powering tomorrow
Growatt

Growatt 7000UE

Growatt 8000UE

Growatt 9000UE

Growatt 10000UE

Growatt 12000UE

Growatt 18000UE

Growatt 20000UE

Installation & Operation Manual

Shenzhen Growatt New Energy Technology CO.,LTD
1st East & 3rd Floor, Jiayu Industrial Zone, Xibianling, Shangwu Village,
Shiyan, Baoan District, Shenzhen,P.R.China

T + 86 755 2747 1942
F + 86 755 2747 2131
E info@ginverter.com
W www.growatt.com

GR - UM - 020 - 01

Index

Information on this Manual 1

1.1 Documents use

1.1.1 Validity

This installation guide contains installation, commissioning, communication, trouble shooting. information of Growatt UE series inverters:

Growatt 7000UE
Growatt 8000UE
Growatt 9000UE
Growatt 10000UE
Growatt 12000UE
Growatt 18000UE
Growatt 20000UE

With this installation guide, users are able to install and operate the inverters easily.This manual does not cover any details concerning equipment connected to the Growatt UE.Store this manual where accessible at all times.

1.1.2 Target Group

This manual is for qualified persons who will operate, maintenance, service and repaired inverters.

1.1.3 Storage of the manual

Store this manual where it will be accessible at all times. We assume no liability for any damage caused by failure to observe these instructions. For possible changes in this manual, SHENZHEN GROWATT NEW ENERGY TECHNOLOGY CO.,LTD accepts no responsibilities to inform the users.

1.1.4 Additional Information

For further information on special topics in the download area at www.ginverter.com

1.2 Symbols Used

The following types of safety instructions and general information appear in this document as described below:

Symbol	description
	Read the manual
 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 or serious injury.
 CAUTION	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
 NOTICE	NOTICE indicates a situation which, if not avoided, could result in property damage.
Information	Information that you must read and know to ensure optimal operation of the system.

1.3 Glossary

AC

Abbreviation for "Alternating Current"

DC

Abbreviation for "Direct Current"

Energy

Energy is measured in Wh (watt hours), kWh (kilowatt hours) or MWh (megawatt hours).

Power

Power is measured in W (watts), kW (kilowatts) or MW (megawatts). Power is an instantaneous value. It displays the power your inverter is currently feeding into the power distribution grid.

Power rate

Power rate is the radio of current power feeding into the power distribution grid and the maximum power of the inverter that can feed into the power distribution grid.

Power Factor

Power factor is the ratio of true power or watts to apparent power.

PV

Abbreviation for photovoltaic

Wireless communication accessories (optional)

The external wireless communication technology is a radio technology that allows the inverter and other communication products to communicate with each other.

2.1 Intended Use

Growatt UE series inverters are to be used solely to feed solar energy converted photovoltaically into the public grid. Growatt UE series inverters are multi-string inverters with multi-MPP trackers, which mean they are able to connect to different PV module arrays. The equipment may only be operated in compliance with its intended use.

Grid-tied PV system Overview:

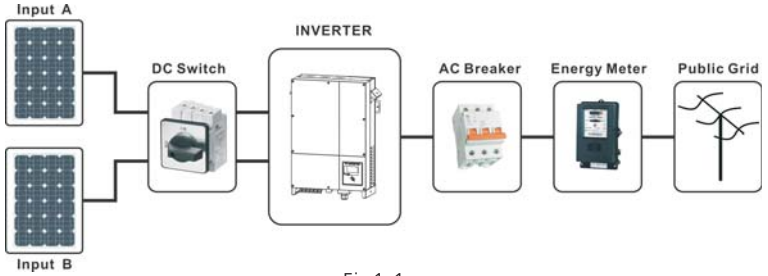


Fig1.1

The inverter may only be operated with a permanent connection to the public power grid. The inverter is not intended for mobile use. Any other or additional use is not considered as intended use. The manufacturer is not responsible for any damages resulting from unintended use. Damage caused by such unintended use is at the sole risk of the operator.

As drawings shown above, a complete Grid-tied PV system consists of PV modules, PV inverters, public grid and other components. Moreover, PV inverters always act as key components.

When design a PV system contains Growatt UE series inverters or any other Growatt inverters, the system designing software ShineDesign (download from site: www.ginverter.com) will provide adequate supports.

PV modules 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 feed-in operation, a leakage current flows from the cells to earth, the size of which depends on the manner in which 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 due to the fact that the inverter would otherwise automatically disconnect from the electricity grid as a protective measure.


Information

If PV modules of the PV system require POSITIVE or NEGATIVE to connect to GROUND, or the capacitance relative to ground of the modules is large, please contact Growatt New Energy for technical support before installation.

2.2 Safety Precautions

The GROWATT UE series Inverters are designed and tested according to international safety requirements; however, certain safety precautions must be observed when installing and operating this inverter. Read and follow all instructions, cautions and warnings in this installation manual. If questions arise, please contact Growatt's technical services at +86 755 2747 1942.

2.3 Assembly Warnings


WARNING

- Prior to installation, inspect the unit to ensure absence of any transport or handling damage, which could affect insulation integrity or safety clearances; failure to do so could result in safety hazards.
- Unauthorized removal of necessary protections, improper use, incorrect installation and operation may lead to serious safety, shock hazards or equipment damage.
- In order to minimize the potential of a shock hazard due to hazardous voltages, cover the entire solar array with dark material prior to connecting the array to any equipment.


CAUTION

- Grounding the PV modules: Comply with the local requirements for grounding the PV modules and the PV generator.
- Growatt recommends connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of the system and personnel.

2.4 Electrical Connection Warnings


DANGER

- Some components in the inverter are live. Touching live components can result in serious injury or death.
- Danger to life due to high voltages in the inverter
  All work on the inverter may be carried out by qualified personnel only.
  The appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children are forbidden to play around the Growatt inverter.


WARNING

- Make all electrical connections (e.g. conductor termination, fuses, PE connection, etc.) in accordance with prevailing regulations. When working with the inverter powered on, adhere to all prevailing safety regulations to minimize risk of accidents.
- The Growatt UE series inverters may only be operated with PV generators (modules and cabling) with protective insulation. Do not connect any source of energy other than PV modules to the Growatt UE series.
- Systems with inverters typically require additional control (e.g., switches, disconnects) or protective devices (e.g., fusing circuit breakers) depending upon the prevailing safety rules.
- Please read this manual carefully, the manufacturer or supplier is not responsible for damage caused by incorrect operation, installation, wiring, transport, etc.


CAUTION

- The Growatt inverter is to be used solely to feed solar energy converted photovoltaically into the public grid. The inverter is suitable for mounting indoors and outdoors.
- You can use the AC current generated as follows:

House grid:	Energy flows into the house grid. The consumers connected, for example, household devices or lighting, consume the energy. The energy left over is fed into the public grid. When the Growatt UE series inverters do not generate any energy, e.g., at night, the consumers which are connected are supplied by the public grid. The energy displayed on the LCD of inverter is for reference only. When energy is fed into the public grid, the energy meter spins backwards.
Public grid:	Energy is fed directly into the public grid. The Growatt UE series inverters need install a separate energy meter. The energy produced is compensated at a rate depending on the electric power company.

2.5 Operation Warnings


WARNING

- Ensure all covers and doors are closed and secure during operation.
- Although designed to meet all safety requirements, some parts and surfaces of Inverter are still hot during operation. To reduce the risk of injury, do not touch the heat sink at the back of the PV-Inverter or nearby surfaces while Inverter is operating.
- Incorrect sizing of the PV plant may result in voltages being present which could destroy the inverter. The inverter display will read the error message " PV Voltage High "
  Turn the rotary switch of the DC Disconnect to the Off position immediately.
  Contact installer.

- All operations regarding transport, installation and start-up, including maintenance must be operated by qualified, trained personnel and in compliance with all prevailing codes and regulations.
- Anytime the inverter has been disconnected from the power network, use extreme caution as some components can retain charge sufficient to create a shock hazard; to minimize occurrence of such conditions, comply with all corresponding safety symbols and markings present on the unit and in this manual.

CAUTION

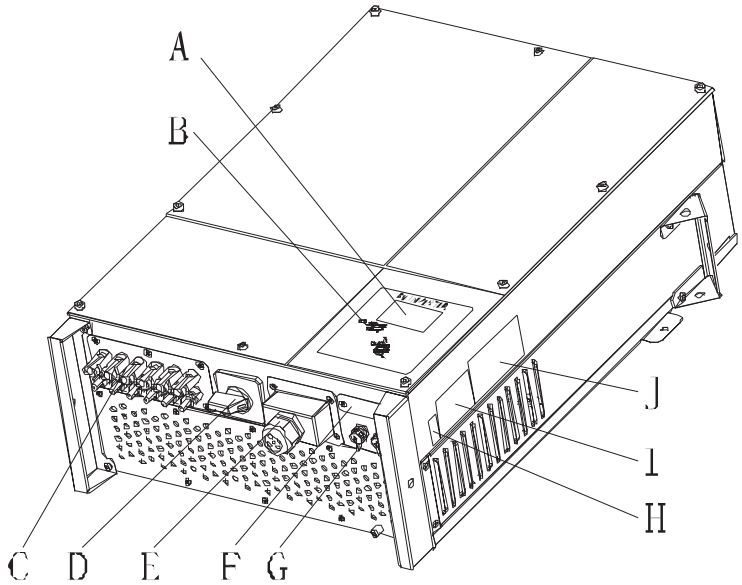
In special cases, there may still be interference for the specified application area despite maintaining standardized emission limit values (e.g. when sensitive equipment is located at the setup location or when the setup location is near radio or television receivers).In this case, the operator is obliged to take proper action to rectify the situation.

- Possible damage to health as a result of the effects of radiation!
  Do not stay closer than 20 cm to the inverter for any length of time.

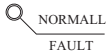
2.6 Symbols on the inverter

Symbol	Explanation
	Electrical voltage!
	Risk of burns!
	Point of connection for grounding protection.
	Direct Current (DC)
	Alternating Current (AC)
	CE mark. The inverter complies with the requirements of the applicable EC guidelines.
	Operation after 5 minutes

3.1 Growatt UE overview

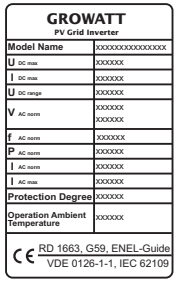


Position	Description
A	LCD
B	LED
C	PV input terminals
D	DC Switch
E	AC output
F	RS232 lid
G	RS485
H	Series Number
I	Warning Label
J	Type label

Symbol	Description	Explanation	
	Tap symbol	Indicates display operation (see Section 6).	
	Inverter state symbol	Green/constant	Operation
		Red/constant	1、Fault-- contact installer 2、Standby module
		Red/flashing	1、Fans Fault-- contact installer 2、Software update

3.2 Type label

The type labels provide a unique identification of the inverter (The type of product, Device-specific characteristics, Certificates and approvals). The type labels are on the right-hand side of the enclosure.
The Certificate Number is just for SAA.

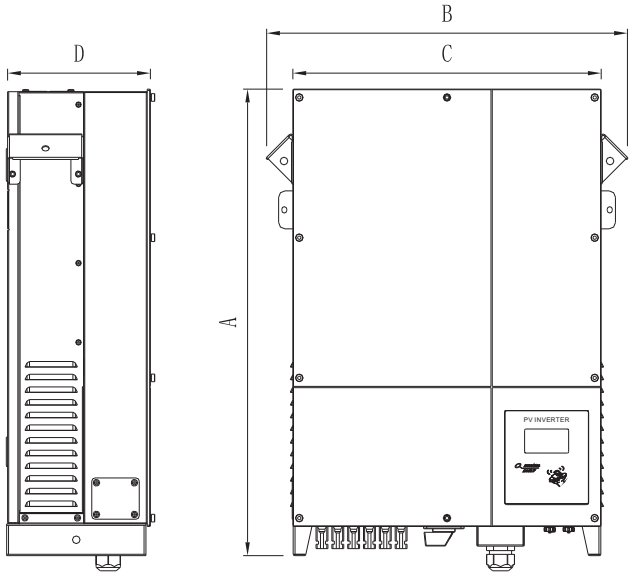


More detail about the type label as the chart below:

Model Name	Growatt7000UE	Growatt8000UE	Growatt9000UE
Max DC voltage	1000V	1000V	1000V
Max input current	15A / 15A	15A / 15A	15A / 15A
MPP voltage range	300V-1000V	300V-1000V	300V-1000V
AC Nominal voltage	3/N/ PE 230V/400V	3/N/ PE 230V/400V	3/N/ PE 230V/400V
AC grid frequency; Range	50/60Hz -6Hz/+5Hz	50/60Hz -6Hz/+5Hz	50/60Hz -6Hz/+5Hz
Max. AC output power	7KW	8KW	9KW
Nominal output current	10.2A	11.6A	13.1A
Max. output current	11.7A	13.3A	15A
Protection Degree	Ip65	Ip65	Ip65
Operation temperaturerange	-25°C ~ +60°C	-25°C ~ +60°C	-25°C ~ +60°C

Model Name	Growatt10000UE	Growatt12000UE	Growatt18000UE	Growatt20000UE
Max DC voltage	1000V	1000V	1000V	1000V
Max input current	15A / 15A	17A / 17A	23A / 23A	26A / 26A
MPP voltage range	300V-1000V	300V-1000V	300V-1000V	300V-1000V
AC Nominal voltage	3/N/ PE 230V/400V	3/N/ PE 230V/400V	3/N/ PE 230V/400V	3/N/ PE 230V/400V
AC grid frequency; Range	50/60Hz -6Hz/+5Hz	50/60Hz -6Hz/+5Hz	50/60Hz -6Hz/+5Hz	50/60Hz -6Hz/+5Hz
Max. AC output power	10KW	12KW	18KW	20KW
Nominal output current	14.4A	17.5A	26A	29A
Max. output current	16A	19A	28.6A	32A
Protection Degree	Ip65	Ip65	Ip65	Ip65
Operation temperaturerange	-25°C ~ +60°C	-25°C ~ +60°C	-25°C ~ +60°C	-25°C ~ +60°C

3.3 Size and weight



	A(mm)	B(mm)	C(mm)	D(mm)	Weight(kg)
7000-12000 UE	740	490	405	235	41
18000-20000 UE	740	570	485	235	60

3.4 Transportation

The inverter is thoroughly tested and inspected strictly before delivery. Our inverters leave our factory in proper electrical and mechanical condition. Special packaging ensures safe and careful transportation. However, transport damage may still occur. The shipping company is responsible in such cases. Thoroughly inspect the inverter upon delivery. Immediately notify the responsible shipping company if you discover any damage to the packaging which indicates that the inverter may have been damaged or if you discover any visible damage to the inverter. We will be glad to assist you, if required. When transporting the inverter, the original or equivalent packaging should to be used, and the maximum layers for original carton is four, as this ensures safe transport.

3.5 Storage of Inverter

If you want to storage the inverter in your warehouse, you should choose an appropriate location to store the inverter.

- The unit must be stored in original package and desiccant must be left in the package.
- The storage temperature should be always between -25℃and +60℃. And the storage relative humidity should be always between 0 and 95%.
- If there are lots of inverters need to be stored, the maximum layers for original carton is four.
- After long term storage, local installer or service department of GROWATT should perform a comprehensive test before installation

Information

After long term storage, the Real Time Clock of the inverter maybe not correct, it will cause the Energy produced today (E_day) error, you need to set the time and date, refer to 6.3.4 setting inverter time or 6.4.3 text line d) setting date and time.

3.6 The advantage of the Growatt UE inverters

The features of UE inverter are below:

- Dual independent MPP trackers
- Integrated DC disconnect switch
- Bluetooth/ RF technology/ Zigbee/ Wifi
- Wide PV voltage range : 180V~1000V
- The maximum efficiency is 98%
- The Europe efficiency is 97.5%
- IP65 environmental protection
- Easy to install

Unpacking 4

Before opening the packing box of Growatt UE, please note that whether there are any visible external damages.

Once open the packing box, please check the delivery for completeness and for any visible external damages of the inverter. If there are anything damaged or missing, please contact your dealer. Complete delivery should contain as follows.

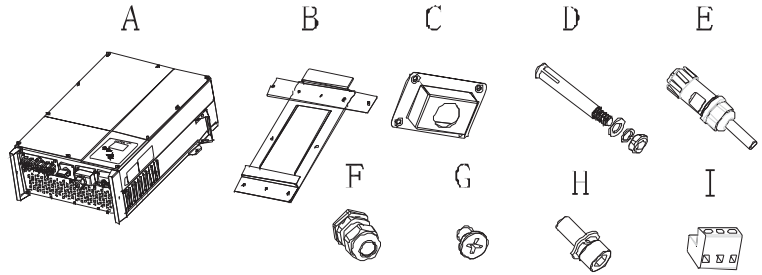


Fig4.1

Item	quantity	Description
A	1	Growatt UE inverter
B	1	Mounting frame
C	1	Waterproof cover
D*	6/8	Explosion screw
E**	2	RS 485 connector
F	1	Cable gland for AC connection
G	4	M4 cross recessed countersunk head screws
H	3	M6 socket head cap screws
I***	2	485 terminal
--	1	Warranty(not show in the picture)
--	1	User manual (not show in the picture)

*Number of D is 6 for Growatt 7000UE-12000UE, and 8 for Growatt18000/20000UE.
**For type 1 RS 485
***For type 2 RS 485

Information

Though the packaging box of Growatt UE is durable, please treat the packing box gently and avoid dispose the packing box.

