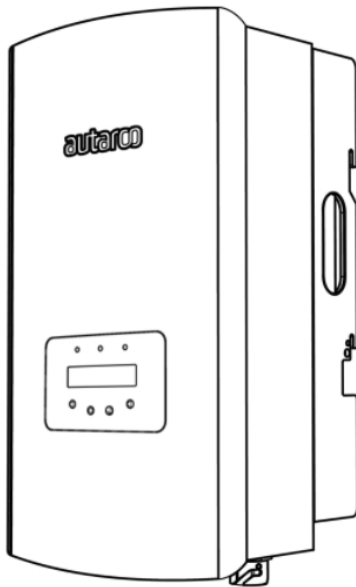# autarco

Installation and Operation Manual

Solar Inverters LD and LQ Mark III series

autarco

Contact Information

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Other Information

This manual is an integral part of the unit. Please read the manual carefully before installation, operation or maintenance. Keep this manual for future reference.

Product information is subject to change without notice. All trademarks are recognized as the property of their respective owners.

Table of contents

1 Introduction

1.1 Read this first

This manual contains important information for use during installation and maintenance of the LD and LQ Mark III series Autarco inverters.

To reduce the risk of electrical shock, and to ensure the safe installation and operation of these Autarco inverters, the following safety symbols appear throughout this document to indicate dangerous conditions and important safety instructions.

WARNING! Symbol indicates important safety instructions, which if not correctly followed, could result in serious injury or death.

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

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

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

1.2 Target audience

This manual is intended for anyone who uses the Autarco LD and LQ Mark III series inverters. Before any further action, operators must first read all safety regulations and be aware of the potential danger in operating high-voltage devices. Operators must also have a complete understanding of this device's features and functions.

ATTENTION!
Qualified personnel means a person with valid license from the local authority in:
- Installing electrical equipment and PV power systems (up to 1000 V).
- Applying all applicable installation codes and using Personal Protective Equipment.
- Analyzing and reducing the hazards involved in performing electrical work.

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

1.3 Product versions covered by this document

The main purpose of this user manual is to provide instructions and detailed procedures for installing, operating, maintaining, and troubleshooting the Autarco LD and LQ Mark III series inverters. These series contain 9 models which are listed below:

- S2.LD5000-MIII
- S2.LD6000-MIII
- S2.LD8000-MIII
- S2.LD9000-MIII
- S2.LD10000-MIII

- S2.LQ12000-MIII
- S2.LQ15000-MIII
- S2.LQ17000-MIII
- S2.LQ20000-MIII

The "S2." in the product code means the product is a grid-tied inverter. The item code or SKU will include an additional number at the end. The final number references the default grid standard and color of the inverter. For example, S2.LD6000-MIII.1 is the 6kW model with Dutch grid standard as default and Autarco blue cover.

Please keep this user manual available at all times in case of emergency.

1.4 Product information

Autarco LD and LQ Mark III series grid tied inverters are state of the art, high efficiency, robust and reliable grid tied inverters at the best price quality ratio available. They are easy to install and carry a standard 5 year product warranty. Our rigorous quality control and testing facilities guarantee Autarco inverters meet the highest quality standards possible. These inverters are the key to our international track record of delivering extremely reliable solar power solutions.

Key features:

- Maximum efficiency of 98.3-98,7%
- String current up to 16A; suitable for high power modules
- Wide MPPT voltage range
- Low startup voltage
- High enclosure protection class IP66

- Automatic voltage stabilization technology in weak grid conditions
- Standard 5 year product warranty, extendable up to 15 years
- RS485 communication port for WiFi, LAN and GPRS communication

For full specifications please see chapter 10 "Specifications".

1.5 Product identification

You can identify the inverter by the serial number (S/N) sticker on the side of the inverter. Important electrical specifications can also be found on the label which can be found on the left side of the inverter housing. Do not remove the label of the serial number as this voids the product warranty.

1.6 Product description

LD and LQ Mark III three phase inverters integrate DRM and backflow power control function, that could be used for smart grid requirements. Product description for LD-MIII below. For LQ-MIII see next page.
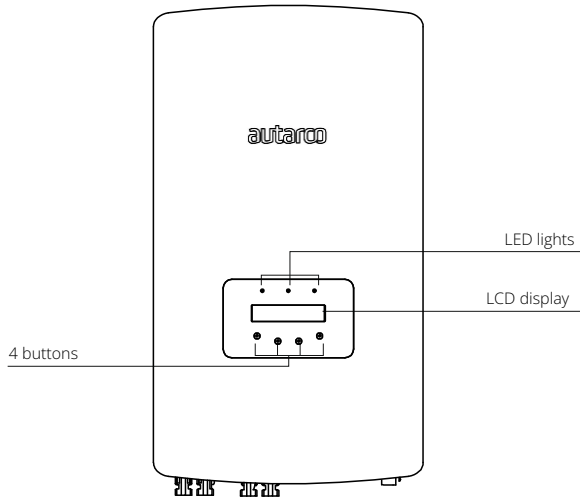
Figure 1.1 Front view LD-MIII
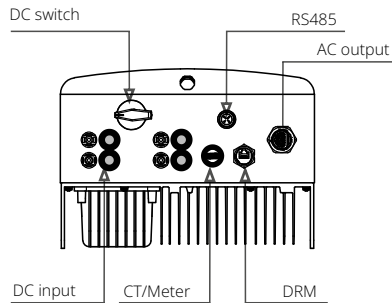
Figure 1.2 Bottom view LD-MIII

Product description for LQ-MIII below.
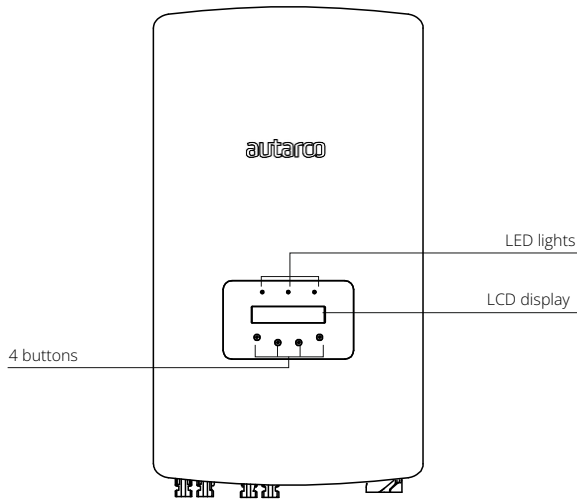
Figure 1.3 Front view LQ-MIII
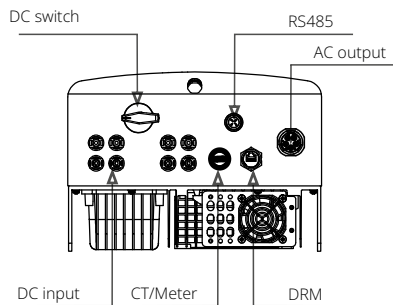
Figure 1.4 Bottom view LQ-MIII

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1.7 Package contents

Package contents for LD-MIII below. For LQ-MIII see next page.

