CPS SCA Series Grid-tied PV Inverter

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

Installation and Operation Manual - Rev 1.0

CHINT POWER SYSTEMS AMERICA CO.

REVISON 1.0 FEB 2018

Table of Contents

Before You Start…

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 and CPS SCH125KTL-DO/US-600 Utility Grid-tied PV Inverters. Be sure to read this manual carefully before using.

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

Installation, commissioning, troubleshooting, and maintenance of the inverter must be done 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 and CPS SCH125KTL-DO/US-600

Instructions inside this user manual will help you solve most installation and operation difficulties. Contact your local supplier if the problem still exists.

Please keep this user manual on hand for quick reference.

Chapter 1 IMPORTANT SAFETY INSTRUCTIONS (SAVE THESE INSTRUCTIONS)

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

Warnings and symbols in this document

	**DANGER:** DANGER indicates a hazardous situation which, if not avoided, will result in death or serious 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 equipment 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.

WARNING:

All installation and wiring connections should be performed only by qualified technical personnel. Disconnect the inverter from PV modules and the 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 of rating of 1500V or higher.

Electric shock Hazard. The DC conductors of this photovoltaic 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 fuses only with same type and ratings.

DANGER:

Please disconnect the inverter from AC grid and PV modules before opening the equipment. Make sure hazardous high voltage and energy inside the equipment has been discharged.

Do not operate or maintain the inverter until at least 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 SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 inverters are approx. **55kg (121 pounds)**. The wire-box portion of the inverters are approx. **25kg (55pounds)/ standard wire-box or 15kg (33pounds)/ centralized wire-box;**

Please ensure the mounting bracket is properly installed before hanging the inverter and wire-box on the bracket.

INSTRUCTION:

Please check with your local electricity supply company before selecting a grid standard. If the inverter is operated with a wrong 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 is not permitted.

Markings on the product

	**HIGH VOLTAGE:** This inverter works with high voltages. All work on the product must only be performed as described in this document.
	**HOT SURFACE:** The 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 through the PE (protective earthing) cable to ensure operational safety.

Chapter 2 Overview

2.1 Inverter for Grid-tied PV Systems

CPS SCH100KTL-DO/US-600 and CPS SCH100KTL-DO/US-600 3-Phase String Inverters are designed for use with carport, commercial rooftop, and large-scale PV grid-tied systems. The system is generally made up of PV modules, DC power distribution equipment, PV inverter and AC power distribution equipment (**Figure 2-1**). The inverter converts the DC from PV modules to AC with 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.

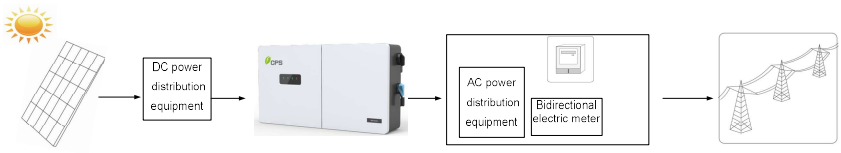


Figure 2-1 Grid-tied PV system

2.2 Product Features

- **High conversion efficiency**: Advanced 3-level conversion technology with SVPWM (Space Vector Pulse Width Modulation); Max. efficiency: 99%; CEC efficiency: 98.5%
- **Grid adaptability:** IEEE 1547, Rule 21, and HECO standards applicable; Reactive power adjustable; PF value: ±0.8, Remote Curtailment.
- **Flexible communication:** Supports standard Modbus RS485 and TCP/IP communications to ensure compatibility with 3rd party monitoring and control systems.
- **Wide DC input voltage range**: Operating DC Input Voltage Range: 860-1450Vdc; Max DC input voltage: 1500V.

- **Long Service Life:** Uses thin-film capacitors to extend inverter's service life.
- **1 MPPT:** 1 MPPT with 16 (100kW) and 20 (125kW) inputs in the standard wire-boxes for maximum flexibility.
- **Wire-box option:** Standard wire-box enables discrete wiring, or optional Centralized wire-box for connection of DC combiner boxes.
- **High protection degree:** NEMA 4X enclosure meets the demanding needs of both indoor and outdoor use.
- **Intelligent Integration:** Integrated load break rated DC/AC disconnect switches, and up to 20 fused string inputs eliminate the need for external combiner boxes, simplifying installation.

2.3 Product Protection Functions

- ✓ Reverse polarity protection of DC input
- ✓ AC and DC Short circuit protection
- ✓ Arc-fault detection and circuit interruption
- ✓ Anti-islanding protection with bi-directional frequency perturbation
- ✓ DC Input and AC output over-voltage protection
- ✓ DC Input over-current protection
- ✓ DC Input insulation against ground monitoring
- ✓ DC injection of AC output
- ✓ AC output voltage and frequency monitoring
- ✓ Leakage current against ground monitoring
- ✓ External environmental temperature monitoring
- ✓ IGBT power module temperature monitoring

2.4 Schematic Diagram and Circuit Design

The basic electrical schematic diagram of CPS SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 inverters are shown in **Figure 2-2**.

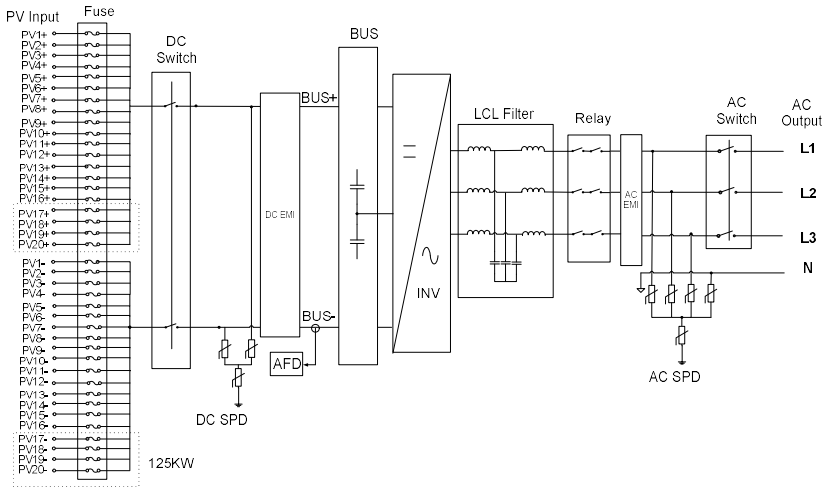
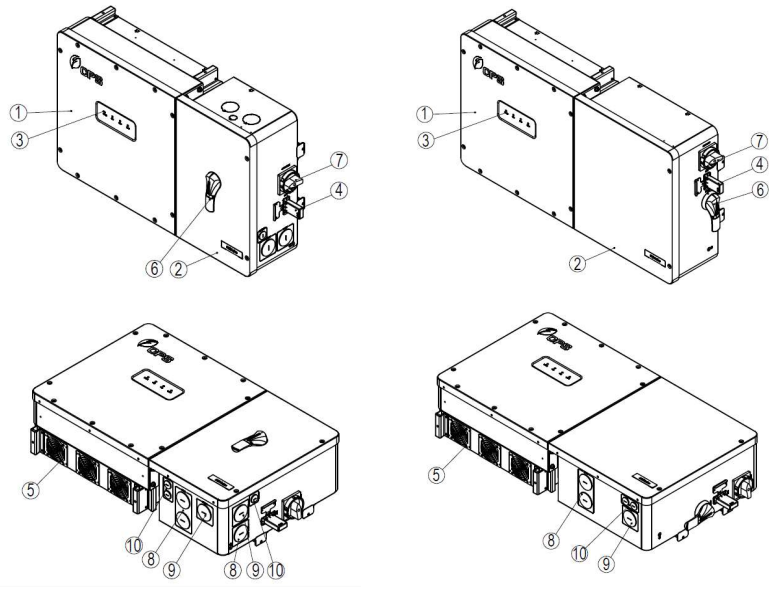


Figure 2-2 Schematic Diagram of the SCH100/125KTL-DO/US-600 Inverter

The input from PV source circuits passes through surge protection circuitry and DC EMI wave filter to the bus capacitance. The inverter then converts the DC voltage to 3-phase AC voltage. Most of the high frequency AC harmonics are removed with the wave filter. The output AC is connected to the grid via a two-stage relay and a maintenance switch. There is also a three-phase SPD at the AC output side.

2.5 Appearance and Main Item Description



Inverter with Centralized Wire-box Inverter with Standard Wire-box

Figure 2-3 Appearance of the CPS SCH100/125KTL-DO/US-600 Inverters

Main items of the Inverter:

① Main inverter enclosure
② Inverter wire-box
③ LED indicator lights
④ LinKit module
⑤ Cooling fans
⑥ DC switch: DC power on/off
⑦ AC switch: AC power on/off
⑧ DC Input cable entry
⑨ AC output cable entry
⑩ Communication cable entry

2.6 Anti-islanding Detection

The SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 inverters include Anti-Islanding detection as required by UL1741/IEEE1547. 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.

2.7 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 500mA.

2.8 Surge Suppression

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

- "Standard 1.2/50μs - 8/20μs Combination Wave"
- "Standard 0.5μs - 100 kHz Ring Wave"

2.9 DC Arc-fault Protection

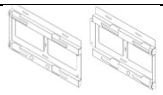
The Standard wire-box inverters include DC Arc-fault detection compliant with UL 1699B. The inverter will detect electrical noise that is indicative of a DC series arc. Upon detection of an arc-fault, the inverter will cease operation.

Chapter 3 Installation

Below is the installation procedure for the SCH100KTL-DO/US-600 and SCH 125KTL-DO/US-600 inverters. 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; B) The wire-box, mounting bracket, user manual 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	The PV inverter	A
(2)	Wire-box of the PV inverter		1	Wire-box will vary depending on the model ordered (Standard or Centralized)	B
(3)	Mounting bracket		1	Bracket to mount the PV inverter (left bracket: inverter, and right bracket: wire-box) Right bracket will vary depending on the model of wire-box ordered.	B
(4)	User manual		1	PV inverter installation and operation manual	B
(5)	Accessory kit		1	Kit contains all necessary hardware and accessories for installation	B

The Accessory kit (5) contains items listed below:

Table 3-2 Accessory Kit

No.	Item	QTY	Note
(1)	M8*Expansion anchors	6	For attaching bracket to concrete wall
(2)	M8×25mm machine bolts with integrated lock washer	6	Used with M8 expansion anchors
(3)	M6 X18mm Phillips screw	5	4 for inverter and mounting bracket; 1 for Ground connection
(4)	M8 hexagon nuts with flange	6	To connect the left and right wall bracket, and securing the main inverter to the wire-box
(5)	8 pin PCB connector plug	1	For dry contact output signal (optional)
(6)	M8×20mm machine bolts with integrated lock washer	4	PV Input busbar wiring (Centralized Wire-box)
(7)	M8 nut with flat gasket and spring washer	4	AC terminal connections
(8)	LINKIT communication module	1	LinKIT2NO-LCD replace LCD display

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.

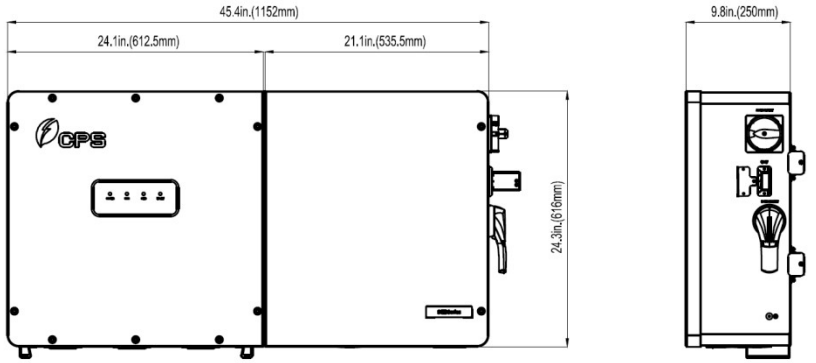
3.1 Recommendations Before Installation

See **Chapter 8**, Technical Data for specification ranges and limits.

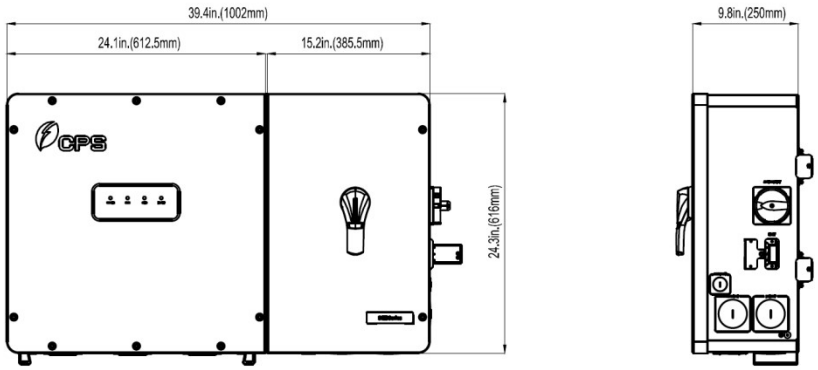
- ✓ Check that the product environmental specifications (protection degree, operating temperature range, humidity and altitude, etc.) meet the requirements of the specific project location.
- ✓ Make sure that the power grid voltage is within range for the grid standard chosen.
- ✓ Ensure that the local 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 (personal protective equipment) during installation.
- ✓ Sufficient space according to **Figure 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.
- ✓ 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.

3.2 Mechanical Installation

(1) **Dimensions**



100/125kW Standard Wire-box



100/125kW Centralized Wire-box

Figure 3-1 Dimensions of CPS SCH100/125KTL-DO/US-600 Inverter

(2) **Installation Method (see Figure 3-2):**

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

(a) If the location permits, install the inverter vertically.

(b) If the inverter cannot be mounted vertically, it may be tilted backward to 15 degrees from horizontal.

(c) Do not mount the inverter leaning forward.

(d) Do not mount the inverter upside down.

(e) Do not mount the inverter horizontal installation.

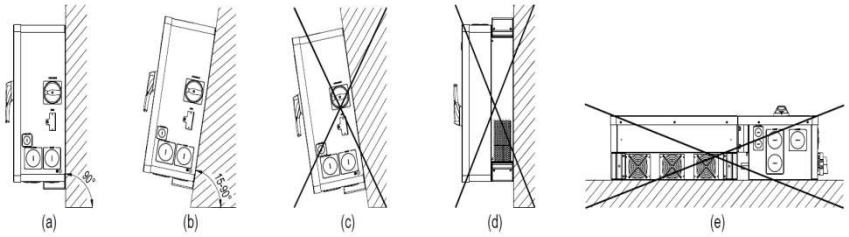


Figure 3-2 Inverter Mounting Options

NOTICE:

If the installation environment allows, avoiding direct sunlight from the inverter, avoiding direct rain and snow, can extend the life of the inverter (See **Figure 3-3**).

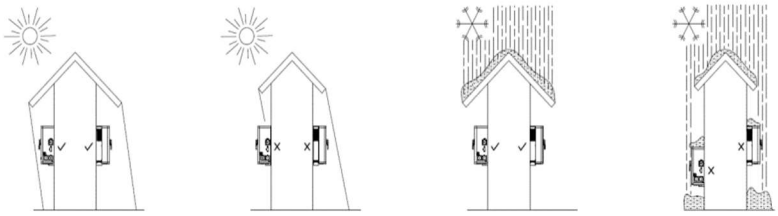


Figure 3-3 Inverter Mounting Suggestion

(3) **Installation Space Requirement (see Figure 3-4):**

The distances between the inverters or the surrounding objects should meet the following conditions:

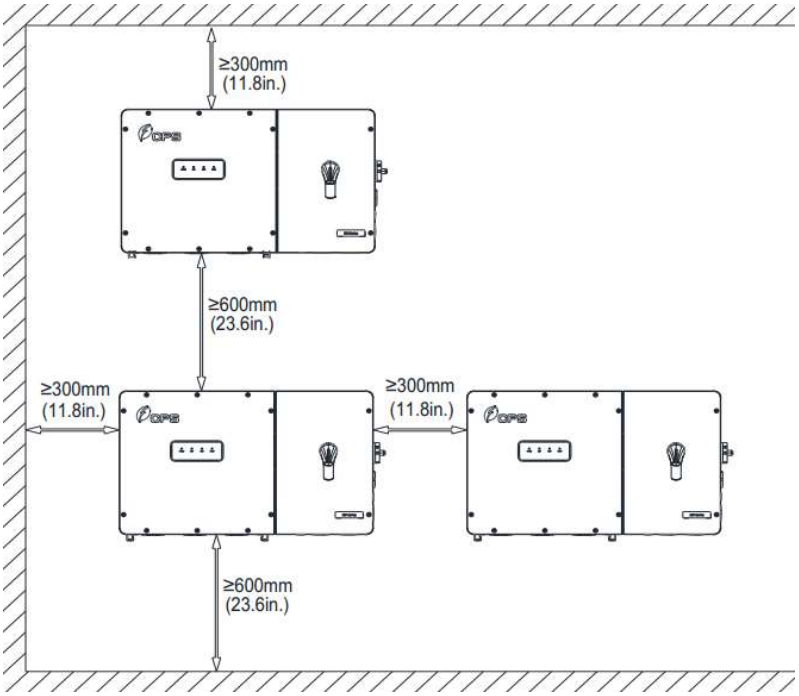


Figure 3-4 Inverter Wall Mounting Dimensions

NOTICE:

The spacing between two adjacently mounted inverters should be ≥300mm (11.8 inches). Ensure that the air space around the inverter is well ventilated.

The installation clearance between two inverters should be increased when the ambient temperature is higher than 45°C.

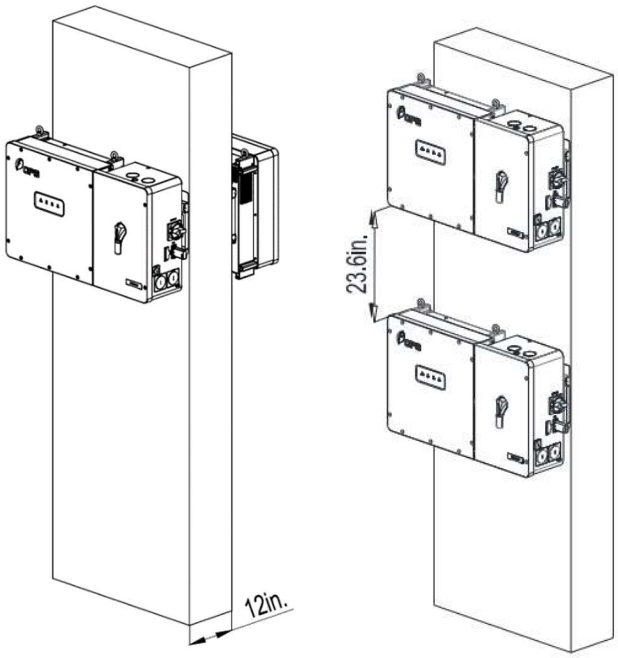


Figure 3-5 Inverter Pillar Mounting Dimensions

CAUTION:

The total weight of the CPS SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 inverter is approx. **80kg (176lbs)**. Please ensure the mounting surface is capable of supporting this weight.

