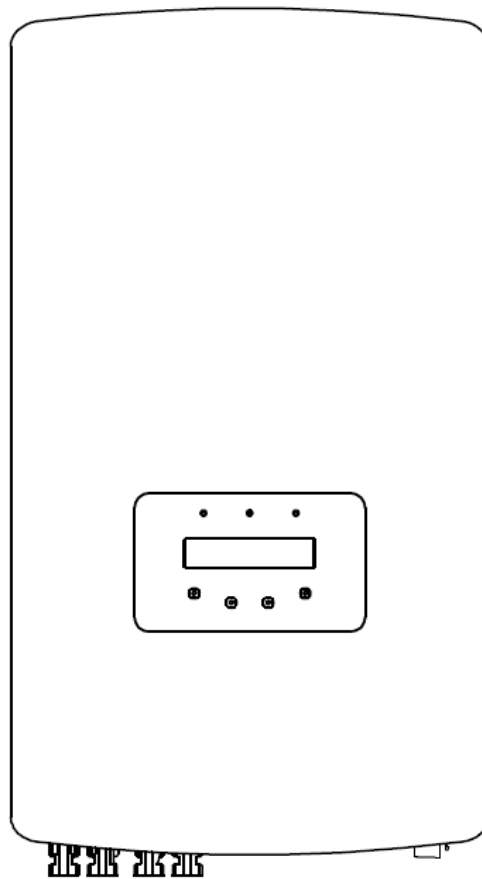




## Installation and Operation Manual

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### Solar Inverters LD Mark II series



## 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.

If any technical problems occur, please contact us with the following information in hand.

- Device Model
- Serial number of product

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## 1. Introduction

### 1.1 Read this first

This manual contains important information for use during installation and maintenance of the Autarco LD Mark II series inverter.

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



**WARNING!** Indicates safety instruction, which if not correctly followed, can result in injury or property damages.



**NOTE!** Indicates safety instruction, which if not correctly followed, could result in some damage or the destruction of the inverter.



**RISK OF ELECTRIC SHOCK!** Indicates safety instructions, which if not correctly followed, could result in electric shock.



**HOT SURFACE!** 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 Mark II series inverter. 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.



**WARNING!** Do not use this product unless it has been successfully installed by qualified personnel in accordance with the instructions in the following chapters.

## 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 Mark II series inverters. This series contains 5 models which are listed below:

- S2.LD5000(S)-MII
- S2.LD6000(S)-MII
- S2.LD8000(S)-MII
- S2.LD9000(S)-MII
- S2.LD10000(S)-MII

The “S2.” In the product code means the product is a grid-tied inverter. If the product has an “S” at the end it comes with integrated DC switches.

The item code or SKU will include an additional number at the end. The final number references the default grid standard and color of inverter. For example, S2.LD6000S-MII.1 is the 6kW model with Dutch grid standard as default, integrated DC switch and Autarco blue cover.

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

## 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 weather conditions such as lightning, etc.



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 situation.



The LD Mark II series inverter 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 local standards and regulations. Please contact your dealer to get the information of authorized repair facility for any maintenance or repairmen.



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



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



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 disconnectors that comply with the NEC Article 690, Part II. Depending on the model Autarco three phase inverters feature an integrated DC switch.



Do not remove cover, there are no user serviceable parts inside. Refer for servicing to qualified and accredited service technicians.



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 unauthorized.



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

Any unauthorized actions including modification of product functionality of any form will affect the validation of warranty service; Autarco may deny the obligation of warranty service accordingly.

## 2.2 Notice for use

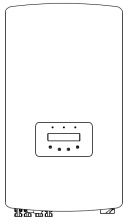
The inverter has been constructed according to the applicable safety and technical guidelines. Use the inverter in installations that meet the following specifications only:

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

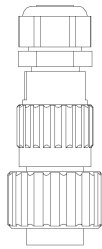
## 2.3 Notice for use

Please verify whether your Autarco LD Mark II series inverter is equipped with an internal DC switch. This switch can be found on the bottom of the inverter (see 3.3). If there isn't an internal DC switch it is important to apply an external DC disconnect in order to completely disconnect the solar PV module strings from the inverter.

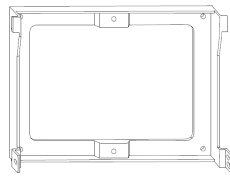
## 2.4 Package contents



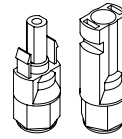
Autarco LD Mark II series inverter



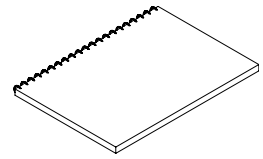
AC plug



Mounting bracket



MC4 connectors  
**S4.MC4F/MC4M**



Instruction manual



Fastening screws 2x

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

## 2.5 Explanations of symbols on inverter



### **DANGER - HIGH ELECTRIC VOLTAGE**

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



### **ATTENTION**

This device 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. Product information

### 3.1 Overview

Autarco LD Mark II 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 10 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:

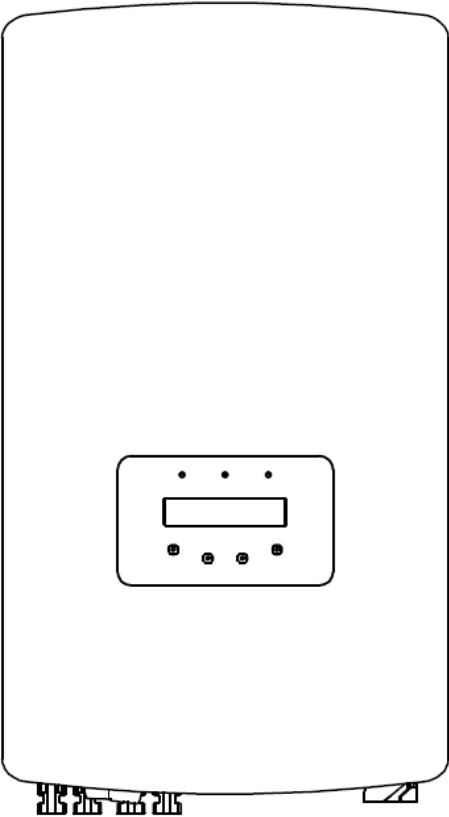
- Maximum efficiency of 98.3-98.7%
- Wide MPPT voltage range
- Low turn off voltage
- High enclosure protection class IP65
- Optional integrated DC switch
- Silent design using convection cooling principle
- Standard 10 year product warranty
- RS485 communication port for Wi-Fi, LAN, GPRS or Z-Wave based monitoring.

For full specifications please see chapter 12 “Product specifications”.

