LEDVANCE USER MANUAL
GRID-CONNECTED PV INVERTER

LT-25K F2
LT-30K F2
LT-33K F2
LT-36K F2
LT-40K F2

LEDVANCE.COM

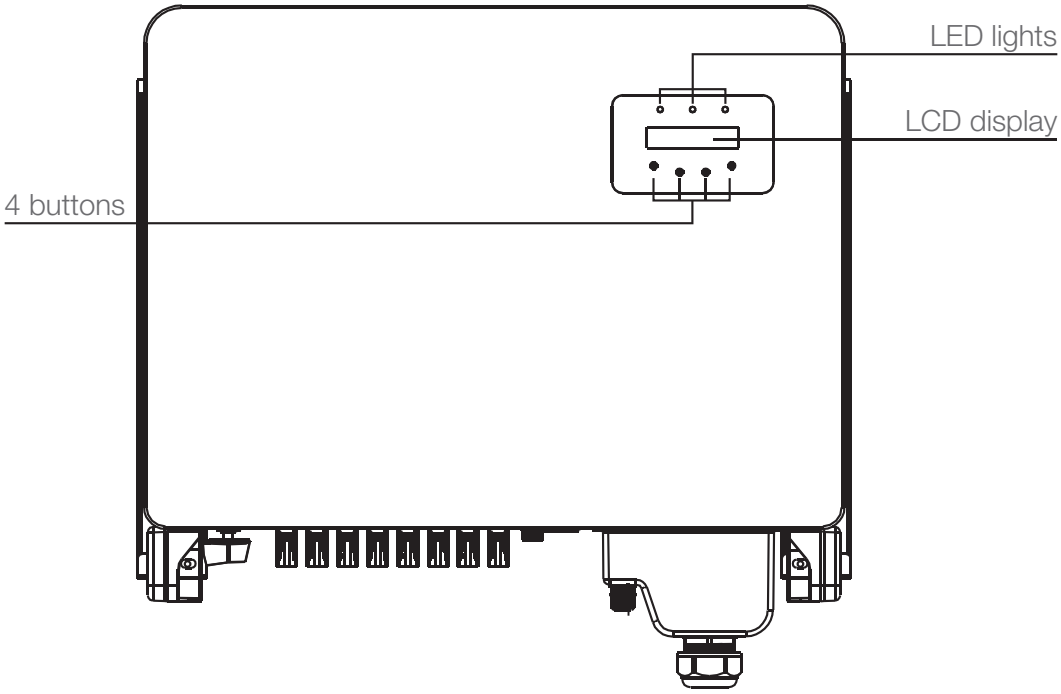
LEDVANCE

CONTENTS

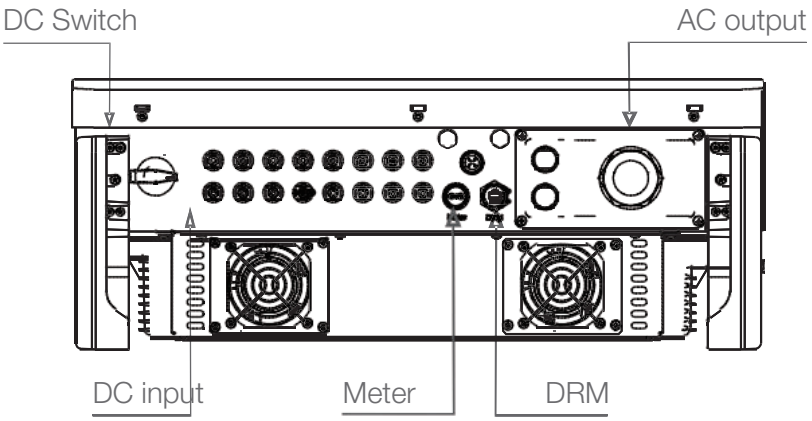
INTRODUCTION

Product description

LEDVANCE three phase inverter is suitable for utility-scale PV projects . This manual covers the three phase inverter model listed below:
LT-25K F2, LT-30K F2, LT-33K F2, LT-36K F2, LT-40K F2



Front view

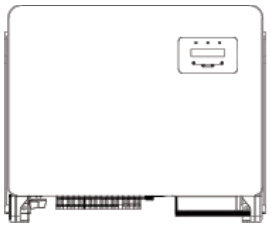


Bottom view

INTRODUCTION

Packaging

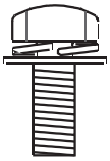
When you receive the inverter, please ensure that all the parts listed below are included:



Inverter x1

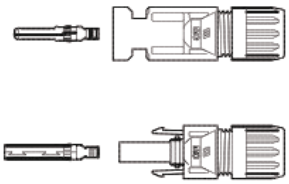
Back plate x1

Cross screws x4

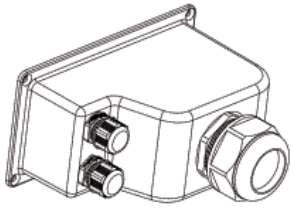


Hex screws x2

RJ45 connector x1



DC connectors x6 or x8
(On basis of actual string number of inverter)



AC terminal cover x1

Quick Installation Guide x1

If anything is missing, please contact your local LEDVANCE distributor.

SAFETY INSTRUCTIONS

Safety symbols

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.

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

CAUTION
CAUTION, RISK OF ELECTRIC SHOCK symbol indicates important safety instructions, which if not correctly followed, could result in electric shock.

CAUTION
CAUTION, HOT SURFACE symbol indicates safety instructions, which if not correctly followed, could result in burns.

General safety instructions

WARNING
Please don't connect PV array positive(+) or negative(-) to ground, it could cause serious damage to the inverter.

WARNING
Electrical installations must be done in accordance with the local and national electrical safety standards.

WARNING
To reduce the risk of fire, over-current protective devices (OCPD) are required for circuits connected to the Inverter.
The DC OCPD shall be installed per local requirements. All photovoltaic source and output circuit conductors shall have disconnects that comply with the NEC Article 690, Part II. All LEDVANCE three phase inverters feature an integrated DC switch.

CAUTION
Risk of electric shock. Do not remove cover. There is no user serviceable parts inside. Refer servicing to qualified and accredited service technicians.

SAFETY INSTRUCTIONS

CAUTION
The PV array (Solar panels) supplies a DC voltage when they are exposed to sunlight.

CAUTION
Risk of electric shock from energy stored in capacitors of the Inverter.
Do not remove cover for 5 minutes after disconnecting all power sources (service technician only).
Warranty may be voided if the cover is removed without unauthorized.

CAUTION
The surface temperature of the inverter can exceed 75 °C (167 °F).
To avoid risk of burns, DO NOT touch the surface when inverter is operating. The inverter must be installed out of reach of children.

Notice for use

The inverter has been constructed according to the applicable safety and technical guidelines. Use the inverter in installations that meet the following specifications only:

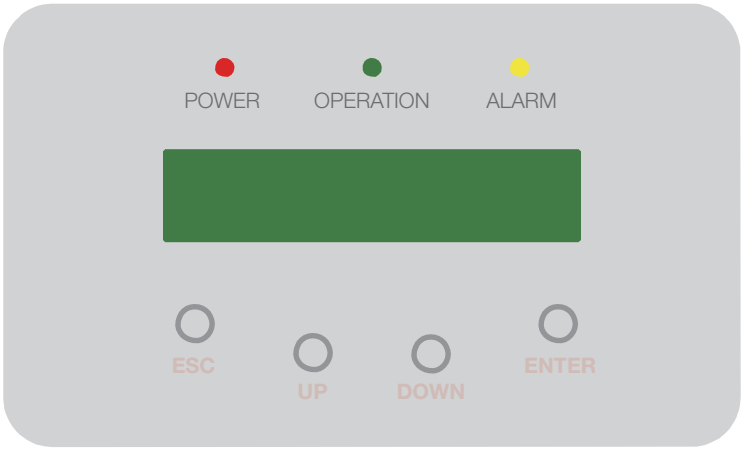
1. Permanent installation is required.
2. The electrical installation must meet all the applicable regulations and standards.
3. The inverter must be installed according to the instructions stated in this manual.
4. The inverter must be installed according to the correct technical specifications.
5. To startup the inverter, the Grid Supply Main Switch (AC) must be switched on, before the solar panel's DC isolator shall be switched on. To stop the inverter, the Grid Supply Main Switch (AC) must be switched off before the solar panel's DC isolator shall be switched off.

Notice for disposal

This product shall not be disposed of with household waste. They should be segregated and brought to an appropriate collection point to enable recycling and avoid potential impacts on the environment and human health. Local rules in waste management shall be respected .

OVERVIEW

Front panel display



Front Panel Display

LED status indicator lights

	Light	Status	Description
①	POWER	ON	The inverter can detect DC power.
		OFF	No DC power or low DC power.
②	OPERATION	ON	The inverter is operating properly.
		OFF	The inverter has stopped to supply power.
		FLASHING	The inverter is initializing.
③	ALARM	ON	Alarm or fault condition is detected.
		OFF	The inverter is operating without fault or a larm.

Status Indicator Lights

Keypad

There are four keys in the front panel of the Inverter (from left to right): ESC, UP, DOWN and ENTER keys. The keypad is used for:

- Scrolling through the displayed options (the UP and DOWN keys);
- Access to modify the adjustable settings (the ESC and ENTER keys).

LCD

The two-line Liquid Crystal Display (LCD) is located on the front panel of the Inverter, which shows the following information:

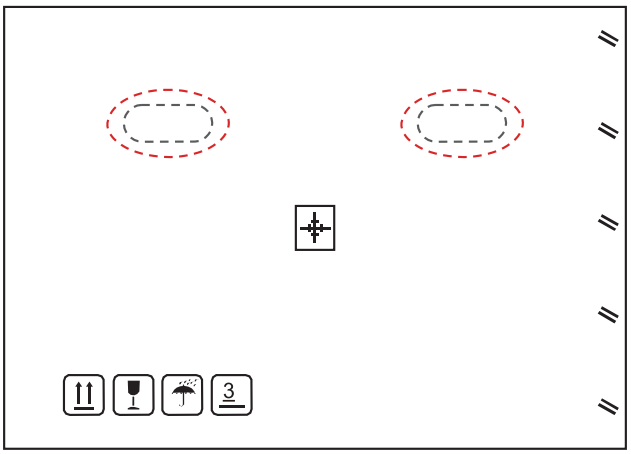
- Inverter operation status and data;
- Service messages for operator;
- Alarm messages and fault indications.

PRODUCT HANDING AND STORAGE

Product handling

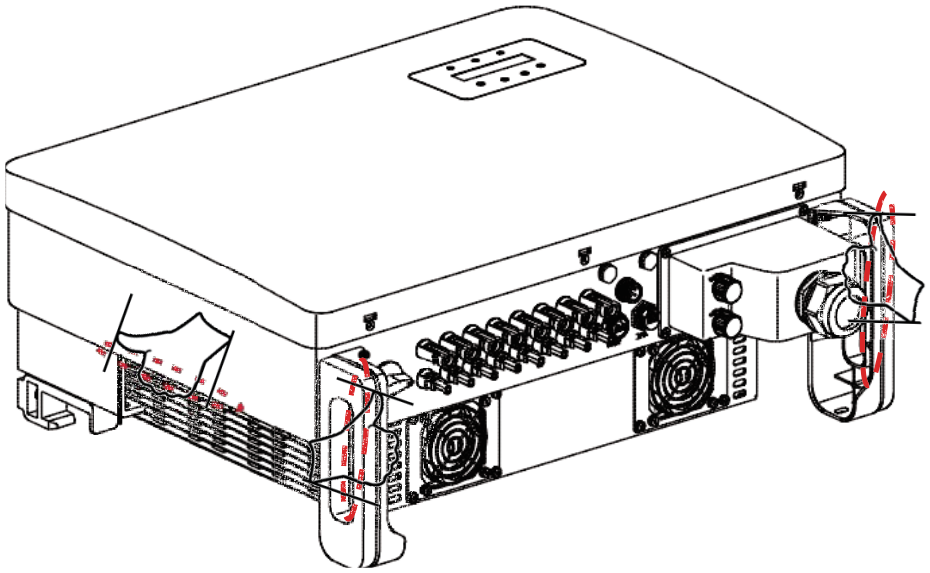
Please review the instruction below for handling the inverter:

- The red circles below denote cutouts on the product package.
  Push in the cutouts to form handles for moving the inverter.



move the inverter

- Open the carton, then two people handle both sides of inverter through the area denoted dotted line.



Inverter handles

NOTE
Be careful to lift the inverter. The weight is around 45 kg.

PRODUCT HANDING AND STORAGE

Product storage

If the inverter is not to be installed immediately, storage instructions and environmental conditions are below:

- Use the original box to repackage the inverter, seal with adhesive tape with the desiccant inside the box.
- Store the inverter(s) in a clean and dry place, free of dust and dirt.
- Storage temperature must be between -40 °C and 70 °C and the humidity should be between 0 and 95% non-condensing.
- Stack no more than three (3) inverters high.
- Keep box(es) away from corrosive materials to avoid damage to the inverter enclosure.
- Inspect packaging regularly. If packaging is damaged (wet, pest damage, etc), repackage the inverter immediately.
- Store the inverter(s) on a flat, hard surface - not inclined or upside down.
- After long-term storage, the inverter needs to be fully examined and tested by qualified service or technical personnel before using.
- Restarting after a long period of non-use requires the equipment to be inspected and, in some cases, the removal of oxidation and dust that has settled inside the equipment will be required.

