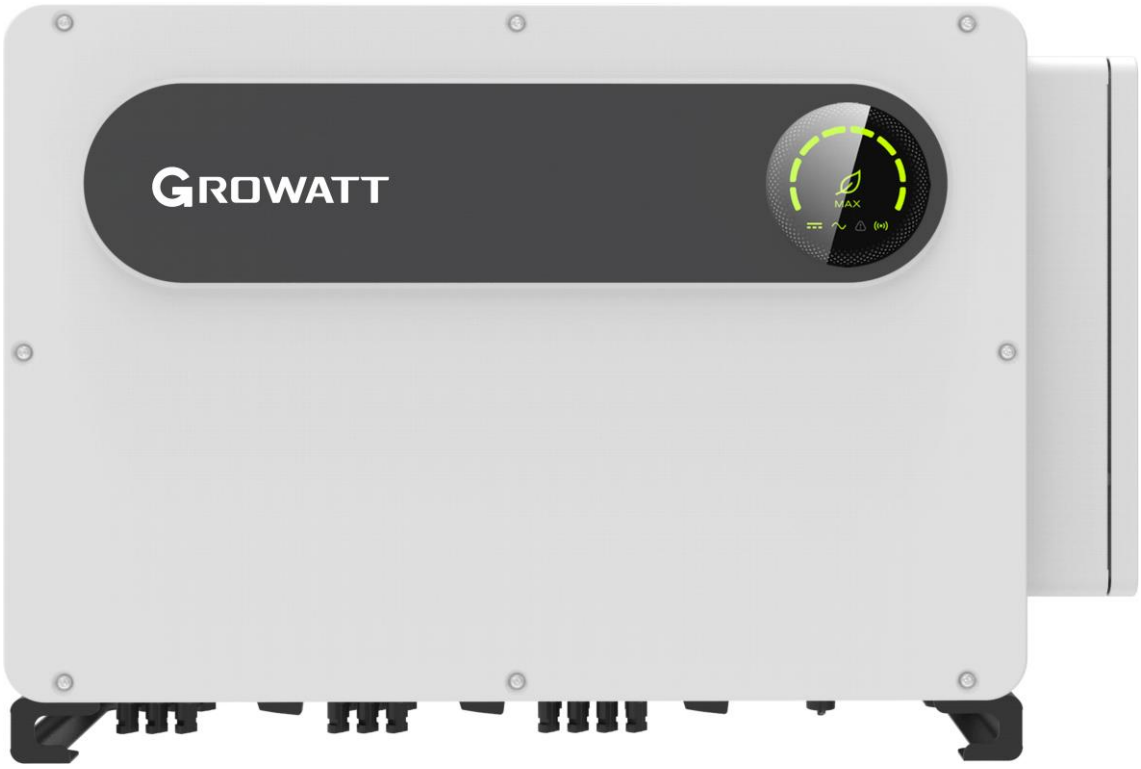


Installation & Operation Manual

目录

1. Overview

1.1 Product Overview

This manual will provide detailed product information and installation instructions for users who using MAX 80-133KTL3-X LV PV Inverter provided by Shenzhen Growatt New Energy Co., Ltd. (hereinafter referred to as Growatt New Energy) . Please read this manual carefully before using the MAX 80-133KTL3-X LV series inverters and store the manual in a reachable place for authorized technicians. Growatt will not notify users of any changes to this manual.

1.2 Applicable Personnel

Only qualified electrical technicians are allowed to install MAX 80-133KTL3-X LV series inverter. By reading the manual throughly and following all the precautions, qualified electrical technician can properly install MAX 80-133KTL3-X LV serial inverter, take trouble shooting and communication settings. If there is any problem during the installation, the installer also can log into www.ginverter.com and leave a message or call customer service hotline +86 75527471942.

2. Safety Precautions

2.1 Safety Overview

1>Before installation, please read through this manual carefully. If any damage caused by improper installation, Growatt reserves the right to disclaim any warranty.

2>All the operation and wiring must be done by trained qualified electrical technicians.

3>During installation process, do not touch any parts inside the inverter except for the terminals wiring .

4>All the electrical connections must meet local country's safety regulations.

5>If this equipment needs maintenance, please contact our local authorized installation and maintenance technicians.

6>You must get the local power supplier's permit before connecting this inverter to the grid.

Transport Process:

	●The inverter is heavy and must be handled carefully to prevent it falling off and hurt.

Installation:

	●Before installation, please read through this manual carefully, any damage caused by improper installation, Growatt reserves the right to disclaim any warranty.
	●Before installation, make sure that the inverter has no electrical connections.
	●For the installation conditions, environment, spacing, etc., please follow the contents of this manual. ●Please install the inverter in a dry and ventilated environment, otherwise may affect the performance of the inverter. ●The installation steps are detailed in this manual, please read carefully before installation.

Electrical Connections:

	●Before taking the electrical connection, please ensure the inverter AC switch is disconnected, otherwise the high voltage from inverter may cause life risk. ●It must be carried out by well-trained professional electrical technicians and abide by this manual and relevant local regulations. ●High voltage is dangerous, please do not touch the inverter at will. ●Do not place flammable and explosive materials around the inverter.
	●Each inverter must be connected with one AC breaker; and the AC breaker can not be shared with multi-inverter. ●It is forbidden to add load between inverter and breaker. ●If the cable is thick, do not shake it forcefully after tightening the cable terminals. Make sure that the terminals are well connected before turning on the inverter to prevent the terminals from loosening, which may cause overheating and damage.

	●Before connecting PV panels and inverter, please check their positive and negative poles.

Maintenance and replacement:

	●It must be operated by well-trained professional electrical technicians and comply with this manual. ●All operations must be performed after power off. Please be sure to disconnect the AC switches for at least 5 minutes before operating to avoid danger. ●If there is PV isolation low alarm, there might be some fault for the inverter case ground protection, please do not touch the inverter case. ●High voltage is dangerous, be careful of electric shock.
	●For better heat dissipation, please clean the fan regularly. ●Do not use an air pump to clean the fan, since it may damage the fan.

Other：

	●After receiving the product, please check whether the inverter package is complete firstly. If it is damaged, please contact the supplier.

	●The Max PV input voltage should not exceed 1100V. ●For the disposed inverter, the consumer should dispose it according to local disposal rules for electrical equipment waste.

2.2 Symbol Conventions

Symbol	Description
	Indicates an imminently hazardous situation which, if not avoided, will result in serious injury or death.

	Indicates potentially hazardous situation which, if not avoided, will result in serious injury or death.
	Indicates potentially hazardous situation which, if not avoided, will result in minor or moderate injury.
	Indicates certain hazardous situation which, if not avoided, will result in property damage.
	Reminds operator to read installation manual before operating or installing inverter.

2.3 Lable Description

Symbol	Name	Meaning
	High Voltage Electric Shock	Inverter operating with high voltage, any operation regarding inverter need to be done by trained and authorized electrical technician.
	Burn Warning	Do not touch a running inverter cause it generates high temperature on the case.
	Protective Grounding	Connect the inverter to the ground bar to achieve the purpose of grounding protection.
	Delay discharge	Residual voltage exists in the inverter, it needs 5 minutes to discharge to the safe voltage.
	Read the installation manual	Reminds operator to read installation manual before operating or installing inverter.
	DC	Means this port is for DC side.
	AC	Means this port is for AC side.

CE	CE Mark	The inverter complies with the CE requirements.

3. Product Introduction

3.1 Appearance

Front view:

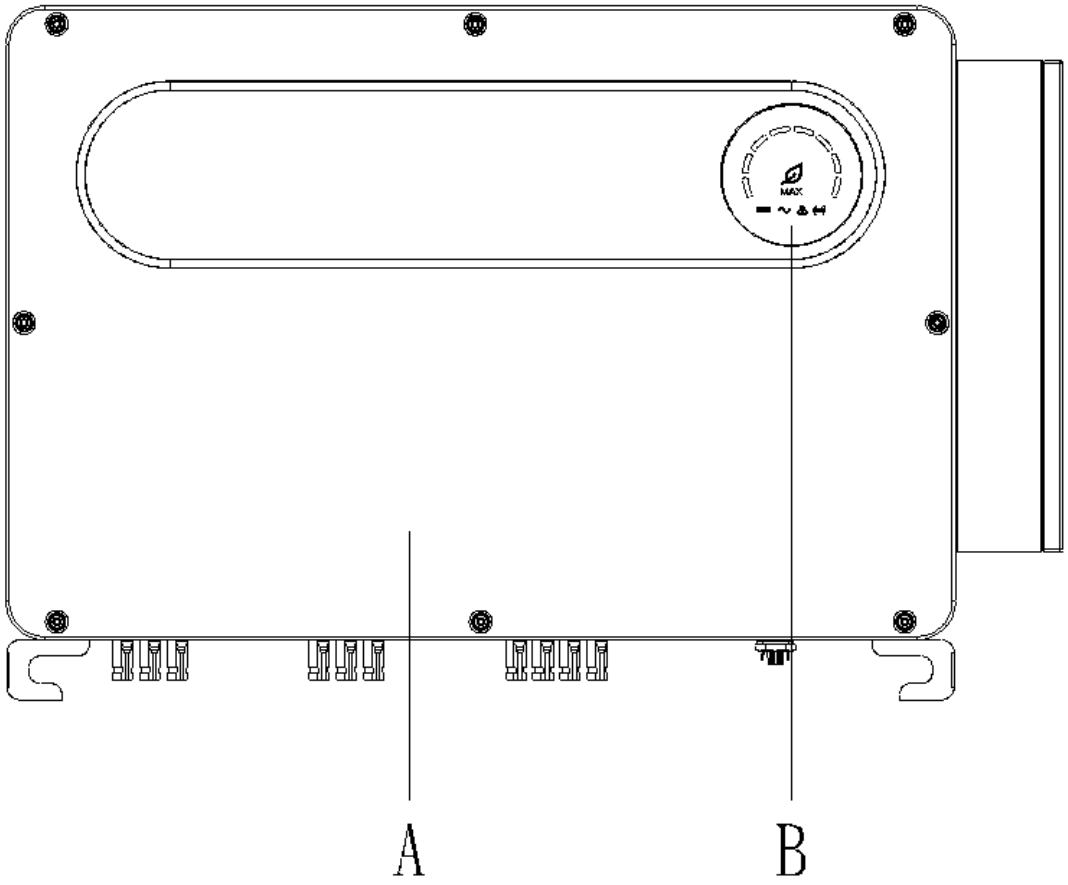


Fig 3.1

Bottom view (Terminals):

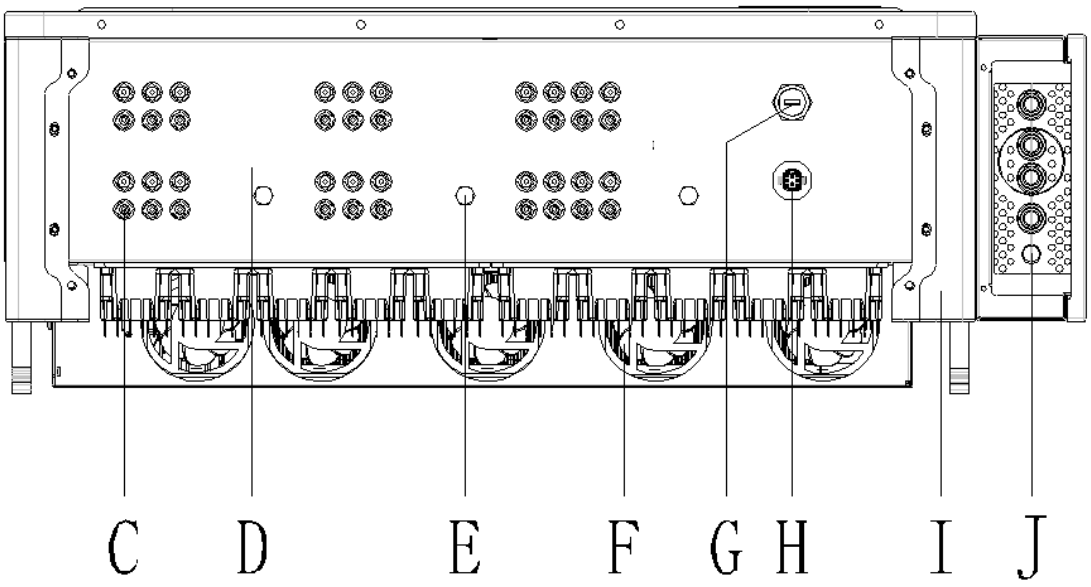
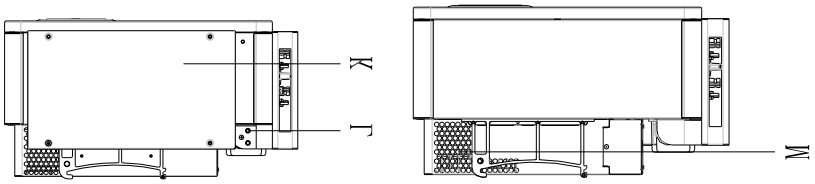


Fig 3.2

机箱侧面



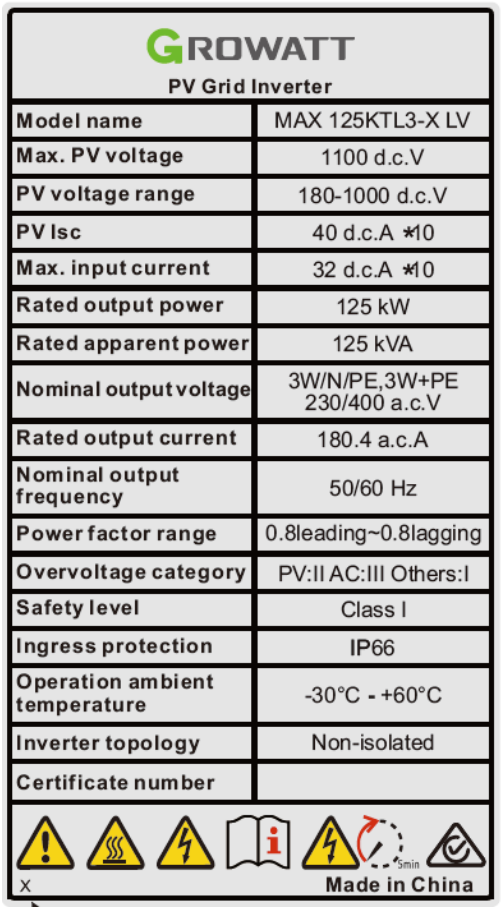
Mark	Description	Mark	Description
A	Front panel	H	COM port
B	LED indicator	I	Anti-collision angle
C	PV terminal	J	Waterproof silicone pad
E	Vent valve	K	Junction box
F	External fan	L	Ground screw hole

G	USB port	M	heat sink

3.2 Basic Data

Model	Size（mm）			Weight (kg)
	Width	Height	Thickness	
MAX 80-133KTL3-X LV Series Inverter	970	640	345	84
MAX 80-133KTL3-X LV Series Inverter with Package	1100	760	500	98

3.3 Nameplate



GROWATT

PV Grid Inverter

Model name	MAX 125KTL3-X LV
Max. PV voltage	1100 d.c.V
PV voltage range	180-1000 d.c.V
PV Isc	40 d.c.A *10
Max. input current	32 d.c.A *10
Rated output power	125 kW
Rated apparent power	125 kVA
Nominal output voltage	3W/N/PE,3W+PE 230/400 a.c.V
Rated output current	180.4 a.c.A
Nominal output frequency	50/60 Hz
Power factor range	0.8leading~0.8lagging
Overvoltage category	PV:II AC:III Others:I
Safety level	Class I
Ingress protection	IP66
Operation ambient temperature	-30°C - +60°C
Inverter topology	Non-isolated
Certificate number	

X

Made in China

Note: Other models of MAX 80-133KTL3-X LV series share the same label design with MAX 125KTL3-X LV, only with different model name and parameters, detail parameter please refer to specification in Chapter 10.

3.4 Working Principle

The MAX 80-133KTL3-X LV series inverter works as follows:

1>The PV panels gather solar to generate DC power to inverter.

2>With input current detection circuit, it can monitor all the PV panels' working status and use MPPT to track the maximum power point.

3>Via the inverter circuit, the DC current will be converted to AC current, and it will be feed back to the grid as grid requirement.

4>With output isolation relay, it can isolate AC output and the grid, if any wrong happened on either inverter side or grid side, isolation relay can disconnect inverter from the grid immediately.

On-grid PV system diagram:

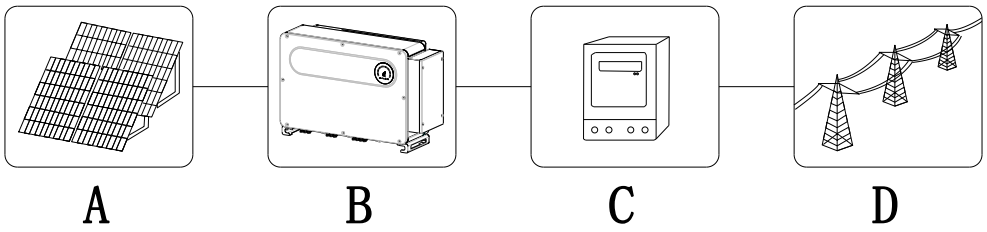


Fig 3.4

symbol	Description	symbol	Description
A	PV string	C	Electric meter
B	Inverter	D	Grid

3.5 Inverter Storage

1>Do not unpack the inverter and store it in a ventilation dry place .

2>Keep the storage temperature at -30℃-+60℃ and humidity at 0-100%.

3>If a large number of inverters need to be stored, the packages would not exceed 4 layers, and avoid stacking bare metal.

4>If the inverter has been stored for long time, inspections and tests should be conducted by qualified personnel before it is put into use.

	After being stored for a month or longer, the inverter's time and date could be wrong, you need set the time and date before using, for more details please refer to Chapter 7.1 inverter commissioning.

3.6 Grid Type

For MAX 80-133KTL3-X LV series inverter, the grid connection method is shown as Fig 3.5 for MAX 80-133KTL3-X LV.

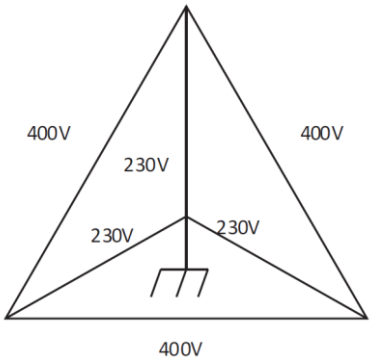


Fig 3.5

3.7 AFCI Function

AFCI (Arc Fault Circuit Interrupter) is a kind of circuit protection device, the main function is to prevent the fire caused by fault arc. The electrical insulation aging, breakage, loose connection, air breakdown caused by air humidity and other issues, all of these may cause an electric spark, which is called arc.

