



Growatt 10000UE

Growatt 12000UE

Growatt 18000UE

Growatt 20000UE

## Installation & Operation Manual

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### 1.1 Validity

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

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.

### 1.2 Target Group

This manual is for qualified persons such as PV system installers or electricians.

Notes: For possible changes in this manual, Growatt New Energy Co., Ltd accepts no responsibilities to inform the users.

### 1.3 Product Overview

Growatt UE series inverters are grid-tied inverters which convert DC current generated by PV modules into AC current and feed it into the public grid in three-phase. Growatt UE series inverters are multi-string inverters with multi-MPP trackers, which mean they are able to connect to different PV module arrays.

## Inverters Overview:



Fig 1.1

## Grid-tied PV system Overview:

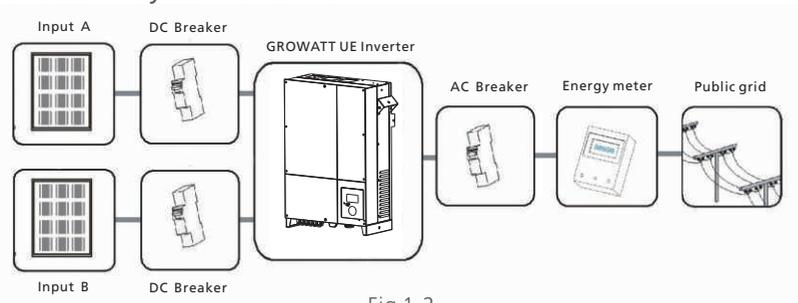


Fig 1.2

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.

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.

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](http://www.ginverter.com)) will provide adequate supports.

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

### 1.4 Safety

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

VDE0126-1-1, RD 1663, G59, G83, AS4777, ENEL-Guide, VDE-AR-N 4105

## DANGER!

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 should be supervised to ensure that they do not play with the appliance.

## CAUTION!

Danger of burn injuries due to hot enclosure parts!

During operation, the upper lid of the enclosure and the enclosure body may become hot.

Only touch the lower enclosure lid during operation.

## CAUTION!

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.

### Grounding the PV generator

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.

## CAUTION!

Possible damage the PV modules as a result of Identification of String Failure!

The GROWATT UE Inverter is equipped with a system which recognizes total failure of individual strings or part-strings.

# 2 Unpacking

## 2.1 Unpacking and Inspection

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.

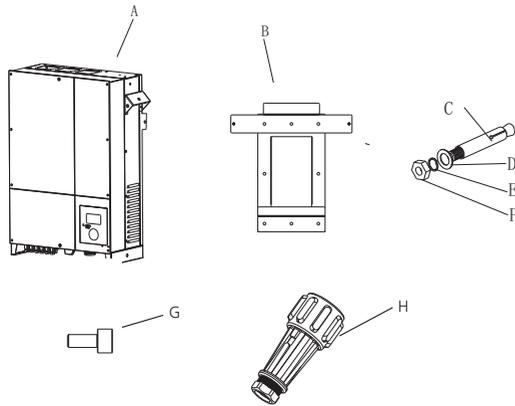


Fig 2.1

Item	Number	Description
A	1	Growatt UE inverter
B	1	Mounting frame
C	6/8	Expansion bolt
D	6/8	flat washer
E	6/8	Spring washer
F	6/8	Nut
G	2	M6*10 screw
H	1	AC connector
--	1	User manual (not shown in the picture)

Hint: Number of C/D/E/F is 6 for Growatt 10000/12000UE, and 8 for Growatt 18000/20000UE.

Handle (G) is equipped for 18000 / 20000 UE only

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

## 2.2 Information of Label

The label contains information as below:

- The inverter type/model (Model Name);
- The certificates and approvals (Certificate Number and Logos at the bottom of the label);
- Specifications of the inverter (From  $U_{DCmax}$  to Operation Ambient Temperature).

GROWATT PV Grid Inverter	
Model Name	Growatt 10000UE
$U_{DCmax}$	1000V
$I_{DCmax}$	2*15A
$U_{DCrange}$	300V - 1000V
$V_{ACnorm}$	3/N/PE 230V/400V
$f_{ACnorm}$	50/60Hz
$P_{ACnorm}$	10kW
$I_{ACnorm}$	14.4A
Protection Degree	IP65
Operation Ambient Temperature	-25°C - +60°C
RD 1663, G59, ENEL-Guide CE VDE 0126-1-1, IEC 62109 AS/NZS 3100, AS4777 VDE-AR-N4105	

Fig 2.2

# Mounting 3

## 3.1 Selecting Mounting Location

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

- A** 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 10 Specifications)
- B** The location selected must be suitable for inverters' dimension. (Refer to 3.2 Dimensions and Required Clearances)
- C** Do not install the inverter on structures constructed of flammable or thermolabile materials.
- D** Never install the inverter in environment of little or no air flow, nor dust environment. That may derate the efficiency of the cooling fan of the inverter; hence derate the efficiency of PV inverter. The cooling fans and air grills should be cleaned every half or a year.
- E** The Ingress Protection rate is IP65 which means the inverter can be installed outdoors and indoors.

**F** Do not expose the inverter to direct sunlight, in order to avoid the power and efficiency derating caused by excessive heating.

**G** The humidity of the installation location should be 0~95% without condensation.

**H** The ambient temperature of the inverter should be  $-25^{\circ}\text{C}\sim+60^{\circ}\text{C}$ .

**I** The installation location must be freely and safely to get at all times.

**J** 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)

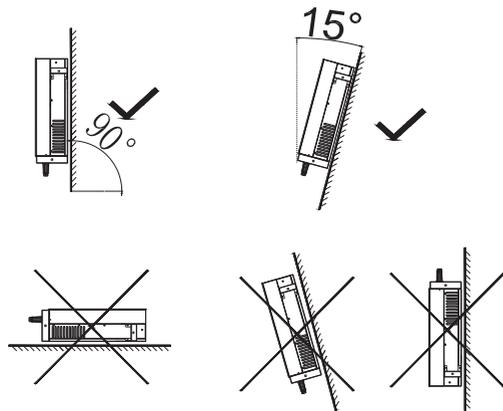


Fig 3.1

**K** Notice the minimum clearances of the inverter. (Refer to 3.2 Dimensions and Required Clearances).

**L** Do not install the inverter near television antenna or any other antennas and antenna cables.

**M** Do not install the inverter in living area, the noise caused by the machine may affect on daily life.

**N** For security reasons, DON'T install the inverter in place where the children can reach.

### 3.2 Dimensions and Required Clearances

Dimensions and weight :

Types	Height(H)	Width(W)	Depth(D)	Weight/kg
10000UE	740	440	235	41
12000UE	740	440	235	41
18000UE	740	520	235	60
20000UE	740	520	235	60

However, additional clearances are needed to guarantee running and operation of the inverters. Especially when several inverters are installed together, the clearances between the inverters and objects are necessary.

