

**MGEA33/40KTL SI**

# Table of Contents

1 Important Safety Instructions .....	3
2 Product Overview .....	4
2.1 Product description .....	4
2.2 Product features.....	4
2.3 Working principle.....	5
2.4 Product view.....	6
3 Installation .....	8
3.1 Inspection before installation .....	8
3.2 Transport.....	8
3.3 Mounting .....	9
4 Electrical Connection.....	10
4.1 Cable sizes.....	10
4.2 Making PV input cable and assembling connector.....	10
4.3 Making the inverter output cable and installation instructions.....	12
4.4 Making RS485 communication cable and connecting.....	13
5 LED Indicator Lights .....	13
5.1 LED status information.....	13
5.2 View alarm information .....	14
6 Operation.....	15
6.1 Power On/Power Off procedure.....	15
6.2 Operation modes.....	16
6.3 Monitoring mode .....	17
7 Solar Assistant APP Operation Manual.....	19
7.1 Local monitoring APP (ISO & Android) installation .....	19
7.1.1 Installation information.....	19
7.1.2 Solar Assistant APP (IOS) installation .....	19
7.2 Operation of Solar Assistant APP (IOS) .....	19
7.3 Operation of Solar Assistant APP (ANDROID) .....	22
7.4 How to distinguish Wi-Fi hotspot .....	24
8 Troubleshooting.....	25
Appendix A .....	28





# 1 Important Safety Instructions

Read the manual carefully to become familiar with the equipment before attempting to install, operate, service or maintain the inverter. Store the manual and other data attached to the product at an easily accessible location.



As standards, specifications and designs are changed from time to time, users should comply with the actual product purchased if there is any discrepancy between the actual product and the content of the manual.

The product is designed and tested in accordance with international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed when installing and operating the product. To reduce the risk of personal injury and ensure the safe installation and operation of the product, you should carefully read and follow all instructions, cautions and warnings in this manual.

The following safety message may appear throughout this manual or on the product to warn of potential hazards to call attention.

Symbol	Description
 <b>WARNING</b>	<b>WARNING</b> indicates a hazardous situation which, if not avoided, could result in serious damage or personal injury.
 <b>DANGER</b>	<b>DANGER! HAZARD OF ELECTRIC SHOCK</b> <b>DANGER</b> indicates a hazard of electric shock, if not avoided, could result in death or serious injury.
 <b>TIPS</b>	<b>TIPS</b> indicate the important information for users to optimize PV system.
 <b>Description</b>	<b>Description</b> indicates additional information in the manual, which emphasizes or supplements on the contents, provides with tips or tricks of the product to help you solve some problems or save your time.

## Safety precautions

 <b>WARNING</b>	<b>WARNING! HAZARD OF ELECTRIC SHOCK</b> <ul style="list-style-type: none"> <li>● MGEA33/40KTL SI Grid-connected PV inverter must be installed, operated, serviced and maintained only by trained electrically qualified persons.</li> <li>● Never touch live components in PV system during operating of the inverter.</li> <li>● Follow all safety instructions in this manual.</li> </ul>
 <b>WARNING</b>	<b>WARNING! Damage to inverter</b> Input DC voltage must be less than 1000 V, as excessive high voltage may result in equipment damage.

- Inverter should be correctly transported, stored, assembled, installed, operated and maintained.
- All operations and wiring should be performed by professional electrical or mechanical engineers so as to ensure that all electrical installation is in accordance with relevant standard. And in order to ensure safe operation, it is required to provide correct earthing and necessary short-circuit protection.
- Ensure no electricity at DC and AC side before inspection or maintenance.
- PV arrays should be covered with lightproof material when they are installed in daytime, otherwise PV arrays will cause high voltage under sunlight.
- After finishing installation or maintenance, firstly close up the AC circuit breaker, and then switch DC power. When

switching DC power, please close up the inverter DC input switch first.

- Follow all instructions in the manual, and completely comply with all danger, warning and safety information.

## Storage

If the inverter does not come into use at once, users need to store the inverter and note the following instructions:

- Do not unpack.
- Maintain a storage temperature of  $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$  and relative humidity of 5% RH ~ 100% RH.
- Storage the inverter in a place free from vibration, conductive dust, direct sunlight and moisture.
- The maximum stacking is four floors, excessive stacking may cause equipment damage.
- Regular checking is required during storage. Replace packaging if find out any damage by rats or vermin.
- After long term storage, the inverter cannot come into use until checking by qualified personnel.

## 2 Product Overview

### 2.1 Product description

MGEA33/40KTL SI Grid-connected Inverters apply to PV grid-connected power generation system. In the PV system, they constantly enable solar panels to output maximum power, and deliver the converted energy from solar panel to power grid. The PV grid-connected power generation system is composed of PV modules, PV grid-connected inverters, AC combiner boxes, metering devices and power distribution system, as shown in the Figure 1.

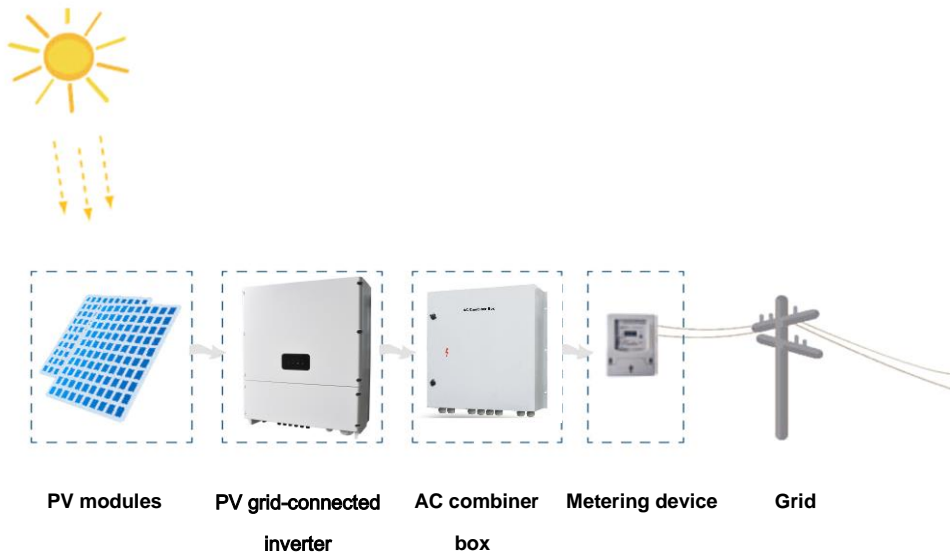


Fig. 1 PV grid-connected power generation system



#### TIPS

Connecting the product to the electrical utility grid should be approved by the local **electricity service department**, and the connection and operation must be made only by qualified personnel.

### 2.2 Product features

#### More energy generated

- Transformerless design, maximum conversion efficiency up to 98.6%, Europe efficiency up to 98.4%
- Three MPP inputs, acquiring maximum energy generated by shadowed PV cells

- Wide MPPT voltage range (320 ~ 900V), longer daily power generation time
- Intelligent MPPT algorithm, the maximum power point tracking is not affected by illuminance abrupt variation
- Accurate identification technology for power change guarantees accurate and stable static MPPT
- Wide operating temperature range (– 25 °C ~ + 60 °C), continuous power generation at full load in high temperature

#### High reliability

- Long lifetime design of film capacitor, 25 years of designed service life for complete machine
- Natural heat dissipation, waterproof, dust resistance, salt fog resistance and corrosion resistance
- Active+passive islanding protection, grid-connected relay redundancy disconnection protection
- Multilayer, step-by-step overcurrent, overvoltage, overtemperature and short-circuit protections for software and hardware
- 6 strings fault monitoring with rapid positioning

#### Advanced control technology

- Double modulation of three level SPWM and SVPWM, natural and smooth switchover
- Adaptive control, adapting to harsh weak power grids environment
- Harmonic current compensation, THD < 1%
- Supporting active and reactive power grid dispatch and SVG function at night
- LVRT function

#### User-friendly and flexible

- Status display with LED indicators, concise interface
- Built-in DC SPD and fuse, no need of DC combiner box, reducing cost for users
- DC shut-off circuit breaker for safe and convenient maintenance operating
- IP 65 protection level for outdoor use
- Wall mounting design, one-step forming of aluminum shell
- Standard RS485 / APP / GPRS / Wi-Fi / Bluetooth communications; Optional PLC viewing the system operation information

## 2.3 Working principle

Figure 2 shows the schematic diagram of MGEA33//40KTL SI inverter. Electric energy generated by PV module passes through lightning arrester which absorbs surge voltage at DC side, and capacitive energy storage maintains DC voltage stable. With the application of three-level SPWM and SVPWM dual modulation, three-phase full-bridge inverter transforms DC power into AC power with the same frequency and phase as power grid, and sine wave AC power is generated through filter, high-frequency signal conducted interference is restrained by AC filter, then the electric energy is sent to the power grid.

