

Instruction Manual



Growatt 2000 HF

Growatt 2500 HF

Growatt 3000 HF

Copyright © 2010 ShenZhen Growatt New Energy Co., Ltd All rights reserved.

No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photographic, magnetic or otherwise, without the prior written permission of ShenZhen Growatt New Energy Co., Ltd.

ShenZhen Growatt New Energy Co., Ltd makes no representations, express or implied, with respect to this documentation or any of the equipment and/or software it may describe, including (with no limitation) any implied warranties of utility, merchantability, or fitness for any particular purpose. All such warranties are expressly disclaimed. Neither ShenZhen Growatt New Energy Co., Ltd nor its distributors or dealers shall be liable for any indirect, incidental, or consequential damages under any circumstances.

(The exclusion of implied warranties may not apply in all cases under some statutes, and thus the above exclusion may not apply.)

Specifications are subject to change without notice. Every attempt has been made to make this document complete, accurate and up-to-date. Readers are cautioned, however, that Growatt reserves the right to make changes without notice and shall not be responsible for any damages, including indirect, incidental or consequential damages, caused by reliance on the material presented, including, but not limited to, omissions, typographical errors, arithmetical errors or listing errors in the content material.

All trademarks are recognized even if these are not marked separately. Missing designations do not mean that a product or brand is not a registered trademark.

ShenZhen Growatt New Energy Co., Ltd
XiCheng Industrial Zone, Bao'an District,
ShenZhen, 518000, China.

1. NOTES ON THIS MANUAL.....	4
1.1 Validity.....	4
1.2 Target Group	4
1.3 Safety	5
2. GROWATT INVERTER	5
2.1 Overview.....	5
2.2 Identifying model and basic datasheet	7
3. UNPACKING AND INSPECTION.....	7
4. INSTALLATION	8
4.1 Safety instructions.....	8
4.2 Selecting the INSTALLATION location.....	9
4.3 Fixed the mounting on the wall.....	10
4.4 Fixed the inverter on the wall.....	11
4.5 Check Inverter Installation Status	12
5. ELECTRICAL CONNECTION	13
5.1 System Diagram with Inverter Electrical connection.....	13
5.2 Safety	14
5.3 Connecting to the grid (AC utility).....	14
5.4 Connect to PV Panel (DC input).....	15
5.5 Commissioning Checking	15
6. DISPLAY AND MESSAGES	16
6.1 LCD display	16
6.2 LCD control	16
6.3 Setting the LCD display	18
7. MODES OF OPERATION	19
7.1 Normal mode.....	19
7.2 Fault mode.....	19
7.3 Shutdown mode.....	19
8. INVERTER STATUS.....	20
9. COMMUNICATIONS	20
9.1 Communications software instructions	20
9.2 Monitor	21
9.3 Detailed information	21
10. TROUBLE SHOOTING.....	21
11. SYSTEM FAULT	21
12. INVERTER FAILURE.....	22
13. SPECIFICATIONS	22
14. GROWATT FACTORY WARRANTY	24
15. WARRANTY CONDITIONS.....	25
16. CONTACT	26

1. NOTES ON THIS MANUAL

1.1 Validity

This manual describes the assembly, installation, commissioning and maintenance of the following Growatt Inverters:

Growatt 2000 HF

Growatt 2500 HF

Growatt 3000 HF

This manual does not cover any details concerning equipment connected to the Growatt (e.g. PV modules). Information concerning the connected equipment is available from the manufacturer of the equipment.

1.2 Target Group

This manual is for qualified personnel. Qualified personnel have received training and have demonstrated skills and knowledge in the construction and operation of this device. Qualified Personnel are trained to deal with the dangers and hazards involved in installing electric devices.

Additional information

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

1.3 Safety

- **Appropriate Usage**

The Growatt is a PV Inverter that converts DC Current from PV generator into AC current. The Growatt is suitable for mounting indoors and outdoors.

You can use the AC current generated as follows:

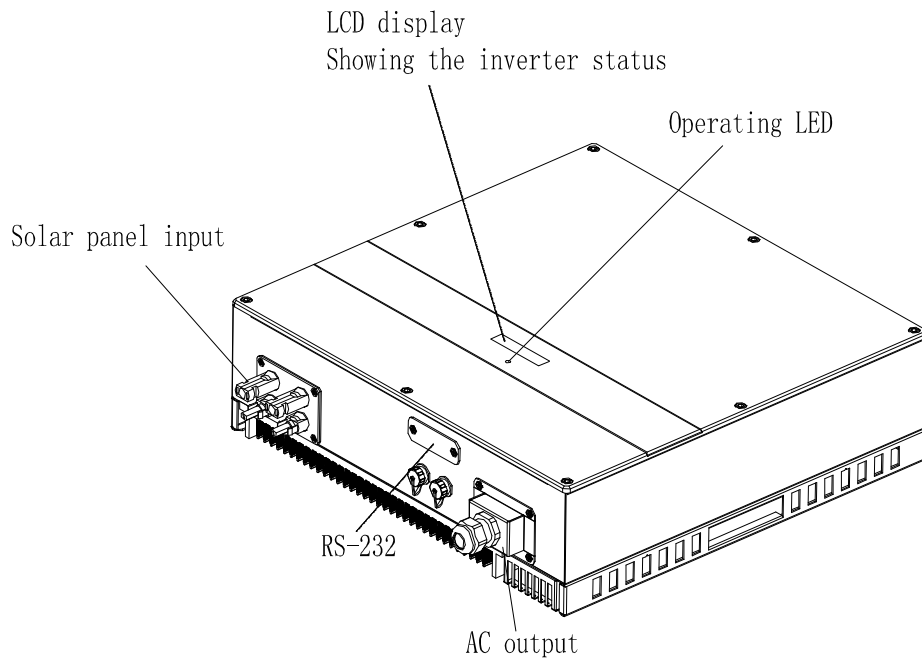
House grid:	Energy flows into the house grid. The consumers connected, for example, household devices or lighting, consume the energy. The energy left over is fed into the public grid. When the Growatt is not generating any energy, e.g., at night, the consumers which are connected are supplied by the public grid. The Growatt does not have its own energy meter. 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 is connected to a separate energy meter. The energy produced is compensated at a rate depending on the electric power company.

Info: *Policies vary from one utility company to another. Consult with a representative of the local utility company before designing and installing a PV system.*