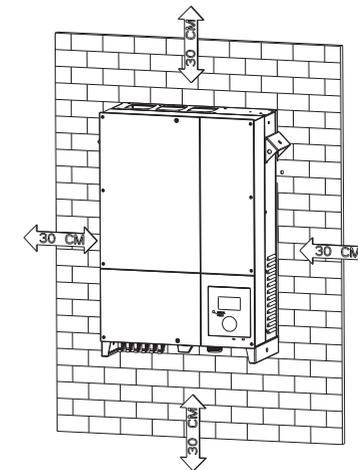
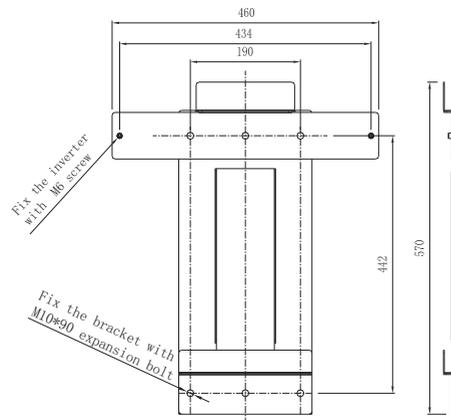


Fig 3.2

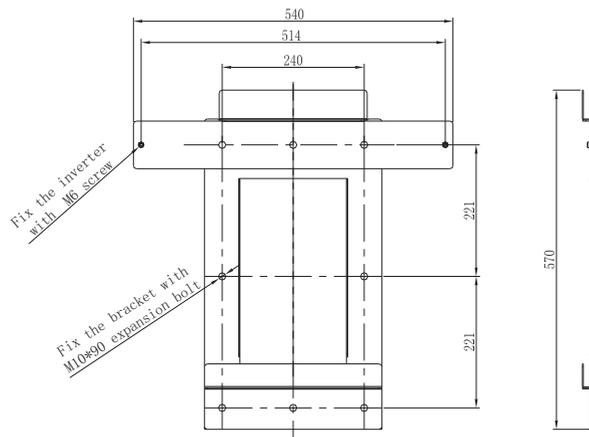
### 3.3 Mounting the Bracket

To mount the inverter on the wall, we should mount the bracket to the wall firmly first of all.

## Overview of the Bracket:



a) bracket of Growatt 10000UE/12000UE



b) bracket of Growatt 18000UE/20000UE

Fig 3.3 Hint: Data units in mm

## Steps:

- Drill holes for screws while use the mounting frame as template. 6 holes for Growatt 10000/12000UE 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 2.1 shows (items C, D, E, F).

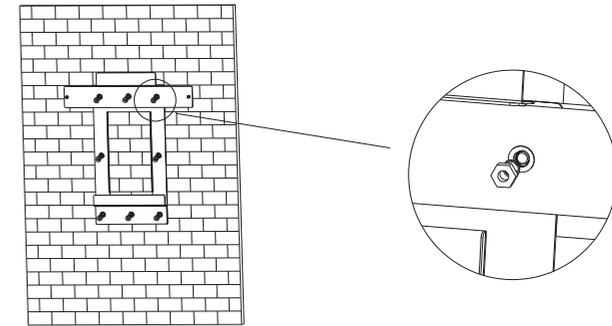


Fig 3.4

Notes: 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.

## 3.4 Mounting Inverter

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 handles (Item G shown in chapter 2.1) 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 3.5(b).

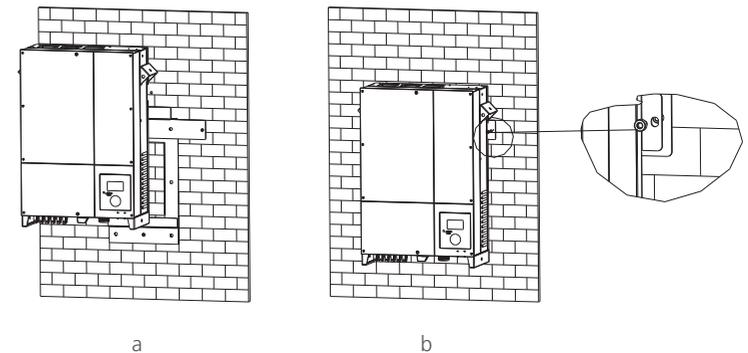


Fig 3.5

# 4 Electrical Connections

## 4.1 Wiring AC Output

- Measure the public grid voltage and frequency (Voltage: 400Vac; Frequency: 50Hz/60Hz; in 3-Phase);
- Open the breaker between the PV inverter and utility; \*
- Screw's torsional force is 8 kg/cm;

\* Specification of AC breaker: Growatt 10000UE/ 12000UE: 32A/400V    Growatt 18000UE/ 20000UE: 63A/400V

### Cable requirements:

Model	Diameter(mm)	Area(mm <sup>2</sup> )	AWG
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

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

### AC connector 1:

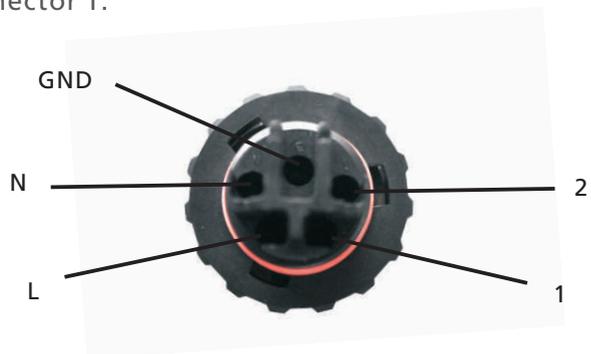


Fig 4.1.1

### Assembly procedure:

1. Make the cables and AC terminals fixed together, and tighten them with the screwdriver.



Fig 4.1.2

2. Connect the five cables into their respective channels, there are numbers and symbols printed on the connector. 'L, 1, 2' connect to three Live Line, 'N' connect the Neutral Line and the symbol '⏏' represents grounding.

3. Tighten the left part and right part clockwise.

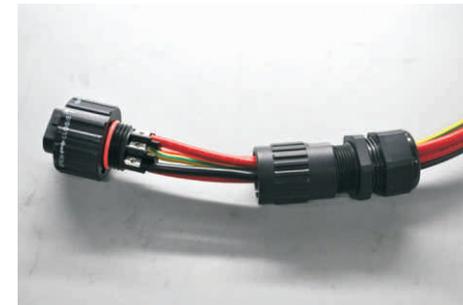


Fig 4.1.3

4. Connect it to the AC side of the inverter.



Fig 4.1.4

## AC connector 2:

### Assembly procedure:

1. First, you need to identify the respective connection channels. Seeing the connector appearance as below, there are numbers and symbols printed on it. '1' connects to the Neutral Line, '2, 3, 4' connect to the three Live Lines and the symbol '⏏' represents grounding.

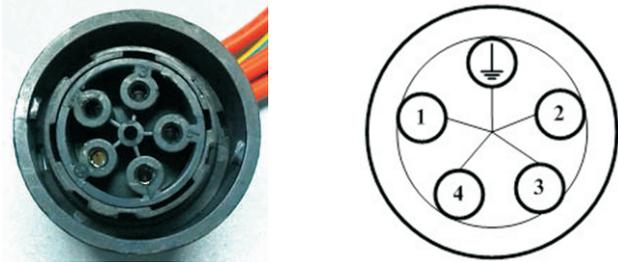


Fig 4.1.5

2. Tighten the left part and right part clockwise.

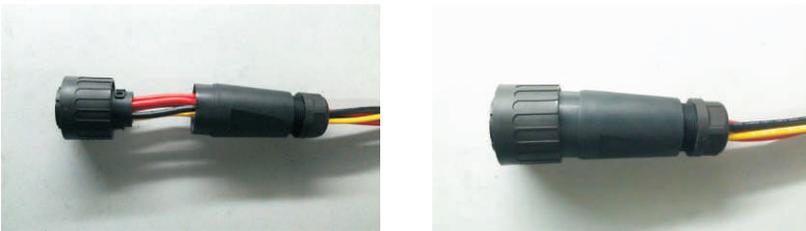


Fig 4.1.6

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



Fig 4.1.7

## AC connector 3:

### Assembly procedure:

1. Unscrew the AC connector by hand and slotted screwdriver into four components:

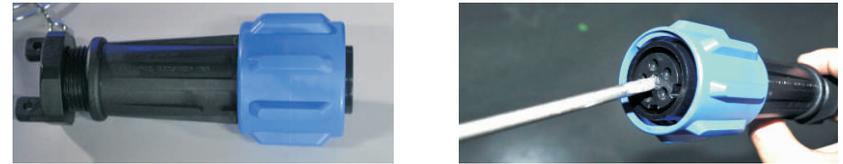


Fig 4.1.8

2. Connect 5 cables into their respective channels on the AC terminal, while 'N' represents Neutral, '1, 2, 3' represent 3 Live line channels and 'E' is ground.

