



GTW1500HF Grid Inverter

Operation Manual



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- Operation of the product without considering the relevant safety regulations
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Date and Revision

Version	Issue Date	Author	Approval	Comment
1.0				

Explanation of Symbols used in this Document




	Warning !
	This symbol indicates information that is essential for a trouble-free and safe operation of the product. Please read these sections carefully in order to avoid any damages of the equipment and for optimal personal protection.
	Note !
	This symbol indicates information that is required for the optimal operation of the product. Read these sections carefully in order to ensure an optimal operation of the product and all its features.
	Read the manual
	Read the manual

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1. Foreword

Dear Customer,

CONGRATULATIONS! Thank you for purchasing the Pro Vista GTW1500HF, which is the new generation of Solar Inverter from Pro Vista Technology Limited. They have been designed with the latest electronic technology available in the market so they can provide the best solution to harvest the maximum power from the solar array with high efficiency towards the grid. High Frequency Transformer Technology offers maximum output in minimum space and light weight.

The GTW1500 HF is equipped with the ProVista grid guard. This is a type of independent disconnection device. It ensures that the GTW1500 HF complies with the IEC/AS regulations for the connection and parallel operation of electrical units to the low-voltage grid of the electricity supply company and with IEC which is a part of these regulations.

This installation manual is intended solely for qualified electricians. Its aim is to help install and set up GTW1500 HF inverters quickly and correctly.

For detailed information on troubleshooting and on how to use the GTW1500 HF, including information about the different communication options, please see the operating instructions.

2. Safety information



Please read this manual carefully before starting installation.

2.1 Safety instructions









	Warning !
	<ul style="list-style-type: none">• The installation of the GTW1500 HF may only be done by qualified technicians.• The installer must be approved by the utility company.• Please read the installation guide carefully before you begin with the installation.

	Warning !
	Work on the GTW1500 HF with the lid removed must be carried out by a qualified electrician. Hazardous and even lethal voltages can be encountered within the enclosure. Before working on the GTW1500 HF with the lid removed, the AC and DC voltages MUST be disconnected from the GTW1500 and it must be sure that all capacitors are discharged.

	Warning !
	After isolating the AC and DC voltage you must wait approx. 30 minutes for the capacitors in the GTW500 HF to discharge. Only then is it safe to open the unit by removing the lid. You must also make sure that no voltage is present in the device.

	Warning !
	<ul style="list-style-type: none">• Make sure that the DCinput voltage never exceeding 450V .<ul style="list-style-type: none">• Higher input voltages will damage the inverter

2.2 Symbols on the Type Label

	<p>Beware of dangerous electrical voltage. The inverter operates at high voltages. All work on the inverter may only be carried out by an electrically skilled person. Energy storage timed discharge 1 minute.</p>
	<p>Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation.</p>
	<p>Caution, risk of danger</p>
	<p>Observe all documentation that accompanies the inverter</p>
	<p>The inverter must not be disposed of together with household waste.</p>
<p>IP65</p>	<p>Degree of protection IP65</p>
<p>CE</p>	<p>CE mark. The inverter complies with the requirements of the applicable CE</p>
	<p>The inverter has transformer</p>
	<p>Alternating current (AC)</p>
	<p>Direct Current (DC)</p>

3. The Introduction

The Provista GTW1500 PV inverter is PV grid-connected inverter in PV system. It allows photovoltaic solar energy from solar modules to be converted and fed to the utility grid.

3.1 The application in PV system

The grid-connected PV system consists of PV arrays, photovoltaic combiner box, photovoltaic grid-connected inverter, metering devices and utility grid (see figure 3-1)