The AFCI function of the MAX series inverter is optional, and the detection equipment is assembled inside the inverter. When an arc is detected on the PV input side of the machine, the CT on the PV input side wire will detect the arc current, the machine will shut down, and the machine will display the corresponding fault code and the buzzer will sound to avoid damage to the user.

NOTE: The AFCI function is optional.

3.8 Anti-PID Function

The full name of PID is Potential Induced Degradation. Since the PID effect, a large amount of charge could accumulate on the surface of the photovoltaic module, which makes the surface passivation of the module worse. Eventually, the fill factor, open circuit voltage, and short-circuit current of the module are reduced, and the power of the photovoltaic module is attenuated.

The Anti-PID function uses the principle of reversible PID changes. MAX series inverters rectify AC voltage at night and boost it to generate a DC voltage. The DC voltage is connected to PV + and the ground respectively. When add a positive bias voltage to the module to make the PID effect reverse, the Anti-PID function could repair the photovoltaic modules at night and extend the service lifespan of photovoltaic modules.

NOTE: The anti-PID function is optional.

4 Unpacking

Unpacking inspection

1>Before unpacking the inverter, please check whether the outer package is damaged

2>After unpacking, please check whether the appearance of the inverter is damaged or lack of accessories. If there is damage or missing accessories, please contact the manufacturer.

The accessories of MAX 80-133KTL3-X LV inverter are as follows:

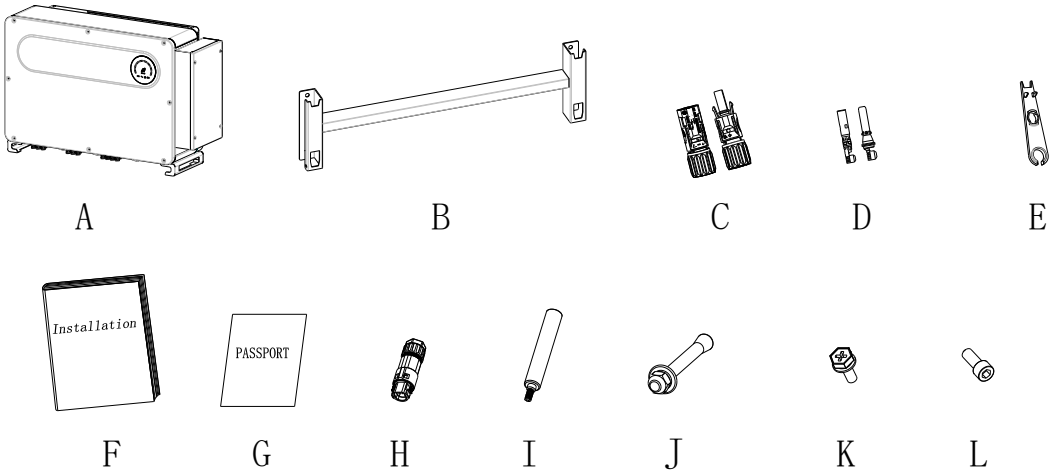


Fig 4.1

Mark	Description	quantity
A	inverter	1
B	Wall mount	1
C	PV terminal	20 PV+ terminals, 20 PV- terminals
D	PV terminal core	20 PV+ terminal cores, 20 PV- terminal cores
E	PV terminal removal tool	1
F	Installation Manual	1
G	Manual Warranty Card	1
H	485 connector	5
I	Carrying handle	2
J	Explosion screw	4
K	Ground screw	2
L	Security screw	2

Note: Although the package of the PV inverter is strong and durable enough, please handle the package gently.

5. Installation

	•To prevent device damage and personal injury, keep balance when moving the inverter because it is heavy. •The power cable interfaces and signal cable interfaces at the bottom of the inverter cannot bear weight. Please do not contact with the ground directly. •When placing inverter on the floor, put foam or paper under the inverter to protect its cover.

5.1 Basic Installation Requirements

A. Ensure that the installation wall is solid enough to bear the inverter (For the weight of the inverter, please refer to Chapter 3 3.2 Dimension Description of this manual).

B. There must be enough installation space to fit the size of inverter.

C. Do not install inverter on flammable or heat-intolerant buildings.

D. This inverter’ s protection degree is IP66, you can install it indoor or outdoor.

E. In order to prevent the inverter from reducing its output power due to overheating, please do not expose the inverter to the sun directly.

F. The installation humidity should be 0-100%.

G. The surrounding temperature of inverter should be from -30℃-+60℃.

H. Inverter should be installed in a vertically or rear tilted surface, please refer to

following figures.

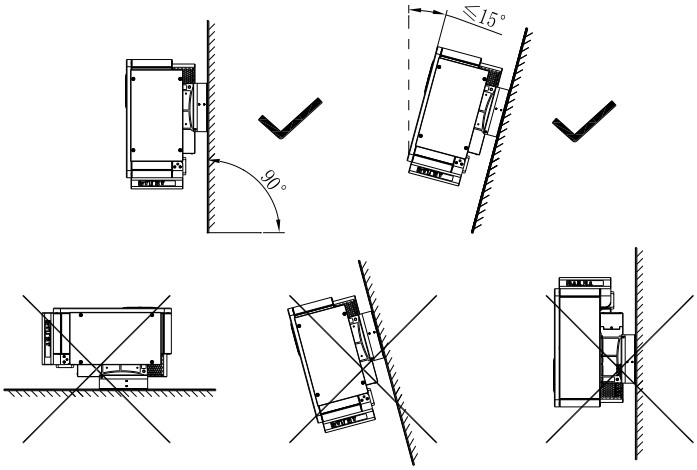


Fig 5.1

I. To ensure the inverter can work smoothly and it is easy for personnel to operate, please pay attention to provide enough space for the inverter.

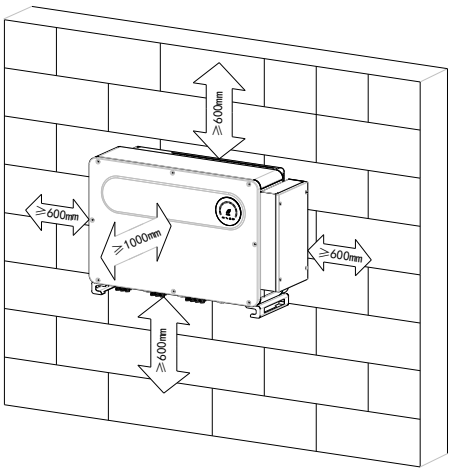


Fig 5.2

J. Do not install inverter close to strong electromagnetic signal.

K. Install the inverter out of children's reach.

5.2 Installation Environment Requirements

A. Although the inverter's protection degree is IP 66, it can extend the service lifespan by avoiding the inverter from being exposed to rain and snow. The following figure could be refered.

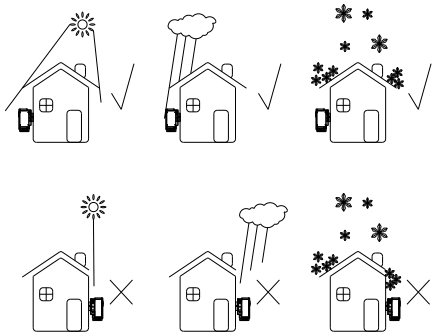


Fig 5.3

B. To reduce the de-rate performance of the inverter and extend inverter's life span, we strongly recommend you install an awning. For the distance between the awning and inverter, please refer to following figure.

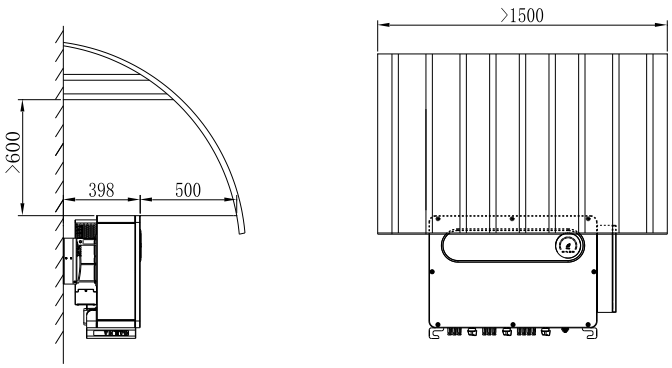


Fig 5.4

C. When you install multiple inverters on the same wall, inverters should be installed as the following figure.

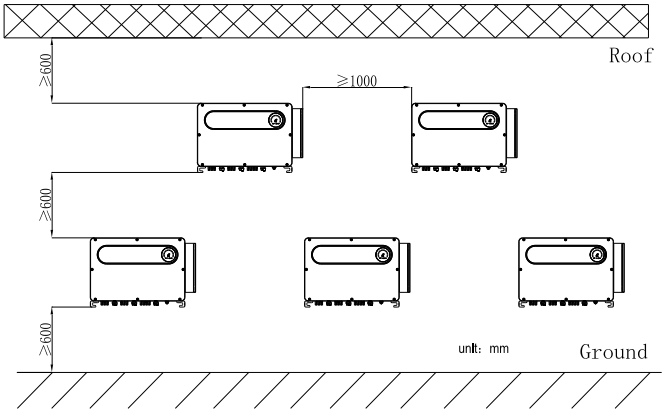


Fig 5.5

D. Do not install inverter into an enclosed space like following figure.

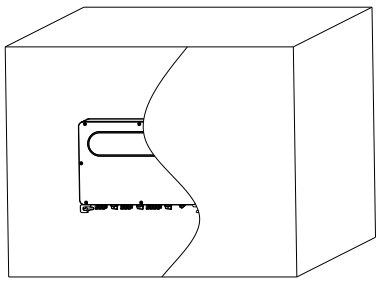


Fig 5.6

5.3 Moving Requirements

WARNING	•The inverter is heavy, please move it carefully and keep balance to avoid personnel injury. •The power cable interfaces and signal cable interfaces at the bottom of the inverter cannot bear weight. Please do not contact with the ground directly.

Method 1：

1>As shown in Fig 5.7, use a rope to tie at ring and handle, lift the inverter from package and move it to installation position.

2>When you are moving the inverter, please keep the balance.

Method 2(Optional):

1> As shown in Fig 5.8, 4-6 persons lift the inverter out of package and swap the ring to moving handles.

2>When you are moving the inverter, please keep the balance.

Notice: The front and bottom labels will be given on the box.

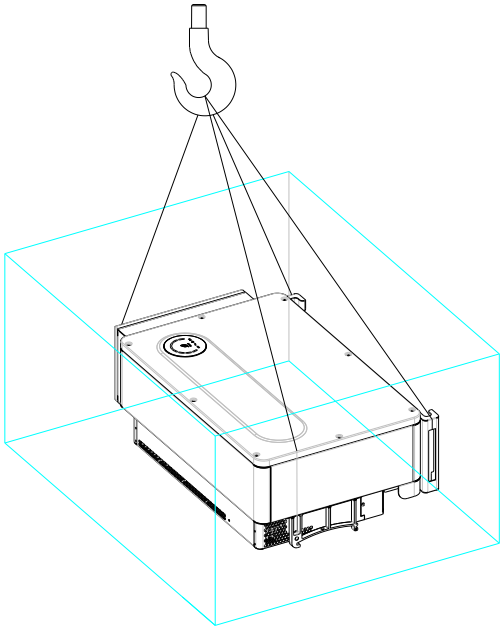


Fig 5.7

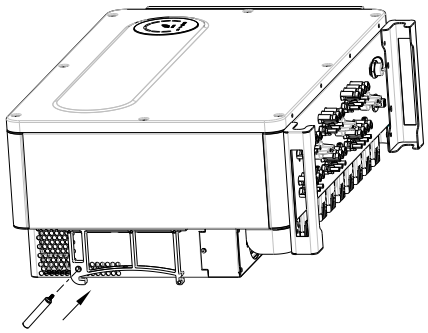


Fig 5.8

5.4 Wall Mount Bracket Installation

Before installing the inverter, you need install the wall mount bracket so that the inverter can be firmly installed on the wall.

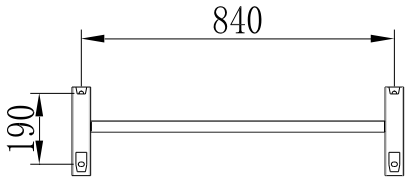


Fig 5.9

Steps:

1>Use the wall mount bracket as a template, drill holes on the wall according to the screw holes on the wall mount, and insert expansion bolts

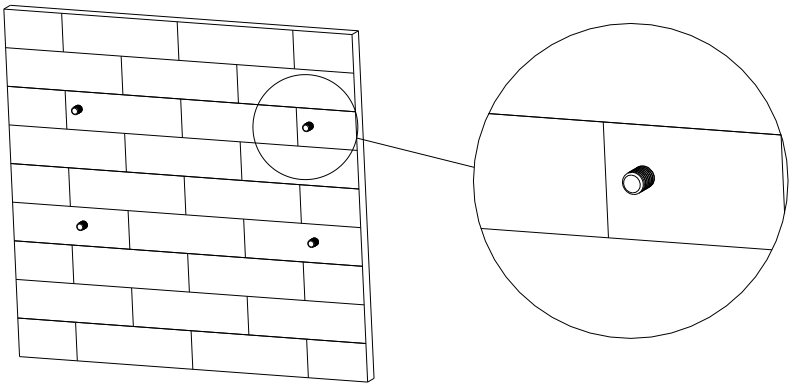


Fig 5.10

Notice：Expansion screws should be installed on solid concrete or brick walls and the wall thickness should be at least 100mm.

2>Fix the wall mount bracket to the wall with screws.

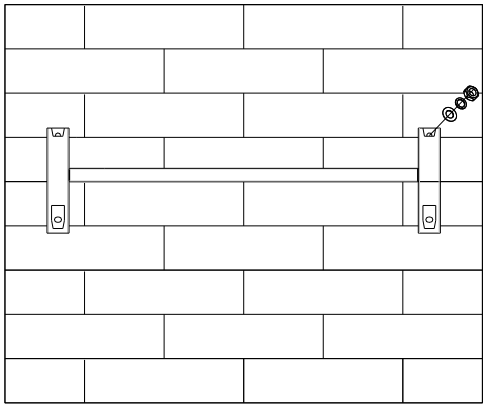


Fig 5.11

Notice: Do not install inverter unless you have confirmed the wall mount plate has been firmly installed on the wall.

5.5 Inverter Installation

After the wall mount bracket has been firmly installed on the wall , put the inverter on that plate.

1>Use the rope(must meet the weight requirement of the inverter) through two rings and lift the inverter up, just as following Figure.

2>Hang the inverter on the wall bracket and fix it with bolts. Please keep the balance of the inverter when hanging.

3>Check the inverter if it is fixed firmly enough and lock all the screws.

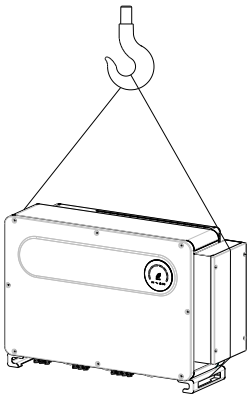


Fig 5.12

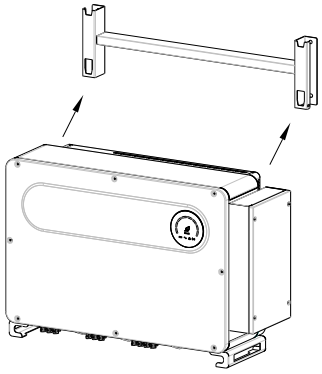


Fig 5.13

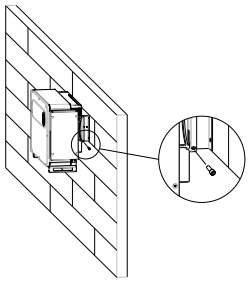


Fig 5.14

6. Electrical Connection

6.1 AC Side Connection

 DANGER	•Before take electrical connection, please ensure the inverter AC switch is at "OFF" , otherwise the high voltage from inverter may cause life risk. •It must be operated by professional electrical or mechanical personnel, and abide by this manual and relevant local regulations. •High voltage is dangerous, please do not touch the inverter at will. ●Do not place flammable and explosive materials around the inverter.
 WARNING	Each inverter must be connected with one AC breaker; and the AC breaker can not be shared with multi-inverter. ●It is forbidden to add load between inverter and breaker. ●If the cable is thick, do not shake it forcefully after tightening the cable terminals. Make sure that the terminals are well connected before turning on the inverter to prevent the terminals from loosening, which may cause overheating and damage. **NOTE** :The inverter has the function of detecting residual current and protecting the inverter against residual current. If your inverter must equip a AC breaker which has the function of detecting residual current ,you must choose a **Type A** RCD breaker with the rating residual current more than 1500mA.

Preparation before connection:

1>Disconnect inverter AC breaker/switch.

2>When you lock the AC cable's screw, the torque force should be 25N·m. When you lock the cover screw, the torque force should be 35kgf·cm.

3>Measure the grid voltage and frequency, please refer to chapter 10.

AC breaker specification:

Inverter model	Breaker model
MAX 80KTL3-X LV	160A/400Vac
MAX 100KTL3-X LV	200A/400Vac
MAX 110KTL3-X LV	250A/400Vac
MAX 120KTL3-X LV	250A/400Vac

MAX 125KTL3-X LV	250A/400Vac
MAX 133KTL3-X LV	250A/400Vac

AC wire specification：

Inverter Model	Copper wire cross sectional area(mm²)	Copper wire recommendation(mm²)	Aluminum wire recommendation(mm²)
MAX 80KTL3-X LV	70-240	70	95
MAX 100KTL3-X LV	70-240	70	95
MAX 110KTL3-X LV	70-240	70	95
MAX 120KTL3-X LV	70-240	70	95
MAX 125KTL3-X LV	70-240	70	95
MAX 133KTL3-X LV	70-240	70	95

Note: The wire must be well immersed in tin, and no branch or breakage.

AC side connection steps:

 WARNING	•If the cable is thick, do not shake it forcefully after tightening the cable terminals. Make sure that the terminals are well connected before turning on the inverter to prevent the terminals from loosening, which may cause overheating and damage.

1>Following figure shows inverter's AC terminal, L1, L2, L3 are three live lines, N is neutral line.

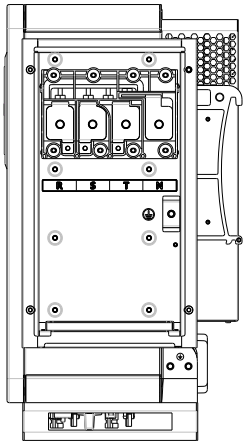


Fig 6.1

2>Firstly, unscrew the waterproof cover, then put the cable through the cover, pile the cable base on terminal size(30mm recommended), use a wire stripper to connect cable. and terminal, tighten all the terminal screws.

