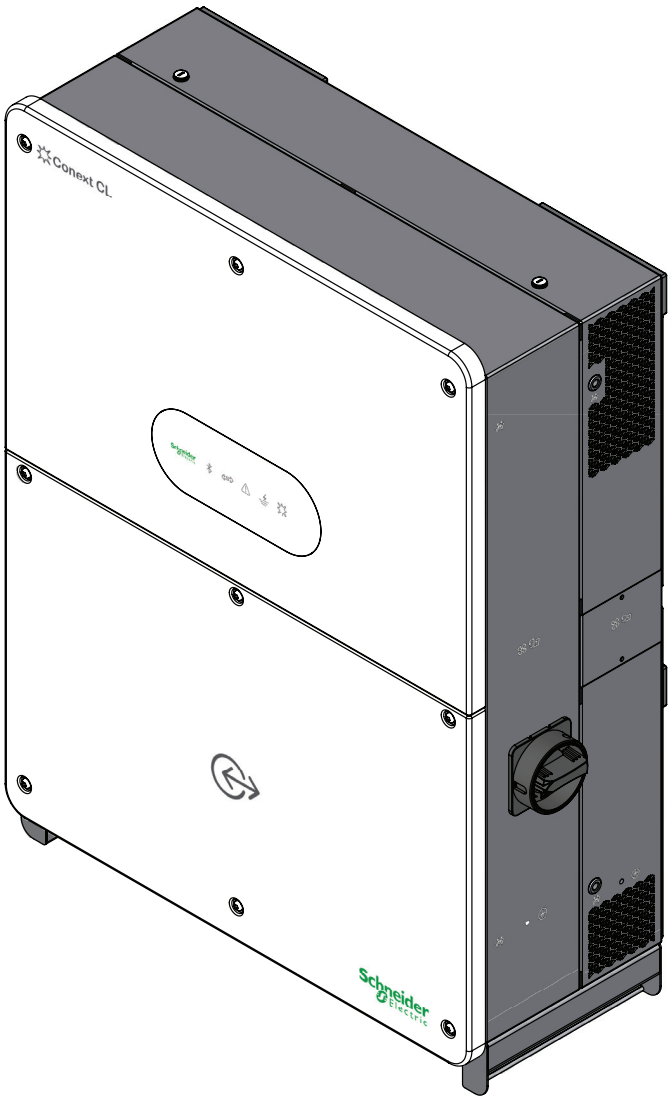
Conext™ CL125 PV Inverter

Owner's Guide

975-0793-01-01 Rev A
5-2018



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Product Part Numbers: PVSCL125A (CL125A—North American version)
PVSCL125E (CL125E—IEC version)

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About This Guide

Purpose

The purpose of this Owner's Guide is to explain the procedures for operating, configuring, maintaining, and troubleshooting the Conext CL125 PV Inverter.

Scope

The Guide provides safety guidelines and general information for installing and operating the Conext CL125, as well as information about configuring, monitoring, and troubleshooting the unit. It does not include information on how to use other Schneider Electric and third-party products.

Audience

The Guide is intended for use by anyone who plans to design, construct, install, or operate a system involving the CL125. The installation information in this guide is intended for qualified personnel. Qualified personnel have training, knowledge, and experience in:

- Installing electrical equipment and PV power systems (up to 1500 volts)
- Applying all applicable installation codes
- Analyzing and reducing the hazards involved in performing electrical work
- Selecting and using Personal Protective Equipment (PPE)

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Organization

This Guide is organized into:

Chapter 1, “Introduction”
Chapter 2, “Installation”
Chapter 3, “Electrical Connections”
Chapter 4, “Commissioning”
Chapter 5, “eConfigure CL125 APP Operation”
Chapter 6, “Troubleshooting”
Chapter 7, “Disconnecting, Dismantling, and Disposing of the CL125”
Chapter 8, “Specifications”

Abbreviations and Acronyms

AC	Alternating Current
CPLD	Complex Programmable Logic Device
DC	Direct Current
DSP	Digital Signal Processor
EMI	Electromagnetic Interference
G or GND	Ground
HMI	Human-Machine Interface
HVRT	High Voltage Ride-Through
LAN	Local Area Network
LOTO	Lock-Out and Tag-Out
LVRT	Low Voltage Ride-Through
LED	Light Emitting Diode (used for indicator lights)
MPPT	Maximum Power Point Tracking
MV	Medium Voltage
NFPA	National Fire Protection Association
PE	Protective Earth
Phase-R	Line 1 (L1) in a three-phase system
Phase-S	Line 2 (L2) in a three-phase system
Phase-T	Line 3 (L3) in a three-phase system
PPE	Personal Protective Equipment
PV	Photovoltaic (or Solar)
SPD	Surge Protection Device

Related Information

You can find more information about Schneider Electric, as well as its products and services at https://solar.schneider-electric.com.

Important Safety Instructions

READ AND SAVE THESE INSTRUCTIONS - DO NOT DISCARD

This document contains important safety instructions that must be followed during installation procedures (if applicable). **Read and keep this Owner's Guide for future reference.**

Read these instructions carefully and look at the equipment (if applicable) to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, can result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, can result in moderate or minor injury.

NOTICE

NOTICE indicates important information that you need to read carefully.

Please Note

Electrical equipment must be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Label Symbols and Product Markings

NOTE: The term "ground" is equivalent to "protective earth" or PE, and the use of these terms depends on local codes and standards. This document uses the term "ground" throughout.

The following symbols appear on labels (or etched) on the inverter.

	Hazardous voltage
	Stored energy hazard discharge time
	Refer to the Owner's Guide for installation and operational instructions
	Direct current
	Alternating current
	Ground (Protective Earth, PE) terminal
	Fan assembly
	Call service
	Handling
	ON switch
	OFF switch

Product Label Placement

The Conext CL125 inverter has different product labels designed to provide information on product ratings and specifications, provide safety information, identify inverter section doors, and identify parts and functions of the inverter.

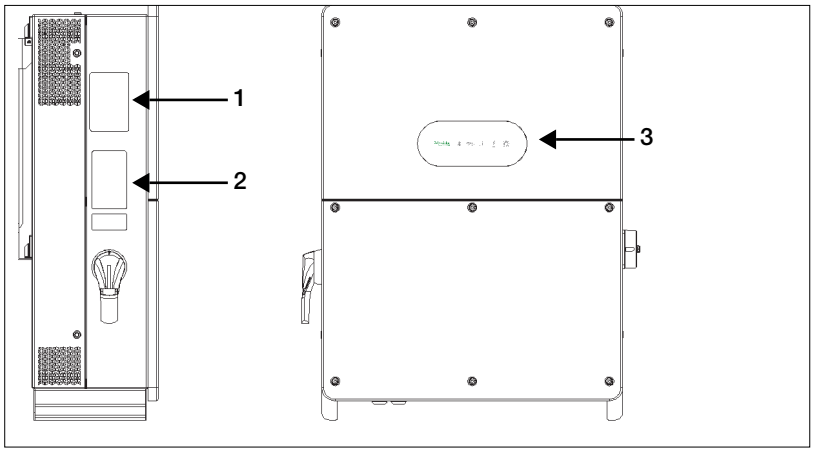

Figure 1-1 Product Labels and Markings

Item	Description
1	Ratings label
2	Main product safety labels
3	LED panel

Ratings Label

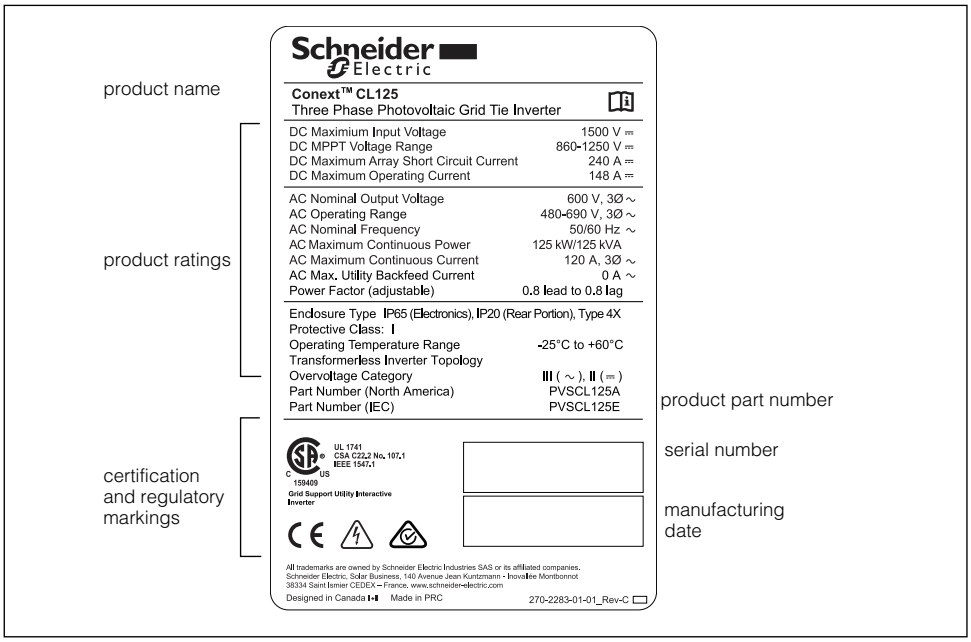

Figure 1-2 Example of a Conext CL125 Product Label

LED Panel

The LED Panel indicates CL125 PV Inverter status information. It is made up of five LED indicators.

Figure 1-3 LED Panel

Table 1-1 LED Panel Icons Short Description

LED Icon	Short Description	LED Icon	Short Description
	Bluetooth connectivity		Ground Fault
	Communication		Normal operation
	Alert	--	--

Safety Information

1. **Before using this product, read all instructions and cautionary markings on the unit and all appropriate sections of this manual.**
2. Use of accessories not recommended or sold by the manufacturer may result in a risk of fire, electric shock, or injury to persons.
3. The manufacturer recommends that all wiring be done by a certified technician or electrician to ensure adherence to the local and national electrical codes applicable in your jurisdiction.
4. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the equipment with damaged or substandard wiring.
5. Do not operate the equipment if it has been damaged in any way.
6. Do not disassemble the Conext CL125 except where noted for connecting wiring and cabling. See your warranty for instructions on obtaining service. Attempting to service the unit yourself may result in a risk of electrical shock or fire.
7. To reduce the risk of electrical shock, disconnect the power supply from the equipment before attempting installation, and any maintenance (including cleaning or working on any components connected to the equipment). Internal capacitors remain charged for ten minutes after all power is disconnected.
8. The equipment must be grounded. Use the protective grounding conductor provided with the AC input conductors.
9. This product is designed for outdoor use and is rated IP65 and Type 4X.
10. To reduce the chance of short-circuits, always use insulated tools when installing or working with this equipment. Do not leave tools inside.
11. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with electrical equipment.
12. Do not open nor disassemble the top half of the unit. There are no user-serviceable parts inside.
13. To disconnect the unit from DC power, open the DC disconnect switch (turn to OFF position), open the DC disconnect device in the DC combiner box, and then remove the PV cables from the DC terminals of the inverter.

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARDS

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

Access to live parts shall be limited to suitably qualified electrical personnel. See installation instructions before connecting to the supply.

NOTICE

EQUIPMENT DAMAGE

- All cables connected to the CL125 must run through the cable glands on the unit.
- This unit is susceptible to damage from EMI and nearby lightning strikes unless a surge protection device (a lightning arrestor) is installed.
- Turn Off all devices before connecting cables.
- Use the DC disconnect switch as the CL125's On/Off switch.
- To isolate the CL125, follow "Lock-Out Tag-Out (LOTO) Procedure" on page xiv.

Failure to follow these instructions can damage equipment or affect network performance.

Storage Information

Store the inverter properly when the inverter is not to be installed immediately.

1. Inverter must be packed inside its original carton with the desiccant bags inside.
2. Store the inverter with its front panel facing up. The carton should lay flat and parallel to the ground.
3. Seal the carton with standard packaging tape.
4. Store the inverter in a dry and clean place to protect it against dust and moisture.
5. Temperature: -40 to 85 °C (-40 to 185 °F)
   Relative humidity: 4 to 100%.
6. Do not stack more than four inverters (carton) on top of another.
7. Keep the inverter away from chemically corrosive materials.
8. Periodically check for any visible damages to the carton and inspect the inverter right away if the carton shows signs of penetration during the storage period. Replace the carton, if necessary.

NOTE: A thorough and professional inspection may be required before installing the inverter after more than six months in storage. Contact a local Schneider Electric sales representative for information on how to arrange the inspection.

IMPORTANT: Storage beyond two years voids the warranty.

Lock-Out Tag-Out (LOTO) Procedure

Lock-out refers to the practice of preventing de-energized circuits from being re-energized by putting locks on the disconnecting devices, holding them open. Tag-out refers to the practice of attaching a tag to the disconnect-device locks warning others not to operate the disconnect device and containing information relating to the lock-out, such as the person responsible, the reason, and the date and time. Combined these two practices are called the lock-out and tag-out (LOTO) procedure.

DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARDS

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Never energize the inverter with the covers removed.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.
- Replace all devices and covers before turning on power to this equipment.
- The inverter is energized from multiple sources. Before opening the cover identify the power source, de-energize, lock-out and tag-out, and wait at least ten minutes for circuits to discharge.

Failure to follow these instructions will result in death or serious injury.

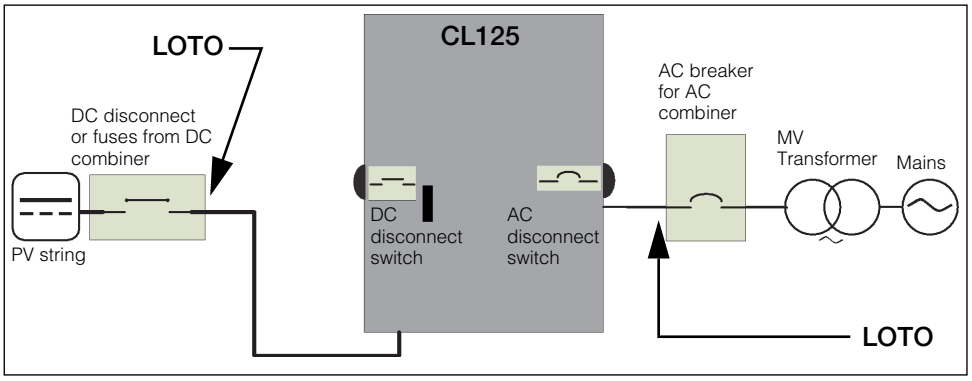

Figure 1-4 Single Line Diagram for CL125

1. Identify the external AC disconnect device, such as an AC breaker from the AC Combiner downstream, from the CL125 unit.
2. Open the AC disconnect device that connects to the CL125 to cut off the AC power source.
3. Open the CL125's internal AC disconnect switch by turning the knob to the OFF position.

4. Lock-out and tag-out the external AC disconnect device.
5. Identify any external DC disconnect device from the DC Combiner upstream from the CL125 unit.
6. Open the DC disconnect device (or if a DC disconnect is absent, then disengage the fuseholder) that connects to the CL125 to cut off the DC power source.
7. Lock-out and tag-out the external DC disconnect device.
8. Open the CL125's internal DC disconnect switch by turning the switch lever to the OFF position.
9. Wait at least ten minutes for the circuits in the CL125 to discharge.
10. Check that the inverter is in zero energy state before performing work.
11. Open the CL125 enclosure and commence service and maintenance activities.

Radio Frequency Interference Notice

Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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Contents

1 Introduction

Chapter 1 contains general information about:

- Conext CL125
- Physical Features
- Technical Features

Conext CL125

The Conext CL125 (also referred to as CL125 PV Inverter) is a transformerless three-phase PV string inverter that is designed to be an integral part of any utility grid-connected PV Power System.

The Conext CL125 is designed to convert DC power generated from the PV array into AC power that is compatible with utility grade AC power. The following diagram illustrates its fundamental application.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

- Do not connect the inverter to a PV string where the positive and negative terminals of the PV strings need to be grounded.
- Do not connect any local load between the inverter and the AC circuit breaker.
- Use the inverter ONLY in a grid-connected PV system.

Failure to follow these instructions can result in death or serious injury.

IMPORTANT: Failure to follow the WARNING voids the warranty.

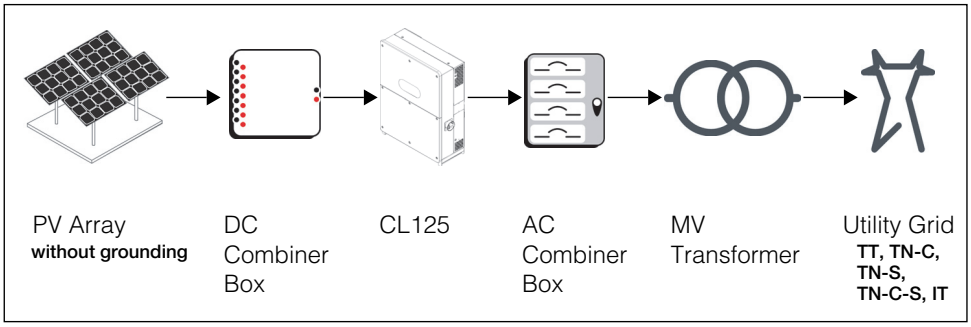


Figure 1-1 Fundamental Application

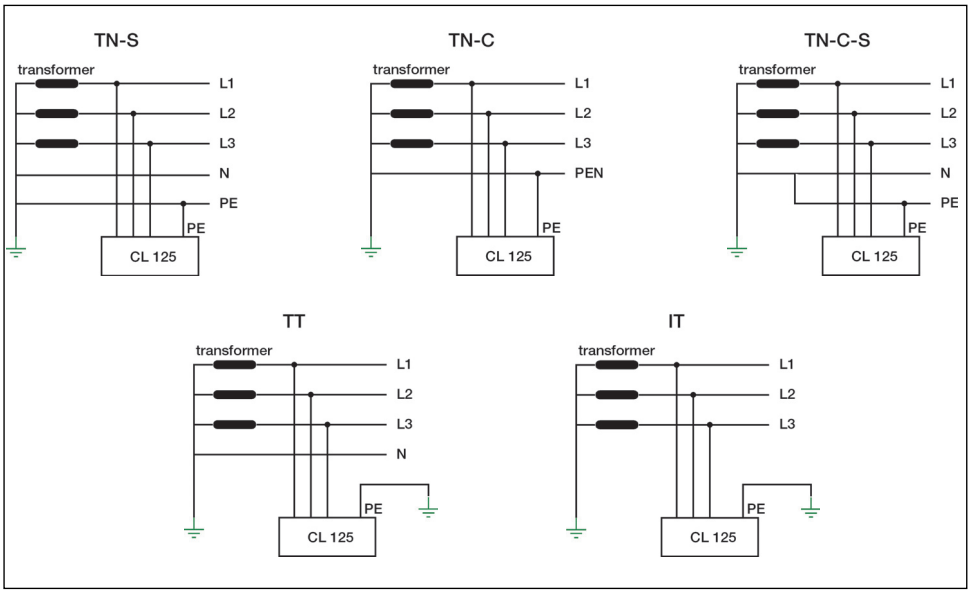


Figure 1-2 Type of Grid Connections

Grid Connection Conditions

More than one CL125 PV Inverter can be connected to the PV system, if the total capacity of the PV system (PV array) exceeds the capacity of a single inverter. Each inverter in the multiple setup connects individually to a PV string at the inverter's DC input side. Then, the inverter's AC output side connects to the AC mains (the grid).

NOTICE

EQUIPMENT DAMAGE

Follow local regulations when installing a connection to a either a **TT** or **TN** system. An additional external Type B RCD (residual current detection) device rated 1.25 A continuous may be required and combined with additional automatic disconnect devices.

Failure to follow these instructions can result in equipment damage.

Physical Features

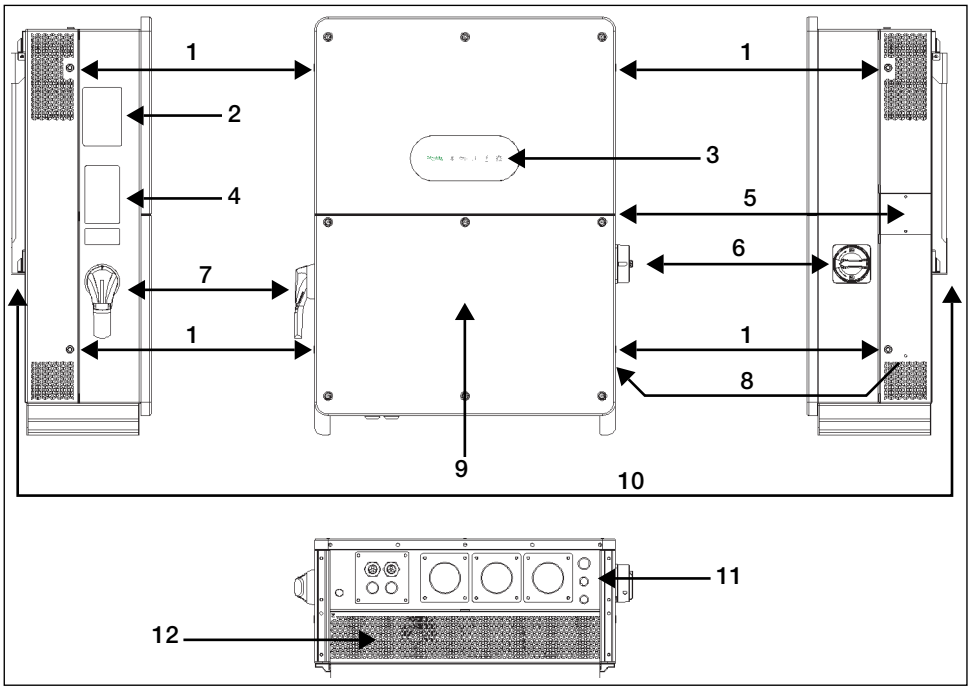


Figure 1-3 CL125 Components

Item	Description
1	**Hole Inserts** are used for seating the screw-in handles (supplied) used for moving, handling, and mounting the PV Inverter.
2	**Ratings Label** contains electrical specifications and regulatory markings.
3	**LED Panel** is the main HMI for viewing operational information.
4	**Warning Label** Read before installing and servicing the unit.
5	**Fan assembly** for accessing the fans.
6	**AC disconnect switch** is a protective component for safely disconnecting AC power from the grid but only up to the terminals.
7	**DC disconnect switch** is a protective component for safely disconnecting DC power from the PV Array but only up to the terminals. For full disconnection, disconnect power from the PV disconnect device. See “Single Line Diagram for CL125” on page xiv.
8	**PE second terminal** for ground connection.
9	**Electrical connection area** includes the DC terminals, AC terminals, and RS-485 communication terminals.
10	**Backplate** is used to hang the PV Inverter onto a mounting surface.
11	**Cable entry points** for AC, DC, and communications.
12	**Air vents** for drawing air circulation inside the unit.

Dimensions

Inverter Dimensions

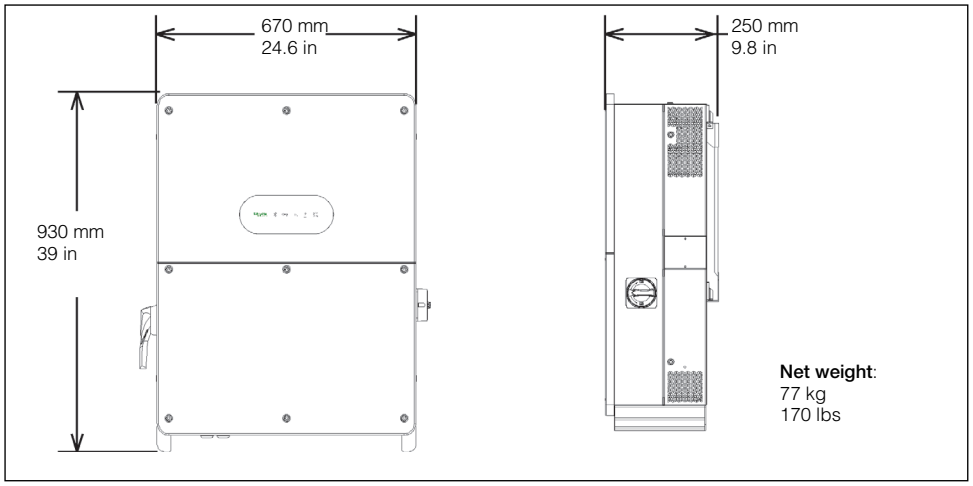


Figure 1-4 Conext CL125 Dimensions

Packaging Box Dimensions

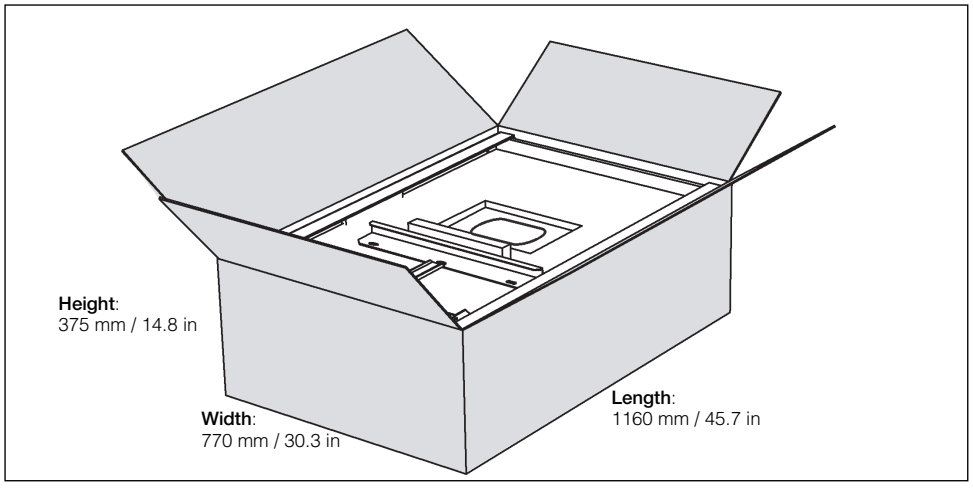


Figure 1-5 Conext CL125 Packaging Box Dimensions

DC Disconnect Switch

The DC disconnect switch is both the main power switch and a protective component which is used to safely disconnect DC power between the PV array and the PV Inverter whenever necessary to do so.

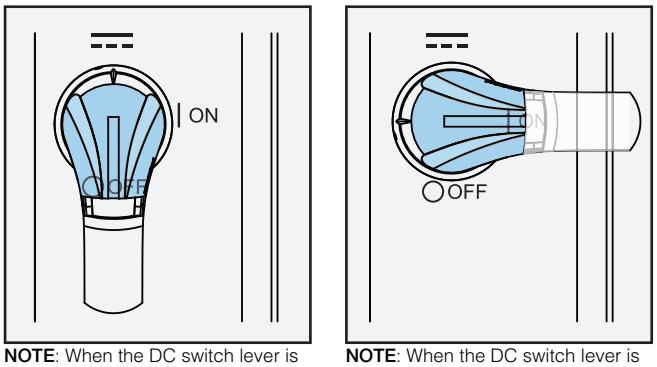
The PV Inverter operates automatically (without the need of switching On or Off) when DC input and AC output requirements are continuously met. Open the DC disconnect switch by turning the switch lever to the Off position only to stop PV Inverter operation, when a ground fault condition is detected or when there is a non-ground event condition to stop inverter operation such as maintenance and servicing.

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Do not perform maintenance and servicing without totally disconnecting the DC source from the inverter. The DC disconnect switch does not de-energize the DC terminal circuits. The terminal circuits remain live even if the DC disconnect switch lever is turned to the Off position.
- To remove power to the inverter, disconnect power from the PV disconnect device. See “Single Line Diagram for CL125” on page xiv.

Failure to follow these instructions can result in death or serious injury.



NOTE: When the DC switch lever is pointing down, the switch is in the OFF position

NOTE: When the DC switch lever is pointing to the right, the switch is in the ON position

Figure 1-6 DC Switch Level Positions

NOTE: The DC disconnect switch is provided with a lockable twisting knob to meet the NFPA 70E standard.

Technical Features

CL125 Circuit Diagram

Figure 1-7 shows the main circuit of the PV Inverter.

Maximum Power Point Tracking (MPPT) is utilized to optimize harvesting DC power from the PV array with different PV input conditions.

The PV Inverter circuit converts DC power into AC power and feeds it to the utility grid through the inverter's AC terminal. The protection circuit is equipped to ensure the device's safe operation and personal safety. The DC disconnect switch (DC Switch) is used to disconnect DC power from the PV Array safely.

The inverter provides standard RS-485 ports for communication.

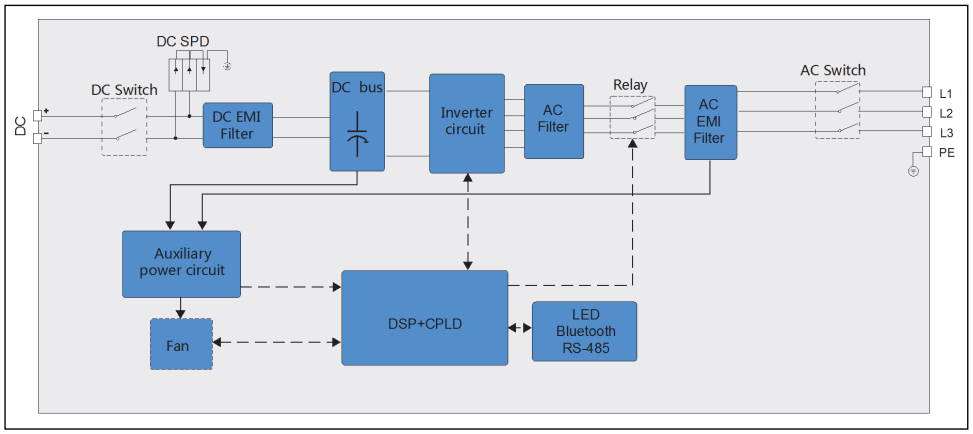


Figure 1-7 Conext CL125 Circuit Diagram

Standard Features

Inverter Function The device's main function is to convert DC current into grid-compatible AC current then feed this current into the grid.

Data Storage and LED Panel The onboard memory stores information such as ground fault detection and other events. They are accessed through the eConfigure CL125 APP interface.

