LEDVANCE

User Manual
Grid-connected PV Inverter
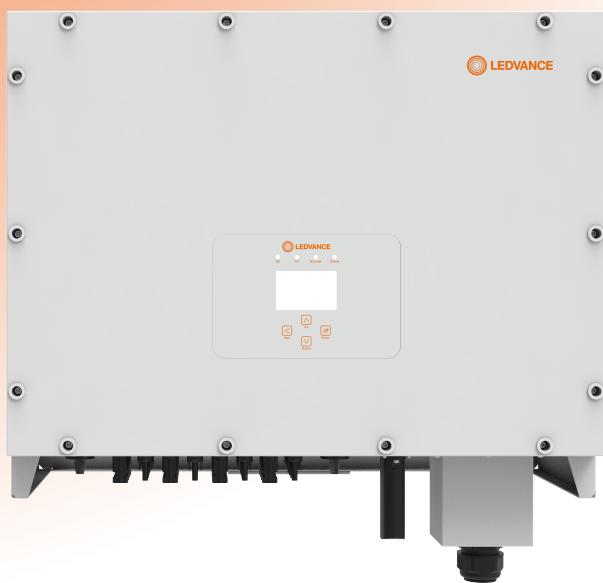
LT-60K F1 LT-80K F1

Contents

About This Manual

The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information about the photovoltaic (PV) system.

How to Use This Manual

Read the manual and other related documents before performing any operation on the inverter. Documents must be stored carefully and be available at all times. **Contents may be periodically updated or revised due to product development. The information in this manual is subject to change without notice.**

1. Introduction

1.1 Appearance Introduction

On-grid inverter can convert solar panel DC power into AC power which can directly input to the grid. Its appearance is shown below. These models contain LT-60K F1,LT-80K F1.
The following is collectively referred to as "inverter".
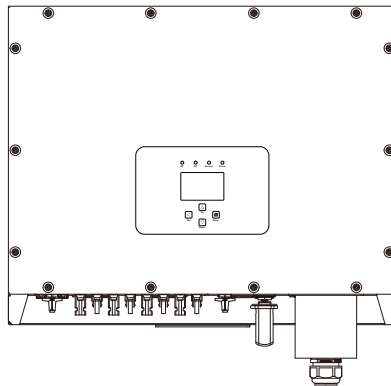
Pic 1.1 Front view
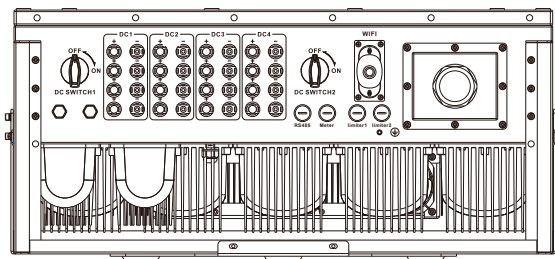
Pic 1.2 Bottom view

1.2 Parts list

Please check the following table, to see whether all the parts are included in the package :

Grid-tied PV String Inverter x 1	Wall mounting bracket x 1	Mounting stainless steel screws M4×12 x 10
Wrench x 1	DC+/DC- Plug connectors including metal terminal x N pairs	Stainless steel anti-collision bolt M12×60 x 3
User manual x1	Datalogger (optional) x1	Installation screws M5× 12 x 2
*Sensor Clamp (optional)x 3	Meter(optional) x 1	
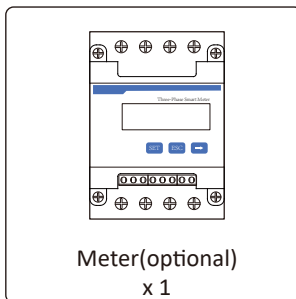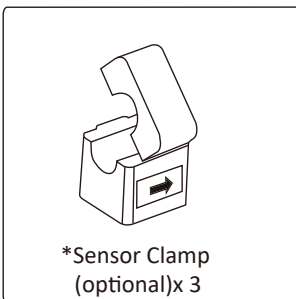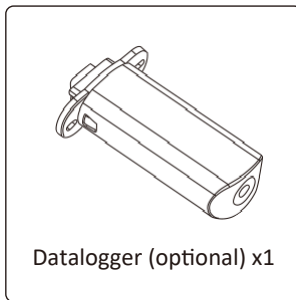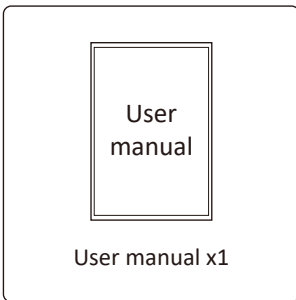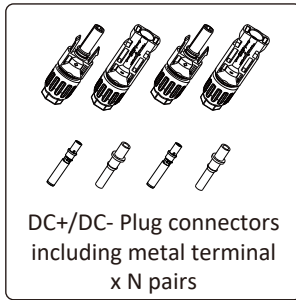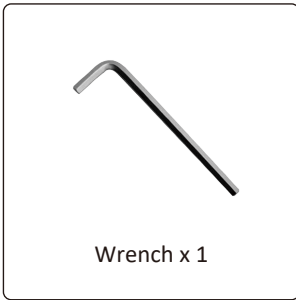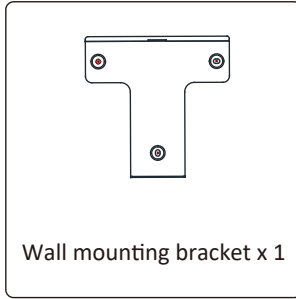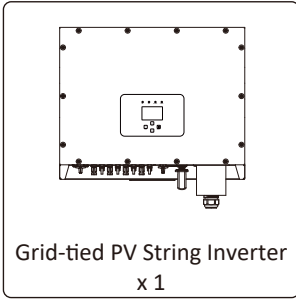
2. Safety warnings and instructions

Improper use may result in potential electric shock hazards or burns. This manual contains important instructions that should be followed during installation and maintenance. Please read these instructions carefully before use and keep them for future reference.

2.1 Safety signs

Safety symbols used in this manual, which highlight potential safety risks and important safety information, are listed as follows:

Warning:
Warning symbol indicates important safety instructions, which if not correctly followed, could result in serious injury or death.

Shock Hazard:
Caution, risk of electric shock symbol indicates important safety instructions, which if not correctly followed, could result in electric shock.

Safety Hint:
Note symbol indicates important safety instructions, which if not correctly followed, could result in some damage or the destruction of the inverter.

High Temperature Hazard:
Caution, hot surface symbol indicates safety instructions, which if not correctly followed, could result in burns.

2.2 Safety instructions

Warning:
Electrical installation of the inverter must conform to the safety operation rules of the country or local area.

Warning:
Inverter adopts non-isolated topology structure, hence must insure DC input and AC output are electrical isolated before operating the inverter.

Shock Hazard:
Prohibit disassembling inverter case, there existing shock hazard,which may cause serious injury or death, please ask qualified person to repair.

Shock Hazard:
When PV module is exposed to sunlight, the output will generate DC voltage. Prohibit touching to avoid shock hazard.

Shock Hazard:
While disconnect the input and output of the inverter for maintenance, please waits for at least 5 mins until the inverter discharge the remnant electricity.

High Temperature Hazard:
Local temperature of inverter may exceed 80℃ while under operating. Please do not touch the inverter case.

2.3 Notes for using

The three phase string power inverter is designed and tested under related safety regulations. It can ensure the personal safety of the user. But as a electric device, it may cause shock or injury by incorrect operation. Please operate the unit under below requirements:

1. Inverter should be installed and maintained by qualified person under local standard regulations.
2. Must disconnect the AC side first, then disconnect DC side while doing installation and maintenance, after that, please wait at least 5 mins to avoid getting shocked.
3. Local temperature of the inverter may exceed 80 ℃ while under operating.Do not touch to avoid getting injured.
4. All electrical installation must be in accordance with local electrical standards, and achieved permission of local power company.
5. Please take appropriate anti-static measure.
6. Please install where children can not touch.

3. Operation Interface

3.1 Interface View
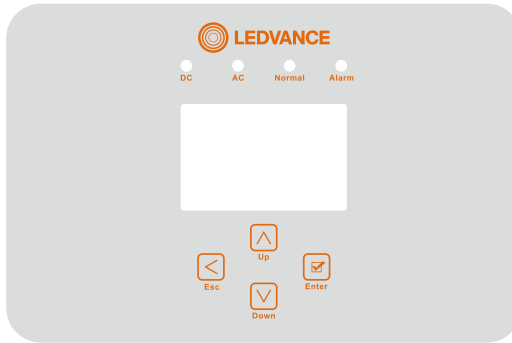
Pic 3.1 Front panel display

3.2 Status Indicator

The inverter panel has 4 indicators, the left one is dc output indicators, green indicates normal DC input. Beside is the AC indicator, green indicating normal ac connection. Beside the AC indicator is the operating indicator, green indicating normal output. The right indicator is alarm. red indicates alarming.

Indicator	status	Explanation
● DC	on	Inverter detects DC input
	off	Low DC input voltage
● AC	on	Grid Connected
	off	Grid Unavailable
● NORMAL	on	Under normal operating
	off	Stop operating
● ALARM	on	Detected faults or report faults
	off	Under normal operating

Table 3.1 Status indicator lights

3.3 Buttons

There are four buttons on the inverter panel： Above is Up and increase button（UP）, Below is down and decrease button（DOWN）, Left is ESC button（ESC）, Right is Enter button（ENTER）. Achieving below functions by the four buttons：

● Page turning (use UP and DOWN button）
● Modify adjustable parameters (use ESC and ENTER button）

3.4 LCD Display

Three phase string inverter use 256*128 dot formation display， Display below content：

● Inverter operation status and information;
● Operating information;
● Warning message and malfunction display.

4. Product installation

4.1 Select installation location

To select a location for the inverter, the following criteria should be considered:

WARNING: Risk of fire

● Do not install the inverter in areas containing highly flammable materials or gases.

● Do not install the inverter in potentially explosive atmospheres.

● Do not install in small closed spaces where air can not circulate freely. To avoid overheating, always make sure the flow of air around the inverter is not blocked.

● Exposure to direct sunlight will increase the operational temperature of the inverter and may cause output power limiting. It is recommended that inverter installed to avoid direct sunlight or raining.

● To avoid overheating ambient air temperature must be considered when choosing the inverter installation location. It is recommended that using a sun shade minimizing direct sunlight when the ambient air temperature around the unit exceeds 100°F/40℃.

Pic 4.1 Recommended installation place
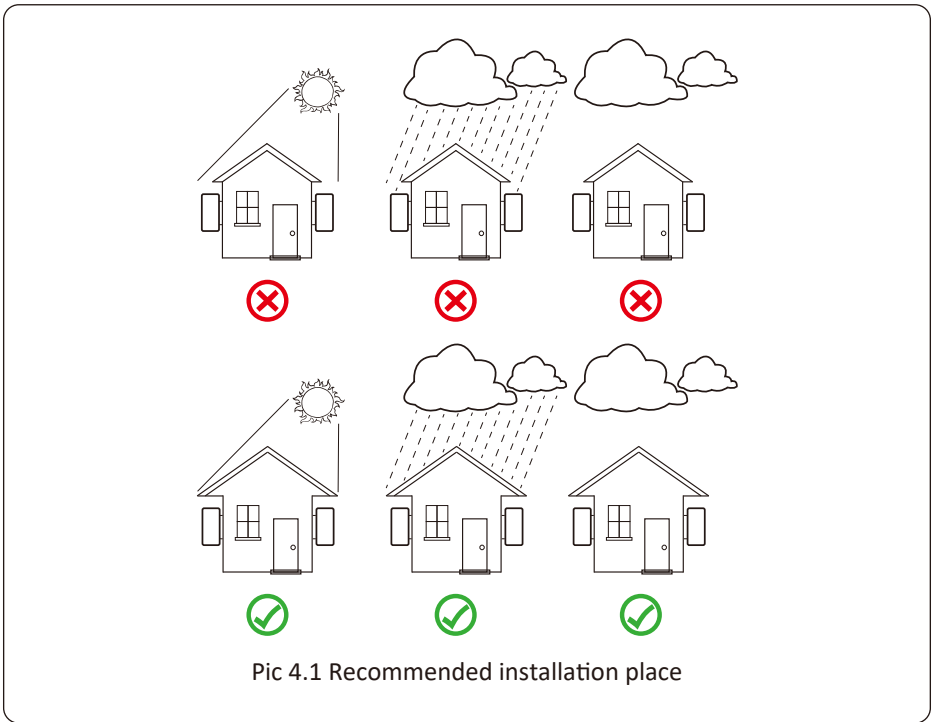
- Install on a wall or strong structure capable of bearing the weight.
- Install vertically with a maximum incline of +/-15°. If the mounted inverter is tilted to an angle greater than the maximum noted, heat dissipation can be inhibited, and may result in less than expected output power.
- If install more than one inverter, must leave at least 500mm gap between each inverter. And each inverter must be at least 500mm above and below.And must install the inverter at the place where children cannot touch. Please see picture 4.3.
- Consider whether the installation environment is helpful to see the inverter LCD display and indicator status clearly.
- Must offer a ventilate environment if inverter installed in the airtight house.

> *Safety Hint:*
> Do not place or store any items next to the inverter.
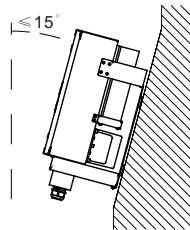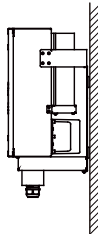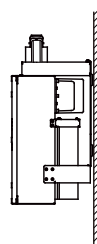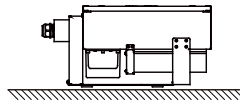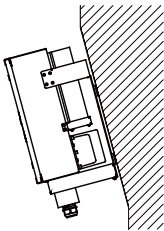
Pic 4.2 Installation Angle
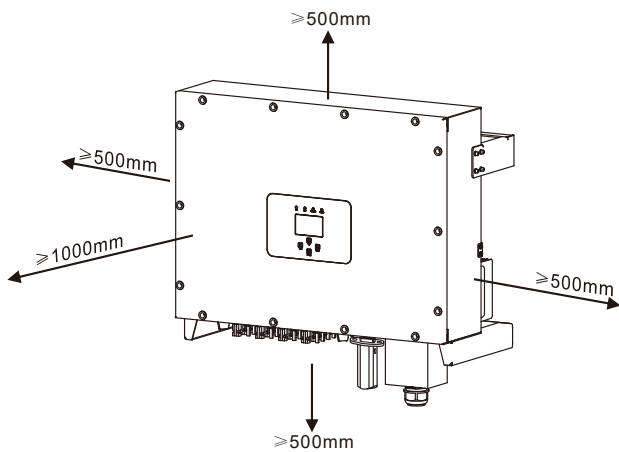
Pic 4.3 Installation Gap

4.2 Inverter of inverter
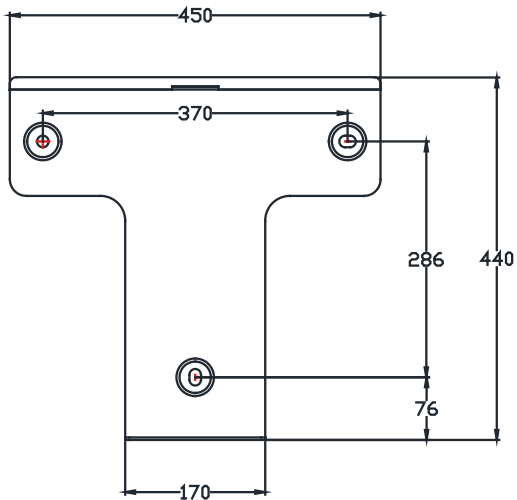
Pic 4.4 Mouting bracket dimensions

4.3 Inverter Installation

The inverter should be mounted in a vertical position. The steps of mounting are as follows
1. For brick walls, the position of the holes should be suitable for the expansion bolts.
2. Make sure the bracket is horizontal and the mounting holes are in the correct points. Drilling the holes on the wall according the marks.
3. Using the expansion bolts to fix the bracket to the wall.

