



CPS PSA1.1MO Prefabricated Substation

User Manual



Shanghai Chint Power Systems Co., Ltd.

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Table of Contents

0	Preface	6
1	Safety Instructions	8
1.1	Explanation of safety symbols in the manual	8
1.2	Interpretation of product markings	9
1.3	General precautions.....	9
1.4	Ground fault protection	11
1.5	Live measurement	11
1.6	Use of measurement equipment	11
1.7	Complete power-off operation	11
1.8	Static electricity protection	12
1.9	Body warning sign protection	12
1.10	Safety warning sign setting.....	12
1.11	Daily operation and maintenance	13
1.12	Other precautions.....	13
2	Product Introduction.....	15
2.1	External introduction of the cabinet	15
2.1.1	Dimension and appearance	15
2.2	Division of container	16
2.3	LV room	16
2.3.1	Power distribution cabinet	17
2.3.2	Low voltage cabinet	18
2.4	HV room.....	20

2.4.1	The medium voltage cabinet	20
2.5	Transformer room.....	21
2.6	Bottom cable entry hole	23
2.7	Medium voltage cable entry hole	24
2.8	Model marking.....	24
3	Identify	25
3.1	Identifying CPS PSA1.1MO	25
3.2	Check the integrity of transportation	25
4	Lifting and Storage	26
4.1	Mode of transport	26
4.2	Lifting	27
4.3	Storage.....	30
5	Mechanical Installation	31
5.1	Check the accessory bags	31
5.2	Conditions of transportation	32
5.3	Lifting and transporting	33
5.3.1	Precautions for lifting.....	33
5.4	Building the foundation	34
5.4.1	Requirements of foundation site.....	34
5.4.2	Recommended foundation construction	34
5.5	Installation space requirements	36
5.6	Installation check	36
5.7	Fix CPS PSA1.1MO on the foundation.....	37

5.8	Install the sheet metal support.....	39
6	Electrical Connection	40
6.1	Five security principles	42
6.2	Check and test the connecting cables.....	42
6.3	Wiring schematic diagram	43
6.4	Electrical connection	44
6.4.1	Grounding	44
6.4.2	External communication box wiring	46
6.4.3	Low voltage wiring	47
6.4.4	High voltage wiring	51
6.4.5	Auxiliary power supply wiring.....	51
6.5	Checks after wiring	52
7	Power Transmission Operation	53
7.1	Inspection before power transmission	53
7.1.1	Low voltage cabinet inspection	53
7.1.2	Medium voltage ring network cabinet inspection	53
7.1.3	Transformer inspection	54
7.1.4	Low voltage cabinet	56
7.2	Attention before power-on.....	57
7.3	Power transmission steps	59
7.3.1	Power on steps	59
7.3.2	Power off steps	61
8	Troubleshooting	62

9	Routine Maintenance	64
9.1	Safety precautions.....	64
9.2	Maintenance	65
9.2.1	Overview.....	65
9.2.2	Maintenance period	65
9.3	Maintenance items	66
9.4	Transformer oil drain operation.....	70
9.5	Paint repair measures	71
9.6	Screen maintenance and replacement	74
10	Technical data	76
11	Quality Assurance	82
11.1	Liability exemption.....	82
11.2	Quality clause (warranty clause)	83

0 Preface



IMPORTANT!

This manual contains important information about product installation and safe operation. Please read it carefully before use.

Thank you for choosing Brazil 1100KVA Prefabricated Substation item (hereinafter referred to as "CPS PSA1.1MO" in this manual) produced by Chint Power Systems Co., Ltd. (hereinafter referred to as "Chint Power"). With innovative design and perfect quality control, the Prefabricated Substation item produced by Chint Power has high reliability. This manual mainly introduces the product characteristics, performance indicators, appearance and interfaces, operating instructions, installation and maintenance of the CPS PSA1.1MO.

This manual is applicable to the following personnel:

- Professional technicians for installation, operation and maintenance of the battery unit;
- Users of the battery unit.

Please read this manual carefully before transporting and installing this product.

This manual is applicable to personnel who transport, install and operate this product.

Readers should at least meet the following requirements:

- Should have certain expertise in electronics, electrical wiring and machinery, and be familiar with electrical and mechanical schematics diagrams.
- Be familiar with the composition and working principle of photovoltaic grid connected power generation system.
- Familiar with the composition and working principle of CPS PSA1.1MO and front and rear level equipment.
- Should have received professional training related to the installation and commissioning of electrical equipment.
- Should have the emergency response capability to the danger or emergency in the process of installation or commissioning.
- Should be familiar with the relevant standards and specifications of the country/region where the project is located, and must obtain the operation

certificate of the relevant standards and specifications of the country/region where the project is located.

- Should be familiar with what is described in this manual.

In case of any problems during installation or operation, please refer to this manual first, and the instructions in it can help you solve common problems. If the problem persists, you can contact the local dealer or representative.

Please keep this manual and other information in the product components together so that the relevant personnel can get it at any time.

- Medium voltage ring network cabinet manual
- MV transformer manual
- Other accompanying manuals

Chint Power reserves the right to modify and update this manual according to the actual situation in different periods.

1 Safety Instructions

Read this manual carefully before installing and operating the prefabricated substation item. If the equipment is not properly installed and used in accordance with the contents of this manual, resulting in damage to the equipment, Chint Power has the right to refuse warranty claims.

Please read this manual carefully before installation. If any damage to the equipment occurs as a result of installation and operation not in accordance with the instructions in this manual, we reserve the right to deny warranty!

1.1 Explanation of safety symbols in the manual

**DANGER!**

A high-level potential hazard that, if not avoided, will result in death or serious injury.

**WARNING!**

A moderate-level potential hazard that, if not avoided, may result in death or serious injury.

**CAUTION!**

A low-level potential hazard that, if not avoided, may result in moderate or mild injury.

**NOTE!**

A potential risk that, if not avoided, may result in the equipment not functioning properly or causing property damage.

**IMPORTANT!**

Additional information in the manual that highlights and supplements the content and may also provide tips or tricks to optimize the use of the product, which helps solve problems or save time.

1.2 Interpretation of product markings



Danger! Electric Shock!

There is a high voltage inside the machine body, so the instructions in the User Manual must be followed for operation of this product.



Protective Earth!

This marking is located at the protective earth (PE) terminal and shall be firmly earthed to ensure operator safety.

1.3 General precautions

Danger!

There is a danger of electric shock if you touch the power grid or the contacts, terminals, etc. connected to it inside the equipment!



- Do not touch terminals or conductors connected to the power grid circuit.
 - Pay attention to all instructions or safety instructions regarding connection to the power grid.
-

Lethally high voltage exists inside the product!



- Heed and follow warning signs on the product.
 - Observe the safety precautions listed in this manual and other documentation related to this equipment
-

Damaged equipment system failure can cause electric shock or fire



- Preliminary visual inspection of equipment for damage or other hazards before operation.
 - Check whether other external equipment circuit connections are safe.
 - Make sure the equipment is in a safe state before operation.
-

WARNING!



The installation and operation of the CPS PSA1.1MO must comply with the relevant standards and regulations of the country where the project is located.



Make sure that the installation environment (such as voltage, temperature, humidity, altitude, pollution level, water proof and dust proof level) is within

the allowable range.



Before operation, the locking device on the pressure relief valve must be removed. For details, refer to 6.1.3 Medium voltage transformer.



Mechanical installation, electrical connection, commissioning, maintenance and troubleshooting must be performed by professional technicians in accordance with local regulations. Before operation, the operator should read this manual completely and master the safety issues related to the operation.

Note!



- During transportation, transfer, installation, wiring and maintenance, the requirements of laws, regulations and relevant standards of the country and region where the equipment is located must be met.
 - The materials prepared by the user and the tools required during the operation must meet the requirements of laws, regulations and relevant standards of the country and region where they are located.
 - The grid connection can only be carried out after obtaining the permission of the power department of the country and region where it is located.
 - The composition and working principle of the entire PV grid-connected power generation system and the relevant standards of the country/region where the project is located shall be fully familiarized.
-

Caution!



Check the fixing bracket again before hanging the machine to ensure that the wall bracket is firmly fixed on the supporting surface.

1.4 Ground fault protection

Danger!



When a ground fault occurs in a photovoltaic system, lethally high voltages may be present in the uncharged part. If accidentally touched, it is very dangerous! Before operation, please make sure that there is no ground fault in the system, and at the same time, take relevant protective measures.

1.5 Live measurement

Danger!



Before making electrical connections, make sure that the CPS PSA1.1MO and its internal electrical equipment are in good condition. All electrical connections must comply with local country/ regional electrical standards.

There are high voltages in the equipment in the CPS PSA1.1MO, accidental touch may cause a fatal electric shock hazard, so during live measurement, you should:



- Take precautions (such as wearing insulating gloves, etc.).
- There must be accompanying personnel to ensure personal safety.

1.6 Use of measurement equipment

In order to ensure that all electrical parameters meet the requirements during the electrical connection and commissioning of the CPS PSA1.1MO, relevant electrical measuring equipment shall be used.



- Choose high-quality measuring equipment whose range and usable conditions all meet the requirements of the site.
- Ensure that the connection and use of the measuring equipment are correct and standardized to avoid dangers such as arcing.
- In case of live measurement, protective work should be done (such as wearing insulating gloves, protective glasses, etc.)

1.7 Complete power-off operation

Only when it is ensured that all equipment in the CPS PSA1.1MO, especially the CPS PSA1.1MO, is completely uncharged, all operations can be performed on it.

- During the entire operation, it is necessary to ensure that the escape route is

unobstructed.

- Ensure that the power-off equipment will not be accidentally re-powered. After the CPS PSA1.1MO is completely out of operation, be sure to wait at least 5 minutes before operating the CPS PSA1.1MO to ensure that the CPS PSA1.1MO is completely uncharged.
- Use a multimeter and electrical testing equipment to ensure that the inside of the equipment is completely uncharged.
- Make necessary grounding and short-circuit connections after confirming that there is no electricity.
- Use insulating cloth to insulate and cover the operating parts near potentially live parts.

1.8 Static electricity protection

Contact with printed circuit boards or other electrostatic sensitive components or improper may cause device damage. Please release static electricity before operation.



- Avoid unnecessary circuit board contact.
- Comply with electrostatic protection specifications, such as wearing anti-static bracelets.

1.9 Body warning sign protection

The warning signs on the body of the CPS PSA1.1MO and the internal electrical equipment contain important information for the safe operation of the CPS PSA1.1MO and internal equipment. It is strictly forbidden to tear or damage it!

Do not tear or damage the sign.



- Ensure that the warning signs of the body are clear and readable at all times.
- Once the warning signs on the body are damaged or blurred, be sure to replace them immediately.

1.10 Safety warning sign setting

When carrying out on-site transportation, installation, overhaul, maintenance and other operations on the CPS PSA1.1MO, in order to prevent unrelated personnel from approaching and improper operation or accidents, please observe the following precautions:

- Place eye-catching warning signs at the front and rear of the CPS PSA1.1MO and at the switch to prevent accidents caused by wrong closing.
- Set up warning signs or safety tapes near the field operation area.

1.11 Daily operation and maintenance

During daily operation, it is necessary to ensure that the doors of the CPS PSA1.1MO and the internal equipment cabinets are closed and locked, and the keys have been pulled out and handed over to a special person for safekeeping. In order to avoid accidents caused by unauthorized personnel entering, or the internal equipment is exposed to rain, animals, etc. At the same time, the CPS PSA1.1MO and internal equipment should be regularly inspected and maintained to ensure long-term reliable operation of the CPS PSA1.1MO.



If the relevant operations are carried out when the equipment is live, be sure to do insulation protection, and ensure that at least two staff are on site at the same time. The photovoltaic power station where the CPS PSA1.1MO is located is usually located in the field environment away from the urban area. Corresponding field rescue facilities shall be prepared as required for implementation when necessary.



The equipment should be operated in accordance with local laws and regulations and strictly follow the safety precautions specified in this manual.



Before servicing or replacing equipment, make sure that the CPS PSA1.1MO is powered off and the high-side and low-side switches are disconnected.

In daily operation and maintenance, please pay attention to the following:

- The nameplate is affixed to the CPS PSA1.1MO. It also contains important parameter information of the equipment. Protect the nameplate during all operations.
- Wear appropriate personal protective equipment, such as safety glasses, safety shoes and safety gloves, during all operations.
- It is recommended to take all necessary auxiliary measures to ensure personal and equipment safety.

1.12 Other precautions

The product manual is an integral part of the product. The manual contains important

Safety Instructions
information on transport, installation, inspection, maintenance, etc. of the CPS PSA1.1MO.
Please read this manual carefully before transporting, installing, overhauling and maintaining the CPS PSA1.1MO.

- Please strictly follow the description in this manual to transport, install, overhaul and maintain the CPS PSA1.1MO. Otherwise, equipment damage, personal injury or property damage may be caused.
- This manual should be kept in a safe place so that it is readily available to transport, installation and operating personnel.

When the CPS PSA1.1MO as a whole or the individual equipment inside needs to be discarded, it cannot be treated as general waste. Some components of the internal machine can be recycled and reused, and at the same time, some components will pollute the environment. Please contact the local authorized professional recycling organization to properly dispose of the product and internal components.



In order to facilitate users to read and use this manual better, a lot of pictures are arranged in the manual. The pictures are for illustrative purposes only. For the specific details of the product, please refer to the actual product received.

Please keep this manual and other related documents close to the equipment. In order to prepare for installation, operation, maintenance, repair and access at any time.



All descriptions in this manual are standard for CPS PSA1.1MO. If users have special needs, please explain to Chint staff when ordering. We will try our best to meet your needs. For the specific details of the product, please refer to the actual product you receive. This manual cannot cover all possible situations during installation, operation, maintenance, overhaul, etc. If you encounter situations that are not explained in the manual, please contact Chint in time.