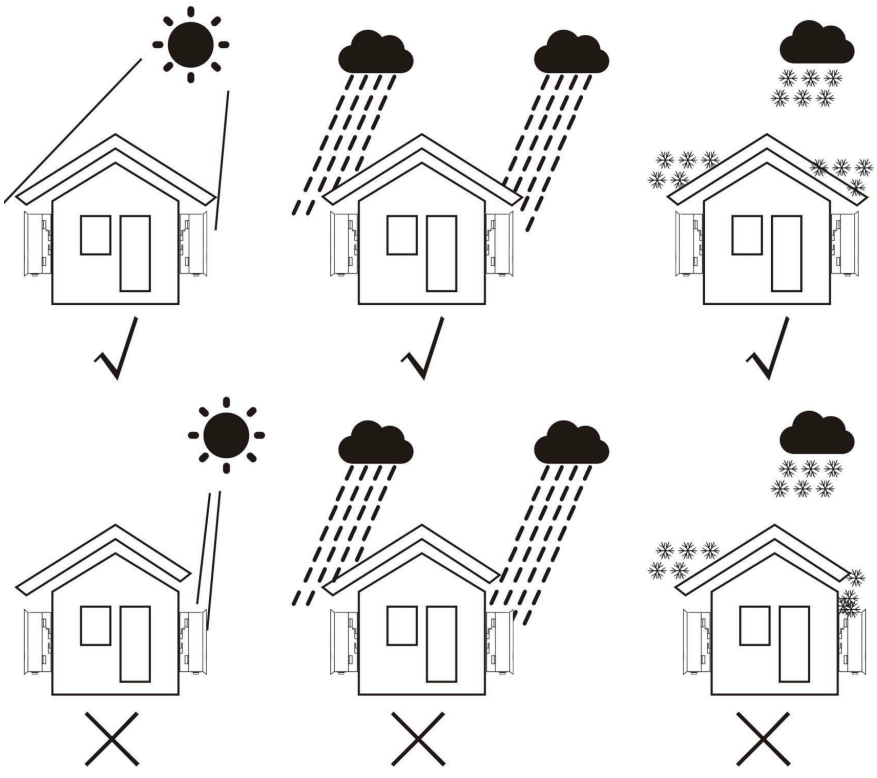
INSTALLATION

Select a location for the inverter

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

WARNING: Risk of fire
Despite careful construction, electrical devices can cause fires.
- Do not install the inverter in areas containing highly flammable materials or gases.
- Do not install the inverter in potentially explosive atmospheres.
- The mounting structure where the inverter is installed must be fireproof.

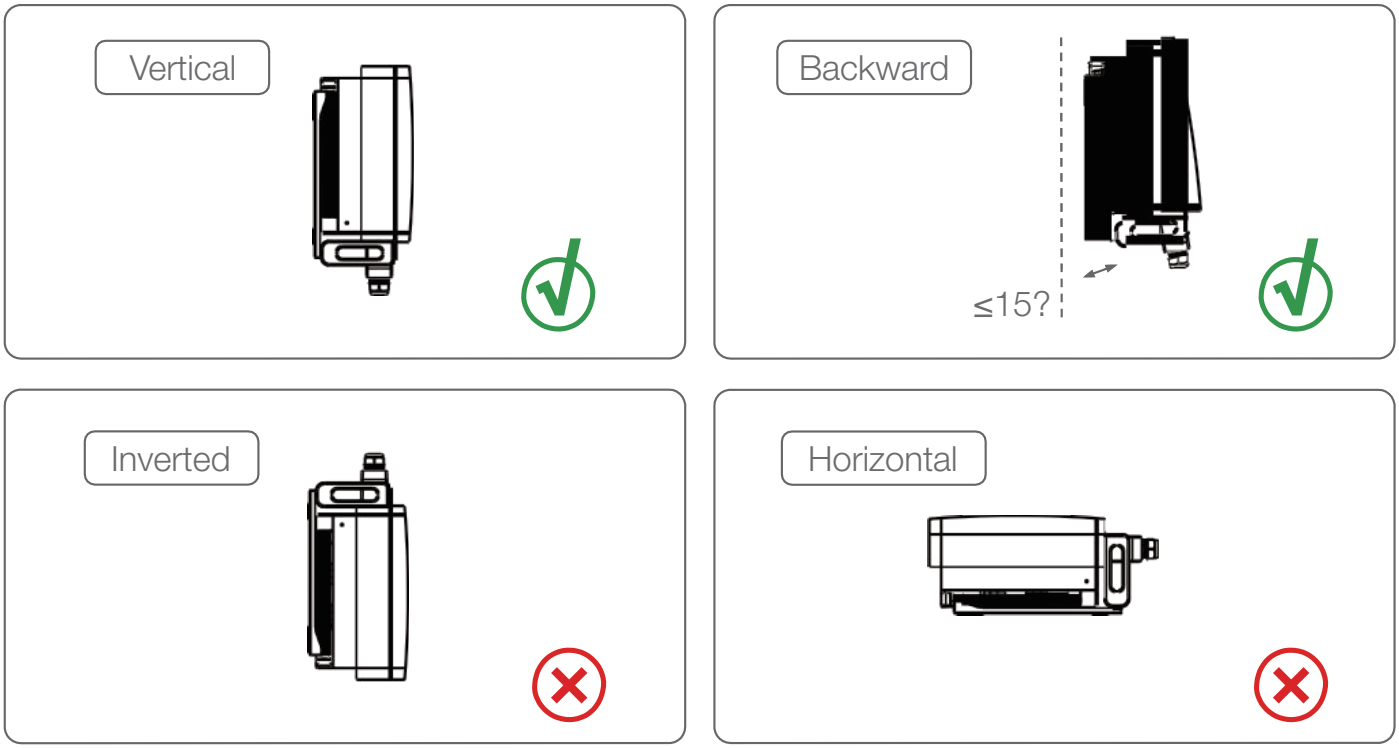
- Do not install in small closed spaces where air can not circulate freely. To avoid overheating, always make sure the flow of air around the inverter is not blocked.
- Exposure to direct sunlight will increase the operational temperature of the inverter and may cause output power limiting. Ginlong recommends inverter installed to avoid direct sunlight or raining.
- To avoid over heating ambient air temperature must be considered when choosing the inverter installation location. Ginlong recommends using a sun shade minimizing direct sunlight when the ambient air temperature around the unit exceeds 104 °F/40 °C.



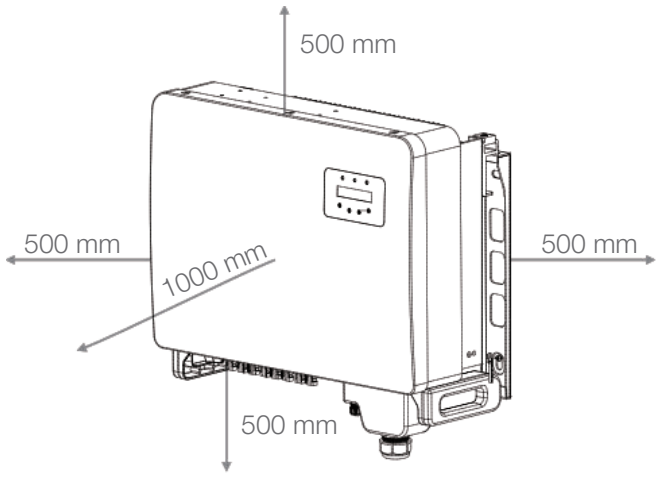
Recommended Installation locations

NOTE
Nothing should be stored on or placed against the inverter.

INSTALLATION



- Install on a vertical surface or structure capable of bearing the weight.
- Please install the inverter vertically. If the inverter cannot be mounted vertically, it may be tilted backward to 15 degrees from vertical.
- For multiple inverters are installed on site, a minimum clearance of 500 mm,should be kept between each inverter and any other mounted equipment. The bottom of the inverter must be at least 500mm from the ground or floor.
- Visibility of the LED status indicator lights and LCD display screen should be considered.

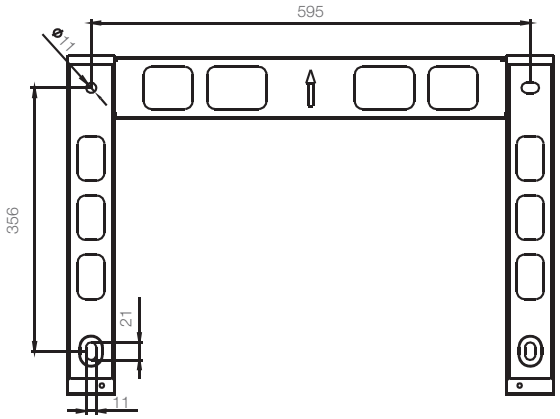


Inverter Mounting clearance

INSTALLATION

Mounting the inverter

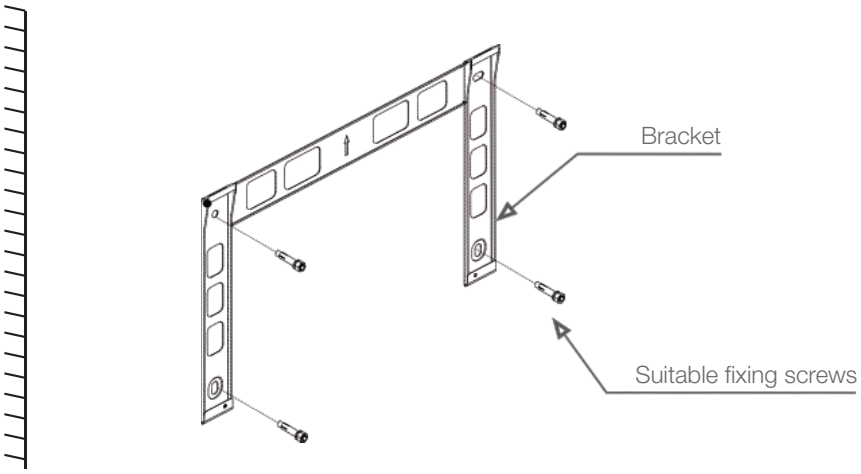
Back hanging plate size:



Inverter wall mounting

As is shown in the figure. Inverter shall be mounted vertically.
The steps to mount the inverter are listed below.

- Refer to Figure above, the holes for expansion bolt based on the hole diameter of bracket (M10*70) , using the percussion drilling with the 10 mm drill need to stay vertically on the wall. And the drill hole must be vertically on the wall. And all drill holes' depth is 60 mm.
- Make sure the bracket is horizontal. And the mounting holes are marked correctly. Drill the holes.
- Into wall at your marks.
  Use the suitable expansion screws to fix the bracket on the wall.

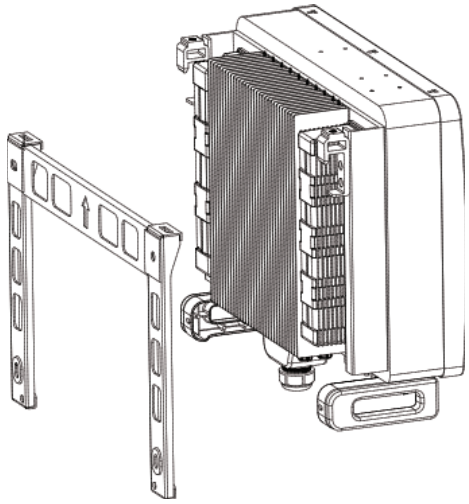


Inverter wall mounting

INSTALLATION

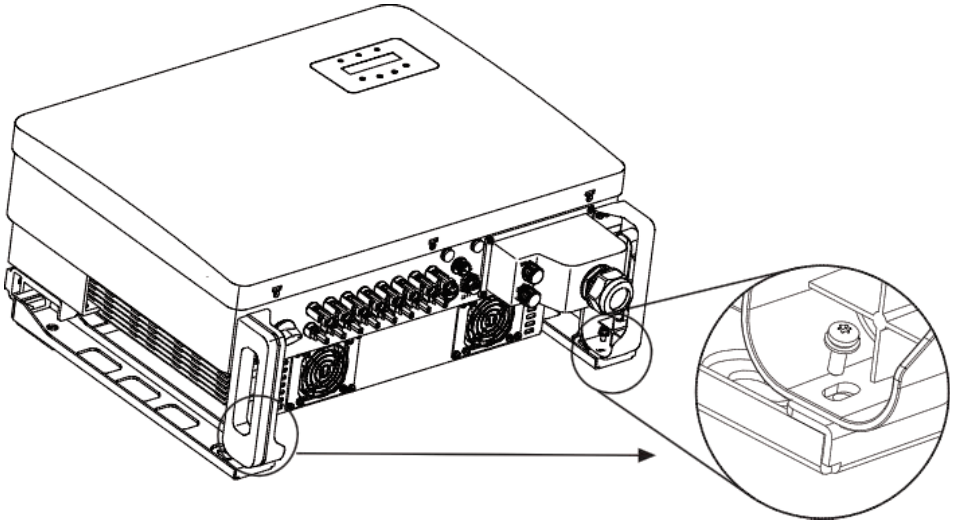
WARNING
The inverter must be mounted vertically.

– Lift the inverter and hang it on the bracket, and then slide down to make sure they match perfectly.



Install the inverter

– If the installation position is high, the inverter cannot be directly mounted on the mounting plate, and the hoisting rope is hoisted through the two lifting holes.
(The rope needs to meet the load-bearing requirements of this product) .



INSTALLATION

Electrical connections

Inverter designs quick-connect terminal, so top cover needn't open during electrical connection. The sign meaning located the bottom of inverter, as shown below. All electrical connections are suit for the local or national standard.

DC 1 ~ DC 8	DC input terminal
ON	Switch on the DC switch
OFF	Switch off the DC switch
COM1	COM port for monitoring
METER	COM port for Meter
DRM	COM port for DRM

Electrical connection symbols

The electrical connection of the inverter must follow the steps listed below:
- Switch the Grid Supply Main Switch (AC) OFF.
- Switch the DC Isolator OFF.
- Connect the inverter to the grid.
- Assemble PV input connector to the Inverter.

