



25A / 40A DC-DC CHARGER

AP25DC / AP40DC

# USER MANUAL



Please read this manual carefully before installation, and retain it for future reference.

V1.3

## 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 clean 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.

Specializing in clean energy solutions, we engineer and supply solar products tailored for homes, 4x4s, recreational vehicles, and virtually any application you can think of. And we also develop dependable, high-performance deep-cycle 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 beyond.

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 not just motivated to explore the limits of solar power but reshaping the future with sustainable energy choices.

Embrace the future with ATEM POWER – Clean Energy by Smart Way.

## **IMPORTANT SAFETY INSTRUCTIONS !**

The following instructions detailed in this manual cannot cover all possible conditions and situations that may occur, so it is the user's responsibility to exercise common sense and caution.

### **General Safety**

- This product is not intended for use by persons with reduced physical, sensory or mental capabilities, or lack of experience or knowledge. Children should be supervised to ensure that they **DO NOT** play with the product.
- Examine the charger regularly for damage. If the battery charger is damaged, it must not be used until it has been repaired.
- When working with electrical equipment or lead acid batteries, have someone nearby in case of an emergency.
- Wear personal protective equipment including eye protection (that protects eyes from all angles) and gloves.
- Prolonged contact to high heat or freezing temperatures will decrease the working life of the unit.
- **DO NOT** use in connection with life support systems or other medical equipment or devices.
- Disconnect the product from the battery each time before cleaning or before making changes to the circuit.
- Install and store the product in a dry and cool place. Keep away from liquids! **DO NOT** expose the product to heat sources such as direct sunlight or other heating elements.
- **DO NOT** use the product if physically damaged or with visibly cracked cables. Contact the manufacturer, customer service to prevent safety hazards.
- **DO NOT** disassemble this charger as such action will not only cause potential damage to you and your unit, but also void the warranty.
- Inadequate ventilation may lead to overheat and inefficient charging.
- This product can only be repaired by professional personnel.
- Disconnect the charger before maintenance or cleaning.
- **DO NOT** strike, throw the product.
- Firmly secure cables and connections.
- It is highly recommended to install 40 Amp circuit breakers (not included) for both the main battery and the auxiliary battery (AP25DC), as well as a 60 Amp circuit breaker for the main battery and a 50 Amp circuit breaker for the auxiliary battery (AP40DC).

### **Battery Safety**

- The acid or fluid within a lead acid battery is corrosive and poisonous, which can produce flammable and toxic gases when recharged and will explode if ignited. When working with those batteries, ALWAYS wear goggles, gloves, or protective clothing, remove personal metal items (such as rings, bracelets, necklaces and watches) and ensure the area is well ventilated. If spilled it will cause severe burning to eyes and skin and corrode metals. Ensure that power is disconnected from any appliance in the vicinity of the spill and immediately wash any area that has been affected with water.
- 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.
- In very cold weather a discharged battery may freeze. NEVER charge a frozen battery. Gases may form, cracking the case, and spray out battery acid.
- Use only rechargeable deep cycle batteries. NEVER attempt to charge a known faulty, frozen, defective battery or non-rechargeable battery.
- Ensure batteries are mounted and stored in an area with good ventilation.
- ALWAYS check the batteries and charging system periodically to ensure no faults occur.
- 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.
- DO NOT smoke or have an open spark or fire near the battery.
- Reverse protection is available for AGM, Gel, Calcium, and Lead Acid batteries, with the exception of LiFePO4 batteries.

### **Installation Safety**

- DO NOT install this charger near heat sources such as fire or heaters or expose it to flammable chemicals, vapors, corrosive gases, liquids or materials.
- DO NOT mount the product in places where there is a risk of gas explosion.
- This product should be firmly fastened to prevent fall down or tip over.
- Ensure the area around the battery is well ventilated before and during charging process.
- It is recommended to mount this product as close as possible to your auxiliary battery. This will ensure maximum performance out of your charger.
- DO NOT lay AC and DC cable in the same conduit and DO NOT pull on the cables.
- When setting up the connection to the DCDC controller, please observe the following sequence: start by connecting the auxiliary battery and make sure its polarity is correct, and subsequently the input source.

