



DC-DC CHARGER

AP20DC

# USER MANUAL



## ABOUT US

ATEM POWER, born in June 2017, as a synonym for exciting outdoor experience, is an Australian company with dedication and passion for the R&D of high quality products in the field of renewable energy products, batteries and related accessories.

Since the company was founded, we have committed to innovation that aims to make your life infinitely more convenient. And the belief in our conviction for quality and commitment allows us to innovate in developing products that are optimally tailored to the needs of our amazing customers.

We engineer and supply solar products for homes, 4x4s, recreational vehicles and virtually any application you can think of. And we also develop reliable, high performing deep-cycled batteries and lithium batteries for standby or daily power needs. Accessories include battery chargers and inverters that are ideal for RV's, commercial vehicles, boats, yachts and many more applications!

At ATEM POWER, we stay true to our DNA by prioritizing technological innovation designed to improve our products and striving to provide excellent customer care. Because we are motivated to explore the limits of solar power!

## IMPOTANT SAFETY INSTRUCTIONS !

- Children or adults under the influence of alcohol or drug, or those who lack of experience or professional knowledge are not allowed to use this unit.
- The user must read and understand all of the warning and safety messages supplied with your product prior to installation or use.
- Do not use or store this charger near heat sources such as fire or heaters or expose it to flammable chemicals, vapors or corrosive gases.
- Please only use this product as intended.
- Do not strike, throw the charger.
- Do not mount the product in places where there is a risk of gas explosion.
- Inadequate ventilation may lead to overheat and inefficient charging.
- Please do not expose the charger to moisture or harsh environments.
- This product should be firmly fastened to prevent fall down or tip over.
- Please do not disassemble this charger as such action will not only cause potential damage to you and your unit, but also void the warranty.
- Please note that this DC-DC charger is not waterproof.
- Please disconnect the charger before maintenance or cleaning.
- This DC-DC charger can only be repaired by professional personnel.
- Before charging, please wear proper eye protections.
- 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.
- Do not smoke or have an open spark or fire near this unit.
- 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.
- Examine the battery charger regularly for damage. If the battery charger is damaged, it must not be used until it has been repaired.

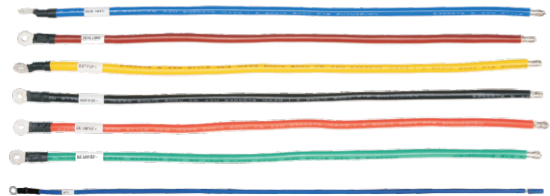
## KEY FEATURES

This DC-DC charger by ATEM POWER, which is ideal for 4WDs, caravans, RVs, trucks, campers, trailers, campervans, commercial vehicles and boats, offers an effective way to charge your auxiliary batteries from the alternator or solar panel (up to 20A) to charge AGM, Gel, calcium, LiFePO4 batteries. It also has a built-in MPPT regulator to maximize energy absorption, thus reducing the load on your engine. And over-charge, short circuit, over-temperature, thermal load, solar input overload, input/output reverse polarity protection have been integrated to offer an extra layer of protection. Furthermore, the charger allows you to re-select the battery during charging by long pressing "POWER", and LED indicator showing stage of charging. And memory function is integrated to make charging more convenient.

