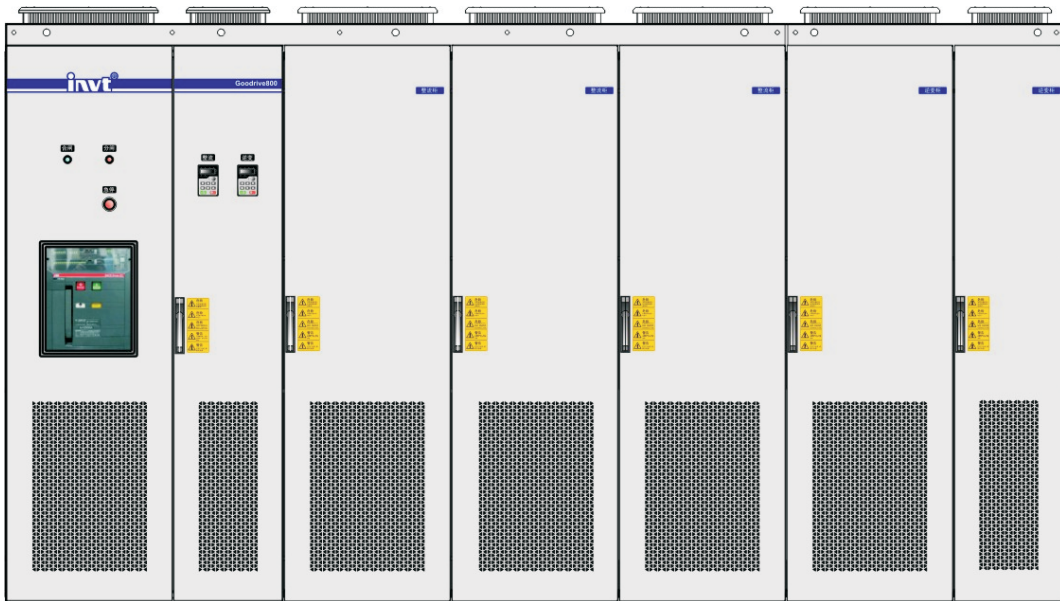




Operation **Manual**

Goodrive 800 Series

Installation and Maintenance Manual



SHENZHEN INVT ELECTRIC CO., LTD.

Preface

Thank you for purchasing our products.

Please read this manual carefully before any application.

Goodrive800 series products are developed for sophisticated application market which needs high overload capacity, high reliability and continuous operations. Its rated current is especially designed for various heavy-load applications such as metallurgy, port machinery, lifting, shore power, petroleum, petrochemical, municipal, chemical, electric power, building materials, mining, ship-building, paper-making and other industries and devices.

Goodrive800 series products apply international module, providing rectifier unit, IGBT, filter unit or whole cabinet to meet requirements of end-users and clients of OEM and integrated system. Different modules can be combined flexibly according to different requirements on the basis of standard configuration. Not only the user can control machines at high precision, but also present the excellent product reliability. Various solution applications are also provided to improve the convenient application at a great rate.

There are hardware manual, software manual, commissioning manual, installation and maintenance manual and application manual, to provide detailed instructions of installation and commissioning, electrical connections, parameters setting, common troubleshooting and routine maintenance. Please read corresponding manual during installation, commissioning and application to ensure proper use and long service life of the product.

If the product is ultimately used for military affairs or manufacture of weapon, it will be listed on the export control formulated by ***Foreign Trade Law of the People's Republic of China***. Rigorous review and necessary export formalities are needed when exported.

Our company reserves the right to update the information of our products. Information may be subject to change without notice during product improving.

The manuals of Goodrive800 include (according to actual order):

Software Manual of Goodrive800 Series Inverters;

Hardware Manual of Goodrive800 Series Inverters;

Software Manual of Goodrive800 Series PWM Rectifiers;

Installation and Maintenance Manual of Goodrive800 Series Products and;

Application Manual of Goodrive800 Series Products.

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Chapter 1 Safety precautions

Please read this manual carefully and follow all safety precautions before moving, installing, operating and maintaining the inverter. If ignored, physical injury or death may occur, or damage may occur to the devices.

If any physical injury or death or damage to the devices occurs for ignoring to the safety precautions in the manual, our company will not be responsible for any damage and we are not legally bound in any manner.

1.1 Safety definition

Danger: Serious physical injury or even death may occur if not follow relevant requirements.









Warning: Physical injury or damage to the devices may occur if not follow relevant requirements.

Note: Physical hurt may occur if not follow relevant requirements.


Qualified electricians: People working on the device should take part in professional electrical and safety training, receive the certification and be familiar with all steps and requirements of installing, commissioning, operating and maintaining the device to avoid any emergency.




1.2 Warning symbols

Warnings caution you about conditions which can result in serious injury or death and/or damage to the equipment, and advice on how to avoid the danger. Following warning symbols are used in this manual:


Symbols	Name	Instruction	Abbreviation
 Danger	Danger	Serious physical injury or even death may occur if not follow the relative requirements	
 Warning	Warning	Physical injury or damage to the devices may occur if not follow the relative requirements	
 Do not	Electrostatic discharge	Damage to the PCBA board may occur if not follow the relative requirements	
 Hot sides	Hot sides	Sides of the device may become hot. Do not touch.	
Note	Note	Physical hurt may occur if not follow the relative requirements	Note

1.3 Safety guidelines

	<ul style="list-style-type: none"> ◇ Only qualified electricians are allowed to operate the inverter. ◇ Do not carry out any wiring and inspection or changing components when the power supply is applied. Ensure all input power supply is disconnected before wiring and checking and always wait for at least the time designated on the inverter or until the DC bus voltage is less than 36V. Below is the table of the waiting time:
-------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

		Voltage degree of Goodrive800 series products	Minimum waiting time
		380V	15 minutes
		500V	
		660V	
	⋄ Do not refit Goodrive800 series products unauthorized; otherwise, fire, electric shock or other injury may occur.		
	⋄ The base of the radiator may become hot during running. Do not touch to avoid hurt.		
	⋄ The electrical parts and components inside Goodrive800 series products are electrostatic. Take measures to avoid electrostatic discharge during relevant operation.		

1.3.1 Delivery and installation

	<ul style="list-style-type: none"> ⋄ Use special tools to install and remove the unit. ⋄ Use crane to install the whole machine. ⋄ Do not install Goodrive800 series products on combustible materials and avoid them to contact any combustible materials. ⋄ Connect the optional parts and components (braking resistors, braking units and feedback units) according to the wiring diagram. ⋄ Prevent dumping in installation because the gravity of the unit is high. ⋄ Ensure no other objects, such as screws and cables, left in the cabinet or Goodrive800 series products after installation or maintenance; otherwise, damage may occur. ⋄ Do not operate if there is any damage or components loss. ⋄ Do not touch Goodrive800 series products with wet items or some part of the body, electric shock may occur.
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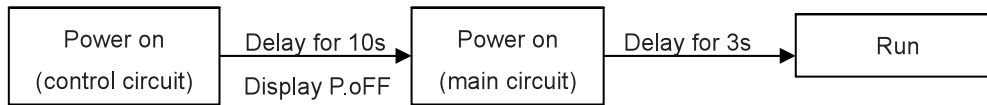
Note:

- ⋄ Select appropriate moving and installing tools to ensure a safe and normal running of the product and avoid physical injury or death. For physical safety, the erector should take some mechanical protective measures, such as wearing exposure shoes and working uniforms.
- ⋄ Ensure to avoid physical shock or vibration during delivery and installation.
- ⋄ Install away from children and other public places.
- ⋄ Goodrive800 series products cannot meet the requirements of low voltage protection in IEC61800-5-1 if the sea level of installation site is above 2000m.
- ⋄ Please use it in appropriate environment (refer to the installation environment).
- ⋄ The leakage current of Goodrive800 series products may be above 3.5mA during operation.
- ⋄ The conductivity of PE grounding conductor is shown below:

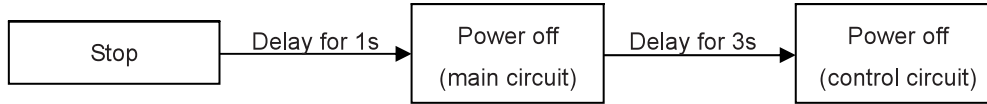
Cross sectional area of power conductor S mm ²	Cross sectional area of grounding conductor mm ²
S≤16	S
16<S≤35	16
35<S	S/2

1.3.2 Time and sequence when power on/off


Time and sequence when power on:



Time and sequence when power off:




1.3.3 Commissioning and running

	<ul style="list-style-type: none"> ◇ Disconnect all power supplies applied to Goodrive800 series products before the terminal wiring and wait for at least the designated time after disconnecting the power supply. ◇ Check the cable connection before power on. ◇ If the auxiliary control power of Goodrive800 series products is provided by external device, all power supplies are not disconnected after switching off. Check according to the diagram because voltage may be present when the device is not started; otherwise, physical injury may occur. ◇ The operator can not touch the electrical parts in the cabinet directly. Pay attention when process the metal shield. ◇ Do not carry out any withstand-voltage test in unit connection. Disconnect the motor cable before any isolation or withstand voltage test to the motor or motor cable. ◇ High voltage is present inside the product during running. Do not open the cabinet door. ◇ The inverter may start up by itself when P01.21=1. Do not get close to the product and motor. ◇ Voltage is also present on the motor terminals even if the motor does not rotate when the main circuit does not power off. ◇ The device cannot be used for “E-stop” independently. ◇ The device cannot be used to break the motor suddenly. A mechanical braking device should be provided. ◇ Follow below precautions: <ol style="list-style-type: none"> 1. All input power supplies are disconnected (including the main and control power supply). 2. Permanent magnet synchronous motor has stopped and the measured output voltage of Goodrive800 series products is less than 36V. 3. The waiting time after permanent magnet synchronous motor stopping is no less than the designated time on Goodrive800 series products and the measured voltage between (+) and (-) is less than 36V. 4. Ensure the motor does not rotate again during operation. It is recommended to install external braking devices or switch off the direct electrical connection between permanent magnet synchronous motor and Goodrive800 series products.
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Note:

- ✧ Do not switch on or off the input power supply of Goodrive800 series products frequently.
- ✧ For Goodrive800 series products that have been stored for a long time, check and fix the capacitance and try to run it again before utilization (see Installation and Maintenance Manual).
- ✧ Cover the cabinet door before running; otherwise, electric shock may occur.


1.3.4 Maintenance and replacement of components

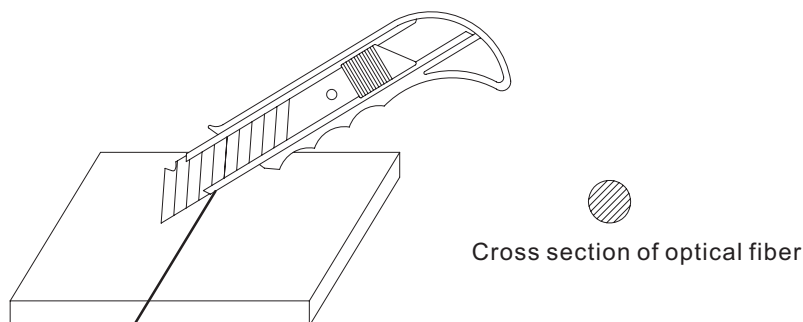
	<ul style="list-style-type: none"> ✧ Only qualified electricians are allowed to perform the maintenance, inspection, and components replacement of Goodrive800 series products. ✧ Disconnect all power supplies to Goodrive800 series products before the terminal wiring. Wait for at least the time designated on Goodrive800 series products after disconnection. ✧ Take measures to avoid screws, cables and other conductive matters to fall into Goodrive800 series products during maintenance and component replacement. ✧ Be carefully during optical fiber operation. Do not touch the conduction-section (glass fiber) when plugging and inserting, because the fiber optic section (glass fiber) is extremely sensitive to dirt. The minimum bend radius of the optical fiber is 35 mm.
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Note:

- ✧ Please select proper torque to tighten screws.
- ✧ Keep the inverter, parts and components away from combustible materials during maintenance and component replacement.
- ✧ Do not carry out any isolation and voltage test on the inverter and do not measure the control circuit of the inverter by megameter.
- ✧ Take right measures to avoid static electric for the product or internal parts and components during the maintenance and replacement.

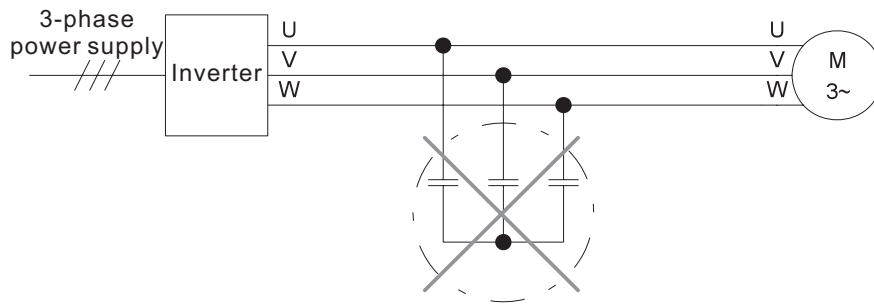
1.3.5 What to do after scrapping

	<ul style="list-style-type: none"> ✧ There are heavy metals in Goodrive800 series products. Deal with it as industrial effluent.
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1.4 Installation notes**1.4.1 Requirement of optical fiber cutting**

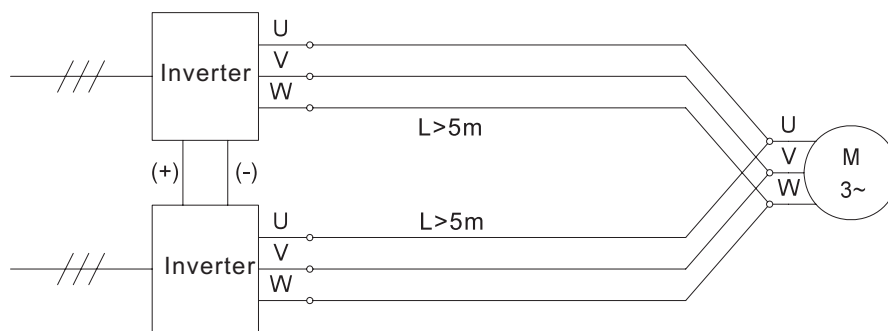
Requirement of optical fiber cutting: Use a utility knife to cut the optical fiber vertically, with one cut, and be sure to keep the cross section smooth and level without sharp angle or burr. Do not use diagonal pliers.

1.4.2 Do not connect the capacitor at output side

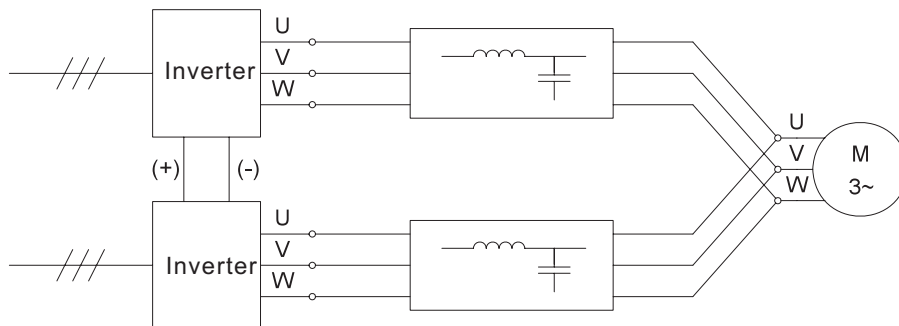


1.4.3 Cable requirement of parallel connection

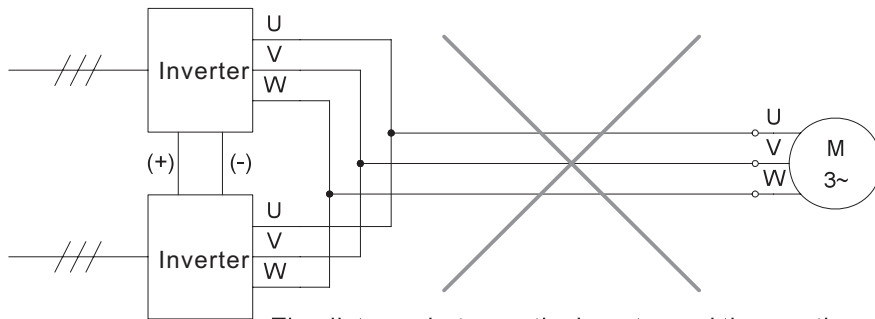
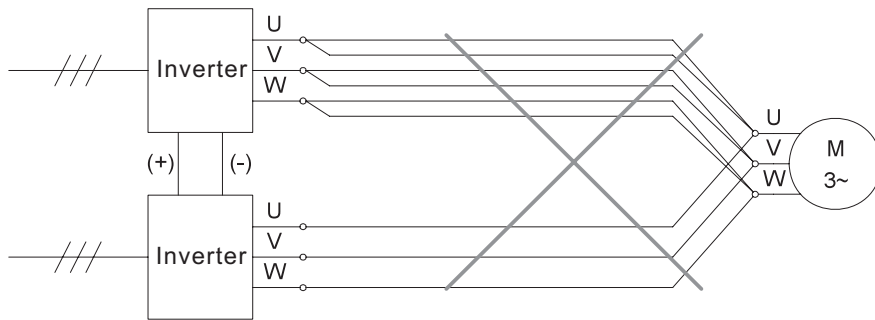
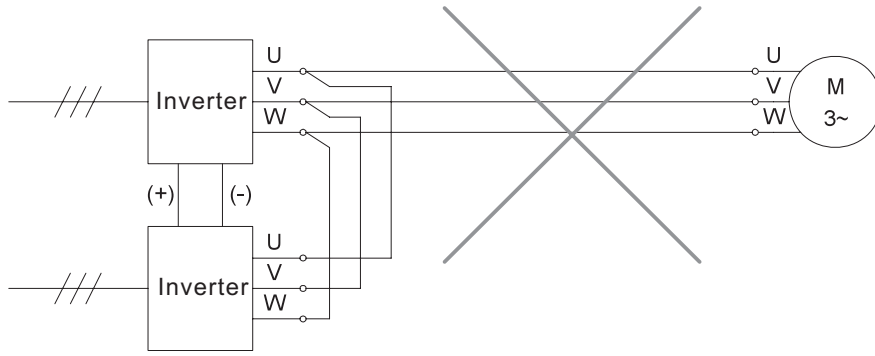
Connection 1: The output cables meet at the motor side, and the cable from each phase of the inverter to the motor is in the same length over 5 meters (as shown below).



Connection 2: The output cables are connected to reactors or sine filters (as shown below).



Wrong connection: The output cables meet at the inverter side or the cable from each phase of the inverter to the motor is in different length (as shown below).



The distance between the inverter and the meeting point < 5m

Chapter 2 Installation

2.1 Overview

The equipment is installed in straight up direction;

The equipment base is installed on flat surface which should be as smooth as possible and firm enough to support the equipment.

Before the installation, check the floor levelness with a gradienter;

If the equipment is installed against the wall, make sure the wall is flat.

Note: Goodrive800-26 series products with a power range of 1000~1200-4 (1200~1500-6) will be shipped separately in two groups, rectification and converting, and then assembled on site.

2.2 Tools required

The tools are used to carry the equipment to the final installation location, fix the equipment on the floor or against the wall, connect the copper bar bus and fasten the terminals.


- Crane, forklift (Check the load capacity)
- A set of wrenches or socket wrenches for connection and fastening
- M6 Allen key
- Medium-sized cross recess screwdriver and small-sized slotted screwdriver
- Related tools to drill field mounting holes (for wall mounting)

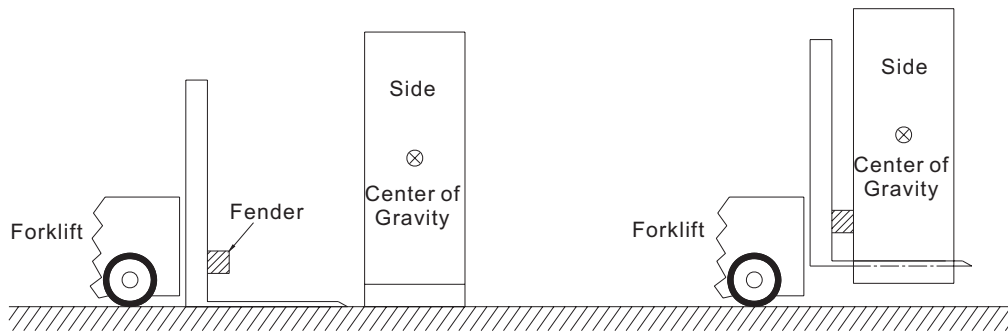
Table of tightening torque for threaded fasteners (Fastener degree: 4.8 Unit: kgf.cm)

Thread specification	Copper bar connection	Sheet metal connection	Remarks
M5	30	20	
M6	45	30	
M8	110	85	
M10	220	164	
M12	390	285	
M16	980	710	

2.3 Vehicles for carrying

2.3.1 Forklift

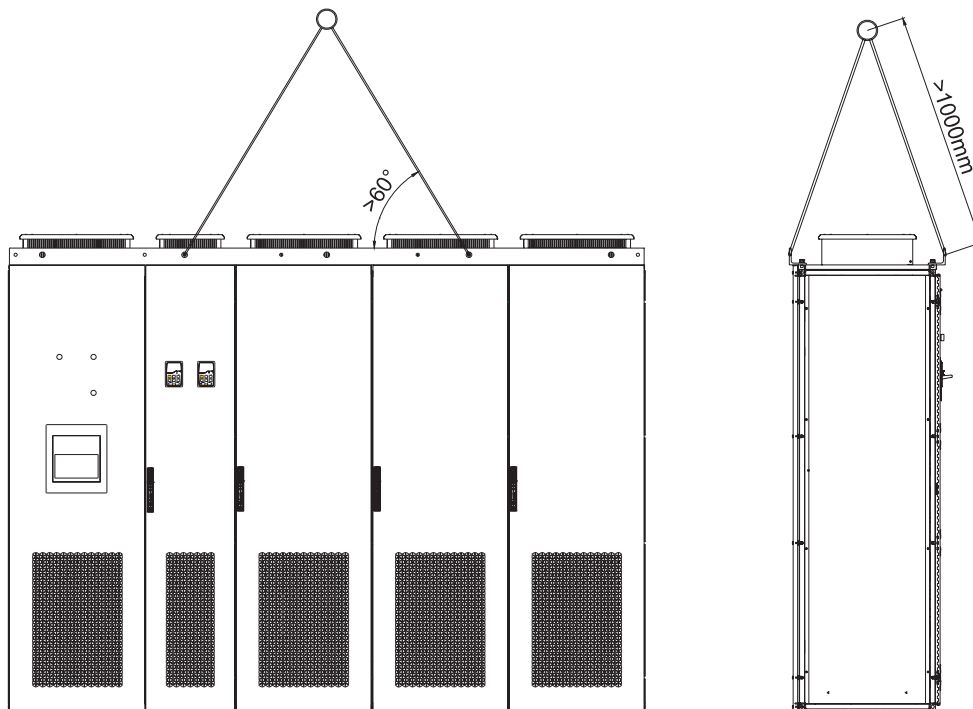
	<p>◇ The equipment must be carried along with the packaging chassis by forklift.</p>
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Note: High center of gravity, handle with care and avoid down.

2.3.2 Crane

When carrying with the hoisting angle steel on top of the equipment, place the rope or sling into the steel hole of hoisting angle and fix it for safety.



2.4 Installation environment

To put the performance into full play and maintain the functions for a long time, installation environment is very important for the inverter, so please install the inverter in the environment as described below.

Environment		Conditions
Working environment	Installation site	Install the equipment vertically on firm chassis indoors; Apply internal base installation for power units; Use air as the cooling medium.
	Temperature	-10°C~50°C, temperature change < 0.5°C/min; Derate 2% for every additional 1°C if the temperature is above 40°C; the highest temperature: 50°C
	Relative humidity	5%~95%
	Other conditions	No condensation, freeze, rain, snow or hail, solar radiation below 700W/m ² , air pressure 70~106kPa
	Salt fog and corrosive gas	Pollution degree 2
	Dust and solid particle	Pollution degree 2
	Altitude	Below 1000m; Derate 1% for every additional 100m if the altitude is above 1000m.
	Vibration	The maximum amplitude accelerated speed ≤ 5.8m/s ² (0.6g)
Storage environment	Storage	Keep in a clean and dry place indoors.
	Temperature	-30°C~60°C, temperature change < 1 °C/min
	Relative humidity	5%~95%
	Time	The time between delivery and storage ≤ 6 months; If the storage time is long, improve the conditions (such as decrease temperature range).
Transportation environment	Means	Trucks, trains and ships can be used to transport on condition of standard packaging cases.
	Temperature	-30°C~60°C
	Relative humidity	Below 95% when the temperature is 40°C.
	Vibration	Sine vibration 9~200Hz, 15m/s ² (1.5g)

Note: Keep Goodrive800 series products in clean and ventilated environment in accordance with the housing protective degree.

Keep the cooling air clean and away from corrosive gas and conductive dust.

2.5 Before installation

2.5.1 Unpacking inspection

Check the products according to the packing list and make sure the model is correct and there's no appearance damage.

2.5.2 Installation requirements

- Wall

The wall near the equipment must be non-flammable. Check no obstacle on the wall before installation. If the equipment is installed against the wall, the wall will be vertical and firm enough to support it.

- Floor

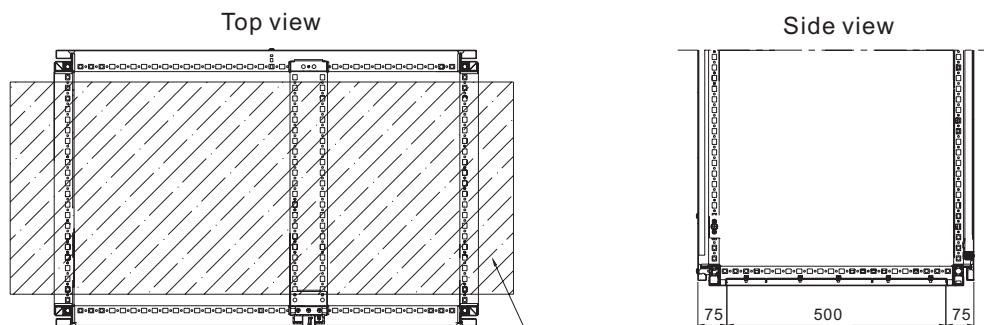
The floor located at the bottom of the equipment must be non-flammable, level, and thick enough to support it.

- Surrounding space

The reserved space in front of the equipment must be not less than 800mm.

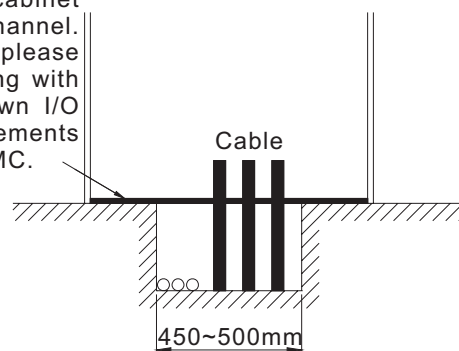
2.5.3 Channel under cabinet

The cable channel can be established in the middle area with a width of 500mm below the cabinet. The weight of the cabinet puts on two cross sections with a width of 75mm, so please make sure the floor can support the cabinet.



The space can be used for the layout of cable channel.

Avoid cooling air enters into the cabinet body via the chassis in the cable channel. To guarantee the protective degree, please use the original chassis delivered along with the inverter. If users matches their own I/O cable boards, pay attention to the requirements of protective degree, fireproofing and EMC.



Note: Support the chassis of the cabinet around.

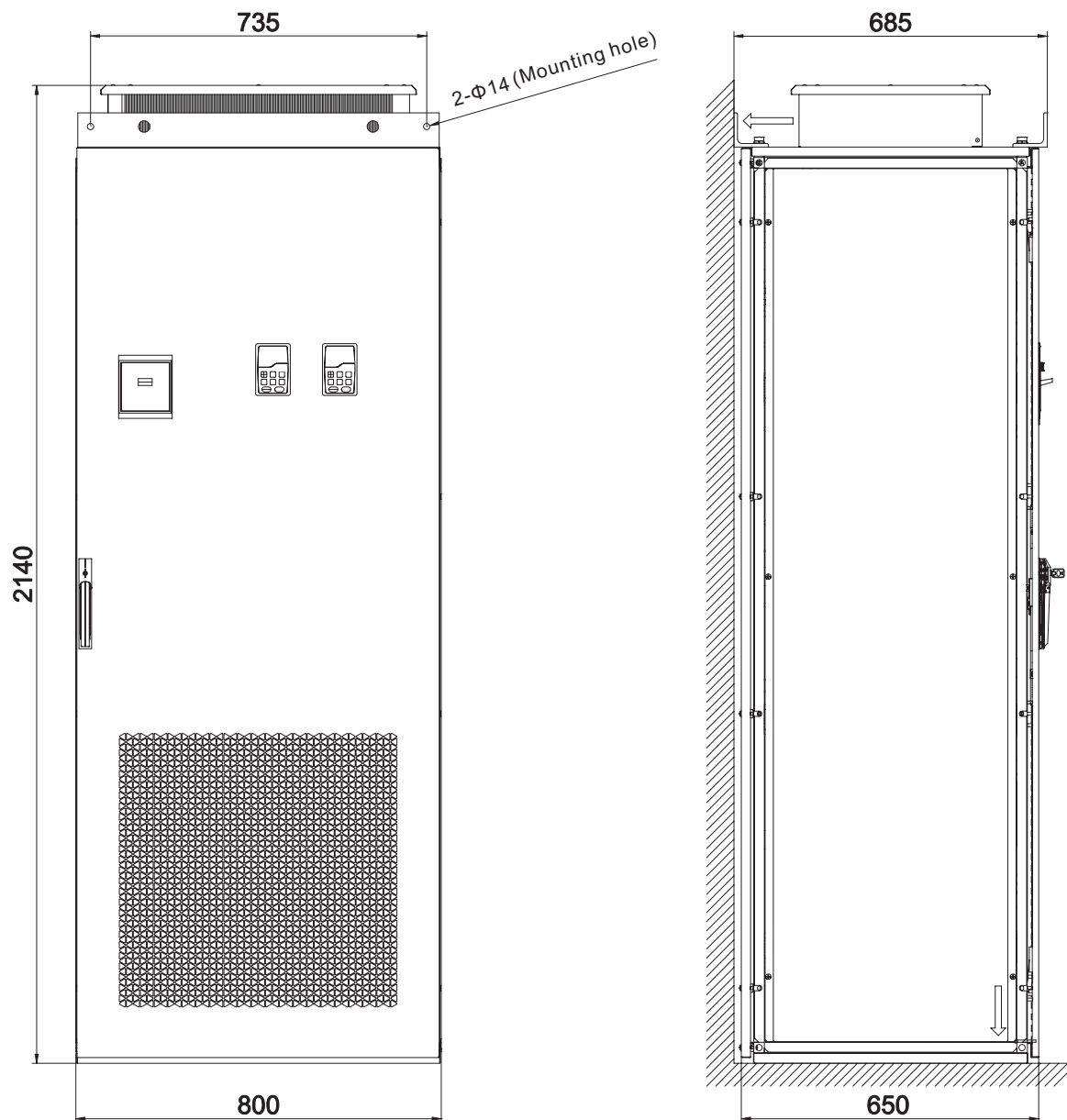
Do not fix the cabinet by welding.

