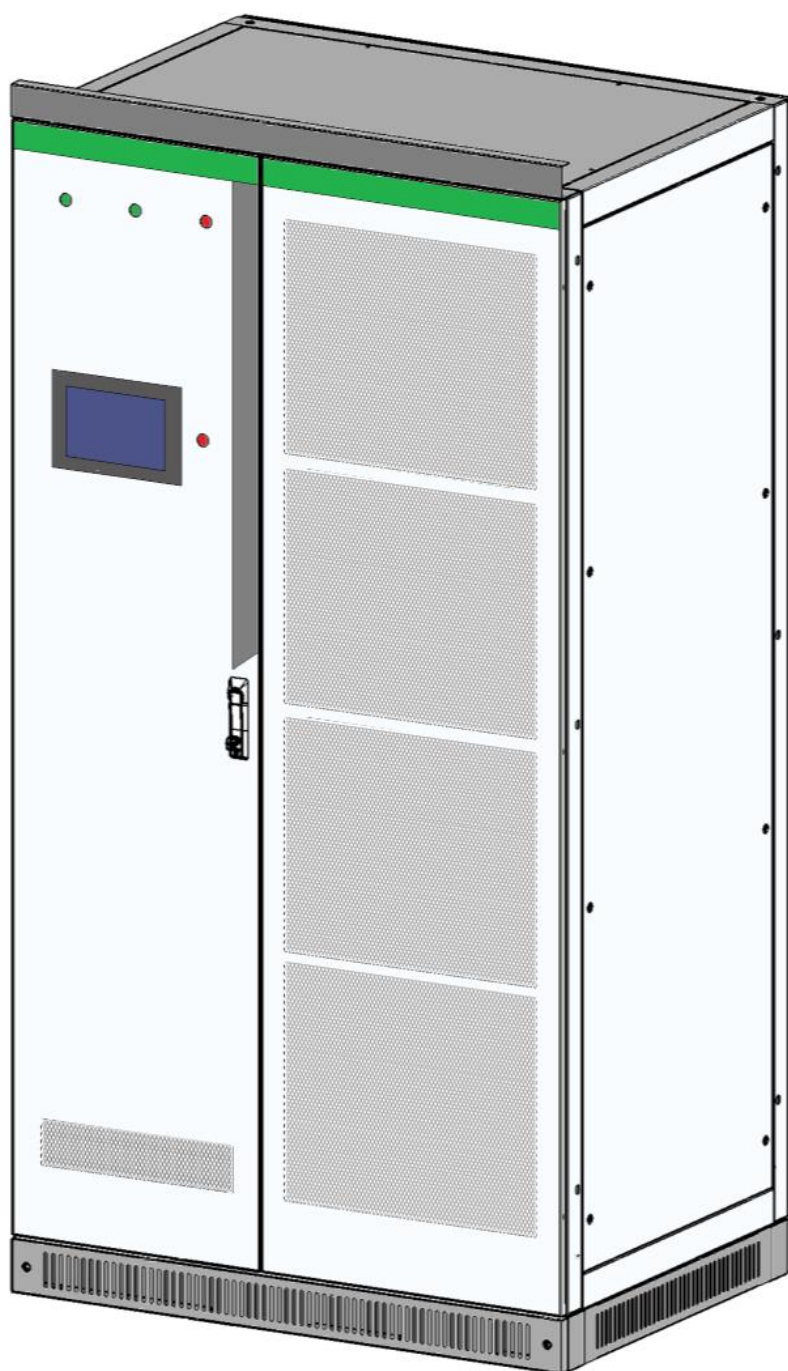


User Manual

DC-DC Converter

Sinexcel



Sinexcel

DC-DC Converter

User Manual

Version: V1.2

Shenzhen Sinexcel Electric Co., Ltd.

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1 Information on this Document

1.1 Validity

This document is valid for the following device models:

- PDC-400K
- PDC-XXX K (XXX could be 50, 100, 150, 200, 250, 300, 350)

Model definition

This section introduces product model definition in this operating manual, as shown in Fig. 1-1:

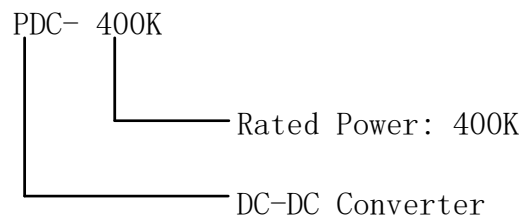


Fig.1-1 Product model definition

For example:

PDC-400K: 400kW DC-DC Converter.

PDC-150K: 150kW DC-DC Converter.

Check the type label for the production version of PCS.

The illustrations in this document have been reduced to be necessary and may differ from the real product.

1.2 Target Group

The tasks described in this document can only be performed by professionals or other qualified persons.

Qualified persons must have the following skills:






- Understand how the product works and how to operate the product
- Understand how the battery works and how to operate the battery
- Training on how to deal with the hazards and risks associated with installing and using electrical equipment installation
- Installation and commissioning of electrical equipment and installations
- Understand all applicable standards and directives
- Understand and follow this manual and all safety information

1.3 Nomenclature Terms and Abbreviations

Terms	Definition
STS	Static Transfer Switch
AC	Alternative current.
DC	Direct current.
BESS	Battery energy storage system
ESS	Energy storage system.
EMS	Energy management system.
BMS	Battery management system.
PCS	Power conversion system.
SLD	Single line diagram
SOH	State of health (of battery), expressed in percentage.
SCR	Silicon controlled rectifier
DOD	Depth of discharge, the rest battery capacity, expressed in percentage.
EOD	End of discharging.
SOC	State of charge (of battery).
UI	User Interface
EPO	Emergency Power Off
SPD	Surge Protecting Device

2 Safety Precautions

2.1 Symbols

Symbol	Explanation
 DANGER	Indicates a dangerous situation that, if not avoided, will result in death or serious injury
 WARNING	Indicates a dangerous situation that, if not avoided, will result in death or serious injury
 CAUTION	Indicates a dangerous situation that, if not avoided, may result in minor or moderate injury
 NOTICE	Indicates that if property damage is not avoided
 NOTE	Draw attention to important information, best practices and tips NOTE is used to address information that is not related to personal injury, equipment damage, and environmental degradation.

2.2 Important Safety instructions

This user's manual is about installation and operation of Sinexcel PWS1 series 500kW Bi-directional Energy Storage converter (PCS).

Before installation, please read this user's manual carefully.

The PCS must be commissioned and maintained by the engineers designated by the manufacturer or the authorized service partner. Otherwise, it might endanger personal safety and result in device fault. Any damage against the device caused thereby shall not be within the warranty scope.

The PCS cannot be used for any circumstance or application related to life support device.

This manual contains important instruction for Models of PWS1 series that shall be followed during installation and maintenance of the PCS.



Any contact with copper bar, contactor and terminal inside the device or connected with the loop of utility grid might result in burning or fatal electric shock.

Don't touch any terminal and conductor connected with the loop of utility grid.

Pay attention to any instruction and safety documents about power on-grid.



WARNING

There might be an electric shock risk inside the device!

Any operation related to this device will be conducted by professionals.

Pay attention to the safety precautions listed in safety instruction and installation documents.

Pay attention to the safety precautions listed in operating and installation manual and other documents.



WARNING

Large leakage current

Before connecting input power supply, please ensure that the grounding is reliable.

The device must be grounded complying with the local electric codes.



WARNING

When storage battery is connected to PCS, there may be DC voltage at input port. Please pay attention to it during operation or check the battery system user manual



WARNING

Don't touch electric parts within 15 minutes after power outage!

There is dangerous energy in capacitance storage. Don't touch device terminal, contactor and cooper bar and other electric parts within 15 minutes after disconnecting all device power supplies.



NOTICE

All maintenance and preservation inside the device require using tools and shall be conducted by trained person. The components behind the protective cover plate and dam board which are opened by tools cannot be maintained by users.

Please read this user's manual before operation.

2.3 Additional Information

Links to additional information can be found at <http://sinexcel.us/> or www.sinexcel.com.

3 Product Introduction

3.1 System Introduction

The 400Kw DC-DC DC converter converts the DC power of the PV module array into DC power that can charge the battery.

PDC-400K series DC-DC converter use the single-stage topology, wide PV input range: 250-650V; voltage range for output to battery: 600-900V, the more detailed parameter can be seen in chapter below.

