



Growatt 2500MTL

Growatt 3000MTL

Growatt 3600MTL

Growatt 4200MTL

Growatt 4600MTL

Growatt 5000MTL



Installation & Operation Manual

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Manual Introduce and Copyright

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1.1 Validity

This installation and user guide describes the assembly, installation, commissioning, communication, maintenance, operating and failure search of the following GROWATT inverters:

Growatt 2500MTL

Growatt 3000MTL

Growatt 3600MTL

Growatt 4200MTL

Growatt 4600MTL

Growatt 5000MTL

This manual does not cover any details concerning equipment connected to the Growatt MTL (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 who 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.

1.3. Additional informatio

Find further information on special topics in the download area at






www.ginverter.com

The manual and other documents must be stored in a convenient place and be available 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.













1.4. Symbols in this document

1.4.1. Warnings in this document

A warning describes a hazard to equipment or personnel. It calls attention to a procedure or practice, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the Growatt equipment and/or other equipment connected to the Growatt equipment or personal injury.

Symbol	description
	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTICE is used to address practices not related to personal injury.
	Information that you must read and know to ensure optimal operation of the system.

1.4.2. Markings on this product

Symbol	Explanation
	Electrical voltage!
	Risk of fire or explosion!
	Risk of burns
	Operation after 5 minutes
	Point of connection for grounding protection.
	Direct Current (DC)
	Alternating Current (AC)
	The inverter has no transformer.
	Read the manual.
	Bluetooth communication is enabled.
	CE mark. The inverter complies with the requirements of the applicable EC guidelines.
	The inverter must not be disposed of with the household waste.

1.5. 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). The energy is the power calculated over time. If, for example, your inverter operates at a constant power of 2000 W for half an hour and then at a constant power of 1000 W for another half an hour, it has fed 1500 Wh of energy into the power distribution grid within that hour.

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 ratio 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 or volt amps. They are identical only when current and voltage are in phase than the power factor is 1.0. The power in an ac circuit is very seldom equal to the direct product of the volts and amperes. In order to find the power of a single phase ac circuit the product of volts and amperes must be multiplied by the power factor.

PV

Abbreviation for photovoltaic

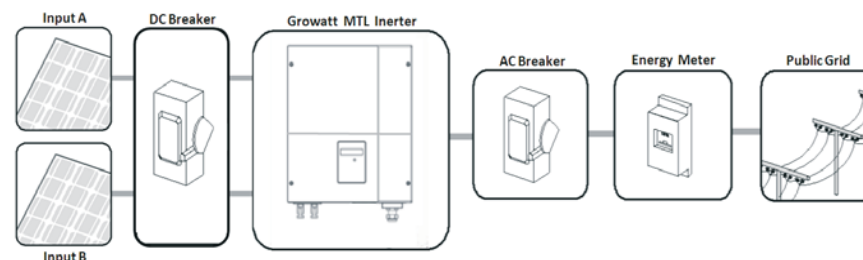
wireless communication

The external wireless communication technology is a radio technology that allows the inverter and other communication products to communicate with each other. The external wireless communication does not require line of sight between the devices and it is selective purchasing.

2.1. Intended Use

The unit converts the DC current generated by the photovoltaic (PV) modules to grid-compliant alternating current and performs single-phase feed-in into the electricity grid. Growatt MTL series inverters are built according to all required safety rules. Nevertheless, improper use may cause lethal hazards for the operator or third parties, or may result in damage to the units and other property.

Principle of a PV plant with this GROWATT XXXXMTL single-phase inverter



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 the intended use. The manufacturer/supplier is not liable for damage caused by such unintended use. Damage caused by such unintended use is at the sole risk of the operator.

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.


2.2. Qualification of skilled person

This grid-tied inverter system operates only when properly connected to the AC –distribution network. Before connecting the Growatt MTL to the power distribution grid, contact the local power distribution grid company. This connection must be made only by qualified technical personnel to connect, and only after receiving appropriate approvals, as required by the local authority having jurisdiction

2.3. Safety instruction

The GROWATT MTL 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 (0)755 2747 1942.


2.4. Assembly Warnings

Symbol	description
	➤ 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.
	➤ Assemble the inverter per the instructions in this manual. Use care when choosing installation location and adhere to specified cooling requirements.
	➤ Unauthorized removal of necessary protections, improper use, incorrect installation and operation may lead to serious safety and shock hazards and/or equipment damage.
	➤ In order to minimize the potential of a shock hazard due to hazardous voltage, cover the entire solar array with dark material prior to connecting the array to any equipment.



- Grounding the PV modules: The Growatt MTL is a transformerless inverter. That is why it has no galvanic separation. Do not ground the DC circuits of the PV modules connected to the Growatt MTL. Only ground the mounting frame of the PV modules. If you connect grounded PV modules to the Growatt MTL inverters, the error message "PV ISO Low".
- 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 with ground these in order to have optimal protection of the system and personnel.

2.5. Electrical Connection Warnings

Symbol	description
	➤ The components in the inverter are live. Touching live components can result in serious injury or death. <ul style="list-style-type: none"> • Do not open the inverter except the wire box by qualified persons. • Electrical installation, repairs and conversions may only be carried out by electrically qualified persons. • Do not touch damaged inverters.
	➤ Danger to life due to high voltages in the inverter <p>There is residual voltage in the inverter. The inverter takes 20 minutes to discharge.</p> <ul style="list-style-type: none"> • Wait 20 minutes before you open the wire box.
	➤ Persons with limited physical or mental abilities may only work with the Growatt inverter following proper instruction and under constant supervision. Children are forbidden to play with the Growatt inverter. Must keep the Growatt inverter away from children.



- 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.
- 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.



- The Growatt Inverter converts DC Current from PV generator into AC current. 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 is not generated 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



- 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.
- 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.
- Do not stay closer than 20 cm to the inverter for any length of time.

2.6. Operation Warnings

Symbol

description

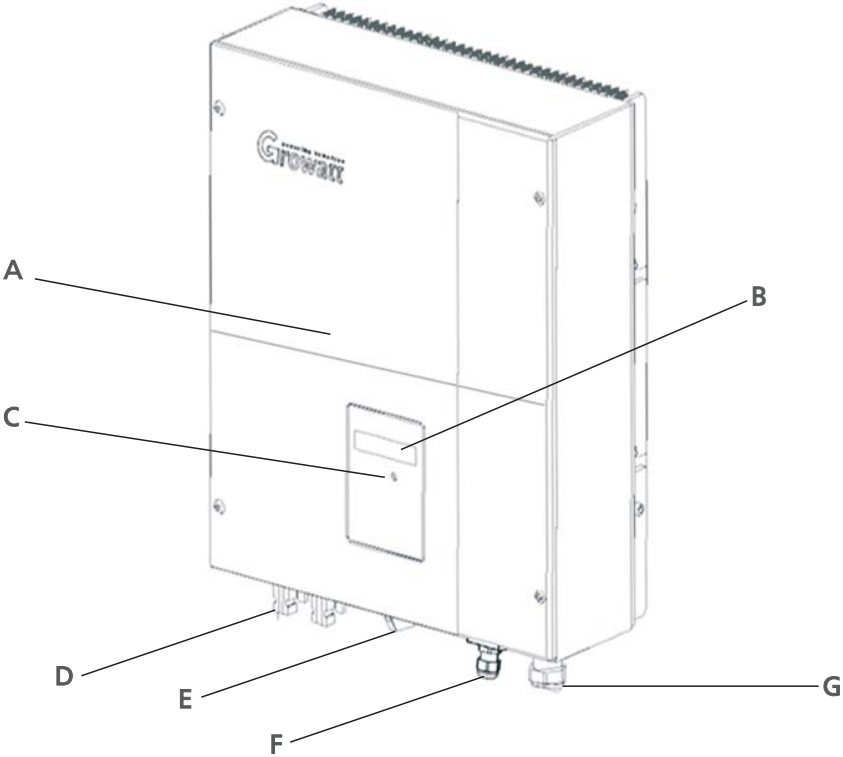


- Ensure all covers and doors are closed and secure during operation.
- Although designed to meet all safety requirements, some parts and surfaces of Inverter are still hot during operation. To reduce the risk of injury, do not touch the heat sink at the back of the PV-Inverter or nearby surfaces while 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-Overvoltage!"
 - Turn the rotary switch of the DC Disconnect to the Off position immediately.
 - Contact installer.

3 Product Description

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

3.1. Overview



Position	Description
A	The front enclosure lid
B	LCD
C	State LED
D	PV input terminals
E	DC switch
F	RS 485
G	AC output



Information

The DC switch of Growatt MTL series is optional for different countries.

Symbol on the inverter

Position	Description	Explanation
	Tap symbol	Setting the display operation by tapping the LCD (see Section 4).
	Inverter status symbol	Indicates inverter operation status

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 left-hand side of the enclosure.

GROWATT PV Grid Inverter	
Model Name	XXXXXX
U _{DC max}	XXXXXX
I _{DC max}	XXXXXX
U _{DC range}	XXXXXX
V _{AC norm}	XXXXXX
f _{AC norm}	XXXXXX
P _{AC norm}	XXXXXX
I _{AC norm}	XXXXXX
PF	XXXXXX
Protection Degree	XXXXXX
Operation Ambient Temperature	XXXXXX
VDE0126-1-1 IEC62109 RD1699 VDE-AR-N4105	
CE G59	

GROWATT PV Grid Inverter	
Model Name	XXXXXX
Certificate Number	XXXXXX
U _{DC max}	XXXXXX
I _{DC max}	XXXXXX
U _{DC range}	XXXXXX
V _{AC norm}	XXXXXX
f _{AC norm}	XXXXXX
P _{AC norm}	XXXXXX
I _{AC norm}	XXXXXX
PF	XXXXXX
Protection Degree	XXXXXX
Operation Ambient Temperature	XXXXXX
AS 4777 & AS 3100 IEC62109	
N136 CE	



Information

As the grid standards of many countries are in the process of improving or upgrading, please refer to the label on the machine for reference of the newest certificate.

