

DC to DC Dual Battery Charger

Operating Instructions



Overview

These dual input DC to DC battery chargers have been designed for in-vehicle use where auxiliary batteries are required to be charged from solar panels or the vehicles main battery. The chargers are available in either 20A and 40A. They offer fully automatic, set-and-forget operation, isolating the main vehicle battery when the engine is off, preventing discharge so you can still start your vehicle when required. The design prioritises solar charging when connected, providing lower load on your vehicle. It provides multi-stage charging for lead acid, AGM/Gel, Calcium, LiON and LiFePO₄ battery types. The in-built solar charge controller accepts PV solar panels with an output voltage range of 16-25V.

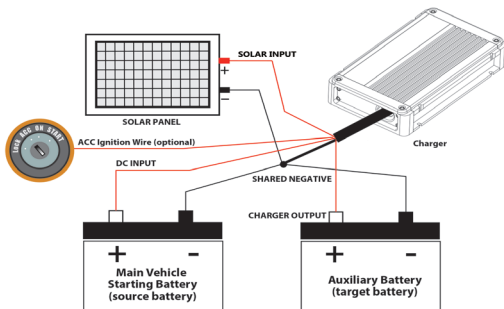
Features

- Heavy duty aluminium case and mounting bracket
- Microchip monitoring and control
- Fully automatic high frequency multi stage charging
- Pulse mode technology that reduces oxidation, evens electrolyte consistency and minimises temperature equating to longer battery life
- Easy push button chemistry select: AGM/Gel, Calcium, LiON, Deep Cycle, VRLA and conventional flooded Lead-Acid batteries
- Internal charger temperature monitoring and power output control
- LED indicators showing state of charge
- Over charging, short circuit and over temperature protection
- Reverse polarity protection:
 1. Input reverse polarity protection
 2. Output reverse polarity protection
- Thermal overload protection
- Solar input overload protection
- Power cut memory function; once selected, the charger will remain on this battery type until it is changed



Installing the Charger

Installation of this unit will require twin core wiring - and suitable cable connectors (not included). See Specifications Table for more details. Any existing cables used in conjunction with this charger will require checking to ensure size is suitable gauge. Where necessary, replace with suitable gauge wiring if they do not meet minimum specifications.



- Locate where you are going to install the DC to DC charger. Ensure the charger is located in a suitable, dry area in the vehicle or caravan.
- Ensure the charger is securely mounted using the brackets and screws provided. Charger can be mounted overhead, vertically or horizontally.
- Measure required cable length from the main vehicle battery through to the location of the DC to DC charger.
- Ensure all cabling meets specification and will not be exposed to excessive heat/moving parts or abrasion.
- You can connect the optional ACC wire to the ignition of your vehicle. If ACC wire is used, the charger will only charge from the source battery when the ignition is on. **WARNING:** If you use ACC wire control with the ignition on but the engine not running, the charger may discharge your engine battery below the point when it can start the engine!
- If the charger is located in a camper/caravan, we recommend the use of an Anderson style plug between the tow vehicle and the camper/caravan as shown in the "Suggested installation to vehicle with caravan" diagram.
- Fit suitable connectors on either end of the twin core cables.

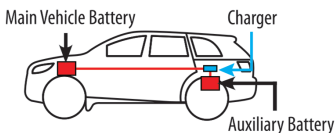
Installing the Charger

- Connect the (-) of the auxiliary battery to the (-) shared negative wire (GROUND) of the charger, and the (+) of auxiliary battery to the (+) positive charger output wire (OUTPUT) using twin core wiring as per recommended cable size.



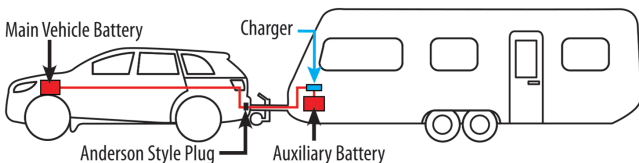
- Using the twin core wiring laid between the main starting battery and the charger, connect the positive (+) of the starting battery to the positive (+) red charger wire (DC INPUT), and the negative (-) of the starting battery to the negative (-) black wire (GROUND) of the charger. Finally, connect the solar panel wires to the charger as per the diagram, as well as the optional ACC wire (if required).
- Ensure unused cables (e.g. ACC wire) are insulated and secured against movement.
- Check all connections are tight.

Suggested installation to vehicle only



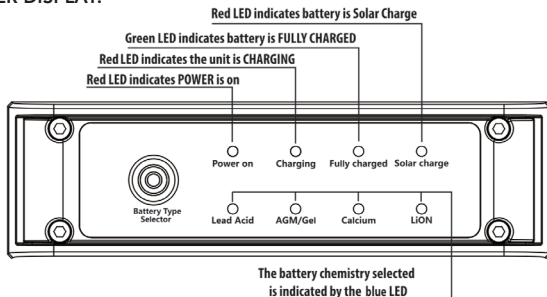
It is recommended to install 30A fuses or circuit breakers between the charger and each battery on the (+) wires, located close to the batteries.