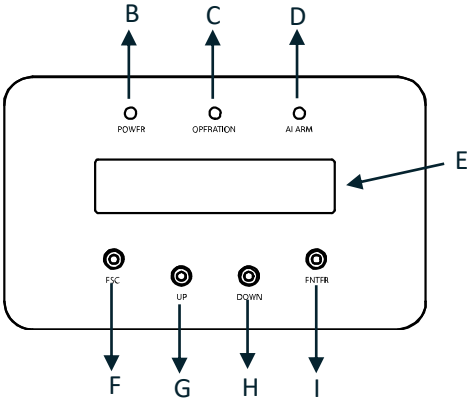
### 3.2 Product identification

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

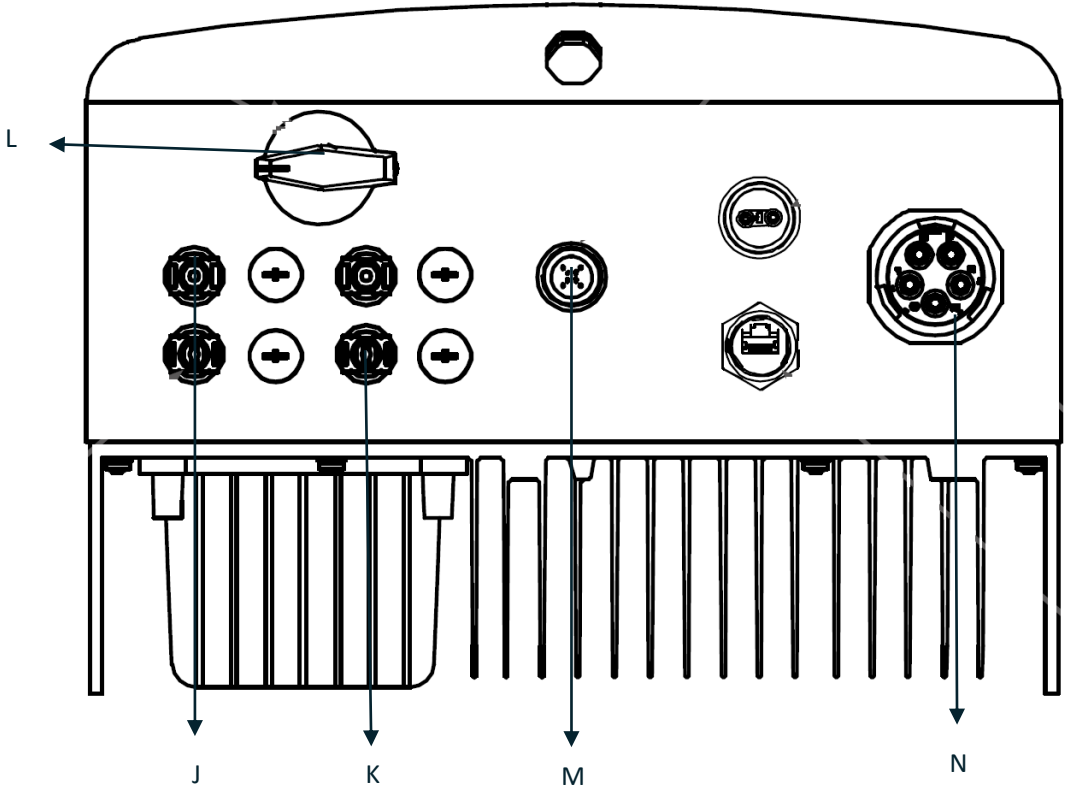
### 3.3 Product overview



← A



- A: Inverter cover
- B: LED light – POWER
- C: LED light – OPERATION
- D: LED light – ALARM
- E: LCD display 2x16 characters
- F: Escape key
- G: Up key
- H: Down key
- I: Enter key
- J: DC +
- K: DC -
- L: DC switch (optional)
- M: Communication port
- N: AC output

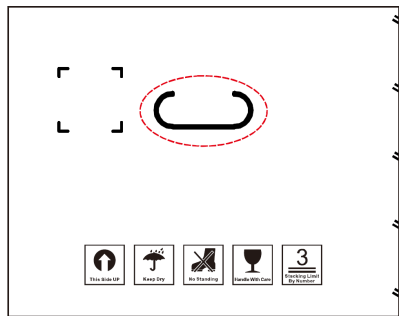


## 4. Product handling and storage

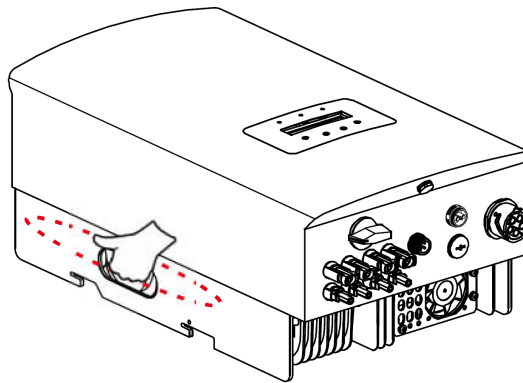
### 4.1 Product handling

Please review the instruction below for handling the inverter:

1. The red circles below denote cut-outs on the product package. Push in the cut-outs to form handles for moving the inverter (see figure below).



2. Open the carton, then handle both sides of inverter through the area denoted dotted line (see figure below).



### 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 -25 and 60C and the humidity should be between 0 and 100% non-condensing .
- Stack no more than four 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 Safety



**DANGER!** Do not install the inverter near flammable or explosive items.



**WARNING!** The installation must be performed by qualified personnel and in compliance with national and local standards and regulations.

This inverter will be connected to a high voltage DC power generator and AC grid. Inappropriate installation may also jeopardize the life span of the inverter.

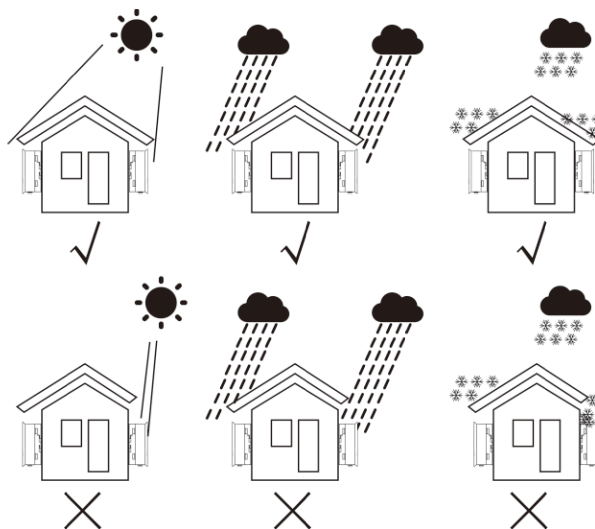


The installation site must have good ventilation conditions. Direct exposure to intense sunshine is not recommended.

### 5.2 Location

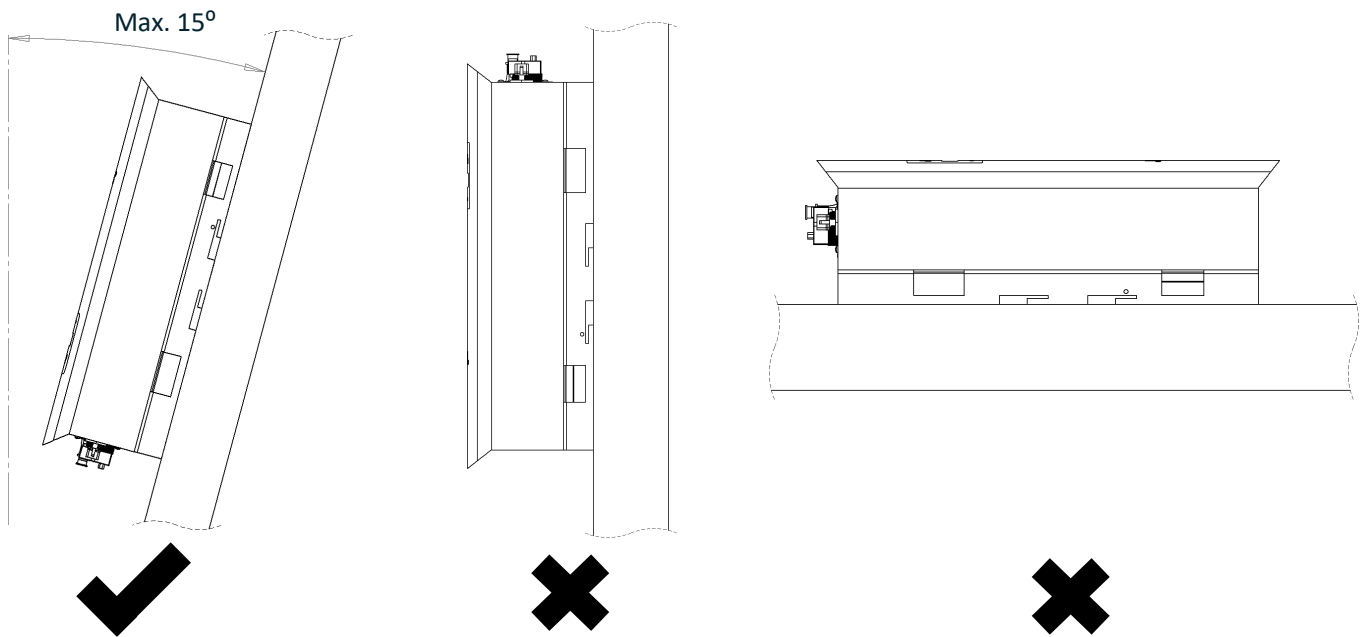
To select a location for the inverter, the following criteria should be considered:

- Do not install in small closed spaces where air cannot 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 inverter installed to avoid direct sunlight or rain.
- To avoid overheating 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 104°F/40°C



### 5.3 Mounting instructions

- The inverter is suitable for outdoor and indoor installation.
- Vertical installation is recommended, with a maximum inclination of 15° backwards.
- Make sure the mounting wall is strong enough to hold the weight of the inverter.
- The ambient temperature of installation site should be between -20 °C and +60 °C.
- It is not recommended that the inverter is exposed to the direct sunshine.
- Make sure of ample ventilation at installation site, insufficient ventilation may reduce the performance of the electronic components inside the inverter and shorten the life span of the inverter.