More detail about the type label as the chart below:

Form1. GROWATT2500-3000 MTL series

Model Name	Growatt 2500MTL	Growatt 3000MTL
Max input DC voltage	500V	500V
Max input DC current	10A/10A	10A/10A

PV voltage range	100V-500V	100V-500V
AC nominal voltage	230V	230V
AC grid frequency	50Hz	50Hz
Nominal AC output power	2500W	3000W
AC normal output current	10.8A	13A
Power factor	1.0	1.0
Environmental Protection Rating	Ip65	Ip65
Operation Ambient temperature	-30...+60°C	-30...+60°C

Form2. GROWATT3600-5000 MTL series

Model Name	Growatt 3600MTL	Growatt 4200MTL	Growatt 4600MTL	Growatt 5000MTL
Max input DC voltage	600V	600V	600V	600V
Max input DC current	10A/10A	15A/15A	15A/15A	15A/15A
PV voltage range	100V-600V	100V-600V	100V-600V	100V-600V
AC nominal voltage	230V	230V	230V	230V
AC grid frequency	50Hz	50Hz	50Hz	50Hz
Nominal AC output power	3600W	4200W	4600W	5000W
AC normal output current	16.3A(or 15.6A)	18.5A	20A	21.8A
Power factor	1.0	1.0	1.0	1.0
Environmental Protection Rating	Ip65	Ip65	Ip65	Ip65
Operation Ambient temperature	-25...+60°C	-25...+60°C	-25...+60°C	-25...+60°C

3.3. Dimensions and Weight

Types	Height (H)	Width (W)	Depth (D)	Weight
Growatt 2500MTL	421 mm 16.6 inch	360 mm 14.2 inch	152 mm 6.0 inch	15.6kg 34.4lb
Growatt3000MTL	421 mm 16.6 inch	360 mm 14.2 inch	152 mm 6.0 inch	15.6kg 34.4lb
Growatt 3600MTL	510 mm 20.0 inch	360 mm 14.2 inch	188 mm 7.4 inch	24kg 52.9lb
Growatt4200MTL	510 mm 20.0 inch	360 mm 14.2 inch	188 mm 7.4 inch	24kg 52.9lb
Growatt4600MTL	510 mm 20.0 inch	360 mm 14.2 inch	188 mm 7.4 inch	24kg 52.9lb
Growatt5000MTL	510 mm 20.0 inch	360 mm 14.2 inch	188 mm 7.4 inch	24kg 52.9lb

3.4. Transport and Store

3.4.1. 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 be used, and the maximum layers for original carton is six, as this ensures safe transport.

3.4.2. 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°C and +60°C. And the storage relative humidity should be always between 0 and 95%.
- If there are a batch of inverters needs to be stored, the maximum layers for original carton as follow.
The maximum layers is 6 for Growatt 2500-3000 MTL, and 5 layers for Growatt 3600-5000 MTL.
- After long term storage, local installer or service department of GROWATT should perform a comprehensive test before installation

3.5. The advantage of Inverter

- Maximum efficiency of 97.9%
- Wide input voltage range from 100--600Vdc
- Integrated DC switch
- Multi MPP controller
- Sound control
- Multi communication pattern
- Easy installation

4 Unpacking

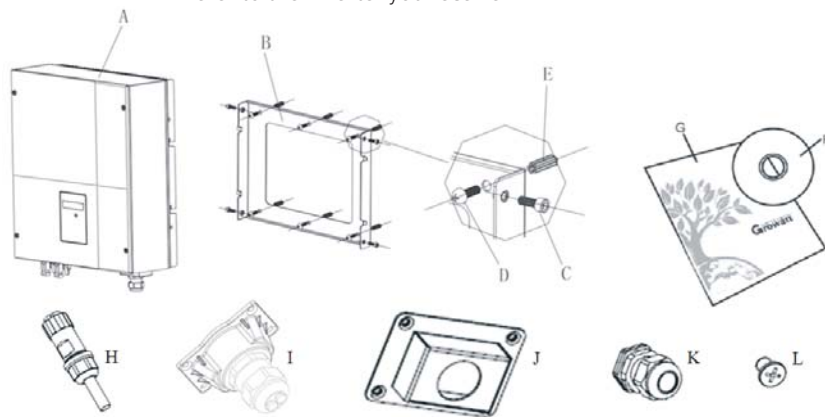
Thoroughly inspect the packaging upon received. If any damage to the carton is visible, or if you find that the inverter unit is damaged after unpacking, please notify the shipping company and SHENZHEN GROWATT NEW ENERGY TECHNOLOGY CO.,LTD immediately.

Meanwhile please check the delivery for completeness and for visible external damages of the inverter. If there are anything damaged or missing, please contact your dealer. Don't dispose its original package. If you want to transport the inverter, it is better to store the inverter into the original package.

After opening the package, please check the contents of the box. It should contain the following, Please check all of the accessories carefully in the carton. If anything missing, contact your dealer at once.

Information

Though the packaging box of Growatt MTL is durable, please treat the packing box gently and avoid dispose the packing box. In this package, there are inverter, cystosepiment and carton from inside to outside.
For the accessories, there are two kinds of configuration, please refer to the inverter you receive.



Item	Number	Description	Remarks
A	1	Growatt MTL inverter	
B	1	Mounting frame	
C	4	Mounting screws	
D	6	Safety-lock screws	
E	6	Mounting frame screw sleeves	
F or G	1	Installation & Operation Manual	
H	1	Cable gland for RS485 connection	Standard configuration 1
I	1	Cable gland for RS485 connection	Standard configuration 2
J	1	Output Shell	
K	1	Cable gland for AC connection	
L	4	M4 cross recessed countersunk head screws	Standard configuration 1
L	8	M4 cross recessed countersunk head screws	Standard configuration 2

5 Installation

5.1. Safety instructions

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 mounting location

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

- The installation location must be suitable for the inverter's weight and dimensions for a long period time. (Refer to 3.3)
- Do not install the inverter on structures constructed of flammable or thermolabile materials.
- 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.
- The Ingress Protection rate is IP65 which means the inverter can be installed outdoors and indoors.
- Do not expose the inverter to direct sunlight, in order to avoid the power and efficiency derating caused by excessive heating.
- The humidity of the installation location should be 0~95% without condensation.
- The ambient temperature should be below 40°C to ensure optimal operation.
- The installation location must be freely and safely to get at all times.
- 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)

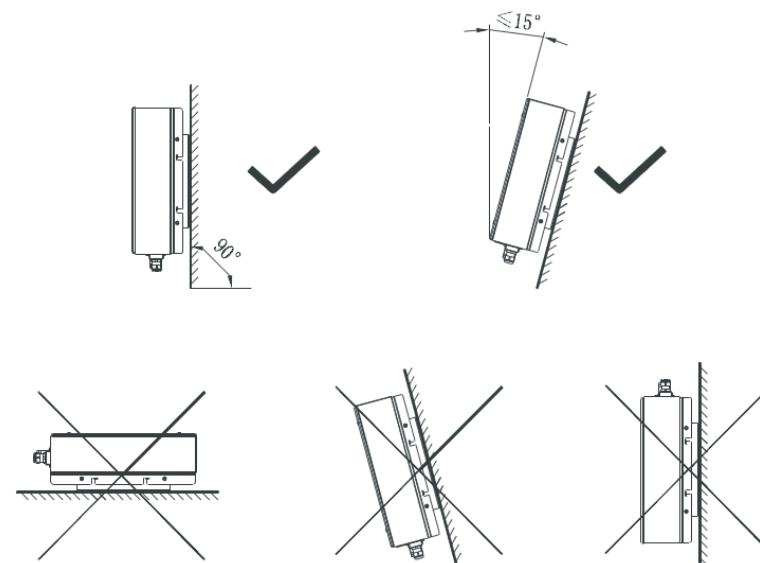
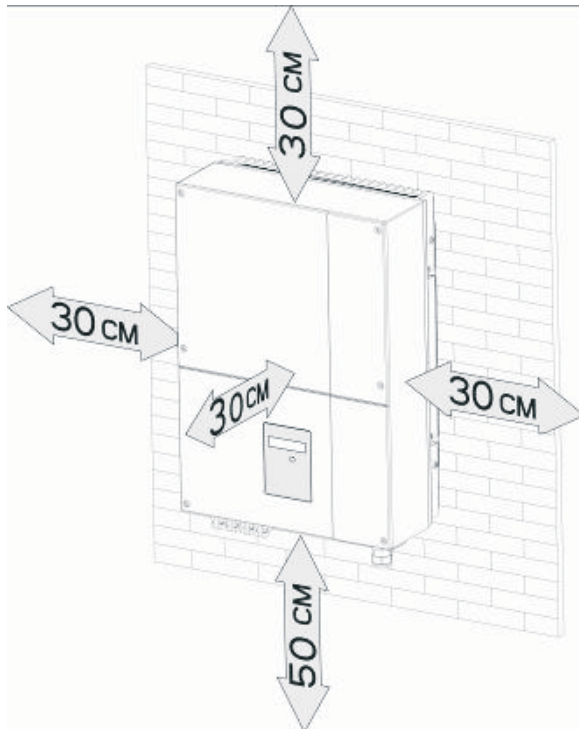
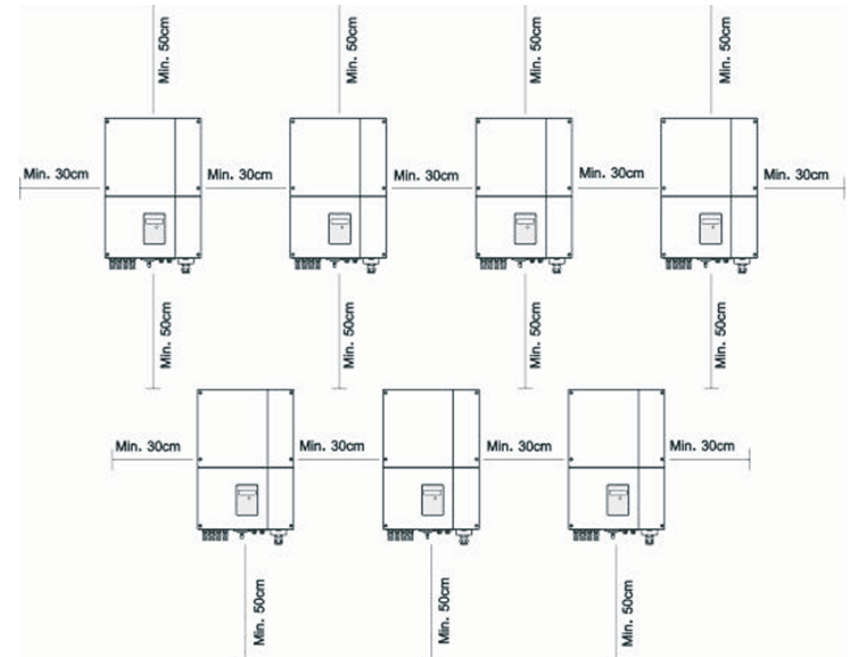