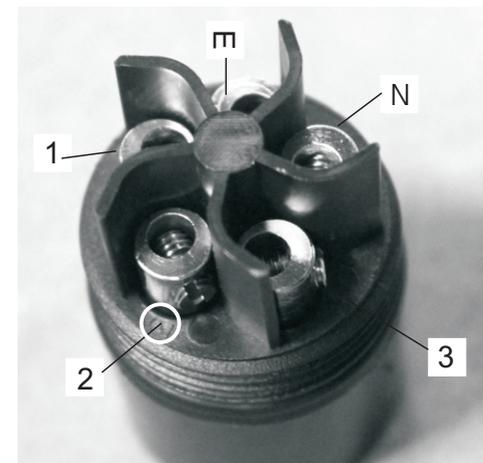


Fig 4.1.9

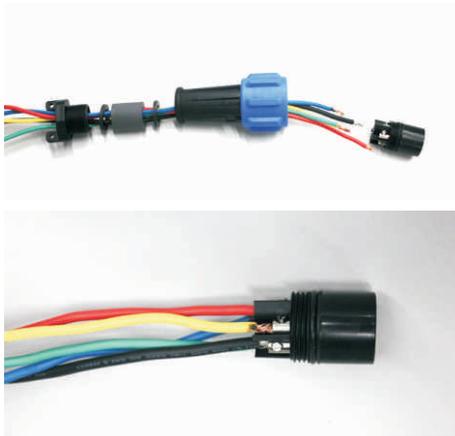


Fig 4.1.10

3. Screw up all the components of the connector by hand and slotted screwdriver.



Fig 4.1.11

4. Connect it to the inverter.



Fig 4.1.12

#### AC connector 4:

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.



Fig 4.1.13

2. Connect five standard cables into relevant terminals. The five cables should be put through the protection shell, as figure below.



Fig 4.1.14

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



Fig 4.1.15

## 4.2 Wiring DC Input

- The open circuit voltage of each string should never exceed 1000Vac.
- 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 MC (multi-connector) connectors;

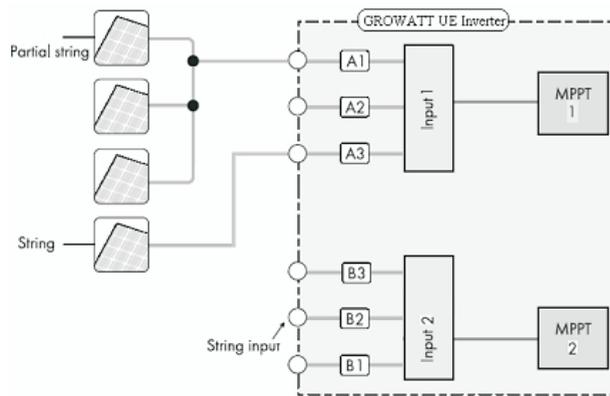


Fig 4.2.1

- Connect the positive and negative terminals from the PV panels to positive and negative terminals on the PV inverter. The maximum string currents are varying from different inverter types



Fig 4.2.2

Type	Max. current
10000UE	15Adc
12000UE	17Adc
18000UE	23Adc
20000UE	26Adc

### Cable requirements:

Model	Diameter(mm)	Area(mm <sup>2</sup> )	AWG
10000UE	2.05	3.332	12
12000UE	2.05	3.332	12
18000UE	2.05	3.332	12
20000UE	2.05	3.332	12

Notes: Under any conditions the total circuit current should never exceed the Max. Current.

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

## 4.3 RS485 cable connection

1. Unscrew the plastic connector.



Fig 4.2.3

2. Make the RS485 cable go through the connector.



Fig 4.2.4

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



Fig 4.2.5

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



Fig 4.2.6

5. Make the heat shrink tubes wrap the joint.



Fig 4.2.7

6. Assemble the connector.



Fig 4.2.8

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

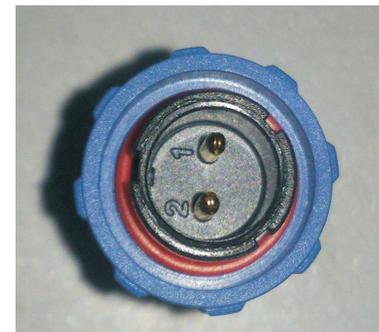
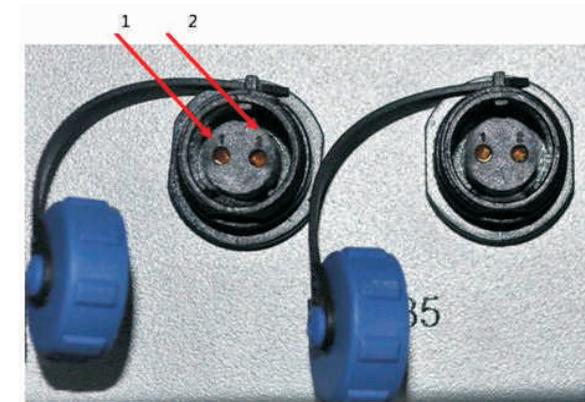


Fig 4.2.9

# 5 Heat Dissipation Maintenance

Heat dissipation is important to reduce the power derating when UE inverters working under high ambient temperature. UE inverters are equipped with cooling fans on the top of the shell. When the temperature is high, fans start work to lower the ambient temperature.

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 5.1 Cleaning Fans and Grills.
- One or two cooling fans failed.  
To exchange the cooling fans please refer to 5.2 Exchanging Fans.
- Poor ventilation of installation location.  
Choose appropriate installation location before mounting.

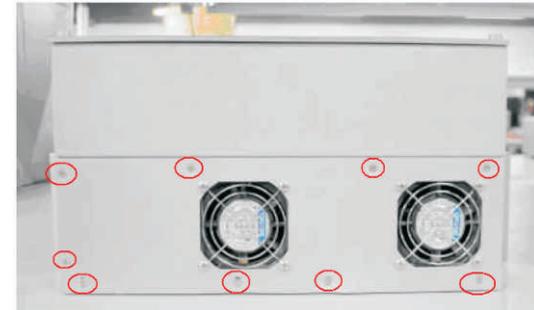
## 5.1 Cleaning Fans and Grills

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

If the 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.

Now there are two types of fan structure:

Fan type 1



Fan type 2



## 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.



Fig 5.1.1



Fig 5.1.2

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.

Top Overview:



Bottom Overview:



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 5.1.3

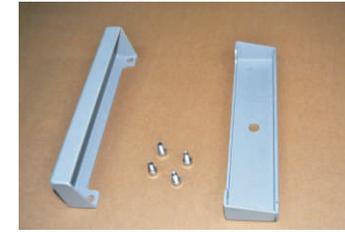


Fig 5.1.4

3.Remove the handles on both sides of UE inverter.

Handles are installed on left and right side of shell planes

Use appropriate screwdriver counterclockwise rotates the screws.

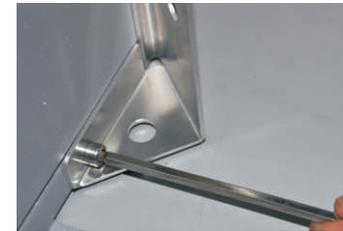


Fig 5.1.5

4.Remove the shell plane of the bottom and right side.



Fig 5.1.6

Use appropriate screwdrivers counterclockwise rotate the screws marked in Fig 5.7.



Fig 5.1.7

Remove the shell plane in direction marked in Fig 5.1.6.

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

To unlock the plug connectors, you need some tinny tools. There are 2 connectors.



Fig 5.1.8

6.Remove the shell plane of the top and left side.