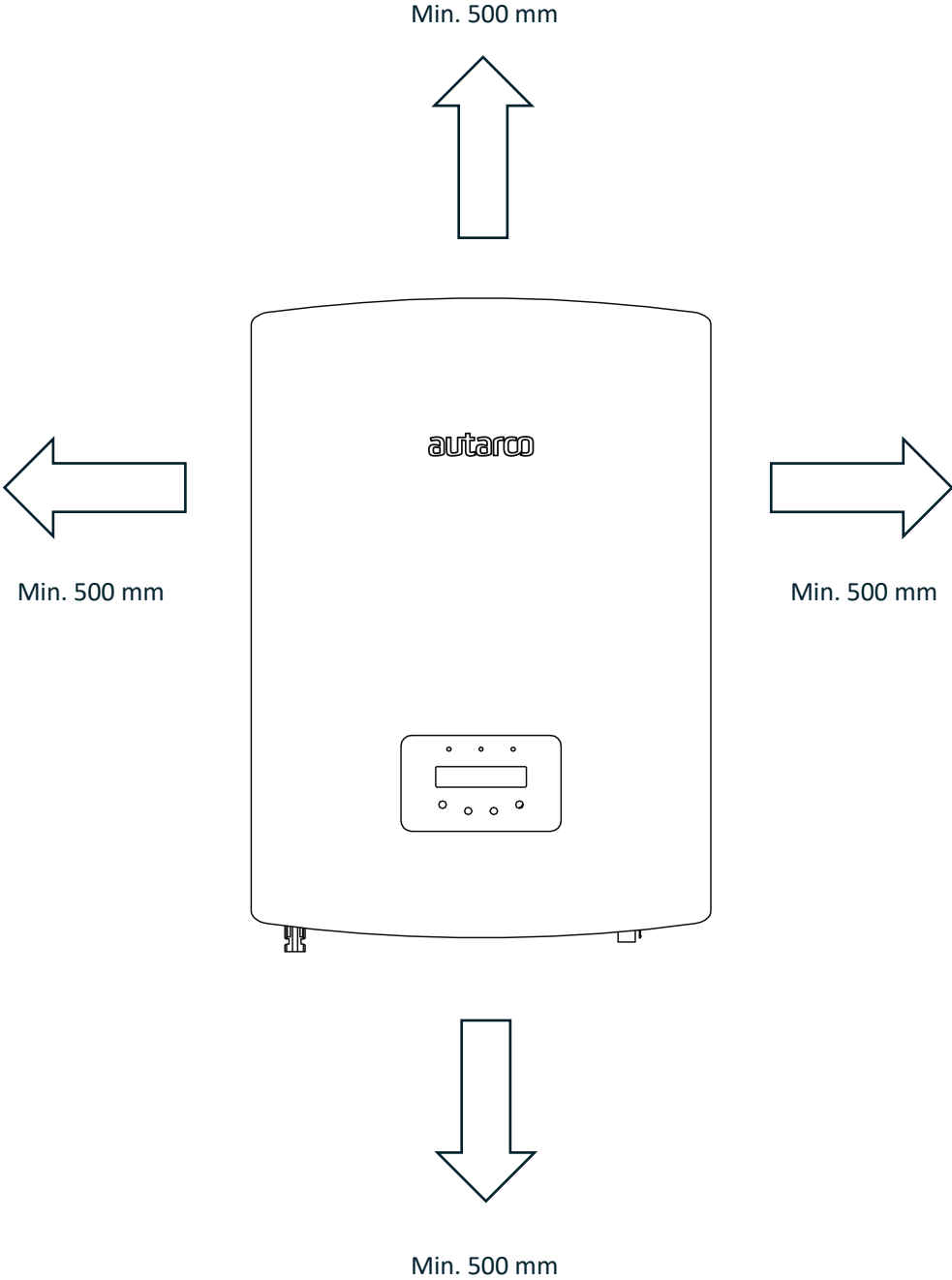
NOTICE! Nothing should be stored on or placed against the inverter.

## 5.4 Safety clearance



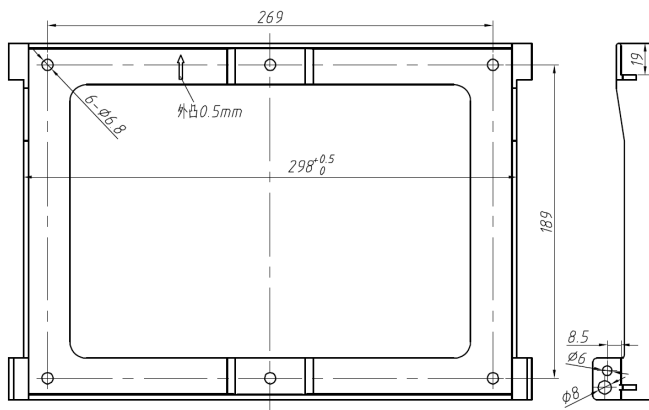
Caution! Make sure heat sinks are out of reach of children.

Observe the following minimum clearances to nearby objects or walls:



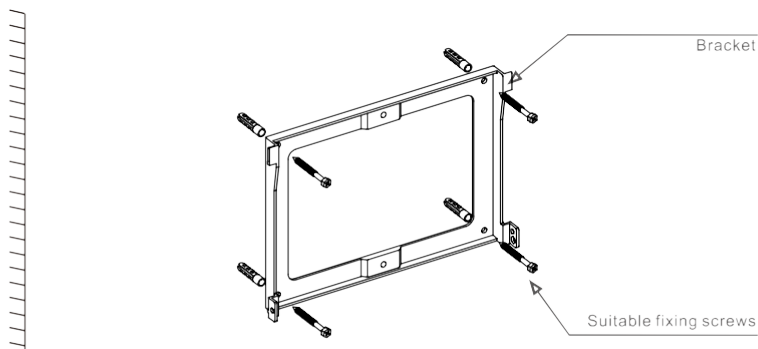
## 5.5 Mounting procedure

Dimensions of mounting bracket:

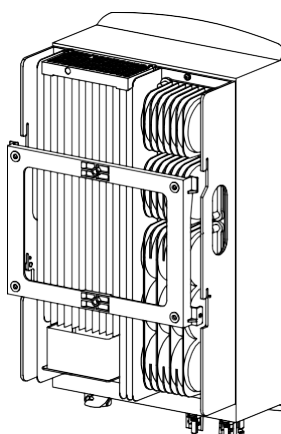


Refer to figures. Inverter shall be mounted vertically. The steps to mount the inverter are listed below.

