# Goodrive880 Series Active Rectifier Unit

## Hardware Manual

SHENZHEN INVT ELECTRIC CO., LTD.

| No. | Change description | Version | Release date |
|---|---|---|---|
| 1 | First release. | V1.0 | July 2024 |
| 2 | ● Updated section 2.3 Product ratings.<br>● Updated model data in section 2.8 Electrical model selection.<br>● Modified Figure 3-27 Control unit installation in section 3.3.7.4 Control unit installation procedure.<br>● Modified the diagrams and terminal descriptions in section 4.4 Electrical wiring and section 4.4.5 Main circuit wiring terminals.<br>● Updated Figure 5-1 in section 5.3 Control unit interface description.<br>● Updated section 6.1 Function expansion module, and deleted section 6.3 EMI filter module.<br>● Modified Figure B-9 in Appendix B Dimension drawings.<br>● Modified section A.2 Grid specifications.<br>● Updated Appendix C Example electrical diagram.<br>● Updated Appendix D Order No. | V1.1 | March 2026 |

# Preface

Thank you for choosing INVT Goodrive880 series engineering variable-frequency drive (VFD).

For ease of use, read the manual carefully before using the product.

As an upgrade product of Goodrive800 series engineering VFD, Goodrive880 series engineering VFD inherits the high reliability feature of Goodrive800 platform but optimizes the upgrade, structure, and components, achieving unit modularization, flexible cabinet configuration, more compact structure, easier installation and maintenance, and optimum protection.

- Excellent speed and torque control performance
- Modular design, as flexible as building blocks, which makes the project integration simple and efficient
- Long-life component selection and fast fault recovery design to ensure efficient process control
- Ergonomic design to make installation and maintenance easier
- Enriched expansion capability to support various protection options

Goodrive880 series engineering VFD can be widely used in:

Metallurgy: Such as high-speed wire rod and hot strip rolling equipment, wide and thick plate equipment, cold rolling equipment, pickling lines, annealing lines, galvanizing line, color coating lines, non-ferrous metal alloy manufacturing equipment, and non-ferrous metal rolling equipment.

Petroleum: All-electric oil drilling rigs, large well repair machines, large oil machinery and equipment electric-drive power transformation, oilfield water injection equipment and other heavy oil equipment.

Paper making: Paper making joint equipment, including flow box, net section, press section, drying section, sizing, hard calendering, coating, super calender, rewinder and other continuous production lines.

Port and other large lifting equipment: Such as shore-side container overhead cranes, tire-type (orbital) container gantry cranes, grab unloaders, grab gantry cranes, large shipbuilding gantry cranes, and large metallurgical casting cranes.

Others: Such as unit test benches, military equipment, oil and gas transmission, and mining transmission equipment.

Goodrive880-91 series is the active rectifier unit product of Goodrive880 series. If not otherwise specified, the active rectifier unit in this manual refers to the active rectifier unit of Goodrive880 series and Goodrive880-91 series product. The rated power of a single unit is 64kW–639kW, and the max. parallel power can be 3642kW. The active unit consists of bus capacitor, IGBT, and filtering components. It is compact in structure and easy to integrate and maintain.

This manual is Goodrive880 series active rectifier unit hardware manual, presenting safety precautions, product information, mechanical and electrical installation, and precautions related to daily maintenance. Read through this manual carefully before installation to ensure the product is installed and operated in a proper manner to give full play to its excellent performance and powerful functions. If you have any question about the function and performance of the product, please consult our technical support.

If the product is ultimately used for military affairs or weapon manufacture, comply with the export control regulations in the Foreign Trade Law of the People's Republic of China and complete related formalities.

To continuously improve the performance of the product to meet higher application requirements, we reserve the right to continuously improve the product and accordingly the product manual, which may be made without prior notice. We have the final interpretation of the manual content.

# Contents

# 1 Safety precautions

## 1.1 Safety declaration

Read this manual carefully and follow all safety precautions before moving, installing, operating and servicing the product. Otherwise, equipment damage or physical injury or death may be caused.

We shall not be liable or responsible for any equipment damage or physical injury or death caused due to your or your customers' failure to follow the safety precautions.

## 1.2 Safety definition

**Danger**: Severe personal injury or even death can result if related requirements are not followed.

**Warning:** Personal injury or equipment damage can result if related requirements are not followed.

**Note**: Actions taken to ensure proper running.

**Trained and qualified professionals**: People operating the equipment must have received professional electrical and safety training and obtained the certificates, and must be familiar with all steps and requirements of equipment installing, commissioning, running and maintaining and capable to prevent any emergencies.

## 1.3 Warning symbols

Warnings caution you about conditions that can result in severe injury or death and/or equipment damage and advice on how to prevent dangers. The following table lists the warning symbols in this manual.

| Symbol | Name | Description |
|---|---|---|
|  | Danger | Severe personal injury or even death can result if related requirements are not followed. |
|  | Warning | Personal injury or equipment damage can result if related requirements are not followed. |
|  | Electrostatic discharge | The PCBA may be damaged if related requirements are not followed. |
|  | Hot sides | Do not touch. The active rectifier base may become hot. |
|   | Electric shock | As high voltage still presents in the bus capacitor after power off, wait for at least 25 minutes (depending on the warning symbols on the machine) after power off to prevent electric shock. |
| Note | Note | Actions taken to ensure proper running. |

## 1.4 Safety guidelines

| | |
|---|---|
|  | • Only trained and qualified professionals are allowed to carry out related operations.<br>• Do not perform wiring, inspection or component replacement when power supply is applied. Ensure all the input power supplies have been disconnected before wiring or inspection, and wait for at least the time designated on the Goodrive880 series product or until the DC bus voltage is less than 36V. The minimum waiting time is |

<table>
<tr><td></td><td>listed in the following.
<table>
<tr><th colspan="2">Model</th><th>Minimum waiting time</th></tr>
<tr><td rowspan="3">380V</td><td>64–126kW</td><td>5 minutes</td></tr>
<tr><td>151–345kW</td><td>15 minutes</td></tr>
<tr><td>Higher than 422kW</td><td>25 minutes</td></tr>
<tr><td>690V</td><td>>437kW</td><td>25 minutes</td></tr>
</table></td></tr>
<tr><td>  </td><td>● Do not modify the VFD unless authorized; otherwise fire, electric shock or other injury may result.</td></tr>
<tr><td>  </td><td>● The base may become hot when the VFD is running. Do not touch. Otherwise, you may get burnt.</td></tr>
<tr><td>  </td><td>● The electrical parts and components inside the VFD are electrostatic sensitive. Take measurements to prevent electrostatic discharge when performing related operations.</td></tr>
</table>

## 1.4.1 Delivery and installation

<table>
<tr><td>  </td><td>● Do not install the active rectifier on inflammables. In addition, prevent the active rectifier from contacting or adhering to inflammables.<br>● Do not run the active rectifier If it is damaged or incomplete.<br>● Do not contact the rectifier unit with damp objects or body parts. Otherwise, electric shock may result.</td></tr>
<tr><td>Note</td><td>● Select appropriate tools for active rectifier delivery and installation to ensure the safe and proper running and avoid physical injury or death. The installation personnel must take mechanical protective measures like wearing safety shoes and working uniforms to protect personal safety.<br>● Protect the active rectifier against physical shock or vibration during the delivery and installation.<br>● Do not carry the product only by its front cover as the cover may fall off.<br>● The installation site must be away from children and other public places.<br>● Prevent the screws, cables and other conductive parts from falling into the rectifier unit.<br>● As the leakage current caused during active rectifier running may exceed 3.5mA, ground properly and ensure the grounding resistance is less than 10Ω. The conductivity of PE grounding conductor must meet the following requirements:
<table>
<tr><th>Power cable conductor cross-sectional area S (mm²)</th><th>Grounding conductor cross-sectional area</th></tr>
<tr><td>S⩽16</td><td>S</td></tr>
<tr><td>16<S⩽35</td><td>16</td></tr>
<tr><td>35<S</td><td>S/2</td></tr>
</table>
● L1, L2, and L3 are the power input terminals, while + and - are the DC bus output terminals. Connect the input power cables and output busbars properly; otherwise, the active rectifier may be damaged.</td></tr>
</table>

## 1.4.2 Commissioning and running

<table>
<tr><td>  </td><td>● Cut off all power supplies connected to the active rectifier unit before terminal wiring, and wait for at least the time designated on the active rectifier unit after</td></tr>
</table>

| | |
|---|---|
| | disconnecting the power supplies.<br>● Medium voltage presents inside the active rectifier during running. Do not carry out any operation on the rectifier unit during running except for keypad setup. For products at voltage class of 4 or 6, the control terminals form extra-low voltage circuits. Therefore, you need to prevent the control terminals from connecting to accessible terminals of other devices.<br>● Before turning on the power supply, check the cable connection status.<br>● Prevent anyone from directly touching the energized part of the cabinet door. Pay special attention to safety when handling shields that are made of metal sheets.<br>● Do not do any withstand voltage testing during active rectifier connection. Disconnect the motor cable before performing any insulation and voltage withstand tests for the motor or motor cable.<br>● Do not open the cabinet door since medium voltage presents inside the VFD during running. |
| Note | ● Do not switch on or switch off the input power supplies of the active rectifier frequently.<br>● If the active rectifier has been stored for a long time without use, perform checking and carry out pilot run for the active rectifier before using it again.<br>● Close the active rectifier front cover before running; otherwise, electric shock may occur. |

## 1.4.3 Maintenance and component replacement

| | |
|---|---|
|  | ● Only trained and qualified professionals are allowed to perform maintenance, inspection, and component replacement for the active rectifier.<br>● Cut off all power supplies connected to the active rectifier before terminal wiring, and wait for at least the time designated on the rectifier unit after disconnecting the power supplies.<br>● During maintenance and component replacement, take measures to prevent screws, cables and other conductive matters from falling into the internal of the active rectifier. |
| Note | ● Use proper torque to tighten screws.<br>● During maintenance and component replacement, keep the active rectifier and its parts and components away from combustible materials and ensure they have no combustible materials adhered.<br>● Do not carry out insulation voltage-endurance test on the active rectifier, or measure the control circuits of the rectifier unit with a megohmmeter.<br>● During maintenance and component replacement, take proper anti-static measures on the active rectifier and its internal parts. |

## 1.4.4 Disposal

| | |
|---|---|
|  | ● The active rectifier contains heavy metals. Dispose of a scrap rectifier unit as industrial waste. |
|  | ● Dispose of a scrap product separately at an appropriate collection point but not place it in the normal waste stream. |

# 2 Product overview

For Goodrive880 series active rectifier products, the rated power of a single unit is 64kW–639kW, while that of parallel units can be up to 3642kW. The active rectifier consists of the active rectifier filter unit and the active rectifier unit. It is compact in structure and easy to integrate and maintain, reducing cabinet footprint.

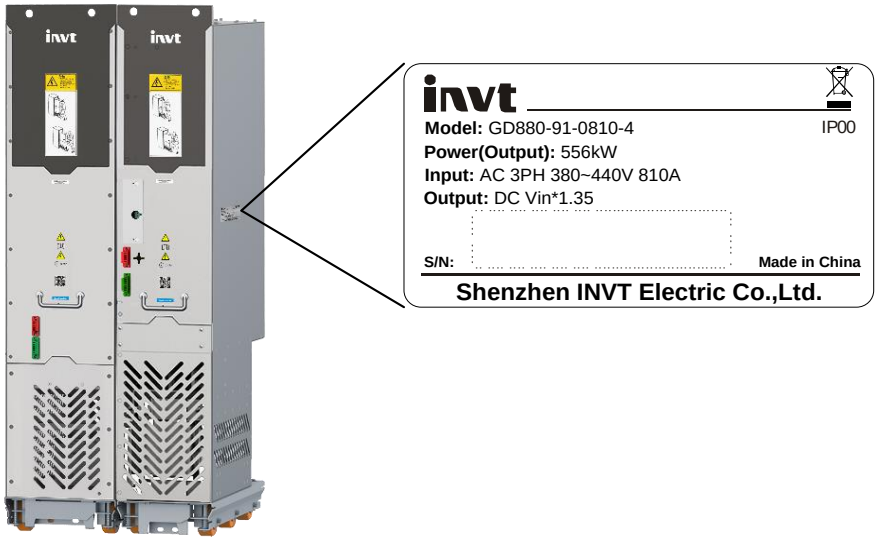
## 2.1 Product specifications

Table 2-1 Product specifications

| Function description | | Specifications |
|---|---|---|
| Power input | Input voltage (V) | 380–440VAC 3PH ±10%, -15%<1min;<br>Rated voltage: 400V<br>520–690VAC 3PH ±10%, -15%<1min; Rated voltage: 690V |
| | Input current (A) | See section 2.3 Product ratings. |
| | Input frequency (Hz) | 50Hz or 60Hz; Allowed range: 47–63Hz |
| Power output | Output voltage (V) | Input voltage * 1.5 |
| | Output current (A) | See section 2.3 Product ratings. |
| | Output power (kW) | See section 2.3 Product ratings. |
| Environment condition | Working temperature | -10°C – +50°C;<br>● No derating is required when the ambient temperature is less than or equal to 40°C.<br>● When the ambient temperature exceeds 40°C, derate by 1% for every increase of 1°C.<br>● The max temperature cannot exceed 50°C. |
| | Relative humidity | 5%–95%, no condensation |
| | Installation altitude | Below 1000m (Derating is required when the altitude exceeds 1000m. Derate by 1% for every increase of 100m.)<br>● No derating is required when the altitude is lower than or equal to 1000m.<br>● When the altitude exceeds 1000m, derate by 1% for each increase of 100m.<br>● The highest altitude cannot exceed 4000m. |
| Mechanical data | Anti-vibration performance | Compliant with 3M4 vibration level in GB/T4798.3 |
| | IP rating | For the module: IP00<br>For the cabinet: IP20 (Optional: IP23 and IP42) |
| | Safety performance | Compliant with EN 61800-5-1 |
| | Cooling method | Forced air cooling |
| Protection function | Protection function | Including functions of protection against overcurrent, overload, overvoltage, undervoltage, overtemperature, and phase loss. |

## 2.2 Product nameplate and model

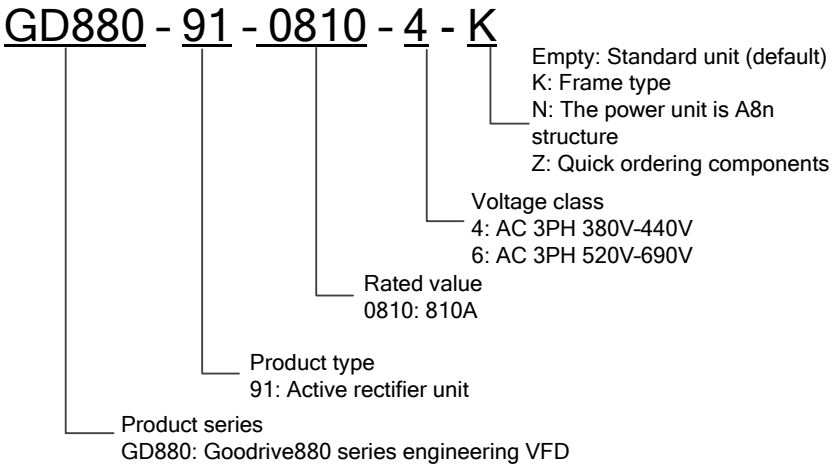
Figure 2-1 Product nameplate




**Note:** The preceding nameplate is a standard product nameplate example. The marking varies slightly depending on the model.

The model designation code contains basic product information such as rated current and rated voltage. You can find the model code on the product nameplate.

Figure 2-2 Product model




**Note:** The preceding model is only an example of GD880-91 models.

## 2.3 Product ratings

Table 2-2 AC 3PH 380V–440V

| Model GD880-91-… | Rated value | | | | | Light overload application | | Heavy overload application | | Frame size | Heat dissipation | Air volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_N$ | $I_N$ | $I_{max}$ | $S_N$ | $P_N$ | $I_{Ld}$ | $P_{Ld}$ | $I_{hd}$ | $P_{Hd}$ | | | |
| | A (AC) | A (DC) | A (DC) | kVA | kW (DC) | A (DC) | kW (DC) | A (DC) | kW (DC) | | kW | $m^3/h$ |
| 0094-4-X | 94 | 107 | 139 | 65 | 64 | 103 | 62 | 80 | 48 | A3+LCL | 0.8 | 179 |
| 0116-4-X | 116 | 130 | 169 | 79 | 78 | 127 | 76 | 98 | 59 | A4+LCL | 1.2 | 255 |
| 0149-4-X | 149 | 170 | 221 | 103 | 102 | 163 | 98 | 128 | 77 | A4+LCL | 1.7 | 255 |
| 0183-4-X | 183 | 210 | 273 | 127 | 126 | 200 | 120 | 157 | 94 | A4+LCL | 2.0 | 255 |
| 0220-4-X | 220 | 252 | 327 | 153 | 151 | 242 | 145 | 189 | 113 | A6+LCL | 2.5 | 1000 |
| 0260-4-X | 260 | 297 | 386 | 180 | 178 | 285 | 171 | 222 | 133 | A6+LCL | 3.7 | 1000 |
| 0312-4-X | 312 | 357 | 464 | 216 | 214 | 342 | 205 | 268 | 161 | A7+LCL | 4.1 | 1000 |
| 0395-4-X | 395 | 452 | 587 | 274 | 271 | 433 | 260 | 339 | 203 | A7+LCL | 5.3 | 1000 |
| 0516-4-X | 516 | 590 | 767 | 358 | 354 | 565 | 339 | 442 | 265 | A7+LCL | 6.4 | 1000 |
| 0615-4-X | 615 | 703 | 914 | 426 | 422 | 675 | 405 | 528 | 317 | A8+LCL | 9.0 | 3000 |
| 0681-4-X | 681 | 772 | 1004 | 468 | 463 | 740 | 444 | 578 | 347 | A8+LCL | 10.2 | 3000 |
| 0810-4-X | 810 | 927 | 1205 | 562 | 556 | 888 | 533 | 695 | 417 | A8+LCL | 14.1 | 3000 |
| 0980-4-X | 980 | 1121 | 1457 | 679 | 673 | 1074 | 646 | 840 | 504 | 2*A8+LCL | 17.7 | 4500 |
| 1168-4-X | 1168 | 1336 | 1737 | 810 | 802 | 1283 | 769 | 1003 | 602 | 2*A8+LCL | 20.1 | 4500 |
| 1295-4-X | 1295 | 1466 | 1906 | 897 | 888 | 1406 | 844 | 1098 | 659 | 2*A8+LCL | 22.1 | 4500 |
| 1539-4-X | 1539 | 1761 | 2289 | 1067 | 1056 | 1687 | 1013 | 1320 | 792 | 2*A8+LCL | 24.1 | 4500 |
| 2336-4-X | 2336 | 2672 | 3474 | 1620 | 1604 | 2566 | 1538 | 2006 | 1204 | 2*(2*A8+LCL) | 40.2 | 9000 |
| 3078-4-X | 3078 | 3521 | 4578 | 2134 | 2113 | 3374 | 2026 | 2640 | 1584 | 2*(2*A8+LCL) | 48.2 | 9000 |
| 4617-4-X | 4617 | 5282 | 6867 | 3201 | 3169 | 5061 | 3039 | 3960 | 2376 | 3*(2*A8+LCL) | 72.3 | 13500 |

Table 2-3 AC 3PH 520V–690V

| Model GD880-91-… | Rated value | | | | | Light overload application | | Heavy overload application | | Frame size | Heat dissipation | Air volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_N$ | $I_N$ | $I_{max}$ | $S_N$ | $P_N$ | $I_{Ld}$ | $P_{Ld}$ | $I_{hd}$ | $P_{Hd}$ | | | |
| | A (AC) | A (DC) | A (DC) | kVA | kW (DC) | A (DC) | kW (DC) | A (DC) | kW (DC) | | kW | $m^3/h$ |
| 0369-6-X | 369 | 422 | 549 | 441 | 437 | 406 | 420 | 317 | 328 | A8+LCL | 13.2 | 3000 |
| 0477-6-X | 477 | 545 | 708 | 570 | 564 | 523 | 541 | 409 | 423 | A8+LCL | 14.5 | 3000 |
| 0540-6-X | 540 | 617 | 803 | 645 | 639 | 592 | 613 | 463 | 479 | A8+LCL | 15.8 | 3000 |
| 0701-6-X | 701 | 802 | 1043 | 839 | 830 | 770 | 797 | 602 | 623 | 2*A8+LCL | 22.3 | 4500 |
| 0906-6-X | 906 | 1036 | 1346 | 1082 | 1072 | 994 | 1029 | 777 | 804 | 2*A8+LCL | 24.8 | 4500 |
| 1026-6-X | 1026 | 1173 | 1525 | 1226 | 1214 | 1126 | 1165 | 880 | 910 | 2*A8+LCL | 27.5 | 4500 |
| 1402-6-X | 1402 | 1604 | 2086 | 1678 | 1660 | 1540 | 1594 | 1204 | 1246 | 2*(2*A8+LCL) | 49.6 | 9000 |
| 2052-6-X | 2052 | 2346 | 3050 | 2452 | 2428 | 2252 | 2330 | 1760 | 1820 | 2*(2*A8+LCL) | 55 | 9000 |

| Model GD880-91-… | Rated value | | | | | Light overload application | | Heavy overload application | | Frame size | Heat dissipation | Air volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $I_N$ | $I_N$ | $I_{max}$ | $S_N$ | $P_N$ | $I_{Ld}$ | $P_{Ld}$ | $I_{hd}$ | $P_{Hd}$ | | | |
| | A (AC) | A (DC) | A (DC) | kVA | kW (DC) | A (DC) | kW (DC) | A (DC) | kW (DC) | | kW | $m^3/h$ |
| 3078-6-X | 3078 | 3519 | 4575 | 3679 | 3642 | 3378 | 3495 | 2640 | 2730 | 3*(2*A8+LCL) | 82.5 | 13500 |
| 4104-6-X | 4104 | 4692 | 6100 | 4905 | 4856 | 4504 | 4660 | 3520 | 3640 | 4*(2*A8+LCL) | 110 | 18000 |
| 5130-6-X | 5130 | 5865 | 7625 | 6131 | 6070 | 5630 | 5825 | 4400 | 4550 | 5*(2*A8+LCL) | 137.5 | 22500 |

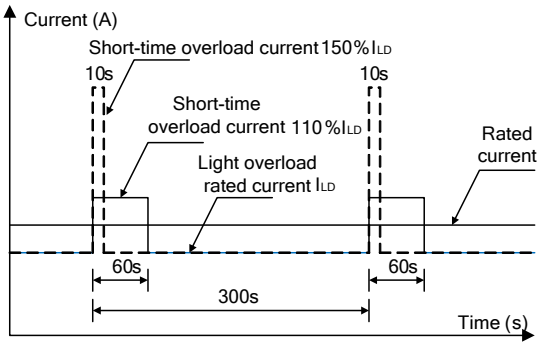
**Note:**

- The active filter components consist of LCL components, using manufacturer's original parts.
- $I_N$ indicates the rated current for continuous running when no overload occurs at 40°C, while $I_{max}$ indicates the max. output current.
- Light overload application: $I_{Ld}$ indicates the continuous running current at light overload. Every 5 minutes, the overload with the current of 110%*$I_{Ld}$ can last for 1 minutes at 40°C.
- Heavy overload application: $I_{Ld}$ indicates the continuous running current at heavy overload. Every 5 minutes, the overload with the current of 150%*$I_{Hd}$ can last for 1 minutes at 40°C.
- The structure offers empty (default), -K, –N, and -Z.
  - ✧ The empty (default) is standard unit without frame.
  - ✧ The -K models use a frame structure, applicable only to A8+LCL and 2*A8+LCL structures.
  - ✧ The -N models use a front-outlet structure for power units, applicable only to A8+LCL structure.
  - ✧ -Z indicates the quick ordering components, which include the related components for minimum system of the active rectifier. For details, see Appendix D Ordering

## 2.4 Overload capability

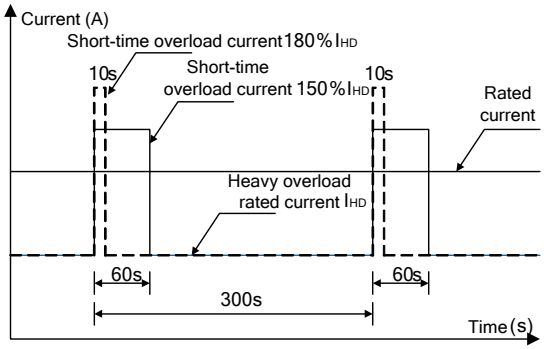
Based on the light overload continuous run current ($I_{Ld}$), the active rectifier can keep running for 60s at 110% of the rated current. See Figure 2-3.

Figure 2-3 Light overload application




Based on the heavy overload continuous run current ($I_{Hd}$), the active rectifier can keep running for 60s at 150% of the rated current. See Figure 2-4.

Figure 2-4 Heavy overload application




# 2.5 Hardware principles

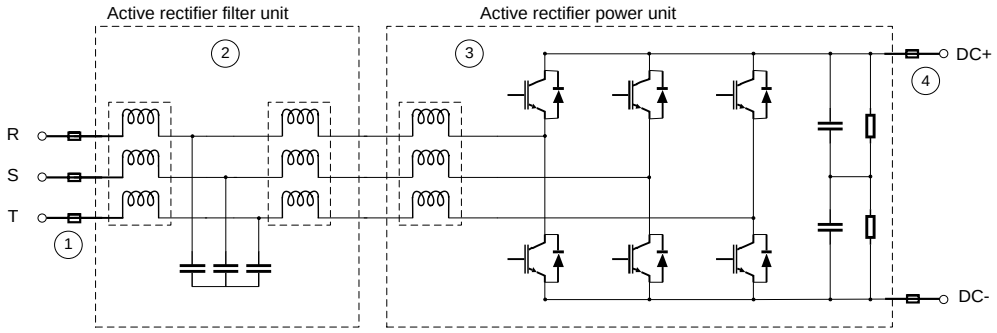
## 2.5.1 Basic principles

The active rectifier, a four-quadrant rectifier system, mainly consists of active rectifier filter unit and active rectifier unit. It is used with the pre-charge circuit and control unit. The intermediate DC voltage can supply the subsequent inverter modules. One or more inverter modules can be installed.

The active rectifier converts 3PH AC voltage into DC voltage, and the DC voltage can supply the subsequent inverter modules to drive motors. It can also feed the regenerative energy of the motor back to the grid. The active rectifier filter unit, which is the filter, is used to suppress input or regenerative current harmonics.

The active rectifier mainly consists of AC fuse, active rectifier filter unit, active rectifier unit, and DC fuse. Figure2-5 shows the simplified main circuit diagram.