2.6 Installation manner

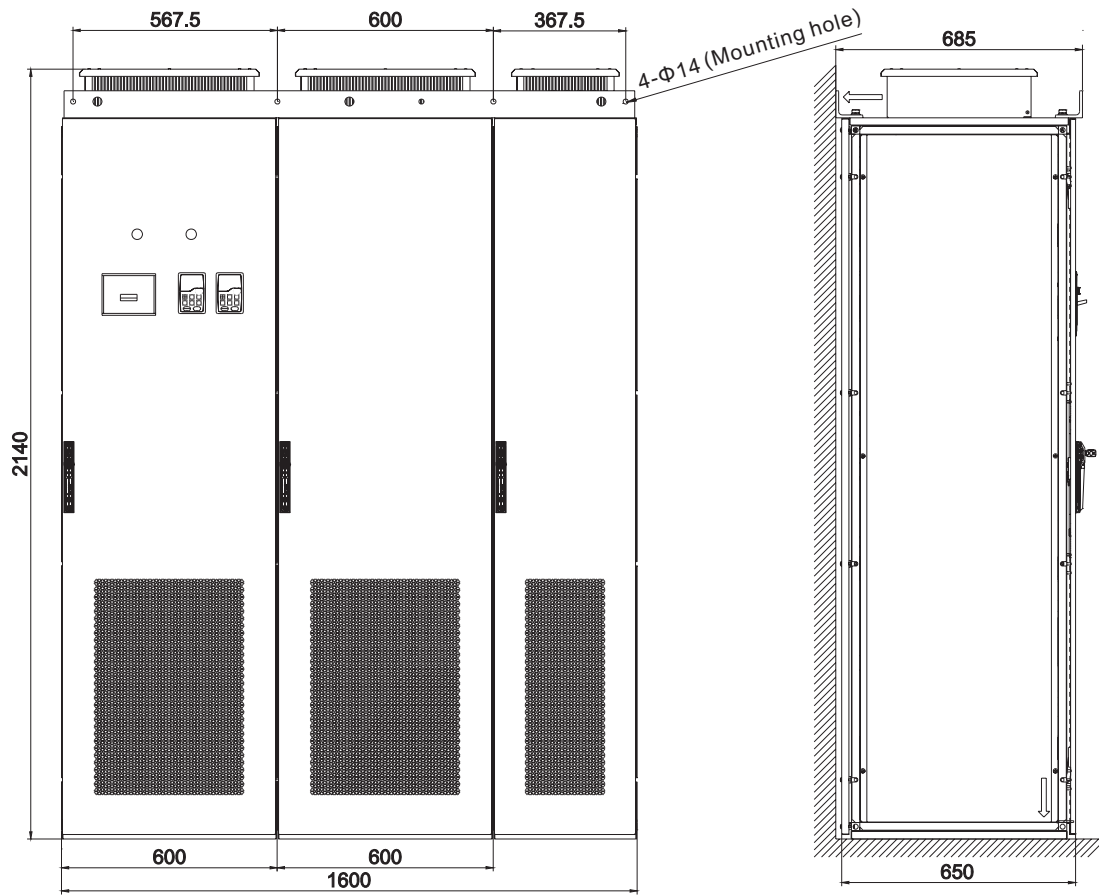
2.6.1 Wall mounting

At first put the equipment in place according to mounting holes, then open the front door and take down inner door component (or remove the protective plate). After that, mount the flat washer, spring washer, and nut which are used to fix the foundation bolt M12. It is necessary to drill mounting holes on the wall on site. Before drilling, note that the top outlet should be covered with a plate or a piece of cloth so that no residue or dust drops inside. After drilling, clear away the residue and dust rather than leave them piling up between the gaps or on the cover.

Single installation: Take Goodrive800-26/Goodrive800-96 series 0132~0200-4 (0160~0250-6) for example:



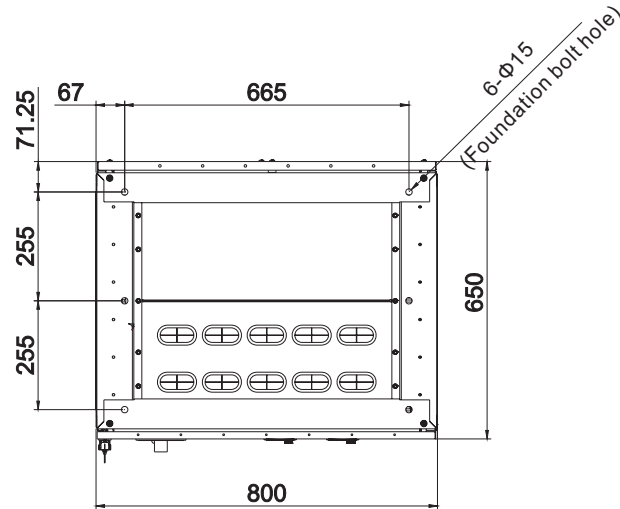
Multiple installations: Take Goodrive800-26/Goodrive800-96 series 0250~0400-4 (0315~0500-6) for example:



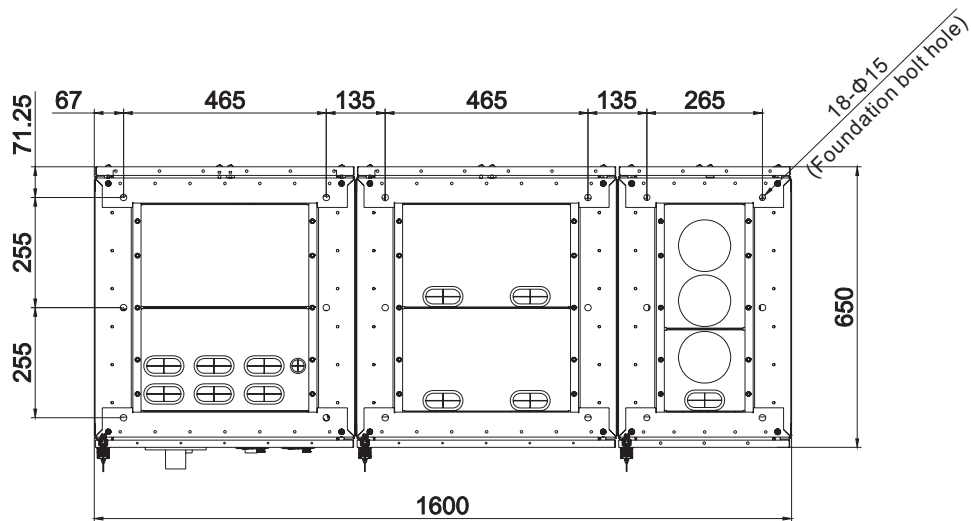
2.6.2 Floor mounting

At first put the equipment in place according to mounting holes, then open the front door and remove lower protective plate. If necessary, twist off the screws of the rear door and then take down the door (connected with ground wire). After that, the flat washer, spring washer, and nut which are used to fix the foundation bolt M12 can be mounted.

Single installation: Take Goodrive800-26/Goodrive800-96 series 0132~0200-4 (0160~0250-6) for example:



Multiple installations: Take Goodrive800 series 0250~0400-4 (0315~0500-6) for example:

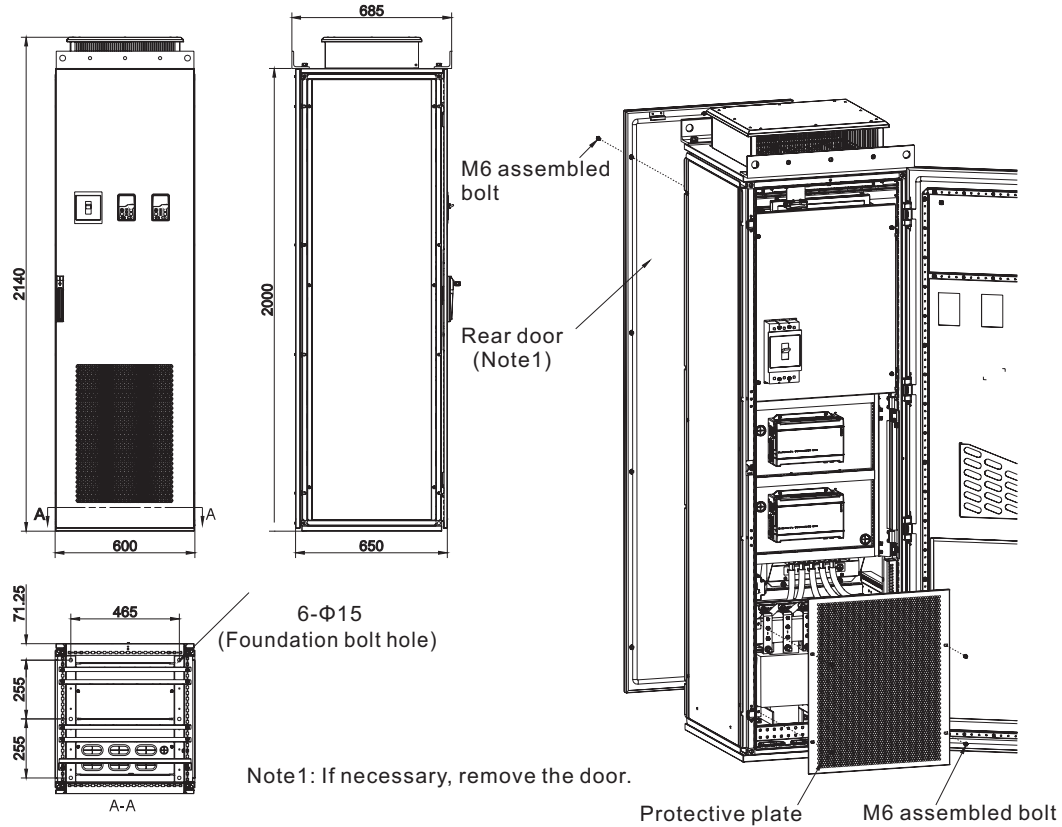


2.7 Engineering installation

2.7.1 Complete cabinet

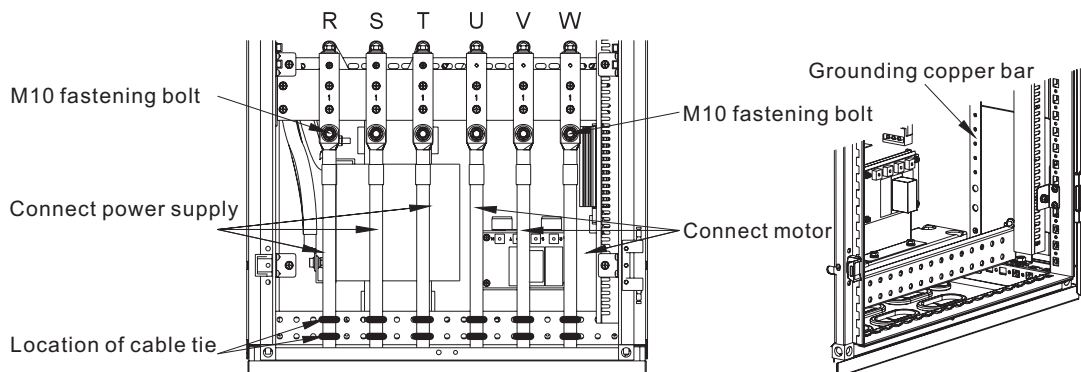
2.7.1.1 Single cabinet

(1) Goodrive800-26/Goodrive800-96 series 0075~0110-4 (0075~0132-6)



Install the equipment according to different ways. Open the front door, take down lower protective plate and, if necessary, remove the rear door. In particular, do not lose or damage the parts and fastening screws after removing the protective plate or the rear door.

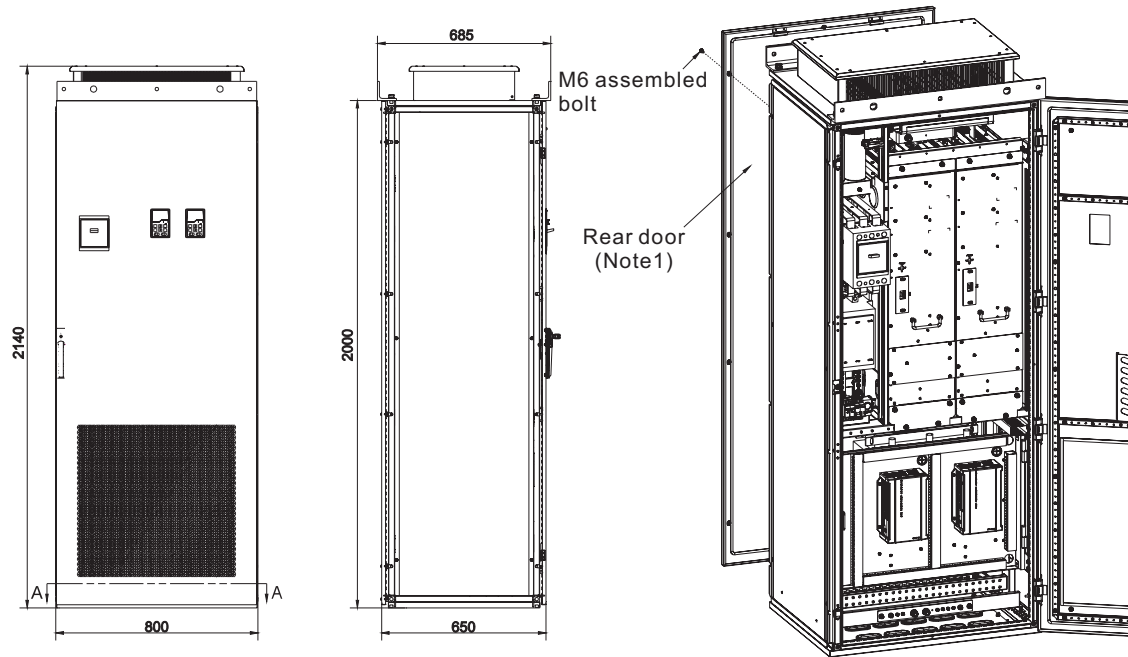
The installation diagram is shown as follows:



	<p>⚡ Do not connect the power line to UVW terminals.</p>
--	----------------------------------------------------------

Reference table of I/O cable specifications

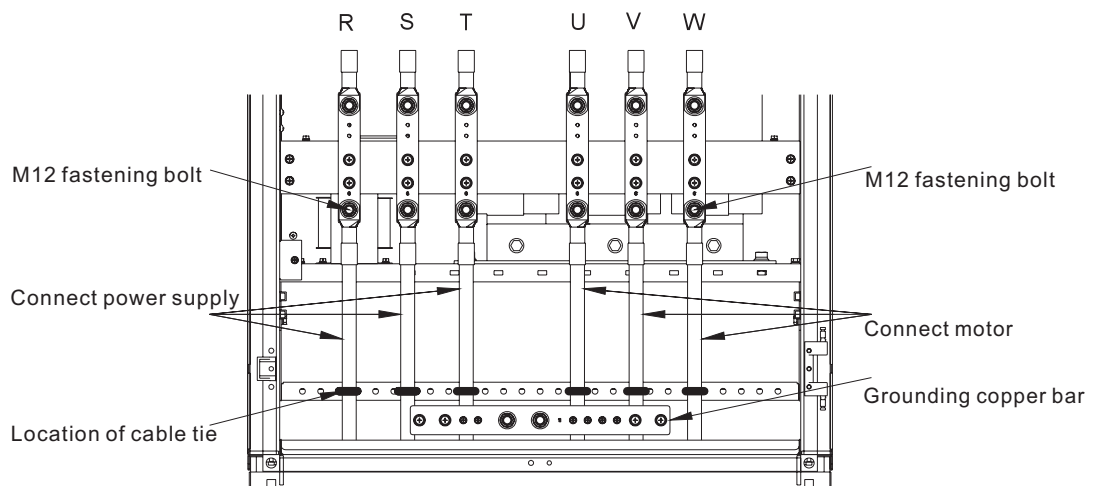
(2) Goodrive800-26/Goodrive800-96 series 0132~0200-4 (0160~0250-6)



Note1: If necessary, remove the door.

Install the equipment according to different ways. Open the front door, then take down inner door component, and, if necessary, remove the rear door. In particular, do not lose or damage the parts and fastening screws after removing the protective plate or the rear door.

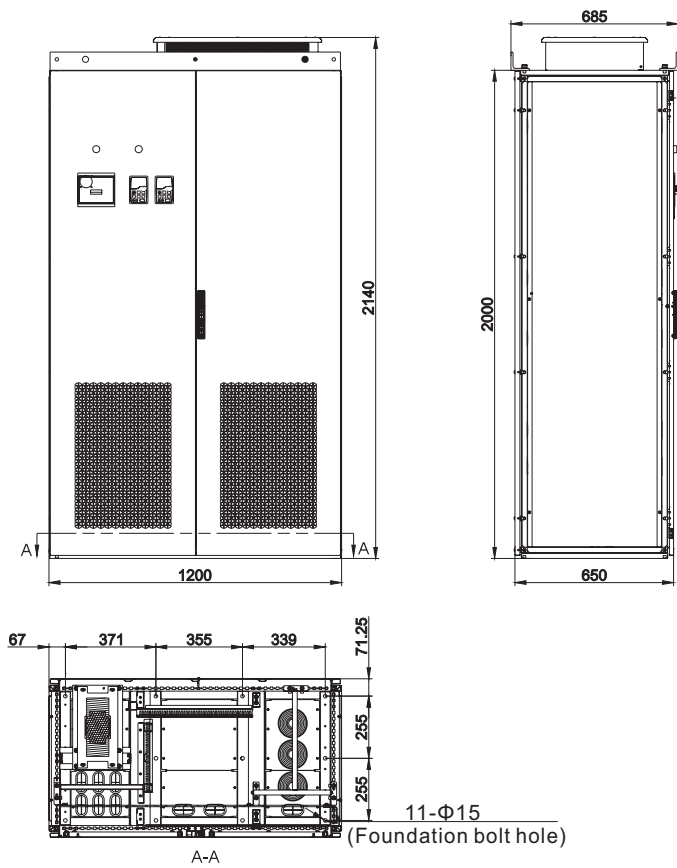
The installation diagram is shown as follows:



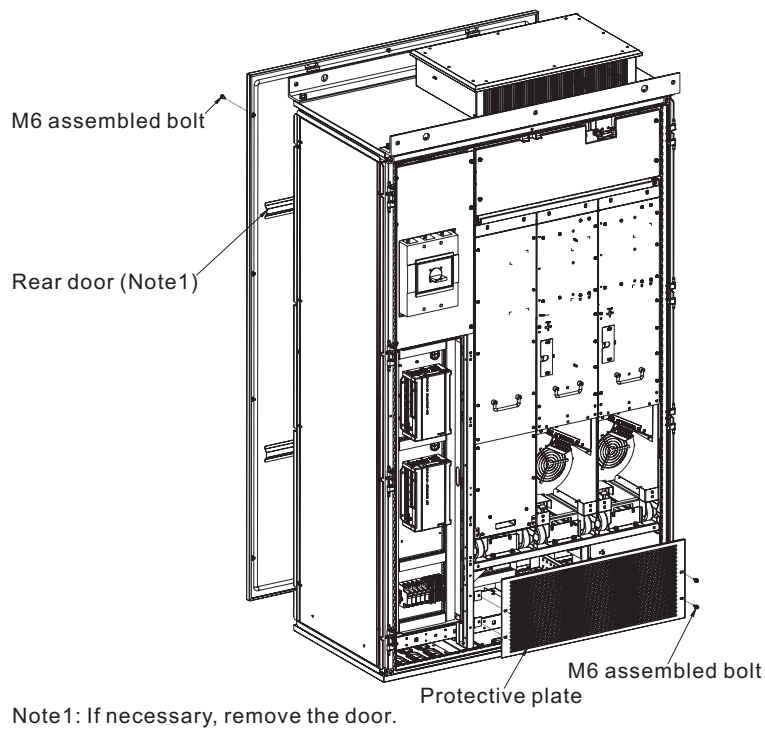
	<p>⚡ Do not connect the power line to UVW terminals.</p>
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Reference table of I/O cable specifications

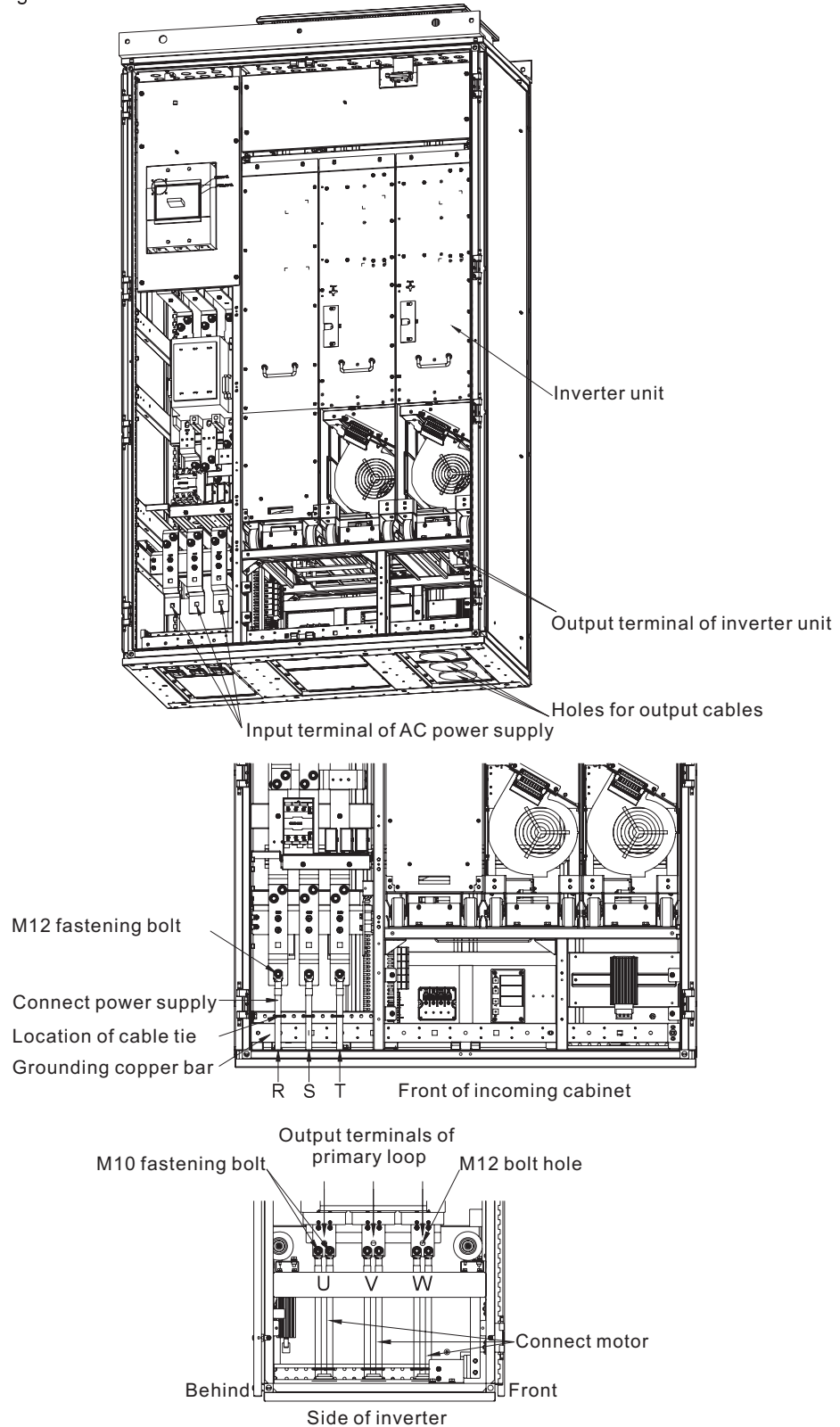
(3) Goodrive800-26/Goodrive800-96 series 0250~0400-4-MSC (0315~0500-6-MSC)




Install the equipment according to different ways. Open the front door, take down lower protective plate and, if necessary, remove the rear door. In particular, do not lose or damage the parts and fastening screws after removing the protective plate or the rear door.



The installation diagram is shown as follows:



	<p>⚡ Do not connect the power line to U V W terminals.</p>
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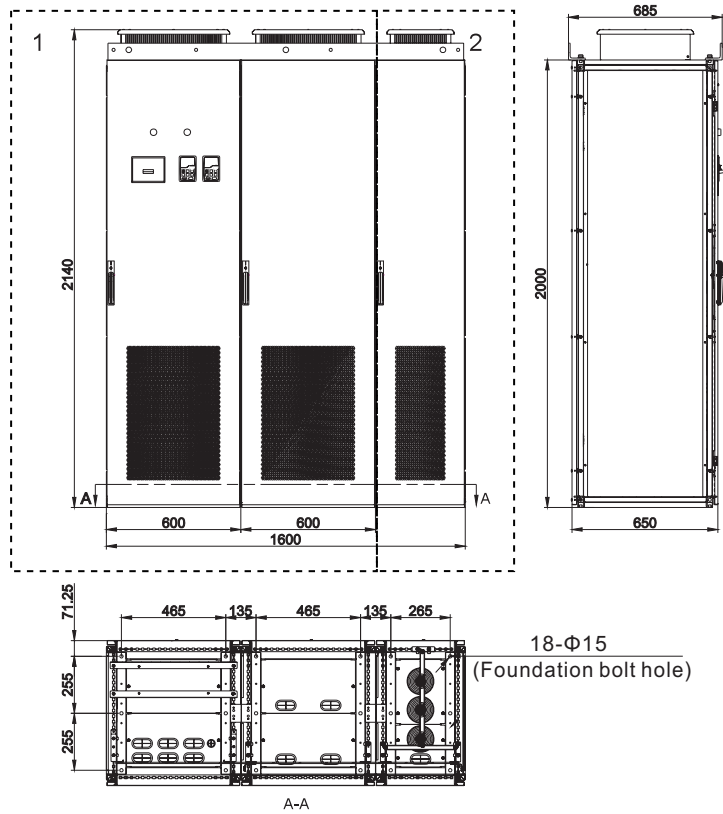
Reference table of I/O cable specifications

2.7.1.2 Multi-cabinet

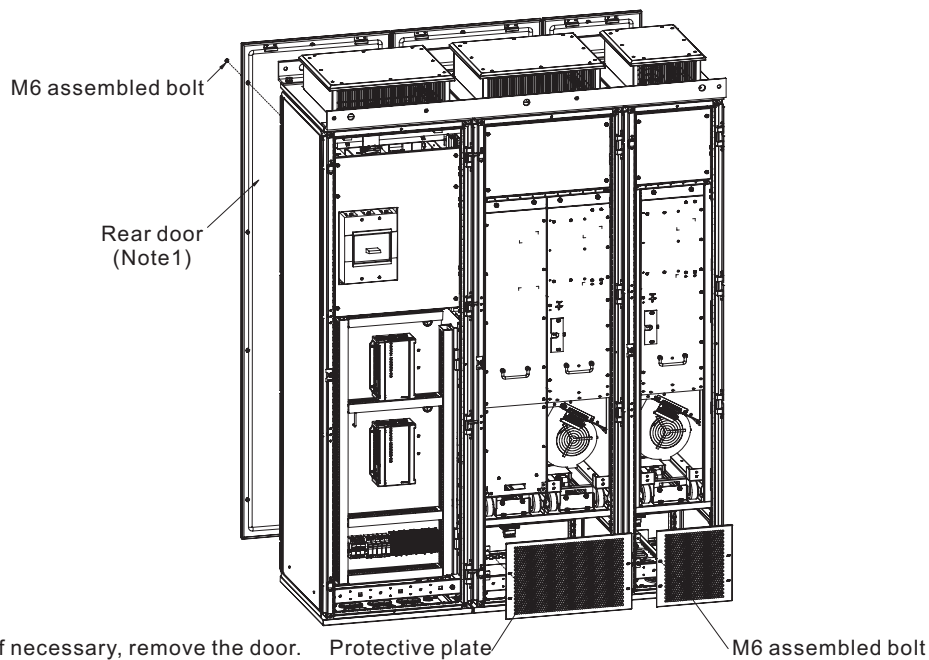
(1) Figure 1+2: Goodrive800-26 series 0250~0400-4 (0315~0500-6)

Figure 1: Goodrive800-96 series 0250~0400-4 (0315~0500-6)

Figure 2: Goodrive800-56 series 0250~0400-4 (0315~0500-6)

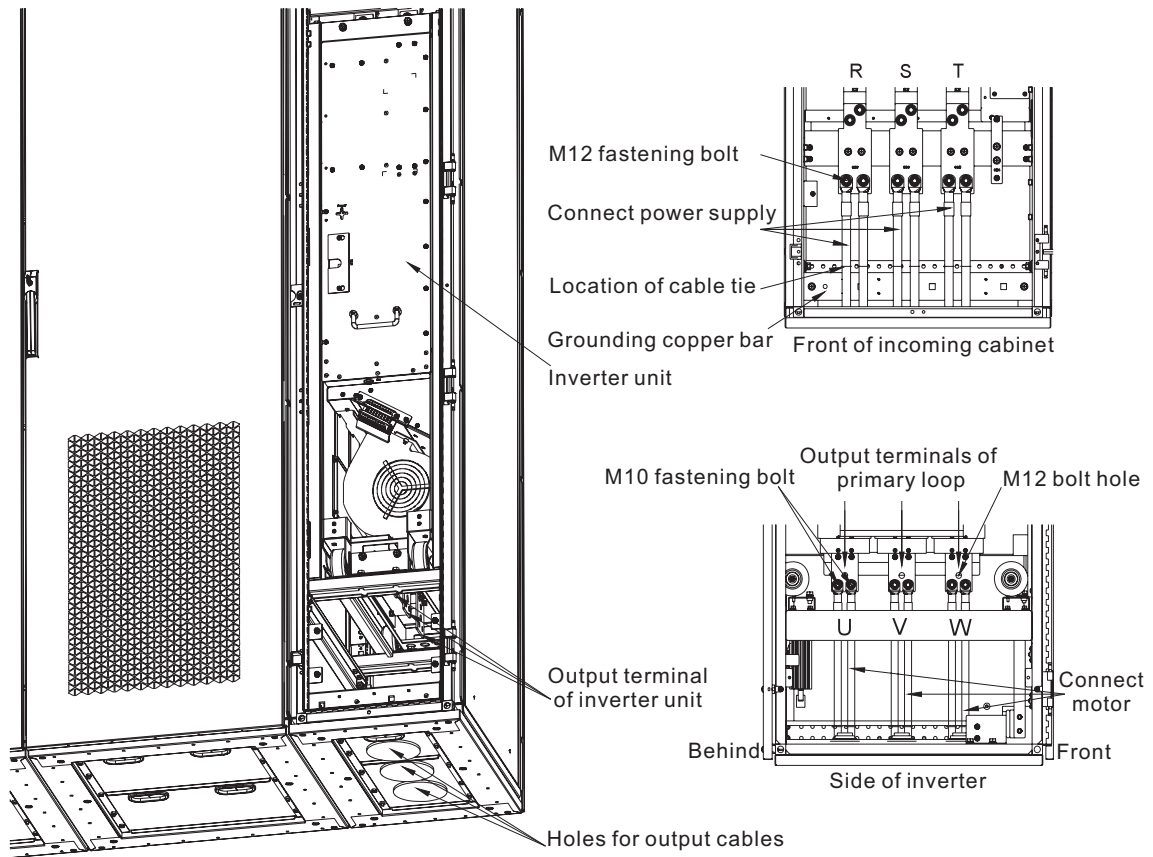



Install the equipment according to different ways. Open the front door, take down lower protective plate and, if necessary, remove the rear door. In particular, do not lose or damage the parts and fastening screws after removing the protective plate or the rear door.



Note1: If necessary, remove the door.

