



60A DC-DC CHARGER

AP60DC

# USER MANUAL



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

V1.0

## 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!

## **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 a 90 Amp circuit breaker (not included) that should be installed near the starter battery.

### **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.

### **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.

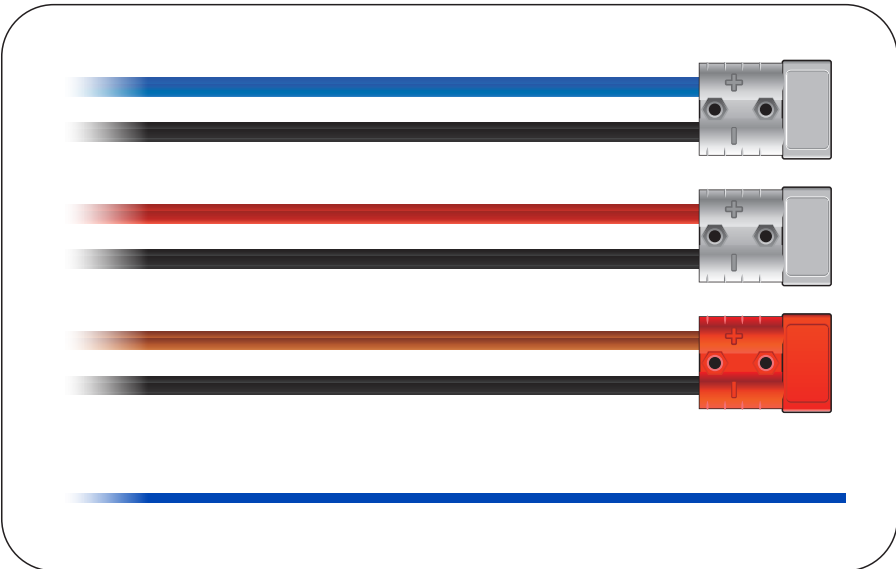
### **Operation Safety**

- 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 60A DC-DC Charger with Anderson Style Plugs
- 1 PC(s) User Manual

# IDENTIFICATION OF PARTS



- Blue: Output +
- Black: GND
- Red: DC Input +
- Black: GND
- Brown: Solar 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.

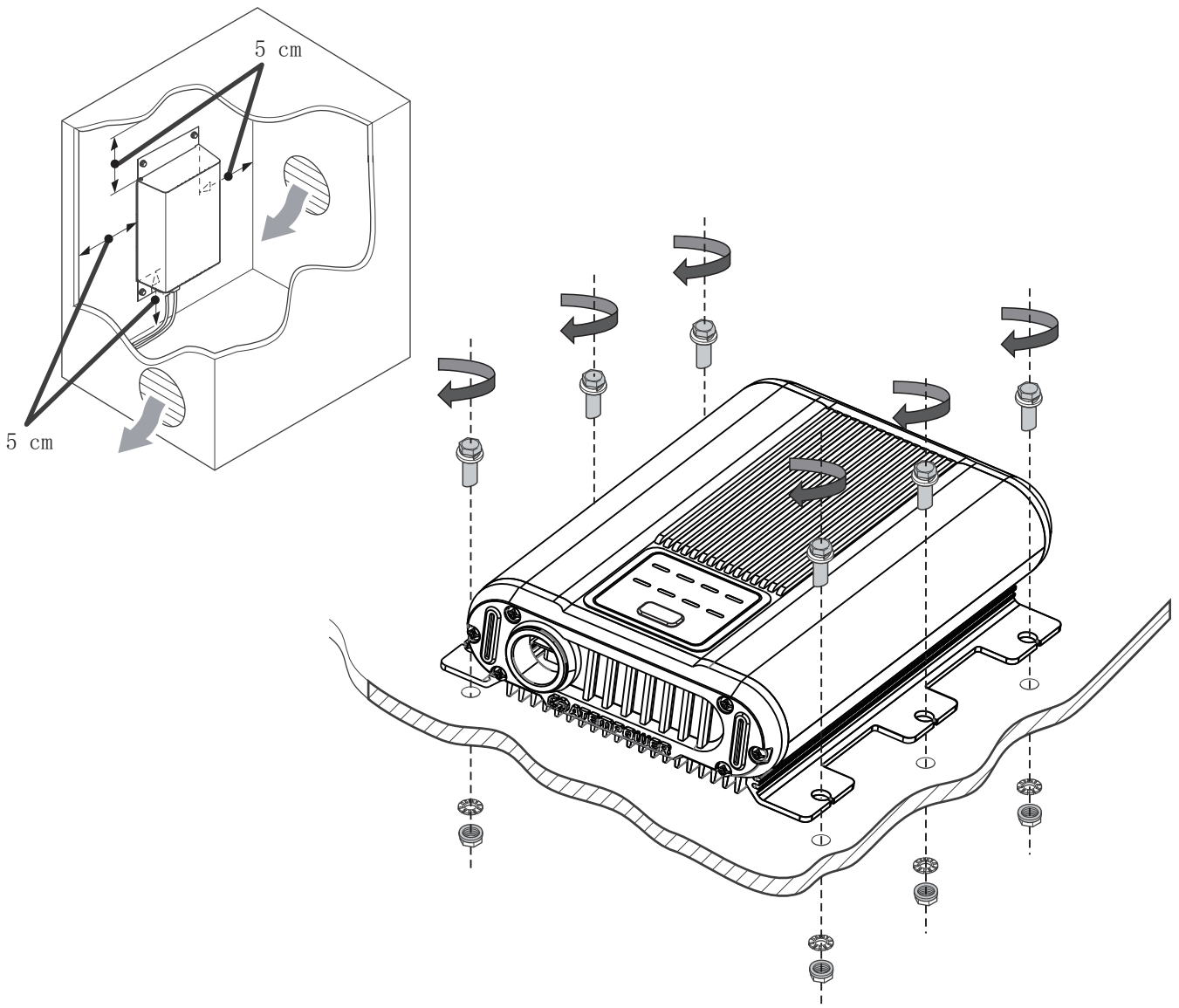
The device must be installed on a level and sufficiently sturdy surface.

