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Hybrid Solar Inverter with Energy Storage

STG-PH series 3.6-6.0kW

INSTRUCTION MANUAL

Please download the software "SolarPowerMonitor2.2.81".

Download link: https://bit.ly/2PyyLg6

Contents

1 Notes on this manual
1.1 Overview

This user manual covers instructions and detailed procedures for installing, operating, maintaining, and troubleshooting the STG-PH 3.6-6kW series of inverters.

Please keep this manual available at all times in case of emergency.

This manual does not cover any details concerning equipment connected to the unit (e.g. PV modules).

1.2 Use instructions

1.2.1 Only professionals who have read and fully understood all the safety rules contained in this manual can install, maintain, and repair this inverter. The operator must be aware that this is a high-voltage device. Qualified personnel must be trained to handle dangers associated with installing electrical equipment.

1.2.2 Before using the inverter, read all labels on this machine. Additionally, read all instructions carefully and store them in an easily accessible place. The manufacturer and supplier are not responsible for any damage caused by non-compliance with these instructions.

1.2.3 The system with this inverter should strictly comply with local laws and regulations in testing and design.

1.2.4 The local safety standards, as well as commonly accepted industry standards, must be adhered to during the installation, operation, and maintenance of the inverter.

1.2.5 Incorrect operation may cause electric shock, injury or damage to the inverter.

1.3 Symbols
Pay attention to the relevant symbols in the product manual and product packaging.

1.3.1 Markings in the manual

SYMBOL	DESCRIPTION
 **DANGER**	**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 **WARNING**	**WARNING** indicates a hazardous situation which, if not avoided, could result in death ,moderate or serious injury .
 **CAUTION**	**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
 **NOTE**	**NOTE** indicates a situation that can result in potential damage, if not avoided.
	Read the manual.

(Table 1.1)

1.3.2 Markings on this product

Symbol	Description
	**Warning regarding dangerous voltage** The product works with high voltage. All work on the product must only be performed as described in the documentation.
	**Beware of hot surface** The product can become hot during operation. Do not touch the product during operation.
	**Observe the operating instructions** Read the documentation before working on it. Follow all safety precautions and instructions as described in the documentation.
	**CE and UKCA Marks** Equipment with CE and UKCA marks meets the basic requirements of the Low-Voltage and Electromagnetic Compatibility regulations.
	**SAA Mark** The inverter complies with the requirement of Equipment and Product Safety Act in Australia.
	**CQC Mark** Equipment standard in line with China Quality Inspection Center safety directive.
	**No unauthorized perforations or modifications** Unauthorized perforations or modifications are strictly forbidden. The manufacturer and supplier shall not be held responsible for any defects or damage to the device or persons resulting from suchactions.
	**Point of connection for grounding protection**
	**Direct Current (DC)**
	Alternating Current (AC)
	Signals danger due to electrical shock and indicates the times (5 minutes) to allow after the inverter has been turned off and disconnected to ensure safety in any installation operation.

(Table 1.2)

2 Safety and conformity

SYMBOL	INSTRUCTIONS
 **DANGER**	**Danger to life due to lethal voltages!** Lethal voltages are present within the unit and on the power supply lines. Therefore, only authorized electricians may install and open the unit. Even when the unit is disconnected, high contact voltages may still be present within the unit.
 **DANGER**	**Danger of burn injuries due to hot enclosure parts!** During operation, the four sides of the enclosure lid and the heat sink may become hot. Only touch the front enclosure lid during operation and use gloves.

 **CAUTION**	**Possible damage to health because of the effects of radiation!** In special cases, there may still be interference for the specified application area despite maintaining standardised emission limit values(e.g.when sensitive equipment is located at the setup location or when the setup location is near radio or television receivers). In this case, the operator is obliged to take proper actior to rectify the situation. Do not stay closer than 20 cm to the inverter for any length of time.
 **NOTE**	**Grounding the PV generator!** The installation must comply with requirements for grounding the PV modules. We recommend connecting the PV frame and other electrically conductive surfaces in a manner which ensures continuous conduction with ground to have optimal protection of the system and personnel.
 **NOTE**	**Capacitive Discharge Currents**! PV modules with large capacities relative to earth, such as thin-film PV modules with cells on a metallic substrate, may only be used if their coupling capacity does not exceed 470nF. During the feed-in operation, a leakage current flows from the cells to earth, the size of which depends on the way the PV modules are installed (e.g. foil on metal roof) and on the weather (rain, snow). This "normal" leakage current may not exceed 50mA since the inverter would otherwise automatically disconnect from the electricity grid as a protective measure.

(Table 2.1)

2.1 DC and AC breaker

Separate the unit securely from the grid and the PV, generators and battery using DC and AC breaker. DC and AC breaker will be able to disconnect all non-ground conductors after installation.

2.2 Grounding of the PV modules

The unit is an energy storage inverter. That is why it has no galvanic separation. Do not ground the positive or negative terminals of the PV modules connected to the unit. Only ground the mounting frame of the PV modules.

If you connect grounded PV modules to the unit the error message "PV Isolation Low" will appear.

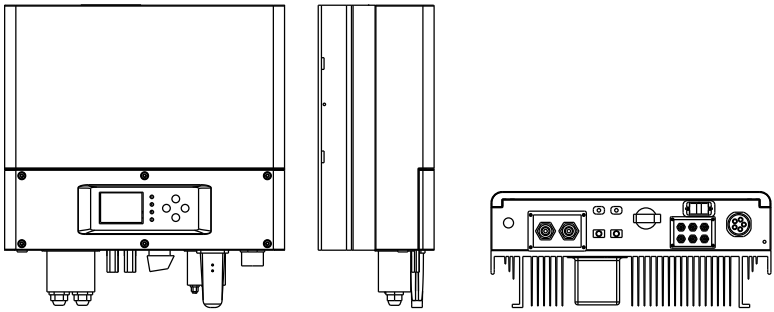
2.3 Qualification of skilled workers

Only appropriately qualified workers should install this inverter. The workers must have the following skills:

- Knowledge of how an inverter works and is operated.
- Instructed in how to deal with the dangers and risks associated with installing and using electrical devices.
- Trained in the installation and commissioning of electrical devices.
- Knowledge of all applicable standards and guidelines.
- Knowledge and observance of this manual and all safety instructions.

3 Product description

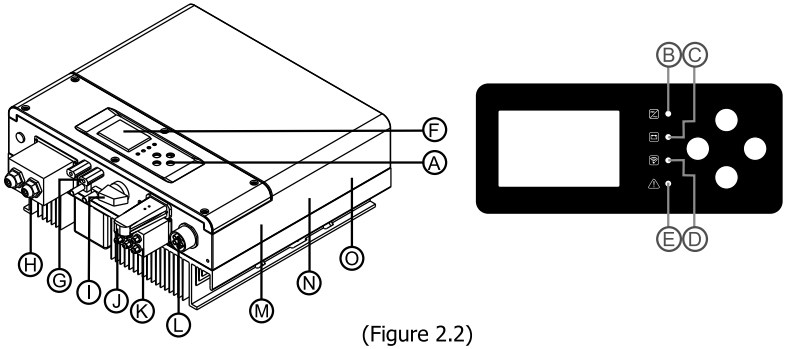
3.1 Inverter overview



(Figure 2.1)

3.2 Information about the unit

The unit is a bidirectional grid-tie inverter, suitable for photovoltaic systems with batteries to store energy. Energy produced by the PV system is used to optimize self-consumption; excess energy is used to charge the batteries, and then fed into the public grid if there is any excess energy produced. When the PV energy output is insufficient to support the connected loads, the system automatically draws energy from the batteries, if the battery capacity is available. If the battery capacity is insufficient to meet the consumption requirements, electricity will be drawn from the public grid.



(Figure 2.2)

A	Function button
B	The inverter operation status indicator
C	Battery indicator
D	Wi-Fi status indicator
E	Fault indicator
F	LCD display panel
G	PV input terminals
H	Battery input terminals and cover
I	PV input switch
J	Wi-Fi com module
K	BTS terminal, BMS terminal, load monitor terminal, CAN communication terminal, USB terminal and cover
L	AC Output terminals and cover
M	Inverter Serial No.
N	Rating label
O	Warning signals label

3.3 Storage of the inverter

If you want to store the unit in your warehouse, you should choose an appropriate location:

- The unit must be stored in its original packaging and desiccant must be left in the package.
- The storage temperature should always be between -25°C and +60°C.
- The storage relative humidity should always be between 0 and 95%, non-condensing.
- A maximum of four units can be stacked vertically.

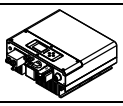
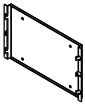
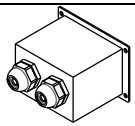
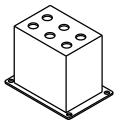
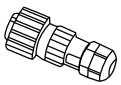
4 Unpacking

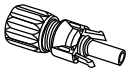
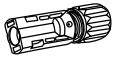
4.1 Check the package

Although the inverter has surpassed stringent testing and is checked before it leaves the factory, it is uncertain that the inverter may suffer damages during transportation. Please check the package for any obvious signs of damage within 7 days after delivery. If damage is found, do not open the package, and contact your supplier as soon as possible.

4.2 Check the assembly parts

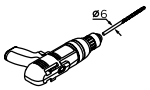
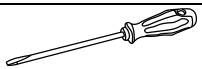
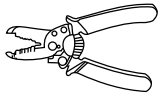
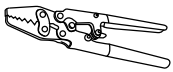
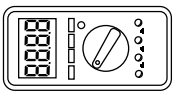
After opening the package, please refer to Table 4.1 to check the completeness of the assembly parts. Please contact your supplier if anything is damaged or missing.

NO.	Pictures	Description	Quantity and Unit
1		Inverter	1PCS
2		Mounting frame	1PCS
3		Wi-Fi module	1PCS
4		Battery wire cover	1PCS
5		BMS, RS485 com wire cover	1PCS
6		AC output cover	1PCS
7		Wall screws	4PCS
8		Inverter screws	2PCS

9		Battery input terminals	2PCS
10		PV+ input connectors	2PCS
11		PV- input connectors	2PCS
12		Metal terminal pins for PV+ input connectors	2PCS
13		Metal terminal pins for PV- input connectors	2PCS
14		CT clamp	1PCS
15		User Manual	1PCS

(Table 4.1)

4.3 Tools required for the installation (not provided)

NO.	Tool	Model	Function
1		Hammer drill Recommended drill diameter 6mm	To drill holes in the wall
2		Screwdriver	Secure the screws for mounting frame, battery terminals, and AC terminals
3		Solar connector tool	Fitting and removal of PV connectors
4		Wire stripper	To strip wire
5		Crimping tools	To crimp power cables
6		Multimeter	To take voltage readings

(Table 4.2)

5 Installation and electrical connection

5.1 Safety

DANGER

Danger to life due to fire or explosion

Despite careful construction, electrical devices can cause fires. Do not install the inverter on flammable or combustible materials or in a location where flammable materials are stored.