(4) **Mounting the Inverter onto the Bracket**

Tools Required: Electric drill (Φ10mm/0.4in. head), No. 13 wrench, pencil/marker, No.2 Phillips head screwdriver

(1) Mark 6 holes on the wall or bearing surface for attaching the inverter mounting bracket as shown in **Figures 3-6a** and **3-6b**.

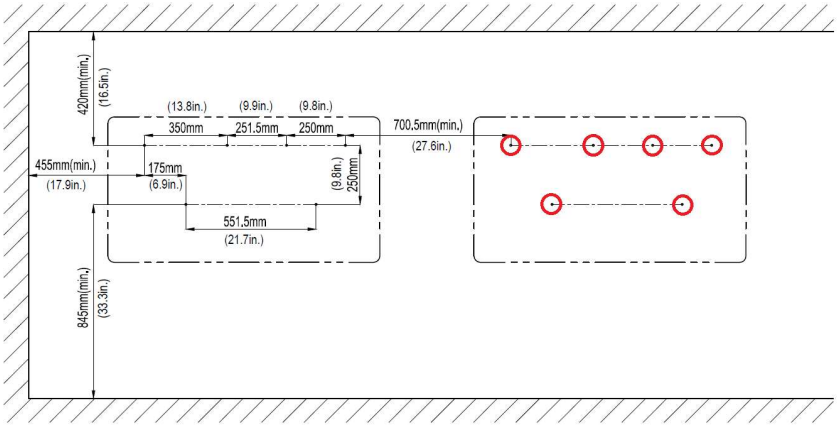


Figure 3-6a 100/125kW Standard Wire-box Bracket Mounting Pattern

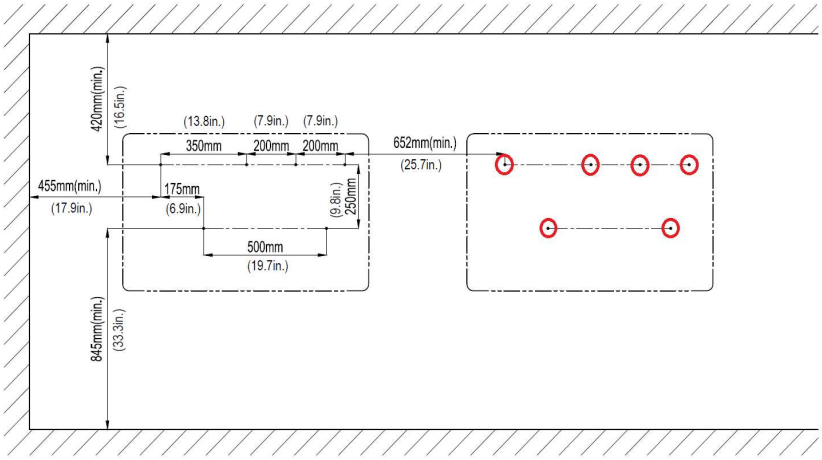
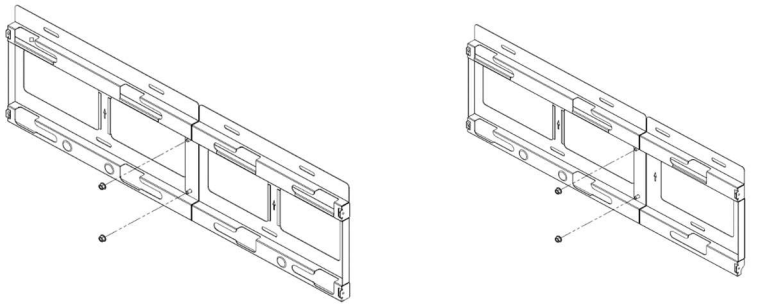


Figure 3-6b 100/125kW Centralized Wire-box Bracket Mounting Pattern

INSTRUCTION:

Before installing the brackets, first connect the left and right wall mounting brackets with 2 PCS M8 flange nuts (**See Figure 3-7)** (torque 12.5 Nm)



100/125kW Standard Wire-box **100/125kW Centralized Wire-box**

Figure 3-7 Left and Right Wall Brackets Combination

(2) **Mounting the Bracket.** Tools Required: Electric drill (Φ10mm/0.4in. head), No. 13 wrench.

Drill holes at the marked positions with a 10mm (0.4in.) drill and insert the **M8 Expansion Anchors** ① into the holes; fasten the **Mounting Bracket** ② with the **M8x25 Assembling Bolts** ③ in the accessory kit. **Figure 3-8** and **3-9**.

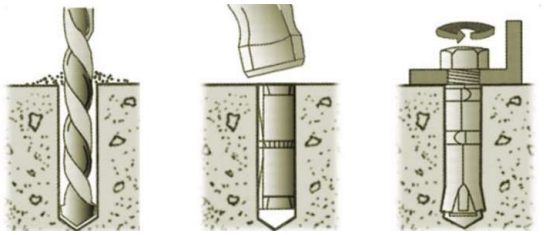


Figure 3-8 Drill holes, set Anchors, and tighten Assembling Bolts

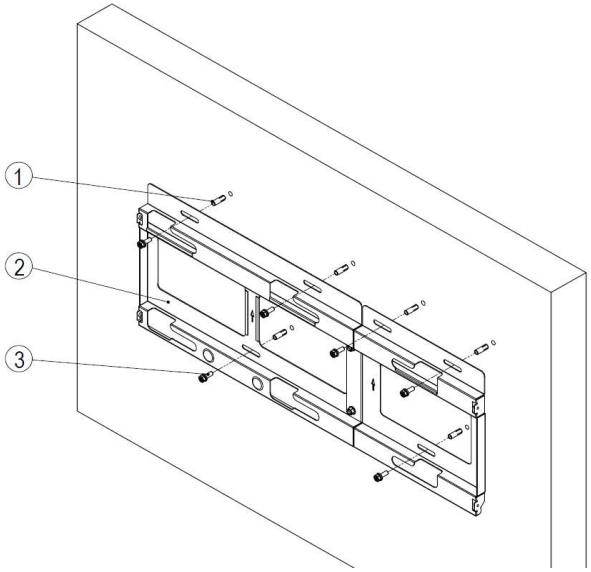


Figure 3-9 Secure the Mounting Bracket

CAUTION:

The main enclosure of the CPS SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 inverters is approx. 55kg (121 pounds). Ensure the mounting bracket is properly installed before hanging the inverter on the bracket. It is recommended to have at least 2 people to mount the inverter due to the weight of the equipment.

(3) **Install the Main Inverter Enclosure.** Tool required: No. 2 Phillips head screwdriver.

First remove the cover plate on the right of the main enclosure. Reserve the screws and cover (**Figure 3-10**).

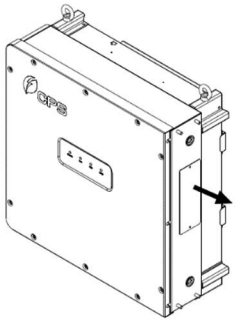


Figure 3-10 Remove the cover of Main Enclosure

Following method A or B 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.

A. Lift mounting: find the lifting eye bolt M10 (2pcs) in the Accessory Kit and screw them into the studs at the top of the inverter. Use 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 should be less than 90 degrees (**Figure 3-11**).

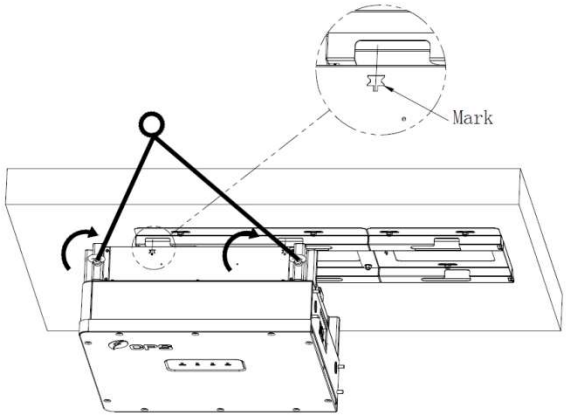


Figure 3-11 Mount the Main Enclosure on the Bracket by Lifting Sling

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

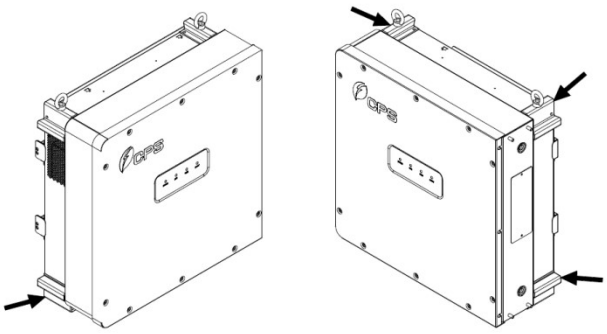


Figure 3-12 Grab Handle Position

After hanging, push the enclosure to the right to its final position (**Figure 3-13**) and secure with M6x18 combination screw (torque: 53 in-lbs. (6 Nm)).

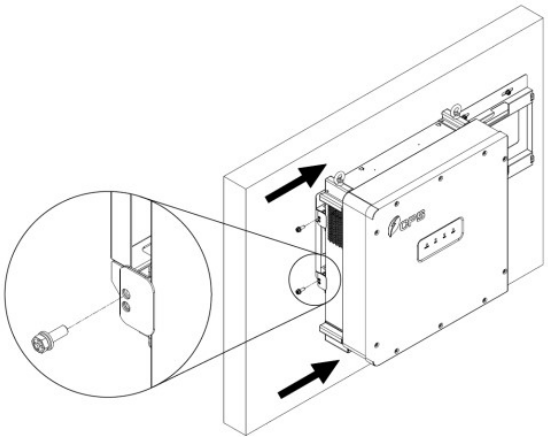


Figure 3-13 The main Enclosure Position

(4) **Install the wire box.** Tool required: No. 2 Phillips head screwdriver

A. Remove the connector cover on the left of the wire box, Save the cover and screws (see **Figure 3-14**).

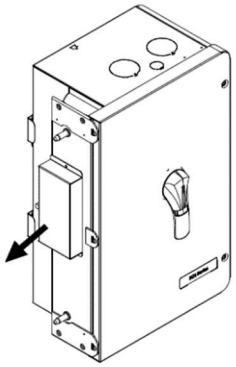


Figure 3-14 Wire Box Cover

B. Aligning the mark on the wire-box with the bracket (**Figure 3-15**), hang the wire-box on the right side of the wall bracket. Push the wire-box left to its final position meeting the main inverter enclosure.

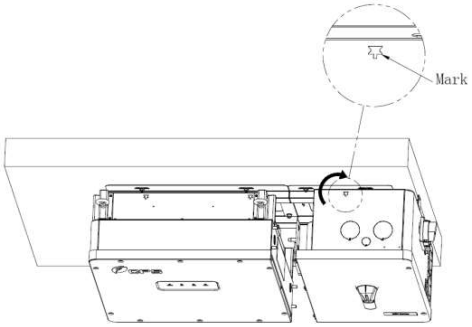


Figure 3-15 Wire-box Position

C. Connect the wire-box to the main enclosure, using the **M8 Flanged Nut** (4pcs) (torque: 110.6 in-lbs. (12.5 Nm). Secure the wire-box to the bracket with **M6x18** combination screw (torque: 53 in-lbs. (6 Nm)) (**Figure 3-16**).

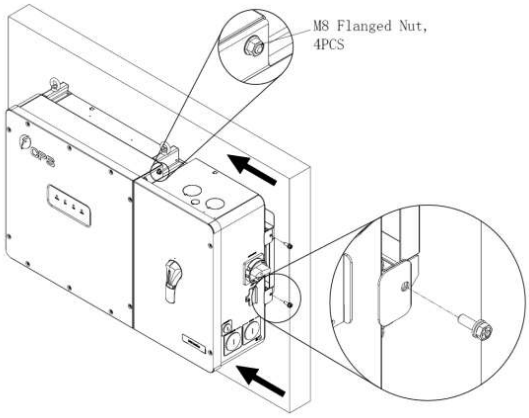


Figure 3-16 Installation of the Wire-box

(5) **Storing the connector covers.** Tool required: No. 2 phillips head screwdriver.

Attach the inverter's connector cover and wire-box connector cover shown in Figure 3-10 and Figure 3-14 to the top of the inverter and wire-box. (**Figure 3-17**)

Torque value of 1.6N.m (14.2in-lbs.).

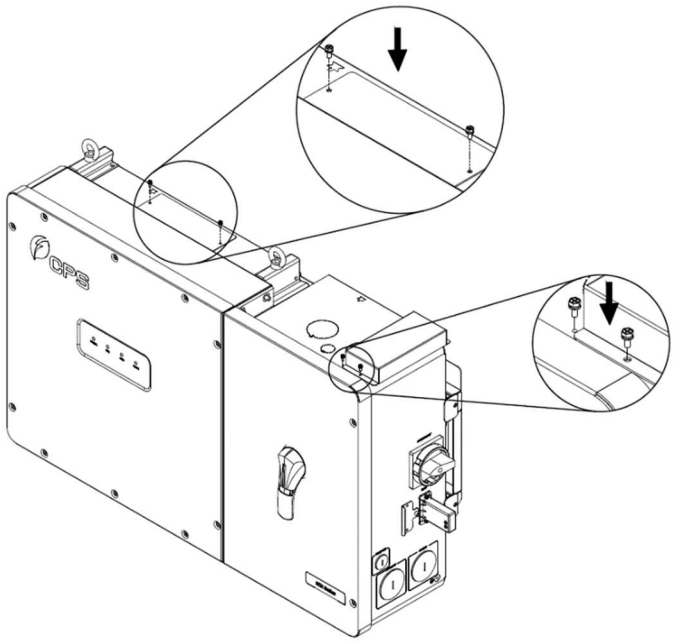


Figure 3-17 attach the Cover to the top of the Inverter

INSTRUCTION:

The LinKit module is required for the commissioning of the inverter. This step does not need to be completed until commissioning. If multiple inverters are connected to the same data network only ONE LinKit is required. Install the LinKit in the first inverter in the network which contains the FlexGateway. The LinKit should be removed after commissioning is complete. See **Section 3.3.5** and **Chapter 4** for more information.

(6) **Install the LinKit Module.** Tools required: No.2 Phillips head screwdriver.

As shown in **Figure 3-16**, remove the two M4x10 fixing screws on the DB9 connector cover, rotate the DB9 connector cover to expose the connector, and install the LINKIT module by plugging into the connector and inserting the two screws just removed. Pay attention to the control torque (torque 14 in-lbs. (1.6 Nm)), to ensure that the seal remains waterproof.

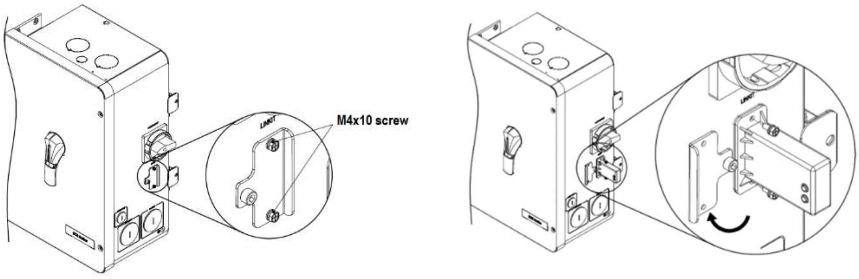


Figure 3-16 Installation of the LinKit Module

(7) Optional Anti-Theft Padlock.

The anti-theft padlock is used to prevent the inverter from being stolen when the equipment is installed outdoors. You can lock the inverter on the bracket, as shown in **Figure 3-18**:

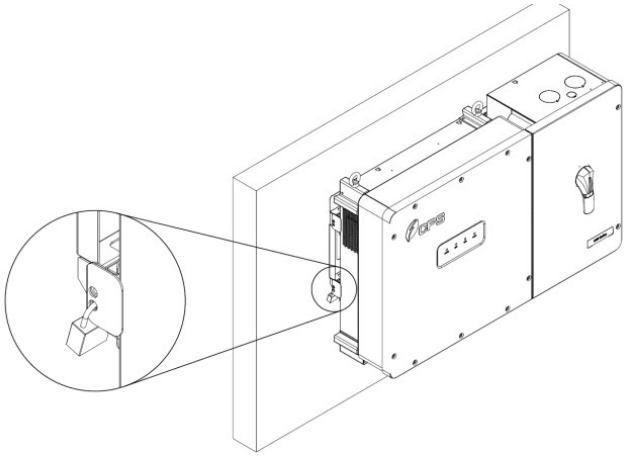
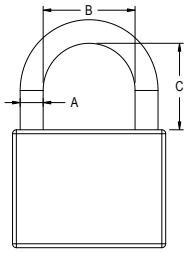


Figure 3-18 Location of the Anti-Theft Padlock

The anti-theft padlock should meet the requirement of the dimensions shown in **Figure 3-19**.



Recommended lock size:

A: Φ3~6mm

B: 20~50mm

C: 20~50mm

Figure 3-19 Dimensions of Anti-Theft Padlock

3.3 Electrical Installation

3.3.1 Removing/Replacing the Wire-box Cover

Tool required: No.3 Phillips head screwdriver. Tabs hold the left side of the cover in place and it is secured by two screws on the right side. Use a No.3 Philips head screwdriver to remove the 2 screws on the wire-box. Pull the right side of the cover away from the wire-box approximately 1 inch before sliding the cover right to release the tabs. This will free the cover from the enclosure and allow the cover to be removed. (**See Figure 3-20**)

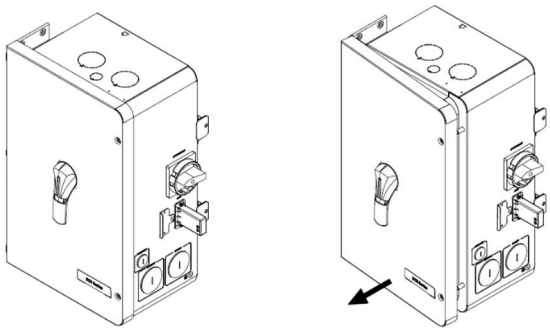


Figure 3-20 Removing the Wire-box Cover

To replace the cover, reverse the order of the above steps use a No.3 Philips head screwdriver to replace the 2 screws on the cover. Torque to 35.4 in-lbs. (4Nm).