The installation diagram is shown as follows:



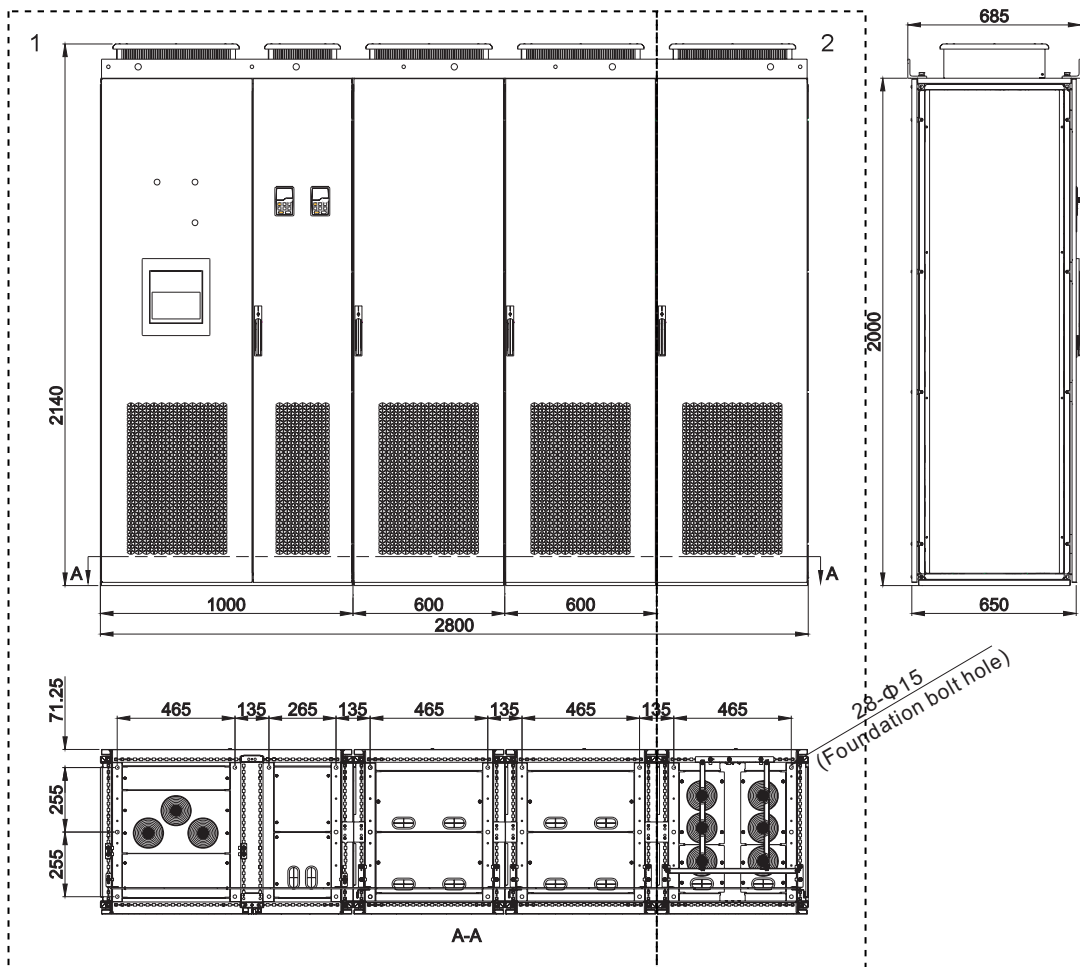
	<p>⚡ Do not connect the power line to UVW terminals.</p>
-------------------------------------------------------------------------------------	----------------------------------------------------------

Reference table of I/O cable specifications

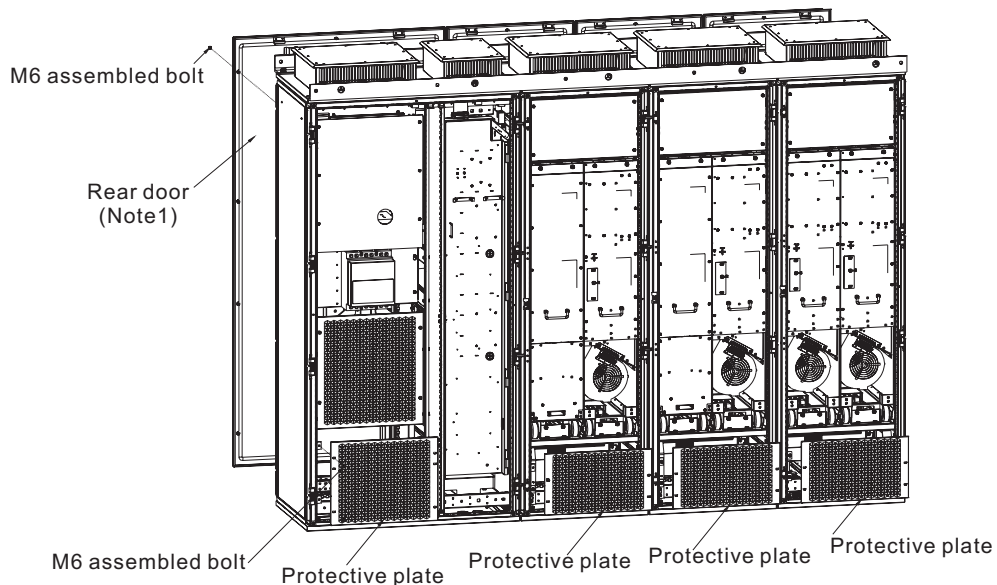
(2) Figure 1+2: Goodrive800-26 series 0500~0800-4 (0630~1000-6)

Figure 1: Goodrive800-96 series 0500~0800-4 (0630~1000-6)

Figure 2: Goodrive800-56 series 0500~0800-4 (0630~1000-6)

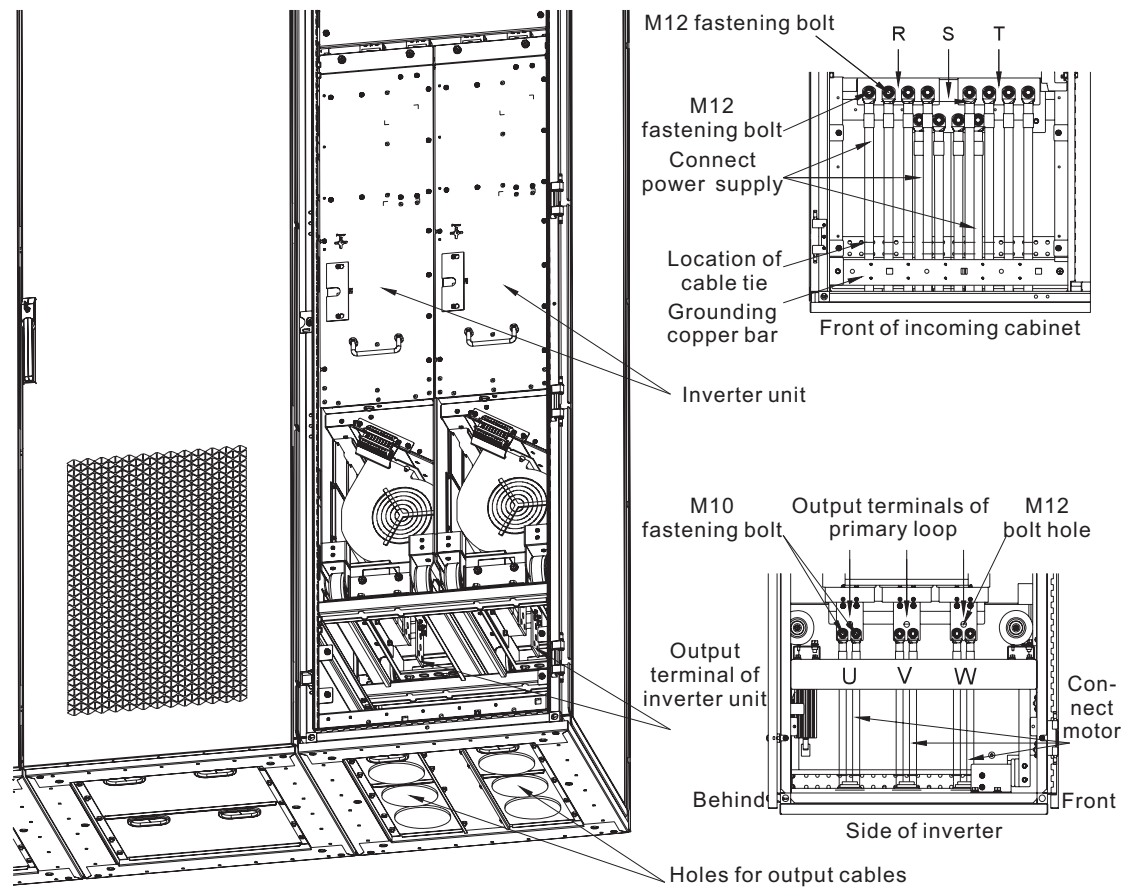



Install the equipment according to different ways. Open the front door, take down lower protective plate and, if necessary, remove the rear door. In particular, do not lose or damage the parts and fastening screws after removing the protective plate or the rear door.



Note1: If necessary, remove the door.

The installation diagram is shown as follows:



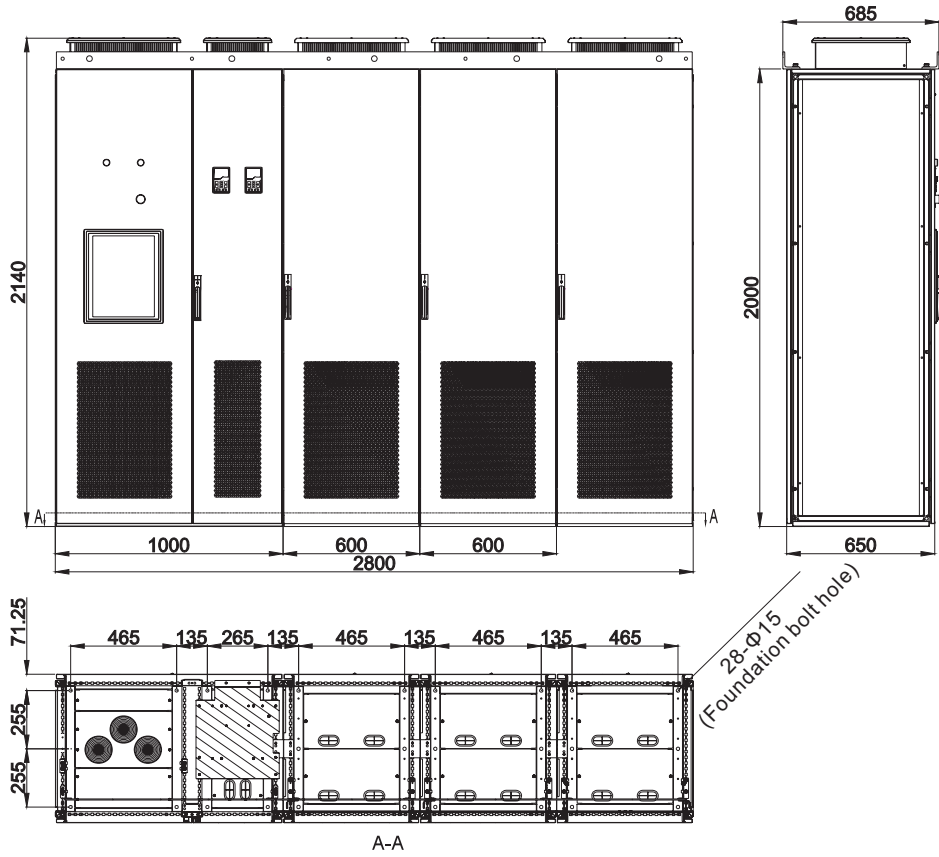
	<p>⚡ Do not connect the power line to UVW terminals.</p>
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Reference table of I/O cable specifications

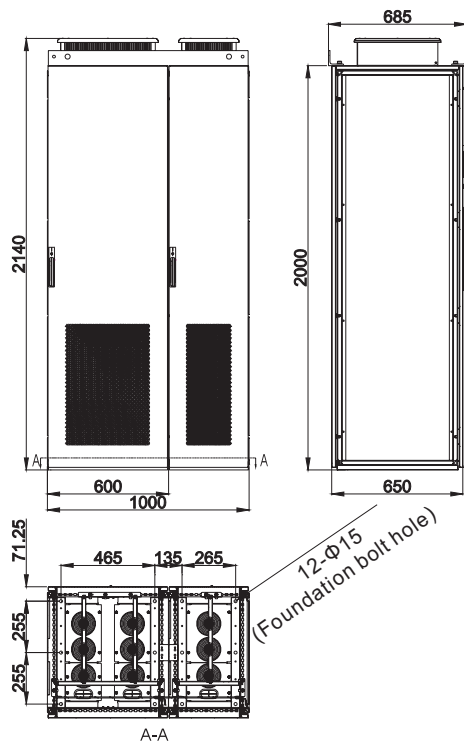
2.7.2 Field combined cabinet

Goodrive800-26 series 1000~1200-4 (1200~1500-6) is combined by rectification and converting which will be delivered separately for field cabinet combination, as shown below:

Rectification: Goodrive800-96 series 1000~1200-4 (1200~1500-6)



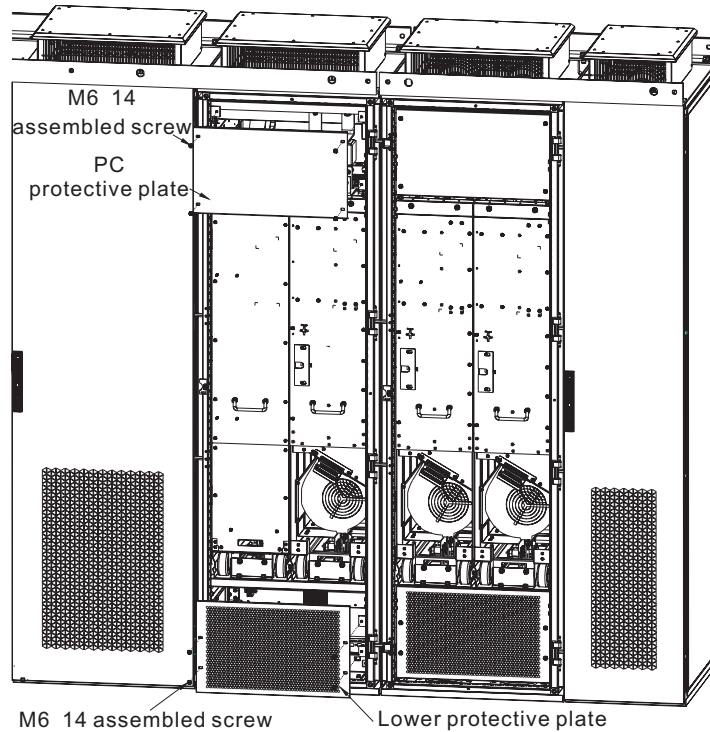
Converting: Goodrive800-56 series 1000~1200-4 (1200~1500-6)



(1) Combine cabinets:

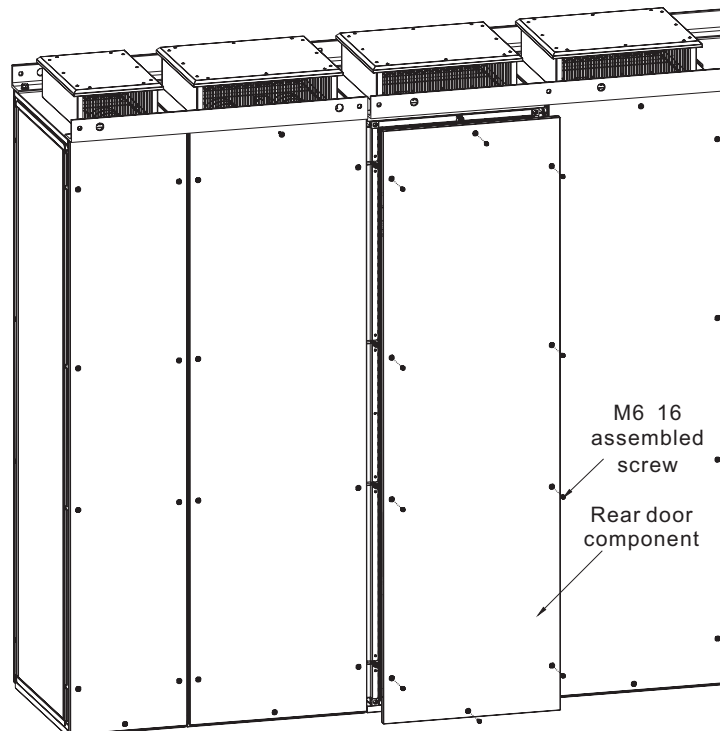
Step 1 Take down the protective plate: As shown below, open the front doors of two adjacent combined cabinets and remove M6X14 screws and then take out PC protective plate and lower protective plate.

Note: Do not lose the parts and fastening screws after removing the protective plates.

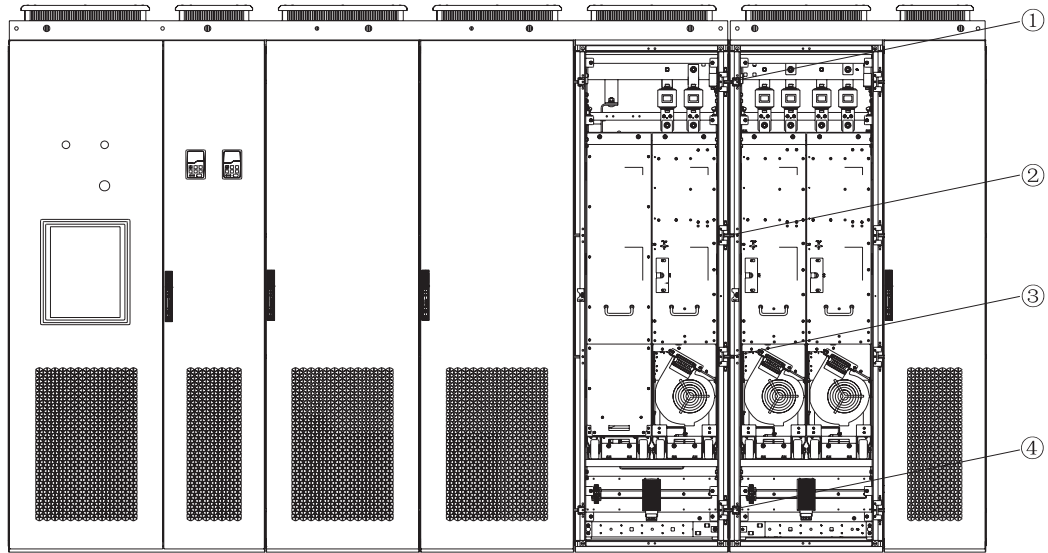


Step 2 Remove rear door component: As shown below, remove M6X16 screws and then take down rear door component.

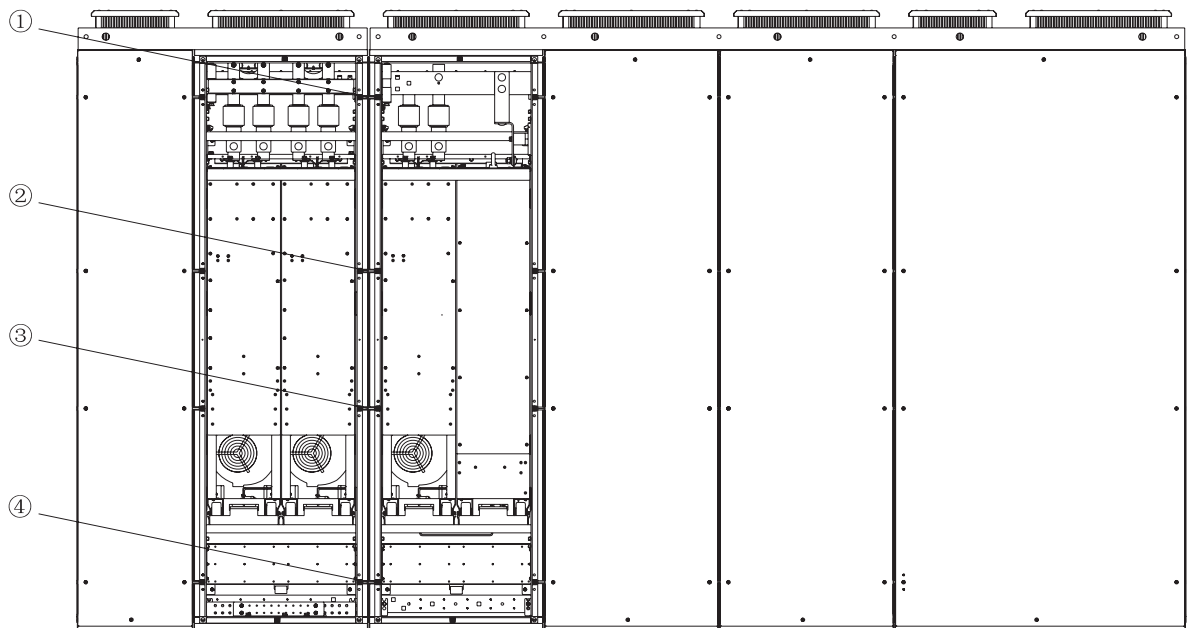
Note: Do not lose the parts and fastening screws after removing rear door component.



Step 3 Install and combine cabinets: As shown below, rectification and converting are connected by hex studs, four at the front and rear of the equipment respectively, and use one M6X10 hex socket screw and one spring washer at each end of the studs and a M6 Allen key for fixing. It is necessary to align the equipment at front and rear and in horizontal direction during locking. (Four studs at the front and rear respectively are marked with ①, ②, ③ and ④.)

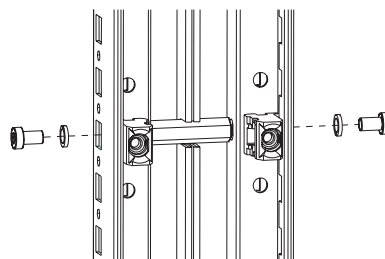


Front view

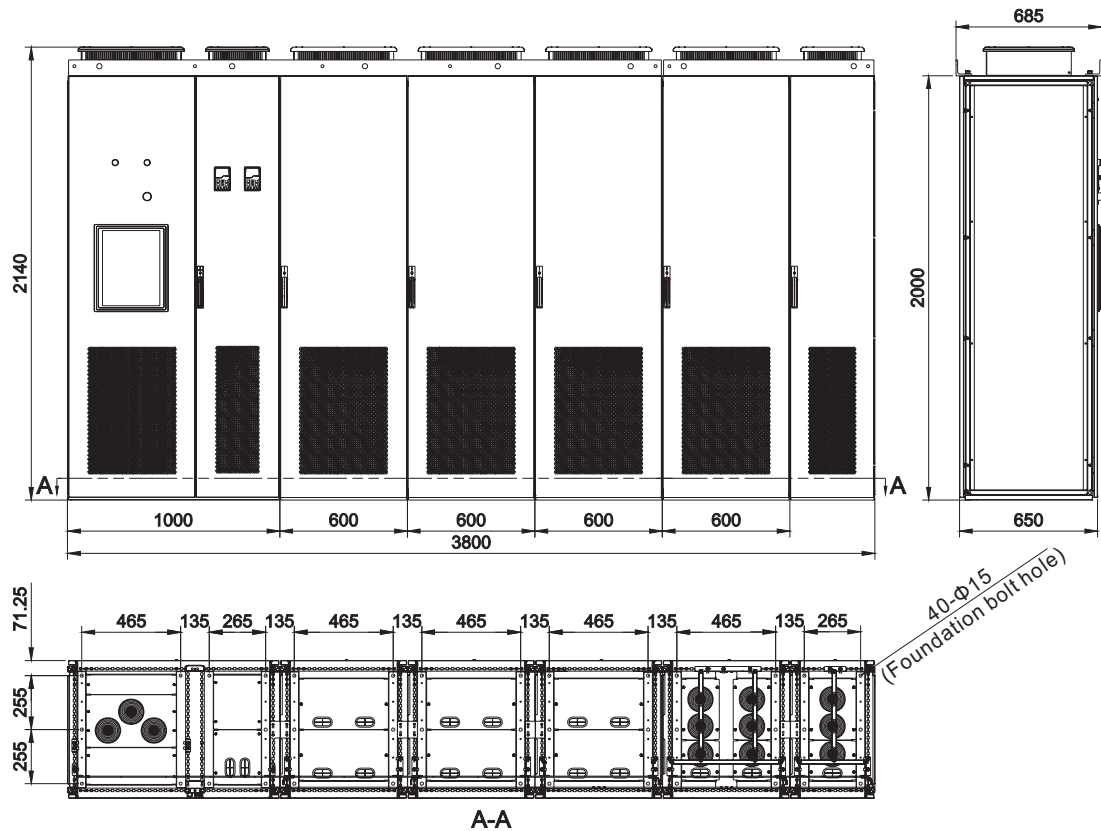


Rear view

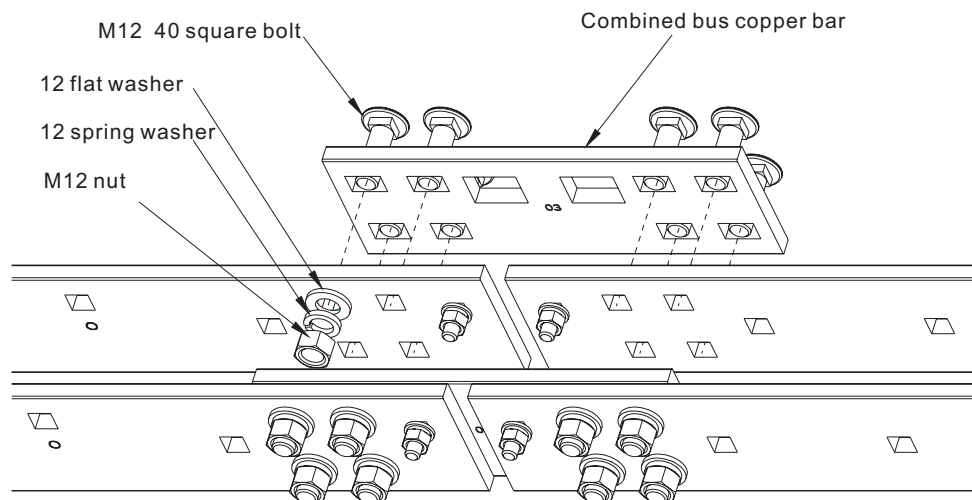
The hex studs, M6 10 hex socket screws and spring washers 6 are mounted as shown on the right.



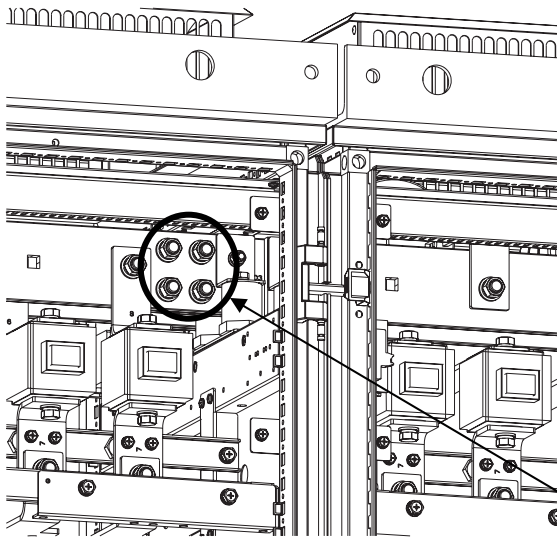
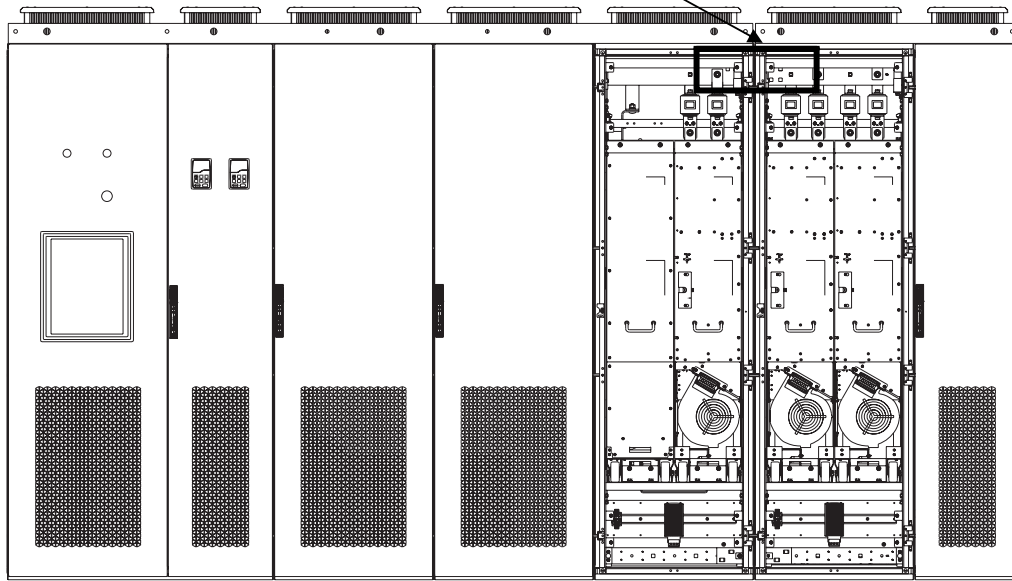
(2) Fix cabinets: After combination, as shown in following figure, use the flat washer 12, spring washer 12 and nut M12 to install and fix the cabinets based on foundation holes of rectification and converting. Goodrive800-26 series 1000~1200-4 (1200~1500-6):



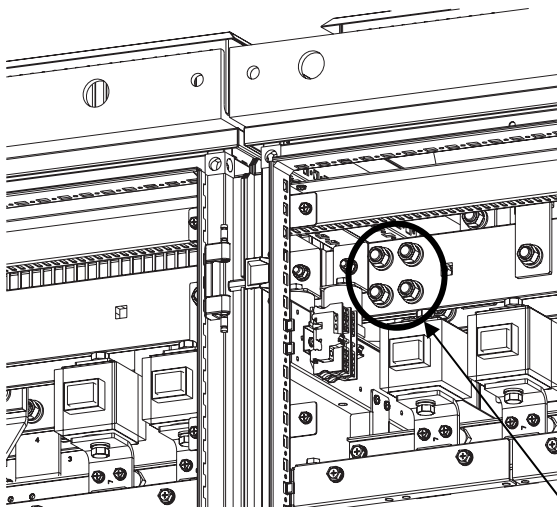
(3) Combine DC bus: As shown below, make the combined bus copper bar go through from rectification side to converting side (install positive copper bar inside at first), connect the bus copper bar at the back of DC bus copper bar, align the bus copper bar with mounting holes and fix it with four M12 square bolts at each end, and finally fasten the bus copper bar after aligning the DC bus. (Pay attention to the direction of the combined bus copper bar.)



Mounting location of the combined bus copper bar (Front view)

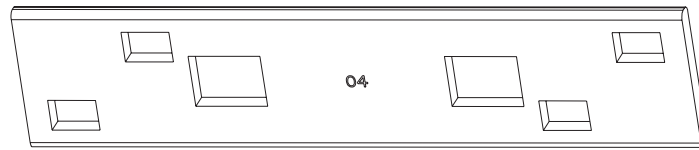


Fastening bolts of DC bus copper bar on the left

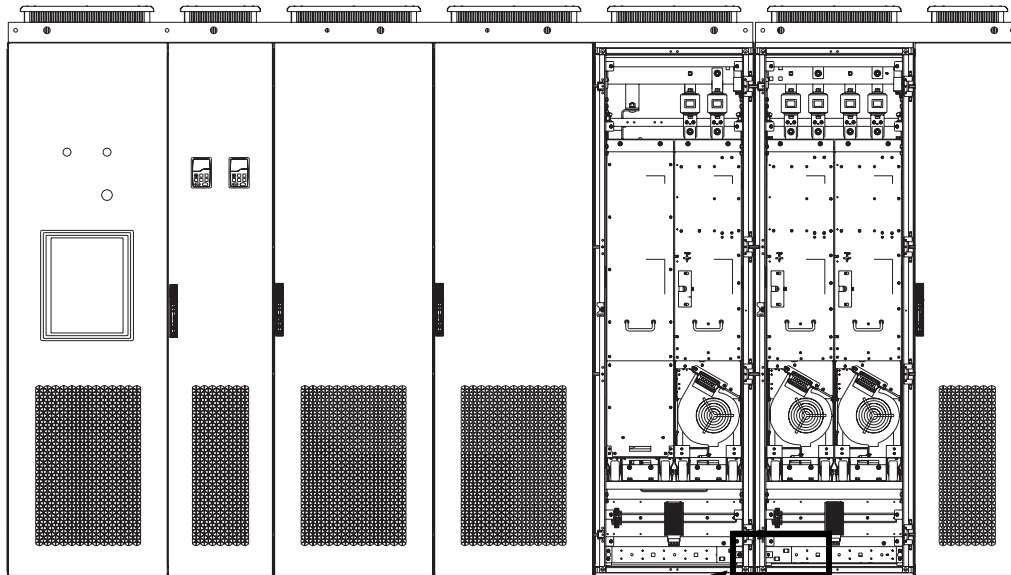


Fastening bolts of DC bus copper bar on the right

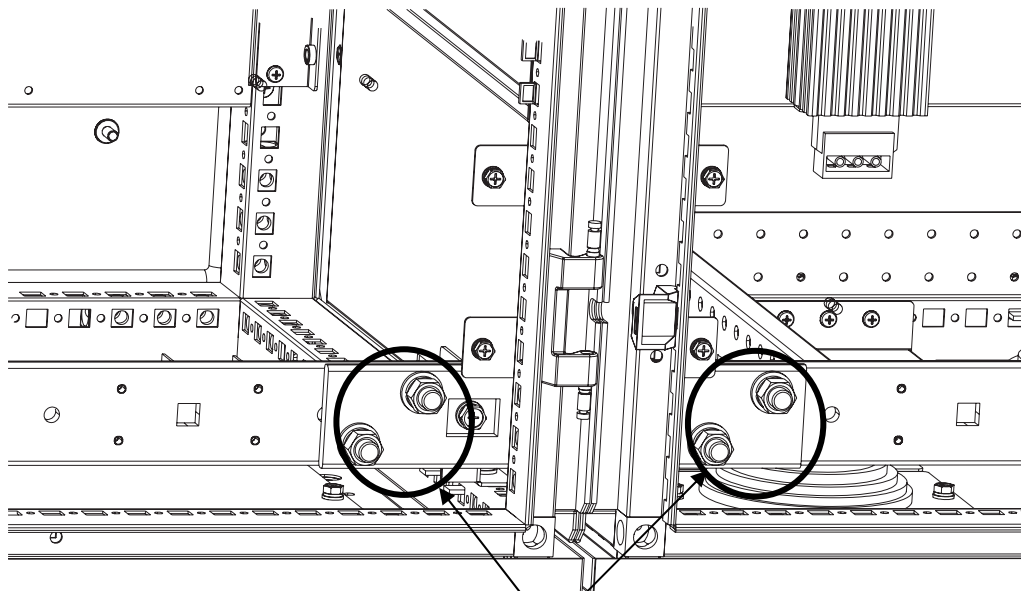
(4) Mount and combine the ground row: As shown below, put the combined ground row from the front side, align the ground row with mounting holes and then fix it with two M12X40 square bolts at each end, and finally fasten the ground row after alignment.



