

# Smart battery charger BS

A1.0

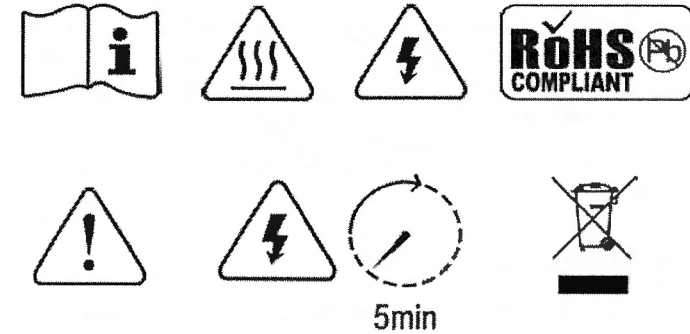
TBB POWER Co.,Ltd.

Web : [www.tbbpower.com](http://www.tbbpower.com)  
Tel : +86-592-5212299  
Fax : +86-592-5796070  
Email : [service@tbbpower.com](mailto:service@tbbpower.com)

TBB POWER Co.,Ltd.  
[www.tbbpower.com](http://www.tbbpower.com)



Model	BS1210
Electrical	
Output voltage (PS mode) (VDC)	12.8V±0.256
Max Output current (A)	10
Nominal input voltage (VAC)	85-265VAC,50/60Hz
Charge algorithms	5 steps. soft start, bulk, absorption, float, recycle
Temperature compensation	Automatically
Absorption voltage(VDC)	AGM:14.4V,GEL:14.1V,LFP:14.4V,WET:14.7V
Floating voltage (VDC)	AGM:13.5V,GEL:13.5V,LFP:13.5V,WET:13.7V
Charging current (A)	10
Min battery voltage (VDC)	2
Efficiency	88%
Input connector	Cable of 1.5 meter with CEE 7/7 plug
Output connector	Fixed cable,2.5mm <sup>2</sup> , 1 meter
Output	1
Ripple noise	≤200mVp-p
Regulation Accuracy	≤2%
Cooling	Self cooling
Working Temperature	-20°C ~ +60°C (40°C~60°Creduce the current)
Protection	
Short circuit	Shutdown output, automatically restart when short circuit is removed
Reverse polarity	No charging
Charger over temp	Shut down the charger
Battery over temp	Shut down the charger
Standards	
LVD	EN60335-1,EN60335-2-29
EMC	EN55014-1,EN55014-2,EN61000-3-2,EN61000-3-3
Structure	
Out case	Aluminum + plastic
Dimension(mm)	175*114*53
Weight(kg)	1.0
IP class	IP20
Insulation Resistance	≥50MΩ
Dielectric strength	I/P-O/P:3.0KV, I/P-PG:1.5KV, O/P-PG:0.5KV



**WARNING: HIGH VOLTAGE INSIDE**

**CAUTION: THE DC FUSE MUST HAVE BEEN TURNED OFF BEFORE SERVICING**

**MADE IN CHINA**

## Disclaimer

Unless specially agreed in writing, TBB Power Co.,Ltd.

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

•Assumes no responsibility or liability for loss or damage, whether direct, indirect, consequential or incidental, which might arise out of the use of such information.

▪ TBB offers standard warranty with its products, taking no responsibility for direct or indirect loss due to equipment failure.

## 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 Instruction

Thanks for choosing our products and this manual were suitable for battery charger and Solar Mate series MPPT.

This chapter contains important safety and operation instructions. Read and keep this User Guide well for later reference.