### Mounting

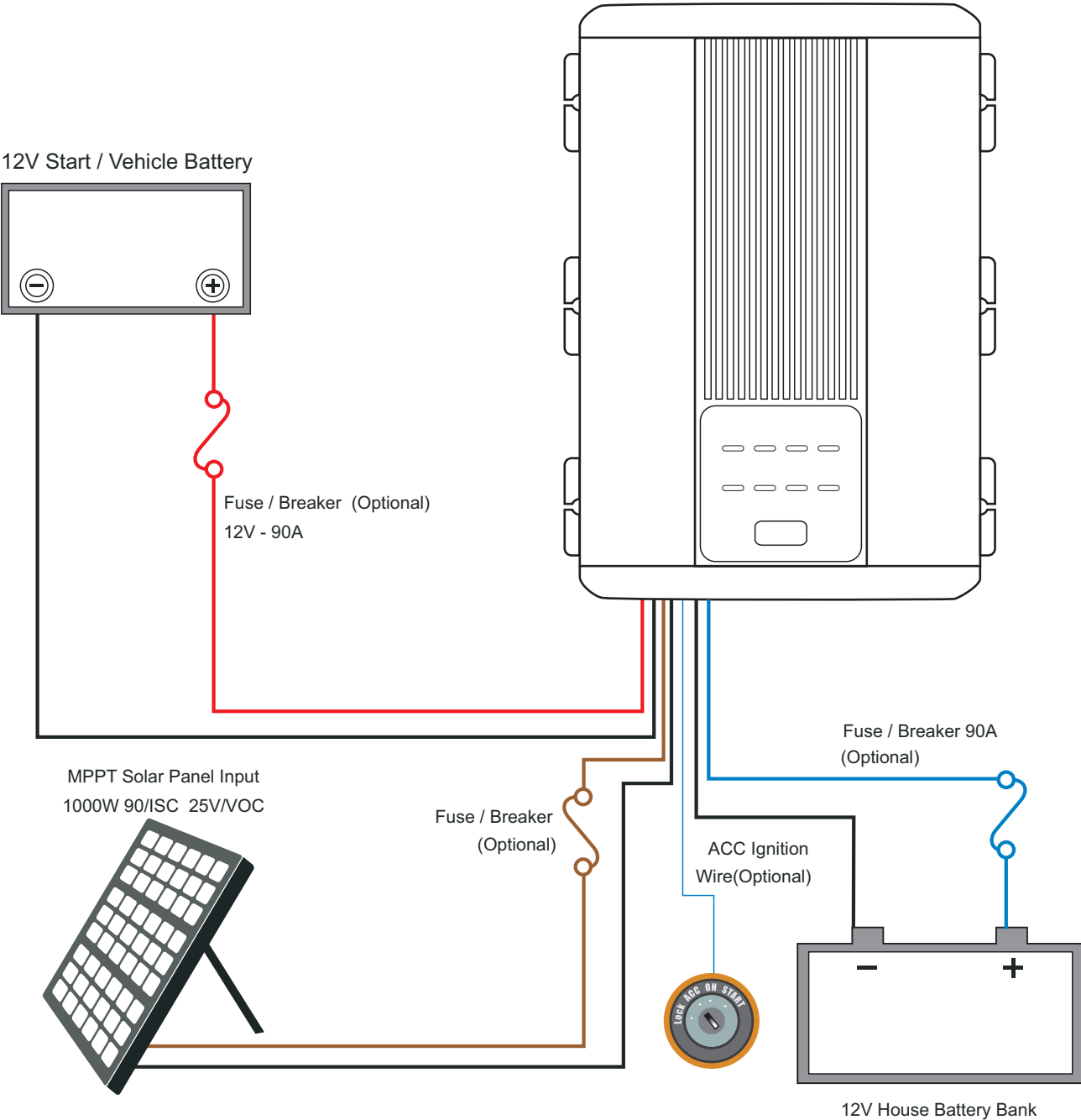
Have at least 5cm of clearance from all areas and ensure some ventilation for best performance.

