CHINT POWER

CPS SCA Series Grid-tied PV Inverter

CPS SCA5/6/7KTL-DO

Installation and Operation Manual

Ver 1.0

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Before You Start...

This manual contains important information regarding installation and safe operation of this unit. Be sure to read this manual carefully before using.

Thank you for choosing this Grid-tied PV Inverter. This PV Inverter is a highly reliable product due to its innovative design and high quality control. Such an Inverter is used in high demand, grid-tied PV systems.

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 6 models: CPS SCA5KTL-DO, CPS SCA6KTL-DO and CPS SCA7KTL-DO.

Instructions inside this user manual will help you solve most installation and operation difficulties.

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 undertaking the installation. CPS reserves the right to refuse warranty claims for equipment damage if the user fails to install the equipment as per 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.

Markings on the product

	HIGH VOLTAGE: The product 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 grounding terminal, which must be securely connected to the earth through the PE (protective earthing) cable to ensure operational safety.
CE	**CERTIFICATION MARK:** The inverter is approved by the CE certification.

WARNING:

All the installation and wiring connections should be performed only by qualified technical personnel. Disconnect the inverter from PV modules and the Power Grid before maintaining and operating the equipment.

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 10 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 SCA5/6/7KTL-DO series inverter is approx **38kg (≈84 pounds)**. Please ensure the mounting is properly installed before hanging the the inverter on the bracket. At least 2 people are required for this procedure due to the weight of the inverter.

INSTRUCTION:

Please check with your local electricity supply company before selecting the grid standard. If the inverter is operated with a wrong grid standard, the electricity supply company may cancel the operation license.

Putting the inverter into operation before the overall system complies with the national rules and safety regulation of the application is not permitted.

Chapter 2 Overview

2.1 Inverter for grid-tied PV systems

CPS SCA5/6/7KTL-DO series inverter is suitable for use with most household and commercial rooftop 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.

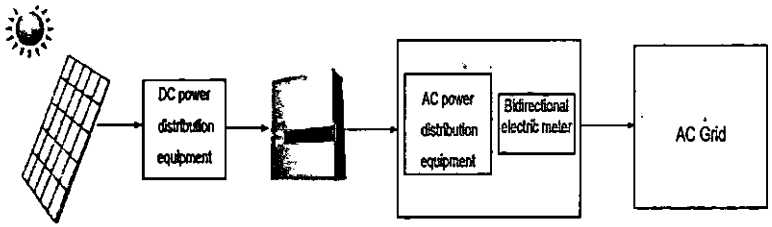


Figure 2-1 Grid-tied PV system

2.2 Product features

- **High conversion efficiency:** Advanced 3-level conversion technology; Max. efficiency: 98.0%; Euro efficiency: 97.4%
- **Strong grid adaptability:** 8 grid standards applicable; LVRT; Reactive power adjustable; PF value:±0.9
- **Flexible communication:** Standard RS485 communication; Optional ZigBee and Ethernet communication; Firmware upgrade by flash disk available; Fast and convenient operation
- **Wide DC input voltage range:** Operating DC Input Voltage Range:

250-950Vdc; Max DC input voltage: 1000V

- **Long service life:** Uses thin-film capacitors to extend inverter's service life
- **2 independent MPPTs:** Automatic input PV connection mode identification
- **High protection degree:** IP65 protection degree meets the needs of both indoor and outdoor use; Embedded DC switch makes field maintenance more flexible and safer

2.3 Product protection function

- ✓ Polarity reverse protection of DC input
- ✓ Short circuit protection
- ✓ DC input insulation against ground monitoring
- ✓ AC output voltage and frequency monitoring
- ✓ Leakage current against ground monitoring
- ✓ DC component of AC output monitoring
- ✓ Anti-islanding protection
- ✓ Input and output over-voltage protection
- ✓ Input over-current protection
- ✓ Environmental temperature monitoring
- ✓ Module temperature monitoring

2.4 Circuit structure design

The basic schematic diagram of CPS SCA5/6/7KTL-DO series inverter is shown in Figure 2-2.

The input of PV modules passes through lightning-proof circuitry, DC EMI wave filter, and the front-end boost circuitry to achieve maximum power tracking and boost up voltages. The output of the inverter converts the DC voltage to 3-phase AC voltage. The high frequency AC components are removed with a wave filter. Then the 3-phase AC voltage is passed through two-stage relays and EMI wave filter for outputting.

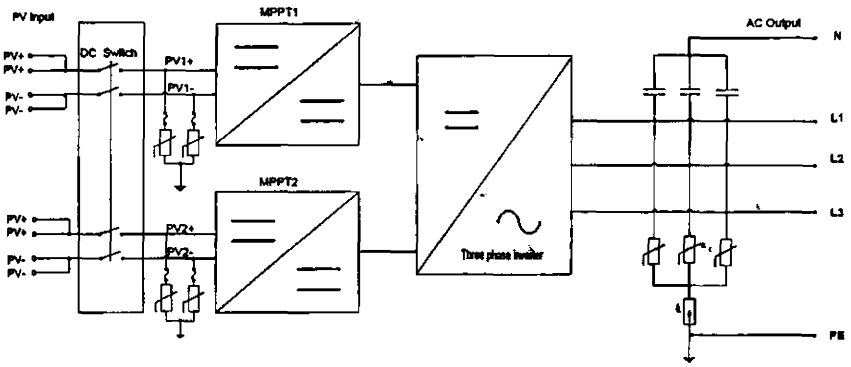


Figure 2-2 Schematic diagram of CPS SCA5/6/7KTL-DO series inverter

2.5 Appearance Description

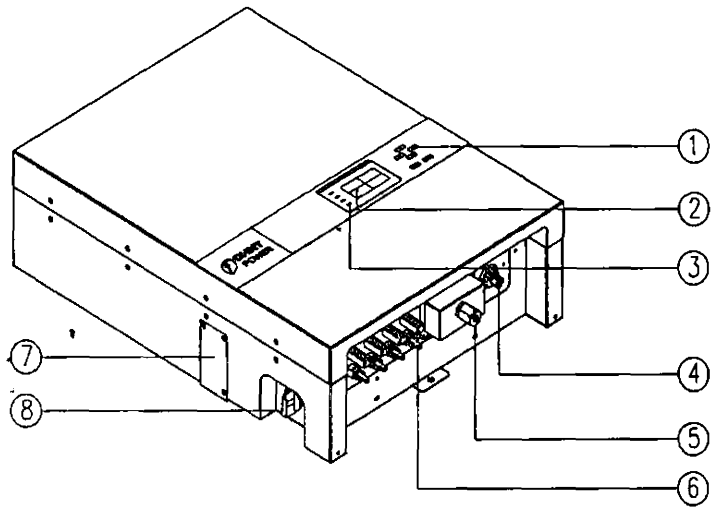


Figure 2-3 Appearance sketch of CPS SCA5/6/7KTL-DO series inverter

Main items of the inverter:

① LCD key buttons: operate the functions and change settings of inverter

② LCD display: indicates data

③ LED indicator lights: indicate the status of inverter

④ AC output terminal: for AC output connection

⑤ Communication port: for remote monitoring of one or more inverters (Support RS485USBCard, EthernetUSBCard and ZigBeeCard; Standard configuration: RS485USBCard)

⑥ DC input terminal: 4 pairs of DC input terminals

⑦ Cover plate

⑧ DC switch: DC power on/off

Chapter 3 Installation

Below is the installation procedure for the inverter. Please read carefully and install the product step-by-step.

Check and make sure that the following items are included in the package before installation.

Table 3-1 Main items

No.	Item	Q'ty	Note
(1)	CPS Grid-tied PV inverter	1	
(2)	Mounting bracket	1	Fixed on the back of Product
(3)	User manual	1	
(4)	Warranty card	1	
(5)	Packing list	1	
(6)	Accessory kit	1	Contains all necessary accessories

The (6) Accessory kit contains items listed below:

Table 3-2 Accessories

No.	Item	Q'ty
(1)	Bolt M8x25,Hex head	6

(2)	Expansion Nut	6
(3)	Ring Terminal:RNY5-5	2
(4)	Screw M5x10	2
(5)	Cord End Terminal:E4010	6
(6)	AC output plug	1
(7)	The cover for Communication port	1
(8)	Gasket	1
(9)	Cable gland	1
(10)	Sealing Pin	1
(11)	Screw M3x8	6
(12)	Tool for disconnect DC connector	1
(13)	DC Input Male Connector	4
(14)	DC Input Female Connector	4
(15)	RJ45 Plug	2

3.1 Basic requirements

- ✓ 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 normal range;
- ✓ Ensure that the local electricity supply authority has granted permission to connect to the grid;
- ✓ Installation personnel must be qualified electricians or people who have received professional training;
- ✓ Sufficient space is 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 in the inverter data sheet to limit undesirable power loss;
- ✓ Do not install the inverter near the electromagnetic source which can compromise the normal operation of electronic equipment;

3.2 Mechanical installation

(1) Dimensions

Dimensions of the inverter are shown in Figure 3-1.

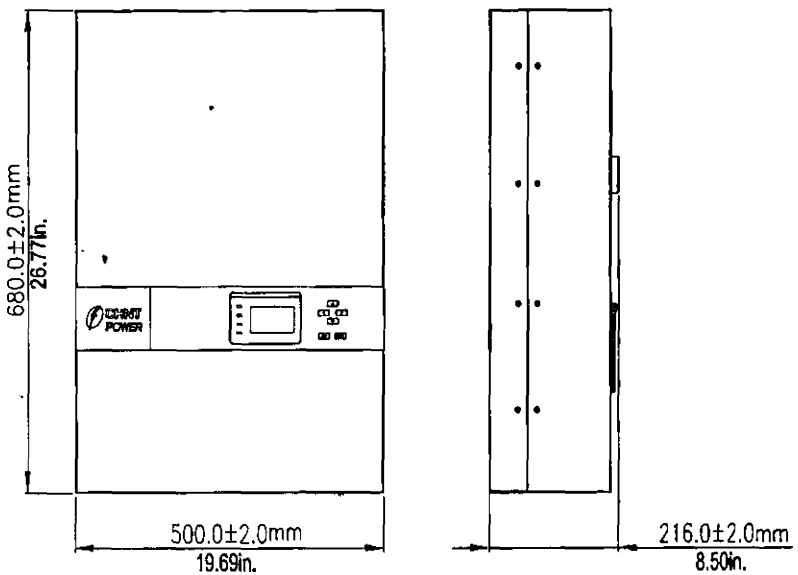


Figure 3-1 Dimensions

(2) Make sure that the bearing surface to mount the inverter is suitable for the load imposed.

(a) It's better to mount the inverter in a vertical position.

(b) If the inverter cannot be mounted vertically, it may be tilted backward by no lower than 15 degrees from horizontal.

(c) Do NOT mount the inverter leaning forward.

(d) Do NOT mount the inverter in a horizontal position (<15 degrees).

(e) Do NOT mount the inverter upside down.

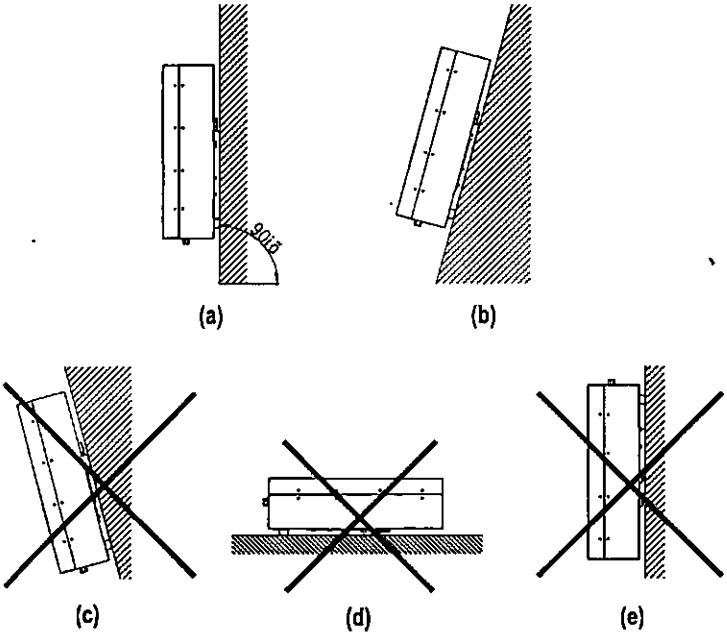


Figure 3-2 Mount the inverter correctly

(3) Space required for inverter mounting on the bearing surface (as shown in Figure 3-3).

The distances between the inverter and the surrounding objects should meet the following conditions in Figure 3-3.

NOTICE:

The recommended spacing between two adjacently mounted inverters is ≥600mm (23.62 inches). If the installation condition can NOT meet the standard, the minimum spacing between two adjacently mounted inverters must be ≥300mm (11.81 inches).