Fig 5.1.9

Use appropriate screwdrivers counterclockwise rotate screws marked in Fig 5.10



Fig 5.1.10

Remove the shell plane in direction marked in Fig 5.1.9.

7.Clean the grills on shell planes.

It's easy to clean the grills on shell plane using water or some tools.

8.Remove and clean the cooling fans.



Fig 5.1.11

Cooling fan is equipped on the top and left shell plane, marked in Fig 5.1.11.

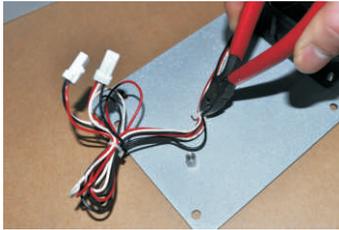


Fig 5.1.12

Cut the cable tie as Fig 5.1.12 shows.



Fig 5.1.13

Unscrew and remove the cooling fans.

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

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.



Fig 5.1.14

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 5.1.15



Fig 5.1.16

4. Pull out the white connectors.



Fig 5.1.17

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

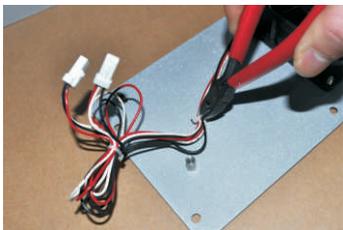


Fig 5.1.18

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

## 5.2 Exchanging Fan

Sometimes the heat dissipation error occurred because the cooling fans failed, under such circumstances, one need 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.

## Commissioning 6

**A**

If the inverter is connected with PV panel arrays and the input voltage is higher than 300Vac, 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 repeat clue to No AC connection at State info and the LED turns red.

In State info, operate by knocks will change the LCD display:

State info ➡ (knock) Input info ➡ (knock) Output info ➡ (knock) E\_day power curve

**B**

Turn on the AC breaker between inverter and grid, the system will operate normally.

**C**

Under normal operating conditions, the LCD displays 'Power: xx.xx Kw' at State info, this is the power fed into grid. The LED turns green.

**D**

Finish commissioning.

# 7 Operation Modes

## 7.1 Normal Mode

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

- Whenever the DC voltage is higher than 350Vac, inverter converts power to grid as generated by the PV panels;
- Whenever the DC voltage is lower than 300Vac, 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.

## 7.2 Fault Mode

The internal intelligent controller can continuously monitor and adjust the system status. 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: Detailed fault information refers to Chapter 10.2 ERROR messages displayed on LCD.

## 7.3 Shutdown Mode

Inverters 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.

# Country Setting and LCD Display 8

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

## 8.1 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 8.1.2.



Fig 8.1.1

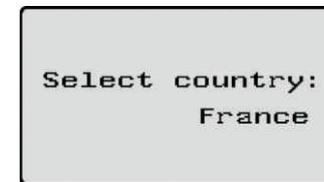


Fig 8.1.2

\* 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 directly select 'VDE0126'.

3. When it comes to the country you want, double knock to enter, as Fig 03.

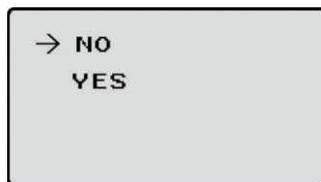


Fig 8.1.3

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.

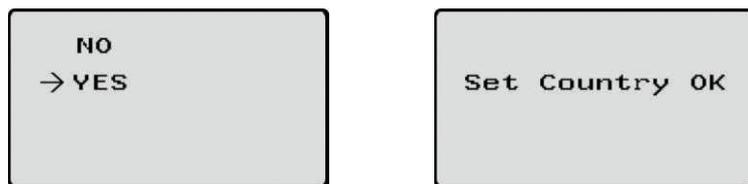


Fig 8.1.4

## 8.2 Power on Display

### 8.2.1 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 Fig8.2.1 for reference.

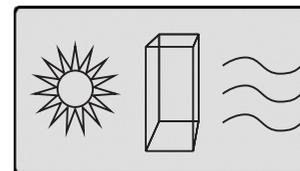


Fig8.2.1:Power on Growatt Logo

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 Fig8.2.2 for reference.

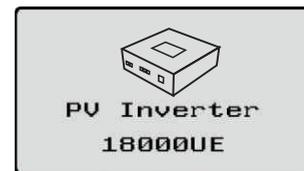


Fig 8.2.2:The second power on interface

After 3 seconds, it will switch to the third interface. See Fig8.2.3 for reference.

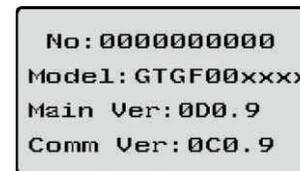


Fig8.2.3:The third power on interface

Here are explanation of items on Fig8.2.3:

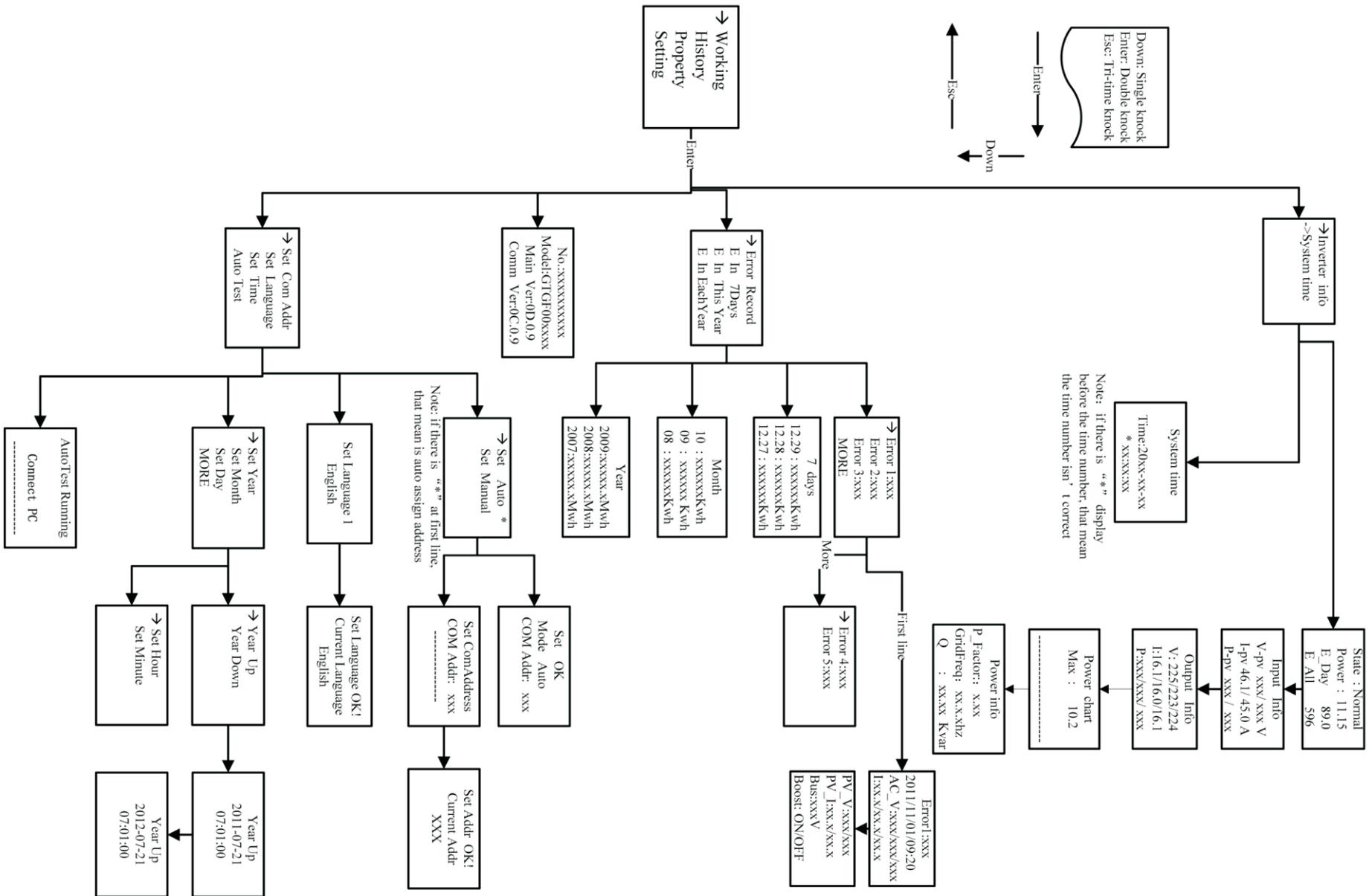
No. : serial number of this inverter.