## 7.Specification

Model	BS1225	BS1225-3	BS1240	BS1240-3
<b>Electrical</b>				
Output voltage (PS mode) (VDC)	12.8V±0.256			
Max Output current (A)	25	25	40	40
Nominal input voltage (VAC)	165-265VAC,50/60Hz			
Charge algorithms	5 steps. soft start, bulk, absorption, float, recycle			
Temperature compensation	Automatically			
Absorption voltage(VDC)	AGM:14.4V,GEL:14.1V,LFP:14.4V,WET:14.7V			
Floating voltage (VDC)	AGM:13.5V,GEL:13.5V,LFP:13.5V,WET:13.7V			
Charging current (A)	25	25	40	40
Min battery voltage (VDC)	2V			
Efficiency	88%			
Input connector	IEC socket			
Output connector	M4 Screw (16mm <sup>2</sup> )			
Output	1+1	2+1	1+1	2+1
Ripple noise	≤200mVp-p			
Regulation Accuracy	≤2%			
Cooling	Fan cooling			
Working Temperature	-20℃ ~ +60℃ (40℃~60℃reduce the current)			
<b>Protection</b>				
Short circuit	Shutdown output, automatically restart when short circuit is removed			
Reverse polarity	No charging			
Charger over temp	Shut down the charger			
Battery over temp	Shut down the charger			
<b>Standards</b>				
LVD	EN60335-1,EN60335-2-29			
EMC	EN55014-1,EN55014-2,EN61000-3-2,EN61000-3-3			
<b>Structure</b>				
Out case	Aluminum + plastic			
Dimension(mm)	249*165*74			
Weight(kg)	1.6			
IP class	IP20	IP22	IP20	IP22
Insulation Resistance	≥50MΩ			
Dielectric strength	I/P-O/P:3.0KV, I/P-PG:1.5KV, O/P-PG:0.5KV			

## 6.FAQ

### 6.1 Fault indicator

When the LED1 is red and flashing, it is fault indication. Please refer the below table for details. If the user switch on the AC grid before the connection of battery, there will be "Battery not connected" indication. To exit this alarm, short press the main button after well connecting the battery.

Fault	LED	LED2	LED3	LED4	LED5
	Flash, Red	Green			
O/P over voltage	●	⊙	●	●	●
Charger over temp	●	●	⊙	●	●
O/P short circuit	●	●	●	⊙	●
Battery not connected or reverse polarity	●	●	●	●	⊙

## Index

1. General Safety information.....	1
2. Introduction.....	2
2.1 Features.....	2
2.1 Principle Diagram.....	4
2.2 Naming Rules.....	4
2.3 Product Picture.....	5
2.3.1 BS1225-3/BS1240-3/BS1225/BS1240.....	5
2.3.1 BS1210.....	5
2.3.2 Accessory.....	5
2.4 Product size.....	6
2.4.1 BS1225/BS1240/BS1225-3/BS1240-3.....	6
2.4.2 BS1210.....	6
3.Installation.....	7
4. Inquiry and Configuration.....	9
5.Operation.....	12
5.1Front Panel.....	12
5.2 Sidepanel.....	14
6.FAQ.....	15
6.1 Fault indicator.....	15
7.Specification.....	16

## 1. General Safety information

- Before using the charger, read all instructions and cautionary markings on the charger, the batteries, and all appropriate sections of this manual.
- Use BS battery charger only for its use as intended.
- Use BS battery charger only in well ventilated rooms. Do not expose the charger to rain, snow, spray, or bilge water. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the charger in a zero-clearance compartment.
- Always interrupt the power supply when doing repair work on the unit.
- Recommend that all wiring be done by a certified technician or electrician to ensure adherence to the local and national electrical codes applicable in your application.
- Always checking that existing wiring is in good condition and that wire is not undersized. Do not operate the charger with damaged or substandard wiring.
- Always use socket which are earthed and secured by earth leakage circuit breaker.
- Batteries contain aggressive acids. Avoid the contact with the battery fluid agent. If a contact with battery fluid agent should occur, then rinse the affected parts of the body or clothing etc. with plenty cold water. It is imperative to seek medical treatment from a doctor with injuries caused by acid.
- DO NOT disassemble the charger by yourself, which may result in a risk of electrical shock or fire. Always refer to professional electrician or our local distributor for support.
- ALWAYS interrupt both the AC and DC connect when doing repair work.
- DO NOT expose lead acid batteries to a lit cigarette, sparks or flames because they produce flammable gasses and could explode.
- NEVER charge NON-rechargeable battery.
- Never try to charge a frozen battery. There is danger of explosion. In this case, place the battery at a frost resistant location and wait until the battery has adapted to the ambient temperature. Only by then, start the charging process.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

