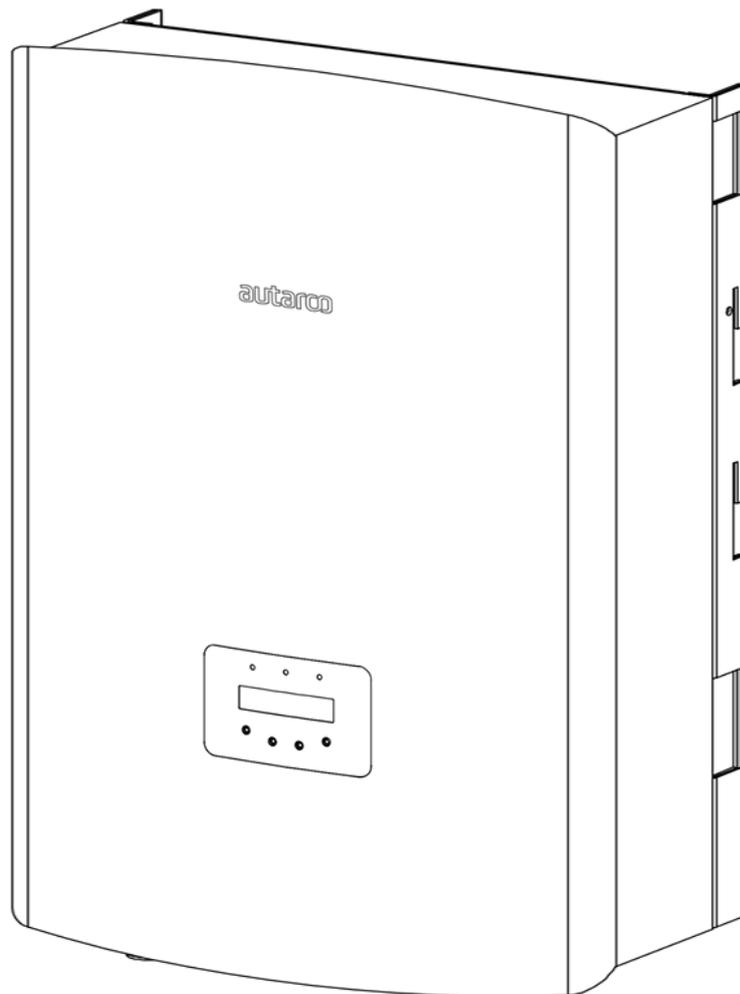


autarco

Installation and Operation Manual

Solar Inverters UX series



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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.

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Table of Contents

1.	Introduction	4
1.1	Read this first	4
1.2	Target Audience	4
1.3	Product versions covered by this document	5
2.	Preparation	6
2.1	Safety instructions	6
2.2	Package contents	7
2.3	Internal DC switch	7
2.4	Explanations of symbols on inverter	7
3.	Product information	8
3.1	Overview	8
3.2	Product identification	8
3.3	Product overview	9
4.	Installation	10
4.1	Safety	10
4.2	Appropriate Mounting Location	10
4.3	Mounting instructions	11
4.4	Safety clearance	12
4.5	Mounting procedure	13
5.	Electrical installation	14
5.1	Grounding	14
5.2	AC connection	16
5.3	Additional Protections	19
5.4	DC connections	20
5.5	Inverter commissioning sequence	21
6.	Operation	22
6.1	LED indicator lights	22
6.2	Inverter display	22
6.3	Information	22
6.4	Settings	24
6.5	Advanced info	24
6.6	Advanced Settings	25
6.7	Temperature derating	28
6.8	External fan	28
7.	Monitoring setup and system registration	28
7.1	The following products are available to monitor UX series inverters:	29
8.	Maintenance	30
8.1	Fan Maintenance	31
9.	Disposal	33
10.	Troubleshooting	33
10.1	General	33
10.2	Internal component fault	33
10.3	Grid errors	34
10.4	System and design fault	35
11.	Product specifications	36

1. Introduction

1.1 Read this first

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

To reduce the risk of electrical shock, and to ensure the safe installation and operation of the UX series Autarco 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.



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 Autarco UX series inverter. Before any further action, the operators must first read all safety regulations and be aware of the potential danger to operate 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 chapter 4 "Installation".

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 UX series of Autarco inverters which includes the following models:

- S2.UX40000(S)
- S2.UX50000(S)
- S2.UX60000(S)
- S2.UX50000-HV(S)
- S2.UX60000-HV(S)
- S2.UX70000-HV(S)

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 colour of inverter. For example, S2.UX50000S.1 is the 50kW model with Dutch grid standard as default and Autarco blue cover.

If the product has an “S” at the end it comes with integrated DC switches.

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 condition.



The UX 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.



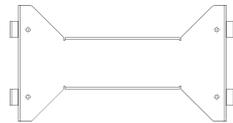
WARNING! The installation, service, recycling and disposal of the inverters must be performed by qualified personnel in compliance with national and local standards and regulations. Please contact your dealer to get the information of authorized repair facility for any maintenance or repairmen.

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.

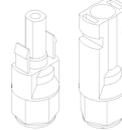
2.2 Package contents



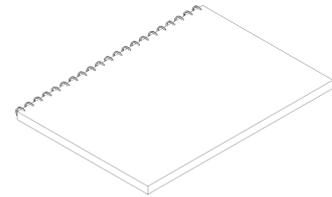
Autarco UX series inverter



Mounting bracket
+ screws



12xMC4 connector
pairs
(S4.MC4F/MC4M)



Instruction manual

2.3 Internal DC switch

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

2.4 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 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 9 "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 UX 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 98.8%
- Wide MPPT voltage range
- Low turn off voltage
- High enclosure protection class IP65
- Intelligent redundant fan-cooling
- Standard ten year product warranty
- Multiple monitoring options
- Optional integrated DC switch

For full specifications please see chapter 11 “Product specifications”.

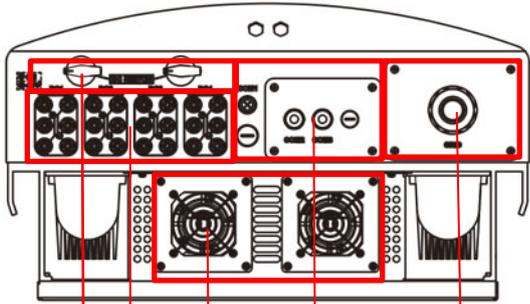
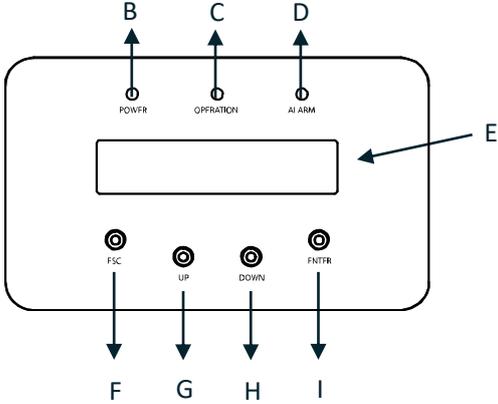
3.2 Product identification

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 the label which can be found on the right side of the inverter housing. Do not remove the label or the serial number as this voids the product warranty.

