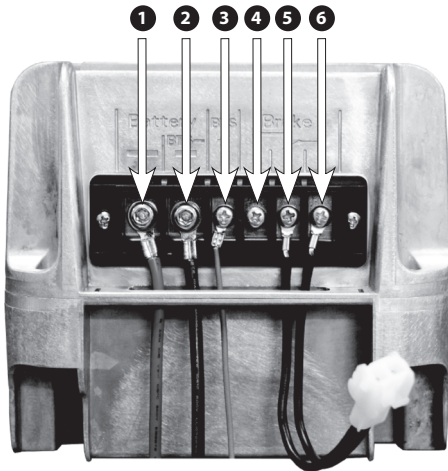
LED 1	LED 2 (100% Indicator)	LED 3 (75% Indicator)	LED 4 (50% Indicator)
Algorithm 30+	Algorithm 20+	Algorithm 10+	Algorithm 1 - 9

#### **For example;**

If the charging profile has been selected to #35, LED 1 will be on to represent the charging profile is 30, and LED 4 will blink 5 times to indicate algorithm #35, while LED 2 and LED 3 will remain off.

If the charging profile has been selected to #18, LED 3 will be on to represent the charging profile is 10, and LED 4 will blink 8 times to indicate algorithm #18, while LED 1 and LED 2 will remain off.

## 5. Connecting the Cables:



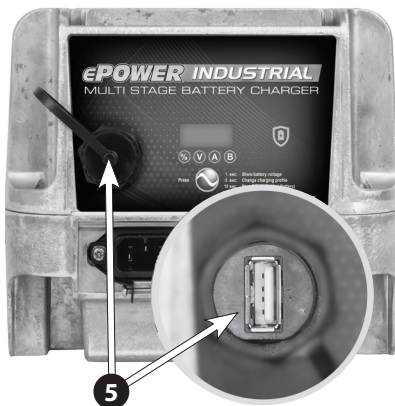
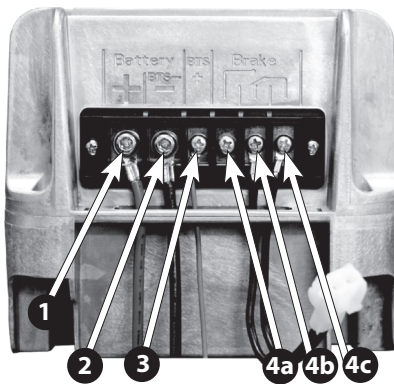
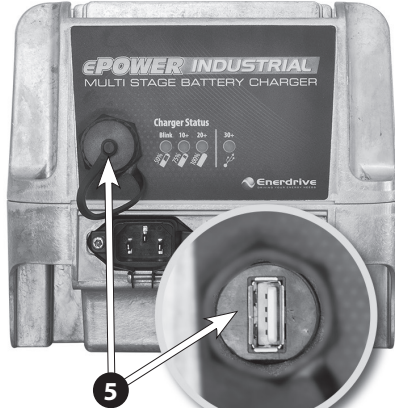
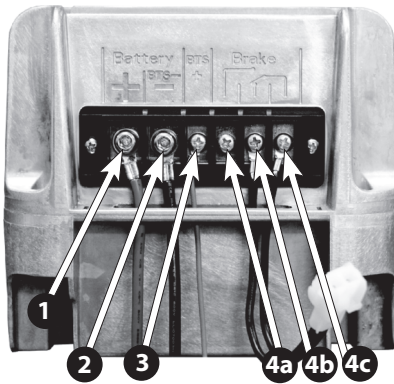
1. Connect to the positive terminal of the battery
2. Connect to the negative terminal of the battery / BTS-
3. Connect to the BTS+
- 4,5,6: Interlock Cable (4,6: **NO** the interlock cables will form an open circuit with no voltage. 5,6: **NC** The interlock cable will form a short circuit with no voltage).
7. Connect CANBUS or LED light wire (optional function).

**Warning:** Assure the battery connection cable is well connected with the charger before it is connected to the battery. Otherwise, the battery short circuit may occur and cause personal injury or damage to the battery.



