THUNDER

CONGRATULATIONS ON THE PURCHASE OF YOUR THUNDER DC TO DC BATTERY CHARGER.

For your personal safety, read, understand and follow the information provided in this instruction manual and on the battery charger.

This specialty 12 Volt battery charger is a sophisticated multi stage charger, utilising fully automatic computerised control, designed to charge most 12 Volt Gel, Lead Acid and Calcium batteries.

It is recommended that this unit be installed by a qualified tradesman.

Connection to your Weekend Escape

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FEATURES & BENEFITS

- Heavy duty aluminium case.
- Microchip monitoring and control.
- Fully automatic high frequency multi stage charging.
- Pulse mode technology that reduces oxidation, and minimises temperature equating to longer battery life.
- Unit will automatically change charge rate mapping for GEL, AGM and standard Lead Acid.
- Internal charger temperature monitoring and power output control.
- Easy to read LED indicators showing state of charge.
- Over charging, short circuit and over temperature protection.
- Reverse polarity protection.
- Solar input MPPT regulated output (25V, 300W max).

IMPORTANT SAFETY WARNINGS

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

To avoid any personal injury, please read the following safety instructions. 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 gasses 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. Ensure the chargers ventilation holes are not obstructed. Inadequate ventilation may over-heat the charger and cause in-efficient operation.
7. This battery charger is not intended for outdoor operation. Do not expose it to moisture or extreme weather conditions.
8. If skin or clothing comes in contact with battery acid, flush the affected area immediately with water. Seek medical attention if necessary.

NOTE: The warnings, cautions and instructions detailed in this 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.

INSTALLATION

- Locate the charger in a suitable dry area in the vehicle or caravan.
- Secure the charger using the mounting tabs on the unit.
- Connect the input terminal on the rear of the charger using suitable cable to the main starting battery of the vehicle (see specification table on next page), it is recommended to place a circuit breaker (30A minimum, not supplied) in the main positive lead as close as possible to the starting battery.
- Connect the auxiliary battery to the output terminal of the charger, ensure the correct size cable is used to prevent any voltage drop (see specification table on next page).
- It is recommended to place a circuit breaker (30A minimum, not supplied) in the auxiliary positive lead as close as possible to the auxiliary battery.
- Secure the negative wire to the common negative terminal and secure to a metal (unmoving) part of the vehicle, it is preferable to connect this directly to the negative terminal of both batteries.
- The TDR02020 will work with even the newest computer controlled alternators, for installation into vehicles with variable voltage alternators, negative must be connected to vehicle chassis.
- If connecting a solar panel connect the positive from the panel to the solar input terminal and the negative of the panel to the negative terminal.
- There is no need for an external regulator the DC-DC has a built in MPPT solar regulator.
- Check all connections are tight.

Once correctly installed the TDR02020 is a simple set and forget dual battery solution.

Start the vehicle and let it idle, the charger will recognise that there is charge being applied to the main starting battery. Once the main starting battery has reached 13.1V the charger will automatically begin to charge.

The charger will continue to operate even after the vehicle has been switched off, however once the main start battery falls below a loaded voltage of 12.2V the charger will automatically shut down.

The TDR02020 will prioritise the vehicle input over the solar input so while the battery voltage is above 12.2V it will continue to charge, however once the main battery has reached a loaded voltage of 12.2V and the charger switches off it will look for a solar input.

If the solar input is above 13V then the green LED on the display will illuminate to indicate that the TDR02020 is now using the solar input to charge the auxiliary battery.

Once the solar input goes under 12V the charger will turn off completely.