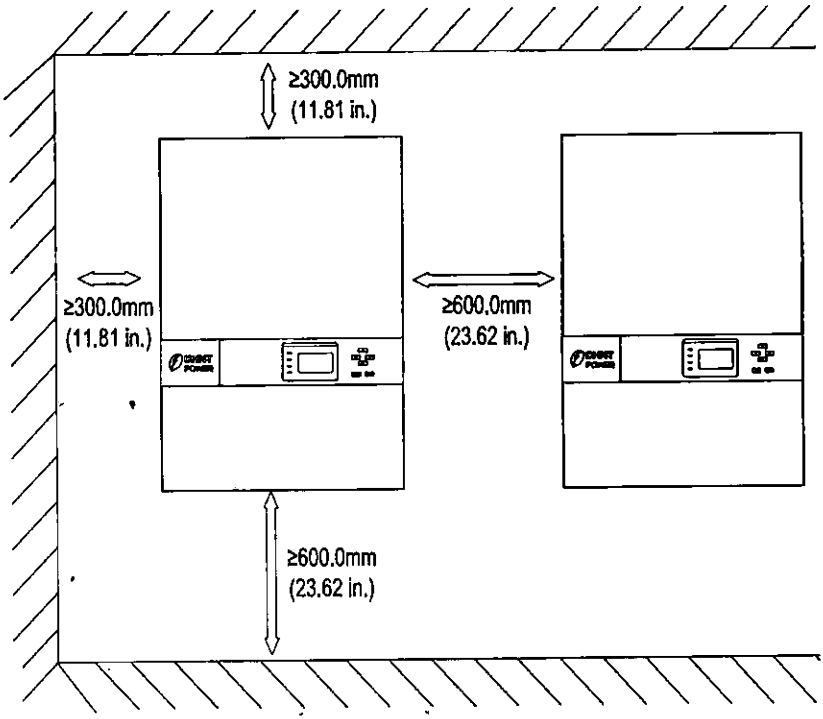


Figure 3-3 Inverter mounting dimensions

(4) Secure the bracket with bolts through the mounting holes and install the inverter:

(a) Mark the 5 holes on the bearing surface for mounting the bracket as shown in Figure 3-4;

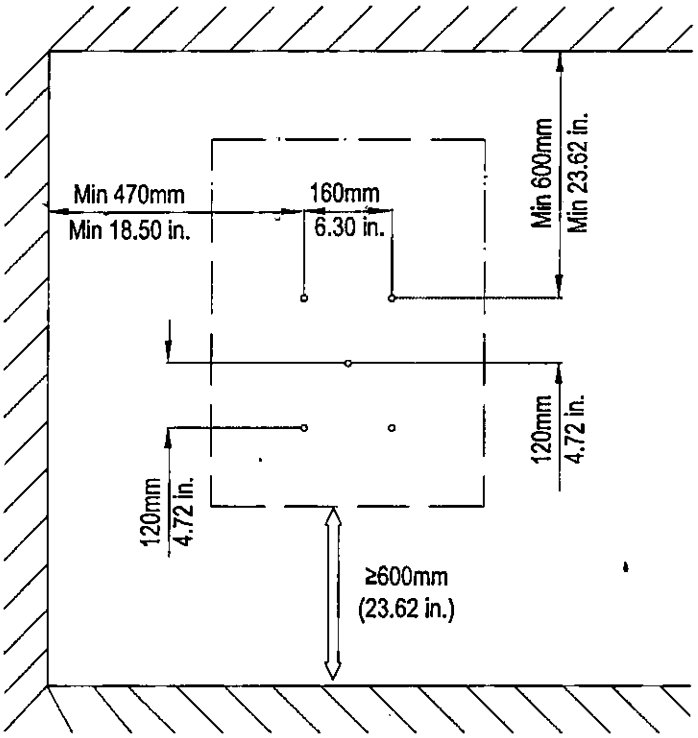


Figure 3-4 Dimensions of holes on the bearing surface

(b) Drill holes at the marked positions with a 10mm drill and put the 5 expansion tubes (in the accessory kit) into the holes;

(c) Remove the mounting bracket from the inverter and the location of screws is shown in Figure 3-5;

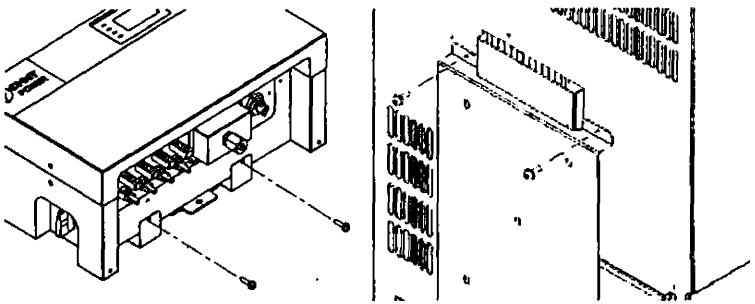


Figure 3-5 Location of screws

(d) Check the dimensions of mounting bracket, as shown below:

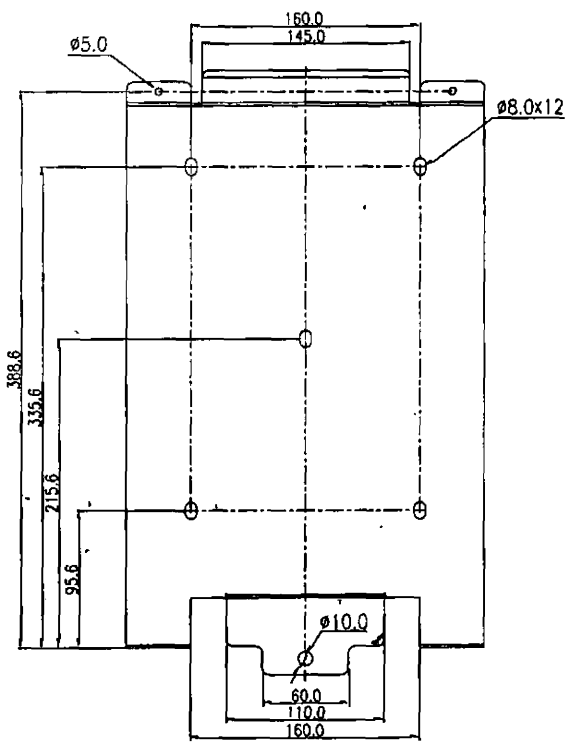


Figure 3-6 Check the dimensions of mounting bracket (mm)

(e) Secure the mounting bracket on the wall with 5 M8 bolts (in the accessory kit), as shown in Figure 3-7;

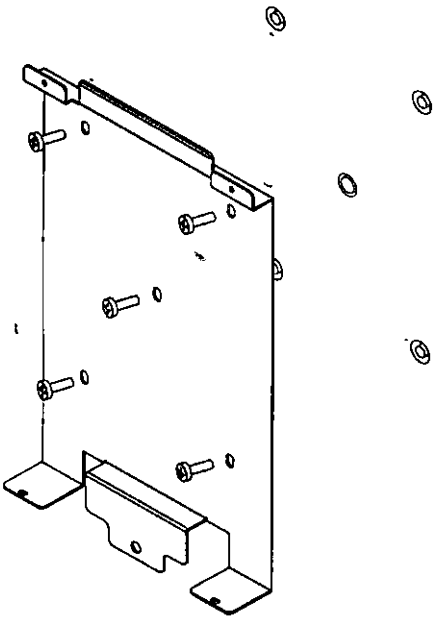


Figure 3-7 Secure the mounting bracket

(f) Hang the inverter on the mounting bracket as shown in Figure 3-8;

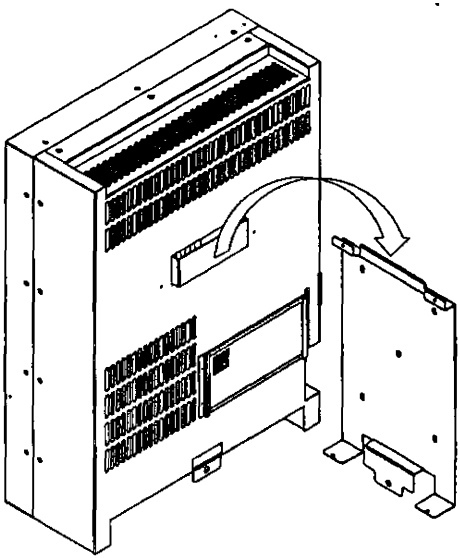


Figure 3-8 Mounting inverter on the bracket

CAUTION:

CPS SCA5/6/7KTL-DO series inverter is approx **38kg (≈84 pounds)**.

Please ensure the mounting is properly installed before hanging the the inverter on the bracket. At least 2 people are required for this procedure due to the weight of the inverter.

(g) Fasten the 2 screws at the bottom of the mounting bracket to the inverter as shown in Figure 3-9:

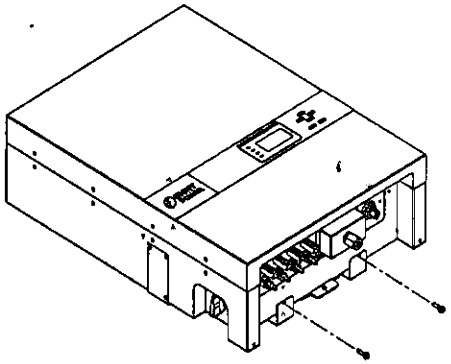


Figure 3-9 Securing inverter on mounting bracket

(h) You can choose to install an anti-theft padlock when the installation is complete.

The anti-theft padlock is used to prevent the inverter from being stolen when the equipment is installed outdoors, as shown in Figure 3-10:

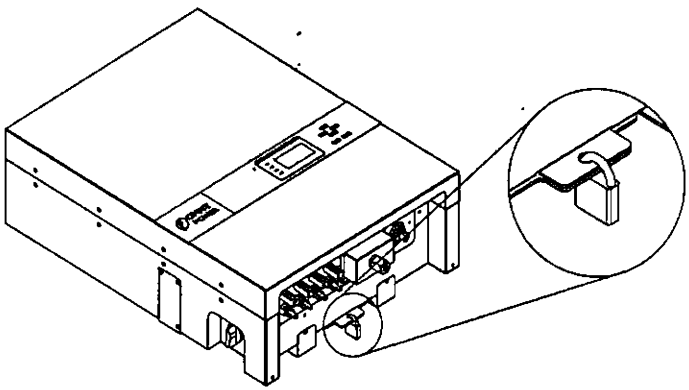
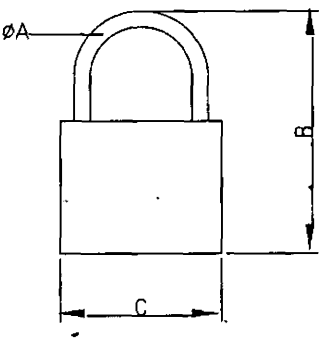


Figure 3-10 Anti-theft padlock location



Recommended padlock size:

A:3~6mm

B:30~40mm

C: 30~40mm

Figure 3-11 Anti-theft padlock size

3.3 Electrical installation

The connection interface of inverter is shown in Figure 3-12:

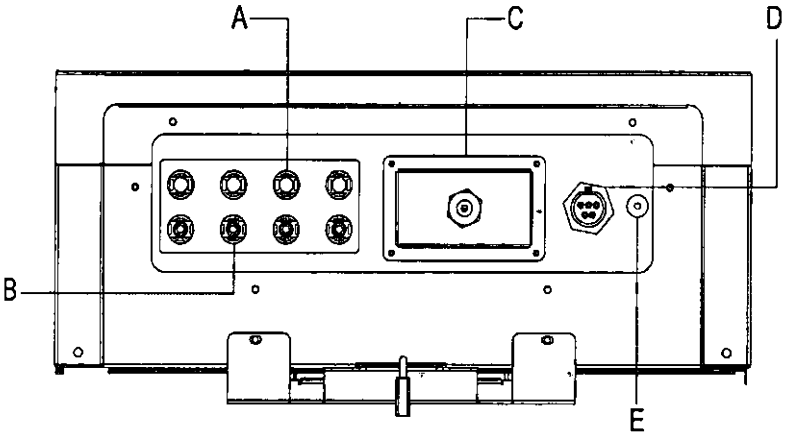


Figure 3-12 Connection interface

Table 3-3 Location and function

Position	Description
A	DC negative input terminal (MC4 type)
B	DC positive input terminal (MC4 type)
C	Communication card slot
D	AC output socket
E	Ground terminal

Please select the cables for electrical connection according to Table 3-4.

Table 3-4 Cable specifications

Specification / Cable	Cross Section Area Range (mm²)	Max. Cable Length (m)
DC cable (+)	2.5~4	28
DC cable (-)	2.5~4	28
AC cable (L1)	2.5~4	28
AC cable (L2)	2.5~4	28
AC cable (L3)	2.5~4	28
AC cable (N)	2.5~4	28
PE cable (GND)	2.5~4	28
Communication cable (RS485)	0.4~1.0	500
Communication cable (Ethernet)	Standard network cable	100

3.3.1 DC connection

CPS SCA5/6/7KTL-DO series inverter has two PV input sections: DC Input-1 and DC Input-2. These two sections can work under "Parallel mode" or "Independent mode". (See Figure 3-13)

The inverter can automatically adjust the mode according to different PV connection systems. Under Parallel mode, the two PV input sections share one MPP Tracker; Under Independent mode, each PV input section works with one MPP Tracker.

