GROWATT

SPH 4-10KTL3 BH-UP

&

User Manual

Contents

1 Overview

1.1 Information on this document

This document introduces the Growatt SPH TL3 BH-UP series inverters concerning its functions, installation, electrical connection, commissioning and maintenance. The content of this document is continually reviewed and amended, where necessary. Prior to operating the inverter, read through this manual and familiarize yourself with all safety precautions and the features of the product. Growatt reserves the right to make changes to the material at any time and without notice in order to keep the document accurate and up-to-date.

1.2 Target group

Only qualified electrical technicians are allowed to install Growatt SPH TL3 BH-UP inverter. Personnel who will operate the equipment should possess the local/national required qualifications.The SPH inverters can be paired with two types of batteries: the lithium battery or the lead-acid battery. Customers can select the appropriate type based on their needs. If the inverter is to be paired with the lithium battery, customers should purchase the battery from Growatt. If the inverter is to be paired with the lead-acid battery, customers can purchase the battery by themselves, which are easily accessible in the market. Please beware that the corresponding operation mode should be configured based on the battery type; otherwise, it might lead to safety hazard. Qualified electrical technicians should read through this manual and observe all instructions to properly install, troubleshoot and configure the SPH inverter.Should you encounter any problem during installation, you can visit www.growatt.com and leave a message, or call our 24-hour service hotline at +86 755 2747 1942.

1.3 Product description

Growatt SPH TL3 BH-UP inverters are designed to store energy from the PV panels and the grid when the AC Charging function is enabled. They can also export power to the grid. During a grid outage, the SPH TL3 BH-UP can work to supply backup power. Growatt SPH series inverters are available in six models:

- SPH 4000TL3 BH-UP
- SPH 5000TL3 BH-UP
- SPH 6000TL3 BH-UP
- SPH 7000TL3 BH-UP
- SPH 8000TL3 BH-UP
- SPH 10000TL3 BH-UP

Note: The models mentioned above are hereinafter referred to as "SPH".

Appearance:

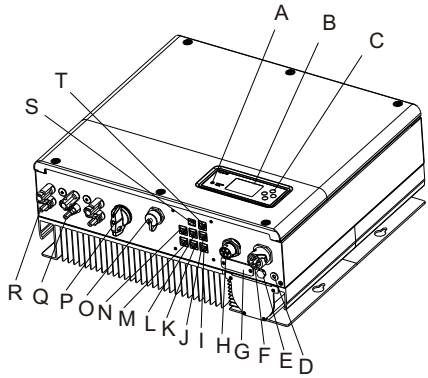


Figure 1.1

Position	Description
A	LED of status display
B	LCD screen
C	Function button
D	Ground point
E	Ventilation valve
F	EPS: EPS output (for off-grid connection)
G	RSD (professionals only)
H	GRID: AC Grid (for on-grid connection)
I	485-3: RS485 communication port (reserved)
J	485-2: RS485 communication port for Meter 2 (reserved)
K	NC (Not Connected)
L	DRMS: RJ45 connector for DRMs (demand response modes)
M	Meter: RS485 communication port for Meter 1
N	CAN: CAN port to communicate with the lithium battery
O	USB: USB port
P	PV switch
Q	PV input
R	BAT: Battery terminal
S	Dry contact
T	485-1: RS485 communication port for Meter 2 (reserved)

1.4 Safety instructions

1. Ensure that you have selected your desired battery system, lithium battery or lead-acid battery, and the corresponding operation mode is configured based on the battery type; otherwise, the SPH would fail to work normally.
2. Read this manual carefully before installation. Growatt shall not be held liable for any device damage caused by failure to follow instructions specified in this manual.
3. Only professional and qualified electricians are allowed to install and operate the equipment.
4. When installing the equipment, do not touch other parts inside the machine.
5. All electrical connections must comply with locally applicable regulations.
6. For purposes of maintenance, please contact the local authorized O&M (operation and maintenance) personnel.
7. Before connecting the inverter to the grid, ensure that you have obtained approval from local power grid department.
8. When install PV modules in the daytime, please turn off the PV switch, Otherwise it will be dangerous as high terminal voltage of modules in the sunshine.

2.1 Intended use

SPH System diagram:

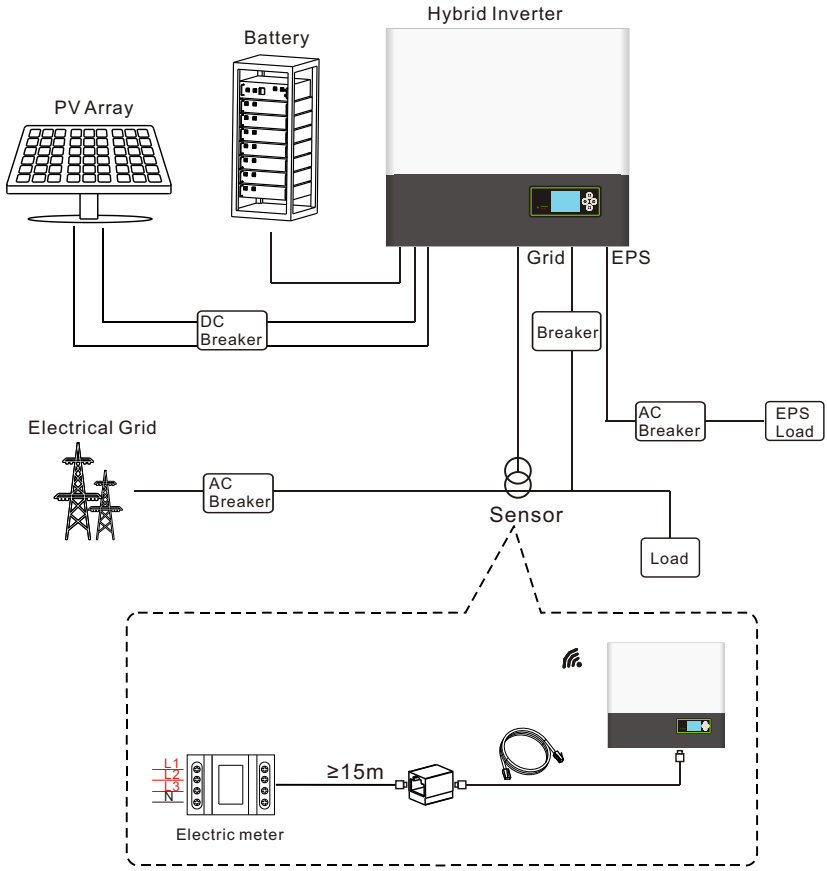


Figure 2.1

As shown in the diagram above, an entire SPH on-grid system consists of PV panels, the SPH inverter, batteries and the public grid.

Note:
As the system includes the use of battery, you must ensure proper ventilation and temperature to avoid battery explosion. The battery installation environment requirements must be strictly adhered to, referring to the specification. If the protection degree is IP20, and the pollution degree is 2, please keep the temperature at 0-40℃ with good ventilation and the humidity at 5%-85%.

2.2 Safety precautions

Risk of high voltage!
Operations marked with these symbols should be performed by professional personnel only.
Keep children, people with disabilities and non-professionals away from the equipment.
Do not allow children to play around the installation site.

Risk of burns due to hot surfaces!
The enclosure and heat sinks of the inverter can be hot during operation.

Possible damage to health due to the radiation from the SPH inverter!
Do not stay closer than 20 cm to the SPH inverter for a long time.

Grounding the SPH inverter

The SPH inverter must be reliably grounded to ensure personal safety.

2.3 Symbols on the SPH inverter

Symbol	Description
	Risk of high voltages which might lead to electric shocks
	Risk of burns due to hot surface
	Danger warning
	Danger to life due to high voltages in the SPH Residual voltage exists after the SPH is powered off. It takes about 5 minutes to discharge to the safe level. Therefore, wait 5 minutes before performing operations on it.
	Grounding: indicates the position for connecting the PE cable

Symbol	Description
	Direct Current (DC)
	Alternating Current (AC)
	CE marking This product complies with the requirements of the applicable EU directives
	Information that you must read and know to ensure optimal system operation

3 Product Description

3.1 SPH system wiring diagram

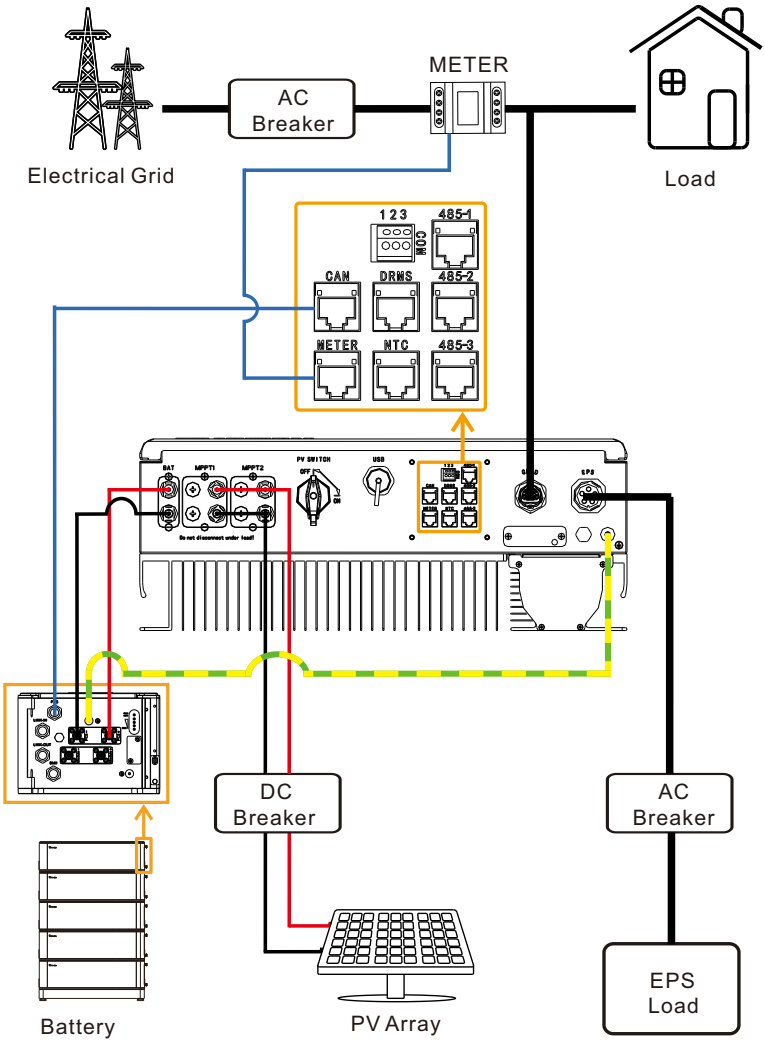


Figure 3.1

Note:
If you are looking at the printed manual, you can scan the QR code on the back cover to obtain the colorful version.

3.2 Growatt SPH series inverter

LED indicator and function buttons

Item	Description	Explanation	
	Push buttons	Allow you to set parameters on the screen	
	SPH status indicator	Green light on	SPH runs normally
		Red light on	Fault state
		Green light blinking	Alarm state
		Red light blinking	Software updating

3.3 Nameplate

The figure below demonstrates the nameplate of SPH 10000TL3 BH-UP as an example. The nameplate figure is for reference only. The actual nameplate prevails.

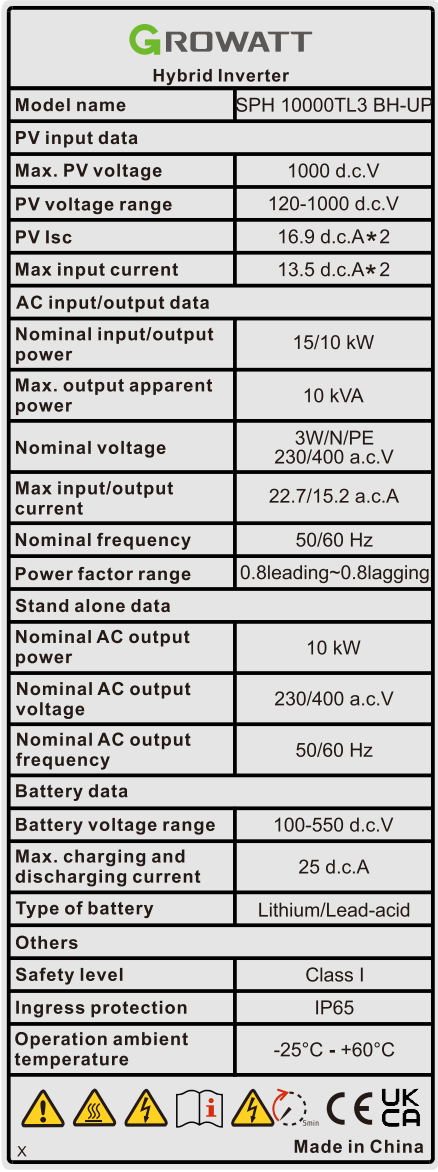


Figure 3.2

Description of the nameplate:

Product model	Growatt SPH 10000TL3 BH-UP
PV input data	
Max. PV voltage	1000 d.c.V
PV voltage range	120~1000 d.c.V
PV Isc	16.9 d.c.A*2
Max. input current	13.5 d.c.A*2
AC input/output data	
Nominal input/output power	15/10 kW
Max. output apparent power	10 kVA
Nominal voltage	3W/N/PE 230/400 a.c.V
Max input/output current	22.7/15.2 a.c.A
Nominal frequency	50Hz/60Hz
Power factor range	0.8 leading~0.8 lagging
Stand alone data	
Nominal AC output power	10kW
Nominal AC output voltage	230/400 a.c.V
Nominal AC output frequency	50/60Hz
Battery data	
Battery voltage range	100~550 d.c.V
Max. charge and discharge current	25 d.c.A
Type of battery	Lithium / Lead-acid
Others	
Safety level	Class I
Ingress Protection	IP65
Operation ambient temperature	-25℃~+60℃

3.4 Size and weight

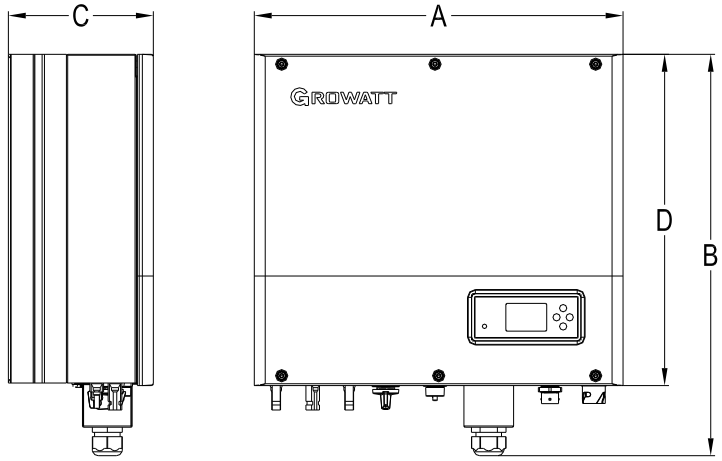


Figure 3.3

	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)
Growatt SPH TL3 BH-UP	505	544	198	453	33

3.5 Highlights of the SPH inverter

The Growatt SPH inverter stands out with the following features:

- All-in-one design, maximizing self-consumption. Support the backup and peak shaving functions.
- Smart energy management with various working modes.
- Advanced battery safety.
- Easy installation.
- Two MPPT inputs.

Inspection upon delivery 4

Before unpacking the inverter, check the outer packing materials for any externally visible damage. After unpacking the inverter, check the scope of delivery for completeness. If the scope of delivery is incomplete or damaged, please contact your dealer.
Packing list of the Growatt SPH inverter:

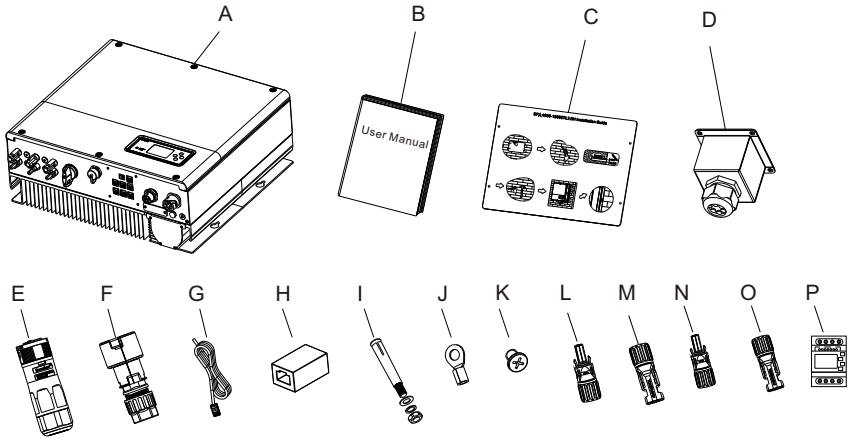


Figure 4.1

Item	Number	Description
A	1	SPH inverter
B	1	User Manual
C	1	Paperboard (installation guide)
D	1	Waterproof cover
E	1	AC Grid connector
F	1	EPS output connector (in red)
G	1	Communication cable
H	1	RJ45 connector
I	4	M6 screw set
J	1	Ring terminal (for Grounding)
K	4	M4 screw
L/M	2/2	MC4 connector (in black)
N/O	1/1	MC4 connector (in blue)
P	1	Electric meter

5 Installation

5.1 Basic installation requirements

A. Ensure that the installation surface meets the load-bearing requirement for supporting the weight of the SPH inverter.
B. The mounting location must be suitable for the dimensions of the SPH inverter.
C. Do not install the equipment on structures made of flammable or thermolabile materials.
D. The SPH inverter is protected to IP65, and its pollution degree is 2.
Please refer to the figures below for the installation environment requirements:

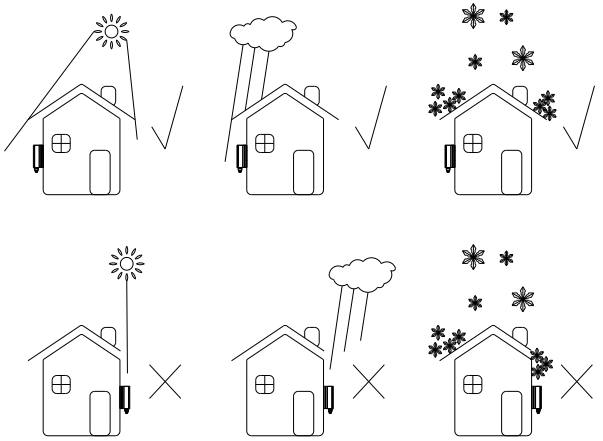


Figure 5.1

E. Do not install the battery too far away from the SPH inverter. The distance between the SPH and the battery should be less than 5 m.
F. The ambient temperature should be -25℃~60℃.
G. The SPH can be mounted vertically or at a maximum back tilt of 15 degrees.
Please refer to the figures below for the mounting angle requirements:

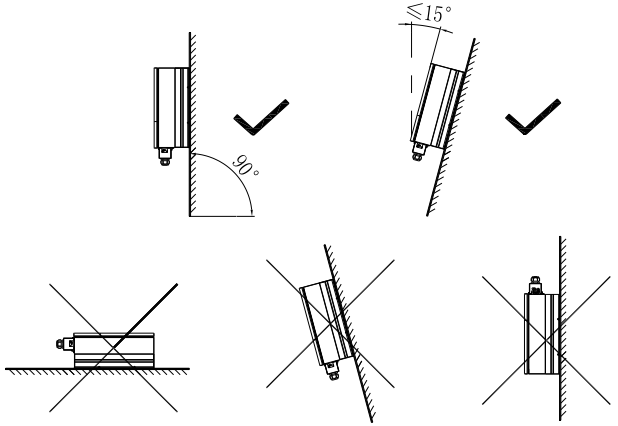


Figure 5.2

H. The installation location should be readily accessible for disconnecting means.
I. To ensure optimal operation of the inverter and facilitate ease of operation, please reserve enough space around the inverter.