Inverter x1	Back plate x1	Fastening screw x2
DC connector **x2**	AC connector x1	RJ45 connector x1

Manual

User manual x1
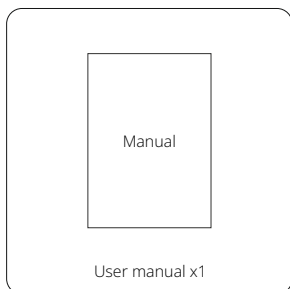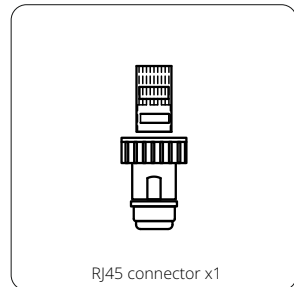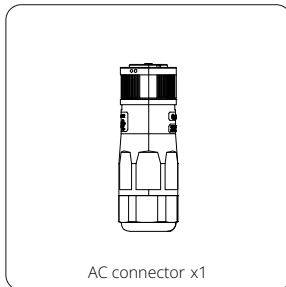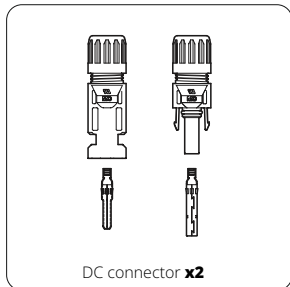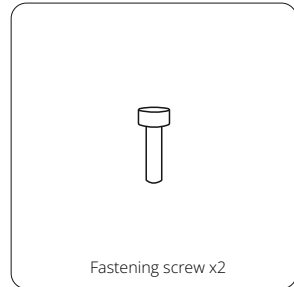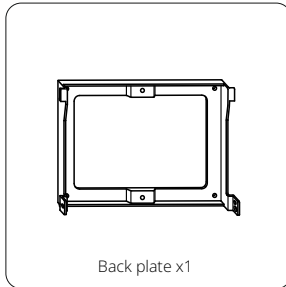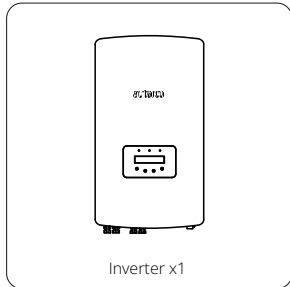
Package contents for LQ-MIII below.

Inverter x1	Back plate x1	Fastening screw x2
DC connector **x4**	AC connector x1	RJ45 connector x1
User manual x1		
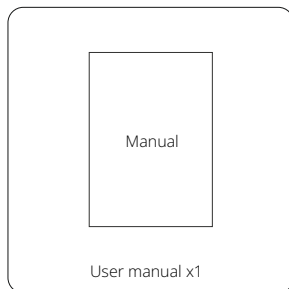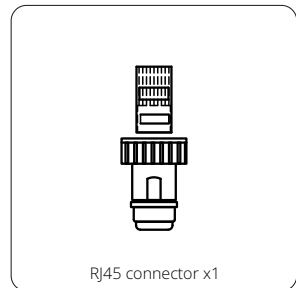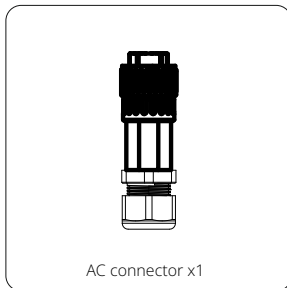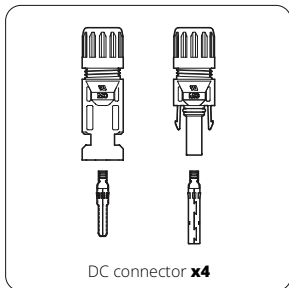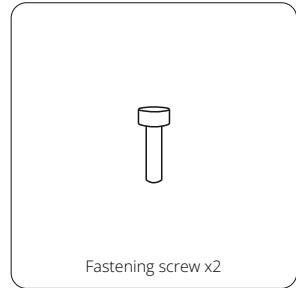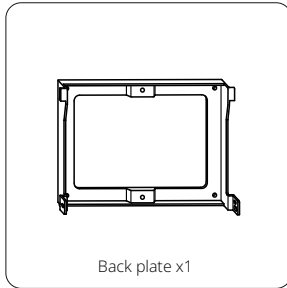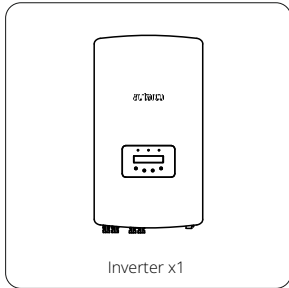
2 Preparation

2.1 Safety instructions

DANGER! Do not touch any internal components whilst the inverter is in operation.

DANGER! Do not stand close to the inverter during severe wheater conditions such as lightning, etc.

DANGER! Make sure you completely cover the surface of all PV arrays with opaque (dark) material before wiring them or make sure the DC circuit breaker or equivalent DC isolator is disconnected. This is because photovoltaic (PV) arrays create electrical energy when exposed to light, and could cause a hazardous condition.

NOTICE! The LD- and LQ-MIII series inverters must only be operated with PV arrays of protection class II, in accordance with IEC 61730, class A.

WARNING! The PV inverter will become hot during operation; please don't touch the heat sink or peripheral surface during or shortly after operation.

NOTICE! Do not directly connect AC output of the inverter to any private AC equipment. The PV inverter is designed to feed AC power directly into the public utility power grid.

WARNING! The installation, service, recycling and disposal of the inverters must be performed by qualified personnel in compliance with national and locals standards and regulations. Please contact your dealer to get the information of authorized repair facilities for any maintenance or repairment.

2.2 Additional install 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 LD- and LQ-MIII 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.

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. To avoid risk of burns, DO NOT touch the surface when inverter is operating. The inverter must be installed out of reach of children.

2.3 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:

- Permanent installation is required.

- The electrical installation must meet all the applicable regulations and standards.

- The inverter must be installed according to the instructions stated in this manual.

- The inverter must be installed according to the correct technical specifications.

- 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.

2.4 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.
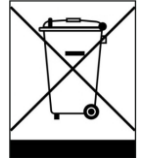
2.5 Internal DC switch

LD- and LQ-MIII series inverters are equipped with an internal DC switch. This switch can be found at the bottom of the inverter.

2.6   Explanations of symbols on inverter

DANGER - HIGH ELECTRIC VOLTAGE!
This device is directly connected to the public grid. All work to the inverter shall be carried out by qualified personnel only. There might be residual currents in the inverter for up to 10 minutes because of large capacitors.

ATTENTION!
This device is directly connected to electricity DC generators and the public AC grid.

DANGER – HOT SURFACES!
The components inside the inverter will get hot during operation, DO NOT touch aluminum housing during operating.

ATTENTION!
In case of any work to the inverter, always refer to this manual for detailed product information.

ATTENTION!
This device SHALL NOT be disposed of in residential waste. Please go to Chapter 10 "Recycling and Disposal" for proper treatments.

CE MARK
This equipment conforms to the basic requirements of the EU guideline governing low voltage and electromagnetic compatibility.

3 Display and indicator lights

3.1 Front panel display
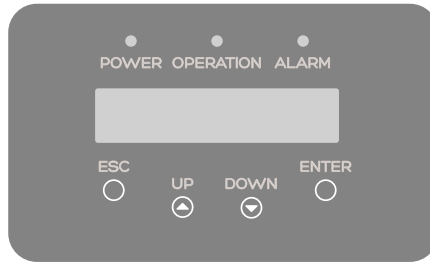
3.2 LED status indicator lights

Light		Status	Description
🔴	POWER	ON	The PV array provides power to the inverter
		OFF	The PV array does not provide power to the inverter
🟢	OPERATION	ON	The inverter is feeding AC power to the grid
		OFF	The inverter is not feeding AC power to the grid
		FLASHING	The inverter is initializing
🟡	ALARM	ON	There is a fault (refer to the inverter display and chapter 9 of this manual)
		OFF	The inverter is operating normally

3.3 Keypad

There are four keys in the front panel of the inverter (from left to right): ESC, UP, DOWN and ENTER.

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)

3.4 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
- Alarm messages and fault indications
- Service messages for operator

4 Product handling and storage

4.1 Product handling

Below the instruction for handling the inverter.

The red circles denote cut outs on the product package.

1.   Push in the cut outs to form handles for moving the inverter.
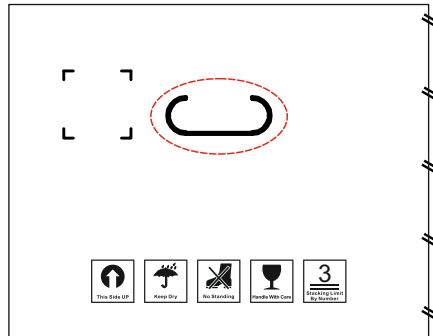
2.   Open the carton, then handle both sides of inverter through the area denoted dotted line.
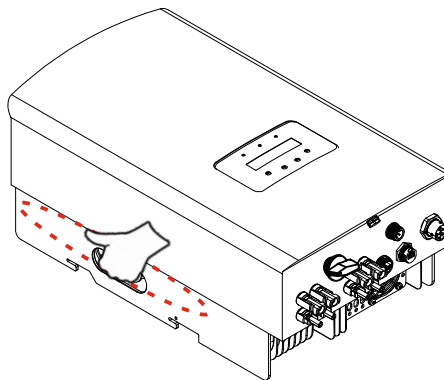
4.2 Product storage

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.