Combined ground row



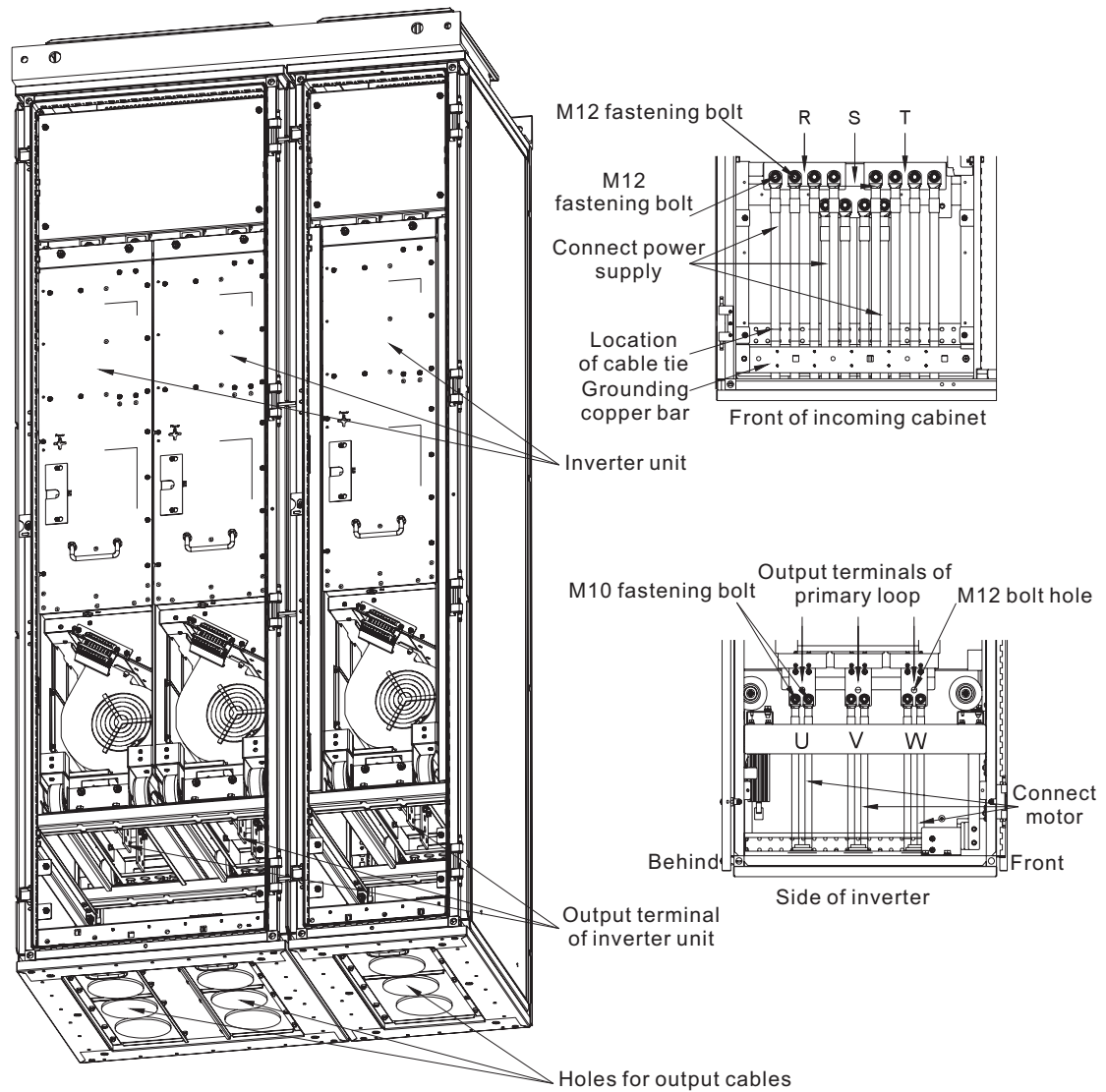
Mounting location of ground row (Front view)




Fastening bolts of the combined ground row on the left and right

(5) Electrical installation

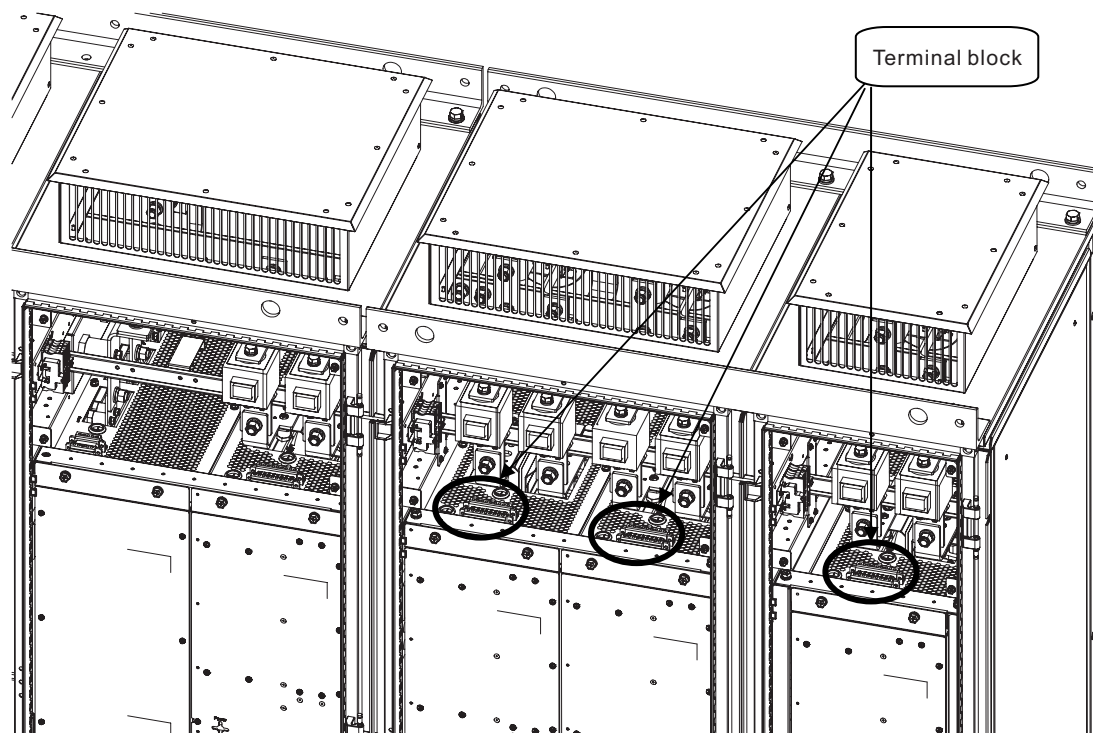
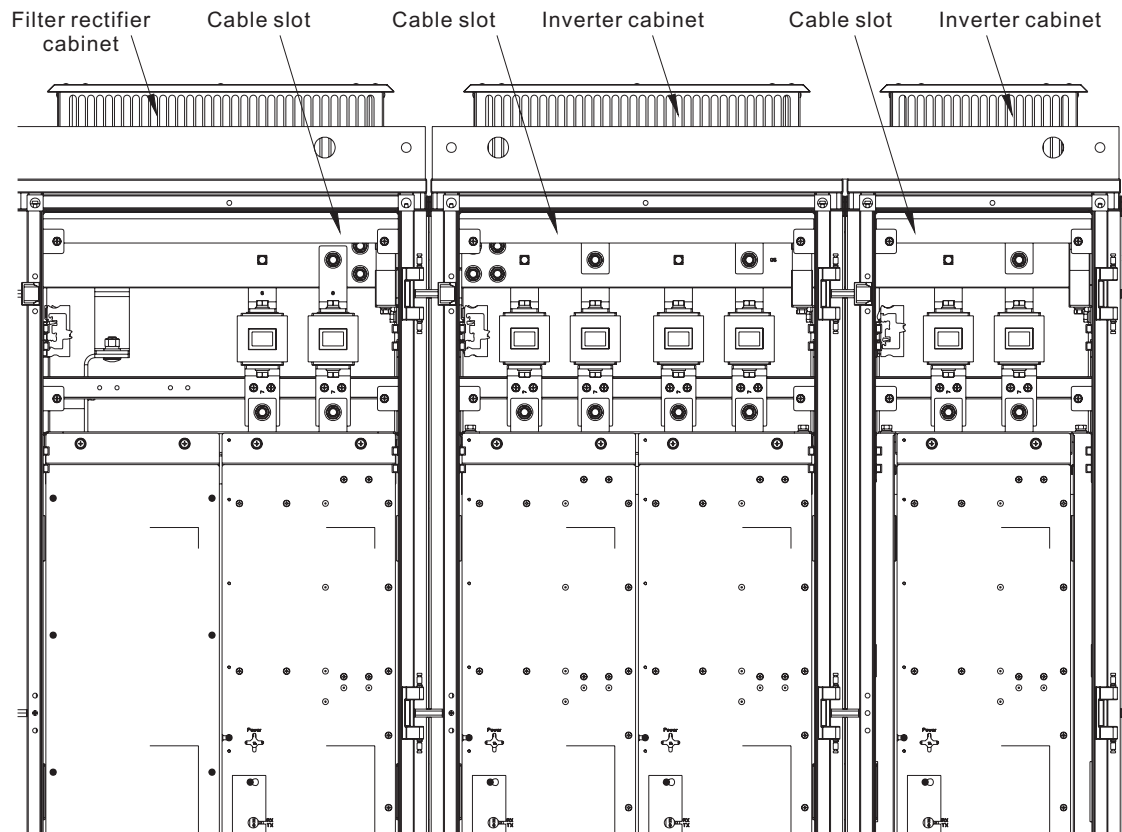
① Installation of I/O cables



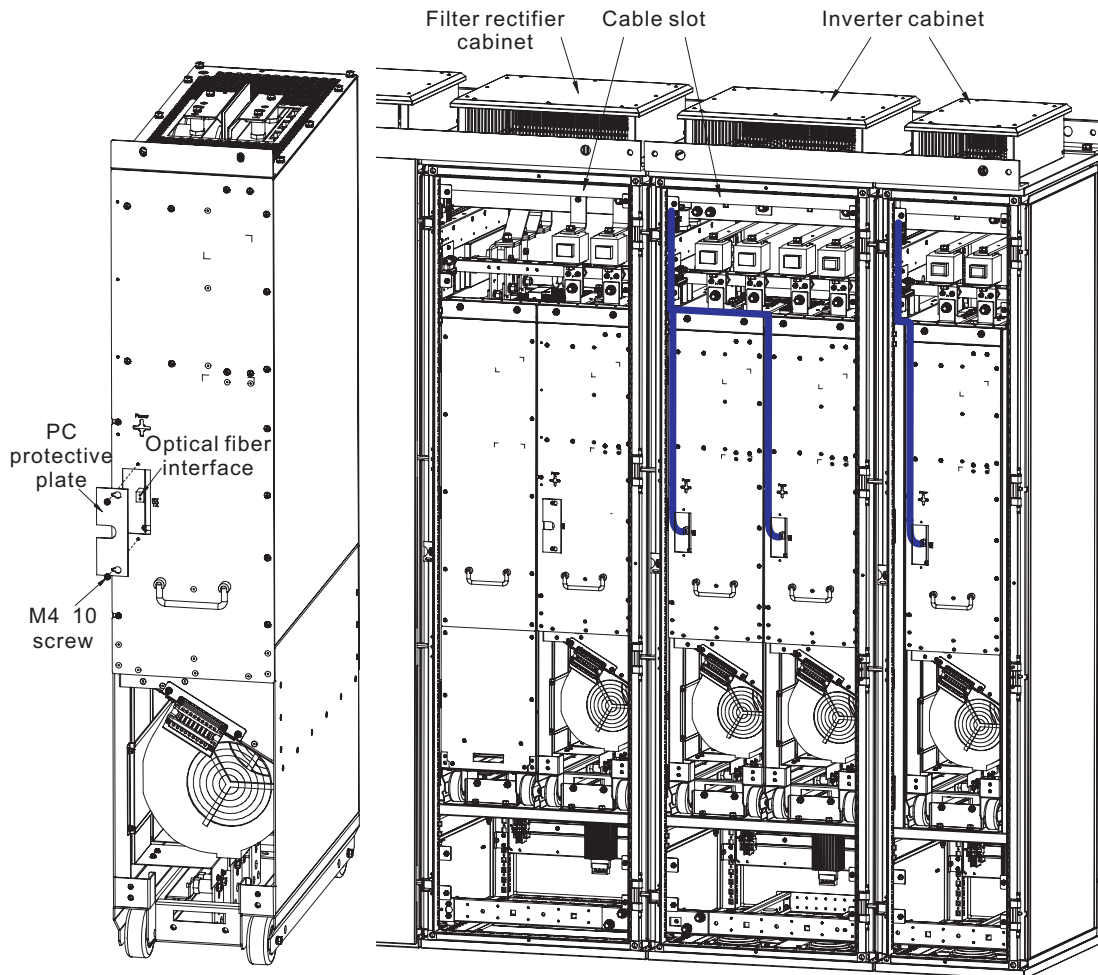
	<p>⚡ Do not connect the power line to UVW terminals.</p>
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Reference table of I/O cable specifications

② Power line: As shown below, take the power line out of the cabling channel of the filter rectifier cabinet (380V/660V), connect it to the 9PIN terminal on the left and right of the inverter cabinet, and fasten it with a small-sized slotted screwdriver. For specific information, refer to the schematic diagram.



③ Optical fiber: As shown below, remove M4X10 screws on PC protective plate at the front of the power unit at first and take down the protective plate. Then take six optical fiber lines out of the cable slot of the filter rectifier cabinet, connect them to the inverter cabinet. The cabling is shown below on the right. (Note: When plugging in and out the optical fiber, hold the connector rather than touch the head because the optical fiber is very sensitive to dust and oil contamination. The minimum allowable bending radius is 35 mm.) Finally, use M4X10 screws to fix the PC protective plate back into place. For specific information, refer to the schematic diagram.



2.8 Table of I/O cable specifications

Table of Goodrive800-26 series I/O cable specifications: Reference only!

Model	Heavy overload				Light overload			
	Input current (A)	Input cable (mm ²)	Output current (A)	Output cable (mm ²)	Input current (A)	Input cable (mm ²)	Output current (A)	Output cable (mm ²)
U_N=380V								
GD800-26-0075-4	115	50	150	70	140	70	180	95
GD800-26-0090-4	140	70	180	95	170	95	215	120
GD800-26-0110-4	170	95	215	120	200	120	260	150
GD800-26-0132-4	200	120	260	150	245	150	305	185
GD800-26-0160-4	245	150	305	185	280	185	350	95*2
GD800-26-0200-4	305	185	380	120*2	335	95*2	425	120*2
GD800-26-0250-4	380	120*2	480	150*2	42	120*2	530	150*2
GD800-26-0315-4	480	150*2	600	185*2	530	150*2	650	185*2
GD800-26-0400-4	610	185*2	720	120*4	685	185*2	810	120*4
GD800-26-0500-4	760	150*3	960	Each unit 150*2	850	185*3	1060	Each unit 150*2
GD800-26-0630-4	960	185*3	1200	Each unit 185*2	1080	185*4	1300	Each unit 185*2
GD800-26-0800-4	1215	240*4	1440	Each unit 120*4	1365	240*4	1620	Each unit 120*4
GD800-26-1000-4	1520	240*5	1800	Each unit 185*2	1670	240*5	1950	Each unit 185*2
GD800-26-1200-4	1825	240*6	2160	Each unit 120*4	2050	240*6	2430	Each unit 120*4
U_N=660V								
GD800-26-0075-6	65	25	86	35	80	35	98	35
GD800-26-0090-6	80	35	98	35	95	35	120	50
GD800-26-0110-6	95	35	120	50	115	50	150	70
GD800-26-0132-6	115	50	150	70	140	70	175	95
GD800-26-0160-6	140	70	175	95	165	95	200	120
GD800-26-0200-6	175	95	220	120	195	120	240	150
GD800-26-0250-6	220	120	270	150	245	150	300	185
GD800-26-0315-6	275	185	350	95*2	310	95*2	380	120*2
GD800-26-0400-6	350	95*2	430	120*2	395	120*2	480	150*2
GD800-26-0500-6	440	120*2	540	150*2	484	150*2	585	185*2
GD800-26-0630-6	555	185*2	700	Each unit 95*2	625	185*2	760	Each unit 120*2
GD800-26-0800-6	705	150*3	860	Each unit 120*2	795	150*3	960	Each unit 150*2
GD800-26-1000-6	880	185*3	1080	Each unit 150*2	970	185*3	1170	Each unit 185*2
GD800-26-1200-6	1055	240*4	1290	Each unit 120*2	1190	240*4	1440	Each unit 150*2
GD800-26-1500-6	1320	240*5	1620	Each unit 150*2	1455	240*5	1755	Each unit 185*2

Goodrive800-96 series products correspond to input specifications while Goodrive800-56 series correspond to output specifications.

Select multiple cabinets as specified above to combine together when the model is larger than Goodrive800 series 1200-4/1500-6, such as two combined GD800-26-1000-4 for GD800-26-2000-4 and two combined GD800-26-1000-6 for GD800-26-2000-6.

Chapter 3 Maintenance

3.1 Overview

Only trained and qualified professionals are allowed to carry out the maintenance.

Before operating inside:

- Disconnect the power supply of the equipment (Note: Any switches or circuit breakers in the cabinet body cannot cut off the power supply)
- Wait for 15 minutes when the DC circuit capacitor in the center discharges
- Ensure the DC bus voltage is lower than 36V

3.2 Tools required

The following tools are used to install and remove the parts and screws during maintenance.

- A set of torque wrenches or socket wrenches
- A set of open end wrenches or socket wrenches
- A set of hex wrenches
- Medium and small sized slotted screwdrivers
- Medium-sized cross recess screwdriver

Table of tightening torque for threaded fasteners (Fastener degree: 4.8 Unit: kgf.cm)

Thread specification	Copper bar connection	Sheet metal connection	Remarks
M5	30	20	
M6	45	30	
M8	110	85	
M10	220	164	
M12	390	285	
M16	980	710	

3.3 Maintenance period

Installed in a suitable environment, the inverter will require little maintenance. The following table lists the regular maintenance period recommended by INVT.

Maintenance period	Illustration
Every 6~12 months (Depend on specific installation environment.)	Check according to the table below
Every 6~12 months (Depend on specific installation environment.)	Check and clean the heat sink
Once a year (Memory does not run.)	Aging of the capacitor
Once a year	Check the air filter and change it if necessary
Every 6 years	Change the filter and the cooling fan of power unit
Every 10 years	Change the capacitor

Check table:

Check item	Check content	Check method	Criterion	
Ambient environment	The ambient temperature, humidity, vibration, dust, gas, oil fog and water drop	Observation and instrument measurement	Complying with technical specifications	
	Foreign materials such as tools and dangerous objects	Observation	No tools or dangerous objects	
Main circuit	For common use	Loose bolts	Tighten up	NA
		Distortion, crackles, damage and color-changing caused by overheating and aging to the machine and insulator	Observation	NA
		Dirtiness and dust	Observation	NA Note: If the color of the copper bars changes, it does not indicate any feature problem.
	Conducting wire	Color-changing or distortion caused by overheating to the conductor	Observation	NA
		Crackles and color-changing to the protective layers of wires	Observation	NA
	Terminal	Broken	Observation	NA
	Filter capacitor	Fluid leakage, color-changing, crackles and housing expansion	Observation	NA
		The safety valve in place	Estimate service life according to maintenance or make use of the electrostatic capacity to measure	NA
		If necessary, measure the electrostatic capacity.	Instrument measurement	Electrostatic capacity \geq initial value * 0.8
	Resistor	Insulator crackles and displacement	Smelling and	NA

Check item		Check content	Check method	Criterion
	Transformer and reactor	caused by overheating	observation	
		Abnormal vibration, sound and odor	Hearing, smelling and observation	NA
	Electromagnetic contactor and relay	Vibration and sound	Hearing	NA
		The contact in good connection	Multimeter	NA
Control circuit	Plug-in	Loose screws and connectors	Tighten up	NA
		Abnormal odor and color-changing	Smelling and observation	NA
		Crackles, damage, distortion and rust	Observation	NA
Cooling system	Cooling fan	Abnormal sound and vibration	Hearing, observation and manual rotation	Rotating stably
		Loose bolts	Tighten up	NA
		Color-changing caused by overheating and dust	Observation and estimate service life according to maintenance	NA
	Ventilating duct	Blockage or adhered substance in the cooling fan, air inlet and air outlet	Observation	NA

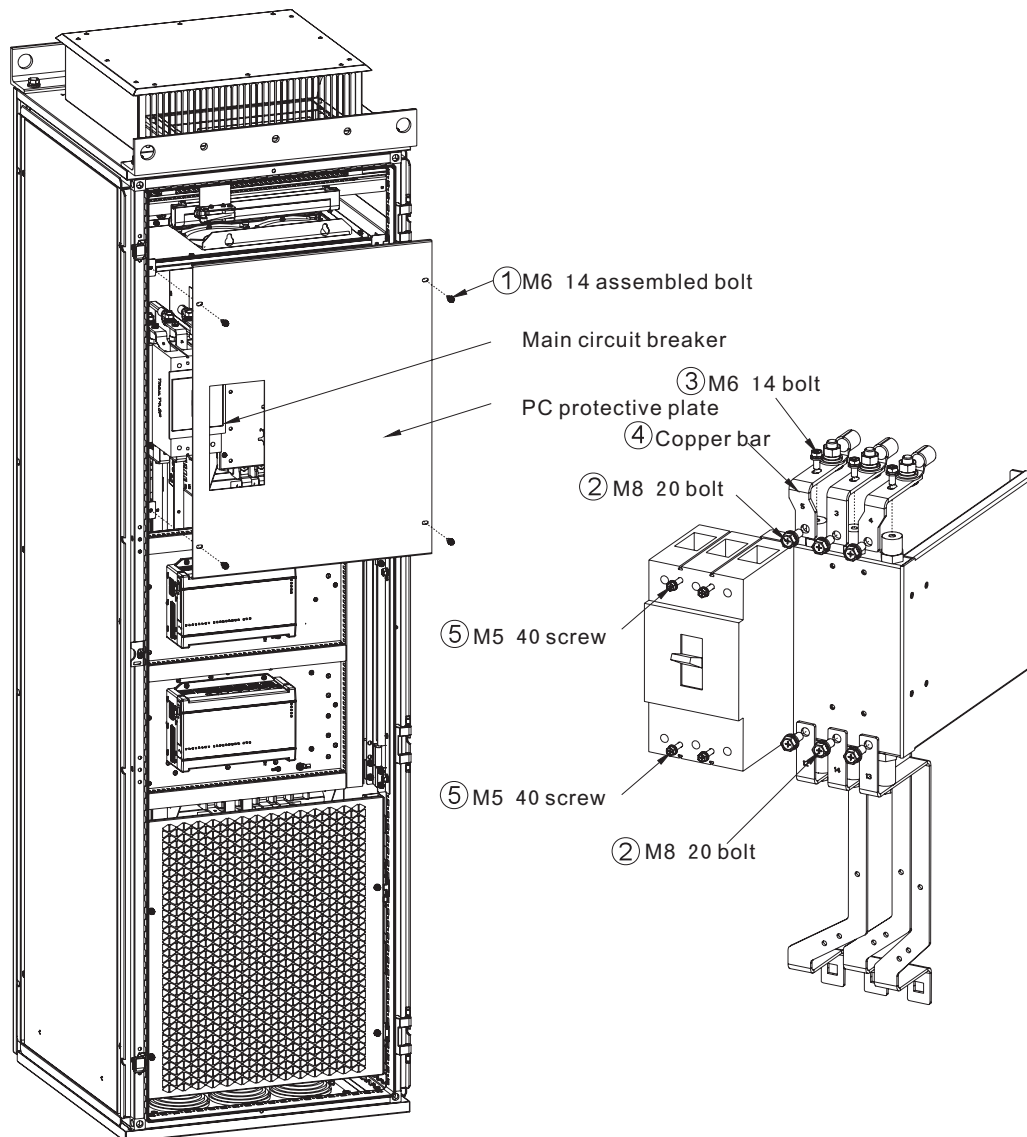
3.4 Specific maintenance

3.4.1 Goodrive800-26 series

3.4.1.1 Goodrive800-26/ Goodrive800-96 series 0075~0110-4 (0075~0132-6)

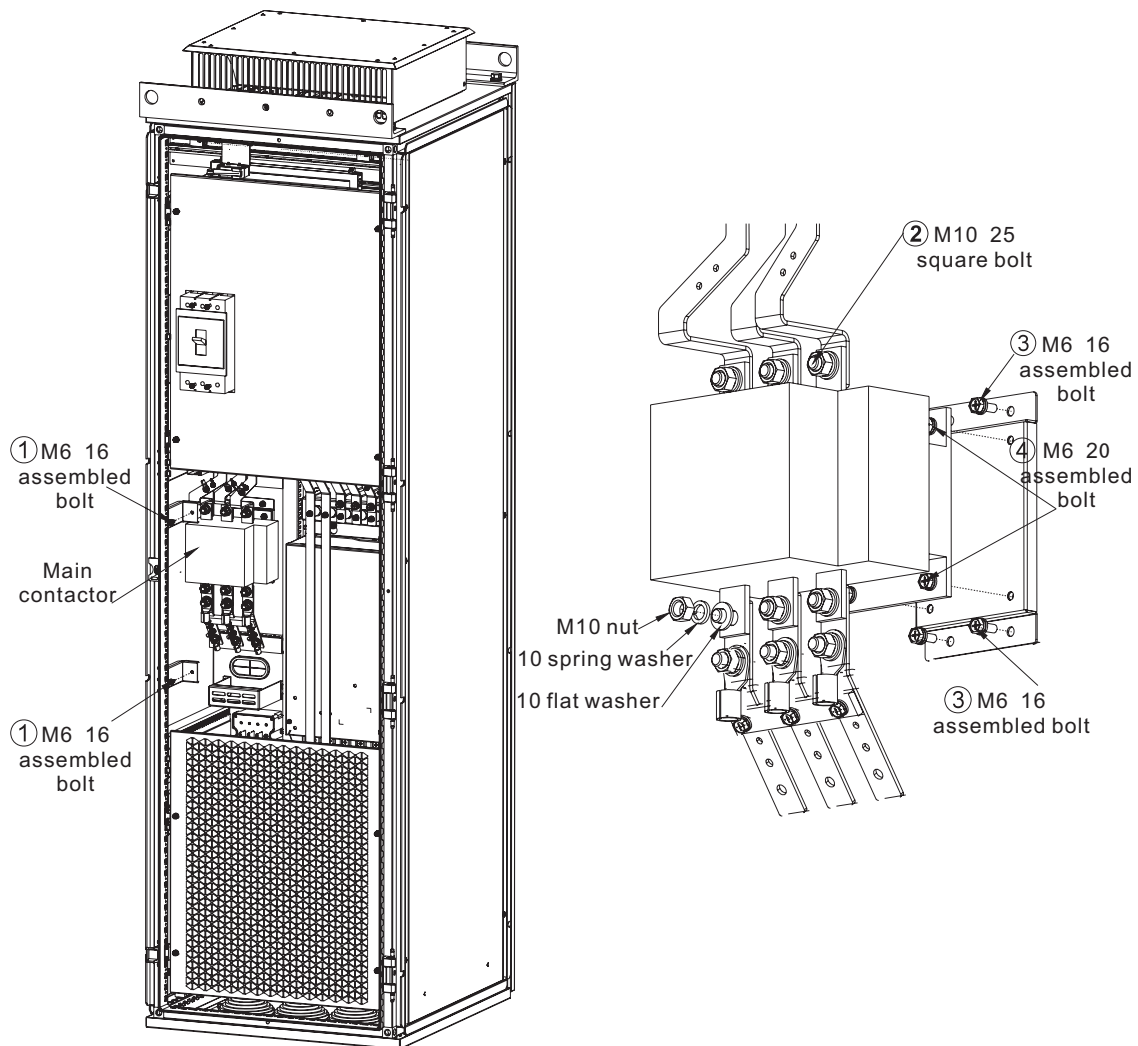
(1) Maintenance for main circuit breaker

1. As shown in ①, firstly open the front door (hidden), remove M6X14 assembled bolts and then take down PC protective plate.
2. As shown in ②, remove 6 M8 assembled bolts used to connect two ends of the main circuit breaker with copper bars.
3. As shown in ③, remove 3 M6X14 bolts of No.2, 3 and 4 copper bars.
4. As shown in ④, take out No.2, 3 and 4 copper bars. (With cables connecting the other ends, the copper bars can move upward freely.)
5. As shown in ⑤, remove 4 M5 screws of main circuit breaker, maintain or replace the main circuit breaker after taking it out upwards.
6. After maintenance or replacement, install the main circuit breaker back into place in reverse order.



(2) Maintenance for main contactor

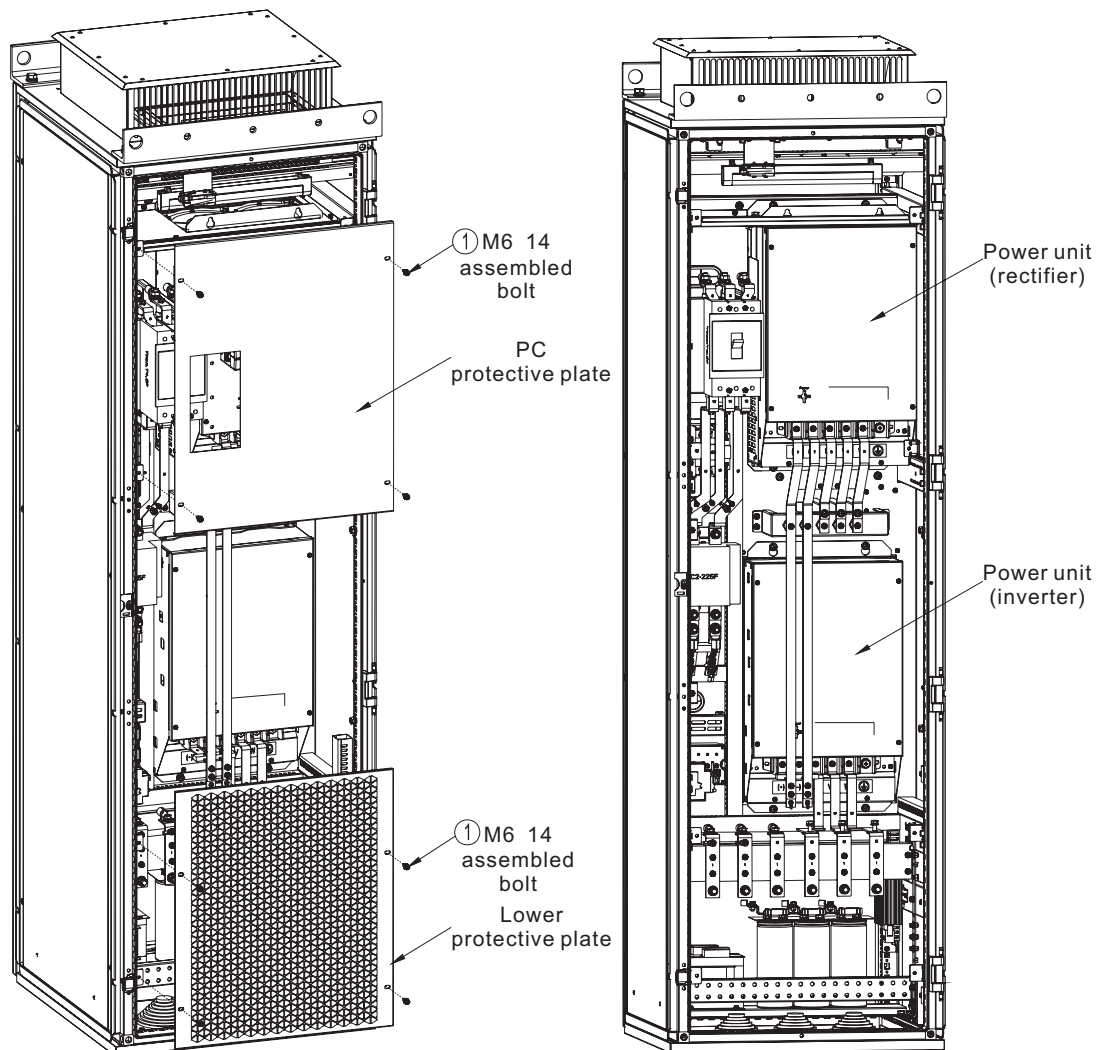
1. As shown in ①, remove 2 M6X16 assembled bolts and take down the inner door component.
2. As shown in ②, remove 6 M10X25 square bolts used to connect two ends of the main contactor with copper bars, with 220 torque.
3. As shown in ③, remove 4 M6X16 assembled bolts used to fix the components of the main contactor, and then take down the components.
4. As shown in ④, remove 4 M6X20 assembled bolts used to fix the main contactor, maintain or replace the main contactor after taking it out.
5. After maintenance or replacement, install the main circuit breaker back into place in reverse order.