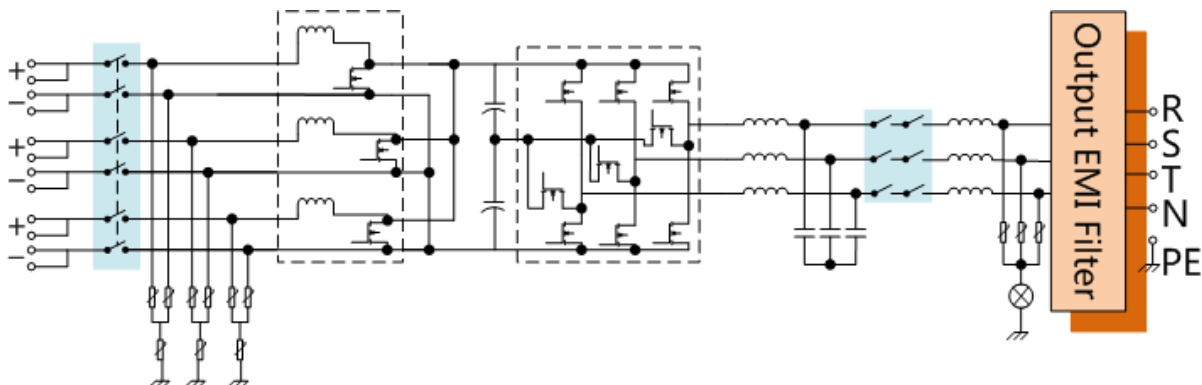
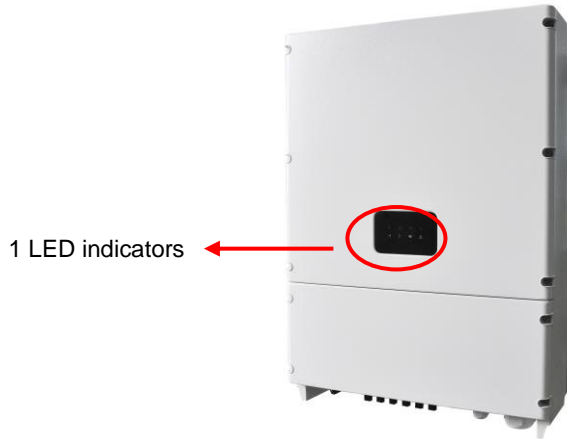


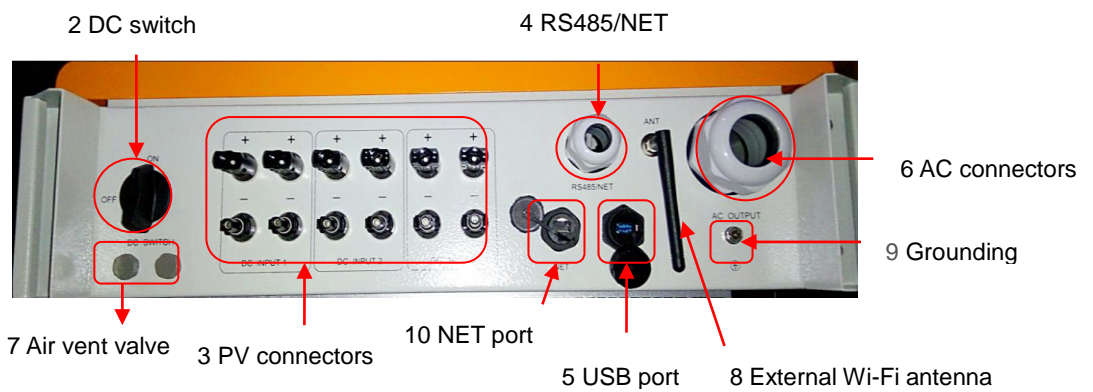
Fig. 2 Schematic diagram of MGEA33/40KTL SI inverter

## 2.4 Product view

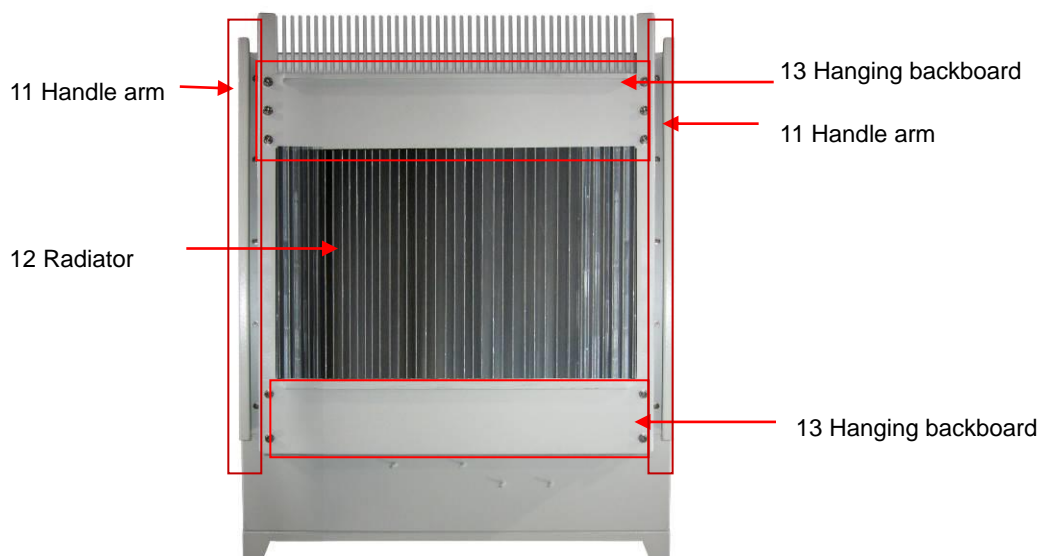
### Front panel



### Bottom panel



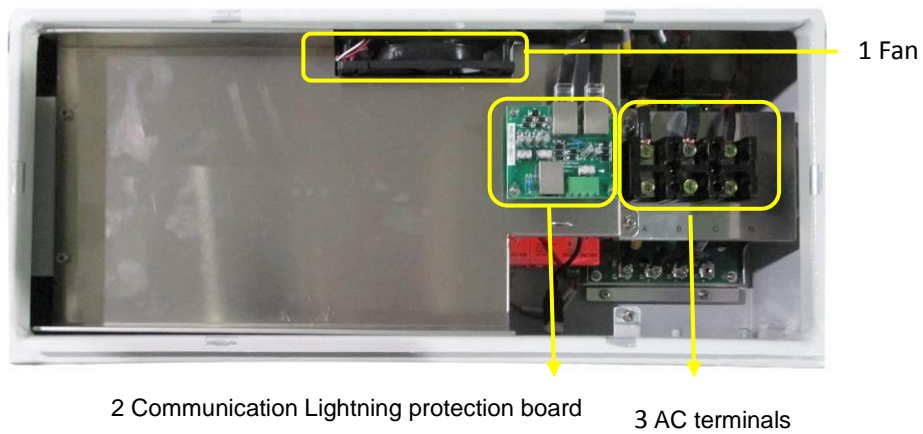
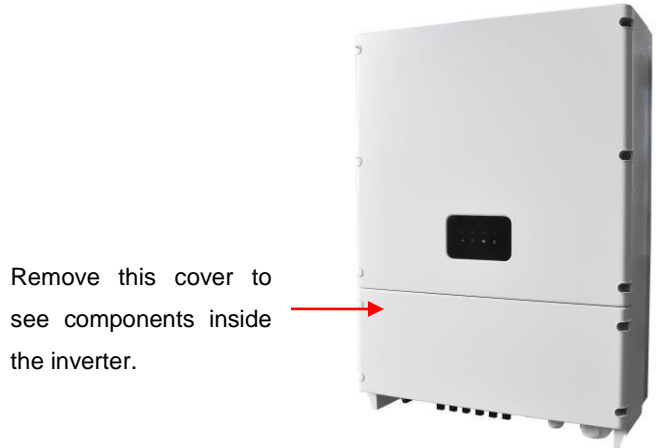
### Rear panel

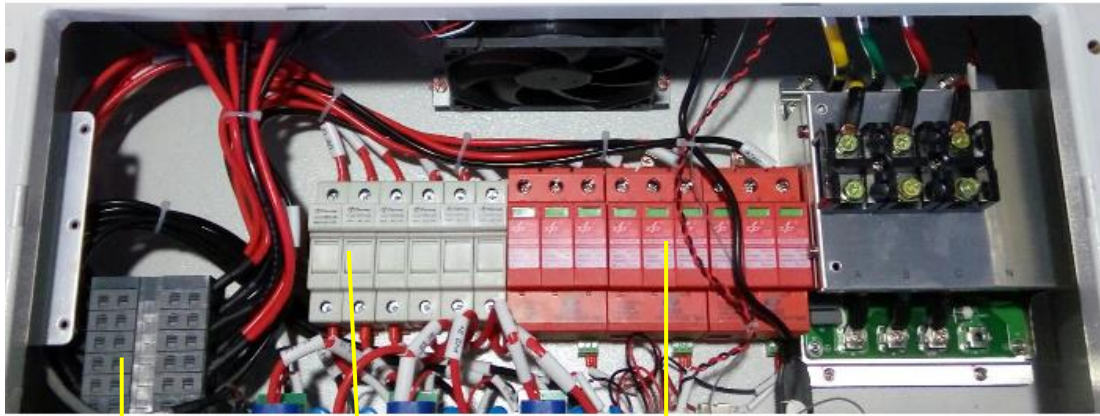


	NO.	Name	Description
Front	1	LED Indicators	Indicate inverter status
Bottom	2	DC switch	Control PV input
	3	PV connectors	Connect with PV battery
	4	RS485/NET	RS485/NET Port
	5	USB port	USB port
	6	AC connectors	Connect with three-phase AC
	7	Air vent valve	Waterproof and breathable
	8	External Wi-Fi antenna	External antenna of Wi-Fi module
	9	Grounding	Insulation equipment enclosure grounding
	10	NET port	NET port
Rear	11	Handle arm	Convenient for handling and installation
	12	Radiator	Reduce temperature of inverter power device
	13	Hanging backboard	Hang inverter on the wall

### Inside


Remove the lower cover of the inverter to see components inside the inverter.