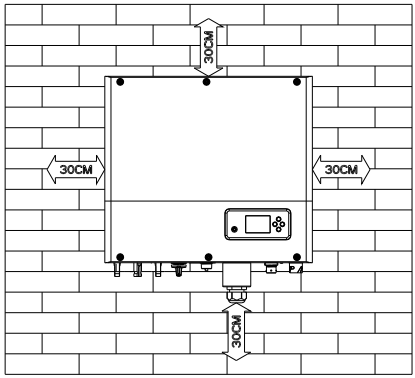


Figure 5.3

J. Keep the inverter away from the television antenna, or other antennas and associated cables.
K. Do not install the equipment in the living area.
L. Ensure that the installation location is inaccessible to children.
M. Consider the space for securing the battery when installing the battery. For the battery dimensions, you can refer to the relevant User Manual.
N. Do not install the battery in areas where flammable or explosive materials are stored.

5.2 Installation tools & connecting the RJ45 connector to the LAN cable

Please prepare the following tools before installing the inverter:

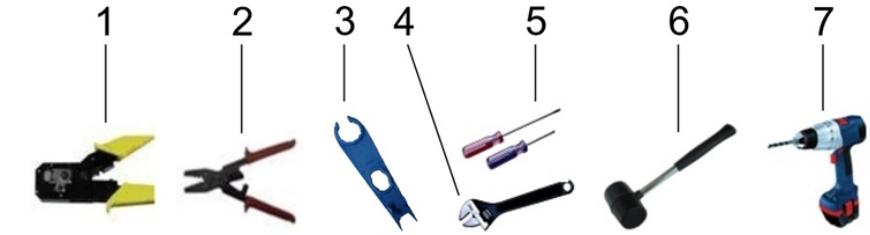


Figure 5.4

No.	Functions
1	Crimp the RJ45 connector
2	Strip cables
3	Disconnect the battery terminal
4	Unscrew nuts
5	Unscrew screws
6	Knock expansion screws
7	Drill holes on the wall

Connecting the RJ45 connector to the LAN cable:

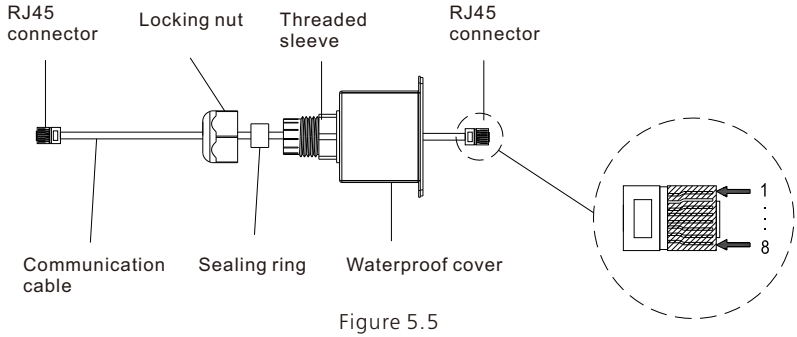


Figure 5.5

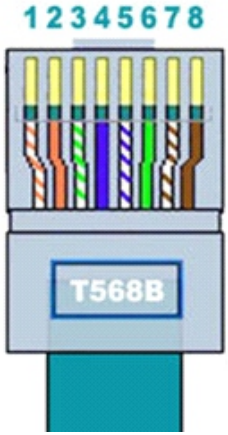


Figure 5.6

No.	CAN	METER	COM	DRMS	485-1/485-2	485-3
1	/	RS485B	DRY+	DRM1/5	RS485B	RS485B
2	/	GND	/	DRM2/6	GND	GND
3	/	/	DRY-	DRM3/7	/	/
4	CANH	/	/	DRM4/8	/	/
5	CANL	RS485A	/	REF	RS485A	RS485A
6	GND	/	/	COM	/	/
7	/	/	/	/	/	/
8	WAKEUP	/	/	/	/	/

RJ45 wiring color code:

PIN	1	2	3	4	5	6	7	8
Color	White orange	Orange	White/ Green	Blue	White/ Blue	Green	White/ Brown	Brown

5.3 Installation instructions

5.3.1 System configuration

Growatt SPH 4000-10000TL3 BH-UP uses the meter as its sensor only. Before installing the system, please beware that:

1. It is recommended that the cable connecting the meter be shorter than 15 m. Therefore, you should consider the cable length between the SPH and the combiner box.
2. The meter must be installed in the L line.
3. The system diagram is shown below:

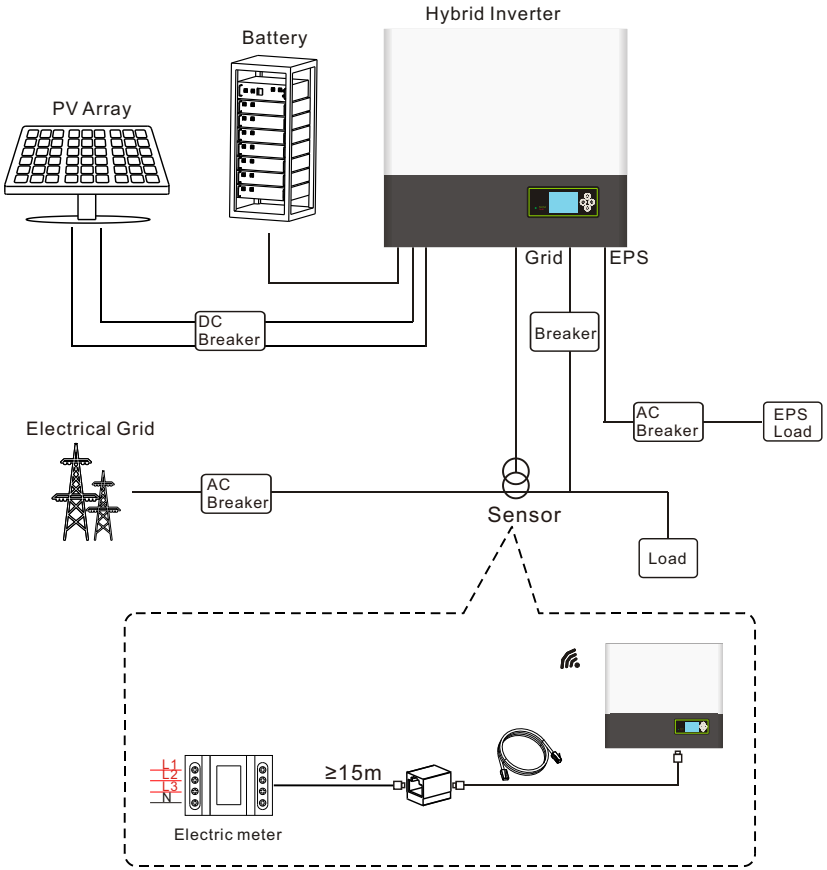


Figure 5.7

5.3.2 Installing the SPH inverter

1. Determine the installation position on the wall, ensure that it is suitable for the weight and dimensions of the inverter.
2. Use the paperboard (installation guide) to determine the hole positions, ensuring that the paperboard is level.
3. Mark the four hole positions on the wall, then remove the paperboard.
4. Drill four holes (Φ8 mm) at the marked positions to a depth of greater than 55 mm.
5. Insert four expansion bolts into the holes (Φ8 mm) (as Fig 5.8b shows).
6. Hang the inverter onto the four screw sets (as Fig 5.8c shows).
7. Fasten the nuts of the screw sets (as Fig 5.8d shows).
8. The installation is complete.

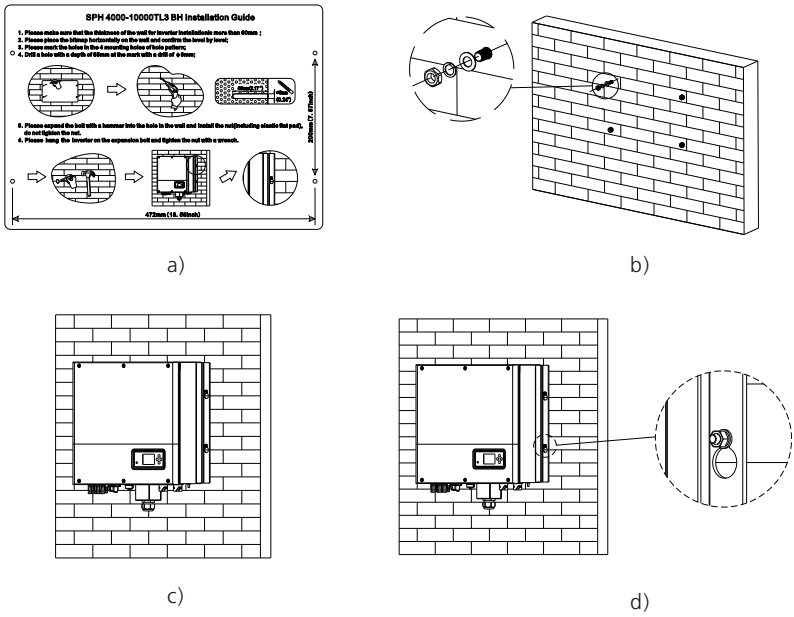


Figure 5.8

5.4 Electrical connection

5.4.1 Connecting the PV connectors (Item L and M in the accessory kit)

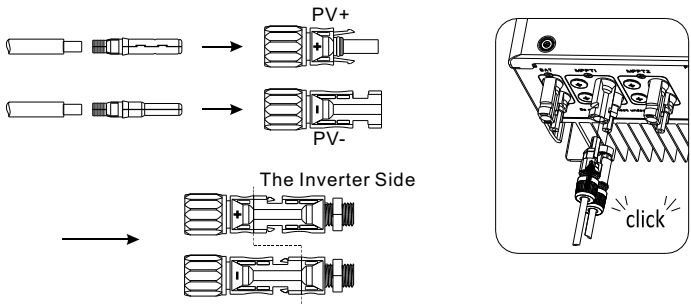


Figure 5.9

Connect the PV panels using the MC4 connectors. Please proceed as follows:
Step 1: Turn off the PV switch.
Step 2: Insert the positive and negative PV cables into the positive (+) and negative (-) poles of the PV input connector respectively.
Ensure that the PV input voltage and current do not exceed the following thresholds:

- Max. PV voltage: 1000V (consider the lowest temperature)
- Max. PV input current per route: 13.5 A
- 2 MPPT inputs are available

Note:
It is recommended that cable greater than or equal to 4 mm^2 / 10 AWG be used.

5.4.2 Connecting the AC Grid terminal and the EPS Output terminal

The SPH inverter comes with the AC Grid terminal and the EPS Output terminal. From the bottom view, the AC Grid terminal is on the left, used to connect the inverter to the utility grid; while the EPS Output terminal is on the right, connected to critical loads for uninterrupted power supply.

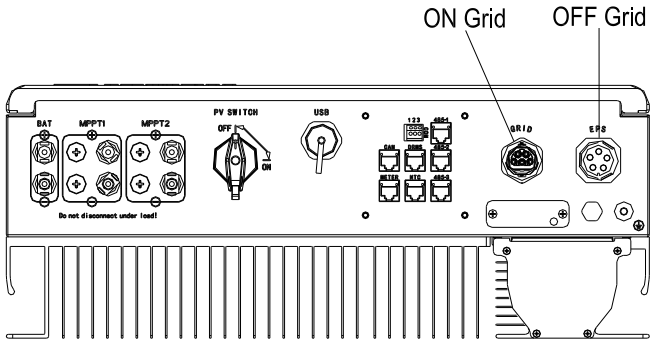


Figure 5.10

Note: When installing the equipment, you need to install the EPS output connector (Item F in the accessory kit) onto the SPH whether the EPS output port is to be connected or not, as shown in Fig 5.10.

Note: Locking screws (for details of the accessory kit, see Figure 4.1).

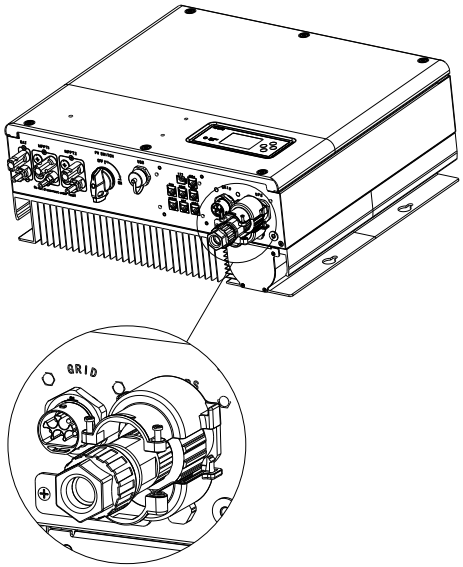


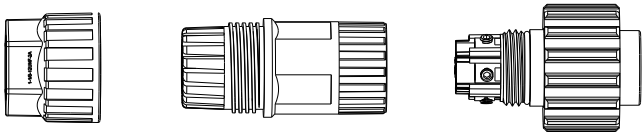
Figure 5.11

Suggested wire length:

conductor cross section	Maximum cable length					
	Growatt SPH 4000 TL3 BH-UP	Growatt SPH 5000 TL3 BH-UP	Growatt SPH 6000 TL3 BH-UP	Growatt SPH 7000 TL3 BH-UP	Growatt SPH 8000 TL3 BH-UP	Growatt SPH 10000 TL3 BH-UP
10AWG	88m	70m	59m	50m	44m	35m
12AWG	55 m	44m	37m	31m	27m	22m

Connecting to the EPS output port:

Step 1: Disassemble the EPS connector which is delivered in the accessory bag.



Locking nut Threaded sleeve Connection terminal

Figure 5.12

Step 2: Route the stripped cables through the locking nut, sealing ring and threaded sleeve, insert them into the connection terminal in accordance with the marks on the connection terminal, and secure the connection by tightening the screws. You can pull the cables gently to ensure that the cables are secured in place.

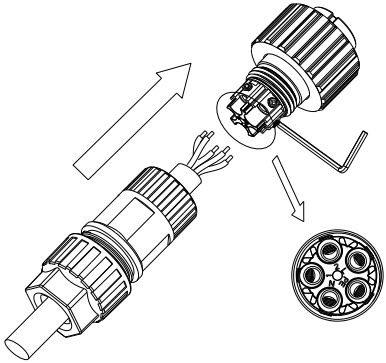


Figure 5.13

Step 3: Push the threaded sleeve onto the connection terminal until both are locked tightly. Then fasten the locking nut.

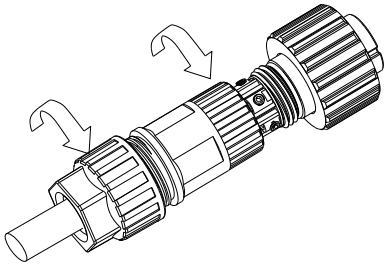


Figure 5.14

Step 4: Rotate the EPS connector to insert it all the way to the EPS output port. Secure the screws to the protective cover using the screwdriver.

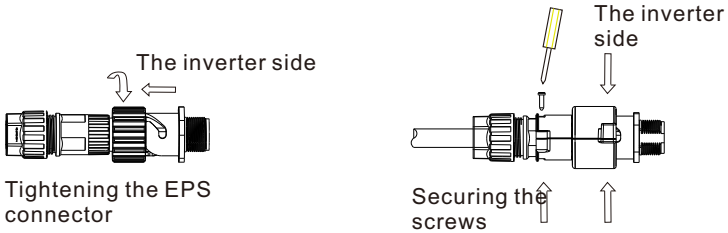


Figure 5.15

Step 5: To remove the EPS connector, loosen the screws on the protective cover, then remove the cover. Rotate the EPS connector anticlockwise, then pull it out.

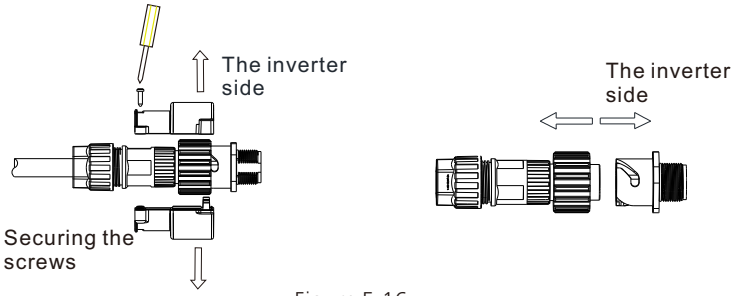


Figure 5.16

Connecting the AC connector:

Step 1: Disassemble the AC connector which is delivered in the accessory bag.

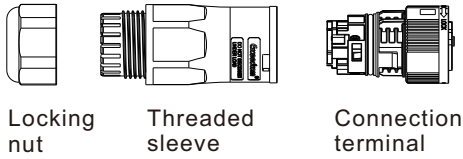


Figure 5.17

Step 2: Route the stripped cables through the locking nut, sealing ring and threaded sleeve, insert them into the connection terminal in accordance with the marks on the connection terminal, and secure the connection by tightening the screws. You can pull the cables gently to ensure that the cables are secured in place.

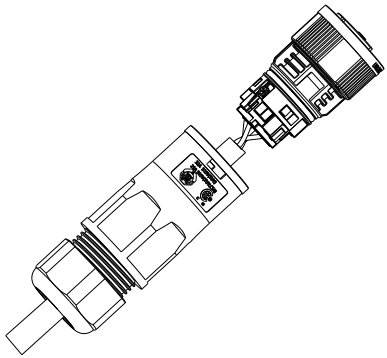


Figure 5.18

Step 3: Push and rotate the threaded sleeve onto the connection terminal until both are locked tightly. Then tighten the locking nut.

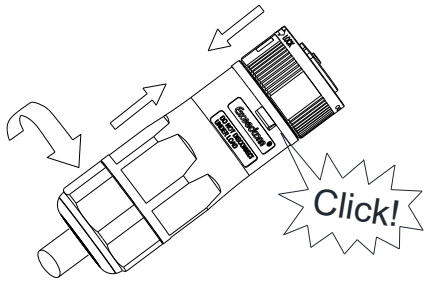
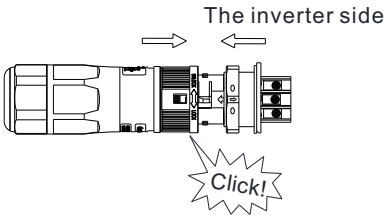


Figure 5.19

Step 4: Push the AC connector into the AC Grid port



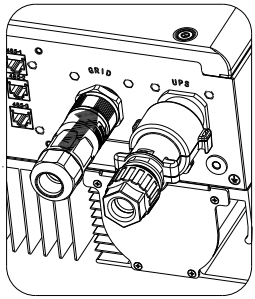


Figure 5.20

Step 5: To remove the AC connector, insert the screwdriver and press the release-mechanism to pull the connector out.

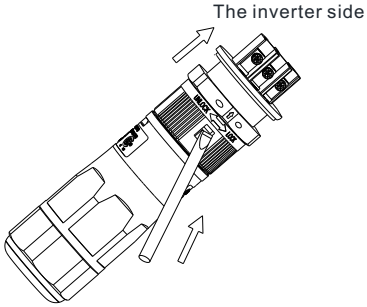


Figure 5.21

The recommended wiring diagrams are as follows:

Diagram A

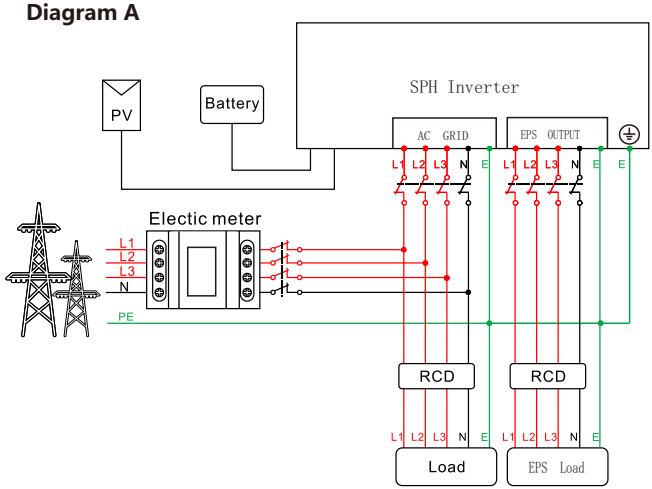


Figure 5.22

Note:
This diagram is an example for the on-grid system without special requirement on the electrical connection. The N line must be connected.

