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SBP SERIES USER MANUAL

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your solar engine

AC-COUPLED INVERTER

340-00087-01

1 Introduction

The SBP series inverters are bi-directional which apply to existing systems with battery to store energy.

Energy produced by the PV system is used to optimize self-consumption; excess energy is used to charge the batteries, and then feed into the national grid when the PV energy is adequate.

When PV energy output is insufficient to support connected loads, the system automatically discharges energy from the batteries if stored energy in battery is abundant. If the battery energy is insufficient to meet own consumption requirements, electricity will be drawn from the grid.

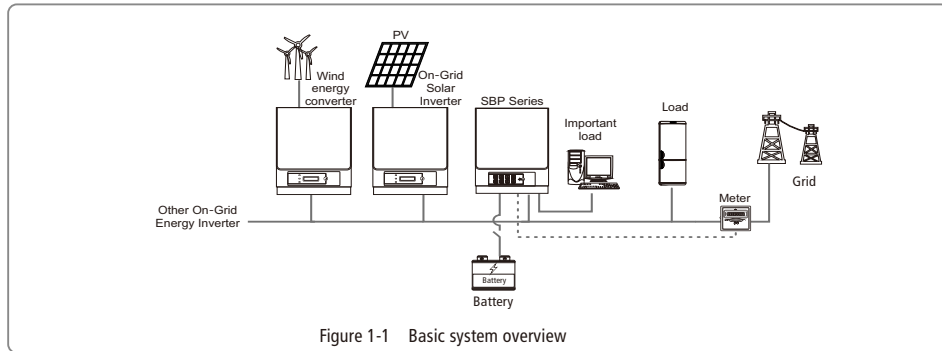The SBP series inverter is designed for both indoor and outdoor use.

Figure 1-1   Basic system overview

2   Important Safety Warning

Before using the inverter, please read all instructions and cautionary markings on the unit and this manual. Store the manual where it can be accessed easily.

The SBP series inverter of Jiangsu GoodWe Power Supply Technology Co. Ltd. (hereinafter referred to as GoodWe) strictly conforms to related safety rules in design and test.

Safety regulations relevant to the location shall be followed during installation, operation and maintenance.

Improper operation may have a risk of electric shock or damage to equipment and property.

2.1 Symbols

|			
⚠	Caution! Failure to observe a warning indicated in this manual may result in injury.	♻	Components of the product can be recycled.
⚡	Danger of high voltage and electric shock!	↑↑	This side up; the package must always be transported, handled and stored in such a way that the arrows always point upwards.
♨	Danger of hot surface!	6	No more than six (6) identical packages may be stacked on each other.

	Product should not be disposed as household waste.		The package/product should be handled carefully and never be tipped over or slung.
	Refer to the operating instructions	☂	Keep dry; the package/product must be protected from excessive humidity and must be stored under cover.
⚡5min	Signals danger due to electrical shock and indicates the time (5 minutes) to allow after the inverter has been turned off and disconnected to ensure safety in any installation operation.	CE	CE Mark

2.2 Safety

● Installation, maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and the requirements of local power authorities and/or companies (for example : AS 4777 and AS/NZS 3000 in Australia).

● To avoid electric shock, DC input and AC output of the inverter must be disconnected and wait at least 5 minutes before performing any installation or maintenance.

● The temperature of some parts of the inverter may exceed 60℃ during operation. To avoid being burnt, do not touch the inverter during operation. Let it cool before touching it.

● Ensure children are kept away from inverters.

● Do not open the front cover of the inverter. Apart from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.

● Static electricity may damage electronic components. Appropriate method must be adopted to prevent such damage to the inverter; otherwise the inverter may be damaged and the warranty annulled.

● If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

● Avoid inserting or pulling the AC and DC terminals when the inverter is running.

● In Australia, the inverter internal switching does not maintain the neutral integrity, neutral integrity must be addressed by external connection arrangements like the example proposed in the diagram 4.9.

● In Australia, the output of backup side in switchbox should be labeled 'main switch UPS supply', the output of normal load side in switchbox should be labeled 'main switch inverter supply'.

● The inverter can exclude the possibility of DC residual currents to 6mA in the system,Where an external RCD is required in addition to the built-in RCMU, type A RCD must be used to avoid tripping。

● Installation position shall not prevent access to the disconnection means;

● Don't connect SBP series in the following ways:
① Back-up port should not be connected to grid;
② Back-up port should not be connected in parallel;
③ One battery should not be connected in parallel;
④ One EzMeter should not be used for multi inverters;
⑤ One or more CTs of EzMeter should not be connected together on the same fire cable;
⑥ Should not connect AC generator on AC or backup side.
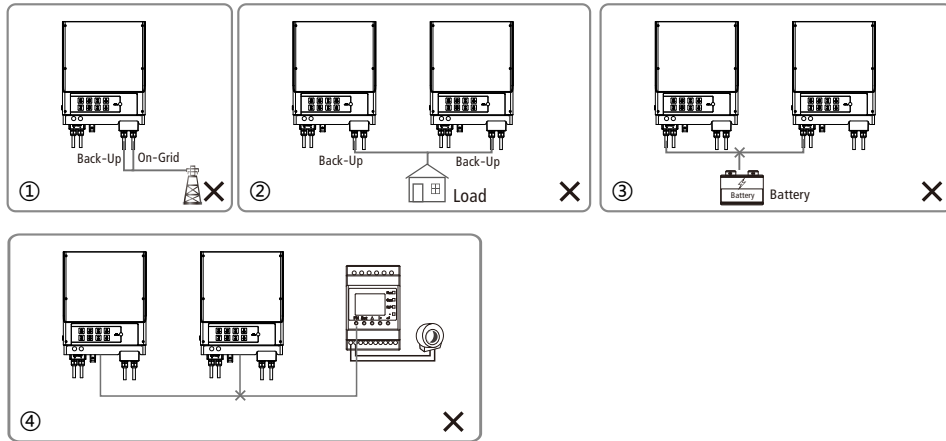
2.3 Special illustration

2.3.1 Back-Up loads

For GoodWe S-BP inverters, it is able to supply a continuous 5000VA output or max 5500VA in less than 10 seconds on back-up side, to support back-up loads. If ambient temperature more than 40℃ and long time off grid run will shut down.

Accepted house loads for back-up side includes: Television, Computer, Fridge, Fan, illumination lamps, microwave oven, electric rice cooker, small power air conditioner, routers etc.

Unaccepted house loads for back-up side includes: high-power air conditioner, high-power water pump, high-power heaters, high-power wash machine, high-power electromagnetic oven, high-power compression engine, high-power hair drier, high-power dust cleaner etc.

2.3.2 Back-Up Overload

When Back-Up Overload happens, the inverter will restart itself. And the preparation time for restart will be longer and longer (max 1 hour) if Back-Up Overload repeats. Following operation helps inverter recover immediately:
a. Decrease back-up load power within max limitation;
b. On EzManage→Advanced Setting→click "Reset Back-Up Overload History"

2.3.3 Battery protection

Battery will act a protective charge/discharge current limitation under any condition as below:
a. Battery SOC lower than 1-DOD;
b. Battery voltage lower than discharge voltage
c. Ambient temperature higher than 45℃ ;
d.Lithium Battery communication abnormal.
When charge/discharge current limitation happens:
a.Under on-grid mode, battery charge/discharge might appears abnormal;
b.Under off-grid mode, Back-up supply will shut off.
Note: if Backup supply shut off because of battery low SOC or battery voltage.

2.3.4 Lead-Acid Batteries Used in Hybrid system

a. For lead-acid batteries connecting with GoodWe Hybrid inverter, the SOC is calculated on inverter side. As lead-acid battery has various brands and battery ages, the SOC calculation will has deviation from the real SOC.
b. For lead-acid battery band, the SOC calculated is the total SOC of the whole bank, thus if there is any uniformity deviation between different battery cells, which will cause overcharge or over-discharge on some cells, further will damage the cell(s) and shorten battery bank life.
c. For lead-acid batteries, please honestly refer to your battery specifications to set Battery Capacity, Charge/discharge current, Charge Voltage and Discharge Depth etc. Default Discharge Voltage is 42V (non-editable). Unsuitable settings for lead-acid batteries will possiblly lead to inaccurate battery SOC, weak battery lifespain, or further battery damage.
d. For lead-acid batteries, please refer to battery charge voltage and temperature profile for a suitable charge voltage setting. Followed an example of a given lead-acid battery:

CHARGE vs TEMPERATURE CHART																							
temperature	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
Cycle Charge	2.66	2.64	2.62	2.60	2.58	2.56	2.54	2.52	2.50	2.48	2.47	2.47	2.45	2.45	2.43	2.41	2.39	2.37	2.35	2.33	2.31	2.29	2.27
Float Charge (voltage/cell)	2.46	2.44	2.42	2.40	2.38	2.36	2.34	2.32	2.31	2.30	2.29	2.29	2.29	2.27	2.26	2.24	2.23	2.23	2.23	2.23	2.23	2.23	2.23

* Under battery temperature 25℃, constant-voltage charge at 2.45*24=58.8V, float charge at 2.27*24=54.48V;
* Under battery temperature 40℃, constant-voltage charge at 2.39*24=57.36V, float charge at 2.23*24=53.52V;
Then battery working temperature should also be under consideration to set battery charge voltage, otherwise, battery will possiblly be damaged.
e. Please choose lead-acid batteries, which is suitable for photovoltaic system, with higher cycle life.
f. For damage caused by unsitable settings, battery out of warranty, battery quality etc, it is ivnerter-irresponsible. For details, please refer to battery user manual.
g.If install the lead-acid batteries,please contact the GoodWe Service Center first(service@goodwe.com.cn)
h.Do not provide the warranty if unconfiremed.
i.For Lead-Acid batteries, we do not have temperature compensation. Customers need set battery charge voltage based on the real working temperature.