5 Installation

5.1 Safety instruction

Danger to life due to fire or explosion
- Despite careful construction, electrical devices can cause fires.
- Do not install the inverter on easily flammable materials and where flammable materials are stored.

Risk of burns due to hot enclosure parts
- Mount the inverter in such a way that it cannot be touched inadvertently.

- All electrical installations shall be done in accordance with the local and national electrical codes. Do not remove the casing. Inverter contains no user serviceable parts. Refer servicing to qualified service personnel. All wiring and electrical installation should be conducted by a qualified service personnel.
- Carefully remove the unit from its packaging and inspect for external damage. If you find any imperfections, please contact your local dealer.
- Be sure that the inverters connect to the ground in order to protect property and personal safety.
- The inverter must only be operated with PV generator. Do not connect any other source of energy to it.
- Both AC and DC voltage sources are terminated inside the PV Inverter. Please disconnect these circuits before servicing.
- This unit is designed to feed power to the public power grid (utility) only. Do not connect this unit to an AC source or generator. Connecting Inverter to external devices could result in serious damage to your equipment.
- When a photovoltaic panel is exposed to light, it generates a DC voltage. When connected to this equipment, a photovoltaic panel will charge the DC link capacitors.
- Energy stored in this equipment's DC link capacitors presents a risk of electric shock. Even after the unit is disconnected from the grid and photovoltaic panels, 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 parts and surfaces of Inverter are still hot during operation. To reduce the risk of injury, do not touch the heat sink at the back of the PV-Inverter or nearby surfaces while Inverter is operating.

5.2 Selecting the Installation Location

This is guidance for installer to choose a suitable installation location, to avoid potential damages to device and operators.

1) The wall selected to install the inverter must be strong and firm enough to support and bear the weight of the inverter for a long period time. (Refer to Chapter 11 Specifications)
2) The location selected must be suitable for inverters' dimension. (Refer to 3.3 Dimensions and Fig.5.2 Required Clearances)
3) Do not install the inverter on structures constructed of flammable or thermo labile materials.
4) Never install the inverter in environment of little or no air flow, nor dust environment.
5) The Ingress Protection rate is IP65 which means the inverter can be installed outdoors and indoors.
6) Do not expose the inverter to direct sunlight, in order to avoid the power and efficiency derating caused by excessive heating.
7) The humidity of the installation location should be 0~95% without condensation.
8) The ambient temperature of the inverter should be -25℃~+60℃.
9) The installation location must be freely and safely to get at all times.
10) Vertically installation and make sure the connection of inverter must be downwards. Never install horizontal and avoids forward and sideways tilt.(Refer to drawings below)

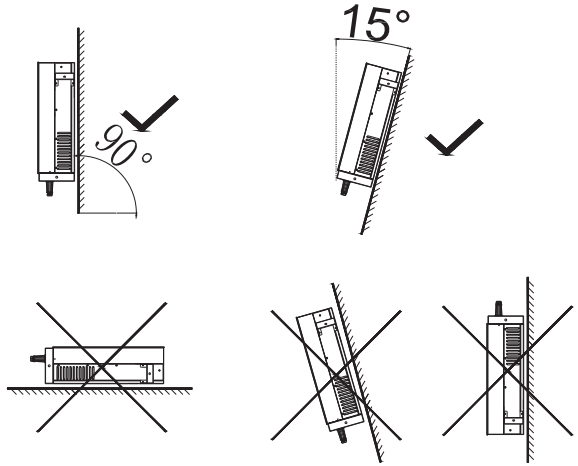


Fig5.1

11) Notice the minimum clearances of the inverter. (Refer to 3.3 Dimensions and Fig.5.2 Required Clearances).

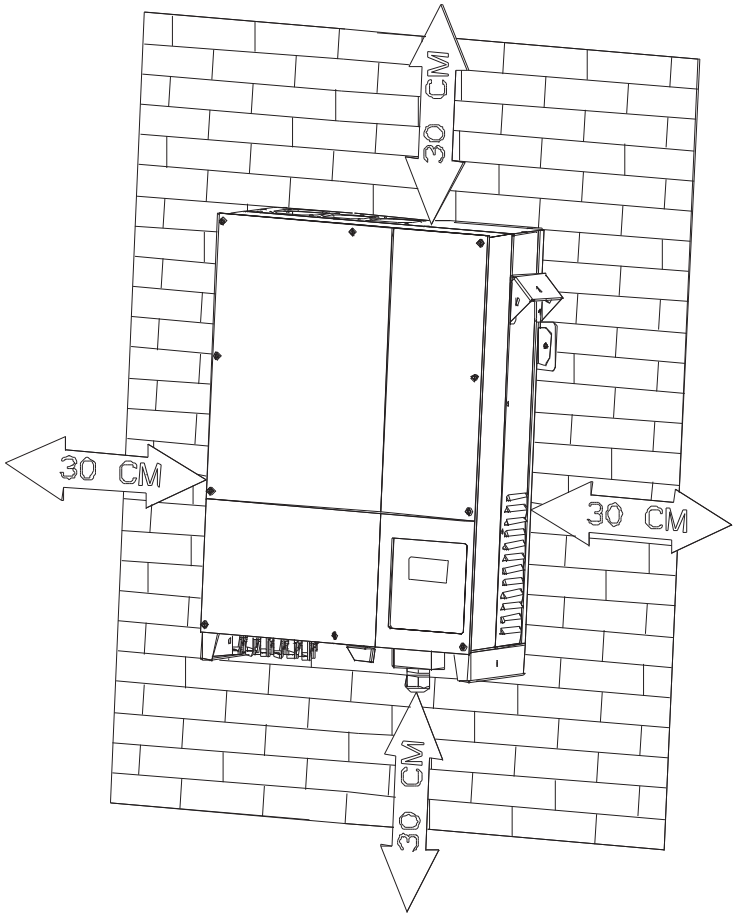


Fig5.2

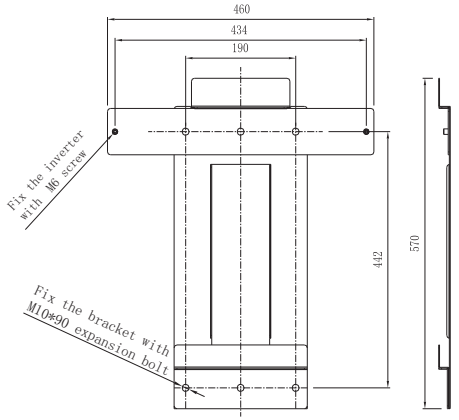
12) Do not install the inverter near television antenna or any other antennas and antenna cables.
13) Do not install the inverter in living area, the noise caused by the machine may affect on daily life.
14) For security reasons, don't install the inverter in place where the children can reach.

5.3 Installation guide

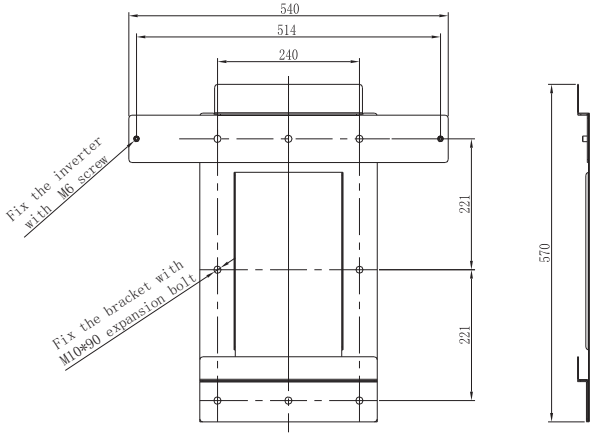
5.3.1 Mounting the Bracket

DANGER

In order to avoid electrical shock or other injury, inspect existing electronic or plumbing installations before drilling holes.



a)bracket of Growatt 7000UE-12000UE



b)bracket of Growatt 18000UE/20000UE

Fig5.3

Hint: Data units in mm
Steps:

- Drill holes for screws while use the mounting frame as template.6 holes for Growatt 7000-12000UE and 8 for Growatt 18000/20000UE.
- Fix the mounting frame on the wall as the figures shown below, combine as the screws as the Items Fig 4.1 shows (items D)

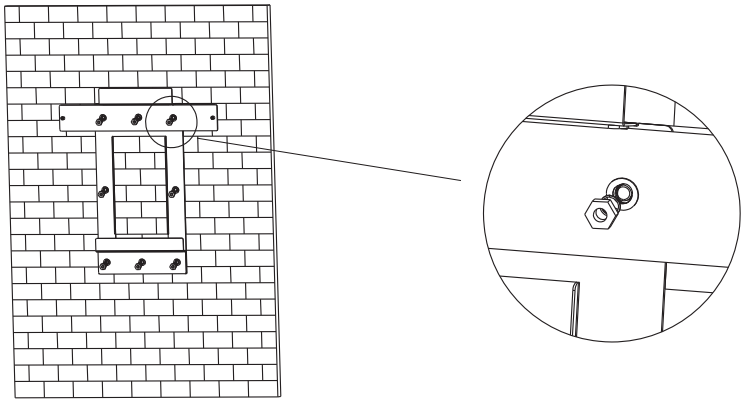


Fig 5.4

5.3.2 Mounting Inverter

Falling equipment can cause serious or even fatal injury, never mount the inverter on the bracket unless you are sure that the mounting frame is really firmly mounted on the wall after carefully checking.

After the bracket is firmly mounted on the wall, then mount the inverter on the bracket.

- Rise up the Growatt UE a little higher than the bracket. Considering the weight of Growatt UE, you need to hang on the inverter. During the process please maintain the balance of the Growatt UE.
- Hang the inverter on the bracket through the match hooks on bracket and the back of the inverter.
- Installed one M6*10 screw at each side of inverter to reliable fixed it on the wall. Please reference in Fig 5.5(b).
- Connection of a second protective conductor. Please reference in Fig5.6.
- Recommend awning installation, the purpose is to extend the inverter service life and reduce the power derating of the inverter. The dimension of the awning refer to Fig5.8.

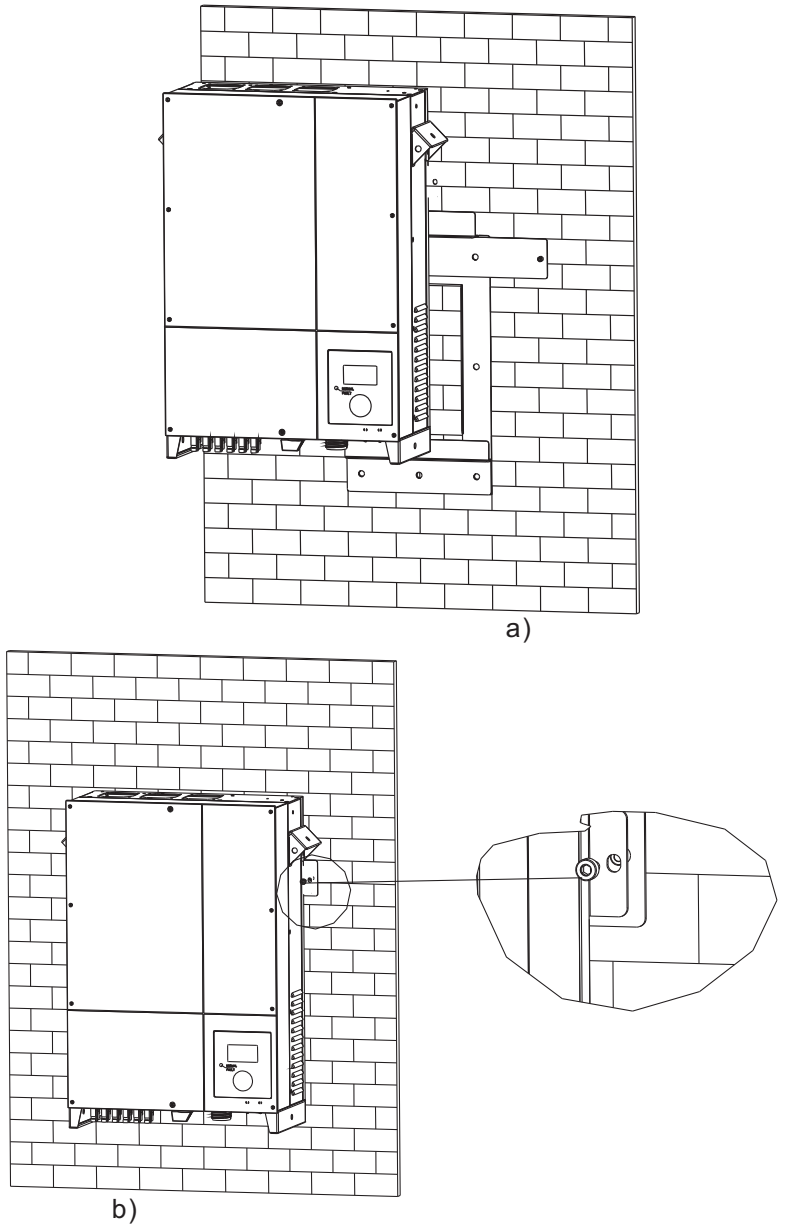


Fig 5.5

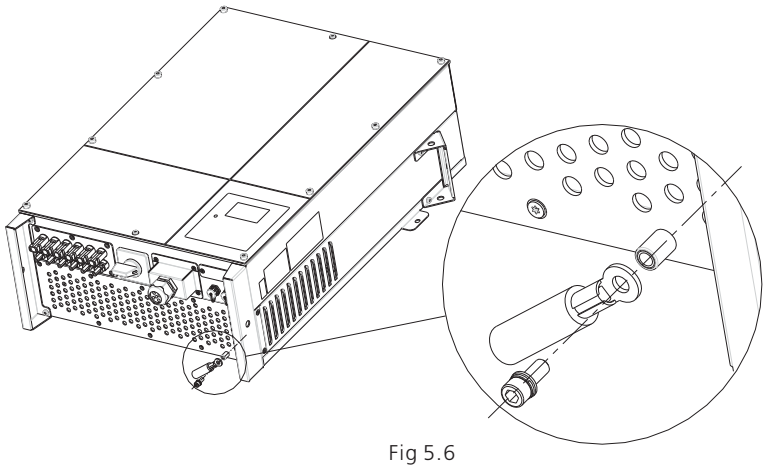
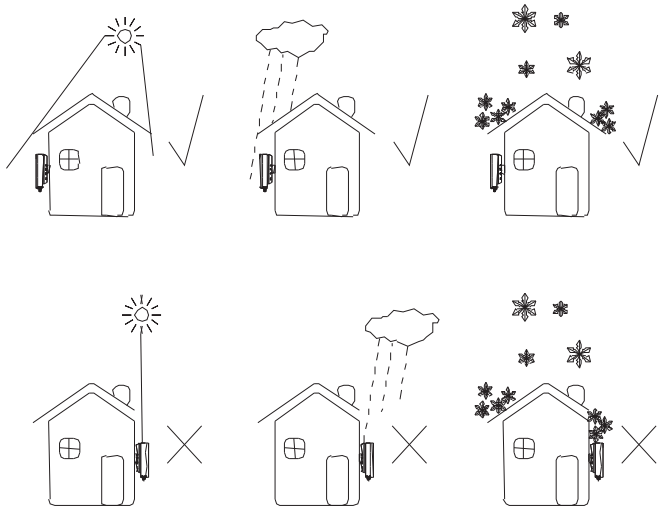


Fig 5.6

5.3.3 Installation layout

Information

Avoid exposing inverter to direct sunlight, rain or snow to extend the inverter service life despite the IP65 protection degree. Exposure to the sunlight may cause additional internal heating which will cause power derating.



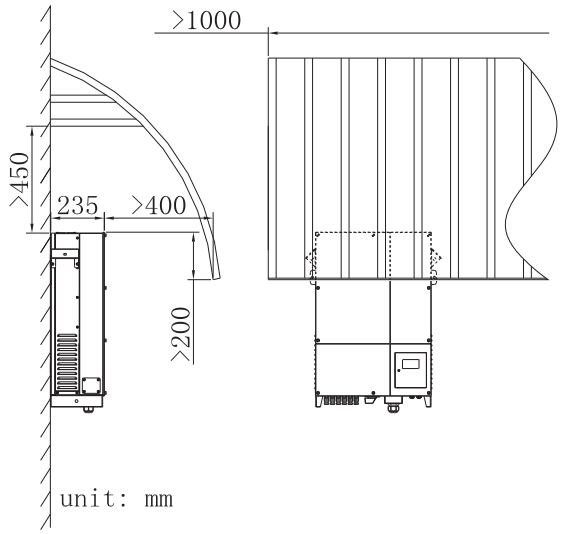


Fig 5.8

More than one inverter need to be installed, the dimensions below should be considered.

