

CPS CB10~20S 1500V Series
PV Smart Combiner Box
Installation and Operation Manual



SHANGHAI CHINT POWER SYSTEMS CO., LTD.

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Before You Start...



Thank you for choosing this PV Smart Combiner Box (simply called "Combiner Box" in the following of this manual) developed by SHANGHAI CHINT POWER SYSTEMS Co., Ltd.

This Combiner Box is a highly reliable product, and is widely applicable in DC combining of various kinds of PV systems.

This manual mainly includes product description, installation, safe operation, troubleshooting and other important information of the Combiner Box. Please carefully read this manual before you operate on the Combiner Box.

The main contents includes:

➤ Safety instructions

Introduce the safety instructions of operation and maintenance on the Combiner Box.

➤ Overview

Introduce the mechanical structure, schematic diagram, etc. of the Combiner Box.

➤ Installation

Introduce the installation, wiring steps and safety instructions of the Combiner Box.

➤ Operation and Maintenance

Introduce how to configure the MCU

➤ Technical Data

Introduce the technical data of Combiner Box.

➤ Quality Assurance

Introduce the quality assurance clauses and contact information.

If you encounter any problems during installation or operation of this unit, first check the user manual before contacting your local dealer or supplier. This user manual will help you solve most difficulties of use, installation and operation.

Target Person:

This manual is applicable to the work staff of wiring, installation, maintenance and daily management of the Combiner Box.

Manual Management:

Please keep this user manual with other related documents, and make sure it is on hand for quick reference.

SHANGHAI CHINT POWER SYSTEMS Co., Ltd. reserves the right of words, pictures and LOGOs, etc. in this manual. Any other party is not allowed to copy any part of the manual without written permission.






The manual is subject to changes and corrections because of the updates of the product. The actual purchased product shall prevail. Users can get the latest manual from our sales channel or our official website:

www.chintpower.com.



Chapter 1 Important safety instructions

Please read this user manual carefully before undertaking the installation. The manufacturer reserves the right to refuse warranty claims for equipment damage if the user fails to install the equipment as per the instructions in this manual.

Warnings and symbols in this document:

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

Markings on the product :

	HIGH VOLTAGE: The product works with high voltages. All work on the product must only be performed as described in this document.
	EARTH GROUND: This symbol marks the location of grounding terminal, which must be securely connected to the earth through the PE (protective earth) cable to ensure operational safety.

**DANGER:**

1. Touching the wiring terminals inside the device may result in death of electric shock!
2. Don't touch the terminals or conducts connected with PV modules or PV inverters, which may result in death of electric shock!

**WARNING:**

1. All the installation and wiring connections should be performed only by qualified technical personnel.
2. Please ensure the DC and AC sources are both disconnected, and the shell of device is securely grounded to avoid electric shock during maintenance or installation of the device.
3. Please do not touch the live parts of the input and output sides to avoid electric shock when checking or maintaining the device.

**CAUTION:**

1. Take caution to move the combiner box in case of falling due to the weight of the device!
 2. Check the device and make sure there is no problem with the installation before putting it into operation!
 3. Connect the wires to the labeled positive and negative positions of the device to avoid short circuit hazard, ensure personal safety and keep the device in normal operation.
 4. Although the Combiner box is certified to international safety
-

standards, it will become hot during operation. Do not touch the hot parts of the device during operation.



NOTICE:

1. Be aware of all the wiring and safety instructions of the combiner box.
 2. All the wiring and operation must conform to the related local standard requirements of the device.
 3. Although the device is of IP65 protection class and can be applied in outdoors, do not install the device in places where are humid or under direct sunlight because it is also an electronic device.
-



INSTRUCTION:

The product nameplate contains important information of the device, including model name, serial number and detailed parameters, etc. If there is any problem or malfunction of the device during operation, customers can contact our after-sales service center and inform the product serial number. Our service personnel can provide timely service for you. Please keep the nameplate intact.

Chapter 2 Overview

2.1 Grid-tied PV system

The Grid-tied PV system is generally made up of PV modules, DC combiner box, DC distribution cabinet, PV inverter and AC distribution cabinet, etc. PV modules convert the solar energy to DC power and distribute to DC combiner box as the first level of current combination, then connected to DC distribution cabinet for second level of current combination. PV inverter converts the DC to the AC with the same frequency and phase with the grid. All or part of the AC power is supplied to local loads, and the surplus power is fed to the grid through AC distribution cabinet.

Figure 2-1 illustrates the position and function of the DC Combiner Box in the Grid-tied PV system:

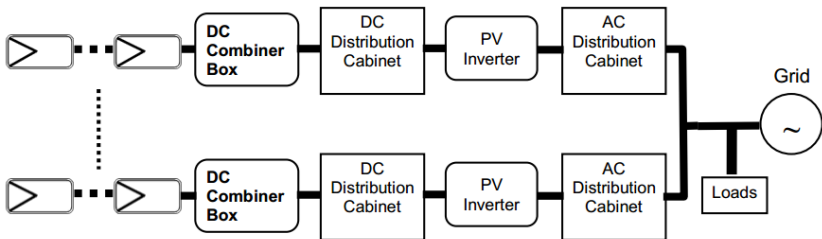


Figure 2-1 Grid-tied PV system

2.2 Overview of PV Smart Combiner Box

CPS CB10~20S 1500V series PV Smart Combiner Box is a safe, compact, aesthetic and practical grid-tied PV system product for customers according to the related national electric and industrial design standard of PV combiner box.