DANGER

Risk of burns due to hot enclosure parts

Mount the inverter in such a way that it cannot be touched inadvertently.

DANGER

All electrical installations must be done in accordance with the local and national electrical codes. Do not remove the casing. The inverter contains no user serviceable parts. Refer servicing to qualified service personnel. All wiring and electrical installation should be conducted by qualified service personnel.

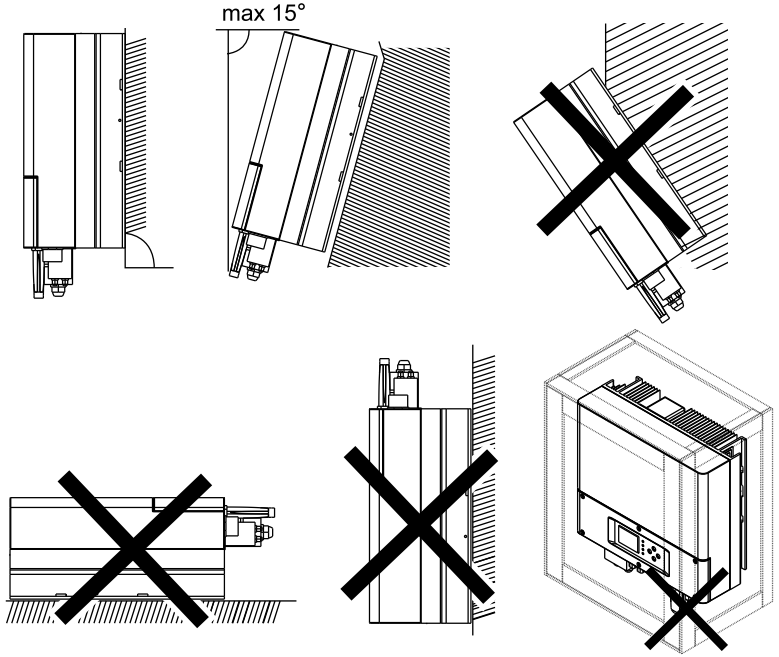
Other installation points:

- Carefully remove the unit from its packaging and inspect for external damage. If you find any imperfections, please contact the installation contractor or supplier.
- Ensure that the inverter is properly grounded to protect property and for personal safety.
- The inverter must only be operated with a PV array. Do not connect any other source of energy to it.
- Both AC and DC voltage sources are present inside the Inverter. Please disconnect all these circuits before servicing the inverter.
- This unit is designed to feed power to the public power grid (utility) only. Do not connect this unit to a different AC source.
- Any PV modules connected to the inverter will charge the DC link capacitors. Energy stored in the inverter DC link capacitors presents a risk of electric shock. Even after the unit is disconnected from the grid and PV array, high voltages may still exist inside the PV-Inverter. Do not remove the casing until at least 5 minutes after disconnecting all power sources.
- Although designed to meet all safety requirements, some surfaces of inverter will still be still hot during operation. To reduce the risk of injury, do not touch the heat sink at the back of the inverter or nearby surfaces while the inverter is operating.

5.2 Selecting the installation location

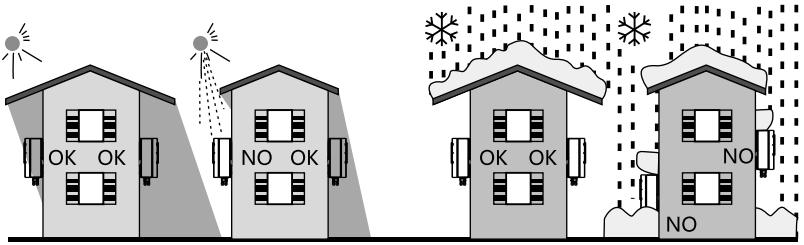
- This is a guidance for the installer to choose a suitable installation location, to avoid potential risks to the device and operators.
- The unit must be mounted at least 914 mm (3 feet) above the ground.
- The installation location must be suitable to support the inverter's weight and size for a long period of time.
- Select the installation location so that the status display can be easily viewed.
- Do not install the inverter on structures made of flammable, combustible or thermolabile materials.
- The humidity of the installation location should be 0~95% without condensation.
- The installation location must remain free and safe to access.
- Installation must be vertical or tilted backwards by maximum angle of 15°. Make sure the connection terminals of the inverter are located on the bottom. Never install horizontally. Do not install with forward or sideways tilt.

- Be sure that the inverter is out of children's reach.
- Do not put anything on top of or cover the inverter.
- Do not install the inverter near television antennae or any other antennae/antennae cables.
- The inverter requires adequate cooling space. Ensure good ventilation for the inverter to ensure the heat can escape adequately. The ambient temperature should be below 40°C to ensure optimum operation.



(Figure 5.1)

- The inverter should not be installed in direct sunlight and should have coverage from the elements:



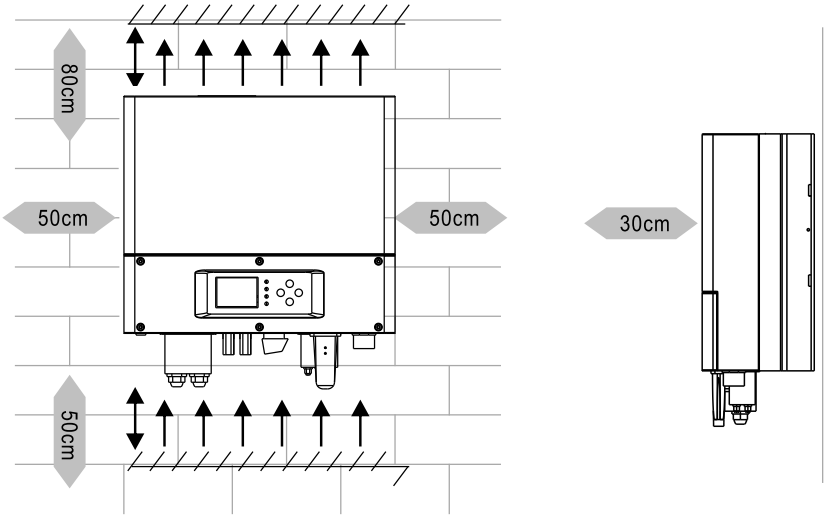
(Figure 5.2)

- Observe the minimum clearances to walls, other inverters or objects as shown in the diagrams below to guarantee sufficient heat dissipation.

Direction	Min. clearance (cm)
above	80
below	50
sides	50
front	30

(Table 5.1)

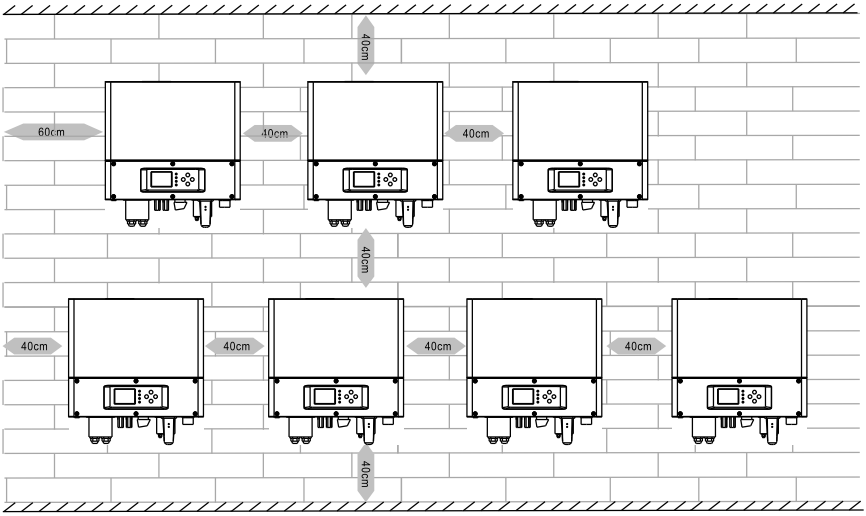
Ambient dimensions of one inverter



(Figure 5.3)

Ambient dimensions of multiple inverters:

- There must be sufficient space between each individual inverter to ensure that the cooling air of the adjacent inverter is not taken in.
- If necessary, increase the clearance space and make sure there is enough fresh air supply to ensure sufficient cooling of the inverters.



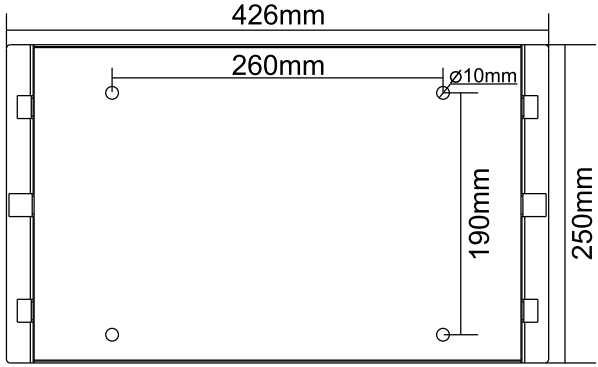
(Figure 5.4)

5.3 Mounting the inverter with the bracket

WARNING

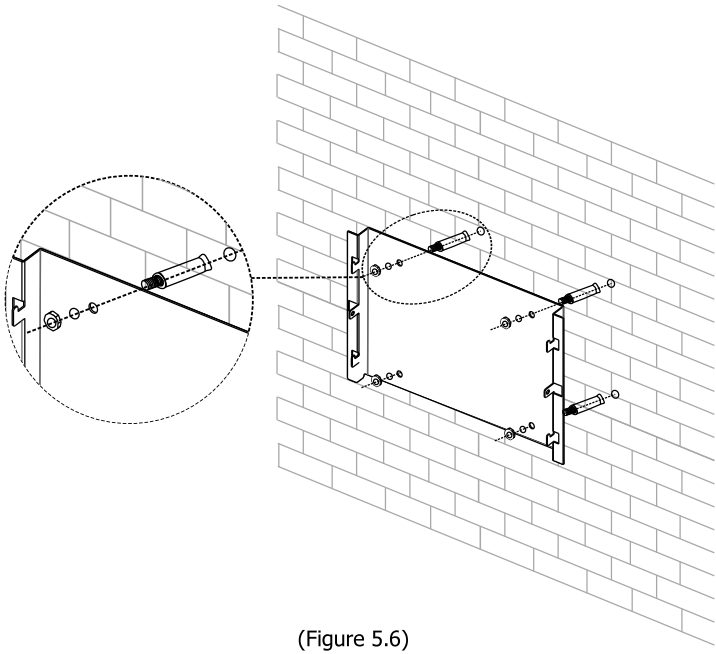
To avoid electrical shock or other injury, check for existing electronic or plumbing installations before drilling holes.