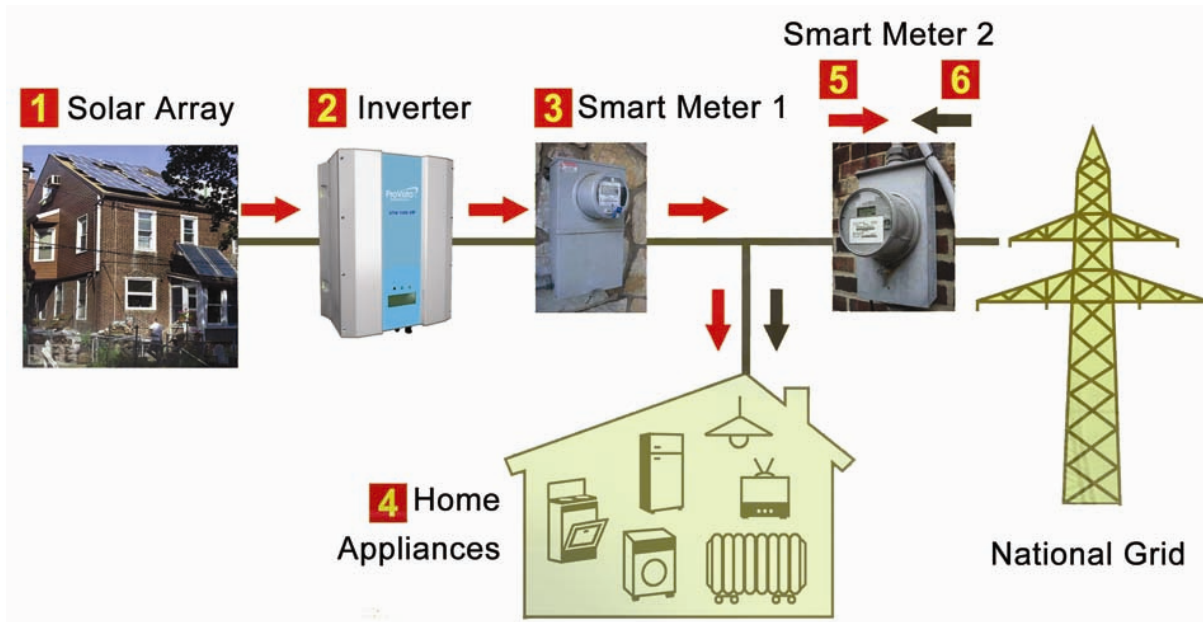





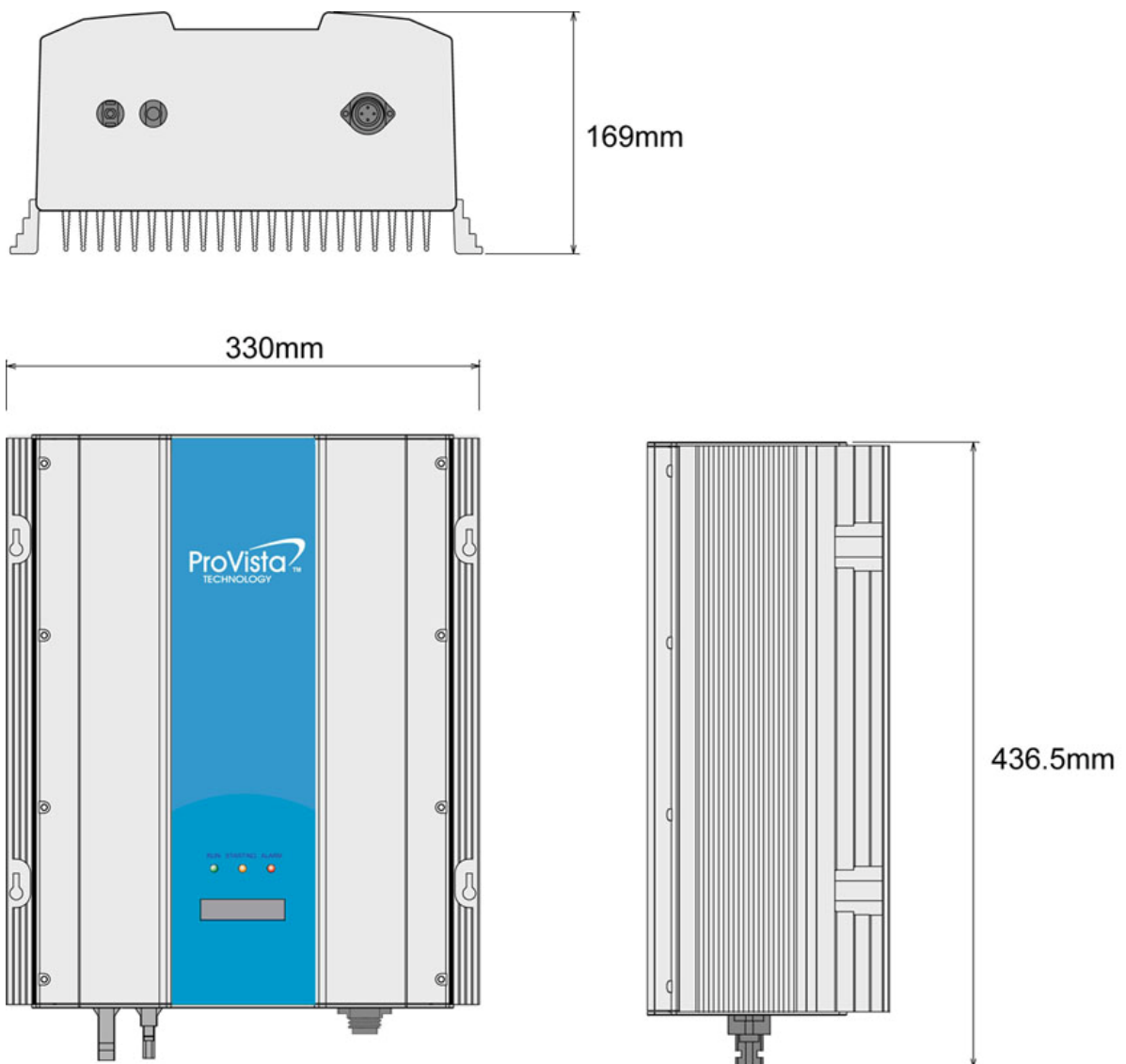
Figure 3-1 PV Grid-connected system

	Note !
	Need permission from the local power department to allow connected grid and invited the professional electrician to install it.
	Warning !
	Make sure the individual PV modules are with the same specification in the PV array.
	Warning !
	Make sure the PV array to be negative grounding.

3.2 The Features

- Using high frequency technique and advanced IGB,the system efficiency is enhanced.
- High conversion efficiency
- Advanced technology for maximum power point tracking(MPPT)
- >99% MPPT efficiency
- Wide input voltage range
- Efficient design of high-frequency isolation transformer
- High efficiency at wide power range
- Advanced anti-islanding technology
- High reliability due to complete protection function
- Easy operation,installation and maintenance

3.3 Dimensions of the GTW1500 HF

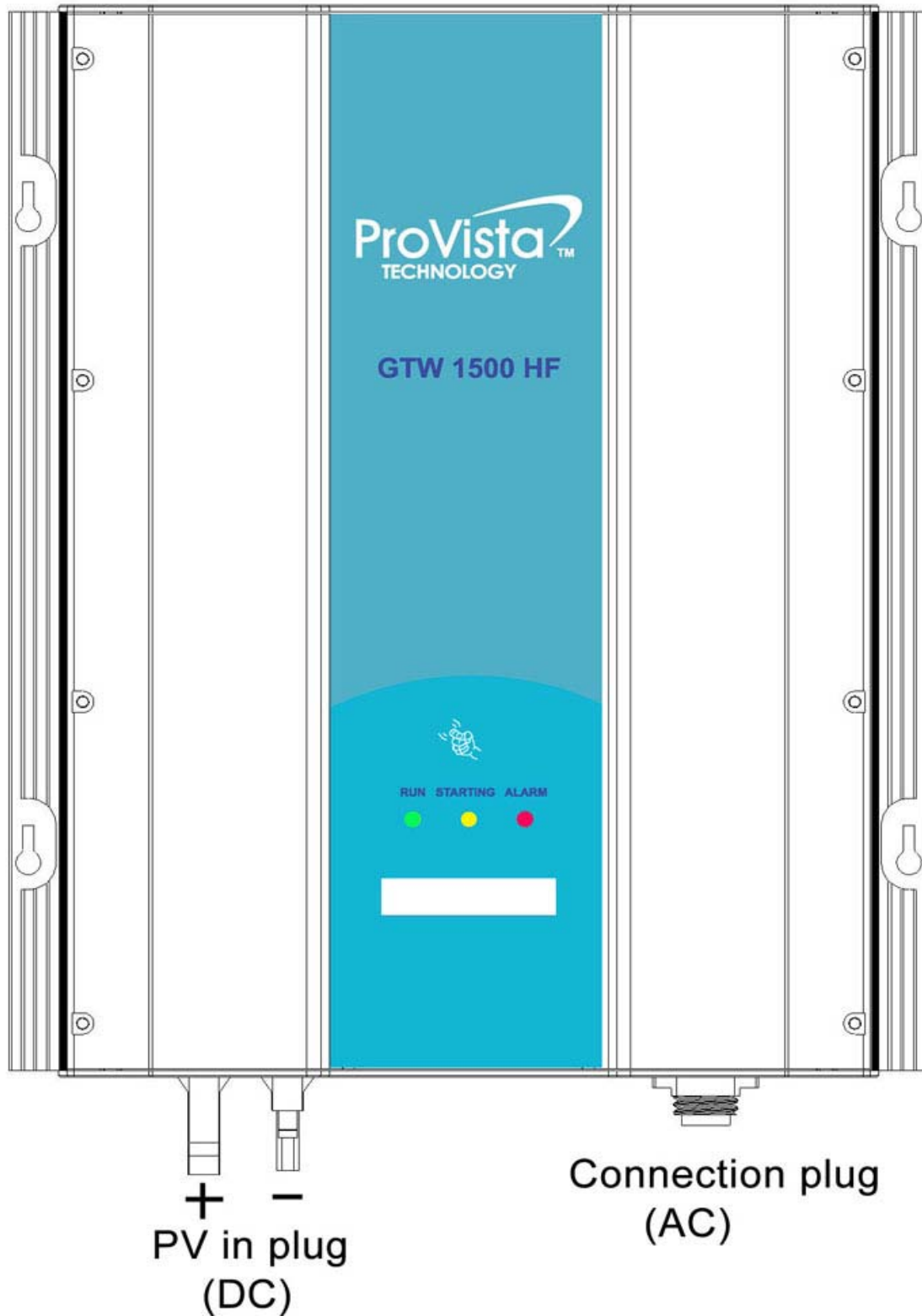


4. Operation

The grid feed process begins in the morning if sufficient insolation is available, and, therefore, if a certain minimum voltage is present in the inverter.

