

CHINT Grid PV-Inverter

CPS SC10KTL-O

Installation and Operation Manual

Version 3.1E



Content

READ THIS USER MANUAL BEFORE YOU START	3
1. SAFETY INSTRUCTIONS	4
2. LIMITED WARRANTY	6
3. OVERVIEW	7
3.1 INTRODUCING THE GRID PV SYSTEM	7
3.2 INTRODUCING CHINT CPS SC10KTL-O INVERTER	7
3.2.1 Dimensions of CPS SC10KTL-O Inverter	8
3.2.2 Identification	9
3.2.3 Specific Parts of CPS SC10KTL-O Inverter	10
3.3 INTRODUCING GRAPHIC DATA LOGGER	11
3.3.1 Configuration	12
3.3.2 Features	12
3.3.3 Connection	13
3.3.4 Appearance	13
4. FEATURES	14
5. INSTALLATION	15
5.1. INSIDE THE PACKAGE	15
5.2. MOUNTING THE PV-INVERTER	15
5.3. CONNECTING THE AC-OUTPUT CABLE	21
5.4. CONNECTING THE PV-PANEL	24
5.5. CONNECTING TO THE JUNCTION BOX	27
5.6 INSTALLATION CHECKLIST	28
6. OPERATION OF PV-INVERTER.....	30
INITIALIZATION FOR REGULATION TYPE SETTING.....	30
6.1 AUTO POWER-UP	31
6.2 OPERATING MODES	31
6.3 USING THE LCD DISPLAY AND DATA LOGGER	33
6.3.1 Operation	33
6.3.2 Display on LCD	34
6.3.3 Data Logger Function Tree:	37
6.4 AUTO TEST SETTING (ONLY FOR ENEL GUIDE 2010 MODEL).....	38
6.5 AUTO TEST RECORD (ONLY FOR ENEL GUIDE 2010 MODEL)	41
6.6 DISPLAY MESSAGES	42
7. COMMUNICATION INTERFACE	46
7.1. RS-232 (ON INVERTER)	46
7.2. OPTIONAL COMMUNICATIONS SLOT FOR RS-485	46
7.3. USB (ON DATA LOGGER)	46
8. DOWNLOADING DATA INSIDE DATA LOGGER	47
8.1. HOW TO EJECT / INJECT THE DATA LOGGER.....	47
8.2. HOW TO ACCESS AND MANAGE LOG DATA	48
9. TROUBLESHOOTING	53
10. PREVENTATIVE MAINTENANCE	56

10.1 VISUAL INSPECTION.....	56
10.2 CHECKING AND MAINTENANCE	56
11. SPECIFICATIONS.....	57
12. DISPOSAL.....	59
13. CONTACT INFORMATION	60
14. COMPLIANCE OF STANDARDS	61
15. LOAD GRAPH AND EFFICIENCY GRAPH	62
APPENDIX I: LINE LOSSES OF THE CPS SC10KTL-O	64
APPENDIX II: SELECTING THE LINE CIRCUIT BREAKERS	65
APPENDIX III: VDE CERTIFICATION	66
APPENDIX IV: VDE0126-1-1 CERTIFICATION	67
APPENDIX V: ENEL GUIDE 2010 CERTIFICATION	68

Read this User Manual before you start

Congratulations on purchasing CHINT Grid PV-Inverter (referred to in this manual as “PV-Inverter”, or simply “Inverter”). This PV-Inverter is a highly reliable product due to its innovative design and excellent quality control. The device is dedicated to high demand, 3 phase grid-linked PV systems. Additionally this product is IP65 rated for dusty or humid environments and is suitable for outdoor use.

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

If you encounter any difficulties during installation or operation, please refer to this manual before contacting your local dealer or representative. Thank you for choosing this product. Please keep this manual on hand for quick reference. Start enjoying CHINT PV-Inverter and your life!

1. Safety Instructions



Risk of Electric Shock:

Alternating Current (AC) and Direct Current (DC) sources are terminated in this device. To prevent risk of electric shock during maintenance or installation please ensure that all AC and DC terminals are disconnected. Be sure to secure the Ground line to the Grid's Ground, and double check the Line and Neutral are not confused with Ground.



Risk of Danger:

More than one source of supply. Disconnect all sources before servicing.



Handling the PV-Inverter:

Only qualified service personnel should handle the PV-Inverter. When the PV-panel is exposed to sufficient radiation and connected to the device, it generates a DC voltage to charge the DC link capacitors.

After disconnecting the PV-Inverter from the power supply and PV-panel, electrical charge can still reside in the DC link capacitors. Before handling the device, please allow at least 60 minutes after the power is disconnected.

Public Utility only:

The PV-Inverter is designed to feed AC power directly to the public utility power grid. Do not connect the AC-output of this device to any private AC equipment.



Hot Surfaces:

Although designed to meet international safety standards, the PV-Inverter can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.

Maintaining and Servicing the PV-Inverter:

Only authorized personnel are allowed to open the inverter for service purpose.



CAUTION – Risk of electric shock from energy stored in capacitor, do not remove cover until 8 minutes after disconnecting all sources of supply.

Unpacking and Installation:

This PV-Inverter weighs 37 kg (81 lb). To avoid injury and for safety purpose, be sure to use proper lifting techniques and secure the help of someone to assist in the unpacking and installation of the inverter.

2. Limited Warranty

The PV-Inverter comes with a 5-year warranty. An optional extended warranty may be available by special request before delivery. This warranty covers all defects due to design, manufacturing and components. This warranty does not cover damages resulting from:

- Seal on the product is broken
- Improper transportation and delivery
- Unqualified persons opening the unit
- Improper installation
- Unauthorized modification, test or repairing
- Use and application beyond the definition in this manual
- Application beyond the scope of safety standards (e.g. VDE)
- Acts of nature such as lightning, fire, storm etc.

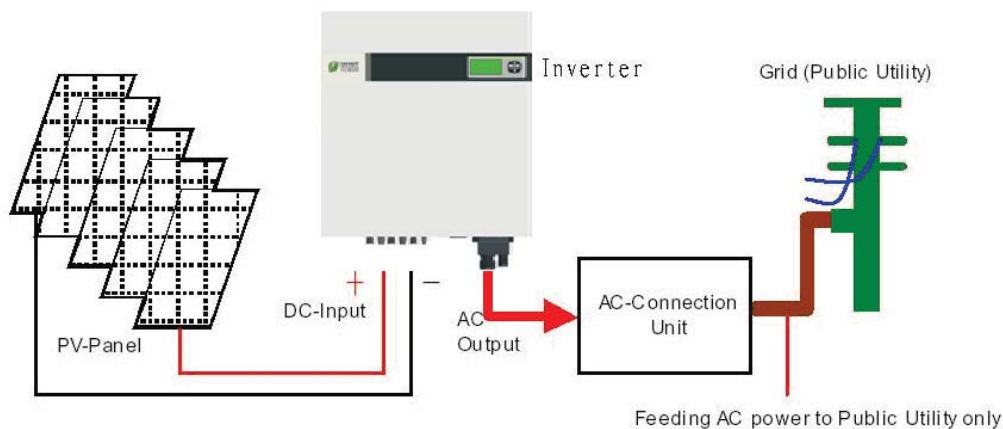
Repairs and/or replacement of parts or the device are made at the manufacturer's discretion. Defective parts or malfunction discovered during installation should be presented in a written report for confirmation before applying for replacement or repair. The damage report must be issued within 5 working days after receiving the PV Inverter. Manufacturer is not responsible for damages beyond the scope of this warranty.

3. Overview

3.1 Introducing the Grid PV System

The Grid PV System is mainly composed of 4 parts: the PV-panels, the PV-Inverter, the AC-Connection Unit (the connection Interface) and a connection to the Public Utility. When a PV-panel is exposed to sufficient irradiation and connected to an inverter, it generates DC power. The PV-Inverter converts DC to AC and feeds in to the Public Utility via the AC-Connection unit.

The following figure shows the PV-Inverter in the Grid PV System.

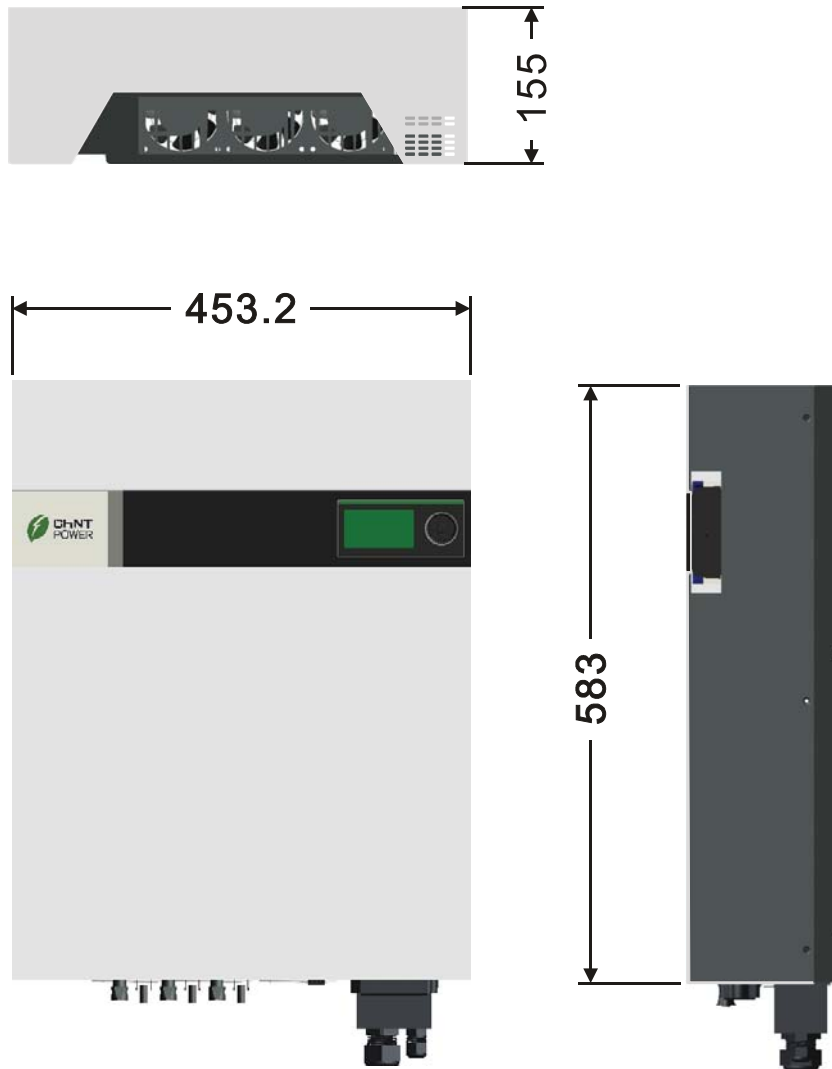


3.2 Introducing CHINT CPS SC10KTL-O Inverter

CHINT grid-connected PV inverter converts direct current (DC) power generated by a PV panel into alternating current (AC), which is compatible with the local electricity distribution network; also called the public utility, or grid system.

3.2.1 Dimensions of CPS SC10KTL-O Inverter

The dimension is in millimeters.



3.2.2 Identification

On the left side of CPS SC10KTL-O shows the type plate of the inverter. The type plate shows the Type, Specifications, and the Serial Number of the inverter. When encounter any difficulties during installation or operation, please record the Serial Number (SN) before contacting your local dealer or representative.



Model NO: CPS SC10KTL-O

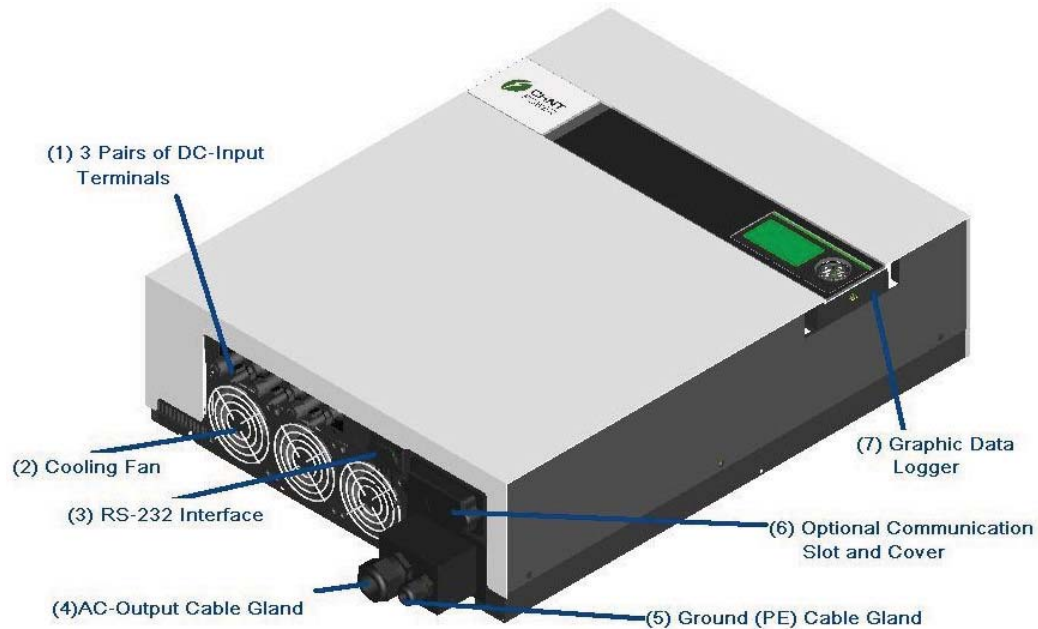
DC	Nominal operating voltage	640V
DC	Max. input current	13A
DC	Operating voltage range	200~800V
AC	Nominal operating voltage	400V,3Ø4W+PE
AC	Nominal operating frequency	50Hz
AC	Nominal output power	10000W
AC	Max.output power	11000W
AC	Max. output current	17.5A
	Operating temperature range	-20~55°C
	Device-Degree of Protection	IP65

Made in Taiwan



3.2.3 Specific Parts of CPS SC10KTL-O Inverter

The descriptions of the major parts of CPS SC10KTL-O Inverter are indicated below:



(1) 3 Pairs of DC-Input Terminals: Each input pair consists of positive and negative terminals. Refer to *Installation Section* for set-up information.

(2) Cooling Fan: The inverter is equipped with 3 air cooling fans to eject heat dissipated by the heat sink. When the temperature of heat sink reaches 50°C the fans automatically turn on.

(3) RS232 Interface: Connect this port directly to your PC via an RS232 serial cable.