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.



## 8.2.2 LCD Display when background light off

After the power on information is displayed automatically and the background light 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 status. See Fig 8.2.4 as reference. The first line displays inverter's status 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.

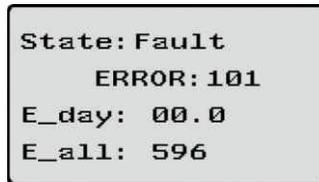


Fig8.2.4:Interface 1: Running status

Interface 2: Input information. See Fig8.2.5 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

W-pv: input power of MPPT1 and MPPT2

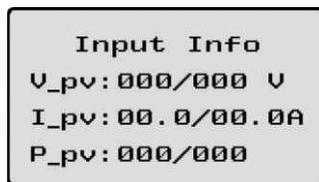


Fig8.2.5:Interface 2: Input information

Interface 3: Output information. See Fig8.2.6 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.

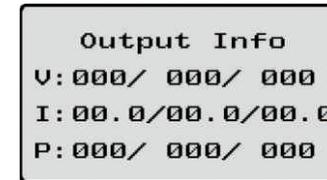


Fig8.2.6:Interface 3: Output information

V: output voltage of each phase

I: output current of each phase

P: output power of each phase

Interface 4: 24 hour' generation curve. See Fig8.2.7 for reference.

This interface shows the generated power of every hour this day.

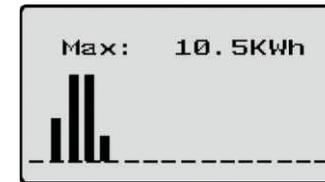


Fig8.2.7:Interface 4: 24 hour's generation curve

Max: maximum power of today

Power curve: today's power curve

## 8.2.3 Connecting messages

When inverter started to connect to grid, the following message will appear on LCD screen. See Fig8.2.8 for reference.

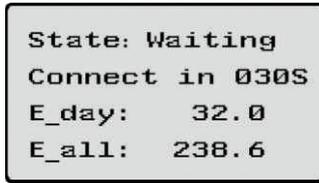


Fig8.2.8 Connect to grid interface

### 8.3 Operate by knock

#### 8.3.1 Knock type and definition

The inverter can support three kinds of knock: single knock, double knock and thrice knock. Each kind of knock has different function. Refer to specified definition in Table 8.1.

Table 8.1 Knock definition list

Knock type	Definition
Single knock	Down
Double knock	Enter
Tri - three knock	Esc

#### 8.3.2 Light background light and single knock to check running information

Before light the background light, the three types of knock functions the same, which is just lighting the background.: just light the background . 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 status, input data, output data, energy generated. In this case user can light the background 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 follows: Fir8.2.4 -> Fig8.2.5 -> Fig 8.2.6 -> Fig8.2.7 -> Fig8.2.8, and then again Fig8.2.4.

### 8.4 Data checking and parameters setting

#### 8.4.1 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 8.4.1 is interface of first level menu.



Fig 8.4.1 First level menu

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

#### 8.4.2 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 8.4.2

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.

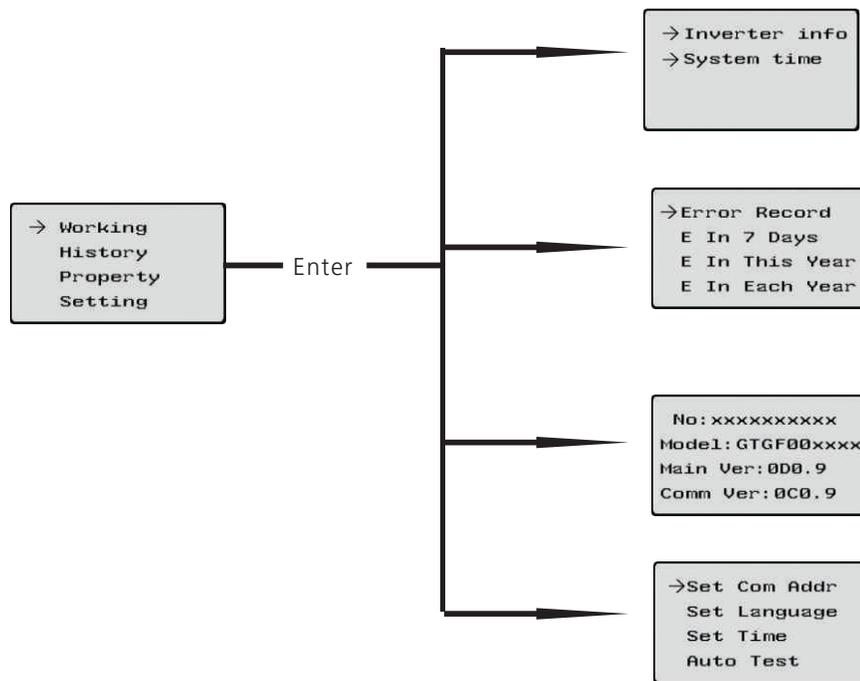


Fig 8.4.2 Second level menu for each first level menu items

### 8.4.3 Third level menu and explanations

#### 8.4.3.1 Working information

The followings are third level menu interfaces for each second level menu items of working information, shown in Fig 8.4.3.

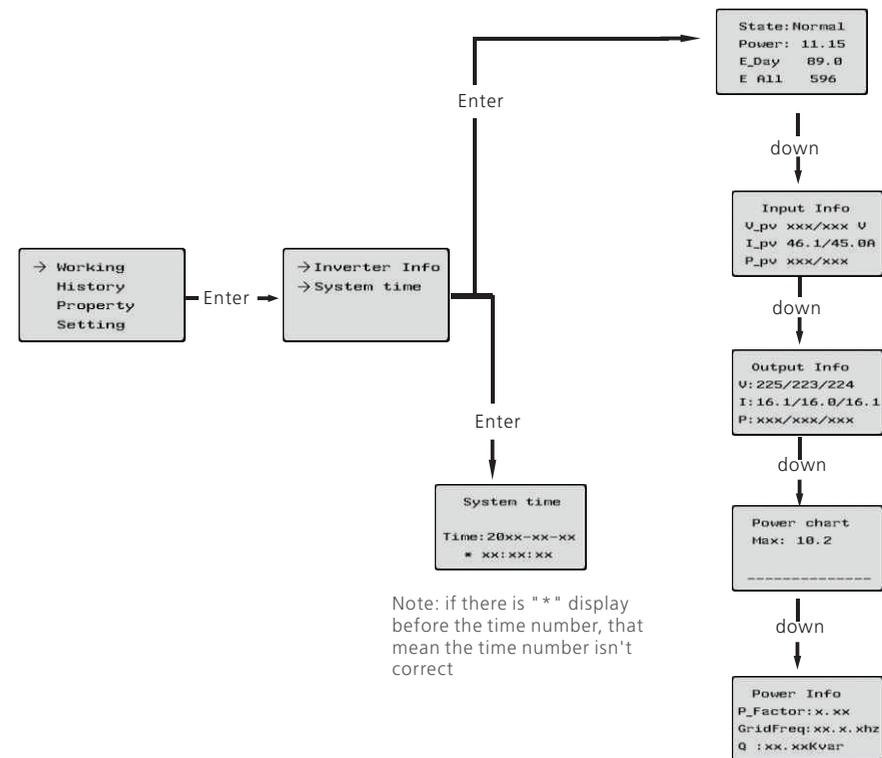


Fig 8.4.3 Third level menu interface of working information

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

Table 8.2 Working information sub-items explanation

Second level menu	Third level items	Item explanation
Inverter info	State: Normal	Inverter running status
	Power: xxx.xx	AC gross output power
	E_day	Energy produced today
	E_all	Energy produced since installation
Input info	V-pv xxx/xxx	Inverter input parameters
	I-pv xx.x/xx.x	PV input voltage for each MPP tracker
	P-pv xxx/xxx	PV input current for each MPP tracker
		PV input power for each MPP tracker