Device Configuration The eConfigure CL125 APP provides the main interface for accessing device settings and changing them for optimal operation of the inverter.

Communication Interface Features a standard RS-485 port which can be connected with a monitoring device, such as a data logger. Bluetooth connectivity is also available for interfacing with the inverter.

Protection Features The unit is equipped with the following features for preventing inverter damage, other equipment damage, and personal injury hazards.

- Short-circuit protection
- Ground insulation resistance detection
- Grid voltage monitoring
- Grid frequency monitoring
- Residual current protection
- DC injection monitoring (in AC output current)
- Anti-islanding protection
- Ambient temperature monitoring
- DC over-voltage protection
- Over-current protection
- Power module over-temperature protection
- Fan equipment failure detection

Derating Features

Output Derating Output derating is a way to protect the inverter from overload or potential event detections. These situations prompt the PV Inverter to initiate power derating:

- Altitude higher than 3000 meters
- Internal temperature is too high (including ambient temperature and internal components temperature)

  NOTE: For example, installing the inverter in an enclosed space may hasten derating.

- Grid voltage is too low
- External power curtailment
- Grid frequency is too high

  NOTE: Dependent on country settings.

- High grid voltage with a simultaneous low PV voltage.

Power Limit Setting Inverter output power can be adjusted via the eConfigure CL125 APP or a remote grid dispatch from the utility company. The corresponding operating state will be displayed on the LED Panel.

Over-temperature Derating High ambient temperature, a blocked fan, or poor ventilation will initiate inverter power derating.

When the temperature inside the unit exceeds the upper limit, the inverter will derate its power output until the internal temperature drops within the permissible range.

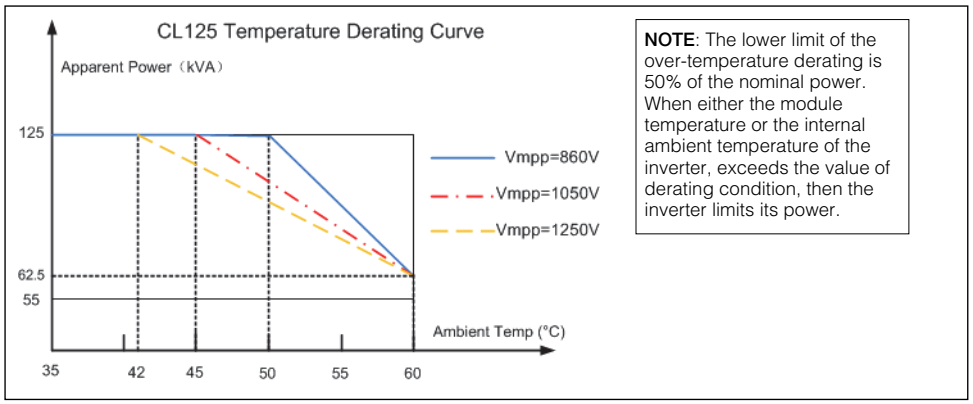


Figure 1-8 Over-Temperature Derating

Grid Under-voltage Derating When grid voltage is low, the inverter will derate the output power to make sure the output current is within the permissible range. Once the grid voltage is within Vmin (600 V), the inverter will derate its output power.

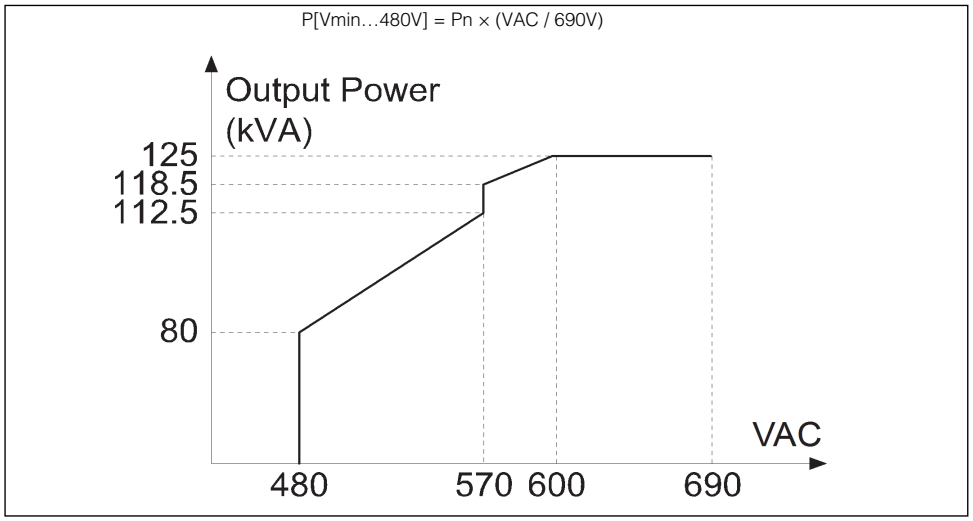


Figure 1-9 Grid Under-Voltage Derating

PV Over-voltage Derating The inverter regularly scans the PV voltage every 25 minutes and forces the PV to derate to test whether the maximum power point is less than 1250 volts.

At 125 KVA, if the maximum power point is higher than 1250 volts, then the inverter will return to the higher voltage limit before it starts derating.

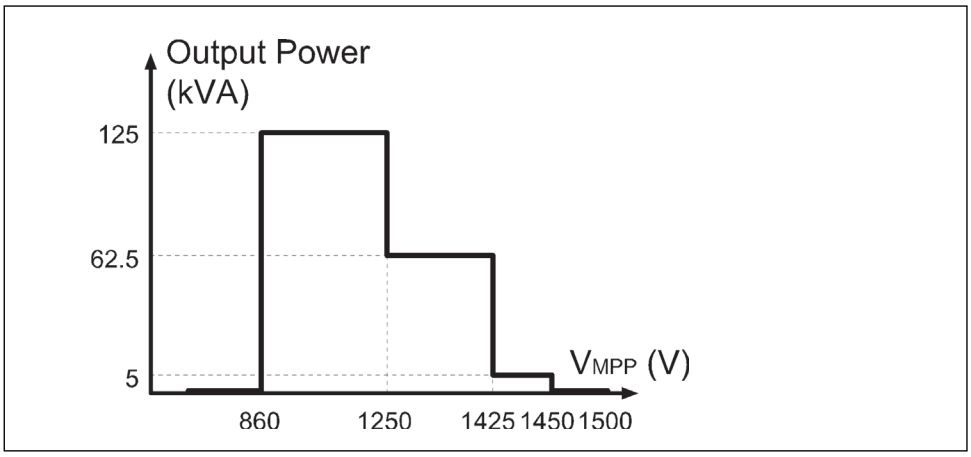


Figure 1-10 PV Over-Voltage Derating

2 Installation

Chapter 2 contains information about:

- Pre-Installation
- Installation

Pre-Installation

Before installing the Conext CL125, read all instructions and cautionary markings in this Guide.

NOTE: Obtain all necessary permits prior to starting the installation. **Installations must meet all local codes and standards.** Installation of this equipment should only be performed by skilled personnel such as qualified electricians and Certified Renewable Energy (RE) System installers.

Planning the Installation

- Read this entire chapter before beginning the installation. It is important to plan the installation from beginning to end.
- Assemble all tools and materials needed for the installation.

Installation

DANGER

ELECTRIC SHOCK AND FIRE HAZARD

- Do not connect the PV Inverter to a live power source prior to cabling and wiring found in Chapter 3, “Electrical Connections”. The inverter can be energized from two sources namely, DC from the PV array and AC from the grid.
- Do not connect any powered device to the PV Inverter during installation.

Failure to follow these instructions will result in death or serious injury.

What’s In The Box

The following materials are supplied in the Conext CL125 package:

First Row

A CL125 unit

B Wall-mounting backplate

C CL125 Quick Install Guide, labels

Second Row

D Metal frame M10x45 fasteners (6x)

E M4x16 backplate screws (2x) and M6 grounding screw/washer

F Lifting handles (4x) and M12 lifting rings (2x)

G Cable glands (2x) with extra grommets (6x various sizes)

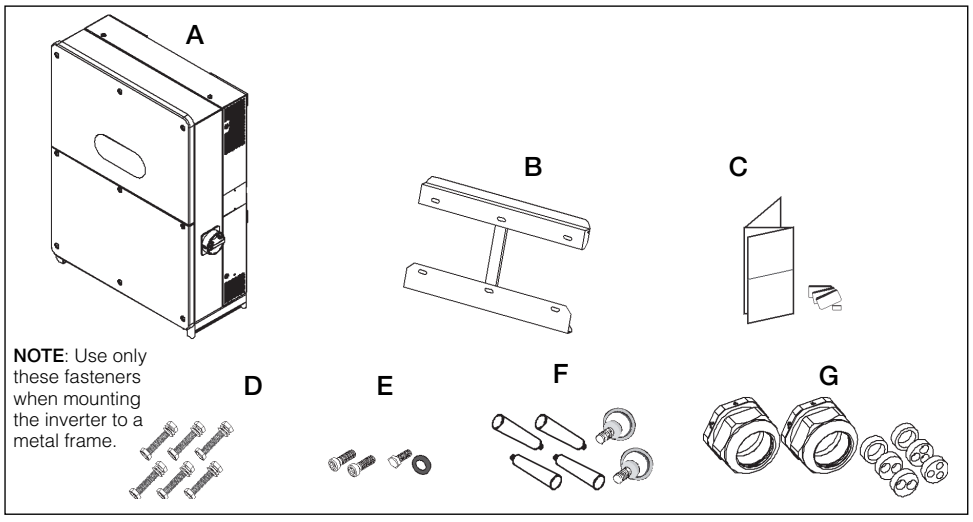


Figure 2-1 What’s In the Box

Material and Tools

The following materials and tools are not supplied but are required to complete the installation:

- Personal protective equipment (PPE)
- Torque wrench
- Screwdriver and drill set (powered and/or manual)
- Calibrated professional digital multimeter with suitable probes and is capable of measuring voltages up to 1500 V
- Crimping tool for higher gauge wires

Location Information

⚠⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARDS

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

Environment

The CL125 is IP65 rated (CL125E) and Type 4X rated (CL125A). It is suitable for outside installation.

The ambient temperature should be within the range of –25 to 60 °C (–13 to 140 °F) to prevent automatic power derating in over-temperature conditions. Relative humidity at the installation site can be from 4 to 100%.

Allow for at least 600 mm (~24 inches) clearance on all sides of the inverter. When installing another inverter next to it (or several inverters around it), increase the clearance between inverters from all sides to 800 mm (~32 inches).

See Figure 2-2, “Clearances and Ambient Temperature” on page 2–5.

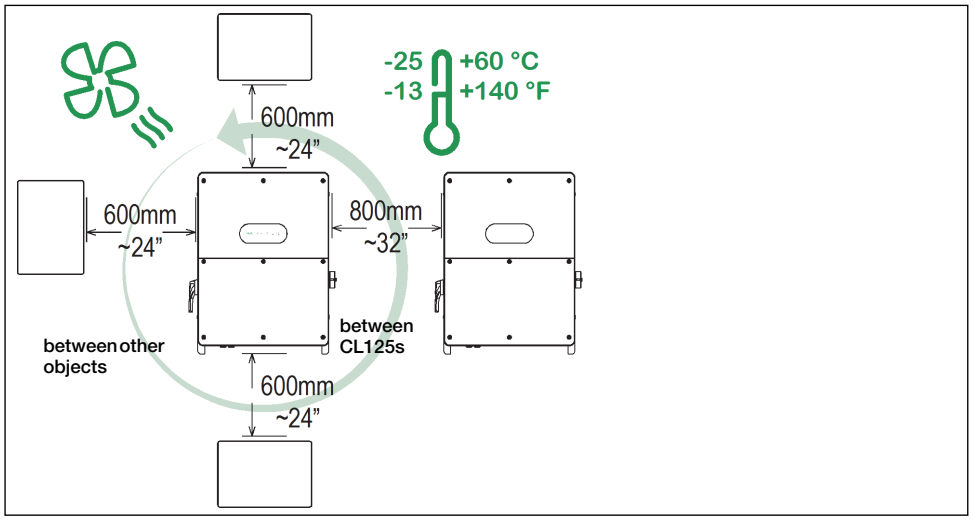


Figure 2-2 Clearances and Ambient Temperature

Fire Safety

⚠ WARNING

IGNITION AND FIRE HAZARD

- This equipment is not ignition protected. To prevent fire or explosion, do not install this product in locations that require ignition-protected equipment. This includes any confined space containing lead acid batteries, or flammable chemicals such as, natural gas (NG), liquid petroleum gas (LPG) or gasoline (Benzine/Petrol).
- Do not install in a confined space with machinery powered by flammable chemicals, or storage tanks, fittings, or other connections between components of fuel or flammable chemical systems.
- Do not install the CL125 on a wooden/plastic/plaster wall.
- Do not install the CL125 near readily flammable materials such as cloth, paper, straw, or plastic sheeting. Keep flammable materials from all sides including the front of the CL125.

Failure to follow these instructions can result in death or serious injury.

Flammable or combustible materials are defined as “any material containing wood, compressed paper, cellulose, plant fibers, plastics, liquids, or other material that will ignite and burn, whether flame-proofed or not” according to NFPA 70E. Flammable liquids are defined as “any liquid whose flash point does not exceed 100 °F (38 °C).” Examples of flammable liquids are gasoline, methanol, and ether.

When choosing a wall or flat surface to install the CL125, choose a wall or flat surface that is not considered a flammable material such as concrete, brick, or metal.

Handling Precautions

⚠ CAUTION

HEAVY LOAD HAZARD

- Do not handle and lift the unit by yourself. Use two people to move, lift, and mount the unit.
- Always use proper lifting techniques during installation.
- When handling the inverter, install all four screw-in handles (supplied) to both sides of the inverter first and make sure they are seated correctly in their slots. Install lifting rings (supplied) to the top side of the inverter and make sure they are seated correctly in their slots.
- Use mechanical or motorized hand trucks and/or a portable crane system whenever possible to aid in proper handling.

Failure to follow these instructions can result in moderate or minor injury.

Storage Considerations

If the inverter cannot be installed immediately after delivery at the installation site, consider storing the inverter inside its original carton and setting it aside away from potential damage. For more guidelines, see “Storage Information” on page xiii.

Location Hazards

In order to avoid other potential hazards follow the instructions in the WARNING below.

⚠ WARNING

ELECTRICAL SHOCK, FIRE, AND PHYSICAL INJURY HAZARD

- Install the CL125 on a concrete wall or metal frame which can support the weight (77 kg /170 lbs) of the unit over time. When installing multiple units, make sure the wall or metal frame can support the total weight of the units over time.
- Install the unit upright at 90° vertical angle in relation to the floor.
- Install the unit at the recommended height of 1.2 m (4 ft.) for easy access to the terminals and ports.
- Avoid installing the CL125 in completely uncovered locations where persistent rain and moisture spray can eventually penetrate the enclosure. Install under a covered structure.

Failure to follow these instructions can result in death or serious injury.

NOTICE

EQUIPMENT DAMAGE

- Avoid installing the CL125 in direct sunlight or near other heat sources like the exhausts of inverters and generators, steam exhausts from boilers and dryers, and engine compartments. Install in shaded locations.
- Choose a location and an installation layout that minimizes potentially induced voltage spikes that might damage the electronics.
- Install a separate and external surge protection device to protect the CL125's power module and communication ports.

Failure to follow these instructions can result in equipment damage.

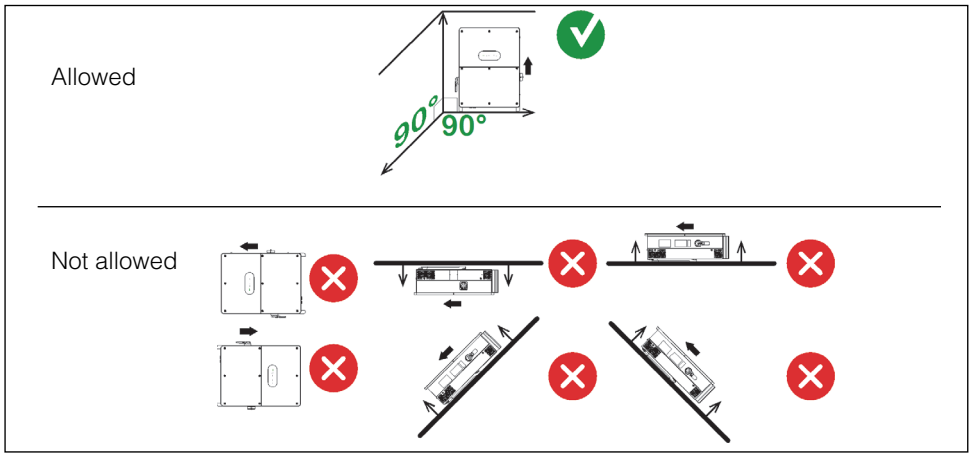


Figure 2-3 Mounting Orientations

PV Planning

For IEC model only:

DANGER

HAZARD OF ELECTRIC SHOCK, FIRE, AND EQUIPMENT DAMAGE

Use the Conext CL125 inverter (PVSCL125E) only with PV modules that have an IEC 61730 Class A Rating.

Failure to follow these instructions will result in death or serious injury.

For North America model only:

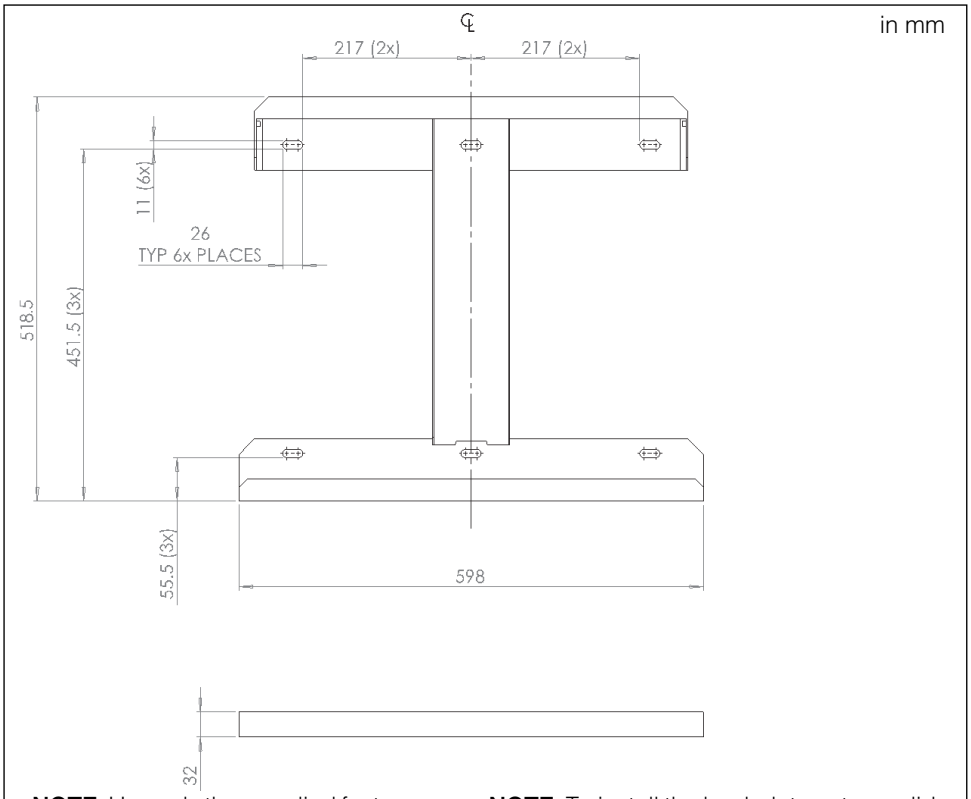
DANGER

HAZARD OF ELECTRIC SHOCK, FIRE, AND EQUIPMENT DAMAGE

Use the Conext CL125 inverter (PVSCL125A) only with PV modules that have a UL Class A Rating.

Failure to follow these instructions will result in death or serious injury.

Install and Mount the CL125



NOTE: Use only the supplied fasteners when installing the backplate to a metal frame.

NOTE: To install the backplate onto a solid wall, use appropriate screws (not supplied).

Figure 2-4 Wall-mounting Backplate Dimensions

To install on a metal frame in an upright position:

1. Prepare to unpack the CL125 from its box by breaking the packaging seal on the front of the box.
2. Unpack the backplate, its corresponding six M10 metal frame fastener sets (bolt, nuts, washers), and the two M4x12 backplate screws from the CL125 packaging. Use only the provided M10 metal frame fasteners for attaching to a metal frame structure.
3. Follow all preceding precautions and warnings starting on page 2–3.
4. Use the backplate to mark the metal frame with the location of the holes to be drilled. See Figure 2-5.

5. Pre-drill the mounting surface, if necessary. See Figure 2-5. Use a drill bit appropriate for a bolt of size M10.

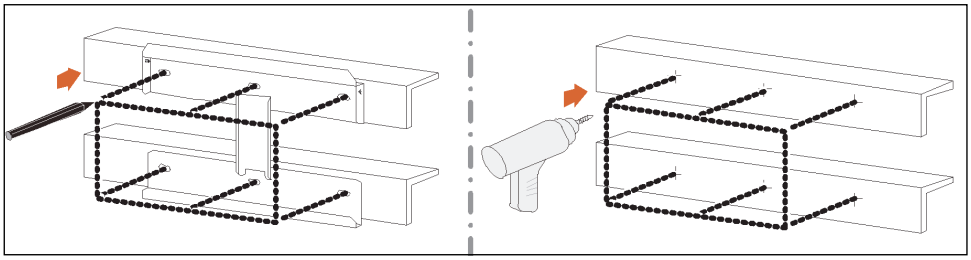


Figure 2-5 Mark and Pre-drill Metal Frame

6. Fasten the backplate to the metal frame using the M10 metal frame fasteners that came with the CL125 packaging. Use a torque of 35 Nm (25.8 lbf-ft) to fasten the nut and the backplate.

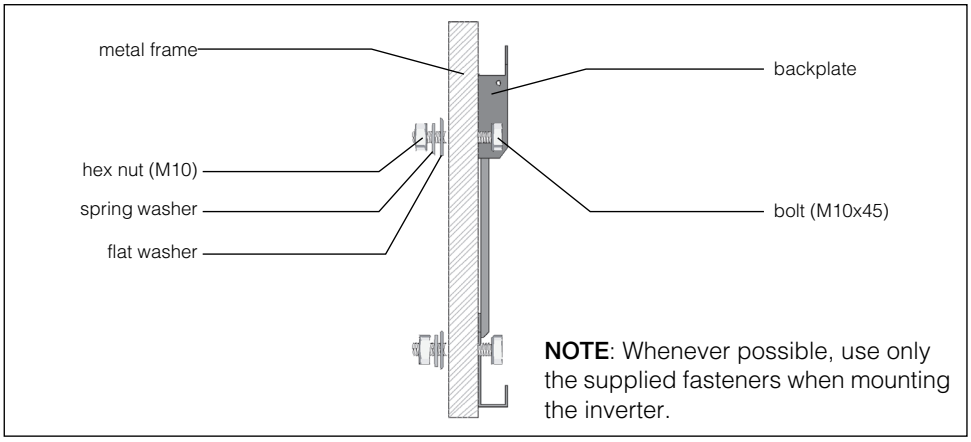


Figure 2-6 Securing the Backplate to the Metal Frame

7. Prepare to unload the CL125 from its box. Use two people to move, lift, and mount the unit. See “Handling Precautions” on page 2–6.

8. Install the screw-in handles as shown in Figure 2-7. Screw in the handles until they are fully seated in the inserts.

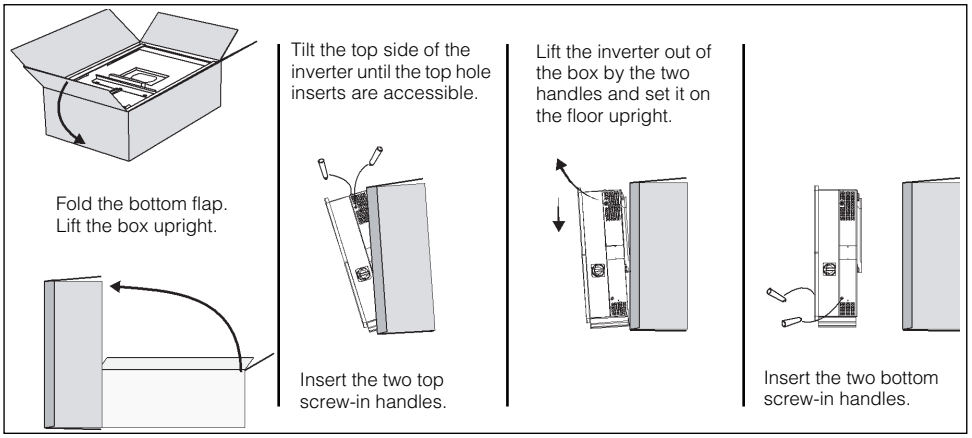


Figure 2-7 Install Screw-in Handles

9. Install the two lifting rings (supplied) at the top of the inverter as shown in Figure 2-8. The holes at the top of the inverter can accommodate an M12-bolt lifting ring.

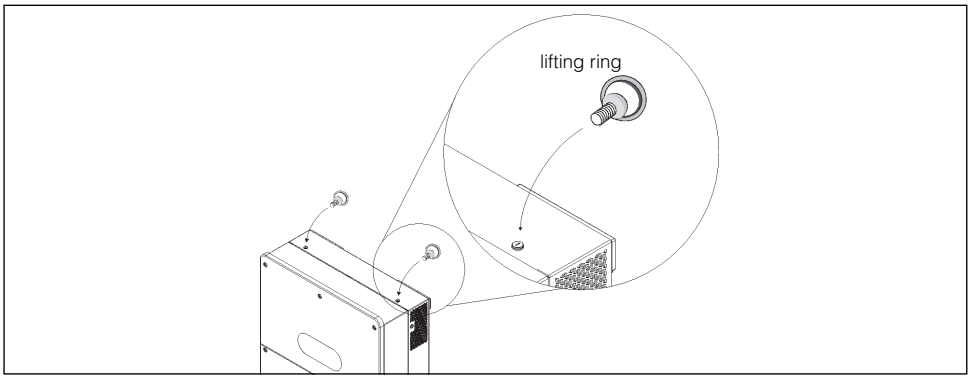


Figure 2-8 Install Lifting Rings

10. Thread a rope with sufficient tensile strength to lift up to 100 kg through the lifting rings as shown in Figure 2-9.

11. Mount (hang) the inverter manually onto the backplate preferably using a portable crane system. See “Handling Precautions” on page 2–6.

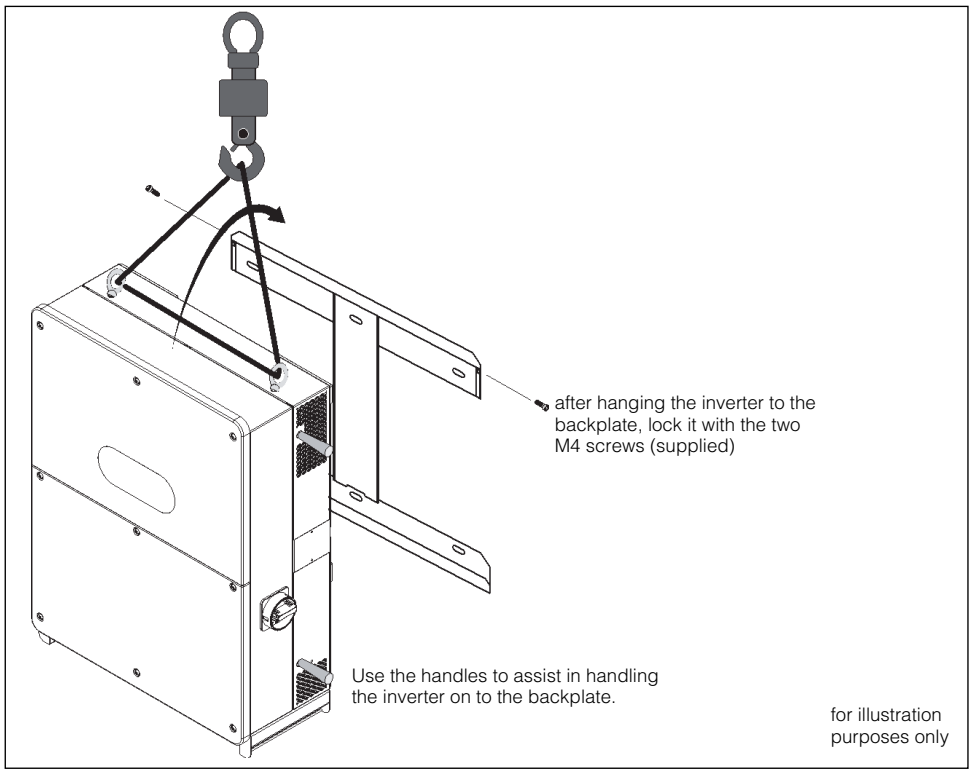


Figure 2-9 Mounting the CL125

12. Lock the inverter to the backplate by fastening the two screws (M4x16) as shown in Figure 2-9.
13. Remove the screw-in handles from the sides of the inverter and also the lifting rings from the top of the inverter.
14. Store the handles and lifting rings away. Do not store them on top of the inverter or inside the inverter enclosure.

To install on a concrete or brick wall in an upright position:

1. Prepare to unpack the CL125 from its box by breaking the packaging seal on the front of the box.
2. Unpack the backplate and the two M4x12 backplate screws from the CL125 packaging. Set aside the corresponding six M10 metal frame fastener sets. You will not need these for mounting to a wall. Procure six appropriate wall fasteners.
3. Follow all preceding precautions and warnings starting on page 2–3.

4. Use the backplate to mark the location of the holes on the wall. See Figure 2-10, “Mark and Pre-drill Wall” on page 2–13.

DANGER

EXPLOSION HAZARD

Check that there are no plumbing or gas pipes or electrical conduits behind the wall when marking for holes and before drilling.

Failure to follow these instructions will result in death or serious injury.