2.3.5 Statement on Wiring Connection in SPLIT Grid System

In SPLIT grid system, there is a solution to make hybrid inverter work under on-grid condition, but he exporting power and load power might be inaccurate as the nominal hybrid inverter output is 230V and there could be loads of both 110V and 220V.
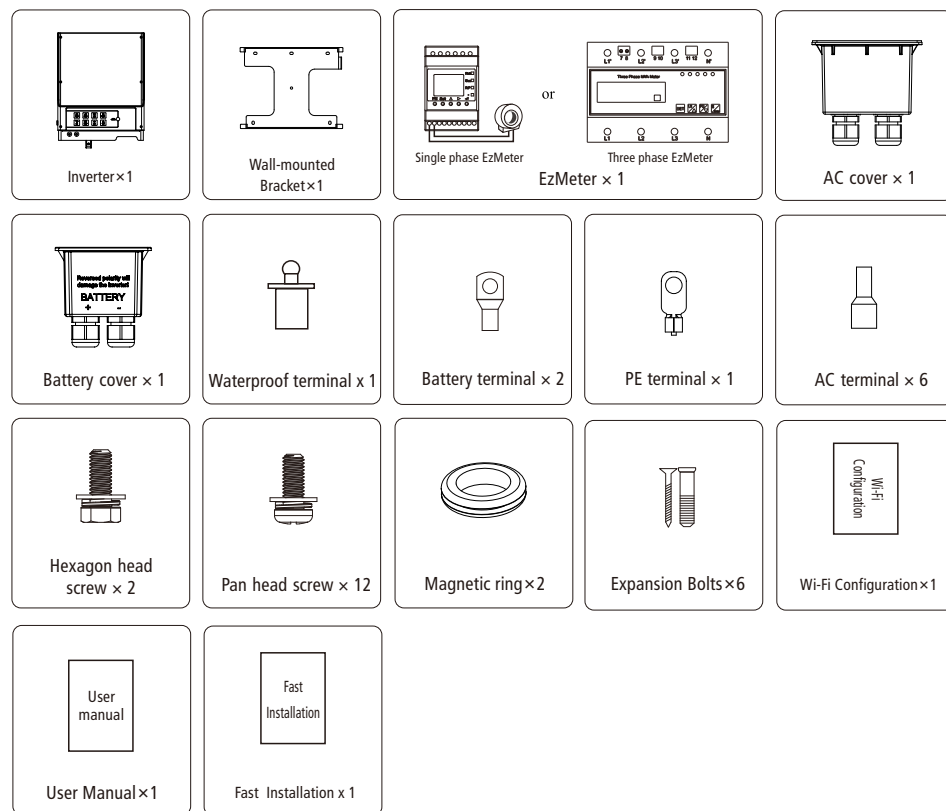
⚠ Grid-tied inverter cannot set 0 exporting, otherwise S−BP cannot enter charging mode.
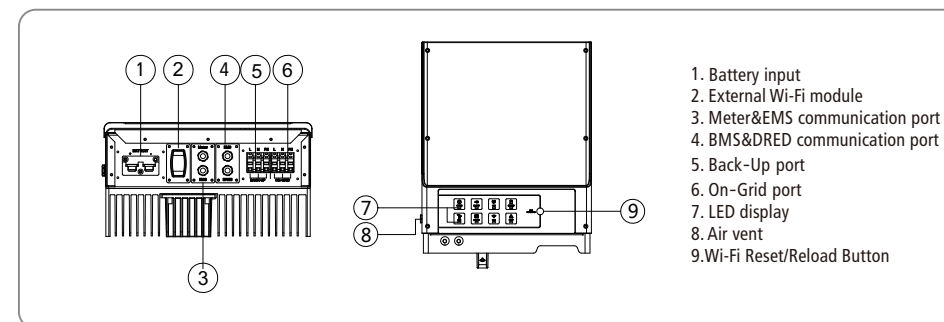
3 Installation

3.1 Packing List

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

Inverter×1	Wall-mounted Bracket×1	Single phase EzMeter or Three phase EzMeter EzMeter × 1	AC cover × 1
Battery cover × 1	Waterproof terminal x 1	Battery terminal × 2	PE terminal × 1
			AC terminal × 6
Hexagon head screw × 2	Pan head screw × 12	Magnetic ring×2	Expansion Bolts×6
			Wi-Fi Configuration×1
User Manual×1	Fast Installation x 1		

● Depending on your order, we have three-phase EzMeter for three-phase grid-tied inverters and single-phase EzMeter for single-phase grid-tied inverters.

3.2 Product Overview

1. Battery input
2. External Wi-Fi module
3. Meter&EMS communication port
4. BMS&DRED communication port
5. Back-Up port
6. On-Grid port
7. LED display
8. Air vent
9.Wi-Fi Reset/Reload Button

3.3 Selecting The Mounting Location

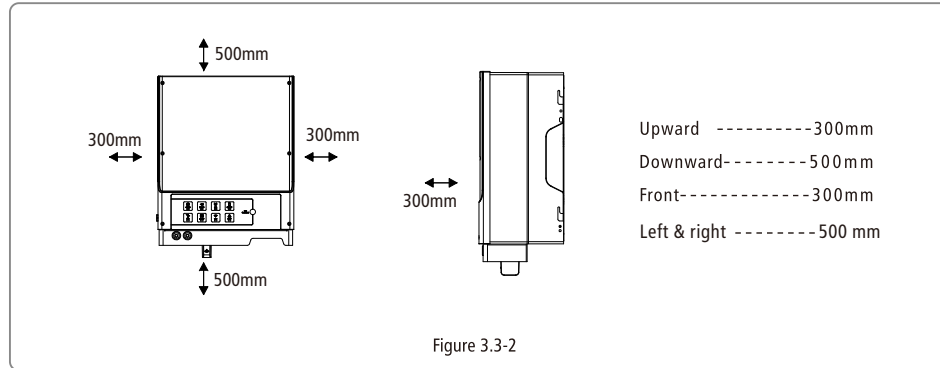Mounting location should be selected based on the following aspects:

● The installation method and mounting location must be suitable for the inverter's weight and dimensions.
● Mount on a solid surface.
● Select a well ventilated place sheltered from direct sun radiation.
● Install vertically or tilted backward by max 15°. The device cannot be installed with a sideways tilt. The connection area must point downwards. Refer to Figure 3.3-1.

Figure 3.3-1
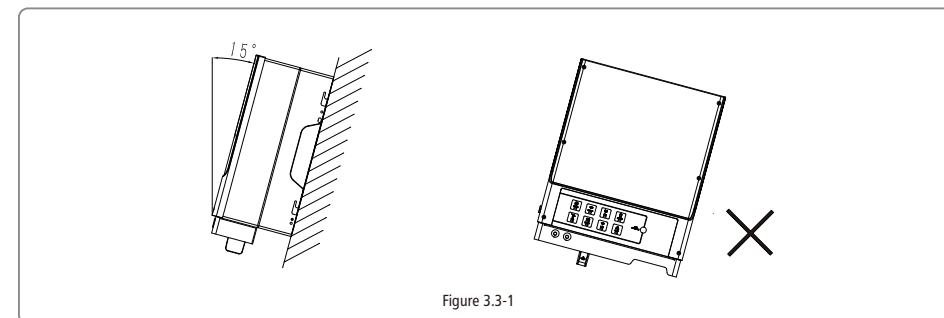
● In order to achieve optimal performance, the ambient temperature should be lower than 45 °C.
● For the convenience of checking the LED lights and possible maintenance activities, please install the inverter at eye level.
● Inverters should NOT be installed near inflammable and explosive items. Any strong electro-magnetic equipment should be kept away from installation site.
● Product label and warning symbols shall be clear to read after installation.
● Please avoid direct sunlight, rain exposure, snow lay up when installing.