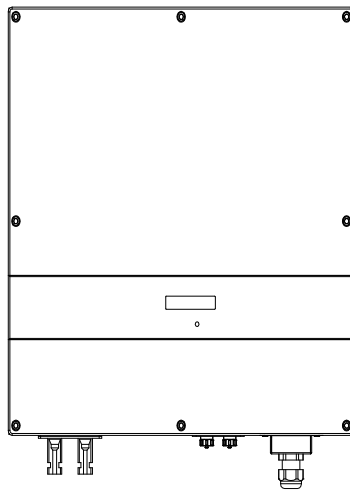
2. GROWATT INVERTER

2.1 Overview

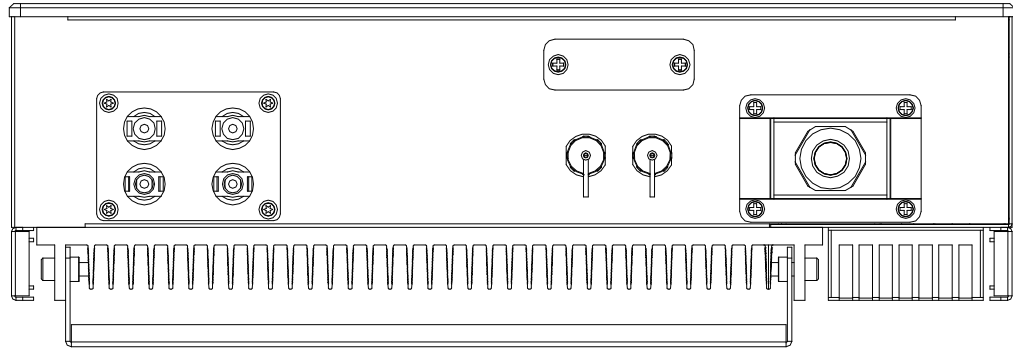
Design Overview



Front View





Bottom View



2.2 Identifying model and basic datasheet

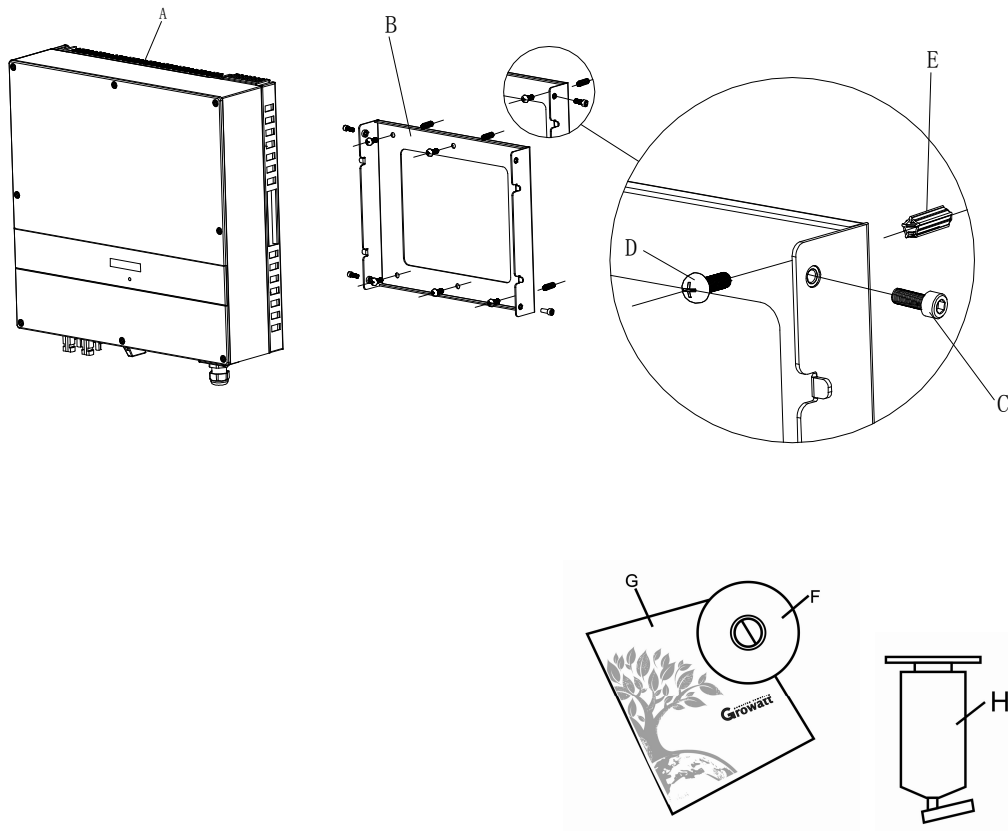
You can identify the pv inverter by the type label. It is on the left side of the enclosure.

- The type of product (Type/Model)
- Device-specific characteristics.
- Certificates and approvals

GROWATT PV G.M. Inverter	
Model Name	Growatt 3000H1P
Certificate Number	
U _{DC max}	600V
I _{DC max}	15A
U _{DC range}	150V-600V
V _{AC nom}	230V
f _{AC nom}	50Hz
P _{AC nom}	3000W
I _{AC nom}	13A
PF	1.0
Protection Degree	IP65
Operation Ambient Temperature	-25--+60°C
AS 4777 & AS 3100	
 	

3. UNPACKING AND INSPECTION

After opening the package, please check the contents of the box. It should contain the following:



Item	Name	Quantity
1	Solar inverter	1
2	Mounting frame	1
3	Mounting screws	6
4	Safety-lock screws	4
5	Mounting frame screws sleeve	6
6	AC socket	1
7	AC socket assembly screws	4
8	Installation & operation manual	1

4. INSTALLATION

4.1 Safety instructions



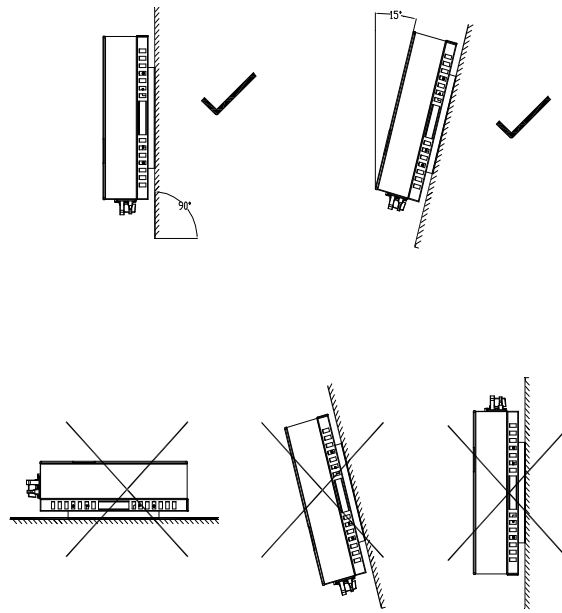
- Do not remove the casing. Inverter contains no user serviceable parts. Refer servicing to qualified service personnel. All wiring and electrical installation

should be conducted by a qualified service personnel and must meet national requirement of AS/NZS 3000

- Both AC and DC voltage sources are terminated inside the PV Inverter. Please disconnect these circuits before servicing.
- 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.
- 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.
- Carefully remove the unit from its packaging and inspect for external damage. If you find any imperfections, please contact your local dealer.
- 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.