Figure2-5 Main circuit diagram of the active rectifier




| No. | Name | Description |
|---|---|---|
| 1 | AC fuse | To protect against overload and short-circuit on the active rectifier side. |
| 2 | Active rectifier filter unit | To suppress AC voltage and current harmonics. |
| 3 | Active rectifier unit | To convert AC current to DC current. |
| 4 | DC fuse | To prevent backend short circuit from causing machine burndown. |

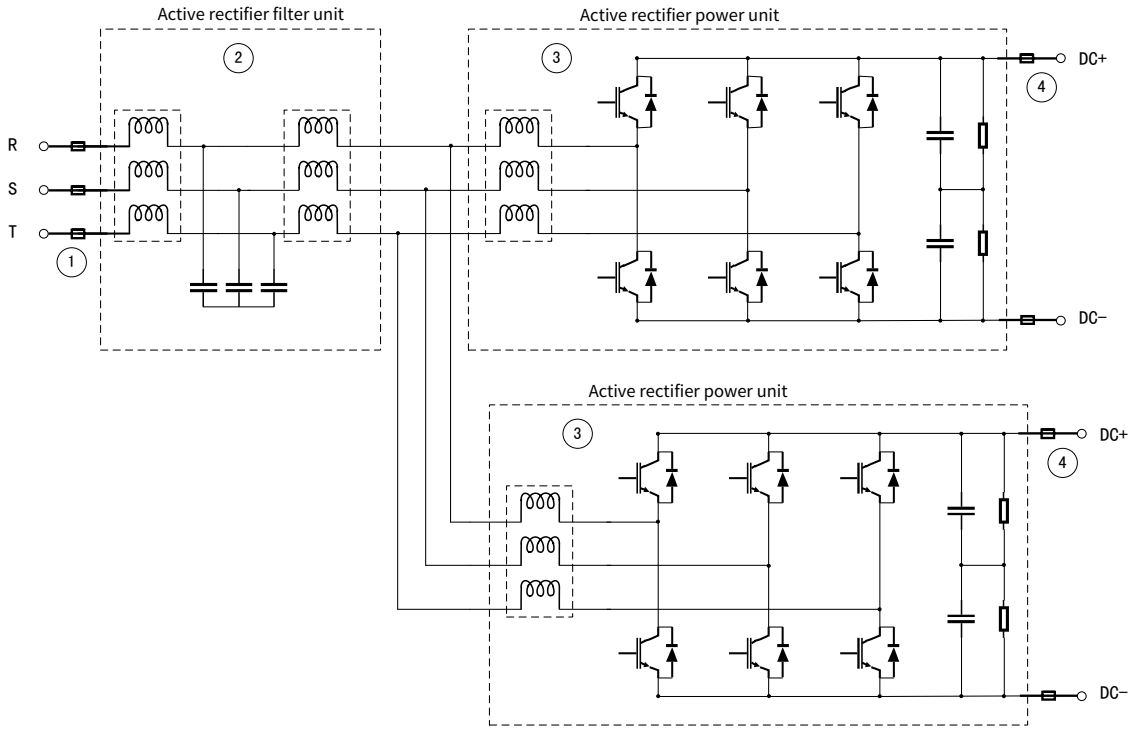
**Note:** The AC/DC fuse is not a component of the active rectifier. You can choose to configure AC/DC fuses according to the actual application requirements.

## 2.5.2 Paralleling principle

The active rectifier supports parallel use in 2*A8+LCL frame structure, that is, one active rectifier filter unit is connected with two active rectifier units, as shown in Figure 2-6. To meet the requirements of greater

capacity, the parallel pattern (2*A8+LCL)*N should be used, where N can be up to 3. In parallel connection, ensure that the active rectifier filter units have the same specifications and active rectifier units use the same software and hardware.

Figure 2-6 Parallel system diagram of the active rectifier



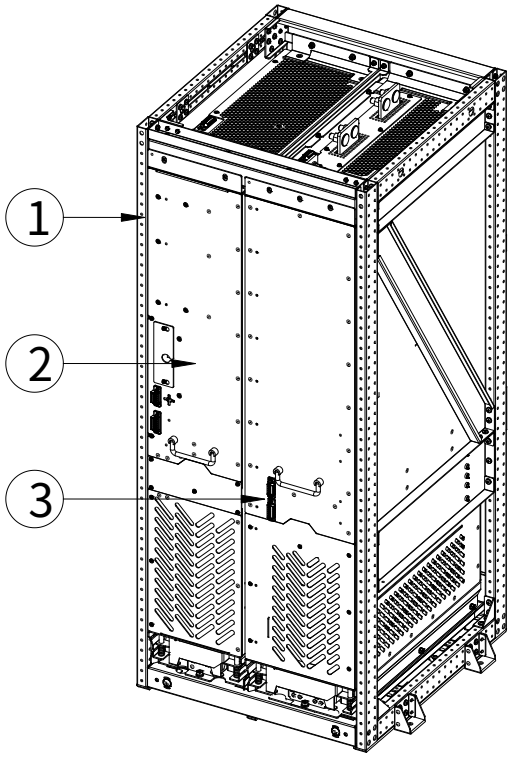

| No. | Name | Description |
|---|---|---|
| 1 | AC fuse | To protect against overload and short-circuit on the active rectifier side. |
| 2 | Active rectifier filter unit | To suppress AC voltage and current harmonics. |
| 3 | Active rectifier unit | To convert AC current to DC current. |
| 4 | DC fuse | To prevent backend short circuit from causing machine burndown. |

# 2.6 Product structure

## 2.6.1 Layout of A8+LCL

The following figure shows the frame layout of A8+LCL.

Figure 2-7 Structure of active rectifier frame (A8+LCL)

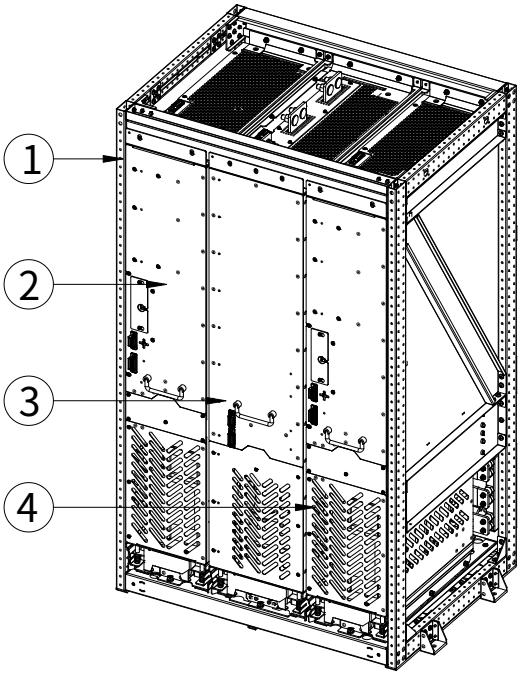



| No. | Name |
|---|---|
| 1 | Frame |
| 2 | Active rectifier unit |
| 3 | Active rectifier filter unit |

## 2.6.2 Layout of 2*A8 + LCL

The following figure shows the frame layout of 2*A8 + LCL.

Figure 2-8 Structure of active rectifier frame (2*A8 + LCL)

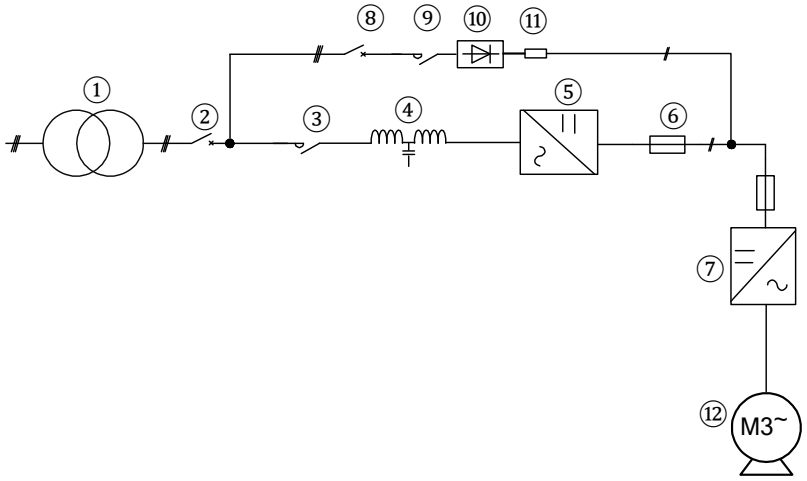


| No. | Name |
|---|---|
| 1 | Frame |
| 2 | Active rectifier unit |
| 3 | Active rectifier filter unit |
| 4 | Active rectifier unit |

## 2.7 System configuration

Figure 2-9 shows the typical topology in which the active rectifier works with one inverter unit (applicable to A3–A7 modules).

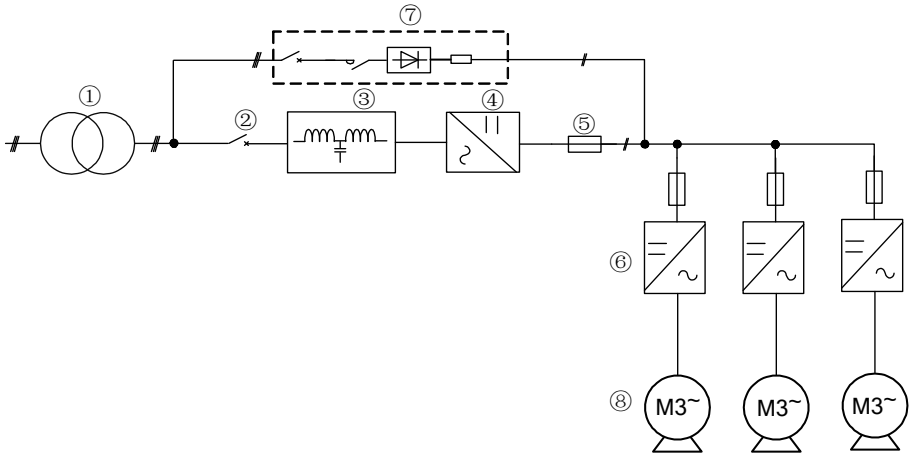
Figure 2-9 System configuration




| No. | Name |
|---|---|
| 1 | Transformer |
| 2 | Isolation switch, fuse |
| 3 | Main circuit contactor |
| 4 | Active rectifier filter component |
| 5 | Active rectifier unit |
| 6 | DC fuse |
| 7 | Inverter unit |
| 8 | Buffer breaker |
| 9 | Buffer contactor |
| 10 | Rectifier bridge |
| 11 | Buffer resistor |
| 12 | Motor |

Figure 2-10 shows the typical topology in which the active rectifier works with three inverter units (applicable to A8 power module).

Figure 2-10 System configuration




| No. | Name |
|---|---|
| 1 | Transformer |
| 2 | Breaker |
| 3 | Active rectifier filter unit |
| 4 | Active rectifier unit |
| 5 | DC fuse |
| 6 | Inverter unit |
| 7 | Buffer component |
| 8 | Motor |

**Note:** The active filter components consist of LCL components, using manufacturer's original parts.

# 2.8 Electrical model selection

## 2.8.1 Buffer component

The buffer component consists of breaker, contactor, rectifier bridge, and buffer resistor, as shown in Figure 2-10.

Table 2-4 Buffer component selection

| Power unit | Frame size | Buffer component model | Qty |
|---|---|---|---|
| GD880-91-0094-4 | A3+LCL | BUB880-0516-4 | 1 |
| GD880-91-0116-4 | A4+LCL | BUB880-0516-4 | 1 |
| GD880-91-0149-4 | A4+LCL | BUB880-0516-4 | 1 |
| GD880-91-0183-4 | A4+LCL | BUB880-0516-4 | 1 |
| GD880-91-0220-4 | A6+LCL | BUB880-0516-4 | 1 |
| GD880-91-0260-4 | A6+LCL | BUB880-0516-4 | 1 |
| GD880-91-0312-4 | A7+LCL | BUB880-0516-4 | 1 |
| GD880-91-0395-4 | A7+LCL | BUB880-0516-4 | 1 |
| GD880-91-0516-4 | A7+LCL | BUB880-0516-4 | 1 |
| GD880-91-0615-4 | A8+LCL | BUB800-0900-4 | 1 |
| GD880-91-0681-4 | A8+LCL | BUB800-0900-4 | 1 |
| GD880-91-0810-4 | A8+LCL | BUB800-0900-4 | 1 |
| GD880-91-0980-4 | 2*A8+LCL | BUB800-1770-4 | 1 |
| GD880-91-1168-4 | 2*A8+LCL | BUB800-1770-4 | 1 |
| GD880-91-1295-4 | 2*A8+LCL | BUB800-1770-4 | 1 |

| Power unit | Frame size | Buffer component model | Qty |
|---|---|---|---|
| GD880-91-1539-4 | 2*A8+LCL | BUB800-1770-4 | 1 |
| GD880-91-2185-4 | 2*(2*A8+LCL) | BUB800-1770-4 | 2 |
| GD880-91-3078-4 | 2*(2*A8+LCL) | BUB800-1770-4 | 2 |
| GD880-91-4617-4 | 3*(2*A8+LCL) | BUB800-1770-4 | 3 |
| GD880-91-0369-6 | A8+LCL | BUB800-0900-6 | 1 |
| GD880-91-0477-6 | A8+LCL | BUB800-0900-6 | 1 |
| GD880-91-0540-6 | A8+LCL | BUB800-0900-6 | 1 |
| GD880-91-0701-6 | 2*A8+LCL | BUB800-1770-6 | 1 |
| GD880-91-0906-6 | 2*A8+LCL | BUB800-1770-6 | 1 |
| GD880-91-1026-6 | 2*A8+LCL | BUB800-1770-6 | 1 |
| GD880-91-1402-6 | 2*(2*A8+LCL) | BUB800-1770-6 | 2 |
| GD880-91-2052-6 | 2*(2*A8+LCL) | BUB800-1770-6 | 2 |
| GD880-91-3078-6 | 3*(2*A8+LCL) | BUB800-1770-6 | 3 |

## 2.8.2 Breaker

A breaker can effectively prevent the overload of the variable-frequency equipment and break the fault current generated by the phase-to-phase or to-ground short circuit, and at the same time it has the function of isolation so as to avoid electric shock accidents during maintenance.

Table 2-5 Breaker model selection

| Power supply module | Frame size | Recommended specification | Recommended breaker (ABB) | Qty |
|---|---|---|---|---|
| GD880-91-0094-4 | A3+LCL | 690V 160A | XT4 N160 | 1 |
| GD880-91-0116-4 | A4+LCL | 690V 160A | XT4 N160 | 1 |
| GD880-91-0149-4 | A4+LCL | 690V 160A | XT4 N160 | 1 |
| GD880-91-0183-4 | A4+LCL | 690V 200A | XT4 N250 | 1 |
| GD880-91-0220-4 | A6+LCL | 690V 250A | XT4 N250 | 1 |
| GD880-91-0260-4 | A6+LCL | 690V 315A | XT5 N400 | 1 |
| GD880-91-0312-4 | A7+LCL | 690V 315A | XT5 N400 | 1 |
| GD880-91-0395-4 | A7+LCL | 690V 400A | XT5 N400 | 1 |
| GD880-91-0516-4 | A7+LCL | 690V 630A | XT5 N630 | 1 |
| GD880-91-0615-4 | A8+LCL | 690V 630A | XT5 N630 | 1 |
| GD880-91-0681-4 | A8+LCL | 690V 800A | XT6 S800M | 1 |
| GD880-91-0810-4 | A8+LCL | 690V 1000A | XT7 S1000M | 1 |
| GD880-91-0980-4 | 2*A8+LCL | 690V 1000A | XT7 S1000M | 1 |
| GD880-91-1168-4 | 2*A8+LCL | 690V 1250A | XT7 S1250M | 1 |
| GD880-91-1295-4 | 2*A8+LCL | 690V 1600A | XT7 S1600M | 1 |
| GD880-91-1539-4 | 2*A8+LCL | 690V 1600A | XT7 S1600M | 1 |
| GD880-91-2185-4 | 2*(2*A8+LCL) | 690V 2500A | E2.2S2500 | 1 |
| GD880-91-3078-4 | 2*(2*A8+LCL) | 690V 3200A | E4.2S3200 | 1 |
| GD880-91-4617-4 | 3*(2*A8+LCL) | 690V 5000A | E6.2S5000 | 1 |
| GD880-91-0369-6 | A8+LCL | 690V 400A | XT5 N400 | 1 |
| GD880-91-0477-6 | A8+LCL | 690V 630A | XT5 N630 | 1 |
| GD880-91-0540-6 | A8+LCL | 690V 630A | XT5 N630 | 1 |
| GD880-91-0701-6 | 2*A8+LCL | 690V 800A | XT6 S800M | 1 |
| GD880-91-0906-6 | 2*A8+LCL | 690V 1000A | XT7 S1000M | 1 |
| GD880-91-1026-6 | 2*A8+LCL | 690V 1250A | XT7 S1250M | 1 |

| Power supply module | Frame size | Recommended specification | Recommended breaker (ABB) | Qty |
|---|---|---|---|---|
| GD880-91-1402-6 | 2*(2*A8+LCL) | 690V 1600A | XT7 S1600M | 1 |
| GD880-91-2052-6 | 2*(2*A8+LCL) | 690V 2500A | E2.2S2500 | 1 |
| GD880-91-3078-6 | 3*(2*A8+LCL) | 690V 3200A | E4.2S3200 | 1 |

**Note:** A7 and lower units are recommended to be equipped with main contactors, and A8 and above breakers should be equipped with an external terminal to controls the opening and closing of the breaker and a status feedback auxiliary contact.

## 2.8.3 AC fuse

An AC fuse protects the rectifier unit and input power cable in case of short circuit, avoiding thermal overload. See the following table for selection.

Table 2-6 AC fuse model selection

| Power supply module | Frame size | Voltage (V) | Current (A) | Qty |
|---|---|---|---|---|
| GD880-91-0094-4 | A3+LCL | 690V | 160A | 3 |
| GD880-91-0116-4 | A4+LCL | 690V | 200A | 3 |
| GD880-91-0149-4 | A4+LCL | 690V | 250A | 3 |
| GD880-91-0183-4 | A4+LCL | 690V | 300A | 3 |
| GD880-91-0220-4 | A6+LCL | 690V | 400A | 3 |
| GD880-91-0260-4 | A6+LCL | 690V | 450A | 3 |
| GD880-91-0312-4 | A7+LCL | 690V | 500A | 3 |
| GD880-91-0395-4 | A7+LCL | 690V | 630A | 3 |
| GD880-91-0516-4 | A7+LCL | 690V | 800A | 3 |
| GD880-91-0615-4 | A8+LCL | 690V | 1000A | 3 |
| GD880-91-0681-4 | A8+LCL | 690V | 1100A | 3 |
| GD880-91-0810-4 | A8+LCL | 690V | 1250A | 3 |
| GD880-91-0980-4 | 2*A8+LCL | 690V | 1600A | 3 |
| GD880-91-1168-4 | 2*A8+LCL | 690V | 900A | 6 |
| GD880-91-1295-4 | 2*A8+LCL | 690V | 1000A | 6 |
| GD880-91-1539-4 | 2*A8+LCL | 690V | 1250A | 6 |
| GD880-91-2185-4 | 2*(2*A8+LCL) | 690V | 1000A | 12 |
| GD880-91-3078-4 | 2*(2*A8+LCL) | 690V | 1250A | 12 |
| GD880-91-4617-4 | 3*(2*A8+LCL) | 690V | 1250A | 18 |
| GD880-91-0369-6 | A8+LCL | 690V | 630A | 3 |
| GD880-91-0477-6 | A8+LCL | 690V | 800A | 3 |
| GD880-91-0540-6 | A8+LCL | 690V | 900A | 3 |
| GD880-91-0701-6 | 2*A8+LCL | 690V | 1100A | 3 |
| GD880-91-0906-6 | 2*A8+LCL | 690V | 800A | 6 |
| GD880-91-1026-6 | 2*A8+LCL | 690V | 900A | 6 |
| GD880-91-1402-6 | 2*(2*A8+LCL) | 690V | 630A | 12 |
| GD880-91-2052-6 | 2*(2*A8+LCL) | 690V | 800A | 12 |
| GD880-91-3078-6 | 3*(2*A8+LCL) | 690V | 800A | 18 |

## 2.8.4 DC fuse

A DC fuse protects the rectifier unit and DC bus in case of short circuit, avoiding thermal overload. The same brand replacement principle should be followed. See the following table for selection.

Table 2-7 DC fuse model selection

| Power supply module | Frame size | Voltage (V) | Current (A) | Qty |
|---|---|---|---|---|
| GD880-91-0094-4 | A3+LCL | 690V | 160A | 2 |
| GD880-91-0116-4 | A4+ LCL | 690V | 200A | 2 |
| GD880-91-0149-4 | A4+ LCL | 690V | 250A | 2 |
| GD880-91-0183-4 | A4+ LCL | 690V | 300A | 2 |
| GD880-91-0220-4 | A6+LCL | 690V | 400A | 2 |
| GD880-91-0260-4 | A6+LCL | 690V | 450A | 2 |
| GD880-91-0312-4 | A7+LCL | 690V | 500A | 2 |
| GD880-91-0395-4 | A7+LCL | 690V | 630A | 2 |
| GD880-91-0516-4 | A7+LCL | 690V | 900A | 2 |
| GD880-91-0615-4 | A8+LCL | 690V | 1000A | 2 |
| GD880-91-0681-4 | A8+LCL | 690V | 1250A | 2 |
| GD880-91-0810-4 | A8+LCL | 690V | 1250A | 2 |
| GD880-91-0980-4 | 2*A8+LCL | 690V | 900A | 4 |
| GD880-91-1168-4 | 2*A8+LCL | 690V | 1000A | 4 |
| GD880-91-1295-4 | 2*A8+LCL | 690V | 1250A | 4 |
| GD880-91-1539-4 | 2*A8+LCL | 690V | 1250A | 4 |
| GD880-91-2185-4 | 2*(2*A8+LCL) | 690V | 1000A | 8 |
| GD880-91-3078-4 | 2*(2*A8+LCL) | 690V | 1250A | 8 |
| GD880-91-4617-4 | 3*(2*A8+LCL) | 690V | 1250A | 12 |
| GD880-91-0369-6 | A8+LCL | 1250V | 700A | 2 |
| GD880-91-0477-6 | A8+LCL | 1250V | 800A | 2 |
| GD880-91-0540-6 | A8+LCL | 1250V | 1000A | 2 |
| GD880-91-0701-6 | 2*A8+LCL | 1250V | 700A | 4 |
| GD880-91-0906-6 | 2*A8+LCL | 1250V | 800A | 4 |
| GD880-91-1026-6 | 2*A8+LCL | 1250V | 1000A | 4 |
| GD880-91-1402-6 | 2*(2*A8+LCL) | 1250V | 700A | 8 |
| GD880-91-2052-6 | 2*(2*A8+LCL) | 1250V | 1000A | 8 |
| GD880-91-3078-6 | 3*(2*A8+LCL) | 1250V | 1000A | 12 |

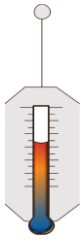
# 3 Mechanical installation

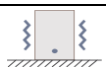
## 3.1 Safety notes

| | |
|---|---|
| ⚠ | • Equipment can tip over if transported incorrectly or with disallowed means of transport. Serious injury, property damage, or even death may result.<br>• Only trained and qualified professionals are allowed to carry out the operations mentioned in this chapter. Please carry out operations according to instructions presented in section 1.4.1 Delivery and installation. Ignoring these safety precautions may lead to physical injury or death, or device damage.<br>• Ensure the active rectifier power has been disconnected before installation. If the active rectifier has been powered on, disconnect the active rectifier unit power and wait for at least the time specified on the rectifier unit, and ensure the POWER indicator is off. You are recommended to use a multimeter to check and ensure the rectifier unit DC bus voltage is below 36V.<br>• The equipment installation must be designed and done according to applicable local laws and regulations. We do not assume any liability whatsoever for any equipment installation which breaches local laws or regulations. If recommendations given by us are not followed, the active rectifier may experience problems that the warranty does not cover.<br>• Only trained and qualified professionals are allowed to carry out related operations.<br>• Do not perform wiring, inspection or component replacement when power supply is applied. Ensure all the input power supplies have been disconnected before wiring or inspection, and wait for at least the time designated on the Goodrive880 series product or until the DC bus voltage is less than 36V. |

## 3.2 Installation environment and site

■ **Environment requirements**

| Environment | Requirement | |
|---|---|---|
| Temperature |  | • -10–+50°C<br>• Do not use the VFD when the ambient temperature exceeds 50°C. When the ambient temperature exceeds 40°C, derate 1% for every increase of 1°C.<br>• The temperature does not change rapidly.<br>• When the VFD is installed in a closed space, such as control cabinet, use a cooling fan or air conditioner for temperature adjustment if necessary.<br>• When the temperature is too low, if you want to use the VFD that has been idled for a long time, install an external heating device before the use to eliminate the freeze inside the VFD. Otherwise, the VFD may be damaged. |
| Relative humidity (RH) |  | • The relative humidity (RH) of the air is less than 90%, and there is no condensation.<br>• The max. RH cannot exceed 60% in the environment where there are corrosive gases. |

| Environment | Requirement | |
|---|---|---|
| Altitude |  | • No derating is required when the altitude is lower than or equal to 1000m.<br>• When the altitude exceeds 1000m, derate 1% for every increase of 100m.<br>• When the altitude exceeds 2000m, consult local INVT dealer or office for details. |
| Vibration |  | Max. vibration ACC: 5.8m/s²(0.6g) |

■ **Location requirement**

| Location | Requirement | |
|---|---|---|
| Indoor |  | Without electromagnetic radiation sources and direct sunlight.<br>**Note:** The VFD must be installed in a clean and well-ventilated environment based on the housing IP rating. |
| |  | Without foreign objects such as oil mist, metal powder, conductive dust, and water. |
| |  | Without radioactive, corrosive, hazard, and combustible and explosive substances.<br>**Note:** Do not install the VFD onto combustible objects. |
| |  | With low salt content |

# 3.3 Installation procedure

The installation procedures are as follows:

Step 1 Perform unpacking inspection. For details, see section 3.3.1 Unpacking inspection.
Step 2 Transport before unpacking. For details, see section 3.3.2 Transportation.
Step 3 Unpack. For details, see section 3.3.3 Unpacking.
Step 4 Lift the modules. For details, see section 3.3.4 Lifting.
Step 5 Install the modules. For details, see section 3.3.5 Installation space and heat dissipation.