(4) AC-Output Cable Gland: The cable gland is for securing the AC power wires L1 (Line 1), L2 (Line 2), L3 (Line 3), N (Neutral), Gnd (PE): 4/6mm²

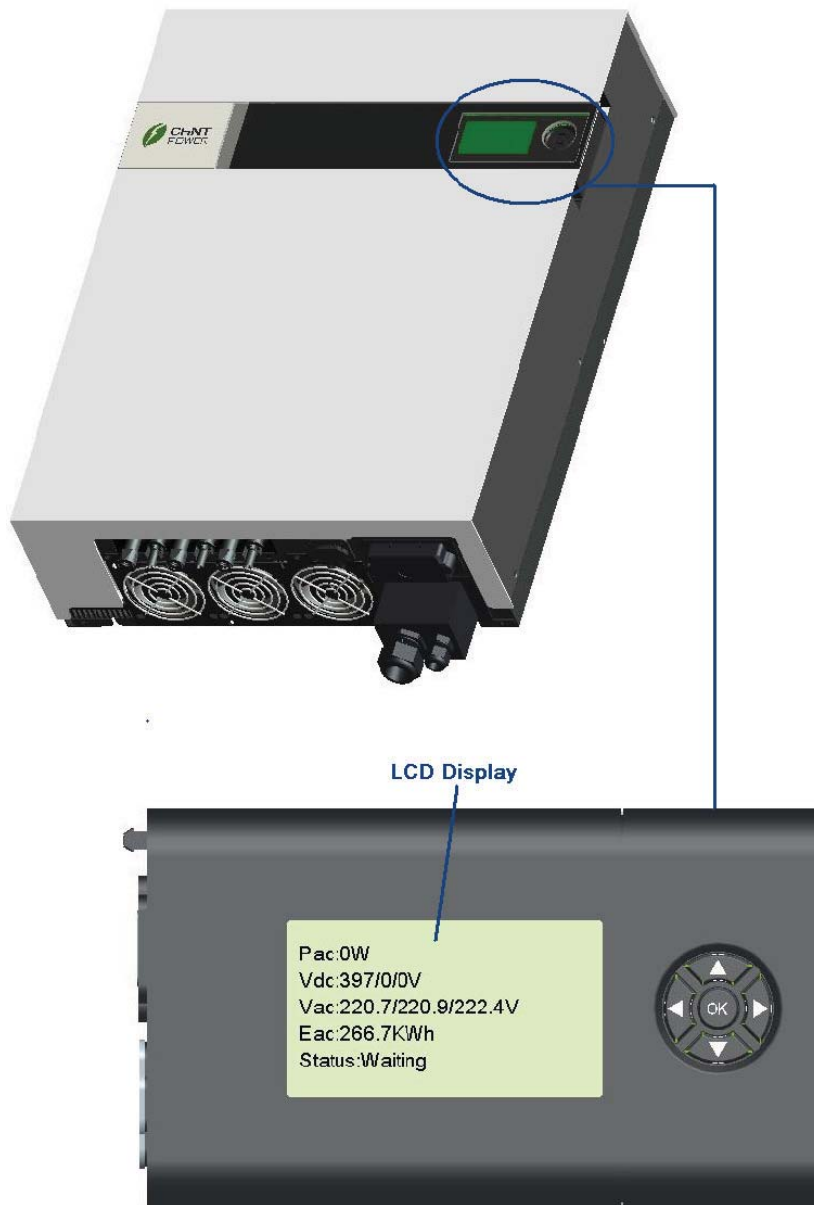
(5) Ground (PE) Cable Gland: The cable gland is for securing the Ground (PE) wire for safety purpose. Refer to *Installation Section* for set-up information. G (Ground, PE): 10mm² wires.

(6) Optional Communication Slot and Cover: The cover behind is a slot is to accommodate the optional communication interface, such as RS485 card.

(7) Graphic Data Logger: This device displays and records useful information about the inverter operating status.

3.3 Introducing Graphic Data Logger

To show the information of inverter, there is a graphic Data Logger in the unit. This Data Logger can show various information of the inverter such as operational status and warning message. In addition, it can be removed from its slot to a place user prefers. A standard 1.8-meter cord is attached with the Data Logger. If the user wishes to extend the length, a standard RS232 (DB9) cable of maximum 15 meters in length can be use for communication purpose.



3.3.1 Configuration

The following table indicates the main specification of the Data Logger:

LCD	Monochrome
Displayed Information	Each I/P power, O/P power, Operation mode and warning message
Storage Period	3 years
Storage Media	SD card
Data Download	Via mini USB

3.3.2 Features

Removable Data Logger

The Data Logger is removable from its inverter. The display is a module designed so that users can remove and put back the module easily. Between the display module and inverter, there is a standard DB9 RS232 cable at length of 1.8m in-between. The display can be mounted on wall after taking out from its slot at inverter.

Multicolored back light

The backlight of the LCD changes according to its status. There are 3 colors and their indications are:

- **Green:** Start-up and normal status
- **Red:** Fault Status. In this status, inverter disconnected from grid due to system fault or inverter failure. These faults and failures are defined in “error message table” later on.
- **Yellow:** Warning Status. Inverter disconnected from grid due to system fault for the past 48 hours, but inverter reconnected again.

Data download

You can download and access logger data with a PC via mini USB cable and manage internal data. For detail information, please refer to Ch 8. *Downloading data inside Data Logger.*

3.3.3 Connection

The Data Logger can be either located on the inverter or remotely mounted on a wall. A 1.8-meter cord connects the display module and the main inverter unit

3.3.4 Appearance

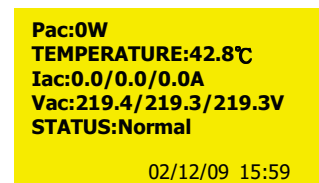
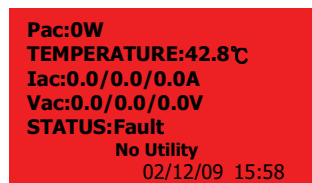
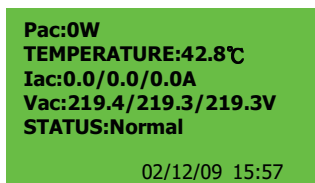
- LCD: 128 x 64 graphic, monochrome



- Navigation Pad: “↑”, “↓”, “→”, “←” and “OK” in the center.



- Back light: 3 colors



4. Features

- Lead-free, RoHS compliant
- Up to 97% high conversion efficiency
- 3 MPP (Maximum Power Point) trackers
- IP65 enclosure
- 128x64 graphic display
- 3-phase 4 wire, 400V
- Compact design
- High reliability
- Easy operation
- Maintenance free
- Powerful Communications Interface
- Embedded ENS, complying with VDE 0126-1-1
- Internal GFCI (Ground Fault Current Interrupter), 30mA

5. Installation

5.1. Inside the Package

The following items are included in the CPS SC10KTL-O Package:

- (1) CPS SC10KTL-O PV-Inverter x 1
- (2) Installation and Operation Manual x 1
- (3) Mounting Screws x 4 and Snap Bushings x 4
- (4) Safety-lock screws x 2
- (5) Mounting Bracket for the inverter x 1
- (6) Mounting plate of the data logger x 1
- (7) Screws for mounting the data logger x 2
- (8) AC Output Cover x 1
- (9) Rubber Bushing for AC connection (2 types)

5.2. Mounting the PV-Inverter



Suggestions before mounting

To obtain optimal results from the PV-Inverter, please consider the following guidelines before installing the device:



Do not expose the PV-Inverter to direct sunlight. Direct sunlight increases the internal temperature that may reduce conversion efficiency.

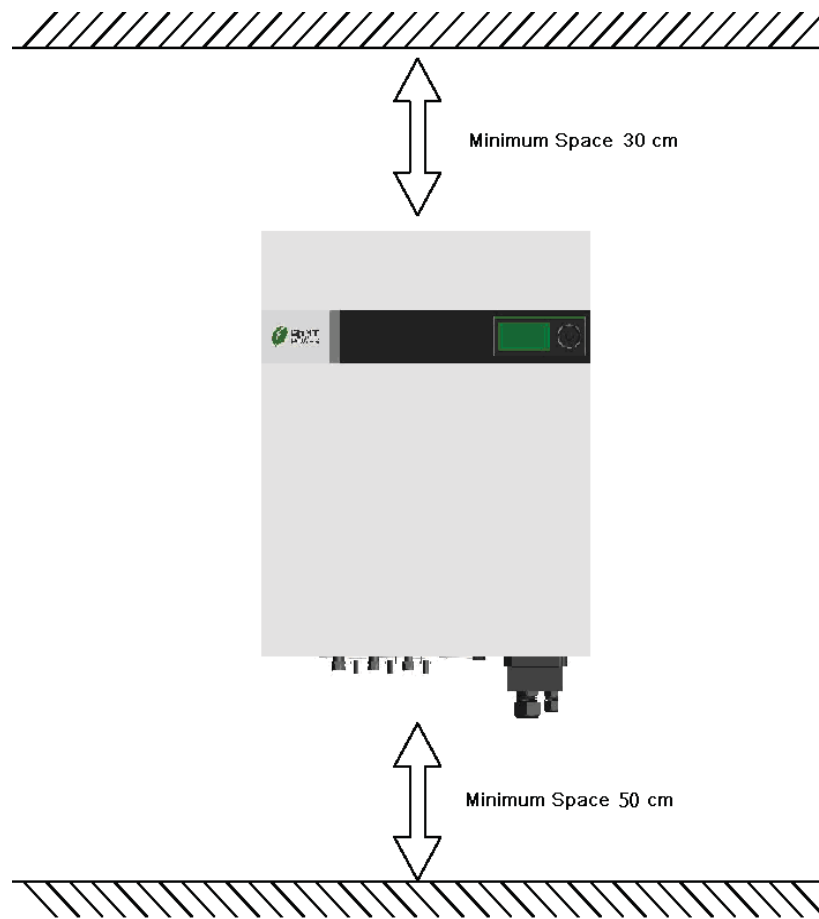
- 1 Check the ambient temperature of installation is within specified range -20 ~ +55°C.
- 2 The AC grid voltage is 400Vx3, -15% +10%, 50Hz.
- 3 Electric utility company has approved the grid connection.
- 4 Qualified personnel are performing the installation.
- 5 Adequate convection space surrounds the inverter.
- 6 Inverter is being installed away from explosive vapors.
- 7 No flammable items are to be near the inverter.
- 8 No mounting on wooden flammable surface.



The PV-Inverter can be installed and operated at locations where the ambient temperature is up to 55°C. However, for optimal operation, it is recommended that inverter is installed where the ambient temperature is between 0~40°C.

To mount the inverter to a wall, please follow the steps:

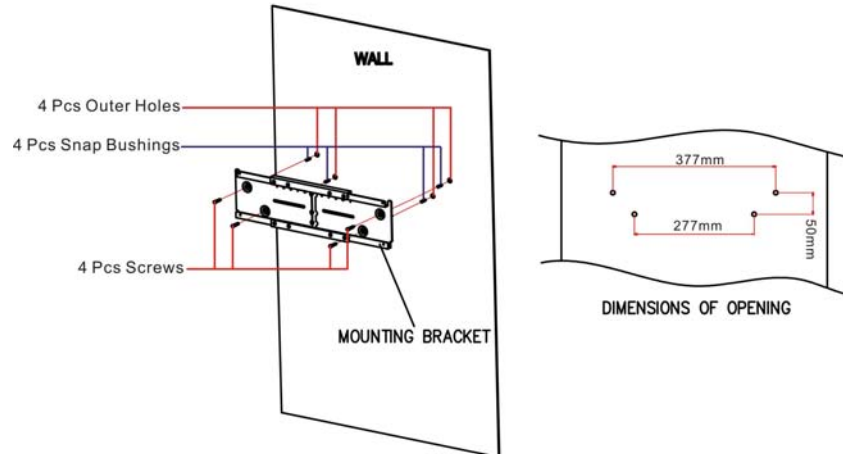
- (a) It is recommended to choose a dry place, out of direct sunlight with ambient temperature between 0 and 40°C
- (b) Select a wall or solid vertical surface which is strong enough to support the inverter.
- (c) The PV-Inverter requires adequate cooling space for heat dissipation. Reserve at least 30cm above and 50cm (measured start from the bottom of the AC cover) below the inverter. Each inverter should have minimum of 30cm space to each other for multiple inverters installation.



(4) Fix the Bracket by using Outer Mounting Holes:

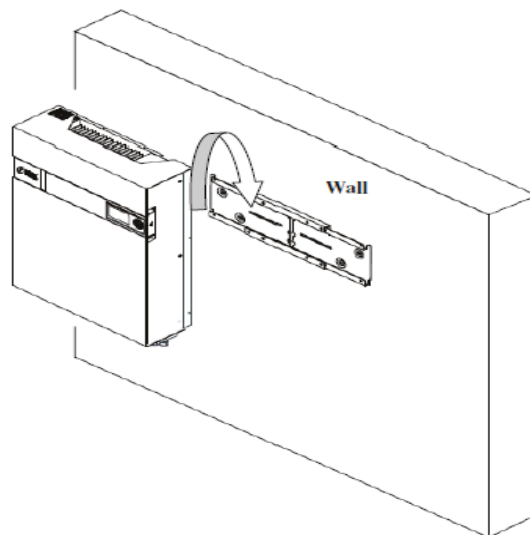
- (a) To install the device to a wall, mark 4 outer holes at the back of the bracket as illustrated below.

Using the outer Mounting Holes



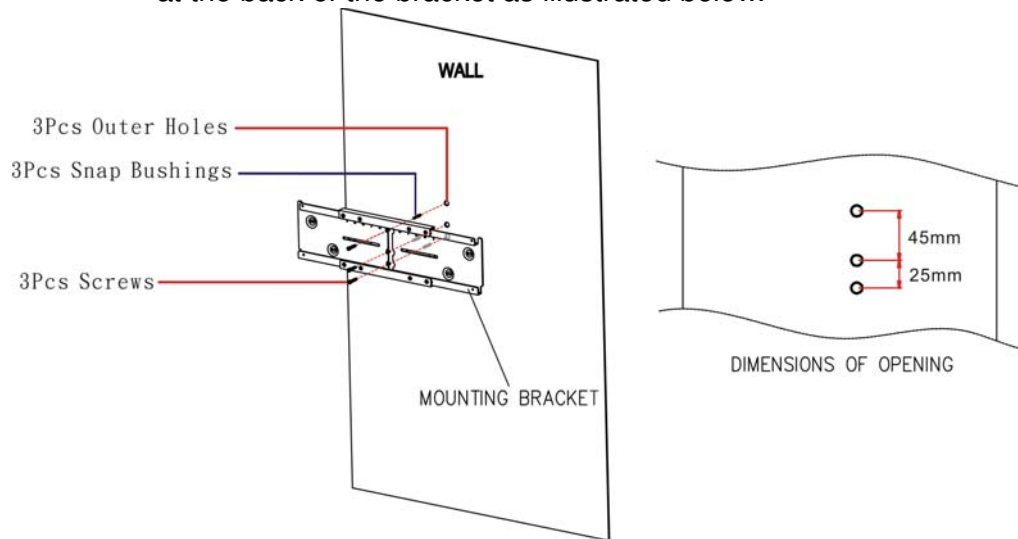
- (b) Drill the 4 marked holes in the wall, and then drive in the 4 Snap Bushings. Now insert the screws, and tighten.

- (c) Mount the PV-Inverter onto the base plate as illustrated below.



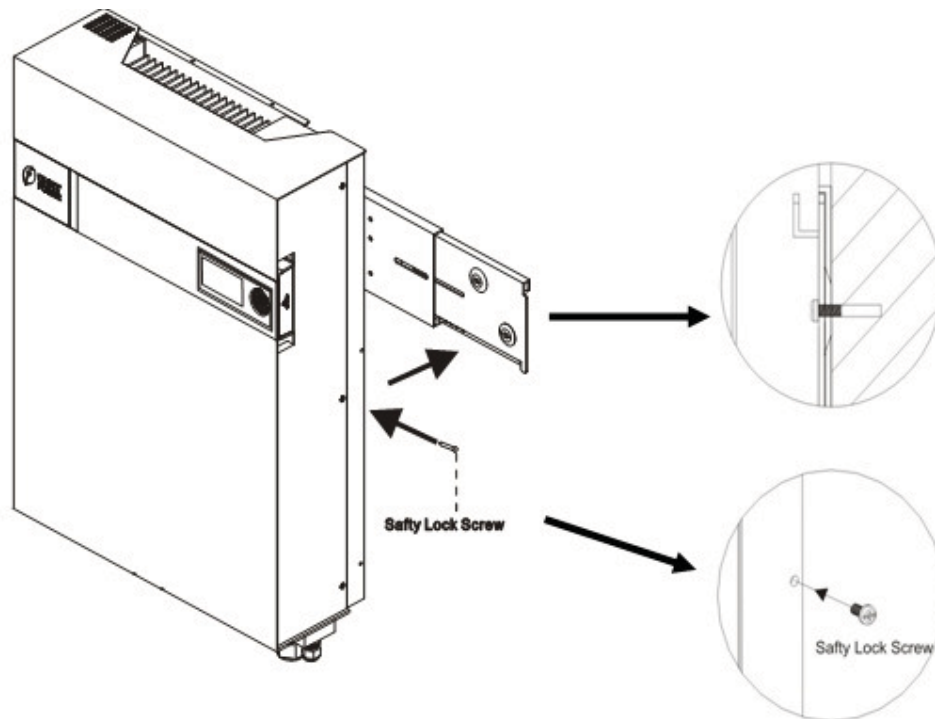
(5) Fix the Bracket by Using Central Mounting Holes:

(a) To install the device to a narrow upright, mark 3 central holes at the back of the bracket as illustrated below.