Grounding

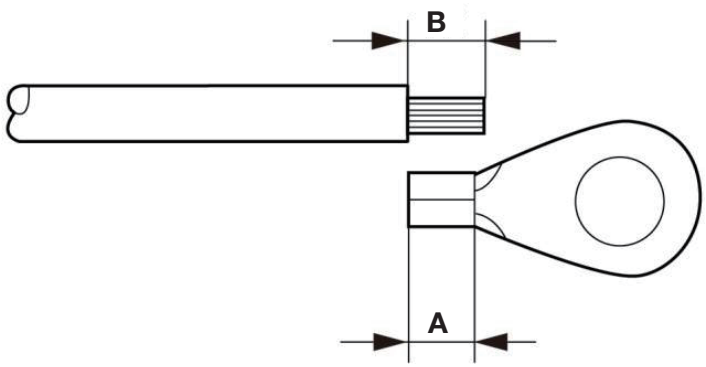
To effectively protect the inverter, two grounding methods must be performed. Connect the AC grounding cable.
Connect the external grounding terminal.

To connect the grounding terminal on the heat sink, please follow the steps below:
- Prepare the grounding cable: recommend to use the ≥ 16 mm^2 outdoor copper-core cable.
- Prepare OT terminals: M6.

IMPORTANT
For multiple inverters in parallel , all inverters should be connected to the same ground point to eliminate the possibility of a voltage potential existing between inverter grounds.

INSTALLATION

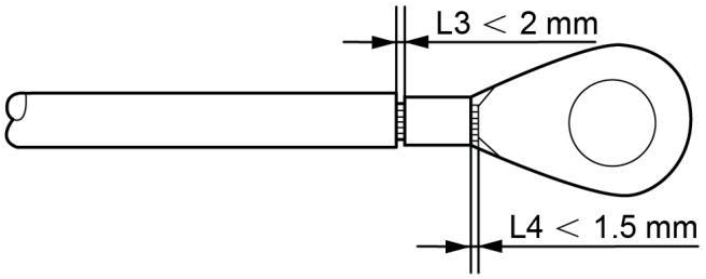
– Strip the ground cable insulation to a suitable length.



Suitable length

IMPORTANT
B (insulation stripping length) is 2 mm~3 mm longer than A (OT cable terminal crimping area) 2 mm~3 mm.

– Insert the stripped wire into the OT terminal crimping area and use the hydraulic clamp to crimp the terminal to the wire.

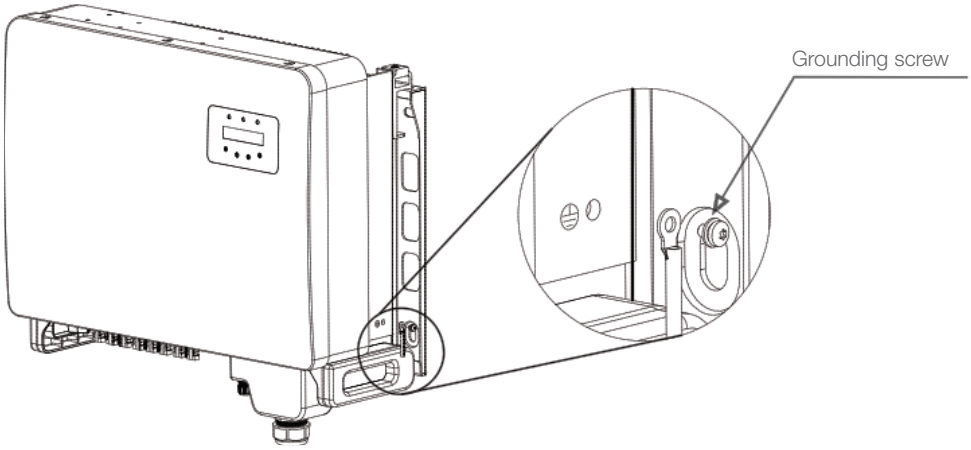


Strip wire

IMPORTANT
After crimping the terminal to the wire, inspect the connection to ensure the terminal is solidly crimped to the wire.

INSTALLATION

- Remove the screw from the heat sink ground point.
- Connect the grounding cable to the grounding point on the heat sink,and tighten the grounding screw, Torque is 3-4 N·m.



Fixed cable

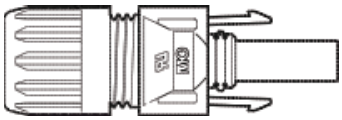
IMPORTANT
For improving anti-corrosion performance, after ground cable installed, apply silicone or paint is preferred to protect.

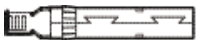
INSTALLATION

Connect PV side of inverter

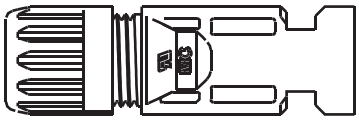
Before connecting inverter, please make sure the PV array open circuit voltage is within the limit of the inverter.

Before connection, please make sure the polarity of the output voltage of PV array matches the“DC+” and “DC-”symbols.





DC+ Connector



DC- Connector

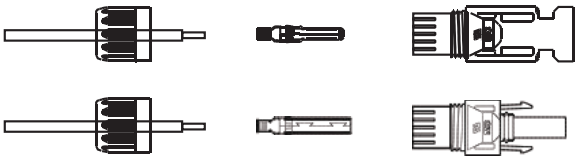
Please use appropriate DC cable for PV system.

Cable type	Cross section (mm²)	
	Range	Recommended value
Industry generic P V cable (model: PV1-F)	4.0~6.0 (12~10 AWG)	4.0 (12 AWG)

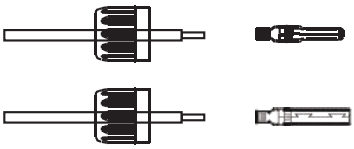
The steps to assemble the DC connectors are listed as follows:

- Strip off the DC wire for about 7 mm, disassemble the connector cap nut.
- Insert the wire into the connector cap nut and contact pin.
- Crimp the contact pin to the wire using a proper wire crimper.
- Insert metal connector into top of connector, and tighten nut with torque 3-4 N·m .
- Measure PV voltage of DC input with multimeter, verify DC input cable polar, and ensure each string of PV voltage in range of inverter operation. Connect DC connector with inverter until hearing a slight clicking sound indicates connection succeed.

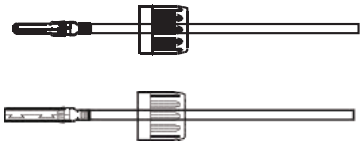
INSTALLATION



Disassemble the Connector Cap nut

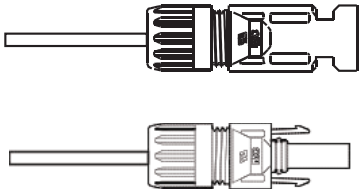


Insert the Wire into the
Connector Cap nut and contact pin

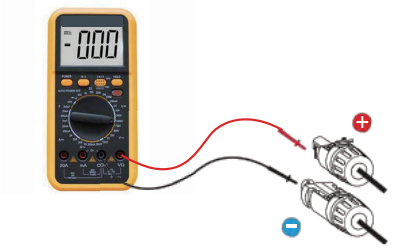


Crimping plier

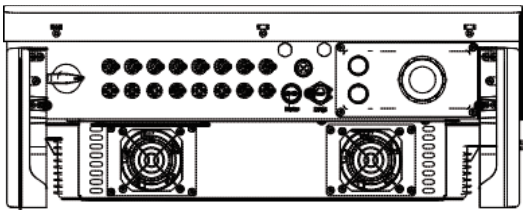
Crimp the contact pin to the wire



Connector with Cap nut Screwed on



Multimeter measurement



Connect the DC
Connectors to the Inverter

CAUTION

If DC inputs are accidently reversely connected or inverter is faulty or not working properly, it is NOT allowed to turn off the DC switch. Otherwise it may cause DC arc and damage the inverter or even lead to a fire disaster.

The correct actions are:

- Use a clip-on ammeter to measure the DC string current.
- If it is above 0.5 A, please wait for the solar irradiance reduces until the current decreases to below 0.5 A.
- Only after the current is below 0.5 A, you are allowed to turn off the DC switches and disconnect the PV strings.
- In order to completely eliminate the possibility of failure, please disconnect the PV strings after turning off the DC switch to aviod secondary failures due to continuous PV energy on the next day.

Please note that any damages due to wrong operations are not covered in the device warranty.

INSTALLATION

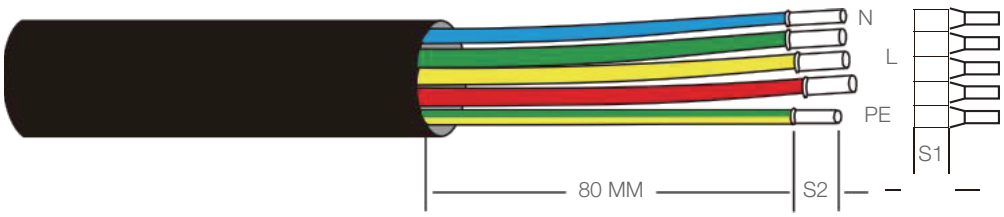
Connect grid side of inverter

For the AC connection, 10-35 mm² cable is required to be used.
Please make sure the resistance of cable is lower than 1.5 ohm.

Cable specification		Copper-cored cable
Traverse cross sectional area (mm²)	Range	10~35
	Recommended	25
Cable outer diameter (mm)	Range	22~32
	Recommended	27

NOTE
For reliable connection, recommend customer select corresponding Euro type connectors based on wiring specification to connect the terminal.

- The steps to assemble the AC grid terminals are listed as follows:
  Strip the end of AC cable insulating jacket about 80 mm then strip the end of each wire.

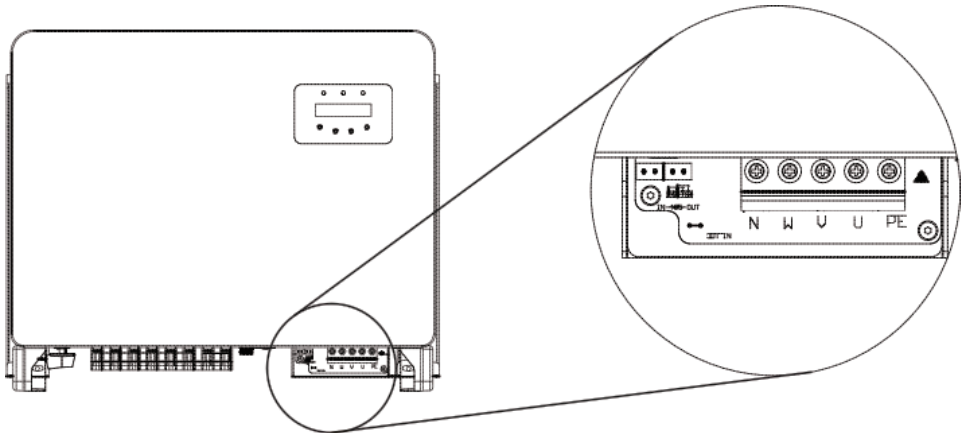


Strip AC cable

NOTE
S2 (insulation stripping length) should be as long as S1 (AC terminal cable compression area).

- Strip the insulation of the wire past the cable crimping area of the OT terminal, then use a hydraulic crimp tool to crimp the terminal. The crimped portion of the terminal must be insulated with heat shrinkable tube or insulating tape.
- Leave the AC breaker disconnected to ensure it does not close unexpectedly.
- Remove the 4 screws on the inverter junction box and remove the junction box cover .
- Insert the cable through the nut, sheath, and AC terminal cover. Connect the cable to the AC terminal block in turn, using a socket wrench. Tighten the screws on the terminal block. The torque is 3~4N·m.

INSTALLATION

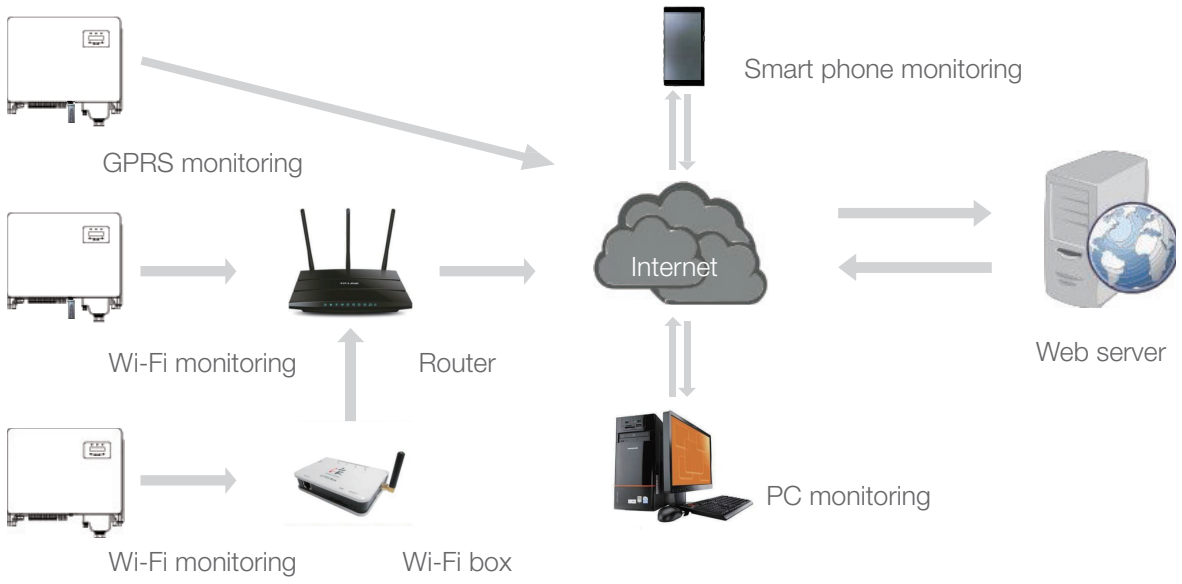


Wiring

NOTE
LEDVANCE three phase inverters integrate neutral connection point.
However, with or without neutral connected won't affect the normal operation of inverter itself.
Please refer to the local grid requirement if need neutral cable connected.

Inverter monitoring connection

The inverter can be monitored via Wi-Fi or GPRS. All LEDVANCE communication devices are optional. For connection instructions, please refer to the LEDVANCE Monitoring Device installation manuals.

