# Hubble Lithium AM-10 Lithium Battery User Manual



Contents



## Hubble Lithium AM-10 Lithium Battery


### Product Specifications

- **Model:** AM-10
- **Battery Type:** LiFePO4 (LFP)
- **Nominal Voltage:** 51.2V
- **Nominal Energy:** 10KWH
- **Design Capacity:** 200AH
- **Design Years:** 15 Years
- **Size:** 673*618*193mm
- **Weight:** 89kg
- **Cycle Life:** Unlimited Cycles within a 10-year warranty
- **Operating Voltage Range:** 40V-58.4V
- **Charging Voltage:** DC 58.4V
- **Charge/Discharge Current:** Same Port 100A
- **Internal Resistance:** 30m
- **BMS Parameters:**
  - **Self-Consumption:** 2W
  - **Rated Voltage:** 51.2V
  - **Balance Current:** 30-65(MA)
  - **Communication Method:** CAN/RS485/RS232
  - **Intelligent Current Limiter:** 20A
- **Longer Lifetime:** 6000 cycles, 15 years design life
- **Operating Temperature:** -10°C ~ 50°C
- **Storage Temperature:** 10°C ~ 50°C

- **Humidity:** 15%-75%

## Product Usage Instructions

### Parallel Connection of Batteries

To connect batteries in parallel, follow the steps below:

- **Note:**
  Maximum of 4 batteries in parallel or maximum inverter current not exceeding 250Amps.
- **Note:**
  The preferred method for battery paralleling is to connect each parallel battery to a busbar. Ensure all cables are the same length from each battery, and ensure the cable thickness are all the same to ensure even distribution of current and load.

### Installation Notes

1. Press the mounting structure on the wall surface and use a marker to draw the installation positioning hole of the fixed pendant. Remove from the wall and drill the holes.
2. Fix the attached six expansion bolts in the opening of the mounting structure and tighten the nuts on the bolts.
3. Lift up the AM-10 battery carefully and hook it into position securely onto the wall mount bracket.

### Interface Definition

1. POWER SWITCH
2. DRY CONTACT
3. RESET
4. ADDRESS
5. RS485
6. CAN
7. RS232
8. BATTERY LINK
9. BATTERY +
10. BATTERY –

### Interface Functions

The interface functions of the product are not specified in the provided text. Please refer to the complete user manual for detailed information on the interface functions.

### Parallel Functions

The parallel functions of the product are not specified in the provided text. Please refer to the complete user manual for detailed information on the parallel functions.

### Warnings

Working with high-voltage systems is dangerous. Do not attempt to modify your inverter and battery setup unless you are certain you understand the risk. Speak to a qualified electrician if you are unsure.

**Completing Setup**
The steps required to complete the setup of the product are not specified in the provided text. Please refer to the complete user manual for detailed information on completing the setup.

**FAQ (Frequently Asked Questions)**

- **Q: Where can I find the latest version of the user manual?**

  A: The latest version of the user manual can be found at **www.hubblelithium.co.za**.
- **Q: What is the warranty period for the AM-10 battery?**

  A: The AM-10 battery comes with a 10-year warranty. Terms and conditions apply.
- **Q: What is the operating temperature range for the battery?**

  A: The operating temperature range for the battery is -10°C to 50°C.
- **Q: Can I connect more than 4 batteries in parallel?**

  A: No, the maximum number of batteries that can be connected in parallel is 4.

You must read this manual before attempting the installation of your battery. Please take note of certain steps to ensure correct inverter compatibility.

Please visit **www.hubblelithium.co.za** for the latest version of this manual.

**WARNING:**
Working with high-voltage systems is dangerous. Do not attempt to modify your inverter and battery setup unless you are certain you understand the risk. Speak to a qualified electrician if you are unsure.