No direct sunlight ✓   No Rain Exposure ✓   No Snow Lay up ✓   Direct Sunlight ✗   Rain Exposure ✗   Snow Lay up ✗
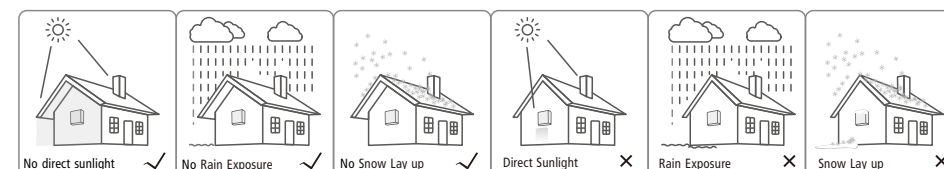
● In consideration of heat dissipation and convenient dismantling , the minimum clearance around the inverter should be no less than the following values :

500mm

300mm 300mm

300mm

Upward ----------300mm
Downward--------500mm
Front-------------300mm
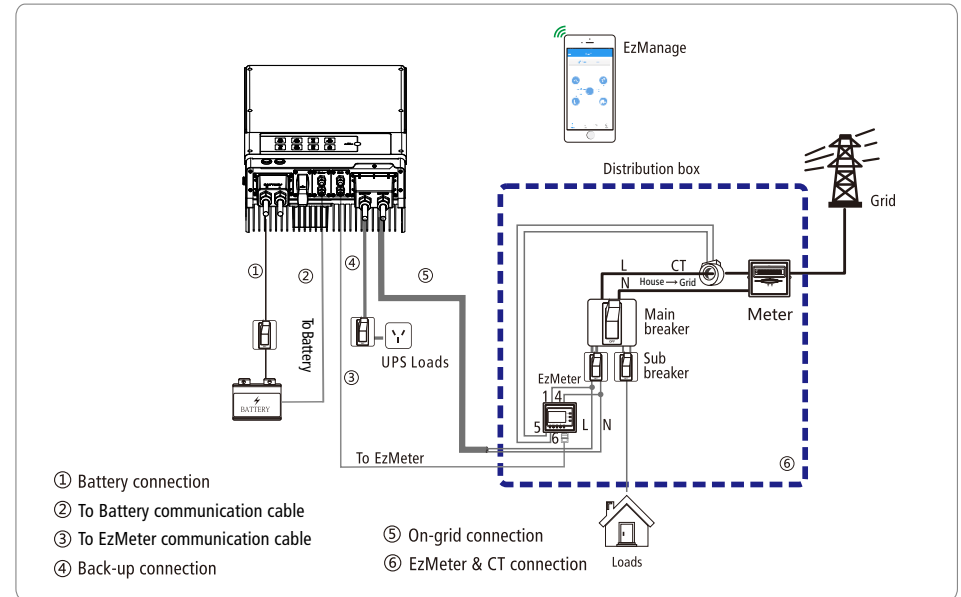Left & right --------500 mm

500mm

Figure 3.3-2

⚠ 3.4 Mounting

Remember that this inverter is heavy! Please be careful when lifting out of the package.

1. Use the wall-mounted bracket as a template and drill 6 holes on the wall, 10 mm in diameter and 80 mm deep. Refer to Figure 3.4-1.
2. Fix the wall-mounted bracket on the wall with six expansion bolts in accessory bag.
3. Carry the inverter by holding the heat-sink on both sides. Refer to Figure 3.4-2.
4. Place the inverter on the wall-mounted bracket. Refer to Figure 3.4-3、 Figure 3.4-4.
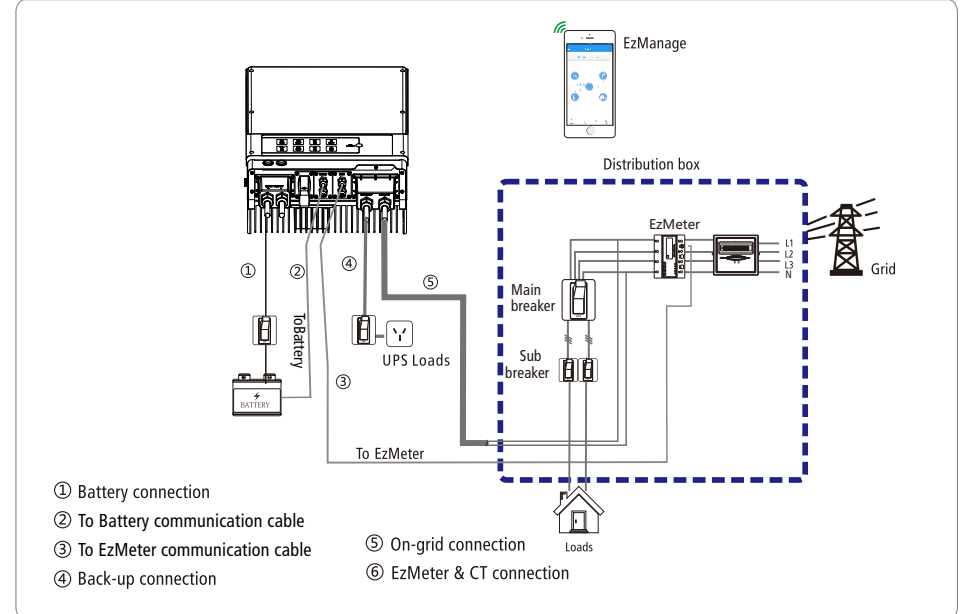
250mm
125mm
120mm
120mm
265mm

Figure 3.4-1

Figure 3.4-2

Figure 3.4-3

Figure 3.4-4
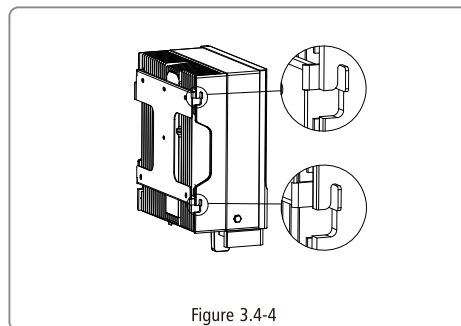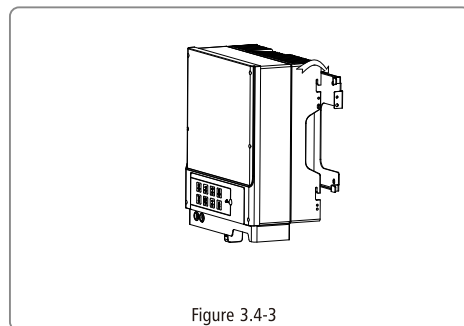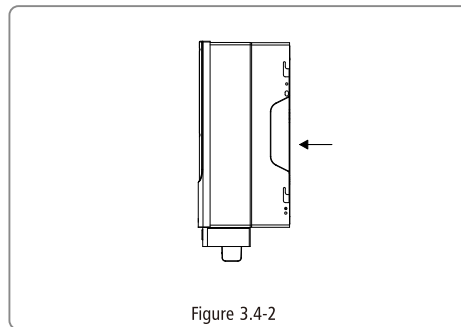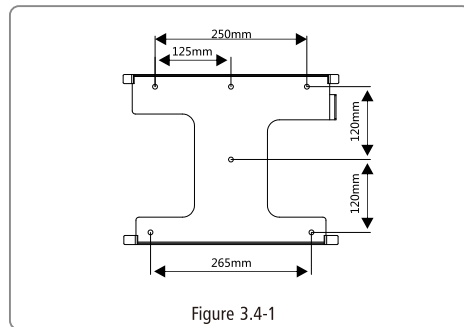
4 Electrical Connection

① For single phase grid systems with single phase EzMeter, system connection diagram as below :

EzManage

Distribution box

Grid

L CT
N House → Grid
Main breaker Meter
Sub breaker
EzMeter
1 4
5 6 L N

To Battery

UPS Loads

To EzMeter

Loads

① Battery connection
② To Battery communication cable
③ To EzMeter communication cable
④ Back-up connection
⑤ On-grid connection
⑥ EzMeter & CT connection

Note: if equipped with lead-acid battery, do not need to connect②.

② For three phase grid systems with three phase EzMeter, system connection diagram as below :

EzManage

Distribution box

EzMeter

Main breaker

Sub breaker

Grid
L1
L2
L3
N

To Battery

UPS Loads

To EzMeter

Loads

① Battery connection
② To Battery communication cable
③ To EzMeter communication cable
④ Back-up connection
⑤ On-grid connection
⑥ EzMeter & CT connection

4.1 Battery Connection

Before connecting to battery, please install a separate DC breaker (63A) between inverter and battery. This will ensure the inverter can be securely disconnected during maintenance.

⚠ ● Reversed polarity will damage the inverter!

● Be aware of electric shock and chemical hazards!

● It is a normal phenomenon that electric arc occurs when connecting battery to the inverter without using a DC breaker.

● It's very important for system safety and efficient operation to use appropriate cables for battery connection. To reduce risk of injury, please use the proper recommended cable size. Refer to Figure 4.1-1.

Grade	Description	Value
A	O.D.	10~12mm
B	Conductor Material Sectional Area	20~25mm^2
C	Bare Wire Length	10mm around

Figure 4.1-1
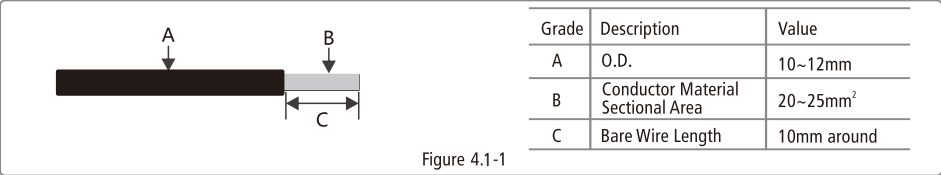
● Suggestion: if the battery is to be installed indoors,for details please refer to battery manufacturer's user manual.