Fig 8.1

- Do not install the inverter near television antenna or any other antennas and antenna cables.
- Do not install the inverter in living area, the noise caused by the machine may affect on daily life.
- For security reasons, don't install the inverter in place where the children can reach.
- Don't put any things on the inverter. Do not cover the inverter.
- Inverter requires adequate cooling space. Providing better ventilation for the inverter to ensure the heat escape adequately.
- Do not expose the inverter to direct sunlight, as this can cause excessive heating and thus power reduction.
- Observe the minimum clearances to walls, other inverters or objects as shown in the diagram below in order to guarantee sufficient heat dissipation.



Ambient dimensions of one inverter

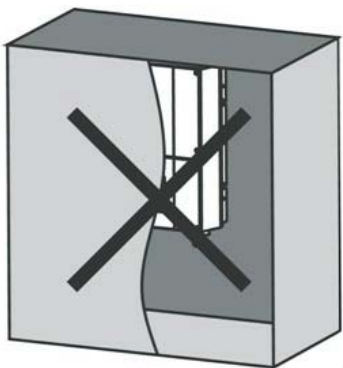


Ambient dimensions of series inverters

- There must be sufficient clearance between the individual inverters to ensure that the cooling air of the adjacent inverter is not taken in.
- If necessary, increase the clearance spaces and make sure there is enough fresh air supply to ensure sufficient cooling of the inverters.
- The inverter can't install to solarization, drench, firm location. We suggest that the inverters should be installed at the location with some cover or protection



- Please make sure the inverter is installed at the right place. The inverter can't install close to trunk



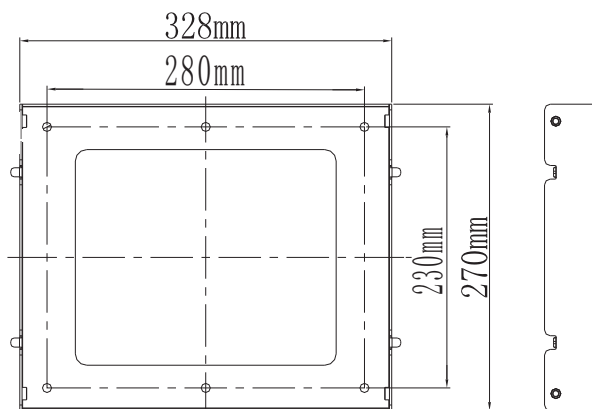
5.3. Mounting Inverter

5.3.1. Mounting bracket

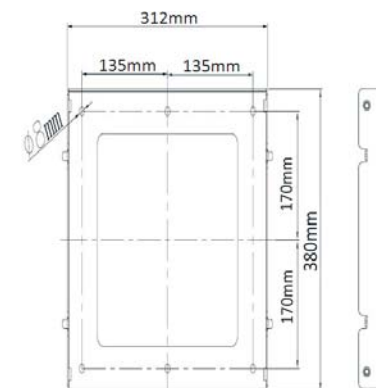


In order to avoid electrical shock or other injury, inspect existing electronic or plumbing installations before drilling holes.

1. Use the bracket as a drilling template and mark the positions of the drill holes.

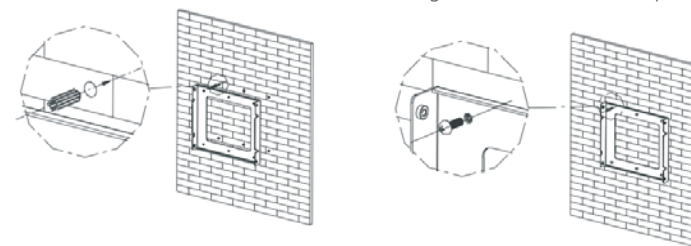


For Growatt2500-3600MTL



For Growatt4200-500MTL

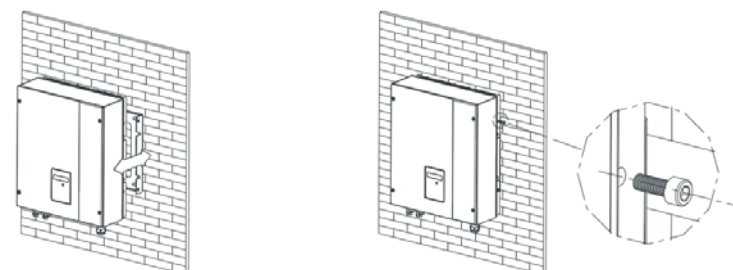
2. Drill four holes for screws, fasten the bracket against the Wall with expansion bolts.



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.

5.3.2. Mounting Inverter

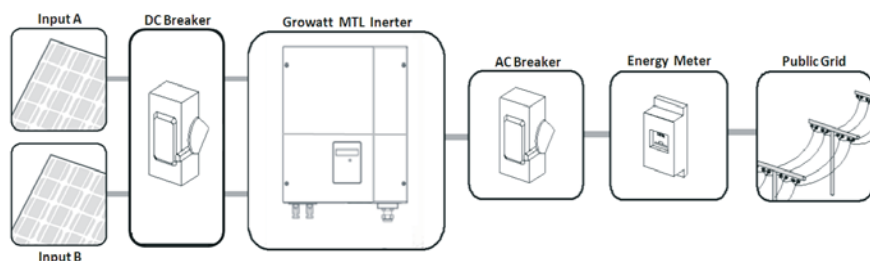
After the bracket is firmly mounted on the wall, then mount the inverter on the bracket.




- Rise up the Growatt MTL a little higher than the bracket. Considered the weight of them. During the process please maintain the balance of the Growatt MTL.
- Hang the inverter on the bracket through the match hooks on bracket.
- After confirming the inverter is fixed reliably, fasten M6 socket head cap screws on the left and right side firmly to prevent the inverter from being lifted off the bracket.
- Connecting the Second Protective Conductor
- If the installation requires, the earth terminal can be used to connect a second protective conductor or as equipotential bonding. This prevents touch current if the original protective conductor fails.
- Cable requirement:
Earthing cable cross-section: 5.26 mm² at maximum

5.4. Connect switch

Separate the Growatt securely from the grid and the PV generators using DC and AC Switch. You must provide an AC circuit breaker. If Growatt DC Switch is included in the delivery of the Growatt, it must be used for operating the inverter.



5.5. Grounding

The Growatt 2500 - 5000MTL series are transformerless inverters. That is why it has no galvanic separation. Do not ground the DC circuits of the PV modules connected to the Growatt. Only ground the mounting frame of the PV modules. If you connect grounded modules to the Growatt, the error message "PV ISO Low". The inverter must be connected to the AC grounding conductor of the power distribution grid via the ground terminal (PE) .



Because of the transformerless design, the DC positive pole and DC negative pole of PV arrays are not permitted to be grounded.

5.6. Connect grid type

TN-C grid	suitable
TN-S grid	suitable
TN-C-S grid	suitable
TT grid	suitable

5.7. Electrical connection

5.7.1. 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.

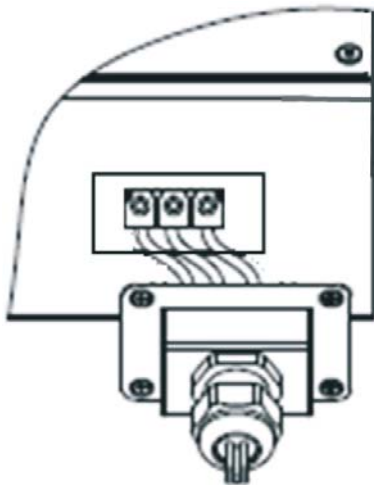
5.7.2. Connection to the grid(AC)

You must install a separate single-phase circuit-breaker or other load disconnection unit for each inverter in order to ensure that the inverter can be safely disconnected under load.

