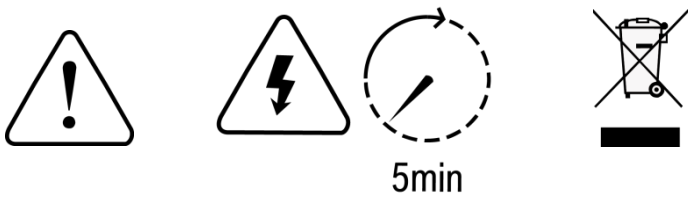
BM

Battery Monitor Manual

Version: A1.0

April. 2017



WARNING : FIRE HAZARD

SUITABLE FOR MOUNTING ON CONCRETE OR OTHER

NON- COMBUS TABLE SURFACE ONLY

CAUTION : THE DC AND AC BREAKER MUST HAVE BEEN

TURNED OFF BEFORE SERVICING

MADE IN CHINA

TBB POWER CO., LTD.

Disclaimer

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- Take no warranty as to the accuracy, sufficiency of suitability of any technical or other information provided in this manual or other documentation.
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About this Manual

This manual describes our product features and provides procedure of installations. This manual is for anyone intending to install our equipment.

General Description

Thanks for choosing TBB product.

The BM series battery monitor features microprocessor controlled combined with high resolution measuring system for Lead Acid battery voltage and charge/discharge current. With built in software, BM series can calculated consumed AH/KWH and remaining AH/KWH, and display battery voltage and battery current as well.

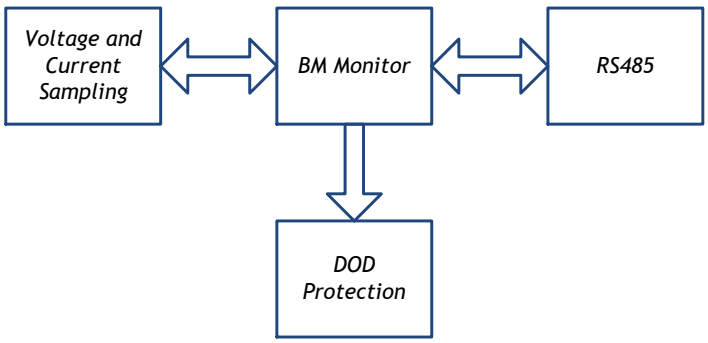
BM could record all battery activities since the first installation (max 200 records). Apart from discharging and charging, multiple other factors are considered including battery size, age ratio of battery etc. With shunt, even the smallest leakage current can be detected and recorded to guarantee the accuracy.

Compared with conventional indicating meters, small current can be measured and read exactly with this device. With this feature, latent consumers (insulation fault, wrong connections, standby unit etc) can be recognized immediately. Meantime, through additional sensor second battery voltage can be measured and displayed.

With the optional DOD protection unit, battery low voltage protection level can be programmed and alarm cam will be sent once reaching the limit to avoid battery damage due to deep discharge. In the meantime, it can be used to drive the battery protection device to shut off the battery against further discharge.

- Battery voltage of service battery
- Battery current : charging and discharging
- Battery residual capacity in AH
- Battery capacity in %
- Programmable for protection point
- RS485 is available
- Available model: 100A, 200A and 400A.

Schematic diagram



Model Name

BM XXX Y

Item		Description	
BM	BM	Battery monitor for lead acid battery	
XXX	100	The max current for battery monitor	100A
	200		200A
	400		400A
Y		for 12V/24V system self-adaption	
	S	for 48V system	

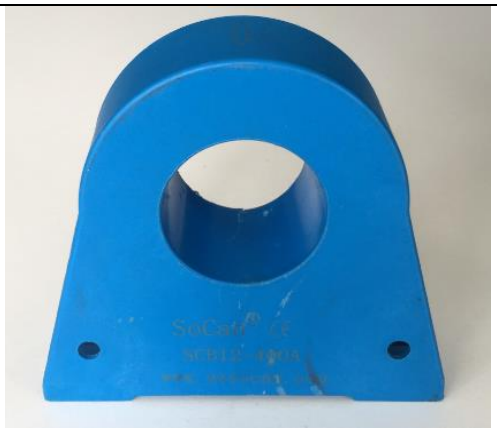
Available model

Model	Max Current	Battery voltage	comments
BM100	100A	12Vdc/24Vdc	12Vdc/24Vdc self-adaption
BM100S	100A	48Vdc	
BM200	200A	12Vdc/24Vdc	12Vdc/24Vdc self-adaption
BM200S	200A	48Vdc	
BM400	400A	12Vdc/24Vdc	12Vdc/24Vdc self-adaption
BM400S	400A	48Vdc	

Optional DOD model:

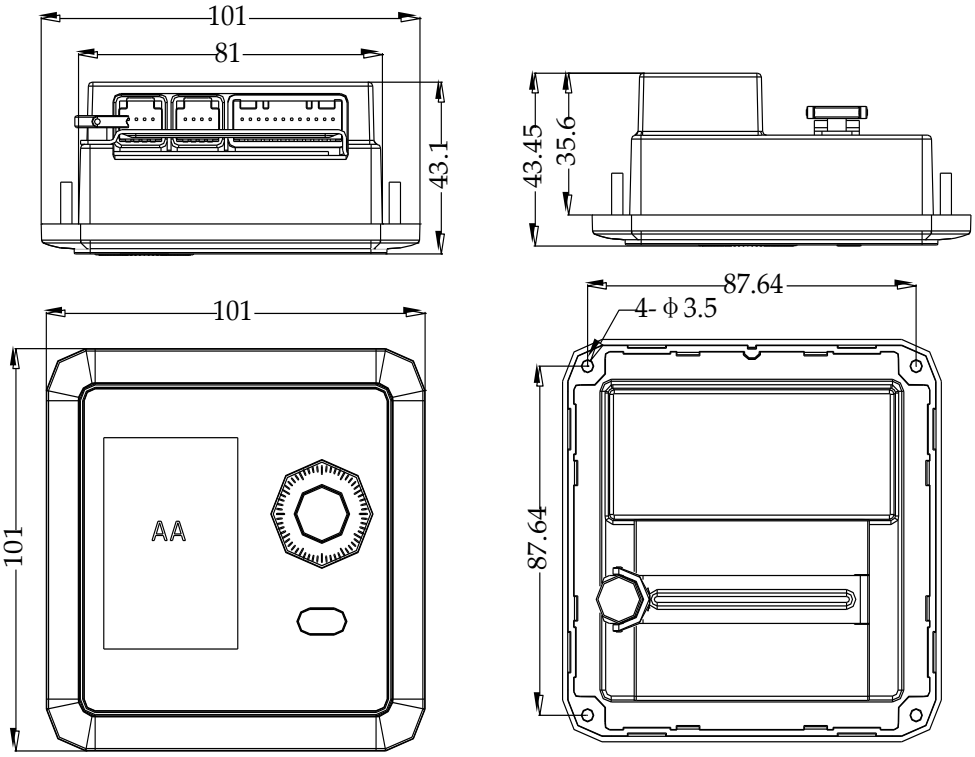
Compatible for	12Vdc	24Vdc	48Vdc
50A	RY50L	/	/
100A	CR100L/RY100L	CR100M	CR100S
200A	CR200LM	CR200LM	CR200S
400A	CR400L	CR400M	CR400S

Components

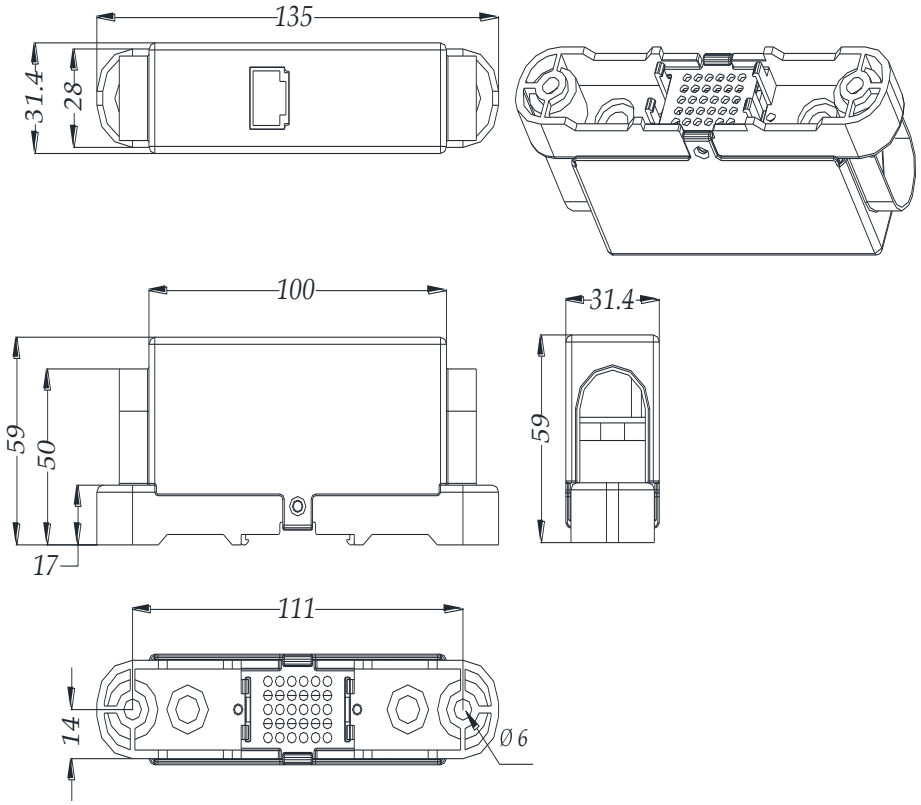
	**Monitor Module**
	**Current Detector Module** **SS (for 100A,200A model)**
	**Current Detector Module** **SH (for 400A model)**