● Suggestion: Batteries must be installed with a distance to each other, for details please refer to battery manufacturer's user manual.

● As for the number of cells used, it will be decided by customer's choice, the choice must comply with the followed requirement: the rated voltage is 48V.

Please follow below steps to implement battery connection:

(1) Check the nominal voltage of batteries. The nominal output voltage should meet Goodwe's product specification.

(2) Disconnect DC breaker between inverter and battery.

(3) Disconnect screw cap from insulator.

(4) Disconnect waterproof ring from insulator.

(5) Put the cable through the components in this order: screw cap, waterproof ring, insulator, battery cover and battery terminal. Refer to Figure 4.1-2.

(6) Compress the terminal head with a professional tool and screw down screw cap slight. Refer to Figure 4.1-3 Figure 4.1-4.

(7) Put battery terminals into the corresponding holes (Red to the positive terminal; Black to the negative terminal) and fasten them by screwdriver and spanner (recommended torsion: 6~8 N.m) , then fasten battery cover with pan head screws in accessory bag. Refer to Figure 4.1-5, Figure 4.1-6, Figure 4.1-7.

(8) Screw down screw cap again.

Figure 4.1-2

Figure 4.1-3

Figure 4.1-4

Figure 4.1-5

Figure 4.1-6

Figure 4.1-7
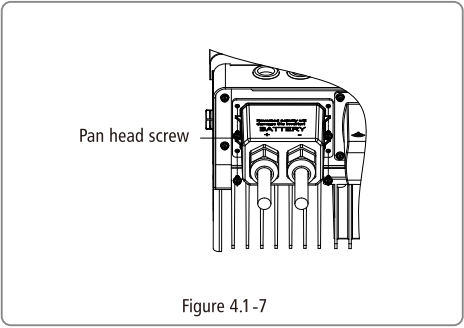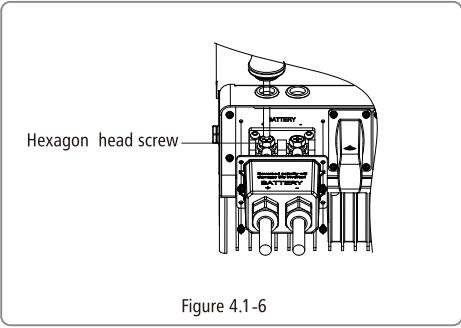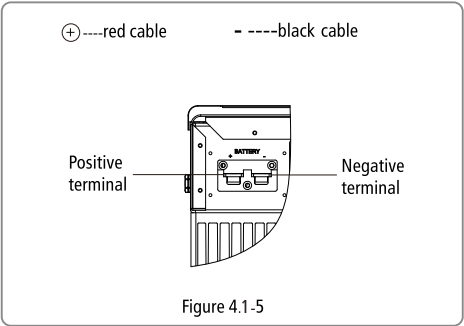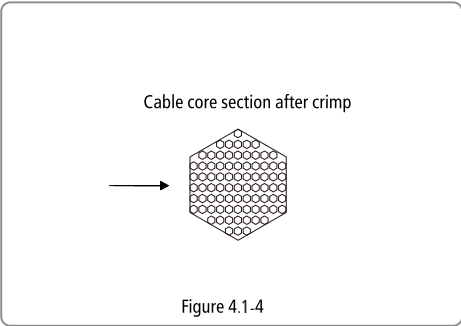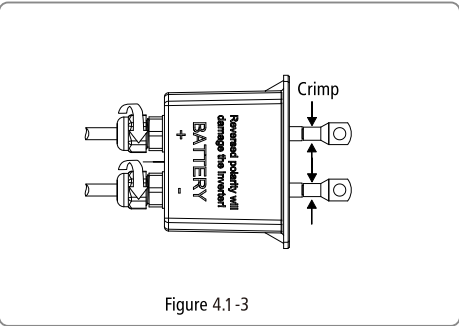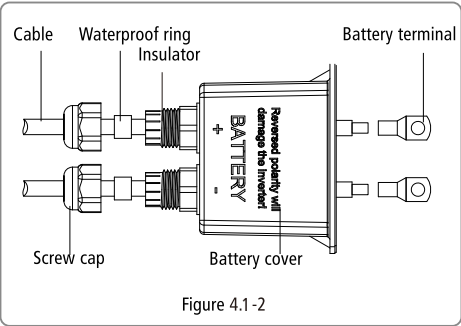
4.2 On-grid & Back-up Connection

4.2.1 On-grid Connection

In order to ensure that the inverter is safe to disconnect from grid, please install a circuit breaker only for inverter on-grid port.

Model	Recommended circuit breaker specifications
GW5000S-BP	50A
GW3600S-BP	40A

Note:
● Multiple inverters are not allowed to share a circuit breaker.

● Load is not allowed to connect between the inverter and the circuit breaker.

4.2.2 BACK-UP Load Connection

In order to ensure that the back-up function can be safe and reliable,please refer to the following content, to the left hand side of Figure 4.2.2-1. Inductive load: Single inductive load max power ≤1 kVA,Total inductive load power≤2kVA;

For example :Such as Air conditioner, Washer, Electric motor etc is inductive load;

Capacitive Load : Single capacitive load power ≤ 1kVA, Total capacitive load power ≤2kVA;

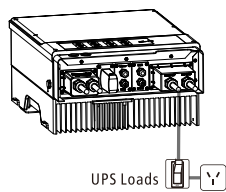For example :Such as computer, Switch power etc is capacitive load;

Model	Norminal Backup Power	RCD
GW5000S-BP	5000VA	32A/30mA
GW3600S-BP	3680VA	25A/30mA

UPS Loads

Figure 4.2.2-1

4.2.3 AC Terminal Connection

⚠ It's very important for system safety and efficient operation to use appropriate cable for AC connection. To reduce risk of injury, please use the proper recommended cable size. Refer to Figure 4.2.3-1.
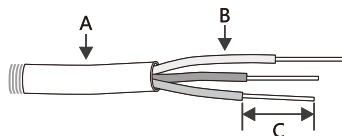

Grade	Description	Size
A	External diameter of the wire	10~12mm
B	Sectional area of conducting materials	6mm²
C	Length of bare wire	Approx.10mm

Figure 4.2.3-1

*Neutral conductor shall be blue, line conductor shall be black or brown (preferred), protective earth bonding line shall be yellow-green.

*The AC line construction shall be such that if the cord should slip in its anchorage, placing a strain on conductors, the protective earthing conductor will be the last to take the strain. such as the PE line is longer than L and N.

Please follow below steps to implement AC connection:

(1) Check the grid voltage and frequency at the connection point of the inverter. It should meet GoodWe's product specification.

(2) Measure the impedance between neutral cable and earth cable, make sure it is not in excess of 10 Ohm.

(3) Disconnect AC breaker between inverter and Grid.

(4) Disconnect screw cap from insulator.

(5) Disconnect waterproof ring from insulator.

(6) Put the cable through the components in this order: screw cap, waterproof ring, insulator, AC cover and AC terminal. Refer to Figure 4.2.3-2.

(7) Compress the terminal head by professional tool and screw down screw cap slightly. Refer to Figure 4.2.3-3 Figure 4.2.3-4.

(8) Insert AC terminals into the corresponding holes and fasten them by screwdriver (Suggest: diameter of the cutter bar is 4mm, torsion: 2~2.5 N.m), then fasten AC cover with pan head screws in accessory bag. Refer to Figure 4.2.3-5, Figure 4.2.3-6, Figure 4.2.3-7.
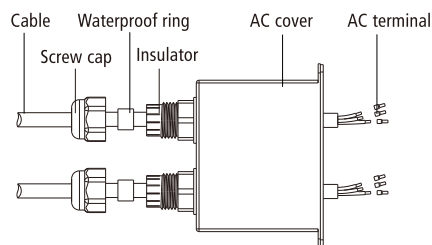
(9) Screw down screw cap again.

Cable   Waterproof ring   AC cover   AC terminal
Screw cap   Insulator

Figure 4.2.3-2

AC terminal should be clamped properly, this is very important !