## 5.2 Sidepanel

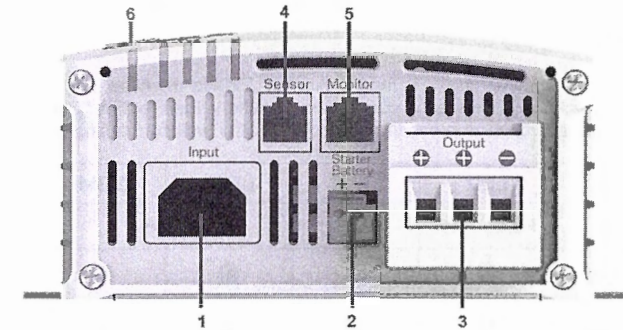


Figure 4-3 BS1225/BS1225-3/BS1240/BS1240-3

No.	Label	Description
1	Input	AC input socket
2	Starter Battery	Starter battery connector
3	Output	Service battery connector
4	Sensor	Battery temperature and voltage sensor connector
5	Monitor	Remote panel connector
6	Setting/Select	Setting button

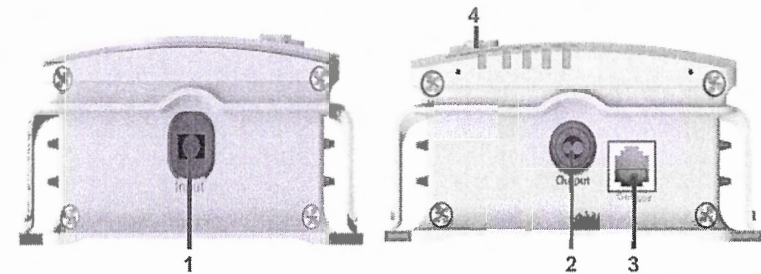


Figure 4-4 BS1210

No.	Label	Description
1	Input	AC input socket
2	Output	Service battery connector
3	Sensor	Battery temperature and voltage sensor connector
4	Setting/Select	Setting button

2	LED2	Green	ON	ON, Green	Bulk charging
			ON	ON, Blue	Battery type is AGM
			ON	ON, Red	Charging current is 10A (12V40A) Charging current is 10A (12V25A) (only for 12V25A and 40A model)
			ON	Quick flashing, Red	Output over voltage alarm
			ON	Slow flashing, Blue	Battery type is set to AGM
			ON	Slow flashing, Red	Charging current is set to 10A (12V40A) Charging current is set to 10A (12V25A) (only for 12V25A and 40A model)
3	LED3	Green	ON	ON, Green	Absorption charging
			ON	ON, Blue	Battery type is GEL
			ON	ON, Red	Charging current is 20A (12V40A) Charging current is 15A (12V25A) (only for 12V25A and 40A model)
			ON	Quick flashing, Red	Battery charger over temp alarm
			ON	Slow flashing, Blue	Set the battery type to GEL
			ON	Slow flashing, Red	Charging current is set to 20A (12V40A) Charging current is set to 15A (12V25A) (only for 12V25A and 40A model)
4	LED4	Green	ON	ON, Green	Floating charging
			ON	ON, Blue	Battery type is LFP
			ON	ON, Red	Charging current is 30A (12V40A) Charging current is 20A (12V25A) (only for 12V25A and 40A model)
			ON	Quick flashing, Red	Output short circuit alarm
			ON	Slow flashing, Blue	Set the battery type to LFP
			ON	Slow flashing, Red	Charging current is set to 30A (12V40A) Charging current is set to 20A (12V25A) (only for 12V25A and 40A model)
5	LED5	Green	ON	ON, Green	Power supply mode
			ON	ON, Blue	Battery type is WET
			ON	ON, Red	Charging current is 40A (12V40A) Charging current is 25A (12V25A) (only for 12V25A and 40A model)
			ON	Quick flashing, Red	Battery not connected or reverse polarity alarm
			ON	Slow flashing, Green	Set to power supply mode
			OFF	Slow flashing, Green	Set to battery charger mode
			ON	Slow flashing, Blue	Set the battery type to WET
			ON	Slow flashing, Red	Charging current is set to 40A (12V40A) Charging current is set to 25A (12V25A) (only for 12V25A and 40A model)

6	Charging state
7	Battery type
8	Charging Current (only for 12V25A and 40A model)

## 2. Introduction

Battery will be permanently damaged either overcharged or remaining undercharged for any period time. BS smart battery charger will continuously deliver right charging at any circumstance with built in battery management features which will be helpful in prolonging your battery life expectancy.