Dimension and Hole size

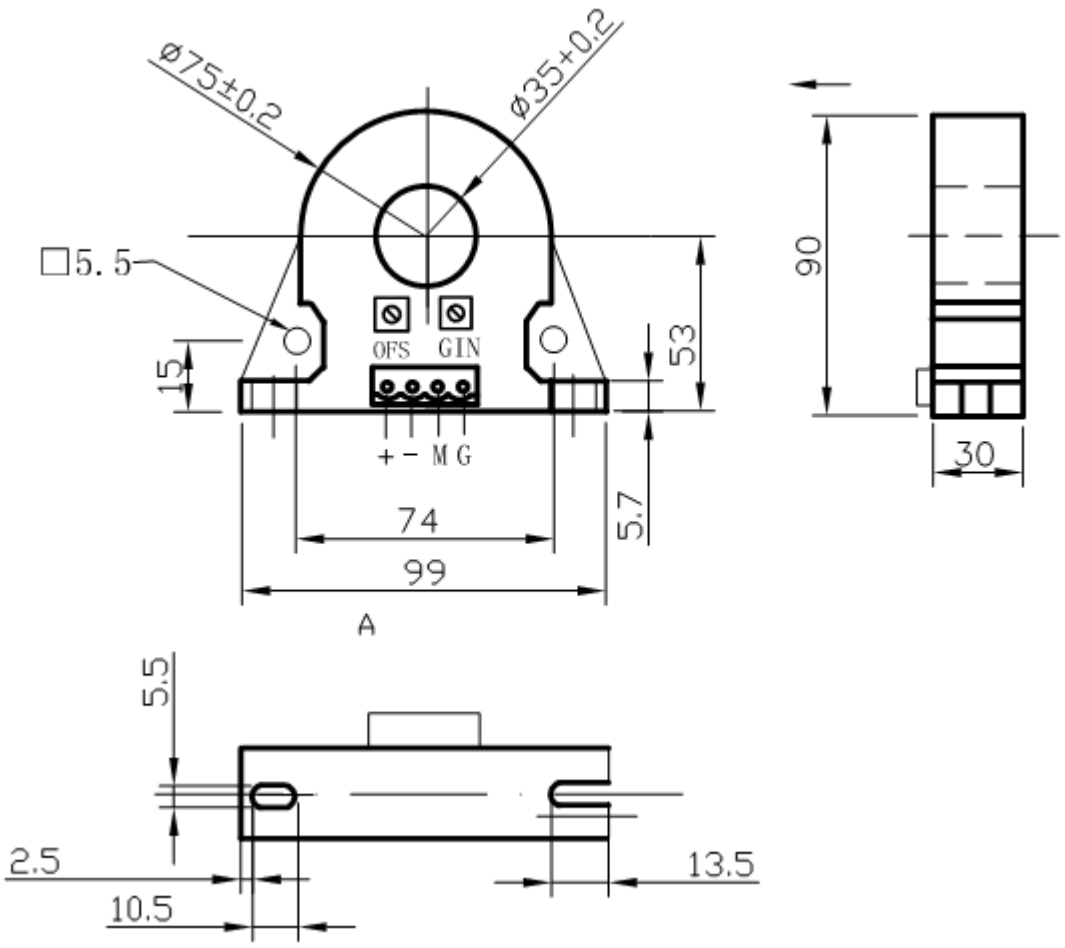
Monitor Module



SS

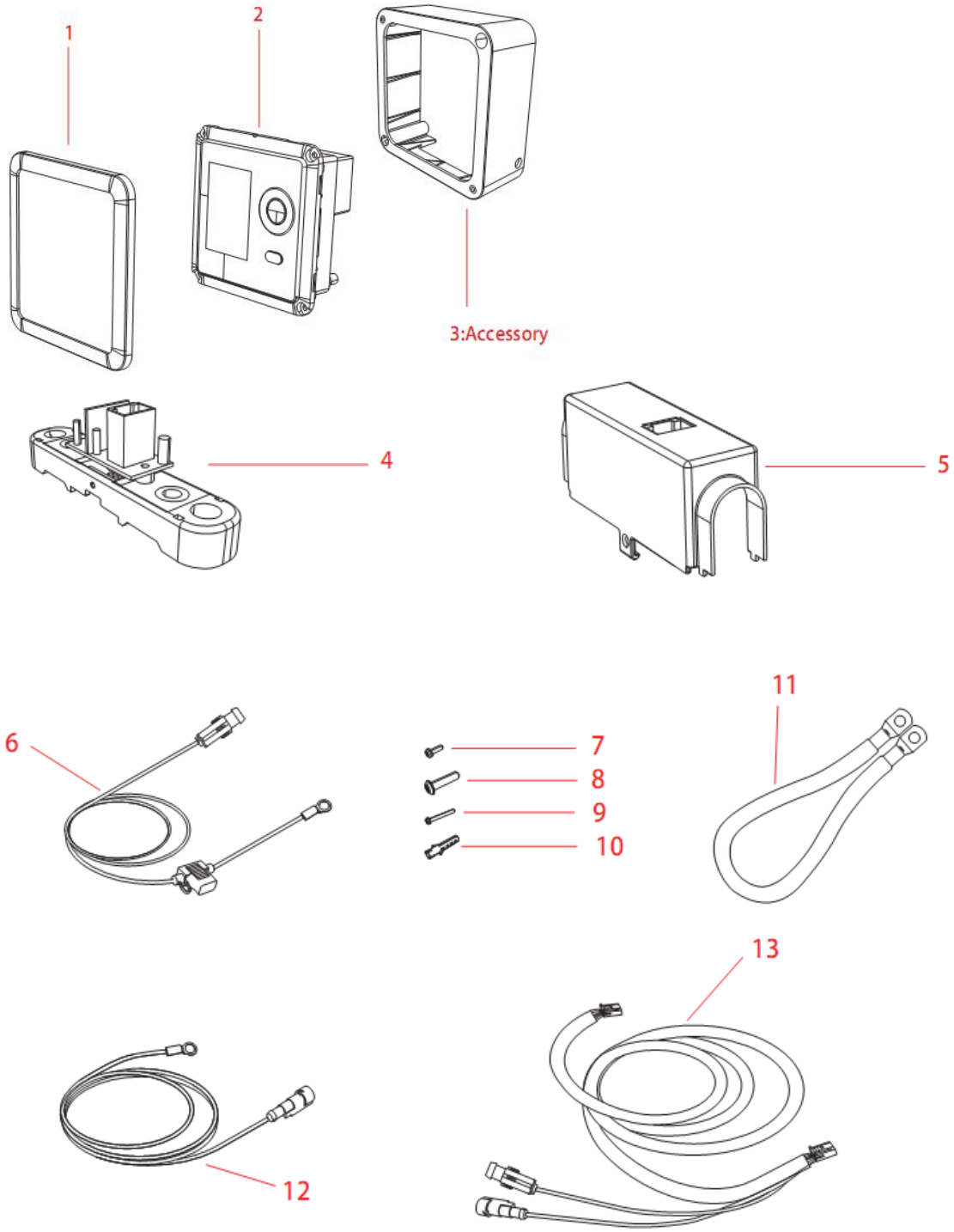


SH



Installation Preparation

Material list



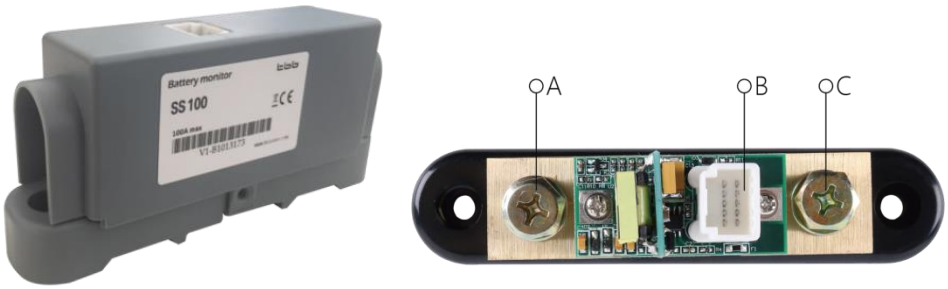
Item	Qty	Description
1	1	Front panel of Monitor Module
2	1	Monitor Module
3	1	Mounting holder
4	1	SS current detector
5	1	SS plate
6	1	Cable for service battery, Cable-Service-Batt-Volt/01
7	3	Screws for mounting holder of the monitor,M3x12mm
8	2	Screws for SS, M6 x 25mm
9	5	Screws for monitor, M3x25mm
10	5	Screw fixing expansion sleeve 4mm
11	1	Connection cable between SS and battery negative, Cable-Flex-50/30 or Cable-Flex-25/30
12	1	Cable for starter battery, Cable-Starter-Batt-Volt/01
13	1	Connection cable between SS and monitor, Cable-BM/03

Connector Description

- **Monitor Module**

A	RS485 Communication (white)	COM
B	Comm. port for battery energy information (black)	BM
C	Comm. for DOD	DOD
D	Cable fastener	

- **Current Detector Module - SS**



Take off the cover, you will see the connector of the SS.