In medium and large scale of PV systems, PV Combiner Box is installed between PV modules and inverter as the DC combination device because of

the great number of PV strings. The PV Combiner Box converge the current of certain PV strings through fuses, and then distribute it to the inverter through SPD and DC breakers.

CPS CB10~20S 1500V series PV Smart Combiner Box developed by SHANGHAI CHINT POWER SYSTEMS Co., Ltd. is suitable for various kinds of PV combination applications, and works together with our PV inverter, DC/AC distribution cabinets to make up a complete PV system. The Combiner Box converge the current from PV arrays to greatly reduce the cable length between PV arrays and inverter and save the system cost to a great extent. The PV Smart Combiner Box equipped with monitoring functions can measure the parameters of input current of each string and total DC output voltage and realize the real time monitoring and data record of PV strings. It is convenient for service personnel to shoot troubles and maintain devices in time, raising the reliability of the operation of the whole PV system.

Features of PV Smart Combiner Box:

(1) High Reliability

- ✓ PV specialized DC breaker, high voltage and large current breaking capacity;
- ✓ PV specialized DC SPD to keep PV devices safe from lightning hazard;
PV power supply: only one string of PV module is enough to provide the power for monitoring module to work normally.

(2) Strong Protective functions

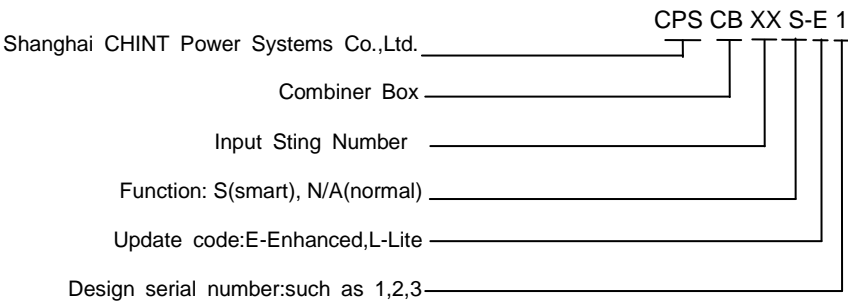
- ✓ String current measurement
- ✓ Voltage of combined current measurement
- ✓ Internal working temperature measurement
- ✓ Over current alarm of PV strings
- ✓ Open circuit alarm of PV strings
- ✓ Upload data of Breaker connect or not

- ✓ SPD fault alarm
- ✓ Display parameter through LCD

(3) Flexible configuration

- ✓ 2A~15A fuse, subject to capacity;
- ✓ 10 ~ 20 input strings;
- ✓ Convenient communication function:RS485 port, support MODBUS-RTU protocol, upload data to monitoring device via RS485;
- ✓ Convenient installation and maintenance, long service life.

2.3 Naming convention



Remark: CPS CB10~20S 1500V Combiner Box support 10 ~ 20 input strings

2.4 Label identification

The identification label of Combiner Box is stuck on the left side of the shell, as shown in Figure 2-2:

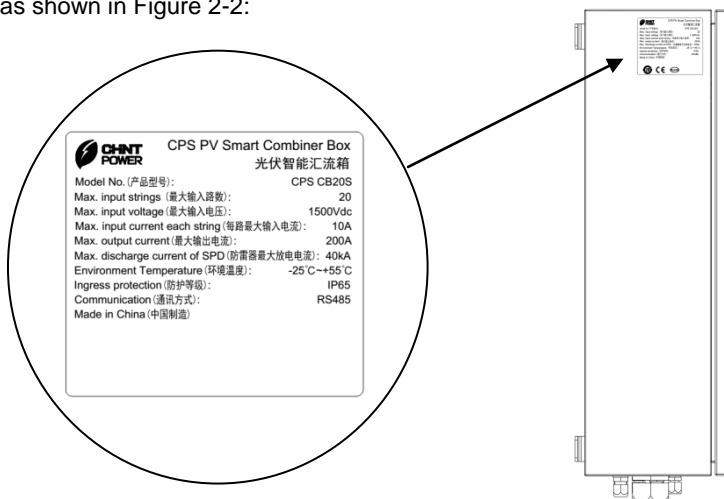


Figure 2-2 Location of identification label

The label of Model No. and S/N is located at the right lower corner of the bottom, as shown in Figure 2-3:

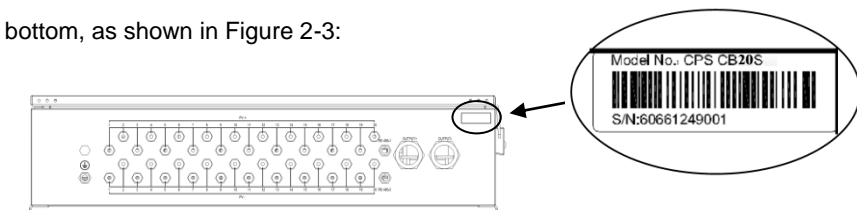


Figure 2-3 Location of SN label



INSTRUCTION:

The product nameplate contains important information of the device, including model name, serial number and detailed parameters, etc. If there is any problem or malfunction of the device during operation, customers can contact our after-sales service center and inform the product serial number. Our service personnel can provide timely service for you. Please keep the nameplate intact.

2.5 Electrical schematic diagram

The main electrical schematic diagram is shown in Figure 2-4. The DC from PV modules is input to the Combiner Box through fuses, measuring and monitoring unit, SPD and output breaker. The DC breaker can meet the need of 1500V DC input.