3.3 Product overview



▲ Figure 1.1 Front view



▲ Figure 1.2 Bottom view

J K L M N

- 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 switches (optional)
- K: DC inputs MPPT 1-4
- L: External Intelligent Fans*
- M: Communication ports
- N: AC terminal block and cover

* The S2.UX40000(S) and S2.UX50000(S) have two fans, the S2US60000(S) has three fans.

4. Installation

4.1 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.



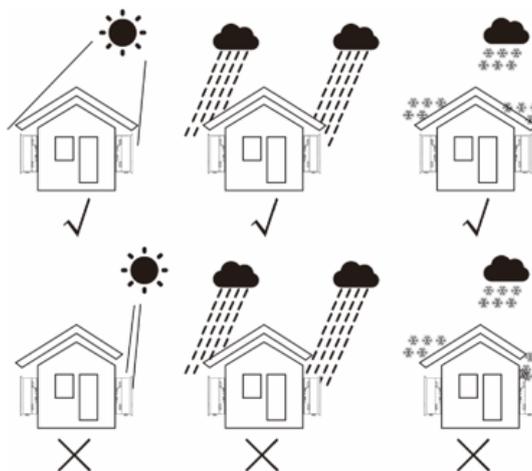
The installation site must have good ventilation conditions. Direct exposure to intense sunshine is not recommended.

4.2 Appropriate Mounting Location



The heat sink can reach a temperature of 75°C under operation.

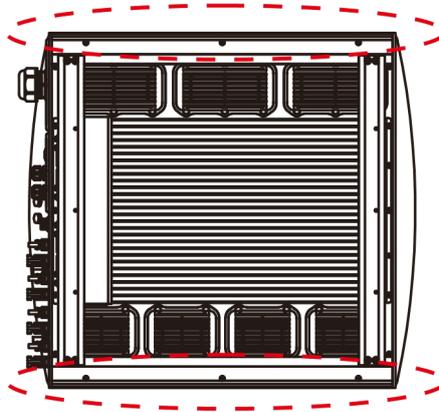
- Make sure the mounting wall is strong enough to hold the weight of the inverter.
- The ambient temperature of installation site should be between -20 °C and +60 °C.
- Make sure of ample ventilation at installation site, insufficient ventilation may reduce the performance of the electronic components inside the inverter and shorten the life span of the inverter.
- The inverter has fans that will intelligently cool the inverter if the internal components exceed 100°C. The fan noise should not exceed 60dB.



4.3 Mounting instructions

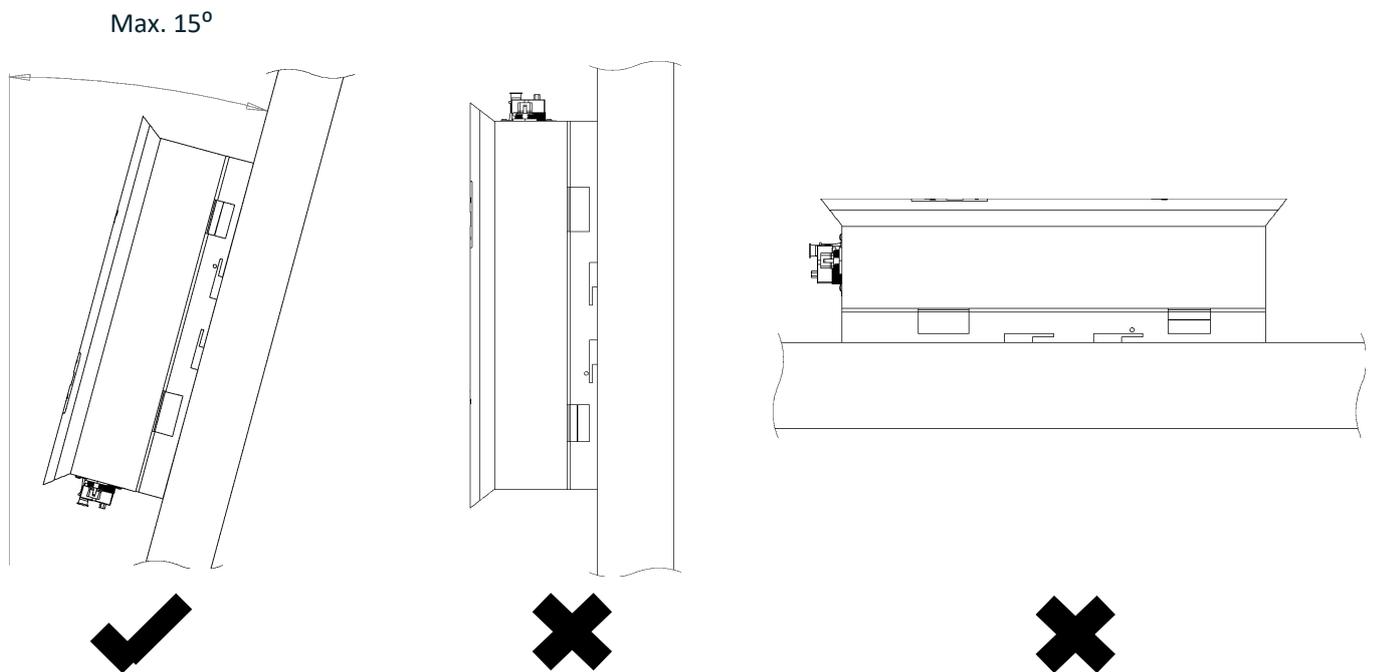


Two people are required to remove the inverter from the carton and install the inverter. Handles are formed into the heatsink for ease of handling the inverter.



▲ Figure 4.2 Inverter handles

- The inverter is suitable for outdoor and indoor installation.
- Vertical installation is recommended, with a maximum inclination of 15° backwards.