If, as nightfall approaches, the voltage drops below the minimum voltage value, grid feed mode ends and the inverter switches off.

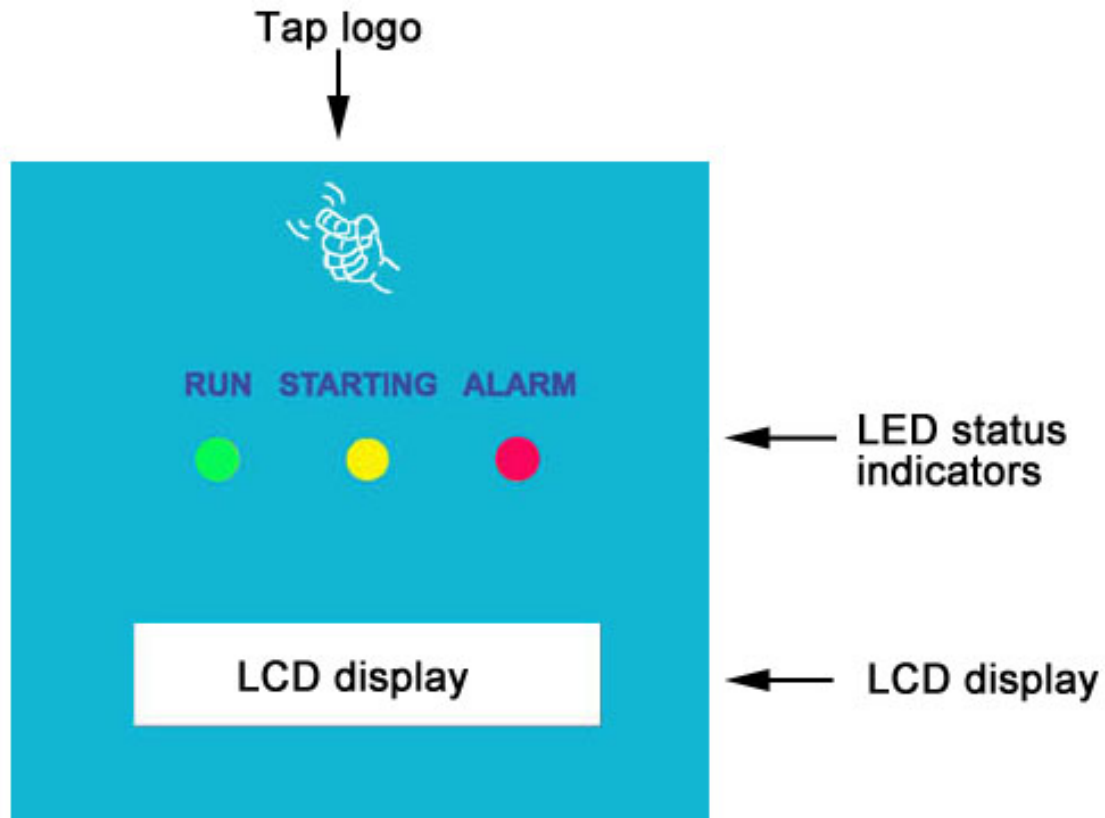
4.1 Overview



4.2 Control panel

4.2.1 Display

The control panel is composed of the LCD display and 3 LED lights. The system can be easily monitored.



4.2.2 LED indicators

Provista inverter with high intelligence, start and stop working each day automatically without human control. There are 3 LED lights in the Control panel. We can know the working state of inverter from these lights. The states of each LED light signals are in the following table.

LED Color	Status
Green	“RUN” means normal operation
Yellow	“STARTING” means start operation
Red	“ALARM” means over-voltage, or under-voltage, or over-current, or islanding

4.2.3 LCD backlight control:

When supply power, the LCD backlight lights. When initialization is completed, and the inverter worked normally about 8 seconds, the backlight will go out. Then knock the panel, backlight lights. If there is no knock signal for 8 seconds, the backlight will go out.

4.3.3 Fault-screen display interface

When a fault occurs, whatever the current LCD display is, it will pop-up fault screen tips until the fault disappears, such as fault indicator lights, LCD screen displays as the following 7 display interface (Menu 9 to Menu 15). it also shows another, if the progress is updated

Menu 9:(RED LED display)

PV Array Voltage Out of range

Menu 10:(RED LED display)

DC Component Out of range

Menu 11:(RED LED display)

Grid Frequency Out of range

Menu 12:(RED LED display)

Output Current Out of range

Menu 13:(RED LED display)

---NOTICE--- <Islanding>

Menu 14:(RED LED display)