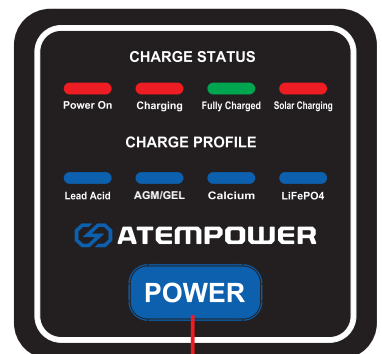
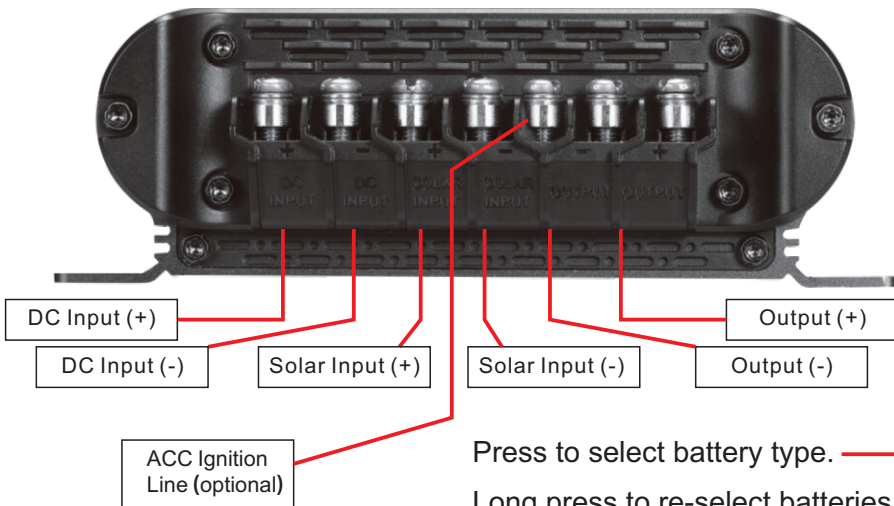
## STAGE OF CHARGING

- (1) Standby
- (2) Pre-charge
- (3) Constant current charging 1
- (4) Constant current charging 2
- (5) Constant voltage charging
- (6) Fully charged
- (7) Re-charge

## PACKING LIST



## IDENTIFICATION OF PARTS



Press to select battery type.

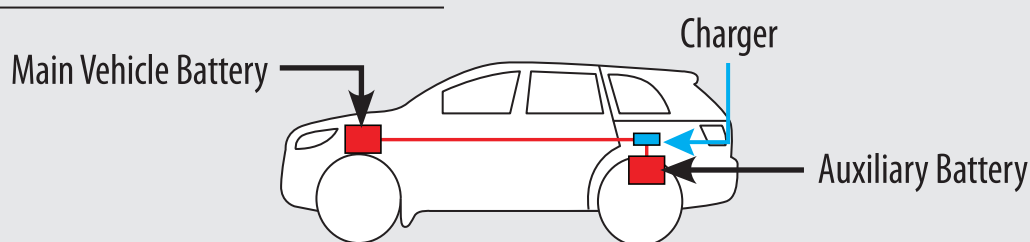
Long press to re-select batteries during charging.

## INSTALLATION INSTRUCTIONS

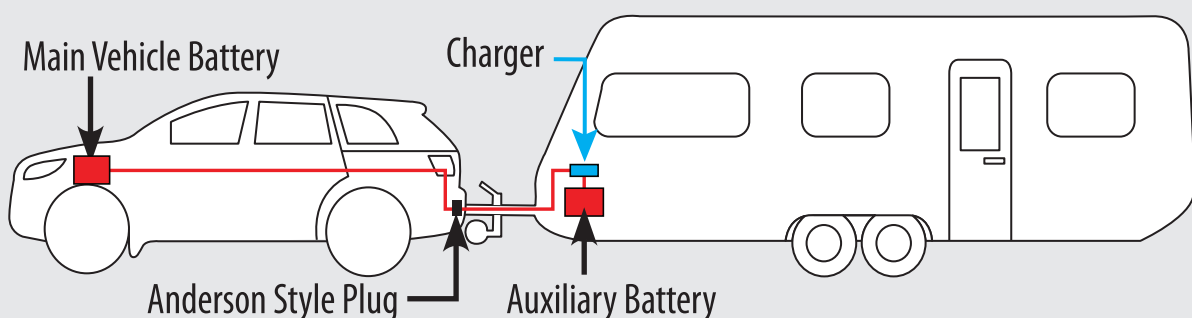
- Please check whether the specification of your cable is compatible with this DC-DC charger.
- This charger can be installed both horizontally and vertically.
- Please make sure that the charger is installed as close as possible to the battery you are going to charge, and you also need to make sure that the areas is not susceptible to moisture, water, dust or high temperatures.
- Please ensure that there is no heat source or flammable gas around the unit.
- Anderson plug is recommended when this charger is installed on a caravan or a campers (see picture below).
- Twin core cable will be used between the start battery and the charger, and you need to connect the common negative and common positive wires from the starter battery to the input of the DC-DC in the appropriate positive and negative terminals.
- It is highly recommended to install a 40 Amp circuit breaker (not included in this package) that should be installed near the starter battery.
- Check whether all connections are clean and tight.
- You can connect the optional ACC line to the ignition of your vehicle, then turn your key to the ACC position when engine starts, which will be detected by the DC-DC charger. And the main battery will start charging your auxiliary battery.