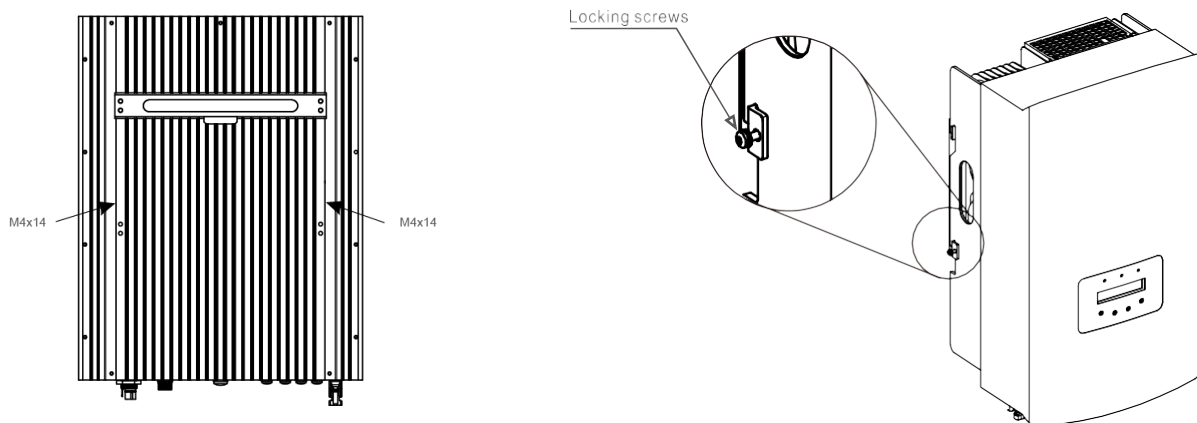
**Step 1** — Mount the wall bracket onto the mounting wall with appropriate screws and plugs. Make sure the bracket is horizontal.



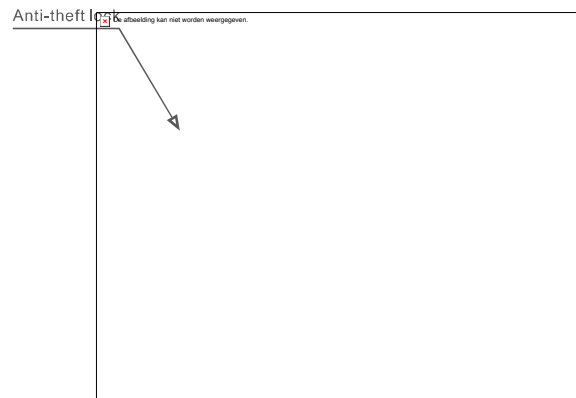
**Step 2** — Lift the inverter and hang it on the bracket.



**Step 3** — Use M4×14 stainless steel screws at holes marked below to secure the mounting hooks to the rear of the inverter.



**Step 4** — If desired, protect the inverter with an anti-theft lock (supplied by user).





## 6. Electrical installation



**DANGER!** This inverter will be connected to a high voltage DC power generator and AC grid. The installation must be performed by qualified personnel and in compliance with national and local standards and regulations

The inverter design provides a quick-connect terminal, so the top cover needn't be opened during electrical connection. Inputs are indicated on the bottom of inverter, as shown below. All electrical connections are suited for the local or national standard.

|           |  |
|-----------|--|
| +         | 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 Isolator OFF.
3. Assemble PV input connector to the Inverter.

### 6.1 Grounding

Autarco recommends two ground protection methods: through grid terminal connection and external heat sink connection. If AC terminal is used to connect ground, please refer to the contents of 6.3. If the heat sink is used to connect the ground, please follow the steps below:

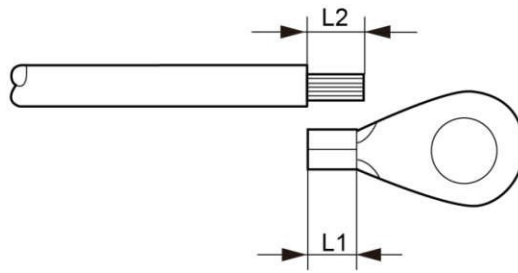
**Step 1** — Prepare the grounding cable: recommend to use the 6mm<sup>2</sup> outdoor copper-core cable.

**Step 2** — Prepare OT terminals: M6.



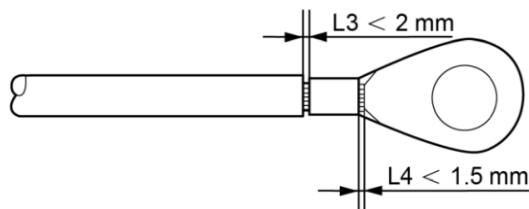
**IMPORTANT!** For multiple inverters in parallel, all inverters should be connected to the same ground point to eliminate the possibility of a voltage potential existing between inverter grounds.

**Step 3** — Strip the ground cable insulation to a suitable length.



**IMPORTANT!** L2 (insulation stripping length) is 2mm-3mm longer than L1 (OT cable terminal crimping area) 2mm-3mm.

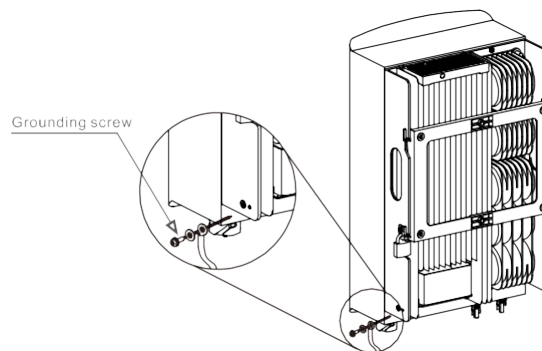
**Step 4** — Insert the stripped wire into the OT terminal crimping area and use the hydraulic clamp to crimp the terminal to the wire.



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

**Step 5** — Remove the screw from the heat sink ground point.

**Step 6** — Connect the grounding cable to the grounding point on the heat sink, and tighten the grounding screw, torque is 3Nm.



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

## 6.2 AC connection

For all AC connections, 6-16mm<sup>2</sup>, YJV-0.6/1KV cable is required to be used. Please make sure the resistance of cable is lower than 1.5ohm. If the wire is longer than 20m, preferred to use 10-16mm<sup>2</sup> cable.



**DANGER!** Never connect or disconnect the connectors under load.



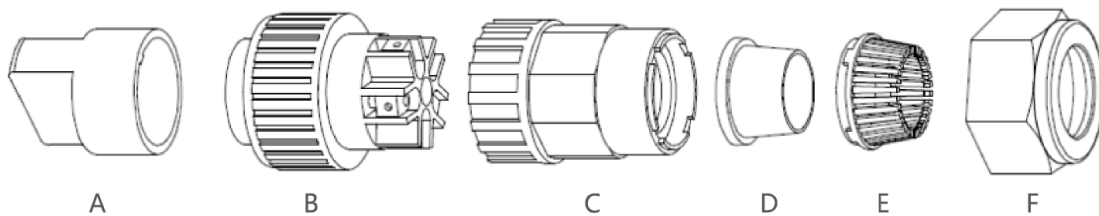
**NOTICE!** The AC connection to the electrical distribution grid must be performed only after receiving authorization from the utility that operates the grid.



**NOTICE!** Make sure to set the correct grid standard as part of system commissioning, see chapter 7.8.

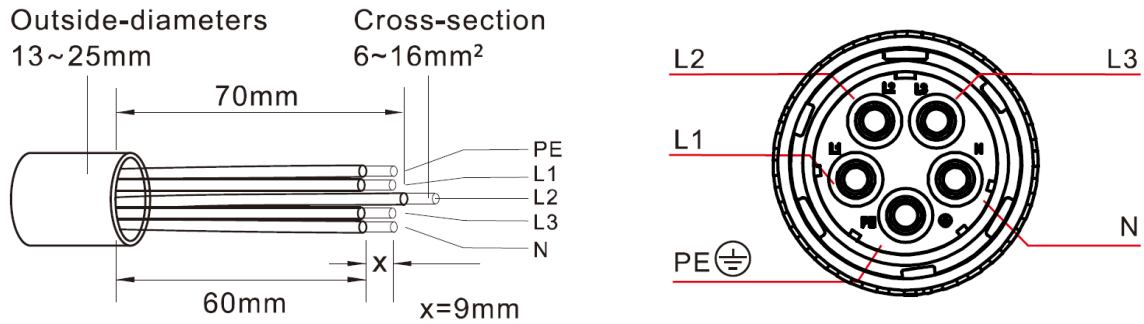


Internal of AC connector signs five connection ports: "L1", "L2", "L3", "N" and "PE". Three live wires are connected the "L1", "L2" and "L3" terminals respectively; ground wire connects "PE"; neutral wire connects "N" terminal:



| Type          | Number | Description                              |   |
|---------------|--------|--|---|
| Accessory     | A      | Plastic fixture (Auxiliary installation) |   |
| AC connectors | B      | Socket element                           |   |
|               | C      | Adapter                                  |   |
|               | D*     | Seal ring                                | Seal ring (thick) suit for 12-18 mm cable |
|               |        |  | Seal ring (thin) suit for 16-21 mm cable  |
|               | E      | Fastening case                           |   |
|               | F      | Swivel nut                               |   |

\*The combination of AC connectors has two seal rings, please refer to different diameters of cable to select corresponding seal ring.



