# A BM1 | Battery Monitor | 1

latest instructions
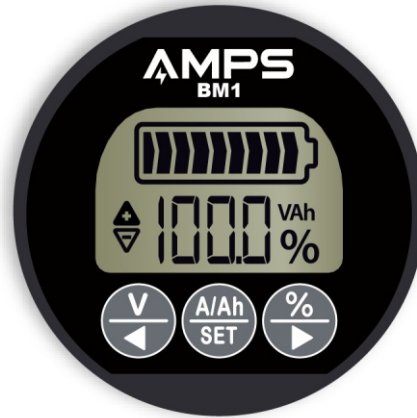




# BM1
## Battery Monitor
## Handbook

Box should include:
- **500A Shunt**
- **Remote Control / Display**
- **1m of shunt to remote cable**
- **1m of B+ power cable**

# WELCOME

## Welcome

Welcome to the AMPS Owners Handbook for the product BM1, the Battery Monitor.

Please take your time to read and fully understand the contents of this Handbook. These guidelines are developed with your safety and the products performance in mind and failure to follow or understand these guidelines may lead to voiding the product warranty or even leading to damage or injury for you or your setup.

If you are unsure of any step or guideline then please consider reaching out to AMPS via our web contact form or our phone service and we shall offer our support.

Thank you for joining AMPS and we hope to serve your travels well.

## BM1

The battery monitor is an extremely accurate meter that allows the user to check the state of charge of a battery bank. The BM1 measures current flowing in / out of your battery(s), the Ah capacity remaining and state of charge. It also displays the voltage of the battery that powers the BM1. The APP additionally shows Wattage figures, temperature of shunt and cycle count.

## Product Code Understanding

Throughout this manual we will make reference to this product as the 'BM1'. The terms '12V' or '24V' are nominal voltage ranges, rather than specific voltages.

## Using this Handbook

This manual must be read throughout before installing this electronic device. Do not lose these instructions - keep them safe. The most up to date instructions can be found on sterling-power.com. Please refer to the latest instruction manual before contacting AMPS. At AMPS, we endeavour to include all of the product information that we can think of into the manual.

## Safety

Installation of the electronic device must be carried out by qualified and trained personnel only. The personnel must be familiar with the locally accepted guidelines and safety measures.

Your safety is AMPS top priority. Please follow all precautions to keep yourself safe. If you believe your unit requires repair then please contact AMPS or your distributor. Do not attempt to service the unit yourself.

## 12V -80V Calculations

This manual has been written predominantly with 12V nominal voltages in mind. But it shall display up to 80VDC.

## Specifications

**BM1**

| | |
|---|---|
| Working Voltage Range | 8V-80V |
| Wattage consumption | 0.144W (12mA at 12V) |
| Standby consumption | 0.006W (0.5mA at 12V) |
| Quiescent / Sleep current | 0.0006W (50uA at 12V) |
| Capacity accuracy | +/-0.5% |
| Voltage accuracy | +/-0.5% |
| *Current accuracy* | *+/-0.5%* |
| *Capacity Ah setting* | *up to 999Ah | 9999Ah (app)* |
| | |
| *Weight* | *390.0g (Shunt + remote)* |

## Standard in the box
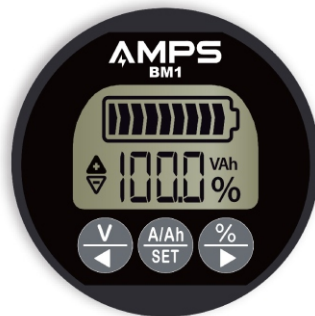


LCD Screen | Remote Control | Bluetooth          500A | 75mV | Shunt w/ holder

BM1

1m shielded wire - shunt to remote connecting wire          1m power lead to run the BM1 (B+ lead)

