



CPS SCH Series Grid-Tied PV Inverter

SCH100KTL-DO/US-600

SCH125KTL-DO/US-600

SCH100KTL-DO/US-480

Installation and Operation Manual - Rev 1.9



CHINT POWER SYSTEMS AMERICA CO.

Revision 1.9 – February 2024



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0 Before You Start...



Scope

This Installation and Operation Manual contains important information, safety guidelines, detailed planning, and setup information for installation, as well as information about configuring, operating, and troubleshooting the CPS SCH100KTL-DO/US-600, CPS SCH125KTL-DO/US-600, and SCH100KTL-DO/US-480 utility grid-tied PV inverters. Read this manual carefully before operating or servicing the inverters.

Audience

The information in Sections 2 Overview, 5 App Interface, and 6 Fault Shutdown and Troubleshooting is intended for the owner and operator of the inverter and does not require any special training or qualifications. The information in Sections 3 Installation, 4 Commissioning (via Wireless), and 7 Product Maintenance is intended for qualified personnel only. Qualified personnel have training, knowledge, and experience in:

- Installing electrical equipment and PV power systems.
- Applying all local installation codes.
- Analyzing and eliminating the hazards involved in performing electrical work.
- Selecting and using personal protective equipment (PPE).

Thank you for choosing a CPS grid-tied PV inverter. This inverter is a high performance and highly reliable product specifically designed for the North American solar market.

Installation, commissioning, troubleshooting, and maintenance of this inverter must be performed only by qualified personnel. If you encounter any problems during installation or operation of this unit, first check the user manual before contacting your local dealer or supplier. This user manual is applicable for the following models:

- CPS SCH100KTL-DO/US-600
- CPS SCH125KTL-DO/US-600
- CPS SCH100KTL-DO/US-480

Please keep this user manual on hand for quick reference.

The manual will be periodically updated or revised due to product development or improvement. The latest version of this manual can be acquired via our website: www.chintpowersystems.com.

1 Important Safety Instructions

(SAVE THESE INSTRUCTIONS)

Please read this user manual carefully before installing the inverter. CPS reserves the right to refuse warranty claims for equipment damage if the user fails to install the product according to the instructions in this manual.

Failure to follow these instructions and other relevant safety procedures may result in the voiding of the product warranty and/or damage to the inverter or other property!

Warnings and symbols in this document include:

	DANGER: DANGER indicates a hazardous situation which, if not avoided, will result in death or injury.
	WARNING: WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION: CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTICE: NOTICE indicates a hazardous situation which, if not avoided, could result in the inverter working abnormally or property loss.
	INSTRUCTION: INSTRUCTION indicates important supplementary information or provides skills or tips that can be used to help you solve a problem or save you time.

Warnings and markings on the product include:

	HIGH VOLTAGE: This inverter works with high voltages. All work on the product must only be performed as described in this document.
	HOT SURFACE: This equipment is designed to meet international safety standards, but surfaces can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.
	EARTH GROUND: This symbol marks the location of the grounding terminal, which must be securely connected to the earth ground through the PE (protective earthing) cable to ensure operational safety.
	CAUTION: Risk of electric shock from energy stored in capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply.

1.1 Safety Instructions of Operating the PV Inverter

WARNING:

All the installation and wiring connections should be performed **ONLY** by qualified technical personnel. Disconnect the inverter from the PV modules and AC grid *before* maintaining and operating the equipment.



Risk of electric shock and fire. Use *only* with PV modules that have a maximum system voltage rating of 1500 V or higher.

Electric shock hazard. The DC conductors of this PV system are normally ungrounded but will become intermittently grounded without indication when the inverter measures the PV array isolation.

Shock hazard. The inverter is energized from both AC and DC sources. Disconnect *all* sources before servicing. For continued protection against risk of fire, replace *only* with the same type and ratings of fuse.

DANGER:



Disconnect the inverter from the AC grid and PV modules *before* opening the equipment. Ensure that hazardous high voltage and energy inside the equipment has been discharged.

Do not operate or maintain the inverter until at least five (5) minutes after disconnecting all sources from DC and AC sides.

NOTICE:



This inverter is designed to connect AC power *only* to the public grid. Do not connect the AC output of this equipment directly to any private AC power equipment.

CAUTION:



CPS SCSH100KTL-DO/US-600, CPS SCH125KTL-DO/US-600, and CPS SCH100KTL-DO/US-480 are approximately **158 lbs (72 kg)**. Ensure the mounting bracket is properly installed before hanging the inverter and wire box on the bracket.

INSTRUCTION:



Check with your local electricity supply company *before* selecting a grid standard. If the inverter is operated with an incorrect grid code setting, the electricity supply company may cancel the interconnection agreement.

Placing the inverter into operation before the overall system complies with the national rules and safety regulations is not permitted.

WARNING:



The DC switch is rated to break loads under normal operating conditions. However, a DC short circuit could be hazardous and the safety procedures listed in this section should be followed before turning OFF the DC switch under fault conditions.

**WARNING:**

Do NOT turn OFF the AC switch under load. Turn OFF the AC feed breaker/disconnect to disconnect the inverter from the grid *before* turning OFF the AC switch.

If there is a fault and it is safe to access the inverter:

1. Read / record the fault code(s) displayed on the CPS Connect Pro app interface.
2. Turn OFF the inverter via app or remote access.
3. Turn OFF the AC feed breaker and the AC switch.
4. If possible, read the DC MPPT currents displayed on the app interface:
 - a. If the MPPT current is < 125 A or the irradiation is obviously low, turn OFF the DC switch.
 - b. If it is safe to open the wire box, proceed with troubleshooting procedures listed in Section 6. Make sure the appropriate safety precautions and PPE are used.
5. If it is NOT possible to read the DC MPPT currents through the app interface, and no fire, smoke, or voltage (AC or DC) to ground is present in the enclosure:
 - a. Follow general safety practices, including PPE, to open the wire box.
 - b. Measure the DC current on each string:
 - i. If zero, open the fuse holder for each string reading approximately zero amps.
 - ii. If > 0.25 A, do not open the fuse holder.
 - c. When all possible fuses are open, measure the total MPPT current.
 - d. If the total MPPT current is < 125 A, turn OFF the DC switch.
 - e. If turning OFF the DC switch causes smoke, then (if safe) turn the DC switch back ON and wait until low irradiation—approximately 30 minutes prior to sunset—to continue troubleshooting.

If there is a fault and it is unsafe to access the inverter:

1. Notify someone else and initiate emergency mitigation if necessary.
 - a. If smoke or fire exists, procure a fire extinguisher.
 - b. If a fire has escaped the inverter enclosure, notify 911 immediately!
2. Turn OFF the AC feed breaker as soon as possible / safe.
3. If safe but conditions are deteriorating, consider:
 - a. Using the fire extinguisher.
 - b. Cutting the string conductors one cable at a time with insulated cutters (while wearing appropriate PPE).
4. Monitor conditions until low irradiation (approximately 30 minutes prior to sunset).
5. If safe, turn OFF the AC and DC switches on the inverter and proceed with troubleshooting procedures (Section 6).

2 Overview

2.1 Inverter for Grid-Tied PV Systems

CPS SCH100/125KTL 3-phase string inverters are designed for use with an UNGROUNDED PV array in large-scale PV grid-tied systems. The system is generally made up of PV modules, PV inverters, and AC power distribution equipment (Figure 2-1). The inverter converts the available DC energy from the PV modules to AC power by synchronizing the output current to the same frequency and phase as the AC grid. All or part of the AC power is supplied to local loads, and the surplus power is supplied to the electricity grid.

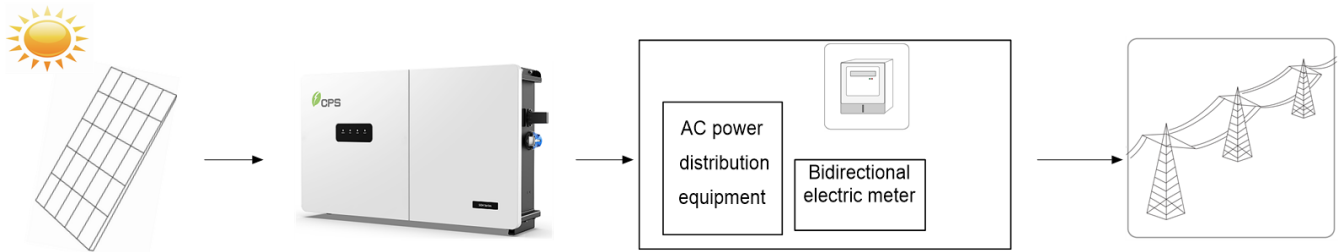


Figure 2-1 Grid-Tied PV System

2.2 Product Features

- **High Conversion Efficiency**
 - Advanced three-level conversion technology with SVPWM (space-vector pulse width modulation).
 - Max. efficiency: 99%
 - CEC efficiency: 98.5%
- **Grid Adaptability**
 - Selectable grid standards: IEEE 1547-2018, CA Rule 21, ISO-NE, and HECO.
 - Reactive power: > 0.99 PF (± 0.8 adjustable); selectable apparent power rating enables full active power rating to ± 0.90 PF for the 100 kW-600 V model and ± 0.95 PF for the 125 kW-600 V and 100 kW-480 V models, and optional local or remote active power curtailment.
- **Flexible Communication**
 - Supports standard Modbus RS485, SunSpec Modbus, and HTTPS/XML communications via FlexOM gateway card to ensure compatibility with third party monitoring and control systems.
- **Wide DC Input Voltage Range**
 - Operating DC input voltage range for CPS SCH100KTL-DO/US-600 and CPS SCH125KTL-DO/US-600 inverters: 860-1450 V_{DC}.
 - Operating DC input voltage range for CPS SCH100KTL-DO/US-480 inverters: 750-1450 V_{DC}.
 - Max. DC input voltage: 1500 V_{DC}.



- **Long Service Life:** Uses thin-film and electrolytic capacitors to extend inverter's service life.
- **Separable Wire Box:** Enables fused DC inputs using the distributed wire box or a centralized wire box option for the connection of DC combiners/harnesses.
- **High Protection Degree:** NEMA 4X enclosure meets the demanding needs of both indoor and outdoor use.
- **Intelligent Integration:** Integrated DC/AC switches and up to 20 fused string inputs eliminate the need for external combiner boxes, simplifying installation.

2.3 Product Protection and Functions

- ✓ AC output voltage and frequency monitoring
- ✓ Anti-islanding protection with bi-directional frequency perturbation
- ✓ DC input and AC output over-voltage protection
- ✓ DC input and AC output overcurrent protection
- ✓ DC input insulation to ground monitoring
- ✓ DC injection of AC output
- ✓ Leakage current against ground monitoring
- ✓ External environmental temperature monitoring
- ✓ IGBT power module temperature monitoring

2.4 Smart Inverter Functions and Default Activation

The CPS SCH100/125KTL 3-phase string inverters employ smart inverter (grid support) functions in compliance with UL1741, SA8-18, and UL1741-SB standards. The default activation status is indicated below:

Function	IEEE 1547-2018	CA Rule 21	ISO-NE
Anti-islanding	Enabled	Enabled	Enabled
Low/high voltage ride-through	Enabled	Enabled	Disabled
Low/high frequency ride-through	Enabled	Enabled	Enabled
Dynamic volt/VAR operation	Enabled	Enabled	Disabled
Ramp rate	Enabled	Enabled	Enabled
Fixed power factor	Disabled	Disabled	Disabled
Reconnect by soft start	Enabled	Enabled	Enabled
Frequency-watt	Enabled	Enabled	Disabled
Volt/watt	Enabled	Enabled	Disabled

2.5 Schematic Diagram and Circuit Design

The basic electrical schematic diagram of CPS SCH100KTL-DO/US-600, CPS SCH125KTL-DO/US-600, and CPS SCH100KTL-DO/US-480 inverters are shown in Figures 2-2a and 2-2b:

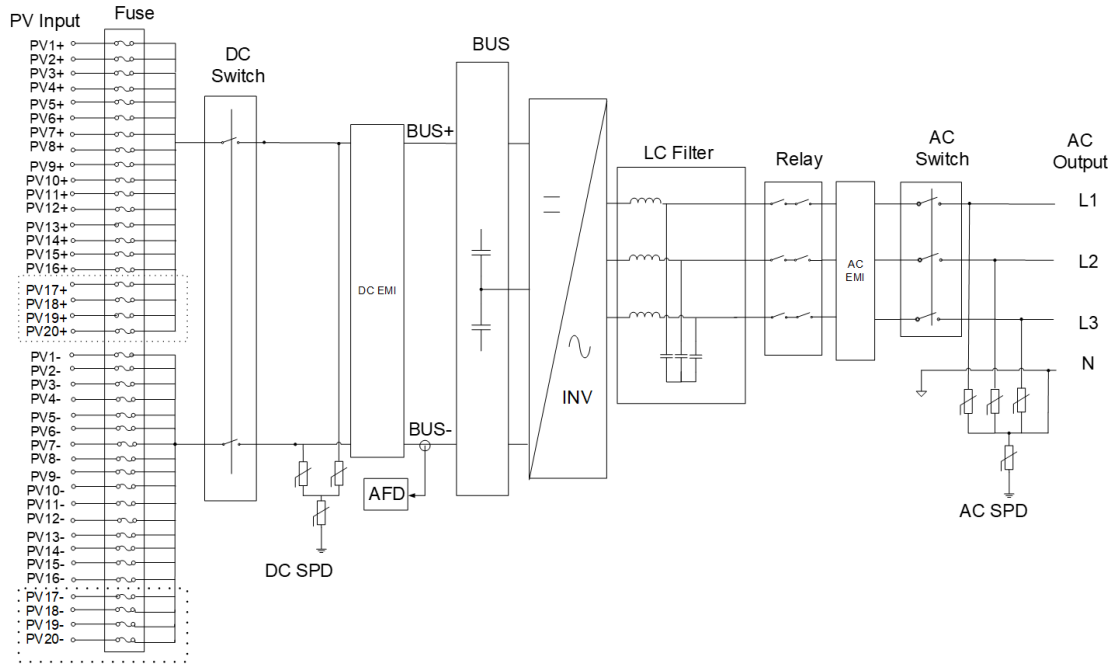


Figure 2-2a CPS SCH100/125KTL Inverter Schematic, Distributed Wire Box

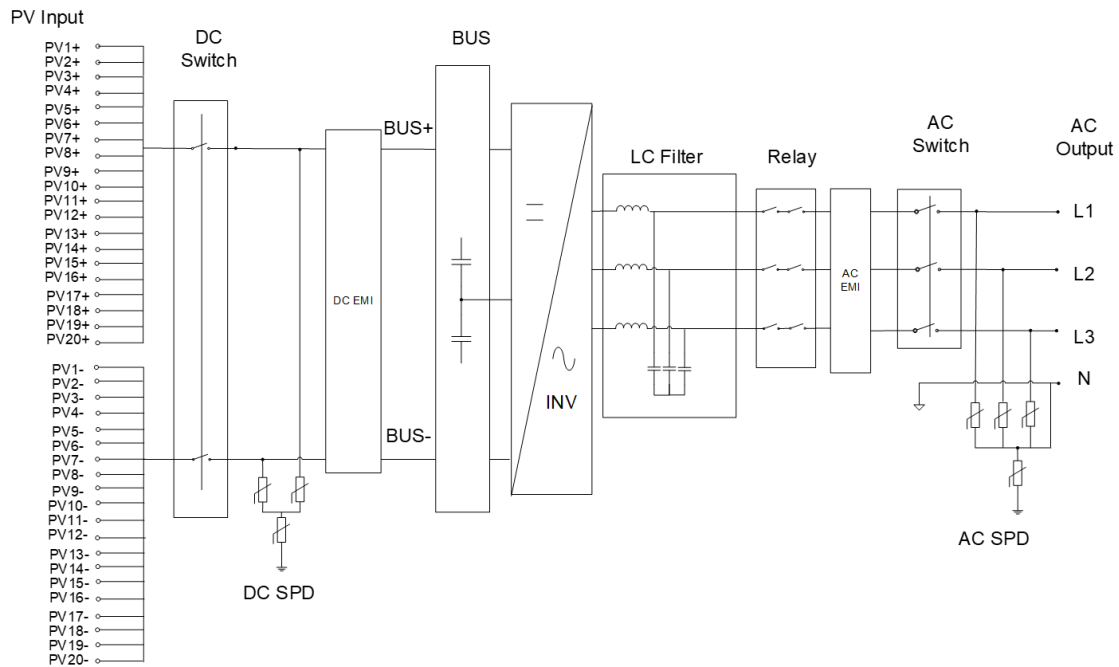


Figure 2-2b CPS SCH100/125KTL Inverter Schematic, Centralized Wire Box

The input from PV circuits passes through surge protection circuitry—the DC EMI wave filter—to bus capacitance. The inverter then converts the DC voltage to three-phase AC voltage. Most of the high frequency AC harmonics are removed with a wave filter and the output AC is connected to the grid via two-stage relay. There is also a three-phase SPD at the AC output side.

2.6 Appearance and Main Item Description

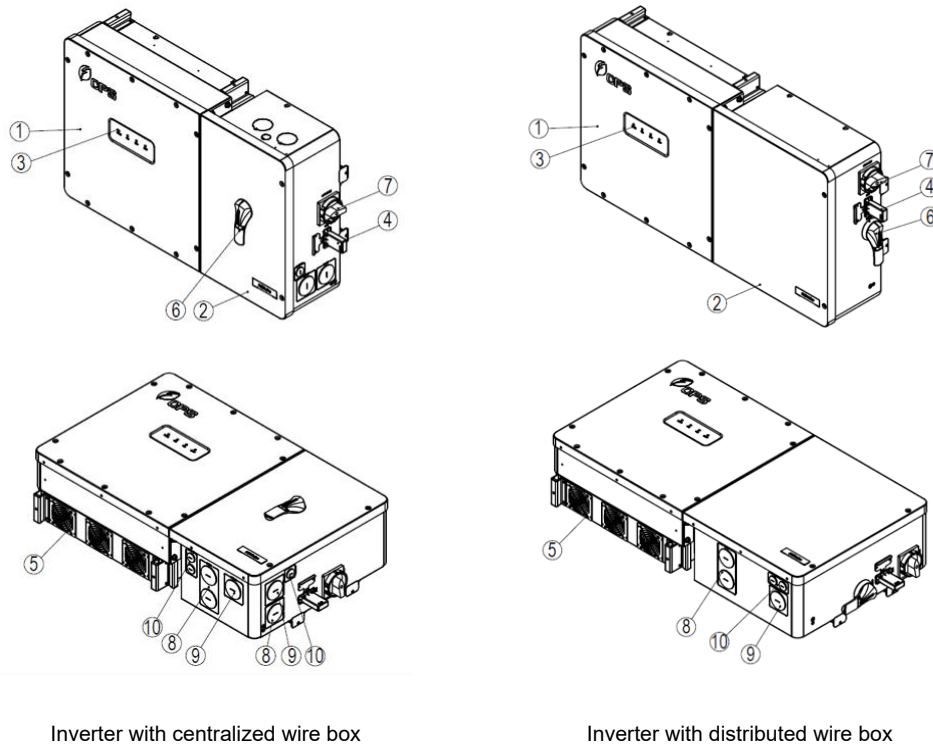


Figure 2-3 Appearance of the CPS SCH100/125KTL-DO/US-600 and SCH 100KTL-DO/US-480 Inverters (Standard wirebox options)

Main items of the inverter:

- | | |
|---------------------------|------------------------------|
| ① Main inverter enclosure | ⑥ DC switch: DC power ON/OFF |
| ② Inverter wire box | ⑦ AC switch: AC power ON/OFF |
| ③ LED indicator lights | ⑧ DC input cable entry |
| ④ Wi-Fi module | ⑨ AC output cable entry |
| ⑤ Cooling fans | ⑩ Communication cable entry |

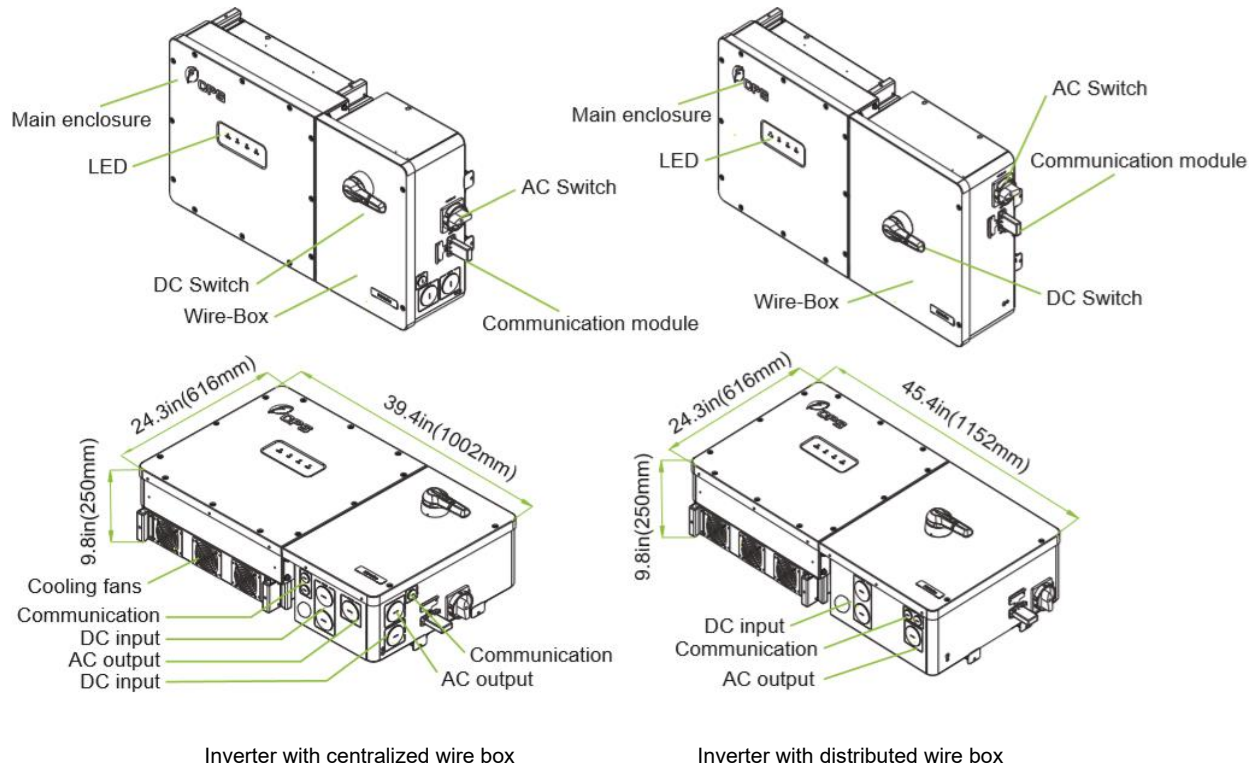


Figure 2-4 Appearance of the CPS SCH100/125KTL-DO/US-600 and SCH 100KTL-DO/US-480 Inverters (DC Disconnect wirebox options)

2.7 Anti-Islanding Detection

The SCH100KTL-DO/US-600, SCH125KTL-DO/US-600, and SCH100KTL-DO/US-480 inverters include anti-islanding detection as required by UL1741 and IEEE 1547. The inverter will continuously make bi-directional perturbations to the frequency of the output current by injecting a small amount of reactive power in order to detect a possible islanding condition. If the grid is stable, these small perturbations will have negligible effects on the system voltage frequency. However, in an islanded condition the changes in reactive power will force the frequency of the system voltage to deviate significantly, which will trigger the inverter to cease operation and disconnect from the grid.

2.8 DC Ground Fault Protection

The inverters include residual current detection as part of the DC ground fault detection method required by UL1741. If there is a ground fault in the PV array, the ground fault detection circuitry will detect leakage current and trigger an alarm. The inverter will cease operation if the leakage current exceeds 500 mA.

2.9 Surge Suppression

Standard Waveform Peak Values		
Surge Category	Ring Wave*	Combination Wave**
B	6 kV / 0.5 kA	6 kV / 3 kA

* Standard 1.2/50 μ s – 8/20 μ s Combination Wave

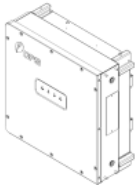
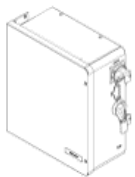
** Standard 0.5 μ s – 100 kHz Ring Wave

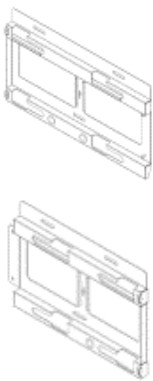
3 Installation

Please read carefully and install the products following the step-by-step instructions.

The inverter and other main items are shipped in two separate packages, consisting of: A) the main inverter enclosure and B) the wire box, mounting bracket, and accessory kit. Before installation, please check that the following items are included in the packages:

Table 3-1 Main Items

No.	Item	Figure	Qty.	Note	Box
(1)	Main enclosure of the PV inverter		1	N/A	A
(2)	Wire box of the PV inverter	 Distributed wire box  Centralized wire box	1	The wire box will vary depending on the model ordered: - Distributed wire box with integrated DC fuse inputs. - Centralized wire box without DC fusing to be used with an external DC combiner.	B

(3)	Mounting bracket		1	The bracket upon which the PV inverter is hung and mounted. • Left: inverter. • Right: wire box. The right bracket will vary depending on the model of the wire box ordered.	B
(4)	Accessory kit		1	Contains all necessary hardware and accessories for installation.	B

The accessory kit (5) contains the items listed below:

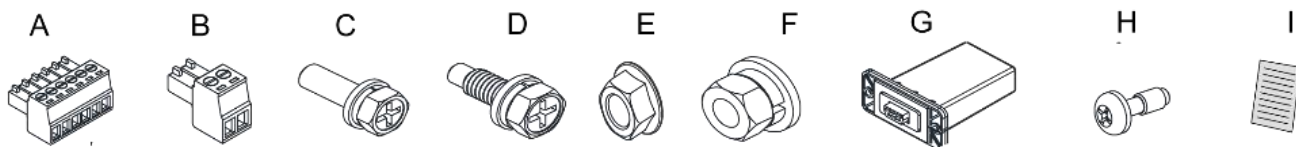


Table 3-2 Accessory Kit

No.	Item	Qty.	Note
(A)	6-pin PCB connector plug	1	For RS485 communication.
(B)	2-pin PCB connector plug	1	For power supply.
(C)	M8x25 mm bolts with integrated lock washer	6	For mounting bracket installation.
(D)	M6x18 mm Phillips screw	4	Four (4) for inverter and mounting bracket; one (1) for ground connection.
(E)	M8 hexagon nuts with flange	7	To connect left and right wall bracket and secure the main inverter to the wire box (one spare).
(F)	M10 nut with flat gasket and spring washer	3	For AC terminal connections.
(G)	Wi-Fi communication module	1	Enables mobile app interface via CPS Connect Pro app.
(H)	Phillips screw	1	Spare (for wire box cover).
(I)	Quick Guide	1	Quick guide for installation



INSTRUCTION:

The items in the accessory kit (Table 3-2) above are for the standard configuration. The accessories provided may vary if optional parts are purchased.

3.1 Recommendations Before Installation

See Section 8 Technical Data for specification ranges and limits.