The DC-DC converter equipped with multi-string MPPT PV maximum power tracking function;

3.2 PCS Appearance

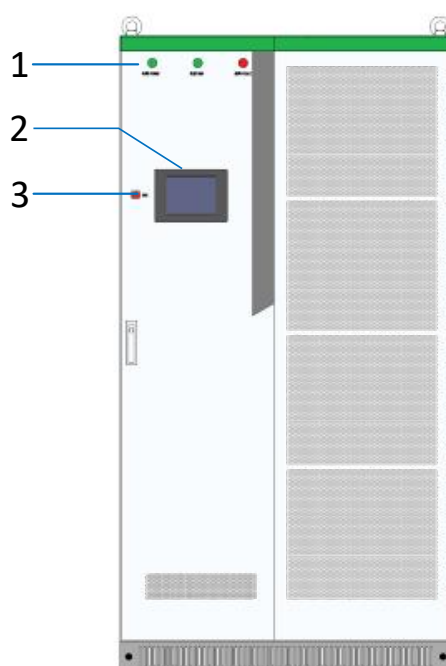


Figure3- 1: Design of the PCS

Position	Designation
1	Indicator light
2	HMI(Touch Screen)
3	EPO (Emergency Power Off)

3.3 System Schematic Diagram

The 400Kw DC-DC DC converter consists of 8 DC modules. These modules can be connected in parallel on the battery side, and each module on the PV side can work independently with multiple MPPTs. Alternatively, when the battery sides are connected in parallel, the PV sides can also connected together in parallel in one point. When each of the battery side and the PV side are connected in parallel in each one point, the master-slave system is identified by the DIP switch dial code on the panel. One of the modules acts as a host, and the other modules act as slaves to synchronize with the host. The DC-DC converter is equipped

with SPD protectors, DC circuit breakers and auxiliary power distribution units. Figure below is a topological diagram of the composition.

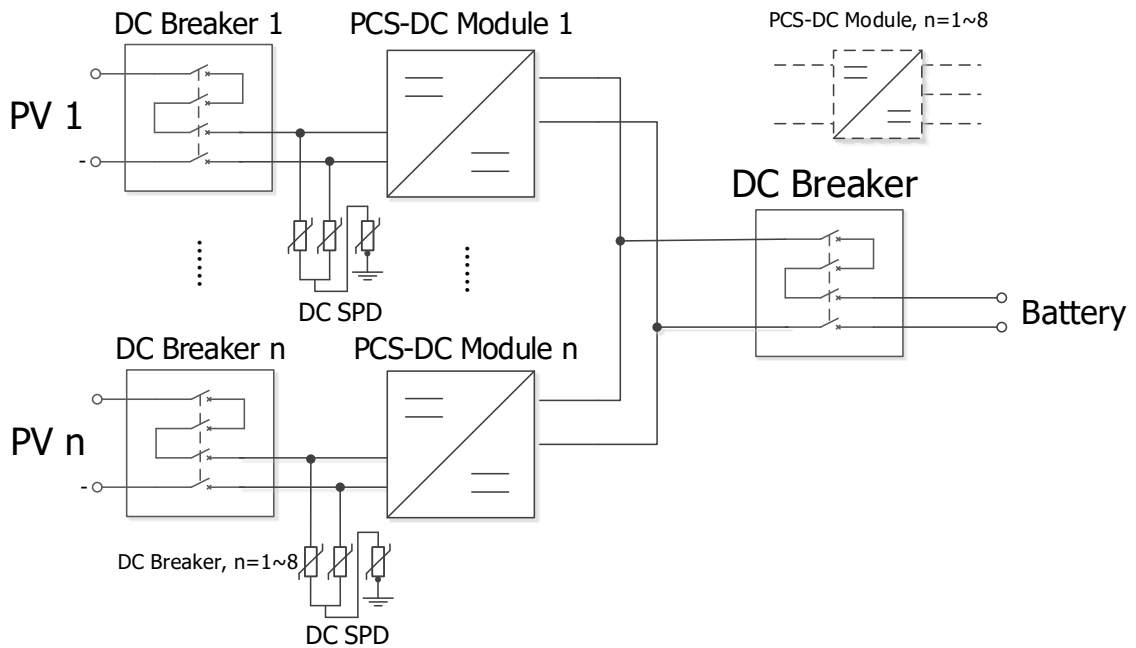


Fig. 3-2 Topological graph for DC-DC Converter

Main composition of DC-DC Converter is shown in Table.3-2

Table 3-2 Main composition of DC-DC Converter

Serial No.	Item	Quantity	Remark
1	Cabinet	1	The cabinet is equipped with distribution components.
2	DC-DC module	1 OR 2,OR 3 to 8	1 for 50kW; 2 for 100kW; 3 for 150kW 8 for 400kW
3	Power Management Unit	1	It is installed in the cabinet door.
4	PV switch	1 or more	Numbered in QF1-QF8(1#-8#DC models match PV switch)
5	Battery switch	1 or more	Numbered in QF9-QF16(1#-8#DC models match Battery switch)
6	SPD protector	1 or more	Numbered in FV1-FV8(1#-8#DC models match SPD)
7	SPD protector switch	1 or more	Numbered in Q3-Q10(1#-8#DC models match SPD protector switch)
8	24V switching power supply switch	1	Q1
9	external AUX power supply switch	1	Q2

3.4 DC-DC Converter Composition

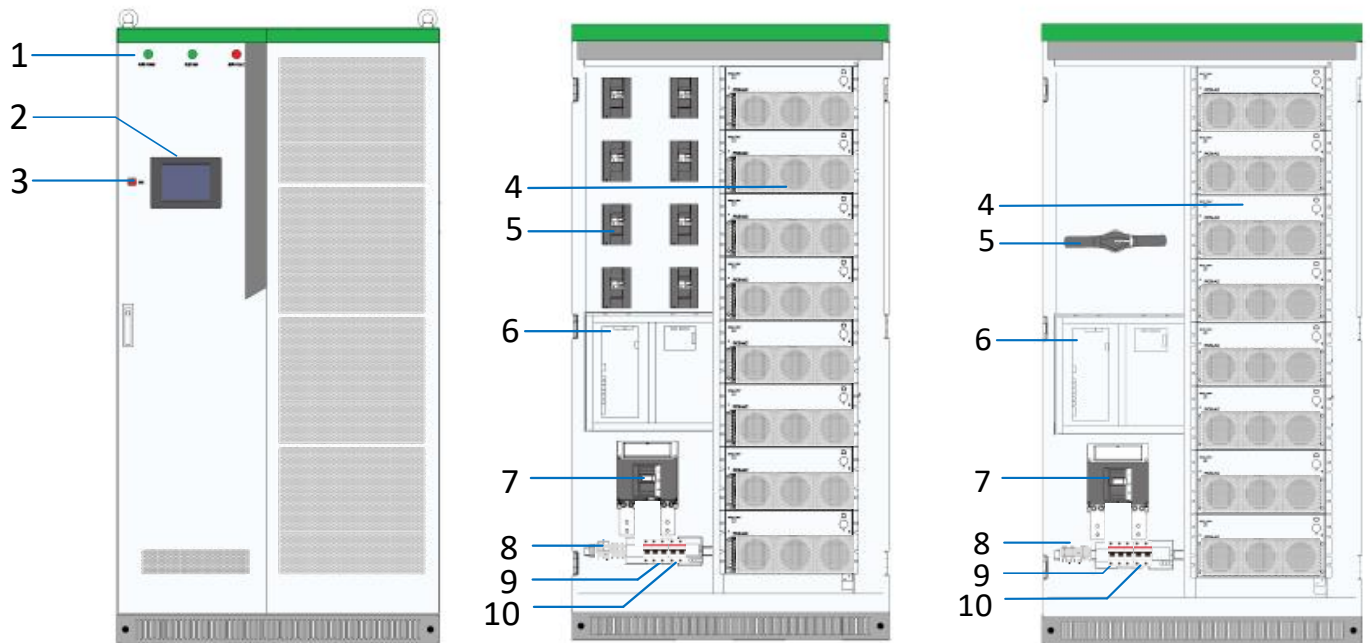


Figure3-3: Visible Components of the DC-DC

8 string MPPT

single string MPPT

Position	Designation	Description
1	Indicator lights	
2	Touch Screen	
3	EPO (Emergency Power Off)	
4	PCS-DC (1~8 module(s))	50KW for1 set
5	Battery DC Branch Switch	1 to 8 set DC Branch Switch
6	U2 Main control board	
7	Main DC Switch	
8	Wiring terminal	
9	SPD switch	
10	AUX Power supply switch	

Components position 8 Wiring Terminal, 9 SPD switch, 10 AUX power supply switch can be seen after unfold the dam-board.

3.5 Operating Compositions

3.5.1 Switches Introduction

3.5.1.1 DC Switch

The DC disconnection unit disconnects the PCS from the Battery module arrays. The NA series PCS breaker is comply to the UL certification.

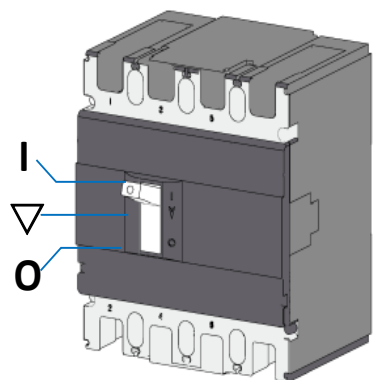


Figure 3-5: Indicators on the DC load-break switch

Position	Designation	Explanation
I	Switch position In (On)	The DC disconnection unit is closed.
∇	Central switch position	The DC disconnection unit was tripped and is open.
O	Switch position off	The DC disconnection unit is open.

3.5.1.2 Battery DC Switch

The DC disconnection unit disconnects the DC-DC Converter from the battery. The SOCOMEC series DC breaker is comply to the UL certification.



Figure 3-6: Indicators on the DC load-break switch

Position	Designation	Explanation
----------	-------------	-------------

I	Switch position In (On)	The DC disconnection unit is closed.
▽	Central switch position	The DC disconnection
O	Switch position off	The DC disconnection

Unbuckle recovery: take the switch to the off first before taking the switch to the on.