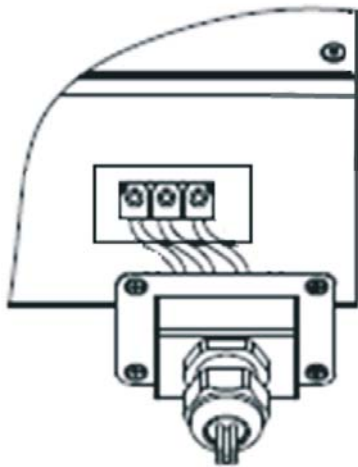
- Open the breaker or fuse between the inverter and utility;
- Measure the public grid voltage and frequency (Voltage: 230Vac; Frequency: 50Hz/60Hz; Please refer to the below form for the AC switch.

Types	Max current output	Suggested AC switch spec
Growatt 2500MTL	13A	400Vac/20A
Growatt 3000MTL	15A	400Vac/25A
Growatt 3600MTL	18A	400Vac/25A
Growatt 4200MTL	21A	400Vac/32A
Growatt 4600MTL	23A	400Vac/32A
Growatt 5000MTL	25A	400Vac/32A

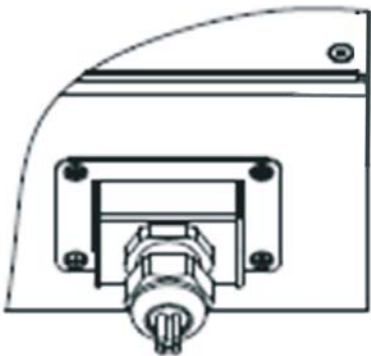
1.The AC side terminals of the inverter are like the following figure, it is clear to confirm that 'L' represents live line output, 'N' represents null line output, 'N' represents null line and  is grounding line.



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



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



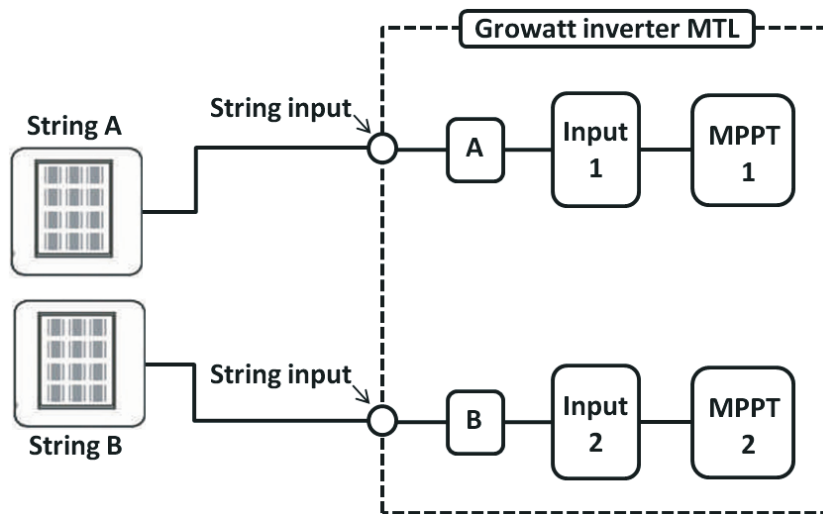
Cable requirements:

Model	_(mm)	Area(mm ²)	AWG no.	MAX.cable length(m)
Growatt2500MTL	_2.05	3.332	12	30
Growatt 3000MTL	_2.05	3.332	12	25
Growatt3600MTL	_2.59	5.260	10	33
Growatt 4200MTL	_2.59	5.260	10	29
Growatt 4600MTL	_2.59	5.260	10	26
Growatt 5000MTL	_2.59	5.260	10	24

5.7.3. Connecting the PV array

5.7.3.1. Conditions for DC connection

The inverter has 2 independent input : input A & input B
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;



Requirements for the PV modules of the connected strings:

- Same type
- Same quantity of PV modules connected in series



If the inverter is not equipped with a DC switch but this is mandatory in the country of installation, install an external DC switch. The following limit values at the DC input of the inverter must not be exceeded:

Types	Max current input A	Max current input B
Growatt 2500MTL	10A	10A
Growatt 3000MTL	10A	10A
Growatt 3600MTL	10A	10A
Growatt 4200MTL	15A	15A
Growatt 4600MTL	15A	15A
Growatt 5000MTL	15A	15A

5.7.3.2. Connecting the PV array (DC)



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.



WARNING
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

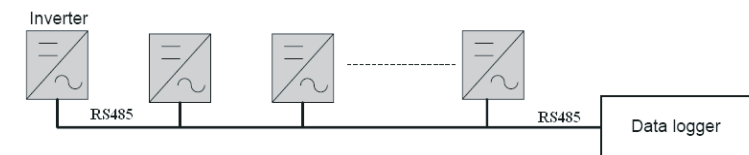
Check the connection cables of the PV modules for correct polarity and make sure that the maximum input voltage of the inverter is not exceeded. At an ambient temperature over 10°C, the open circuit voltage of the PV modules should not exceed 90% of the maximum input voltage of the inverter. Otherwise, the maximum inverter input voltage may be exceeded at low ambient temperatures.

5.8. Special connecting

5.8.1. Monitoring system

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

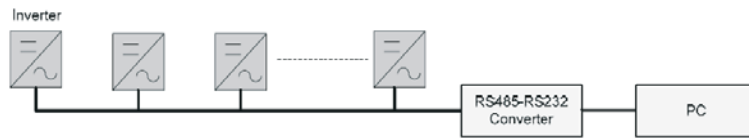
- Through RS485 interface-Data logger



- Through RS485 interface-Data logger+ PC



➤ Through RS485 interface-RS485-232 converter+ PC

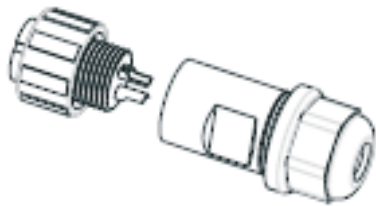


5.8.2. RS485 cable connection

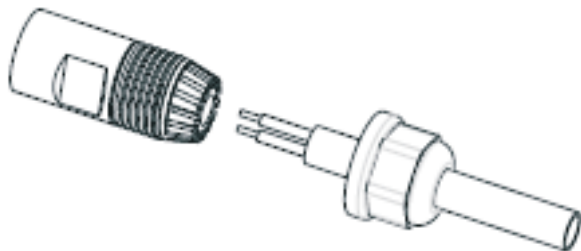
There are two ways of RS485 connection (refer to chapter 4). Please refer to 5.8.2.1 with standard configuration1; and 5.8.2.2 with standard configuration2.

5.8.2.2. Type 1

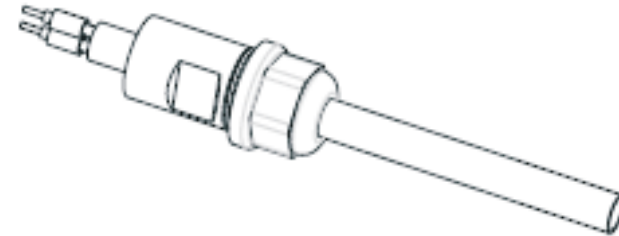
1. Unscrew the plastic connector.



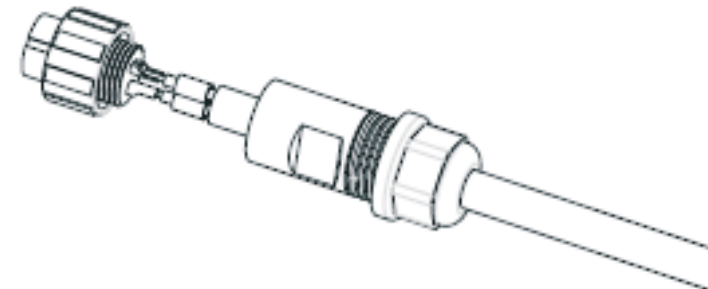
2. Make the RS485 cable go through the connector.



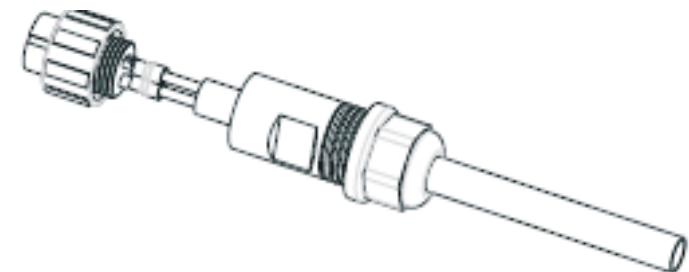
3. Put two heat shrink tubes onto the front head of RS485 cable.



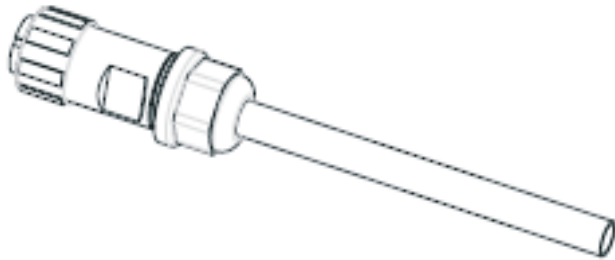
4. Insert the two metal head into relevant small cupreous hole, and fasten the connection by soldering.