INSTRUCTION:

It is important to use hand tools and not power drivers. During installation hold the cover in alignment with balanced force. Partially engage screws into the threaded inserts before tightening. Maintain alignment to avoid thread damage.

3.3.2 Wire-box Details

(1) **Exterior Wire-box Details**

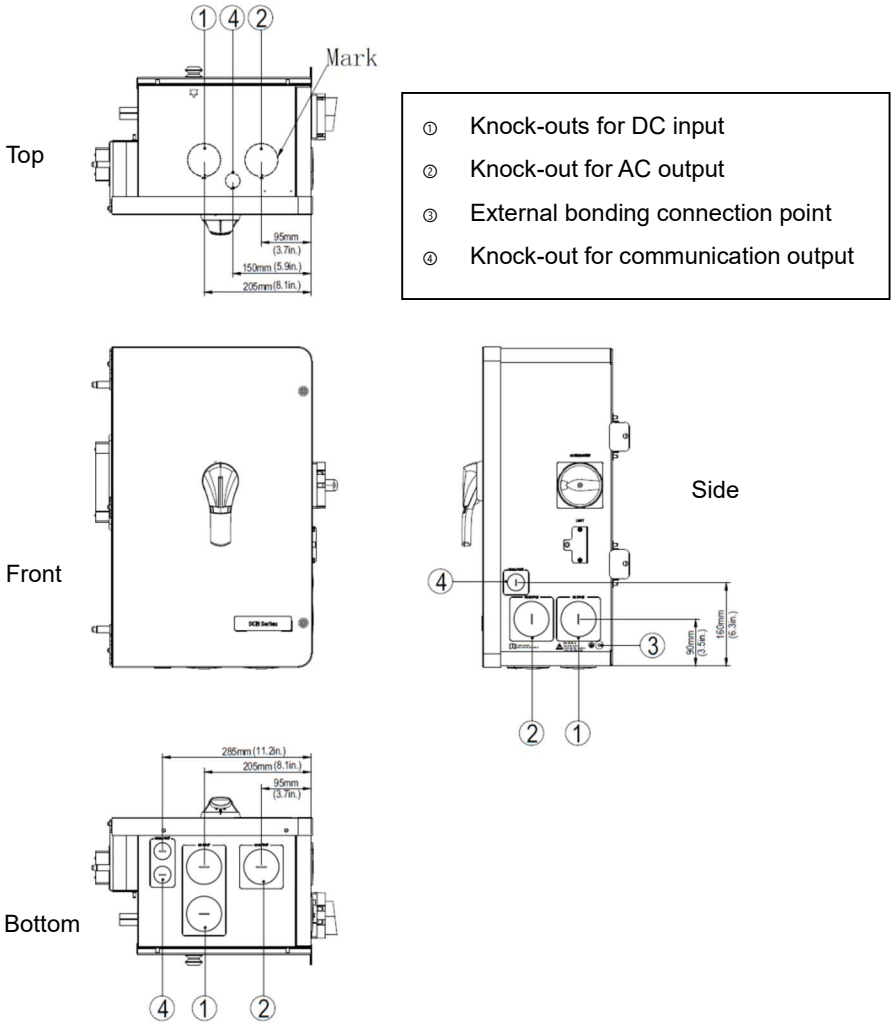


Figure 3-21 Conduit Knock-out Locations (Centralized Wire-box)

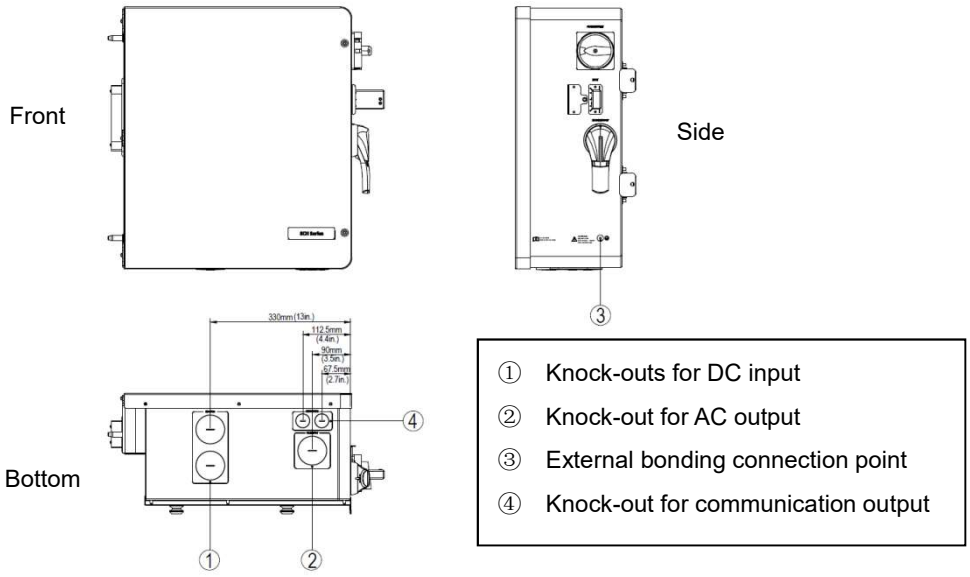


Figure 3-21 Conduit Knock-out Locations (Standard Wire-box)

(2) **Interior Wire-box Details**

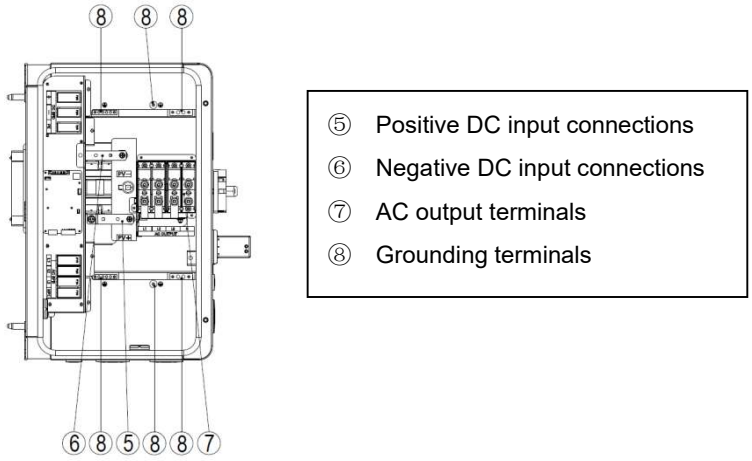


Figure 3-20 Internal Connection Points (Centralized Wire-box)

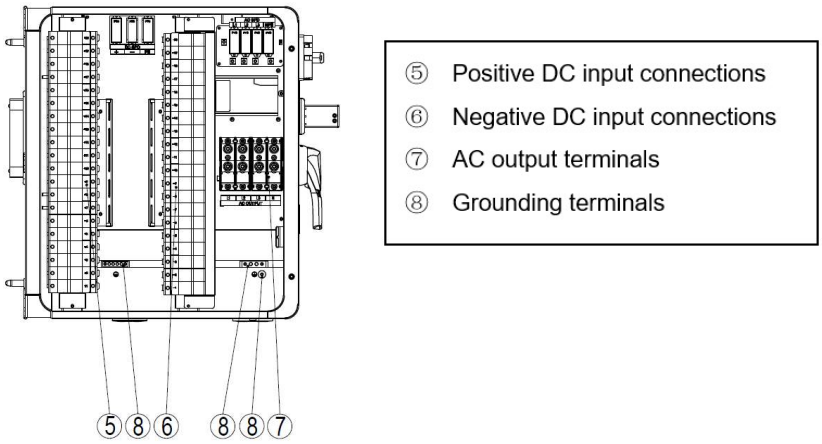


Figure 3-20 Internal Connection Points (Standard Wire-box)

The SCH100/125KTL-DO/US-600 Inverter operates with ungrounded arrays, although the PV system requires an equipment grounding conductor.

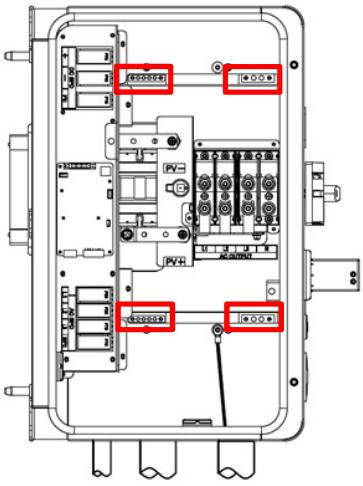


Figure 3-21 Internal Grounding Points (Centralized Wire-box)

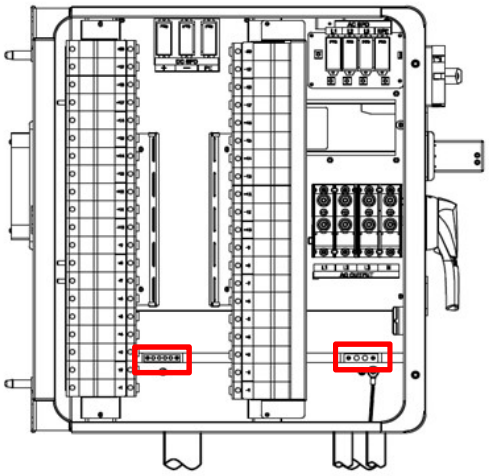


Figure 3-21 Internal Grounding Points (Standard Wire-box)

3.3.3 DC Connection

(1) **DC Fuse Configuration**

CPS SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 Standard wire-boxes accept 15, 20, 25 and 30A fuses. **The desired fuse must be specified when ordering the inverter.**

Customers must verify that the appropriate fuses are installed depending on the actual configuration of PV strings.

A. Each DC input from the PV strings requires fuse protection.
B. The rated voltage of the fuse must be 1500V_{DC}.
C. The rated current of the fuse is generally 1.56 × short circuit current from the PV strings, rounded up to the next available fuse size.

Table 3-5 DC Fuse selection (Standard wire–box)

Brand	15A/1500V	20A/1500V	25A/1500V	30A/1500V
Littlefuse				
Adler				
Sinofuse				

Note 1: The 1500V_{DC} Littelfuse KLKD fuse series are recommended.

Note 2: Two 30A fuses shall not be installed in adjacent fuse holders.

Note 3: The recommended fuse types are configured according to the condition that the input strings are the same.

WARNING: Use of different fuses or incorrectly sized fuses can cause damage to equipment or create unsafe working conditions. Any damage resulting from incompatible fuses is not covered by warranty.

(2) **DC Conductor Connections**

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

A. Confirm the DC configuration and ensure that the maximum open circuit voltage of the PV modules is lower than 1500V_{DC} under any conditions;

B. Confirm that the PV strings for the MPPT of the inverter are of the same type and specification before connection. The number of PV modules per string, orientation, and tilt of modules should all be the same per 1 inverter.

Note: The temperature rating of the conductors should be no less than 90°C (194°F).

C. Check the polarity (**Figure 3-22**) before terminating the DC

conductors according to the following steps:

i. Use a multi-meter at the end of the PV string to check the polarity.

ii. The positive (+) terminal of conductor should match the positive (+) terminal of inverter's DC input.

iii. The negative (-) terminal of conductor should match the negative (-) terminal of inverter's DC input.

NOTICE:

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

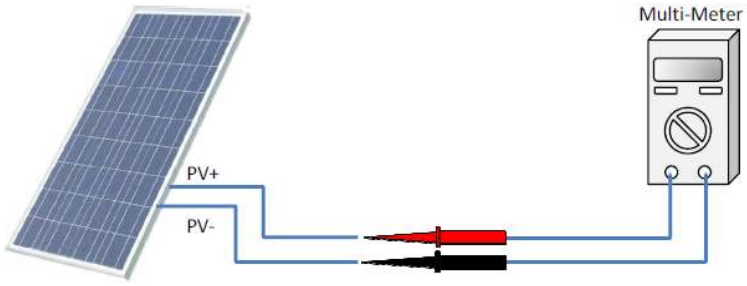


Figure 3-22 Polarity Check

D. Remove the liquid-tight hole plugs from the DC input of the wire-box and install 2 inch conduit and conduit fittings into the holes. Proper fittings must be used in order to maintain the weatherproof seal. Then route the conductors through the conduit inside the wire-box

Table 3-7 Tools Required for Conductor Termination

Tools	Remark
No. 2 Phillips bit and a Torque driver	PV String connections (Standard wire-box)
	PV output conductor connections (Centralized wire-box)
Diagonal pliers	Cut cable
Wire stripping pliers	Remove jacket

Choose the conductor size and material for the inverters according to the following configuration table:

Table 3-3 Cable Specifications

Terminal	Cable
DC input (+ / -)	Screw Clamp Fuse Holder: 12 - 6AWG (Copper only) Standard wire box
DC input (+ / -)	Busbar: 1AWG - 250kcmil CU/AL. *Lugs not supplied.* Use 3/8" tubular lug sized for the application. Centralized Wire-box
Ground terminals	12 – 6AWG

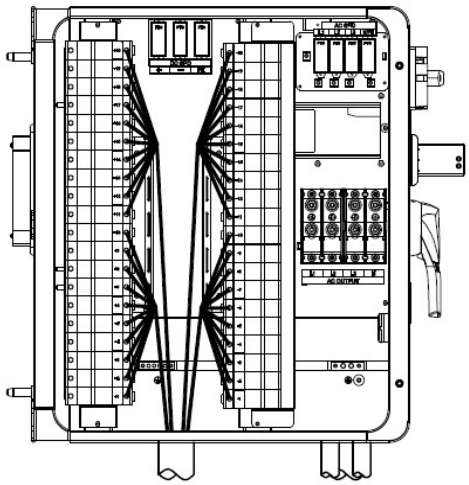


Figure 3-22 connect the DC cable (Standard wire box)

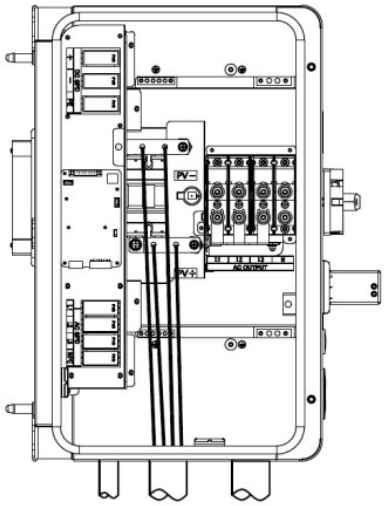


Figure 3-23 Connect the DC cable (Centralized Wire-box)

E. Strip approximately ½ inch of the cable jacket from the end of the string conductor. Insert the conductor into the fuseholder terminal ensuring the stranding of the conductor remains firmly twisted and does not separate. Tighten the screw to secure the conductor in the fuseholder.
Tools required: No. 2 Phillips bit and a Torque driver.
Torque value: 26.5 in-lbs. (3Nm)
Note: If you are using the **Centralized Wire-box** M8 Stud Type busbar (Wire range: 1AWG – 250Kcmil CU/AL, Lugs not supplied)

3.3.4 AC and Ground Connection

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

(1) Remove the liquid-tight hole plug from the AC input of the wire-box and install 2 inch conduit and conduit fittings into the hole. Proper fittings must be used in order to maintain the weatherproof seal. Then route the cables through the conduit inside the wire-box.

Table 3-8 Tools Required for Cable Termination

No.	Tools	Remark
1	1.5mm flat screwdriver	RS485 communication terminal
2	10mm hex head wrench	External bonding (if necessary)
3	13mm hex head wrench	AC terminal block
5	Diagonal pliers	Cut cable
6	Wire stripping pliers	Remove jacket
7	Crimping pliers	Crimp terminal

Table 3-9 Torque value

Location	Torque
AC output terminal block	15 Nm (132 in-lbs.)
Internal grounding bar	4 Nm (35.4 in-lbs.)
Internal grounding stud	4 Nm (35.4 in-lbs.)
External bonding point	4 Nm (35.4 in-lbs.)

Choose the AC conductors according to the following configuration table:

Table 3-10 Cables specifications

Position	Conductor Size	
AC output (L1/L2/L3/N)	3 - 3/0AWG (Copper) 2 - 3/0AWG (Aluminum)	2AWG recommended (Copper) 1AWG recommended (Aluminum)
PE	6 - 4AWG(Copper)	6AWG recommended (Copper)

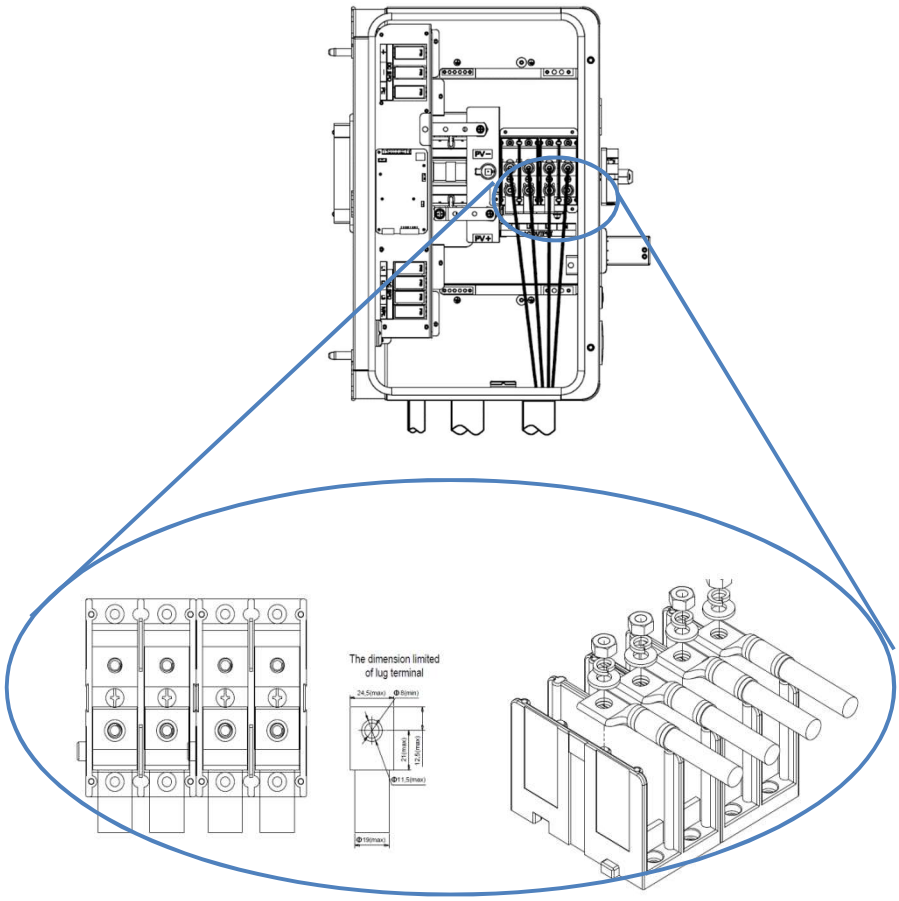


Figure 3-26 AC Output Cable Connection (Centralized Wire-box)

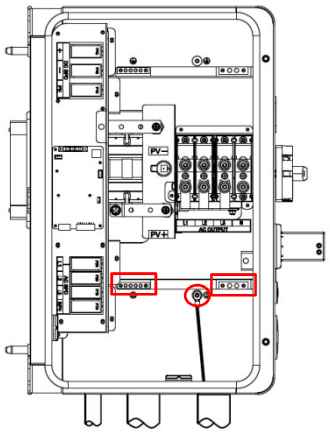


Figure 3-27 Ground Connections (Centralized Wire-box)

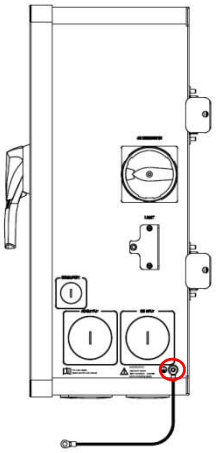


Figure 3-28 External Bonding Location

(2) Connect the AC (L1, L2, L3, N) conductors to the terminal block and connect the grounding conductor to the internal grounding terminal block. The neutral conductor is optional.