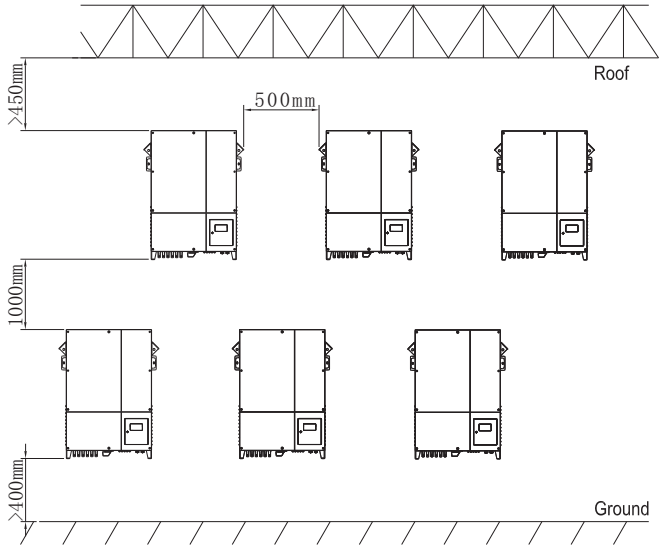


Fig 5.9

5.4 Electrical Connections

5.4.1 Safety

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 and DC sides

Danger of damage to electronic components due to electrostatic discharge.
Take appropriate ESD precautions when replacing and installing the inverter.

5.4.2 Wiring AC Output

Conditions for the AC Connection
You must comply with the connection requirements of your utility operator.
All usages must comply with the regulations.
Residual-current protective device
The inverter is equipped with an integrated universal residual-current monitoring unit.
If the network operator stipulates a residual-current protective device, you must use a residual-current protective device that triggers in the event of a residual-current of 100 mA or more.
Connection of a second protective conductor
In some installation countries, a second protective conductor is required to prevent a touch current in
the event of a malfunction in the original protective conductor.
For installation countries falling within the scope of validity of the IEC standard 62109, you must Install
the protective conductor on the AC terminal with a conductor cross-section of at least 10 mm²Cu.
Or Install a second protective conductor on the earth terminal with the same cross-section as the original
protective conductor on the AC terminal
Load disconnection unit
You must install a separate three-phase miniature circuit-breaker or other load disconnection unit for each inverter in order to ensure that the inverter can be safely disconnected under load.

- Measure the public grid voltage and frequency (Voltage: 400Vac; Frequency: 50Hz/60Hz; in 3-Phase);
- Open the breaker between the PV inverter and utility;
  Specification of AC breaker: Growatt 7000UE:16A/400V
  Growatt 8000UE/ 9000UE: 20A/400V
  Growatt 10000UE/ 12000UE: 25A/400V
  Growatt 18000UE/ 20000UE: 50A/400V

Cable requirements:

Model	Diameter(mm)	Area(mm²)	Available wire gauge (AWG)
7000UE	2.05~4.11	4~16	12~6
8000UE	2.05~4.11	4~16	12~6
9000UE	2.05~4.11	4~16	12~6
10000UE	2.05~4.11	4~16	12~6
12000UE	2.05~4.11	4~16	12~6
18000UE	2.59~4.11	6~16	10~6
20000UE	2.59~4.11	6~16	10~6

Conductor Cross section	Max. cable length(m)						
	Growatt 7000UE	Growatt 10000UE	Growatt 10000UE	Growatt 10000UE	Growatt 12000UE	Growatt 18000UE	Growatt 20000UE
6.0 mm²	70	60	54	48	40	27	25
10.0 mm²	140	125	110	72	60	40	36
16.0 mm²	220	200	15	105	88	59	53

AC connector type	Conductor cross-section (mm²)	Stripping length (mm)
Connector 1	4.0-6.0	8
Connector 2	4.0-6.0	8
Terminal 3	6.0-16.0	10

Please do not use single-core wire cable.

There are three types of AC connector for Growatt UE series inverters. Please follow the instructions corresponding to the parts we offer you.

AC connector 1:
Assembly procedure:

1) Connect the cables into their respective channels, 'N' on the picture represents Neutral channel (marked with '1' on the terminal), '1,2,3' on the picture represent three Live line channels (marked with '2,3,4' on the terminal), and GND on the picture represents Ground channel (marked with ⏚ on the terminal).

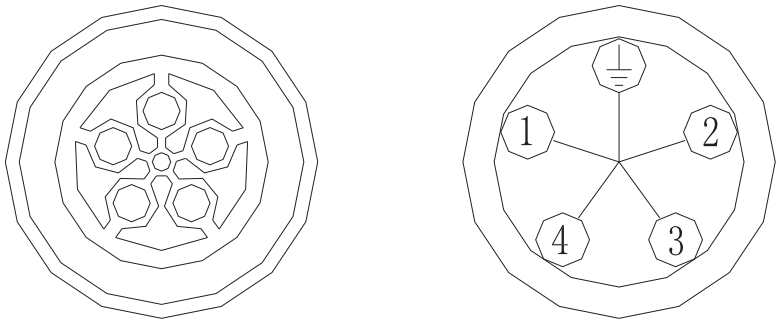


Fig 5.10

2) Tighten the left part and right part clockwise.

Fig 5.11

3) Connect it to the AC side of the inverter.

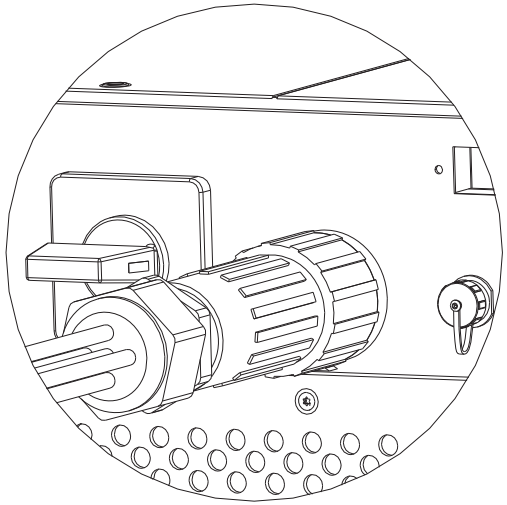
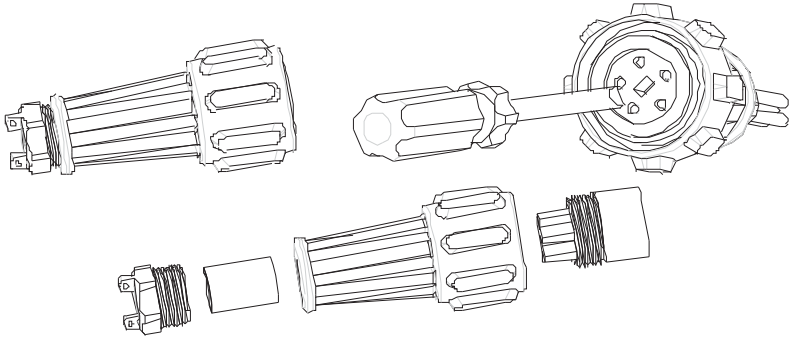


Fig 5.12

AC connector 2:
Assembly procedure:
1) Unscrew the AC connector by hand and slotted screwdriver into four components:



2) Connect 5 cables into their respective channels on the AC terminal, while 'N' represents Neutral, '1, 2, 3' represent 3 line channels and 'E' is ground, tighten all screws (1.0Nm (9 lbf.in.) max).

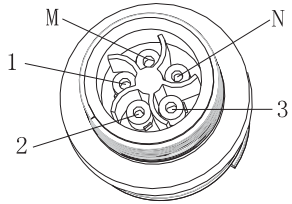


Fig 5.14

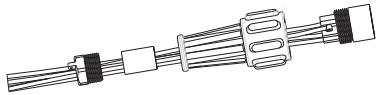


Fig 5.15

3) Insert the contact into the body with slotted screwdriver (1.13Nm (10 lbf.in.) to 1.36Nm (12 lbf.in.)),screw up other components of the connector.

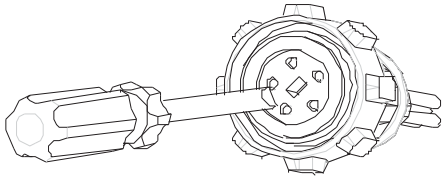


Fig 5.16

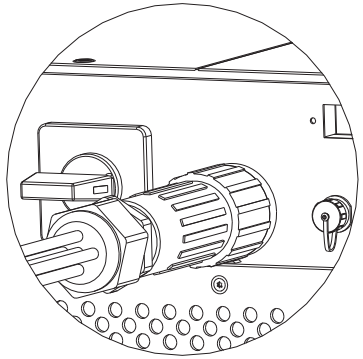


Fig 5.17

4) Connect it to the inverter. Fig. 5.17.

AC terminal 3:

1) The AC side terminals of the inverter are like the following figure, it is clear to confirm that 'L1, L2, L3' represents three live line output, 'N' represents neutral line and ⏚ is grounding line.
2) Connect five standard cables into relevant terminals. The five cables should be put through the protection shell, as figure below.

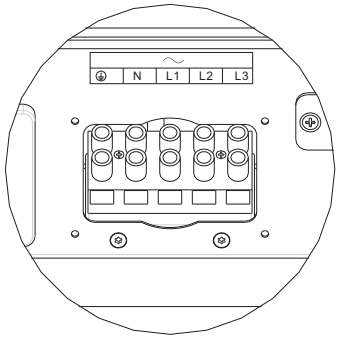


Fig 5.18

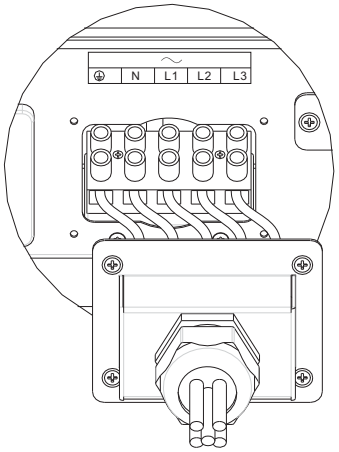


Fig 5.19

3) Fasten the protection shell onto the bottom of the inverter, make sure the four screws are tightened, the completed appearance is like the below figure

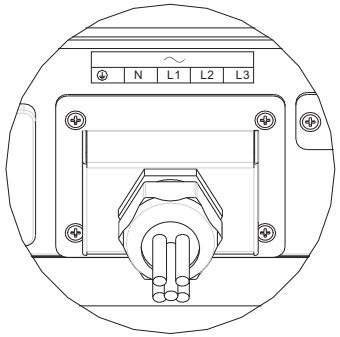


Fig 5.20

5.4.3 Wiring DC Input

DANGER

Danger to life due to lethal voltages!
Before connecting the PV array, ensure that the DC switch and AC breaker are disconnect from the inverter. NEVER connect or disconnect the DC connectors under load.

WARNING

Improper operation during the wiring process can cause fatal injury to operator or unrecoverable damage to the inverter. Only qualified personnel can perform the wiring work.

Risk of damage to the inverter.
If the voltage of the PV modules exceeds the maximum input voltage of the inverter, it can be destroyed by the overvoltage. This will void all warranty claims.
Do not connect strings to the inverter that have an open-circuit voltage greater than the maximum input voltage of the inverter.

To reduce the risk of electric shock, avoid touching the live components and treat the terminals carefully.

Information

The PV modules should have an IEC61730 Class A rating*.
Please use the same brand male and female PV connectors.
Under any conditions the total circuit current should never exceed the Max. Current.

NOTICE

Excessive voltages can destroy the measuring device
Only use measuring devices with a DC input voltage range up to at least 1,000 Vdc.

*Relate only to transformerless installation.
1 Check the connection cables of the PV modules for correct polarity and make sure that the maximum input voltage of the inverter is not exceeded.
2 The diagram drawing of DC side is shown as below, notice that the connectors are in paired (male and female connectors). The connectors for PV arrays and inverters are H4 (AMPHENOL) connectors;

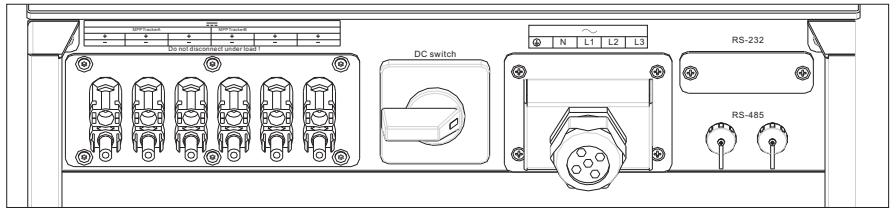


Fig 5.21

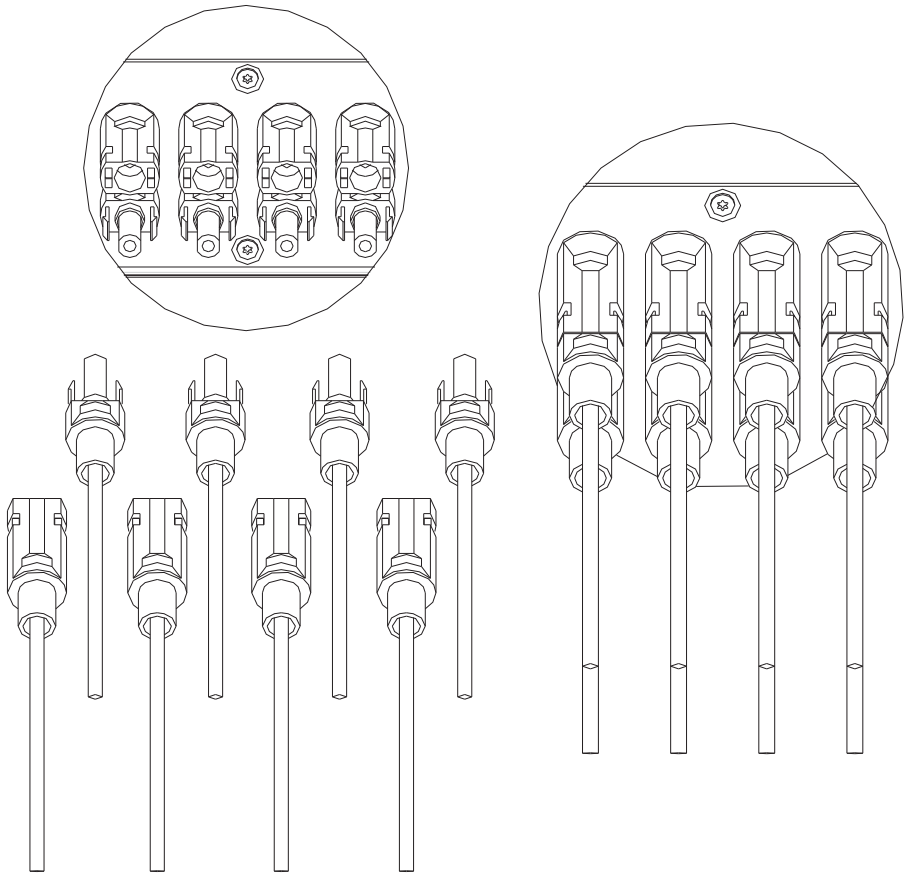


Fig 5.22

3 Check the assembled DC connectors for correct polarity and connect them to the inverter.
4 The maximum string currents are varying from different inverter types.

Type	Description
7000-10000UE	15A
12000UE	17A
18000UE	23A
20000UE	26A

5 In order to seal the inverter, all unneeded DC inputs must be closed with sealing plugs:
Cable requirements:

Mode	Diameter(mm)	Area(mm²)	AWG
7000UE	2.05	3.332	12
8000UE	2.05	3.332	12
9000UE	2.05	3.332	12
10000UE	2.05	3.332	12
12000UE	2.05	3.332	12
18000UE	2.05	3.332	12
20000UE	2.05	3.332	12

5.4.4 Grounding

AC Grounding

The Growatt UE must be connected to the AC grounding conductor of the power distribution grid via the ground terminal (PE).

PV Grounding

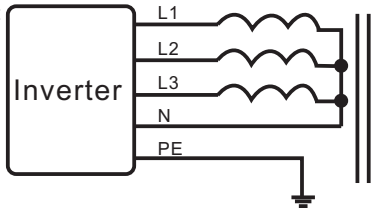
The grounding conductor in the framework of the PV array must be connected to the PV grounding conductor and the DC grounding conductor. The cross-section of the grounding conductor corresponds to the cross-section of the largest conductor in the DC system.

DC Grounding Conductor

A DC grounding conductor may be required by the Authority Having Jurisdiction (AHJ). Use the terminal block for the PV grounding conductor and DC grounding conductor.