NOTICE: DESIGN AND INSTALLATION RECOMMENDATIONS

Maintaining a NEMA 4X rating is essential to ensure safe operation of the inverter. Water ingress is likely to cause a failure that could result in an unsafe condition. The following are recommended:

- Addition of weep holes or any other hole will void the warranty.
- Metallic conduit is recommended to prevent propagation.
- All conduit entries must be sealed to prevent moisture ingress. Sealing conduits at the other end will provide additional protection; firestop putty may be used.



NOTICE: The allowable ambient temperature ranges for the CPS SCH100KTL-DO/US-600, SCH125KTL-DO/US-600, and SCH100KTL-DO/US-480 3-phase string inverters are defined based on the following conditions:

- **Condition 1:** -40°F to 158°F (-40°C to 70°C), inverter not installed and in storage (in packaging or unpackaged).
- **Condition 2:** -22°F to 140°F (-30°C to 60°C), inverter installed, connected to electric utility grid, and operating during daylight hours.
- **Condition 3:** No low temperature limit to 158°F (70°C), inverter installed and connected to electric utility grid but non-operating (daylight or nighttime hours).

The bulkhead connector cover does NOT provide a watertight seal.

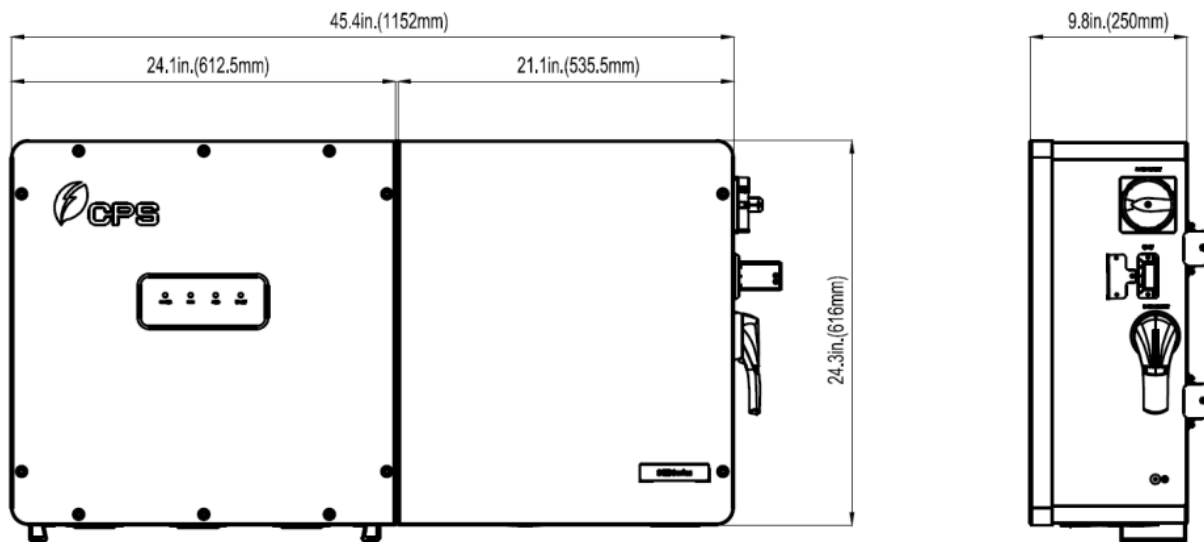
PRE-INSTALLATION CHECKLIST:

- ✓ Check that the product environmental specifications (protection degree, operating temperature range, humidity, altitude, etc.) meet the requirements of the specific project location.
- ✓ Ensure that the power grid voltage is within range for the grid standard chosen.
- ✓ Ensure that the local electricity supply authority has granted permission to connect to the grid.
- ✓ Installation personnel must be qualified electricians or those who have received professional training.
- ✓ Wear and use proper PPE during installation.
- ✓ Sufficient space according to Figures 3-4 and 3-5 must be provided to allow the inverter cooling system to operate normally.
- ✓ Install the inverter away from flammable and explosive substances (this includes unmaintained grass).

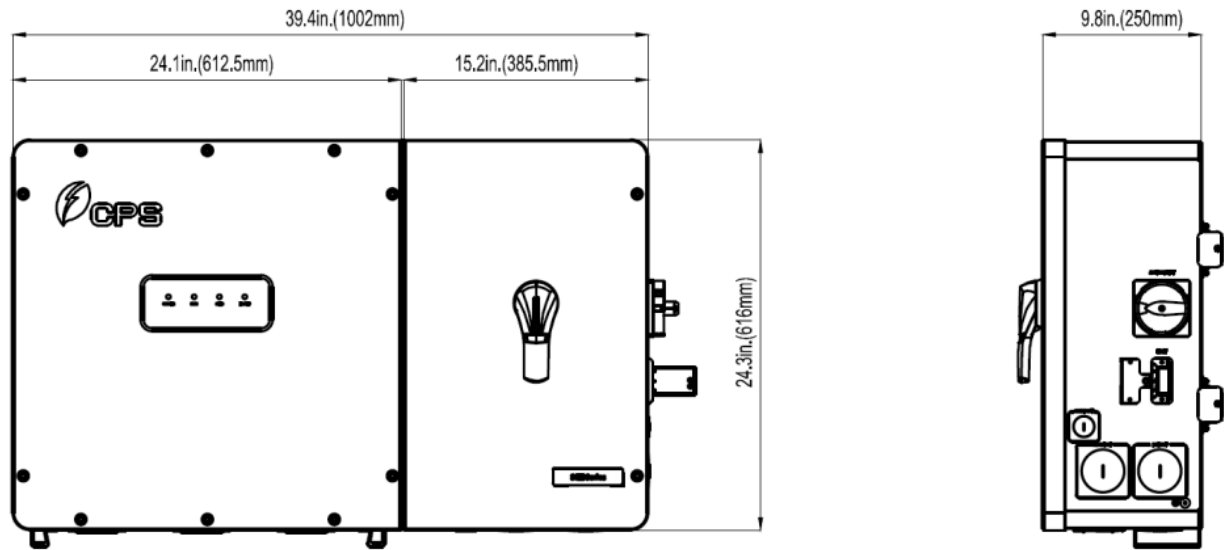
- ✓ Avoid installing the inverter in locations that exceed the temperature limits specified for the inverter to prevent undesirable power loss.
- ✓ Do not install the inverter near an electromagnetic source which can compromise the normal operation of electronic equipment.
- ✓ Ensure the PV array is not grounded.
- ✓ The conduits' entries meet the following criteria:
 - ALL conduit entries must use watertight fittings.
 - ALL conduit entries use sealant around the wires inside the wire box to prevent moisture ingress.
 - Metal conduit fittings recommended to contain any thermal event in the wire box caused by moisture ingress.

3.2 Mechanical Installation

3.2.1 Dimensions



100/125 kW Distributed Wire Box



100/125 kW Centralized Wire Box

Figure 3-1 Dimensions of CPS SCH100/125KTL-DO/US-600 and CPS SCH100KTL-DO/US-480 Inverters

3.2.2 Installation Method

Ensure the mounting structure (bearing wall, rack, etc.) is suitable to support the weight of the inverter. Follow the mounting guidelines below:

- If location permits, install the inverter vertically.
- If the inverter cannot be mounted vertically, it may be tilted backward to 15° from horizontal.
- Do NOT mount the inverter leaning forward.
- Do NOT mount the inverter upside down.
- Do NOT mount the inverter horizontally.

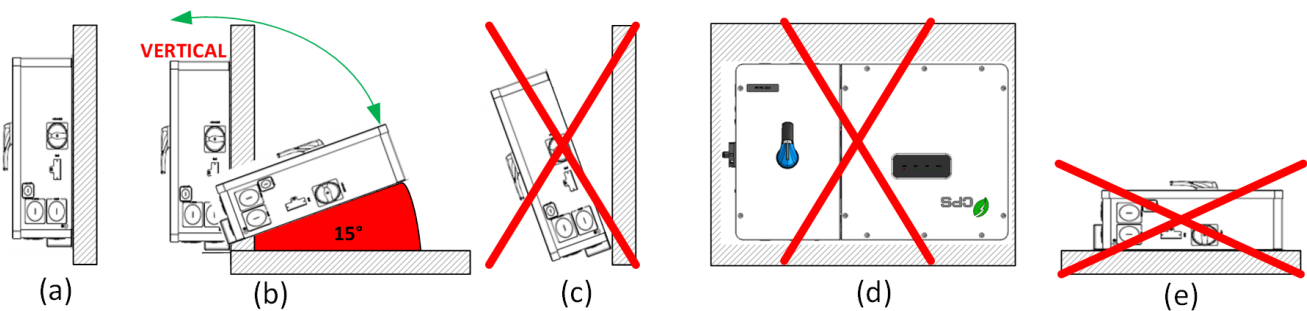


Figure 3-2 Inverter Mounting Options



NOTICE:

If the installation environment allows, avoiding direct sunlight, rain, and snow can extend the life of the inverter (See Figure 3-3). Direct sun install does not impact warranty.

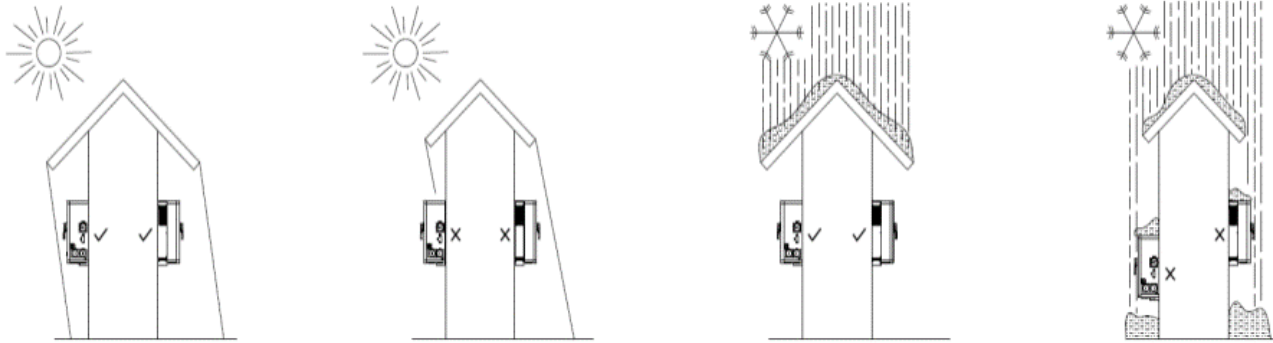


Figure 3-3 Inverter Mounting Suggestion

3.2.3 Installation Space Requirement

See Figures 3-4a, b, and c; the letters for the items listed below correlate to those shown in Figures 3-4a, b, and c. The distances between the inverters or the surrounding objects should meet the following conditions:

- A. Minimum height from the ground (12 inch / 30.48 cm minimum):
 - MUST prevent water damage in flood-prone areas.
 - Allows for ease of fan replacement.
- B. Minimum height between air intake or air exhaust (6 inch / 15.24 cm minimum):
 - Distance MUST be great enough to allow low impedance to air flow.
 - Distance allows easy fan replacement access.
- C. The NEC specifies the maximum allowable height for a disconnect switch MUST be 6 ft 7 in as defined under Readily Accessible Locations. An exception to this requirement is allowed when AC and DC disconnecting means are mounted within site of the inverter.
 - If the inverters are stacked and meet this (C) requirement, baffles MUST be installed *unless* the inverters are staggered per Figure 3-4a. This configuration also allows ease of conduit routing without a wire-way.
- D. Distance between side-by-side inverters SHOULD be greater than 18 in.
 - This dimension depends on if the inverters are stacked and staggered (Figure 3-4a) or not.
 - The stacked and staggered configuration does not require a baffle because the exhaust of the lower unit is directed between the inverters above.
- E. Distance between side-by-side inverters SHOULD be greater than 12 in, **except in case D above**.

- F. This dimension will typically be determined by the structural strength required to support the inverters.
- F1. There **MUST** be a vertical chimney of at least 50 square inches directly above and per inverter for the exhaust air.
- F2. The clearance above the inverter chimney **MUST** be greater than 6 in per stacked inverter. The front and rear of this dimension **MUST** be open to allow horizontal air flow.
- G. Wire-ways:
- G1. In the case of a wire-way installed between the stacked inverter, the clearances **MUST** meet (B) and (C) requirements above. For a 10 in wire-way, this would be a 22 in minimum.
- G2. If no wire-way is installed, the minimum clearance **MUST** be greater than 18 in.
- H. In the staggered configurations, the vertical alignment **MUST** be as shown in the figures below.

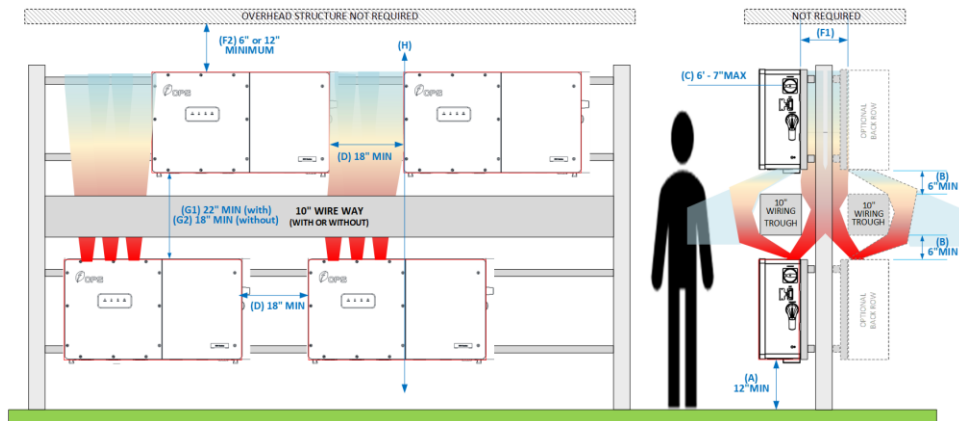


Figure 3-4a

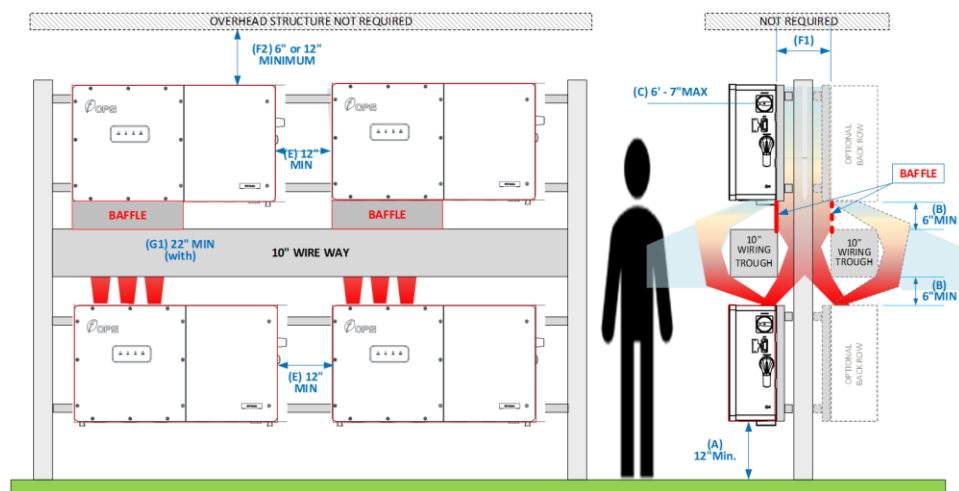


Figure 3-4b

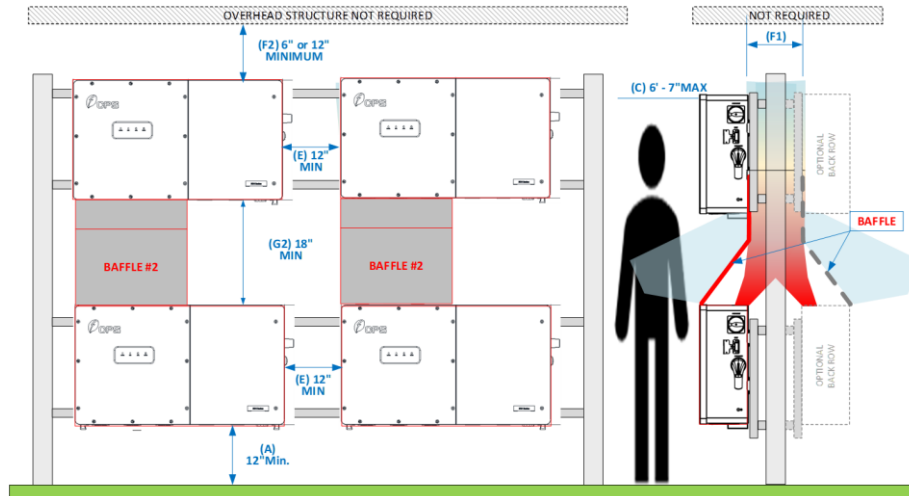


Figure 3-4c

3.2.4 Mounting the Inverter onto the Bracket

Tools required:

- Electric drill (0.4 in / 10 mm head)
- No. 13 wrench
- No. 2 Phillips head screwdriver
- Pencil / marker

Instructions:

1. Mark six (6) holes on the wall or bearing surface for attaching the inverter mounting bracket (Figures 3-5 and 3-6):

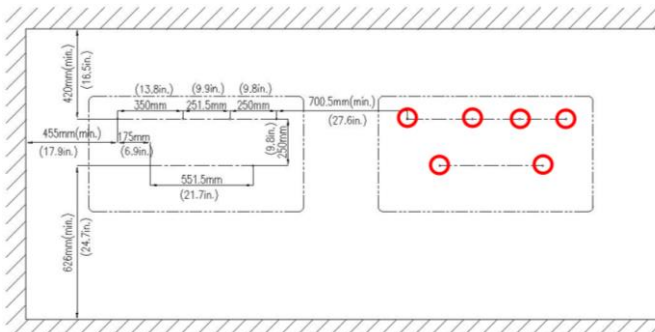


Figure 3-5 100/125 kW Distributed Wire Box Bracket Mounting Pattern

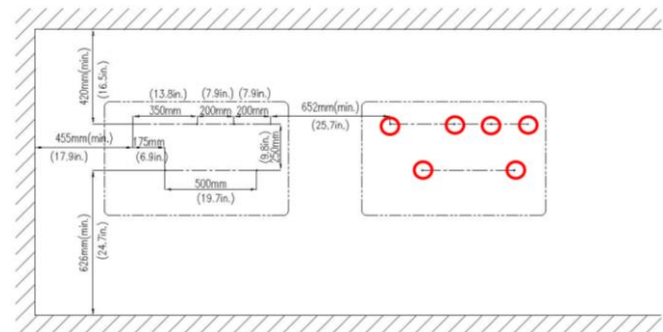
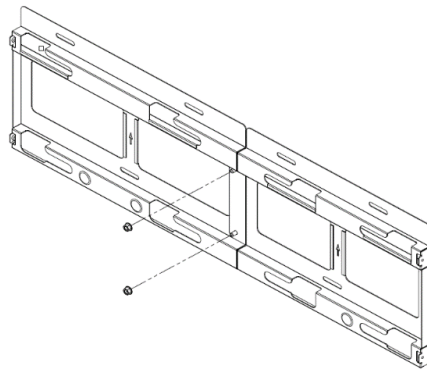


Figure 3-6 100/125 kW Centralized Wire Box Bracket Mounting Pattern

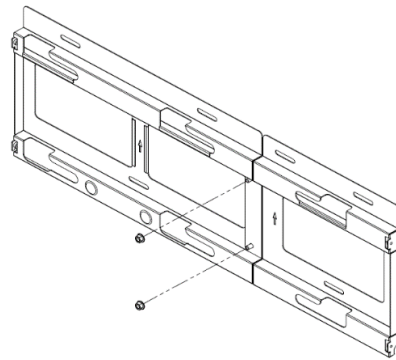


INSTRUCTION:

Before installing the brackets, first connect the left and right wall mounting brackets with the two M8 flange nuts (see Figure 3-7) and torque to 110 in-lbs (12.5 N·m).



100/125 kW Distributed Wire Box



100/125 kW Centralized Wire Box

Figure 3-7 Left and Right Wall Brackets Combination

2. Mount the bracket (Figures 3-8 and 3-9):

- a. Use the electric drill to drill holes at the marked positions.
- b. Insert the ① M8 expansion anchors into the holes.

Fasten the ② mounting bracket with the ③ M8x25 assembling bolts in the accessory kit.



Figure 3-8 Drill Holes, Set Anchors, and Tighten Assembling Bolts

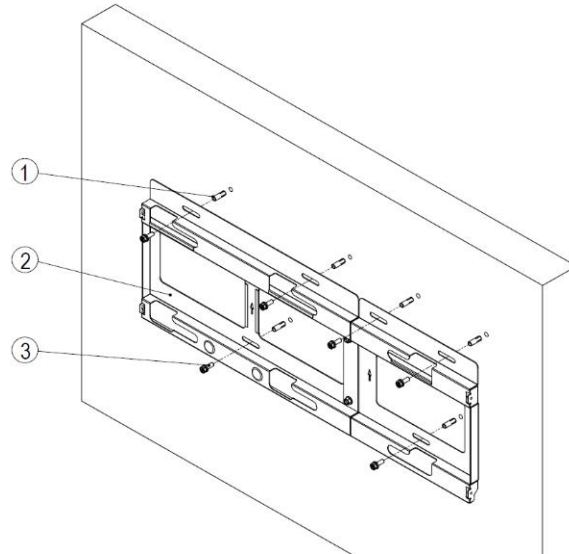


Figure 3-9 Secure the Mounting Bracket

CAUTION:



The main enclosure of the CPS SCH100KTL-DO/US-600, SCH125KTL-DO/US-600, and SCH100KTL-DO/US-480 inverters is approximately **121 lbs (55 kg)**.

Ensure the mounting bracket is properly installed before hanging the inverter on the bracket. It is recommended to have at least two (2) people to mount the inverter due to the weight of the equipment.

3. Install the main inverter enclosure:

- a. Use the no. 2 Phillips head screwdriver to remove the cover plate on the right side of the main enclosure and save the screws and cover (Figure 3-10):

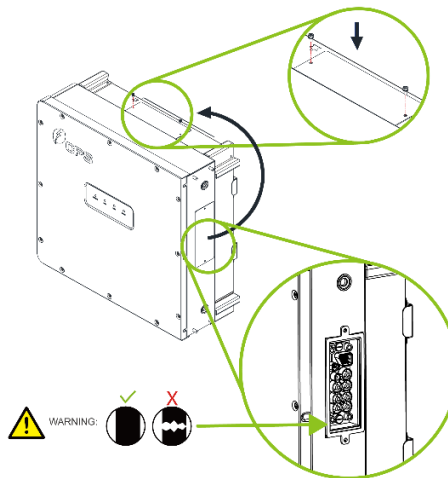


Figure 3-10 Remove the Cover of the Main Enclosure



NOTICE:

Cover and screws may be required for servicing in the future.

Covers do not provide waterproof protection. Please check waterproof seal after removing the cover plate.

- b. Following one of the two methods listed below (lift mounting or manual mounting) mount the main enclosure by aligning the mark on the top of the main unit with the opening of the wall bracket (Figure 3-11), setting the main enclosure in the track.

- **Lift mounting:** Screw two (2) lifting eye bolts M10 into the studs at the top of the inverter, then use a sling rope or bar (inserted through both lifting eye bolts) to lift the inverter onto the bracket. The minimum angle between the two sling ropes must be less than 90° (Figure 3-11).

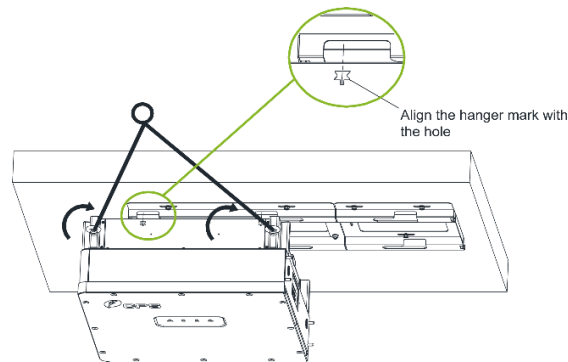


Figure 3-11 Mount the Main Enclosure on the Bracket by Lifting Sling

- **Manual mounting:** At least two people are needed to properly lift the inverter by the handle positions marked in Figure 3-12 and mount the inverter onto the bracket.

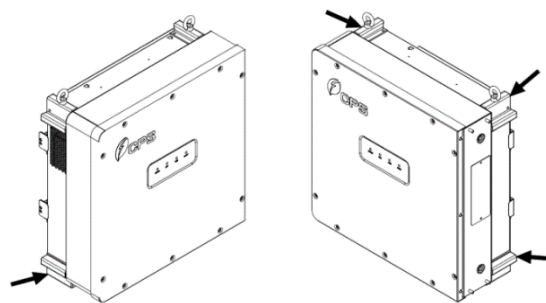


Figure 3-12 Grab Handle Position

- c. After hanging, push the enclosure to the right into its final position (Figure 3-13) and secure with an M6x18 combination screw torqued to 53 in-lbs (6 N·m).

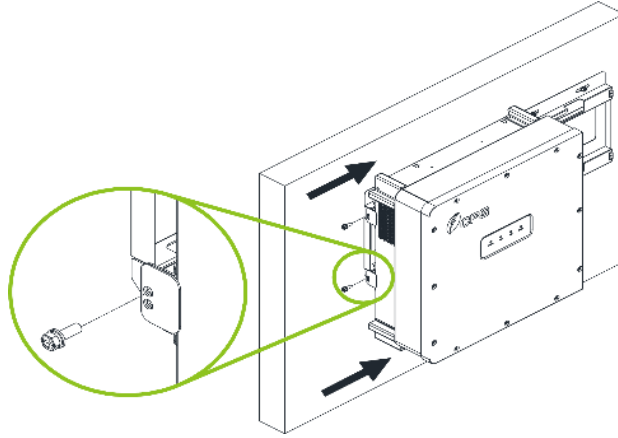


Figure 3-13 Main Enclosure Position

4. Install the wire box:

- a. Remove the connector cover on the left side of the wire box, saving the cover and screws (Figure 3-14):

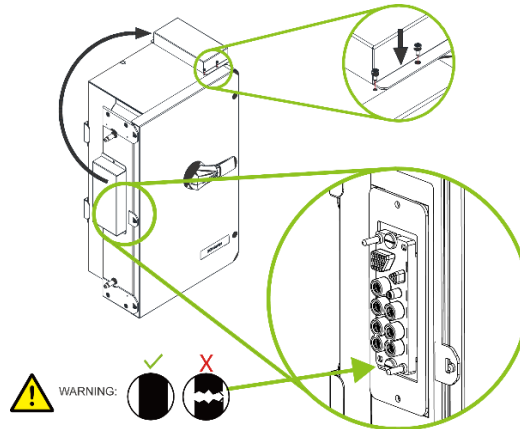


Figure 3-14 Wire Box Cover

- b. Align the mark on the wire box with the bracket (Figure 3-15) and hang the wire box on the right side of the wall bracket:

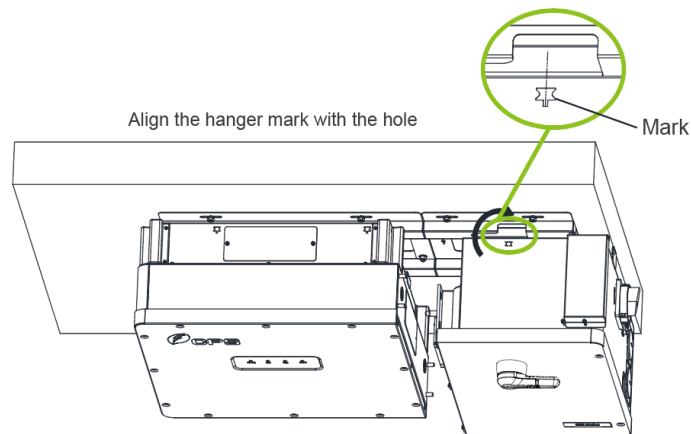


Figure 3-15 Wire Box Position

- c. Push the wire box left to its final position meeting the main inverter enclosure.
- d. Connect the wire box to the main enclosure using the M8 flanged nut and torque to 110.6 in-lbs (12.5 N·m).
- e. Secure the wire box to the bracket with the M6x18 combination screw torqued to 53 in-lbs (6 N·m) (Figure 3-16):

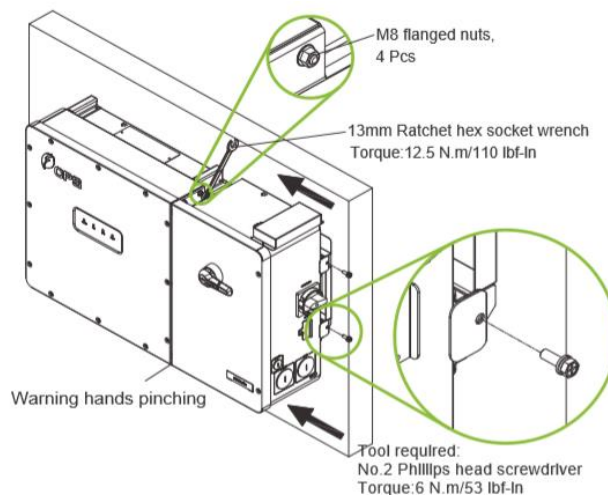


Figure 3-16 Installation of the Wire Box

This connection provides the ground bond for the inverter main enclosure. Failure to properly install may result in shock or equipment failure.

