



AC CONVERTER / BATTERY CHARGER
User's Manual

MODEL #: CON120AC12/24VDC



Listed to UL 458 and CSA 22.2 NO. 107.1
Standards

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INTRODUCTION

You have purchased the AIMS Power 12V/24V AC Converter and Battery Charger. This product will bring you reliable power when used and maintained properly. This manual provides safety guidelines, detailed planning and setup information, installation procedures, as well as information about operating and troubleshooting the unit. This manual does not provide details about specific brands of batteries. AIMS Power recommends you consult the battery manufacturer for charging information.

READ THE MANUAL AND UNDERSTAND ALL SAFETY PRECAUTIONS BEFORE INSTALLING AND OPERATING THE UNIT. SAVE THE MANUAL FOR FUTURE REFERENCE.



Important Safety Instructions



CAUTION

1. Installation and service should be performed by a qualified service technician. High voltage is present inside unit. Incorrect installation or use may result in risk of electric shock or fire. No user serviceable parts inside the unit.
2. Remove all sources of power, utility and battery power before servicing or installing.
3. Risk of explosive gases
 - ◆ Working near batteries is dangerous. Batteries produce explosive gases during normal battery operation.
 - ◆ To reduce risk of battery explosion, follow the instructions in this manual and the instructions from the battery manufacturer.
4. Plan ahead
 - ◆ Someone should be within range of your voice or close enough to come to your aid when working near a lead-acid battery.
 - ◆ Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or

eyes.

- ◆ Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
- ◆ If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
- ◆ NEVER smoke or allow a spark or flame in vicinity of battery.
- ◆ Be extra cautious to reduce risk of dropping metal tool onto battery. It might spark or short circuit battery or other electrical part that may cause explosion.
- ◆ Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short circuit current high enough to weld a ring or like metal, causing a severe burn.

5. Preparing to charge

- ◆ Never charge a frozen battery.
- ◆ Be sure battery is mounted in a well-ventilated compartment.
- ◆ Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from the cells. Do not overfill. For a battery without cell caps, carefully follow manufacturers charging instructions. (only for flooded batteries)

6. Charger location & installation

- ◆ In an event of failure, the unit could produce arcs or sparks. NEVER install in battery or engine compartment or in the presence of explosive gases. Keep all gases away from unit.
- ◆ Protect all wiring from physical damage, vibration and excessive heat.
- ◆ Insure that the unit is properly setup for the type of battery being charged.
- ◆ Do not expose unit to rain or snow.
- ◆ Insure all terminating connections are clean and tight to prevent arcing and overheating.
- ◆ Unit must be properly installed as described in these instructions prior to operation.
- ◆ Do not adjust any functions including the current, voltage and battery type when unit is working. All adjustments must be made when converter is disconnected.

1. General Description

The AIMS Power AC Converter / Battery Charger 12V/24V is ideal for applications that require diverse ways of recharging batteries. There are many ways to recharge batteries and the wide AC input range of this unit accommodates most applications and battery technologies. Useful with generators and shore power, this converter charges various types of batteries such as, open lead acid, AGM, Gel and LiFePO4. The reliable high frequency structure, accepts wide range input voltages of 70Vac to 145Vac to accommodate unstable inputs. The unit also includes a selectable 12Vdc or 24Vdc output. The AIMS Power AC Converter / Battery Charger provides the flexibility for almost any application and the large charging capacity of 75 amps gets the job done quickly.

1.1 Features

- ◆ Three stage variable charging voltage algorithm for maximizing the battery lifetime. Bulk, absorb and float
- ◆ Large charging capacity design (75 Amp for 12Vdc; 37.5 Amp for 24Vdc) less charging time needed
- ◆ Adjustable charge current control setting is based on connected battery's capacity to safely charge batteries and avoid over charging.
- ◆ Wide input voltage range, 70Vac to 145Vac for unstable input
- ◆ High AC to DC converting efficiency design (higher than 80%)
- ◆ Smart fan control for maximizing the performance and fan life
- ◆ Includes battery temperature sensor port to help maintain the life of the battery(s)