Ground kit

If PV modules of the PV system require POSITIVE or NEGATIVE to connect to GROUND, the output of inverter should connect to grid with an isolating transformer. The connection method is below:

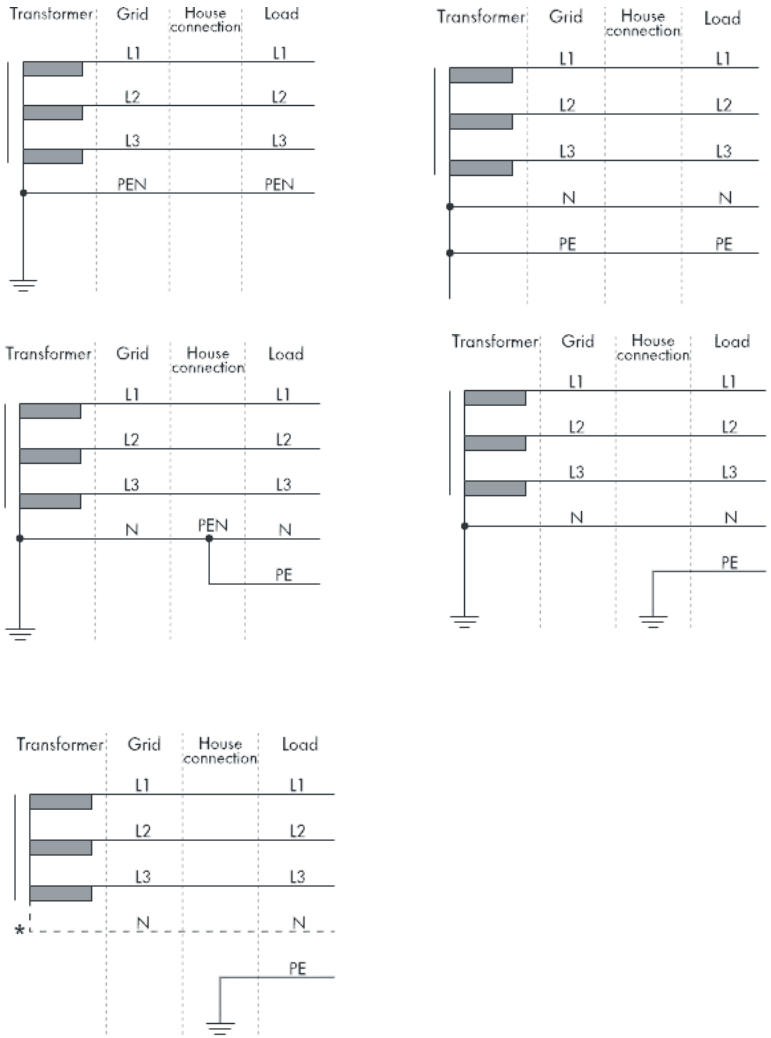


N of transformer should not be connected to PE.

5.5 Grid Type

5.5.1 Common grid type

Based on the local GRID standards, it may select different connection types. In the following you will find an overview of the most common type of grid structure.



Information

If the output of inverter was connected to grid with an isolation transformer, and the inverter display PV Isolation Low error during when you start-up the inverter, please set the parameter "Enable Neutral" via Growatt software Shinebus, or connect the Neutral of inverter output to PE.

5.5.2 Compatibility Table

Grid type	TN-C grid	TN-S grid	TN-C-S grid	TT grid	IT grid
Growatt 7000UE	yes (N and PE of inverter both should connect to PEN of grid.)	yes	yes	yes, if UN-PE < 30V	no
Growatt 8000UE	yes (N and PE of inverter both should connect to PEN of grid.)	yes	yes	yes, if UN-PE < 30V	no
Growatt 9000UE	yes (N and PE of inverter both should connect to PEN of grid.)	yes	yes	yes, if UN-PE < 30V	no
Growatt 10000UE	yes (N and PE of inverter both should connect to PEN of grid.)	yes	yes	yes, if UN-PE < 30V	no
Growatt 12000UE	yes (N and PE of inverter both should connect to PEN of grid.)	yes	yes	yes, if UN-PE < 30V	no
Growatt 18000UE	yes (N and PE of inverter both should connect to PEN of grid.)	yes	yes	yes, if UN-PE < 30V	no
Growatt 20000UE	yes (N and PE of inverter both should connect to PEN of grid.)	yes	yes	yes, if UN-PE < 30V	no

Commissioning 6

6.1 Commission the Inverter

1) Remove all covers from the PV array.
2) Check the PV and AC voltage.
3) Plug in the PV input.
4) Turn the DC Disconnect to position "I".
5) If the inverter is connected with PV panel arrays and the input voltage is higher than 300Vdc, while the AC grid is not connected yet, LCD will display messages in order as below:

- Company info ➡ Basic info ➡ State info
- The LCD will display " AC V outrange "at State info and the LED turns red.
- Please check all information on the LCD, operate by knocks you will see the different parameters.
- Single knock to Light the backlight ➡ State info (single knock) Input info ➡ (single knock) Output info

6) Turn on the AC breaker between inverter and grid, the system will operate automatically.
7) Under normal operating conditions, the LCD displays 'Power: xx.xx Kw' at State info, this is the power feed into grid. The LED turns green.
8) Check the time and date of inverter as follow:
Single knock to Light the backlight ➡ State info (Thrice knock) ➡ Inverter info (single knock) ➡System Time(double knock), if they are not correct, please set them, refer to 6.3.4 setting inverter timeor 6.4.3 text line d) setting date and time.

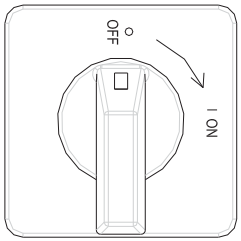


Fig 5.26

6.2 Operation Modes

Normal Mode

In this mode, the inverter works normally and LED turns green.

- Whenever the DC voltage is higher than 350Vdc, inverter converts power to grid as generated by the PV panels;
- Whenever the DC voltage is lower than 300Vdc, the inverter will work in waiting state and attempt to connect the grid. In waiting state the inverter consumes just enough power generated by the PV panel to monitor the internal system.

Notes: The inverter starts up automatically when DC power from the PV panel is sufficient.

Fault Mode

The internal intelligent controller can continuously monitor and adjust the system state. If inverter finds any unexpected conditions such as system fault and inverter fault, the fault information will be displayed on the LCD. In fault mode the LED turns red.

Notes: a) Detailed fault information refers to Chapter 10.2 ERROR messages displayed on LCD.
b) When PV Isolation error occurred in SAA safety standard, the buzzer will give an alarm every fifteen seconds.

Shutdown Mode

nverters automatically stop running during periods of little or no sunlight. In shutdown mode the inverters take no power from the grid and panel, and the LCD and LED turns off.

Notes: If the PV string DC voltage is too low, the inverter will also turn to Shutdown Mode.

Derating mode

When AC frequency is higher than 50.3Hz(settable), the inverter will derate its output power according to the rule.

When user set the output limit command to the inverter, the inverter will also limit the output according to the setting.

In this derating mode, the LCD will show "DERATING".

6.3 Country Setting and LCD Display

n the lower right corner of inverter there is the LCD display. We can check inverter running state, historical generation data, etc, on the LCD screen. Items displayed can be changed by knock; you can also change some inverter parameters by knock.

6.3.1 Country Setting

If it is the first time the inverter starts up after installation, LCD will quickly switch to and stay at the country setting interface. Only the inverter is set to comply with a certain country rule, it will work and display normally. Otherwise, LCD will always stay at the 'Please select' interface.

Please finish the country setting according to the following steps:

1) When at the first interface 'Select country:' the option is 'VDE0126' in default. By single knock, countries will vary from one to another, for example, 'France', as Fig 6.3.1

Fig 6.3.1

Fig 6.3.2

Note: If you have ordered the inverter with specific country settings, the parameters have been preset in factory and you don't need to operate this step any more.

2) There are eleven countries/rules to select:

1	VDE0126
2	Germany
3	France
4	Italy
5	Greece
6	Hungary
7	Belgium
8	Turkey
9	Denmark
10	Spain
11	UK-G59

Note: if you can't find the country you want, please contact Growatt.

3) When it comes to the country you want, double knock to enter, as Fig 6.3.3.

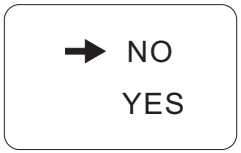


Fig 6.3.3

4) When enter the confirm interface, there are two options 'NO' and 'YES', and the cursor will stay at 'NO' in default, single knock to shift between 'NO' and 'YES', double knock to confirm your selection. When at 'NO', double knock will exit, when at 'YES', double knock will set up. After the setting is successful, the LCD will display "Set Country OK", and inverter will reboot automatically.

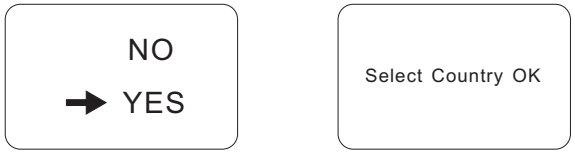


Fig 6.3.4

6.3.2 Power on Display

Power on display

After inverter restarts, LCD background will light automatically. Growatt Logo will appear immediately. The background light will last for 2 seconds. See Fig6.3.5 for reference.

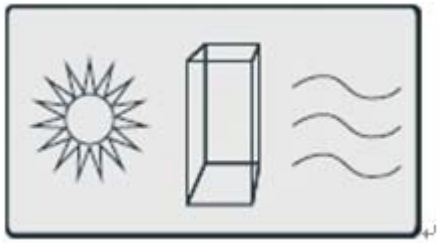


Fig6.3.5 Power on Growatt Logo

After displaying Growatt Logo for 2 seconds, LCD screen will switch to the second interface; display the figure of inverter, company name, inverter's power rating, etc. The second interface will last for 3 seconds. See Fig6.3.6 for reference.

Fig 6.3.6 The second power on interface

After 3 seconds, it will switch to the third interface. See Fig6.3.7 for reference.

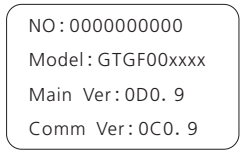


Fig6.3.7 The third power on interface

Here is explanation of items on Fig6.3.7:

- No.: Serial number of this inverter.
- Model: model name of this inverter.
- Main Ver: firmware version of control board.
- Comm Ver: firmware version of communication board.

After displaying information of the third interface for 3 seconds, the background light will turn off.

LCD Display when backlight off

After the power on information is displayed automatically and the backlight turns off, the LCD display will switch to the following Interface 1. There are 4 interfaces, which can be displayed in turn by single knock.

Interface 1: Running state. See Fig 6.3.4 as reference. The first line displays inverter's state description, for example, in faulty state it will display ERROR and followed with faulty codes, which is convenient to compare with error code list in manual. The second line displays inverter's states name; and the third line displays energy generated today, and the forth line displays the total energy generated since installation.

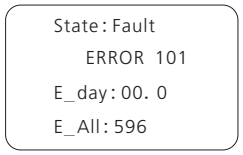


Fig6.3.8 Interface 1: Running state

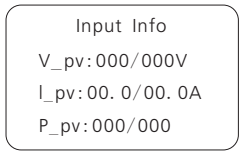


Fig6.3.9 Interface 2: Input information

Interface 2: Input information. See Fig6.3.9 for reference.
This interface displays parameters of PV input, including input voltage, current, and power of each MPP tracker.

- V-pv: input voltage of MPPT1 and MPPT2
- I-pv: input current of MPPT1 and MPPT2
- P-pv: input power of MPPT1 and MPPT2

Interface 3: Output information. See Fig6.3.10 for reference.
This interface displays output information of inverter, including output voltage of each phase, output current of each phase, and output power of each phase.

- V: output voltage of each phase
- I: output current of each phase
- P: output power of each phase

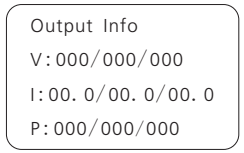


Fig6.3.10 Interface 3: Output

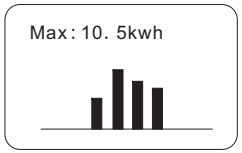


Fig6.3.11 Interface 4: 24 hour's generation curve

Interface 4: 24 hour's generation curve. See Fig6.3.11 for reference.
This interface shows the generated power of every hour this day.

- Max: maximum power of today
- Power curve: today's power curve

6.3.2 .3 Connecting messages

When inverter started to connect to grid, the following message will appear on LCD screen. See Fig6.3.12 for reference.information

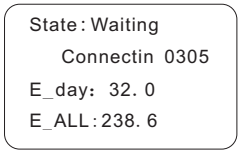


Fig6.3.12 Connect to gird interface

6.3.2.4 LCD Lock and unlock

LCD display will be locked while there is no any operation in two minutes. You need knock four times to unlock LCD. See Fig6.3.13 for reference.

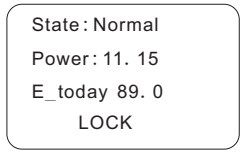


Fig6.3.13 Lock LCD display

6.3.3 Operate by knock

Knock type and definition
The inverter can support for kinds of knock: single knock, double knock, thrice knock, Knock four times. Each kind of knock has different function. Refer to specified definition in Table 6.1.

Table 6.1 Knock definition list

Knock type	Definition
Single knock	Down
Double knock	Enter
Thrice knock	Esc
Knock four times	Unlock LCD

Light backlight and single knock to check running information

Before light the backlight, the four types of knock functions are the same, which is just lighting the backlight. Note that the background lighting will automatically turn off if there is no knock detected in 10 seconds.

During cloudy days or in the area of low light, it's inconvenient for users to check inverter running information such as state, input data, output data, energy generated. In this case user can light the backlight and check those data by single knock, a single knock will switch LCD screen to a following interface. The interface display on LCD screen will circle as follow: Fir6.3.8 -> Fig6.3.9 -> Fig 6.3.10 -> Fig6.3.11-> Fig6.3.12, and then again Fig6.3.8.

6.3.4 Data checking and parameters setting

First level menu

It is a little bit different to enter the first level menu, note that using thrice knock to enter first level menu instead of double knock. Fig 6.3.14 is the interface of first level menu.

Fig 6.3.14 First level menu

In current interface, a single knock will switch the index to next item, double knock will enter the corresponding second level menu.

Second level menu

In first level menu, double knock will lead to next level menu.
The followings are second level menu interfaces for each first level menu items, shown in Fig 6.3.15.
In second level menu, a single knock will switch the index to next item; a double knock will enter the corresponding third level menu. And a thrice knock will back to first level menu.

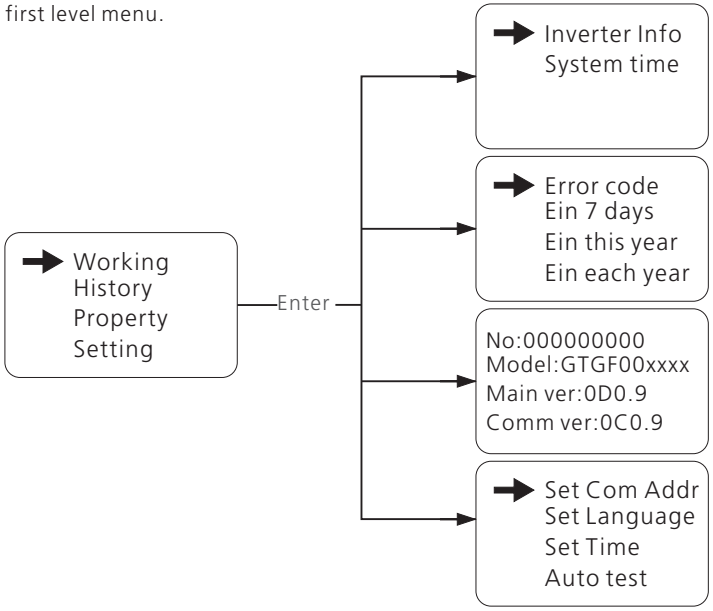


Fig 6.3.15 Second level menu for each first level menu items

Explanations of each item in third level menu interface of working information:
State information:

Table 6.2 Working information sub-items explanation

Second level menu	Third level items	Item explanation
Inverter info	State: Normal	Inverter running state
	Power: xxx.xx	AC gross output power
	E_day	Energy produced today
	E_all	Energy produced since installation
	Input info	Inverter input parameters
	V_pv: xxx/xxx	PV input voltage for each MPP tracker
	I_pv: xx.x/xx.x	PV input current for each MPP tracker
	P_pv: xxx/xxx	PV input power for each MPP tracker
	Output info	Inverter output parameters
	V: xxx.xxx.xxx	AC output voltage for each phase
	I: xx.x/xx.x/xx.x	AC output current for each phase
	P: xxx/xxx/xxx	AC output power for each phase
	Power chart	Histogram of generation power
	Maxrve	Maximum output power of inverter
	Power info	Generation power information of inverter
	P_Factor	Power factor
	Q	Reactive power
	GridFreq	Utility grid frequency

Historical information

Fig 6.3.17 is the third level menu interfaces for each second level menu items of historical information.

