# BAT12Wh

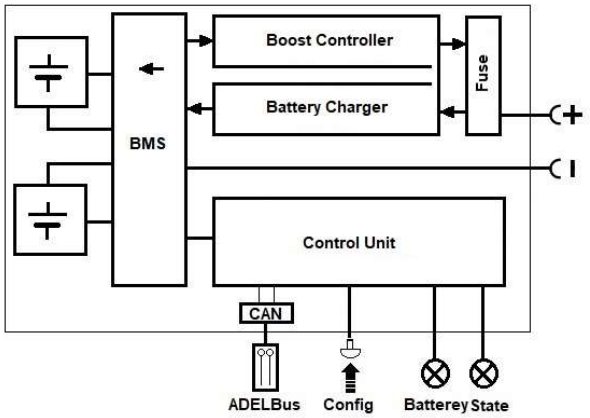
Battery Bank 12Wh for 12 & 24 Vdc applications

# Instruction Manual

Thank you for having chosen one of our products for your work.
We are certain that it will give the utmost satisfaction and be a notable help on your job and application.

## 1 Product Description

Battery Bank for DC-UPS "All In One". Lithium-ion technology maintenance-free, designed to provide emergency power backup in the field of Industrial, domotic and domestic applications. Suitable for 12V or 24V systems. Simple connection with screw terminals for Wall mount or DIN rail. The device integrates CAN protocol communication to exchange all data on ADELBus.




## 2 Safety and warning notes

To safety operate this Battery Bank please read and follow all instructions carefully. Read this manual thoroughly before attempting to unpack, install or operate. Please refer to section 7 for a complete information about safety.

**WARNING** – Explosion hazard: do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
**WARNING** – Explosion hazard. Replacement of components may impair suitability for class I, Division 2.

**WARNING** – Switch off the system before connecting the module. Never work on the machine when it is live. The device must be installed according to EN61010 and EN62368-1

**WARNING** – The device is equipped whit an internal fuse. If the internal fuse blows up (fails opens), most probably there is a fault in the device. If this failure occurs, the device must be returned to the factory.

## 3 How to Install

### 3.1 Mounting

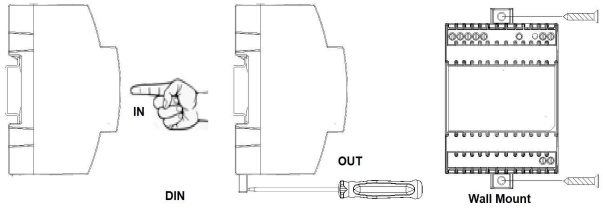



Fig. 1 – Mounting of the BAT12Wh

### 3.2 Din Rail or Panel Mounting

Fig. 1 shows the mounting of the BAT12Wh. It is possible to mount the device on DIN rail or on panel and fix it by 4 screws 2.9x8-16. There is no limit for the panel thickness.

### 3.3 How to connect the Battery Bank

The device is supplied directly from the power source which provides power to recharge the battery bank and receives power from the battery bank in backup mode. The device is protected by an internal physical fuse, also in worst case situations. The input rating is 8 – 35Vdc.

### 3.4 Device Connection (Fig.2)

The following cable cross-sections may be used:

| | Solid (mm2) | Stranded (mm2) | AWG | Torque (Nm) | Stripping Length |
|---|---|---|---|---|---|
| In: | 0.2–2.5 | 0.2–2.5 | 24 – 14 | 0.5–0.6 | 7 mm |
| Out: | 0.2–2.5 | 0.2–2.5 | 24 – 14 | 0.5–0.6 | 7 mm |
| Signal: | | | | | AMP Modu II |

Screw type terminals, 2.5 mm$^2$. Wiring shall be marked to indicate the proper connection for the power supply. Use copper cables only; for power connections use wires suitable for at least 75°C