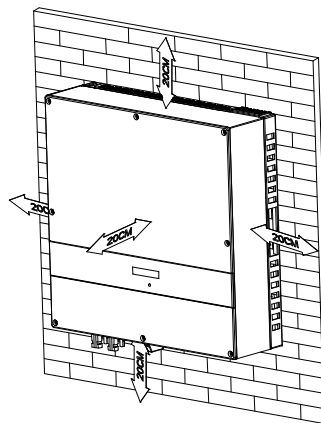
4.2 Selecting the INSTALLATION location

- The unit shall be mounted at least 914 mm (3 feet) above the ground.
- The installation method and mounting location must be suitable for the weight and dimensions of the inverter. Select a wall or solid vertical surface that can support the PV-Inverter.
- Mount on a solid surface, The mounting location must be accessible at all times.
- Vertical installation or tilted backwards by max. 15°.
- The connection area must point downwards.
- Do not install horizontally.

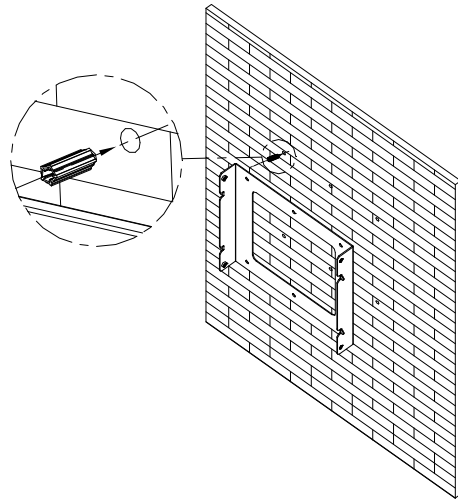


4.3 Fixed the mounting on the wall

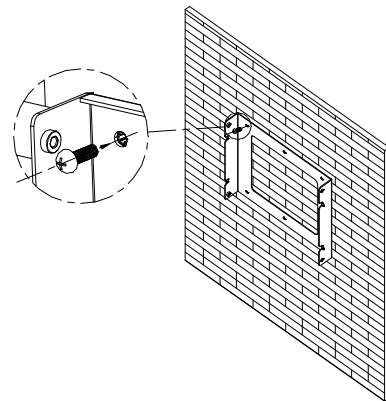
- Inverter requires adequate cooling space. Allow at least 20cm space above and below the inverter.



- Using the mounting frame as a template, drill 4 holes as illustrated in image

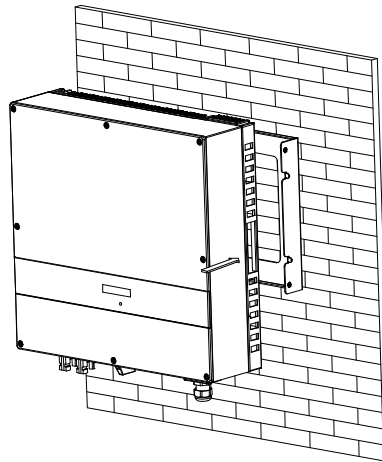


- Fix the mounting frame as the figure shows. Do not make the screws to be flush to the wall. Instead, leave 2 to 4mm exposed.

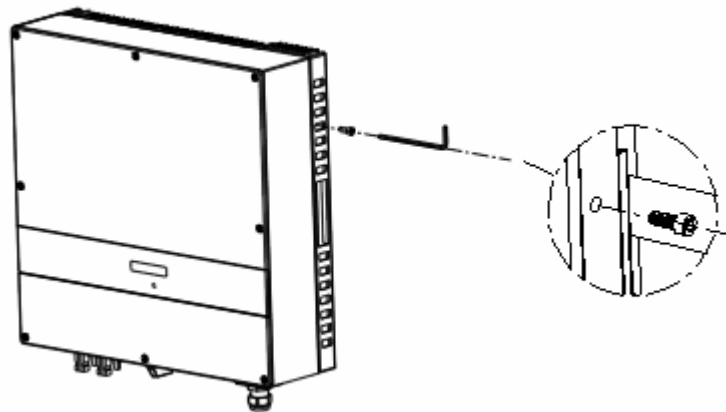


4.4 Fixed the inverter on the wall

- Hang the inverter on the mounting frame.



- Insert safety-lock screws to the bottom leg to secure the inverter.



4.5 Check Inverter Installation Status

- Check the upper straps of PV-Inverter and ensure it fits on to the bracket.
- Check the secure mounting of the PV-Inverter by trying to raise it from the bottom. The PV-Inverter should remain firmly attached.
- Select the installation location so that the status display can be easily viewed.
- Choose a strong mounting wall to prevent vibrations while inverter is operating.