2 Product Introduction

2.1 External introduction of the cabinet

2.1.1 Dimension and appearance

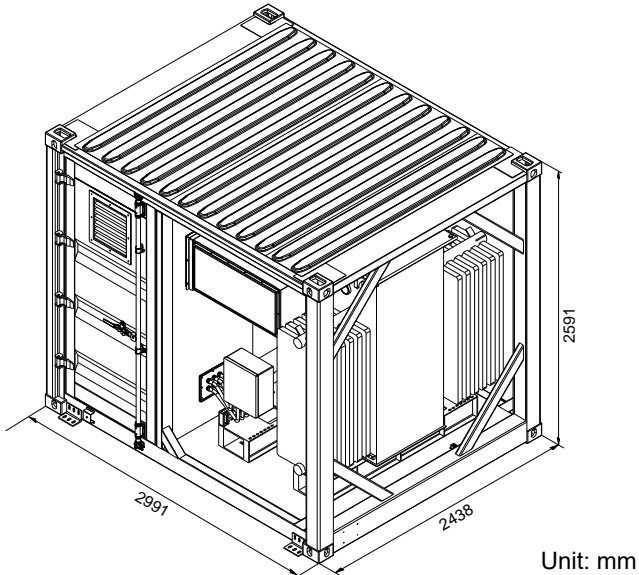


Figure 2-1 Dimensions

Maximum door opening size:

After opening both doors, the maximum opening size is as shown in the figure below.

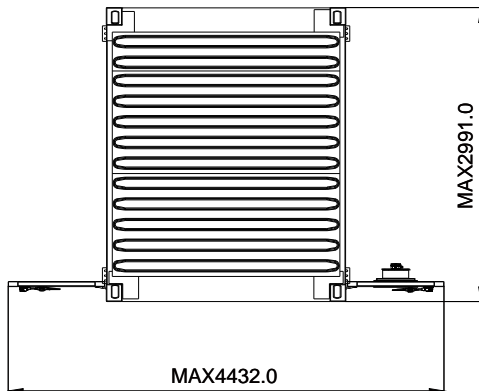


Figure 2-2 Max door opening size

2.2 Division of container

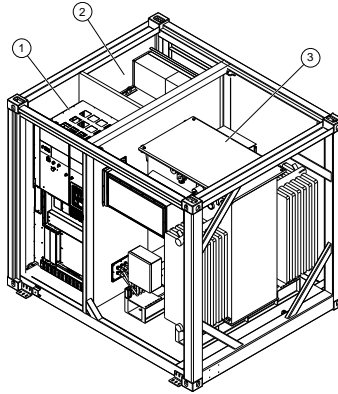


Figure 2-3 Main equipment

No.	Name
1	LV room
2	HV room
3	Transformer room

2.3 LV room

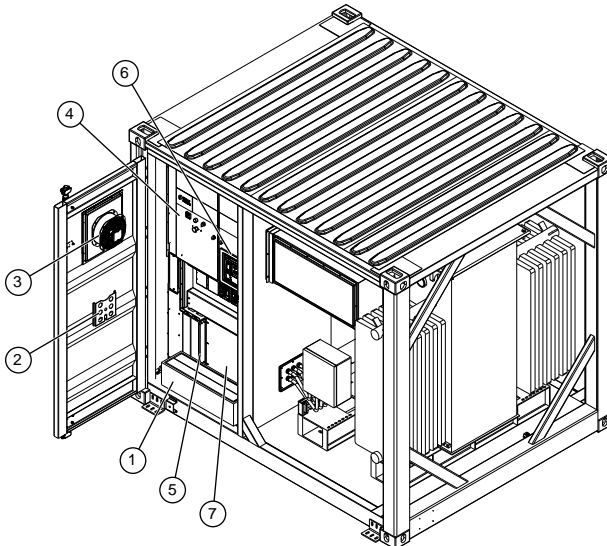


Figure 2-4 LV room

No.	Name	Note
1	Accessory bag	Include accessory 1 and fire-proof putty
2	Attachment column	Place the documents and keys
3	Fan	/
4	Power distribution cabinet	Communication module and power distribution module
5	UPS	SG-15/0.8kVA dry-type transformer
6	Frame circuit breaker	/
7	Auxiliary transformer	/

2.3.1 Power distribution cabinet

The power distribution cabinet is composed of communication module, distribution box, auxiliary transformer and UPS.

The internal layout of the power distribution cabinet is shown below.

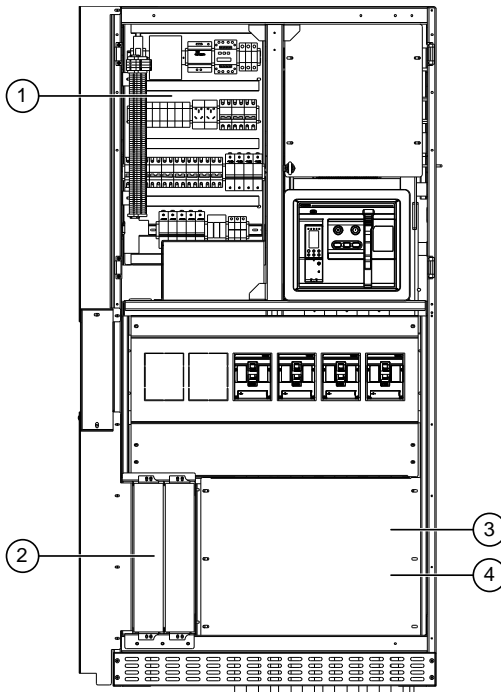


Figure 2-10 Internal layout of the power distribution cabinet

NO.	Name
1	Communication and power distribution module
2	UPS
3	Transformer cover
4	Dry-type transformer

The following figure shows the communication module in the PDC:

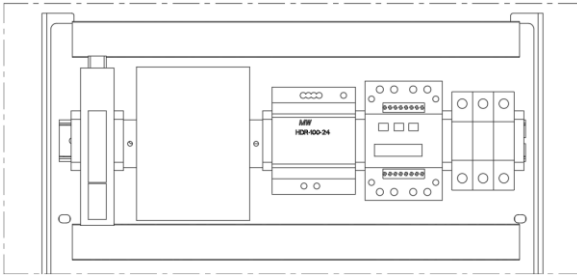


Figure 2-9 Communication module in the PDC

2.3.2 Low voltage cabinet

The low-voltage cabinet is located in the low-voltage room of the CPS PSA1.1MO, and is used to combine the cables input by the inverter, boost the voltage through the medium-voltage transformer, and finally feed it into the grid.

Taking CPS PSA1.1MO as an example, the following figure shows the internal components of the cabinet.

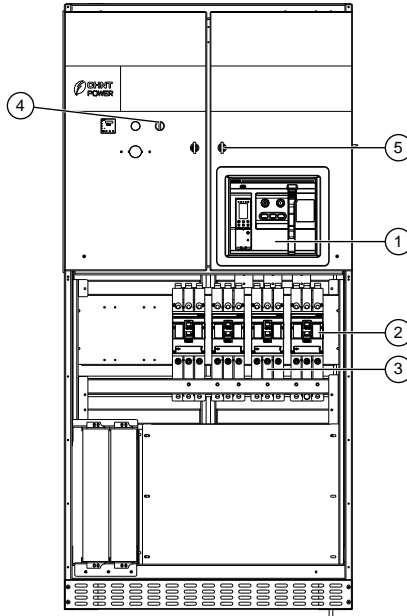


Figure 2-7 Low voltage cabinet

No.	Name	Effect
1	Frame circuit breaker	Inside low-voltage cabinet A, it is used to connect/disconnect cabinet A. Inside low-voltage cabinet B, it is used to connect/disconnect cabinet B.
2	Molded case circuit breaker	Used to connect/disconnect the corresponding terminal.
3	Low voltage wiring area	Connect to the front inverter.
4	Control knob	Control mode for setting the circuit breaker: remote, local.
		Turn the control knob to the "Remote" position to set it to remote control. Turn the control knob to the "local" position to set it to local control.
5	Lock box	Three lock heads are interlocked to lock the operating key.

2.4 HV room

The high voltage room is located on the back and contains a medium voltage ring network cabinet inside.

2.4.1 The medium voltage cabinet

The medium voltage cabinet contains a medium voltage ring network cabinet.

The ring network cabinet consists of a circuit breaker cabinet and a directly connected cable cabinet. Cabinet names vary with cabinet manufacturers, as shown in the following table.

Table 2-3 Cabinet names

Manufacturer	Chint	ABB/Daqq
Circuit breaker cabinet	V	V
Directly connected cable cabinet	D	D

The 34.5kV NG7-40.5 combination cabinet of Chint brand is as follows:

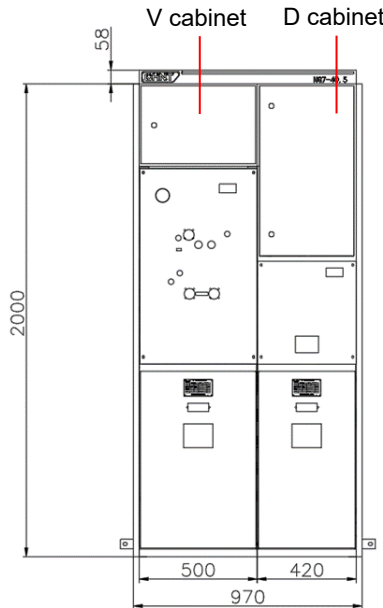






Figure 2-8 Medium voltage cabinet




2.5 Transformer room


Contains a medium voltage transformer. A medium voltage transformer can convert the low voltage output by the inverter to a grid compatible high voltage.

The transformer room mainly contains a medium voltage transformer. The transformer integrates accessories such as pressure relief valve, step switch, oil level gauge, pressure gauge, oil temperature gauge, oil filling valve and oil drain valve. The functions of each accessory are shown below.

Table 2-2 Transformer room component

Photo	Name	Description
	Oil filling valve	When the oil level in the transformer tank is low, open the oil filling valve.
	Pressure relief valve	When the oil pressure in the tank reaches 55kPa, the valve will automatically release.
	Pressure gauge	The pressure gauge is used to read the pressure value inside the oil tank.
	Oil level gauge	<p>If the oil level value falls below the lowest mark on the oil level gauge or below the oil level mark required for safe operation of the transformer, the transformer will stop running.</p> <p>When the oil level is too high, open the oil drain valve to lower the oil level.</p> <p>When the oil level is too low, disconnect the transformer and check the oil tank for oil leakage.</p>

	<p>Oil temperature gauge</p>	<p>The oil temperature alarm temperature is 100°C. When the oil temperature reaches this value, the alarm signal will be sent to the intelligent power distribution cabinet or client communication device.</p> <p>The oil temperature trip temperature is 105°C.</p> <p>When the oil temperature reaches this value, the trip signal will be sent to the intelligent distribution cabinet or client communication device. At the same time, the transformer will be disconnected from the front and rear stage equipment.</p>
	<p>Winding Thermometer</p>	<p>The oil temperature alarm temperature is 100°C. When the oil temperature reaches this value, the alarm signal will be sent to the intelligent power distribution cabinet or client communication device. The oil temperature trip temperature is 105°C. When the oil temperature reaches this value, the trip signal will be sent to the intelligent distribution cabinet or client communication device. At the same time, the transformer will be disconnected from the front and rear stage equipment.</p>
	<p>Oil drain valve</p>	<p>When the oil level is too high or maintenance is required, the oil drain valve needs to be opened.</p>

	<p>Step switch</p>	<p>The step switch has five positions: 1, 2, 3, 4, and 5. For more details, refer to "Figure 7-2 Voltage Ratio Adjustment by Step Switching".</p>
-----------------------------------------------------------------------------------	--------------------	---------------------------------------------------------------------------------------------------------------------------------------------------

2.6 Bottom cable entry hole

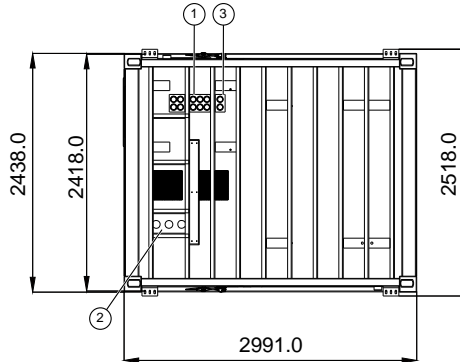
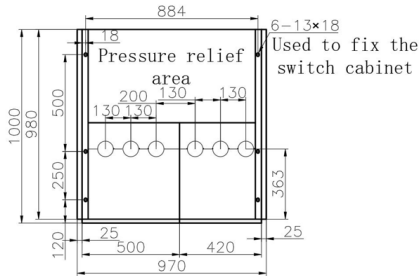


Figure 2-5 Bottom cable entry hole

No.	Name	Description
1	Low voltage inlet hole	All cables connected to the low-voltage cabinet enter through this hole.
2	High voltage inlet hole	All cables connected to the high voltage grid are inserted through this hole.
3	Communication and power distribution inlets	All cables connecting with external communication equipment and power supply equipment enter through this hole.

2.7 Medium voltage cable entry hole



(1)

Figure 2-6 Medium voltage cable entry hole

Table 2-1 Cable entry hole at the bottom of the ring network cabinet

Ring network cabinet brand	Grid voltage
Chint	34.5kV

2.8 Model marking

The following is an example of the meaning of CPS PSA1.1MO.

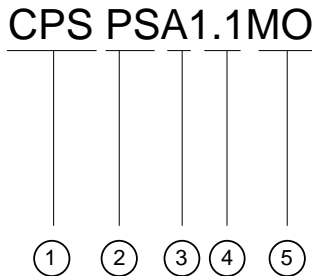


Figure 2-11 Meanings of CPS PSA1.1MO

No.	Name	Meaning
1	Company name	CPS: Chint Power Systems
2	Product category	PS: Pre-installed photovoltaic system, inverter room
3	Electrical characteristics.	A: Alternating current
4	Power level	1.1 MW
5	Functional characteristics	M: MPPT controller (for off grid systems) O: Oil transformer pre-installed photovoltaic system

3 Identify

3.1 Identifying CPS PSA1.1MO

The CPS PSA1.1MO can be identified by the nameplate. The information contained in the nameplate includes: model, main technical parameters, certification body identification and origin, etc.