Crimp

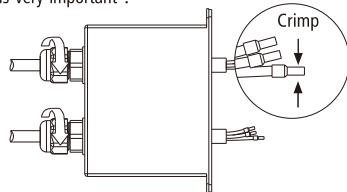Figure 4.2.3-3

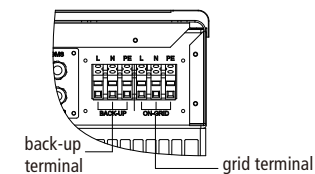cable core section after crimp

Figure4.2.3-4

L—line   N---neutral   PE---earth

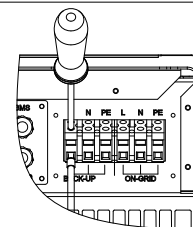back-up terminal   grid terminal
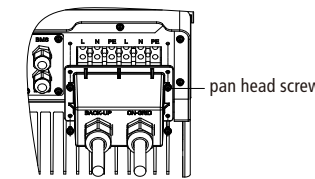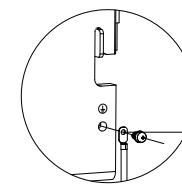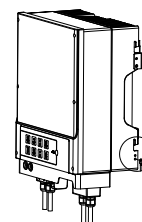
Figure4.2.3-5

Figure4.2.3-6

pan head screw

Figure4.2.3-7

An earth wire terminal is set on the right side of the inverter. It shall be connected to earth wire.Refer to Figure 4.2-4.

The terminal can be connected to earth wire.
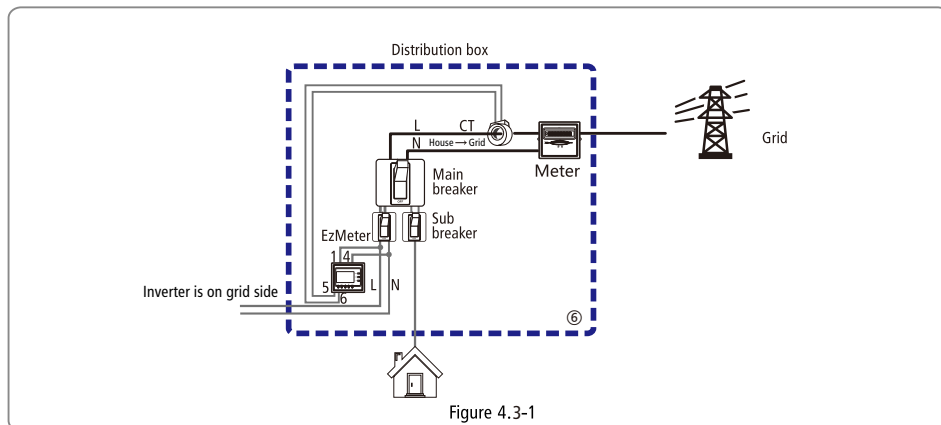
Figure4.2-4

4.3 EzMeter & CT Connection

EzMeter can detect the grid voltage and the magnitude and direction of current, to control the working condition of hybrid inverter via RS-485 communication.For the connection method of EzMeter & CT refer to Figure 4.4-1.

Please follow below steps to implement the EzMeter & CT connection:

(1) Connect the CT to the main 'L' line as the Figure 4.4-1 , make sure that the CT direction is ' House → Grid '.

(2) Connect the EzMeter to the random 'L' and 'N' line, as the figures shows. To power up the EzMeter and detect the grid voltage, make sure that '1' connects to 'L', '4' connects to 'N'.

For the connection method of Type 1 EzMeter refer to Figure 4.4-1.
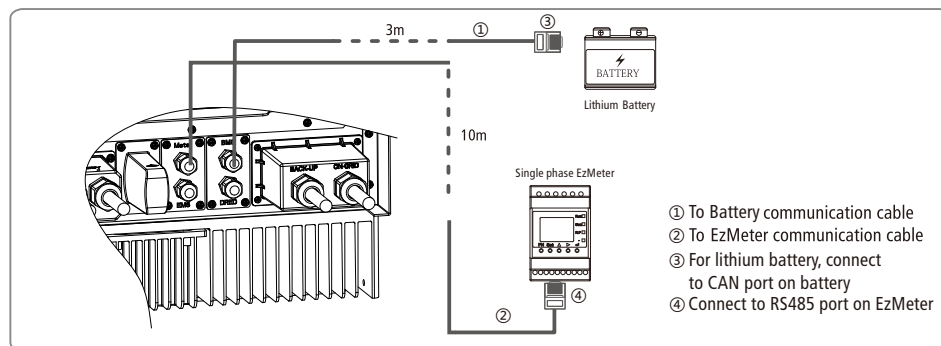
Figure 4.3-1

Distribution box

Grid

Meter

CT
House → Grid

Main breaker

Sub breaker

EzMeter

Inverter is on grid side

Figure 4.3-1

EzMeter LED light illustration

	OFF	ON	Blink
RUN	Not working	/	Working normal
Com(Red)	Not communicating	/	Communicating
R-P(Red)	Power Positive	Power Negative	/
----(Red)		Nagative Value Indicator	/

EzMeter can work normally after installation, no configuration is needed.
Users can see if communication is normal by checking if Com(Red) is blinking;
Make sure that the CT direction K L and L/N line connection is correct when installing EzMeter.

4.4 Communication Connection

3m

BATTERY

Lithium Battery

10m

Single phase EzMeter

① To Battery communication cable
② To EzMeter communication cable
③ For lithium battery, connect to CAN port on battery
④ Connect to RS485 port on EzMeter

There are two pre-made cables onnected to SBP inverter, one cable is 3m which is marked "To Battery" should be connected to Li-battery communication port, the other cable is 10m which is marked "To EzMeter" should be connected to EzMeter.If not using the battery communication and SBP inverter is installed outside， please take out the "To Battery" cable by removing the communication cover, then put the communication cover back and install the waterproof terminal.
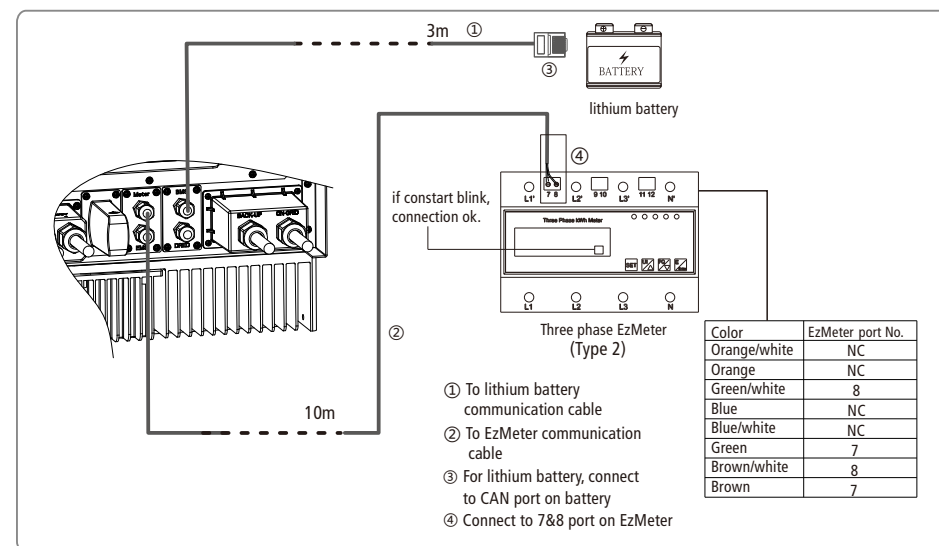The"To Meter"communication cable attached on the inverter can be extended to max 100m, but for "to battery" cable, we do not suggest any extension.

BMS port is used for communication with lithium battery and can be used for both CAN and RS485 communication protocols.
RS485 port is used for communication with expansion devices.

For three phase grid systems with three phase EzMeter,please snip the "To EzMeter" communication cable,then EzMeter communication cable should be as per the installation diagram.

3m

BATTERY

lithium battery

if constart blink, connection ok.

Three phase EzMeter
(Type 2)

10m

① To lithium battery communication cable
② To EzMeter communication cable
③ For lithium battery, connect to CAN port on battery
④ Connect to 7&8 port on EzMeter

| Color	EzMeter port No.
Orange/white	NC
Orange	NC
Green/white	8
Blue	NC
Blue/white	NC
Green	7
Brown/white	8
Brown	7

4.5 Wi-Fi Reset & Reload

Wi-Fi Reset & Reload only apply to WiFi connection problems, such as 'can't find the inverter WiFi signal' or 'WiFi configuration problem'.

Wi-Fi Reset means restarting the Wi-Fi module.
Wi-Fi Reload means making the Wi-Fi module to the default factory setting.

● Short press(about 1s) the touch switch, then LED Wi-Fi displays once a second flicker, Wi-Fi reset is successful. Refer to Figure 4.5-1.

●Long press(more than 3s) the touch switch, then Wi-Fi reload is successful. Refer to Figure 4.5-1.

Touch switch

Figure 4.5-1
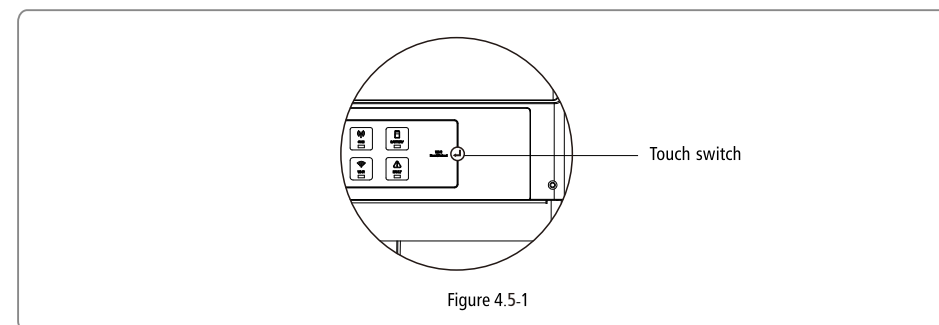
4.6 DRED Connection

Connection Procedure:

● Put the cable through the components in this order: screw cap, one-hole sealing ring, insulation body and sheet metal parts.