Since the neutral is used by the inverter for voltage sensing only, the neutral does not carry current. The size of the neutral may be reduced to a conductor no smaller than the EGC or 8 AWG, which is the smallest acceptable wire for the terminal block.

(3) When the output of the inverter is connected to the grid, an external AC circuit breaker is required to be installed to safely disconnect the inverter from the grid should an overcurrent occur. Either a 3-pole or 4-pole AC circuit breaker may be selected as per the following recommendation. Selecting a breaker of another size may either result in nuisance tripping or rejection from the AHJ.

Table 3-11 Specification of AC breaker selection

Inverter	AC breaker rated current（A）
CPS SCH100KTL-DO/US-600	150A
CPS SCH125KTL-DO/US-600	175A

The SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 inverters operate at 600V_{AC}/Wye output. If another voltage/configuration is required a transformer may be necessary.

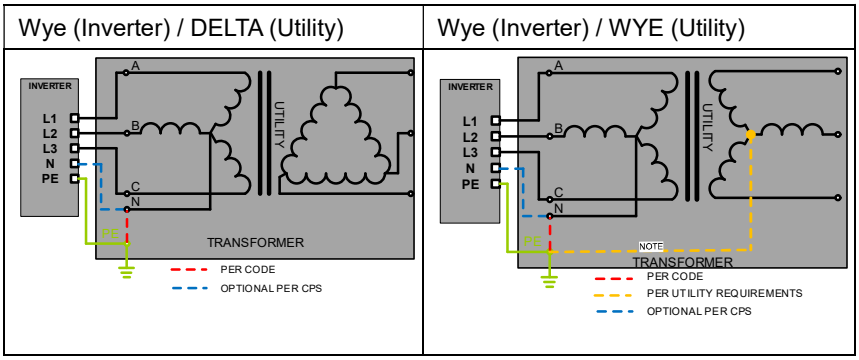


Figure 3-29 AC Acceptable Transformer Winding Configurations

NOTES:

1. The nearest upstream transformer must be a grounded WYE on the inverter side. The Neutral on the Utility Side (H0) and Inverter Side (X0) may be connected internally and brought out as one terminal in the LV compartment and labeled (H0X0).
2. Transformer short-circuit impedance (Z%) should be less than 6%.
3. The transformer VA rating must be at least 100% of the sum of the connected inverter VA ratings.
4. CPS recommends the **transformer VA rating be selected** based on IEEE C57.159-2016 *Guide on Transformers for application in Distributed Photovoltaic (DPV) Power Generation Systems*. It is the responsibility of the system designer to determine and take in account the reliability of the transformer or other system parameters.
5. The transformer does not require a static shield.

6. The maximum number of inverters connected to a single transformer is 50.
7. The recommended maximum voltage-drop on the Inverter to Point of Common Coupling (to the grid) is 2% at full load – including conductor temperature considerations. Voltage drop greater than 2% may require changing the transformer tap or as a last resort adjusting the GridMaxVolt trip point settings.

Note: If aluminum conductors are being used CPS recommends the following steps to prepare each conductor prior to landing and terminating to the AC terminal block:

(1) Strip the outer insulating jacket from the conductor and use care so as not to nick any of the strands.

(2) Using a utility knife, gently strip the top layer of the aluminum conductors

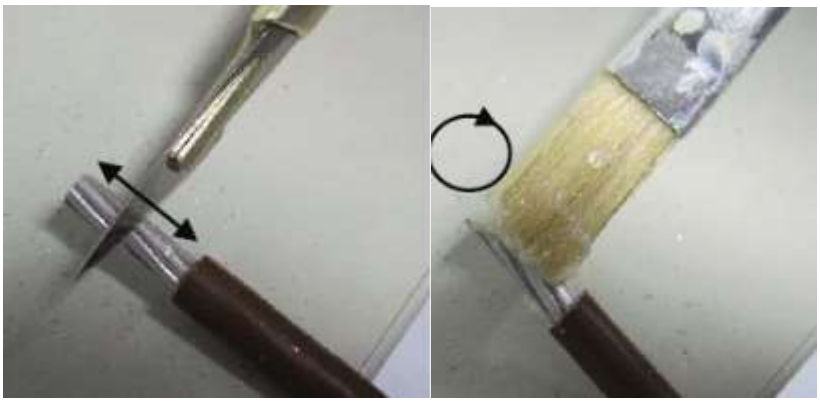


Figure 3-30 Preparing Aluminum Conductors prior to connecting

(3) After removing the oxidized layer, immediately apply neutral grease (Noalox or an acid- and alkali-free Vaseline) and connect the conductor immediately to the terminal. Perform these steps on one cable at a time. If the process is stopped or delayed before applying the grease and continued later the conductor must be scraped again. It takes roughly 30-60 seconds for an oxidized layer to form on top of the conductors.

3.3.5 Communication Connection

CPS SCH100KTL-DO/US-600 and SCH125KTL-DO/US-600 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.

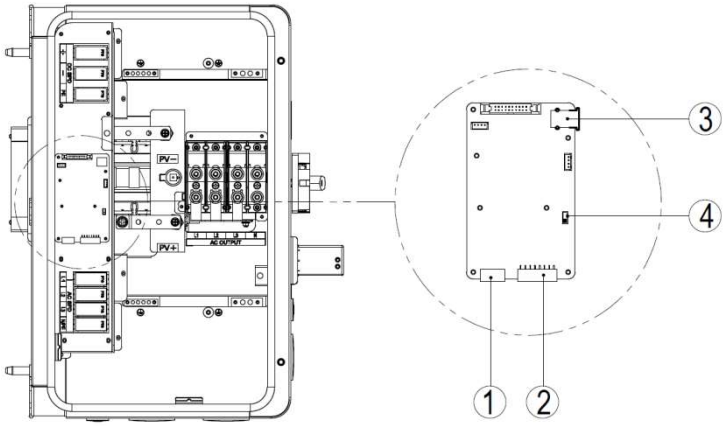
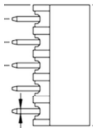
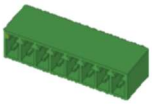
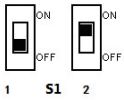


Figure 3-31 Communication Board (Centralized Wire-box)

Table 3-12 Communication Connection Interfaces

Item	Picture	Configuration description
① RS485 (Debug only)		1. 12V+ 2. 12VGND 3. RS485+ 4. RS485- 5. COM
② RS485 port (8-pin connector)		1. NC 2. NC 3. RS485+ 4. RS485- 5. GND 6. RS485+ 7. RS485- 8. GND
③ USB port P6		Firmware upgrade via USB
④ Selector switch for setting the 120Ω terminal resistor of the RS485 communication S1		1. Disable the termination resistor 2. Enable the termination resistance

RS485 communication cable connection ②:

Choose the RS485 communication cables according to the following table:

Table 3-11 Cables specifications

	Cable
RS485 communication	UTP CAT-5e or 3x 22 - 18AWG communication cable (e.g. Belden 3106A)

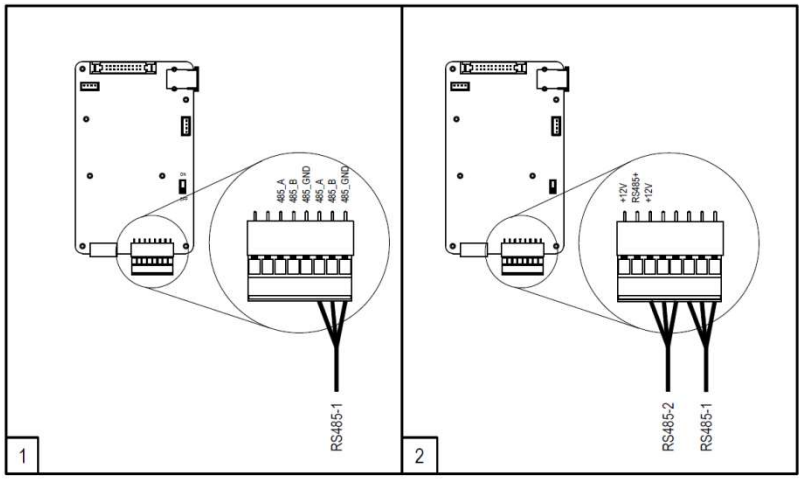


Figure 3-32 RS485 Connection

1. Cable connection of RS485 communication (1 inverter): 8 pin connector
2. Cable connection of RS485 network communication (multiple inverters): 8 pin connector

It is recommended that industrial grade RS485 cable be used in lieu of unshielded twisted pair. Communication cable such as (CAT5) or Belden 3106A cable for RS485 5-pin connector is preferred.

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 LinKit module and application. The LinKit is installed in the first inverter in the network. Use the 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 3-33**. It is important to daisy chain the inverter RS485 connections to minimize noise and bus reflections. Other communication topologies, such as the star networks, are not recommended.

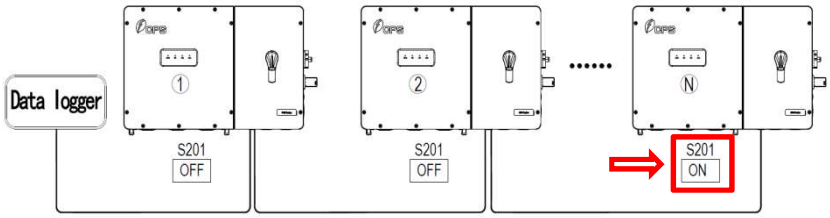


Figure 3-33 RS485 Network Connection

If there are multiple inverters in the RS485 network, the selector switch S1 (S201 as depicted) of the last inverter in the daisy-chain should be in ON position, to have the 120ohm terminal resistor enabled. The selector switch S1 of all other inverters should be in the OFF position to disable the terminal resistor.

	**Warning:** Risk of Electric Shock. Make sure all DC and AC power to the unit has been disconnected before opening the inverter wire-box and ensure that hazardous high voltage and power inside the equipment has been discharged. Wait at least 5 minutes before opening the wire-box.

(1) Open the inverter wire-box (See section 3.3.1).

(2) Bring the communication cables into the wire-box through the provided knockout holes at the bottom. Ensure the proper fittings are used in order to provide a weatherproof seal.

(3) Connect the RS485 wires to the green connector ensuring correct polarity, using a shielded twisted pair cable.

(4) If the inverter is the **last** Modbus device in the daisy chain, make sure the Modbus termination switch S1 is in the ON position enabling Modbus termination. Do **not** turn the switch to the ON position in any other inverters of the daisy chain.

Chapter 4 Commissioning (Via internal Wireless)

WARNING:

Please follow the guidelines below before on-grid operation to eliminate possible dangers to ensure safety.

4.1 Commissioning Checklist

4.1.1 Mechanical Installation

- Make sure that the mounting bracket is secure and all the screws have been tightened to the specified torque values. 35.4 in-lbs. (4Nm)

4.1.2 Conductor Connections

- The polarity of DC input cables must be correct, and the DC Switch should be in the “OFF” position.
- Make sure all conductors are connected to the correct terminals with the proper torque.

Location	Torque Value
AC output terminal block	132.8 in-lbs. (15 Nm)
DC terminals	20 in-lbs. (2.3 Nm)
Internal grounding bar	35.4 in-lbs. (4 Nm)
Internal grounding stud	35.4 in-lbs. (4 Nm)
External bonding point	35.4 in-lbs. (4 Nm)

- All conductors employ proper cable management, avoiding abrasions and sharp edges. (Please refer to 3.3 Electrical installation)

4.1.3 Electrical Check

- Make sure that the AC circuit breaker is appropriately sized.
- Test whether the AC voltage is within the normal operating range.
- Confirm the DC open circuit voltage of input strings is less than 1500V.

4.2 Commissioning Steps

Complete the checklist above before commissioning the inverter as follows:

(1) Turn on the AC circuit breaker.

(2) Turn on the DC circuit breaker.

(Skip these two steps if there are no circuit breakers.)

(3) Switch the DC Switch to the “ON” position. When the energy supplied by the PV array is sufficient, the LED of inverter will light up. The inverter will then start up.

4.3 Connection to the inverter – Wireless

Once powered, the inverter will automatically create a wireless network which will be visible as an Access Point from the user devices (tablet, smartphone, etc.)

(1) Download the LinKit APP by scanning the QR code below or searching “LinKit” in the Google Play Store or Apple App Store.

(2) Make sure the LinKit module is plugged in to the inverter (or first inverter in the data network) and open the APP.

(3) Enable the wireless connection on the device which is being used for the board setup (tablet, smartphone or PC) and connect it to the Access Point created by the inverter system. The name of the wireless network created by the system will be: ZELK-XXX where “X” can be found on the “LinKIT Label” placed on the side of the inverter).

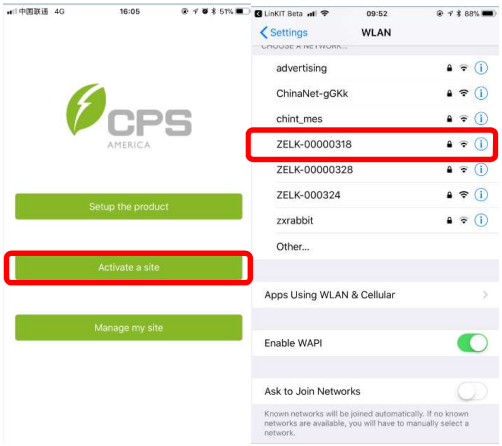


Figure 4-1 LinKIT Connection

(4) Input the password “PASSWORD” then set the grid “Regulation, PV Link Type, Neutral Line, RS485 and Inverter Clock” as shown in **Figure 4-2**.

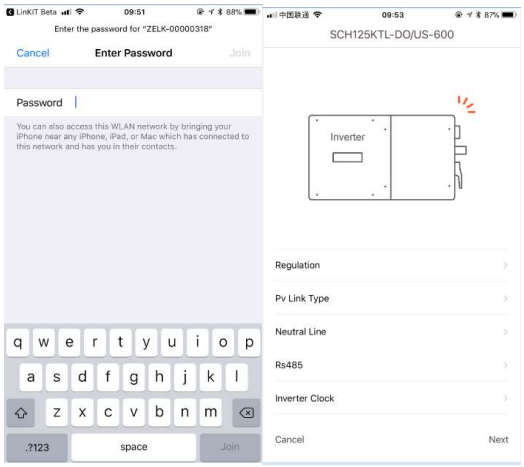


Figure 4-2 System setting

INSTRUCTION:
Please check with your local electricity supply company before selecting a grid standard. If the inverter is operated with a wrong 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.

- **Regulation**: Selecting a grid standard
- **Neutral Line Setting**: Enter whether a neutral line is installed.
- **RS485**: Choosing the communication data Modbus Address and Baud Rate.
- **Inverter Clock**: Setting the system clock.

When the device screen shows the normal operation status (**Figure 4-3**) and the "RUN" light on the inverter's LED indicator panel is illuminated, this is an indication that the grid connection and power generation are successful.

Figure 4-3 Normal Operation Status

If the inverter fails to operate normally, the inverter's "FAULT" light will illuminate and the fault information will show on the Device screen. Accessing the "History" will allow the user to check the detail as shown in the **Figure 4-4**.

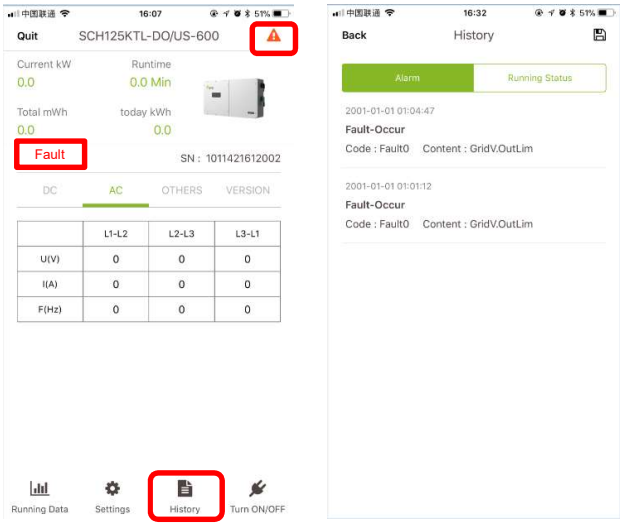


Figure 4-4 Fault Information Interface

Chapter 5 APP Interface

5.1 Overview

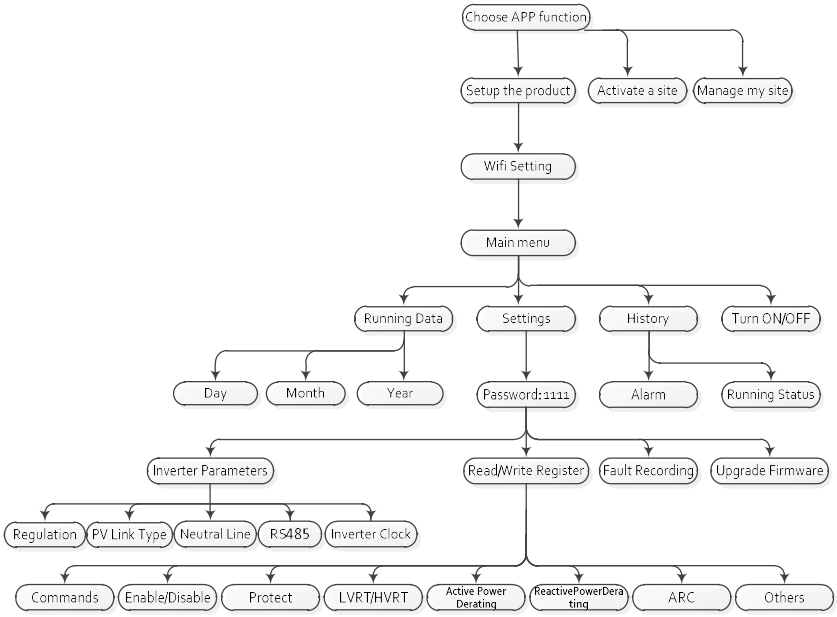


Figure 5-1 Application Interface Tree

5.2 Main Menu

From the Main menu the following sub-menus are accessible:

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

The main menu screen provides information tabs for DC, AC and “Other” production values as well as “Version” information as seen in **Figure 5-2**.

