

HUBBLE LITHIUM AM-2 MANUAL



Integrated Lithium-ion Battery

Manual for Hubble AM-2

Version: V1.0

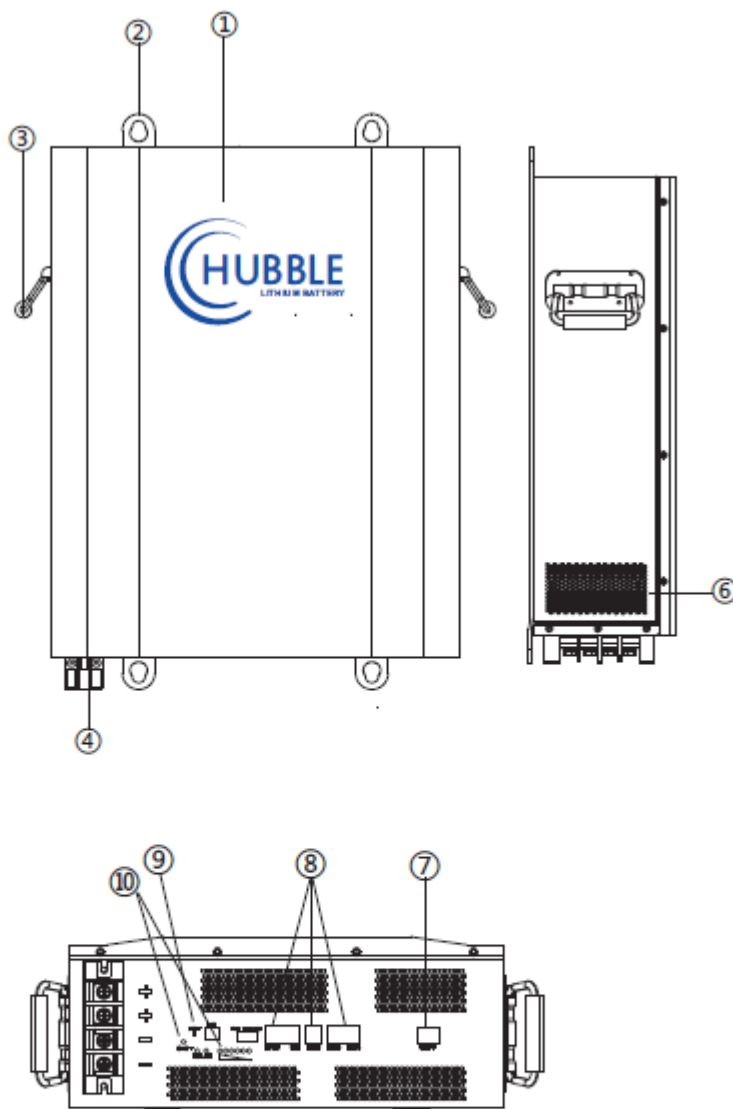
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1. Appearance

Below illustration of the AM-2 model.



- | | |
|-------------------|---------------------------|
| ① Cover | ⑥ Cooling Case |
| ② Hanging Ear | ⑦ Power Switch |
| ③ Handle | ⑧ Communication Interface |
| ④ Output Terminal | ⑨ Reset Switch |
| | ⑩ Led Lights |

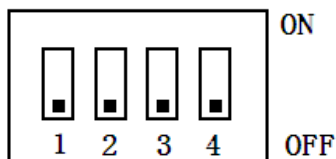
2. Installation

The AM-2 is designed to be wall mounted or installed flat inside a cabinet. The unit is not designed to be installed upside down or sideways on a wall.

When installing on a wall ensure you use Rawl bolts to secure the unit onto the wall.

3. Dip switch settings

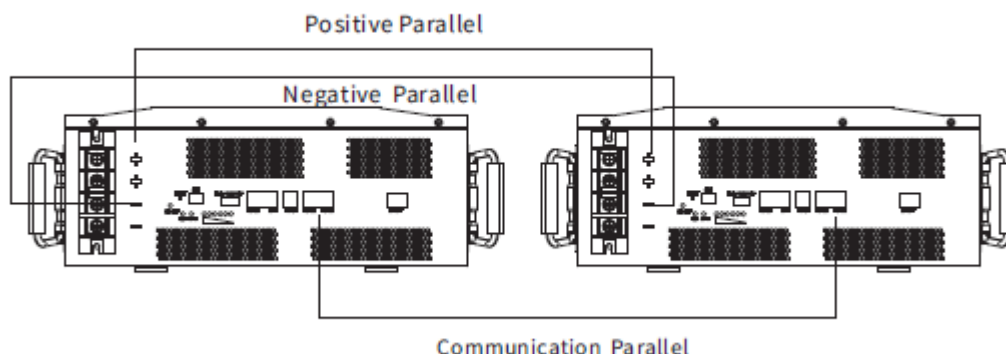
Configure each battery address to enable proper setup and communication. Each battery needs a unique serial addresses in order to communicate. If you are only using 1 battery in your setup, ensure you set the battery to address 1.