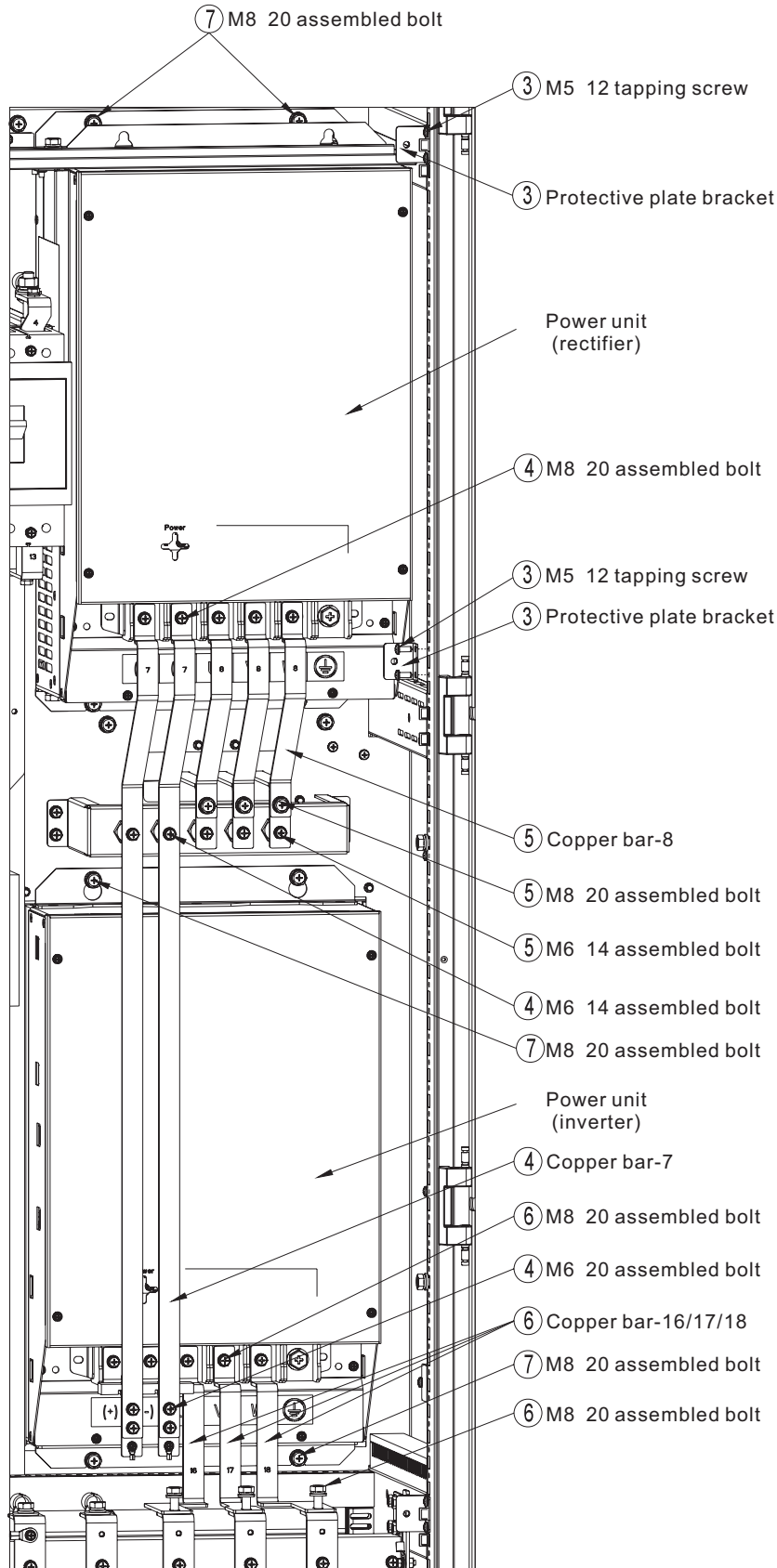
Note: The front door and inner door component are hidden in the figure.

(3) Maintenance for units

1. As shown in ①, firstly open the front door, remove M6X14 assembled bolts and then take out the PC protective plate and lower protective plate.
2. Refer to the first step in maintenance of main contactor, open inner door component.
3. As shown in ③, remove M5X12 tapping screws and then take out the brackets of protective plate (only 2 mounting brackets of upper protective plate removed).
4. As shown in ④, remove DC bus copper bars of the unit: take out 2 pieces of copper bar-7 after removing 2 M8X20, 4 M6X20 and 2 M6X14 assembled bolts.
5. As shown in ⑤, take out copper bar-8 after removing 6 M8X20 and 3 M6X14 assembled bolts (for rectifier unit removal).
6. As shown in ⑥, take out copper bar-16, copper bar-17 and copper bar-18 after removing 6 M8X20 assembled bolts (for inverter unit removal).
7. As shown in ⑦, the unit is hanging-type, so 2 M8X20 assembled bolts at the top only need to be loose enough to take out the unit instead of removal while 2 M8X20 assembled bolts at the bottom need to be removed. After that, hold the unit and take it out horizontally. Maintenance or replacement can be carried out then. If necessary, use the utility cart for unit removal.
8. After maintenance or replacement, install the unit back into place in reverse order.



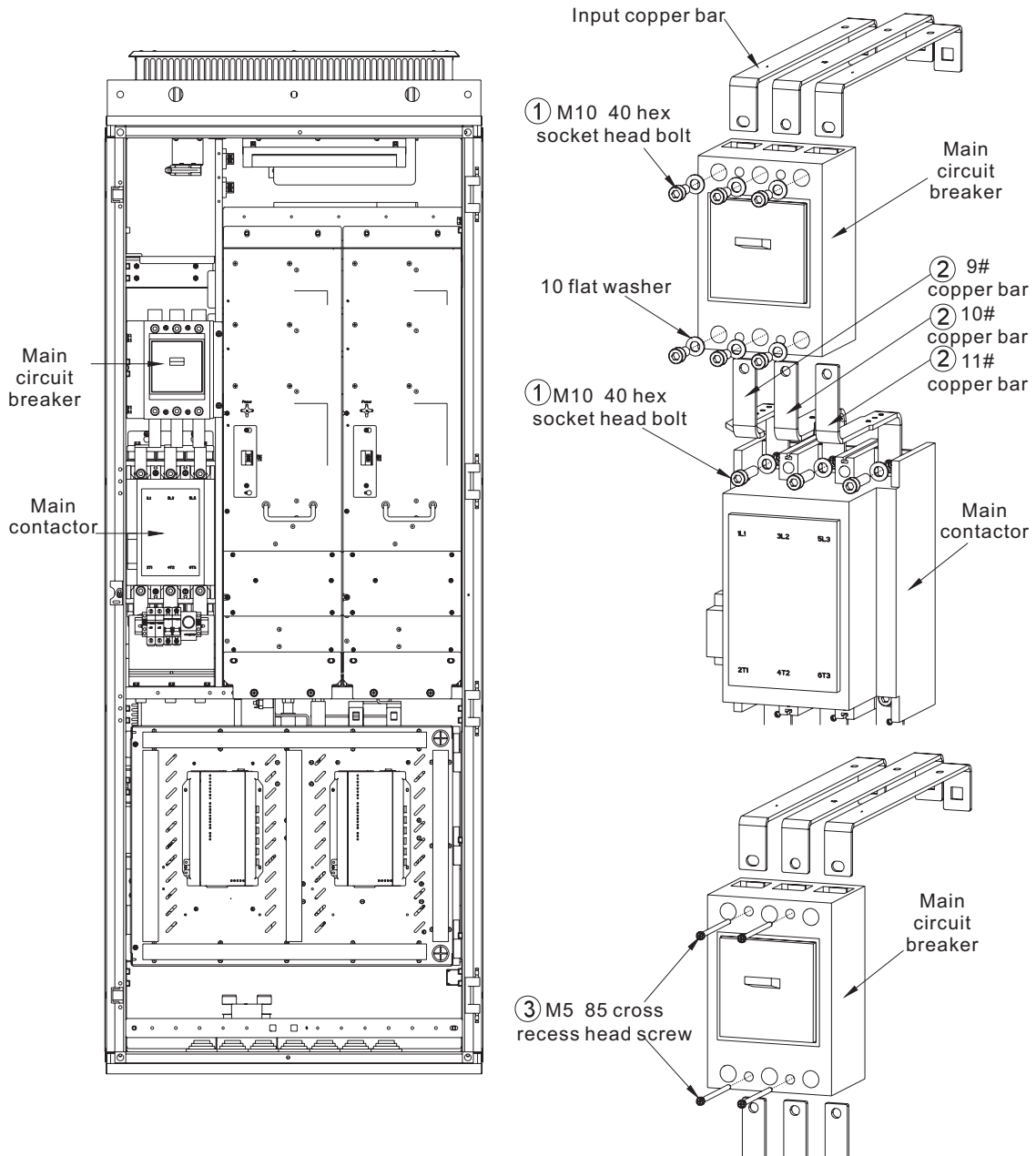
Note: The front door and inner door component are hidden in the figure.



3.4.1.2 Goodrive800-26/ Goodrive800-96 series 0132~0200-4 (0160~0250-6)

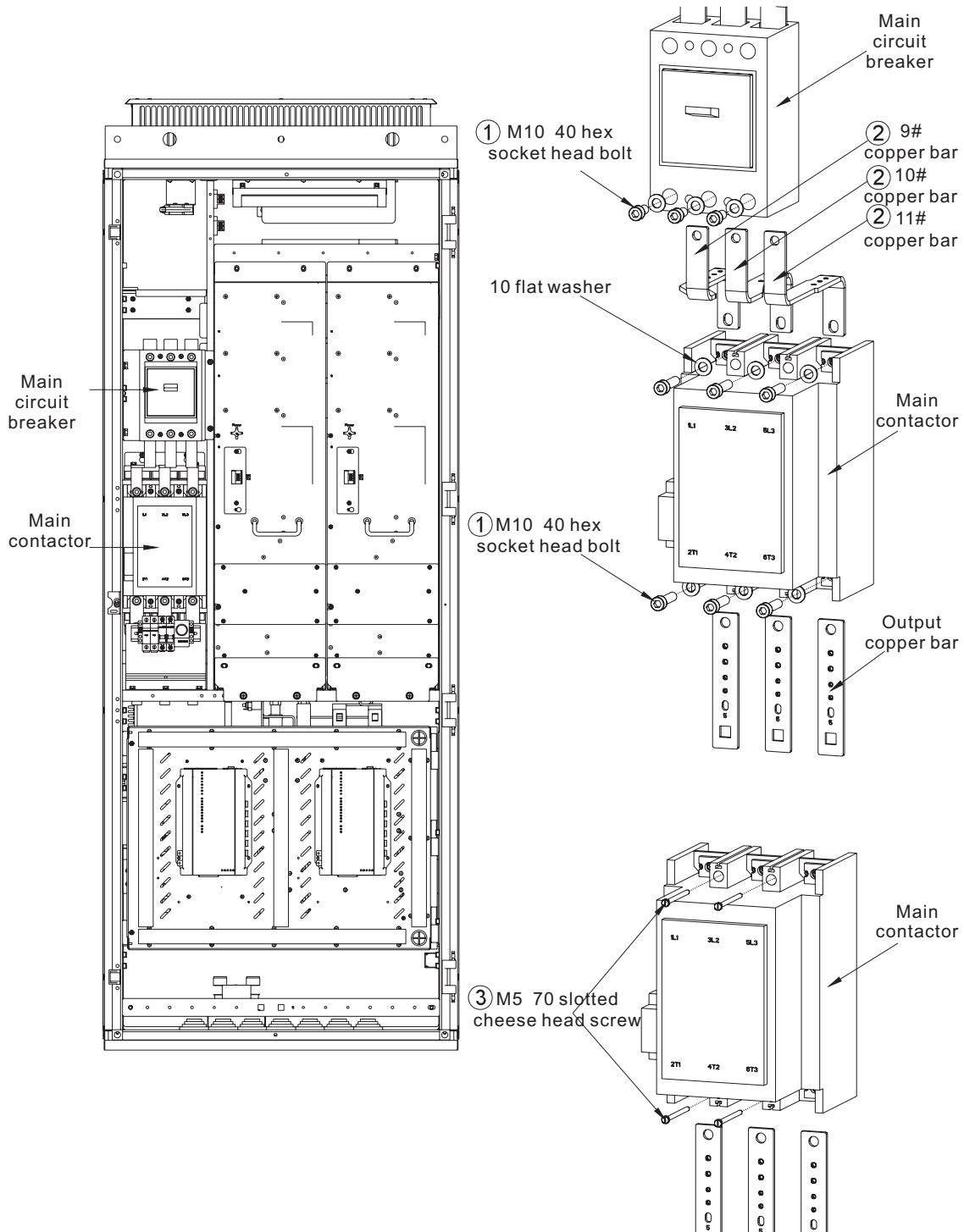
(1) Maintenance for main circuit breaker

1. As shown in ①, firstly open the front door (hidden) and remove 9 M10 bolts used to connect two ends of the main circuit breaker with copper bars.
2. As shown in ②, remove 9#, 10# and 11# copper bars between the main circuit breaker and the main contactor.
3. As shown in ③, after removed 4 M5 fastening screws, the main circuit breaker can be maintained or changed.
4. After maintenance or replacement, install the main circuit breaker back into place in reverse order.



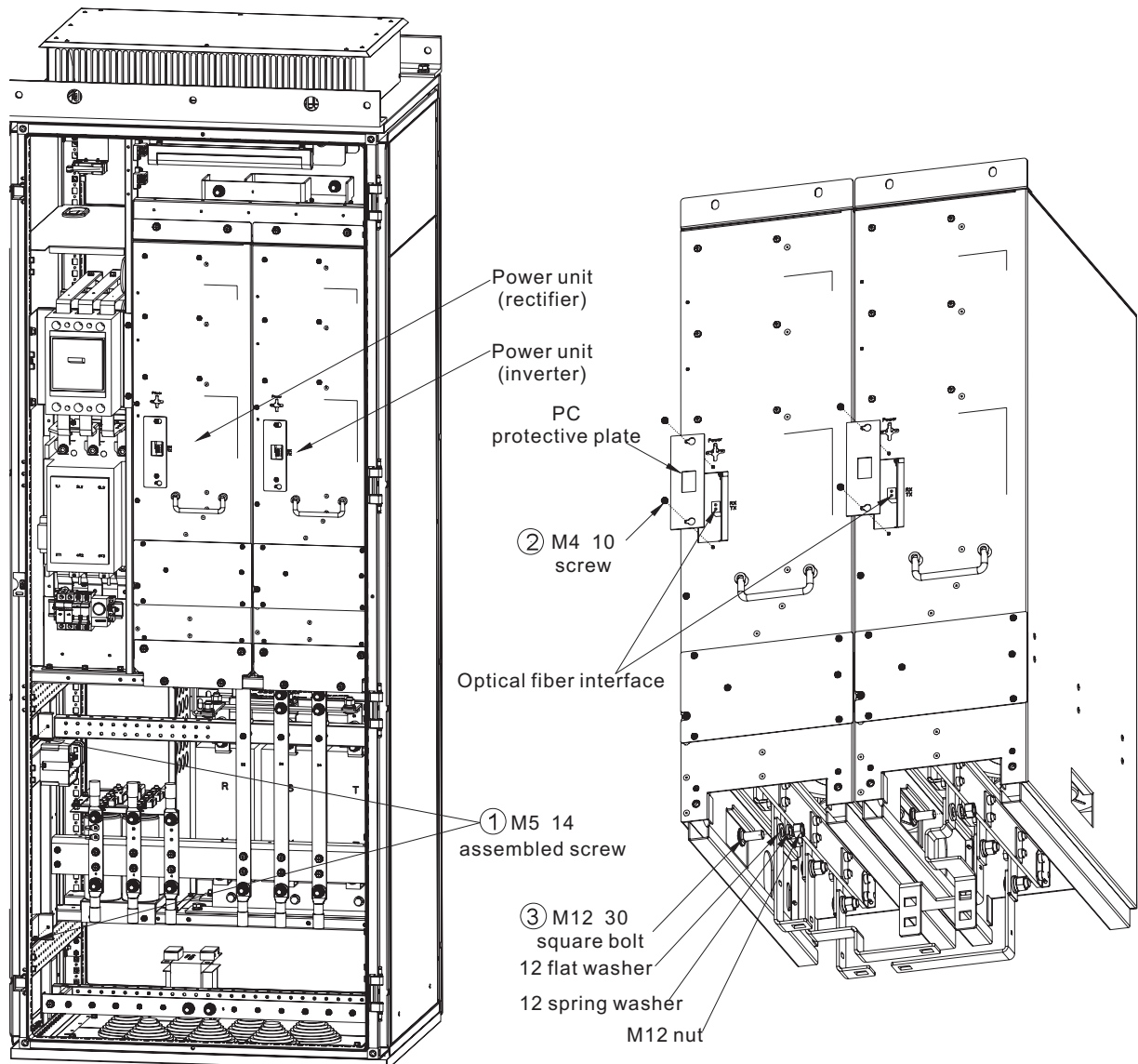
(2) Maintenance for main contactor

1. As shown in ①, firstly open the front door (hidden) and remove 9 M10 bolts used to connect two ends of the main circuit breaker with copper bars.
2. As shown in ②, remove 9#, 10# and 11# copper bars between the main circuit breaker and the main contactor.
3. As shown in ③, after removed 4 M5 fastening screws, the main contactor can be maintained or changed.
4. After maintenance or replacement, install the main contactor back into place in reverse order.

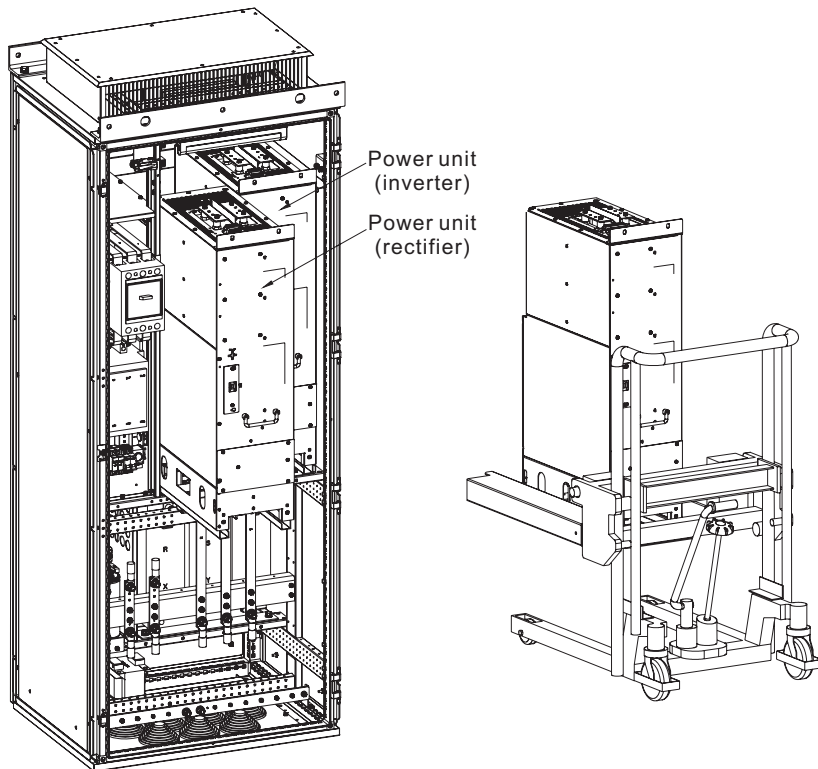
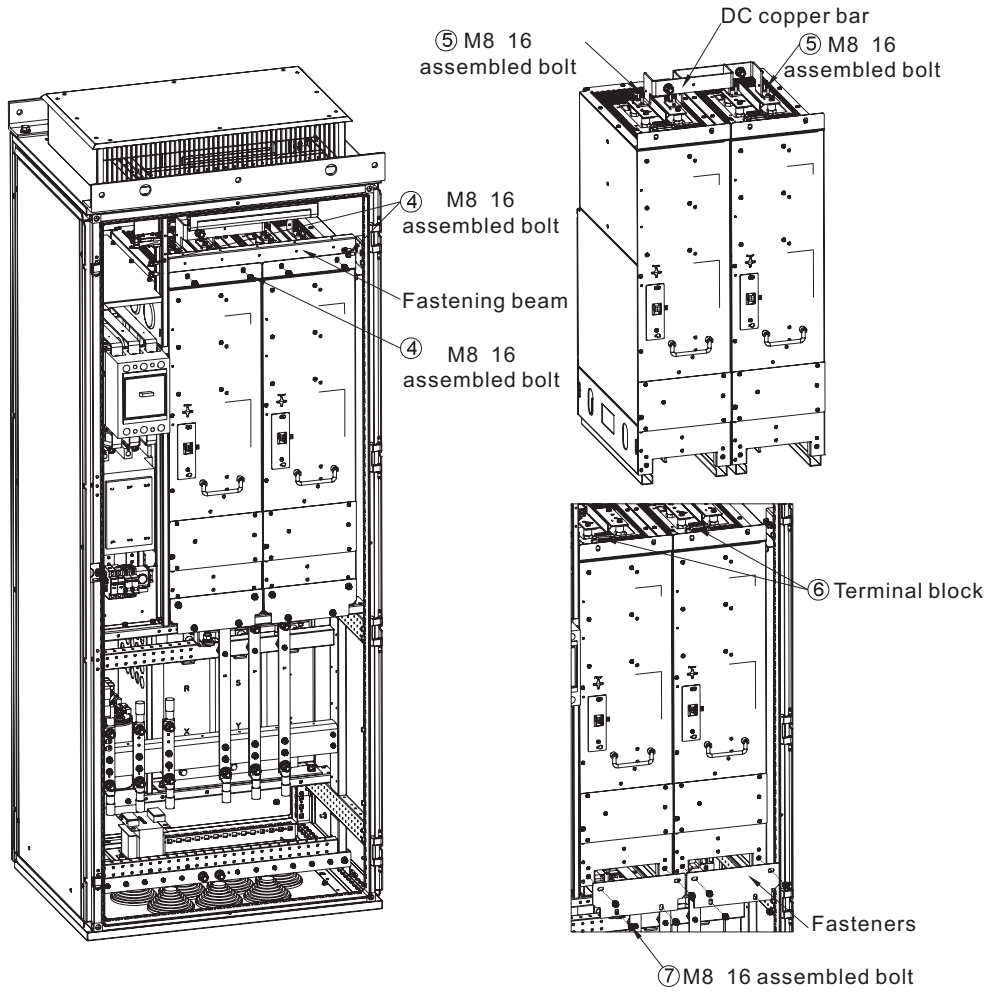


(3) Maintenance for units

1. As shown in ①, firstly open the front door, remove 2 M5X14 assembled bolts and then take down inner door component.
2. As shown in ②, after loosening M4X10 screws, take out PC protective plate. Unplug optical fiber and take down the cable tie used to fix optical fiber on the unit.
3. As shown in ③, remove M12X30 square bolts (3 in total for each unit).
4. As shown in ④, remove fastening bolts at the top of the unit and M8X16 assembled bolts of fastening beam for unit, and then take out the beam.
5. As shown in ⑤, remove M8X16 assembled bolts of DC bus copper bars and take out copper bars.
6. As shown in ⑥, remove M4X10 screws, disconnect the terminals and take down the cable tie.
7. As shown in ⑦, remove M8X16 assembled bolts at the bottom of the unit and take down unit fasteners. If necessary, use the utility cart for unit removal.
8. After maintenance or replacement, install the unit back into place in reverse order.



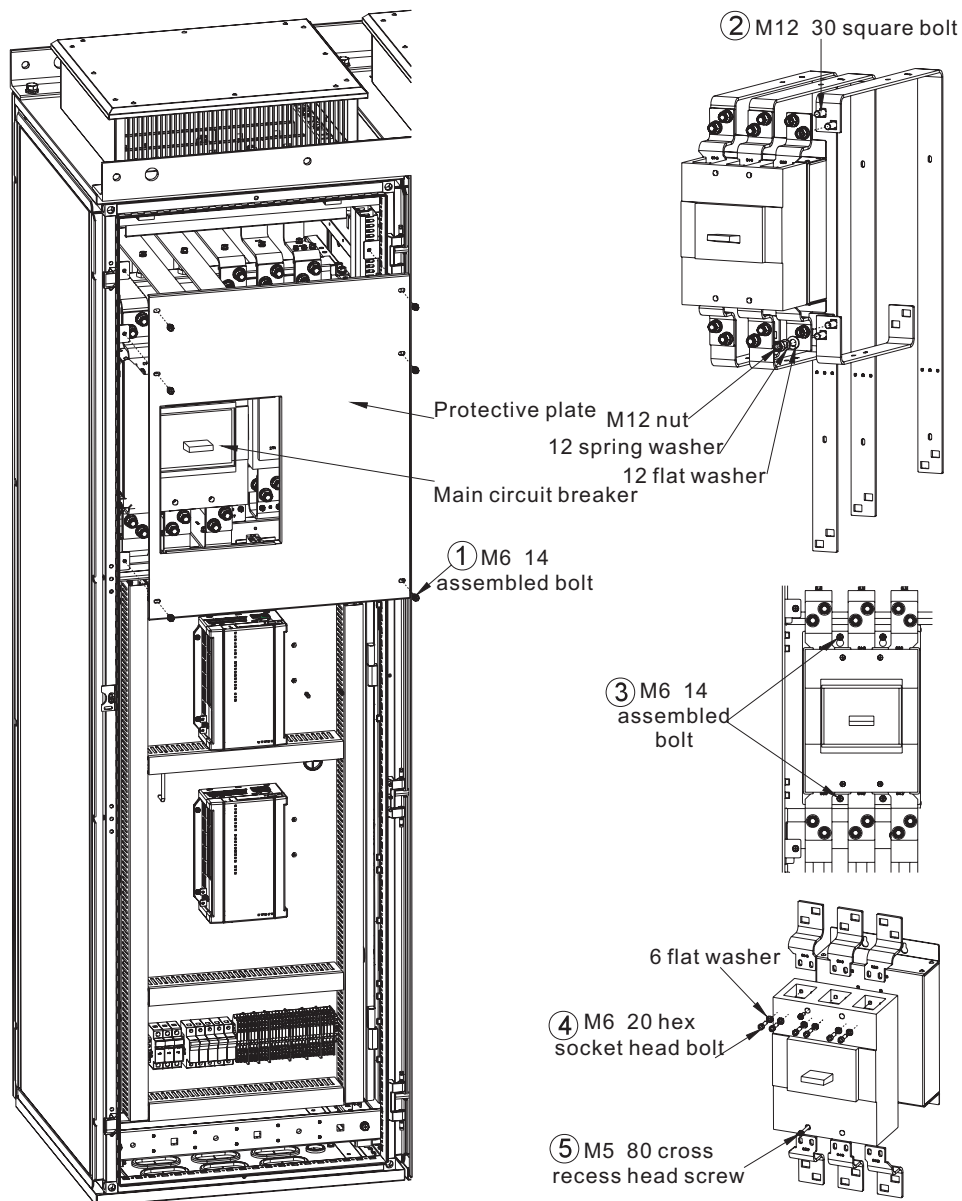
Note: The front door and inner door component are hidden in the figure.



3.4.1.3 Goodrive800-26/ Goodrive800-96 series 0250~0400-4 (0315~0500-6)

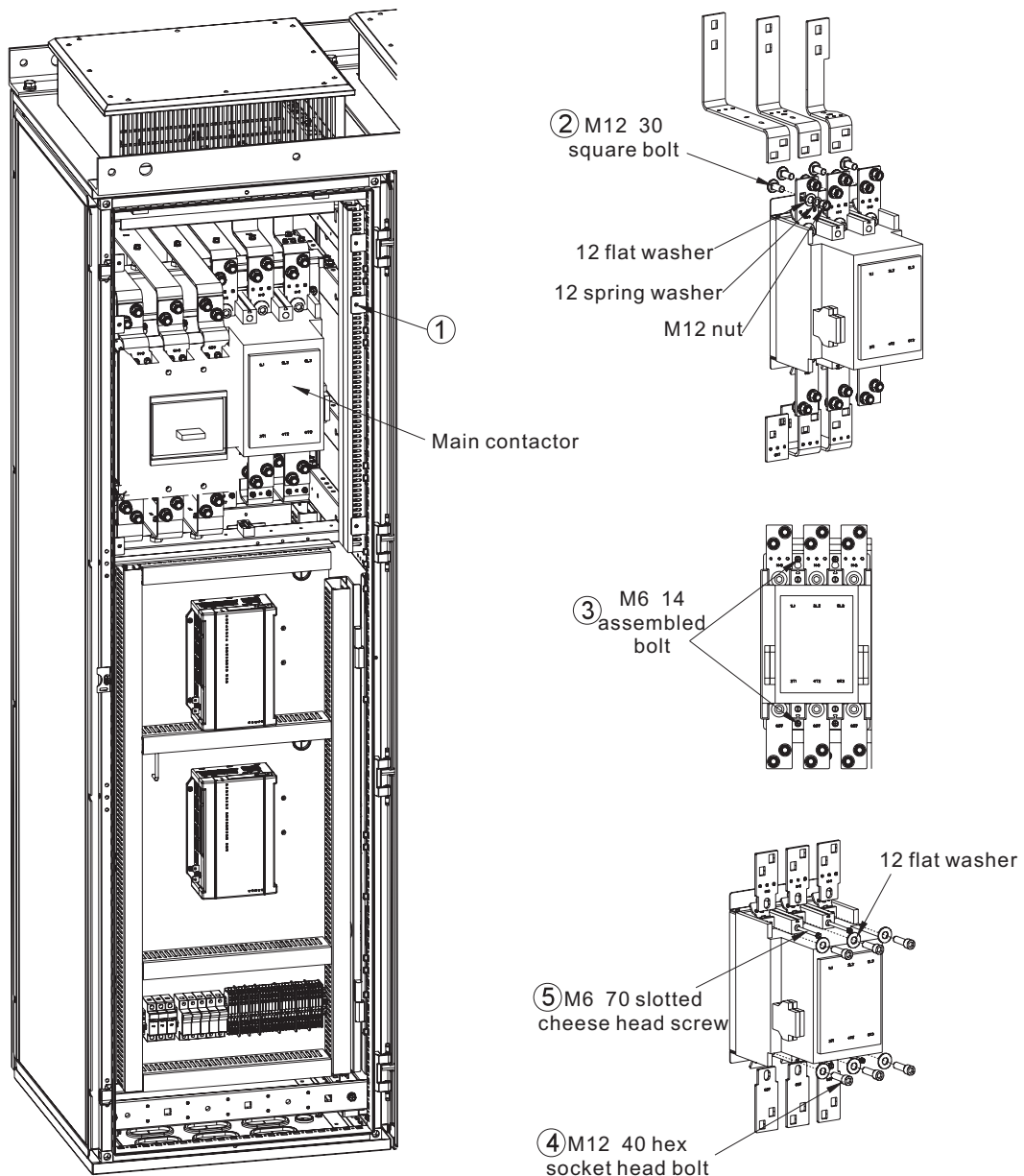
(1) Maintenance for main circuit breaker

1. As shown in ①, firstly open the front door (hidden), remove M6X14 assembled bolts and take out the protective plate.
2. As shown in ②, remove 12 M12X30 square bolts used to connect two ends of the main circuit breaker with copper bars. (Note: At the power range, except Goodrive800 series 0400-4, other series select M10.)
3. As shown in ③, remove 4 M6X14 assembled bolts on the mounting plate of the main circuit breaker. The component is hanging-type, so the bolts at the top only need to be loose enough to take it out.
4. As shown in ④, remove M6X20 hex socket head bolts and then take down the copper bars at two ends of the main circuit breaker.
5. As shown in ⑤, after removed 4 M5X80 fastening screws, the main circuit breaker can be maintained or changed.
6. After maintenance or replacement, install the main circuit breaker into place in reverse order.