2. Installation and Operation

2.1 Front Panel Description

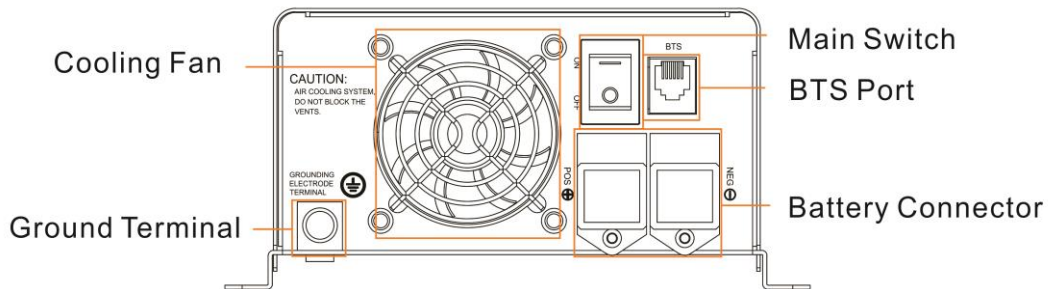


Figure 1 Front Panel

Main Switch

ON: Once the unit has been properly installed and batteries are connected, flip the switch to “ON”, the unit will turn on automatically, and work according to the input AC source’s status.
OFF: Flip the switch to “OFF”, the unit will turn off.

BTS Port

Connect the BTS to this port.

A battery temperature sensor (BTS) can be used to ensure proper charging of the batteries based on temperature. Installing a BTS extends battery life by preventing overcharging in warm temperatures and undercharging in cold temperatures. Attach BTS closest to the negative terminal.

Ground Terminal

Connect the GND to the Ground Terminal using 8 AWG wire.

Battery Connector

Connect the Battery to the Positive (+) Battery Terminal and the Negative (-) Battery Terminal. Do NOT reverse the polarity!

2.2 Rear Panel Description

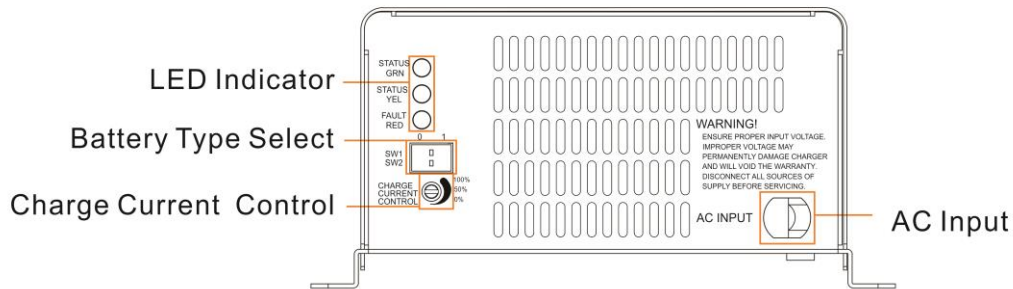


Figure 2 Rear Panel

LED Indicator

The unit has green, yellow and red LEDs to indicate the operating status of the AC converter.

Table 1 – 1: LED status indicator

Conditions	Red(Fault RED)	Yellow(Status YEL)	Green(Status GRN)
Mode select fault	Blinking 0.5s	Blinking 0.5s	Blinking 0.5s
Output voltage too low	Solid	Blinking 2s	Off
Fan fault	Blinking 0.5s	Off	Off
Over temperature	Blinking 2s	Off	Off
Output over voltage	Solid	Blinking 0.5s	Off
Output over current	Solid	Solid	Off
Input over / Under voltage /Frequency	Solid	Off	Off
Constant current / Constant voltage	Off	Solid	Solid
Float stage	Off	Blinking 2s	Solid
Battery over temperature	Off	Blinking 2s	Off

Battery Type Select

The AC Converter can charge four types of batteries, which can be set using the dial switch. **Battery voltage is auto sensing for 12V and 24V batteries. The converter must detect a DC voltage.**

Battery Type	SW1	SW2	Bulk	Float
Generic Flooded/Lead	0	1	14.8V	13.8V
Gel	1	0	14.0V	13.7V
AGM	1	1	14.6V	13.7V
LiFePo4	0	0	14.4V	14.4V
MULTIPLY X2 FOR 24V				

Charge Current Control Dial

This dial can adjust the amount of charge current. The adjustment range is 20%-100% of the total current rating.

Input terminal

The unit can accept input voltages ranging from 70Vac – 145Vac.