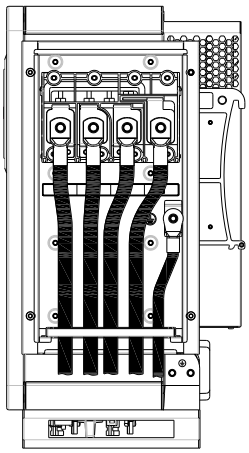


Fig 6.2

Diagram of OT terminal:

Fig 6.3

3>Put the water proof cover back to the inverter and fill the cover with fireproof mud,

just as following figure.

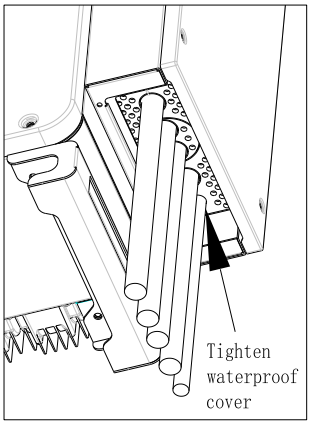


Fig 6.4

WARNING	●The waterproof cover must be tightened, otherwise there is a risk of water ingress.

6.2 DC Side Connection

DANGER	●Before taking the electrical connection, please ensure the inverter AC switch is at "OFF”, otherwise the high voltage from inverter may cause life risk. ●It must be operated by professional electrical or mechanical personnel, and abide by this manual and relevant local regulations. ●High voltage is dangerous, please do not touch the inverter at will. ●Do not place flammable and explosive materials around the inverter.

Notice: The sunlight will generate voltage on the PV panels, after connecting in series, the high voltage may injure personnel. So before connecting DC input cable you need cover PV panels with light-tight materials

WARNING	●Each string's maximum open circuit voltage cannot exceed 1100Vdc, otherwise it could lead to fire or damage the inverter. ●The inverter shall be used with IEC 61730 Class A rating PV module. ●When the group is suspended, be sure to use dust plugs to block up to prevent entering the water into the

	dust.

1>Each string solar panels should be same brand and same model.

2>Under any circumstance, the maximum short circuit current should not exceed 40A.

3>The total panels power should not exceed 1.5 times of inverter input power.

4>To optimize system settings, it is recommended two strings with same amount PV panels for single MPPT.

Notice: The male and female terminals need to be matched before connecting.

Please check the polarity of the PV panels and the inverter’ s terminals before connecting. The positive pole of the PV panel is connected to the “+” of inverter DC input terminal. The negative pole of the PV panel is connected to the “-” of inverter DC input terminal.

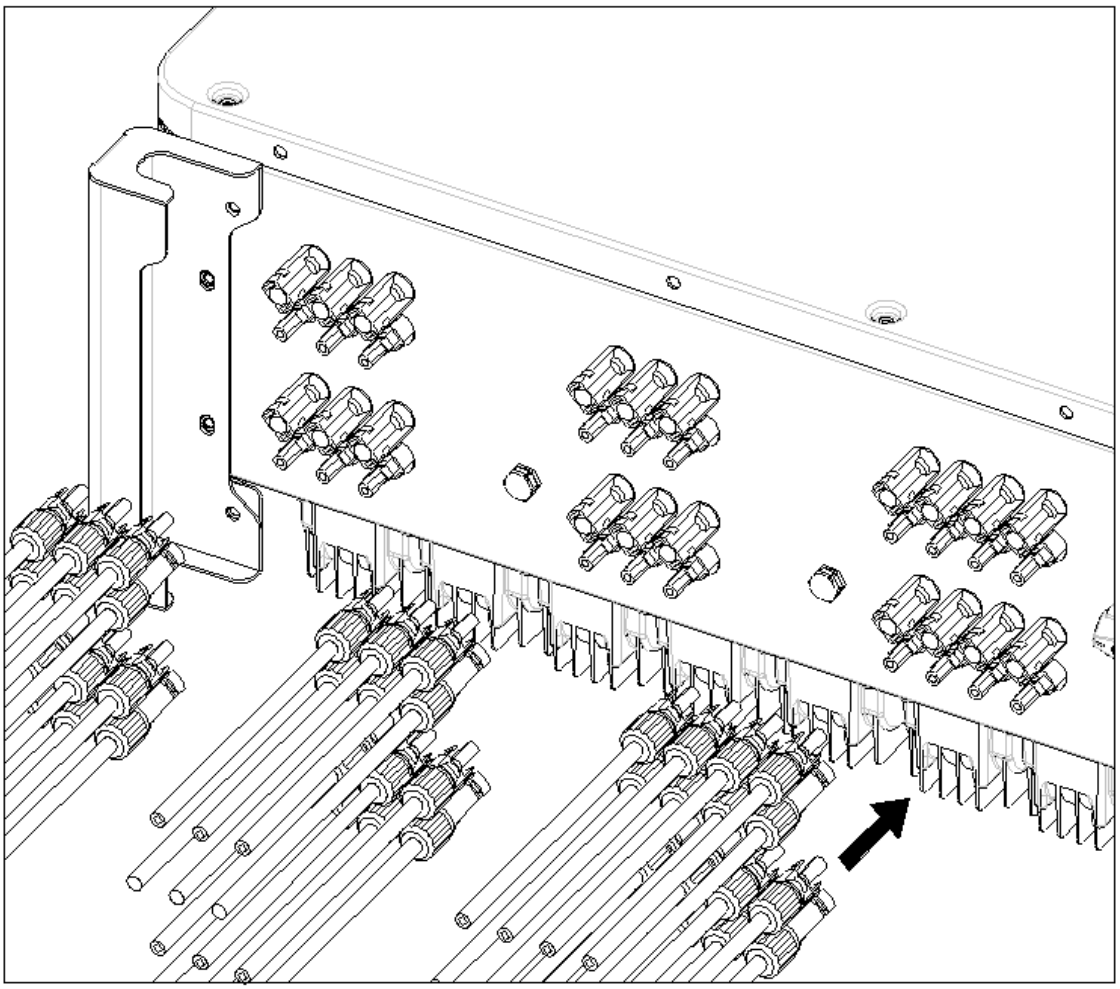


Fig 6.5

5> The stripping length is determined by the specifications of the crimping terminal, crimp the wires and terminals with crimping pliers, and connect them to the corresponding connector housings. When you hear a click, it means that the connection is good.

6>Connect the positive and negative poles to inverter terminals, for the input current per string, please refer to following table.

Inverter model	Max. input current per string
MAX 80-133KTL3-X LV	16A*2

7. Cable specifications:

Inverter model	Cross-sectional area (mm²)	Recommendation(mm²)	Cable outer diameter(mm²)
MAX 80-133KTL3-X LV	4-6	4	4.5-7.8

Notice：1. In any case, the total current of all strings cannot exceed the maximum current of the inverter;

2. Please do not touch the PV panels during running.

3. Make sure the cable is unbroken.

6.3 Connection of Communication Cables

6.3.1 RS485

RS485 can be used for single inverter communication also can be used for multiple

inverters (maximum 32 inverters) , the longest distance is 500 meters, high speed (Baud rate 38400) , the communication port as following.

It is recommended to use twisted-pair shielded wire as RS485 communication line. For single inverter communication, the shielding layer of the communication line needs to be connected to the earth. The shielding layer can be connected to the protective ground of the inverter shell. For multiple inverters connected in parallel, two RS485 ports are used at the same time. The shielding layer of the communication line must be connected to the communication ground GND of the RS485 connection port. The GND of the inverter shall be short-circuited together through the wire, and then connected to the inverter of the monitoring equipment (set as the first one) The communication ground GND of the inverter is connected to the protective ground of the inverter housing.

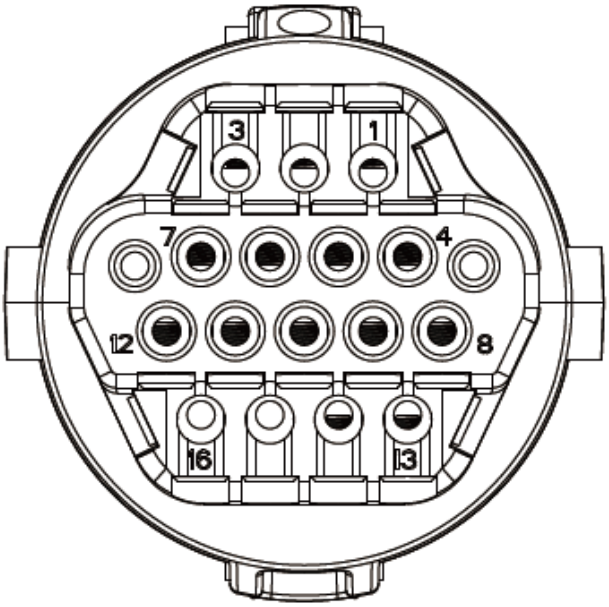


Fig 6.6A

Mark	Description	Mark	Description
1/2	485-1 PE Shield	9	DRM1/5
3	485-1 A1	10	DRM2/6
4	485-1 B1	11	DRM3/7
5	485-1 A1	12	DRM4/8
6	485-1 B1	13	REF/GEN
7	485-2 A1	14	DRM0/COM
8	485-2 B1	15/16	485-1 Matching resistance

Notice: When multiple inverters are connected in parallel or the transmission distance is long, The reason for this is to increase the matching resistance.

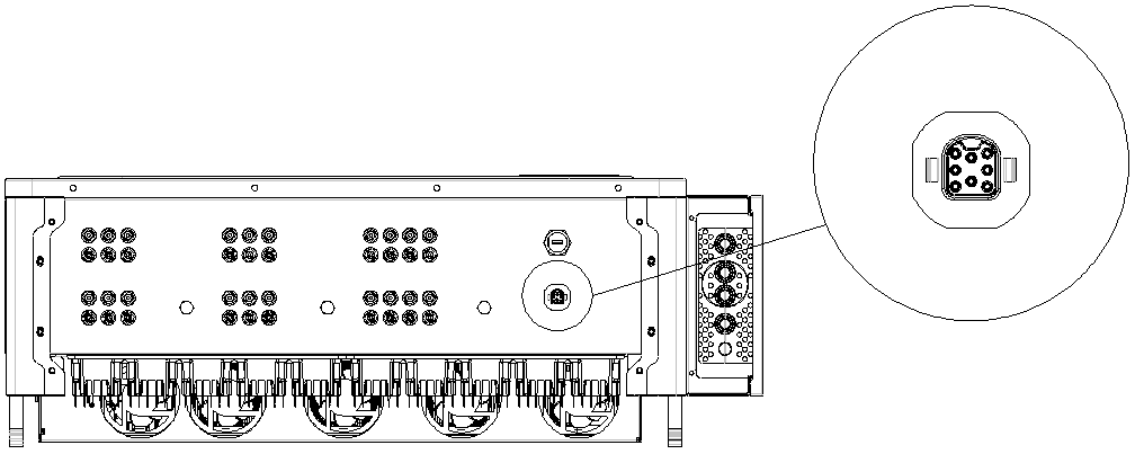


Fig 6.7

6.3.2 USB port

MAX 80-133KTL3-X LV series inverter is configured with USB_A port ,can be connected to USB to WIFI module, Shine GPRS-X, Shine Wifi-X, Shine 4G-X, Shine Link-X, etc. The monitoring module is selected to implement the monitoring function. In addition, you can quickly update the software via a USB flash drive.

Steps to install the monitoring module:

1> Loose waterproof cover, and remove waterproof plug.

2> As shown in Figure 6.8A,plug the USB to WIFI dongle to USB_A port, the indicating LED will lit up.

3> As shown in Figure 6.8B, make sure that △ is on the front side, plug the monitoring module to USB_A port, and tighten the screws.

Note: When the operator leaves please take the monitoring module and data cable away, and tighten the waterproof cover to avoid water entering the interface.

6.4 Protective Grounding Connection

In this PV system, all the unloaded metal components and cases should be connected to the ground.

Single inverter need to be grounded via a PE cable. For multiple inverters system, all the PE cable of inverters and the metal shelves of PV arrays should be connected to the same grounding point to achieve the equipotential bonding.

The grounding steps is taking out the ground screw at the inverter bottom and connecting the ground cables as following figure.

Notice: 1.The safety ground of the machine and the lightning protection ground shall be connected separately, and the distance shall be as far away as possible.

2. Take care to prevent rain at the grounding wire terminal joint, and do not directly expose it to the air.

3.When you lock the ground screw, the torque force should be 30kgf·cm.

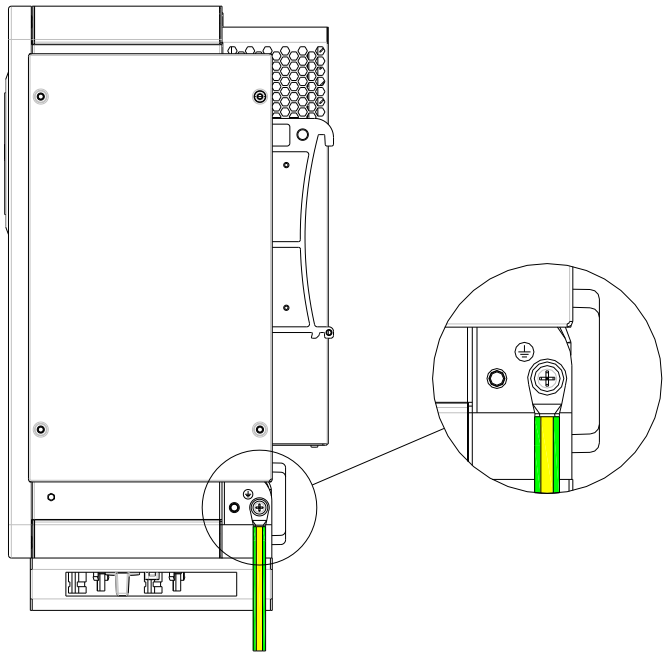


Fig 6.9

PE cable specifications

Conductor Cross-Sectional Area S ofthe AC Power Cable (Unit: mm^2)	Conductor Cross-Sectional Area Sp of the PE Cable (Unit: mm^2)
S＞35	Sp≥S/2
The specifications are valid only if the conductors of the PE cable and AC power cable use the same material. If the materials are different, ensure that the conductor cross-sectional area of the PE cable produces a conductance equivalent to that of the cable specified in this table.	

According to the relevant provisions of IEC 61643-32 "Connecting to photovoltaic devices surge protectors - selection and use of guidelines", no matter for household or outdoor PV plants, it is necessary to ensure the implementation of lightning protection measures for PV systems:

WARNING	The lightning protection measures for photovoltaic systems shall be carried out in accordance with the corresponding national standards and IEC standards. Otherwise, photovoltaic devices such as components, inverters and power distribution facilities may be damaged by lightning. In this case, the company does not carry out warranty and assumes any responsibility.

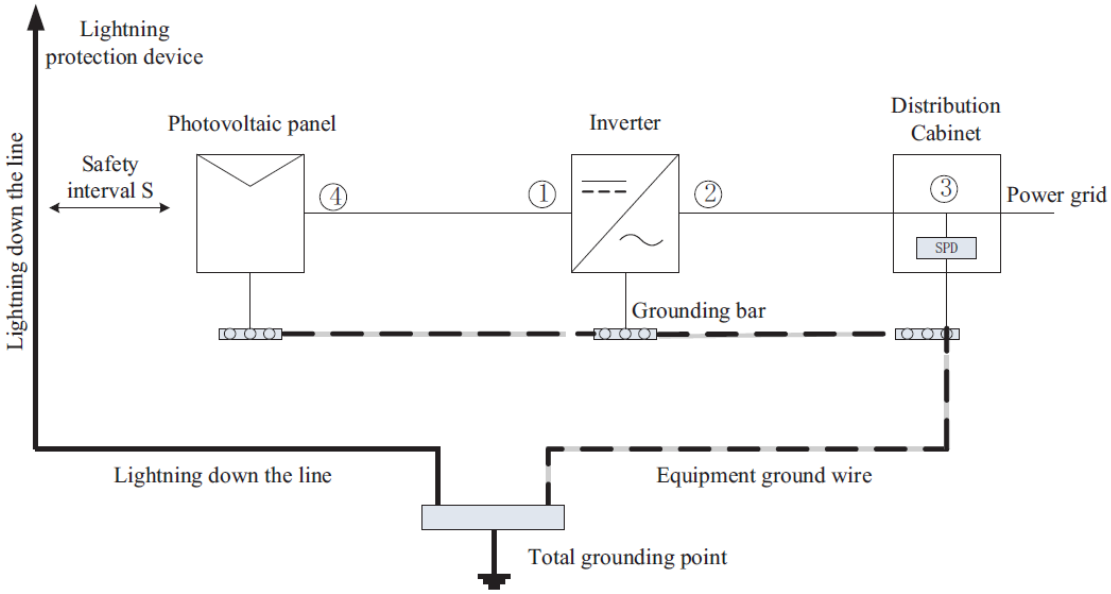


Fig 6.10

1）It is generally recommended to install lightning protection devices (such as lightning rods / lightning protection belts and down conductors) to prevent lightning from hitting the PV array.

2） Lightning protection devices and down-conductors and related equipment in photovoltaic systems (including photovoltaic panels, inverters, cables, power distribution equipment) should keep a safe separation distance S.

A. When the safety distance S is satisfied, the position ①③ of the figure should be equipped with a lightning protection module. In general, it is recommended to install Type II in position ① and Type I in position ③.

B. When the safety and safety distance S is not met:

In addition to position 3, Type I lightning protection module should be installed at ①②④.

3） The lightning down conductor and the equipment grounding wire eventually converge at a general grounding point, but they cannot share wires. That is, the equipment grounding wire should be separately, and the wire

diameter requirement is >6mm² under the condition of meeting the safety separation distance S;

4) About the above lightning protection lightning receptor system related design reference GB/T 21714.3-2015 Suggested value of S: According to the general 5 storey height (about 15m) building roof, S takes 2.5m enough, this distance can be simplified according to the inverse relationship of the floor height.