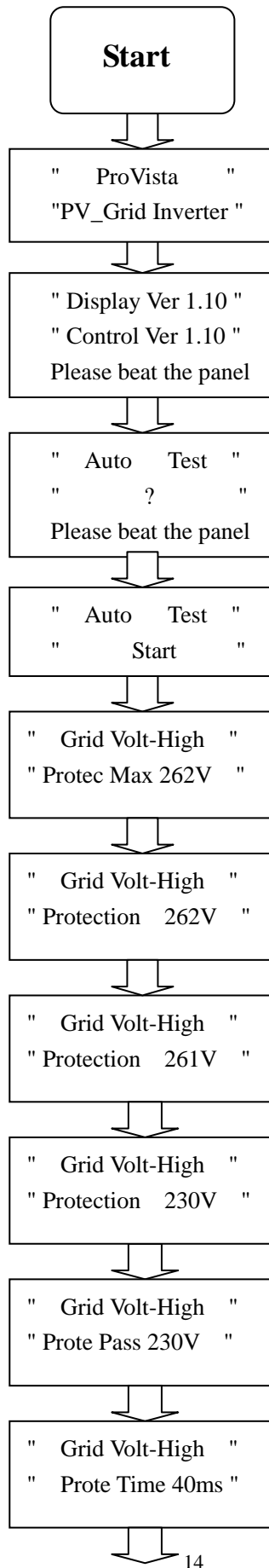
Temperature Out of range

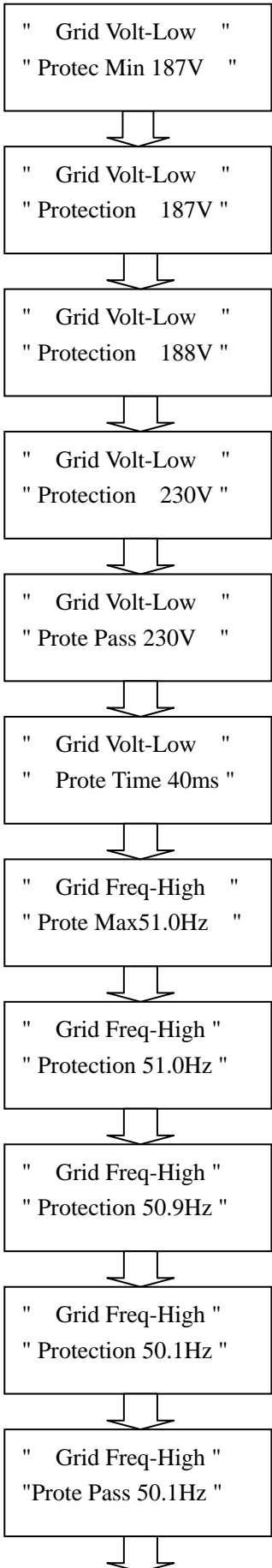
Menu 15:(RED LED display)

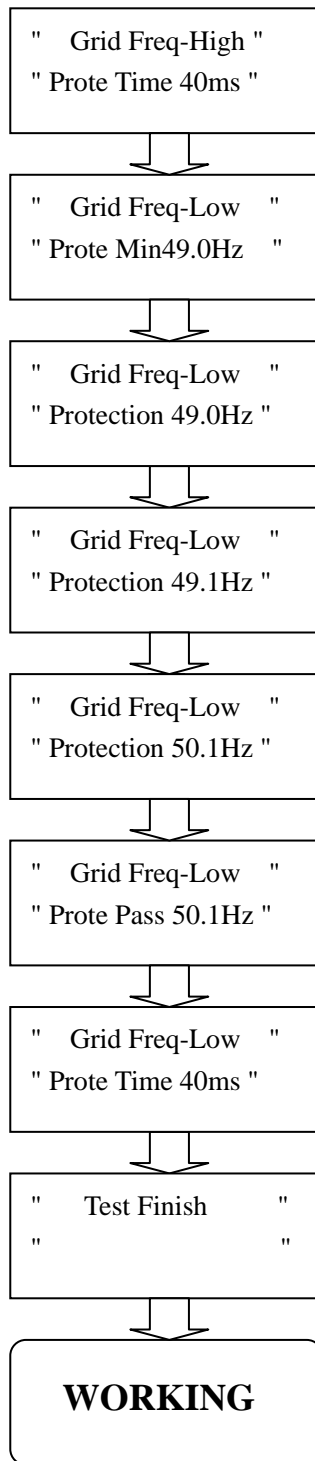
---NOTICE--- <NO POWER>

4.3.4 Auto test display interface

When entering the auto test mode, display interface:







5. Installation

Please read the installation instruction carefully before installation. Pay attention to the safety of the fitting instruction.

5.1 Installation requirements

Please check that all of the conditions listed below are met before installing and setting up the GTW1500 HF

5.1.1 Ambient conditions

The ambient temperature must be within $-25\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$.

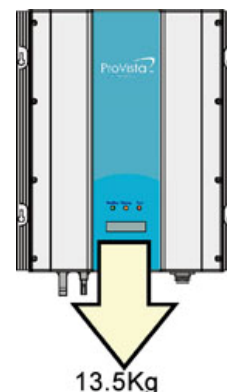
The GTW1500 HF weighs 13.5 kg. Please take this weight into account when choosing the installation site and method of fastening the wall mounting bracket.


In domestic installations, the unit should not be mounted on plasterboard walls or similar as otherwise audible vibrations are likely to result.


The GTW1500 HF should be installed in a place where it is not exposed to direct sunlight. An increased ambient temperature can reduce the yield of the PV system.


Provide better ventilation for GTW1500 HF to ensure that heat is dissipated adequately.

According to EMC and noise level, the installation location is as far as possible away from the living area.



	Warning !
	Unintentionally pulling out the DC plug connectors under load can damage the plug and result in a serious injury! Install the GTW1500 HF in such a way that it is not possible (e.g. for children) to unplug the DC plug connector accidentally.

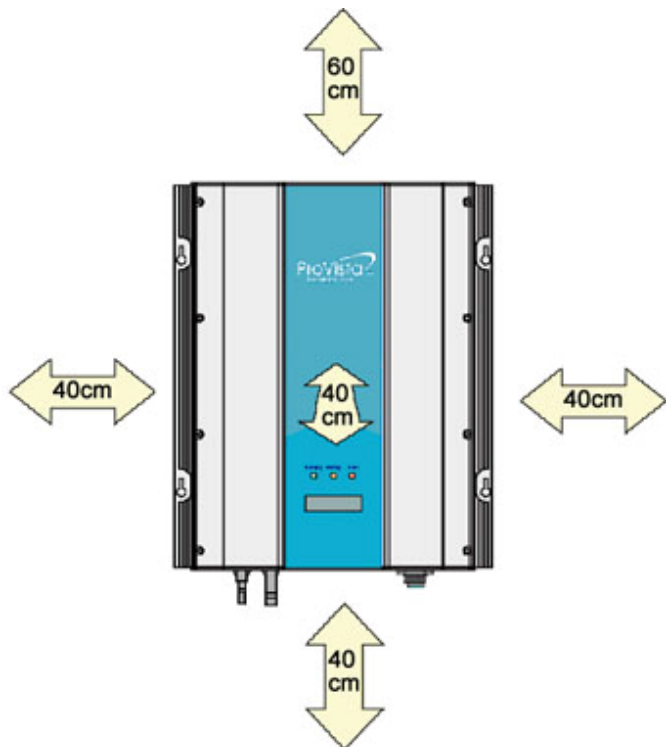
	Warning !
	Individual components in the GTW1500 HF can reach a temperature of more than $50\text{ }^{\circ}\text{C}$

	Warning !
	Do not install the GTW1500 HF on flammable construction materials, in areas where highly flammable materials are stored or in potentially explosive environments!