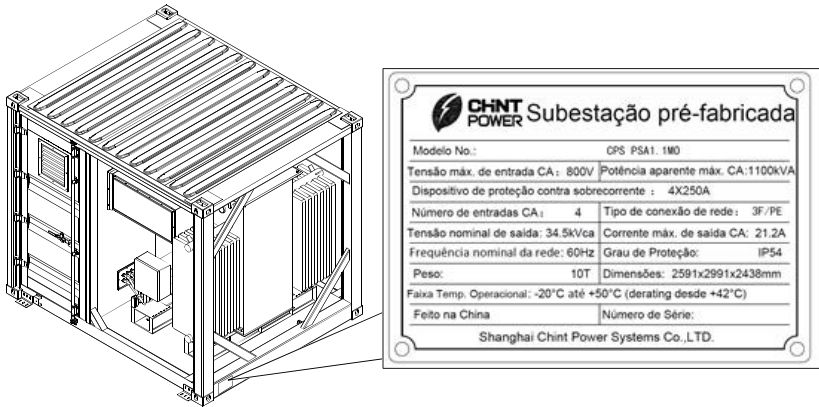


Figure 4-1 Nameplate

NOTE!



The nameplate contains important parameter information, which should be protected during transportation, installation, maintenance, overhaul and other operations.

Destruction or dismantling is strictly prohibited!

3.2 Check the integrity of transportation

Before leaving the factory, the staff of Chint has conducted a comprehensive and careful inspection of the CPS PSA1.1MO, and packaged it firmly. Nonetheless, it is possible that the device may be bumped or even damaged during transportation.

After receiving the box, it is first necessary to check the integrity of the transportation. At least the following items shall be carefully checked: check whether all shipped components are complete according to the packing list.

- Confirm that the received machine is consistent with the ordered model.

- Carefully check the CPS PSA1.1MO and internal equipment to see if there is any damage during transportation.

NOTE!

Only complete and undamaged CPS PSA1.1MO can be installed and commissioned! Before starting the installation make sure that:

- The CPS PSA1.1MO itself is intact and without any damage.
- All equipment in the CPS PSA1.1MO is in good condition without any damage.

4 Lifting and Storage

4.1 Mode of transport

In order to facilitate transportation, two 10-foot containers are connected by twisting locks to form a 20-foot standard container. After transportation to the site, the twisting locks need to be removed. The specific transportation mode and twisting lock position are as follows:

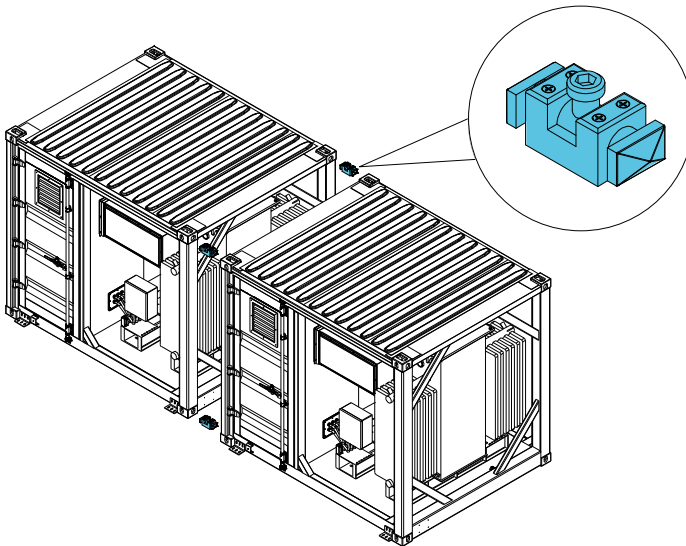


Figure 4-2 Twist lock

1. Loosen the twist lock chuck with an Allen wrench. As shown, rotate counterclockwise in the direction of the arrow. The hex key used for chuck is HW10, and the hex key used

for twist lock base is HW6.

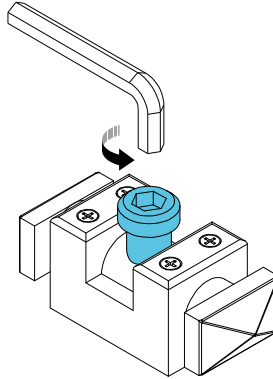


Figure 4-3 Loosen the twist lock

2. Lift the chuck, there is an obvious vertical chute on the twist lock, and turn the shaft outwards through the chute. As shown, push the chuck outward.

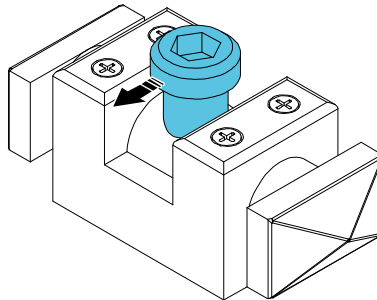


Figure 4-4 Turn the twist lock

3. Observe the shape of the special fixed block of the twist lock inside the container lock hole, and remove the twist lock by rotating the shaft until it is consistent with the shape of the lock hole.

4.2 Lifting

In the process of hoisting the CPS PSA1.1MO, each operation link should be carried out according to the following requirements:

- The CPS PSA1.1MO shall be lifted vertically without dragging on the ground or on the top of the lower box, and the CPS PSA1.1MO shall not be dragged or pushed on any surface.

- Keep it stable, and the diagonal of the cabinet should be inclined $\leq 5^\circ$.
- After the CPS PSA1.1MO is moved 50mm away from the support surface, it shall be suspended, and the connection between the lifting equipment and the CPS PSA1.1MO shall be checked. The lifting can be carried out only after the connection is confirmed to be firm.
- The lifting equipment shall be lifted and put down gently. The cabinet shall fall slowly and steadily to avoid impact on the internal equipment.
- When the cabinet is in contact with the base, remove the hoisting steel cable after the base is evenly stressed.
- The installation location should be firm, horizontal and well drained. The CPS PSA1.1MO is supported by four bottom fittings on the ground.
- After placing the CPS PSA1.1MO on the base at a constant speed, remove the fixing rope in time.

Fastening of connectors:

The suspended ceiling of the CPS PSA1.1MO can be carried out by using slings with hooks or U-hooks. The lifting device shall be properly connected with the CPS PSA1.1MO cabinet. The weight of container is about 10t.

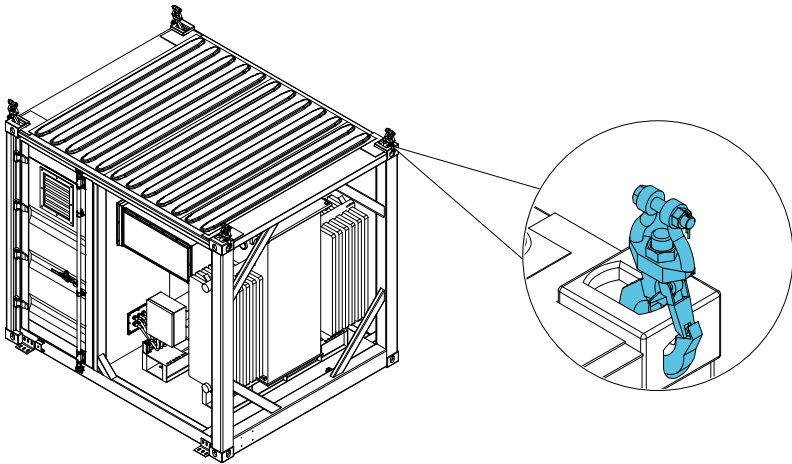


Figure 4-5 Fasten connector (hooks)

After the first hoisted container is fixed, the subsequent container hoisting can be carried out. The CPS PSA1.1MO should be lifted by four top corner pieces, as shown in the figure below:

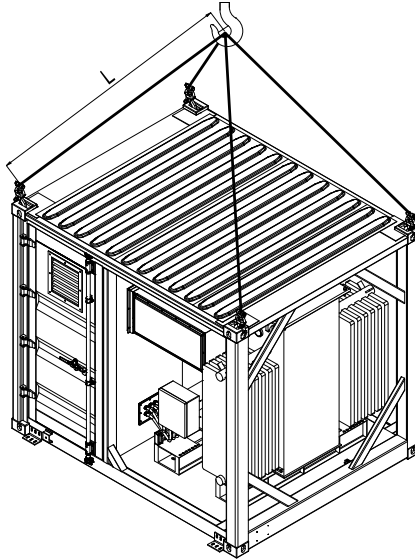


Figure 4-6 Lifting

Project	Requirements
Steel cable length (L)	$L > 4\text{m}$
Number of steel cables	4 sticks


NOTE!

The weight of container is about 10 t, please select suitable steel cable and crane.

Fastening of connectors:

The suspended ceiling of the CPS PSA1.1MO can be carried out by using slings with hooks or U-hooks. The lifting device shall be properly connected with the CPS PSA1.1MO cabinet. The weight of container is about 10t.


DANGER!

When lifting and transporting, all safety operation standards and regulations of the country/region where the project is located must be strictly observed.


NOTE!

Chint shall not be liable for any personal injury or property loss caused by violation of relevant requirements or other safety specifications.

4.3 Storage

After the successful completion of the delivery work, if it is not installed immediately, please store the CPS PSA1.1MO properly as described in this section.

- In order to prevent condensation in the CPS PSA1.1MO or the bottom of the box from being soaked by rainwater in rainy season, the CPS PSA1.1MO shall be stored in an indoor environment, such as a large warehouse or workshop.
- If it must be stored outdoors due to site conditions, the CPS PSA1.1MO base must be raised. The specific lifting height shall be reasonably determined according to site geological and meteorological conditions.
- Storage environment temperature: $-30^{\circ}\text{C} \sim +60^{\circ}\text{C}$; Relative humidity of storage environment: $0 \sim 95\%$, no condensation. When the ambient temperature is too low, provide heating for the internal equipment of the CPS PSA1.1MO. The CPS PSA1.1MO shall be stored on a dry, flat, solid ground with sufficient bearing capacity and no vegetation cover. The storage ground must be flat and free of water, unevenness or undulation.
- When storing, ensure that the doors of the CPS PSA1.1MO and the internal equipment cabinets are locked, and the cabinet doors of the CPS PSA1.1MO and equipment inside the cabinet are locked tightly.
- Effective measures must be taken to prevent rain, sand and dust from entering the CPS PSA1.1MO. At least the air inlet and outlet of the CPS PSA1.1MO must be effectively protected.
- During storage, lock the CPS PSA1.1MO and internal equipment door locks. Take appropriate protective measures (at least the air inlet and outlet should be sealed) to prevent rain and dust from entering the CPS PSA1.1MO.
- When selecting the temporary storage platform, the supporting feet of the CPS PSA1.1MO shall be taken into account. Check the CPS PSA1.1MO and internal equipment regularly (at least every half month).

5 Mechanical Installation



WARNING!

During the whole process of mechanical installation, the relevant standards and requirements of the project location must be strictly followed.

5.1 Check the accessory bags

Before installation, check the accessory bags. Open the front door and rear door, the positions of accessory bag is as the following figure.

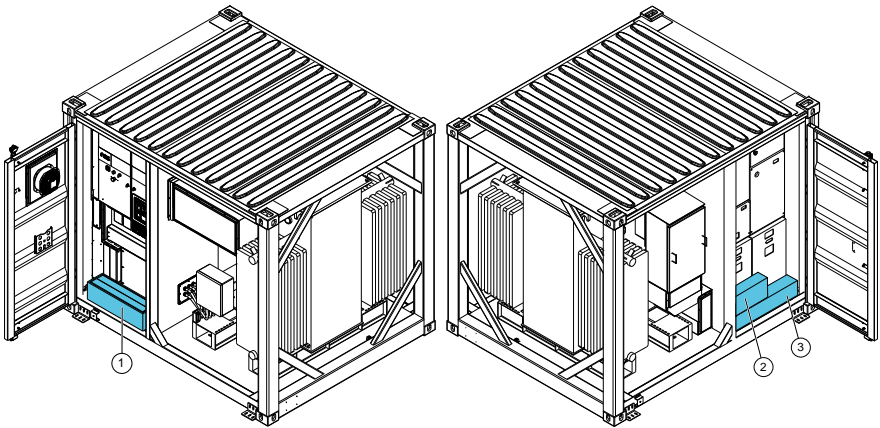


Figure 5-1 Location of accessory bags

No.	Name	Qty	Usage
1	AC surge protector	1	Reserve
	Fuse, 50A/1000VAC 50KA	3	Reserve
	Fuse, 25A/1000VAC 25KA	6	Reserve
	Sheet metal support	2	Install the external communication box
	Container fixing bracket	4	Fix the container on the foundation
	M8x20 Combined screw	8	Fix the sheet metal support on the container
	M12x40 Combined screw	12	Fix the container fixing bracket
	M12x35 Grounding screw	2	Fix the grounding cables on the container ground point
2	Preparation kit	1	Include tools for connecting cables
3	35 KV cable accessories	1	

5.2 Conditions of transportation

All kinds of equipment in the CPS PSA1.1MO have been installed and fixed before leaving the factory, and the CPS PSA1.1MO can be hoisted and transported as a whole during transportation.

The CPS PSA1.1MO is transported to the site of the power station by the freight company, and the site management personnel of the power station will be notified in advance to negotiate and arrange delivery and unloading. After delivery, the CPS PSA1.1MO is moved to the final position, which needs to be operated by the engineering construction personnel of the power station.

WARNING!

During the whole process of loading, unloading and transportation, the operation safety regulations of the country/region where the project is located must be observed!



- Any machines and tools used in the CPS PSA1.1MO and operation shall be maintained.
- All personnel engaged in loading, unloading and bolting shall receive corresponding training, especially safety training.