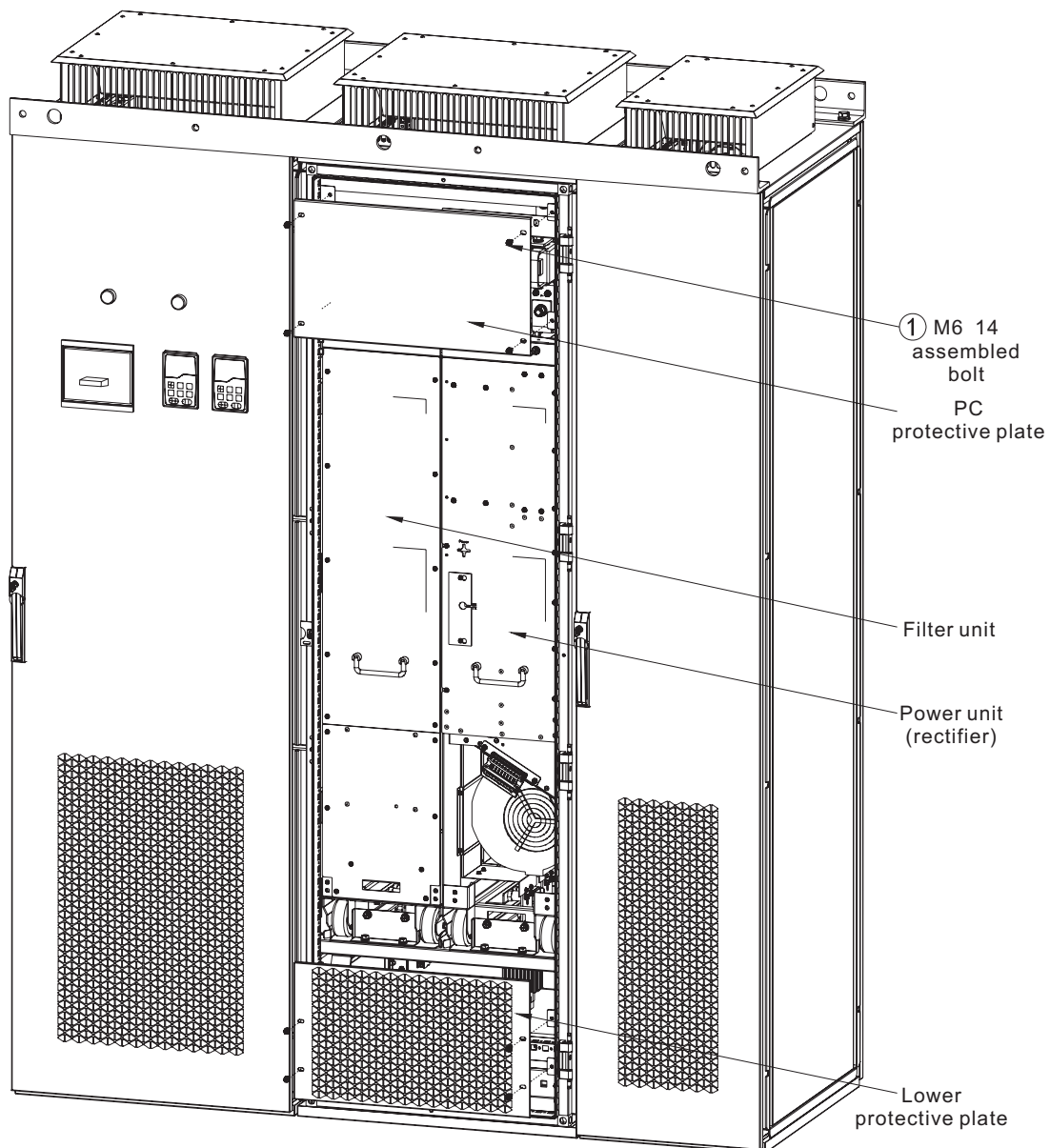
(2) Maintenance for main contactor

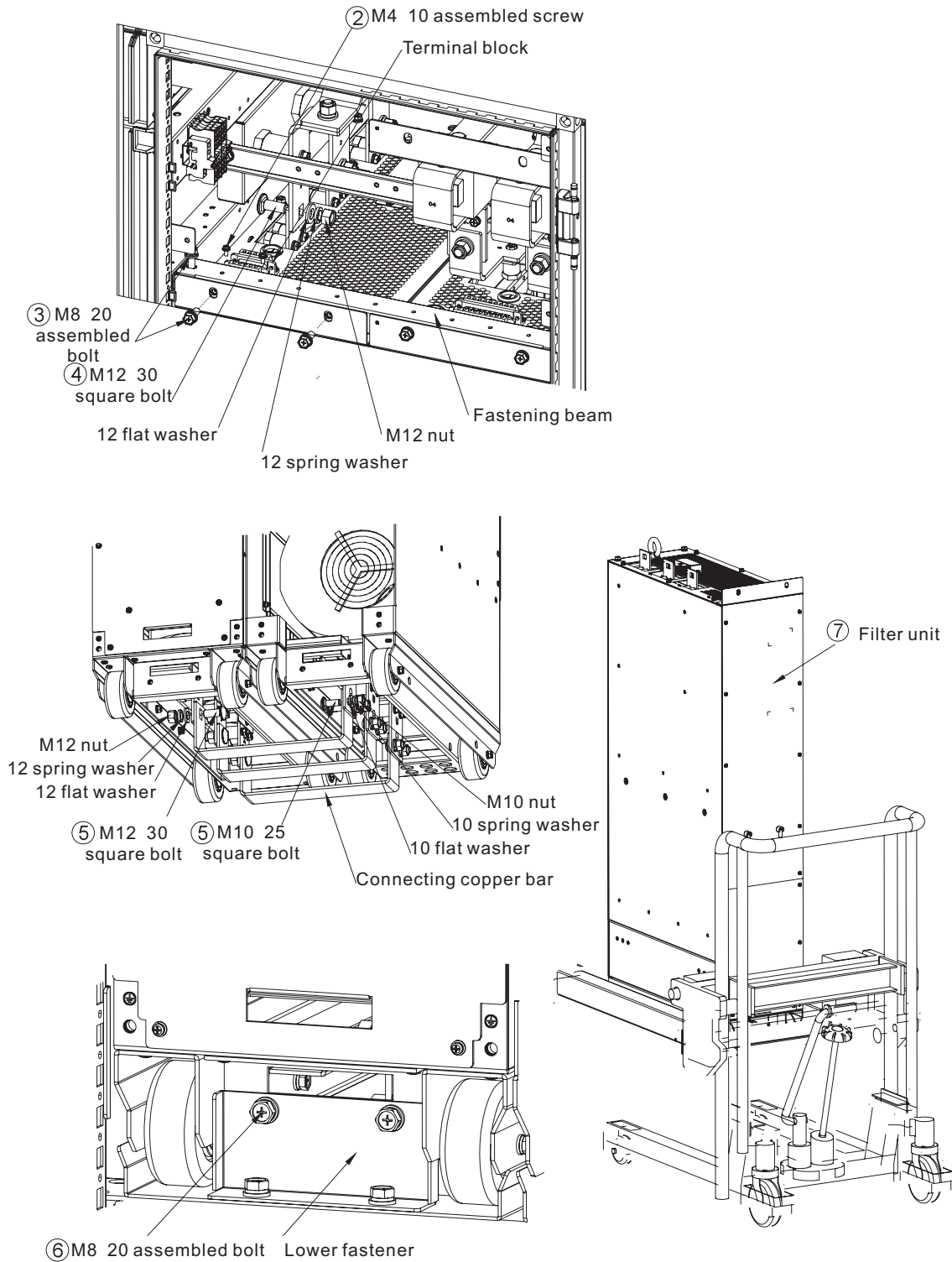
1. Refer to the first step in maintenance for main circuit breaker of Goodrive800-26 series 0250~0400-4 (0315~0500-6).
2. As shown in ②, remove 12 M12X30 square bolts used to connect two ends of the main circuit breaker with copper bars. (Note: At the power range, except Goodrive800 series 0400-4, other series select M10.)
3. As shown in ③, remove 4 M6X14 assembled bolts on the mounting plate of the main contactor. The component is hanging-type, so the bolts at the top only need to be loose enough to take it out.
4. As shown in ④, remove M12X40 hex socket head bolts and take down the copper bars at two ends of the main breaker.
5. As shown in ⑤, after removed 4 M6X70 fastening screws, the main contactor can be maintained or changed.
6. After maintenance or replacement, install the components of the main contactor back into place in reverse order.



(3) Maintenance for filter unit

1. As shown in ①, open the front door, remove M6X14 assembled bolts and then take out PC protective plate and lower protective plate.
2. As shown in ②, remove M4X10 assembled screws, disconnect the terminals and take down the cable tie.
3. As shown in ③, remove fastening bolts at the top of the unit and M8X20 assembled bolts of fastening beam for unit, and then take out the beam.
4. As shown in ④, remove fastening bolts of the copper bars between AC bus and unit, 3 M12X30 square bolts in total.
5. As shown in ⑤, after removing M12X30 and M10X25 square bolts, take out 3 copper bars.
6. As shown in ⑥, after removing 4 M8 screws, take out the lower fastener.
7. Raise the utility cart to an appropriate position and then use it to pull out the unit. After that, the unit can be maintained or changed.
8. After maintenance or replacement, install the unit back into place in reverse order.





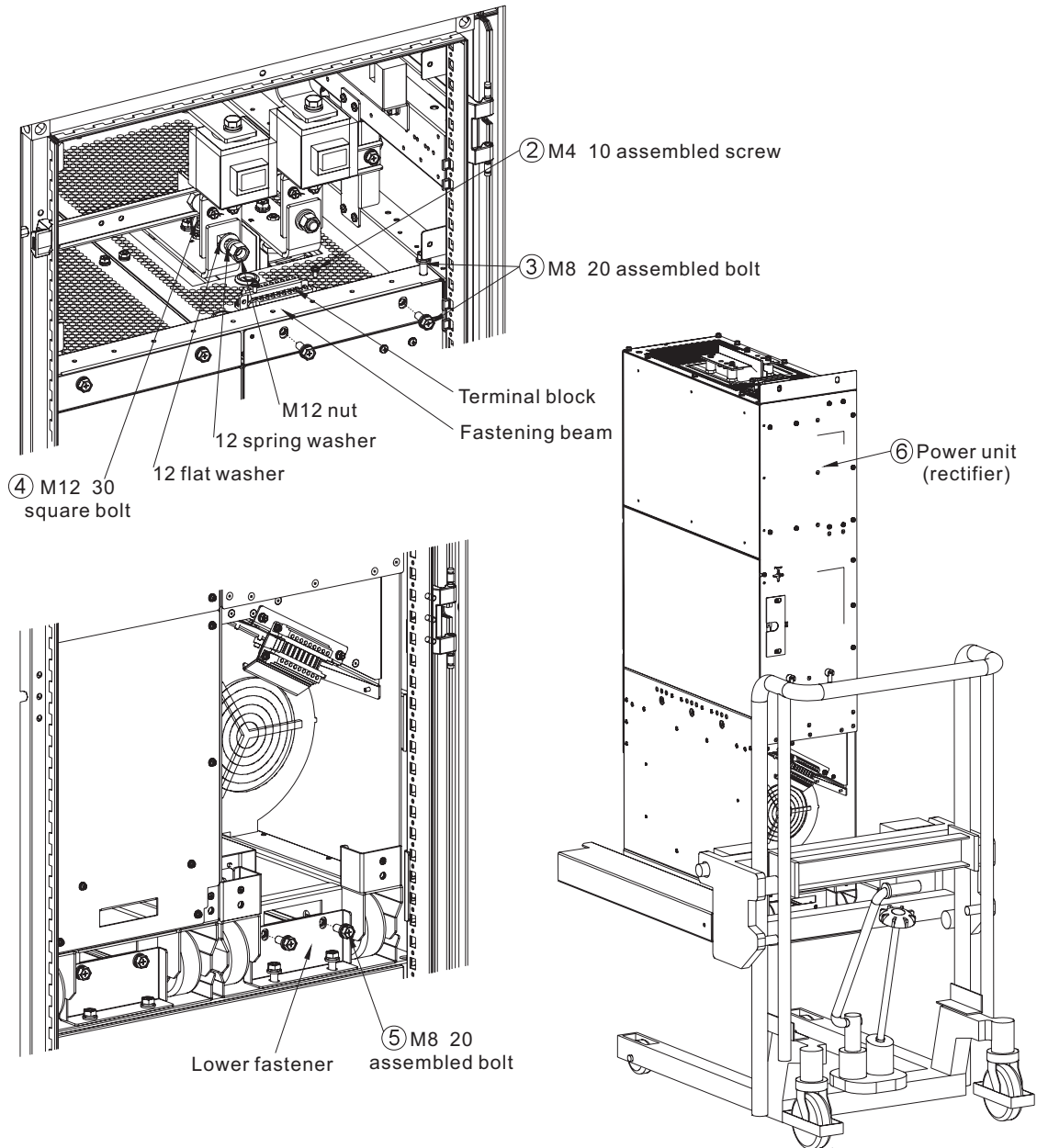
(4) Maintenance for power unit (Rectifier)

1. Refer to the first step in maintenance for filter unit.
2. As shown in ②, after removing M4X10 assembled screws, disconnect the terminals.
3. As shown in ③, remove fastening bolts at the top of the unit and M8X20 assembled bolts of fastening beam for unit, and then take out the beam.
4. As shown in ④, remove 2 M12X30 square bolts of the copper bars between DC bus and unit.
5. As shown in ⑤, after removing 4 M8X20 assembled bolts, take out the lower fastener.

6. As shown in ③, raise the utility cart to an appropriate position and then use it to pull out the unit. After that, the unit can be maintained or changed.

7. After maintenance or replacement, install the unit back into place in reverse order.

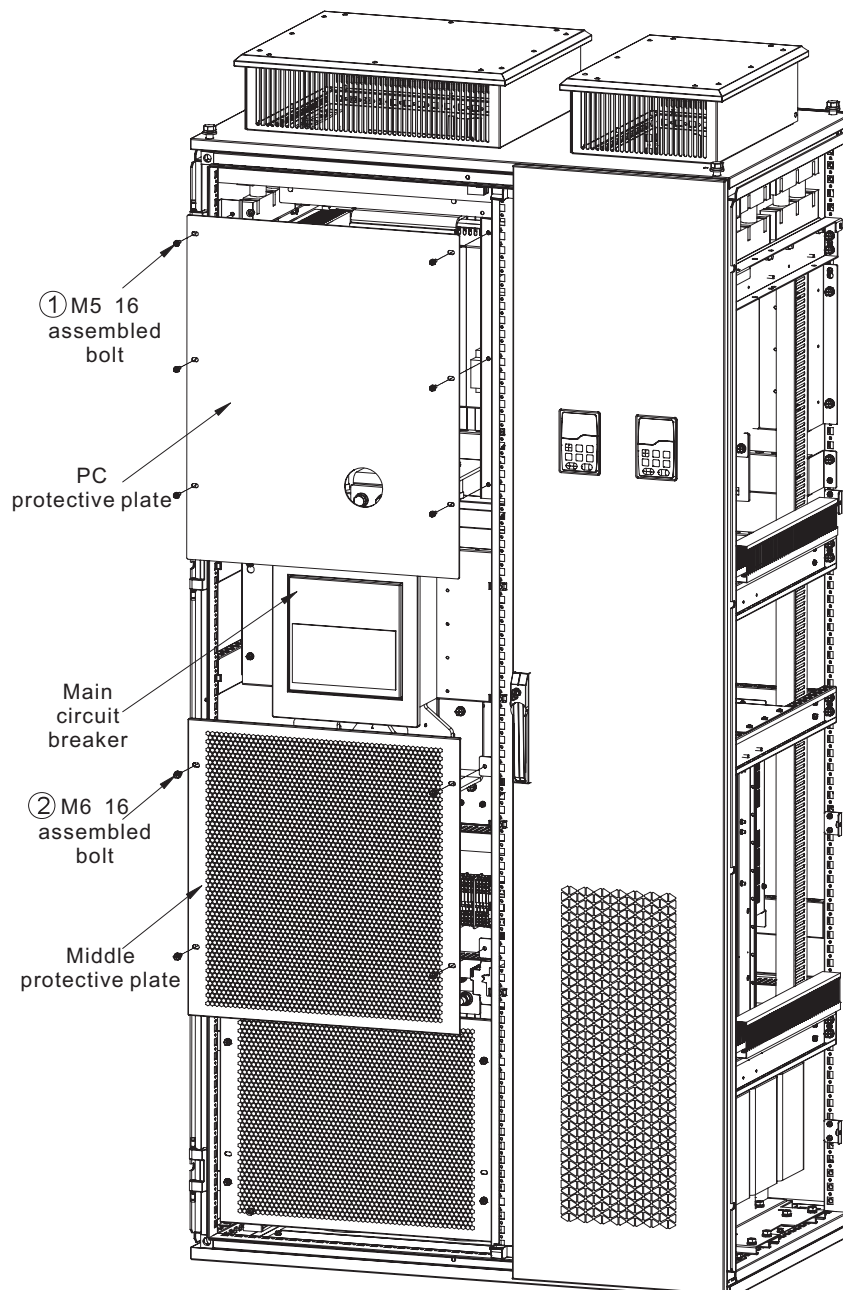
Note: The steps in maintenance for power unit (inverter) and power unit (rectifier) are the same.

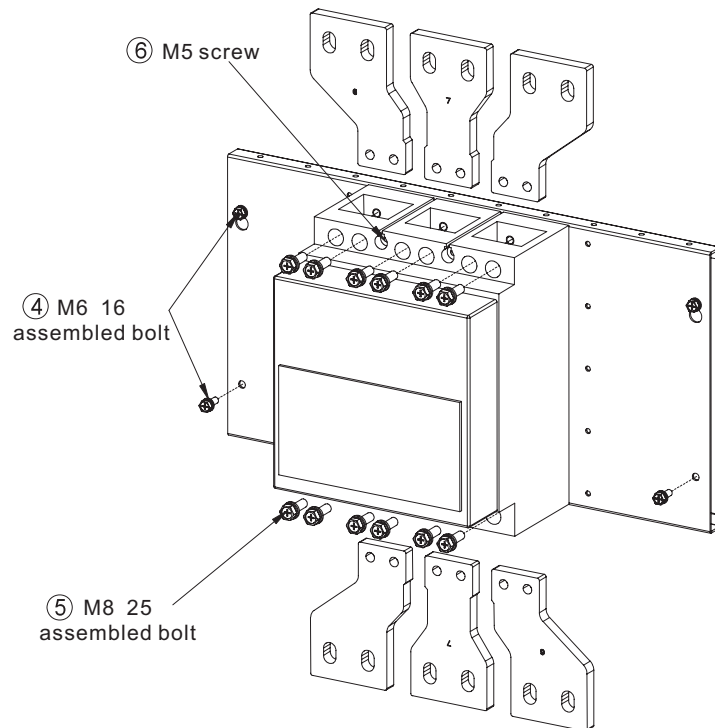
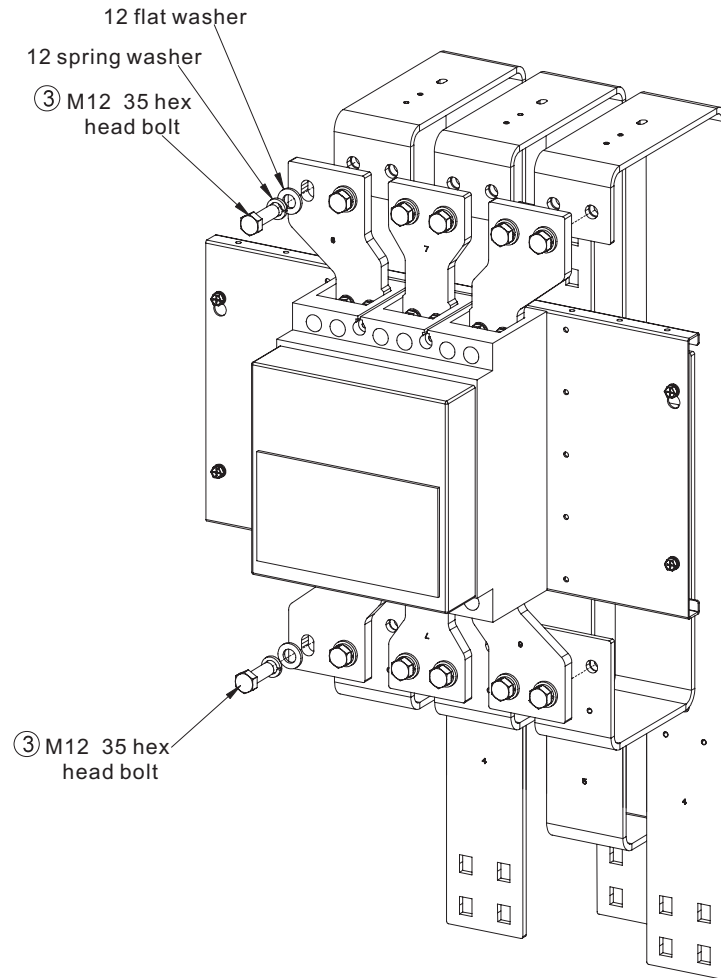


3.4.1.4 Goodrive800-26/ Goodrive800-96 series 0500~0800-4 (0630~1000-6)

(1) Maintenance for main circuit breaker

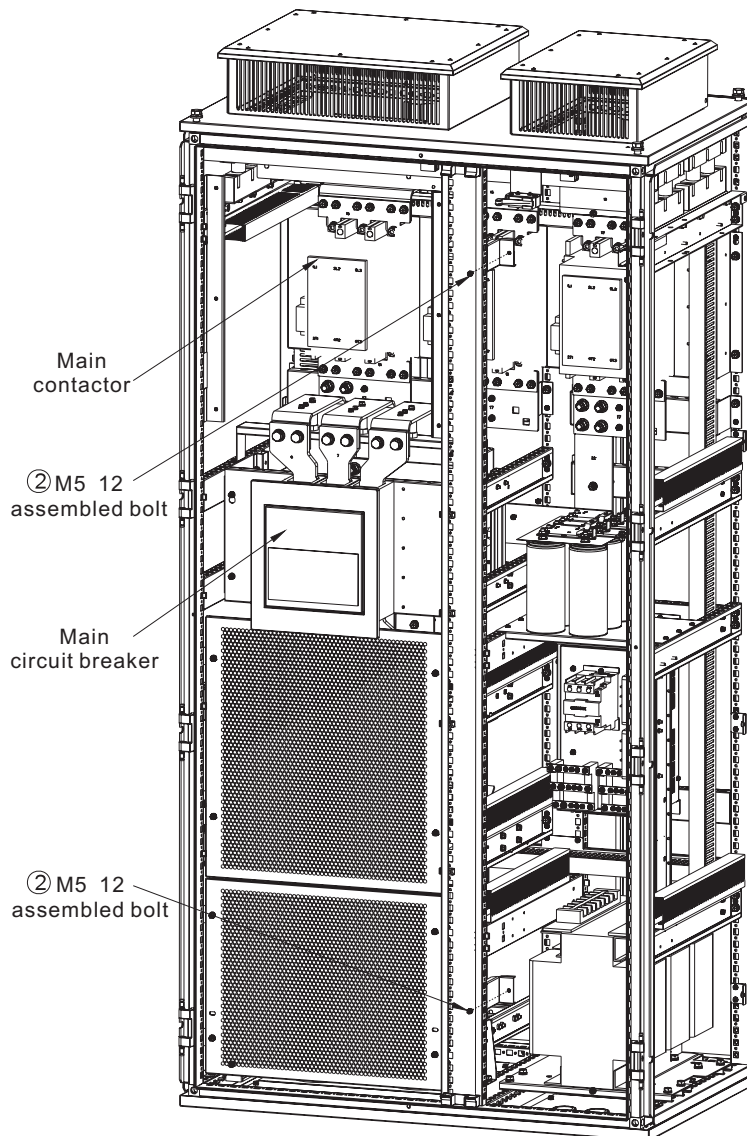
1. As shown in ①, open the front door (hidden), remove M5X16 assembled bolts and take down PC protective plate.
2. As shown in ②, remove M6X16 assembled bolts and take down middle protective plate.
3. As shown in ③, remove 12 M12X35 hex head bolts used to connect two ends of the main circuit breaker with copper bars.
4. As shown in ④, remove 4 M6X16 assembled bolts on the mounting plate of the main circuit breaker. The component is hanging-type, so the bolts at the top only need to be loose enough to take it out.
5. As shown in ⑤, after removing M8X25 assembled bolts, take out the copper bars at two ends of the main circuit breaker.
6. As shown in ⑥, after removed 4 M5 fastening screws, the main circuit breaker can be maintained or changed.
7. After maintenance or replacement, install the main circuit breaker back into place in reverse order.

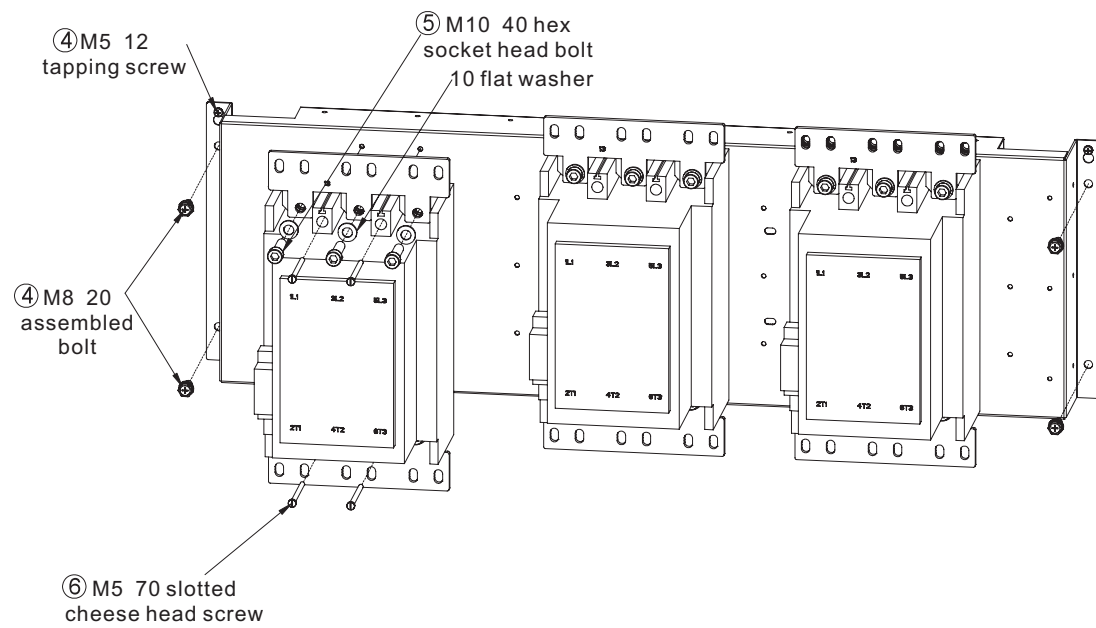
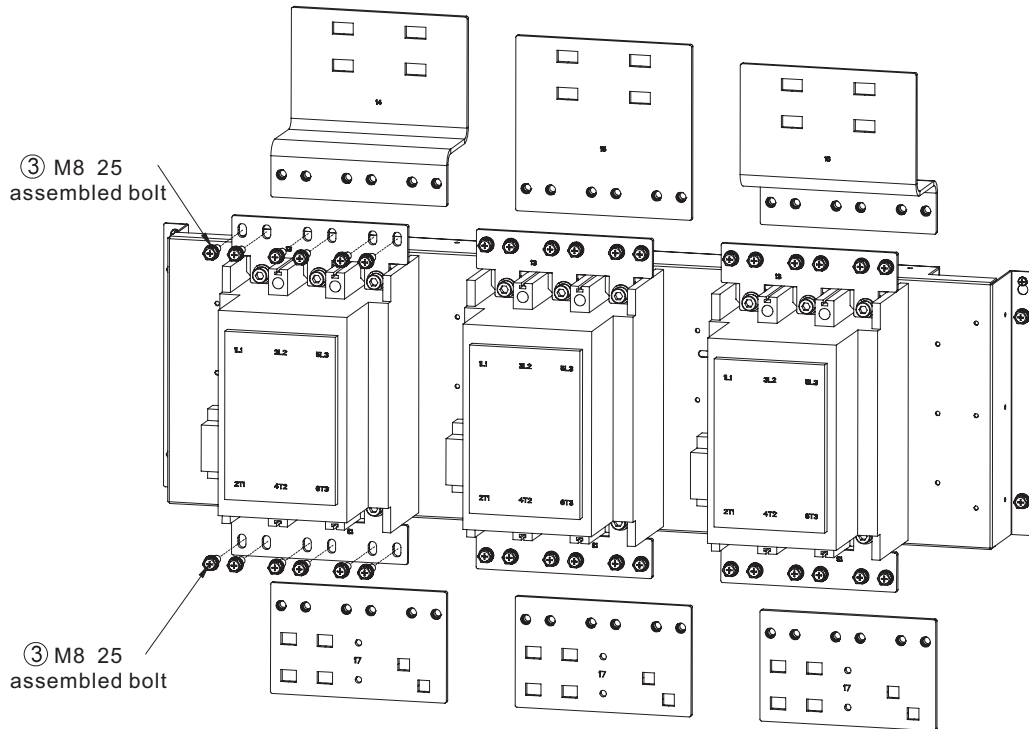




(2) Maintenance for main contactor

1. Refer to ① above: Open the front door, remove M5X16 assembled bolts and take down PC protective plate.
2. As shown in ②, after removing M5X12 assembled bolts, take down inner door component of incoming cabinet (hidden).
3. As shown in ③, remove 36 M8X25 assembled bolts used to connect two ends of the main contactor with copper bars.
4. As shown in ④, firstly loosen 2 M5 tapping screws on the mounting plate of the main contactor and then remove 4 M8X20 assembled bolts at the bottom. The component is hanging-type, so the tapping screws at the top only need to be loose enough to take it out.
5. As shown in ⑤, after removing M10X40 socket head bolts, take down the copper bars at two ends of the main contactor.
6. As shown in ⑥, after removed M5X70 slotted cheese head screws, the main contactor can be maintained or changed.
7. After maintenance or replacement, install the components of the main contactor back into place in reverse order.