4 DC rotary switch    5 DC fuse holder / fuse    6 DC lightning arrester

No.	Name	Description
1	Fan	Enhance radiating capacity of radiator
2	Communication Lightning protection board	prevent RS485 and Ethernet cable from lightning strike
3	AC terminals	connect three-phase AC power
4	DC rotary switch	Switch On/Off DC input
5	DC fuse holder / fuse	Avoid damage to the components inside caused by excessive DC current
6	DC lightning arrester	Avoid damage to the components inside caused by lightning strike

 <b>WARNING</b>	<ul style="list-style-type: none"> <li>● To avoid the risk of electric shock, do not disassemble the cover of the inverter</li> <li>● Make sure the power is completely disconnected before wiring.</li> </ul>
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### 3 Installation

#### 3.1 Inspection before installation

MGEA33/40KTLSI grid-connected inverter has been tested carefully before delivery, while it may be damaged in transportation. Do not power on and notify the carrier and dealer if find damaged or parts missing.

#### 3.2 Transport

Follow these instructions in the manual to handle with MGEA33/40KTLSI inverter. Avoid risk of injury due to the inverter falling during transport.

 <b>WARNING</b>	<p>Take the weight and dimensions of the inverter into account. Watch out for falling and collision during transport.</p>
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Two operators hold the handle arms at two sides of inverter, as shown in Figure 3, take out the inverter from the packing box and carry it to the installation location.

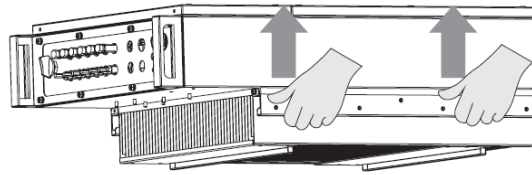




Fig 3 Handling method

### 3.3 Mounting

 <p><b>CAUTION</b></p>	<p><b>Danger to life if installed in improper locations</b> The mounting location or bracket must be suitable for the weight and dimensions of the inverter.</p>
 <p><b>CAUTION</b></p>	<p>Carefully aim at the position and gently hang the inverter on the mounting frame. Falling may result in damage to inverter or danger to life.</p>

- MGEA33/40KTL SI inverter is suited for indoor and outdoor installation and corresponds to degree of protection IP65.
- Mount on a solid support surface. It must be suitable for the weight and dimension of the inverter. The mechanical dimension of MGEA33/40KTL SI is 580mmx820mmx255mm (WxHxD), weigh about 65kg.
- In order to maintain sufficient ventilation and service access, a clearance between the inverter and surrounding objects should be observed as following (as shown in Figure 4) :  $\geq 200\text{mm}$  at the sides;  $\geq 500\text{mm}$  at the top;  $\geq 300\text{mm}$  at the underside;  $\geq 1000\text{mm}$  from the front.
- According to the EMC and noise level, the inverter is applicable to industrial environment and should be installed away from living area as far as possible.
- Mount vertically or tilted backwards by max.  $15^\circ$ . Never mount it with a forward tilt. The wiring terminal should be down.
- Place the wall mounting bracket (see Figure 5) against a suitable wall with explosion screws, aim the groove of the hanging backboard of the inverter at the convex edge of the wall mounting bracket, then attach the inverter to the wall mounting bracket.

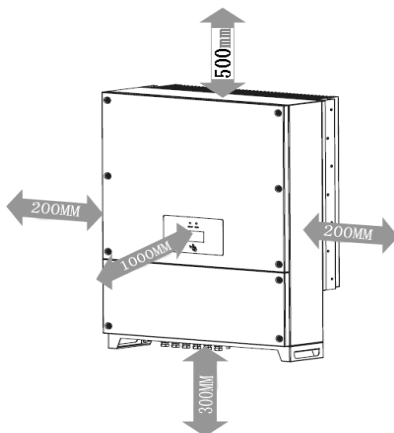


Fig. 4 Minimum clearance

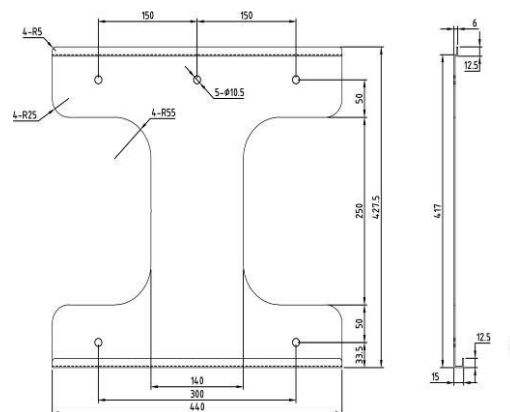






Fig. 5 Wall mounting bracket

## 4 Electrical Connection

 <b>DANGER</b>	<ul style="list-style-type: none"> <li>● Before the electrical connection, make sure that the AC and DC sides are not charged.</li> <li>● Before connecting DC terminal cables, ensure the inverter DC switch is disconnected or PV panels are covered with lightproof material.</li> <li>● All cables must be firmly connected, well insulated and meet the specification requirements.</li> <li>● The open-circuit voltage of configured PV arrays must be less than 900V.</li> </ul>
 <b>WARNING</b>	<ul style="list-style-type: none"> <li>● Electrical connection should only be made by electrically qualified personnel.</li> <li>● Prohibit electrical installation under the state of electricity, otherwise it may result in damage to inverter or danger to life.</li> </ul>
 <b>TIPS</b>	<p>Connecting the inverter to the electrical utility grid should be approved by the local electricity service department.</p>




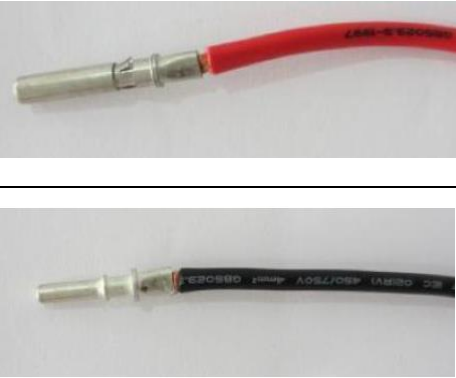
### 4.1 Cable sizes

Cable	Cable size (mm <sup>2</sup> )
PV array DC +	Provide 6 inputs, cable diameter > 4mm <sup>2</sup>
PV array DC-	Provide 6 inputs, cable diameter > 4 mm <sup>2</sup>
Power grid L1 phase	Provide single input, cable diameter > 10 mm <sup>2</sup>
Power grid L2 phase	Provide single input, cable diameter > 10 mm <sup>2</sup>
Power grid L3 phase	Provide single input, cable diameter > 10 mm <sup>2</sup>
Power grid N	Cable diameter > 10 mm <sup>2</sup>
Ground wire	Cable diameter > 8 mm <sup>2</sup>

 <b>TIPS</b>	<ul style="list-style-type: none"> <li>● The above table of cable size is based on UL, If use other cables, refer to the standard for reasonable replacement.</li> <li>● For actual installation cable size, refer to the output value of equipment specifications.</li> </ul>
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### 4.2 Making PV input cable and assembling connector

Step 1: Strip the insulation layer from DC cable about 6mm to expose copper wire, insert the copper wire into the metal tube core of connector and press it firmly with a crimping plier.

-pole input terminal and tube core	+ pole input terminal and tube core
	
<p>Strip the cable, insert it into tube core and press it firmly with a crimping plier</p>	
	

Step 2: Loosen the terminal cap and lead cable through the cap. Insert tube core into wire slot until the connection is completed.



Step 3: Tighten the terminal cap.

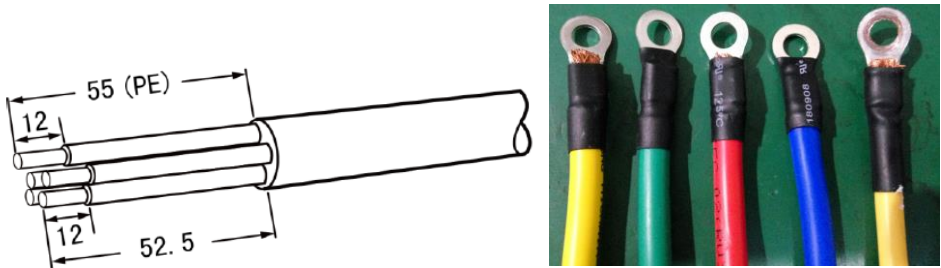


Step 4: Insert terminals with connected wires into corresponding + and – terminal at the bottom of inverter.

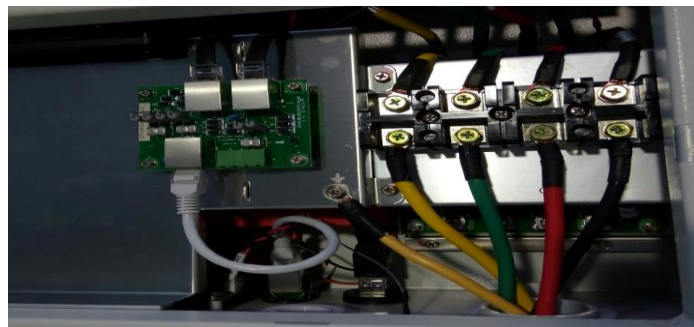



### 4.3 Making the inverter output cable and installation instructions

Step 1: Use wire stripper to strip the sheath and insulation layer from AC output cable at a suitable length, and press the terminal firmly.



Step 2: Put the AC output cables (L1, L2, L3, N, PE) into the waterproof terminals.