4.4 Safety clearance

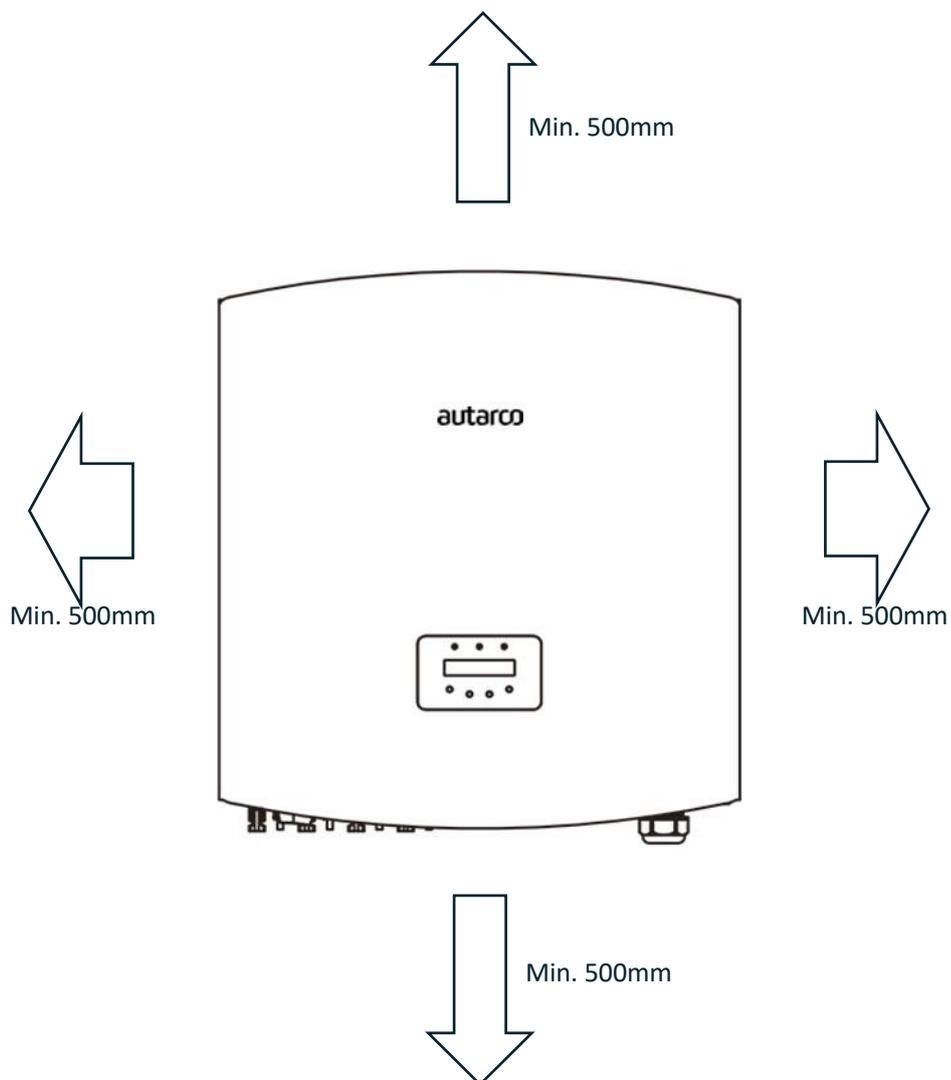


CAUTION! Make sure heat sinks are out of reach of children.



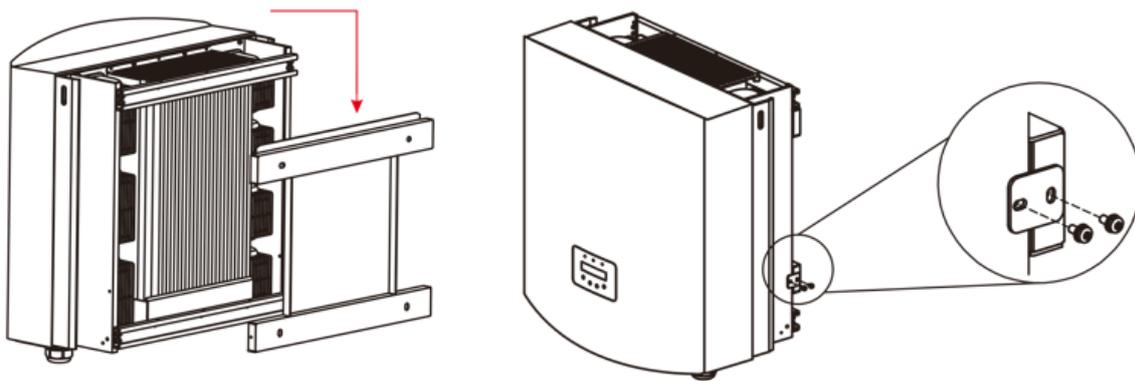
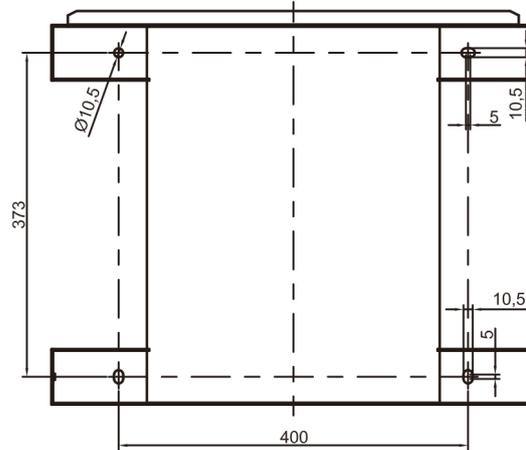
WARNING! When installing multiple inverters, make sure there is sufficient clearance between them. High temperatures may affect performance.

Observe the following minimum clearances to walls and other inverters



4.5 Mounting procedure

- Step 1** — Mount the wall bracket onto the mounting wall with appropriate screws/plugs
- Step 2** — Lower the inverter onto the bracket
- Step 3** — Use screws in the packaging to fix the bottom of the inverter to the mounting bracket



5. 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

5.1 Grounding



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 6.6.

There are two options for ground protection: through grid terminal connection and external heat sink connection.

If AC terminal is used to connect ground, please refer to the contents of 5.3.2.

If the heat sink is used to connect the ground, please follow the steps below.

- 1) Prepare the grounding cable: recommended to use the 16-35mm² outdoor copper-core cable.
- 2) Prepare OT terminals M6

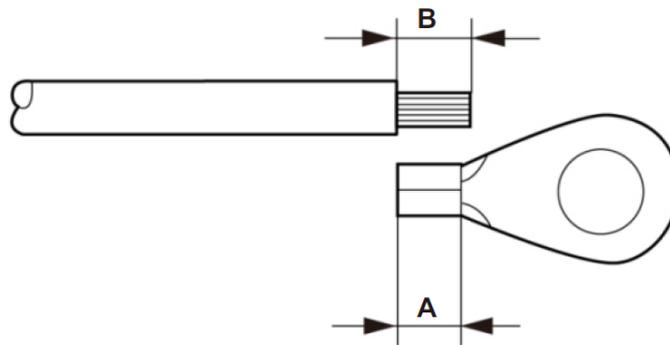


IMPORTANT! For multiple inverters in parallel, all inverters should be connected to the same ground point to eliminate the possibility of a voltage potential existing between inverters grounds.



WARNING! No matter what kind of grounding connection is adopted, it is strictly forbidden to connect the ground of the inverter with the lightning protection of the building, otherwise Autarco will not be responsible for any damage caused by lightning.

- 3) Strip the grounding cable insulation to the suitable length as shown in Figure 5.7.

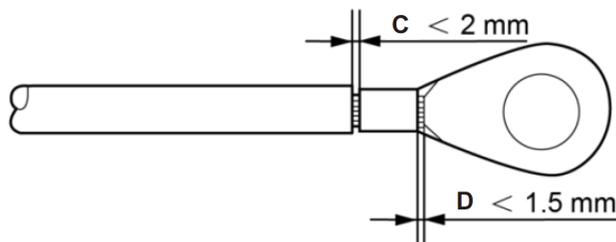


▲ Figure5.7 suitable length



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

- 4) Insert the stripped wire into the OT terminal crimping area, and use the hydraulic clamp to crimp the terminal to the wire (as shown in Figure 5.8).