Address	Dip Switch				Remark
	#1	#2	#3	#4	
1	ON	OFF	OFF	OFF	Master
2	OFF	ON	OFF	OFF	Battery 2
3	ON	ON	OFF	OFF	Battery 3
4	OFF	OFF	ON	OFF	Battery 4
5	ON	OFF	ON	OFF	Battery 5
6	OFF	ON	ON	OFF	Battery 6
7	OFF	OFF	OFF	OFF	Battery 7
8	OFF	OFF	OFF	OFF	Battery 8
9	OFF	OFF	OFF	OFF	Battery 9
10	OFF	OFF	OFF	OFF	Battery 10
11	OFF	OFF	OFF	OFF	Battery 11
12	OFF	OFF	OFF	OFF	Battery 12
13	OFF	OFF	OFF	OFF	Battery 13
14	OFF	OFF	OFF	OFF	Battery 14
15	OFF	OFF	OFF	OFF	Battery 15

4. Connections

To connect multiple batteries, ensure you use the supplied RJ45 to RJ45 (normal LAN cable) and plug the one end into the master "Battery Link", and the other end into battery #2. Continue this step until all the batteries has been linked up.



NOTE: If you do not have a battery link cable supplied with your battery, you can use a normal computer LAN cable to connect each battery. The pin layouts for the ports are the same as a normal LAN cable.

Continue to wire up the DC block terminals of each battery to the inverter/charger.

Once you have completed the address configuration, inter battery communication links and wired up the DC connections you can proceed to configure the inverter charge settings.

NOTE: If your batteries are unbalanced or the voltage of each pack is different by more than 2 Volts DC then your packs will try to inter balance by over 100Amps. This could cause the other batteries in the configuration to Over Current and go into protection mode. If this occurs, charge each pack full individually with the inverter/charger, then switch the other packs on once each has been charged to 100%.

5. DC Isolator

The Hubble AM series of batteries has an integrated electronic circuit breaker built into the BMS. The integrated electronic CB is for protecting the battery and the internal cells against overload, over current, over volt etc. It is however required to install an external DC fuse or circuit breaker before using or operating the batteries. Please ensure you use the correct rating as per battery specification.

6. Inverter Setup (Pre launch)

Set your Inverter/charger to the following settings before you start charging or using the lithium batteries. It is very important to set the voltages correctly as out of range voltages can damage the battery.

The following settings are to be used for all charger/inverters.

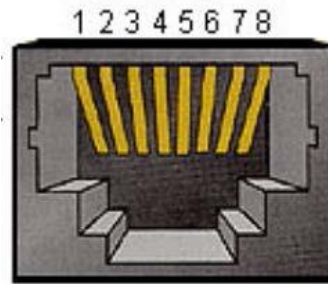
Inverter / Charger Settings		
Bulk/Equalisation Charge	53.6 Volt	
Float Charge	53 Volt	
Low DC Cut off	43 Volt	
Axpert Recommended Settings		
Voltage Point back to Utility	47 Volt	Axpert Type
Voltage Point back to Battery	53 Volt	Axpert Type

7. CAN Bus Setup (Optional)

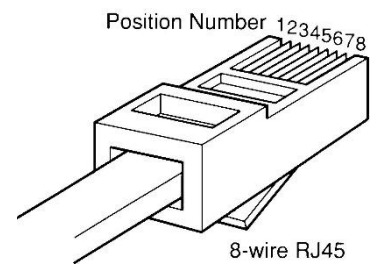
The AM series models has an integrated CAN bus port on each battery. The CAN bus can be used to connect to any inverter that is CAN bus ready. The Hubble range of lithium batteries with CAN bus port can integrate with most leading inverters. For more information on CAN bus and compatible inverters see our website at www.hubblelithium.co.za for more information.

To connect the CAN bus cable from the battery to the inverter, ensure you have the correct pin layout. The below is the pin configuration that the Hubble battery CAN bus port uses. Ensure you have the pin out for the cable required for your inverter.