5. Pre-drill the mounting surface, if necessary. See Figure 2-10, “Mark and Pre-drill Wall” on page 2–13.

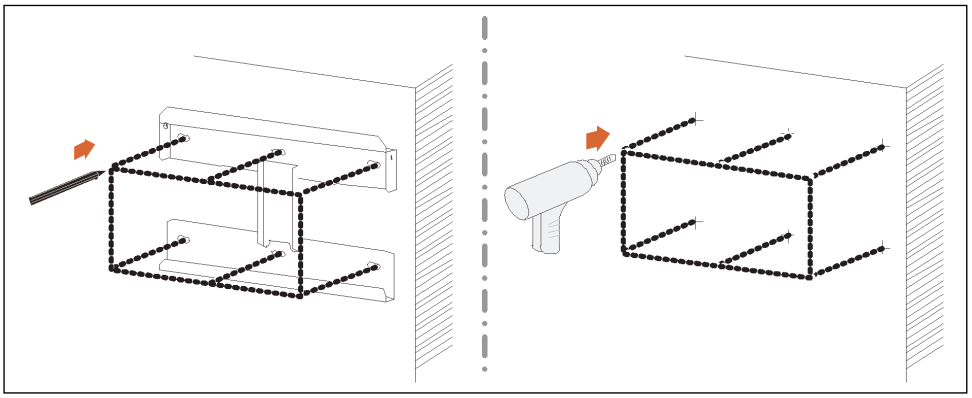


Figure 2-10 Mark and Pre-drill Wall

6. Fasten the wall-mounting backplate to the wall with six appropriate fasteners (not supplied). Use a torque of 35 Nm (25.8 lbf-ft) to fasten the screws to the backplate.
7. Unpack the screw-in handles and install them as shown in Figure 2-7, “Install Screw-in Handles” on page 2–11. Screw in the handles until they are fully seated in the inserts.
8. Install two lifting rings (supplied) at the top of the inverter. The holes at the top of the inverter can accommodate an M12-bolt lifting ring.
9. Thread a rope with sufficient tensile strength to lift up to 100 kg through the lifting rings. See Figure 2-9.
10. Mount (hang) the inverter manually onto the backplate preferably using a portable crane system. See Figure 2-9, “Mounting the CL125” on page 2–12 for a similar illustration. See “Handling Precautions” on page 2–6.
11. Lock the inverter to the backplate by fastening the two screws (M4x16). See Figure 2-9, “Mounting the CL125” on page 2–12 for a similar illustration.
12. Remove the screw-in handles from the sides of the inverter and also the lifting rings from the top of the inverter.
13. Store the handles and lifting rings away from the top of the inverter or inside the inverter enclosure.

Torque Values

⚠CAUTION

FIRE HAZARD

Tighten fasteners such as screws, nuts, bolts, and cable glands (used for routing field wiring and current carrying cable) according to the recommendations in the table below. Incorrect torque may cause a fire.

Failure to follow these instructions can result in moderate or minor injury.

NOTICE

EQUIPMENT DAMAGE

Tighten fasteners such as wall screws, metal frame nuts, and panel screws according to the recommendations in the table below. Over torquing may damage the head of the fastener. Under torquing may loosen the installation over time.

Failure to follow these instructions can result in equipment damage.

Table 2-1 Summary of Torque Values

Type	Description	Nm (IEC)	ft-lb (NA)
cable gland sealing nut	for communication cables such as RS-485 CAT 5/ CAT 6 cable	9.0–9.6	6.6–7.1
cable gland sealing nut	for AC/DC cable gland	28.8	21.2
connector screw	RS-485 wire connector	0.2	0.15
fastener	transparent protection panel	0.8 ±0.1	0.6 ±0.1
fastener	lower enclosure panel	4.3 ±0.2	3.2 ±0.15
fastener	to lock the CL125 unit to the mounting backplate	2.7–4.8	2–3.5
fastener (metal)	metal frame-mounting backplate nut	35	25.8
fastener (wall)	wall-mounting backplate expansion	35	25.8
terminal bolt	DC terminals	12–14	8.9–10.3
terminal bolt	AC terminals	12–14	8.9–10.3
terminal bolt	PE (ground) terminal	12–14	8.9–10.3

Cable Strain Relief Options

NOTICE

EQUIPMENT DAMAGE

Always follow local regulations when choosing the cable types to use in this installation. Only replace the supplied cable glands with cable glands of the same size and construction. When using conduits, match conduits with the sizes of the pre-punched knockouts on the unit. Do not remove hole plugs unless you are installing a strain relief device. Replace hole plugs on unused knockout holes.

Failure to follow these instructions can result in equipment damage.

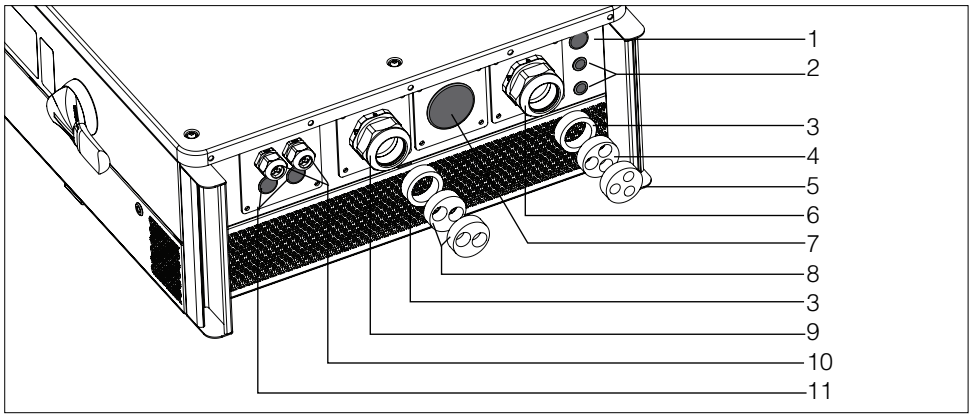


Figure 2-11 Cable Entry Panel

NOTE: Trade size refers to standard thread sizing used on hardware such as fasteners, connectors that help match the hardware to a connecting hardware piece. For example, a lug with a trade size of 3” will fit on a terminal bolt of a similar trade size but their actual dimensions are not 3 inches. Trade sizes are either metric or imperial or some other standard such as PG. There is no direct conversion between these standards so conversions are approximations.

Table 2-2 Cable Entry Strain Relief Options

Item	Description	trade size		size of cables
		metric	imperial	mm^2 (# of wires)
1	Pre-punched knockout with installed hole plug	M22	--	--
2	Pre-punched knockouts with installed hole plugs	M12.5	--	--
3	Grommets (1-hole) (2x) (supplied)	--	--	240 (2-core) 185 (3-core) 120 (4-core)

Table 2-2 Cable Entry Strain Relief Options

Item	Description	trade size		size of cables
		metric	imperial	mm^2 (# of wires)
4	Grommet (3-hole) (supplied)	--	--	150 (1-core) 50 (2-core) 25 (3-core)
5	Grommet (3-hole) (supplied)	--	--	95 (1-core)
6	Cable gland for AC cable (with 1-hole grommet) on removable plate (supplied)	--	--	185 (3-core) 120 (4-core)
7	Pre-punched knockout with hole plug on removable plate	M63	2”	--
	Pre-punched knockout on chassis with the plate removed	--	3”	--
8	Grommets (2-hole) (2x) (supplied)	--	--	35 (3-core) 25 (4-core)
9	Cable gland for DC Cables (with 1-hole grommet) on removable plate (supplied)	--	--	240 (2-core) 185 (3-core)
10	Cable glands for communication cables (2x) (installed with 3-hole grommet)	PG21	--	--
11	Pre-punched knockouts with installed hole plugs	M22	--	--

Cable Strain Relief Installation

To install the AC and DC Cable Glands:

DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARD

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

1. Perform the “Lock-Out Tag-Out (LOTO) Procedure” on page xiv, if applicable.
2. Remove the six screws on the front cover of the wiring box.

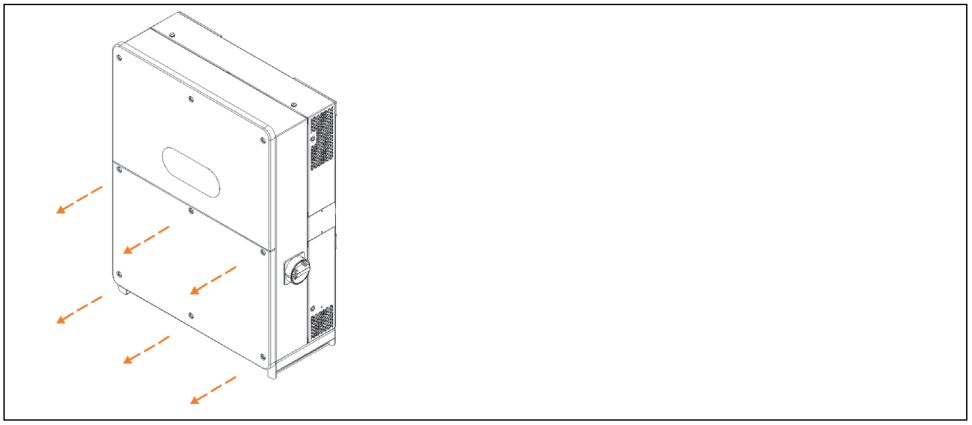


Figure 2-12 Removing the Front Cover Panel

3. Remove the knockout plugs from their installation on the unit and set them aside.

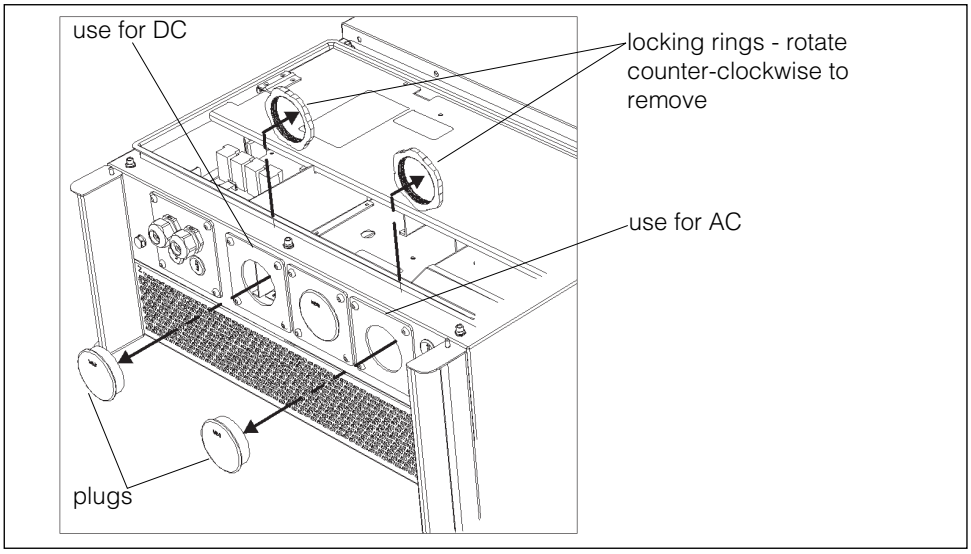


Figure 2-13 Removing the Knockout Plug

To access the bigger sized (3”) knockouts, remove the knockout plates from their installation on the unit and set them aside.

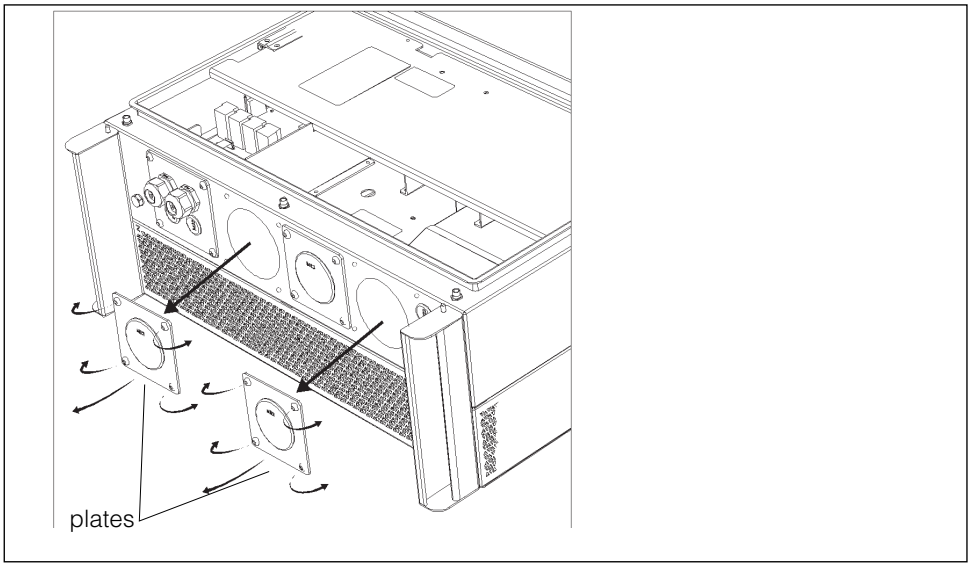


Figure 2-14 Removing the Knockout Plate

4. Take the cable gland sets (supplied) and install them on the knockouts.

   Depending on the cable size you are using, you may have to replace the grommet on the cable gland set with one of the extra grommets (supplied) to match the cable size.

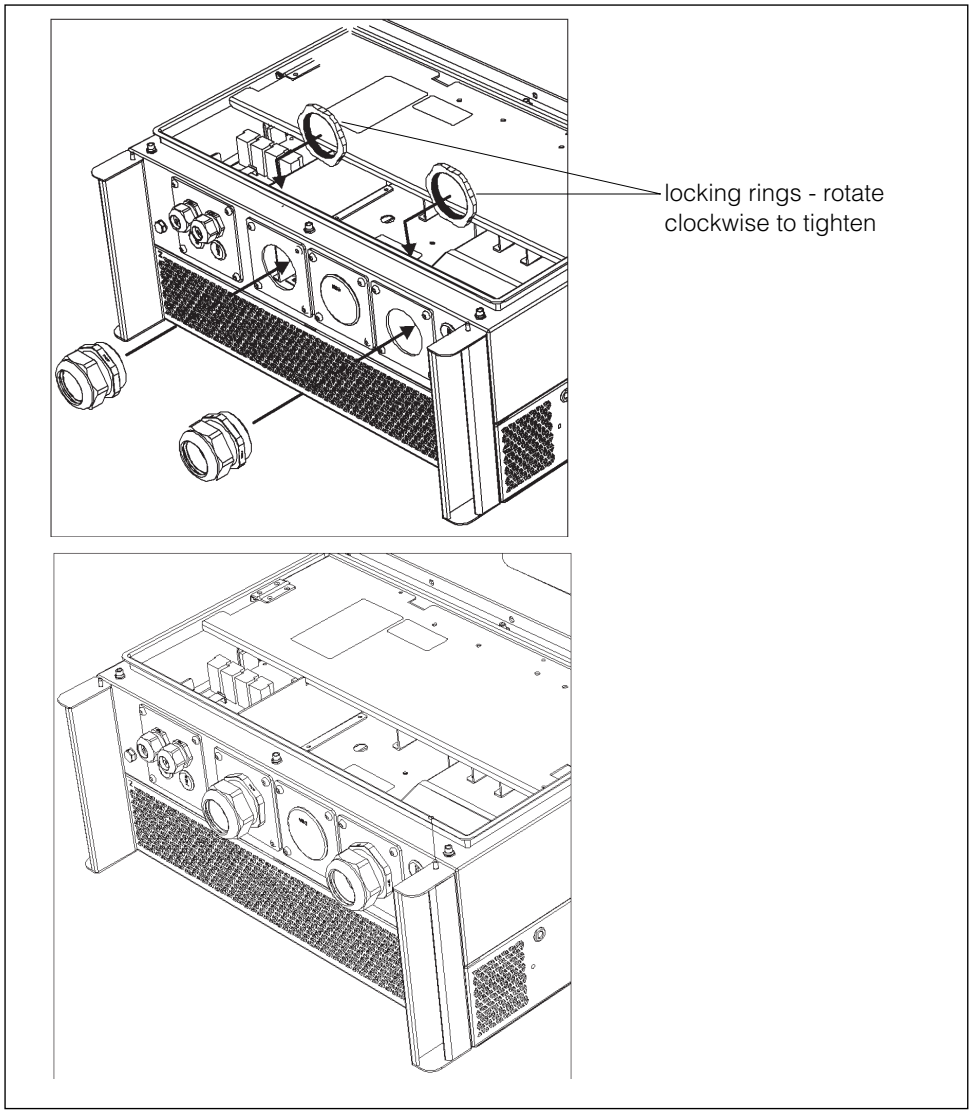


Figure 2-15 Installing the Cable Glands

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3 Electrical Connections

Chapter 3 contains information about:

- Precautions
- Cabling and Wiring
- Communication Connection

Precautions

Before connecting the Conext CL125 to electrical cables, wires, and communication cables, read all instructions and cautionary markings in this Guide.

NOTE: Obtain all necessary permits prior to starting the installation. **Installations must meet all local codes and standards.** Installation of this equipment should only be performed by skilled personnel such as qualified electricians and Certified Renewable Energy (RE) System installers.

Planning the Electrical Connections

- Read this entire chapter before making electrical connections to and from the unit. It is important to plan the installation from beginning to end.
- Assemble all tools and materials needed for the installation.

Cabling and Wiring

DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARDS

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

Material and Tools

The following materials and tools are not supplied but are required to complete the installation:

- AC power cable [4-core - (3+PE)]
- DC power cables [(red for (+), black for (-), green/yellow (GND)]
- RS-485 cable(s) for Modbus/RS-485 device connections
- Wire stripper
- Screwdriver set, pliers
- Laptop computer (PC or Mac)

Once the Conext CL125 is installed at the site, it is now ready to be connected to the PV array (via the DC combiner) and the utility grid (via the AC combiner).

Terminal and Cable Entry Points

The CL125E's electrical connection terminals are located inside the inverter wiring box and the cable entry points are at the bottom of the unit.

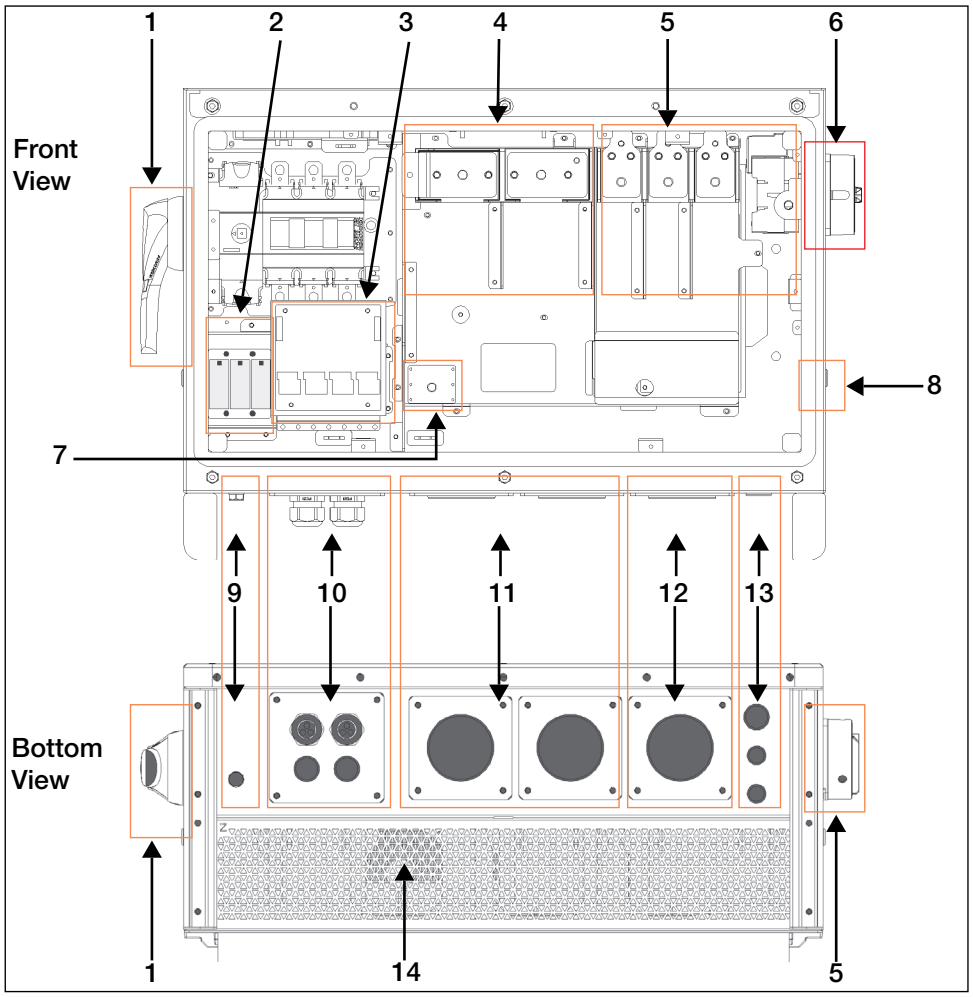


Figure 3-1 Terminals and Cable Entry Points

Table 3-1 Description of Terminals and Cable Entry Points

#	Description	#	Description
1	DC disconnect switch	**8**	Chassis Ground (PE) terminal
2	DC SPD (surge protection device)	**9**	Waterproof pressure vent
3	Communication circuit board	**10**	Communication cable access
4	DC PV terminals [PV+][PV–]	**11**	DC (PV) cable access
5	AC terminals [AC1][AC2][AC3][GND]	**12**	AC cable access
6	AC disconnect switch	**13**	Extra cable access
7	DC Ground (PE) terminal	**14**	Air vent (main)

AC Side Cable Connection

AC Side Requirements

NOTE: Connection to the utility grid must be done only after receiving approval from the local company.

Before connecting to the grid, verify that both the grid voltage and frequency meet the requirements of the CL125's voltage and frequency settings. Contact the local utility company for a solution if the grid does not meet the specifications. For information on the settings, see "Product Specifications" on page 8–2.

AC Circuit Breaker

An independent three- or four-pole circuit breaker must be installed downstream from the inverter before the grid connection. This is to ensure that the inverter can be disconnected safely from the grid.

Inverter	Recommended AC circuit breaker
PVSCL125E	150A
PVSCL125A	

NOTICE

EQUIPMENT DAMAGE

- Do not connect multiple PV Inverters to a single circuit breaker.
- Do not connect loads between the PV Inverter and the circuit breaker.

Failure to follow these instructions can result in damage to the inverter and other connected equipment.

Residual Current Device

With an integrated comprehensive residual current monitoring component, the inverter is capable of distinguishing a ground fault current from normal capacitive leakage current. This allows the inverter to disconnect from the grid as soon as the ground fault is detected.

Multiple Inverters in Parallel Connection

Follow either of the two scenarios when attempting to connect several inverters in parallel to the grid.

Scenario 1

Several inverters are in parallel connection to the 3-phase low voltage (600V L-L) grid.

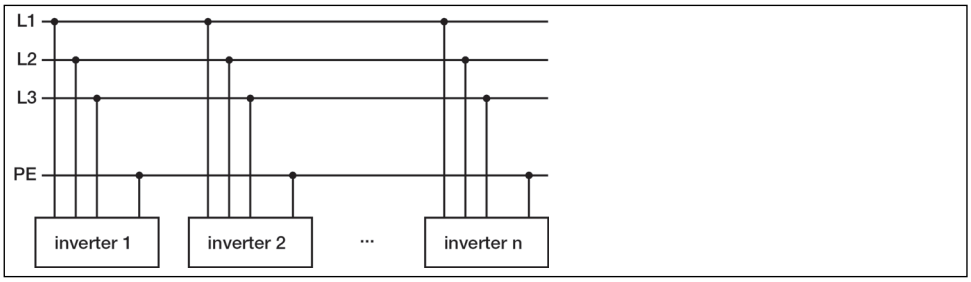


Figure 3-2 Parallel Connection to 600V L-L Grid

Requirements If the number of the grid-connected PV Inverters exceed 20, contact a local Schneider Electric Sales Application Engineer (SAE).

Scenario 2

Several inverters are in parallel connection to the low voltage side of the MV transformer. The high voltage side is connected to the MV grid.

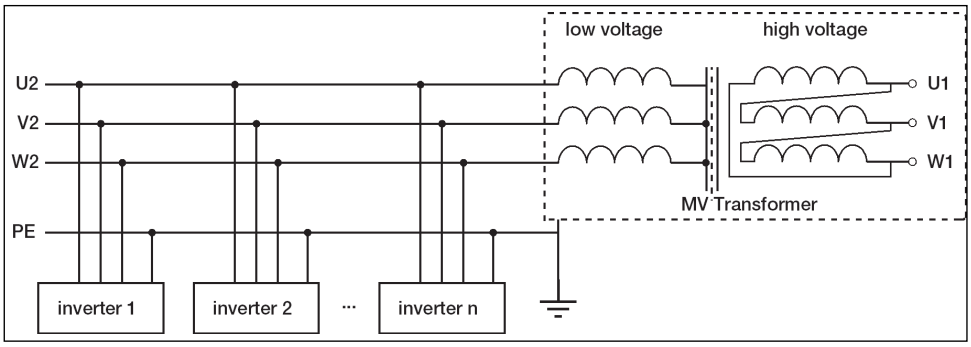


Figure 3-3 Parallel Connection to MV Transformer

Requirements If the number of the grid-connected PV Inverters exceed 20, contact a local Schneider Electric Sales Application Engineer (SAE).

The nominal power of the MV transformer's low voltage side matches the inverter's output power.

NOTE: It is recommended to use a transformer with a short circuit impedance of less than 5%.

Medium Voltage Transformer Requirements

Conext CL125 Transformer Technical Requirements:

- Nominal Frequency: 60Hz (PVSCL125A), 50/60 Hz (PVSCL125E)
- Primary Voltage: According to the grid-connection point voltage
- Secondary Voltage: 600 VAC (Line-to-Line, allowed range:480~690 VAC)

NOTE:

- Additional phase monitoring devices may be required for grounded primary (utility side) transformers. Engineers shall confirm the protection requirement prior to selecting the transformer.
- When the utility side phase monitoring devices are absent, and the system fully relies on inverter protection to shut down during the loss-of-phase condition at the utility side, Schneider Electric recommends a transformer with a DELTA connection on the utility side.
- The transformer must be suitable for operation with inverters which work with PWM modulation.
- Short Circuit Impedance Ω(%) of the transformer shall be less than 6%.
- The transformer shall be capable of withstanding a certain level of harmonic current. The maximum total harmonic current is 3% of the fundamental current at nominal power output.
- The transformer shall be capable of withstanding a certain level of DC current injection which is 0.5% of the fundamental current at nominal power.
- The transformer shall be capable of withstanding a certain degree of phase imbalance which is at 5% of the current at nominal power.
- The protection degree of the transformer should be taken into account to coordinate with the inverters.
- For thermal rating, the load curve of the transformer and the ambient conditions at the respective installation site should be taken into account.
- The applicable country-specific standards should be taken into account.

Grid Connection

The AC terminals inside the CL125 inverter accommodates an AC connection for a 3-phase + PE wire grid connection (**L1**, **L2**, **L3**, and **GND**).

AC Cable Requirements

Select AC cables according to the following factors:

- Grid impedance should correspond to the specifications below to avoid accidental short-circuit or output power derating.

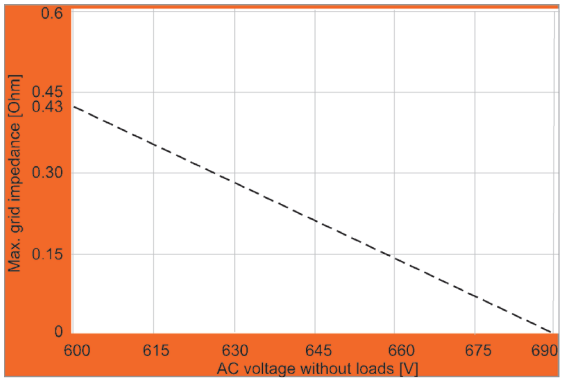


Figure 3-4 AC Cable Grid Impedance

- When calculating voltage drop, a cable with a higher cross section area could be selected to ensure power loss within a 1% limit. Check that the AC cable outer diameter is suitable for the AC terminals of the inverter.
- Withstand ambient temperature
- Cable layout (that is, inside wall, underground, free air, etc.)
- UV resistance
- Cable resistance / length

Cable layout and installation conditions (inside wall, underground, free air, etc.)

- UV resistance
- The maximum operation temperature of the cable should be no less than 90 °C
- The current rating of the cable should be selected in accordance with the maximum AC output current of the inverter.
- The voltage rating of the cable should no less than 600 VAC.
- The Conductor type can be copper (CU) wire or aluminum (AL) wire.
- The AC cable must be designed in accordance with the local installation requirements.
- If you use aluminum cable, you need to purchase a corresponding transition terminal.

AC Cable Connection

To connect the PV Inverter to the grid:

1. Strip the AC cable as shown below. The example below is for a 4-core cable.

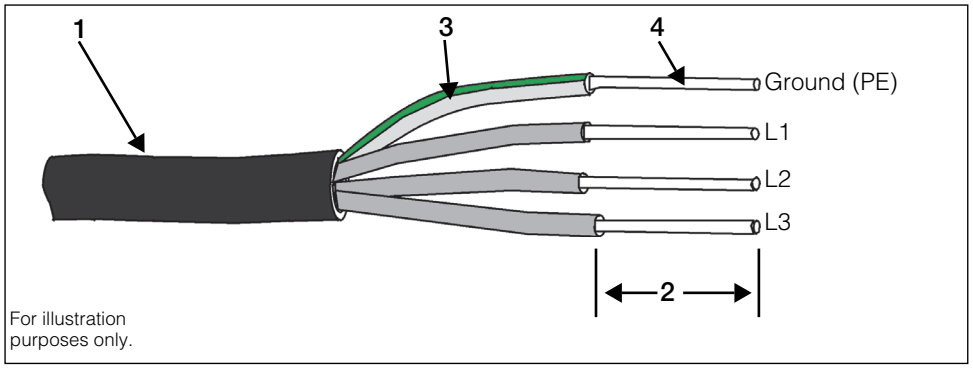


Figure 3-5 AC Cable Wiring Illustration

Table 3-2 AC Cable Wiring Components

No.	Description	Remark
1	Protective layer	--
2	Length of insulation to be stripped off	Dependent on the kind of lug to use
3	Insulation layer	--
4	Cross section of AC cable (maximum)	350kcmil/185 mm^2
5	Type	Aluminum (AL) or copper (CU)

NOTE: For AC cables with stranded wires, use cold-press terminal lugs for termination. Always use lugs that grip the shape of the wires on AC cables. Always use the proper lugs according to the type of metal of the wires on AC cables.

