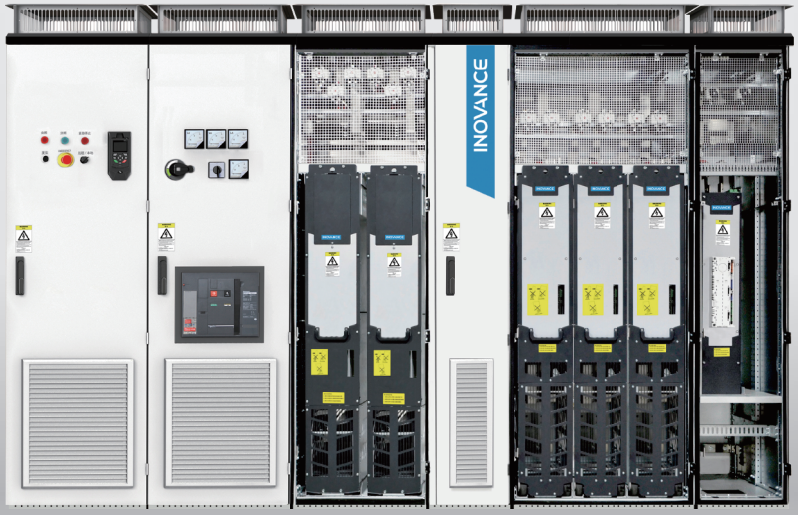
INOVANCE

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MD880 Series Multi-drive Cabinet

Design and Maintenance Guide

Industrial Automation | Intelligent Elevator | New Energy Vehicle | Industrial Robot | Rail Transit

Data code 19012267B01

Preface

Introduction

This user guide describes the design of the auxiliary cabinet, incoming cabinet, basic rectifier cabinet, active rectifier cabinet, and inverter cabinet, as well as maintenance and inspection on the cabinet. Read through this user guide especially the safety precautions before proceeding with cabinet design and maintenance.

This user guide is intended for designers of the cabinet layout of MD880 series products.

Note

- The drawings in this guide are shown for illustration only and may be different from the product. Actual products may vary.
- The user guide is subject to change due to product upgrade, specification modification as well as efforts to the accuracy and convenience of the guide.

Precaution

- Drawings in the user guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- Drawings in the user guide are for reference only and may vary with the product you purchased.
- The instructions are subject to change without notice due to product upgrade, specification modification as well as efforts to increase the accuracy and convenience of the user guide.
- Contact our agents or customer service center if you have problems during use.

More Documents

Document Name	Document Coding	Description
MD880 Series Multi-drive Cabinet Design and Maintenance Guide (This guide)	19010782	Introduces the design and maintenance of the cabinet, including auxiliary cabinet, incoming cabinet, and basic rectifier cabinet, active/regenerative rectifier cabinet, and inverter cabinet.
MD880 Series Multi-Drive Cabinet Mechanical Installation Guide	19010725	Introduces the installation dimensions, space design, specific installation steps, wiring requirements, routing requirements, option installation requirements, and common EMC troubleshooting suggestions.

Revision History

Revision date	Version	Description
March 2025	B01	Made minor corrections.
January 2023	B00	• Added sections on environmental requirements for cabinet installation, site requirements, fixation mode, thermal design, derating data, structural layout and dimensions of regenerative rectifier cabinet, braking cabinet, and connection cabinet, as well as storage and maintenance, and disposal and recycling. • Optimized section titles. • Made minor corrections.
November 2020	A02	Made minor corrections.
April 2019	A01	Added QR code to the cover
June 2018	A00	Initial release.

Access to the Guide

This guide is not delivered with the product. You can obtain the PDF version by the following methods:

- Do keyword search under Service and Support at *www.inovance.com*.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install My Inovance app, where you can search for and download user guides.

Warranty Disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. Maintenance will be charged after the warranty expires.

Within the warranty period, maintenance will be charged for the following damage:

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or unusual voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

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Safety Precautions

Safety Disclaimer

- This chapter provides essential safety instructions for proper use of the product. Before using this product, read through the user guide, especially the safety instructions. Failure to observe the safety instructions may result in death, severe personal injuries, or equipment damage.
- "DANGER", "WARNING", and "CAUTION" in this guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
- Use this product in environments meeting the design and specification requirements; otherwise, a fault may occur. Noncompliance-caused malfunction or damage to parts are not covered in product quality warranty.
- Inovance shall take no responsibility for any personal injuries or property damage caused by improper use.

Safety Levels and Definitions

	"DANGER" indicates that failure to comply with the notice can result in death or severe personal injuries.
	"WARNING" indicates that failure to comply with the notice may result in death or severe personal injuries.
	"CAUTION" indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

Safety Precautions

- Drawings in the guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- Product illustrations in this guide are for reference only. Refer to the actual product for specific information.

Unpacking

• Do not install the equipment if you find damage, rust, or signs of use on the equipment or accessories upon unpacking. • Do not install the equipment if you find water seepage or missing or damaged components upon unpacking. • Do not install the equipment if you find the packing list does not conform to the equipment you received.

CAUTION

- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package in sequence. Do not hit the package violently.
- Check whether there is damage, rust, or signs of bumping on the surface of the equipment and equipment accessories before unpacking.
- Check whether the package contents are consistent with the packing list before unpacking.

Storage and Transportation

WARNING

- Large-scale or heavy equipment must be transported by qualified professionals using specialized hoisting equipment. Failure to comply may result in personal injuries or equipment damage.
- Before hoisting the equipment, ensure that components such as the front cover and terminal blocks are secured firmly with screws. Loosely-connected components may fall off and result in personal injuries or equipment damage.
- Never stand or stay below the equipment when the equipment is being hoisted by the hoisting equipment.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply may result in personal injuries or equipment damage.

CAUTION

- Handle the equipment with care during transportation and mind your steps to prevent personal injuries or equipment damage.
- When carrying the equipment with bare hands, hold the equipment casing firmly with care to prevent parts from falling. Failure to comply may result in personal injuries.
- Store and transport the equipment based on the storage and transportation requirements. Failure to comply can result in equipment damage.
- Avoid storing or transporting the equipment in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing this product for more than three months. Long-term storage requires stricter protection and necessary inspection.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport the equipment with other equipment or materials that may harm or have negative impacts on the product.

Installation

DANGER

- Installation must be carried out by skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise. Non-professionals are not allowed to install the equipment.



- Read through the guide and safety precautions before installation.
- Do not install the equipment in places with strong electric or magnetic fields.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply will result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in electric shock.
- When installing the equipment in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or a fire.
- Do not retrofit the equipment.
- Do not fiddle with the bolts used to fix equipment components or the bolts marked in red.
- When the equipment is installed in a cabinet or final assembly, a fireproof enclosure providing both electrical and mechanical protections must be provided. The IP rating must meet IEC standards and local laws and regulations.
- Before installing equipments with strong electromagnetic interference, such as a transformer, install a shielding equipment for the equipment to prevent malfunction.
- Install the product on an incombustible object such as metal and do not touch or attach the product to combustibles. Failure to comply can result in fire accident.



- Cover the top of the equipment with a piece of cloth or paper during installation. This is to prevent unwanted objects such as metal chippings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper to prevent over-temperature caused by poor ventilation due to blocked ventilation holes.
- Resonance may occur when the equipment operating at a constant speed switches to variable speed operations. In this case, install the vibration-proof rubber under the motor frame or use the vibration suppression function to reduce resonance.

Wiring



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Before wiring, disconnect all the power supplies of the equipment. Wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. Measure the DC voltage of the main circuit and make sure that it is below the safety voltage. Failure to comply can result in electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply can result in electric shock.
- Check that the equipment is grounded properly. Failure to comply can result in electric shock.



- Do not connect the input power supply to the output side of the equipment. Failure to comply can result in equipment damage or even a fire.
- When connecting a drive to the motor, check that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- Cables used for wiring must meet cross sectional area and shielding requirements. The shield of the cable must be reliably grounded at one end.
- Tighten the terminal screws with the tightening torque specified in the user guide. Improper tightening torque may result in overheat, damage to the connecting parts, or a fire.
- After wiring is done, check that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply may result in electric shock or equipment damage.



- Follow the electrostatic discharge (ESD) procedure and wear an anti-static wrist strap to perform wiring. Failure to comply may result in damage to the equipment or to the internal circuit.
- Use shielded twisted pairs for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply can result in equipment malfunction.

Power-on



- Before power-on, check that the equipment is installed properly with reliable wiring and the motor can be restarted.
- Check that the power supply meets equipment requirements before powering on to prevent equipment damage or a fire.
- When the equipment is powered on, do not open the cabinet door or protective cover, touch any wiring terminal, or disassemble any component of the equipment. Failure to comply can result in electric shock.



- Perform a trial run after wiring and parameter setting to ensure that the equipment operates safely. Failure to comply may result in personal injuries or equipment damage.
- Before powering on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in a fire.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.

Operation state



- The equipment must be operated only by professionals. Failure to comply can result in death or personal injuries.
- During operation, do not touch any connecting terminals or disassemble any component of the equipment. Failure to comply can result in electric shock.



- Do not touch the equipment enclosure, fan, or resistor with bare hands. Failure to comply may result in burns.
- During operation, prevent metal or other objects from falling into the equipment. Failure to comply may result in a fire or equipment damage.

Maintenance



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply can result in electric shock.
- Before maintenance, disconnect all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
- When a permanent magnet motor is used, do not touch the motor terminals immediately after power-off because the motor terminals can generate induced voltage during rotation even after the equipment is powered off. Failure to comply can result in electric shock.



- Perform routine and periodic inspection and maintenance on the equipment in accordance with maintenance requirements and keep a maintenance record.

Repair



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not repair the equipment with power ON. Failure to comply can result in electric shock.
- Before inspection and repair, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.

WARNING

- Require for repair services in accordance with the product warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injuries, or equipment damage.
- Troubleshooting and repair must be performed by professionals in accordance with the repair instructions, with repair records kept properly.
- Replace quick-wear parts of the equipment in accordance with the replacement instructions.
- Do not operate on damaged equipment. Failure to comply may result in death, personal injuries, or worse equipment damage.
- After the equipment is replaced, check the wiring and set parameters again.

Disposal

WARNING

- Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in death, personal injuries, or property damage.
- Recycle retired equipment in accordance with industry waste disposal standards to avoid environmental pollution.

Safety Label

To ensure safe operations, comply with safety signs on the equipment and do not damage or remove the safety labels. See the following table for descriptions of the safety labels:

Safety Label	Description
	• Read through the safety instructions before operating the equipment. Failure to comply may result in death, personal injuries, or equipment damage. • Do not touch the terminals or remove the cover with power ON or within 15 min after power-off. Failure to comply will result in electric shock.