Transport and mobile CPS PSA1.1MO should at least meet the following conditions:

- Each cabinet door of the CPS PSA1.1MO is locked tightly.
- According to the site conditions, select the appropriate means of transport, usually a crane or a forklift. The selected means of transport must have sufficient load-bearing capacity.
- Additional traction devices may be required if on slopes.
- Remove all obstacles that exist or may exist during the movement, such as trees, cables, etc.
- The CPS PSA1.1MO should be transported and moved under favorable weather conditions as far as possible.
- Before transportation, be sure to use a flexible rope to fix the lifting ring on the top of the CPS PSA1.1MO to the platform base, and then fix the four fixing points on the bottom of the platform to the fixing points of the transport vehicle.

- In addition, when the CPS PSA1.1MO is grounded, it should also be ensured that:
The ground of the CPS PSA1.1MO should be solid and flat, well drained, free from obstacles and protrusions;
- On site, the CPS PSA1.1MO shall be supported by only four bottom corner pieces.

5.3 Lifting and transporting

5.3.1 Precautions for lifting

DANGER!



- During the whole process of hoisting the CPS PSA1.1MO, it is necessary to strictly follow the safety operation rules of the crane.
- It is strictly forbidden to stand within the range of 10m in the operating area. In particular, it is strictly forbidden to stand under the hoisting arm and under the hoisted or moving machine to avoid casualties.
- In case of bad weather conditions, such as heavy rain, heavy fog, strong wind, etc., the lifting work should be stopped.

When lifting a CPS PSA1.1MO, at least the following requirements must be met:

- Safety on site must be ensured when lifting.
- When carrying out lifting and installation operations, there should be a professional on-site commanding the whole process.
- The strength of the slings used should take into account the weight of the CPS PSA1.1MO.
- The crane shall have sufficient arm length and rotation radius.
- Ensure that all sling connections are safe and secure.
- The length of the sling can be adjusted appropriately according to the actual requirements of the site.
- Smoothly transport the CPS PSA1.1MO.
- Transport the CPS PSA1.1MO by connecting the four top corner fittings.
- Take all necessary auxiliary measures to ensure the safe and smooth lifting of the CPS PSA1.1MO.
- All cabinet doors should be closed and locked.
- It is recommended to lift from left to right or right to left to ensure smooth lifting.

5.4 Building the foundation

5.4.1 Requirements of foundation site

When choosing an installation site, please follow at least the following principles:

- The climate environment and geological conditions (such as stress wave emission, groundwater level) and other characteristics of the CPS PSA1.1MO installation site should be fully considered.
- The surrounding environment is dry and well ventilated, away from flammable and explosive areas.
- The soil at the installation site needs to have a certain degree of compaction. If the soil is loose, please take measures to ensure the foundation is stable.
- It should be kept away from places that generate dust, oily smoke, harmful gases, and produce or store corrosive, flammable, and explosive materials.
- The installation location cannot be in a low-lying area and the site level should be higher than the historically high water level in the area.
- The soil is in good condition, the ground is firm, and there must be no bad geological conditions such as rubber soil and weak soil layers. Do not choose the ground that is easy to accumulate water and sink.
- A well-ventilated place.
- Choose an open location to ensure that there are no obstacles within 10m from the equipment.
- Keep a distance of at least 50m from residential areas to avoid noise pollution.

5.4.2 Recommended foundation construction

WARNING!



The specific foundation scheme is determined by the on-site investigation of the local construction team. The following is for reference only, and should not be taken as the standard. All hoisting and foundation construction during the installation of the box transformer must be designed and operated by holding relevant certificates or professionals.

At least the following requirements shall be met when constructing the foundation:

- The bottom of the foundation pit where the foundation is built must be compacted and

filled.

- The foundation should be sufficient to provide effective load-bearing support for the CPS PSA1.1MO.
- Elevate the CPS PSA1.1MO to prevent rainwater from eroding the CPS PSA1.1MO base and interior. It is recommended that the foundation be about 100mm higher than the horizontal ground of the installation site.
- Build cement foundations of sufficient cross-sectional area and height. The foundation height is determined by the construction party according to the site geology.
- Cable routing should be considered when constructing foundations.

The overall foundation construction effect is shown in the figure below.

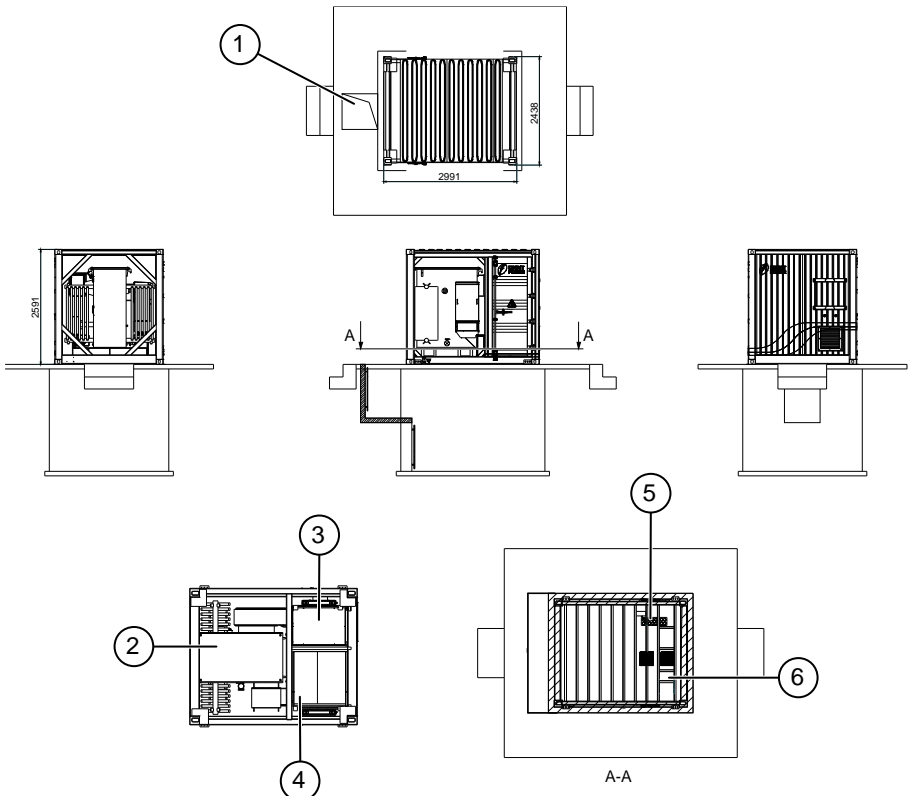


Figure 5-2 Overall foundation construction

No.	Description	Usage
1	Maintenance hole	Enter the bottom of the container
2	Oil immersed transformer	/
3	AC low voltage cabinet / Control power cabinet	/
4	HV cabinet NG7	/
5	Bottom cable entry holes	Inverter cable / Communication cable / Outside power supply cable
6	Medium voltage cable entry hole	The entrance of HV cable

5.5 Installation space requirements

In the field, the CPS PSA1.1MO needs to be used together with the inverter, and the distance between the inverter and the CPS PSA1.1MO is as follows.

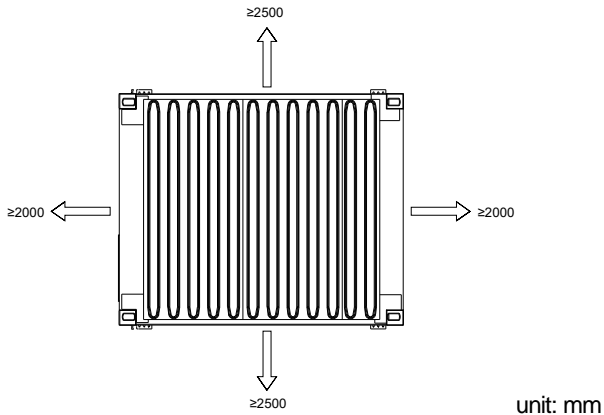


Figure 5-3 Installation space requirements



NOTE!

The distances shown above are minimum requirements.

5.6 Installation check

Before installation, please carry out the following checks:

- Bolts and nuts are tightened.
- The cabinet body is in good contact with the base below and bears even force.
- All doors open and close smoothly.

5.7 Fix CPS PSA1.1MO on the foundation

Lift the prefabricated substation to the installation area, use four L-shaped angle steel to fix the substation on the foundation.

1. There are L-shaped angle steel mounting holes reserved at the bottom of the CPS PSA1.1MO.

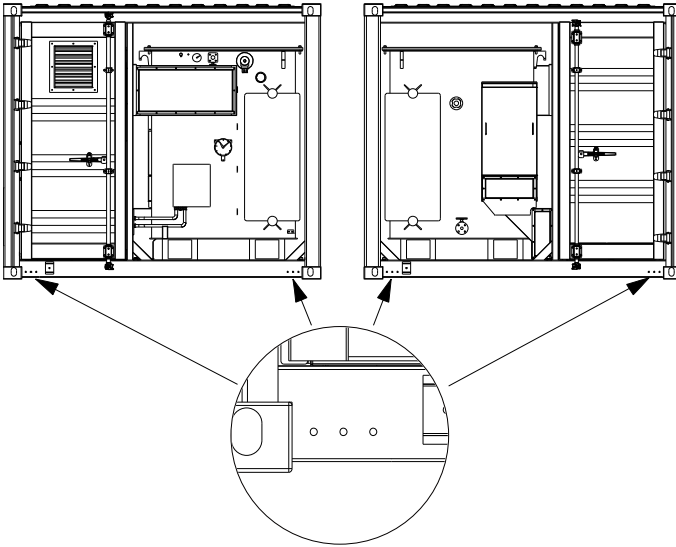


Figure 5-4 Positions of fixing point

2. Mark the drill location with the L-shaped angle steel.

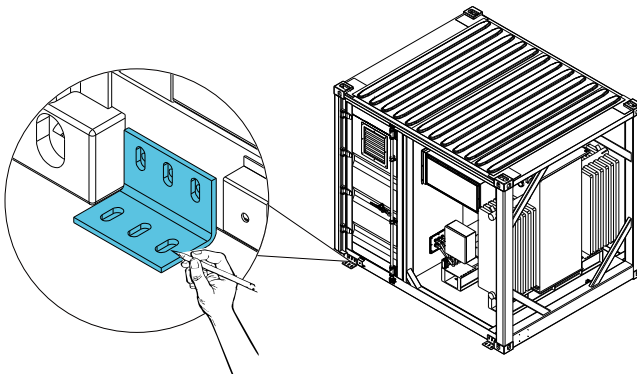


Figure 5-5 Mark the drill locations.

- Use a percussion drill ($\Phi 12$ mm bit) to drill a hole of 70 mm depth. Use the rubber hammer to knock in the four expansion tubes.

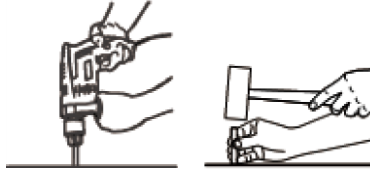


Figure 5-6 Drill and install expansion tube

- Screw off the nuts from the expansion tubes. Put the L-shaped steel on the ground and make sure expansion tubes thread the holes of the L-shaped steel.

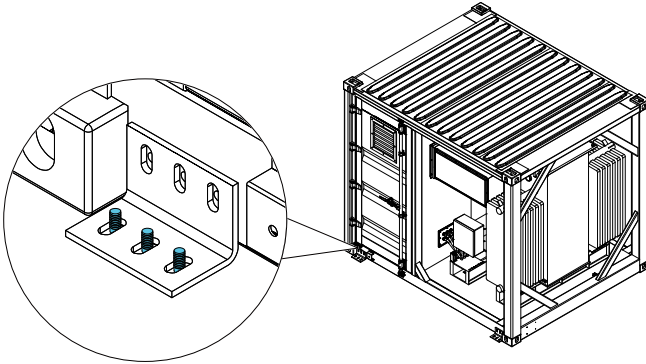


Figure 5-7 Install the L-shaped steel

- Tighten the nuts and M12x40 combined screws. Torque: 500 ± 50 Kgf-cm

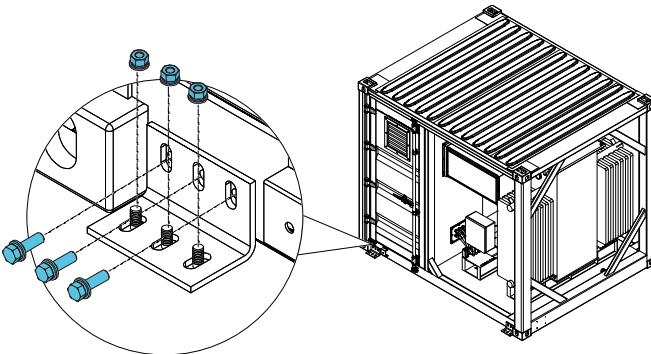


Figure 5-8 Fix the container

- Install the other three L-shaped steels in the same way.

5.8 Install the sheet metal support

1. Open the front door, takeout the sheet metal support and M8x20 screws inside the accessory box.

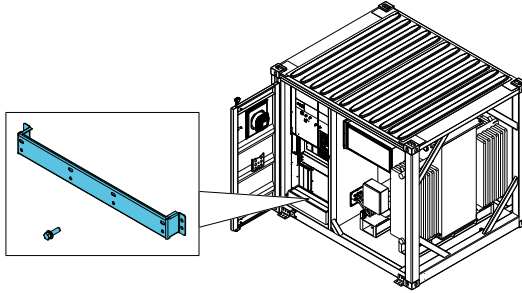


Figure 5-9 Support and screw

2. Install the sheet metal support on the left side of the container. Torque: 125 ± 12.5 Kgf-cm.

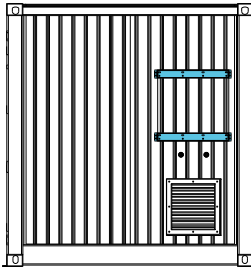


Figure 5-10 Install the support

3. Install the communication box and thread the cables through the grand head (1). The maximum outer diameter of the cable is 18-25 mm.

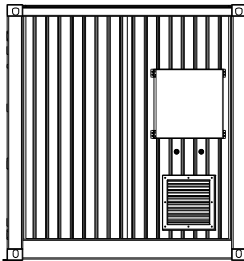


Figure 5-11 Grand head

6 Electrical Connection

DANGER!

