


# DUNE<sup>4WD</sup>

## OWNERS MANUAL



**20A, 30A / 12V DC TO DC  
BATTERY CHARGER  
WITH SOLAR INPUT**



The Dune 4WD PTDC12V20A and PTDC12V30A DC to DC battery chargers have been designed and built to work with today's highly advanced vehicles with electronic management systems. A fully automatic charging system controlled by the vehicle ignition allows Dune 4WD DC to DC chargers to professionally charge auxiliary battery systems whilst protecting the starter battery from going flat.

The Dune 4WD DC to DC battery chargers are compatible with the most used battery chemistries including AGM, GEL, Sealed Lead Acid, Calcium and Lithium (Lithium via selection wire). Once setup and connected the charger requires no other user input.

## **SAFETY REQUIREMENTS:**

**FOR AUTOMOTIVE 12 VOLT USE ONLY, NOT TO BE USED WITH DRY CELL BATTERIES.**

### **WARNING!**

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

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

1. During the charging process, do not use a naked flame near a battery. Batteries generate explosive gases during the charging process that may explode.
2. Never smoke or light cigarettes near a battery.
3. Do not place tools on top of a battery or allow tools to fall on the battery to prevent the chance of a short circuit and sparks.
4. Always wear eye protection when charging a battery.
5. Ensure charging and testing is conducted in a well-ventilated area.
6. Inadequate ventilation may over-heat the charger and cause in-efficient operation.
7. Even with IP65 protection, this battery charger is not intended for constant uncovered outdoor operation. Do not expose it to moisture or extreme weather conditions. Do not submerge.
8. If skin or clothing comes in contact with battery acid, flush the affected area immediately with water. Seek medical attention if necessary.
9. The battery charger contains hazardous voltages. There are no user serviceable components inside. To avoid a hazard this unit must be repaired or replaced by the manufacturer, service agent or equally qualified person.

The warnings, cautions and instructions detailed in this instruction manual cannot cover all possible conditions and situations that may occur. Common sense and caution are factors, which cannot be built into this product and must be supplied by the operator.

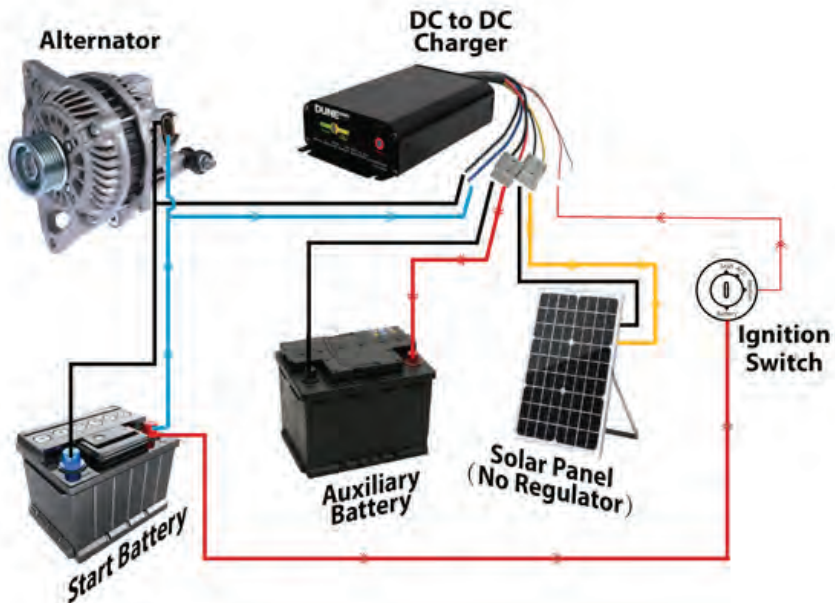
## FIRST AID:

- For first aid advice, contact the Poisons Information Centre in Australia (PH: 131126) or the National Poisons Centre in New Zealand (PH: 0800 764 766)
- If battery acid makes contact with the skin or clothing, wash immediately with soap and water.
- If battery acid makes contact with eyes, hold eyelids apart and flush the eye continuously with fresh running water for at least 15 minutes or until the poisons information centre advises you to stop.
- If battery acid is swallowed, do not induce vomiting. Drink a glass of water and seek immediate medical assistance.