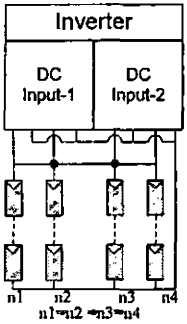


Figure 3-13(a) Parallel mode

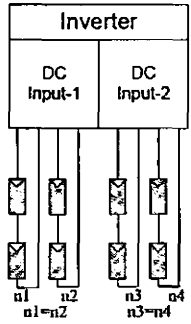


Figure 3-13(b) Independent mode

To ensure the optimum performance of the inverter, please read the following guidelines before DC connection:

(a) Confirm the DC configuration referring to Table 3-5 and ensure that the maximum open circuit voltage of the PV modules is lower than 1000 Vdc under any conditions;

Table 3-5 DC input power configuration

Inverter Model	Max. DC input power	Rated DC input power each section	Max. DC power each section
CPS SCA5KTL-DO	6.5KW	2.6KW	3KW
CPS SCA6KTL-DO	7.8KW	3.2KW	3.5KW
CPS SCA7KTL-DO	9.1KW	3.7KW	4KW

(b) Confirm that the PV strings for each MPPT of the inverter are of the same type and specification before connection. The number, orientation, and tilt of PV strings may differ for different applications.

(c) Check the polarity (Figure 3-14) before plugging the DC connectors with the cables of PV strings according to the following steps:

i. Use a multi-meter to measure the PV strings' cable ends and check the polarity.
ii. The positive (+) terminal of cable should match the positive (+) terminal of inverter's DC input.
iii. The negative (-) terminal of cable should match the negative (-) terminal of inverter's DC input.

NOTICE:
It is important to use a multi-meter to check the polarity of DC input cables to avoid any risk of reverse polarity.

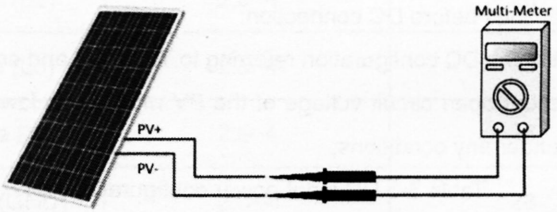
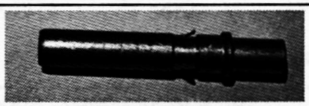
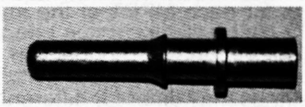


Figure 3-14 Polarity check

(d) Put the positive (negative) DC cable through the gland and cable fastener, and then crimp the cable terminal with the steel core shown in Table 3-6.

Table 3-6 Steel core for DC cables

No.	Item	Function
1		For Positive DC cable
2		For Negative DC cable

(e) Insert the crimped positive and negative terminals into the male and female connectors respectively, and then tighten the seal glands, as shown in Figure 3-15 and Figure 3-16:

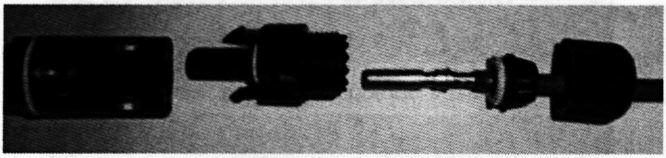


Figure 3-15 Assemble male connector on DC positive cable

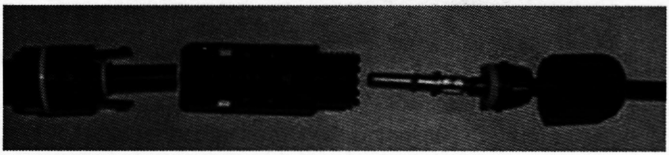


Figure 3-16 Assemble female connector on DC negative cable

(f) Plug the assembled DC cable connectors with the positive and negative connectors on the inverter side respectively, as shown in Figure 3-17:

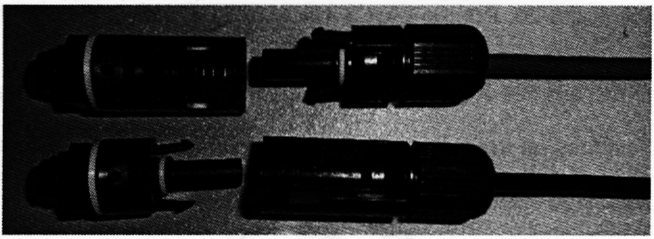


Figure 3-17 Plug DC cable connectors

If the input connector needs to be unplugged, put the DC input disconnection wrench into the slot on the connector, and unplug the connector by pressing down the wrench as shown in Figure 3-18 & Figure 3-19:

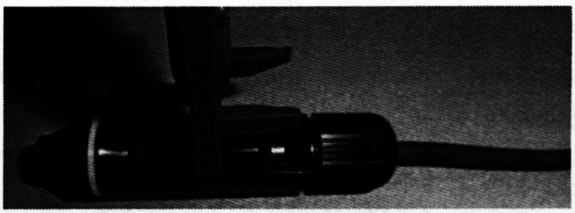


Figure 3-18 Unplug the positive connector

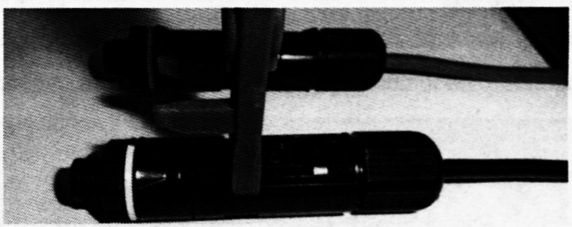


Figure 3-19 Unplug the negative connector

3.3.2 AC and ground connection

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

1.) AC connection: Screw off the waterproof cover on the AC output gland shown in Figure 3-20; Put the L1, L2, L3, N and PE cables through the gland as per the cable order 1, 2, L, N and ⏚. Make sure that all the cables are securely fastened on the gland and then screw on the waterproof cover.

Figure 3-20 AC output gland

2.) Ground connection: The inverter supports two kinds of ground connection: Internal and external ground connection

(1) Internal ground connection: Select a 5 core (3P+N+G) cable according to Table 3-3, crimp the cable ends and then connect the cable to the AC side.

(2) External ground connection: Select a 4 core (3P+N) cable according to Table 3-3, crimp the cable ends and then connect the cable to the AC side. Then use a recommended crimped PE cable to connect to the ground terminal (refer to Figure 3-11) on the inverter with a M5 screw (in the accessory kit).

3.) Plug the assembled AC connector with the AC terminal into the inverter, as shown in Figure 3-21. Make sure the connector is securely fitted.

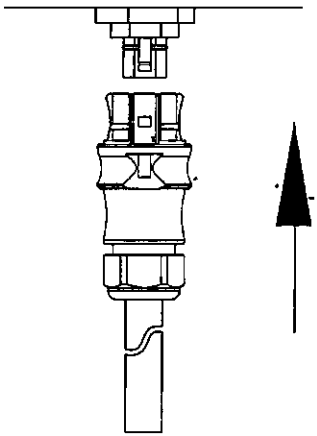


Figure 3-21 Plug the AC connector

4.) The AC output cables (L1/L2/L3/N) of each inverter are connected to the power grid through an independent 4-pole AC breaker to ensure the safe disconnection between inverter and power grid. Please select AC breaker according to Table 3-7.

Table 3-7 AC breaker selection specification

Inverter	AC breaker rated current (A)
CPS SCA5KTL-DO	15
CPS SCA6KTL-DO	15
CPS SCA7KTL-DO	20

3.3.3 Communication connection

CPS SCA5/6/7KTL-DO series inverter supports 3 communication methods: RS485, Ethernet and ZigBee. The 3 corresponding communication cards are RS485USBCard, EthernetUSBCard and ZigBeeUSBCard. Each card supports firmware upgrade by USB disk.

NOTICE:

Please operate as per the ESD requirements to avoid damaging the cards when plugging the communication card into the slot.

1.) RS485&Ethernet

Install the communication box illustrated in Figure 3-22.

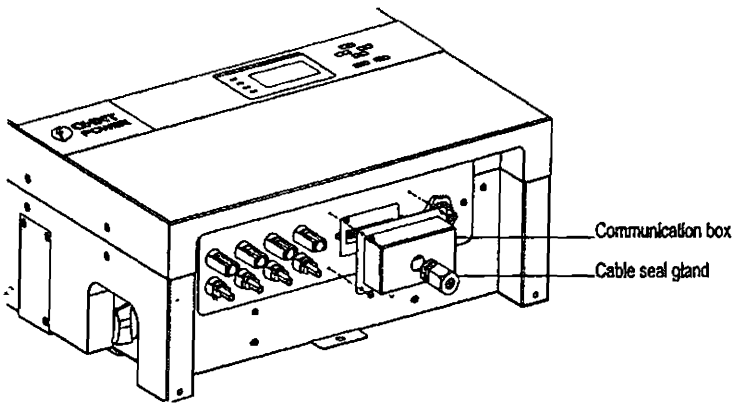


Figure 3-22 Install communication box

1. Make sure the RS485USBCard or EthernetUSBCard is installed in the card slot.
2. Screw the cable seal gland on to the communication box and then fasten the gland from the inside of the box.

   Use the recommended communication cable in Table 3-3 and then put it through the cable seal gland. Put the wires of communication cable in order as listed in Table 3-8. To avoid any on-site signal interference, it is recommended to use shielded twisted pair (STP) cable for RS485 communication method, the length of which should NOT exceed 500 metres.

Table 3-8 Wire order of RS485 communication cable

No.	Color	Function
1	White orange	485+
2	Orange	Not used
3	White green	485-
4	Blue	Not used
5	White blue	Not used
6	Green	Not used
7	White brown	COM
8	Brown	Not used

Use standard network cable for the Ethernet communication method according to the 568B standard. The wire order is listed in Table 3-9 and the maximum wire length should not exceed 100 metres.

Table 3-9 Wire order of Ethernet communication cable

No.	Color
1	White orange
2	Orange
3	White green
4	Blue
5	White blue
6	Green
7	White brown
8	Brown

3. Crimp the cable end with a crystal head connector as illustrated in Figure 3-23.

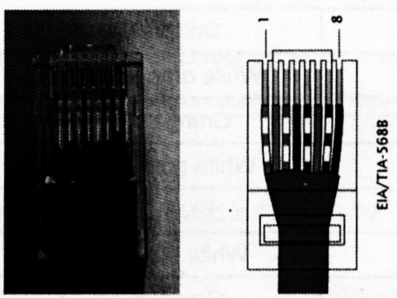


Figure 3-23 Crystal head connector

4. Plug the crimped crystal head connector into the terminal on the communication card:

① RS485USBCard has two RJ45 communication ports: RS485-1 and RS485-2. The functions of two ports (Figure 3-24) are the same.

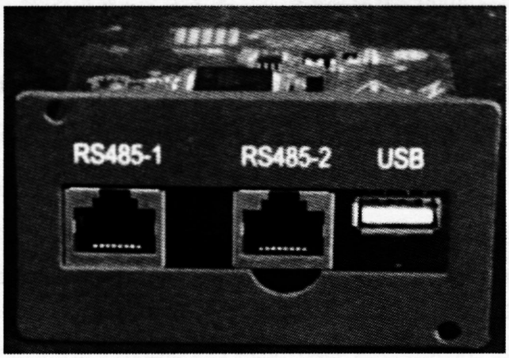


Figure 3-24 RS485USBCard

② EthernetUSBCard has an Ethernet communication port for TCP/IP communication, as shown in Figure 3-25:

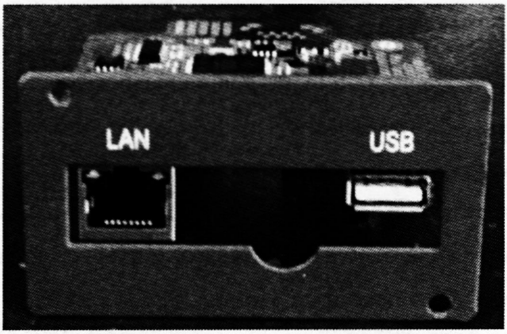


Figure 3-25 EthernetUSBCard

The factory default IP address is 192.168.1.100. You may check the IP address by the finder.exe software.

Use the Web Page function embedded in the EthernetUSBCard to input the effective IP address in the IE address bar, such as //192.168.1.100. Set up the internet parameters and check the real-time information of inverter, etc. Set the baud rate to 9600pbs through LCD operations when installing the Ethernet card.

5. Fasten the communication box at the bottom of the inverter with 4 screws as illustrated in Figure 3-22.
6. Screw in the sealing nut, place the seal pin in the hole of cable seal gland in which has no communication cable, and then fasten the sealing nut.

2.) ZigBee

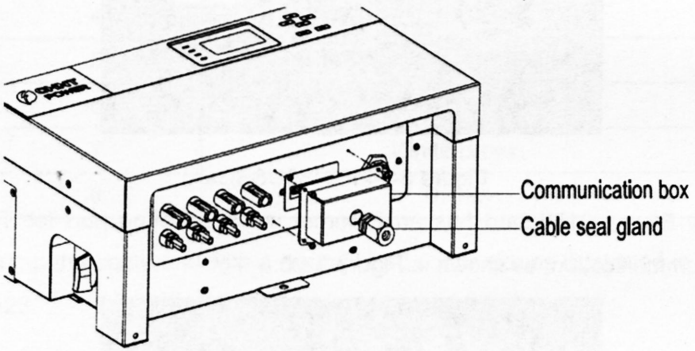


Figure 3-26 Install communication box

1. Make sure the ZigBeeUSBCard is installed in the card slot.
2. Screw the two cable seal glands on the communication box and then fasten the gland from the inside of box.
3. Put the antenna cable through cable seal gland, and then plug the cable connector with the terminal on the ZigBeeUSBCard shown in Figure 3-27.