The SPD and DC breaker operation status and alarm can be collected and processed via the smart monitoring module.

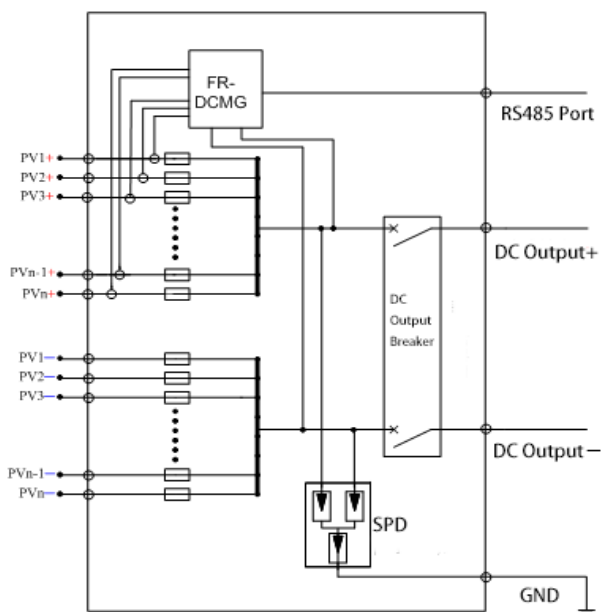


Figure 2-4 Schematic diagram of Combiner Box

2.6 Product appearance and structure

Appearance of Combiner Box is shown in Figure 2-5:



Figure 2-5 CPS CB20S Appearance of Combiner Box

➤ Internal structure of Combiner Box :

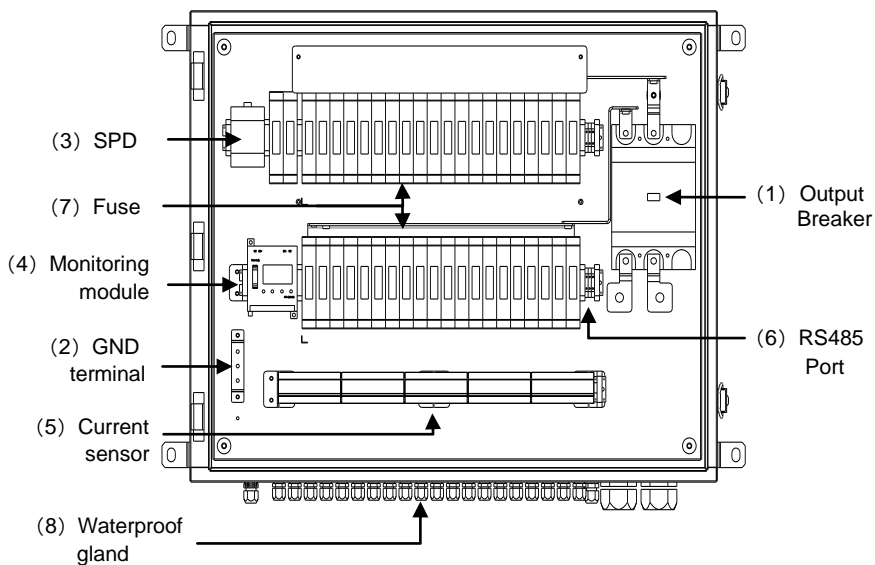


Figure 2-6 CPS CB20S Internal structure of Combiner Box

- (1) Output Breaker: protect PV module, cable and other device in case of over current or short circuit;
- (2) GND terminal: Ground connection;
- (3) SPD: protect PV module, cable and other device in case of lightning and over voltage;
- (4) Monitoring module: Display the current, voltage, set communication address and so on;
- (5) Current Sensor: measure the current of PV strings via embedded CT;
- (6) RS485 communication terminals: RS485 connection;
- (7) Fuse: including fuse socket and fuse, direct connection with PV strings;
- (8) Waterproof gland: wiring through the waterproof gland to ensure of the protection degree. (Optional for PV string input:PV connector) .

2.7 Description of measuring and control unit

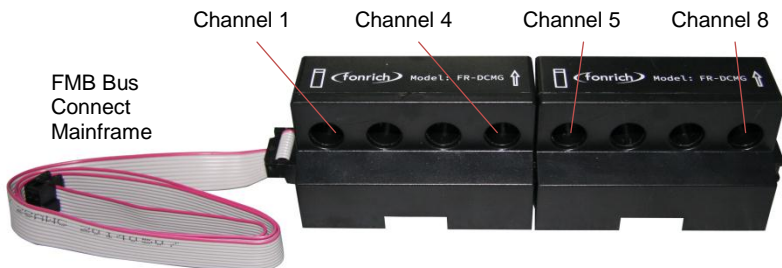
The monitoring module (FR-DCMG) can collect the operation data and monitor the status of PV combiner box.

The main function of monitoring module is to measure the current of each PV string and the main current voltage, detect the operation status of circuit and give fault alarms. The monitoring module supports Modbus-RTU communication protocol and can be remotely controlled, enabling the PV combiner box to become a smart device available with remote communication, remote measuring, remote adjusting and remote control.