1 Cabinet System Structure

1.1 Single-Cabinet Type

1.1.1 Cabinet Type and Width

Name	300-mm wide	400-mm wide	600-mm wide	800-mm wide
Auxiliary cabinet	-	400-mm wide (2 x HCU)	600-mm wide (4 x HCU)	800-mm wide (6 x HCU)
Incoming cabinet	-	400-mm wide 6-pulse (630–1,600 A)	600-mm wide 6-pulse (2,000–2,500 A) 12-pulse (2x630–2x1,000 A)	800-mm wide 6-pulse (3,200 A)
Basic rectifier cabinet	-	400-mm wide (1 x T2)	600-mm wide (2 x T2)	800-mm wide (3 x T2)
Active rectifier cabinet	-	-	600-mm wide (BLCL+H8)	800-mm wide (BLCL+2 x H8)
Regenerative rectifier cabinet	-	-	600-mm wide (L+H8)	800-mm wide (L+2 x H8)
H8 inverter cabinet	-	400-mm wide (1 x H8)	600-mm wide (2 x H8)	800-mm wide (3 x H8)
H7 inverter cabinet	-	400-mm wide (1 x H7)	600-mm wide (2 x H7)	800-mm wide (3 x H7)
H6 inverter cabinet	-	400-mm wide (1 x H6)	600-mm wide (2 x H6)	800-mm wide (3 x H6)
H1 to H6 multi-function cabinet	-	400-mm wide (1 x H6) 400-mm wide (1 x H4) 400-mm wide (2 x H1 to H3)	600-mm wide (H6) 600-mm wide (H6+2 x H1 to H3) 600-mm wide (H4+2 x H1 to H3) 600-mm wide (2 x H4) 600-mm wide (4 x H1 to H3)	600-mm wide (2 x H6) 600-mm wide (H6+H4) 600-mm wide (H6+3 x H1 to H3) 600-mm wide (H4+3 x H1 to H3) 600-mm wide (5 x H1 to H3) 600-mm wide (3 x H4)
Braking Cabinet	-	-	600-mm wide	-
Connection cabinet	300-mm wide	-	-	-

Note

H8, L, T2, and BLCL: The buffer or reactor is not included in H6/H7 inverter cabinet with a width of 600 mm or 800 mm.

1.1.2 Cabinet Model

MD880-50C-800-0800
① ② ③ ④

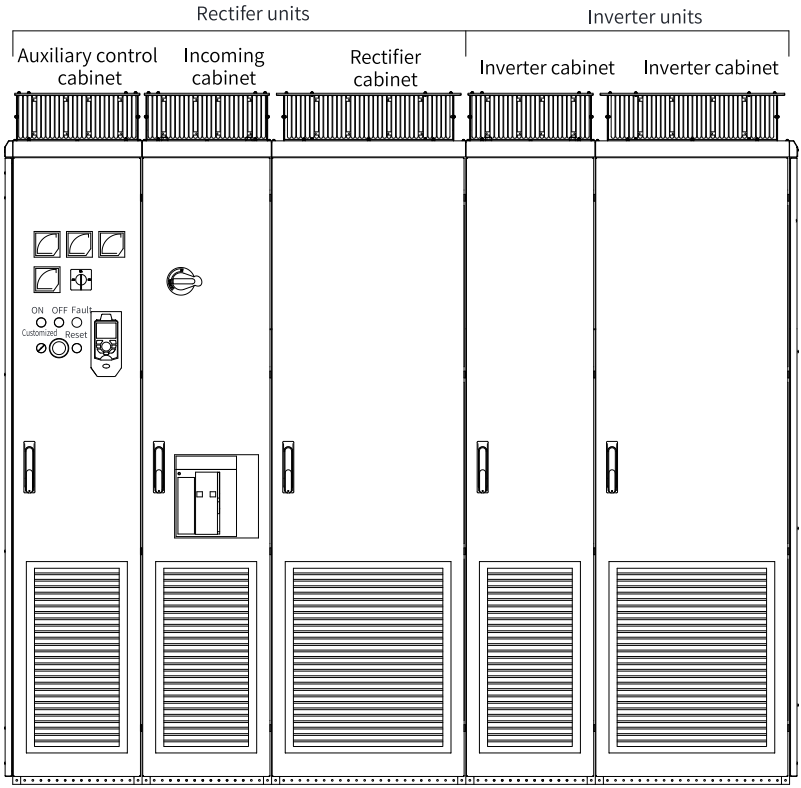
① **Product platform** MD880: MD880 series	③ **Cabinet width** 300: 300 mm 400: 400 mm 600: 600 mm 800: 800 mm
② **Product type** 01C: Auxiliary cabinet 11C: 6-pulse basic rectifier incoming cabinet 12C: 12-pulse basic rectifier incoming cabinet 13C: Regenerative/Active rectifier incoming cabinet 20C: Basic rectifier cabinet 30C: Regenerative rectifier cabinet 40C: Active rectifier cabinet 50C: Inverter cabinet 60C: Braking cabinet 70C: Connection cabinet	④ **Rated current of the incoming cabinet** 0630: 630 A 0800: 800 A 1000: 1000 A 1250: 1250 A 1600: 1600 A 2500: 2500 A 3200: 3200 A

1.1.3 Cable Inlet/Outlet Load Interfaces of the Power Cabinet

Specifications of cable inlet/output copper busbar and number of wiring holes						
Item	Cabinet type	Name	Current	Copper busbar (mm x mm)	Wiring holes (mm)	Recommended cable specification (mm x mm)
1	Incoming Cabinet	LCU1-0630 x 6-pulse 400-mm wide	630 A	60 x 8	Φ13 x 4	4 x 150
2		LCU1-0800 x 6-Ppulse 400-mm wide	800 A			
3		LCU1-1000 x 6-pulse 400-mm wide	1,000 A	60 x 10		6 x 150
4		LCU1-1250 x 6-pulse 400-mm wide	1,250 A			4 x 240
5		LCU1-1600 x 6-pulse 400-mm wide	1,600 A	60-62	Ø17 x 4	6 x 240
6		LCU2-2000 x 6-pulse 600-mm wide	2,000 A	80-82	Φ17 x 5	8 x 240
7	Inverter Cabinet	LCU2-2500 x 6-pulse 600-mm wide	2,500 A	(80 x 10) x 2		10 x 240
8		LCU3-3200 x 6-pulse 800-mm wide	3,200 A	(100 x 8) x 3	Φ17 x 6	10 x 300
9		LCU2-0630 x 12-pulse 600-mm wide	630 A	50 x 6	Ø17	2 x 240
10		LCU2-0800 x 12-pulse 600-mm wide	800 A	(50 x 6) x 2	Φ17 x 2	4 x 240
11		LCU2-1000 x 12-pulse 600-mm wide	1,000 A	(50 x 6) x 2	Φ17 x 2	4 x 240
12		H8 400-mm wide	H8	40 x 8	Φ13 x 2	See MD880-50 Series Inverter Module Hardware Guide
13		2 x H8 600-mm wide	2 x H8	(40 x 8) x 2	Φ13 x 4	See MD880-50 Series Inverter Module Hardware Guide
14		3 x H8 800-mm wide	3 x H8	(40 x 8) x 3	Φ13 x 6	See MD880-50 Series Inverter Module Hardware Guide
15	Braking Cabinet	Three-phase braking cabinet	H8	40 x 8	Φ13 x 2	See MD880-50 Series Inverter Module Hardware Guide

1.2 Overview of the Cabinet

The following figure shows an example of the cabinet with rectifier and inverter units. The cable enters the cabinet through the bottom.



Name	Function
Auxiliary control cabinet	Used for centralized control of the system, which is comprised of customer DI/DO interfaces, control power supply, HCU control module, instrument display, and panel control.
Incoming cabinet	Used for connection between the power grid of the factory and the rectifier cabinet, which includes the power input cable terminals and the switching devices.
Rectifier cabinet	Used as power supply for the entire drive system, converting the AC voltage from the grid into DC voltage to power the inverter units connected to the common DC busbar, including the rectifier filter module, basic rectifier module, or active rectifier module, as well as the AC fuse.
Inverter cabinet	An inverter module for motor drive, including various models of inverter power modules, DC bus fuses, and DC disconnectors (optional).

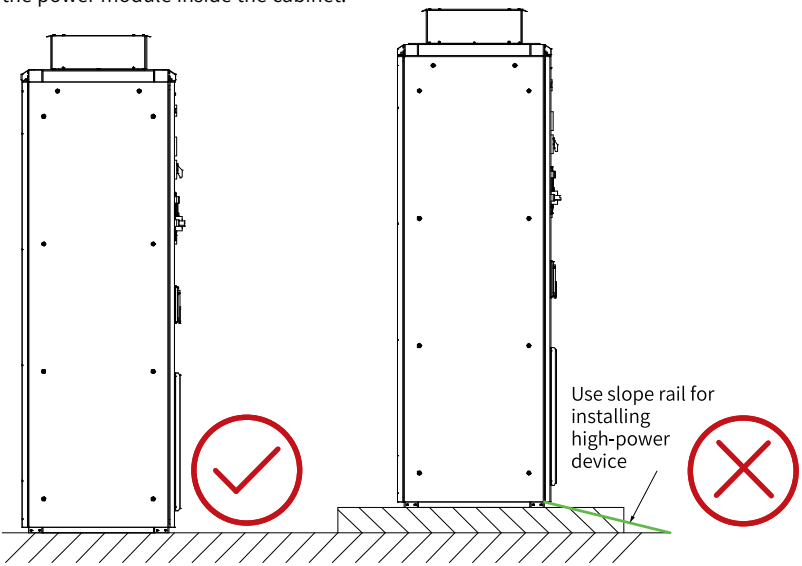
2 General Cabinet Design Instructions

2.1 Installation Environment

No.	Requirement
1	The installation site must be well ventilated or cooled to ensure proper heat dissipation.
2	The environment in which the drive cabinet is installed must meet the specifications.
3	The wall behind the drive cabinet must be made of non-flammable material.
4	Reserve enough space above the drive cabinet to allow the cooling air to circulate.
5	The floor that the drive cabinet is installed on is of non-flammable material, as smooth as possible, and strong enough to support the weight of the cabinet. Check the floor flatness with a spirit level. The maximum allowed deviation from the surface level is 5 mm (0.2 in) in every 3 meters (10 ft). Level the installation site, if necessary, as the cabinet is not equipped with adjustable feet. Level the installation site, if necessary, as the cabinet is not equipped with adjustable feet.

Caution

To facilitate maintenance, place the cabinet in a low position. If the cabinet is installed to a high position, the slope rail that comes with the module cannot be used when you replace the power module inside the cabinet.



2.2 Installation Site Requirements

The foundation design should account for the inspection space in front of the MD880 multi-drive cabinet, as well as the installation and routing of power supply cables, drive motor cables, and system control cables. It is recommended to design a cable trench or cable conduit beneath the MD880 multi-drive cabinet (power and signal cables must be separated to avoid affecting equipment functionality). The wiring diagram and requirements are shown below.

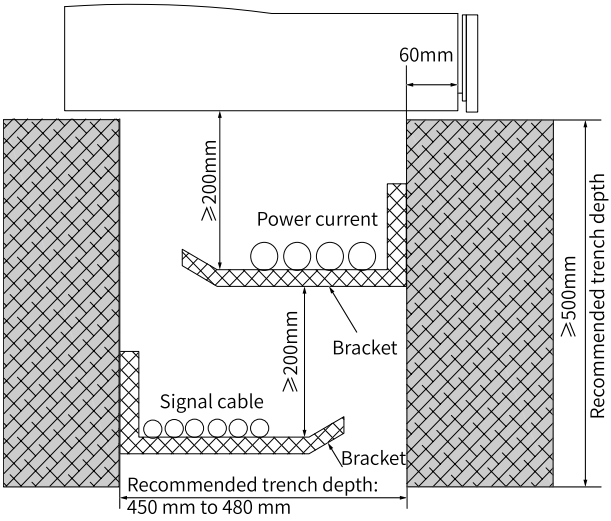


Figure 2-1 Installation site requirements

2.3 Cabinet Structure

- The cabinet frame must be sturdy enough to carry the weight of the drive components, control circuit and other equipment installed in it.
- The cabinet must protect the power module against contact and meet the requirements for dust and humidity.

2.4 Fixation Mode

- Fixing the cabinet
  The drive cabinet must be installed vertically and upright. Use bolts to secure the cabinet to the base through the inner holes.
- Joining Cabinet Sections Together
  Wide cabinet line-ups are delivered in multiple sections. Attach the adjacent sections to the joining cubicle at the end of each cabinet section. A plastic bag inside the cabinet contains the special bolts used to fix the cabinet sections.