When choosing the installation site, ensure there is enough space for heat to dissipate. Under normal conditions, the following guidelines should be applied for the space to be kept clear around the GTW1500 HF:

Minimum clearance

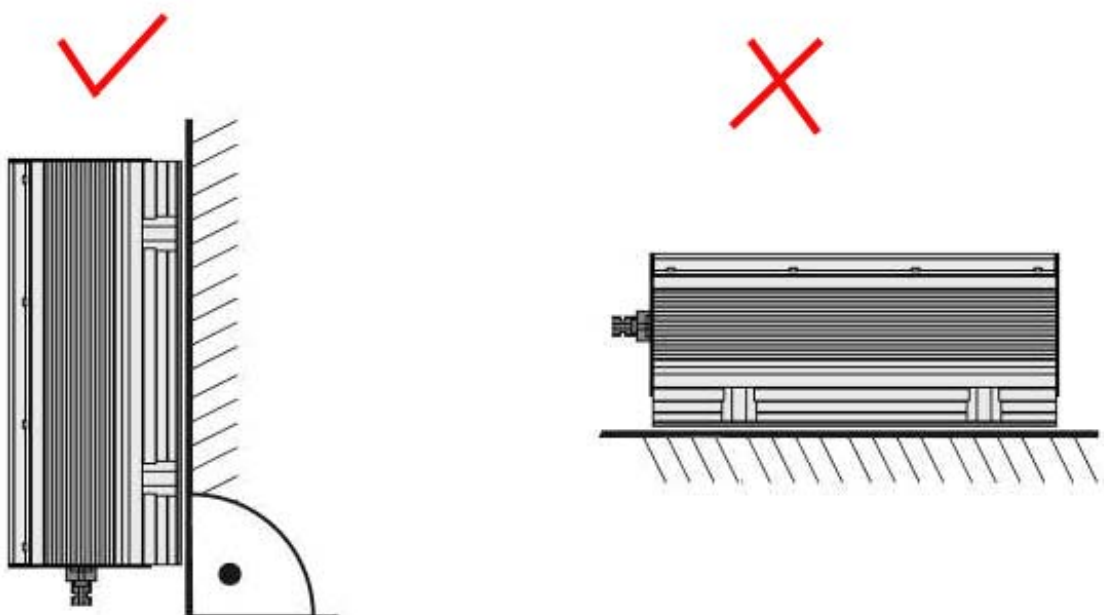
Direction	Minimum clearance
above	60cm
below	40cm
sides	40cm
In front	40cm



5.2 Position

The GTW1500 HF is designed to be mounted on a vertical wall. For an optimum energy yield and the most convenient operation, vertical installation at eye-level is preferable. In case it is absolutely necessary to tilt the GTW1500 HF to the back the maximum angle is 10 °. If installing the unit outdoors, make sure that it is not slanted forwards.

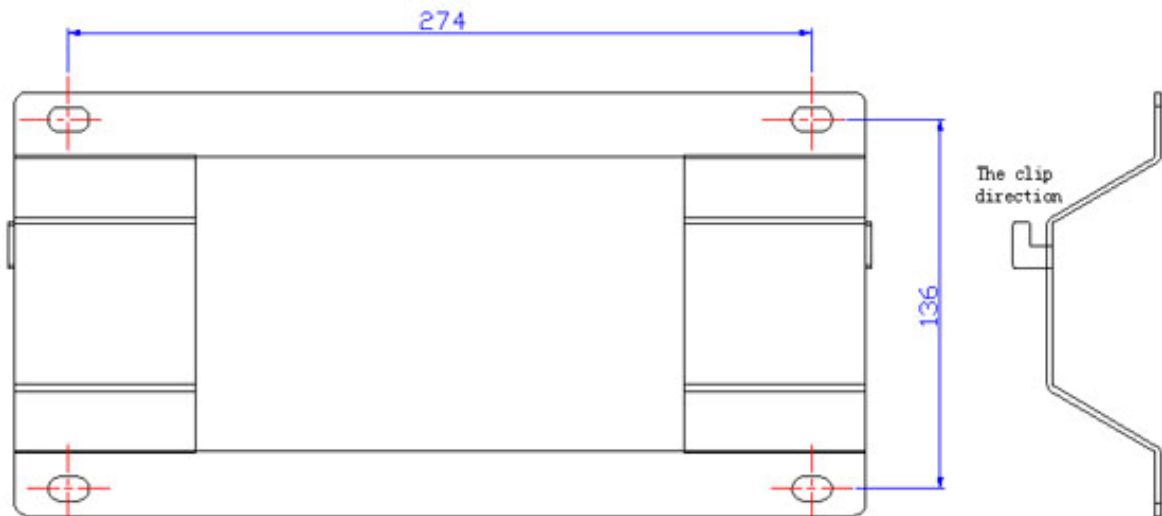
It is not recommended to install the GTW1500 HF lying on the back side with the lid facing upwards.



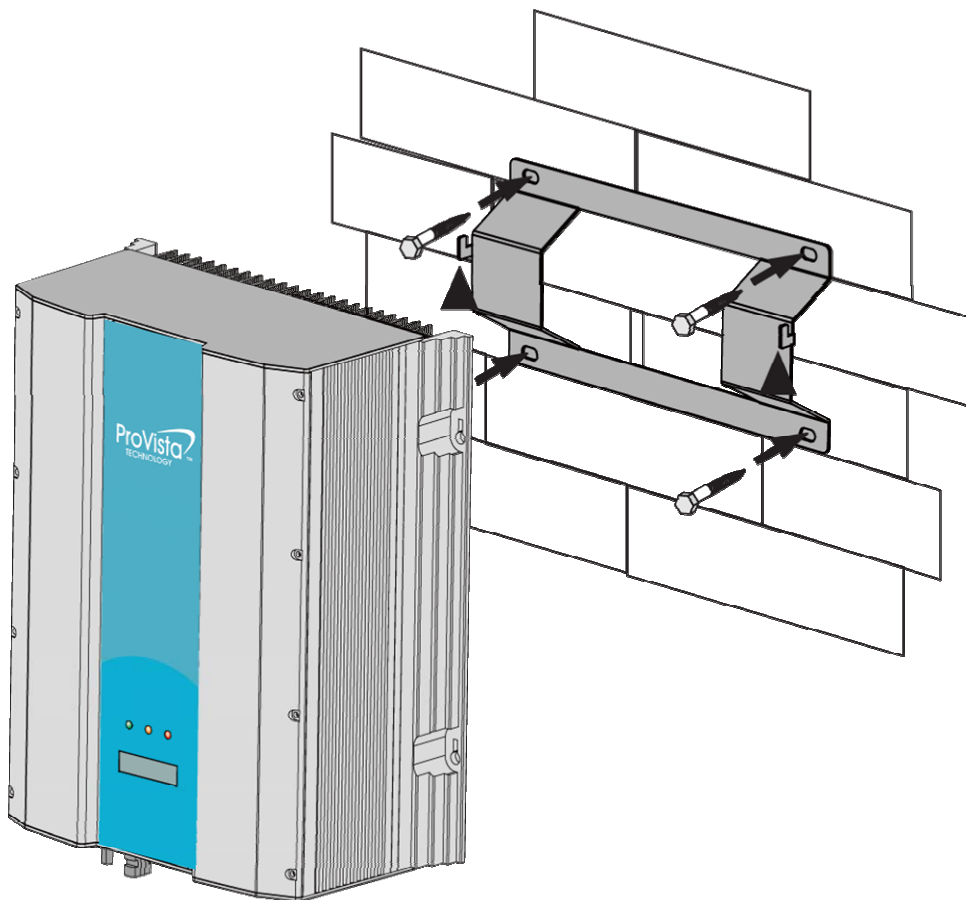
5.3 Installation

1. Drill four holes for the screws at the selected installation position. The space between every every holes is shown as below photo.