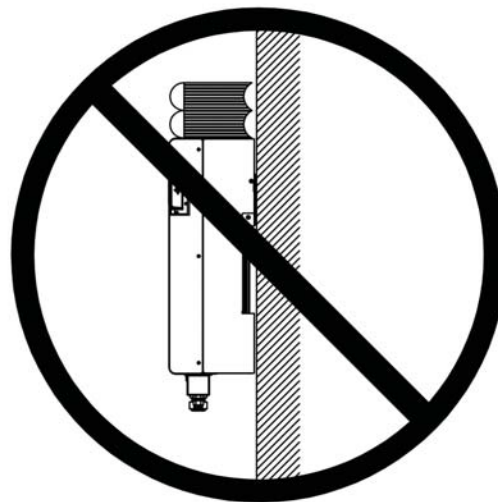
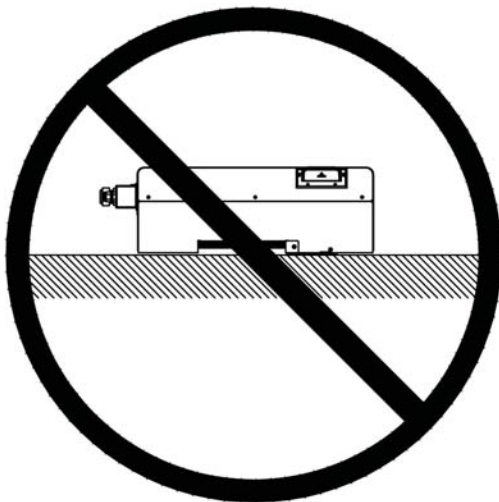
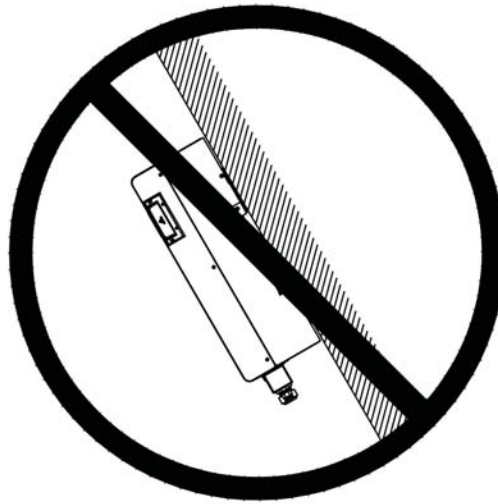
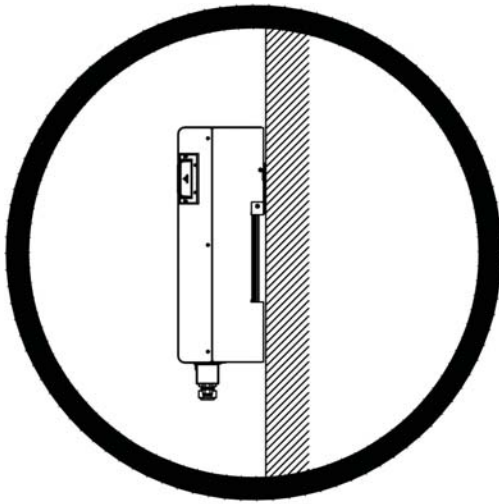
(b) Drill the 3 marked holes in the wall, and then drive in the 3 Snap Bushings. Now insert the screws, and tighten.

(6) Mount the PV-Inverter onto the bracket as illustrated:



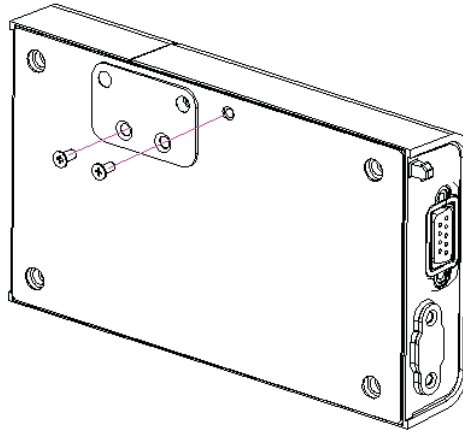
(7) Insert the Safety Lock screws to fix the PV-Inverter in place.

(8) Ensure the device is properly fixed to the bracket.

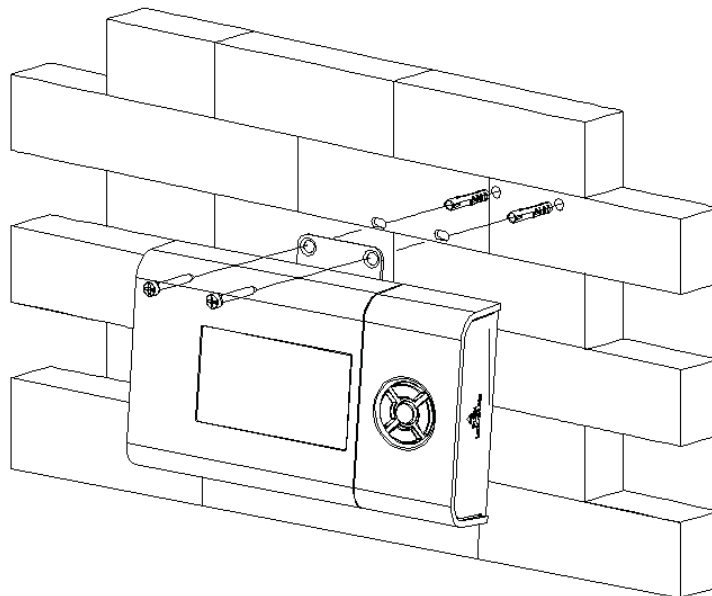


(9) Users can install Data Logger separately from the main unit. The mounting plate of the data logger and 2 screws are included in the accessories package:

(a) Fix the mounting plate of the data logger by 2 screws.



(b) Drill 2 holes in the wall, insert the screws, and tighten to fix the Data Logger in place.

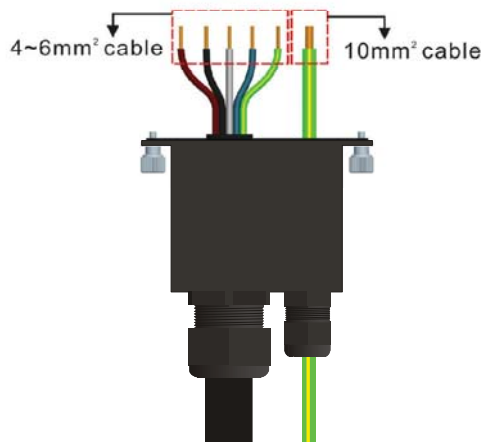


5.3. Connecting the AC-Output Cable

Connect the PV-Inverter to the AC-Junction box via the AC-output cable and Ground cable as shown in the following steps:

- (1) Find the recommended AC-output cable size:
Do not use cables where losses will exceed 1%, see Appendix 1
L1 (Line 1), L2 (Line 2), L3 (Line 3), N (Neutral), Gnd (PE): 4/6mm²

Gnd (PE): 10mm²
 - (2) Remove the rubber plug from inside the AC and Ground connector socket.
 - (3) Insert AC cables to the left side of the connection lock, rubber bushing in the accessory package, and AC-output cover. Then, insert Ground cable to the right side of the connection lock, rubber bushing, and AC-output cover.
- The choice of cable together with the way it is routed, the ambient temperatures the inverter operates at, and other underlying conditions determines the maximum AC fuse protection used for the inverter. See Appendix 2



Suggestion before connecting

To obtain solid connection to terminal block, we strongly suggest that appropriate **insulated cord end terminals** are used for each wire, and the stripping length of the terminal is **12mm**.

- Insert the AC-output cables; the **Brown wire to L1**, the **Black wire to L2**, the **Grey wire to L3**, the **Blue wire to N** (Neutral), and the **Yellow-Green wire to Gnd (PE)** of the terminal block.



- (6) Fix the L1, L2, L3, N, and Gnd (PE).



Please note that all wires should be firmly connected with torque value 1.5Nm- 1.8Nm.

- (7) Fix the other 10mm² Gnd (PE) wire firmly.



- (8) Fix the AC output cover back with a screwdriver.





- (9) Twist on the connector cable gland to lock the bushing and cable.



5.4. Connecting the PV-Panel

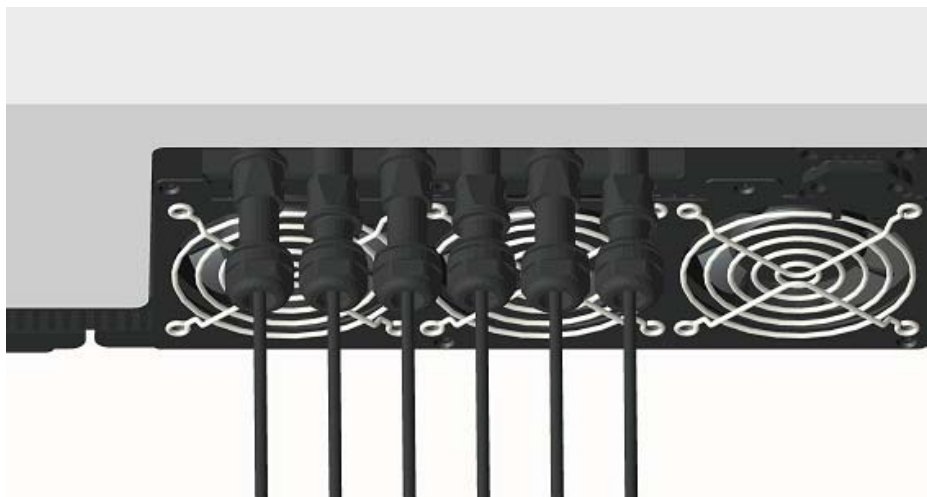
For connecting the DC input, the connected strings must consist of modules of the same type. The number, orientation, and tilt of the panels may differ for different application usage. The following are the specification of the plug connectors.

Connector Type	Cable connection dimension	Max. Rated Current
Male cable coupler 	Ø 4mm connecting system (ex: Wieland PST40i1)	30A
Female cable coupler 	Ø 4mm connecting system (ex: Wieland PST40i1)	30A

Suggestions before connecting the PV Panel

To obtain optimal results from the PV-Inverter, please consider the following guidelines before connecting the PV Panel to the device:

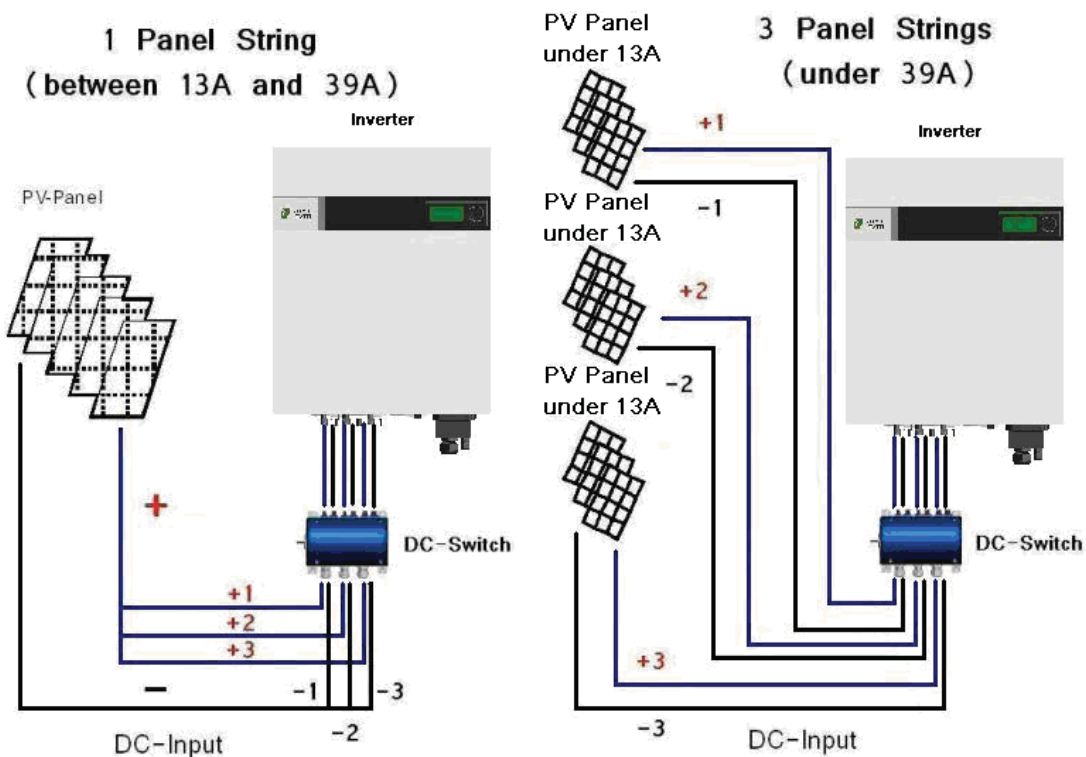
- (1) First make sure the maximum open circuit voltage (V_{oc}) of each PV string is below $800V_{DC}$ under any condition.
- (2) Always connect PV-Panel **positive (+) terminal** to PV-Inverter DC positive (+) terminal; the PV-Panel **negative (-) terminal** to PV-Inverter DC negative (-) terminal.



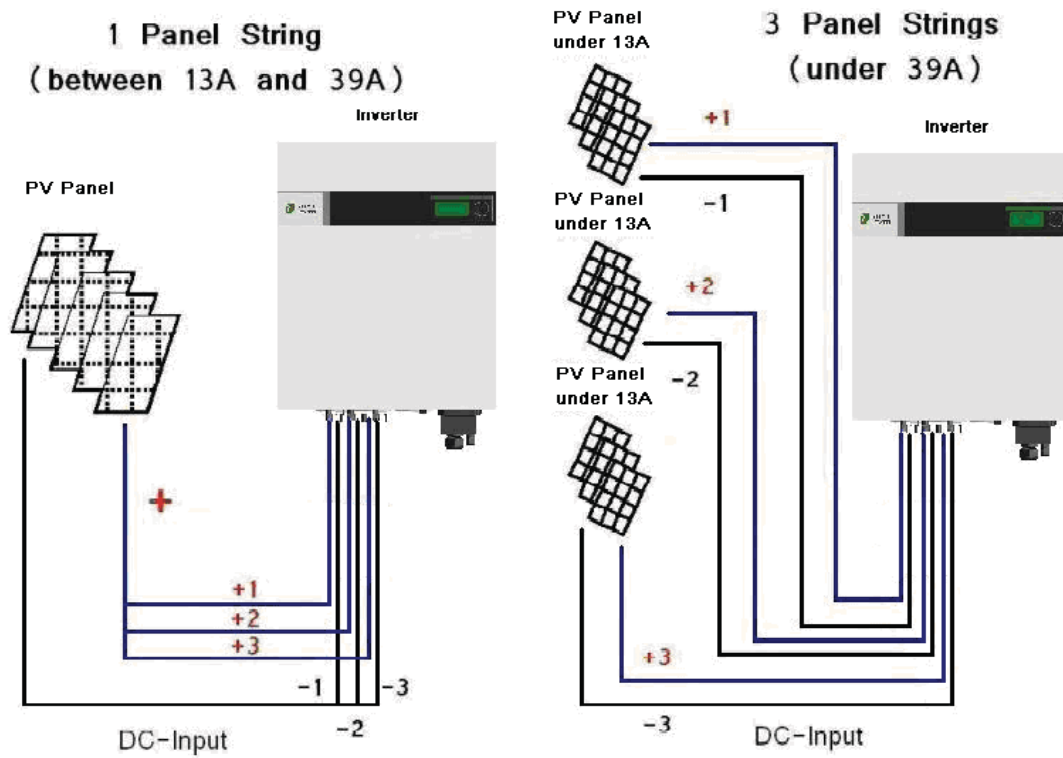
- (3) Each set of PV-Inverter DC terminal converts maximum DC input current of 13A. As a result, 3 pairs of PV-Inverter DC terminals can take a combined input current of up to 39A.
- (4) To fully optimize the string arrangement of PV generator, use the following configuration guidelines:
- For PV DC output less than 13A, use a single pair of PV-Inverter DC terminals.
 - For PV DC output between 13A and 26A, use two sets of inverter DC terminals.
 - For PV DC output between 26A and 39A, use three sets of inverter DC terminals.