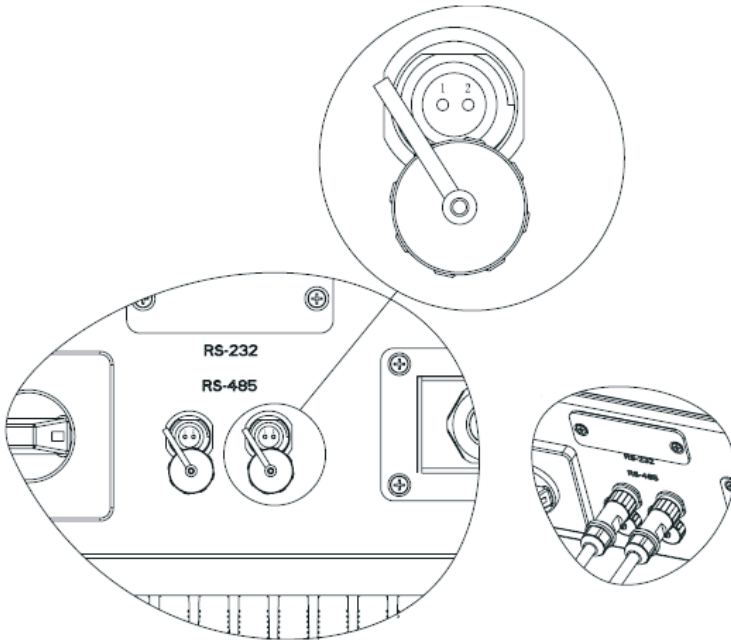
5. Make the heat shrink tubes wrap the joint.



6. Assemble the connector.

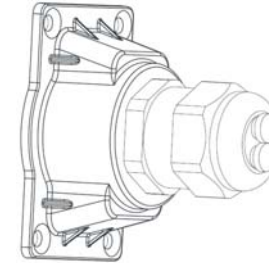


7. Connect the RS485 connector onto the inverter. Make sure the connection matched ('1' to '1', '2' to '2').

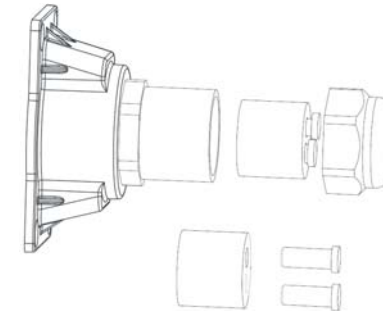


5.8.2.2.Type 2

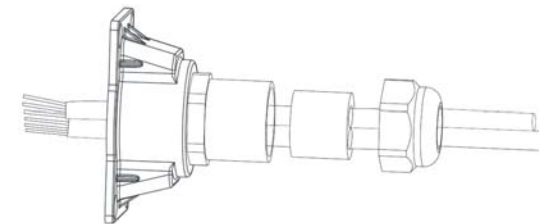
1. Please take out the RS485 waterproof device from the Accessories bag, even if you Don't choose RS485 as communication method, the RS485 waterproof device still has to be locked on the inverter.



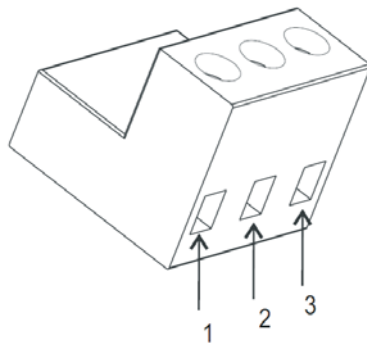
2. Twist off the waterproof connector, and pull out one or two Stopper according to your demand.



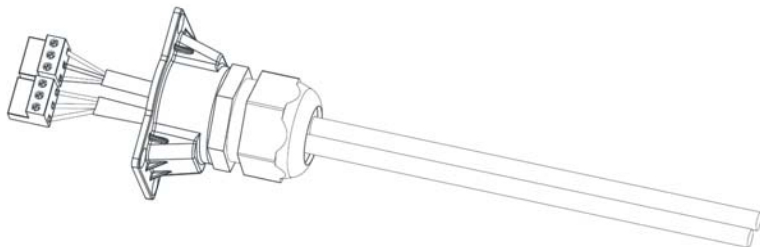
3. Make the cable through the hole of rubber stopper and the RS485 waterproof cover. The type of cable is recommended as "KVVVP22/2*1.5"



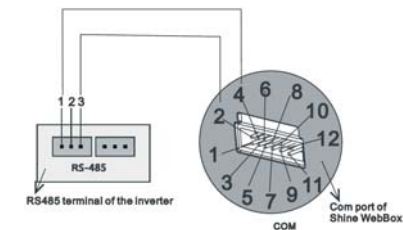
4. Take out the RS485 connection terminal



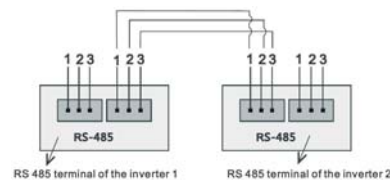
5. Connect the cable to the RS485 terminal ('1' to '1', '3' to '3', and '2' to the shielding net) → plug RS485 terminals into the inverter → tight waterproof connector → lock waterproof device onto the inverter.



As to the connection between inverter and Shine WebBox (or Shine Pano), please refer to the following figure.



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



6 Commissioning

6.1. Parameters setting

Users can use sound control function to change the display language and luminance of the display, enable auto-test function and choose utility model.

6.1.1. Language setting

Single knock to make the current display become bright →Single knock to “set language” →Double knock enter “language: English” →Single knock to select the language. After setting, you need to wait a few seconds until the display becomes dark, then the setting will be saved.

6.1.2. Set luminance of LCD display

Single knock to make the display become bright→Single knock to “set LCD contrast” →Double knock to enter “LCD contrast 2” →Single knock to select the luminance. You also need to wait a few seconds after selecting. When the display becomes dark, the change is saved.

6.1.3. Set communication address

Single knock to make the display become bright →Single knock to “COM Address: xx” →Double knock change the address to set model →Single knock to set address. After selecting, you need to wait a few seconds until the display becomes dark, then the change is saved.

6.1.4. Run auto test function

Single knock to make the display become bright →Single knock to “Enable Auto test” →Double knock to enter “Waiting to start” →Single knock to start auto test. and then waiting several minutes for the test result.

6.1.5. Set Queensland grid voltage range

Single knock to make the display become bright -> Single knock to item “Model: GTXXXXXX” -> Double knock to enter “Normal Volt range” -> Single knock to change it to “Qld Vmax 255v” -> wait until the display become dark, then the



This function is only for Ergon Energy area, Queensland, Australia.

6.2. Independent function option

6.2.1. Country selecting

When the PV panels are connected and their output voltage is greater than 100Vdc but the AC grid is not yet connected, inverter will start up automatically. If it is the first time to power on the inverter after installation, you may need to select a specific country. Otherwise, the interface will stay at the ‘Please Select’ interface all the time. There are eleven options to select, as the list below.



Information

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.

Country/Regulation Name	options
VDE0126-1-1	// 0
Germany	//1
UK_G83	//2
Italy	//3
France	//4
Denmark	//5
Belgium	//6
Spain	//7
Greece	//8
Turkey	//9
Hungary	//10



If the country you want to select is not in the above list, please directly select VDE0126-1-1.
Netherlands select VDE0126-1-1.

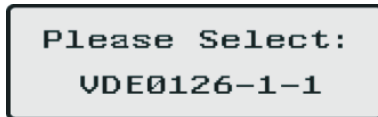


Information

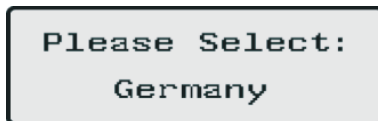
The GROWATT2500-3000 MTL series inverter can only be used for single grid-connected in the area where Italy (CEI 0-21) and Germany (VDE-AR-N4105) are requested to accord.

Please finish the country selecting according to the following steps

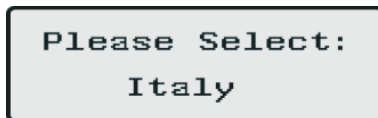
A The LCD will quickly switch to and stay at the 'Please select' interface after power on, as below:



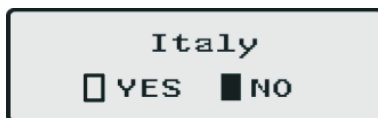
B Single knock on the LCD, countries will vary from one to another along the above list order. below acts as an example, and Germany is the second selection.



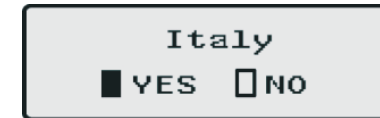
C When you need to select any of these countries, you can Double knock to enter the next interface. Here we select Italy as an example, as below:



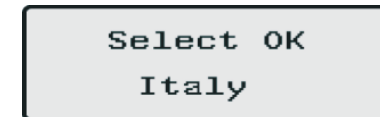
D When the country arrives at Italy, Double knock to enter the two options 'YES' and 'NO', and the cursor stays at 'NO' in default, as below:



E Single knock to select 'YES', as below:



F Double knock to confirm your selection, LCD will display 'Select OK' with the country name in the below, as below:



Information

if you still single knock at the interface as E, the cursor will go to 'NO' again as D, then if you double knock, the display will switch to the interface as C.