3.5.1.3 AUX power supply Switch

AUX power supply can be the redundancy power supply through the AC Switch inside the PCS cabinet. These switches can be visible after opening the dam-board.

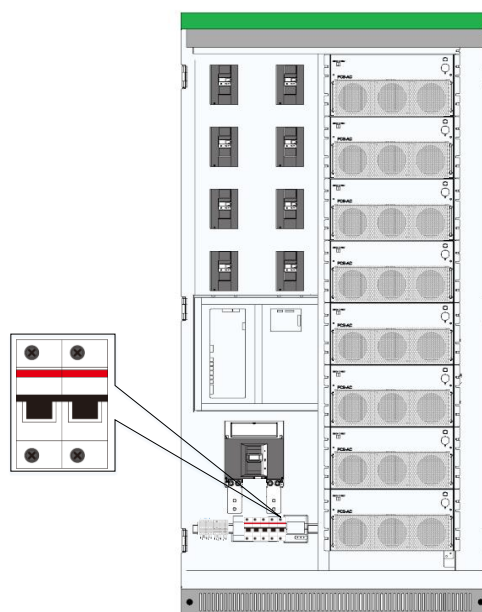


Figure 3-6: AUX power supply Switch

3.5.2 Touch Screen

3.5.2.1 User Interface

The touch display is used to display instantaneous values and parameter settings. Click the touch screen with fingernail. Tapping the symbols on the touch display activates the corresponding functions. If the touch display has not been touched for 【ten】 minutes, the display is locked and the logged-in user will be logged out. By tapping the screen unlock the display again. The touch display is divided into two areas.

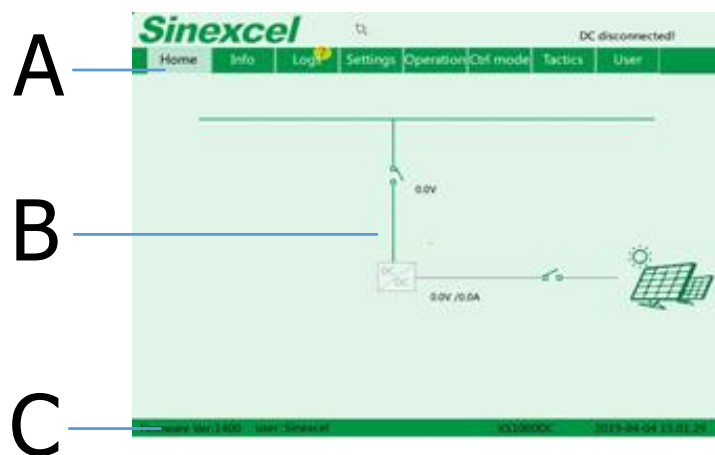







Figure 3-7 UI Design of the touch display

Position	Designation	Explanation
A	Menu	Menu can be different before/after log-in and other setting.
B	System Topology	
C	Version and time	

3.5.2.2 Symbols Explanation

Symbol	Designation
	DC side
	DC Module
	PV Solar
	Switch on DC or AC side open
	Switch on DC or AC side closed

3.5.3 LEDs of the System

The appearance of the PCS is shown in below. Front door body is mainly composed of touch screen, normal indicator light, alarm indicator light and emergency shutdown button etc.

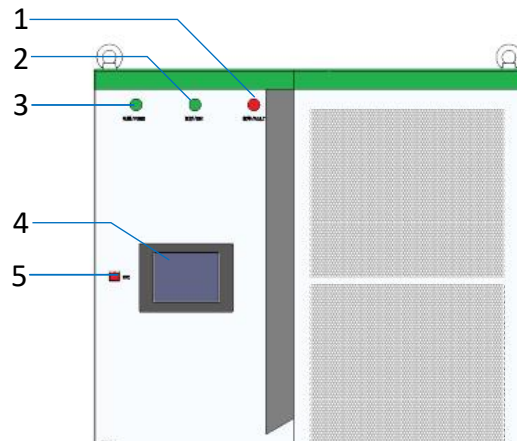


Figure 3-8 LEDs on the front panel

LED designation	Description	Explanation
1	Fault indicator light	
2	Normal indicator light	
3	Power indicator light	
4	Touch screen	
5	Emergency shutdown button	

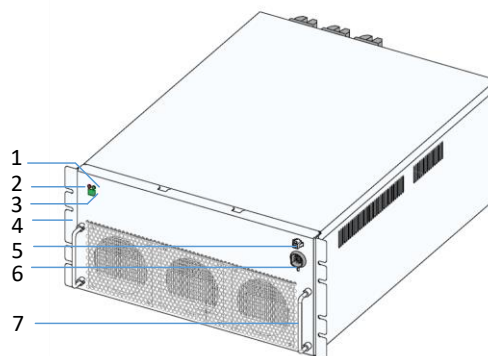












Figure 3-9 Front view for PCS-DC module

LED designation	Description	Explanation
1	Normal indicator light	Green
2	Fault indicator light	Red
3	DIP switch	Address
4	Hanger	
5	Power supply socket	
6	Communication cable socket	
7	Handle	Can't bearing too much weight

3.5.4 Labels

No.	Label	Explanation
1		Label-Dot label-A phase
2		Label-Dot label-B phase
3		Label-Dot label-C phase
4		Label-Dot label-Negative electrode
5		Label-Dot label-Negative electrode
6		Label-Dot label-Negative electrode
7		Label-Dot label-Neutral line
8		Label-Dot label-Grounding
9		Label-Warning label-Danger High Voltage
10		Label-Warning label-Danger large leak current

4 Technical Data

Technical parameters table (400KW)

Specification

PDC-400K

LV PV input mode (Default)	
HV DC bus voltage	LV voltage+40V ~ 850V
HV DC bus current	0~100A×8
LV PV input voltage	250~840V
LV PV input current	0~130A×8
Power rating	50kW×8
LV battery dis-/charge mode (Optional)	
HV DC bus voltage	LV voltage+40V ~ 850V
HV DC bus current	0~100A×8
LV battery voltage	250~840V
LV battery current	0~130A×8
Power rating	50kW×8
Physical	
Cooling	Forced air cooling
Noise	70dB
Enclosure	IP20/NEMA1
Max elevation	3000m/10000feet (> 2000m/6500feet derating)
Operating temperature	ambient -20°C to 50°C (De-rating over 45°C)
Humidity	0~95% (No condensing)
Size (W×H×D)	1100×2060×800mm
Weight	600kg
Installation	Floor standing
Other	
Peak efficiency	98%
Protection	OTP, OVP/UVP, EPO, Fan/Relay Failure, OLP
Configurable protection limits	Upper/Lower Voltage, Battery EOD voltage.
Display	Touch Screen
Communication	RS485,CAN,Ethernet
Isolation	Non-isolation
Compliant	CE LVD IEC 62109/62477, CE EMC IEC 61000 UL1741

Application environment restrictions:

When the DC-DC Converter is working in stand-alone mode, there are some restriction to the application environment.

- Several DC-DC Module independent working is the customized function. When require the multi-string input and multi-string output, please contact manufacture to do the customization.

5 Storing, lifting and transporting

5.1 Safety during Transport



WARNING

If the lifted or suspended load falls over, falls or sways, there is a risk of crushing

Vibration or careless or hasty lifting and transport can cause the product to tip over or fall. This can result in death or serious injury.

All national transport standards and regulations must be respected.

Always transport the product as close as possible to the floor.

Avoid fast or uneven movement during transport.

Always maintain a sufficient safety distance from the product during transportation.



NOTICE

Damaged frame structure of the DC-DC Converter due to uneven support surface

Placing the DC-DC Converter on an uneven surface can cause bending, which causes the DC-DC Converter door to no longer close properly. This can cause moisture and dust to seep into the DC-DC Converter

Do not place the DC-DC Converter on an unstable, uneven surface, even for short periods of time.

The unevenness of the support surface must be less than 0.25%.

Do not use the installed kick plate to transport the DC-DC Converter.

5.2 Transporting DC-DC Converter

5.2.1 Transport and storage

The module of the DC-DC are installed in the DC-DC cabinet rack during shipping. During device transport and storage, pay attention to the caution sign on the packing case.

The selection of storing position should ensure that:

- There is no corrosive gas around it.
 - There are over-wetting and high-temperature sources.
 - It is not a dusty environment.
 - It complies with the local firefighting requirements.
-



NOTICE

During rack transport and storage, stacking is not allowed. The device top cannot be placed with other articles.

The rack should be placed vertically at forward direction. Don't keep it upright placed horizontally.

6 Installation

6.1 Safety during Installation



DANGER

Risk of electric shock caused by live voltage

There is a high voltage in the live components of the product. Touching field components can result in death or seriousness electric shock damage.

Wear appropriate personal protective equipment for all work on the product.

Do not touch any live components.

Observe all warning messages in products and documents.

Obey all safety information from the battery manufacturer.



DANGER

Electric shock hazard caused by DC cable

The DC cable connected to the battery is live. Contact with live cables can cause electrocuted death or serious injury shock.

Before connecting the DC cable, make sure that the DC cable has no voltage.

Wear appropriate personal protective equipment for all work on the product.