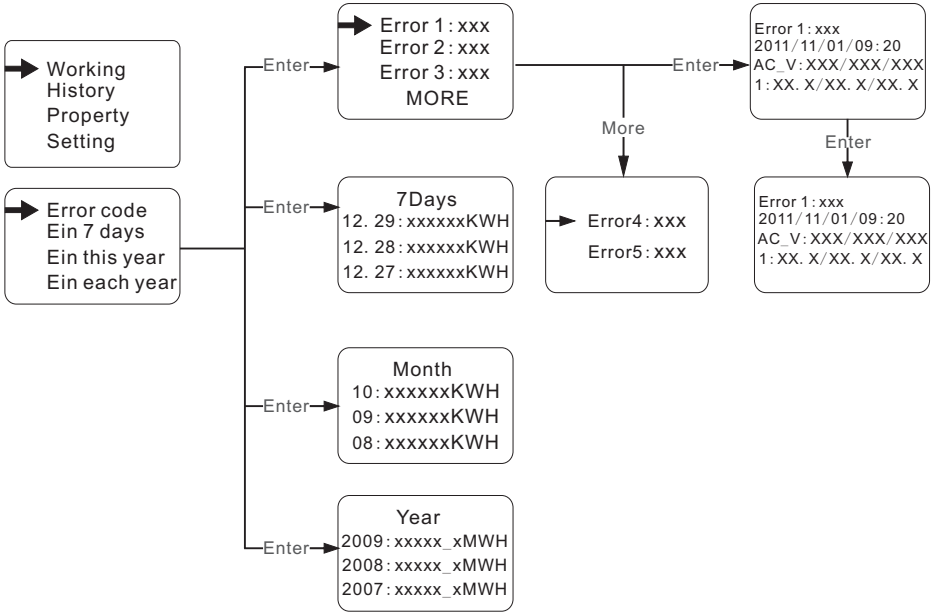


Fig 6.3.17 Third level menu interface of historical information

Explanation of each item in third level menu interface of working information:
State information:

Table 6.3 Historical information sub-items explanation

Second level menu	Third level items	Item explanation
Error Record	Error1 : xxx Error2 : xxx Error3 : xxx Error4 : xxx Error5 : xxx	Five latest error records
	More	More error record

Second level menu	Third level items	Item explanation
E in 7 Days	7 Days	Title indicates this is latest 7 days running data
	MM:DD: xxxx.x Kwh	Format is Month:Date, xxxx.x is energy generated in that day.
E in Each Month	Month	Title indicates this is every month's running data in this year.
	MM: xxxx.x Kwh	xxxx.x is energy generated in that month.
E in Each Year	Year	Title indicates this is latest 10 years running data.
	20XX: xxxx.x Mwh	xxxx.x is energy generated in the corresponding year.

Property information

Fig 6.3.18 is the second level menu interfaces of property

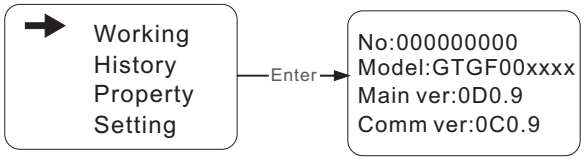


Fig 6.3.18 Property information

Explanation of each item in third level menu interface of working information:

First level menu	Second level items	Item explanation
Property	No.:xxxxxxxxxx	Serial number of this inverter.
	Model:GTGF00xxxx	Model name of this inverter.
	Main Ver:0D0.9	Firmware version of Control Board
	Comm Ver:0C0.9	Firmware version of Communication Board

Parameters setting

Fig 6.3.19 is the setting information in second level menu.nterfaces of property

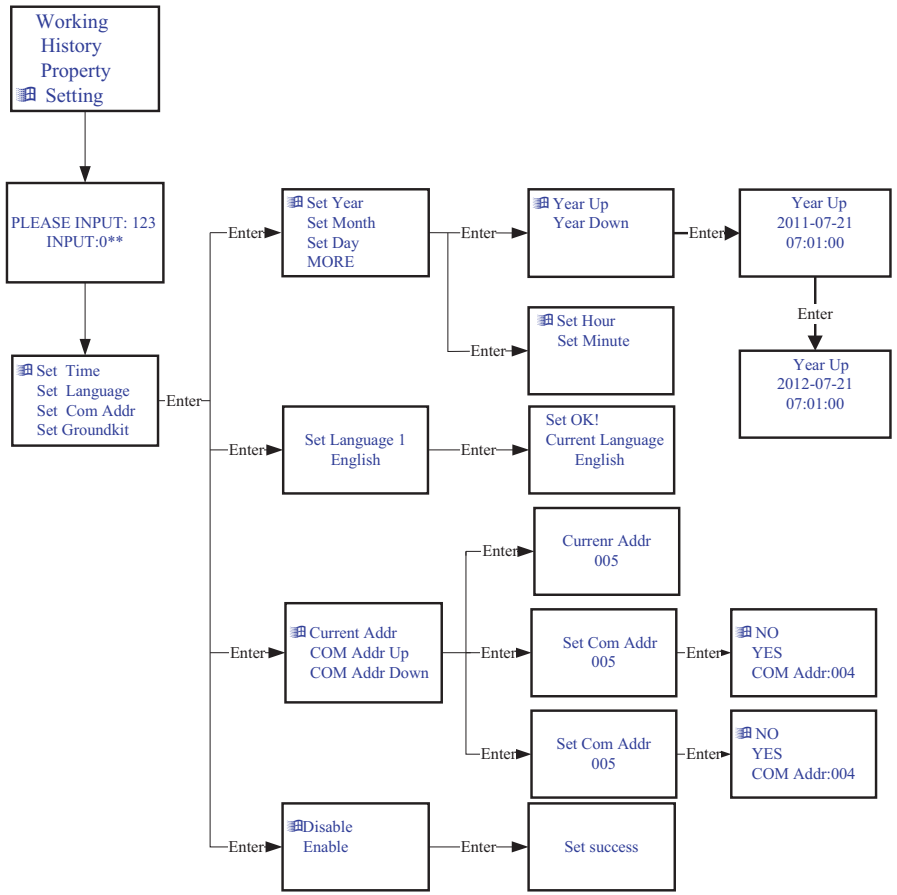


Fig 6.3.19 setting second level menu and its sub-menus

Setting inverter's COM address

When communicating with monitoring software or device, the software or device may regard inverter's COM address as communication address (Also may use inverter's serial number as communication address).The COM address could be assigned. The second level menu "Set COM Addr" of setting is to set inverter's COM address.

Setting steps:

Input password->Setting->Set COM addr->Set Manual, "Current Addr" is the current address of inverter."COM Addr Up"add address. "COM Addr Up" decrease address .Single knock to change value of fixed address, double knock enter next manual. Choose "YES"to save changes, and LCD screen will display "Set Addr OK! Current Addr XXX", see Fig 6.3.19 for reference.

Setting language

To change inverter's displaying language, please select Setting->Set language, then LCD screen will display current language type, single knock to change current language, double knock will save changes and displays "Set Language OK! Current Language English" see Fig 6.3.19 for reference.

Please note in order to prevent disoperation, system language won't be change in second level menu "Set language", but it will be only if user saves save the choice by double knock and LCD displays "Set OK!"

The inverter provides five languages: Italian, English, German, Spanish, and French. The number on Set language interface is sequence number of these five languages, the sequence number and its corresponding language are shown in Table6.5.

Table6.5 sequence number of languages

Language	Sequence Number
Italian	0
English	1
German	2
Spanish	3
French	4

Setting inverter time

Inverter provides a system clock; user must set the system time after installation, as the historical statistic data for a period were based on the clock. User can set the following time parameters: year, month, day, hour, minute.

Set year: Setting->Set time->Set year->Year up or Year down->knock to change year. Thrice knock to exit and save changes.

Set month: Setting->Set time->Set month->Month up or Month down->knock to change month. Thrice knock to exit and save changes.

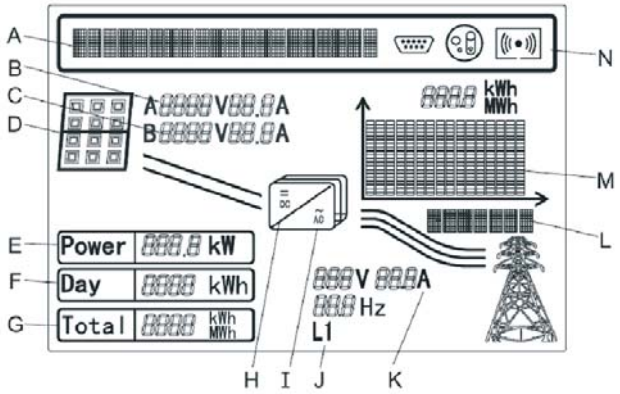
Set date: Setting->Set time->Set date->Date up or Date down->knock to change date. Thrice knock to exit and save changes.

Set hour: Setting->Set time->Set hour->Hour up or Hour down->knock to change Hour. Thrice knock to exit and save changes.

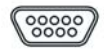
Set minute: Setting->Set time->Set minute->minute up or minute down->knock to change minute. Thrice knock to exit and save changes.

6.4 M3 LCD Display

6.4.1 Graphic display



Position	Detail
A	Text line for displaying an event
B	Input voltage and current of MPPTA
C	Input voltage and current of MPPTB
D	PV array A and B, Light when the array voltage is above the start voltage(300Vdc)
E	Current power
F	Daily energy
G	Total energy generated since the inverter was installed
H	Light when the array voltage is above the start voltage(300Vdc)
I	Lighted when "H" is lighted and feed-in
J	Output phase of the line conductor, switch every 5 seconds.
K	Output voltage /current /frequency of the line conductor
L	Graphical display of the inverter energy/power
M	



RS232 communication

RS485 communication

External wireless communication

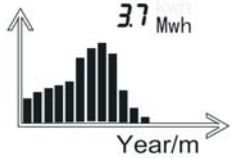
Internal wireless communication

6.4.2 Graph

The inverter energy and/or power is shown as a graph on the display. The lower right-hand bar of the graph represents the current unit of time: Day/h, Week/day, Month/M, Year/Y. The top bar of the graph represents the maximum value of the graph values. The daily graph is displayed by default. You can trip the enclosure lid three times to switch the current unit of time and the generation information.

The graph shows recent 16 hours of power generation and the maximum value power of the 16 values.

The graph shows recent 7 days of power generation and the maximum value power of the 7 values.



The graph shows recent 12 months of power generation and the maximum value power of the 12 values.

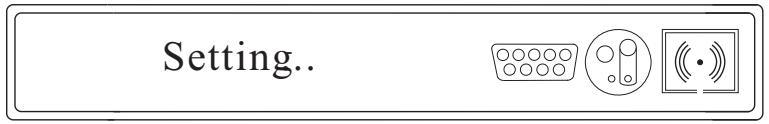
The graph shows recent 16 years of power generation and the maximum value power of the 16 values.

6.4.3 Text line

The Text line is used for displaying an event. Include the information of setting language, models, communication address, and time. The "Power Rate" and "Power Factor" are take turn to display by default. You need input"123" before enter into the setting interface。

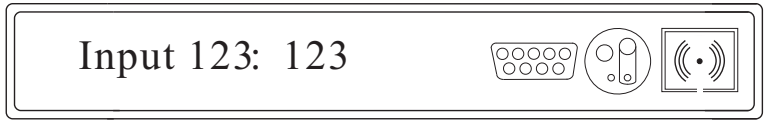
You can operate the inputting "123" ：

1) Single knock the enclosure lid until the text line switch to the text as follow:

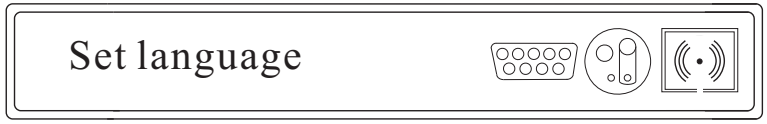


2) Double knock, the text will show "input123 ： 000".

3) Double knock the enclosure lid ready to input password. Single knock to change value of first, double knock enter into next position.



4) Knock the enclosure lid three times to enter into setting interface.

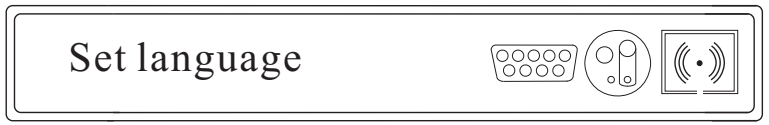


5) Knock the enclosure lid four times to exit setting interface.

You can operate the settings as follow:

a) Setting language

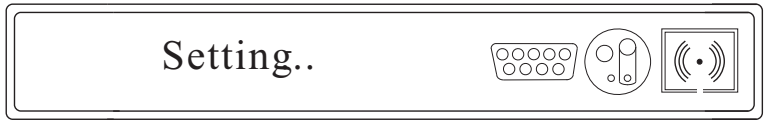
1) Knock the enclosure lid once every time until the text line switch to the text as follow:



2) Knock the enclosure lid twice and the text will show the language.

3) You can choose the language by tripping the enclosure once; the language includes English, Deutsh, Espanol, Francais, Italiano.

4) Then you can trip the enclosure three times to confirm the language you have chosen. And the text line change as follow:

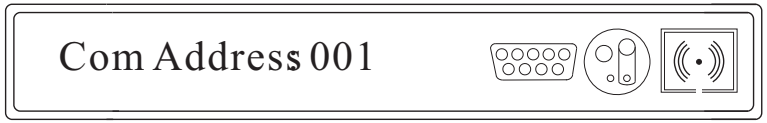


The language is set!

b) Setting Com Address

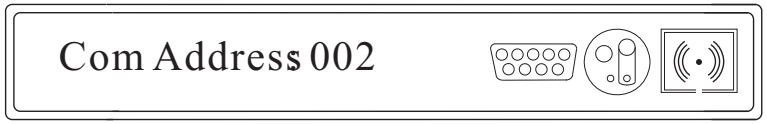
For the communicating, the inverter needs a communication address. In multi system, the addresses of inverters must be different from one to another.

1) Single knock until the text line switch to the text as follow:



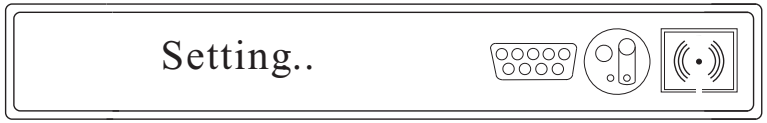
2) Double knock the enclosure lid and the lower number text"1" will flash: 001.

3) If you want to change it, single knock to change it from 0 to 9.



4) If you want to set the address more lager, double knock the enclosure lid to let the higher number text "002" flashing. And single knock the enclosure lid to change it from 0 to 9. So as the highest number text. In the general condition, the maximum number of the address is within 32.

5) Then you can knock the enclosure three times to confirm the address you have set.



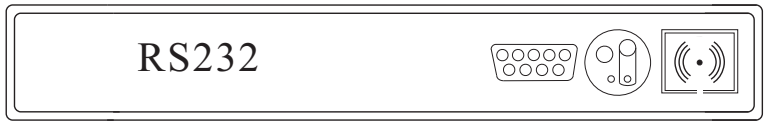
The Com Address is set!

C) Switching the RS232 and the External wireless communication

Information

As the Serial communication with the computer and the external wireless communication using the same serial port, we have to choose one. The RS232 is communicating to computer so that the computer can be connected to the inverter using our software tools. The RS232 is chose by default in the inverter.

1) Trip the enclosure lid once every time until the text line switch to the text as follow:



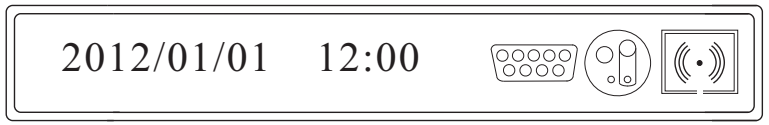
2) Double knock the enclosure lid and switching to external wireless communication.follow:

3) Then knock the enclosure three times to confirm it. And the text line change as follow :

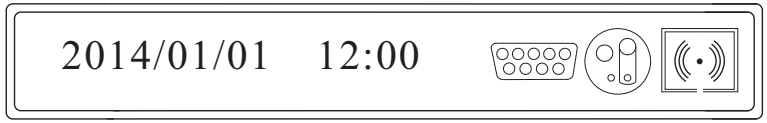
The External wireless communication is set!

d)Setting date and time

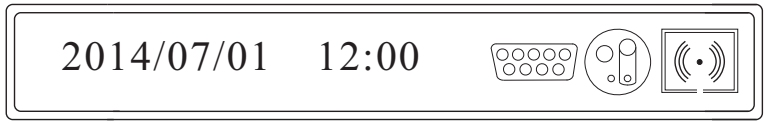
1) Single knock the enclosure lid until the text line switch to the text as follow（the time maybe different depends on the inverter）:



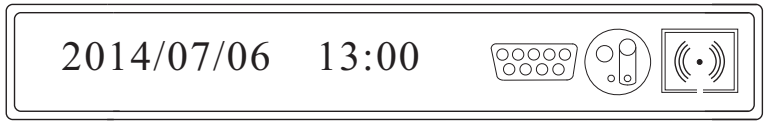
2) Double knock the enclosure lid and the text will switch to the year"2012", and the two lower numbers "2012" will flash, you can change it by single knock.