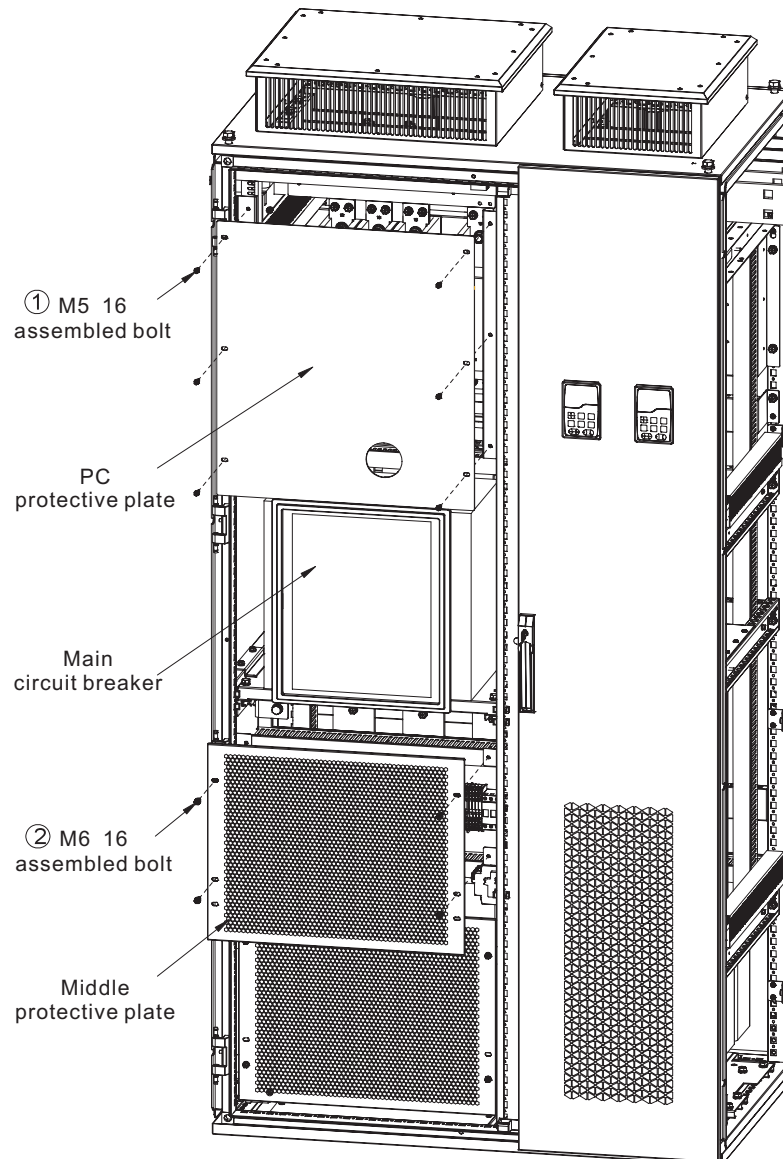
(3) Maintenance for units

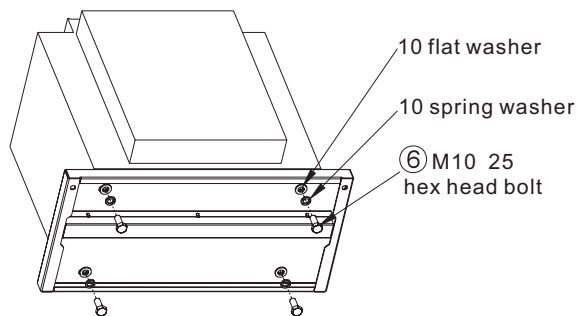
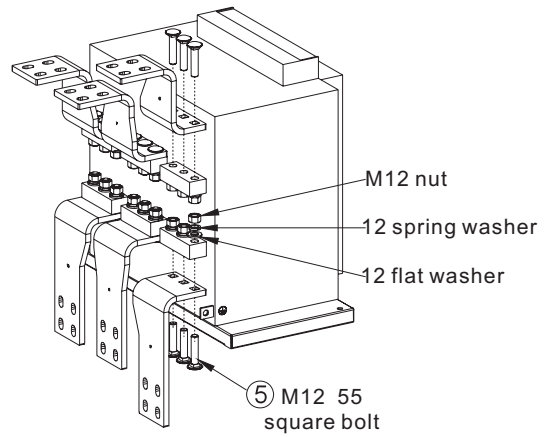
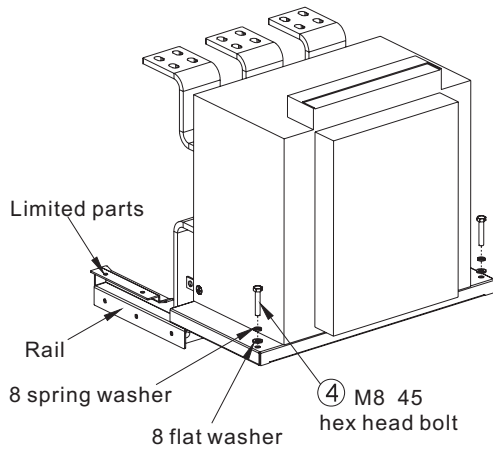
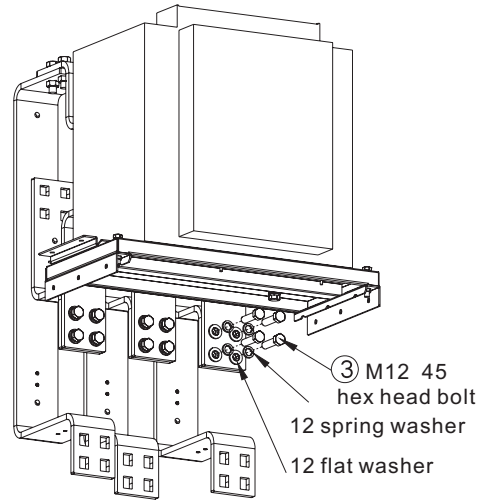
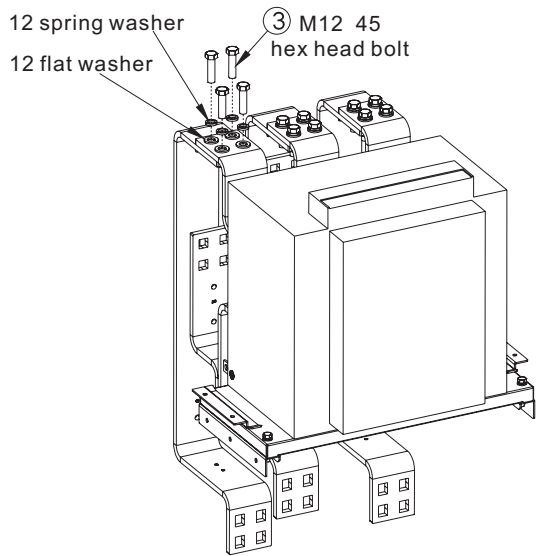
The steps in maintenance for filter unit, power unit (rectifier) and power unit (inverter) are the same as maintenance for units of Goodrive800-26/ Goodrive800-96 series 0250~0400-4 (0315~0500-6).

3.4.1.5 Goodrive800-26/ Goodrive800-96 series 1000~1200-4 (1200~1500-6)

(1) Maintenance for main circuit breaker

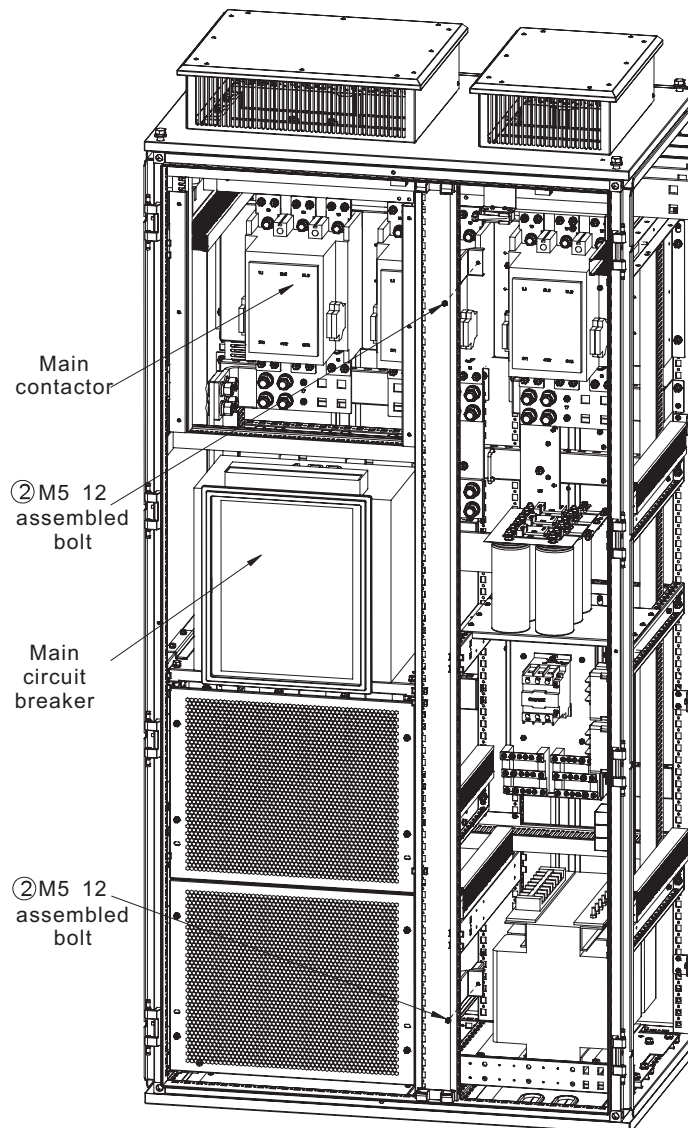
1. As shown in ①, open the left-front door (hidden), remove M5X16 assembled bolts and take out PC protective plate.
2. As shown in ②, after removing M6X16 assembled bolts, take down middle protective plate.
3. As shown in ③, remove 24 M12X45 hex head bolts used to connect two ends of the main circuit breaker with copper bars.
4. As shown in ④, remove 2 M8X45 hex head bolts on the mounting plate of the main circuit breaker, pull out along the rail and simultaneously avoid the components dropping off. (The main circuit breaker weighs about 66Kg.)
5. As shown in ⑤, after removing M12X55 square bolts, take out the copper bars at two ends of the main circuit breaker.
6. As shown in ⑥, after removed 4 M10X25 hex head bolts at the bottom, the main circuit breaker can be maintained or changed.
7. After maintenance or replacement, install the main circuit breaker back into place in reverse order.

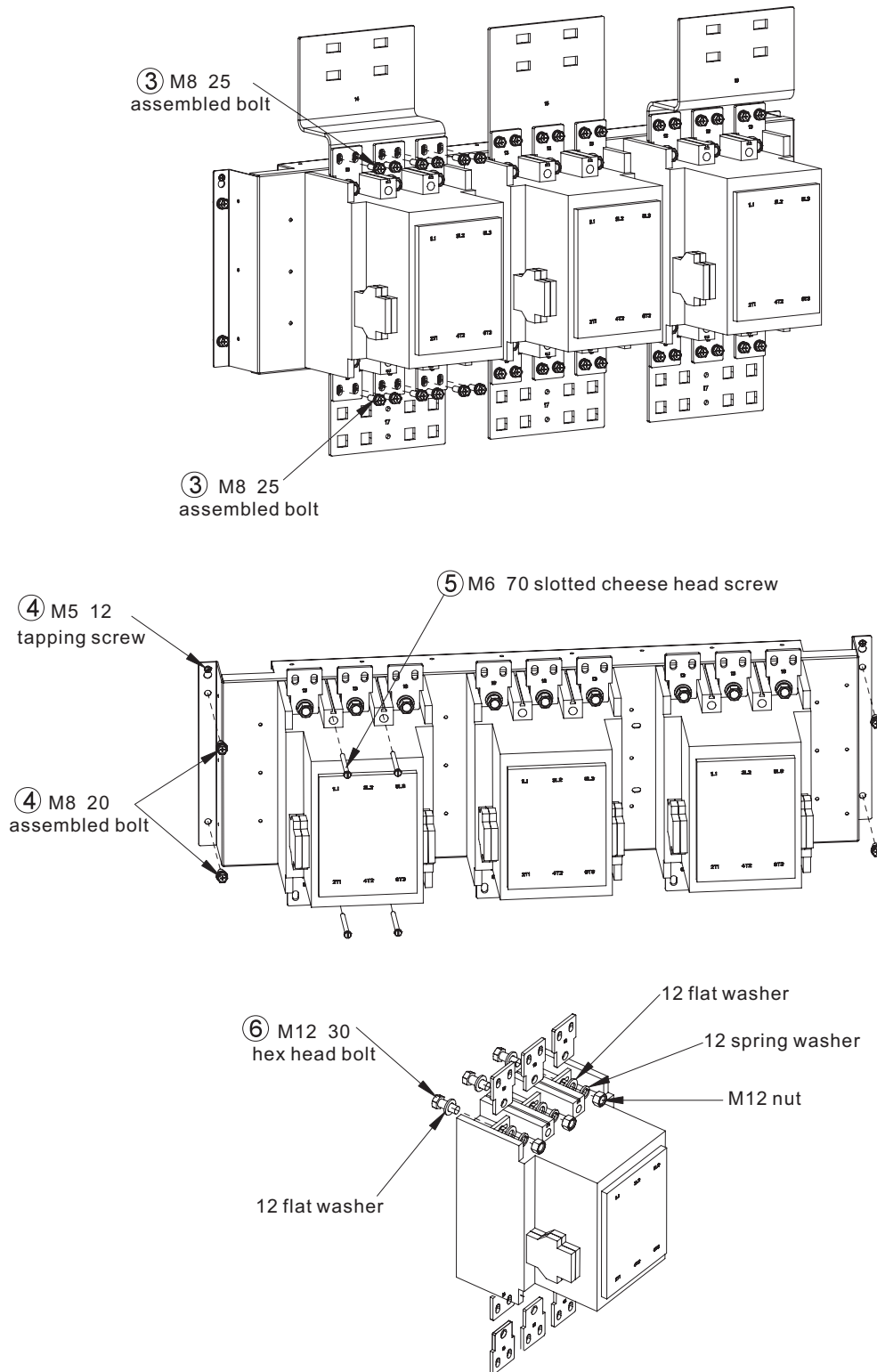




(2) Maintenance for main contactor

1. Refer to ① above: Open the front door, remove M5X16 assembled bolts and take down PC protective plate.
2. As shown in ②, after removing M5X12 assembled bolts, take down inner door component of incoming cabinet (hidden).
3. As shown in ③, remove 36 M8X25 assembled bolts of the copper bars used to connect two ends of the main contactor with copper bars.
4. As shown in ④, firstly loosen 2 M5 tapping screws on the mounting plate of the main contactor and then remove 4 M8X20 assembled bolts at the bottom. The component is hanging-type, so the tapping screws at the top only need to be loose enough to take it out.
5. As shown in ⑤, after removing M6X70 slotted cheese head screws, take down the main contactor (with copper bars at two ends).
6. As shown in ⑥, after removed M12X30 hex head bolts and copper bars, the main contactor can be maintained or changed.
7. After maintenance or replacement, install the components of the main contactor back into place in reverse order.





(3) Maintenance for units

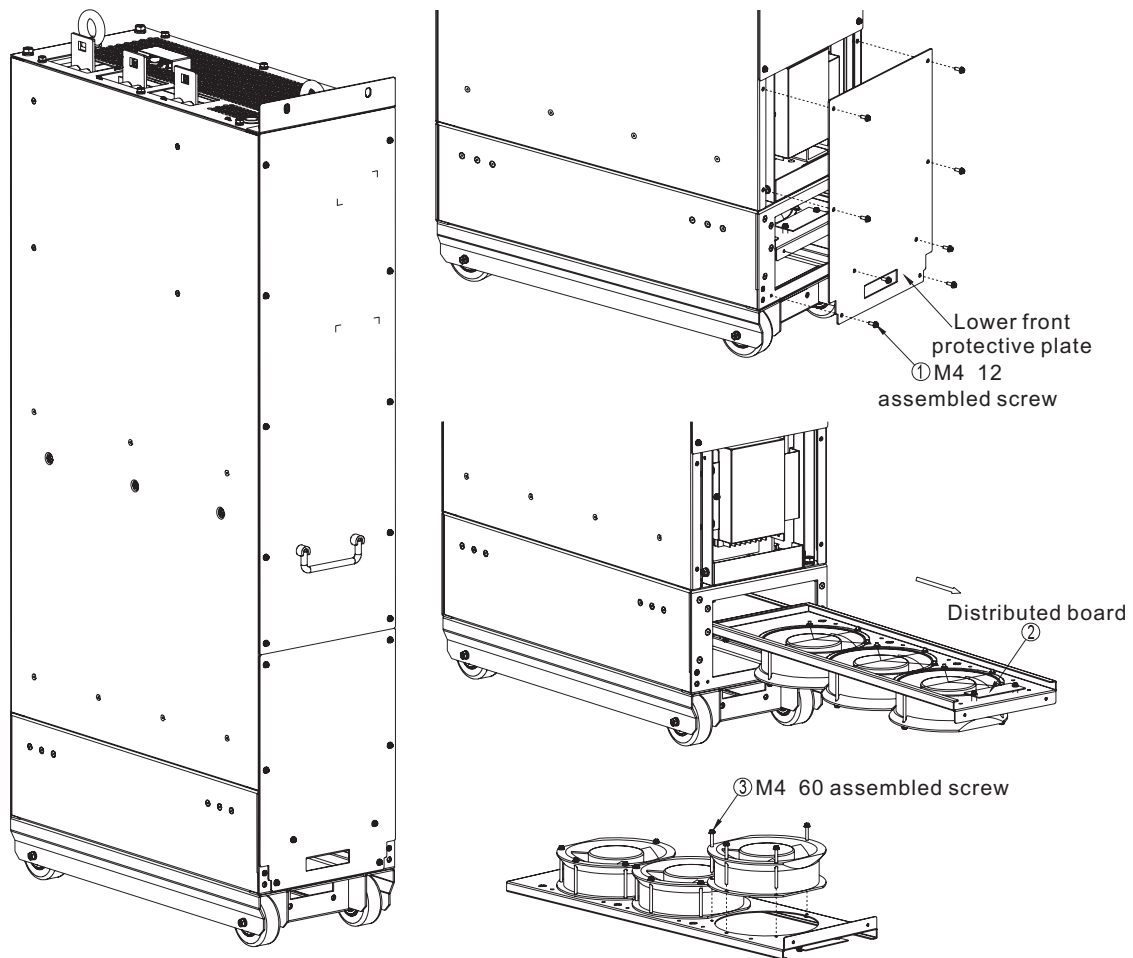
The steps in maintenance for filter unit, power unit (rectifier) and power unit (inverter) are the same as maintenance for units of Goodrive800-26/ Goodrive800-96 series 0250~0400-4 (0315~0500-6).

3.4.2 Goodrive800-01 series filter units

3.4.2.1 Goodrive800-01 series 0250~0400-4 (0315~0500-6)

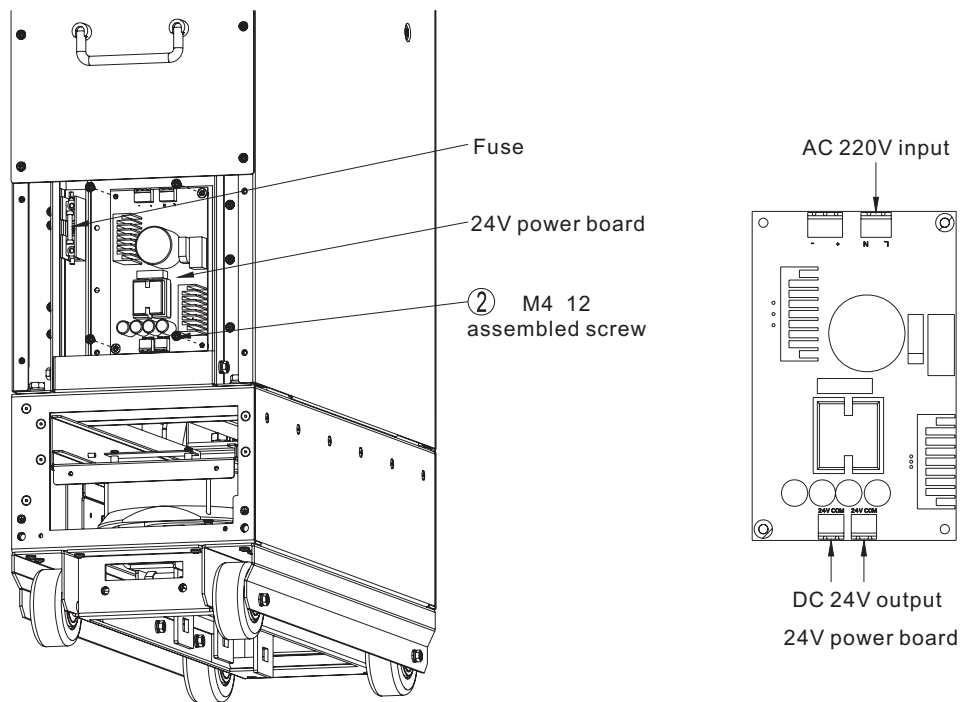
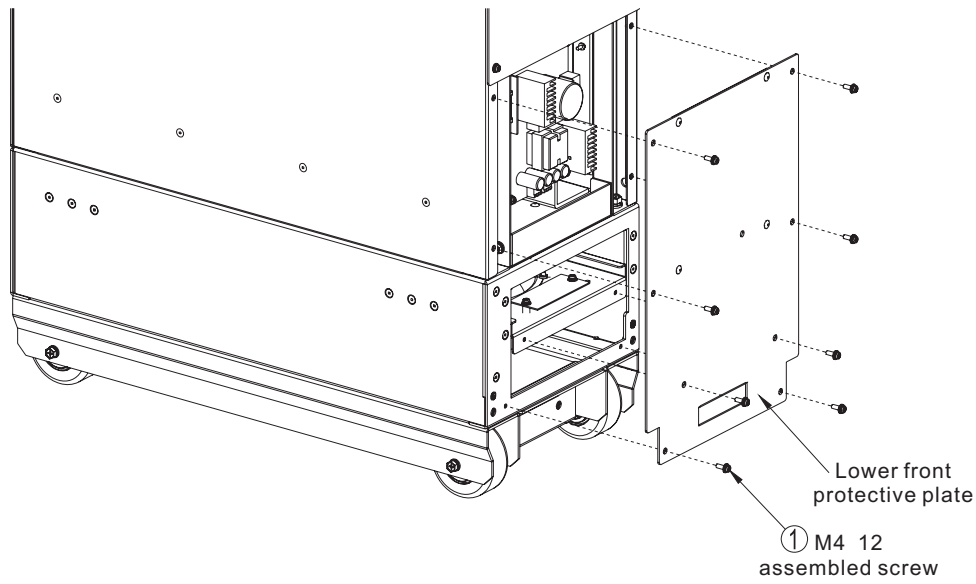
(1) Maintenance for fans

1. As shown in ①, after removing M4X12 assembled screws, take down lower front protective cover.
2. As shown in ②, disconnect the incoming power line on the distributed board of the fans and then pull out the components in arrow direction.
3. As shown in ③, after removed M4X60 assembled screws, the fans can be taken out for maintenance or replacement.
4. After maintenance or replacement, install the fans back into place in reverse order. (Pay attention to the installation direction: up draft.)



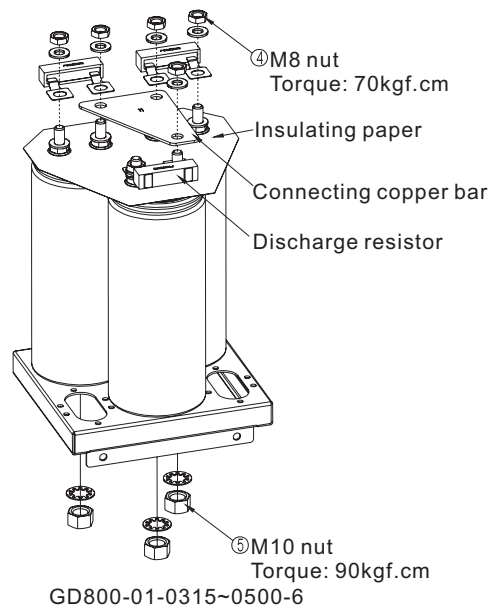
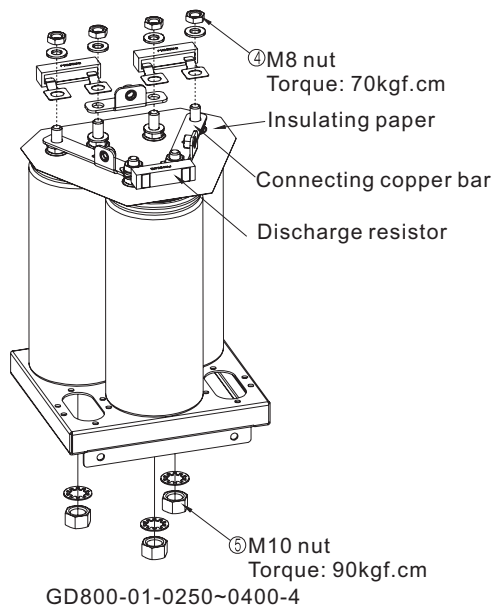
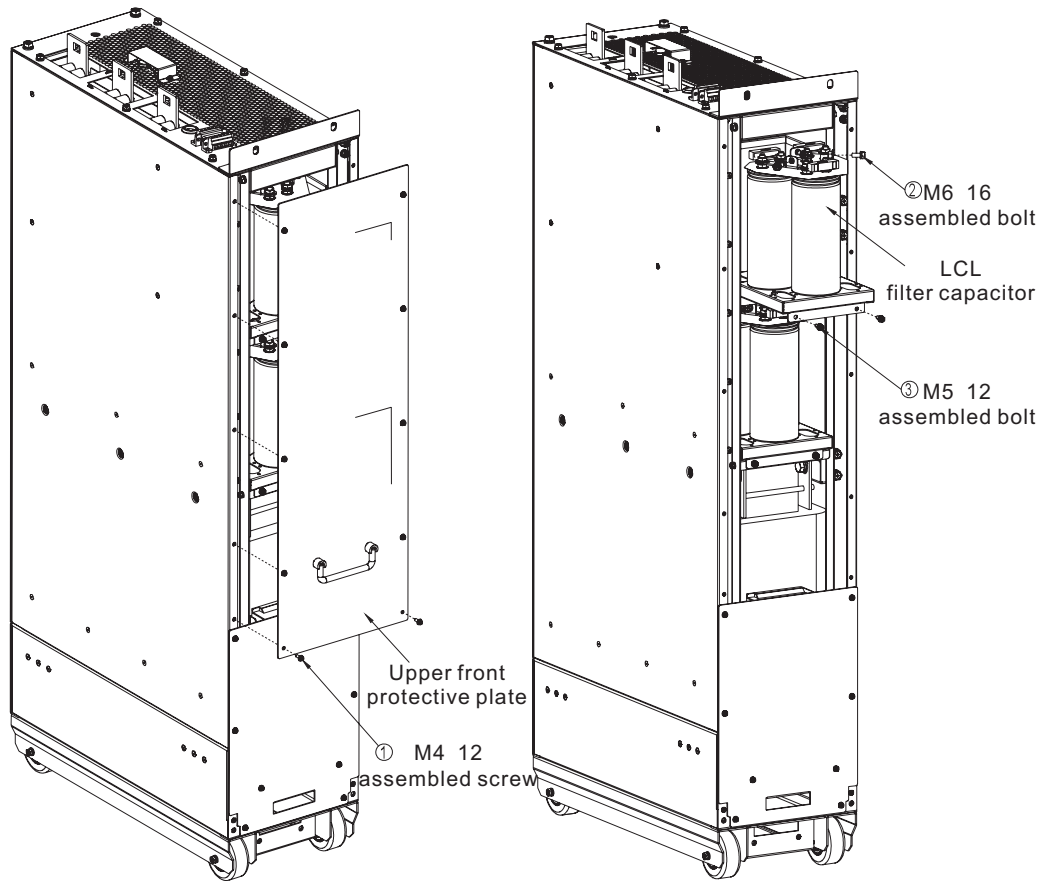
(2) Maintenance for power board

1. As shown in ①, after removing M4X12 assembled screws, take down lower front protective cover.
2. Disconnect the terminals at I/O interface of the power board.
3. As shown in ②, after removed M4X12 assembled screws, the power board can be taken out for maintenance or replacement.
4. After maintenance or replacement, install the power board back into place in reverse order.



(3) Maintenance for LCL filter capacitor

1. As shown in ①, after removing M4X12 assembled screws, take down upper front protective cover.
2. As shown in ②, remove M6X16 assembled bolts of capacitor cables.
3. As shown in ③, after removed M5X12 assembled bolts, the capacitor component can be pulled out.
4. As shown in ④, after removing M8 fastening nuts and washers, take out the discharge resistor, copper bars and insulating paper in order.
5. As shown in ⑤, after removed M10 clamp nuts and washers, LCL filter capacitor can be taken out for maintenance or replacement.
6. After maintenance or replacement, install the LCL filter capacitor back into place in reverse order.



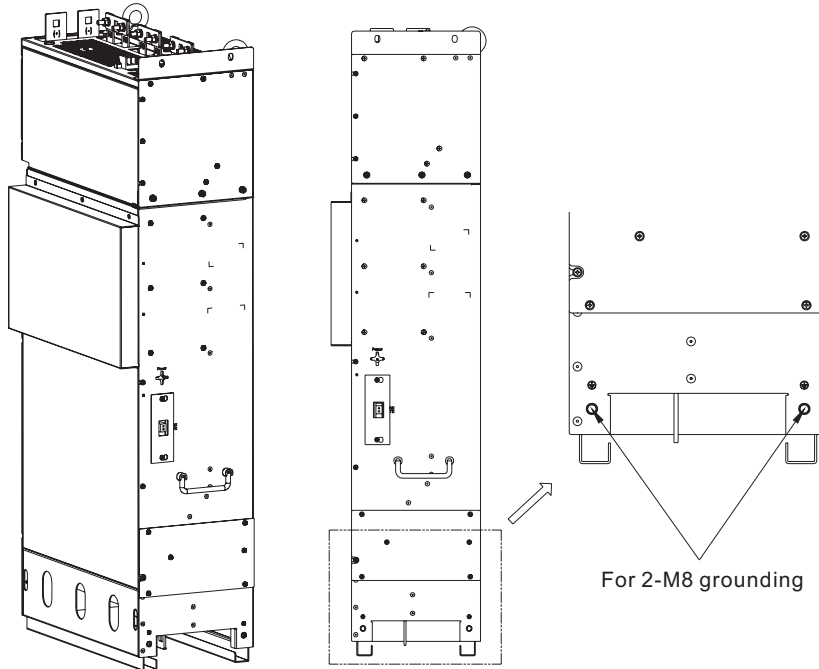
3.4.3 Goodrive800-11 series

3.4.3.1 Goodrive800-11 series 0132~0200-4 (0160~0250-6)

(1) Maintenance for inverter unit fan

Refer to the maintenance for fans of Goodrive800-51 series 0132~0200-4 (0160~0250-6).

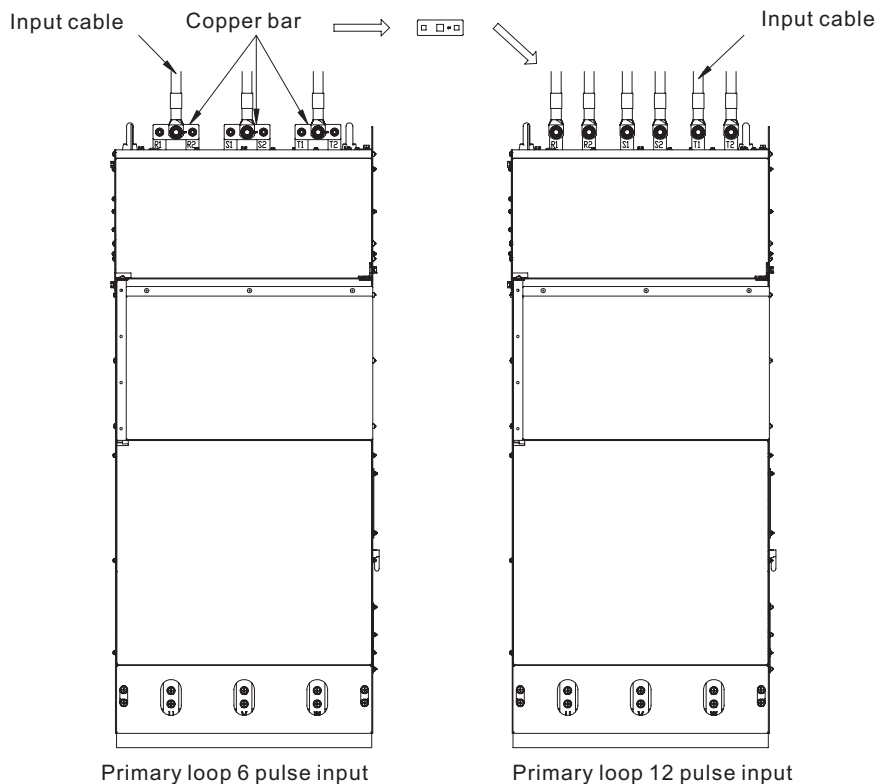
(2) Grounding of inverter unit



(3) Primary loop 6/12 pulse shifting

See the primary loop 6 pulse input in following figure on the left: Connect the input cables to the copper bars between R1 and R2, S1 and S2, T1 and T2; M12X30 square bolts are fastening bolts.

See the primary loop 12 pulse input in following figure on the right: Remove 3 copper bars and then connect the input cables to R1, R2, S1, S2, T1 and T2; M8X30 square bolts are fastening bolts.