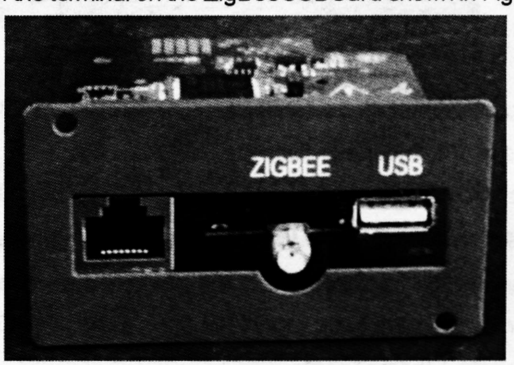


Figure 3-27 ZigBeeUSBCard

4. Fasten the communication box at the bottom of the inverter with 4 screws as illustrated in Figure 3-26.
5. Screw up the sealing nut, plug the seal pin in the hole of cable seal gland in which has no communication cable, and then fasten the sealing nut.

NOTICE:
It is important to use seal pin to fill the vacant communication holes on the cable seal gland in order to retain full protection.

6. Install the antenna at the bottom of the inverter, as shown in Figure 3-28.

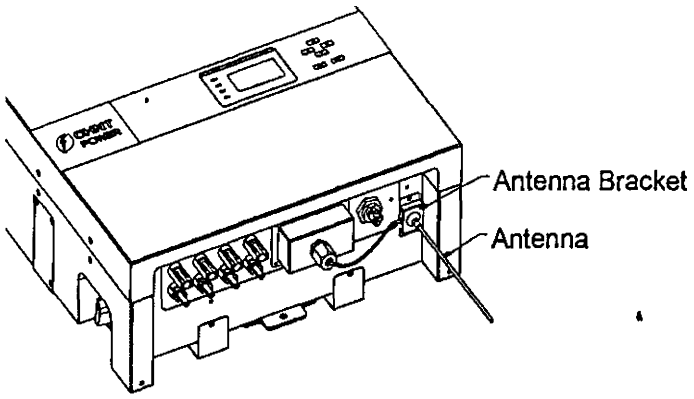


Figure 3-28 Install the antenna of ZigBee communication

The ZigBeeUSBCard supports wireless network communication. The communication frequency is optional from 2.405GHz—2.480GHz and the visible communication distance reaches up to 2000 metres. It is no doubt the best choice for the field that is not convenient to place wires for communication.

The factory default configuration of ZigBeeUSBCard is transit route mode. The communication frequency is 2.480GHz. Network ID is 0xFF. The transmit mode is Master-slave, and the communication baud rate is 9600pbs. Set the

baud rate to 9600pbs through LCD operations when installing the Zigbee card.

For more information about CPS monitoring solutions, please visit www.chintpower.com or contact our after-sales service centre.

Chapter 4 Commissioning

4.1 Commissioning Checklist

WARNING:

Please check before on-grid operation to eliminate possible dangers to ensure safety.

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.

(Please refer to 3.2 Mechanical installation)

4.1.2 Cable connections

- Make sure that all cables are connected to the right terminals.
- The appropriate cable placement is important to avoid physical damage.
- The polarity of DC input cables should be correct and the DC Switch should be on "OFF" position.

  (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.
- Make sure the DC open circuit voltage of input strings is less than 1000V.

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 LCD screen of inverter will light up. The inverter will then start up with the message "sys checking".

4.) Set up the grid standard:

INSTRUCTION:

Please check with your local electricity supply company before selecting the grid standard. If the inverter is operated with a wrong grid standard, the electricity supply company may cancel the operation license.

Putting the inverter into operation before the overall system complies with the national rules and safety regulation of the application is not permitted.

- When the inverter completes "sys checking", LCD shows the screen as Figure 4-1. Press ENTER to the standard selection interface, as shown in Figure 4-2.
- Select the corresponding grid standard according to the requirement of your local electricity supply company. If "Success" appears, it indicates that the grid standard has been set up. Then press ESC to quit the interface and the LCD screen will come back to "standby".

Figure 4-1 Set up grid standard

→ 1	VDE-0126	5	C10/11
2	VDE-4105	6	EN50438
3	G59/2	7	CEI 0-21
4	RD1699	8	CGC

Figure 4-2 Select grid standard

5.) When the LCD screen shows the normal operation status (Figure 4-3) and the "RUN" light on the LED panel lights up, it indicates that the grid connection and power generation are successful.

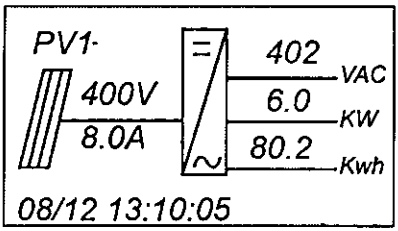


Figure 4-3 Normal operation status

6.) If the inverter fails to operate normally, "FAULT" light will light up and the fault information will show on the LCD screen.

(Please refer to 7.1.2 Troubleshoot LCD faults)

7.) Set up system time and language

Set up the system time and language according to "5.4.4 System configuration".

8.) To check the real time operation information, you can refer to "5.4.1 Operation information".

Chapter 5 User Interface

5.1 Description of LCD panel

The inverter's LCD panel mainly consists of LCD screen, LED indicator lights, buzzer and 6 keys, as shown in Figure 5-1.

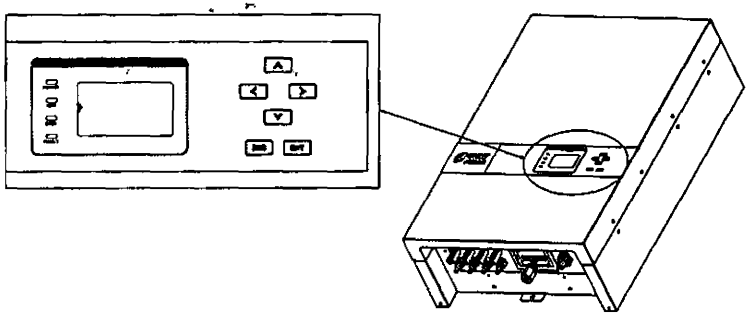


Figure 5-1 LCD panel

Interpretation for the indicator lights is shown in Table 5-1 and function of the keys is shown in Table 5-2.

Table 5-1 LED Indication

LED light	Name	Status	Indication
POWER	Working power light	Light on	Energized (control panel starts to work)
		Light off	Power supply not working
RUN	Grid-tied operation indication	Light on	In grid-tied power generation state
		Flash	Derated running status (light up 0.5s,

	light		light off 1.6s)
		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 1.6s)
		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

Table 5-2 Definition of the keys

Key	Description	Definition of function
ESC	Escape key	Back/end/mute
ENT	Enter key	Confirm entering the menu/confirm set value
^	Up	Page up in selection menu
v	Down	Page down in selection menu
<	Left	-1 when setting parameters

	Right	+1 when setting parameters

5.2 Operation state

Table 5-1 indicates the definitions of LED, i.e. indicates the information of the inverter's operation state. It indicates that the system is energized and under DSP control when "POWER" lights up.

"RUN" will light up when the inverter detects that the grid connection conditions meet the requirements and power is fed into the grid. "RUN" will blink if the grid is in de-rated running state during the period of feeding power into the grid.

"GRID" will light up when the grid is normal during the operation of the inverter. Otherwise, "GRID" will blink until the grid restores to normal.

"FAULT" will blink quickly as a fault (except grid abnormality) occurs. "FAULT" will not light out until the fault is eliminated. The light will blink slowly when an alarm occurs. "FAULT" remains illuminated when an internal fault occurs.

The buzzer will give an alarm if a fault (involving power grid abnormality) occurs.

5.3 Interface types

Users can perform the corresponding operations with the 6 function keys according to the indications of the LCD display.

(1) The LCD interface starts with the company logo once the system is energized, as shown in Figure 5-2.

Figure 5-2 LOGO interface

(2) Indication of inverter operation mode:

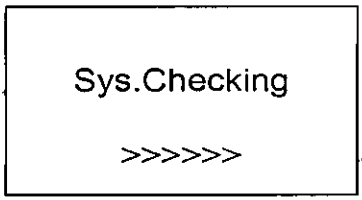


Figure 5-3 Inverter system check ongoing

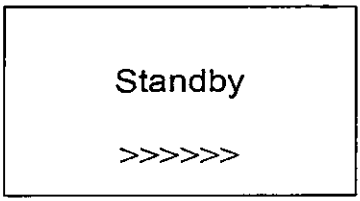
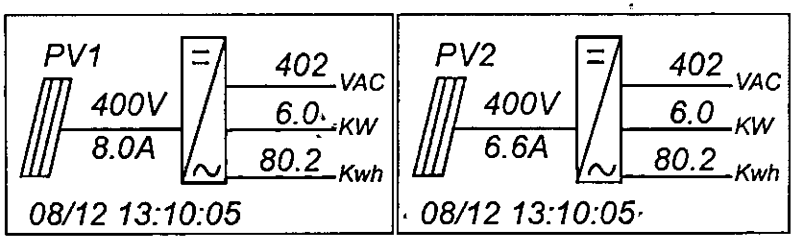


Figure.5-4 Inverter system in standby mode



(a) (b)

Figure 5-5 Default display interface for normal operation

Figure 5-6 Fault indication interface

LCD screen will display different mode interfaces based on the operation modes of the inverter. There are four operation modes: startup system check mode (as shown in Figure 5-3), stand-by mode (as shown in Figure 5-4), normal operation mode (as shown in Figure 5-5, the switching time between (a) and (b) is 5 seconds), and fault mode (as shown in Figure 5-6).

The default indication interface mainly indicates PV voltage, PV current, grid voltage, instant power, daily generated power and time information under normal operation.

The present fault information will be indicated on the LCD screen when the inverter is in fault mode.

5.4 Menu functions

LCD screen displays "default indication interface" when the inverter is in operation mode. Press ESC in this interface to escape the default interface and enter the main operation interface. The main operation interface is shown in Figure 5-7.

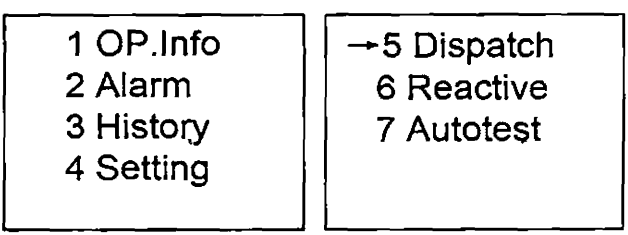


Figure 5-7 Main menus on the LCD screen

The main operation interface of LCD screen has 7 menus, i.e. "1 OP. Info", "2 Alarm", "3 History", "4 Setting", "5 Dispatch", "6 Operation" and "7 Autotest". The users may select options with PAGEUP and PAGEDOWN, and then press ENTER to confirm selection. The users can return to the default indication interface by pressing ESC.

5.4.1 Operation information

When the cursor moves to "1 OP. Info" in the main screen, you should press ENTER to select the operation information as shown in Figure 5-8. Check the information by pressing PAGEUP and PAGEDOWN. Return to the previous menu and enter the main operation interface by pressing ESC.

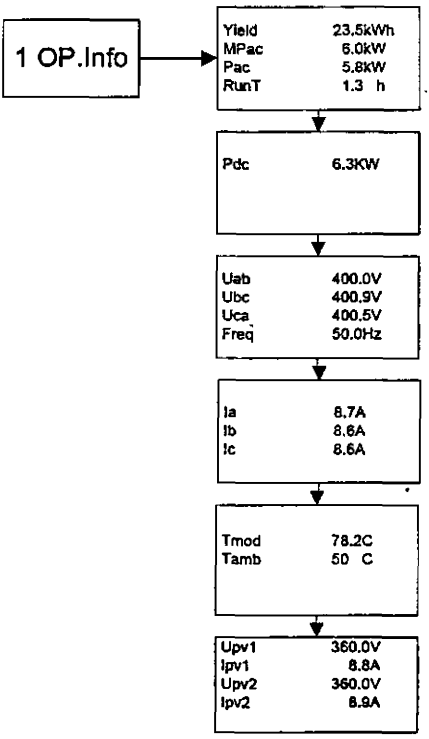


Figure 5-8 Operation information indication

5.4.2 Present fault

As described before, if a fault occurs during normal operation of the inverter, corresponding fault messages will be indicated in "2 Alarm" menu in addition to the sound and light alarms. Move the cursor to "2 Alarm" and press ENTER to check out the specific fault information, as shown in Figure 5-9.