The dimension of the mounting bracket:



(Figure 5.5)

- Use the mounting bracket as a template to drill holes, as illustrated in the image below.
- Fix the mounting frame as the image shows. Do not make the screws flush to the wall, instead, leave 2 to 4mm exposed.



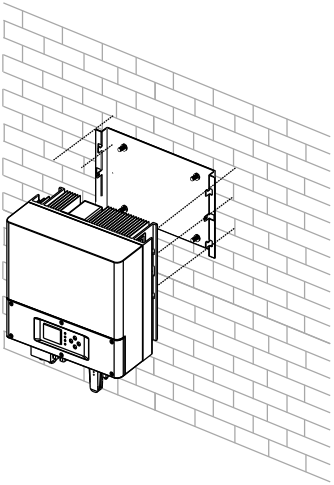
(Figure 5.6)

5.4 Fixing the inverter on the wall

WARNING

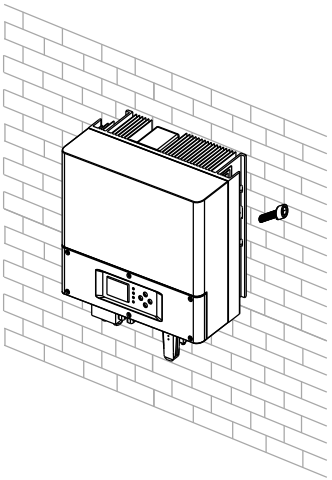
Falling equipment can cause serious or even fatal injury. Never mount the inverter on the bracket unless you are sure that the bracket is firmly attached on the wall after careful checking.

- Raise the inverter a little higher than the bracket whilst maintaining the balance of the inverter.
- Hang the inverter on the bracket through the matching hooks on bracket.



(Figure 5.7)

- After confirming the inverter is fixed reliably, fasten the two M5 safety-lock cap head screws on the left and right side firmly to prevent the inverter from being lifted off the bracket.



(Figure 5.8)

5.5 Checking the inverter installation status

Once the inverter has been installed, please make sure to check the following:

- Check the upper mounting rails of the inverter and ensure they fit on to the bracket.
- Check the security of mounting of the inverter by trying to raise it from the bottom and detach from the bracket. The inverter should remain firmly attached.

5.6 Electrical connection

5.6.1 Safety

WARNING

Danger to life due to lethal voltages!

High voltages which may cause electric shocks are present in the conductive parts of the inverter. Prior to performing any work on the inverter, disconnect the inverter on the AC side, PV side and battery side.

Do not reverse the polarity of the battery connection as this will instantly damage the inverter!

WARNING

Danger of damage to electronic components due to electrostatic discharge.

Take appropriate ESD precautions when replacing and installing the inverter.

WARNING

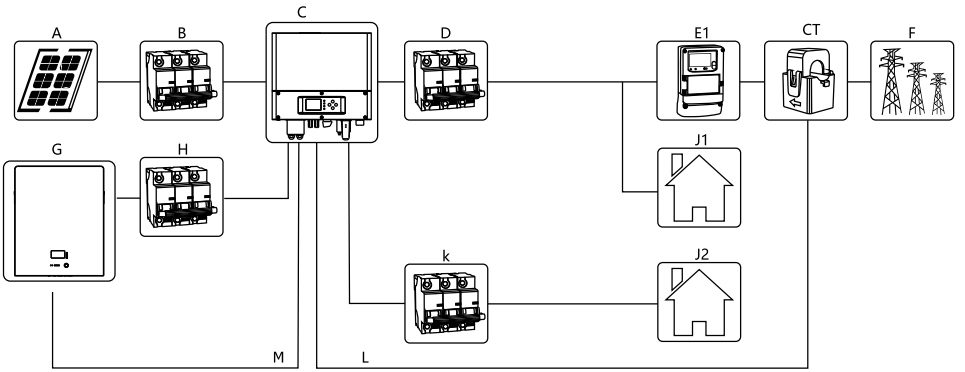
Grounding

Before connecting the power cables, you must connect the ground wire first.

Note:

- The electrical wiring must be carried out by professional technicians. Before any electrical connection is made, it must be considered and kept in mind that the inverter is bi-directionally powered. Professional personnel must wear personal protective equipment such as insulating gloves, insulating rubber shoes with toe caps, goggles and a safety helmet.
- Electrical connections should follow appropriate rules in regards to conductor cross-sectional area, fuses, grounding protection, cable insulation and trunking.

5.6.2 Inverter system diagram



(Figure 5.9)

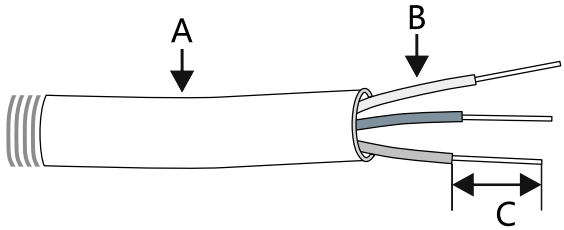
Position	Description
A	PV module
B	PV side breaker
C	Inverter
D	Main AC output breaker
E1	Energy meter used to measure utility power consumption
F	Utility grid
G	Battery
H	Battery DC breaker
J1	Normal loads
J2	Essential loads
K	Back-up output breaker
L	Cable to connect CT clamp and the inverter
M	BMS communication connection
CT	CT clamp to measure current flow from the grid / to the grid

(Table 5.2)

5.6.3 Connection to the grid (AC / utility)

NOTE

- Use only solid or stranded wire. Do not use fine stranded wire.
- Use cables which are suitable for high ambient temperatures.
- Use cables with a large cross-sectional area.



(Figure 5.10)

Bare length C=8mm, output cable requirements:

Product Model	Area (mm^2) B	AWG No.
3.6kW	4.17	AWG11
4kW	5.26	AWG10
4.6kW	5.26	AWG10
5kW	5.26	AWG10
6kW	6.63	AWG9

(Table 5.3)

NOTE

The cable length should not exceed 48m as the resistance of the cable will result in a power loss and reduce the inverter efficiency.

WARNING

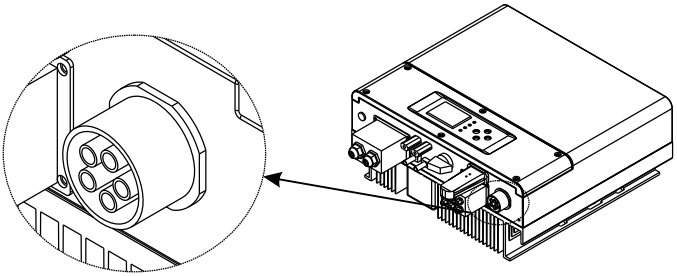
• You must install a separate AC circuit-breaker or other load disconnection unit between the inverter and utility, to ensure that the inverter can be safely disconnected under load.
The separate disconnection unit needs to meet the requirements below:
Voltage: the rated voltage of the breaker must be higher than the AC grid voltage.
Current: the current must not be less than 1.2 times of the inverter max output current.
• Single-phase AC circuit breakers are selected according to Table 5.4.
• **Connecting to the back-up.**
You can connect the important loads to the back-up AC output; however, you must install a AC separate circuit-breaker or another load disconnection unit between the inverter back-up output and the important load, to ensure that the inverter can be safely disconnected under load.

We suggest using an AC breaker with the following specifications:

Product Model	AC Breaker Rating
3.6kW	25A/230V
4kW	28A/230V
4.6kW	28A/230V
5kW	30A/230V
6kW	32A/230V

(Table 5.4)

• **Connecting to the grid**
1. The grid connection has 5 conductors (L1, L2, L3, N, PE).



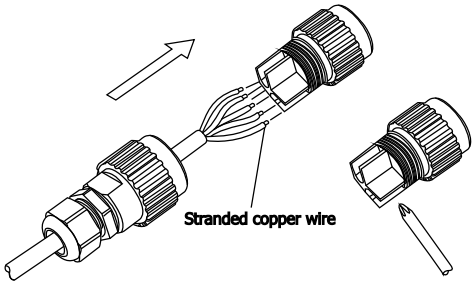
(Figure 5.11)

2. Insert the stripped conductors (EPS_L, EPS_N, GRID_L, GRID_N, PE): into the screw terminals of the connector with the signs L1, N, L2, L3, PE (⏚) and tighten the screws firmly.

EPS relates to essential loads output (marked J2 in Figure 5.9). It is not necessary to use this output.

WARNING

Ensure EPS and grid wires are not confused and are connected strictly according to the table in Figure 5.12 below. An error in connecting the grid wires to incorrect terminals may damage the inverter.

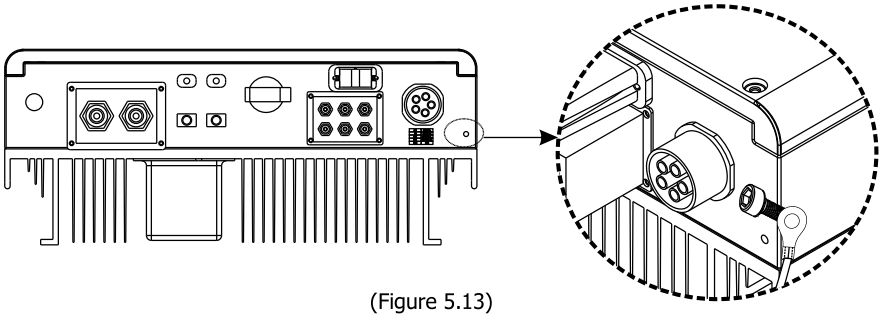


L1	EPS-L
N	EPS-N
L2	GRID-L
L3	GRID-N
PE	PE

(Figure 5.12)

● Grounding the inverter

The inverter must be connected to the AC grounding conductor of the grid via the ground terminal (PE) ⏚, the symbol "PE" is shown in Figure 5.11 and Figure 5.12. If necessary, ground the chassis as shown below.