Combined with up to date technology and our knowledge with batteries, BS smart battery charger was especially designed for mobile and marine application. It is an ideal solution for your battery charging on board.

### 2.1 Features

- Active PFC featuring smaller and higher efficiency, max 88%
  - With multiple isolated outputs, including slave charger for starter battery
  - Automatically work as power supply or charger
  - Sophisticated TBB premium II multiple stages charging algorithm for lead acid battery
  - LFP charging algorithm is available.
  - Automatic temperature compensation charging.
  - Automatic voltage compensation charging
  - Programmable with software
  - Special silent design
- TBB premium II multi stage adaptive charging algorithm for lead acid battery
- Fitted with multistage charging algorithm (bulk-absorption-float-recycle), BS battery charger is designed to charge battery quickly and fully. Microprocessor controlled charging algorithm with variable absorption charging timer guarantee the optional charging for batteries of different discharged state.

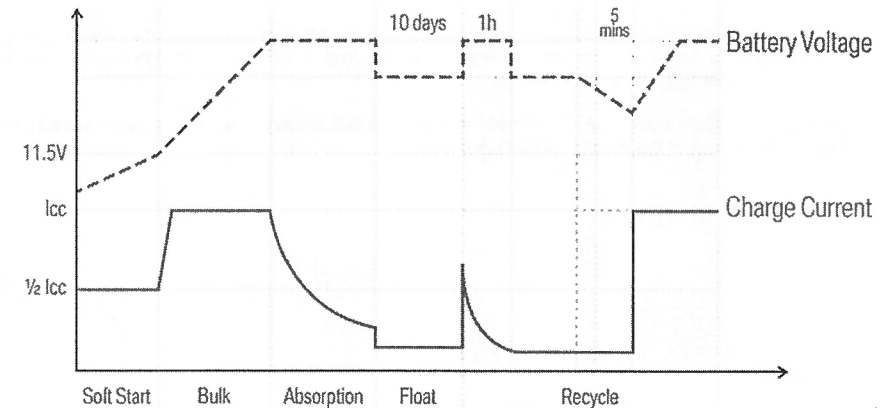


Figure 1-1 charge pattern

Float charging and Recycle charging program guarantee your battery could get proper maintenance in case of long time connected

### ➤ Battery temperature compensation

Battery temperature is a key factor in correct charging, the charging formula must be adjusted (automatically and in real time) according to the actual battery temperature to ensure that battery are fully charged but not overcharged or undercharged.

All charging voltages recommended by battery manufacture are in fact only applied at 20°C - 25°C.

The battery temperature and voltage sensor supplied with BS charger measures the temperature of battery

and automatically makes adjustments at real time to properly charge your batteries at compensation rate of  $-4\text{mv} / ^\circ\text{C} / \text{cell}$ .

In case of battery temperature sensor was not present, BS charger will use 25°C as default setting.

### ➤ Voltage compensated charging

Through the battery temperature and voltage sensor, BS charger could automatically adjust its output compensating the voltage drop on the cable assuring the full charging through delivering the right voltage to battery.

### ➤ Charging current adjustable

Through the smart button, user can choose the different charging current according the battery capacity. We recommend the charging current set as 10% of battery capacity ( $I=0.1C$ ) for lead acid battery and 30% of battery capacity for lithium battery.

### ➤ Slave battery charger for starter battery (only for 12V25A and 40A model)

Along with a powerful charger for stationery/service battery, BS battery charger is offering a slave charger of max 3A to keep starter battery charged.