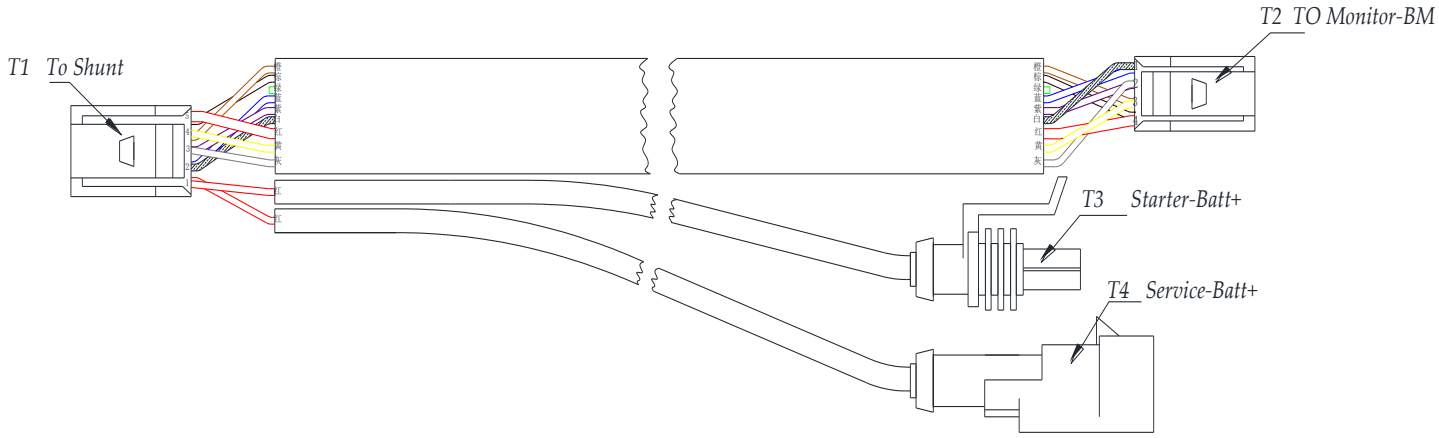
A	Load -
B	BM comm.Cable connector
C	BAT-

Cable preparation

Please prepare the following cables for installation

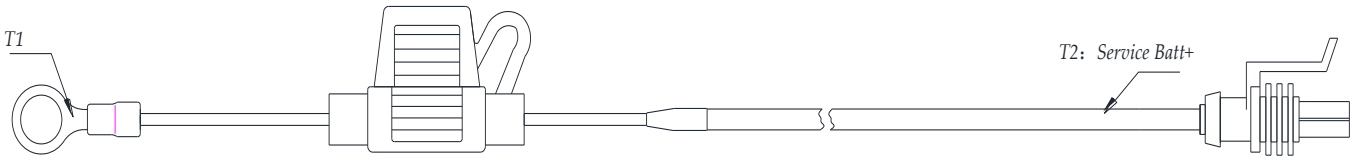
Model	lenght	comments
Cable-BM/03	3	The standard
Cable-Service-Batt-Volt/01	1	The standard
Cable-Starter-Batt-Volt/01	1	The standard
Cable-L8-D/03	3	for BML1008/BML2008
Cable-L4-D/03	3	for BML1004/BML2004
Cable-Flex-50/30	0.3	for SS200/SS200S
Cable-Flex-25/30	0.3	for SS100/SS100S

Cable-BM/03



T1	To Connect to SS or SH
T2	To Port BM of the monitor module
T3	To connect Cable-Starter-Batt-Volt/01
T4	To connect Cable-Service-Batt-Volt/01

Cable-Service-Batt-Volt/01



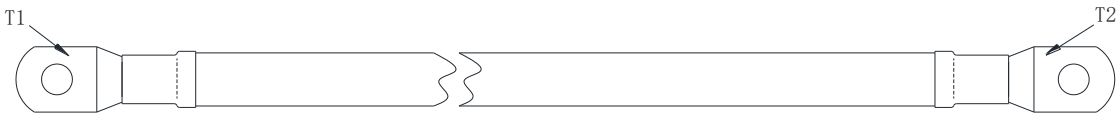
T1	To Connect to Service batt +
T2	To connect to Cable-BM/03

Cable-Starter-Batt-Volt/01

T1	To Connect to Starter batt +
T2	To connect to Cable-BM/03

Cable-Flex-50/30 or Cable-Flex-25/30

Cable-Flex-50/30 and Cable-Flex-25/30 are to connect between battery negative connector and BAT- connector of current detector module (SS or SH).



Installation Request

Work temperature: -20～60℃ Storage temperature:-40～85℃

Cooling: Natural cooling Humility: 0%-95% non-condensing

Install the unit at the location where has well ventilation.

Recommended working temperature is 0～25℃

Recommended humility is around 50%

Installation

Professional electrical technician is required for the installation.

Please make sure BM is powered off during the installation which means the connection between Cable-BM/03 and Cable-Starter-Batt-Volt/01 BAT+ / Cable-Service-Batt-Volt/01 S-BAT+ is the last step of the installation.

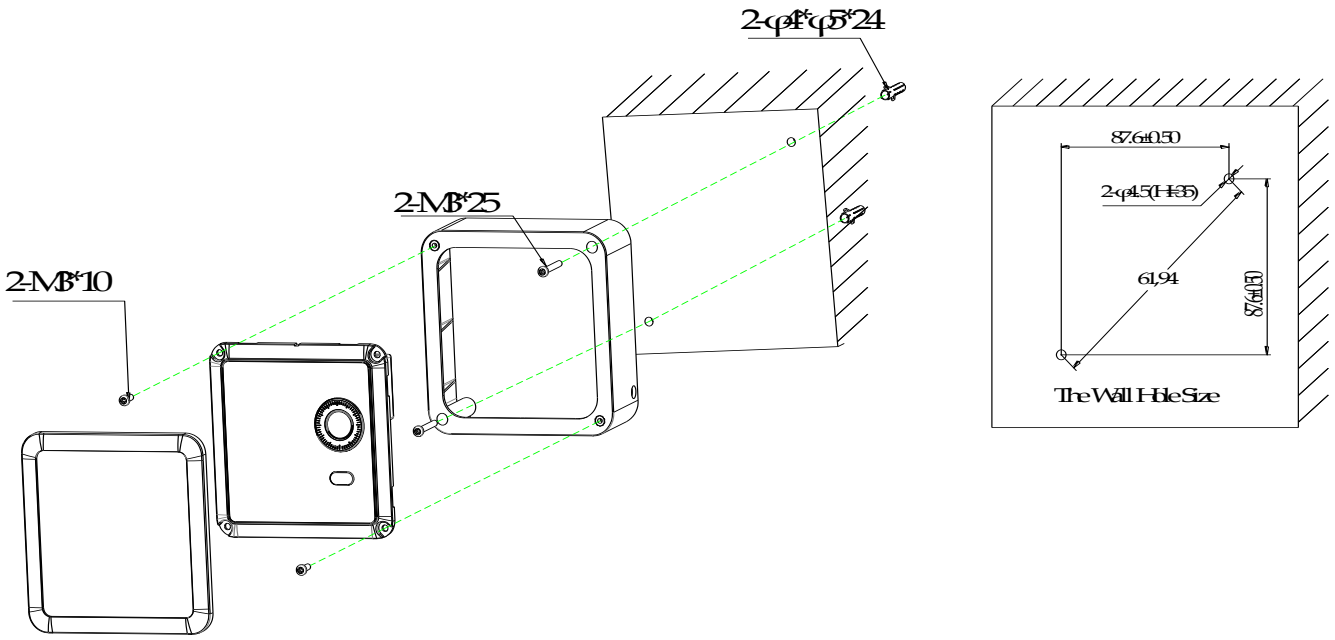
Please make sure all of the equipments are powered off during the installation.

The location of SS/SH is recommended to be as close as possible to the battery. Shorter cable between SS/SH and battery is better.