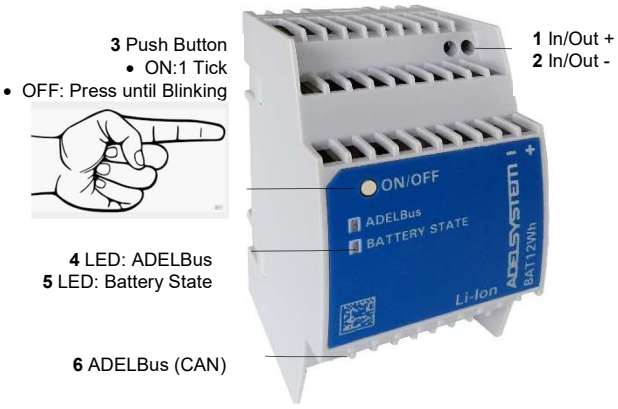



Fig. 2 –Battery Bank connections

### 3.5 Connection terminal and wiring

| Reference | Description |
|---|---|
| 1 | + Positive Pole |
| 2 | - Negative Pole |
| 3 | Push Button:<br>• Press once to turn ON: LED 5 GREEN blinking<br>• Long press to turn OFF, until LED 5 ORANGE blinks quickly, then release and Leave |
| 4 | LED for CAN communication |
| 5 | LED For the Battery State |
| 6 | ADELBus connection (AUX1) |

## 4 Use the Battery Bank

### 4.1 Connection Diagram

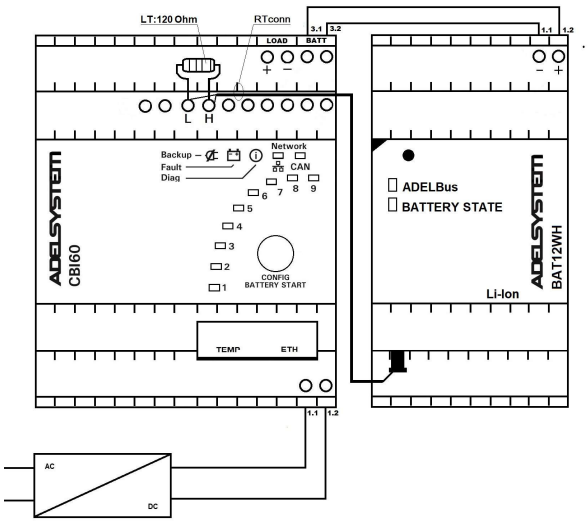



Fig. 3 –Connection to DC Ups

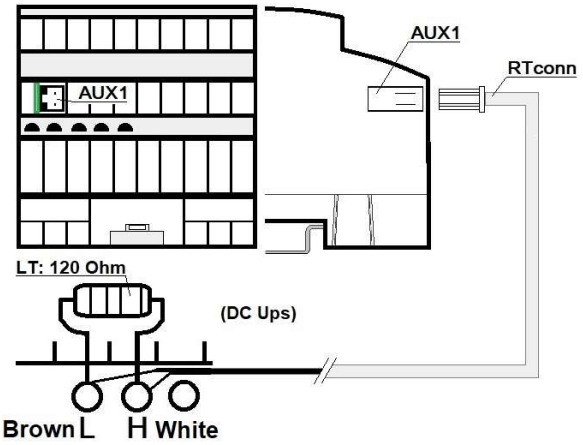



Fig. 4 –Connection RTConn cable

To ADELBus connection, please connect the cable RTConn on AUX1 as explained in Fig.4 and connect the other side of the cable to the CAN terminals L (Brown) and H (White) of the DC Ups, with a line termination (LT) resistor 120 Ohm, present inside the cable kit.

### 4.2 First time configuration

When connected for the first time to a power source, the device is automatically configured for 12V or 24V output voltage.
The actual setting can be checked as follows:

- Turn off the Battery Bank
- Press the button and keep it pressed; the LED 5 will stay ON solid:
  - RED: output voltage not set (defaults to 12V) => the device must be started with external power
  - GREEN: output voltage set to 12V
  - ORANGE: output voltage set to 24V

(see "reset to factory" procedure to change the output voltage)

If the DC-UPS supports the ADELBus on CAN, the following procedure must be carried out when connected for the first time to a Battery Bank:

- Make sure that the ADELBus is properly connected and that both the Battery Bank and the DC UPS are switched OFF
- Turn ON the Battery Bank by pressing the button once
- THEN turn ON the DC-UPS by supplying AC power
- Note: if the battery bank is completely discharged and does not start, keep its button pressed while starting the DC-UPS and continue to keep the button pressed
- Wait until the CAN LED is solid green on both devices

### 4.3 LED Indication

| | Status | LED 5 Battery State |
|---|---|---|
| Charging mode status | Float | GREEN 1 Blink/2 sec |
| | Absorption | GREEN 1 Blink/sec |
| | Bulk | GREEN 2 Blink/sec |
| | Recovery | GREEN 5 Blink/sec |
| Back Up | Running from battery | ORANGE slow flashing |
| | Battery low | ORANGE fixed ON |
| Alarm | Battery overvoltage | RED 1 Blink/pause |
| Alarm | Battery not detected or internal disconnection | RED 2 Blink/pause |
| | Overload or short circuit | RED 4 Blink/pause |
| | Internal device failure | RED 7 Blink/pause |
| | Battery temperature sensor faulty | RED 12 Blink/pause |
| | Battery overtemperature | RED 15 Blink/pause |

### 4.4 Reset to factory procedure

- Turn on the device from battery with a "click and long press" of the button, like a "double click" but the second time the button must remain pressed
- If the "click and long press" of the button was done correctly the Battery State LED will blink in GREEN slowly (once a second): keep the button pressed
- After 5 seconds the Battery State LED will blink RED quickly. Keep the button pressed for 10 seconds more.
- Note: if the button is released within 10 seconds, the device will turn in "bootloader mode" with the Battery Status LED fixed ON and the ADELBus LED will flickering RED and GREEN. If this happens, click the button to turn off the device and repeat the procedure
- After 10 seconds the Battery State LED will stay fixed ON: release the button, the device will restore the factory settings and turn off.

## 5 Functionality of BMS

- All critical parameters of the battery system (such as cell temperature, voltages, currents, etc.) are monitored cyclically by the battery management system for compliance with the limits and the battery system is shut down in the event of a fault. Charging and discharging is only possible with an active battery management system.

### 5.1 Protection functions

The BMS has a large number of parameters for detecting fault conditions:

- Overcharge
- Over discharge
- Discharge overcurrent
- Charge overcurrent
- Load short-circuit

## 6 Technical Data

### 6.1 Please refer to the product data sheet

## 7 Accessory

- RTConn: connector cable for the connection to AUX1. This is needed for data exchange with the DC UPS through the ADELBus (if supported by the DC UPS).
- Line Terminator 120 Ohm present inside the Kit of the RTConn.

## 8 Safety instructions

### 8.1 General information

Incorrect operation or connection may result in serious injury or death.

### 8.2 Safety instructions and warnings for battery use

- As with other batteries, lithium batteries also have the potential to continue being a source of danger even in the supposedly discharged state, as they can deliver a very high short-circuit current.
- Too deep discharge leads to lasting damage. Deeply discharged battery modules may no longer be charged or operated. For example, deep discharge can occur during very long storage of a battery module which was completely discharged (to discharge limit) when taken into storage.
- The battery must not be disassembled, opened, damaged or crushed.
- The battery should not be exposed to heat or fire. Prolonged, direct sun- light is to be avoided.
- The battery should be kept out of the reach of children.
- One or more batteries should not be stored dangerously in a box or drawer where they could short-circuit each other or be short-circuited by other conductive materials.
- The battery must not be subjected to mechanical shocks.
- The polarity symbols plus (+) and minus (-) on the cells, batteries and devices must always be observed. The correct use must be ensured.
- The battery should be kept clean and dry.
- If the battery connections become dirty, clean them with a dry, clean cloth.
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### 8.3 Safety instructions and warnings for battery use (continuation)

**If a cell leaks, the fluid must not come into contact with the skin or enter the eyes or mouth.**

#### 8.3.1 Measures in case of inhalation

Vapors or mists escaping from a damaged cell can cause respiratory irritation. When inhaling the contents of an open cell, remove the source of contamination or remove the affected person to fresh air. Seek medical help

#### 8.3.2 Measures in case of eye contact

Contact with the contents of an opened cell can cause severe burns or eye irritation. If eye contact occurs with the contents of an opened cell, immediately rinse the contaminated eye(s) with a lukewarm, slightly flowing stream of water for at least 30 minutes. Keep eyelids open. Neutral saline may be used as soon as available. If necessary, further rinse the eyes during transport to the emergency supply station. Take care that contaminated water is not flushed to the naked eye or face. Immediately transfer the affected person to an emergency care center.