Dimensions drawing
(not to scale)
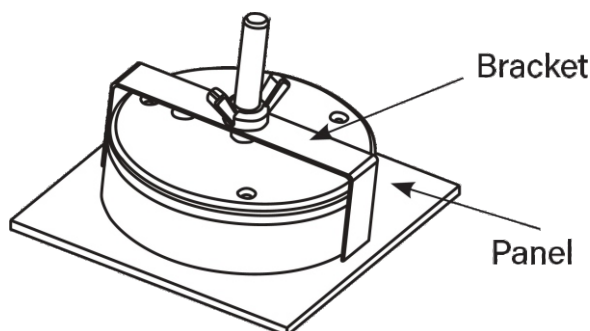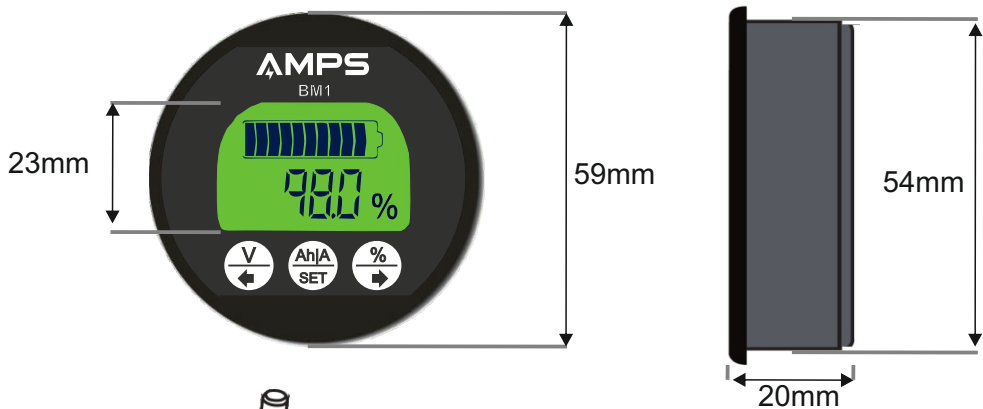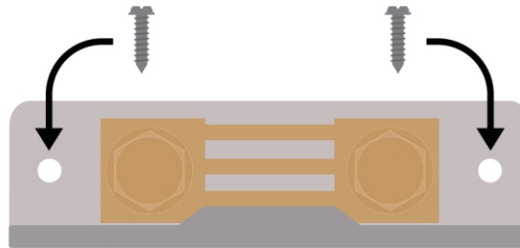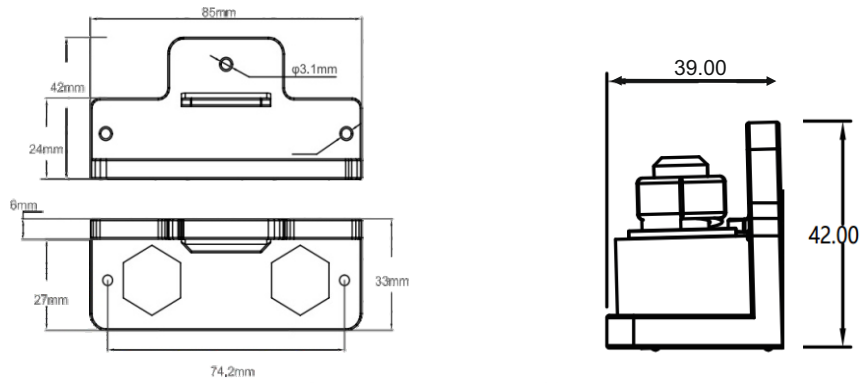
## Remote Control



Bluetooth Dongle, inside remote

State of Charger indicator

Charging indicator (up)

Discharging indicator (down)