The following diagrams show the PV system with/without DC Switch .

✓ **Illustration of the PV System with DC Switch (DCW 10-3-3):**

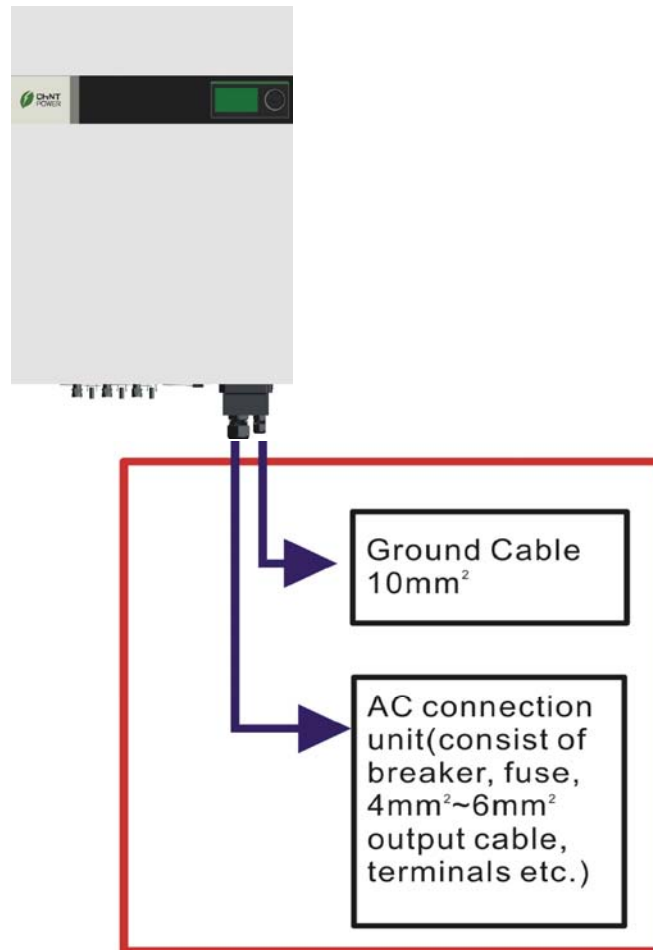


(1) Illustration of the PV System without DC-Switch:



5.5. Connecting to the Junction box

The AC Junction box is an interface between the PV-Inverter and the Public Utility. It may consist of an electrical breaker, fuse and terminals for connection to both the PV-Inverter and the Public Utility. This AC Junction box must be designed by a qualified technician to comply with local safety standards.



5.6 Installation Checklist



(1) High voltages exist when the PV-Panel is exposed to sufficient irradiation. Exposed terminals of the PV-Panel are under tension, and can cause electric shock. Avoid making physical contact with those parts of the device.

(2) After the PV-Panels are connected to the PV-Inverter, the output voltage is greater than $300V_{DC}$ and when the AC grid is not connected to the inverter, the Data Logger LCD displays the following:

```

Pac:0W
TEMPERATURE:42.8°C
Iac:0.0/0.0/0.0A
Vac:0.0/0.0/0.0V
STATUS:Fault
      No Utility
      02/12/09 15:59
  
```

(3) Check the connection between the PV-Inverter and the AC Connection System, and then check the connection between the Public Utility and the AC junction box. Close the AC breaker or fuse in the unit.

(4) Under normal operation, the Data Logger LCD shows the following as an example:

```

Pac:0W
TEMPERATURE:42.8°C
Iac:0.0/0.0/0.0A
Vac:219.4/219.3/219.3V
STATUS:Normal
      02/12/09 15:59
  
```

(5) When the display is green, the inverter is feeding power to the grid. Under such condition, you have installed the inverter successfully.



Before connecting PV-Panels to DC terminals, make sure the polarity of each connection is correct. An incorrect connection could permanently damage the device.

(6) Measure utility power quality of each phase, make sure the waveform of voltage is a pure sine wave without any harmonics right after your PV system is completed, performing the measurement when your PV system has about maximum power generation is recommended.

(7) In case harmonics exist in your PV system, one or more of capacitors or AC filters are required to install at Inverter side or between Inverters to isolation transformer until the pure sine wave is measured.




If utility power quality measurement is not performed and ensured right after the PV system is completed, a certain amount of harmonics may exist in the PV system, which would accelerate aging or degradation of inner components and ends in malfunction or damage of the Inverters.



Any degradation or damage of the device due to nonperformance of above measurement or uncontrolled power quality is out of the scope of warranty.

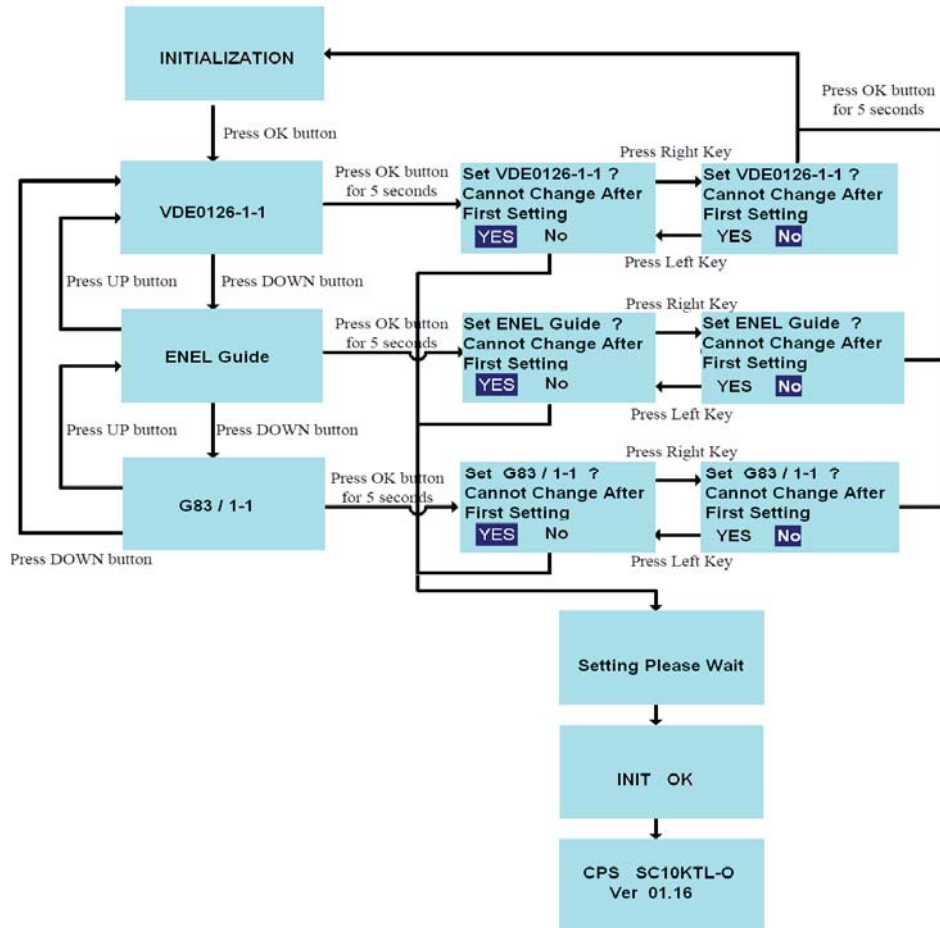
6. Operation of PV-Inverter

Initialization for Regulation Type Setting

- The Inverter provides a “INITIALIZATION” function at the first time start-up as an process in which user is able to select the suitable regulation type before normal operation.
- The inverter will not able to operate normally before regulation setting is completed even though it is connected correctly at both DC input and AC output.
- The following figure illustrates the process of “Initialization”, and the display sequence of regulation available for selection.
- For example, if user need to set regulation type to VDE0126-1-1, user have to take following steps to complete the process:
 1. Power on the inverter to start the “INITIALIZATION” process.
 2. Change the menu by button control until VDE0126-1-1 present, hold on to this regulation page and press the button for 5 seconds, a confirmation request will appear stated as “Set VDE0126-1-1? Cannot Change After First Setting”.
 3. Confirm the setting by selecting “YES” with ◀ or ▶ button, the wording “YES” turn to highlighted after selected, press  button for 5 seconds until “INIT OK” message appeared, the regulation setting is completed.



Note: Incorrect regulation type setting would cause inverter to non-operation, please consult with your dealer if you are not familiar with regulation type setting.



6.1 Auto Power-up

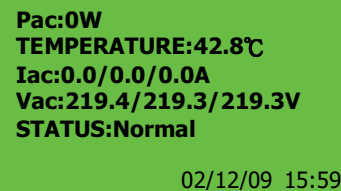
The PV-Inverter starts up automatically once the DC-power from the PV Panel is sufficient and the fuse is closed.

6.2 Operating Modes

There are 4 modes of operation. For each mode, there is a corresponding color and text to indicate the status.

(1) Normal

In this mode, inverter continuously converts energy from solar generator to grid (utility). The corresponding color of LCD is green in this case.

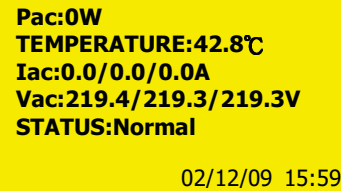


Pac:0W
TEMPERATURE:42.8℃
Iac:0.0/0.0/0.0A
Vac:219.4/219.3/219.3V
STATUS:Normal

02/12/09 15:59

(2) Recovery from Fault

In some situations such as abnormal voltage and frequency, the inverter has to disconnect from grid. After the situations are cleared, inverter recovers to normal condition. For the coming 48 hours, the LCD backlight will be yellow as following picture. If there is no further abnormal event after 48 hours of operation, the color switches back to green again.



Pac:0W
TEMPERATURE:42.8℃
Iac:0.0/0.0/0.0A
Vac:219.4/219.3/219.3V
STATUS:Normal

02/12/09 15:59

(3) During Fault

During grid fault or system failure (refer to “error message table” for further information) the inverter disconnects from the grid, the backlight turns red, and alarm is ON to notify user. User can press “OK” button on navigation pad to clear fault notification. In this condition, please check the message. If the fault notification can not be cleared, please contact with your local service.

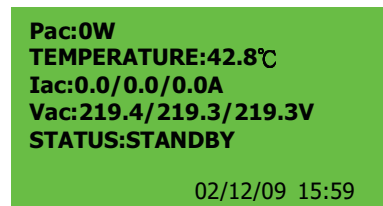


(4) Shutdown

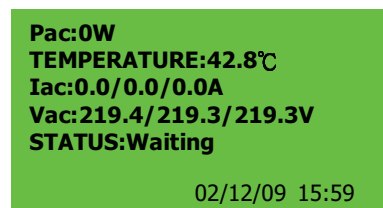
During night and very dark day, the inverter automatically shuts down. In this condition, Data Logger and the navigation pad are inactive.

(5) Three Operating States:

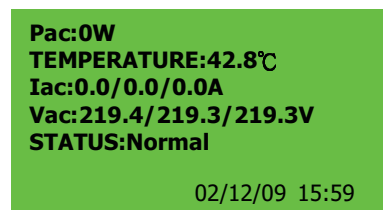
- (1) **Standby:** During normal operation, the PV-Inverter is in “standby” state and the open circuit voltage is between 200V to 300V.



- **Waiting:** Between 300V and 350V in DC side, the device is in “waiting” state, in the meanwhile, the inverter is checking both DC And AC conditions and waiting for connection.



- **Normal:** To be in “normal” state, voltage on DC side must be above 350V. To check the DC wire connection, this inverter tries to disturb its input power for every starting-up. During the process, user can see the DC power reading drift.



6.3 Using the LCD Display and Data Logger

6.3.1 Operation

(1) Keys on the data logger:

On the data logger, there are 5 keys used to change and operate. Generally, the functions of keys are defined as followings.

- “→”: View the lower layer (1st to 2nd) or move the cursor right
- “←”: View upper layer (2nd to 1st) or move the cursor left
- “↑”: View the previous screen or move the cursor up
- “↓”: View the next screen or move the cursor down
- “OK”: Set or confirm

(2) Back light of LCD

As described in previous section, the color of backlight changes according to operation status. To save power, the light remains illuminated only for 3 minutes after last operation. However, in case a failure or error occurs, other than the backlight goes red, the backlight flashes every second until user presses the key according to instruction on the LCD.

(3) Audio Alarm

To inform the user, data logger will emit audio alarm in cases of following:

- (a) Inverter failure
- (b) Memory capacity of data logger is less than 5%
- (c) Convection fan is not able to rotate for any reason

This alarm also can be turned “off” by setting in the “System Display”. To do this, please refer to “System Display” section afterwards.

(4) Behavior in case memory is full

Once the capacity of memory is less than 5%, data logger will emit audible alarm. At that moment, user should manage the data inside and try to clear the memory by using a PC. *In case user ignores the warning and does not clear the memory, after memory is 100% full, the latest data will overwrite the earlier ones.*

6.3.2 Display on LCD

(1) Startup

After the inverter starts up, the LCD shows logo and firmware version. The frame lasts for 3 seconds and changes to text information below.

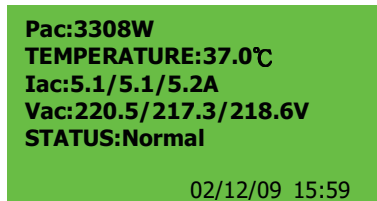


(2) Text display

The display shows four measurements and one status. The bottom-right part of the display shows the time and date. **On occurrence of a “warning” or “error” message, the bottom line “Status” is automatically replaced by the error message.**

The user can change the four monitoring parameters.

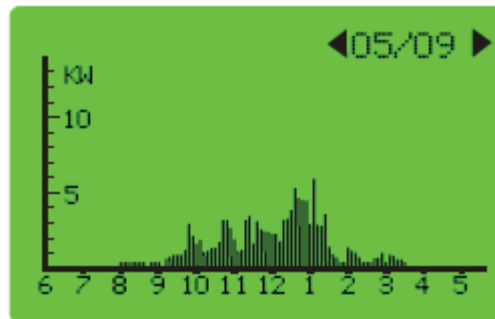
- (a) Press “→” to high-light the monitoring parameter at the first line. By using “↑” and “↓”, the user can shift to the next line.
- (b) Press “OK” to begin setting the monitoring parameter.
- (c) Press “↑” or “↓” to select the monitoring parameter of the line.
- (d) Press “OK” to confirm.



(3) Daily graph

By pressing the “↓” key in text display, screen on LCD is transformed to daily graph as below. The graph indicates the AC power trend of a specified date. Further explanations are stated below:

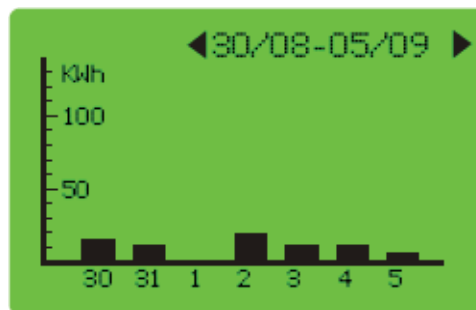
- **Time-axis (x-axis):** On the frame, the longest period is 12 hours. The number represents the hour. The first recorded data of a day is plotted on the left most point. In case the recorded data of a day is longer than 12 hours, press “OK” first and then press “→” and “←” to move the graph to time interested. Press “OK” again to terminate the moving.
- **Power-axis (y-axis):** From 0 to 13KW. Each point is the averaged power during 6-minute interval.
- **Date:** On the upper right corner, the date of present display is shown. To see daily graph of expected day, press “→” and “←” to select



(4) Weekly graph

Press the “↓” of daily display, LCD changes to the “Weekly Display” as below. For further explanations, see below:

- **Time-axis (x-axis):** 7 days from Sunday of a week. The left most point is the data for Sunday.
- **Generated KWh (Y-axis):** The amount in kWh of that day. Ranged from 0 to 100kWh.
- **Week change:** Press “←” and “→” to switch to the week interested. The corresponding dates on the upper-right corner can also be changed.



