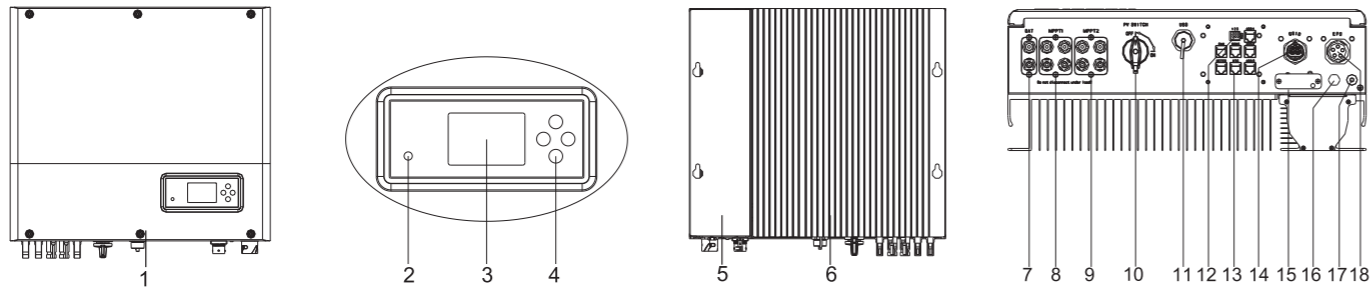


1. Overview



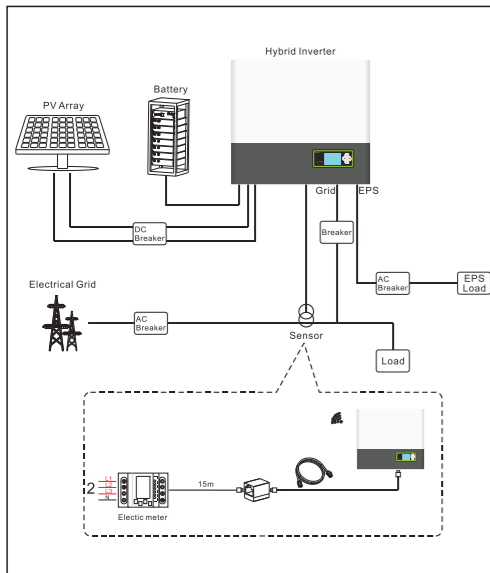
- 1. Front panel
- 2. Double color LED
- 3. LCD screen
- 4. Push button
- 5. Magnetic devices
- 6. Heat sink
- 7. Battery connector
- 8. PVA connector
- 9. PVB connector
- 10. PV switch
- 11. USB port
- 12. Dry connector
- 13. Communication ports
- 14. AC grid connector
- 15. Reserved hole
- 16. Breathable valve
- 17. Grounding screw
- 18. EPS connector

⚠ Note:
 1. Only three-phase meter supports current direction detection.
 2. Function introduction of communication ports(14) in the follow.

⚠ Note:
 1. This file will be updated from time to time due to product upgrades or other reasons. Unless otherwise agreed, this document is intended as a guide only. All information and suggestions do not constitute an express or implied warranty. The final interpretation of the content is at Growatt.
 2. This document is for quick guidance installation only. For details, please refer to the User Manual.
 3. Machine damage caused by failure to follow the content is not covered by the warranty.