High voltage danger! Electric shock danger!



Do not touch live parts!

Before installation, make sure that the CPS PSA1.1MO and its internal equipment are not live.

Do not place the CPS PSA1.1MO on flammable surfaces.



When a ground fault occurs in a photovoltaic system, lethally high voltages may be present in the parts that are not energized. Very dangerous if accidentally touched! Before operation, please ensure that there is no ground fault in the system, and at the same time, take relevant protective measures.



All electrical connections must comply with the relevant standards and codes of the country where the project is located. The CPS PSA1.1MO can only be connected to the grid side after it has been approved by the local power supply company and installed by professional technicians.



Only professional electricians or qualified personnel can electrically connect this product.

Before wiring, turn off all switches.



The entry of wind, sand and moisture may damage the electrical equipment in the CPS PSA1.1MO or affect the operation performance of the equipment!

- In windy and sandy seasons, or when the relative humidity in the surrounding environment is greater than 95%, electrical connection shall be avoided.
 - When there is no wind and sand, and the weather is clear and dry, start the connection work.
-



Fire at the connection process!

Failure to comply with the torque requirements may cause fire at the connection!

The bolts must be tightened strictly to the torques described in this manual.

Damage of optical fiber!



Too small bending radius or excessive winding may damage the optical fiber.

Please follow the relevant instructions of the optical fiber manufacturer on the minimum allowable bending radius.



When laying cables, ensure electrical insulation and comply with EMC specifications. Power cables and power and communication cables should be laid in layers. And when necessary, provide protection and support for the cable to reduce the stress on the cable.



To effectively reduce signal interference, it is recommended to use optical fibers for external communication cables.

Only qualified electrical engineers can carry out work related to electrical connection. Please follow the requirements given in safety instructions in this manual.



Please strictly follow the wiring identification inside the device to perform wiring operations.

Chint shall not be liable for any person injury or property damage caused by ignoring these safety instructions.

The installation design of the CPS PSA1.1MO must comply with the relevant standards or codes of the country/region where the project is located.



If the installation design requirements given in this manual are not followed, or the installation is not carried out in accordance with the relevant electrical standards or specifications of the installation location, resulting in CPS PSA1.1MO or system failure, it will not be included in the warranty scope.

6.1 Five security principles

During the whole process of electrical connection and all other operations on CPS PSA1.1MO and other equipment, the following five safety principles shall be observed:

1. Disconnect all external connections of the CPS PSA1.1MO by professionals, as well as the connection with the UPS of the internal power supply of the equipment.
2. Ensure that each disconnection is not accidentally re-energized.
3. Use professional electrical inspection equipment to ensure that the inside of the equipment is completely de-energized.
4. Only professionals can make the necessary ground and short-circuit connections.
5. For possible live parts near the operating part, use insulating cloth to cover them.

6.2 Check and test the connecting cables

Open the transformer door and check whether the high-low voltage cabinet and transformer are in good condition and whether the spare parts are in good condition. If any damage occurs, please inform the product supplier and conduct the transformer voltage test according to the test manual before installing the connecting cables.

Table 6-1 Cable specifications

Area	Effect	Recommended Cable Specifications
Low voltage room	Low voltage busbar and inverter connection	Max. 400 mm ² aluminum wire
Ring network cabinet	Connect to the grid side	It is related to the brand and model of the ring network cabinet. For details, please refer to the manual of the ring network cabinet
Communication box	Communication port	485 line or optical fiber, etc.
Power distribution room	CPS PSA1.1MO Self-Powered Window	Copper flexible wire

6.3 Wiring schematic diagram

Taking CPS PSA 1.1MO as an example, the primary electrical schematic diagram is as follows: (specifically, the drawings shall prevail).

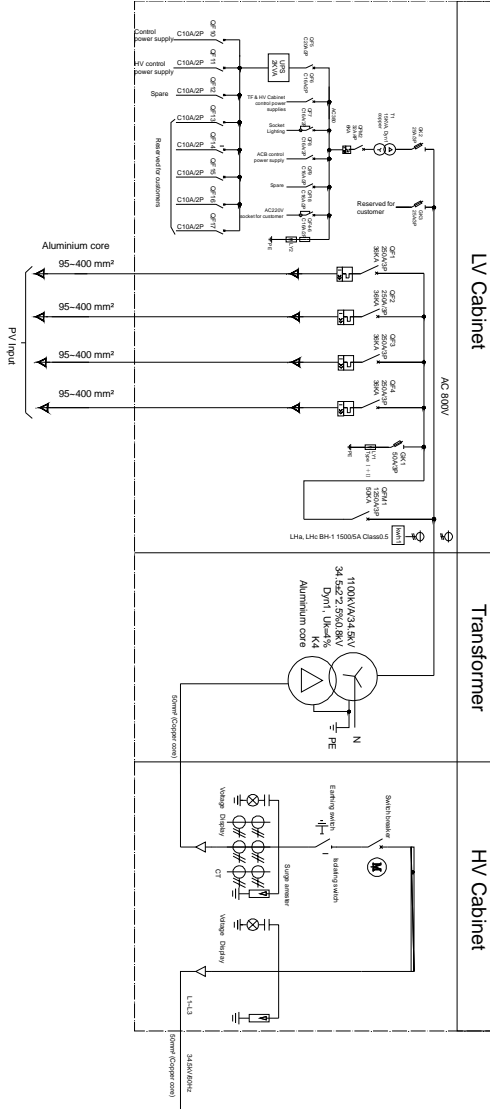


Figure 6-1 Electrical schematic diagram

6.4 Electrical connection

Before leaving the factory, the electrical connections between the equipment inside the CPS PSA1.1MO have been completed. On site, wiring between external equipment and CPS PSA1.1MO is required, including grounding, low-voltage side wiring, high-voltage side wiring, communication and power distribution wiring.

6.4.1 Grounding

Grounding includes equipotential connection inside the CPS PSA1.1MO and grounding of external grounding points.

Internal grounding

Before leaving the factory, the equipotential connection between all the equipment in the CPS PSA1.1MO has been completed, and they are uniformly summarized to the grounding copper bar.

External grounding

In order to facilitate grounding, there are two grounding points outside the CPS PSA1.1MO cabinet.

Ground point is as shown below.

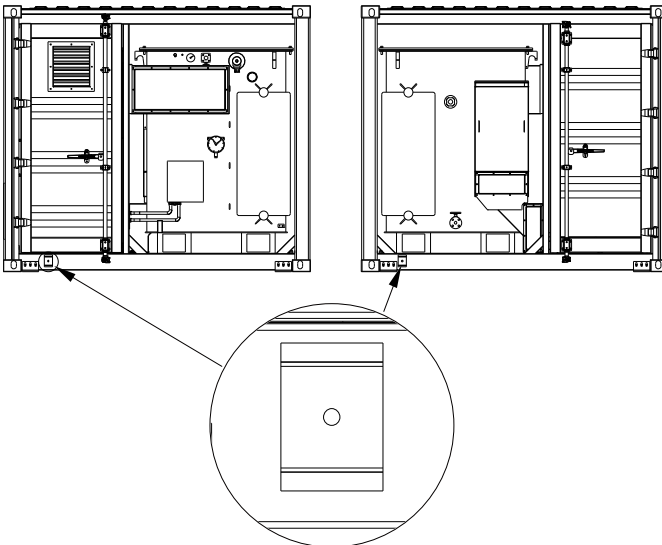


Figure 6-2 Grounding points

Measure the conductivity between the equipment grounding terminal and the total equipotential bonding copper bar to ensure the effectiveness of the internal grounding connection. The external grounding point of the CPS PSA1.1MO shall be reliably grounded through the following two methods.

- Use 70mm²~ 95mm² grounding cables to reliably connect the external grounding point of the CPS PSA1.1MO to the grounding point of the photovoltaic system. After completion, use M12 bolts to tighten and the torque is 500±50 Kgf-cm.



It is recommended to reliably connect two grounding points outside the CPS PSA1.1MO to the grounding point of the photovoltaic system.

The CPS PSA1.1MO needs to be grounded reliably. After completion, the following operations are required:

Measure the conductivity between the equipment grounding terminal and the total equipotential bonding copper bar to ensure the effectiveness of the internal grounding connection. After the ground connection is completed, the ground resistance must be measured, and the resistance value should not be greater than 4Ω.



During the ground connection process, if you have any questions, please contact the relevant staff in time. If the installation is not carried out in accordance with the installation specifications, or if it is installed or modified without permission, it may cause safety accidents or equipment damage. Chint does not assume any responsibility for any loss caused thereby.

6.4.2 External communication box wiring

1. Remove the two partitions to connect cables.

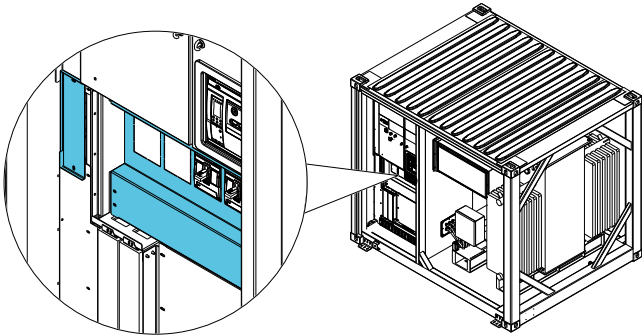


Figure 6-3 Remove the partitions

2. Thread the cables of external communication box through the three holes.

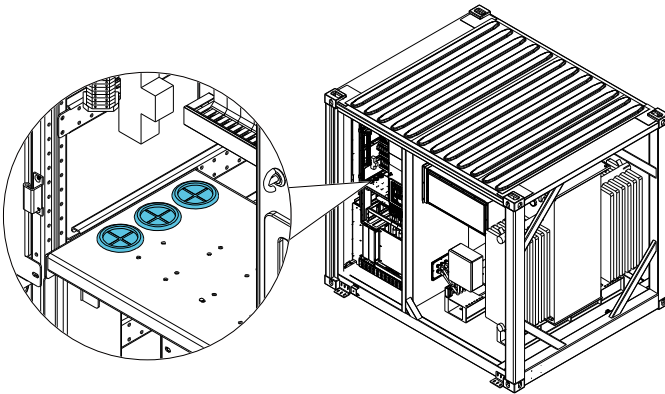


Figure 6-4 Holes for cables

3. Connect the cables of external communication box to the communication module.

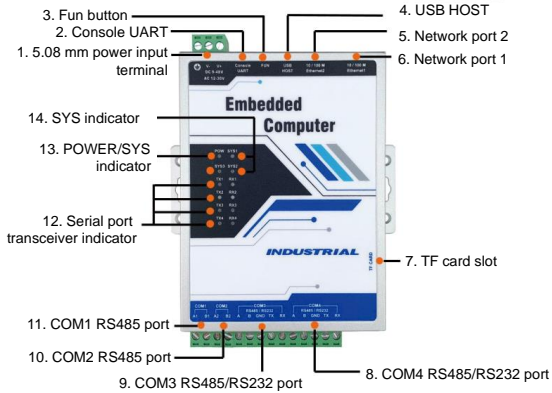


Figure 6-5 Wiring terminal

6.4.3 Low voltage wiring

The low-voltage terminals are located in the lower part of the low-voltage cabinet, as shown in the figure below.

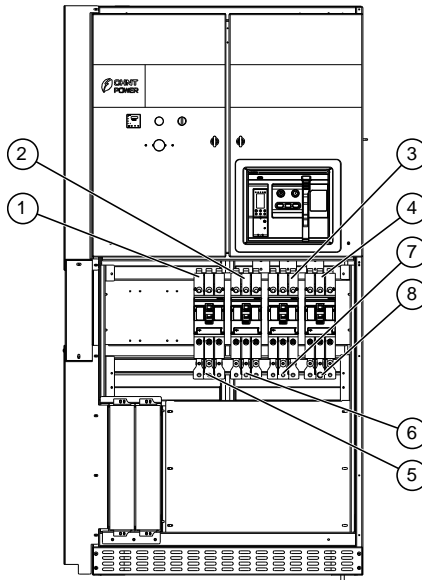


Figure 6-6 Low voltage terminals

No.	Code	Name
1	QF1	Molded case circuit breaker
2	QF2	
3	QF3	
4	QF4	
5	A1	OT terminal
6	A2	
7	A3	
8	A4	

Connect the low voltage cables from PV:

Fire risk!

Incorrect wiring sequence may cause fire!



- Please pay attention to the connection sequence of the wiring parts.
- When connecting, make sure that the connector is tight. Inadequate connections or oxidation of the contact surfaces can also cause excessive heat, which may result in fire.

1. Make sure that the output circuit breakers of each inverter at the previous stage are in the OFF state.
2. Make sure that both the air circuit breaker and the molded case circuit breaker are disconnected.
3. Remove the OT terminals from the circuit breakers.