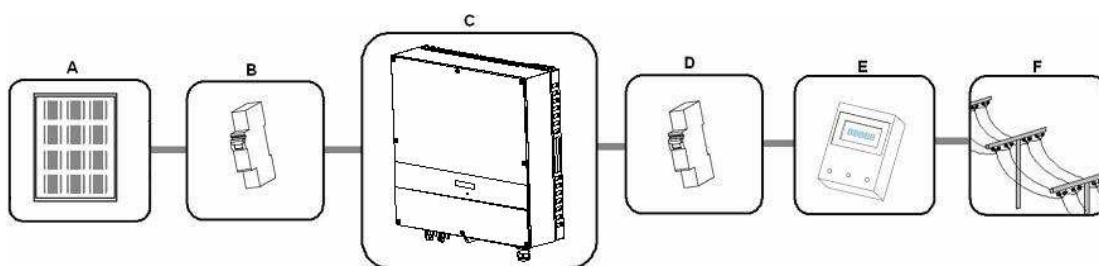
5. ELECTRICAL CONNECTION

WARNING: *All electrical installations shall be done in accordance with the local and national requirement of AS/NZS 3000*

WARNING: *Policies vary from one utility company to another. Consult with a representative of the local utility company before designing and installing a PV system.*

5.1 System Diagram with Inverter Electrical connection

- This unit or system is provided with fixed trip limits and shall not be aggregated above 30 kW on a single Point of Common Connection.
- PV Panel: Provide DC power to inverter.
- Converts DC (Direct Current) power from PV panel(s) to AC (Alternating Current) power. Because Inverter is grid-connected it controls the current amplitude according to the PV Panel power supply. Inverter always tries to convert the maximum power from your PV panel(s).
- Connection system: This “interface” between Utility and PV-Inverter may consist of electrical breaker, fuse and connecting terminals. To comply with local safety standards and codes, the connection system should be designed and implemented by a qualified technician.
- Utility: Referred to as “grid” in this manual, is the way your electric power company provides power to your place.



Position	Description
A	PV modules
B	DC load circuit breaker
C	Growatt Inverter
D	AC load circuit breaker

E	Energy meter
F	Utility grid

5.2 Safety

The Growatt Inverter must be connected to the AC ground from the utility via the Ground Terminal (PE).

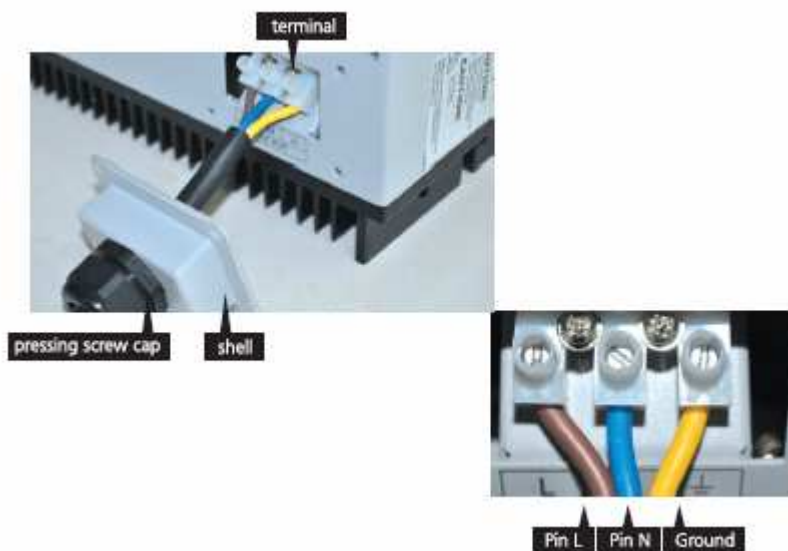
5.3 Connecting to the grid (AC utility)

5.3.1 GRID standards

IMPORTANT: *If several GROWATT are installed in a three-phase AC GRID, it is recommended to distribute the inverters between the phases in order to reduce the power unbalances between the phases. Always refer to the local standards.*

5.3.2 Connection of the AC wiring (AC output)

- **A** Measure grid(utility) voltage and frequency. It should be 230 VAC(or 220VAC),50/60Hz and single phase.
- **B** Open the breaker or fuse between PV Inverter and utility.
- **C** For Inverter, connect AC wires as follows:



Model	_(mm)	Area(mm ²)	AWG no.
Growatt 2000 HF	_2.05	3.332	12
Growatt 2500 HF	_2.05	3.332	12
Growatt 3000 HF	_2.05	3.332	12

5.4 Connect to PV Panel (DC input)

WARNING:

RISK OF ELECTRIC SHOCK AND FIRE . USE ONLY WITH PV MODULES WITH A MAXIMNM SYSTEM VOLTAGE OF RATING!

WARNING:

ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE NORMALLY UNGROUNDED BUT WILL BECOME INTERMITTENTLY GROUNDED WITHOUT INDICATION WHEN THE INVERTER MEASURES THE PV ARRAY ISOLATION!