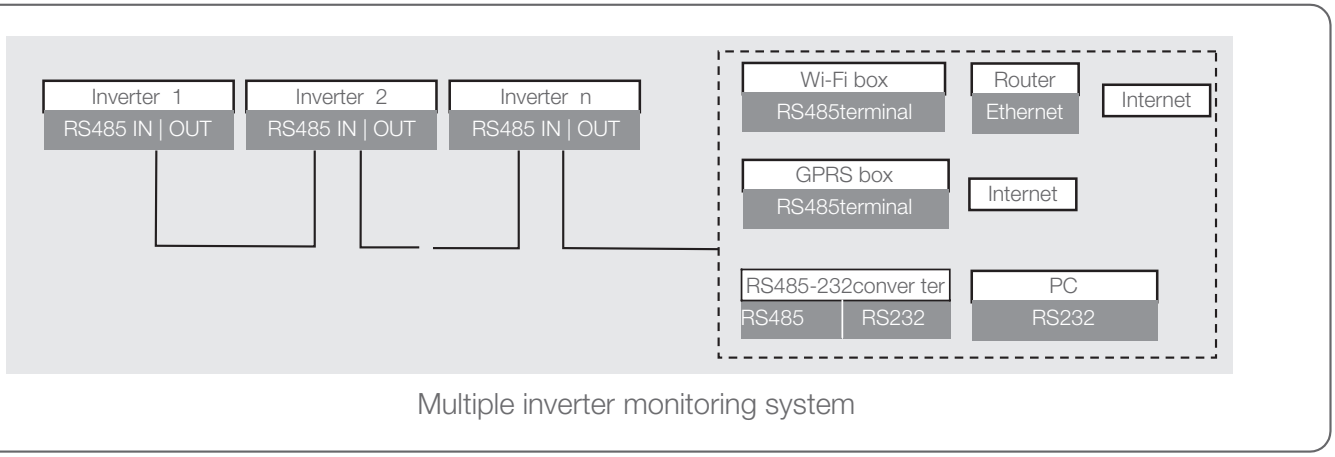


Wireless communication function

INSTALLATION

Monitoring system for multiple inverters

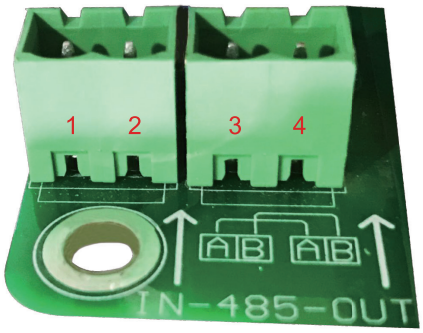
Multiple inverters can be monitored by RS-485 daisy chain configuration.



Multiple inverter monitoring system

RS485 Connection

Install the RS485 communication cables through the terminal block as shown in Figure below. Recommended cable cross sectional area is 0.2 - 1.5 mm □ , the cable outer diameter is 5 mm -10 mm.



RS485 Terminal Definition

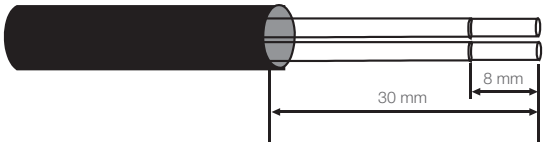
NO.	Port definition	Description
1	RS485A1 IN	RS485A1, RS485 differential signal+
2	RS485B1 IN	RS485B1, RS485 differential signal-
3	RS485A2 OUT	RS485A2, RS485 differential signal+
4	RS485B2 OUT	RS485B2, RS485 differential signal-

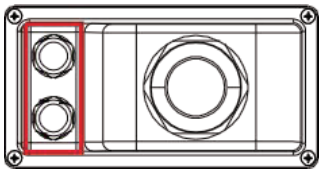
Port definition

INSTALLATION

Terminal block connection

- Use a wire stripper to peel off the insulation layer of the communication cables to a certain length as shown in the left-dow figure.
- Screw off the covers of "COM2" and "COM3" on the inverter as shown in the right-dow figure.





- Insert the communication cables into the "COM2" and "COM3" ports.
- Fasten the cables onto the pluggable terminals provided in the accessory package.
- Match the pluggable terminals to the terminal block in the inverter and press to fasten it. After cable installation,
  please remember to fasten the screws of the AC terminal cover in case of water damage.

Max. over current protection device (OCPD)

To protect the inverter's AC grid connection conductors, LEDVANCE recommends installing breakers that will protect against overcurrent. The following table defines OCPD ratings for the inverters.

Inverter	Rated voltage(V)	Rated output current (Amps)	Current for protection device (A)
LT-25K F2	220/380, 230/400	38.0/36.1	50
LT-30K F2	220/380, 230/400	45.6/43.3	63
LT-33K F2	220/380, 230/400	50.1/47.6	63
LT-36K F2	220/380, 230/400	54.7/52.0	80
LT-40K F2	220/380, 230/400	60.8/57.7	80

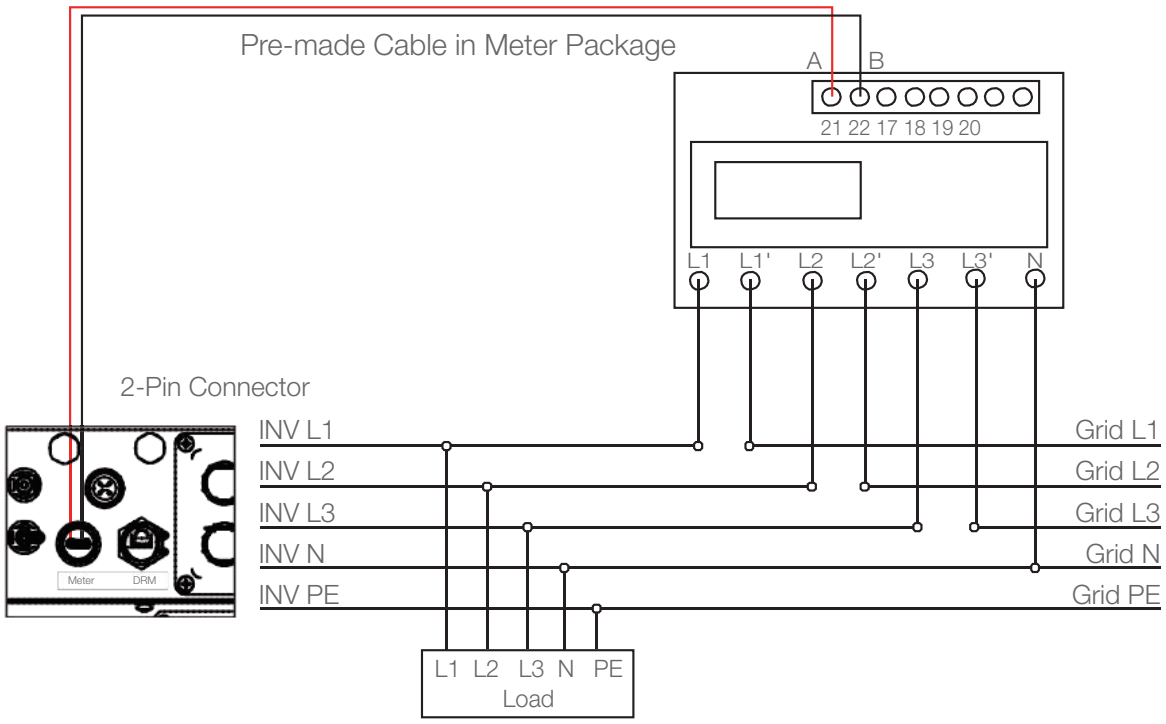
INSTALLATION

Meter Connection (optional)

The inverter can work with a three phase smart meter to achieve Export Power Management function and/or 24 hour consumption monitoring function.

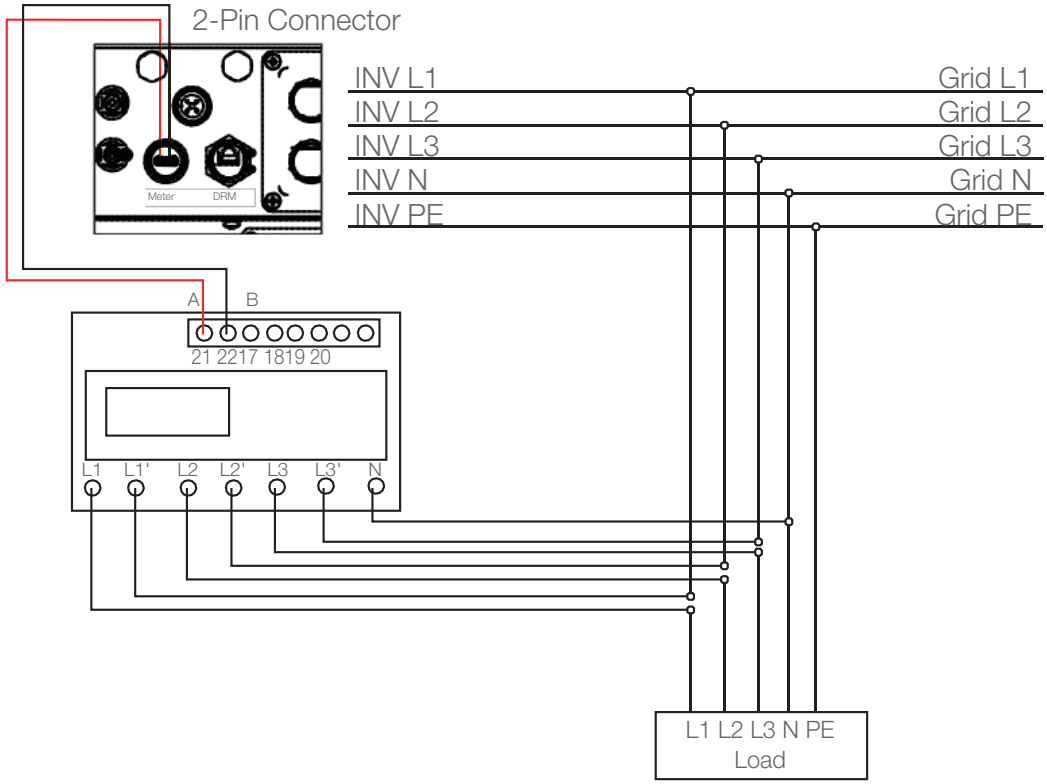
NOTE
To achieve Export Power Management function, the smart meter can be installed on either grid side or load side.
To achieve 24 hour consumption monitoring function, the smart meter can only be installed on grid side.

Two types of meters are supported:
Direct Insert Type Meter - Max input current 80 A (DTSD1352-Direct Insert Type).
External CT Type Meter - 150 A/5 A CTs are supplied (DTSD1352-External CT Type).
Customer can place the order for a suitable meter from LEDVANCE Sales Reps.
Below are the connection diagrams of different meters connecting to different locations.

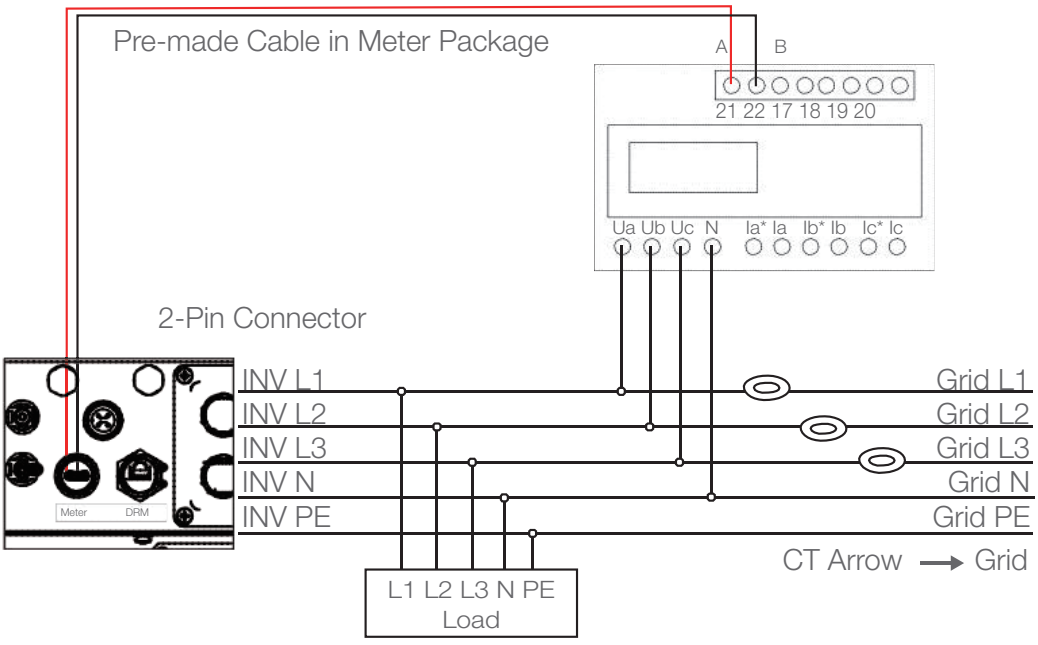


Direct Insert Type Meter - “Meter in Grid”