WARNING

Danger to life due to electric shock when entering the storage system

Damage to the insulation in the storage system can result in fatal ground currents. May cause a fatal electric shock. Ensure that the insulation resistance of the storage system exceeds the minimum.

Minimum value: The insulation resistance is: 14kΩ.

The PCS must be installed in a closed electrical operating area.



WARNING

Fire due to failure to observe torque specifications at real-time bolt connections

Failure to comply with the specified torque reduces the current carrying capacity of the live bolt connection, thereby reducing the contact resistance increase.

This can cause the components to overheat and catch fire.

Be sure to always tighten the live bolt connection using the exact torque specified in this document.

Use only the right tools when working on the device.

Avoid repeatedly tightening the live bolt connection as this may result in unacceptably high torque.

6.2 Mechanical Installation

6.2.1 Mounting preparation

Drilling Mounting Holes is required in the Foundation. The overall dimension of the DC-DC Converter is shown in figure below.

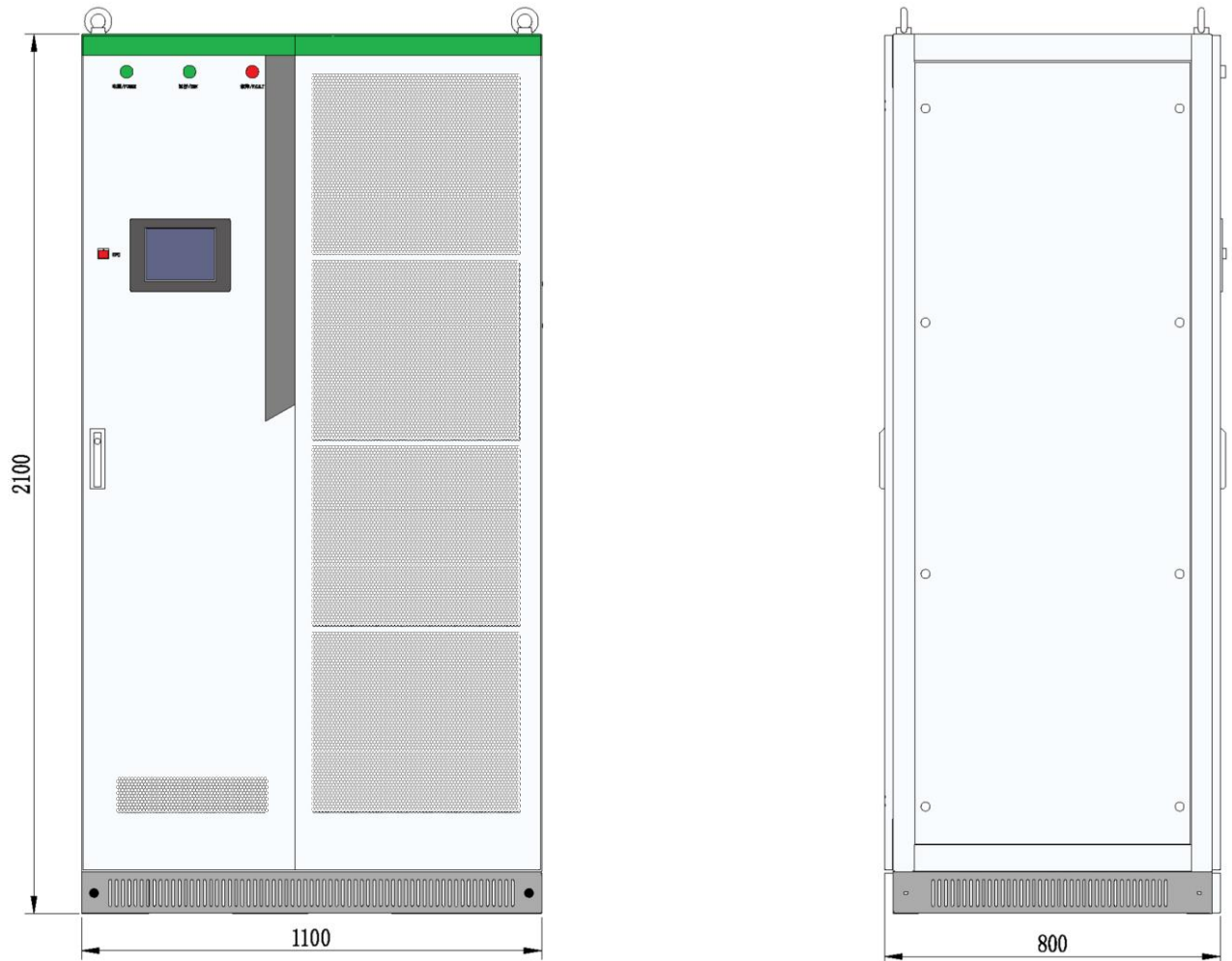


Fig. 6-1 Overall dimensions of the DC-DC Converter cabinet, width: 800mm, height: 2160mm (without lifting rings); depth: 1100mm. Green threshold height 60mm, If you don't have enough height to enter the room, you can take it off.

DC-DC Converter: No load-bearing lifting rings in the cabinet, no lifting.

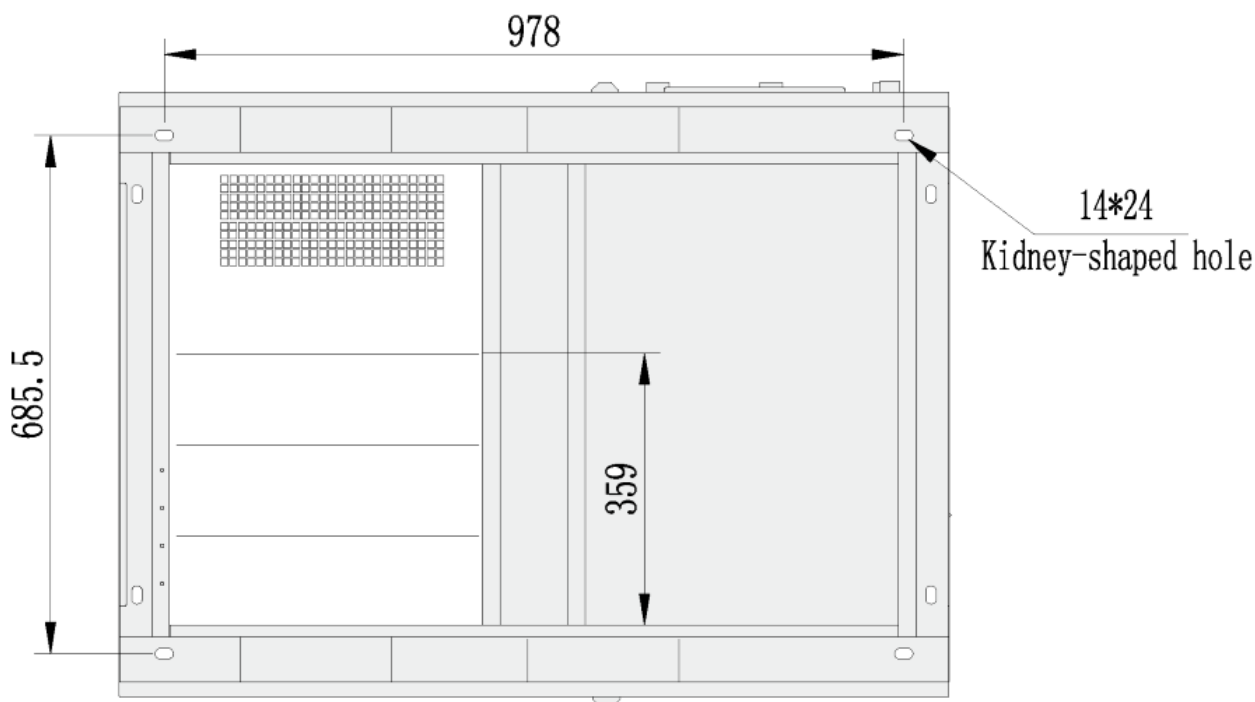


Fig. 6-2 the DC-DC Converter rack wiring hole in bottom view

There are two hole in each corner, only one hole need to mount bolts, the other hole is used as a spare.

6.2.2 Preparation for Mounting on a Base

After the rack is removed to the installation position of BESS (battery energy storage system) with a forklift or a tool. Fine adjust the rack and remove it to the designed position, open the internal door of rack, use M10 or M12 screw to fix the rack.

When the rack needs to be fixed on the steel channel, $\Phi 14$ holes can be made in the steel channel. Fix the rack to the steel channel with screws.

When the rack is fixed to the concrete floor, make holes on the floor and fix the rack to the concrete floor with expansion screws.

For the detailed mounting on a base, please seen the Installation Manual.

6.3 Electrical Connections

6.3.1 Input requirement

DC-DC 400KW :The PV DC voltage of the cabinet must be within its required input range, Otherwise, the DC-DC cabinet will not work. When users configure the number of series of photovoltaic panels, the maximum input voltage and the minimum input voltage of the module should be fully considered. Specifically can consult the company's technical service personnel.

The battery system used with the DC-DC cabinet should be equipped with a DC switch and the charge/discharge voltage should be between input voltage ranges. When the DC-DC cabinet is connected to an external battery pack, make sure the DC switch is disconnected.