● Pull out the 6-pin terminal from the socket in the cabinet and take off the resistor which is fixed in it. Cable should be connected as Figure4.6-1.

● Insert the green terminal into the corresponding interior terminal of the inverter. Pull cable softly to ensure the cable is not pulled out.

● Lock the sheet metal parts onto the box and tighten the screw cap.

NOTE：

6-pin terminal is used to make connection to DRED device. If DRED device is not available, please keep it not connected.

No	Function
1	DRM1/5
2	DRM2/6
3	DRM3/7
4	DRM4/8
5	REFGEN
6	COM/DRM0

6.5mm
25mm

Screw Nut The insulator Screw cap
RS485 Communication Board Single hole seal ring Cables
123456
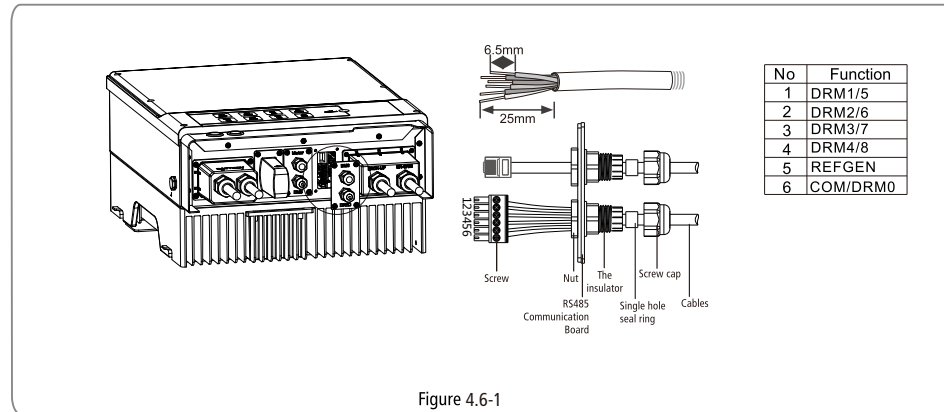
Figure 4.6-1

1.DRED connection is only available for Australia and New Zealand

2.Supported DRM commands:DRM0,DRM1,DRM2,DRM3.DRM4,DRM5,DRM6,DRM7,DRM8

4.7 Earth Fault Alarm

The inverter complies with IEC62109-2 13.9.When earth fault occurs,the fault indicator LED on front cover will light up and the inverter will email the fault information to customer.

4.8 System Connection Diagram for Australia
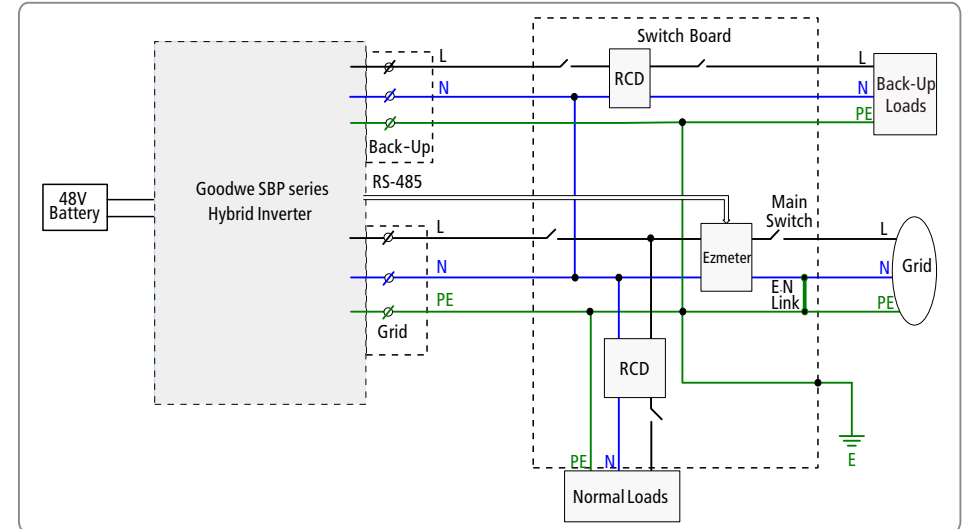
4.9 Special Back-up Connection   4.9 special backup application

1:Loads are supplied from back-up side
2:Loads are not powered
3:Loads are supplied from grid side
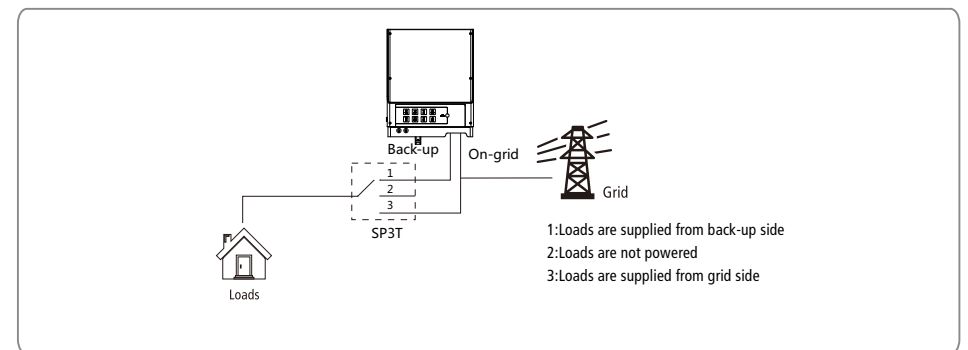
If the SBP unit needs maintenance, then just switch SP3T to position 3 as shown above. Thus the loads will be supplied by grid (loads supply will not be cut off).

4.11 Special Adjustable Setpoints

The inverter has field adjustable function,such as trip points,trip times, reconnect times,active and invalid of QU curve,PU curve.

It is adjustable through special software ,if you want to use it ,please contact with after sales.

The methods document of using the software can download from goodwe website or contact with after sales.

5 EzManage Illustration
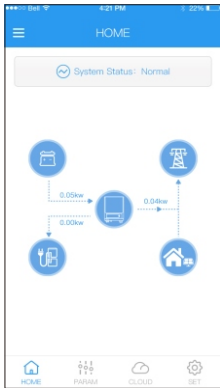
SBP Series inverter has no LCD screen, it can be controlled via the APP software (EzManage). For iOS Systems, please go to AppStore to search for "EzManage", then download and install it. For Android Systems, please go to Google play to search for "EzManage", then download and install it. Besides, it can be also installed by scanning the QR code on the back cover of this manual .

When SBP hybrid inverter is working, please use mobile devices to select the SSID of inverter (Factory defaults is Solar - Wi-Fi, and initial password is 12345678. If any questions, please refer to Wi-Fi Configuration). After accessing inverter's Wi-Fi network, you can open the App then configure and monitor the SBP system.

6 CEI Auto Test/Power limit function Introduction

The PV Auto Test function of CEI is integrated in EzManage App. For the detailed operation of this function, please check instructions on EzManage App.

You can set Power limit function by EzManage APP. For the detailed operation of this function, please check instructions on EzManage App.