Pre-made Cable in Meter Package

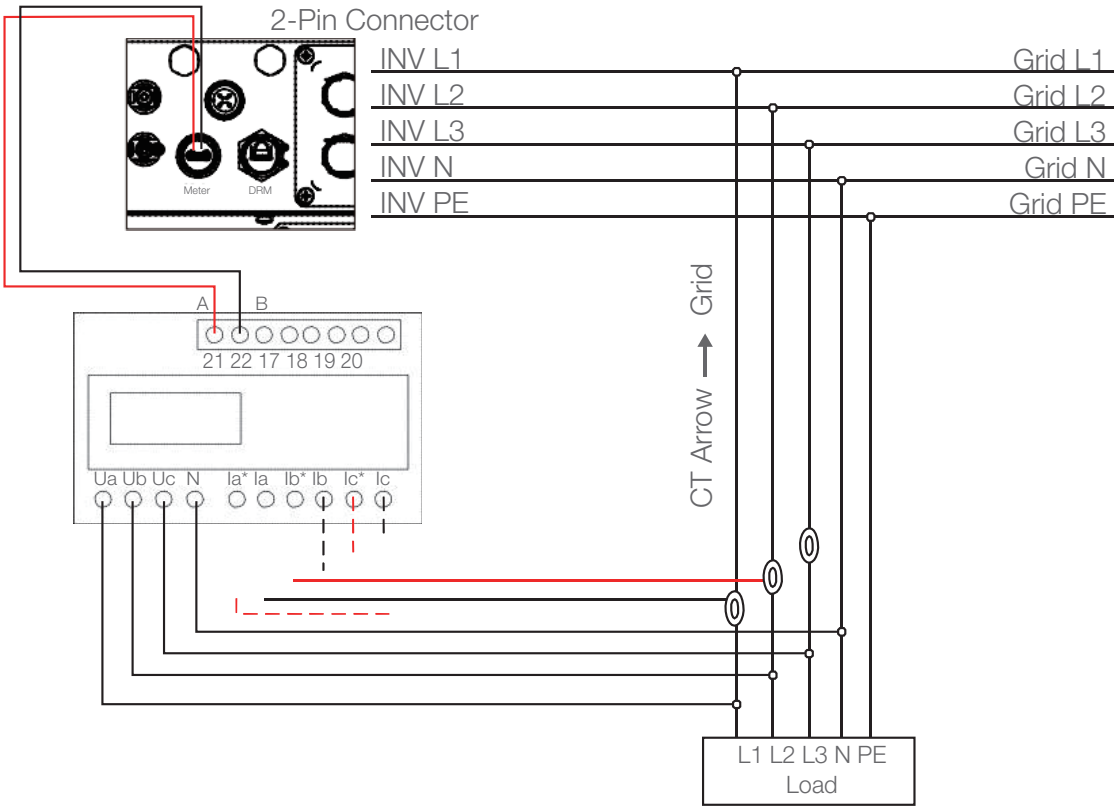


Direct Insert Type Meter - “Meter in Load”



External CT Type Meter - “Meter in Grid”

Pre-made Cable in Meter Package



External CT Type Meter - “Meter in Load”

INSTALLATION

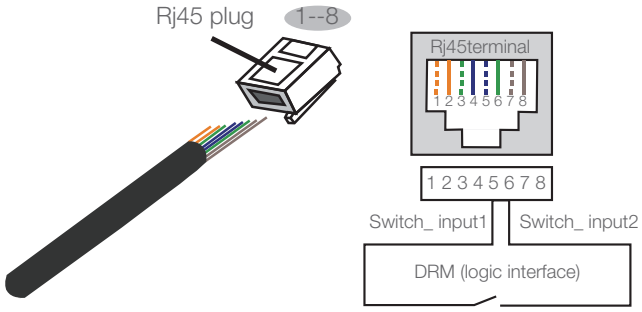
Logic interface connection

Logic interface is required by some local regulations that can be operated by a simple switch or contactor (Not available in South Africa).
When the switch is closed the inverter can operated normally. When the switch is opened, the inverter will reduce it's output power to zero within 5 s.
Pin5 and Pin6 of RJ45 terminal is used for the logic interface connection.
Please follow below steps to assemble RJ45 connector.

- Insert the network cable into the communication connection terminal of RJ45.

RJ45 communication connection terminals

- Use the network wire stripper to strip the insulation layer of the communication cable. According to the standard line sequence of figure below connect the wire to the plug of RJ45, and then use a network cable crimping tool to make it tight.



Correspondence between the cables and the stitches of plug, Pin5 and Pin6 of R J45 terminal is used for the logic interface, other Pins are reserved.
Pin 1: Reserved; Pin 2: Reserved
Pin 3: Reserved; Pin 4: Reserved
Pin 5: Switch_input1; Pin 6: Switch_input2
Pin 7: Reserved; Pin 8: Reserved

Strip the insulation layer and connect to RJ45 plug

- Connect RJ45 to DRM (logic interface).
  After wire connection, please refer chapter Advanced settings to enable the logic interface function.

START&STOP

Start the inverter

To start up the Inverter, it is important that the following steps are strictly followed:

- Switch the grid supply main Switch (AC) ON first.
- Switch the DC switch ON. If the voltage of PV arrays are higher than start up voltage, the inverter will initialize. The red LED power will light.
- When both the DC and the AC sides supply to the inverter, it will be ready to generate power. Initially, the inverter will check both its internal parameters and the parameters of the AC grid, to ensure that they are within the acceptable limits. At the same time, the green LED will flash and the LCD displays the information of INITIALIZING.
- After 30-300 seconds (depending on local requirement), the inverter will start to generate power. The green LED will be on continually and the LCD displays GENERATING.

WARNING

Do not touch the surface when the inverter is operating. It may be hot and cause burns.

Stop the inverter

To stop the inverter, it is mandatory that the steps below are followed in the exact order outlined.

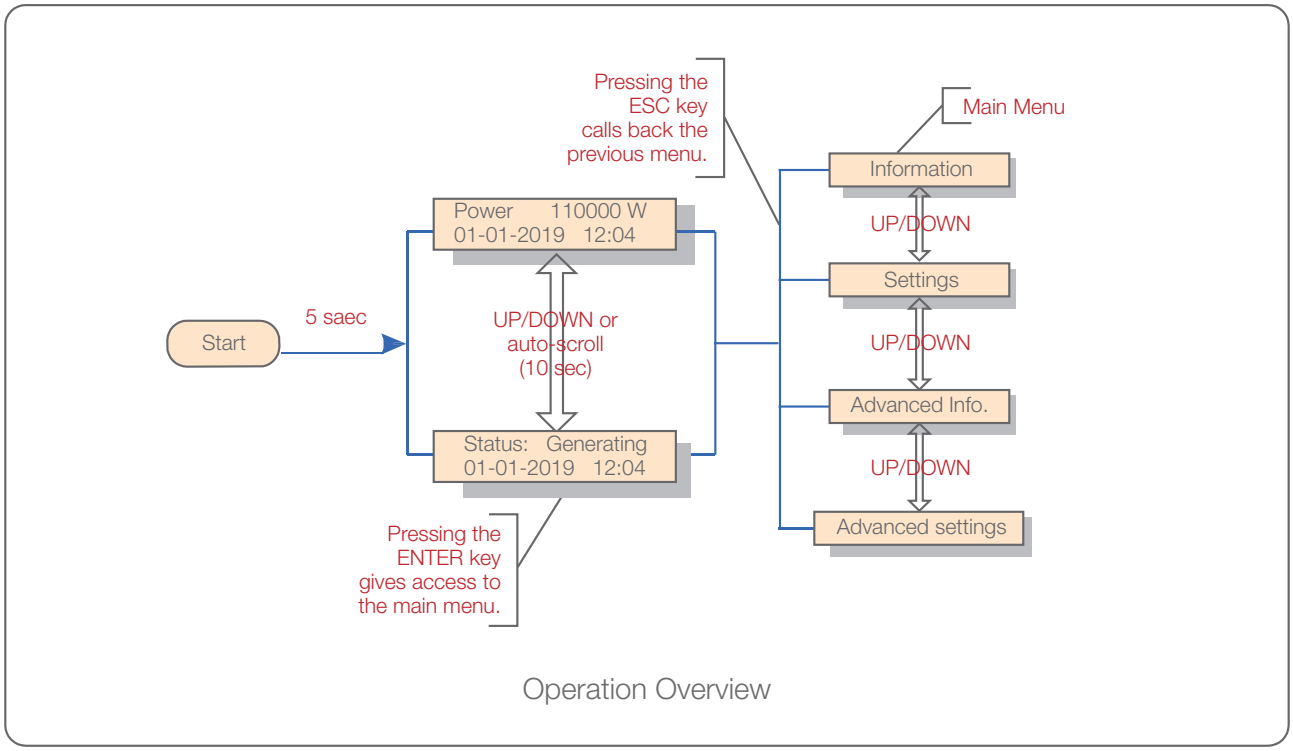
- Select "Grid Off" in the Advanced Setting of Inverter LCD.
- Turn off the AC Switch between LEDVANCE inverter and Grid.
- Wait approximately 30 seconds (during this time, the AC side capacitors are dissipating energy). If the inverter has DC voltage above the start-up threshold, the red POWER LED will be lit. Switch the DC switch OFF.
- Confirm all LED's switch OFF (~one (1) minute).

CAUTION

Although the inverter DC disconnect switch is in the OFF position and all the LED's are OFF, operators must wait five (5) minutes after the DC power source has been disconnected before opening the inverter cabinet. DC side capacitors can take up to five (5) minutes to dissipate all stored energy.

OPERATION

In normal operation, LCD screen alternatively shows inverter power and operation status. The screen can be scrolled manually by pressing the UP/DOWN keys. Pressing the ENTER key gives access to Main Menu.



Operation Overview

Main Menu

There are four submenus in the Main Menu:
- Information
- Settings
- Advanced Info.
- Advanced Settings

Information

The LEDVANCE three Phase Inverter main menu provides access to operational data and information. The information is displayed by selecting "Information" from the menu and then by scrolling up or down.

Cable specification		Copper-cored cable
Traverse cross sectional area (mm^2)	Range	35 ~ 240
	Recommended	70
Cable outer diameter (mm)	Range	38 ~ 56
	Recommended	45

Display	Duration	Description
V_DC01: 0000.0 V i_DC01: 0000.0 A	10 sec	V_DC01: Shows input DC voltage. I_DC01: Shows input DC current.
V_A: 000.0 V I_ A: 000.0 A	10 sec	V_A: Shows the grid's voltage value. I_A: Shows the grid's current value.
V_C: 000.0 V I_ C: 000.0 A	10 sec	V_C: Shows the grid's voltage value. I_C: Shows the grid's current value.
Status: Generating Power: 0000 W	10 sec	Status: Shows instant status of the Inverter. Power: Shows instant output power value.
Rea_Power: 0000 Var App_Power: 0000 VA	10 sec	Rea_Power: Shows the reactive power of the inverter. App_Power: Shows the apparent power of the inverter.
Grid Frequency F_Grid 00.00 Hz	10 sec	F_Grid: Shows the grid's frequency value.
Total Energy 0000000 kwh	10 sec	Total generated energy value.
This Month: 0000 kwh Last Month: 0000 kwh	10 sec	This Month: Total energy generated this month. Last Month: Total energy generated last month.
Today: 00.0 kwh Yesterday: 00.0 kwh	10 sec	Today: Total energy generated today. Yesterday: Total energy generated yesterday.
Inverter SN 00000000000000	10 sec	Display series number of the inverter.
Work Mode: NULL DRM NO.: 08	10 sec	DRM NO.: Shows DRM Number.
I_PV01: + 05.0 A I_PV02: + 04.9 A . . . I_PV08: + 05.2 A	10 sec	I_PV01 : Shows input 01 current value. I_PV02 : Shows input 02 current value. ... I_PV08 : Shows input 08 current value.

Information list

OPERATION

Lock screen

Pressing the ESC key returns to the Main Menu. Pressing the ENTER key locks (Figure (a)) or unlocks (Figure (b)) the screen.

(a) (b)

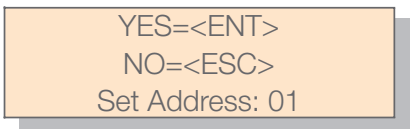
Settings

The following submenus are displayed when the Settings menu is selected:
1. Set Time
2. Set Address

– Set Time
This function allows time and date setting. When this function is selected, the LCD will display a screen as shown in Figure below.

Press the UP/DOWN keys to set time and data. Press the ENTER key to move from one digit to the next (from left to right). Press the ESC key to save the settings and return to the previous menu.

– Set Address
This function is used to set the address when muti inverters are connected to three monitor. number of LEDVANCE Three Phase Inverter is “01”.



Set Address

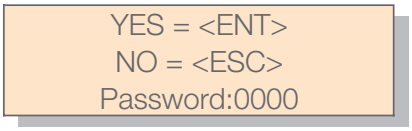
Press the UP/DOWN keys to set the address. Press the ENTER key to save the settings. Press the ESC key to cancel the change and return to the previous menu.

Advanced Info - Technicians only

CAUTION

To access to this area is for fully qualified and accredited technicians only. Enter menu “Advanced Info.” and “Advanced settings” (need password).

Select “Advanced Info.” from the Main Menu. The screen will require the password as below:



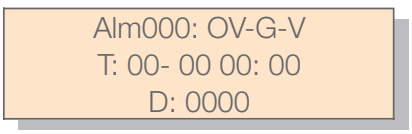
Enter password

The default password is “0010".
Please press “down” to move the cursor, press “up” to select the number.
After enter the correct password the Main Menu will display a screen and be able to access to the following information.

1. Alarm Message
2. Running message
3. Version
4. Daily Energy
5. Monthly Energy
6. Yearly Energy
7. Daily Records
8. Communication Data
9. Warning Message

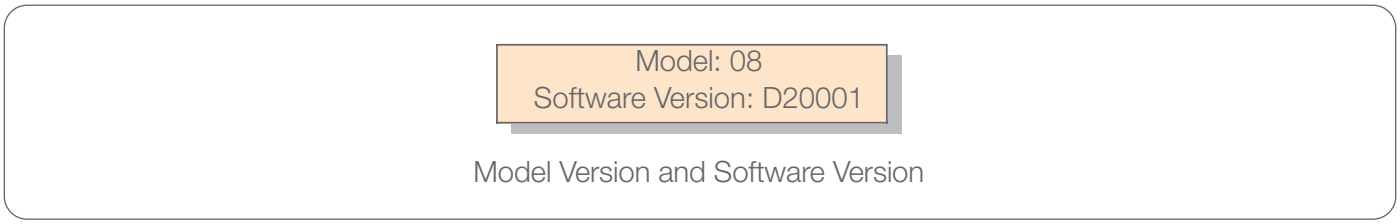
The screen can be scrolled manually by pressing the UP/DOWN keys. Pressing the ENTER key gives access to a submenu. Press the ESC key to return to the Main Menu.

- Alarm Message
  The display shows the 100 latest alarm messages. Screens can be scrolled manually by pressing the UP/DOWN keys. Press the ESC key to return to the previous menu.