SPECIFICATIONS

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OUTPUT	20A
INPUT FUSE RATING	Minimum 30A
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VEHICLE INPUT VOLTAGE RANGE	12.2V-17V **Note:** If voltage increases over 17V the Thunder DC-DC will shut off, reset will be needed.
MIN AND MAXIMUM CHARGING VOLTAGES	13.1V-15.2V (stops charging when alternator or vehicle battery below 12.2V)
SOLAR INPUT VOLTAGE RANGE	13V-25V
MAXIMUM SOLAR WATT INPUT	300W **Note:** Exceeding 300W of Solar will damage the Thunder DC-DC charger
CHARGING STYLE	8 stage from Vehicle and 3 stage from Solar
OPERATING TEMPERATURE	0°C to 60°C (current derates after 60°)
FLOAT VOLTAGE	13.8V
STANDBY CURRENT	3mA
BATTERY RANGE	18 to 250Ah

RECOMMENDED *MINIMUM* CABLE LENGTH / TWIN CORE	
0 - 1 METRE	6mm/17AWG
1 - 5 METRE	8 B&S/8AWG
5 METRES PLUS	6 B&S/6AWG* amperage control

*When fitting the TDR02020 to a caravan, the cable will need to be connected to the towing vehicle with a suitable heavy duty connector such as a 50A "Anderson" connector or similar.

WARNING: ONLY TO BE USED WITH 12V BATTERIES, NEVER ATTEMPT TO RECHARGE DRY CELL BATTERIES.

INTEGRATED LED DIAGRAM

The TDR02020 uses an integrated LED display for easy reference of your auxiliary battery state of charge and indicator lights.

These functions include;

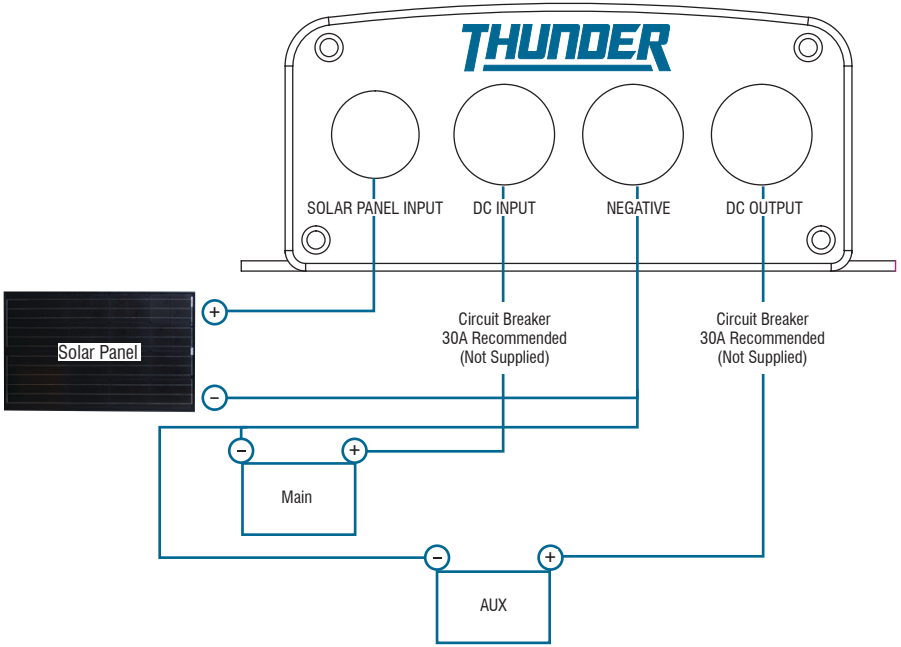
- Solar (green LED)
- Reverse polarity (orange LED including alarm)
- Faulty battery (red LED)

NOTE: The percentage display shows the stage at what the DC-DC battery charger is in, not the percentage of the battery charge, at 80% the battery is fully charged.