7 LED Lights Illustration

SYSTEM	BACK-UP	COM	BATTERY	GRID	ENERGY	Wifi	FAULT
Green	Green	Blue	Blue	Blue	Yellow	Yellow	Red
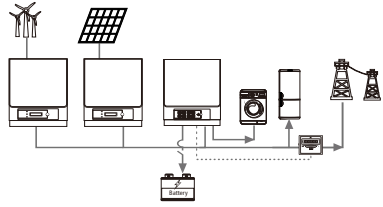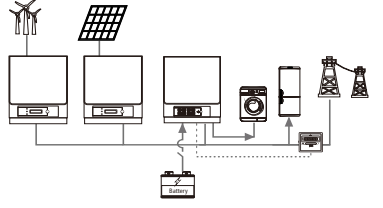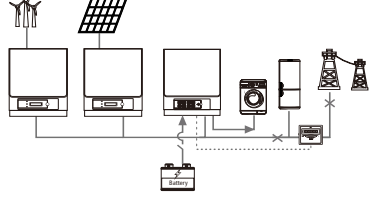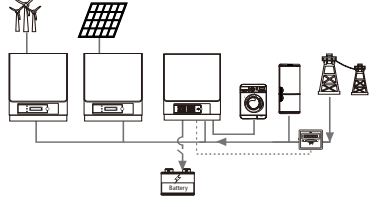
INDICATOR	STATUS	EXPLANATION
SYSTEM	ON	ON = SYSTEM IS READY
	BLINK	BLINK = SYSTEM IS STARTING UP
	OFF	OFF = SYSTEM IS NOT OPERATING
BACKUP	ON	ON = BACK-UP IS READY / POWER AVAILABLE
	OFF	OFF = BACK-UP IS OFF / NO POWER AVAILABLE
COM	ON	ON=BMS AND METER COMMUNICATION OK
	BLINK1	BLINK1= METER COMMUNICATION OK, BMS COMMUNICATION FAIL
	BLINK2	BLINK2= BMS COMMUNICATION OK, METER COMMUNICATION FAIL
	OFF	OFF= BMS AND METER COMMUNICATION FAIL
BATTERY	ON	ON = BATTERY IS CHARGING
	BLINK 1	BLINK 1 = BATTERY IS DISCHARGING
	BLINK 2	BLINK 2 = BATTERY IS LOW / SOC IS LOW
	OFF	OFF = BATTERY IS DISCONNECTED / NOT ACTIVE
GRID	ON	ON = GRID IS ACTIVE AND CONNECTED
	BLINK	BLINK = GRID IS ACTIVE BUT NOT CONNECTED
	OFF	OFF = GRID IS NOT ACTIVE
ENERGY	ON	ON = CONSUMING ENERGY FROM GRID / BUYING
	BLINK 1	BLINK 1 = SUPPLYING ENERGY TO GRID / ZEROING
	BLINK 2	BLINK 2 = SUPPLYING ENERGY TO GRID / SELLING
	OFF	OFF = GRID NOT CONNECTED OR SYSTEM NOT OPERATING
Wi-Fi	ON	ON = Wi-Fi CONNECTED / ACTIVE
	BLINK 1	BLINK 1 = Wi-Fi SYSTEM RESETTING
	BLINK 2	BLINK 2 = Wi-Fi NOT CONNECT TO ROUTER
	BLINK 4	BLINK 4 = Wi-Fi SERVER PROBLEM
	OFF	OFF = Wi-Fi NOT ACTIVE
FAULT	ON	ON = FAULT HAS OCCURRED
	BLINK	BLINK = OVERLOAD OF BACK-UP OUTPUT / REDUCE LOAD
	OFF	OFF = NO FAULT

Note:

If Solar-Wifi not connect to internet, or just connect Solar-Wifi directly to your smart phone, then led status on inverter is not referrible.

8 Work Modes

SBP series inverters have the following main work modes based on different conditions:

Mode1：
EzMeter power>0W， excess energy is used to charge the battery， and any remaining energy is delivered to the grid.

Mode2：
EzMeter power<0W,battery energy is used for local loads first,the grid also can supply when the battery capacity is not enough.

Mode3：
If the grid is faulty or there is no grid, the system can still work, batteries supply energy for local loads.

Mode4：
The battery can be charged by the grid, time and power of battery charging can be set up flexibly.

9 Trouble shooting

Q/A and Trouble Shooting on SBP			
(+/-) not reversed	Check items before SBP start-up	PLEASE CHECK THE FOLLOWING ITEMS AT THE FIRST INSTALLATION, MAKE SURE EVERYTHING IS WORKING. OR PLEASE STOP INVERTER SYSTEM TILL EVERY THING CONFIRMED FINE OR CONTACT GOODWE.	
		Checking Items	Checking Description
		Battery connection	Confirm the connection between SBP and battery : polarity (+/-) not reversed
		AC OUTPUT Connection	Confirm ON-GRID connected to power grid andBack-up to loads : polarity not reversed
		EzMeter / CT connection	Make sure EzMeter & CT connected between house loads and grid. and follow the House→ Grid direction sign on CT.
	Checking items when start up system	EzMeter Communication check	Checking details： 1. Check if the COM led on EzMeter triple blinking or not. 2. Or connect Solar-Wifi, check in EzManage App ("Parameters") if EzMeter COM state is "OK" or not. If COM LED does not blink, or show "NG" on App, then please check the connection between EzMeter and SBP, like: 1. RJ45 port broken or not; 2. Communication cable looses or broken? 3. EzMeter should connect to SBP RS485 port. If everything is Ok, but problem still there, please contact GoodWe after-sales services.
		CT & EzMeter connection direction	1. Turn off PV and open Loads, check if R-P led is solid or not： If "R-P" not solid, please check a. if CT or EzMeter connected in a wrong direction (the arrow on EzMeter & CT should point to grid); b. if connection between EzMeter power supply (port 1 and 4 on EzMeter) is OK or not. If both are OK but problem still there, please contact GoodWe after-sales services.
		BMS Communication	NOTE: No need to check this, if using a Lead-acid battery. For lithium battery, please check following: Connect Solar-Wifi, check on EzManage APP (Parameter >>> Battery) if BMS status shows "BMS Communication OK" or not. If APP BMS Status on APP says"BMS Communication Failure", please reboot SBP. if problem is still there, please check further: a. Check on EzManage APP (Basic Setting) if Battery type is right what you have or not, if not right, please set it right in "Basic Setting" b. Connection between battery and SBP is OK or not; c. communication cable looses or broken? d. RJ45 port/cables broken or not; If everything is Ok, but problem still there, please contact GoodWe after-sales services.

		Battery settings on APP	1. For Lithium batteries: connect Solar-Wifi, check on EzManage APP (Parameter >>> Battery) if Battery Mode is right for your requirements. If not right, please change it to the correct mode in "Boost settings" 2. For lead-acid batteries: All the settings should comply with the parameters of the battery (GoodWe do not suggest the settings for lead-acid batteries)

	Problems	Solutions
Problems During Operation	SBP not starting up with ONLY battery connected	1. Make sure the voltage of battery is higher than 48V, otherwise battery cannot start SBP up. If battery voltage is OK, but problem still there, please contact GoodWe after-sales services.
	SBP Battery not discharging when Pmeter<-150W.	Check items: 1. Communication between SBP and EzMeter is OK or not; 2. Make sure Meter power is higher than 150W? a. SBP/battery will not discharge continuously unless Meter Power is higher than 150W; b. If Meter Power is higher than 150W, but SBP/Battery still not discharge, then please check Ezmeter & CT connection and direction; 1. Make sure SOC is higher than 1-DOD ; Or if battery discharged to below 1-DOD, than battery will only discharge again when SOC charged to 20%+(1-DOD)/2 and SOC >105%-DOD(if need battery discharge immediately, customer can restart the system) 2. Check on APP if it is set as charge time, during charge time, battery will not discharge (battery will charge preferentially during coincident time of charge/discharge) If everything is OK, but problem still there, please contact GoodWe after-sales services.
	SBP/Battery not charging when Pmeter>150W	Check items: 1. Check if charge voltage is properly set 2. Check if it is set as only discharge time. 3. Check if battery is fully charged or not, or battery voltage reachs "charge voltage" or not. If everything is OK, but problem still there, please contact GoodWe after-sales services.

	Big Power fluctuation on Battery charge/discharge	Check items 1. Check if there is a fluctuation on load power; 2. Check if there is a fluctuation on Meter power on GoodWe Portal. If everything is OK, please contact GoodWe after-sales Services.
	Battery change between Charge/discharge continually.	Check items: 1. Make sure battery settings are saved successfully; 2. Check if there is a fluctuation on Meter power on GoodWe Portal If Meter power is stable but problem still exists, please contact GoodWe services.
	1. Battery does not charge	Check items: 1. Make sure BMS works OK. if not, please try to restart SBP, and check the connection (for lithium batteries); 2. Check if EzMeter & CT are connected in the right position and to right direction as on the user manual;

	Questions	Answers
Q&A (Questions and Answers)	About OutPut Power Limit	1. Can set on APP the max output power to grid; 2. If Output Power Limit set as 0W, then 100w max can be still exported to grid.
	"Battery Activate" function	1. Open or close it on EzManage APP; 2. Used to activate battery when battery is discharged completely; 3. Only used when there is no battery charge.
	Only use battery when grid is OFF	1. On APP, Open off-grid output function and backup function; 2. Set charge time as 00:00-23:59, discharge time as default
	On Portal, SOC has a sudden jump up to 95%?	1. Happened on Lead-acid battery or when BMS communication NG on lithium battery; 2. If battery charge current is keep lower than floating charge current set on APP for 30mins, SOC will be reset to 95% compulsively;
	Battery cannot charge to 100%	1. For LG batteries, it will stop charging at SOC 95%. This is normal for LG batteries. 2. Battery will also stop charging when battery voltage reaches charge voltage set on EzManage APP.
	Cannot see Solar-WiFi signal on mobile devices	1. Solar-WiFi signal will disappear when SBP is connected to the internet; if need to change settings, it can be connected to the customer's router to change. 2. If you cannot see wifi signal and cannot connect to router, then please try to reload wifi (refer to SBP user Manual) 3. If you still cannot find wifi signal, then restart SBP(disconnect everything including battery and AC.) If you cannot find Solar-WiFi after all these steps, please contact GoodWe after-sales services.