Alarm Message

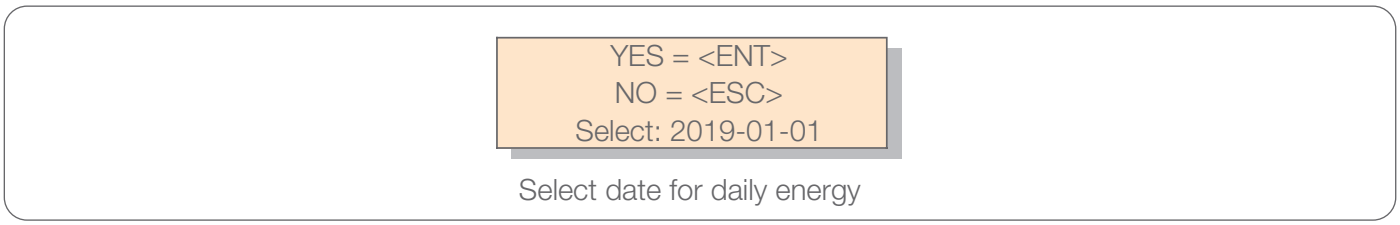
- Running Message
  This function is for maintaince person to get running message such as internal temperature, Standard No.1,2,etc.
  Screens can be scrolled manually by pressing the UP/DOWN keys.
- ersion
  The screen shows the model version of the inverter. And the screen will show the software ver by pressing the UP and DOWN at the same time..



Model Version and Software Version

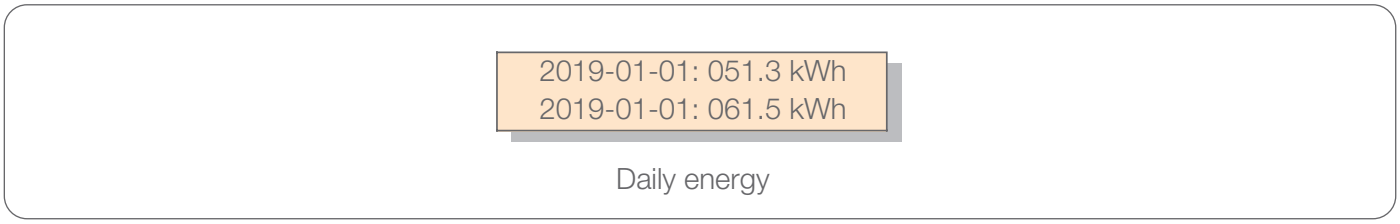
– Daily Energy

The function is for checking the energy generation for selected day.



Select date for daily energy

Press DOWN key to move the cursor to day, month and year, press UP key to change the digit. Press Enter after the date is fixed.

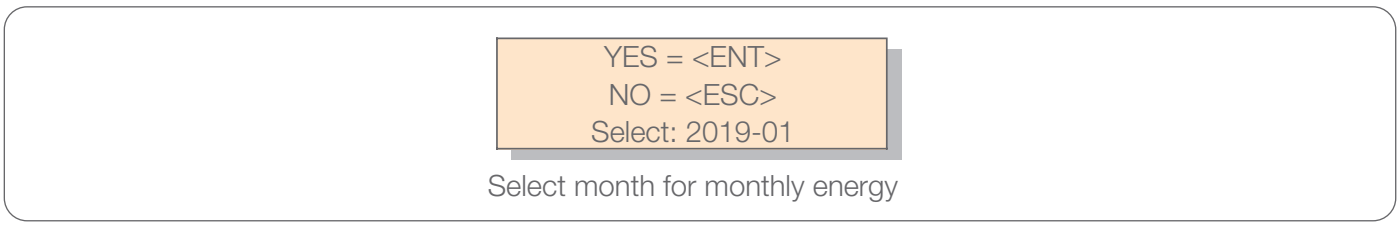


Daily energy

Press UP / DOWN key to move one date from another.

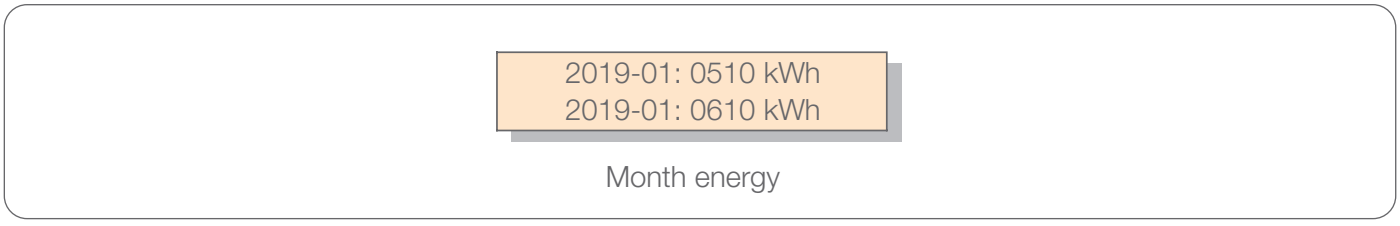
– Monthly Energy

The function is for checking the energy generation for selected month.



Select month for monthly energy

Press DOWN key to move the cursor to day and month, press UP key to change the digit. Press Enter after the date is fixed.

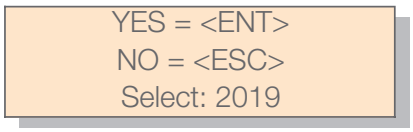


Month energy

Press UP/DOWN key to move one date from another.

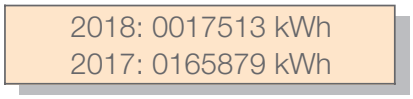
– Yearly Energy

The function is for checking the energy generation for selected year.



Select year for yearly energy

Press DOWN key to move the cursor to day and year, press UP key to change the digit. Press Enter after the date is fixed.



Yearly energy

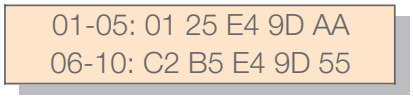
Press UP/DOWN key to move one date from another.

– Daily Records

The screen shows history of changing settings. Only for maintance personel.

– Communication Data

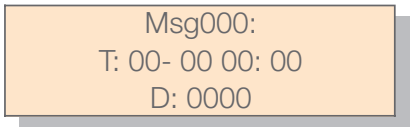
The screen shows the internal data of the Inverter, which is for service technicians only.



Communication Data

– Warning Message

The display shows the 100 latest warn messages. Screens can be scrolled manually by pressing the UP/DOWN keys. Press the ESC key to return to the previous menu.



Warning Message

Advanced settings - technicians only

NOTE
To access to this area is for fully qualified and accredited technicians only. Please follow Advanced Info to enter password to access this menu.

Select Advanced Settings from the Main Menu to access the following options:

1. Select Standard
2. Grid ON/OFF
3. 24 H Switch
4. Clear Energy
5. Reset Password
6. Power Control
7. Calibrate Energy
8. Special Settings
9. STD. Mode Settings
10. Restore Settings
11. HMI Update
12. Internal EPM Set
13. External EPM set
14. Restart HMI
15. Debug Parameter
16. Fan Text
17. DSP Update
18. Compensation Set
19. I/V Curve

– Selecting Standard
This function is used to select the grid's reference standard.

YES = <ENT>
NO = <ESC>
Standard:G59/3

Press the UP/DOWN keys to select the standard (G59/3, UL-480V, VDE0126, AS4777-15, AS4777-02, CQC380A, ENEL, UL-380V, MEX-CFE, C10/11 and “User-Def” function).
Press the ENTER key to confirm the setting.
Press the ESC key to cancel changes and returns to previous menu.

NOTE
This function is for technicians use only.

Selecting the “User-Def” menu will access to the following submenu.

→ OV-G-V1: 400 V
OV-G-V1-T: 1.0 S

NOTE
The "User-Def" function can be only used by the service engineer and must be allowed by the local energy supplier.

Below is the setting range for “User-Def”. Using this function, the limits can be changed manually.

OV-G-V1: 220---374 V	OV-G-F1: 50.1-65 Hz
OV-G-V1-T: 0.01---300 S	OV-G-F1-T: 0.01---300 S
OV-G-V2: 220---374 V	OV-G-F2: 50.1-65 Hz
OV-G-V2-T: 0.01---300 S	OV-G-F2-T: 0.01---300 S
UN-G-V1: 110---277 V	UN-G-F1: 45-59.9 Hz
UN-G-V1-T: 0.01---300 S	UN-G-F1-T: 0.01---300 S
UN-G-V2: 110---277 V	UN-G-F2: 45-59.9 Hz
UN-G-V2-T: 0.01---300 S	UN-G-F2-T: 0.01---300 S
Startup-T: 10-600 S	Restore-T: 10-600 S

Setting ranges for User-Def (L-N)

Press the UP/DOWN keys to scroll through items. Press the ENTER key to edit the highlighted item. Press the UP/DOWN keys again to change the setting. Press the ENTER key to save the setting. Press the ESC key to cancel changes and returns to the previous menu.

NOTE
For different countries, the grid standard needs to be set as different according to local requirements. If there is any doubt, please consult LEDVANCE service technicians for details.

– Grid ON/OFF
This function is used to start up or stop the power generation of LEDVANCE Inverter.

Grid ON Grid OFF

Set Grid ON/OFF

Screens can be scrolled manually by pressing the UP/DOWN keys. Press the ENTER key to save the setting. Press the ESC key to return to the previous menu.

– 24 H Switch

This function controls the 24 H hours consumption function enable or disable.

Enable Disable

Set 24 H ON/OFF

NOTE

When this is enabled, the inverter LCD will still be alive at night with the power LED light on. If the grid is in malfunction at night, the system can't recover even after the grid is back to normal but the consumption data will still be recorded in the meter. Until the sunrise, the system will start to work again while the meter data can be uploaded to the LEDVANCE monitoring system to calibrate the load consumption data.

– Clear Energy

Clear Energy can reset the history yield of inverter

These two functions are applicable by maintenance personnel only, wrong operation will prevent the inverter from working properly.

– Reset Password

This function is used to set the new password for menu "Advanced info." and "Advanced information".

YES = <ENT>
NO = <ESC>
Password: 0000

Set new password

Enter the right password before set new password. Press the DOWN key to move the cursor, press the UP key to revise the value. Press the ENTER key to execute the setting.
Press the ESC key to return to the previous menu.

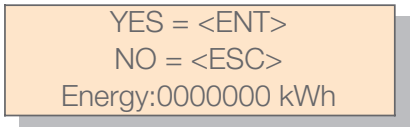
OPERATION

– Power control
Active and reactive power can be set through power setting button.
There are 5 item for this sub menu:
1. Set output power
2. Set Reactive Power
3. Out_P With Restore
4. Rea_P With Restore
5. Select P F Curve

This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

– 24 H Switch

Maintenance or replacement could clear or cause a different value of total energy. Use this function could allow user to revise the value of total energy to the same value as before. If the monitoring website is used the data will be synchronous with this setting automatically.



Calibrate energy

Press the DOWN key to move the cursor, Press the UP key to revise the value. Press the ENTER key to execute the setting. Press the ESC key to return to the previous menu.

– Special Settings

This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

– STD Mode settings
There are 6 setting under STD. Mode settings.
1. Working Mode Set
2. Power Rate Limit
3. Freq Derate Set
4. 10 mins Voltage Set
5. Power Priority
6. Initial Settings

This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

– Enable logic interface settings

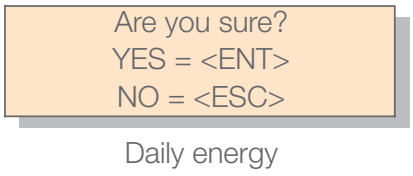
When select G98 or G99 standard to use the logic interface function, please follow below settings to enable the DRM. DRM default setting is “OFF” , if DRM set “ON”, but the logic interface un-connected to the switch or the switch is open, the inverter HMI will display “Limit by DRM” and the inverter output power will be limited to zero.

1. Select Initial Settings
2. Select DRM and set it “ON”

– Restore Settings

There are 5 items in initial setting submenu.

Restore setting could set all item in 7.5.8 special setting to default. The screen shows as below:



Press the Enter key to save the setting after setting grid off.

Press the ESC key to return the previous mean.

– HMI Update

This function is used for updating the LCD program.

This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

OPERATION

Select EPM Settings from the Main Menu to access the following options:
1. Mode Select 2. Backflow Power 3. Fail safe ON/OFF 4. Backflow Work Mode

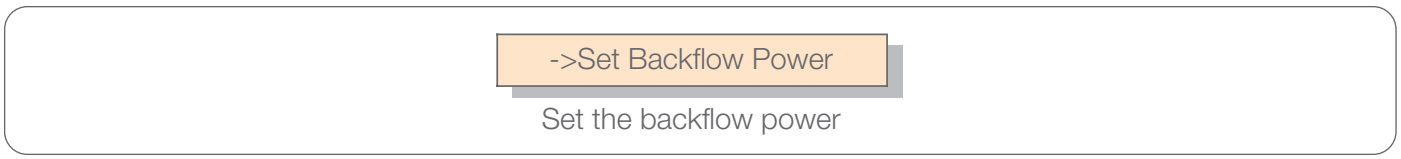
- Mode Select

  There are 4 settings in this menu as below:
  1. OFF 2. Meter in Load 3. Meter in Grid 4.Consumption Monitor

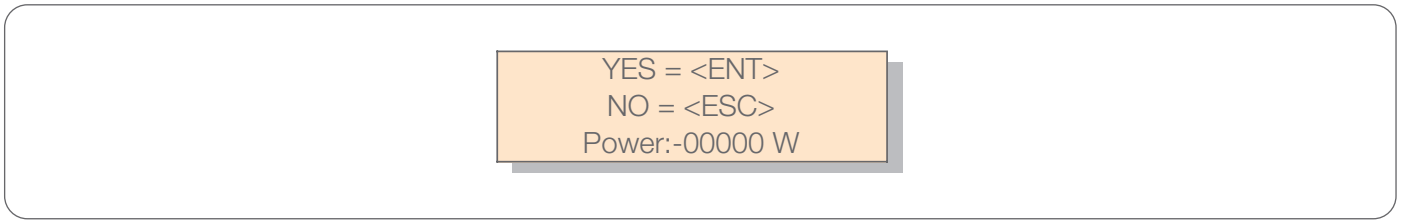
  OFF: Functions are disabled
  Meter in Load: LEDVANCE Smart Meter is connected in the load branch circuit.
  Meter in Grid: LEDVANCE Smart Meter is connected in the grid connection point (The backflow power is default as 0 W).
  Consumption Monitor: LEDVANCE Smart Meter is connected in the grid connection point (The backflow power setting is not applicable).