6.3.2 Output requirement

The DC-DC cabinet output is DC that charges the battery. Maximum current can be 390A.

6.3.3 Wiring mode

The wiring mode of the The DC-DC cabinet is down inlet and down outlet, the incoming and outlet wiring holes located in bottom of the PCS cabinet. The cables put into the cable trough via the wire holes at the base. Open the front door and dismantle the dam-board to seen wiring of the cooper bars. As for wiring requirements, single cables or multiple cables with proper wire diameter should be selected. It is suggested that the current in 1mm² wire should be $\leq 3A$.

Table 6-2 DC-DC Specification for cabinet wiring components

Position	Designation	Description
1	DC (1~8 modules)	PCS-DC modules
2	Battery switch (QF9)	SIRCO PV 1000VDC-315A-2P
3	PV switch (QF1-QF8)	SIRCO PV 1000VDC-315A-2P
4	Confluence bus of battery side	BAT+,BAT-
5	Confluence bus of PV side	PV+,PV-
6	Cabinet Grounding Channels	PE

Open the dam-board of back door and then can see the wiring copper bar as shown below.

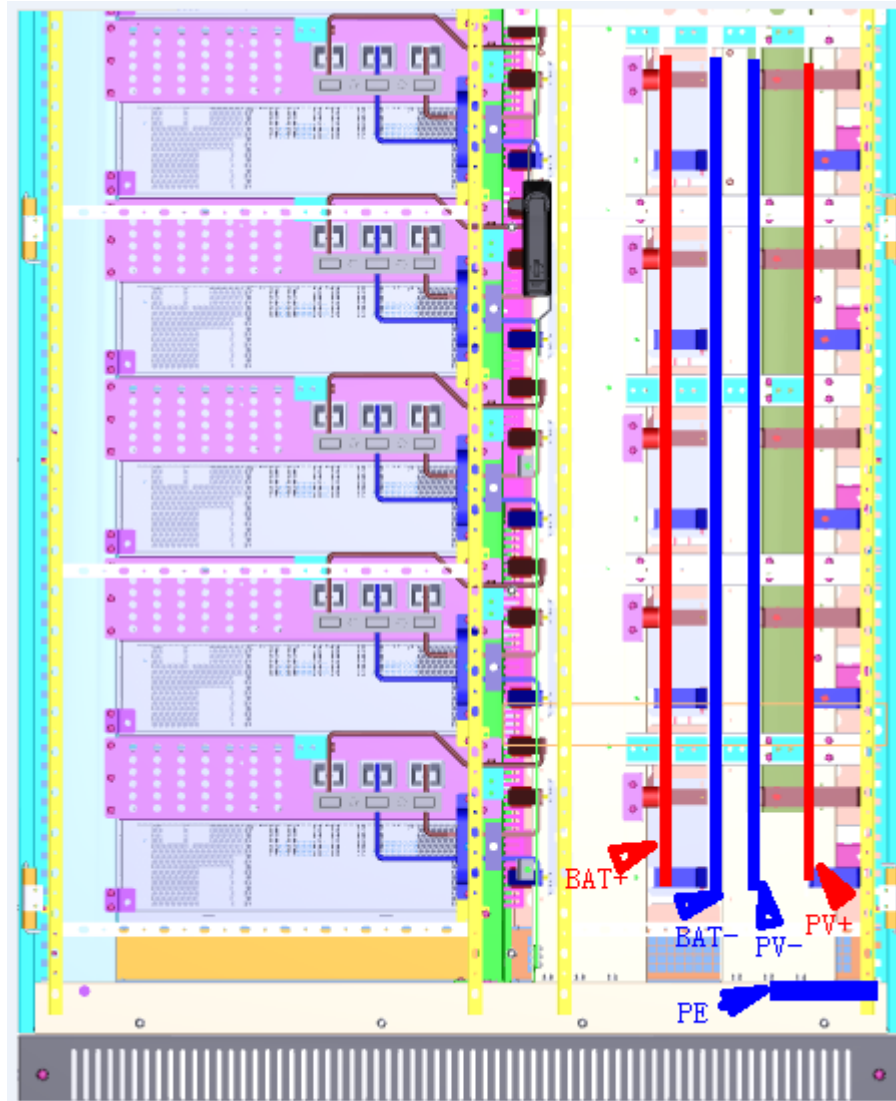


Table 6-3 description for wiring components of DC-DC cabinet

6.3.4 System grounding

The modules in the DC-DC cabinet realize grounding connection with the rack through hangers.

As for rack grounding, the rack bottom is installed with grounded cooper bars. During wiring, refer to the following table for cable diameter. The grounding resistance should be less than 4Ω .

Table 6-5 Grounding PE cable description

Rated power	Copper PE line section recommendation (mm ²)
50kW	≥ 16
100kW	≥ 25
500kW	≥ 75



WARNING

Rack and modules need to be grounded reliably! The grounding resistance should be less than 4Ω .

6.3.5 DC port wiring

The DC port wiring should be done before power on, the detailed DC port wiring could be seen in installation manual.



DANGER

Disconnect DC distribution switch and ensure that there is no dangerous voltage in the system during wiring.



NOTICE

The positive and negative poles of batteries cannot be connected inversely. Before wiring, a multi-mete needs to be used for measurement.

6.3.6 Wiring of terminal strips

Except power cable connection in the whole DC-DC cabinet. There are also auxiliary power connection, input and output of some node signals. All of them are led to the terminal strips with cluster cables in the rack. The port definition of external wiring for terminal strips is shown in figure below.



NOTICE

All wires are connected to the wiring terminals externally from the wiring holes at the bottom of DC-DC cabinet. After wiring, fireproofing mud should be used to seal the wiring holes.

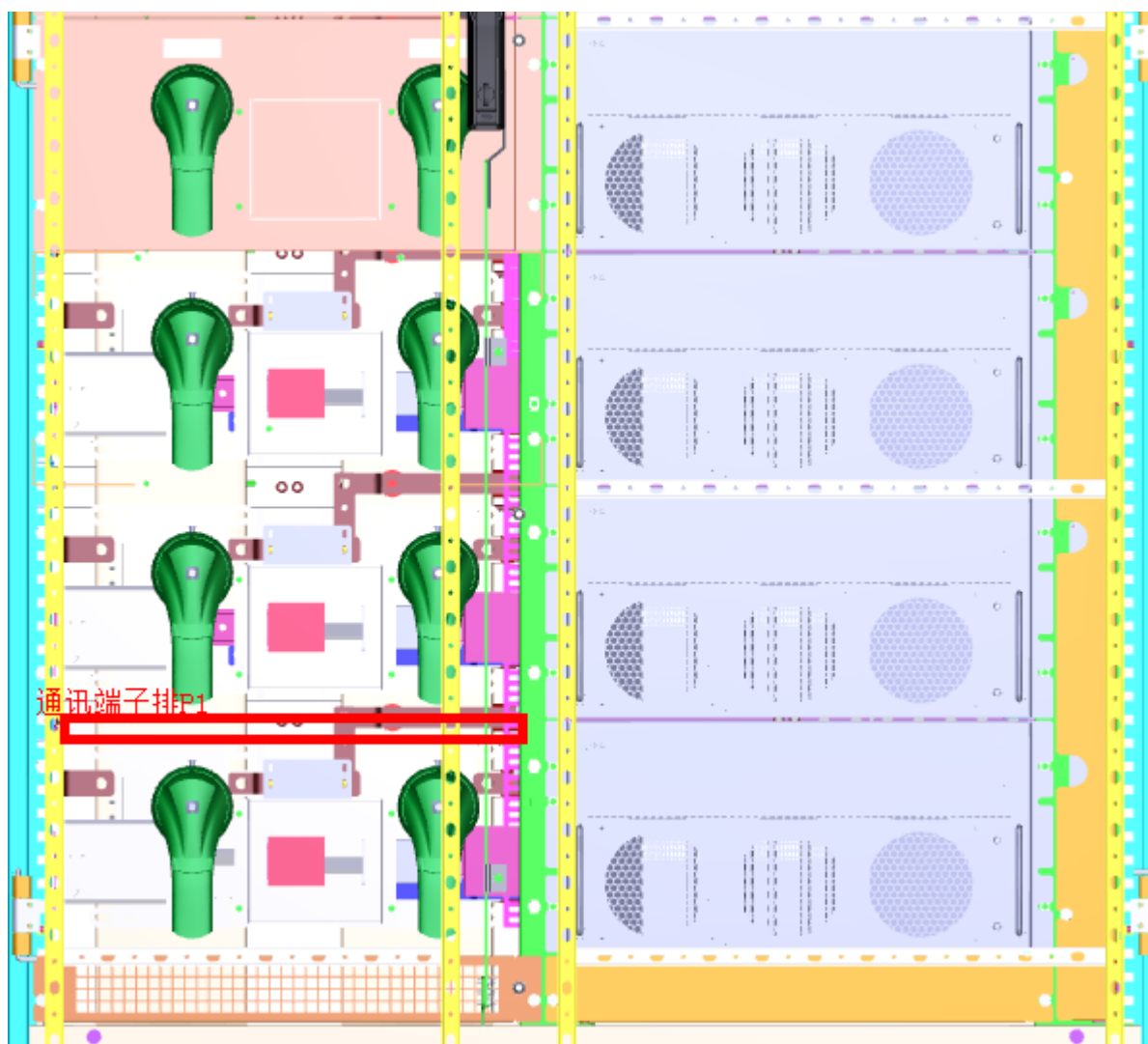


Fig. 6-8 Wring and communication interface position

Table 6-6 Communication interface description

Interface position	Description	Explanation
1	Terminal strip ports	RS485 , CAN, (AS BELLOW)
2	Touch Screen	Ethernet port Shown as 6.10 Communication interface