5 Installation

5.1 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.

- 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. Autarco recommends to avoid the inverter to be in direct sunlight or rain.

- To avoid overheating the ambient air temperature must be considered when choosing the inverter installation location. Autarco recommends using a sun shade minimizing direct sunlight when the ambient air temperature around the unit exceeds 40°C.
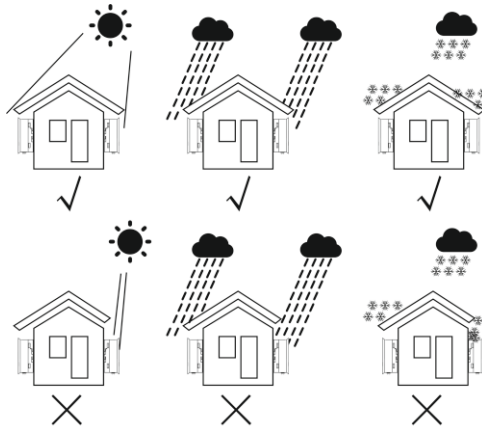
⚠️ NOTE! Nothing should be stored on or placed against the inverter.

Vertical ✓

≤15° Backward ✓

Inverted ✗
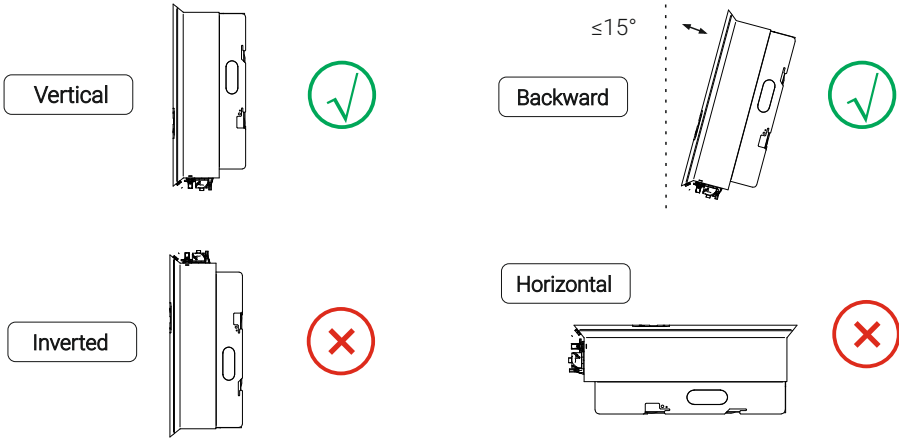
Horizontal ✗

- The visibility of the LED status indicator lights and LCD should be considered.
- Install vertically (+/- 5°) or tilted backward (≤15°).
- Don't mount the inverter on a tilted forward wall.
- Don't mount the inverter on horizontally.

500mm

500mm

500mm

1000mm
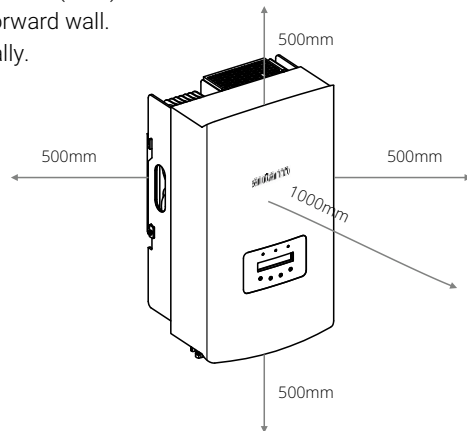
500mm

- Temperature of inverter heat sink might reach 75°C.
- The inverter is designed for working in extreme environments, operation temperature range: -25°C~65°C.
- When one or more inverters are installed in one location, a minimum of 500mm clearance should be kept between each inverter or other object. The bottom of the inverter should have a minimum of 500mm clearance to the ground.

5.2 Mounting the inverter

Dimensions of mounting bracket:
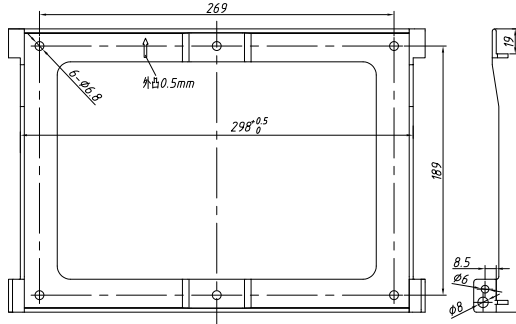
Inverter shall be mounted vertically.
The steps to mount the inverter are listed below.
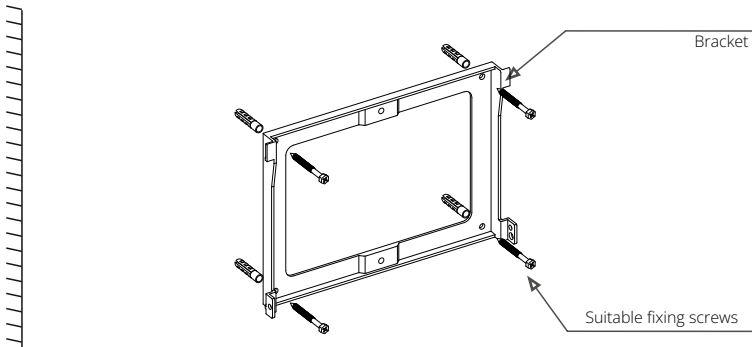
1.   Make sure the bracket is in landscape position and the mounting holes are marked correctly.

2.   Drill the holes into the wall at your marks.

3.   Use the suitable expansion screws to fix the bracket on the wall.

WARNING! The inverter must be mounted vertically.
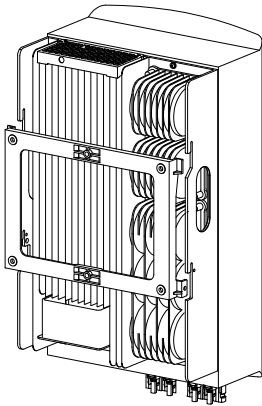
4.   Lift the inverter and hang it on the bracket. Fix both sides of inverter with the locking screws.

Locking screws
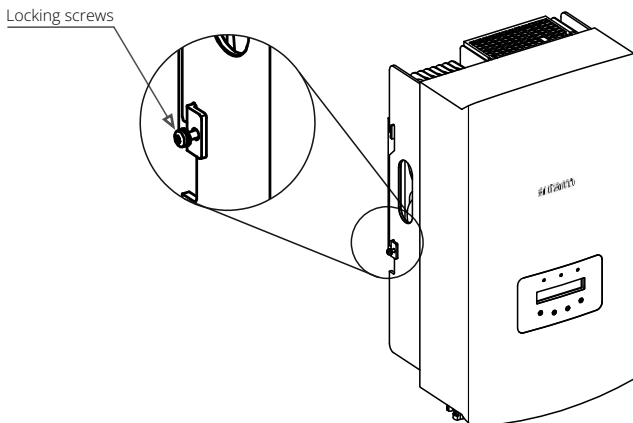
5.   Anti-theft lock mount (optional)

The anti-theft lock option makes it possible to fixate the inverter to the bracket in order to prevent theft. The lock can be up to 5mm thick (keyhole diameter). A lock of stainless steel is preferred.