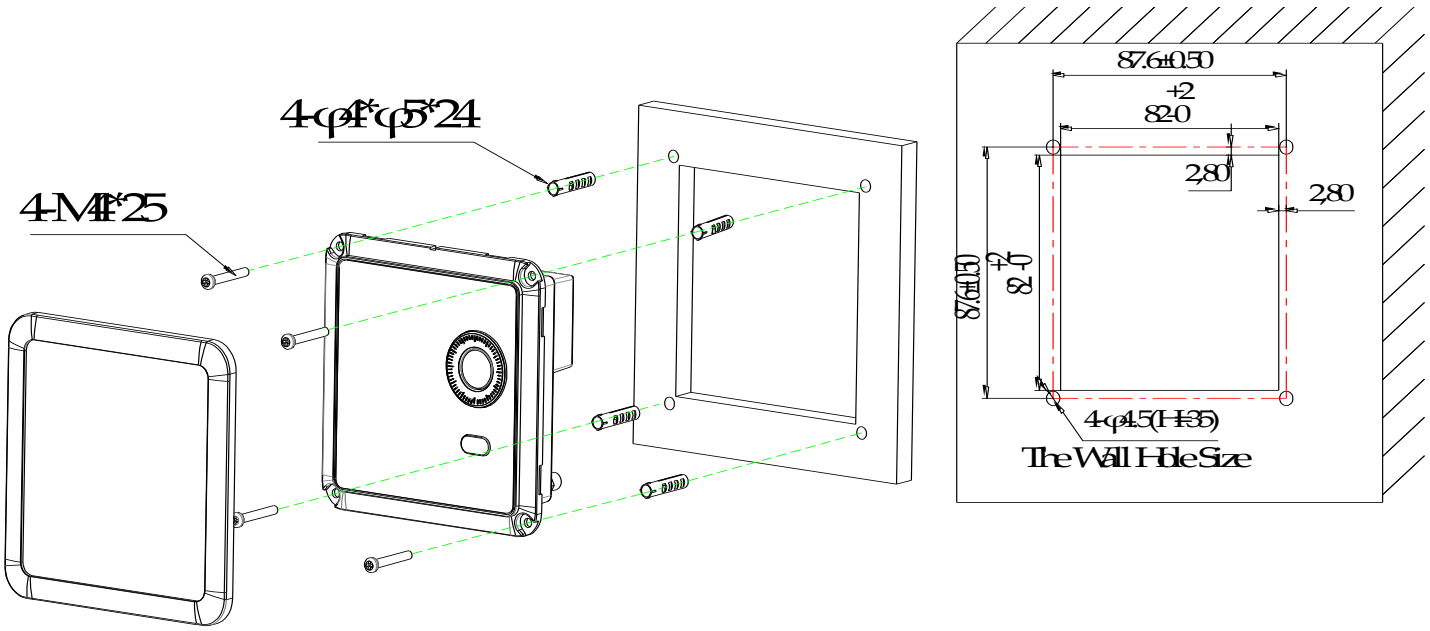
Monitor Module

Mounting holder is optional accessary. Please consult to the distributor or TBB Power if you need it.

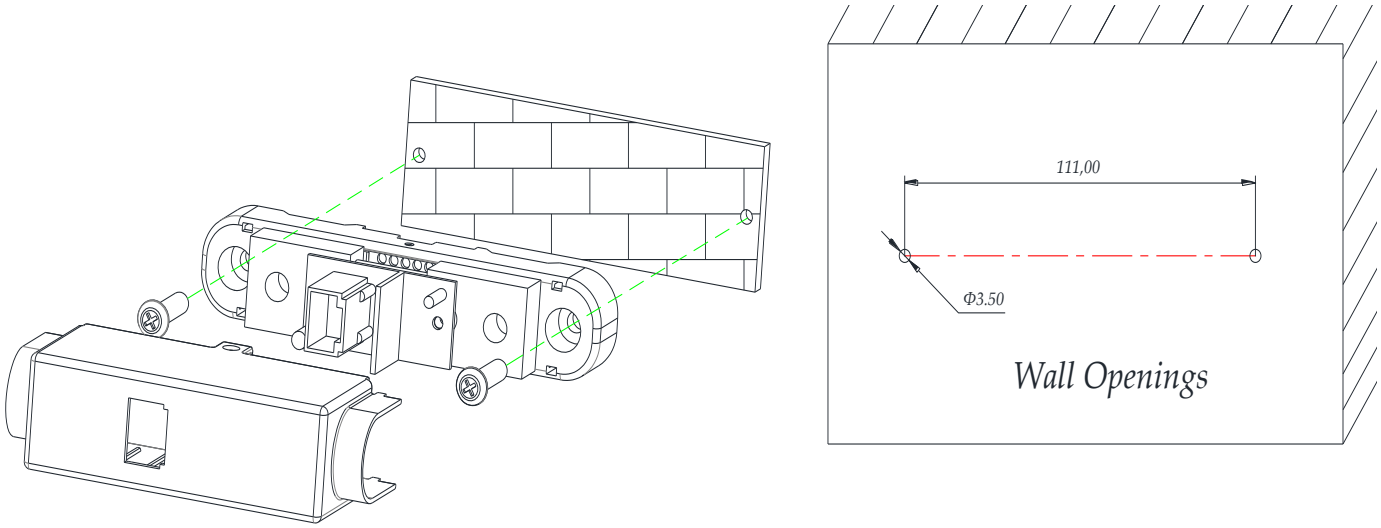
- **Installation with the mounting holder**



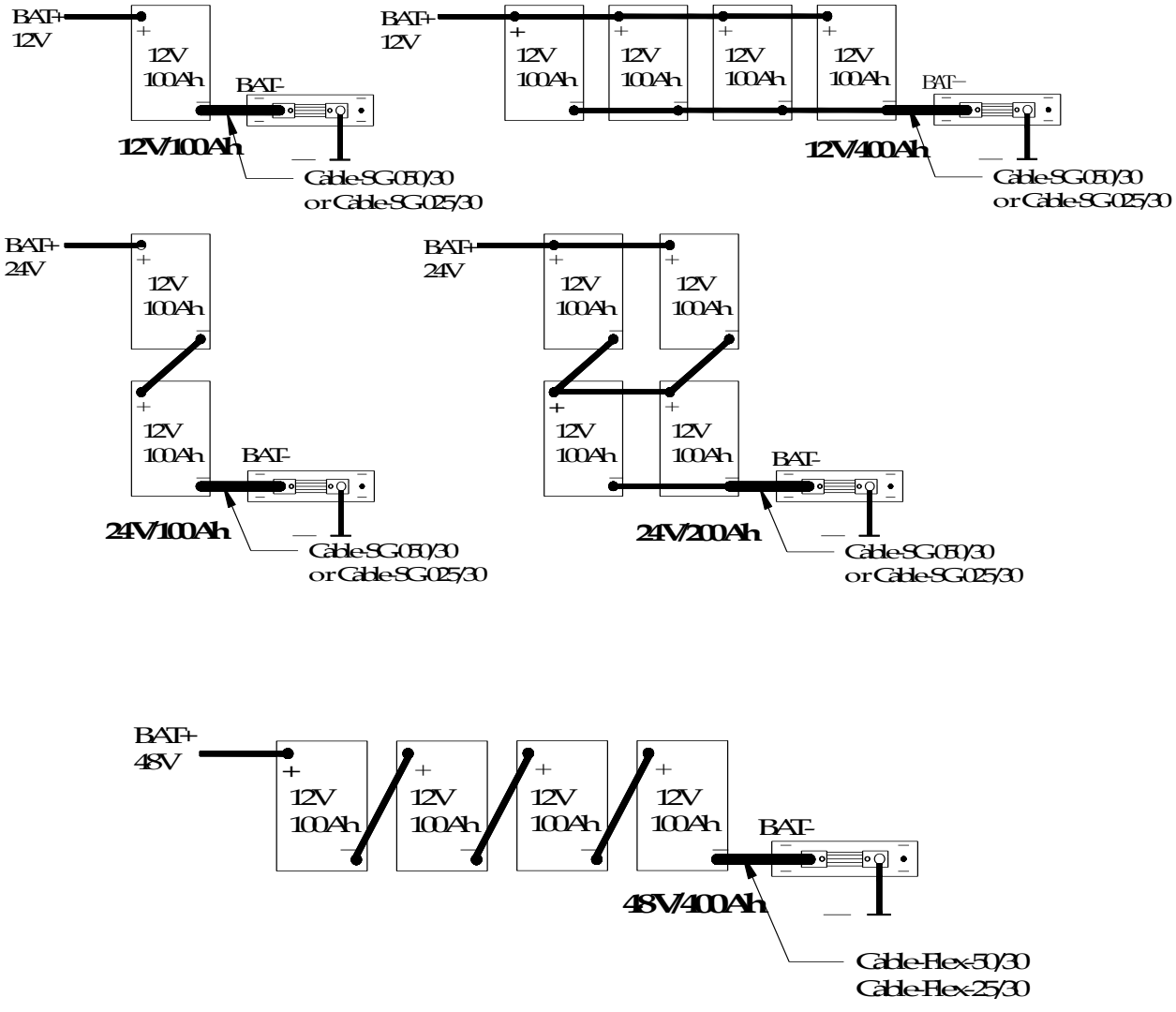
- **Installation without the mounting holder**