Note: the charger may discharge your main battery if the ACC line is connected but you key is not turned to the START position.

### Suggested fitment to vehicle only



### Suggested fitment to vehicle with caravan



This charger can also be connected to the solar panel, see detailed wiring diagram at Page 5.

## HOW TO USE

### 1. DC Battery

- Start your vehicle and let it idle.
- And the charger will recognize that there is a charge being applied to the main starting battery.
- The charger will charge the auxiliary battery when the main starting battery has reached 13V. The main battery will start charging the auxiliary battery when its voltage is or above 11.5V (ACC line connected).
- Press “POWER” to re-select batteries (The default setting is for lead acid battery, and your setting will be saved once selection is made).
- The charger will continue to operate even after the vehicle has been switched off, however when the main starting battery fall below 12.5 volts the charger will automatically shut off. The main battery will start charging the auxiliary battery when its voltage is or above 11.5V (ACC line connected); The main battery will start charging the auxiliary battery when its voltage is or above 13V (ACC line not connected).

### 2. Solar Input

- The charger will shift to solar charge mode when the input terminal is connected to the solar panel.
- Press “POWER” to select the corresponding battery type, and batteries can be re-selected during charging by long pressing the button.
- Charging begins when the output of solar panel reach 16V~25V, and the panel will stop to charge when its output is below 10V.

**Note: this charger is not designed to charge your auxiliary battery with DC inputs and solar concurrently, DC enjoys input priority over solar. The recharge voltage for LiFePO4 battery is 13.2V, and for batteries including AGM, Gel and Calcium, the voltage is 12.3V.**