Diagram B

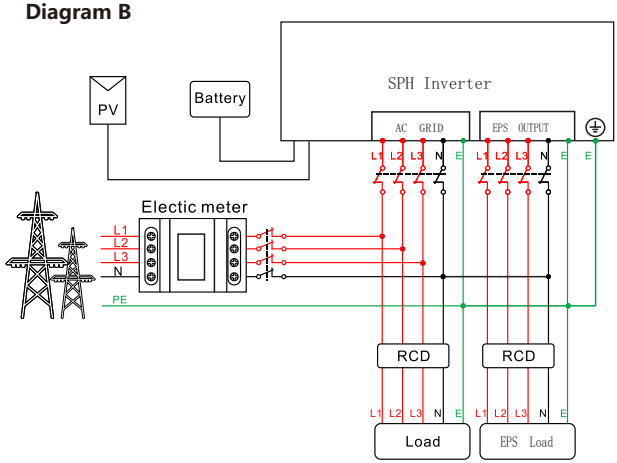


Figure 5.23

Note:
This diagram is an example for cable connection in Australia and New Zealand, where a switch cannot be installed on the N line. The N line must be connected.

Diagram C

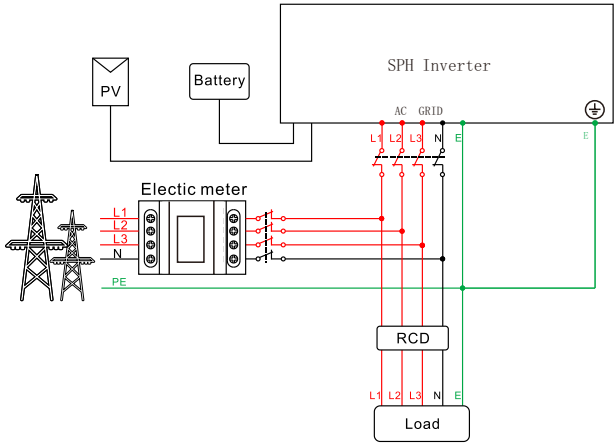


Figure 5.24

Note:
This diagram is an example for customers who only want to build the on-grid energy storage system without backup function. The N line must be connected.

5.4.3 Three meter wiring methods of SPH

The three meter wiring methods are demonstrated below:

Note:
For details about meter installation, please refer to the meter installation guide delivered with the machine.

1. Three phase meter-CHNT

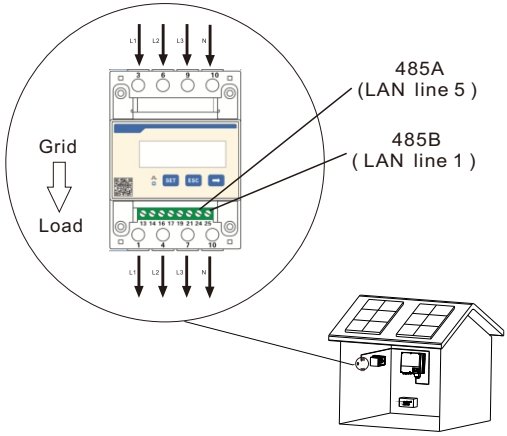


Figure 5.25

2. Three phase meter-Eastron

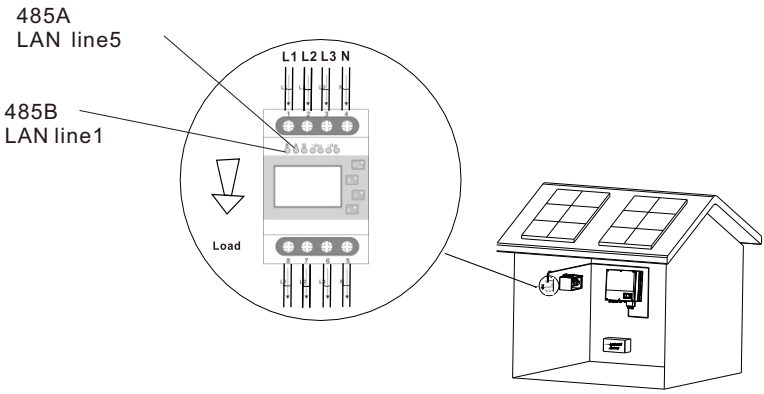


Figure 5.26

3. Three phase CT meter-Eastron

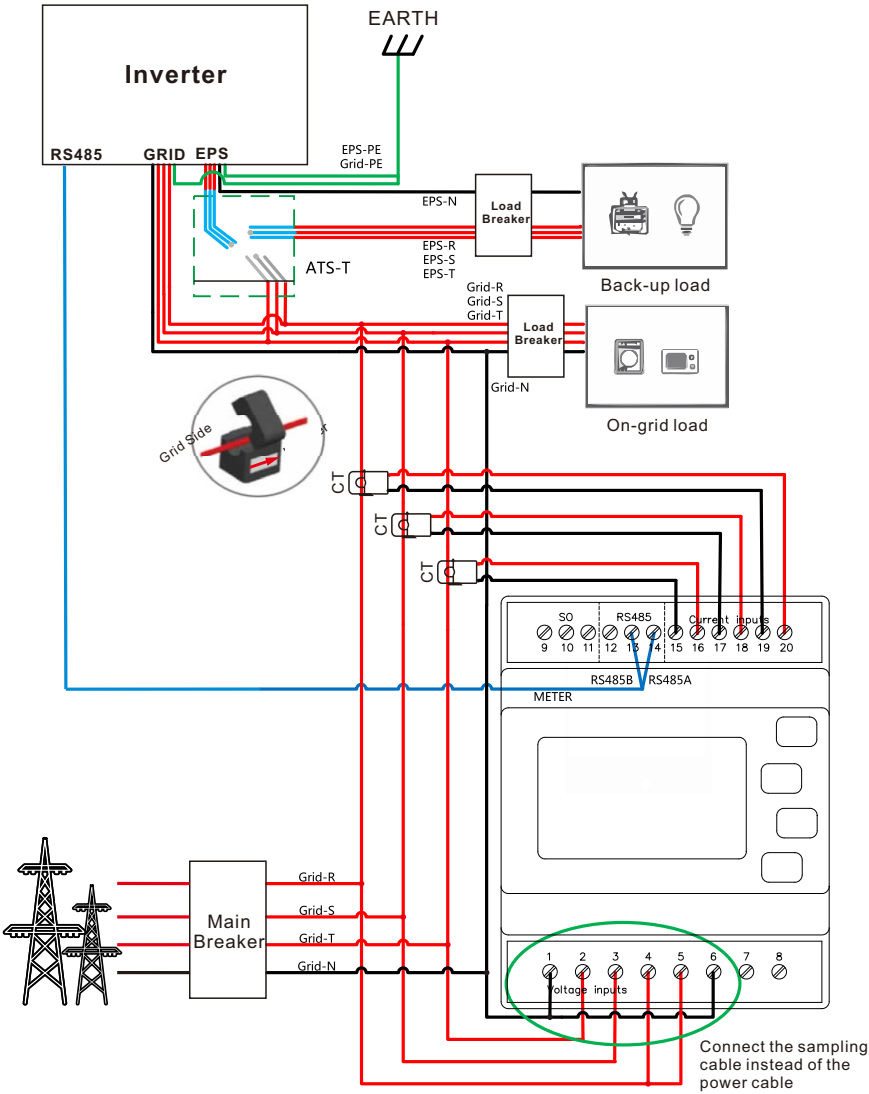

Inverter
EARTH
RS485
GRID
EPS
EPS-PE
Grid-PE
EPS-N
Load Breaker
EPS-R
EPS-S
EPS-T
ATS-T
Back-up load
Grid-R
Grid-S
Grid-T
Load Breaker
Grid-N
On-grid load
Grid Side
CT
CT
CT
SO
RS485
Current inputs
9 10 11 12 13 14 15 16 17 18 19 20
RS485B
RS485A
METER
1 2 3 4 5 6 7 8
Voltage inputs
Main Breaker
Grid-R
Grid-S
Grid-T
Grid-N
Connect the sampling cable instead of the power cable

Figure 5.27

 Note	➢ The machine shell has a screw for a ground wire. It is important to connect the shell to the earth. ➢ If you have no battery now, you can also float BAT terminal, and this hybrid inverter will only work like a PV inverter ➢ If you want to operate the inverter in the on-grid mode only, please refer to Fig 5.21 to connect the AC Grid terminal and reserve the EPS Output terminal. ➢ If you want to enable both the on-grid mode and the backup function, please refer to Fig 5.19 and Fig 5.20 to connect the AC Grid terminal and the EPS Output terminal. ➢ The AC Grid terminal and the EPS Output terminal cannot connect together directly. ➢ The EPS Output terminal cannot be connected to the utility grid. ➢ Grid power is needed upon initial startup.

Note:
This product is equipped with a built-in residual current detection device (RCD). Once the fault current detected exceeds the threshold, the inverter will be immediately disconnected from the utility grid. If local regulations require the installation of an external RCD between the inverter and the loads, you are advised to install a type A RCD with a rating of 30 mA. Where required by local regulations the use of an external RCD between the inverter and the grid, it is recommended to install a Type A RCD with a rated power of 300 mA or an RCD that complies with locally applicable regulations.

	EPS output does not support half-wave load type devices, such as hair dryers.

5.4.4 Connecting the battery terminal

Connect the battery using the MC4 connector. Please proceed as follows:
Step 1: Turn off the battery switch.
Step 2: Insert the positive and negative battery cables into the positive (+) and negative (-) poles of the battery input connector respectively.
Ensure that the battery input voltage and current do not exceed the following thresholds:

- Max. battery voltage: 550V
- Max. battery input current: 25A
- Max. battery input power : 10000W

Note:
It is recommended that cable greater than or equal to 4mm^2 / 10 AWG be used.

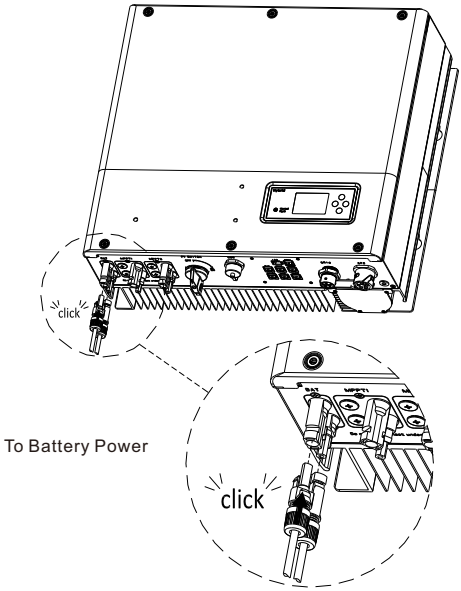


Figure 5.30

Note:
It is suggested that the distance between the battery and the SPH be no longer than 5 m, and the power cable specification be greater than 10 AWG.

5.4.5 Connecting the meter terminal

To monitor the energy flow using the meter, please proceed as follows to connect the meter:
Step 1: Connect the LAN cable with the RJ45 connector, referring to Section 5.2.
Step 2: Thread the swivel nut over the LAN cable.
Step 3: Press the cable support sleeve out of the cable gland.
Step 4: Remove the filler plug from the cable support sleeve.
Step 5: Route the LAN cable through an opening in the cable support sleeve.
Step 6: Thread the LAN cable through the cable gland.
Step 7: Insert the RJ45 plug of the network cable into the "METER" connector on the inverter until it snaps into place.
Step 8: If no other cables need to be installed, lock the waterproof cover to the inverter with screws.
Step9: Screw the swivel nut onto the waterproof cover.

Note:
1. The meter must be purchased from Growatt. Meters of other brands would fail to communicate with the SPH inverter.
2. For details about wiring the meter, please refer to the User Manual of the meter.

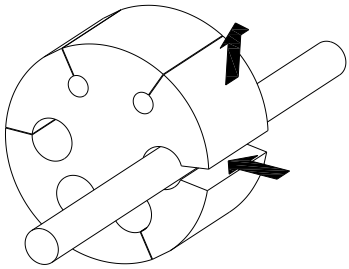


Figure 5.31

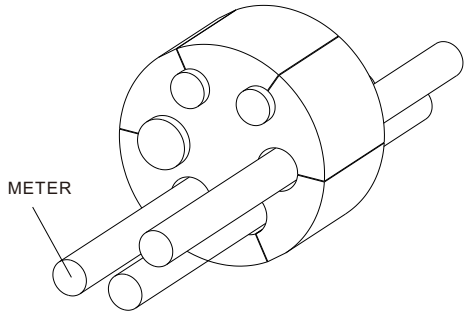


Figure 5.32

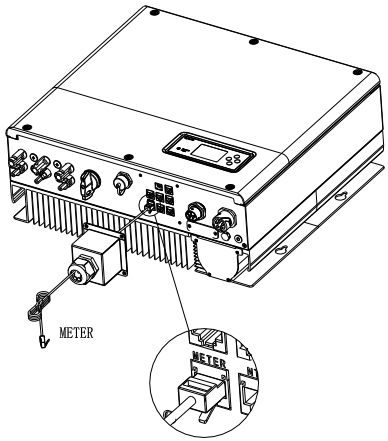


Figure 5.33

Note:
The LAN cable connecting the meter is 15 m in length with the RJ45 connector at both ends (one end connected to the meter and the other connected to the inverter). If the cable is not long enough, you can extend the cable to a length of up to 25 m. Please refer to the figure below:

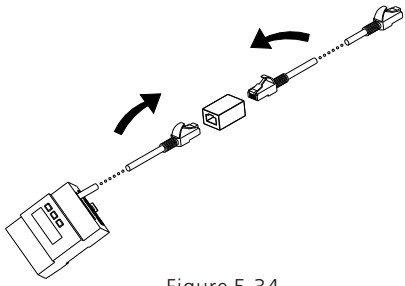


Figure 5.34

5.4.6 Connecting to the CAN port for communication with the lithium battery

To communicate with the lithium battery via CAN communication, please proceed as follows to connect to the CAN port:

Step 1: Unscrew the swivel nut from the cable gland.
Step 2: Thread the swivel nut over the "CAN" cable.
Step 3: Press the cable support sleeve out of the cable gland.
Step 4: Remove the filler plug from the cable support sleeve.
Step 5: Route the "CAN" cable through an opening in the cable support sleeve.
Step 6: Thread the "CAN" cable through the cable gland.
Step 7: Insert the RJ45 plug of the network cable into the "CAN" connector on the inverter until it snaps into place.
Step 8: If no other cables need to be installed, lock the waterproof cover to the inverter with screws.
Step 9: Screw the swivel nut onto the waterproof cover.

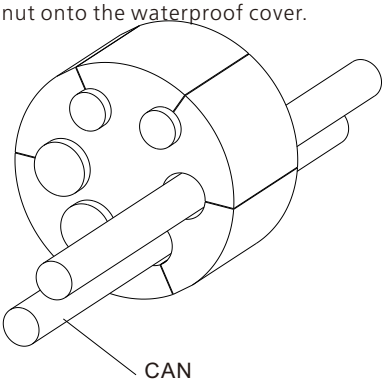


Figure 5.35

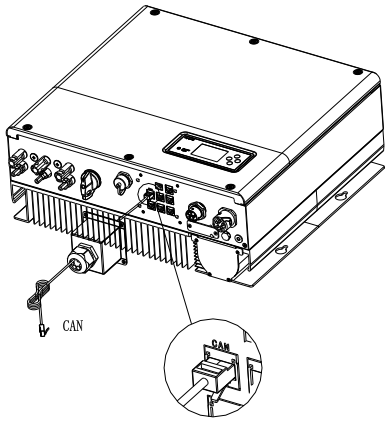


Figure 5.36

Note: If you are using a lead-acid battery, you do not need to install this communication cable.

5.4.7 Connecting the RS485 terminal

The RS485 communication ports are used for communication with the meter. Please connect to the RS485 port as follows:

Step 1: Unscrew the swivel nut from the cable gland.
Step 2: Thread the swivel nut over the "RS485" cable.
Step 3: Press the cable support sleeve out of the cable gland.
Step 4: Remove the filler plug from the cable support sleeve.
Step 5: Route the "RS485" cable through an opening in the cable support sleeve.
Step 6: Thread the "RS485" cable through the cable gland.
Step 7: Insert the RJ45 plug of the network cable into the "485-1" or "485-2" connector on the inverter until it snaps into place.
Step 8: If no other cables need to be installed, lock the waterproof cover to the inverter with screws.
Step 9: Screw the swivel nut onto the waterproof cover.

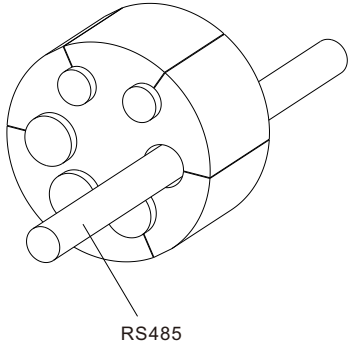


Figure 5.37

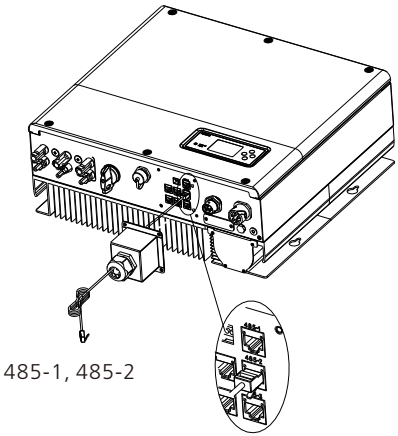


Figure 5.38

5.4.8 Connecting the DRMS port

If the SPH inverter is commissioned in Europe, the DRMS port should be connected.
Please take the following steps to connect to the DRMs port:
Step 1: Unscrew the swivel nut from the cable gland.
Step 2: Thread the swivel nut over the "DRMS" cable.
Step 3: Press the cable support sleeve out of the cable gland.
Step 4: Remove the filler plug from the cable support sleeve.
Step 5: Route the "DRMS" cable through an opening in the cable support sleeve.
Step 6: Thread the "DRMS" cable through the cable gland.
Step 7: Insert the RJ45 plug of the network cable into the "DRMS" connector on the inverter until it snaps into place.
Step 8: If no other cables need to be installed, lock the waterproof cover to the inverter with screws.
Step 9: Screw the swivel nut onto the waterproof cover.

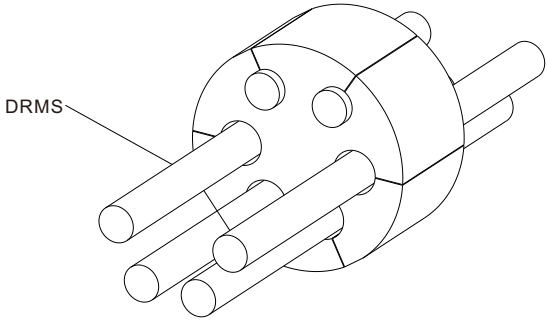


Figure 5.39

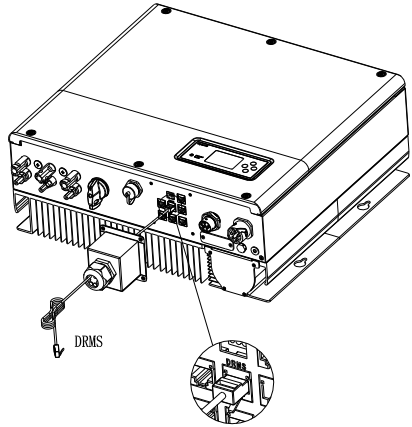


Figure 5.40

If the SPH is commissioned in Europe, the DRMS port should be connected.

Pin	Description	DRMs Power Control
1	DRM5	0%
2	DRM6	30%
3	DRM7	60%
4	DRM8	100%
5	Ref/Gen	/
6	COM/DRM0	standby
7	/	/
8	/	/

Note:
1. The DRMS function can only be used in the Load First mode.
2. For the following safety standards, only DRM5 is supported:
SA_AUSTRIA, SA_POLAND, SA_SWEDEN, SA_DEMARK_DK1, SA_DEMARK_DK2, SA_VDE0126, SA_FRANCE, SA_HUNGARY, SA_SPAIN, SA_GREECE_CONTINENT.
3.The DRM port is safe for humans to touch. It is recommended to use a safe device for the DRM controller on the user side.