## Product Description

**SMART**

*Every module is equiped with an independent BMS system.*

**EASY INSTALLATION**

*Just plug & play.*

**SAFE**

*Safe litium iron phosphate battery cell.*

**CERTIFIED**

*CE IEC UN38.3 MSDS.*

**MODULAR**

*Modular expansion*

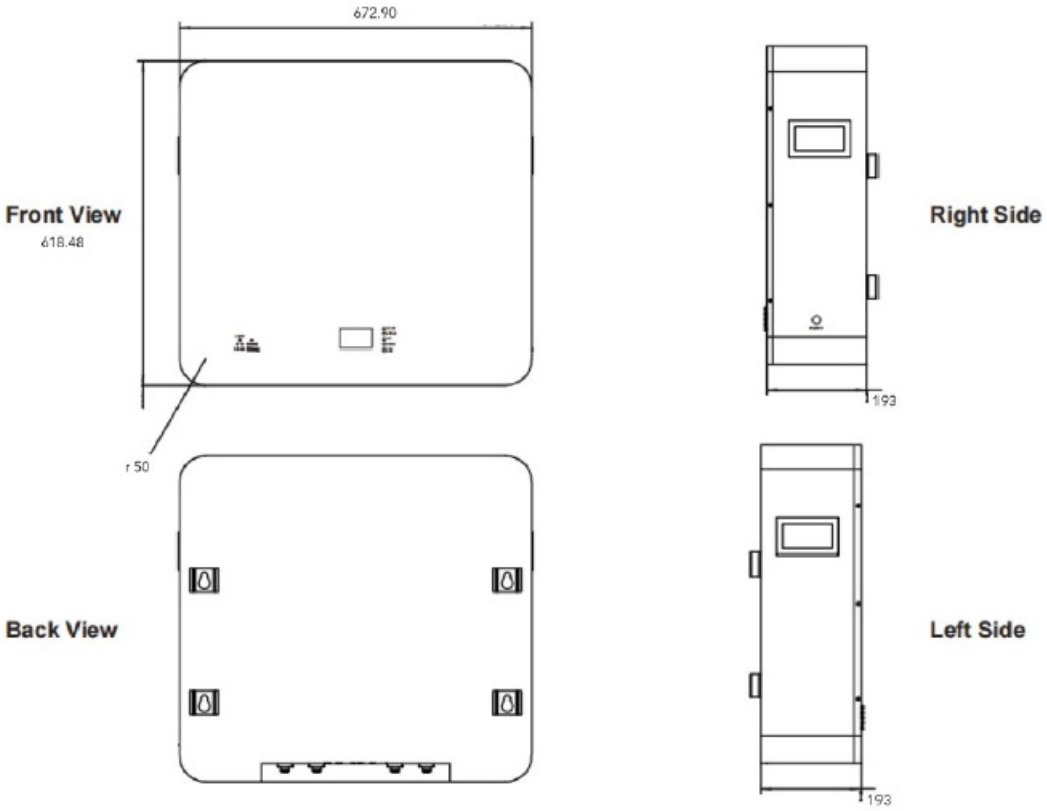
**LONGER LIFETIME**

*6000 cycles, 15 years design life.*

| TECHNICAL SPECIFICATIONS | |
|---|---|
| Model | AM-10 |
| Battery Type | LiFePO4 (LFP) |
| Norminal Voltage (V) | 51.2V |
| Norminal Energy (KWH) | 10KWH |
| Design Capacity | 200AH |
| Design Years | 15 Years |
| **PRODUCT SIZE** | |
| Size | 673*618*193mm |
| Weight | 89kg |
| **TECHNICAL PARAMETER** | |
| Cycle Life | Unlimited Cycled within 10 year warranty. T's & C's apply. |
| Operating Voltage Range | 40V-58.4V |
| Charging Voltage | DC 58.4V |
| Charge/Discharge Current(A) | Same Port 100A |
| Intermal Resistance | ≥30mΩ |
| **BMS PARAMETERS** | |
| Self-Consumption | ≥2W |
| Rated Voltage | 51.2V |
| Balance Current | 30-65(MA) |
| Communication Method | CAN/RS485/RS232 |
| Intelligent Current Limiter | 20A |
| **AMBIENT TEMPERATURE** | |
| Operating Temperature | -10C ~ 50C |
| Storage Temperature | 10C ~ 50C |
| Humidity | 15%-75% |

Lithium battery systems are widely used in residential energy storage systems, such as solar energy storage systems and UPS. The power wall LiFeP04 battery pack adopts the international advanced lithium iron phosphate battery application technology and BMS control technology.