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#### 8.3.3 Measures in case of skin contact

Contact with the contents of an opened cell can cause burns. If skin contact occurs with the contents of an open cell, remove contaminated clothing, shoes and leather parts. Rinse immediately with lukewarm, low-flow water for at least 30 minutes. Seek medical attention if irritation symptoms or pain persist. Thoroughly wash or dispose of clothing, shoes and leather goods before reuse.

# 9 Handling and storage instructions

- No foreign particles (e.g. metal splinters, small nails, chips or other conductive metals) should enter the battery.
- Do not expose the battery to moisture (water, rain water, snow, etc.) during storage.
- To avoid deep discharge, charge the battery before storing it and check the state of charge at least every 2 months. If necessary, charge the battery to 70%.
- Store the battery in a cool and dry place where it is protected from damage and unauthorized access.
- High temperature fluctuations in the storage area should be avoided, for example storage next to heaters. Do not expose battery modules permanently to solar radiation.
- To achieve optimum battery life, it should be stored at a temperature of 25 °C ±5 °C and a humidity of 0 % to 80 %. The state of charge should be more than 30 %.
- When the battery is completely discharged, the battery must be charged as soon as possible.

# 10 Transport instructions

The commercial transportation of lithium batteries is subject to the dangerous goods law. Transport preparations and transport must only be carried out by appropriately trained persons or the process must be accompanied by appropriate experts or qualified companies.

## 10.1 Transport regulations

- Lithium batteries are subject to the following dangerous goods regulations and exceptions - in the respective current version:
- **Class 9**
- **UN 3480: LITHIUM-ION BATTERIES (including lithium-ion polymer batteries)**
- **UN 3481: LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT**
- **Packing group: II**
- **Tunnel category E**

## 10.2 Transport of damaged or defective battery modules

Defective or damaged battery modules are also subject to the stricter transport special provision 376. These reach all the way to packaging in an aluminum box with vermiculite filling or a complete transport ban.

## 10.3 Air transport of waste batteries

Waste batteries and batteries transported for purposes of recycling or disposal are excluded from air freight unless authorized by the competent national authorities of the country of origin and the country of the executing company. (IATA DGR SV A183)

## 10.4 Batteries for disposal and recycling (road/railway/sea)

Lithium batteries may be transported for disposal and recycling in accordance with ADR SV 230 and SV 188, as applicable, or, if they have a gross mass of not more than 500 g, according to ADR SV 636 b.

## 10.5 Transport of used battery modules

When transporting used, intact and undamaged battery modules, the regulations for new batteries can usually be applied. However, for the transport of used - but not damaged - batteries, please also refer to the corresponding special regulations (636) or packing instructions (P903a and P903b / ADR).

## 10.6 Special and packaging regulations

The battery modules have an energy content of less than 100 Wh, therefore simplifying special provisions of the dangerous goods law can be applied:

- **ADR, RID: SV 188;**
- **IMDG: SP 188;**
- **IATA: PI 965, 966, 967, each section II**

For detailed transport instructions please refer to the safety data sheet

# 11 Disposal instructions

Used battery modules must be returned at the point of sale or in a special disposal system (industry, trade). The battery modules must not be disposed of with household waste and must be collected separately from any further waste. The battery modules must not be allowed to enter sewers or bodies of water or be buried in the ground. The used battery modules must also be treated in accordance with section 9 "Handling and storage instructions". They should preferably be given for disposal in a discharged condition and in a plastic bag or in their original packaging

## 11.1 Other information

The instructions in this operating manual merely provide assistance for compliance with legal requirements, but do not replace them. The information provided has been compiled to the best of our knowledge and belief