Suggested installation to vehicle with caravan



Operating the Charger

CHARGER DISPLAY:



1. DC BATTERY

Once correctly installed, the charger is a simple "set and forget" dual battery switch.

- Start the vehicle and let it idle.
- The charger will now recognise that there is charge being applied to the main starting battery.
- Once the main starting battery has reached 13.0V, the charger will begin to charge the auxiliary battery. If the ACC ignition signal is detected, DC to DC charging will start when the source battery is 11.5V or above.
- The initial default setting is for Lead Acid batteries.
- If you are charging a battery with a different chemistry, simply change the battery type by pressing the battery type selector button on the front panel of the charger.
- Once selected, the charger will remain on this battery type until it is changed.
- The charger will continue to operate even after the vehicle has been switched off, however, once the main starting battery falls below 12.5V, the charger will automatically shut off. If the ACC wire control is used and the ignition signal is on, charging will shut off when source battery is 10.8V or below.

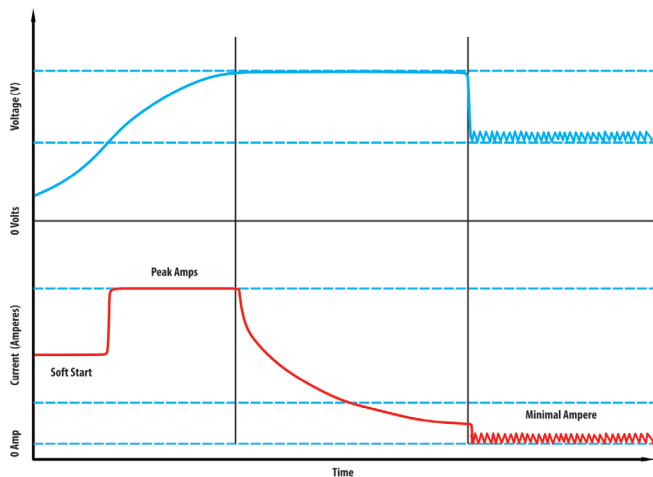
2. SOLAR INPUT (works only when the DC battery input is not available)

- Once you have connected the input terminal with the solar panels positive and negative, the charger will transfer to solar charge mode.
- If you are charging a battery with a different chemistry, simply change the battery type by pressing the battery type selector button on the front panel of the charger.
- Solar charging requires an input of 16-25V from solar panels. When available solar panel voltage falls below 16V, no charge will be delivered to the auxiliary battery.

Specifications

	Model: N 2087	Model: N 2089
Type	Multi Stage	Multi Stage
DC Battery Input	12.5 - 16.0V	12.5 - 16.0V
Solar Input	16.0 - 25.0V	16.0 - 25.0V
Output / Charging Voltage	14.4 - 15.4 V (stops charging when alternator output or vehicle battery below 12.5V)	14.4 - 15.4 V (stops charging when alternator output or vehicle battery below 12.4V)
DC Output Current	20A	40A
Solar Output Current	20A	40A
Minimum Start Voltage	2.5V - for battery being charged	2.5V - for battery being charged
Charge Control		
Soft Start	Yes	Yes
Soft Charge Current	20A	40A
Bulk Charge Voltage	14.7V (AGM/Gel), 13.5V (Lead Acid), 15.4V (Calcium), 14.4V (LiON)	14.7V (AGM/Gel), 14.4V (Lead Acid), 15.4V (Calcium), 14.4V (LiON)
Absorption	Constant voltage with automatic amperage control	Constant voltage with automatic amperage control
Float Charge Current	13.5V (AGM/Gel), 14.4V (Lead Acid), 13.5V (Calcium)	13.5V (AGM/Gel), 13.5V (Lead Acid), 13.5V (Calcium)
Float Charge Current	100mA	100mA
Battery Range	18 to 250Ah	60 to 500Ah
Recommended Cable Cross-Section		
0 - 1 metres	10 AWG	8 AWG
1 - 5 metres	8 AWG	6 AWG
5 + metres	6 AWG	4 AWG

WARNING: Failure to use recommended wiring will severely impact the performance of this DC to DC charger.



Charging algorithm will change according to battery type.

Charging Voltages

	AMG/GEL	LEAD ACID	CALCIUM	LION
BOOST	14.3 V	14.0 V	15.0 V	14.0 V
CHARGING	14.7 V	14.4 V	15.4 V	14.4 V
MAINTENANCE	13.5 V	13.5 V	13.5 V	-

NOTE: Battery manufacturers sometimes specify charging voltages. Not observing their charging instructions may void your battery's warranty.

Additional Information - Deep Cycle Batteries

When calculating your power usage you should add together the approximate current draw of your connected appliances. Adjusting for how many hours you expect them to be used during a 24 hour period. For instance, a fridge may draw up more when getting cold, but during the day may only draw less than 2 Amps, and at night even less as cooler temperatures make it stay cool longer.