(5) Error history

By pressing “↓” again on the “Weekly Display”, the LCD changes to “Error Message” as shown below. The LCD displays last two recorded error events.

ERROR HISTORY

E1:Isolation fault
@ 02/12/09 2:44
VALUE=N/A
E2:Grid fault
@01/12/09 10:21
VALUE=51.5Hz

(6) System Information

By pressing “↓” again on “Error History”, the LCD changes to the information of the inverter including serial number of the inverter, firmware version, etc... as shown below.

SYSTEM INFORMATION

S/N: ST20090623
Version: 00.11-00.07
MEMORY: 0.1%
DATE: 02/12/09 WED
TIME: 02:52:32 GMT+01
AUDIO ALARM: ON
LANGUAGE: ENG

The following are the monitoring parameters shown in “System Display”:

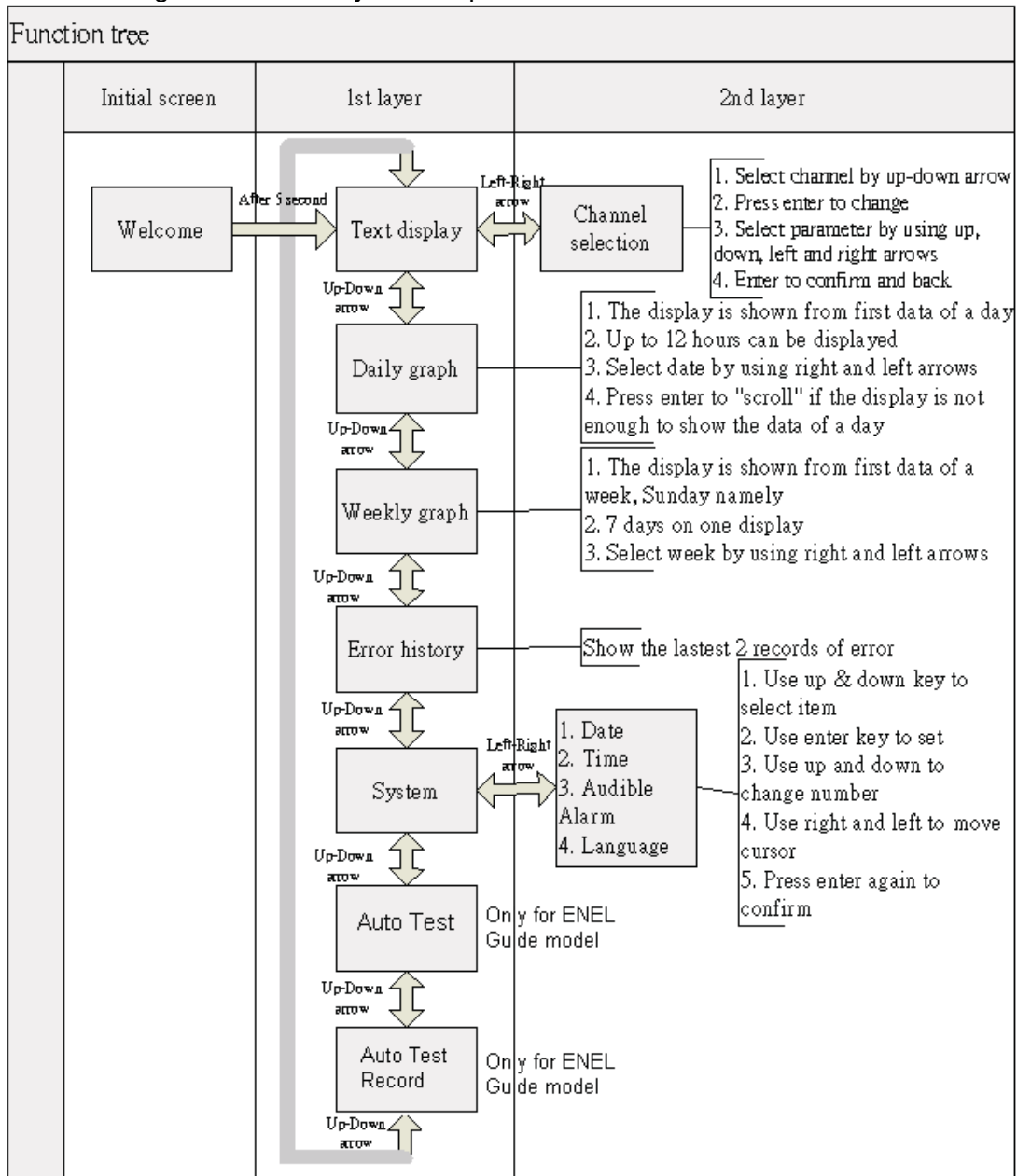
- SN: The serial number of the inverter
- Version: The firmware version of the inverter
- Memory: The memory status of the Data Logger
- Date: The date setting of the inverter
- Time: The time setting of the inverter
- Audio Alarm: “On” or “Off”, the status of the setting
- Language: The language setting of display

To change the Date, Time, Audio and Language settings:

- Press “→” and then press “↑” or “↓” to change the parameter to the desired setting.
- Press “OK” to confirm. Use “↑” and “↓” to alter the value
- Press “OK” to confirm.

6.3.3 Data Logger Function Tree:

The following is the summary of the operation:

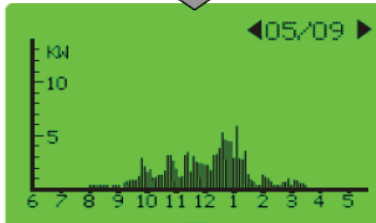


6.4 Auto Test Setting (Only for ENEL GUIDE 2010 model)

Pac: 2850 W
 Vdc: 403/404/403 V
 Vac: 225.4/224.3/225.3 V
 Safety: ENEL Guide
 Status: Normal
 06/30/11 15:01

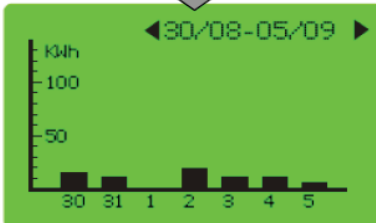
The Inverter is supplied with an auto test function which enables the user to check that the protection interface is operating correctly.

Press



- In order to select this function, press the function button until the message "AUTO TEST SET" appears on the display panel.

Press



Press

Error History
 E001: No Utility
 @ 06/30/11 15:49
 Value=N/A
 E001: No Utility
 @ 06/30/11 15:49
 Value=N/A

Press

System Display
 SN: xxxxxxxx
 Version: M0.20-00.27
 Memory: 0.3%
 Date: 06/30/11 Thu
 Time: 15:55:19 GMT+01
 Audible Alarm: Off
 Language: English

Press

AUTO TEST
 V ↑ 260V ≤ 0.1 S
 V ↓ 195V ≤ 0.2 S
 F ↑ 60.4Hz ≤ 0.06 S
 F ↓ 59.3Hz ≤ 0.06 S
 Press OK TO START


- Auto test set menu appears.

Auto Test Setting

AUTO TEST

V ↑ 260V ≤ 0.1 S
 V ↓ 195V ≤ 0.2 S
 F ↑ 60.4Hz ≤ 0.06 S
 F ↓ 59.3Hz ≤ 0.06 S

Press OK TO START

- Press and hold the  button for at least 5 seconds to initiate the auto test procedure.

Press  5 secs

AUTO TEST

V ↑ 234V Gv : 228V
 V ↓ 195V ≤ 0.2 S
 F ↑ 60.4Hz ≤ 0.06 S
 F ↓ 59.3Hz ≤ 0.06 S

TEST...

- Upper Voltage threshold will be checked.
- When the upper voltage threshold is equal to Gv, the inverter will disconnect from the grid.

AUTO TEST

T OK 228V-53 ≤ 100ms
 V ↓ 195V ≤ 0.2 S
 F ↑ 60.4Hz ≤ 0.06 S
 F ↓ 59.3Hz ≤ 0.06 S

Please Wait


- Display shows test result and the disconnected time is less than 100ms.
- The inverter entered checking state for reconnecting to the grid.

AUTO TEST

T OK 228V-53 ≤ 100ms
 V ↓ 195V ≤ 0.2 S
 F ↑ 60.4Hz ≤ 0.06 S
 F ↓ 59.3Hz ≤ 0.06 S

PRESS OK TO START

- The inverter reconnected to the grid, and ready for next test.

Press 

AUTO TEST

T OK 228V-53 ≤ 100ms
 V ↓ 203V Gv : 224V
 F ↑ 60.4Hz ≤ 0.06 S
 F ↓ 59.3Hz ≤ 0.06 S

TEST...

- Lower voltage threshold is checked.
- When the lower voltage threshold is equal to Gv, the inverter will disconnect from the grid.

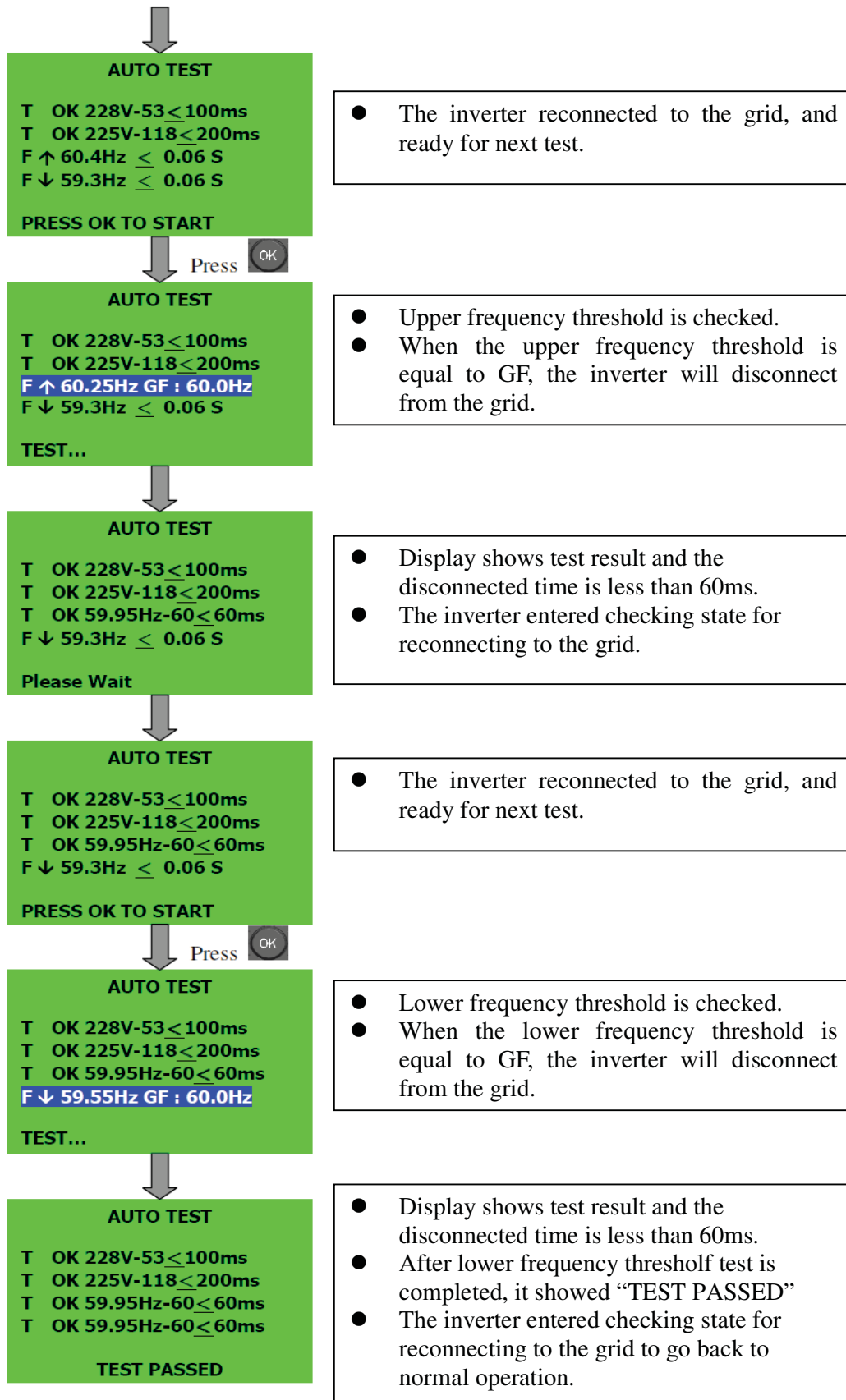
AUTO TEST

T OK 228V-53 ≤ 100ms
 T OK 225V-118 ≤ 200ms
 F ↑ 60.4Hz ≤ 0.06 S
 F ↓ 59.3Hz ≤ 0.06 S

Please Wait

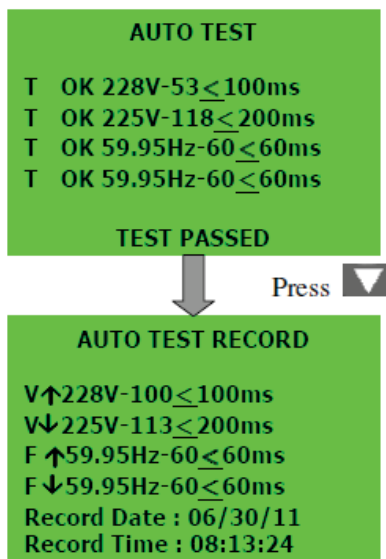
- Display shows test result and the disconnected time is less than 200ms.
- The inverter entered checking state for reconnecting to the grid.


Auto Test Setting



6.5 Auto Test Record (Only for ENEL GUIDE 2010 model)

After the Auto test setting, inverter will record the auto test result, as shown in below.



- After Auto test, press the  button, the Auto Test Record will be shown on the screen.
- If there's no test record, the message of "No AutoTest Record" will be shown on the screen.

6.6 Display Messages

Operating conditions	In English	In German	In Italian	Description
Normal Working Status				
Power off	No display	No display	No display	In case of input voltage < 200V, PV inverter is totally shutdown
Standby	Status:Standby	Status:Bereitschaft	Stato:Standby	Input voltage range: 200V~ 260V
Initialization & waiting	Status:Waiting	Status:Warten	Stato:In attesa	Input voltage range: 260~350V
Check grid	Status:Checking xxxs	Status:Netz-Prüf xxxs	Stato:Ricerca MPP xxxs	In case of PV voltage> 350V, inverter is checking feeding conditions
Feeding grid, MPPT	Status:Normal	Status:Normalbetriebe	Stato:Conneso Normale	Inverter is feeding power. After 10 seconds of this display, LCD will show wattage.
Waiting for reconnect to grid	Status:Reconnect xxxs	Status:Kontakt xxxs	Stato:Connes.Retexs	The time for reconnect to grid
FLASH	Status:FLASH	Status:FLASH	Stato:Aggiornamento	FLASH firmware
SLAVE FLASH	Status:SLAVE FLASH	Status:SLAVE FLASH	Stato:Aggiorn. Slave	SLAVE FLASH firmware
FAULT	Status:Fault	Status:Fehler	Stato:errore	See "System Fault", "Inverter Fault" to know the fault detail
Monitoring Parameters				
Instantaneous Input power	Pdc:xxxx/xxx/xxxW	Pdc:xxxx/xxx/xxxW	Pdc:xxxx/xxx/xxxW	The individual DC input power
Instantaneous Output power	Pac:xxxxxW	Pac:xxxxxW	P.Istant.:xxxxxW	The real time output power in xxx W
Accumulated energy information	Etot:xxxxxxxx.xkWh	E-tot:xxxxxxxx.xkWh	Etot:xxxxxxxx.xkWh	Total energy to has been fed to grid since inverter was installed
3-phase Grid voltage	Vac:xxx.x/xxx.x/xxx.x V	Uac:xxx.x/xxx.x/xxx.x V	VAC:xxx.x/xxx.x/xxx.x V	Grid voltage in xxx.x VAC for 3 phases
Grid frequency	Frequency:xx.xHz	Frequenz:xx.x Hz	Frequenza:xx.x Hz	Grid frequency in xx.x Hz
Feeding current	Iac:xx.x/xx.x/xx.xA	Iac:xx.x/xx.x/xx.xA	IAC:xx.x/xx.x/xx.xA	Feeding current amount in xx.x A
PV array voltage	Vdc:xxx/xxx/xxxV	Udc:xxx/xxx/xxxV	VDC:xxx/xxx/xxxV	Input voltage of PV array, xxx VDC
PV array current	Idc:xx.x/xx.x/xx.xA	Idc:xx.x/xx.x/xx.xA	IDC:xx.x/xx.x/xx.xA	Input DC current of tracker n
Daily Energy	Etoday:xxx.xkWh	E-Heute:xxx.xkWh	Oggi:xxx.xkWh	The accumulated kWh of that day
Working Hour	H-total:xxxxxxhr	H-total:xxxxxxhr	Ore tot. Funz.:xxxxxx	Total working hours of inverter