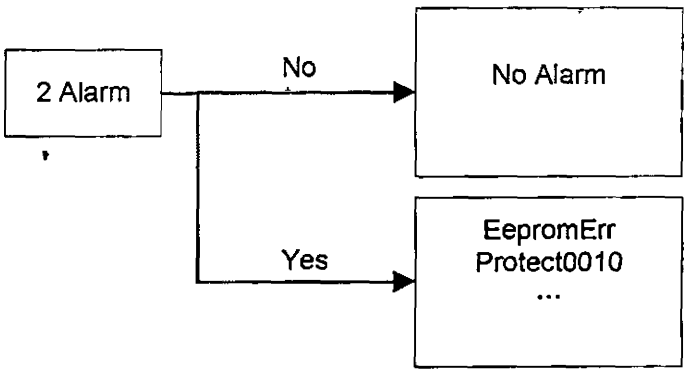


Figure 5-9 Present failure information

5.4.3 History

Move the cursor to "3 History" in the main interface. Press ENTER to check the history information, as shown in Figure 5-10. There are 4 submenus in "3 History": "1 ErrRecd", "2 OP. Recd", "3 Version" and "4 TotalTag".

(1) UP to 100 items of latest fault messages can be recorded and found in "1 ErrRecd" menu.

(2) The last 21 days of operation history data is available to be checked in "2 OP. Recd" menu. All variable names in the data comply with the content in "1 OP. Info" menu of the main interface. The users can select the "2 OP. Recd" menu and input the retraceable days (For example, the input number is 21. If the current date is December 15th, the LCD will indicate the operation information of 21 days before that date which is November 24th).

(3) Current grid standard, serial number, machine version and LCD version of the product are listed in "3 Version" menu.

(4) Cumulative generated power from the first day the inverter began working is available to be checked in "4 TotalTag" menu.

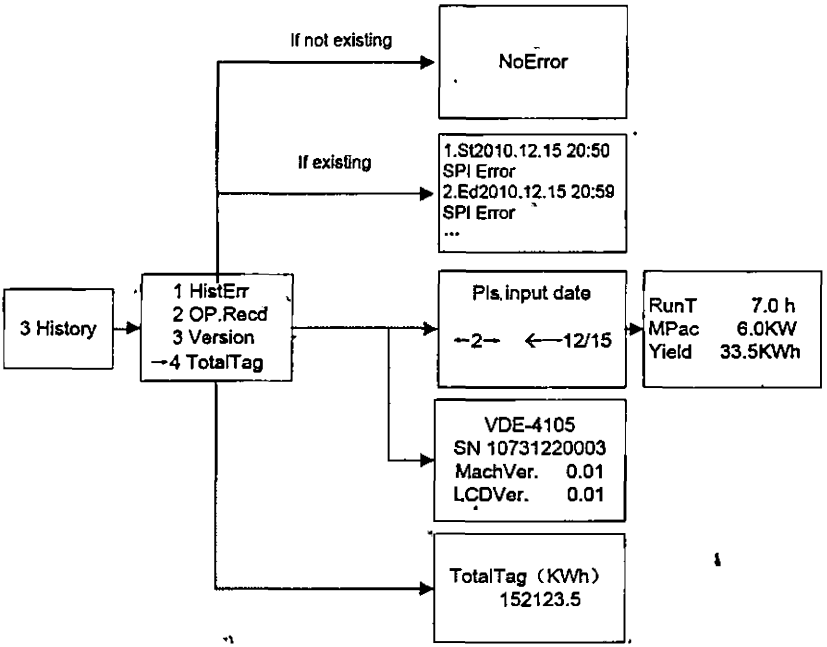


Figure 5-10 History menu and submenu

5.4.4 System configuration

Move the cursor to "4 Setting" in the main interface. Press ENTER to set the current system parameters, as shown in Figure 5-11. There are 6 submenus in "4 Setting": "1 ON/OFF", "2 Language", "3 Buzzer", "4 System", "5 Commun" and "6 MPPTScan".

(1) The inverter can be started and shut down with "1 ON/OFF" menu.

Move the cursor to "ON" and press ENTER, "ON State" will then be indicated at the bottom of LCD screen; move the cursor to "OFF" and press ENTER, then "OFF State" will be indicated as well. The inverter will stand by instead of working normally if the startup conditions do not meet the set value even if "ON" is selected. The inverter will be shut down immediately if "OFF" is selected in any case.

(2) Five languages, i.e. French, English, Spanish, German, and Italian are available in "2 Language" menu.

(3) Key beep and fault beep can be set mute/unmute in "3 Buzzer" menu. "Key beep" and "Alarm beep" can be chosen by pressing PAGEUP and PAGEDOWN. Shift between "Enable" and "Disable" by pressing LEFT and RIGHT if the cursor is on the "Key beep". Complete the setup by pressing ENTER. Similarly, the fault beep can be set up in the same way.

(4) Set up the system date and time with "4 SysTime" menu (These parameters are of critical importance and will be used in history information). Select year, month, day, hour and minute by pressing PAGEUP / PAGEDOWN, and set up the specific date and time by pressing LEFT and RIGHT.

(5) Set the 485 communication parameters with "5 Commun." menu.

(6) There are 3 submenus in the "6 MPPTScan" menu:

"1 Enable" is used to turn on/off the MPPT Scan function. Press LEFT to enable the function and press RIGHT to disable the function. Then press ENTER to confirm the setting. When the MPPT Scan is enabled, the inverter will scan the MPPT according to the cycle time.

"2 Cycle(min)" is used to set up the cycle time of MPPT Scan. Move the cursor to this menu, press ENTER to set up the cycle time. Use LEFT or RIGHT to adjust the cycle time. The cycle time ranges from (30, 540) and the unit is minute. Press ENTER to confirm the setting and then ESC to the previous menu.

"3 Manual" is used to trigger the MPPT Scan manually. Move the cursor to this menu, and press ENTER to scan the MPPT for one time.

INSTRUCTION:

Please beware that the "3 Manual" is only available when the "MPPTScan" function is enabled.

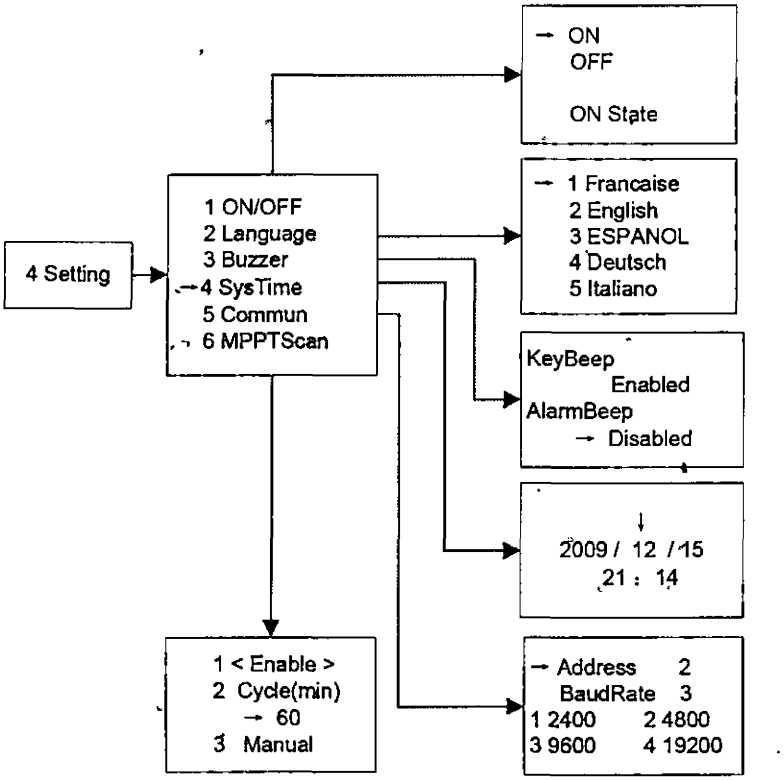


Figure 5-11 System setup menu and submenu

5.4.5 Power dispatch

You can check the "ActivePower" and "PowerFactor" using the following steps:

Move the cursor to "5 Dispatch" in the main interface and press ENTER to go to the following interface (Figure 5-12):

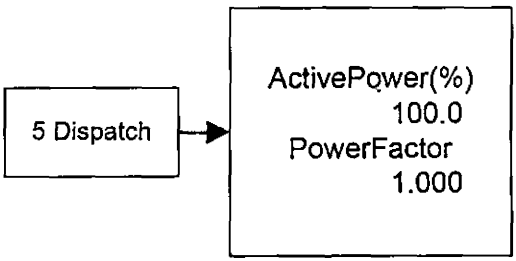


Figure 5-12 Active Power and PowerFactor

Remote power dispatch: The "ActivePower" and "PowerFactor" can be controlled remotely by software. Please refer to "5.4.6 Operation Parameters" for detailed information.

5.4.6 Power management

Select the "6 Reactive" menu, and Press ENTER to go to the following interface (Figure 5-13):

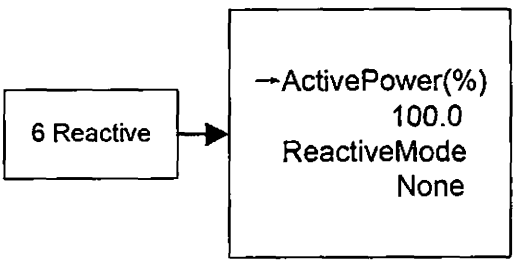


Figure 5-13 Active Power and Reactive Mode settings

The active power parameters are adjustable from 0% to 100.0% in the "ActivePower (%)" menu.

The default setting of "ReactiveMode" is "None" (Figure 5-13). You can change the following functions to set up the reactive mode if required.

The "ReactiveMode" menu has 6 submenus (Figure 5-14), including "1.None", "2.Dispatch", "3. Q Set", "4. PF Set", "5. PF(P) Set" and "6. Q(U) Set".

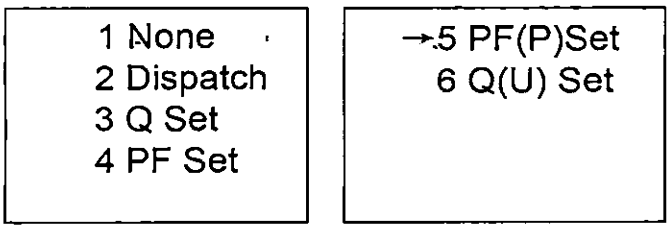


Figure 5-14 Submenus of ReactiveMode

1. None: No mode/Disable reactive mode
2. Dispatch: Remote power dispatch mode

To remotely control the parameters of "ActivePower" and "PowerFactor" by software, users need to enable the "Dispatch" function in "ReactiveMode". Please operate as shown in Figure 5-15:

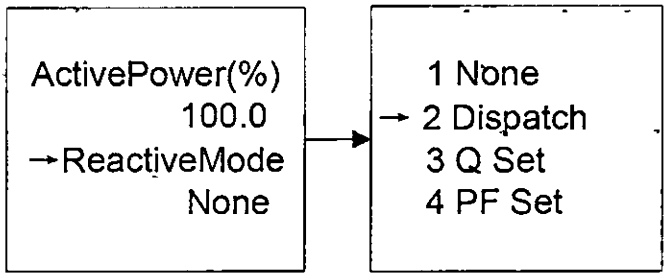


Figure 5-15 Enable the dispatch function

When the remote power dispatch function is enabled, users can change the values of ActivePower, PowerFactor and Q Set.

3. Q: Set the Q value

Note: Change the reactive power by adjusting the Q value (reactive compensation)

4. PF: Set the PF value

Note: Change the reactive power by adjusting the PowerFactor

5. PF(P): PF curve mode

Note: The power factor changes according to the power change, as shown in Figure 5-16:

INSTRUCTION:

The PF (P) function is only available for VDE-4105 and CEI 0-21 grid standard.

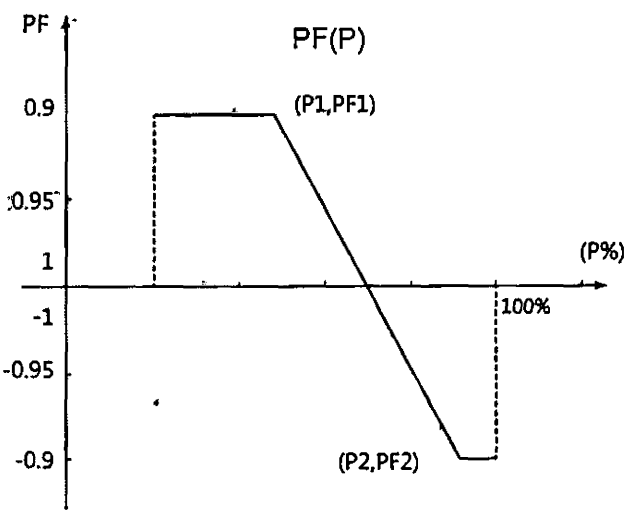


Figure 5-16 PF(P) curve

6. Q(U) : Q(U) curve mode

Note: The reactive compensation changes according to the grid voltage change, as shown in Figure 5-17.

INSTRUCTION:

The Q(U) function is only available for CEI 0-21 grid standard.