(Figure 5.13)

5.6.4 Connection to PV panels

DANGER
Risk of electric shock and fire. Use only with solar panels (not any other source of power), and with a maximum open circuit voltage of solar panels within 500Vdc at any temperature.

DANGER
Electric shock hazard. The DC conductors of this PV system are normally ungrounded but will become intermittently grounded without indication when the inverter detects the PV array isolation.

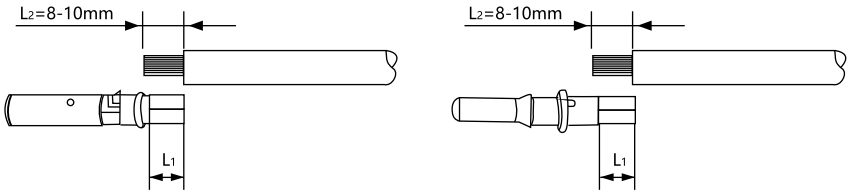
DANGER
Never disconnect the PV connectors under load.

DANGER
Because of the non-isolated design, the PV positive pole and PV negative pole of the solar array are not permitted to be grounded.

• **Connecting PV input power cables**

Step 1 Remove cable glands from the positive and negative PV connectors.

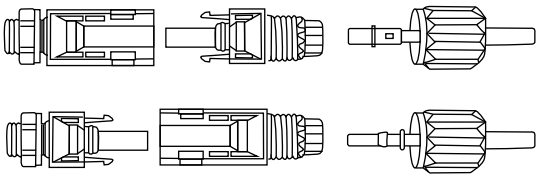
Step 2 Take out the metal pins from accessories package and strip the cable ends as shown in Figure 5.14.



(Figure 5.14)

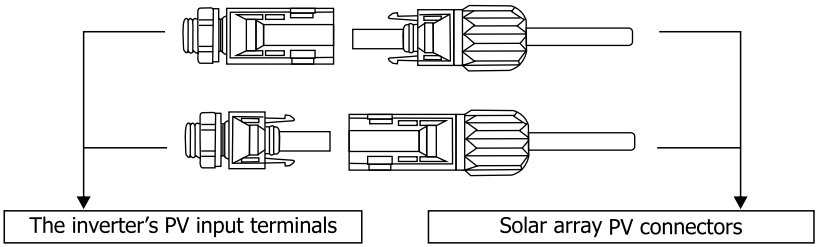
Step 3 Insert the positive and negative cables into the corresponding cable glands.

Step 4 Insert the stripped positive and negative power cables into the positive and negative metal pins respectively and crimp them using a suitable crimping tool. Ensure that the cables are crimped until they cannot be pulled out by force less than 400 N. Insert the metal pins with the cables into the plastic connector housings until the end and tighten the nuts firmly.



(Figure 5.15)

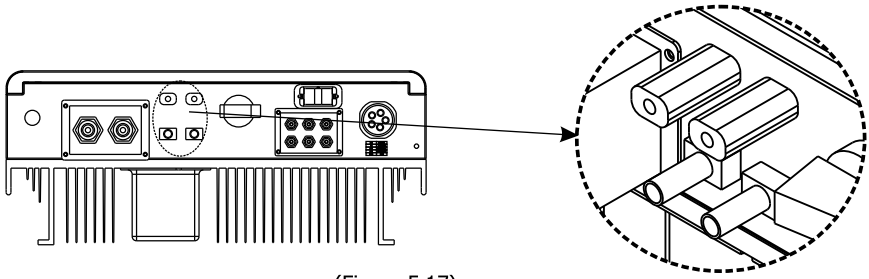
Step 5 Plug the positive and negative connectors into the corresponding PV input terminals of the inverter until you hear a "click" sound.



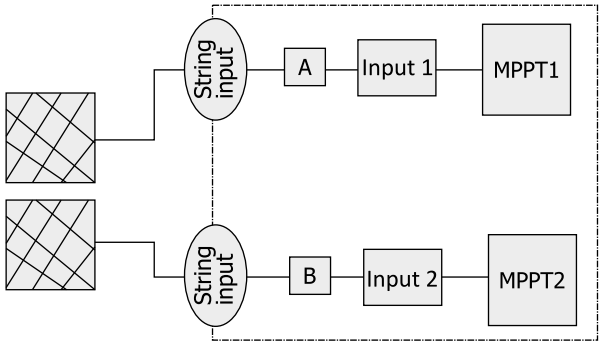
(Figure 5.16)

• Two MPPT trackers

The STG-PH series inverter has 2 independent PV inputs: input A and input B. Each input has a separate MPPT tracker which extracts the maximum power from each solar array independently. This significantly increases the system efficiency for installations where 2 solar arrays are positioned at a different angle or orientation on the roof, or they are affected by shading at different times of the day.



(Figure 5.17)



(Figure 5.18)

In smaller systems only one of the solar inputs can be used (either A or B) as long as the maximum output voltage and current of the array are within the maximum limits of the inverter (500Voc / 15A).

Note: while it is permissible to use different makes or sizes of solar modules in one of the arrays compared to the other, please ensure that all modules connected within the same array are identical.

CAUTION

If the inverter is not equipped with a built-in PV isolator switch, please install an external PV switch.

(Table 5.5)

• Conditions for PV connection

CAUTION	Before connecting the PV array, ensure that the PV, battery switch and AC breaker are open and the inverter is disconnected from any power. Never connect or disconnect the PV connectors under load. Ensure that: - The maximum open circuit voltage (Voc) of each PV string (on input A or B) is less than 500Vdc at any temperature. - The PV input current of each string does not exceed 15A.

Cable requirements:

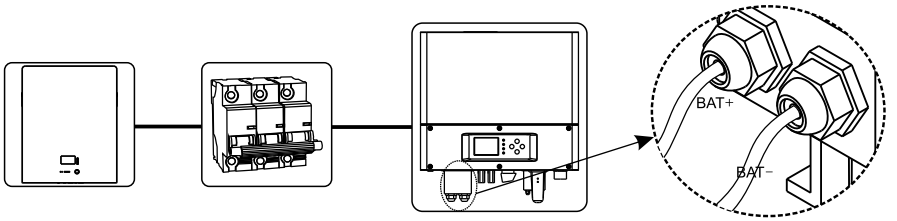
Product Model	Cross sectional area (mm^2)	AWG No.
3.6kW	6~10	8~10
4kW		
4.6kW		
5kW		
6kW		

(Table 5.5)

5.6.5 Connection to the battery

5.6.5.1 Battery power line connection

Before connecting to the battery, you much install a separate DC breaker between the inverter and the battery for overcurrent protection and isolation during maintenance. The overcurrent trip rating of the breaker should be chosen according to the inverter DC input current, but in any case, it should not be higher than the maximum current rating of the cables connecting the inverter and the battery.

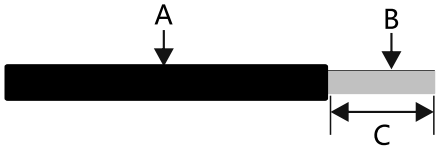


(Figure 5.19)

DANGER

Reversed polarity will damage the inverter!!!

It is very important for system safety and efficient operation to use the appropriate cable for battery connection.



(Figure 5.20)

Gauge	Description	Value
A	Cable Outer Diameter	10~15mm
B	Conductor Cross-Section	35~50mm2
C	Bare Wire Length	~10mm

(Table 5.6)

5.6.5.2 Battery communication cable connection (for lithium batteries only)

(Figure 5.21)

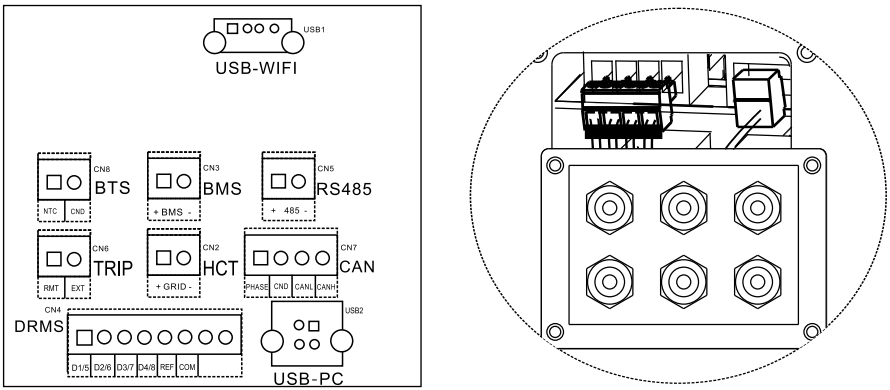
The above is an example of the battery communication cable with the pin configuration for CAN protocol. This cable is suitable for Photonic Universe lithium batteries LFP48-100W and LFP48-100R series. For other battery types and brands, please use or make a cable with the RS485 or CAN pin configuration matching the pins in the socket of your battery.

The battery installation must comply with the battery user manual.

The following steps must be followed when connecting the battery:
(1) Disconnect the breaker between the inverter and the battery.
(2) Check the polarity of the battery cables and the inverter's battery terminals.
(3) Compress the bare ends of the battery cables using an appropriate tool.
(4) Insert the battery cables into the inverter's battery terminals and tighten the screws.
(5) If you are using the inverter with a lead-acid battery, the temperature sensor should be installed. This connects to the "BTS" terminals shown in Figure 5.22. Fix the temperature sensor on the case of your battery by sticky tape.
(6) If you are using the inverter with a lithium battery, you can connect the BMS communication cable to the "BMS", or "RS485", or "CAN" terminals shown in Figure 5.22, depending on the protocol used by your battery. For a lithium battery with the RS485 protocol, connect it to the CN3 BMS port. For a battery with the CAN protocol, connect it to the CN7 CAN port.