G When the selection is successful, the inverter will reboot automatically



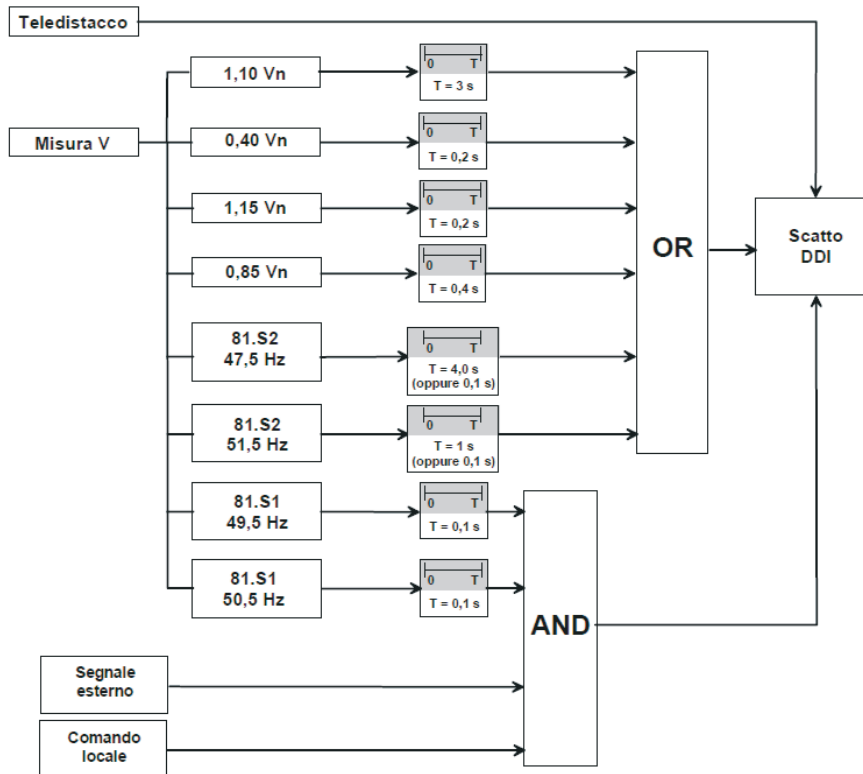
Information

If you have selected and confirmed an unwanted country neglectful, please contact Growatt for specific software to clear and reset again.

6.2.2.Auto test

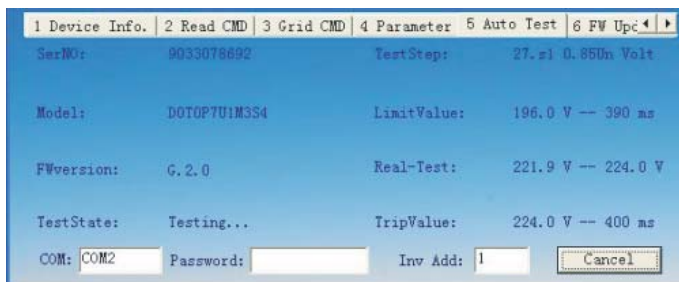
6.2.2.1.Spec of the CEI 0-21 SPI

SPI function: the integrated SPI consists of 4 voltage level protection and 2 frequency range protection. The protection logic is as follows:

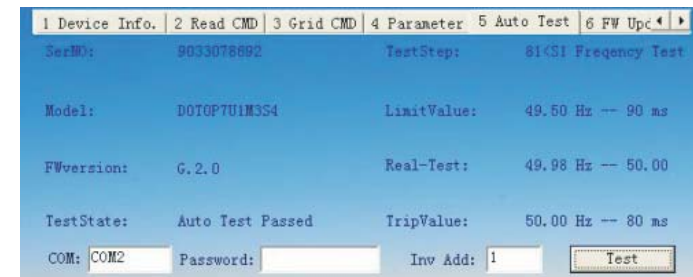


6.2.2.1. Autotest

- Connect the Inverter and the PC by RS232;
- Power on the inverter, check the inverter com address, and wait the inverter to connect to grid;
- Open the PC software ShineBus, and select page "5 Auto Test"; set the PC com port(COM) and the inverter com address(Inv Add);
- Click button "Test" to test the SPI function;



- Wait the test finish, there are 8 levels testing;



- The test result data is saved in the "Auto test report of xxxxxx .txt" under the Software install direction;

```

*****
SerialNO. : 1234567890
FW Version : G.2.0
Test Date : 31/07/2012
Start Time : 17:36:30

59.S2 1.15Un Volt
Limit Value : 263.0 V -- 180 ms
Trip Value : 229.0 V -- 180 ms
Step Result : PASS

27.s1 0.85Un Volt
Limit Value : 196.0 V -- 380 ms
Trip Value : 232.0 V -- 380 ms
Step Result : PASS

81>s2 Frequency
Limit Value : 51.50 Hz -- 60 ms
Trip Value : 49.95 Hz -- 60 ms
Step Result : PASS

81<S2 Frequency
Limit Value : 47.53 Hz -- 60 ms
Trip Value : 50.03 Hz -- 60 ms
Step Result : PASS

59.S1 1.10Un Volt
Limit Value : 252.0 V -- 2000 ms
Trip Value : 232.0 V -- 2005 ms
Step Result : PASS

27.s2 0.40Un Volt
  
```

➤ Test fail condition:

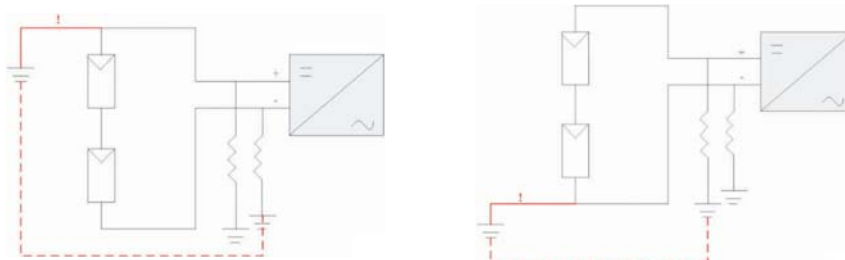
Condition	Reason	Reason
Test Stop	Communication lose or inverter occur other fault when testing	Check the communication or check the inverter state
Test fail	The trip value of the test result is not in the limit of the spec	Check the grid state, make sure the grid is stable, and retest

6.2.3. GFCI function

GFCI is short for Ground-Fault Circuit Interrupter which is used for preventing from being electric shock. The inverter is equipped with integrated RCD (Residual Current Protective Device) and RCM (Residual Current Operated Monitor). The current sensor will detect the volume of the leakage current and compare it with the pre-set value. If the leakage current is above the permitted range, the RCD will disconnect the inverter from the AC load.

6.2.4. PV isolation detection

The ISO function a protection mechanism. The inverter measures the resistances between both the positive pole and negative pole of PV panel and earth. Either of the measured value is lower than the limit, the PV inverter will not connect to grid, the output relay will stay open, and show 'PV isolation low'. The limited value is determined by the standards. The firmware setting of our PV inverters is 5Mohm. The simplified principle of the isolation resistance measurement is described as below:



6.3. LCD display

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

6.3.1. General 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: xxxxxxxxxx
 FW Version: x.x.x
 Connect in: xxS
 Connect : OK
 Power: xxxx.xW

Power on LCD display

6.3.1.1. The first line of LCD

STATUS	DISPLAY CONTENT	REMARK
Waiting	Waiting	When the input voltage is between 100V and 150V during start up, inverter will display waiting
	Standby	When the input voltage falls to 100V, inverter will display standby. The inverter will shut down when input voltage is lower than 70V).
Normal	Connect in xxS	System checking
	Reconnect in xxS	System checking
	Connect OK	Connecting to the grid
	Power: xxxx.xW	Inverter output power in normal mode.
Fault	Error: xxx	System fault
Auto Test	Auto Testing	Protecting function
Programming	Programming	Firmware update



In fault mode, there can be different error messages displayed in the LCD due to different faults. Please refer to Chapter 10 for reference. The first line of LCD display can be changed by knock on the LCD screen. The second line automatically changes in the interval of 2 or 4 seconds as above Table.

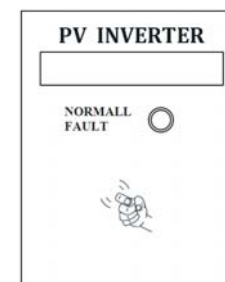
6.3.1.2. The second line of LCD

CYCLE DISPLAY	DISPLAY TIME/S	REMARK
Power : 2013.4W model: P1U1M3S3	2	Model number of the inverter
Power : 2016.8W FW Version: H.1.0	2	Firmware version of the inverter
Power : 2012.8W SerNO: DK00000000	2	Serial number, which is also shown on
Power : 2009.6W Etoday: 7.1kWh	4	Energy generated today. For accurate energy to get the FIT payment, please refer to your meter
Power : 2017.0W Eall : 90KWH	4	Total generated energy since installation. For accurate energy to get the FIT payment, please refer to your meter
Power : 2123.4W Ppv: 786 1488W	4	PV input power
Power : 2103.4W PV: 310/313 B: 370V	4	PV voltage (PV) and Bus voltage (B)
Power : 2016.2W AC: 230V F: 50.0Hz	4	Grid voltage (AC) and frequency (F)
Enable auto test Power : 2021.8W Enale Auto Test	4	Enable auto test function

Set Language	4	Set display language
Power : 2019.5W Set Language		
Set contrast	4	Set LCD contrast
Power : 2008.2W Set LCD Contrast		
Set COM Address	4	Set communication address
Power : 2019.5W COM Address: Move		

6.3.2. LCD control

To save power, the LCD display's background light will turn off automatically in 10 seconds. Single knock will turn on the background light. The display on the inverter can be controlled by knocking the sound control panel in front of it.