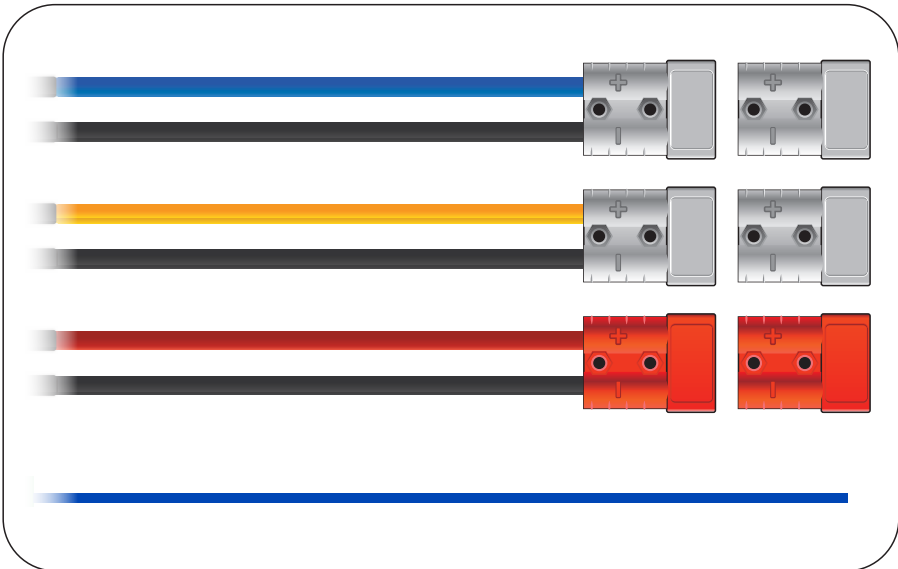
### **Operation Safety**

- 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.
- DO NOT operate in salty, wet, or damp environments; in the vicinity of corrosive fumes; in the vicinity of combustible material; in areas with risks of explosions.
- Please be aware that parts of this product may still produce voltage even after disconnected or activation of fuse.
- DO NOT disconnect cables while the product is operating.

# IN THE KIT

- 1 PC(s) ATEM POWER 25A / 40A DC-DC Charger with Anderson Style Plugs
- 3 PC(s) Anderson Style Plugs
- 1 PC(s) User Manual

# IDENTIFICATION OF PARTS



- Blue: Solar Input +
- Black: GND
- Yellow: Output +
- Black: GND
- Red: DC Input +
- Black: GND
- ACC Ignition Line

## INSTALLATION

### Location Considerations

When selecting a location for the DC-DC, make sure that the unit is as close as possible to the battery you will be charging (auxiliary battery). The charger may be mounted on the cabin of the vehicle, along a chassis rail, the inner guard of a vehicle, behind the grille or headlight or even on the side of the radiator. However, you want to make sure that the area is not susceptible to moisture or other substances as well as potentially high temperatures.

The battery charger can be installed horizontally as well as vertically.