 <p><b>TIPS</b></p>	<ul style="list-style-type: none"><li>● Making the inverter output cable and installation instructions is only for reference. Please note that MGEA30-33KTL SI output wiring is 3W + N + PE; MGEA35-40KTL SI output wiring is 3W + PE.</li><li>● For specific internal installation wiring, refer to the output specification value of the inverter grid.</li></ul>
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Step 3: Use a Phillips screwdriver to loosen the bolt in each jack, and insert each cable into the corresponding position,

and then tighten each bolt. PE cable is connected to  jack.

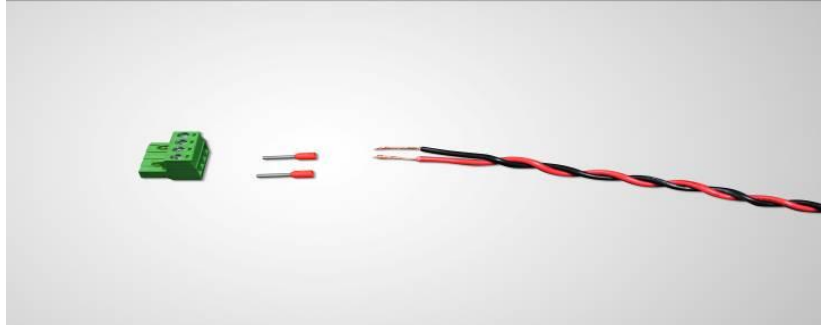
Step 4: Tighten the sealing cap to the housing.

## 4.4 Making RS485 communication cable and connecting

Recommended RS485 communication cable is 0.5mm<sup>2</sup> twisted-pair with 10mm stripping length.

Step 1: Use a wire stripper to strip the insulation layer of RS485 cable at a suitable length.

Step 2: Connect the red tube terminal to the RS485 cable, and press it firmly with a crimping pliers.



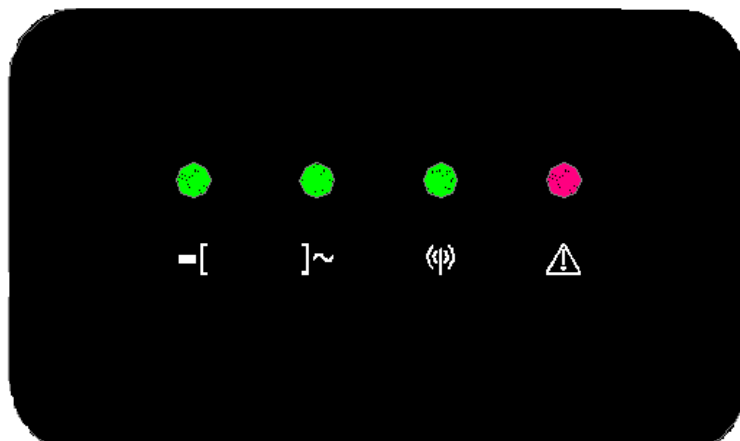
Step 3: Insert the pressed RS485 cable into the corresponding RS485 waterproof terminal and follow below picture to connect the cable. (RS485-A on the PCB corresponds to red; RS485-B on the PCB corresponds to black)



## 5 LED Indicator Lights

### 5.1 LED status information

There are 4 LED indicator lights on the inverter LED panel to display the system state or alarm.



## Description of LED main interface

- When work normally, LED indicator lights indicates:

	Illumination	No illumination	Flash
LED 1 (green)	At least one PV input	PV input voltage is less than 200 V	Unused
LED 2 (green)	The inverter is connected to the grid	The inverter is not connected to the grid	Unused
LED 3 (green)	Unused	RS485 communication interruption	RS485 communication normal
LED 4 (red)	When the inverter is in the state of self-test, standby, sleep and shutdown	The system is in the grid-connected state, and no fault alarm	When the system has fault alarm

- When insert U disk, carry out USB-related operations:

LED 1 (green)	LED 2 (green)	LED 3 (green)	LED 4 (red)	Description
☆	☆	☆	☆	Flashes 5 times, U disk is inserted or pulled out
☆	☆	☆	○	Loading file
○	○	○	○	No U-disk operation
●	○	○	○	Exporting history
○	●	○	○	Cleaning history
○	○	●	○	Loading firmware upgrade file
●	●	●	☆	Operation fails
●	●	●	○	Operation succeed
☆	○	○	○	DSP1 is in the process of upgrade
☆	○	○	☆	DSP1 upgrade fails
●	☆	○	○	DSP2 is in the process of upgrade
●	☆	○	☆	DSP2 upgrade fails
●	●	☆	○	CPLD is in the process of upgrade
●	●	☆	☆	CPLD upgrade fails

- LED indicator is illuminated      ○ LED indicator is not illuminated      ☆LED indicator flashes


## 5.2 View alarm information

User can follow the tips of LED indicator lights to view the inverter fault information.

- Export history with U disk.
- Connect monitoring and control software via RS485/NET communication to view running information of the equipment.
- Connect APP via Wi-Fi / GPRS (optional) communication devices to view running information of the system.

## 6 Operation

### 6.1 Power On/Power Off procedure

 <b>WARNING</b>	Verify again that the voltage at both DC and AC side is in line with the inverter range allowed.
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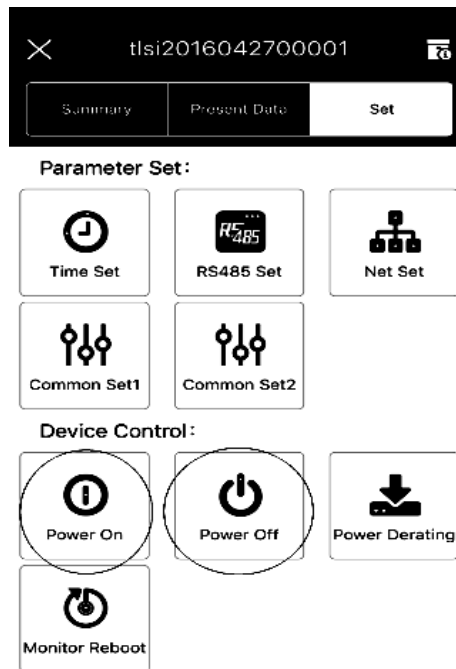
#### Powering On

After electrical connection, follow the following steps to turn on EA33/40KTLSI inverter:

- 1 Ensure correct connection between inverter and power grid.
- 2 Ensure PV array polarity is correct.
- 3 Ensure AC and DC terminals are fixed securely;
- 4 Close AC output switch
- 5 Turn DC switch to “ON” position.
- 6 When input voltage is more than 320V and power is more than 200W, the inverter will be automatically operated with grid connection.

#### Powering Off

The inverter will shut down automatically when the grid-connected condition is not met. If you need to turn off the inverter manually, you need to use PV assistant APP to monitor the inverter and then tap “Power Off”, and the inverter will enter the standby mode. In this situation, you need to turn on the inverter manually or it will start up automatically when powering on again after power failure, otherwise, the inverter will always be in standby mode. For manual startup, it is also need to use PV assistant APP to monitor the inverter and tap “Power On”.



APP Power On/Off

## 6.2 Operation modes

MGEA33/40KTL SI supports unattended monitoring, automatic operation and judges if grid-connection power generation is required according to the output power of PV arrays. The system operation process includes five work status: startup, grid-connected operation, standby, sleep, shutdown and troubleshooting. Figure 6 presents the operation mode conversion process for EA33/40KTL SI grid-connected inverter ( $V_{pv}$  means the DC output voltage of PV array)

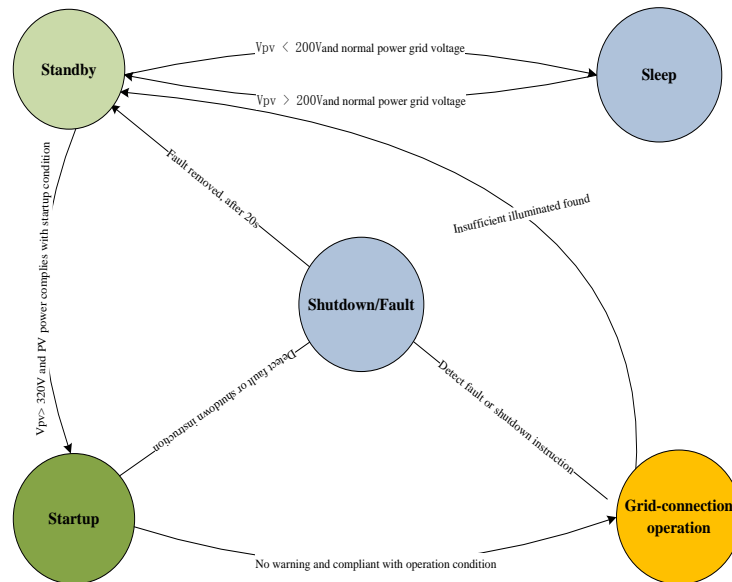


Fig. 6 Operation mode conversion process

### ◆ Startup

Startup refers to the preparation stage from standby mode to grid-connected operation mode. In this mode, grid-connected inverters constantly detect if PV modules have sufficient energy to generate power connected to the grid, namely when the open-circuit voltage of PV modules is up to 320V and the output power of solar panels is up to above 200W, PV grid-connected inverters will convert from startup state to grid-connected operation state.

### ◆ Grid-connected operation

Grid-connected operation mode is that grid-connected inverters convert DC power of PV arrays into AC power and connect to the power grid. In order to maximize the use of PV arrays energy, the system is designed with maximum power point tracking (MPPT) control, namely no matter what condition of sunshine and temperature, the system constantly enable PV arrays to maximize power output.