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

1. Auxiliary battery not connected: press "POWER" to select the type of battery you need.
2. Auxiliary battery connected: long press "POWER" button for 3 seconds to enter selection mode, then press "POWER" to select the type you need. Once selected, long press "POWER" to confirm and exit. It has a power-off memory function, and will remain on this battery until it is changed.

### Lithium Reactivation

Select the "LiFePO4" mode, and long press "POWER" for 5s. The "charging" (red) indicator will flash for 10s. If the battery is successfully activated, the "charging" (red) indicator will be constant on and the DC-DC charger will begin to charge the battery. Otherwise, the DC-DC charger will enter the standby state and the "Power On" indicator will be on. Please note that the battery should be disconnected from the load, and that the polarity should be correct. Both DC and PV inputs are supported.

### 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.

### 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 reach 16V~25V, and the panel will stop to charge when its output is below 10V.

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.

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



## **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 12.5V (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 12.5V (acc line not connected) or is less than 10.8V (acc line connected), the charger will stop charging.

## **BUILT-IN PROTECTIONS**

### **Battery Analysis**

The buzzer will beep-beep and the “Power On” indicator will blink when the battery is charged to full in 5 minutes and its voltage is below 12V.

### **Input/Output Reverse Polarity Protection**

This charger is equipped with reverse polarity protection. If your polarity is reversed, the charger won't begin charging and the buzzer will beep-beep.

### **Over-temperature Protection**

Charging current will be limited when the temperature of its radiator exceeds 75°C.

### **Output Short Circuit Protection**

This charger is equipped with short circuit protection. If short circuit happened, the charger will immediately stop charging.

## TECHNICAL SPECIFICATIONS

MODEL	AP60DC
Product Dimensions	225*157*65.2mm
Product Weight	1.84KG
Battery Input Voltage Range	13~16V
MIN. Solar Input Voltage	16V
MAX. Solar Input Current	100A
MAX. Solar Input Voltage	25V
MAX. Output Current	60A
DC Input Voltage	13~16V
Rated Charging Current	60A MAX (IN/OUT)
Charging Voltage Range	2.5~15.4V
Idle Power Consumption	<9mA
Operational Temperature (Ambient)	-10°C~45°C
Humidity	0%~90%
IP Rating	IP 20
Soft Start	YES
Soft Charge Current	20A
Bulk Charge Voltage	14.7V(AGM/GEL) 14.4V(LEAD ACID) 15.4V(Calcium) 14.4V(LiFePO4)
SUGGESTED GAUGE	
1 - 5 Metres	5AWG
5 Metres +	3AWG

## UNDERSTANDING THE ERROR CODES

PROBLEM	POSSIBLE CAUSE	SOLUTION
The alarm will be on, and the "Power On" indicator will be blinking	Bad battery	Change a new battery
The LiFePO4 battery cannot be charged	Your LiFePO4 battery is undercharged and is sleeping	Select "LiFePO4" and long press "POWER" for 5s to wake up your LiFePO4 battery
The alarm is on but there is no output	Reverse polarity protection	The charger and the battery are reversely connected
The "Charging" icon is not on	The charger is not correctly connected to the battery	Check whether the connection is correct or whether your battery is 12V

## 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.

## CHARGING VOLTAGE LIMITS

BATTERY TYPE	GEL/AGM	LEAD ACID	Calcium	LiFePO4
BULK	14.3V	14.0V	15.0V	14.0V
BOOST	14.7V	14.4V	15.4V	14.6V
FLOAT	13.5V	13.5V	13.5V	/



# 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)