5.6.6 Communication terminal connection

Communication terminal as shown in the figure below:



(Figure 5.22)

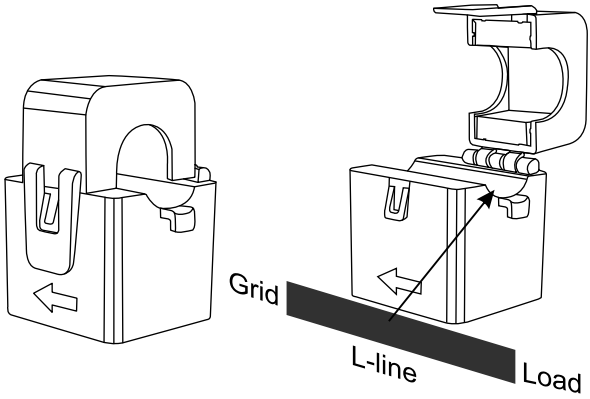
5.6.6.1 Connection of the CT clamp to the inverter

In a single inverter system, the CT clamp must be installed to allow the inverter to monitor the energy flow from the grid into the house, to control the battery charge and discharge and improve self-consumption of solar energy.

The CT clamp must be installed close to the grid's point of entrance to the house (refer to the Figure 5.9), upstream from the inverter and any connected loads. This will ensure the inverter can properly monitor the power consumption. The inverter will then control the PV power feed to the grid to balance the level of household power use based on the readings from the CT clamp.

The CT clamp installation directions are as follows (Figure 5.23):

- The direction of the arrow on the CT clamp must point towards the grid connection.
- Connect the black cable of the CT clamp to the "-" terminals of the "CN2 HCT" terminals shown in figure 5.22.
- Connect the white cable of the CT clamp to the "+" terminals of the "CN2 HCT" terminals shown in figure 5.22.



(Figure 5.23)

5.6.6.2 PC connection to the inverter

To connect the inverter to a PC, connect the USB cable to the USB2 USB-PC terminal on the inverter COM port (Figure 5.22).

Special monitoring software can be installed on the PC. Please contact your supplier for details.

5.6.6.3 The DRM0 function for SAA certification

The DRM, or Demand Response Mode function of the inverter is provided for SAA approvals in Australia. The DRM0 is the Demand Response Mode for zero production following a command from a utility company, a building management system etc. Upon receipt of such command, the inverter reduces the grid export to zero. The terminals for this connection are marked "CN6 TRIP" and are shown in Figure 5.22.

6 Start-up and shut down of the inverter

6.1 Starting up the inverter

Ensure all wire connections are correct (including polarity) and tight before turning on any breakers.
(1) Turn on the solar PV switch
(2) Connect the AC circuit breaker
(3) Turn on the battery breaker
(4) The inverter will start automatically when the PV voltage is higher than 150V and the battery voltage is higher than 44V.

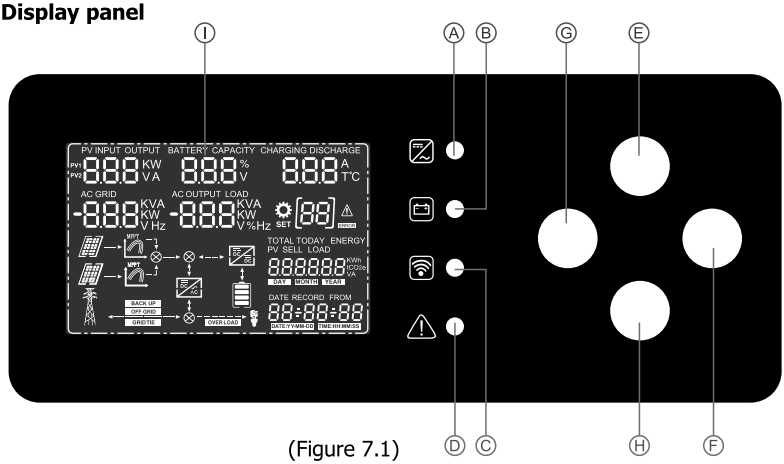
6.2 Turning off the inverter

DANGER
Do not disconnect the solar PV connectors under load.

(1) Disconnect the AC circuit breaker and prevent it from being reconnected.
(2) Disconnect the Battery breaker and prevent it from being reconnected.
(3) Turn off the PV isolator switch.
(4) Check the inverter operating status.
(5) Wait until the LEDs and LCD display turn off; this indicates that the inverter has shut down.

7 Display panel, LCD display and settings

7.1 Display panel



(Figure 7.1)

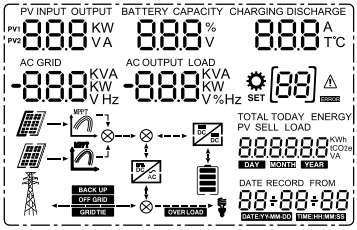
The display interface has four LEDs and is operated by four functional buttons defined as follows:

No.	Name	**Describe**
A	LED	Green: Normal Status
B		Yellow: Battery charge or discharge status
C		Blue: Wi-Fi communication status
D		Red: Fault status
E	Button	UP :Scroll up or increase value
F		ENTER :OK
G		ESC : Go to the main menu or leave the current interface
H		Down :Scroll down or decrease value
I	LCD	Display inverter operating status

(Table 7.1)

7.2 LCD display and settings

7.2.1 LCD display information



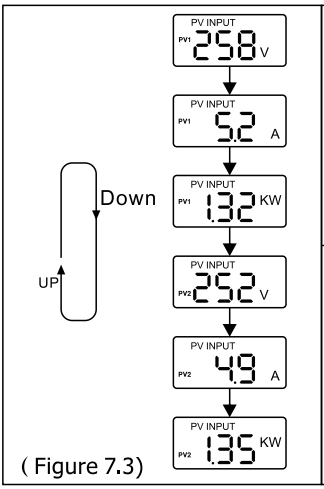
(Figure 7.2)

Display	Function
PV INPUT OUTPUT	Indicating the input voltage, current or power of the PV1/PV2 inputs. kW: Power; V: Voltage; A: Current.
BATTERY CAPACITY	Indicating the battery voltage or percentage of the state of charge (SOC) of the battery. V: Voltage; %: Percentage SOC.
CHARGING DISCHARGE	Indicating the charge current, discharge current or temperature of the battery.
AC GRID	Indicating the power, voltage or frequency of the AC Grid. kVA/ kW: Power; V: Voltage; Hz: Frequency.
AC OUTPUT LOAD	Indicating the AC output power, voltage, frequency or percentage of the load. kVA/ kW: Power; V: Voltage; Hz: Frequency; %: Load Percentage.
SET	Indicating setup interface page number.
	Indicating warning or fault codes. Warning code: . Fault code: .
TOTAL TODAY ENERGY PV SELL LOAD DAY MONTH YEAR	Indicating the electricity generation. TOTAL ENERGY PV: Total PV input; TOTAL ENERGY SELL: Total energy fed to the grid; TOTAL ENERGY LOAD: Total energy used by the load; TODAY ENERGY PV: PV input energy today; TODAY ENERGY SELL: Energy fed to the grid today; TODAY ENERGY LOAD: Energy used by the load today;
DATE RECORD FROM	Indicating date and time.
	Indicating solar panel connection status; Flicker refers to PV input voltage out of the range.
	Indicating the status of the public grid.
	Indicating battery capacity (0-24%, 25-49%, 50-74% and 75-100%) and the charging status.
	Indicating the status of the load.
	Indicating the status of charge or discharge.
	Indicating the status of the inverter or rectifier.

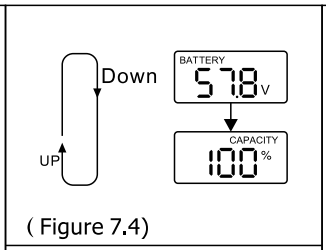
7.2.2 Navigation of the display

The main interface is the default display of the system. When the inverter is powered on, it automatically shows this default interface. This interface includes seven information display blocks. To view the following information, you can press "Up" or "Down" to scroll through the blocks:

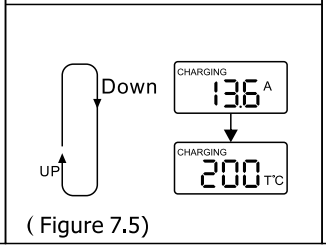
(1) PV input voltage, current and power. (Figure 7.3)
(2) Battery voltage and capacity. (Figure 7.4)
(3) Battery charge or discharge current, temperature. (Figure 7.5)
(4) Inverter output power, voltage, frequency and load current, power. (Figure 7.6)
(5) AC input power, voltage, current and frequency. (Figure 7.7)
(6) Energy counter for the day and for the whole time. (Figure 7.8)
(7) Time and date. (Figure 7.9)



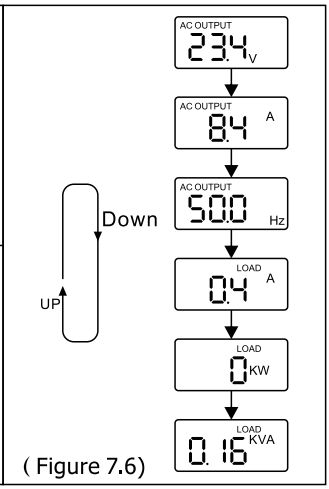
(Figure 7.3)



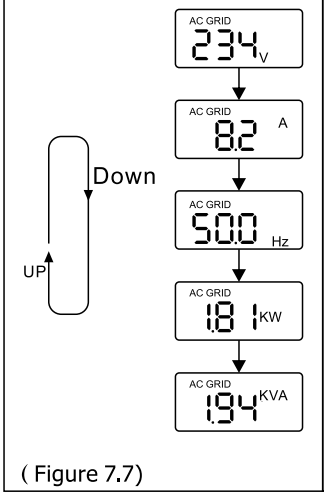
(Figure 7.4)



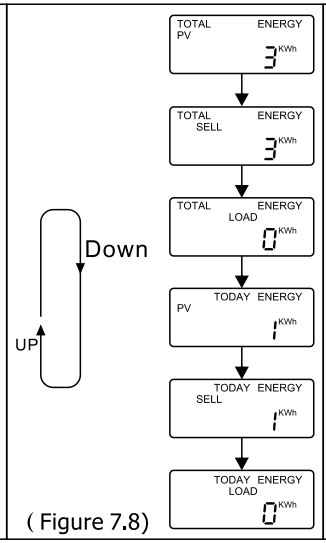
(Figure 7.5)