## WARNING

- Please make sure the battery connection cables are correctly connected to the charger terminals before operating the charger
- Always connect the positive cable to the battery first, then the negative cable to the negative (chassis for B negative grounded vehicles) prior to connecting to supply mains.
- After charging, and when removing charger, always disconnect the battery charger from the supply mains, then disconnect the negative/chassis connection and then the positive connection.
- Supply mains wiring in fixed installs such as caravans or similar vehicles must be in accordance with the national wiring rules.





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### Images on previous page refer to EPI-2430, EPI-3620, EPI-4815 & EPI-4835

<b>1</b>	Connect to the positive terminal of the battery
<b>2</b>	Connect to the negative terminal of the battery
<b>3</b>	Connect to the Battery Temp Sense (BTS)
<b>4</b>	Interlock Connection - the interlock cable connections provide a normally open or normally closed circuit with no voltage, which change state when the charger is operational.
<b>4a</b>	Normally open
<b>4b</b>	Normally closed
<b>4c</b>	Common
<b>5</b>	USB Terminal for Charge Profile settings



## WARNING

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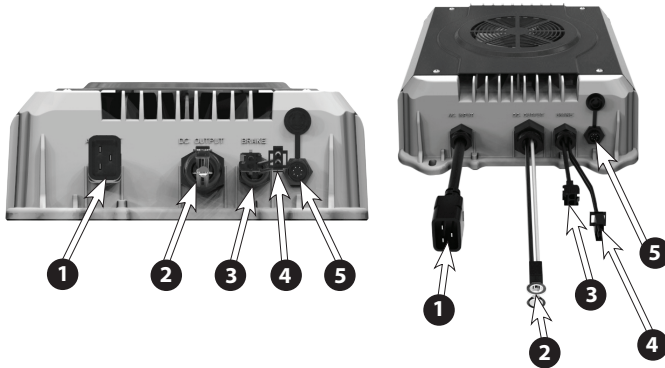


Image refers to EPI-4860

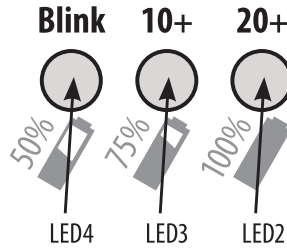
<b>1</b>	AC Input	
<b>2</b>	DC Battery Connection	Red = Positive Black = Negative White = Temp. Sens
<b>3</b>	Brake Switch	When AC has power - open circuit When AC has NO power - closed circuit
<b>4</b>	Charger Switch	Open circuit - charger ON Closed circuit - charger OFF
<b>5</b>	Remote LED	

## 6. MAINTENANCE INSTRUCTIONS

1. Do not expose the charger to oil, dirt, mud or direct heavy water spray when cleaning vehicle.
2. The enclosure of the charger has been tested successfully to EN60529, meeting IP66 compliance.
3. If the detachable AC input power supply cable is damaged, replace with a cable that is a safety approved detachable cable, 3 conductor, 1.5 mm<sup>2</sup> minimum, and rated appropriate for use in the country of destination. AC input type to the charger is, type IEC 60320 C14 plug.

## 7. FAULT INDICATION WITH LED DISPLAY

When a fault occurs, LED2(100%)/LED3(75%)/LED4(50%)will blink at the same time.



Blinking Frequency (every 4 sec)	Fault Cause	Solution
1.	The battery is not connected or the battery voltage is too low	1) Check battery connection is correct. 2) Check charger connection is correct. 3) Check each battery is good.
2.	Abnormal AC Power Input (Voltage)	1) Check AC input cord is connected between charger and AC outlet. 2) Make sure AC plug is tightly inserted into AC outlet.
3.	Charger High Temperature Protection	1) Charger shuts down and enters protection mode due to charger/environmental temperature is too high. Please place the charger in a well ventilated environment. 2) Disconnect the charger and wait for 15-20 mins before reconnecting for charging.
4.	Battery High Temperature Protection	1) Charger will reduce output current and stop charging when the battery temperature exceeds 50°. 2) When the battery temperature drops, the charger will reset automatically.
5.	Output Current is too large	Return to the factory for repair.
6.	Battery Voltage is too high	Check and assure that the correct output battery voltage is connected.