### ➤ Special silent design

User-friendly special silent design. The fan of charger will stop working after the charging current drop to small amount for a period of them. And it will also automatic turn to work condition if inner temperature increased.

Through the Silent button on the remote control, the BS battery charger will automatically to reduce the output of the charger and stop the fan.

## 5.Operation

### 5.1Front Panel

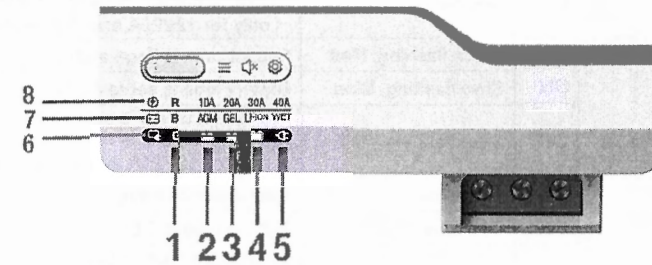


Figure 5-1 BS1225/BS1225-3/BS1240/BS1240-3

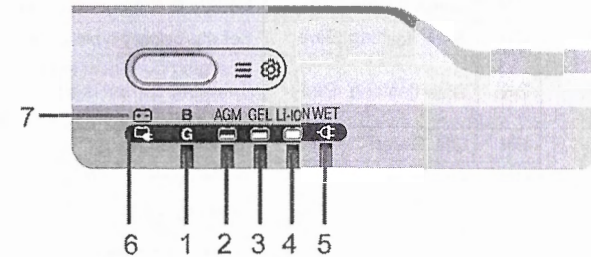


Figure 5-2 BS1210

LED2 ~ 5 represents different status of the units combined with the LED 1.

When LED1 is slow flashing, the BS charger is in the setting status.

When LED1 is quick flashing, the BS charger is in the fault indicator.

When LED1 is ON, they are the working status indicator.

No	LED	Color	Status	Description
1	LED 1	Green	ON	Charging status indication
			Slow flashing (flash once every second)	Working mode setting
		Blue	ON	Battery type indication
			Slow flashing (flash once every second)	Battery type setting
		Red	ON	Charging current indication (only for 12V25A and 40A model)
			Slow flashing (flash once every second)	Charging current setting
Quick flashing (flash twice every second)	Fault status indication			



If the LED1 is blue, it is in the indication of battery type. You can also set the battery type after long press the button for 3secs.

Battery type	LED1	LED2	LED3	LED4	LED5
	BLUE	Green			
AGM	☼	☼	●	●	●
GEL	☼	●	☼	●	●
LFP	☼	●	●	☼	●
WET	☼	●	●	●	☼

If the LED1 is red, it is in the indication of battery charger power. You can also set the power after long press the button for 3secs. (only for 12V25A and 40A model)

Charging current percentage	LED1	LED2	LED3	LED4	LED5
	Red	Green			
25%	☼	☼	●	●	●
50%	☼	●	☼	●	●
75%	☼	●	●	☼	●
100%	☼	●	●	●	☼