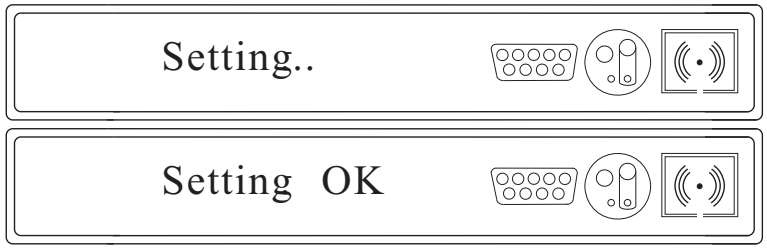
3) Double knock the enclosure lid and switching to the month"01", and it will flash. Then you can change it by single knock.



4) So as to setting the day and the time.



5) Then you need knock the enclosure three times to confirm it. And the text line change as follow :



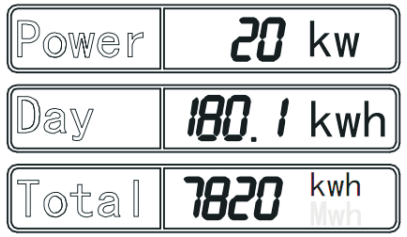
The date and the time are set!

Information

You can set all above by Growatt software 'Shinebus' with computer. For further information please go to the site: www.ginverte.com.

6.4.4 Power display

The power and energy of the inverter are displayed in three fields: Power, Day and Total. The display is updated every five seconds.



Power

The power is that the inverter is currently feeding into the electricity grid.

Day

The energy fed into the electricity grid on this particular day. This equals the energy generated from the inverter's start-up in the morning to the current time.

Total

The total energy is that the inverter has fed into the electricity grid during its entire operating time.

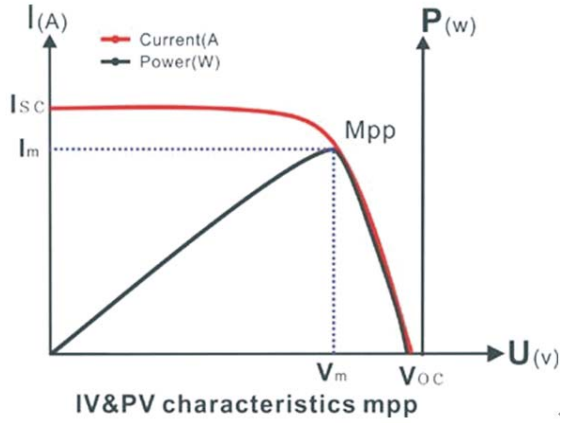
Measurement accuracy

The display values may deviate from the actual values and must not be used for billing purposes. The inverter's measurement values are required for the operational control and to control the current to be fed into the electricity grid. The inverter does not have a calibrated meter.

6.5 Double MPPT of the Growatt UE

The Growatt UE includes dual input section to process two strings with independent MPPT, high speed and precise MPPT algorithm for real-time power tracking and energy harvesting, as well as transformerless operation for high performance, the max conversion efficiency is up to 98%. The wide input voltage range makes the inverter suitable to low power operation as well as the high power operation.

As the weather influence and the location of two MPPT PV arrays different, the power of the MPPT A inputs is different from the power inputs of the MPPT B at the same time, the Growatt UE works at a non-symmetrical input state. But the MPPT algorithm of the inverter makes it tracking the maximum power point of every MPPT channel to improve the energy utilization of the PV arrays.

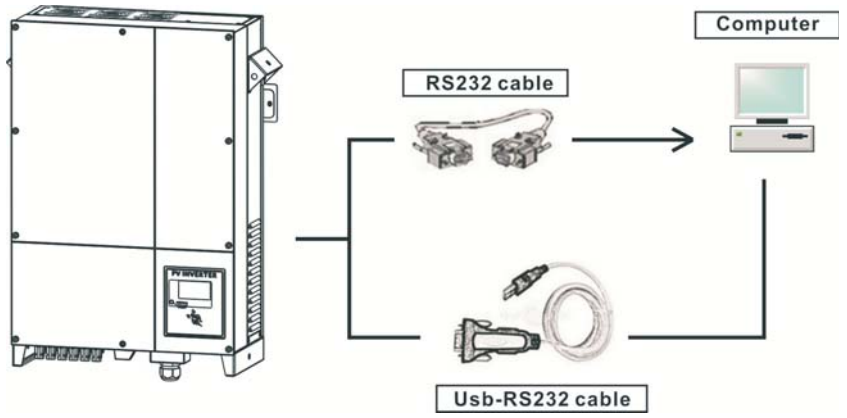


IV&PV characteristics mpp

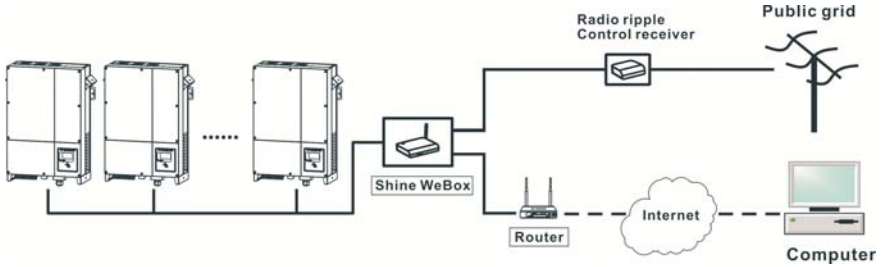
6.6 Communication

About the software of shinebus and the usage of it please download from the web: www.growatt.comchannel to improve the energy utilization of the PV arrays.

The connecting diagram as follow:



Active power control with a ripple control signal receiver



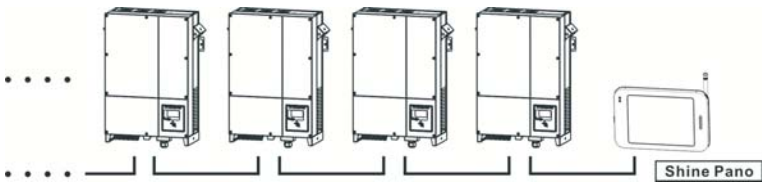
6.6.2 Monitor the inverters

The inverter provides RS485 interface and RS232 interface to communicate with remote PC or logger. User can monitor the inverter state via the following types of communication systems.

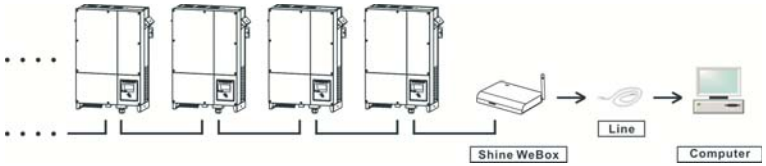
You can update firmware via RS232 or RS485*

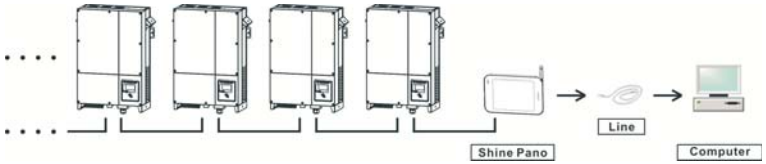
Plan A:

- Through RS485 interface-Data logger.



- Through RS485 interface-Data logger.



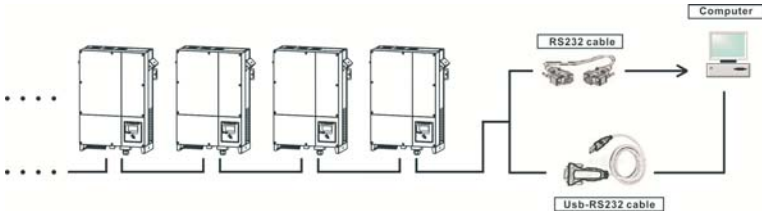


- Through RS485 interface-RS485-232 /RS232 converter-PC

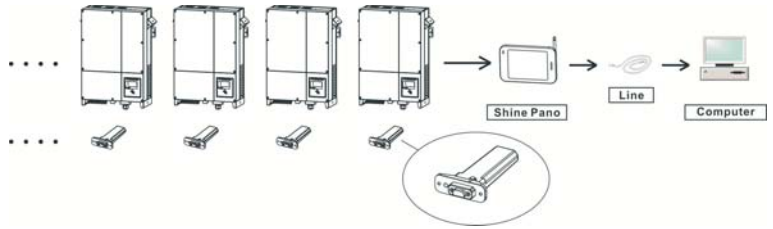
* Only for the inverter with the firmware after 0D37+0C30

Information

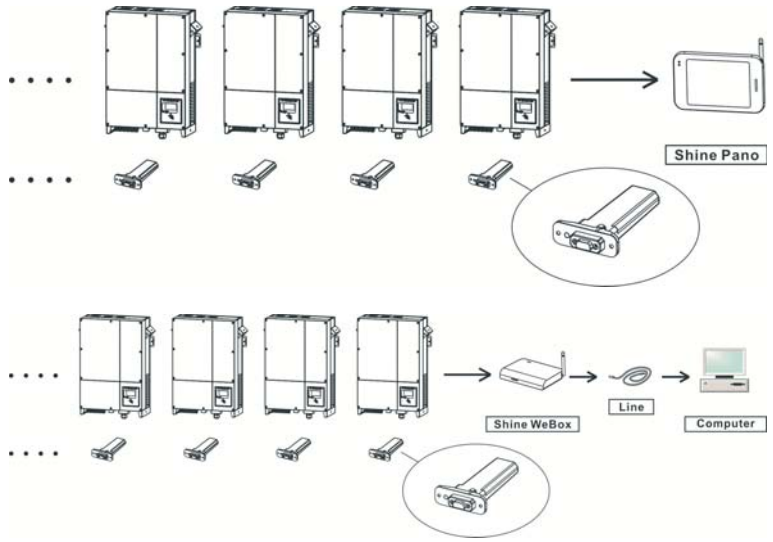
If you want to update firmware online, please disconnect AC breaker of the inverter first. If you plan to update firmware via RS485, please disconnect the monitor device.



- Through RS232 interface- wireless module-Data logger.

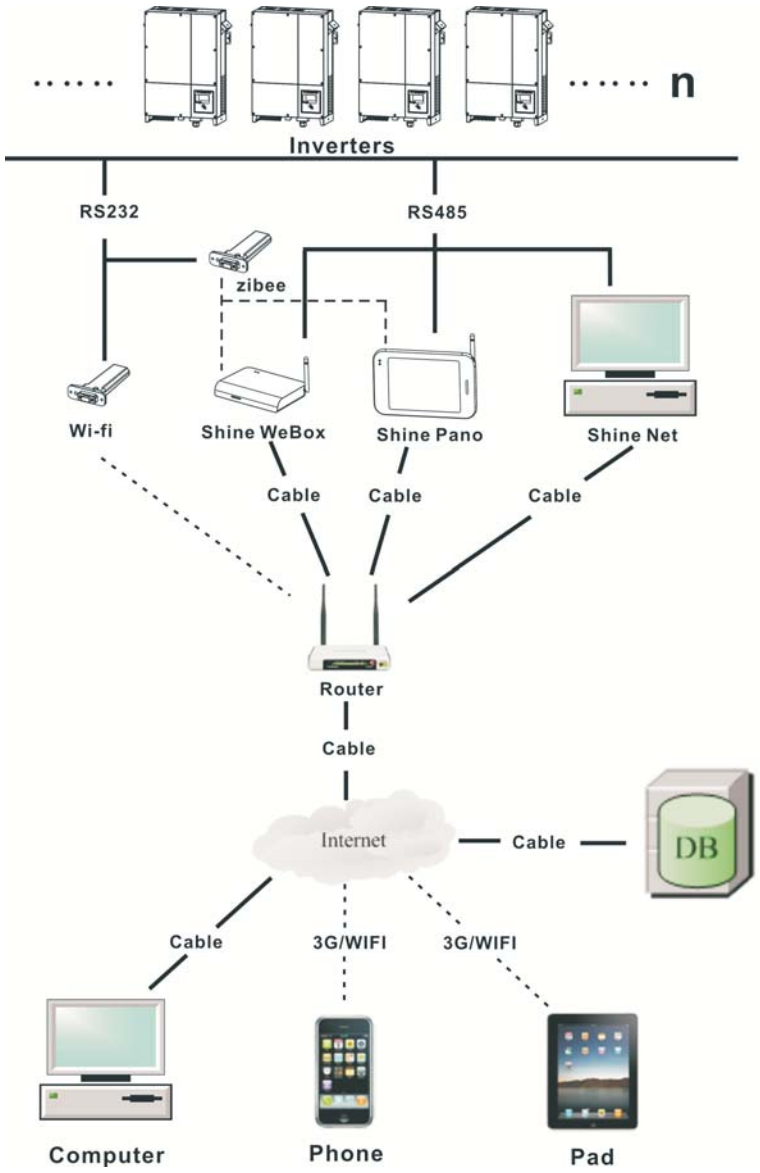


- Through RS232 interface- wireless module-Data logger-PC.



- Through RS232 interface- wireless module-Data logger-Internet.

Plan B



Information

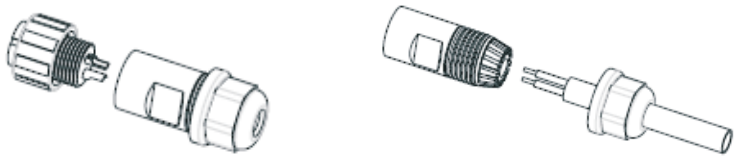
When three phase inverter and single-phase inverter shared a RS485 communication line, the total length of which does not exceed 1km.

6.6.3 RS485 cable connection

There are two types RS485 connector.

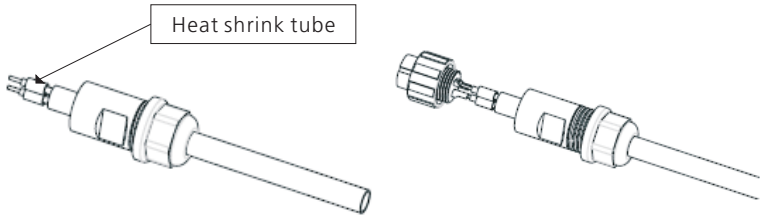
Type 1:

1. Unscrew the plastic connector.



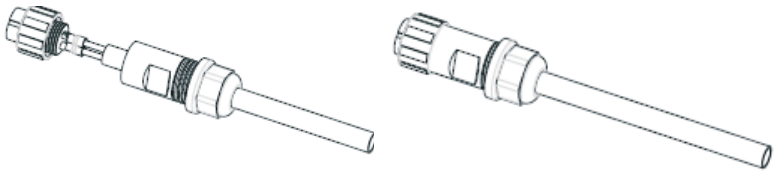
2. Make the RS485 cable go through the connector.

3. Put two heat shrink tubes onto the front head of RS485 cable.



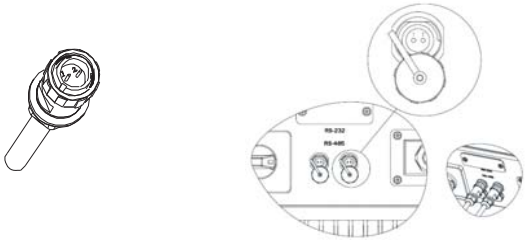
4. Insert the two metal head into relevant small cupreous hole, and fasten the connection by soldering.

5. Make the heat shrink tubes wrap the joint.



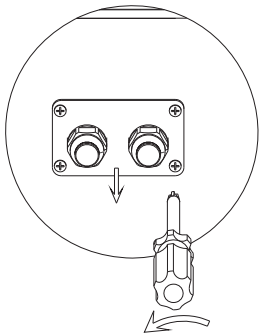
6. Assemble the connector.

7. Connect the RS485 connector onto the inverter. Make sure the connection matched ('1' to '1', '2' to '2').

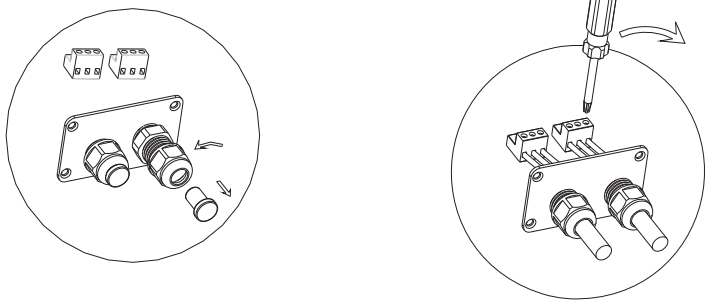


Type 2:

1. Please loosen four screws, take down the RS485 waterproof cover from inverter. If you don't choose RS485 as communication method, keep it on the inverter.