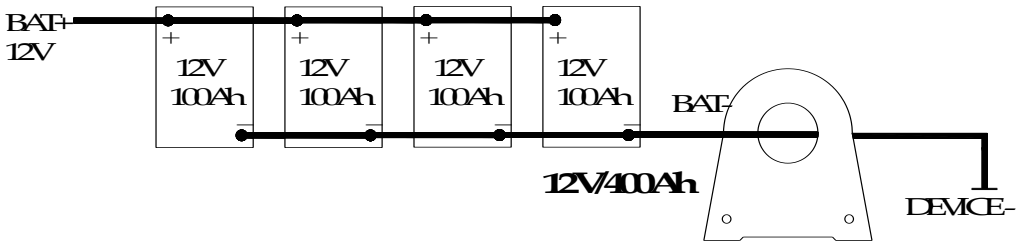
- **SS/SH Installation**



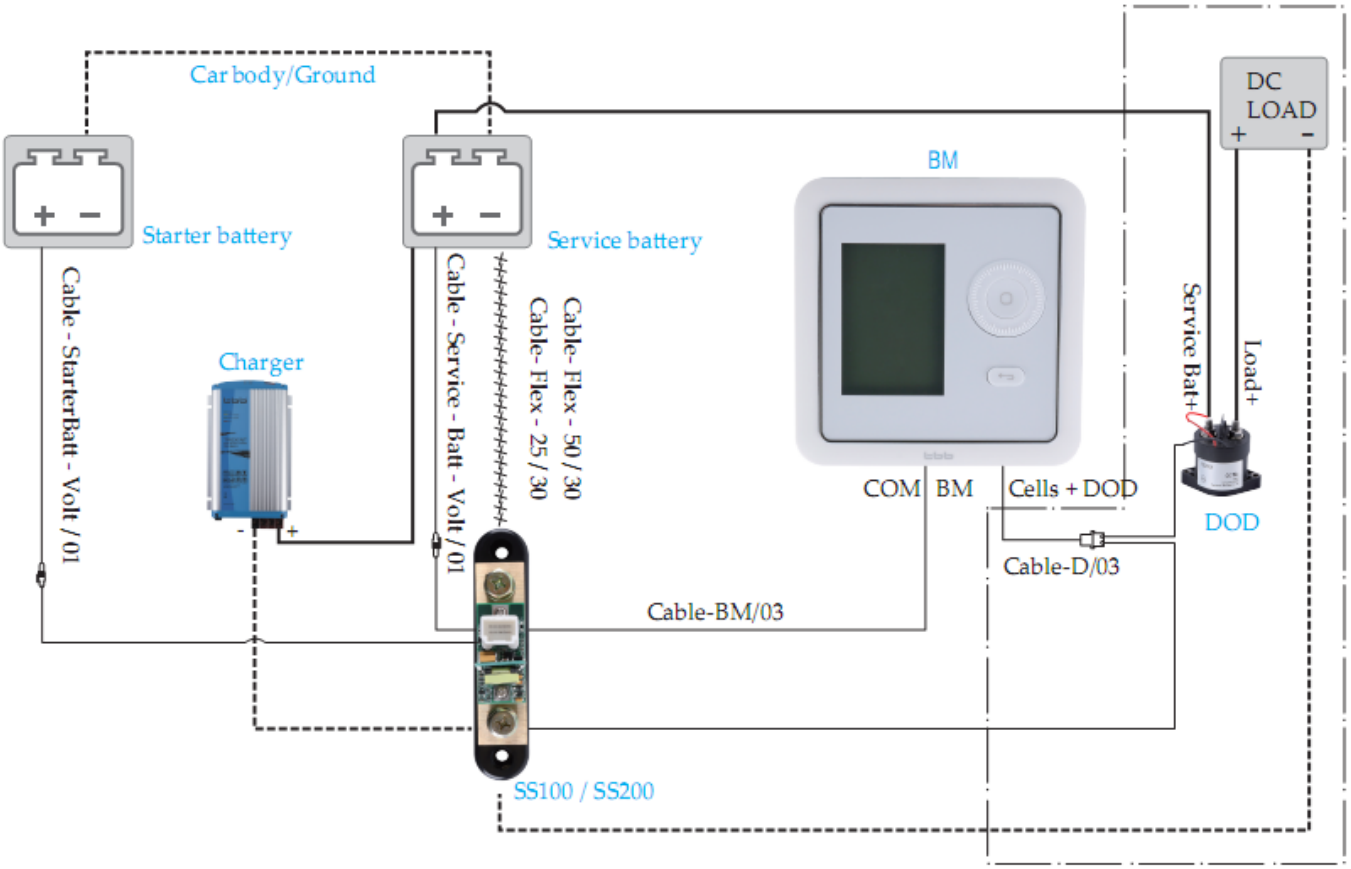
Connection to battery groups.



SH Installation.



BM Connection Diagram



Operation

- **First power on**

1. Confirm the connections are correct as the manual guided and fastened.
2. Connect Cable-Starter-Batt- Volt/01and Cable-BM/03.
3. Connect Cable-Service-Batt-Volt/01 and Cable-BM/03.

BM is powered on after the above steps.

4. Initial settings for BM.
   a) Set battery type and capacity.
   b) Set System datetime and installation datetime.
   c) Battery capacity correction. Use a proper battery charger to charge the battery until there is no alarms on the BML display.
   d) Any change of the battery type or battery capacity setting needs a repeat for step b) and c)


DO NOT plug out any connectors on the BM during it is working.

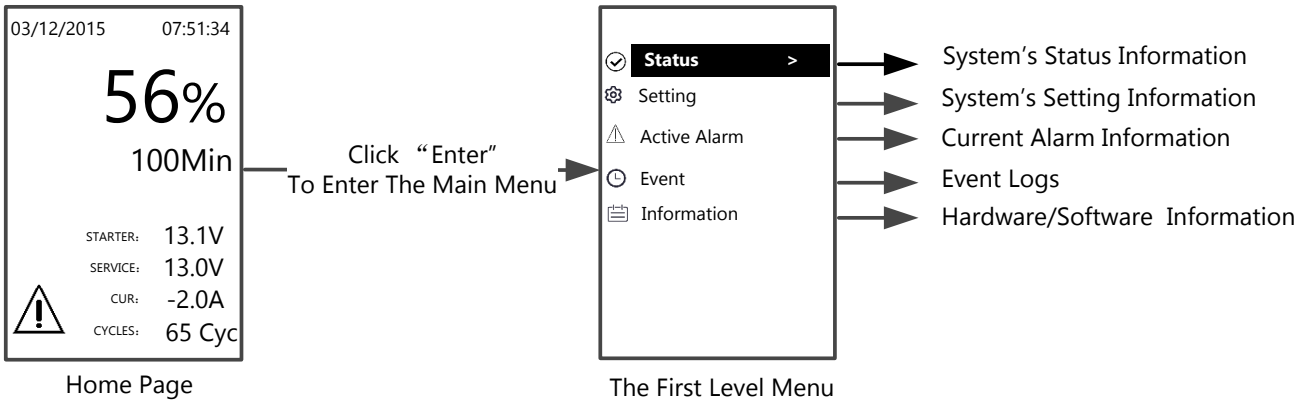
- **Power Off**

a) If there is starter battery connected, disconnect the cable connect with the starter battery first, then disconnect the cable connected to the service battery,Cable-Service-Batt-Volt/01 and Cable-BM/03 to complete the shut down of BM.

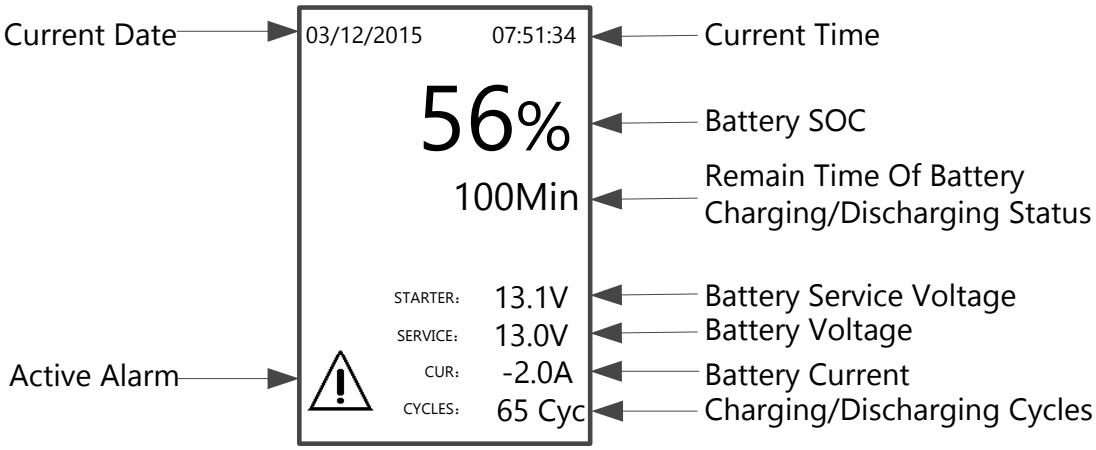
b) If there is no starter battery connected, disconnect disconnect the cable connected to the service battery, Cable-Service-Batt-Volt/01 and Cable-BM/03 to complete the shut down of BM.