2.1 Principle Diagram

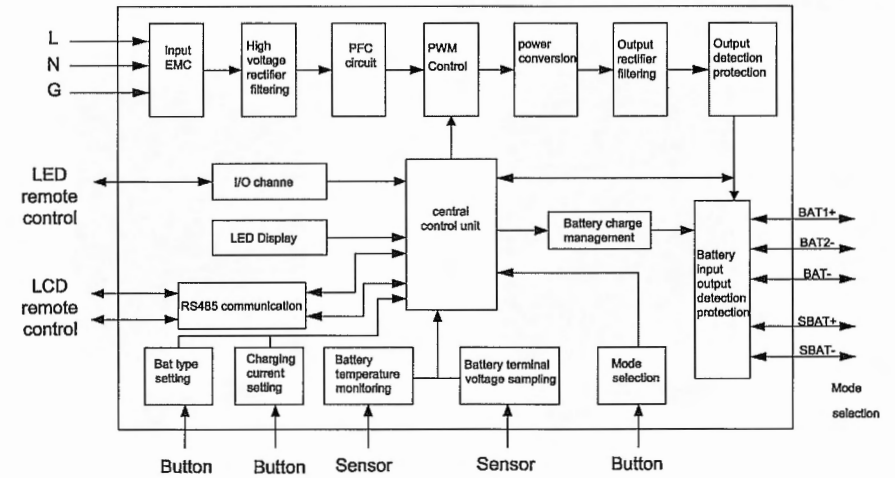


Figure 2-1 schematic diagram

2.2 Naming Rules

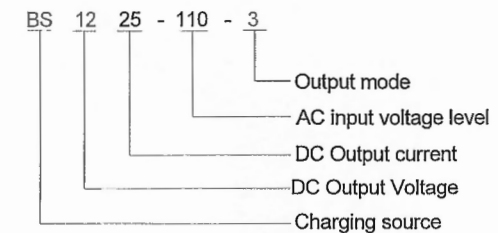
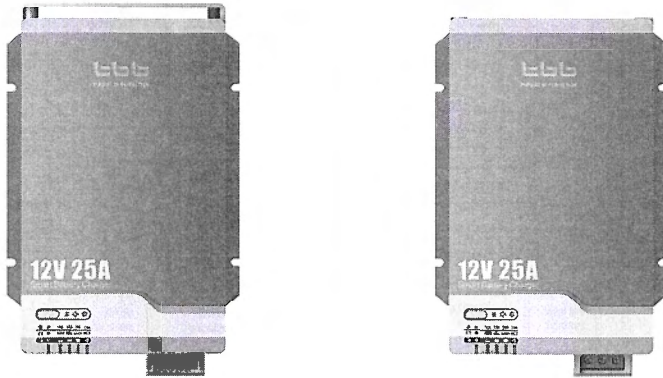


	figure	explanation
charging source	BS	Represents a charger whose input is ac and output is DC
DC Output Voltage	12	Indicates that the dc output voltage of the charger is 12V
	24	Indicates that the dc output voltage of the charger is 24V
DC OUTPUT CURRENT	12	Indicates that the dc output current of the charger is 12A
	20	Indicates that the dc output current of the charger is 20A
	25	Indicates that the dc output current of the charger is 25A
Ac input voltage level	40	Indicates that the dc output current of the charger is 40A
	vacancy	Indicates that the ac input of the charger is 220V
output mode	110	Indicates that the ac input of the charger is 110V
	vacancy	Means the power supply is 1+1 output mode
	3	Means the power supply is 2+1 output mode

2.3 Product Picture

2.3.1 BS1225-3/BS1240-3/BS1225/BS1240



2.3.1 BS1210



2.3.2 Accessory

Battery temperature and voltage sensor

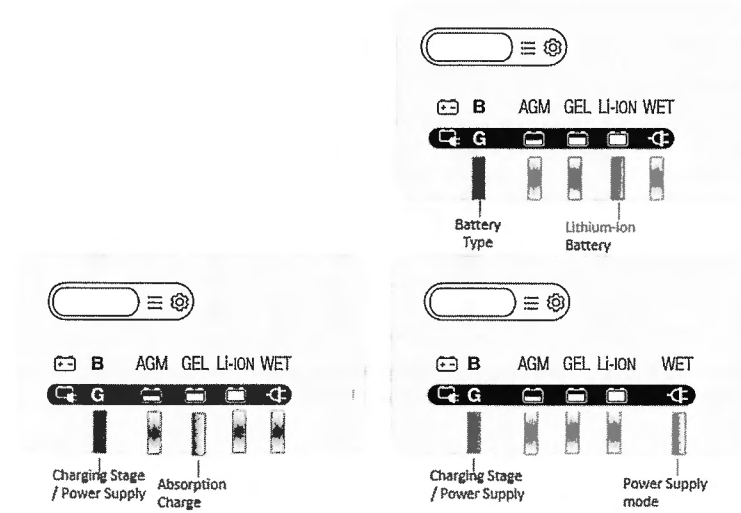


Figure 4-2 BS1210

When the LED1 is green, it is in the indication of charging status. You can also set this battery charger into a power supply by pressing this button for 3sec entering into setting mode.