## FEATURES:

- The Dune 4WD DC to DC battery chargers have been designed and built to work with today's highly advanced vehicles with electronic management systems and computer-controlled alternators.
- A fully automatic 8 stage charging system controlled by the ignition allows the charger to be always connected without the auxiliary battery becoming overcharged or the connected starter battery being drained flat.
- 50A connectors are included to provide ease of installation and are fitted to the solar INPUT and DC AUX OUTPUT.
- Heavy duty anodised aluminium housing with mounting points
- Inbuilt protections against short circuits, open circuits, output reverse polarity, over charging, over current and over heating
- Automatic Chemistry selection for Lead Acid, Gel, Calcium AGM batteries.
- Lithium mode charging when lithium mode wire is connected to ground.
- Battery charge capacity: 60~160A/h (1160ccA) or 60 -200A/h.
- 1.5 volt minimum battery start up
- Microchip monitoring and software control
- Solar input voltage regulated output (25V, 300W for 20A and 400W for 30A max).
- Specially designed to remain operational with temperatures ranging from -10 °C - +95 °C, therefore suitable for under bonnet installations.
- IP65 Dust and Water ingress protection.
- **Suitable for 12 Volt batteries ONLY.**

## INSTALLATION INSTRUCTIONS:

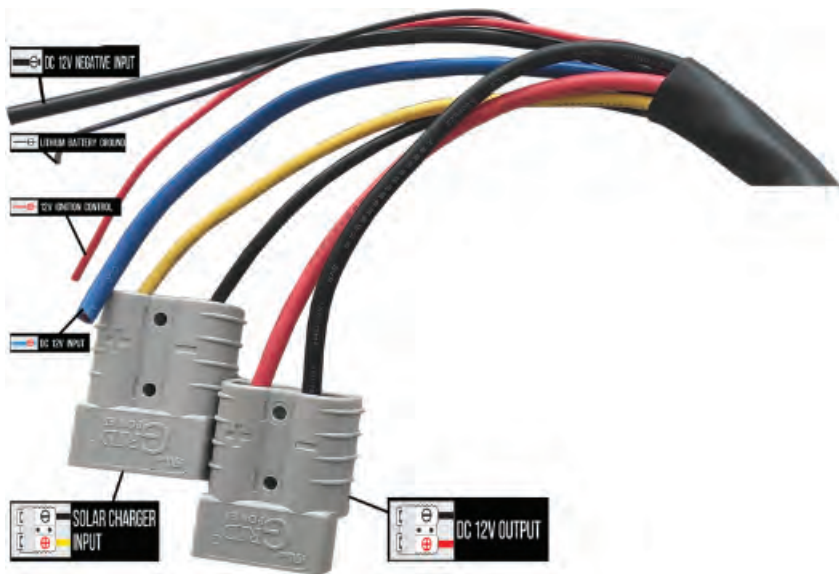


*\*Example installation diagram showing wiring colours used for Dune 4WD DC to DC chargers*


- Locate the charger in a suitable dry location in the vehicle or caravan, away from extreme heat sources such as exhaust systems or turbo chargers.
- For optimum performance, the battery charger should be located as close to the main cranking battery as practicable. If a position is chosen away from the main battery you must research and select the correct size cable to minimise or eliminate voltage drop:

The +12V Start Battery wire (**BLUE WIRE**), +12V Auxiliary Battery Output wire (**RED WIRE**) and Common Ground wires (**BLACK WIRE**) exiting the rear of the charger as shown is crucial to have the correct sized cables. Please use an online voltage drop chart or calculator to determine the maximum length and size of cable you can use for your specific installation.

*Reducing cable size or exceeding recommended max length may lead to excessive voltage drop, causing poor charger performance or failure. We highly recommend installation by a suitably qualified automotive electrician if you do not possess a level of DIY installation experience.*



- Secure the charger using the screws provided.
- Once the charger is in a suitable position first connect the Red (+ve vehicle ignition power) wire to the ignition power supply. The ignition wire **MUST** be connected for the charger to function. The charger will now only function once the ignition is on. **NOTE:** this must be a switched ignition source not constant, in order to protect the main starter battery from running flat.
- The thin black wire is only used and connected to ground if the charger is going to charge lithium batteries. Disregard this cable and **DO NOT CONNECT** if you are not using a Lithium battery.
- Measure and connect a suitable length and thickness of cable with 50A connector plug from the Installed Auxiliary battery to the charger.
- Measure and cut to length cable from the charger to the main vehicle starting battery. Terminate the cable with suitably sized cable lugs (soldering these is highly recommended), then connect the terminated blue 12V start battery cable to the **POSITIVE(+)** battery terminal of the main vehicle battery.