Anti-theft lock
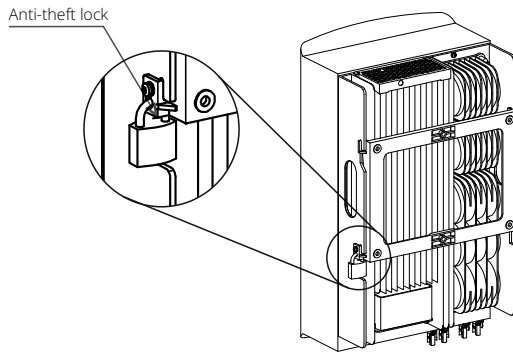
5.3 **Electrical connections**

The inverter design has a quick-connect terminal, so the top cover doesn't need to be opened during electrical connection. The meaning of the signs located at the bottom of inverter are written below:

+	Positive DC input terminal
-	Negative DC input terminal
DC 1	DC input terminal
DC 2	DC input terminal
DC SWITCH	Switch of DC input terminals
COM	RJ45 and terminal block for RS485 communication port
GRID	Connecting terminal of the Grid

The electrical connection of the inverter must follow the steps listed below:

1.   Switch the grid supply main switch (AC) OFF.
2.   Switch the DC switch OFF.
3.   Assemble PV input connector to the inverter.

5.3.1　Grounding

To effectively protect the inverter, two grounding methods must be performed.
Connect the AC grounding cable (please refer to section 5.3.3).
Connect the external grounding terminal.

To connect the grounding terminal on the heat sink, please follow the steps below:

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.

1. Prepare the grounding cable: recommend to use the ≥ 6mm² outdoor copper-core cable.
2. Prepare OT terminals: M6.
3. Strip the ground cable insulation to a suitable length (see figure below).
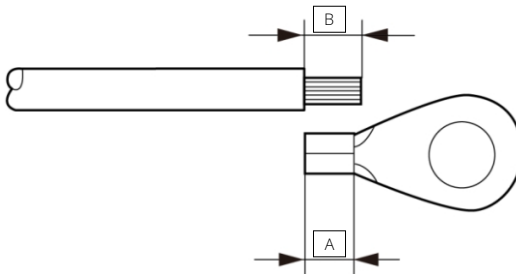
IMPORTANT! B (insulation stripping length) is 2mm~3mm longer than A (OT cable terminal crimping area) 2mm~3mm.

4. Insert the stripped wire into the OT terminal crimping area and use the hydraulic clamp to crimp the terminal to the wire (see figure on the next page).
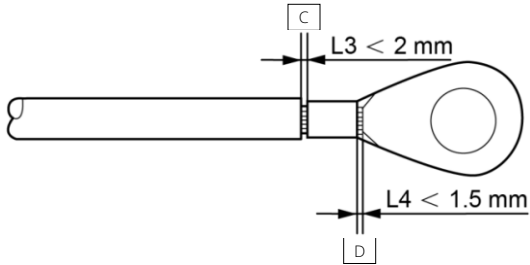
IMPORTANT! After crimping the terminal to the wire, inspect the connection to ensure the terminal is solidly crimped to the wire.

5. Remove the screw from the heat sink ground point.
6. Connect the grounding cable to the grounding point on the heat sink, and tighten the grounding screw, torque 3Nm (see figure below).

Grounding screw
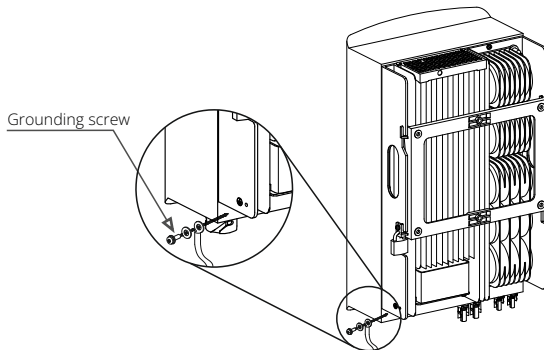
IMPORTANT! For improving anti-corrosion performance: after the ground cable is installed, applying silicone or paint is preferred.

5.3.2   Connect PV side of inverter

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

Before connecting the inverter, please make sure the polarity of the output voltage of PV array matches the "DC+" and "DC-" symbols.
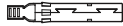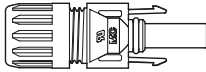
Figure 5.11 DC+ Connector   Figure 5.12 DC- Connector
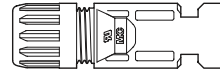
Please use approved DC cables for the PV system.

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

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

1.   Strip off the DC wire for about 7mm, disassemble the connector cap nut. (see figure 5.13)
2.   Insert the wire into the connector cap nut and contact pin. (see figure 5.14)
3.   Crimp the contact pin to the wire using a proper wire crimper. (see figure 5.15)
4.   Insert metal connector into top of connector, and tighten nut with torque 2.5-3 Nm (see figure 5.16).

5. Measure PV voltage of DC input with a multimeter, verify the DC input cable polarity (see figure 5.17), and ensure that each string's PV voltage is in the operation range of the inverter. Connect the DC connector with the inverter until hearing a slight clicking sound, that indicates the connection succeeded (see figure 5.18).
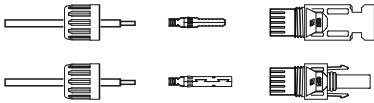
Figure 5.13 Disassemble the connector cap nut
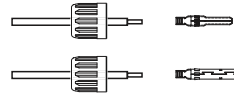
Figure 5.14 Insert the wire into the connector cap nut and contact pin

Crimping plier
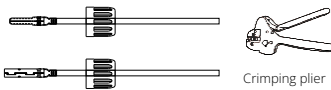
Figure 5.15 Crimp the contact pin to the wire
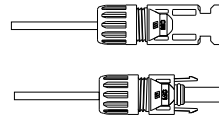
Figure 5.16 Connector with cap nut screwed on
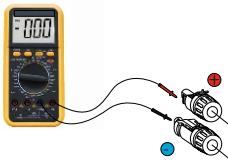
Figure 5.17 Multimeter measurement
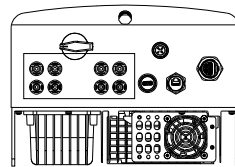
Figure 5.18 Connect the DC connectors to the Inverter

CAUTION! If DC inputs are accidently reversely connected, or the inverter is faulty or not working properly, it is NOT allowed to turn off the DC switch as it will damage the inverter and even leads to a fire disaster. The correct actions are:

1. Use a clip-on ammeter to measure the DC string current.
2. If it is above 0.5A, please wait for the solar irradiance to reduce until the current decreases to below 0.5A.
3. Only after the current is below 0.5A, you are allowed to turn off the DC switches and disconnect the PV strings.

Please note that any damage due to wrong operations is not covered in the device warranty.

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5.3.3   Connect grid side of inverter

For all AC connectors, YJV-0.6/1kV, cables with 6mm² diameter are required to be used.
Please make sure the resistance of AC cable is lower than 1.5 ohm.

Internally the AC connector signs "L1","L2","L3","N" and "PE", the five connection ports
(see figure 5.21). Three phase lines shall be connected to the "L1", "L2" and "L3"
terminals respectively, ground wire shall be connected to "PE" and neutral wire shall be
connected to "N" terminal.
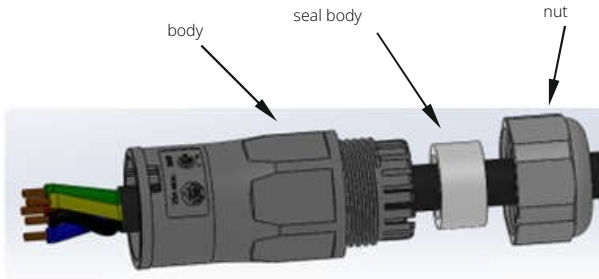
Figure 5.19 AC connector
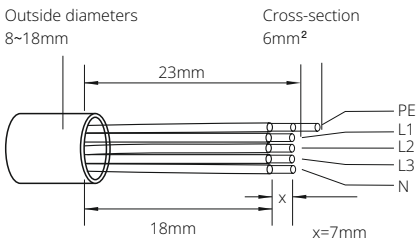
Figure 5.20 Stripped and bared wire
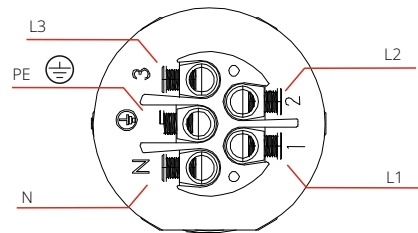
Figure 5.21 Internal structure of AC connector

The steps of installing the AC grid terminal connector are as follows:

A.   Fix the wires into the correct position, torque 0.8Nm.
      Please try to pull out the wire slightly to make sure that the wires are well connected.
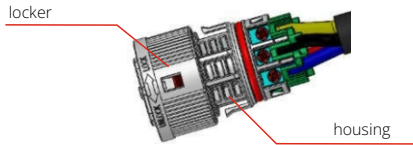
Figure 5.22 Connect wires to the terminal

B   Insert the seal and clamp finger into body, then tighten the nut, torque 2.5Nm.