**INTERFACE & SIZE**




## Product Specifications

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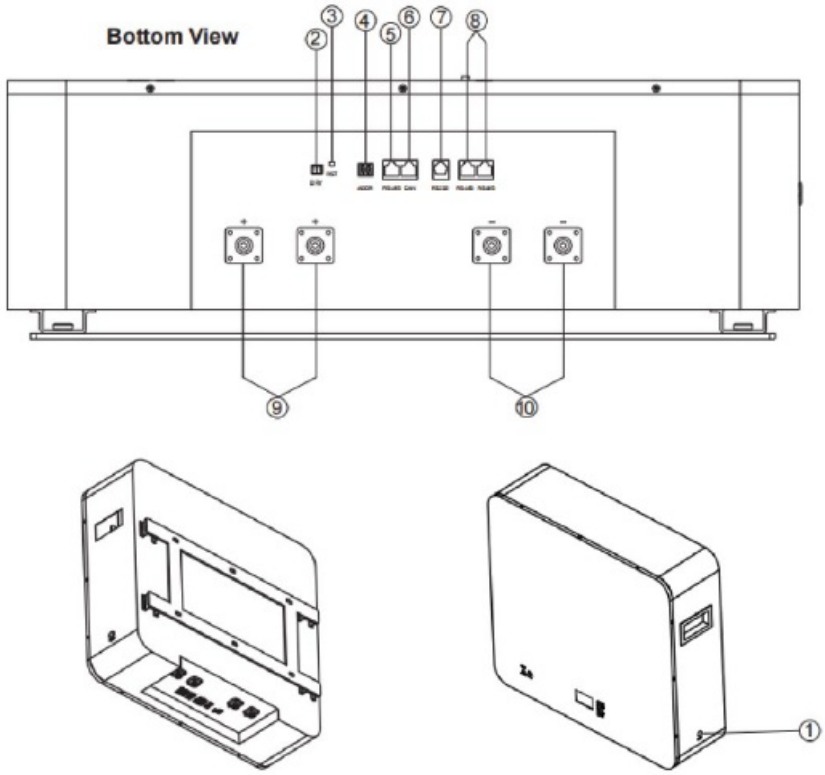



## PARALLEL CONNECTION OF BATTERIES

Connect the positive pole and positive pole in parallel, and the negative pole and negative pole in parallel, as shown in the figure below:

### CORRECT METHODS OF BATTERY LINKING

- **Note Diagram 1:**
  Maximum of 4 batteries in parallel or maximum inverter current not exceeding 250Amps.
- **Note Diagram 2:**
  The preferred method for battery paralleling is to connect each parallel battery to a busbar. Ensure all cables are the same length from each battery, and ensure the cable thickness are all the same to ensure even distribution of current and load.

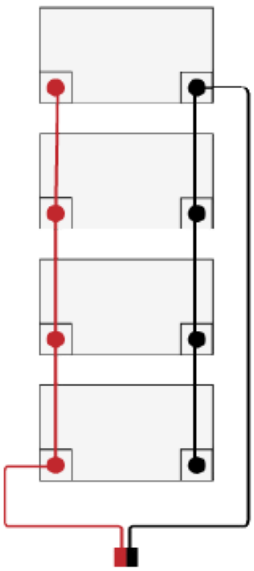


DIAGRAM 1

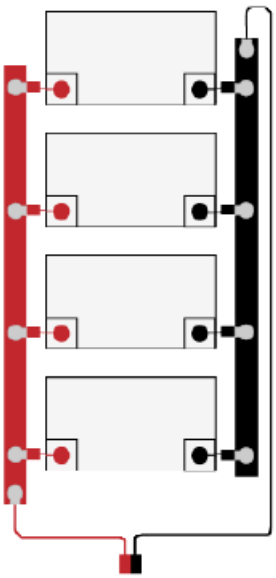
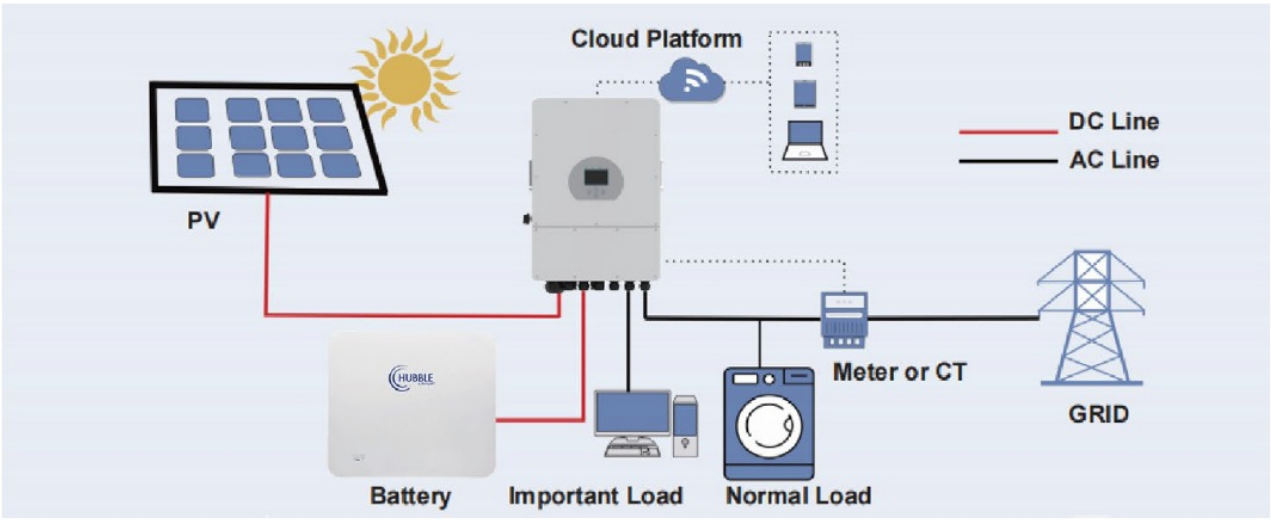