Volts | Amps | Ah

Capacity percentage

Operational buttons

AMPS
BM1

VAh
%

V
Ah|A
SET
%

Value

## 500A | 75mV Shunt



8mm bolts | 40mm long

Mounting bracket



8-80VDC - Positive connection block

Remote Control Connection

500A shunt
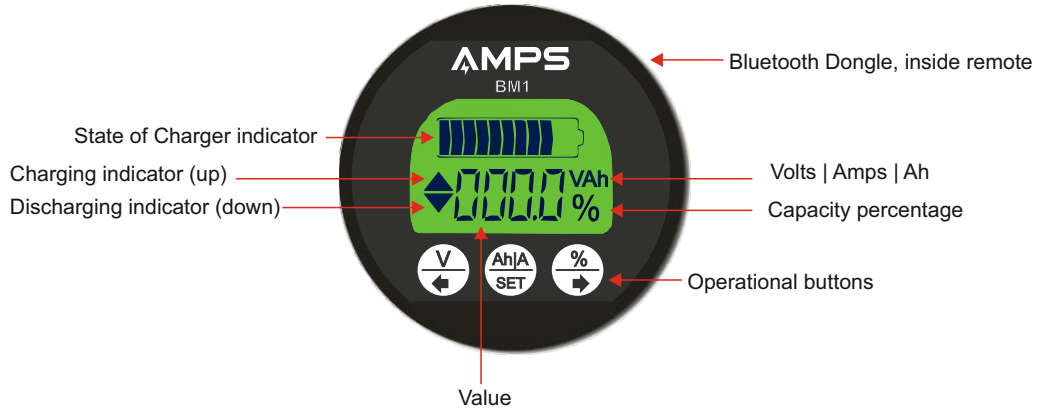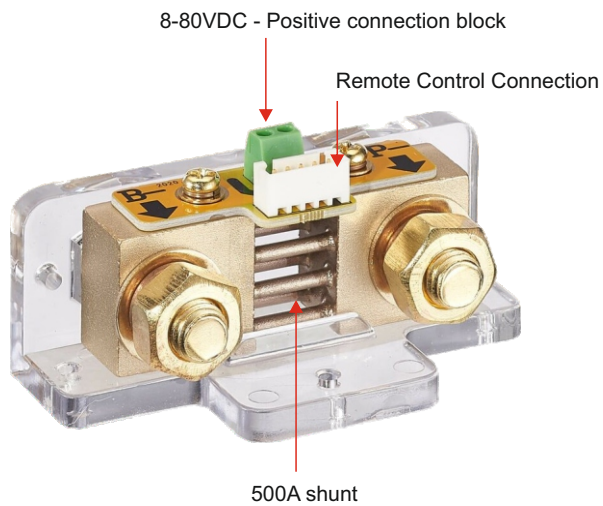
Orientation of shunt does not matter