Second level menu	Third level items	Item explanation
Inverter info	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

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

Table 8.3 Historical information sub-items explanation

Second level menu	Third level items	Item explanation
Error Record	Error1: xxx	Display 5 latest error record.
	Error2: xxx	
	Error3: xxx	
	More	
E in 7Days	7 Days	Title indicate 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 This Year	Month	Title indicate 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 indicate this is latest 10 years running data
	20XX: xxxx.x Mwh	xxxx.x is energy generated in the corresponding year.

### 8.4.3.2 Historical information

The followings are third level menu interfaces for each second level menu items of historical information, shown in Fig 8.4.4.

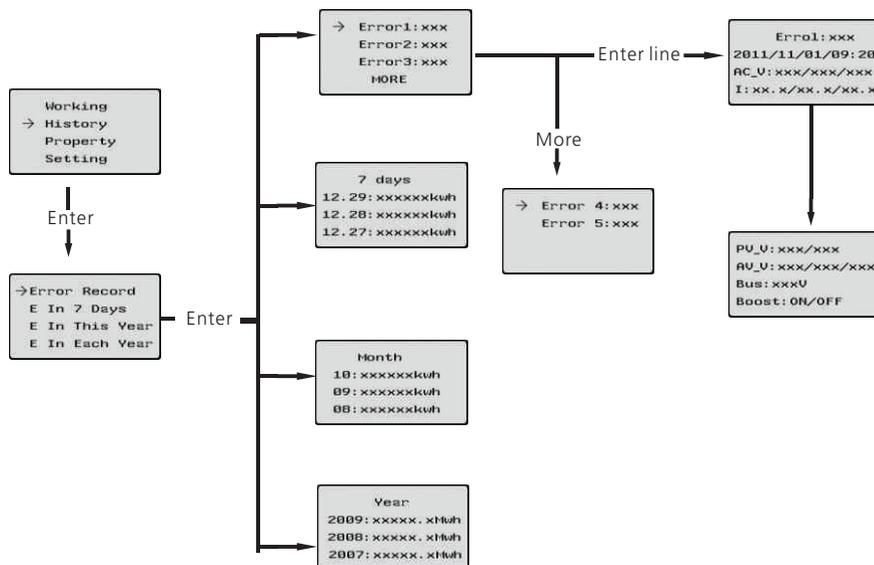


Fig 8.4.4 Third level menu interface of historical information

### 8.4.3.3 Property information

The followings are second level menu interfaces of property, shown in Fig 8.4.5.



Fig 8.4.5 Property information

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

Table 8.4 Property information

First level menu	Second level items	Item explanation
Property	No.:xxxxxxxx	Serial number of this inverter
	Model:GTGF00xxxx	Odel name of this inverter
	Main Ver:0D0.9	
	Comm Ver:0C0.9	

#### 8.4.4 Parameters set and auto test

The followings are setting information in second level menu and its sub-menus, shown in Fig 8.4.6.

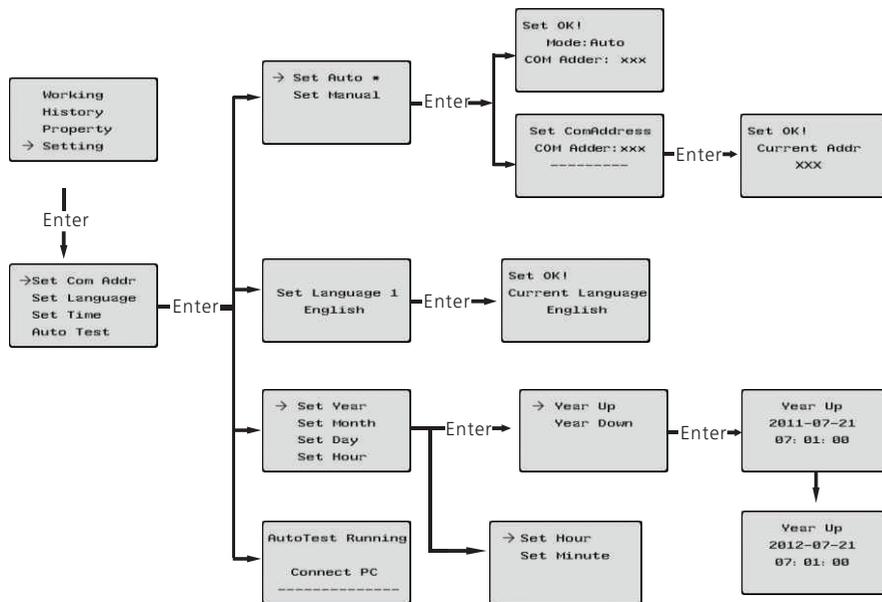


Fig 8.4.6 setting second level menu and its sub-menus

#### 8.3.4.1 Set 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 random or fixed. The second level menu "Set COM address" of setting is to set inverter's COM address.

Set random COM address :  
Setting->Set COM addr->Set Auto, then LCD screen will display "Set OK, Mode: Auto, COM addr: xxx", see Fig 8.14 for reference.

Set fixed COM address:  
Setting->Set COM addr->Set Manual, then single knock to change value of fixed address, double knock will save changes, and LCD screen will display "Set Addr OK! Current Addr XXX", see Fig 8.4.6for reference.

#### 8.4.4.2 Set 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 8.14 for reference.

Please note in order to prevent misoperation, 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 Table 8.5

Table8.5 sequence number of languages

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

### 8.4.4.3 Set 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.

### 8.4.4.4 Auto test function

Auto test function is to check the inverter's protection when grid is abnormal, including over voltage, under voltage, over frequency, and under frequency.

To run auto test function please select Setting->Auto test, then double knock to start auto test function. It's required to connect inverter to computer and run a test software in computer.