- f. Tighten the M8 nuts in the following order: 1 → 2 → 3 → 4, then repeat to confirm that all nuts are tightened securely (Figure 3-17):

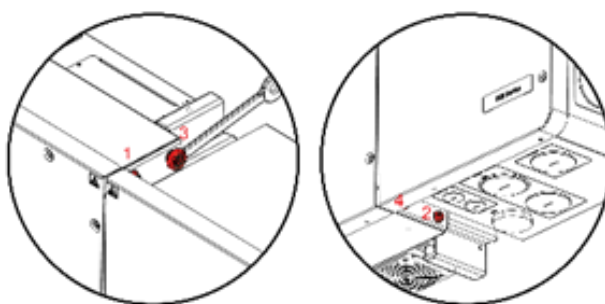


Figure 3-17 Tighten the M8 Nuts



CAUTION:

The weight of the inverter is approximately 176 lbs (80 kg). Ensure the mounting bracket is properly installed before hanging the inverter on the bracket.



CAUTION:

Please be careful with your hand when pushing the unit.

5. Store the connector covers:

- a. Attach the inverter's connector cover (Figure 3-10) and wire box connector cover (Figure 3-14) to the top of the inverter and wire box (Figure 3-18):

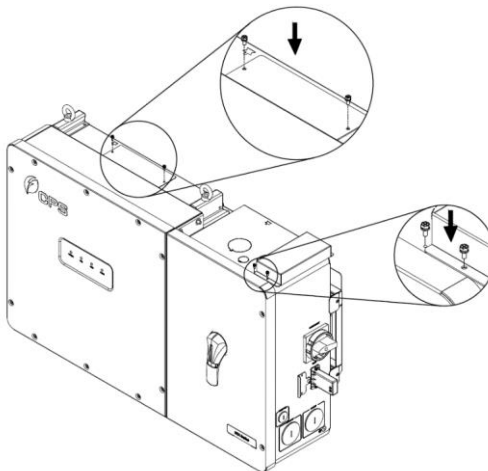


Figure 3-18 Attach Cover to Top of the Inverter

- b. Torque to 14.2 in-lbs (1.6 N·m).



NOTICE:

Cover and screws may be required for servicing in the future.

Covers do not provide waterproof protection. Please check waterproof seal after removing the cover plate.

6. Install the Wi-Fi module:

- a. As shown in Figure 3-19, remove the two M4x10 fixing screws on the DB9 connector cover.
- b. Rotate the DB9 connector cover to expose the connector.
- c. Install the Wi-Fi module by plugging it into the connector and re-inserting the two screws just removed.
- d. Pay attention to the control torque (14 in-lbs / 1.6 N·m) to ensure the seal remains waterproof.

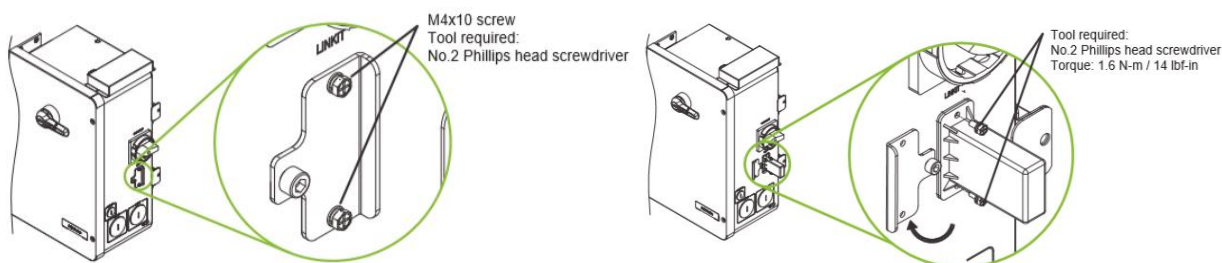


Figure 3-19 Installation of the Wi-Fi Module

7. **OPTIONAL:** Install an anti-theft padlock. The anti-theft padlock is used to prevent the inverter from being stolen when the equipment is installed outdoors. The inverter can be locked to the bracket as shown in Figure 3-20. The anti-theft padlock should meet the dimensional requirements shown in Figure 3-21.

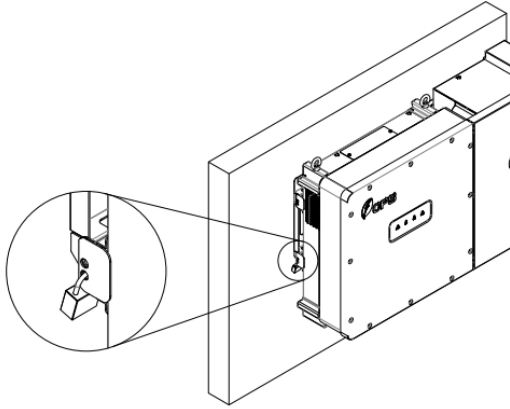


Figure 3-20 Location of the Anti-Theft Padlock

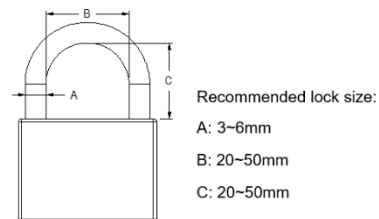


Figure 3-21 Dimensions of Anti-Theft Padlock

3.3 Electrical Installation

3.3.1 Removing/Replacing the Wire Box Cover

1. Open the DC switch on the wire box cover.
2. Tabs hold the left side of the wire box cover in place, and the cover is secured by two screws on the right side. Use a no. 3 Phillips head screwdriver to remove the two (2) screws on the wire box.
3. Pull the right side of the cover away from the wire box approximately one inch (2.5 cm) before sliding the cover right to release the tabs. This will free the cover from the enclosure and allow the cover to be removed (Figure 3-22):

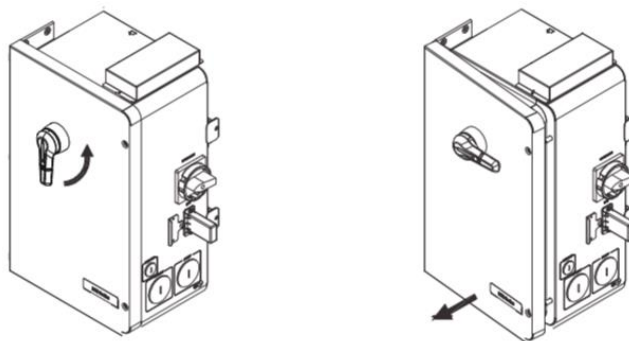


Figure 3-22 Removing the Wire Box Cover

4. To replace the cover, reverse the order of the above steps, then torque the screws to 35.4 in-lbs (4 N·m).



INSTRUCTION:

It is important to use hand tools (e.g., screwdriver or T-handle) and NOT power drivers or other types of screwdrivers.

During installation, it is recommended to hold the cover in alignment with balanced force. Partially engage the screws into the threaded inserts *before* tightening. Maintain alignment to avoid thread damage. After screws are fully engaged, torque to 35.4 in-lbs (4 N·m).

3.3.2 Wire Box Details

3.3.2.1 Exterior Wire Box Details

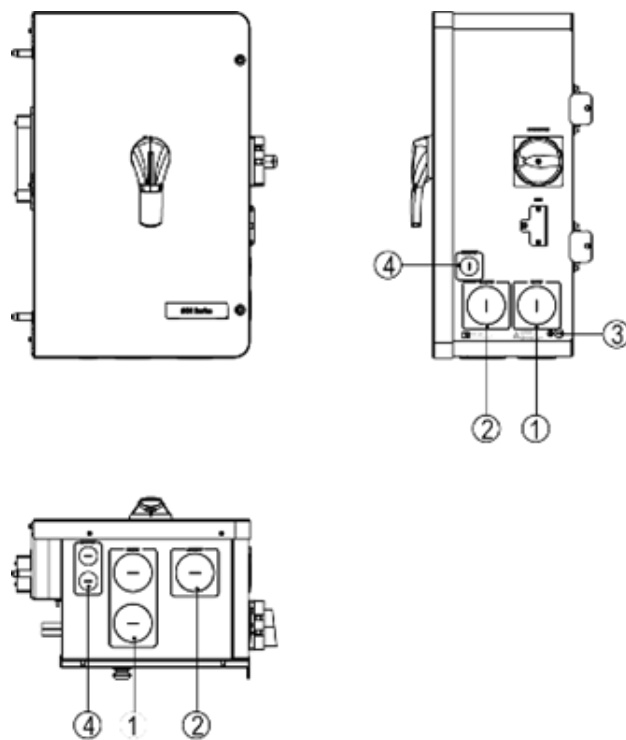


Figure 3-23 Conduit Knockout Locations (Centralized Wire Box)

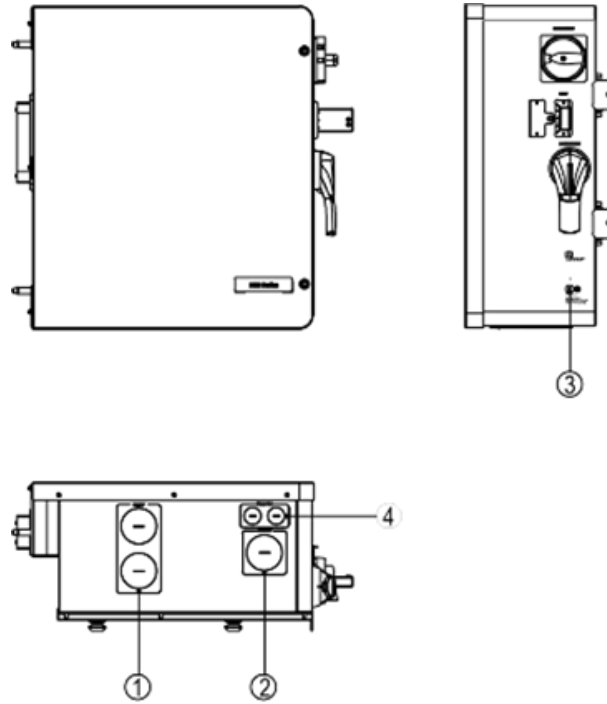


Figure 3-24 Conduit Knockout Locations (Distributed Wire Box)

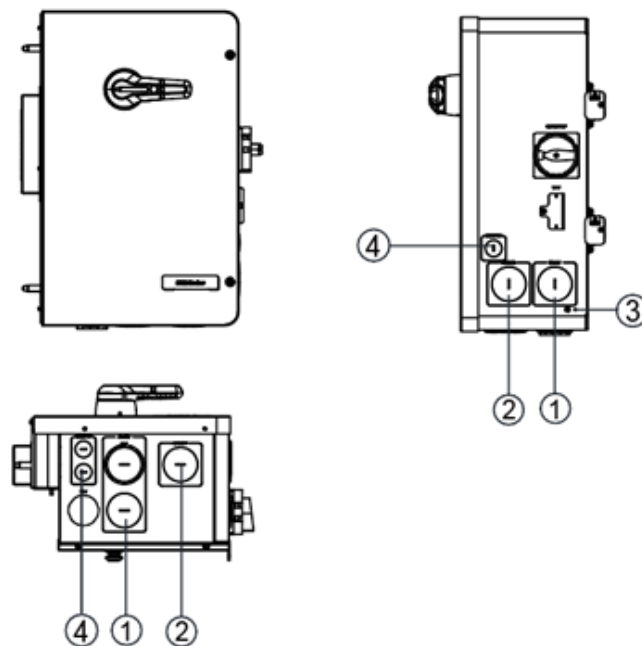


Figure 3-25 Conduit Knockout Locations (Centralized Wire Box with DC Disconnect)

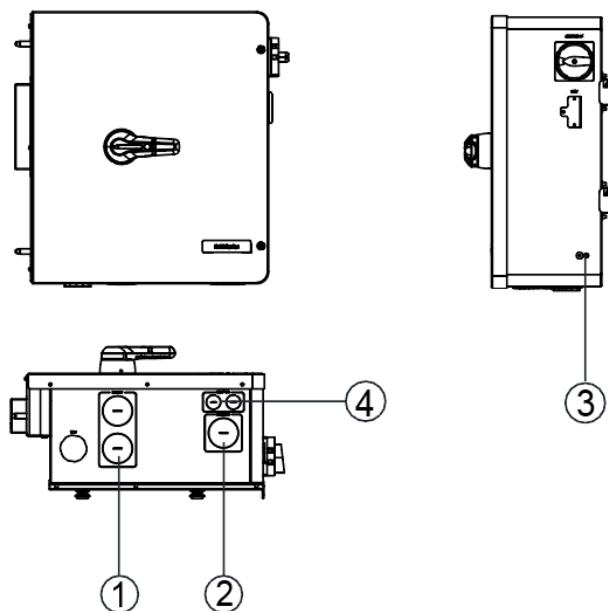


Figure 3-26 Conduit Knockout Locations (Distributed Wire Box with DC Disconnect)

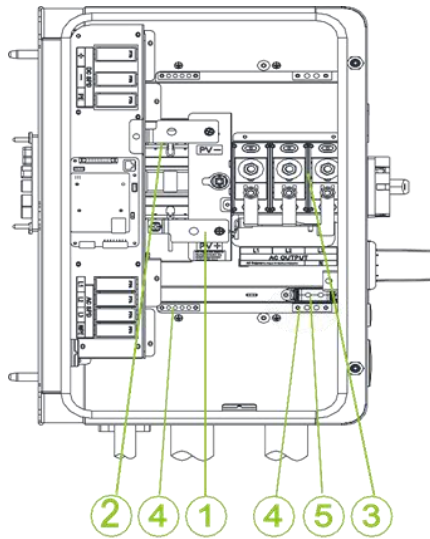
No.	Item
1	Knock-outs for DC input (2" Conduit)
2	Knock-out for AC output (2" Conduit)
3	External ground connection point
4	Knock-out for communication output (3/4" Conduit)



INSTRUCTION:

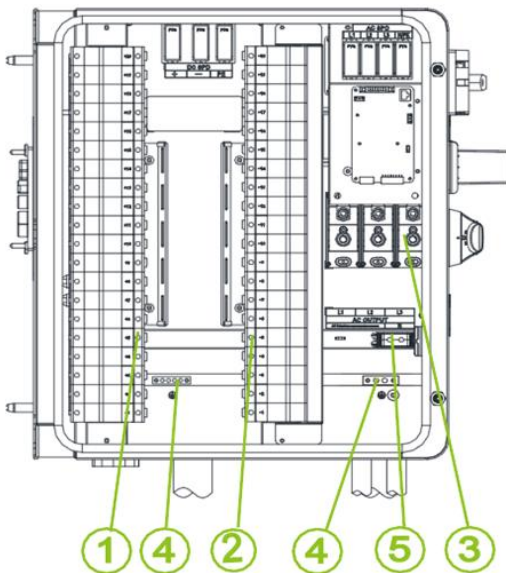
2-inch knockouts can be enlarged if the hardware from the larger size does not interfere with the installation of the cover or other components. Enlarged holes should be centered in the original hole if possible.

3.3.2.2 Interior Wire Box Details



- ① Positive DC input connections
- ② Negative DC input connections
- ③ AC output terminals
- ④ Grounding terminals
- ⑤ Neutral Terminal

Figure 3-27 Internal Connection Points (Centralized Wire Box V2)



- ① Positive DC input connections
- ② Negative DC input connections
- ③ AC output terminals
- ④ Grounding terminals
- ⑤ Neutral Terminal

Figure 3-28 Internal Connection Points (Distributed Wire Box)

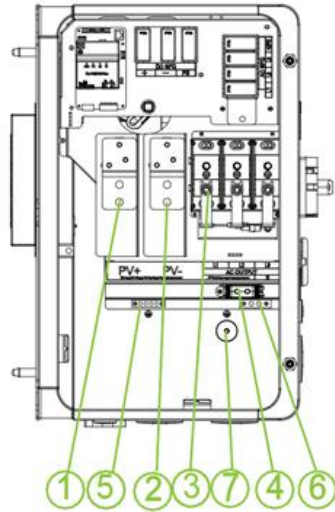


Figure 3-29 Internal Connection Points (Centralized Wire Box with DC Disconnect)

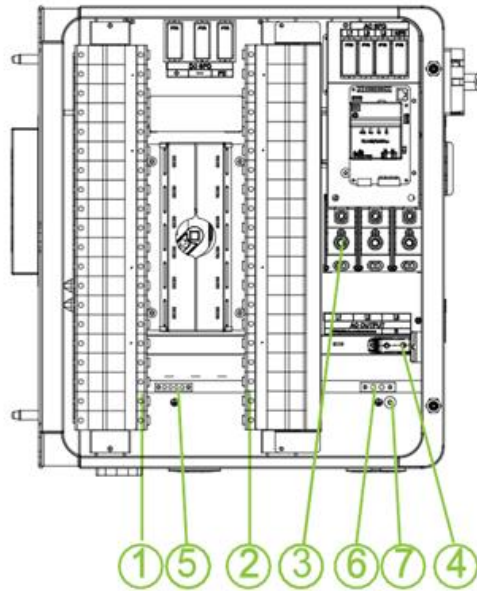


Figure 3-30 Internal Connection Points (Distributed Wire Box with DC Disconnect)

No.	Item
1	Positive DC input connections
2	Negative DC input connections
3	AC output terminals
4	Neutral terminal
5	Grounding terminal A
6	Grounding terminal B
7	Internal grounding stud

Table 3-3 Cable Specifications

DC Cable Specifications	
Terminal	Conductor
DC input (+ / -) Distributed Wire Box	Screw clamp #12-6 AWG Cu only (90°C fuse holder rating) Cable overall diameter: < 0.29 in (7.3 mm)
DC input (+ / -) Centralized Wire Box V2	Busbar, M10 bolts: 500 kcmil CU/AL max. (1 termination per pole), 300 kcmil CU/AL max. (2 terminations per pole). Lugs not supplied. Cu/Al conductor size determined by: NEC calculations, site voltage drop requirements, and DC terminal dimensions. See Figure 3-31 & 3-32 for centralized wire box V2 dimensions (90°C rated). Allows for single or parallel one-hole lugs on top and bottom; 0.43 in (11 mm) through holes, use lugs with a 3/8 in (9.53 mm) or 1/2 in (12.7 mm) hole.
DC input (+ / -) Centralized Wire Box with DC Disconnect	Cu/Al conductor size determined by: NEC calculations, site voltage drop requirements, and DC terminal dimensions. See Figure 3-33 for centralized wire box with DC Disconnect dimensions (90°C rated). Allows for one-hole or two-hole lugs; 0.43 in (11 mm) through holes, 1" (25.4mm) hole distance.
AC and Ground Cables Specifications	
Position	Conductor
AC output (L1/L2/L3/N) Distributed Wire Box (L1/L2/L3/N) Centralized Wire Box	Cu/Al conductor determined by NEC calculations and the maximum terminal lug dimensions in Figures 3-35 or 3-36. Terminal block is rated for 90°C. Note: AC output hole diameter may need to be increased to 2.5 or 3 inch for larger cable diameters.
Ground terminals	Gnd A #4-14 AWG; Gnd B #2-14 AWG (Cu/Al)
RS485 Communication	
RS485 Communication	Three #22-18 AWG communicable cables (e.g., Belden 3106A).



INSTRUCTION:

Use antioxidant paste or grease for aluminum conductor connections.

Table 3-4 Tools Required for Cable Termination

No.	Tool	Use
1	#2 Phillips head screwdriver	DC cable for wire box
2	13 mm / 17 mm hex socket wrench	AC terminal block (L1-L3)
3	13 mm hex socket / 5 mm hex drive wrench	AC terminal block (N)
4	10 mm hex socket wrench	External grounding / bonding
5	5 mm flat screwdriver	Internal grounding bar
6	1.5 mm flat screwdriver	RS485 communication terminal
7	Diagonal pliers	Cut cable
8	Wire stripping pliers	Remove jacket
9	Crimping pliers	Crimp terminal

Table 3-5 Torque Values

Torque Table	USCS	SI Unit
ELECTRICAL CONNECTIONS		
DC string wiring for distributed wire box	26 in-lbs	3 N·m
DC cable for centralized wire box V2	200 in-lbs	22.5 N·m
DC cable for centralized wire box with DC Disconnect	200 in-lbs	22.5 N·m
AC terminal M10 (L1-L3) distributed & centralized V2 wire box	200 in-lbs	22.5 N·m
AC terminal screw-clamp (N) distributed & centralized V2 wire box	120 in-lbs	14 N·m
Internal grounding bar A	26.5 in-lbs	3 N·m
Internal grounding bar B	45 in-lbs	5 N·m
Internal grounding stud	53 in-lbs	6 N·m
External grounding point	53 in-lbs	6 N·m
RS485 communication	1.8 in-lbs	0.2 N·m
MECHANICAL CONNECTIONS		
Inverter to bracket	52.8 in-lbs	6 N·m
Cover	35.4 in-lbs	4 N·m
Main to wire box	111 in-lbs	12.5 N·m
Fan replacement	14.2 in-lbs	1.6 N·m

3.3.3 AC and Ground Connection

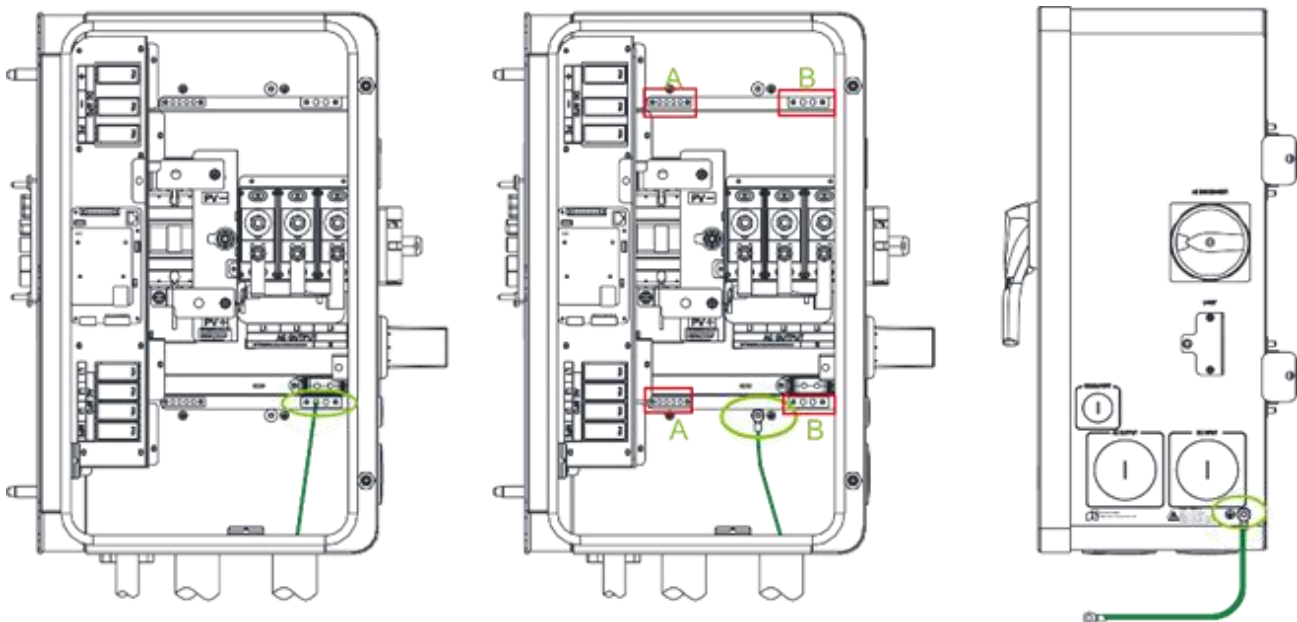


Figure 3-31 Grounding Connection Points (Centralized Wire Box V2)

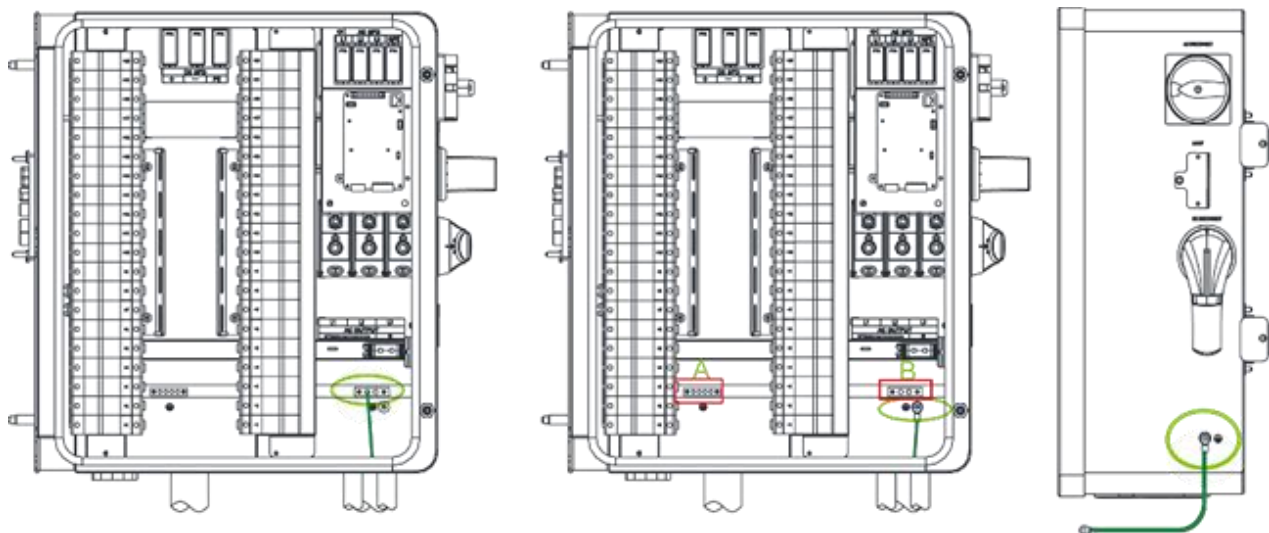


Figure 3-32 Grounding Connection Points (Distributed Wire Box)