6.5 Active power control with smart meter , CT or ripple control signal receiver

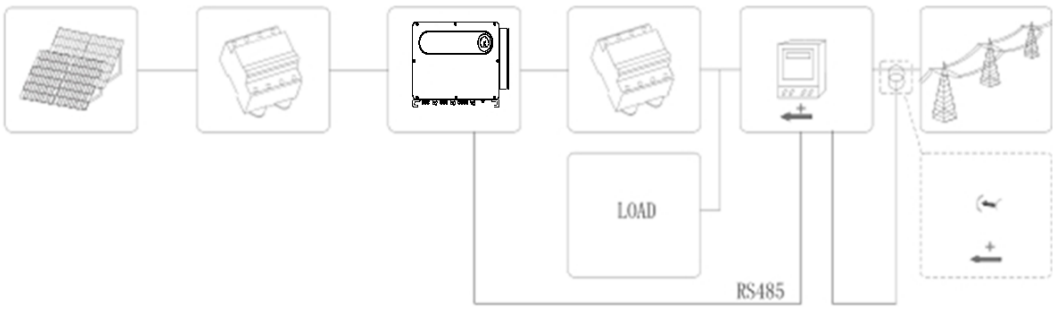
Information	The position of export limitation CT or Meter must between the Inverter & Load and gird. Multiple inverter combination is not suitable in Australia.

This series inverter has integrated generation limitation control and export limitation functionality.

The generation control function is used to control the active or apparent power output levels of an inverter.

The export limit control function for an inverter is used to control the generation from an inverter to manage the export power level from an electrical installation to the grid.

To use this function, you can connect smart meter or CT.



Manufacturer	CHNT	EASTRON	Growatt
Type	DTSU666	SDM630MCT V2	APM-CT-G

General Specifications

Type	DTSU666	SDM630MCT V2	APM-CT-G
Voltage AC (Un)	230V	230V	230V
Voltage Range	184~264.5V AC	170 to 480V AC	161~287.5V AC
Base Current (Ib)	0.1V AC	0.1V AC	0.1V AC
Power consumption	<1.5W/6VA	<1.5W/6VA	<1.5W/6VA

Frequency	50/ 60Hz(±10%)	45-65 Hz	45-65Hz
AC voltage withstand	4KV for 1 minute	4KV/1min	4KV for 1 minute
Impulse voltage withstand	6KV-1.2uS waveform	6kV – 1.2μS waveform	6KV-1.2uS waveform
Overcurrent withstand	20Imax for 0.5s	20Imax for 0.5s	20Imax for 0.5s
Pulse output 1	6400imp/kWh (default)	3200 imp/kWh	300imp/kWh (default)
Pulse output 2	0.001(default) /0.01/0.1/1 kWh/kVArh (configurable)	0.001(default) /0.01/0.1/1 kWh/kVArh (configurable)	/
Display Max. Reading	9999999kWh	9999999.9 kWh	/

Environment

Type	DTSU666	SDM630MCT V2	APM-CT-G
Operating temperature	-10℃ to +45℃	-25℃~+55℃	-30℃ ～ 65℃
Storage and transportation temperature	-25℃ to +70℃	-40℃~+70℃	-40℃ ～ 70℃
Reference temperature	23℃ ± 2℃	23℃ ± 2℃	23℃ ± 2℃
Relative humidity	0 to 75%, non-condensing	≤ 90%	0 to 85%, non-condensing
Altitude	up to 4000m	up to 2000m	up to 4000m
Warm up time	3s	3s	3s
Installation category	CAT III	CAT III	CAT III
Mechanical Environment	M1	M1	M1
Electromagnetic environment	E2	E2	E2
Degree of pollution	2	2	2

Mechanics

Type	DTSU666	SDM630MCT V2	APM-CT-G
Din rail dimensions	72x100x65(WxHxD) DIN 43880	94.5x72x65(WxHxD) DIN 43880	90*45*65mm (WxHxD) DIN 43880
Mounting	DIN rail 35mm	DIN rail 35mm	DIN rail 35mm

Ingress protection	IP51 (indoor)	IP51 (indoor)	IP20
Material	self-extinguishing UL94V-0	self-extinguishing UL94V-0	self-extinguishing UL94V-0

The following table describes how we can connect Chint meter DTSU666 to inverter:

Meter Pin NO.	Description	Meter Connection
1	IA*	A phase current input terminal
2	UA	Phase A voltage input terminal
3	IA	A phase current output terminal
4	IB*	B phase current input terminal
5	UB	Phase B voltage input terminal
6	IB	B phase current output terminal
7	IC*	C phase current input terminal
8	UC	Phase B voltage input terminal
9	IC	C phase current output terminal
11	UN	N phase current output terminal
15	B	RS485 B terminal
19	Active power, reactive power output high end	/
21	Active energy, reactive energy output low-end	/
24	A	RS485 A terminal

The following table describes how we can connect EASTRON meter SDM630MCT V2 to inverter:

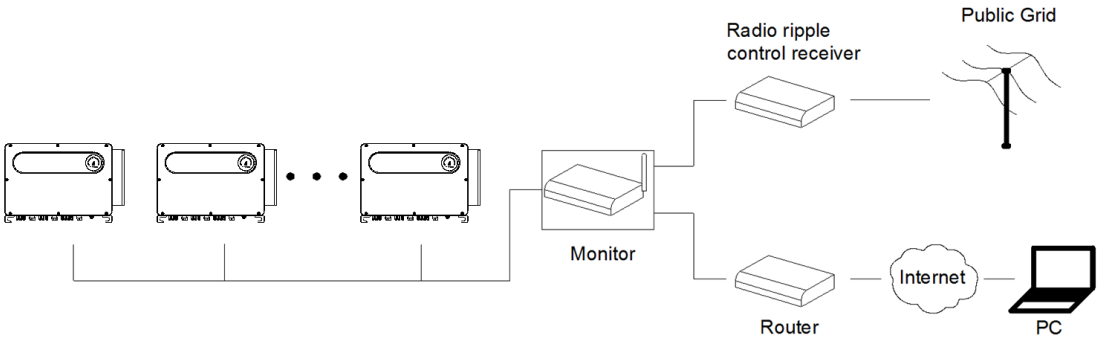
Meter Pin NO.	Description	Meter Connection
1	UN	N input terminal
2	UL3	Phase L3 voltage input terminal
3	UL2	Phase L2 voltage input terminal
4	UL1	Phase L1 voltage input terminal
5	UL	Auxiliary power supply Phase L voltage input terminal
6	UN	Auxiliary power supply N input terminal
7	UL	Phase L voltage output terminal
8	UN	N output terminal
9	Active energy, reactive energy output	/

	high end 1	
10	Active energy, reactive energy output low-end	/
11	Active energy, reactive energy output high end 2	/
12	GND	GND
13	A	RS485 A terminal
14	B	RS485 B terminal
15	IL1*	L1 phase current input terminal
16	IL1	L1 phase current output terminal
17	IL2*	L1 phase current input terminal
18	IL2	L1 phase current output terminal
19	IL3*	L1 phase current input terminal
20	IL3	L1 phase current output terminal

The following table describes how we can connect Growatt meter APM-CT-G to inverter:

Meter Pin NO.	Description	Meter Connection
1	A	RS485 A terminal
2	GND	GND
3	B	RS485 B terminal
5	IL3*	L1 phase current input terminal
6	IL3	L1 phase current output terminal
7	IL2*	L1 phase current input terminal
8	IL2	L1 phase current output terminal
9	IL1*	L1 phase current input terminal
10	IL1	L1 phase current output terminal
11	UL1	Phase L1 voltage input terminal
12	UL2	Phase L2 voltage input terminal
13	UL3	Phase L3 voltage input terminal
14	UN	N input terminal
15	PE	PE

Active power control with a ripple control signal receiver.



6.6 Inverter demand response modes (DRMS)

This series inverter has the function of demand response modes, We use 16Pin socket as inverter DRMS connection.

Information	DRMS application description ➢ Only applicable to AS/NZS4777.2:2015. ➢ DRM0, DRM5, DRM6, DRM7, DRM8 are available.
CAUTION	Damage to the inverter due to moisture and dust penetration ➢ Make sure the cable gland has been tightened firmly. ➢ If the cable gland are not mounted properly, the inverter can be destroyed due to moisture and dust penetration. All the warranty claim will be invalid.

6.6.1 16Pin socket pin assignment

COM Socket Pin NO.	Assignment for inverters capable of both charging and discharging
9	DRM 5
10	DRM 6
11	DRM 7
12	DRM 8
13	RefGen
14	Com/DRM0

6.6.2 Method of asserting demand response modes

Mode	Socket Asserted by	Requirement

	shorting pins		
DRM 0	14	13	Operate the disconnection device
DRM 5	9	13	Do not generate power
DRM 6	10	13	Do not generate at more than 50% of rated power
DRM 7	11	13	Do not generate at more than 75% of rated power AND Sink reactive power if capabie
DRM 8	12	13	Increase power generation (subject to constraints from other active DRMs)

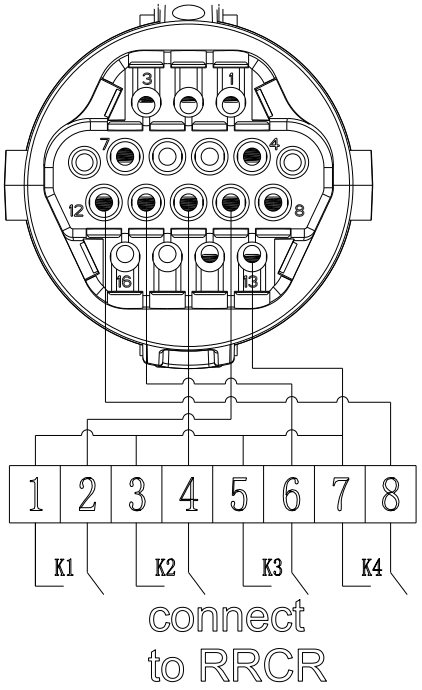
6.6.3 Using DRMS for EU

 **WARNING**	Excessive voltage can damage the inverter! External voltage of DRMs PORT don't over +5V.

Inverter – RRCR Connection

6.6.3.1 The following table describes the connector pin assignment and function:

COM Socket pin NO.	Description	Connect to RRCR
9	Relay contact 1 input	K1 – Relay 1 output
10	Relay contact 2 input	K2 – Relay 2 output
11	Relay contact 3 input	K3 – Relay 3 output
12	Relay contact 4 input	K4 – Relay 4 output
13	GND	Relays common node
14	Not connected	Not connected
15	Not connected	Not connected
16	Not connected	Not connected



6.6.3.2The inverter is preconfigured to the following RRCR power levels:

COM Socket Pin 9	COM Socket Pin 10	COM Socket Pin 11	COM Socket Pin 12	Active power	Cos(ϕ)
Short circuit with Pin13	-	-	-	0%	1
-	Short circuit with Pin13	-	-	30%	1
-	-	Short circuit with Pin13	-	60%	1
-	-	-	Short circuit with Pin13	100 %	1

Active power control and reactive power control are enabled separately.

6.7 Earth Fault Alarm

The inverter complies with AS/NZS 5033.When the Earth fault occurs,the Red LED will light up.The buzzer in the inverter will keep ringing unless the fault condition is cleared (This function is only avilable for Australia and New Zealand).

6.8 AFCI(Optional)

6.8.1 Arc-Fault Circuit Interrupter (AFCI)

In accordance with the National Electrical Code R, Article 690.11, the inverter has a system for the recognition of electric arc detection and interruption. An electric arc with a power of 300 W or greater must be interrupted by the AFCI within the time specified by UL 1699B. A tripped AFCI can only be reset manually. You can eactivate the automatic arc fault detection and interruption (AFCI) via a communication roduct in "Installer" mode if you do not require the function. The 2011 edition of the National Electrical Code R, Section 690.11 stipulates that newly installed PV systems attached to a building must be fitted with a means of detecting and disconnecting serial electric arcs (AFCI) on the PV side.

6.8.2 Danger information

	Danger of fire from electric arc Only test the AFCI for false tripping in the order described below. Do not deactivate the AFCI permanently.

If an "Error 200" message is displayed, the buzzer alarms, an electric arc occurred in the PV system. The AFCI has tripped and the inverter is in permanent shutdown.

The inverter has large electrical potential differences between its conductors. Arc flashes can occur through air when high-voltage current flows. Do not work on the product during operation.

When the inverter error 200, please follow the steps:

7. Commissioning

7.1 Inverter Commissioning

	•If the inverter is stored for more than one month, its default time and date might be wrong, the time and date should be reset before connecting to the grid.

7.1.1 Set inverter address

After inverter is turned on normally, its communication address can be set via RS485 or USB port. When multiple inverters are connected in parallel via RS485, the inverter must be set to a different communication address. When a single inverter communicates, the default communication address can be used.

Note: The default communication address of the inverter is 1, the address could be set from 1 to 254.

7.1.1.1 Set RS485 address via Shinebus

The inverter RS485 address can be modified through the upper computer

software ShineBus, and this operation is performed by professionals.

7.1.1.2 Set RS485 address on ShinePhone APP

Refer to Chapter 8.2 Local Data Monitoring, download the APP and log in to the monitoring system to modify the RS485 address. This operation is performed by professionals.

1>Click “Parameters”

2>Enter password.(When you use it for the first time, please set the password firstly. Click "Reset password" to enter the OSS account number and password. The

distributor and installer can apply for the OSS account from Growatt. Click "Sign in"

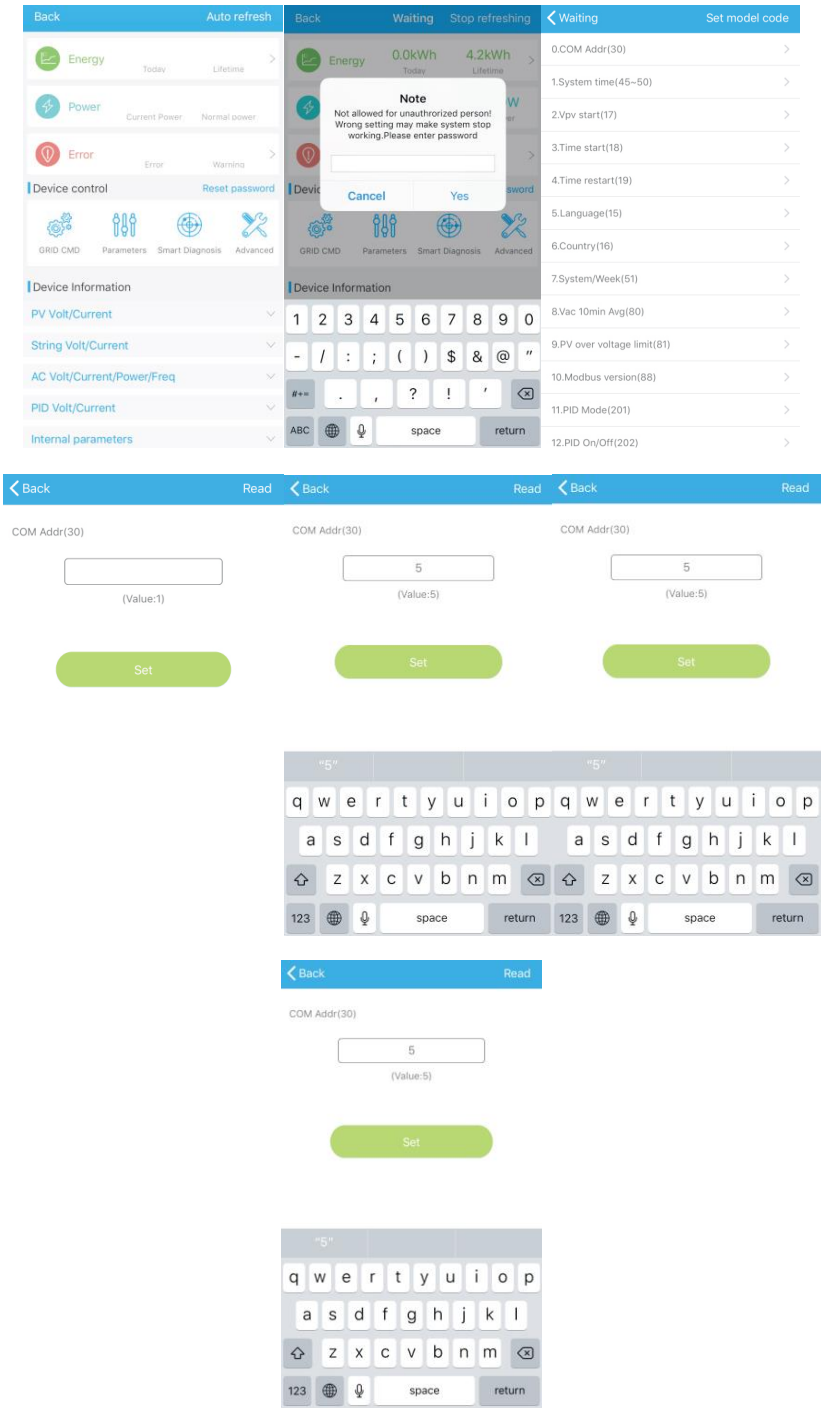
to set the password. After the setting is successful, you can start using it.)

3>Click top item “COM Address”；

4>Click the "Read" button in the upper right corner to read the current communication address of the inverter;

5> Set inverter communication address;

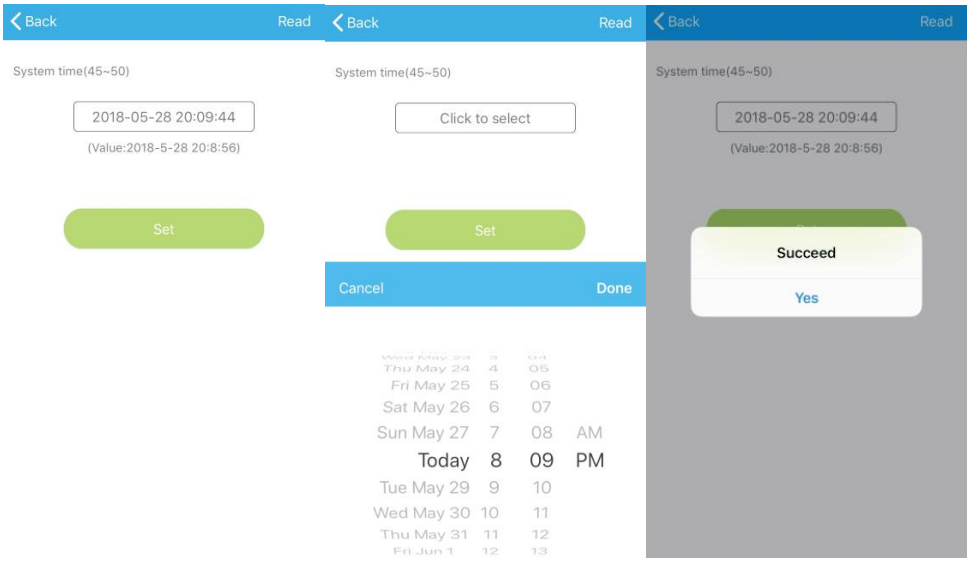
6>Read inverter communication address to ensure the setting is successful;



7.1.2 Inverter Time and Date Setting

Method 1:

Please refer to section 8.2.1 and login ShinePhone APP. Click "System Time(45-50)"to set inverter time.