Status	LED 1	LED2	LED3	LED4	LED5
		Green	Green		
Bulk	⦿	⦿	●	●	●
Absorption	⦿	●	⦿	●	●
Float	⦿	●	●	⦿	●
Power supply	⦿	●	●	●	⦿

## 4. Inquiry and Configuration

There is a multifunction switch for you to set the battery charger or check your setting. The LED displaying the charging status by default, through short press the button you can check the battery type and charger power you set.

Please follow the following steps to set the charger.

1. Please short press the button entering into Battery Type Display mode or Charger Power Display mode.
2. Then, long press the main button for 3s, you can enter into the setting mode.
3. By pressing the button, you can set the battery type or charger power.
4. After the setting, please long press the button to confirm the setting.

As a reminder, different colors of LED are designed for various setting.

- BLUE = battery type setting (AGM, GEL, LFP, WET)
- RED = charging current setting (only for 12V25A and 40A model)
- GREEN = working mode setting, battery charger or power supply

### Examples

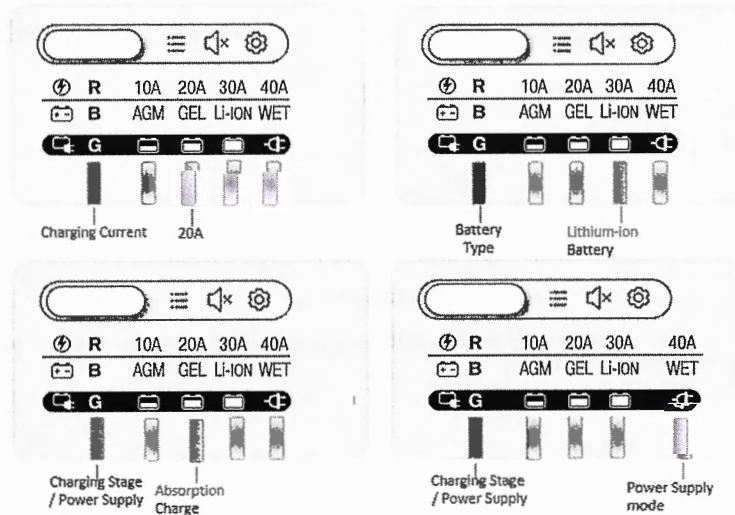
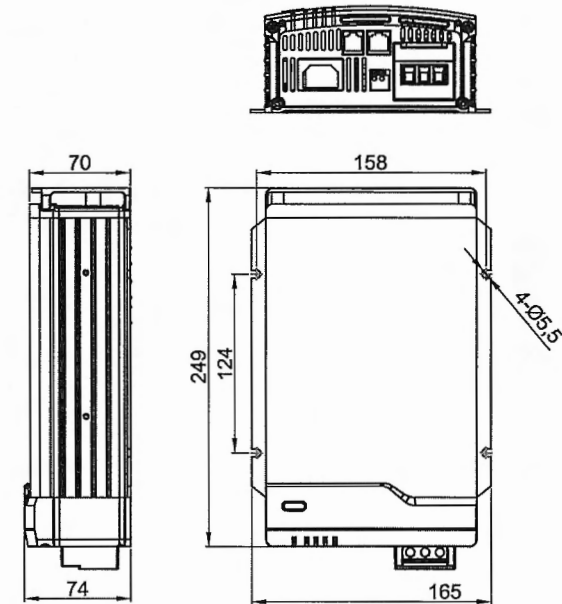


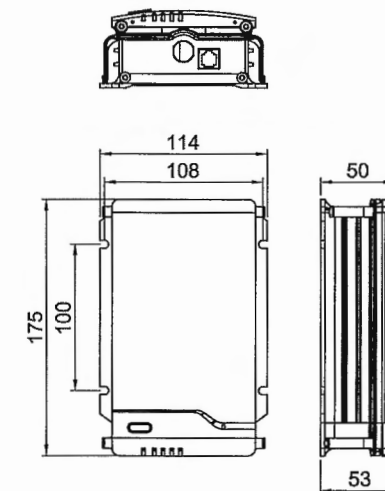
Figure 4-1 BS1225/BS1225-3/BS1240/BS1240-3