Display

- **BM Menu**

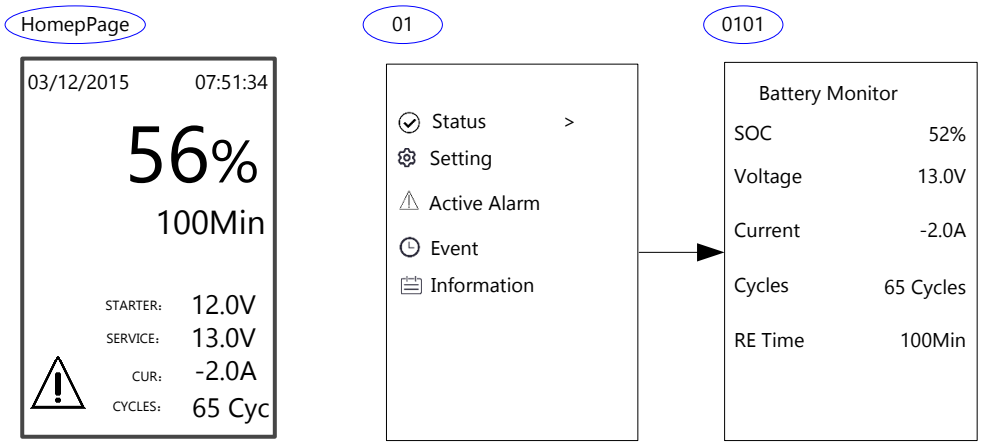


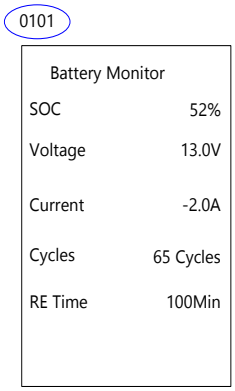
1. Home page



- "Active Alarm" is ON, means the battery capacity correction is not completed.
- "Active Alarm" is flashing, means the battery capacity correction is completed with alarms. Please consult the technician.
- "Active Alarm" is OFF, means the battery capacity correction is completed successfully.

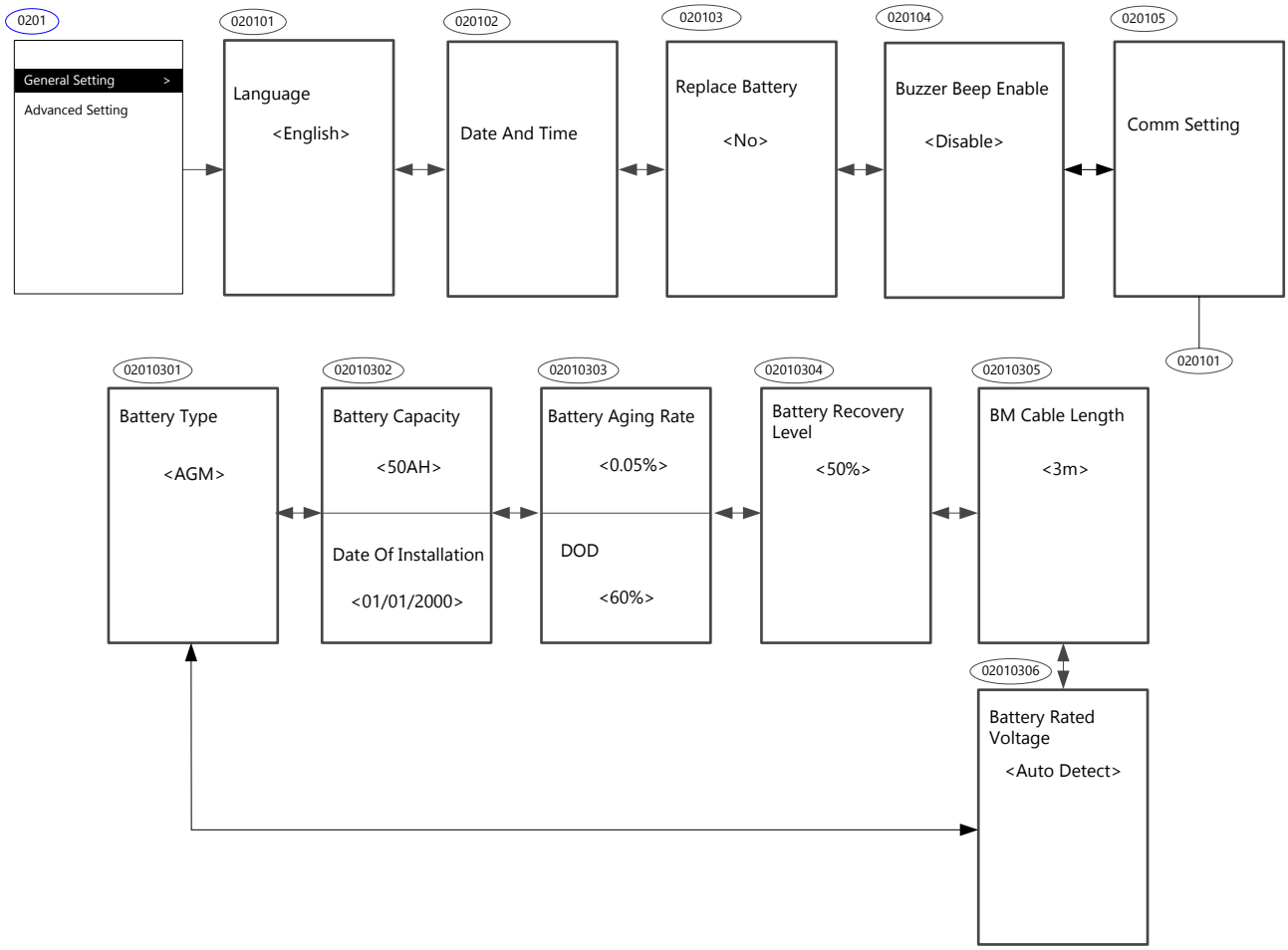
2. Status

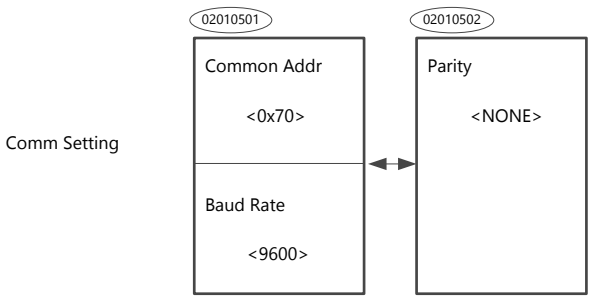


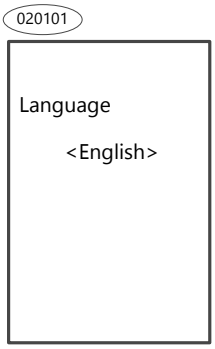
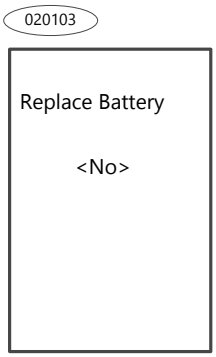
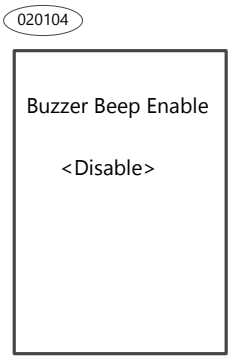


SOC: Battery State of Charge , 0%~100%
Voltage: Battery Voltage
Current: Battery current. "-"means discharged current.
Without "-" means charging current.
Cycles: Battery cycles
RE Time: Battery left to go.

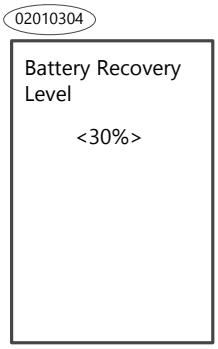
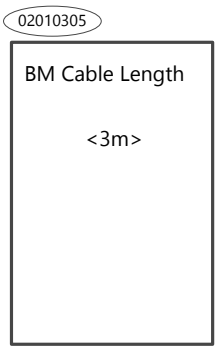
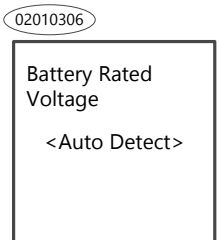
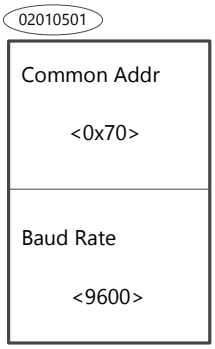
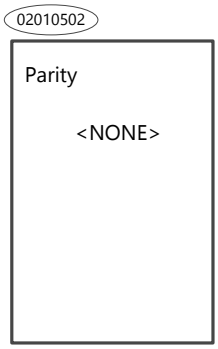
3. Setting


0201
General Setting >
Advanced Setting
020101
Language
<English>
020102
Date And Time
020103
Replace Battery
<No>
020104
Buzzer Beep Enable
<Disable>
020105
Comm Setting
020101
02010301
Battery Type
<AGM>
02010302
Battery Capacity
<50AH>
Date Of Installation
<01/01/2000>
02010303
Battery Aging Rate
<0.05%>
DOD
<60%>
02010304
Battery Recovery Level
<50%>
02010305
BM Cable Length
<3m>
02010306
Battery Rated Voltage
<Auto Detect>

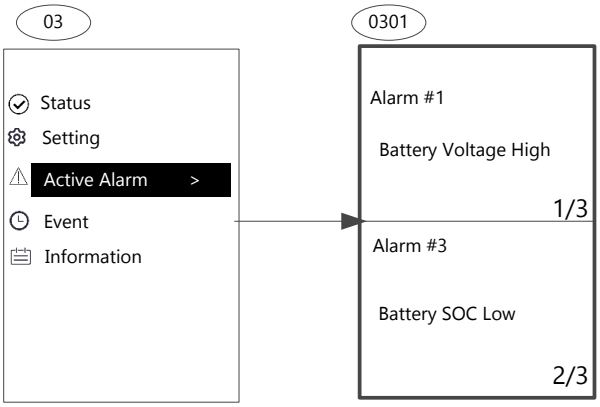

Comm Setting
02010501
Common Addr
<0x70>
Baud Rate
<9600>
02010502
Parity
<NONE>

	**Language:** Only support English.
	**Date and time:** System Date time setting.
	**Replace Battery：** Set "Yes" for replacing the battery and doing the related setting for battery parameters.
	**Buzzer Beep Enable：** "Enable" to forbid the buzzer beep.