Auto test procedure

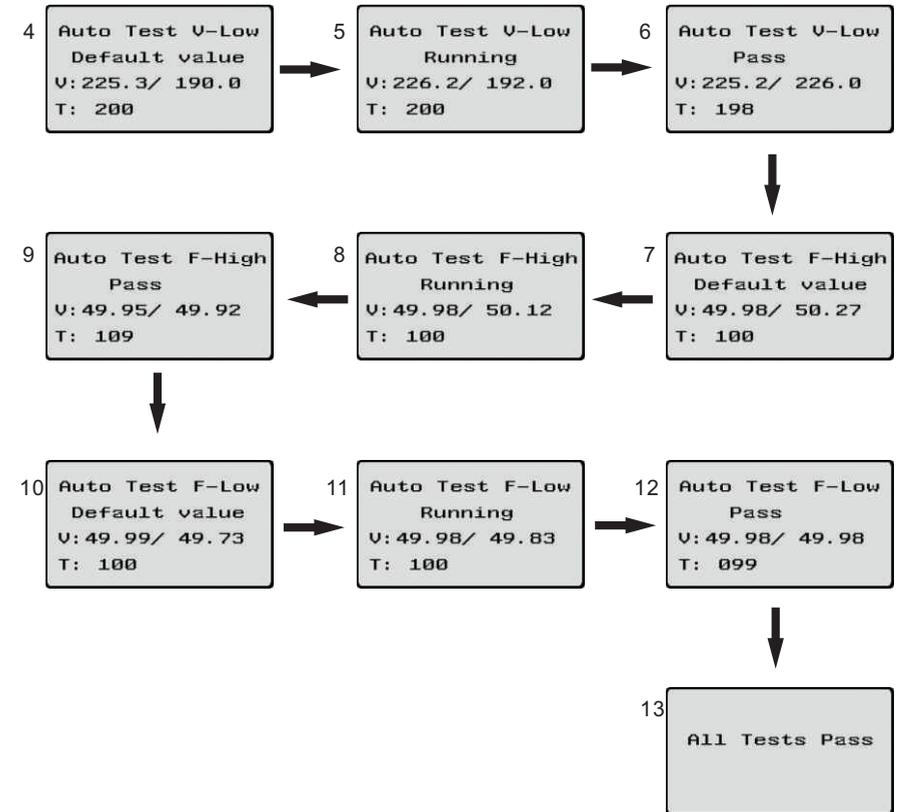
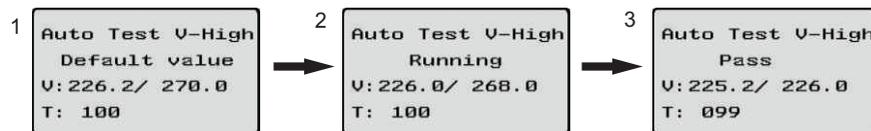


Fig 8.4.7

## 8.5 Inverter faulty messages

When system fault or inverter error occurs, inverter will display faulty message or error code on LCD screen.

### 8.5.1 System fault

System fault is related to the solar system, it may be caused by PV panels wiring, AC wiring, or AC grid faults.

The followings are all system faulty messages displayed on inverter:

**System fault message may display on LCD**

**Explanation and suggestion**

Auto Test Failed	Auto test didn't pass
No AC Connection	No utility, no grid connected
PV Isolation Low	Insulation problem.
Residual I High	GFCI current high
Output High DCI	Output current DC offset too high
PV Voltage High	PV panel voltage too high
AC V Outrange	Grid voltage out of range
AC F Outrange	Grid frequency out of range

**8.5.2 Error message**

Inverter errors are problems come from interior inverter.

**DISPLAY**

**OPERATION**

Error: 100	Fan fault
Error: 101	Communication fault
Error: 103	EEPROM fault
Error: 104	Model Fault
Error: 117	Relay Fault

**DISPLAY**

**OPERATION**

Error: 119	GFCI Fault
Error: 121	Control board communication Fault

# Communication 9

## 9.1 ShineNet

ShineNet is a monitoring software applied to monitor Growatt inverters via RS232 port or Bluetooth module. With the special designed functions and friendly compact UI, it can comprehensively meet users' requirements for system monitoring and bring unprecedented user experience.

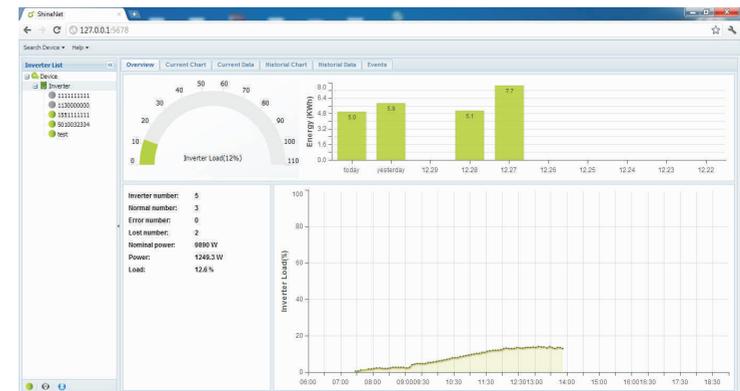


Fig 9.1

## Features:

- Monitor and record current data and of inverters.
- Record historical data.
- Monitor and record event information of inverter.
- Connect computer and inverter via RS232 and RS485 port (wire connection) or Bluetooth module (wireless connection).
- Remote access available for local area network.

Notes: Users are able to monitor the inverter after the setting of software. Detailed information about setting and functions refer to the ShineNET Manual.

Notes: you can download the ShineNet YN2.0 from: <ftp://113.106.58.169>, the user name is `ftpguest` and Password is `ftpguest`

## 9.2 ShineVision

ShineVision is a wireless monitoring device, which consists of a power monitor and a number of transmitters, and one shinevision can monitoring 1 to 6 inverters. The transmitters transmit the running data collected from photovoltaic inverters to the monitor and display the data onto the monitor screen, including data of generated energy, the gross generated energy and the generation income obtained from the above-mentioned data through some simple calculations, indoor temperature, date and time, as well as CO2 emissions.



Fig 9.2

## Features:

- Monitor and transmitter communicate via wireless communication technology.
- External transmitter, with IP65 waterproof and dustproof.
- A monitor can simultaneously communicate with six transmitters.
- Communication distance between monitor and transmitter : 30 meter.
- Power supply option: built-in battery slot, an external DC power supply.
- Easy installation, and convenient to use it.

Notes: The Monitor should be kept indoor. For detailed information, please refer to ShineVision Manual.

## 9.3 ShinePano

It is the latest intelligent monitoring master, specially designed for solar power plant. Using stable Linux operating system with high-speed CPU, it can smartly present solar system status through friendly user interface on 8-inch large color touch screen.



Fig 9.3

#### Features:

- A multi-functional and high-performance communication data logger; Keep user informed of the system's status at any time.
- Massive storage with flexible parameters setting, system information management, error prompt and record.
- Collects data and uploads information over the internet in near real-time to Growatt Shine Server platform.
- Connect with inverter: RS485 and Zigbee (Wireless module).
- 8 inches touch screen(\*option): support hand writing and USB mouse.

### 9.4 ShineWebBox

It is a cost-effective and compact monitoring device, specially designed for solar power plant. Using stable Linux operating system with high-speed CPU, it can smartly record your system features. ShineWebBox Provides local storage, easy wireless and TCP/IP configuration, and presents plant data over Internet.



Fig 9.4

#### Features:

- A multi-functional and high-performance communication data logger; Keep user informed of the system's status at any time.
- Massive storage with flexible parameters setting, system information management, error prompt and record.
- Collects data and uploads information over the internet in near real-time to Growatt Shine Server platform.

## Trouble Shooting 10

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.

### 10.1 General question

For General question, please visit [www.ginverter.com](http://www.ginverter.com), and find the Q&A column.

## 10.2 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.

### 10.2.1 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
No AC Connection	No utility grid connected or utility grid power failure.	1.Check AC wiring, especially the ground wire. 2.Contact Growatt
AC V Outrange	Utility grid voltage is out of permissible range.	1.Check grid voltage. 2.If the error message still exists despite the grid voltage being within the tolerable range, contact Growatt.

Error message	Description	Suggestion
AC F Outrange	Utility grid frequency out of permissible range.	1.Check firmware version (Please refer to LCD display section). If firmware version is below G.1.3, contact Growatt. 2.Check grid frequency. 3.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 8 M $\Omega$ ). If the error message is displayed despite the above checking passed, contact Growatt.
Residual I High	Leakage current too high	1.Restart inverter. 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.	Disconnect the DC wire immediately.
Auto Test Failed	Auto test didn't passed	Reboot inverter.