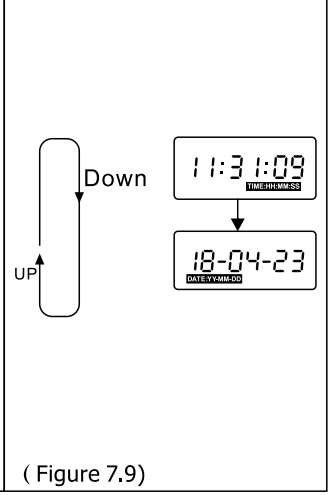
(Figure 7.6)



(Figure 7.7)

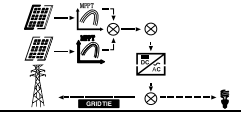
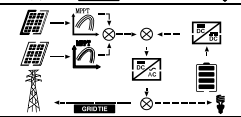
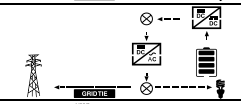
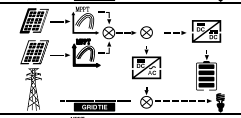
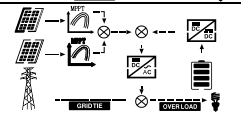
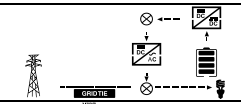
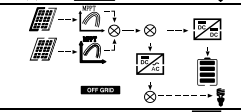
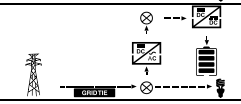
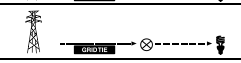
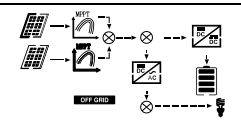
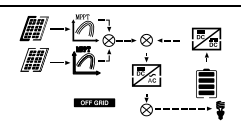
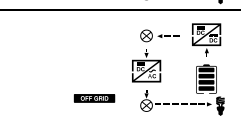
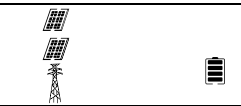


(Figure 7.8)



(Figure 7.9)

7.2.3 Inverter working modes

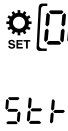
Inverter mode	Description	Display image
Feed energy to the grid	Only PV is supplying power to the grid and load	
	PV and battery are supplying power to the grid and load together	
	Only battery is supplying power to grid and load	
Match load	PV is supplying power to the battery and load. No power is being fed to the grid.	
	PV and the battery are supplying power to the load . No power is being fed to the grid.	
	Only the battery is supplying power to the load. No PV power is available. No power is being fed to the grid.	
Battery charge	PV is supplying power to the load and charging the battery.	
	The grid is supplying power to the load and charging the battery.	
Standby	The grid will supply power to load in the event of an inverter fault.	
Off grid	PV power is sufficient enough to supply power to the battery for charging and to power the load.	
	PV and the battery are both supplying power to the load.	
	The battery is discharging and supplying power to the load.	
Stop	Inverter shut down or a fault has occurred.	

(Table 7.3)

7.2.4 Inverter settings menu

Press the "Enter" button to enter the setup menu and press the "Up" or "Down" button to scroll through different settings. Once the desired setting is found press the "Enter" button to edit this setting. Use the "Up" or "Down" buttons to select the desired value, and press the "Enter" button to confirm the value of this setting. Once finished, press "Esc" for 5 seconds to exit the settings menu.

Note the term "VBat" in the table below means battery voltage, and "SOC" is state of charge (%).

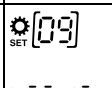
No.	Description	Option	
01	Manual On/Off control	(default)  	Manual shut down of the inverter
		 	Manual start-up of the inverter
02	User mode	 	**0: Store mode**: 1) When only the grid and the battery are available: load is powered by the mains (bypass), and the mains charges the battery. 2) When the battery, mains and solar is available: - Battery energy insufficient: load is powered by the mains (bypass). Solar and the mains charge the battery. - Battery energy sufficient: solar is feeding power to the grid.
		 	**1: Load priority mode** (default option): (the battery maintains minimum capacity) ① VBat > *V1 (low)* or SOC > *SOC (low)* chosen in Setting 15. 1) When only the grid and the battery are available: - Battery energy insufficient: the grid and the battery jointly supply power to the load; - Battery energy sufficient: battery supplies power to the load. 2) When the battery, grid and solar are all available: the battery and solar both supply power to the load. When the solar energy and battery energy are insufficient, the grid jointly supplies power to the load. The solar energy supplies the load as a priority. Any excess is used to recharge the battery, and then the surplus is exported into the grid. ② VBat < *V1 (low)* or SOC < *SOC (low)* chosen in Setting 15. 1) When only the grid and the battery are available: the grid supplies power to the load, the battery does not

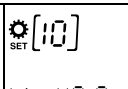
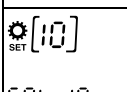
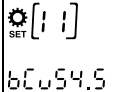
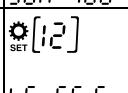
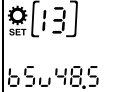
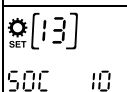
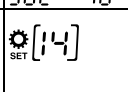
			charge or discharge; 2) When the battery, grid and solar are all available: the solar energy and the grid jointly supply the load. The solar energy supplies the load as a priority. Any excess is used to recharge the battery, and then the surplus is exported into the grid. If mains charging is enabled (Setting 21), the grid supplies power to the load and charges the battery until the battery voltage reaches *V1 (low)* or SOC reaches *SOC (low)* as per Setting 15.
		 bFn	**2: Battery priority mode**: (the battery maintains maximum capacity) ① VBat > *V2 (high)* or SOC > *SOC (high)* chosen in Setting 14. 1) When only the grid and the battery are available: - Battery energy is sufficient: the battery supplies power to the load. - Battery energy is insufficient: the grid and battery will jointly supply power to the load. 2) When the battery, grid and solar are all available: the battery and solar will both supply power to the load. When the solar energy and battery energy are insufficient, the grid jointly supplies power to the load. The solar energy powers the load as a priority. Any excess is used to recharge the battery, and then the surplus is exported into the grid. ② VBat < *V2 (high)* or SOC < *SOC (high)* chosen in Setting 14. 1) When only the grid and the battery are available: the grid supplies power to the load, the battery does not charge or discharge. If mains charging is enabled (Setting 21), the grid powers the load and charges the battery until the battery voltage reaches *V2 (high)* or SOC reaches *SOC (high)* as per Setting 14. 2) When the battery, grid and solar are all available: solar and the grid power the load jointly. The solar energy powers the load as a priority. Any excess is used to recharge the battery, and then the surplus is exported into the grid. If mains charging is enabled (Setting 21), the solar and the grid power the load and charge the battery until the battery voltage reaches *V2 (high)* or SOC reaches *SOC (high)* as per Setting 14.

		 	**3: Grid priority mode**: (solar power is mostly exported to the grid) ① VBat > 0.5*(V1(Low)+V2(high)) or SOC > 0.5*(SOC(low)+SOC(high)) chosen in Settings 14 and 15. The battery condition is effectively compared to the middle point between these two settings. 1) When only the grid and the battery are available: the battery exports its energy to the grid at full power. 2) When the battery, grid and solar are all available: the inverter exports energy to the grid at full power. The solar energy is exported as a priority and any excess solar power is used to charge the battery. ② VBat < 0.5*(V1(Low)+V2(high)) or SOC < 0.5*(SOC(low)+SOC(high)) chosen in Settings 14 and 15, and VBat / SOC > Setting 13. 1) When only the grid and the battery are available: the battery is not charged, and it provides the necessary power to the load. 2) When the battery, grid and solar are all available: the battery provides the necessary power to the load, and all available solar power is exported to the grid. If there is any excess solar power available, it is used to charge the battery. ③ VBat / SOC < Setting 13. 1) When only the grid and the battery are available: the grid is used to power the load, the battery energy is not used. 2) When the battery, grid and solar are all available: the grid provides power to the load, and the solar energy charges the battery as a priority. Any excess of solar energy is used to power the load jointly with the grid, and the surplus is exported into the grid. If mains charging is enabled (Setting 21), the grid charges the battery to Setting 13.
		 	**4: Advanced mode**: 1. The advanced mode has six time periods for setting different modes: Load priority mode, Battery priority mode, Grid priority mode. 2. Time outside of the six periods is the default mode (chosen from Load priority / Battery priority / Grid priority). The inverter will revert to the default mode when outside of these six time periods.

			For example: The default mode is Load priority mode: Time periods: 00:00~07:00 is in the Battery priority mode; 08:00~12:00 is in the Load priority mode; 13:00~16:00 is in the Grid priority mode; 18:00~24:00 is in the Battery priority mode; The remaining time is in Load priority mode.
			Reserved
03	Power safety regulation		NULL (default)
			1: EN_50549
			2: 50549_B (Belgium)
			3: 50549_P (Poland)
			4. G99
			5. NRS
			6. UNE
			7. NTS
			8. VDE

		SET 03 COdbrF	9. BRF_230V
		SET 03 COdbrn	10. BRN_127V
		SET 03 COdFrn	11. FRM_50HZ
		SET 03 COdF, 5	12. FRI_50HZ
		SET 03 COdF, 6	13. FRI_60HZ
04	PV source input mode	(default) SET 04 , nd	IND: dual independent input mode. Two MPPT solar trackers work independently.
		SET 04 PAr	PAR: dual parallel input mode. Two solar inputs work in parallel.
05	Battery type	(default) SET 05 LI U	LI-U: Lithium battery, no communication is required. Charging and discharging of the battery will follow the inverter settings. If the battery has special requirements (such as for charging voltage, discharging threshold, maximum charging current etc), please set the inverter parameters according to the battery specifications.
		SET 05 AGn	Reserved
		SET 05 LEAd	LEAD: Lead acid battery. Charging and discharging of the battery will follow the inverter settings. If the battery has special requirements (such as for charging voltage, discharging threshold, maximum charging current etc), please set the inverter parameters according to the battery specifications.
		SET 05 LI 5	LI-S: Lithium battery with communication between the inverter and the Battery Management System (BMS) enabled. Use Setting 22 to select the appropriate communication protocol for your battery.