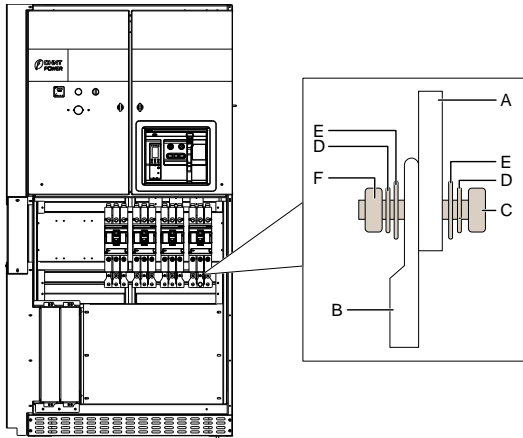


Figure 6-7 OT terminal

No.	Name	No.	Name
A	copper bar	D	spring pad
B	OT terminal	E	Flat pad
C	bolt	F	Nut

4. Remove an appropriate length of the insulation layer from the cable.

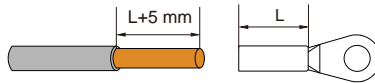


Figure 6-8 Remove the insulation layer

5. Insert the exposed wire core into the crimp area of the OT terminal, use crimping pliers to crimp the OT terminal.

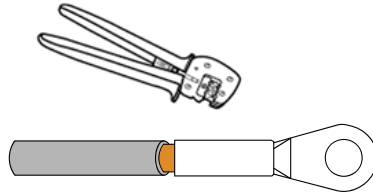


Figure 6-9 Crimp the cable

6. Wrap the wire crimp area with heat shrink tube and use hot air gun to seal the tubes.

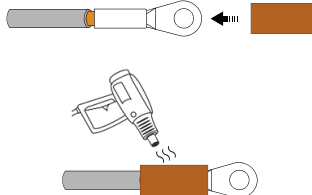


Figure 6-10 Seal OT terminal and cable

7. Connect the OT terminal onto the copper bar, tighten the bolt and nut.

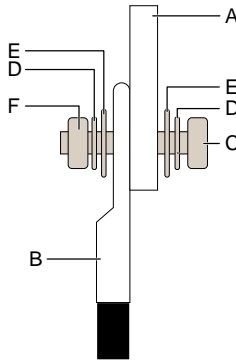


Figure 6-11 Install the OT terminal

No.	Name	No.	Name
A	copper bar	D	spring pad
B	OT terminal	E	Flat pad
C	bolt	F	Nut

8. Confirm whether the wiring terminal is fastened in place and cover the low-voltage cabinet cover.
9. Install the two partitions back to their original positions after the wiring is complete. Torque: 60 ± 6 Kgf-cm.

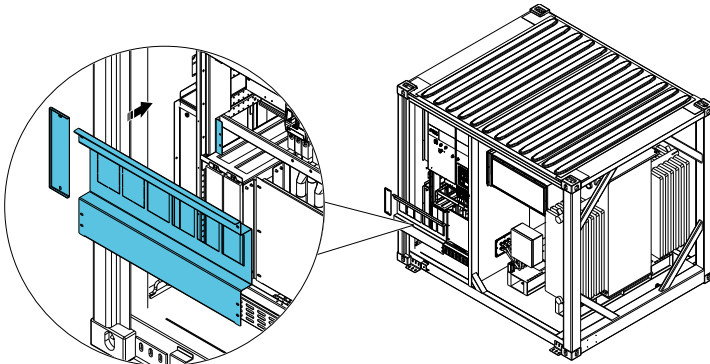


Figure 6-12 Install the two partitions



If M12 1/2" UNC bolts are used in Electric terminal include copper contact & Transformer contact), copper bolts the tightening torque is $(155+10)$ Kgf-cm, steel bolts the tightening torque is $(500+20)$ Kgf-cm.



- The length of the wiring screws should be appropriate, and it is enough to expose the mounting holes of the copper bars slightly. Too long may affect the insulation performance or even short-circuit.
- Check whether there is a part of the heat-shrinkable sleeve clamped at the connection between the terminal and the copper bar. If it is clamped, it should be removed immediately, otherwise it may cause poor contact or even heat damage.
- Make sure that the terminal and the copper bar are in good and tight connection and have good contact.

6.4.4 High voltage wiring

The connection terminals of the CPS PSA1.1MO and external high voltage equipment are located inside the ring network cabinet. On site, refer to the [manual of the ring network cabinet](#) for wiring.

6.4.5 Auxiliary power supply wiring

There are spare sockets reserved inside the power distribution cabinet, as shown in the following figure. On site, perform wiring according to port identification and wiring drawings.

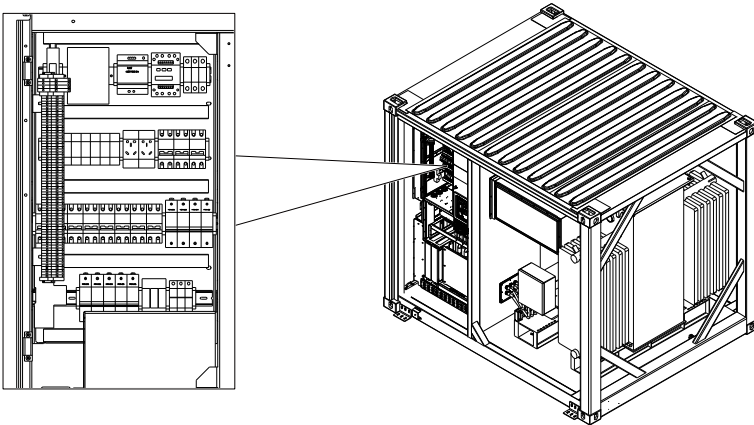


Figure 6-13 Auxiliary power supply wiring

6.5 Checks after wiring

Inspection items	Acceptance criteria
Equipment appearance	The appearance of the equipment is complete without damage, rust and paint peeling. If there is paint peeling, please carry out touch-up operation. Equipment labels are clearly visible. Damaged labels should be replaced promptly.
Cable appearance	The protective cable wrapping is intact and there is no obvious damage. The threading cable and hose are in good condition.
Cable connection	The cable connection location is the same as the design. The terminals are made in accordance with the specifications, and the connection is firm and reliable. The labels at both ends of each cable are clear, and the labels are oriented in the same direction. The wiring meets the principle of strong and weak electricity separation.
Cable arrangement	The cables are neat and beautiful. The wire buckle joints are cut neatly, and no spikes are exposed. Allowance shall be reserved at the turning as required and shall not be tightened. The cables are straight and smooth, and the cables in the cabinet do not cross.
Cabinet cleaning	The inside of the box is clean and tidy, free of excess cables, wire ends, terminals and tools. There is no obvious sundries outside the equipment.

7 Power Transmission Operation



The operations described in this subsection should only be performed by professionals and in accordance with local standards/regulations.

7.1 Inspection before power transmission

7.1.1 Low voltage cabinet inspection

NO.	Inspection item
1	Installation meets design requirements.
2	The bottom of the cabinet is horizontal, and each cabinet door can be opened and closed flexibly
3	There are no cracks, dents or scratches on the surface of the cabinet. If necessary, repaint the paint falling area.
4	At least two grounding points of each cabinet should be grounded reliably, and the grounding resistance should be less than 4Ω .
5	The number and location of external accessories are consistent with the attached documents.
6	All markings are correct, clear and complete.

7.1.2 Medium voltage ring network cabinet inspection

NO.	Inspection item
1	There are no cracks, dents or scratches on the surface of the cabinet.
2	The pointer of SF6 barometer is located in the green area.
3	Rotate the current terminal, disconnect the scriber for the current terminal, and measure the resistance at both ends. The value of the three-phase resistance should be small and close. After measurement, return the current terminal to the connected position and tighten. The backup current loop needs to be short-circuited and grounded.
4	Disconnect the yellow and green wires of the secondary circuit grounding wire, measure the resistance of the secondary circuit to ground. The resistance should be $1M\Omega$ or more, the ground wire is restored, and the resistance becomes 0.5Ω or less.
5	If conditions permit (with a relay protection tester or current source), check the setting of the protection device, including the setting, control word, and soft pressure plate. The setting must exactly match the setting sheet provided by the user.
6	Confirm that the trip pressure platen is put into use.

NO.	Inspection item
7	The cable compartment door is closed.
8	The auxiliary AC power supply air switch in the cabinet is closed.
9	The remote local switch is in the remote position.
10	The local switch operating hole is padlocked.
11	The load switch is opened and the grounding switch is closed.
12	Remove all foreign objects in the medium-voltage ring network cabinet, such as tools and remaining installation materials.

7.1.3 Transformer inspection

NO.	Inspection item
1	Confirm that there are no cracks, dents and scratches on the surface of the transformer.
2	Confirm that there is no oil leakage on the surface of the transformer.
3	The pointer of the transformer oil level gauge is at a low oil level in the normal working range.
4	<p>The transformer oil temperature indication is close to the ambient temperature, the cover of the oil temperature gauge is installed tightly, the surface is clean, and the glass is not damaged.</p> <p>The cover of the oil thermometer shall be firmly installed and the surface shall be clean and intact.</p> <p>The temperature measurement loop is complete.</p>
5	When the oil temperature is 20°C, the scale of the transformer oil thermometer will be displayed at "4".
6	The locking mechanism of the pressure relief valve has been removed and the pressure relief valve is not working. If not, follow the steps shown in Figure 7-1 Removing the Pressure Relief Valve Lockout to remove the lockout.
7	Install the respirator, disassemble the sealing plate on the respirator mounting plate and install the respirator.
8	The pressure gauge shows at 0.
9	The no-load tap-changer gear is placed according to the user's set value requirements. If the customer does not have a fixed value, it is placed in the rated gear (five gears for conventional transformers, and the third gear is the rated gear), and the gear fixing bolts need to be fastened into the gear slot.

	After inspection, close the protective cover of the gear switch
10	There is no packaging residue on the transformer surface and no debris in the transformer room.
11	Check the outside air insulation distance. Whether the air insulation distance between bushings of different voltage levels and grounding complies with relevant standards.
12	The oil leakage port of the transformer room is not blocked.
13	The transformer room mesh door is closed and locked.

Remove the locking device:

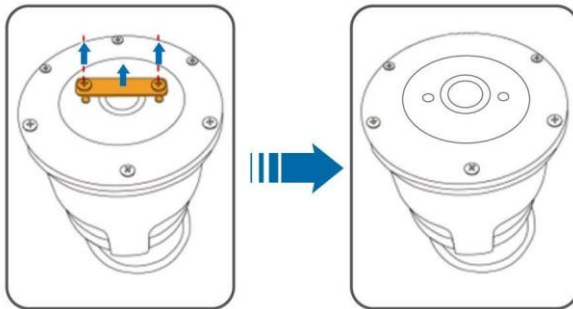


Figure 7-1 Removing the Pressure Relief Valve Locking Device

Adjust the no-load step switch:

The transformer output voltage is adjusted by operating the step switch. When operating the step switch, please ensure that the transformer is in a non-excited state, that is, there is no electricity on the high and low voltage sides of the transformer. When the voltage on the low-voltage side remains unchanged, the output voltage on the high-voltage side in different gears is:

Gear	Output Voltage
1	Rated voltage x 1.05
2	Rated voltage x 1.025
3	Rated voltage x 1
4	Rated voltage x 0.975
5	Rated voltage x 0.95

Taking gear 1 as an example, the steps for adjusting the voltage ratio are shown in the figure

below.

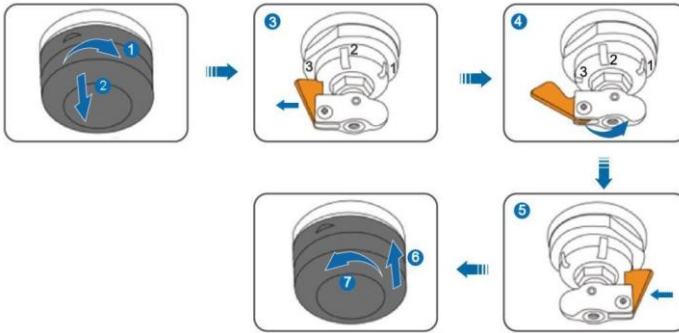


Figure 7-2 Adjusting the voltage ratio

7.1.4 Low voltage cabinet

NO.	Inspection item
1	Molded case circuit breakers are in the open position.
2	There is no obvious deformation of the copper bar, and no sundries are placed on the copper bar.
3	Measure the ground resistance of the incoming and outgoing copper bars of the circuit breaker. In the transformer neutral point ungrounded system, the incoming and outgoing line-to-ground resistance should be $M\Omega$; in the neutral grounding system, the outgoing copper bar resistance is $M\Omega$ and the phase-to-phase resistance is also $M\Omega$ class. (The auxiliary transformer circuit breaker needs to be disconnected, otherwise the phase-to-phase resistance is basically 0Ω .)
4	Measure the fuse resistance, the three-phase resistance should be small and the resistance value should be close.
5	The status indication of lightning arrester is green.
6	Move the scribe of the current terminal to the breaking position, and measure the resistance at both ends of the fracture. The value of three phase resistance should be small and close. After the measurement is completed, restore the current terminal to the connected position and tighten it. The backup current loop needs to be short-circuited and grounded.
7	Disconnect the yellow-green wire of the secondary circuit grounding wire, measure the resistance of the secondary circuit to ground, the resistance should be $M\Omega$, the grounding wire is

NO.	Inspection item
	restored, and the resistance becomes less than 0.5Ω
8	The installation bolts of the incoming cables are fastened, and the cables are not loosened by pulling.
9	The plugging of incoming line hole has been completed.
10	There is no damage to the appearance of each component.
11	Remove all foreign objects in the switchgear, such as tools, remaining installation materials, etc.

7.2 Attention before power-on

1. Dismantle the transportation protection device before power-on.

Dismantle Method: Rotate the red cap of the pressure relief valve until it can be removed.



Figure 7-3 Pressure relief valve



Do not dismantle the transportation protection device. When the product is running, the internal pressure of the transformer may be too large due to some extreme conditions, which may affect equipment and personal safety.

2. Dismantle the fasteners of the pressure relief valve.

Dismantle Method: Loosen the nut with a wrench and remove the epoxy board.

WARNING!



Do not dismantle the pressure relief valve.

When the product is running, the internal **pres**sure of the transformer may be too large due to some extreme conditions, which may affect equipment and personal safety.

3. Pull the ring on the pressure relief valve before powering the product, and observe if the pointer of the pressure gauge points at zero.



Figure 7-4 Ring of the pressure relief valve

WARNING!



Do not touch the transformer when the product is running to avoid heat scalding and electric shocking.

Choose suitable copper-aluminum crimp terminals for reliable connection when installing the HV cable. Then fix the HV cable reliably with the cable clamp.

7.3 Power transmission steps



After running for 24 hours under no-load state and ensuring that there is no abnormality, the CPS PSA1.1MO can be run with load.

Handover test, system power on and other operations must be carried out by local qualified electricians according to national / local standards.