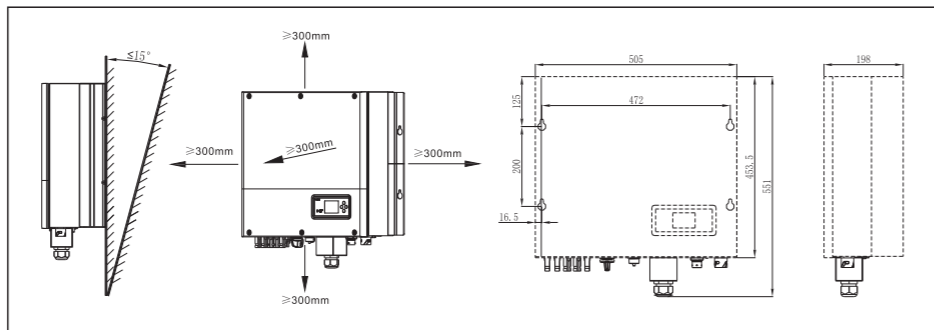
2. Installation

System Overview

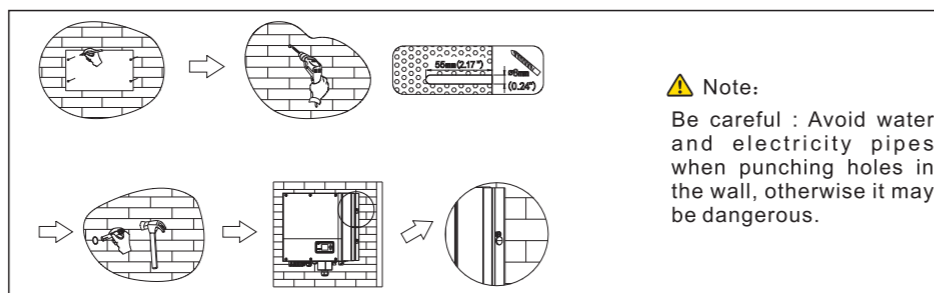


⚠ Note:
 The installation of this hybrid system needs to comprehensively consider the position of the battery and the power collector.

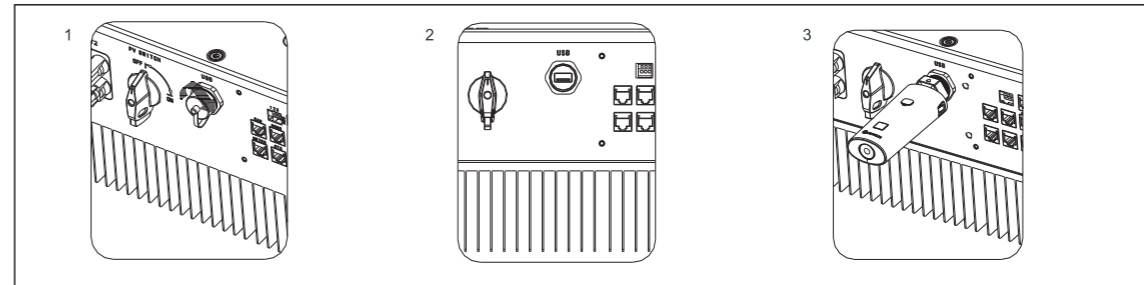
2.1 Installation requirements



2.2 Wall mounting



2.3 communication module installation



Follow the installation steps:
 1. Remove the USB waterproof cover.
 2. Plug in the communication module.

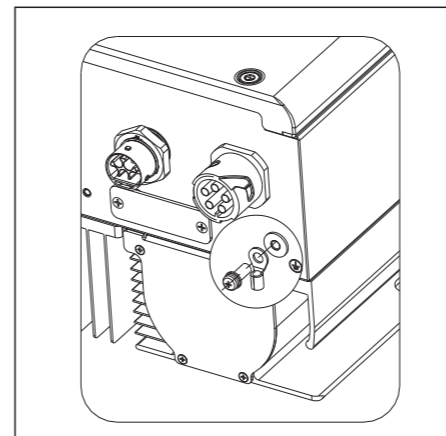
3. Connecting cables

Please prepare the cable before connecting as follows.