### ◆ Standby

Standby refers to the state in which the input voltage of the inverter is more than 200V and less than 320V, meanwhile parameters of grid voltage and frequency are within allowable range and the inverter has no fault. In this mode, the inverter constantly detects open-circuit voltage of PV arrays, and accesses to startup state when detects that its open-circuit voltage is more than 320V.

### ◆ Sleep

Sleep refers to the state in which the output voltage of PV arrays is less than 200V, fails to support auxiliary power supply and power grid is normal. When the system detects the output voltage of PV arrays is less than 200V and no demand for SVG scheduling in night, it will automatically access to sleep state to reduce system energy consumption.

### ◆ Normal shutdown or fault


Normal shutdown or fault refers to the specific state in which the system will protect itself when the output power of



PV arrays is low or has shutdown failure.

When the output power of PV arrays is low and less than 100W in consecutive 5 minutes, and no demand for SVG scheduling in night, the system will access to shutdown mode.

When the system detects a failure, it will separate the inverter from the power grid under any circumstances. In this state, LED fault indicator flashes giving alarm prompt. According to the LED fault alarm prompt, users can view fault record via communication devices and handle it against the troubleshooting table. When the failure is automatically cleared, the system will automatically detect whether meet conditions of grid-connected power generation or not in 20s, when conditions are complied, start generating power normally, otherwise maintain the fault state until the system returns to normal.

 Danger	In order to avoid the risk of electrical shock, ensure that the equipment is completely powered off, and troubleshooting should be made only by qualified personnel.
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## 6.3 Monitoring mode

### Wi-Fi communication system

If you purchase optional wireless communication kits, the grid-connected PV inverter is equipped with Wi-Fi wireless communication function without external RS485 cable. It is used with upper-supervision software or mobile APP to do real-time monitoring of inverter datas.

Wireless monitoring is divided into two modes, mobile monitoring and computer monitoring. Users need to install PV inverter monitoring software on computer or install mobile application program.

Wi-Fi module connection has AP mode and STA mode. AP mode is a wireless access point, by which mobile phone, computer or other devices can be connected to Wi-Fi module. STA mode is a terminal. Wi-Fi module is connected to the router, and users may connect to the router via mobile phone or computer, and view the real-time inverter datas via monitoring software on the phone or computer. There are two ways to diagrammatize connection modes as shown below.

#### ◆ Mobile terminal monitoring

Access method 1:

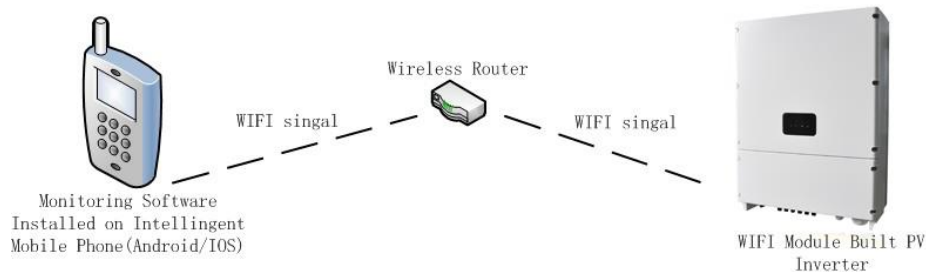


Fig. 7 Mobile phone – Router - Inverter

This access method is most common used. Users can either surf the internet by phone or monitor the inverter datas at any time.

Access method 2:

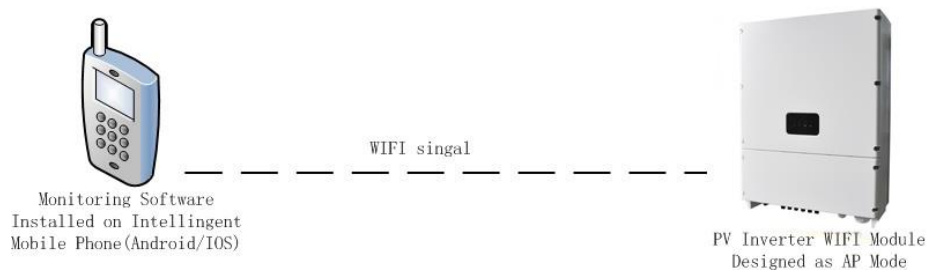


Fig. 8 Mobile Phone - Inverter

This access method is used without wireless Router. Users' phone is directly connected to the inverter via Wi-Fi to view the inverter datas.

◆ **Computer terminal monitoring**

Access method 1:

User may connect to wireless router via computer, and access Router via Wi-Fi or network cable, and use PV inverter monitoring software to view the inverter datas.

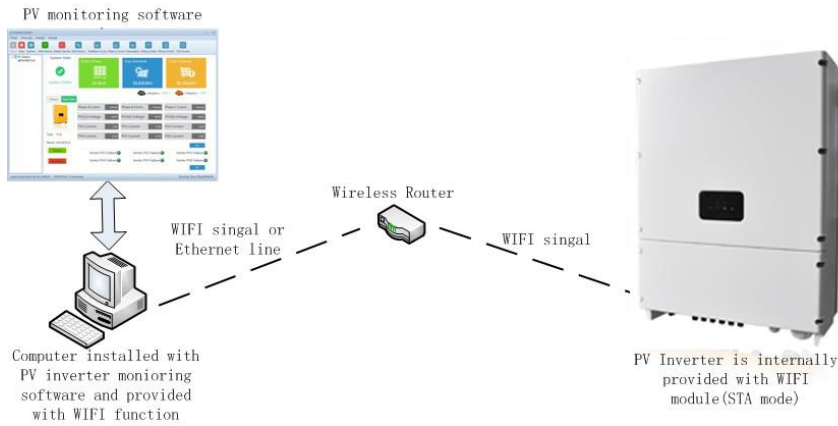


Fig. 9 Computer- Router- Inverter

Access method 2:

Users' computer is directly connected to the PV inverter. The computer must be equipped with wireless Wi-Fi function. Real-time monitoring of the inverter datas can be made with PV monitoring software.

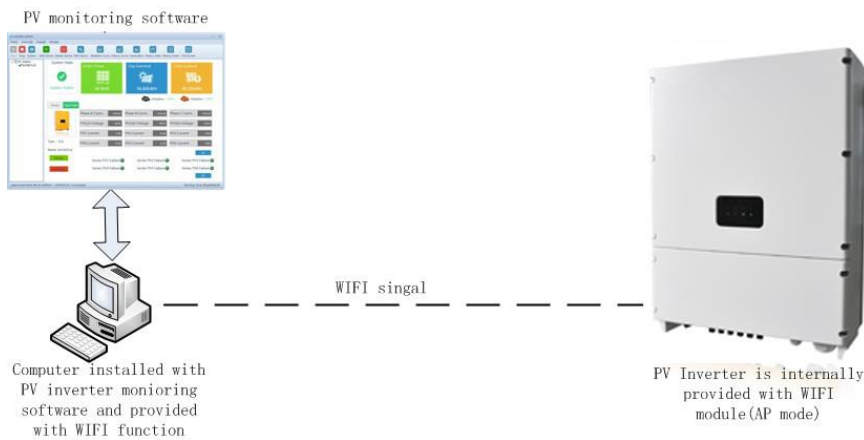


Fig. 10 Computer- Inverter

**Wi-Fi module configuration**

The inverter Wi-Fi module has two operation modes, AP mode and STA mode. Users may switch working mode by software in mobile phone or computer. Users should download and install software smartlink3.6.3 in mobile phone and configure the mode according to specific process. For the computer terminal, users may configure Wi-Fi module parameter via debugging software SecureCRT, and the default configuration of inverter is AP mode before delivery.

## 7 Solar Assistant APP Operation Manual

### 7.1 Local monitoring APP (ISO & Android) installation

#### 7.1.1 Installation information

iOS version installation requires iOS 7.1 and higher system. Android version installation requires Android 4.0 and higher system. Bluetooth parts require system above 4.3.

#### 7.1.2 Solar Assistant APP (IOS) installation

- Use mobile browser to input <http://www.idbksolar.com/sa/app.html> to enter the download page to install App.
- Scan below QRCode to enter the installation page (support iOS and Android downloading)



- iPhone users can search “Solar Assistant” in App Store to install App.

### 7.2 Operation of Solar Assistant APP (IOS)

#### ◆ Startup

Find Solar Assistant icon () in desktop and click it.



Fig. 11 Welcome window

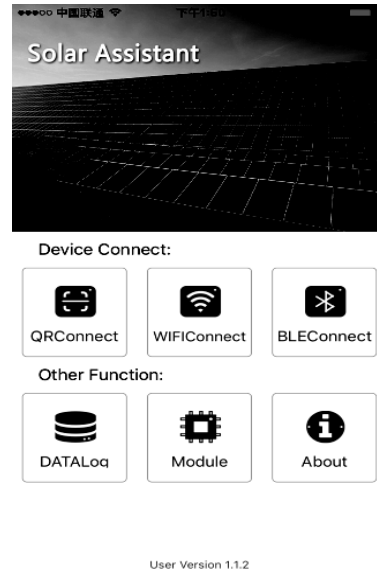


Fig. 12 Home

## ◆ Devices connection

### Step 1: Selecting connection type

Select connection type according to the current configuration of the target device. If the target device is equipped with blue tooth module, click “BLE Connect”. If the target device is equipped with Wi-Fi module, click “Wi-Fi Connect”. After clicking the APP, the current hardware and software environment of mobile phone will be judged automatically for determining whether to support this function or not, if not, the APP will give tips.

### Step 2: Connection

❶ If the Wi-Fi Connect is selected in the first step, it will skip to the interface of Fig. 13, and then click Connect.