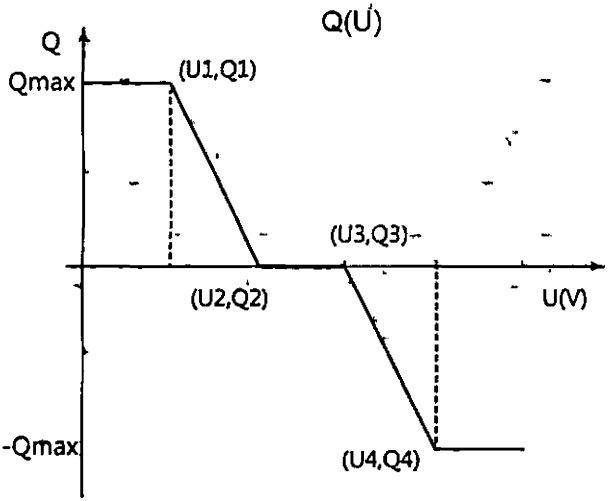


Figure 5-17 Q(U) curve

The Table 5-3 lists the parameters of Q, PF, PF(P) and Q(U) modes. Press ENTER to start up the modes when the parameters are set up.

Table 5-3 Operation parameters table

Mode	No.	Parameter Name	Setup range (lower limit, default & upper limit)
Q	1	ReactiveComp(%)	(-100.0%, 100.0%, 100.0%)
PF	1	PowerFactor	(-1.000, 1.000, 1.000)

PF(P)	1	PF(P)_P1(%)	(0, 50%, 100%)
	2	PF(P)_PF1	(-1.000, 1.000, 1.000)
	3	PF(P)_P2(%)	(0, 100%, 100%)
	4	PF(P)_PF2	(-1.000, -0.900, 1.000)
	5	V.PFStart (V)	(358.5, 358.5, 438.2)
	6	V.PFStop (V)	(0, 0, 438.2)
Q(U)	1	Qu_U1 (V)	(430.2, 430.2, 438.2)
	2	Qu_Q1 (%)	(-100.0%, 0%, 100.0%)
	3	Qu_U2 (V)	(430.2, 438.2, 438.2)
	4	Qu_Q2 (%)	(-100.0%, 50.0%, 100.0%)
	5	Qu_U3 (V)	(358.5, 366.4, 366.4)
	6	Qu_Q3 (%)	(-100.0%, 0%, 100.0%)
	7	Qu_U4 (V)	(358.5, 358.5, 366.4)
	8	Qu_Q4 (%)	(-100.0%, -50.0%, 100.0%)
	9	P.QuStart (%)	(5.0%, 20.0%, 100.0%)
	10	P.QuStop(%)	(5.0%, 5.0%, 100.0%)

5.4.7 Autotest

INSTRUCTION:

The Autotest is only needed for CEI 0-21 grid standard.

The "7 Autotest" appears ONLY when users select the "CEI 0-21" grid standard. Users can do the Class I and Class II protection tests to the grid voltage and frequency in the "7 Autotest" menu.

Select "7 Autotest" and press ENTER to go to the 8 submenus, including "1 V.MassI", "2 V.MiniI", "3 .MassI", "4 F.MiniI", "5 V.MassII", "6 V.MiniII", "7 F.MassII" and "8 F.MiniII".

INSTRUCTION:

The Autotest function is ONLY available when the inverter is in normal operation mode.

Take the "1 V.MassI" for example. When you select this submenu and press ENTER, "V.MassI Inizio?" will appear on the LCD screen for your confirmation. You can press ESC to cancel the test. If press ENTER again, you will see "Prova ..." on the LCD screen. When the test is complete, the test result will be reported on the screen as shown in Figure 5-18. Then press ESC to go back to the 8 submenus for other tests with the same test steps.

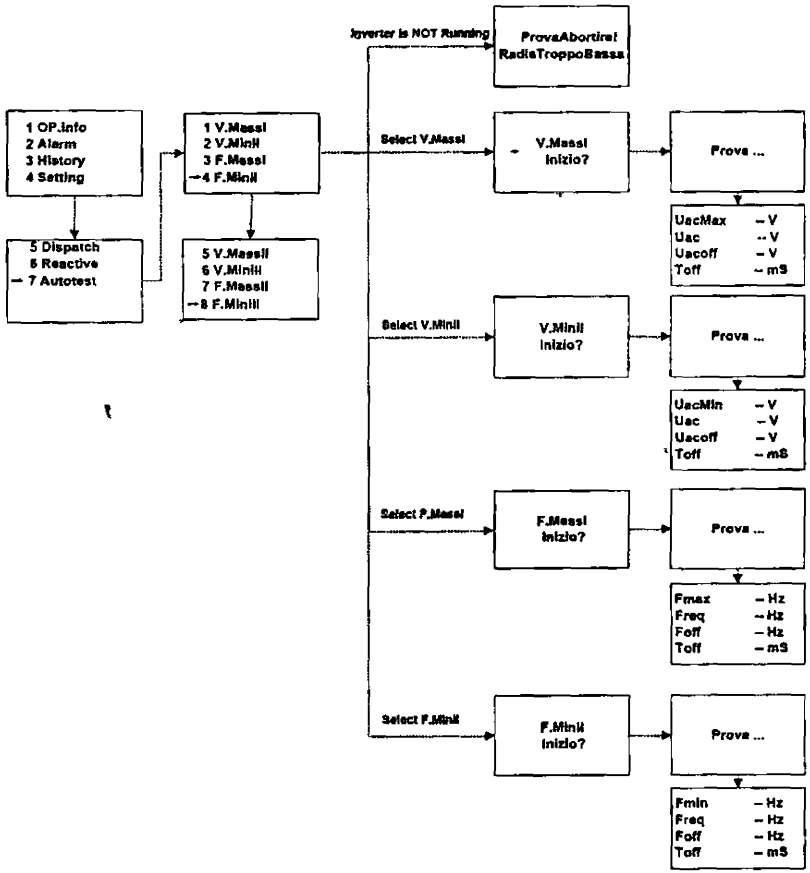


Figure 5-18 Autotest menu and submenus

5.4.8 System protection parameters setup

Press PAGEDOWN and ENTER at the same time in the main interface and enter the password (PAGEUP -> PAGEDOWN -> RIGHT -> LEFT) to access the system parameters setup menu. This menu includes 5 submenus: "1 SysPara", "2 Restart", "3 Recover", "4 ClrErrRecd" and "5 Stdset", as shown in Figure 5-19.

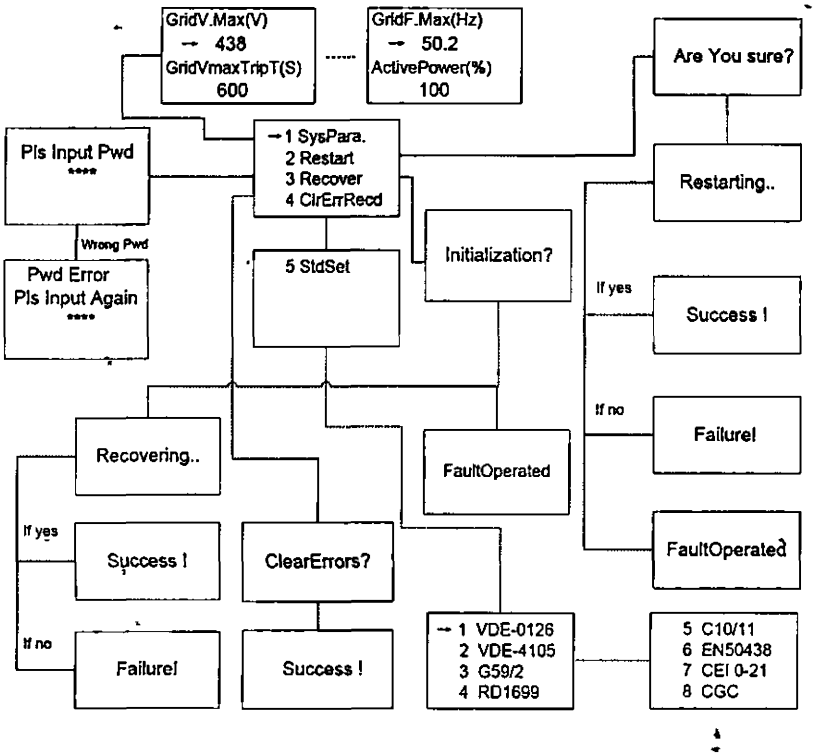


Figure 5-19 System parameters setup

(1) The system protection parameters of each grid standard can be set up in "1 SysPara" menu. The specification of protection parameters is listed in Table 5-4.

Table 5-4 Protection parameters table

System Parameters	Description
V.MaxI (V)	Class I Max. grid voltage
VmaxTripTI (S)	Class I Max. trip time
V.MinI (V)	Class I Min. grid voltage

VminTripTI (S)	Class I Min. grid voltage trip time
V.MaxII (V)	Class II Max. grid voltage
VmaxTripII (S)	Class II Max. grid voltage trip time
V.MinII (V)	Class II Min. grid voltage
VminTripTII (S)	Class II Min. grid voltage trip time
F.MaxI (Hz)	Class I Max. grid frequency
FmaxTripTI (S)	Class I Max. grid frequency trip time
F.MinI (Hz)	Class I Min. grid frequency
FminTripTI (S)	Class I Min. grid frequency trip time
F.MaxII (Hz)	Class II Max. grid frequency
FmaxTripTII (S)	Class II Max.grid frequency trip time
F.MinII(Hz)	Class II Min. grid frequency
FminTripTII (S)	Class II Min. grid frequency trip time
V.MaxRecover	Max. grid voltage recover value
V.MinRecover	Min. grid voltage recover value
V.RecoverT (S)	Grid voltage recover time
F.MaxRecover	Max. grid frequency recover value
F.MinRecover	Min. grid frequency recover value
F.RecoverT	Grid frequency recover time
PVStartVol (V)	PV startup voltage
SoftStep (KW/S)	Soft step
F.DeStart (Hz)	Over-frequency de-rating start frequency (See 5.4.9 Over-frequency de-rating)

F.DeStop (Hz)	Over-frequency de-rating stop frequency (See 5.4.9 Over-frequency de-rating)
LVRT Enable	Enable/Disable LVRT (See 5.4.10 LVRT)
LVRT Votage (%)	LVRT start voltage

(2) "2 Restart" menu: If a fault shutdown happens, a severe fault may have occurred inside the inverter. The user can perform a force reboot for one time in this menu if the user needs to restart the inverter.

INSTRUCTION:

This function is effective only when the fault "IntFault0010~0150" in the troubleshooting table occurs. The inverter may restore to normal operation automatically if alarm or protection faults occur. This function will not respond when the inverter is in operation mode and a "FaultOperated" alarm interface will be indicated.

(3) "3 Recover" menu: The manufacturer's parameter default value can be restored when the inverter is not in operation mode. Otherwise "Fault Operating" will be reminded.

(4) "4 ClrErrRecd" menu: History information of the failures can be wiped clear after confirmation

(5) "5 Stdset" menu: User can change the grid standard as per the local requirement of the electricity supply company in this menu if you chose an incorrect grid standard when first starting up the inverter.

NOTICE:

Please do NOT change the grid standard when the inverter is in operation mode; otherwise, the change is invalid. Please refer to "6.2

Manual shutdown" to shut down the inverter manually.

INSTRUCTION:

The CPS SCA5/6/7KTL-DO series inverter supports 8 grid standards. Please check with your local electricity supply company before selecting the grid standard. If the inverter is operated with a wrong grid standard, the electricity supply company may cancel the operation license.

You must not put the inverter into operation before the overall system complies with the national rules and safety regulation of the application.

5.4.9 Over-frequency de-rating

The "F.DeStart (Hz)" and "F.DeStop (Hz)" in the protection parameters represent Over-frequency de-rating start frequency and Over-frequency de-rating stop frequency respectively. (These two parameters are the slope of curve in VDE-4105. grid standard.)

When the grid standard is CEI 0-21, the "F.DeStart (Hz)" ranges from (50.00Hz, 51.50Hz) and the default value is 50.30Hz. The "F.DeStop (Hz)" ranges from (50.00Hz, 51.50Hz) and the default value is 51.50Hz.

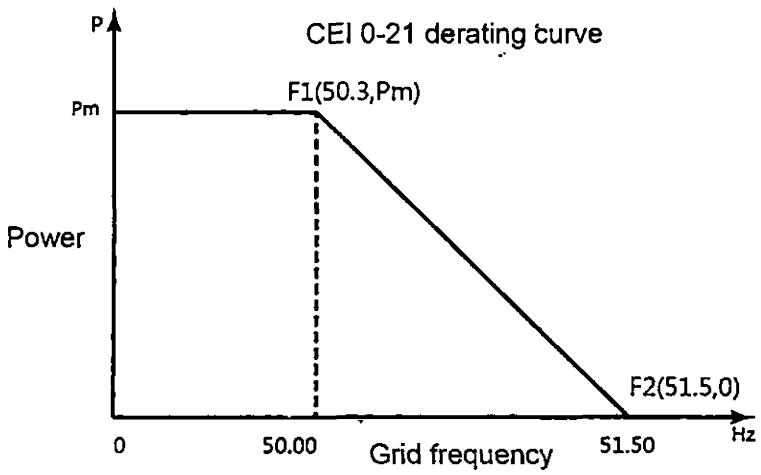


Figure 5-20 CEI 0-21 de-rating curve

When the grid standard is VDE-4105, the "F.DeStart (Hz)" ranges from (50.00Hz, 51.50Hz) and the default value is 50.20Hz. The Over-frequency de-rating slope ranges from (0, 100%) and the default value is 40.0%.