* Method of asserting Demand Response Mode

MODE	RJ45 socket asserted by shorting the following pins	
DRM0	Pin5	Pin6
DRM5	Pin1	Pin5
DRM6	Pin2	Pin5
DRM7	Pin3	Pin5
DRM8	Pin4	Pin5

5.4.9 Connecting the dry contact port

The dry contact is used to communicate with external devices (such as remote start of the water heater). The wiring steps are as follows:

Step 1: Unscrew the swivel nut from the cable gland.
Step 2: Thread the swivel nut over the cable.
Step 3: Press the cable support sleeve out of the cable gland.
Step 4: Remove the filler plug from the cable support sleeve.
Step 5: Route the network cable through an opening in the cable support sleeve.
Step 6: Thread the network cable through the cable gland.
Step 7: Thread cables into connection terminal of the inverter, then press the terminal with relevant tools and make sure cables are securely connected.
Step 8: If no other cables need to be installed, lock the waterproof cover to the inverter with screws.
Step 9: Screw the swivel nut onto the waterproof cover.

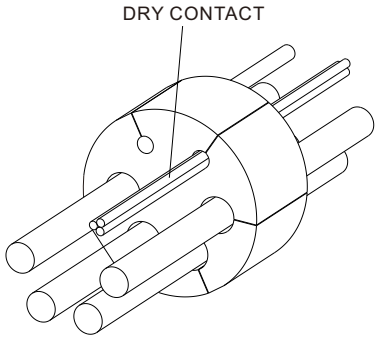


Figure 5.41

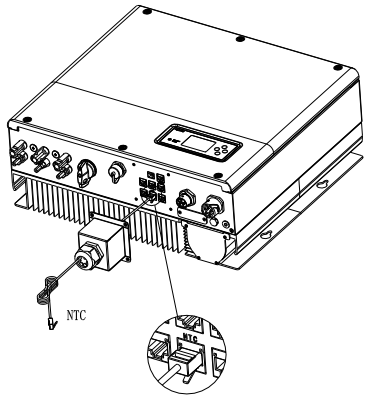


Figure 5.42

Note:

1. If the cable is not used, e.g. the dry contact cable, please do not remove the filler plug from the cable support sleeve.
2. The dry contact can provide a source output of 12 V and less than 200 mA to the driver replay and others. Please be aware of the output power.

5.4.10 Grounding the inverter

The SPH must be grounded properly with the grounding cable. The ground point is showed below. The specification of the grounding cable should be greater than 10 AWG.

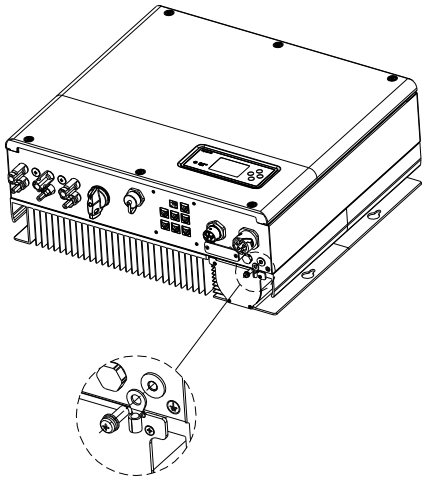


Figure 5.43

Grounding the PV array

The grounding conductor of the PV panel racking must be firmly grounded on the PV array side, inverter side and battery side. The cross-sectional area of the grounding conductor should be the same as that of the DC grounding conductor. The minimum wire size is 10 WAG.

DC grounding

Please select the DC grounding method, the PV grounding junction box, and the DC grounding wire size according to local standards.

Grounding device

If the positive or negative pole of the PV array in the PV system needs to be grounded, the inverter output should be insulated with an isolation transformer. The isolation transformer shall comply with IEC 62109-1, -2.

The connections are as follows:

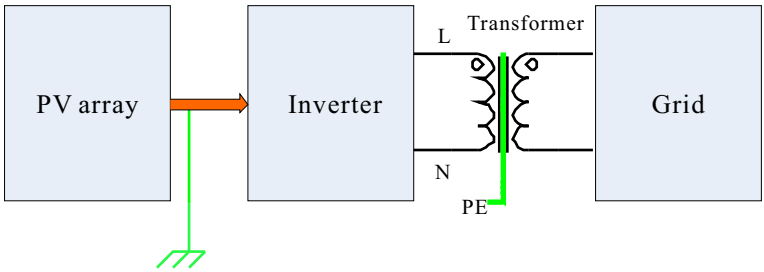


Chart 5.44

6 Commissioning

6.1 Commissioning the SPH

Upon completion of installation and electrical connection, power on the SPH system in the following steps:

- Connect the PV side
- Connect the AC side
- Connect the battery side
- Turn on the AC breaker
- Turn on the battery
- Finally, turn on the PV side

When the SPH is operating normally, the screen displays "Normal" and the LED indicator would be green.
In case that the SPH fails to work in the normal mode and the indicator turns red, please check the following items:

- All cables are properly connected.
- All external switches are on.
- The inverter's built-in switch is on.
- Ensure that the battery is on.
- Refer to Part 9.1 for correction

For details about setting the working mode, please refer to Section 6.4.4.

6.2 Operation modes

6.2.1 Normal mode

In normal mode, the SPH can operate in the on-grid mode, or supply backup power during a grid outage.

• On-grid mode

Users are allowed to configure the time periods to operate the SPH in the on-grid mode. On the LCD screen, you can set only one period; while on the Growatt Server website, you can set up to three periods to specify the working mode. For details, please see Section 6.4.4.

Load first: the default mode. In this mode, the solar power is prioritized to power the loads. When the solar power is insufficient, the battery will discharge to support the loads. If the solar power is sufficient, the surplus power will be directed to the battery. If no battery is connected or the battery has been fully charged, any further surplus energy will be fed to the grid (expect that the export limitation is enabled).
Battery first: In this mode, the power is prioritized towards charging the battery. It is recommended to select this mode during low electricity price periods. You need to set the ON and OFF time of each period, the charge cutoff SOC and the charge power, which should not be greater than the battery maximum input power. If the AC Charging (charge from grid) function is disabled, the SPH will charge the battery with solar power as a priority. If enabled, the SPH will charge the battery will both the solar power and the power drawn from the grid.
Grid first: In this mode, the solar power and the battery energy will be fed to the grid first. You are advised to choose this mode during high electricity price periods. You need to set the ON and OFF time of each period, the discharge cutoff SOC and the discharge power, which should not be greater than the battery maximum output power.

When the other inverter (excluding the SPH) is present, the inverter output and the battery energy are prioritized to support the loads. The excess power will be fed to the grid.
When no other inverter is installed or the solar energy is insufficient, the battery will discharge to support the loads and the excess power will be fed to the grid.

• Bypass mode

When the SPH is only connected on the AC side with no connection to the battery and the PV panel, the SPH can be powered on and it will enter the Bypass mode.

• Backup mode

In the event of a grid anomaly or grid outage, the inverter will switch to the backup mode, supplying power to critical loads with the battery and PV energy via the EPS output. You can disable the backup function following instructions in Section 6.4.4. If the PV power or the battery energy is loss, the other energy source should supply power. Please note that the maximum output power of the SPH in backup mode is 10000 W. Therefore, the load power connected to the EPS output port should be less than 10000 W.

Note:
Users can set only one period for Battery first or Grid first working mode on the LCD screen. To configure more periods, you can log into the Growatt Server webpage.
If you want to charge battery from grid, you need to enter the password on the LCD screen and set AC CHG to "Enable".

6.2.2 Fault mode

The SPH's smart management system monitors the system in real time. In case that any exception is detected, such as a system fault or an inverter fault, the LCD screen will display the fault information with the LED indicator turning red.

Note:
➢ For detailed fault description, please refer to Section 9.1.

6.2.3 Programming mode

In the Programming mode, the SPH is updating and it is not allowed to cut out the power during the update process. The SPH will switch to the normal mode once the upgrade is complete.

6.2.4 Checking mode

Before the SPH enters the normal mode, the inverter will perform self-check. Once all tests are passed, the system will enter the normal mode; otherwise, it will enter the fault mode.

6.2.5 Standby mode

The SPH enters the standby mode when no fault has been detected while the operating requirements are not met.

6.2.6 Shutdown mode

To shut down the SPH, you need to disconnect all energy sources and the SPH will enter the shutdown mode automatically.
Steps to shut down the SPH:

- Turn off the battery switch.
- Disconnect the AC power source. Wait until the LED indicator and the LCD screen of the SPH turn off.

Note:
After powering off the equipment, the residual voltage and heat still exist. Therefore, wait for over 5 minutes before performing any operation.

6.3 Country setting

After powering on the inverter, you can select the grid code of your country/region on the LCD screen. Please refer to the following table:

Country/region	Grid code	Model number
EU model	VDE0126	GT0XXXXXX1
	Germany	GT0XXXXXX1
	VDE-AR-N4110	(NULL)
	Belgium	GT0XXXXXXD
	Poland	GT0XXXXXXB
	France	GT1XXXXXX9
	Spain	GT0XXXXXX0
	Austria	GT1XXXXXXE
	Denmark_DK1	GT1XXXXXX7
	Denmark_DK2	GT1XXXXXXB
	Sweden	GT1XXXXXX6
	Norway	(NULL)
	Switzerland	(NULL)
	Bulgaria	(NULL)
	Greece	GT0XXXXXX2
	Estonia	(NULL)
	EN50549	GT1XXXXXXD
	CzechRepublic	GT2XXXXXX3

6.4 Three export limitation modes

6.4.1 Three-phase total export limitation mode

The limited feed-in power configured in this mode in percentage limits the algebraic sum of the total three-phase power drawn from and fed to the grid. On the grid side, the power drawn from the grid is counted as positive value, while the power fed to the grid is negative.

For an inverter with a maximum output power of 10 kW, if the percentage of feed-in power is set to 10%, the exported power is limited to 1 kW, i.e., the algebraic sum (in blue) of the power drawn from the grid and the power fed to the grid should be not less than -1 kW.
If the energy flow is about to go over the limit (-1kW), the inverter will reduce the three-phase output power to stop this tendency. (The rated power of the inverter in following examples is 10 kW and the percentage of exported power is preconfigured to 10%.)

6.4.1.1 Three-phase system with balanced loads

Figure 6.1 shows the three-phase system with balanced loads, and the inverter side can provide sufficient power to the load (power provided by the inverter side is not less than 2+2+2=6 kW). The inverter output power is not greater than the sum of the total load power and the preconfigured exported power (2+2+2+1=7 kW). At this time, the three-phase output of the inverter side is balanced; the three-phase power of the grid side is balanced and it is only allowed to feed power to the grid.

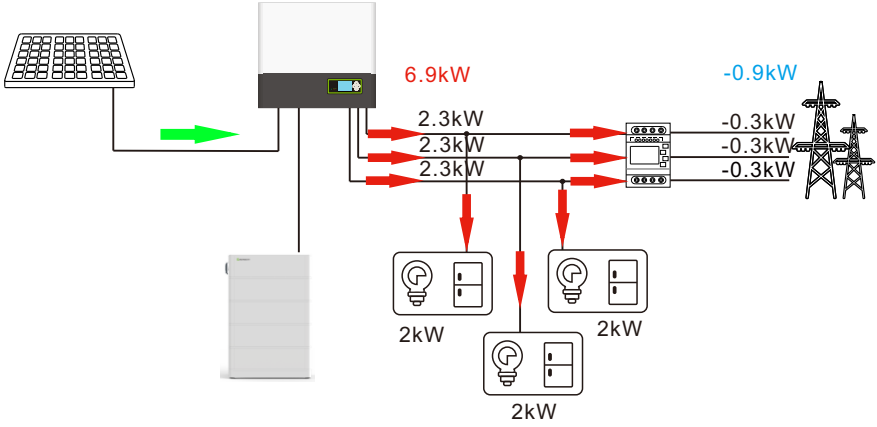


Figure 6.1

Figure 6.2 shows the three-phase system with balanced loads, and the inverter side cannot provide sufficient power to the load (power provided by the inverter side is less than 2+2+2=6 kW), and the inverter output power is not greater than the sum of the total load power and the preconfigured exported power (2+2+2+1=7 kW). At this time, the three-phase output of the inverter side is balanced; the three-phase power of the grid side is balanced and it is only allowed to draw power from the grid.

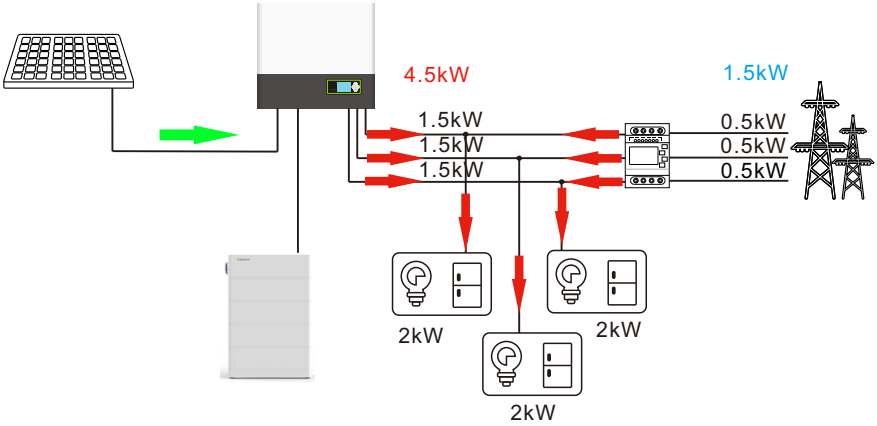


Figure 6.2

6.4.1.2 Three-phase system with unbalanced loads

Figure 6.3 shows the three-phase system with unbalanced loads. The inverter side can provide enough power to the load (power provided by the inverter side is not less than 1+2+3=6 kW), and each phase can provide enough power to the load (the load power of each phase is not more than 3.3 kW). The inverter output power is not greater than the sum of the total load power and the preconfigured exported power (1+2+3+1=7 kW). At this time, the three-phase output on the inverter side is balanced; the three-phase power on the grid side is unbalanced, and it is allowed to draw power from the grid and feed power to the grid.

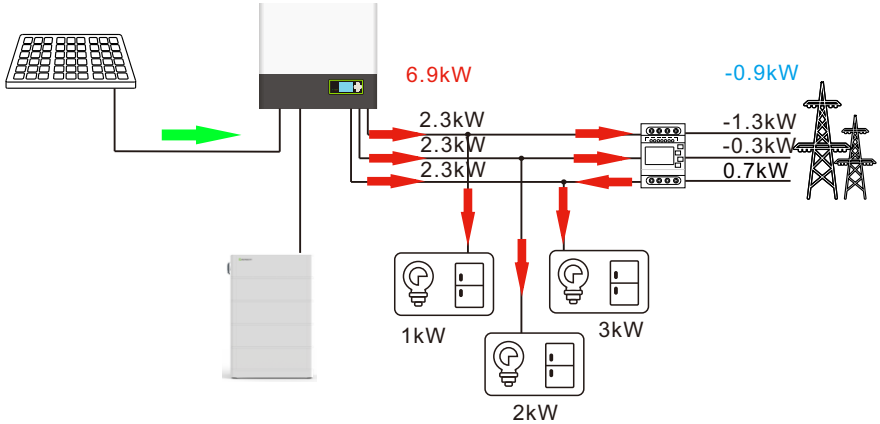


Figure 6.3

Figure 6.4 shows the three-phase system with unbalanced loads. The inverter side can provide enough power to the load (power provided by the inverter side is not less than 1.5+1+4=6.5 kW), while not every phase can provide enough power to the load (the load power of one phase exceeds 3.3kW). The inverter output power is not greater than the sum of the total load power and the preconfigured exported power (1.5+1+4+1=7.5 kW). At this time, the three-phase output on the inverter side is unbalanced; the three-phase power on the grid side is unbalanced, and it is allowed to draw power from or feed power to the grid.

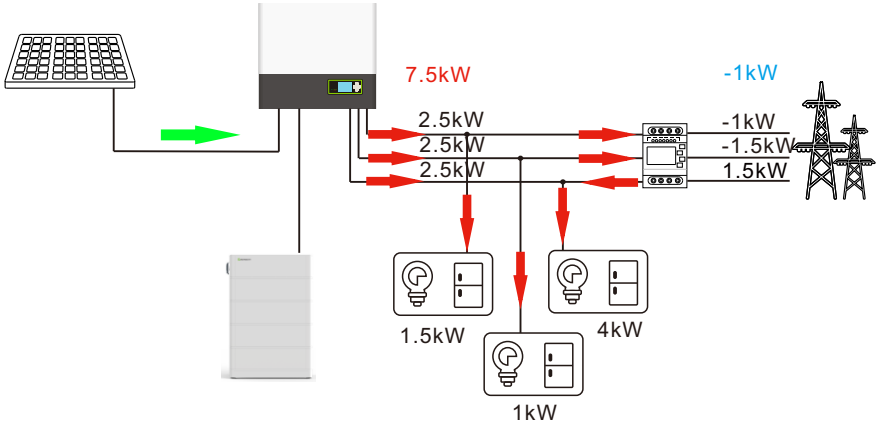


Figure 6.4

Figure 6.5 shows the three-phase system with unbalanced loads. The inverter side cannot provide enough power to the load (power provided by the inverter side is less than 1+2+3=6 kW), the inverter output power is not greater than the sum of the total load power and the preconfigured exported power (1+2+3+1=7 kW). At this time, the three-phase output of the inverter side is balanced; the three-phase power of the grid side is unbalanced, and it is allowed to draw power from or feed power to the grid.

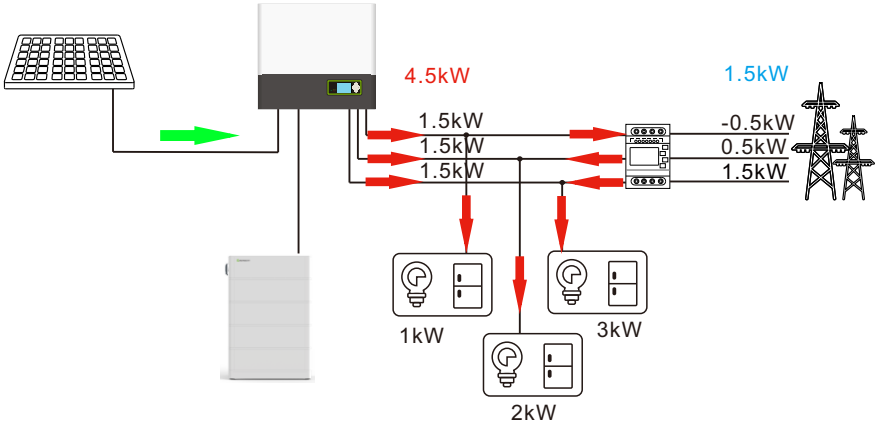


Figure 6.5

6.4.2 Three-phase independent export limitation mode

The limited feed-in power configured in this mode in percentage limits the algebraic sum of the total three-phase power drawn from and fed to the grid, and the three-phase power is equally divided among three phases with each phase not exceeding the average value of the preconfigured exported power. The power fed to the grid is counted as negative value.

For an inverter with a maximum output power of 10 kW, if the percentage of feed-in power is set to 10%, the algebraic sum of the power drawn from the grid and the power fed to the grid in this mode should be not less than -1 kW, and the value of the power flowing into the grid for each phase cannot be less than -0.33 kW. If the energy flow per phase is about to go over the limit (-0.33 kW), the inverter will reduce the output power to stop this tendency.

6.4.2.1 Three-phase system with balanced loads

Figure 6.6 shows the three-phase system with balanced loads. The inverter side can provide enough power to the load (power provided by the inverter side is not less than 2+2+2=6 kW). The total inverter output power is not greater than the sum of the total load power and the preconfigured exported power (2+2+2+1=7 kW). At this time, the three-phase output of the inverter side is balanced; the three-phase power of the grid side is balanced, and it is only allowed to feed power to the grid.