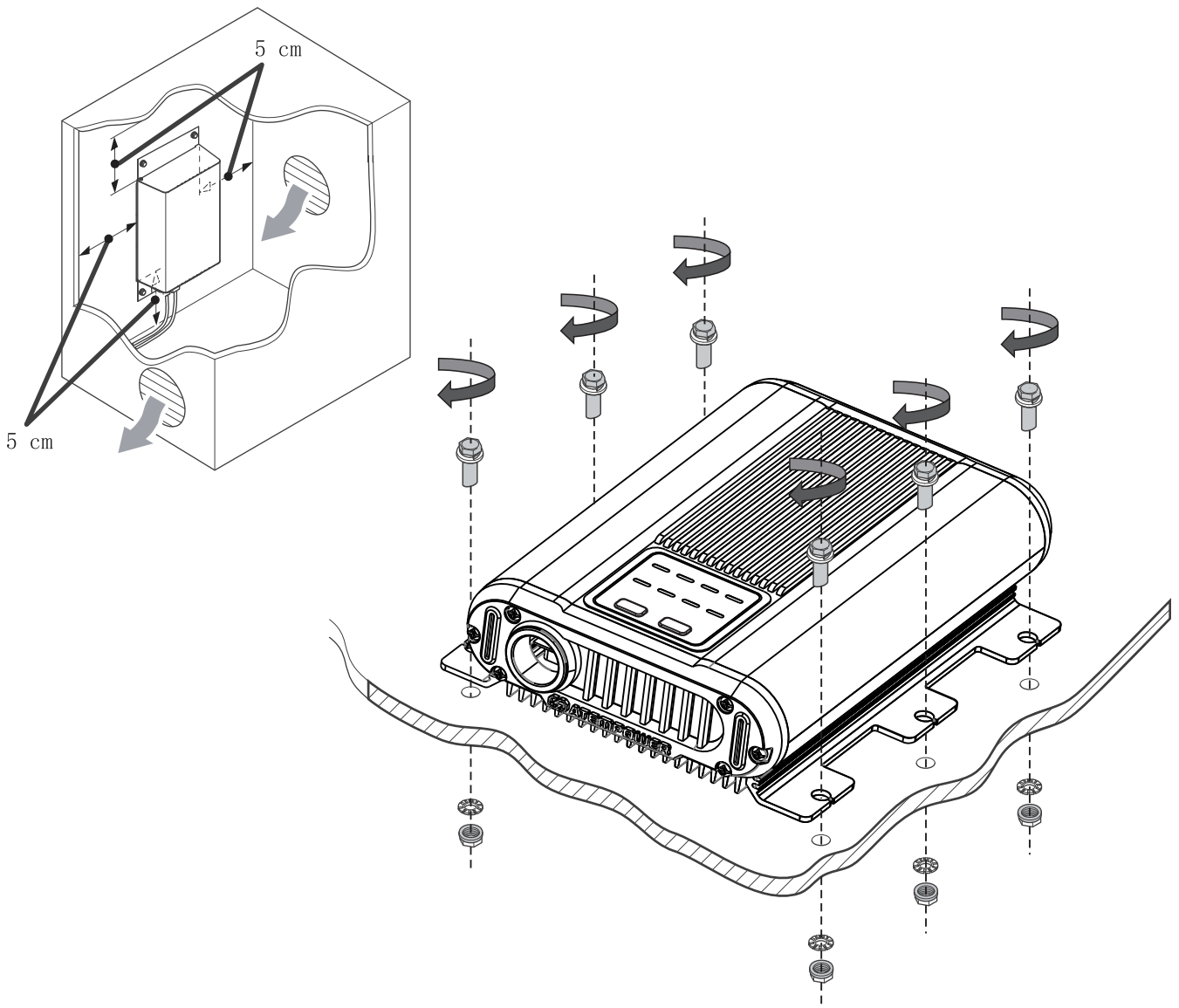
The device must be installed on a level and sufficiently sturdy surface.