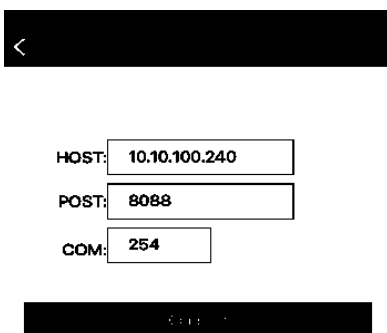


Fig. 13 Wi-Fi parameters

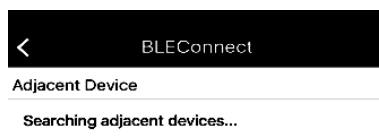


Fig. 14 Open Bluetooth

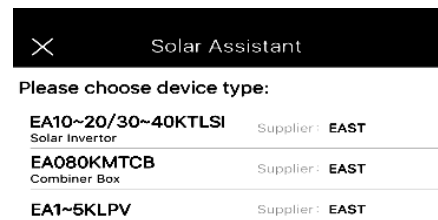


Fig. 15 Devices Info

❷ If the Bluetooth connection type is selected in the first step, however, Bluetooth is not open from the mobile phone, the Bluetooth permission will be requested. Here, click [Yes], it will start searching. The available Bluetooth device will be displayed in the list in the searching process, and click target Bluetooth to connect it.

### Step 3: Selecting devices type

Select the first option “ MGEA10-20/30-40KTLSI”. As shown in Fig. 15.

### Step 4: Checking whether the connection is successful or not

It will enter main interface after the third step. If all runs normally, the homepage displays normal datas, as shown in Fig. 16 and Fig 17. If connection fails, the homepage displays “Loading fails”, as shown in Fig. 18.

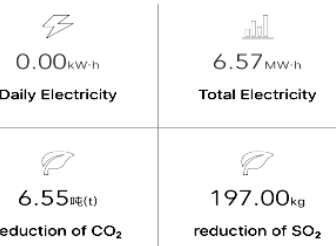
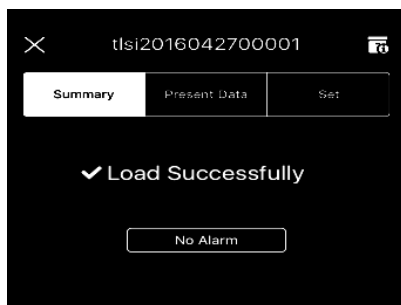


Fig. 16 Load successfully

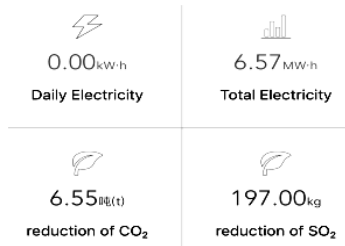
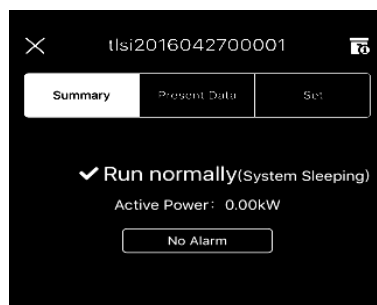


Fig. 17 Run normally

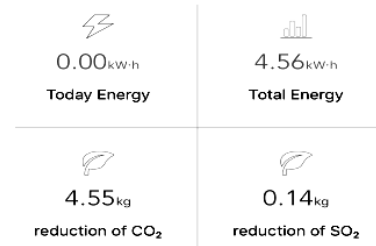
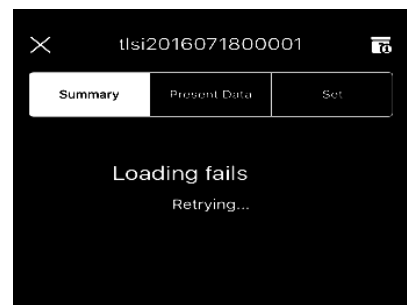


Fig. 18 Loading fails

## ◆ Devices monitoring

Device data and remote control equipment can be viewed via App after connecting successfully.

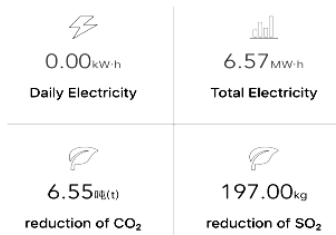
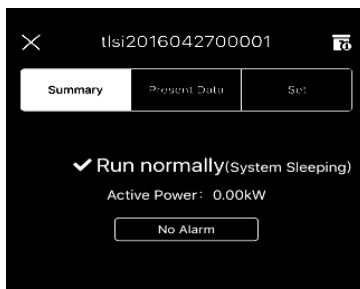


Fig. 19 Summary

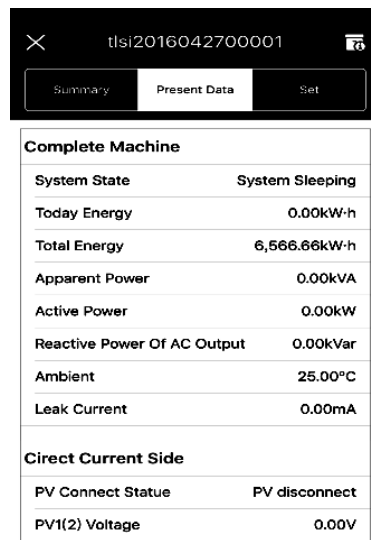


Fig. 20 Present data

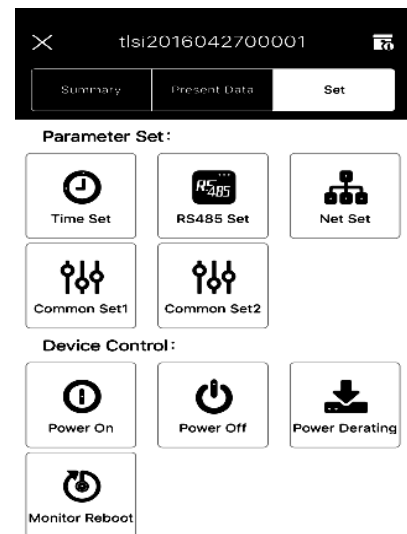


Fig. 21 Devices Set

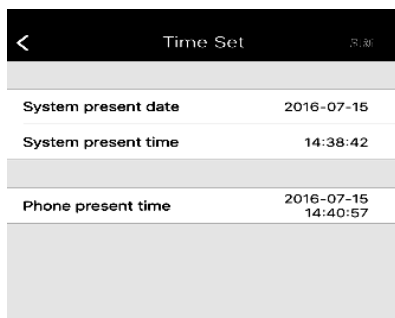


Fig. 22 Time Set

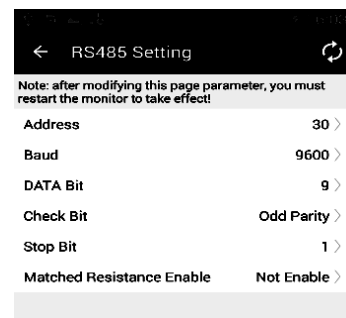


Fig. 23 RS485 Setting

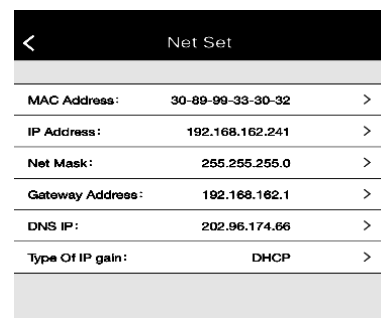


Fig. 24 Net Set

**Notice:** “Net Set” in the above figure indicates the wired network card address for setting string inverters, which is irrelevant to Wi-Fi address.

## 7.3 Operation of Solar Assistant APP (ANDROID)

### ◆ Startup

Find Solar Assistant icon (  ) in desktop and click it.



Fig. 25 Welcome window

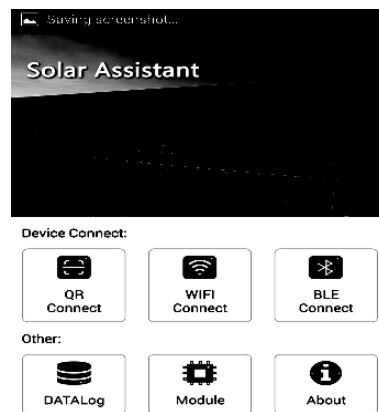


Fig. 26 Home

### ◆ Devices connection

#### Step 1: Selecting connection type

Select connection type according to the current configuration of the target device. If the target device is equipped with Bluetooth module, click “BLE Connect”. If the target device is equipped with Wi-Fi module, click “Wi-Fi Connect”. After clicking the APP, the current hardware and software environment of mobile phone will be judged automatically for determining whether to support this function or not, if not , the APP will give tips.

**Notice:** Bluetooth connection requires Android 4.3 above systems. If the current phone does not support it, it will give notifications when clicking BLE Connection,

#### Step 2: Selecting devices type

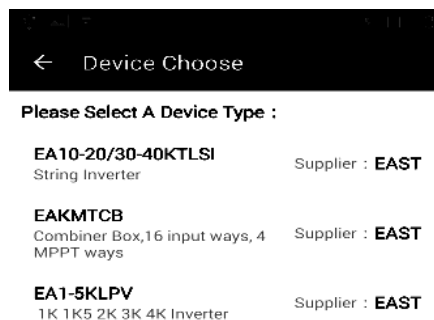


Fig. 27 Selecting devices

Select the first option “ MGEA10-20/30-40KTL SI”.