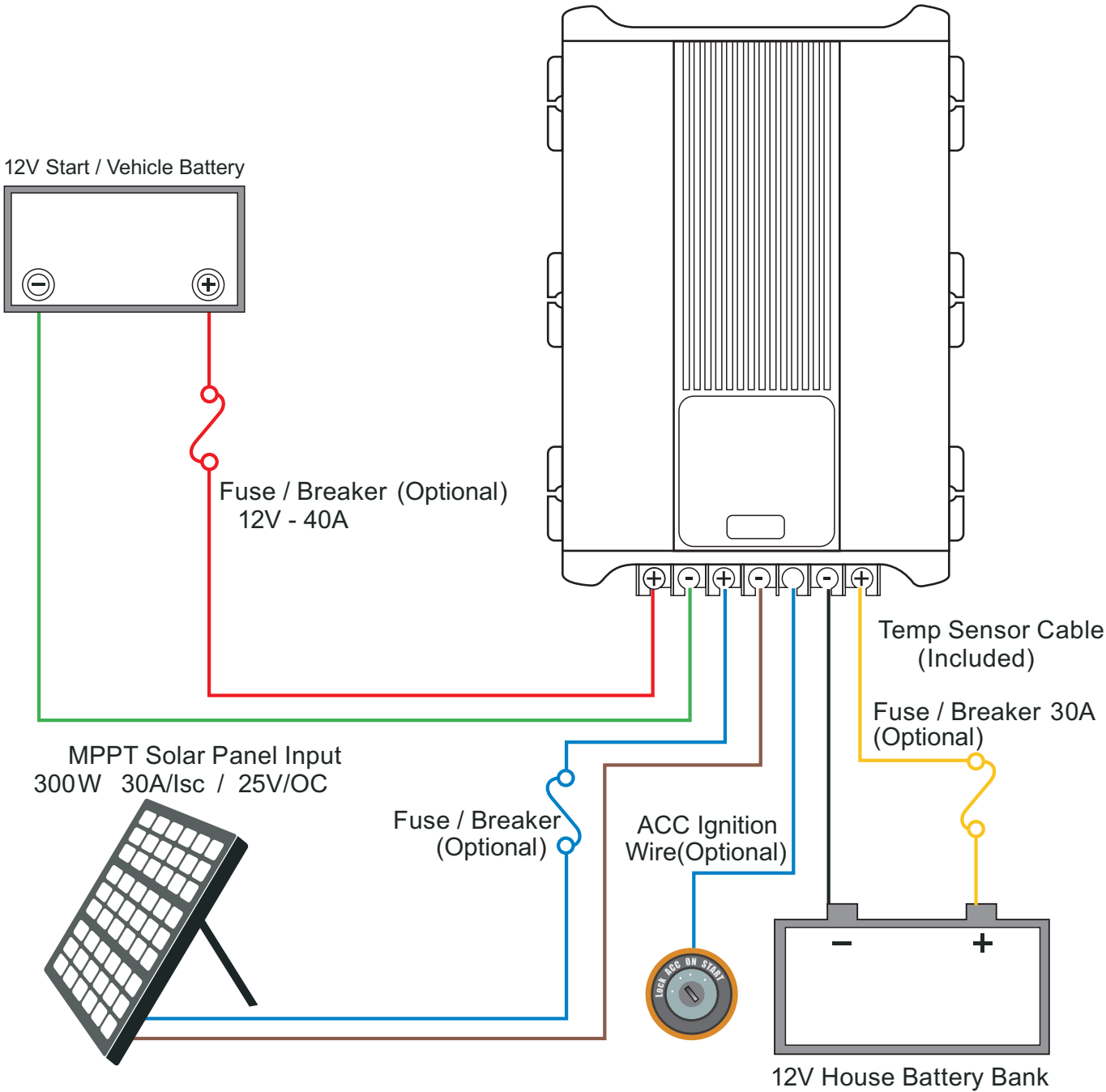
**Wake-up of Lithium-Ion Batteries in Sleep Mode: this DC-DC charger cannot charge a lithium-ion battery in sleep mode. To charge the lithium-ion battery, first make sure the DC-DC charger is correctly connected to the battery. Then select the “LiFePo4” mode, and long press “POWER” for 5s. The “charging” (red) indicator will flash for 10s. If the battery is successfully waken up, the “charging” (red) indicator will be constantly on and the DC-DC charger begins to charge the battery. Otherwise, the DC-DC charger will enter the standby state and the “Power On” indicator will be on.**

## DEEP CYCLE BATTERY MAINTENANCE

- This DC-DC charger by ATEM POWER will be used to charge your auxiliary battery, for example, deep cycle batteries that are designed to provide power for your fridges and light in caravan or camper.
- It is known that the lifespan of a deep cycle battery can be extended if it is not discharged below 50% of its full capacity. A fully charged battery (50 amp) can deliver 50 amp/hours without shortening its lifespan.
- Your fridge might use appropriately 24 amps per day. In this light, if your 100AH battery is only used to power your fridge while receiving no charge, and it would require charging after 48 hours.
- To replenish the capacity of the battery (100AH capacity, 50AH discharged), you may need to use a 40 amp DC-DC charger that would further require at least 1.25 hours of driving/solar charging. A 30 amp unit will require at least 1.67 hours of driving/solar charging to fully recharge the battery. A 20 amp unit will require at least 2.5 hours of driving /solar charging to fully recharge the battery. Undercharge the battery or discharge it by more than 50% will significantly shorten its lifespan.