7.3.1 Power on steps

1. Press the UPS start button for 3 seconds, check the displayed output voltage (default 220V) of UPS;
2. Insert the UPS power plug into the CZ2 (1) socket;
3. Switch on the micro circuit breaker QF10 (2) and QF11 (3) ;
4. Close the circuit breaker GK2 (4) in low voltage room;

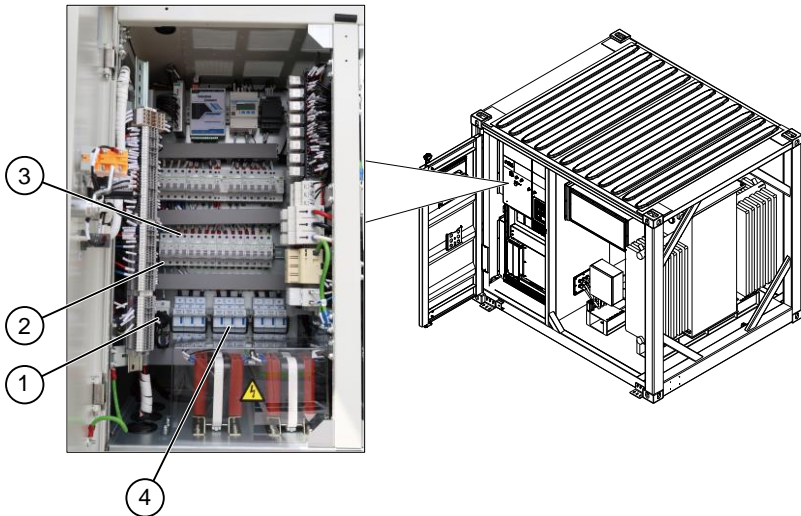


Figure 7-5 Electrical components locations

5. Move to high voltage, and close 1QF (5) in circuit breaker cabinet and 2QF (6) in cable connection cabinet.
6. Put on the high voltage operation protective equipment;
7. Use the operating tool to turn the grounding switch (7) to "O" position, then turn the Isolation switch (8) to "I" position.
8. Manually rotate the red switch (9) to switch on the circuit breaker and the DXN light is on.

9. Switch on the circuit breaker QFM1-QFM2 (10) in order.

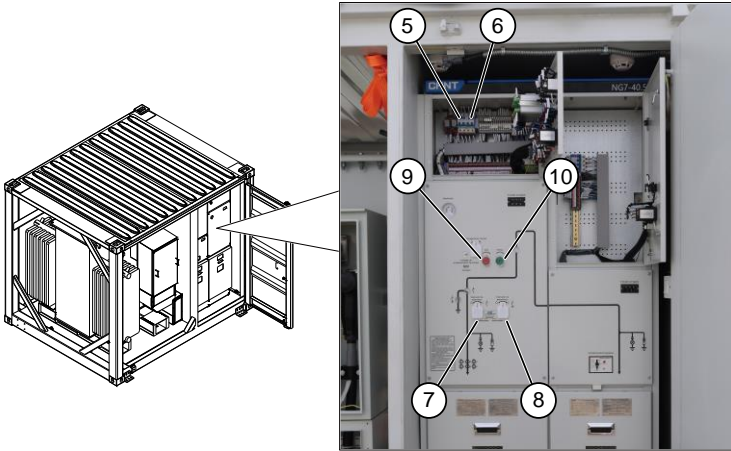


Figure 7-6 Electrical components locations

10. Switch on the circuit breaker QF5-QF8 (11) in order.

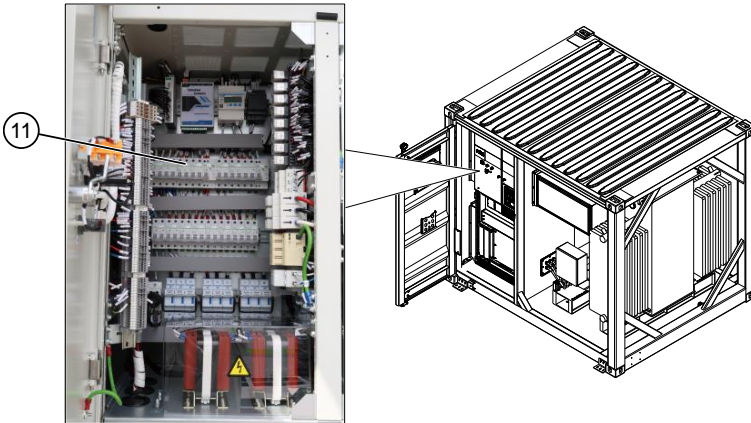


Figure 7-7 Electrical components locations

11. Switch on the circuit breaker QF1-QF4 (12).

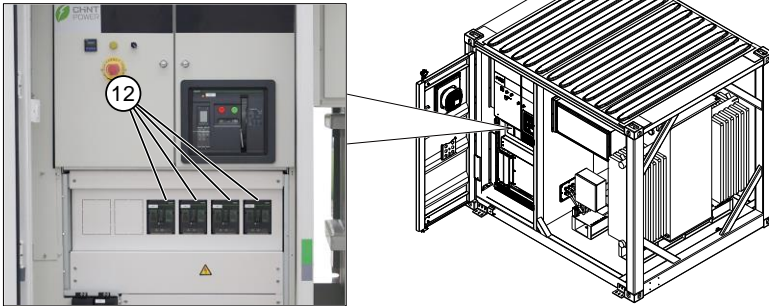


Figure 7-8 Electrical components locations

7.3.2 Power off steps

The positions of electrical components is shown in 7.3.1 Power on steps.

1. Switch off circuit breaker QF1, QF2, QF3 and QF4.
2. Switch off the circuit breaker QFM1, QFM2, QF5, QF6, QF7 and QF8 in order.
3. Put on the high voltage operation protective equipment and move to high voltage cabinet.
4. Manually rotate the green switch to switch off the circuit breaker.
5. Use the operating tool to turn the Isolation switch to “O” position, then turn the grounding switch to “I” position.
6. Switch off circuit breaker 1QF in circuit breaker cabinet and 2QF in cable connection cabinet.
7. Switch off QF10 and QF11.
8. Press the UPS start button for 4 seconds to shutdown UPS.

8 Troubleshooting

This chapter only lists common troubleshooting methods on the transformer side. For more details, please refer to the relevant transformer and ring network cabinet user manuals.

High voltage danger! Electric shock danger!

Serious injury or death!



Before maintenance, inspection, etc.

- Disconnect all internal switches.
 - Disconnect the switches of all equipment at the front and rear stages of the CPS PSA1.1MO.
-

Fault phenomenon	Possible reason	Troubleshooting method
Pressure relief valve tripped	1. Internal short-circuit fault of the transformer.	If it is a short circuit fault, perform oil chromatographic analysis to further determine the cause of the fault. It is strictly forbidden to put the transformer into operation before the cause of the fault has been determined and the fault has not been solved. (Note: If it is determined that the internal fault is serious, it means that the inside of the transformer is damaged, please contact our company for replacement.)
	2. The pressure relief valve is faulty.	The elastic expander on the pressure release valve is stuck inside, or the torque of the bolts that fasten the membrane is too large, causing the membrane to be damaged. Please contact our company for

Fault phenomenon	Possible reason	Troubleshooting method
	3. Improper oil filling before maintenance or installation of transformer. The pressure relief valve locking device on the oil tank is not opened as required	replacement. After turning off the power, open the oil hole to release the pressure in the oil tank.

If you have any questions about this product, please contact us. In order to provide you with faster and better after-sales service, we need your assistance to provide the following information:

- Equipment model
- Equipment serial number
- Fault code / name
- Simple description of fault phenomenon

9 Routine Maintenance

Due to the influence of ambient temperature, humidity, dust and vibration, the components inside the CPS PSA1.1MO will age and wear out, which will lead to potential failures inside the CPS PSA1.1MO. Therefore, it is necessary to carry out routine and regular maintenance on the CPS PSA1.1MO to ensure its normal operation and service life.

All measures and methods that help the CPS PSA1.1MO to be in good working condition belong to the scope of maintenance work.

9.1 Safety precautions

High voltage danger! Electric shock danger!

Serious injury or death!



After shutdown, please wait at least 10 minutes before opening the door. Before performing maintenance work, make sure that the inside of the device is completely de-energized.

Only qualified and authorized personnel may perform operations such as maintenance on the CPS PSA1.1MO.



During maintenance, do not leave metal parts such as screws and washers in the CPS PSA1.1MO, otherwise the equipment may be damaged!

The entry of wind, sand and moisture may damage the electrical equipment in the CPS PSA1.1MO or affect the operation performance of the equipment!



- Do not open the equipment cabinet door in the CPS PSA1.1MO in the wind and sand season or when the relative humidity in the surrounding environment is greater than 95%.
- Maintenance work can only be started when there is no wind and sand and the weather is clear and dry.

In order to ensure the safety of operators when maintaining or overhauling the CPS PSA1.1MO, be sure to abide by the following five safety rules:

1. Professionals ensure that CPS PSA1.1MO cannot be re-energized accidentally .
2. Use electrical inspection equipment to ensure that the inside of the CPS PSA1.1MO is completely de-energized.
3. Have the necessary ground and short-circuit connections made by professionals.

4. For possible live parts near the operating part, use insulating cloth to cover them.
5. Check whether the escape route is blocked.

9.2 Maintenance

9.2.1 Overview

The CPS PSA1.1MO has IP54 protection grade and is suitable for outdoor use. However, harsh environment or long-term operation will cause the aging of the CPS PSA1.1MO or damage to the internal equipment. Regular maintenance and inspection of the CPS PSA1.1MO, and replacement of aging and damaged components will effectively prolong its service life and improve the performance of internal equipment.



Irregular inspection is necessary, especially when the overall performance of the system is poor.

9.2.2 Maintenance period

In order to ensure the good operation of the equipment in the CPS PSA1.1MO, the CPS PSA1.1MO should be maintained regularly.

The maintenance intervals given in this section are reference values. The actual maintenance period should be reasonably determined based on the actual environmental conditions of the project site. If the operating environment of the CPS PSA1.1MO is relatively harsh, such as in a desert area, the corresponding maintenance period should be shortened. In particular, internal and external cleaning, anti-corrosion and anti-rust work, etc., should be more frequent. If the CPS PSA1.1MO is installed in a desert area, it is recommended that the inside and outside of the CPS PSA1.1MO should be carefully inspected and thoroughly cleaned after each sandstorm.



Failure to comply with the torque requirements may cause fire at the connection!

During the electrical connection process, the bolts must be tightened strictly to the torques described in this manual.



Incorrect wiring sequence may cause fire. Please pay attention to the connection sequence of the wiring parts. When connecting, make sure that the connector is tight. Inadequate connections or oxidation of the contact surfaces can also cause excessive heat which may cause fire.

9.3 Maintenance items

Routine inspection and maintenance must comply with the relevant regulations of the power company. Inspection, maintenance and repair can only be performed by trained personnel who are familiar with the equipment. Personnel must be certified and comply with safety regulations issued by the power company.

Table 9-1 Maintenance items

Inspection item	Inspection method	Period
System Status and Cleaning	Check whether the CPS PSA1.1MO and internal equipment are damaged or deformed.	Once a month
	Check whether there is abnormal noise during the operation of the internal equipment.	
	Check whether the temperature inside the CPS PSA1.1MO is too high.	
	Check whether the temperature inside the CPS PSA1.1MO is too high. Check that warning signs, labels, etc. are clearly visible and not defaced. Replace if necessary.	
	Check whether the humidity and gray scale are too heavy, and clean the equipment if necessary.	
	Check whether there is oxidation or corrosion inside the CPS PSA1.1MO. If present, refer to rust removal.	

Inspection item	Inspection method	Period
Cable connection	Check whether the power cable is loose. If it is loose, tighten it according to the torque specified in the manual.	Once every half a year after the first commissioning and once every two years thereafter.
	Check whether the power cables and control cables are damaged, especially whether the skin in contact with the metal surface has any signs of cuts.	
	Check whether the insulating wrapping tape of the power cable terminal is peeled off.	
Fan / heat exchange	Clean or replace the dust filter.	Once every half a year after the first commissioning, and once every half a year to once a year thereafter.
	Check the operating status of the fan/heat exchanger.	
	Check whether the fan / heat exchanger makes abnormal sound during operation.	
Equipment maintenance	For maintenance of various internal equipment, please refer to relevant manuals.	/
Medium voltage ring network cabinet	Check the SF6 barometer to see if the pointer is within the green range. If the pointer approaches red, please stop the operation and replenish gas to it.	Once a month
	Check the live indicator and check whether the L1 / L2 / L3 indicator is	

Inspection item	Inspection method	Period
	normal. If it is abnormal, please replace the L1/L2/L3 indicator lights when the power is off.	
Transformer	Check the transformer oil level indicator. If the oil level is low, please power off the CPS PSA1.1MO and fill in oil in time.	Once a month
	Check whether there is oil leakage around the pressure relief valve. If yes, tighten the valve.	
	Check the sheath of low-voltage cabinet and high voltage cabinet to see if there is oil leakage. If yes, tighten the valve.	
	Check whether there is oil leakage at the joint between the transformer radiator and the oil tank flange. If yes, please tighten the valve in time.	
	Check whether the real-time temperature of the oil thermometer is normal. If abnormal, measure the resistance of PT1/PT2 and PT3 with a multimeter. If the result is unqualified, it means that the temperature controller is faulty and needs to be repaired in time.	
Low voltage cabinet	Check whether the lightning arrester indicator is normal (green) or faulty (red).	Once a month

Inspection item	Inspection method	Period
	Check for condensation on interior side panels and top cover.	
Other equipment	Replace damaged lamps promptly.	When necessary
	Replace damaged smoke sensors and fire extinguishers promptly.	
	Replace the temperature and humidity controller in time.	

9.4 Transformer oil drain operation

Oil drain valve

The oil drain valve is located at the bottom of the transformer.