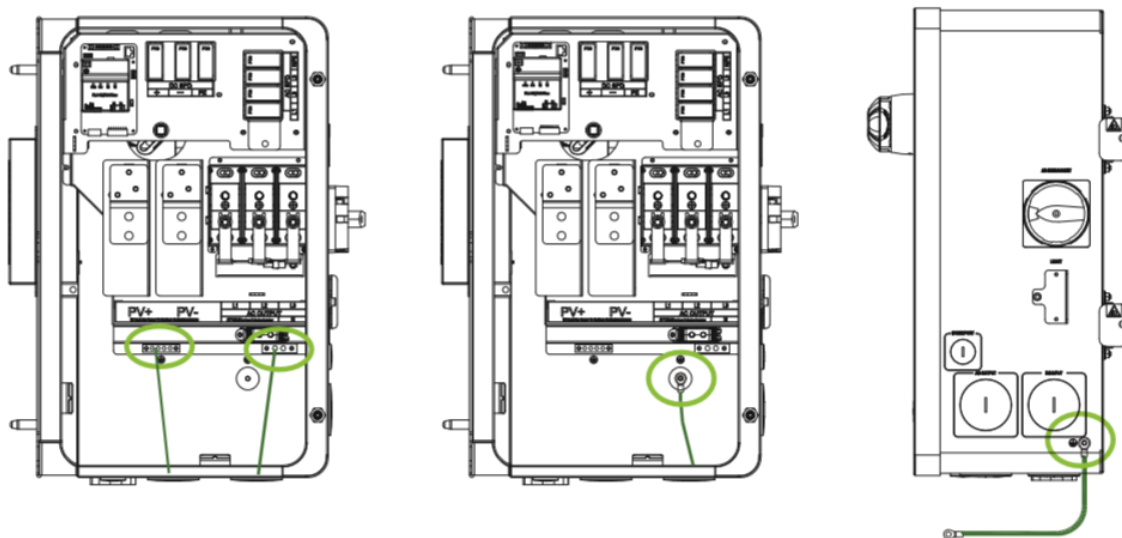
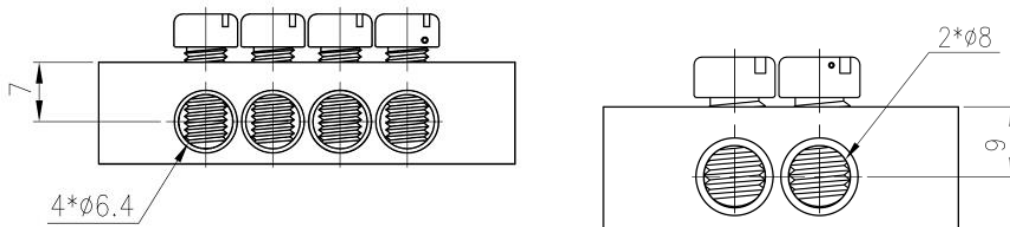


Figure 3-33 Grounding Connection Points (Centralized Wire Box with DC Disconnect)

The following describes how to connect the AC and ground cables between the inverter and the AC grid:

1. Connect the ground cables to the grounding points shown in Figures 3-31, 3-32, or 3-33 and bond the inverter to the local grounding point (drive ground rod or equivalent).
2. Remove the waterproof plugs from the AC output of the wire box and install the appropriately sized conduit and conduit fittings into the hole.
3. Route the cables through the conduit inside the wire box.
4. Run a circuit ground with the AC power cables and connect to the internal ground bus.
5. Bond the wire box to the local ground connection with a separate ground wire for personnel safety. By bonding at this location, it is easier for the operator to determine if the inverter is safely grounded.
6. Connect the AC cables (L1, L2, L3, N) to the terminal block and connect the ground cable to the internal grounding terminal block. The neutral conductor is optional and not required.



Ground Terminal A

Ground Terminal B

Figure 3-34 Ground Terminal Size

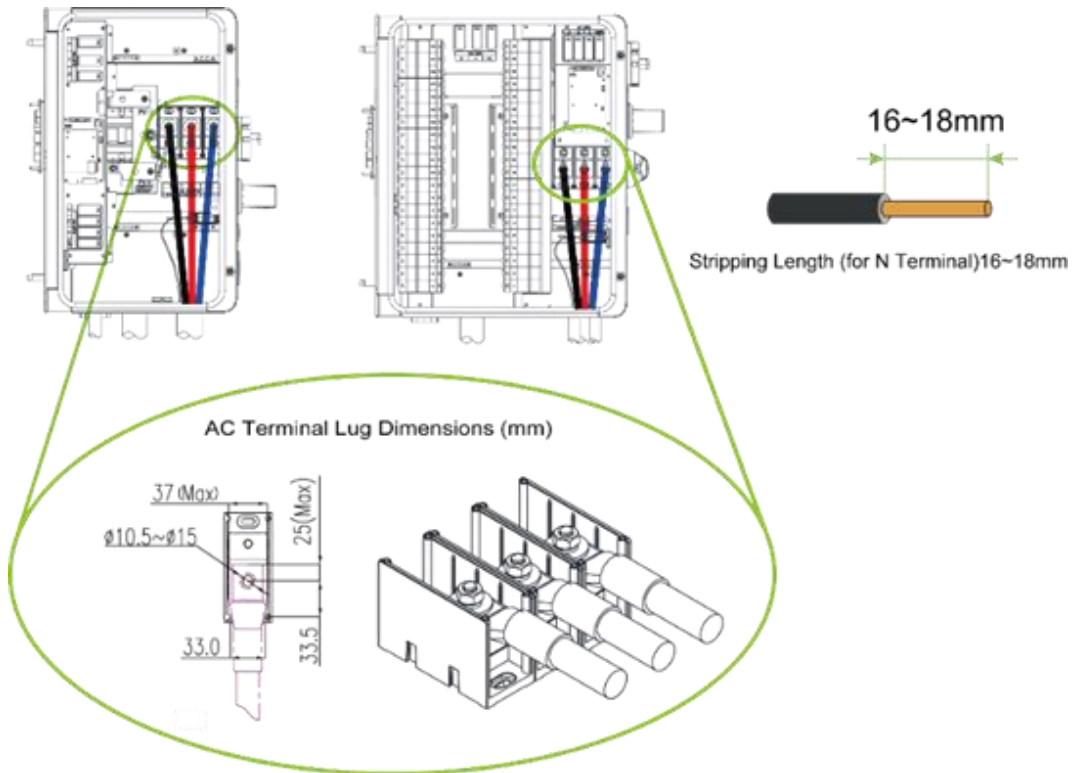


Figure 3-35 AC Output Cable Connection (Standard Wire Boxes)

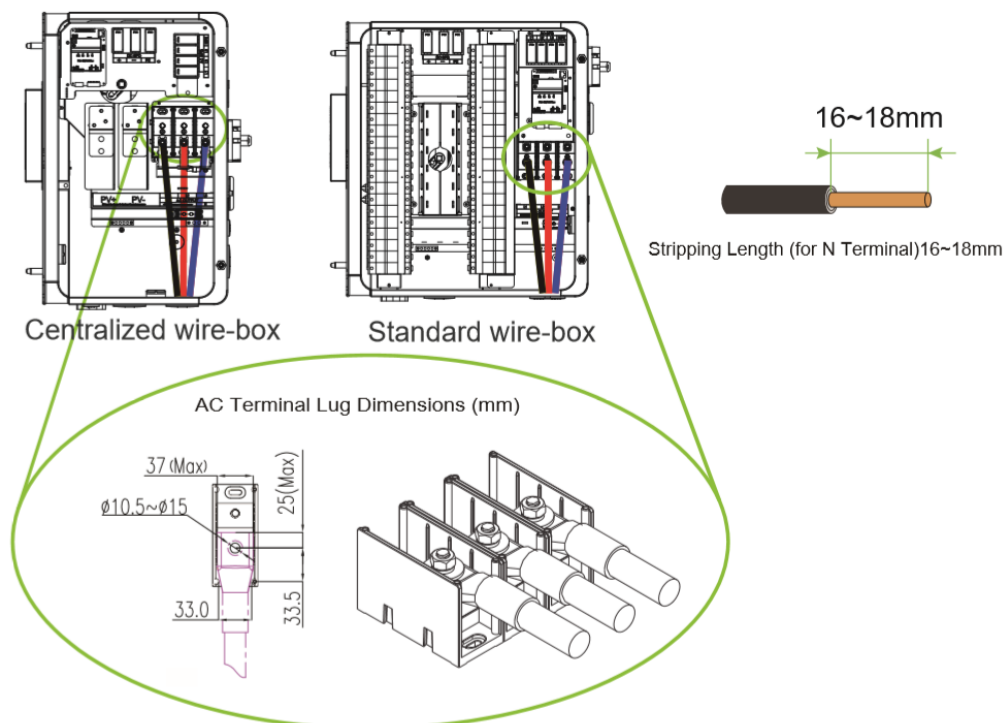


Figure 3-36 AC Output Cable Connection (DC Disconnect Wire Boxes)

When the output of the inverter is connected to the grid, an external AC circuit breaker must be installed to safely disconnect the inverter from the grid should an overcurrent even occur. The minimum size breaker is determined by NEC calculations. The internal temperature of the AC panel must be considered and appropriate derate applied to prevent nuisance tripping.

Table 3-6 Specification of AC Breaker Selection

Inverter	Max AC OCPD
CPS SCH100KTL-DO/US-600	200 A
CPS SCH125KTL-DO/US-600	200 A
CPS SCH100KTL-DO/US-480	200 A

The SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 inverters operate at 600 V_{AC} / Wye output. If another voltage or configuration is required, a transformer may be necessary. Up to 30 inverters may be connected in parallel for use with a single transformer.



NOTICE:

Transformer configurations:

- 3 W wye and 4 W grounded wye are recommended.
- Floating 3 W wye delta configuration is acceptable. External AC Ground Fault detection may be required by code NEC 2017/2020 Section 250.21 for floating AC systems.
- The presence of a grounding transformer or YG:D configuration causes voltage regeneration; loss of single phase must be mitigated externally to the inverter due to regenerated voltage present at inverter AC terminals.
- **Open and grounded delta configurations are NOT acceptable.**

3.3.4 DC Connection

3.3.4.1 DC Fuse Configuration

CPS SCH100/125KTL-DO/US-600 and SCH100KTL-DO/US-480 standard/distributed wire boxes are equipped with 25 A DC fuses. The Distributed wire boxes with DC Disconnect are shipping with 20 A DC fuses. Customers must verify that the appropriate fuses are installed depending on the actual configuration of the DC strings:

- Each DC input from the PV strings requires fuse protection.
- The rated voltage of the fuse must be 1500 V_{DC}.
- The rated current of the fuse is typically the value of the short circuit current from the PV strings multiplied by 1.56, then rounded to the next available fuse size. NEC 2017/2020 alternate calculations may allow a smaller fuse to be used.

The following table lists fuse type, specifications, and rating of 1500 Vdc Adler fuse series that can be used with CPS 100/125kW distributed wire boxes:

Table 3-7 DC Fuse Selection

Fuse	15 A	20 A	25A	30A
Type	Adler A74	Adler A74	Adler A74	Adler A74
Spec	15A/1500V	20A/1500V	25A/1500V	30A/1500V



WARNING:

The use of different fuses or incorrectly sized fuses can cause damage to equipment or create unsafe working conditions. Any damage resulting from the use of incompatible fuses is **NOT** covered by warranty.

3.3.4.2 DC Cable Connection

To ensure optimum performance of the inverter, please read the following guidelines *before* performing any DC connections:

1. Confirm the DC configuration and ensure that the maximum open circuit voltage of the PV modules is lower than 1500 V_{DC} under *any* conditions.
2. Confirm that the PV strings for the MPPT of the inverter are of the same type and specification before connecting.
3. Check the polarity before terminating the DC cables of the PV strings according to the following steps:
 - a. Use a multimeter to measure the PV strings' cable ends and check the polarity.
 - b. Ensure the positive (+) terminal of the cable matches the positive (+) terminal of the inverter's DC input.
 - c. Ensure the negative (-) terminal of the cable matches the negative (-) terminal of the inverter's DC input.

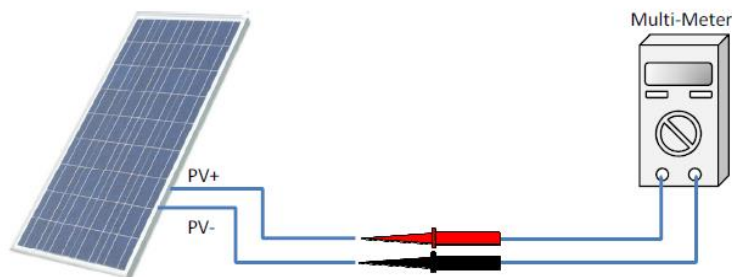


Figure 3-37 Polarity Check



NOTICE:

It is important to use a multimeter rated at least 1500 V to check the polarity of the DC input conductors to avoid any risk of reverse polarity.

A reversed string is extremely hazardous and will result in a blown fuse when the irradiation is high. The voltage across the blown fuse will be twice as much Voc and could prevent proper fuse operation, resulting in a fire.

4. Remove the watertight hole plugs from the DC input of the wire box, install two-inch conduit and conduit fittings into the holes, and route the cables through the conduit inside the wire box.
5. Connect the DC cables to the fuse holders and tighten the screws, as shown in Figure 3-38 (Distributed Wire Box) or connect the DC cables to the DC input busbars as shown in Figure 3-39 or 3-41 (Centralized Wire Box).
6. Tighten the screws or nuts per the torque table above (Table 3-5).

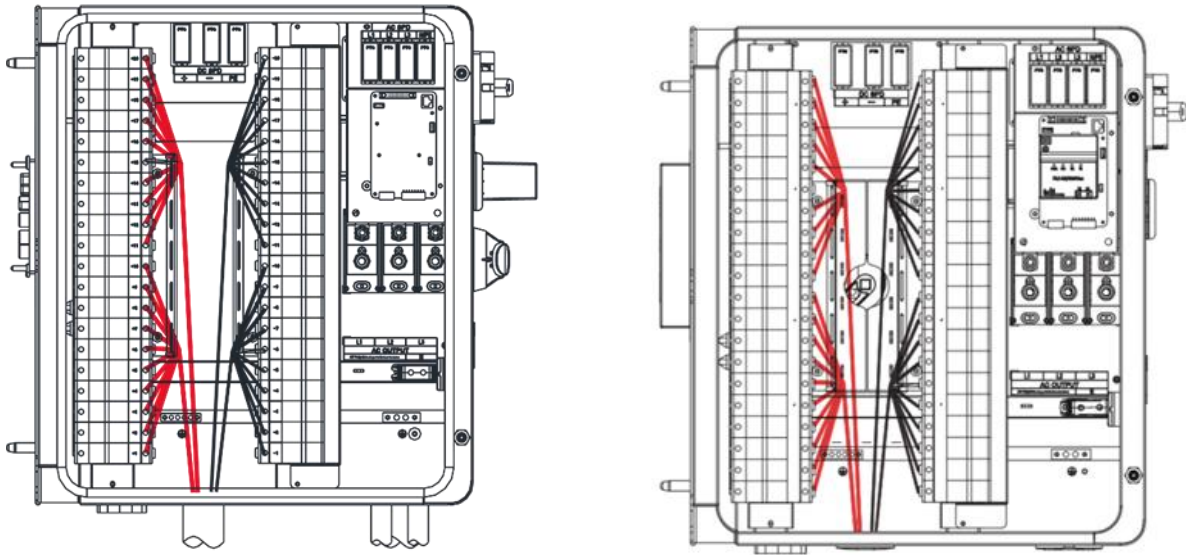


Figure 3-38 DC Cable Connections (Distributed Wire Boxes – Standard & Disconnect Versions)

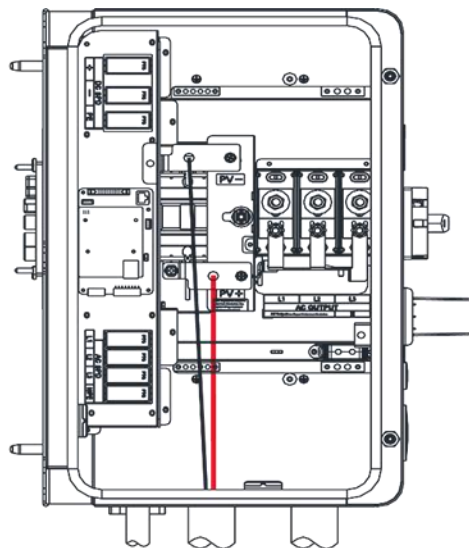


Figure 3-39 DC Cable Connections (Centralized Wire Box V2)

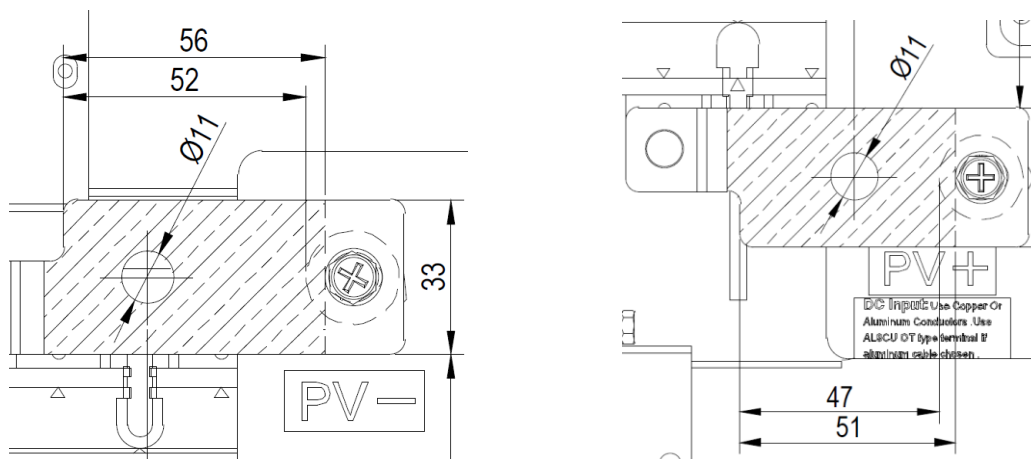


Figure 3-40 DC Bus Connection Dimensions for Centralized Wire Box V2

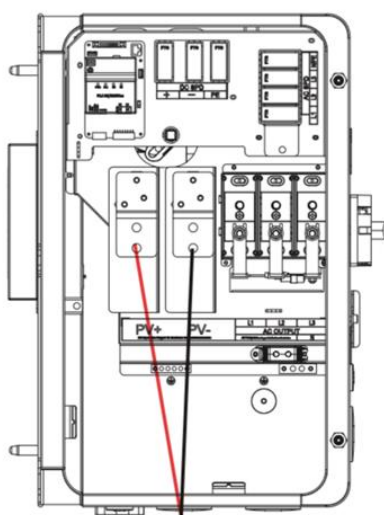


Figure 3-41 DC Cable Connections (Centralized Wire Box with DC Disconnect)

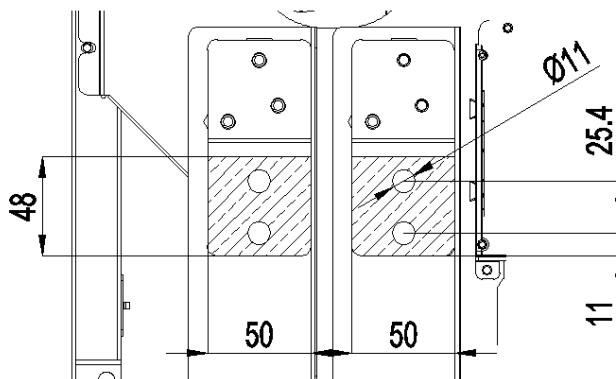


Figure 3-42 DC Bus Connection Dimensions for Centralized Wire Box with DC Disconnect

3.3.5 Communication Connection

CPS SCH100KTL-DO/US-600, CPS SCH125KTL-DO/US-600, and SCH100KTL-DO/US-480 inverters support industry standard SunSpec and Modbus RS485 communication. Below is a description of the components of the communication card and its location in the inverter wire boxes.

3.3.5.1 Communication Board Description

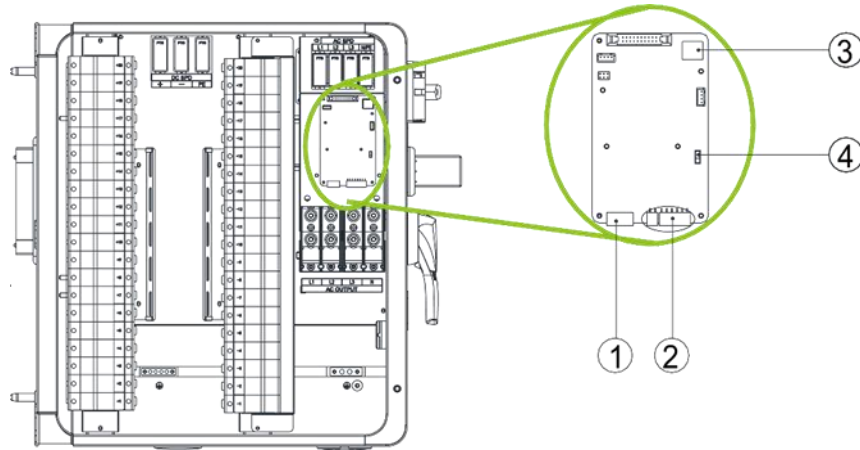


Figure 3-43 Communication board (Distributed Wire Box)

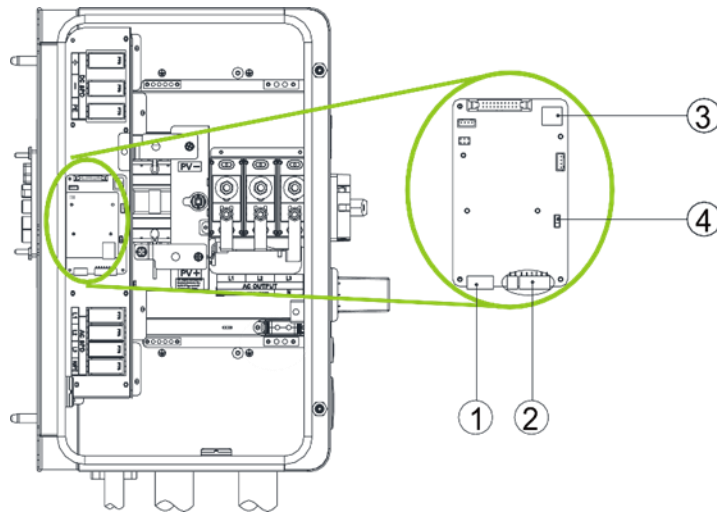


Figure 3-44 Communication board (Centralized Wire Box V2)

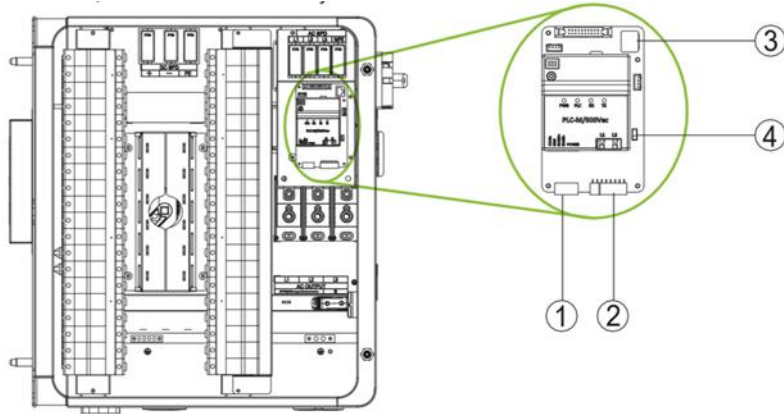


Figure 3-45 Communication board (Distributed Wire Box with DC Disconnect)

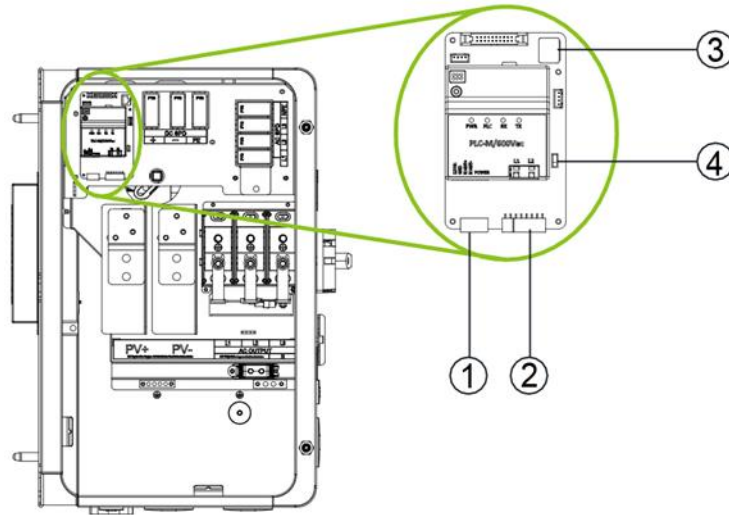
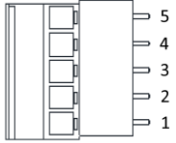
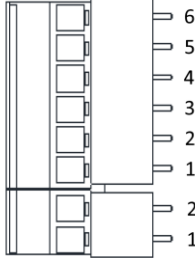
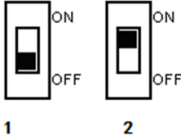


Figure 3-46 Communication board (Centralized Wire Box with DC Disconnect)

Table 3-8 Communication Connection Interfaces

Item	Picture	Configuration Description
① RS485 (Debug only)		Debug only
② RS485 port (2- and 6-pin connector)		6 – RS485_GND (Common) 5 – RS485_B 4 – RS485_A 3 – RS485_GND (Common) 2 – RS485_B 1 – RS485_A 2 – +12V 1 – 12V_GND

③ RJ45 port		Debug only
④ Selector switch for setting the 120 Ω terminal resistor of the RS485 communication S201		OFF – Disable the termination resistor ON – Enable the termination resistor

3.3.5.2 RS485 Cable Connection

Use three (3) #22-18 AWG communication cables (e.g., Belden 3106A) for the RS485 communication cables:

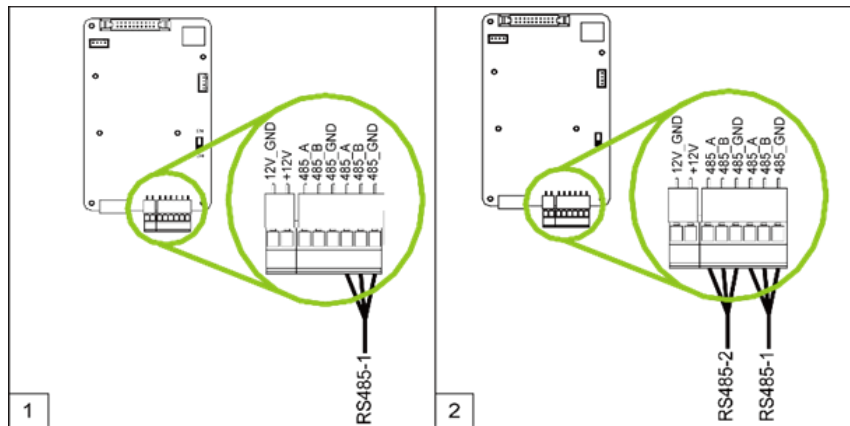


Figure 3-47 RS485 Connection (New Communication Board 6-pin)

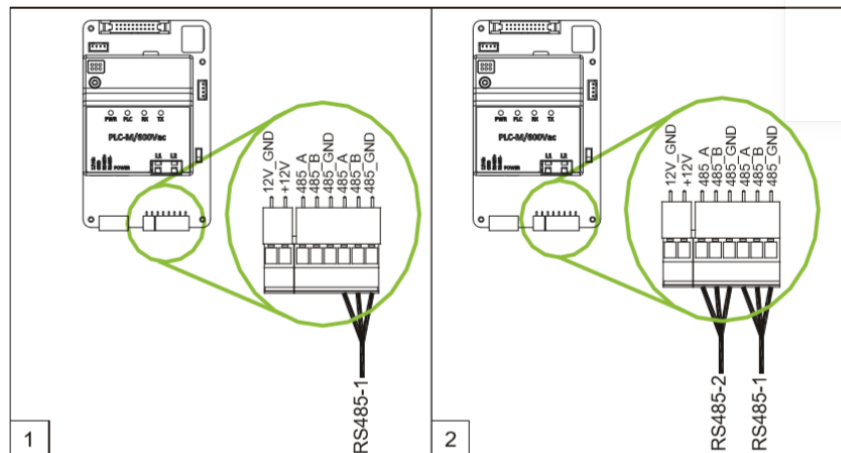


Figure 3-48 RS485 Connection (New Communication Board 6-pin)

1. Cable connection of RS485 communication (one inverter): 6-pin connector
2. Cable connection of RS485 network communication (multiple inverters): 6-pin connector

It is recommended that industrial grade shielded twisted pair RS485 cable be used in lieu of an unshielded or untwisted pair. Data communication cable such as Belden 3106A for the RS485 6-pin connector can be used.