	External Communication			Terminal
	CAN	7	CAN_H	C3-J15-1
	CAN	8	CAN_L	C3-J15-2
	485	9	485+	C3-J16-4
	485	10	485-	C3-J16-5

Fig. 6-9 Definition of terminal strip ports

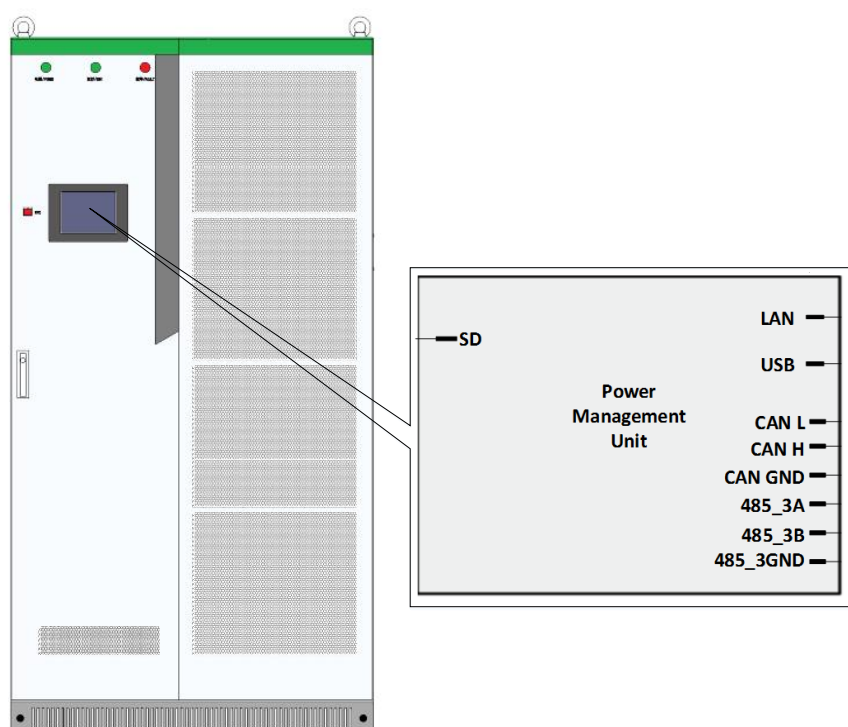


Fig. 6.10 Definition of touch screen communication ports

The LAN (Ethernet) port is used for communication. The USB port is used for system update or the logs export. The other communication ports in the back of touch screen has been wired to the wiring terminal strip ports.

6.4 Communication interface connection

The DC-DC converter supports Modbus protocol, adopts RS485 and Ethernet communication interface and facilitates users to conduct background monitoring for the DC-DC converter and realizes remote signaling, remote metering, remote control and remote regulating of DC-DC Converter.

Table 6-10 Communication interface with other equipment

Equipment	Wiring Method
EMS	RS485 or Ethernet (Protocol is based on MODBUS TCP/IP or MODBUS RTU compatible with SUNSPEC/MESA) Defaulted as RS485 MODEBUS RTU. Use Ethernet when the system require fast control. When the EMS need to communicate in CAN method, a CAN to Ethernet communication protocol converter is required.
BMS	RS485 or Ethernet or CAN (Protocol is based on MODBUS TCP/IP or MODBUS RTU compatible with SUNSPEC/MESA) Defaulted as CAN When the BMS need to communicate in Ethernet method, an Ethernet to CAN communication protocol converter is required.
Another PCS	CAN
Smart meter	Through external EMS
Air Conditioning	Through external EMS
Fire Fighting System	Through external EMS

Water Level Gauge	Through external EMS
Diesel Generators	Through external EMS

6.4.1 Connecting the EMS over RS485 or Ethernet

EMS can choose to use RS485 or Ethernet access, depending on the user's specific application, as shown in the figure below.

RS 485 Port

The front door of the storage converter is embedded with touch screen Management Unit. User interface can be seen at its back. The position number of RS485 communication interface in the HMI (Touch Screen) is J23. It is led to terminal strip ports 9 and 10. Users can transfer serial port signal to the one which can be processed by PC via interface converter (such as RS485 transferred to RS232). The storage converter could be set and commissioned alone via background software. It can read operation and warning information. Corresponding settings, startup and shut down operations can be conducted.

Ethernet Port

The monitoring panel integrates Ethernet port with position numbered as RJ25 that can be seen in the back of the touch screen. It supports Modbus TCP/IP protocol and has its own IP address. Ethernet connection requires a switch router, and fixed IP needs to be set. Connecting cables are twisted pair (namely network cable). The storage converter are connected to the switch router, and the switch router is connected to remote control computer. The state of the storage converter can be monitored and controlled in real time after setting IP address and port number in the monitoring computer.

6.4.2 Connecting a BMS over CAN

When directly connecting to the BMS, the communication port is default as CAN as shown below. If the BMS use Ethernet communication port, a Ethernet-CAN protocol converter is needed . That Ethernet-CAN protocol converter should be bought by the user and its beyond Sinexcel's scope of supply.

The DC-DC cabinet communicates with battery management unit (BMS) to monitor battery state information, give an alarm and provide fault protection for battery according to the battery state and improve the safety of storage battery. It supports CAN communication. In particular, the position number of CAN communication interface can be seen in the back of HMI (Touch screen). It is led to terminal strip ports 7 and 8.

6.5 Check after installation

After installation of PCS, please inspect all aspects according to the checklist in the Installation Manual. Any failure to complete the checklist might void the warranty.

7 Function Description

7.1 Operating Status

7.1.1 Overview of the Operating Status

Refer to the following table for status of DC-DC converter.

Table 7-1 Status of DC-DC converter

Status	Condition	Running mode
Powered off	PV,Battery switch disconnected	The lights on the equipment are all out.
Powered up	PV,Battery switch connected	The power on the equipment is on.
RUN	the device receives startup command	RUN green light in front door is always on, and the module green light is always on.
Faults	Any fault information	Red light is always on, the module red light is always on or flickers, and the buzzer makes an alarm.
Shutdown	The device receives shutdown command.	RUN green light flickers slowly, and the module green light flickers slowly.

8 Operation

8.1 Safety during Operation



NOTICE

DC side operation is disturbed due to incorrect parameter settings

When setting the mode of the AC side, please make sure that the control parameter is consistent with the grid requirement.

8.2 Power On Procedure

Power on for the first time:

- 1): Confirm the PV and BATTERY cable firmly connected according to the check list in the Installation Manual.
- 2): Measure the insulation withstand voltage according to the international or local standard. The following insulation withstand voltage should be measured
Positive pole "+" to ground "GND"; Negative pole "-" to ground "GND".
- 3): Measure the PV voltage; Battery DC voltage;
- 4): If the PV voltage, Battery DC voltage within the normal range as shown in technical specifications, then

close the switch in sequence.

Power on every time:

1): Check whether the EPO button in reset state.

2): Close the switch in sequence.

Firstly close the PV switch, then close the BATTERY switch.

8.3 Setting Procedure before startup

8.3.1 Touch screen power on

After auxiliary power of the DC-DC converter is connected, THE HMI is on. At this moment, an initializing interface will appear. It shows that "The system is booting, please wait". After system booting, the interface will disappear.