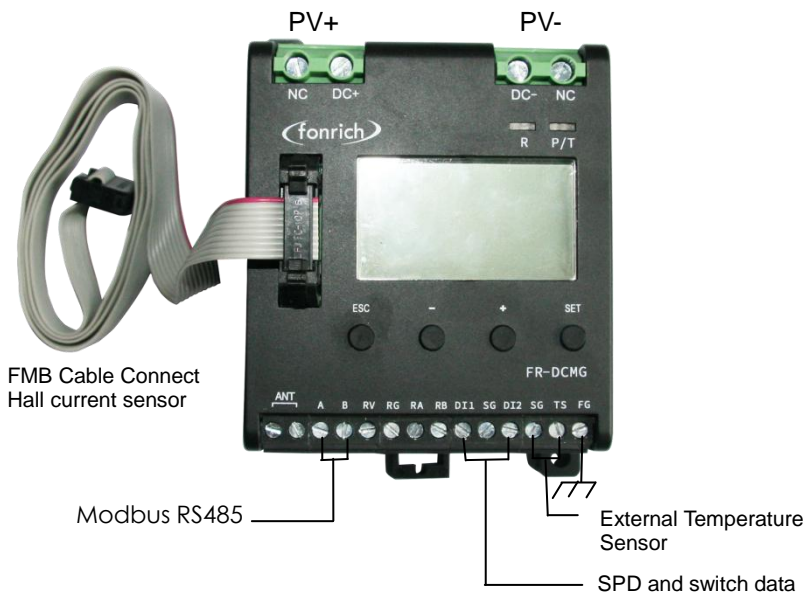
Monitoring module can monitor the current and voltage of PV strings. It can also give fault alarms to PV string over/under-voltage, reverse connection, over/under-current, fuse failure (open-circuit of PV string), breaker tripping and SPD failure. The collected data by module can be uploaded to monitoring device via RS485 for data analysis.

Description of monitoring module and connection

Hall Current Sensor FR-DCMG-HS4C through cascade system, supports monitor 4~24 channel. Specific instructions and connections at the diagram (case 8 channel).



Monitor module supports Modbus transmission mode and a wireless communication network transmission mode (For this transfer mode, need special instructions when ordering).



2.8 Description of mode setting and display function



The R and P/T light are LED light, the P/T light will be bright to show that the device is working. The light R and P/T will twinkle to indicate that the communication is normal.

Keys Operation

FR-DCMG has four key buttons: "ESC", "-", "+", "SET". The key "ESC" is used to return to the default interface or cancel the setting of parameters. The key "SET" is used to enter the parameter setting interface, choose the parameter that to be configured, or confirm the setting. The keys "+" and "-" is used to scroll the screen, or adjust the value of the parameters.

FR-DCMG supports multiple operation interfaces: the histogram display of the detected current, digital display of the detected current and generated energy, parameters' setting interface, and the wireless node state interface in the FWB GATEWAY mode. The plentiful interfaces make it convenient to operate the device. Here is the description of every mode and the interface in the below.

Description of mode selection and display

First time power on, the P/T light means the equipment work well, LCD display

LOGO for 5 seconds, then go to corresponding mode. Press the key "ESC" and "SET" in the same time could enter into the mode selecting interface, as show below:



"*" is the selecting cursor that can be moved by pressing "+" and "-" keys
FWB NODE: Wireless client mode. In this mode the data will transmit to gateway through the router.

FWB GATEWAY: Wireless gateway mode. In this mode, gateway device manage its own network, include data collecting, routing, and data uploading through RS485. Beside, gateway could check local current and voltage.

MODBUS NODE: MODBUS slave mode, PC could set up parameter through RS485 and receive the data from the device.

CLEAR ALL: When the cursor stop here and press "SET", the history data of generating energy will be cleared.

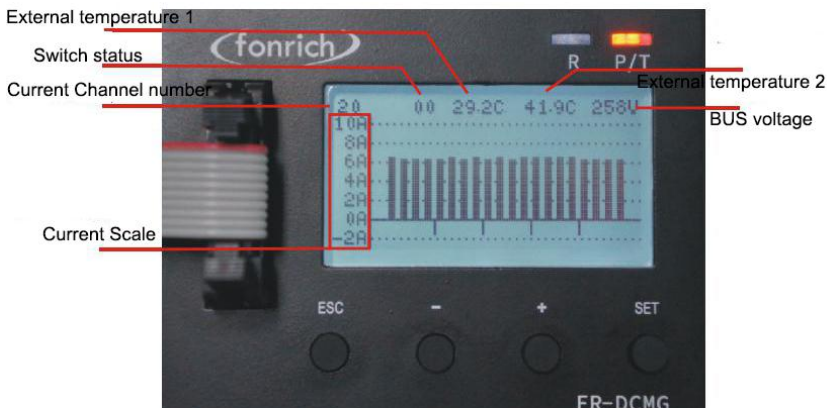
MODBUS mode

After the first time power on, the system default mode is MODBUS mode.

When the communication was established with PC through RS485, LED R and P/T will flash alternately, which means communication function normally.