Anchoring

Mounting bracket

Stainless steel screws
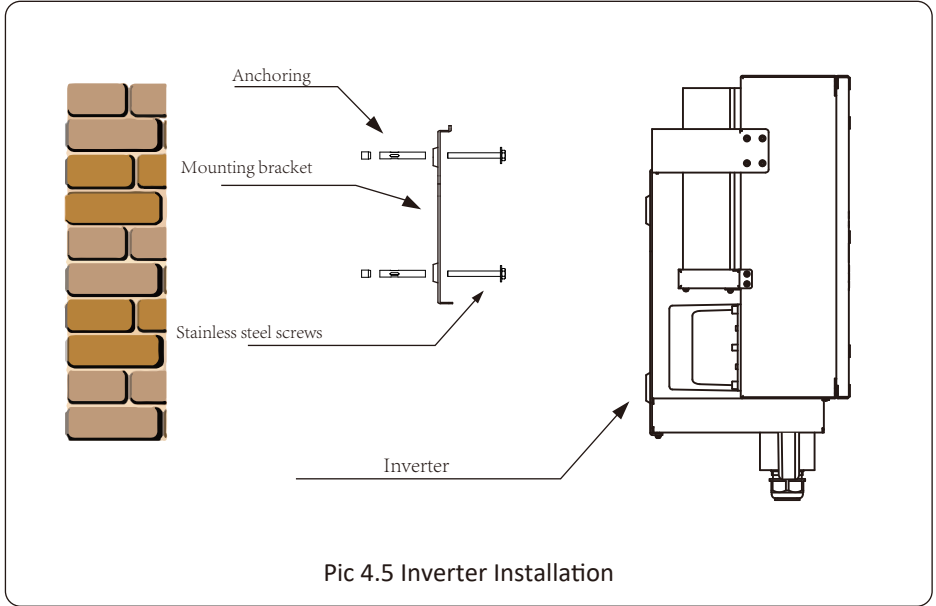
Inverter

Pic 4.5 Inverter Installation

5 Electrical Connection

5.1 DC input terminal connection

1. Switch the Grid Supply Main Switch(AC)OFF.
2. Switch the DC lsolator OFF.
3. Assemble PV input connector to the inverter.

Warning:
When using PV modules, please ensure the PV+ & PV- of solar panel is not connected to the system ground bar.

Safety Hint:
Before connection, please make sure the polarity of the output voltage of PV array matches the "DC+" and "DC-" symbols.

Warning:
Before connecting inverter, please make sure the PV array open circuit voltage is within the 1000V of the inverter.
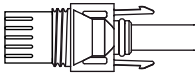
Pic 5.1 DC+ male connector   Pic 5.2 DC- female connector
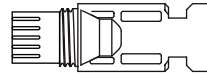
Safety Hint:
Please use approved DC cable for PV system.

Cable type	Cross section（mm^2）	
	Range	*Recommended value*
Industry generic PV cable (model: PV1-F)	4.0~6.0 (12~10AWG)	4.0(12AWG)

Table 5.1 DC Cable Specifications

The steps to assemble the DC connectors are listed as follows:

a) Strip off the DC wire about 7mm, disassemble the connector cap nut (see picture 5.3).

Pic 5.3 Disassemble the connector cap nut
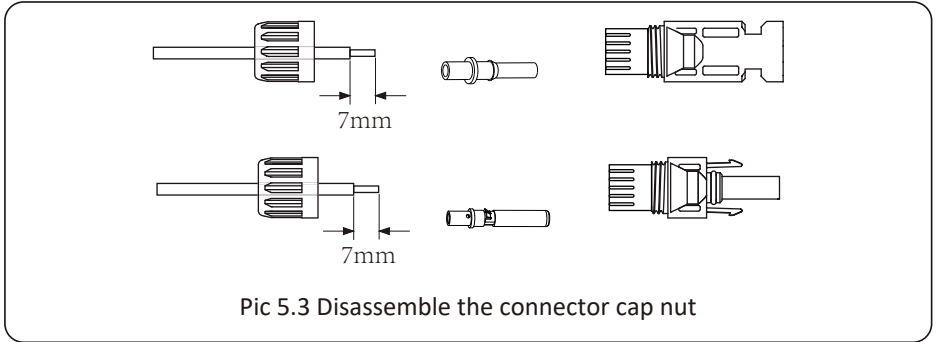
b) Crimping metal terminals with crimping pliers as shown in picture 5.4.

Crimping plier

Pic 5.4 Crimp the contact pin to the wire
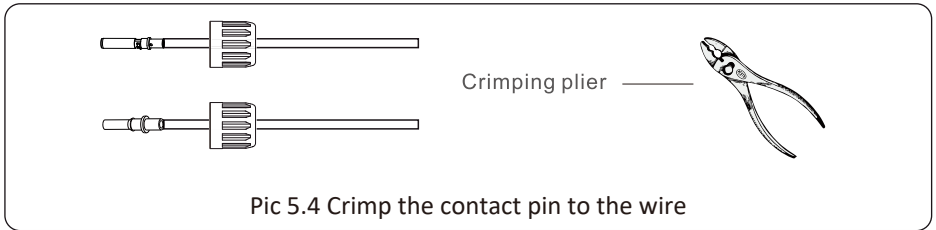
c) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector. (as shown in picture 5.5).

Pic 5.5 connector with cap nut screwed on
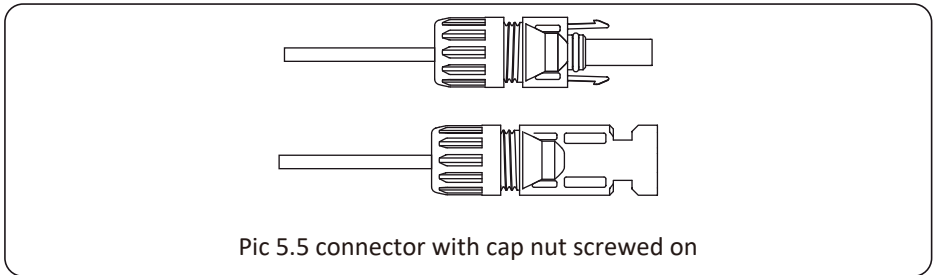
d) Finally insert the DC connector into the positive and negative input of the inverter, shown as picture 5.6
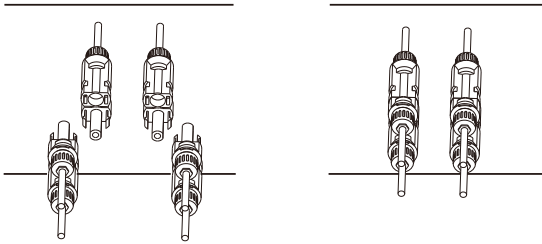
Pic 5.6 DC input connection

Warning:
Sunlight shines on the panel will generate voltage, high voltage in series may cause danger to life. Therefore, before connecting the DC input line, the solar panel needs to be blocked by the opaque material and the DC switch should be 'OFF', otherwise, the high voltage of the inverter may lead to life-threatening conditions.

Warning:
Use the DC power connector of the accessories. Do not interconnect the connectors of different manufacturers.

5.2 AC terminal connection

Model	Wire Size	Cable(mm²)	Torque value(max)	Max cable length
60KW	2AWG	33mm²	16.9Nm	Outside cable (3L+N)20m
80KW	0AWG	53.5mm²	20.3Nm	

Table 5.2 Recommened cable specifications

Warning:
The AC cable line L1 is connected to socket 1; L2 is connected to socket 2; L3 is connected to socket 3, the PE line is connected to the earth , the N wire is connected to the socket of N.

AC wire production method is the same as that of 5.2.1.
AC wire installation method:
1) Remove the 8 fixing screws on the AC junction box of the inverter as shown in Pic 5.7.
After removing the junction box, you can see the terminals of the inverter. The default is 5
digits as shown in Pic 5.8.
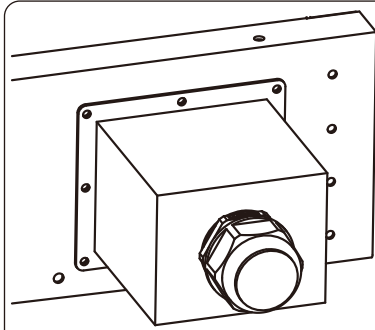
Pic 5.7 AC junction box   Pic 5.8 AC terminal
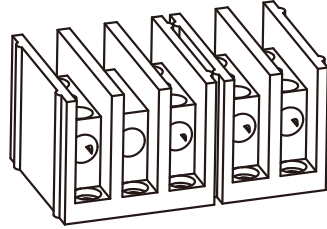
2) Connect the cable through the junction box, waterproof jacket, and insert into the terminal
(The picture shows the connection mode of three phase lines connected to the junction box,
ground wire screwed on the inverter shell) Pic5.9,and use hexagon screwdriver to presses the
wiring harness to the connect terminal as shown in Pic5.10.
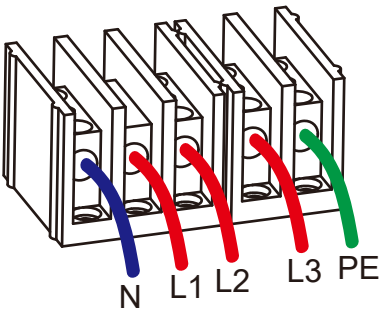
Pic 5.9 AC cable connected t
o the terminal   Pic 5.10 Tightening the
AC connection cable
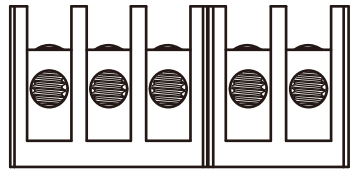
3) Screw the AC connection cover back to the shell and tighten all the screws to tighten the waterproof protection connector, as shown in Pic 5.11
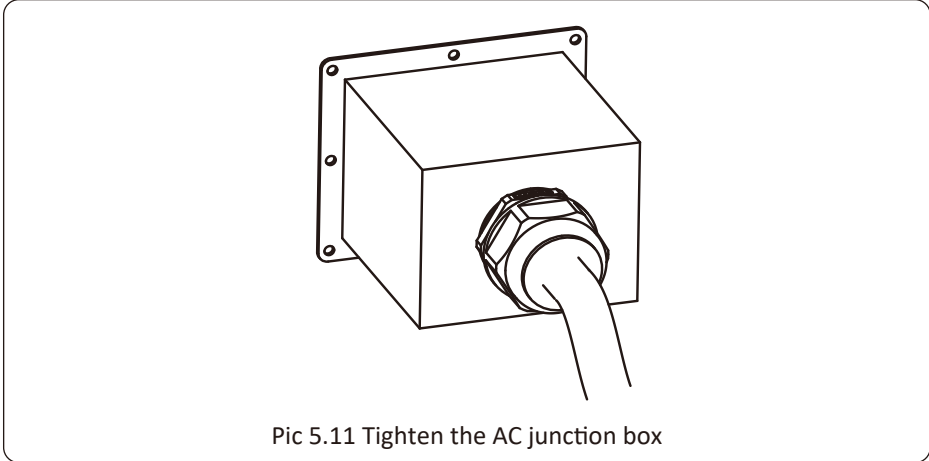
Pic 5.11 Tighten the AC junction box

5.2.3 Recommended current protector specifications

Inverter	Rated voltage	Rated output power（KW）	Current protection device（A）
LT-60K F1	400	60	120
LT-80K F1	400	80	160

Table 5.3 Recommended current protector specifications

5.3 Connection of the ground line

Good grounded is important for resist the surge voltage shock and improve EMI's performance. So before the connection of AC, DC, communication connections, inverter needs to ground first. For a single system, just ground the PE cable; For multiple machine systems, all PE cables of the inverter need to be connected to the same grounding copper platoon to ensure the equipotent connection. The installation of the shell ground wire is shown as.
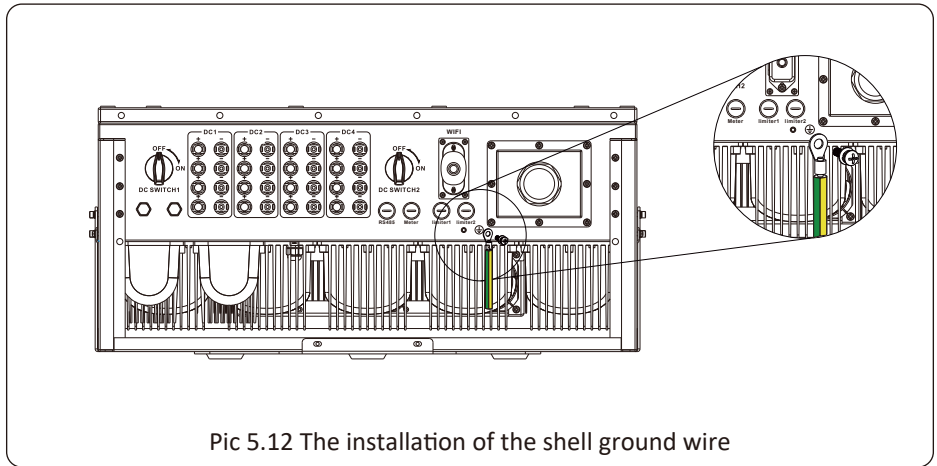
Pic 5.12 The installation of the shell ground wire

> *Warning:*
> Inverter has built-in leakage current detection circuit, If an external leakage current protection device is connected, its operating current must be greater than 300 mA or higher, otherwise inverter may not work properly.