Method 2:

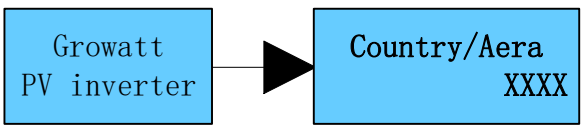
Please connect GPRS antenna to the inverter as section 6.3.3, when the inverter is

powered on, connect the inverter to the server as section 8.1.2, then the inverter time will be updated automatically.

7.1.3 Country/Area and Region setting

Information	Country/Area and Region setting ➢ When the inverter start up,we need to select the right country,if we don't select any country, the inverter will run under AS/NZS4777.2 as default for Australia & Region A,or run under VDE0126-1-1 for other region after 30s.

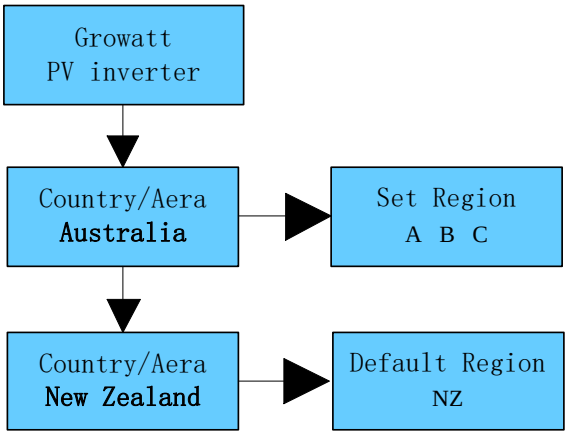
When inverter powered on, OLED will light automatically. Once the PV power is sufficient, OLED displays the following:



Press the touch key once a second to scroll through the different Country, showing on the screen will constantly change.For example, if you want to choose Newzealand, press the control key until the OLED display shows "Newzealand" as below:

Press the touch key 5S, the OLED shows Country setting is complete.

When the Country setting is complete, the OLED display shows “Set Region” as below:



We can set Region A,B or C when you choose Australia,but if you choose Newzealand the default Region is NZ.

When Region A is selected, the inverter loads all the Region A values for power quality response modes and grid protection settings.

7.1.4 Enabling/Disabling Power Quality Response Modes（PQRM）

Information	PQRM setting ➢ When the Region setting is completed, the inverter will operate under default mode different from region.

MIN TL-X contains five types Power Quality Response Modes：

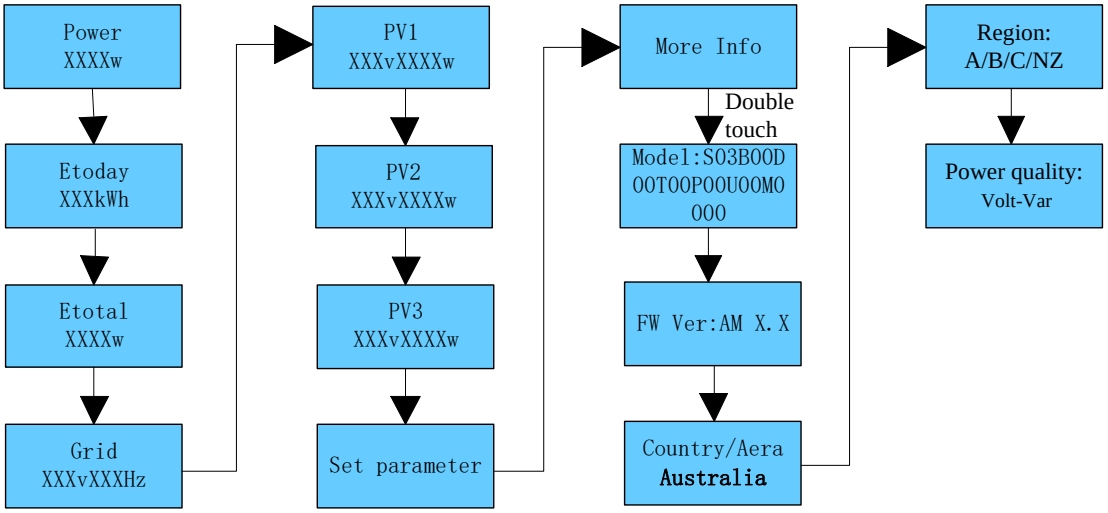
Volt-Var, Volt-watt, Fixed PF, Reactive power, Power limit.If you want to change the

Power Quality Response Modes please refer to chapter 7.3.1.

7.1.5 Check firmware version,Region,Country/Area and Power Quality Response Modes

Single touch to switch display.

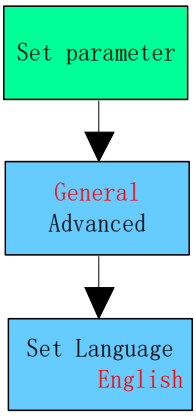
Double touch to enter next stage menu.



7.2 General setting

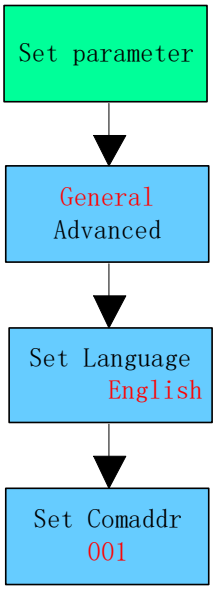
7.2.1 Set inverter display language

This series inverter provides multi languages.
Single touch to switch different language.
Double touch to confirm you setting.
Set the language as described below:



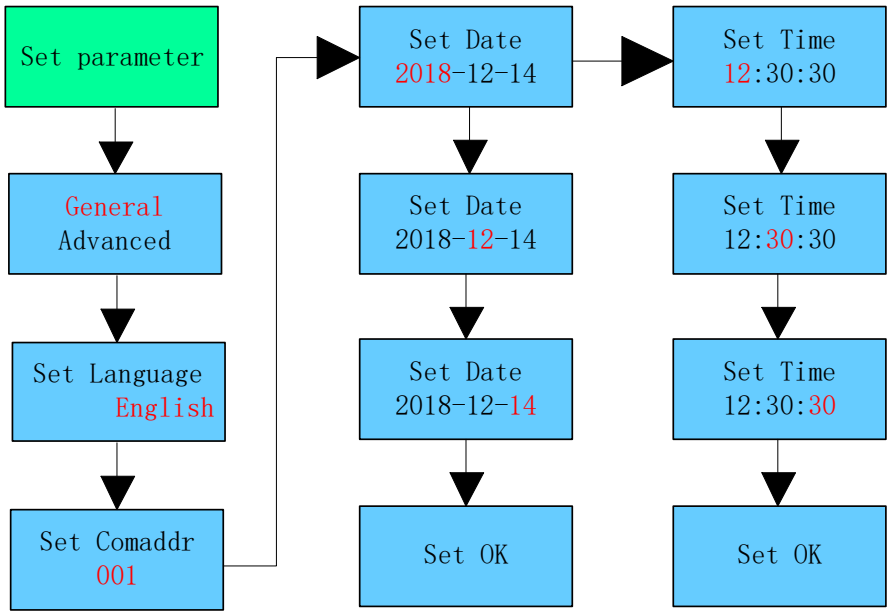
7.2.2 Set inverter COM address

The default COM address is 1.We can change COM address as described below:
Single touch to switch display or make the number +1.
Hold 5s, the COM address become 001.
Double touch to confirm you setting.



7.2.3 Set inverter date & time

Single touch make the number +1.
Double touch to confirm you setting.
Hold 5s recover defaut value.

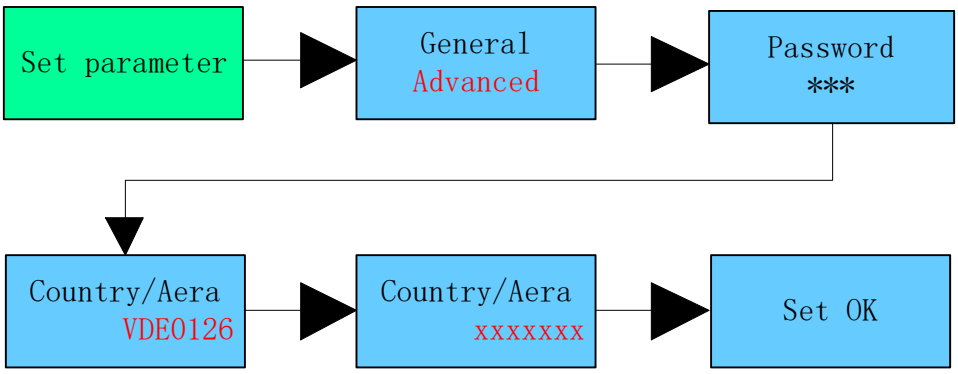


7.3 Advanced setting

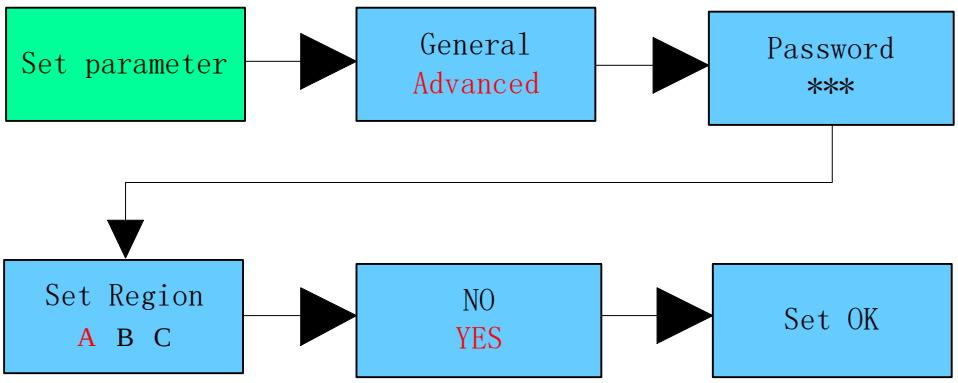
7.3.1 Reset Country,Region and Power Quality Response Modes （PQRM）

Single touch to switch display or make the number +1.
Double touch to confirm you setting.
Input right password,you can change Country/Area,Region and PQRM settings.

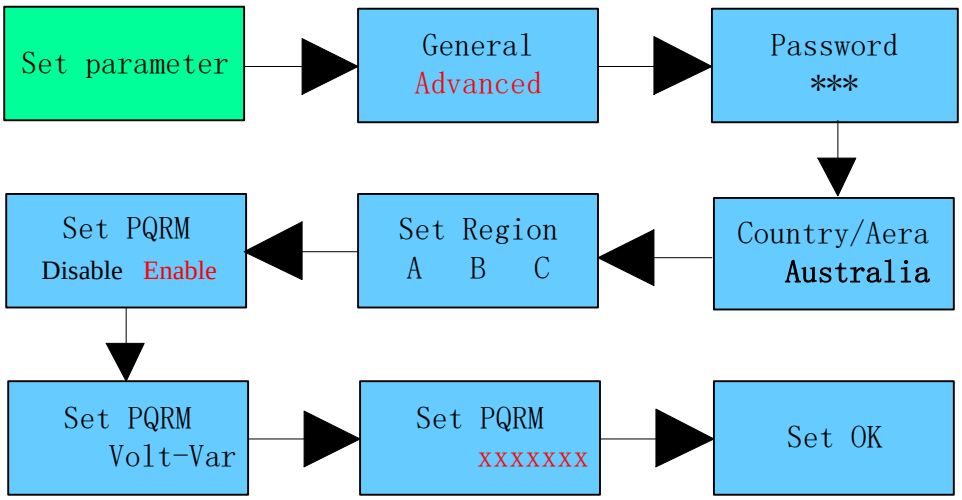
Reset Country



Reset Region



Reset PQRM



7.3.2 Generation & Export limitation control and Power Sensor setting

Single touch to switch display or make the number +1.

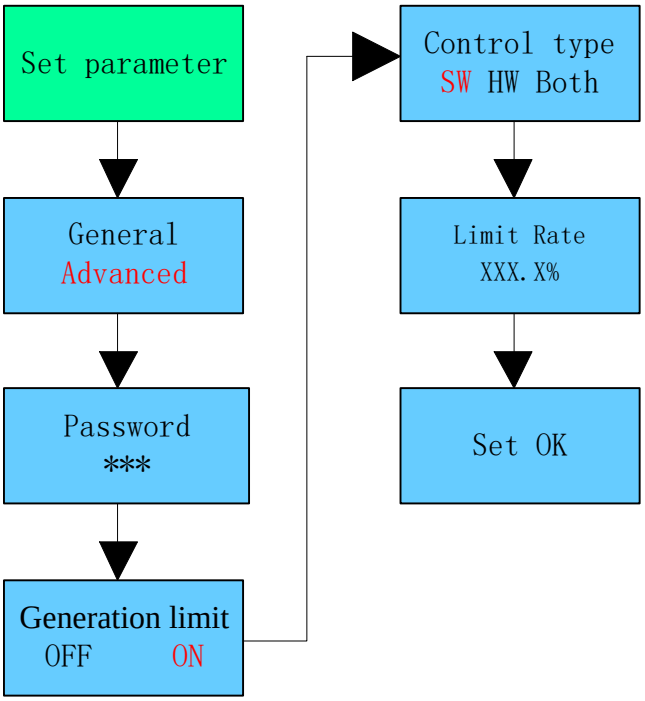
Double touch to confirm you setting.

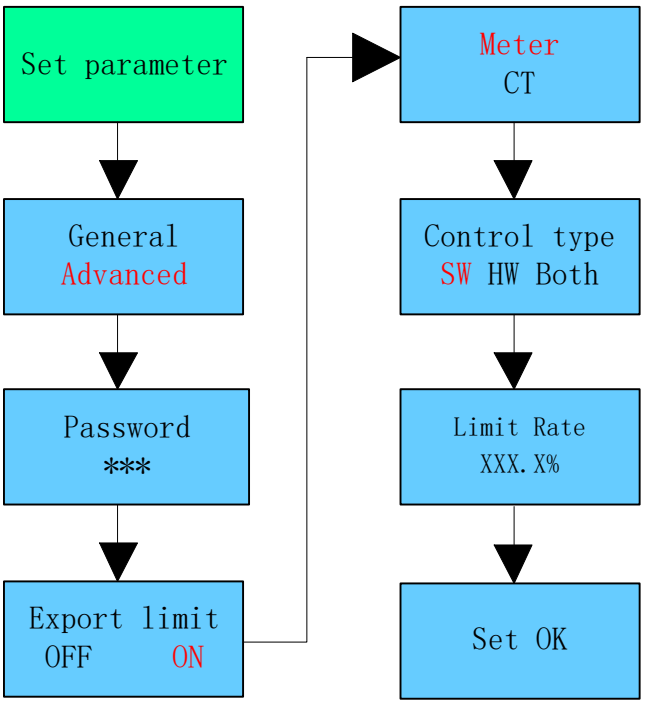
Control type:

SW stands for enabling software limit control function

HW stands for enabling hardware limit control function

Both stands for enabling software and hardware limit control function at the same time.



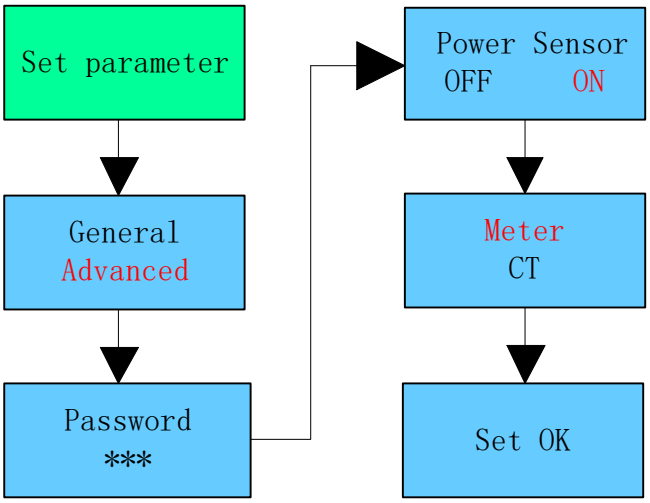


Under the permission given by your energy provider, the ratio of your system output powe
r

divided by the rated power of the inverter is called Limit Rate.For instance,if the energy pr
ovider

only accepts 8kVA/kW

from your 10kW system, then the Limit Rate of 10kW inverter is 80.0%.

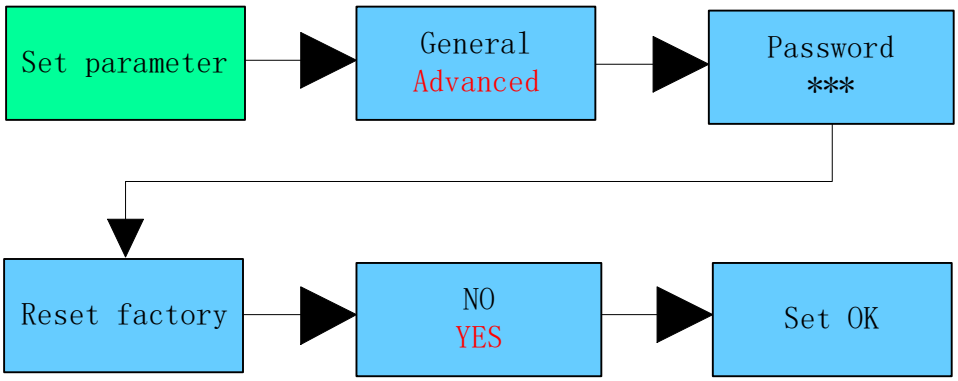


If you only want to check the load consumption function,you can choose Meter as Power sensor.CT is just only for Export Limit function.

7.3.3 Reset factory

Information	Perform this operation with caution because all configured parameters except the current date,time, and model parameters will be restored to their factory defaults.

Single touch to switch display or make the number +1.
Double touch to confirm you setting.
Input right password,you can reset factory default setting.



7.3.4 Adjust the setpoints from the regional default values

Under the permission by Distribution Network Service Provider,the installer can adjust the setpoints from the regional default values.

Please refer to the document 《Adjust the setpoints from the regional default values instruction》

7.3.5 Generation & Export limitation control and Power Sensor setting

Single touch to switch display or make the number +1.