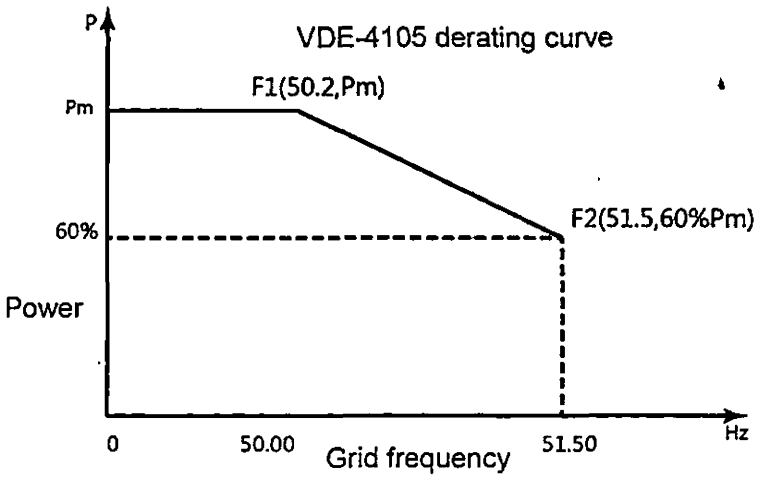


Figure 5-21 VDE-4105 de-rating curve

5.4.10 LVRT

In the protection parameters, the "LVRT Enable" is meant to enable/disable LVRT function. The "LVRT Voltage (%)" represents the start voltage of LVRT.

"LVRT Enable": When the parameter is set up to 1, it means the LVRT is enabled; When the parameter is set up to 0, it means the LVRT is disabled.

"LVRT Voltage (%)" ranges from (70%,90%) , and the default value is 80%.

Chapter 6 Operation

6.1 Start-up

Manual start-up: Manual start-up is required after regulation setting or manual (fault) shut-down. Move the cursor from the main operation interface to "4 Setting". Press ENTER and go to submenu "1 ON/OFF". Then move the cursor to "ON" and press ENTER to start the inverter. Then the inverter will start up and operate normally if the start-up condition is met. Otherwise, the inverter stands by.

Automatic start-up: 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.

6.2 Shut-down

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

Move the cursor from the main operation interface to "4 Setting". Press ENTER and go to submenu "1 ON/OFF". Move the cursor to "OFF" and press ENTER, and then the inverter will be shut down.

Automatic shutdown: 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.

6.3 Operation mode

There are 4 operation modes. The following are corresponding indications for each mode.

(1) System check mode for start up, as shown in Figure 6-1:

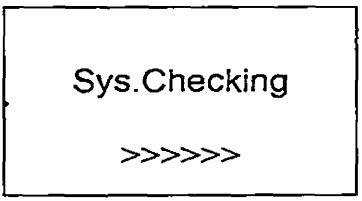
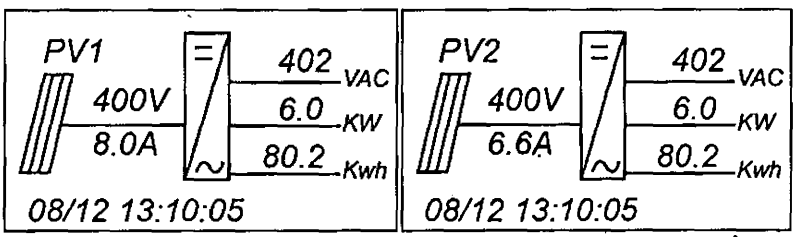


Figure 6-1 System self check ongoing

This mode indicates that the inverter is checking whether it is ready for normal operation after the manual start-up of inverter.

(2) Normal operation mode: Default indication interface for normal operation is shown in Figure 6-2 (a) and 6-2 (b). The switching time between (a) and (b) is 5 seconds.



(a) (b)

Figure 6-2 Default indication interface for normal operation

In this mode, the inverter converts the power generated by PV modules to AC continuously and feeds into the power grid.

(3) Standby mode, as shown in Figure 6-3:

The inverter will enter standby mode when the output voltage and power of PV modules do not meet the startup conditions or PV voltage and input power are lower than the set value. The inverter will check automatically whether it meets the startup conditions in this mode until it turns back to normal mode. The inverter will switch from standby mode to fault mode if a malfunction occurs.

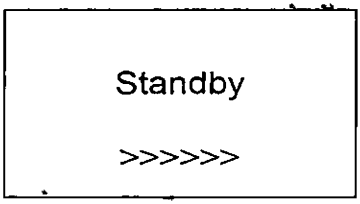


Figure 6-3 Inverter system in standby mode

INSTRUCTION:

If the "SPICommErr" occurs along with the flashing LED fault indicator, the actual working status of inverter may not be standby despite "Standby" is shown on the LCD. Please refer to the "Troubleshooting Table" for detailed measures to solve this problem.

(4) Fault mode, as shown in Figure 6-4:

The inverter will disconnect from the power grid and turn into fault mode when the inverter or power grid fails. Check the specific cause in "Troubleshooting table" (Table 6-1) according to the fault message displayed on the LCD and eliminate the fault referring to the instructions.

Figure 6-4 Fault indication interface

WARNING:

All the installation and wiring connections should be performed by qualified technical personnel. Disconnect the inverter from PV modules and the AC supply before undertaking maintenance.

6.4 Grid-tied power generation

CPS SCA5/6/7KTL-DO series inverter has an automatic grid-tied power generation process. It will check constantly whether AC power grid meets the conditions for grid-tied power generation, and also test whether the PV array has adequate energy. After all conditions are met, the inverter will enter grid-tied power generation mode. While in grid-tied power generation, the inverter can detect the power grid at all times, and also keep the photovoltaic array output in maximum power point tracking (MPPT) mode. In case of any abnormity, the inverter will enter the protection program immediately. If the sunlight is weak and very little power is generated, the inverter will enter standby mode. When the voltage of PV array is again stable and higher than the set value, the inverter will try to start grid-tied power generation again.

Chapter 7 Maintenance and De-installation

7.1 Fault shut down and troubleshooting

7.1.1 LED fault and troubleshooting

Please refer to the definition of LED lights in Table 5-1 and shoot the troubles according to Table 7-1:

Table 7-1 Trouble shooting of LED lights

LED fault status	Solutions
Both of the "Power" LED and LCD screen don't light up.	1. Turn off the 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 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 lights off or "FAULT" LED lights up.	Refer to Table 7-2 for troubleshooting

7.1.2 LCD 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 LCD screen. Please refer to "5.4.2 Present fault" for detailed operation.

The causes of a fault can be identified based on the faults listed in Table 7-2. Proper analysis is recommended before contacting after-sales service. There are 3 types of fault: alarm, protection and hardware fault.

Table 7-2 LCD Troubleshooting table

Alarm	1.TempSensorErr	Definition: Prompt detection of abnormal temperature
		Possible causes: 1.Temperature Sensor socket connecter has poor contact; 2.Temperature Sensor is damaged;
		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
	2.SPICommErr	Definition: Communication inside inverter fails
		Possible causes: Socket 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
	3.IntFanErr	Definition: Fan (not visible from outside) inside inverter is working abnormally
		Possible causes: 1.Fan service life has expired; 2. Fan socket connecter has poor contact.
		Recommended solutions: 1.Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2.Switch off 3-phase work power supply and then reboot the system; 3.Contact after-sales service personnel
	4.ExtFanErr	Definition: The visible fan from outside view is working abnormally
		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 matters on fan blades; 3.Switch off 3-phase work power supply and then reboot the system;

		4.Contact after-sales service personnel
	5.EepromErr	Definition: Internal alarm
		Possible causes: Internal memory has a problem
		Recommended solutions: 1.Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2.Contact after-sales service personnel
Protection	1.TempOver	Definition: Ambient or internal temperature is too high
		Possible causes: 1.Ambient temperature outside the inverter is too high; 2.Fan is blocked; 3.Air convection is affected because of incorrect installation.
		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
	2.GridV.OutLim	Definition:

		Grid voltage exceeds the specified range,
		Possible causes: 1.Grid voltage is abnormal; Power grid breaks down 2.Cable connection between the inverter and the grid is poor;
		Recommended solutions: 1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Check whether the grid voltage is within the specified range; 3.Check whether the cable between the inverter and power grid is disconnected or has abnormalities; 4.Contact after-sales service personnel.
	3.GridF.OutLim	Definition: Grid voltage frequency is abnormal, or power grid is not detected
		Possible causes: 1.Grid frequency has abnormalities; 2.Cable connection between the inverter and the grid is poor;
		Recommended solutions: 1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Check whether the grid frequency is within the specified range; 3.Check whether the cable between the inverter

		and power grid is disconnected or has abnormalities; 4.Contact after-sales service personnel
	4.PVVoltOver	Definition: PV voltage exceeds the specified value
		Possible causes: PV over-voltage
		Recommended solutions: 1.Observe for 30 minutes and see whether the alarm will be eliminated automatically; 2.Check whether PV voltage exceeds the specified range; 3.Turn off the PV input switch, wait for 5 minutes, and then turn on the switch again; 4.Contact after-sales service personnel
	5.PV1 (2) Reverse**	Definition: PV module is connected inversely
		Possible causes: PV positive pole and negative pole are connected inversely;
		Recommended solutions: 1.Check whether positive pole and negative pole are connected inversely; 2.Contact after-sales service personnel
	6.GFCI.Err	Definition: System leakage current is too high
		Possible causes: 1.Excessive parasitic capacitance on PV module

		due to environmental factor; 2.Grounding is abnormal; 3.Fault inside the inverter
		Recommended solutions: 1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Detect whether the electrical connection is abnormal 3.Contact after-sales service personnel
	7.IsolationErr	Definition: Insulation impedance of PV positive to ground or PV negative to ground exceeds the specified range
		Possible causes: Air humidity is high
		Recommended solutions: 1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Check insulation of PV system; 3.Contact after-sales service personnel
	8.IntProtect0010~0260	Definition: Internal protection of the inverter
		Possible causes: Protection procedure occurs inside the inverter
		Recommended solutions: 1.Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.Contact after-sales service personnel

Fault	IntFault0010~0150	Definition: Internal fault of the inverter
		Possible causes: Fault occurs inside the inverter
		Recommended solutions: 1.The inverter can be forced to restart once if it is required by operation and if it is confirmed that there is no other problem; 2.Contact after-sales service personnel

INSTRUCTION:

*The actual display of "PV.VoltOver" is "PV1VoltOver" or "PV2VoltOver".

*The actual display of "PV.Reverse" is "PV1Reverse" or "PV2Reverse".

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 10 minutes after disconnecting all sources of DC and AC.

7.2 Product maintenance

7.2.1 Check the electrical connection

Check all the cable connections as a regular maintenance inspection every half a year or per year.

1.) Check whether the cable connections are loose. Please tighten all the

cables referring to "3.3 Electrical installation".

2.) Check whether the cables are damaged, especially whether the cable surface is scratched. Repair or replace the cables if necessary.

7.2.2 Clean the air vent filter

The inverter can become hot during normal operation. In order to ensure the reliable operation, CPS SCA10KTL-DO(HE) and CPS SCA12KTL-DO(HE) use variable speed cooling fans to keep sufficient air convection for 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. You can refer to "7.2.4 Clean filter" for detailed information.

7.2.3 Replace cooling fans

INSTRUCTION:

Please be aware that only CPS SCA10KTL-DO(HE) and CPS SCA12KTL-DO(HE) have external cooling fans for replacement.

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.