5.4 Inverter monitoring connection

Inverter has the function of wireless remote monitoring inverter. The inverter has Wifi function and Wifi Plug in the accessories is used to realize the connection between the inverter and the network. The operation, installation, networking, APP download are detailed in the WIFI PLUG instructions. Figure 5.13 is the Internet monitoring solution.
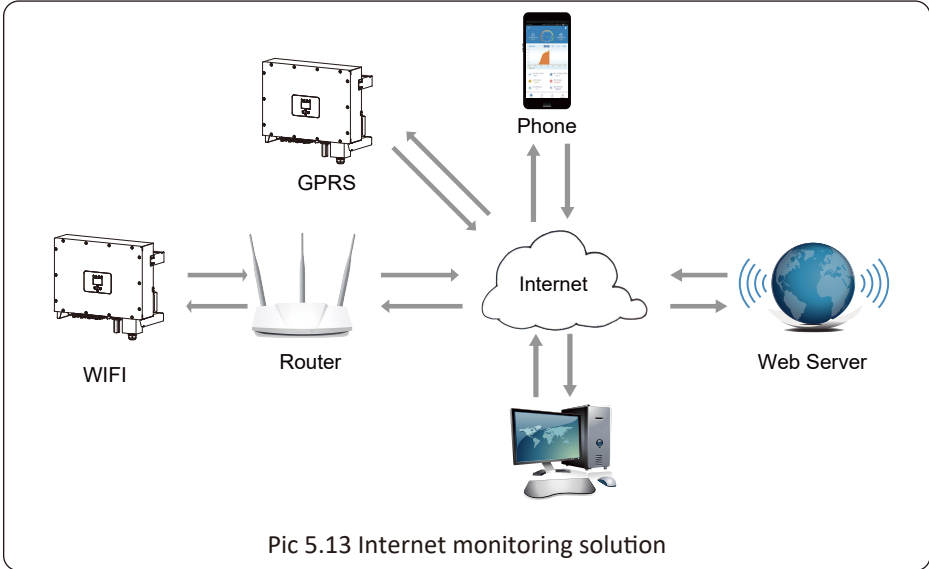
Pic 5.13 Internet monitoring solution

5.4.1 Installation of datalogger

When installing the WiFi stick, tear off the sealing strip on the inverter. Insert the datalogger into the interface and fix it with a screw. The configuration of the datalogger needs to be performed after various electrical connections have been completed and the inverter DC power on. When the inverter is on the DC power, it is determined whether the datalogger is normally electrified (The LED light shines out of the shell).
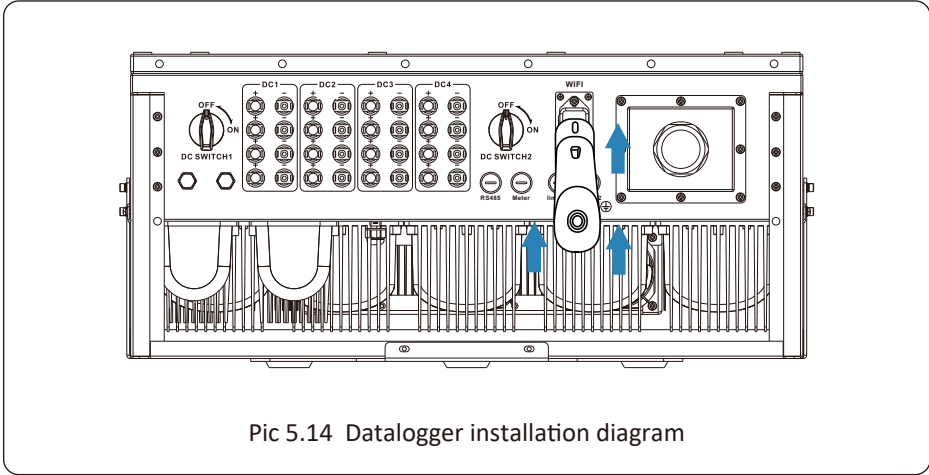
Pic 5.14 Datalogger installation diagram

5.4.2 Configuration of datalogger

For the configuration of datalogger, please refer to illustrations of the datalogger.

6. Start up and Shut off

Ensure that the inverter meets the following conditions before starting the inverter, otherwise it may cause fire or damage to the inverter without quality assurance, at the same time the situation on our company does not undertake any responsibility. At the same time, to optimize the system configuration, it is recommended that the two inputs be connected to the same number of PV modules.

   a). The maximum open circuit voltage of each set of PV modules shall not exceed 1000Vdc under any conditions.

   b). Each input of the inverter better use the same type of PV module in series.

   c). Total output power of PV shall not exceed the maximum input power of inverter, each PV modules shall not exceed the rated power of each channel.

6.1 Start up the inverter

When starting up the inverter, should fellow steps below :
   1. Starting switch on the AC breaker.
   2. Turn on the DC switch of the PV module, and if the panel provides sufficient starting voltage and power, the inverter will start.
   3. The inverter will first check the internal parameters and the grid parameters, while the liquid crystal will show that the inverter is self-checking.
   4. If the parameter is within acceptable range, the inverter will generate energy.
      NORMAL indicator light is on.

6.2 Shut off the inverter

Must follow below steps while Shutting down the inverter:
   1. Switch off the AC breaker.
   2. Wait for 30 seconds, turn off the dc switch (if any), or simply disconnect the dc input connector. The inverter will close the LCD and all led within two minutes.

7. Zero-export function via energy meter

There're two kinds of energy meters for this series inverter. First type is Eastron SDM630-Modbus V2 which is able to measure the Max. 100A current directly. More details please refer to Pic 7.1 & 7.2. For the Eastron SDM630 MCT 40mA, it needs external CT to measure the current. The CT power range is from 5A-2000A. More details about the Eastron SDM630 MCT, please refer to Pic 7.3 & 7.4. Also, the CHNT meter DTSU666 is supported, it can measure the Max. 80A current directly. More details about the DTSU666, please refer to Pic 7.5 & 7.6.

When you are reading this, we believe that you have completed the connection according to the requirements of chapter 5, if you have been running your inverter at this time, and you want to use the zero-export function, please turn off AC and DC switch of the inverter, and wait for 5 minutes until the inverter completely discharged.
For system wiring diagram, the red line refers to L line (L1, L2, L3), the black line refers to the neutral line (N). Connecting energy meter RS485 cable to inverter's RS485 port. It's recommended to install an AC switch between the inverter and the utility grid, the specs of the AC switch are determined by the power of load.
If there is no integrated DC switch inside the inverter you purchased, we commend you to connect the DC switch. The voltage and current of the switch depend on the PV array you access.
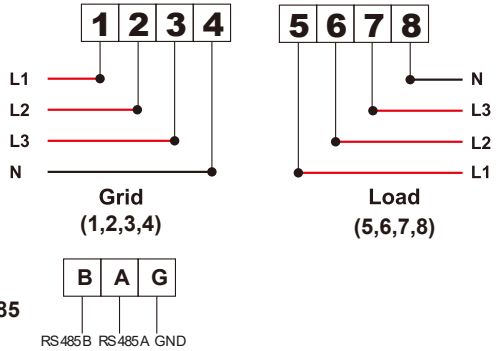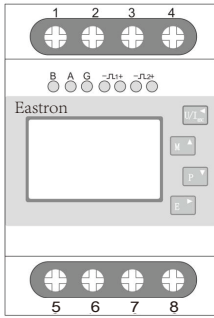
Eastron SDM630-Modbus V2
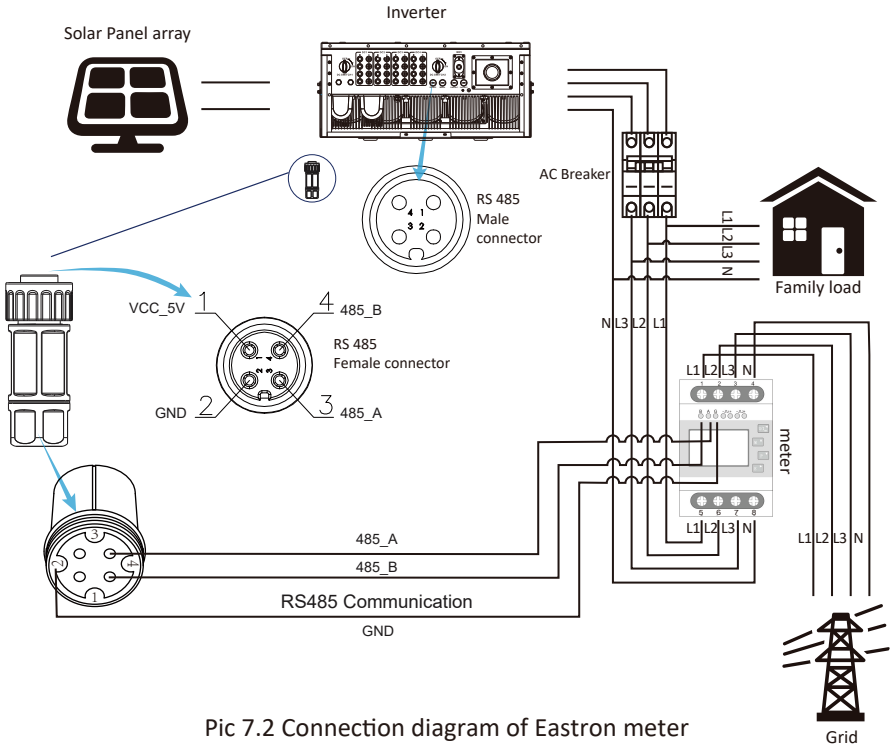
Grid (1,2,3,4)

Load (5,6,7,8)

RS 485

B A G

RS485B RS485A GND

L1
L2
L3
N

N
L3
L2
L1

Pic 7.1 Eastron meter

Solar Panel array

Inverter

AC Breaker

RS 485 Male connector

Family load

VCC_5V

485_B

RS 485 Female connector

GND

485_A

meter

485_A

485_B

RS485 Communication

GND

Grid

Pic 7.2 Connection diagram of Eastron meter
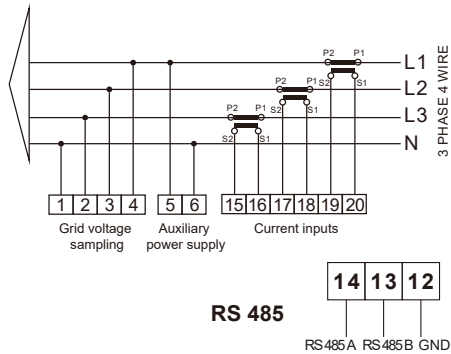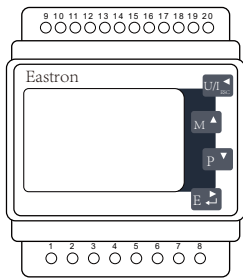
Eastron SDM630MCT

Pic 7.3 Eastron meter
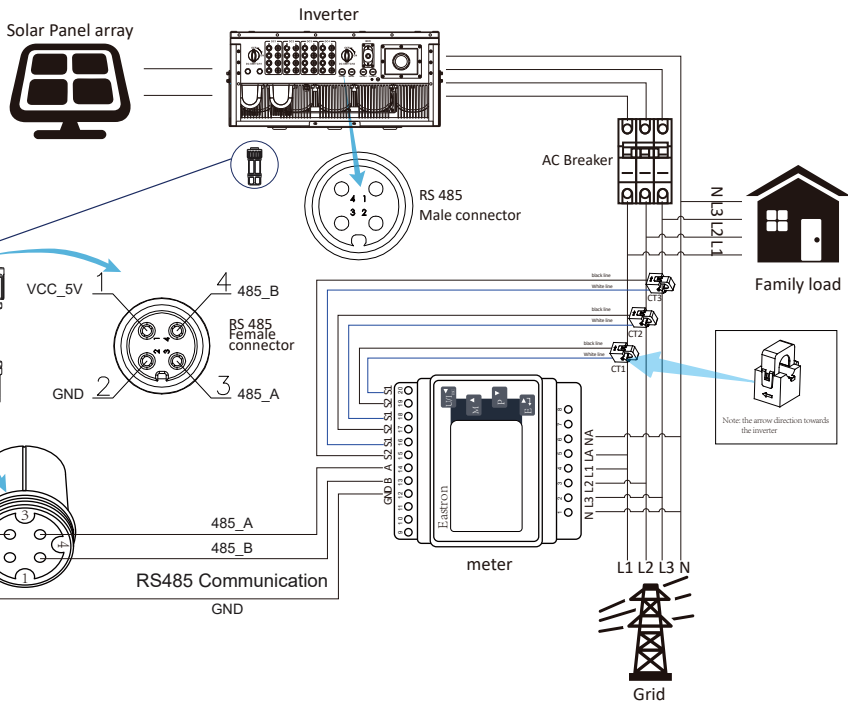
Pic 7.4 Connection diagram of Eastron meter

Three-Phase Smart Meter

SET ESC →

24 25

1   4   7   10

CHNT DTSU666

Grid (1,4,7,10)

L1
L2
L3
N

| 1 | 3 | 4 | 6 | 7 | 9 | 10 |

Load (3,6,9,10)

RS 485

| 24 | 25 |

A   B

Pic 7.5 CHNT meter

Solar Panel array

Inverter

RS 485 Male connector

AC Breaker

N L3 L2 L1

Family load

VCC_5V   1   4   485_B

RS 485 Female connector

GND   2   3   485_A

meter

L1 L2 L3 N

485_A
485_B

RS485 Communication

L1 L2 L3 N
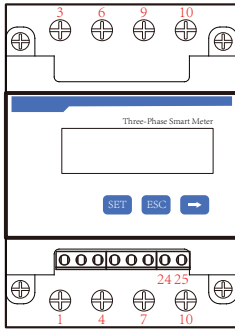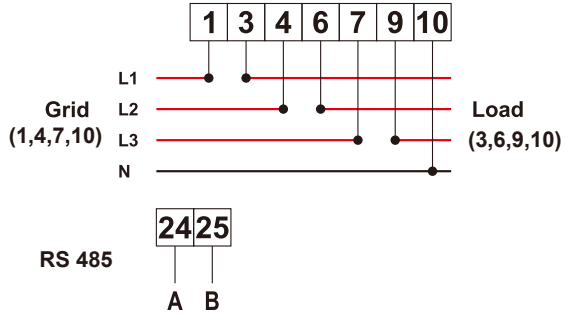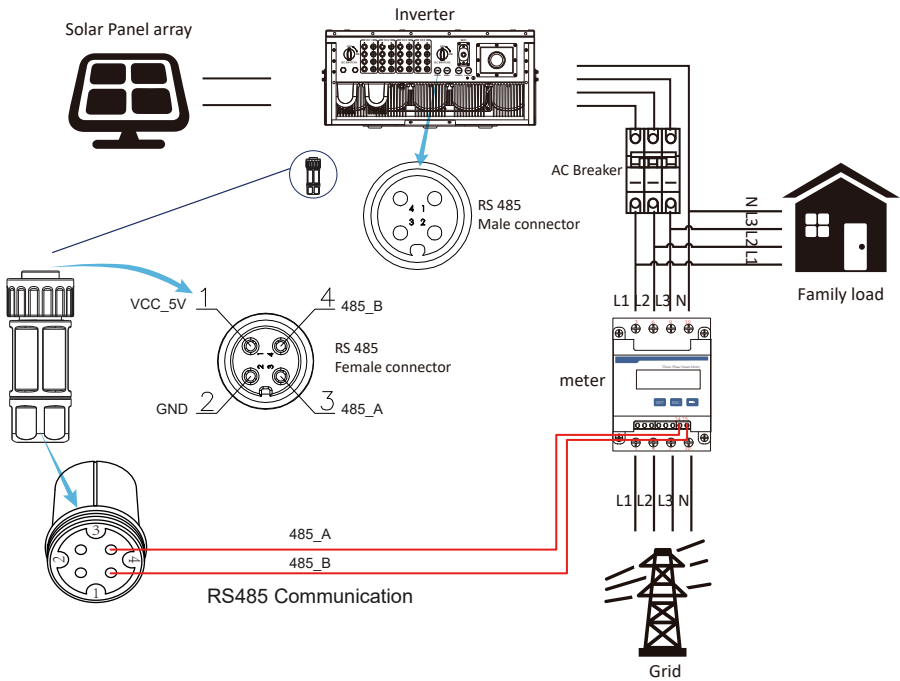
Grid

Pic 7.6 Connection diagram of CHNT meter

Safety Hint:
Ensuring grid input cables connect 1/4/7/10 port of energy meter, and inverter AC output cables connect 3/6/9/10 port of energy meter when connecting.