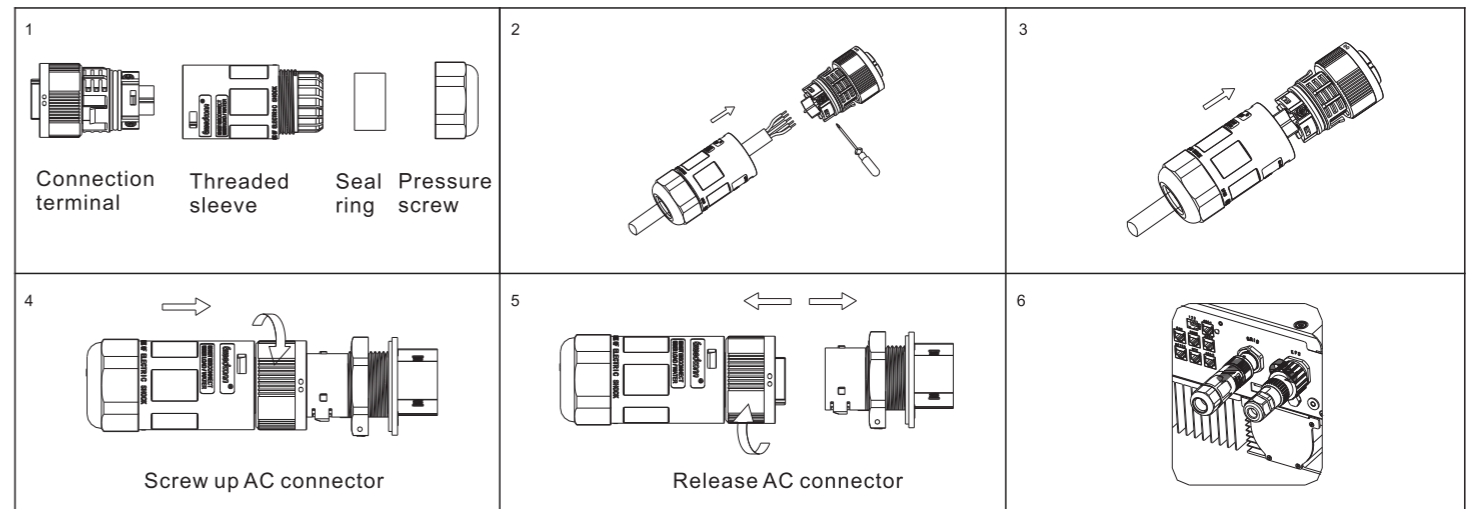
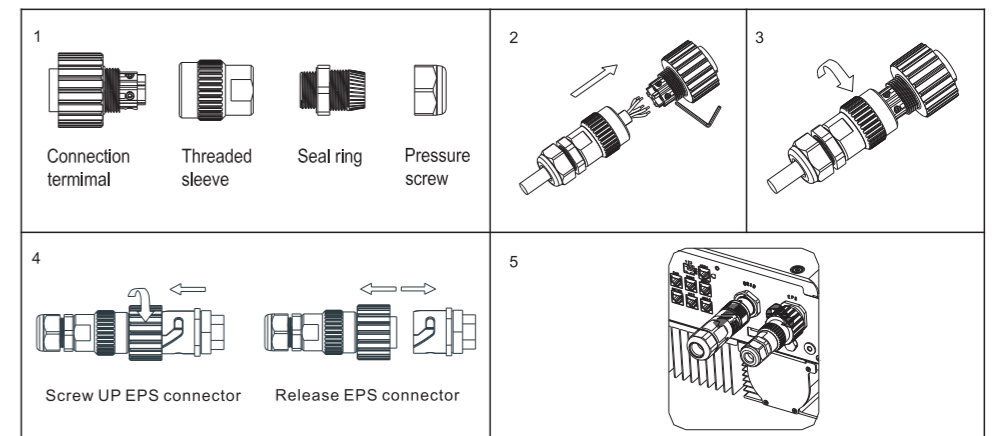
Number	Cable name	Type	Recommend module
1	Grounding wire	Single multi-core yellow-green copper wire	Wire diameter>AWG10
2	AC output wire	Two or three different color multi-core copper wires	Wire diameter>AWG12
3	PV input wire	Photovoltaic dedicated cable (such as PV1-F)	4mm ² - 6mm ²
4	Battery input wire	Red and black multi-core copper	Wire diameter>AWG10
5	Communication wire	CAT5E	/

⚠ Notice:
 1. Lithium battery has its own power line and communication line, so please use them directly.
 2. Hybrid inverter include the basic communication line. So please use them directly.
 3. Please make sure all the switches off before connection. For your safety, please do not operation when power on.