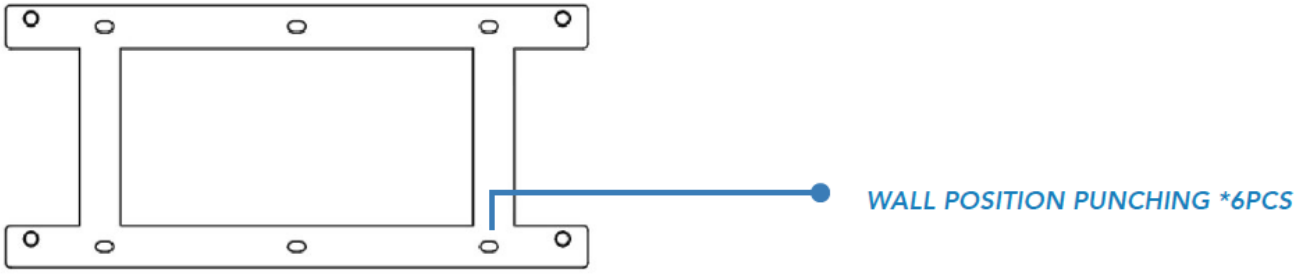
DIAGRAM 2

**SOLUTION DIAGRAM:**

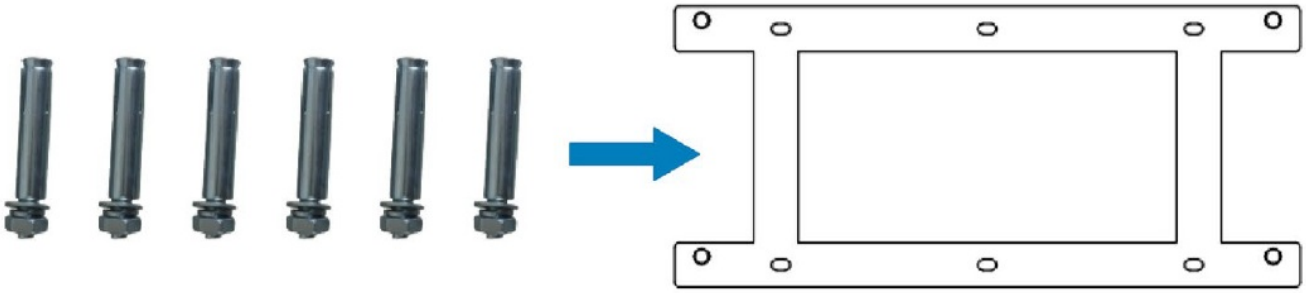



## Installation Notes

1. As shown in the figure below, press the mounting structure on the wall surface, use a marker to draw the installation positioning hole of the fixed pendant, remove it from the wall, and drill the holes.




2. As shown in the figure below, fix the attached six expansion bolts in the opening of the mounting structure, and tighten the nuts on the bolts.