1. Press Enter button on the LCD panel in the main interface into the menu options, select [parameter setting] to enter setup submenu, and then select [run param], at this time please input the default password 1234 through pressing the button [up down, enter], enter the operation parameter setting interface, shown as picture 7.7.

```
┌─────────────────────────────────────────┐
│ MENU》 Setup》 Run Param                  │
│ ─────────────────────────────────────── │
│ ActiveP    31%         SelfCheck  20S     │
│ QMode    QU          Island       OFF     │
│ ReactP    0.0%        Meter        ON      │
│ PF        1.000       Limiter      OFF     │
│ Fun_ISO   ON          Feed_In     0%      │
│ Fun_RCD  ON          MPPT Num    6       │
│         OK                 Cancel         │
└─────────────────────────────────────────┘
```

Pic 7.7 Zero-export function via meter setting interface

2. Operate the button [up down], move setting cursor to energy meter and press the button [enter]. At this time you can turn on the energy meter by choosing [up down] button, please press [enter] button to confirm when setting done.
3. Move the cursor to [OK], press [enter] to save the settings and exit the running parameters page, otherwise the settings are invalid.
4. If set up successfully, you can return to the menu interface, and display the LCD to [home page] by press the [up down] button. If it displays [meter power XXW], the zero-export function setting is completed. Shown as picture 7.8.

```
┌─────────────────────────────────────────┐
│ PARAMETR                          Meter   │
│ ─────────────────────────────────────── │
│                                   SN:1    │
│ Meter Power:        428W                  │
│ Load  Power:        1.043kW               │
│          Day              Total           │
│ ImpEp : 9.51kWh        2.24MWh            │
│ ExpEp : 0.00kWh        574.75KWh          │
│ LoadEp : 13.71kWh       1.67MWh           │
└─────────────────────────────────────────┘
```

Pic 7.8 Zero-export function via energy meter turn on

5. Meter power 428W shows positive means grid is supplying the load, and no power fed into grid. if meter power shows negative, it means PV energy is being sold to grid or energy meter wiring conncetion has problem.
6. After properly connection is done, wait for inverter starting. If the power of the PV array meets the current power consumption, the inverter will keep a certain output to counteract the power of the grid without backflow .

7.1 Multiple strings and parallel connection meters

This application is that when the string inverters work in parallel, there is only one power grid and one load, and only one meter can be connected to prevent reverse current, so only this many-to-one anti-reverse current connection can be connected.

If there're several inverters parallelling operation in a plant, also it can use 1pcs meter to realize zero export function.For example, if there're 3pcs inverters parallelling operation in the system with 1pcs meter.We need to setup 1pcs inverteras the master and others setup as slaves. And, all of them need to connect to the meter via RS485.Below is the system diagram and configuration of the system.

```
MENU Setting

Exp_Mode  AVG        Generator    ON
CT_Ratio      1       G.CT         1
MFR        AUTO       G.MFR      AUTO
FeedIn      0.0KW     G.Pout     0%
Shunt       OFF       G.Cap    200.0 KW
ShuntQTY    3
         Back
```

Pic 7.9 Meter function

Name	Description	Range
Exp_Mode	AVG: Average power of three phase is zero exported. MIN: Phase with minimum load power is zero exported, while the other two phase may be in purchase mode.	AVG/MIN
CT_Ratio	CT ratio of power grid side meter when extern CT is applied.	1-1000
MFR	Manufacturer of the grid side meter. Modbus Address of it should be set as 01.	AUTO/CHNT/EASTRON
Feedin	Percentage of the Feed in power exported to the grid.	0-110%
Shunt	Parallel mode. Set one inverter as Master, others are Slave. ONLY need to set the master, Slave will follow the settings in the master.	OFF/Master/Slave
ShuntQTY	Number of inverters in parallel	1-16
Generator	DG side meter function Enable/Disable	ON/OFF
G.CT	CT ratio of power DG side meter when extern CT is applied.	1-1000
G.MFR	Manufacturer of the DG side meter. Modbus Address of it should be set as 02.	AUTO/CHNT/EASTRON
G.Pout	Output power percentage of the DG.	0-110%
G.Cap	Capacity of the DG.	1-999kW

Note: Select Meter option in Run Param and long press ENTER button to enter this Meter Setting page.
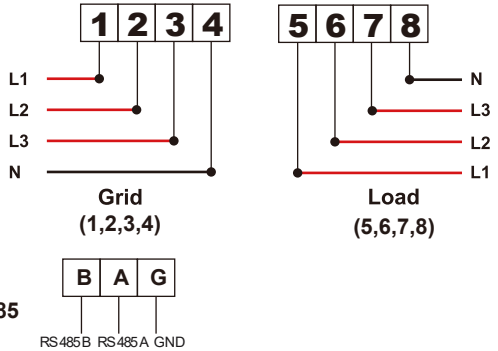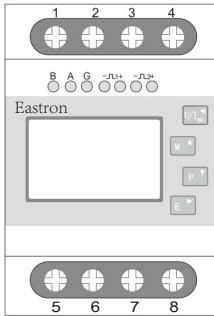
Eastron SDM630-Modbus V2

Pic 7.10 Eastron meter
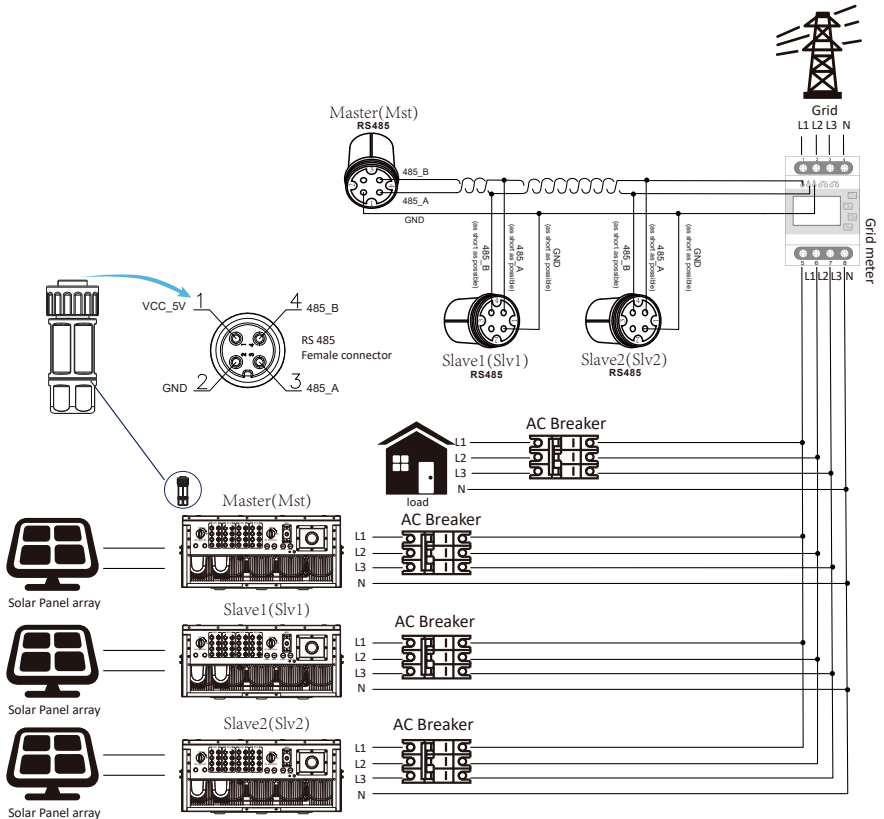
Pic 7.11 Eastron Connection diagram(The pass-through table)
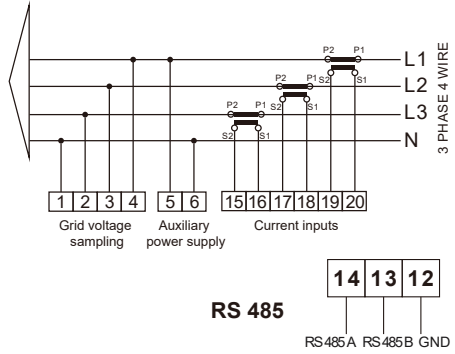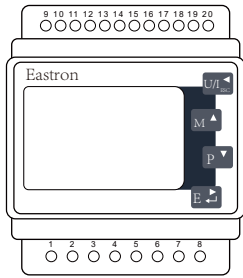
Eastron SDM630MCT

Pic 7.12 Eastron meter

Grid voltage sampling

Auxiliary power supply

Current inputs

3 PHASE 4 WIRE

L1
L2
L3
N

RS 485

| 14 | 13 | 12 |

RS485A RS485B GND

Master(Mst)

Slave1(Slv1)

Slave2(Slv2)

AC Breaker

Solar Panel array

load

VCC_5V

485_B

RS 485
Female connector

GND

485_A

Master(Mst)
RS485

485_B
485_A
GND

Slave1(Slv1)
RS485

Slave2(Slv2)
RS485

Grid meter

Grid

L1 L2 L3 N
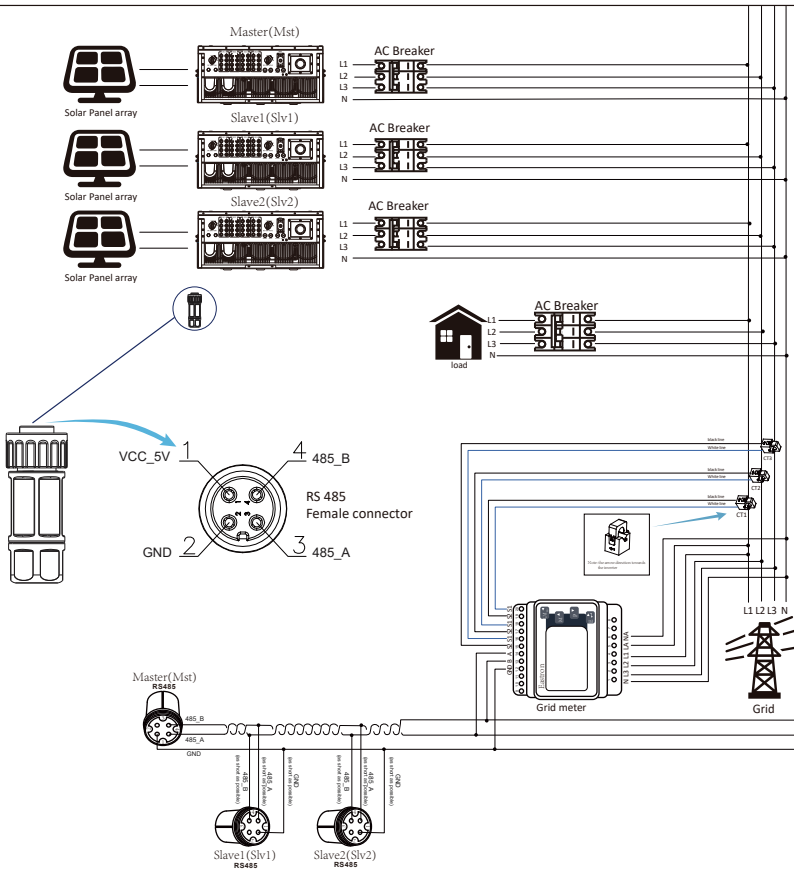
Pic 7.13 Connection diagram(Three-phase electricity)

- 27 -
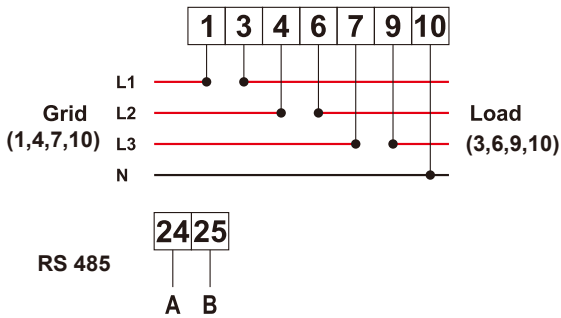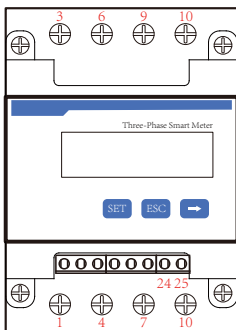
Pic 7.14 CHNT meter
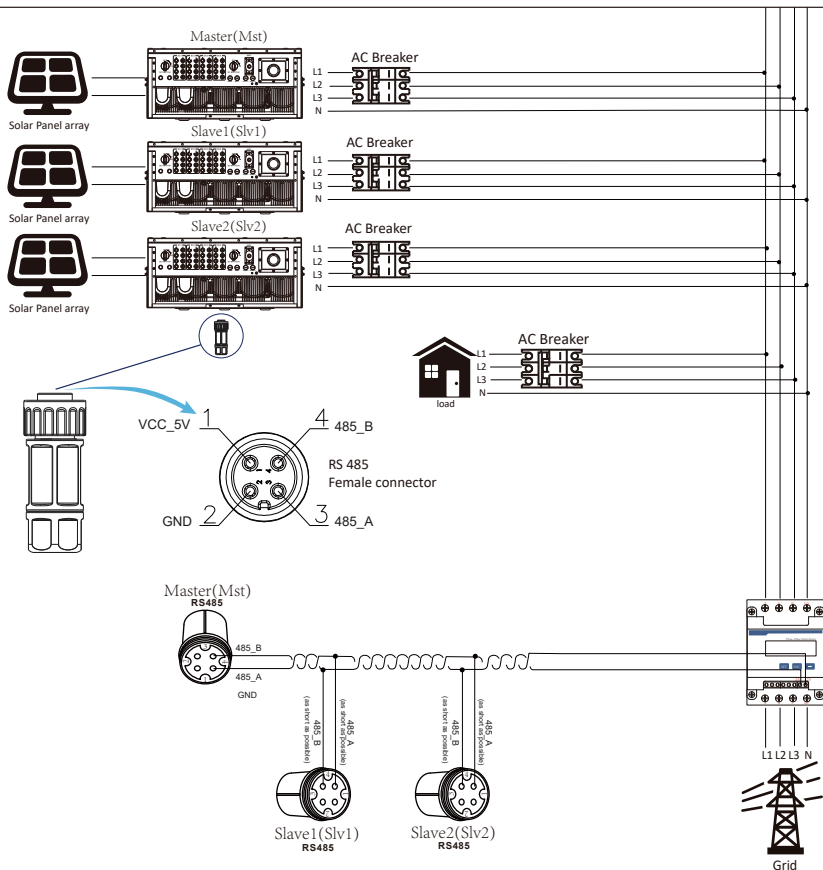
Pic 7.15 CHNT Connection diagram(The pass-through table)

7.4 How to browse the load power of your PV grid-tie plant on monitoring platform?

If you want to browse load power of the system and how much energy (KWH) does it export to grid（inverter output power is used to power the load firstly and then the surplus energy will feed into grid）. You also need to connect the meter according to above diagram. After the connection completed successfully, the inverter will show the load power on the LCD.
Also, you will be able to browse the load power on the monitoring platform http://cloud. ledvance.re. The operation steps are as follows:

1. Enter website: cloud.ledvance-re.com/cloud.ledvance.re

2. Click sign up to register you account
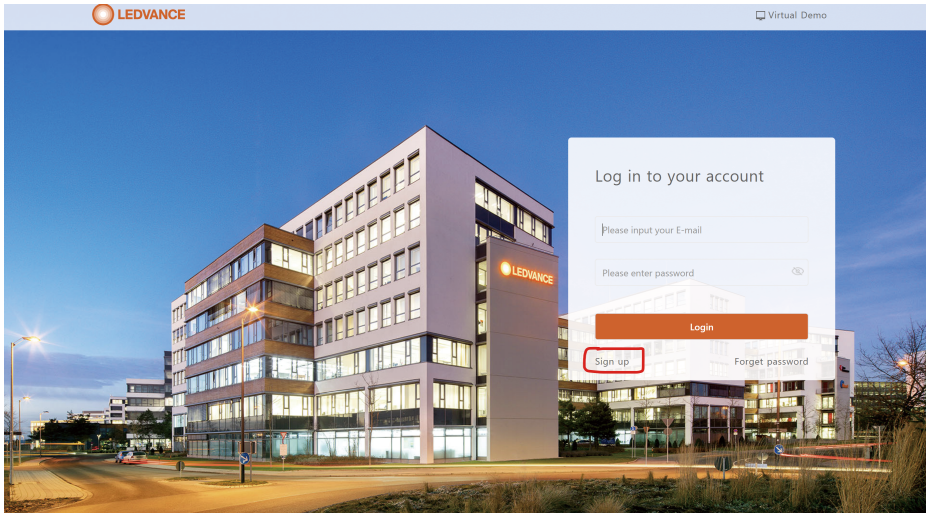
3. click plant create plant and fill in details.