3.1 Grounding



3.2 AC GRID and EPS output connection



3.3 DC connection

3.3.1 PV and Battery input terminal installation

<p>1</p> <p>Positive metal terminal 8-10 mm</p> <p>Negative metal terminal 8-10 mm</p>	<p>2</p> <p>Please make sure cable can't put out from terminal after pressing.</p>	<p>3</p> <p>Positive metal terminal</p> <p>Negative metal terminal</p> <p>Pull the PV or Battery cable make sure there is no loosen or shaking.</p>
<p>4</p> <p>Lock nut to ensure fastening.</p>	<p>5</p> <p>Make sure the cable polarity is correct.</p>	

3.3.2 Plug in PV terminal

<p>1</p> <p>PV+ click</p> <p>PV- click</p>	<p>2</p> <p>click</p>	<p>Notes:</p> <ol style="list-style-type: none"> Please make sure the PV input voltage/current not beyond the specification before plug in. When installing the PV terminal, pay attention to the distinction between the positive and negative terminals and the one-to-one correspondence between the terminals and hybrid inverter. When the terminal is docked, there is a click sound. After the terminal is docked, gently pull the PV cable to observe whether the terminal is shaking or not.
--	-----------------------	---

3.3.3 Plug in Battery terminal

<p>1</p> <p>Blue terminal click</p> <p>BAT+ click</p> <p>BAT- click</p>	<p>2</p> <p>click</p>	<p>Notes:</p> <ol style="list-style-type: none"> Turn off the battery cabinet switch and disconnect the CAN communication cable before inserting. Make sure that the battery input voltage/current does not exceed the specifications. When installing the battery terminal, pay attention to the distinction between the positive and negative terminals and the one-to-one correspondence between the terminals and hybrid inverter. When the terminal is docked, there is a click sound. After the terminal is docked, gently pull the battery cable to observe whether the terminal is shaking or not.
---	-----------------------	--

3.3.4 Communication cables installation

<p>1</p> <p>RJ45 terminal Pressure screw Threaded sleeve RJ45 terminal</p> <p>Communication line Seal ring Waterproof cover</p>	<p>2</p>	<p>3</p> <p>NTC DRY CONTACT DRMS METER1 CAN RS485/METER2</p>	<p>When all the communication lines are installed, push the waterproof cover into the bottom, lock the screws fixed to the frame, and finally lock the waterproof cap.</p>
<p>4</p> <p>METER</p>	<p>5</p>	<p>6</p>	

4. Post-installation check

Number	Acceptance Criteria	Number	Acceptance Criteria
1	Hybrid inverter is installed correctly and firmly	2	ShineWiFi-X or Shinelink or GPRS is installed correctly and firmly.
3	Cable wiring is reasonable, meets the requirements, no broken skin, etc.	4	The ground wire confirms the connection and is reliable.
5	All switches off	6	All wires are correct and securely connected.
7	Cable tie port trimming, no sharp corners, etc.	8	All exposed terminals are well protected, no vacant ports.
9	Pay attention to packing all the residual materials.		

5. On off hybrid inverter

Notes:

Before power on, please make sure all of the voltage and current are in the range of specification of hybrid inverter. Otherwise it will be damage to hybrid inverter.

Follow are the steps of turn on actions:

- Turn on the switch between Grid and hybrid inverter.
- Turn on battery and the switch between battery and hybrid inverter.
- Turn on PV switch.
- Turn on Battery switch.
- If need to setup hybrid inverter. Please turn to user manual of hybrid inverter for detail description.
- The shutdown steps are opposite to the above order.
- The hybrid has an installation diagnosis function, please run "DiagnoseFun" after the installation is completed.