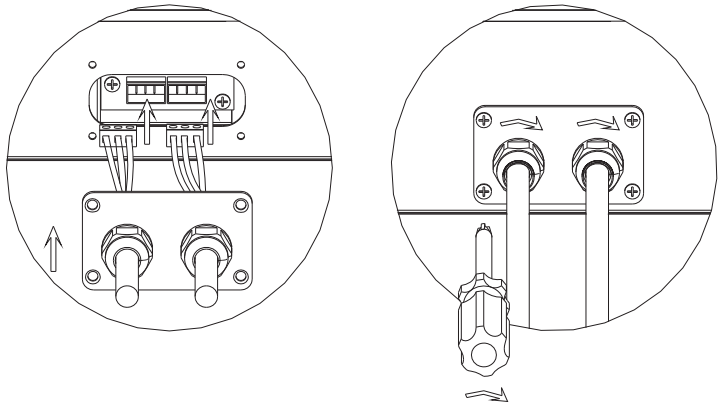
2. Slightly loosen the swivel nut, remove the filler-plug from the M16 cable gland.



3. Make the cable through the hole of cable gland and put the cable into the RS485 terminals, fix all cables with screwdriver ('1'to'1', '3'to'3', '2' to the shielding layer

Information Pull cables outwards to confirm whether they are installed firmly

4. Plug in two terminals. Cover the fix board.

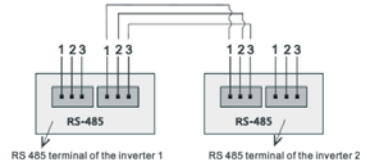


Information Tighten 4 pcs screws first, then tighten cable gland.

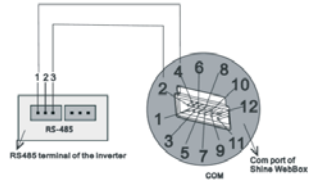
5. Tighten 4pcs screws and cable gland.

Note:

1) As to the connection between inverters, please refer to the following figure.



2) As to the connection between inverter and ShineWebBox (ShinePano), please



7 Start-Up and shut down the inverter

7.1 Start-Up the inverter

1.Turn on the AC grid breaker;
2.Turn on the DC switch of the inverter, and the inverter will start automatically when the input voltage is higher than 300V.

7.2 Shut down the Inverter

1.Turn off the AC grid breaker;
2.Turn off the DC switch of the inverter.
3.Check the inverter operating state.
4.Until the display of LCD goes out, the inverter is shut down.

8 Maintenance and Cleaning

Once the output power is derating because of too high warming, some tips can help you solve such problems:

- The air grills or cooling fans are clogged. To clean the air grills and cooling fans please refer to 8.1 Cleaning Fans and Grills.
- One or two cooling fans failed. To exchange the cooling fans please refer to 8.2 Exchanging Fans.
- Ventilation of installation location is poor. Choose appropriate installation location before mounting.

8.1 Cleaning Fans and Grills

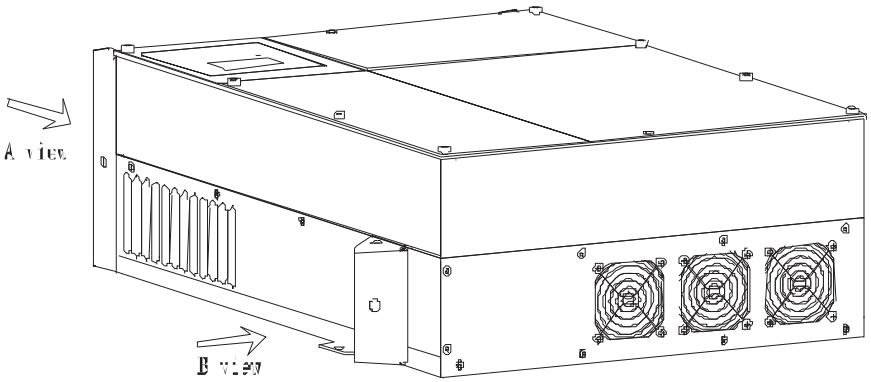
Maintain fans and grills every half a year to reduce the power derating caused by excessive heat.

If fans or grills are just covered by soft dust particles, using tools such as vacuum cleaner to clean the fans. And if user has no such tools or there are obstructions in fans, grills or the cooling area of inverter, you need to clean the fans and grills after they are took apart from the inverter.

Note: There are two types of fan structure:

Fan type 1 cleaning procedure:

1. Before cleaning, please disconnect the DC and AC connection.
   - Turn off the DC switch.
   - Disconnect the DC terminal. (You might need some tool to disconnect the male and female terminals)
   - Disconnect the AC terminal.
2. Remove the protecting plants at the bottom of UE inverter.
   Remove the inverter from mounting bracket, and place inverter horizontally on clean and dry place.
   First of all you should remove the protection planes at the bottom of UE inverters.
   Use screwdrivers counterclockwise rotate the screws as figures shown below.



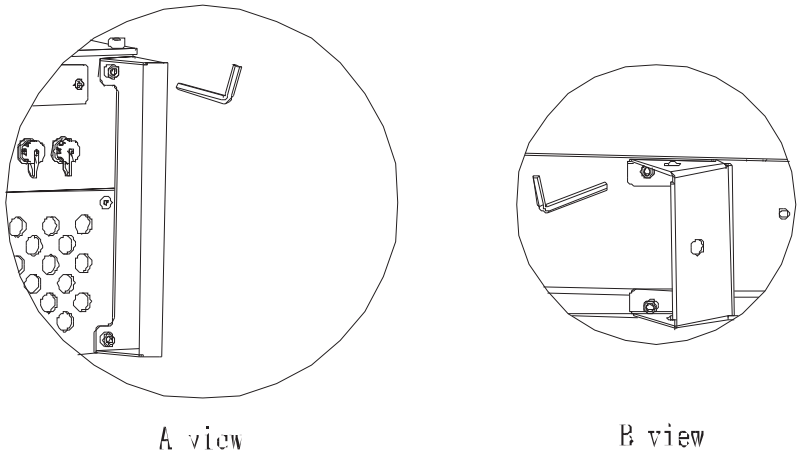


Fig 8.1.1

3. Remove the handles on both sides of UE inverter as fig.8.1.1 B View show.
4. Remove the shell plane of the bottom and right side.

   Use appropriate screwdrivers counterclockwise rotate the screws marked in Fig 8.1.2.

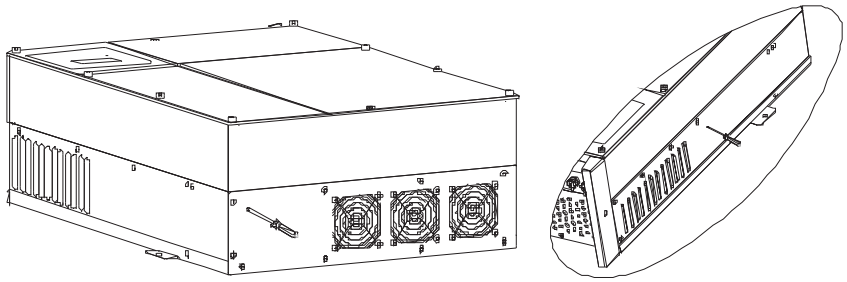


Fig 8.1.2

5. Unlock and remove the plug connectors of cooling fans.

   To unlock the plug connectors, you need some tinny tools. There are 2 connectors, as Fig8.1.3 3 show.

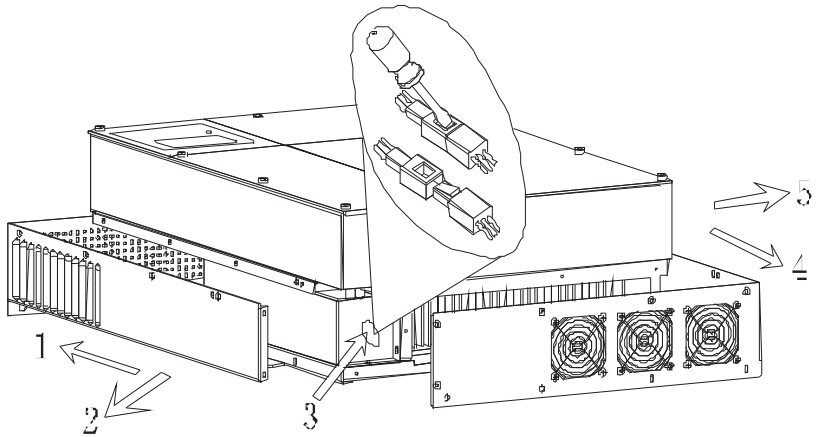


Fig 8.1.3

6. Remove the shell plane of the top and left side, as Fig8.1.3 1 2 4 5 show.

   It's easy to clean the grills on shell plane using water or some tools.
7. Clean the grills on shell planes.
8. Remove and clean the cooling fans.

   Unscrew and remove the cooling fans as Fig8.1.4

   Clean the cooling fans using appropriate tools such as brushes, clothes or water.

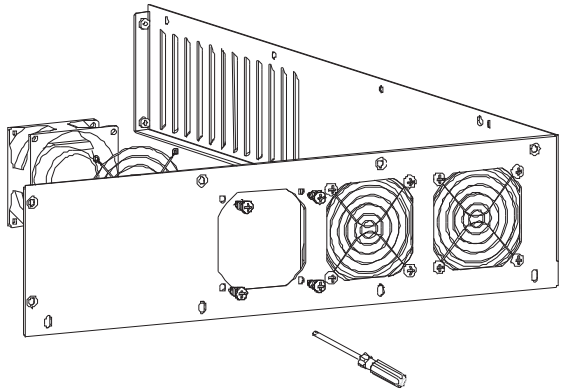


Fig 8.1.4

9. After cleaning, assemble the inverter in reverse order. If you cleaning the fans using water please make sure the fans, cables and connectors are dry before assembling.

Fan type 2 cleaning procedure

1. Please disconnect the DC and AC connection.
   - Turn off the DC switch.
   - Disconnect the DC terminal. (You might need some tool to disconnect the male and female terminals)
   - Disconnect the AC terminal.
2. Remove the protecting plants at the bottom of UE inverter.
   Remove the inverter from mounting bracket, and place inverter horizontally on clean and dry place.
3. Screw off the screws to open the cover with suitable tool, then fans will be seen, as figures below:

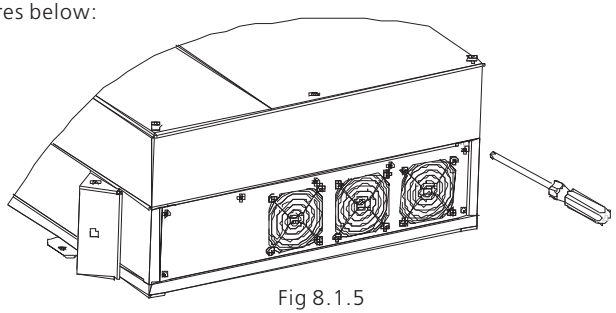


Fig 8.1.5

4. Pull out the white connectors with some tinny tools.

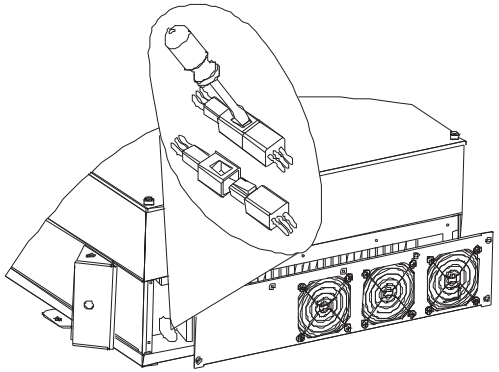


Fig 8.1.6

5. Take away the fans from the cover and clean them thoroughly.

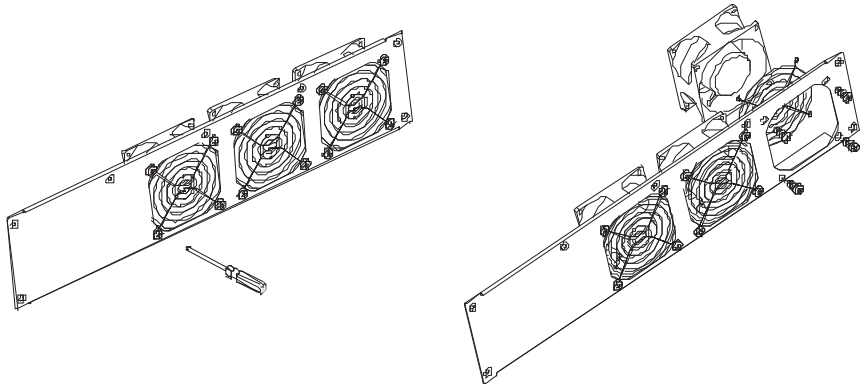


Fig 8.1.7

6. When finishing cleaning, put back the fans in reverse order.

8.2 Exchange Fan

Sometimes the heat dissipation error occurred because the cooling fans failed, under such situation, you need to exchange the cooling fans.
The procedure is similar to 5.2 Cleaning Cooling Fan and Grill (Step 1 ~ 8), step 9 should be exchanging the fans and assembling the inverter in reverse order.

9 Trouble shooting

Our quality control program assures that every inverter is manufactured to accurate specifications and is thoroughly tested before leaving our factory. If you have difficulty in the operation of your inverter, please read through the following information to correct the problem.

9.1 Error Messages displayed on LCD

An error message will be displayed on the LCD screen when a fault occurs. The faults consist of system fault and inverter fault.

You may be advised to contact Growatt in some situation, please provide the following information.

Information concerning the inverter:

- Serial number
- Model number
- Error message on LCD
- Short description of the problem
- Grid voltage
- DC input voltage
- Can you reproduce the failure? If yes, how?
- Has this problem occurred in the past?
- What was the ambient condition when the problem occurred?

Information concerning the PV panels:

- Manufacturer name and model number of the PV panel
- Output power of the panel
- Voc of the panel
- Vmp of the panel
- Imp of the panel
- Number of panels in each string

If it is necessary to replace the unit, please ship it in the original box.

9.1.1 System fault

System fault (system faults are mainly caused by system instead of inverter, please check the items as instructed below before replacing inverter).

Error message	Description	Suggestion
AC V Outrange	Utility grid voltage is out of permissible range.	1. Check grid voltage. 2. Check AC wiring, especially the ground wire. 3. If the error message still exists despite the grid voltage being within the tolerable range, contact Growatt.
ACF Outrange	Utility grid frequency out of permissible range.	1. Check AC wiring and grid frequency. 2. If the error message is displayed despite the grid frequency being within the tolerable range, contact Growatt
PV Isolation Low	Insulation problem	1. Check if panel enclosure ground properly. 2. Check if inverter ground properly. 3. Check if the DC breaker gets wet. 4. Check the impedance of PV (+) & PV (-) between ground (must be more than 1 MΩ). If the error message is displayed despite the above checking passed, contact Growatt.
Residual I High	Leakage current too high	1.Restart invert 2. If error message still exists, contact Growatt.

Output High DCI	Output current DC offset too high	1. Restart inverter. 2. If error message still exists, contact Growatt.
PV Voltage High	The DC input voltage is exceeding the maximum tolerable value.	1. Disconnect the DC wire immediately. 2. Check the voltage of each PV string with multimerter. 3. If the voltage of PV strings is lower than 980V, contact Growatt.
Auto Test Failed	Auto test didn't pass.	Restart inverter, repeat Auto Test, if problem still exist, contact Growatt.
Over Temperature	NTC OPEN or the temperature of heatsink is too high.	If the ambient temperature of inverter is lower than 60°C, restart invert, if error message still exists, contact Growatt.

9.1.2 Inverter warning

Warning code	Meanings	Suggestion
Warning100	For Growatt 7000UE-12000UE: Problem with fan 1 or fan 2. For Growatt 18000UE/20000UE: Problem with fan 1, fan 2, fan 3 or fan 4.	1. Check grid voltage. 2. Check AC wiring, especially the ground wire. 3. If the error message still exists despite the grid voltage being within the tolerable range, contact Growatt.
Warning103	Fail to read EEPROM.	Restart the inverter. If the warning still exist, please contact Growatt customer service to replace the COM board.
Warning104	Firmware version is not consistent.	Uptate the right version firmware.
Warning 105	Fail to write EEPROM.	Restart the inverter. If the warning still exist, please contact Growatt customer service to replace the COM board.

9.1.3 Inverter fault

Error code	Meanings	Suggestion
Error: 101	Communication board has not received data from control board for 10 seconds.	1、Restart inverter, if problem still exist, update the firmware ; 2、Change control board or COM board, if problem still exist, contact Growatt.
Error: 103	EEPROM fault.	Restart inverter, if problem still exist, Contact Growatt.
Error: 107	The AC voltage sampled by the main MCU and redundant MCU is not the same.	Restart inverter, if problem still exist, Contact Growatt.
Error: 117	Relay fault.	Restart inverter, if problem still exist, Contact Growatt.
Error: 119	GFCI fault.	Restart inverter, if problem still exist, change IO board, or contact Growatt.
Error: 121	Control board has not received data from Communication board for 5S.	1、Restart inverter, if problem still exist, update the firmware ; 2、Change control board or COM board, if problem still exist, contact Growatt.