## 10.2.1 Inverter fault

Error code	Meanings	Suggestion
Error: 100	For 18K/20K inverter: Problem with fan No.4. For 8K/10K inverter: Problem with No. 2 fan. Note: If there is problem with other fans, inverter continue running with warning on LCD showing: Fan Error.	1.Replace faulty fan. 2.If problem still exists after replacement, contact Growatt.
Error: 101	Communication board has not received data from control board for 10 seconds. Electromagnetic Interference cause communication problem.	1.Reboot inverter by cutting off DC supply, and Error message will disappear. 2.If the error 101 is often displayed, the environment Electromagnetic Interference is too strong. Contact Growatt.
Error: 103	EEPROM fault.	Contact Growatt.
Error: 104	Model setting fault. Reason can be Model and safety requirement have not been set correctly.	Contact Growatt..
Error: 117	Relay fault	Contact Growatt
Error: 119	GFCI fault.	Contact Growatt

Error code	Meanings	Suggestion
Error: 121	Control board has not received data from Communication board for 5S.	Electromagnetic Interference too strong, contact Growatt.

## Specifications 11

	10000UE	12000UE	18000UE	20000UE
<b>Input Data</b>				
Max. DC power	10500W	12500W	18700W	20800W
Max. DC voltage	1000V	1000V	1000V	1000V
PV voltage range MPPT	400V-800V	400V-800V	400V-800V	400V-800V
Initial / shut-down voltage	300V/150V	300V/150V	300V/150V	300V/150V
Max. input current (input A/input B)	15A / 15A	17A / 17A	23A / 23A	26A / 26A
Number of MPP trackers	2	2	2	2
Max. number of parallel strings	2/2	2/2	3/3	3/3
DC Connections	MC4(optional MC3)	MC4(optional MC3)	MC4(optional MC3)	MC4(optional MC3)

	10000UE	12000UE	18000UE	20000UE
<b>Output Data</b>				
Max. apparent power	10KVA	12KVA	18KVA	20KVA
Nominal output power	10KW	12KW	18KW	20KW
Nominal output current	14.4A	17.5A	26A	29A
Maximum short-circuit current	19A	21A	32A	32A
AC voltage range	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 /60 Hz-6Hz / +5Hz	50 /60 Hz-6Hz / +5Hz	50 /60 Hz-6Hz / +5Hz	50 /60 Hz-6Hz / +5Hz
Phase shift (cos φ)	0.8leading- 0.8laging	0.8leading- 0.8laging	0.8leading- 0.8laging	0.8leading- 0.8laging
AC output THD	<3% (normal power output)	<3% (normal power output)	<3% (normal power output)	<3% (normal power output)
AC connection	Three phase	Three phase	Three phase	Three phase
Consumption(night)	<0.5W	<0.5W	<0.5W	<0.5W
Ground failure detection	Yes	Yes	Yes	Yes
<b>Efficiency</b>				
Max . efficiency	98%	98%	98%	98%
Euro-eta	97.5%	97.5%	97.5%	97.5%
<b>General Data</b>				
Dimensions (W / H / D) in mm	440/740/235	440/740/235	520/740/235	520/740/235
Weight	41 KG	41 KG	60 KG	60 KG
Ambient temperature range	-25°C...+60°C	-25°C...+60°C	-25°C...+60°C	-25°C...+60°C
Continuous full output power temperature range	-25°C...+45°C	-25°C...+45°C	-25°C...+45°C	-25°C...+45°C
Cooling concept	Fans	Fans	Fans	Fans
Installation: Indoors / Outdoors(IP 65)	yes/yes	yes/yes	yes/yes	yes/yes
Interfaces:RS485/RS232/ Bluetooth/Rf/ZigBee	yes/yes/opt/opt/opt	yes/yes/opt/opt/opt	yes/yes/opt/opt/opt	yes/yes/opt/opt/opt
LCD display	Yes(Alphanumeric 4 lines)	Yes(Alphanumeric 4 lines)	Yes(Alphanumeric 4 lines)	Yes(Alphanumeric 4 lines)
Isolation	Transformerless	Transformerless	Transformerless	Transformerless
Warranty: 5 years / 10 years	Yes / Opt	Yes / Opt	Yes / Opt	Yes / Opt
Certificates and approvals	VDE0126-1-1, IEC62109, RD 1663, G59, G83, EN61000-6-2, EN61000-6-3, As4777, AS/ NZS 3100, ENEL-Guide, VDE-AR-N 4105			

This certificate represents a 5 year warranty for the Growatt inverter products listed below. Possession of this certificate validates a standard factory warranty of 5 years from the date of purchase.

## Warranted products

This warranty is applicable solely to the following products:

Growatt 1500, Growatt 2000, Growatt 3000, Growatt 4000, Growatt 5000, Sungold 1500, Sungold 2000, Sungold 5000, Growatt 3600MTL, Growatt 4200MTL, Growatt 5000MTL, Growatt 3600MTL-US, Growatt 4200MTL-US, Growatt 5000MTL-US, Growatt 10000UE, Growatt 12000UE, Growatt 18000UE, Growatt 20000UE

## Limited Product Warranty

(Applicable under normal application, installation, use and service conditions)  
Growatt warrants the above listed products to be free from defects and/or failure specified for a period not exceeding five (5) years from the date of sale as shown in the Proof of Purchase to the Original purchaser.

The warranties described in these "Limited Warranties " are exclusive and are expressly in lieu of and exclude all other warranties, whether written, oral, express or implied, including but not limited to, warranties of merchantability and of fitness for a particular purpose, use ,or application, and all other obligations or liabilities on the part of GROWATT , unless such other obligations or liabilities are expressly agreed to it in writing signed and approved by GROWATT , GROWATT shall have no responsibility or liability whatsoever for damage or injury to persons or property, or for other loss or injury resulting from any cause whatsoever arising out of or related to the modules, including, without limitation, any defects in the modules or from use or installation. Under no circumstances shall GROWATT be liable for incidental , consequential or special damages howsoever caused; loss of use, loss of production, loss of revenues are therefore specifically and without limitation excluded to the extent legally permissible, GROWATT 's aggregate liability, if any, in damages or otherwise, shall not exceed the invoice as paid by the customer.

The “**Limited Product Warranties**” described above shall not apply to, and Growatt shall have no obligation of any kind whatsoever with respect to, any inverter which has been subjected to:

- Misuse, abuse, neglect or accident;
- Alteration, improper installation or application;
- Unauthorized modification or attempted repairs;
- Insufficient ventilation of the product;
- Transport damage;
- Breaking of the original manufacturers seal;
- Non-observance of Growatt installation and maintenance instruction;
- Failure to observe the applicable safety regulations
- Power failure surges, lightning, flood, fire, exposure to incorrect use, negligence, accident, force majeure, explosion, terrorist act, vandalism or damage caused by incorrect installation, modification or extreme weather conditions or other circumstances not reasonably attributable to Growatt.

The warranty shall also cease to apply if the product cannot be correctly identified as the product of Growatt. Warranty claims will not be honored if the type of serial number on the inverters have been altered, removed or rendered illegible.

## Liability

The liability of Growatt in respect of any defects in its PV inverters shall be limited to compliance with the obligations as stated in these terms and conditions of warranty. Maximum liability shall be limited to the sale price of the product. Growatt shall accept no liability for loss of profit, resultant of indirect damage, any loss of electrical power and / or compensation of energy suppliers within the express meaning of that term.

The warranty rights as meant herein are not transferable or assignable to any third party excepting the named warranty holder.

If a device becomes defective during the agreed Growatt factory warranty period and provided that it will not be impossible or unreasonable, the device will be, as selected by Growatt,

1. Shipped to a Growatt service center for repair, or
2. repaired on-site, or
3. exchanged for a replacement device of equivalent value according to model and age.

The warranty shall not cover transportation costs in connection with the return of defective modules. The cost of the installation or reinstallation of the modules shall also be expressly excluded as are all other related logistical and process costs incurred by all parties in relation to this warranty claim.

# 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 inverters