Figure 5.23 Tighten up the cap on the terminal

C   Connect the AC grid connector to the inverter, until hearing a slight click sound that indicates the connection succeeded.
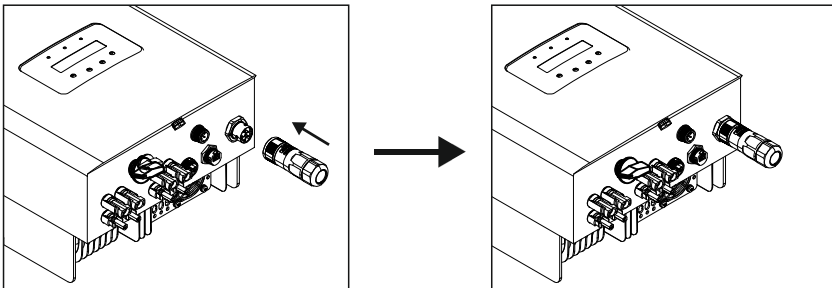
Figure 5.24 Connect AC connector to inverter

5.3.4 Max. over current protection device (OCPD)

To protect the inverter's AC grid connection conductors, Autarco recommends installing breakers that will protect against over current. The following table defines OCPD ratings for the LD and LQ Mark III three phase inverters.

Inverter	Rated voltage (V)	Rated output current (A)	Current for protection device (A)
S2.LD5000-MIII	230/400	7.2	16
S2.LD6000-MIII	230/400	8.7	16
S2.LD8000-MIII	230/400	11.5	20
S2.LD9000-MIII	230/400	13.0	20
S2.LD10000-MIII	230/400	14.4	20
S2.LQ12000-MIII	230/400	17.3	25
S2.LQ15000-MIII	230/400	21.7	32
S2.LQ17000-MIII	230/400	24.6	40
S2.LQ20000-MIII	230/400	28.9	40

5.3.5 Inverter monitoring connection

The inverter can be monitored via WiFi or GPRS. All Autarco communication devices are optional. For connection instructions, please refer to the Autarco monitoring device installation manuals.
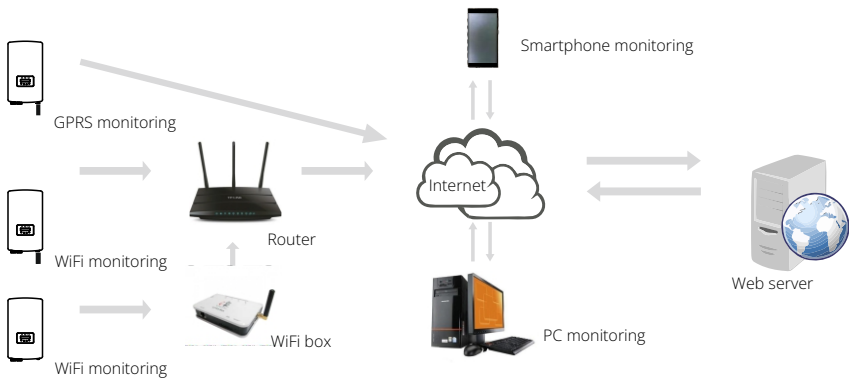
5.3.6   Smart meter connection

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

⚠️ NOTE! To make use of the Export Power Management function, the smart meter can be installed on either the grid side or the loadside. To make use of the 24hour consumption monitoring function, the smart meter can only be installed on the grid side.

Autarco LD and LQ Mark III series inverters can be used with the following smart meter:

External CT Type Meter (DTSD1352 -External CT Type)

Below are the connection diagrams for the smart meter to be installed in different locations.
For detailed settings, please refer to section 7.5.12.
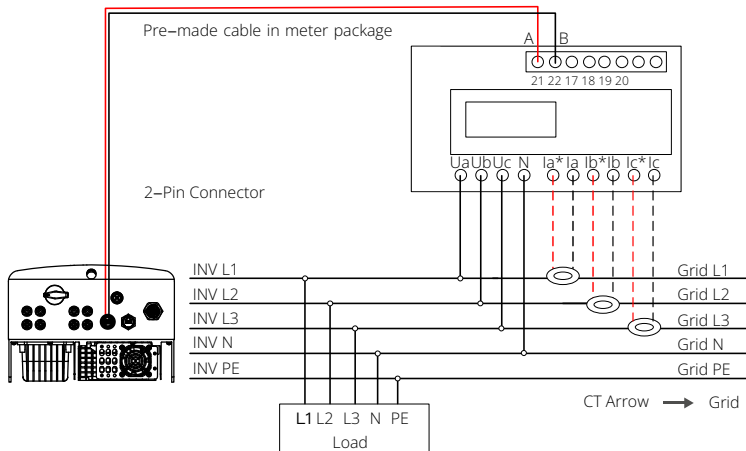
Figure 5.28 External CT Type Meter - "Meter in Grid"
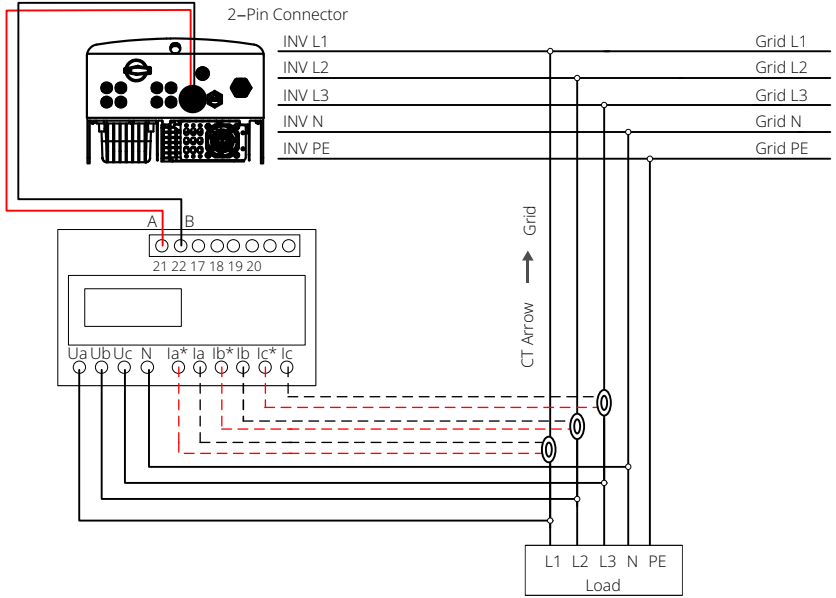
Figure 5.29 External CT Type Meter - "Meter in Load"

5.3.7　　Logic interface connection

Logic interface is required by some local regulations. It can be operated by a simple switch or contactor (not available in South Africa).

When the switch is closed the inverter operates normally. When the switch is opened, the inverter will reduce its output power to zero within 5s. Pin5 and Pin6 of RJ45 terminal are used for the logic interface connection.
Please follow the steps below to assemble the RJ45 connector.

1.　　Insert the network cable into the communication connection terminal of Rj45.

Figure 5.30 RJ45 communication connection terminal

2.　　Use the network wire stripper to strip the insulation layer of the communication cable. According to the standard line sequence of figure 5.31, connect the wire to the plug of RJ45. Then use a network cable crimping tool to make it tight.