10 Decommissioning

10.1 Dismantling the Inverter

1. Disconnect the inverter as described in section 7.
2. Remove all connection cables from the inverter.

Danger of burn injuries due to hot enclosure parts!
Wait 20 minutes before disassembling until the housing has cooled down.

3. Screw off all projecting cable glands.
4. Lift the inverter off the bracket and unscrew the bracket screws.

10.2 Packing the Inverter

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

10.3 Disposing of the Inverter

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

Specification 11

11.1 Specification of Growatt UE

Model	Growatt 7000UE	Growatt 8000UE	Growatt 9000UE
Specification			
Input data			
Max. DC power	7300W	8350W	9500W
Max. DC voltage	1000V	1000V	1000V
Start Voltage	350V	350V	350V
PV voltage range	180V-1000V	180V-1000V	180V-1000V
MPP voltage range/ nominal voltage	300V-1000V/600V	300V-1000V/600V	300V-1000V/600V
Max. input current	15A/15A	15A/15A	15A/15A
Max. input current per string	15A	15A	15A
Number of independent MPP trackers/strings per MPP tracker	2/2	2/2	2/2

Output (AC)

Max AC apparent power	7.0KVA	8.0KVA	9.0KVA
Max. AC power(PF=1)	7.0KW	8.0KW	9.0KW
Nominal AC power(PF=0.95)	6.65KW	7.6KW	8.55KW
Max. output current	11.7A	13.3A	15A
AC nominal voltage; range	3/N/PE, 230V/400V 184~275V	3/N/PE, 230V/400V 184~275V	3/N/PE, 230V/400V 184~275V
AC grid frequency; range	50/60Hz 44-55Hz/54-65Hz	50/60Hz 44-55Hz/54-65Hz	50/60Hz 44-55Hz/54-65Hz
Power factor	0.8leading - 0.8laging	0.8leading - 0.8laging	0.8leading - 0.8laging
THDi	<3%	<3%	<3%
AC grid connection type	Three phase	Three phase	Three phase

Efficiency

Max efficiency	**98%**	**98%**	**98%**
Euro-eta	**97.0%**	**97.2%**	**97.5%**
MPPT efficiency	**99.5%**	**99.5%**	**99.5%**

Protection devices

DC reverse polarity protection	yes	yes	yes
DC switch for each MPPT	yes	yes	yes
Output over current protection	yes	yes	yes
Output AC overvoltage Protection - Varistor	yes	yes	yes
Ground fault monitoring	yes	yes	yes
Grid monitoring	yes	yes	yes
Integrated all-pole sensitive leakage current monitoring unit	yes	yes	yes

General Data

Dimensions(W/H/D)	740/490/235 mm 29.1/19.3/9.3 inch	740/490/235 mm 29.1/19.3/9.3 inch	740/490/235 mm 29.1/19.3/9.3 inch
Weight	41kg/90.4lb	41kg/90.4lb	41kg/90.4lb
Operating temperature range	-25 °C ... +60 °C (-13 °F ... +140 °F) With derating above 45 °C(113 °F)	-25 °C ... +60 °C (-13 °F ... +140 °F) With derating above 45 °C(113 °F)	-25 °C ... +60 °C (-13 °F ... +140 °F) With derating above 45 °C(113 °F)
Noise emission (typical)	≤ 55 dB(A)	≤ 55 dB(A)	≤ 55 dB(A)

Altitude			
Self-consumption night	＜0.5 W	＜0.5 W	＜0.5 W
Topology	transformerless	transformerless	transformerless
Cooling concept	Smart cooling	Smart cooling	Smart cooling
Environmental Protection Rating	Ip65	Ip65	Ip65
Relative humidity	0…95% Non-condensing	0…95% Non-condensing	0…95% Non-condensing
Features			
DC connection	H4/MC4(opt)	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal	Screw terminal
Display	LCD	LCD	LCD
Interfaces: RS232/RS485/Bluetooth /RF/Zigbee/Wifi	yes/yes/opt/opt /opt/opt	yes/yes/opt/opt /opt/opt	yes/yes/opt/opt /opt/opt
Warranty: 5 years / 10 years	yes /opt	yes /opt	yes /opt
Certificates and approvals	VDE-AR-N4105, CEI 0-21, CE, VDE 0126-1-1, IEC 62109, RD 1663, G59/2, EN50438, AS4777, AS 3100		

Model	Growatt 10000UE	Growatt 12000UE
Specification		
DC input data		
Max. DC power	10500W	12500W
Max. DC voltage	1000V	1000V
Start DC voltage	350V	350V
DC voltage range	180V~1000V	180V~1000V
MPP voltage range/nominal voltage	300V~1000V/600V	300V~1000V/600V
Full load DC voltage range	400V~800V	400V~800V
Max. DC current (input A/input B)	15A/15A	17A/17A
Max. short-circuit current per string	20A	20A
Max. number of parallel strings	2/2	2/2
AC output data		
Max. AC apparent power	10kVA	12kVA
Max. AC power(PF=1)	10kW	12kW
Nominal AC power(PF=0.95)	9.5kW	11.4kW
Max AC current	16A	19A
Nominal AC voltage; Range	3/N/PE 230V/400V 184~275V	3/N/PE 230V/400V 184~275V
AC grid frequency; Range	50/60Hz -6Hz/+5Hz	50/60Hz -6Hz/+5Hz
Power factor	0.8leading~0.8laging	0.8leading~0.8laging
THDi	<3% (Full power output)	<3% (Full power output)
AC grid connection type	Three phase	Three phase

Efficiency		
Max. efficiency	98%	98%
Euro-eta	97.5%	97.5%
MPPT efficiency	99.5%	99.5%
Protection devices		
DC reverse polarity protection	yes	yes
DC switch for each MPPT	yes	yes
Output over current protection	yes	yes
Output AC overvoltage Protection - Varistor	yes	yes
Ground fault monitoring	yes	yes
Grid monitoring	yes	yes
Integrated all-pole sensitive leakage current monitoring unit	yes	yes
General data		
Dimensions (W / H / D) in mm	740/490/235 mm 29.1/19.3/9.3 inch	740/490/235 mm 29.1/19.3/9.3 inch
Weight	41kg/90.4lb	41kg/90.4lb
Ambient temperature range	-25 °C~+60 °C (-13 °F~+140 °F) With derating above 45 °C (113 °F)	-25 °C~+60 °C (-13 °F~+140 °F) With derating above 45 °C (113 °F)
Noise emission (typical)	≤55 dB(A)	≤55 dB(A)
Altitude	2000m(6560ft) without derating	
Self-consumption night	<0.5 W	<0.5 W
Topology	Transformerless	Transformerless
Cooling concept	Smart cooling	Smart cooling
Environmental Protection Rating	Ip65	Ip65
Relative humidity	0~95% Non-condensing	0~95% Non-condensing

Features		
DC connection	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal
Display	LCD	LCD
Interfaces: RS232/RS485/ Bluetooth/RF/Zigbee/Wi-Fi	yes/yes/opt/opt /opt/opt	yes/yes/opt/opt /opt/opt
Warranty: 5 years / 10 years	yes /opt	yes /opt
Certificates and approvals	VDE-AR-N4105, BDEW, CEI 0-21, RD1669, VDE 0126-1-1, G59, IEC 62109, CE, AS4777, AS/NZS 3100, etc.	

Model	Growatt 18000UE	Growatt 20000UE
Specification **DC input data**		
Max. DC power	18700W	20800W
Max. DC voltage	1000V	1000V
Start DC voltage	350V	350V
DC voltage range	180V~1000V	180V~1000V
MPP voltage range/nominal voltage	300V~1000V/600V	300V~1000V/600V
Full load DC voltage range	400V~800V	400V~800V
Max. DC current (input A/input B)	23A/23A	26A/26A
Max. short-circuit current per string	20A	20A
Max. number of parallel strings	2/3	2/3

AC output data

Max. AC apparent power	18kVA	20kVA
Max. AC power	18kW	20kW
Nominal AC power(PF=0.9)	16.2kW	18kW
Max AC current	28.6A	32A
Nominal AC voltage; Range	3/N/PE 230V/400V 184~275V	3/N/PE 230V/400V 184~275V
AC grid frequency; Range	50/60Hz -6Hz/+5Hz	50/60Hz -6Hz/+5Hz
Power factor	0.8leading~0.8laging	0.8leading~0.8laging
THDi	<3% (Full power output)	<3% (Full power output)
AC grid connection type	Three phase	Three phase

Efficiency

Max. efficiency	98%	98%
Euro-eta	97.5%	97.5%
MPPT efficiency	99.5%	99.5%

Protection devices

DC reverse polarity protection	yes	yes
DC switch for each MPPT	yes	yes
Output over current protection	yes	yes
Output AC overvoltage Protection - Varistor	yes	yes
Ground fault monitoring	yes	yes
Integrated all-pole sensitive leakage current monitoring unit	yes	yes

General data

Dimensions (W / H / D) in mm	740/570/235 mm 29.1/22.4/9.3 inch	740/570/235 mm 29.1/22.4/9.3 inch
Weight	60 kg/132.3lb	60kg/132.3lb
Ambient temperature range	-25 °C~+60 °C (-13 °F~+140 °F) With derating above 45 °C (113 °F)	-25 °C~+60 °C (-13 °F~+140 °F) With derating above 45 °C (113 °F)
Noise emission (typical)	≤55 dB(A)	≤55 dB(A)
Altitude	2000m(6560ft) without derating	
Self-consumption night	<0.5 W	<0.5 W
Topology	Transformerless	Transformerless
Cooling concept	Smart cooling	Smart cooling
Environmental Protection Rating	Ip65	Ip65
Relative humidity	0~95% Non-condensing	0~95% Non-condensing

Features

DC connection	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal
Display	LCD	LCD
Interfaces: RS232/RS485/ Bluetooth/RF/Zigbee/Wi-Fi	yes/yes/opt/opt /opt/opt	yes/yes/opt/opt /opt/opt
Warranty: 5 years / 10 years	yes /opt	yes /opt
Certificates and approvals	VDE-AR-N4105, BDEW, CEI 0-21, RD1669, VDE 0126-1-1, G59, IEC 62109, CE, AS4777, AS/NZS 3100, etc.	

11.2 DC connector info

H4 Specification:

Contact size	2.5mm2/14AWG	4mm2/12 AWG	6mm2/10 AWG	10mm2/8AWG
Rated current (at 90℃)	32A	40A	44A	65A
Rated system voltage	600V DC(UL) 1000V DC(TUV)			
Contact resistance	0.25mΩ TYP			
Degree of protection(mated)	Ip68			
Socket contact material	Copper. Tin plated			
Insulation material	Thermoplastic, UL94 V-0			
Ambient temperature range	-40℃ to +90℃			
Strip length	7.0mm(9/32)			
Cable jacket diameter	4.5 to 7.8mm(3/16: to 5/16")			

11.3 Torque Values

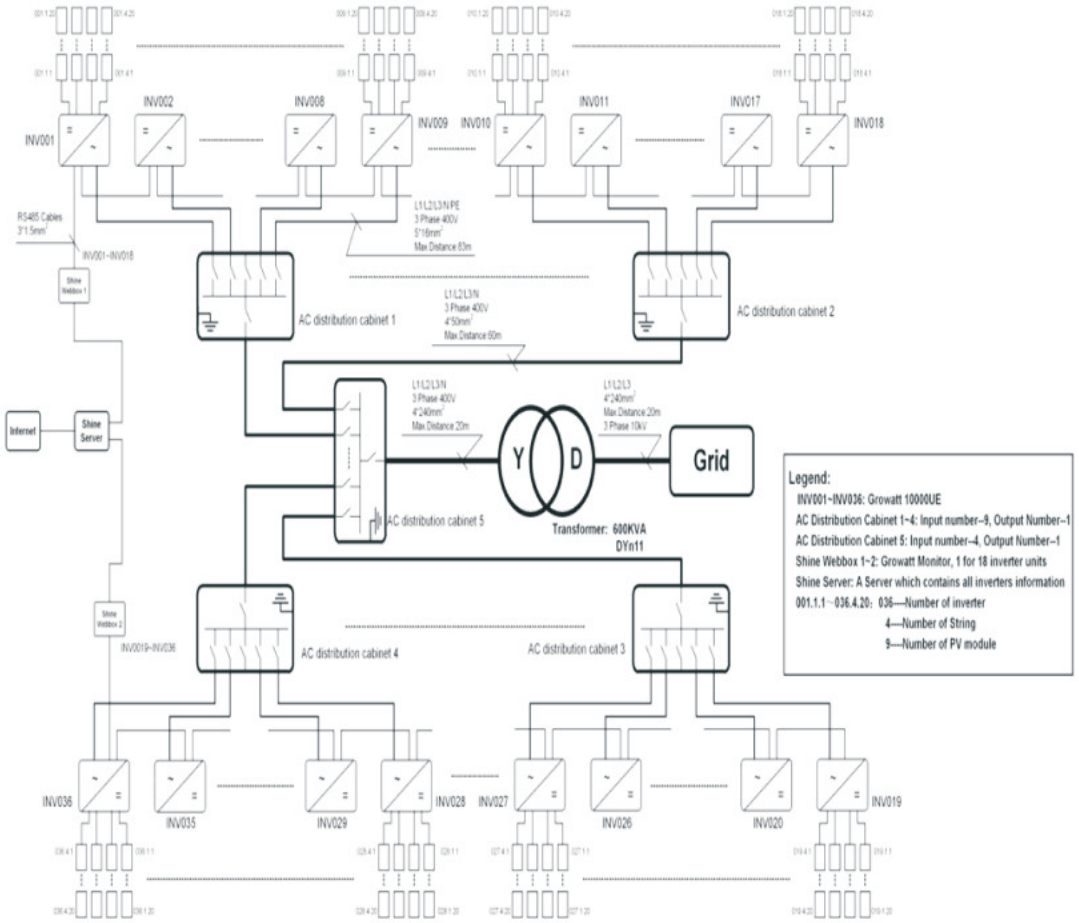
Enclosure lid screws	1.3Nm(10.8 1bf.in)
Shell and RS232 screws	0.7Nm(6.2 1bf.in)
AC terminal	1.8Nm(16.0 1bf.in)
AC connector 1 & 2	1.0Nm(9 1bf.in)
M6 socket head cap screws for securing the enclosure at the bracket	2Nm(18 1bf.in)
Fans screws	1Nm(9.0 1bf.in)

11.4 Spare Parts and Accessories

Name	Description	Growatt order number
Fans	Outside fan/wire of Growatt UE	025.0002101/018.0007100 025.0002001/018.0007000 025.0001900/018.0006900
	Internal fan of Growatt UE	025.0000601
Shine Webox	Communication data logger	MR00.0001700
Shine Pano	Communication data logger	200.0004900
Shine Vision receiver	Communication data logger receiver	MR00.0000201
Shine Vision emitter	Communication data logger emitter	MR00.0000601
Zigbee	Communication interface	200.0007000
Wi-Fi	Communication interface	MR00.0001400
Bluetooth	Communication interface	MR00.0002200

12 PV system installation

Installation with multiple inverters on a three phase system:



Certificates 13

Growatt UE is designed to use worldwide, hence the inverters meet different safety standards of variety countries and regions.

Model	Certificates
Growatt 7000UE	VDE-AR-N 4105, IEC 62109, VDE0126-1-1, CE,AS4777,AS3100
Growatt 8000UE	VDE-AR-N 4105, IEC 62109, VDE0126-1-1, CE,AS4777,AS3100
Growatt 9000UE	VDE-AR-N 4105, IEC 62109, VDE0126-1-1, CE,AS4777,AS3100
Growatt 10000UE	VDE-AR-N4105,CEI0-21,IEC62109,VDE0126-1-1, RD 1699, G59 1/2, AS4777,AS3100,CE
Growatt 12000UE	VDE-AR-N4105,CEI0-21,IEC62109,VDE0126-1-1, RD 1699, G59 1/2, AS4777,AS3100,CE
Growatt 18000UE	VDE-AR-N4105,CEI0-21,IEC62109,VDE0126-1-1, RD 1699, G59 1/2, AS4777,AS3100,CE
Growatt 20000UE	VDE-AR-N4105,BDEW,CEI0-21,IEC62109,VDE0126-1-1,RD1699, G591/2,AS4777,AS3100,CE

14 Contact

If you have technical problems concerning our products, contact your installer or Growatt. During inquiring, please provide below information:

1. Inverter type
2. Modules information
3. Communication method
4. Serial number of Inverters
5. Error code of Inverters
6. Display of inverter

Shenzhen Growatt New Energy Technology CO.,LTD

1st East & 3rd Floor, Jiayu Industrial Zone, Xibianling, Shangwu Village,
Shiyan, Baoan District, Shenzhen,P.R.China

Serviceline

T : + 86 755 2747 1942
F : + 86 755 2747 2131
E : service@ginverter.com