- **Under any condition!** Make sure the maximum open circuit voltage (Voc) of each PV string is less than 600Vdc for Growatt 2000 HF, Growatt 2500 HF and Growatt 3000 HF. The length of input wire must be less than 30m.
- Before connecting PV panels to DC terminals, please make sure the polarity is correct. Incorrect polarity connection could permanently damage the unit. Checks short-circuit current of the PV string. The total short-circuit current of the PV string should be less than the inverter's maximum DC current.
- Use MC (Muli-contact) connectors for PV array terminals
- Connect the positive and negative terminals from the PV panel to positive (+) terminals and negative (-) terminals on the PV-Inverter. Each DC terminal on Inverter can withstand **15**Adc for Growatt 3000 HF and Growatt 2500, **12**Adc for Growatt 2000 HF.
- High voltages exist when the PV panel is exposed to the sun. To reduce risk of electric shock, avoid touching live components and treat connection terminals carefully.
- Cable requirements

Model	_(mm)	Area(mm ²)	AWG no.
Growatt 2000 HF	_2.05	3.332	12
Growatt 2500 HF	_2.05	3.332	12
Growatt 3000 HF	_2.05	3.332	12

5.5 Commissioning Checking

- When the PV panels are connected and their output voltage is greater than 100 VDC but the AC grid is not yet connected, the message on the LCD display produce the following messages in order: “Growatt Inverter”-> “Waiting” -> “No AC connection”. The display repeats “No AC connection” and the LED will be red.
- Close the AC breaker or fuse between PV-Inverter and grid. The normal operating sequence begins.

- Under normal operating conditions the LCD displays “Power: xxxx.xW”. That is the power fed to the grid. The LED turns green.
- This completes the check.

6. DISPLAY AND MESSAGES

6.1 LCD display

Starting-up display sequence, Once the PV power is sufficient, Inverter displays information as shown in the flow chart as follow:

Module: xxxxxx
 SerNo: xxxxxxxxxxxx
 FW Version: x.x.x
 Connect in: xxS
 Connect : OK
 Power: xxxx.xW

6.2 LCD control

To save power, the LCD display’s backlight automatically turns off after 30 seconds. The display on the inverter can be control by Knock on the front of it.

The first line will show some status of the inverter, there are 5 status listed in below table.

The First Line Of LCD		
STATE	DISPLAY CONTENT	REMARK
Wait State	Standby	PV voltage low
	Waiting	Initial waiting
	Connect in xxS	System checking
	Reconnect in xxS	System checking
Inverter State	Connect OK	Connect to Grid
	Power: xxxx.xW	Inverter watt at working
Fault State	Error: xxx	System Fault
Auto Test State	Auto Testing	Protection auto test
Program State	Programming	Update Software

While Growatt inverter is working, the first line will normally show Power status:

Power : 2016.2W
 AC: 230V F: 50.0Hz

The Second line can change by knock on

The Second Line Of LCD		
CYCLE DISPLAY	DISPLAY TIME/S	REMARK
Power : 2013.4W model: P1U1M3S3	2	The inverter model
Power : 2016.8W FW Version: H.1.0	2	The software version
Power : 2012.8W SerNO: DK00000000	2	The Serial Number
Power : 2009.6W Etoday: 7.1kWh	4	The energy today
Power : 2017.0W Eall : 90KWH	4	The energy all
Power : 2123.4W PpV : 2123.4W	4	PV input watt
Power : 2103.4W PV: 313 B: 370V	4	The PV and Bus Voltage
Power : 2016.2W AC: 230V F: 50.0Hz	4	The grid system
Enable auto test		
Power : 2021.8W Enale Auto Test	4	The enable auto test
Set Language		
Power : 2019.5W Set Language	4	Set Language
Set contrast		
Power : 2008.2W Set LCD Contrast	4	Set LCD Contrast
Set COM Address		
Power : 2019.5W COM Address: Move	4	Set Communications Address

Set GRID standards

Power : 2016.2W
Net Model: 2

4

Set GRID standards

6.3 Setting the LCD display

Sound control can define the display language, luminance of the display, auto-test and utility model choice. When the LCD is dark, Knock and double knock make it becomes bright. Knock to make it display next information or change the set situation. Double knock make the display stand for 30 second on 1-5. And enter set menu on 6-12.

- **Setting language**

Knock to make the display bright→knock to“set language”→double knock to enter“language: English”→knock to select the language you need and wait until the display become dark.

- **Setting luminance of the display**

Knock to make the display bright →knock to“set LCD contrast”→double knock to enter“LCD contrast 2”→knock to select the luminance you need and wait until the display become dark.

- **Setting communication address**

Knock to make the display bright-->knock to “COM Address:xx” -->double knock to change the Address model-->clock to set address.