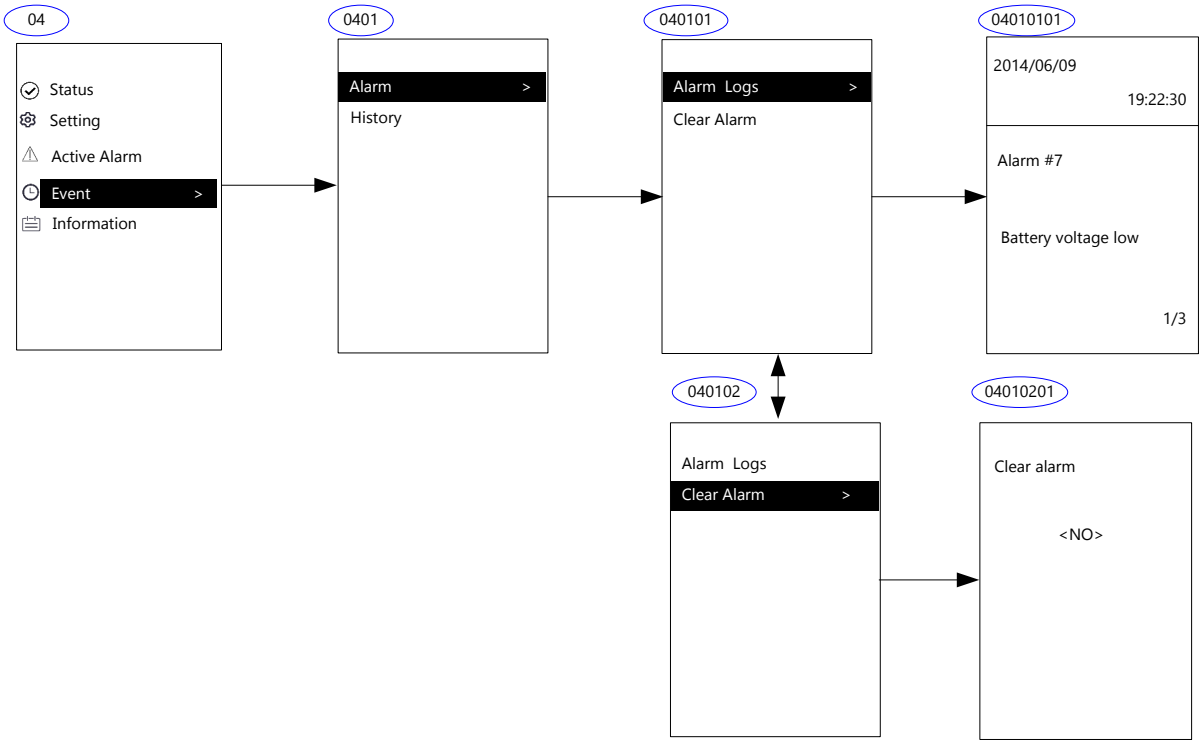
020105 Comm Setting	**Comm Setting:** To set the address, baud rate and parity check bit of RS485.
02010301 Battery Type <LFP>	**Battery Type:** AGM/Semi Traction/GEL/Traction/Lead-carbon/LFP/Polymer
02010302 Battery Capacity <50AH> Date Of Installation <01/01/2000>	**Battery Capacity:** Default is 50AH, setting range 50~2000AH. Please set the value as the capacity of your battery. **Date of Installation:** Installation date of battery. It is request to reset when replacing the battery. Default:01/01/2000, setting range 01/01/2000-31/12/2099。
02010303 Battery Aging Rate <0.05%> DOD <80%>	Battery Aging Rate: Permitted battery aging rate every year. Default is 0.05%, setting range 0.00%~5.00%. DOD ： Depth of Discharge. Default is 75%. Setting range 50%~80%.

	**Battery Recovery Level:** The level recovered from the battery low voltage protection. Default is (1-DOD+10%), setting range is (1-DOD+10%) ~90%.
	**BM Cable Length:** The cable length from shunt to MCU. Default is 3m. Setting range is 3m/5m/7m/10m.
	**Battery Rated Voltage:** Battery nominal voltage. Default is "Auto Detect" It could be Auto Detect/12V/24V.
	**Common Addr:** RS485 address setting. Default is 0x70. Setting range is 0x01~0xF6. It is recommended to keep the default value. **Baud Rate:** RS485 baud rate setting. Default is 9600. Setting range is 38400/19200/ 9600/4800/2400/1200. It is recommended to keep the default value.
	**Parity:** RS485 parity setting. It can be set as ODD/EVEN/NONE. Default is NONE.

4. Active Alarm



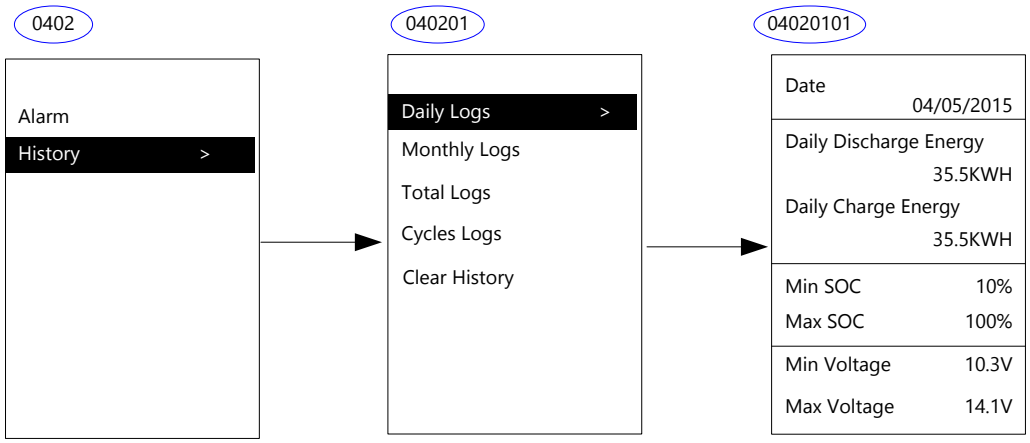
5. Events

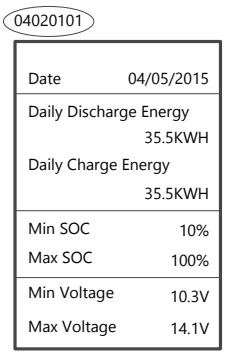


Please refer the below table for more details about the alarms in “Active Alarm” and “Alarm” of “Events”.(N=1~8)

No.	Alarms	Comments
#1	Battery voltage high	High battery voltage alarm
#2	Battery voltage low	Low battery voltage alarm
#3	Battery SOC low	Battery SOC low alarm
#4	Battery voltage high Pro	High battery voltage protection
#5	Battery voltage low Pro	Low battery voltage protection
#6	Battery SOC low Pro	Battery SOC low protection

6. History





Daily Energy, SOC and Voltage of the setting day.

Date： Choose the date. It offers 2 years' history records from the setting date.

Daily Discharge Energy

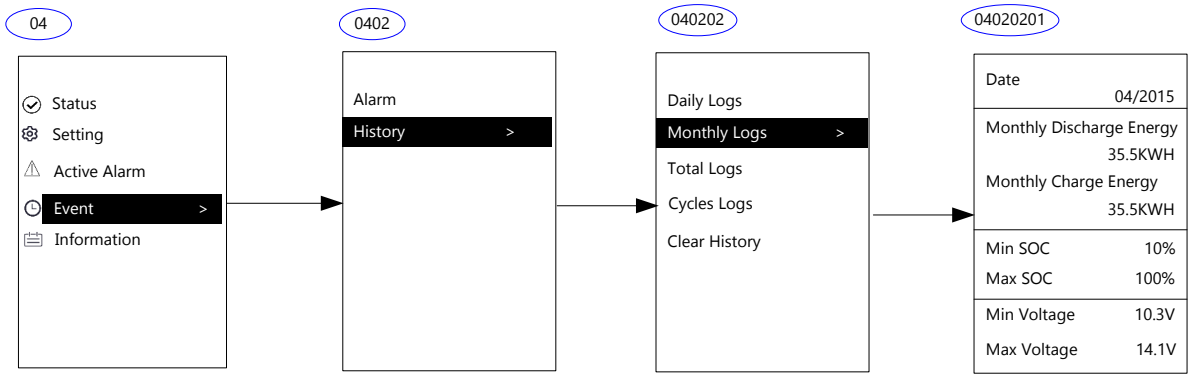
Daily Charge Energy

Min SOC： The lowest SOC level in the day.