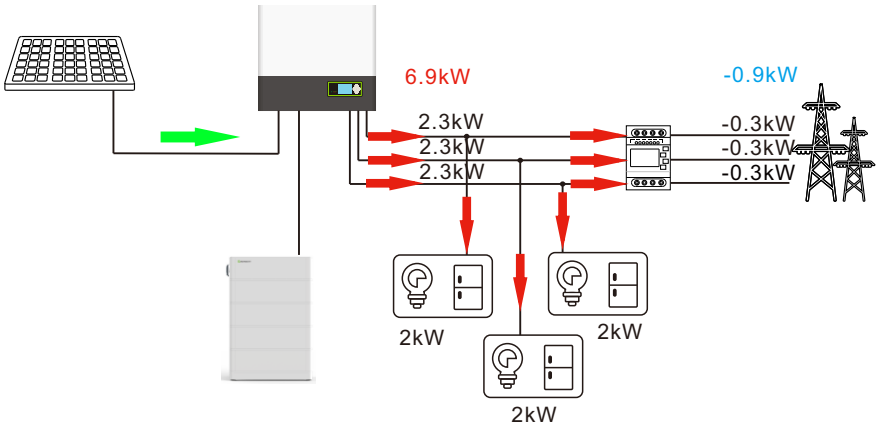


Figure 6.6

Figure 6.7 shows the three-phase system with balanced loads. The inverter side cannot provide enough power to the load (power provided by the inverter side is less than 2+2+2=6 kW). The total inverter output power is not greater than the sum of the total load power and the preconfigured exported power (2+2+2+1=7 kW). At this time, the three-phase output of the inverter side is balanced; the three-phase power of the grid side is balanced and it is only allowed to draw power from the grid.

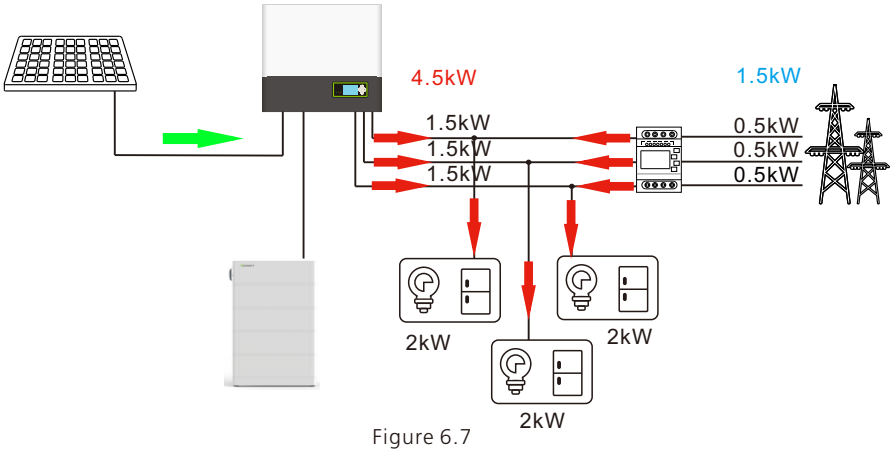


Figure 6.7

6.4.2.2 Three-phase system with unbalanced loads

Figure 6.8 shows the three-phase system with unbalanced loads. The inverter side can provide enough power to the load (the power provided by the inverter side is not less than 1+2+3=6 kW), and each phase can provide enough power to the load (the load power of each phase is not greater than 3.3 kW). The total value of the inverter output power is not greater than the sum of the total load power and the preconfigured exported power (1+2+3+1=7 kW). At this time, the three-phase output on the inverter side is unbalanced; the three-phase power on the grid side is not necessarily balanced and it is only allowed to feed power to the grid.

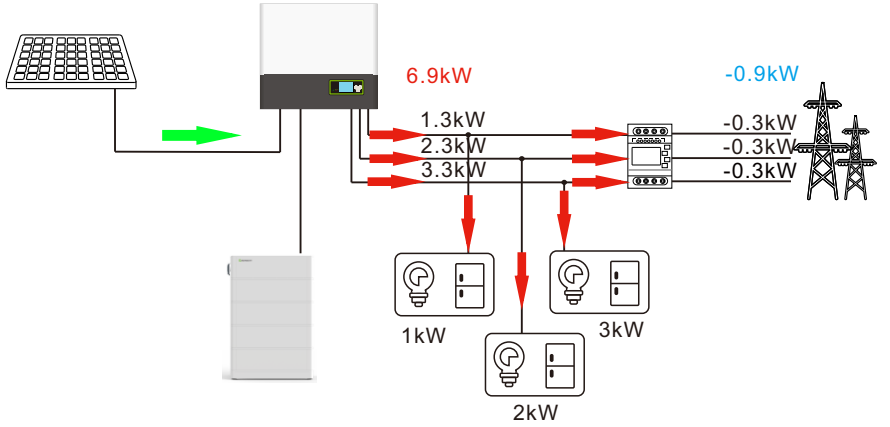


Figure 6.8

Figure 6.9 shows the three-phase system with unbalanced loads. The inverter side can provide enough power to the load (power provided by the inverter side is not less than 4+1+2=7 kW), and not every phase can provide enough power to the load (the load power of one phase exceeds 3.3 kW). The total value of the inverter output power is not greater than the sum of the total load power and the preconfigured exported power (4+1+2+1=8 kW). At this time, the three-phase output of the inverter side is unbalanced; the three-phase power of the grid side is unbalanced, and it is allowed to draw power from or feed power to the grid.

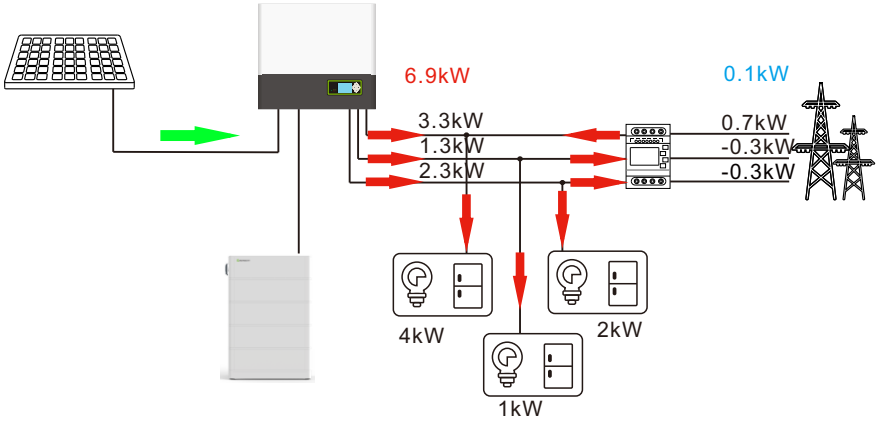


Figure 6.9

Note:
Although the inverter side can provide sufficient power (> 7kW), each phase output of the inverter with a rating of 10 kW is at most 3.3 kW, and the R phase also needs to draw 0.7 kW from the grid. The other two phases can export at most 0.33 kW to the grid respectively. In conclusion, the total power output provided by the inverter is 6.9 kW.

Figure 6.10 shows the three-phase system with unbalanced loads. The inverter side cannot provide enough power to the load (power provided by the inverter side is less than 1+2+3=6 kW). The total value of the inverter output power is not greater than the sum of the total load power and the preconfigured exported power (1+2+3+1=7 kW). At this time, the three-phase output of the inverter side
is unbalanced; the threephase power of the grid side is unbalanced, and it is allowed to draw power from or feed power to the grid.

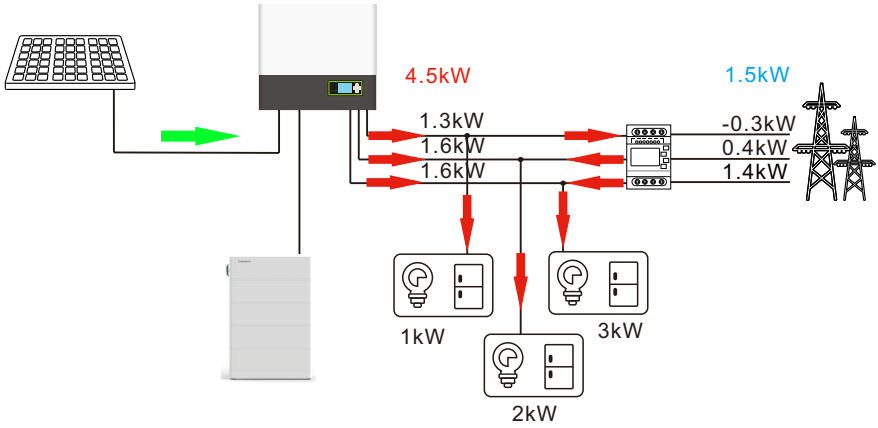


Figure 6.10

6.4.3 Limited feed-in power percentage can be set in Czech

The limited feed-in power configured in percentage under the grid code of Czech limits the total power fed to the grid from all three phases. After prioritizing the power supply to loads, each phase will export as much power as possible while fulfilling the export limitation requirement. The power fed to the grid is counted as negative value.

For an inverter with a maximum output power of 10 kW, if the percentage of exported power is set to 10%, after prioritizing the power supply to loads, the inverter will export power to the grid with the R>S>T priority until no excess power is present or the algebraic sum of the power fed to the grid (in blue) is -1kW. If the exported power is about to go over the limit value (-1 kW), the inverter will reduce the output power in the order of T, S, and R to stop this tendency.

6.4.3.1 Three-phase system with balanced loads

Figure 6.11 shows the three-phase system with balanced loads. The inverter side can provide enough power to the load (power provided by the inverter is not less than 2+2+2=6 kW), and the total inverter output power is equal to the sum of the total load power and the preconfigured exported power (2+2+2+1=7 kW). At this time, the three-phase output on the inverter side is balanced; the three-phase power on the grid side is not necessarily balanced and it is only allowed to feed power to the grid.

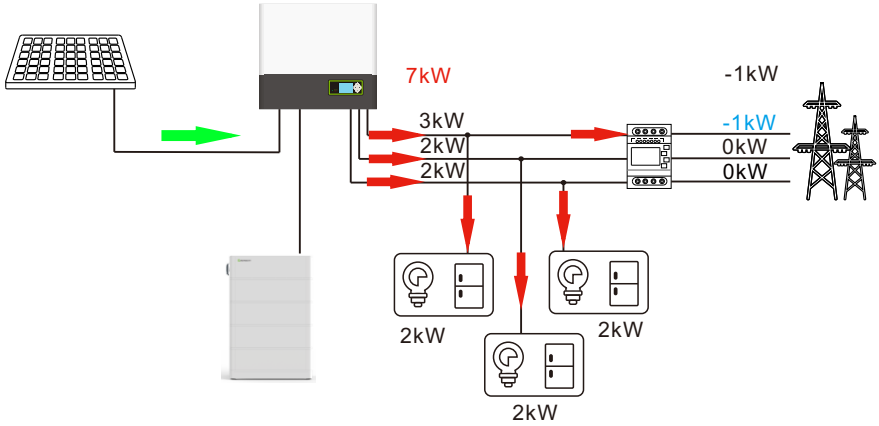


Figure 6.11

Figure 6.12 shows the three-phase system with balanced loads. The inverter side can provide enough power to the load (power provided by the inverter is not less than 2.5+2.5+2.5=7.5 kW). The total inverter output power is not greater than the sum of the total load power and the preconfigured exported (2.5+2.5+2.5+1=8.5 kW). At this time, the three-phase output on the inverter side is balanced; the three-phase power on the grid side is not necessarily balanced, and it is only allowed to feed power to the grid.

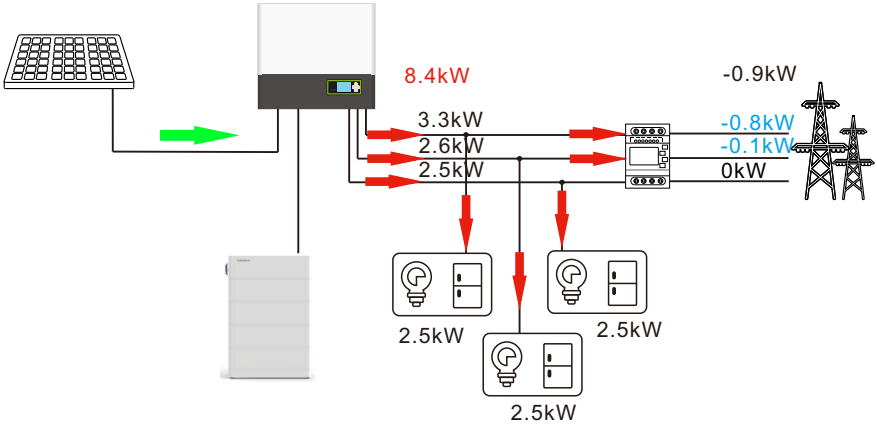


Figure 6.12

Figure 6.13 shows the three-phase system with balanced loads. The inverter side cannot provide enough power to the load (the power provided by the inverter side is less than 2+2+2 = 6 kW), the total inverter output power is not greater than the sum of the total load power and the preconfigured exported power (2+2+2+1=7 kW). At this time, the three-phase output on the inverter side is balanced; the three-phase power on the grid side is balanced and it is only allowed to draw power from the grid.

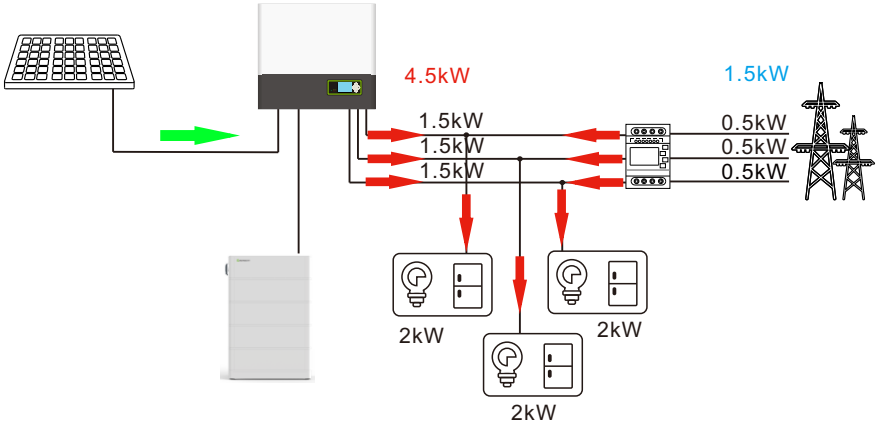


Figure 6.13

6.4.3.2 Three-phase system with unbalanced loads

Figure 6.14 shows the three-phase system with unbalanced loads. The inverter side can provide enough power to the load. The power provided by the inverter side is not less than 1+2+3=6 kW), and each phase can provide enough power to the load (the load power per phase is not more than 3.3 kW). The total inverter output power is not greater than the sum of the total load power and the preconfigured exported power value (1+2+3+1= 7 kW). At this time, the three-phase output on the inverter side is unbalanced; the three-phase power on the grid side is unbalanced, and it is only allowed to feed power to the grid.

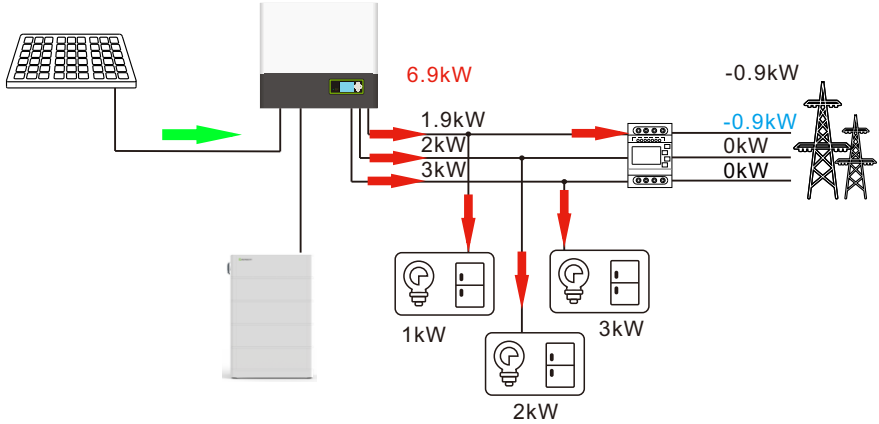


Figure 6.14

Figure 6.15 shows the three-phase system with unbalanced loads. The inverter side can provide enough power to the load (the power provided by the inverter side is not less than 4+1+2=7 kW), and not every phase can provide enough power to the load (the load power of one phase is greater than 3.3 kW). The total inverter output power is not greater than the sum of the total load power and the preconfigured exported power (4+1+2+1=8 kW). At this time, the three-phase output on the inverter side is unbalanced; the three-phase power on the grid side is unbalanced, and it is allowed to draw power from and feed power to the grid.

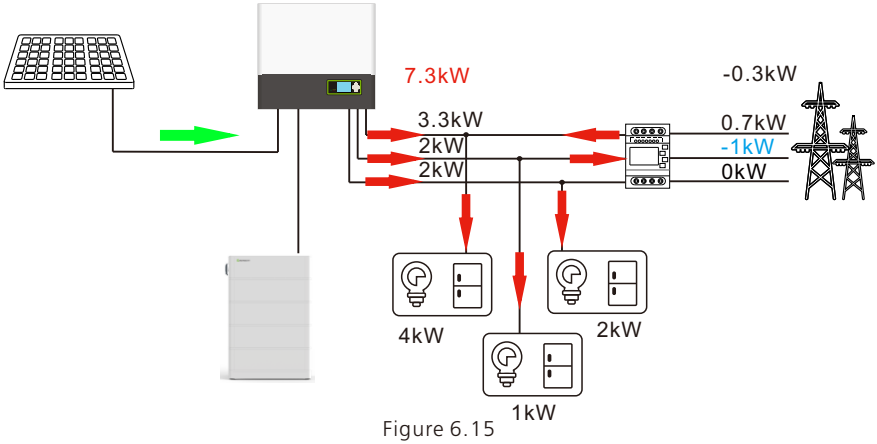


Figure 6.15

Figure 6.16 shows the three-phase system with unbalanced loads. The inverter side cannot provide enough power to the load (the power provided by the inverter side is less than 2+4+3=9 kW). The total inverter output power is not greater than the sum of the total load power and the preconfigured power value (2+4+3+1=10 kW). At this time, the three-phase output on the inverter side is balanced; the three-phase power on the grid side is unbalanced, and it is only allowed to draw power from the grid.

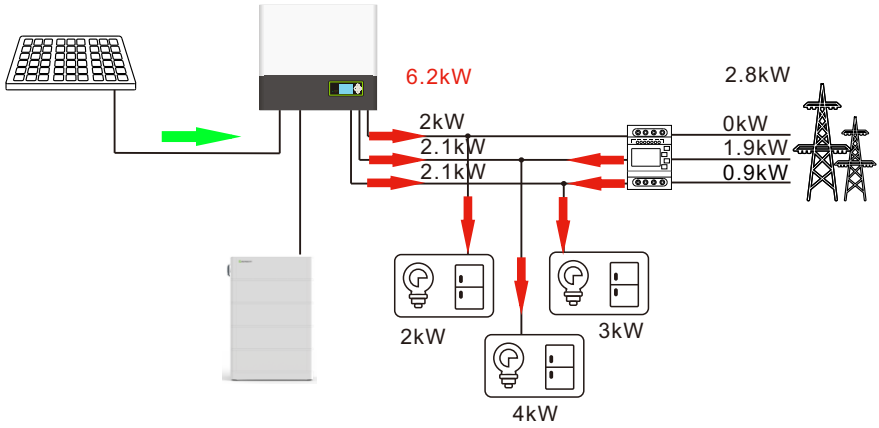


Figure 6.16

Note: For details of export limitation settings, please refer to Section 6.4.4 (Subsection 11).