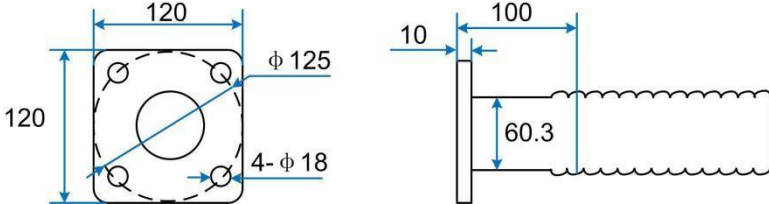


Figure 91 Oil drain valve

No.	Name	Component source
1	Cleaned steel hoses and oil tanks	Not included in the scope of supply
2	Rag	
3	Wrench	
4	Adjustable wrench	
5	Oil drain hose connector	
6	Pipe clamp	



The capacity of the oil tank must be greater than $N \times 200$ L, and N represents the amount of oil to be released.

Operation steps:

1. Remove the oil drain valve cover.

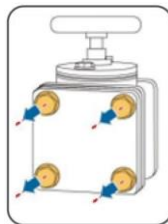


Figure 92 Remove the cover

2. Fix the oil drain hose connector. One end of the steel hose is connected to the oil drain

hose connector, and the other end is connected to the oil tank.

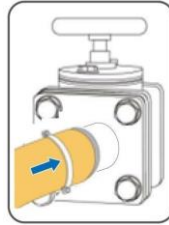


Figure 93 Fix the oil drain hose connector

3. Open the oil drain valve, and the transformer oil slowly flows from the transformer into the oil tank.
4. When no oil flows out of the transformer, stop draining the oil.
5. Close the oil drain valve and remove the oil drain hose connector and hose.
6. Reinstall the cover of the oil drain valve.


9.5 Paint repair measures

Check the appearance of the cabinet for damage:

Case 1: Surface dirt caused by water stains and dust can be cleaned

Material:




- Rag
- Water
- Alcohol or other non-corrosive cleaned

Illustration	Step
	<ol style="list-style-type: none"> 1. Use a rag (or other scrubbing tool) dampened with water to scrub the dirty parts of the surface. 2. If it cannot be cleaned with water, scrub with 97% alcohol until the surface cleanliness reached an acceptable range. (You can also try to use a non-corrosive cleaner commonly used in your area)

Case 2: The surface is dirty & the topcoat is damaged, and the surface traces cannot be cleaned.

Material:




- Sandpaper
- Rag
- Water
- Alcohol
- Brush
- The color number is RAL7035 paint

Illustration	Step
	<p>1. Use sandpaper to polish the rough or scratched parts of the surface paint to make the surface smooth.</p>
	<p>2. Using a cloth dampened with water or 97% alcohol, scrub the damaged area to remove surface stains.</p>
	<p>3. After the surface is dry, use a soft brush to touch up the scratched parts of the paint, and try to keep the paint brushing as uniform as possible.</p>

Case 3: The primer is damaged and the substrate is exposed.

Material:

- Sandpaper
- Rag
- Water
- Alcohol
- Zinc rich primer
- Brush
- The color number is RAL7035 paint

Illustration	Step
	<p>1. Use sandpaper to polish the rough or scratched parts of the surface paint to make the surface smooth.</p>
	<p>2. Using a cloth dampened with water or 97% alcohol, scrub the damaged area to remove surface stains and dust.</p>
	<p>3. After the surface is dry, spray zinc-rich primer to protect the exposed parts of the substrate. The coating shall completely cover the exposed substrate.</p>



4. After the primer is dry, use a soft brush to touch up the damaged parts, and try to keep the paint brushing as uniform as possible.



It is necessary to check whether the protective paint sprayed on the shell of the CPS PSA1.1MO has peeled off, peeled paint, etc. If found, please repair it in time. The entire exterior of the CPS PSA1.1MO should be repainted with special protective paint every 5 years.

9.6 Screen maintenance and replacement

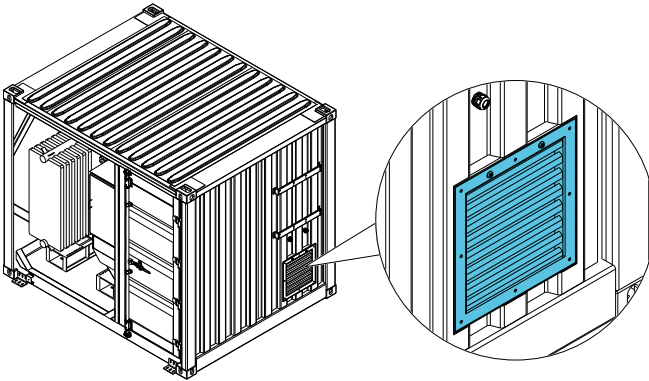


Figure 9-4 Screen position

The fixing bracket of the filter screen is fixed with a lock, as shown in the figure below. When replacing it, you need to open the lock with a key, then tilt the filter screen, take out the filter screen, replace it with a new filter screen, and then lock the lock in a correct position.

1. Open the lock and tilt the screen.

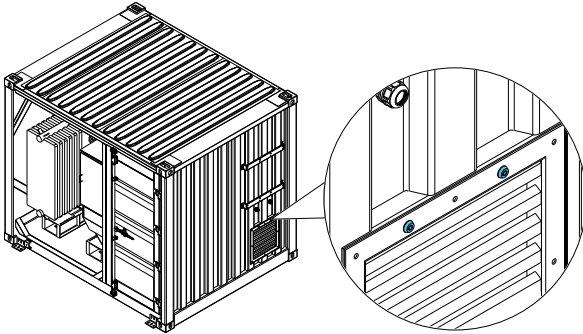


Figure 9-5 Open the locks of the window

2. Unlock the locks on the inner side.

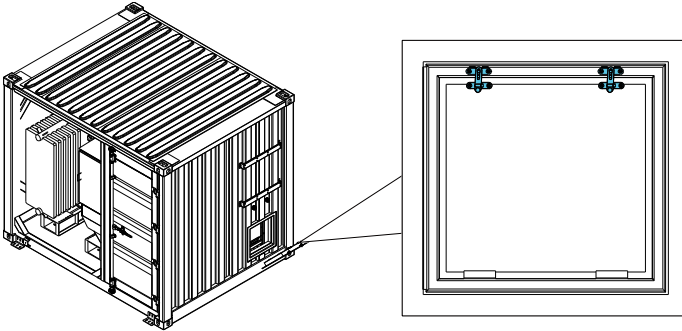


Figure 9-6 Locks of the screen

3. Pull out the screen and insert a new one.

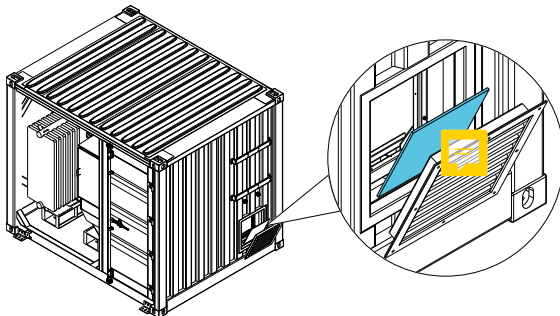


Figure 9-7 Replace the screen

4. Install the support to the original position.
5. Lock the support.

10 Technical data

Step-up CPS PSA1.1MO	Winding material Al
Type	Containerized
Rated voltage	34.5 KV
Maximum voltage	36 KV
Rated Frequency (Hz)	60
Rated Current (A)	
MV/LV-LV	18.4/793.9
Insulation Class(KV)	LI 170 AC70 /LI AC3
Insulation Thermal Class	Class A
Lightning Impulse With-stand Voltage	170kV
Power Frequency With-stand Voltage	70kV/80kV
Thermal Current (R.M.S. KA/4s)	25
Dynamic Current (Peak KA)	50
Weight (t)	About 10
Size	10' HC
Dimension (mm)	Height x Length x Width: 2591x2991x2438
Protection Class	IP54

I	Step-up Transformer	
NO.	Name	
1	Type:	Oil-immersed
2	Rated Capacity (KVA)	1100
3	Phases:	3
4	Winding material	AL
5	MV Winding Rated Voltage (KV) :	34.5
6	MV Maximum Voltage	36

	(KV)	
7	LV Rated Voltage (KV)	0.8 (Matched with inverters output)
8	Rated Frequency (Hz)	60
9	Tap Changer:	$\pm 2 \times 2.5\%$
10	Connection of Winding:	Dyn1
11	Impedance Voltage (%)	4%
	L1-M	4meet IEC60076.5)
	L1-M (100% power)	10
12	Power Frequency Withstand Voltage (KV)	
	1) MV:	70
	2) LV:	3
13	Lightning Impulse Withstand Voltage (KV) (Peak)	LI 170
14	Noise (dB)	$\leq 65\text{dB}$
15	Insulation Thermal Class	A
16	Shell Protection Class	IP54
17	Partial Discharge	Meet IEC Standard
18	Temperature Rise Limitation (K)	Top Oil: 60K Winding: 65K
19	Rated Ratio, Losses at 75°C ,(Power Factor of 1)	
	— Full Load	(meet PEI 99%)
	— Half Load	(meet PEI 99.32%)
	No Load Losses(W)	1663W
	Load Losses(W)	8500W
20	Minimum Peak Efficiency	99.58%(EU No 548 T2)

	Index	
21	Protection	Oil temperature, oil level, pressure, Buchholzrelay, winding temperature

II	RMU (MV Circuit Breaker)	RMU
1	Type	SF6
2	Rated Voltage (KV)	38
3	Rated Current (A)	630
4	1min power frequency withstand voltage (KV) phase to phase, to earth/fracture 1min	70/80
5	Lightning impulse withstand voltage (KV) phase to phase, to earth/fracture	170/195
6	Rated break current (KA) Rated break current (KA)	25/4S
7	Dynamic Current (KA)	65
8	Thermal Current (KA/s)	25/4
9	Protection	FS-R210

III	MV Surge Arrester	
1	Type	Metal-oxide surge arresters without gaps
2	Rated Voltage (KV)	51
3	Operating Voltage (KV)	134
4	Nominal discharge current (KA)	5

5	Lightning Impulse Residual Voltage (8/20 S, 5kA)(KV)	134
6	1mA DC Reference Voltage (KV)	73
7	Current Flow Capacity (2ms) (A)	800
8	Large Current Impulse Withstand	Meet IEC 60099-4
9	Large Current Discharge Current Class	Meet IEC 60099-4

IV	LV ACB	
1	Installation type	Fixed
3	Phases	3
4	Rated Voltage (V)	800
5	Frame Rate Current	2500
6	Trip Rated Current (A)	1250
7	Rated limit short-circuit breaking capacity Icu (KA)	65
8	Rated operating shortcircuit breaking capacity Ics (KA)	65
9	Rated short-circuit making capacity Icm (peak value) (KA)	143
10	Rated short-time withstand current Icw (effective value)1s (KA)	65
11	control Type	Magnetic (the overload, short circuit, grounding etc.)

V	LV MCCB	
1	Type	MCCB

2	Phases	3
3	Rated Voltage (V)	800
4	Frame Rated Current (A)	250
5	Trip Rated Current (A)	250
6	Rated limit short-circuit breaking capacity Icu: (KA)	36
7	Rated operating shortcircuit breaking capacity Ics: (KA)	36
8	control Type	Thermal

VI	LV CT	
1	Type	dry
2	Rated current Ratio	1500/5A
3	Secondary Rated Capacity (VA)	20
4	Accuracy Class	0.5

VII	Auxiliary Transformer	
1	Type:	Copper winding Dry type
2	Rated Capacity (KVA)	15
3	Phases:	3
4	primary rated voltage: (KV):	0.8
5	Primary maximum voltage: (KV)	1
6	Second rated voltage: (KV) Second rated voltage:	0.38/0.23

	(KV)	
7	Frequency (Hz)	60
VIII	Intelligent Integrated Measurement and Protection Device	Y,Outlet: MODBUS-TCP

11 Quality Assurance

11.1 Liability exemption

1. Exceed the quality assurance period of the product.
2. Cannot provide product serial number or the SN is not clear/complete.
3. Damage during transportation/storage/handling.
4. Misuse, abuse, intentional damage, negligence or accidental damage.
5. Improper commissioning, testing, operation, maintenance or installation performed by customer, including but not limited to:
 - Failure to meet safe operating environment or system requirements of external electrical parameters provided in written document;
 - Failure to operate the covered product in accordance with the product's operating manual or user guide;
 - Relocate and reinstall systems not in accordance with the requirements of Chint power;
 - Unsafe electrical or chemical environment or other similar kind of conditions;
 - Direct failure caused by wrong voltage or faulty power system;
 - Unauthorized disassembly of the products, or unauthorized modification of the product or provided software;
6. Entrust installation, maintenance personnel not designated by the CHINT to install, repair and disassemble the products;
7. Damages caused by ignoring the safety warnings in the manual or break the rules in relevant statutory safety regulations;
8. Damages caused by operating environment beyond the requirements of the product user manual or failure to commissioning, install, use and maintain the equipment according to the requirements of the product user manual.
9. Unforeseen disasters or irresistible accidents (including but not limited to acts of public enemies, acts of government agencies or domestic or foreign institutions, vandalism, riots, fires, floods, typhoons, explosions or other disasters, epidemic or quarantine restrictions, labor disturbances or labor shortages, accidents, cargo embargoes or any other events beyond the control of CHINT).
10. The lightning protection measures have not been implemented or are not in accordance

Quality Assurance with standards (Photovoltaic systems' lightning protection measures should comply with the relevant national and IEC standards; otherwise, it may result in damage to photovoltaic devices such as modules, inverters, distribution facilities, etc., due to lightning strikes).

11. Other circumstances that are not covered by the company's after-sales warranty agreement.

11.2 Quality clause (warranty clause)

1. For products that fail during the warranty period, our company will repair or replace new products free of charge.
2. Customer shall present the invoice of the product and date of purchase. At the same time, the trademark on the product should be clearly visible, otherwise we have rights to refuse quality assurance.
3. The unqualified product under replacement should be returned to our company.
4. It is necessary to provide a reasonable time for the company to overhaul the equipment.
5. For more warranty terms, refer to the applicable standard warranty policy in place at time of purchase

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