***It is an essential safety step to use an inline fuse or circuit breaker (not supplied) at a suitable point along this cable, as close as possible to the main starting battery. Failure to install suitable protection can result in severe vehicle damage in the event of a short circuit.***

- Ground charger BLACK cable at a convenient point, do not extend cable. If grounding to vehicle chassis, ensure the contacts are clean and all paint or coatings are removed for a clean metal to metal contact.
  - IMPORTANT: For long term safety of your installation, solder all joints and terminations, and use quality heat shrink tubing to ensure all exposed cables are wrapped and insulated
  - You can connect the solar positive input cable to the YELLOW solar input wire on the charger and solar panel NEGATIVE cable to the common ground if a solar panel is installed.
  - Recheck all connections before starting the vehicle and programming the charger.

*\* When fitting the PTDC12V30A to a caravan or trailer the cable will need to be connected to the towing vehicle with a suitable heavy duty 50A connector such as a 50A "Anderson Style" connector or similar, using correct gauge cable for the total length of installation. **We highly recommend consulting a qualified Automotive Electrician** as incorrect cable size selection and poor connections will drastically affect the efficiency and operation of this battery charger.*

## **CHARGING INSTRUCTIONS:**

Once you have correctly installed the Dune 4WD DC to DC charger, start the vehicle and let it idle, the charger will recognize that there is charge being applied to the main starting battery. Once the main starting battery has reached 13.2 volts the charger will automatically turn on and the charger will begin to charge.

The charger will continue to operate if the ignition is switched to the "ON" position with the engine running (alternator charging), therefore no matter how the voltage of the starting battery changes, as long as the vehicle is in the run state the charger will work normally.

- The charger will only begin charging when the engine is running (alternator charging) once the main battery reaches 13.2 volts.
- The charger will turn off once the ignition is turned off after 5 seconds.
- After the ignition and engine is turned off and charger stops working, the solar input will automatically switch on to charge the auxiliary battery (if connected to solar panel(s)).
- If the engine is started again, the solar input will automatically switch off. The Second (Aux) battery will receive a charge once the alternator charges the start battery to 13.2v (engine must be running and alternator charging)

## 8 stage DC Charging mode (Ignition on and alternator charging):

### 1. Analysis / Desulphation

A small voltage pulse is applied to the battery to ensure it can effectively and safely accept a charge. Desulphation uses pulse reconditioning to gently remove any sulphation build up on the battery plates and prevents oxidization. Stabilizes electrolyte consistency and minimises the battery temperature rising while charging, recovers battery capacity and can help extend battery life.

### 2. Soft Start

The soft start function improves the batteries charging capability, reduces gas and heat build-up and can improve electrolyte consistency which can become uneven in the battery cells from day to day use. A steadily increasing current is applied over a set time so as not to initially overload the battery. This stage prepares the battery for the more intense charging stages to follow.

### 3. Bulk charge

Maximum charge current is delivered to the battery to minimize charge times.

### 4. Absorption

Reduces the current supplied to the battery and ensures that the battery has been completely charged without the risk of being overcharged.

### 5. Analysis – Testing the battery while charging

The charger shuts off power and measures voltage drop over a set time. If unacceptable readings are measured this may indicate an internal short or other issue inside the battery.

### 6. Boost/ equalisation charge

Once the battery is fully charged, the charger will equalize all of the battery cells by providing a steady set voltage over a programmed period of time, at low current.

### 7. Float stage

After the boost/equalisation stage, the current will drop to low amperage to maintain the battery in a fully charged and ready to use state.

### 8. Maintenance charge

After float stage the voltage will maintain at a constant level with a small pulse frequency. Current is dropped to a very low level.

## Lithium Charging Mode (Lithium black ground wire connected):

**Stage 1:** Charging commences with charger applying increasing voltage with a constant 20A or 30A output current (model dependant).

**Stage 2:** The Charger performs constant voltage charging to 14.1V, then starts reducing current output. When the current is lower than 6A, it will switch to stage 3.

**Stage 3:** Performs float charging with 13.1V and minimal current. If the battery voltage drops below 12V, it will then switch back to stage 1 for recharging.