### Mounting

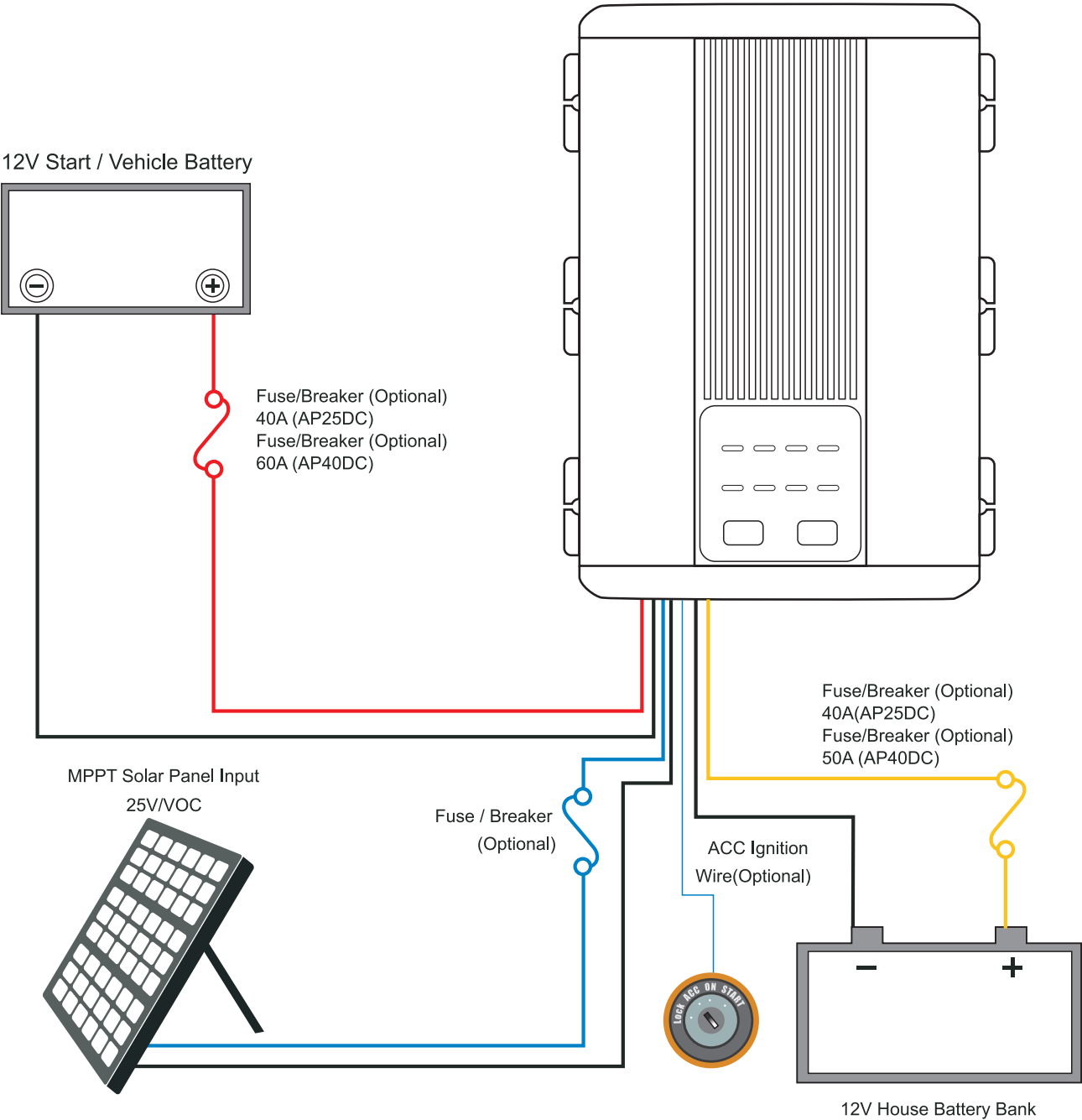
Have at least 5cm of clearance from all areas and ensure some ventilation for best performance.

Trace the mounting holes with a pencil/pen when placing the DC-DC against the desired area.

Use 6 x screws to secure the DC-DC onto a surface.



# WIRING



## OPERATION

### Battery Type Selection

Long press "SELECT" button for 3 seconds to enter selection mode, and the LED indicator will be blinking. Press "SELECT" to select the type you need. Then long press "SELECT" button to confirm and exit. It has a power-off memory function, and will remain on this battery type until it is changed.

### Reverse Charging

Long press "Reverse Charge" for 3 seconds to start reverse charging when the voltage of your main battery is greater than 3V but less than 12V, and the voltage of your auxiliary battery is greater than 12.5V.

"Power On", "Charging", "Fully Charged" and "Solar Charging" will blink simultaneously and the beeper will beep periodically during this process.

For AP40DC, it is recommended to exit when the voltage of your main battery is greater than 13V and the charging current is less than 10A, or the voltage of the auxiliary battery is less than 11V. For AP25DC, it is recommended to exit when the voltage of your main battery is greater than 13V and the charging current is less than 6.25A, or the voltage of the auxiliary battery is less than 11V.

### Lithium Reactivation

To begin, please choose the lithium battery mode. If the battery voltage is found to be less than 3V, it will be considered as the lithium battery being in an undervoltage protection state and will activate automatically. It's worth noting that during activation, it is essential to disconnect any load connected to the battery. The lithium battery activation function is compatible with both the DC port and PV port inputs at the same time. After powering up the DCDC charger, it will automatically initiate activation after 180 seconds, with an activation cycle lasting 100 seconds.

### Input Priority

When both solar and DC input meet the start-up condition (which does not mean you need to connect both solar and DC input), the charger will automatically choose DC input. Even if solar input is chosen to charge your battery, the controller will consistently detect whether the DC input meets the charging requirement and will switch to DC supply when it meets that requirement.

### ACC Line

For vehicles with a smart alternator, you'll need to connect the ACC line to a switched ignition source (a point that supplies 12V only when the key is in the "ON" position and disconnects when the key is in the "OFF" position, for example) of your vehicle, usually it can be found in the vehicle's fuse box and a fuse tap can be used. Then the main battery will start charging your auxiliary battery.

### DC Input

Start your vehicle and let it idle.