## 3.3.1 Unpacking inspection

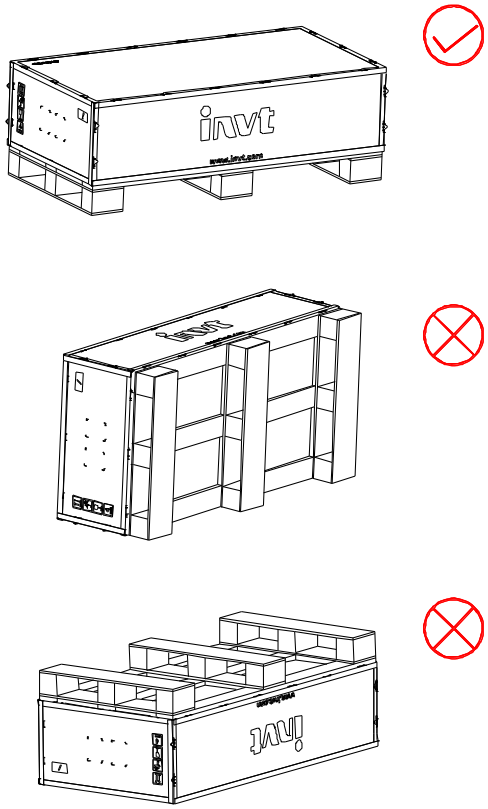
After receiving the product, perform the following steps to ensure the product use safety.

1. Before unpacking, check whether the product package is intact–whether the package is damaged, dampened, soaked, or deformed.
2. Check whether the nameplate and label on the product body are consistent with the model ordered.
3. After unpacking, check whether the interior surface of the packing box is abnormal, for example, in wet condition, and whether the equipment enclosure is damaged or cracked.
4. Check whether the parts (including the complete equipment of active rectifier, keypad, and manual) inside the packing box are complete.

## 3.3.2 Transportation

The GD880 series active rectifier is shipped in a wooden box with pallets, which are heavy as a whole and must be carried with a lifting tool, such as a forklift and crane; operators must be professionally trained; the regenerative rectifier must be transported in strict accordance with the allowed ways marked on the box, and not allowed to be transported upside down or on the sides.

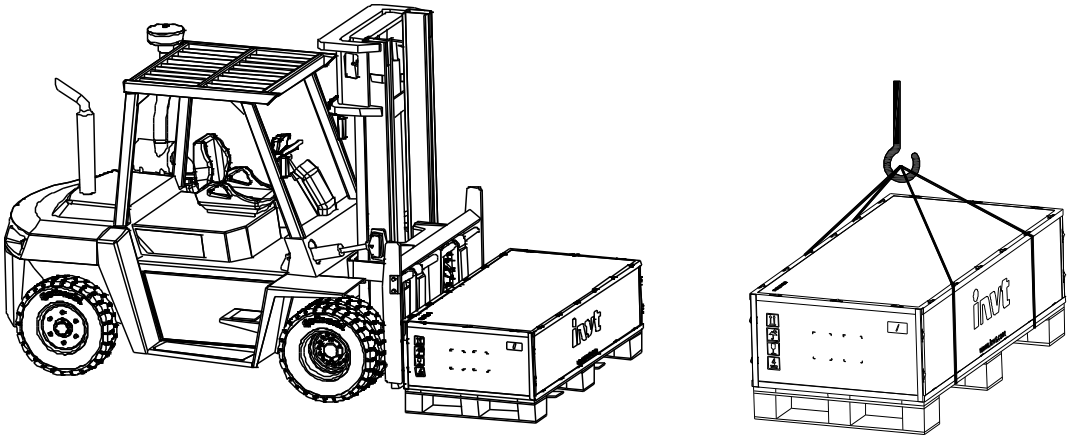
Figure 3-1 Transportation requirements



When transported with a forklift, the active rectifier must be fixed to the pallets and transported together, which means you are not allowed to remove the pallets to transport the active rectifier. If the forklift's fork tines are too short, it may cause the unit/cabinet to tip over, resulting in serious injury, property damage or even death.

When transported with a crane, the active rectifier unit must be fixed to the pallets and lifted together.

Figure 3-2 Transportation means



## 3.3.3 Unpacking

The unit is delivered in the wooden box padded with EPE.

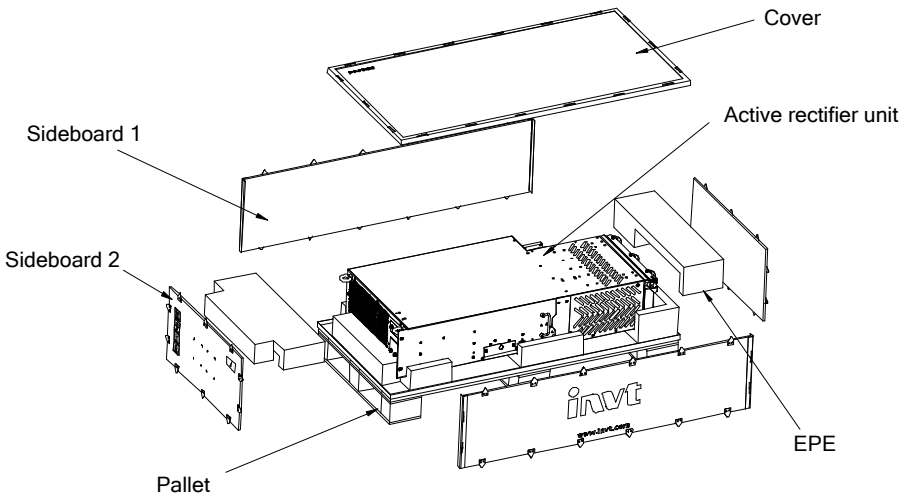
To remove the packing, do as follows:

1. Place the well-packed unit in an empty and flat place.

2. Use tools such as a pry bar or large one-piece screwdriver to remove the wooden box cover and the steel tongue nails of the surrounding boards.
3. Remove the surrounding boards and EPE filling materials from the wooden box.
4. Cut off the plastic windings.
5. Take out of the unit.
6. Ensure that the unit is intact without any damage.

Dispose of or recycle packaging in accordance with local regulations.

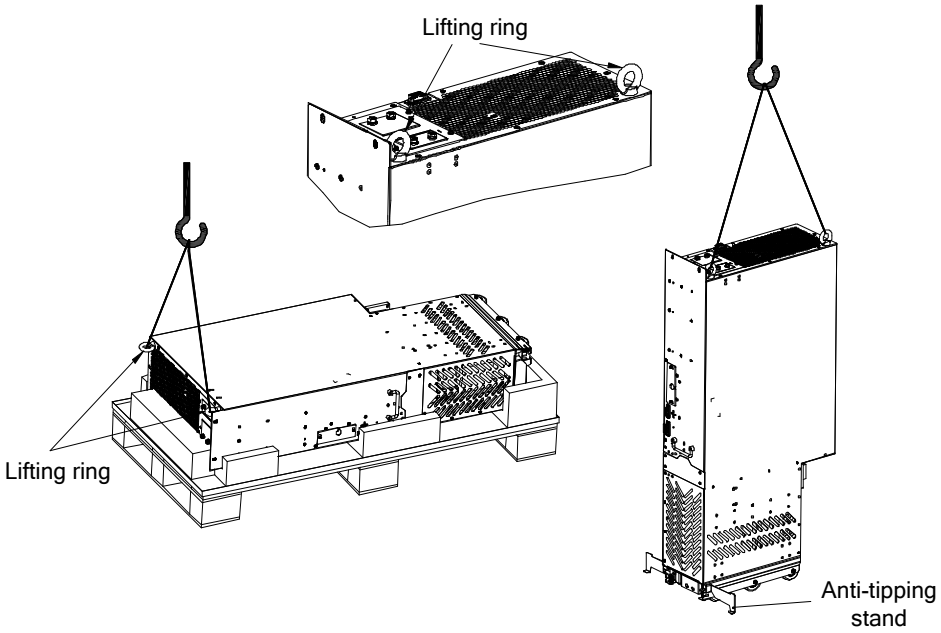
Figure 3-3 Unpacking




## 3.3.4 Lifting

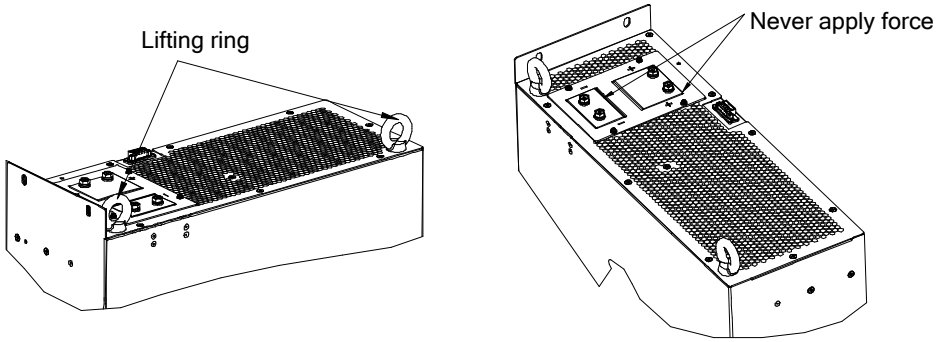
Attach the required lifting ring to the locations shown in the figure, use the sling to slowly lift the unit end, move the unit until it is completely lifted, place it vertically in the empty and flat place, and then unfold the anti-tipping stand at the lower front of the unit. Figure 3-4 shows the anti-tipping stand location.

Figure 3-4 Unit lifting



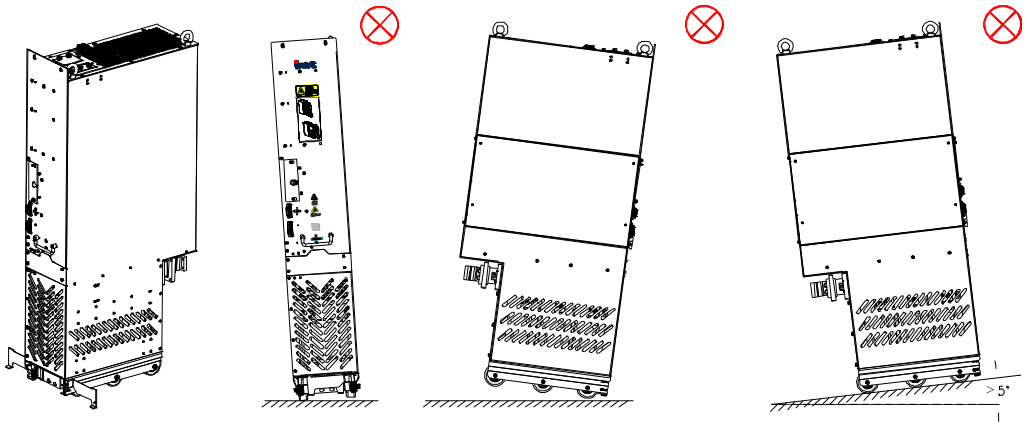

**Note:** Use the lifting ring on the top of active rectifier unit for lifting and moving. Never apply force to the positive or negative bus terminals.

Figure 3-5 Unit top structure




The active rectifier unit has a high center of gravity and must be placed on a flat and solid ground with sufficient support strength and a tilt angle of less than 5°. Failure to comply with this requirement will cause the unit to tip over or topple over, which may result in serious injury or property damage.

Figure 3-6 Unit placing requirements




Note the following to fold or unfold the anti-tipping stand:

1. To unfold the anti-tipping stand, pull down the anti-tipping stand to press the spring, wrap it around the restraining pin and rotate it 180° to snap into the slot as shown in Figure 3-8.
2. To fold the anti-tipping stand, rotate the anti-tipping stand in the slot by 180° to restore the pressed spring back to its original state to clamp the anti-tipping stand, as shown in Figure 3-9.
3. The restraint of the pin ensures that the anti-tipping stand will not unfold due to shaking. The anti-tipping stand folds, as shown in Figure 3-7.

Figure 3-7 Unit bottom structure

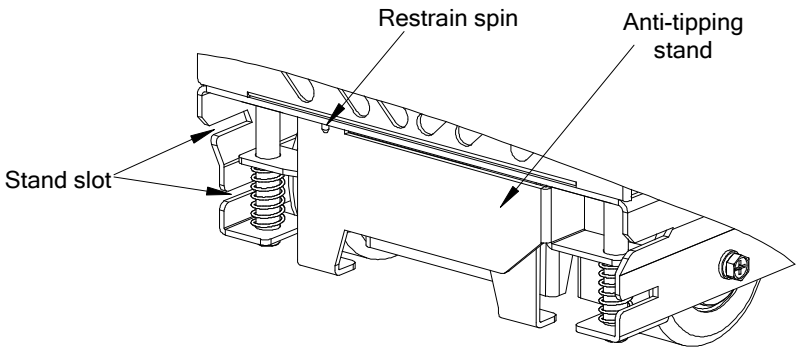



Figure 3-8 Unfolding the anti-tipping stand

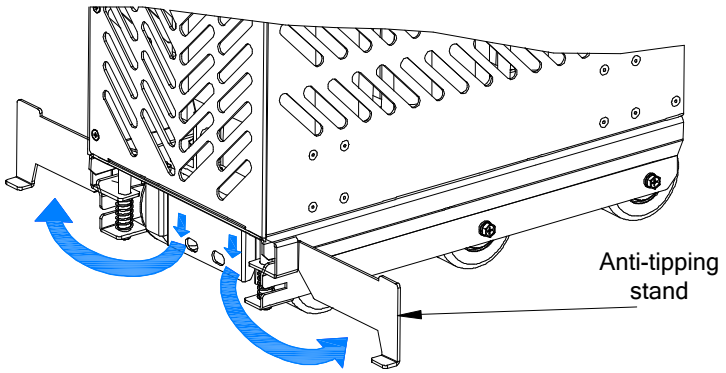
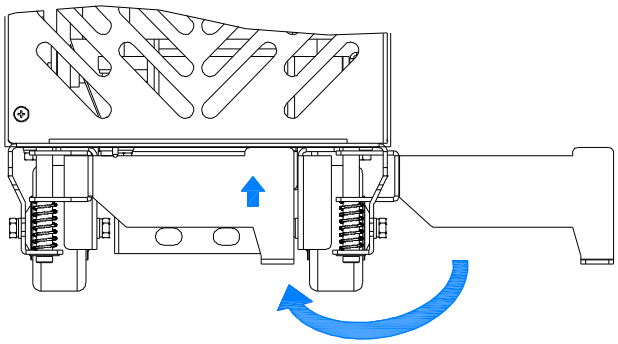



Figure 3-9 Folding the anti-tipping stand



## 3.3.5 Installation space and heat dissipation

1. Installation space requirements for A3i& A4i active rectifier units

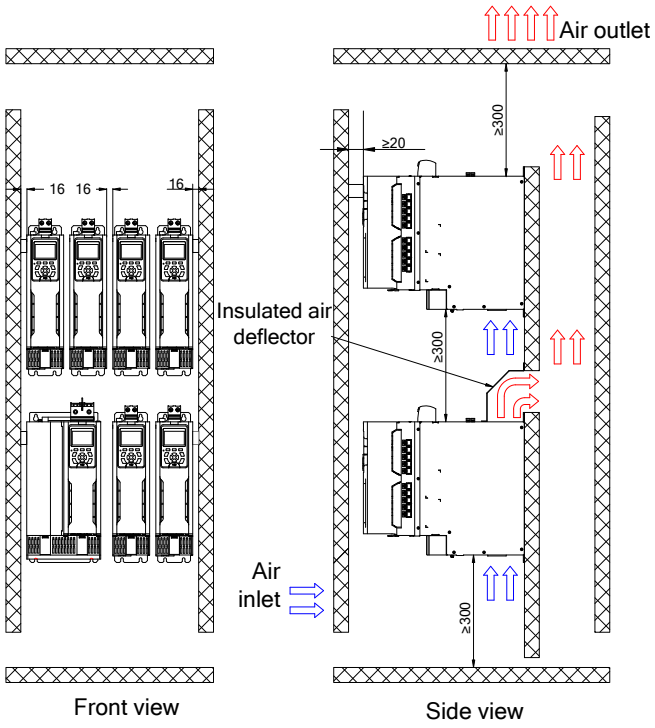
Active rectifier units using A3i or A4i frame vary with power class. Note the following requirements to ensure reliable installation and excellent heat dissipation:

A. The active rectifier unit must be installed and used in a cabinet.

B. A minimum ventilation clearance must be kept from the top and bottom of the active rectifier unit to ensure good heat dissipation. See Figure 3-10.

C. Both sides of each unit are designed with air baffle and sealing sponge for isolation to prevent the hot air at the unit top outlet from circulating inside the cabinet and ensure that the heat of the unit is discharged from the heat dissipation holes at the cabinet top outlet cover. See Figure 3-10.

Figure 3-10 Installation space requirements for A4i active rectifier units (Unit: mm)




2. Installation space requirements for A6i& A7i active rectifier units

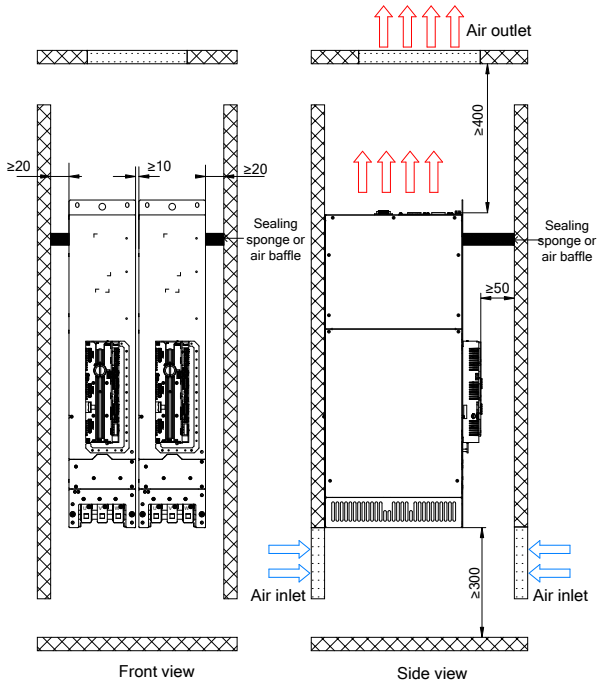
Note the following requirements to ensure reliable installation and excellent heat dissipation for active rectifier units using A6i or A7i frame:

A. The active rectifier unit must be installed and used in a cabinet.

B. A minimum ventilation clearance must be kept from the top and bottom of the active rectifier unit to ensure good heat dissipation. See Figure 3-11.

C. Both sides of each unit are designed with air baffle and sealing sponge for isolation to prevent the hot air at the unit top outlet from circulating inside the cabinet and ensure that the heat of the unit is discharged from the heat dissipation holes at the cabinet top outlet cover. See Figure 3-11.

Figure 3-11 Installation space requirements for A6i and A7i active rectifier units (Unit: mm)

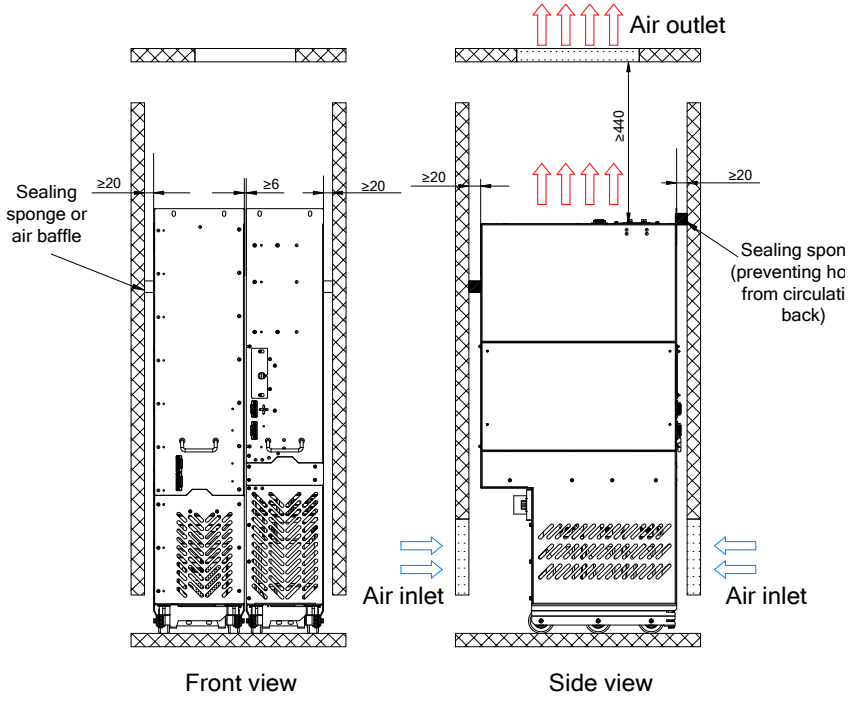



3. Installation space requirements for A8i active rectifier units

To ensure that the active rectifier unit is installed reliably and in good heat dissipation, pay attention to the following:

A. The active rectifier unit must be installed and used in a cabinet.
B. A minimum ventilation clearance must be kept from the top and bottom of the active rectifier unit to ensure good heat dissipation. See Figure 3-12.
C. Both sides of each unit are designed with air baffle and sealing sponge for isolation to prevent the hot air at the unit top outlet from circulating inside the cabinet and ensure that the heat of the unit is discharged from the heat dissipation holes at the cabinet top outlet cover. See Figure 3-12.

Figure 3-12 Installation space requirements for A8i active rectifier units (Unit: mm)



To ensure good heat dissipation of the active rectifier, design the air inlet and outlet as follows:

Air inlet area formula:

$S_{in}$= (1.5~2.0) x ($S_{module1}$ + $S_{module2}$ + $S_{module3}$+……+ $S_{module\ N}$)

S: System ventilation area

$S_{module}$: Each module ventilation area ($cm^2$)

Air outlet area for

mula: $S_{out}$= (1.2–1.5) x $S_{in}$.

For details about the air volumes required by the active rectifier, see Table 3-1.

Table 3-1 Ventilation areas and actual air volumes of active rectifier

| No. | Frame size | Ventilation area $S_{in}$ ($cm^2$) | Actual air volume (CFM) |
|---|---|---|---|
| 1 | A3i | 70 | 105 |
| | A4i | 90 | 150 |
| 2 | A6i | 634 | 568 |
| 3 | A7i | 654 | 588 |
| 4 | A8+LCL | 1550 | 1460 |
| 5 | 2*A8+LCL | 2360 | 2340 |

| | |
|---|---|
| ⚠ | Violation of the requirements in section 3.3.5 Installation space and heat dissipation will shorten the active rectifier life and may result in active rectifier failure or malfunction. |

## 3.3.6 Cabinet installation

### 3.3.6.1 Cabinet requirements

It is recommended that the cabinet adopts the nine-fold profile cabinet (PS cabinet). Before mounting the inverter unit, install two bottom support crossbeams, a mounting bracket, and a mounting rail in the cabinet, and design the mounting crossbeam for active rectifier unit fixing, and reserve fixing holes on the mounting crossbeam (see Appendix B for the specific location and size).

To fix the bottom support crossbeams and install the unit tray:

1. Use ten M8 cage nuts to fix the five bottom support crossbeams to the base of the nine-fold profile cabinet frame. (For the support crossbeams, T⩾2.0mm, firmly installed)
2. Fix the mounting bracket to the nine-fold profile cabinet frame base with twenty M5 self-tapping screws. See Figure 3-13.
3. Install the unit tray on the support crossbeams with ten M8 screws. See Figure 3-14.
4. If you use another type of cabinet but not nine-fold pr
5. ofile cabinet, the fixing holes for the mounting bracket need to be drilled and assembled on site.

Figure 3-13 Installing the support crossbeams

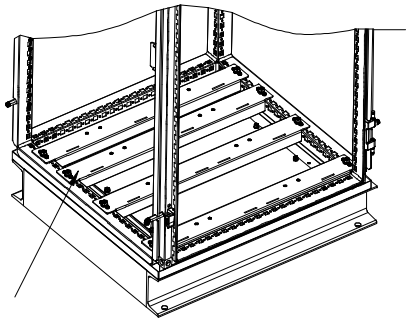
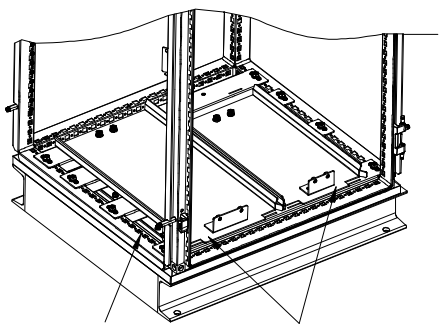


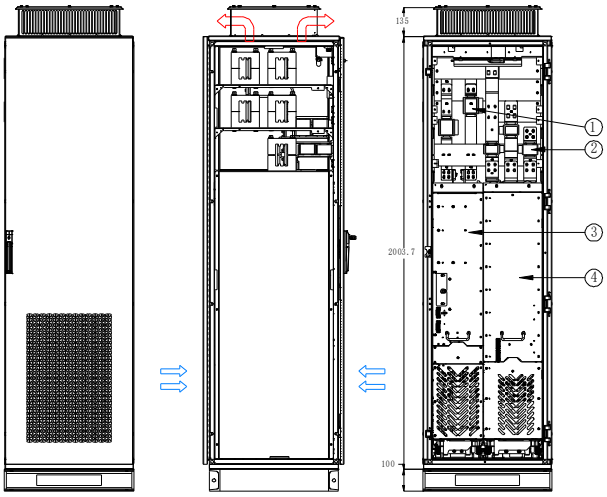

Figure 3-14 Installing the unit tray



### 3.3.6.2 Layout and mounting for A8+LCL

Figure 3-15 shows the 600mm-wide cabinet layout for A8+LCL.

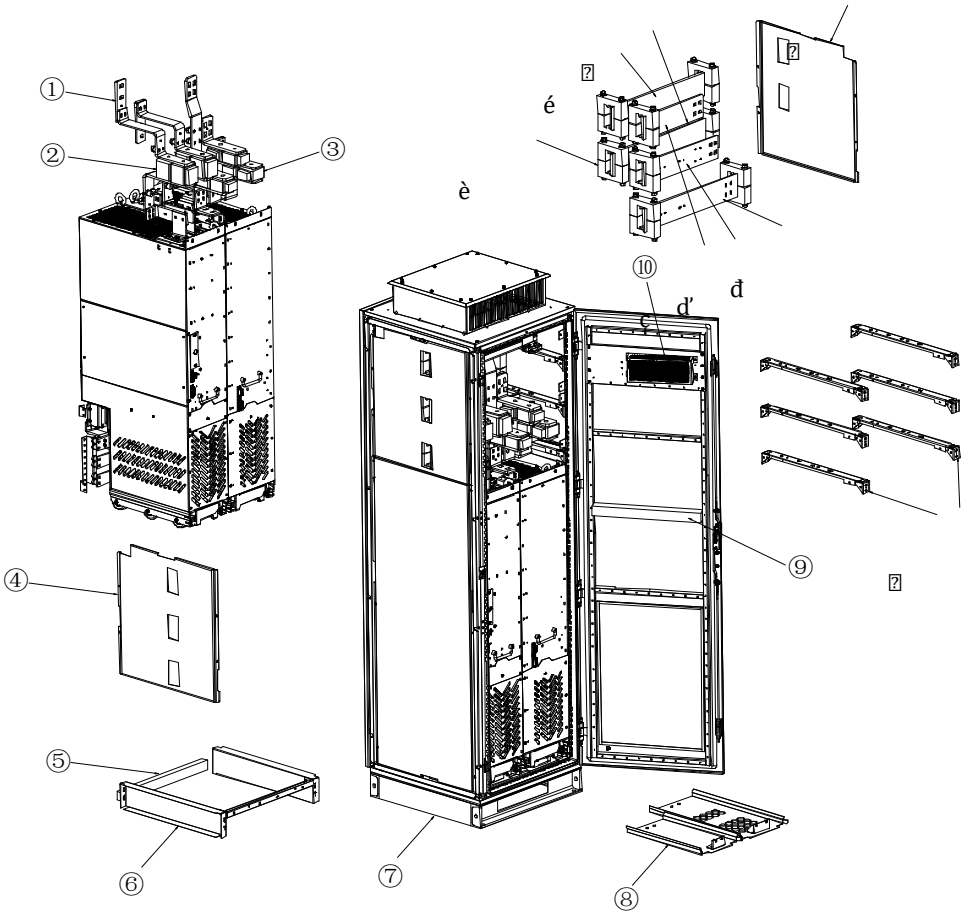
Figure 3-15 Layout of 600mm-wide cabinet for A8+LCL (Unit: mm)




| No. | Name |
|---|---|
| 1 | DC fuse |
| 2 | AC fuse |
| 3 | Active rectifier unit |
| 4 | Active rectifier filter unit |

Figure 3-16 shows the 600mm-wide cabinet installation for A8+LCL.