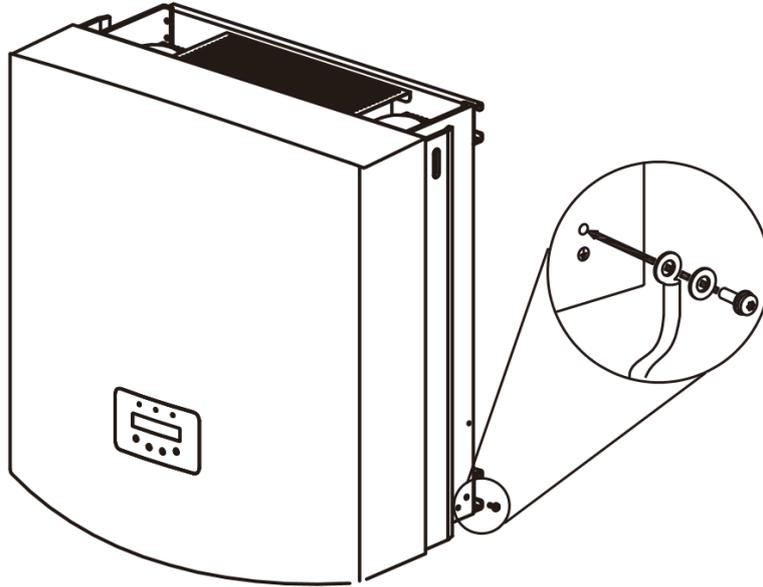
▲ Figure5.8 strip wire



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) Use the screw of the ground point to attach the grounding cable. Tighten the screw securely. Torque is 3Nm (as shown as in Figure 5.9).



▲ Figure 5.9 fix the cable



IMPORTANT! In order to improve the corrosion resistance of the grounding terminal, we recommend that the external grounding terminal is coated with silica gel or paint for protection after installation of the grounding cable.

5.2 AC connection



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.

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.

We recommend 16- 35mm² 105 °C cable with resistance lower than 1.5 ohm.

Please make sure the resistance of cable is lower than 1.5 ohm. If the wire is longer than 20m, it's recommended to use 25-35mm cable. Refer to local electrical codes for wire sizing.



NOTE: There is no need to connect N to AC side for the UX series three-phase inverter, the ground wire can be connected to the grounding hole on the right side of the inverter heat sink.

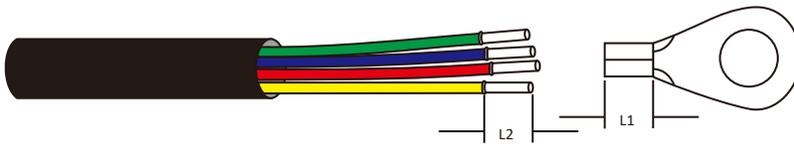
Cable specification		Copper-cored cable	Copper clad aluminum / Aluminum Alloy cable
Traverse cross sectional area (mm ²)	Range	16~35	25~35
	Recommended	25	35
Cable outer diameter (mm)	Range	22~32	
	Recommended	27	



NOTE: Prepare M6 OT terminals

The steps to assemble the AC grid terminals are listed as follows:

- A) Strip the end of AC cable insulating jacket about 90mm then strip the end of each wire (as shown in figure 5.17).



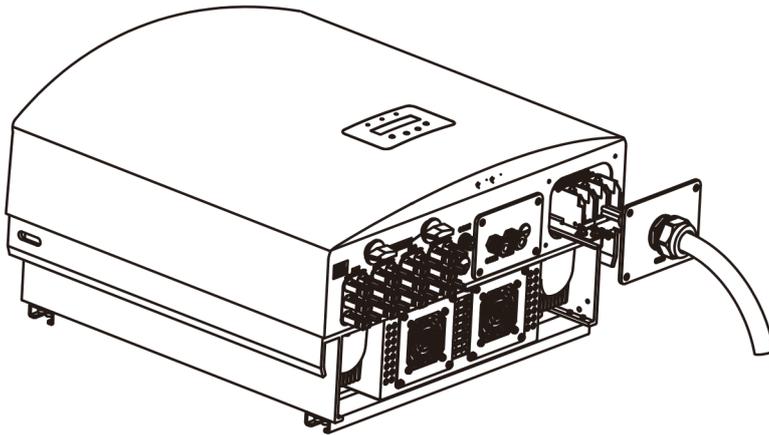
▲ Figure 5.17 Strip AC cable



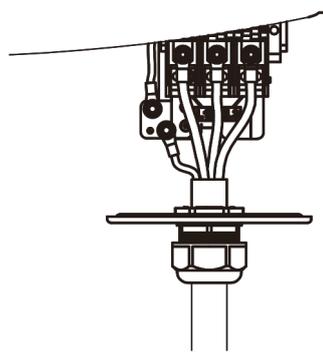
NOTE: L2 (insulation stripping length) is 2mm-3mm longer than L1 (OT cable terminal crimping area)

- B) Strip the insulation of the wire core, insert into the cable crimping area of the OT terminal, then use a hydraulic crimp tool to crimp it firmly. The wire must be covered with heat shrinkable tube or insulating tape. When using the heat shrinkable tube sleeve the heat shrinkable tube over the wire before crimping the OT terminal.
- C) Remove the 4 screws on the AC terminal cover and remove the cover.

- D) Remove the screw under terminal slide and pull out the terminal.
- E) Insert the cable through cap nut, water proof bushing and AC terminal cover into the AC terminal and use a socket wrench to tight the screws. The torque is 4-6Nm (as shown in figure 5.20).

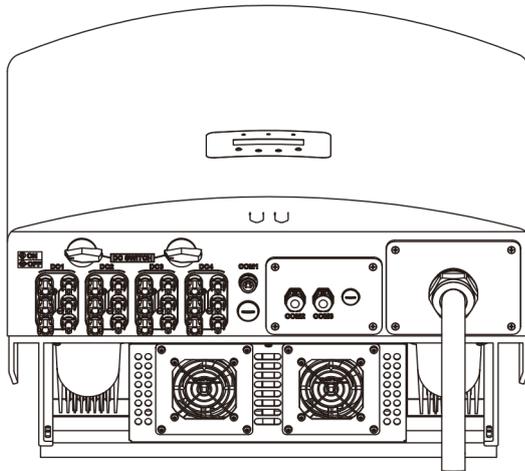


▲ Figure 5.20a Connect cable to AC terminal



▲ Figure 5.20b Connect cable to AC terminal

- F) Push the AC terminals along the rail to the inside of the inverter then tighten the screws under rack. Tighten the 4 screws of AC terminal cover and tighten the AC entry cap nut (as shown in figure 5.21).



▲ Figure 5.21 Tighten the AC terminal



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.



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

5.3 Additional Protections

To protect the inverter's AC grid connection conductors, Autarco recommends installing breakers that will protect against overcurrent. The following table defines OPCD ratings for each model;

Inverter	Rate Voltage (V)	Rated Output (kW)	OPCD: Current for protection device (A)
S2.UX40000(S)	400V	40	80
S2.UX50000(S)	400V	50	100
S2.UX60000(S)	400V	60	100
S2.UX50000-HV(S)	480/500V	50	80
S2.UX60000-HV(S)	480/500V	60	80
S2.UX70000-HV(S)	540V	70	90

The Autarco inverter is equipped with an integrated Residual Current Protective Device (RCPD) and Residual Current Operated Monitor (RCOM). The RCOM will detect 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 300 mA or more. A type “A” RCD can be used in accordance with our “Manufacturer’s declaration for usage of residual current devices”. Contact Autarco for advice.

5.4 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.

UX series inverters have four MPP trackers. The DC characteristics of each model is shown in the table below:

Inverter	MPP trackers	Max DC power	Max DC voltage	Max. DC current per MPPT
S2.UX40000(S)	4	48000W	1100V	22.0A
S2.UX50000(S)		60000W		28.5A
S2.UX60000(S)		72000W		22.0A
S2.UX50000-HV (S)		60000W		28.5A
S2.UX60000-HV (S)		72000W		22.0A
S2.UX70000-HV(S)		84000W		28.5A



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

To connect the PV generator to the inverters we use 4mm² or 6mm² PV cable and MC4 connectors. For details on how to assemble MC4 connector please refer 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 while under voltage is permitted.