Keep drilling vertical to the wall, and don't shake the drill to avoid holes tilting.



2. Please fix the wall bracket on the wall with the explosion screws. Mount the GTW1500-HF on the wall bracket.



6. Electrical connection


This chapter describes electrical connection between the GTW1500 inverter, solar arrays and the power grid. Before the connection, please carefully read the following steps.

6.1 Wire specifications

Before installation, please reference the wires recommended sizes as below table.

Wire	Requirements(AWG)
PV DC+ wire	12AWG
PV DC- wire	12AWG
GND wire	12AWG
Grid L wire	12AWG
Grid N wire	12AWG

6.2 AC connection steps

	Warning !
	Before you connect the mains cable to the AC connection socket, make sure that no voltage is present at the cable.

1. AC output socket as below.



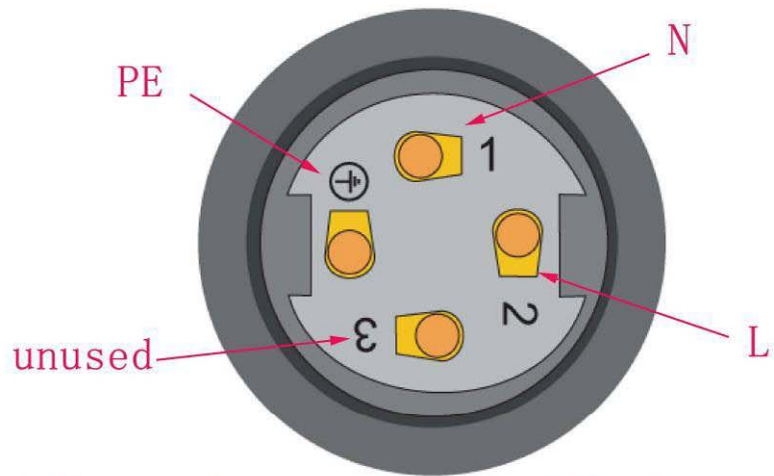
2. AC socket parts included as below



3. Proceed the AC output cable with a diameter between $\varnothing 7\text{mm}$ and $\varnothing 12\text{mm}$ as below photo showing.



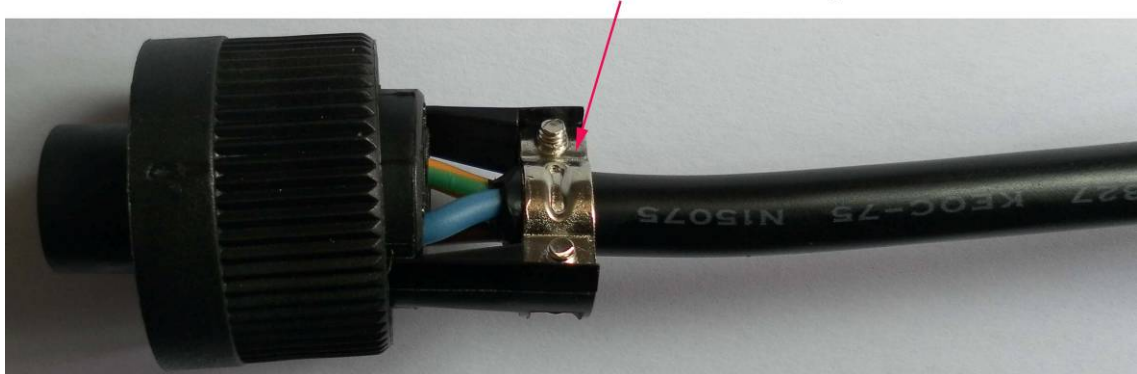
4. Connect the individual conductors into the socket's terminals with correct polarity and position as below photo showing, and make sure the wires are securely connected.



1. Neutral conductor N (blue) to screw terminal 1.
2. Live L (brown or black) to screw terminal 2
3. Terminal 3 remains unused
4. Protective earth PE (green/yellow) to the screw terminal with the earth sign.

5. Fix the AC cable.

Fix the cable with the clip




6. Screw the threaded sleeve into the socket element and tighten it.



7. Finally, screw the pressure screw, washer and sealing ring into the threaded sleeve, and tighten them. Then the AC output socket is fully assembled.



6.3 PV connection steps

	Warning !
	Make sure the PV array to be negative grounding.

The PV generator strings are connected directly to the terminal in the connection box. Connect the PV generator and inverter using connectors as below photo. The positive and negative terminals on the PV module are corresponding to positive(+) terminals and negative(-) terminals on the inverter.



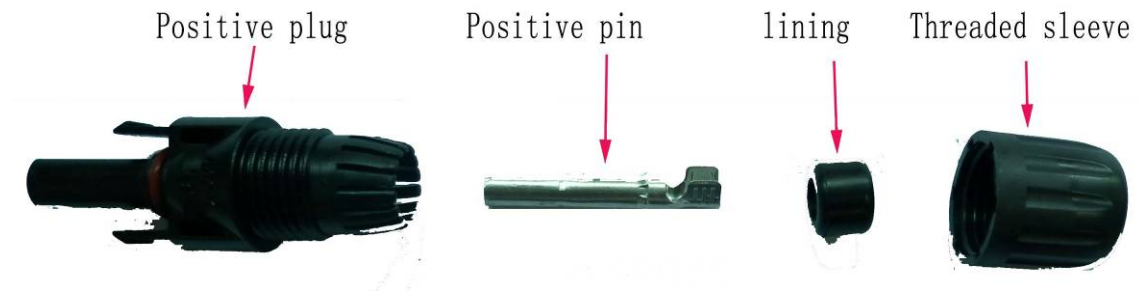


Warning !

Before you connect the PV input connection socket, make sure that no voltage is present at the cable.

Connection procedure

1. Parts of the positive plug



2. Proceed the cable as below photo showing.



3. Connect the positive pin and rivet line together as below photo showing.



4. Insert the lining into the positive plug smoothly.



5. Screw the threaded sleeve.No need too tight, not falling off is ok.



6. As the below photo showing, insert the cable with riveting pin(pic2) into the main unit, it is appropriate when you hear the sound, after inserting, please have a anti-pull to double check if matched firmly.