06	Maximum charging current		3.6kW: 80A (default), range 0-80A 4kW: 85A (default), range 0-85A 4.6kW: 100A (default), range 0-100A 5kW: 110A (default), range 0-110A 6kW: 125A (default), range 0-125A
07	Maximum discharging current		3.6kW: 80A (default), range 0-80A 4kW: 85A (default), range 0-85A 4.6kW: 100A (default), range 0-100A 5kW: 110A (default), range 0-110A 6kW: 125A (default), range 0-125A
08	Maximum charging current from mains (grid current)		3.6kW: 15.6A (default), range 0-15.6A 4kW: 17.5A (default), range 0-17.5A 4.6kW: 20A (default), range 0-20A 5kW: 21.7A (default), range 0-21.7A 6kW: 26A (default), range 0-26A
09	Trickle charging current		10A (default), range 0-50A.

10	Bulk charging (maximum charging current) setpoint		LI-U: 49.0V (default) Set the value between Setting 13 and Setting 11. Note: Not less than Stop discharge voltage (Setting 13), Not more than Constant voltage charging value (Setting 11). LEAD: 49.0V (default) Set the value between Setting 13 and Setting 12. Note: Not less than Stop discharge voltage (Setting 13), Not more than Float charging voltage (Setting 12)
			LI-S: SOC = 10% (default) Set the value between Setting 13 and Setting 11. Note: Not less than Stop discharge SOC (Setting 13), Not more than Constant voltage charging SOC (Setting 11).
11	Absorption charging (constant voltage) setpoint		LI-U: 54.5V (default) Set the value between Setting 13 and Setting 12. Note: Not less than Stop discharge voltage (Setting 13), Not more than Float charging voltage (Setting 12). LEAD: 56.5 (default) Set the value between Setting 13 and Setting 16. Note: Not less than Stop discharge voltage (Setting 13), Not more than Battery Over voltage (Setting 16).
			LI-S: SOC =90% (default) Set the value between 0 and 100 Note: Not less than 0, Not more than 100.
12	Float charging voltage setpoint		LI-U: 55.5V (default) Set the value between Setting 11 and Setting 16. Note: Not less than Constant voltage charging value (Setting 11), Not more than Battery over voltage value (Setting 16). LEAD: 54.5V (default) Set the value between Setting 11 and Setting 13. Note: Not less than Stop discharge voltage (Setting 13), Not more than Constant voltage charging value (Setting 11).
13	Battery low voltage alarm (stop discharge) voltage setpoint		LI-U: 48.5V (default) Set the value between Setting 17 and Setting 11. Note: Not less than Battery under voltage value (Setting 17), Not more than Constant voltage charging value (Setting 11). LEAD: 44.0V (default) Set the value between Setting 17 and Setting 12. Not less than Battery under voltage value (Setting 17), Not more than Float charging voltage (Setting 12).
			LI-S: SOC = 15% (default) Set the value between 0 and 100.
14	User mode high value setting V2(high) / SOC(high)		LI-U: 54.0V (default) Set the value between Setting 15 and Setting 11. Note: Not less than User mode Low value (Setting 15), not more than Constant voltage charging value (Setting 11). LEAD: 54.0V (default) Set the value between Setting 15 and Setting 12. Note: Not less than User mode Low value (Setting 15), not more than Float charging voltage (Setting 12).

		SET 14 H50 90	LI-S: SOC = 90% (default) Set the value between Setting 15 and 100. Note: Not less than User mode Low value (Setting 15), not more than 100.
15	User mode low value setting V1(low) / SOC(low)	SET 15 Lu050.0	LI-U or LEAD: 50.0V (default) Set the value between Setting 13 and Setting 14. Note: Not less than Stop discharge voltage (Setting 13), not more than User mode high value (Setting 14).
		SET 15 L50 50	LI-S: SOC = 50% (default) Set the value between Setting 13 and Setting 14. Note: Not less than Stop discharge value (Setting 13), not more than User mode high value (Setting 14).
16	Battery overvoltage setpoint	SET 16 bOu60.0	LI-U and LI-S: 60.0V (default) Set the value between Setting 12 and 60V. Note: Not less than Float charging voltage (Setting 12), not more than 60V LEAD: 60V (default) Set the value between Setting 11 and 60V. Note: Not less than Constant voltage charging value (Setting 11), not more than 60V.
17	Battery undervoltage setpoint	SET 17 bUu44.0	LI-U or LEAD: 44.0V (default) Set the value between 40V and Setting 13. Note: Not less than 40V, not more than Stop discharge voltage (Setting 13).
		SET 17 LuS 5	LI-S: SOC = 5% (default) Set the value between 0% and Setting 18. Note: Not less than 0%, not more than Setting 18.
18	Battery undervoltage recovery setpoint	SET 18 buu48.0	LI-U or LEAD: 48.0V (default) Set the value between Setting 17 and Setting 16. Note: Not less than Setting 17, not more than Setting 16.
		SET 18 buS 20	LI-S: SOC = 20% (default) Set the value between Setting 17 and 100%. Note: Not less than Setting 17, not more than 100%.
19	Inverter output AC voltage	SET 19 inu230	230Vac (default) Set the value between 200 and 260Vac.
20	Anti backflow setting	SET 20 Ct OFF	Anti backflow setting to prevent feeding energy into the grid: - OFF (default): Disable anti backflow (export to the grid is allowed). - ON: Enable anti backflow (export to the grid is not allowed)
21	Mains charging setting	SET 21 Gtb On	Charging from mains (grid) control: - ON (default): Enable mains charging. - OFF: Disable mains charging.
22	BMS communication protocol	SET 22 bmS 1	BMS protocol selection (if LI-S battery is chosen in Setting 5): - 0 (default) - 17: Photonic Universe batteries LFP48-100R or LFP48-100W. For other brands of batteries, please set it according to the CAN / RS485 protocol list in the app or contact your supplier.
23	Reset function	SET 23 rSt	Restores factory default settings. Note: This function can be used in the Standby mode.

(Table 7.4)

7.3 Wi-Fi parameter settings

With the Wi-Fi app, you can use the local connection mode to connect to the inverter and set up the battery parameters and other inverter settings. If you do not adjust the inverter parameters, it will work with the default settings. The QR code to download the app is located on the Wi-Fi adapter.

WARNING

The inverter must be turned on (see Chapter 6) and the Wi-Fi adapter must be plugged into the inverter for the Wi-Fi connection to work. Set the inverter parameters according to your battery and system specifications. Default inverter settings may not conform to your battery needs and may cause damage or inefficiency in your system.

Note: the installation, commissioning and changes to settings of the inverter can only be carried out by qualified professionals.

8 Communication

This inverter uses Wi-Fi as the standard wireless communication, with access to the inverter parameters and settings via the mobile phone app. In addition, the software SolarPowerMonitor can be used for communication (the download link and the QR code are on the title page of this manual).

9 Troubleshooting

Error codes

Use the error codes table below for guidance during troubleshooting:

Error code	Error message	Description	Suggestions
01	Communication Fault	CPU Communication Fault	1. Restart the inverter. 2. If the error message still exists, contact the installation contractor or supplier.
02	BMS Communication Fault	BMS Communication Fault	1. Check whether the BMS communication interface connection is normal and re-plug the BMS communication line. 2. If the error message still exists, contact the installation contractor or supplier.
03	Inv Ocp Tz Fault	Inverter Overcurrent Transistor Protection	1.Restart the inverter. 2.If the error message still exists, contact the installation contractor or supplier.
04	Pv Ocp Tz Fault	Solar Overcurrent Transistor Protection	1. Restart the inverter. 2. If the error message still exists, contact the installation contractor or supplier.
05	Batt Ocp Tz Fault	Battery Overcurrent Transistor Protection	1.Restart the inverter. 2.If the error message still exists, contact the installation contractor or supplier.
06	Inv Over Current	Inverter Overcurrent Protection	1.Restart the inverter. 2.If the error message still exists, contact the installation contractor or supplier.
07	Bat Over Current	Battery Overcurrent Protection	1.Restart the inverter. 2.If the error message still exists, contact the installation contractor or supplier.
08	Pv Over Current	Solar Overcurrent Protection	1.Restart the inverter. 2.If the error message still exists, contact the installation contractor or supplier.

09	Bus Voltage High	Bus Overvoltage Protection	1. Check if the PV voltage exceeds the inverter input voltage range. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
10	Bus Volt Low	Bus Low Voltage Protection	1. Restart the inverter. 2. If the error message still exists, contact the installation contractor or supplier.
11	Bat Volt High	High Battery Voltage Protection	1. Check if the battery voltage is correct; 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier
12	Bat Volt Low	Low Battery Voltage Protection	1. Check if the battery voltage is correct; 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
13	Grid Voltage Fault	Mains Voltage Protection	1. Check if the grid voltage is correct; 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
14	Grid Frequency Fault	Mains Frequency Protection	1. Check if the grid frequency is correct; 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
15	Inv Voltage Fault	Inverter Voltage Protection	1. Check if the load exceeds the power rating of the inverter or if it is short circuited. 2. Restart the inverter. 3. If the error message still exists, contact the installation contactor or supplier.
16	Pv Volt High Fault	Solar High Voltage Protection	1. Check if the PV voltage is correct. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
17	EPS Over Load Fault	Essential Load Overload Protection	1. Check if the load exceeds the power rating of the inverter or if it is short circuited. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
18	PV Over Load Fault	Solar Overload Protection	1.Restart the inverter. 2.If the error message still exists, contact the installation contractor or supplier.
19	Internal ambient temperature too high	Internal Ambient High Temperature Protection	1. Check the installation environment. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
20	Inv temperature too high	Internal Inverter High Temperature Protection	1. Check the installation environment. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.

21	Transformer temperature too high	Transformer High Temperature Protection	1. Check the installation environment. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
22	DC temperature too high	DC Circuit High Temperature Protection	1. Check the installation environment. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
23	DCI High	DC to AC Overcurrent Protection	1.Restart the inverter. 2.If the error message still exists, contact the installation contractor or supplier.
24	GFCI High	Earth Current Leakage Protection	1. Check if the solar power wiring is damaged. 2. Restart the inverter. 3. If the error message still exists, contact the installation contractor or supplier.
25	ISO Fault	Solar Panels Isolation Protection	1. Check if the solar power wiring is damaged. 2. Restart the inverter. 3. If error message still exists, contact the installation contractor or supplier
26	PE Fault	Grounding Connection Protection	1. Check the ground wire connection. 2. Check the Grid L/N wire connection. 3. Restart the inverter. 4. If the error message still exists, contact the installation contractor or supplier.
27	Inv Relay	Inverter Relay Protection	1. Restart the inverter. 2. If the error message still exists, contact the installation contractor or supplier.
28	Grid Relay	Grid Relay Protection	1. Restart the inverter. 2. If the error message still exists, contact the installation contractor or supplier.
29	Bypass Relay	Bypass Relay Protection	1. Restart the inverter. 2. If the error message still exists, contact the installation contractor or supplier.