The following example shows you typical current draw for connected lights and fridge at three distinct periods of the day. Daytime (or Fridge only), Evening (Fridge + Lighting) and Overnight (Fridge only - low current draw).

Daytime

7am-5pm: 10 hours

2.7A Fridge running 30 minutes per hour: $2.7A / 2 = 1.35A$

Total consumption over 10 hours: 13.5Ah

Evening

5pm-9pm: 4 hours

2.7A Fridge running 20 minutes per hour: $2.7A / 3 = 0.9A$

LED Lighting: $0.6A \times 2 = 1.2A$

Total consumption over 4 hours: 8Ah

Overnight

9pm-7am: 10 hours

2.7A Fridge running 10 minutes per hour: $2.7A / 6 = 0.45A$

Total consumption over 4 hours: 4.5Ah

Adding the three final power consumption figures together results in a total usage of 26.4Ah over a 24 hour period.

Using the 50% rule for deep cycle batteries means that a 100Ah battery will offer 50Ah of usable capacity and require recharging in roughly 48 hours.

Important Safety Instructions

To avoid any personal injury, please read the safety instructions below.

This battery charger is not intended for use by children or infirm persons without supervision.

FOR AUTOMOTIVE AND RECREATIONAL VEHICLE 12V DEEP CYCLE BATTERY USE ONLY. NOT TO BE USED WITH DRY CELL BATTERIES.

- During the charging process, do not use near naked flame. Batteries generate gases during the charging process that may cause an explosion.
- Never smoke or light cigarettes near a battery.
- Do not place tools on top of battery or allow tools to fall onto the battery to prevent the chance of a short circuit and sparks.
- Always wear eye protection while charging a battery.
- Ensure charging and testing is conducted in a well ventilated area.
- Inadequate ventilation may overheat the charger and cause inefficient operation.
- This battery charger is not intended for outdoor operation. Do not expose it to moisture or extreme weather conditions.
- The ACID/FLUID within a battery is highly corrosive and poisonous. It can produce flammable and toxic gases when charged and/or recharging and will explode if ignited. When working with batteries, always wear eye protection, remove jewellery and ensure the area is well ventilated. If split it will cause severe burning to eyes, skin and clothing, damage paintwork and corrode many metals. Ensure that power is disconnected from any appliance in the vicinity of the spill and immediately wash any the affected area with water.

The warnings, cautions and instructions detailed in this manual cannot cover all possible conditions and situations that may occur. Common sense and caution are important factors when using this product. Please retain this instruction manual for future reference.

Troubleshooting

Charger won't indicate charging	• Check charger is connected to battery • Check terminal connection • Check that the battery is 12V
Battery won't charge	• Check that all wiring meets specifications • Check condition of battery • Check performance of alternator
Battery won't fully charge or hold charge	Batteries that are over 3 years old, severely discharged (or previously had been severely discharged), not regularly recharged, overheated, low in electrolyte, undercharged, overcharged or sulphated, may not accept or hold charge. A good automotive store or battery outlet often offer a free or low cost, in store service to check the condition of the battery. Your battery may require replacement.

Altronic Distributors warrants this product for one year from date of purchase from Altronics or its resellers to the consumer. If this item is part of an installation or another product, please contact the installer or supplier for your warranty.

During the warranty period, we undertake to repair or replace your product at no charge if found to be defective due to a manufacturing fault. The warranty excludes damage by misuse or incorrect installation (i.e. failure to install and operate device according to specifications in the supplied instruction manual), neglect, shipping accident, or no fault found, nor by use in a way or manner not intended by the supplier.

For repair or service please contact your **PLACE OF PURCHASE**.

If this item was purchased directly from Altronics please make a warranty claim by:

1. FOR MAIL ORDER CUSTOMERS (includes school and trade orders),

- a) Calling your nearest store location and quoting your tax invoice number.
- b) Upon contacting Altronics, we will issue an R.A. (Return Authorisation). As Altronics have a number of service agents throughout Australia, a copy of the R.A. will be emailed, faxed or mailed to you with full instructions of how and where to send the goods. The freight for shipping goods back to Altronics for all repairs is at the customers expense.
- c) A copy of the R.A. form, (or at the very minimum, the R.A. number) must accompany the goods to effect the repair.
- d) Altronics will pay the return freight to the customer where the warranty claim has been accepted.
- e) Please quote the R.A. number in any correspondence to us.

2. FOR OVER THE COUNTER PURCHASES to make a warranty claim, please return the goods to us in any of our stores, with a copy of your proof of purchase (tax invoice).

- a) Upon leaving the goods at one of our stores, an R.A. number will be issued to you.
 - b) Once repaired, you will be contacted, advising that the goods are ready to be collected from the store.
- It is at Altronics discretion as to whether the goods will be repaired or replaced (whilst under warranty); and as to whether identical goods will be used to replace the item due to changes of models / products.

Note: Under no circumstances should you attempt to repair the device yourself or via a non-authorised Altronics service centre, as this will invalidate the 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.