Interface of histogram display

The histogram interface will come up after logo. Histogram interface is the default interface of MODBUS mode, it shown like below:



Current channel number: String number;

Switch status: First bit is status of SPD (0—normal, 1—fault); second bit is status of breaker (0—open, 1—close);

External temperature 1: The temperature of the Combiner Box (2# usually not to using);

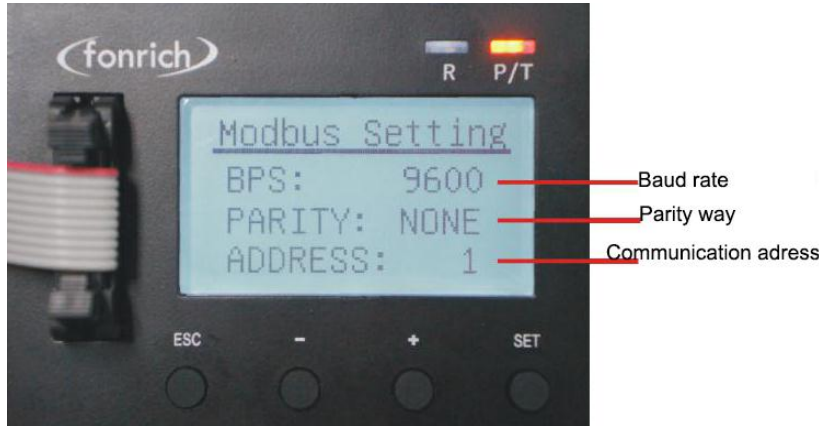
BUS voltage: The value of BUS voltage.

The histogram shows the current value of every channel, the current value ranges from -2A to 10A. For the hall sensors are four channel sensors, so in the histogram every four channels will be indicated from another four channels which means that from left to right is channels 1-4, channels 5-8, channels 9-12 and so on. If no operation in 15 seconds, the brightness of the LCD will decrease.

Description of setting parameter

When the key "SET" is pressed in the histogram interface the device will enter

MODBUS parameter setting interface, the device can communicate through RS485 in the other two mode also but the MODBUS related parameter should be set in the MODBUS mode. Modbus setting interface comes up as below:



BPS : MODBUS communication baud rare, the selectable rate are 2400, 4800, 9600(default), 19200, 38400.

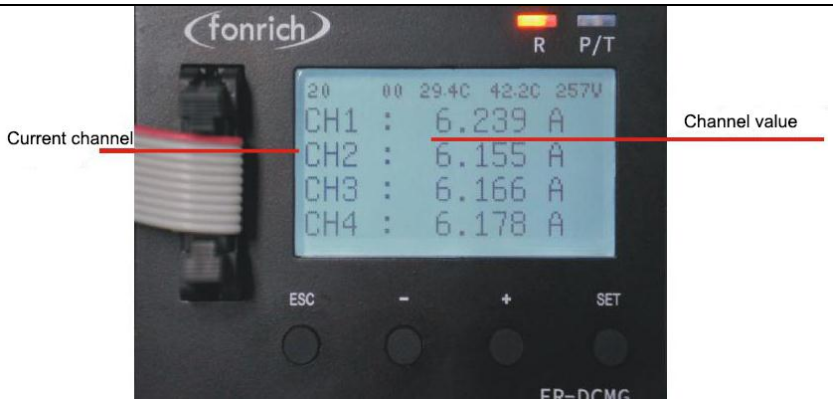
PARITY: MODBUS parity way, could be select (NONE), (ODD), (EVEN), default is NONE.

ADDRESS: The address of the MODBUS, Ranges from 1 to 247(default 1).

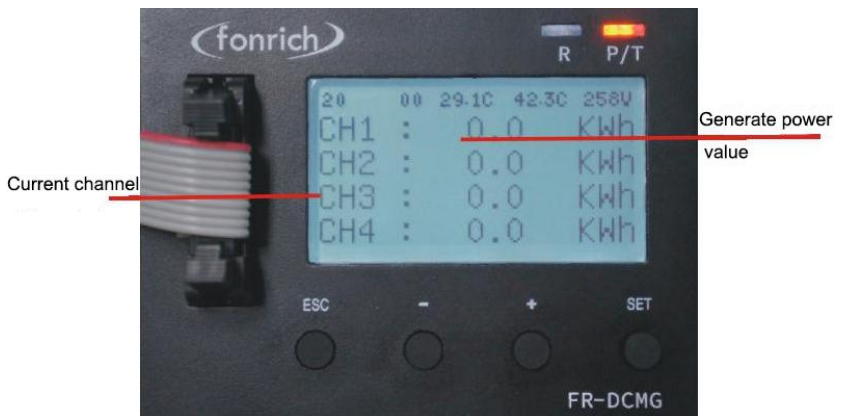
Description of digital display

When the key "+" or "-" is pressed in the histogram interface to enter the digital display interface which show the current value of every strings and total generating power. Press "+" to show current value, and press "-" to show generated energy value. Then go on pressing the "+" or "-" key will scroll the screen to show current or generated energy value of other channels.

Current display:



Total generated energy display :



2.9 Introduction of main electrical components

2.9.1 Surge Protective Device (SPD)

Surge protective device is a component that restricts the voltage. Its impedance becomes high when there is no over current in the system, but becomes low quickly when over current occurs and restrict the output voltage within regulated range to protect the after end devices.

The SPD is mainly made up of protective module and socket. The protective module and socket are exclusively independent, and adopt the plug and play structure.

2.9.2 DC circuit breaker

CPS CBXXS 1500V Combiner Box adopts the PV specialized DC circuit breaker to raise the Max. DC input voltage to 1500V.

2.9.3 PV Fuse

CPS CBXXS 1500V Combiner Box adopts the PV specialized PV FUSE to raise the Max. DC input voltage to 1500V.

3.1 Checklist

Check the product whether there is any obvious damage or the items in the package are complete before installation. Contact your supplier if any problem is found.