CAUTION! MC4 connectors are watertight IP67 but cannot be used permanently under water. Do not lay the MC4 connectors directly 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.

5.5 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 both the DC switches
3. Switch ON both the DC switches	
4. Switch ON the AC switch	

6. Operation

6.1 LED indicator lights

There are three LED status indicator lights in the front panel of UX 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 3.1 explains their meanings.

Light	Status	Description
● POWER (red)	ON	The PV array provides power to the inverter
	OFF	The PV array does not provide power to the inverter
● OPERATION (green)	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 (yellow)	ON	There is a fault. Refer to the inverter display and chapter 10 of this manual for details
	OFF	The inverter is operating normally

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.

6.2 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. 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 6.3.
- Settings, described in detail in chapter 6.4.
- Advanced information, described in detail in chapter 6.5.
- Advanced settings, described in details in chapter 6.6.

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

6.3 Information

The UX 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. You can also press UP or DOWN keys to manually scroll through. Pressing the ENTER key will lock or unlock the current display.



(locked)



(scrolling)

By pressing the ESC key returns to the main menu.

State	Description
V_DC1 %VALUE% I_DC1 %VALUE% A	Shows the input voltage (V) of the MPPT1 Shows the input current (A) of the MPPT1
V_DC2 %VALUE% I_DC2 %VALUE% A	Shows the input voltage (V) of the MPPT2 Shows the input current (A) of the MPPT2
V_DC3 %VALUE% I_DC3 %VALUE% A	Shows the input voltage (V) of the MPPT3 Shows the input current (A) of the MPPT3
V_DC4 %VALUE% I_DC4 %VALUE% A	Shows the input voltage (V) of the MPPT4 Shows the input current (A) of the MPPT4
V_A %VALUE% I_A %VALUE% A	Shows the voltage (V) of the grid L1 Shows the current (A) of the grid L1
V_B %VALUE% I_B %VALUE% A	Shows the voltage (V) of the grid L2 Shows the current (A) of the grid L2
V_C %VALUE% I_C %VALUE% A	Shows the voltage (V) of the grid L3 Shows the current (A) of the grid L3
Status: %VALUE% Power: %VALUE% W	Shows the status of the inverter Shows current output power (W) of the inverter For any status other than “Generating” and “Initializing” please refer to chapter 10 for troubleshooting
Rea_Power: %VALUE% Var App_Power: %VALUE% VA	Shows the real power generated Shows the apparent power generated
Grid frequency F_Grid %VALUE% Hz	Shows current frequency (Hz) of the grid
Total Energy %VALUE% kWh	Shows total energy output (kWh)
This Month: %VALUE% kWh Last Month: %VALUE% kWh	Total energy output in this month (kWh) Total energy output of last month (kWh)
Today: %VALUE% kWh Yesterday: %VALUE% kWh	Total energy output in this day (kWh) Total energy output of yesterday (kWh)
Inverter S/N	Serial ID of the inverter
Work Mode: DRM Number:	Demand response mode (only relevant for some markets) The demand response number (1-8) of the inverter

6.4 Settings

The following options are available under the Settings submenu:

Set Time and Date	<p>Press UP/DOWN keys to set change element Press ENTER key to move to next element Press ESC key to save date and return</p>
Set Address	<p>Assign a number (##) to the inverter to distinguish between multiple inverters when using parallel communication with WIFI-BOX or GPRS-BOX</p> <p>Press UP/DOWN keys to set change number Press ENTER key to save the setting Press ESC key to return.</p> <div style="text-align: center;">  <p>Changing the Address when using WIFI-STICK or LAN-STICK may result in monitoring to stop working.</p> </div>
Restore Settings	Delete alarm messages that have been generated

6.5 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	The display shows the 100 latest alarm messages (see Figure 7.6). Press UP/DOWN keys to cycle through alarm messages Press ESC key to return
Running Message	This function is for maintenance personnel to get running message such as internal temperature, Standard NO. etc. Screens can be scrolled manually by pressing the UP/DOWN keys.
Version	The screen shows the operating software version of the inverter
Daily Energy	The function is for checking the energy generation for selected day. 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. Press UP/DOWN key to move one date from another.
Monthly Energy	The function is for checking the energy generation for selected month. Press DOWN key to move the cursor, press UP key to change the digit. Press ENTER after the month/year is fixed. Press UP/DOWN key to move one date from another.
Yearly Energy	The function is for checking the energy generation for selected year. Press DOWN key to move the cursor, press UP key to change the digit. Press ENTER after the month/year is fixed. Press UP/DOWN key to move one date from another.
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	Internal data of the inverter

6.6 Advanced Settings



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

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

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:

<p>OV-G-V1: 236---335V</p> <p>OV-G-V1-T: 0.1---9s</p> <p>OV-G-V2: 248---341V</p> <p>OV-G-V2-T: 0.1---1s</p> <p>UN-G-V1: 173---236V</p> <p>UN-G-V1-T: 0.1---9s</p> <p>UN-G-V2: 132---219V</p> <p>UN-G-V2-T: 0.1---1s</p>	<p>OV-G-F1: 50.2-53Hz(60.2-63Hz)</p> <p>OV-G-F1-T: 0.1---9s</p> <p>OV-G-F2: 51-53Hz(61-63Hz)</p> <p>OV-G-F2-T: 0.1---9s</p> <p>UN-G-F1: 47-49.5Hz(57-59.5Hz)</p> <p>UN-G-F1-T: 0.1---9s</p> <p>UN-G-F2: 47-49Hz(57-59Hz)</p> <p>UN-G-F2-T: 0.1---9s</p>
---	---

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

Press ENTER key to save and return

Press ESC key to cancel and return



WARNING! Set GRID ON (see below) before new standard is activated.



WARNING! Please note that the User-Def standard is not to be used without the agreement of the local grid authority.

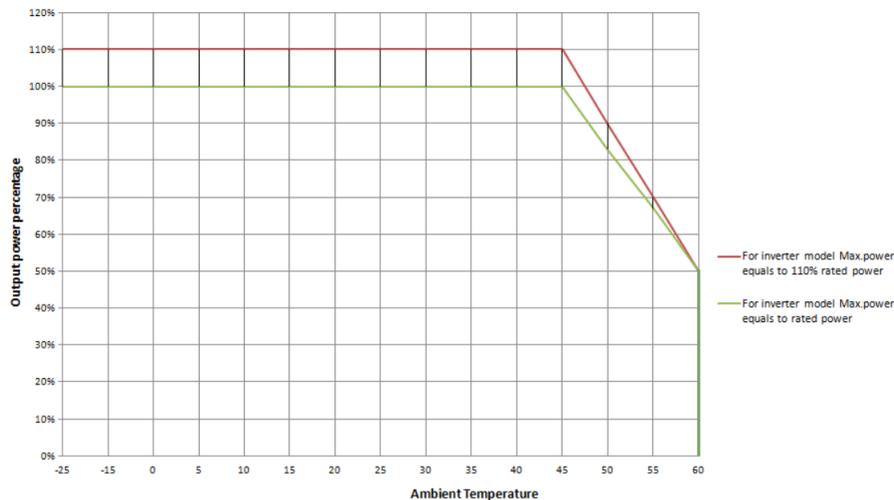
Grid ON/OFF Press UP/DOWN keys to cycle through grid ON/OFF options