Figure 3-16 Installation diagram of A8+LCL in an 600mm-wide cabinet




| No. | Name |
|---|---|
| 1 | Unit-top copper bar assembly |
| 2 | AC fuse |
| 3 | DC fuse |
| 4 | Left protective plate |
| 5 | Back sealing sponge |
| 6 | Unit-top fixing assembly |
| 7 | Cabinet |
| 8 | Unit bottom fixed plate |
| 9 | Front sealing sponge |
| 10 | Power supply board |
| 11 | L1-phase copper busbar |
| 12 | L2-phase copper busbar |
| 13 | L3-phase copper busbar |
| 14 | Busbar fixing clamp |
| 15 | Copper busbar of (+) |
| 16 | Copper busbar of (-) |
| 17 | Right protective plate |
| 18 | Busbar clamp support |

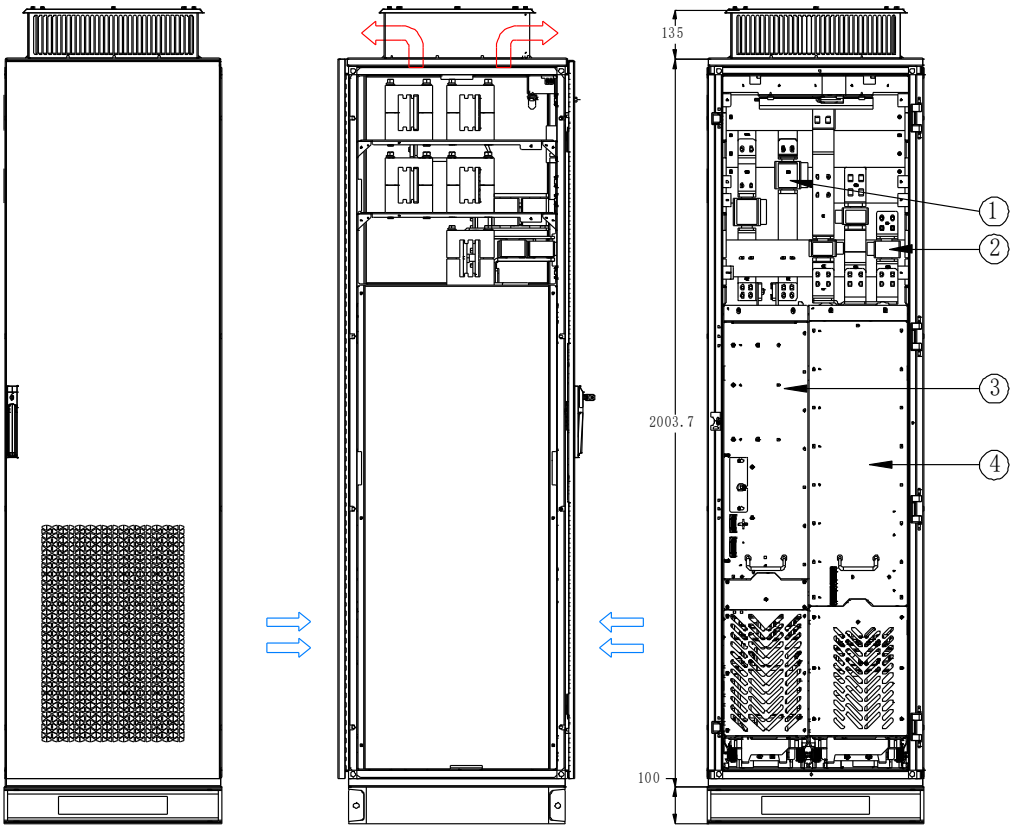
**Note:** A 40X40 sealing sponge must be used at the position corresponding to the air baffle in the

front/back door panel, which prevents air duct reflow.

### 3.3.6.3 Layout and mounting for 2* A8 + LCL

Figure 3-17 shows the 850mm-wide cabinet layout for +2*A8 + LCL.

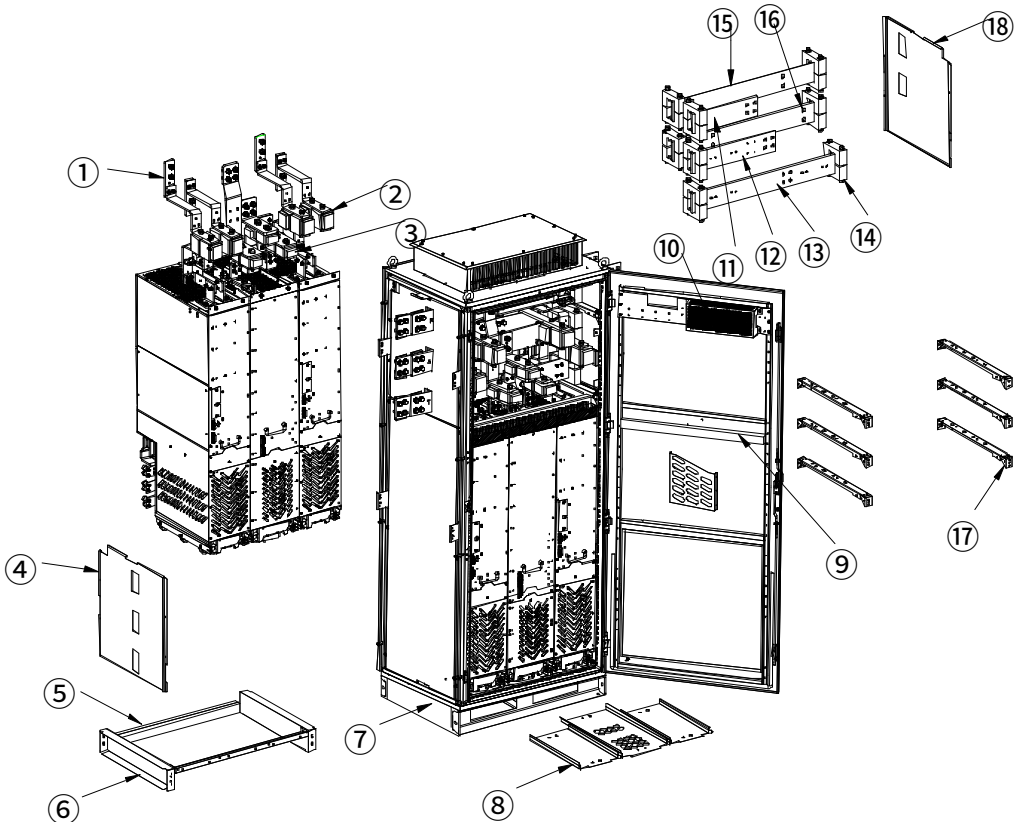
Figure 3-17 Cabinet layout for 2*A8+ LCL (Unit: mm)




| No. | Name |
|---|---|
| 1 | DC fuse |
| 2 | AC fuse |
| 3 | Active rectifier unit |
| 4 | Active rectifier filter unit |
| 5 | Active rectifier unit |

Figure 3-18 shows the 850mm-wide cabinet installation for 2*A8 + LCL.

Figure 3-18 Installation diagram of 2*A8 + LCL in an 850mm-wide cabinet




| No. | Name |
|---|---|
| 1 | Unit-top copper bar assembly |
| 2 | AC fuse |
| 3 | DC fuse |
| 4 | Left protective plate |
| 5 | Back sealing sponge |
| 6 | Unit-top fixing assembly |
| 7 | Cabinet |
| 8 | Unit bottom fixed plate |
| 9 | Front sealing sponge |
| 10 | Power supply board |
| 11 | L1-phase copper busbar |
| 12 | L2-phase copper busbar |
| 13 | L3-phase copper busbar |
| 14 | Busbar clamp |
| 15 | Copper busbar of (+) |
| 16 | Copper busbar of (-) |
| 17 | Busbar clamp support |
| 18 | Right protective plate |

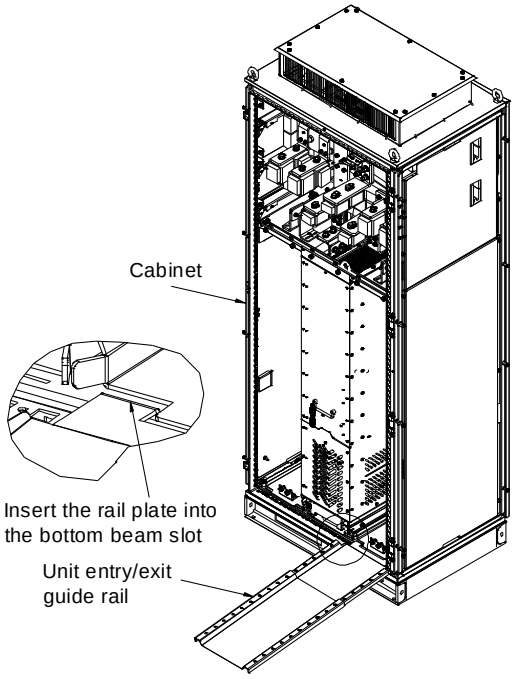
**Note:** A 40×40 sealing sponge must be used at the position corresponding to the air baffle in the front/back door panel, which prevents air duct reflow.

### 3.3.6.4 Unit installation and replacement

The installation procedure is as follows:

Step 1 Insert the unit entry/exit guide rail into the slot of the cabinet front bottom beam. See Figure 3-19.

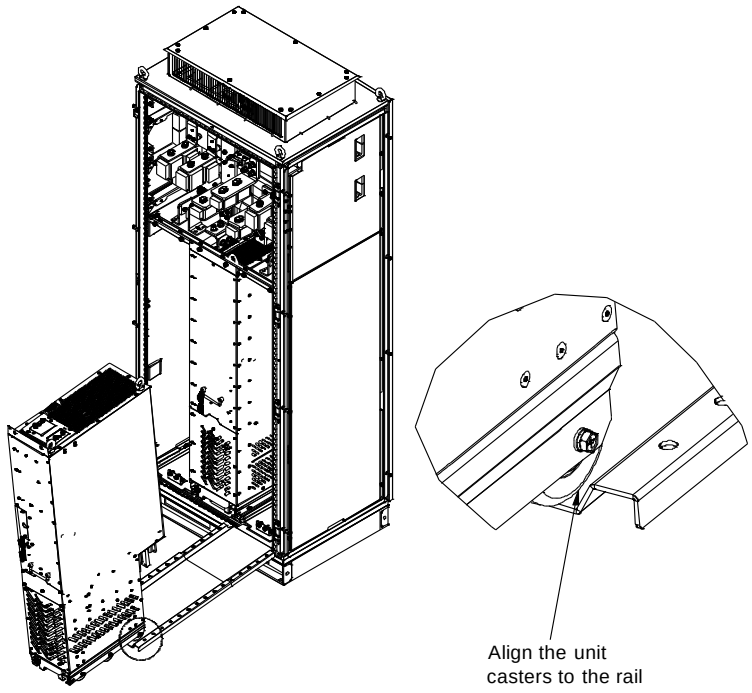
Figure 3-19 Unit entry/exit guide rail placement




Step 2 Push the unit into the cabinet.

A. Align the unit casters to the rail. See Figure 3-20.

Figure 3-20 Unit placement

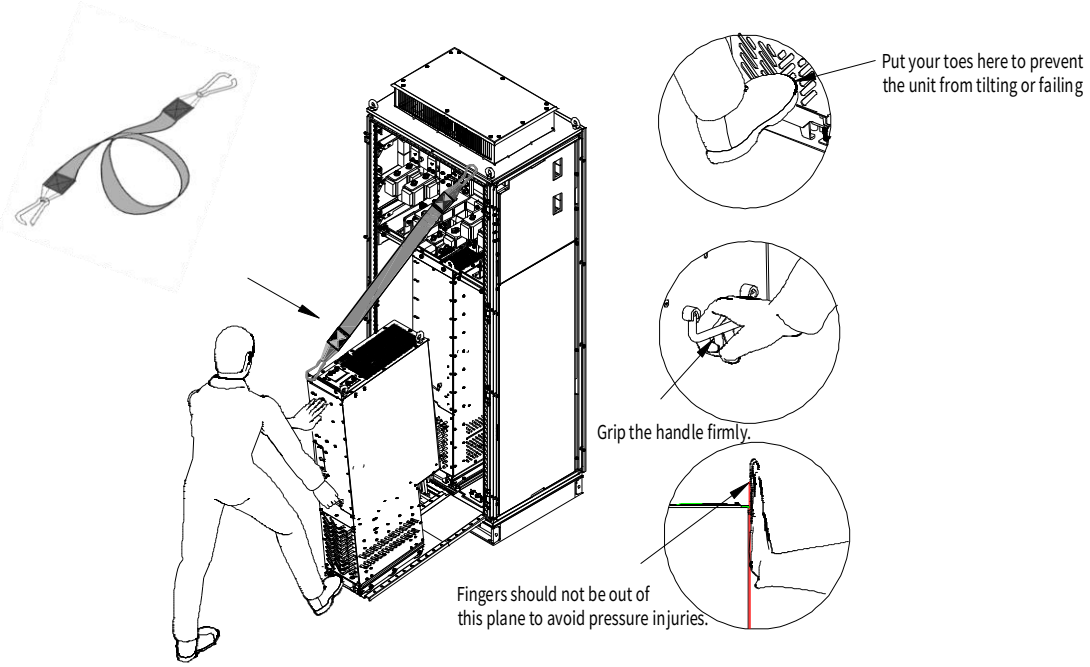


B. Push the active rectifier unit into the cabinet slowly. See Figure3-21.

**Note:**

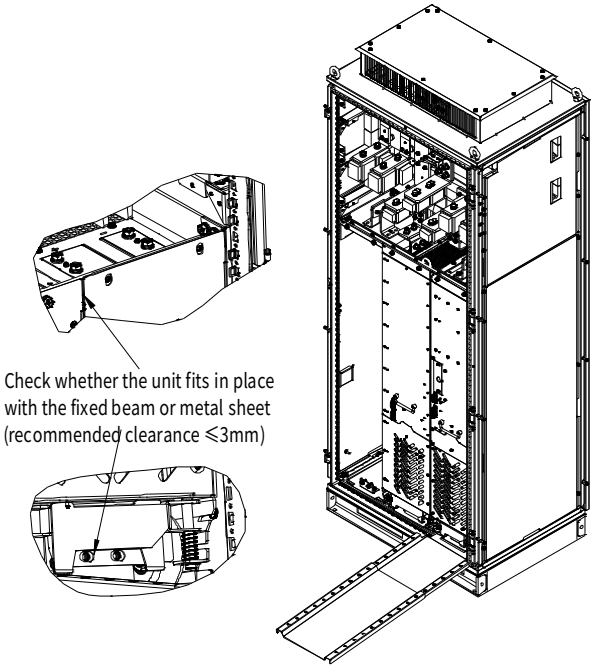
- Since the active rectifier unit barycenter is too high, use the auxiliary rope for mounting to prevent the unit from rollover during the push-in or push-out.
- When pushing in/out the active rectifier unit, use one foot to apply force to the bottom of the unit while holding the handle to prevent the unit from tipping over, falling over, hitting or injury. See Figure3-21.
- When installing or replacing the unit, wear gloves and safety shoes to prevent against scratching or smashing.

Figure3-21 Pushing the active rectifier unit into the cabinet



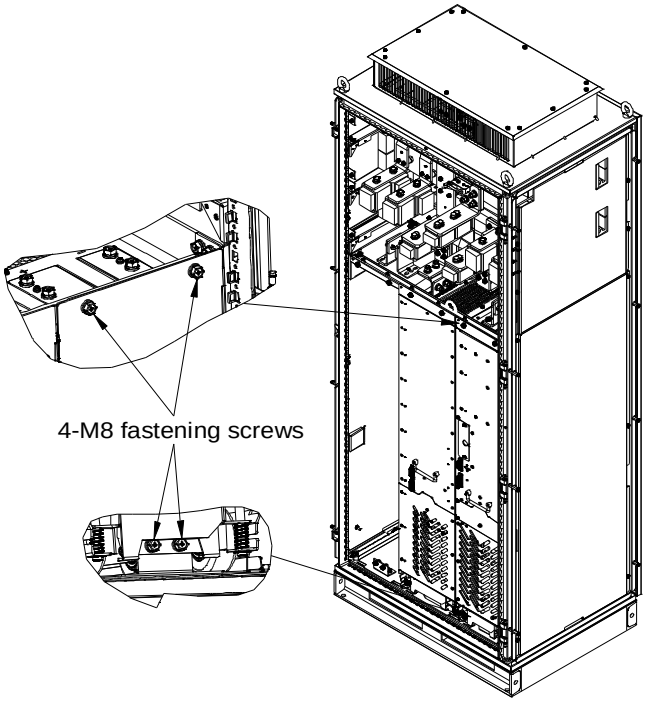

C. Ensure that the unit is pushed into place. See Figure 3-22.

Figure 3-22 Checking whether the unit is pushed into place



D. After confirming that the unit is pushed into place, install the unit fixing screws and remove the unit entry/exit guide rail. See Figure 3-23.

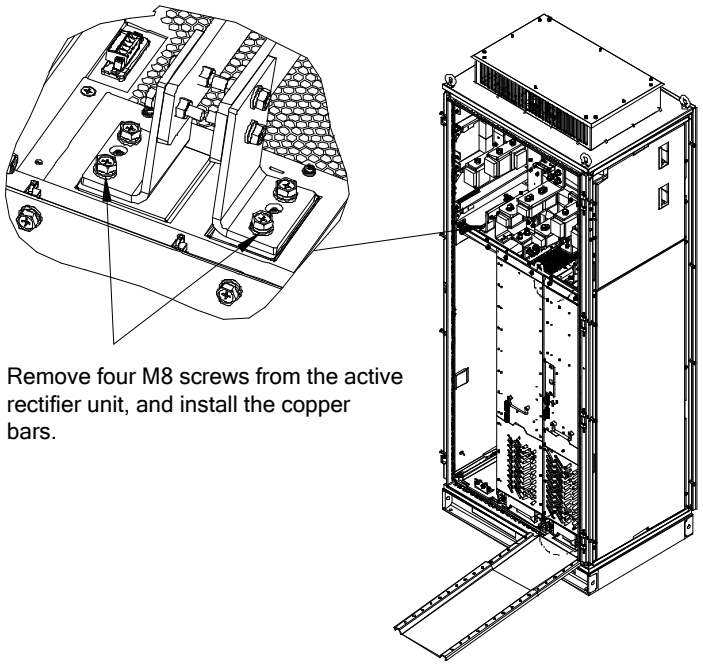
Figure 3-23 Unit fixing




E. Install the active rectifier on the other side in the same way.

F. Remove the copper bar fixing screws at the unit top and then install the unit-top copper bars as shown in Figure 3-24.

Figure 3-24 Installing unit-top copper bars



## 3.3.7 Active rectifier control unit (ACU) size and installation

### 3.3.7.1 Preparing

- Before installation, ensure the cabinet has been powered off (excluding external power) for at least 25 minutes.
- Prevent the control unit from falling or shock to avoid damage.
- Do not disassemble the control unit to avoid damage.
- Do not fasten with excessive torque; otherwise, terminals may be damaged.

#### ■ Required tools

Phillips #1 screwdriver may be required during installation.

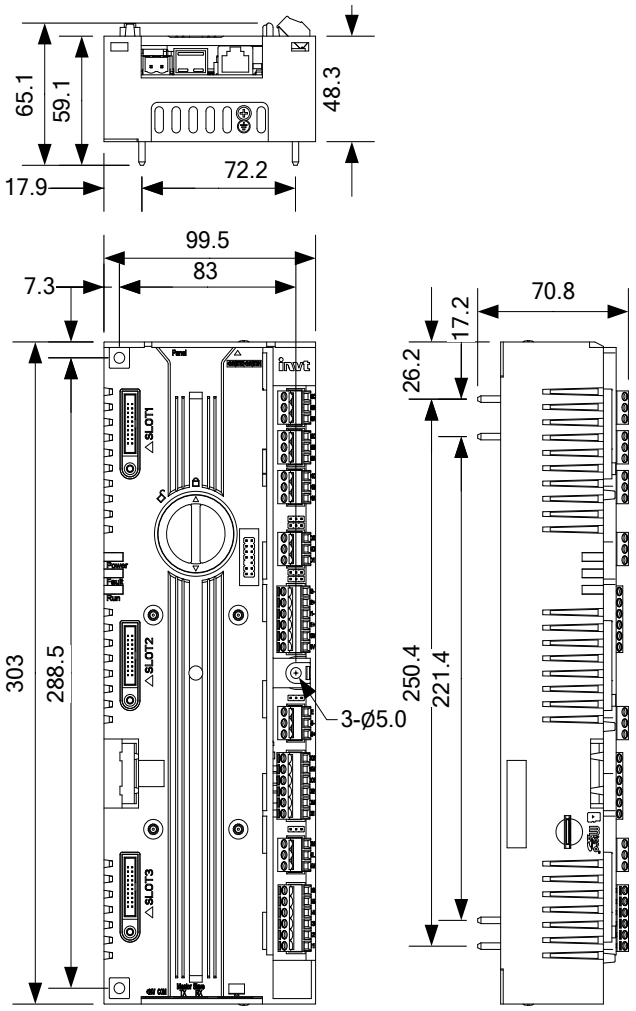
#### ■ Fastening torque

Screws are used to install the control unit with fastening torque.

| Screw | Fastening torque |
|---|---|
| M4 | 1.5N.m |

### 3.3.7.2 Control unit size

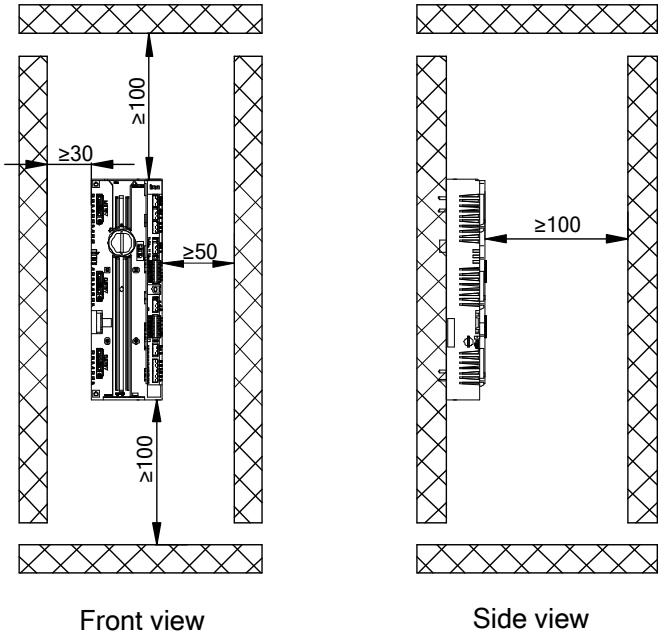
Figure 3-25 Control unit dimensions (unit: mm)



### 3.3.7.3 Control unit installation space requirements

To make the control unit installation smooth, the distance between the upper and lower parts of the control unit and the building and its components should be left as shown in the following figure, and the control unit must be installed on a conductive metal plate, the entire conductive bottom of the control unit must properly work with the installation surface.

Figure 3-26 Requirements on control unit installation space (unit: mm)

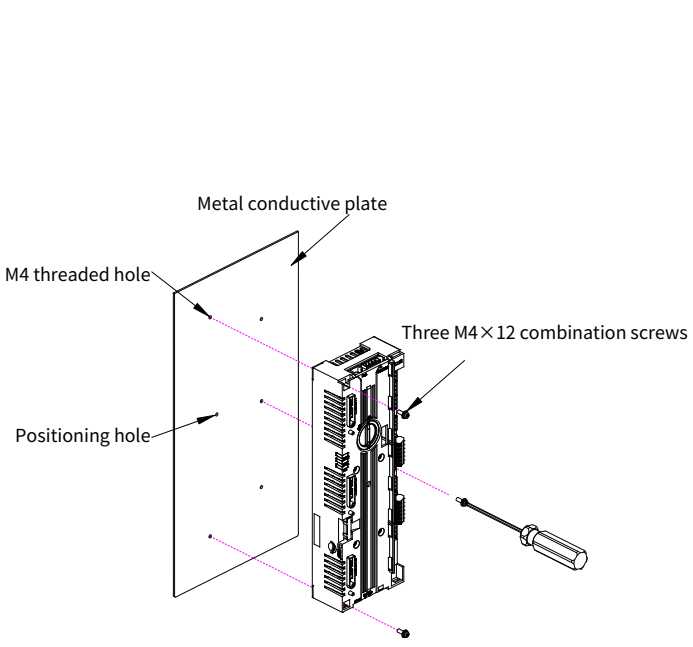


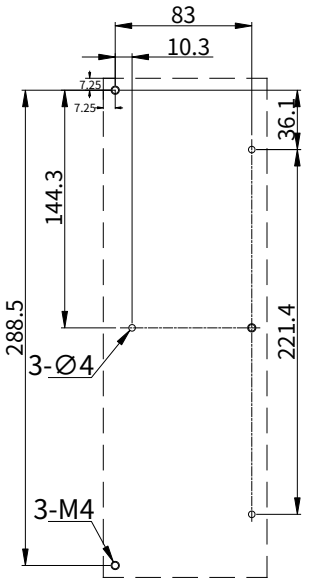

### 3.3.7.4 Control unit installation procedure

Step 1 Place the control unit as shown in the figure.

Step 2 Use Phillips #1 screwdriver to tighten the four M4 screws to fix the control unit to the metal plate as shown in Figure 3-27.

Figure 3-27 Control unit installation (Unit: mm)




Recommended hole position for the main control box installation

**Note:**

- The control unit assembly plate must be a exposed metal plate and ensure that the metal plate can be reliably grounded.
- The control unit housing will be connected to the cabinet housing via a grounding plate.