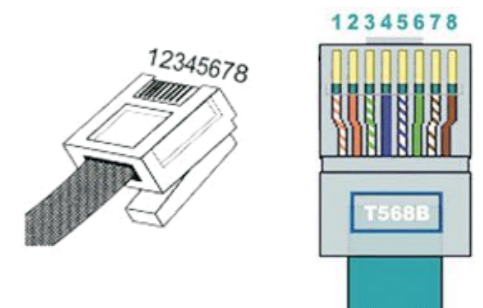
6. Status of hybrid inverter

Customer can read more information by push button. Follow are the instruction of button and LED.

Mark	Description	Explanation	
	Push-button	Operation of display screen and set system	
	Status symbol of SPH	Green light on	SPH run normally
		Red light on	Fault state
		Green light blinking	Alarm state
		Red light blinking	Software updating

7. Definition of RJ45 Port Pin

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



8. Service and contact

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Growatt New Energy



Installation & Operation Manual



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GR-UM-226-A-01

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1 Brief Introduction

1.1 Preface

This manual will provide the users who use the Growatt SPH TL3 BH-UP Series of Shenzhen Growatt New Energy Technology Co.,LTD(Short for Growatt as below) with the detailed product information and the installation instructions. Please read this manual carefully and put this manual on some place where is convenient to installation, operation, obtain. Any modifications of Growatt new energy, we will not notify the user.

1.2 Target Group

Growatt SPH TL3 BH-UP inverter must be installed by professional electrical personnel who have obtained the certification of the relevant departments. We have two kinds of energy storage machine for different battery one is for lithium battery and the other is for lead-acid battery, we suggest: customer should decide which kind of energy storage machine you want, Growatt can provide only lithium battery with energy storage machine, customer can choose lead-acid energy storage machine with no battery provide by Growatt while they can buy these battery from market easily. Especially if customer choose energy storage system with lithium battery(which must be provide by Growatt) but used for lead-acid battery or used lead-acid battery for lithium battery model, it will be dangerous. Installer can install energy storage machine of Growatt SPH TL3 BH-UP Series rapidly and troubleshooting, build communication system through read this manual carefully.If you have any questions in the process of installation, you can login in www.growatt.com and leave some message.Or you can call our 24-hour service hotline+86 0755 2747 1942.

1.3 Product Description

Growatt SPH TL3 BH-UP Series is used to store energy generated by the photovoltaic cell panels or energy from grid if it is allowed in the battery, also energy can be sent to power grid through SPH TL3 BH-UP for self consumption or when Grid power is lost, SPH TL3 BH-UP can be used as backup power.

SPH series has six kinds of type:

- 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: we describe this series as "SPH" as below.

Overview:

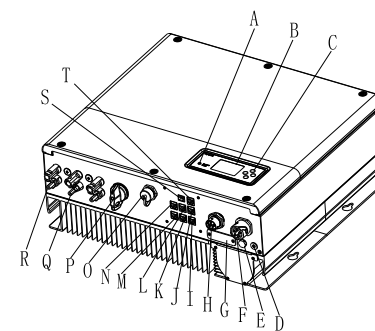


Chart 1.1

Position	Description
A	LED of status display
B	LCD screen
C	Function button
D	Ground point
E	Breathable valve
F	UPS output(off grid connection)
G	RSD(do not open except by Professional staff)
H	AC Grid (on grid connection)
I	Rs485 communication interface(Reserved)
J	Rs485 communication interface of meter2(Reserved)
K	NTC: Lead-acid temperature sensor terminal
L	Rj45 interface of DRMs(used only in Australia)
M	Rs485 communication interface of meter1
N	CAN communication interface of Lithium battery
O	USB interface
P	PV switch
Q	PV input
R	Battery terminal
S	Dry contact
T	Rs485 communication interface of meter2(Reserved)