The cross-section diameter of the AC cable must be selected carefully in order to prevent accidental disconnections of the inverter from the grid due to high impedance of the cable.

2. Connect the AC cable's wires to their corresponding terminals. For torque values, see Table 2-1 on page 2–14.

3. Pull the cable away from the terminals gently to make sure the wires do not disconnect from their terminals.

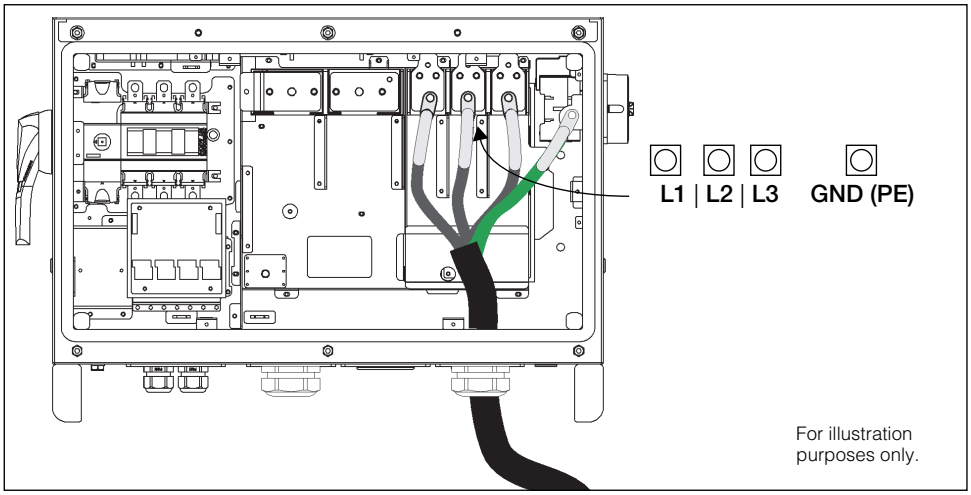


Figure 3-6 AC Cable Wiring Connections

NOTICE

EQUIPMENT DAMAGE

- Observe and strictly follow the AC terminal layout. The PV Inverter will not work normally if any of the phase wires is connected to the PE terminal.
- Do not insert wires without stripping the insulation layer. Damaged wires may affect the normal operation of the inverter.

Failure to follow these instructions may cause inverter damage.

4. Establish a similar connection to the AC Combiner box downstream from the inverter.

PV Array Connection

DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARDS

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARDS

- Be careful when handling cables from PV arrays. PV arrays produce electrical energy when exposed to light.
- Check that the PV impedance to ground is within specifications before connecting the PV array to the inverter.

Failure to follow these instructions will result in death or serious injury.

PV Input Configuration

The CL125 PV Inverter is a single-stage inverter and is equipped with a built-in Maximum Power Point Tracker (MPPT).

NOTICE

EQUIPMENT DAMAGE

- Check and make sure that the voltage of each PV array is less than 1500 V.
- Check that the maximum short circuit current on the DC side is within specifications.

Failure to follow these instructions may cause inverter damage.

To make full use of the DC input power, PV modules should be homogenous. This means that each module in the PV string must be of the same type and the same number of PV cells. All the PV strings should have identical tilt and orientation.

Before connecting a PV string to the inverter, the following electrical parameters must be met.

Total DC power limit	Max. open-circuit voltage limit for each input	Short-circuit current limit
132000 W[a]	1500 V	240 A

a.Multiply by a factor of 1.35 for over-panelling.

DC Cable Requirements

- Maximum operating temperature of the cable: > 90 °C.
- Voltage rating: > 1500VDC
- Conductor type: copper (CU) or aluminum (AL)
- Maximum cross sectional area: 400 Kcmil or 200 mm^2

NOTE: The DC cable must meet local installation requirements and guidelines.

PV Input Connection

DC input cables (red pos+)(black neg–)(yellow/green Ground [PE]) are connected to the PV input terminals (PV+)(PV–)(PV Ground [PE]) of the inverter. DC input cables from the DC Combiner should be equipped and terminated with correctly sized compression lugs.

DC Cable Connection

To connect DC input cables to the inverter:

⚠⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARD

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

1. Strip off insulation layer from the cable appropriate for the cable connector (lug) that will used to terminate the DC cable.

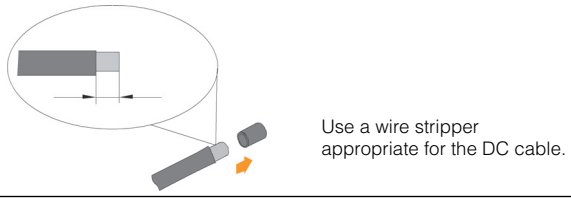


Figure 3-7 DC Cable Stripping

2. Terminate the cable ends with the correctly sized lugs (must match size M8 bolts). These are now your DC connectors.

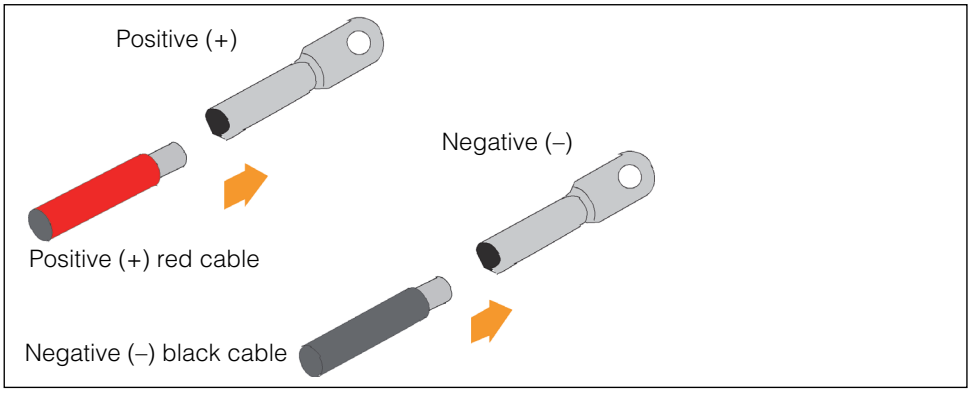


Figure 3-8 DC Cable Termination

3. Apply heat-shrink tubing to the cable ends and lug stems.
4. Check to make sure the polarities of the DC cables are correct.

NOTE: The inverter will not function properly if the DC polarities are reversed.

5. Turn the CL125's DC disconnect switch lever to OFF position (meaning, the relay is **open**).

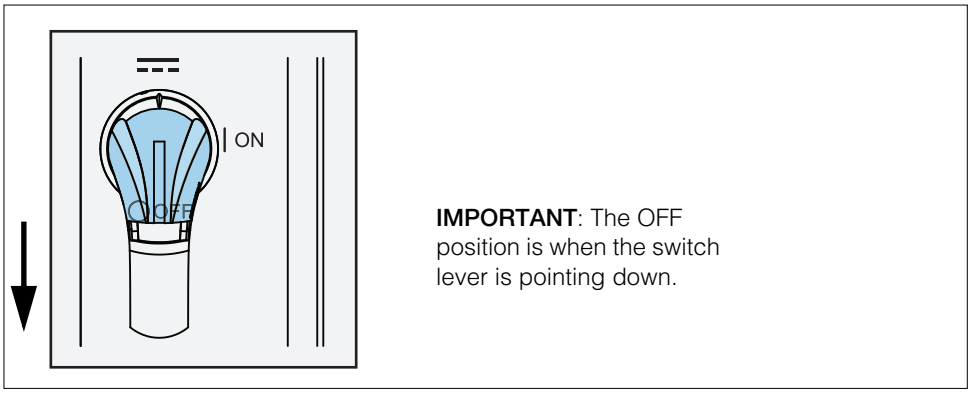


Figure 3-9 DC Disconnect Switch OFF Position

6. Double check the polarity of the DC cables and then check the open-circuit voltage and make sure it does not exceed the inverter's input limit of 1500 V (even under the lowest operating temperature).

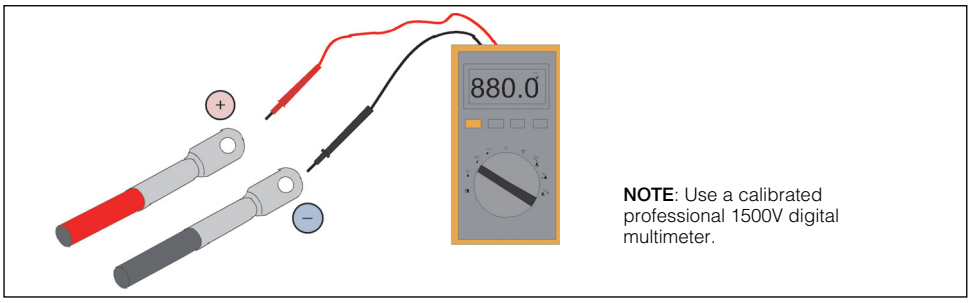


Figure 3-10 DC Cable Polarity

NOTICE

EQUIPMENT DAMAGE

Check the positive and negative polarity of the PV cells. After confirming the correct polarities, insert the DC connectors into the PV input terminals of the inverter.

Failure to follow these instructions may damage the inverter and other connected equipment.

7. Install the positive and negative DC connectors into the PV (+)(–) input terminals on the inverter. For torque values, see Table 2-1 on page 2–14.

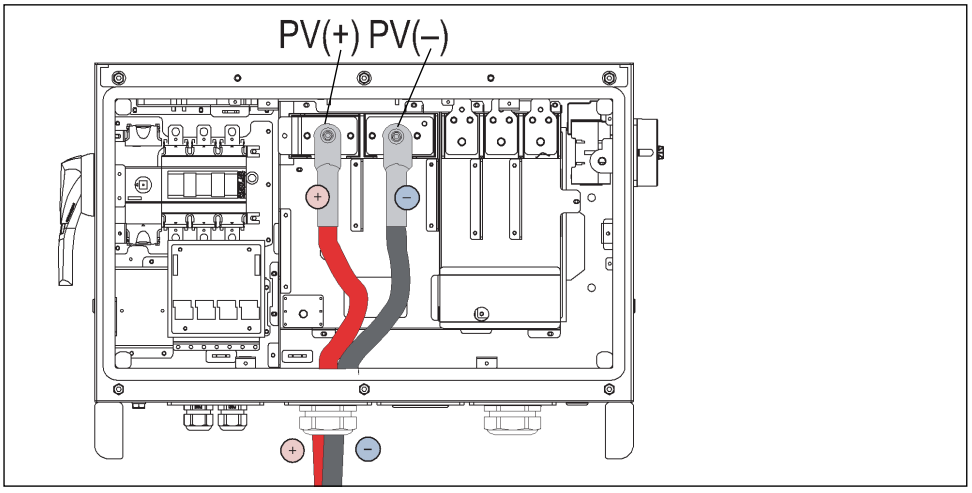


Figure 3-11 DC Cable Connections

8. Establish a similar connection to the DC Combiner box upstream from the inverter.

Grounding the Inverter

⚠ WARNING

ELECTRIC SHOCK HAZARD

Do not ground either DC positive or negative poles of the PV string. The Conext CL125 PV Inverter does not isolate the PV from the grid.

Failure to follow these instructions can result in death or serious injury.

Grounding System Overview

In this PV system, all non-current carrying metal parts and device enclosure should be grounded (such as the PV array frame and the inverter enclosure).

Single Inverter

When there is only one inverter in the PV system, the Ground (PE) cable must be grounded to the PV panel's metal frame.

1. Strip off insulation layer from the cable appropriate for the cable connector that will used to terminate the DC Ground (PE) cable.
2. Terminate one cable end with the correctly sized lug (must match size M8 bolt). This is now your DC Ground (PE) connector.
3. Apply heat-shrink tubing to the cable end and lug stem.
4. Install the Ground (PE) connector into the DC ground terminal on the inverter. For torque values, see Table 2-1 on page 2–14.

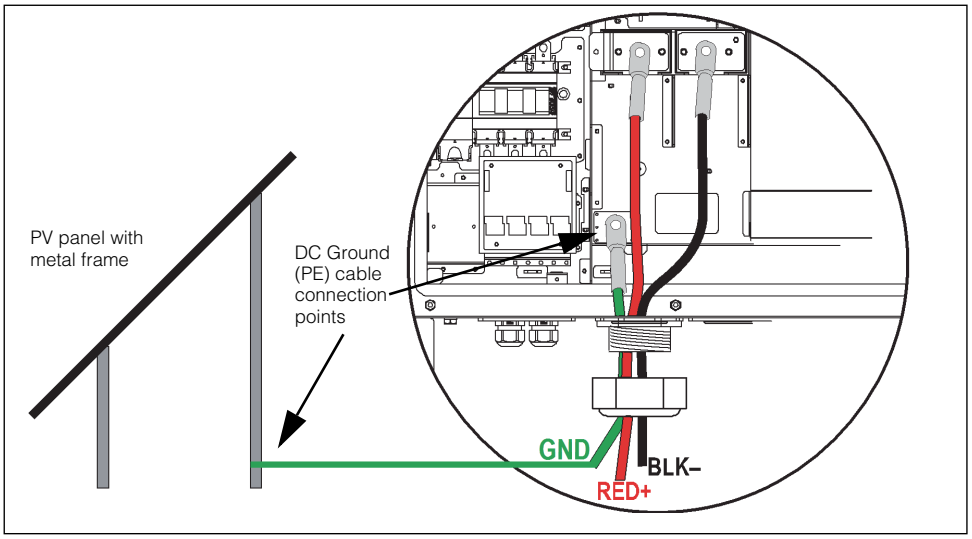


Figure 3-12 DC Ground (PE) Cable Connection

5. Connect the other end of the DC cable to the metal frame of the PV panel.

Multiple Inverters

When there are multiple inverters in the PV system, they can be grounded at multiple points. Connect the PE cables of all the inverters and the mounting metal frames of the PV array to the equipotential cable (depends on the situation at the site) in order to establish an equipotential connection. See Figure 3-13.

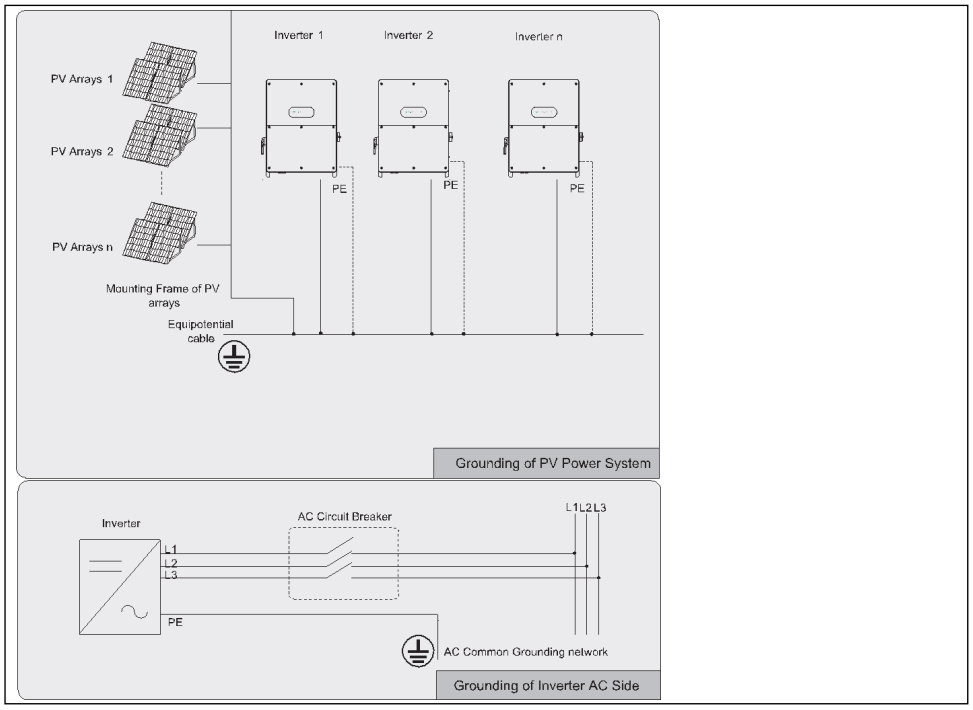


Figure 3-13 Grounding of Single or Multiple PV Inverters

Second Protective Earth Terminal

The Conext CL125 PV Inverter is equipped with a second protective earth (PE) terminal as specified in IEC/EN 62109-1.

Position of Second PE Terminal

There is a second PE terminal on the right side of the inverter. Perform a PE connection, if necessary.

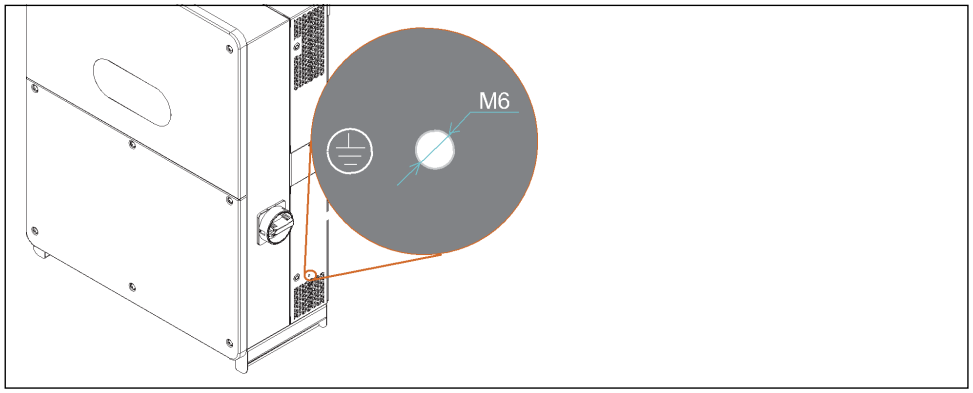


Figure 3-14 Second Ground (PE) Terminal

Cable Connection

To connect a PE cable to the PE terminal:

- Follow the illustration below. For torque values, see Table 2-1 on page 2–14.

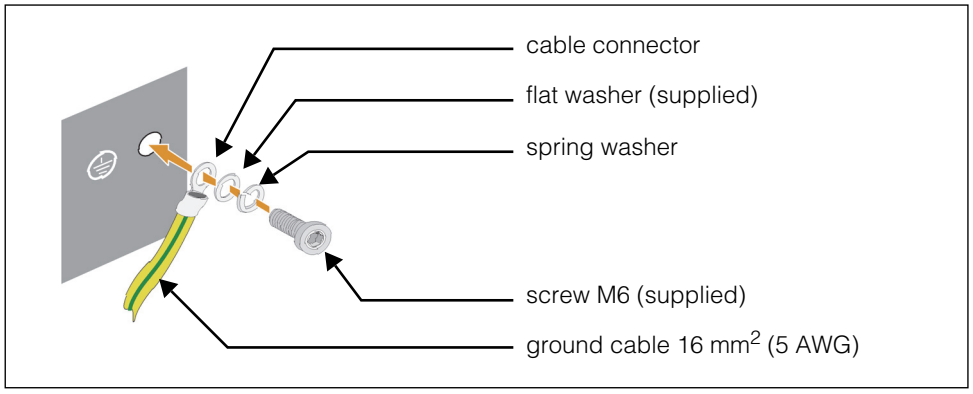


Figure 3-15 PE Terminal Connection

Communication Connection

Overview

The Conext CL125 PV Inverter has waterproof communication connection terminals inside the wiring box. There are two RS-485 A/B terminals (RS485_2 and RS485_1), an ALARM dry contact interface, and a Local Stop dry contact interface which are all mounted on the communication circuit board of the wiring box. A 120Ω terminating resistor can be connected between the A and B communication cable through the dip switch for the RS-485 A/B (RS485_2) terminals.

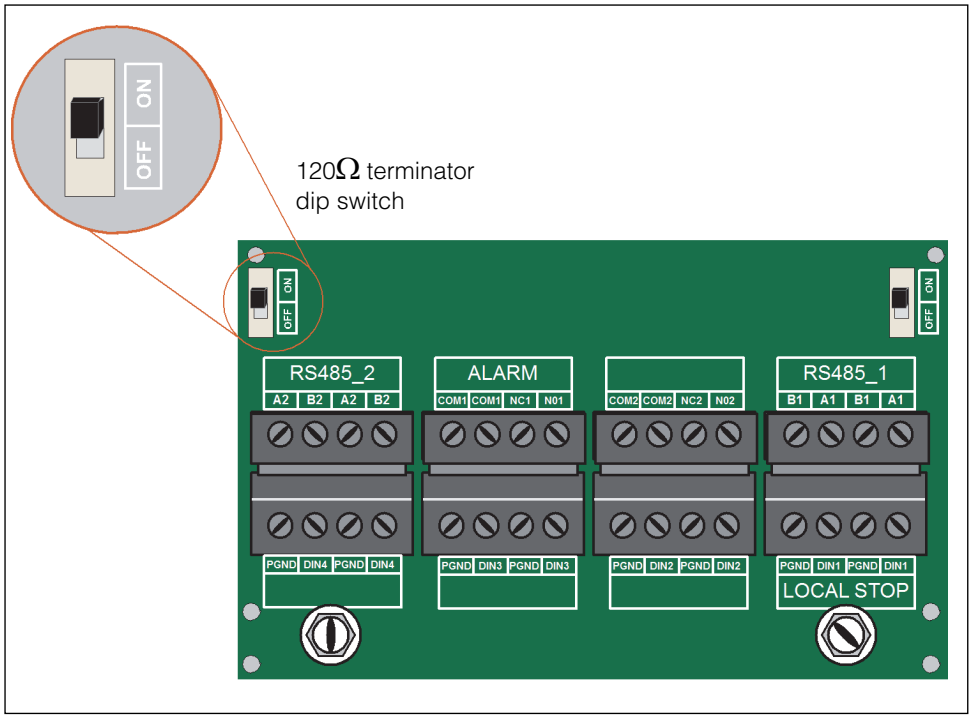


Figure 3-16 Communication Configuration

PV Inverter operational information can be transferred to a local data logging device (a data logger) through an RS-485 communication connection. Communication settings are configured using the eConfigure CL125 APP.

NOTE: Before proceeding, plan and prepare the correct type of RS-485 communication cables. The RS-485 cable should be a shielded, grounded twisted pair cable. A converter such as the RS-485-to-USB converter is needed to convert signals between the PV Inverter and the computer.

RS-485 Communication Connection

For A Single PV Inverter to a computer

One RS-485 cable is needed for this connection.

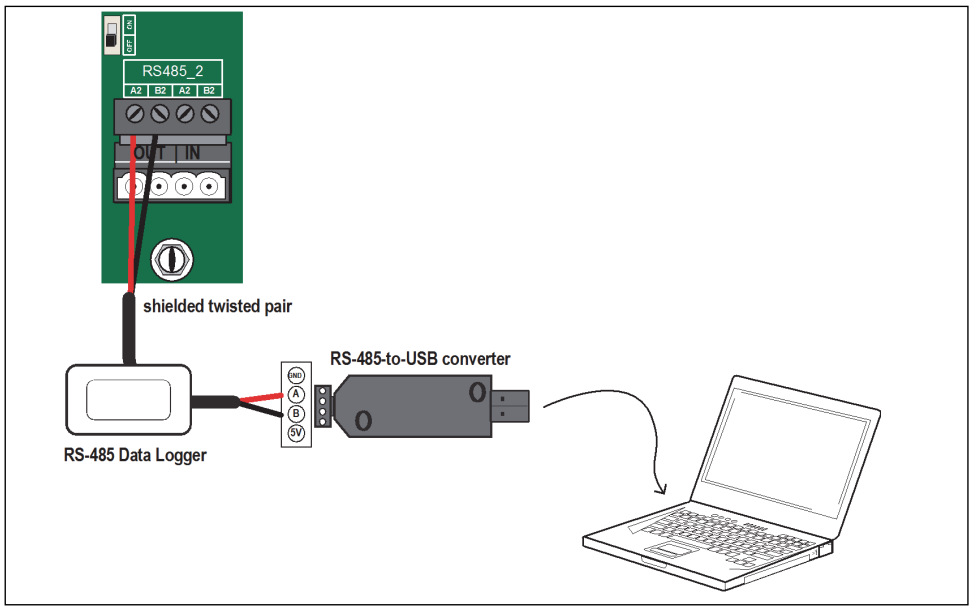
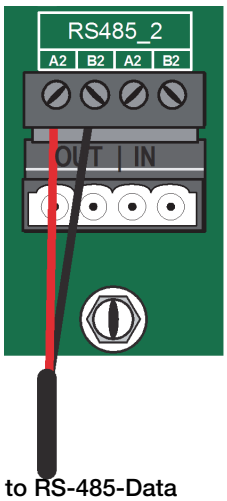
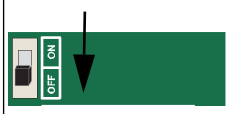


Figure 3-17 RS-485 Single Inverter Connection

Table 3-3 RS-485 Single Inverter Connection

PV Inverter	RS-485 bus	Terminating Resistor
Single inverter		Off 

For Multiple Inverters

A number of RS-485 cables is needed for multiple connections. A simple formula of X = n – 1, where X is the number of RS-485 cables needed and n is the total number of PV Inverters. The inverters are inter-connected by daisy chain and the first and last inverters in the chain must be terminated with a 120Ω resistor. The shielding layer of the RS-485 cable should be single-point grounded.

The total length of RS-485 communication cable should be less than 1000 m.

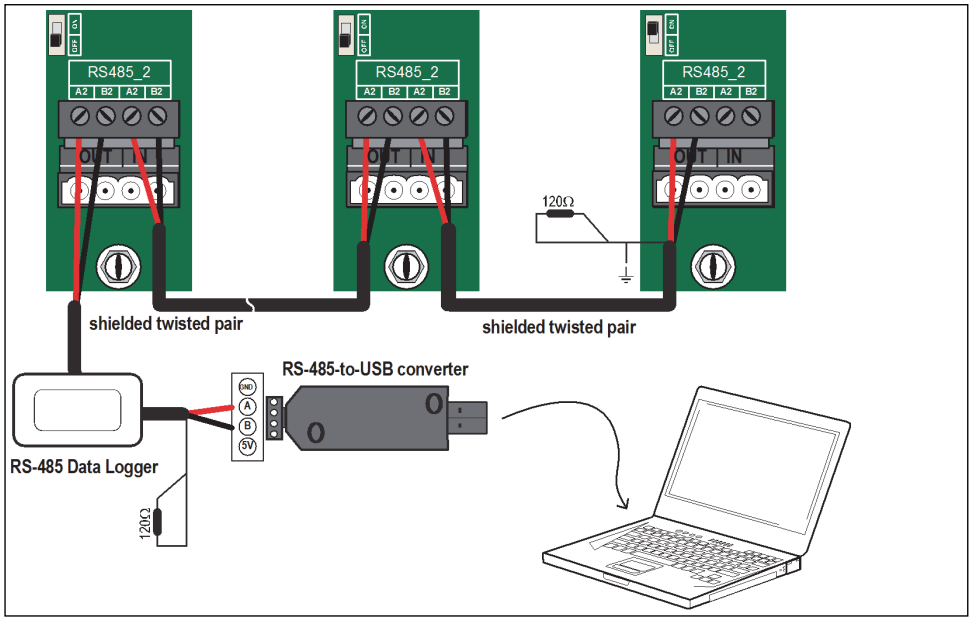


Figure 3-18 RS-485 Multiple Inverter Connections

NOTE: For more information, see the *Conext CL125 Modbus Application Note (document part number: 976-0405-01-01).*

Table 3-4 RS-485 Multiple Inverter Connections

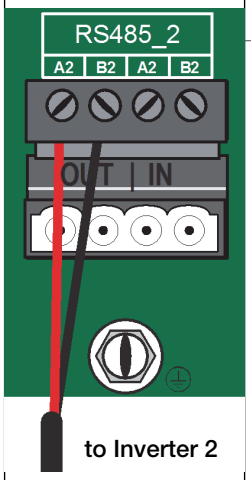
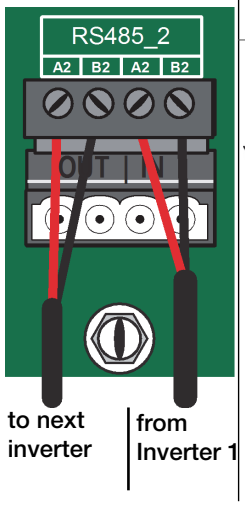
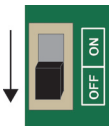
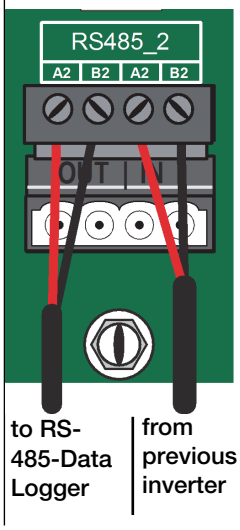
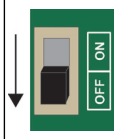
PV Inverter	Communication connection	Terminating Resistor
Inverter 1		On 
Inverter 2 to n–1		Off 

Table 3-4 RS-485 Multiple Inverter Connections

PV Inverter	Communication connection	Terminating Resistor
Inverter n		Off 

RS-485 Communication Architecture Diagram

The architecture diagram of the RS-485 communication is shown.