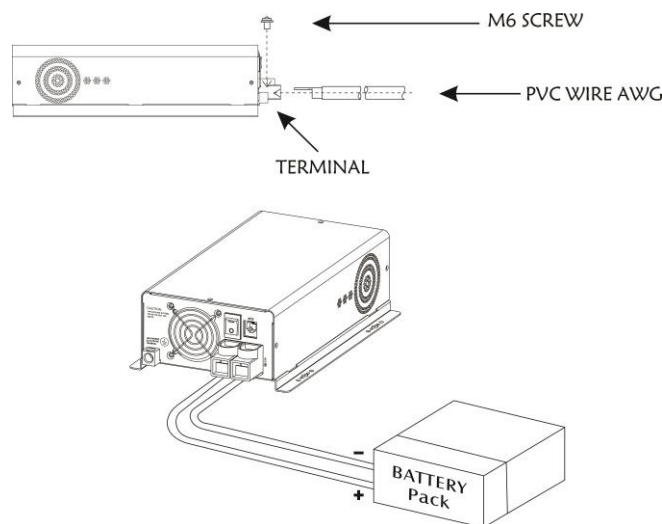
CAUTION Before connecting, power off the unit and make sure the AC cord is not

plugged into an AC outlet.

2.3 DC Output Battery Connection –Battery should be connected first then AC power can be applied. Use included AC cable connected to a minimum of 10A breaker.

Step 1- Follow battery polarity guide located near battery terminal! Place the battery cable ring terminal over AC Converter / Battery Charger's battery terminal. Tighten the M6*12 Screw. Do not place anything between the flat part of battery terminal and the battery cable ring terminal, or overheating may occur.

Figure 1: Battery to Charger cable connection

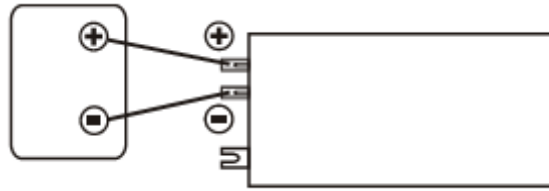


Caution! DO NOT place anything between battery cable ring terminals and battery terminals. The terminal stud is not designed to carry current. Apply anti-oxidant paste to terminals after terminals have been torqued.

Step 2- Connect battery cables to your batteries

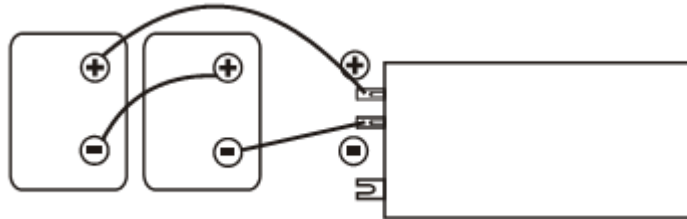
1) Single battery connection: When using a single battery, its voltage must be equal to the voltage of unit's nominal input voltage.

Figure 2: Single battery connection



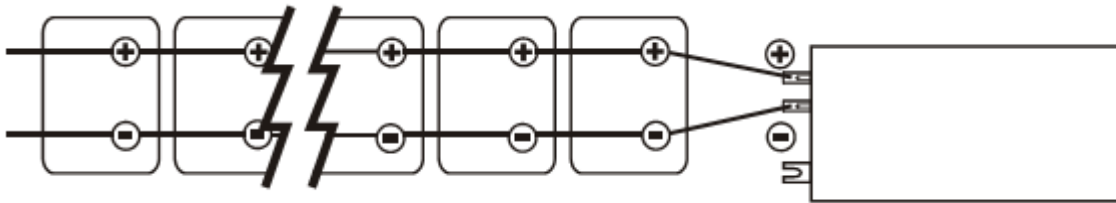
2) Series battery connection: When using multiple batteries in series, all batteries must equal in voltage and amp hour capacity, and the sum of their voltages must be equal to the voltage of unit's nominal input voltage.

Figure 3: Series battery connection



3) Parallel battery connection: When using multiple batteries in parallel, each battery's voltage must be equal to the voltage of unit's nominal input voltage.

Figure 4: Parallel battery connection



2.4 AC Input Connection

Use provided AC cable. Connect to a breaker minimum of 10A. AC voltage range of 70Vac to 145Vac.

2.5 Parallel Connection

To get more charge current, the Battery Charger can be connected in parallel configuration. Maximum of two units can be connected in parallel. For example, in 12Vdc mode, connecting 2 Battery Chargers in parallel can get maximal 150Amp charging current. In 24Vdc mode, the paralleled system can reach maximal 75Amp current.