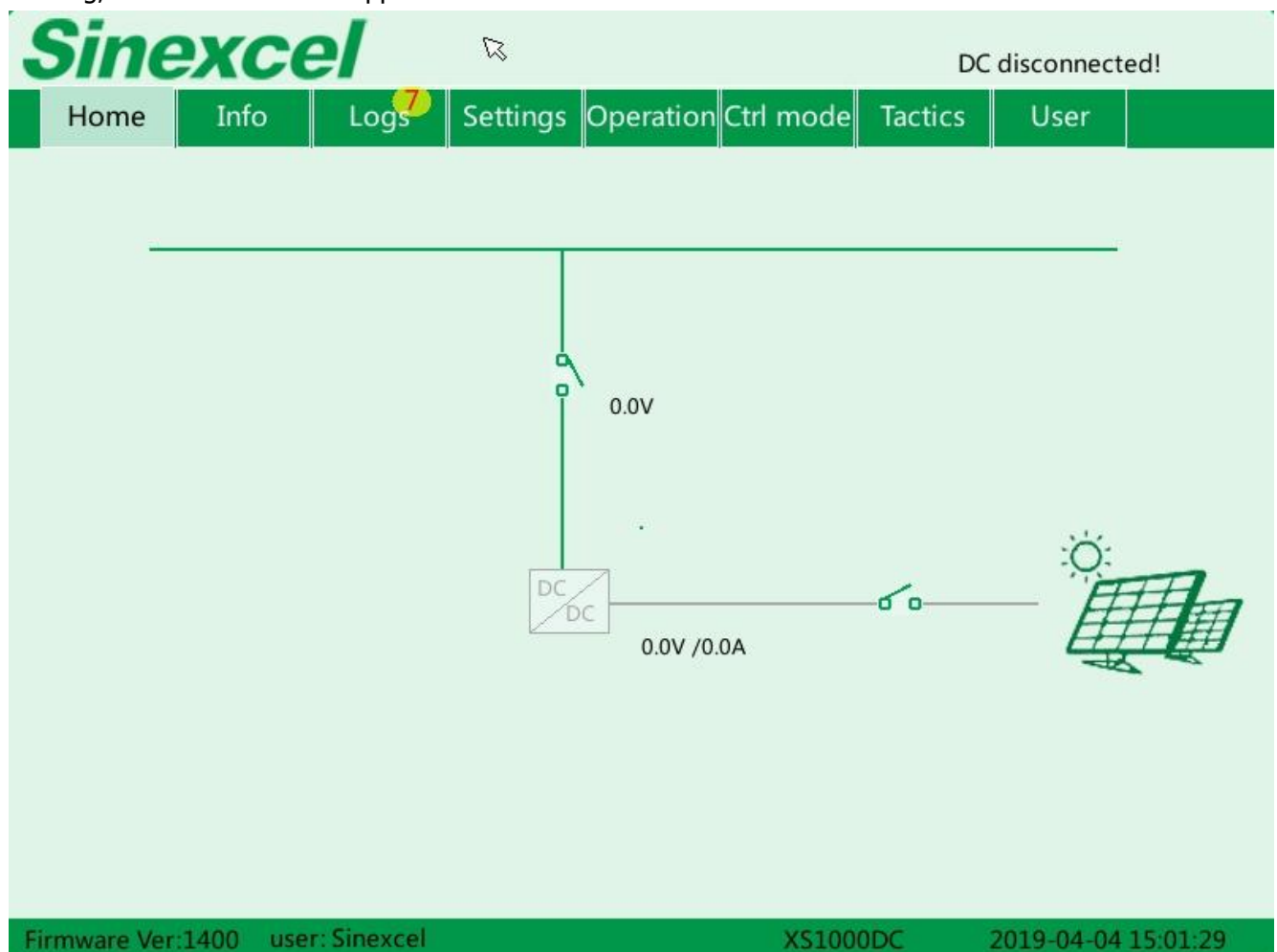


Fig. 8 4 Main Interface Sample

Detailed Menu information can be seen in Appendix. "12.1 Touch Screen Startup"

8.3.2 Log into the control Interface

1. Select **"User"**, Log into the control interface on touch screen with password.
2. User can get the password from the authorized person/ party / agency/ etc.

The login password 123456789 can obtain administrator authority.

8.3.3 Select Control Mode

Main menu structure can be different in different **"Ctrl Mode"**.

Configuring the control mode

1. Select **"User"**, Log into the control interface on touch screen with password.
2. Select **"Ctrl Mode"** > **"Manual Operate"**

Then the **"Settings"** is visible.

8.3.4 General Settings

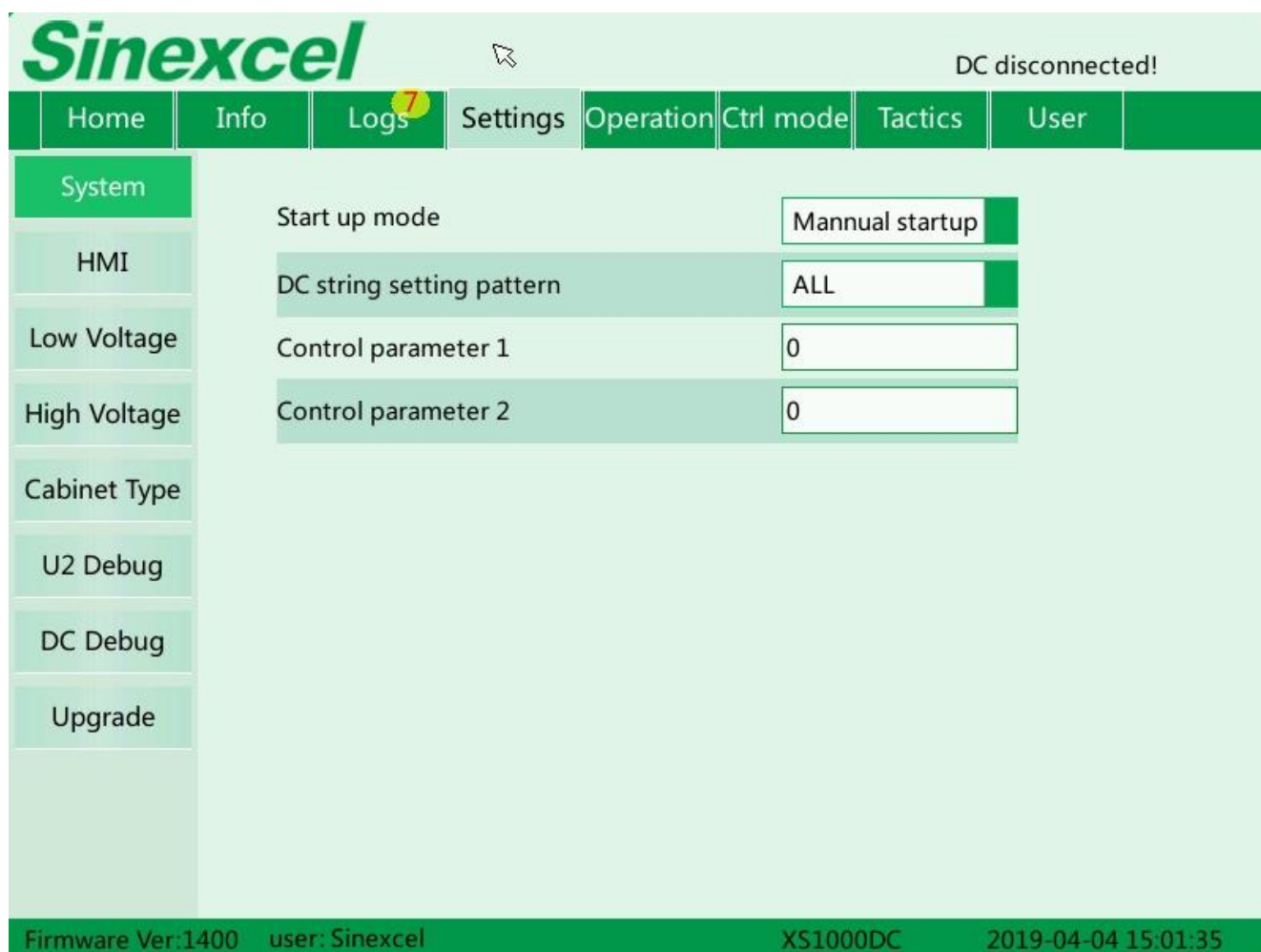


Fig. 8-5 Setting Interface Sample

There are General Setting and Advanced Setting, the commonly used setting is in the **"General"**. Users should set the **"DC Configuration"** according to the voltage and current requirement of BMS. The detailed advanced setting can be seen in **Appendix1 12.4 Parameter Setting**.

8.3.5 Communication setting

Procedure:

If you do not see the settings options, do the following first:

1. Select **"User"**> Input password> **"OK"**>**"Login"**.
2. Select **"Ctrl mode"**> **"Manual Operate"**.
3. Select **"Setting"**> **"Advanced"**, **IP addresses, gateways, subnet masks, Porter rates,**

etc. can be set as needed;

4.If there are multiple devices on the scene, different modbus device addresses need to be set up in order to distinguish;

8.4 Manual Startup Procedure

Check before startup:

1. Select "User", Log into the control interface on touch screen with password.
2. Select "Ctrl Mode" > "Manual Operate"
3. Select "setting" >"System",
4. Select "Operation" >"System Startup"

The detailed menu explanation can be seen in Appendix1 12.7 Manual Startup.

8.5 Automatic Startup Procedure

1. Select "**User**", Log into the control interface on touch screen with password.
2. Select "**Ctrl Mode**" > "**Automatic Operate**"

The detailed menu explanation can be seen in **Appendix1 12.8 Automatic startup.**

8.6 Remote Startup Procedure

1. Select "**User**", Log into the control interface on touch screen with password.
2. Select "**Ctrl Mode**" > "**Remote Control**"
3. Then with other control equipment to start the DC-DC converter remotely.

The detailed menu explanation can be seen in **Appendix1 12.9 Remote startup.**

8.7 Shutdown Procedure

During normal operation of DC-DC Converter, the following steps can be conducted if shutdown is required.

1. The DC-DC Converter is working in remote control mode and then with other control equipment to stop the DC-DC Converter remotely.

Manual shutdown procedure

1. "**Ctrl Mode**" > "**Manual Operate**";
2. **Select "Operation" >"System Stop"** to manually stop the DC-DC Converter.

The detailed menu explanation can be seen in **Appendix1 12.10 Shutdown procedure.**

8.8 System Power Off

When DC-DC converter is in "Stop" mode, can cut off the DC power and power off the system

- 1): Manually or remote control the system stop.
- 2): Disconnect the PV switch.
- 3): Disconnect the Battery DC switch.