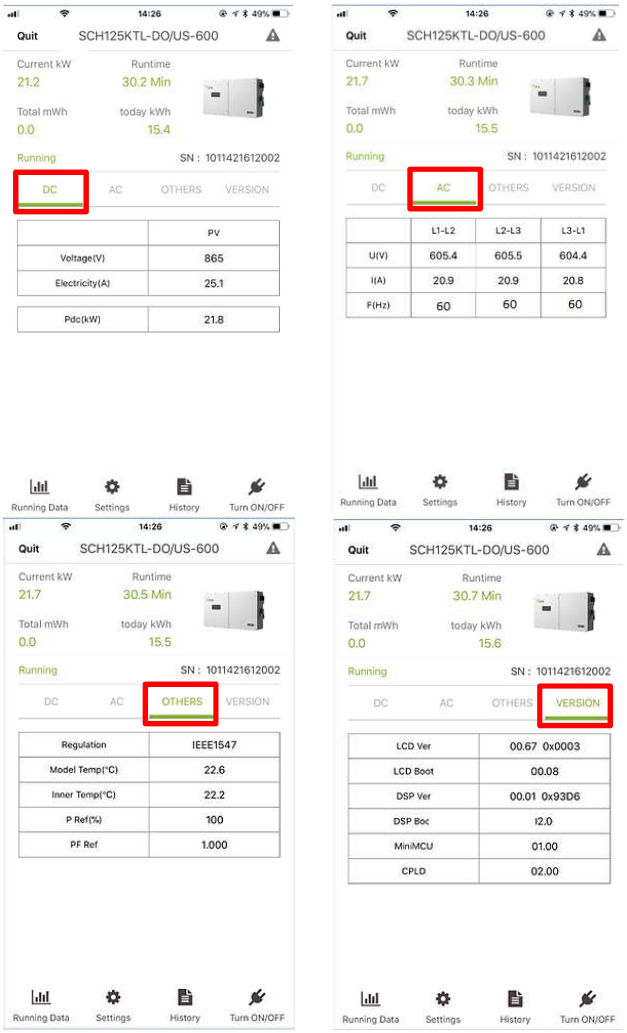


Figure 5-2 Main Menu

5.3 Running Data

The Running Data sub-menu provides the power generation view with Current, Day, Month, Year and Total as shown in **Figure 5-3**.

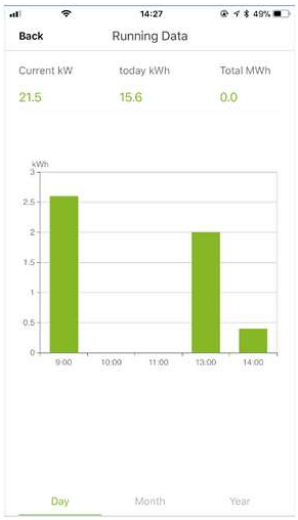


Figure 5-3 Running Data

5.4 Settings

To access the Settings page input the password “1111”.

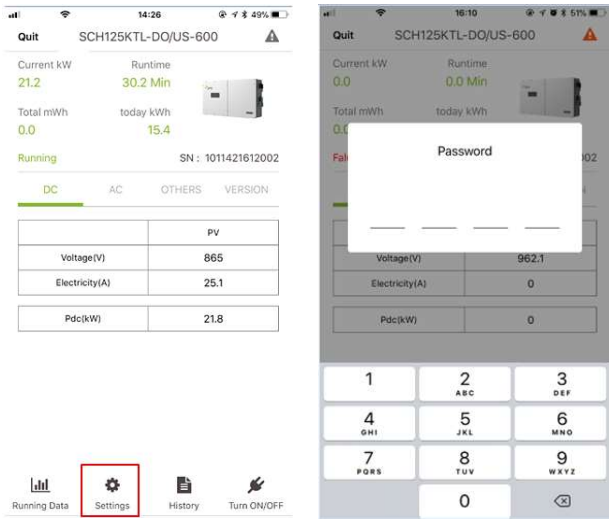


Figure 5-4 Accessing Settings

The Settings menu allows access to the following sub-menus:

- Inverter Parameters
- Read/Write Register
- Fault Recording
- Upgrade Firmware

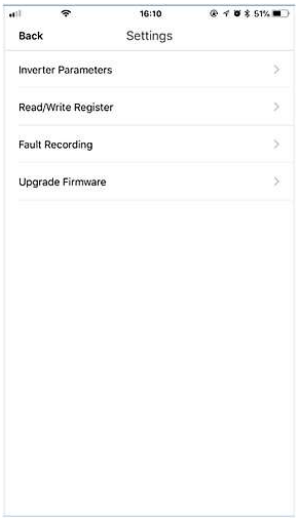


Figure 5-5 Settings Sub-menu

5.4.1 Inverter Parameters

The Inverter Parameters section provides access to the following sub-menus: Regulation, PV Link Type, Neutral Line, RS 485, Inverter Clock and Change Password as shown in **Figure 5-6**. The current settings, made during the commissioning step will be visible.

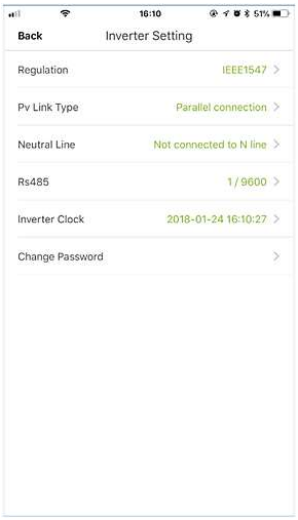


Figure 5-6 Inverter Parameter Settings

5.4.2 Read/Write Register

The Read/Write Register provides access to the following sub-menus:

- Commands
- Enable/Disable
- Protect
- LVRT/HVRT
- Active Power Derating
- Reactive Power Derating
- Others

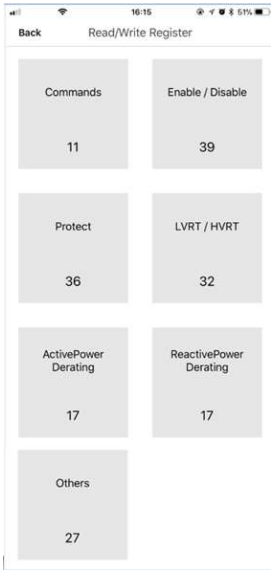


Figure 5-7 Read/Write Register

5.4.2.1 Commands

The following 9 options are available in the Commands menu:

- **Power On/Off**: Manual Power ON/OFF is required after regulation setting or manual (fault) shut-down.
- **Force Restart**: If a fault shutdown occurs, a severe fault may have occurred inside the inverter. The user can perform a force reboot for one time per Power-on in this menu if the user needs to restart the inverter.
- **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.
- **MPPTScan**: Used to execute the MPPT scanning manually. The device screen will skip to normal operation interface if the MPPT

scanning succeeds or remain on the "**MPPTScan menu**" interface if the scanning fails.

- **ArcDetect**: Execute the "**ARC Detect**". The inverter will stop operating and test AFCI.
- **ArcAlarmClear**: Used to clear the ARC fault. The operation result will appear on the Device, i.e. "Succeed" or "Failed".
- **PF_Remote**: Used for Reactive Power Derating.
- **P_Remote**: Used for Reactive Power Derating.
- **Q_Remote**: Used for Reactive Power Derating.

Figure 5-8 Command Sub-menu

MPPT scan function is factory set to **Enabled**, yet can also be set to **Disabled**. When the MPPT scan function is enabled, the scan occurs every 60 minutes. The inverter will scan the maximum power point in the MPPT range when the total input power is lower than 90% of the active power.

Once this MPPT scan function is activated on the device, it will search

the maximum power point at a voltage step of 5V in the MPPT range for full load and retrieve the maximum power point.

ArcDetect and protection is mainly divided into two parts; the Arcing check board is responsible for whether there is Arcing in line, and transfer Arcing protection signal to the DSP in the dominating control board. The control board DSP is responsible for the control of removing the inverter from the grid after receiving the Arcing signal to ensure safety. The Arcing board failure will cause 'ARC board err' shown on the device and it will not connect to the grid until the arc board is OK. If there is an Arcing fault, the device displays the fault which can only be cleared manually.

5.4.2.2 Enable/Disable

Enable/Disable is used to enable or disable the functions and protect the following parameters:

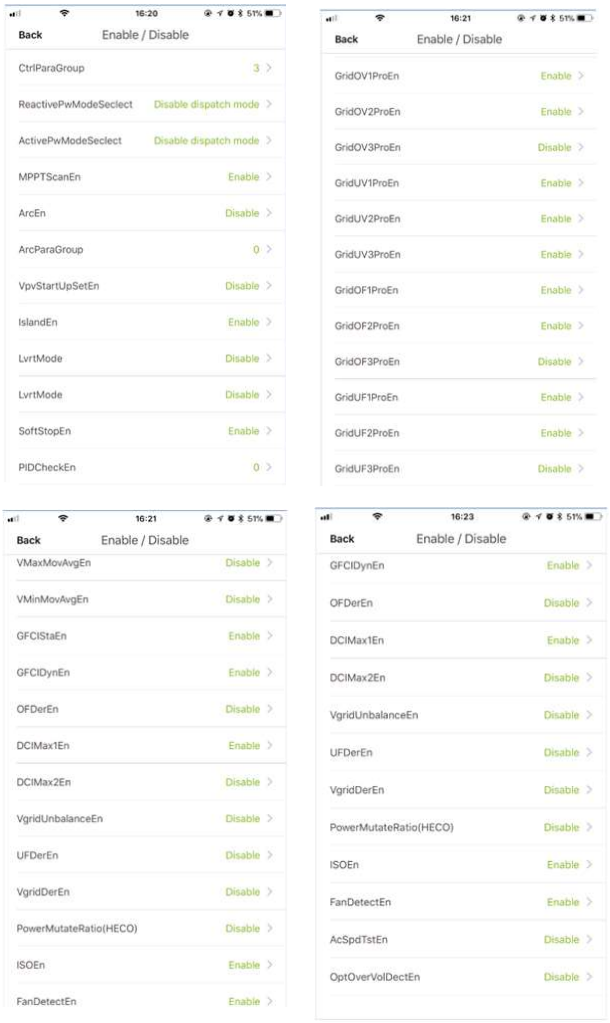


Figure 5-9 Parameter Enable/Disable

5.4.2.3 Protect

The **Protect** interface is used to display and set the protection parameters of the AC grid voltage, frequency and recovery, etc.

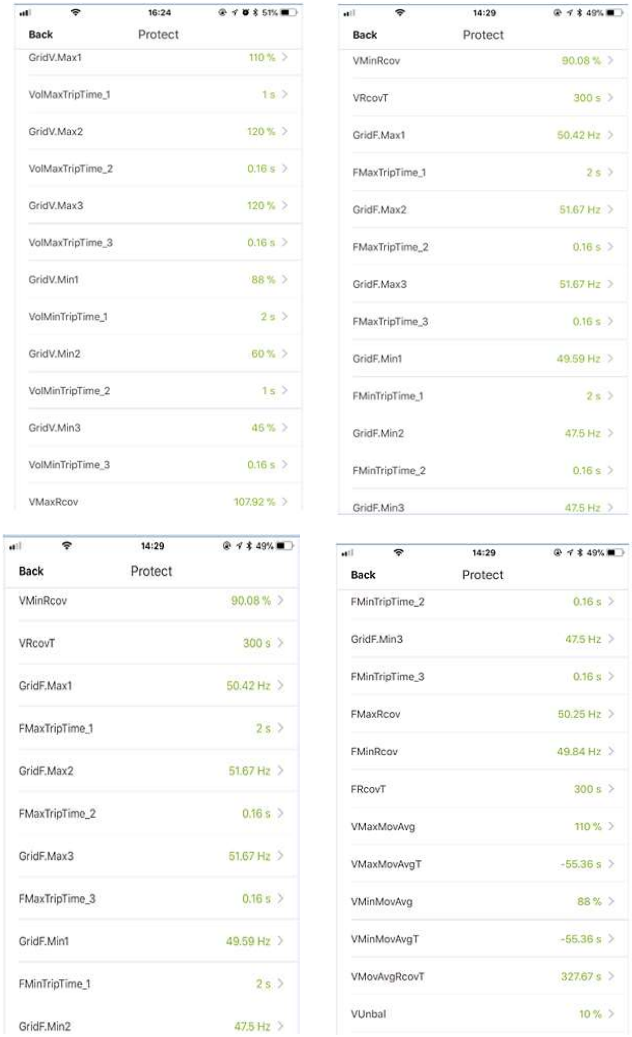


Figure 5-10 Protect Parameters

Table 5-1 The Protection Parameters (IEEE1547 and Rule21)

Grid Over Voltage Protection			
Parameter name	**Description**	**Setup range (lower limit, default, upper limit) IEEE-1547**	**Setup range (lower limit, default, upper limit) Rule-21**
GridVoltMax1	Threshold value of Level 1 Max. grid voltage	{100.00%, 110.00%, 135.00%}	{100.00%, 110.00%, 135.00%}
VoltMaxTripTime1(S)	Threshold value of Level 1 Max. grid trip voltage	{0, 1.00, 655}	{0, 12.50, 655}
GridVoltMax2	Threshold value of Level 2 Max. grid voltage	{100.00%, 120.00%, 135.00%}	{100.00%, 120.00%, 135.00%}
VoltMaxTripTime2(S)	Threshold value of Level 2 Max. grid trip voltage	{0, 0.16, 655}	{0, 0.16, 655}
GridVoltMax3	Threshold value of Level 3 Max. grid voltage	{100.00%, 120.00%, 135.00%}	{100.00%, 120.00%, 135.00%}
VoltMaxTripTime3(S)	Threshold value of Level 3 Max. grid trip voltage	{0, 0.16, 655}	{0, 0.16, 655}
Grid Low Voltage Protection			
GridVoltMin1	Threshold value of Level 1 Min. grid voltage	{30.00%, 88.00%, 100.00%}	{30.00%, 88.00%, 100.00%}
VoltMinTripTime1(S)	Threshold value of Level 1 Min. grid trip voltage	{0, 2.0, 655}	{0, 20.50, 655}
GridVoltMin2	Threshold value of Level 2 Min. grid voltage	{30.00%, 60.00%, 100.00%}	{30.00%,70.00%, 100.00%}

Parameter name	Description	Setup range (lower limit, default, upper limit) IEEE1547	Setup range (lower limit, default, upper limit) Rule-21
VoltMinTripTime2(S)	Threshold value of Level 2 Min. grid trip voltage	{0, 1.00, 655}	{0, 10.50, 655}
GridVoltMin3	Threshold value of Level 3 Min. grid voltage	{30.00%, 45.00%, 100.00%}	{30.00%, 50.00%, 100.00%}
VoltMinTripTime3(S)	Threshold value of Level 3 Min. grid trip voltage	{0, 0.16, 655}	{0, 1.5, 655}
Grid Low Frequency Protection			
GridFrqMin1	Protection threshold value of Level 1 Min. grid frequency (Hz)	{54, 59.5, 60}	{45, 58.5, 60}
FrqMinTripT1(S)	Trip time of Level 1 Min. grid frequency	{0, 2, 655}	{0, 299.50, 655.00}
GridFrqMin2	Protection threshold value of Level 2 Min. grid frequency (Hz)	{54, 57, 60}	{45, 57, 60}
FrqMinTripT2(S)	Trip time of Level 2 Min. grid frequency	{0, 0.16, 655}	{0, 0.16, 655}
GridFrqMin3	Protection threshold value of Level 3 Min. grid frequency (Hz)	{54, 57, 60}	{54, 57, 60}
FrqMinTripT3(S)	Trip time of Level 3 Min. grid frequency	{0, 0.16, 655}	{0, 0.16, 655}

Grid Over Frequency Protection			
Parameter name	**Description**	**Setup range (lower limit, default, upper limit) IEEE1547**	**Setup range (lower limit, default, upper limit) Rule-21**
GridFrqMax1	Protection threshold value of Level 1 Max. grid frequency (Hz)	{60, 60.5, 65}	{50, 60.5, 65}
FrqMaxTripT1(S)	Trip time of Level 1 Max. grid frequency	{0, 2, 655}	{0, 299.50, 655}
GridFrqMax2	Protection threshold value of Level 2 Max. grid frequency (Hz)	{50, 62, 65}	{50, 62, 65}
FrqMaxTripT2(S)	Trip time of Level 2 Max. grid frequency	{0, 0.16, 655}	{0, 0.16, 655}
GridFrqMax3	Protection threshold value of Level 3 Max. grid frequency (Hz)	{60, 62, 65}	{50, 62, 65}
FrqMaxTripT3(S)	Trip time of Level 3 Max. grid frequency	{0, 0.16, 655}	{0, 0.16, 655}
Grid Recovery			
VolMax(V)	Recovery Max threshold grid voltage protection	{80.00%, 107.92%, 135.00%}	{80.00%, 107.99%, 135.00%}
VolMin(V)	Recovery Min threshold. grid voltage protection	{20.00%, 90.08%, 100.00%}	{20.00%, 90.00%, 100.00%}
VolRecoveryT(S)	Recovery time of grid voltage protection	{0, 300, 655}	{0, 300, 655}
FrqMax(Hz)	Recovery Max thresholdgrid Frequency protection	{54, 60.3, 66}	{54, 60.4, 65}