# BATTERY WIRING

This diagram is for a reference only. Local rules and regulations should be followed when installing this unit.



**NOTE:** First connect the ACC line to the ignition of your vehicle. Then turn your key to the ACC position when engine starts, which will be detected by the DC-DC charger. And your auxiliary battery will be charged via the main battery.

## TROUBLESHOOTING

- Display shows that the charger is not charging: check where the battery is connected; check the terminals; check whether the battery is 12V.
- Battery is not charging: check whether all connections are connected correctly; check the status of the battery; check the status of your vehicle or solar panel.
- Battery cannot be fully charged or power cannot be maintained: please check whether your battery has been used for over 3 years; overheat; low in electrolyte; over-charging or battery vulcanized; You need to consult your battery manufacturer to check its condition or make a replacement.

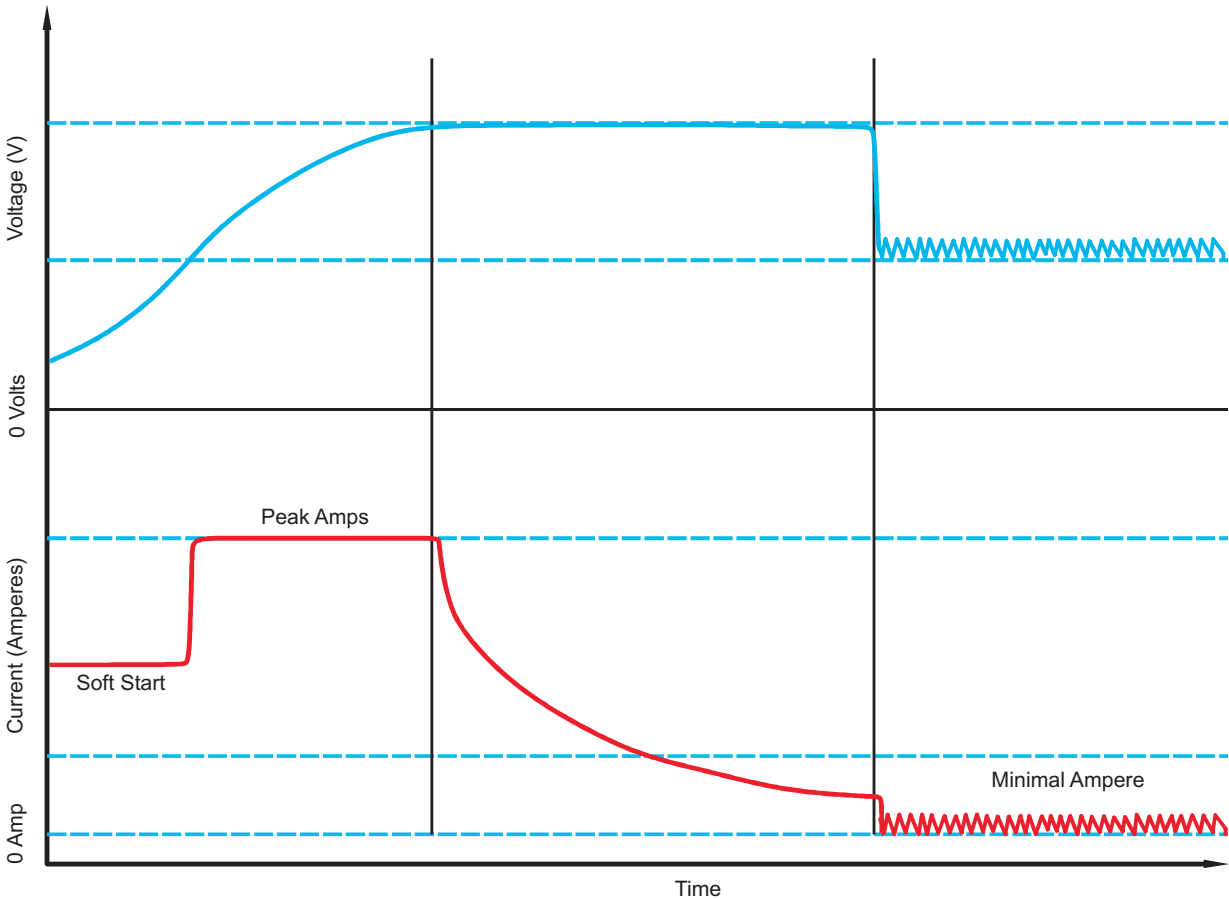
## TECHNICAL SPECIFICATIONS

|                                 |   |                               |
|---------------------------------|---|-------------------------------|
| <b>Model:</b>                   | <b>AP20DC</b>   |                               |
| Type                            | Multi Stage   |                               |
| Input                           | DC Battery:13.0 -16.0 Volts   | Solar Input:16.0 - 25.0 Volts |
| Output / Charging Voltage       | 14.4 - 15.4 Volts (Stops charging when alternator output or vehicle battery below 12.5 Volts) |                               |
| Output Current                  | DC Output:20A   | Solar Output:20A              |
| Minimum Start Voltage           | 2.5 Volts - For battery being charged   |                               |
| <b>Charge Control</b>           |   |                               |
| Soft Start                      | YES   |                               |
| Soft Charge Current             | 20A   |                               |
| Bulk Charge Voltage             | 14.7V (AGM/Gel)14.4(Lead Acid)15.4(Calcium)14.4V(LiFePO4)                                     |                               |
| Absorption                      | Constant voltage with automatic amperage control  |                               |
| Equalisation                    | Automatic   |                               |
| Float Charge Voltage            | 13.5 (AGM/Gel)13.5V(Lead Acid)13.5V(Calcium)  |                               |