WIRING DIAGRAM

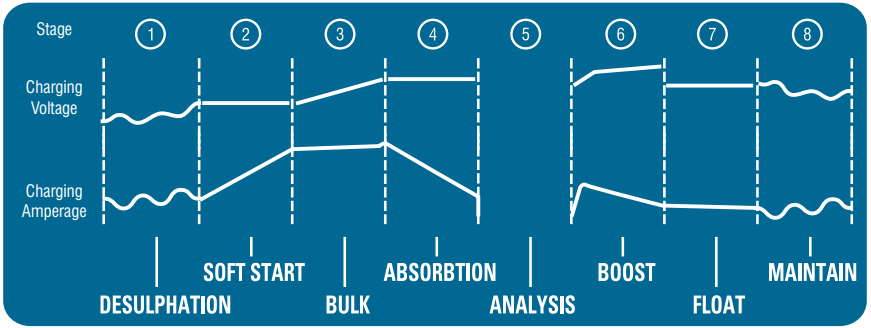
As your auxiliary battery charges, its state of charge is reflected by the Thunder logo illuminating in 10% increments. A percentage charge is also shown in green.

This percentage charge will be affected by loads that are attached to the auxiliary battery. The percentage charge of the auxiliary battery is most accurate when there is no load being drawn.



8 STAGE CHARGING MODE

1. Stage 1 - Battery Check: Pre-charge 5 sec, switches into stage 2 (12V).
2. Stage 2 - Soft Start: Less than 2A or 10 sec charging, switches into stage 3.
3. Stage 3 - Constant Current Charging (Bulk Charge): Max 20A, switches to stage 4 when the battery voltage charges to 14.5V.
   Note: Voltage varies to maintain a constant current until 14.5V is reached.
4. Stage 4 - Constant Voltage Charging (Absorption Charge): Constant 14.5V, up to one hour or current drops to 3A, will switch to stage 5.
   Note: Current varies to maintain constant voltage until it drops below 3A.
5. Stage 5 - Analysis: If the battery voltage drops to 12V or less in one minute, faulty battery indicator will light up with beeper. After one minute If voltage is over 12.6V the Thunder DC-DC goes to stage 6.
   Note: If battery is determined to be faulty the Thunder DC-DC will stop charge.
6. Stage 6 - Boost Stage: Voltage up to max of 15.2V (dependant on battery chemistry), or up to one hour. (up to 20A) If the current drops to less than 4A then it will switch to stage 7.
   Note: Battery chemistry is determined during charging stages, using algorithms that differentiate the rate of charge specific to a particular chemistry e.g. AGM, Calcium, flooded etc.
7. Stage 7 - Final Charge / Test: Highest voltage 13.8V, when the current is less than 1A or one hour has passed, it will switch into stage 8.
8. Stage 8 - Maintenance Charge (Float): Constant 13.8V pulse charging.
9. Stage 8 - Pulse Check: Every 20 sec to monitor discharge (if discharge is found on the aux battery it will move back to Stage 3, and work it's way back through the stages).



SOLAR CHARGING MODE

1. Stage 1 - Direct Solar Energy: Charges the battery until the battery voltage reaches 14.5V, switches to stage 2.
2. Stage 2 - Overpressure Pulse Charging: When the battery voltage is lower than 14.5V, charger pulses for one sec on and one sec off. This will occur for two hours, or until 14.5V average is reached (whichever comes first). Then will switch to stage 3.
3. Stage 3 - Pulse Floating Charge: Pulse one sec on, one sec off at 13.8V.