#### Step 3: Connection

- If the Wi-Fi Connect is selected in the first step, it will skip to interface of Fig. 28. And then click CONNECT.

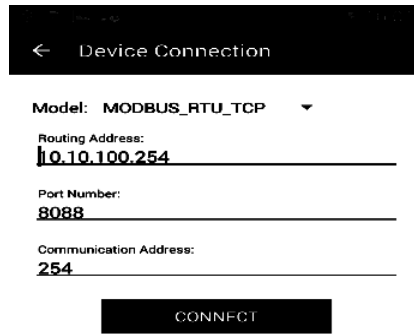


Fig. 28 Wi-Fi parameters

- If the Bluetooth connection type is selected in the first step, however, Bluetooth is not open from the mobile phone, the Bluetooth permission will be requested. Here, click [Yes], it will start searching. The available Bluetooth device will be displayed in the list in the searching process, and click target Bluetooth to enter main interface.

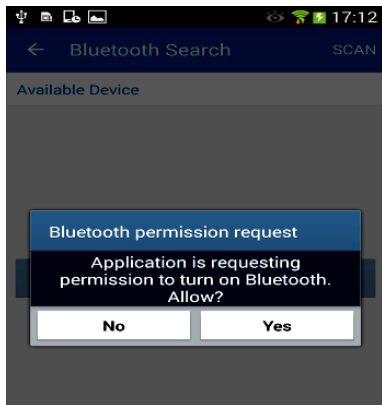


Fig. 29 Open Bluetooth

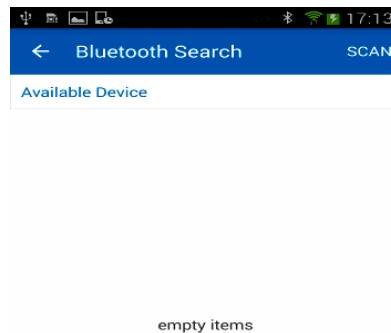


Fig. 30 Bluetooth Search

#### Step 4: Checking whether the connection is successful or not

It will enter main interface after the third step.

If all runs normally, the homepage displays normal datas, as shown in Fig. 31 and Fig 32, if not, it displays “data read failed” in 15 seconds, as shown in Fig. 33.

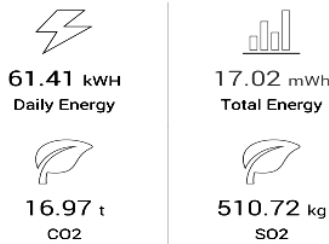
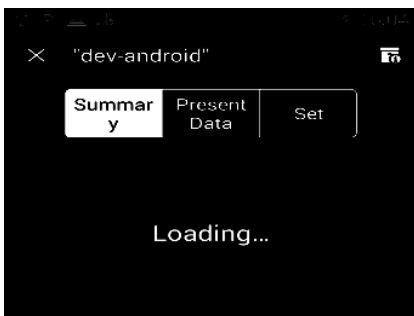


Fig. 31 Loading

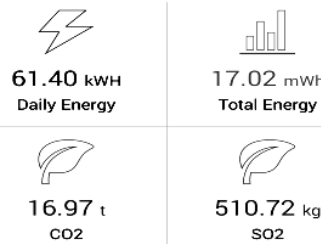
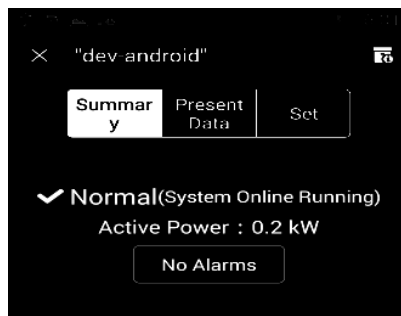


Fig. 32 Run normally

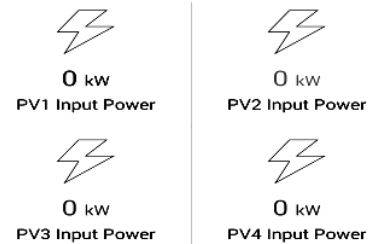
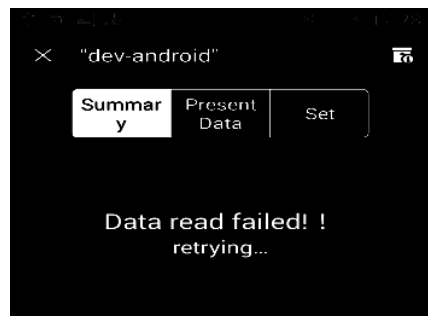


Fig. 33 Data read failed

#### ◆ Devices monitoring

Device data and remote control equipment can be viewed via App after connecting successfully.

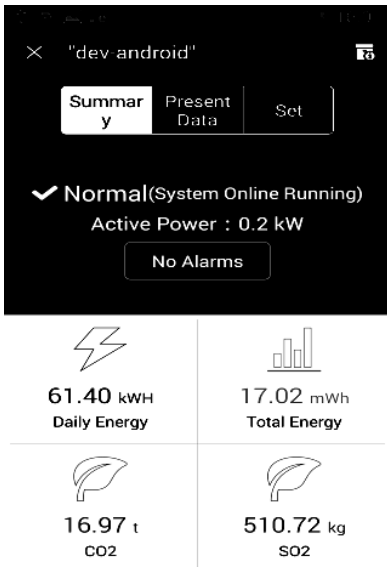


Fig. 34 Summary

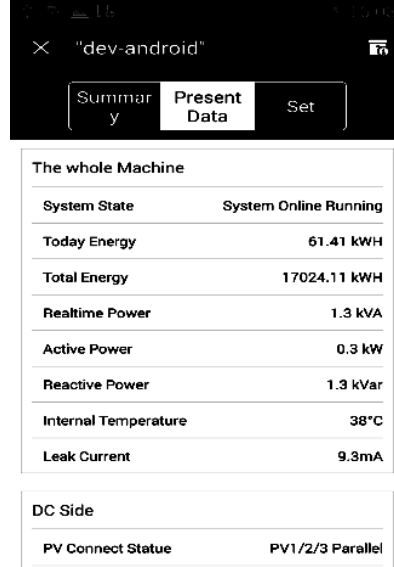


Fig. 35 Present Data Fig.

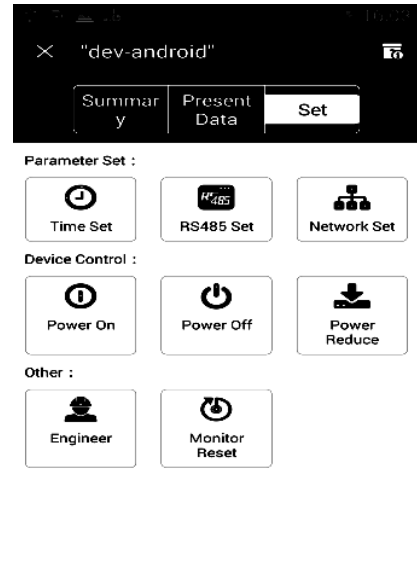


Fig. 36 Devices Set



Fig. 37 Time Setting

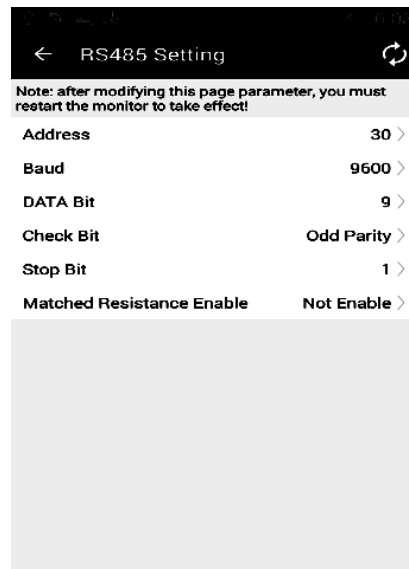


Fig. 38 RS485 Setting

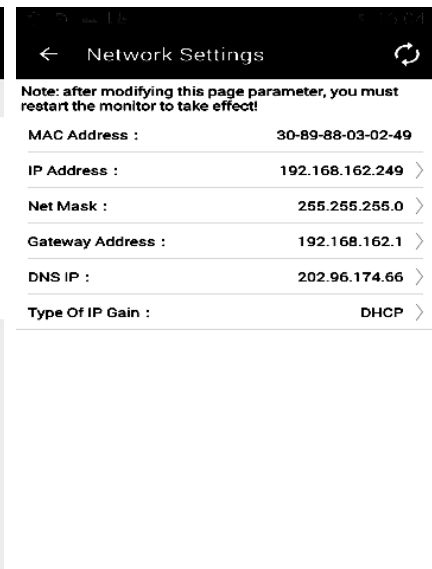


Fig. 39 Network Settings

**Notice:** Devices “network settings” in the above figure indicates the wired network card address for setting string inverters, which is irrelevant to Wi-Fi address.

## 7.4 How to distinguish Wi-Fi hotspot

The serial number of device is the default hotspot name for all our Wi-Fi modules. You can find the hotspot’s name from the nameplate on the inverters, as shown in example below:



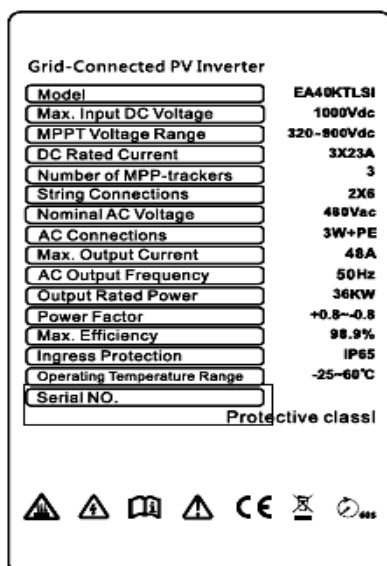


Fig. 40 Nameplate

**Note:** Above nameplate information is for reference only, specific please in kind prevail.

## 8 Troubleshooting

Once a failure of string inverters occurs, fault lights will be illuminated. The current fault and fault ID can be viewed via communication devices. Meanwhile the inverter will determine whether to shut down or not according to the alarm level.