	Cannot save settings on EzManage APP	1. Make sure you connected to solar-wifi (make sure no other devices connected) or router (if connected Solar-wifi to router) and on home page it shows connection OK. 2. Make sure SBP is under waiting mode (on APP) before you change any settings on EzManage APP ---- disconnect grid/load/battery, only leave PV connected and then restart SBP till you see work mode as wait on APP. If all these steps do not help, please contact GoodWe services.
	Battery switch trip	1. For lithium batteries, please make sure BMS communication is OK; 2. Please check if battery voltage is lower than discharge voltage set on APP 3. Make sure no short-cut on Battery connection side.
	Battery configuration	1. Lithium battery must connect to BMS communication; 2. Nominal voltage for Lead-acid battery is 48V, max charge voltage 60V; 3. For example, serial connection of 4*12V 100Ah lead-acid battery, the capacity will still be 100Ah.
	Lithium battery connection	For connection of Ezconverter/battery and SBP, please refer to battery connection SOP, chose right battery brand and fill in battery capacity value.
	Limitation on Backup Loads	1. For Inductive Loads (like Air conditioner/wash machine/drill), the max power for each load should be lower than1.5KVA , total power lower than 2.5KVA 2. For Capacitive Loads, the total max power should be lower than 3KVA
	NOT ALLOWED connection	1. Back-up side connected to grid; or backup side connected in parallel; 2. Battery connected to grid;

10 Error Messages

An error message will be displayed on the APP if a fault occurs.
Table 8-1 is the Description of Error Message

Error message	Description
Utility Loss	Grid disconnected
Fac Failure	Grid frequency no longer within permissible range
Over Temperature	Overtemperature on the case
Relay-Check Failure	Relay self-checking failure
DC Injection High	Overhigh DC injection
EEPROM R/W Failure	Memory chip failure
SPI Failure	Internal communication failure
DC Bus High	Overhigh BUS voltage
AC HCT Failure	Output current sensor failure
Vac Failure	Grid voltage no longer within permissible range
Battery Over Temperature	Battery Over Temperature
Battery Under Temperature	Battery Under Temperature
Battery Cell Voltage Differences	Li-Ion Battery Cell Voltage Differences
Battery Over Total Voltage	Li-Ion Battery Over Total Voltage
Battery Discharge Over Current	Battery Discharge Over Current
Battery Charge Over Current	Battery Charge Over Current
Battery Under SOC	Battery Capacity Low
Battery Under Total Voltage	Battery Under Total Voltage
Battery Communication Fail	Battery Communication Fail
Battery Output Short	Battery Output Short
Over Load	Back-up Output Over Load

11 Technical Parameters

Technical Data	GW3600S-BP	GW5000S-BP
Battery Input Data		
Battery Type	Li-Ion or Lead-acid [5]	Li-Ion or Lead-acid [5]
Nominal Battery Voltage (V)	48	48
Max. Charging Voltage (V)	≤60 (Configurable)	
Max. Charging Current (A) [1]	75	100
Max. Discharging Current (A) [1]	75	100
Battery Capacity (Ah) [2]	100~2000	100~2000
Battery Over current Protection(A)	125	
Battery Backfeed Current(A)	0	
Charging Mode for Li-Ion Battery	Self-adaption to BMS	
Charging Mode for Lead-acid Battery	3-stage adaptive with maintenance	
AC Output Data (On-grid)		
Nominal Apparent Power Output to Utility Grid (VA)	3680	5000
Max. Apparent Power Output to Utility Grid (VA)	3680	5000
Max. Apparent Power from Utility Grid (VA)	7360	9200
Nominal Output Voltage (V)	230	230
Nominal Ouput Frequency (Hz)	50/60	50/60
Max. AC Current Output to Utility Grid (A)	16	22.8 [3]
Max. AC Current From Utility Grid (A)	32	40
AC Over Current Protection(A)	40	50
AC Backfeed Current(A)	0	
Output Inrush Current (peak and duration)	60A 5us	
Maximum output fault current (peak and duration)	70A 3s	
Input Inrush Current (peak and duration)	<100A 20us	
Output Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	
Output THDi	<3% @Nominal Output	
Grid Connection	Single phase	
AC Overvoltage Category	Category III	
AC Output Data (Back-up) [6]		
Max. Output Apparent Power (VA) [4]	3680	5000
Peak Output Apparent Power (VA) [4]	4416, 10sec	5500, 10sec
Automatic Switch Time(ms)	<10	<10
Nominal Output Voltage (V)	230 (±2%)	
Nominal Output Freqency (Hz)	50/60 (±0.2%)	
Max. Output Current (A)	16	22.8
Back-up Over Current Protection(A)	40	50
Output Inrush Current (peak and duration)	60A 5us	
Maximum output fault current (peak and duration)	70A 3s	

Output THDv (linear load)	<3%
Efficiency	
Max. Efficiency	95.5%
Protection	
Anti-islanding Protection	Integrated(AFD)
Output Over Current Protection	Integrated
Output Short Protection	Integrated
Output Over Voltage Protection	Integrated
General Data	
Operation Temperature Range (℃)	-25~60
Storage Temperature (℃)	-30~65
Relative Humidity	0~95%
Moisture Location Category	4K4H
External Environment Pollution Degree	Grade1、2、3
Operation Altitude (m)	4000
Cooling	Natural Convection
Noise (dB)	<25
User Interface	LED & APP
Interface With BMS	RS485; CAN
Interface With Meter	RS485
Communication With Cloud	Wi-Fi
Weight (kg)	18.5
Size (Width*Height*Depth mm)	347*432*190
Mounting	Wall Bracket
Protection Degree	IP65
Environment Category	Outdoor & indoor
Standby Self Consumption (W)	<15
Topology	High Frequency Isolation
Protective class	I
Certifications & Standards		
Grid Regulation	AS/NZS 4777.2:2015, G83/2 G100, CEI 0-21,EN 50438 VDE-AR-N 4105,VDE 0126-1-1	AS/NZS 4777.2:2015, G59/3, G100 CEI 0-21,EN 50438,VDE-AR-N 4105 VDE 0126-1-1
Safety Regulation	IEC 62477-1, IEC 62040-1	
EMC	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-4-16,EN 61000-4-18,EN 61000-4-29	

Note：the equiment can be only connected to the Grid type TN-C-S.

Zref : RA = 0,24 ; XA = j 0,15 at 50 Hz;
         RN = 0,16 ; XN = j 0,10 at 50 Hz.

[1]：For lead-acid battery, default charge current is 0.15C, which can be configurable up to 0.5C by APP EzManage and cannot exceed 75A/100A. C shows the battery capacity, so for a 100Ah capacity, the default charge current is 0.15 * 100A = 15A.
     For Li-Ion battery, discharge and charge current follows the command of BMS which doesn't exceed 100A.

[2] : Under off-grid mode, battery capacity should be more than 100 Ah. Under on-grid mode, battery capacity could be less than 100Ah.

[3] : 21.7A for AS4777.2

[4] : Can be reached only if using Lead-acid batteries or Li-Ion batteries output power is greater than the load power, the inverter will shut down.

[5] For lead-acid or gel batteries connected in hybrid system, there will be a deviation on SOC calculation, and will have a SOC jumping change shown on portal or APP.

[6] For a total off-grid system or long time absence of grid, battery will probably over-discharge, or drained out. We do not recommend a totally off-grid system

Note

Overvoltage category definition

Category I : applies to equipment connected to a circuit where measures have been taken to reduce transient overvoltage to a low level.

Category II : applies to equipment not permanently connected to the installation. Examples are appliances, portable tools and other plug-connected equipment;

Category III: applies to fixed equipment downstream of and including, the main distribution board. Examples are switchgear and other equipment in an industrial installation;

Category IV: applies to equipment permanently connected at the origin of an installation (upstream of the main distribution board). Example are electricity meters, primary overcurrent protection equipment and other equipment connected directly to outdoor open lines.

Moisture location category definition

Moisture parameters	Level		
	3K3	4K2	4K4H
Temperature Range	0~+40°C	-33~+40°C	-20~ +55°C
Humidity Range	5%~85%	15%~100%	4%~100%

Environment category definition

Outdoor : the ambient air temperature is -20~50°C, Relative humidity range is 4 % to 100 %, applied to PD3

Indoor unconditioned: the ambient air temperature is -20~50°C, Relative humidity range is 5 % to 95%,applied to PD3

Indoor conditioned: the ambient air temperature is 0~40°C, Relative humidity range is 5 % to 85%,applied to PD2

Pollution degree definition

Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.

Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

Pollution degree 3: Conductive pollution occurs, or, dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected.

Pollution degree 4: Persistent conductive pollution occurs, for example, the pollution cause by conductive dust, rain and snow.

12 Certificates

G100   AS/NZS 4777.2:2015   IEC 62477-1   IEC 62040-1   CEI 0-21   VDE 0126-1-1

VDE-AR-N 4105

13 Maintenance

Heatsink: please use towel to clean the heatsink once a year;

Torque: please use torque wrench to tighten the AC and battery terminal wiring connection once a year; Followed 4.2 and 4.3 torque instruction.

DC swith: check the DC switch regularly, active the DC switch 10 times in a row once a year. operating the DC switch will clean the contacts and will extand the life of the DC switch.

Waterproof covers: check if waterproof covers of RS485 and USB port is fasten once a year.