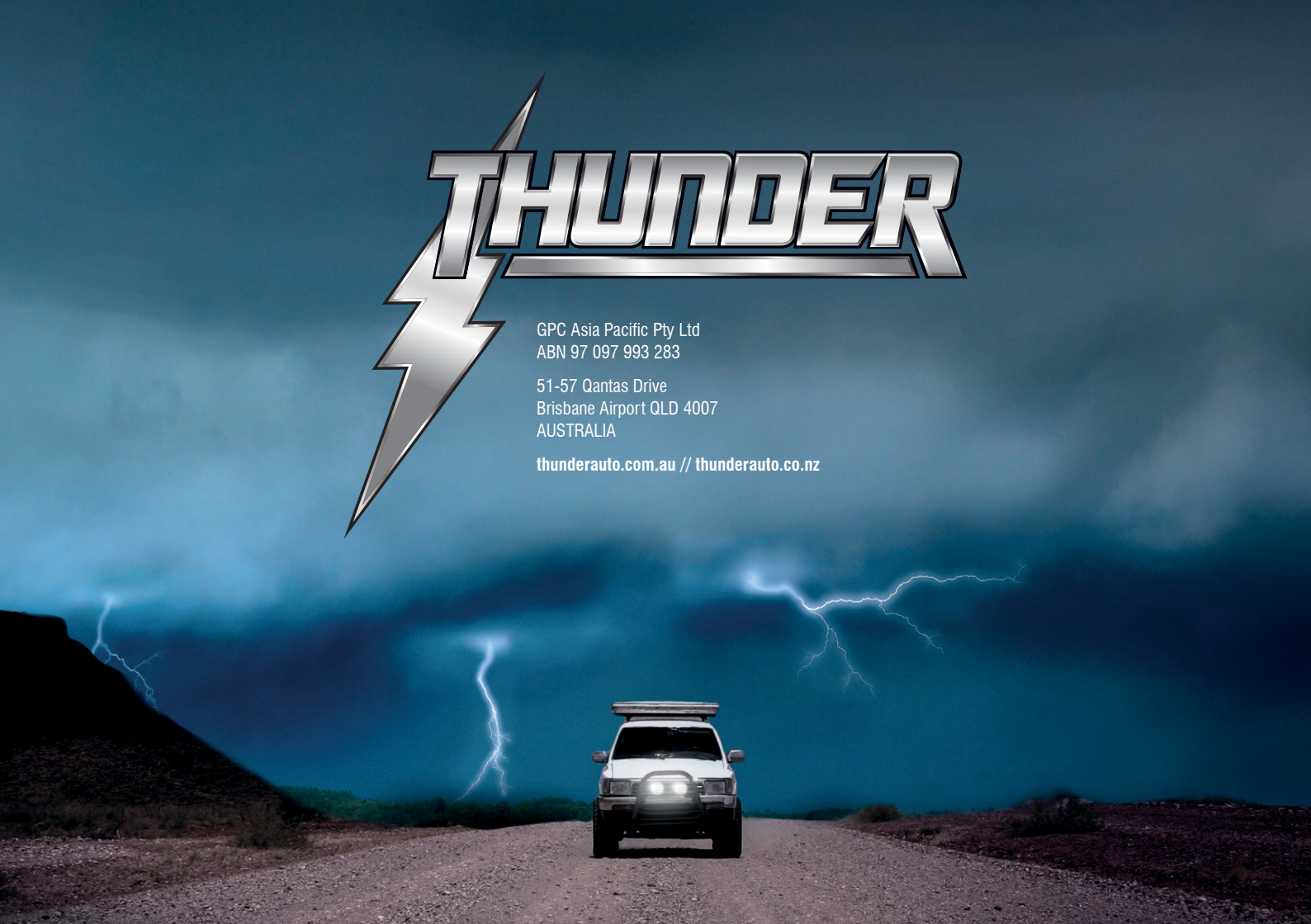
WARRANTY TERMS & CONDITIONS

When you acquire or fit a Thunder product you have the peace of mind in knowing that it is backed by a comprehensive 12 month warranty against defects in materials & workmanship. The Thunder warranty is provided in additional to any rights you may have under the Australian Consumer Law.

All claims under this warranty should be made by returning the product to the place of purchase at your expense, with the detail of the fault, proof of purchase & fitment details. If we determine that a Thunder product is defective in materials or workmanship during the warranty period, we will either repair or replace the unit.

This warranty does not apply to failure or damage to a Thunder product caused by incorrect or faulty fitment, accidental or intentional damage, failure of other products, incorrect application, incorrect voltage, environmental damage, operation of the product outside of its environmental and technical specifications, or repair or modification carried out by anyone other than an authorised repairer.

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 & 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 & the failure does not amount to a major failure.



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