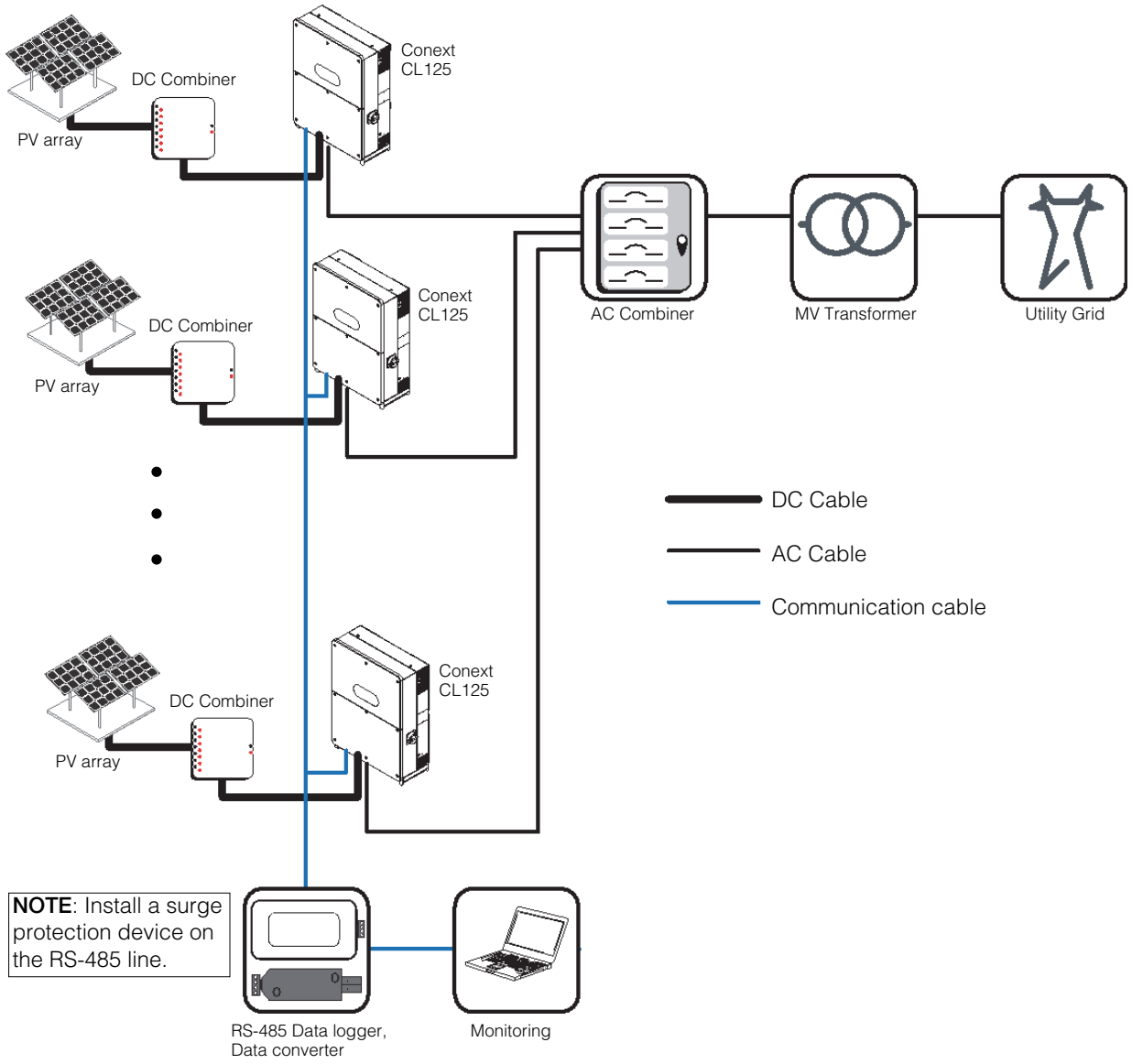


Figure 3-19 RS-485 Communication Architecture Diagram

RS-485 Communication Connection

To connect an RS-485 cable to the terminal:

1. Lead and route the network cable through a communication cable gland to the communication circuit board.
2. Strip off the insulation layer of the communication cable. Connect the **A** and **B** wires of the RS-485 communication cable to their corresponding terminals which are labeled on the communication circuit board.
3. **Applies to multiple inverters**. Repeat steps 1 and 2 according to the position of the inverter (refer to Table 3-4 on page 3–22). For a single inverter refer only to Table 3-3 on page 3–20.
4. Pull cable/s out gently to make sure they do not disconnect from the terminal.
5. Switch the terminating resistor to ON or OFF, according to the position of the inverter in the case of multiple inverters (refer to Table 3-4 on page 3–22). For a single inverter refer only to Table 3-3 on page 3–20.
6. Tighten the sealing lock to seal off the vacant terminals to prevent dust and moisture from penetrating the inverter.
7. Replace the front cover of the inverter enclosure, if there is no other connection procedures to be done.
8. Connect the other end of the communication cables to their respective devices. Refer to the manuals of 3rd party devices.
9. Confirm that there is a communication connection between the interconnected devices and set the communication parameters.

NOTE: Set the RS-485 communication parameters from the eConfigure CL125 APP.

NOTE: Contact a local Schneider Electric sales representative for recommendations on an RS-485-to-USB converter or order a 3rd party device such as a Moxa UPort 1130I.

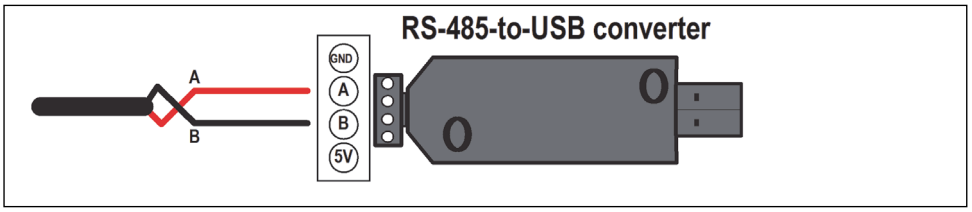


Figure 3-20 RS-485 Converter Equivalent

Configurable Dry Contacts

There is an ALARM dry contact interface, as well as a Local Stop dry contact interface which are provided in the inverter and mounted on the communication circuit board of the wiring box.

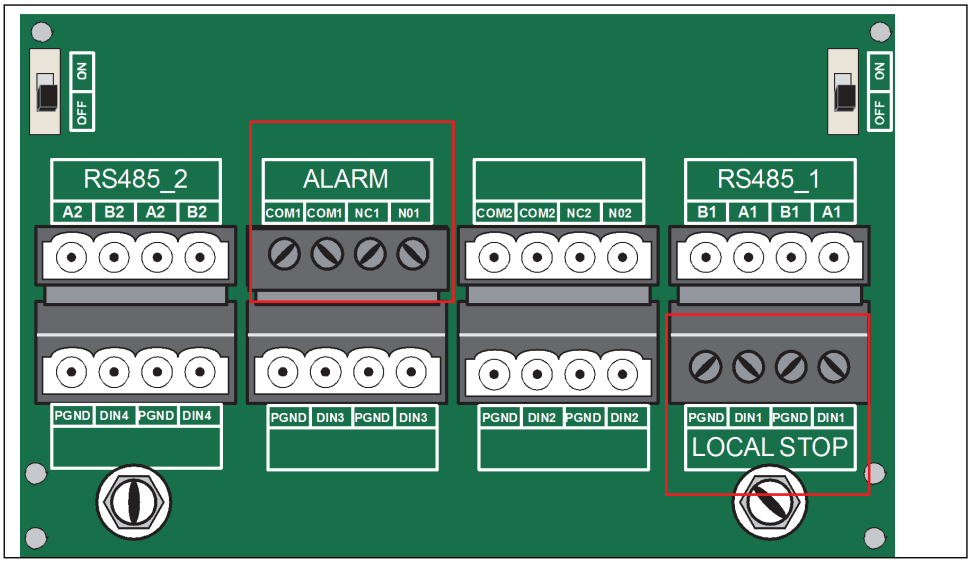


Figure 3-21 Communication Configuration Circuit Board

ALARM Dry Contact

Devices connected to this relay must comply with the following requirements:

AC Requirements

Max voltage	250 V
Max current	3 A

DC Requirements

Max voltage	30 V
Max current	3 A

Cable sizes

Max size	16 AWG
Min size	28 WG

Local Stop Dry Contact

The dry contact can be configured as Local Stop. When the two terminals, PGND and DIN1 are short-circuited, the inverter stops operating immediately.

Note that the dry contacts only support passive switch signal input.

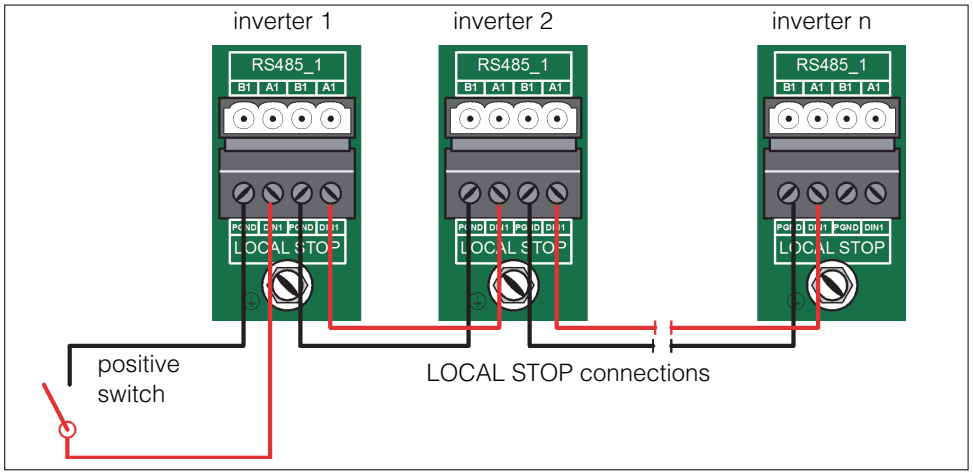


Figure 3-22 Multiple Inverters in a Daisy Chain Topology

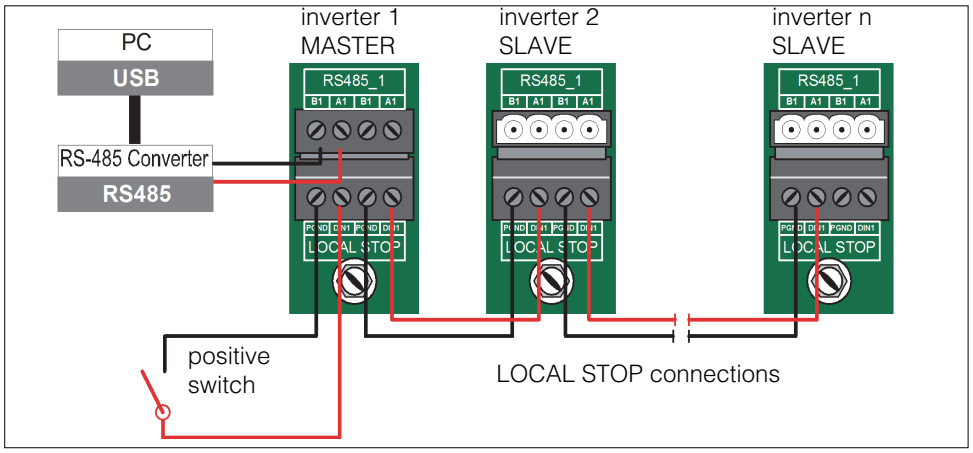


Figure 3-23 Multiple Inverters in a Master-Slave Mode Connection

The inverter with a direct connection to the RS-485 converter is automatically set to the master inverter. It sends Stop instructions to other inverters via RS-485 communications.

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4 Commissioning

Chapter 4 contains information about:

- Inspection Before Commissioning
- Commissioning Procedure

Inspection Before Commissioning

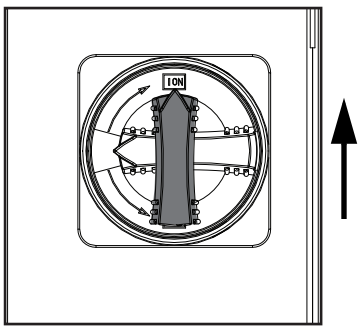
Check the following before starting the PV Inverter.

- ❑ The PV Inverter is accessible for operation, maintenance, and service.
- ❑ Check to confirm that the inverter is stable and fixed on the wall/metal frame.
- ❑ Check for proper ventilation.
- ❑ Check for and remove any object such as tools and extra screws on top of the PV Inverter.
- ❑ Check that the PV Inverter is clean and free of debris.
- ❑ Check that the PV Inverter and its accessories are connected securely.
- ❑ The cables are routed through the cable glands and protected against potential mechanical damage. Do not overtighten the sealing locks.
- ❑ A suitably rated AC circuit breaker (in an AC combiner box) is installed and the cables are properly connected.
- ❑ The AC terminals are properly torqued according to recommended torque settings (see “Summary of Torque Values” on page 2–14). Check both top and bottom terminals and adjust accordingly.
- ❑ The terminals which are not being used inside the wiring box are sealed.
- ❑ For the CL125A, check if the communication and AC cable knockouts were installed with Type 4/4X-rated conduit hubs as required.
- ❑ The product warning label and rating label are affixed permanently and not peeling off from the product.
- ❑ Check that you have an iOS or Android smart device that supports Bluetooth 4.1 LE at the commissioning site.
- ❑ Check that you have the eConfigure CL125 APP installed on the smart device.
- ❑ If you are viewing this Owner’s Guide online from https://solar.schneider-electric.com, make sure that you download a copy that you can access offline.

Commissioning Procedure

Make sure that "Inspection Before Commissioning" is done before operating the inverter.

1. Close (turn On) the AC circuit breaker in the AC combiner box.
2. Close (turn to ON position) the inverter's AC disconnect switch.

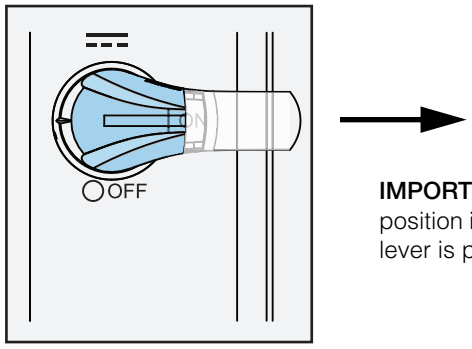


IMPORTANT: The ON position is when the switch knob is pointing up.

Figure 4-1 AC Disconnect Switch ON Position

3. Close (turn On) the DC disconnect in the DC combiner box installed close to the PV string (or array).

   If the DC combiner box does not have a DC disconnect, ensure that the PV cables are terminated and connected properly to the fuses/MC4s of the DC combiner.
4. Close (turn to ON position) the inverter's DC disconnect switch.



IMPORTANT: The ON position is when the switch lever is pointing right.

Figure 4-2 DC Disconnect Switch ON Position

5. Observe the LED Panel.

   If there is sufficient sunlight and enough DC power, the PV arrays shall initialize and supply DC power to the PV Inverter.

   The LED Panel is activated when DC voltage exceeds the inverter's startup voltage.

Table 4-1 LED Panel Indicators

LED Icon	Color	State	Definition
	Blue	OFF	No device is connected to the inverter through the Bluetooth.
		Flashing	The Bluetooth communication is connected and there is data communication.
	Blue	OFF	The RS485 communication cable is not connected or the communication channel has no data interaction.
		Flashing	The RS485 communication cable is connected and the communication channel has data interaction
	OFF	OFF	No event is detected. No alarms.
	Red	Steady	An event is detected and the device cannot connect to the gird.
		Flashing	Automatic recovery is in progress.
	Red	OFF	No ground fault is detected.
		Steady	An earth impedance short-circuit fault is detected (ground fault).
	Green	OFF	Both the AC and DC are powered down.
		Steady	The device is connected to the grid and operating normally.
		Flashing	The DC or AC is powered and the device is in Standby or Startup mode (not connected to the grid).

6. Use the eConfigure CL125 APP to establish the communication connection with the inverter through Bluetooth.
7. From a laptop/PC, perform a firmware upgrade (see page 5–31).
8. From the eConfigure CL125 APP, set the initial parameters. For more information, see "eConfigure CL125 APP Operation" on page 5–1.
9. From the eConfigure CL125 APP, perform a **Device Restart**. When the device is initialized, the eConfigure CL125 APP will send initial instructions and the device will start and operate.

5 eConfigure CL125 APP Operation

Chapter 5 contains information about:

- Introduction to the System
- Acquire and Install the eConfigure CL125 APP
- Basic eConfigure CL125 APP Operation

Introduction to the System

The eConfigure CL125 APP is a Bluetooth network-based smart device app. It allows customers and installers to monitor and configure the Conext CL125 series of PV inverters.

The eConfigure CL125 APP supports:

- Seamless Bluetooth connection over smartphone and tablet devices (smart devices)
- Both Android and iOS smart devices
- First time configuration of Conext CL125 PV inverters (during commissioning)
- Local monitoring of individual Conext CL125 PV inverters
- Configuration of various power control parameters, country selection, etc
- Event monitoring and data logging
- Firmware updates of Conext CL125 PV inverters

NOTE: During the use of the eConfigure CL125 APP, make sure your smart device is within five meters from the inverter and there are no objects that can disrupt communication between your smart device and the inverter. Signal reception is affected by these factors.

Acquire and Install the eConfigure CL125 APP

System Requirements

To run the eConfigure CL125 APP smart device app, you need:

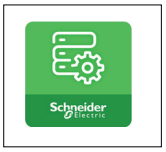
- iOS 10 or above (iPhone 6 or newer models)
- Android 5 or above
- Bluetooth 4.1 LE

Installation

Go to your iOS or Android smart device app store and search for **eConfigure CL125 APP**.

iOS	Android
	

The eConfigure CL125 APP icon appears on your smart device upon successful installation.



Basic eConfigure CL125 APP Operation

The eConfigure CL125 APP can be used to monitor and configure device and power control parameters for Conext CL125 PV inverters.

The following operations are applicable for both iOS and Android-based smart devices.

- Connecting to the Conext CL125 PV Inverter
- Disconnecting from the Conext CL125 PV Inverter
- Configuring a PV Inverter for the First Time
- Navigating the CL125 APP Menu Structure

Connecting to the Conext CL125 PV Inverter

To connect the inverter:

1. Wake up the smart device and then tap on the eConfigure CL125 APP icon to launch the app.

   The following login screen shows up on successful launch.

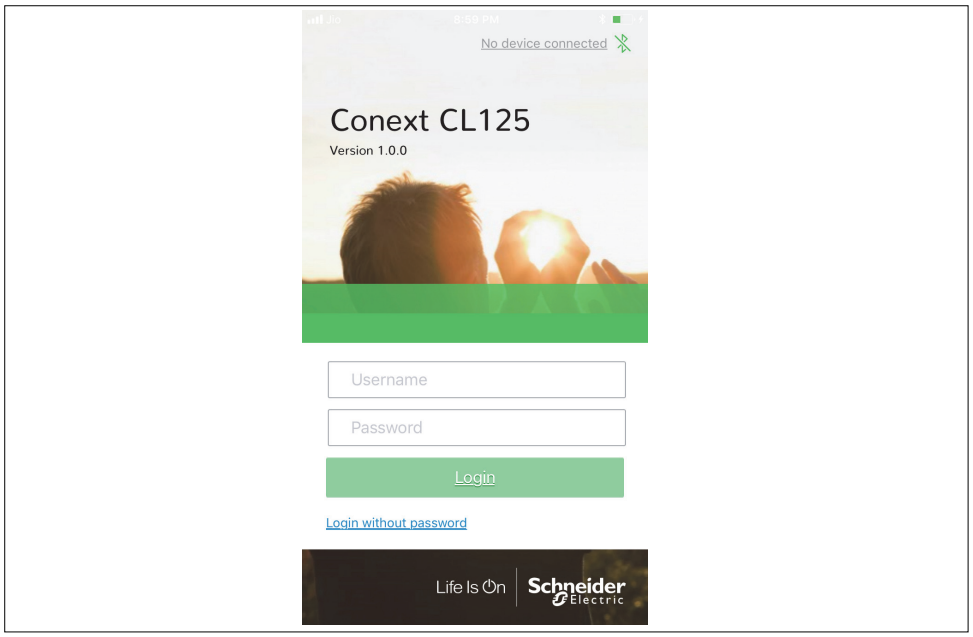


Figure 5-1 Log-in Screen

2. Enter the **Username** and **Password**.

   The following types of user accounts are supported.

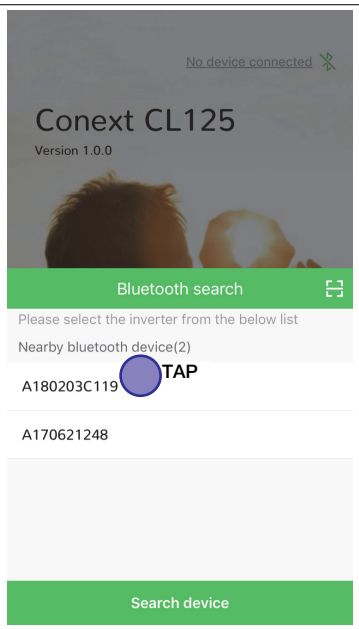
Type	Name	Default Password	Description
Basic login	None	None	Select “Login without password option”
User login	User	111111	
Admin/Level 2 login	A level 2 password is required to view this information. Contact your Sales Application Engineer.		

   After a successful log-in, the Bluetooth search screen appears.

3. Tap **Search device** at the bottom of the screen to scan for nearby inverters.

   On successful device detection, a list of devices appears under **Nearby Bluetooth device( )**. The devices are sorted according to their serial numbers.

   Also, on successful connection, the Bluetooth LED on the inverter’s front LED panel turns on.

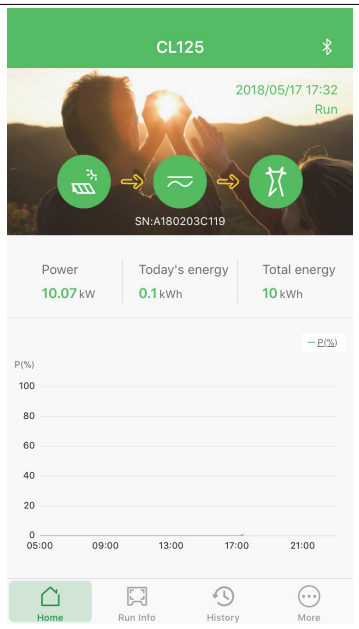


NOTE: Ensure that Bluetooth is enabled on the smart device for successful Bluetooth pairing to the Conext CL125 PV inverter.

Figure 5-2 Search Device Screen

4. Tap (select) an inverter from the list.
5. Verify the connection of the selected inverter by checking that the Bluetooth LED on the inverter's LED panel is On.

   The home page of the eConfigure CL125 APP appears.



NOTE: If the user is configuring the inverter for the first time then the **Initialize Screen** will be displayed instead. For more information, see "Configuring a PV Inverter for the First Time" on page 5–8.

Figure 5-3 Home Screen

Disconnecting from the Conext CL125 PV Inverter

To disconnect the inverter:

1. Tap **More**.
2. Tap **Logout**.
3. Tap **Confirm** to close the session.

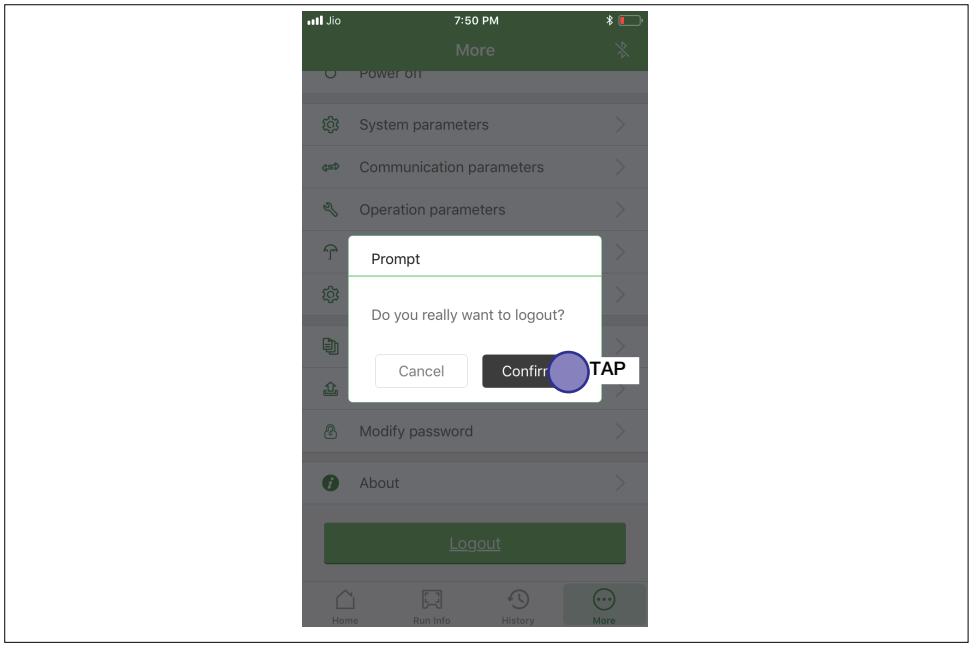


Figure 5-4 Logout Screen

Configuring a PV Inverter for the First Time

The First-Time Inverter Setting options are available only when a PV inverter is being configured for the first time. The user is required to configure each of the option parameters for proper operation of the inverter.

Options	Usage	User Level
Country set	Tap to select the country or grid type.	All
Protection level	Tap to set the protection level of the grid limits.	All
Device address	Tap to set Modbus RS485 slave address. When multiple inverters are connected to the same RS485 bus, this ID should be unique.	All
Date and time settings	Tap to set the date and time settings, This is used for Inverter event, alarm and energy production data.	All

NOTICE

EQUIPMENT SETTINGS

Consult a Sales Application Engineer (SAE) from Schneider Electric for the proper settings.

Failure to follow these instructions may cause an unexpected loss of production yield.

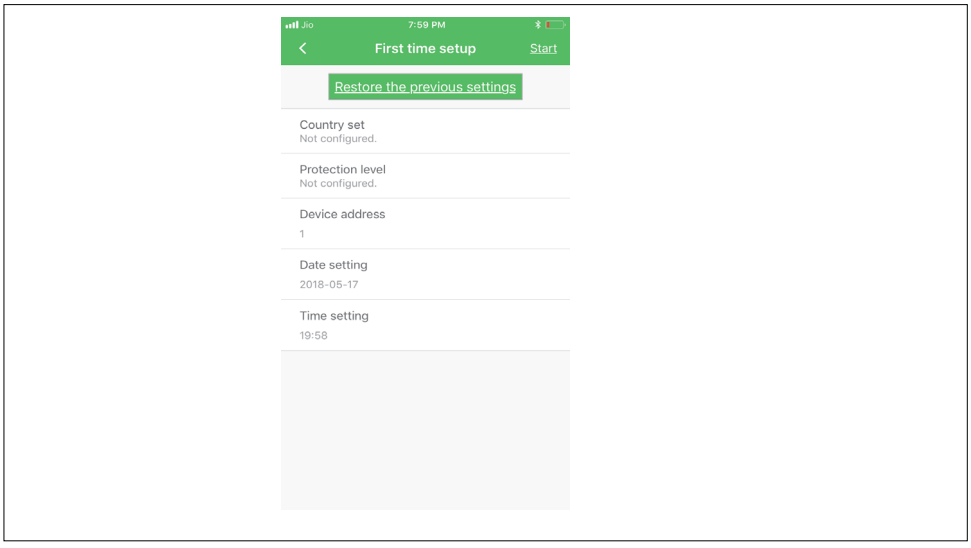


Figure 5-5 Initialize Screen

Navigating the CL125 APP Menu Structure

Figure 5-6 shows an overview of the various menu screens of the eConfigure CL125 APP. Some settings are only available for Level 2 users.

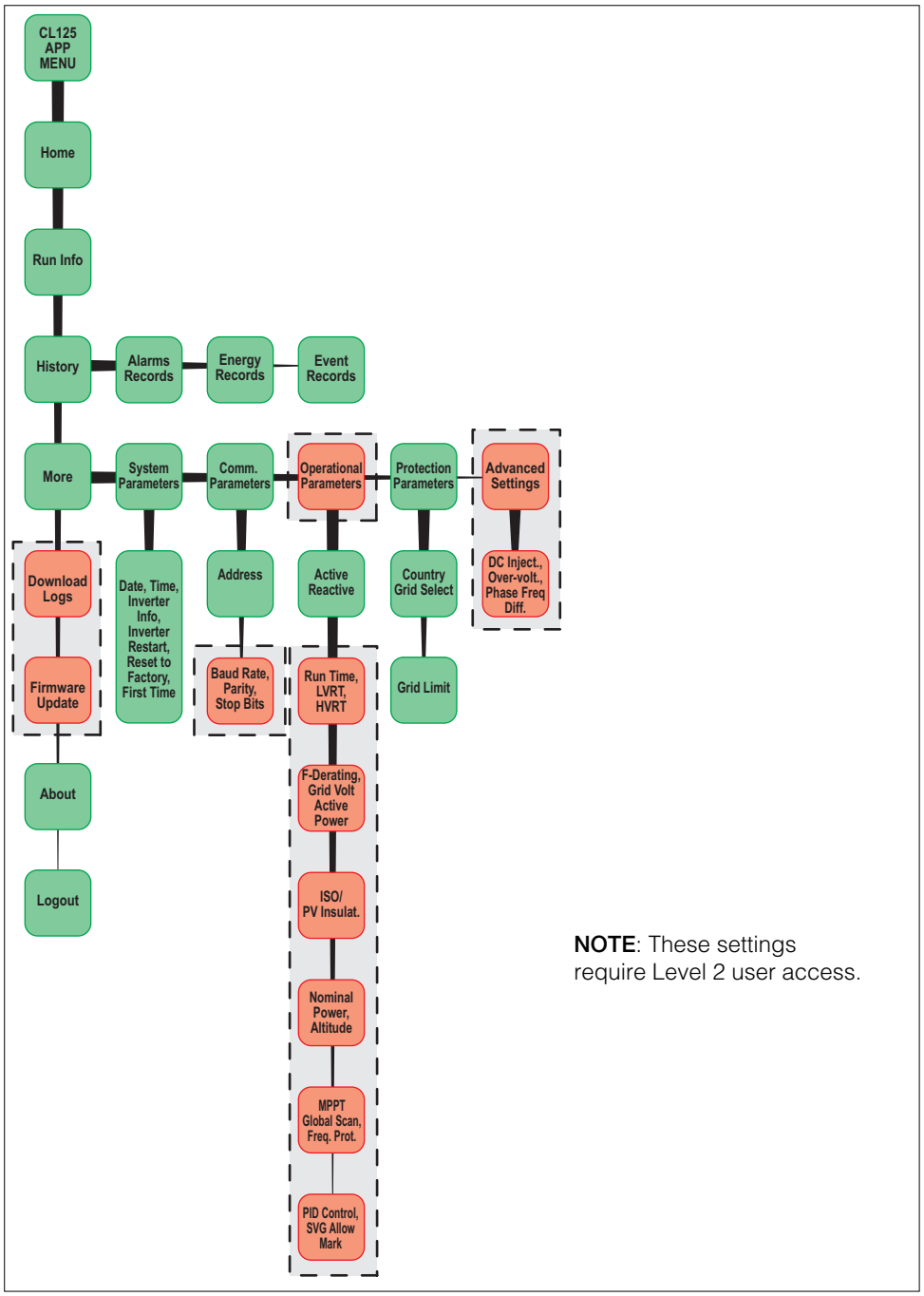


Figure 5-6 eConfigure CL125 APP Basic Menu Structure

Home

The **Home** screen displays a snapshot of system PV energy production and the health of all connected PV inverters. See Figure 5-7.