## WITH DIGITAL DISPLAY

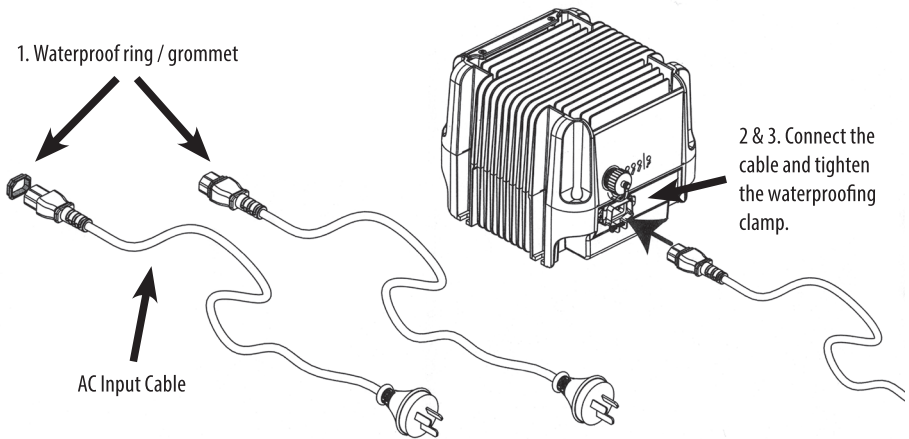
<b>Blinking Frequency</b>	<b>Fault Cause</b>	<b>Solution</b>
<b>E01 bAt</b>	The battery is not connected or the battery is in reverse or the battery is damaged	1) Check battery connection is correct. 2) Check charger connection is correct. 3) Check each battery is good.
<b>E02 AC</b>	Abnormal AC Power Input (Voltage)	1) Check AC input cord is connected between charger and AC outlet. 2) Make sure AC plug is tightly inserted into AC outlet.
<b>E03 Hot</b>	Charger High Temperature Protection	1) Charger shuts down and enters protection mode due to charger/environmental temperature is too high. Please place the charger in a well ventilated environment. 2) Disconnect the charger and wait for 15-20 mins before reconnecting for charging.
<b>E04 bAt</b>	Battery High Temperature Protection	1) Charger will reduce output current and stop charging when the battery temperature exceeds 50°. 2) When the battery temperature drops, the charger will reset automatically.
<b>E05 Err</b>	Internal error in product	Return to the factory for repair.
<b>E06 bAt</b>	Battery Voltage is too high	Check and assure that the correct output battery voltage is connected.

## 8. WATERPROOFING INSTALLATION

Waterproof ring installation of the AC input cable.

1. Slip waterproof ring or grommet over the AC input cable
2. Connect the AC input cable into the charger ensuring the waterproofing ring is seated correctly
3. Firmly tighten the waterproofing clamp using a Phillips head screw driver

**\*NOTE:** Take care to not overtighten the waterproof clamp.





## 9. SPECIFICATIONS

Model:	EPI-2430	EPI-3620	EPI-4815	EPI-4835	EPI-4860
<b>DC Output</b>					
Voltage-nom (VDC)	24V	36V	48V	48V	48V
Voltage-max (VDC)	34V	51V	68V	68V	68V
Current-max (A)	30A	20A	15A	35A	60A
Applicable to Battery	AGM, Flooded, GEL, Lithium				
Reverse Polarity	Electronic Protection - auto - reset				
Short Circuit	Electronic Protection - auto - reset				
<b>AC Input</b>					
Voltage Range (VAC)	100 - 240VAC		180 - 240VAC	220 - 240VAC	
Frequency (Hz)	50 - 60Hz		50 - 60Hz		
Power max (W)	850W		1985W	3400W	
Current max (A)	8.5A		10A	15A	
Dimensions	20.7 x 18.0 x 16.0 cm		19.5 x 18.0 x 19.5 cm	35.9 x 28.0 x 10.7 cm	
Weight	4.6 kg		5.2 kg	10 kg	
Operating Temperature	-20C ~ +50C		-20C ~ +50C	-20C ~ +50C	
Storage Temperature	-40C ~ +70C		-40C ~ +70C	-40C ~ +70C	

\*IP Rating: IP66 when AC input waterproof ring/grommet is used. See Page 12.

Note: Specifications are subject to change without notices.



## 10. CHARGE PROFILE

### Charge Profile Instructions:

Changing the Charge Profile on the Enerdrive ePOWER Industrial Charger

The ePOWER Industrial charger has the ability to be programmed with a charge profile (algorithm) to suit any battery. The default charge profile that comes installed on the charger is b02. This charge profile is suited for Trojan T105 batteries. You can change the charge profile installed on the charger at any time via the USB port on the front of the charger.