Correspondence between the cables and the stitches of plug, Pin5 and Pin6 of RJ45 terminal are 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
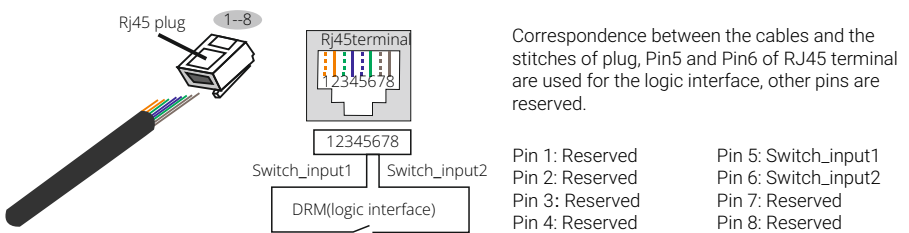
Figure 5.31 Strip the insulation layer and connect to RJ45 plug

3.　　Connect RJ45 to DRM (logic interface) .

After connecting the wire, please refer to chapter 7.5.9.1 to enable the logic interface function.

6 Start & stop

6.1 Start the inverter

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

1. Switch the grid supply main switch (AC) ON first.
2. Switch the DC switch ON. If the voltage of PV arrays are higher than the start up voltage, the inverter will turn on. The red power LED will light.
3. 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.
4. After 30-300 seconds (depending on local requirements), 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.

6.2 Stop the inverter

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

1. Select "Grid Off" in the Advanced Settings of inverter LCD.
2. Turn off the AC switch between the inverter and the grid.
3. Wait approximately 30 seconds (during this time, the AC side capacitors are dissipating energy). If the inverter receives a DC voltage above the start-up threshold, the red power LED will be lit. Switch the DC switch OFF.
4. Confirm all LEDs switch OFF (this can take approximately one minute).

⚠ CAUTION! Although the inverter DC disconnect switch is in the OFF position and all the LEDs 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.

7 Operation

In normal operation, the LCD screen alternately shows inverter power and operation status (see figure 7.1). The screen can be scrolled manually by pressing the UP/DOWN keys. Pressing the ENTER key gives access to Main Menu.
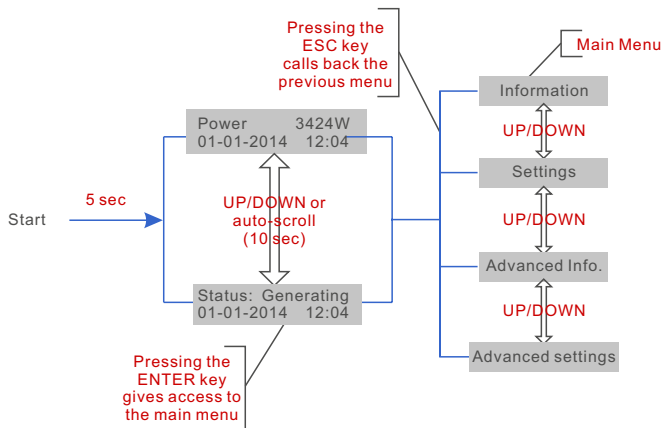
Figure 7.1 Operation Overview

7.1 Main menu

There are four submenus in the Main Menu (see figure 7.1):

1.   Information
2.   Settings
3.   Advanced Info
4.   Advanced Settings

7.2 Information

The Autarco LD and LQ Mark III inverters 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.

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Display	Duration	Description
V_DC1 350.8V I_DC1 5.1A	10 sec	V_DC1: Shows input 01 voltage value. I_DC1: Shows input 01 current value.
V_DC2 350.8V I_DC2 5.1A	10 sec	V_DC2: Shows input 02 voltage value. I_DC2: Shows input 02 current value.
V_A 230.4V I_A 8.1A	10 sec	V_A: Shows the grid's voltage value. I_A: Shows the grid's current value.
V_C 230.4V I_C 8.1A	10 sec	V_C: Shows the grid's voltage value. I_C: Shows the grid's current value.
Status: Generating Power: 1488W	10 sec	Status: Shows instant status of the Inverter. Power: Shows instant output power value.
Grid Frequency F_Grid 50.06Hz	10 sec	F_Grid: Shows the grid's frequency value.
Total Energy 0258458 kwh	10 sec	Total generated energy value.
This Month: 0123kwh Last Month: 0123kwh	10 sec	This Month: Total energy generated this month. Last Month: Total energy generated last month.
Today: 15.1kwh Yesterday: 13.5kwh	10 sec	Today: Total energy generated today. Yesterday: Total energy generated yesterday.
Inverter SN 00000000000000	10 sec	Display series number of the inverter.

Table 7.1 Information list

7.2.1 Lock Screen

Pressing the ESC key returns to the Main Menu. Pressing the ENTER key locks
(Figure 7.2(a)) or unlocks (Figure 7.2 (b)) the screen.

(a)   (b)

Figure 7.2 Locks and Unlocks the Screen of LCD
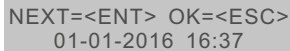
7.3 Settings

The following submenus are displayed when the Settings menu is selected:

1. Set Time
2. Set Address

7.3.1 Set time

This function allows time and date setting. When this function is selected, the LCD will display a screen as shown in figure 7.3.

```
NEXT=<ENT> OK=<ESC>
    01-01-2016 16:37
```

Figure 7.3 Set Time

Press the UP/DOWN keys to set time and date. 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.

7.3.2 Set address

This function is used to set the address when multiple inverters are connected to the monitor. The address number can be assigned from "01"to "99"(see figure 7.4). The default address number of the inverter is "01".

```
YES=<ENT> NO=<ESC>
    Set Address: 01
```

Figure 7.4 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.

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7.4 Advanced info - technicians only

NOTE! The access to this area is for fully qualified and accredited technicians only. Enter menu "Advanced Info" and "Advanced settings" (password needed).

Select "Advanced Info" from the Main Menu. The screen will require the password:

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

Figure 7.5 Enter password

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.

7.4.1 Alarm message

The display shows the 100 latest alarm messages (see figure 7.6). Screens can be scrolled manually by pressing the UP/ DOWN keys. Press the ESC key to return to the previous menu.

```
Alm000: OV-G-V
T: 00-00 00:00 D:0000
```

Figure 7.6 Alarm Message

7.4.2 Running message

This function is for maintenaince person to get running messages such as internal temperature, Standard No.1, 2, etc. Screens can be scrolled manually by pressing the UP/DOWN keys.

7.4.3 Version

The screen shows the model version of the inverter. And the screen will show the software version by pressing the UP and DOWN at the same time (see figure 7.7).

```
                    Model: 08
          Software Version: D20001
```

Figure 7.7 Model Version and Software Version

7.4.4 Daily energy

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

```
          YES=<ENT> NO=<ESC>
            Select: 2019-01-01
```

Figure 7.8 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 set.

```
          2019-01-01: 051.3kWh
          2019-01-01: 061.5kWh
```

Figure 7.9 Daily energy

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

7.4.5 Monthly energy

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

```
          YES=<ENT> NO=<ESC>
             Select: 2019-01
```

Figure 7.10 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 set.

```
          2019-01: 0510kWh
          2019-01: 0610kWh
```

Figure 7.11 Month energy

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

7.4.6 Yearly energy

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

```
YES=<ENT> NO=<ESC>
Select: 2015
```

Figure 7.12 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 set.

```
2015: 0017513kWh
2014: 0165879kWh
```

Figure 7.13 Yearly energy

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

7.4.7 Daily record

The screen shows the history of changed settings. Only for maintenance personnel.

7.4.8 Communication data

The screen shows the internal data of the inverter (see figure 7.14), which is for service technicians only.

```
01-05: 01 25 E4 9D AA
06-10: C2 B5 E4 9D 55
```

Figure 7.14 Communication Data

7.4.9 Warning message

The display shows the 100 latest warning messages (see figure 7.15). Screens can be scrolled manually by pressing the UP/ DOWN keys. Press the ESC key to return to the previous menu.

```
Msg000:
T: 00-00 00:00 D:0000
```

Figure 7.15 Warning Message

7.5 Advanced settings - technicians only

NOTE! The access to this area is for fully qualified and accredited technicians only. Please follow 7.4 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. **24H 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. **DSP Update**
17. **Compensation Set**

7.5.1 Selecting standard

This function is used to select the grid's reference standard (see Figure 7.16).

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

Figure 7.16

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 provide access to the following submenu (see figure 7.17),

```
─  OV-G-V1: 260V
   OV-G-V1-T: 1S
```

Figure 7.17

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

Below is the setting range for "User-Def". By using this function, the limits can be changed manually.