Each inverter has a corresponding AC grid terminal connector.

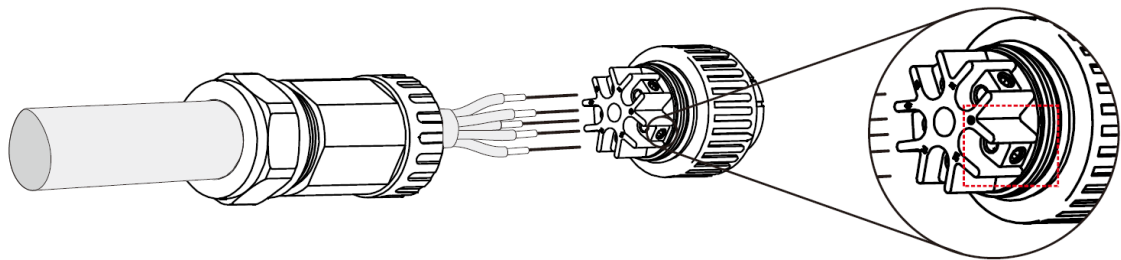
The Autarco inverter is equipped with an integrated Residual Current Protective Device (RCPD) and Residual Current Operated Monitor (RCOM). The RCOM will detect the volume of the leakage current and compare it with the expected value, if the leakage current exceeds the permitted range, the RCPD will disconnect the inverter from the AC load.

If regulations in the country of installation stipulate an external Residual Current Device (RCD), you must use a device with a tripping threshold of 100 mA or more. For the LD/LQ-series we recommend to use at least 100 mA. A type "A" RCD can be used in accordance with our "Manufacturer's declaration for usage of residual current devices". Contact Autarco for advice.

The AC cable used must be dimensioned in accordance with any local and national directives on cable dimensions which specify requirements for the minimum conductor cross-section. Cable dimensioning factors are e.g.: nominal AC current, type of cable, type of routing, cable bundling, ambient temperature and maximum specified line losses.

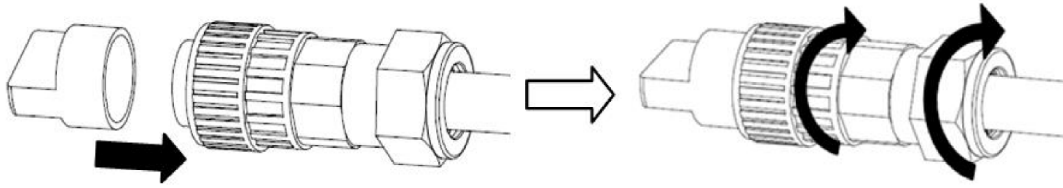
The steps to assemble AC grid terminal connector are listed as follows:

**Step 1** — Strip outer jacket 70mm and strip each cable insulation about  $9\pm 1$ mm. Put the cable through nut and sleeve of socket element, insert corresponding terminals and tighten with Allen wrench.

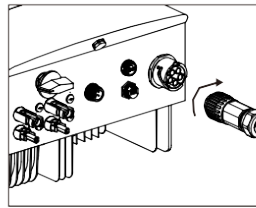


Tighten cable with 3.0 mm Allen wrench. The allen screw is easy to drop off, so don't screw it out completely.

**Step 2** — Clip plastic fixture in socket element, tighten adapter in socket element, then tighten swivel nut with 3-4Nm torque.



**Step 3** — Connect AC connector with inverter, then tighten AC connector clockwise (see figure below), until hearing a slight clicking sound indicating connection succeed.



**NOTICE!** It is important that the AC wires are connected to the right terminals as indicated by the “L”, “N” and “Earthing” symbols on each AC connector.

In some countries a second protective conductor is required as a matter of principle. In each case, observe the applicable regulations for the site.



The AC connection to the electrical distribution grid must be performed only after receiving authorization from the utility that operates the grid.

Always use separate fuses for consumer load. Use dedicated circuit breakers with load switch functionality for load switching.

The selection of the mains circuit breaker rating depends on the wiring design (wire cross-section area), cable type, wiring method, ambient temperature, inverter current rating etc. Derating of the circuit breaker rating may be necessary due to self-heating or if exposed to heat.



**DANGER!** No consumer load should be applied between the mains circuit breaker and the inverter.

## 6.3 DC connections

Please always use the MC4 connectors from the inverter box to connect strings to the inverter.



**DANGER!** Never connect or disconnect the connectors under load.



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.



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

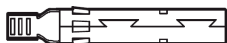
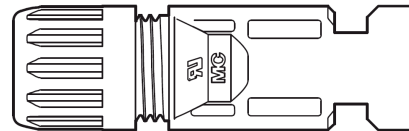
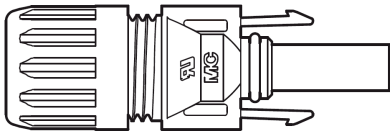


Please use approved DC cable for PV system.

| Cable type                                  | Cross section (mm <sup>2</sup> ) |                   |
|---|----------------------------------|-------------------|
|   | Range                            | Recommended value |
| Industry generic PV cable<br>(model: PV1-F) | 4.0-6.0<br>(12-10AWG)            | 4.0 (12AWG)       |



**DANGER!** Do not connect the strings with an open circuit voltage greater than the Max DC voltage of the inverter.



DC+ Connector



DC- Connector

To connect the PV generator to the inverters you use 4mm<sup>2</sup> or 6mm<sup>2</sup> PV cable and MC4 connectors. For details on how to assemble MC4 connector please refer to our MC4 connector manual.



**DANGER!** For protection against electric shock, MC4 connectors must be isolated from the PV array while being assembled or disassembled.



DC connections must not be unplugged while under load. They can be placed in a no-load state by switching off the DC/AC converter or breaking the DC circuit interrupter. Plugging and unplugging while under voltage is permitted.



**CAUTION!** MC4 connectors are watertight IP67 but cannot be used permanently under water. Do not lay the MC4 connectors on the roof surface.



If any tools or parts are used in the MC4 connector assembly other than those listed in the MC4 connector manual, neither safety nor compliance with the technical data can be guaranteed.

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

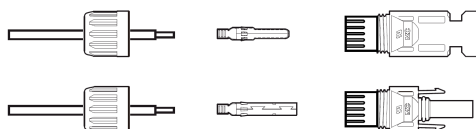
**Step 1** — Strip off the DC wire for about 7mm, disassemble the connector cap nut.

**Step 2** — Insert the wire into the connector cap nut and contact pin.

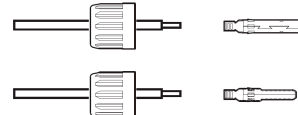
**Step 3** — Crimp the contact pin to the wire using a proper wire crimping tool.

**Step 4** — Insert metal connector into top of connector, and tighten nut with torque 2.5-3 Nm.

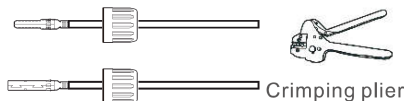
**Step 5** — Measure PV voltage of DC input with multi-meter, verify DC input cable polar, and ensure each string of PV voltage in range of inverter operation. Connect DC connector with inverter until hearing a slight clicking sound indicates connection succeed.