2.5 Heat Dissipation Design

- The cabinet must be well ventilated to comply with the cooling air flow and ambient temperature requirements. The internal cooling fan of the drive module can rotate at the set speed, ensuring a constant air flow surrounding the module. The amount of heat

that must be dissipated from the cabinet determines the amount of air that must be refreshed.

- Reserve sufficient space surrounding the components to allow heat dissipation. The space reserved must meet the minimum clearance required by each component.
- Ventilation is also needed for cables and other additional devices.
- Ensure that the air inlet and outlet are large enough to ensure sufficient air flow in and out of the cabinet. This requirement is essential for proper cooling of the drive module.

2.5.1 Air Duct Design

Requirements for cooling ducts of cabinets comprised of H1 to H6 frames

Mounting spaces and clearances of inverter units with H1 to H6 frames are different based on the power rating. The following figure shows the mounting space and clearance diagram of units with H1 to H6 frames.

Note

The following dimensions are the minimum values.

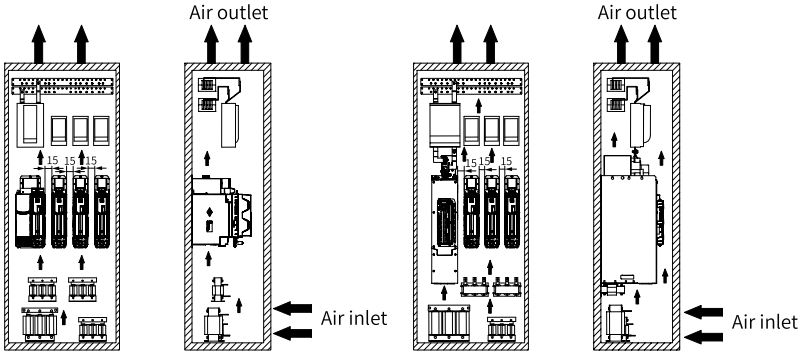


Figure 2-2 Air duct requirements (mm)

Requirements for cooling ducts of single-module cabinets comprised of H6 to H7 frames

Mounting spaces and clearances of inverter units with H6 to H7 frames are different based on the power rating. The following figure shows the mounting space and clearance diagram of single-module cabinets.

Note

The following dimensions are the minimum values.

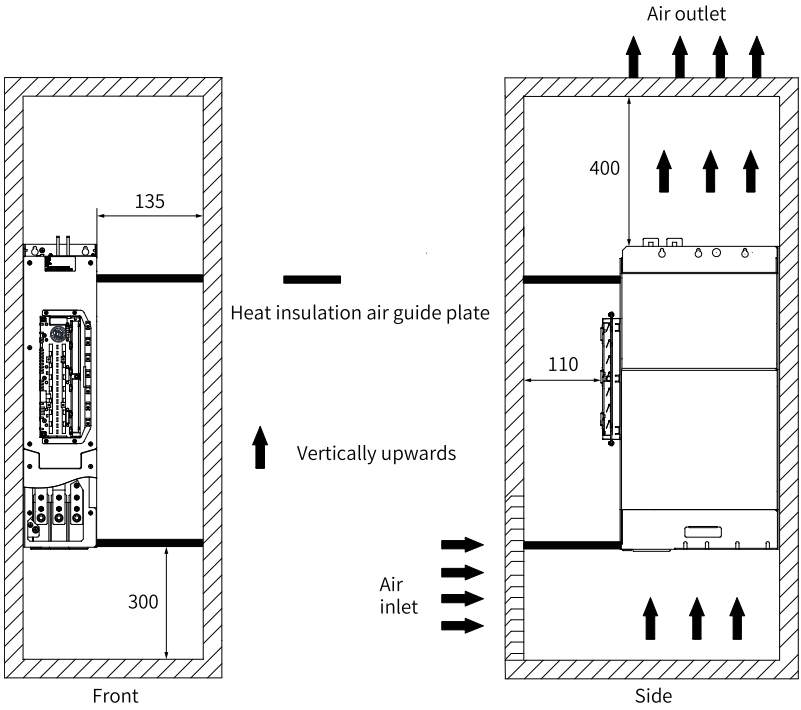


Figure 2-3 Air duct requirements (mm)

Requirements for cooling ducts of single-module cabinets comprised of H8 inverter module, T2 rectifier module, and BLCL filter module

The following figure shows the mounting space and clearance diagram of the cabinet with H8 inverter module, T2 rectifier module, and BLCL filter module. The cabinet depth is 600 mm (frame size). The module is 40 mm away from the front door plate to facilitate routing of cables and optical fibers, and 30 mm away from the rear door.

Note

The following dimensions are the minimum values.

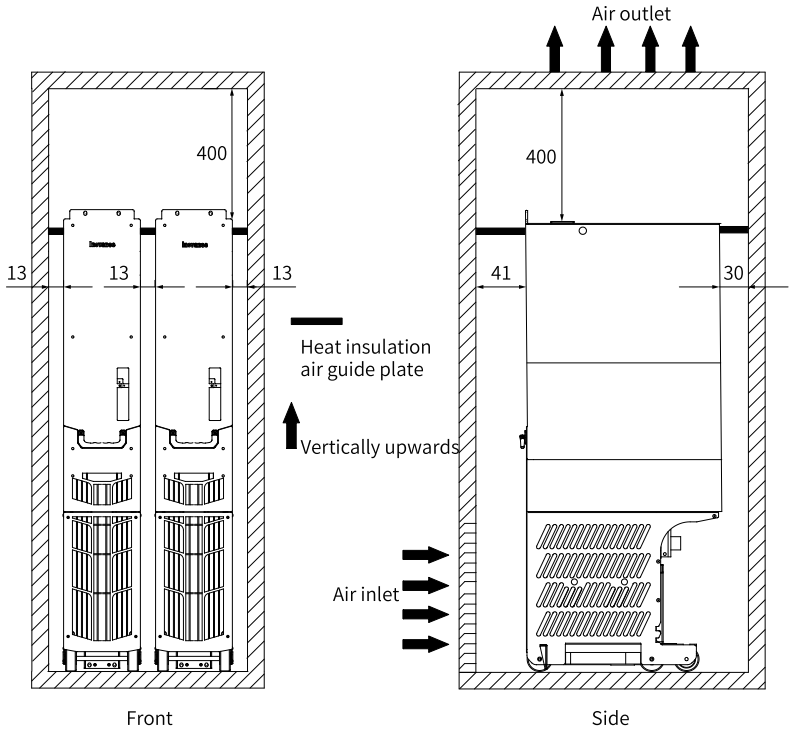


Figure 2-4 Air duct requirements (mm)

2.5.2 Air Inlet and Outlet Specifications

- Minimum ventilation space must be reserved above and below the inverter module to ensure effective air ventilation. Particularly when using cable ducts, this must be strictly followed, and no wiring or installation of any components is permitted within this area. The arrangement of air inlets and outlets shall comply with the following requirements.
  - Air inlet area: S = (1.5 to 2.0) x (S_{unit} 1 + S_{unit} 2 + S_{unit} 3+… + S_{unit} N)
  - S: Ventilation area of the system in m^2; S_{unit} : : Ventilation area of each unit in cm^2
  - Air outlet area: S = (1.2 to 1.5) × Air inlet area

The ventilation areas for each inverter unit of the MD880 are shown in the table below:

Structure	Ventilation area of the inverter unit (cm^2)
H1 to H3	13
H4	70
H6	710
H7	750
H8	1,400

2.5.3 Preventing Recirculation of Hot Air

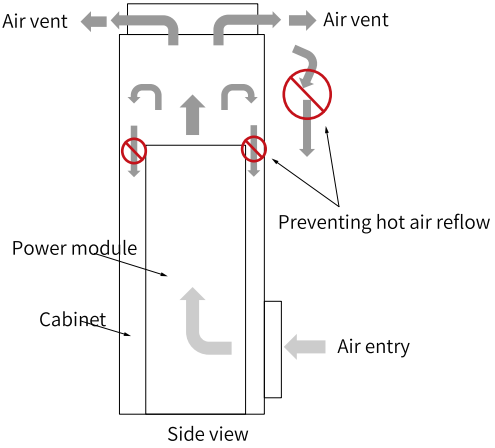


Figure 2-5 Air exhaust

Exterior of cabinet

Prevent the hot air outside the cabinet from entering air flow circulation by guiding the hot air away from the air inlet area. Some possible solutions include:

- Set grids for airflow guidance at the air inlet and outlet.
- Position the air inlet and outlet on different sides of the cabinet.
- Position the cooling air inlet below the front door and install additional blowers on top of the cabinet.

Interior of cabinet

Prevent the hot air from circulating inside the cabinet using a leak-proof air baffle at the location shown in the appropriate power module manual. Seal the baffle to the inner wall using a neoprene gasket or equivalent.

2.5.4 Requirement for Space Inside the Cabinet

To facilitate installation and maintenance, it is recommended to leave enough space around the equipment to allow adequate cooling air flow, necessary clearance, and space required for holding cables and cable supports. Do not install the control board near the main circuit or high-temperature parts.

For the interior space requirements of inverter cabinets of different frames, see *"2.5.1 Air Duct Design" on page 18*.

2.6 Grounding the Mounting Frame

Make sure any cross-devices or frames on which components are mounted are properly grounded and the connecting surfaces are left unpainted.



Ensure that the module is grounded properly through the fixing points on the mounting baseplate.

2.7 Material and Connection of Busbar

- It is recommended to use nickel plated copper or aluminum materials for the busbar.
- Before connecting the aluminum busbar, remove the oxide coating on the busbar and apply proper antioxidant joint compound.

2.8 Cabinet Heater

If there is a risk of condensation in the cabinet, use a cabinet heater. Although the heater is mainly used to keep the air dry, it can also be used for heating in low temperatures. When placing the heater, follow the instructions provided by the manufacturer.

Recommended: Siv HDJR-100L.

2.9 EMC Requirements

- The fewer and smaller the holes in the cabinet, the better the anti-interference and anti-attenuation performance will be. The maximum diameter of a hole on the galvanic metal contact surface in the covered cabinet structure is 100 mm. Pay special attention to the size of the grid holes at the cooling air inlet and air outlet.
- Weld the steel panels together without holes to achieve the optimal electrical connection. If welding is not possible, do not paint the gap between panels. In this case, install special conductive EMC bars to realize galvanic connection. Generally, reliable conductive bars are made of flexible silicon with the surface covered by a metal mesh. Additional conductive gaskets are needed between metal surfaces to enhance the contact between them. The maximum distance between assembly screws is 100 mm.
- Make sure that a high-frequency multi-point grounding system has been established in the cabinet. This is to prevent voltage difference and to form structures that can shield against radiation. Use short and flat low-inductance copper braids to improve the performance of high-frequency grounding system. Do not use high-frequency one-point grounding due to the long distances in the cabinet.

- Conductive EMC shielding gaskets are not sufficient for protective grounding. A sturdy low-frequency grounding structure is required for electrical safety of the components. Follow local regulations to design protective grounding.
- Routing
  - To enable the drive to comply with EMC requirements, a 360° high frequency grounding must be performed at the cable inlet of the motor and control cable shield (360° grounding is also recommended for the power supply cable.).
  - For the input and output shielded power cables inside the cabinet, the shield must come into contact with the shield plate inside the cabinet through a large surface area to achieve a proper EMC shielding effect. The following figure shows the mounting mode.