The package includes the following items:

- (1) One Combiner Box
- (2) One copy of installation and operation manual (1 manual per tray)
- (3) One copy of packing checklist
- (4) One copy of service warranty card & Certificate of quality
- (5) Two Combiner Box keys

3.2 Basic installation requirements

**WARNING:**

All the installation and wiring connections should be performed only by qualified technical personnel.

**NOTICE:**

Although the device is of IP65 protection class and can be applied in outdoors, do not install the device in places where are humid or under direct sunlight because it is also an electronic device.

**CAUTION:**

Heavy device, move with caution in case of falling!

The dimensions (WxDxH) of the CPS CB10S,CPS CB12S,CPS CB14S,CPS CB16S-E1 PV combiner box are 700mmx600mmx200mm. The weight is about 35 kilograms.

The dimensions (WxDxH) of the CPS CB16S,CPS CB18S,CPS CB20S PV combiner box are 850mmx650mmx200mm. The weight is about 38 kilograms.

Installation method:

- ✓ Install the device vertically on the mounting bracket of PV arrays
- ✓ Mount or install the device on the wall or steel support

➤ Dimensional sketch of the PV combiner box is shown below:

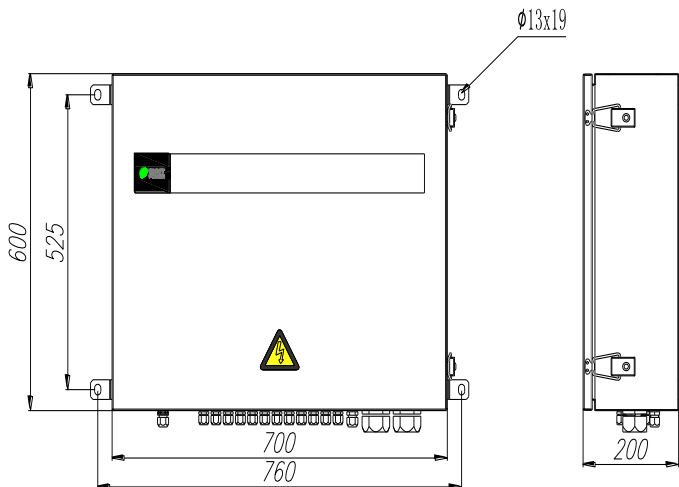


Figure 3-1a Dimensions of the CPS CB10S,CPS CB12S,CPS CB14S,CPS CB16S-E1 PV combiner box

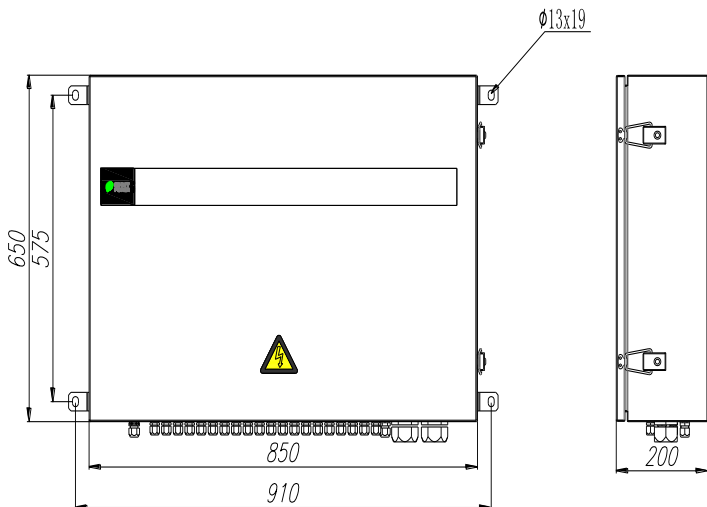


Figure 3-1b Dimensions of the CPS CB16S,CPS CB18S,CPS CB20S PV combiner box

3.3 Open and lock the box

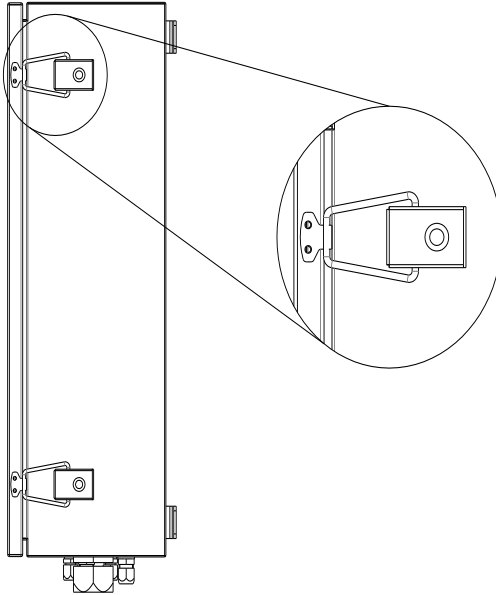


Figure 3-2 Diagram of the locks on the box

The keys are provided to open and close the combiner box in the product package. You can find the lock on the right side of box enclosure, plug the key in the lock hole.,turn it to open or close the box. Please beware that the box is opened and closed when both of the locks are unlocked or locked.



NOTICE:

Turn the keys to make sure the door is locked in case of water leaking in the combiner box.