3. Lift the AM-10 battery carefully and hook it into position securely onto the wall mount bracket.

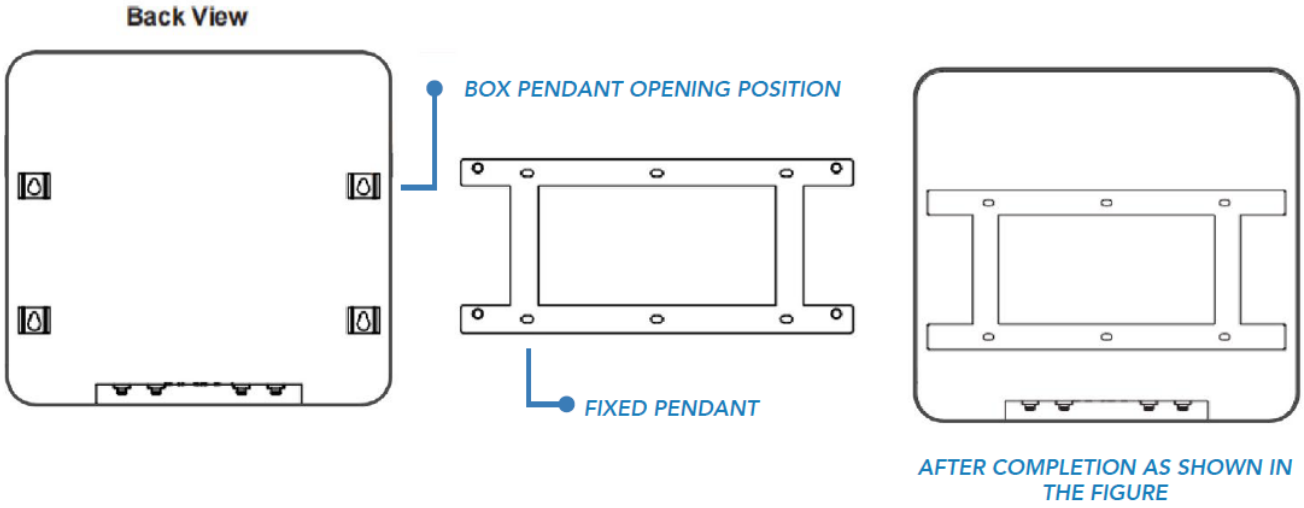



**TABLE 1 LED WORKING STATUS INDICATION**

| STATUS | NORMAL / ALARM / PROTECTION | RUN | ALM | SOC INDICATION LEDS | | | | REMARK |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| POWER OFF | Dormancy | OFF | OFF | OFF | OFF | OFF | OFF | All off |
| STANDBY | Normal | Fash 1 | OFF | According to the electricity instruction | | | | Standby state |
| | Alarm | Flash 1 | Flash 3 | | | | | Cell low voltage |
| CHARGE | Normal | Lighting | OFF | According to the electricity instruction (Power level indicates maximum LED flash 2) | | | | Alarm when overvoltage light is off |
| | Alarm | Lighting | Flash 3 | | | | | |
| | Overcharge Protection | Lighting | OFF | Lighting | Lighting | Lighting | Lighting | If there is no charging the LED light is in standby state |
| | Temperature Over-current Protection | OFF | Lighting | OFF | OFF | OFF | OFF | Stop charging |
| DISCHARGE | Normal | Flash 3 | OFF | According to the electricity instruction. | | | | |
| | Alarm | Flash 3 | Flash 3 | | | | | |
| | Undervoltage protection | OFF | OFF | OFF | OFF | OFF | OFF | Stop discharge |
| | Temperature Overcurrent Short-circuit Reverse connection Failure protection | OFF | Lighting | OFF | OFF | OFF | OFF | Stop discharge |
| FAIL | | OFF | Lighting | OFF | OFF | OFF | OFF | Stop charging and discharging. |

**TABLE 2 CAPACITY INDICATION INSTRUCTIONS**

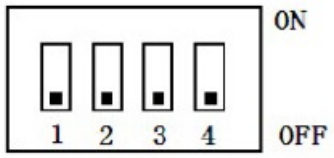
| STATE | | CHARGE | | | | DISCHARGE | | | |
|---|---|---|---|---|---|---|---|---|---|
| Capacity Indicator Light | | L4 | L3 | L2 | L1 | L4 | L3 | L2 | L1 |
| Battery Power (%) | 0 ~ 25% | OFF | OFF | OFF | Flash 2 | OFF | OFF | OFF | Lighting |
| | 25 ~ 50% | OFF | OFF | Flash 2 | Lighting | OFF | OFF | Lighting | Lighting |
| | 50 ~ 75% | OFF | Flash 2 | Lighting | Lighting | OFF | Lighting | Lighting | Lighting |
| | 75 ~ 100% | Flash 2 | Lighting | Lighting | Lighting | Lighting | Lighting | Lighting | Lighting |

**TABLE 3 LED FLASH INSTRUCTIONS**

| FLASH MODE | ON | OFF |
|---|---|---|
| FLASH 1 | 0.25 S | 3.75 S |
| FLASH 2 | 0.5 S | O.5 S |
| FLASH 3 | 0.5 S | 1.5 S |

**Note:** can enable or prohibit the LED indicator light alarm through the upper machine, the factory default is enabled.