4. after the step above you can see the plant running message.

LEDVANCE

- My Plants
  - Plant List
- Equipment
- Firmware
- Operation Data
- Company
- Customer
- Logging
- Management

15867874332

Current Status

0%
Power（W）

0

3680kWp
Capacity

6.5£
Today Revenue

24 6.5 E-Today(kWh)

31 155.5 E-Month(kWh)

12 536.9 E-Year(kWh)

669.2 E-Total(kWh)

Power Flow

0W

1116W

95%

8W

1086W

Weather Info.

6.9°

broken clouds

05:48 2
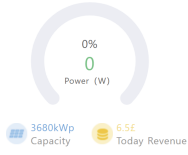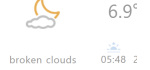
Plant Info.

Name:	2205
Capacity:	36
Commissioning Date:	2022
Installer:	Robert H
Phone:	07584
E-mail:	
Time Zone:	UTC
Address:	Bradley Vw Morley
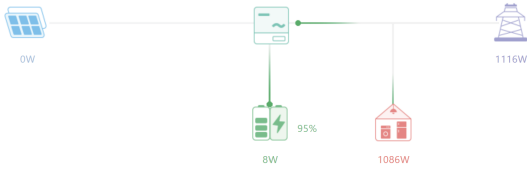
8. General Operation

During normal operation, the LCD shows the current status of the inverter, including the current power, total generation, a bar chart of power operation and inverter ID, etc. Press the Up key and the Down key to see the current DC voltage, DC current, AC voltage, AC current, inverter radiator temperature, software version number and Wifi connection state of the inverter.

Setup — Running param

- ActiveP
- Q-Mode
  - QP
    - P1-P6
    - Q1-Q6
    - Back
  - PFP
    - Cut-In
    - Cut-Out
    - P1-P6 PF1-PF6
    - Time
  - QU
    - start
    - stop
    - PmpTime
    - PtUsed
    - Curve
  - PF
  - PER
  - OFF
- ReactP
- PF
- Fun- ISO
- Fun RCD
- SelfCheck
- Island
- Meter
  - Exp_Mode
    - AVG
    - MIN
  - CT_Ratio 0
  - MFR
    - AUTO
    - ACREL
    - EASTRON
      - OFF
      - SLV
      - MST
    - CHNT
  - FeedIn
  - Shunt
  - ShuntQTY
  - Generator
  - G.CT
  - G.MFR
    - AUTO
    - ACREL
    - EASTRON
    - CHNT
  - G.FeedIn
  - G.Cap
- Limiter
- Feed-in
- MPPT Num
- ARC
  - CLR
  - ON
  - OFF
- OF-Derate
- UF-Uprate
  - ON
    - HYS
    - ON
    - OFF
  - OFF
  - V1-V4 P1-P4
- PU
- WGRa
- WGraStr
- VRef
- PowerLim
  - HardLim
  - P_H
  - SoftLim
  - P_S
- VoltageRT
  - HVRT
  - LVRT
  - Vstart
  - Vstop
- DRM
- Sunspec
- OK Cancel

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Setup
  ├─ Protect Param
  │   ├─ GridStanderd
  │   │   ├─ INMETRO
  │   │   ├─ EN50549
  │   │   ├─ EN50438
  │   │   ├─ IEC61727
  │   │   ├─ CUSTOM
  │   │   ├─ VDE_4105
  │   │   ├─ UTE_C15
  │   │   ├─ RD1699
  │   │   ├─ CEI_0_21
  │   │   ├─ G98_G99
  │   │   ├─ AS4777(.2)
  │   │   ├─ NB/T 32004
  │   │   ├─ MEA
  │   │   └─ PEA
  │   ├─ Advanced
  │   │   ├─ OV_3-OV_1   240.0V
  │   │   ├─ Tov_3-Tov_1   1000ms
  │   │   ├─ UV_1-UV_3   235.0V
  │   │   ├─ Tuv_1-Tuv_3   1000ms
  │   │   ├─ OF_3-OF_1   52.00HZ
  │   │   ├─ Tof_3-Tof_1   1000ms
  │   │   ├─ UF_1-UF_3   48.00HZ
  │   │   ├─ Tuf_1-Tuf_3   1000ms
  │   │   ├─ Vrc_H
  │   │   ├─ Vrc_L
  │   │   ├─ Frc_H
  │   │   ├─ Frc_L
  │   │   ├─ VGrid 127/220V
  │   │   ├─ OV10Min
  │   │   └─ Uov
  │   └─ Back
  └─ Comm. param
       ├─ Address:08
       ├─ Meter:Unkonw
       └─ BaudRate: 9600

8.1 The initial interface

From the initial interface, you can check power, daily generation, gross generation, invertert ID , model and time.

```
 0.0Kw      SN-01       2022-01-18       08:00:00

 Power:       29.86Kw    P - 45 Kw

 Day   :        295kWh

 Total  :       25 MWh

 State  :

 Standby                  0    6    12    18    24

 ID:2110214096    PF:0.000              Flash
```
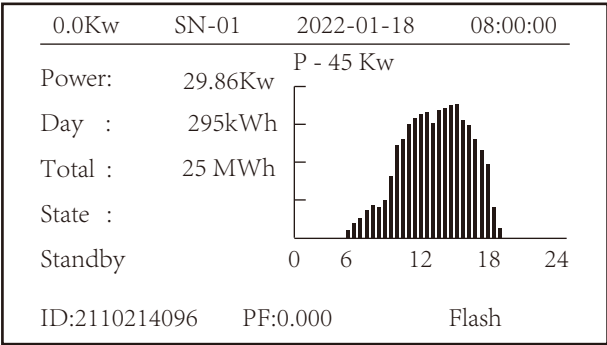
Pic 8.1 The initial interface

Press UP or Down you can check inverter DC voltage, DC current, AC voltage, AC current, inverter temperature, software version information.

```
 RUN                                         Input

 PV1   V : 349.9V   I : 10.3A   P : 3.6KW

 PV2   V : 313.0V   I : 8.3A    P : 2.6KW
```
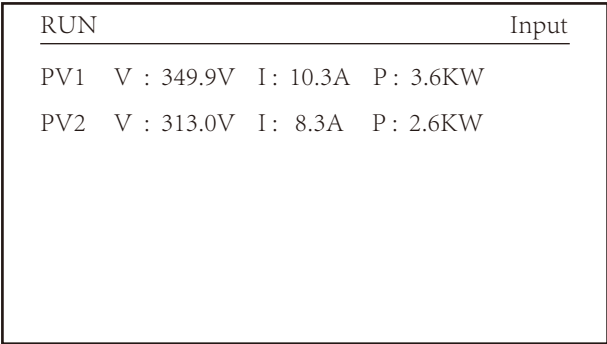
Pic 8.2 PV input and DC current information

You can check the PV information, the number of strings input, MPPT voltage and MPPT current.

```
RUN                              Grid

Ua : 234.5V                   Ia : 0.0A




Grid Freq : 50.00Hz


```

Pic 8.3 AC running state information

You can check the three phase voltage, current, and grid frequency.

```
RUN



              Total DC Power:
                  3.602W


Lcd0196   Inv1400              ● ●
```

Pic 8.4 Inverter firmware version

You can check the inverter LCD software Ver0196 and Control Software Version Ver1400.
There are two black spot in the bottom right corner. The first flash means inverter is
communicating with LCD. The second flash means LCD is communicating with wifi plug.

```
PARAMETR                        Meter
                                SN: 0
Meter Power:        0W
Load  Power:        0W
           Day             Total
ImpEp : 0.00kWh            0.00kWh
ExpEp : 0.00kWh            0.00kWh
LoadEp : 0.00kWh           0.00kWh

```

Pic 8.5 Meter power and load power

8.1.1 Main Menu

There are four submenu in the Main Menu.

```
MENU
              Statistics      《
              Fault Record
              ON/OFF
              Setup
```
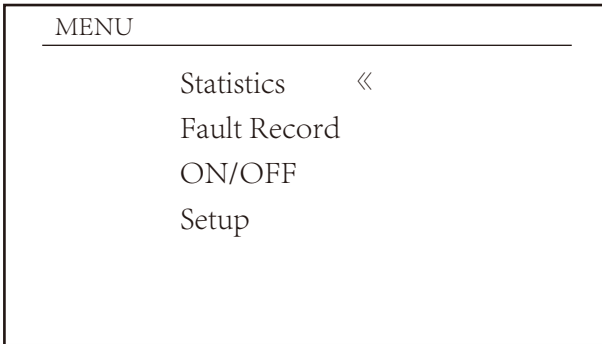
Pic 8.6 Main Menu

8.2 Statistics information

There are five submenu in the statistics.

```
MENU》 Statistics

E-Day                   E-History

E-Month                 Test Data     《

E-Year
```
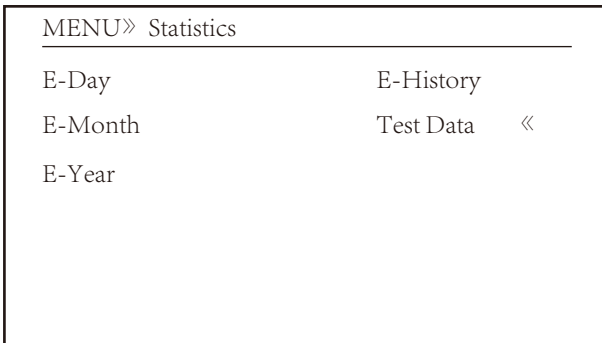
Pic 8.7 Statistics

Into each submenu through cursor.

MENU》Statistics》E-Day

<2022-01-18>

10MWh

```
      |
      |-
      |
      |-
      |
      |-
      |
      |_____
      0    6    12    18    24
```

Pic 8.8 E-Day

MENU》Statistics》E-Month

2022-01 1-10 20 31 <>

10MWh

```
    |
    |-
    |
    |-
    |
    |-
    |
    |_____
     01  02  03  04  05  06  07  08  09  10
```

Pic 8.9 E-Month

MENU》Statistics》E-Year

<2022>

200KWh

```
   |
   |-
   |
   |-
   |
   |_____
    01  02  03  04  05  06  07  08  09  10  11  12
```

Pic 8.10 E-Year

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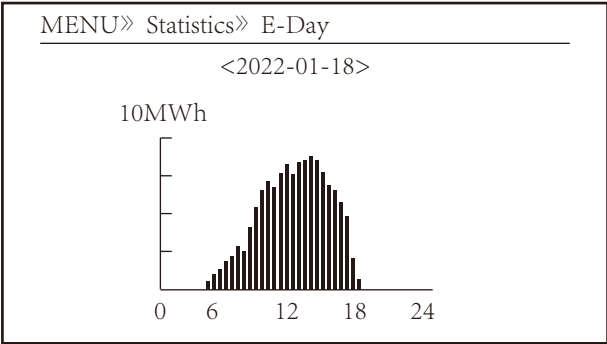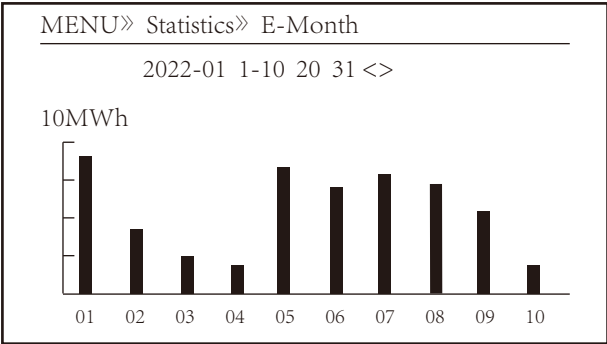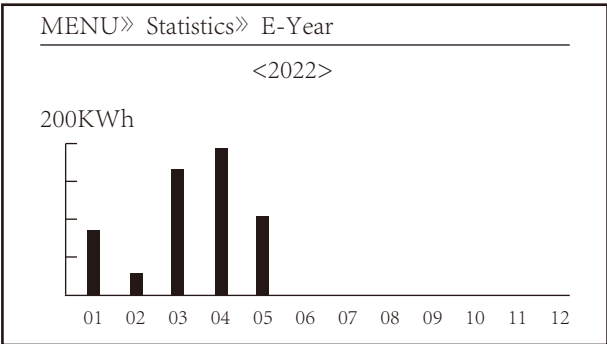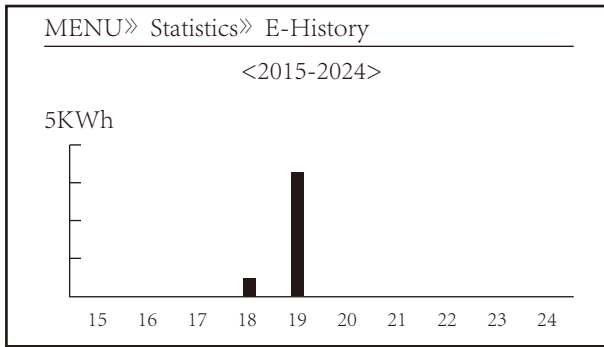
Pic 8.11 E-History

This information is for technician's reference.

PV1 :	19186	1k3 :	11126	ofC :	2057
PV2 :	19198	1k4 :	11140	137 :	2145
HV :	24362	1k5 :	16666	138 :	2248
GFD :	9119	1k6 :	2927	139 :	1497
DiL :	36	vHV :	24362	140 :	0
AVL :	-2	BSn :	12218	141 :	0
126 :	287	ofA :	2065	142 :	0
1k2 :	6	ofB :	2653	143 :	0
146 :	0	148 :	0	144 :	0
147 :	0	149 :	0	145 :	0

Pic 8.12 Test Data

8.3 Fault Record

Only can keep four fault record in the menu include time, customer can deal with it depends on the error code.