6.4. Independence of two MPPT

The Growatt MTL includes dual input 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 efficiencies. The two MPPT channel can track the maximum power point independently when inverter gets separate input from solar panel. Due to the topology design of the Growatt MTL. When the MPPT track the maximum power, it will change the current of PV panel, and then, the output voltage and power of PV panel will be changed at the same time. The inverter will continue to compare output power to previous power, and then control the output current of the PV panel. Two MPPT adopt separate control, so they are independent of each other.



Although the Growatt MTL can work well in independence of two MPPT, it is recommended to configure the two MPPT channels with the same PV panels and power.

6.5. Communication

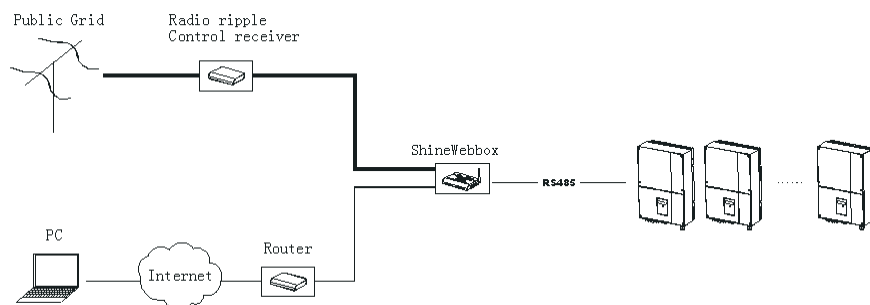
The inverter can be equipped with a RS485 communication module in order to engage in wire-linked communication with special data acquisition devices (e.g. ShineWebBox or ShinePano) or a PC with corresponding software (e.g. ShineNet). A detailed wiring diagram and installation description can be found in the communication module manual.

6.5.1. RS485 (standard)

RS485 is used for multipoint communication. ShineWebbox can monitor more than one at the same time. But the Max length of the cable should not exceed 1000m. The monitoring system layout for inverters is as follows:



We recommend the monitoring system layout for a number of inverters as follow.



The program "Shine Server" operating on the PC can provide real-time monitoring of these inverters via ShineWebBox.

6.5.2. RS232 (standard)

RS232 is used for single point communication. Use a RS232 cable to connect from inverter's RS232 port to computer's RS232 port, or to connect to a RS232-to-USB converter, then connect to computer's USB port. And then run ShineNet to monitor the inverter.

6.5.3. Bluetooth / Zigbee / WiFi (Optional)

Bluetooth wireless can be used as an optional monitoring scheme. Simply insert Bluetooth module (It is available from Growatt) to inverter's RS232 port, then run ShineNet in a computer (with a Bluetooth adapter). Zigbee wireless monitoring must be used with ShinePano or ShineWebBox. WiFi wireless monitoring must be used with ShineServer.

6.6. Commissioning the inverter

- 1.If the inverter connects with PV panel arrays and the input voltage is higher than 70Vdc, while the AC grid is not connected yet, LCD will display messages in order as below:
'Ser NO: xxx'->'xxxxx'->'FW version'->'Waiting'->'No AC connection', the display repeats 'NO Utility' and LED will be red.
- 2.Turn on the AC breaker or close the fuse between inverter and grid, the system will operate normally.
- 3.Under normal operating conditions, the LCD displays 'Power: xxx.x W' at State info, this is the power fed into grid. LED turns green.
- 4.Finish commissioning.

6.7. Monitoring tool instructions

6.7.1. 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.



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.

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

You can download the ShineNet YN2.0 from: <ftp://113.106.58.169>, the user name is ftpguest and Password is ftpguest. ShineNet may be upgraded for better function or user experience, please refer to the actual software version.



Information

6.7.2. 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.



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.



Information

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

6.7.3. 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.



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.

6.7.4. 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.



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.

7.1. Start up the Inverter

1. Connect the line circuit breaker from single phase.
2. Turn on the DC switch, and the inverter will start automatically when the input voltage is higher than 100V.

7.2. Shutdown the Inverter

1. Disconnect the line circuit breaker from single phase and prevent it from being reactivated.
2. Turn off the dc switch.
3. Check the inverter operating status.
4. Waiting until LED, display have gone out, the inverter is shut down.

8 Operation Modes

8.1. Waiting mode

When the PV voltage is higher than 100V, Inverter will be powered up, and enters "waiting" mode.
In this mode, inverter will check the system parameters. If the system is normal, and PV voltage is higher than 150Vdc, the inverter will attempt to connect to grid.

8.2. Normal mode

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

- Whenever the DC voltage is higher than 150Vdc, inverter converts power to grid as generated by the PV panels;
- Whenever the DC voltage is lower than 100Vdc, the inverter will work in standby 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 status;



Information

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

8.3. 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.



Information

Detailed fault information refers to chapter 10 Troubleshooting.

8.4. 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.



Information

If the PV string DC voltage is too low (≤ 70 Vdc) or DC switch open, the inverter will also turn to shutdown Mode

9.1. Checking heat dissipation

If the inverter regularly reduces its output power due to high temperature, please improve the heat dissipation condition. Maybe you need to clean the heat sink.

9.2. Checking the DC switch

Checking externally visible damage and discoloration of the DC switch. If there is any visible damage to the DC Disconnect, or visible discoloration, contact the installer.

Once a year, turn the rotary switch from the On position to the Off position 5 times in succession. This cleans the contacts of the rotary switch and prolongs the electrical endurance of the DC Disconnect



9.3. Cleaning the Inverter

If the inverter is dirty, clean the enclosure lid, the display, and the LEDs using only clean water and a cloth. Do not use any cleaning agents (e.g. solvents or abrasives).

Sometimes, the PV inverter does not work normally, we recommend the following solutions for common troubleshooting. The following table can help the technician to understand the problem and take action.

10.1 Warnings(W)

Warnings(W) identify the current status of the Growatt MTL. Warnings do not relate to a fault. When a (W) with a number after it appears in the display, it indicates a Warning Code and is usually cleared through an orderly shutdown/re-set or a self corrective action performed by the inverter. See the (W) codes in the following table.

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.
AC F Outrange	Utility grid frequency out of permissible range.	1.Check grid frequency. 2.If the error message is displayed despite the grid frequency being within the tolerable range, contact Growatt.
Over Temperature	Temperature outrange	1.check the inverter operation state 2.If the error message is displayed still, please 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.If the error message is displayed despite the above checking passed, contact Growatt.
Output High DCI	Output current DC offset too high	1.Restart inverter. 2.If error message still exists, contact Growatt.

Residual I High	Leakage current 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 switch immediately.
Auto Test Failed	Auto test didn't passed.	Restart inverter



Information

If the suggestions do not work, please connect to the Growatt.

Error: 119	GFCI Device Damage	Contact Growatt.
Error: 120	HCT fault	Contact Growatt.
Error: 121	Communication fault. Master processor can't receive data from Slave processor.	1.Restart the inverter 2.If error message still exists, contact Growatt..
Error: 122	Bus voltage fault	Contact Growatt.

10.2 Errors(E)

Errors(E) codes identify a possible equipment failure, fault or incorrect inverter setting or configuration. Any and all attempts to correct or clear a fault must be performed by qualified personnel. Typically, the (E) code can be cleared once the cause or fault is removed. Some of the (E) codes, Error as indicated in the table below, may indicate a fatal error and require you to contact the supplier or the Growatt to replace a new one.

Error code	Description	Suggestion
Error: 101	Communication fault Slave processor can't receive data from Master processor.	1.Restart inverter 2.If error message still exists, contact Growatt.
Error: 102	Consistent fault. Data received by Master and Slave processor are different. The reason can be utility grid voltage or frequency change frequently. .	1.Restart inverter. 2.If error message appears frequently or error message still exists after replacement, check utility grid. If you require help, contact Growatt. 3.If error message still exists, contact Growatt.
Error: 116	EEPROM fault	Contact Growatt.
Error: 117	Relay fault	Contact Growatt.
Error: 118	Init model fault	Contact Growatt.

11.1. 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.

11.2. 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.

11.3. Storing the Inverter

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

11.4. Disposing of the Inverter



Do not dispose of faulty inverters or accessories together with household waste. Please 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

12.1. Specification

Table1.GROWATT2500-3000 MTL series

Model	Growatt 2500MTL	Growatt 3000MTL
Specifications		
Input data(DC)		
Max. DC power	2700W	3200W
Max. DC voltage	500V	500V
Start voltage	150V	150V
PV voltage range	100V-500V	100V-500V
MPP work voltage range/ nominal voltage	120V-500V/360V	120V-500V/360V
Full load dc voltage range	190V-450V	190V-450V
Max. input current of tracker A/ tracker B	10A/10A	10A/10A
Max. input current per string of tracker A/tracker B	10A/10A	10A/10A
Number of independent MPP trackers / strings per MPP tracker	2/1	2/1