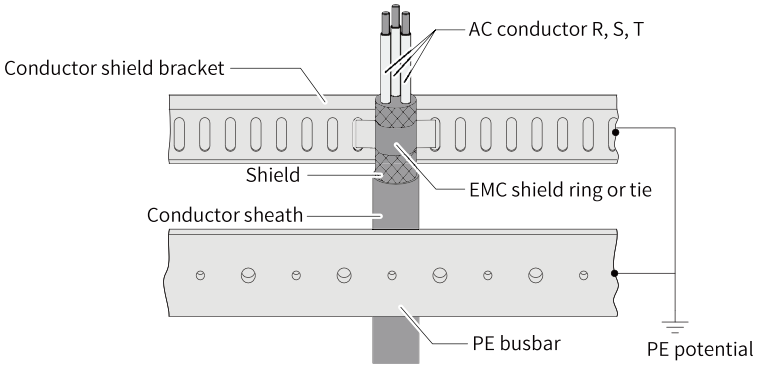


Figure 2-6 Connection of shielded power cables

3 Common Kit for Cabinets

The MD880 cabinets are assembled from common sets and dedicated sheet metal parts. The common set includes the cabinet frame, front and back door panels, and top cover. The dedicated sheet metal parts are used to hold power modules and components together in the frame.

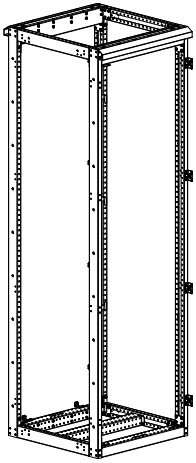
- Thermoplastic urethanes coating (20 μm in thickness) is applied on visible surface of the hot-galvanized steel plate of the cabinet. The thickness of the hot-galvanized coating is 80–120 μm. Color: RAL 7035 (light beige, matt) Copper busbar, tin-plating or nickel-plating
- Inverter module: Color RAL 433U, hot-galvanized steel plate 1.5–2 mm
- Fireproof materials (IEC 60332-1) are non-metal insulation materials, most of which can be self-extinguished.
- The packing box is made of wooden or plywood plates.

Note

The relationship between frame and top cover can be defined by users.

Cabinet frame

The cabinet frame is a universal structural component, available in four width variants of 300 mm, 400 mm, 600 mm, and 800 mm to accommodate different cabinet dimensions.



Cabinet top cover

The top cover is also a universal structural component, available in four width variants of 300 mm, 400 mm, 600 mm, and 800 mm to accommodate different cabinet dimensions.



4 Layout and Dimensions of Cabinet Structure

4.1 Auxiliary Cabinet

Auxiliary cabinet layout

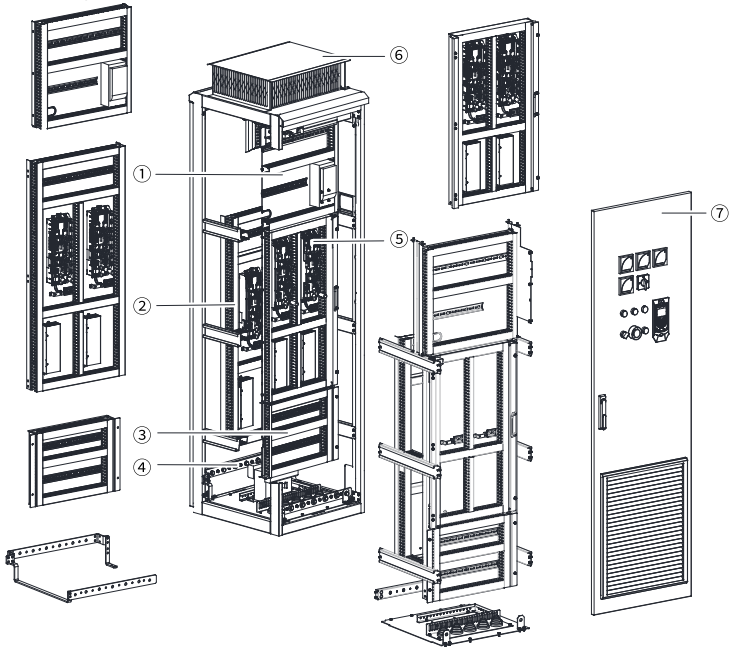


Figure 4-1 Auxiliary cabinet layout

No.	Name
①	Terminal mounting plate on top of cabinet, which is used for installation of terminals, air switches, and fuse switches
②	HCU mounting plate in front of the cabinet that used for installation of the HCU and HPCU
③	Control terminal mounting plate
④	Copper busbar kit of the auxiliary cabinet
⑤	HCU mounting plate at the rear of the cabinet that used for installation of the HCU and HPCU
⑥	Top cover with an IP rating of IP21
⑦	Auxiliary cabinet door plate that used for installation of electric meters and smart operating panel SOP-20-880

Dimensions of the auxiliary cabinet

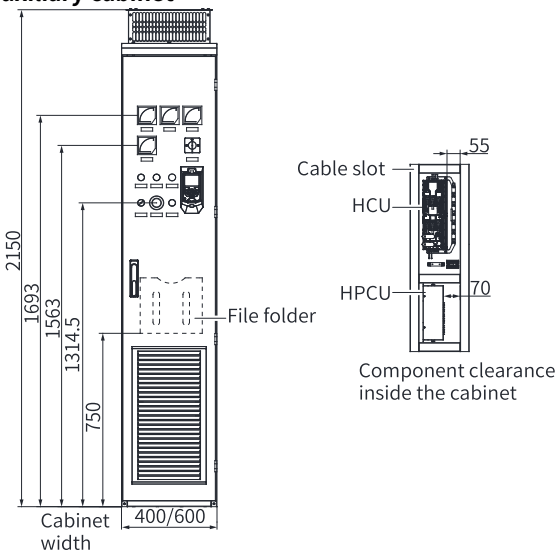


Figure 4-2 Dimensions of auxiliary cabinet (mm)

4.2 Incoming Cabinet

Layout of the incoming cabinet

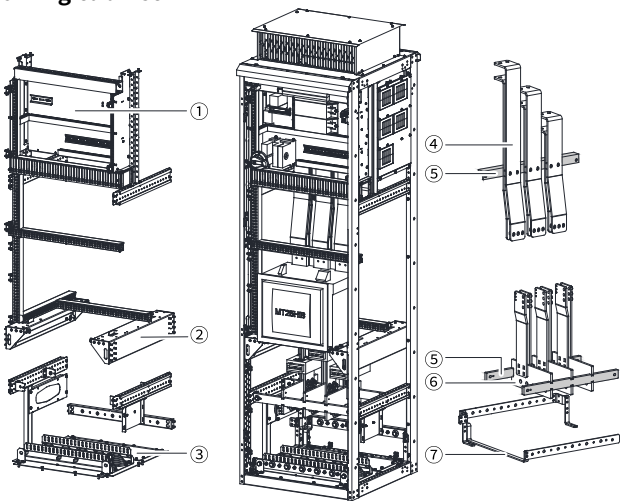


Figure 4-3 Layout of the incoming cabinet

No.	Name
①	Mounting plate on top of the cabinet, used for installation of terminals, air switches, and fuse switches (not available in basic rectifier cabinets)
②	Circuit breaker mounting plate
③	Bottom plate of the cabinet, which is set with cable inlet holes
④	Wiring copper busbar of the circuit breaker
⑤	Insulating beam for fixing the copper busbar
⑥	Wiring copper busbar of circuit breaker
⑦	PE bus of the incoming cabinet

Dimensions of the incoming cabinet

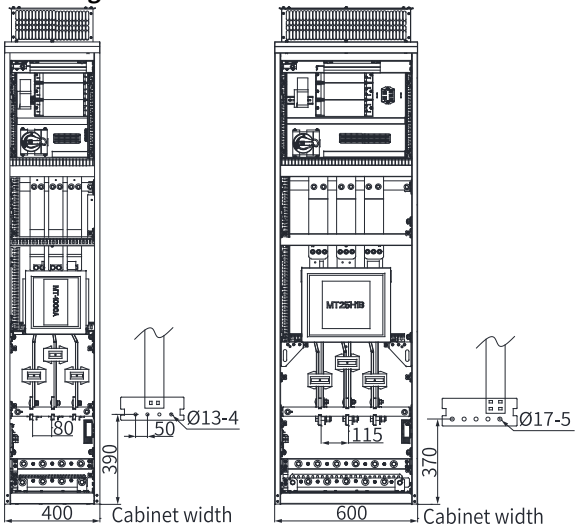


Figure 4-4 Dimensions of the incoming cabinet (mm)

4.3 Basic Rectifier Cabinet

Layout of the basic rectifier cabinet

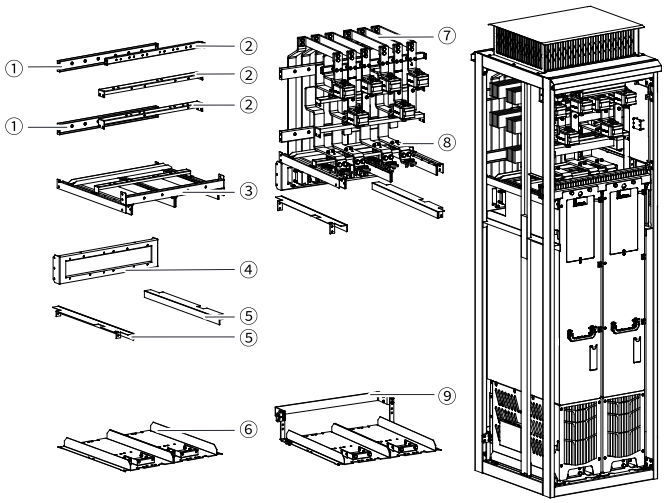


Figure 4-5 Layout of the basic rectifier cabinet

No.	Name
①	Beam for installing copper busbar on back of the cabinet
②	Beam for fixing the copper busbar in front of the cabinet
③	Module mounting bracket
④	Quick connecting terminal
⑤	Mounting bracket
⑥	General module mounting baseplate
⑦	Input copper busbar of T2 basic rectifier module
⑧	Output copper busbar of T2 basic rectifier module
⑨	PE copper busbar of the rectifier cabinet

Dimensions of basic rectifier cabinet

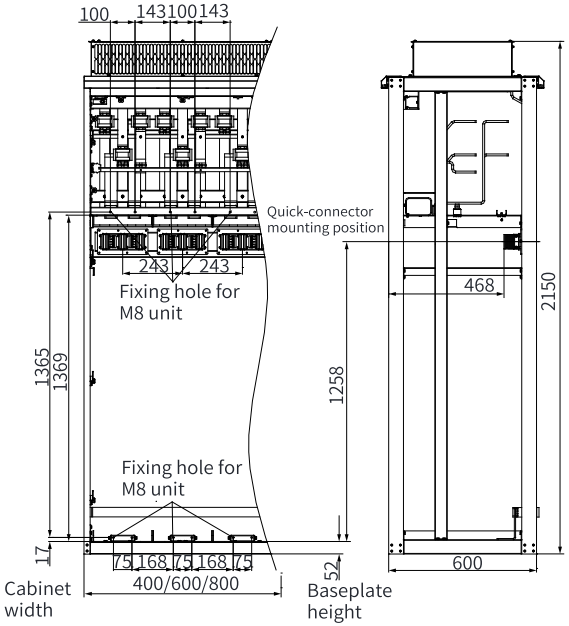


Figure 4-6 Dimensions of basic rectifier cabinet (mm)

4.4 Regenerative Rectifier Cabinet

Layout of regenerative rectifier cabinet

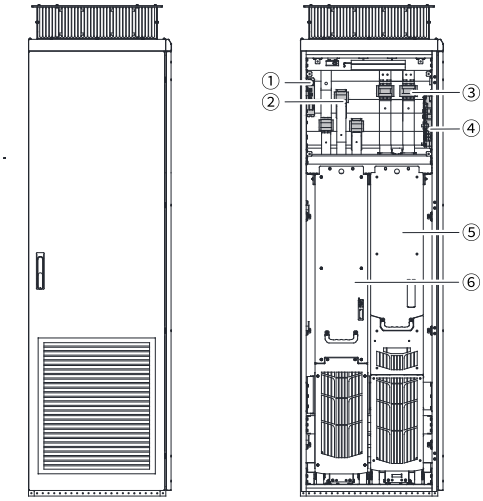


Figure 4-7 Layout of the regenerative rectifier cabinet (L+H8)