## 3.3.8 Keypad installation

The GD880-91 active rectifier is equipped with an externally mounted keypad (as shown in Figure 3-28), which is used with a keypad bracket that can be fixed to the cabinet door or external support sheet metal, and the keypad bracket mounting structure is shown in Figure 3-29.

Figure 3-28 LCD keypad structure (Unit: mm)

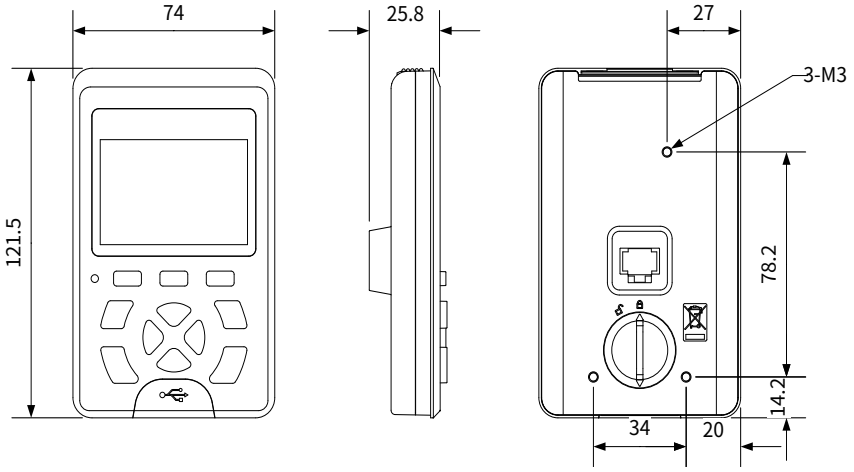



Figure 3-29 Mounting the keypad bracket (Unit: mm)

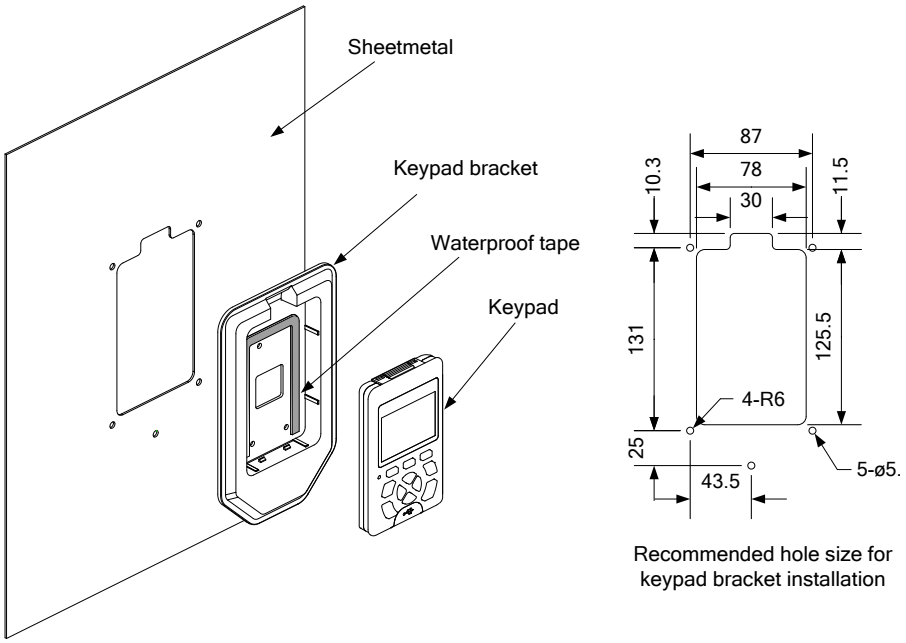
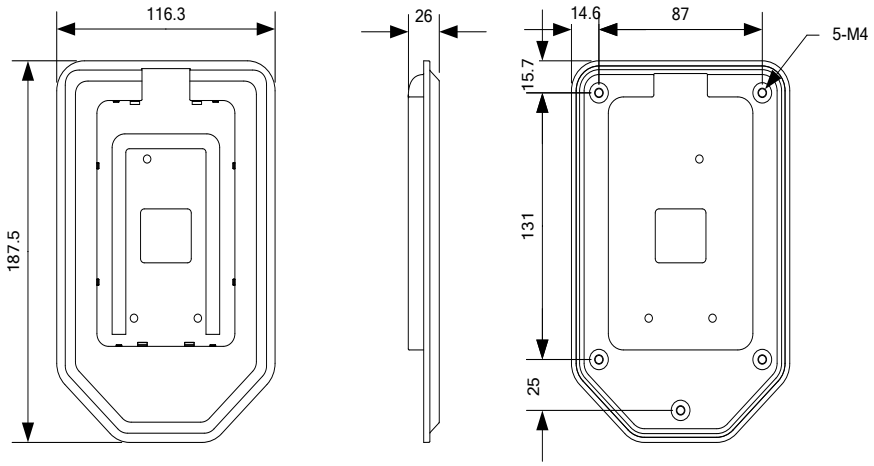


Figure 3-30 Keypad bracket dimensions (unit: mm)




## 3.3.9 Fastening torque

You need the following tools to install the active rectifier unit:

- Standard toolbox, including screwdrivers, nut wrenches, socket wrenches
- Torque wrenches with torques from 1.5N・m to 100N・m
- Socket wrench extension bars, 400mm long

The unit installation involves conductive components (AC input connectors, DC bus connectors, and cable terminals) and other component connections (grounding terminals, protective ground terminals, and fixing screws), and the screw tightening torques must meet the requirements in the following table.

Table 3-2 Recommended values of screw thread tightening torque

| Screw/Bolt | Strength grade | Recommended torque (N・m) |
|---|---|---|
| M4 | 4.8 | 1.5 |
| M5 | 4.8 | 3 |
| M6 | 4.8 | 5 |
| M8 | 4.8 | 11 |
| M10 | 4.8 | 22 |
| M12 | 4.8 | 39 |

## 3.3.10 Checklist

| No. | Operation | Compliant | Completed |
|---|---|---|---|
| 1 | Installed the beam for active rectifier fixing in the nine-fold profile cabinet. | ☐ | ☐ |
| 2 | Installed the bottom tray for active rectifier fixing in the nine-fold profile cabinet. | ☐ | ☐ |
| 3 | Installed the copper bars of the unit in the cabinet. | ☐ | ☐ |
| 4 | Assemble the mounting rail (optional part) and mount it in the cabinet. | ☐ | ☐ |
| 5 | In the cooperation of two people, aligned the active rectifier unit casters with the mounting guide rail and pushed the active rectifier unit to the cabinet. (See Figure3-21. The auxiliary rope for mounting has been used to prevent the unit from side tipping during the push-in or push-out.) | ☐ | ☐ |
| 6 | Removed the auxiliary rope for mounting, and ensured that | ☐ | ☐ |

| No. | Operation | Compliant | Completed |
|---|---|---|---|
| | the unit was pushed into place. | | |
| 7 | Inserted screws into the fixing holes at the unit front top and bottom to fix the unit to the cabinet. (See Figure 3-23.) | ☐ | ☐ |
| 8 | Installed the (+) and (-) bus copper bars. | ☐ | ☐ |
| 9 | Removed the mounting rail when you ensure the mounting is secure. | ☐ | ☐ |
| 10 | Checked the screw tightening state. | ☐ | ☐ |

# 4 Electrical installation

## 4.1 Safety notes

- All safety precautions in this manual must be read and followed. Only trained and qualified professionals are allowed to carry out the operations mentioned in this chapter.
- All work on electrical equipment must comply with the following:
  - ✧ The power is off.
  - ✧ Re-power on must not occur.
  - ✧ Wait for at least the time designated on the active rectifier, and ensure the voltage between (+) and (-) is lower than 36V through measurement.
  - ✧ The equipment is well grounded.
  - ✧ Live parts have been shielded or isolated.
- All installation work can be performed only in power-off (no voltage) state since medium voltage is present in the active rectifier internal during the running.
- Do not perform wiring, inspection or component replacement when power supply is applied. Before wiring or inspection, ensure all the input power supplies have been disconnected, and wait for at least 15 minutes or until the DC bus voltage is lower than 36V.
- If the auxiliary control power of the active rectifier is supplied externally, disconnecting the circuit break device cannot disconnect the entire power supply. The active rectifier control system may be live even if not started. Please refer to the electrical schematic diagram for inspection to avoid personal injury caused by contacting the live part of the unit.
- If the safety device on a current branch trips, check the active rectifier for the fault cause, rectify the fault, and replace the damaged parts.

## 4.2 Insulation inspection

**Active rectifier unit and active rectifier filter unit**

Before delivery, each unit has been tested for insulation of the main circuit to the housing. Moreover, there is voltage limiting circuit inside the VFD, and the circuit will automatically cut off the test voltage of the withstand voltage test. Do not carry out insulation withstand test on the VFD, or measure the control circuit of the VFD with a megohmmeter.

**Input power cable**

Check the insulation conditions of the input power cable of the VFD according to the local regulations before connecting it.

## 4.3 EMC requirements

**General knowledge of electromagnetic compatibility**

EMC is short for electromagnetic compatibility, which refers to the ability of a device or system to function properly in its electromagnetic environment and not constitute an unbearable electromagnetic disturbance to anything in that environment. EMC includes two aspects: electromagnetic interference and electromagnetic immunity.

Electromagnetic interference can be divided into two categories according to the transmission paths: conducted interference and radiation interference.

- Conducted interference propagates along any conductor. Therefore, any conductor, such as wire, transmission line, inductor, and capacitor, is a transmission channel for conducted interference.
- Radiated interference is in the form of electromagnetic waves that propagate with energy that is inversely proportional to the square of the distance.

Electromagnetic interference must have three conditions or three elements at the same time: interference source, transmission channel, and sensitive receiver, each of which is indispensable. The solution of EMC problem mainly focuses the three elements. For users, the solution of EMC problem is mainly in transmission channels because the equipment as interference source or receiver cannot be changed.

Different electric and electronic devices have different EMC capacities because of adopting different EMC standards or classes.

**General EMC guidelines on variable-frequency regulation system wiring**

The following introduces general EMC guidelines on VFDs in several aspects including noise control, site wiring and grounding for reference in site installation, with consideration of ECM characteristics of VFDs where the input current and output voltage harmonics are relatively small but the voltage is high and the current is large.

1. Noise control:

All the connections to the VFD control terminals must use shielded wires. The shield layer of wire must be grounded near the VFD entrance. The ground mode is 360-degree loop connection formed by cable clips. It is not allowed to connect the twisted shield layer to the ground of the VFD, which greatly decreases or loses the shield effect.

2. Site wiring

- Power supply wiring: The shield layer of power supply incoming cables of the VFD shall be grounded reliably. It is not allowed to route the power cables and control cables in parallel.
- Device categorization: There are different electric devices in the same distribution system, which have different ability of emitting and withstanding electromagnetic noise. Therefore, it needs to categorize these devices into strong noise device and noise sensitive device. The same kind of devices needs to be placed in the same area, and the distance between devices in different categories needs to be more than 20cm.
- Wiring in the control cabinet: During wiring, signal cables and power cables need to be arranged in different areas. It is not allowed to arrange them in parallel or in interlaced state at a close distance (less than 20cm) or tie them together. If the signal cables have to cross the power cables, they need to be arranged in 90 degree angle.

3. Grounding

The VFD must be grounded safely and reliably in operation. Grounding has the priority in all EMC methods because it does not only ensure the safety of equipment and persons, but also it is the simplest, most effective and lowest-cost solution for EMC problems.

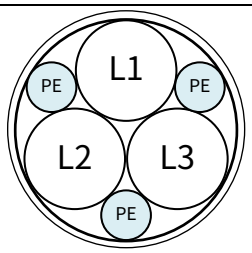
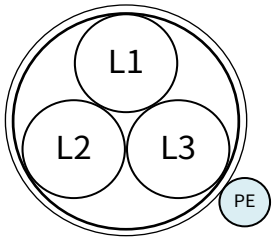
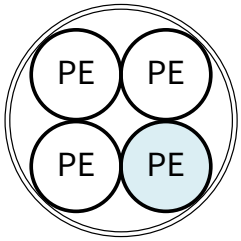
Three categories of grounding: special pole grounding, common pole grounding and series-wound grounding. Different control system needs to use special pole grounding, different devices in the same control system needs to use common pole grounding, and different devices connected by the same power cables needs to use series-wound grounding.

This section introduces general EMC guidelines on VFDs in several aspects including noise control, site wiring and grounding for reference in site installation.

## 4.3.1 Power cable

To meet the EMC requirements stipulated in the CE standards, you must use symmetrical shielded cables as motor cables.

Four-core cables can be used as input cables, but symmetrical shielded cables are recommended. Compared with four-core cables, symmetrical shielded cables can reduce electromagnetic radiation as well as the current and loss of the motor cables.

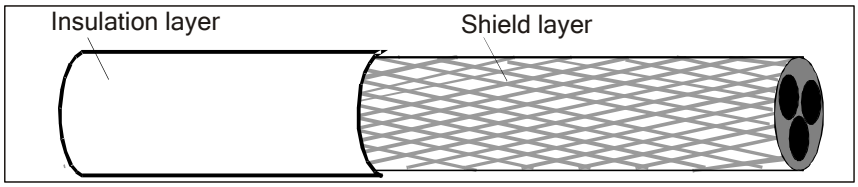
| | | |
|---|---|---|
|  |  |  |
| Symmetrical shielded cable, PEs in symmetrical manner | Symmetrical shielded cable, PE in separated manner | Asymmetrical four-core cable |

Power cables mut meet the following requirements:

- The sizes of the input power cables and motor cables must comply with local regulations.
- The input power cables and motor cables must be able to carry the corresponding load currents.
- The maximum temperature margin of the motor cables in continuous operation cannot be lower than 70°C.
- PE grounding conductor conductivity must be as good as possible to reduce the grounding resistance to achieve better impedance continuity. If the electrical conductivity of the motor cable shield layer does not meet the requirements, a separate PE conductor must be used.

To effectively restrict the emission and conduction of radio frequency (RF) interference, the conductivity of the shielded cable must at least be 1/10 of the conductivity of the phase conductor. This requirement can be well met by a copper or aluminum shield layer. The following figure shows the minimum requirement on motor cables of a VFD. The cable must consist of a layer of spiral-shaped copper strips. The denser the shield layer is, the more effectively the electromagnetic interference is restricted.

Figure 4-1 Cross-section of the cable




**Note:** Before connecting the input power cable of the VFD, check the insulation conditions of the cable according to local regulations.

## 4.3.2 Control cable

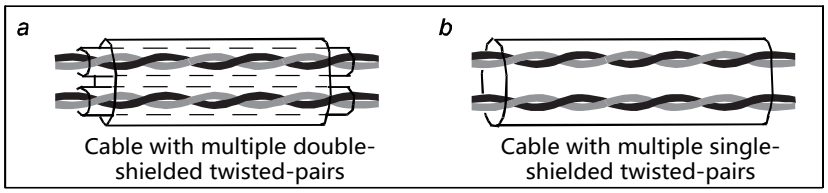
All analog signal cables, communication cables, and encoder cables must be shielded cables.

Analog signal cables need to be double-shielded twisted-pair cables (as shown in figure a). Use one separate shielded twisted pair for each signal. Do not use the same ground wire for different analog signals.

Communication cables and encoder cables need to be single-shielded twisted-pair cables (as shown in figure b). The shield layer of cable is connected to the system PE by means of a 360-degree connection or twisting into a single bundle, and the exposed shield layer is wrapped with insulating tape to prevent interference introduced by the shield layer in contact with other equipment and structural components.

The keypad needs to be connected by using a network cable. In complicated electromagnetic environments, a shielded network cable is recommended.

Figure 4-2 Control cable




**Note:** Analog signals and digital signals cannot share a same cable, and their cables must be routed separately.

## 4.3.3 Wiring suggestions

Motor cables and input cables in a drive system are interference cables, while communication cables, encoder cables, analog signals, and high-speed signal cables are sensitive cables. It is recommended that you arrange the motor cables, input power cables, and control cables separately in different trays, reducing electromagnetic interference caused by the du/dt of the VFD output to other cables. The general cable arrangement rules are shown in Figure 4-3. The recommended values for the spacing between sensitive and interference cables are shown in Table 4-1.

Figure 4-3 General cable arrangement rules

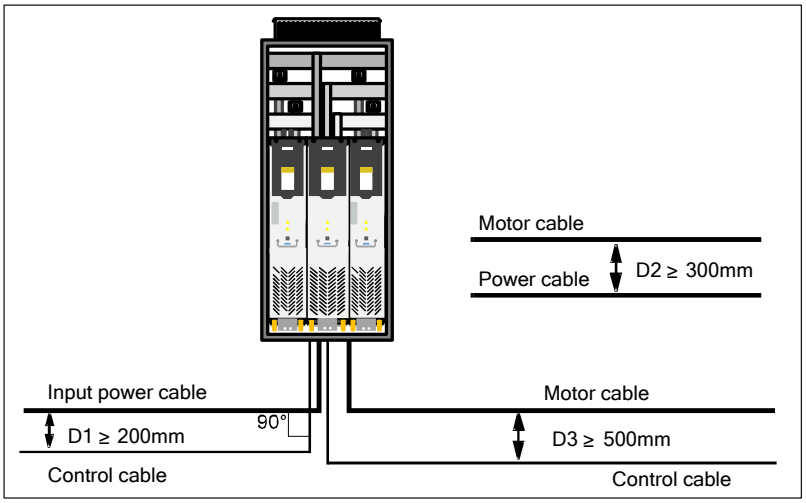


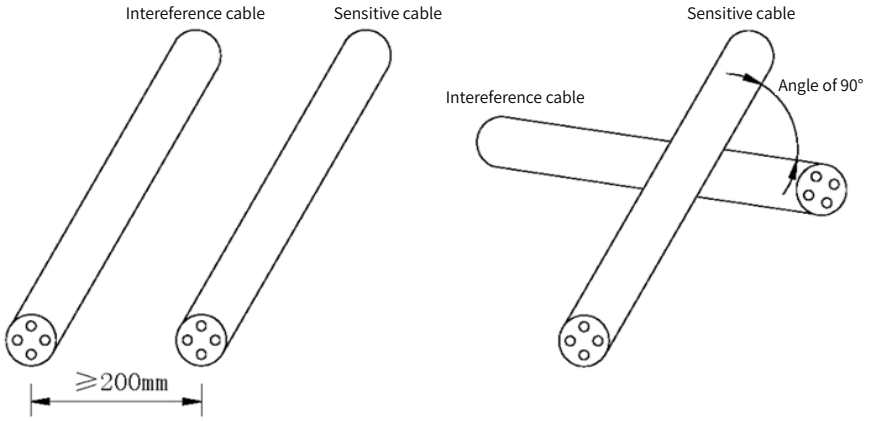

Table 4-1 Recommended values for the spacing between sensitive and interference cables

| D1 | D2 | D3 |
|---|---|---|
| ⩾200mm | ⩾300mm | ⩾500mm |

**Note:**

- The motor cables of different VFDs/rectifiers can be arranged in parallel, but motor cables must be arranged far away from sensitive cables.
- Analog signals and digital signals cannot share a same cable, and their cables must be routed separately.
- If a control cable and power cable must cross each other, ensure that the angle between them is 90 degrees.

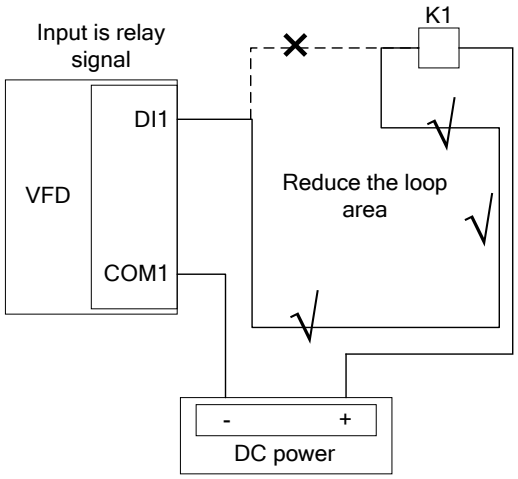
Table 4-4 Routing sensitive and interference cables




The cable trays must be connected properly and well grounded. Aluminum trays can implement local equipotential.

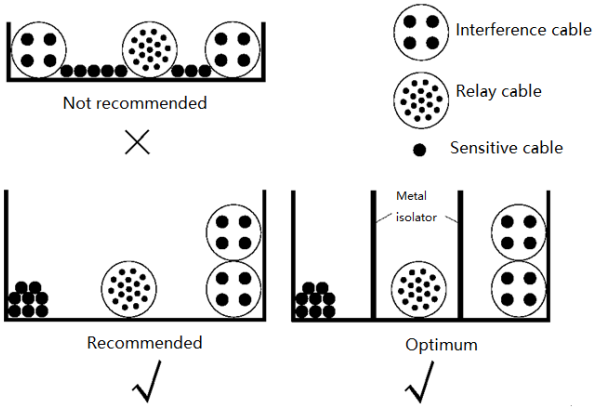
For inputs of such as relay signals and other non-differential signals, non-twisted pair cables can be used, and the wiring should minimize the loop area and a pair of signal lines should be routed as close as possible.

Figure 4-5 Non-differential signal wiring loop




When laying multiple types of cables, the cables should always be routed along the alignment grooves or metal pipes in equipotential connection, with different types of cables separated as much as possible. You can better improve electromagnetic compatibility by using metal spacers to isolate different types of cables in the same metal groove or metal pipe.

Figure 4-6 Routing multiple types of cable

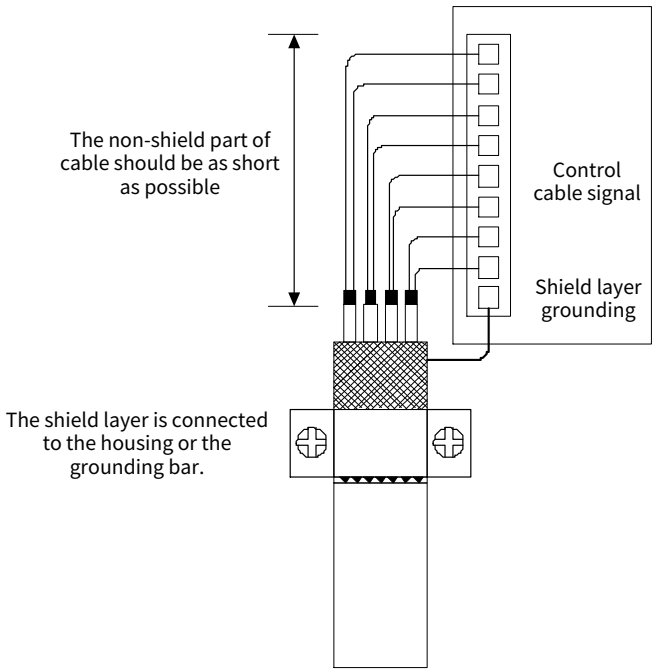


## 4.3.4 Shielded cable connection

The shield layer of signal cable is grounded at both ends, of which the grounding points must be the same. That is, if the shield layer at the upper computer side is connected to PE, the shield layer at the drive side is also connected to PE; if the shield layer at the upper computer side is connected to GND, the shield layer at the drive side is also connected to GND. It is recommended to connect the both ends of the shield layer to PE, which is the housing.

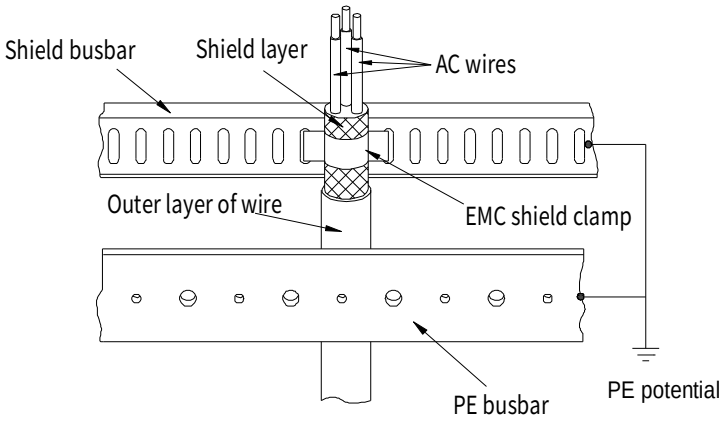
The unshielded part of the control cable that is shielded should be as short as possible, and the shield layer is connected to the nearest PE end. If the cable is stripped too long, the core is susceptible to interference of signals, especially analog, communication, and encoder signals.

Figure 4-7 Control cable shield connection




The shield layers of the input power and output motor cables should have large contact with the shield board inside the installation cabinet to achieve good EMC shield effect. The specific installation and fixing method can be referred to Figure 4-8.

Figure 4-8 Power cable shield connection



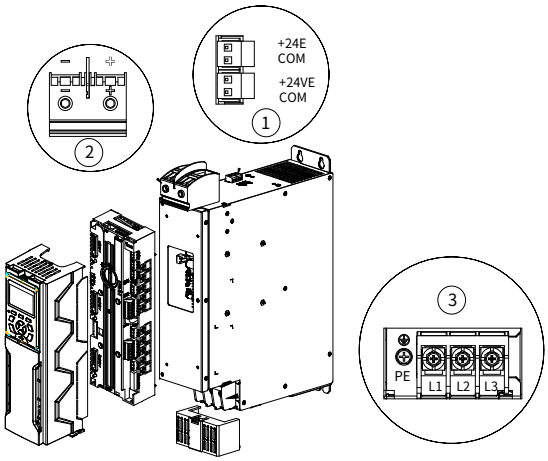
# 4.4 Electrical wiring

## 4.4.1 Main circuit wiring

### 4.4.1.1 A3&A4 cable connection

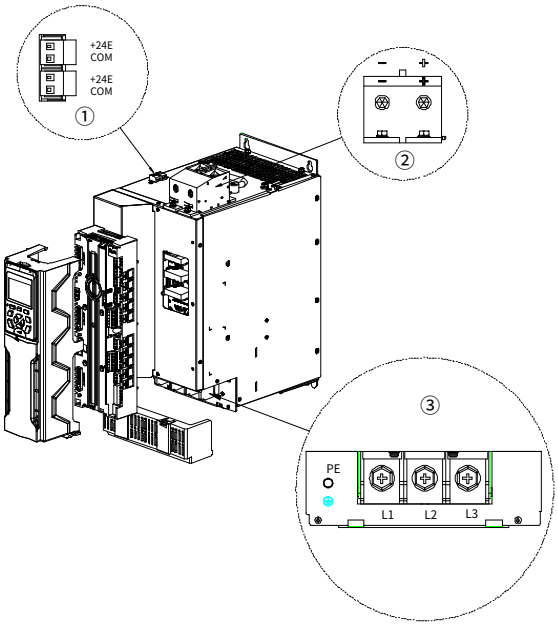
1. A3 unit terminals

Figure 4-9 A3 unit terminals




2. A4 unit terminals

Figure 4-10 A4 unit terminals




| No. | Terminal name | Description |
|---|---|---|
| ① | +24E | 24V auxiliary power terminal (The auxiliary power supply must be isolated 24V.)<br>Specification: 24VDC±10% 1A |
| | COM | |
| ② | + | Positive or negative busbar DC output<br>Voltage: 1.5*Vin<br>Connection: cable terminal of M8/12N・m |
| | - | |
| ③ | L1 | 3PH AC power input<br>Voltage: 3PH AC 380–440V |
| | L2 | |

| No. | Terminal name | Description |
|---|---|---|
| | L3 | Connection: A3: cable terminal of M6/5N・m<br>A4: cable terminal of M10/29N・m |

3. Wiring procedures for A3–A4 units are as follow:

Step 1 Remove the plastic case protective cover from the cable terminal area.