Output (AC)		
Rated AC output power	2500W	3000W
Max. AC power	2500W	3000W
Max. output current	12.5A	15A
AC nominal voltage; range	220V/230V/240V; 180Vac-280Vac	220V/230V/240V; 180Vac-280Vac
AC grid frequency; range	50,60Hz;±5 Hz	50,60Hz;±5 Hz
Power factor	1	1
THDI	<3%	<3%
AC connection	Single phase	Single phase
Efficiency		
Max. efficiency	97.5%	97.5%
Euro weighted efficiency	97%	97%
MPPT efficiency	99. 5%	99. 5%
Protection devices		
DC reverse polarity protection	yes	yes
DC switch rating for each MPPT	yes	yes
Output over current protection	yes	yes
Output over voltage 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	360/421/152	360/421/152
Weight	15.6KG	15.6KG
Operating temperature range	- 30°C ... +60°C (-22...+140°F) with derating above 45°C /113°F	- 30°C ... +60°C (-22...+140°F) with derating above 45°C /113°F
Noise emission (typical)	≤ 25 dB(A)	≤ 25 dB(A)
Altitude	2000m(6560ft) without derating	
Self-Consumption night	< 0.5 W	< 0.5 W
Topology	transformerless	transformerless
Cooling concept	Natural	Natural
Environmental Protection Rating	Ip65	Ip65
Relative humidity	95%	95%
Features		
DC connection	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal
Display	LCD	LCD
Interfaces:RS485/RS232 /Bluetooth /RF/Zigbee/Wifi	yes/yes/opt/opt/opt/opt	yes/yes/opt/opt/opt/opt
Warranty: 5 years / 10 years	yes /opt	yes /opt

Table2. GROWATT3600-5000 MTL series

Model	Growatt 3600MTL	Growatt 4200MTL	Growatt 4600MTL	Growatt 5000MTL
Specifications				
Input data(DC)				
Max. DC power	3800W	4400W	4800W	5200W
Max. DC voltage	600V	600V	600V	600V
Start voltage	150V	150V	150V	150V
PV voltage range	100V-600V	100V-600V	100V-600V	100V-600V
MPP work voltage range/ nominal voltage	120V-600V/360V	120V-600V/360V	120V-600V/360V	120V-600V/360V
Full load dc voltage range	190V-580V	175V-580V	175V-580V	175V-580V
Max. input current of tracker A/ tracker B	10A/10A	15A/15A	15A/15A	15A/15A
Max. input current per string of tracker A/tracker B	10A/10A	15A/15A	15A/15A	15A/15A
Number of independent MPP trackers / strings per MPP tracker	2/2	2/2	2/2	2/2

Output (AC)				
Rated AC output power	3600W	4200W	4600W	5000W
Max. AC power	3600W	4200W	4600W	5000W
Max. output current	18A	21A	23A	25A
AC nominal voltage; range	220V/230V/240V; 180Vac-280Vac	220V/230V/240V; 180Vac-280Vac	220V/230V/240V; 180Vac-280Vac	220V/230V/240V; 180Vac-280Vac
AC grid frequency; range	50,60Hz;±5 Hz	50,60Hz;±5 Hz	50,60Hz;±5 Hz	50,60Hz;±5 Hz
Power factor	1	1	1	1
THDI	<3%	<3%	<3%	<3%
AC connection	Single phase	Single phase	Single phase	Single phase
Efficiency				
Max. efficiency	97. 6%	97.9%	97.9%	97.9%
Euro weighted efficiency	97%	97. 4%	97. 4%	97. 4%
MPPT efficiency	99. 5%	99. 5%	99. 5%	99. 5%
Protection devices				
DC reverse polarity protection	yes	yes	yes	yes
DC switch rating for each MPPT	yes	yes	yes	yes
Output over current protection	yes	yes	yes	yes
Output over voltage protection-varistor	yes	yes	yes	yes
Ground fault monitoring	yes	yes	yes	yes
Grid monitoring	yes	yes	yes	yes
Integrated all - pole sensitive leakage current monitoring unit	yes	yes	yes	yes

General Data

Dimensions (W / H / D) in mm	360/510/188	360/510/188	360/510/188	360/510/188
Weight	24KG	24KG	24KG	24KG
Operating temperature range	- 25°C ... +60°C (-13...+140°F) with derating above 50°C /122°F	- 25°C ... +60°C (-13...+140°F) with derating above 50°C /122°F	- 25°C ... +60°C (-13...+140°F) with derating above 50°C /122°F	- 25°C ... +60°C (-13...+140°F) with derating above 50°C /122°F
Noise emission (typical)	≤ 25 dB(A)	≤ 25 dB(A)	≤ 25 dB(A)	≤ 25 dB(A)
Altitude	2000m(6560ft) without derating			
Self-Consumption night	< 0.5 W	< 0.5 W	< 0.5 W	< 0.5 W
Topology	transformerless	transformerless	transformerless	transformerless
Cooling concept	Natural	Natural	Natural	Natural
Environmental Protection Rating	Ip65	Ip65	Ip65	Ip65
Relative humidity	95%	95%	95%	95%

Features

DC connection	H4/MC4(opt)	H4/MC4(opt)	H4/MC4(opt)	H4/MC4(opt)
AC connection	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Display	LCD	LCD	LCD	LCD
Interfaces:RS485/RS232/Bluetooth / RF/Zigbee/Wifi	yes/yes/opt/opt/opt/opt	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	yes /opt

12.2. DC connector info

DC connection H4/MC4(opt)

12.3. Trip volatge &Trip frequency

Country	Undervoltage	Overvoltage	Underfrequency	Overfrequency
Australia	207V	263V	46.0Hz	54.0Hz
Spain	196V	252V	48.0Hz	50.5Hz
Greece	184V	264V	47.5Hz	51.0Hz
Germany	184V	252V	47.53Hz	51.47Hz
UK	201V	251V	47.5Hz	51.5Hz
Ireland	210V	250V	47.1Hz	50.45Hz
China	196V	252V	48.0Hz	50.5Hz
Denmark	207V	252V	47.5Hz	52.0Hz
Hungary	195V	253V	49.0Hz	51.0Hz
Italy	184V	275V	49.0Hz	51Hz
Belgium	195V	253V	47.5Hz	50.5Hz

12.4. Torque

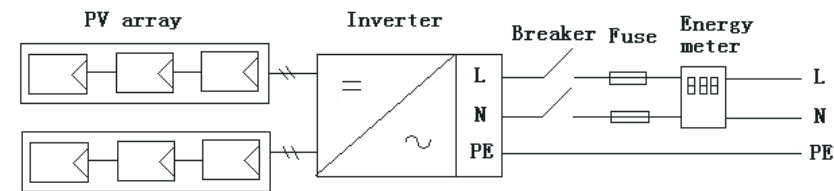
Enclosure lid screws	7kg.cm
Shell and RS232 screws	7kg.cm
AC terminal	6kg.cm
M6 soket head cap screws for securing the enclosure at the bracket	20kg.cm
Additional ground screws	20kg.cm

12.5. Accessories

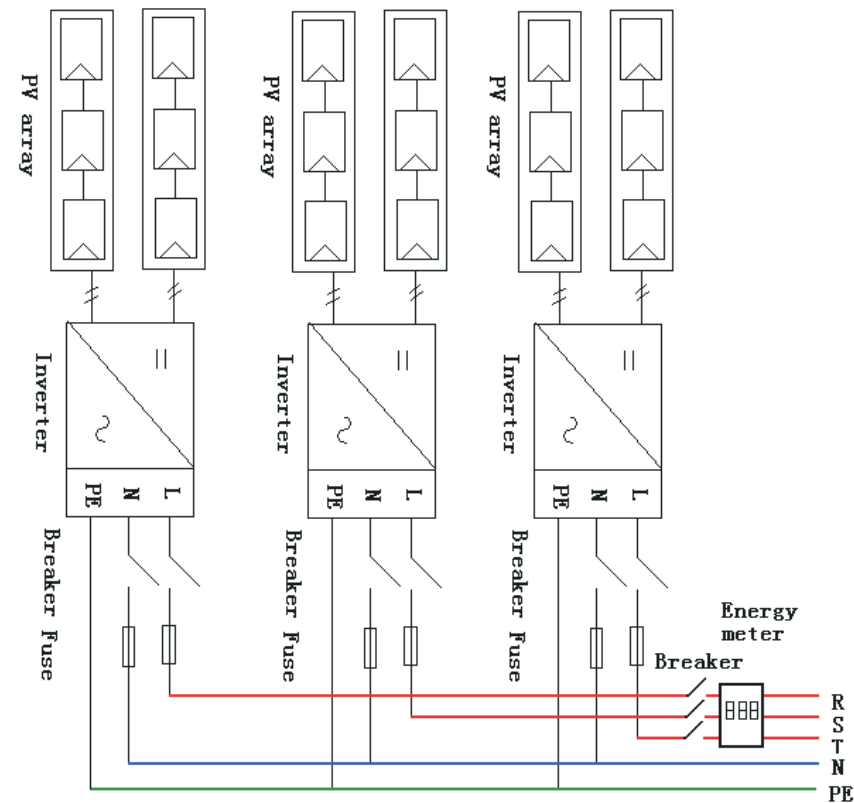
In the following table you will find the optional accessories for your product. If required, you can order these from SHENZHEN GROWATT NEW ENERGY TECHNOLOGY CO.,LTD or your dealer.

Name	Brief description
Bluetooth	
WIFI	
ZIGBEE	

13.1. Single inverter



13.2. Multi inverters



14 Compliance Certificates

14.1. List

GROWATT2500-3000 MTL series

Certificates IEC-62109、CE、VDE0126-1-1、VDE-AR-N4105、AS4777、AS/NZS 3100、G83

GROWATT3600-5000 MTL series

Certificates IEC-62109、CE、VDE0126-1-1、CGC、DK5940、G59、G83、RD1663、RD1699、EN50438、ENEL-Guide、AS4777、AS/NZS 3100

15.2. Download address

www.ginverter.com/Download.aspx

Contact 15

If you have technical problems about our products, contact the GROWATT Serviceline. We need the following information in order to provide you with the necessary assistance:

- Inverter type
- Serial number of the inverter
- Event number or display message of the inverter
- Type and number of PV modules connected
- Optional equipment

Shenzhen Growatt New Energy Technology CO.,LTD

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