| Float Charge Current            | 0-20A   |                               |
| Battery Range                   | 60 to 600Ah   |                               |
| <b>Cable Length / Twin Core</b> |   |                               |
| 0 - 1 Metres                    | 10AWG   |                               |
| 1 - 5 Metres                    | 8 AWG   |                               |
| 5 Metres +                      | 6 AWG   |                               |

# CHARGING VOLTAGE

|             | AGM/GEL | LEAD ACID | CALCIUM | LiFePO4 |
|-------------|---------|-----------|---------|---------|
| BOOST       | 14.3 V  | 14.0 V    | 15.0 V  | 14.0 V  |
| CHARGING    | 14.7V   | 14.4 V    | 15.4 V  | 14.4 V  |
| MAINTENANCE | 13.5 V  | 13.5 V    | 13.5 V  |         |

# CHARGING ALGORITHM



Charging algorithm will change according to battery type.

**NOTE:** Charging voltage is specified by your battery manufacturer. Non observance of instructions will void the warranty of your battery.





# WARRANTY



## WARRANTY PERIOD:

Full 12 months warranty from date of purchase against all manufacturing defects. This DC-DC charger by ATEM POWER comes with guarantees that cannot be excluded under the Australian Consumer Law.

## WHAT DOES THE WARRANTY COVER?

Under normal usage conditions, this warranty covers:

- Any defect in design or manufacture which results in its failure to perform correctly as described.
- We will either repair or replace the product at our discretion provide that the fault is found to have been caused by a design or manufacturing defect and not misuse or tampering.
- The limited warranty is the only one that applies to this unit, and it sets forth all the responsibilities of ATEM POWER.

## THE WARRANTY DOES NOT COVER:

- Cost of removing and reinstalling the product.
- Travel and /or other expenses due to customer's location
- Transport charges and damage in transit. It is your responsibility to deliver and pick up your product, including any costs associated with the postage of repairing or replacing your product. If you want to send the product back we recommend that you insure against loss or damage.
- Any loss directly or indirectly associated with the product that fails to operate.
- Damage caused by mould, misuse, incorrect operation, adverse weather, accidents and daily wear and tear.
- The warranty does not extend to subsequent purchasers or users other than OEM applications.
- This unit 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.