Remote Control

AMPS
BM1
1000.0 VAh %
V◄ A/Ah SET %►

Solar regulator(s)
Inverter(s)
Battery Charger(s)
Other chargers / loads

**+**

The thin red cable provided can be extended

1m standard

500A shunt

**Shunt must be installed in the negative**

**P-**          **B-**

8-80VDC
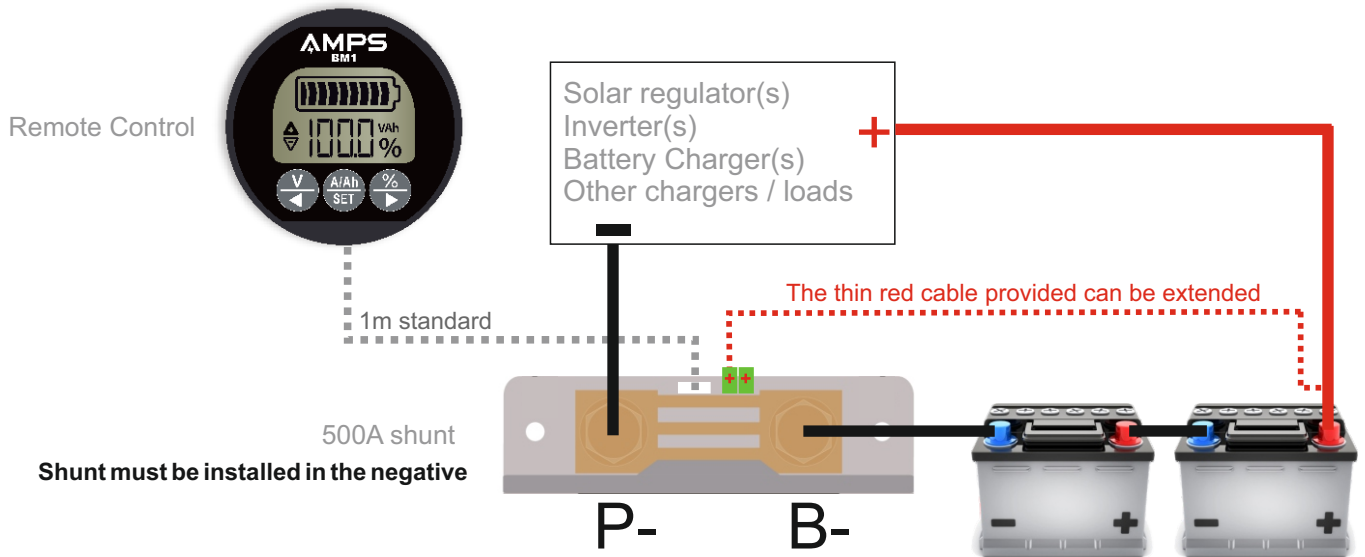
**P-**
This terminal on the shunt should be used for ALL negative connections (except for battery -ve). However, If you want to add a busbar here, that is also fine.
Essentially, all of the current entering or leaving the battery MUST flow through the shunt.

**B-**
The ONLY connector on the B- terminal should be that of the negative post of the battery.
The distance between B- and the battery -ve terminal should be as short as possible. You want as clean / clear a connection here as possible. You may even wish to use a ANL style fuse to simply bridge the gap between the B- and the battery terminal.
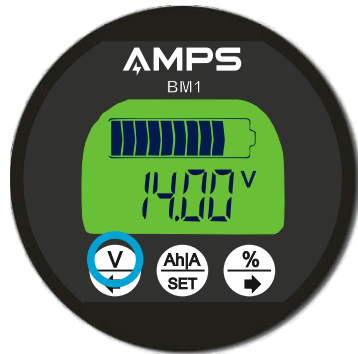
500A shunt

standard cable 1m

AMPS
BM1
1000.0 VAh %
V◄ A/Ah SET %►
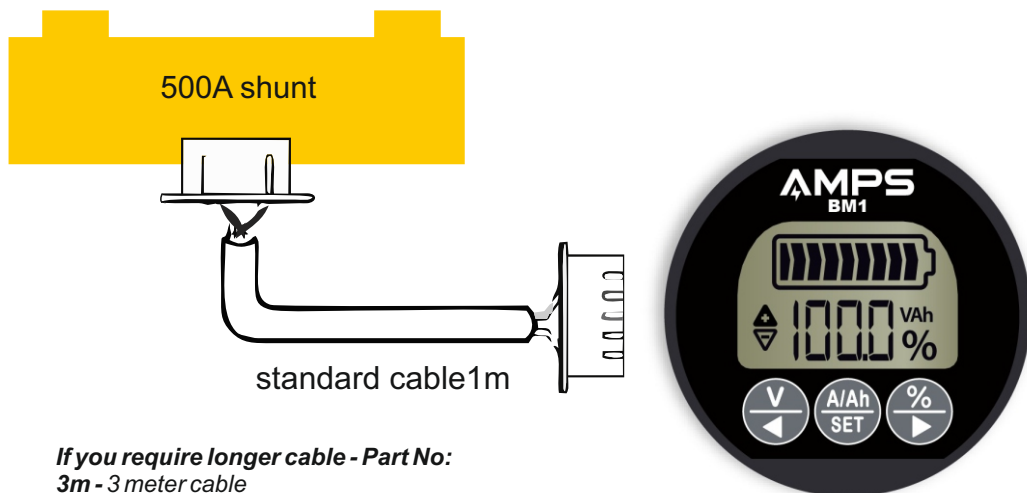
*If you require longer cable - Part No:*
**3m -** *3 meter cable*
**6m -** *6 meter cable*

**Basic Main Screen**

To refer to V, Ah|A or % simply press the respective buttons on the remote control. Before you can get an accurate readout of Ah and % please set the Ah capacity of the battery, see below.