Some common fault alarms and solutions are listed in the following table.

### Definition of alarm level:

**Important alarm:** The inverter fails, enter shutdown mode and stop grid-connected power generation.

**Prompt alarm:** Some parts of the inverter fails, but the inverter still can make grid-connected power generation.

Alarm ID	Alarm Message	Alarm Level	Possible Cause	Solution
101 ~ 103	High voltage of PV strings	Important	Excessive number of PV panels connected in serial results in output overhigh voltage, finally causing open-circuit voltage of PV strings higher than maximum input voltage of inverter.	Check whether the serial connection configuration of PV strings is excessive or not, it may cause open-circuit voltage higher than maximum input voltage of inverter. If it is, adjusting the string number configured is required to drop output voltage of PV strings to within specification range. After adjusting properly, the inverter will be restored to work normally.
111 ~ 113	Reversed input polarity	Important	Input polarity is reversely connected during installation.	Check whether the corresponding anode and cathode of inverter input is connected reversely or not, if it is, please adjust the polarity.
121 ~ 123	BOOST lightning protection fault	Prompt	BOOST lightning arrester is not connected or damaged.	Check whether BOOST lightning arrester is connected, if not, connect it.
131	Low input power	Prompt	PV strings suffered long-term fixed shelter and aging.	Check whether the PV string is sheltered. If its surface is clean and

				not sheltered, check if the PV panel is damaged.
141	ISO insulation impedance abnormality	Important		
201	Blackouts	Important	No power supply from power grid.	Check whether the power grid is electriferous or not
211 ~ 216	Overvoltage	Important	Power grid voltage is over high beyond allowable range.	Occasional occurrence may be caused by short-term power grid abnormality. After detecting normal power grid, the inverter will be restored to normal operation without manual intervention. If the problem occurs frequently, please check if power grid voltage is in the allowable range, if not, please contact local power operators, if it is, revise the protection point after getting approval from local power operators.
221 ~ 226	Undervoltage	Important	Power grid voltage is much low beyond allowable range.	Same solutions as power grid overvoltage.
231 ~ 236	Overfrequency	Important	Power grid frequency is much high beyond allowable range.	Same solutions as power grid overvoltage.
241 ~ 246	Underfrequency	Important	Power grid frequency is much low beyond allowable range.	Same solutions as power grid overvoltage.
251 ~ 253	Abnormal power grid frequency	Important	The inverter detects that power grid frequency is beyond allowable range before grid-connected operating.	Same solutions as power grid overvoltage.
261	Islanding	Important	Abnormal fluctuation happens on power grid frequency	Check whether the power grid is in islanding state or not.
262	Power grid unbalance abnormality	Important	Power grid unbalance exceeds the allowable range.	Occasional occurrence may be caused by short-term power grid abnormality. After detecting normal power grid, the inverter will be restored to normal operation without manual intervention.
263	FRT occurrence	Prompt	Low voltage ride-through (LVRT) and dropping happen on power grid voltage	Prompt alarm will be emitted when LVRT and dropping happen on power grid voltage, no need for special treatment.
264	Reverse phase sequence of power grid	Prompt	Power grid ABC phase sequences are connected reversely.	Adjust AB or BC or CA two-phase connection.
301 ~ 331	BOOST circuit fault	Important	Abnormal external conditions result in BOOST circuit protection inside the inverter, the possible cause includes: ID: 301~309 Drastic variations in external conditions of the inverter results in excessive input current. ID: 311 ~ 316 Drastic variations in external	The inverter makes real-time monitoring of external working conditions, and will be restored to normal operation without manual intervention after fault fixed.  ID: 321 ~ 323 Check whether the cables of BOOST temperature sensor are connected or not.

			<p>conditions of the inverter results in excessive input voltage. ID: 321 ~ 323</p> <p>The Inverter detects that BOOST temperature exceeds allowable range. ID: 331</p> <p>Soft start of Inverter BOOST fails.</p>	
401 ~ 491	Inverter circuit fault	Important	<p>Abnormal external conditions result in inverter circuit protection inside the inverter, the possible causes includes: ID: 401 ~ 416</p> <p>Drastic variations in external conditions of the inverter results in excessive output current. ID: 421~427</p> <p>Inverter output short circuit. ID: 431 ~ 433</p> <p>DC components of Inverter current ABC three-phase exceed allowable range. ID: 441 ~ 444</p> <p>After current of the inverter exceeds allowable range. ID: 451 ~ 455</p> <p>The Inverter detects that temperature exceeds allowable range. ID: 461 ~ 466</p> <p>Drastic variations in external conditions of the inverter results in positive and negative bus voltages exceed allowable range. ID: 471 ~ 474</p> <p>The inverter detects relay failure. ID: 481</p> <p>Inverter phase lock is abnormal. ID: 482</p> <p>Inverter soft start fails. ID: 483</p> <p>Output lightning arrester is abnormal. ID: 485 ~ 486</p> <p>The inverter detects that fans are normal. ID: 491</p> <p>Output power derating</p>	<p>The inverter makes real-time monitoring of external working conditions, and will be restored to normal operation without manual intervention after fault fixed. ID: 421 ~ 427</p> <p>Check whether there is a short circuit on the output cable of the inverter or not. ID: 451 ~ 455</p> <p>Check whether the cables of the inverter temperature sensor are connected or not. ID: 471 ~ 474</p> <p>Check whether relays of the inverter are normal or not, and are conglutinated or not. ID: 483</p> <p>Check whether the output lightning arrester of the inverter is connected normally or not, and are damaged or not. ID: 485 ~ 486</p> <p>Check whether the cables of inverter fans are connected or not, and are damaged or not.</p>
501 ~ 503	Communication fault	Important	<p>Communication between inverter chips is abnormal.</p>	<p>501 ~ 502: EEPROM components have problems. 503: Main and auxiliary chips work abnormally.</p>
601	Abnormal version detection	Important	<p>Software version mismatch</p>	<p>Update the software.</p>

Note: Please contact the local dealer or supplier if the recommended solution in the above table fails to help you

## Appendix A

### Technical data of String Inverter (MGEA33KTLSI/40KTLSI)

Model	MGEA33KTLSI	MGEA40KTLSI
<b>Input</b>		
Maximum DC input power	33800 W	40800 W
Maximum DC input voltage	1000 V	
Starting voltage	200 V	
Maximum DC input current	3 × 23 A	
MPP voltage range	320 ~ 900 V	
Voltage range of full-load MPP	480 ~ 800 V	580 ~ 850 V
Numbers of MPPT	3	
Rated DC input voltage	620 V	680 V
DC terminals	2 × 6	
MPPT efficiency (static)	> 99.9%	
Insulation voltage resistance between DC input terminal and chassis	Basic insulation 3000 Vdc / 1 min	
<b>Output</b>		
Rated output power	30 kW	36 kW
Maximum apparent power	33 kVA	40 kVA
Maximum active power (cosΦ=1)	33 kW	40 kW
Rated output voltage	3 × 380 / 400 / 415 Vac + N + PE	3 × 277 / 480 Vac + PE
Rated output current	3 × 45.9 A	
Rated frequency	50 Hz / 60 Hz	
DC component	< 0.5% (rated current)	
THD%	< 3% (rated power)	
PF	0.8 leading ~ 0.8 lagging	
Insulation voltage resistance between AC input terminal and chassis	Basic insulation 3000 Vdc / 1min	
<b>Efficiency</b>		
Maximum conversion efficiency	98.7%	98.9%
European efficiency	98.4%	98.5%
<b>General Parameters</b>		
Standby consumption	< 15 W	
Topology	Transformerless	
MTBF	40,000 h	
Warranty	5 / 10 / 15 / 20 / 25 years optional	
<b>Protections</b>		
Input reverse connection protection	Yes	

DC input switch	Yes
DC overvoltage and overload protection	Yes
Output AC short-circuit protection	Yes
AC overload, overcurrent restriction and protection	Yes
Overvoltage, undervoltage and unbalance protection for power grid	Yes
Overfrequency and Underfrequency protection	Yes
Electric leakage protection	Yes
Lightning protection	Yes
Islanding protection	Active and passive method
DC surge protection	Yes
AC surge protection	Yes
Insulation impedance detection protection	Yes
<b>Standards</b>	
Certification	TUV/VDE/CE/CQC
Grid-connected standards	TUV / VDE – AR – N – 4105 / G59
EMC / Safety rules	EN61000-6-2,EN61000-6-3, EN61000-3-2,EN61000-3-3, EN61000-3-11,EN61000-3-12, EN/IEC62109-1,EN/IEC62109-2
<b>Display and communications</b>	
Display	LED
RS485	Yes
USB	Yes
PLC	Optional
APP & BLE	Yes
<b>Others</b>	
Mechanical dimensions (W×H×D)	580 mm × 820 mm × 255 mm
Operating temperature	-25°C ~ 60°C
Heat dissipation method	Natural heat dissipation
Maximum working altitude	3000 m
Relative humidity	0 - 100% (non-condensing)
Weight	< 65 kg
Protection rating	IP 65