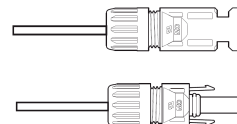
Disassemble the Connector Cap nut



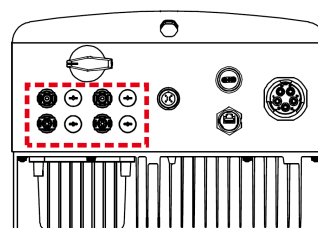
Insert the Wire into the Connector Cap nut and contact pin

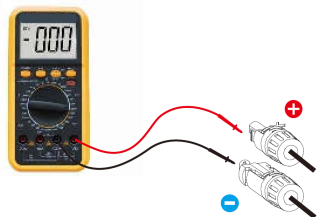


Crimp the contact pin to the wire



Connector with Cap nut Screwed on





Multimeter measurement

Connect the DC Connectors to the Inverter



**WARNING!** If DC input wire reverses, please not operate DC switch, DC1 and DC2 instantly to avoid inverter damage. Damage caused by this reason isn't covered by warranty.  
 Solution: Until reduced sun irradiance and PV voltage is below 0.5 A (mostly in evening), then put DC switch in "off" position, remove "+", "-" connectors to reconnect wires.

## 6.4 Max. over current protection device (OCPD)

To protect the inverter's AC grid connection conductors, Autarco recommends installing breakers that will protect against overcurrent. The following table defines OCPD ratings for the Autarco 5-10kW three phase inverters.

| Inverter          | Rated voltage (V) | Rated output current (A) | Current for protection device(A) |
|-------------------|-------------------|--------------------------|----------------------------------|
| S2.LD5000(S)-MII  | 400               | 7.2                      | 20                               |
| S2.LD6000(S)-MII  | 400               | 8.7                      | 20                               |
| S2.LD8000(S)-MII  | 400               | 11.5                     | 20                               |
| S2.LD9000(S)-MII  | 400               | 13.0                     | 32                               |
| S2.LD10000(S)-MII | 400               | 14.4                     | 32                               |

## 6.5 Inverter commissioning sequence

| Turn ON                                   | Turn OFF                    |
|---|-----------------------------|
| 1. Connect AC side (if not connected yet) | 1. Switch OFF the AC switch |
| 2. Connect DC side (if not connected yet) | 2. Switch OFF the DC switch |
| 3. Switch ON the DC switch                |                             |
| 4. Switch ON the AC switch                |                             |



## 7. Operation

### 7.1 LED indicator lights

There are three LED status indicator lights in the front panel of Autarco LD Mark II series inverters. The left POWER light (red) indicates power status of the inverter. The middle OPERATION light (green) indicates the operation status. The right ALARM light (yellow) indicates the alarm status. Table 7.1 explains their meanings.

| Light               | Status   | Description                                      |
|---------------------|----------|--|
| ● POWER (red)       | ON       | The inverter can detect DC power.                |
|                     | OFF      | No DC power or low DC power.                     |
| ● OPERATION (green) | ON       | The inverter is operating properly.              |
|                     | OFF      | The inverter has stopped to supply power.        |
|                     | FLASHING | The inverter is initializing.                    |
| ● ALARM (yellow)    | ON       | Alarm or fault condition is detected.            |
|                     | OFF      | The inverter is operating without fault or alarm |

When inverter DC switch and AC switch have been turned on the inverter will start initializing. After approx. 3 minutes the inverter will start normal operation with the inverter display showing GENERATING.

### 7.2 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).

### 7.3 Inverter display



NOTICE! During normal operation, make sure the optional integrated DC switch is switched "on".

The display content consists of 2 lines. During regular operation the display shows the current power and operation status alternatively for 10 seconds, alongside any alarm messages. Pressing the UP or DOWN buttons will manually cycle through these two displays. Pressing the ENTER button gives access to the main menu which has four sub menus:

- Information, described in detail in chapter 7.5.
- Settings, described in detail in chapter 7.6.
- Advanced information, described in detail in chapter 7.7.
- Advanced settings, described in details in chapter 7.8.

By pressing UP or DOWN keys you can cycle through these sub menus, click ENTER to go into the submenu.

## 7.4 Lock screen

Pressing the ESC key returns to the Main Menu. Pressing the ENTER key locks or unlocks the screen.

## 7.5 Information

The Autarco LD Mark II series inverters main menu provides access to operational data and information. The information is displayed by selecting "Information" from the main menu. By default the inverter display will scroll through the information states below. Pressing the ENTER key will lock or unlock the current display. You can also press UP or DOWN keys to manually scroll through. By pressing the ESC key returns to the main menu.

| State  | Description  |
|--|--|
| V_DC1 %VALUE%<br>I_DC1 %VALUE% A                   | Shows the input voltage (V) of the MPPT1<br>Shows the input current (A) of the MPPT1   |
| V_DC2 %VALUE%<br>I_DC2 %VALUE% A                   | Shows the input voltage (V) of the MPPT2<br>Shows the input current (A) of the MPPT2   |
| V_A %VALUE%<br>I_A %VALUE% A                       | Shows the voltage (V) of the grid<br>Shows the current (A) of the grid   |
| V_C %VALUE%<br>I_C %VALUE% A                       | Shows the voltage (V) of the grid<br>Shows the current (A) of the grid   |
| Status: %VALUE%<br>Power: %VALUE% W                | Shows the status of the inverter<br>Shows current output power (W) of the inverter<br><br>For any status other than "Generating" and "Initializing" please refer to chapter 11 for troubleshooting |
| Grid frequency<br>F_Grid %VALUE% Hz                | Shows current frequency (Hz) of the grid   |
| Total Energy<br>%VALUE% kWh                        | Shows total energy output (kWh)  |
| This Month: %VALUE% kWh<br>Last Month: %VALUE% kWh | Total energy output in this month (kWh)<br>Total energy output of last month (kWh)   |
| This day: %VALUE% kWh<br>Last day: %VALUE% kWh     | Total energy output in this day (kWh)<br>Total energy output of yesterday (kWh)  |
| Inverter SN  | Display series number of the inverter  |

## 7.6 Settings

The following options are available under the Settings submenu:

|                   |  |
|-------------------|--|
| Set Time and Date | Press UP/DOWN keys to set change element<br>Press ENTER key to move to next element<br>Press ESC key to save date and return |
|-------------------|--|

|                  |   |
|------------------|---|
| Set Address      | <p>Assign a number (##) to the inverter to distinguish between multiple inverters on a single monitoring device. Required when using a LAN-box or GPRS-box, not necessary for installations of single inverters.</p> <p>Press UP/DOWN keys to set change number<br/>Press ENTER key to save the setting<br/>Press ESC key to return</p> |
| Restore Settings | Delete alarm messages that have been generated  |

## 7.7 Advanced info



**WARNING!** Access to this section of the menu is for Autarco qualified and accredited technicians only. Unauthorized access will void the product and system warranty.

Screen can be scrolled through with UP/DOWN keys to see the information as per the table below. Press ENTER key to enter a submenu. Press ESC key to go back to the main menu.


|                    |  |
|--------------------|--|
| Alarm Messages     | <p>Scroll through the last ten alarm messages for troubleshooting purposes.<br/>Press UP/DOWN keys to cycle through alarm messages<br/>Press ESC key to return</p>   |
| Running Message    | <p>This function is for maintenance person to get running message such as internal temperature, Standard No .1, 2, etc.<br/>Screens can be scrolled manually by pressing the UP/DOWN keys.</p>   |
| Version            | The screen shows the model version and software version of the inverter  |
| Daily energy       | <p>This function is for checking the energy generation for selected day.<br/>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.<br/>Press UP/DOWN key to move one date from another.</p> |
| Monthly energy     | <p>This function is for checking the energy generation for selected month.<br/>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.<br/>Press UP/DOWN key to move one date from another.</p>     |
| Yearly energy      | <p>This function is for checking the energy generation for selected year.<br/>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.<br/>Press UP/DOWN key to move one date from another.</p>       |
| Daily record       | The screen shows history of changing settings. Only for maintenance personnel.   |
| Communication data | The screen shows information interpretable to qualified technicians only   |
| 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   |

## 7.8 Advanced Settings



WARNING! Access to this section of the menu is for Autarco qualified and accredited technicians only. Unauthorized access will void the product and system warranty.