**table 4 dual switch position**

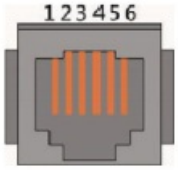



| ADDRESS | CODES THE SWITCH POSITION | | | |
|---|---|---|---|---|
| | #1 | #2 | #3 | #4 |
| 1 | OFF | OFF | OFF | OFF |
| 2 | ON | OFF | OFF | OFF |
| 3 | OFF | ON | OFF | OFF |
| 4 | ON | ON | OFF | OFF |
| 5 | OFF | OFF | ON | OFF |
| 6 | ON | OFF | ON | OFF |
| 7 | OFF | ON | ON | OFF |
| 8 | ON | ON | ON | OFF |
| 9 | OFF | OFF | OFF | ON |
| 10 | ON | OFF | OFF | ON |
| 11 | OFF | ON | OFF | ON |
| 12 | ON | ON | OFF | ON |
| 13 | OFF | OFF | ON | ON |
| 14 | ON | OFF | ON | ON |
| 15 | OFF | ON | ON | ON |
| 16 | ON | ON | ON | ON |

## Interface Definition

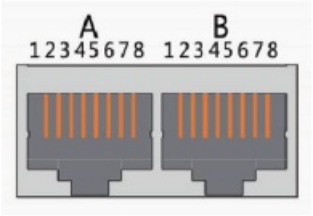
**DIAGRAM OF THE COMMUNICATION INTERFACE**

RS232 communication port definition:



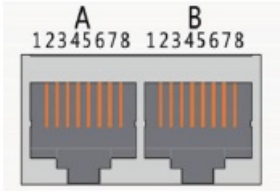

| INTERFACE | DEFINED DECLARATION | |
|---|---|---|
| **RJ12, RS232 pin layout** | PIN 1 | NC (empty) |
| | PIN 2 | NC (empty) |
| | PIN 3 | TX protection board sends data (computer receiving dat a foot) |
| | PIN 4 | RX protection board receives data (computer sends dat a) |
| | PIN 5 | Ground signal ground |
| | PIN 6 | NC (empty) |

**RS 485-1/CAN COMMUNICATION INTERFACE DEFINITION:**



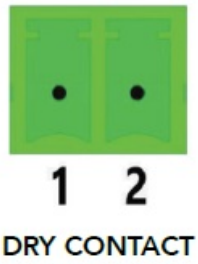

| INTERFACE | DEFINED DECLARATION | | | DEFINED DECLARATION | | |
|---|---|---|---|---|---|---|
| **X1**<br>**Communication port definition** | **RJ45**<br>**CAN pin layo ut** | PIN 1 | CANL | **RJ45,**<br>**RS485 pin la yout** | PIN 1 | RS485-B1 |
| | | PIN 2 | CGND | | PIN 2 | RS485-A1 |
| | | PIN 3 | NC (empty) | | PIN 3 | RS485-GND |
| | | PIN 4 | CANH | | PIN 4 | RS485-B1 |
| | | PIN 5 | CANL | | PIN 5 | RS485-A1 |
| | | PIN 6 | NC (empty) | | PIN 6 | RS485-GND |
| | | PIN 7 | CGND | | PIN 7 | NC (empty) |
| | | PIN 8 | CANH | | PIN 8 | NC (empty) |

**RS485-2 COMMUNICATION INTERFACE DEFINITION:**




| INTERFACE | DEFINED DECLARATION | | | DEFINED DECLARATION | | |
|---|---|---|---|---|---|---|
| Battery link ports | A part RS-485-2 Interface | PIN 1 | RS485-B2 | B part RS-485-2 Interface | PIN 1 | RS485-B2 |
| | | PIN 2 | RS485-A2 | | PIN 2 | RS485-A2 |
| | | PIN 3 | RS485-GND | | PIN 3 | RS485-GND |
| | | PIN 4 | NC (empty) | | PIN 4 | NC (empty) |
| | | PIN 5 | NC (empty) | | PIN 5 | NC (empty) |
| | | PIN 6 | RS485-GND | | PIN 6 | RS485-GND |
| | | PIN 7 | RS485-A2 | | PIN 7 | RS485-A2 |
| | | PIN 8 | RS485-B2 | | PIN 8 | RS485-B2 |