3. Troubleshooting

Table 1 – 3: Troubleshooting list

Symptom	Probable cause	Items to check or correct
Completely dead, no display	No battery power	Battery disconnected, over discharged, or connected in reverse, no display polarity.
	Battery voltage too low	Battery voltage must be at least 10V for the unit to operate.

	Power switch is not on	Press and hold power switch.
AC power present at distribution panel	AC input is missing	Check AC input connections.
	Breaker has popped	Reset the input protector.
Green, yellow and red LED blinking 0.5s together	Mode select fault	12V mode: Adjust battery voltage lower than 15V 24V mode: Adjust battery voltage higher than 18V
Red LED blinking 0.5s other LEDs off	Fan fault	Check the fan in charger. Thermal/load based
Red LED Blinking 2s	The charger is operating over temperature	On the heat sink of DC-DC part should be operate below 105°C

If any other situations occur that are not listed above, call AIMS Power immediately.

4. Specifications

4.1 Input	
Input Voltage	96-145VAC full performance
	70-96VAC automatically de-rate to 50% of full load current
Frequency	40Hz to 70Hz
Nominal Input Current at Rated Output	<9Aac
Voltage Measurement Accuracy	±8Vac
Frequency Measurement Accuracy	±1Hz
4.2 Output	
Nominal Voltage	12/24Vdc auto adjusting
Output Current	Input voltage 96-145V, output current 75A for 12V mode output current 37.5A for 24V mode
	Input voltage 70-96V, output current 37.5A for 12V mode output current 18.75A for 24V mode
Rated Output Current	Auto adjust to 12/24V
Current Accuracy	± 6% of full rated output current @25°C, for target currents across the range from 10% rated output (for absorption exit criteria accuracy) to the current limit setpoint.
Load Regulation	1.5%
Current Limit	75-80Amp
Dead-Battery Charging	8-14.9Vdc at 100% of rated output current
	8-29.8Vdc at 100% of rated output current
Selectable Battery Type	Open Lead-Acid, Gel, AGM, LiFePo4, adjustable
Parallel Outputs	Maximum of two AC converter units connected in parallel
Efficiency	80%

4.3 Protection	
Input Over Voltage	Unit must be safe for input voltage up to 150VacRMS (and up to 215Vpeak), need not be operating. Above this level the unit may be damaged.
Reverse Battery Polarity Protection	Non-destructive reverse battery polarity protection with fuses. Unit shall not sustain damage and shall meet all specifications after fuse replacement.
Input Under-voltage	Unit must not be damaged for all input voltages from 0-300Vac. Shutdown or input current limit or other means may be applied when input voltage is out of normal operating range.
Output over voltage 12/24V mode	12Vdc. Unit will shut down if $V_{charging} > V_{charging} (target) + 1.0Vdc$ for more than 2 seconds; unit will restart when voltage $\leq V_{charging} (target)$ for more than 2 seconds. For battery OVP the unit will restart in the same stage. 24Vdc. Unit will shut down if $V_{charging} > V_{charging} (target) + 1.5Vdc$ for more than 2 seconds; unit will restart when voltage $\leq V_{charging} (target)$ for more than 2 seconds. For battery OVP the unit will restart in the same stage.
Charger over temperature protection	The internal temperatures of the charger will be measured by NTC. Based on these measurements, unit will shut down if the temperature exceeds 105°C. Unit will restart when environment temperature cools to 95 °C.
BTS(Battery Temperature Sensing)	The battery temperature sensor allows the charge controller to continuously adjust charge voltage / charge current based on actual battery temperature. When the battery temperature is over 40 °C, unit will reduce the charging voltage to Float voltage, also it will reduce the Max charging current by 10% with every two degree of temperature rise. When the battery temperature is over 50 °C, unit will shut down.
4.4 Environmental	
Operation temperature	Nominal ambient temperature: 25°C Operating Ambient Temperature range: -10°C to 40°C (On the heat sink of DC-DC part, if the temperature is over 90 °C, the Charger Current will be de-rate to 50% ; if the temperature is over 105 °C, the Unit will be shut down.)
Relative humidity	5~95% without condensation
Noise	Unit requirements: below 50dB (A) measured at 1 m distance with fan full working.
Storage Conditions Temperature	-20°C to +80°C
Cooling	Thermal/load based fan
Safety	ETL listed to UL458, CSA22.2#107.1
4.5 Mechanical	
Dimension (D x W x H) mm	10.25" * 6.75" * 3.25"
Unit Weight	6.5 lb
Gross Weight	7 lb

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