3.3.5.3 RS485 Network Connection

When the inverters are monitored via the RS485 communication, a unique RS485 address for each inverter can be set up through the app interface. Use the CPS Connect Pro app to assign an address to each inverter on the network. Up to 32 inverters can be connected together in the RS485 communication network. The daisy-chain topology is recommended for the RS485 network connection, as shown in Figure 3-41, to minimize noise and bus reflections. Other communication topologies, such as star networks, are not recommended. All RS485 connections must be terminated in a serial fashion.

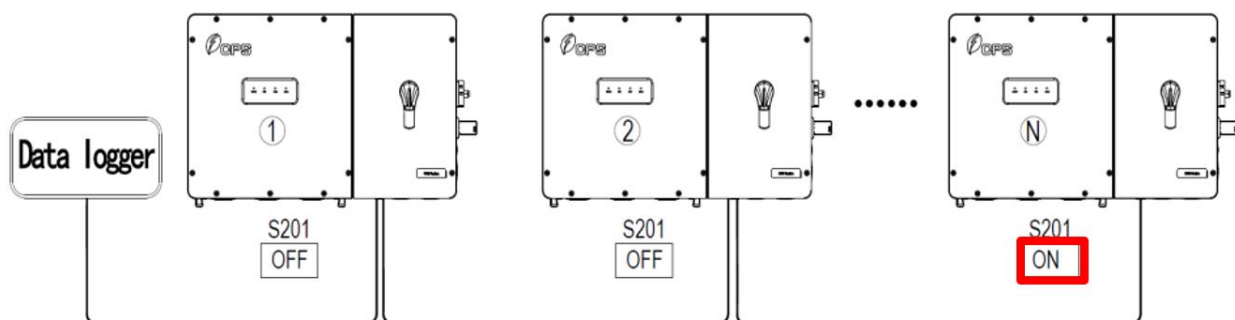


Figure 3-49 RS485 Network Connection

If there are multiple inverters in the RS485 network, the selector switch S201 of the last inverter in the daisy-chain must be in ON position to have the 120 ohm terminal resistor enabled. The selector switch S201 of all other inverters should be in the OFF position to disable the terminal resistor.

It is important to daisy chain the inverter RS485 connections to minimize noise and bus reflections. All RS485 connections must be terminated in a serial fashion and must not exceed 32 in total. A daisy-chain configuration is above a multiple branch configuration.



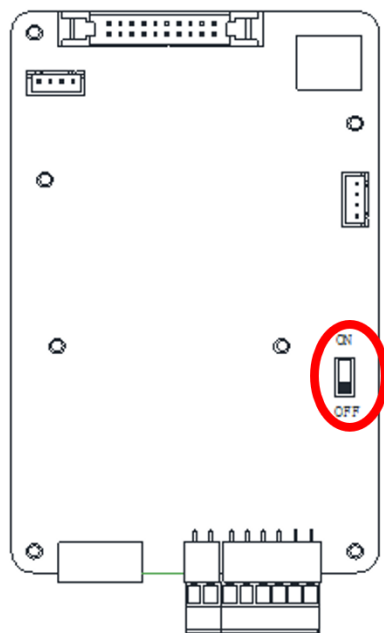
WARNING: Risk of Electric Shock.

Ensure that *all* DC and AC power to the unit has been disconnected and that hazardous high voltage and power inside the equipment has been discharged *before* opening the inverter wire box. Wait at least five minutes before opening the wire box.

3.3.5.4 Communication Wiring Procedure

1. Open the inverter wire box.
2. Bring the communication cables into the wire box through the provided knockout holes at the bottom.
3. Connect the RS485 wires to the green Phoenix connector, ensuring correct polarity and using a shielded twisted pair cable.
4. If the inverter is the last Modbus device in the daisy chain, ensure the Modbus termination switch S201 is in the ON position to enable Modbus termination while the Modbus termination switch S201 in all other inverters of the daisy chain are in the OFF position.
5. Connect the shield or drain wire continuously, but not in contact with RS (Common) or enclosure ground.
6. Single point ground the shield / drain wire.

Note: Do not connect the RS485 common to ground.



S201 – Selector switch for the 120 Ω RS485 termination resistor:

- **ON:** Enable the Modbus (RS485) bus termination (applies only for the last inverter in the daisy chain).
- **OFF:** Disable the Modbus (RS485) bus termination (factory default).

Figure 3-50 Modbus (RS485) Termination Switch (S201) Location and Settings on the Communication Board

3.3.6 Cable Entry Joints and Seals

All the electrical cables and communication cables must be jointed and sealed properly according to the following requirements to ensure performance and water tightness.

- The cable must be vertical to prevent excessive cable stress.

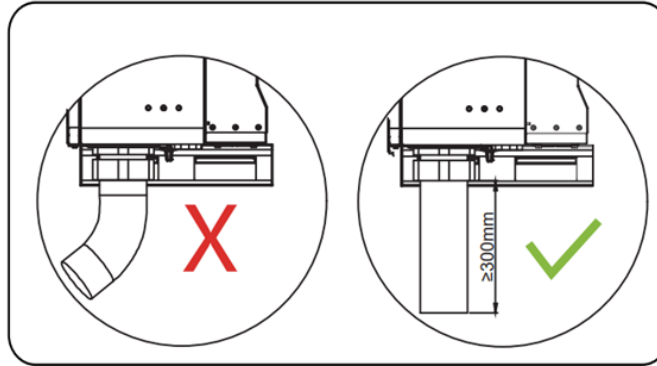


Figure 3-51 Vertical Cable Entry

- After the cable passes through the fastening head, fireproof putties must be applied to seal the joint tightly to prevent water vapor from entering.

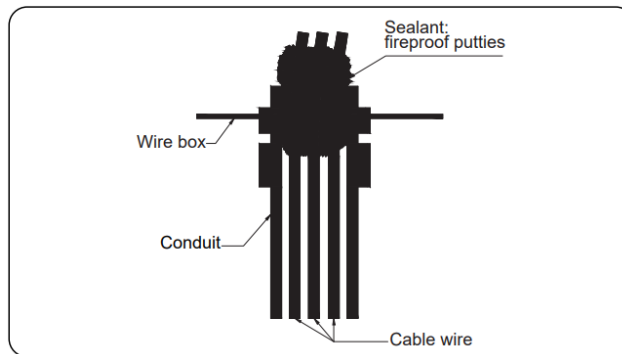


Figure 3-52 Fireproof Putty Application

- After tightening the fastening head, watertight sealants must be applied on its inner surface and outer surface to avoid loosening and prevent water from entering.

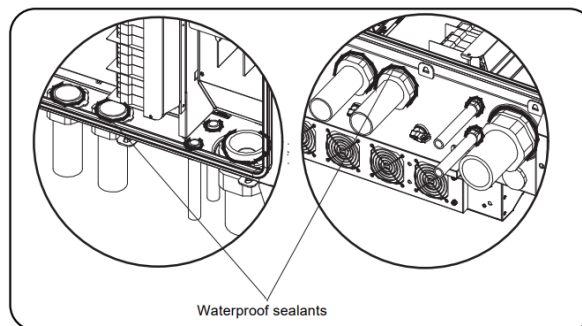


Figure 3-53 Watertight Sealant Application

- Before and after tightening the fastening head, check carefully to ensure the watertight gasket is in good condition, i.e. its surface is uniform and unbroken.

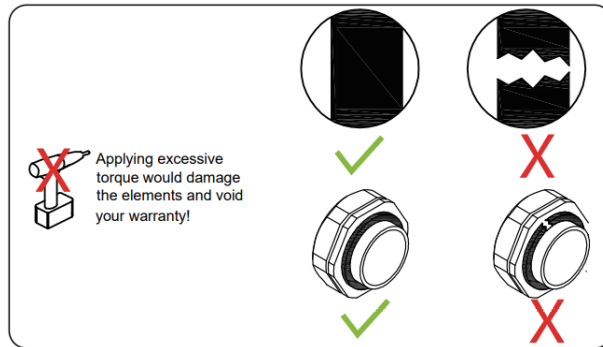


Figure 3-54 Watertight Gasket

4 Commissioning (via Wireless)



WARNING:

Follow the guidelines below *before* on-grid operation to eliminate possible dangers and ensure safety.

4.1 App Download

The inverter settings are accessed through the CPS Connect Pro application. Users can download the iOS version from the App Store or the Android version from the Google Play store. (Supports Android 4.1 and iOS 9.0 or later.)



4.2 Commissioning Checklist

4.2.1 Mechanical Installation

Ensure that the mounting bracket is secure and that all the screws have been tightened to the specified torque values listed in Table 3-5 above.

4.2.2 Cable Connections

- ✓ Ensure that all cables are connected to the correct terminals and torqued to the values specified above.
- ✓ Practice appropriate cable management to avoid physical damage.
- ✓ Ensure the polarity of the DC input cables is correct and that the DC switch is in the OFF position. (Refer to Section 3.3.)

4.2.3 Electrical Check

- ✓ Ensure that the AC circuit breaker is appropriately sized.
- ✓ Test to determine if the AC voltage is within the normal operating range.
- ✓ Ensure that the DC open circuit voltage of input strings is less than 1500 V.

4.3 Commissioning Steps

Complete the checklist in Section 4.2 Commissioning Checklist before commissioning the inverter as follows:

1. Turn ON the AC circuit breaker (if present).
2. Turn ON the DC circuit breaker (if present).
3. Turn the DC switch into the ON position.

When the energy supplied by the PV array is sufficient, the LED of the inverter will illuminate and the inverter will start up.

4.4 Connection to the Inverter (Wireless)

When the inverter is powered, it will automatically create a wireless network that will be visible as an access point from user devices (tablet, smartphone, etc.) as a connection to the inverter via Wi-Fi. To connect to the inverter:

1. Open the CPS Connect Pro app and select **No-LCD Inverter**.
2. Enable the wireless connection on the device being used for the board setup (tablet or smartphone) and connect it to the access point created by the inverter system. The name of the wireless network created by the system will be named *CPLK-XXXXXXX*, where X can be found on the LinkKIT label placed on the side of the Wi-Fi module.
3. Enter "Password" (with a capital P) as the password.
4. Tap the **Setting** icon and enter "1111" as the password to access the **Setting** interface.
5. Select the **Inverter Parameters** tab to set the grid code, PV link type, neutral line, RS485, and inverter clock (Figure 4-1):

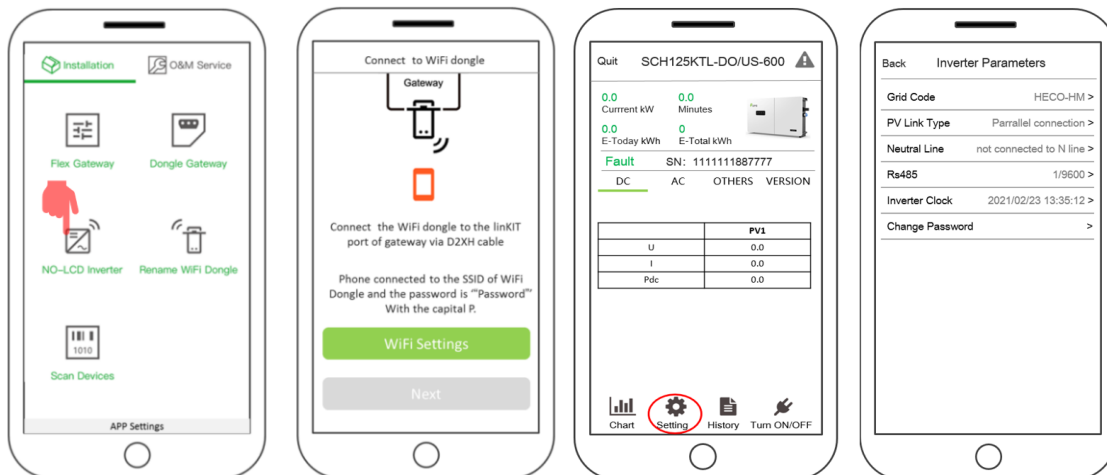


Figure 4-1 System Settings

Grid Code	Standard codes are available: IEEE 1547, CARule 21, ISO-NE, and HECO. Other SRDs can be implemented by manually configuring the settings.
PV Link Type	(N/A – 1 MPPT)
Neutral Line Setting	Select whether a neutral is connected or not.
RS485	Choose the communication data Modbus address and baud rate (9600). Each inverter on a daisy chain must have a unique Modbus address.
Inverter Clock	Set the system clock.



INSTRUCTION:

Check with your local electricity supply company *before* selecting a grid standard. If the inverter is operated with an incorrect grid standard, the electricity supply company may cancel the interconnection agreement. Placing the inverter into operation before the overall system complies with the national rules and safety regulations of the application is not permitted.

When the device screen shows normal operation status (Figure 4-2) and the **RUN** light on the LED panel is illuminated, this indicates the grid connection and power generation are successful.

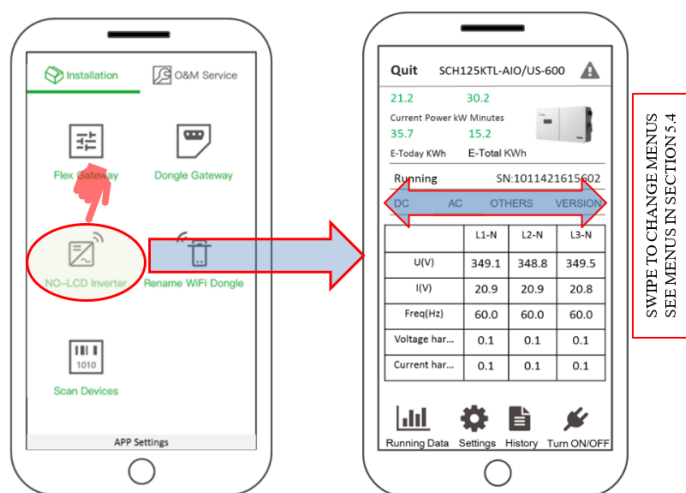


Figure 4-2 Normal Operation Status (Summary Screen)

If the inverter fails to operate normally, the **FAULT** light will illuminate and the fault information will show on the **Device** screen. You can select **History** to check the details as shown in Figure 4-3:

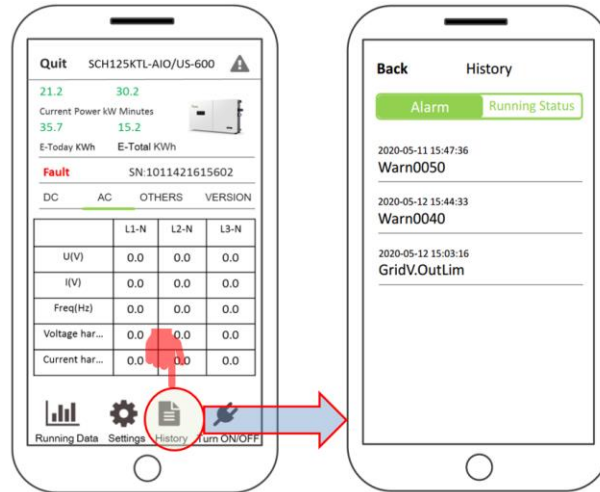


Figure 4-3 Fault Information Interface

5 App Interface

5.1 Overview

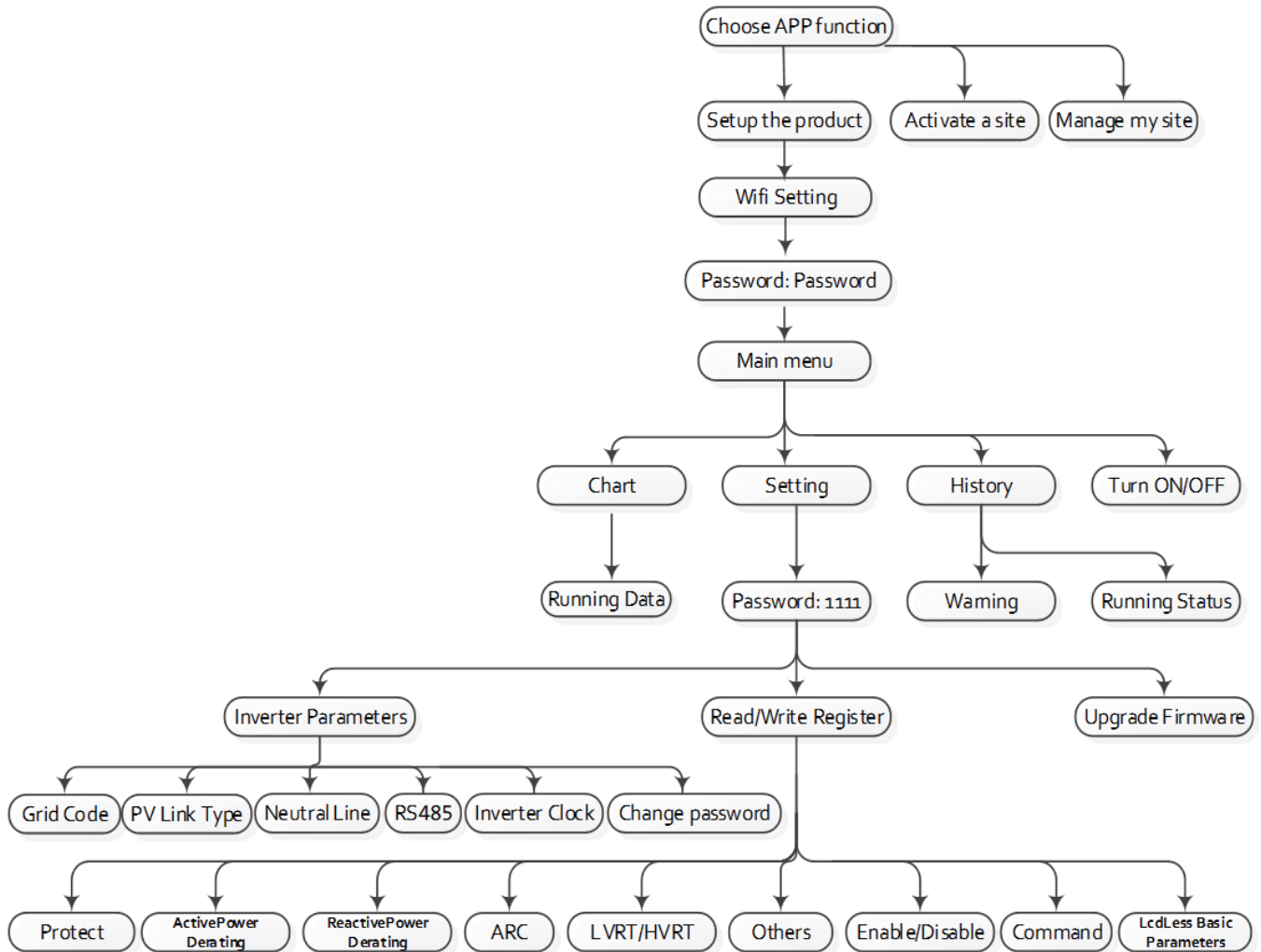


Figure 5-1 App Interface Menu Tree

5.2 Main Menu

In the **Main Menu**, you can access the following sub-menus:

- Running Data
- Settings
- History
- Turn ON/OFF

You can also view the main information related to the status of the inverter, as well as further information in the **DC**, **AC**, **OTHERS**, and **VERSION** tabs in the main section:

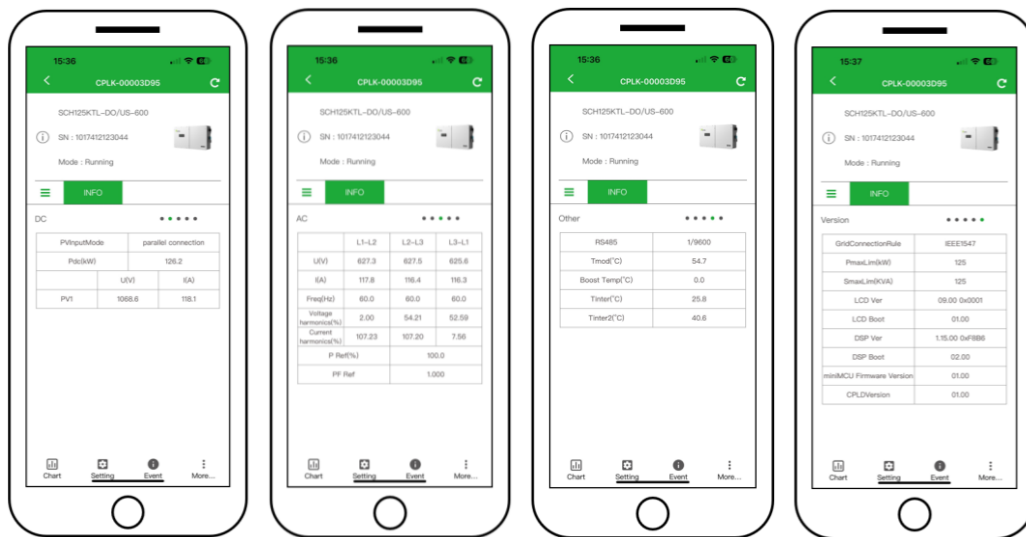
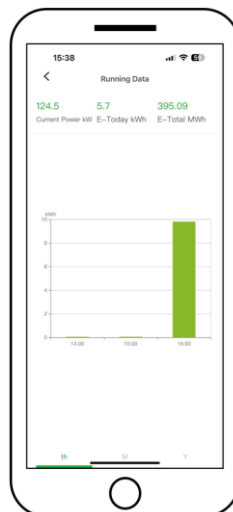


Figure 5-2 Main Menu Screens

5.3 Running Data

In the **Running Data** submenu, you can view the power generation for the current time, day, month, year, and total:



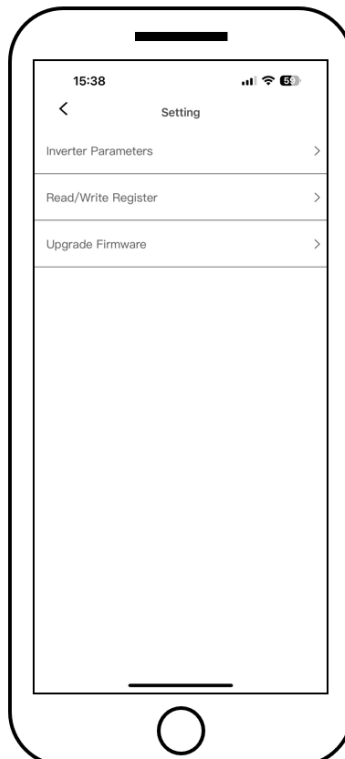
5.4 Settings

Select the **Setting** icon and enter “1111” as the password:



In the **Setting** section, you can access the following submenus:

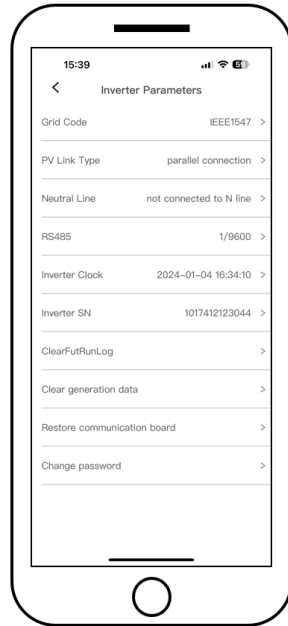
- Inverter Parameters
- Read/Write Register
- Upgrade Firmware



5.4.1 Inverter Parameters

In the **Inverter Parameters** section, you can access the following submenus:

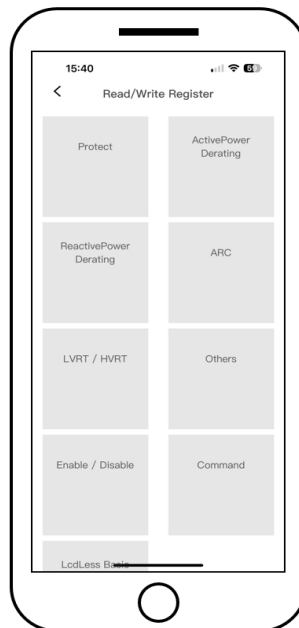
- Grid Code
- PV Link Type
- Neutral Line
- RS485
- Inverter Clock
- Change Password



5.4.2 Read/Write Register

In the **Read/Write Register** section, you can access the following submenus:

- Protect
- ActivePowerDerating
- ReactivePowerDerating
- LVRT/HVRT
- Others
- Enable/Disable
- Command



5.4.2.2 Protect

The **Protect** interface is used to display and set the protection parameters of the AC grid voltage, frequency, recovery, etc. Each of the three protection levels for OV, UV, OF, and UF can be independently disabled. See Table 5-1.