Screen can be scrolled through with UP/DOWN keys to see the information as per the table below. Press ENTER key to enter a submenu. Press ESC key to go back to the main menu.



WARNING! Set GRID OFF (see below) before changing this setting.

Press UP/DOWN keys to cycle through available standards

- AS4777
- VDE0126
- UL1741
- G83
- User defined

Press ENTER key to save the setting  
Press ESC key to cancel and return

When selecting 'User defined' the following upper and lower values have to be set for voltage and frequency:





OV-G-V1: 220---290V  
OV-G-V1-T: 0.1---9S  
OV-G-V2: 220---290V  
OV-G-V2-T:0.1---1S  
UN-G-V1: 90---21 0V  
UN-G-V1-T: 0.1---9S  
UN-G-V2: 90---210V  
UN-G-V2-T: 0.1---1 S




Startup-T: 10---600S  
Restore-T: 10---600S



OV-G-F1: 50.2-53Hz(60.2-64Hz)  
OV-G-F1-T: 0.1---9S  
OV-G-F2: 50.2-53Hz(60.2-64Hz)  
OV-G-F2-T:0.1---9S  
UN-G-F1: 47-49.5Hz(56-59.8Hz)  
UN-G-F1-T: 0.1---9S  
UN-G-F2: 4 7-49Hz(56-59.8Hz)  
UN-G-F2-T: 0.1---9S

Press UP/DOWN keys to scroll through these values  
Press ENTER key to edit the selected value  
Press UP/DOWN keys to change the selected value

Select grid standard

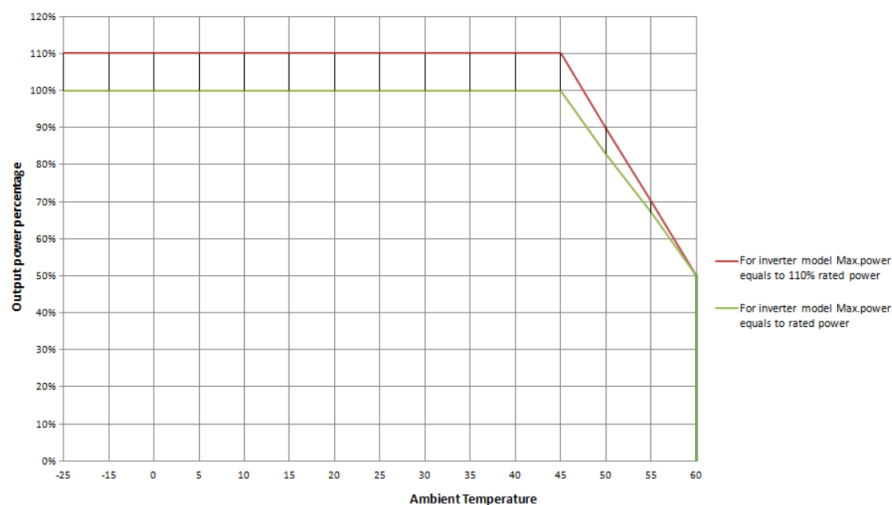
|                  |  |
|------------------|--|
|                  | <p>Press ENTER key to save and return<br/>Press ESC key to cancel and return</p> <p> WARNING! Set GRID ON (see below) before new standard is activated.</p> <p> WARNING! Please note that the user-defined standard is not to be used without the agreement of the local grid authority.</p>   |
| Grid ON/OFF      | <p>Press UP/DOWN keys to cycle through grid ON/OFF options<br/>Press ENTER key to save<br/>Press ESC key to return</p>   |
| Clear Energy     | <p>Reset the inverters total kWh output to zero.</p>   |
| Reset Password   | <p>Change the password to enter Advanced Info and Advanced Settings.</p>   |
| Power control    | <p>Active and reactive power can be set through power setting button.<br/>There are 5 item for this sub menu:</p> <ol style="list-style-type: none"> <li>1. Set output power</li> <li>2. Set Reactive Power</li> <li>3. Out_P With Restore</li> <li>4. Rea_P With Restore</li> <li>5. Select PF Curve</li> </ol> <p> WARNING! This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.</p> |
| Calibrate Energy | <p>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.</p> <p>Press DOWN key to move the cursor.<br/>Press UP key to revise the value<br/>Press ENTER key to execute the setting<br/>Press ESC key to return</p>  |
| Special Settings | <p> WARNING! This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.</p>  |

|                          |   |
|--------------------------|---|
| <p>STD Mode settings</p> | <p>There are 5 setting under STD. Mode settings.</p> <ol style="list-style-type: none"> <li>1. Working mode</li> <li>2. Power Rate limit</li> <li>3. Freq. Derate set</li> <li>4. 10mins OV-G-V set.</li> <li>5. Initial Settings</li> </ol> <div style="display: flex; align-items: center; margin-top: 20px;">  <p>WARNING! This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.</p> </div> <p style="margin-top: 20px;"><b>Enable logic interface setting:</b> when select G98 or G99 standard to use the logic interface function, please follow below settings to enable the DRM. ORM default setting is "OFF", if ORM set "ON ", but the logic interface un-connected to the switch or the switch is open, the inverter HMI will display "Limit by OR M" and the inverter output power will be limited to zero.</p> <ol style="list-style-type: none"> <li>1. Select Initial Settings</li> <li>2. Select DRM and set it "ON"</li> </ol> |
| <p>Restore Settings</p>  | <p>There are 5 items in special settings submenu.<br/>Restore setting could set all items to default.<br/>Press the Enter key to save the setting after setting grid off. Press the ESC key to return the previous mean.</p>  |
| <p>HMI Update</p>        | <p>This function is used for updating the LCD program.</p> <div style="display: flex; align-items: center; margin-top: 20px;">  <p>WARNING! This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.</p> </div>   |
| <p>Internal EPM Set</p>  | <div style="display: flex; align-items: center; margin-bottom: 20px;">  <p>NOTICE! To access to this area is for fully qualified and accredited technicians only.</p> </div> <p>The default password is "0010". Please press DOWN to move the cursor, press UP to select the number.<br/>Select EPM Settings from the Main Menu to access the following options:</p> <ol style="list-style-type: none"> <li>1. Mode Select</li> <li>2. Set Backflow Power</li> <li>3. Fail safe ON/OFF</li> </ol>  |
| <p>➔ Mode Select</p>     | <p>There are 3 settings in this menu as below:</p> <ol style="list-style-type: none"> <li>1. OFF - This function is used to shut down the Export Power Set.</li> <li>2. Meter in Load - The submenu is used to set Meter in Load.</li> </ol>  |

|                    |  |
|--------------------|--|
|                    | <p>3. Meter in Grid - The submenu is used to set meter in Grid<br/>Press the ENTER key to set done.<br/>Press the ESC key to the previous menu.</p>  |
| → Backflow Power   | <p>This submenu is used for set allowed power that inverter can generate to grid.<br/>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.<br/>Press the ESC key to save the settings and return to the previous menu.</p> |
| → Fail safe ON/OFF | <p>This function is used to remind whether the EPM is ON or not. The default setting is ON.<br/>Press the UP/DOWN keys to set ON /OFF. Press the ENTER key to set done. Press the ESC key to the previous menu.</p>  |
| External EPM set   | This function is turned on when the EPM is external.   |
| Restart HMI        | The function is used for restarting the HMI.   |
| Debug Parameter    | This function is used for manufacturer maintenance personnel only.   |
| DSP Update         |  <p>WARNING! This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.</p>   |
| Compensation set   |  <p>WARNING! This function is applicable by maintenance personnel only, wrong operation will prevent the inverter from reaching maximum power.</p>  |

## 7.9 Temperature derating

The output power of the inverter varies with ambient temperature, as shown in the figure below.