1.4 Safety Instructions

1. Please be clear which kind of battery system you want, lithium battery system or lead-acid battery system, if you choose the wrong system, SPH can't work normally.
2. Please read this manual carefully before the installation, The company has the right not to quality assurance, If not according to the instructions of this manual for installation and cause equipment damage.
3. All the operation and connection please professional electrical or mechanical engineer.
4. During installation, Please don't touch the other parts within the box.
5. All the electrical installation must comply with the local electrical safety standards.
6. If equipments needs to maintain, Please contact with local specify system installation and maintenance personnel.
7. Use the equipment to combined to grid needs to obtain the permission of local power supply 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 Safety

2.1 Purpose Use

The system chart of SPH:

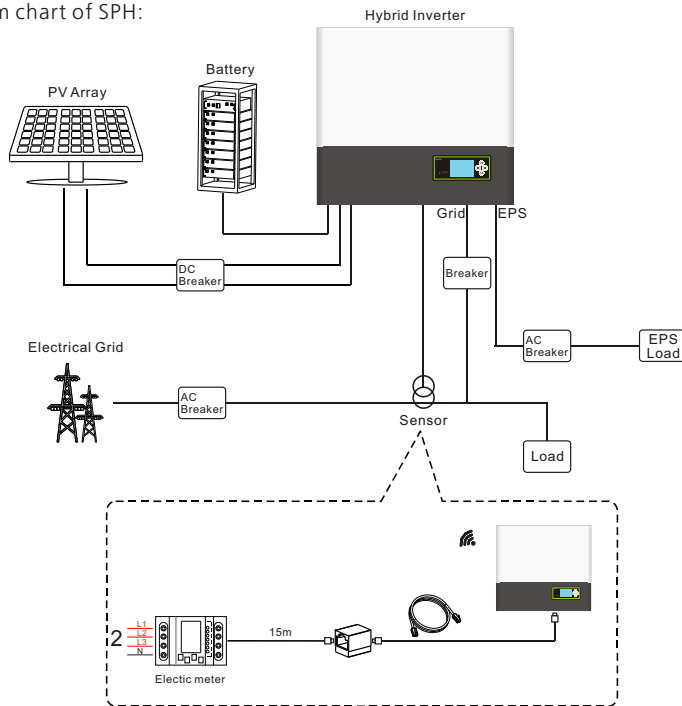


Chart 2.1

As shown above, a complete grid-connected system of SPH consists of PV modules, SPH inverter, battery, utility grid and other components.

Attention:

As the system refer to battery use, We must make sure ventilation of the service environment and temperature control in order to prevent the danger of battery explosion, Battery recommended installation environment must be strictly in accordance with the specification, if the specification is IP20 environment, the pollution degree of the unit is PD2, meanwhile the temperature should be control in the 0-40°C of indoor ventilation and the humidity should be 5%-85%. If the chosen PV modules needs to positive or negative ground connection, please contact with Growatt for technical support before installation.

2.2 Safety Measure



Risk of high voltage !

Relevant operation for professional personnel.

Please notice children, disabled, laypeople do not close.

Supervise and make sure children don't play near the installation position of energy storage machine.



Risk of burns on the parts shell of SPH inverter !

During the work, Cover, shell around, radiator is likely to be hot.



SPH inverter exists radiation maybe affect health !

Don't stay a long time within 20cm range from SPH inverter.










SPH inverter ground connection

Please ensure SPH inverter ground connection is reliable for make sure people's safety.

2.3 Symbols introduction on the SPH inverter

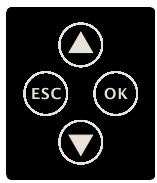
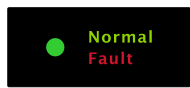
Symbol	Description
	Caution: Risk of electrical shock!
	Caution : hot surface!