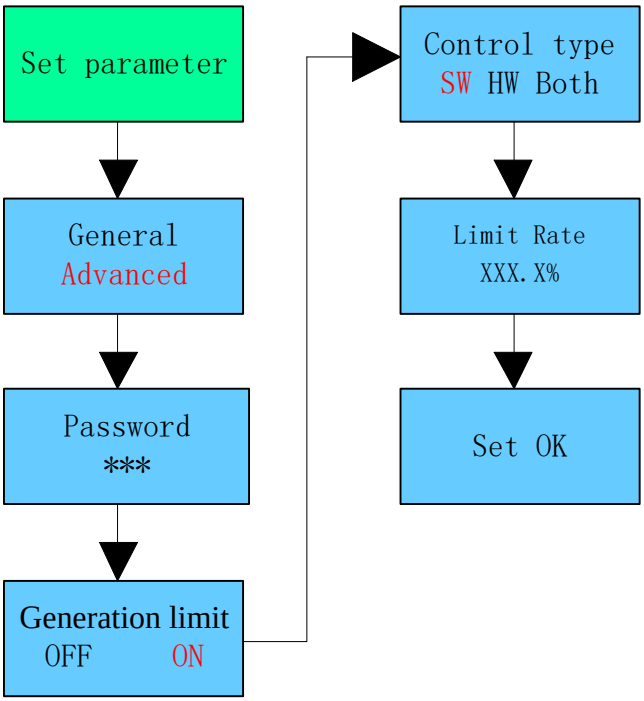
Double touch to confirm you setting.

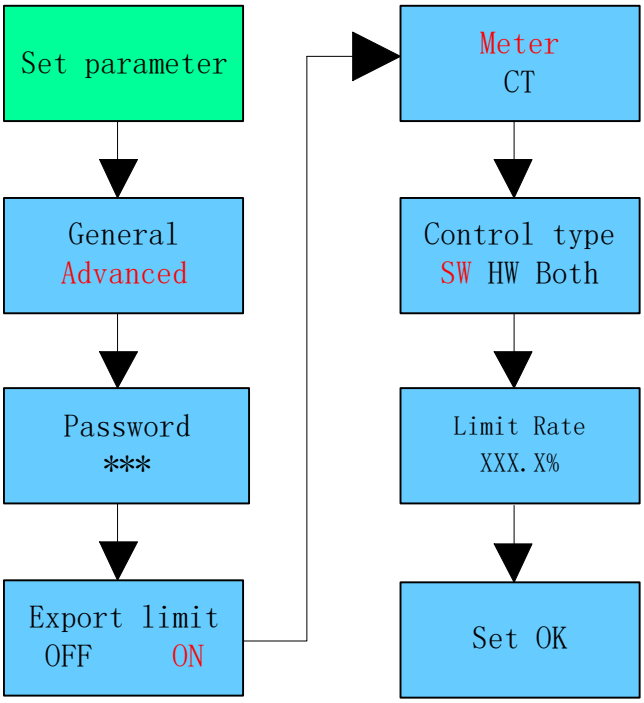
Control type:

SW stands for enabling software limit control function

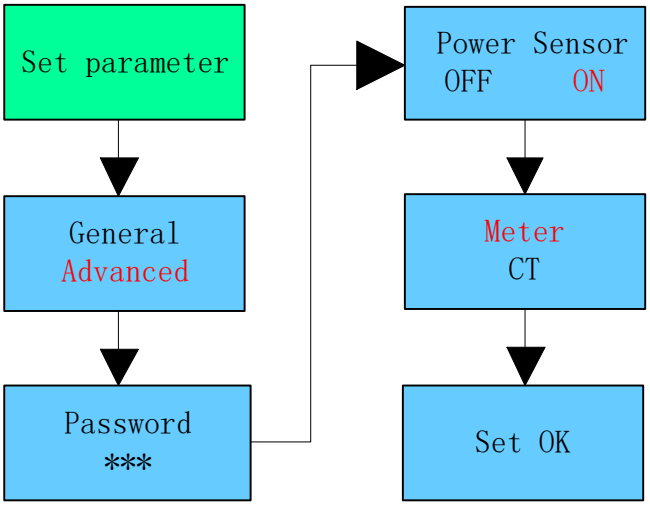
HW stands for enabling hardware limit control function

Both stands for enabling software and hardware limit control function at the same time.





Under the permission given by your energy provider, the ratio of your system output powe r divided by the rated power of the inverter is called Limit Rate.For instance,if the energy provi der only accepts 8kVA/kW
from your 10kW system, then the Limit Rate of 10kW inverter is 80.0%.



If you only want to check the load consumption function, you can choose Meter as Power sensor. CT is just only for Export Limit function.

7.4 Operation Mode

7.4.1 Waiting Mode

When the DC voltage is more than 180V, inverter will be powered on and enters the "waiting" state.

Under this mode, inverter will check the system parameter. If the system is normal and PV voltage is more than 195V, inverter will try to connect to the grid.

7.4.2 Working Mode

Under this mode, the inverter works normally, and the power and fault code LED indicators show the power exported to the grid by the inverter. When the DC voltage is greater than or equal to 180V, the inverter will convert the DC power generated by the photovoltaic module into AC power and send it to the grid. When the DC voltage is less than 180V, the inverter enters the "waiting" state and tries to connect to the grid. In this state, the inverter consumes only a small amount of power to detect the internal system status

Note: When the photovoltaic module provides enough power (voltage>195V), the inverter will automatically start.

7.4.3 Fault Mode

The intelligent control system of the inverter will continuously monitor and adjust the state of the system. When the inverter detects any fault, the alarm or fault LED indicator lights up or flashes red, and the power and fault code LED indicators show the fault information.

Note: Please refer to section10 to check the fault message and take corrective measures.

7.4.4 Off Mode

When the sunlight is weak or no light, inverter will stop working automatically. When it is off, inverter will not consume gird power or PV module. At the same time, the LED of inverter will be turned off.

Note: When PV string DC voltage is too low(≤ 150Vdc), inverter will be off.

7.5 LED Display

The status of inverter could be checked from LED display directly.

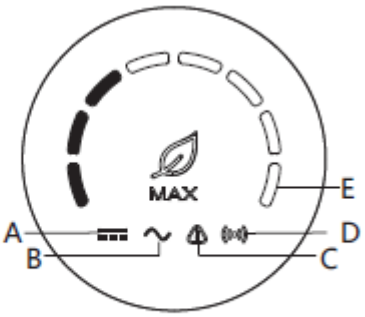


图 7.3

图 7.4

Description of LED status			
LED code	LED Name	Inverter status	LED status
A	PV voltage indicator light	PV voltage reaches the grid-connected voltage	Green LED is on
		PV voltage does not reach the grid-connected voltage	LED is off
B	AC voltage indicator light	Inverter is connected to the grid	Green LED is on
		No AC voltage	LED is off
		With AC voltage, the inverter is at Grid-connected countdown status	The green LED flashes slowly, and the alarm or fault indicator light is off
C	Alarm or fault indicator light	Inverter works normally	LED is off
		There is some alarm for this inverter	Red LED flashes slowly
		There is some fault for this inverter	Red light is on
D	Communication indicator light	Inverter has external communication, such as RS485, GPRS, etc.	Green LED is on
		Inverter has no	LED is off

		external communication	
		Inverter upgrade or USB interface is reading and writing data	Green LED flashes fast
E	Power or fault code indicator light	Inverter is connected to the grid	The number of lighting of 8 LED lights from left to right represents the ratio of the current power of the inverter to the rated power of the inverter: if all the 8 green LEDs are on, it means the inverter’ s output power is 100% . As figure 7.3 shows, its output power is 37.5% of the rated power.
		There is some fault for this inverter	The five LEDs from right to left represent 1, 2, 4, 8, 16 in turn, representing the fault code of the inverter. As shown in Figure 7.4, the LED status represents 2, and then 2 is added to the specific 99 to get 101, so it can be known that the inverter reported error 101.

7.6 Powering on the inverter

7.6.1 Precautions

Before turning on the AC switch between the inverter and the power grid, use a multimeter to check that the AC voltage is within the specified range.

7.6.2 Procedure

Step 1 Turn on the AC switch between the inverter and the power grid.
Step 2 Turn on the DC switch at the bottom of the inverter.
Step 3 Data monitoring through USB or RS485 interface, see chapter 8 for details

7.7 Powering off the inverter

7.7.1 Procedure

Step 1 Run a shutdown command on the app, ShineBus, or monitoring webpage.
See chapter 8 for details
Step 2 Turn off the AC switch between the inverter and the power grid.
Step 3 Turn off both DC switches.

8 Monitoring Methods

8.1 Remote Data Monitoring

The remote monitoring platforms of MAX 80-133KTL3-X LV series inverter include APP (ShinePhone) and website(Shineserver and OSS). Kinds of devices, such as RS485, GPRS, 4G and PLC(reserved) can be used for the monitoring.

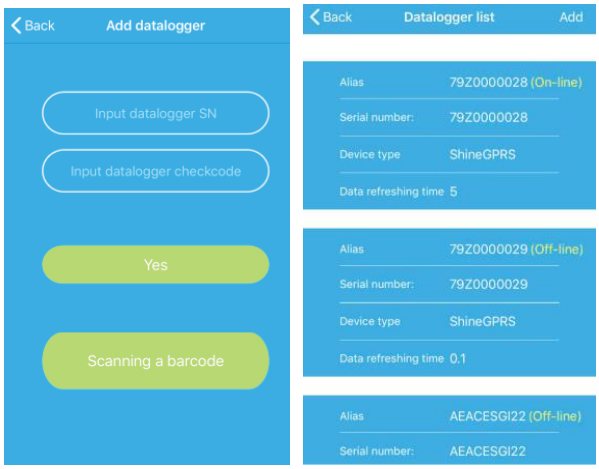
8.1.1 Mobile Phone APP(ShinePhone) Remote Monitoring

1>Scan the following QR code, or download from Google Play or Apple Store by searching "Shinephone", download and install the APP.

Note: 1.Make sure the APP is the latest version.
2.For more information, please find online at http://server.growatt.com.

2> Users can register their mobile APP account by following the steps below: Run ShinePhone go to login page click register".Registration is required to fill in the information, with the * is required, the agreement is mandatory, you can log in to the main interface of ShinePhone after registration, the registration page and the main interface are as shown below.

Shinephone login and main page:

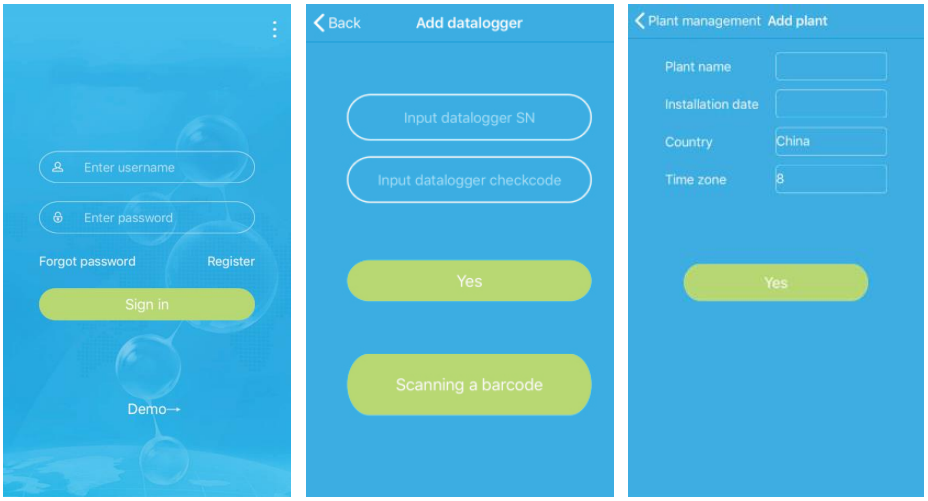


Shinephone Main Page:

1>Main page top middle is the name of current plant, user can click the "∨" button to switch to other plants under this account.User can add datalogger, check datalogger and add plant by click “+” button at the top right corner.

2>The upper part of the main interface shows the total inverter power, total power generation and revenue of the current power station.

3> "My device" shows the inverter of the current plant. You can enter the details interface by clicking the name of the inverter, or you can set it on top and edit it by sliding left. Editing includes modifying aliases and deleting devices.



Datalogger:

1>User can add more datalogger under the particular plant.

Way: Click “+” in the upper right corner of the device page and select “Add datalogger (WiFi/GPRS, etc.)”, as shown in Figure 8.7.

Note: Users can choose to add the datalogger via manually entering the datalogger serial number, or you can add it by scanning the barcode on the nameplate.

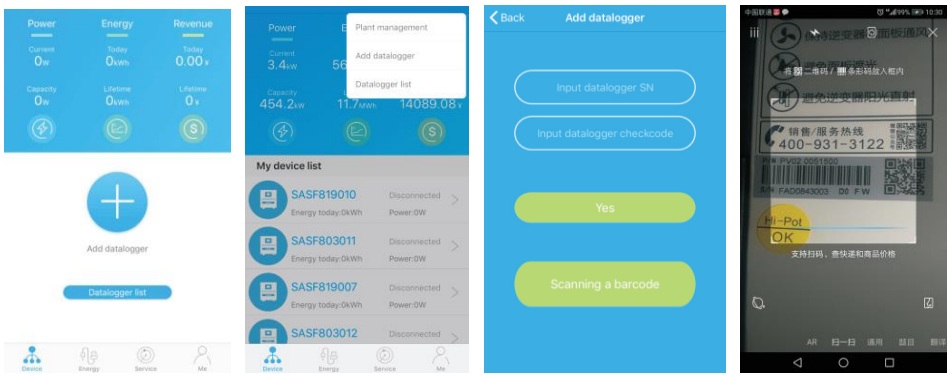


图 8.7

2>Users can add, edit, delete, and configure the dataloggers under the plant name through the datalogger list interface.

3>Users can add more plants with the add plant function.

Device page and function:

1>Device page: User can click the device to see more details, the device page show

current power and Energy today and daily power chart, user can find more with

control, parameter, data and Events page.

2>Control: user set inverter on/off, set active power, set reactive power, set PF, set

inverter time, set grid voltage high, set grid voltage low. The operation password is

: inverter+ date, for example inverter20170722.

3>Parameter: user can see device SN, rated power, firmware version, PV1 voltage,

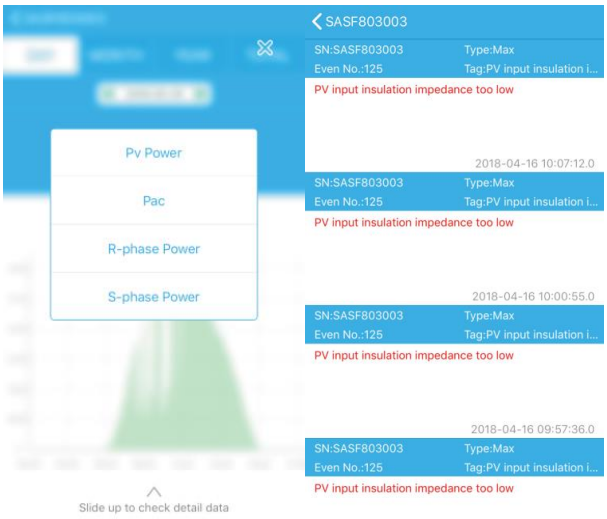
current, and power etc.

4>Data page: user can see the PV power, voltage, current, R phase power, S phase

power, S phase power, T phase power, output power by day, month, year, by finger up

cross the screen.

5>Logs: User can see the fault message if there it is.



8.2 Local Data Monitoring

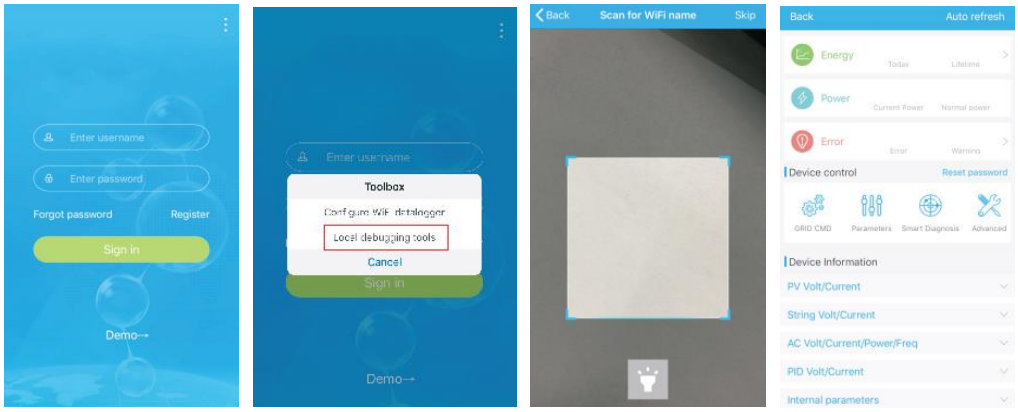
MAX 80-133KTL3-X LV Series Inverter local data monitoring mode has a mobile phone app phone) and PC direct connection, u disk, details are as follows.

8.2.1 Mobile Phone APP (Shinephone) Local Monitoring

8.2.1.1 Log on to APP for local monitoring

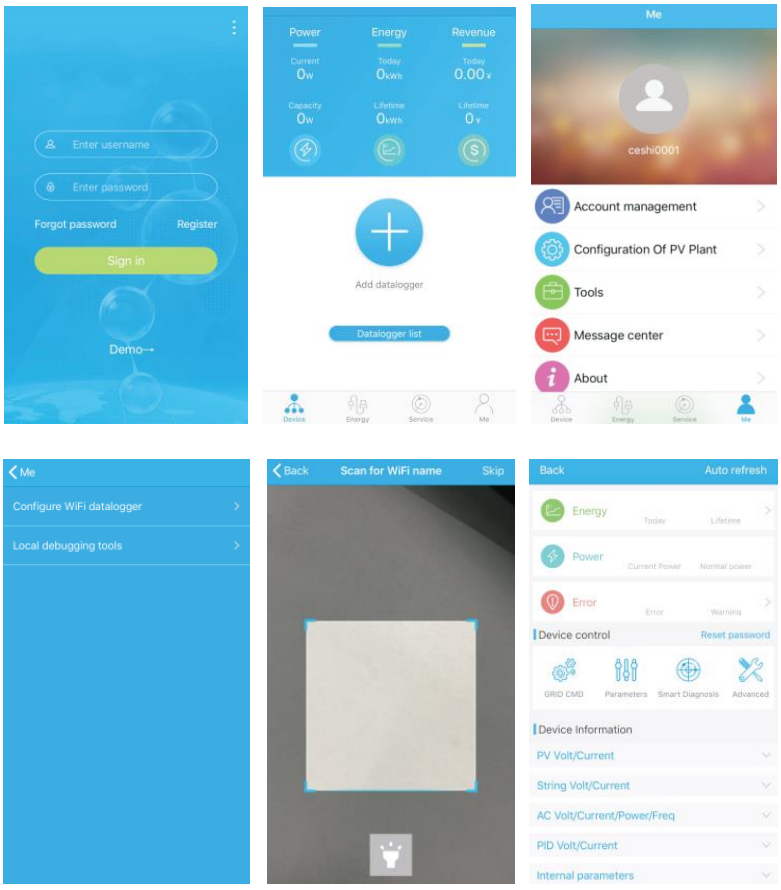
Method 1

When you open the app login front page, click the top right corner toolbox icon. Pop up the toolbox, click the local debugging tool, and you can get the wifi name of the collector by scanning the QR code or barcode(The default password for WIFI is 12345678. If you have already connected, you can click "Skip" to connect directly to the WIFI.)