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

Table 7.2 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 Autarco service technicians for details.

7.5.2 Grid on/off

This function is used to start up or stop the power generation of the inverter (see figure 7.18).


```
─  Grid ON
   Grid OFF
```

Figure 7.18 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.

7.5.3 24H switch

This function controls the 24 hours consumption function, to enable or disable (see figure 7.19).

```
─ Enable
  Disable
```
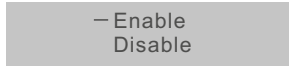
Figure 7.19 Set 24H ON/OFF

NOTE! When this is enabled, the inverter LCD will still be ON 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 Autarco monitoring system to calibrate the load consumption data.

7.5.4 Clear energy

Clear Energy can reset the history yield of the inverter.

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

7.5.5 Reset password

This function is used to set the new password for menu "Advanced info" and "Advanced information" (see figure 7.20).

```
YES=<ENT> NO=<ESC>
   Password: 0000
```
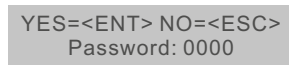
Figure 7.20 Set new password

Enter the right password before setting the 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.

7.5.6 Power control

Active and reactive power can be set through the power setting button.
There are 5 item in this submenu:

1. Set Output Power
2. Set Reactive Power
3. Out_P With Restore

4. Rea_P With Restore
5. Select PF Curve

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

7.5.7 Calibrate energy

Maintenance or replacement could clear or cause a different value of total energy. Use of this function could allow the 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.

```
YES=<ENT> NO=<ESC>
Energy:0000000kWh
```

Figure 7.21 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.

7.5.8 Special settings

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

7.5.9 STD mode settings

There are 5 settings under STD submenu:

1. Working mode
2. Power Rate limit
3. Freq. Derate set

4. 10mins OV-G-V set.
5. Initial Settings

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

7.5.9.1   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 is set "ON", but the logic interface is disconnected 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"

7.5.10 Restore settings

There are 5 items in initial setting submenu.
Restore setting could set all items in 7.5.8 (special settings) to default.
The screen shows as below:

```
       Are you sure?
   YES=<ENT> NO=<ESC>
```
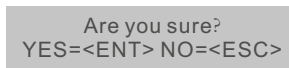
Figure 7.22 Restore Settings

By switching the grid OFF, press the Enter key to save the setting.

7.5.11 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.

7.5.12 Internal EPM set

NOTE! This section includes two functions related to the smart meter.
Please refer to section 5.3.6 for detailed connection diagrams.

Function 1: Internal Export Power Management Function
Inverters can work with a smart meter to dynamically limit the export power of the system. Zero injection can be achieved. Smart meter can be installed either on the grid side OR the load side.

Function 2: 24 Hour Consumption Monitoring Function
Only applicable if Autarco monitoring system is used. Inverters can work with a smart meter to monitor the load consumption data for the whole day and the data will be displayed on the Autarco monitoring system. Smart meter can only be installed on the grid side.

NOTE! Please refer to below instructions for different user scenarios.

Scenario 1. Only Function 1 is required
Step 1: Refer to Section 5.3.6 to connect the smart meter on the grid side or load side.
Step 2: Select the Section 7.5.12.1 Mode Select as Option 2 (Meter in Load) or option 3 (Meter in Grid) accordingly.
Step 3: Configure the Section 7.5.12.2 to set the allowed backflow power.
Step 4: Configure the Section 7.5.12.3 to enable the failsafe function (if necessary).
Step 5: Configure the Section 7.5.12.4 to modify the work mode (if necessary).

Scenario 2. Both Function 1 and 2 are required
Using a smart meter:
Step 1: Refer to Section 5.3.6 to connect the smart meter on the grid side.
Step 2: Select the Section 7.5.12.1 Mode Select as Option 3 (Meter in Grid).
Step 3: Select the Section 7.5.3 24H Switch as "Enable".
Step 4: Configure the Section 7.5.12.2 to set the allowed backflow power.
Step 5: Configure the Section 7.5.12.3 to enable the failsafe function (if necessary).
Step 6: Configure the Autarco monitoring system (please refer to the manual of monitoring device).

If customer does not want to enable the export power control function, please change the "backflow power" to the max output power of the inverter in Step 4 OR simply select the mode as "consumption monitor" in Step 2 and skip Step 4-5.

Select EPM Settings from the Main Menu to access the following

1. Mode Select   3. Fail safe ON/OFF   Mode
2. Backflow Power   4. Backflow Work

7.5.12.1 Mode select

There are 4 settings in this menu as below:

1. OFF   3. Meter in Grid
2. Meter in Load   4. Consumption

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

7.5.12.2 Backflow power

The setting is used to define the allowed export power into the grid.
The setting range is between 00000W and 29900W.
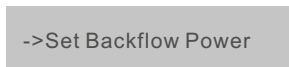
->Set Backflow Power

Figure 7.23 Set the backflow power

YES=<ENT> NO=<ESC>
Power:-00000W

Figure 7.24

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.

7.5.12.3 Fail safe on/off

This setting is used to give out an alarm (stops 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.

YES=<ENT> NO=<ESC>
Fail Safe Set:ON

Figure 7.25 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.

7.5.12.4 Backflow work mode

This submenu is used for setting the backflow work mode: 01, 02. "01" is the default mode.

```
->Backflow Work Mode
```

Figure 7.26 Set the Backflow work mode

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

Figure 7.27

Mode "01", as shown in the figure 7.28, is 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.
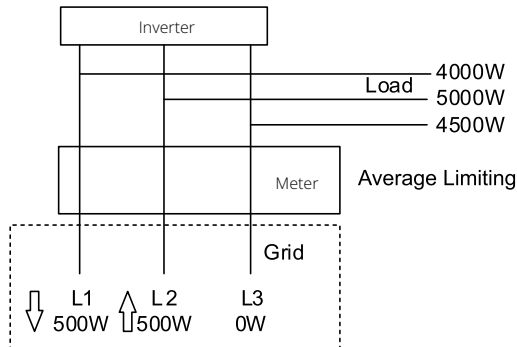
Figure 7.28

Mode "02", as shown in the figure 7.29, is the per phase limiting mode. The inverter only generates the power that equals to one of the three-phase load powers that is the lowest load power of a certain phase.
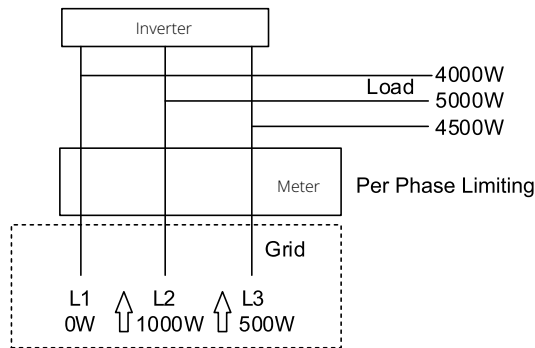
Figure 7.29

7.5.13 External EPM set

This setting should only be turned on when Autarco external EPM device is used.
Two options are available 5G-EPM and Others-EPM.
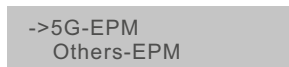
Figure 7.30

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 per time.

7.5.14 Restart HMI

This function is used for restarting of the HMI.

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

7.5.15 Debug parameter

This function is used for manufacturer maintenance personnel only.

7.5.16 DSP update

This function is used for updating the DSP.

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

7.5.17 Compensation set

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

7.6 AFCI function

Autarco 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.

7.6.1 Enable the AFCI function

The AFCI function can be enabled in the following.

Path: Advanced Setting > Password > Special Settings > AFCI Set > AFCI ON/OFF > ON

```
→ AFCI ON/OFF          → ON
  AFCI Level             OFF
```

Figure 7.31 Set AFCI

WARNING! The "AFCI Level" is reserved for Autarco technicians ONLY. Do not change the sensitivity otherwise it will lead to frequent false alarms or malfunctions. Autarco 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.

7.6.2   Arc fault

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

ARC-FAULT
Restart Press ESC 3s

Figure 7.32 Arc Fault

The 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 3s and wait for the inverter to restart.