**V**
Pressing V displays the voltage of the battery that the thin red sense wire is connected to. Typically the leisure battery / service battery.
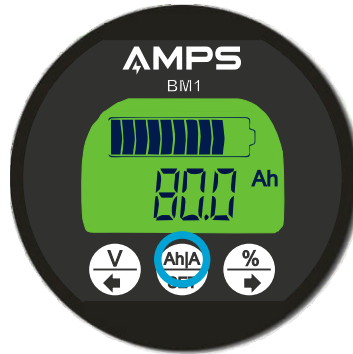
**Ah|A**
Toggle pressing of the Ah | A button toggles between the Ah capacity remaining in your battery and the current flow (A).
*The Ah feature shall need setting up in the menu option (read on).*
The A feature shall be the instant live read out of the net current flowing across the shunt. To understand which direction the current is flowing refer to the up / down arrows on the left of the screen. Up means net current flowing into battery. Down means net current out of battery.
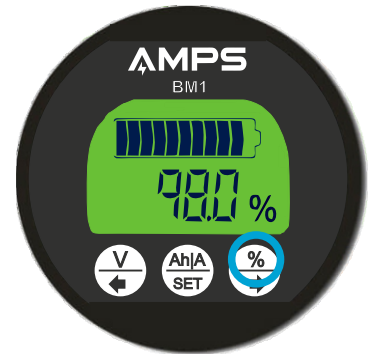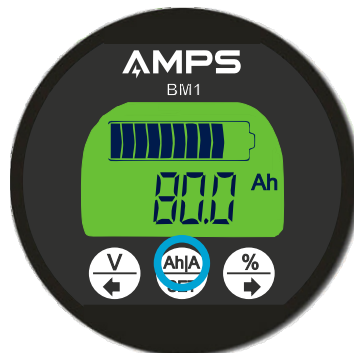
**%**
Pressing the % button shall display a State of Charge % remaining in your battery. This feature shall also need to be setup in the menu (read on).

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**Setting up Ah capacity of the battery.**

By setting up the Ah on the remote control this shall also calibrate the SOC % meter readout.



Setting the Ah capacity

On the remote control, toggle the Ah | A button until you see **Ah** on the right hand side. Then press+hold the Ah|A button for 5 seconds until it begins to flash.

Then use the left or right arrows to set the Ah capacity of your battery(s). Once you have set the value, press SET button once.

This value can be set up at any time during the charge cycle of the battery. However, once set, the battery(s) need to be discharged, then charged back up to FULL.

N.B. to get an exact figure of the Ah of your battery bank may be difficult. We recommend setting the Ah figure to a conservative value. Essentially a value that you wish to take out of your battery. For example, you may have a 300Ah battery bank of lead acid (AGM, gel, sealed) but you only wish to ever monitor the first 140Ah of the entire bank because you do not wish to exceed this. Simply set the Ah capacity to 140Ah. Therefore at 0% state of charge you know that you have used all of that sensible amount up.