Operating conditions	In English	In German	In Italian	Description
Internal Temperature	Temperature:xx.x°C	Temperatur:xx.x°C	Tempo.Interna:xx.x°C	Temperature is indicated in Celsius
System Fault				
Isolation failure	Isolation Fault	Isolationsfehle	Err.Isolameto	Earth fault of the PV-panels or failure of surge voltage protection
GFCI active	Ground I Fault	Fehlerstrom	Disp.terra alta	Leakage current on ground conductor is too high
Grid failure	Grid Fault	AC-Überstrom	Dati rete insuf.	Grid measured data is beyond the specification (voltage & frequency)
Relay failure	Relay Failure	Relis fehler	Err.impedenza	The output relay is out of order
No utility	No Utility	Kein Netz	No rete	Utility is not available
Input voltage too high	PV over voltage	DC-Überspg	SovravoltaggioPV	Input voltage higher than 800V
Consistent failure	Consistent fault	Konsistenzfehler	Err.processore	The readings of 2 microprocessors are not consistent. It could be caused by CPU and/or other circuit do not function well.
Temperature too high	Over temperature	Übertemperatur	Temp.in eccesso	The internal temperature is higher than normal value
Output DC injection too high	DC INJ High	DC INJ zu hoch	Uscita DC alta	Output DC injection is too high
EEPROM problem	EEPROM failure	EEPROM Fehler	Err EEPROM	Reading/writing of EEPROM failed
Communication failure between microprocessors	Sci Failure	CPU Fehlfunktion	Err.accesso dati	The communication between MCU inside is abnormal
DC bus voltage is too high	High DC Bus	U/dc bus zu hoch	DC Bus alto	The DC BUS inside is higher than expected
DC bus voltage is too low	Low DC Bus	U/dcbus zu klein	DC Bus basso	The DC BUS inside is lower than expected
Output DC sensor abnormal	DC Sensor Fault	DC Sensor Fehler	Err.Sensore DC	The output DC sensor is abnormal
GFCI detection problem	GFCI Failure	FI-Fehler	Err.Sens.Terra	The GFCI circuit is abnormal
Master and Slave firmware mismatch1	M-S Ver. Fault	M-S Ver. Fault	FW incompatibile	firmware mismatch between Master and Slave
Memory card full	Memory Full	Memory Full	Memoria piena	There is not enough space to store data
System Information				
Serial Number	SN: xxxxxxxxxxxxxxxx	SN: xxxxxxxxxxxxxxxx	Seriale: xxxxxxxxxxxxxxxx	16 characters, unique serial number
Firmware version	Version:xx.xx-xx.xx	Version:xx.xx-xx.xx	Ver.FW:xx.xx-xx.xx	The Master and Slave CPU F/W version information

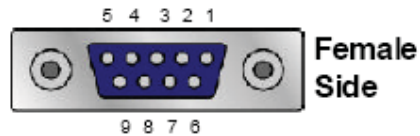
Operating conditions	In English	In German	In Italian	Description
SD card memory	Memory:xx.x%	Speicher:xx.x%	Utilizzo mem:xx.x%	Memory utilization percentage on SD card
Date display	Date:DD/MM/YY Sun	Datum:DD/MM/YY Son.	DATA:DD/MM/YY Dom.	Date display
Date display	Date:DD/MM/YY Mon	Datum:DD/MM/YY Mon.	DATA:DD/MM/YY Lun.	Date display
Date display	Date:DD/MM/YY Tue	Datum:DD/MM/YY Die.	DATA:DD/MM/YY Mar.	Date display
Date display	Date:DD/MM/YY Wed	Datum:DD/MM/YY Mit.	DATA:DD/MM/YY Mer.	Date display
Date display	Date:DD/MM/YY Thu	Datum:DD/MM/YY Don.	DATA:DD/MM/YY Gio.	Date display
Date display	Date:DD/MM/YY Fri	Datum:DD/MM/YY Frei.	DATA:DD/MM/YY Ven.	Date display
Date display	Date:DD/MM/YY Sat	Datum:DD/MM/YY Sam.	DATA:DD/MM/YY Sab.	Date display
Time display	Time:HH/MM/SS GMT+xx	Zeit:HH/MM/SS GMT+xx	Ora:HH/MM/SS GMT+xx	Time display
Audible alarm setting on	Audible Alarm:On	Alarm:An	Allarme:attivo	Set up audible alarm
Audible alarm setting off	Audible Alarm:Off	Alarm:Aus	Allarme:disattivato	Set up audible alarm
Setting Language	Language:English	Sprache: Englisch	Lingua:ENG	Set up of the display language
Setting Language	Language:ESP	Sprache:ESP	Lingua:Spagnolo	Set up of the display language
Setting Language	Language:German	Sprache: Deutsch	Lingua:Tedesco	Set up of the display language
Setting Language	Language:ITA	Sprache: ITA	Lingua:Italiano	Set up of the display language
Working Message				
Memory is to be full	Memory left xx.x%	memory left xx.x%	Memoria rimasta xx.x%	When the memory space of card is less than 5%, this warning should be displayed in the status.
Fan Lock	Fan Lock	FanLock	BloccoVentil.	The fan for heat dissipation is stopped abnormally
Other Message				
Initial screen	Ver xx.xx	Ver xx.xx	Ver xx.xx	LCD Firmware version
USB connection	USB CONNECT	USB angeschlossen	USB Connessa	Connect to PC with USB
Daily graph	No Daily Records	Keine Tagesaufz.	Giorno:Nessun dato	No data for daily graph display

Operating conditions	In English	In German	In Italian	Description
Daily graph	Please Wait	Bitte warten	Attendere prego	data processing
Weekly graph	No Weekly Records	Keine Wochenaufz.	Settim:Nessun Dato	No data for weekly graph display
Error history	Error History	Fehlergeschichte	Archivio errori	banner
Error history	No Error History	Keine Fehlergeschi.	Nessun Dato	No data for error history display
Error history	Value=N/A	Value= N/A	Valore:N/D	fault value is not available
Error history	Value=xxxx xxxx xxxx	Value= xxxx xxxx xxxx	Valore:xxxx xxxx xxxx	display fault value
System display	SYSTEM INFORMATION	Systemanzeige	Informazioni sistema	banner
Display after error	Press OK to Clear	Presse OK zum Löschen	tasto OK per tornare	Press OK to clear fault message box
Auto Test	PRESS OK TO START	Presse OK zu beginnen	tasto OK per tornare	Press OK to start Auto Test

7. Communication Interface

7.1. RS-232 (on inverter)

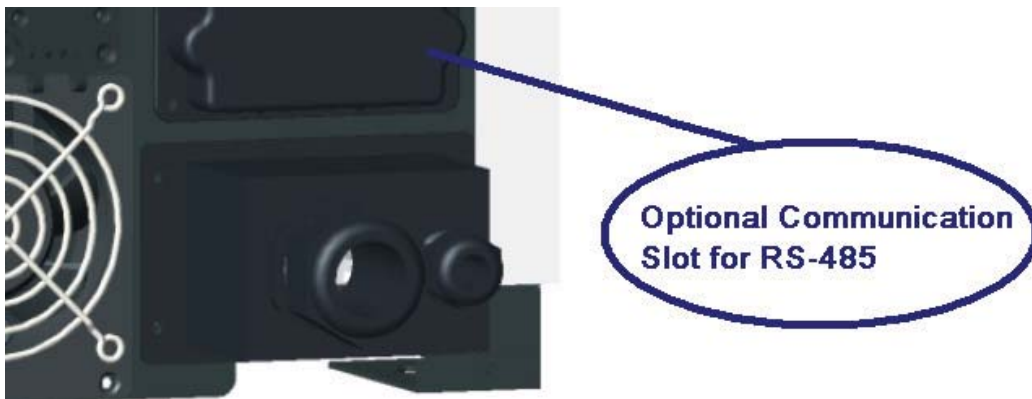
The PV-Inverter is equipped with a versatile communications interface. Use “Pro Control” to monitor the status of multiple inverters. Firmware upgrades are also available via this interface. **CPS SC10KTL-O** is integrated with a DB9 socket for the RS-232 interface. Open the DB9 socket cover before use. Pin assignment of this DB9 socket is stated as below:



Pin	Signal Assignment
1	N.C.
2	TxD
3	RxD
4	N.C.
5	Common
6	N.C.
7	N.C.
8	N.C.
9	N.C.

7.2. Optional Communications slot for RS-485

The PV-Inverter has an extended slot for an optional communication interface. Add a RS-485 card or compliant card to extend the communication functions of the inverter. To use this slot, please use a screwdriver to open the cover, insert the card into the slot and wire through the rubber bushing. For further information, refer to manual of related interface card.



7.3. USB (on Data Logger)

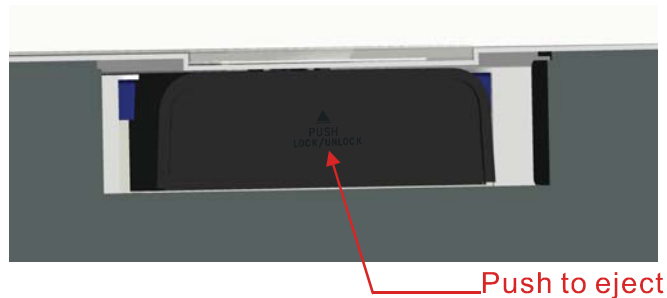
The Data Logger is fit with a mini USB connector for your PC USB host interface. Open the mini type USB socket cover before use.

8. Downloading Data inside Data Logger

To manage the data inside the Data Logger, please take out the Data Logger from inverter and access its internal data via USB cable. The Data Logger is powered directly by the PC's USB port.

8.1. How to eject / inject the Data Logger

- (1) Push the area which marked "PUSH LOCK/UNLOCK", the Data Logger will be ejected. Take it out carefully.



- (2) After taking out, you can see a cable between Data Logger and inverter, unbind the cable if necessary. The cable can be extended to 1.8m at most. To get further extension, you can use a standard RS-232 cable to do that. To separate the Data Logger from inverter, disconnect RS-232 connector on it.



- (3) When you want to place back the Data Logger, please use the tie provided to bind the cable as shown above. Then, cram the cable and slide the Data Logger into the inverter, slightly push the Data Logger on the side, the Data Logger will be locked.

8.2. How to Access and Manage Log Data

- 7 Remove the Data Logger from the inverter and disconnect the RS-232 cable. Unscrew and take off the cover of mini-B USB port. For PC with **Windows ME, 2000, and XP, Vista and Win7**, it is not necessary to install driver to access the data logger. For PC with **Windows 98**, to access the data logger, driver for the data logger is needed. ****Do not remove the data Logger while the inverter unit is working.****



- (2) Connect the mini-B USB to Data Logger and Type A USB to PC. LCD will show "USB CONNECT" when Data Logger is connected to PC properly.



(3) Click “My Computer” – “Removable Disk” in your PC.

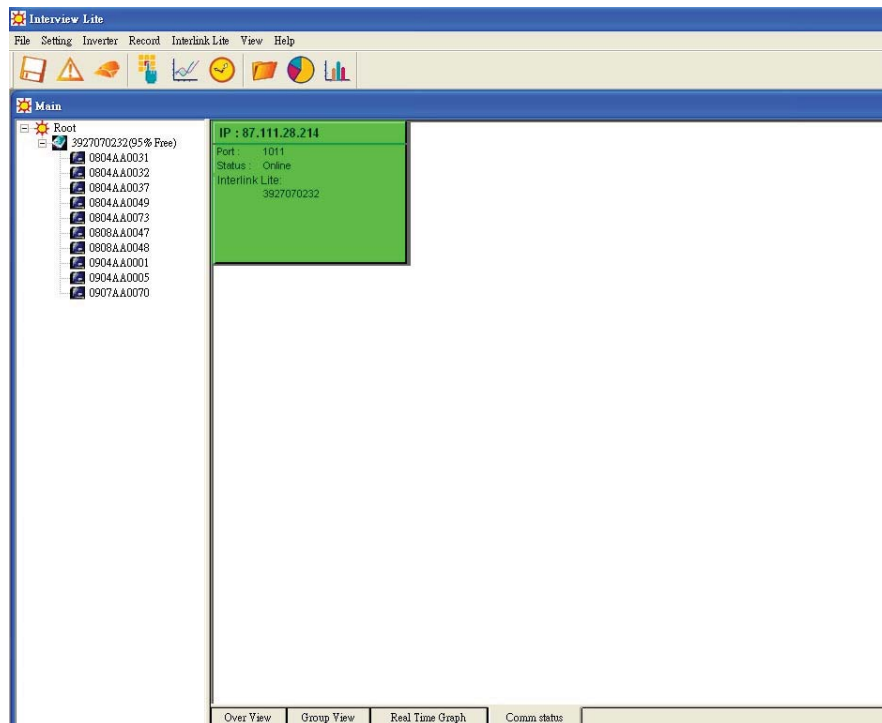


(4) Copy the “DAILY” folder in the “Removable Disk” and paste it on the “Desktop.”

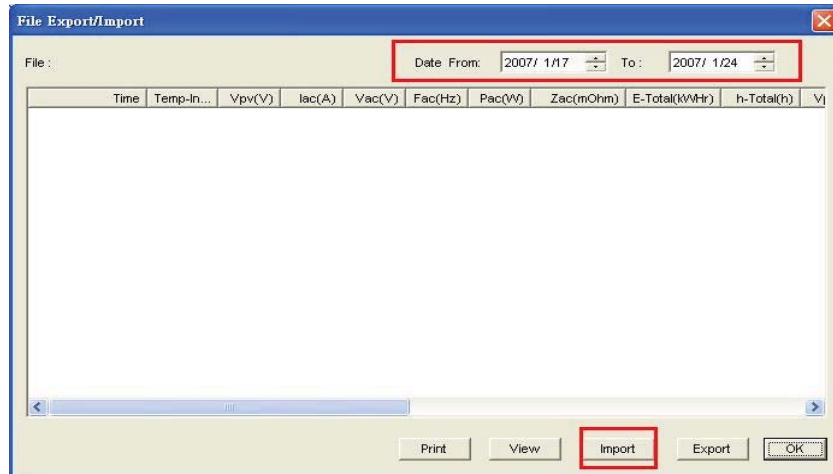
(5) Execute the “Interview Lite” program. Then, click “File”, select “Export/Import”.



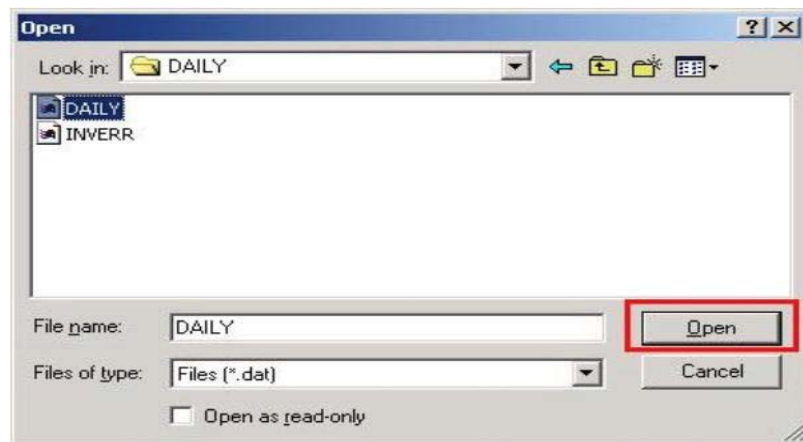
Please contact your local dealer or representative for the installation for this program.