3.4 Recommended cables and torque value

Select the appropriate cables as follows:

Terminals	Cable (20 strings)
DC input +	Copper:Φ 4/6mm ²
DC input -	Copper:Φ 4/6mm ²
DC output +	Copper:Φ 70/95mm ² Aluminium:Φ 185/240mm ²
DC output -	Copper:Φ 70/95mm ² Aluminium:Φ 185/240mm ²
GND	Copper:Φ 16mm ²

Select the torque value as follows:

Screw size	Use description	Torque value
M12X30	Box fixed installation use	500±50 kgf.cm
M12X30	Output DC cable fixing use	350±35 kgf.cm
M5	Input PV cable fixing use	25±2.5 kgf.cm
M5X12	Grounding cabel fixing use	25±2.5 kgf.cm
M3	Communication cable fixing use	7±1 kgf.cm

Precautions of wiring:

1. Connect the cables strictly according to the instructions in the manual and labels on the box.
2. Connect the negative cables to the negative terminals and the positive cables to the positive ones. Make sure the polarity of connection is correct.

3.5 Electrical connection

**WARNING:**

Please check all the input and output cable terminals in case of high DC voltage and make sure there's no voltage before electrical connection to avoid electric shock!

**CAUTION:**

Connect the wires to the labeled positive and negative positions of the device to avoid short circuit hazard, ensure personal safety and keep the device in normal operation.

3.5.1 Connection terminals layout

The wiring terminals are shown below:

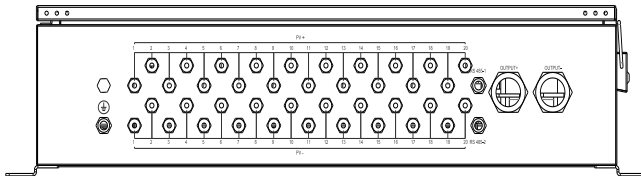
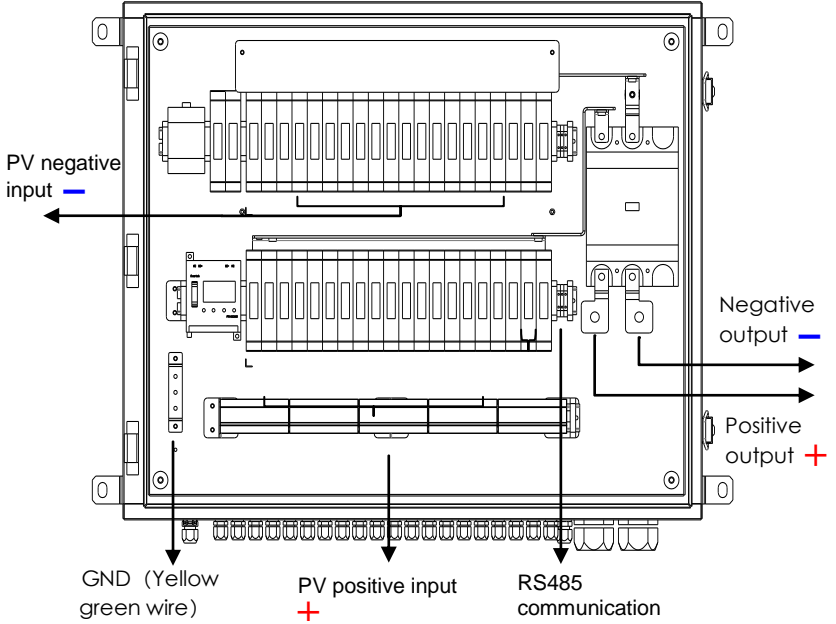


Figure 3-3 CPS CB20S wiring terminals

3.5.2 Cable connection

**CAUTION:**

Connect the wires to the labeled positive and negative positions of the device to avoid short circuit hazard, ensure personal safety and keep the device in normal operation.

The input terminals are located at the bottom of the combiner box. Loosen off the waterproof glands before cable connection, connect the cables to the fuse sockets, tighten the screws, fix the cables and then tighten up the waterproof glands. (For PV connector type input cable connection, just need to plug the female and male PV connector of cable terminal to female and male PV connector of panel terminal.)

The DC output wiring terminals are located at the DC breakers on the right side inside the combiner box. Connect the cables to the "+" and "-" labeled terminals, tighten the screws, fix the cables and tighten up the waterproof glands.

Connect the grounding cable (box shell or leading wire) to the GND terminal in the combiner box. Make the cable as short and straight as possible.

3.5.3 Communication connection

The terminals on the right side of the combiner box are used for RS485 communication. Shield twisted pair (STP) cables are commonly used as communication cables, the length of which should not exceed 1500 meters.

One single combiner box can be directly connected to the RS485 bus cable via RS485 A1, B1 and GND connection. For multi-party communication scenario of combiner boxes, the communication cables should be connected in cascade and then to the monitoring system via RS485 bus cable via RS485 A1, B1 and GND connect.

Chapter 4 Operation and Maintenance



CAUTION:

Check the device and make sure there is no problem with the installation before putting it into operation!

4.1 Function configuration

4.1.1 Working conditions of smart module

When the PV Bus voltage reaches 200V or above (PV power taking), the power module begins working. Then the monitoring module will get started to work, in local can get the operation data and status of the PV combiner box through LCD display. Background can read the operation data and status of the PV combiner box by software.

4.1.2 Configure the communication address and Baud rate

When the power module begins working, system go to MODBUS mode default, we can press "SET" to the interface of setting parameter over the LOGO display ,select BPS setting baud rate to 2400、4800、9600(default), ADDRESS: communication address range is 1~247.