Parameter name	Description	Setup range (lower limit, default, upper limit) IEEE1547	Setup range (lower limit, default, upper limit) Rule-21
FrqMin(Hz)	Recovery Min threshold. grid Frequency protection	{54, 59.8, 60}	{48, 58.6, 60}
FrqRecoveryT(S)	Recovery time of grid frequency protection	{0, 300, 655}	{0, 300, 655}
Grid Voltage Balance			
GridVolBalance	Threshold value of grid voltage unbalance	(0.01%,10%,10%)	(0.01%,10%,10%)

5.4.2.4 LVRT/HVRT

LVRT/HVRT is used to set the LVRT (Low voltage ride through) and HVRT (High voltage ride through) parameters as following:

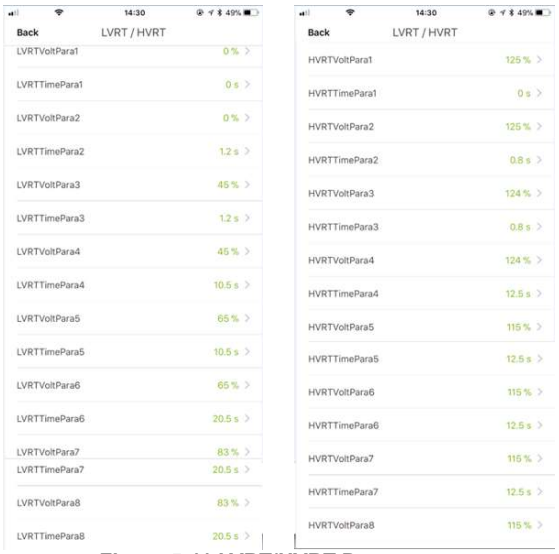


Figure 5-11 LVRT/HVRT Parameters

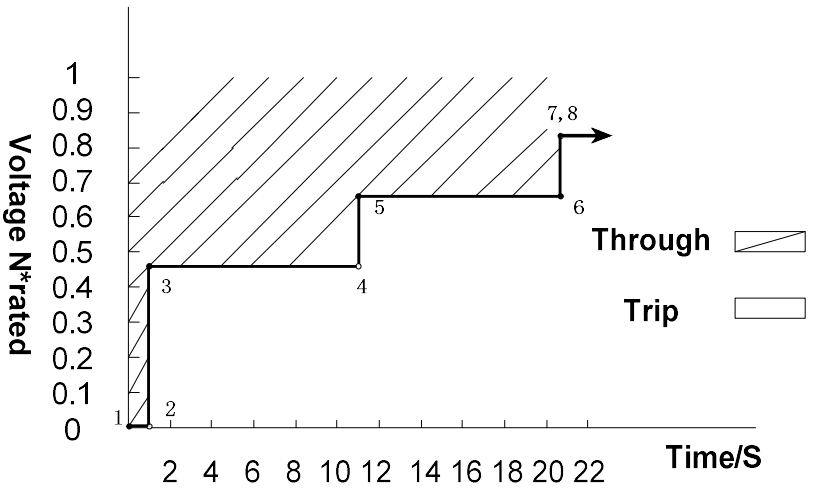


Figure 5-12 LVRT Curve

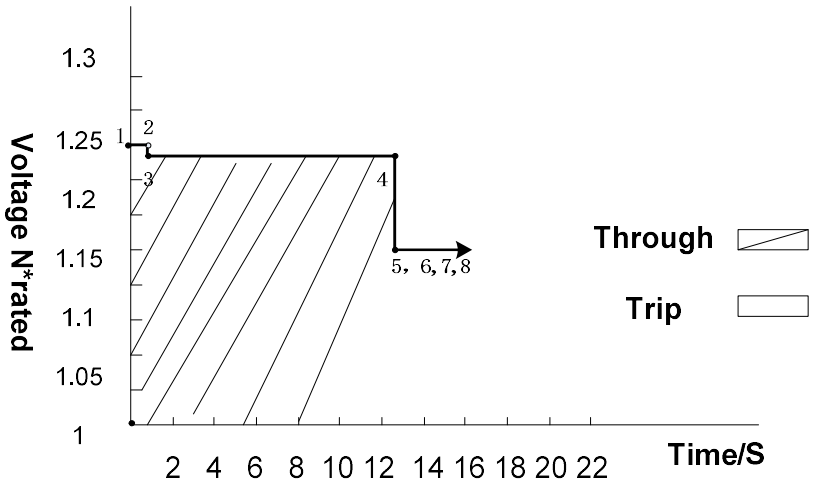


Figure 5-13 HVRT Curve

Table 5-2 LVRT and HVRT Parameters

LVRT			
Parameter name	**Description**	**Setup range (lower limit, default, upper limit) IEEE1547**	**Setup range (lower limit, default, upper limit) Rule-21**
LVRTVoltPara(1,2)	Threshold value of Low voltage ride through (first & second point)	{0%, 0%, 100%} {0%, 0%, 100%}	{0%, 0%, 100%} {0%, 0%, 100%}
LVRTTimePara(1,2)	Time of Level Low voltage ride through (first & second point)	{0, 0, 655} {0, 1.2, 655}	{0, 0, 655} {0, 1.2, 655}
LVRTVoltPara(3,4)	Threshold value of Low voltage ride through (third & fourth point)	{0%, 45%, 100%} {0%, 45%, 100%}	{0%, 50%, 100%} {0%, 50%, 100%}
LVRTTimePara(3,4)	Time of Level Low voltage ride through (third & fourth point)	{0,1.2, 655} {0, 10.5, 655}	{0,1.2, 655} {0, 10.5, 655}
LVRTVoltPara(5,6)	Threshold value of Low voltage ride through (fifth & sixth point)	{0%, 65%, 100%} {0%, 65%, 100%}	{0%, 70%, 100%} {0%, 70%, 100%}
LVRTTimePara(5,6)	Time of Level Low voltage ride through (fifth & sixth point)	{0, 10.5, 655} {0, 20.5, 655}	{0, 10.5, 655} {0, 20.5, 655}
LVRTVoltPara(7,8)	Threshold value of Low voltage ride through (seventh & eighth point)	{0%, 83%, 100%} {0%, 83%, 100%}	{0%, 88%, 100%} {0%, 88%, 100%}
LVRTTimePara(7,8)	Time of Level Low voltage ride through (seventh & eighth point)	{0, 20.5, 655} {0, 20.5, 655}	{0, 20.5, 655} {0, 20.5, 655}

HVRT			
Parameter name	**Description**	**Setup range (lower limit, default, upper limit) IEEE1547**	**Setup range (lower limit, default, upper limit) Rule-21**
HVRTVoltPara(1,2)	Threshold value of high voltage ride through (first & second point)	{100%, 125%, 135%} {100%, 125%, 135%}	{100%, 125%, 135%} {100%, 125%, 135%}
HVRTTimePara(1,2)	Time of Level high voltage ride through (first & second point)	{0, 0, 655} {0, 0.8, 655}	{0, 0, 655} {0, 0.11, 655}
HVRTVoltPara(3,4)	Threshold value of high voltage ride through (third & fourth point)	{100%, 124%, 135%} {100%, 124%, 135%}	{100%, 120%, 135%} {100%, 120%, 135%}
HVRTTimePara(3,4)	Time of Level high voltage ride through (third & fourth point)	{0, 0.8, 655} {0, 12.5, 655}	{0, 0.11, 655} {0, 12.5, 655}
HVRTVoltPara(5,6)	Threshold value of high voltage ride through (fifth & sixth point)	{100%, 115%, 135%} {100%, 115%, 135%}	{100%, 110%, 135%} {100%, 110%, 135%}
HVRTTimePara(5,6)	Time of Level high voltage ride through (fifth & sixth point)	{0, 12.5, 655} {0, 12.5, 655}	{0, 12.5, 655} {0, 12.5, 655}
HVRTVoltPara(7,8)	Threshold value of high voltage ride through (seventh & eighth point)	{100%, 115%, 135%} {100%, 115%, 135%}	{100%, 110%, 135%} {100%, 110%, 135%}
HVRTTimePara(7,8)	Time of Level high voltage ride through (seventh & eighth point)	{0, 12.5, 655} {0, 12.5, 655}	{0, 12.5, 655} {0, 12.5, 655}

5.4.2.5 Active Power Derating

The **ActivePowerDerating** menu is used to set the active power derating parameters including Active Power Derating, Over frequency derating, Low frequency derating and High temperature frequency derating, etc. The parameters are shown in **Table 5-3**.

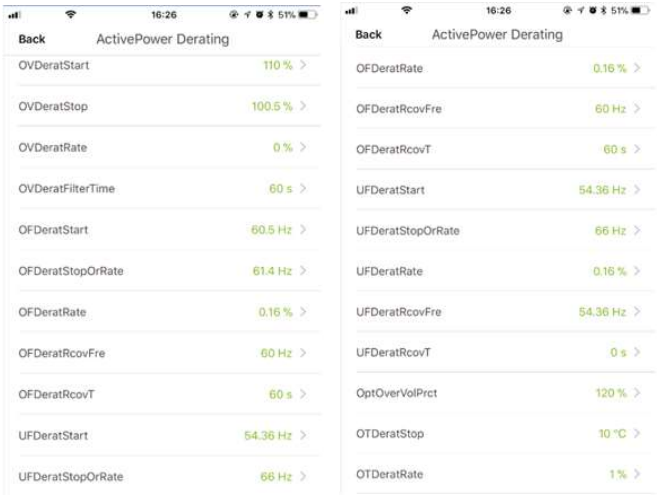


Figure 5-14 Active Power Derating menu

Table 5-3 Power Derating Setup

Parameter name	Description	Setup range (lower limit, default, upper limit) IEEE1547	Setup range (lower limit, default, upper limit) Rule-21
OVDeratStart	The trigger Voltage of Overvoltage derating	{100%,110%,135%}	{100%,110%,135%}
OVDeratStop	The end Voltage of Overvoltage derating	{95%,100.5%,105%}	{95%,100.5%,105%}
OVDeratRate	The rate of Overvoltage derating	{0%,0%,100%}	{0%,0%,100%}
OvrVoltFilterT(s)	The filtering time of OverVoltage derating	{1,60,90}	{1,60,90}

Table 5-3 Power Derating Setup Continued

Parameter name	Description	Setup range (lower limit, default, upper limit) IEEE1547	Setup range (lower limit, default, upper limit) Rule-21
OFDeratStart(Hz)	The trigger of OverFrequency derating	{54,60.5,66}	{54,60.2,66}
OFDeratStop(Hz)	The end frequency of Overfrequency derating	{60,61.4,72}	{60,61.5,72}
OFDeratRate(P%/s)	The rate of Overfrequency derating	{0,01,0.16,10}	{0,01,8.00,10}
OFDeratRcovFre(Hz)	The recovery frequency of OverFrequency derating	{58.8,60,66}	{58.8,60.20,66}
OFDeratRcovT(s)	The recovery time of OverFrequency derating	{0,60,1200}	{0,20,1200}
UFDeratStart(Hz)	The trigger of UnderFrequency derating	{54,54.36,60}	{54,54.36,60}
UFDeratStop(Hz)	The end frequency of UnderFrequency derating	{60,61.4,72}	{60,61.5,72}
UFDeratRate(P%/s)	The rate of UnderFrequency derating	{0,01,0.16,10}	{0,01,8.00,10}
UFDeratRcovFre(Hz)	The recovery frequency of UnderFrequency derating	{58.8,60,66}	{58.8,60.20,66}
UFDeratRcovT(s)	The recovery time of UnderFrequency derating	{0,60,1200}	{0,20,1200}
OptOverVolPrct	The Value of Operating overvoltage protect	{110%,120%,135%}	{110%,120%,135%}
OTDeratRate	The rate of OverTemp derating	{1%,1%,10%}	{1%,1%,10%}

5.4.2.6 Reactive Power Derating

The **ReactivePowerDerating** menu is used to set the Grid reactive power derating parameters including PF parameters and Qu parameters, etc. The parameters as shown in **Table 5-4**.

Note: The PF and Q value can be adjusted by remote software if "Remote" is selected.

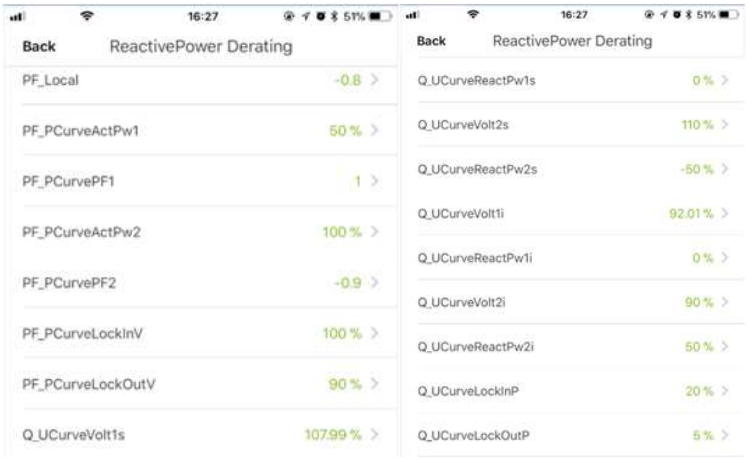


Figure 5-15 Reactive Power Derating menu

(1) **PF Set**: Set the PF value. Change the reactive power by adjusting the Power Factor.

(2) **PF(P) Curve**: PF curve mode. The power factor changes according to the power change, as shown in **Figure 5-16**.

INSTRUCTION:

The PF (P) Curve function is only available for IEEE-1547 grid standards.

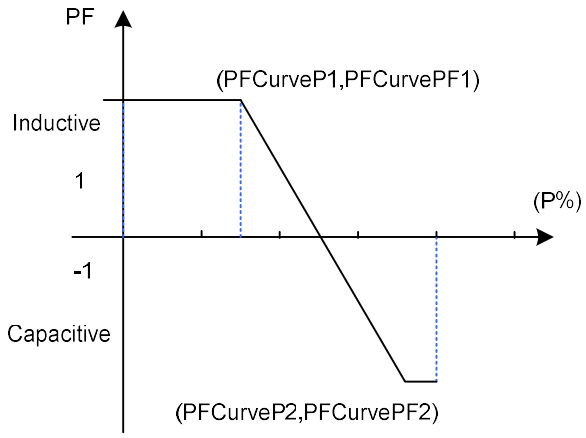


Figure 5-16 PF(P) Curve Model

(3) **Q(U) Curve**: Q(U) curve mode. The reactive compensation changes according to the grid voltage change, as shown in Figure 5-17.

INSTRUCTION:

The Q(U) curve function is only available for IEEE-1547 grid standards.

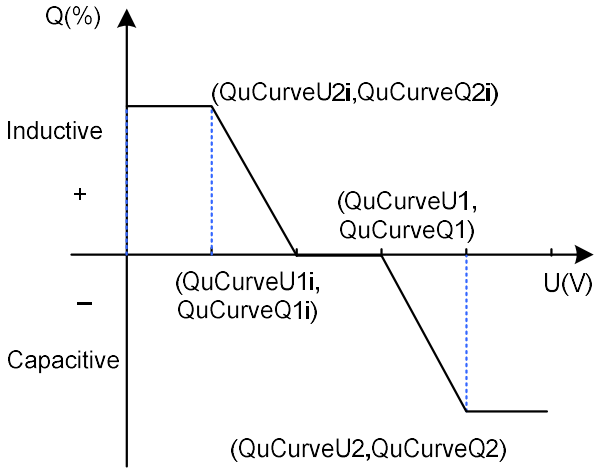


Figure 5-17 Q(U) Curve Mode

Table 5-4 lists the parameters of PF Set, PF(P) Curve and Q(U) Curve modes. Press **Enable** (refer **to Section 5.4.2.2**) to start up the modes after the parameters are entered.