The charger will recognize that there is a charge being applied to the main starting battery.

It will charge your auxiliary battery when the main battery has reached 13V or when its voltage is or above 12V (ACC line connected).



The charger will continue to operate even after the vehicle has been switched off, however when the main starting battery falls below 12.7V (acc line not connected) or is less than 11.3V (acc line connected), the charger will stop charging.

STATUS	POWER ON		POWER OFF		DERATING
ACC Voltage	>8.5V	<8V	>8.5V	<8V	/
DC Input Voltage	>12V	>13V	<11.3V	<12.7V	<11V
Battery Voltage	>7V	>7V	/	/	/

**Note:** To obtain the accurate voltage of the starter battery, it will conduct scheduled measurements at a 100-second downtime interval. But it won't conduct that measurement when the charging current is less than 5A.

### Solar Input

The charger will shift to solar charge mode when the input terminal is connected to the solar panel. Charging begins when the output of solar panel is greater than 10V, and the panel will stop to charge when its output is below 9V.

The ATEM POWER DC to DC charger can also charge your battery via solar panels through its MPPT solar input section. Maximum Power Point Tracking (MPPT) allows it to optimise the electronics to ensure all of the watts available from the solar panels are extracted. This makes them operate at the most efficient voltage and ensures you get maximum solar energy supply.

STATUS	POWER ON	POWER OFF
Solar Input Voltage	>10V	<9V
Battery Voltage	>7V	/

**Note:** this charger is not designed to charge your auxiliary battery with DC inputs and solar simultaneously, DC enjoys input priority over solar.

## **BUILT-IN PROTECTIONS**

### **Input Reverse Polarity Protection**

Both solar and DC input ports are equipped with reverse polarity protection. If your polarity is reversed, the charger won't begin charging.

### **Input Overvoltage Protection**

When the voltage of the solar input exceeds 30V or that of the DC input surpasses 24V, the buzzer will beep-beep for 3 minutes. Press any key then the buzzer will stop beeping and the "Power On" indicator will blink once during a three-second interval.

### **Output Reverse Polarity Protection**

Output port (battery port) is equipped with reverse polarity protection. If your polarity is reversed, the charger won't begin charging. It's important to note that in LiFePO4 mode, there is no output reverse protection, and connecting the battery with the wrong polarity may damage the controller.

### **Battery Overvoltage Protection**

The buzzer will beep-beep for 3 minutes when the voltage of the battery is 0.4V higher than its fully charged status. Press any key then the buzzer will stop beeping and the battery type indicator will blink once during a three-second interval.

### **Over-Temperature Protection**

Charging current will be limited when the temperature of the circuit board exceeds 60°C. Charging will stop when as temperature exceeds 70°C. The buzzer will beep for 3 minutes. Press any key then it will stop beeping. The charger will resume charging until temperature drops under 58°C, and the "Power On" indicator will blink twice during a two-second interval.

### **Charge Timeout Protection**

The DC-DC charger will stop charging if it has been consistently operating for more than 12 hours. The buzzer will beep-beep for 3 minutes. Press any key then the buzzer will stop beeping and the "Power On" indicator will blink twice during a two-second interval. But the charger will also be locked.

### **BMS Protection for Lithium Batteries**

In the LiFePO4 mode, the charger will stop charging if the voltage of your LiFePO4 battery has experienced a sudden drop. The battery type indicator will blink once during a three-second interval and the charger will recharge the battery after 5 minutes. Press any key then the buzzer will stop beeping.

## TECHNICAL SPECIFICATIONS

MODEL	AP25DC	AP40DC
Product Dimensions	189x148x48mm	
Product Weight	1.1kg	
DC Input Voltage Range	11V~24V	
Solar Input Voltage Range	9V~30V	
Max. Input Current	28A	45A
Output Voltage	0~15.4V	
Max. Output Power	385W	616W
Rated Output Current	25A	40A
Standby Current	<10mA	
Charging Profile	4 Stages	
Battery Compatibility	Lead Acid, AGM, Calcium, LiON (LiFePO4)	
IP Rating	IP-54	
Operational Temperature	-20°C~45°C	
Storage Temperature	-40°C~60°C	
Humidity	0%~90%	

## MAINTENANCE

Regularly inspect the wiring and its terminals, and ensure that they are tight, clean and free of cracks or corrosion.