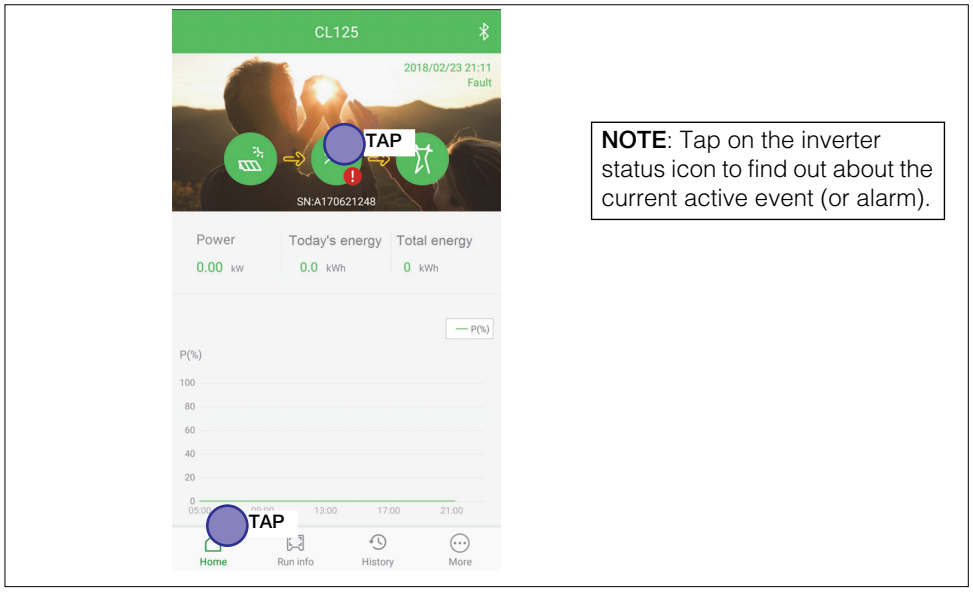


Figure 5-7 Home Screen

Run Info

The **Run Info** screen displays active inverter settings such as DC voltage, DC current, DC power, AC voltage, AC current, AC power, AC power factor, inverter internal temperature, and country information. See Figure 5-8.

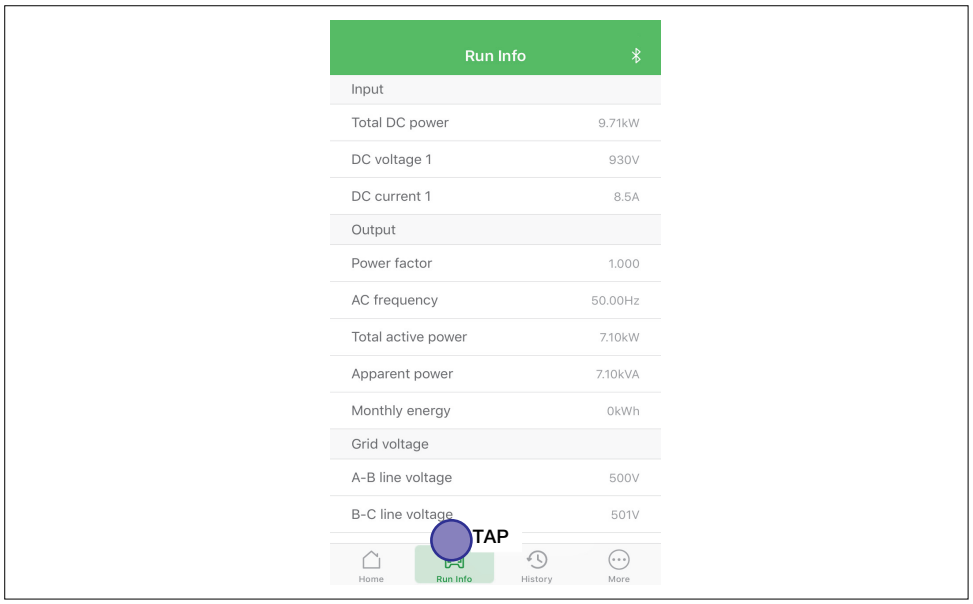


Figure 5-8 Run Info Screen

History

Tap on **History** to display the following information. See Figure 5-9.

Option	Usage	Access
Alarm Records	Tap to view all historical alarms. Select the time period of the alarms by adjusting the date.	All
	Tap on individual alarms to get more detailed information, timestamp, repair advice.	
Energy records	Tap to display a graphical view of power and energy yield.	All
	Swipe to the right to display detailed daily, monthly, and yearly energy yields.	
Event Records	Tap to view all the inverter events.	All
	Select the time period of the events by adjusting the date.	

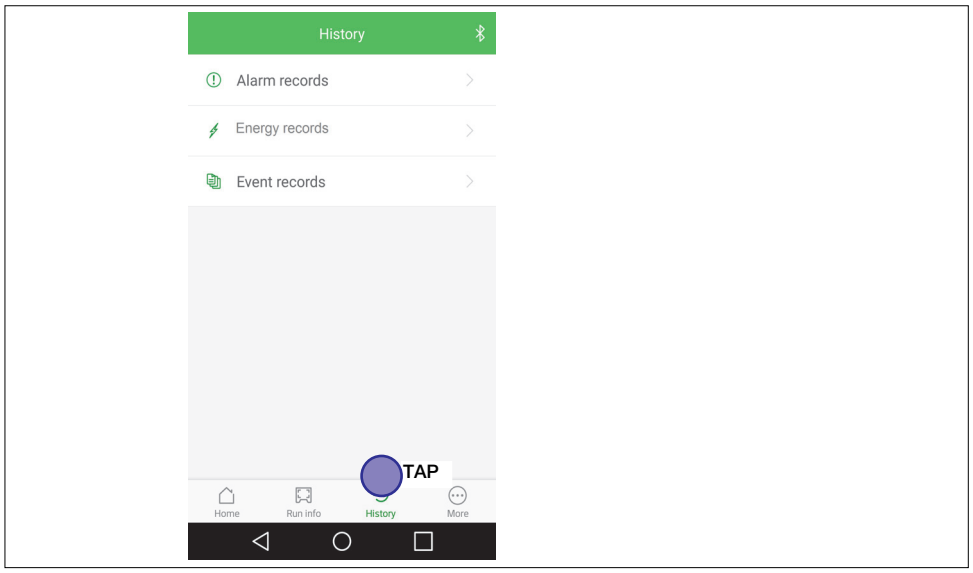


Figure 5-9 History Screen

More Settings

Tap **More** to display additional settings for the inverter. See Figure 5-10.

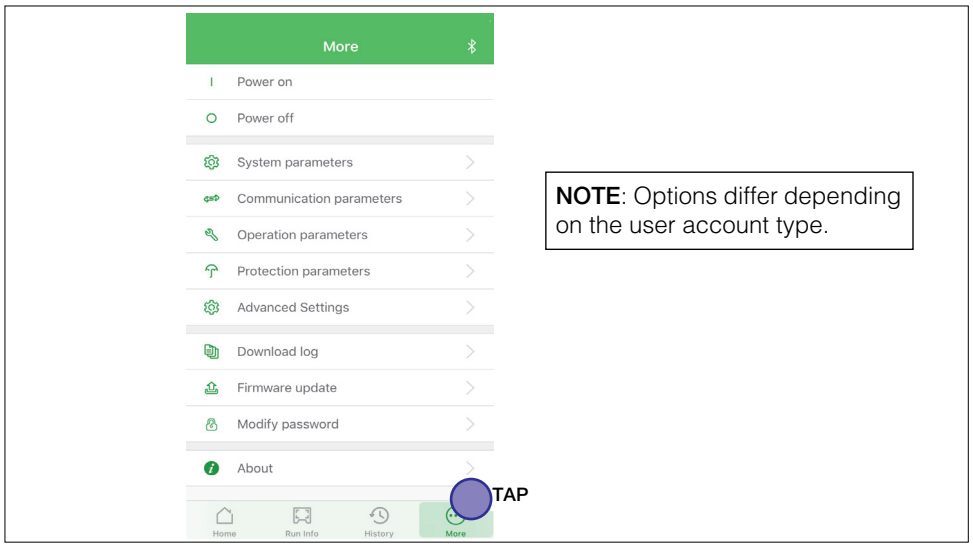


Figure 5-10 More Screen

System Parameters

These settings adjust the various system options below.

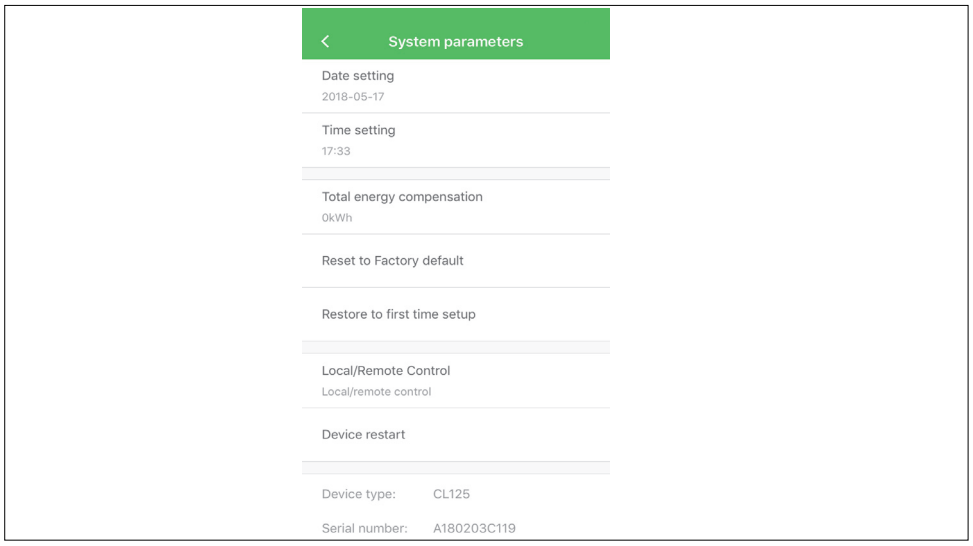


Figure 5-11 System Parameter Screen

Options	Usage	Access
Date and Time settings	Tap to set the system date and time.	All
Total energy compensation	Tap to set the energy offset.	All
Reset to Factory defaults	Tap to reset the inverter to factory settings. This clears all regional grid settings and the log files.	All
Restore to first time setup	Tap to reset to the first-time configuration set up in order to select the grid type.	Level 2
Local/Remote Control	Tap to select either the eConfigure CL125 APP or the EasyConfig Tool/Modbus for configuring critical power systems	Level 2
Device Restart	Tap to restart the inverter.	All
Device Info	Tap to display the inverter model, serial number, and firmware version.	All

Communication Parameters

This option controls the inverters Modbus RS485 communication settings.

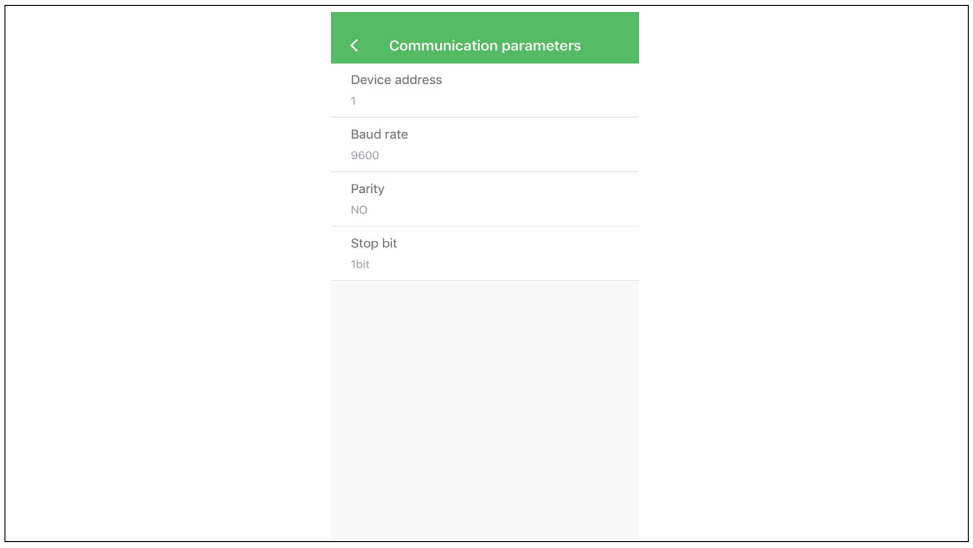


Figure 5-12 Communication Parameter Screen

NOTICE

USER LEVEL ACCESS

Contact a Schneider Electric representative to request or set up a Level 2 user access account. Many settings require Level 2 user access.

Failure to follow these instructions may affect production yield.

Options	Usage	Access
Address	Tap to Set the Modbus address of the inverter	All
Baud Rate	Tap to select the required RS485 baud rate.	Level 2
Parity	Tap to select the required parity	Level 2
Stop Bits	Tap to select the required stop bit	Level 2

Operation Parameters

These settings are used to adjust inverter power controls.

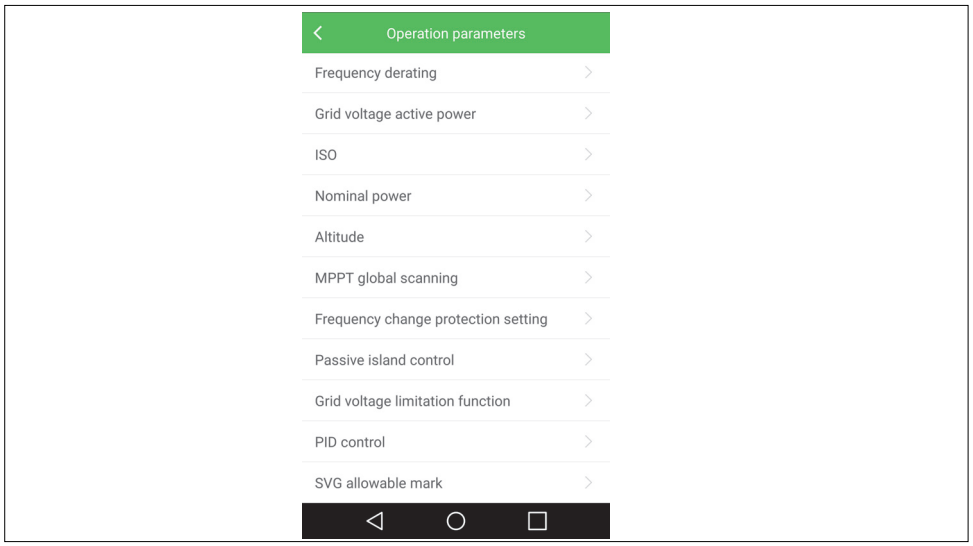


Figure 5-13 Operation Parameter Screen

NOTICE

USER LEVEL ACCESS

Contact a Schneider Electric representative to request or set up a Level 2 user access account. Many settings require Level 2 user access.

Make sure that in the system parameters, the local control or local/remote control option is set. This is to allow operation parameters to be configured from the CL125 APP.

Failure to follow these instructions may affect production yield.

Options	Usage	Access
Active and Reactive settings	Tap to set the Active (see page 5–16) and Reactive (see page 5–18) power limits.	All
Run time	Tap to reconnect and set fault recovery times.	Level 2
LVRT	Tap to set the LVRT set points.	Level 2
HVRT	Tap to set the HVRT set points.	Level 2
Frequency derating	Tap to set the Frequency derating set points.	Level 2
Grid voltage active power	Tap to set the active power versus grid voltage derating.	Level 2

Options	Usage	Access
ISO	Tap to set the insulation resistance limit.	Level 2
Nominal power	Tap to set the maximum nominal power of the inverter.	Level 2
Altitude	Tap to set the altitude derating set point.	Level 2
MPPT global settings	Tap to set MPPT global scan time.	Level 2
Frequency change settings	Tap to set the anti-islanding set points.	Level 2
Passive island detection control	Tap to set the passive islanding detection set points.	Level 2
Grid voltage limitation	Tap to set active and reactive derating in relation to grid voltage.	Level 2

Active Power Control Parameters

These settings adjust the inverter's active power control parameters. See Figure 5-14 and Table 5-1. For more information, see the *Conext CL125 Inverter - Active and Reactive Power Control and LVRT/HVRT Application Note (document number: 976-0406-01-01)*.

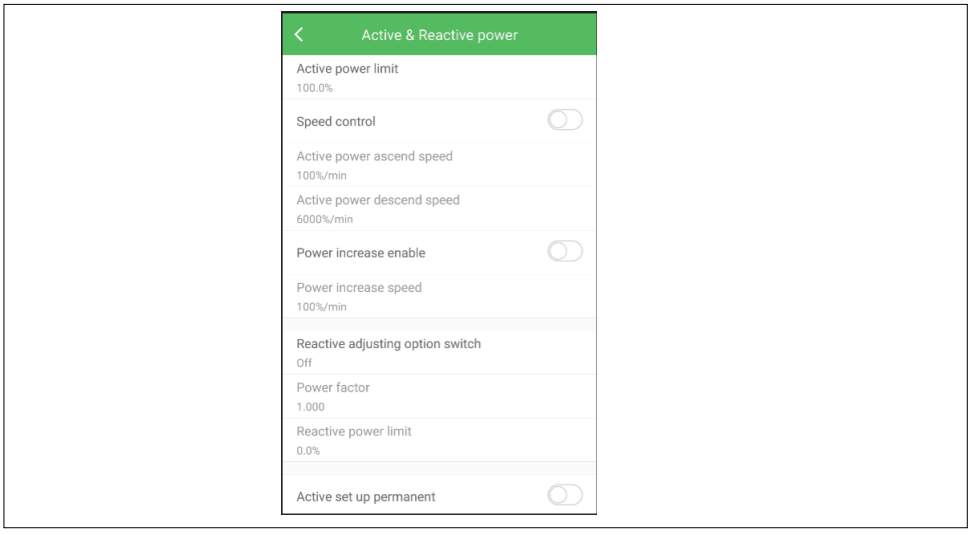


Figure 5-14 Active Power Control

Table 5-1 Active Power Control Parameters

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Active power limit	%	0	*	100	0.1%	Nominal power can be limited in percentage (%).
Speed control	-	-	#	--	--	Sets the change rate of active power. When ON, active power speed can be increased (ascend) or decreased (descend).
Active power ascend speed	%/min	8	*	6000	1%	Active power ascend speed rate measured in % per minute.
Active power descend speed	%/min	8	*	6000	1%	Active power descend speed rate measured in % per minute.
Power increase enable	-	-	#	--	--	Sets the increase rate of active power after an event (or fault). When ON, active power speed can be increased.
Power increase speed	%/min	8	*	6000	1%	Power increase speed rate measured in % per minute.
Active setup permanent	-	-	#	--	--	When ON, active power settings are saved.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

Reactive Power Control Parameters

These settings adjust the inverter's reactive power control parameters. See Figure 5-15 and Table 5-2.

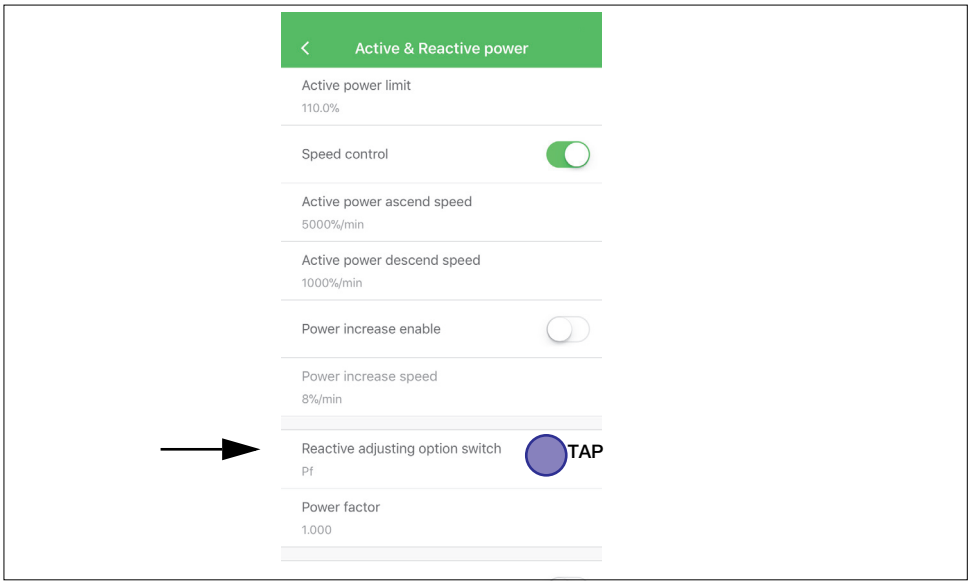


Figure 5-15 Reactive Power Control

Table 5-2 Reactive Power Control Parameters

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Reactive adjusting option switch	-	-	-	-	-	The CL125 inverter provides a reactive power regulation function. Use this **Reactive adjusting option switch** to activate the function and to select the proper regulation mode. See Table 5-3, "Regulation Mode" on page 5–19.
Power Increase Speed	%/min	8	*	100	1%	Power increase speed rate measured in % per minute.
Reactive Setup Permanent	-	-	#	--	--	When ON, reactive power settings are saved.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

Table 5-3 Regulation Mode[a]

Regulation Mode	Description	See...
Off	The power factor (Pf) is limited to 1.000 and the reactive power limit is set to 0.0%	-
Pf	The reactive power can be regulated by the parameter Pf (Power factor).	page 5–19
Qt	The reactive power can be regulated by the parameter Reactive power limit (in %).	page 5–20
Q(P)	The PF changes with the output power of the inverter.	page 5–20
Q(U)	The reactive power changes with the grid voltage.	page 5–21

a.If one regulation mode is selected, then the other modes are disabled.

Table 5-4 Pf Regulation Mode

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Reactive adjusting option switch	-	-	-	-	-	Select Pf
Power factor	-	–0.800 (ind)	*	+0.800 (cap)	0.001	Power factor of inverter AC output
Reactive Setup Permanent	-	-	#	--	--	When ON, reactive power settings are saved.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

Table 5-5 Qt Regulation Mode

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Reactive adjusting option switch	-	-	-	-	-	Select Qt
Reactive power limit	%	–100	0.0	+100	1%	100% of reactive power is equal to 75kVar.
Reactive Setup Permanent	-	-	#	--	--	When ON, reactive power settings are saved.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

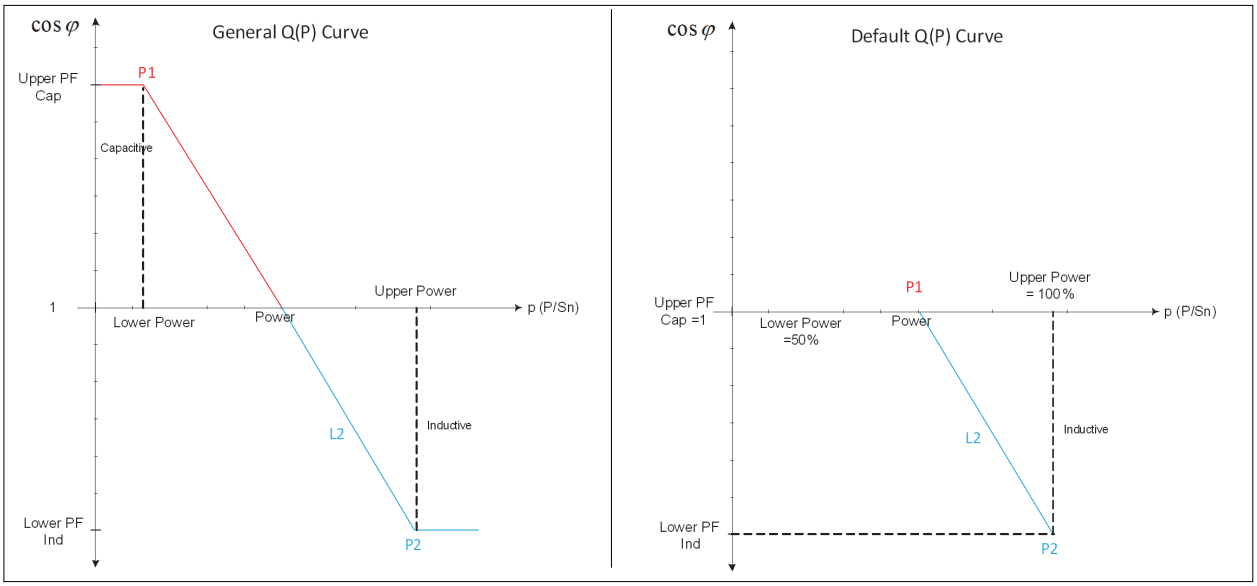


Figure 5-16 Q(P) Curves

Table 5-6 Q(P) Regulation Mode

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Reactive adjusting option switch	-	-	-	-	-	Select Q(P)
Lower power	%	0	*	50	0.1%	Output power of P1 in Q(P) mode curve

Table 5-6 Q(P) Regulation Mode

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Upper power	%	50	*	100	0.1%	Output power of P2 in Q(P) mode curve
Upper limit - Pf(Cap)	-	0.900	*	1.000	0.001	Power factor of P1 in Q(P) mode curve
Lower limit - Pf(Ind)	-	0.900	*	1.000	0.001	Power factor of P2 in Q(P) mode curve
Reactive Setup Permanent	-	-	#	--	--	When ON, reactive power settings are saved.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

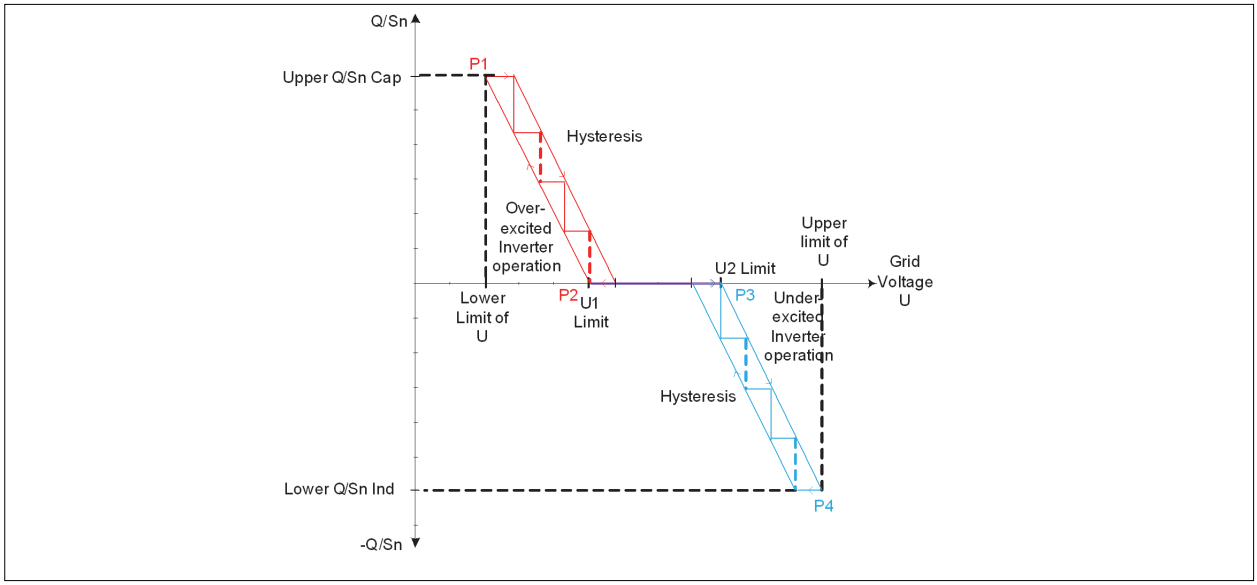


Figure 5-17 Q(U) Curve

Table 5-7 Q(U) Regulation Mode

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Reactive adjusting option switch	-	-	-	-	-	Select Q(U)
Lower U limit	%	80	*	100	0.1%	Grid voltage limit of P1 in Q(U) mode curve (in %)

Table 5-7 Q(U) Regulation Mode

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
U1 limit	%	90	*	110	0.1%	Grid voltage limit of P2 in Q(U) mode curve (in %)
U2 limit	%	100	*	110	0.1%	Grid voltage limit of P3 in Q(U) mode curve (in %)
Upper U limit	%	100	*	120	0.1%	Grid voltage limit of P4 in Q(U) mode curve (in %)
Hysteresis	%	0	*	5	0.1%	Hysteresis voltage width (in %)
Lower Q/Sn	%	0	8	50	0.1%	Inductive Q/Sn value of P4 in the Q(U) mode curve (in %)
Upper Q/Sn	%	0	8	50	0.1%	Capacitive Q/Sn value of P1 in the Q(U) mode curve (in %)
Reactive Setup Permanent	-	-	--	*	--	When ON, reactive power settings are saved.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

Frequency Derating Parameters

These settings adjust the inverter's frequency derating parameters. See Figure 5-18 and Table 5-8.