**DRY CONTACT DESCRIPTION**




This BMS can provide one channel of dry contact signal, all dry contact signals are passive switch-es, regardless of polarity.

| KRY 1 (2P terminal) | | |
|---|---|---|
| **BMS STATE** | **DESCRIPTION** | **REMARK** |
| Normal Operation | 1/2 pin is disconnected | |
| BMS Alarm | 1/2 pin is connected | Output when SOC alarm, under vol tage and over voltage alarm, and B MS protection state, such as under voltage protection, over-voltage pro tection, or short circuit protection; |

**BUTTON OPERATION INSTRUCTIONS**

- When the BMS is in a sleep state, press the button for more than 1 S, and the protection board is activated.
- When the BMS is in the operating state, pressing the button for more than 3 seconds and less than
- 6 seconds, then the BMS will enter the sleep state. When the BMS is working, the protection board will reset

when the button is pressed for more than 6S.

**BUZZER ACTION DESCRIPTION**
In the case of short-circuit protection, the buzzer beeps every 2 seconds. If a short circuit is detected 3 times in a row then the short-circuit protection is locked, and the buzzer will no longer beep. Disconnect the battery and wait a few minutes to switch it back on. It might take up to 5 minutes to redetect a clear condition and then the BMS will re-enable.

## INTERFACE FUNCTIONS

**WARNING**
Interfacing or plugging in any 3rd party or non-approved Hubble products or peripherals into the RS232 (serial) or RS485 (Battery Link) ports, can cause damage to the BMS and cause the BMS to malfunction. This may also result in damaging the internal cells. Plugging in non-approved Hubble products into these ports can immediately void your warranty.

**DESCRIPTION OF SLEEP FUNCTION**
In order to reduce the power consumption of the whole system, the system has a sleep function.

**When the following conditions are met, the system will enter sleep mode:**

1. The over-discharge protection of the BMS has not been released for 5 minutes.
2. The duration of the standby state has reached 24 hours (no communication, no charge, and discharge, no charger connected).

**DESCRIPTION OF WAKE-UP FUNCTION**
Please note that the battery enters sleep mode due to single or overall over-discharge, and cannot be activated or switched on by the serial port or the comm ports.

**The BMS will activate and wake from sleep when the following is detected:**

1. If a charge current is applied to the battery from the inverter/ups.
2. If the power button is pressed.
3. Through communication from the RS232 or CANBus in certain circumstances.

**CURRENT LIMITING FUNCTION**
The BMS has an advanced current limiting function built in. The charge current limiter is designed to activate if the charging current has reached the maximum battery design charge limit. This ensures the battery does not disconnect from the circuit and the current limiter takes over and reduces the charge to 20Amps per battery. The default start-up condition of the charging current limit is to start when the charging current is greater than 100A. After entering the current limit, the test will be performed again every 10 minutes. When the current is less than the current limit start value, the current limit function will be turned off. When the current is bigger than the current limit start value, then the current limiting mode with stay enabled.

**COMMUNICATION DESCRIPTION**

1. The RS232 port is only for use with Hubble-specific peripherals or technicians or at a service center to interface with the BMS. Attempting to use this port for anything else or 3rd party products can cause damage.
2. The CAN Port is specifically to be used for any interfacing 3rd party equipment like inverters etc. This port is dedicated to inverters and other CAN bus ports for communication to get battery information.

3. The RS485 communication port can be interfaced with 3rd party inverters that do not have a CAN port and are supported by Hubble.
4. The Battery link ports are only for connecting more batteries of the same model to increase capacity and enable multiple battery communications.