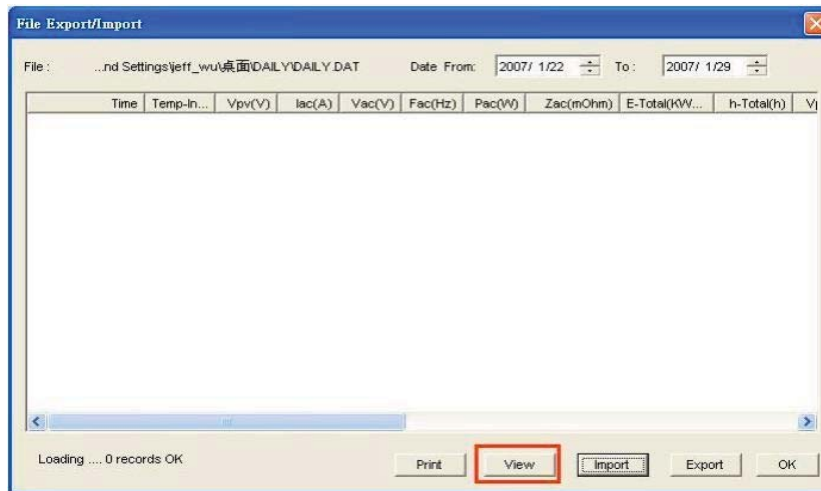
- (6) Select “Date from” and “Date to” the period which you prefer. Then, click “Import” button.



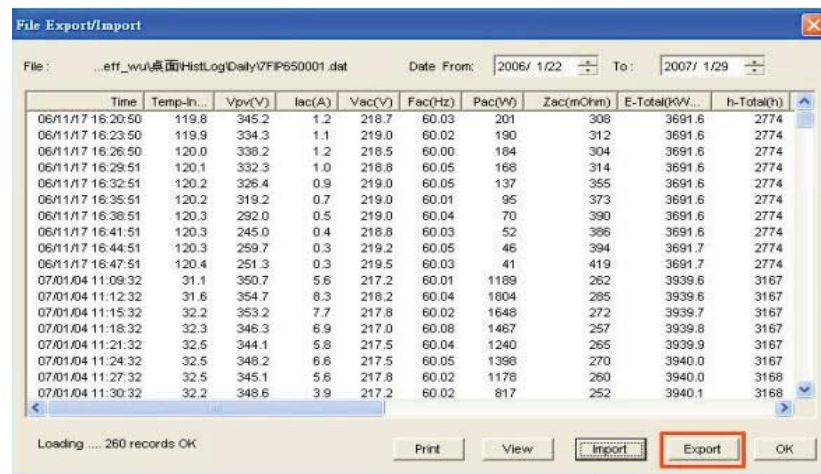
- (7) Select “DAILY.dat” file under your previous saved DAILY folder. Then, click “Open” button.



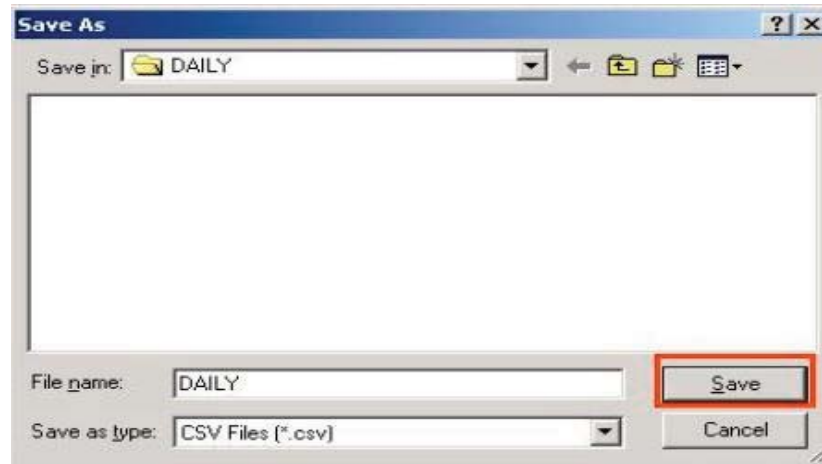
- (8) Click “View” button and the log data will be processed by Pro-Control software in few seconds.



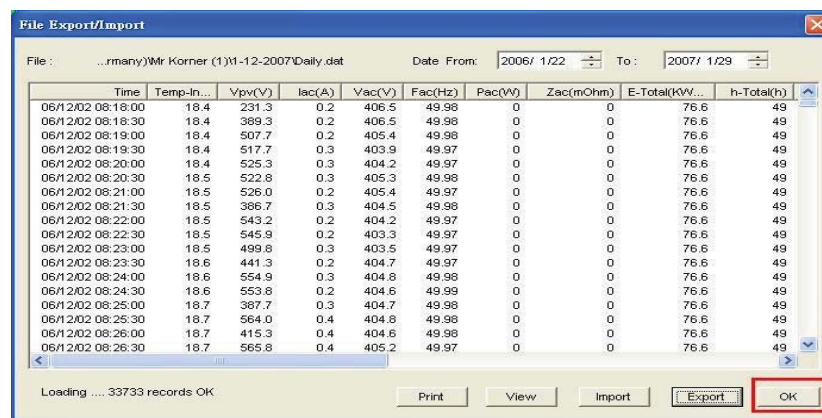
- (9) Click “Export” button



- (10) Click “Save” button. Then, log data will be saved in .CSV format in your preferred directory in your PC



- (11) Click “OK” button.



- (12) Double click “DAILY.CSV” file in your preferred directory in your PC. After that, you can manipulate the log data with Microsoft Excel.

9. Troubleshooting

The PV-Inverter requires very little maintenance. When unexpected situation occurs, please refer to the following table for quick troubleshooting before contacting your local service. The following table lists common fault messages and ways to cope with the fault or error.

Fault Analysis and Actions

	Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
System Fault	Ground I Fault	The ground current detected by inverter is higher than threshold	<ol style="list-style-type: none"> 1. Obstacle, humidity or water exits between AC LINE and/or NEUTRAL to earth ground 2. Obstacle, humidity or water exits between AC LINE and/or NEUTRAL to earth ground in the junction box 3. The Insulation of AC wires is broken that could be bit by rat or any animals 4. Inverter is abnormal 	<ol style="list-style-type: none"> 1. Disconnect AC connection of inverter by opening AC switch. 2. Check the AC junction box and wiring of system. Clear obstacle ONLY IN SAFE CONDITIONS 3. Reconnect AC connection, check the status of inverter 4. If the problem persists, call local service 	<ol style="list-style-type: none"> 1. Disconnect AC side of inverter by opening AC switch 2. Disconnect the DC side from the inverter 3. Check both the AC and DC wiring and insulation 4. Reconnect AC connection, check the status of inverter 5. If the problem persists, please <ul style="list-style-type: none"> ➤ Update the firmware according to instructions, or 3. Replace the inverter
	Grid Fault	Grid measured data is beyond the specification (voltage & frequency)	<ol style="list-style-type: none"> 1. The detected AC voltage is beyond/under the setting of inverter 2. The detected AC frequency is beyond/under the setting of inverter 3. AC connection is not correct 4. Grid condition is weak or unstable 5. Other high-power consumption device is affecting the grid system 6. The setting of inverter is deviated from its default values 7. Inverter is abnormal 	<ol style="list-style-type: none"> 1. If this problem occurs seldom (such as 1 time a day), no action is necessary 2. If the problem occurs frequently, do the actions below 3. Find the device with high power consumption near your AC system 4. Use inverter software to check the setting of inverter. The setting should be in the range listed in specification 5. If the settings are not correct, call your service for changing 6. Use inverter software or monitoring device to collect data. Send the data to professionals for further investigation 7. Consult your utility power supplier, understand the grid conditions 8. Ask help of your installer 	<ol style="list-style-type: none"> 1. Check the system connection including polarities and security first 2. Find the devices with high power consumption near the AC system 3. Consult the utility power supplier, understand the grid conditions 4. Use inverter software to monitor the frequency and voltage 5. If the measured data beyond the setting, under the permission of utility supplier, use the software to change parameters 6. If the situation is not improved after changing parameters, please <ul style="list-style-type: none"> ➤ Update the firmware according to instructions, or ➤ Replace the inverter

	Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
	No Utility	Inverter is not able to detect AC voltage	<ol style="list-style-type: none"> Grid is not available AC connection is incorrect AC switch between inverter and utility is not ON AC fuse and/or breaker is open Inverter is abnormal 	<ol style="list-style-type: none"> Make sure the breaker and switch on AC side are close Check the AC wiring If the problem continues, call your local service 	<ol style="list-style-type: none"> Make sure the breaker and switch on AC side are close Check the AC wiring If the problem continues, replace the inverter
	PV over Voltage	The detected PV voltage is higher than specification	<ol style="list-style-type: none"> The PV array voltage is too high Inverter is abnormal 	<ol style="list-style-type: none"> Open DC connection of inverter and reconnect If the fault continues, call your local service 	<ol style="list-style-type: none"> Check the open PV voltage, and see if it is more than or too close to specification If PV voltage is much less than specification and the problem still occurs, please replace the inverter
	Consistent Fault	The readings of 2 microprocessors are inconsistent	<ol style="list-style-type: none"> Software problem Circuits inside inverter are abnormal Inverter is abnormal 	<ol style="list-style-type: none"> Open all DC connections of inverter Wait for 3 minutes Reconnect DC connection and check If the fault continues, call your local service 	<ol style="list-style-type: none"> Open all DC connections of inverter Wait for 3 minutes Reconnect DC connection and check If the fault continues <ul style="list-style-type: none"> Update the firmware according to instructions, or Replace the inverter
Inverter Failure	Over Temperature	The detected temperature is high	<ol style="list-style-type: none"> Ambient temperature is too high Heat dissipation problem Inverter is abnormal 	<ol style="list-style-type: none"> Make sure the ambient temperature of installation is less than 55°C Check the space near the heat sink Remove any obstacle that block the heat dissipation near heat sink Call local service if the problems persists 	<ol style="list-style-type: none"> Make sure the ambient temperature of installation is less than 55°C Check the space near the heat sink Remove any obstacle that block the heat dissipation near heat sink If the problem persists, replace it
	Relay Failure	The checking of AC relay is abnormal	Inverter is abnormal	<ol style="list-style-type: none"> Disconnect ALL PV (+) and PV (-) Wait for 1 minutes After no display on LCD, reconnect again and check If the message appears again, call your local service 	<ol style="list-style-type: none"> Make sure installation is under specification of each model for "High DC Bus" Do the same actions as left column again If the problem persists, please try to <ul style="list-style-type: none"> Upgrade the latest firmware according to instruction or firmware release note, or Replace the unit
	DC INJ High	DC current component in AC output is higher than permission	<ol style="list-style-type: none"> The AC sensor at output is abnormal Grid DC current is higher than the permissible value. Inverter is abnormal 	<ol style="list-style-type: none"> Observe the faulty condition for 1 minute. If it does not restore to normal operation, please call service. 	<ol style="list-style-type: none"> Reconnect DC connection and check <ul style="list-style-type: none"> Update the firmware according to instructions, or Replace the inverter If the fault continues
	EEPROM Failure	EEPROM inside inverter is abnormal	<ol style="list-style-type: none"> Software problem Circuits inside inverter are abnormal Inverter is abnormal 	<ol style="list-style-type: none"> Disconnect PV (+) and PV (-) from the input, start the unit again. If it does not work, please call service. 	<ol style="list-style-type: none"> Do the same actions as left column again If the fault continues <ul style="list-style-type: none"> Update the firmware according to instructions, or Replace the inverter

	Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
	SCI Failure	Communication between the two CPUs is abnormal	<ol style="list-style-type: none"> 1. Software problem 2. Circuits inside inverter are abnormal 3. Inverter is abnormal 	<ol style="list-style-type: none"> 1. Disconnect PV (+) and PV (-) from the input, start the unit again. 2. If it does not work, please call service. 	<ol style="list-style-type: none"> 1. Do the same actions as left column again 2. If the fault continues <ul style="list-style-type: none"> ➢ Update the firmware according to instructions, or ➢ Replace the inverter
	High DC Bus	DC BUS voltage inside inverter is higher than expectation	Inverter is abnormal	<ol style="list-style-type: none"> 1. Disconnect PV (+) and PV (-) from the input, start the unit again. 2. If so, please call service. 	<ol style="list-style-type: none"> 1. Do the same actions as left column again 2. If the fault continues <ul style="list-style-type: none"> ➢ Update the firmware according to instructions, or ➢ Replace the inverter
	Low DC Bus	DC BUS voltage inside inverter is lower than expectation	Inverter is abnormal	<ol style="list-style-type: none"> 1. Disconnect PV (+) and PV (-) from the input, start the unit again. 2. If it does not work, please call service. 	<ol style="list-style-type: none"> 1. Do the same actions as left column again 2. If the fault continues <ul style="list-style-type: none"> ➢ Update the firmware according to instructions, or ➢ Replace the inverter
	DC Sensor Fault	The DC sensor at output is abnormal			
	GFCI Failure	The GFCI detection circuit is abnormal			

Warning: Dangerous high voltage exists on both DC and AC wires and connections. For the end-user: Please do NOT touch any live parts.

10. Preventative maintenance

Although the PV-Inverter requires very little maintenance, the following inspections at regularly would help to ensure the PV Inverter operation at optimal performance level.

10.1 Visual Inspection

Check the inverter and cables for any signs of external damage. Contact your installer immediately if you find any defects. **Do not carry out any repairs on your own.**

10.2 Checking and Maintenance

Asking your installer to check for proper inverter operation at regularly is the measure we suggested for preventative maintenance.

The following check is the key:

- (1) Check If the fan guard is covered with debris or just, get rid of it if find any.
- (2) Check heatsink to ensure no barrier blocking its air flow.
- (3) Inspect for corrosion, especially at connecting point.
- (4) Verify all connections are firmly tightened.

11. Specifications

Model	CPS SC10KTL-O		
Market	German	UK	Italy
Input (DC)			
Nominal DC voltage	640 V		
Max. PV open voltage	800V		
System start-up voltage	260 V		
Initial feeding voltage	350 V		
Shutdown voltage	200V typical		
Full load rated voltage range ¹	320 ~ 720 V		
MPPT voltage range	245 ~ 720 V		
MPPT efficiency	> 99%		
Number of MPP tracker(s)	3		
Max. DC current per tracker	13A		
Max. power per tracker	5500W		
DC voltage ripple	< 10%		
DC insulation resistance ²	>5MΩ		
Output (AC)			
Nominal AC power	10kW		
Max. AC power (in 10 minutes)	11kW		
Nominal voltage	400 V x3		
Operational voltage range ³ (FW Setting)	195.5~257.6V	210~262 V	195.5~260 V
Disconnection time of excess operational voltage range	≤0.2 sec.	≤1.5 sec.	Min. voltage: ≤0.2 sec. Max. voltage: ≤0.1 sec.
Operational frequency range ⁴ (FW Setting)	47.55~50.15 Hz	47.05~50.45 Hz	49.75~50.25 Hz
Disconnection time of excess operational frequency range	≤0.2 sec.	≤0.5 sec.	≤0.1 sec.
Re-connecting time after disconnection	30 sec.	180 sec.	60 sec.
AC wiring system	3-phase 4 wire		
Nominal AC current	14.5 A /per phase		
Max. AC current	17.5 A /per phase		
O/P current distortion (THD i)	< 3%		
Power Factor	> 0.99		

¹ Standard test condition: 25°C / Input source in parallel for model with multi-MPP trackers

² The DC resistance requirement for positive or negative terminal to chassis ground

³ Regulation voltage range: VDE0126-1-1: 184~264.5 V; ENEL Guide 2010: 184~267 V; G83/1-1: 207~264 V.

⁴ Regulation frequency range: VDE0126-1-1: 47.5~50.2Hz; ENEL Guide 2010: 49.7~50.3Hz; G83/1-1: 47~50.5Hz.