Ensure that DC-DC charger is free of dust or liquids, and is well-ventilated. Better ventilation improves its performance.

## UNDERSTANDING THE ERROR CODES

PROBLEM	POSSIBLE CAUSE	SOLUTION
The "Power On" indicator blinks once during a three-second interval	Abnormal solar or DC input (e.g. overvoltage)	Reconnect solar panel or DC input
The "Power On" indicator blinks twice during a two-second interval	The DC-DC charger is overheat	Mount the charger onto a well-ventilated area
The "Power On" indicator blinks three times during a one-second interval	Self-diagnosis of faults	The charger will be locked when that error occurs, and you'll need to cut off its power and restart. If the problem still continues, please contact ATEM POWER.
The battery type indicator blinks once during a three-second interval	Battery abnormal connection (e.g. overvoltage, overcurrent)	Reconnect your battery
The battery type indicator blinks three times during a one-second interval	BMS protection for lithium batteries has activated	Ensure the battery cells are functioning properly
Battery type indicator blinks twice during a two-second interval	Charging that takes too long	Check whether the battery capacity is too large, or the battery itself is abnormal. Please note that the charger will be locked when that error occurs, and you'll need to cut off its power and restart

## CHARGING STAGES

CHARGING STAGE	BATTERY VOLTAGE				CHARGING CURRENT	
	LEAD ACID	GEL/AGM	Calcium	LiON	AP25DC	AP40DC
TRICKLE CHARGE	<10V	<10V	<10V	<10V	≤12.5A	≤20A
CC(Constant Current)	12V~14.4V	12V~14.7V	12V~15.4V	12V~14.4V	≤25A	≤40A
CV(Constant Voltage)	14.4V	14.7V	15.4V	14.4V	≤25A	≤40A
FULLY CHARGED	14.4V	14.7V	15.4V	14.4V	<2.5A(DC Input) <1A(Solar Input)	<4A(DC Input) <1A(Solar Input)
FLOATING CHARGE	13.8V	13.8V	13.8V	/	≤12.5A	≤20A
RECHARGING	13.2V	13.2V	13.2V	13.6V	≤12.5A(LiON Only)	≤20A(LiON Only)



# WARRANTY



ATEM POWER (“Manufacturer”) warrants, to the original purchaser, (“User”) that its DC-DC charger, if purchased from Manufacturer or an authorized distributor or dealer, will be free of defects in material and/or workmanship under normal application, installation, use and maintenance conditions from the date sold and for the duration (the “Warranty Period”) of 1 YEAR. Within the Warranty Period, subject to the exclusions listed below, the Manufacturer will repair, replace the DC-DC charger or provide you with a refund at our discretion, if the unit in question are determined to be defective in material or workmanship. If the Manufacturer deems the charger to be not repairable, a new, similar product will be offered, or a refund will be issued. This Limited Warranty is to the original purchaser of the DC-DC charger and is not transferable to any other person or entity.

## EXCLUSIONS:

This warranty does not cover defects that are caused by normal wear and tear, inadequate maintenance, transportation, storage or faulty repair, misuse, neglect, accident or abuse, modification, failure to observe installation and maintenance instructions or improper installation. It is recommended that the installation should be performed by suitably qualified technicians or the warranty will be voided. For further clarity, this warranty is also void if the DC-DC charger:

- is used for applications other than which it was designed and intended for,
- is disassembled, or repaired by someone other than an authorized Manufacturer's agent, or without ATEM POWER's authorization,
- has been subject to adverse weather, extreme temperature or physical damage,
- has been damaged by force majeure (e.g. flash of lightning, overvoltage, storm, fire),
- selected by the user is not of the correct size or specification for the intended application,
- is damaged due to the non-observance of any of the instructions supplied by ATEM POWER, or defects resulting from any action of the purchaser including but not limited to mishandling or operation outside of design limits.

## CLAIMS:

Request return authorization. No returns will be credited without an authorization. In the case of returned products, Manufacturer's exclusive liability for breach of any warranty on the product shall be to replace the DC-DC charger within the warranty period in accordance with the terms of this limited warranty. In no event shall Manufacturer be liable for any loss or damages of any other kind, whether direct, incidental, consequential including lost profits, exemplary, special or otherwise, including any lost profits or removal, shipping, or installation expenses.

For more information, please visit: [www.atempower.com](http://www.atempower.com)