## 8. Monitoring setup and system registration

The instructions about monitoring setup and system registration can be found in separate manuals enclosed in the documentation that came with this Autarco system. For more information manual please contact your Autarco installer or refer to our website [www.autarco.com](http://www.autarco.com).

## 9. Maintenance

The Autarco LD Mark II series inverters do not require regular maintenance. However, impurities such as dust and dirt accumulation on the heat sink may negatively affect the inverter's ability to dissipate heat. Any dirt or dust can be removed with a cloth or soft brush.



CAUTION! Do not touch the heat sink when the inverter is in operation. Turn OFF the inverter and allow for cooling down before cleaning.



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

## 10. Disposal

To comply with European Directive 2002/96/EC on waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Ignoring this EU Directive may have severe effects on the environment and your health.



# 11. Troubleshooting

## 11.1 General

| Display message | Action  |
|-----------------|---|
| Blank screen    | <ul style="list-style-type: none"> <li>• Check that all switches are in the ON position (including internal DC switch if present)</li> <li>• Check AC and DC power supply. If DC power is greater than 10W and string voltage greater than 100V the inverter should start.</li> <li>• If switches are on and AC and DC power supplies is available please contact installer.</li> </ul> |

## 11.2 Internal component fault

| Error type | Display message                    | Error code | Error description        | Action  |
|------------|------------------------------------|------------|--------------------------|---|
|            | No power                           |            | Inverter no power on LCD | <ul style="list-style-type: none"> <li>○ Check PV input connections</li> <li>○ Check DC input voltage (single phase &gt;120V, three phase &gt;350V)</li> <li>○ Check if PV +/- is reversed</li> </ul> |
|            | LCD show initializing all the time |            | Can not start-up         | <ol style="list-style-type: none"> <li>1. Check if the connector on main board or power board are fixed.</li> <li>2. Check if the DSP connector to power board are fixed.</li> </ol>                  |
|            | OV-G-V01/02/03/04                  |            | Over grid voltage        | <ol style="list-style-type: none"> <li>1. Resistant of AC cable is too high. Change bigger size grid cable</li> <li>2. Adjust the protection limit if it's allowed by electrical company.</li> </ol>  |
|            | UN-G-V01/02                        |            | Under grid voltage       | <ol style="list-style-type: none"> <li>1. Use user define function to adjust the protection limit if it's allowed by electrical company.</li> </ol>   |
|            | OV-G-F01/02                        |            | Over grid frequency      |   |
|            | UN-G-F01/02                        |            | Under grid frequency     |   |
|            | G-IMP                              |            | High grid impedance      |   |
|            | NO-GRID                            |            | No grid voltage          | <ol style="list-style-type: none"> <li>1. Check connections and grid switch.</li> <li>2. Check the grid voltage inside inverter terminal.</li> </ol>  |
|            | OV-DC01/02/03/04                   |            | Over DC voltage          | <ol style="list-style-type: none"> <li>1. Reduce the module number in series</li> </ol>   |
|            | OV-BUS                             |            | Over DC bus voltage      | <ol style="list-style-type: none"> <li>1. Check inverter inductor connection</li> <li>2. Check driver connection</li> </ol>   |

|   |  |   |
|---|--|---|
| UN-BUS01/02                                     | Under DC bus voltage                     |   |
| GRID-INTF01/02                                  | Grid interference                        | 1. Restart inverter<br>2. Change power board  |
| OV-G-I  | Over grid current                        |   |
| IGBT-OV-I                                       | Over IGBT current                        |   |
| DC-INTF<br>OV-DCA-I                             | DC input overcurrent                     | 1. Restart inverter<br>2. Identify and remove the string to the fault MPPT<br>3. Change power board   |
| IGFOL-F   | Grid current tracking fail               | 1. Restart inverter or contact installer.   |
| IG-AD   | Grid current sampling fail               |   |
| OV-TEM  | Over Temperature                         | 1. Check inverter surrounding ventilation.<br>2. Check if there's sunshine direct on inverter in hot weather.   |
| 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                   |   |
| PV ISO-PRO<br>01/02                             | PV isolation protection                  | 1. Remove all DC input, reconnect and restart inverter one by one.<br>2. Identify which string cause the fault and check the isolation of the string. |
| ILEAK-PRO<br>01/02/03/04                        | Leakage current protection               | 1. Check AC and DC connection<br>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<br>(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. |
|--|--------------------------|---|



CAUTION! If the inverter displays any alarm message as listed in previous table; 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.

1. Serial number of Autarco Three Phase Inverter;
2. The distributor/dealer of Autarco Three Phase 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 7.5) 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

## 12. Product specifications

| Model                                    | S2.LD5000(S)-<br>MII      | S2.LD6000(S)-<br>MII | S2.LD8000(S)-<br>MII | 2.LD9000(S)-<br>MII | 2.LD10000(S)-<br>MII |
|--|---------------------------|----------------------|----------------------|---------------------|----------------------|
| Max. DC input power (W)                  | 6000                      | 7200                 | 9600                 | 10800               | 12000                |
| Max. DC input voltage (V)                | 1000                      |                      |                      |                     |                      |
| Rated DC voltage (V)                     | 600                       |                      |                      |                     |                      |
| Start-up voltage (V)                     | 180                       |                      |                      |                     |                      |
| MPPT voltage range (V)                   | 160...850                 |                      |                      |                     |                      |
| Max. input current (A)                   | 11+11                     |                      |                      |                     |                      |
| Max short circuit input current (AMPS)   | 17.2+17.2                 |                      |                      |                     |                      |
| MPPT number/Max input strings number     | 2/2                       |                      |                      |                     |                      |
| Rated output power (W)                   | 5000                      | 6000                 | 8000                 | 9000                | 10000                |
| Max. output power (W)                    | 5500                      | 6600                 | 8800                 | 9900                | 11000*               |
| Max. apparent output power (VA)          | 5500                      | 6600                 | 8800                 | 9900                | 11000*               |
| Rated grid voltage (V)                   | 3/N/PE~400                |                      |                      |                     |                      |
| Rated output current (A)                 | 7.2                       | 8.7                  | 11.5                 | 13                  | 14.4                 |
| Power Factor (at rated output power)     | 0.8 leading ~ 0.8 lagging |                      |                      |                     |                      |
| THDi (at rated output power)             | <1.5%                     |                      |                      |                     |                      |
| Rated grid frequency (Hz)                | 50/60                     |                      |                      |                     |                      |
| Operating frequency range (Hz)           | 47...52 or 57...62        |                      |                      |                     |                      |
| Max. efficiency                          | 98.3%                     | 98.3%                | 98.7%                | 98.7%               | 98.7%                |
| EU efficiency                            | 97.8%                     | 97.8%                | 98.1%                | 98.1%               | 98.1%                |
| MPPT efficiency                          | >99.5%                    |                      |                      |                     |                      |
| Dimensions W*H*D (mm)                    | 310*563*219               |                      |                      |                     |                      |
| Weight (kg)                              | 18.0                      |                      |                      |                     |                      |
| Topology                                 | Transformerless           |                      |                      |                     |                      |
| Operating ambient temperature range (°C) | -25°C ... 60°C            |                      |                      |                     |                      |
| Ingress protection                       | IP65                      |                      |                      |                     |                      |
| Noise emission (typical)                 | <30 dBA                   |                      |                      |                     |                      |

|                                 |   |
|---------------------------------|---|
| Cooling concept                 | Natural convection  |
| Max. operation altitude         | 4000m   |
| Designed lifetime               | >20 years   |
| Grid connection standard        | EN50438, G83/2, G98, G99, AS4777.2:2015, VDE0126-1-1, IEC61727, VDE N4105 |
| Operating surroundings humidity | 0...100% Condensing   |
| Connection                      | MC4 connector and IP67 rated plug   |
| Display                         | LCD, 2x20 characters  |
| Communication connections       | 4 pins RS485 connector  |
| Warranty Terms                  | 5 Years STD (Extendable to 15 Years)                                      |

\* 10000W for Belgium (4105BEL)