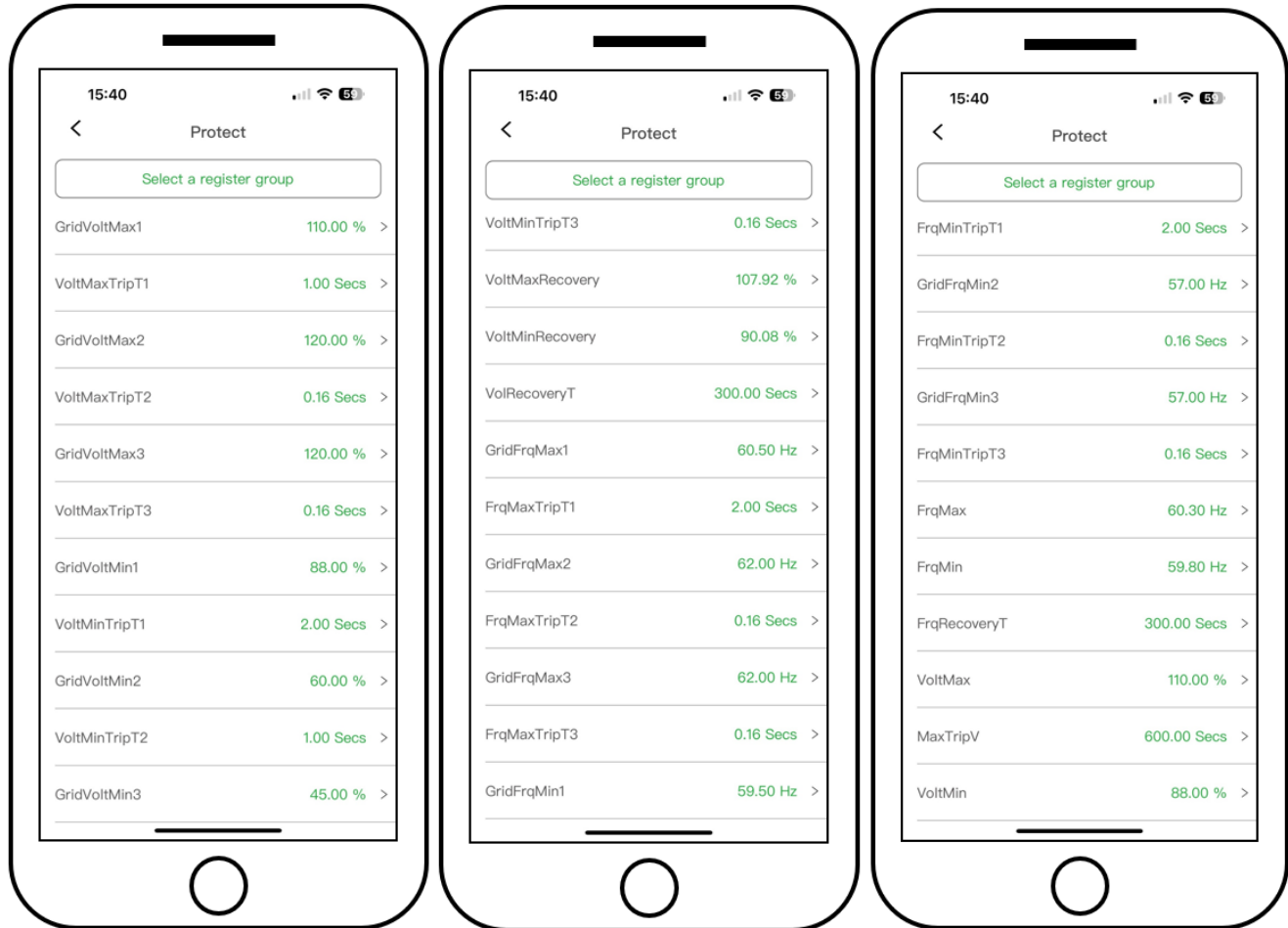


Table 5-1 Protection Parameters (IEEE 1547, Rule 21, ISO-NE)

Parameter Name	Description	Range	IEEE 1547	Rule 21	ISO-NE
Grid Over Voltage Protection (Table 5-6, REF 13-15)					
GridVoltMax1 (%)	Level 1 max. grid voltage	{100.00%, 135.00%}	110.00%	110.00%	110.00%
VoltMaxTripTime1 (S)	Level 1 max. grid trip voltage	{0, 655}	1.00	12.50	2
GridVoltMax2 (%)	Level 2 max. grid voltage	{100.00%, 135.00%}	120.00%	120.00%	120.00%
VoltMaxTripTime2 (S)	Level 2 max. grid trip voltage	{0, 655}	0.16	0.16	0.16
GridVoltMax3 (%)	Level 3 max. grid voltage	{100.00%, 135.00%}	120.00%	120.00%	120.00%
VoltMaxTripTime3 (S)	Level 3 max. grid trip voltage	{0, 655}	0.16	0.16	0.16
Grid Low Voltage Protection (Table 5-6, REF 16-18)					
GridVoltMin1 (%)	Level 1 min. grid voltage	{30.00%, 100.00%}	{88.00%}	{88.00%}	{88.00%}
VoltMinTripTime1 (S)	Level 1 min. grid trip voltage	{0, 655}	{2.0}	{20.50}	{2}
GridVoltMin2 (%)	Level 2 min. grid voltage	{30.00%, 100.00%}	{60.00%}	{70.00%}	{50.00%}
VoltMinTripTime2 (S)	Level 2 min. grid trip voltage	{0, 655}	{1.00}	{10.50}	{1.1}
GridVoltMin3 (%)	Level 3 min. grid voltage	{30.00%, 100.00%}	{45.00%}	{50.00%}	{45.00%}
VoltMinTripTime3 (S)	Level 3 min. grid trip voltage	{0, 655}	{0.16}	{1.5}	{0.16}
VMaxRov	Recovery max. threshold grid voltage protection	{80.00%, 135.00%}	{107.92%}	{107.99%}	{105.00%}
VMinRov (V)	Recovery min. threshold grid voltage protection	{20.00%, 100.00%}	{90.08%}	{90.00%}	{91.70%}
VRcovT (S)	Recovery time of grid voltage protection	{0, 655}	{300}	{300}	{300}
Grid Over Frequency Protection Table (Table 5-6, REF 19-21)					
GridF.Max1	Level 1 max. grid frequency	{60, 66}	{60.5}	{60.5}	{61.2}
FMaxTripTime1 (S)	Level 1 max. grid trip frequency	{0, 655}	{2}	{299.50}	{300.0}
GridF.Max2	Level 2 max. grid frequency	{60, 66}	{62}	{62}	{62}
FMaxTripTime2 (S)	Level 2 max. grid trip frequency	{0, 655}	{0.16}	{0.16}	{0.16}
GridF.Max3	Level 3 max. grid frequency	{60, 66}	{62}	{62}	{62}
FMaxTripTime3 (S)	Level 3 max. grid trip frequency	{0, 655}	{0.16}	{0.16}	{0.16}
Grid Low Frequency Protection (Table 5-6, REF 22-24)					
GridF.Min1	Level 1 min. grid frequency	{54, 60}	{59.5}	{58.5}	{58.5}
FrqMinTripTime1 (S)	Level 1 min. grid trip frequency	{0, 655}	{2}	{299.50}	{300.00}
GridF.Min2	Level 2 min. grid frequency	{54, 60}	{57}	{57}	{56.5}
FMinTripTime2 (S)	Level 2 min. grid trip frequency	{0, 655}	{0.16}	{0.16}	{0.16}
GridF.Min3	Level 3 min. grid frequency	{54, 60}	{57}	{57}	{56.5}
FMinTripTime3 (S)	Level 3 min. grid trip frequency	{0, 655}	{0.16}	{0.16}	{0.16}
FMaxRcov (Hz)	Recovery max. threshold grid frequency protection	{54, 66}	{60.3}	{60.4}	{60.1}
FMinRcov (Hz)	Recovery min. threshold grid frequency protection	{54, 60}	{59.8}	{58.6}	{59.5}
FRcovT (S)	Recovery time of grid frequency protection	{0, 655}	{300}	{300}	{300}
Moving Average Parameters (Table 5-6, REF 25 and 26)					
VMaxMovAvg	Threshold max. move average voltage	{100.00%, 135.00%}	110.00%	110.00%	110.00%
VMaxMovAvgT	Trip time of max. move average voltage	{0, 655}	{600}	{600}	{600}
VMinMovAvg	Threshold min. move average voltage	{80.00%, 100.00%}	{88.00%}	{87.99%}	{88.00%}
VMinMovAvgT	Trip time of min. move average voltage	{0, 655}	{600}	{600}	{600}
Voltage Unbalance (Table 5-6, REF 32)					
VUnbal	Threshold grid voltage unbalance	{0.01, 10%}	{10%}	{10%}	{10%}

5.4.2.3 ActivePowerDerating

The **ActivePowerDerating** interface is used to set the active power derating parameters (shown in Table 5-2). To make static changes to these settings, either onsite or via the FlexOM Gateway Portal, the active power mode in Table 5-6 (REF 3) must be set to "Local Control." The setting made in Remote Dispatch Mode will reset when the DC power cycles.

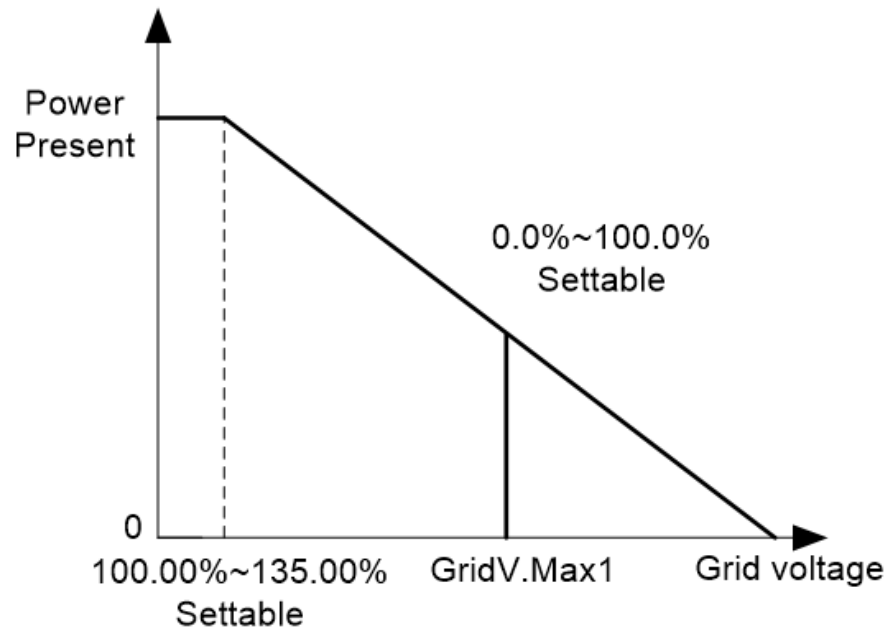


Figure 5-3 Curve of Over Voltage Derating

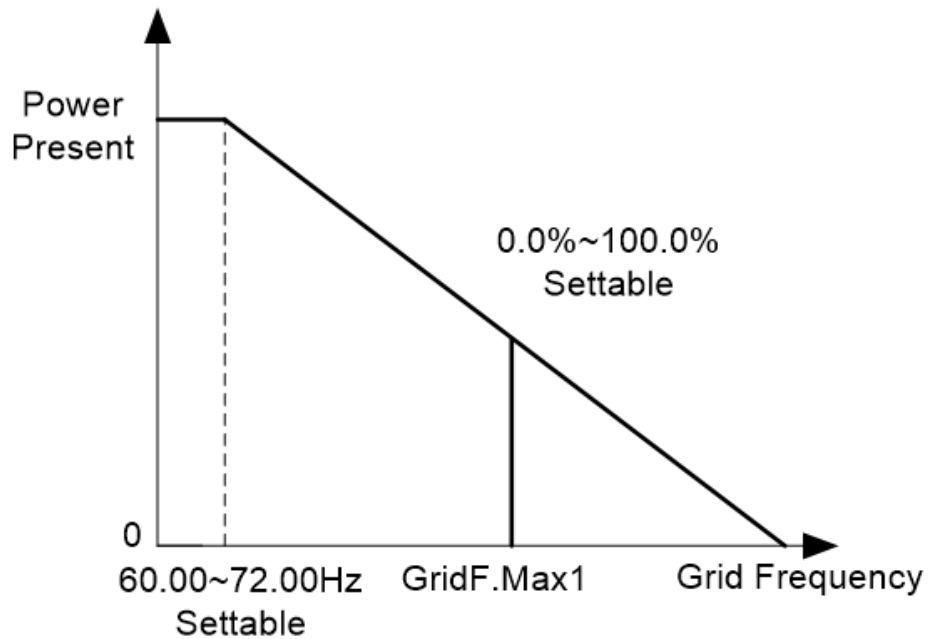


Figure 5-4 Curve of Over Frequency Derating

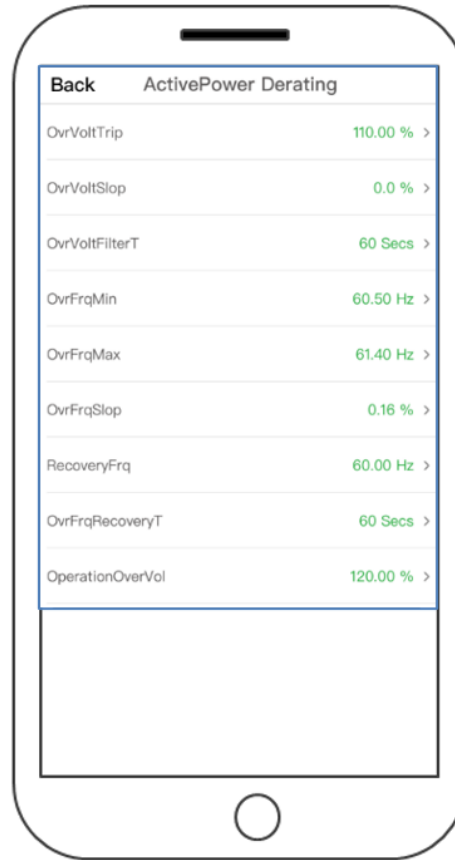
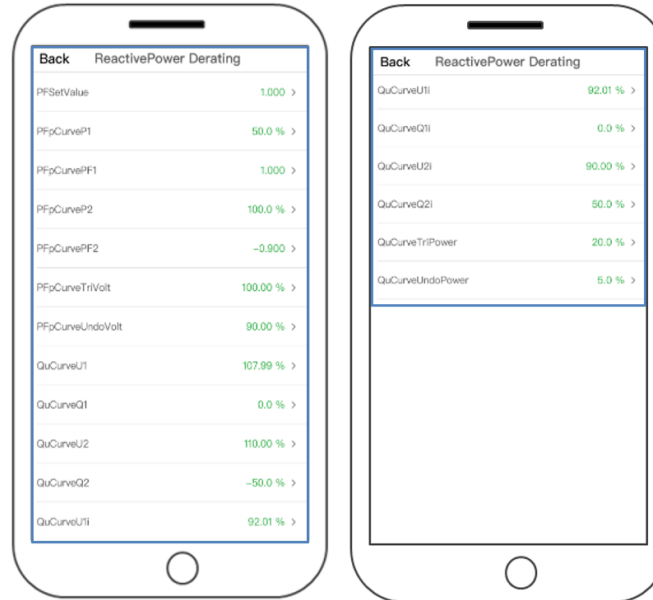


Table 5-2 Active Power Derating Setup

Parameter Name	Description	Range	IEEE 1547	Rule 21	ISO-NE
Over Voltage Derate (Table 5-6, REF 34 to Enable)					
FrqActPwrRecoveryT	Recovery time of Over Frequency derating	{0,1200}	{60}	{60}	{600}
OperationOverVol	Operating overvoltage protect value	{100%, 135%}	{120%}	{120%}	{120%}
VwCurveV1	Grid Volt of VwCurve point V1	{100%, 110%}	{106%}	{106%}	{106%}
VwCurveP1	Power of VwCurve point P1	{0%, 110%}	{100%}	{100%}	{100%}
VwCurveV2	Grid Volt of VwCurve V2	{100%, 110%}	{110%}	{110%}	{110%}
VwCurveP2	Power of VwCurve P2	{0%, 110%}	{0%}	{0%}	{100%}
GridVOpenLpRespT	Open loop response time	{0.5, 90.0}	{10.0}	{5.0}	{10.0}
Over Frequency Derate (Table 5-6, REF 29 to Enable)					
FreqDroopDbOf (Hz)	The dead zone of overfrequency active power regulation	{0.000, 1.000}	{0.036}	{0.036}	{0.036}
FreqDroopDbUf (Hz)	The dead zone of underfrequency active power regulation	{0.000, 1.000}	{0.036}	{0.036}	{0.036}
FreqDroopKOf	Coefficient of overfrequency active power regulation	{0.02, 0.10}	{0.05}	{0.05}	{0.05}
FreqDroopKUf	Coefficient of underfrequency active power regulation	{0.02, 0.10}	{0.05}	{0.05}	{0.05}
FreqDroopRspTms (s)	Response time of frequency active regulation	{0.2, 10.0}	{5.0}	{5.0}	{5.0}

5.4.2.4 ReactivePowerDerating

The **ReactivePowerDerating** interface is used to set the grid reactive power derating parameters (shown in Table 5-3). These functions are enabled according to the mode selected in Table 5-6 (REF 2). The Remote Dispatch Mode is used when a site controller is actively setting or changing reactive mode parameters. Any setting changes made in Remote Dispatch Mode will reset to the factory default settings when the DC power cycles.



PF Set: Set the PF value. Change the reactive power by adjusting the power factor.

PF(P) Curve: PF curve mode. The power factor changes according to the power change (see Figure 5-5).

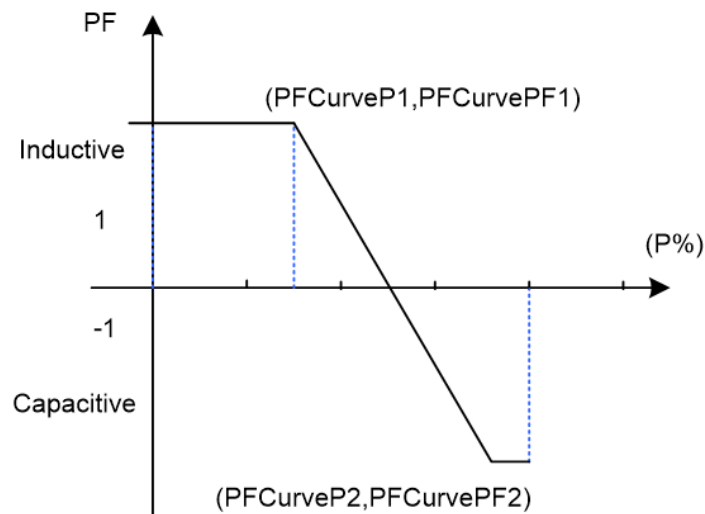


Figure 5-5 PF(P) Curve Mode

Q(U) Curve: Q(U) curve mode. The reactive compensation changes according to the grid voltage change (see Figure 5-6).

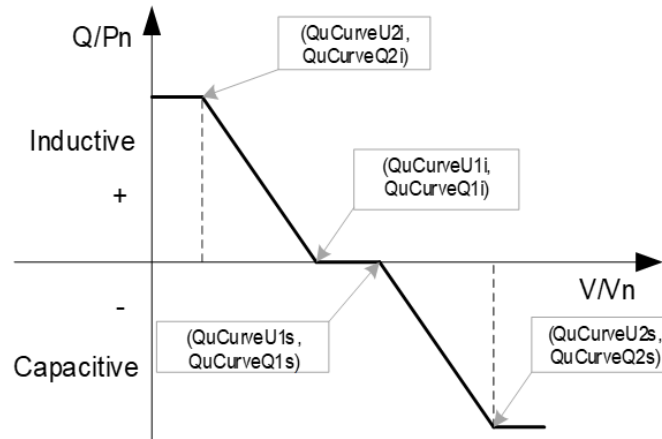


Figure 5-6 Q(U) Curve Mode

Q(P) Curve: Q(P) curve mode. The reactive compensation changes according to the active power change (see Figure 5-7).

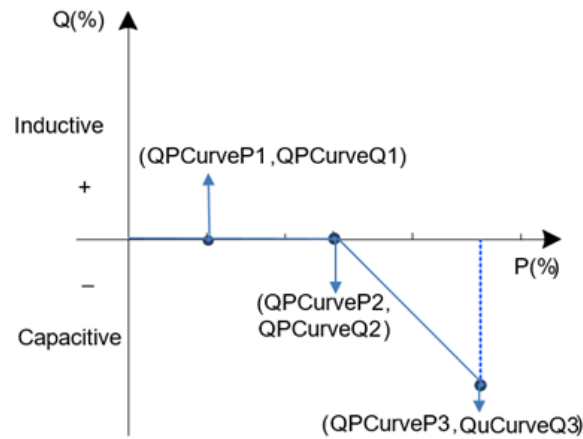


Figure 5-7 Q(P) Curve Mode

Table 5-3 Parameters of Reactive Power Control (IEEE-1547, Rule 21, ISO-NE)

Grid Reactive Power Derating					
Parameter Name	Description	Range	IEEE 1547	Rule 21	ISO-NE
Fixed Power Factor					
PFSetValue	Local power factor setting	{-1, 1}	{1}	{-0.95}	{1}
PF(P) Power Factor vs. Power					
PFpCurveP1 (%)	Power of PF(P) point 1	{0, 110%}	{50%}	{50%}	{50%}
PFpCurvePF1	PF of PF(P) point 1	{-1, 1}	{1}	{1}	{1}
PFpCurveP2 (%)	Power of PF(P) point 2	{0, 110%}	{100%}	{100%}	{100%}
PFpCurvePF2	PF of PF(P) point 2	{-1, 1}	{-0.9}	{-0.9}	{-0.9}
PFpCurveTriVolt	Trigger voltage of PF(P)	{100%, 110%}	{100%}	{100%}	{100%}
PFpCurveUndoVolt	Undo voltage of PF(P)	{90%, 100%}	{90%}	{90%}	{90%}

Q(U) Dynamic VAR Support					
QuCurveU1	Voltage of Q(U) point 1s	{100%, 110%}	{107.99%}	{107.99%}	{107.99%}
QuCurveQ1	Reactive power of Q(U) point 1s	{-66%, 66%}	{0%}	{0%}	{0%}
QuCurveU2	Voltage of Q(U) point 2s	{104%, 110%}	{108%}	{107%}	{107%}
QuCurveQ2	Reactive power of Q(U) point 2s	{-66%, 66%}	{-44%}	{-30%}	{-30%}
QuCurveU1i	Voltage of Q(U) point 1i	{90%, 110%}	{98.00%}	{96.70%}	{96.70%}
QuCurveQ1i	Reactive power of Q(U) point 1i	{-66%, 66%}	{0%}	{0%}	{0%}
QuCurveU2i	Voltage of Q(U) point 2i	{80%, 100%}	{92%}	{92%}	{92%}
QuCurveQ2i	Reactive power of Q(U) point 2i	{-66%, 66%}	{44%}	{30%}	{30%}
QuCurveTriPower	Trigger voltage of Q(U)	{5%, 100%}	{20%}	{20%}	{20%}
QuCurveUndoPower	The undo power of Q(U)	{5%, 100%}	{5%}	{5%}	{5%}
QuCurveVref	The rated reference voltage of Q(U) curve	{95%, 105%}	{100%}	{100%}	{100%}
QuCrvVrefAdjstT (s)	The rated reference voltage regulation time of Q(U) curve	{300, 5000}	{1000}	{1000}	{1000}
QuCrvOpenLoop (s)	Open loop response time of Q(U) curve	{1, 90}	{15}	{15}	{15}
Q_UCrvVrefAdjst	The rated reference voltage enable of Q(U) curve	{Disable, Enable}	Disable	Disable	Disable
Q(P) Dynamic VAR Support					
ActiveReacCurveP1	Active power of Q(P) Curve point 1	{0%, 70%}	{20%}	{0%}	{0%}
ActiveReacCurveQ1	Reactive power of Q(P) Curve point 1	{-66%, 66%}	{0%}	{0%}	{0%}
ActiveReacCurveP2	Active power of Q(P) Curve point 2	{40%, 90%}	{50%}	{50%}	{50%}
ActiveReacCurveQ2	Reactive power of Q(P) Curve point 2	{-66%, 66%}	{0%}	{0%}	{0%}
ActiveReacCurveP3	Active power of Q(P) Curve point 3	{50%, 100%}	{90%}	{100%}	{100%}
ActiveReacCurveQ3	Reactive power of Q(P) Curve point 3	{-66%, 66%}	{-44%}	{-44%}	{-44%}
QpCurveOpenLoopRespTime (s)	Response time of Q(P) Curve	{0, 10%}	{1%}	{1%}	{1%}

5.4.2.5 LVRT/HVRT

The **LVRT/HVRT** interface is used to set the LVRT and HVRT parameters (Table 5-6, REF 9 and 10).