- Backflow Power

  The setting is used to define the allowed export power into the grid.
  The setting range is between 00000 W to 29900 W.



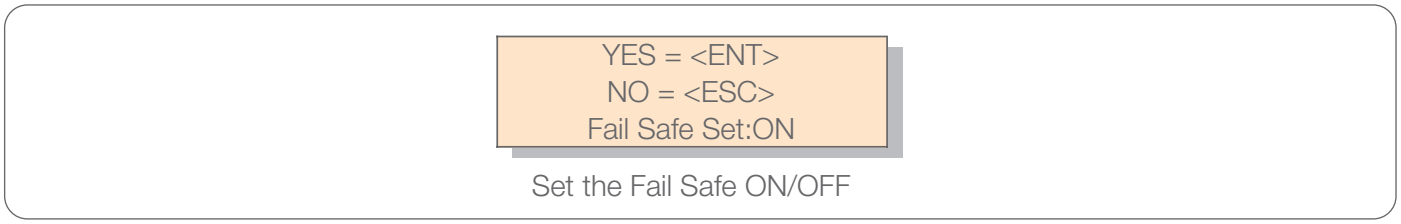
Set the backflow power



Press the UP/DOWN keys to set data. Press the ENTER key to set backflow power.
Then press DOWN keys to move the cursor, press UP to change the number.
Press the ESC key to save the settings and return to the previous menu.

- Fail safe ON/OFF

  This setting is used to give out an alarm (stop inverter generation as well) when the Meter connection is lost during operation.
  It can prevent potential backflow power into the grid when the system loses control.



Set the Fail Safe ON/OFF

It is only mandatory to turn on this function when the inverter is installed in UK due to the G100 regulation. For other regions,customers can enable or disable the function as they desire.

NOTE
When the failsafe function is ON and CT/Meter is disconnected somehow, the inverter will stop generation and give "Failsafe" alarm on the LCD. When the failsafe function is OFF and CT/Meter is disconnected somehow, the inverter will keep the output power as the last moment when the CT/Meter is still connected. After a restart, the inverter will output at full power without limit.

– Backflow Work Mode

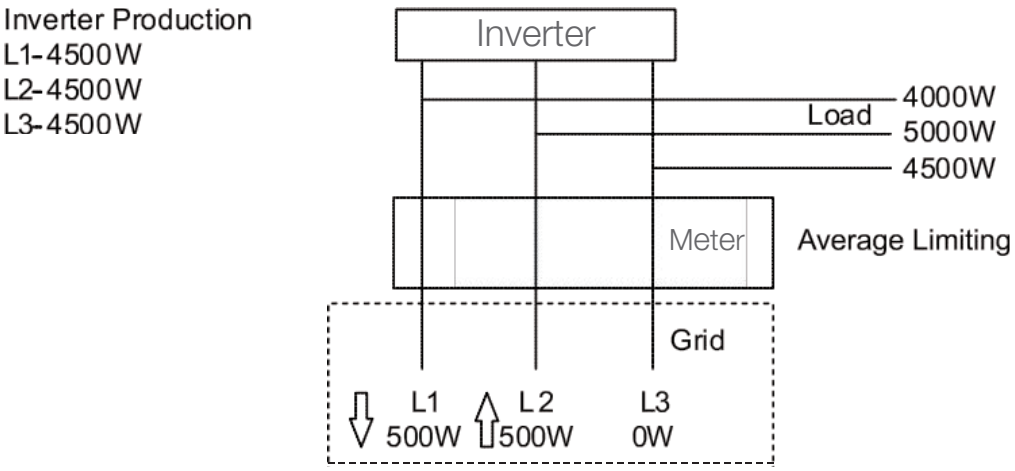
This submenu is used for set backflow work mode: 01, 02. “01” is the default mode.

->Backflow Work Mode

Set the Backflow work mode

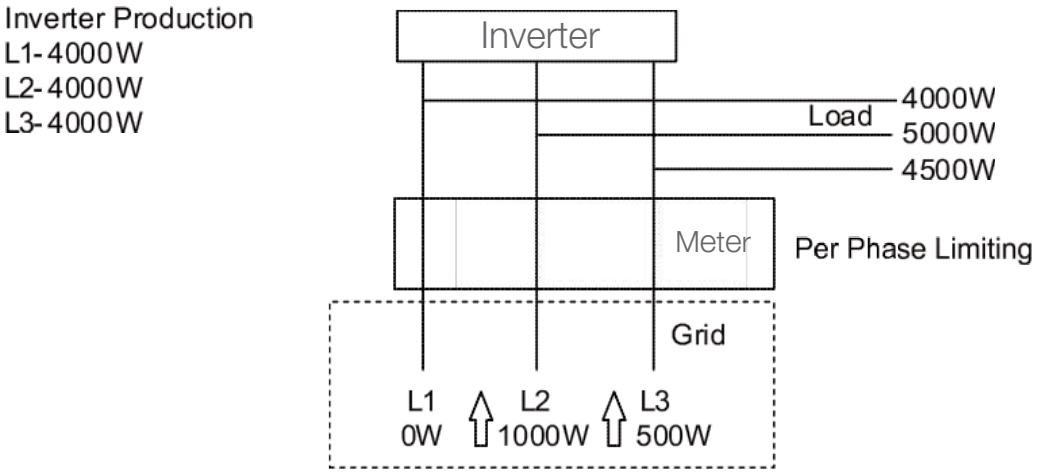
YES = <ENT>
NO = <ESC>
Mode:01

Mode “01”, as shown in the figure below, the average limiting mode, the output power of each phase is the average of the three-phase load power, and it is more than the phase of the lowest power in three phases.



OPERATION

Mode “02”, As shown in the figure below the perphase limiting mode, the inverter only generate the power that equals to one of three-phase load power that is the lowest load power of a certain phase.



– External EPM Set

This setting should only be turned on when LEDVANCE external EPM device is used.
Two options are available: 5G-EPM and Others-EPM.

->5G-EPM Others-EPM

5G-EPM Failsafe Option should be turned ON when 5G series EPM device is used Others-EPM Failsafe Option should be turned ON when 2G series EPM device is used Only one option can be activated each time.

– Restart HMI

The function is used for restart the HMI.

This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

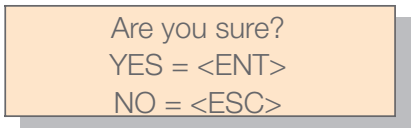
– Debug Parameter

This function is used for manufacturer maintenance personnel only.

– AN Test

This section is applicable to maintenance personnel only.

Selecting “Fan Test” displays the sub-menu shown below:



Fan Test is a factory test function. Press the ENTER key to start the test.
Press the ESC key to return to the previous menu.

– DSP Update

The function is used for update the DSP.

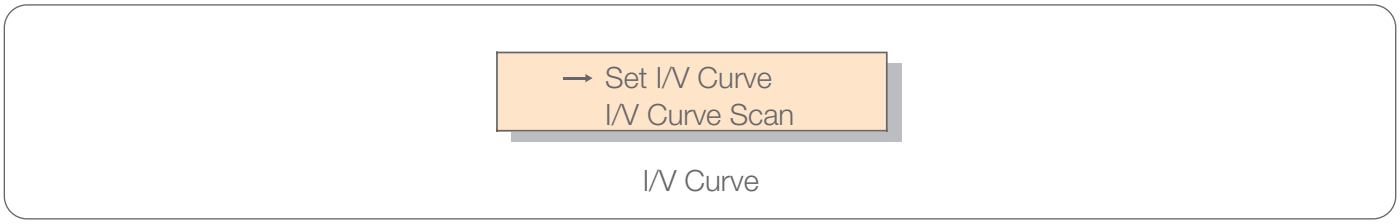
This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

– Compensation Set

This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.

– I/V Curve

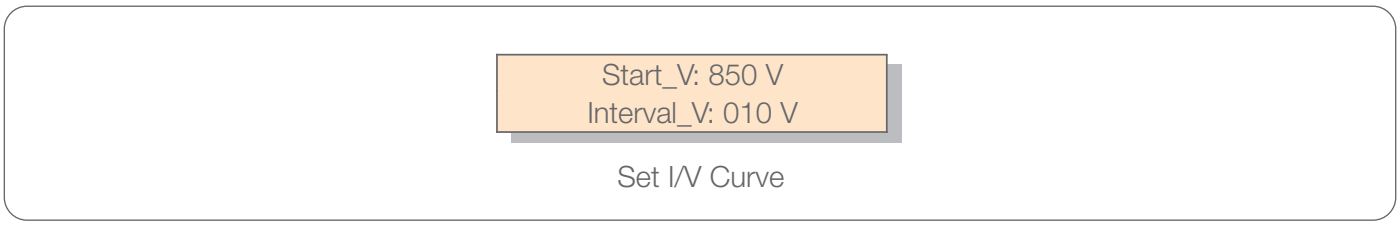
This function is used to scan the I/V characteristic curves of each PV strings.



I/V Curve

– Set I/V Curve

This setting can set the scanning voltage start point and the voltage interval.

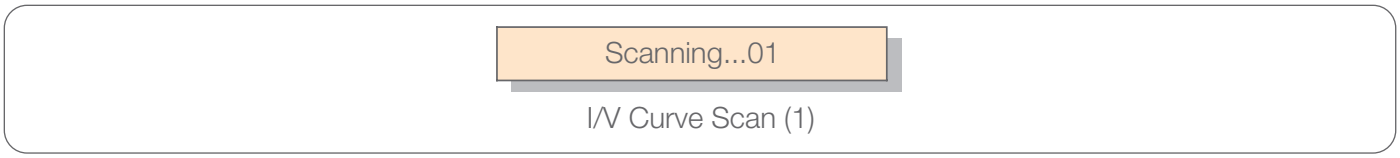


Set I/V Curve

Start_V: The start voltage of the I/V scan. (Adjustable from 300V-1000V)
Interval_V: The scanning voltage interval. (Adjustable from 1-100V)
In total, 60 data points can be scanned.

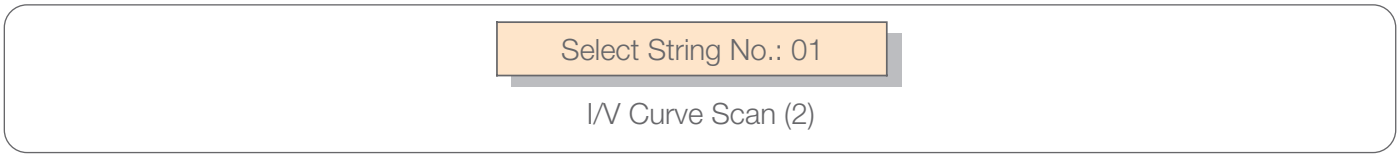
– I/V Curve Scan

Press “ENT” to start the I/V curve scan.

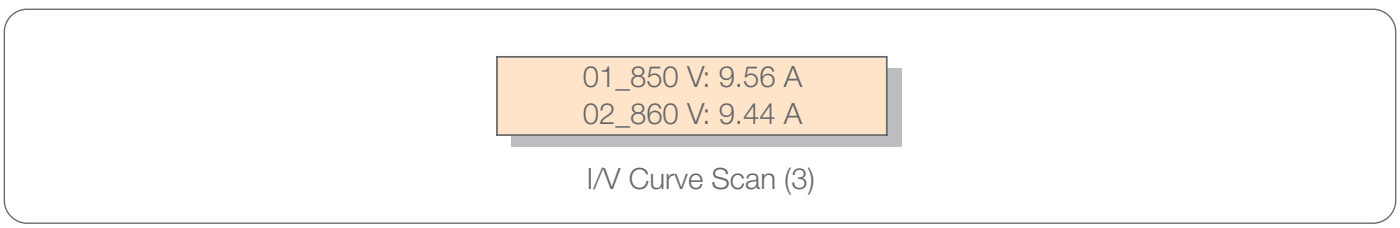


I/V Curve Scan (1)

After it is completed, the screen will display “Scan OK” and then enter the following section.



I/V Curve Scan (2)



I/V Curve Scan (3)

OPERATION

AFCI function

LEDVANCE inverters have the built-in AFCI function which can detect the arc fault on the DC circuit and shut down the inverter to prevent a fire disaster.

Enable the AFCI function
The AFCI function can be enabled in the following.
Path: Advanced Setting -> Password: 0010 ->Special Settings -> AFCI Set -> AFCI ON/OFF -> ON

Set AFCI

Warning
The "AFCI Level" is reserved for LEDVANCE technicians ONLY. Do not change the sensitivity otherwise it will lead to frequent false alarms or malfunctions. LEDVANCE is not responsible for any further damages caused by unauthorized modifications.

NOTE
The setting corresponds to the current status as well which can be used to inspect the ON/OFF state of the AFCI function.

Arc Fault
During the normal operation, if an DC arc is detected, the inverter will shut down and give out the following alarm:

Arc Fault

Installer needs to thoroughly inspect the DC circuit to ensure all the cables are correctly fastened.
Once the DC circuit issue has been fixed or it is confirmed to be OK, press “ESC” for 3 s and wait for the inverter to restart.

MAINTENANCE

LEDVANCE Three Phase Inverter does not require any regular maintenance. However, cleaning the dust on heat-sink will help the inverter to dissipate the heat and increase its life time. The dust can be removed with a soft brush.