MENU» Fault Record

Fault	:	F352022-01-05 08:38
History :	1	F352022-01-05 08:37
	2	F352022-01-04 18:47
	3	F352022-01-04 17:54
	4	F352022-01-04 17:53

Pic 8.13 Fault Record

8.4 ON/OFF setting

```
MENU» ON/OFF
──────────────────────────────

              Turn  ON

              Turn  OFF    «



```
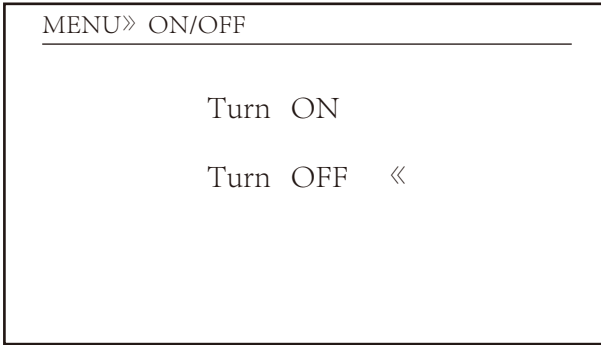
Pic 8.14 ON/OFF setting

Into each submenu through cursor.

```
MENU» ON/OFF» Turn ON
──────────────────────────────


                 OK        «

     Turn  ON
                 Cancel


```

Pic 8.15 ON set

```
MENU» ON/OFF» Turn OFF
──────────────────────────────


                 OK        «

     Turn  OFF
                 Cancel


```
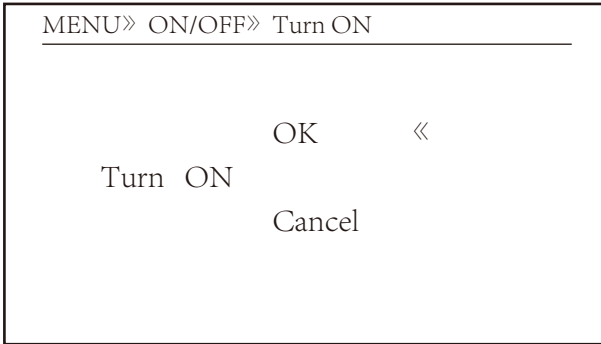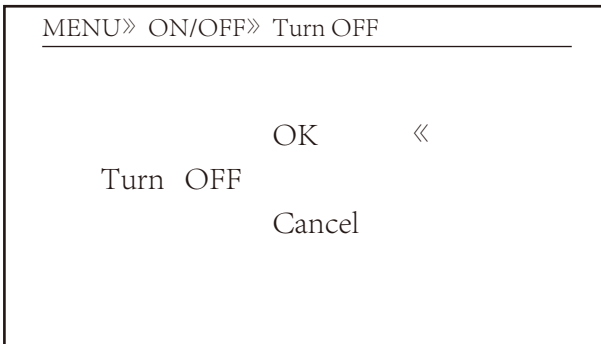
Pic 8.16 OFF set

8.5 Parameter setting

Setting includes system param, run param, protect param, comm.. param. All of these information for maintenance reference.

```
MENU》Setup
─────────────────────────────────

          System   Param    《

          Run      Param

          Protect  Param

          Comm.    Param

```
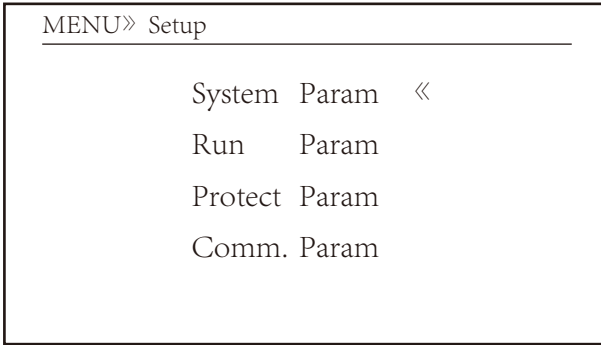
Pic 8.17 Setting

8.5.1 System Param

```
MENU》Setup 》System   Param
─────────────────────────────────
          Time Set

          Language Set

          Display Set

          Factory data reset

          Setting Restore
```
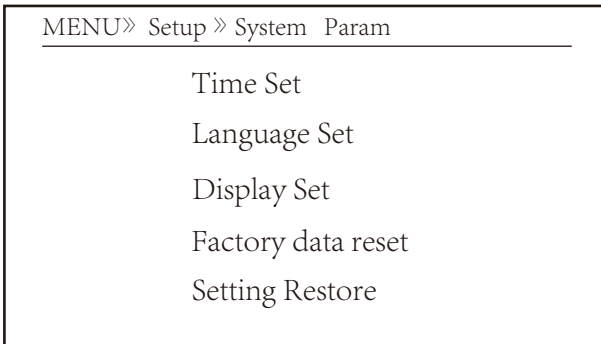
Pic 8.17.1 System Param Setting

8.5.1.1 Time Set

```
┌────────────────────────────────────────┐
│ Time Set                                │
│ ──────────────────────────────────     │
│                                         │
│       2022-01-18   09:36:30             │
│                                         │
│                                         │
│     OK                    Cancel        │
│                                         │
└────────────────────────────────────────┘
```
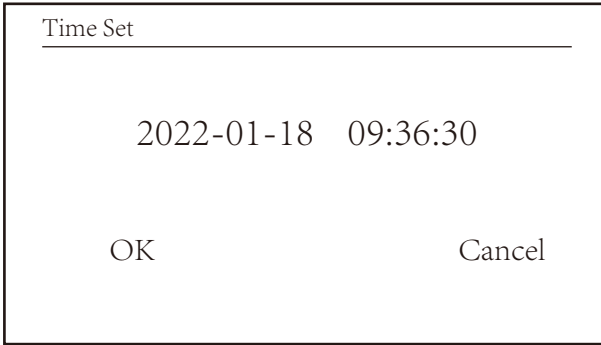
Pic 8.18 System Param

8.5.1.2 Language Set

```
┌────────────────────────────────────────┐
│ Lauguage Set                            │
│ ──────────────────────────────────     │
│                                         │
│    简体中文                              │
│    English            《                │
│    Polski                               │
│                                         │
│                                         │
└────────────────────────────────────────┘
```
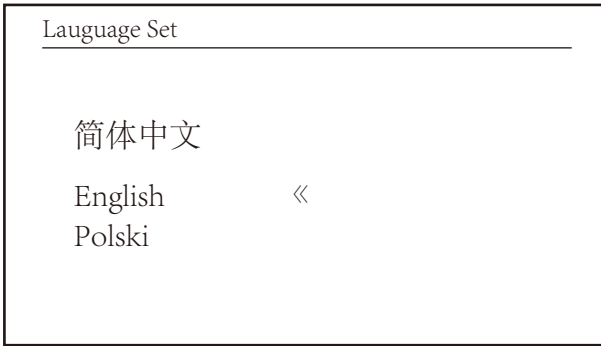
Pic 8.19 Lauguage set

8.5.1.3 Display Set

```
┌────────────────────────────────────────┐
│ Display Set                             │
│ ──────────────────────────────────     │
│   Brightness Keep  《                   │
│   Delay time  05S                       │
│                                         │
│   OK                      Cancel        │
│                                         │
└────────────────────────────────────────┘
```
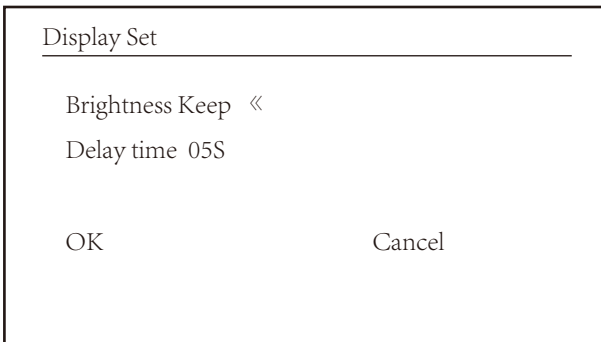
Pic 8.20 Display set

8.5.1.4 Factory data reset

```
Factory data reset
_____

  Confirm to reset    《


  Cancel



```
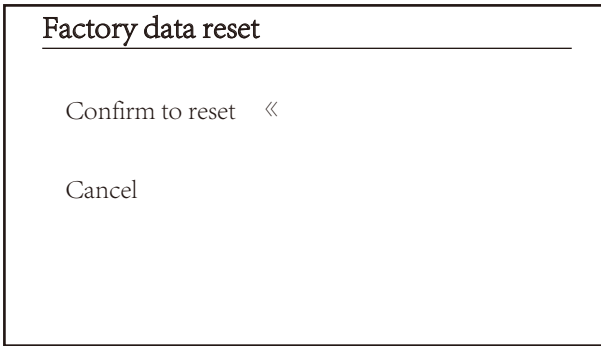
Pic 8.21 Factory data reset set

8.5.1.5 Setting Restore

```
Setting Restore
_____

  Confirm to restore    《


  Cancel



```
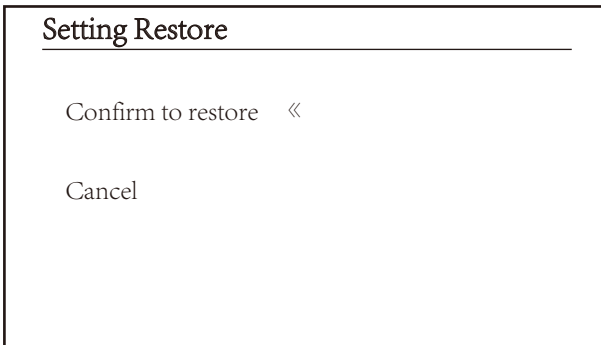
Pic 8.22 Factory data reset set

⚠️ *Warning:*
Password required-- only for access-authorized engineer. Un-authorized access may avoid the warranty. The initial password is 1234.

8.5.2 Running Param

```
                    PassWord
                   *   *   *   *
```

Pic 8.23 Password

```
MENU》Setup》Run Param

ActiveP   31%        SelfCheck  20S
QMode   OFF         Island       OFF
ReactP  0.0%        Meter        ON
PF         1.000      Limiter      OFF
Fun_ISO   OFF       Feed_In    0%
Fun_RCD  OFF       MPPT Num    6
        OK              Cancel
```
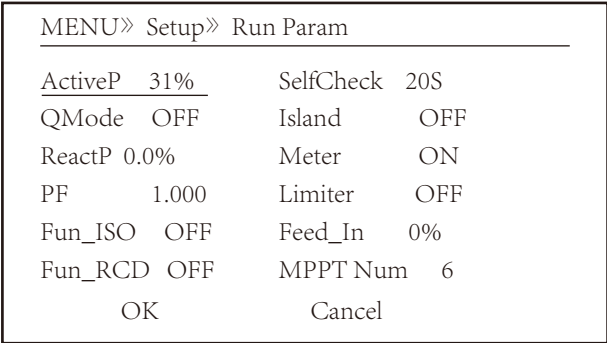
Name	Description	Range
ActiveP	Adjust the output active power in %	0-110%
QMode	Multiple reactive power control modes	OFF/Q(P)/PF(P)/Q(U)/PF/PER
ReactP	Adjust reactive power output in %	-100%-+100%
PF	Power Fator	-1-0.8~+0.8-1
Fun_ISO	Insulation resistance detection	ON/OFF
Fun_RCD	Residual current detection	ON/OFF
Self-check	Inverter's self-check time.The default value 60s	0-1000s
Island	Anti-islanding protection	ON/OFF
Meter	Energy meter.If inverter will connect meter,then set here to ON	ON/OFF
Feed_IN %	It is used to deploy how much power can be feed in to grid when the inverter works under zero export mode.(For example,Feed_in=50% of the 80KW model and load power is 39KW. which means Max 40KW power can be feed into grid after inverter providing 39Kw to the load firstly.	0-100%

Pic 8.24 Running Param

> **Warning:**
> Engineer Only.
> We will set the param depends on the safety requirements, so customers don't need to reset it.
> The password is same as 8.23 Running param

```
MENU》 Setup》 Run Param

ARC          OFF      Vref          0.0V
OFDerate    OFF      PowerLimit
UFUprate    OFF      VoltageRT
PU           OFF      DRM          OFF
WGra         0.0%     Sunspec      OFF
WGraStr      0.0%

         OK              Cancel
```

| Name	Description	Range
ARC	Arc-fault detection function	ON/OFF/Clear
OFDerate	Active power response to over frequency	0-100% Pmax/Hz
UFUprate	Active power response to under frequency	0-100% Pmax/Hz
PU	power response to grid voltage deviation	ON/OFF
WGra	Active power ramp rate (% Pnom/Sec)	0.1%-50%
WGraStr	Active power ramp rate at first start (% Pnom/Sec)	0.1%~50%
Vref	Grid reference voltage for functions including Q(U),PF(P),P(U)etc.	80-260V
PowerLimit	Hard/soft export limit control	ON/OFF
VoltageRT	voltage ride through function	ON/OFF
DRM	Demand Response Modes	ON/OFF
Sunspec	Sunspec Function	ON/OFF

8.5.2.1 Over-frequency Response

This series inverter provides "over-frequency response" function.
Long pressing the "OFD Derate" to enter the "over-frequency response" setting menu.

```
MENU》 Setup》 Run Param
─────────────────────────────────

ARC       OFF        Vref        220.0V
─────────
OFDerate  ON
─────────             PowerLimit
UFUprate  OFF         VoltageRT
PU        OFF         DRM       OFF
WGra      20.0%       Sunspec   OFF
Sunspec   OFF
          OK              Cancel
```

Definition of Over-frequency Response Parameters

Parameter	Range	Description
StartPoint	45HZ-65HZ	The Start frequency value for over-frequency response.
StopPoint	45HZ-65HZ	The Stop frequency value for over-frequency response.
RecoverPoint	45HZ-65HZ	In hysteresis mode, power is restored only when it is below this frequency
RecoverGradient	0.3%¬300% P/min	Ramp rate of power recovery
RecoverDelay	0-1000s	Time Delay of power recovery in hysteresis mode

For example, StartPoint: 50.5Hz, StopPoint: 51.5Hz, RecoverPoint: 50.1Hz, when the grid frequency increases beyond StartPoint: 50.5Hz, the inverter will linearly reduce the power output with a gradient of 100% Pmax/Hz until it reaches StopPoint: 51.5Hz.

```
OverFrequenceDerate
─────────────────────────────────

StartPoint          50.50Hz
StopPoint           51.50Hz
RecoverPoint        50.1Hz
RecoverGradient     1.00%
RecoverDelay        0S

          Back
```
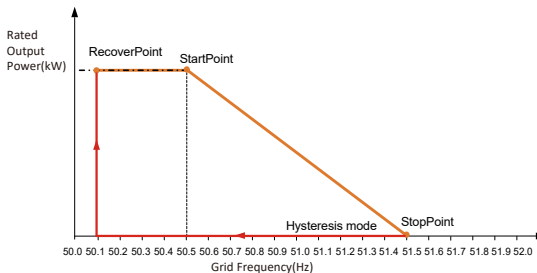

Frq-Watt Mode for Over-frequency Conditions

When the frequency exceeds StopPoint: 51.5Hz, the inverter output should stop (ie 0 W).
When the frequency is lower than StopPoint: 51.5 Hz, the inverter will linearly increase the power output with a gradient of 100% Pmax/Hz until it reaches StopPoint: 50.5 Hz.
In the hysteresis mode, when the frequency is lower than StopPoint: 51.5 Hz, the inverter will not increase the power output until it is lower than RecoverPoint: 50.1 Hz.

```
MENU》 Setup》 Run Param

ActiveP    31%          SelfCheck   20S
QMode    QU            Island        OFF
ReactP      0.0%        Meter         ON
PF          1.000        Limiter       OFF
Fun_ISO   ON           Feed_In      0%
Fun_RCD  ON           MPPT Num    6
        OK                  Cancel
```

The inverter provides a reactive power regulation function.
Tap **Reactive Power Regulation Mode** to select proper regulation mode and set the corresponding parameters.

- **"OFF" Mode**

  The reactive power regulation function is disabled. The PF is fixed at +1.000

- **ReactiveP**

  Adjust reactive power output in %.