- **Setting utility model choice**

Knock to make the display bright→knock to“Net Model: xx” →double knock to enter“Net Model: xx”→knock to select the **Utility model** you need and wait until the display become dark.

Power : 2016.2W
Net Model: 2

Power : 2016.2W
Net Model: 3

Power : 2016.2W
Net Model: 4

- **Auto test**

Knock to make the display bright→knock to“Enable Auto test”→double knock to enter “Waiting to start”→knock to start auto test and wait for the test result.

7. MODES OF OPERATION

There are 3 different modes of operation.

7.1 Normal mode

In this mode, Inverter works normally. Whenever the supplied power from PV panel is sufficient (voltage>150VDC), Inverter converts power to the grid as generated by the PV panel. If the power is insufficient(voltage<120VDC) , Inverter enters a “waiting” state. Whilst “waiting” Inverter uses just enough power from the PV panel monitor internal system status. In normal mode the LED is green.

7.2 Fault mode

The internal intelligent controller can continuously monitor and adjust the system status. If Inverter finds any unexpected conditions such as grid problems or internal failure, it will display the information on its LCD and the LED will be red.

7.3 Shutdown mode

During periods of little or no sunlight, Inverter automatically stops running. In this mode, Inverter does not take any power from the grid. The display and LED's on the front panel do not work.

Notes :

Operating inverter is quite easy. During normal operation, Inverter runs automatically. However, to achieve maximum conversion efficiency of Inverter, please read the following information:

Notes :

Le fonctionnement d'un onduleur est assez facile. Lors d'une phase normale, l'onduleur fonctionne automatiquement. Cependant, afin d'atteindre l'efficacité de conversion maximale de l'onduleur, veuillez lire les instructions suivantes :

Automatic ON-OFF: Inverter starts up automatically when DC-power from the PV panel is sufficient.

Once the PV-Inverter starts it enters one of the following 3 states:

1. Standby: The PV string can only provide just enough voltage to minimum requirements of the controller.

2. Waiting: When the PV string DC voltage is greater than 100V, Inverter enters “waiting” state and attempts to connect to the grid.

3. Normal operation: When PV string DC voltage is greater than 150V, Inverter operates in normal state.

8. INVERTER STATUS

Inverter is designed to be user-friendly; therefore, the status of the Inverter can be easily understood by reading the information shown on the front panel display. All possible messages are shown in the following table.

DISPLAY	OPERATION
system fault	
Auto Test Failed	Auto Test do not pass
No AC Connection	No Utility, No Grid Connect
GFDI Fault	Leakage current too large
PV Voltage High	PV panel Voltage too high
AC V Outrange	Grid Voltage out of range
AC F Outrange	Grid Frequency out of range
Inverter fault	
Error: 100	2.5V Reference Voltage Fault
Error: 101	Communication Fault
Error: 102	Consistent Fault
Error: 116	EEPROM Fault
Error: 117	Relay Fault
Error: 118	Init Model Fault
Error: 120	HCT Fault
Error: 121	Communication Fault
Error: 122	Bus Voltage Fault
Error: 123	Auto Test Fail

9. COMMUNICATIONS

9.1 Communications software instructions

Shine NET is a PC software that communicate with Shine Inverter to analyze the inverter working state. It is convenient for you to know the inverter real time working state and the history work information.

Spec:

1. Communicate with inverter by RS232 and Bluetooth.
2. Construct net with inverter, GRO monitor and Shine NET by RS232, Bluetooth and Internet.
3. Two Interfaces: Multi Inverter Interface and Wave Data Interface.
4. In Multi Inverter Interface: See at most 4 inverters working data at the same time, you can select your own compare inverters and parameters.
5. In Wave Data Interface: Query the inverter real time and history power wave, work data and error information.
6. Multi languages: English, French, German, Spanish and etc.
7. Support OS: WinXP/ Vista/win7/2000/2003.

9.2 Monitor

After setting the software the user can monitoring the inverter. The right side of the main interface is the detailed information of inverter.

9.3 Detailed information

Detailed setting method and other functions refer to “Shine NET Manual.” in the CD.

10. TROUBLE SHOOTING

In most situations, the Inverter requires very little service. However, if Inverter is not able to work perfectly, please refer to the following instructions before calling your local dealer.

Should any problems arise, the LED on the front panel will be red and the LCD displays the relevant information. Please refer to the following table for a list of potential problems and their solutions.

11. SYSTEM FAULT

• Ground Fault

1. The ground current is too high.
2. Unplug the inputs from the PV generator and check the peripheral AC system.
3. After the cause is cleared, re-plug the PV panel and check PV-Inverter status.
4. If the problem persists please call service.