With AMPS $LiFePO_4$ (lithium Iron Phosphate) batteries simply set the Ah capacity to the Ah value(s) written on the battery(s) themselves. Add the Ah numbers together if you have multiple AMPS batteries in your install.  If you have 3x 12V 100Ah - set the Ah capacity to 300Ah, etc.
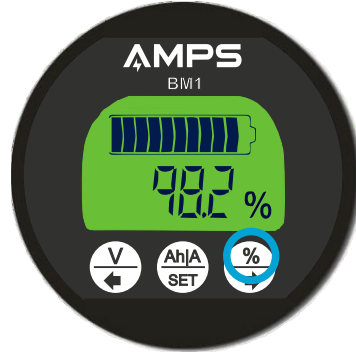
# REMOTE CONTROL

## Setting the % SOC to 100%

If you find that after you have set the Ah capacity that the % value never reaches 100% and you wish to calibrate the SOC% to 100%, follow these instructions.
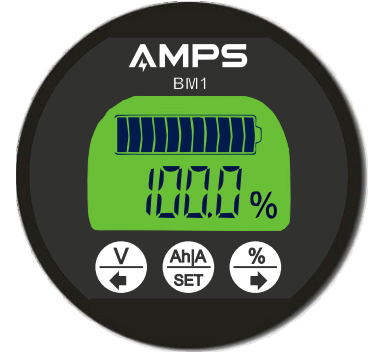
*Firstly, ensure that your batteries are as full as possible / as full as you would like them to be.*

Press the % button.

Then press and hold % until 100% appear on the screen.

The BM1 is forced to 100%. This calibrates the BM1 to be the new '100%' full. Simultaneously, it forces the Ah capacity to the value you've set, on the previous page. i.e. FULL.
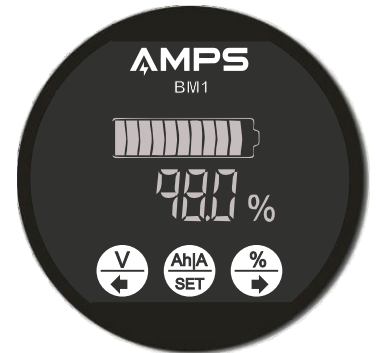
*Ensure NOT to tamper with this setting once setup has been established.*

## Turning the back light on/off

If you wish to turn the backlight off press both the left and right buttons simultaneously until the screen turns off.
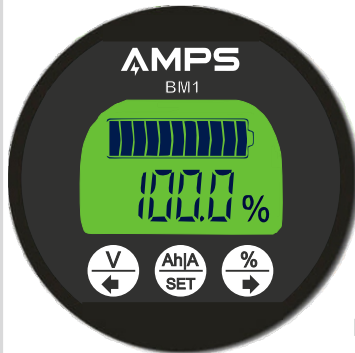
long press both left and right buttons

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## Troubleshooting | FAQ

**My readings are always wrong!**

The most common installation problem when installing any Ah Counter is that there is always 1 or multiple negative cables that are accidentally bypassing the shunt. If ANY negative wire(s) bypass the shunt the shunt can not read the current flowing down the bypass cable. Check to ensure there are no rogue negative wires (large or small). All of the negatives (except the battery itself) should be connected to the **P-**.

**BM1 shunt getting very hot**

The shunt can get hot for 2 main reasons. Simply high current for a long period of time generates heat. Or, loose connections at or around the shunt can cause heat spots that conduct through the shunt. Cleaning / improving metal to metal contact for better conduction. This shall also improve power delivery.

**Current shown on remote display is very different to any other ammeter display.**

Ensure only the big bolts house all of the connections on the shunt. Do not connect any wires to the smaller screws on the printed circuit board or any other locations on the shunt itself. By doing this you shall have erroneous current readings.

**Ah capacity becomes more inaccurate over time. I'm losing battery capacity.**

The rate of ageing of lead acid style batteries varies based on use and age. When they age, they reduce their ability to store Ah. From time to time you have to reset the new 100% full state of charge meter.

**% SOC meter is always wrong**

SOC % is best described as a guestimate. It works from simple maths. The user tells the BM1 what Ah the battery is and it knows the current flow in and out via the shunt. It therefore works out a % state of charge. Battery degradation, parasitic drains, damaged cells, cold weather, high discharge loads etc. may not influence the SOC% value but may influence the actual state of charge of the battery.