8 Maintenance

Autarco LD and LQ MIII inverters do not require any regular maintenance. However, cleaning the dust on the 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 (refer to section 6.2) 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.

8.1 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 connections.
5. Place the inverter on the platform.
6. Remove the 4 screws on the fan plate and pull out the fan assembly slowly.
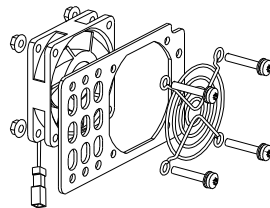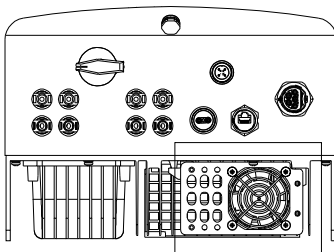
7. Disconnect the fan connector carefully and take out the fan.
8. Clean or replace the fan. Assemble the fan on the rack.
9. Connect the electrical wire and reinstall the fan assembly. Restart the inverter.

Autarco recommends to check operation of the external fan once per year.

9 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 below.

No power	Inverter no power on LCD	1. Check PV input connections 2. Check DC input voltage (single phase >120V, three phase >350V) 3. Check if PV+/- 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-INTF OV-DCA-I	DC input overcurrent	1. Restart inverter 2. Identify and remove the string to the fault MPPT 3. 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	12V power supply fault	

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-PRO 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 0.5A 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.

Table 9.1 Fault message and description

NOTE! If the inverter displays any alarm message as listed in table 9.1; please turn off the inverter (refer to Section 6.2 to stop your inverter) and wait for 5 minutes before restarting it (refer to Section 6.1 to start your inverter). If the failure persists, please contact your local distributor or the service center. Please have ready the following information before contacting us:

1. Serial number of Autarco inverter
2. The distributor/dealer of Autarco inverter (if available)
3. Installation date
4. 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 (refer to Section 6.2) will also be helpful.)
5. The PV array configuration (e.g. number of panels, capacity of panels, number of strings, etc.)
6. Your contact details

10 Specifications

On the following pages you find the specifications sheet per inverter model.

Page 53-59 include the LD Mark III models.
Page 60-63 include the LQ Mark III models.

Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	16+16
Max short circuit input current (Amps)	20+20
MPPT number/Max input strings number	2/2
Rated output power (Watts)	3000
Max. output power (Watts)	3300
Max. apparent output power (VA)	3300
Rated grid voltage (Volts)	3/N/PE~220/380, 230/400
Rated output current (Amps)	4.6/4.3
Max. output current (Amps)	4.7
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.3%
EU efficiency	97.7%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

LD and LQ MIII Series Inverter

Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	16+16
Max short circuit input current (Amps)	20+20
MPPT number/Max input strings number	2/2
Rated output power (Watts)	4000
Max. output power (Watts)	4400
Max. apparent output power (VA)	4400
Rated grid voltage (Volts)	3/N/PE~220/380, 230/400
Rated output current (Amps)	6.1/5.8
Max. output current (Amps)	6.4
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.3%
EU efficiency	97.7%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

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Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	16+16
Max short circuit input current (Amps)	20+20
MPPT number/Max input strings number	2/2
Rated output power (Watts)	5000
Max. output power (Watts)	5500
Max. apparent output power (VA)	5500
Rated grid voltage (Volts)	3/N/PE~220/380, 230/400
Rated output current (Amps)	7.6/7.2
Max. output current (Amps)	7.9
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.3%
EU efficiency	97.9%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	16+16
Max short circuit input current (Amps)	20+20
MPPT number/Max input strings number	2/2
Rated output power (Watts)	6000
Max. output power (Watts)	6600
Max. apparent output power (VA)	6600
Rated grid voltage (Volts)	3/N/PE~220/380, 230/400
Rated output current (Amps)	9.1/8.7
Max. output current (Amps)	9.5
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.3%
EU efficiency	97.9%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

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Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	16+16
Max short circuit input current (Amps)	20+20
MPPT number/Max input strings number	2/2
Rated output power (Watts)	8000
Max. output power (Watts)	8800
Max. apparent output power (VA)	8800
Rated grid voltage (Volts)	3/N/PE~220/380, 230/400
Rated output current (Amps)	12.2/11.5
Max. output current (Amps)	12.7
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.5%
EU efficiency	97.9%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160…1000
Max. input current (Amps)	16+16
Max short circuit input current (Amps)	20+20
MPPT number/Max input strings number	2/2
Rated output power (Watts)	9000
Max. output power (Watts)	9900
Max. apparent output power (VA)	9900
Rated grid voltage (Volts)	3/N/PE~220/380, 230/400
Rated output current (Amps)	13.7/13.0
Max. output current (Amps)	14.3
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45…55 or 55…65
Max.efficiency	98.5%
EU efficiency	97.9%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25…+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	16+16
Max short circuit input current (Amps)	20+20
MPPT number/Max input strings number	2/2
Rated output power (Watts)	10000
Max. output power (Watts)	11000
Max. apparent output power (VA)	11000
Rated grid voltage (Volts)	3/N/PE~220/380, 230/400
Rated output current (Amps)	15.2/14.4
Max. output current (Amps)	15.9
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.5%
EU efficiency	97.9%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<30 dBA
Cooling concept	Natural convection
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	32+32
Max short circuit input current (Amps)	40+40
MPPT number/Max input strings number	2/4
Rated output power (Watts)	12000
Max. output power (Watts)	13200
Max. apparent output power (VA)	13200
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated output current (Amps)	18.2/17.3
Max. output current (Amps)	19.1
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.6%
EU efficiency	98.0%
Dimensions	310W*563H*219D (mm)
Weight	17.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<60 dBA
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

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Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	32+32
Max short circuit input current (Amps)	40+40
MPPT number/Max input strings number	2/4
Rated output power (Watts)	15000
Max. output power (Watts)	16500
Max. apparent output power (VA)	16500
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated output current (Amps)	22.8/21.7
Max. output current (Amps)	23.8
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.6%
EU efficiency	98.0%
Dimensions	310W*563H*219D (mm)
Weight	18.8kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<60 dBA
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	32+32
Max short circuit input current (Amps)	40+40
MPPT number/Max input strings number	2/4
Rated output power (Watts)	17000
Max. output power (Watts)	18700
Max. apparent output power (VA)	18700
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated output current (Amps)	25.8/24.6
Max. output current (Amps)	27.0
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.7%
EU efficiency	98.1%
Dimensions	310W*563H*219D (mm)
Weight	20.0kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<60 dBA
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)

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Max. DC input voltage (Volts)	1100
Rated DC voltage (Volts)	600
Start-up voltage (Volts)	180
MPPT voltage range (Volts)	160...1000
Max. input current (Amps)	32+32
Max short circuit input current (Amps)	40+40
MPPT number/Max input strings number	2/4
Rated output power (Watts)	20000
Max. output power (Watts)	22000
Max. apparent output power (VA)	22000
Rated grid voltage (Volts)	3/N/PE, 220/380, 230/400
Rated output current (Amps)	30.4/28.9
Max. output current (Amps)	31.8
Power Factor (at rated output power)	>0.99 (0.8 leading - 0.8 lagging)
THDi (at rated output power)	<2%
Rated grid frequency (Hertz)	50/60
Operating frequency range (Hertz)	45...55 or 55...65
Max.efficiency	98.7%
EU efficiency	98.1%
Dimensions	310W*563H*219D (mm)
Weight	20.0kg
Topology	Transformerless
Self consumption (night)	1 W
Operating ambient temperature range	-25...+60
Relative humidity	0~100%
Ingress protection	IP66
Noise emission (typical)	<60 dBA
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, IEC 60068, IEC 61683, EN 50530
Safety/EMC standard	IEC 62109-1/-2, EN 61000-6-1/-2/-3/-4
DC connection	MC4 connector
AC connection	Quick connection plug
Display	LCD, 2×20 Z.
Communication connections	RS485, DO, DI, Optional: Wi-Fi, GPRS,USB*
Warranty Terms	5 Years (Extend to 15 Years)