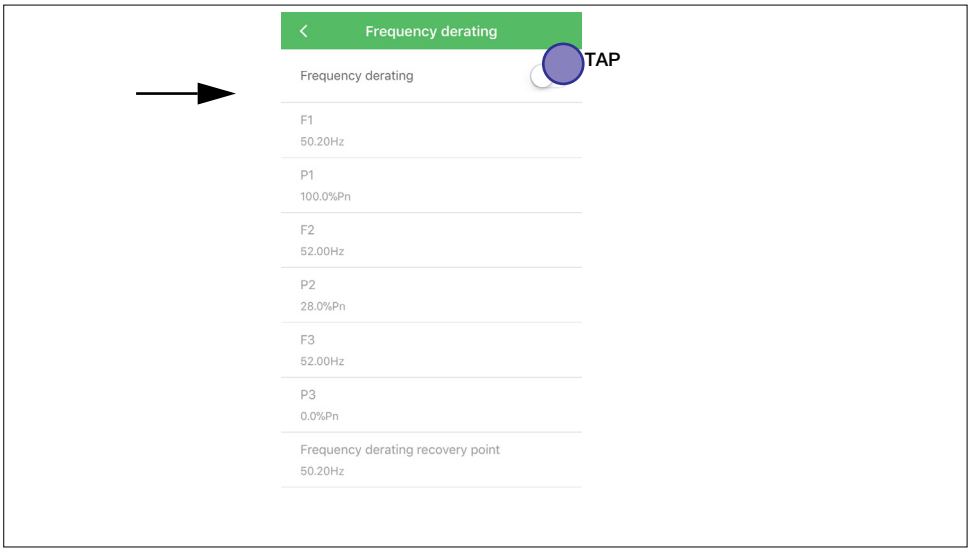


Figure 5-18 Active Power vs Over Frequency Change

Table 5-8 Frequency Derating Parameters

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Frequency derating	-	-	#	--	--	When ON, the selected inverter will operate in active power derating mode when the grid frequency exceeds the set value.
F1 F2 F3	Hz	50.00 60.00	-	55.00 65.00	0.01	These three values of frequency and power define the frequency derating curve. The user decides the slope of derating and enter the calculated values. P1>P2>P3
P1 P2 P3	%	0	*	100	1	

Table 5-8 Frequency Derating Parameters

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Frequency derating recovery point	Hz	50.00 60.00	-	55.00 65.00	0.01	The frequency at which active power will start to increase after a frequency derating.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

Grid Voltage Active Power Parameters

These settings adjust the inverter's frequency derating parameters. See Figure 5-19 and Table 5-9.

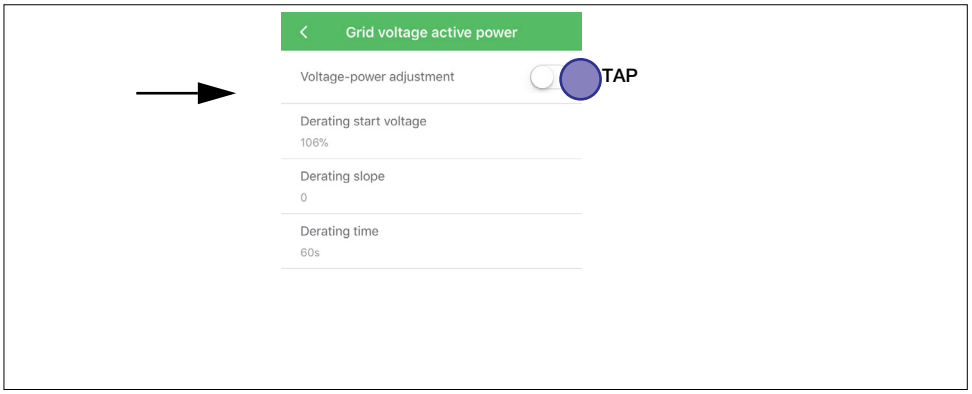


Figure 5-19 Grid Voltage Active Power

Table 5-9 Grid Voltage Active Power Derating Parameters

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Voltage power adjustment	-	-	#	--	--	When ON, the selected inverter's derating voltage slope and time can be adjusted.
Derating start voltage	%	105	*	150	1	Starting voltage at which active power begins to derate.
Derating slope	%	0	*	100	1	Slope of active power in derating mode.

Table 5-9 Grid Voltage Active Power Derating Parameters

Parameter	Unit	Min	Default	Max	Resolution	Parameter Value Info
Derating time	s (sec)	0	*	600	1	The frequency at which active power will start to increase after a frequency derating.

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

Low Voltage/High Voltage Ride-Through (LVRT/ HVRT) Parameters

These settings adjust the inverter's ride-through parameters during low voltage and high voltage events. See Figure 5-20 and Table 5-9.

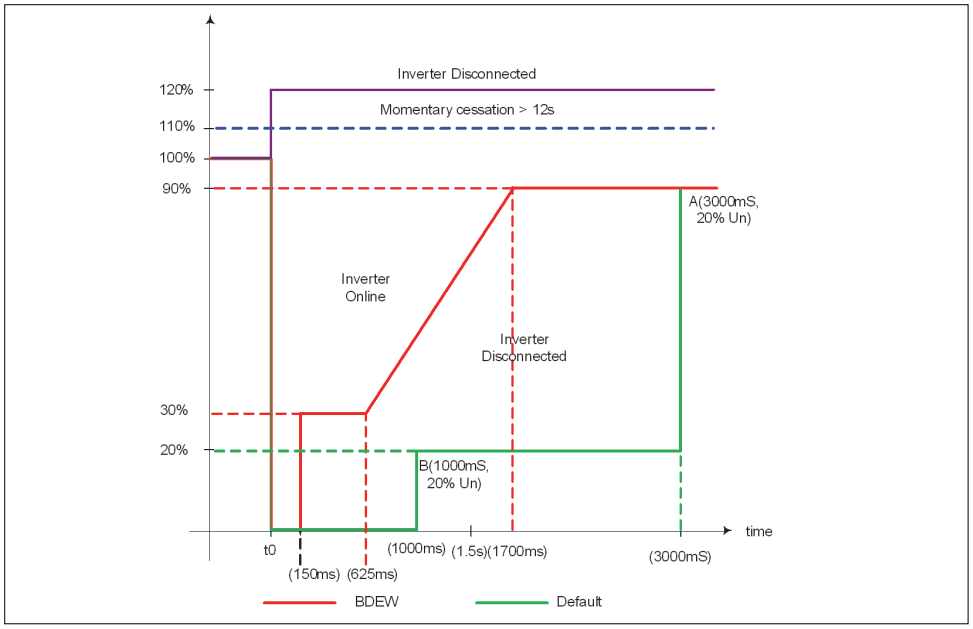


Figure 5-20 LVRT and HVRT Curves

Figure 5-21 LVRT

Table 5-10 LVRT Parameters

Parameter	Unit	Min	Default	Max	Resolution	Description
LVRT	-	-	#	--	--	When ON, the selected inverter will remain connected to the grid during event conditions and provide reactive power.
LVRT Voltage V1	V (volts)	60	*	600	0.1	User set
LVRT Voltage V2	V (volts)	60	*	600	0.1	User set
LVRT Voltage V3	V (volts)	60	*	600	0.1	User set
LVRT Voltage V4	V (volts)	60	*	600	0.1	User set
LVRT Voltage V5	V (volts)	60	*	600	0.1	User set
LVRT T1	ms (millisec)	0	*	60000	1	User set

Table 5-10 LVRT Parameters

Parameter	Unit	Min	Default	Max	Resolution	Description
LVRT T2	ms (millisec)	0	*	60000	1	User set
LVRT T3	ms (millisec)	0	*	60000	1	User set
LVRT T4	ms (millisec)	0	*	60000	1	User set
LVRT T5	ms (millisec)	0	*	60000	1	User set
LVRT k factor	-	0	*	10	0.1	User set parameter for the reactive power injection calculation

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

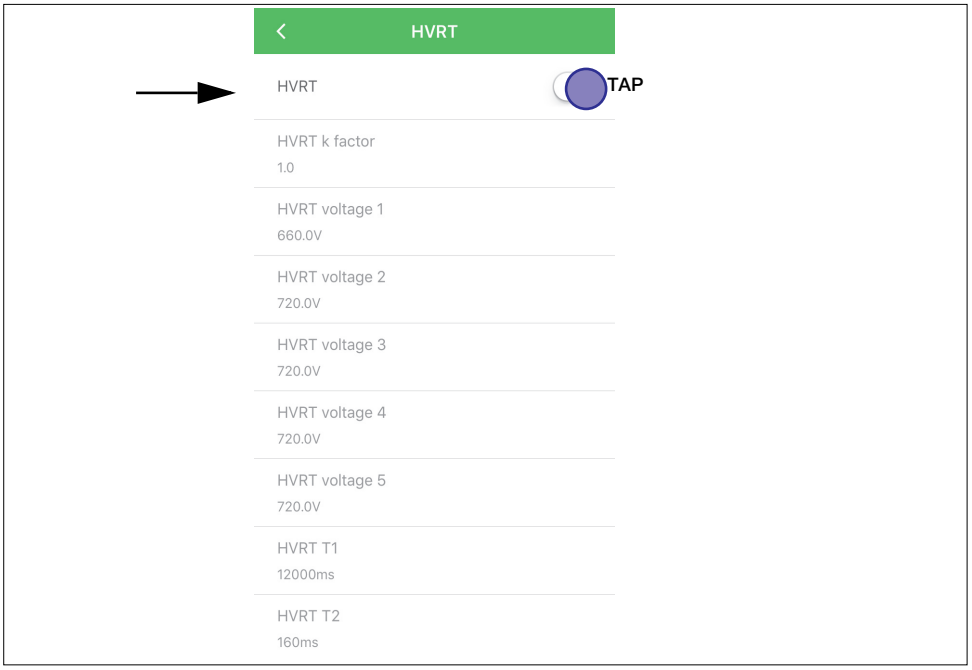


Figure 5-22 HVRT

Table 5-11 HVRT Parameters

Parameter	Unit	Min	Default	Max	Resolution	Description
HVRT	-	-	#	--	--	When ON, the selected inverter will remain connected to the grid during event conditions and provide reactive power.
HVRT Voltage V1	V (volts)	447	*	826	0.1	User set
HVRT Voltage V2	V (volts)	447	*	826	0.1	User set
HVRT Voltage V3	V (volts)	447	*	826	0.1	User set
HVRT Voltage V4	V (volts)	447	*	826	0.1	User set
HVRT Voltage V5	V (volts)	447	*	826	0.1	User set
HVRT T1	ms (millisec)	0	*	60000	1	User set
HVRT T2	ms (millisec)	0	*	60000	1	User set
HVRT T3	ms (millisec)	0	*	60000	1	User set
HVRT T4	ms (millisec)	0	*	60000	1	User set
HVRT T5	ms (millisec)	0	*	60000	1	User set
HVRT k factor	-	0	*2	10	0.1	User set parameter for the reactive power injection calculation

***** - this value depends on a country-specific grid code requirement.

- this is either OFF or ON depending on a country-specific grid code requirement.

Protection Parameters

These settings adjust the inverter's grid output protection limits and the regional settings.

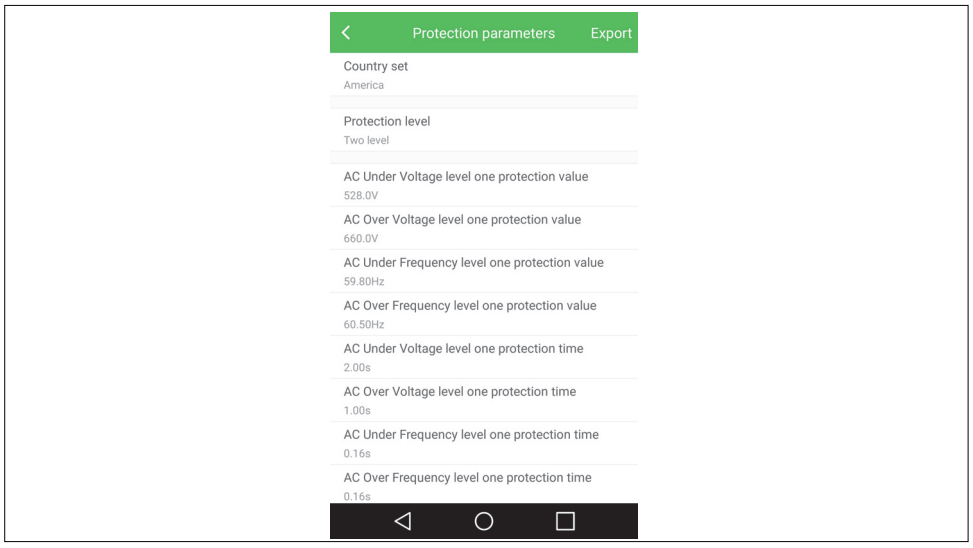


Figure 5-23 Protection Parameter Screen

NOTICE
USER LEVEL ACCESS Contact a Schneider Electric representative to request or set up a Level 2 user access account. Many settings require Level 2 user access. **Failure to follow these instructions may affect production yield.**

Options	Usage	Access
Country set	Tap to select the country or grid type.	All
Protection level	Tap to set the protection levels for over-voltage limits, under-voltage limits, and frequency limits.	Level 2

Advanced Settings

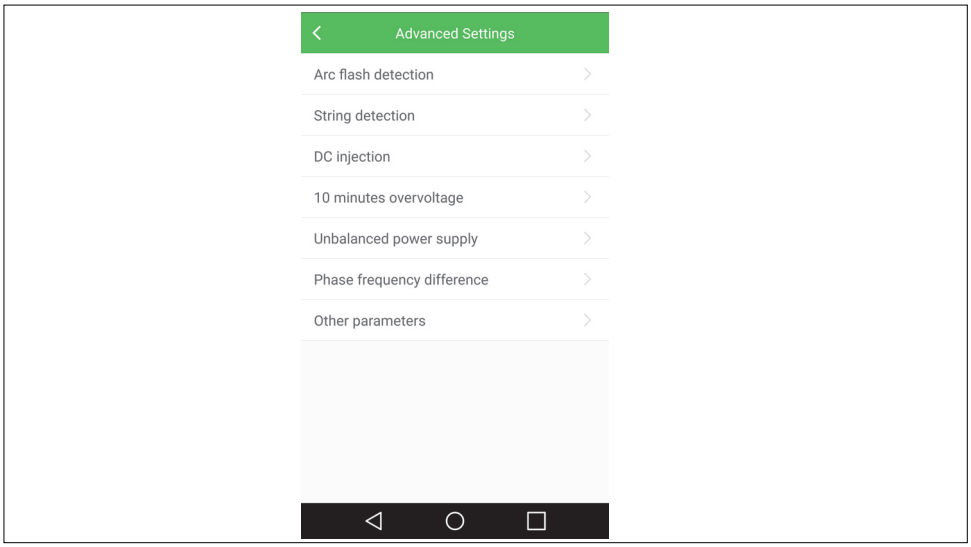


Figure 5-24 Advanced Settings Screen

NOTICE

USER LEVEL ACCESS

Contact a Schneider Electric representative to request or set up a Level 2 user access account. Many settings require Level 2 user access.

Failure to follow these instructions may affect production yield.

Options	Usage	Access
DC Injection	Tap to enable and set the DC injection current trip limits.	Level 2
Arc fault detection	Not supported	Level 2
String detection	Not supported	Level 2
10-minute over-voltage	Country/Grid type dependent feature	Level 2

Firmware Update

The eConfigure CL125 APP can facilitate the firmware update of the Conext CL125 PV inverter. The firmware update is done via Bluetooth which eliminates physically opening the inverter enclosure.

NOTICE

USER LEVEL ACCESS

Contact a Schneider Electric representative to request or set up a Level 2 user access account. Many settings require Level 2 user access.

Failure to follow these instructions may affect production yield.

NOTICE

FIRMWARE UPDATE

- Charge the smart device to more than 50% to make sure that the smart device has sufficient battery for the firmware update.
- Do not switch off the smart device while updating the firmware.
- Stay near the inverter during the update process.
- Before going to the PV site to update the inverter, make sure that you have downloaded the latest firmware package to a laptop/PC and you have the latest eConfigure CL125 APP on your smart device.
- Bring along to the PV site, the USB cable for your smart device.
- Ensure that the Conext CL125 is powered by both AC and DC sources for the firmware update process.

Failure to follow these instructions may affect inverter operation.

System Requirements

To perform a firmware update on the CL125 inverter, you need:

- Smart device
  - iOS 10 or above (iPhone 6 or newer models)
  - Android 5 or above
  - Bluetooth 4.1 LE
- Windows laptop/PC
  - Windows 7/10 (minimum)
  - Access to Internet

NOTE: The CL125 inverter must be powered by both DC and AC sources for the firmware update process.

To update the firmware using a laptop/PC and an Android smart device:

1. From a laptop/PC, open a web browser and download the latest firmware package from the Conext CL125 product website.
2. Open and unzip the firmware package.
3. Connect the device to the laptop/PC using a USB cable.
4. Mount the Android smart device as a USB device.
5. Browse the Android smart device's file system and navigate to the **SE-CL125** directory.
6. Copy the contents of the unzipped firmware package from the laptop/PC to the **SE-CL125** directory on the Android smart device.
7. Switch to your Android smart device and tap on the eConfigure CL125 APP icon.
8. Log in using **admin** credentials.
9. Tap **More**.
10. Tap **Firmware Update**.
11. Search and select the **LCD_CL125_Vxx_Vxx_A_xx.sgu** (or **MDSP_CL125_Vxx_Vxx_A_xx.sgu**) firmware file, where **Vxx_Vxx_A_xx** may vary depending on the latest firmware.
12. Tap **Update**.

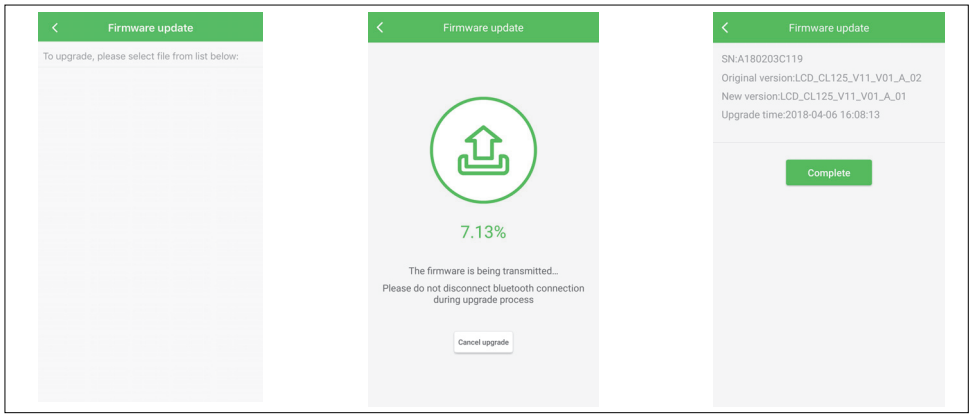


Figure 5-25 Firmware Update Screens

13. Observe the firmware update progress screen.

    You may tap the **Cancel upgrade** button to cancel the firmware update.
14. Tap **Complete** once the firmware update is finished.
15. Restart the Conext CL125 PV inverter by turning OFF both the AC and DC disconnect switches and then turning them ON.
16. Confirm that the firmware was updated from the eConfigure CL125 APP under **System parameters > Firmware version**.

NOTE: The CL125 inverter must be powered by both DC and AC sources for the firmware update process.

To update the firmware using a laptop/PC and an iOS smart device:

1. Download and install the latest iTunes for Windows application from the Apple website. If you already have iTunes on your Windows laptop/PC, simply update to the latest iTunes for Windows version.

   NOTE: This step is a pre-requisite.
2. Open a web browser from the laptop/PC and download the latest firmware package from the Conext CL125 product website.
3. Open and unzip the firmware package and store the contents to a local folder.
4. Connect the iOS smart device to the laptop/PC using a USB cable.
5. Launch the iTunes for Windows application.
6. Click the **Phone** icon.

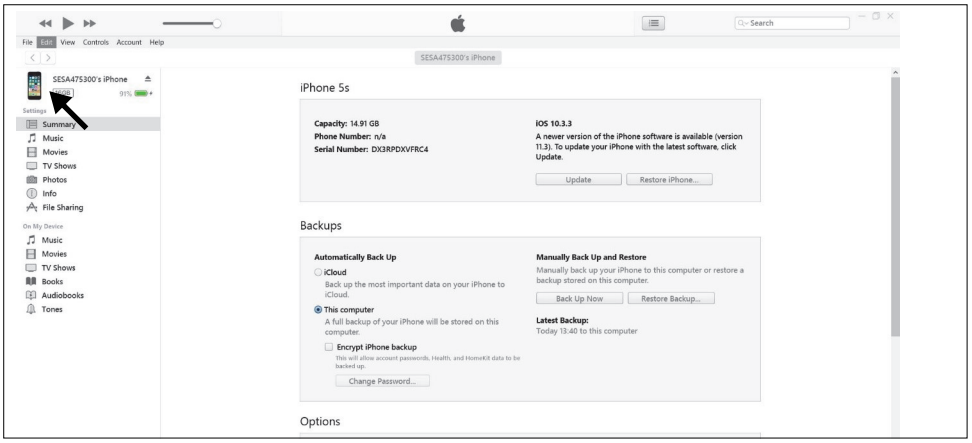


Figure 5-26 iTunes for Windows Example

7. Click the **File Sharing** option under **Settings**.

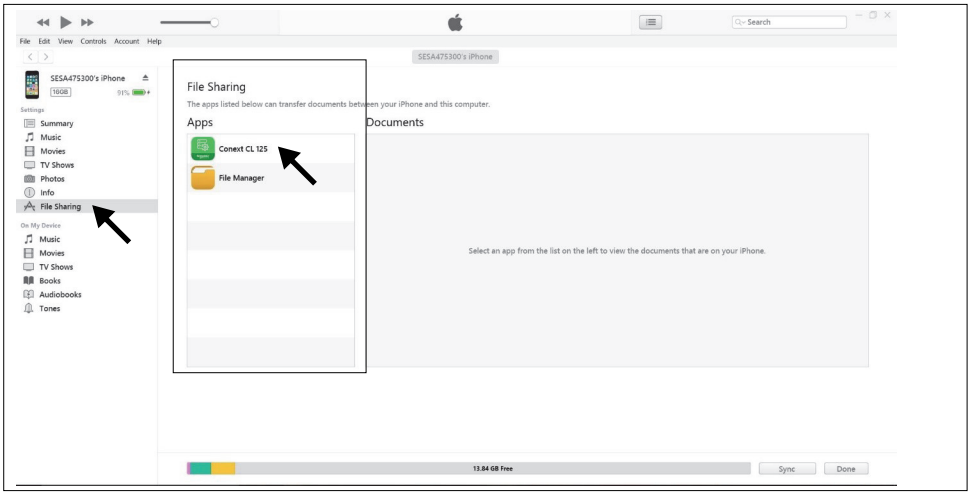
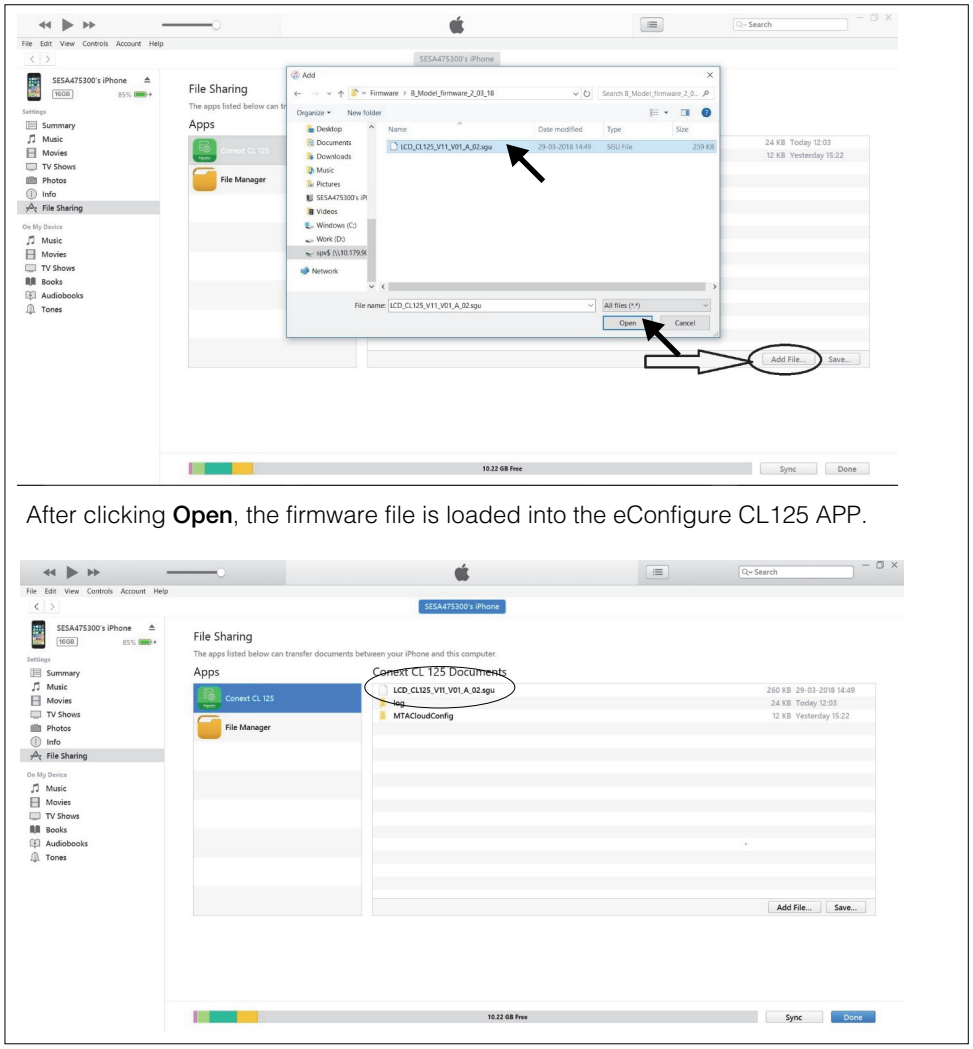


Figure 5-27 iTunes for Windows File Sharing

8. Click the **Conext CL125** app under **File Sharing > Apps**.
9. Click the **Add File...** button in the **Conext CL125 Documents** section and navigate to the local folder where you have stored the unzipped firmware package files
10. Search and select the **LCD_CL125_Vxx_Vxx_A_xx.sgu** (or **MDSP_CL125_Vxx_Vxx_A_xx.sgu**) firmware file.
11. Click **Open** in file browser dialog box.



After clicking **Open**, the firmware file is loaded into the eConfigure CL125 APP.

Figure 5-28 iTunes for Windows Add File

12. Switch to your iOS smart device and tap on the eConfigure CL125 APP icon.
13. Log in using **admin** credentials.
14. Tap **More**.
15. Tap **Firmware Update**.

16. Tap the **LCD_CL125_Vxx_Vxx_A_xx.sgu** (or **MDSP_CL125_Vxx_Vxx_A_xx.sgu**) firmware file, where **Vxx_Vxx_A_xx** may vary depending on the latest firmware.
17. Tap **Confirm** in the **Upgrade information** dialog.
18. Observe the firmware update progress screen.

    You may tap the **Cancel upgrade** button to cancel the firmware update.

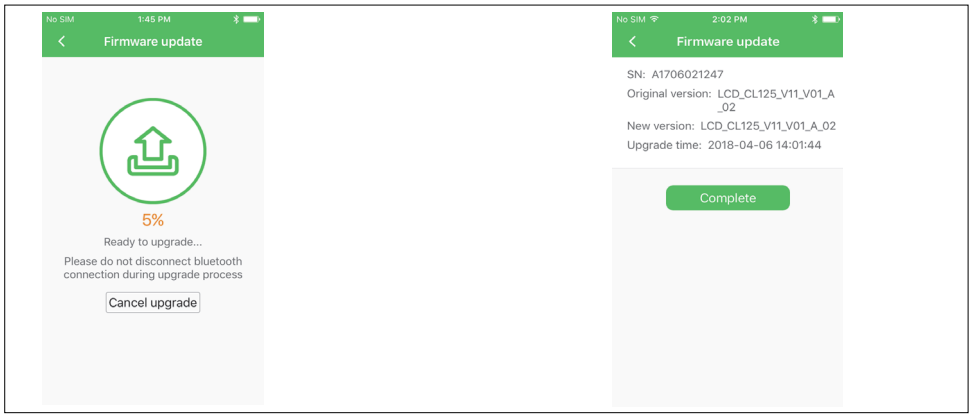


Figure 5-29 Firmware Update Screens

19. Tap **Complete** once the firmware update is finished.
20. Restart the Conext CL125 PV inverter by turning OFF both the AC and DC disconnect switches and then turning them ON.
21. Confirm that the firmware was updated from the eConfigure CL125 APP under **System parameters > Firmware version**.

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6 Troubleshooting

Chapter 6 contains information about:

- Troubleshooting
- Maintenance

Troubleshooting

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

Access to live parts shall be limited to suitably qualified electrical personnel.

NOTE: Some of the solutions presented in the troubleshooting section may require you to open the CL125 enclosure temporarily while still receiving power from an AC source. Follow the **DANGER** safety message above prior to opening the CL125 enclosure.

LED Indicator

Problem	Symptom	Check...	Solution
The CL125 appears to be non-operational.	LED indicators on the LED Panel are Off.	... the downstream AC circuit breaker to see that it is closed (turned On). ... the AC wiring connections on the AC circuit breaker and the inverter terminals. ... the upstream DC circuit breaker to see that it is closed (turned On). ... the DC disconnect switch on the inverter is turned to ON position. ... the polarity of the PV arrays and that they match the cables leading to the inverter terminals.	Perform the "Lock-Out Tag-Out (LOTO) Procedure" on page xiv. Revisit the instructions and perform "Cabling and Wiring" on page 3–3 and "Commissioning Procedure" on page 4–3 again. If the problem persists, see NOTE on page 6–4.
The CL125 is energized but one or more of the LED indicators are showing symptoms.	green LED indicator is Off	... the AC wiring connections on the AC circuit breaker and the inverter terminals. ... whether the DC input voltage exceeds the startup voltage of the inverter.	Perform the "Lock-Out Tag-Out (LOTO) Procedure" on page xiv. Revisit the instructions and perform "AC Side Cable Connection" on page 3–5 and "PV Array Connection" on page 3–11 again. If the problem persists, see NOTE on page 6–4.
	red LED indicator is On	... for detected event conditions using the eConfigure CL125 APP.	The inverter usually stops inverting when this indicator is on. To understand the condition further, refer to Table 6-1, "Event Codes" on page 6–5 and match a solution to the event code.