PIN Number	CAN Pin
1	-
2	GROUND
3	-
4	CAN H
5	CAN L
6	-
7	-
8	-



CAN Port



8-wire RJ45

8. Completing Setup

Once all the above steps have been completed with CAN bus step being optional the setup should be complete for your batteries. You can proceed to follow the start-up instructions from your inverter manufacturer.

9. LED Indication

Table 1: LED Operation Status

Status	Normal / Alarm / Protection	RUN	ALM	SOC Indication LEDs				Remark
		●	●	●	●	●	●	
Power Off	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	All off
Standby	Normal	Flash 1	OFF	Indication by SOC				Standby state
	Alarm	Flash 1	Flash 3					Cell low voltage
Charge	Normal	ON	OFF	Indication by SOC (The top SOC Led Flash 2)				ALM Led OFF when Cell over-charge voltage Alarm
	Alarm	ON	Flash 3					
	Over Charge Protection	ON	OFF	ON	ON	ON	ON	If no mains supply, LED as standby
	Temperature/Over-current Fault Protection	OFF	ON	OFF	OFF	OFF	OFF	
Discharge	Normal	Flash3	OFF	Indication by SOC				
	Alarm	Flash3	Flash 3					
	Under Discharge Protection	OFF	OFF	OFF	OFF	OFF	OFF	
	Temperature Alarm or Over-current Alarm or Short Circuit Protection	OFF	ON	OFF	OFF	OFF	OFF	
	Fault	OFF	ON	OFF	OFF	OFF	OFF	

Table 2: LED Flash Status

FLASH	ON	OFF
Flash 1	0.25 S	3.75 S
Flash 2	0.5 S	0.5 S
Flash 3	0.5 S	1.5 S

- When battery is turned on you can reset the BMS operation mode to default to clear a temporary alarm status. Push the switch for 6 seconds, the BMS will reset. LEDs will flash one at the same.

10. BMS Low Power Mode

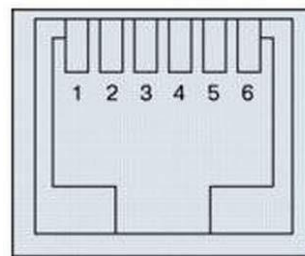
The Hubble BMS will enter low power mode if the following conditions happen:

- When over-discharge protection has occurred. (30S later).
- When all cell-voltage less than sleep voltage parameter setting to prevent complete cell/battery drain.
- Standby time is more than 24 hours (without charge and discharge current, without balance, without protection and fault).

11. RS232 Communication Port

The RS232 interface is used to connect to either the RIOT Cloudlink (www.riotsystems.cloud) device or for technical support to interface directly through a service laptop and access the BMS directly for programming and troubleshooting.

PIN Number	RS232 Pin
1	-
2	Ground
3	BMS Transmit
4	BMS Receive
5	Ground
6	-



RS232 Port

12. RS485 Communication Port

The RS485 interface is used only for performing firmware updates directly for the BMS. This port cannot be used for any inverter communications. This port is reserved for administrative and workshop technicians.

13. Data Storage

The Hubble BMS has a built-in alarm and event data storage memory. Alarms and events are recorded as, occurrence time, fault categories, over/under cell voltage, pack voltage, charge/discharge capacity, charge/discharge current, temperature, etc. This can be downloaded by a service technician to help troubleshoot any issues or problems of the battery.

14. Maintenance

The Hubble BMS will protect the battery and life of your battery as best possible. However, it must be noted that proper operation of the battery is recommended, and maintenance functions should be taken to ensure the maximum life of your batteries.

1. Cell balancing is a very important function of the lifespan of your battery. It is important to ensure the cell balancing functions are properly performed. The Hubble BMS cell balancer will only activate upon 100% state of charge when the batteries near full charge. Thus, it is critical that a full charge to the batteries are provided at least once every 5 (five) days, but preferably daily upon a charge cycle. Enough charge time should be provided to balance the cells until the BMS completely stops taking charge from the inverter. Cell cycle life cannot be guaranteed if balancing is not performed on a regular basis. This is especially important in complete off grid systems where a stable power supply is not available.

15. BMS EMC Safety

ESD

Complies with Level 4 of GB/T 17626.2-2006 (EN55024): 8KV at contact and 15KV at air. Normal operation after test.

Electromagnetic Conduction

Complies with Lever A of YD/T 983-1998 (EN55022).

Electromagnetic Radiation

Complies with Lever A of YD/T 983-1998 (EN55022).

Inrush

Complies with GB/T 17626.5-2008 (EN6100-4-2).

Disclaimer:

Information published on this manual is correct as of the date published on this manual.

Please ensure you have the latest manual which can be obtained from our website at

www.hubblelithium.co.za