1. Use a T20 screwdriver to take off the 3 screws on the fan tray, as shown in Figure 7-1:

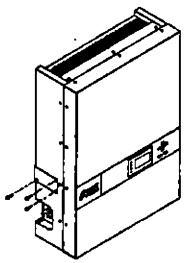


Figure 7-1 Take off the screws on the fan tray

2. Take out the fan tray assembly

(1) Pull out the fan tray assembly about 50mm from the left side of the inverter until the cable connector (see black arrow) between the fan and inverter shows up, as shown in Figure 7-2:

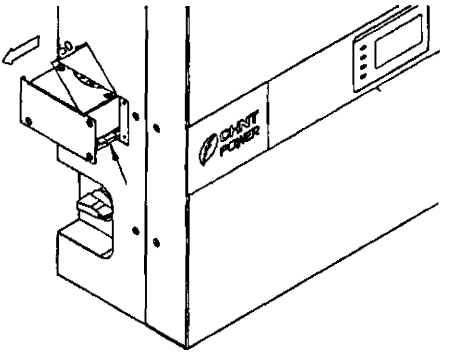


Figure 7-2 Pull out fan tray assembly

(2) Press the buckle, disconnect the cable connector and then pull out the whole fan tray assembly from the inverter, as shown in Figure 7-3:

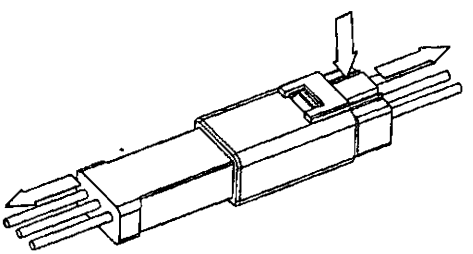


Figure 7-3 Disconnect the connector

3. Replace fan tray assembly

(1) Take off the 8 screws according to Figure 7-4:

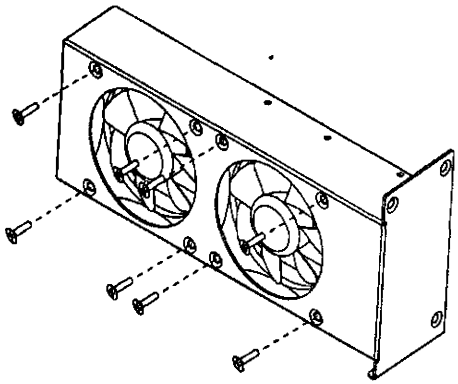


Figure 7-4 Take off the screws

(2) Take off the big fan with the direction of No.1 arrow and then push the small fan in the direction of No.2 arrow illustrated in Figure 7-5:

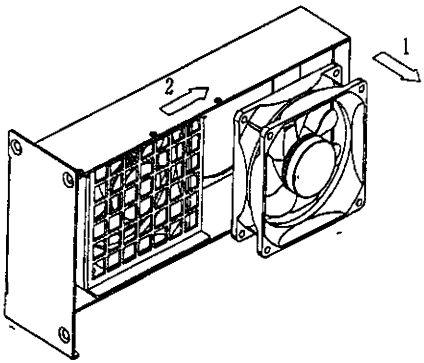


Figure 7-5 Take off the fans

(3) Install the new fans following steps (1) to (2) in reverse order. Please check direction and the size of the two fans before installation, as shown in Figure 7-6:

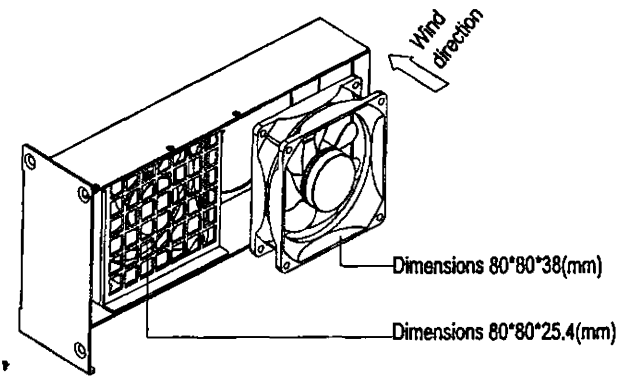


Figure 7-6 Dimensions of fans and wind direction

(4) Connect the cable connector between the fan and inverter and fasten the cable on the fan tray with ribbons.

(5) Plug the fan tray assembly into the inverter and fasten the screws, as shown in Figure 7-7:

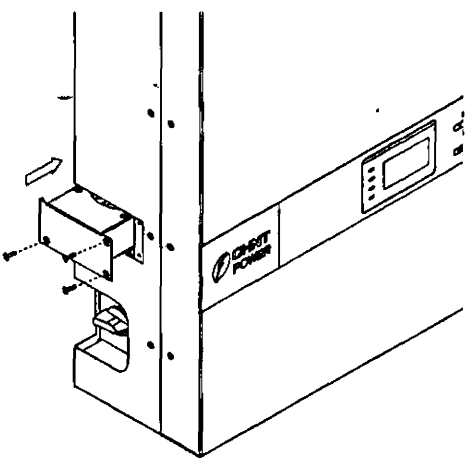


Figure 7-7 Plug in the fan tray assembly

7.2.4 Clean or replace the filter

1. Take off the screw with a Phillips screwdriver, as shown in Figure 7-8:

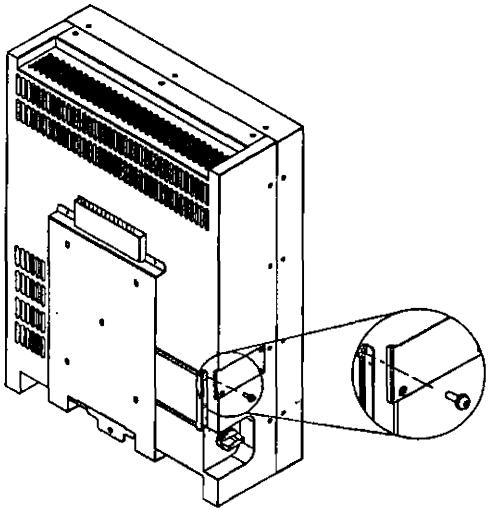


Figure 7-8 Take off the screw on the filter

2. Push the filter in the direction of No.1 arrow and then remove in the direction of No. 2 arrow, as shown in Figure 7-9:

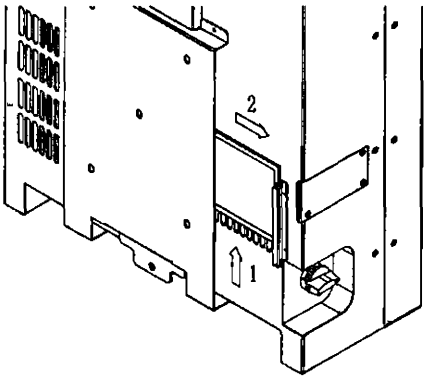


Figure 7-9 Take off the filter

3. Wash the filter net or replace with a new one. Install the filter net into the slot and then fasten the screws, as shown in Figure 7-10:

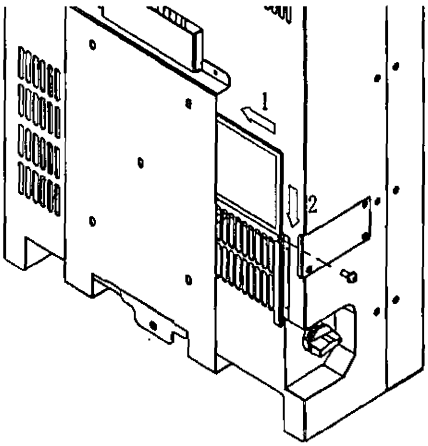


Figure 7-10 Install the filter net

7.3 De-installing the inverter

De-install the inverter according to the following steps when the service time is due or for other reasons:

DANGER:

Please disconnect the electrical connection in strict accordance with the following steps. Otherwise, the inverter will be damaged and the service personnel's life will be endangered.

1.) Turn off the AC breaker, and use Padlocks if provided.

2.) Turn off the DC breaker, and use Padlocks if provided.
(Skip the two steps if there are no circuit breakers.)

3.) Switch the DC switch to "OFF" position.

4.) Wait for 10 minutes to ensure the internal capacitors have been completely discharged.

5.) Measure the AC output cable terminal voltage against the ground, and

make sure the voltage is 0V.

6.) Disconnect the AC and PE cables referring to "3.3.2 AC and PE connection".

7.) Disconnect the DC cables referring to "3.3.1 DC connection".

8.) Take out the communication card, and disconnect the communication cables.

9.) De-install the inverter using the reverse operation steps referring to "3.2 Mechanical installation".

Chapter 8 Technical Data

Model Name	CPS SCA5KTL-DO	CPS SCA6KTL-DO	CPS SCA7KTL-DO
DC Input			
Nominal DC Input Power	5.1kW	6.2kW	7.3kW
Max. DC Input Power for each MPPT	3kW	3.5kW	4kW
Max. DC Input Voltage	1000Vdc		
Operating DC Input Voltage Range	250-950Vdc		
Start-up DC Input Voltage / Power	300V/150W		
Nominal DC Input Voltage	600V		
MPPT Voltage Range	300-800Vdc		
Number of MPP Tracker	2		
Number of DC Inputs (strings)	2x2		
Max. Input Current	2x10A	2x12A	2x14A
Max. Input Current per string	10A	12A	14A
DC Disconnection Type	Integrated DC switch		
PV Array Configuration	Floating		
AC Output			
Rated AC Output Power	5kW	6kW	7kW
Max. AC Output Power	5kW	6kW	7kW
Rated Output Voltage	400Vac		
Output Voltage Range[1]	320-460Vac		
Grid Connection Type	3Φ/N/PE		
Max AC Output Current	7.3A	8.7A	10.2A
Rated Output Frequency	50/60Hz		
Output Frequency Range[2]	45-65Hz (programmable)		

[1] The Output Voltage Range may differ according to specific grid standards.
[2] The Output Frequency Range may differ according to specific grid standards.

Power Factor	>0.99 (±0.9 adjustable)		
Current THD	<3%		
AC Disconnection Type	-		
System			
Topology	Transformerless		
Max. Efficiency	98.0%		
Euro Efficiency	97.4%		
Stand-by / Night Consumption	<7W / <0.3W		
Environment.			
Protection Degree	IP65		
Cooling	Natural Convection		
Operating Temperature Range	-25°C to +60°C (derating from 50°C)		
Operating Humidity	0-95%, non-condensing		
Operating Altitude	4000m (derating from 2000m)		
Display and Communication			
Display	LCD+LED		
Communication	Standard: RS485, USB; Option: Ethernet, Zigbee		
Mechanical Data			
Dimensions (WxHxD) (mm)	500x680x216		
Weight (kg)	38	38	38
Compliance			
Safety and EMC Standard (In progress)	LVD: 2006/95/EC, IEC/EN 62109-1: 2010, IEC/EN 62109-2: 2011. EMC: 2004/108/EC, Class B, IEC/EN61000-6-2: 2005, IEC/EN61000-6-3: 2007.		
Grid Standard (In progress)	VDE-AR-N 4105, VDE V 0126-1-1/A1, C10/11, CEI 0-21, G83/1-1, G59/2		

Note[1]: CPS SCA5/6/7KTL-DO de-rates when the DC voltage of is lower than 300V or higher than 800V. (See Figure 8-1)

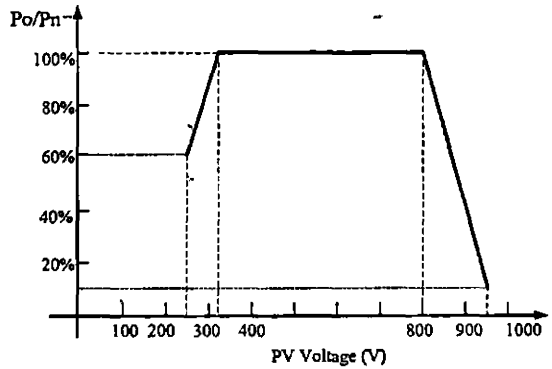


Figure 8-1 DC voltage de-rating curve

Note[2]: CPS SCA5/6/7KTL-DO de-rates when the environmental temperature is higher than 50℃. (See Figure 8-2)

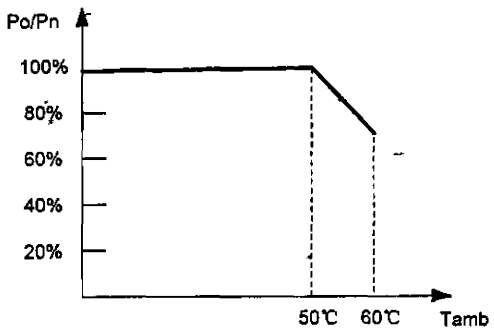


Figure 8-2 Environmental temperature de-rating curve

Chapter 9 Quality Assurance

9.1 Warranty

Chint Power provides the standard warranty upon the contract for offshore products, generally with a period of five (5) years which begin from installation, commissioning and acceptance or six (6) months after the delivery of the goods (whichever comes first).

9.2 Disclaimer

This warranty covers all defects due to design, components and manufacturing. However, the warranty does not cover damages resulting from the following circumstances:

- Damage caused during transportation
- Insufficient ventilation for the inverter
- The Inverter has been misused, neglected, or abused
- The Inverter has been used or stored in conditions beyond its electrical or environmental specifications
- The Inverter has been used for purposes other than for which it was designed
- The Inverter has been used beyond its stated specifications, operating parameters and application
- Acts of third parties, atmospheric discharges, excess voltage, chemical influences, natural wear and tear and for loss or damage in transit
- Improper testing, operation, maintenance, adjustment or repair of any kind not authorized in writing by the manufacturer
- Products or software changed without authorization
- The Inverter has been connected to other equipment with which it is not compatible
- Negligence of safety warning and relevant mandatory safety

specifications on the product and in its related document;

- Application beyond the scope of applicable safety or grid standards (VDE, UL, etc.)
- Unexpected disaster or force majeure

9.3 Quality clause (Warranty clause)

1. CPS will repair or replace with new products with malfunctions during the warranty period.

2. The replaced non-conformance products should be returned to CPS.

3. Reasonable time should be provided to CPS for repair work.

Please do not hesitate to contact us if you have any questions regarding CPS SCA5/6/7KTL-DO series grid-tied PV inverter. We are glad to provide the best service for you.

Chapter 10 Disposal

The dealer or installers should remove the PV Inverter from the array and contact the supplier for disposal instructions

The Inverter must not be disposed of with the household waste.

Disposal of the PV-Inverter at the end of its service life should be done in accordance with the disposal regulations for electronic waste which apply at the installation site at that time.

Note: Please contact supplier or dealer for disposal options.

SHANGHAI CHINT POWER SYSTEMS CO., LTD.

Address: Building 4, No. 3255, Sixian Road,
Songjiang District, Shanghai, China
Zip Code: 201614

Web: www.chintpower.com/en
Email: service.cps@chint.com
Service Hotline: +86-21-37791222-6300

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