4.2 Start up and Shut down

4.2.1 Start up



WARNING:

Disconnect the fuse attached with the dc power module when commissioning the DC cabinet and PV inverter or checking the equipment regularly.

1. Check and ensure that all circuit connections are tightened, and disconnect all the fuses.
2. Switch the multi-meter to DCV grade to measure the DC voltage and polarity of each PV input string, make sure the DC voltage is within the range of system requirement and the polarity matches the labeled mark

inside the combiner box.

3. Connect the positive and negative fuses of the first PV string, and check whether the voltage is normal and the polarity is correct.
 4. If DC voltage is higher than 200V, the P/T indicator will light up.
 5. Connect the rest of fuses.
 6. Turn on the DC breakers.
 7. Check and make sure the DC output voltage is normal and the polarity is correct.
-



INSTRUCTION:

1. Disconnect and check the corresponding fuses if there is any abnormality.
 2. Through software recheck the current parameters of each PV string after the combiner box is in normal operation.
-

4.2.2 Shut down

1. Disconnect DC output breakers.
2. Disconnect fuses of each PV string.

4.3 Maintenance



WARNING:

Please do not touch the live parts of the input and output sides to avoid electric shock when checking or maintaining the device.

Regular maintenance inspection:

- ✓ Cleaning
- ✓ Tighten the cables and check whether the GND cable is damaged.
Repair or replace the cables if necessary.
- ✓ Check whether the SPD is in normal condition.
- ✓ Check the status of breakers
- ✓ Check the status of fuses
- ✓ Check whether the display panel is normal.

To keep the device working normally in a long time, it is necessary to check its working status regularly. Please contact the dealer or manufacturer if any problem is found. The components in the combiner box are specially designed and made for PV application, so they cannot be mixed in use with other normal components. If the spare parts and products need to be replaced, please contact your dealer or manufacturer. It is recommended for customers to implement device management regulations and arrange specialist to keep the device in normal and safe operation.

4.4 Fault analysis and troubleshooting

Faults	Possible causes	Recommended Solutions	Remarks
Output power derating(PV string open circuit)	1. Fuses of PV string are damaged. 2.PV module string circuit is in open circuit.	1. Replace the damaged fuses. 2. Check PV modules and cable connections.	Pay attention to the rated current of fuse.
SPD ineffective alarm	SPD is damaged.	Replace SPD	The indicator showing red means the SPD is ineffective.
No DC output (DC breaker trip alarm)	1. DC breaker trips. 2. Cable connection fault	1. Check whether DC breaker is turned on or tripped. 2. Check the cable connection and reconnect the Combiner box if no fault is discovered.	
Fuse socket is loose	Socket will be loosened if fuse is plugged in and out many times.	Repair or replace fuse socket to ensure the contact is well	
Background alarm	Combiner Box cable or equipment fault	View the prompt through the software. Such as: whether SPD damaged.	

Chapter 5 Technical Data

PV Combiner Box Parameters	
Model Name	CPS CB10S,CPS CB12S,CPS CB14S,CPS CB16S-E1,CPS CB16S,CPS CB18S,CPS CB20S
Rated DC Voltage	DC1500V
Input Strings	10 ~ 20
Max. Input Current	DC 10A/String
Max. Current	DC 20 x 10A
Protection Degree	IP65
Mounting Method	Wall mounting
Operating Temperature	- 25°C ~ + 55°C
Operating Altitude	4000m
Operating Humidity	0~95%, non-condensing
Weight	10~16inputs(E1):35kg; 16~20inputs:38kg
Dimensions (WxHxD)	10~16inputs(E1):700mm×600mm×200mm 16~20inputs:850mm×650mm×200mm
SUP Monitoring Module Parameters	
Monitoring item	Analog quantity: PV input current, DC BUS voltage; Switching quantity: DC breaker position signal, DC breaker tripping signal, SPD failure signal
PV input current measuring range and accuracy	Measuring range: -2A ~ 10A; Accuracy: ±0.1A
PV BUS Voltage Range and Accuracy	Measuring range: 300 ~ 1500V; Accuracy: ±0.5%
Temperature of Combiner Box Range and Accuracy	Measuring range: - 40°C ~ + 120°C Accuracy: ±2°C
Warning item	Reverse current alarm, PV over/under voltage, over current alarm, PV string abnormal (under current) alarm, Fuse alarm (PV string open-circuit), SPD failure alarm

Chapter 6 Quality Assurance

6.1 Warranty

The warranty policy of this product is specified in a contract; otherwise the warranty period is 12 months (1 year).

6.2 Disclaimer

1. Damage caused during transportation;
2. The product has been used or stored in conditions beyond its electrical or environmental specifications;
3. Products using incorrect or inappropriate (including installation and operation);
4. Products or software changed without authorization;
5. Negligence of safety warning and relevant mandatory safety specifications on the product and in its related document;
6. Unexpected disaster or force majeure.

6.3 Quality clause (Warranty clause)

1. SHANGHAI CHINT POWER SYSTEM will repair or replace with new products with malfunctions during the warranty period;
2. The replaced non-conformance products should be returned to SHANGHAI CHINT POWER SYSTEM;
3. Reasonable time should be provided to SHANGHAI CHINT POWER SYSTEM for repair work.

Please do not hesitate to contact us if you have any questions regarding CPS CB10~20S 1500V PV Smart Combiner Box. We are glad to provide the best service for you.

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CPS CB10~20S 1500V Series PV Smart Combiner Box Installation and Operation Manual

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