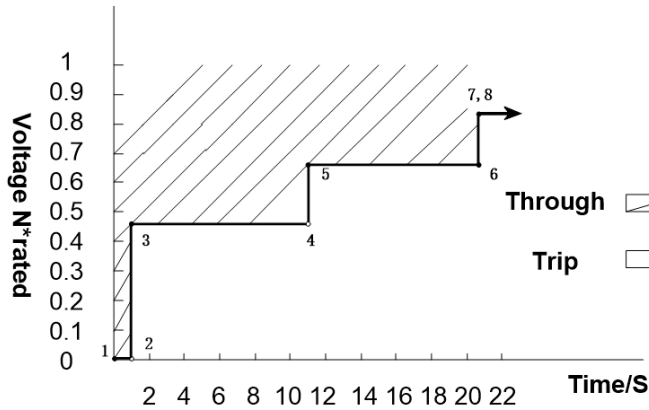
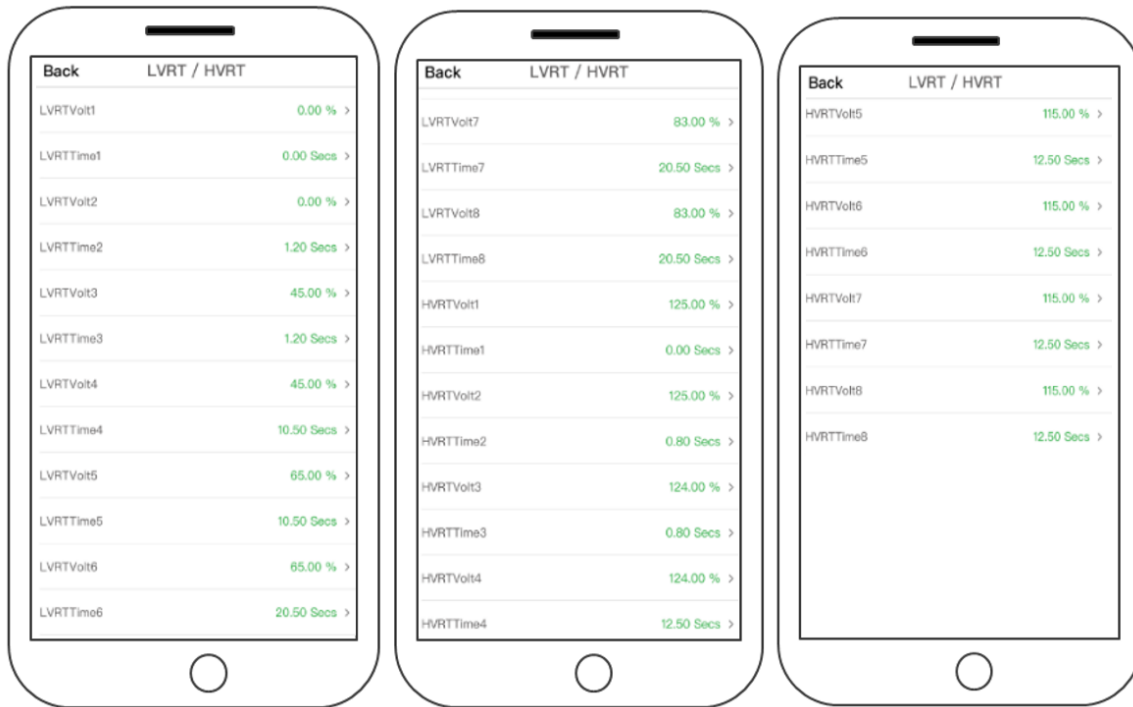


Figure 5-7 The LVRT Curve

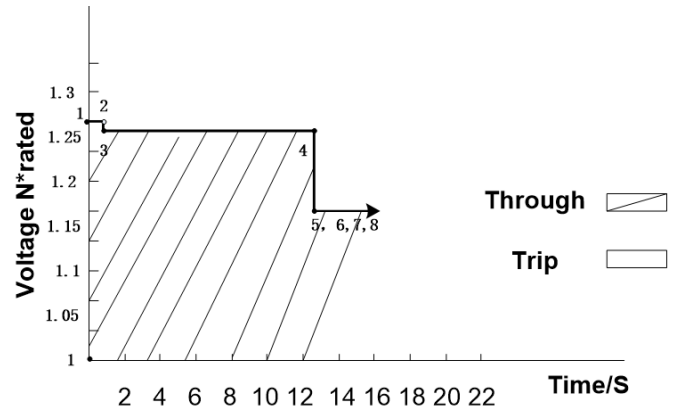


Figure 5-8 The HVRT Curve

Table 5-4 LVRT and HVRT Parameters

Parameter Name	Description	Range	IEEE 1547	Rule 21	ISO-NE
LVRT (Table 5-6, REF 9)					
LVRTVolt (1,2)	Threshold of LVRT (1 st or 2 nd point)	{0%, 100%} {0%, 100%}	{0%} {0%}	{0%} {0%}	{0%} {0%}
LVRTTime (1,2)	Time of LVRT (1 st or 2 nd point)	{0, 655} {0, 655}	{0} {1.0}	{0} {1.2}	{0} {0.16}
LVRTVolt (3,4)	Threshold of LVRT (3 rd or 4 th point)	{0%, 100%} {0%, 100%}	{50%} {50%}	{50%} {50%}	{30%} {45%}
LVRTTime (3,4)	Time of LVRT (3 rd or 4 th point)	{0, 655} {0, 655}	{1.0} {10.0}	{1.2} {10.5}	{0.16} {0.21}

LVRTVolt (5,6)	Threshold of LVRT (5 th or 6 th point)	{0%, 100%} {0%, 100%}	{70%} {70%}	{70%} {70%}	{45%} {65%}
LVRTTime(5,6)	Time of LVRT (5 th or 6 th point)	{0, 655} {0, 655}	{10.0} {20.0}	{10.5} {20.5}	{0.37} {0.37}
LVRTVolt (7,8)	Threshold of LVRT (7 th or 8 th point)	{0%, 100%} {0%, 100%}	{88%} {88%}	{88%} {88%}	{65%} {88%}
LVRTTime (7,8)	Time of LVRT (7 th or 8 th point)	{0, 655} {0, 655}	{20.0} {20.0}	{20.5} {20.5}	{3.05} {3.25}
HVRT (Table 5-6, REF 10)					
HVRTVolt (1,2)	Threshold of HVRT (1 st or 2 nd point)	{100%, 135%} {100%, 135%}	{125%} {125%}	{125%} {125%}	{120%} {120%}
HVRTTime (1,2)	Time of HVRT (1 st or 2 nd point)	{0, 655} {0, 655}	{0} {0.16}	{0} {0.11}	{0} {0.16}
HVRTVolt (3,4)	Threshold of HVRT (3 rd or 4 th point)	{100%, 135%} {100%, 135%}	{120%} {120%}	{120%} {120%}	{120%} {117.5%}
HVRTTime (3,4)	Time of HVRT (3 rd or 4 th point)	{0, 655} {0, 655}	{0.16} {12.0}	{0.11} {12.5}	{0.25} {0.25}
HVRTVolt (5,6)	Threshold of HVRT (5 th or 6 th point)	{100%, 135%} {100%, 135%}	{110%} {110%}	{110%} {110%}	{117.5%} {115%}
HVRTTime (5,6)	Time of HVRT (5 th or 6 th point)	{0, 655} {0, 655}	{12.0} {12.0}	{12.5} {12.5}	{0.55} {0.55}
HVRTVolt (7,8)	Threshold of HVRT (7 th or 8 th point)	{100%, 135%} {100%, 135%}	{110%} {110%}	{110%} {110%}	{115%} {110%}
HVRTTime (7,8)	Time of HVRT (7 th or 8 th point)	{0, 655} {0, 655}	{12.0} {12.5}	{12.5} {12.5}	{1.05} {1.05}

5.4.2.6 Others

The REF column in Table 5-5 below corresponds to the REF column in Table 5-6.

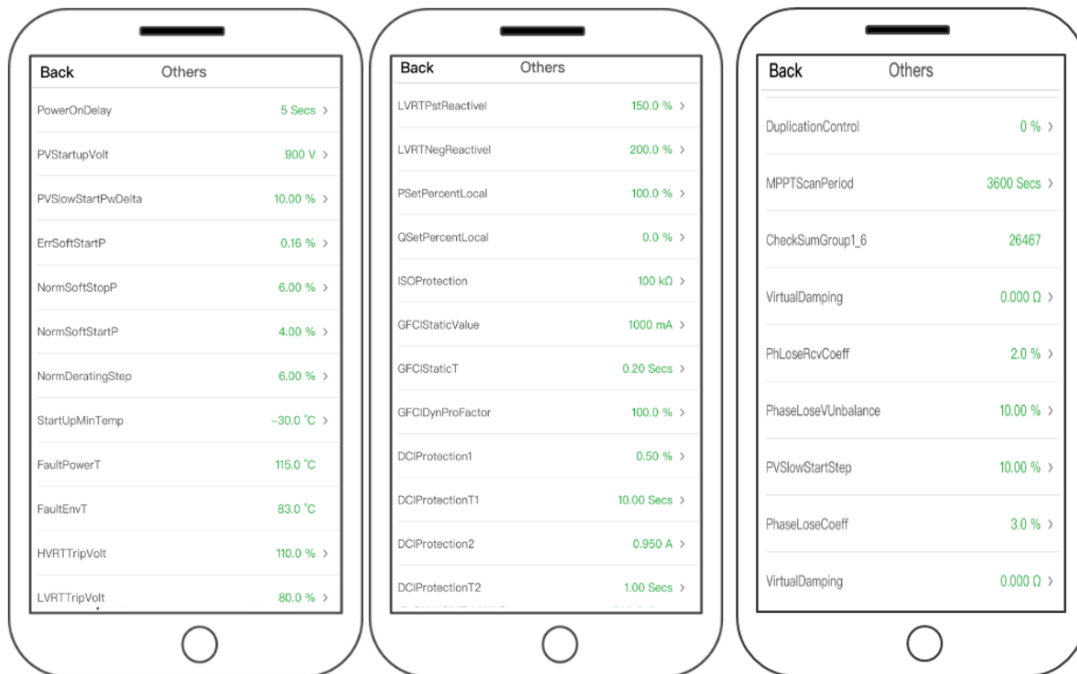


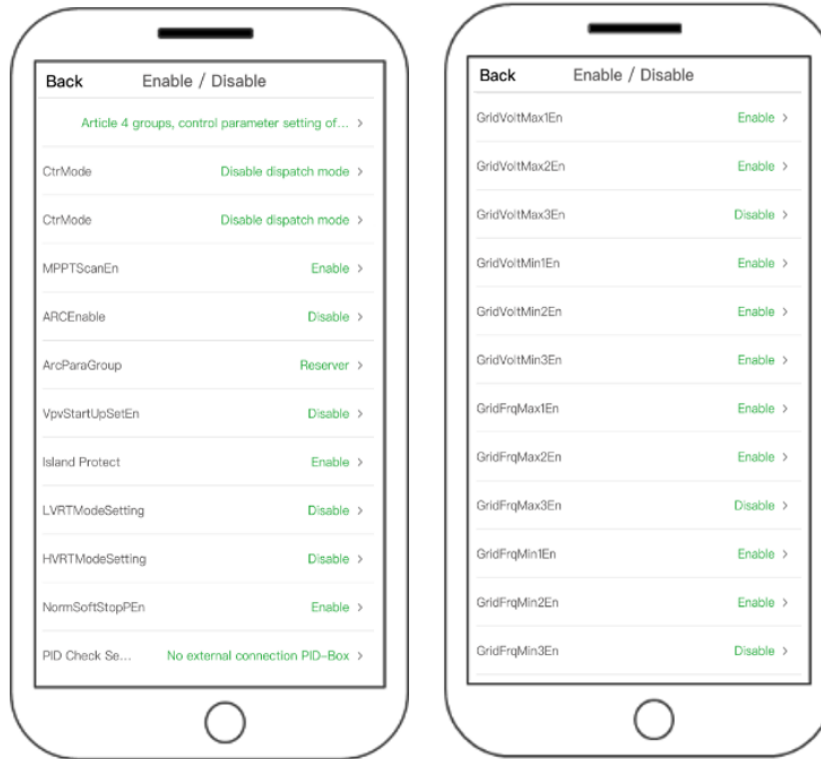
Table 5-5 Other Parameters

Parameter Name	REF	Description	Range	IEEE 1547	Rule 21	ISO-NE
PowerOnDelay (s)	N/A	Startup delay time	{0, 1200}	{300}	{5}	{5}
PVStartupVolt (V)	7	PV startup voltage	{860, 950}	{900}	{900}	{900}
PVSlowStartPwDelta	35	Increasing irradiation power ramp rate	{0.01%, 10%}	{5.00%}	{5.00%}	{5.00%}
ErrSoftStartT (s)	N/A	Power time after fault	{1, 1000}	{625}	{50}	{50}
NomSoftStopT (s)	11	Normal soft stop power time	{1, 1000}	{1}	{50}	{17}
NomSoftStartT (s)	N/A	Normal soft start power time	{1, 1000}	{300}	{50}	{50}
NomDeratingStep	N/A	Normal power derating step	{0.01%, 100%}	{6.00%}	{100.00%}	{6.00%}
StartUpMinTemp (°C)	N/A	Minimum startup temperature	{-35, -20}	{-30}	{-30}	{-30}
FaultPowerT (°C)	N/A	IGBT fault temperature	{80, 98}	{94}	{94}	{94}
FaultEnvT (°C)	N/A	Enclosure fault temperature	{78.5}	{78.5}	{78.5}	{78.5}
HVRTTripVol	10	HVRT trigger voltage	{100%, 135%}	{110%}	{110%}	{110%}
LVRTTripVol	9	LVRT trigger voltage	{70%, 100%}	{80%}	{88%}	{88%}
LV RTPstReactiveI	9	LVRT positive current coefficient	{0%, 300%}	{150%}	{150%}	{150%}
LVRTNegReactiveI	9	LVRT negative current coefficient	{0%, 300%}	{200%}	{20%}	{200%}
PSetPercentLocal	3	Active power derate	{0%, 110%}	{100%}	{100%}	{100%}
QSetPercentLocal	2	Reactive power derate	{-66%, 66%}	{0%}	{0%}	{0%}
ISOProtection (kΩ)	36	Minimum insulation resistance	{1k, 2000}	{100}	{100}	{100}
GFCIStaticValue (mA)	27	Static threshold leakage current	{100, 1000}	{1000}	{1000}	{1000}
GFCIStaticT (s)	27	Static threshold leakage time	{0, 655}	{0.2}	{0.2}	{0.2}
GFCIDynProFactor	28	Threshold dynamic coefficient leakage current	{0.0%, 200%}	{100%}	{100%}	{100%}
DCIProtection1	30	Maximum DCI value 1	{0.1%, 5.00%}	{0.50%}	{0.50%}	{0.50%}
DCIProtectionT1 (s)	30	Trip time 1 of DCI value	{0.00, 120.00}	{60.00}	{60.00}	{60.00}
DCIProtection2 (A)	31	Maximum DCI value 2	{0.005, 5}	{0.950}	{0.950}	{0.950}
DCIProtectionT2 (s)	31	Trip time 2 of DCI value	{0.00, 120.00}	{1.00}	{1.00}	{1.00}
DuplicationControl	N/A	Current replication THDi	{0%, 100%}	{0%}	{0%}	{0%}
MPPTScanPerid (s)	4	MPPT scan cycle	{300, 5400}	{3600}	{3600}	{3600}
ChecksumGroup1_6	N/A					
PhLoseRcvCoeff	42	Phase loss recover coefficient	{0.5%, 30.0%}	{2.0%}	{2.0%}	{2.0%}
PhaseLoseVUnbalance	42	Phase loss fault volt balance	{0.01%, 10%}	{10%}	{10%}	{10%}
PVSlowStartStep	42	PV slow start step	{0.01%, 100%}	{10%}	{10%}	{10%}
PhaseLoseCoeff	42	Phase loss fault coefficient	{0.5%, 30.0%}	{3.0%}	{3.0%}	{3.0%}
VirtualDamping (Ω)	N/A	Virtual resistance	{0.00, 5.00}	{0}	{0}	{0}

ModTempMutProtVal (°C)	N/A	Module temperature mutation protection	{5.0, 10.0}	{6.0}	{6.0}	{6.0}
BootPwrAdjustVal	N/A	Boot power adjustment factor	{5, 60}	{40}	{40}	{40}

5.4.2.7 **Enable/Disable**

The **Enable/Disable** interface is used to enable or disable the functions and protection parameters as follows:



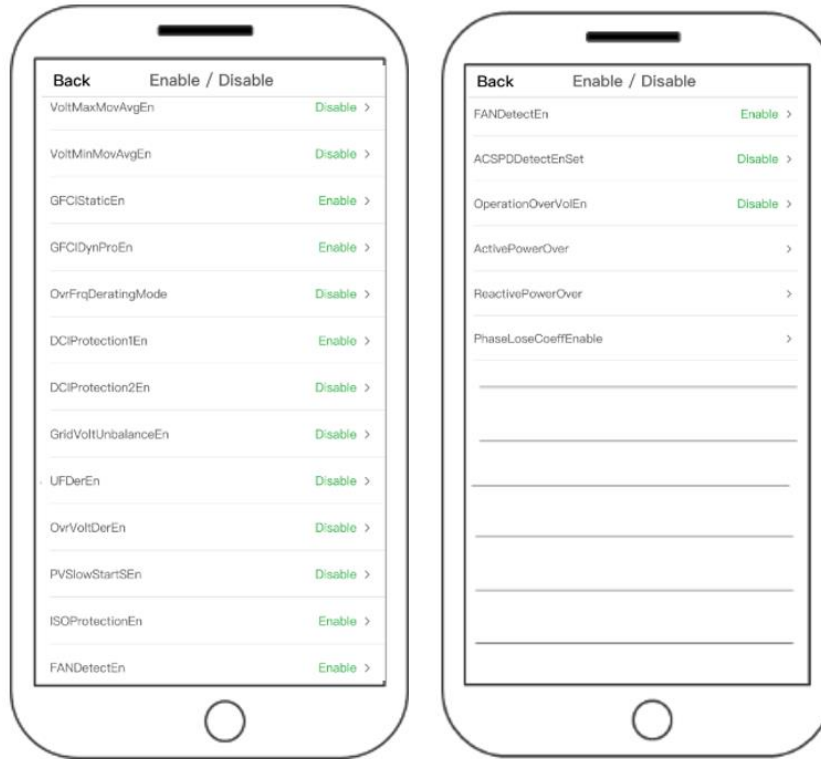


Table 5-6 Enable/Disable Parameters (IEEE 1547, Rule 21, and ISO-NE)

REF	Parameter Name	Description	Range	IEEE 1547	Rule 21	ISO-NE
1	CtrlParaGroup	Control loop parameters	{0, 1, 2, 3, 4}	{4}	{4}	{4}
2	CtrlModeReactivePw	Reactive power control mode	Disable dispatch Remote dispatch Local Q Local PF PF(P) Q(U)	{Local PF}	{Q(U)}	{Disable dispatch}
3	CtrlModeActivePw	Active power control mode	Disable dispatch Remote dispatch Local control	{Disable dispatch}	{Disable dispatch}	{Disable dispatch}
4	MPPTScanEn	MPPT scan control	{Disable, Enable}	{Disable}	{Disable}	{Disable}
5	ARCEnable	AFCI not available	{Disable, Enable}	{Disable}	{Disable}	{Disable}
6	ARCParaGroup	AFCI not available	Reserved	Reserved	Reserved	Reserved
7	VpvStartUpSetEn	PV voltage minimum	{Disable, Enable}	{Disable}	{Disable}	{Disable}
8	Island Protect	Anti-island	{Disable, Enable}	{Enable}	{Enable}	{Enable}

REF	Parameter Name	Description	Range	IEEE 1547	Rule 21	ISO-NE
9	LVRTModeSetting	LVRT mode setting	Disable Enable no Q Enable with Q	{Enable with Q}	{Enable with Q}	{Disable}
10	HVRTModeSetting	HVRT mode setting	Disable Enable no Q Enable with Q	{Enable no Q}	{Enable no Q}	{Disable}
11	NormSoftStopPEn	Soft STOP ramp function	{Disable, Enable}	{Enable}	{Enable}	{Enable}
12	PIDCheckEn	PID check setting	{Disable, Enable}	{Disable}	{Disable}	{Disable}
13	GridVolMax1En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
14	GridVolMax2En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
15	GridVolMax3En	Grid protection	{Disable, Enable}	{Disable}	{Disable}	{Disable}
16	GridVolMin1En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
17	GridVolMin2En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
18	GridVolMin3En	Grid protection	{Disable, Enable}	{Disable}	{Disable}	{Disable}
19	GridFrqMax1En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
20	GridFrqMax2En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
21	GridFrqMax3En	Grid protection	{Disable, Enable}	{Disable}	{Disable}	{Disable}
22	GridFrqMin1En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
23	GridFrqMin2En	Grid protection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
24	GridFrqMin3En	Grid protection	{Disable, Enable}	{Disable}	{Disable}	{Disable}
25	VoltMaxMovAvgEn	Moving average function	{Disable, Enable}	{Disable}	{Disable}	{Disable}
26	VoltMinMovAvgEn	Moving average function	{Disable, Enable}	{Disable}	{Disable}	{Disable}
27	GFCIStaticEn	Static GFCI detection	{Disable, Enable}	{Enable}	{Enable}	{Enable}
28	GFCIDynProEn	Dynamic GFCI detection	{Disable, Enable}	{Enable}	{Disable}	{Disable}
29	OvrFrqDeratingMode	Over frequency derating	{Disable, Enable}	{Disable}	{Enable}	{Disable}
30	DCIProtection1En	DC current injection 1	{Disable, Enable}	{Enable}	{Enable}	{Enable}
31	DCIProtection2En	DC current injection 2	{Disable, Enable}	{Disable}	{Disable}	{Disable}
32	GridVoltUnbalanceEn	Grid voltage imbalance	{Disable, Enable}	{Enable}	{Enable}	{Enable}

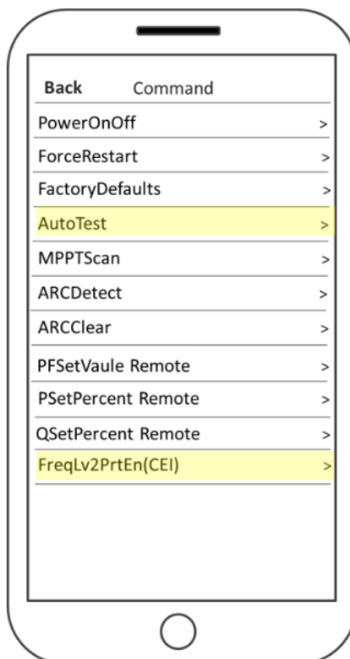
REF	Parameter Name	Description	Range	IEEE 1547	Rule 21	ISO-NE
33	OvrVoltDerEn	Over voltage derating	{Disable, Enable}	{Enable}	{Enable}	{Disable}
34	PVSlowStartSEn	Slow start function after power mutation	{Disable, Enable}	{Disable}	{Enable}	{Enable}
35	ISOProtectionEn	Insulation resistance	{Disable, Enable}	{Enable}	{Enable}	{Enable}
36	FANDetectEn	Fans detect function	{Disable, Enable}	{Enable}	{Enable}	{Enable}
37	ACSPDDetectEnSet	AC surge protection device test function	{Disable, Enable}	{Disable}	{Disable}	{Disable}
38	OperationOverVolEn	Over voltage detection	{Disable, Enable}	{Enable}	{Disable}	{Disable}
39	ActivePowerOver	Active power over matching	{Disable, Enable}	{Disable}	{Disable}	{Disable}
40	ReactivePowerOver	kVA overhead	{Disable, Enable}	{Disable}	{Disable}	{Disable}
41	PhaseLoseCoeffEnable	Loss of single-phase detection with voltage regeneration	Disable Enable before connect Always enable Enhanced	{Disable}	{Disable}	{Disable}
42	PWMModeSelect	PWM mode selection	SVPWM DPWM	{SVPWM}	{SVPWM}	{SVPWM}
43	MPPTModeSelect	MPPT mode selection	Curve Mode Fixed-point Mode	{Curve Mode}	{Curve Mode}	{Curve Mode}

5.4.2.8 Commands

In the **Command** section, you can access the following submenus:

- **Power On/Off:** Manual Turn ON/OFF is required after regulation setting or manual (fault) shutdown.
- **Force Restart:** If there is a fault shutdown, a severe fault may have occurred inside the inverter. The user can perform a force reboot in this menu if the inverter needs to be restarted.
- **Factory Reset:** The manufacturer's parameter default values can be restored when the inverter is not in operation mode. Otherwise, "Fault Operated" will be reported.
- **Auto Test:** for Italian grid standard only.
- **MPPTScan:** Used to manually execute MPPT scanning. The device screen will skip to the normal operation interface if the scanning fails.
 - The MPPT scan function is used for multi-MPP tracking and is useful if the PV panels are partly shadowed or installed at different angles.
 - The factory default setting of MPPTScan is **Enabled**, but it can also be set to **Disabled**.
 - When the MPPTScan function is enabled, the scan period is 60 minutes. The inverter will scan the maximum power point in the MPPT range if the total input is lower than 90% of the active power.

- After the MPPTScan function is activated on the device, it will search the maximum power point at a voltage step of 5 V in the MPPT range for the full load and retrieve the maximum power point.
- **PFSsetValue Remote:** Used to remotely set PF value.
- **PSetPercent Remote:** Used to remotely set active power percent.
- **QSetPercent Remote:** Used to remotely set reactive power percent.
- **CEI:** for Italian grid standard only.



AutoTest: only for Italian grid standard.

CEI: only for Italian grid standard.

5.4.3 Fault Recording

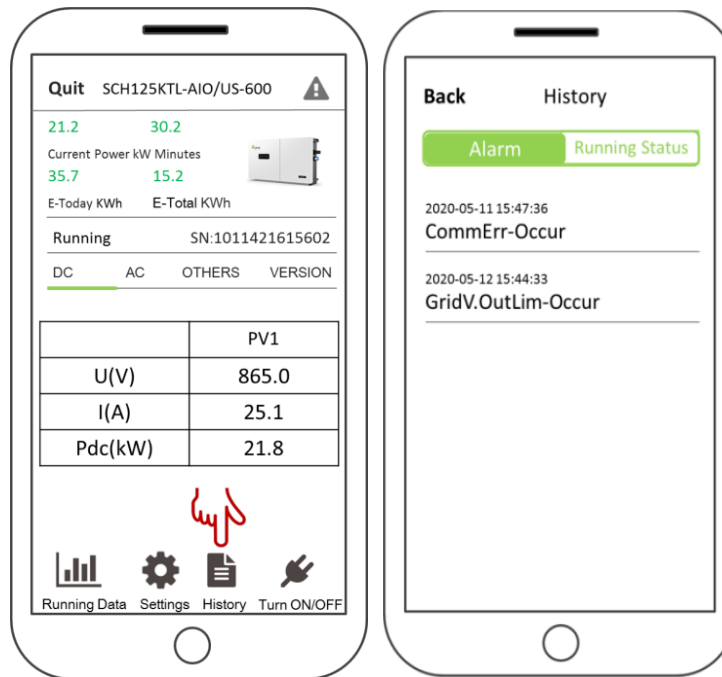
Up to 128 fault records can be stored in the **Fault Record** menu.

5.4.4 Firmware Upgrade

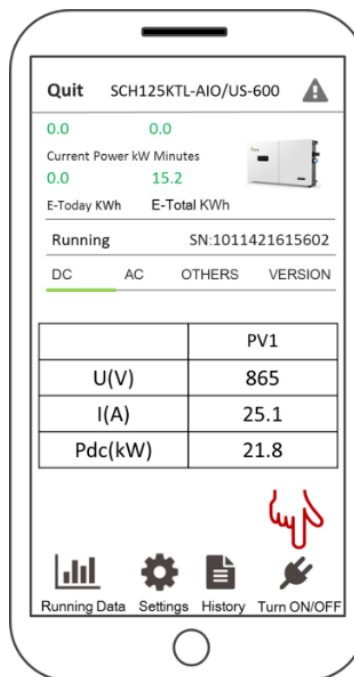
If the inverter firmware version needs to be updated, please contact the CPS Service Hotline at +1 (855) 584-7168, Ext. 1.

5.5 History

There are two submenus in the **History** menu, **Alarm** and **Running Status**:



5.6 Turn ON/OFF



- **Manual Turn ON/OFF:** Required after regulation setting or manual (fault) shutdown.
 - To manually turn on the inverter:

1. Tap the **TURN ON/OFF** icon at the bottom of the screen.
2. Select **Turn ON** to start the inverter.
 - a. If the startup condition is met, the inverter will turn on and operate normally.
 - b. Otherwise, the inverter will go into standby mode.
- It is not normally necessary to manually turn off the inverter, but it can be shut down manually if regulation setting or maintenance is required. To manually turn off the inverter:
 1. Tap the **TURN ON/OFF** icon at the bottom of the screen.
 2. Select **Turn OFF** to shut down the inverter.

- **Automatic Turn ON/OFF:**

- The inverter will start up automatically when the output voltage and power of the PV arrays meet the set value, the AC power grid is normal, and the ambient temperature is within the allowable operating range.
- The inverter will shut down automatically when the output voltage and power of the PV modules are lower than the set value, the AC power grid fails, or the ambient temperature exceeds the normal range.

6 Fault Shutdown and Troubleshooting

6.1 LED Fault and Troubleshooting

The inverters have four LED lights on the front of the units. Table 6-1 describes the lights during operation.