7. As the below photo showing, tighten the threaded sleeve with a tool, the gap at around 1.2mm is the best.)



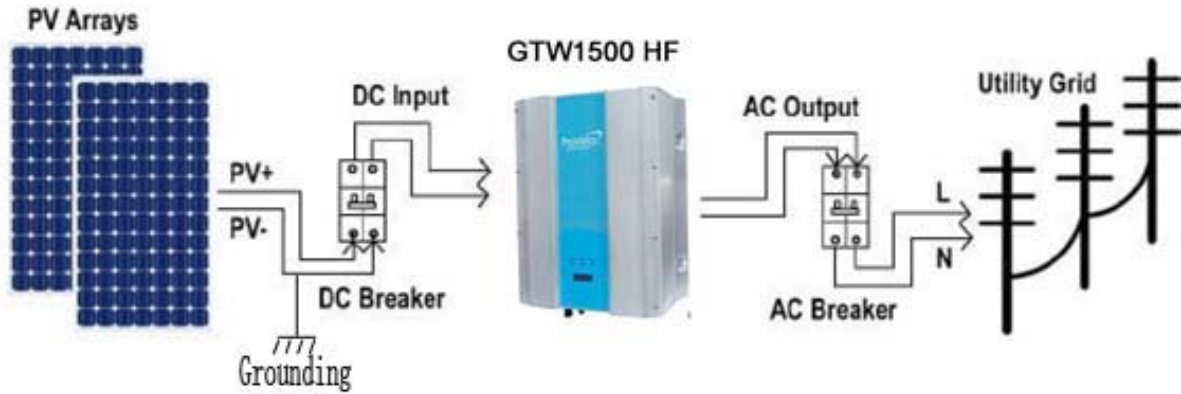
8. The assembly plug is as the below photo showing.



9. The assembly of the negative plug is with the same steps as the positive plug above.

6.4 Electrical connection steps

As below photo shows the electrical connection diagram. user must add a DC circuit breaker at the input side of inverter, add an AC circuit breaker at the output side of inverter. And the requirement models of breakers as table.



Breakers	Requirement model
DC Breaker	600VDC,16A
AC Breaker	400VAC,10A

	Warning !
	Do not switch on the AC breaker until the PV generator has been connected and all of the devices have been fixed.

	Warning !
	Check the correct polarity before you connect the PV-strings!


	Warning !
	Do not plug and pull any connectors when the inverter is charged.

The GTW1500 HF is designed for operation on 230 V grids and works at grid voltages of 200 V to 260 V at 49 Hz to 51 Hz

	Limit values for AC output
Voltage range	200 V ... 260 V
Frequency range	49 Hz ... 51 Hz

Pay attention to the local utility regulations in any case.

Check that the PV generator connectors have the right polarity and do not exceed the maximum string voltage of 400 V (DC).

Warning !	
	<p>If the voltage of the PV modules the maximum input voltage of the inverter, it can be destroyed by the overvoltage. This will void all warranty claims.</p> <ul style="list-style-type: none"> • Do not connect strings with an open circuit voltage greater than the maximum input voltage of the inverter. • Check the plant design.

The complete wiring for a GTW1500 HF is shown schematically in the following Diagram:



6.5 Startup

You can start up the GTW1500 HF when

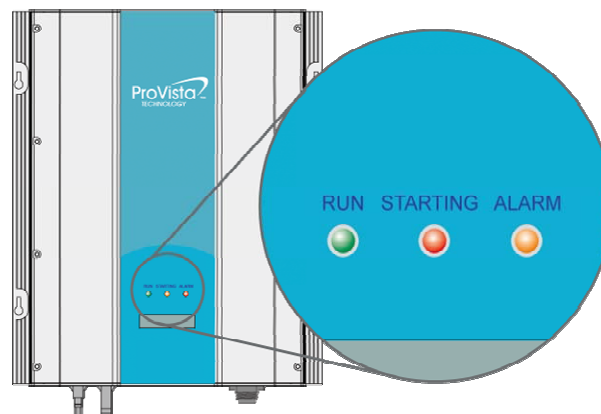
- The lid is securely screwed on the enclosure
- The AC (mains) cable is connected correctly

- The DC cables (PV strings) are fully connected and the unused DC plug connectors on the bottom of the enclosure are closed with the protective caps.


How to start up the inverter

1 .Switch the line circuit breaker to the "on" position

2 .Now look at the LED display and check the table on the next page to check whether the GTW1500 HF is in a fault-free operating status



7. Opening and closing the GTW1500 HF

	Warning !
	If you need to open the device for whatever reason, please pay attention to section 2 "Safety information" (page 6).

7.1 Opening the GTW1500 HF

Follow the sequence below under all circumstances.

1. Switch the line circuit breaker to the "off" position.
2. Disconnect the PV generator from the GTW1500 HF .
3. Wait 30 minutes!
4. Remove the eight screws from the lid and pull the lid off the enclosure. Unlock the green-yellow PE connection and remove it from the lid and take the lid off.

7.2 Closing the GTW1500 HF

Follow the sequence below under all circumstances.

1. Reconnect the earth wire (PE) to the lid. Now secure the lid to the GTW1500 by tightening the eight screws.
2. Connect the PV generator.
3. Switch the line circuit breaker to the "on" position.
4. Now check whether the LED display on the GTW1500 HF indicates that the

device is functioning correctly.

8. Replacing the varistors

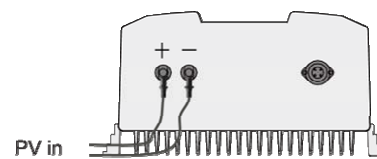
The GTW1500 HF is a complex high-technology device. As a result, the possibilities for fixing faults on site are limited to just a few items. Please don't try to carry out repairs other than those described here. Use the ProVista's service and repair service instead.

If the red LED on the status display glows continuously during operation, you should first of all make sure that there is no earth fault in the PV generator

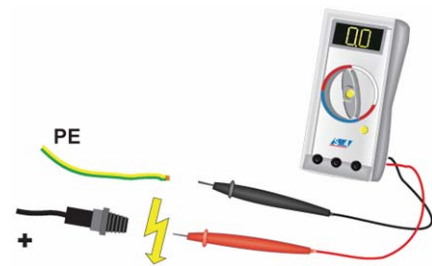
1. Disconnect the GTW1500 HF from the low voltage grid (switch the line circuit breaker to its "off" position or pull out the AC plug). Make sure the grid cannot be inadvertently reconnected.

2. Disconnect the DC plug connectors for all strings. Make sure you note the order of the individual inverter inputs so you can put them back in the right place later!


4. Taking one DC plug connector at a time, measure the voltages between one DC plug connector of a string and earth potential. Pay attention to the safety warnings!



Disconnect the PV generators from the GTW1500HF.



Measure the voltage between DC plug connectors and earth potential.

	Warning !
	Dangerous high voltages may be present. Danger of death!

5. the measured voltages are constant and if their total is roughly the same as the open circuit voltage of the string then there is a earth fault in this string. Its approximate location can be deduced from the relationships between the voltages

6. Repeat points 3 and 4 for each string

If you found a earth fault, it is probably not necessary to replace the varistors. Instead, make sure the ground fault is fixed. Generally the PV generator's installation engineer should be hired for this job. In this case continue as described under point 10, but without reconnecting the faulty string. Protect its DC plug against accidental touch contact (e.g. by fitting the protective caps or using sufficient high-voltage insulating tape).

If you did not find any earth fault in the PV generators, it is likely that one of the thermally monitored varistors has lost its protective function. These components are wearing parts.