Step 2 Connect the cable to the output terminal in the correct wire connection sequence: L1, L2, L3 or + and -.

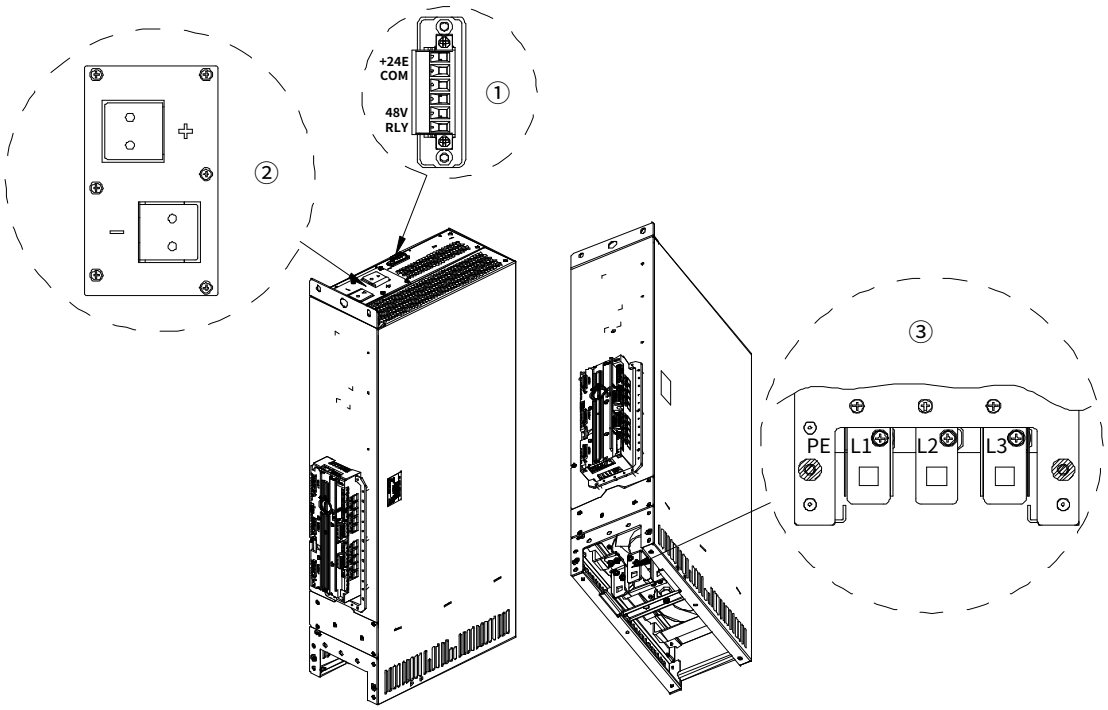
Step 3 Fix the power cable on the cable holder to avoid stress on the terminal.

Step 4 When using shielded power cables, the shielding layer must be fixed to the shielding board according to EMC requirements.

### 4.4.1.2 A6–A7 unit wiring

1. A6–A7 unit terminals

Figure 4-11 A6–A7 unit terminals




| No. | Terminal name | Description |
|---|---|---|
| ① | +24E | 24V auxiliary power terminal (The auxiliary power supply must be isolated 24V.)<br>Specification: 24VDC±10% 1A |
| | COM | |
| | 48V | 48V control, reserved function |
| | RLY | |
| ② | + | Positive or negative busbar DC output<br>Voltage: 510–720VDC<br>Connection: copper bar terminal of M6/9N・m |
| | - | |
| ③ | L1 | 3PH AC power input<br>Voltage: 3PH AC 380–440V<br>Connection: copper bar terminal of M10/32N・m |
| | L2 | |
| | L3 | |

2. Wiring procedures for A6–A7 units are as follow:

Step 1 Connect the cable to the output terminal in the correct wire connection sequence: L1, L2, L3 or + and -.

Step 2 Please ensure that all input and output are correctly connected.

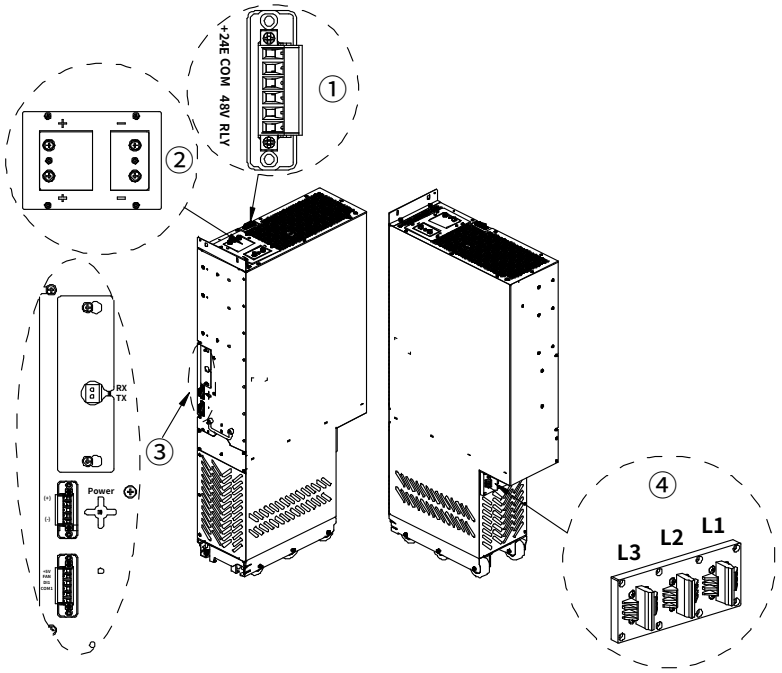
Step 3 Fix the power cable on the cable holder to avoid stress on the terminal.

Step 4 When using shielded power cables, the shielding layer must be fixed to the shielding board according to EMC requirements.

### 4.4.1.3 A8 unit wiring

1. A8 unit terminals

Figure 4-12 A8 unit terminals




| No. | Terminal name | Description |
|---|---|---|
| ① | +24E | 24V auxiliary power terminal (The auxiliary power supply must be isolated 24V.)<br>For commissioning, specification: 24VDC±10% 1A |
| | COM | |
| | 48V | 48V control, reserved function |
| | RLY | |
| ② | + | Positive or negative busbar DC output<br>Voltage: 1.5*Vin<br>Connection: copper bar terminal of M8/11N・m |
| | - | |
| ③ | +5V | Fan control signal terminal of active rectifier unit |
| | FAN | |
| | DI1 | Digital input of active rectifier unit |
| | COM1 | |
| | (+) | Bus power output terminals of active rectifier unit |
| | (-) | |
| ④ | L1 | 3PH AC power input<br>Voltage: 3PH AC 380–440V (corresponding to 400V products); 3PH AC 520–690V (corresponding to 690V |
| | L2 | |
| | L3 | |

| No. | Terminal name | Description |
|---|---|---|
| | | products)<br>Connection: Quick plug connection |

2. Wiring procedures for A8 units are as follow:

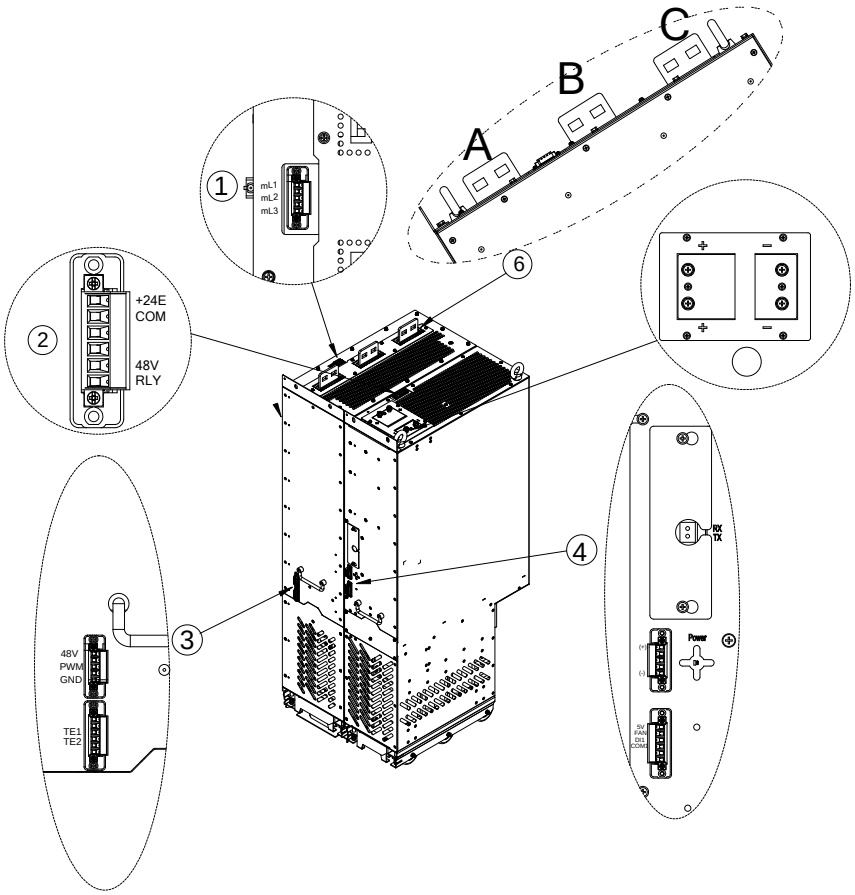
Step 1 Please ensure that all input and output are correctly connected.

Step 2 Fix the power cable on the cable holder to avoid stress on the terminal.

Step 3 When using shielded power cables, the shielding layer must be fixed to the shielding board according to EMC requirements.

## 4.4.2 Main circuit wiring terminals

Figure 4-13 Active rectifier filter wiring terminals

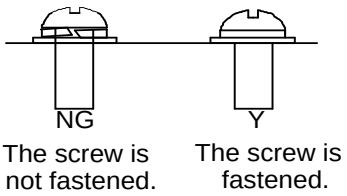



| No. | Terminal name | Description |
|---|---|---|
| ① | mL1 | Input power signal detection terminal, connected with the AC voltage detection card. |
| | mL2 | |
| | mL3 | |
| ② | +24E | 24V auxiliary power terminal (The auxiliary power supply must be isolated 24V.)<br>For commissioning, specification: 24VDC±10% 1A |
| | COM | |
| | 48V | Buffer contactor signal. If there is no internal buffer, the control external buffer contactor must be a 48VDC coil contactor |
| | RLY | |

| No. | Terminal name | Description |
|---|---|---|
| ③ | 48V | Fan power input of active rectifier filter |
| | PWM | |
| | GND | |
| | TE1 | Reactor overtemperature contact terminals of active rectifier filter unit |
| | TE2 | |
| ④ | (+) | Bus power output terminals of active rectifier unit |
| | (-) | |
| | +5V | Fan control signal terminal of active rectifier unit |
| | FAN | |
| | DI1 | Digital input of active rectifier unit |
| | COM1 | |
| ⑤ | + | Positive or negative busbar DC output<br>Voltage: 1.5*Vin<br>Connection: Copper bar terminal of M8/11N・m |
| | - | |
| ⑥ | A | 3PH AC power input of LCL filter unit<br>Voltage: 3PH AC 380–440V<br>Connection: Copper bar terminal of M10/32N・m |
| | B | |
| | C | |

## 4.4.3 Screw tightening

Figure 4-14 Screw installation requirements




## 4.4.4 Electrical installation checklist

| No. | Operation | Compliant | Completed |
|---|---|---|---|
| 1 | Checked the input and output power wiring and ensured the wiring positions and voltages were correct. | ☐ | ☐ |
| 2 | Ensured that the input and output power wiring was correct and fastened. | ☐ | ☐ |
| 3 | Ensured that the input and output power cable carrying capacity selection was correct. | ☐ | ☐ |
| 4 | Ensured that routing the input and output power cables that were shielded complied with EMC regulations. | ☐ | ☐ |
| 5 | Checked the external auxiliary power wiring and ensured the wiring positions and voltages are correct. | ☐ | ☐ |
| 6 | Routed the control power cables and power cables separately, complying with EMC regulations. | ☐ | ☐ |

# 5 Active rectifier control unit (ACU)

## 5.1 Control unit composition

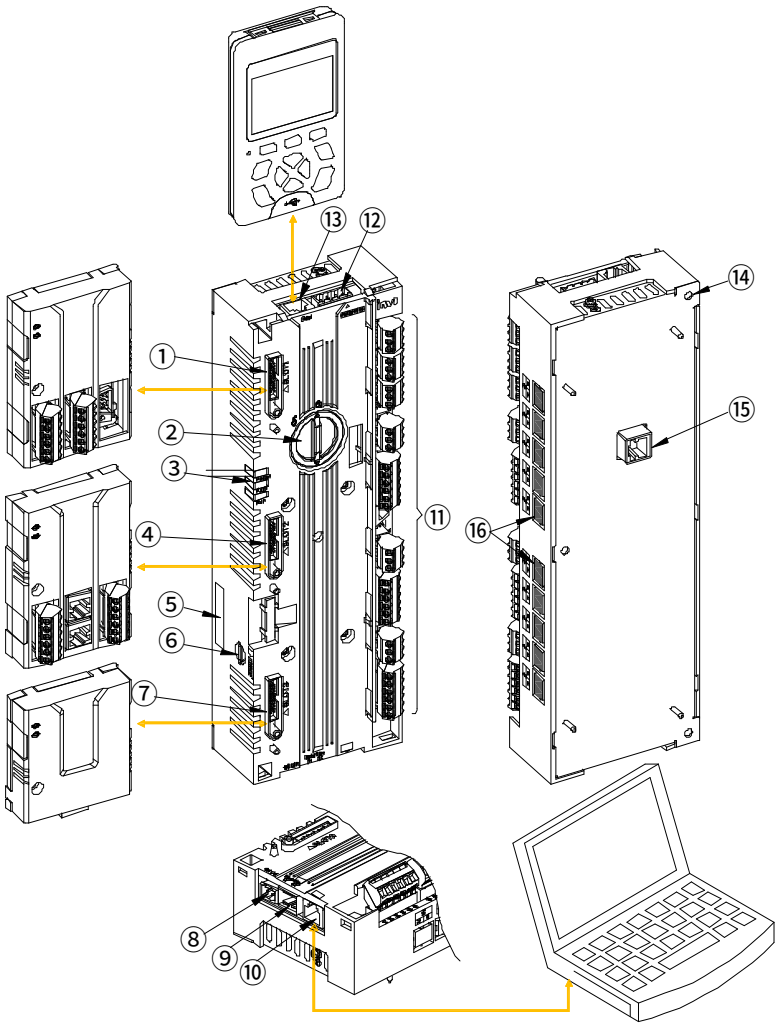



Table 5-1 Function description

| Symbol | Component | Function description |
|---|---|---|
| ① | Slot 1 | Applied to 73.5×103×23.5(mm) function expansion modules and communication expansion card |
| | Battery cover plate | Button battery replacement cover. The internal button battery is a non rechargeable lithium battery that needs to be replaced regularly. |
| ③ | Indicator | Power supply, fault, running indicator |
| ④ | Slot 2 | Applied to 73.5×103×23.5(mm) function expansion modules, communication expansion card, and optical fiber expansion card |
| ⑤ | Nameplate | Nameplate information |
| ⑥ | SD card | Standard microSD memory card, flexible to plug and unplug, capacity: 32GB |
| ⑦ | Slot 3 | Applied to 73.5×74×23.5(mm) function expansion modules, communication expansion card, and optical fiber expansion card |
| ⑧ | Power interface | 24V power input terminal |

| Symbol | Component | Function description |
|---|---|---|
| ⑨ | Fiber optic interface | Master/slave optical fiber interface (optional) |
| ⑩ | RJ45 terminal | Upper computer interface, connecting to a PC for status monitoring |
| ⑪ | User terminal | Standard input and output terminals for users |
| ⑫ | STO terminal | Safe Torque Off input |
| ⑬ | RJ45 terminal | HMI, connecting to the SOP-880 keypad |
| ⑭ | Fixed hole | ACU fixing holes (three holes) |
| ⑮ | RJ45 terminal | Communication interface with power unit (active rectifier A1–A4, A6, A7 units) |
| ⑯ | Fiber optic interface | Fiber optic communication interface with power unit (active rectifier A8 unit) |

## 5.2 State indication

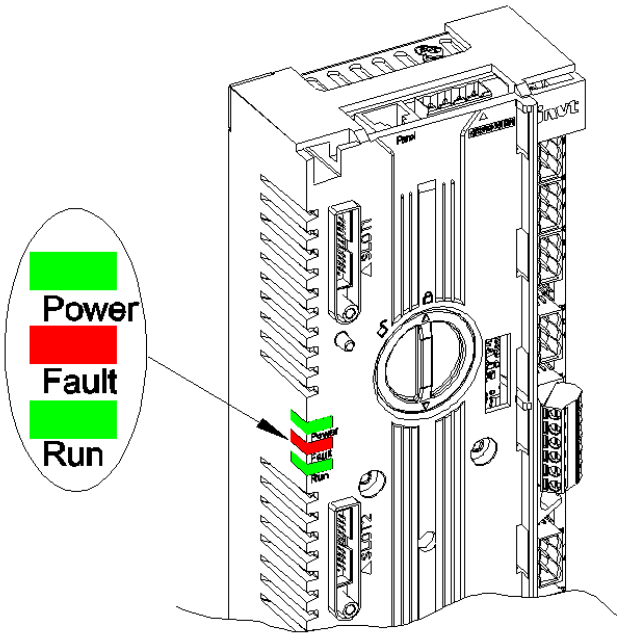
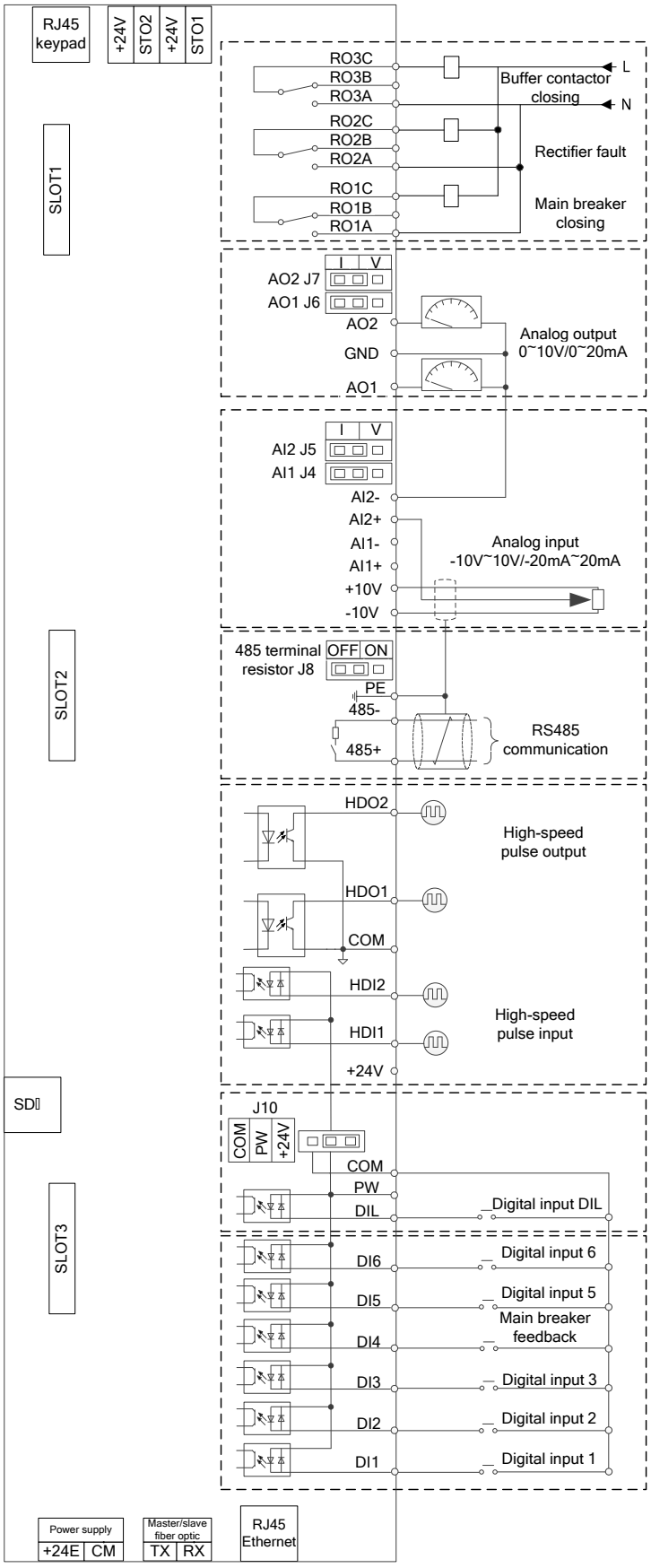



Table 5-2 Indicator description

| No. | Name | State | Description |
|---|---|---|---|
| 1 | POWER | ON | The control unit is properly powered. |
| | | OFF | The control unit is not powered or power failure occurs. |
| 2 | Fault | ON | The system is faulty. |
| | | OFF | The system is normal. |
| 3 | RUN | ON | The rectifier device is running. |
| | | OFF | The rectifier device is stopped. |

# 5.3 Control unit interface description

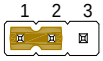
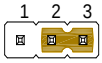
Figure 5-1 Control unit circuit wiring

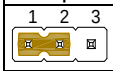


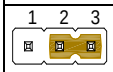
### 5.3.1 External interfaces

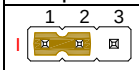
| Terminal symbol | Name | Description |
|---|---|---|
| Input power | +24E, CM | Power supply for the control unit |
| Digital input | DI1–DI6, DIL | Input type: relay contact, NPN or PNP |
| Digital power output | +24V, COM | Digital power, isolated from power input 24V |
| High-speed digital input | HDI1, HDI2 | Input type: NPN or PNP |
| High-speed digital output | HDO1, HDO2 | Output type: Open collector |
| Analog input | AI1, AI2 | Input type: current or voltage, selected through the jumper |
| Analog output | AO1, AO2 | Output type: current or voltage, selected through the jumper |
| Relay output | ROxA, ROxB, ROxC | Contacts: NO, NC, common point |
| RS485 communication | 485+, 485- | RS485 communication. The terminal resistor is selected through the jumper. |
| RJ45 terminal | RJ45 keypad | Communication interface with keypad |
| RJ45 terminal | RJ45 Ethernet | Ethernet communication with a PC |

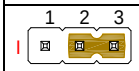
### 5.3.2 Detailed introduction to external interfaces

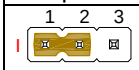
| Terminal | Terminal symbol | Function description | Cable specifications |
|---|---|---|---|
| **Input power** | | | |
| 1 | +24E | 24VDC±10%2A | Two-core twisted-pair cable is recommended.<br>Cross-sectional area: 0.5–2.5mm² |
| 2 | CM | | |
| **DI input terminal** | | | |
| 1 | DI1 | 1. Input impedance: 3.3kΩ<br>2. Voltage input range: 12–30V<br>3. Supports NPN and PNP bi-direction input, relay contact input<br>4. Max. input frequency: 1kHz | Single-core wire<br>Cross-sectional area: 0.5–2.5mm² |
| 2 | DI2 | | |
| 3 | DI3 | | |
| 4 | DI4 | | |
| 5 | DI5 | | |
| 6 | DI6 | | |
| **DIL input terminal** | | | |
| 1 | DIL | Digital interlock. When its input is high, all other input terminals are forced to be invalid. | Two-core twisted-pair cable is recommended.<br>Cross-sectional area: 0.5–2.5mm² |
| 2 | PW | Provides power supply for DIL, DI1–DI6, HDI, HDO | |
| 3 | COM | Digital common ground | |
| Jumper J10: power supply selection | | | |
|  1 is short connected to 2 , PW is short connected to internal COM, and DI uses the internal power ground. If external power is required, you need to remove the shorting cap. | | | |
|  2 is short connected to 3 , PW is short connected to internal +24V, and DI uses the internal | | | |

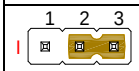
<table>
<tr><th>Terminal</th><th>Terminal symbol</th><th>Function description</th><th>Cable specifications</th></tr>
<tr><td colspan="4">power. If external power is required, you need to remove the shorting cap.</td></tr>
<tr><td colspan="4">HDIO terminal</td></tr>
<tr><td>1</td><td>+24V</td><td rowspan="3">1. Input type: PNP, NPN<br>2. Input frequency range: 0–50kHz<br>3. Input voltage range: 12–30V<br>4. Duty ratio: 30%–70%</td><td rowspan="6">Two-core twisted-pair cable is recommended.<br>Cross-sectional area: 0.5–2.5mm²<br>HDI and COM, HDO and COM use twisted-pair cables.</td></tr>
<tr><td>2</td><td>HDI1</td></tr>
<tr><td>3</td><td>HDI2</td></tr>
<tr><td>4</td><td>COM</td><td rowspan="3">1. Output type: OC<br>2. Output frequency range: 0–50kHz<br>3. Max. output load: 20mA/30V<br>4. Duty ratio: 50%</td></tr>
<tr><td>5</td><td>HDO1</td></tr>
<tr><td>6</td><td>HDO2</td></tr>
<tr><td colspan="4">RS485 communication terminals</td></tr>
<tr><td>1</td><td>485+</td><td rowspan="3">RS485 bus, standard 5V electrical level<br>Terminal resistor: 120Ω<br>Max. baud rate: 115200<br>Max. number of nodes: 32 (without relay)</td><td rowspan="3">Two-core twisted-pair cable is recommended.<br>Cross-sectional area: 0.5–2.5mm²</td></tr>
<tr><td>2</td><td>485-</td></tr>
<tr><td>3</td><td>PE</td></tr>
<tr><td colspan="4">Jumper J8: terminal resistor selection</td></tr>
<tr><td colspan="4"> 

When 1 and 2 are short-circuited, the terminal resistor is disconnected.</td></tr>
<tr><td colspan="4"> 