Table 5-4 Parameters of Reactive Power Control (IEEE-1547 and Rule-21)

Grid Reactive Power Derating			
Parameter name	**Setup range (lower limit, default, upper limit) IEEE1547**	**Setup range (lower limit, default, upper limit) Rule-21**	**Description**
PF_Local	{-0.8,-1},{1},{0.8,1}	{-0.8,-1},{1},{0.8,1}	Local Power Factor Setting
PF_PCurveActPw1（%）	{0,50%,110%}	{0,50%,110%}	Power of PF(P)Curve point 1
PF_PCurvePF1	{-1,-0.8},{1},{0.8,1}	{-1,-0.8},{1},{0.8,1}	PF of PF(P)Curve point 1
PF_PCurveActPw2（%）	{0,100%,110%}	{0,100%,110%}	PF of PF(P)Curve point 2
PF_PCurvePF2	{-1,-0.8},{-0.9},{0.8,1}	{-1,-0.8},{-0.9},{0.8,1}	PF of PF(P)Curve point 2
PF_PCurveLockInV	{100%,100%,110%}	{100%,100%,110%}	The trigger voltage of PF(P)Curve
PF_PCurveLockOutV	{90%,90%,100%}	{90%,90%,100%}	PF curve revocation voltage
Q_UCurveVolt1s	{100%,107.99%,110%}	{100%,107.99%,110%}	Voltage of Q(U)Curve point 1
Q_UCurveReactPw1s	{-66%,0,66%}	{-60%,0,60%}	Reactive power of Q(U)Curve point 1
Q_UCurveVolt2s	{108%,110%,110%}	{108%,108%,110%}	Voltage of Q(U)Curve point 2
Q_UCurveReactPw2s	{-66%,-50%,66%}	{-60%,-60%,60%}	Reactive power of Q(U)Curve point 2

Parameter name	Setup range (lower limit, default, upper limit) IEEE1547	Setup range (lower limit, default, upper limit) Rule-21	Description
Q_UCurveVolt1i	{90%,92.01%,99%}	{90%,99%,99%}	Voltage of Q(U)Curve point 1i
Q_UCurveReactPw1i	{-66%,0,66%}	{-60%,0,60%}	Reactive power of Q(U)Curve point 1i
Q_UCurveVolt2i	{80%,90%,92%}	{80%,92%,92%}	Voltage of Q(U)Curve point 2i
Q_UCurveReactPw2i	{-66%,50%,66%}	{-60%,60%,60%}	Reactive power of Q(U)Curve point 2i
Q_UCurveLockInP	{5%,20%,100%}	{5%,20%,100%}	The trigger voltage of Q(U)Curve
Q_UCurveLockOutP	{5%,5%,100%}	{5%,5%,100%}	The end voltage of Q(U)Curve

5.4.2.7 Others

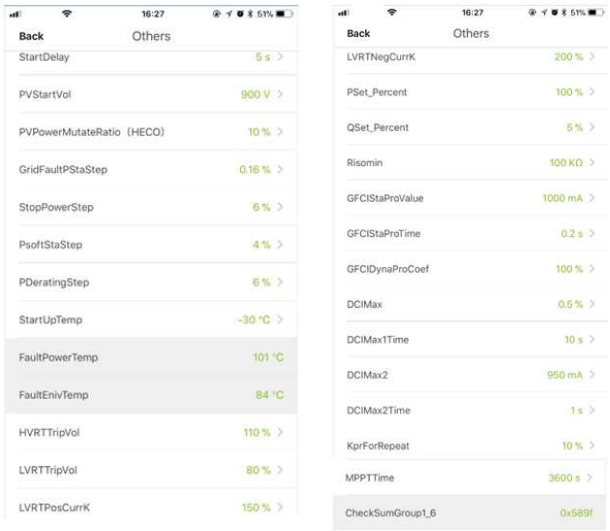


Figure 5-18 "Other" sub-menu

Table 5-5 Other Parameters

Parameter name	Description	Setup range (lower limit, default, upper limit) IEEE1547	Setup range (lower limit, default, upper limit) Rule-21
StartDelay	Startup delay time	(0,5,1200)	(0,5,1200)
PVStartVolt(V)	PV start-up voltage	(860,900,1000)	(860,900,1000)
PVPowerMutateRatio (HECO)	The output power should be slowly increased due to the change of PV illumination at the HECO standard.	{0.01%,10.00%,10%}	{0.01%,10.00%,10%} {0.01%,10.00%,10}
GridFaultPStaStep	Power startup step after Grid Fault	{0.01%,0.16%,10%}	{0.01%,0.16%,10%}
PDeratingStep	Normal power step in soft stop	{0.01%,6.00%,10%}	{0.01%,2.00%,10%}
StartUpTemp	Start Up Temperature	(-35,-30,-20)	(-35,-30,-20)
HVRTTripVol	The trigger Voltage of HVRT	{110%,110%,135%}	{110%,110%,135%}
LVRTTripVol	The trigger Voltage of LVRT	{80%,80%,100%}	{80%,80%,100%}
LVRTPosCurrK	Coefficient of LVRT positive current	{0%,150%,300%}	{0%,150%,300%}
PSet_Pecent	Active power derating percent	{0%,100%,100%}	{0%,100%,100%}
QSet_Pecent	Reactive power derating percent	{-100%,0%,100%}	{-100%,0%,100%}
Risomin	Minimum insulation resistance	(1k,100k,2000k)	(1k,100k,2000k)
GFCIStaProValue	The static threshold value of Leakage current	(100,1000,1000)	(100,1000,1000)

Table 5-5 Other Parameters Continued

Parameter name	Description	Setup range (lower limit, default, upper limit) IEEE1547	Setup range (lower limit, default, upper limit) Rule-21
GFCIStaProTime	The static threshold value of Leakage current	(0,0.2,655)	(0,0.2,655)
GFCIDynProCoef	The dynamic trigger coefficient of Leakage current	(0.0%,100%,200%)	(0.0%,100%,200%)
DCIMax	Maximum DCI value	(0.01%,0.50%,5.00%)	(0.01%,0.50%,5.00%)
DCIMax1Time	Trip time 1 of DCI value	(0.00,10.00,120.00)	(0.00,10.00,120.00)
DCIMax2	Maximum DCI value2	(5,950,5000)	(5,950,5000)
DCIMax2Time	Trip time 2 of DCI value	(0.00,1.00,120.00)	(0.00,1.00,120.00)
KprForRepeat	Parameter of repetitive control is for THDi	(0%,0%,100%)	(0%,0%,100%)
MPPTTime	MPPTScan Cycle	(300,3600,5400)	(300,3600,5400)

5.4.3 Fault Recording

The last record can store up to 128 faults in the **Fault Record** menu.

5.4.4 Firmware Upgrade

Update the firmware by using the APP LinKIT:

(1) If the APP LinKIT is not already installed, refer to **Section 4.3**.

(2) Select “Manage my site” and log in to your account (According to the LinKIT User manual)

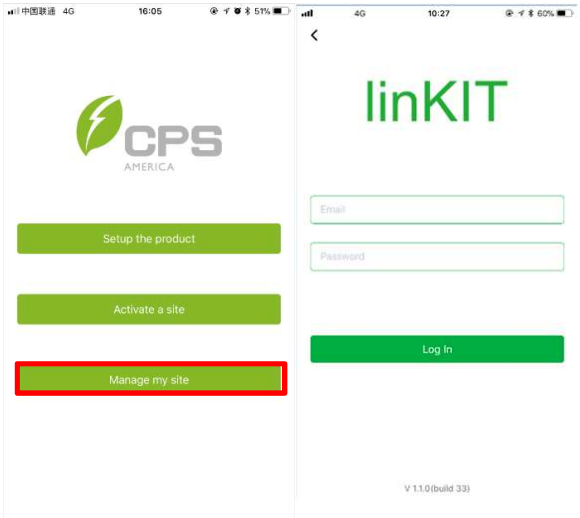


Figure 5-19 Firmware update via LinKIT

(3) Use the drop-down menu then select the “Firmware on cloud”.

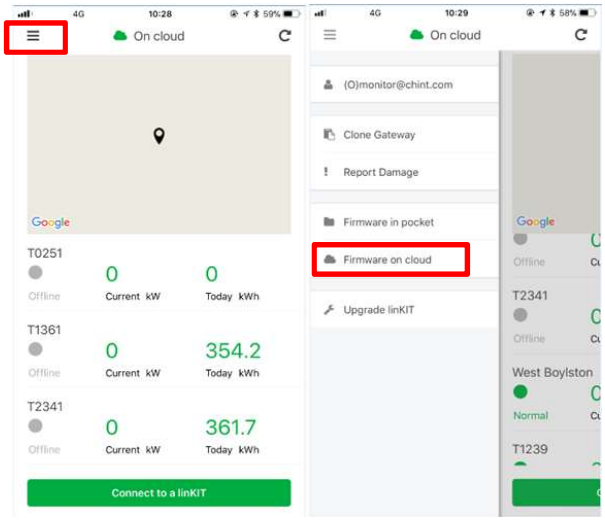


Figure 5-20 LinKIT Firmware on cloud

(4) Choose the “LCD” or “DPS” and “Inverter Model” then click the Firmware which is to be upgraded.

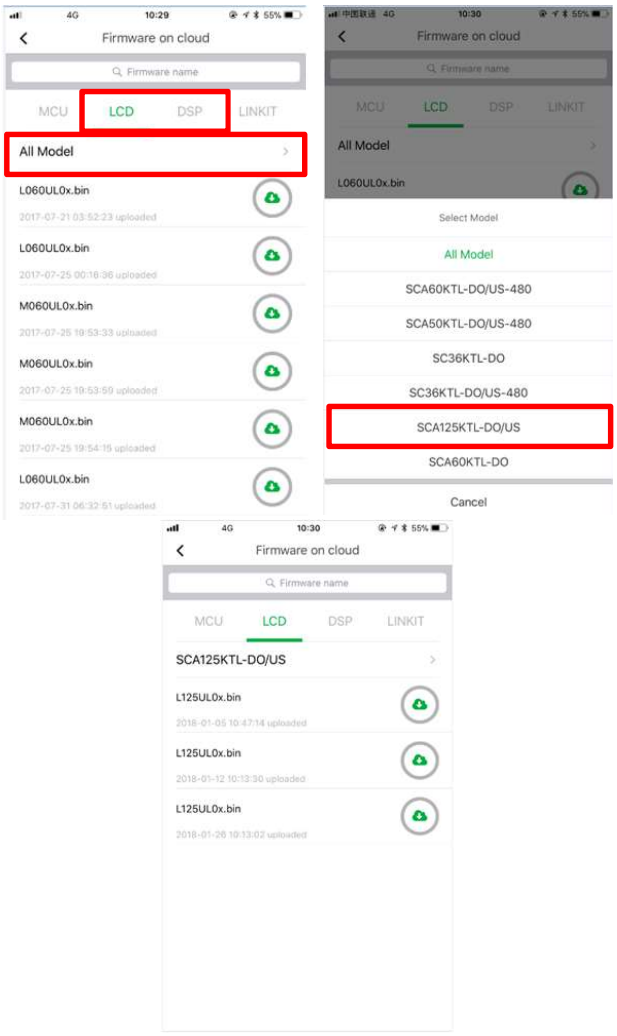


Figure 5-21 Choosing the firmware to upgrade

(5) Upgrade the Program. Choosing “Upgrade Firmware” and the previous selection of “LCD” or “DSP”, click start to begin upgrading.

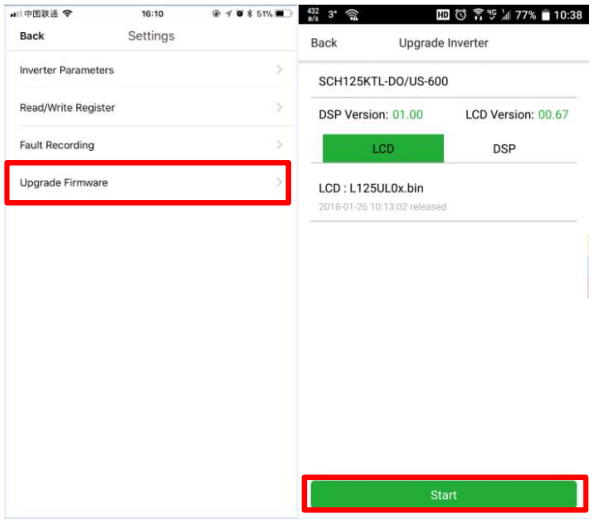


Figure 5-22 Upgrading Firmware

5.5 History

There are 2 submenus in the **History** menu: **Alarm** and **Running Status**.

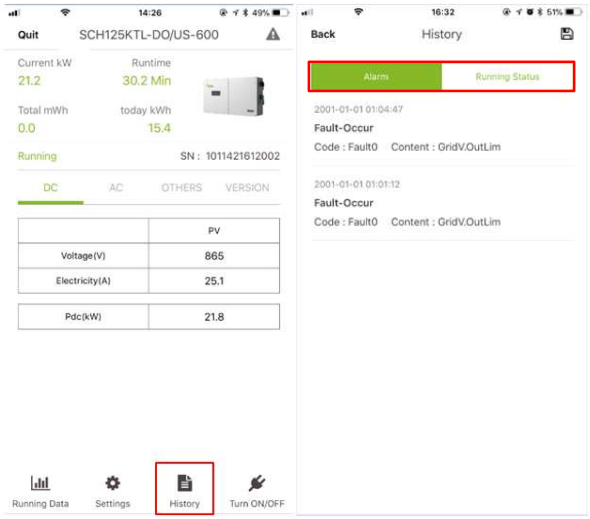


Figure 5-23 History menu

5.6 Turn ON/OFF

Manual Turn ON/OFF: Manual Power ON/OFF is required after regulation setting or manual (fault) shut-down.

(1) Select **Turn ON/OFF** at the bottom of the screen**.**

(2) Select **Turn ON** to start the inverter. The inverter will start up and operate normally if the start-up condition is met. Otherwise, the inverter will go to stand-by mode.

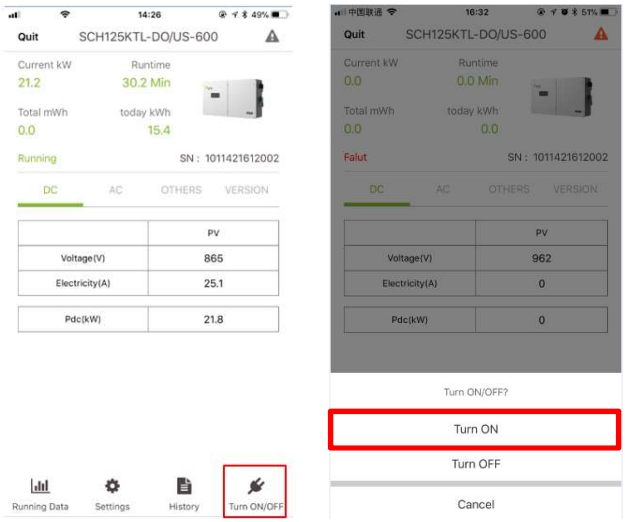


Figure 5-24 Turn ON/OFF

Normally, it is not necessary to Turn OFF the inverter, but it can be shut down manually if regulation setting or maintenance is required.

Move the cursor to submenu **"Turn ON/OFF"**. Move the cursor to "Turn OFF" and ensure, then the inverter will be shut down.

Automatic Turn ON/OFF: The inverter will start up automatically when the output voltage and power of PV arrays meet the set value, AC power grid is normal, and the ambient temperature is within allowable operating range.

The inverter will be shut down automatically when the output voltage and power of PV modules are lower than the set value, or AC power grid fails; or the ambient temperature exceeds the normal range.

Chapter 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 AC no power on
		Flash	PV no power and AC Power on
		Light off	No Power working
RUN	Grid-tied operation indication light	Light on	In grid-tied power generation state
		Flash	Derated running status (light up 0.5s, light off 1.5s)
		Light off	In other operation status or power supply not working
GRID	Grid status indication light	Light on	Grid is normal
		Flash	Grid fault (light up 0.5s, light off 1.5s)
		Light off	Power supply not working
FAULT	Fault status indication light	Light on	Indicates a Fault
		Slow flash	Indicates Alarm (light up 0.5s, light off 2s)
		Fast flash	Protective action (light up 0.5s, light off 0.5s)
		Light off	No fault or power supply not working
ALL	Upgrade status	flash	LCD or DSP upgrading

Table 6-2 Troubleshooting of LED Lights

LED fault status	Solutions
The **Power** LED does not light up.	1. Turn off the external AC breaker 2. Switch the DC switch to “OFF” position 3. Check the PV input voltage and polarity
The **GRID** LED is blinking.	1. Turn off the external AC breaker 2. Switch the DC switch to “OFF” position 3. Check whether the grid voltage is normal and whether the cable connection of AC side is correct and secure
The **RUN** LED light is off or **FAULT** LED lights up.	Refer to **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 output short circuit, grid overvoltage / undervoltage, grid overfrequency / underfrequency, high environmental temperature or internal malfunction of the machine. The fault information will be displayed on the APP interface. Please refer to “5.4.3 Fault Recording” for detailed operation.

The causes of a fault can be identified based on the faults listed in **Table 6-3**. Proper analysis is recommended before contacting after-sales service. There are 4 types of fault: **Alarm**, **Protection, Fault** and **Warn**.

Table 6-3 Troubleshooting Alarm Codes

Alarm	1.CommErr	Definition: Communication inside inverter fails
		Possible causes: Terminal block connecters of internal communication wires have poor contact
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Switch off 3-phase working power supply and then reboot the system; 3. Contact after-sales service personnel
	2.ExtFanErr	Definition: Cooling fan failure by visual check
		Possible causes: 1. Fan is blocked; 2. Fan service life has expired; 3. Fan socket connecter has poor contact.
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Check for foreign objects on fan blades; 3. Switch off 3-phase power supply and then reboot the system; 4. Contact after-sales service personnel

Alarm	3. IntFanErr	Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Check for foreign objects on fan blades; 3. Switch off 3-phase work power supply and then reboot the system; 4. Contact after-sales service personnel.

Table 6-4 Troubleshooting Warning Codes

Warn	Warn0030 (EepromErr)	Definition: Internal alarm
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Contact after-sales service personnel.
	Warn0040 (DC SPD fault)	Recommended solutions: The alarm is reserved now. The alarms in field can be ignored.
	Warn0050 (TempSensorErr)	Recommended solutions: 1. Observe temperature display; 2. Switch off 3-phase working power supply and then reboot the system; 3. Contact after-sales service personnel.
	Warn0100 (AC SPD fault)	Recommended solutions: The alarm is reserved now. The alarms in field can be ignored.

Table 6-5 Troubleshooting Protection Codes

Protection	Protect0090 (Bus over voltage)	Recommended solutions: 1. Restart inverter by recycle both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	Protect0070 (Bus imbalance)	Recommended solutions: 1. Raise limit of IDCmax (for example, 400mA) to allow inverter more room to adjust in transient condition to cope with imbalance of impedance and voltage between Grid phases. 2. If after adjustment, alarm still occurs, replace inverter.

Protection	Protect0030 (Inverter Over Current)	Recommended solutions: 1. Restart inverter by recycle both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	GridV.OutLim	Recommended solutions: 1. Make sure the grid connection is good. 2. Restart the inverter again.
	GridF.OutLim	Recommended solutions: 1. Check the AC wires connection and AC frequency is in range; 2. Check the measurement value in LCD, if the grid frequency is in limit, restart the inverter.
	Protect0020 (Grid relay error)	Recommended solutions: 1. Restart inverter by recycle both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	TempOver (Over-temperature protection)	Recommended solutions: 1. Confirm that external ambient temperature is within the specified range of operating temperature; 2. Check whether air inlet is blocked; 3. Check whether fan is blocked; 4. Check whether the location of installation is appropriate or not; 5. Observe for 30 minutes and see whether the alarm will be eliminated automatically; 6. Contact after-sales service personnel.
	Protect0180 (The sampling offset of DCI)	Recommended solutions: 1. If the inverter can start up, then recalibrate. 2. If the inverter consistently reports this alarm and cannot start up, then replace inverter.
	Protect0170 (DCI high)	Recommended solutions: 1. Raise limit of DCImax (for example, 400mA) to allow inverter more room to adjust in transient condition to cope with imbalance of impedance and voltage between Grid phases. 2. After raising limit, if inverter cannot clear fault, replace inverter.