	<p>Press ENTER key to save Press ESC key to return</p>
Clear Energy	<p>Reset the inverters total kWh output to zero.</p> <p> Using this function without previous approval from Autarco will void any existing kWh Guarantees.</p>
New Password	<p>Change the password to enter Advanced Info and Advanced Settings. Enter the current password before setting a new password. Press the DOWN key to move the cursor, Press the UP key to change the digit. Press the ENTER key to execute the setting. Press the ESC key to return to the previous menu.</p>
Power Control	<p>Inverter output active power and reactive power control can be set through this menu if the grid is unbalanced:</p> <ol style="list-style-type: none"> 1. Set output power 2. Set reactive power 3. Out_P with restore 4. Rea_P with restore 5. Select PF curve
Calibrate Energy	<p>Maintenance or replacement could clear or cause a different value for total energy. Use this function to allow user to revise the value of total energy to the same value as before.</p> <p>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.</p>
Special Settings	<p>Special settings can switch off functions temporarily for testing purposes. These tests should only be done by qualified Autarco personnel or trained installers when requested to do so. Submenu includes:</p> <ol style="list-style-type: none"> 1. Grid Filter Set 2. Relay_Protect Set 3. ILeak_Protect Set 4. GROUND_Protect Set 5. GRID INTF.02 Set 6. MPPT Parallel Mode 7. Cnst. Voltage Mode 8. L/FRT Set 9. IgZero_COMP. Set 10. PI Set 11. IgADCheckPRO Set 12. NoSmallPulse Set 13.
STD Mode Settings	<p>STD Mode Settings are used when demand response is required by grid operators.</p> <ol style="list-style-type: none"> 1. Working Mode Set

	<ol style="list-style-type: none"> 2. Power Rate Limit 3. Freq Derate Set 4. 10mins Voltage Set 5. Initial Settings
Restore Settings	Restore Settings resets the inverter to factory defaults.
HMI Updater	Selecting HMI Updater will show the current software version the LCD screen is based on.
Reset HMI	This function is used to reset the HMI software.
Debug parameter	Shows debug parameters.
Fan test	Test intelligent fan
Power parameter	<p>This function is used to calibrate inverter output energy. It will not impact the energy count for inverter with RGM.</p> <p> Using this function without previous approval from Autarco will void any existing kWh Guarantees.</p>

6.7 Temperature derating

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



6.8 External fan

The inverter's external fan switches on automatically when cooling via the heat sink is no longer sufficient. When the inverter's core temperature reaches 70°C, the fan will be activated. It will switch off once the core temperature is below 60°C.

7. Monitoring setup and system registration

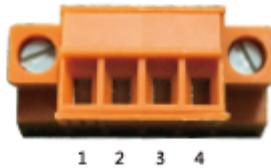
The UX inverters have the following communication ports:

- COM1: Green 4 pin connector RS485
- COM2 and COM3: Cable glands and cover with following connection points behind:
 - 2 x RJ45 connections
 - 1 x RS485 terminal block

COM2 and COM3 are RJ-45 connectors suitable for connecting multiple inverters in daisy chain configuration and connecting them to a WIFI-box, GPRS-box or other data logger.



Steps for connecting the RS-485 cable.

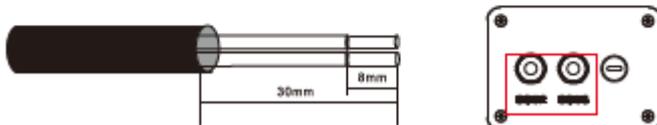


NO.	Port definition	Description
1	RS485A ₁ IN	RS485A ₁ ,RS485 differential signal+
2	RS485B ₁ IN	RS485B ₁ ,RS485 differential signal-
3	RS485A ₂ OUT	RS485A ₂ ,RS485 differential signal+
4	RS485B ₂ OUT	RS485B ₂ ,RS485 differential signal-

Connection of Terminal board.

a. Strip the insulation and shield to a suitable length. Use diagram below as a guide.

b. Remove the cap nut from the waterproof cable glands labeled COM2 and COM3 at the bottom of the inverter. Remove the plug from the fitting.



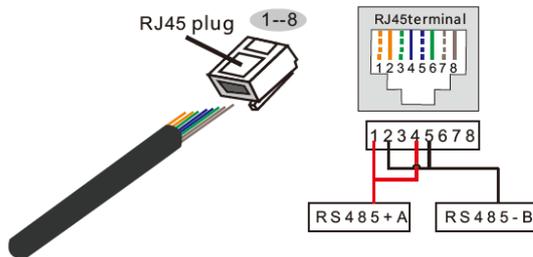
- c. Pass the cable through the cap nut for each port. COM2(RS485 IN) COM3(RS485 OUT).
- d. Pull down the terminal block on user interface board.

7.1 The following products are available to monitor UX series inverters:

Product	Port	Communication Method	Connection To:	IOT Capability	# Inverters per product	Parallel Connection
S2.WIFI-STICK	COM1	WIFI	Router	N	1	N
S2.LAN-BOX	COM2 & COM3	WIFI OR LAN	Router	N	10	Y, Cabled (RJ45)
S2.ETHERNET-STICK	COM1	Cabled (RJ45)	Router	N	1	N
S2.ZWAVE-STICK	COM1	Z-wave	Z-wave Gateway	Y	1	N
S2.GPRS-STICK	COM1	Sim Data	Cellular network	N	1	N
S2.GPRS-BOX	COM2 & COM3	Sim Data	Cellular network	N	10	Y, Cabled (RJ45)
PC or Data Logger	COM2 Terminal block	Local	PC or Data Logger	N	1	N

Steps for using RJ45 connections for RS485 Communications:

1. Use a network wire stripper to strip the insulation layer off the communication cable. Using the standard wire sequence referenced in TIA/EIA 568B, separate the wires in the cable. Use a network cable tool to trim the wire. Flatten the wire in the order shown in the figure below.



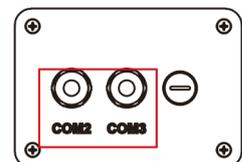
Correspondence between the cables and the stitches of plug

- Pin 1: white and orange ; Pin 2: orange
- Pin 3: white and green ; Pin 4: blue
- Pin 5: white and blue ; Pin 6: green
- Pin 7: white and brown ; Pin 8: brown

Pin 1 with 4 and 2 with 5 are used for communication connection

- Pin 1 and 4 are connected with RS485+A
- Pin 2 and 5 are connected with RS485 - B

2. Insert the wire into the RJ45 connector then crimp the connector with the crimping tool.
3. Remove the cap nut from the waterproof cable glands labeled COM2 and COM3 at the bottom of the inverter. Remove the plug from the fitting.
4. Insert the RJ45 connector into the RJ45 port in the inverter maintenance chamber.
5. Replace the cap nuts for COM2/3 and tighten firmly.



Please refer to related instructions of communication products for further installation instructions. Complete monitoring setup at <https://my.autarco.com/>

8. Maintenance



CAUTION! Do not touch the heat sink when the inverter is in operation. Turn OFF the inverter (see section 5.5) and allow for cooling down before cleaning.



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

The UX series inverters require general maintenance to be performed once per year. 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.