No.	Name
①	HSVM synchronous voltage detection module
②	Fuse on the AC side
③	Fuse on the DC side
④	Fan power supply
⑤	Regenerative rectifier module
⑥	Regenerative rectifier filter module

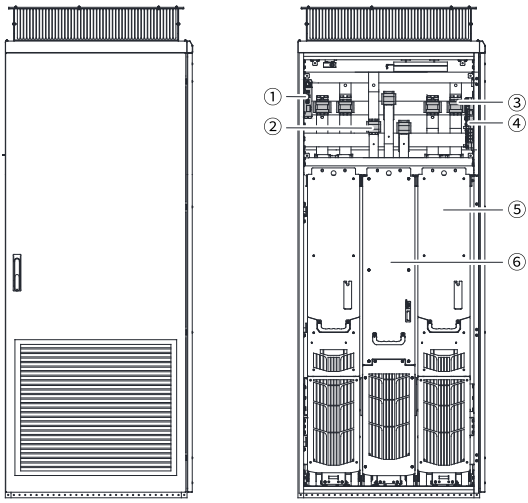


Figure 4-8 Layout of the regenerative rectifier cabinet (L+2H8)

No.	Name
①	HSVM synchronous voltage detection module
②	Fuse on the AC side
③	Fuse on the DC side
④	Fan power supply
⑤	Regenerative rectifier module
⑥	Regenerative rectifier filter module

Dimensions of the regenerative rectifier cabinet

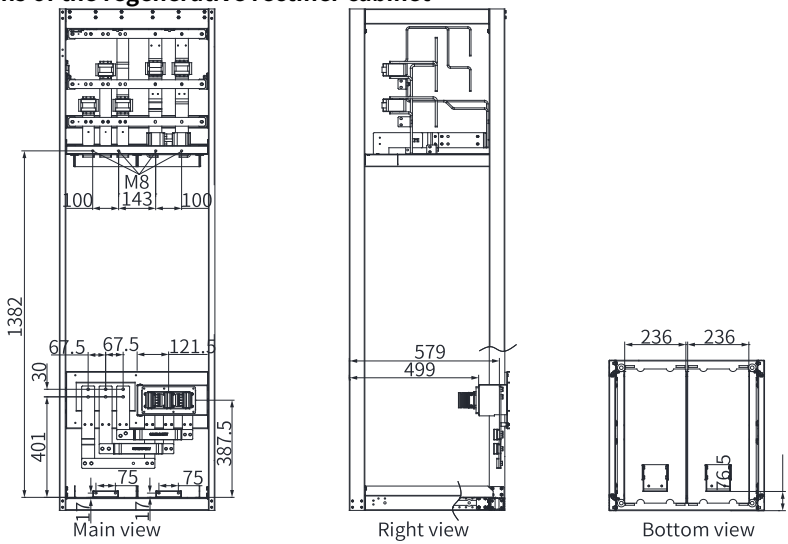


Figure 4-9 Dimensions of regenerative rectifier cabinet with a width of 400 mm

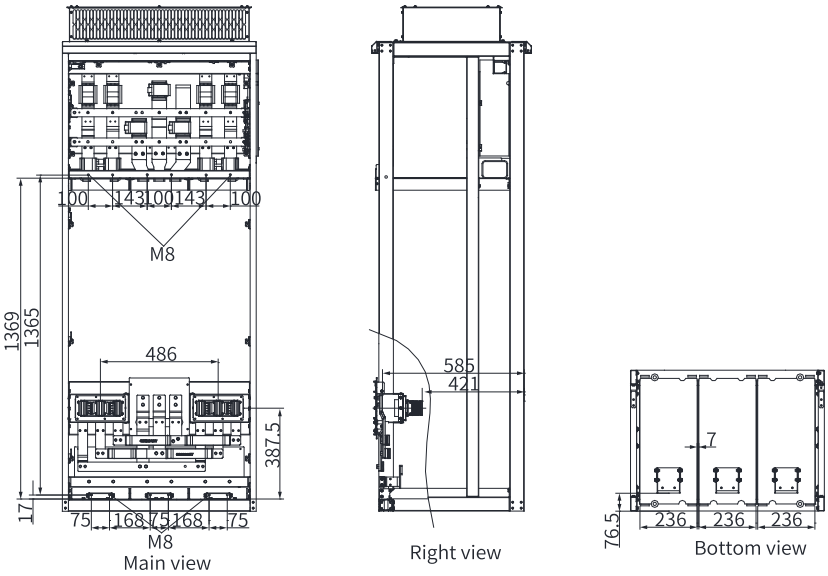


Figure 4-10 Dimensions of regenerative rectifier cabinet with a width of 600 mm

4.5 Active Rectifier Cabinet

Layout of the active rectifier cabinet

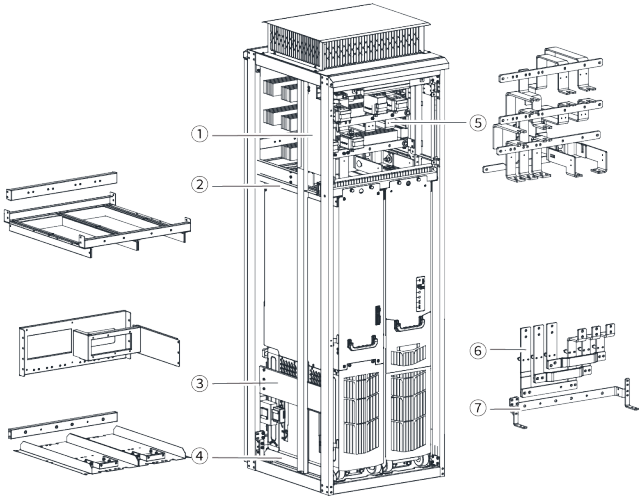


Figure 4-11 Layout of the active rectifier cabinet

No.	Name
①	Mounting plate on both sides of the cabinet, which is used for installation of the SVM card and LCL fan power supply
②	Frame for fixing the module
③	Copper busbar and quick-fit mounting beam
④	Module mounting baseplate
⑤	BLCL input copper busbar and H8 output copper busbar
⑥	Copper busbar used to connect H8 and BLCL
⑦	PE copper busbar of active rectifier cabinet with a width of 600 mm

Dimensions of the active rectifier cabinet

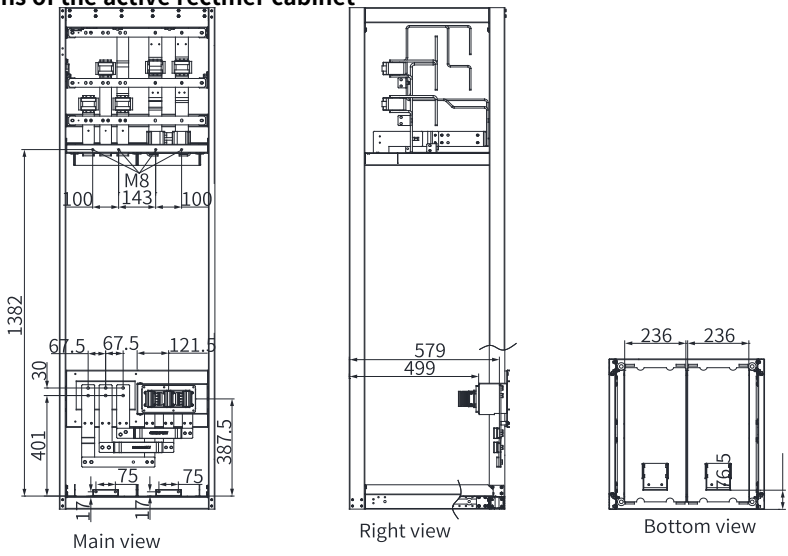


Figure 4-12 Dimensions of active rectifier cabinet with a width of 600 mm

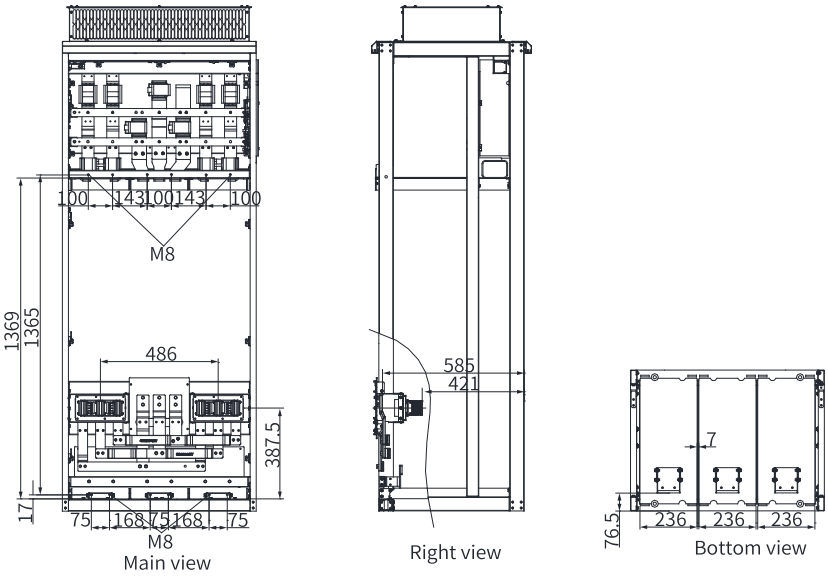


Figure 4-13 Dimensions of active rectifier cabinet with a width of 800 mm

4.6 Inverter Cabinet

Layout of the inverter cabinet

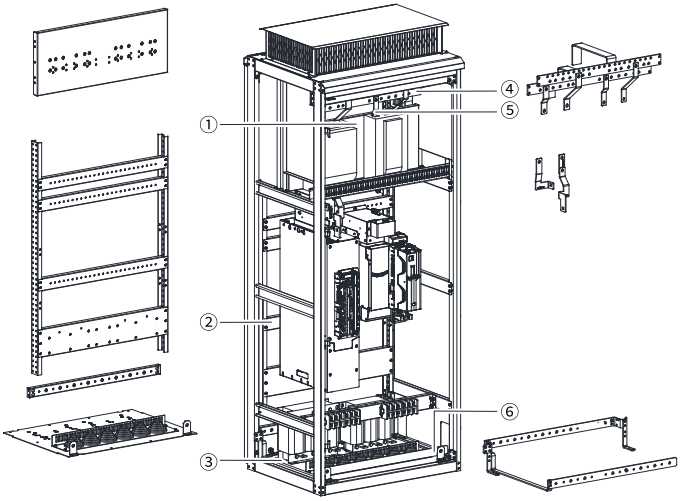


Figure 4-14 Layout of H1 and H6 inverter cabinets

No.	Name
①	Mounting plate for fuse switch on top of cabinet
②	Mounting beam for H1 to H6 modules
③	Cabinet bottom plate
④	Positive/Negative adapter bus
⑤	Module input copper busbar and copper busbar for connecting the fuse switch
⑥	PE copper busbar for 800-mm wide cabinets

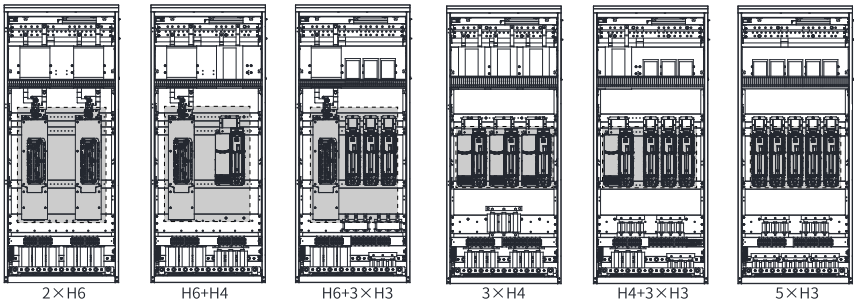


Figure 4-15 Mounting mode for H1 to H6 inverter modules (800-mm wide)