Method 2

Open app enter user name and password click login, enter me (personal center). Click the enter tool, find the local debugger to enter, and you can get the wifi name of the collector by scanning the QR code or barcode(The default password for WIFI is 12345678. If you have already connected, you can click "Skip" to connect directly to the WIFI.)



8.2.1.2 Use of local monitoring and debugging

When taking the local monitoring, the mobile phone must be connected to the WIFI of the datalogger to view the device status (click refresh in the upper right corner, you can get the latest data).

Electricity generation: the option to view the latest generation, daily generation, monthly and annual generation of detailed information;

Power: you can see the current power and rated power value; failure: can read the equipment detailed fault information.

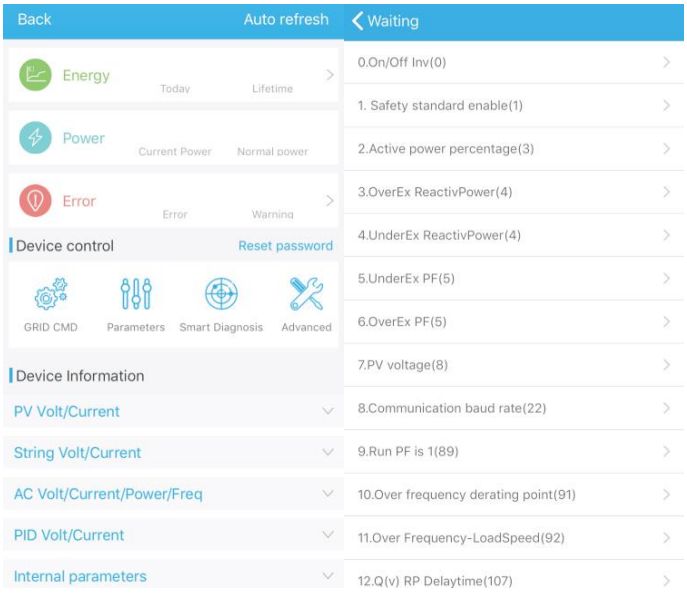
Note: In addition to resetting the password to connect to the network, other WIFI modules that must connect to the collector can view information.

A. Reset password

Need network connection login oss account to set up or modify the local debug password.

B. Setting configuration

The configuration data of inverter, voltage, power and so on can be modified according to the usage (Fig 8.36).



C. Parameter configuration

The parameter data of the equipment can be modified according to the usage (Fig 8.37).

D. Intelligent detection

Detailed and accurate view of the device's detailed data and status (Fig 8.38)

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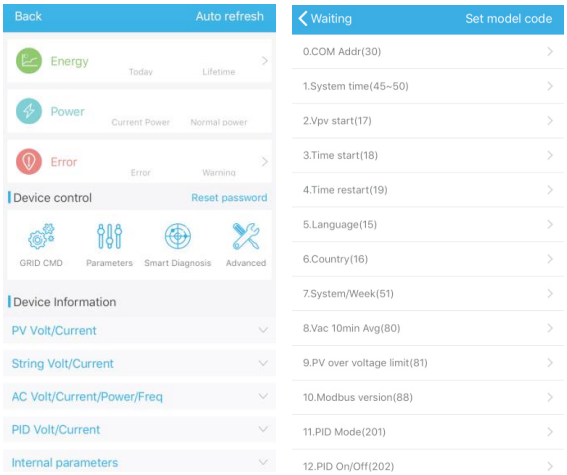
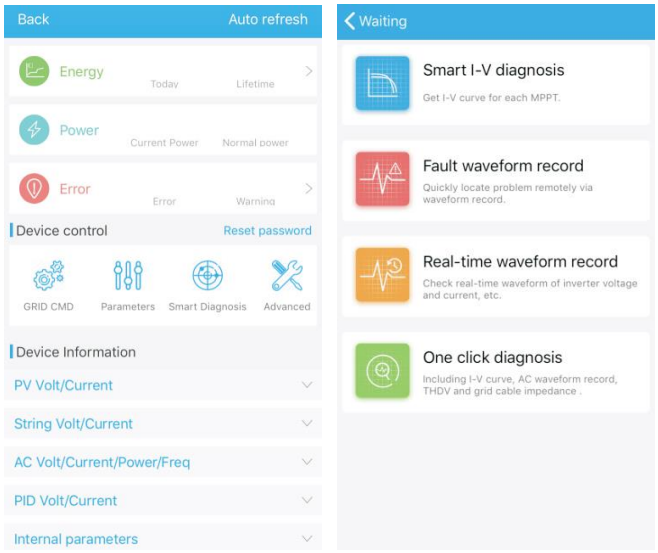
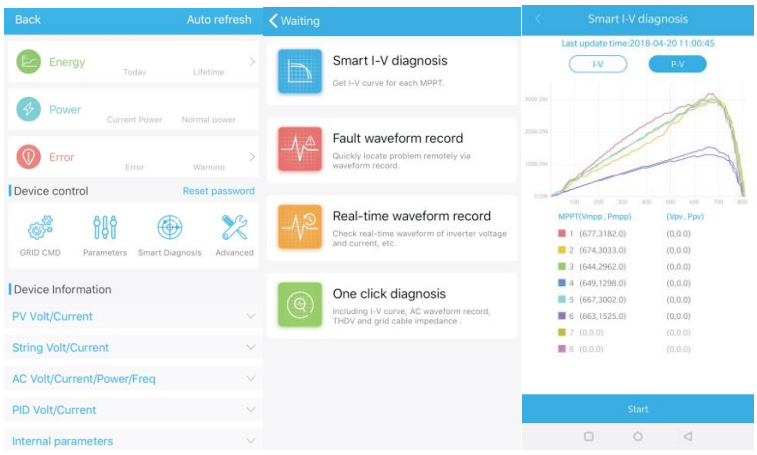




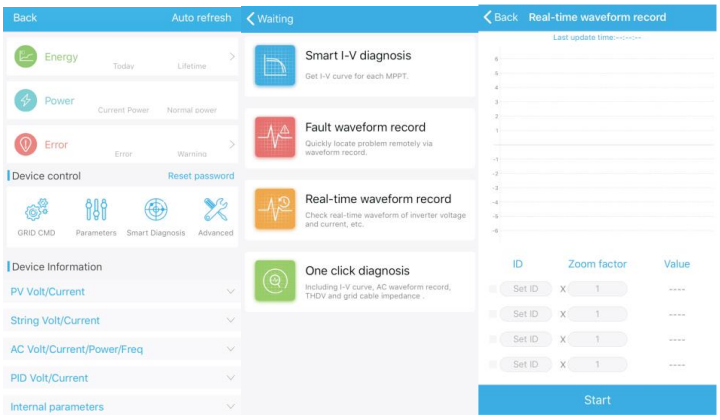
E. Intelligent I-V curve scanning

Can remotely scan each mppt (Fig 8.39).



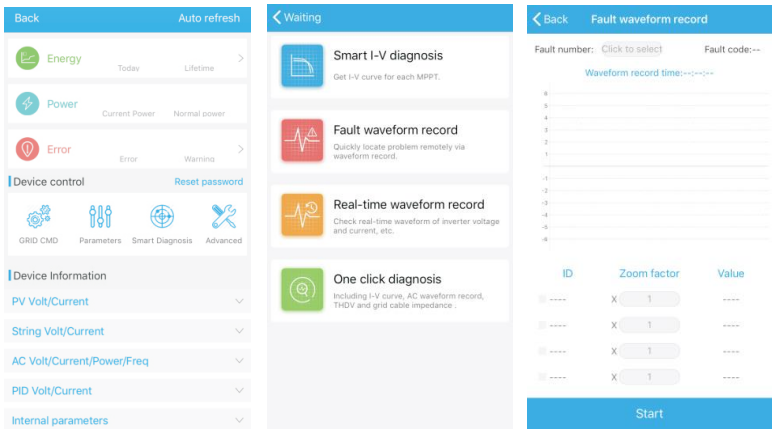
F. Fault wave recording detection

Remote, fast and accurate fault location (Fig 8.40).



G. Real-time recording detection

Inverter voltage and current quality can be observed in real time (Fig 8.41).



H. One click diagnosis

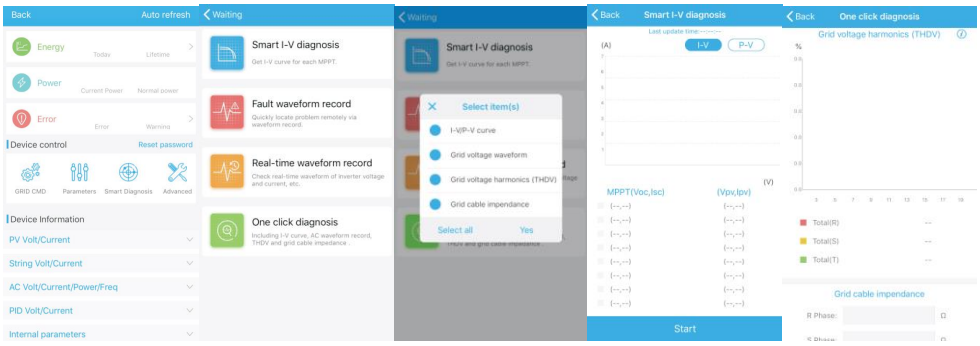
I-V curve diagnosis, grid waveform, THDV and cable impedance detection all at one click (Fig 8.42).

I Advanced setting

Set the parameters according to the register address (professionals).

J. Device information

Check PV voltage/current, string voltage/current, AC voltage /current /power/ frequency, PID voltage/current, internal parameters and device detail information and parameters(Fig 8.43).



8.2.2 U Disk Monitoring

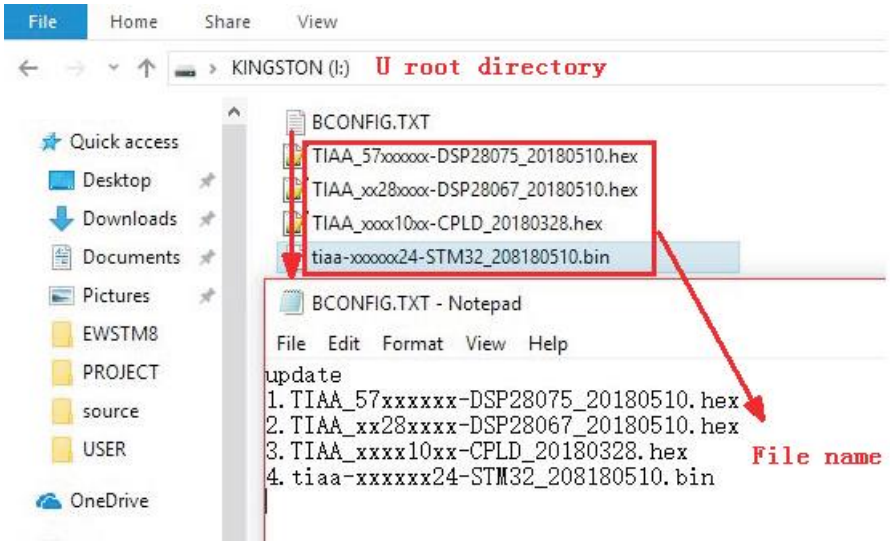
Refer to 6.3.2 USB to WIFI/ U disk communicate connection, the local monitoring of U

disk can realize the functions of software burning, fault recording, curve analysis and

real time recording. Details are as follows:

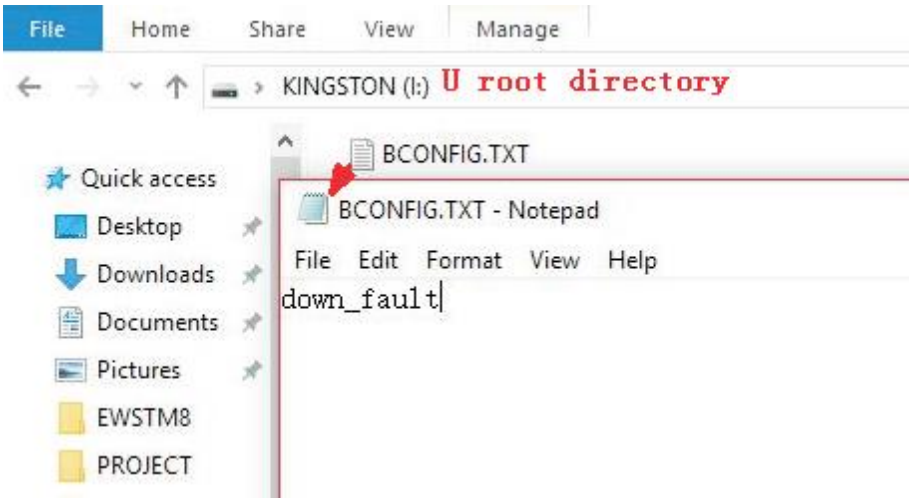
1>Firmware Programming

Create the bconfig.txt file under the root of the U disk, write to the following content, then insert the U disk to programming. Note the M3 program needs to be programming at last time.



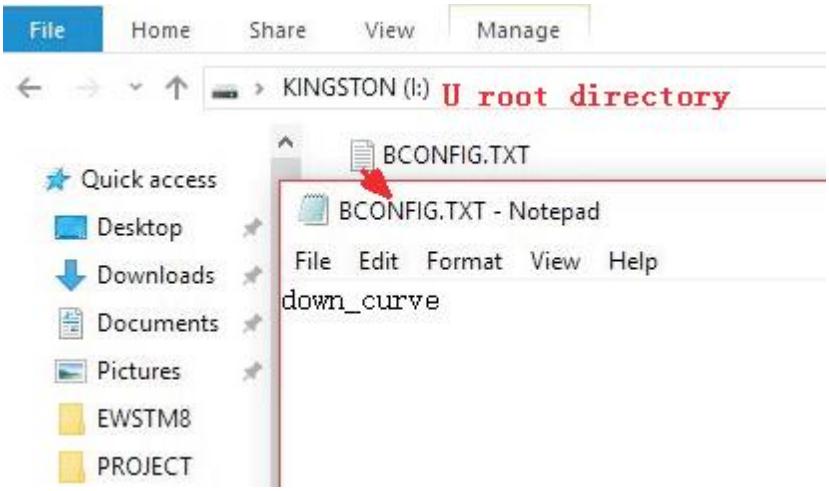
2>Fault Recording

Create the bconfig.txt file under the root of the U disk, write the following content, then insert the U disk that can be read fault information, then generates a form under the files in the root directory, A total of 60 fault recording information is stored, the latest Numbers is 0.



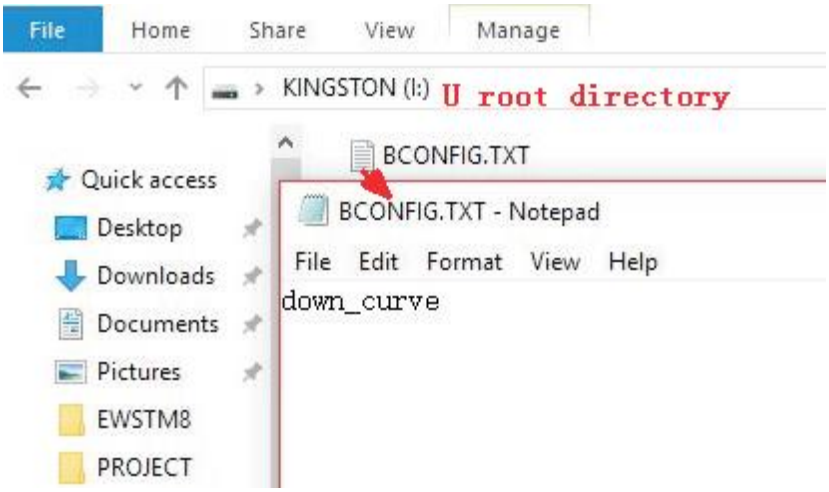
3>Curve Analysis

Create the bconfig.txt file under the root of the U disk, write the following content, the insert U disk to record I-V curve, then generates a form under the files in the root directory.



4>Real Time Recording

Create the bconfig.txt file under the root of the U disk, write the following content, then insert U disk to read real time recording information，then generates a form under the files in the root directory，the form record's waveform is consistent with the ID of the command setting.



9. System Maintenance

9.1 Routine Maintenance

9.1.1 Inverter Cleaning

DANGER	•Before any operation, please disconnect the AC switch, and wait for at least 5 minutes until internal capacitance discharge completely.

1>Check the ambient temperature and dust of the inverter, clean the inverter if necessary.

2>Observe whether the air outlet is normal, if necessary, clean the air outlet or clean the fans, for details please refer to 9.1.2.

9.1.2 Fan Maintenance

	•It must be operated by well-trained professional electrical technicians and follow the instructions in this manual. •Please disconnect the AC switch before any operation, and wait for at least 5 minutes until the internal bus capacitance discharge completely.
	•Do not use the air pump to clean the fans, it may damage the fans.

When the Growatt MAX series inverter work in high temperature environment, good

ventilation and heat dissipation can effectively reduce the chance of load derating. Inverter equipped with cooling fans, when the internal temperature is too high, the fans will work to reduce the internal temperature. When the inverter is derating since the higher internal temperature, the possible causes and solutions are as follows

1) The fan is blocked or there is too much dust on the heat sink, it is necessary to clean the fan, fan guard or heat sink;

2) The fan is damaged so that the fan needs to be replaced;

3) The ventilation of the installation location is poor, so the appropriate installation location should be chosen according to the basic installation requirements .

The cleaning and replacement procedure of fan;

1>Please ensure that the DC side and AC side of the inverter have been disconnected

before cleaning or replacing the fan.

1) Disconnect DC terminals from inverter (Users need tools to disconnect the DC

connection terminals).

2) Turn off AC switch.

2>Remove the screws on the fan guards with a cross screwdriver. it is shown as below.