## 2.4 Product size

### 2.4.1 BS1225/BS1240/BS1225-3/BS1240-3

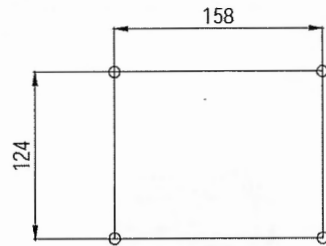
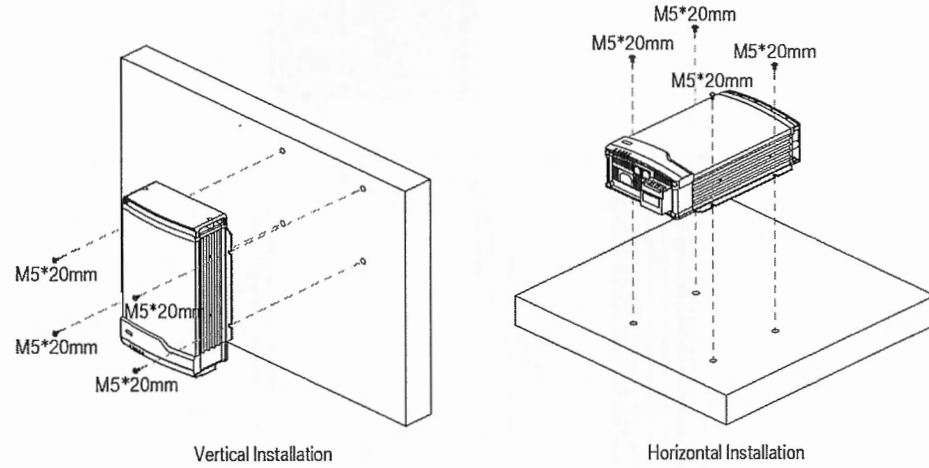


### 2.4.2 BS1210

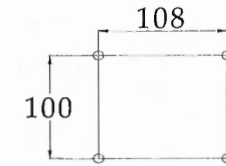
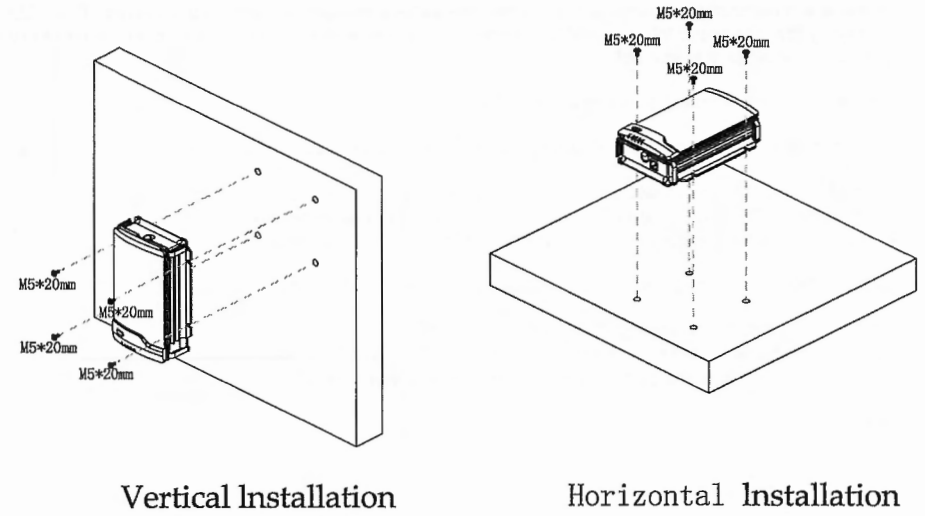


### 3. Installation

BS can be installed on a horizontal surface or vertically on a wall. Please see following instructions:



BS1225-3/BS1240-3 Hole size



BS1210 Hole size



Ensure clearance on both sides of BS unit upon installation. A recommended clearance of 5cm on each side.