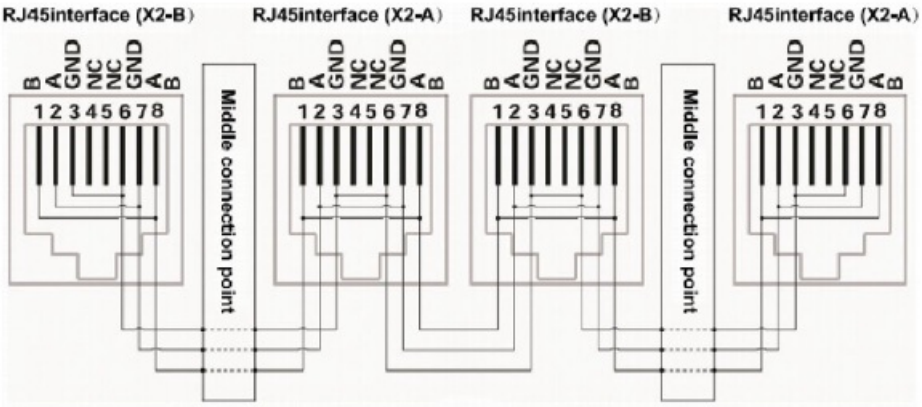
**OPTIONAL CLOUDLINK DEVICE**
The Hubble Cloudlink is an optional add-on to the Hubble X and AM range of products. As long as the device is connected to Wi-Fi it will cloud, all battery and inverter data to our cloud-server, enabling users to remotely monitor their power system.

- **Learn more about the Hubble Cloudlink here:** https://www.hubblelithium.co.za/hubble-cloudlink.html.
- **Access the latest Coudlink Setup Guide here:** https://www.hubblelithium.co.za/cloudlink-setup.html.

## PARALLEL FUNCTIONS

### PARALLEL (CASCADE) FUNCTION OF BATTERY PACKS

- When the battery packs are cascaded, the one with the communication address 0001 is called the master battery pack, and the other ones with the communication address are called the slave battery packs. The slave battery pack can communicate with the master battery pack through the RS485 communication interface, and the master battery pack centrally packs and manages the data of each battery pack in this cascaded system.
- When the battery packs are cascaded, only the main battery pack can communicate with the host computer, upload the data, status, and information of all battery packs in the cascaded system, integrate monitoring and management, and realize remote monitoring.




**RS485 PARALLEL WIRING DIAGRAM**
When performing multi-machine parallel communication operations, it is necessary to configure the DIP address of each PACK first. The dialing code adopts the BCD code format, the definition is:


*(black is OFF, blank is ON)*

### WARNING

TO ENSURE PROPER USE OF THE BATTERY PLEASE READ THE MANUAL CAREFULLY BEFORE USING IT.

**HANDLING**

- Do not expose the battery to fire.
- Do not place the battery in a charger or equipment with the wrong terminals connected.
- Avoid shorting circuiting the battery.
- Avoid excessive physical shock or vibration.
- Do not disassemble or deform the battery.
- Do not immerse in water.
- Do not mix the battery with other different makes, types, or models of batteries.
- Keep out of the reach of children.
- **CHARGE AND DISCHARGE**
  The battery must be charged with an appropriate charger/inverter only. Never use a modified or damaged charger.
- **STORAGE**
  Store the battery in a cool, dry, and well-ventilated area.
- **DISPOSAL**
  Regulations vary for different countries. Dispose of under local regulations.

#### Battery Operation Instruction

- **CHARGING**
  - **Charging current:** Do not surpass the specified charging current.
  - **Charging voltage:** Do not surpass the specified charging voltage.
  - Ensure correct DC polarity before connecting the terminals.
- **DISCHARGING CURRENT**
  The discharging current must not surpass this maximum battery specification.
- **BATTERY STORAGE**
  The battery should be stored in the product specification book stipulation temperature range. If has surpassed above for six months the long time storage, suggests you should carry an additional charge to the battery.

## COMPLETING SETUP

**CONGRATULATIONS!**
Once all the above steps have been completed you can proceed to follow the start-up instructions given by your inverter manufacturer.

If you have any difficulties with setting up your system, please contact our Technical Support Department via **support@hubblelithium.co.za**. Be sure to include the following information in your initial email so that we can provide you with timely assistance:

1. Inverter make & model
2. Model & number of connected batteries
3. Are your batteries in Series or Parallel?
4. A brief description of your system and any issues you may be having

5. If possible; images of your power system
6. Contact Details, if we should need to contact you

**VIEW OUR WEBSITE FOR MORE INFORMATION**
**www.hubblelithium.co.za**.

Information published in this manual is correct as of the date published in this manual. Please ensure you have the latest manual which can be obtained from our website at **www.hubblelithium.co.za**.

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## Documents / Resources

| | |
|---|---|
|   | **Hubble Lithium AM-10 Lithium Battery** [pdf] User Manual<br>AM-10 Lithium Battery, AM-10, Lithium Battery, Battery |

## References

- Hubble Lithium
- Hubble Lithium | Cloudlink
- Hubble Lithium | Cloudlink
- User Manual