	Caution: risk of danger!
	Danger to life due to high voltage in SPH. There is residual voltage in SPH, SPH requires 5 minutes to discharge. Please wait 5 minutes before you open the upper lid or the DC lid.
	Protective conductor terminal
	Direct Current(DC)
	Alternating Current(AC)
	The machine complies with the requirements of the applicable CE guidelines
	Refer to the operating instructions.

3 Product Description


3.1 Growatt SPH series inverter

Marks of SPH

Mark	Description	Explanation	
	Push-button	Operation of display screen and set system	
	Status symbol of SPH	Green light on	SPH run normally
		Red light on	fault state
		Green light blinking	Alarm state
		Red light blinking	Software updating

3.2 Label Explanation

Label contains the following information: for example SPH 10000TL3 BH-UP shows as below:

GROWATT Hybrid Inverter	
Model name	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 output/input data	
Nominal input/output power	15000/10000 W
Max. output apparent power	10000 VA
Nominal voltage	3W/N/PE 230/400 a.c.V
Max. input/output current	22.7/15.2 a.c.A
Nominal Frequency	50/60 Hz
Power factor range	0.8leading~0.8lagging
Stand alone data	
Nominal AC output power	10000 W
Nominal AC output voltage	230/400 a.c.V
Nominal AC output Frequency	50/60 Hz
Battery data	
Battery voltage range	100-550 d.c.V
Max. charging and discharging current	25 d.c.A
Type of battery	Lithium/Lead-acid
Others	
Safety level	Class I
Ingress Protection	IP65
Operation Ambient Temperature	-25°C - +60°C
VDE0126-1-1	
	
X Made in China	

Description of label :

The type of product	Growatt SPH 10000TL3 BH-UP
PV input data	
Max. PV voltage	1000Vdc
PV voltage range	120~1000Vdc
PV Isc	16.9A*2
Max. input current	13.5A*2
AC output/input data	
Max. output power	10000W
Max. apparent power	10000VA
Nominal output voltage	3W/N/PE 230/400Vac
Max output current	15.2A
Nominal output Frequency	50Hz/60Hz
Power factor range	0.8 leading~0.8 lagging
Stand alone data	
Nominal AC output power	10000W
Nominal AC output voltage	230/400Vac
Nominal AC output Frequency	50Hz/60Hz
Battery data	
Battery voltage range	100~550Vdc
Max. charge and discharge current	25A
Type of battery	Lithium / Lead-acid
Others	
Safety level	Class I
Ingress Protection	IP65
Operation Ambient Temperature	-25°C~+60°C
Certificates Number	(For Australian models)

3.3 Size and weight

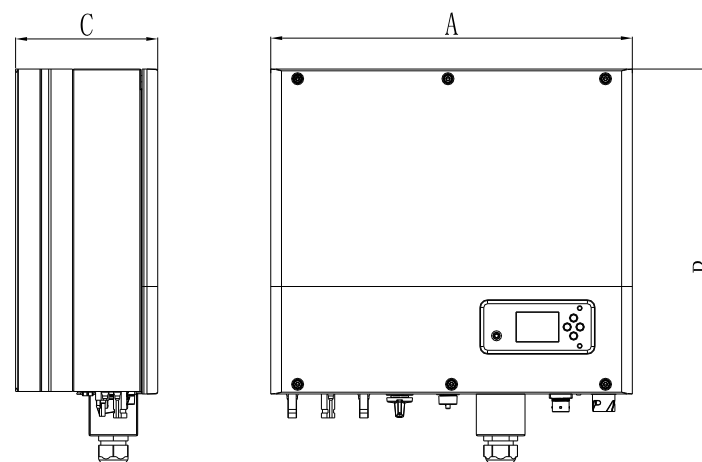


Chart 3.1

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

3.4 The advantage of the unit of Growatt SPH

Features below:

- All in one design. Can improve self consumption, back up and also pinch the valley.
- Smart management, work mode can be set.
- Safe battery used.
- Easy installation.
- Two mpp tracker input.