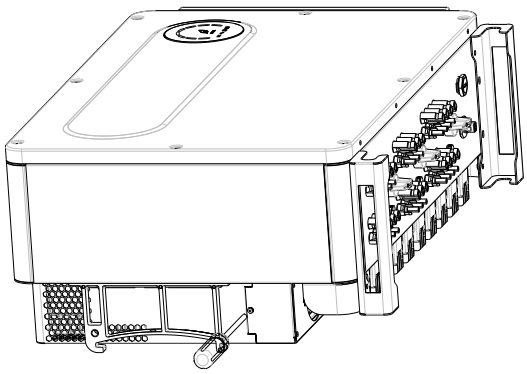


Fig 9.1 External fan view

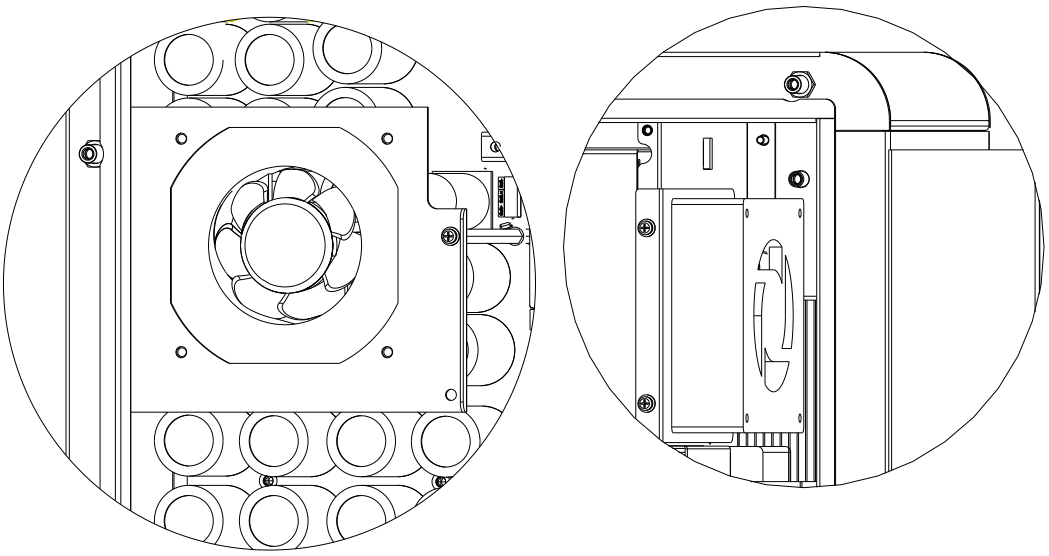


Fig 9.2 Internal fan view

3>Disconnect the wire connector of the fans with a flat head screw driver and remove

the fans from the fan guards, it is shown as below.

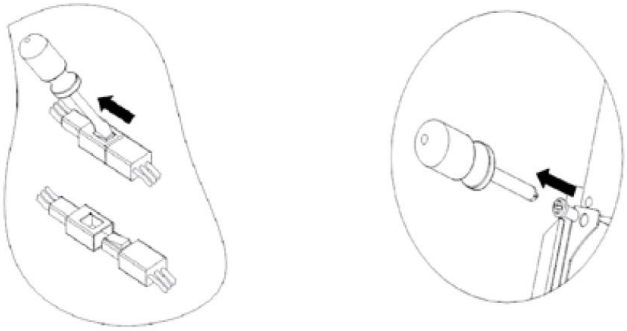


Fig 9.3

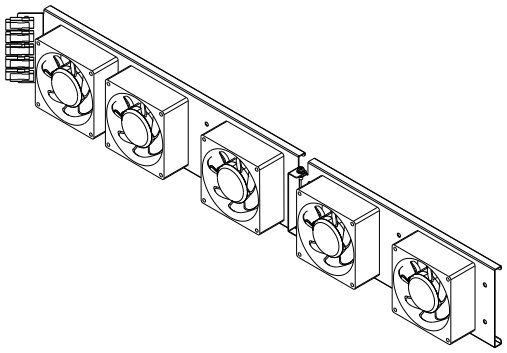


Fig 9.4 External fan view

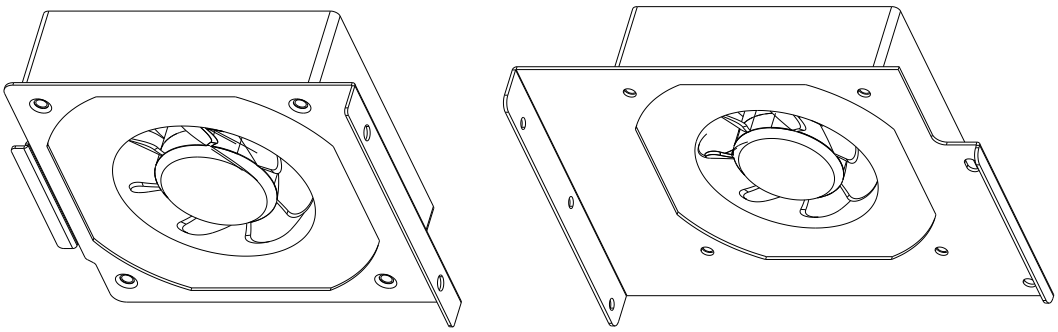


Fig 9.5 Internal fan view

Notice：MAX 80-133KTL3-X LV series inverter has seven fans (internal fan 2pcs，external fan 5pcs).

4>Clean fan, fan guards and heat sink or replace fan.

1) Clean the heat sink with an air pump, and clean the fan and fan guard with a brush or damp cloth;

2) Remove each fan separately for cleaning if necessary.

3) Remove the fan that need to be replaced with a cross screwdriver, replace a new fan.

4) Arrange the wiring harness and fix it with a cable tie;

5>Install the fan, fan guard and inverter again.

9.2 Trouble Shooting

	•Work on the Growatt Max must be carried out by qualified personnel. •Normally grounded conductors may be ungrounded and energized when a PV isolation low is indicated. •Risk of electric shock.

9.2.1 Warning

The current state of the MAX 80-133KTL3-X LV inverter can be identified through the warning, and the warning does not involve faults. When a warning occurs, it can be cleared by orderly shutting down the inverter, resetting it, or performing self-correction. The fault codes for warnings are shown in the following table:

Warning	Description	Suggestion
Warning 200	Panel access failure	1. Check whether the panel is normal after shutting down; 2. If the fault message still exists, contact the manufacturer
Warning 201	String/PID quick connect terminal abnormal	1: Check the string terminal wiring after shutdown 2: If the fault message still exists, contact the manufacturer
Warning 202	DC lightning protection device alarm	1: Check the DC lightning arrester after shutting down 2: If the fault message still exists, contact the manufacturer
Warning 203	Panel short circuit	1: Check whether the first or second road panel or circuit is short-circuited 2: If the fault message still exists, contact the manufacturer
Warning 204	Abnormal function of dry node	1: Check the dry node wiring after shutting down 2: If the fault message still exists, contact the manufacturer
Warning 205	Boost drive abnormal	1: Restart the inverter 2: If the fault message still exists, contact the manufacturer
Warning	AC lightning protection device alarm	1: Check the DC lightning arrester after shutting down 2: If the fault message still exists, contact the manufacturer

206		
Warning 207	USB overcurrent protection	1: Unplug the U disk 2: Reconnect the U disk after shutting down 3: If the fault message still exists, contact the manufacturer
Warning 208	DC fuse is broken	1: Check the fuse after shutting down 2: If the fault message still exists, contact the manufacturer
Warning 209	Panel voltage is too high	1: Confirm the DC voltage 2: After the normal voltage is restored, if the fault message still exists, contact the manufacturer
Warning 210	Panel reverse	1: Check the panel input 2: If the fault message still exists, contact the manufacturer
Warning 300	No mains connection	1. Please confirm whether the power grid is lost. 2. If the fault message still exists, contact the manufacturer
Warning 301	Mains voltage is out of range	1. Check whether the AC voltage is within the specification range of the standard voltage. 2. If the fault message still exists, contact the manufacturer
Warning 302	Mains frequency is out of range	1. Check whether the frequency is within the range. 2. If the fault message still exists, contact the manufacturer
Warning 303	Output overload	1: Reduce output power 2: If the fault message still exists, contact the manufacturer
Warning 304	Open current transformer	1: Check whether the current transformer is connected well 2: If the fault message still exists, contact the manufacturer
Warning 305	Reverse connection of current transformer	1: Check whether the current transformer is connected reversely 2: If the fault message still exists, contact the manufacturer
Warning 306	Current transformer communication failure	1: Please check the communication line 2: If the fault information still exists, contact the manufacturer
Warning 307	Wireless CT pairing timeout	1: Please check the communication line 2: If the fault information still exists, contact the manufacturer
Warning 400	Fan function is abnormal	1: Check the fan wiring after shutting down 2: Replace the fan 3: If the fault message still exists, contact the manufacturer

Warning 401	The meter is abnormal	1: Check whether the meter is turned on 2: Check whether the connection between the machine and the meter is normal
Warning 402	Communication between the optimizer and the inverter is abnormal	1. Check whether the optimizer is open. 2. Check whether the connection between the optimizer and the inverter is normal
Warning 403	Abnormal string communication	1: Check the string board wiring after shutdown 2: If the fault message still exists, contact the manufacturer
Warning 404	Memory exception	1: Restart the inverter 2: If the fault message still exists, contact the manufacturer
Warning 405	The firmware version of the control board and the communication board do not match	1: Check the firmware version 2: If the fault message still exists, contact the manufacturer
Warning 406	Boost circuit failure	1. Restart the inverter 2. If the fault message still exists, contact the manufacturer

Notice：MAX 80-133KTL3-X LV series inverter has three external fans and one Internal fan.

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

9.2.2 Error

The error code indicates that the equipment is damaged or the setting is abnormal. Any operation should be performed by professionals. After the error is cleared, the machine stops reporting the error. Some errors are irreparable errors, please contact Growatt New Energy.

Error Code	**Description**	**Suggestion**
Error 200	DC arc abnormal	1: Check the panel terminal wiring after shutting down 2: Restart the inverter 3: If the fault message still exists, contact the manufacturer
Error 201	Leakage current is too high	1: Restart the inverter 2: If the fault message still exists, contact the manufacturer

Error 202	Panel voltage is too high	1: Confirm the DC voltage 2: After the normal voltage is restored, if the fault message still exists, contact the manufacturer
Error 203	Low panel insulation resistance	1: After shutting down, check whether the panel shell is reliably grounded. 2: If the fault message still exists, contact the manufacturer
Error 300	The mains voltage is abnormal	1: Check the grid voltage 2: If the grid voltage has recovered to the allowable range and the fault information still exists, contact the manufacturer
Error 301	AC wiring failure	1: Please check the mains terminal 2: If the fault message still exists, contact the manufacturer
Error 302	No mains connection	1: Check the AC side line connection after shutting down 2: If the fault message still exists, contact the manufacturer
Error 303	Zero ground detection anomaly	1. Check the ground wire after shutting down to ensure that the ground wire is connected reliably. 2: If the fault message still exists, contact the manufacturer
Error 304	Abnormal mains frequency	1: Detect grid frequency and restart 2: If the fault message still exists, contact the manufacturer
Error 305	Output overload protection	1: Check the output load and reduce the load power 2: If the fault information still exists, contact the manufacturer
Error 306	Reverse connection of current transformer	1: Check the connection direction of the current transformer after shutting down 2: If the fault information still exists, contact the manufacturer
Error 307	Current transformer communication failure	1: Please check the communication line 2: If the fault information still exists, contact the manufacturer
Error 308	Pairing timeout	1: The pairing of the machine and the current transformer has timed out, re-pair 2: If the fault information still exists, contact the manufacturer
Error 400	Abnormal DC component offset	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 401	The output voltage DC component is too high	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 402	The output current DC component is too high	1: Restart the machine 2: If the fault information still exists, contact the manufacturer

Error 403	Unbalanced output current	1: Check whether the output current is unbalanced after shutdown 2: If the fault message still exists, contact the manufacturer
Error 404	Abnormal bus voltage sampling	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 405	The relay is abnormal	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 406	Initialization mode exception	1: Reset the mode 2: If the fault message still exists, contact the manufacturer
Error 407	Auto-detection failed	1: Restart the inverter 2: If the fault message still exists, contact the manufacturer
Error 408	Temperature is too high	1. Check the temperature after shutting down, and restart the inverter when it is normal 2. If the fault message still exists, contact the manufacturer
Error 409	Abnormal bus voltage	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 410	Inconsistent insulation resistance sampling	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 411	Internal communication abnormal	1: Check the wiring of the communication version after shutting down 2: If the fault message still exists, contact the manufacturer
Error 412	The temperature sensor connection is abnormal	1. Check whether the temperature sampling module is properly connected after shutting down 2. If the fault message still exists, contact the manufacturer
Error 413	Drive exception	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 414	Memory exception	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 415	Abnormal auxiliary power supply	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 416	Overcurrent protection	1: Restart the machine 2: If the fault information still exists, contact the manufacturer

Error 417	The grid voltage sampling is inconsistent	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 418	The firmware version of the control board and the communication board do not match	1: Check the firmware version 2: If the fault message still exists, contact the manufacturer
Error 419	Leakage current sampling is inconsistent	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 420	Leakage current module is abnormal	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 421	CPLD abnormal	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 422	Redundant sampling is inconsistent	1: Restart the machine 2: If the fault information still exists, contact the manufacturer
Error 425	AFCI self-check failure	1: Restart the machine 2: If the fault information still exists, contact the manufacturer

10 Technical Data

10.1 Specification

Specifications	**MAX 80KTL3-X LV**	**MAX 100KTL3-X LV**	**MAX 110KTL3-X LV**	**MAX 120KTL3-X LV**	**MAX 125KTL3-X LV**	**MAX 133KTL3-X LV**
Input Data(DC)						
Max. recommended PV power(for module STC)	120000 W	150000 W	165000 W	180000 W	187500 W	199500 W

Max. DC voltage	1100V					
Start voltage	195V					
Min. operating voltage	180V					
Nominal voltage	600V					
PV input operating voltage range	180-1000V					
MPP voltage range	550V-850V	550V-850V	550V-850V	600V-850V	600V-850V	600V-850V
No. of MPP trackers	7	10	10	10	10	10
No. of PV strings per MPP trackers	2					
Max. input current per MPP trackers	32A					
Max. short-circuit current per MPP trackers	40A					
DC overvoltage category	Category II					
Output Data(AC)						
AC nominal power	80000W	100000W	110000W	120000W	125000W	133000W
Rated apparent power	80000VA	100000VA	110000VA	120000VA	125000VA	133000VA
Max. AC apparent power	88000VA	110000VA	121000VA	132000VA	137500VA	146300VA
Nominal AC voltage/range	230V/400V 340-440VAC					
AC grid frequency/rang	50/60Hz 45-55Hz/55-65Hz					

e						
Rated output current	121.5A @380V 115.5A@400 V	151.9A @380V 144.3A@400 V	167.1A @380V 158.8A@400 V	182.3A @380V 173.2A@400 V	189.9A @380V 180.4A@400 V	202.1A @380V 192.0A@400 V
Max. output current	133.7A @380V 127.0A@400 V	167.1A @380V 158.8A@400 V	183.8A @380V 174.6A@400 V	200.5A @380V 190.5A@400 V	208.9A @380V 198.5A@400 V	222.3A @380V 211.2A@400 V
AC inrush current	140A					
Max. output overcurrent protection	400A					
Max output overload protection	160A	200A	250A	250A	250A	250A
Max. inrush current (Peak value/duration time)	< 35A/5ms					
Max. output fault current(Peak value/duration time)	<440A/10us					
Overvoltage category	PV:II AC:III Others:I					
Anti-islanding protection	Integrated(Reactive power disturbance)					
Anti-islanding protection	Non-isolated					
Power factor(@nominal	>0.99					
Max. inverter backfeed current to PV array	0A					

Adjustable power factor	0.8leading ...0.8lagging				
THDi	<3%				
AC grid connection type	3W/N/PE				
AC overvoltage category	Category III				
efficiency					
Max. efficiency	98.80%	99.00%	99.00%	99.00%	99.00%
Euro-eta	98.50%				
Protection devices					
DC reverse-polarity protection	Yes				
DC Surge protection	Type II				
Insulation resistance monitoring	Yes				
AC surge protection	Type II				
AC short-circuit protection	Yes				
Grid monitoring	Yes				
Anti-islanding protection	Yes				
Residual-current monitoring unit	Yes				
String monitoring	Yes				
Anti-PID function	Optional				
AFCI protection	Optional				
General data					

Dimensions (W /H / D) in mm	970*640*345mm
Weight	84kg
Operating temperature range	-30℃- +60℃
Altitude	4000m
Internal consumption at	<1W(Note1)
Topology	Non-isolated
Cooling	Fan cool
Protective class	Class I
Protection degree	IP66
Relative humidity	0~100%
DC connection	VP-D4/MC4(Optional)
AC connection	Cable gland +OT terminal
Interfaces	
Display	LED/WIFI+APP
RS485/USB	Yes
PLC/GPRS/ 4G	Optional
Warranty: 5 /10 years	Optional
Certificates and approvals	
Grid regulation	AS/NZS 4777.2,CEI 0-21,CEI 0-16,VDE-AR-N 4105, DIN V VDE V 0126-1-1,UTE C 15-712-1,EN 50438, IEC 60068,IEC 61683,IEC 62116,IEC 61727, MEA,PEA,DRRG/DEWA:2016,BDEW,G59/3
EMC	EN61000-6-2,EN61000-6-4
Safety	IEC/EN62109-1,IEC/EN62109-2
Note1. Self-consumption less than 15W when AC power supply at night.	

***Only for Australia market.**

*** *The AC Voltage and Frequency Range may vary depending on specific country grid standard.**

*****Without AC power supply function.**

All specifications are subject to change without notice.

11. Decommissioning

If the inverter does not operate in the future, it needs to be properly disposed. The steps are as follows:

1> Disconnect the external AC short-circuit device and prevent reconnection due to misoperation.

2>Wait at least 5 minutes until the internal capacitor discharge is completed.

3>Disconnect the AC connector.

4>Disconnect the DC connector.

5>Remove the inverter from the wall.

6>Disposing of the inverter.

11.1 Disposing Of The MAX Series Inverter

	Do not dispose of MAX 80-133KTL3-X LV series inverter 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. Quality Assurance

Please refer to related file.

13 Compliance Certificates

- Certificates

With the appropriate settings, the unit will comply with the requirements specified in the following standards and directives:

Model	Certificates
MAX80-133KTL -X LV	CE , IEC 62109, AS4777

14. Contact

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

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