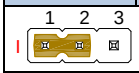
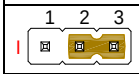
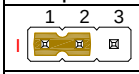
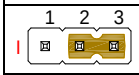
When 2 and 3 are short-circuited, the terminal resistor is connected.</td></tr>
<tr><td colspan="4">Analog input terminal</td></tr>
<tr><td>1</td><td>-10V</td><td rowspan="2">Positive and negative 10V power supply<br>Max. output current: 10mA</td><td rowspan="6">Cross-sectional area: 0.5–2.5mm²<br>When two AIs are used, use two two-core shielded twisted-pair cables.<br>When reference voltage is used, use one four-core shielded twisted-pair cable for one AI.</td></tr>
<tr><td>2</td><td>+10V</td></tr>
<tr><td>3</td><td>AI1+</td><td rowspan="4">Current input: -20mA–20mA, Rin: 500Ω<br>Voltage input: -10V–10V, Rin: 30kΩ<br>Differential input range: ±30V<br>Sampling interval: 0.1ms<br>Resolution: 11 bit+signbit</td></tr>
<tr><td>4</td><td>AI1-</td></tr>
<tr><td>5</td><td>AI2+</td></tr>
<tr><td>6</td><td>AI2-</td></tr>
<tr><td colspan="4">Jumper J4: Selection between AI1 voltage and current signal inputs</td></tr>
<tr><td colspan="4"> 

When 1 and 2 are short-circuited, AI1 current input is used.</td></tr>
<tr><td colspan="4"> 

When 2 and 3 are short-circuited, AI1 voltage input is used.</td></tr>
<tr><td colspan="4">Jumper J5: Selection between AI2 voltage and current signal inputs</td></tr>
<tr><td colspan="4"> 

When 1 and 2 are short-circuited, AI2 current input is used.</td></tr>
<tr><td colspan="4"> 

When 2 and 3 are short-circuited, AI2 voltage input is used.</td></tr>
<tr><td colspan="4">Analog output terminal</td></tr>
<tr><td rowspan="3">Analog output</td><td>AO1</td><td rowspan="3">AO output range:<br>0–20mA, Rload≤500Ω<br>0–10V, Rload≥10kΩ<br>Resolution: 11 bit+signbit<br>Accuracy: 2% of full scale range</td><td rowspan="3">Two-core twisted-pair cable is recommended.<br>Cross-sectional area: 0.5–2.5mm²<br>AO1 and GND, AO2 and GND use twisted-pair cables.</td></tr>
<tr><td>GND</td></tr>
<tr><td>AO2</td></tr>
<tr><td colspan="4">Jumper J6: Selection between AO1 voltage and current signal outputs</td></tr>
</table>

| Terminal | Terminal symbol | Function description | Cable specifications |
|---|---|---|---|
|  | When 1 and 2 are short-circuited, AO1 current output is used. | | |
|  | When 2 and 3 are short-circuited, AO1 voltage output is used. | | |
| Jumper J7: Selection between AO2 voltage and current signal inputs | | | |
|  | When 1 and 2 are short-circuited, AO2 current output is used. | | |
|  | When 2 and 3 are short-circuited, AO2 voltage output is used. | | |
| **Relay 1 output terminal** | | | |
| 1 | RO1A | Output type: passive NO and NC contacts<br>Contact parameters: 250VAC/30VDC, 3A | Single-core wire<br>Cross-sectional area: 0.5–2.5mm² |
| 2 | RO1B | | |
| 3 | RO1C | | |
| **Relay 2 output terminal** | | | |
| 1 | RO2A | Output type: passive NO and NC contacts<br>Contact parameters: 250VAC/30VDC, 3A | Single-core wire<br>Cross-sectional area: 0.5–2.5mm² |
| 2 | RO2B | | |
| 3 | RO2C | | |
| **Relay 3 output terminal** | | | |
| 1 | RO3A | Output type: passive NO and NC contacts<br>Contact parameters: 250VAC/30VDC, 3A | Single-core wire<br>Cross-sectional area: 0.5–2.5mm² |
| 2 | RO3B | | |
| 3 | RO3C | | |
| **Master/slave optical fiber** | | | |
| 1 | TX | Transmitting optical fiber communication | Dedicated optical fiber cable |
| 2 | RX | Receiving optical fiber communication | |
| **Safe torque off terminal** | | | |
| 1 | STO1 | Rectifier module STO input<br>They has been short connected before delivery by default. | Four-core shielded twisted-pair cable<br>Cross-sectional area: 0.5–2.5mm² |
| 2 | +24V | | |
| 3 | STO2 | | |
| 4 | +24V | | |
| **RJ45 keypad** | | | |
| 1 | RJ45 | Connected to SOP-880-01 keypad | Standard shielded network cable |
| **RJ45 Ethernet** | | | |
| 1 | RJ45 | Ethernet communication with a PC | Standard shielded network cable |

# 5.4 Control unit expansion interface

## 5.4.1 Expansion module

The control unit can implement the corresponding expansion functions by adding the corresponding expansion modules. The details are as follows.

| No. | Name | Model | Function description | Connect with ACU through | Dimensions (W×H×D) (unit: mm) |
|---|---|---|---|---|---|
| 1 | Input/output module | EC-IO801 | Two AIs<br>Two AOs<br>Three DIs<br>1 relay outputs | SLOT | 73.5×103×23.5 |
| 2 | PROFINET IO module | EC-TX809 | PROFINET IO industrial Ethernet | SLOT | 73.5×74×23.5 |
| 3 | PROFIBUS-DP module | EC-TX803 | PROFIBUS-DP bus adapter | SLOT | 73.5×74×23.5 |
| 4 | CAN bus module | EC-TX805 | CANopen bus adapter | SLOT | 73.5×74×23.5 |
| 5 | Optical fiber expansion module | EC-TX821 | One 50M expansion optical fiber | SLOT | 73.5×74×23.5 |
| 6 | Optical fiber expansion module | EC-TX823 | Three 50M expansion optical fibers | SLOT | 73.5×74×23.5 |
| 7 | Voltage detection module | IVDM-10 | AC voltage detection module | Fiber optic | 37.4×180×113 |
| 8 | Intelligent operation keypad | SOP-880-01 | Human-machine interface keypad | RS422 | 74×121.5×26 |

**Note:**

- EC-TX821 and EC-TX823 can only be inserted in SLOT2 or SLOT3.
- It is recommended to install the EC-TX803 card in SLOT3.

## 5.4.2 SLOT expansion application

The control unit can cooperate with different expansion modules, which are directly installed on the SLOT card slot of the control unit, as shown in the following figure.

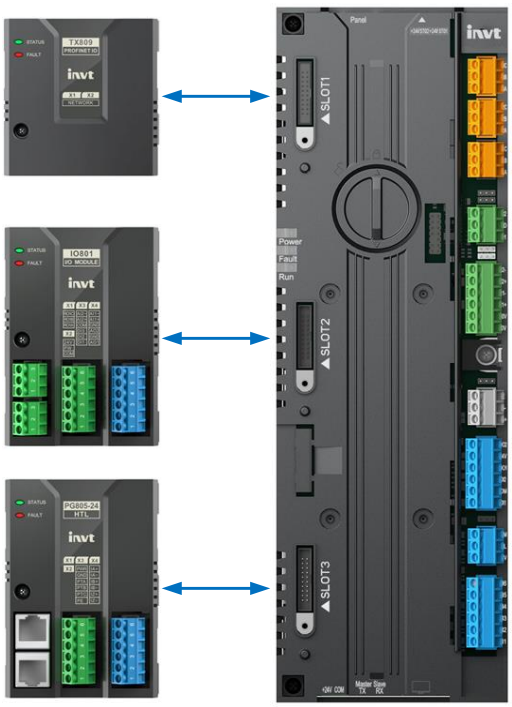


Table 5-3 Expansion module installation description

| Expansion card | SLOT1 | SLOT2 | SLOT3 | Expansion card type |
|---|---|---|---|---|
| EC-TX803 | - | - | ✓ | PROFIBUS-DP |
| EC-TX805 | ✓ | ✓ | ✓ | CANopen |
| EC-TX809 | ✓ | - | - | PROFINET IO |
| EC-TX821 | - | - | ✓ | Expansion module with one optical fiber interface |
| EC-TX823 | - | - | ✓ | Expansion module with three optical fiber interfaces |
| EC-IO801 | ✓ | ✓ | - | IO expansion module |

**Note:**

- When SLOT2 is empty, EC-TX803 and EC-TX809 can be installed in SLOT1.
- EC-TX821 and EC-TX823 can only be inserted in SLOT2 or SLOT3.

# 6 Accessories

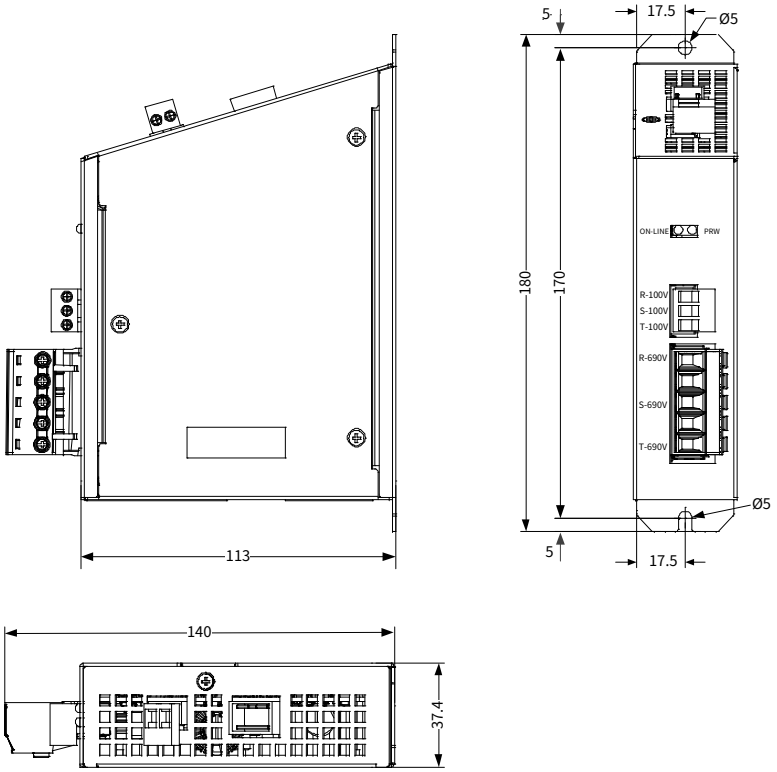
## 6.1 Function expansion module

The function expansion module in active rectifier mainly use the AC voltage detection module which is mainly used for input voltage detection and supports wall mounting and rail mounting.

### 6.1.1 Outline dimensions

The dimensions of the IVDM-10 AC voltage detection module is 37.4x113x180mm (W x D x H), and the outline structure are shown as Figure 6-1.

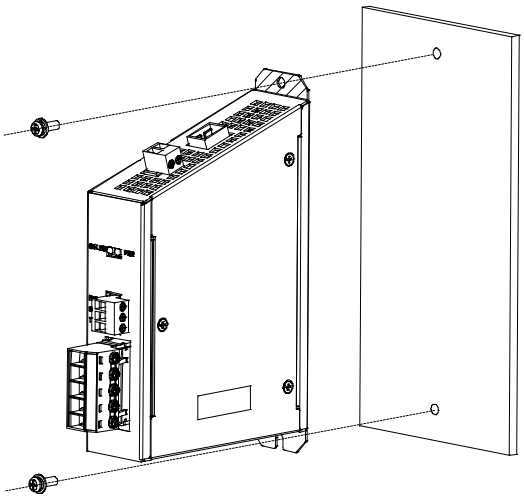
Figure 6-1 Product outline and mounting dimensions (unit: mm)




### 6.1.2 Installation method

#### 6.1.2.1 Wall mounting

The AC voltage detection module adopts the wall mounting method. Align the installation holes and tighten the screws.

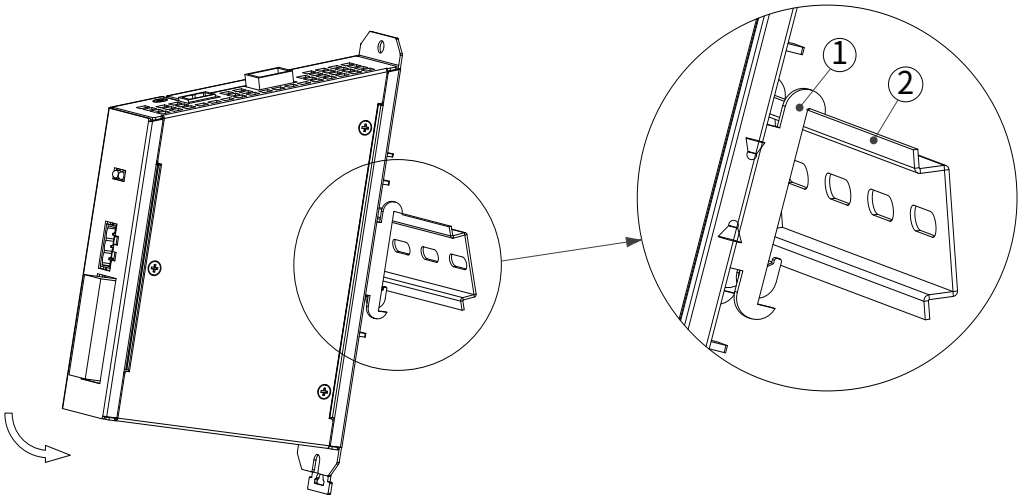


**Note:**

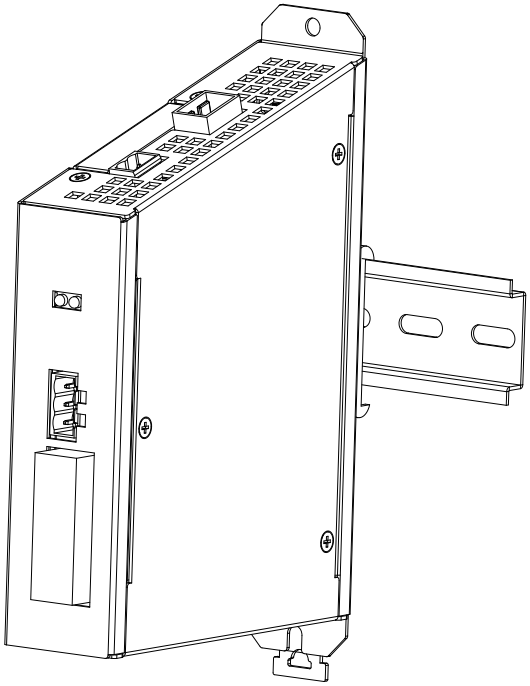
- Ensure that all terminals and optical fiber plugs are installed in place for effective electrical connection.
- The module is grounded through contact between its exposed metal shell and the assembly board inside the cabinet, so the assembly board must be an exposed metal plate. To ensure the reliable operation of the module and meet the EMC requirements, please tighten the screws to ensure reliable grounding.

### 6.1.2.2 Rail mounting

The AC voltage detection module is installed using rail mounting method: Hold the IVDM-10 module, tilt it to place the upper part of the rail slot onto the rail, and press down on the lower part of the rail slot in the direction of the arrow to fully fix the rail slot ① onto the rail ②.



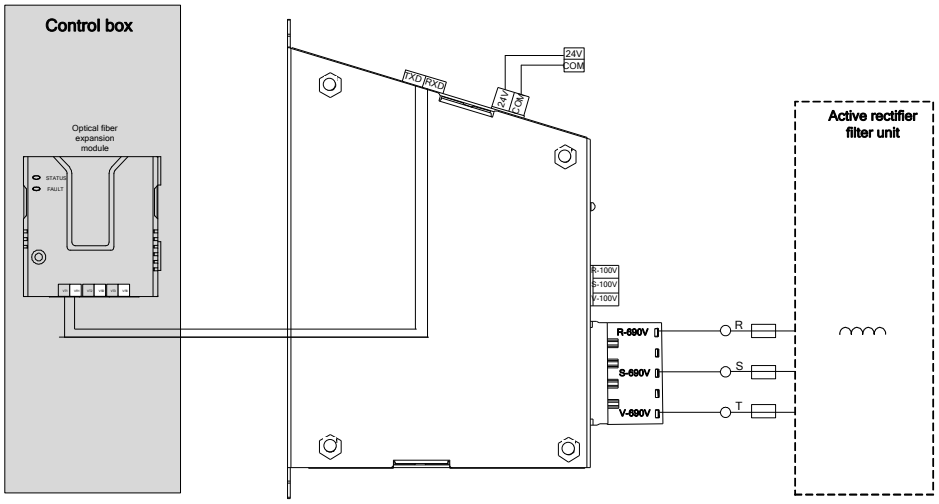

The final effect diagram of rail mounting is shown in the following figure.



### 6.1.3 External wiring

The IVDM-10 AC voltage detection module is connected to the optical fiber expansion module EC-TX821/TX823 through optical fibers, transmitting the detection signal to the control box. Figure 6-2 shows the external wiring diagram of the IVDM-10 module, taking the optical fiber expansion module EC-TX823 and active rectifier filter unit as an example.

Figure 6-2 External wiring diagram when using IVDM-10




**Note:**The 3PH AC voltage line sequence of the IVDM-10 module must be consistent with the phase sequence of the incoming cable of the rectifier filter unit. Otherwise, the overcurrent fault will occur in the rectifier unit.

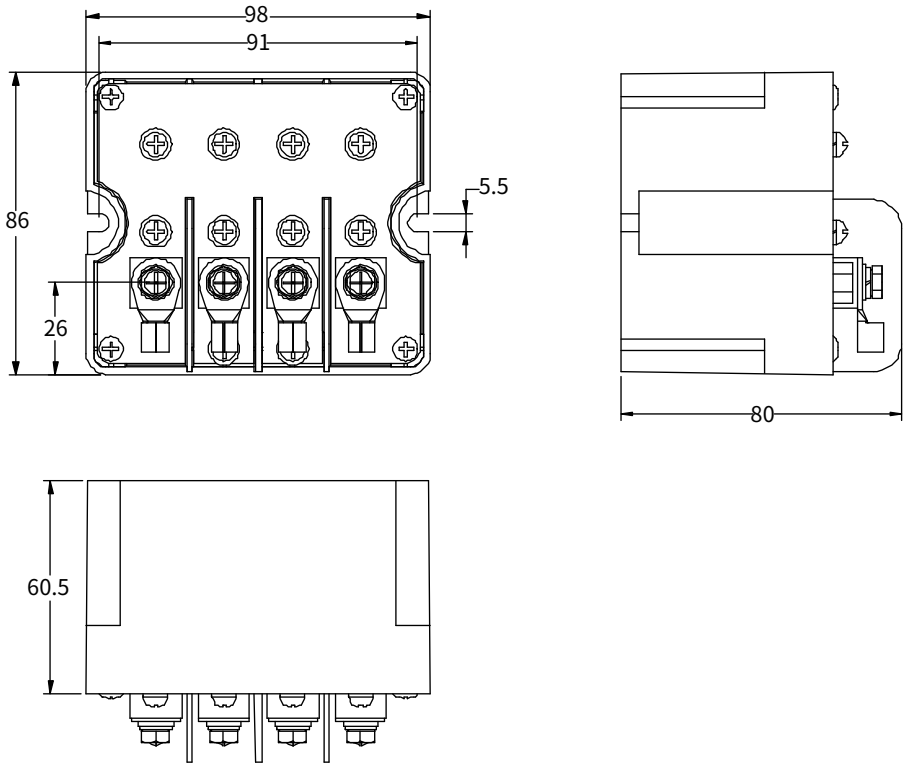
For details about AC voltage detection module, refer to the AC Voltage Detection Module Manual.

## 6.2 Surge protection module

For products in A3–A7 frame sizes, buffer components are not configured with surge protection modules, it is necessary to configure additional surge protection module (Model: RV-380V) on the grid side. The surge

protection module is used to absorb the surge or peak voltage among the AC power grid, ensuring that the rectifier module is not damaged. The dimensions of the surge protection module is 98x86x80 mm (W x D x H), as shown in Figure 6-3.

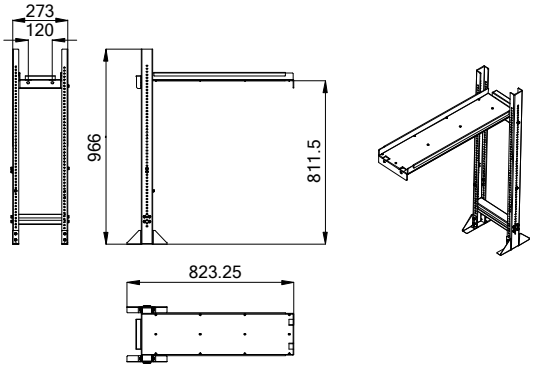
Figure 6-3 Surge protection module




## 6.3 A6&A7 maintenance bracket

When installing or maintaining the A6&A7 active rectifier units in a cabinet, to make it convenient for the active rectifier module to enter or exit the cabinet, it is necessary to use the active rectifier unit maintenance bracket (Model: MB-A7).

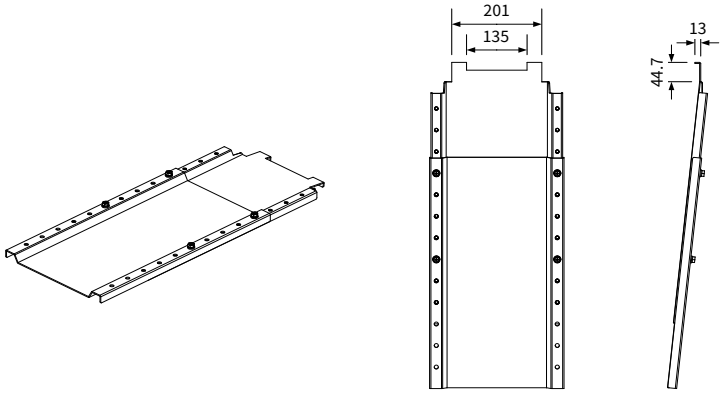
Figure 6-4 Maintenance bracket dimensions (unit: mm)




## 6.4 A8 installation guide rail

When installing or maintaining the A8 active rectifier units in a cabinet, to make it convenient for the active rectifier module to enter or exit the cabinet, it is necessary to use the active rectifier unit mounting rail (Model: MB-A8). For details, see section 3.3.5 Installation space and heat dissipation.

Figure 6-5 Installation rail dimensions (unit: mm)



# 7 Maintenance and inspection

## 7.1 Periodical inspection

### 7.1.1 Overview

Only trained and qualified professionals are allowed to maintain the equipment.

Before operating the interior of the equipment:

- Disconnect the power from the equipment (note that no switch/breaker installed in the cabinet can disconnect the power to the equipment).
- Wait 25 minutes for the DC circuit capacitor to discharge.
- Ensure that the DC bus voltage is lower than 36V.

### 7.1.2 Required tools

These tools are used to remove and install devices, screws, and other components during maintenance and repair.

- A set of torque wrench or sleeve
- A set of open end wrench or sleeve
- A set of hexagonal wrench
- A medium-sized straight screwdriver and a small-sized straight screwdriver
- A medium-sized cross screwdriver
- Cart

Table 7-1 Screw thread tightening torque (Fastener grade: 4.8; unit: N・m)

| Screw thread specification | Copper bar connection | Metal sheet connection |
|---|---|---|
| M5 | 3 | 2 |
| M6 | 4.5 | 3 |
| M8 | 11 | 8.5 |
| M10 | 22 | 16.4 |
| M12 | 39 | 28.5 |
| M16 | 98 | 71 |

### 7.1.3 Maintenance cycle

Little maintenance is required when the active rectifier unit is installed in an environment that meets requirements. The following table describes the routine maintenance periods recommended by us.

Table 7-2 Maintenance cycle

| Maintenance cycle | Maintenance work description |
|---|---|
| Once per 6–12 months (based on the site installation environment) | Check according to the following table |
| Once per 6–12 months (based on the site installation environment) | Heat sink inspection and cleaning |
| Once per year (stored without use) | Capacitor aging |
| Once per year | Air filter check. Replace it when necessary. |

| Maintenance cycle | Maintenance work description |
|---|---|
| Every 6 years | Replace the fans for the filter and power units |
| Every 10 years | Capacitor replacement |

Table 7-3 Checklist

| Check scope | | Item | Method | Criterion |
|---|---|---|---|---|
| Ambient environment | | Check the temperature, and humidity, and whether there is vibration, dust, gas, oil spray, and water droplets in the environment. | Visual inspection, and use instruments for measurement. | The requirements stated in this manual are met. |
| | | Check whether there are foreign matters, such as tools, or dangerous substances placed nearby. | Visual inspection | There are no tools or dangerous substances placed nearby. |
| Voltage | | Check the voltage of the main circuit and control circuit. | Use multimeters or other instruments for measurement. | Comply with the requirements stated in this manual. (Do not use a multimeter to measure the bus voltage.) |
| Keypad | | Check the display of information. | Visual inspection | The characters are displayed properly. |
| | | Check whether characters are not completely displayed. | Visual inspection | The requirements stated in this manual are met. |
| Main circuit | Common | Check whether the bolts loose or come off. | Screw them up. | No exception occurs. |
| | | Check whether the machine is deformed, cracked, or damaged, or their color changes due to overheating and aging. | Visual inspection | No exception occurs. |
| | | Check whether there are stains and dust attached. | Visual inspection | No exception occurs. **Note:** Discoloration of copper bars does not mean that they cannot work properly. |
| | Conductor and wire | Check whether conductors are deformed or color change for overheat. | Visual inspection | No exception occurs. |
| | | Check whether the wire sheaths are cracked or their color changes. | Visual inspection | No exception occurs. |
| | Terminal block | Check whether there is damage. | Visual inspection | No exception occurs. |
| | Reactor | Check whether there is unusual | Auditory, | No exception |

| Check scope | | Item | Method | Criterion |
|---|---|---|---|---|
| | | vibration sounds or smells. | olfactory, and visual inspection | occurs. |
| Control circuit | Control PCB and connector | Check whether the screws and connectors loose. | Screw them up. | No exception occurs. |
| | | Check whether there is unusual smell or discoloration. | Olfactory and visual inspection | No exception occurs. |
| | | Check whether there are cracks, damage, deformation, or rust. | Visual inspection | No exception occurs. |
| | | Check whether there is electrolyte leakage or deformation. | Visual inspection, and determine the service life based on the maintenance information. | No exception occurs. |
| Cooling system | Cooling fan | Check whether there are unusual sounds or vibration. | Auditory and visual inspection, and turn the fan blades with your hand. | The rotation is smooth. |
| | | Check whether the bolts loose. | Screw them up. | No exception occurs. |
| | | Check whether there is decoloration caused due to overheat.<br>Check whether there is dust. | Visual inspection, and determine the service life based on the maintenance information. | No exception occurs. |
| | Ventilation duct | Check whether there are foreign matters blocking or attached to the cooling fan, air inlets, or air outlets.<br>Check whether there are foreign objects attached. | Visual inspection | No exception occurs. |

For more details about maintenance, contact the local INVT office, or visit our website https://www.invt.com, and choose **Support** > **Services**.