- **"PF" Mode**

  The power factor (PF) is fixed and the reactive power is regulated by the parameter PF. The PF ranges from 0.8 leading to 0.8 lagging.
  •Leading: the inverter is absorbing reactive power from the Grid.
  •Lagging: the inverter is injecting reactive power into the grid.

- **"Q(U)" Mode**

  The reactive power output of the inverter varies in response to the grid voltage.

- **"Q(P)" Mode**

  The reactive power output by the inverter is controlled by the active power of the inverter.

"Q(U)" Mode

```
QU Setting
─────────────────────────────

Start      30.0%
Stop       20.0%
RmpTime  2s
PtUsed     4
Curve
─────────

        Back
```

```
QU Setting
─────────────────────────────

V1      80.0%       Q1      -25.0%
─────────────────────────────
V2      90.0%       Q2       0.0%
V3     110.0%       Q3       0.0%
V4     120.0%       Q4      25.0%
V5     120.0%       Q5      25.0%
V6     120.0%       Q6      25.0%

        Back
```
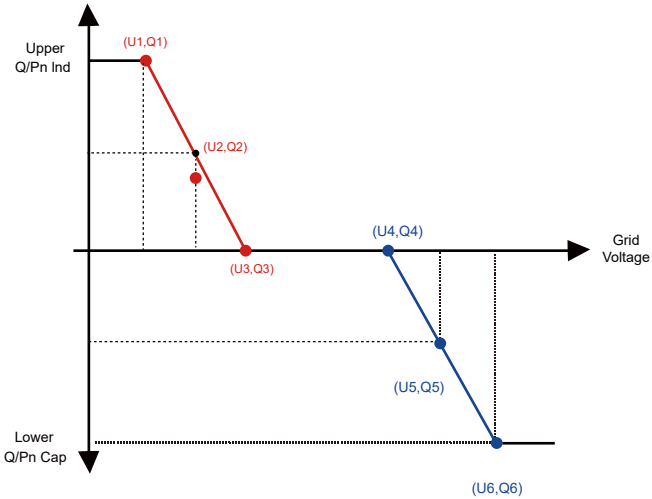

Pic 8.25 Reactive Power Regulation Curve in Q(U) Curve

| Parameter	Range	Description
Start	0%-130% Rate out power	The QU mode starts when the active power is greater than this value
Stop	0%-130% Rate out power	The QU mode stops when the active power is less than this value
RMpTime	0-1000s	Increase or decrease the time required for the reactive power to reach the specified value of the curve.
PtUsed	2-6	Point number used in QU Curve
Curve		QU Curve
Q1	-60% -60% Q/Pn	Value of Q/Pn at point (U1,Q1) on the Q(U) mode curve
V1	0-110% VRated	Grid voltage limit at point (U1,Q1) on the Q(U) mode curve
Q2	-60% -60% Q/Pn	Value of Q/Pn at point (U2,Q2) on the Q(U) mode curve
V2	0-110% VRated	Grid voltage limit at point (U2,Q2) on the Q(U) mode curve
Q3	-60% -60% Q/Pn	Value of Q/Pn at point (U3,Q3) on the Q(U) mode curve
V3	0-110% VRated	Grid voltage limit at point (U3,Q3) on the Q(U) mode curve
Q4	-60% -60% Q/Pn	Value of Q/Pn at point (U4,Q4) on the Q(U) mode curve
V4	0-110% VRated	Grid voltage limit at point (U4,Q4) on the Q(U) mode curve
Q5	-60% -60% Q/Pn	Value of Q/Pn at point (U5,Q5) on the Q(U) mode curve
V5	0-110% VRated	Grid voltage limit at point (U5,Q5) on the Q(U) mode curve
Q6	-60% -60% Q/Pn	Value of Q/Pn at point (U6,Q6) on the Q(U) mode curve
V6	0-110% VRated	Grid voltage limit at point (U6,Q6) on the Q(U) mode curve

"Q(U)" Mode Parameters Explanation

"Q(P)" Mode

The reactive power output by the inverter is controlled by the active power of the inverter.
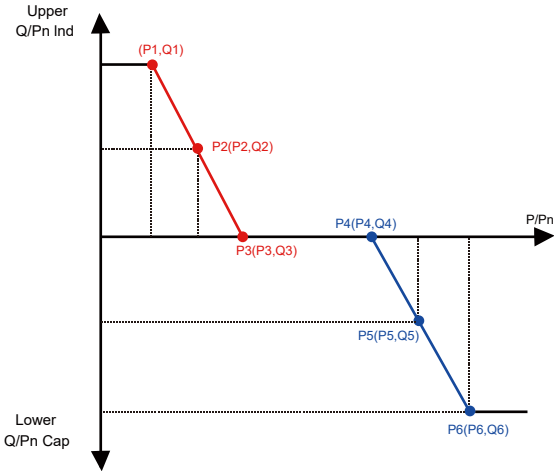
Pic 8.26   Reactive Power Regulation Curve in Q(P) Mode

```
MENU» Setup» Run Param

ActiveP    31%          SelfCheck   20S
QMode    QP            Island          OFF
ReactP      0.0%        Meter           ON
PF           1.000        Limiter         OFF
Fun_ISO   ON           Feed_In       0%
Fun_RCD  ON           MPPT Num    6
        OK                      Cancel
```

```
QP  Setting

P1        80.0%         Q1       -25.0%
P2        90.0%         Q2        0.0%
P3       110.0%         Q3        0.0%
P4       120.0%         Q4       25.0%
P5       120.0%         Q5       25.0%
P6       120.0%         Q6       25.0%

        Back
```

Parameter	Range	Descrption
P1	0%-100% Pn	Value of Q/Pn at point (P1,Q1) on the Q(P) mode curve
Q1	-60% -60% Q/Pn	Reactive power value at point (P1,Q1) on the Q(P) mode curve
P2	0%-100% Pn	Value of Q/Pn at point (P2,Q2) on the Q(P) mode curve
Q2	-60% -60% Q/Pn	Reactive power value at point (P2,Q2) on the Q(P) mode curve
P3	0%-100% Pn	Value of Q/Pn at point (P3,Q3) on the Q(P) mode curve
Q3	-60% -60% Q/Pn	Reactive power value at point (P3,Q3) on the Q(P) mode curve
P4	0%-100% Pn	Value of Q/Pn at point (P4,Q4) on the Q(P) mode curve
Q4	-60% -60% Q/Pn	Reactive power value at point (P4,Q4) on the Q(P) mode curve
P5	0%-100% Pn	Value of Q/Pn at point (P5,Q5) on the Q(P) mode curve
Q5	-60% -60% Q/Pn	Reactive power value at point (P5,Q5) on the Q(P) mode curve
P6	0%-100% Pn	Value of Q/Pn at point (P6,Q6) on the Q(P) mode curve
Q6	-60% -60% Q/Pn	Reactive power value at point (P6,Q6) on the Q(P) mode curve

"Q(P)" Mode Parameters Explanation

"PU" Mode

The active power output of the inverter varies in response to the grid voltage

```
MENU》Setup》Run Param

ARC        OFF      Vref       0.0V
OFDerate   OFF
UFUprate   OFF
PU         ON
WGra       0.0%
Sunspec    OFF

        OK            Cancel
```

PU Setting

U1	0.0%	P1	0.0%
U2	0.0%	P2	0.0%
U3	0.0%	P3	0.0%
U4	0.0%	P4	0.0%

Back
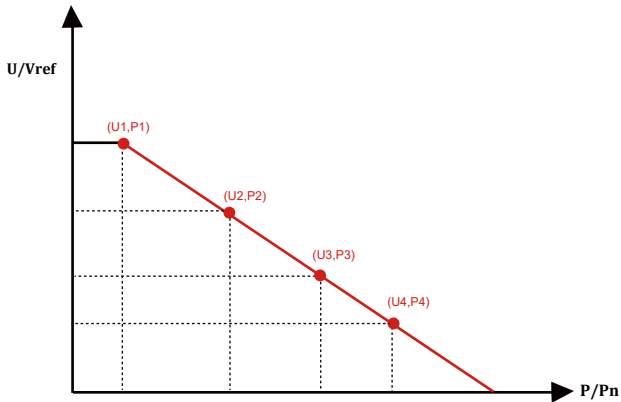
Pic 8.27 Active Power Regulation Curve in PU Curve

Parameter	Range	Description
P1	0%-110% Pn	Value of P/Pn at point (P1,U1) on the PU mode curve
U1	0% -150% Vref	Grid voltage limit at point (P1,U1) on the PU mode curve
P2	0%-110% Pn	Value of P/Pn at point (P2,U2) on the PU mode curve
U2	0% -150% Vref	Grid voltage limit at point (P2,U2) on the PU mode curve
P3	0%-110% Pn	Value of P/Pn at point (P3,U3) on the PU mode curve
U3	0% -150% Vref	Grid voltage limit at point (P3,U3) on the PU mode curve
P4	0%-110% Pn	Value of P/Pn at point (P4,U4) on the PU mode curve
U4	0% -150% Vref	Grid voltage limit at point (P4,U4) on the PU mode curve

"PU" Mode Parameters Explanation

"PF(P)" Mode

PFP Setting

Vstart	0.0%	Vstop	0.0%
P1	0.0%	PF1	-1.000
P2	0.0%	PF2	-1.000
P3	0.0%	PF3	-1.000
P4	0.0%	PF4	-1.000
P5	0.0%	PF5	-1.000
	Back		

PFP Setting

P6	0.0%	PF6	-1.000
Time	0s		

Back
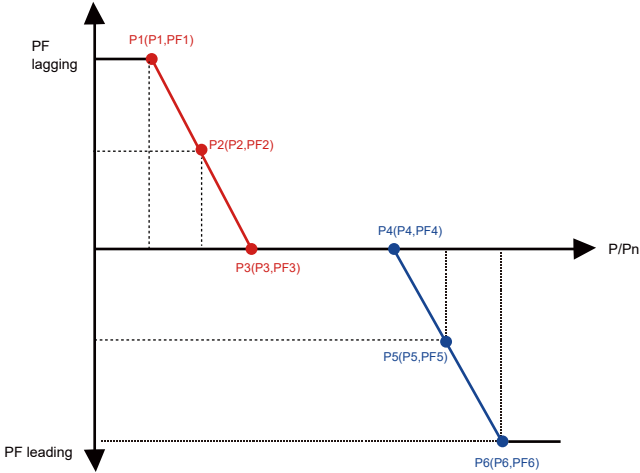
Pic 8.28 Power factor Regulation Curve in PF(P) Mode

Parameter	Range	Description
Vstart	0-150% Vref	The PFP mode is enable when grid voltage is greater than Vstart
Vstop	0-150% Vref	The PFP mode is disable when grid voltage is less than Vstop
P1	0-110% Pn	Power value at point (PF1,P1) on the PF(P) Curve
PF1	0.8 leading - 0.8 lagging	PF value at point (PF1,P1) on the PF(P) Curve
P2	0-110% Pn	Power value at point (PF2,P2) on the PF(P) Curve
PF2	0.8 leading - 0.8 lagging	PF value at point (P2,PF2) on the PF(P) Curve
P3	0-110% Pn	Power value at point (P3,PF3) on the PF(P) Curve
PF3	0.8 leading - 0.8 lagging	PF value at point (P3,PF3) on the PF(P) Curve
P4	0-110% Pn	Power value at point (P4,PF4) on the PF(P) Curve
PF4	0.8 leading - 0.8 lagging	PF value at point (P4,PF4) on the PF(P) Curve
P5	0-110% Pn	Power value at point (P5,PF5) on the PF(P) Curve
PF5	0.8 leading - 0.8 lagging	PF value at point (P5,PF5) on the PF(P) Curve
P6	0-110% Pn	Power value at point (P6,PF6) on the PF(P) Curve
PF6	0.8 leading - 0.8 lagging	PF value at point (P6,PF6) on the PF(P) Curve
RMpTime	0-1000s	The time of the PFF Curve in seconds (time to accomplish a change of 95%).

"PF(P)" Mode Parameters Explanation

8.5.3 Protect Param

```
MENU》 Setup》 Protect Param
───────────────────────────────
    O  INMETRO        O  UTE_C15
    O  EN50549        O  RD_1699
    O  EN50438        O  CEI_0_21
    O  IEC61727       O  G98_G99
    ⊙  CUSTOM    《   O  AS4777
    O  VED_4105       O  NBT32004
         OK              Cancel
```
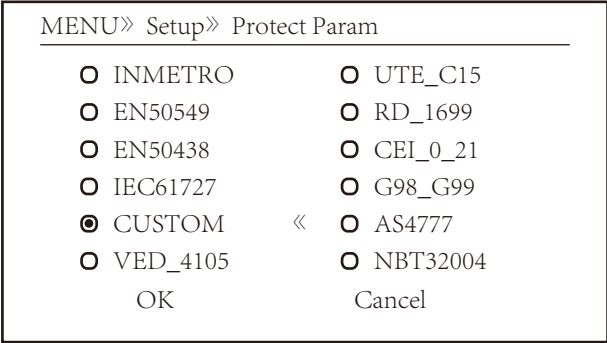
Pic 8.29 Protect Param

⚠ *Warning:*
Engineer only.

```
CUSTOM
───────────────────────────────
    AC OverVoltage 1:  270.0V  《
    Tripping Time   1:    100ms
    AC OverVoltage 2:  300.0V
    Tripping Time   2:    100ms
    AC OverVoltage 3:  300.0V
    Tripping Time   3:    100ms
```

```
CUSTOM
───────────────────────────────
    AC LowVoltage 1:  176.0V  《
    Tripping Time   1:    100ms
    AC LowVoltage 2:  176.0V
    Tripping Time   2:    100ms
    AC LowVoltage 3:  176.0V
    Tripping Time   3:    100ms
```
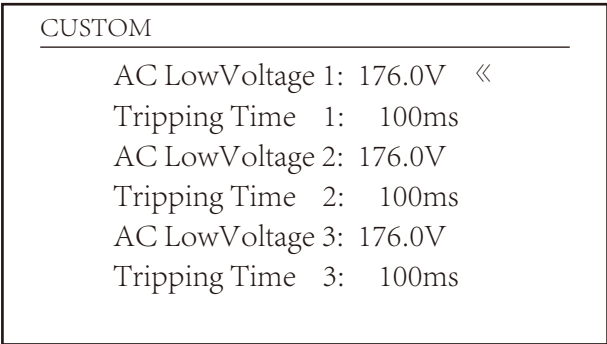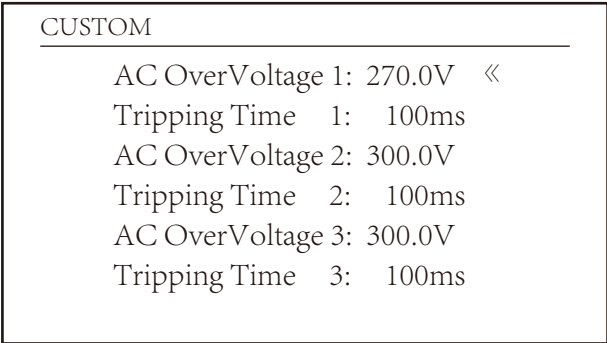
```
CUSTOM
_____
      AC OverFreq    1:  52.00Hz   《
      Tripping Time  1:    2000ms
      AC OverFreq    2:  53.00Hz
      Tripping Time  2:     500ms
      AC OverFreq    3:  54.00Hz
      Tripping Time  3:     200ms
```

```
CUSTOM
_____
      AC LowFreq     1:  48.00Hz   《
      Tripping Time  1:    2000ms
      AC LowFreq     2:  47.00Hz
      Tripping Time  2:     500ms
      AC LowFreq     3:  46.00Hz
      Tripping Time  3:     200ms
```

```
CUSTOM
_____


      Rated Voltage     220/380V 《


         OK                 Cancel
```