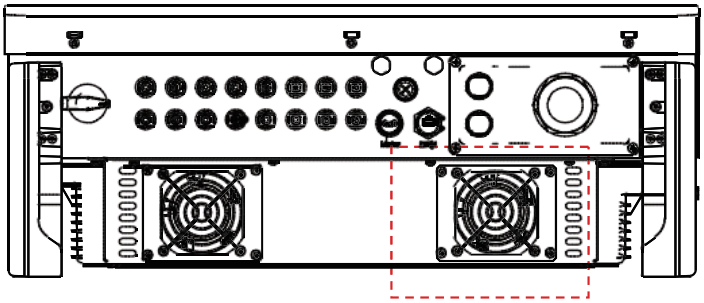
CAUTION
Do not touch the inverter's surface when it is operating. Some parts of the inverter may be hot and cause burns. Turn off the inverter and wait for a cool-down period before any maintenance or cleaning operation.

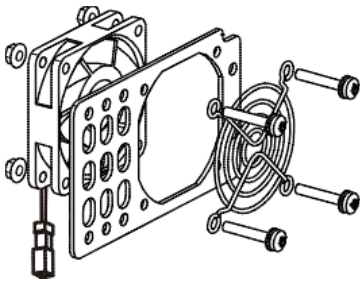
The LCD and the LED status indicator lights can be cleaned with a damp cloth if they are too dirty to be read.

NOTE
Never use any solvents, abrasives or corrosive materials to clean the inverter.

Fan maintenance

If the fan does not work properly, the inverter will not be cooled effectively. and it may affect the effective operation of the inverter .
Therefore, it is necessary to clean or replace a broken fan as follows:
1. Disconnect the AC power.
2. Turn the DC switch to "OFF" position.
3. Wait for 10 minutes at least.
4. Disconnect all electric connection.
5. Place the inverter on the platform.
6. Remove the 4 screws on the fan plate and pull out the fan assembly slowly.





11. Disconnect the fan connector carefully and take out the fan.
12. Clean or replace the fan. Assemble the fan on the rack.
13. Connect the electrical wire and reinstall the fan assembly. Restart the inverter.

TROUBLESHOOTING

The inverter is designed in accordance with the most important international grid-tied standards and 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.
In case of failure, the LCD screen will display an alarm message. In this case, the inverter may stop feeding into the grid. The failure descriptions and their corresponding alarm messages are listed in Table below:

Alarm Message	Failure description	Solution
No power	Inverter no power on LCD	1. Check PV input connections 2. Check DC input voltage (single phase >120 V, three phase >350 V) 3. Check if P V+/- is reversed
LCD show initializing all the time	Can not start-up	1. Check if the connector on main board or power board are fixed. 2. Check if the DSP connector to power board are fixed.
OV-G-V01/02/03/04	Over grid voltage	1. Resistant of AC cable is too high. Change bigger size grid cable 2. Adjust the protection limit if it's allowed by electrical company.
UN-G-V01/02	Under grid voltage	1. Use user define function to adjust the protection limit if it's allowed by electrical company.
OV-G-F01/02	Over grid frequency	
UN-G-F01/02	Under grid frequency	
G-IMP	High grid impedance	
NO-GRID	No grid voltage	1. Check connections and grid switch. 2. Check the grid voltage inside inverter terminal.
OV-DC01/02/03/04	Over DC voltage	1. Reduce the module number in series
OV-BUS	Over DC bus voltage	1. Check inverter inductor connection 2. Check driver connection
UN-BUS01/02	Under DC bus voltage	
GRID-INTF01/02	Grid interference	1. Restart inverter 2. Change power board
OV-G-I	Over grid current	
IGBT-OV-I	Over IGBT current	
DC-IN TF OV-DCA-I	DC input overcurrent	1. Restart inverter Identify and remove the string to the fault MPPT 2. Change power board
IGFOL-F	Grid current tracking fail	1. Restart inverter or contact installer.
IG-AD	Grid current sampling fail	
INI-FAULT	Initialization system fault	1. Restart inverter or contact installer.
DSP-B-FAULT	Comm. failure between main and slave DSP	
12Power-FAULT	12 V power supply fault	

TROUBLESHOOTING

Alarm Message	Failure description	Solution
OV-TEM	Over Temperature	1. Check inverter surrounding ventilation. 2. Check if there's sunshine direct on inverter in hot weather.
PV ISO-P RO 01/02	PV isolation protection	1. Remove all DC input, reconnect and restart inverter one by one. 2. Identify which string cause the fault and check the isolation of the string.
ILeak-PRO 01/02/03/04	Leakage current protection	1. Check AC and DC connection 2. Check inverter inside cable connection.
RelayChk-FAIL	Relay check fail	1. Restart inverter or contact installer.
DCinj-FAULT	High DC injection current	
AFCI self- detection (model with AFCI module)	AFCI module self-detect fault	1. Restart inverter or connect technician.
Arcing protection (model with AFCI module)	Detect arc in DC circuit	1. Check inverter connection whether arc exists and restart inverter.
Screen OFF with DC applied	Inverter internally damaged	1. Do not turn off the DC switches as it will damage the inverter. 2. Please wait for the solar irradiance reduces and confirm the string current is less than 0.5 A with a clip-on ammeter and then turn off the DC switches. 3. Please note that any damages due to wrong operations are not covered in the device warranty.

Fault message and description

NOTE
If the inverter displays any alarm message as listed in Table above; please turn off the inverter and wait for 5 minutes before restarting it. If the failure persists, please contact your local distributor or the service center. Please keep ready with you the following information before contacting us.

- Serial number of LEDVANCE Three Phase Inverter;
- The distributor/dealer of LEDVANCE Three Phase Inverter (if available);
- Installation date.
- The description of problem (i.e. the alarm message displayed on the LCD and the status of the LED status indicator lights. Other readings obtained from the Information submenu will also be helpful.);
- The PV array configuration (e.g. number of panels, capacity of panels, number of strings, etc.);
- Your contact details.

SPECIFICATIONS

Model	LT-25K F2
Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	200~1000
Max. input current (Amps)	3*32
Max short circuit input current (Amps)	3*40
MPPT number/Max input strings number	3/6
Rated output power (Watts)	25000
Max. output power (Watts)	27500
Max. apparent output power (VA)	27500
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated grid output current (Amps)	38.0/36.1
Max. output current (Amps)	41.8
Power Factor (at rated output power)	0.8leading ~ 0.8lagging
THDi (at rated output power)	< 3%
Rated grid frequency (Hertz)	50/60
Max.efficiency	98.5%
EU efficiency	98.1%
Dimensions (W*H*D)	647*629*252 mm
Weight	38.2 kg
Topology	Transformerless
Self consumption (night)	<1 W
Operating ambient temperature range	-25 °C ~ +60 °C
Relative humidity	0~100%
Ingress protection	IP66
Noise emission {Typical}	< 55 dB (A)
Cooling concept	Intelligent redundant fan-cooling
Max.operation altitude	4000 m
Grid connection standard	G98 or G99, VDE-AR-N 4105 / VDE V 0124, EN 50549-1, VDE 0126 / UTE C 15 / VFR:2019, RD 1699 / RD 244 / UNE 206006 / UNE 206007-1, CEI 0-21, C10/11, NRS 097-2-1, TOR, EIFS 2018.2, IEC 62116, IEC 61727, IEC60068, IEC 61683, EN 50530
Safty/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	OT Terminal
Display	LCD, 2×20 Z
Communication connections	RS485, Optional: Wifi, GPRS,USB*
Warranty	5 years (extand to 20 years)

Optional USB* : only for the brazilian market

SPECIFICATIONS

Model	LT-30K F2
Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	200~1000
Max. input current (Amps)	3*32
Max short circuit input current (Amps)	3*40
MPPT number/Max input strings number	3/6
Rated output power (Watts)	30000
Max. output power (Watts)	33000
Max. apparent output power (VA)	33000
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated grid output current (Amps)	45.6/43.3
Max. output current (Amps)	50.2
Power Factor (at rated output power)	0.8leading ~ 0.8lagging
THDi (at rated output power)	< 3%
Rated grid frequency (Hertz)	50/60
Max.efficiency	98.5%
EU efficiency	98.1%
Dimensions (W*H*D)	647*629*252 mm
Weight	38.2 kg
Topology	Transformerless
Self consumption (night)	<1 W
Operating ambient temperature range	-25 °C ~ +60 °C
Relative humidity	0~100%
Ingress protection	IP66
Noise emission {Typical}	<55 dB (A)
Cooling concept	Intelligent redundant fan-cooling
Max.operation altitude	4000 m
Grid connection standard	G98 or G99, VDE-AR-N 4105 / VDE V 0124, EN 50549-1, VDE 0126 / UTE C 15 / VFR:2019, RD 1699 / RD 244 / UNE 206006 / UNE 206007-1, CEI 0-21, C10/11, NRS 097-2-1, TOR, EIFS 2018.2, IEC 62116, IEC 61727, IEC60068, IEC 61683, EN 50530
Safty/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	OT Terminal
Display	LCD, 2×20 Z
Communication connections	RS485, Optional: Wifi, GPRS,USB*
Warranty	5 years (extand to 20 years)

Optional USB* : only for the brazilian market

SPECIFICATIONS

Model	LT-33K F2
Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	200~1000
Max. input current (Amps)	3*32
Max short circuit input current (Amps)	3*40
MPPT number/Max input strings number	3/6
Rated output power (Watts)	33000
Max. output power (Watts)	36300
Max. apparent output power (VA)	36300
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated grid output current (Amps)	50.1/47.6
Max. output current (Amps)	55.1
Power Factor (at rated output power)	0.8leading ~ 0.8lagging
THDi (at rated output power)	<3%
Rated grid frequency (Hertz)	50/60
Max.efficiency	98.6%
EU efficiency	98.2%
Dimensions (W*H*D)	647*629*252 mm
Weight	38.2 kg
Topology	Transformerless
Self consumption (night)	<1 W
Operating ambient temperature range	-25 °C ~ +60 °C
Relative humidity	0~100%
Ingress protection	IP66
Noise emission {Typical}	<55 dB (A)
Cooling concept	Intelligent redundant fan-cooling
Max.operation altitude	4000 m
Grid connection standard	G98 or G99, VDE-AR-N 4105 / VDE V 0124, EN 50549-1, VDE 0126 / UTE C 15 / VFR:2019, RD 1699 / RD 244 / UNE 206006 / UNE 206007-1, CEI 0-21, C10/11, NRS 097-2-1, TOR, EIFS 2018.2, IEC 62116, IEC 61727, IEC60068, IEC 61683, EN 50530
Safty/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	OT Terminal
Display	LCD, 2×20 Z
Communication connections	RS485, Optional: Wifi, GPRS,USB*
Warranty	5 years (extand to 20 years)

Optional USB* : only for the brazilian market

SPECIFICATIONS

Model	LT-36K F2
Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	200~1000
Max. input current (Amps)	4*32
Max short circuit input current (Amps)	4*40
MPPT number/Max input strings number	4/8
Rated output power (Watts)	36000
Max. output power (Watts)	39600
Max. apparent output power (VA)	39600
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated grid output current (Amps)	54.7/52.0
Max. output current (Amps)	60.2
Power Factor (at rated output power)	0.8leading ~ 0.8lagging
THDi (at rated output power)	< 3%
Rated grid frequency (Hertz)	50/60
Max.efficiency	98.7%
EU efficiency	98.3%
Dimensions (W*H*D)	647*629*252 mm
Weight	42.1 kg
Topology	Transformerless
Self consumption (night)	<1 W
Operating ambient temperature range	-25 °C ~ +60 °C
Relative humidity	0~100%
Ingress protection	IP66
Noise emission {Typical}	<55 dB (A)
Cooling concept	Intelligent redundant fan-cooling
Max.operation altitude	4000 m
Grid connection standard	G98 or G99, VDE-AR-N 4105 / VDE V 0124, EN 50549-1, VDE 0126 / UTE C 15 / VFR:2019, RD 1699 / RD 244 / UNE 206006 / UNE 206007-1, CEI 0-21, C10/11, NRS 097-2-1, TOR, EIFS 2018.2, IEC 62116, IEC 61727, IEC60068, IEC 61683, EN 50530
Safty/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	OT Terminal
Display	LCD, 2×20 Z
Communication connections	RS485, Optional: Wifi, GPRS,USB*
Warranty	5 years (extand to 20 years)

Optional USB* : only for the brazilian market

SPECIFICATIONS

Model	LT-40K F2
Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	200~1000
Max. input current (Amps)	4*32
Max short circuit input current (Amps)	4*40
MPPT number/Max input strings number	4/8
Rated output power (Watts)	40000
Max. output power (Watts)	44000
Max. apparent output power (VA)	44000
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated grid output current (Amps)	60.8/57.7
Max. output current (Amps)	66.9
Power Factor (at rated output power)	0.8leading ~ 0.8lagging
THDi (at rated output power)	<3%
Rated grid frequency (Hertz)	50/60
Max.efficiency	98.7%
EU efficiency	98.3%
Dimensions (W*H*D)	647*629*252 mm
Weight	42.1 kg
Topology	Transformerless
Self consumption (night)	<1 W
Operating ambient temperature range	-25 °C ~ +60 °C
Relative humidity	0~100%
Ingress protection	IP66
Noise emission {Typical}	<55 dB (A)
Cooling concept	Intelligent redundant fan-cooling
Max.operation altitude	4000m
Grid connection standard	G98 or G99, VDE-AR-N 4105 / VDE V 0124, EN 50549-1, VDE 0126 / UTE C 15 / VFR:2019, RD 1699 / RD 244 / UNE 206006 / UNE 206007-1, CEI 0-21, C10/11, NRS 097-2-1, TOR, EIFS 2018.2, IEC 62116, IEC 61727, IEC60068, IEC 61683, EN 50530
Safty/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	OT Terminal
Display	LCD, 2×20 Z
Communication connections	RS485, Optional: Wifi, GPRS,USB*
Warranty	5 years (extand to 20 years)

Optional USB* : only for the brazilian market