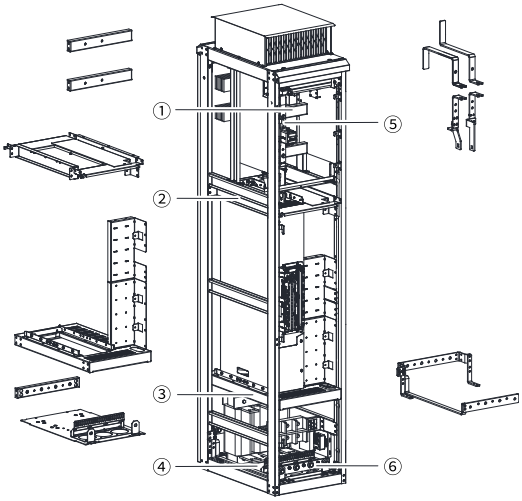


Figure 4-16 Layout of H6 and H7 inverter cabinets

No.	Name
①	Beam for fixing the copper busbar
②	Module mounting bracket
③	Mounting pallet
④	Bottom plate for 400-mm wide cabinets
⑤	Module input copper busbar
⑥	PE copper busbar for 400-mm wide cabinets

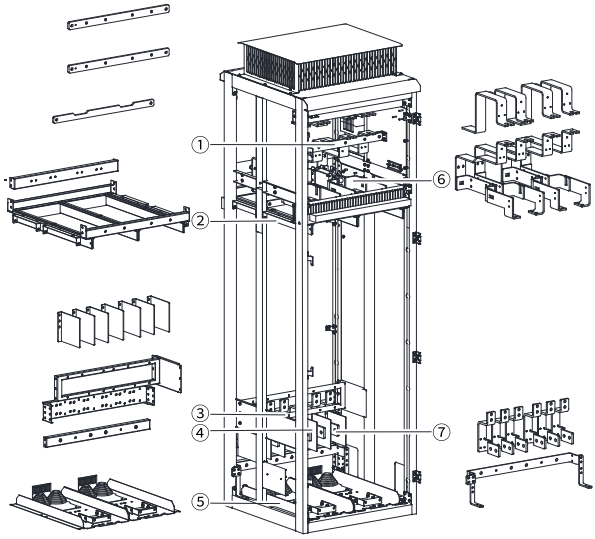


Figure 4-17 Layout of 2 x H8 inverter cabinets

No.	Name
①	Copper busbar mounting beam
②	Module mounting frame
③	Phase-to-phase isolating partition
④	Quick-connector mounting beam
⑤	Module mounting baseplate
⑥	Module input copper busbar
⑦	Output copper busbar and PE copper busbar

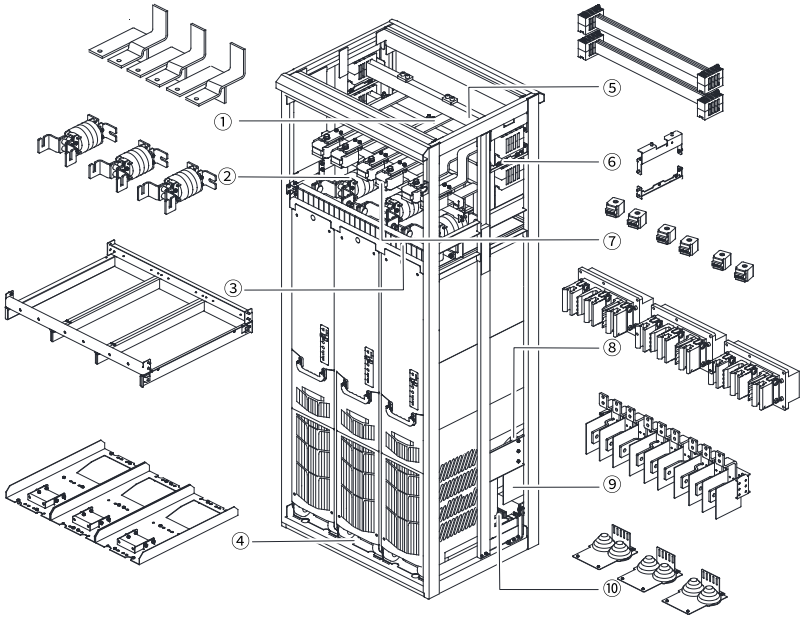


Figure 4-18 Layout of 3 x H8 inverter cabinets

No.	Name
①	DC input copper busbar
②	Common mode magnetic ring (optional)
③	Upper mounting parts
④	Lower mounting parts
⑤	Bus and bus clamp
⑥	Fixing bracket of bus clamp
⑦	Fuse
⑧	Quick-connector socket
⑨	AC output copper busbar
⑩	Bottom outlet hole

Dimensions of inverter cabinet

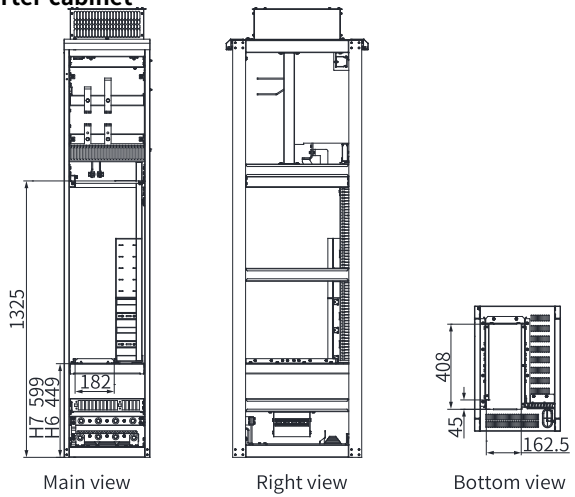


Figure 4-19 Dimensions of H6/H7 inverter cabinets with a width of 400 mm

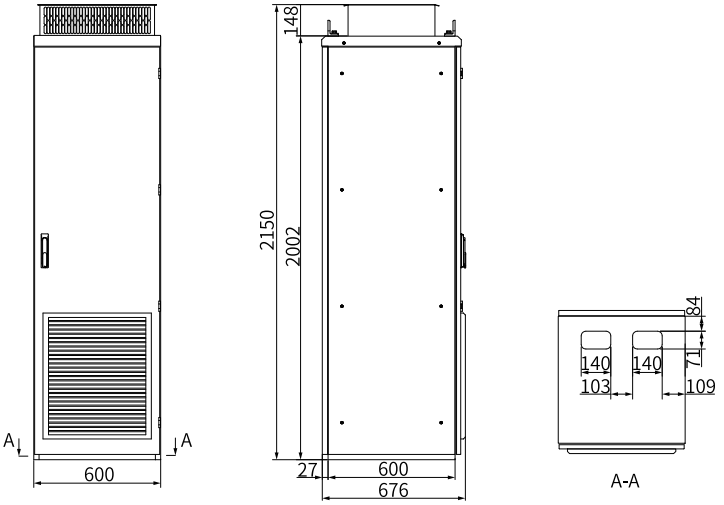


Figure 4-20 Dimensions of 2 x H8 inverter cabinets (mm)

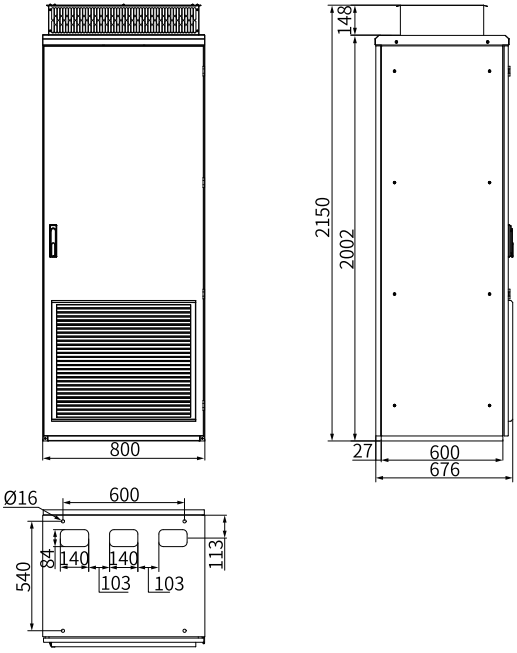


Figure 4-21 Dimensions of 3 x H8 inverter cabinets (mm)

4.7 Braking Cabinet

Layout of the braking cabinet

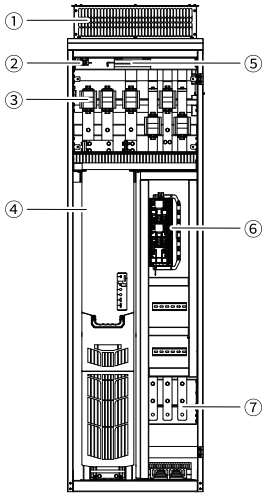


Figure 4-22 Layout of the braking cabinet_1

No.	Name
①	IP21 top cover
②	Limit switch
③	Fuse
④	Braking module
⑤	Lighting
⑥	HCU
⑦	Grounding copper busbar

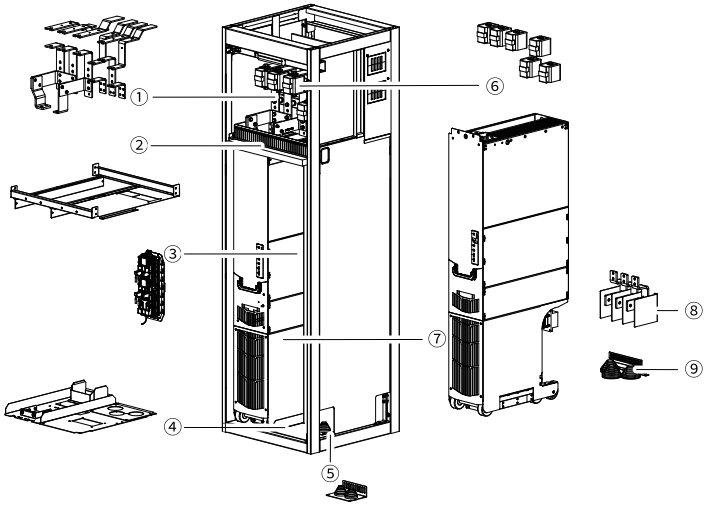


Figure 4-23 Layout of the braking cabinet_2

No.	Name
①	Branch copper busbar
②	Mounting guide rail
③	HCU
④	Bottom plate guide rail
⑤	Control cable outlet hole
⑥	Fuse
⑦	Braking module
⑧	Wiring copper busbar of the power cable
⑨	Power cable inlet/outlet hole

Dimensions of the braking cabinet

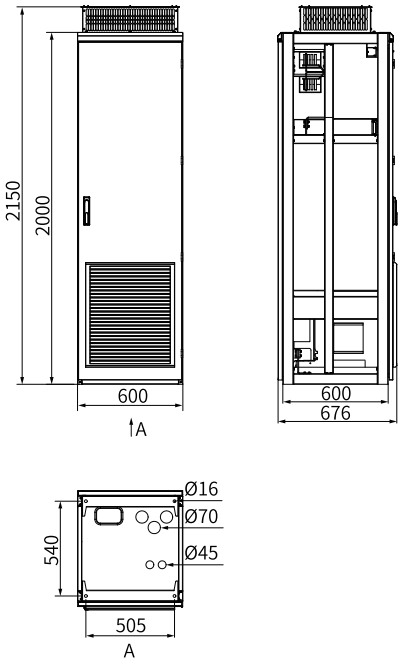


Figure 4-24 Dimensions of the braking cabinet (mm)