Problem	Symptom	Check...	Solution
The CL125 is energized but one or more of the LED indicators are showing symptoms.	green LED indicator is flashing	... whether both AC and PV are connected to the inverter and their voltages are well within the operating range of the inverter.	The inverter may be in Standby state or may be attempting to connect to the grid. To understand the condition further, refer to Table 6-1, “Event Codes” on page 6–5 and match a solution to the event code. If the flashing persists for a long amount of time, see NOTE on page 6–4.
	red LED indicator is On	... for detected event conditions using the eConfigure CL125 APP.	This indicates a ground fault condition. See Table 6-1, “Event Codes” on page 6–5 and match a solution to the event code.

NOTE: If the problem persists, contact technical support at: http://solar.schneider-electric.com/tech-support.

Event Codes Displayed in the eConfigure CL125 APP

Table 6-1 lists all possible event conditions with corresponding event code, description, and a solution.

Table 6-1 Event Codes

Event Code	Description	Solution
002	The grid voltage exceeds the inverter's permissible range. **NOTE**: Protection time and protection thresholds depend on the utility's requirements.	Measure the grid voltage. Follow instructions in the DANGER message at the beginning of this chapter. If the grid voltage exceeds the inverter's permissible range, contact the utility company for suggestions. If the grid voltage is within the inverter's permissible range, see NOTE on page 6–12.
003	Grid transient voltage exceeds the permissible range.	This is a short term event caused by transients in the grid. Wait for the inverter to recover automatically. See NOTE on page 6–12.
004	The grid voltage is below the inverter's permissible lower limit. **NOTE**: Protection time and protection thresholds depend on the utility's requirements.	Measure the grid voltage. Follow instructions in the DANGER message at the beginning of this chapter. If the measured grid voltage is below the permissible operational limit, contact the utility company for suggestions. If the measured grid voltage is within the permissible operating range of the inverter and the event persists, see NOTE on page 6–12.
005	The grid voltage is below the utility's under-voltage protection limit.	This could be a short term event due to grid conditions. Wait for the inverter to recover automatically. See NOTE on page 6–12.
006	The AC output current exceeds the inverter's protection limit.	The inverter will resume operation when the AC output current falls below the protection limit. If the event persists, see NOTE on page 6–12.

Table 6-1 Event Codes

Event Code	Description	Solution
007	Transient AC over current	This may be a short term event. The inverter can recover automatically. Wait for a few minutes for the inverter to recover but if the event persists, see NOTE on page 6–12.
008	The grid frequency exceeds the inverter's permissible operating upper limit.	Measure the grid frequency. Follow instructions in the DANGER message at the beginning of this chapter. If the grid frequency is within the permissible operating range of the inverter and the event persists, see NOTE on page 6–12. If the grid frequency is not within the permissible operating range of the inverter, contact the utility company for suggestions.
009	The grid frequency is below the inverter's permissible operating lower limit.	
010	Islanding	Check whether the AC breaker at the AC combiner box is turned ON. Check whether the inverter's AC disconnect switch is turned ON. Measure the grid voltage at the AC Connection to the Inverter. Follow instructions in the DANGER message at the beginning of this chapter. Check whether AC cables are all properly connected. Check whether the grid is in service. See NOTE on page 6–12.
011	The DC component of the AC current exceeds the inverter's limit.	This may be a short term event. The inverter can recover automatically. Wait for a few minutes for the inverter to recover but if the event persists, see NOTE on page 6–12.

Table 6-1 Event Codes

Event Code	Description	Solution
012	Residual current leakage detected is high.	Check whether the insulation is low on the PV array or a higher leakage current in the inverter. See NOTE on page 6–12.
013	A grid condition event is detected that is outside of normal operations.	This condition may occur when grid voltage exceeds or falls below the inverter's permissible operating range. Contact the utility company for suggestions. The inverter can recover automatically. Wait for a few minutes for the inverter to recover but if the event persists, see NOTE on page 6–12.
014	Average grid over-voltage (10 minutes)	This condition occurs when grid voltage exceeds the inverter's permissible operating limit for an average of 10 minutes. Contact the utility company for suggestions. The inverter can recover automatically. Wait for a few minutes for the inverter to recover but if the event persists, see NOTE on page 6–12.
015	Grid impedance exceeds inverter's limit.	Verify that the type and size of AC cables as well as transformer impedance are specified according to the CL125 Solution Guides or local electrical regulations. Wait for the inverter to recover automatically. See NOTE on page 6–12.
016	AC output overload	Wait for the inverter to recover automatically. See NOTE on page 6–12.
017	Grid voltage imbalance	Wait for the inverter to recover automatically. Test the grid voltage to confirm the imbalance. See NOTE on page 6–12.

Table 6-1 Event Codes

Event Code	Description	Solution
019	High transient DC bus voltage	Wait for the inverter to recover automatically. See NOTE on page 6–12.
020	High DC bus voltage	Wait for the inverter to recover automatically. See NOTE on page 6–12.
021	PV input over current	Check the PV configuration and connection. See NOTE on page 6–12.
022	Over current protection	If the grid or PV current is within the permissible operating range of the inverter and the event persists, see NOTE on page 6–12.
023	PV configuration mode has changed during normal operation.	Check the PV configuration. Restart the inverter.
024	Voltage imbalance at neutral point	Wait for the inverter to recover automatically when the deviation falls within the permissible range. See NOTE on page 6–12.
025	Transient unbalance of voltage neutral point	Wait for the inverter to recover automatically when the deviation falls within the permissible range. See NOTE on page 6–12.
026	Bus voltage is fluctuating.	Wait for the inverter to recover automatically. See NOTE on page 6–12.
028	PV reverse connection is detected.	Check that the PV cables are connected from the PV source to the inverter's PV terminals with the correct polarity.
030	Clamp capacitance over-voltage event is detected.	Wait for the inverter to recover automatically. See NOTE on page 6–12.
031	Clamp capacitance under-voltage event is detected.	
032	Clamp capacitance imbalance event is detected.	
033	Clamp capacitance pre-charge ground fault is detected	

Table 6-1 Event Codes

Event Code	Description	Solution
036	Module temperature is too high.	Verify that the DC input power is not greater than the DC:AC ratio of 1.5. If it is, then reduce DC input power. Check whether the inverter is directly placed under the sun and intense sun exposure is causing the inverter's module temperature to rise. Install a proper shade to shield the inverter from direct sunlight. See NOTE on page 6–12.
037	Internal ambient temperature is too high.	Check the functionality of the fans. Replace any broken fan if necessary. Clean the air outlet grates. See NOTE on page 6–12.
038	Line tie relay contacts have welded or are open.	Wait for the inverter to recover automatically. See NOTE on page 6–12.
039	Inverter insulation resistance event (ISO-flt)	Wait for the inverter to recover automatically. Test for insulation damages in the wiring. See NOTE on page 6–12.
040	AC (or DC) over-current or DC over-voltage event is detected.	Wait for the inverter to recover automatically. See NOTE on page 6–12.
041	Current leakage sampling channel event	Wait for the inverter to recover automatically. See NOTE on page 6–12.
042	AC current imbalance	Wait for the inverter to recover automatically. See NOTE on page 6–12.

Table 6-1 Event Codes

Event Code	Description	Solution
043	The ambient temperature falls below -25 °C (-13 °F)	Stop operating the inverter and disconnect it from all power sources. Wait for the ambient temperature to rise within the permissible operating range and then restart the inverter.
044	DC/AC inversion circuit event	Wait for the inverter to recover automatically. See NOTE on page 6–12.
047	PV configuration mode set on the eConfigure CL125 APP does not match the design.	Disconnect the inverter from all power sources. See “PV Array Connection” on page 11 to reconnect the PV strings and reselect PV configuration mode.
048	Phase-R current sampling channel event	Wait for the inverter to recover automatically. See NOTE on page 6–12.
049	Phase-S current sampling channel event	
050	Phase-T current sampling channel event	
053	Grid voltage redundancy event is detected.	Measure the grid voltage. Follow instructions in the DANGER message at the beginning of this chapter. If the measured grid voltage exceeds the permissible operational limit, contact the utility company for suggestions. See NOTE on page 6–12.

Table 6-1 Event Codes

Event Code	Description	Solution
054	Grid frequency redundancy event is detected.	Measure the grid frequency. Follow instructions in the DANGER message at the beginning of this chapter. If the grid frequency exceeds the inverter's permissible range, contact the utility company for suggestions. If the problem persists but the grid frequency is within the inverter's permissible range, contact technical support at: http://solar.schneider-electric.com/tech-support
055	Inverter insulation resistance redundancy event is detected.	Wait for the inverter to recover automatically. See NOTE on page 6–12.
056	Inverter leakage current redundancy event is detected.	Check if there is a ground fault at the PV string. See NOTE on page 6–12.
059	Main DSP communication redundancy event is detected.	Wait for the inverter to recover automatically. See NOTE on page 6–12.
060	Main DSP data comparison event is detected.	
070	Fan event	Stop operating the inverter by disconnecting it from all power sources. Remove and replace the fan. See "Fan Maintenance" on page 6–14. To know which fan is affected, refer to the fan operation status in the eConfigure CL125 APP. See "Fan Event" on page 6–12. See NOTE on page 6–12.
071	AC side SPD event	For DC SPD, see "Replacing an Expended DC SPD" on page 6–17. For AC SPD, see NOTE on page 6–12.
072	DC side SPD event	

Table 6-1 Event Codes

Event Code	Description	Solution
074	Communication event	An event has occurred in the internal communication of the inverter. However, the inverter continues feeding into the grid. See NOTE on page 6–12.
075	Solar irradiation is not sufficient for inverter operation	Wait for sufficient sunlight. If this event recurs when irradiation is sufficient, check the PV system design and adjust the connection of PV inputs.
076	PV overload condition	Check the PV system design and adjust the connection of PV inputs.
078	PV power event warning	Check the PV input terminals for loose connections. Tighten the connections according to torque specifications found in “PV Array Connection” on page 3–11. See NOTE on page 6–12.
Fan Event - Operation Status		**Description**
0 0 0 0 1		Fan 1 experienced an event.
0 0 0 1 0		Fan 2 experienced an event.
0 0 1 0 0		Fan 3 experienced an event.
0 0 0 1 1‘		Fans 1 & 2 experienced an event.
0 0 1 1 1		Fans 1-3 experienced an event.
0 1 0 0 0		Fan 4 (high power) experienced an event.
1 0 0 0 0		Fan 5 (low power) experienced an event.

1 means an event is detected. **0** means fan is healthy.

NOTE: If the problem persists, contact technical support at: http://solar.schneider-electric.com/tech-support.

Maintenance

Routine Maintenance

Table 6-2 Routine Maintenance Schedule

Component	Maintenance	Frequency
CL125 unit	Clean any dust accumulation on the inverter. Clear the inverter enclosure of any leaves, sand, and dust build up and other debris, if necessary. Check if the air inlet and outlet are clear of any debris. Clean the air inlet and outlet, if necessary. See below.	Every six months to a year (depending on air quality in the local area)
Fans	Check whether there are visible cracks on the fan blades. Check for unusual noise when the fan is turning. Clean or replace the fans if necessary (see “Fan Maintenance” on page 6–14).	Once a year
DC SPD	Check the DC SPD. Replace the DC SPD whenever necessary.	Every six months
CL125 firmware	Update the inverter’s firmware periodically. See “Firmware Update” on page 5–31.	Every six months

Cleaning the Air Inlet and Outlet

Heat is generated in the process of running the inverter. The inverter adopts a controlled forced-air cooling method.

In order to maintain good ventilation, make sure that the air inlet and outlet grates are not blocked and they are clear of any debris.

Clean the air inlet and outlet grates with a soft brush or a vacuum cleaner, if necessary.

NOTE: Do not use pressurized air (compressed air) to clean the grates. This will force debris inside the enclosure.

Fan Maintenance

Fans inside the PV Inverter are used to cool the inverter during operation. If the fans do not operate normally, the inverter may not be cooled down and operational efficiency may decrease. Therefore, it is necessary to maintain the fans and keep them clean and free of debris. If necessary, replace broken fans. Contact your local Schneider Electric Sales Representative at: http://solar.schneider-electric.com.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- This equipment must be installed only by qualified personnel and serviced only by authorized service personnel equipped with appropriate PPE and following safe electrical work practices.
- Before opening any doors or covers:
  - Consult system diagram to identify all power sources. This equipment is energized from multiple sources: the DC input, and the AC grid. When the PV array is exposed to light, it supplies a DC voltage to this equipment.
  - De-energize, lock out, and tag out all power sources. The DC disconnect is located on the left side of the unit. The AC disconnect switch is located on the right side of the unit.
  - Wait at least ten minutes for internal capacitors to discharge to safe voltages.
  - Wearing appropriate PPE, verify that all circuits are de-energized using a suitably rated meter.
- Never energize the inverter with the covers removed.
- Replace all devices and covers before turning on power to this equipment.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.

Failure to follow these instructions will result in death or serious injury.

To replace the main fan assembly:

1. Perform the steps in “Disconnecting Power from the Inverter” on page 7–2.
2. Remove the screws holding the fan assembly to the enclosure as shown in Figure 6-1.

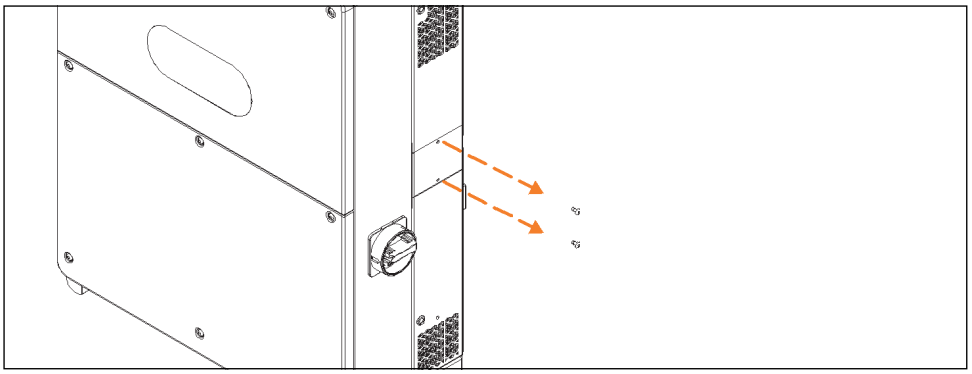


Figure 6-1 Remove Screws from Side Panel

When the fan assembly is removed the fans' power wires will also get pulled out of the enclosure.

3. Press on the locking button on the fans' power connectors and pull the connectors outward from each other.

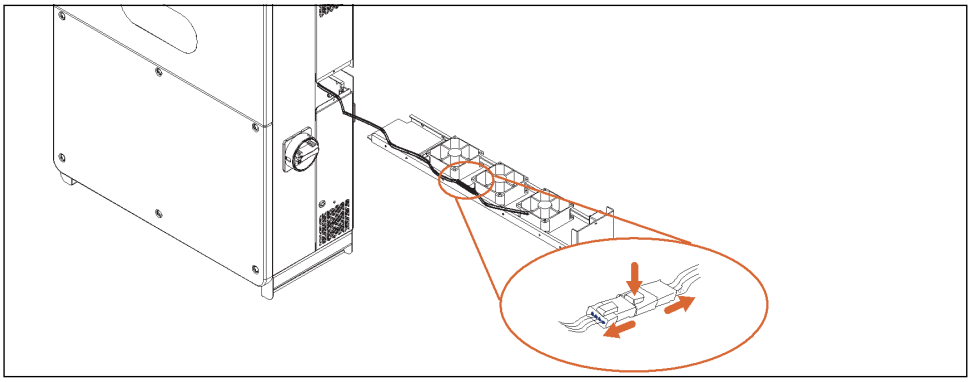


Figure 6-2 Detach Fan Assembly

4. Remove the fans from the inverter.
5. Replace the broken fans, if necessary.

   Clean the fan with a soft brush or a vacuum cleaner, if there is no replacement done.

   NOTE: Do not use pressurized air (compressed air) to clean the fan. This will force debris inside the enclosure.

6. Reassemble the fans (including plugging in the power connectors) back into the inverter.
7. Perform the "Commissioning Procedure" on page 4–3.

To replace the secondary fan assembly:

1. Perform the “Lock-Out Tag-Out (LOTO) Procedure” on page xiv, if applicable.
2. Remove the six screws on the front cover of the wiring box.

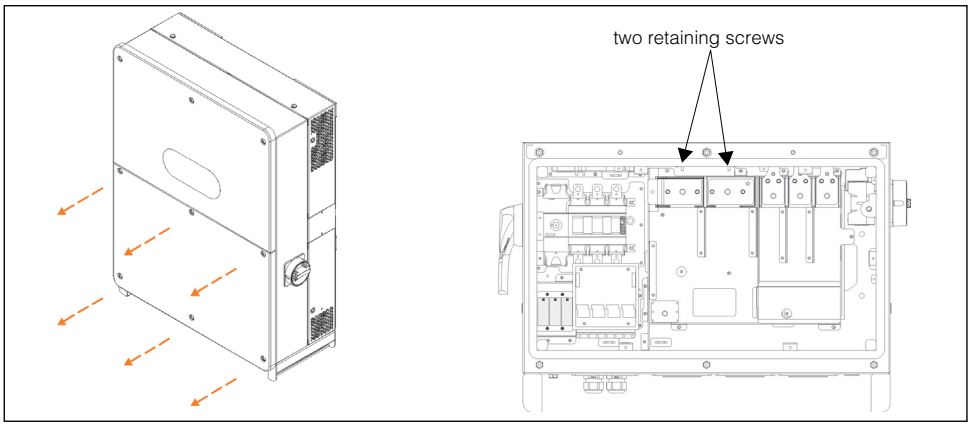


Figure 6-3 Removing the Front Cover Panel

3. Remove the two retaining screws holding the fan assembly.

   When the secondary fan assembly is removed the fan’s power wires will also get pulled out of the enclosure.
4. Press on the locking button on the fan’s power connectors and pull the connectors outward from each other.
5. Remove the fan from the inverter.
6. Replace the broken fan, if necessary.

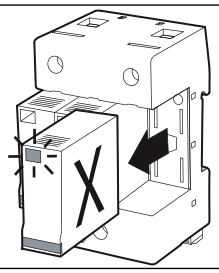
   Clean the fan with a soft brush or a vacuum cleaner, if there is no replacement done.

   NOTE: Do not use pressurized air (compressed air) to clean the fan. This will force debris inside the enclosure.
7. Reassemble the fan (including plugging in the power connectors) back into the inverter.
8. Replace the front cover panel.
9. Perform the “Commissioning Procedure” on page 4–3.

Replacing an Expended DC SPD

To replace the DC SPD (surge protection device):

1. Open the AC circuit breaker at the AC combiner box (turn it OFF) and perform the “Lock-Out Tag-Out (LOTO) Procedure” on page xiv, if not yet done.
2. Open the upstream DC disconnect or open the fuseholders at the DC combiner box (turn it OFF).
3. Open the DC disconnect switch of the PV Inverter (turn to OFF position).
4. Wait about ten minutes until the capacitors inside the inverter have discharged.
5. Remove the six screws on the front cover of the lower wiring box then put away the front cover. For torque, see “Torque Values” on page 2–14.
6. Measure the AC voltage to ground at the AC terminal to confirm that the AC output voltage of the inverter at the AC circuit breaker is zero.
7. Measure the DC voltage at the DC terminal to confirm that it is zero.
8. Identify the expended DC SPD cartridge by the red indicator (see picture below).
9. Remove the expended DC SPD cartridge by pulling the cartridge out of its housing using your index finger and thumb to grab the top and bottom edges.



DC SPD Manufacturer Part Number
ABB PVR PV T2 40-1500 C QS

Figure 6-4 Remove DC SPD Cartridge from Housing

10. Insert the new SPD into the housing in the same but opposite direction as step 9. The replacement SPD has to be of the same type and rating. If not, procure the correct SPD.
11. Reassemble the inverter’s front cover. For torque, see “Torque Values” on page 2–14.
12. Perform the “Commissioning Procedure” on page 4–3.

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7

Disconnecting, Dismantling, and Disposing of the CL125

Chapter 7 contains information about:

- Disconnecting Power from the Inverter
- Dismantling the CL125
- Disposing of the CL125

Disconnecting Power from the Inverter

For maintenance work or any service work, the CL125 PV Inverter must be disconnected from all power sources.

⚠⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH HAZARD

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel. Access to live parts shall be limited to suitably qualified electrical personnel. See installation instructions before connecting to the supply.
- Never energize the inverter with enclosure cover open.
- Before opening the inverter's enclosure identify the power source, de-energize, lock-out, and tag-out and wait at least ten minutes for circuits to discharge. See "Lock-Out Tag-Out (LOTO) Procedure" on page xiv.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.

Failure to follow these instructions will result in death or serious injury.

NOTE: Follow steps 1 and 2 in sequence exactly.

To disconnect the inverter from DC and AC power sources:

1. Open the AC breaker in the AC combiner box and perform the "Lock-Out Tag-Out (LOTO) Procedure" on page xiv.
2. Open the DC disconnect device in the DC combiner box and perform the "Lock-Out Tag-Out (LOTO) Procedure" on page xiv.

   If there is no DC disconnect device in the DC combiner box, you have to physically remove all PV string connections to the DC combiner box.
3. Open the CL125 inverter's DC disconnect switch (turn Off) and AC disconnect switch (turn Off).
4. Wait about ten minutes until the capacitors inside the inverter have discharged.
5. Remove the six screws on the front cover of the lower wiring box then put away the front cover, as shown in Figure 7-1.

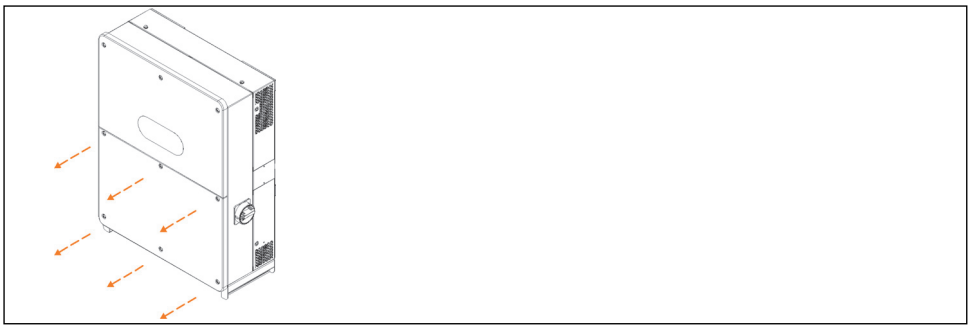

Figure 7-1 Removing the Front Panel

6. Measure using a suitable voltage sensing meter, the AC voltage at the PV Inverter's AC terminals between Line-to-Line and Line-to-Ground. The measured voltage should be zero.
7. Measure using a suitable voltage sensing meter the DC voltage at the PV Inverter's DC terminals. The measured voltage should be zero.
8. Remove the AC cables from the terminals using suitable tools.
9. Remove the DC cables from the terminals using suitable tools.

Dismantling the CL125

To dismantle the PV Inverter:

1. Reverse the steps found in "RS-485 Communication Connection".
2. Reverse the steps found in "AC Cable Connection" on page 3–9, "DC Cable Connection" on page 3–13, and "Cable Connection" on page 3–18.
3. Reverse the steps found in "Install and Mount the CL125" starting on page 2–9.
4. Store the PV Inverter according to the guidelines stated in "Storage Information" on page xiii.

Disposing of the CL125

The end user of the CL125 is responsible for the proper disposal of the PV Inverter.

As a general rule, do not dispose of or discard the CL125 along with ordinary household garbage or organic waste.

Always follow regional, national, and /or local waste disposal directives concerning disposing, discarding, or recycling of equipment containing electronic and electrical components such as the CL125.

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8 Specifications

Chapter 8 contains information about:

- DC Side - Technical Specification
- AC Side - Technical Specification
- General Specifications
- User Interface and Communications
- Regulatory Approvals

Product Specifications

DC Side	Conext CL125E (IEC)	Conext CL125A (NA)
DC Maximum input voltage	1500 VDC	1500 VDC
Full power MPPT voltage range (PF=1)	860 - 1250 VDC	860 - 1250 VDC
Operating voltage range at nominal AC voltage	860 - 1450 VDC	860 - 1450 VDC
DC start voltage at nominal grid voltage	920 VDC	920 VDC
DC max. input short circuit current	240 ADC	240 ADC
DC max. array input current	148 ADC	148 ADC
Number of MPPT	1	1
DC disconnect switch / DC SPD	Included / Type II DIN rail surge arrester	Included / Type II DIN rail surge arrester

AC Side	Conext CL125E (IEC)	Conext CL125A (NA)
Max. AC output Active power (PF=1, nominal AC voltage)	125 kW	125 kW
Max. output fault current and duration	8400 Apk, 926.4 Arms, 4.36 ms	8400 Apk, 926.4 Arms, 4.36 ms
Max. continuous Apparent power (nominal AC voltage)	125 kVA	125 kVA
AC Voltage range / AC Voltage (nominal)	480VAC to 690VAC / 600VAC	480VAC to 690VAC / 600VAC
Frequency / Frequency range	50 Hz & 60 Hz / 45 to 55 Hz & 55 to 65 Hz	60 Hz / 55 to 65 Hz
Max. Output current	120 Arms	120 Arms
Max. Backfeed current	0 A	0 A
Max. Output over-current protection	270 AAC	270 AAC
Power factor range	Default > 0.99, 0.8 lead to 0.8 lag adjustable	Default > 0.99, 0.8 lead to 0.8 lag adjustable
THD at nominal power	< 3%	<3%

AC Side	Conext CL125E (IEC)	Conext CL125A (NA)
AC connection	Screw Terminals (max 185 mm^2/ 350 kcmil), AL - CU type cable compatible	Screw Terminals (max 185 mm^2/ 350 kcmil), AL - CU type cable compatible
AC disconnect	Included	Included
AC connection	4-wire, 3-phase + PE	4-wire, 3-phase + PE

NA Utility Interconnection Voltage and Frequency Trip Limits and Trip Times		Conext CL125A (NA)
Parameter	**Default Trip Value**	**Default Trip Time (sec)**
Voltage Very High	720 VAC	0.16
Voltage High	660 VAC	1
Voltage Low	528 VAC	2
Voltage Very Low	300 VAC	0.16
Frequency Very High	60.5 Hz	0.16
Frequency High	60.5 Hz	0.16
Frequency Low	59.3 Hz	0.16
Frequency Very Low	57 Hz	0.16

NOTE: Accuracy for voltage and frequency below. Per Rule 21, additional settings are available separately.

- Voltage: ±1% V (L-L)
- Frequency: ±0.01 Hz
- Time: 1%, but not less than 50 ms

General Specifications	Conext CL125E (IEC)	Conext CL125A (NA)
Peak efficiency Euro efficiency CEC efficiency	98.8% 98.7% n/a	98.8% n/a 98.5%
Power consumption at night time	< 8 W	< 8 W
Enclosure rating	IP 65 (electronics), IP 20 (rear portion)	Type 4X (electronics)
Protective class	I	--
OVC	III (mains), II (PV)	--
Pollution degree	3	--
Inverter net weight	77 kg	170 lbs

General Specifications	Conext CL125E (IEC)	Conext CL125A (NA)
Inverter dimensions (L x W x D)	930 x 670 x 250 mm	36.6 x 26.4 x 9.8 in
Ambient air temperature for operation[a]	-25 to 60 °C, derating > 50 °C	-13°F to 140 °F, derating > 122 °F
Max. Operating altitude	4000 m, derating > 3000 m	13123 ft, derating > 9842 ft
Relative temperature (in storage)	-40 to 85 °C	-40 to 185 °F
Relative humidity (%)	4 to 100% condensing	4 to 100% condensing
Audible noise	75 dBA ±3 dBA	75 dBA ±3 dBA
Inverter mounting	Vertical wall mounting	Vertical wall mounting

a.For the derating curve, see Figure 1-8, “Over-Temperature Derating” on page 1–9.

User Interface and Communications	Conext CL125E (IEC)	Conext CL125A (NA)
User interface	LED panel on the front of the unit and eConfigure CL125 APP via Bluetooth 4.0	
Communication interface	RS485-Modbus Communication protocol - SunSpec compatible & certified	

Regulatory Approvals	Conext CL125E (IEC)	Conext CL125A (NA)
Certifications	IEC/EN 62109-1, IEC/EN 62109-2, IEC/EN 61000-6-2, IEC/EN 61683, EN 50530, IEC 60068-2-1, -2, -6, -14, -21, -27, -30, -75, IEC/EN 60529, IEC 61000-6-4, IEC/EN 61727, IEC/EN 62116, BDEW:2016, Dubai-DEWA, Thailand-PEA, South Africa NRS-097-2-1	UL 1741, UL 1741 SA, CSA C22.2 107.1-01, CEC efficiency standard, FCC Class A, IEEE1547, IEEE1547.1, California Rule 21
Environmental	RoHS, REACH and 4K4H	RoHS
Bluetooth Module	IC: 7922A-2001	FCC ID: WAP2001

Efficiency Curve

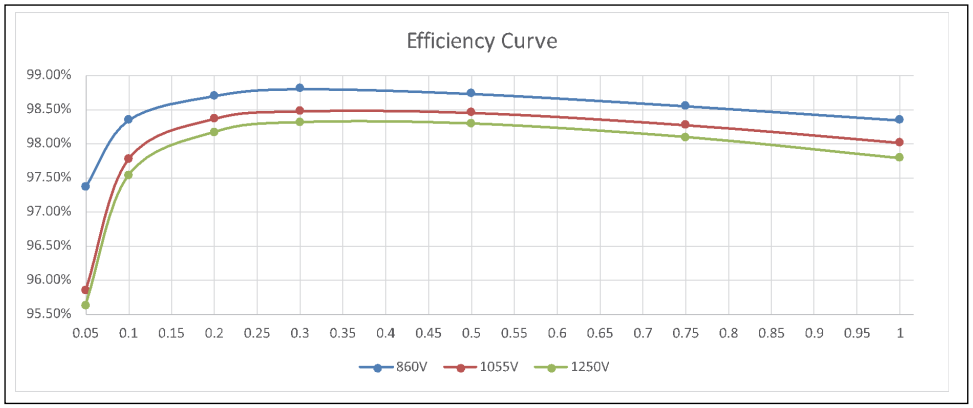

Figure 8-1 CL125 Efficiency Curve

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As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

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