Protection	IsolationErr (Insulation resistance low)	Check wires of PV and ground: 1. Turn OFF AC switch to disconnect inverter from Grid. 2. Open fuse drawers to de-couple PV strings from each other. Test strings with string test set. 3. Add one PV string at a time and start up inverter to see if alarm occurs. 4. If there is no alarm, turn OFF AC switches to disconnect from Grid and add in the next string. Startup inverter again. 5. Continue until you can find the string that triggers the alarm. Trace wirings of faulted string to find any leakage to Earth Ground. 6. The parameter ISOResist in hidden menu can be adjusted.
	GFCIErr (leakage current high)	Check wires of PV and ground: 1. Turn OFF AC switch to disconnect inverter from Grid. 2. Open fuse drawers to de-couple PV strings from each other. Test strings with string test set 3. Add one PV string at a time and start up inverter to see if alarm occurs. 4. If there is no alarm, turn OFF AC switches to disconnect from Grid and add in the next string. Startup inverter again. 5. Continue until you can find the string that triggers the alarm. Trace wirings of faulted string to find any leakage to Earth Ground.
	Protect0150 (Mini MCU Fault)	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	Protect0110 (BUS over voltage (firmware))	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	Protect0100 (The sensor fault of leakage current)	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If not cleared, replace Filter board or inverter.

Protection	PV Reverse (PV input reverse connection)	Recommended solutions: 1. Turn DC Switch OFF 2. Open Fuse holder to isolate PV strings 3. Use meter to find which PV string is connected in reverse polarity 4. Correct PV string connection
	PV Over current (PV Over current)	Recommended solutions: 1. Check PV input Current 2. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	PVVoltOver	Recommended solutions: 1. Measure voltage at DC terminals in wire-box and compare with reading in Measurement menu. PV voltage must be less than 1500V in open circuit condition. 2. If display reading is not within 2% of meter reading, replace inverter. If display reading is within 2% of meter reading, adjust number of panel in the string.
	Protect0230 (Inverter open-loop self-test fault)	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	ARC Protect	Recommended solutions: 1. Check logic connector to Arc board to be secure. 2. Run Arc Fault Test from Settings Menu 3. If Alarm re-occurs, replace arc board or wire-box.
	Arcboard Err	Recommended solutions: 1. Check logic connector to Arc board to be secure. 2. Run Arc Fault Test from Settings Menu 3. If Alarm re-occurs, replace arc board or wire-box.

Table 6-6 Troubleshooting Fault Codes

Fault	Fault0130 (Bus over total voltage)	Recommended solutions: 1. Restart inverter by recycle both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	Fault0110 (Bus imbalance)	Recommended solutions: 1. Raise limit of IDCmax (for example, 400mA) to allow inverter more room to adjust in transient condition to cope with imbalance of impedance and voltage between Grid phases. 2. If after adjustment, alarm still occurs, replace inverter.
	Fault0100 (Grid relay fault)	Recommended solutions: 1. Restart inverter by recycle both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.
	Fault0090 (Dynamic leakage current high)	Check wires of PV and ground: 1. Turn OFF AC switch to disconnect inverter from Grid. 2. Open fuse drawers to de-couple PV strings from each other. Test strings with string test set. 3. Add one PV string at a time and start up inverter to see if alarm occurs. 4. If there is no alarm, turn OFF AC switches to disconnect from Grid and add in the next string. Startup inverter again. 5. Continue until you can find the string that triggers the alarm. Trace wirings of faulted string to find any leakage to Earth Ground.
	Fault0080 (Bus Hardware over current fault)	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.

	Fault0060 (CPLD Fault)	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace Control Board or inverter.
	Fault0020 (Bus over volt Hardware)	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. 2. If inverter cannot clear fault, replace inverter.
	Fault0150 (Open-loop self-check failure)	Recommended solutions: 1. Restart inverter by recycling both AC and DC switches. Wait for 1 minute between OFF and ON for all energy to discharge. 2. If inverter cannot clear fault, replace inverter.

DANGER:

Please disconnect the inverter from AC grid and PV modules before opening the equipment. Make sure hazardous high voltage and energy inside the equipment has been discharged.

Do not operate or maintain the inverter until at least 5 minutes after disconnecting all sources of DC and AC.

Chapter 7 Product Maintenance

7.1 Check Electrical Connections

Check all conductor connections as a regular maintenance inspection every 6 months or once a year.

(1) Check the conductor connections. If loose, tighten all connections, referring to **3.3 Electrical installation**.

(2) Check for cable damage, especially whether the surface is scratched or smooth. Repair or replace the cables if necessary.

7.2 Clean the Air Vent Filter

The inverter can become hot during normal operation. The CPS SCH100/125KTL-DO inverters use built in cooling fans to provide sufficient air flow to help in heat dissipation.

Check the air vent regularly to make sure it is not blocked and clean the vent with soft brush or vacuum cleaner if necessary.

7.3 Replace the Cooling Fans

If the internal temperature of the inverter is too high or abnormal noise is heard, assuming the air vent is not blocked and is clean, it may be necessary to replace the external fans.

Attention: Disconnect the AC & DC power when replacing the fans.

Refer to **Figure 7-1** for replacing 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 cooling fan. (**Figure 7-1.2**)

(3) Use a No. 2 Phillips head screwdriver to remove the screws of the individual fans. (**Figure 7-1.3**)

(4) Attached the new cooling fans on the fan tray and fasten the cable on

the fan tray with cable ties. Torque value: 15 in-lbs. (1.7 Nm).

(5) Install the assembled fans back to the inverter. Torque value: 13.3 in-lbs. (1.5 Nm).

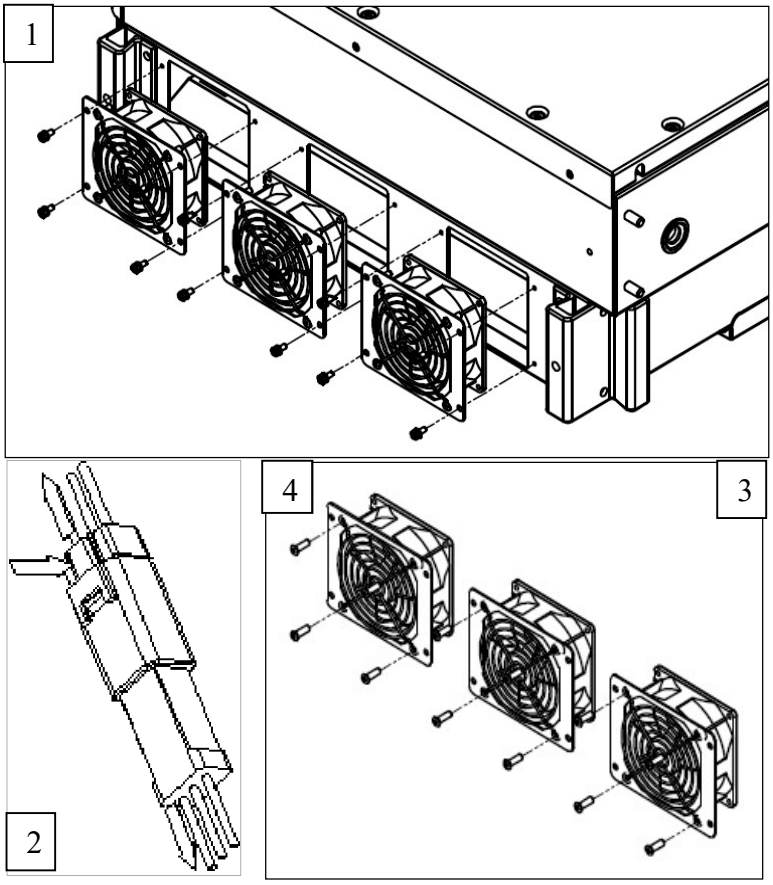


Figure 7-1 Replacing the Cooling Fans

7.4 Replace the Inverter

Confirm the following steps before replacing the inverter:

(1) The AC breaker of inverter is turned off.

(2) The DC switch of inverter is turned off.

Replace the inverter according to the following steps:

(1) Unlock the padlock if it is installed on the inverter.

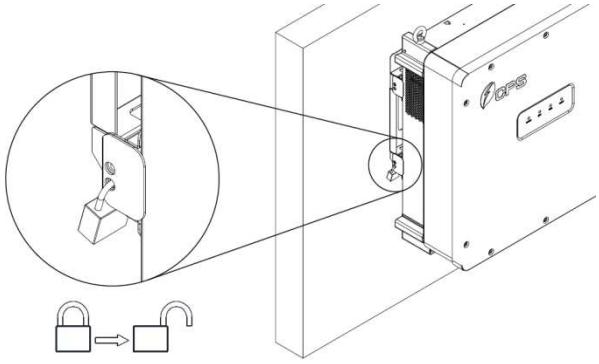


Figure 7-2 Unlock the Padlock

(2) Use a No. 3 phillips head screwdriver to unscrew the 2 screws on top of both the wire-box and inverter to remove the connector covers.

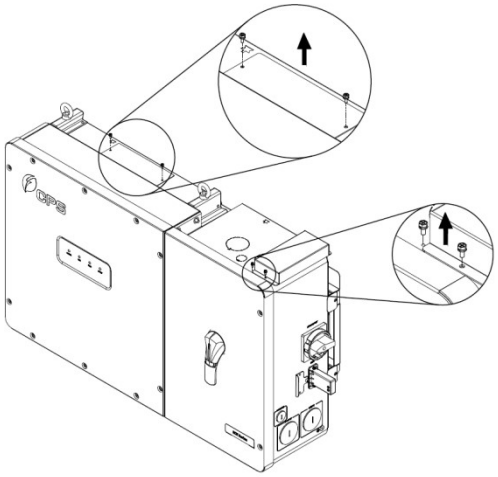


Figure 7-3 Remove the screws on both sides

(3) Use a No. 10 hex wrench to remove the 4 screws between the main inverter enclosure and the wire-box. Slide the wire-box right to disconnect the inverter from the wire-box.

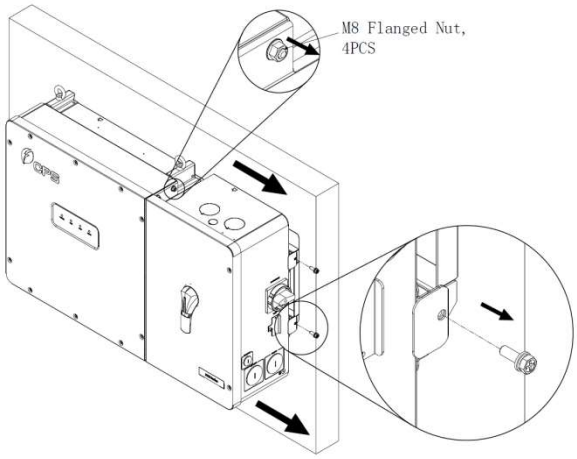


Figure 7-4 Disconnect the main housing from the wire-box

(4) Remove the screws which are connect between the inverter enclousure and installation rail, then slide the inverter enclousure left on the rail to remove.

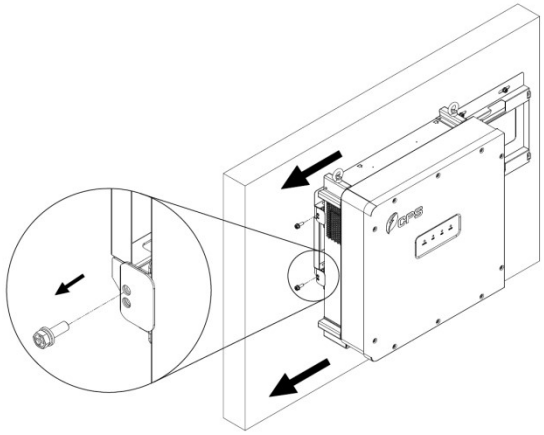


Figure 7-5 Remove the 2 screws between main housing and rail

(5) Use a No. 2 phillips head screwdriver to install the connector covers on the connector of the wire-box and inverter. Torque value: 14.2 in-lbs. (1.6Nm)

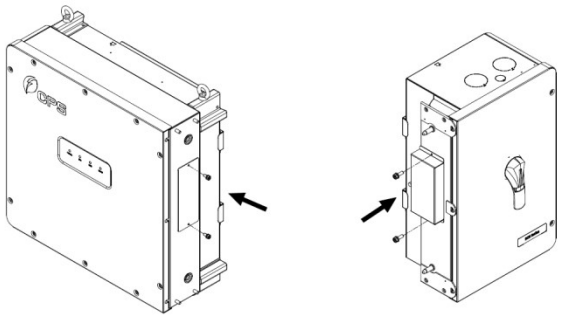


Figure 7-6 Install the Cover on the Connector of the Wire-box

Chapter 8 Technical Data

Model Name	CPS SCH100KTL-DO	CPS SCH125KTL-DO
DC Input		
Max. PV Power	150kW	187.5kW
Max. DC Input Voltage	1500Vdc	
MPPT Voltage Range	860-1450Vdc	
MPPT Full Load Operating Voltage Range	870-1300Vdc	
Start-up DC Input Voltage / Power	900V / 250W	
Rated Input Voltage	1500V	1500V
Number of DC Inputs (Strings)	16	20
Max. PV Short-Circuit Current	220A	275A
DC Disconnection Type	Load Rated DC Switch	
DC Surge Protection	Type II MOV, Up=2.5kV, In=20kV (8/20us)	
AC Output		
Rated AC Output Power	100kW	125kW
Max. AC Output Power	100kVA (111kVA @PF>0.9)	125kVA (132kVA @PF>0.95)
Rated Output Voltage	600Vac	
Output Voltage Range	528-660Vac	
Grid Connection Type	3Φ/ N (Option) / PE, Wye	
Max AC OCPD Rating	106.9A	127.2A
Rated Output Frequency	60Hz	
Output Frequency Range	57-63Hz	
Power Factor	>0.99 (±0.8 adjustable)	
Current THD	<3%	
AC Disconnection Type	Load Rated AC Switch (Standard Wire-box only)	

System	
Topology	Transformerless
Max. Efficiency	99.0%
CEC Efficiency	98.5%
Stand-by / Night consumption	<2W
Environment	
Enclosure Protection Degree	NEMA 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)
Operating Humidity	0-100%
Operating Altitude	8202ft / 2500m
Display and Communication	
User Interface and Display	LED Indicators + APP
Inverter Monitoring	Modbus RS485 / PLC (Standard Wire-box)
Site Level Monitoring	CPS Flex Gateway (1 per 64 inverters)
Modbus Data Mapping	SunSpec and CPS Modbus
Remote Diagnostics / FW Upgrade Functions	Standard with CPS Flex Gateway (1 per data network)
Mechanical Data	
Dimensions (WxHxD) (in/mm)	45.28x24.25x9.84in (1150x616x250mm) with Standard Wire-box 39.37x24.25x9.84in (1000x616x250mm) with Centralized Wire-box
Weight (lbs./kg)	Inverter: 121lbs / 55Kg Standard Wire-box: 55lbs / 25Kg “Centralized” Wire-box: 33lbs / 15Kg
AC Termination	M8 Stud Type Terminal Block (Wire range: 6 - 3/0AWG CU/AL5, Lugs not supplied)
DC Termination	Screw Clamp Fuse Holder (Wire range: 12 - 6AWG CU) - Standard Wire-box Busbar, M8 PEMserts (Wire range: 1AWG - 250kcmil CU/AL, Lugs not supplied) - Centralized Wire-box
Mounting Angle	15 – 90° from horizontal (vertical/angled)
Fused String Inputs	20A fuses provided, 15/25/30A available

Safety	
Safety and EMC Standard	UL1741-2010; UL1741-SA; CSA-C22.2 NO.107.1-01, IEEE1547a-2014; FCC: 47 CFR Part 15
Grid Standard	IEEE 1547a-2014, CA Rule 21
Smart-Grid Features	Voltage-RideThru, Frequency-RideThru, Soft-Start, Volt-Var, Frequency-Watt

When the DC input voltage is higher than 1300V, the inverter begins derating, as shown in **Figure 8-1**.

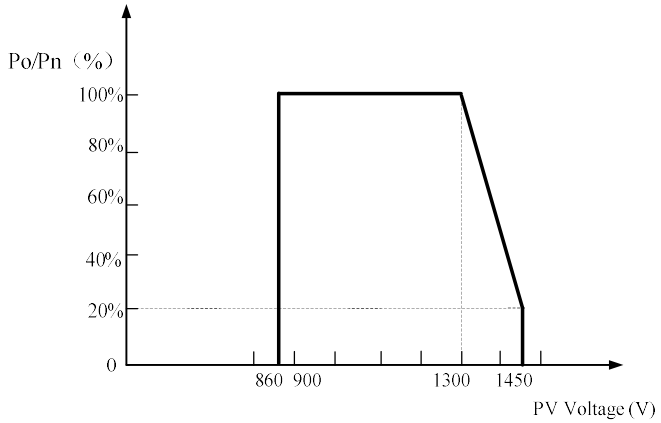


Figure 8-1 CPS SCH100/125KTL-DO Derating Curve of PV Input Voltage

When the ambient temperature is higher than 113°F/45°C, the inverter output power will begin to derate, as shown in **Figure 8-2**.

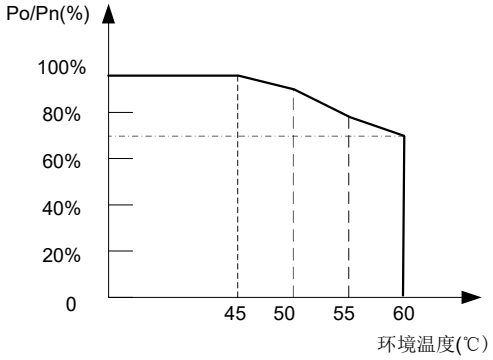


Figure 8-2 CPS SCH100/125KTL-DO Derating Curve with High Temperature

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 8-3**.

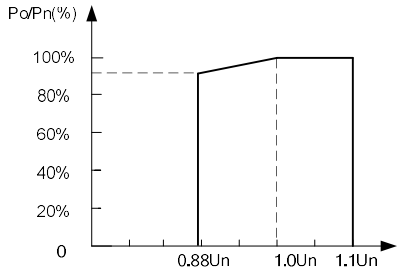


Figure 8-3 CPS SCH100/125KTL-DO Derating Curve of Grid Voltage

Chapter 9 Limited Warranty

The warranty policy of this product is specified in the contract; otherwise, the standard warranty is 10 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.

CHINT POWER SYSTEMS AMERICA CO., LTD.

Address: 1297 N Plano Rd Richardson Texas 75081

Service Hotline: 855-584-7168

Email: AmericaSales@chintpower.com

Website: www.chintpowersystems.com

SHANGHAI CHINT POWER SYSTEMS CO., LTD.

Headquarters: Building 4, No. 3255, Sixian Road,

Songjiang District, Shanghai, China

Tele: +86 -21 -3779 1222 -6300

Fax: +86 -21 -3779 1222 -6001

Part No: 9.0020.0334 B0