### 3 stage Solar Charging mode (Unregulated solar panel connected, ignition off, no alternator charging):

Dune 4WD DC to DC chargers are designed to ONLY accept NON – REGULATED solar panels. If your panel has a fixed regulator, bypass the Dune 4WD DC to DC charger and attach directly to the battery.

- Stage 1.** Direct Solar energy is applied to charge the battery until the battery voltage reaches 14.9V, it then switches to stage 2.
- Stage 2.** Over pressure pulse charging, when the battery voltage is lower than 14.9V, charger pulses for 1 sec on and 1 sec off. This will occur for 2 hours, or until a 14.9V average is reached, whichever comes first. It will then switch to Stage 3.
- Stage 3.** Pulse Floating Charge: Pulse one second on, one second off at 13.8V.

### Solar Charging – Automatic Dual charging mode:

If the auxiliary battery reaches 14.9V at stage 2 under solar charging mode, The DC to DC charger will also link to and charge the vehicle starting battery simultaneously. The solar charging mode will charge both batteries until they reach 14.9V, then the Solar charging mode will switch to stage 3.

Simultaneous charging of the auxiliary and starting battery will only occur if there is minimal load being pulled from the auxiliary battery, as the dual charging mode only starts once the aux battery is near to full. This is a unique feature to maximise any excess solar energy you are producing when loads are minimal (e.g., fridges are in between cycles etc), and will ensure your entire battery system is well maintained.

### COLOUR LED INDICATION:



#### Red "POWER"

Indicates the charger is connected.

#### Green "CHARGING"

Indicates the charger is now charging the auxiliary battery.

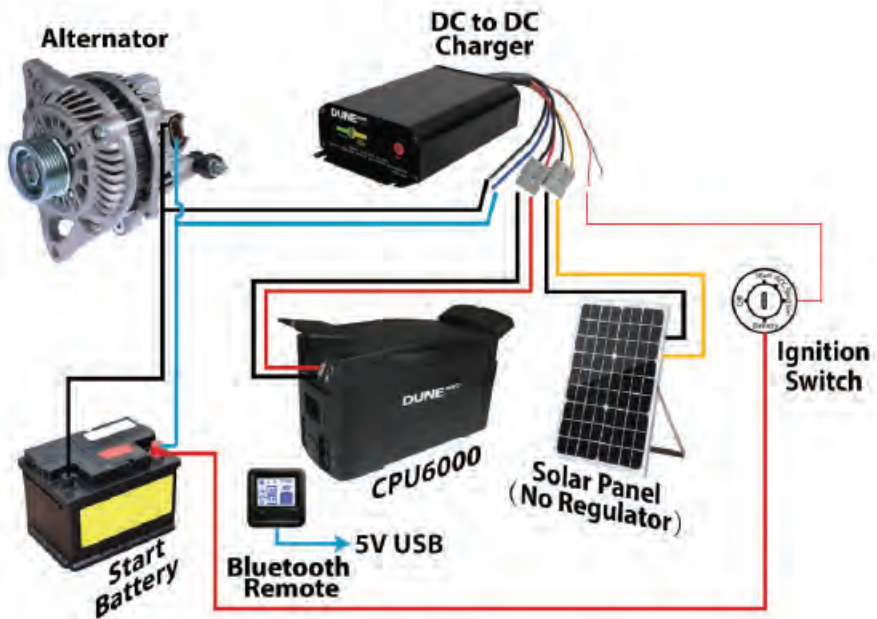
#### Yellow "FULLY CHARGED"

The charger has completed charging the battery and has gone into float.



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Operating DC to DC charger in-conjunction with Dune 4WD Deluxe Battery Box (CPU6000):