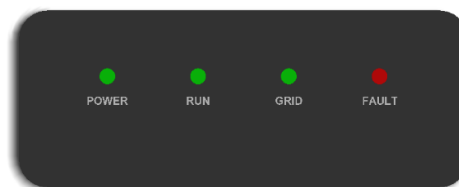


Table 6-1 Description of LED Light Indicators

LED Light	Name	Status	Indication
POWER	Working power light	Light on	PV energized (control panel starts to work) and no AC power
		Flashing	No PV power and AC power on
		Light off	No power working
RUN	Grid-tied operation indication light	Light on	In grid-tied power generation state
		Flashing	Derated running status (light on for 0.5 seconds, light off for 1.5 seconds)
		Light off	In other operation status OR power supply not working
GRID		Light on	Grid is normal

	Grid status indication light	Flashing	Grid fault (light on for 0.5 seconds, light off for 1.5 seconds)
		Light off	Power supply not working
FAULT	Fault status indication light	Light on	Indicates a fault
		Slow flash	Indicates an alarm (light on for 0.5 seconds, light off for 2 seconds)
		Fast flash	Protective action (light on for 0.5 seconds, light off for 0.5 seconds)
		Light off	No fault OR power supply not working
ALL	Upgrade status	Flashing	LCD or DSP upgrading

Table 6-2 Troubleshooting LED Lights

LED Fault Status	Solutions
The POWER LED does not light up.	1. Turn OFF the external AC breaker. 2. Turn OFF the DC switch. 3. Check the PV input voltage and polarity.
The GRID LED is blinking.	1. Turn OFF the external AC breaker. 2. Turn OFF the DC switch. 3. Determine whether the grid voltage is normal and whether the cable connection of the AC side is correct and secure.
The RUN LED light is off OR the FAULT LED light is on.	See Table 6-3 for troubleshooting.

6.2 Fault and Troubleshooting

The inverter will be shut down automatically if the PV power generation system fails (such as an output short circuit, grid over / under voltage, grid over / under frequency, high environmental temperature, or internal malfunction of the machine). The fault information will be displayed on the app interface; please see Section 5.4.3 Fault Recording for details.

The causes of a fault can be identified based on the faults listed in Table 6-3 through Table 6-6. Proper analysis is recommended before contacting CPS Customer Service.

Table 6-3 Troubleshooting Alarm Codes

ALARM CODES	
CommErr	Definition: Communication inside the inverter failed.
	Possible cause: Terminal block connectors of the internal communication wires have poor contact.
	Recommended solution: 1. Observe for five minutes to determine if the alarm will be eliminated automatically. 2. Turn OFF the 3-phase working power supply and reboot the system. 3. Contact CPS customer service.
ExtFanErr	Definition: Cooling fan failure by visual check.
	Possible causes: • Fan is blocked. • Fan service life has expired. • Fan socket connector has poor contact.

	Recommended solution: 1. Observe for five minutes to determine if the alarm will be eliminated automatically. 2. Check for foreign objects on the fan blades. 3. Turn OFF the 3-phase power supply and reboot the system. 4. Contact CPS customer service.
IntFanErr	Recommended solution: 1. Observe for five minutes to determine if the alarm will be eliminated automatically. 2. Check for foreign objects on the fan blades. 3. Turn OFF the 3-phase power supply and reboot the system. 4. Contact CPS customer service.

Table 6-4 Troubleshooting Warning Codes

WARNING CODES	
Warn0030 (EepromErr)	Definition: internal alarm. Recommended solution: 1. Observe for five minutes to determine if the alarm will be eliminated automatically. 2. Contact CPS customer service.
Warn0040 (DC SPD fault)	Recommended solution: The alarm is reserved now; alarms in field can be ignored.
Warn0050 (TempSensorErr)	Recommended solution: 1. Observe the temperature display. 2. Turn OFF the 3-phase power supply and reboot the system. 3. Contact CPS customer service.
Warn0100 (AC SPD fault)	Recommended solution: The alarm is reserved now; alarms in field can be ignored.

Table 6-5 Troubleshooting Protection Codes

PROTECTION CODES	
Code	Recommended Solution
Protect0090 (bus over voltage)	1. Restart the inverter by power cycling both AC and DC switches. 2. Wait for one minute between OFF and ON for all energy to discharge. 3. If the inverter cannot clear the fault, replace the inverter.
Protect0030 (inverter over current)	
Protect0020 (grid relay error)	
Protect0150 (mini MCU fault)	
Protect0110 (bus over voltage (FW))	
Protect0100 (sensor fault of leakage current)	

PROTECTION CODES	
Code	Recommended Solution
Protect0230 (inverter open-loop self-test fault)	
Protect0070 (bus imbalance)	1. Raise the limit of DCImax (e.g., 400 mA) to allow the inverter more room to adjust in transient condition to cope with imbalance impedance and voltage between grid phases. 2. If the alarm still occurs after the adjustment, replace the inverter.
Protect 0170 (DCI high)	
GridV.OutLim	1. Ensure the grid connection is good. 2. Restart the inverter again.
GridF.OutLim	1. Check the AC wires' connection. 2. Check if the AC frequency is in range. 3. Check the measurement value in LCD; if the grid frequency is in limit, restart the inverter.
TempOver (over-temperature protection)	1. Confirm that the external ambient temperature is within the specified operating range. 2. Check if the air inlet is blocked. 3. Check if the fan is blocked. 4. Check if the location of installation is appropriate. 5. Observe for 30 minutes to see whether the alarm will be eliminated automatically. 6. Contact CPS customer service.
Protect0180 (sampling offset of DCI)	1. If the inverter can start up, recalibrate. 2. If the inverter consistently reports this alarm and cannot start up, replace the inverter.
IsolationErr (insulation resistance low)	1. Turn OFF the AC switch to disconnect the inverter from the grid. 2. Open the fuse drawers to de-couple the PV strings from each other. 3. Test strings with a string test set. 4. If there is no alarm, turn OFF the AC switches to disconnect from the grid and add in the next string, then start up the inverter again. 5. Continue until you can locate the string that triggers the alarm. 6. Trace the wirings of the faulted string to find any leakage to earth ground.
GFCIErr (leakage current high)	Check the wires of the PV and ground: 1. Turn OFF the AC switch to disconnect the inverter from the grid. 2. Open the fuse drawers to de-couple the PV strings from each other. 3. Test strings with a string test set. 4. If there is no alarm, turn OFF the AC switches to disconnect from the grid and add in the next string, then start up the inverter again. 5. Continue until you can locate the string that triggers the alarm. 6. Trace the wirings of the faulted string to find any leakage to earth ground.

PROTECTION CODES	
Code	Recommended Solution
PV Reverse (PV input reverse connection)	1. Turn the DC switch OFF. 2. Open the fuse holder to isolate the PV strings. 3. Use a meter to locate which PV string is connected in reverse polarity. 4. Correct the PV string connection.
PV Over current (PV over current)	1. Check PV input current. 2. Restart the inverter by power cycling both AC and DC switches. 3. Wait for one minute between OFF and ON for all energy to discharge. 4. If the inverter cannot clear the fault, replace the inverter.
PVVoltOver	1. Measure the voltage at the DC terminals in the wire box and compare with the reading in the Measurement menu. 2. PV voltage must be less than 1500 V in open circuit condition: a. If the display reading is <u>not</u> within 2% of the meter reading, replace the inverter. b. If the display reading is within 2% of the meter reading, adjust the number of panels in the string.

Table 6-6 Troubleshooting Fault Codes

FAULT CODES	
Code	Recommended Solution
Fault0130 (bus over total voltage)	1. Restart the inverter by power cycling both AC and DC switches. 2. Wait for one minute between OFF and ON for all energy to discharge. 3. If the inverter cannot clear the fault, replace the inverter.
Fault0100 (grid relay fault)	
Fault0080 (bus hardware over current fault)	
Fault0060 (CPLD fault)	
Fault0020 (bus over volt hardware)	
Fault0150 (open-loop self-check failure)	

FAULT CODES	
Code	Recommended Solution
Fault0110 (bus imbalance)	1. Raise the limit of DCI_{max} (e.g., 400 mA) to allow the inverter more room to adjust in transient condition to cope with imbalance impedance and voltage between grid phases. 2. If the alarm still occurs after the adjustment, replace the inverter.
Fault0090 (dynamic leakage current high)	Check the wires of the PV and ground: 1. Turn OFF the AC switch to disconnect the inverter from the grid. 2. Open the fuse drawers to de-couple the PV strings from each other. 3. Test strings with a string test set. 4. If there is no alarm, turn OFF the AC switches to disconnect from the grid and add in the next string, then start up the inverter again. 5. Continue until you can locate the string that triggers the alarm. 6. Trace the wirings of the faulted string to find any leakage to earth ground.

DANGER:



Disconnect the inverter from the AC grid and PV modules and ensure that hazardous high voltage and energy inside the equipment has been discharged *before* opening the equipment. Do not operate or maintain the inverter until at least five minutes after disconnecting all sources of DC and AC.

7 Product Maintenance

7.1 General Maintenance

DANGER:



Before starting any product maintenance, check that the inverter is not running, the inverter is disconnected from the AC grid, and the inverter is disconnected from the PV modules. Ensure that hazardous high voltage and energy inside the equipment has been discharged.

Do not operate or maintain the inverter until at least five (5) minutes after disconnecting all sources from DC and AC sides.

Servicing of the inverter should be performed **ONLY** by qualified personnel.

7.1.1 Check Electrical Connections

- ✓ Check all cable connections as a regular maintenance inspection every six months or once per year.
- ✓ Check the cable connections and tighten if necessary per Section 3.3 Electrical Installation.
- ✓ Check for cable damage, especially whether the cable surface is scratched or smooth, and repair or replace cables if necessary.

7.1.2 Clean the Air Vent Filter

The inverter can become hot during normal operation. CPS SCH100/125KTL-DO/US-600 and SCH 100KTL-DO/US-480 inverters use built-in cooling fans to provide sufficient air flow to help in heat dissipation. Check the air vent regularly to ensure it is not blocked; clean the vent with a soft brush or vacuum cleaner if necessary.

7.1.3 Replace the Cooling Fans

If the internal temperature of the inverter is too high or the inverter is making an abnormal noise, check if the air vent is blocked or dirty. If the air vent is clean and not blocked, it may be necessary to replace the external fans; see Figure 7-1 for replacing the cooling fans.

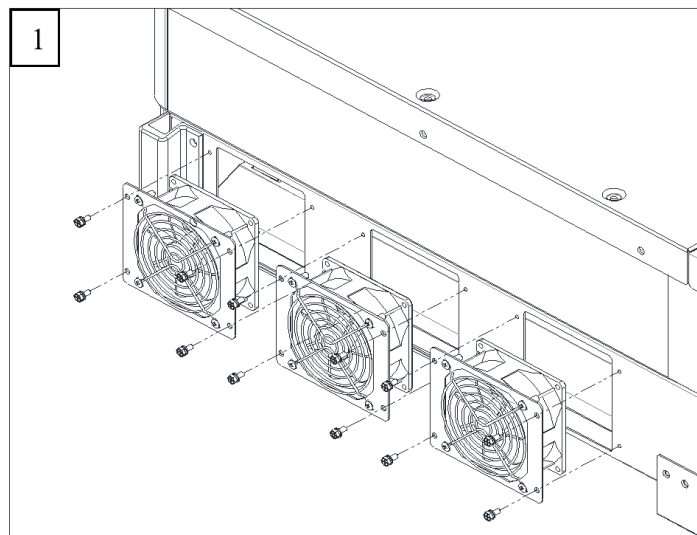


DANGER:

Disconnect the AC and DC power *before* replacing the fans.

To replace the cooling fans:

1. Use a no. 2 Phillips head screwdriver to remove the 12 screws on the fan tray (Figure 7-1.1).
2. Disconnect the waterproof cable connector from the cooling fan (Figure 7-1.2).
3. Use a no. 2 Phillips head screwdriver to remove the fan screws (Figure 7-1.3).
4. Attach the new cooling fans onto the fan tray.
5. Fasten the cable on the fan tray with cable ties and torque to 14.2 in-lbs (1.6 N·m).
6. Install the assembled fans back into the inverter and torque to 14.2 in-lbs (1.6 N·m).



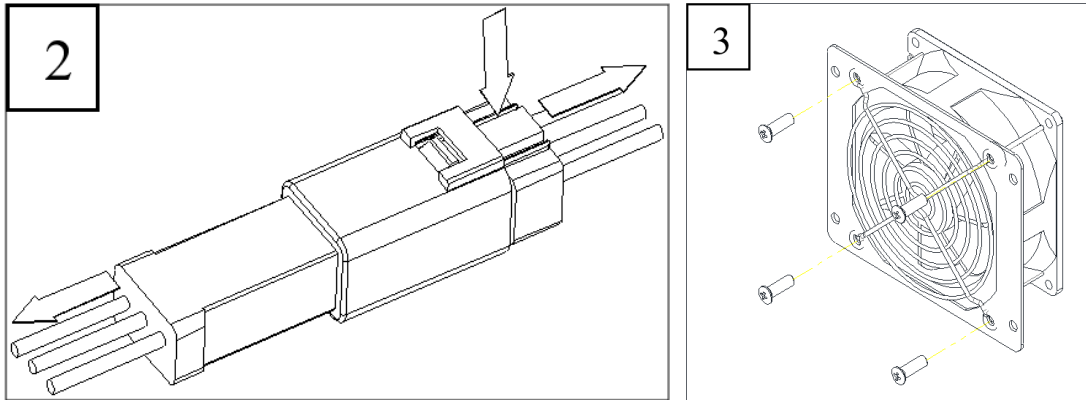


Figure 7-1 Replace Cooling Fans

7.2 Replace the Inverter

Confirm the following before replacing the inverter:

1. The AC breaker of the inverter is turned OFF.
2. The DC switch of the inverter is turned OFF.

To replace the inverter:

1. Unlock the padlock (if present).

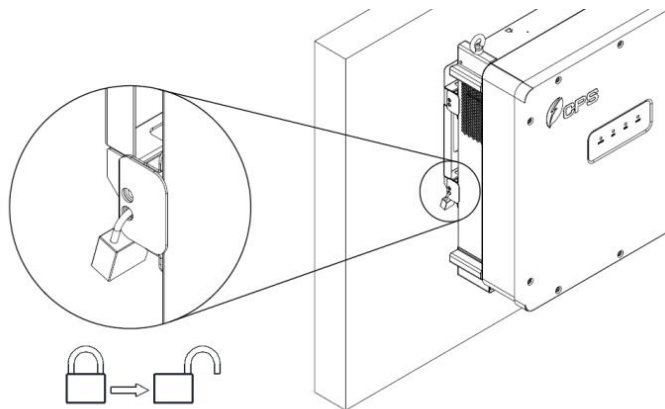


Figure 7-2 Unlock the Padlock

2. Use a no. 3 Phillips head screwdriver to unscrew the two screws on top of both the wire box and the inverter, then remove the connector covers.

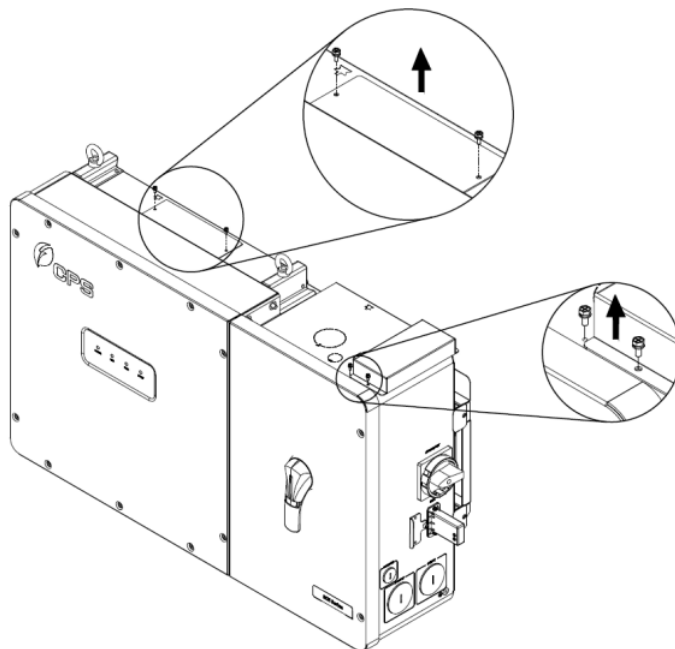


Figure 7-3 Remove the Screws on Both Sides

3. Use a 0.51 in (13 mm) hex head wrench to remove the four screws between the main inverter enclosure and the wire box.
4. Slide the wire box right to disconnect the inverter from the wire box.

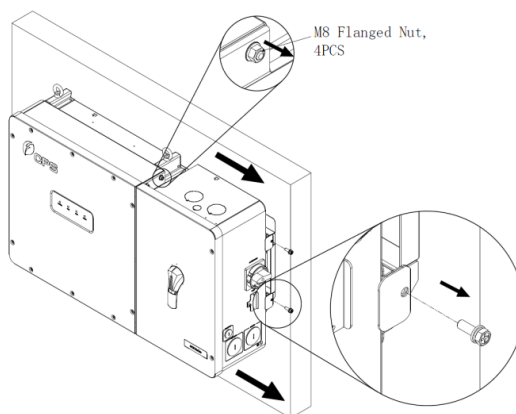


Figure 7-4 Disconnect the Main Housing from the Wire Box

5. Remove the screws connecting the inverter enclosure and installation rail, then slide the inverter enclosure left on the rail to remove it.

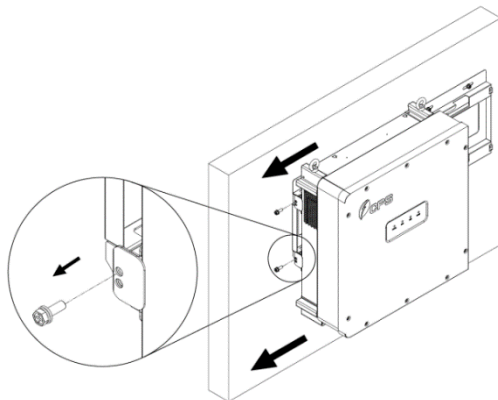


Figure 7-5 Remove the Two Screws Between the Main Housing and the Rail

6. Use a no. 2 Phillips head screwdriver to reinstall the connector covers on the connector of the wire box and inverter, then torque to 14.2 in-lbs (1.6 N·m).

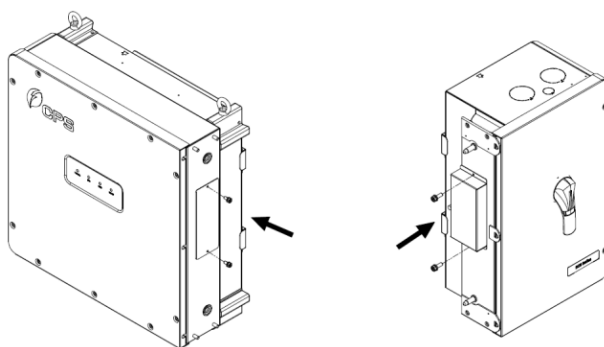


Figure 7-6 Install the Cover on the Connector of the Wire Box

8 Technical Data

8.1 Datasheet

For reference **ONLY** – refer to the datasheet on our website for the latest information.

	SCH100KTL-DO/US-600	SCH125KTL-DO/US-600	SCH100KTL-DO/US-480
DC Input – Ungrounded Array			
Max. PV Power	187.5 kW		
Max. DC Input Voltage	1500 V _{DC}		
Operating DC Input Voltage	860-1450 V _{DC}		750-1450 V _{DC}
MPPT Voltage Range	870-1300 V _{DC}		760-1300 V _{DC}
Startup DC Input Voltage	900 V		
Number of DC Inputs	Distributed Wire Box: 20 PV source circuits, positive and negative fused Centralized Wire Box: 1 PV output circuit, 1-2 terminations per pole, non-fused		

Max. PV Input Current (Isc × 1.25)	275 A		
DC Disconnection Type	Load-rated DC switch		
AC Output			
Rated AC Output Power ¹	100 kW	125 kW	100 kW
Max. AC Apparent Power (selectable)	100 kVA (111 kVA @ PF >0.9)	125 kVA (132 kVA @ PF >0.95)	100 kVA (105.3 kVA @ PF >0.95)
Rated Output Voltage	600 Vac		480 Vac
Output Voltage Range ²	528-660 Vac		423-528 Vac
Grid Connection Type ³	3Φ / PE / N (neutral optional)		
Max. AC Output Current	96.3 / 106.8 A @ 600 V	120.3 / 127.0 A @ 600 V	120.3 / 126.7 A @ 480 V
Rated Output Frequency	60 Hz		
Output Frequency Range ²	57-63 Hz		
Power Factor	>0.99 (±0.8 adjustable)		
Current THD	< 3%		
AC Disconnection Type	Load-rated AC switch		
System and Performance			
Topology	Transformerless		
Max. Efficiency	99.1%		98.9%
CEC Efficiency	98.5%		98.0%
Standby / Night Consumption	< 4 W		

	SCH100KTL-DO/US-600	SCH125KTL-DO/US-600	SCH100KTL-DO/US-480
Environment			
Enclosure Protection Degree	NEMA Type 4X		
Cooling Method	Variable speed cooling fans		
Operation Temperature Range	-22°F to 140°F / -30°C to 60°C (derating from 113°F / 45°C)		
Storage Temperature Range	-40°F to 148°F / -40°C to 70°C maximum		
Operating Humidity	0-95%, non-condensing		
Operating Altitude	8202 ft / 2500 m		
Display and Communication			
User Interface and Display	LED indicators, CPS Connect Pro app		
Inverter Monitoring	Modbus RS485 / PLC option		
Site Level Monitoring	CPS Flex Gateway (one per 32 inverters)		
Modbus Data Mapping	SunSpec / CPS		

Remote Diagnostics / Firmware Upgrade Functions	Standard with CPS Flex Gateway
Mechanical Data	
Dimensions (W × H × D)	Distributed Wire Box: 45.28 × 24.25 × 9.84 in (1150 × 616 × 250 mm) Centralized Wire Box: 39.37 × 24.25 × 9.84 in (1000 × 616 × 250 mm)
Weight	Inverter: 121 lbs / 55 kg Distributed Wire Box: 55 lbs / 25 kg Centralized Wire Box: 33 lbs / 15 kg
Mounting / Installation Angle	15°-90° from horizontal (vertical or angled)
Safety	
Certifications and Standards	UL 1741-SA/SB, CSA-C22.2 NO.107.1-01, IEEE 1547-2018, FCC PART15
Selectable Grid Standard	IEEE 1547a-2014, IEEE 1547-2018, CA Rule 21, ISO-NE

1 100 kW active power derating begins at 113° F (45° C) when $MPPT \geq V_{min}$; 125 kW active power derating begins at 107.6° F (42° C) when $PF = \pm 0.95$ and $MPPT \geq V_{min}$, and at 113° F (45° C) when $PF=1$ and $MPPT \geq V_{min}$

2 The output voltage range and output frequency range may differ according to the specific grid standard.

3 Delta configurations must not be corner-grounded.

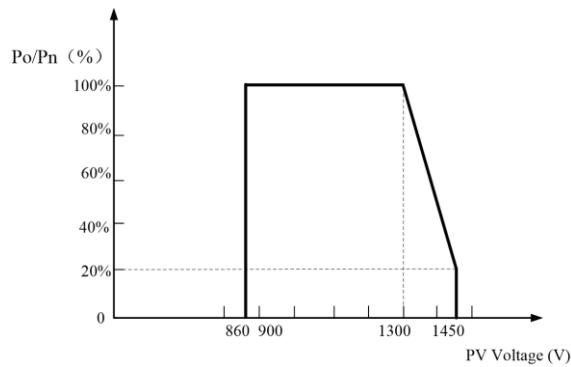


Figure 8-1 CPS SCH100/125KTL-DO/US-600 Derating Curve of PV Input Voltage

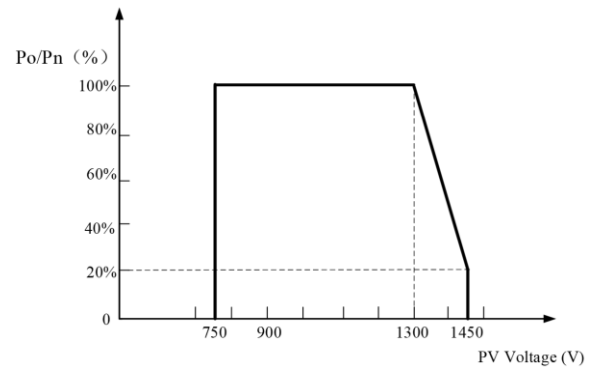


Figure 8-2 CPS SCH100KTL-DO/US-480 Derating Curve of PV Input Voltage

When the DC input voltage is higher than 1300 V, the inverter begins derating (as shown in Figures 8-1 and 8-2 above).

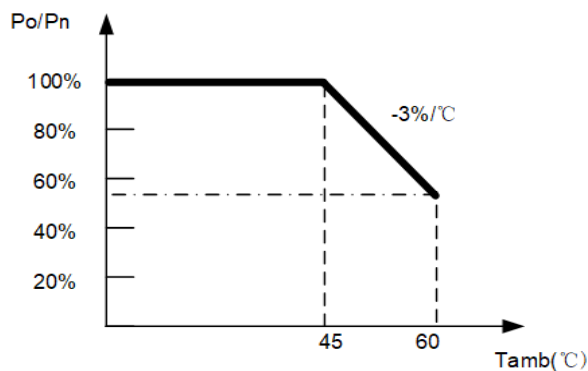


Figure 8-3 Derating Curve with High Temperature

When the ambient temperature is higher than 113°F (45°C), the inverter output power will begin to derate (as shown in Figure 8-3 above).

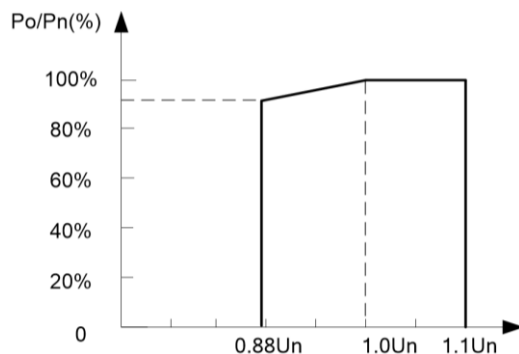


Figure 8-4 Derating Curve of Grid Voltage

When the grid voltage is within 100-110% of the rated output voltage, the inverter output power may reach 100%. When the grid voltage is lower than 100%, the inverter will limit the AC output current and the output power will begin to derate (as shown in Figure 8-4 above).

8.2 Measurement Tolerances

The data supplied by the inverter may differ from measurements taken by certified measuring instruments (e.g., output meters, multi-meters, and grid analyzers). The inverter is not a measuring instrument and has wider tolerances for the measurements it makes.

The inverter tolerances are shown below:

- $\pm 5\%$ for real-time measurements with output power *below* 20% nominal power.
- $\pm 3\%$ for real-time measurements with output power *above* 20% nominal power.
- $\pm 4\%$ for all statistical data.

CPS inverter tolerances are specified below:



- Voltage: $\pm 1\%$
- Current: $\pm 2\%$
- Frequency: $\pm 0.5\%$
- Power: $\pm 3\%$
- Time: $\pm 1\%$
- Temperature: $\pm 1.8^{\circ}\text{F}$ ($\pm 2^{\circ}\text{C}$)

9 Limited Warranty

The warranty policy of this product is specified in the contract; otherwise, the standard warranty is five (5) years.

For service, Chint Power Systems America will provide local support. For warranty terms, please refer to the CPS America standard warranty policy in place at time of purchase.

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Service Hotline: 855-584-7168

Email: AmericaSales@chintpower.com

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