• **GFDI Fault**

1.If panels is PV- grounded, please check the impedance between the earth and the PV-, the impedance must be less than 100Ω

2. .If panels is PV+ grounded, please check the impedance between the earth and the PV+, the impedance must be less than 100Ω

3.The type Fuse of GFDI is DC 1000V/500mA

4. If the problem persists please call service.

• **No Utility**

1. Grid is not connected.

2. Check grid connection cables.

3. Check grid usability.

12. INVERTER FAILURE

• **PV Over Voltage**

1. Check the open PV voltage, see if it is greater than or too close to 600Vdc for Growatt 1500 HF, Growatt 2000 HF and Growatt 3000 HF.

2. If PV voltage is less than 600Vdc for Growatt 1500 HF ,Growatt 2000 HF and Growatt 3000 HF, and the problem still occurs, please call local service.

• **Consistent Fault**

1. Disconnect PV (+) or PV (-) from the input, restart the PV-Inverter.

2. If it does not work, call service.

> If there is no display on the panel, please check PV-input connections. If the voltage is higher than 150V, call your local service.

> During periods of little or no sunlight, the PV-Inverter may continuously start up and shut down. This is due to insufficient power generated to operate the control circuits.

13. SPECIFICATIONS

Model	Growatt 2000 HF	Growatt 2500 HF	Growatt 3000 HF
Specifications			
Input data			
Max. DC power	2200W	2700W	3200W
Max. DC voltage	600V	600V	600V

Start voltage	150V	150V	150V
DC nominal voltage	360V	360V	360V
PV range voltage	100V-600V	100V-600V	100V-600V
Number of MPP trackers/strings per MPP tracker	1/2	1/2	1/2
Max. input current /per string	12A/12A	15A/15A	15A/15A
Output data			
Nominal AC output power	2000W	2500W	3000W
Max. AC power	2000W	2500W	3000W
Nominal output current	8.7A	10.8A	13A
Max. output current	10A	12A	14.3A
AC nominal voltage;range	230V; 207Vac~263Vac	230V; 207Vac~263Vac	230V; 207Vac~263Vac
AC grid frequency;range	50,60HZ;± 5 Hz	50,60HZ;± 5 Hz	50,60HZ;± 5 Hz
Phase shift (cos φ)	>0.99	>0.99	>0.99
THDI	<3%	<3%	<3%
AC connection	Single phase	Single phase	Single phase
Efficiency			
Max. efficiency	96%	96%	96%
Euro-eta	95.5%	95.5%	95.5%
MPPT efficiency	99.5%	99.5%	99.5%
Protection devices			
DC reverse polarity protection	yes	yes	yes
AC short - circuit protection	yes	yes	yes
Ground fault monitoring Grid monitoring	yes	yes	yes
Integrated all - pole sensitive leakage current monitoring unit	yes	yes	yes
General Data			
Dimensions (W /H /D) in mm	440/455/135		
Weight	14.6KG	15.1 KG	15.9 KG
Operating ambient temperature range	-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
Noise emission (typical)	≤ 25 dB(A)	≤ 25 dB(A)	≤ 25 dB(A)
Altitude	Up to 2000m without power derating		
Consumption: operating	<5W /< 0.5 W	<5W /< 0.5 W	<5W /< 0.5 W

(standby) / night			
Topology	transformer	transformer	transformer
Cooling concept	No fan	No fan	No fan
Installation :Indoors/ Outdoors (IP65 electronics)	yes/yes	yes/yes	yes/yes
Features			
DCconnection:(MC3/MC4/H4)	yes	yes	yes
AC connection: Terminals	yes	yes	yes
LCD display	yes	yes	yes
Interfaces: Bluetooth / RS485/RS232	Opt/Opt/yes	Opt/Opt/yes	Opt/Opt/yes
Warranty: 5 years / 10 years	Yes/opt	Yes/opt	Yes/opt

14. GROWATT FACTORY WARRANTY

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 2000 HF, Growatt 2500 HF, Growatt 3000 HF

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 and kind whatsoever with respect to, any inverter which has been subjected to:

- Misuse, abuse, neglect or accident;
- Alteration, improper installation or application;
- Unauthorised 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, lighting, 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.

15. WARRANTY CONDITIONS

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,

- Shipped to a Growatt service centre for repair, or
- repaired on-site, or
- 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.

16. CONTACT

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

- Inverter type
- Modules information
- Communication method
- Serial number of Inverters
- Error code of Inverters
- Display of inverters

ShenZhen Growatt New Energy Co., Ltd

Xicheng Industrial Zone,

Bao'an District, Shenzhen, 51800, China.

Tel: +86 (0)755 2747 1900

Fax: +86 (0) 755 2749 1460

Email: service@ginverter.com

Website: www.ginverter.com