The detailed menu explanation can be seen in **Appendix1 12.11 System Power Off**

8.9 Emergency shutdown

When the DC-DC Converter system is abnormal, press the emergency shutdown button "EPO" on the rack door and the DC-DC Converter will instantly stop running.



WARNING

To prevent personal injury, please use a multi-meter to measure the voltage at input terminal if case maintenance or opening is conducted. After ensuring that there is no mains supply, relevant operation can be conducted!

After about 15 minutes, the upper cover plate can be opened after DC BUS bar capacitance fully discharges (refer to warning label on module case surface).

9 Troubleshooting

9.1 Safety during Troubleshooting



DANGER

Danger of electric shock due to high voltage on the product

There may be high voltages on the product under fault conditions. Touching real-time components can lead to danger or death

Serious injury due to electric shock.

Observe all safety information when operating the product.

Wear appropriate personal protective equipment for all work on the product.

If you are unable to resolve the interference with this document, please contact the manufacture.

9.2 Export fault record

Insert a USB flash disk into the USB port in the back of the touch screen.

When need to send the logs to the manufacture to analyze.

1. Select **"User"**, Log into the control interface on touch screen with password.
2. Select **"Ctrl Mode"** > **"Manual Operate"**
3. Select **"logs"** > **"Export Logs"**>**"Download All Logs"**

9.3 Faults caused by improper parameter settings

Table below shows the faults that caused by improper parameter setting.

User could reset the parameter under the instruction in Appendix and then the faults can be automatically solved.



NOTICE

Alarm classification:

Fault: shutdown.

Warning: alarm but not shut down;

Alarm Clearance method:

Auto: After the cause of the alarm disappears, the alarm is automatically cleared.

Manual: After the cause of the alarm disappears, you need to manually send an alarm clear command.

Power Off: After the causes of the alarm disappear, you need to power off and restart.

Alarm Classification + Clearance Method (**abbreviate to A.C. + C.M.**):

Fault + Auto

Fault + Manual

Fault + Power Off

Warning + Auto

Warning + Power Off

Failure Name	A.C.+C.M.	Reason
DC input over voltage	Fault + Auto	PCS DC voltage is higher than the upper voltage limit
DC input under voltage	Fault + Auto	PCS DC voltage is lower than the lower voltage limit or DC voltage is not connected
DC bus over voltage	Fault + Auto	The voltage on the DC bus capacitor is too high during module working
DC bus under voltage	Fault + Auto	The voltage on the DC bus capacitor is too low during module operation
Battery under energy	Fault + Auto	1. The BMS is emptied when in off-grid state; 2. The DC voltage is lower than the discharge termination voltage of <DC parameter> in the off-grid state;
Parameter mismatch	Fault + Auto	1. The parameter setting of <DC parameter> is unreasonable; 2. When the system is running in the off-grid condition, the number of AC modules running is more than the number of DC modules running.

Table 9-1 Faults caused by improper parameter setting

9.4 Detailed Troubleshooting

The detailed troubleshooting can be got from the manufacture or retailer.

10 Maintenance

10.1 Safety during Maintenance



DANGER

There is a high voltage in the live components of the product. Touching field components can result in death or seriousness electric shock damage.

Wear appropriate personal protective equipment for all work on the product.

Do not touch any live components.

Observe all warning messages in products and documents.

Obey all safety information from the battery manufacturer.

Always disconnect the following devices from the outside before performing any work:

- grid voltage fed by the grid
- internal power supply
- DC voltage of the battery
- additional external voltage, such as control signal from the control room

Make sure that the disconnected device cannot be reconnected.

After turning off the converter, wait at least 15 minutes before turning it on to discharge the capacitor complete.

Before operating the drive, make sure that all devices are completely voltage free.

Cover or isolate any adjacent live components.



NOTICE

Property damage due to dust intrusion and moisture infiltration

Ingress of dust or moisture can damage the product and affect its function.

Perform maintenance work only when the environment is dry and free of dust.

The product is only allowed to wiring or assembly and disassembly operate when the product is turned off.

Connect the external power supply after finish installing the product.

If the installation or commissioning process is interrupted, install all dam panels, close and lock the rack.

The product must always be closed for storage.

Store the product in a dry, covered area.

10.2 Maintenance Schedule and Consumables

10.2.1 Operation environment requirements

Device operation environment must comply with the operation environment required for the device:

Allowable environment temperature: -20~55°C (power de-rating for 45 °C above)

Allowable relative humidity: 0~95% (non-condensing)

Allowable maximum elevation: 3,000m

Note: When exceeding the maximum elevation, the PCS will have de-rating output.

Please consult customer service center for specific de-rating coefficient.

10.2.2 Electrical and fixed connection inspection

After being put into operation, conduct regular inspection on device's electrical and fixed part connection. Such inspection is advisably conducted every three months. Record for each inspection should be made.

- Rack grounding connection;

- Module grounding connection;

- Electrical connection for DC input;

- Electrical connection for AC input;

- Electrical connection for auxiliary power supply;

- Electrical connection for communication cables.

- AC/DC switch, SPD and fan.

- Access monitored fault information.

10.2.3 Clearing and cleaning

Before the device is put into operation, the dust and sundries in its cooper bars, terminals and mesh openings should be cleaned.

After the device is put into operation, the dust in machine room should be cleaned regularly. Check whether the ventilating and air exhaust facilities in machine room are normal. They are advisably cleaned once every three months.

10.3 Maintenance Work

Unfavorable environmental conditions shorten maintenance intervals

Location and environmental conditions can affect maintenance intervals. Pay attention to cleaning and corrosion protection

It may need to be more frequent, depending on the conditions at the installation site.

If the DC power distribution parts is affected by adverse environmental conditions, it is recommended to shorten maintenance interval.

Sinexcel recommends an optical inspection in regular periods to determine maintenance requirements

Consumables and maintenance materials

Only those consumables and maintenance materials are usually not included in standard equipment list.

Professionals or electrically qualified person listed standard tools and materials such as torque are taken for granted.

Wrench, single contact voltage tester are available for all maintenance operations.

Maintenance work under the voltage supply.

- See the information in HMI

- Read error messages and warnings

- Check DC Switchgear

Check the AC disconnect device

Check the fan

Maintenance under no voltage conditions

See the information in HMI

Performing a visual inspection

Cleaning the ventilation panels

Cleaning air ducts and ventilation ducts

Check internal

Check the bolt connection of the power cord.

Check label

Check latches, door stops and hinges.

Check the SPD (Surge Protecting Device)

11 [Contact](#)

If you have technical problems with our products, please contact the service hotline. Please provide the following information to help you with the necessary assistance:

- Equipment model
- serial number
- Battery Type and number
- Communication type
- Firmware version
- Error number and error message

Shenzhen Sinexcel Electric Co., Ltd.

Website: <http://sinexcel.us/> or www.sinexcel.com

Add: Building 6, Area 2, Baiwangxin High-tech Industrial Park, No. 1002, Songbai Road, Nanshan District, Shenzhen

Postcode: 518055

Hotline: +86 0755-8651-1588

Appendix 1 Settings on HMI (Touch Screen)

12.1 Touch Screen Startup

Operation control can be conducted via HMI (human-computer interface). This section introduces the HMI display content and settable parameters.

The **"Home"**, **"Info"**, **"Logs"**, **"User"** can always be seen before log-in with a password. The detailed menu structure can be seen as below.

12.1.1 Main Menu Structure before log-in

All these information bellow can be visible after the system booting and touch screen can be normally display.

"Home", **"Info"**, **"Logs"**, **"User"** menu can be seen in the main menu structure before login.

12.1.1.1 Home

After initializing, the home page is shown. On the main wiring diagram of system topology, system DC voltage and current, general system status can be seen.

1. Log into the DC-DC converter user interface
2. Select **"Home"**

12.1.1.2 Information

1. Log into the DC-DC converter user interface.。
2. Select **"Home"** > **"Info"**

In the Info pages, users can get the overview of the entire system operation parameters.

The branch menu **"DC Info"**, **"Status"**, **"BMS"** can be seen under the menu **"Info"**

User can see the specific information under each menu

"DC Info" shown the status of DC BUS, battery is connected to the DC BUS.

"DC Voltage (V)" "DC Current (A)" "DC Power (kw)" "Status" "Warning" "Switch" "Bus Voltage (V)" can be seen under the **"DC Info"**.

"BMS" information is different according to different BMS supplier brands

12.1.1.3 Logs

In logs page, users can review current alarm, past alarm, operation record, status record of the system, and operation curves.

Logs					Explanation
Current	No.	Warning/Fault	Occurrence Time	Dismissed Time	
Past Alarm	No.	Warning/Fault	Occurrence Time	Dismissed Time	
Operation	No.	Designation	Time Stamp	Operation	
Status Logs	No.	Designation	Time	Status	
Export	Downloading Process: Downloading All Logs				Invisible before log-in

12.1.2 Log into the control Interface

1. Select **"User"**, Log into the control interface on touch screen with password.
2. User can get the password from the authorized person/ party / agency/ etc.

The login password 123456789 can obtain administrator authority.



NOTICE

Hierarchical password function, different password have different administration authority.