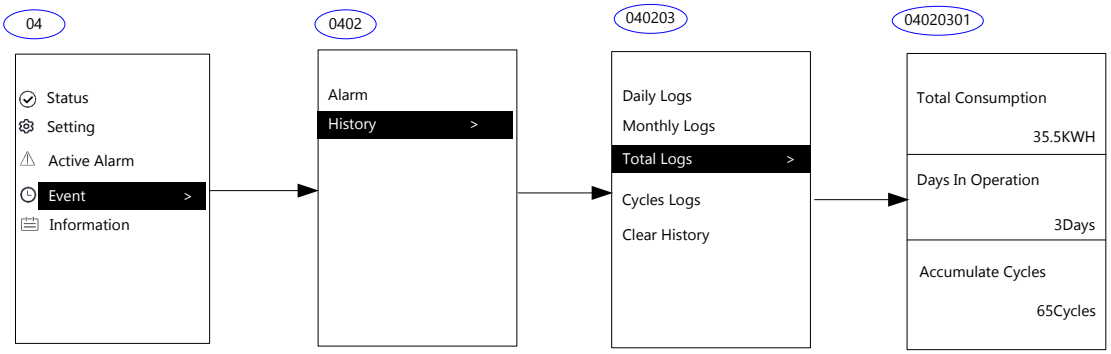
Max SOC： The highest SOC level in the day.

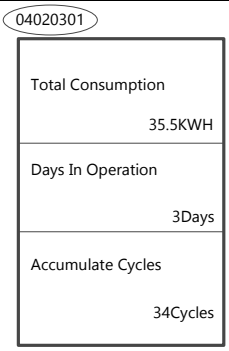
Min Voltage :The lowest battery voltage in the day.

Max Voltage： The highest battery voltage in the day.

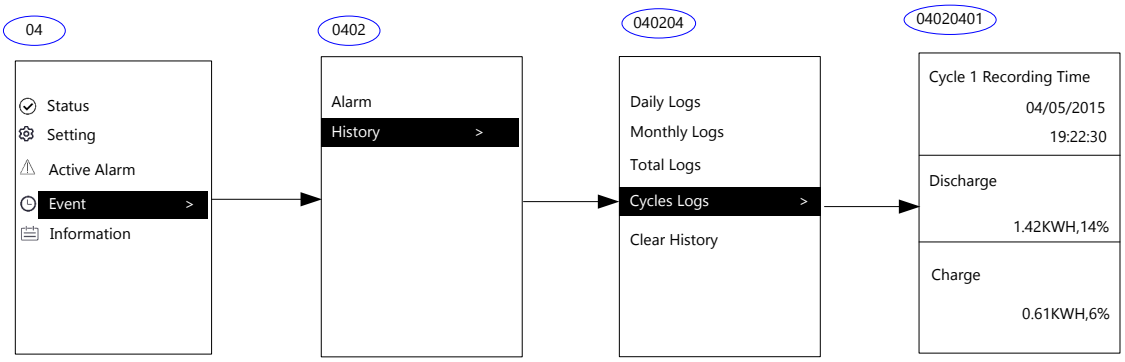


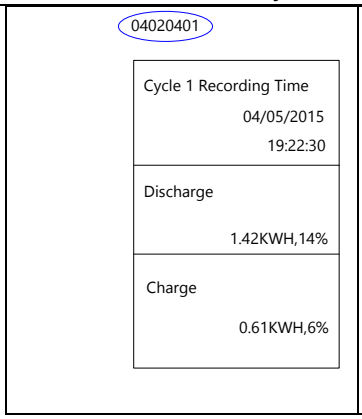
04020201 Month 04/2015 Monthly Discharge Energy 35.5KWH Monthly Charge Energy 35.5KWH Min SOC 10% Max SOC 100% Min Voltage 10.3V Max Voltage 14.1V	**Monthly information about energy, SOC and voltage.** **Date：** Choose the month. If offers 10 years' history records fromtoday. **Monthly discharge energy** **Monthly charge energy** **Min SOC：** The lowest SOC level in the month. **Max SOC：** The highest SOC level in the month **Min Voltage** : The lowest battery voltage in the month **Max Voltage：** The highest battery voltage in the month





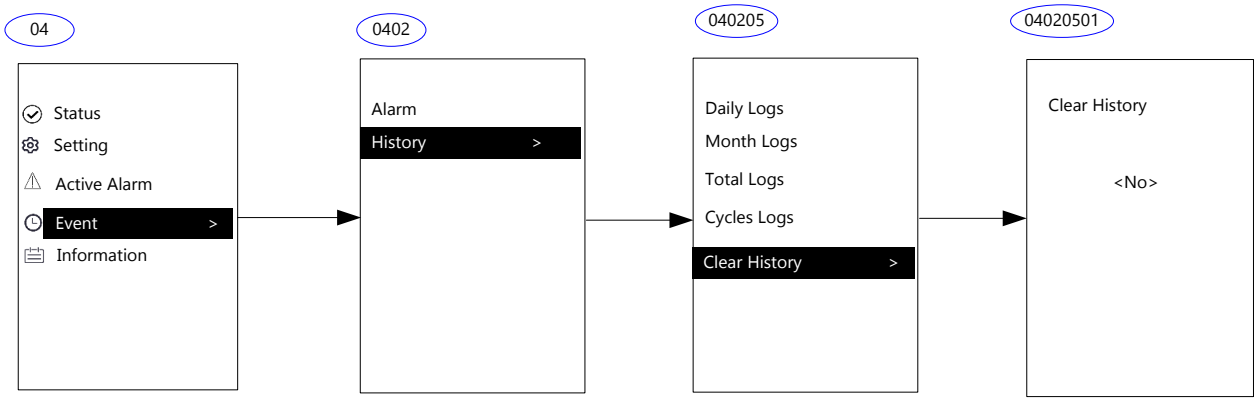
Total Consumption:
Total discharged energy of the batterysincethe latest setting for battery type and capacity.
Days In Operation: The accumulated days for the batterysince the latest setting for battery type and capacity.
Accumulate Cycles: The accumulated charged/discharged cycles for battery since the latest setting for battery type and capacity.

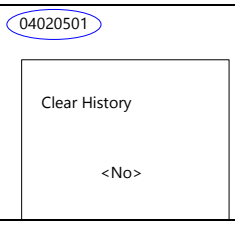




The information about the latest 100 cycles.

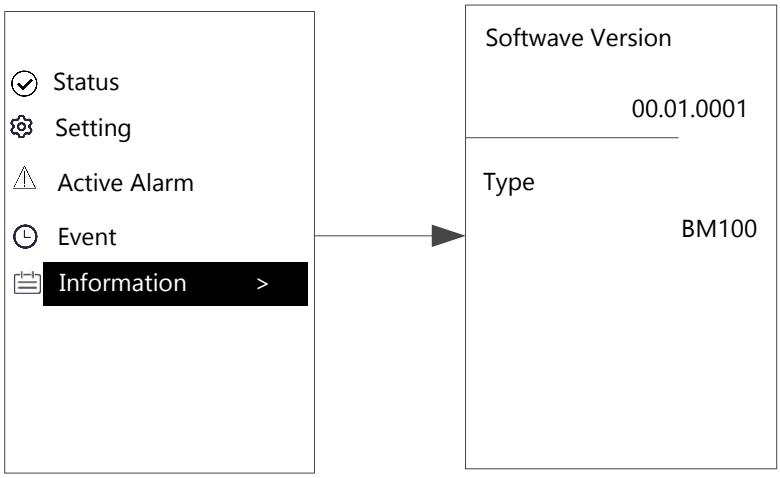
Cycle N Recording Time:
The ending time of the charging and discharging cycle.
Discharge: The energy consumption and the decreasing capacity after the discharged in the cycle.
Charge: The energy charged into the battery and the increasing capacity after the charging in the cycle.





Clear History:
Clear all of the history records.

7. Information



The software version and the model of the BM unit.

Specification

BM		BM100	BM100S	BM200	BM200S	BM400	BM400S
Electrical specification							
Operation voltage range		8-33VDC	24-70VDC	8-33VDC	24-70VDC	8-33VDC	24-70VDC
Operation current range		≤0.15A					
Battery voltage		12V/24V	48V	12V/24V	48V	12V/24V	48V
Max battery voltage		33V	66V	33V	66V	33V	66V
Max measuring current		100A	100A	200A	200A	400A	400A
Standby consumption		<1W					
Voltage accuracy		±1%					
Current accuracy		±3%					
SOC accuracy		±5%					
DOD Dry contact	Qty	1					
	Nominal switching capacity	0.5A/30VDC					
	protection	Battery over voltage/Battery low voltage					
Other specification							
Communication		RS485					
Working temperature		-25℃ ～ 65℃					
Dimension (LxWxH) - mm		101*101*43.45					
Height-g		500g					
IP protection		IP32(Monitor)/IP10（SS100/SS100S/SS200/SS200S/SH400/SH400S)					

Cooling	Self cooling
Standards	EN55022, EN60950

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