General model	VDE0126	GT0XXXXXX1
	TUNISIA	(NULL)
	Ukraine	(NULL)
	VDE-AR-N4105	GT0XXXXXX7
	IEC62116&61727	GT0XXXXXXC
	South Africa	GT1XXXXXXC(NULL)
	Dubai	(NULL)
	Chile	(NULL)
	Argentina	(NULL)
	Uruguay	(NULL)
	Others	(NULL)
Italy	CEI 0-21	GT0XXXXXX4
	CEI 0-16	(NULL)
Hungary	Hungary	GT0XXXXXXC
UK	G98	GT0XXXXXX8
	G99	GT0XXXXXX5
	Ireland	GT1XXXXXX3
	NI_G98	(NULL)
	NI_G99	(NULL)
Australia	AS4777	GT4XXXXXX3
	NewZealand	GT5XXXXXX8
	Queensland	GT4XXXXXX2
	AU_Victoria	GT4XXXXXX1
	AU_Western	GT4XXXXXX4
	AU_Horizon	GT4XXXXXX5
	AU_Ausgrid	GT4XXXXXX6
	AU_Endeavour	GT4XXXXXX7
	AU_Ergon_Energy	GT4XXXXXX8
	AU_Energex	GT4XXXXXX9
	AU_sa_network	GT4XXXXXXA
Brazil	Brazil	GT1XXXXXX5(NULL)
	Brazil 240V	(NULL)
Mexico	Mexico	(NULL)
India	India	GT1XXXXXX4(NULL)
Korea	Korea	(NULL)
Taiwan	Taiwan VPC	GT1XXXXXX2(NULL)
	Taiwan TPC	(NULL)
Thailand	MEA	GT0XXXXXXE
	PEA	GT0XXXXXXF
Vietnam	Vietnam	(NULL)
CQC	CQC	GT0XXXXXXA
	CQC_1	GT1XXXXXX1

6.5 Display and button

6.5.1 LCD display area

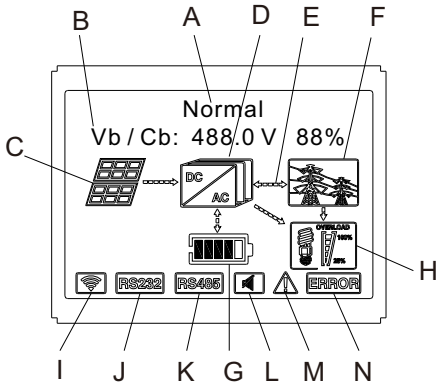


Figure 6.17

Location	Description
A	Inverter status
B	Basic information
C	PV input (if you connect two tracks, it will show two. Otherwise show one)
D	SPH inverter
E	Power flow line
F	Grid
G	Battery (display SOC with five bars, and each bar represents 20%)
H	Local load
I	Wireless communication
J	RS232
K	RS485
L	Buzzer(Reserved)
M	Warning
N	Fault

6.5.2 LED and button instruction

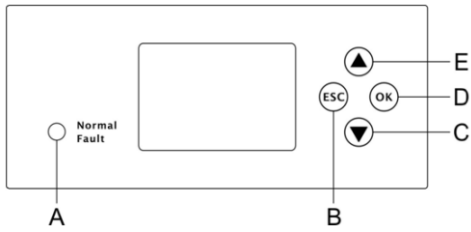


Figure 6.18

Location	Description
A	Status indicator
B	ESC key (Cancel)
C	Down
D	Enter
E	Up

Note:
The LED indicator denotes the operating status of the SPH with two colors - green and red. For details, please refer to Section 3.1.

6.5.3 LCD display

The LCD display demonstrates the operating status of the inverter, the basic information and the fault information.
It also allows users to set the language, charging/discharging priority and the system time. The LCD screen displays the information in turn.

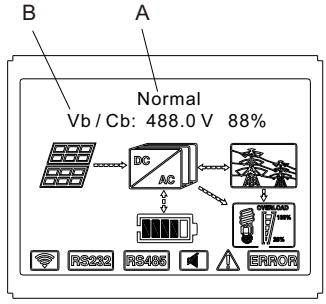


Figure 6.19

Line A display:

- Standby: the SPH is in standby mode. No fault is detected, but the operating requirements are not met.
- Normal: the SPH is operating properly.
- Checking: the SPH is performing self-check. If no fault is detected, it will switch to the normal mode; otherwise, it will switch to the fault mode.
- Programming: the SPH is upgrading the firmware
- Fault: once a fault is detected, the SPH will be shut down to protect the device.

Line B display:

In normal mode, the LCD screen lights up automatically. You can press the "Up" button to access the setting menu. Please refer to the chart below:

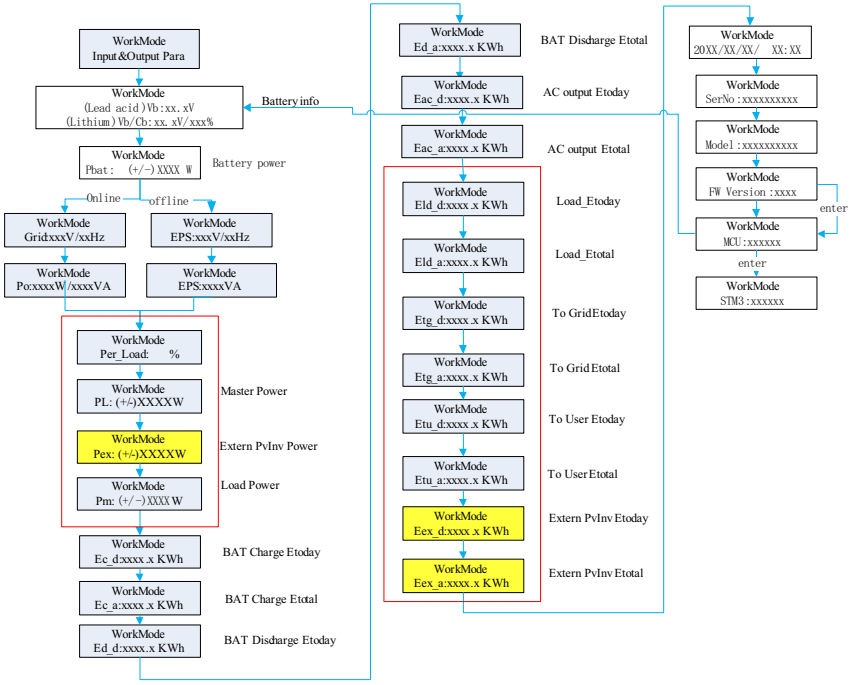


Chart 6.20

Note:

- Press "Down" to move to the next item, and "Up" to the previous one.
- The work mode is displayed in accordance with the actual operating status.
- Vb refers to the voltage of battery. Pm means the monitoring power.

6.5.4 Setting the working mode

Press the "Enter" key for over 3s to enter the setup mode. You can press "Enter" to confirm your setting or "ESC" to exit. Please refer to the process flow chart below:

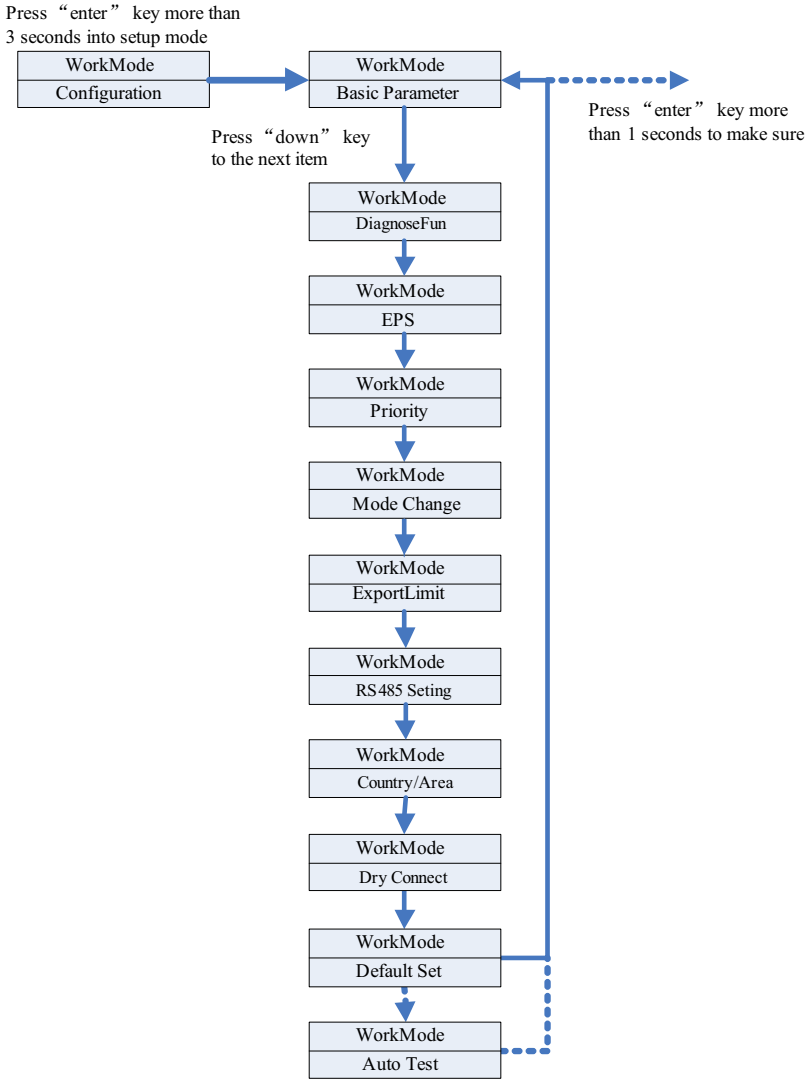


Chart 6.21

For inverters to be commissioned in Italy with the grid code of CEI, the Auto Test is required. For details, please refer to the Appendix.

In the "Basic Parameter" menu, you can press "Enter" for over 1s to access the setting menu:

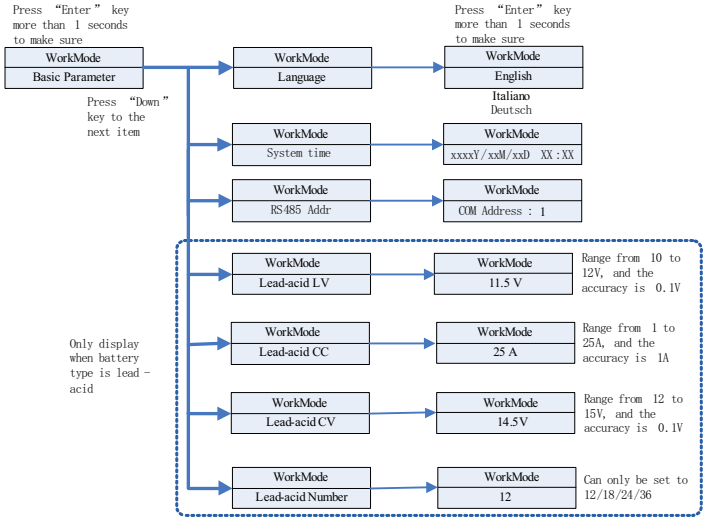


Chart 6.22

In the basic Parameter, you can set language (English, Italian, German), system time, Lead-acid LV (minimum voltage of single battery, 11.5V by default), Lead-acid CC (maximum battery charge & discharge current , 25A by default), Lead-acid CV (maximum voltage of single battery, 14.5V by default), Lead-acid Number (number of connected batteries, 12 by default).

2. In the "EPS" menu, you can press "Enter" for 1s to access the setting menu:

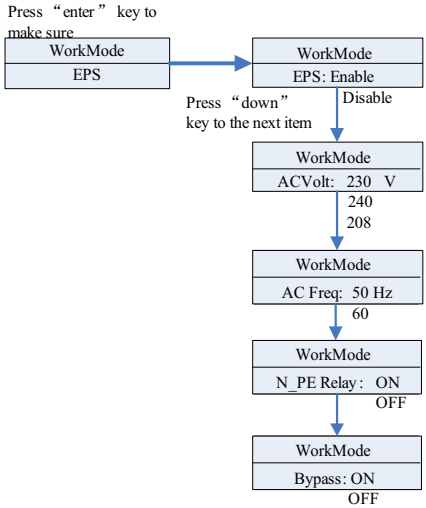


Chart 6.23

Note:

1. When EPS is disabled and Bypass is set to OFF, EPS port will not have voltage output under any circumstances;
2. When EPS is enabled and Bypass is set to OFF, EPS port will have voltage output only in the case of power failure when the ATS will transition the critical loads;
3. When EPS is disabled and Bypass is set to ON, EPS port also has voltage output when there is power grid; and during power failure, EPS port will not have voltage output;
4. When EPS is enabled and Bypass is set to ON, EPS port will have voltage output under any circumstances.
5. When N-PE Relay is ON, the N-PE replay is closed in the off-grid mode, when the EPS-N line and the EPS-PE line will be connected; and the N-PE replay is open in other operating modes. When the N-PE Relay is OFF, the N-PE Relay is open all the time.

You can set EPS to "Enable" or "Disable". It is enabled by default. The default AC voltage is 230V and the default frequency is 50Hz.

3. In the "Priority" menu, you can press "Enter" to access the setting menu:

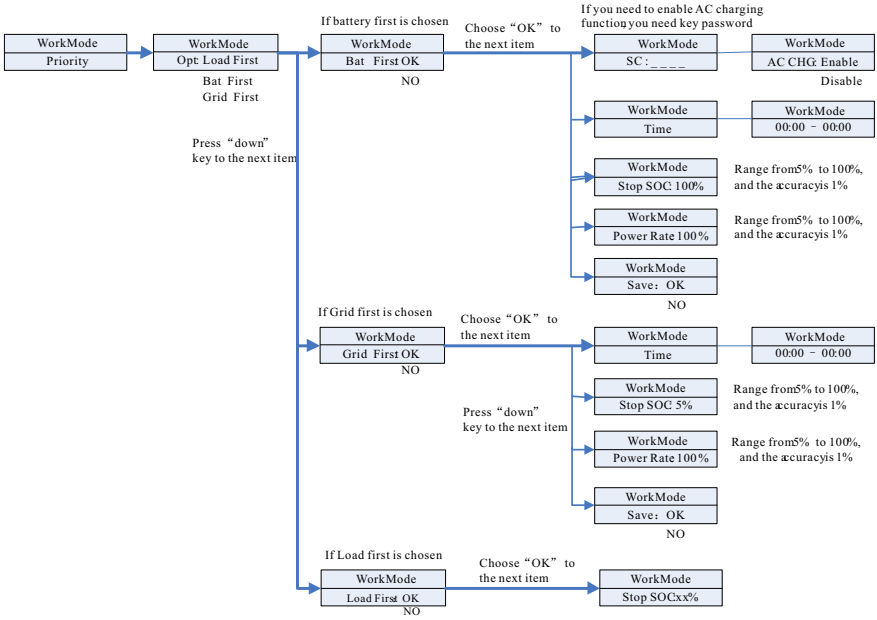


Chart 6.24

Note:

- "Power Rate" is used to set the power of the battery. The battery power varies based on the battery type. Therefore, please check the maximum power of the battery you selected.
- Time setting range is 24 hours. If the end time is less than the start time, the time-span crosses midnight.

4. In "Mode Change", you can press "Enter" to access the setting options:

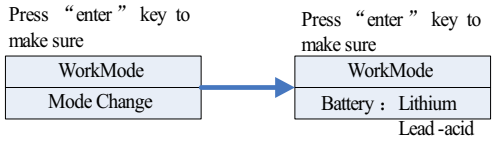


Chart 6.25

In the battery type, you can choose lithium battery or lead-acid battery.

5. In the "DiagnoseFun (Diagnose Function)" menu, you can run the assembly check upon completion of installation.

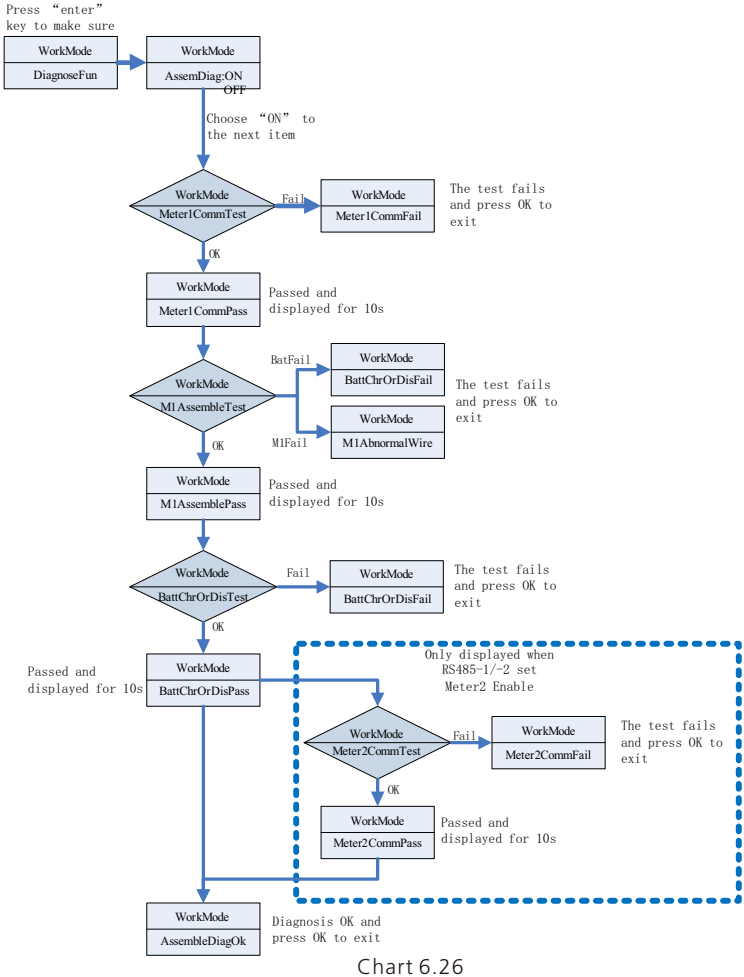


Chart 6.26

Note

1. The LCD screen displays PASS after each test passes. Wait for 10s, and then proceed to the next test.
2. If the test fails, you can press the OK key to exit.
3. When the self-check is complete, please press the OK key to confirm, then exit self-check.
4. Disconnect the PV, EPS and Load sides, and turn on the battery and grid connection, then run the DiagnoseFun (Diagnose Function).

If the test fails, please press the OK key and check the following items:

Error Message	Description	Suggestion
Meter1CommFail	Meter1 communication fault	Check the connection of the communication cable between Meter 1 and the inverter.
BattChrOrDisFail	The battery cannot charge or discharge normally	Check if there are Battery or BMS related error messages on the LCD.
M1AbnormalWire	Meter1 wiring error	Check if the phase sequence of Meter1 power line is correct.
Meter2CommFail	Meter2 communication fault	Check the connection of the communication cable between Meter 2 and the inverter.

6. In the "ExportLimit (Export Limitation)" menu, you can press "Enter" to access the setting menu:

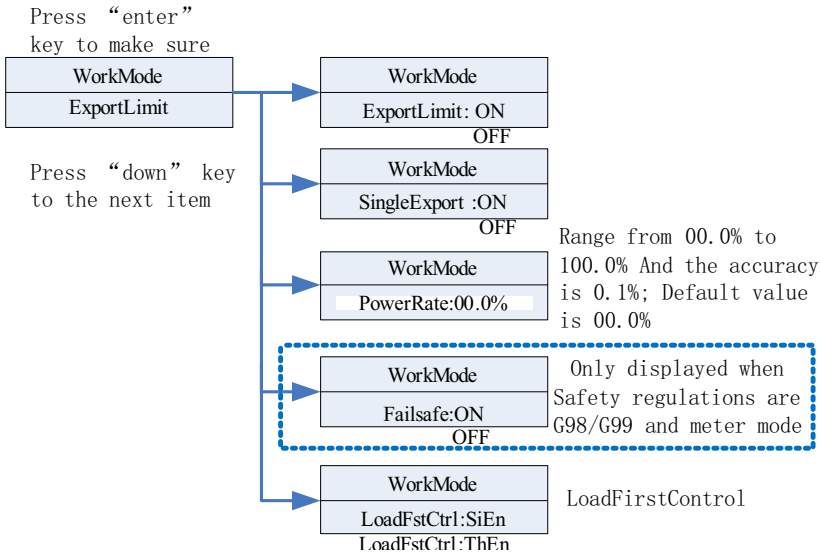


Chart 6.27

Note:
1.When the ExportLimit is set to ON and the SingleLimit is OFF, the total Export Limit function takes effect.
2.When the ExportLimit is set to ON and the SingleLimit is ON, the phase-level export limit function takes effect.
3.LoadFstCtrl has two modes: SiEn and ThEn. If it is set to SiEn, the phase-level power control function takes effect in LoadFirst mode, the AC power output will operate according to the exact load consumption in each phase. If it is set to ThEn, the total three-phase power control function takes effect in LoadFirst mode, the AC power output will operate according to the total three-phase power consumption.

ExportLimit function is used by the user to control the power feeding into the grid. When this function is enabled, the feeding power to the grid will be equal to or less than the set value. The purpose of the fail-safe function is to ensure that in the event of a failure of export limit function, the active power output will drop to the allowable output within a specified time.

Note:
- The default value is 0.00%.
- The total export limit function takes effect only when ExportLimit is enabled.
- The phase-level export limit function will only take effect when the SingleLimit and ExportLimit are enabled at the same time.