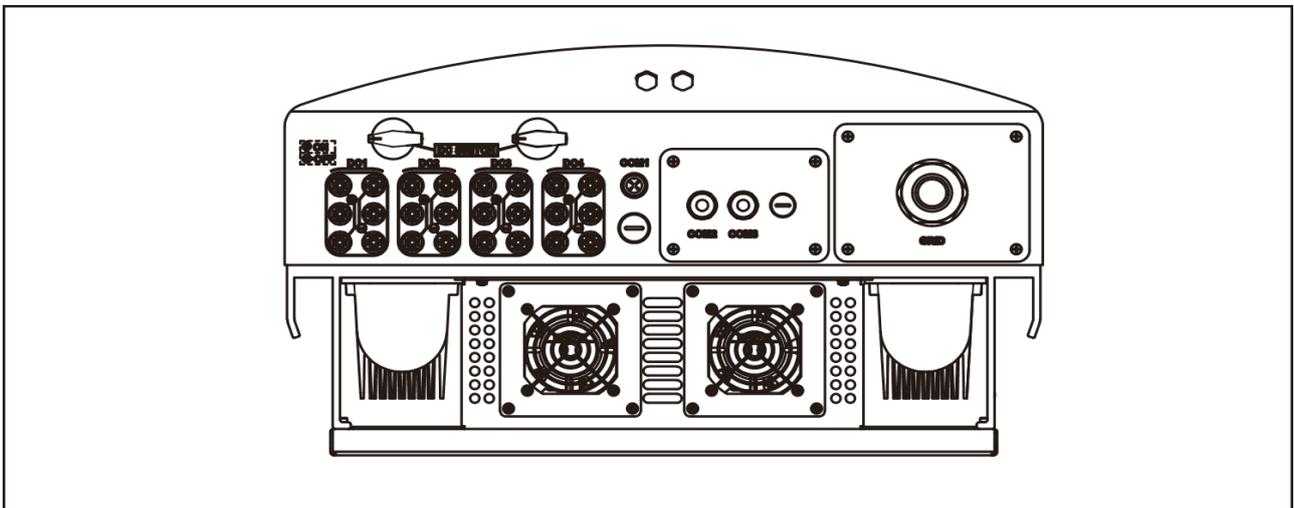
8.1 Fan Maintenance

If the fan does not work properly, the inverter will not be cooled effectively and inverter efficiency may be reduced.

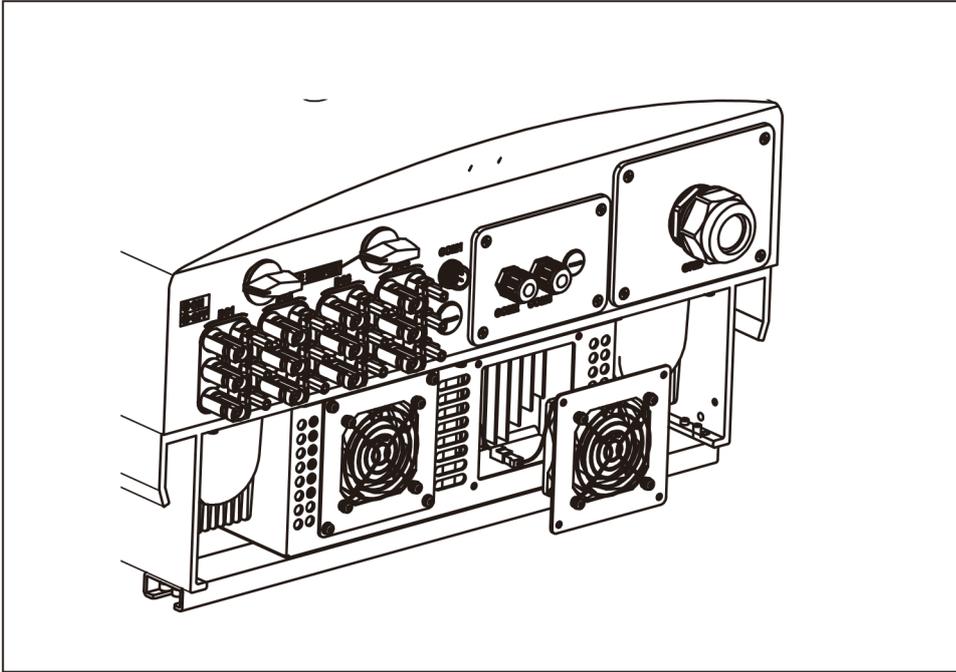
Note: The S2.UX40000(S) and S2.UX50000(S) have two fans, the S2US60000(S) has three fans.

Broken fans should be replaced following process below:

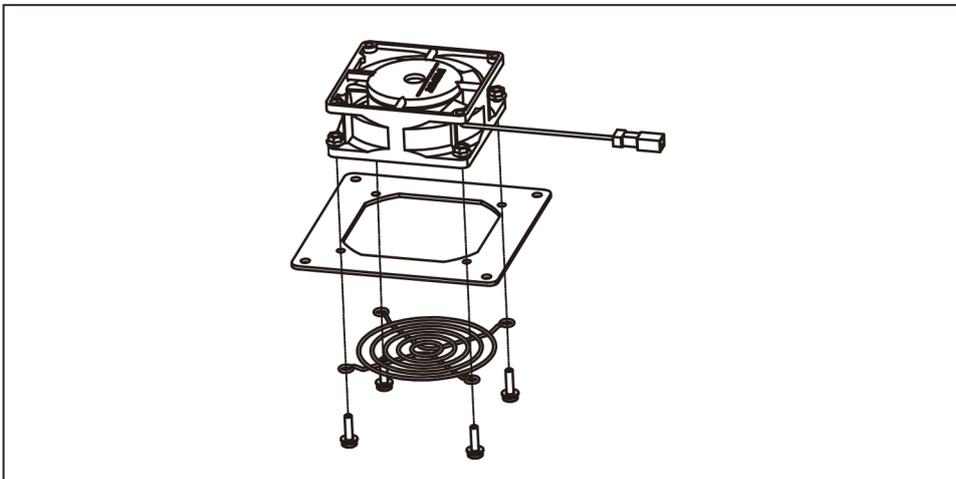
1. Disconnect the AC power.
2. Turn the DC switch to "OFF" position.
3. Wait for 10 minutes at least.



4. Remove the 4 screws on the fan plate and pull out the fan assembly slowly.



5. Disconnect the fan connector carefully and take out the fan.
6. Clean or replace the fan. Assemble the fan on the rack.



7. Connect the electrical wire and reinstall the fan assembly. Restart the inverter.

9. 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.

10. Troubleshooting

10.1 General

Display message	Action
Blank screen	<ul style="list-style-type: none"> • Check that all switches are in the ON position (including internal DC switch if present) • Check AC and DC power supply. If DC power is greater than 10W and string voltage greater than 200V the inverter should start. • If switches are on and AC and DC power supplies is available please contact installer.