Model	CPS SC10KTL-O		
Efficiency			
Max. conversion efficiency ⁵	96.5%		
European efficiency ⁶	95% @ nominal input		
General Data			
Topology	transformerless		
Power consumption: standby / night	< 30W / < 3.5W		
Protection degree	Chassis: IP65 Fan: IP55		
Heat dissipation	Air force cooling, variable fan speed control according to temperature on heatsink		
Operating temperature range ⁷	-20 ~ +55°C		
Continuous full power temperature range	-20 ~ +40°C		
Humidity	0 to 95%		
Storage humidity	0 to 95%		
Altitude	Up to 2000m without power derating		
Re-connecting time after disconnection	30 seconds		
Communication	RS232 standard RS485 optional.		
Hazard substance restriction	Lead free, complied with RoHS GP2		
RS485 Protocol	Standard protocol, Eaton Phoenixtec MMPL proprietary protocol		
Normative references			
Grid interface regulation	VDE0126-1-1	G83/ 1-1	ENEL 2010
Safety	DIN EN 50178 (4.98) (VDE0160) (IEC62103)		
EMC: EMS / EMI	EN 61000-6-2 (2005) / EN 61000-6-3 (2007)		
CE	LVD: 2006/95/EC EMC: 2004/108/EC		
Mechanical			
Dimension WxDxH	453.2 x 155 x 583 (mm)		
Weight (kg)	37kg		
*The product's specifications are subject to change without notice.			

⁵ According to EN61683-1991, the minimum value is 95.82%

⁶ According to EN61683-1991, the minimum value is 94.05%

⁷ Operating temperature for data download: >0°C

12. 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.

Dispose 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.

Please contact supplier for disposal instruction, the contact information could be found in **Chapter 13. Contact Information.**

13. Contact Information

Should you have technical problems concerning this product, please contact our Service line.

We require the following information in order to provide you with the necessary assistance:

- Inverter type
- Serial number of the PV Inverter
- Type and number of PV panel connected
- Fault message
- Communication method

SHANGHAI CHINT POWER SYSTEMS CO., LTD.

Add: Building 4, No.855 Wenhe Road, Songjiang District, Shanghai, 201614, China

Tel :+86 - 21 - 3779 1222

Fax:+86 - 21 - 3779 1222 - 6016

Service Hotline : +86 - 21 - 3779 1222 - 6300

Mail:service.cps@chint.com

Web:www.chintpower.com

14. Compliance of Standards

EMC:

EN 61000-6-3 (class B)

EN 61000-6-2

Grid Interference:

EN 61000-3-2

EN 61000-3-3

Grid Interface Regulation:

VDE0126-1-1 (2006)

Grid Monitoring:

Independent disconnection device (MSD, *Mains monitoring with allocated Switching Devices*) according to VDEW; EN DIN VDE 0126-1-1 (2006.02)

Low Voltage Regulation:

EN 50178 (4.98) (VDE 0160) (IEC62103)

Normative references			
Grid interface regulation	VDE0126-1-1	G83/ 1-1	ENEL 2010
Safety	DIN EN 50178 (4.98) (VDE0160) (IEC62103)		
EMC: EMS / EMI	EN 61000-6-2 (2005) / EN 61000-6-3 (2007)		
CE	LVD: 2006/95/EC EMC: 2004/108/EC		

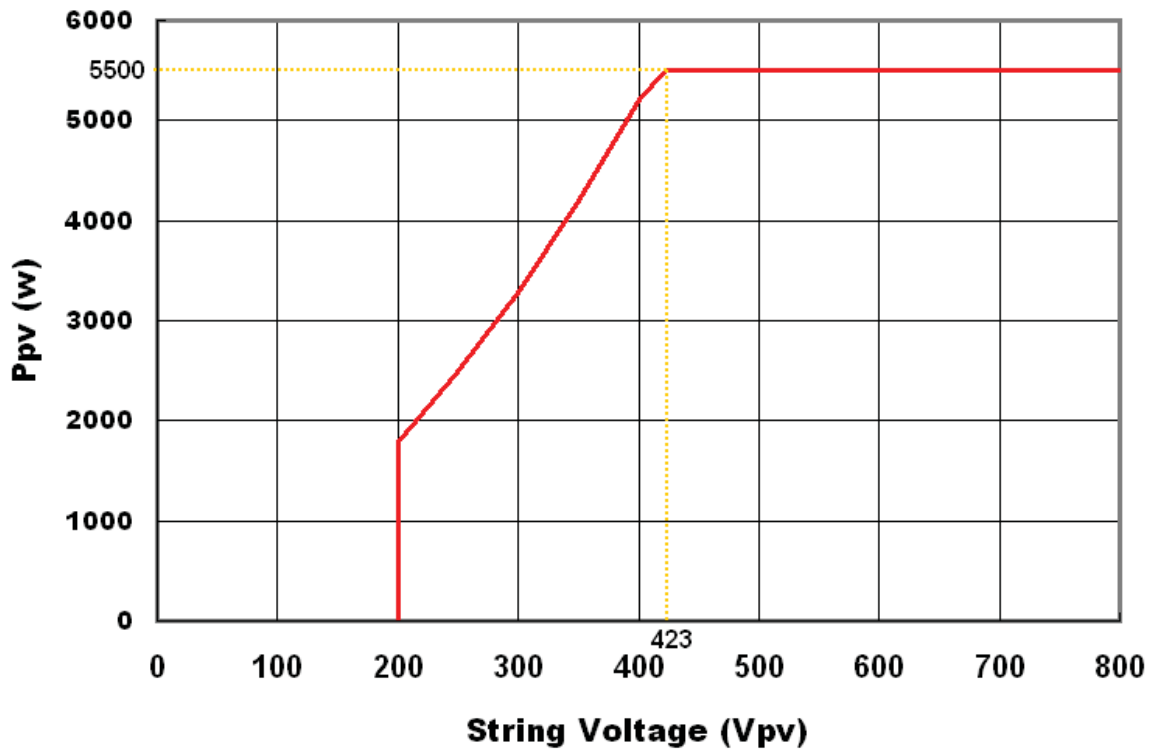
15. Load Graph and Efficiency Graph

The relationship between PV input voltage (String voltage, V_{PV}) and input power (P_{MPP}) is shown in the following example. Once the PV input voltage is less than 423V, the relation of V_{PV} and power is:

$$P_{PV}(W) = 0.0205 \times V_{PV}^2 + 4.8 \times V_{PV}$$

(under condition: $423V > \text{String voltage}, V_{PV} > 200V$)

For example: V_{PV} is $400V_{DC}$, the maximum power converted by the inverter in one string is 5200W.



Allowable String DC Power v.s. String Voltage

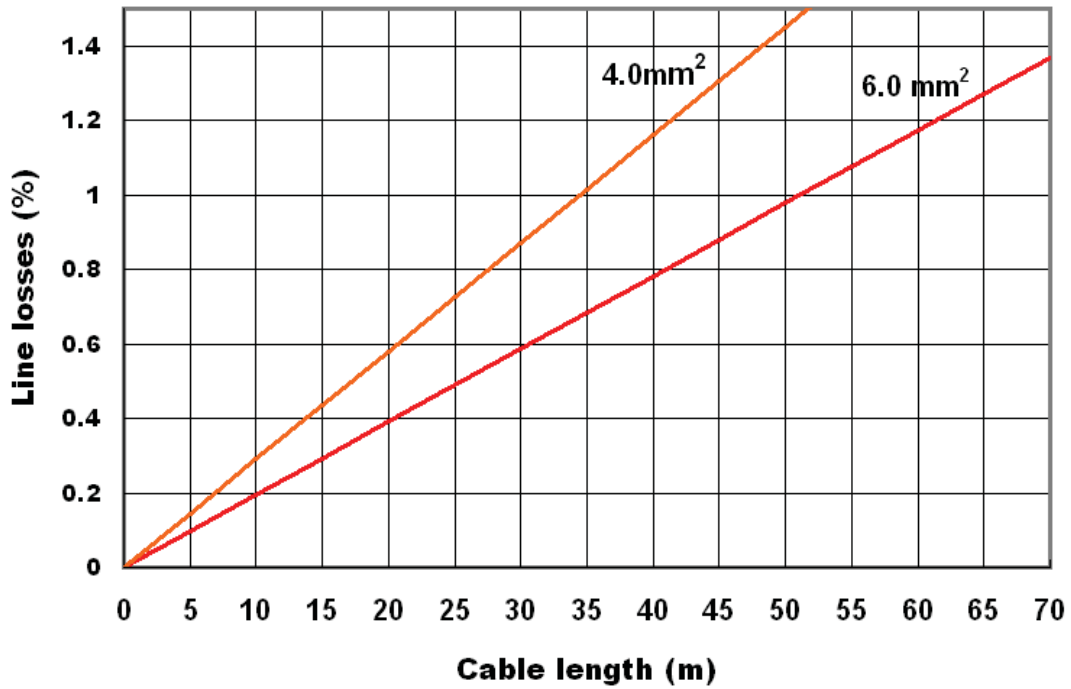
The typical efficiency chart related to V_{DC} and P_{AC} is as shown below.



Results may vary due to test equipment tolerances and product differences.



Appendix I: Line losses of the CPS SC10KTL-O



The following maximum cable lengths are possible for the different cable cross-sections:

Cable cross-section	4.0mm ²	6.0mm ²
Max. cable length	34m	51m

Appendix II: SELECTING THE LINE CIRCUIT BREAKERS

1. the maximum possible nominal current for the cable used and the maximum possible fuse protection for the **CPS SC10KTL-O** limit the maximum possible nominal current for the line circuit breaker
2. additionally, check the thermal suitability of the line circuit breakers

When selecting line circuit breakers, a number of load factors needs to be taken into account. These can be found in the respective datasheets. For example, one manufacturer's circuit breaker may be designed for an ambient temperature of **50°C**.

Appendix III: VDE Certification

VDE Prüf- und Zertifizierungsinstitut

ZEICHENGENEHMIGUNG MARKS APPROVAL

Shanghai Chint Power
Systems Co., Ltd.
#4 Building, No. 855 Wenhe Rd.
201614 SONGJIANG DISTRICT, SHANGHAI
Shanghai
CHINA

ist berechtigt, für ihr Produkt /
is authorized to use for their product

PV-Wechselrichter ohne selbsttätige Freischnittstelle
Power converter for photovoltaic without interactive fail safe interface

die hier abgebildeten markenrechtlich geschützten Zeichen
für die ab Blatt 2 aufgeführten Typen zu benutzen /
the legally protected Marks as shown below for the types referred to on page 2 ff.



Geprüft und zertifiziert nach /
Tested and certified according to

DIN EN 50178 (VDE 0160)-1998-04; EN 50178:1997
DIN EN 60529 (VDE 0470 Teil 1):2000-09; EN 60529:1991 + A1:2000

Das Produkt entspricht den Anforderungen des deutschen Geräte- und Produktsicherheitsgesetzes (GPSG) hinsichtlich der Gewährleistung von Sicherheit und Gesundheit.
The product covers the requirements of the German Act "Geräte- und Produktsicherheitsgesetz (GPSG)" regarding the ensurance of safety and health.

Befristet zum / valid until: 2015-03-31

Aktenzeichen: 5012648-3971-0002 / 135893

File ref.:

VDE Prüf- und Zertifizierungsinstitut GmbH
VDE Testing and Certification Institute
Zertifizierungsstelle / Certification

Ausweis-Nr. 40030346 Blatt 1
Certificate No. Page

Weitere Bedingungen siehe Rückseite und Folgeblätter /
further conditions see overleaf and following pages

Offenbach, 2010-06-22

VDE Zertifikate sind nur gültig bei Veröffentlichung unter:
VDE certificates are valid only when published on:

<http://www.vde.com/zertifikat>
<http://www.vde.com/certificate>




Appendix IV: VDE0126-1-1 Certification



**Bureau Veritas Consumer
Product Services GmbH**

Businesspark A98
86842 Tuerkheim
Deutschland
+ 49 (0) 8245 968 10-0
cps-tuerkheim@de.bureauveritas.com

Unbedenklichkeitsbescheinigung

Antragsteller: SHANGHAI CHINT POWER SYSTEMS CO., LTD.
#4 Building, No.855 Wenhe Rd
Songjiang District
Shanghai 201614
China

Erzeugnis: Selbsttätige Schaltstelle zwischen einer netzparallelen
Eigenerzeugungsanlage und dem öffentlichen
Niederspannungsnetz

Modell: CPS SC10KTL-0

Bestimmungsgemäße Verwendung:

Selbsttätige Schaltstelle mit dreiphasiger Netzüberwachung gemäß DIN V VDE V 0126-1-1:2006-02 für Photovoltaikanlagen mit einer dreiphasigen Paralleleinspeisung über Wechselrichter in das Netz der öffentlichen Versorgung. Die selbsttätige Schaltstelle ist integraler Bestandteil des oben angeführten traflosen Wechselrichters. Diese dient als Ersatz für eine jederzeit dem Verteilungsnetzbetreiber (VNB) zugängliche Schaltstelle mit Trennfunktion.

Prüfgrundlagen:

DIN V VDE V 0126-1-1 (VDE V 0126-1-1):2006-02 und „Eigenerzeugungsanlagen am Niederspannungsnetz, 4. Ausgabe 2001, Richtlinie für Anschluss und Parallelbetrieb von Eigenerzeugungsanlagen am Niederspannungsnetz“ mit VDN Ergänzungen, Stand 2005 vom Verband der Elektrizitätswirtschaft (VDEW) und vom Verband der Netzbetreiber (VDN).

Ein repräsentatives Testmuster des oben genannten Erzeugnisses entspricht den zum Zeitpunkt der Ausstellung dieser Bescheinigung geltenden sicherheitstechnischen Anforderungen der aufgeführten Prüfgrundlagen für die bestimmungsgemäße Verwendung.

Bericht Nummer: 09TH0394-VDE0126


Zertifikat Nummer: U10-321

Datum: 2010-07-02

Gültig bis: 2013-04-15


Achim Hänchen
ZERTIFIZIERSTELLENLEITER

Appendix IV: ENEL Guide 2010 Certification



Bureau Veritas Consumer
Products Services
Germany GmbH
Businesspark A96
86842 Türkheim
Germany
+ 49 (0) 40 740 41 - 0
cps-tuerkheim@de.bureauveritas.com

Dichiarazione di conformità

NOME ORGANISMO CERTIFICATORE: Bureau Veritas Consumer Products Services Germany GmbH
ACCREDITAMENTO n° ZLS I16/G3933-1/8/09
Rif. DIN EN 45011
Data validità: 30-Giugno-2013

OGGETTO: GUIDA PER LE CONNESSIONI ALLA RETE ELETTRICA DI ENEL
DISTRIBUZIONE, Ed. 2.1, Dicembre 2010
REGOLE TECNICHE DI CONNESSIONE DI CLIENTI PRODUTTORI ALLE RETI
ENEL IN BASSA TENSIONE

TIPOLOGIA APPARATO A CUI SI RIFERISCE LA DICHIARAZIONE:			
DISPOSITIVO DI INTERFACCIA	PROTEZIONE DI INTERFACCIA	DISPOSITIVO DI CONVERSIONE STATICA	DISPOSITIVO DI GENERAZIONE ROTANTE
X	X	X	

CONSTRUTTORE: SHANGHAI CHINT POWER SYSTEMS CO., LTD.
#4 Building, No.855 Wenhe Rd
Songjiang District
Shanghai 201614
China

MODELLO:	CPS SC10KTL-O
POTENZA NOMINALE:	10,0kW

VERSIONE FIRMWARE: Master: M0.20
Slave: 00.27

NUMERO DI FASI: trifase

RIFERIMENTO: Il dispositivo non è equipaggiato con trasformatore di isolamento a bassa frequenza.

RIFERIMENTI DEI LABORATORI CHE HANNO ESEGUITO LE PROVE:
Bureau Veritas Consumer Products Services Germany GmbH
ACCREDITAMENTO n° ZLS I16/G3933-1/7/09
Rif. DIN EN ISO/IEC 17025
Data validità: 30-Giugno-2013

Esaminati i Fascicoli Prove n°09TH0394-ENELguide, emessi dal laboratorio Bureau Veritas Consumer Products Services Germany GmbH

Si dichiara che il prodotto indicato è conforme alle prescrizioni ENEL

Numero di certificato: U11-644
Data di emissione: 2011-07-26


 Achim Hänchen
FIRMA RESPONSABILE