4.8 Connection Cabinet

Layout of the connection cabinet

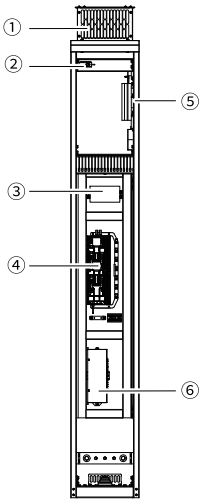


Figure 4-25 Layout of the connection cabinet_1

No.	Name
①	IP21 top cover
②	Limit switch
③	Control device
④	HCU
⑤	Lighting
⑥	HPCU

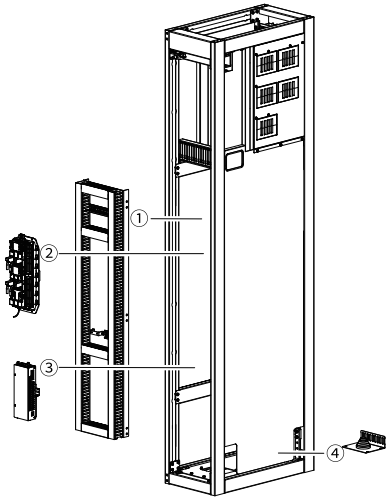


Figure 4-26 Layout of the connection cabinet_2

No.	Name
①	Component installation board
②	HCU
③	HPCU
④	Cable inlet hole

Dimensions of the connection cabinet

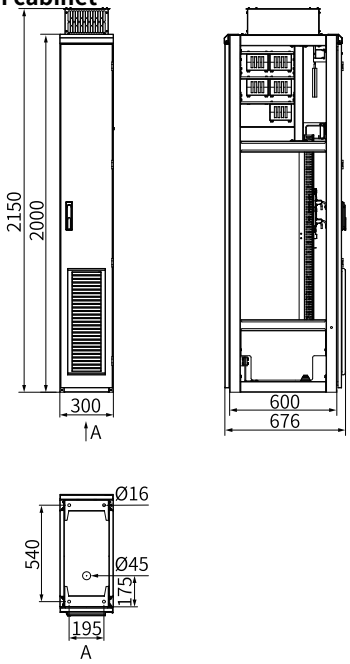


Figure 4-27 Dimensions of the connection cabinet (mm)

5 Maintenance and Inspection

5.1 Safety Instructions for Maintenance and Inspection



Take necessary safety measures before maintenance and inspection.

- Note that the active rectifier module is energized with high voltage, and all wiring work must be carried out with module de-energized.
- Before maintenance and inspection, power off the module, wait for 15 minutes and confirm that the voltage of the module is lower than 36 VDC. Failure to comply can result in personal injuries due to the residual voltage in the capacitor.
- When the external power supply is connected, hazardous voltage are still present in the cabinet and modules even if the main breaker is open. Ensure that no voltage is present before operation.
- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Mount and wire the equipment according to national standards, industry standards, and local safety codes.
- Handle heavy equipment or equipment with high center of gravity with care. Improper lifting or handling may result in death, serious personal injuries, or major property loss.
- Be aware of the possibly residual rotation of the cooling fan.

5.2 Precautions for Cleaning

To keep stable operation of the equipment, remove the dust and contamination periodically.

Pay attention to the following:

- Dust accumulation
  The dusts inside the cabinet and modules can only be removed by professionals regularly (at least once a year) according to relevant safety regulations. A brush and vacuum cleaner must be used to clean the dust. For positions that cannot be easily reached, use dry compressed air (max. 1 bar) for cleaning.
- Ventilation
  Always keep the ventilation openings of the cabinet and modules unobstructed and ensure that the cooling fan is functioning properly.

5.3 Precautions for Inspection

Inspection entails taking measures to ensure the normal operation of equipment and troubleshoot any malfunctions.

Required tools

The following tools may be required during inspection and component replacement:

- Wrench or socket wrench with an opening of 8-M5
- Wrench or socket wrench with an opening of 10-M6
- Wrench or socket wrench with an opening of 13-M8
- Wrench or socket wrench with an opening of 16-M10
- Wrench or socket wrench with an opening of 18-M12
- Torque wrench
- PH1 and PH2 phillips screwdriver
- A socket wrench set with two extension rods is recommended.

Service life of components

To ensure the long-term normal operation of active rectifiers, perform regular maintenance and servicing on the electronic components according to their service life. The service life of the electronic components is affected by their operating environments and conditions. The following table lists the replacement interval of these components for your reference:

Table 5–1 Replacement interval of components

Name	Standard service life
DC fan	5 years
Electrolytic capacitor	8 years
Printed circuit board	10 years

Note

The operation conditions for keeping the standard service life are as follows:

- Ambient temperature: 30°C as annual average temperature
- Load coefficient: below 80%
- Operating time: 24 hours of continuous operation

Tightening torques of screw connectors

Observe the following tightening torque when tightening the connector of conductive parts (connection among DC bus interfaces, motor interfaces and busbars), non-conductive parts (grounding terminals and protective grounding terminals), and common steel connectors.

Table 5–2 Tightening torque for current-carrying components

Screw/Bolt	Grounding terminals, protective grounding terminals, and steel-made terminals (N · m) (Capable of conducting fault current)	Current Busbar of Plastic Box (N · m) (Capable of conducting operating current)
M2.5	0.3	0.3
M3	1	0.8
M4	1.2	1.2
M5	2.8	2.5
M6	4.8	4.8
M8	20	10.5
M10	40	20
M12	70	45

Cable terminals and fasteners

Regularly check whether the cable terminals and screw terminals are secured properly. If not, re-tighten them. Check the cabling fault. If any component is damaged, replace it immediately.

Note

The actual maintenance cycle depends on the mounting environment and operating conditions of the equipment.

5.4 Component Maintenance

5.4.1 Filter Screen Maintenance

Warning

- Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.
- Before replacement, power off the equipment first to prevent the fan from sucking in the external air that contains pollutants. When applying external power supply to the fan, be aware of the residual rotation of the fan or disconnect the power supply of the external fan.
- If the dirty air filter is not replace timely, devices in the cabinet may stop due to high temperature.

Removing the filter screen

Replace and clean the air inlet filter screen of the high-protection cabinet as shown in the following figure.

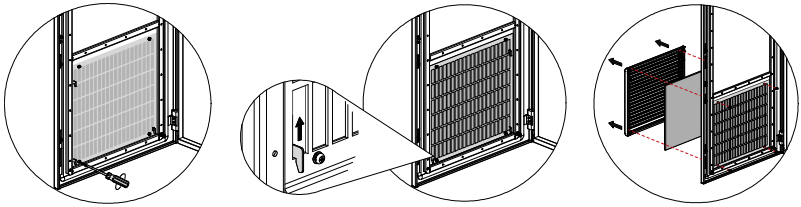


Figure 5-1 Removing the filter screen

Steps for removing the filter screen:

1. Power off the cabinet and cut off the fan power supply.
2. Open the cabinet front door and remove the four M4 screws securing the window blind.
3. Lift up the window blind and remove it.
4. Remove the filter screen from the window blind and clean (or replace) it.

Installing the filter screen

Steps for installing the filter screen:

1. Install the cleaned (or new) filter screen into the window blind.
2. Insert the window blind into the reserved hole.
3. Use screws to secure the window blind again from the inner side of the front door.

Follow the preceding steps for all the filter screens that need to be replaced.

5.4.2 Replacing the DC Fan of the Active Rectifier Module

Warning

Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

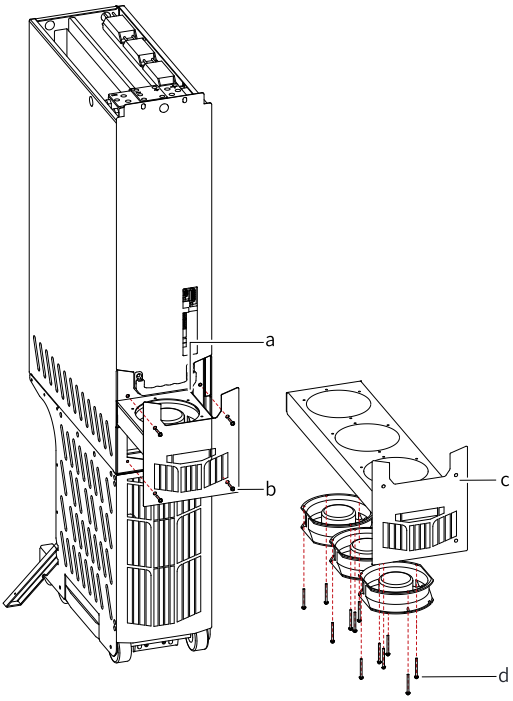


Figure 5-2 Replacing the fan of the active rectifier module

Steps for replacing the module:

1. Disconnect the DC power supply from the drive cabinet and ensure that the equipment carries no residual voltage.
2. Open the cabinet door and use a screwdriver to remove the four M5 screws (b) from the fan assembly (c).

3. Unplug the power cable (a) of the fan when pulling the fan units out from the front of the module.
4. Remove the twelve M4 screws (four in case of one fan) from the fan assembly .
5. Install a new fan of the same specification in the same procedure, but in the reverse order.

Note

- The air flows from bottom to top. When installing the fan, make the UP arrow face upwards.
- Do not pinch the power cable of the fan during installation.

5.4.3 Replacing the DC Fan of the Active Rectifier Filter Module



Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

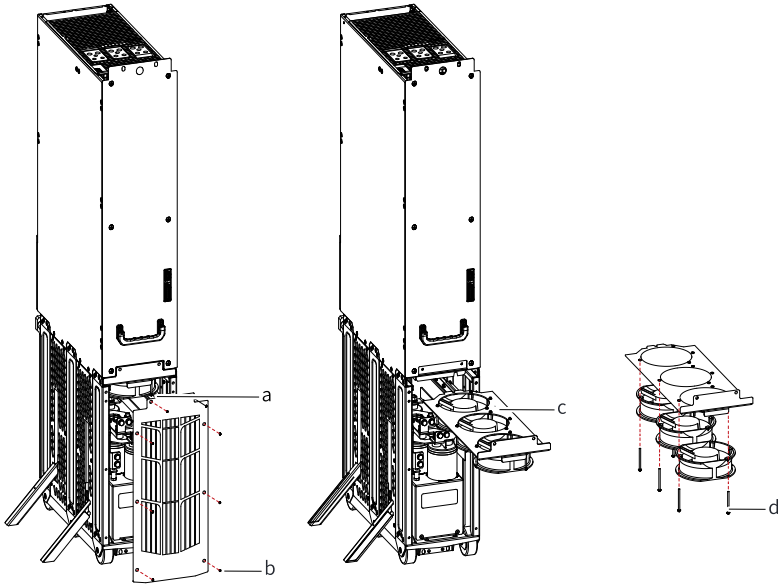


Figure 5-3 Replacing the fan of the active rectifier filter module

Steps for replacing the module:

1. Disconnect the DC power supply from the drive cabinet and ensure that the equipment carries no residual voltage.
2. Open the cabinet door and use a screwdriver to remove the eight M5 screws (b) securing the panel, and then remove the panel.
3. Disconnect the fan wiring (a) from module.
4. Pull out the fan assembly (c).
5. Remove the twelve M4 screws (d) securing the fan, and then remove the fan.
6. Install a new fan and fan assembly in the same procedure, but in the reverse order.
7. Wire the fan to the power supply module and install the panel.

Note

- The air flows from bottom to top. When installing the fan, make the UP arrow face upwards.
- Do not pinch the power cable of the fan during installation.