10.2 Internal component fault

Error type	Display message	Error code	Error description	Action
Over BUS DC voltage	OV-BUS	1021	Internal fault	<ol style="list-style-type: none"> 1. Restart inverter (up to three times). 2. If error persists contact installer.
Under BUS DC voltage	UN_BUS	1012	Internal fault	
BUS balance fault	UNB2_BUS	1024	Internal fault	
System initial fault	INI-PRO	1031	Internal fault	
Relay fault	Relay_PRO	1035	Internal fault	
DSP_B fault	DSP_B_PRO	1036	Internal fault	
DC injection	DCInj_PRO	1037	Internal fault	
12V under voltage fault	12Power_PRO	1038	Internal fault	

10.3 Grid errors

Error type	Display message	Error code	Error description	Action
Over voltage	OV-G-V	1010	Grid voltage exceeds the standard set in the inverter	<ol style="list-style-type: none"> 1. Wait to see if the grid voltage returns within limits. 2. If problem persists, check whether the grid standard is set correctly in Advanced Setting). 3. Check V_AC, grid voltage, in Information display of inverter (see 6.4) and perform independent measurement of grid voltage to confirm that the inverter reading is correct. If the measured voltage is outside the local grid standard limits, please contact your local utility as it may require monitoring and adjustment
Under voltage	UN-G-V	1011	Grid voltage is below the standard set in the inverter	<ol style="list-style-type: none"> 4. With agreement from utility it is possible to set a user defined voltage range (see 6.7).
Over frequency	OV-G-F	1012	Grid frequency exceeds the standard set in the inverter.	<ol style="list-style-type: none"> 1. Wait to see if the grid frequency returns within limits. 2. If a problem persists, check whether the grid standard is set correct in Advanced Settings (see 6.7). 3. Check grid frequency, in Information display of inverter (see 6.4) and perform independent measurement of grid frequency to confirm that the inverter reading is correct. If the measured frequency is outside the local grid standard limits, please contact your local utility as it may require monitoring and adjustment.
Under frequency	UN-G-V	1013	Grid frequency is below the standard set in the inverter.	<ol style="list-style-type: none"> 4. With agreement from utility it is possible to set a user defined frequency range (see 6.7).
Grid impedance	G-IMP	1014	High grid impedance	<ol style="list-style-type: none"> 1. Wait to see if the grid returns within limits. 2. If problem persists please contact your local utility as it may require monitoring and adjustment.
No Grid	NO Grid	1015	The inverter cannot detect a grid.	<ol style="list-style-type: none"> 1. Check your AC power connections, fuses and switches. 2. Restart the inverter. 3. Call your local grid to resolve the black out.

10.4 System and design fault

Error type	Display message	Error code	Error description	Action
Over DC voltage	OV-DC	1020	The DC input of the solar strings exceeds the inverters limits.	<ol style="list-style-type: none"> 1. Restart inverter (up to three times). 2. Contact installer to: <ol style="list-style-type: none"> a. Perform independent measurement of string voltage to confirm that the inverter reading is correct. 3. Rewire strings so that string voltage is within accepted range.
Over temperature	TEM-PRO	1032	The internal temperature of inverter exceeds limits.	<ol style="list-style-type: none"> 1. Check location of inverter. Ensure it has adequate ventilation and is not exposed to direct sunlight. 2. Contact installer to replace inverter in case problem persists.
Short circuit fault	SHORT-PRO	1030	A short circuit has been detected in the system.	<ol style="list-style-type: none"> 1. Restart inverter (up to three times). 2. Call installer to: <ol style="list-style-type: none"> a. Check for pinched, crimped or otherwise damaged cables and connections. b. Check all switches for short circuit. 3. If error persists contact Autarco for replacement inverter.
Ground fault	GROUND-PRO	1033	Current flow detected through ground conductor.	<ol style="list-style-type: none"> 1. Restart inverter (up to three times). 2. Call installer to: <ol style="list-style-type: none"> a. Check if there is any current on the ground conductor using a clamp meter. b. Check for pinched, crimped or otherwise damaged cables and connections. 3. If error persists contact Autarco for replacement inverter.
Current leakage	ILeak_PRO O	1034	A current leak has been detected.	<ol style="list-style-type: none"> 1. Restart inverter (up to three times). 2. Call installer to: <ol style="list-style-type: none"> a. Check if there is any current on the ground conductor using a clamp meter. b. Check for pinched, crimped or otherwise damaged cables and connections. 3. If error persists contact Autarco for replacement inverter.

11. Product specifications

	S2.UX40000(S)	S2.UX50000(S)	S2.UX60000(S)	S2.UX50000-HV	S2.UX60000-HV	S2.UX70000-HV
Input						
Max. DC voltage (V)	1100					
MPPT voltage range (V)	200-1000					
Turn on voltage (V)	200					
Turn off voltage (V)	200					
Number of MPP trackers	4					
Max. DC current per MPPT (A)	22.0	28.5	28.5	22.0	28.5	28.5
Number of DC connections per MPPT	2	3				
Total number of strings	8	12				
DC connection type	MC4					
Output						
Nominal AC power (W)	40000	50000	60000	50000	60000	70000
Max. AC power (W)	44000	55000	66000	55000	66000	77000
Nominal AC current (A)	58.0	72.2	86.6	60.2/57.7	72.2/69.3	74.8
Max. AC current (A)	66.9	83.3	100.0	66.2	80	82.3
Power connection	Three phase					
Grid voltage range	According to EN50438 VDE 0126-1-1, UL1741, G59/3, AS4777					
Grid frequency range	According to EN50438 VDE 0126-1-1, UL1741, G59/3, AS4777					
Power factor (at rated output power)	0.8 ...1... 0.8					
Harmonic distortion at nom. output	<3%					
AC connector	OT Terminal connectors					
Overvoltage category	OVC III (MAINS), OVC II (PV)					
Power consumption						
Nighttime power consumption (W)	< 1					
Standby power consumption (W)	6					
Efficiencies						
Max. efficiency	98.8%		99.0%	99.0%		99.0%
Euro efficiency	98.4%		98.5%	98.72%		98.5%

	S2.UX40000(S)	S2.UX50000(S)	S2.UX60000(S)	S2.UX50000-HV	S2.UX60000-HV	S2.UX70000-HV
Safety protection						
Internal overvoltage protection	Yes					
DC Insulation monitoring	Yes					
Earth fault protection	Yes					
Grid monitoring	According to VDE 0126-1-1, UL1741, G83/2, AS4777					
Earth fault current monitoring	According to VDE 0126-1-1, UL1741, G83/2, AS4777					
DC current monitoring	According to VDE 0126-1-1, UL1741, G83/2, AS4777					
Islanding protection	According to VDE 0126-1-1, UL1741, G83/2, AS4777					
CE- compliant	According to EN61000-6-2, EN61000-6-4, AS3100, IEC62109					
General data						
Dimensions (W x H x D) (mm)	630 x 700 x 357					
Weight	61kg	63kg	61kg	61kg	63kg	63kg
Installation environment	Indoor or outdoor					
Mounting	Wall bracket					
Operating temperature range (°C)	-25°C to 60°C					
Max. relative humidity	100%					
Maximum altitude	4000m					
IP protection rating	IP65 according to EN60529					
Isolation type	Transformerless					
Cooling concept	Natural convection	Intelligent redundant fan-cooling		Natural convection	Intelligent redundant fan-cooling	
Noise level (dB)	< 30	< 60		< 30	< 60	
LED indicators	3					
LCD display	16 x 2 character					
Communication interfaces	4 pins RS485 connector 2 RJ45 connector 2 group of terminal block					
Optional interfaces	Wi-Fi, GPRS, Z-Wave, LAN					
Standard warranty	10 years					
Integrated DC switch	Optional					