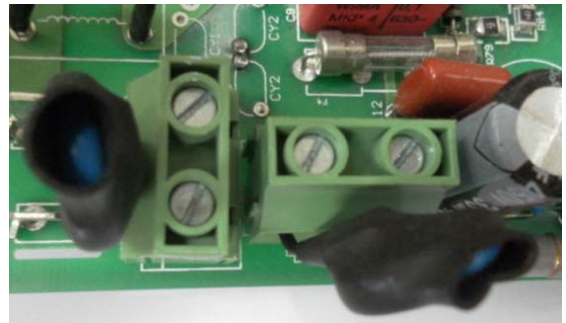
Their functioning diminishes with age or following repeated responses as a result of overvoltages. You can now check these varistors in the following way, paying attention to the safety information in section 2 "Safety information" (page 6).

7. Remove the screws that secure the lid and remove the lid from the GTW1500 HF.

Disconnect the PE connection from the lid. Make sure that no voltage is present.

8. Using a continuity tester, check all the varistors to see if there is a conducting connection between connectors 2 and 3. If there isn't, then that varistor is not working. The positions of the varistors in the GTW1500 HF can be seen in the diagram in section 3.1 "Unit description" (page 11).

9. Replace the varistor concerned with a new one as shown in the drawing to the right. Ensure the varistor is installed the right way round! If you do not receive a special tool for operating the terminal clamps with your replacement varistors, please contact ProVista. As an alternative, the terminal contacts can be operated using a suitable screwdriver. Since the failure of one varistor is generally due to factors that affect all varistors in a similar way (temperature, age, inductive overvoltages), it is highly recommended that you replace both varistors, not just the one that is obviously defective. The varistors were specially manufactured for use in the GTW1500 HF and are not commercially available. They must be ordered directly from **ProVista**.



In case there are no spare varistors available the GTW1500 HF still can feed electricity into the grid. The input is not protected against over-voltages in this case. Replacement varistors should be obtained as soon as possible. In systems with a high risk of over-voltages, the GTW1500 HF should not be operated with defective varistors

10. Reconnect the PE connection on the lid and close the GTW1500 HF .

11. Connect up the faultless PV generator strings to the inverter

12. Close off the unneeded DC input sockets using the protective caps supplied in the accessories kit.

13. Switch the line circuit breaker to the "on" position

14. Now check whether the LED display on the GTW1500 HF indicates that the device is functioning correctly.

15. Exchanging the AC FUSE

Exchanging the AC side fuses, if it breaks:

Turn off all the AC and DC switches and /or breakers, wait for at least 3 minutes, then open the GTW1500HF, and exchange the fuse F3:

F3:
Littelfuse 314-15A
6.3 * 32



If no earth fault and no defective varistor were found, there is probably a fault in the GTW1500 HF. In this case, contact the ProVista service to discuss what to do next.

9 Technical data

9.1 PV generator connection data

Max. input open circuit voltage	Upv:	400 V
Input voltage, MPP range	U _{PV} :	180 V~ 350 V
Max. input current	I _{pv} max	9.5A
Max. input power	P _{DC}	1700 W
Recommended generator power		1500 W

9.2 Grid connection data

Nominal output power	PACnom	1500 W
Nominal output current	IACnom	6.9 A
Power factor		1
Peak Efficiency		94%
Nominal grid voltage		230 Vac
Operating range, grid voltage	Uac	200~260 V AC
Nominal grid frequency		50Hz
Operating range, grid frequency	f	49~51 Hz(AU)/47.5~50.2Hz(Germany)
Total Harmonic Distortion		<5% to Standard
EMI		compliant with CE /AS4777 Standard

All-pole isolator on the DC input side	DC plug connector
Automatic Shutdown for	
DC over/under voltage	
AC over/under frequency	
AC over/under voltage	
Over heat	

9.3 Device description

For a detailed description of the device, see the operating instructions.

General data

Protection category per IEC62109-1 & IP65
Dimensions (w * h * d) 330 mm x 436.5 mm x 169 mm
Weight 13 kg

External interfaces

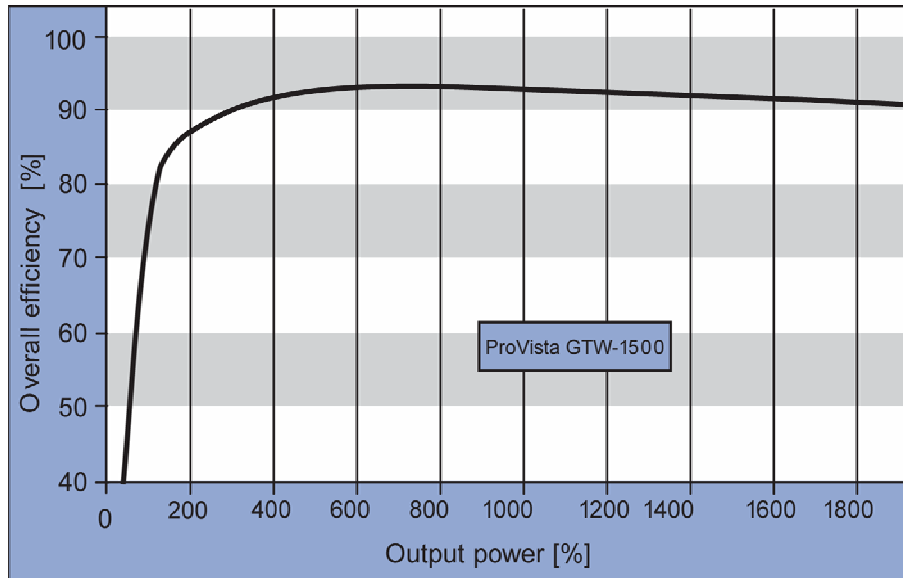
Data transmission over mains power line	Optional
Data transmission over separate data cable	Optional, RS232 / RS485, electrically separated
Wireless data transmission	Optional

Efficiency

Max. efficiency 94 %

European standard efficiency 91 %

The efficiency of the GTW1500 HF depends mainly on the input voltage of the connected PV strings. The lower the input voltage the higher is the efficiency of the GTW1500 HF.



9.4 GTW1500 HF operating parameters

Unauthorised changes to the operating parameters may result in:

- Injury or accidents as a result of changing the internal safety routines in the GTW1500 HF
- Voiding the GTW1500 HF's operating permission
- Voiding the GTW1500 HF's guarantee Never change the parameters of your GTW1500 HF without express authorization and instructions.

10 Contact

In the case of complaints or faults, we request that you contact the local supplier from whom you got this product installed. They will help you with any issues you may have. Pls provide below information in order to provide you with the necessary assistance.

- Model number
- Inverter serial number
- Type and number of PV modules connected
- Type of grounding(positive or negative)
- Event number or display message of the inverter
- Optional equipment(e.g. communication devices)

ProVista Technology Limited
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Tel: +852 2330 8842
Fax: +852 2330 8843
E-mail: sales@provistahk.com

11 Appendix-A Model Number Conversion Table

Descriptions	Model Number (For Protronic use)	Model Name (For provista use)
1500W Grid-Connected inverter	SGA015	GTW1500HF