5.4.4 Replacing the Frame Accessory Kit

Warning

Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

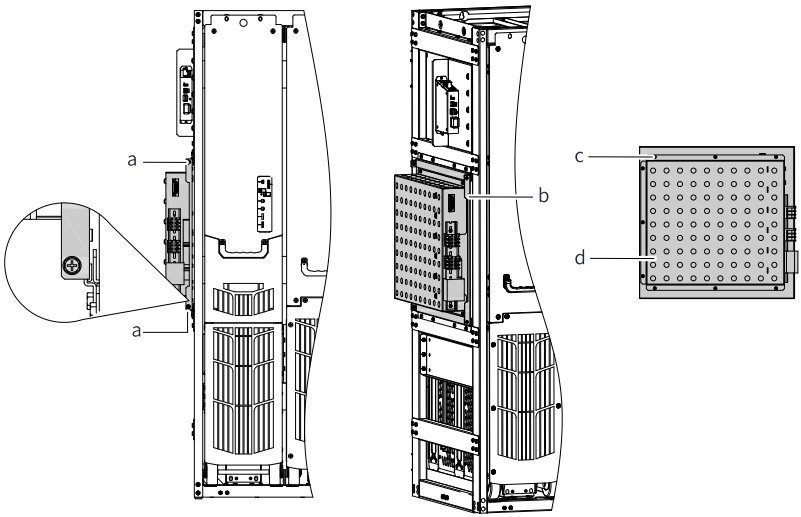


Figure 5-4 Replacing the frame accessory kit

Steps for replacing the module:

1. Disconnect the DC power supply from the drive cabinet and ensure that the equipment carries no residual voltage.
2. Disconnect all wiring terminals connected to the accessory kit.
3. Use a screwdriver to remove the two M6 screws (a) in the front.
4. Pull the bending edge of the sheet metal (b) to take out the accessory kit.
5. Use a screwdriver to remove the nine M4 screws (c) securing the accessory kit cover, remove the accessory kit cover (d), service internal components, and connect corresponding cables.
6. Install the accessory kit in the same procedure, but in the reverse order.
7. Wire cables properly.

5.4.5 Replacing the Fan Power Supply

Warning

Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

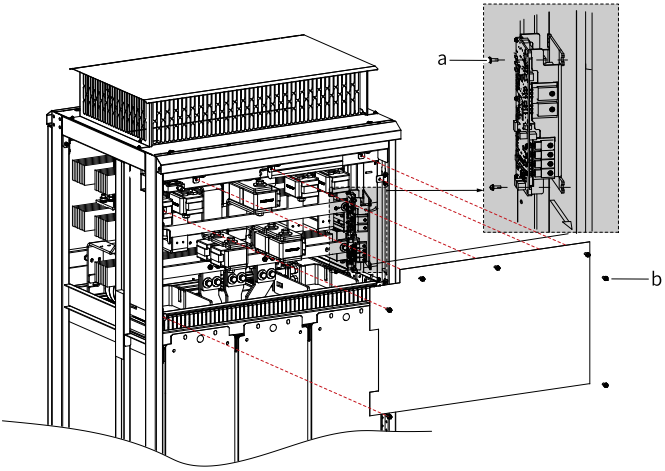


Figure 5-5 Replacing the fan power supply

Steps for replacing the fan power supply:

1. Disconnect the DC power supply from the drive cabinet and ensure that the equipment carries no residual voltage.
2. Open the cabinet door.
3. Loosen the M6 screw (b) on the upper cover of the cabinet and remove the cover.
4. Pull out the terminal of the fan power supply.
5. Remove the two M5 screws (a) securing the power supply, and then remove the power supply. Be careful not to drop the screws inside the module.
6. Install a new power supply in the same procedure, but in the reverse order.
7. Re-connect the power supply terminals.
8. Tighten the cover and close the cabinet door.

Note

Do not damage the fixing screws. Tighten the fixing screws of the power supply with a tightening torque of 1.2 N•m.

5.4.6 Replacing the HSVM-10 Module

Warning

Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

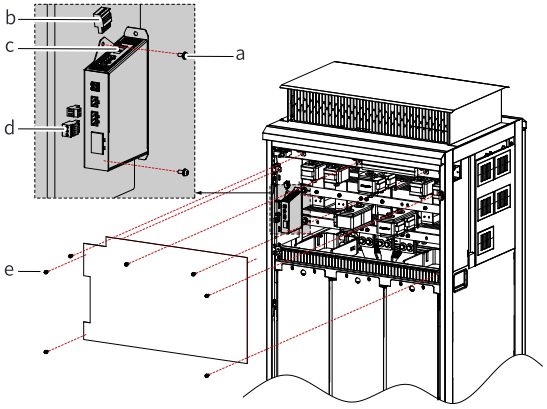


Figure 5-6 Replacing the HSVM-10 module

Steps for replacing the module:

1. Disconnect the DC power supply from the drive cabinet and ensure that the equipment carries no residual voltage.
2. Open the cabinet door.
3. Loosen the M6 screw (e) on the upper cover of the cabinet and remove the cover.
4. Pull out the optical fiber (c) from the top of HSVM-10.
5. Pull out the 24 V power supply terminal (b) from the top of HSVM-10.
6. Pull out the three-phase AC voltage detection terminal (d) in the front of HSVM-10.

7. Remove the two M4 screws (a) on the HSVM-10 and take out the HSVM-10. Be careful not to drop the screws inside the module.
8. Install a new HSVM-10 module in the same procedure, but in the reverse order.
9. Tighten the cover and close the cabinet door.

Note

Do not damage the fixing screws. Tighten the screws that used to fix the HSVM-10 module with a tightening torque of 1.2 N•m.

5.4.7 Replacing the HSVM-20 Module

Warning

Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

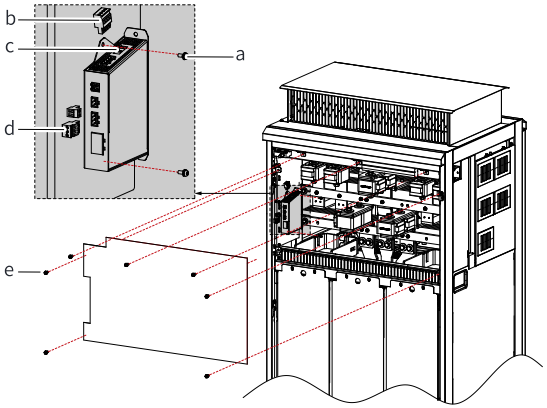


Figure 5-7 Replacing the HSVM-20 module

Steps for replacing the module:

1. Disconnect the DC power supply from the drive cabinet and ensure that the equipment carries no residual voltage.
2. Open the cabinet door.
3. Loosen the M6 screw (e) on the upper cover of the cabinet and remove the cover.

4. Pull out the optical fiber (c) from the top of HSVM-20.
5. Pull out the 24 V power supply terminal (b) from the top of HSVM-20.
6. Pull out the three-phase AC voltage detection terminal (d) in the front of HSVM-20.
7. Remove the two M4 screws (a) on the HSVM-20 and take out the HSVM-20. Be careful not to drop the screws inside the module.
8. Install a new HSVM-20 module in the same procedure, but in the reverse order.
9. Tighten the cover and close the cabinet door.

Note

Do not damage the fixing screws. Tighten the screws that used to fix the HSVM-20 module with a tightening torque of 1.2 N•m.

5.4.8 Replacing the Lightning Protection Board

Warning

Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

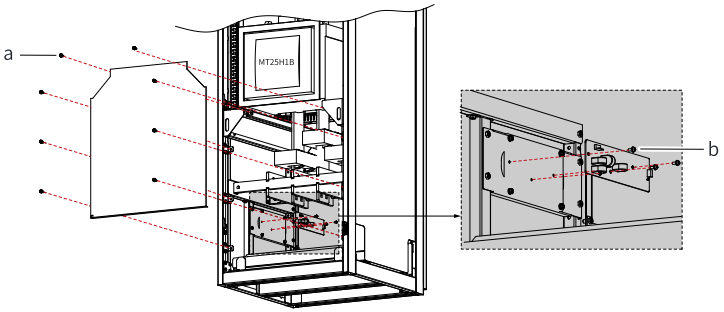


Figure 5-8 Replacing the lightning protection board

Replacement steps:

1. Disconnect the AC power supply from the drive cabinet and the disconnector of the charging circuit. Ensure that the equipment carries no residual voltage.
2. Open the cabinet door.
3. Loosen the M6 screws (a) on the lower cover of the cabinet and remove the cover.

4. Disconnect the lightning protection board terminals and remove the M4 fixing screws (b).
5. Replace with a new lightening protection board in the same procedure, but in the reverse order.
6. Re-connect the terminals.
7. Tighten the cover and close the cabinet door.

Note

- Do not damage the fixing screws. Tighten the screws that used to fix the lightening protection board with a tightening torque of 1.2 N•m.
- When the power supply cabinet operates in an IT system, remove the two M4 screws on the voltage dependent resistor board.

5.4.9 Replacing the Fuse

Warning

Component replacement can be performed by professionals only. Before maintenance and inspection, read the safety instructions in *" Safety Precautions" on page 5* and *"5.1 Safety Instructions for Maintenance and Inspection" on page 48*. Failure to comply may result in personal injury or equipment damage.

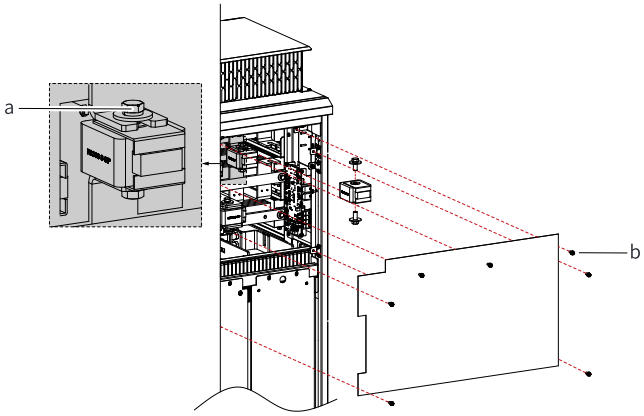


Figure 5-9 Replacing the fuse

Steps

1. Disconnect the AC power supply from the drive cabinet and the fuse switch of the pre-charge circuit. Ensure that the equipment carries no residual voltage.
2. Open the cabinet door.
3. Loosen the M6 screw (b) on the upper cover of the cabinet and remove the cover.
4. Loosen the M10/M12 screws (a) slightly and pull out the fuse together with the nut. Note: do not loosen the nut completely to prevent the nut from falling into the module.
5. Remove the nut and check the condition of the fuse. If the fuse burns out, replace all the fuses and tighten the nut. The maximum tightening torque of the nut is 35 N•m.
6. Install the cover in the same procedure, but in the reverse order and close the cabinet door.

5.4.10 Replacing the Module

For detailed instructions on replacing a module, see the manual of MD880 series modules.

5.5 Storage and Warranty

Store the drive in a clean and dry room, with temperatures between -40°C and +70°C and temperature variation smaller than 1°C/min. If the drive is stored for a prolonged period once it has been unpacked, cover it or take other appropriate measures to keep it from contamination and environmental pollutants.



For storage of the equipment, observe the following requirements:

- Pack the equipment into its original packing box provided by Inovance.
- Do not expose the equipment to environments with moisture, high temperatures, or direct sunlight for a long time.

5.6 Disposal and Recycle

The raw materials contained in the drive module can be recycled to achieve energy conservation and environmental protection.

Most recyclable parts are marked with recycling symbols.

- Packaging materials can be degraded and recycled.
- All metal components can be recycled;
- Plastic parts can be recycled according to local regulations or burned under controlled conditions.

If not, most parts can be disposed of by landfill. However, DC capacitors (C1-1 to C1-x) contain electrolytes, which are classified as hazardous waste in the EU standard. They can be reprocessed as necessary according to local regulations.

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