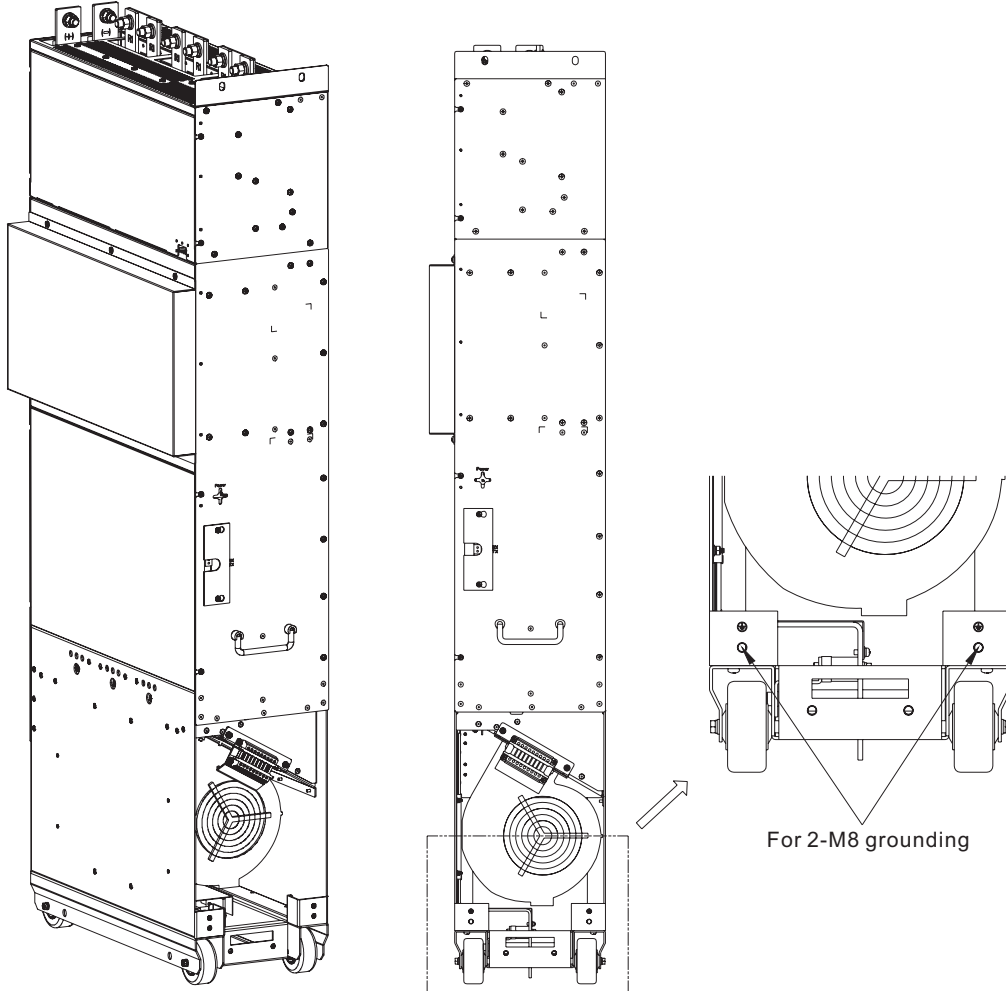


3.4.3.2 Goodrive800-11 series 0250~0400-4 (0315~0500-6)

(1) Maintenance for inverter unit fan

Refer to the maintenance for fans of Goodrive800-51 series 0250~0400-4 (0315~0500-6).

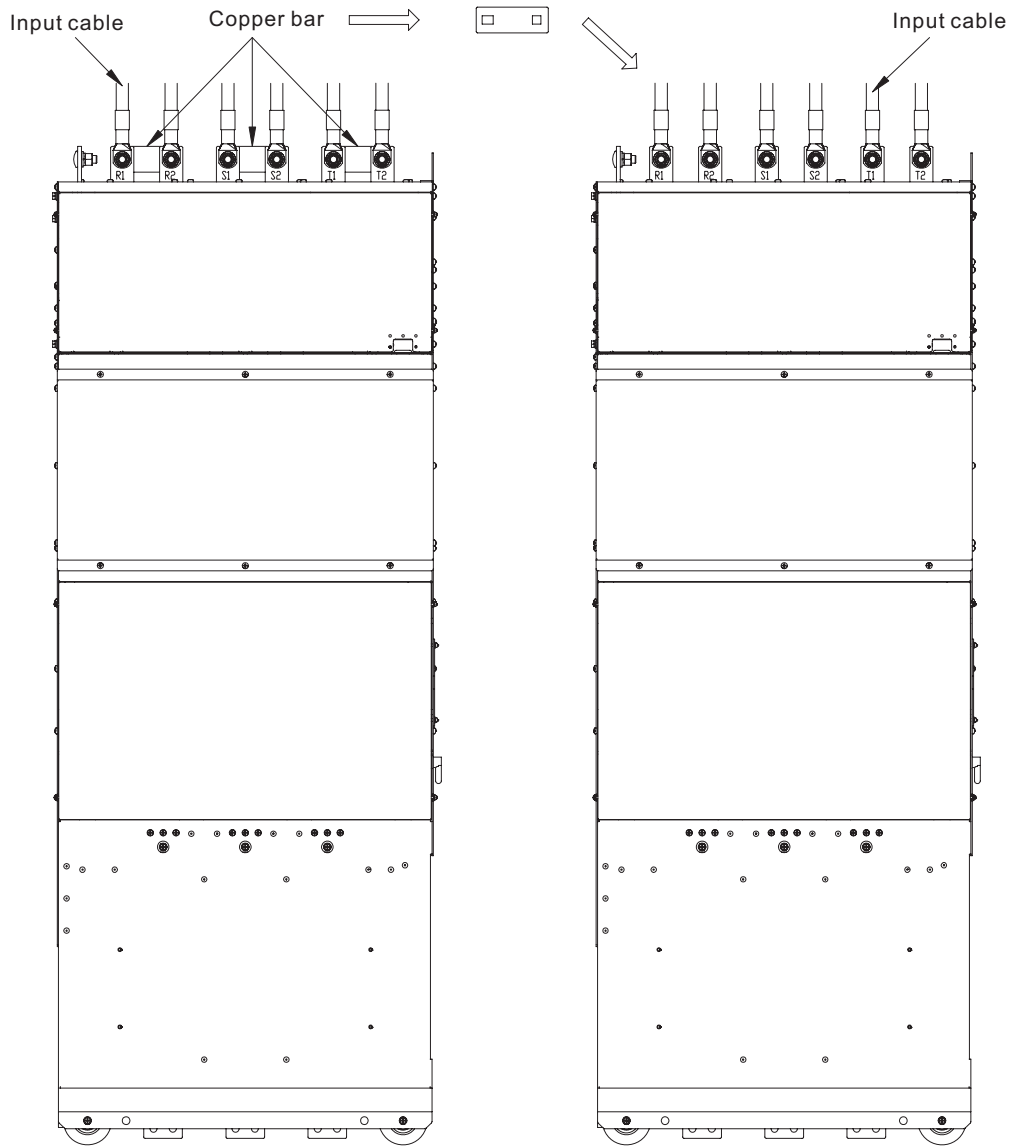
(2) Grounding of inverter unit



(3) Primary loop 6/12 pulse shifting

See the primary loop 6 pulse input in following figure on the left: Connect the input cables to R1, R2, S1, S2, T1 and T2, and simultaneously mount the copper bars; M12X35 square bolts are fastening bolts.

See the primary loop 12 pulse input in following figure on the right: Remove 3 copper bars and then connect the input cables to R1, R2, S1, S2, T1 and T2; M12X35 square bolts are fastening bolts.



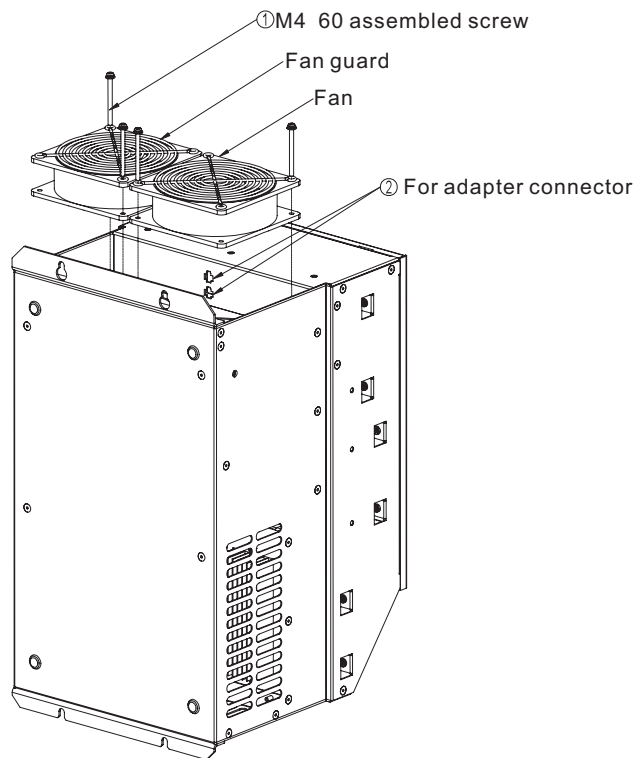
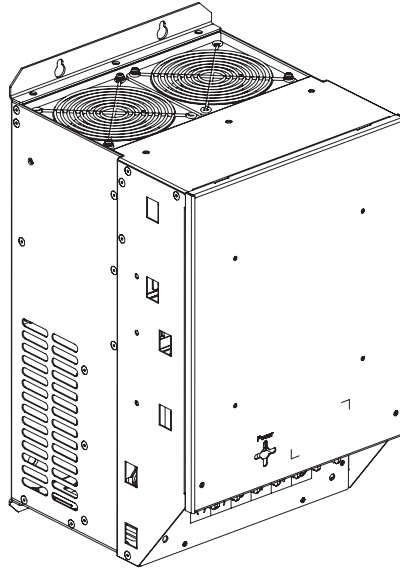
Primary loop 6 pulse input

Primary loop 12 pulse input

3.4.4 Goodrive800-51 series

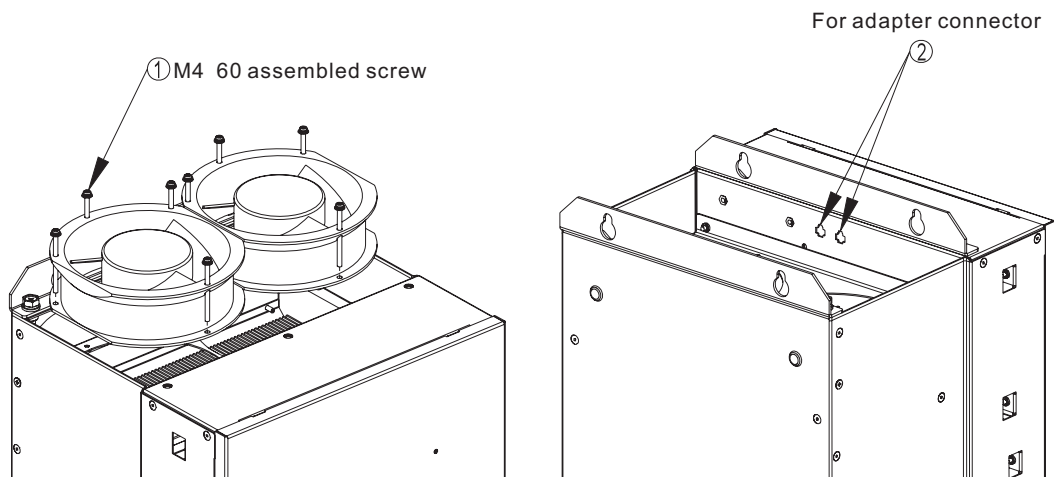
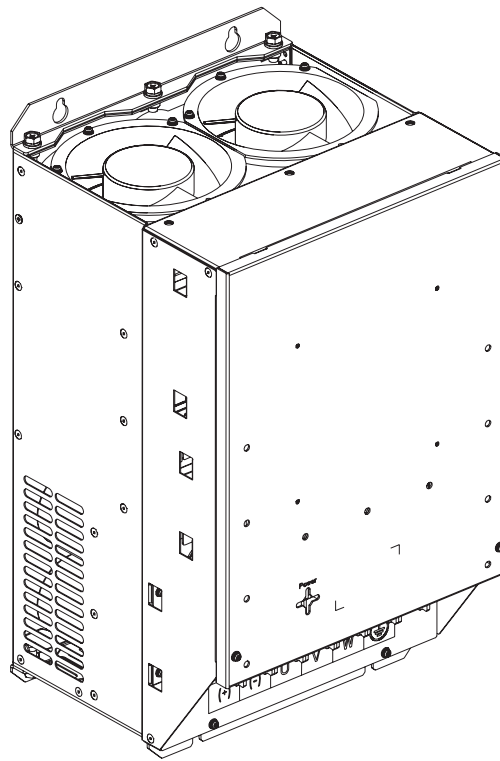
3.4.4.1 Maintenance for Goodrive800-51 series 0037~0055-4 (0037~0055-6) fans

1. As shown in ①, remove M4X60 assembled screws of the fans.
2. As shown in ②, after pulling out part of the fans (till the location as specified in ② shows) and unplugging the adapter connector, the fans can be taken out for maintenance or replacement.
3. After maintenance or replacement, install the fans back into place in reverse order. (Pay attention to the installation direction: up draft.)



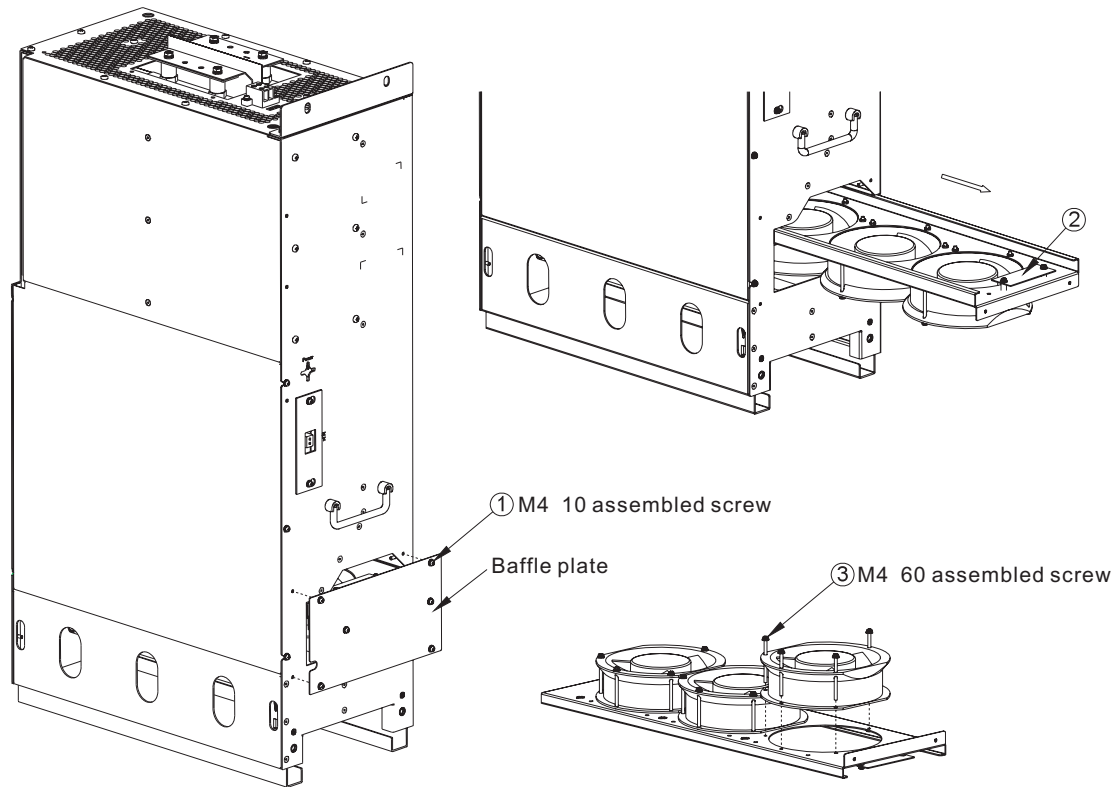
3.4.4.2 Maintenance for Goodrive800-51 series 0075~0110-4 (0075~0132-6) fans

1. As shown in ①, remove M4X60 assembled screws of the fans.
2. As shown in ②, after pulling out part of the fans (till the location as specified in ② shows) and unplugging the adapter connector, the fans can be taken out for maintenance or replacement.
3. After maintenance or replacement, install the fans back into place in reverse order. (Pay attention to the installation direction: up draft.)



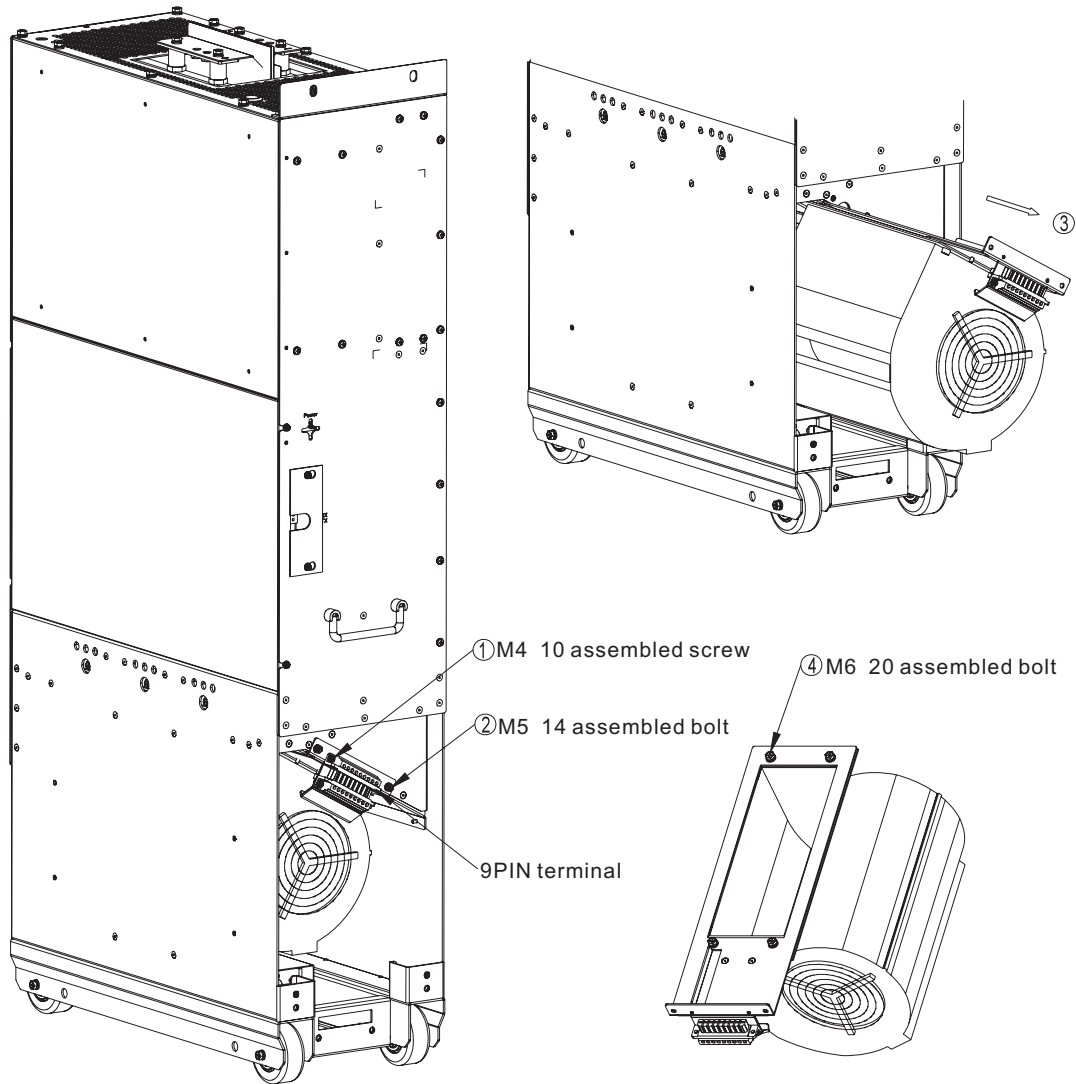
3.4.4.3 Maintenance for Goodrive800-51 series 0132~0200-4 (0160~0250-6) fans

1. As shown in ①, after removing 6 M4X10 assembled screws, take down the baffle plate.
2. As shown in ②, disconnect the incoming power line on the distributed board of the fans and then pull out the components in arrow direction.
3. As shown in ③, after removed M4X60 assembled screws, the fans can be taken out for maintenance or replacement.
4. After maintenance or replacement, install the fans back into place in reverse order. (Pay attention to the installation direction: up draft.)



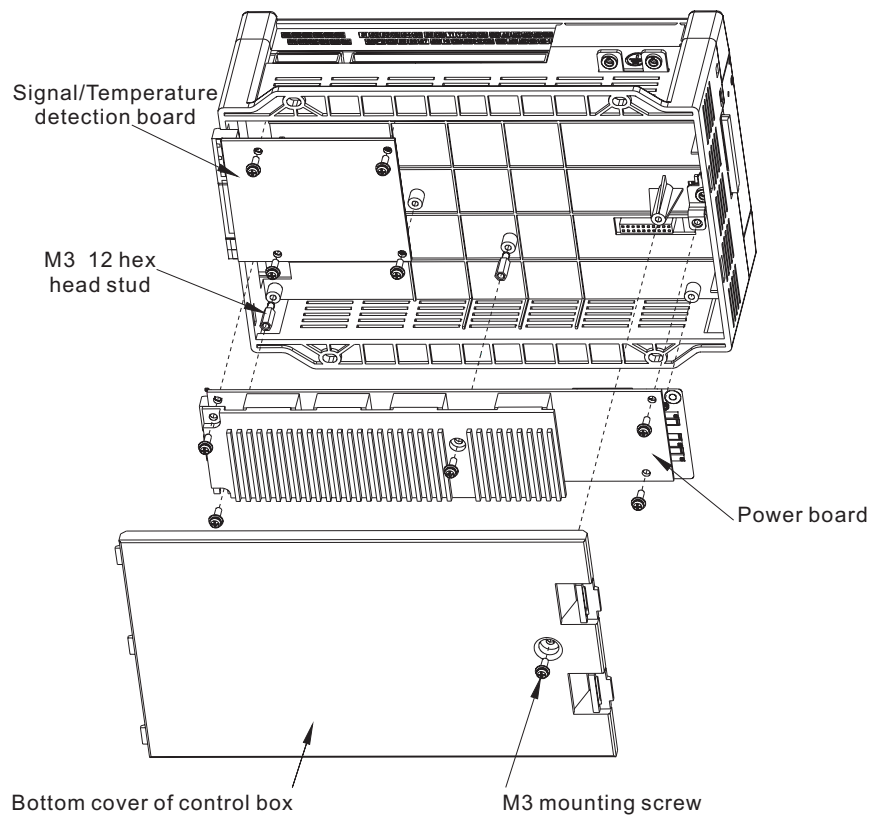
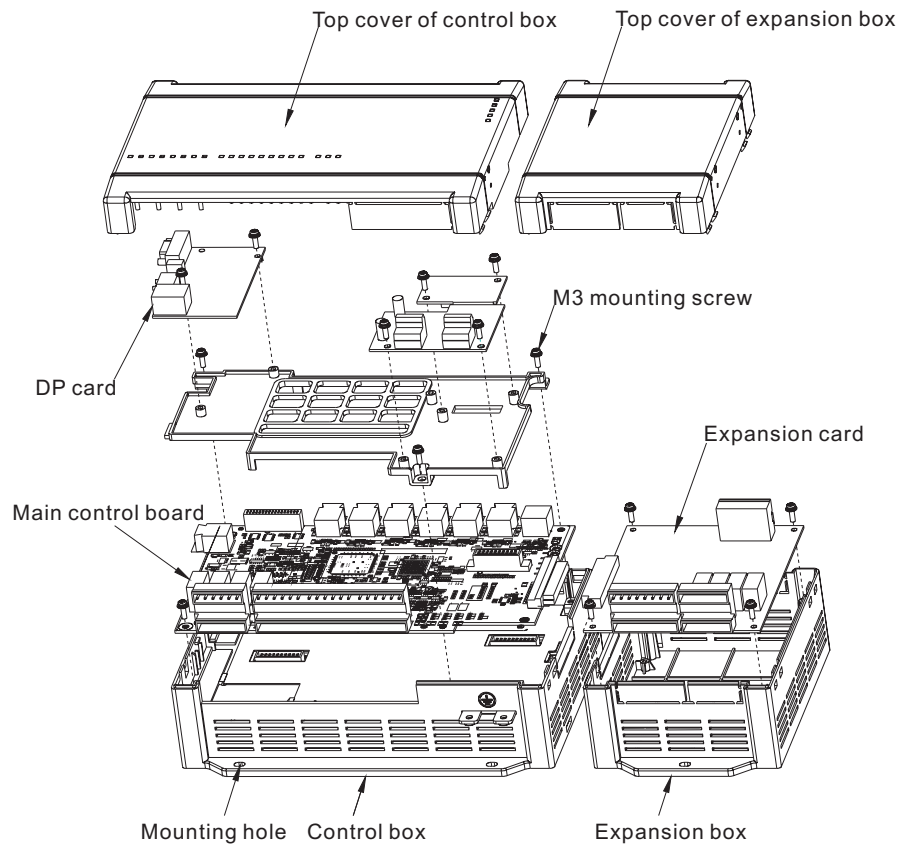
3.4.4.4 Maintenance for Goodrive800-51 series 0250~0400-4 (0315~0500-6) fans

1. As shown in ①, after removing M4X10 assembled screws at 9PIN terminal, disconnect 9PIN terminal.
2. As shown in ②, remove 2 M5X14 assembled bolts.
3. As shown in ③, pull out the components in arrow direction.
4. As shown in ④, after removed 4 M6X20 assembled screws, the fans can be taken out for maintenance or replacement.
5. After maintenance or replacement, install the fans back into place in reverse order.

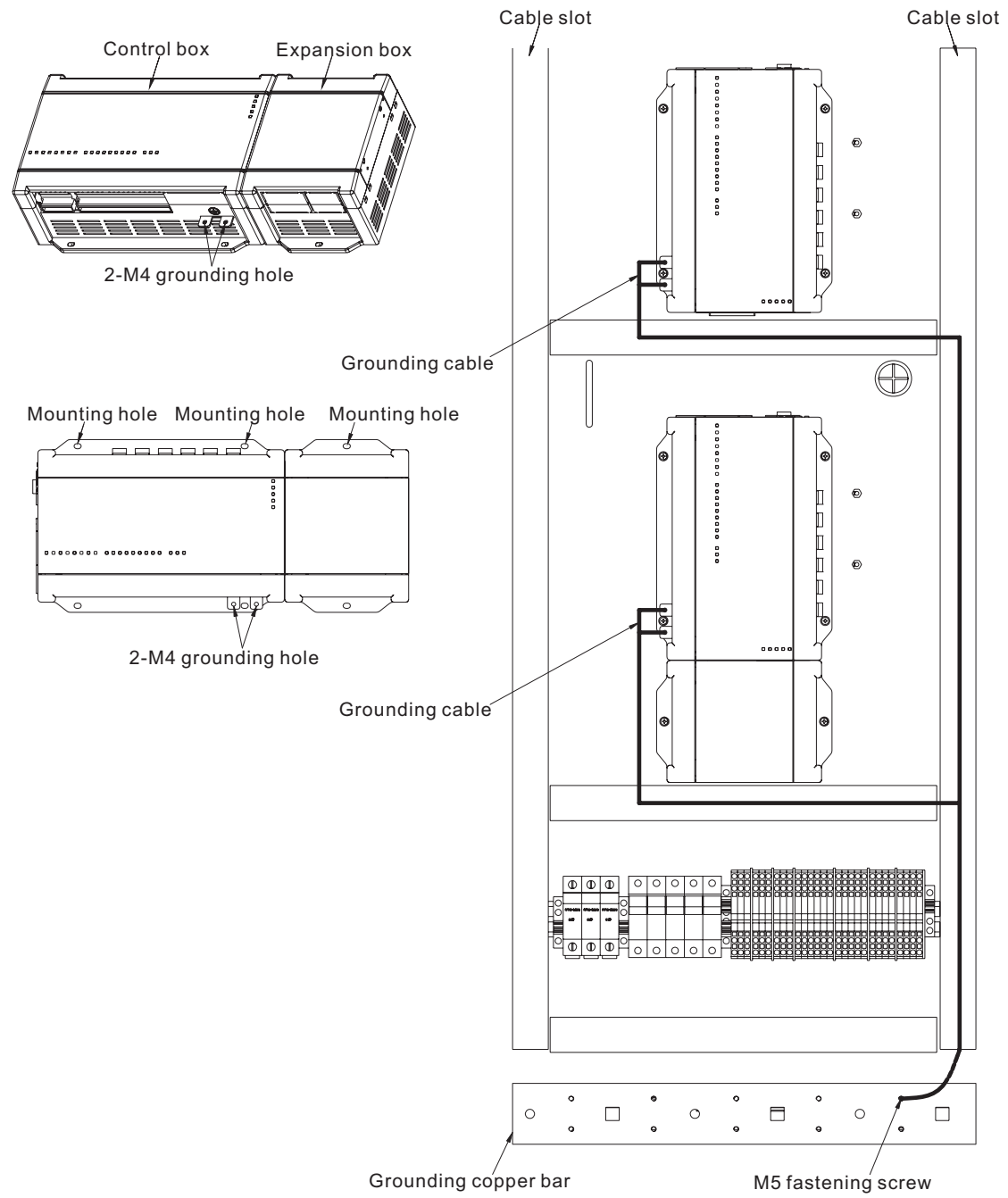


3.4.5 Control box

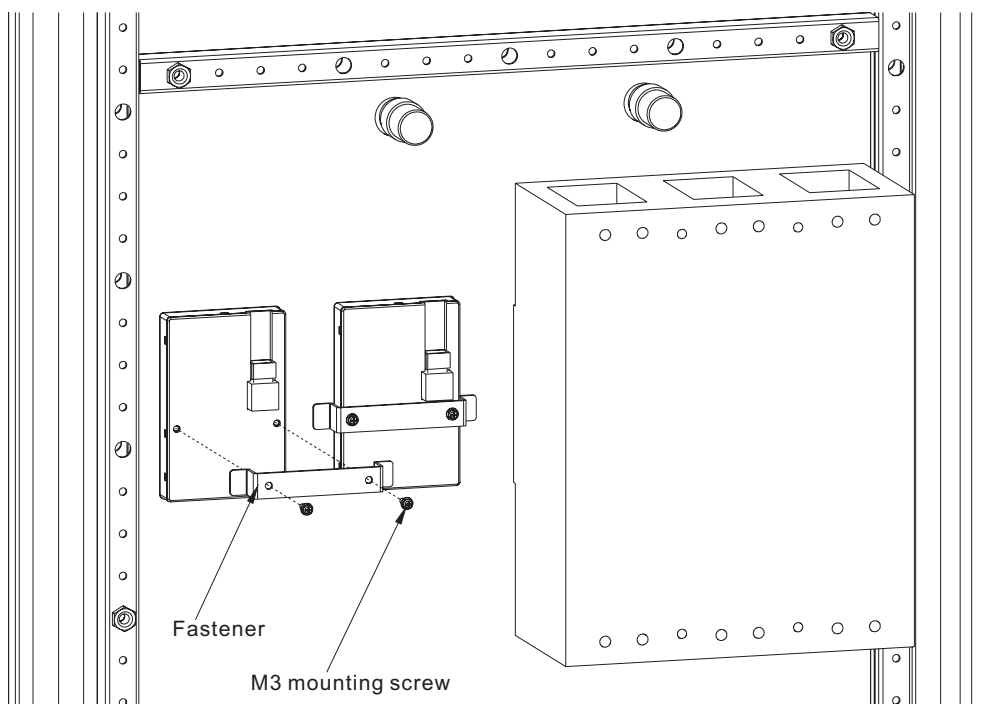
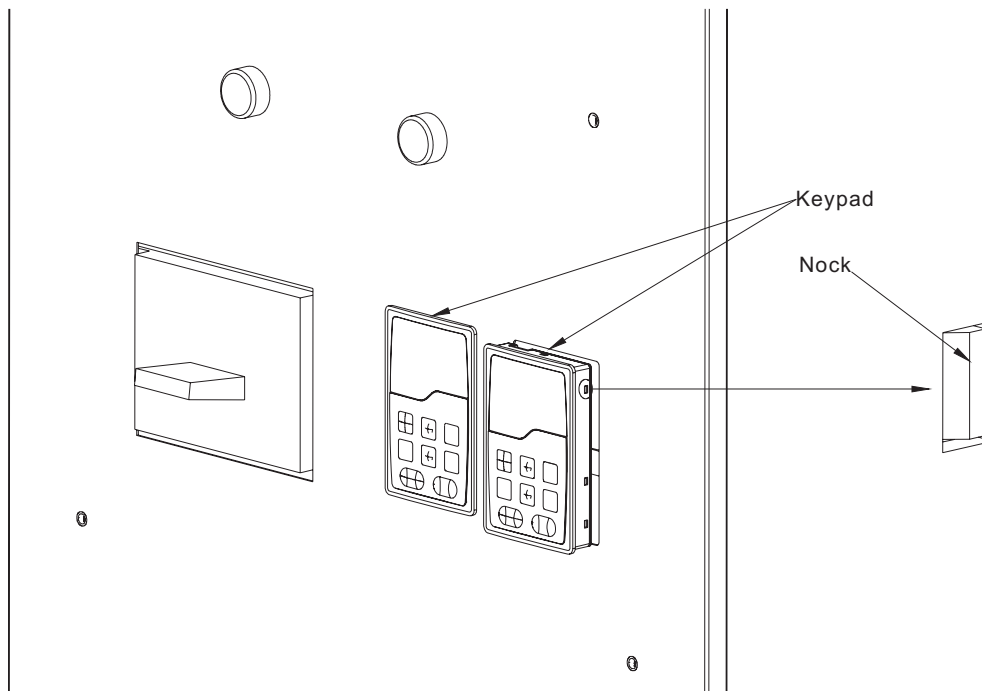
(1) Control box and expansion box



(2) Grounding of control box



3.4.6 Keypad





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