(Table 9.1)

Alarm codes

Use the alarm codes table below for guidance during troubleshooting:

Alarm code	Alarm message	Description	Suggestions
1	Grid Power Limit Flag	Grid Power Limit Alarm	Check if the grid voltage is correct.
2	Grid Ov Freq Dec Flag	Grid Over Frequency Alarm	Check if the grid frequency is correct.
3	Grid Un Freq Inc Flag	Grid Under Frequency Alarm	Check if the grid frequency is correct.
4	Grid Ov Volt Dec Flag	Grid Over Voltage Alarm	Check if the grid voltage is correct.
5	Grid Ov Temp Dec Flag	Grid Over Temperature Alarm	Check the installation environment.
6	Fan Warning Flag	Fan Warning Alarm	Check the fan.
17	BMS Voltage High	BMS High Voltage Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
18	BMS Voltage Low	BMS Low Voltage Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
19	BMS Charging Over current	BMS Charging Over Current Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
20	BMS Discharging Over Current	BMS Discharging Over Current Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
21	BMS Temperature High	BMS High Temperature Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
22	BMS Temperature Low	BMS Low Temperature Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
23	BMS Short Circuit	BMS Short Circuit Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
24	BMS System Failure	BMS System Failure Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.
25	BMS Other Error	BMS Other Error Alarm	1. Check the battery. 2. Set the inverter parameters to operate according to the battery parameters.

(Table 9.2)

Note: If the suggestions do not work, please contact the installation contractor or supplier.

10 Maintenance and cleaning

10.1 Checking heat dissipation

If the inverter regularly reduces its output power due to high temperature, please ensure the inverter can properly dissipate heat through the heat sink. The heat sink may need to be cleaned as part of this process.

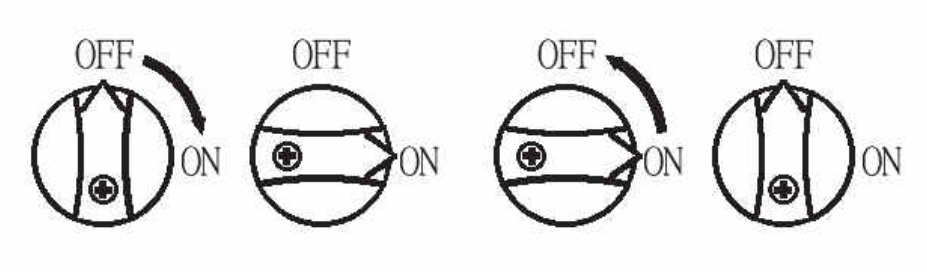
10.2 Cleaning the inverter

If the inverter is dirty, turn-off the AC breaker and DC switch, and then PV switch, wait until the inverter shuts down. Then clean the enclosure lid and the LCD display using only a wet cloth. Do not use any cleaning agents (e.g. solvents or abrasive chemicals).

10.3 Checking the PV switch

Check for externally visible damage and discoloration of the PV breaker and the cables at regular intervals. If there is any visible damage to the breaker, or visible discoloration or damage to the cables, please contact qualified professionals for maintenance.

Once a year, turn the rotary switch of the PV switch from the ON position to the OFF position 5 times in succession. This cleans the contacts of the rotary switch and prolongs the electrical endurance of the PV switch.



(Figure 10.1)

11 Decommissioning

11.1 Dismantling the inverter

(1) Disconnect the inverter from the grid, battery and PV.
(2) Remove all connection cables from the inverter.
(3) Remove all cable glands.
(4) Lift the inverter off the bracket and unscrew the bracket screws.

WARNING

Danger of burn injuries due to hot enclosure parts!

Wait 20 minutes before disassembling until the housing has cooled down.

11.2 Packing the inverter

If possible, always pack the inverter in its original carton and secure it with tension belts. If the original packaging is no longer available, you can also use an equivalent carton. The box must be capable of being closed completely and supporting both the weight and the size of the inverter.

11.3 Storing the inverter

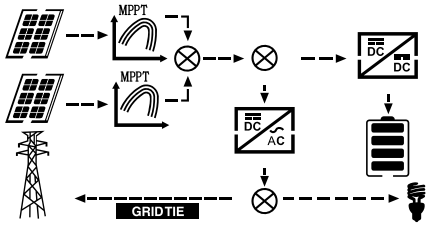
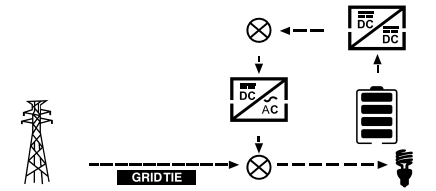
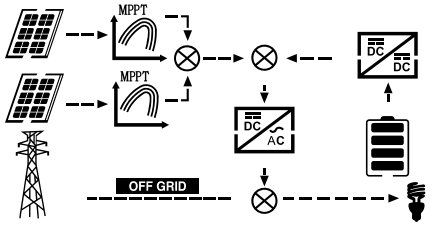
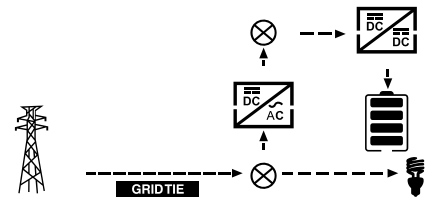
Store the inverter in a dry place where ambient temperatures are always between -25°C and +60°C.

11.4 Disposing of the inverter

Do not dispose of faulty inverters or accessories together with household waste. Please comply with the disposal regulations for electronic waste which apply at the installation site at that time. Ensure that the old unit and any accessories are disposed of in a proper manner.

12 Working status

Depending on conditions, the inverter may have the following working status.

Description	LCD display operation diagram
State 1: The energy produced by the PV system is used to optimise self-consumption. The excess energy is used to recharge the batteries, then is exported to grid.	
State 2: When there is no PV, and the battery is sufficient, it can supply the load together with the grid power.	
State 3: When the grid fails or is disconnected, the system automatically switches to the off-grid mode. The Essential load output can be supplied by the PV and battery.	
State 4: The battery can be charged from the grid. The charging time/power can be set through the app.	

(Table 12.1)

13 Specifications

MODEL	STG-PH3600-48	STG-PH4000-48	STG-PH4600-48	STG-PH5000-48	STG-PH6000-48
Rated Power (W)	3600	4000	4600	5000	6000
PV INPUT (DC)					
Number of MPP trackers / inputs	2				
PV strings per tracker	1				
Maximum total PV input power for both trackers (W)	5400	6000	7000	7500	9000
Nominal PV operating voltage / tracker (V)	360				
Maximum PV open circuit voltage / tracker (V)	500				
Full load PV voltage range / tracker (V)	180~500	200~500	235~500	235~500	235~500
Starting PV voltage / tracker (V)	120				
PV MPPT voltage range / tracker (V)	120~500				
Maximum PV input current / tracker(A)	15				
GRID OUTPUT (AC)					
Nominal AC output power (W)	3600	4000	4600	5000	6000
Nominal output current (A)	15.6	17.5	20	21.7	26
Inrush current (A)	32.6	36.2	41.8	43.4	54.4
Nominal output voltage (V)	220/230/240				
Output voltage range (V)	180-280				
Nominal frequency (Hz)	50/60				
Output frequency range (Hz)	45~55/55-65				
Total harmonic distortion (THDi)	<3%				
Power factor at rated power	1				
Displacement power factor	0.8 leading ~ 0.8 lagging				
Grid type	Single phase				

MODEL	STG-PH3600-48	STG-PH4000-48	STG-PH4600-48	STG-PH5000-48	STG-PH6000-48
BATTERY MODE OUTPUT (AC)					
Rated Output Power (VA)	3600	4000	4600	5000	6000
Peak Power (VA)	6000,10s			7500,10s	9000,10s
Output Rated Current (A)	15.6	17.5	20	21.7	26
Nominal Output Voltage (V)	230				
Output Voltage Accuracy Range	±1%				
Nominal Output Frequency (Hz)	50/60 (optional)				
Output Frequency Accuracy Range	±0.2%				
Output Waveform	Pure sine wave				
Total harmonic distortion THDv (linear load)	<3%				
BATTERY AND CHARGER					
Battery Type	Lead-acid / Lithium				
Nominal DC voltage (V)	48				
Battery Voltage Range (V)	40~60				
Maximum Charging Power (W)	3600	4000	4600	5000	6000
Maximum Charging Current (A)	75	85	95	105	125
Charging Curve	3-stage adaptive with maintenance				
Overcurrent Protection	YES				
Over Temperature Protection	YES				
GENERAL DATA					
Noise (dB)	<65dB				
Operating Temperature Range (°C)	-25~60°C; if >45°C derating starts				
Cooling	Natural cooling				
Altitude Without Derating	2000m				
Communication Interface	RS485, CAN, Wi-Fi				
Size (mm)	480W x 198.7D x 420H				
Weight (kg)	27kg				
Enclosure Protection Degree	IP65				

COMPLIANCE	
Grid Regulation	G98/G99, EN50549-1, Poland, C10/11:2021, NRS2017
Safety Regulation	IEC/EN62109-1, IEC/EN62109-2
EMC	EN61000-6-1, EN61000-6-3
EFFICIENCY	
Maximum Efficiency	97.1%
Euro Efficiency	96.5%
MPPT Efficiency	99.5%
PROTECTION	
PV Reverse Polarity Protection	Yes
PV Switch Rating for each MPPT	Yes
Output Overcurrent Protection	Yes
Output Overvoltage Protection	Yes
Earth Leakage Monitoring	Yes
Grid Monitoring	Yes
Integrated All-Pole sensitive Leakage Current	Yes

(Table 13.1)

Note: Specifications are subject to change without further notice.

14 Contact

If you have any technical problems with this product, please contact the installation contractor or supplier with the following information for assistance:

- Circumstances when the problem happened (charging, discharging, load, any switches turned on or off, settings changed, time of the day etc)
- Inverter model;
- Inverter error messages;
- Inverter LED & LCD display information;
- Type and number of PV modules connected;
- Battery type, size and settings;
- Optional equipment

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