Pic 8.25 "CUSTOM"

```
┌─────────────────────────────────────────────┐
│  MENU》 Setup》 Protect Param                  │
│  ─────────────────────────────────────────   │
│      O  INMETRO          O  UTE_C15           │
│      O  EN50549          O  RD_1699           │
│      O  EN50438          O  CEI_0_21          │
│      O  IEC61727         O  G98_G99           │
│      O  CUSTOM           ⊙  AS4777  《         │
│      O  VED_4105         O  NBT32004          │
│           OK                  Cancel          │
└─────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────┐
│  MENU》 Setup》 Protect Param                  │
│  ─────────────────────────────────────────   │
│   O  AS4777.2  Australia  A                   │
│   O  AS4777.2  Australia  B                   │
│   O  AS4777.2  Australia  C                   │
│   O  AS4777.2  New  Zealand                   │
│                                               │
│                                               │
└─────────────────────────────────────────────┘
```
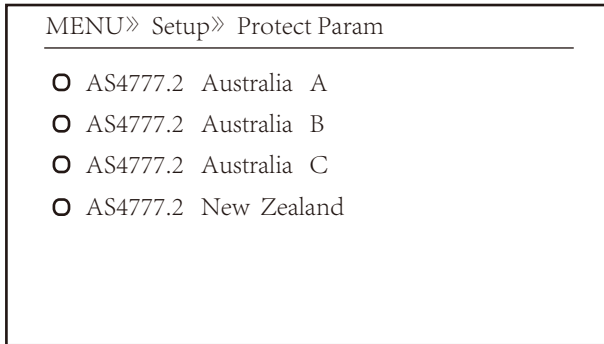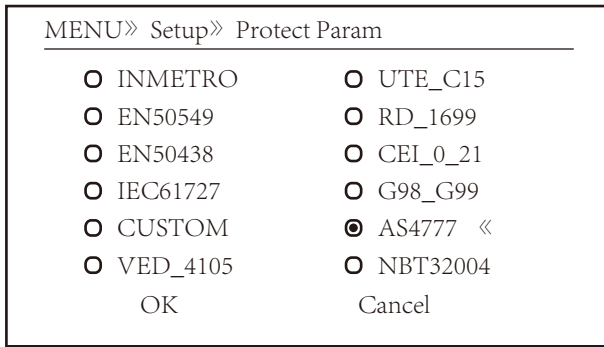
Pic 8.30 "AS4777"

8.5.4 Comm. Param

```
┌─────────────────────────────────────────────┐
│  MENU》 Setup》 Comm.Param                     │
│  ─────────────────────────────────────────   │
│    Address  : 01     《                        │
│                                               │
│    Meter    : Unkonw                          │
│                                               │
│    BaudRate : 9600                            │
│                                               │
└─────────────────────────────────────────────┘
```
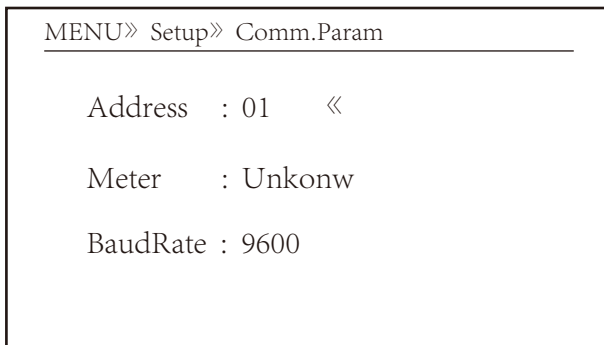
Pic 8.31 Communication param

9. Repair and Maintenance

String type inverter doesn't need regular maintenance. However, debris or dust will affect heat sink's thermal performance. It is better to clean it with a soft brush. If the surface is too dirty and affect the reading of LCD and LED lamp, you can use wet cloth to clean it up.

High Temperature Hazard:
When the device is running, the local temperature is too high and the touch can cause burns. Turn off the inverter and wait for it cooling, then you can clean and maintain.

Safety Hint:
No solvent, abrasive materials or corrosive materials can be used for cleaning any parts of the inverter.

10.Error information and processing

Inverter has been designed in accordance with international grid tied standards for safety, and electromagnetic compatibility requirements. Before delivering to the customer the inverter has been subjected to several tests to ensure its optimal operation and reliability.

10.1 Error code

If there is any failure,the LCD screen will display an alarm message. In this case, the inverter may stop feeding energy into the grid. The alarm description and their corresponding alarm messages are listed Table 10.1.

Error code	Description	Ongrid - Three Phase
F01	DC input polarity reverse fault	Check the PV input polarity.
F02	DC insulation impedance permanent fault	Check the grounding cable of inverter.
F03	DC leakage current fault	Hardly appear the code. Never ever happened so far.
F04	Ground fault GFDI	Check the solar panel output connection.
F05	Read the memory error	Failure in reading memory (EEPROM). Restart the inverter if the fault still exists, contact your installer.
F06	Write the memory error	Failure in writing memory (EEPROM). Restart the inverter if the fault still exists, contact your installer.
F07	GFDI blown fuse	Hardly appear the code. Never ever happened so far.
F08	GFDI grounding touch failure	Hardly appear the code. Never ever happened so far.
F09	IGBT damaged by excessive drop voltage	Hardly appear the code. Never ever happened so far.
F10	Auxiliary switch power supply failure	1. It tells the DC 12V is not existed. 2. Restart the inverter, if the fault still exists, please contact your installer.
F11	AC main contactor errors	Hardly appear the code. Never ever happened so far.
F12	AC auxiliary contactor errors	Hardly appear the code. Never ever happened so far.
F13	reserved	1. Loss of one phase or AC voltage detection part failure or relays not closed. 2. Restart the inverter, if the error still exists, please contact your installer.
F14	DC firmware over current	Hardly appear the code. Never ever happened so far.
F15	AC firmware over current	1. The internal AC sensor or detection circuit on control board or connection wire may loose. 2. Restart the inverter, if the error still exists, please contact your installer.
F16	GFCI(RCD) Ac leakage current fault	1. This fault means the average leakage current is over 300mA. Check whether DC power supply or solar panels is ok, then check 'Test data'-> 'diL'value is about 40; Then check the leakage current sensor or circuit (the following picture). Checking test data needs using big LCD. 2. Restart the inverter, if the error still exists, please contact your installer.
F17	Three phase current, over-current fault	Hardly appear the code. Never ever happened so far.
F18	AC over current fault of hardware	1. Check AC sensor or detection circuit on control board or connection wire. 2. Restart the inverter or factory reset, if the error still exists, please contact your installer.
F19	All hardware failure synthesis	Hardly appear the code. Never ever happened so far.
F20	DC over current fault of the hardware	1. Check whether solar panel output current is within the allowed range. 2. Check DC current sensor and its detection circuit. 3. Check if the inverter FW version is suitable for the hardware. 4. Restart the inverter, if the error still exists, please contact your installer.

Error code	Description	Ongrid - Three Phase
F21	DC leakage flow fault	Hardly appear the code. Never ever happened so far.
F22	Crash stop (if there is a stop button)	Contact your installer for help.
F23	AC leakage current is transient over current	1. This fault means the leakage current is above 30mA suddenly. Check whether DC power supply or solar panels is ok, then check 'Test data'-> 'diL'value is about 40; Then check the leakage current sensor or circuit. Check test data needs using big LCD. 2. Restart the inverter, if the fault still exists, contact your installer.
F24	DC insulation impedance failure	1. Check Vpe resistance on main board or detection on control board. Check PV panels is OK. Many times this issue is the PV problem. 2. Check whether the PV panel (aluminum frame) is grounded well and inverter is grounded well. Open the cover of inverter and then check the inside ground cable is fixed well on the shell. 3. Check if the AC/DC cable, terminal block are shorted to ground or the insulation is damaged. 4. Restart the inverter, if the fault still exists, contact your installer .
F25	DC feedback fault	Hardly appear the code. Never ever happened so far.
F26	The DC busbar is unbalanced	1. Check whether the 'BUSN' cable or driver board power supply cable is loose. 2. Restart the inverter, if the fault still exists, contact your installer.
F27	DC end insulation error	Hardly appear the code. Never ever happened so far.
F28	Inverter 1 DC high fault	Hardly appear the code. Never ever happened so far.
F29	AC load switch failure	Hardly appear the code. Never ever happened so far.
F30	AC main contactor failure	1. Check relays and AC voltage of relays. 2. Check relays driver circuit. Check if the software is not suitable for this inverter. (Old inverter not have relays detection function) 3. Restart the inverter, if the fault still exists, contact your installer.
F31	Relay open circuit fault	1. At least one Relay can't be closed. Check relays and its driver signal. (Old inverter not have relays detection function) 2. Restart the inverter, if the fault still exists, contact your installer.
F32	Inverter 2 dc high fault	Hardly appear the code. Never ever happened so far.
F33	AC over current	Hardly appear the code. Never ever happened so far.
F34	AC current over load	Hardly appear the code. Never ever happened so far.
F35	No AC grid	1. Check AC grid voltage. Check AC voltage detection circuit. Check if the AC connector in good condition. Check whether the AC grid is normal in voltage. 2. Restart the inverter, if the fault still exists, contact your installer.
F36	AC grid phase error	Hardly appear the code. Never ever happened so far.
F37	AC three-phase voltage unbalance failure	Hardly appear the code. Never ever happened so far.
F38	AC three-phase current unbalance failure	Hardly appear the code. Never ever happened so far.

Error code	Description	Ongrid - Three Phase
F39	AC over current(one cycle)	1. Check AC current sensor and its circuit. 2. Restart the inverter, if the fault still exists, contact your installer or Deye service.
F40	DC over current	Hardly appear the code. Never ever happened so far.
F41	AC Line W,U over voltage	Check the AC voltage protection setting. And Check if the AC cable is too thin.Check the voltage difference between LCD and meter.
F42	AC Line W,U low voltage	Check the AC voltage protection setting. Check the voltage difference between LCD and meter. Also need to check whether AC cables are all firmly and correctly connected.
F43	AC Line V,W over voltage	Check the AC voltage protection setting.And Check if the AC cable is too thin.Check the voltage difference between LCD and meter.
F44	AC Line V,W low voltage	Check the AC voltage protection setting. Check the voltage difference between LCD and meter. Also need to check whether AC cables are all firmly and correctly connected.
F45	AC Line U,V over voltage	Check the AC voltage protection setting.And Check if the AC cable is too thin.Check the voltage difference between LCD and meter.
F46	AC Line U,V low voltage	Check the AC voltage protection setting.
F47	AC Over frequency	Check the frequency protection setting.
F48	AC lower frequency	Check the frequency protection setting.
F49	U phase grid current DC component over current	Hardly appear the code. Never ever happened so far.
F50	V phase grid current DC component over current	Hardly appear the code. Never ever happened so far.
F51	W phase grid current DC component over current	Hardly appear the code. Never ever happened so far.
F52	AC inductor A, phase current DC current high	Hardly appear the code. Never ever happened so far.
F53	AC inductor B, phase current DC current high	Hardly appear the code. Never ever happened so far.
F54	AC inductor C, phase current DC current high	Hardly appear the code. Never ever happened so far.
F55	DC busbar voltage is too high	1. Check PV voltage and Ubus voltage and its detection circuit. If the PV input voltage exceeds the limit, please reduce the number of solar panels in series. 2. For Ubus voltage, please check the LCD display.
F56	DC busbar voltage is too low	1. It tells the PV input voltage is low and it always happens in the early morning. 2. Check PV voltage and Ubus voltage. When inverter is running, then showing F56, maybe Loss of driver or need update firmware. 3. Restart the inverter, if the fault still exists, contact your installer.
F57	AC reverse irrigation	AC reverse irrigation.
F58	AC grid U over current	Hardly appear the code. Never ever happened so far.

Error code	Description	Ongrid - Three Phase
F59	AC grid V over current	Hardly appear the code. Never ever happened so far.
F60	AC grid W over current	Hardly appear the code. Never ever happened so far.
F61	Reactor A phase over current	Hardly appear the code. Never ever happened so far.
F62	Reactor B phase over current	Hardly appear the code. Never ever happened so far.
F63	ARC fault	1. Check PV module cable connection and clear the fault; 2. Seek help from us, if can not go back to normal state.
F64	IGBT heat sink high temperature	1. Check temperature sensor. Check if firmware is suitable for the hardware. Check if the inverter is its right model. 2. Restart the inverter, if the fault still exists, contact your installer.

Table10.1 Error codes and their solutions

Safety Hint:
If your string inverter has any of the fault information shown in Table 10-1,and when you reset the machine and still don't solve the problem,please contact our distributor and provide the below details:

1. Serial number of the inverter;
2. The distributor/dealer of the inverter(if available);
3. Installation date;
4. The discription of problem(include LCD'error code and LED starus indicator lights);
5. Your contact details.

11.Specification

Model	LT-60K F1	LT-80K F1
Input Side		
Max.DC Power(kW)	78	104
Max.DC Input Voltage(V)	1000	
Start-up DC Input Voltage(V)	250	
MPPT Operating Range(V)	200~850	
Max.DC Input Current(A)	40+40+40+40	
Max. Short Circuit Current (A)	60+60+60+60	
Number of MPPT/Strings per MPPT	4/3+3+3+3	4/4+4+4+4
Output Side		
Rated Output Power(kW)	60	80
Max.Active Power(kW)	66	88
Rated AC Grid Voltage(V)	3L/N/PE 220/380V 230/400V	
AC Grid Voltage Range(V)	0.85Un-1.1Un (this may vary with grid standards)	
Rated Grid Frequency(Hz)	50/60 (Optional)	
Operating Phase	Three phase	
Rated AC Grid Output Current(A)	90.9/87.0A	121.2/115.9A
Max.AC Output Current(A)	100/95.7A	133.3/127.5A
Maximum output fault current (a.c. A, peak)	166.1	221.2
Maximum output overcurrent protection (a.c. A,peak)	184.5	245.8
Output Power Factor	0.8 leading to 0.8 lagging	
Grid Current THD	<3%	
DC Injection Current	<0.5%	
Grid Frequency Range	45-55 or 55-65 (Optional)	
Efficiency		
Max.Efficiency	98.6%	98.7%
Euro Efficiency	98.3%	
MPPT Efficiency	>99%	
General Data		
Cabinet Size（W*H*D）[mm]	700×575×297 (Excluding connectors and brackets)	
Weight(kg)	60	
Topology	Transformerless	
Internal consumption	<1W (Night)	
Operating temperature	-25 ~ 65℃,>45℃ derating	
Ingress protection	IP65	
Noise Emission(Typical)	≤ 50 dB(A)	≤ 55 dB(A)
Type Of Cooling	Smart cooling	
Permissible Altitude (m)	2000m	
Warranty [year]	Standard 5 years, extended warranty	
Grid Connection Standard	VDE4105, IEC61727/62116, VDE0126, AS4777.2, CEI 0 21, EN50549-1, G98, G99, C10-11, UNE217002, NBR16149/NBR16150	
Operation surrounding humidity	0~100%	
Safety EMC / Standard	IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2	

General Data	
DC Connection	MC-4 mateable
AC Connection	IP65 rated plug
Display	LCD 240 × 160
Interface	RS485/RS232/Wifi/LAN

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