**NOTE:** You will require a formatted (FAT32) USB memory stick with a capacity of 1024KB or larger.

Please carefully follow the steps below to change the charge profile: -

1. Download and save the Battery Algorithm Listing from the download link **[www.enerdrive.com.au/Algorithm/ePOWER-algorithm.xlsx](http://www.enerdrive.com.au/Algorithm/ePOWER-algorithm.xlsx)**
  2. Select a charge profile that matches the batteries you are using from the "Charge Profile Listing" tab in this spreadsheet.
  3. Right click on the selected Charge Profile in the "Charge Profile" column and click "Copy".
  4. Now "Paste" the copied charge profile to your formatted USB memory stick.
  5. Make sure the charger is NOT connected to the battery or AC power.
  6. Unscrew the round cap covering the USB port on the front of the charger and insert the USB memory stick.
  7. Plug the AC power cord into the charger and switch ON AC power.
  8. Please allow up to 1 min for programming. Programming is complete once USB status LED is "SOLID".
  9. Switch OFF AC power to the charger.
  10. Remove USB memory stick and screw USB cap back on.
  11. Switch ON AC power to the charger and check the charge profile you selected has been installed. The charger will display the installed charge profile as a series of flashes of the Battery Capacity LED's. See user manual for explanation.
  12. Switch OFF AC power to the charger.
  13. Connect the charger to the DC battery.
  14. Switch ON the AC power to the charger to begin charging with the installed charge profile.
- The ePOWER Industrial charger can also be programmed with a custom (user defined) charge profile for batteries that are not listed. If you cannot find a suitable charge profile for your batteries please contact Enerdrive.

**PLEASE NOTE:** *ALL relevant battery charging specifications MUST be supplied in order for us to be able to create a custom charge profile for you. See following page for the Charge Profile Table.*

## Charge Profile Table:

Algorithm No.	Manufacturer	Model	Batt Type	Ah_C20
b38	Custom Setup	Custom Setup	Custom	Custom
b01	Common	Common type of flooded	Flooded	300
b02	Trojan	TROJAN T105	Flooded	225
b04	Discover	Discover AGM	AGM	250
b05	US	US battery Flooded	Flooded	250
b06	Trojan	Trojan 30XHS	Flooded	130
b07	Trojan	Trojan T125	Flooded	240
b08	Trojan	Trojan J305	Flooded	330
b10	Trojan	Trojan T145	Flooded	260
b11	Trojan	Trojan T1275	Flooded	150
b12	Discover	Discover DGC6A-220D AGM	AGM	220
b13	Trojan	Trojan T605	Flooded	210
b18	Trojan	Trojan T875 Flooded	Flooded	170
b19	US	US2000 Flooded	Flooded	216
b20	US	US2200 Flooded	Flooded	232
b21	US	US250hc Flooded	Flooded	280
b25	Fullriver	Fullriver DC224-6 AGM	Flooded	224
b27	Trojan	Trojan L16P-AC Flooded	Flooded	420
b28	Common	Generic 200-370Ah AGM	AGM	300
b29	US	US.8VGCXC2 Flooded	Flooded	170
b30	US	US. 12VXC2 Flooded	Flooded	155
b31	US	US 305XC Flooded	Flooded	310
b32	US	US 125 XC2 FLA	Flooded	242
b33	US	US 145 XC2 FLA	Flooded	251
b34	Crown	Crown CR-235 FLA	Flooded	235
b35	Crown	Crown CR-245 FLA	Flooded	245

## 11. WARRANTY



### 5 Year Warranty

In the unlikely event that a technical issue arises with an Enerdrive product, customers are encouraged to initially contact the Enerdrive Support Team on 1300 851 535 or [support@enerdrive.com.au](mailto:support@enerdrive.com.au) for immediate and efficient expertise and first class product support.

#### **Important Note: Consumer Protections**

If you have purchased your product in Australia, you should be aware that:

This warranty is provided in addition to other rights and remedies held by a consumer at law. 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.

Enerdrive warrants that its Products will be free from defects in materials and workmanship (subject to limits, and in normal conditions, as described in the complete Enerdrive Warranty Policy) for up to 5 years from the date of purchase.

For full terms, conditions and claim process, refer to the Enerdrive website.

<https://enerdrive.com.au/warranty/>



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