7. In the "RS485" menu, you can press Enter to select the RS485 communication mode:

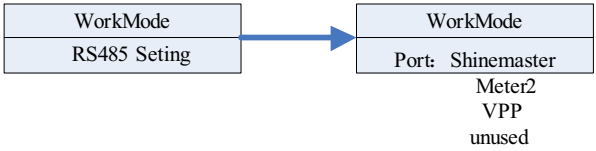


Chart 6.28

Note:
- The default value is "unused".
- In ShineMaster mode, SPH will enter parallel mode. At this time, it needs to be equipped with SEM-E and does not need to be connected to the meter.
- In Meter2 mode, SPH allows two meters to be connected. One is used to read the bus power, and the other is used to read the power of other inverters.
- In VPP mode, SPH allows access to external controllers to make relevant settings for SPH.

8. In the "Country/Area" menu, you can press Enter to configure the grid code (password: 1111):

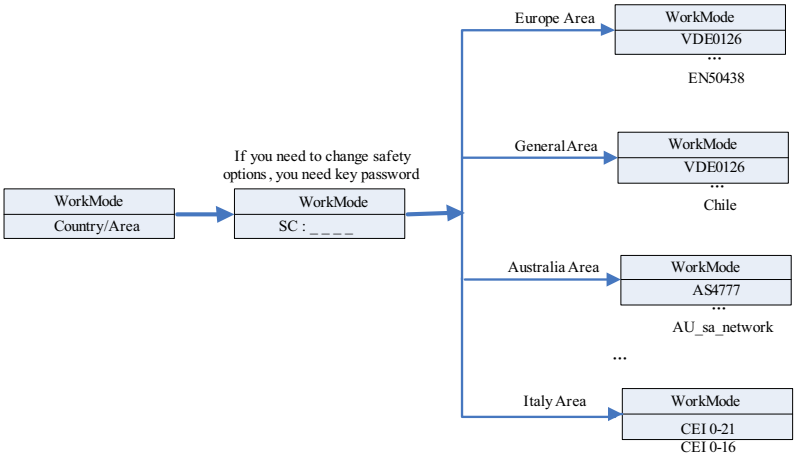


Chart 6.29

Note:

- Default safety regulations are set at the factory.
- Determine the region according to the factory's safety regulations set in the factory before delivery, LCD can only set the corresponding region's safety regulations.

9. In the "Dry Contact" menu, you can press Enter to configure the working hours of external devices, such as the water heater, diesel generator and others:

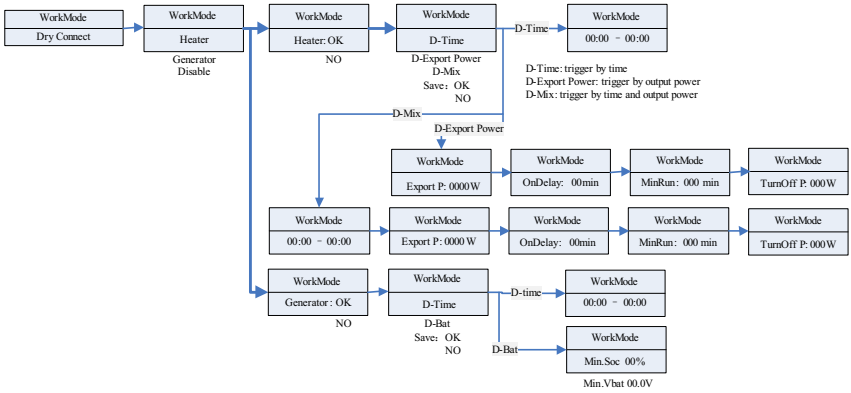


Chart 6.30

Note:

1. The D-Bat setting item in the generator option will display different parameters according to the type of battery connected. Min.SOC will displayed when a lithium battery is connected, and Min.Vbat when a lead-acid battery is connected.
2. In the shinemaster parallel system, using the "Heater" option, you can only start the dry contact function by setting "D-Time". When you set D-Export Power to enable the dry contact function, the dry contact function may not work properly.

10. In the "Default" menu, you can press Enter to access the setting menu:

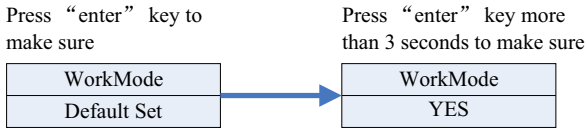


Chart 6.31

″Default set" means that all predefined parameters will be restored to the default value. Please be cautious not to accidentally choose factory reset.

6.5.5 Three-phase total export limitation configuration

6.5.5.1 Setting procedure

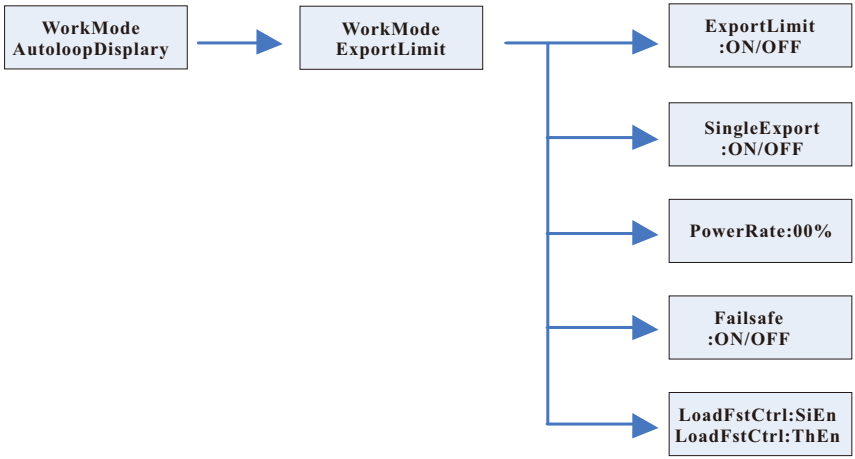


Figure 6.32

6.5.5.2 Setting guide

(1) Long press “enter” to access the "WorkMode" configuration page from the home page for operating mode settings.
(2) Press “down” or press "up" to access the "ExportLimit" page for export limitation settings.
(3) The first setting item is "ExportLimit", press “enter” once to enter the editing mode.
(4) Press “up” or “down” to change the selected option, and set it to "ON".
(5) Press "enter" once to confirm your setting and exit the editing mode.
(6) Press “down” once, and go to the next item to set "SingleExport" to ON to enable independent export limitation for each phase.
(7) Press “enter” once to enter the editing mode.
(8) Press "up" or "down" key to change the selected option and set it to "OFF".
(9) Press "enter" once to confirm your setting and exit the editing mode.
(10) Press “down” once to go to the next item to set the "PowerRate" – limited feed-in power in percentage.
(11) Press “enter” once to enter the editing mode.
(12) Press "up" or "down" key to set it to the desired value.
(13) Press "enter" once to confirm your setting and exit the editing mode.
If the following configuration is not applicable, it goes directly to operation (18).
(14) Press “down” once to go to the next item to access the "Failsafe" for export limitation failsafe settings.
(15) Press “enter” once to enter the editing mode.
(16) Press "up" or "down" key to set it to the desired value.
(17) Press "enter" once to confirm your setting and exit the editing mode.
(18) Press “down” once to go to the next item "LoadFstCtrl" (Load First Control).
(19) Press “enter” once to enter the editing mode.
(20) Press "up" or "down" key to change the setting to "ThEn"(Three-phase Enable).
(21) Press "enter" once to confirm your setting and exit the editing mode.
(22) Finally, press "Esc" to exit settings.

6.5.6 Three-phase independent export limitation configuration

6.5.6.1 Setting procedure

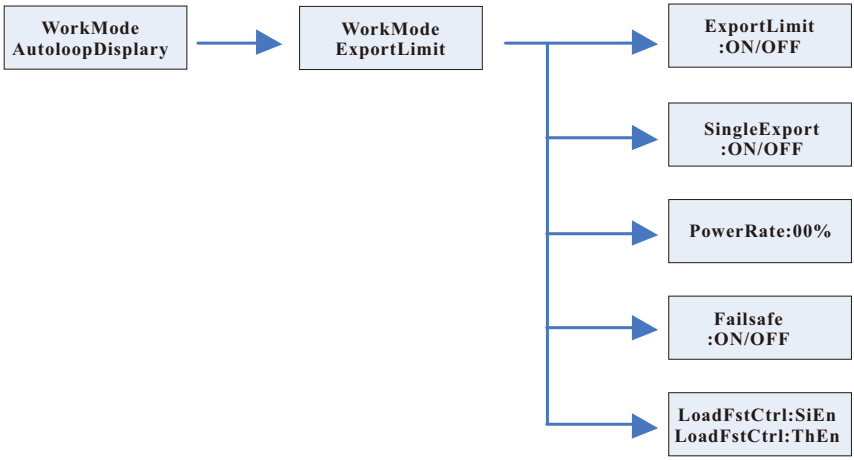


Figure 6.33

6.5.6.2 Setting guide

(1) Long press “enter” to access the "WorkMode" configuration page from the home page for operating mode settings.
(2) Press “down” or press "up" to access the "ExportLimit" page for export limitation settings.
(3) The first setting item is "ExportLimit", press “enter” once to enter the editing mode.
(4) Press “up” or “down” to change the selected option, and set it to "ON".
(5) Press "enter" once to confirm your setting and exit the editing mode.
(6) Press “down” once, and go to the next item to set "SingleExport" to ON to enable independent export limitation for each phase.
(7) Press “enter” once to enter the editing mode.
(8) Press "up" or "down" key to change the selected option and set it to "ON".
(9) Press "enter" once to confirm your setting and exit the editing mode.
(10) Press “down” once to go to the next item to set the "PowerRate" – limited feed-in power in percentage.
(11) Press “enter” once to enter the editing mode.
(12) Press "up" or "down" key to set it to the desired value.
(13) Press "enter" once to confirm your setting and exit the editing mode.
If the following configuration is not applicable, it goes directly to operation (18).
(14) Press “down” once to go to the next item to access the "Failsafe" for export limitation failsafe settings.
(15) Press “enter” once to enter the editing mode.
(16) Press "up" or "down" key to set it to the desired value.
(17) Press "enter" once to confirm your setting and exit the editing mode.
(18) Press “down” once to go to the next item "LoadFstCtrl" (Load First Control).
(19) Press “enter” once to enter the editing mode.
(20) Press "up" or "down" key to change the setting to "ThEn"(Three-phase Enable).
(21) Press "enter" once to confirm your setting and exit the editing mode.
(22) Finally, press "Esc" to exit settings.

6.5.7 Export limitation configuration for Czech grid code

6.5.7.1 Setting procedure

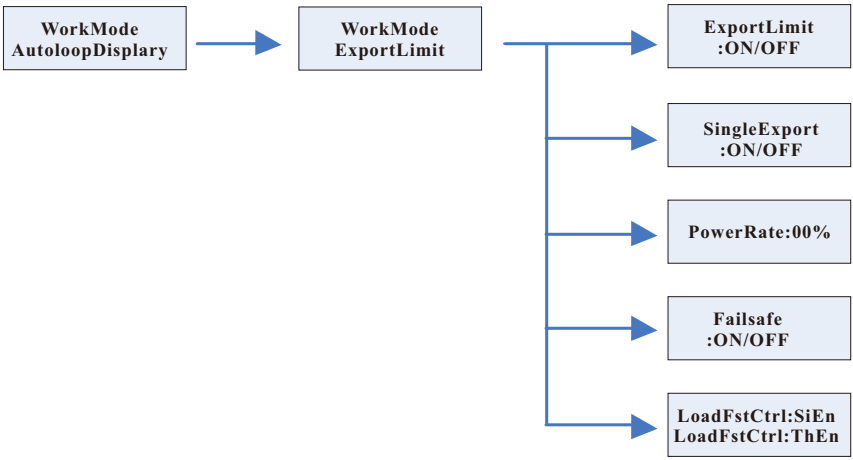


Figure 6.34

6.5.7.2 Setting guide

1) Set the Czech grid code on ShineBus.
(2) Set the inverter mode to “Load First”.
(3) Long press “enter” to access the "WorkMode" configuration page from the home page for operating mode settings.
(4) Press “down” or press "up" to access the "ExportLimit" page for export limitation settings.
(5) The first setting item is "ExportLimit", press “enter” once to enter the editing mode.
(6) Press “up” or “down” to change the selected option, and set it to "ON".
(7) Press "enter" once to confirm your setting and exit the editing mode.
(8) Press “down” once, and go to the next item to set "SingleExport" to ON to enable independent export limitation for each phase.
(9) Press “enter” once to enter the editing mode.
(10) Press "up" or "down" key to change the selected option and set it to "OFF".
(11) Press "enter" once to confirm your setting and exit the editing mode.
(12) Press “down” once to go to the next item to set the "PowerRate" – limited feed-in power in percentage.
(13) Press “enter” once to enter the editing mode.
(14) Press "up" or "down" key to set it to the desired value.
(15) Press "enter" once to confirm your setting and exit the editing mode.
If the following configuration is not applicable, it goes directly to operation (18).
(16) Press “down” once to go to the next item to access the "Failsafe" for export limitation failsafe settings.
(17) Press “enter” once to enter the editing mode.
(18) Press "up" or "down" key to set it to the desired value.
(19) Press "enter" once to confirm your setting and exit the editing mode.
(20) Press “down” once to go to the next item "LoadFstCtrl" (Load First Control).
(21) Press “enter” once to enter the editing mode.
(22) Press "up" or "down" key to change the selected option to "SIEn"(Single-phase Enable).
(23) Press "enter" once to confirm your setting and exit the editing mode.
(24) Finally, press "Esc" to exit settings.

Note: For details of the three export limitation modes, please see Section 6.4.

6.6 Communication

6.6.1 Use of USB-A port

The USB port is used for firmware upgrade. With the USB flash drive, you can update the software. Please refer to the figure below:

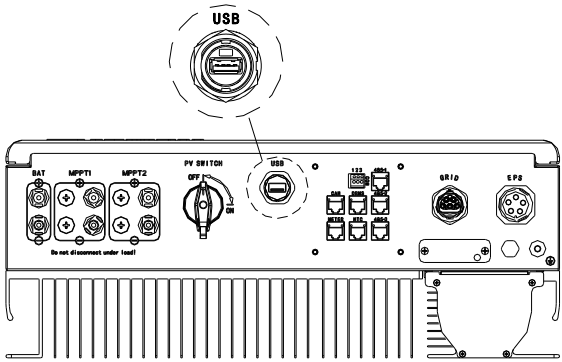


Figure 6.35

Note:
The USB port is only used for firmware update. Do not use it for charging.

6.6.2 The 485-1/485-2 port

485-1/485-2 port is the extended 485 interface on SPH, which needs to be used in conjunction with the RS485 Setting in the LCD menu to communicate with external devices.

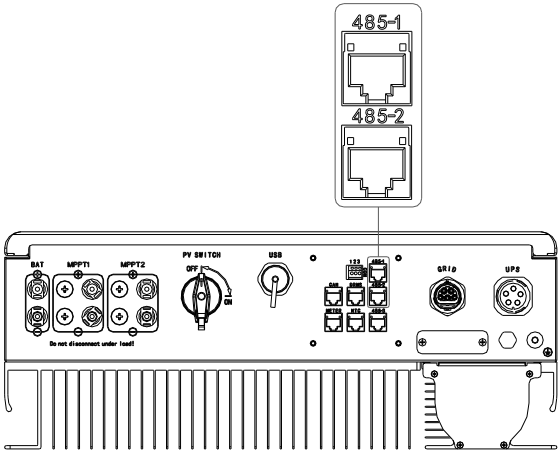


Figure 6.36

The SPH inverters can be connected in parallel. For details, please refer to the ShineMaster User Manual.

When set to Meter2 mode, the wiring diagram is as follows:

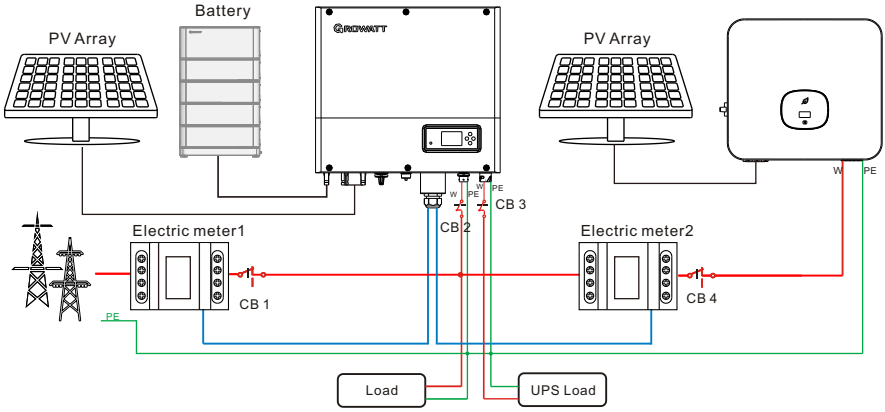


Figure 6.37

Note:
the W wires include L1, L2, L3 and N lines. For the connection of the meter, please see Section 5.4.2.

The master SPH will receive data from two meters simultaneously: Meter 1 (connected to the Meter port on the SPH) should be connected to the grid-side bus and the communication cable to the Meter port; Meter 2 should be connected to the output side of the inverter and the communication cable to the 485-1/485-2 port. For details about meter wiring, please see Section 5.4.2.
For Circuit Breaker (CB) 2, 3 and 4, the recommended specification is 25A/230V; for CB 1, the recommended specification is 50A/230V.

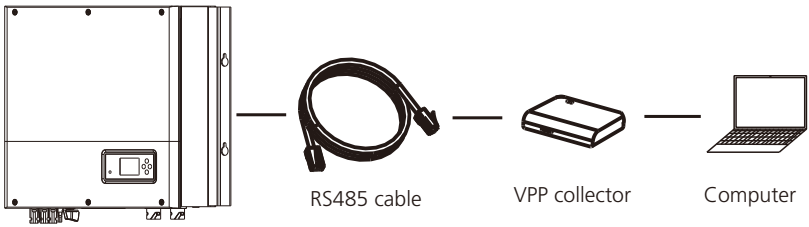


Figure 6.38

The external VPP collector is connected to the 485-1/485-2 port with a network cable. Once the communication is successfully established, the SPH will respond to the instructions issued by the VPP.

6.6.3 The 485-3 port

The USB-3 port is mainly used for monitoring connection with the computer. Once the communication between the SPH and the computer is successfully established, you are allowed to monitor the system, set parameters and update the software by running the ShineBus software developed by Growatt.
To download ShineBus, please visit Growatt official website.

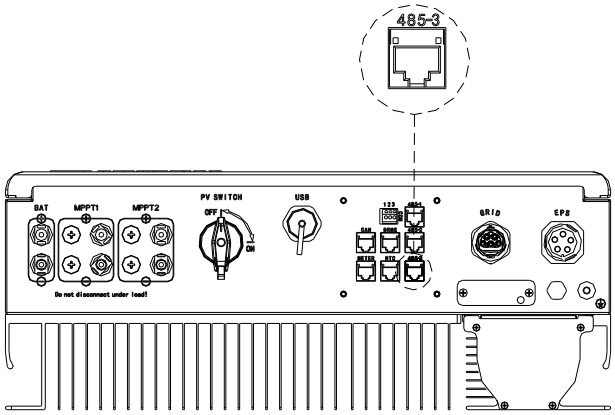


Figure 6.39

The wiring diagram is as follows:

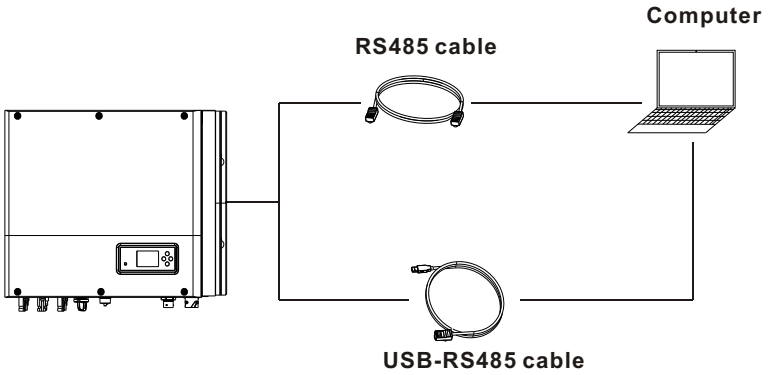


Figure 6.40

6.6.4 Monitoring

You can monitor the SPH operating status via connecting to the RS485 communication port on the SPH.