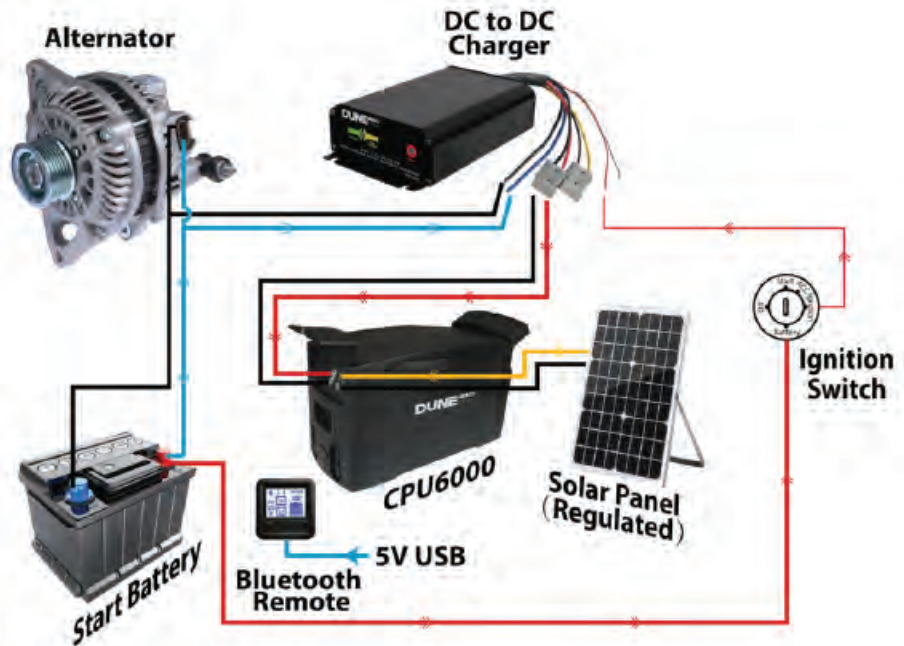


*\*Example installation diagram with DC to DC charger used in conjunction with Dune 4WD Deluxe Battery Box*

- Using the simple plug and play 50A connectors, after following the DC to DC charger installation instructions above plug the DC to DC 12V OUTPUT plug, directly to the 12V DC INPUT plug on the rear of the Dune 4WD Deluxe Battery Box.
- With the ignition switched DC to DC charger, once your Dune 4WD Deluxe Battery Box is connected it will commence charging as soon as your vehicle is running and the start battery reaches 13.2V.

**IMPORTANT:** If you have solar panels installed on your vehicle for use with the Dune 4WD Deluxe Battery Box:

- If the solar panels are UNREGULATED, connect directly to the SOLAR CHARGER INPUT 50A connector on the DC to DC charger, then ONLY connect the DC to DC charger to the Battery Box using the 12V DC INPUT plug.
- If the solar panels are REGULATED, bypass the DC to DC charger and connect the regulated solar panels directly to the SOLAR INPUT connector on the rear of the Dune 4WD Deluxe Power Box.



## Technical Specifications:

Part Number:	PTDC12V20A	PTDC12V30A
<b>Charger type:</b>	8 Stage intelligent battery Charger DC-DC	8 Stage intelligent battery Charger DC-DC
<b>Compatible rechargeable battery types:</b>	12V Only, Sealed lead-acid, AGM, Gel, Calcium, Lithium	12V Only, Sealed lead-acid, AGM, Gel, Calcium, Lithium
<b>Input Power (V):</b>	11.5 to 15.0 Volts DC	11.5 to 15.0 Volts DC
<b>Output Voltage</b>	13.3-15V stops charging when ignition is switched off for 5 seconds	13.3-15V stops charging when ignition is switched off for 5 seconds
<b>Maximum Output Power:</b>	12V/20A	12V/30A
<b>Charge Control</b>		
<b>De-sulphation</b>	Yes	Yes
<b>Soft Start</b>	Yes	Yes
<b>Bulk Charge</b>	Yes	Yes
<b>Absorption</b>	Yes	Yes
<b>Analysis</b>	Yes	Yes
<b>Boost</b>	Yes	Yes
<b>Float</b>	Yes	Yes
<b>Maintenance:</b>	Yes	Yes
<b>Lithium mode constant voltage charging</b>	14,1V	14,1V
<b>Lithium mode float charging voltage</b>	13,1V	13,1V
<b>Maximum recommended battery charging capacity:</b>	60 to 160Ah battery	60 to 200Ah battery
<b>Minimum Start Voltage for 2nd battery</b>	1.5 Volts	1.5 Volts
<b>Charging Time (Reference)</b>	12h for 160A/h battery	12h for 200A/h battery
<b>Operating Temperature:</b>	-10°C - +95°C	-10°C - +95°C
<b>Case Type:</b>	Heavy duty anodised aluminium housing	Heavy duty anodised aluminium housing
<b>Water / Dust resistance</b>	Yes (IP65)	Yes (IP65)