Note:
To view detailed monitoring information, you can log into the ShineServer webpage or the ShinePhone APP. TheShineWiFi-X or ShineLink-X can be connected to the inverter via the USB port.

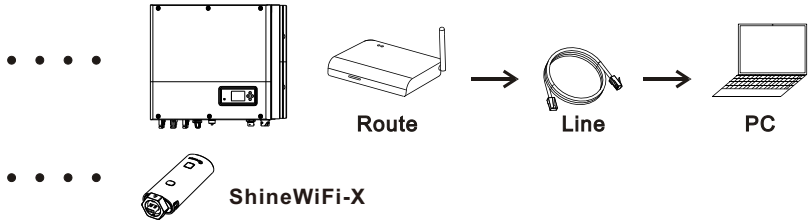


Figure 6.41

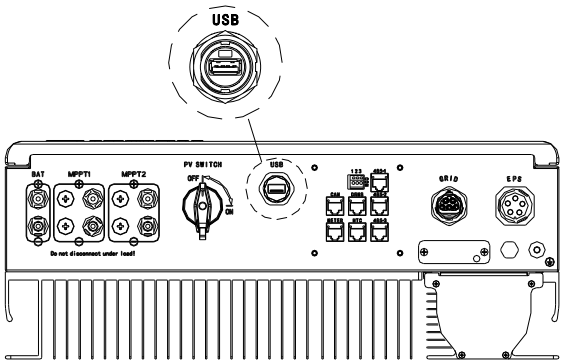


Figure 6.42

7 Powering on/off the SPH system

7.1 Powering on the SPH system

Users can start up SPH inverters through following steps:

1. Connect to the grid.
2. Connect to the battery.
3. Turn on the AC circuit breaker and then the battery switch.
4. If the LED indicator turns green, it indicates that the SPH inverter has been successfully powered on.

7.2 Powering off the SPH system

1. Turn off all circuit breakers and switches.
2. Disconnect the inverter.
3. Disconnect the battery.
4. Disconnect the AC connector.
5. Wait until the LED indicator and the LCD display go off, indicating that the SPH has been completely powered off.

Notes on the installation environment, 8 maintenance and cleaning

Heat dissipation performance is important when the SPH works in high-temperature environment. Proper heat dissipation can help to reduce the failure rate of SPH due to excessive heat. The SPH inverter adopts natural cooling with the heat dissipated from the top of the heat sink. The battery paired with the inverter is protected to IP65. Ensure that the temperature is within the permissible range for both the inverter and the battery.
When using the battery, please pay attention to the following things:
Caution: Do not dispose of batteries in a fire. The batteries may explode.
Caution: Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
Caution: A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:
a) Do not wear watches, rings or other metal objects.
b) Use tools with insulated handles.
c) Wear rubber gloves and boots.
d) Do not lay tools or metal parts on top of batteries.
e) Disconnect charging source prior to connecting or disconnecting battery terminals.
f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

If the SPH fails to work properly due to over-temperature or under-temperature, please proceed as follows:

- Check if the air duct of the heat sink is properly installed. Choose an appropriate position before installation.
- Check if the battery temperature is excessively high. If so, you need to ensure proper ventilation and cool the battery down.
- Check if the battery temperature is lower than the specified threshold, which might initiate the low-temperature protection. The fault will disappear once the temperature is within the permissible range.

Note:
- Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
- When replacing batteries, replace with the same type and number of batteries or battery packs.
- General instructions regarding removal and installation of batteries.

Note:
All operations mentioned above should be performed by qualified and professional personnel. If you need to perform the operations mentioned above, you MUST ensure that the entire system is powered off.

9 Fault removal

Growatt products have gone through strict tests and inspections before delivery. As with all electrical devices, there are residual risks despite careful construction. Should you encounter any problems, you can visit www.ginverter.com to check the Q&A section or call our customer service line. We require the following information in order to provide you with the necessary assistance:

- Inverter serial number
- Inverter model
- Fault information on the LCD screen
- Brief introduction of the problem
- The battery voltage
- The grid voltage and frequency
- The manufacturer and model of the battery
- The capacity and wiring mode of the battery
- Purchase time of the battery and the use frequency
- Can you reproduce the problem?
- Has the problem occurred before?
- When did the fault occur?

9.1 System fault information list and troubleshooting suggestions

Warning Message		
Error message	Description	Suggestion
Warning401	Meter Communication fault	Check the wire connection between the meter and the inverter.
Warning506	Battery temperature out of specified range for charge or discharge	Check if the ambient temperature of the battery is beyond the specified range.
AC V Outrange	Grid voltage fault. Please refer to the local grid standard for more details about the grid voltage.	1. Check if the grid voltage is beyond the specified range. 2. Check the grid connection.
AC F Outrange	Grid frequency fault. Please refer to the local grid standard for more details about the grid frequency.	1. Check if the grid frequency is beyond the specified range. 2. Restart the inverter. 3. Please contact Growatt support if the problem persists after restart.
BMS COM Fault	Communication fault	1. Check if the lithium battery has been turned on. 2. Check the connection between the lithium battery and the inverter.
Battery reversed	Battery terminals reversed	Check the polarity of the battery terminals.

Warning Message		
Error message	Description	Suggestion
Battery Open	Battery terminal open (only for lithium battery)	1. Check the battery connection. 2. Check if the switches between the battery and the inverter have been turned on.
Over load	EPS output overload warning. If this warning occurred three times, the off-grid function will be locked for one hour.	Please reduce the load connected to the EPS output port.
No AC Connection	No Utility	1. Check if the grid goes down. 2. Check the grid connection. 3. Check if the switches have been turned on.
Output High DCI	High DC component in the output power. Please refer to the local grid standard for disconnection time when the output DC current is too high.	1. Restart the inverter. 2. Please contact Growatt support if the problem persists after restart.
Bat Voltage High	Battery Voltage higher than 560V	1. Check if the battery voltage is within the specified range. 2. Check the battery connection. If the actual battery voltage is higher than 560V, please disconnect the battery and check the inverter.
Bat Voltage Low	Battery Voltage lower than 100 V	1. Check if the battery voltage is within the specified range. 2. Check the connection between the battery and the inverter.
BMS Warning:XXX	BMS report warning	1.Check the warning information referring to the lithium battery user manual. 2. Please contact Growatt support if the problem persists after restart.
BMS error:XXX	BMS report error	1.Check the warning information referring to the lithium battery user manual. 2. Please contact Growatt support if the problem persists after restart.
EPS Volt Low	EPS output voltage low	1. Check the power of the load connected to the EPS output port. If overload occurs, please reduce the load. 2. Restart the inverter.

Error message		
Inverter fault code	LCD Display	Suggested measure
Error 300	AC V Outrange (1)	1. Check the grid voltage. 2. If the error message still exists despite the grid voltage being within the permissible range, please contact Growatt support.
Error 300	AC V Outrange (2)	1. Check the grid voltage. 2. If the error message still exists despite the grid voltage being within the permissible range, please contact Growatt support.
Error 300	AC V Outrange (3)	1. Check the grid voltage. 2. If the error message still exists despite the grid voltage being within the permissible range, please contact Growatt support.
Error 304	AC F Outrange	1. Restart the inverter. 2. If the error message still exists, please contact Growatt support.
Error 302	No AC Connection	1. Check the grid voltage. 2. If the error message still exists despite the grid voltage being within the permissible range, please contact Growatt support.
Error 604	EPS Volt Low	1. Restart the inverter. 2. If the error message still exists, please contact Growatt support.
Error 607	EPS Over Load	1. Restart the inverter. 2. If the error message still exists, please contact Growatt support.
Error 505	Battery reversed	1. Check battery terminals. 2. If the error message still exists, please contact Growatt support.
Error 506	Battery Open	1. Check battery terminals. 2. If the error message still exists, please contact Growatt support.
Error 502	Bat Voltage Low	1. Check battery voltage. 2. If the error message still exists, please contact Growatt support.
Error 503	Bat Voltage High	1. Check battery voltage. 2. If the error message still exists, please contact Growatt support.
Error 500	BMS COM Fault	1. Check the battery communication port. 2. If the error message still exists, please contact Growatt support.
Error 402	Output High DCI	1. Restart the inverter. 2. If the error message still exists, please contact Growatt support.

Error message		
Inverter fault code	LCD Display	Suggested measure
Error 203	PV Isolation Low	1. Check if the PV panel enclosure is properly grounded. 2. If the error message persists, please contact Growatt support.
Error 202	PV Voltage High	1. Disconnect the DC switch immediately and check the voltage. 2. If the DC input voltage is within the permissible range and the error message persists, please contact Growatt support.
Error 600	OP Short Fault	1. Restart the inverter. 2. If the error message still exists, please contact Growatt support.
PV1 short	Pv1 short	1. After shutdown, check is the PV panel is normal. 2. If the error message persists, please contact Growatt support.
PV2 short	Pv2 short	1. After shutdown, check is the PV panel is normal. 2. If the error message persists, please contact Growatt support.
CT LN Reversed	CT LN Reversed	1. Check if the CT is properly connected. 2. If the error message still exists, please contact Growatt support.
Error 507	Over Load	1. Check if the load power is greater than the lithium battery rated power. 2. If the error message still exists, please contact Growatt support.

10 EU Declaration of Conformity

Within the scope of EU directives:

- 2014/35/EU Low Voltage Directive (LVD)
- 2014/30/EU Electromagnetic Compatibility Directive (EMC)
- 2011/65/EU RoHS Directive and its amendment (EU)2015/863

Shenzhen Growatt New Energy Technology Co. Ltd confirms that the Growatt inverters and accessories described in this document are in compliance with the above-mentioned EU directives. The entire EU Declaration of Conformity can be found at www.ginverter.com.

Decommissioning 11

11.1 Removing the SPH inverter

1. Disconnect all electrical connections from the inverter, including the RS485 communication cable, DC input cables, AC output cables, battery cables, and the grounding cable.
2. Remove the inverter from the mounting bracket.
3. Put away the mounting bracket.

	Be aware of the residual heat on the SPH enclosure to avoid body burns. Wait 20 minutes for the SPH to cool down before removing it.

11.2 Packing the SPH inverter

If the original package is available, please place the inverter in the original box and tie it with tapes.
If the original package is not available, please put the inverter in a carton box that is suitable for its dimensions and weight.

11.3 Storing the SPH inverter

Store the inverter in a dry place and keep the temperature between -25℃ and 60℃

11.4 Disposing of the SPH inverter

Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.

12 Product specification

12.1 Growatt SPH inverter specification

Model / Specifications	SPH 4000 TL3 BH-UP	SPH 5000 TL3 BH-UP	SPH 6000 TL3 BH-UP	SPH 7000 TL3 BH-UP	SPH 8000 TL3 BH-UP	SPH 10K TL3 BH-UP
Input data (DC)						
Max. recommended PV power(for module STC)	3000W*2	3750W*2	4500W*2	5200W*2	6000W*2	7500W*2
Max. DC voltage	1000V					
Start voltage	120V					
Nominal voltage	600V					
MPP voltage range	120~1000V					
No. of MPP trackers	2					
No. of PV strings per MPP trackers	1					
Max. input current per MPP	13.5A/13.5A					
Max. short-circuit current per MPP trackers	16.9A/16.9A					
Output data (AC)						
AC nominal power	4000W	5000W	6000W	7000W	8000W	10000W
Max. AC apparent power	4000VA	5000VA	6000VA	7000VA	8000VA	10000VA
Nominal AC voltage/range	230V/400V; 310~476					
AC grid frequency/ range	50/60Hz; 45~55Hz/55~65 Hz					
Max. output current	6.1A	7.6A	9.1A	10.6A	12.1A	15.2A
Power factor (@nominal power)	1					
Adjustable power factor	0.8leading ~ 0.8lagging					
THDi	<3%					
AC grid connection type	3W+N+PE					
Stand alone (AC power)						
AC nominal output power	4000W	5000W	6000W	7000W	8000W	10000W
Max. AC apparent power	4000VA	5000VA	6000VA	7000VA	8000VA	10000VA

Specifications \ Model	SPH 4000 TL3 BH-UP	SPH 5000 TL3 BH-UP	SPH 6000 TL3 BH-UP	SPH 7000 TL3 BH-UP	SPH 8000 TL3 BH-UP	SPH 10K TL3 BH-UP
Nominal AC voltage	230V/400V					
Nominal AC frequency	50/60Hz					
Max. output current	6.1A	7.6A	9.1A	10.6A	12.1A	15.2A
THDV	< 3%					
Switch time	< 10ms					
Battery data (DC)						
Battery voltage range	100~550V					
Max. charging / discharging current	25A					
Continuous charging / discharging power	4000W	5000W	6000W	7000W	8000W	10000W
Type of battery	lithium battery / Lead-acid battery					
Capacity of battery	7.68~76.8kWh					
Efficiency						
Max. efficiency	97.6%	97.8%	98.0%	98.2%	98.2%	98.2%
Euro-eta	97.0%	97.2%	97.3%	97.4%	97.4%	97.5%
MAX. Battery charge/discharge efficiency	97.4%					
Protection devices						
DC reverse-polarity protection	Yes					
Battery reverse protection	Yes					
DC switch	Yes					
DC Surge protection	Type II					
Insulation resistance monitoring	Yes					
AC surge protection	Type III					
AC short-circuit protection	Yes					
Ground fault monitoring	Yes					
Grid monitoring	Yes					
Anti-islanding protection	Yes					

Specifications \ Model	SPH 4000 TL3 BH-UP	SPH 5000 TL3 BH-UP	SPH 6000 TL3 BH-UP	SPH 7000 TL3 BH-UP	SPH 8000 TL3 BH-UP	SPH 10K TL3 BH-UP
Residual-current monitoring unit	Yes					
General data						
Dimensions (W / H / D)	544*505*198.5mm					
Weight	33kg					
Operating temperature range	– 25 °C ~ +60 °C(–13 °F ~ +140 °F) derating >45℃ (113℉)					
Noise emission (typical)	≤35 dB(A)					
Altitude	3000m					
Self-Consumption	<13W					
Topology	Transformerless					
Cooling	Natural					
Protection degree	IP65					
Relative humidity	0~100%					
DC connection	H4 / MC4 (Optional)					
AC connection	Connector					
Battery connection	H4 / MC4 (Optional)					
Interfaces						
Display	LCD+LED					
RS485/CAN/USB	Yes					
RF/WIFI/GPRS/4G	Optional					
Warranty: 5 / 10 years	Yes / Optional					
Standard compliance						
Grid regulation	IEC 62040, VDE-AR-N 4105, VDE 0126, UTE C 15-712, C10/C11, EN50549, CEI 0-21, CEI 0-16, IEC62116, IEC61727, AS/NZS4777, G98, TOR Erzeuger					
EMC	EN61000-6-1, EN61000-6-3					
Safety	IEC/EN62109-1, IEC/EN62109-2					

Note: The SPH can only operate when the PV input is 120V with its power greater than 120W. Otherwise, it will only light up the display.

12.2 DC input terminal parameter

MC4 specification:

	2.5mm²/14AWG	4mm²/12 AWG	6mm²/10 AWG	10mm²/8AWG
Rated current (90℃ environment)	32A	40A	44A	65A
Nominal system voltage	1000V DC (UL) 1000V DC (TUV)			
Contact resistance	0.25mΩ			
Protection grade	IP68			
Socket contact materials	Copper, tin			
Insulation materials	Thermoplastics UL94 V-0			
Ambient temperature range	-40℃ to +90℃			
Wire stripping length	7.0mm (9/32")			
Cable casing diameter	4.5 to 7.8mm (3/16" to 5/16")			

12.3 Torque

Upper cover screws	1.3N·m (10.8 lbf·in)
Shell	0.7N·m (6.2 lbf·in)
DC connector	1.8N·m (16.0 lbf·in)
M6 screwdriver	2N·m (18 lbf·in)
Grounding screw	2N·m (18 lbf·in)

12.4 Accessories (optional)

The following table lists the optional accessories for the SPH Inverter. If you need to purchase any of them, you can contact Growatt or your dealer. The P/N is for reference only and it is subject to change without notice.

Product name	Description	GROWATT P/N
ShineLink	Used for data logging in EU	MR00.0011200
	Used for data logging in Australia	MR00.0011300
ShineWiFi-X	Used for data logging	MR00.0011000
GPRS	Used for data logging	MR00.0011801

13 Certificate of Compliance

Growatt confirms herewith that the products, when correctly configured, are in compliance with the requirements specified in the following standards and directives:

Model	Certificate
SPH series inverters	IEC 62040, VDE-AR-N 4105, VDE 0126, UTE C 15-712, C10/C11, EN50549, CEI 0-21, CEI 0-16, IEC62116, IEC61727, AS/NZS4777, G98, TOR Erzeuger, EN61000-6-1, EN61000-6-3, IEC/EN62109-1, IEC/EN62109-2

Contact us 14

If you have technical problems concerning our products, please contact Growatt Service Line or your dealer. To provide you with the necessary support, please have the following information ready:

1. The serial number of the SPH inverter
2. The model information of the SPH inverter
3. The communication mode of the SPH inverter
4. The fault information of the SPH inverter
5. The information displayed on the screen of the SPH inverter
6. The manufacturer and model of the battery
7. The capacity and wiring mode of the battery

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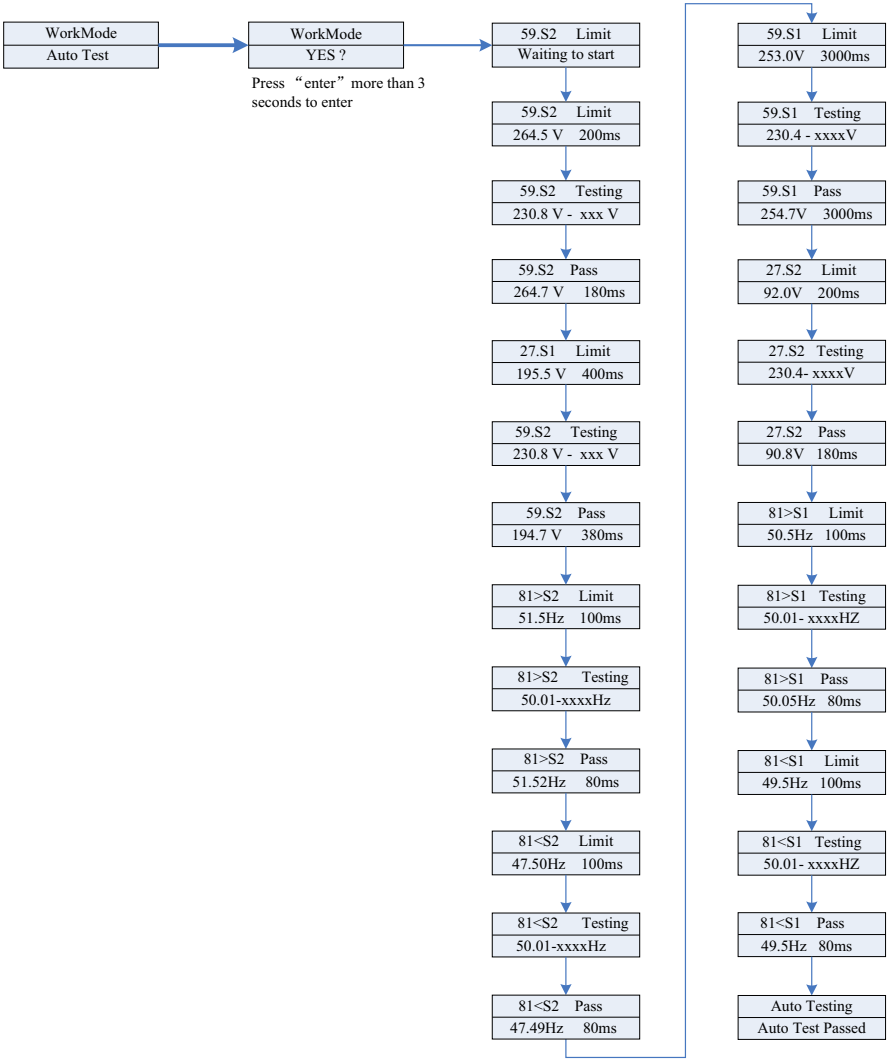
Appendix:

Auto Test (for Italy only)

The following chart illustrates the procedure of Auto Test. In the setting menu on the LCD screen, select "Auto Test", then press the "Enter" key for 3 seconds.



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