# 7.2 Replacement of wearing parts

## 7.2.1 Capacitor

### 7.2.1.1 Capacitor reforming

If the active rectifier unit has been left unused for a long time, you need to follow the instructions to reform the DC bus capacitor before using it. The storage time is calculated from the date the VFD is delivered.

| Storage time | Operation principle |
|---|---|
| Less than 1 year | No charging operation is required. |
| 1 to 2 years | The active rectifier unit needs to be powered on for 1 hour before the first running command. |
| 2 to 3 years | Use a voltage controlled power supply to charge the active rectifier unit: |

| Storage time | Operation principle |
|---|---|
| | ● Charge the VFD at 25% of the rated voltage for 30 minutes,<br>● and then charge it at 50% of the rated voltage for 30 minutes,<br>● at 75% for another 30 minutes,<br>● and finally charge it at 100% of the rated voltage for 30 minutes. |
| More than 3 years | Use a voltage controlled power supply to charge the active rectifier unit:<br>● Charge the VFD at 25% of the rated voltage for 2 hours,<br>● and then charge it at 50% of the rated voltage for 2 hours,<br>● at 75% for another 2 hours,<br>● and finally charge it at 100% of the rated voltage for 2 hours. |

- The method for using a voltage controlled power supply to charge the active rectifier unit is described as follows:

  For active rectifier units of a high voltage class, ensure that the voltage requirement (for example, 380 V) is met during charging. Capacitor changing requires little current, and therefore you can use a small-capacity power supply (2 A is sufficient).

- The method for using a resistor (incandescent lamp) to charge the active rectifier unit is described as follows:

  If you directly connect the drive device to a power supply to charge the DC bus capacitor, it needs to be charged for a minimum of 60 minutes. The charging operation must be performed at a normal indoor temperature without load, and you must connect a resistor in series mode in the 3PH circuit of the power supply.

  For a 380V drive device, use a resistor of 1 kΩ/100W. If the voltage of the power supply is no higher than 380 V, you can also use an incandescent lamp of 100W. If an incandescent lamp is used, it may go off or the light may become very weak.

Figure 7-1 380V driving-device charging circuit example

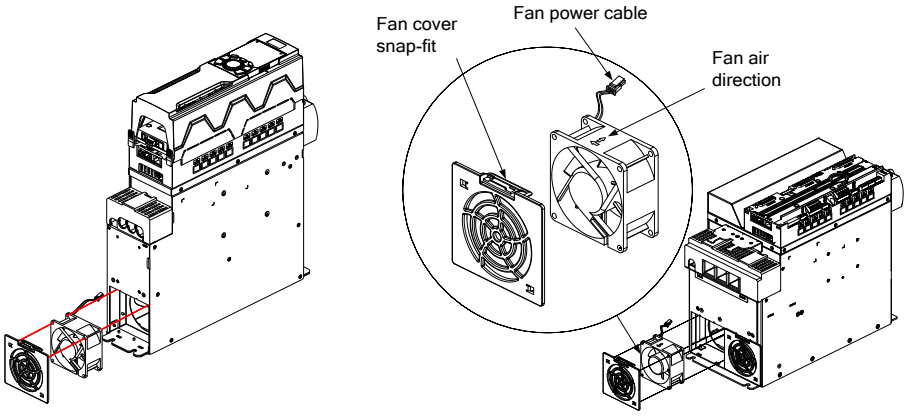

### 7.2.1.2 Electrolytic capacitor replacement

| | |
|---|---|
| ⚠ | Read chapter 1 Safety precautions carefully and follow the instructions to perform operations. Ignoring these safety precautions may lead to physical injury or death, or device damage. |

The electrolytic capacitor of an active rectifier unit must be replaced if it has been used for more than 35,000 hours. For details about the replacement, contact the local INVT office.

## 7.2.2 Cooling fan

- Replacing the fan for A3&A4




Step 1 Disconnect the DC power supply of the drive system and check to ensure there is no voltage in the equipment.

Step 2 Press and hold the snap-fits of the fan cover, and remove the fan cover.

Step 3 Pull the fan out slowly and unplug the fan power cord plug to complete the fan disassembly.

Step 4 Install the new fan in the reverse order of the disassembly steps.

- Replacing the fan for A6&A7

Step 1 Stop the unit, disconnect the AC power supply, and wait for a time no shorter than the waiting time designated on the unit.

Step 2 Remove the fan module front cover from the unit housing.

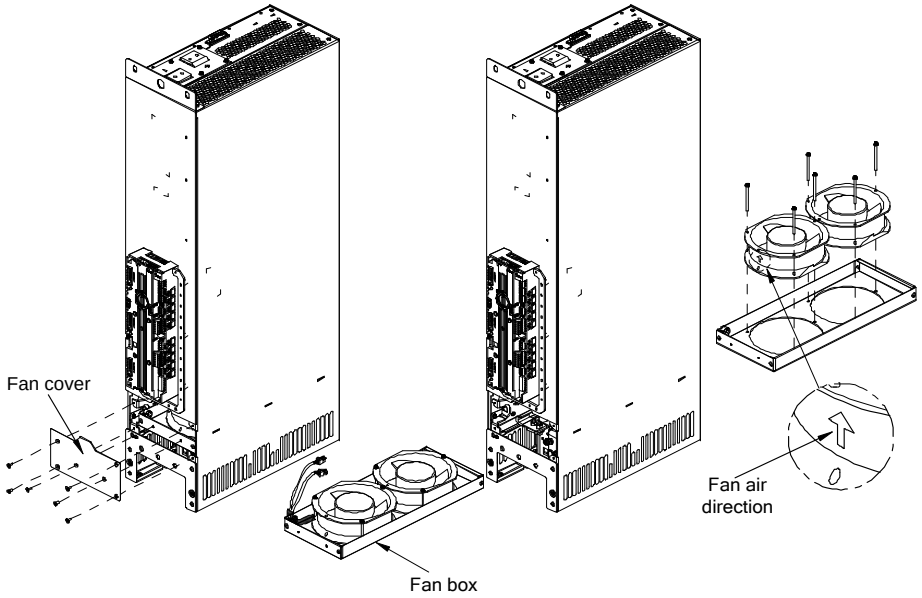
Step 3 Remove the fan module connection cable.

Step 4 Pull out the fan box and remove the fan with a screwdriver.

Step 5 Install a new fan in the fan box. Insert the fan module connection cable to the connector in reverse sequence. Install the front cover. Ensure that the air direction of the fan is consistent with that of the unit, as shown in Figure 7-2.

Step 6 Connect to the power.

Figure 7-2 Fan maintenance for A6&A7 active rectifier unit




- Replacing the fan for A8

The service life of the cooling fan of the active rectifier unit is more than 35000 hours. The actual service life of the cooling fan is related to the use of the unit and the temperature in the ambient environment.

You can view the running duration of the active rectifier unit through P07.14 (Accumulated running time).

The increase of the bearing noise indicates a fan fault. If the unit is applied in a key position, replace the fan once the fan starts to generate unusual noise. You can purchase spares of fans from INVT.

| | |
|---|---|
| ⚠ | Read chapter 1 Safety precautions carefully and follow the instructions to perform operations. Ignoring these safety precautions may lead to physical injury or death, or device damage. |

Step 1 Stop the unit, disconnect the AC power supply, and wait for a time no shorter than the waiting time designated on the unit.

Step 2 Remove the fan module front cover from the unit housing.

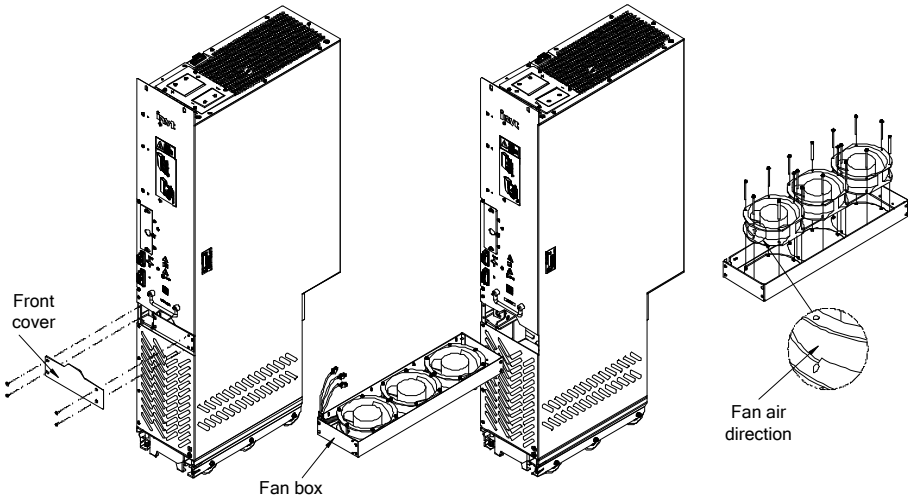
Step 3 Remove the fan module connection cable.

Step 4 Pull out the fan box and remove the fan with a screwdriver.

Step 5 Install a new fan in the fan box. Insert the fan module connection cable to the connector in reverse sequence. Install the front cover. Ensure that the air direction of the fan is consistent with that of the unit, as shown in Figure 7-3.

Step 6 Connect to the power.

Figure 7-3 Fan maintenance for A8 active rectifier unit




## 7.2.3 DC fuse

To check and replace the DC fuse of an A8 active rectifier unit, do as follows:

| | |
|---|---|
| ⚠ | Only qualified electricians can perform this task. Read all the safety precautions. Ignoring these safety precautions may lead to physical injury or death, or device damage. |

Step 1 Stop the unit, disconnect the AC power supply, and wait for a time no shorter than the waiting time designated on the unit.

Step 2 Remove the screws of the protective cover plate of the unit DC fuse and remove the cover plate.

Step 3 Remove the copper bar fixing screws of the DC fuse assembly and remove the DC fuse assembly.

Step 4 Check the condition of the fuse and replace it as needed. When replacing it, install the new fuse and copper bar as an assembly and tighten the screws according to the tightening torque table.

Step 5 Install the protective cover and close the cabinet door.

Step 6 Connect to the power.

## 7.2.4 Active rectifier unit

- Replacement of A6&A7 active rectifier unit

To replace the active rectifier unit, do as follows:

Step 1 Stop the machine and disconnect the AC power.

Step 2 Open the cabinet door and check to ensure there is no voltage in the equipment.

Step 3 Remove the protective plate and disconnect the external connection cables of the active rectifier unit.

Step 4 Disconnect the (+) and (-) DC output copper bars.

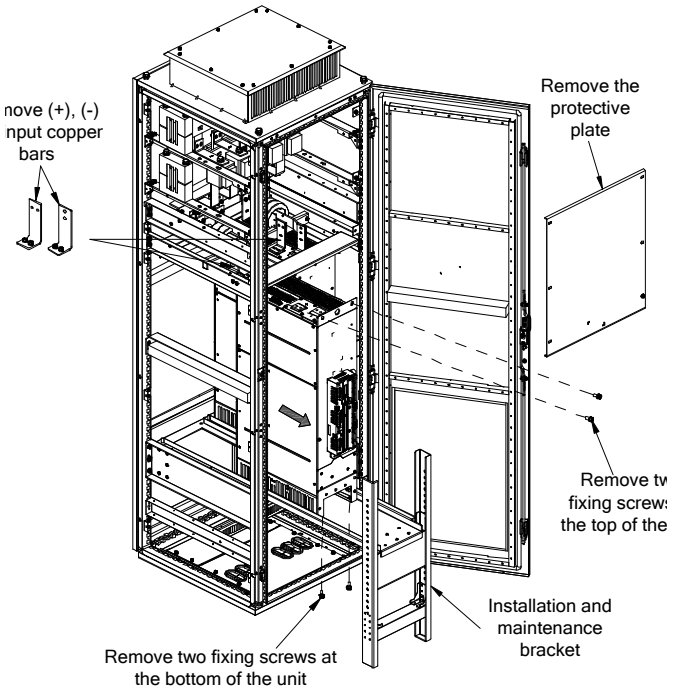
Step 5 Mount the unit maintenance bracket.

Step 6 Remove the (four M8) fixing screws from the top and bottom of the unit.

Step 7 Pull the active rectifier unit to the maintenance bracket until it can be lifted or removed.

Step 8 Install the new active rectifier unit by referring the reverse order of the procedure.

Figure 7-4 Replacement of A6&A7 active rectifier unit




- Replacement of A8 active rectifier unit

To replace the active rectifier unit, do as follows:

Step 1 Stop the machine and disconnect the AC power.

Step 2 Open the cabinet door and check to ensure there is no voltage in the equipment.

Step 3 Disconnect the external connection cables of the active rectifier unit.

Step 4 Disconnect the (+) and (-) DC output copper bars.

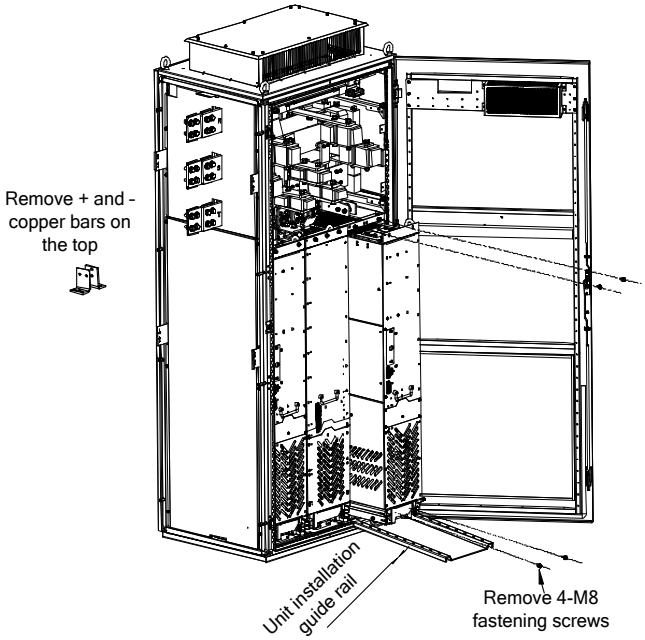
Step 5 Install the unit entry/exit guide rail.

Step 6 Remove the (four M8) fixing screws from the top and bottom of the unit.

Step 7 Pull the active rectifier unit and unfold the anti-tipping stand.

Step 8 Install the new active rectifier unit by referring the reverse order of the procedure.

Figure 7-5 Replacement of A8 active rectifier unit




- Replacement of A8n active rectifier unit

Step 1 Stop the machine and disconnect the AC power.

Step 2 Open the cabinet door and check to ensure there is no voltage in the equipment.

Step 3 Remove the protective plate in the cabinet.

Step 4 Disconnect the external connection cables of the active rectifier unit.

Step 5 Disconnect the (+) and (-) DC input copper bars.

Step 6 Remove the screws connecting the copper bar between the reactor base and the unit (six M6*25 screws in total).

Step 7 Mount the maintenance bracket.

Step 8 Pull the active rectifier unit to the maintenance bracket until it can be lifted or removed.

Step 9 Install the new active rectifier unit by referring the reverse order of the procedure.

Figure 7-6 Replacing the A8n active rectifier unit

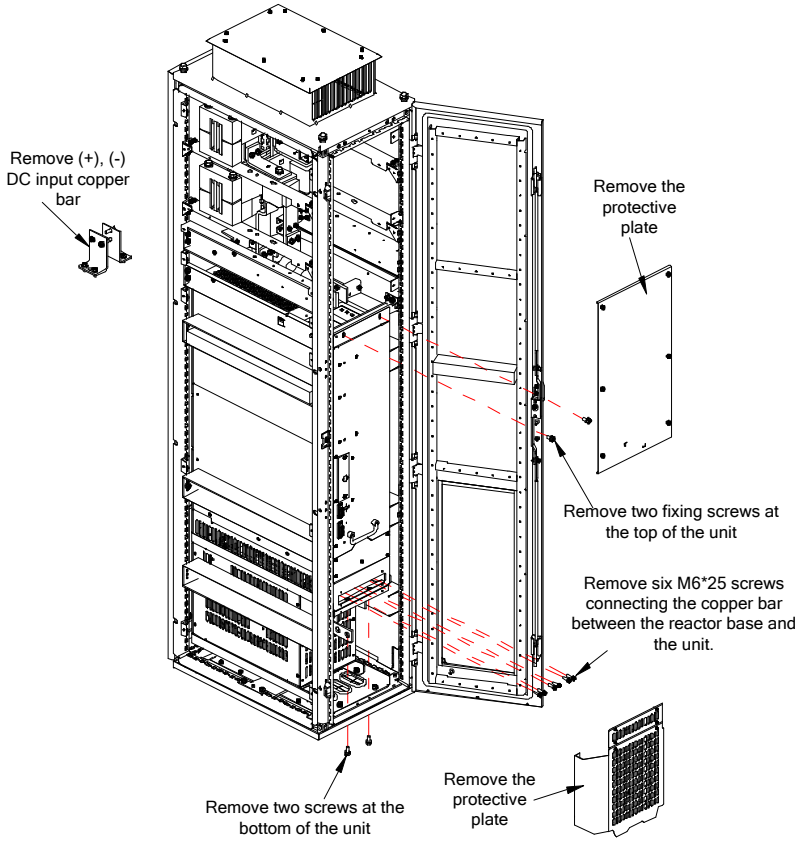
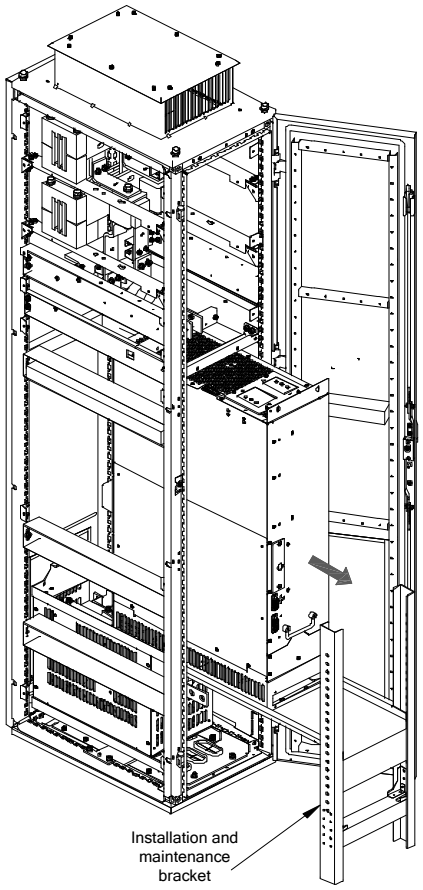



Figure 7-7 Installation and maintenance bracket

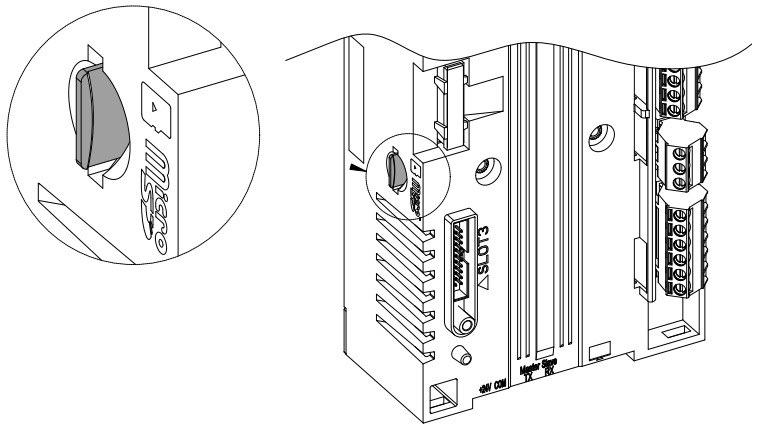


## 7.2.5 Control unit and keypad

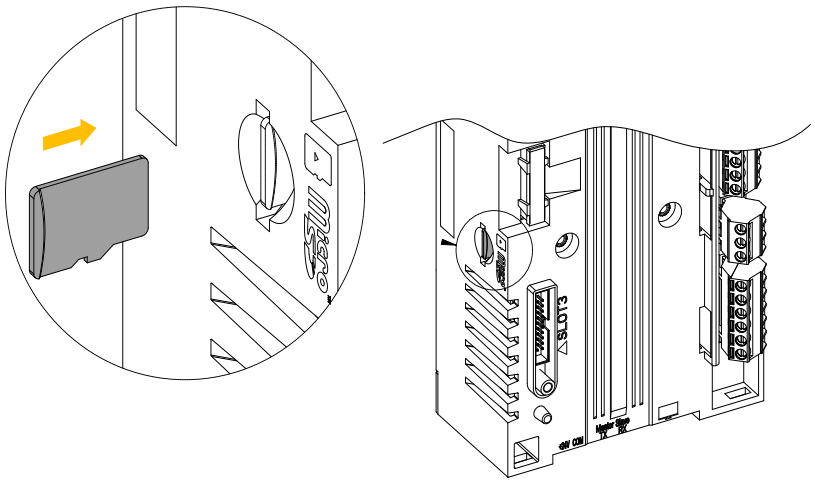
- Replace the storage card

After the control unit is replaced, the existing parameter settings can be preserved by transferring the storage card from the faulty control unit to a new control unit.
The procedure is as follows:

Step 1 Press the SD storage card once, and pull the SD storage card out from the faulty control unit after the SD card is ejected.



Step 2 Insert and push the SD card into the card holder of the new control unit in the direction shown in the figure.



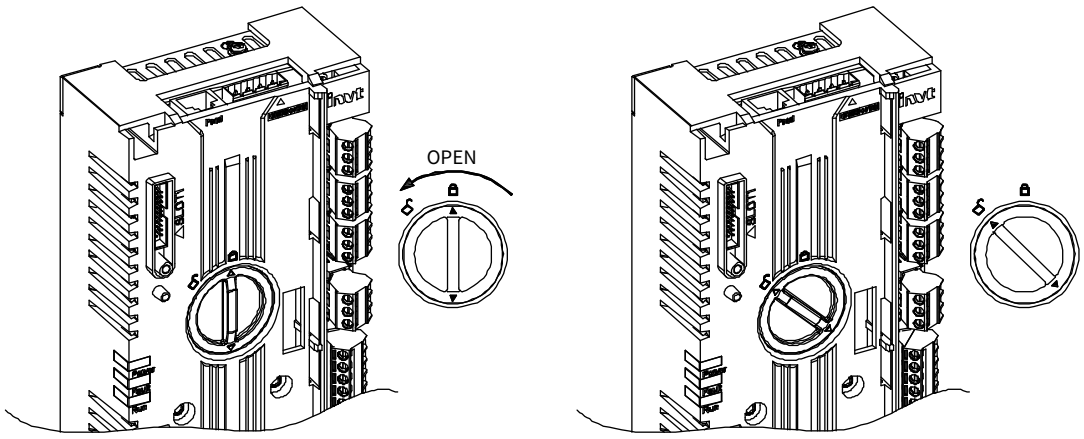
Step 3 Ensure that the SD storage card is pushed into place. Otherwise, abnormalities may occur due to poor contact.

- Replace the control unit battery.

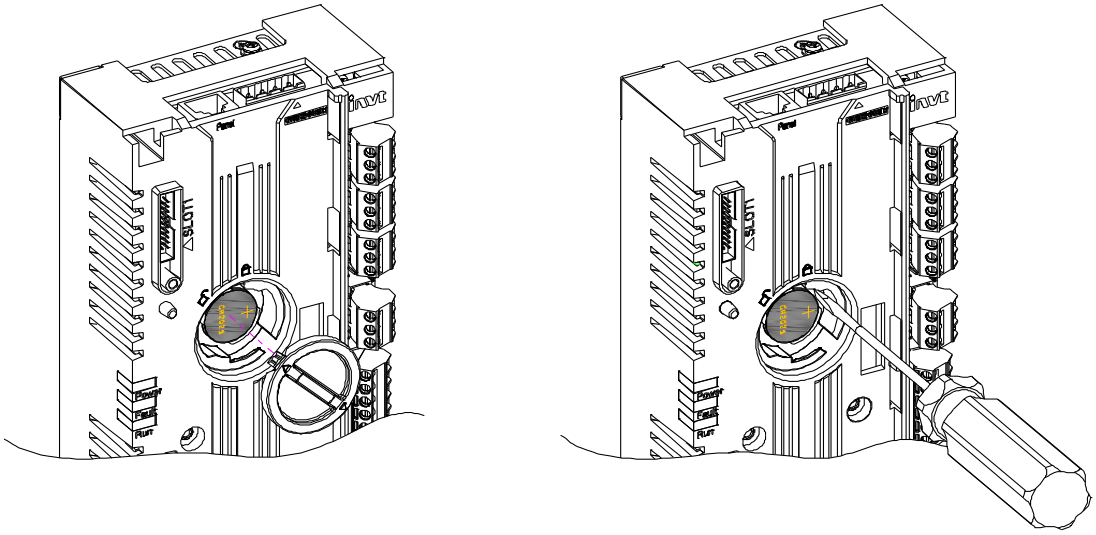
**Note:**The unit battery type is CR2032 (MAXELL).

The procedure is as follows:

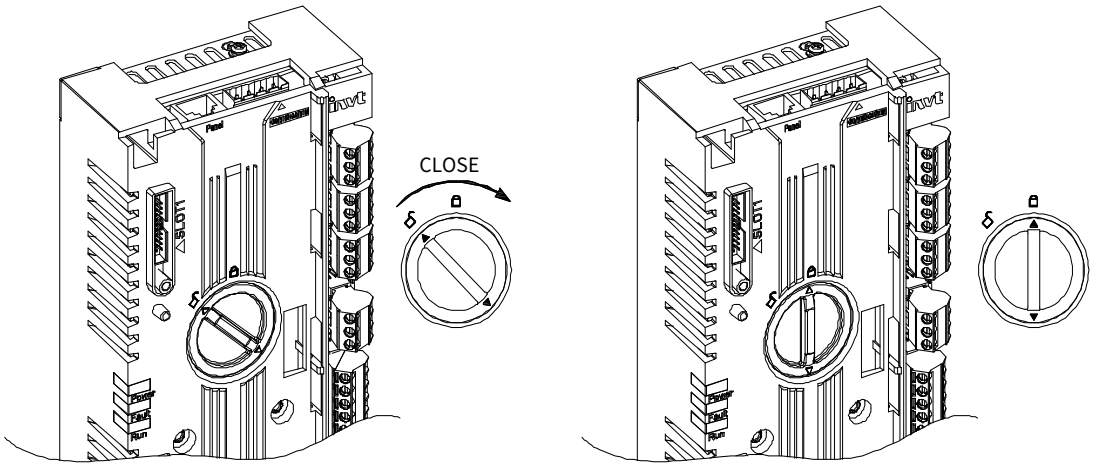
Step 1 Hold the battery cover by hand and rotate it counterclockwise by 45° until the cover opens.




Step 2 Remove the cover, press one side of the battery with a screwdriver, remove and replace the control unit battery with a new one.



Step 3 Close the cover and rotate it clockwise by 45° to tighten it.



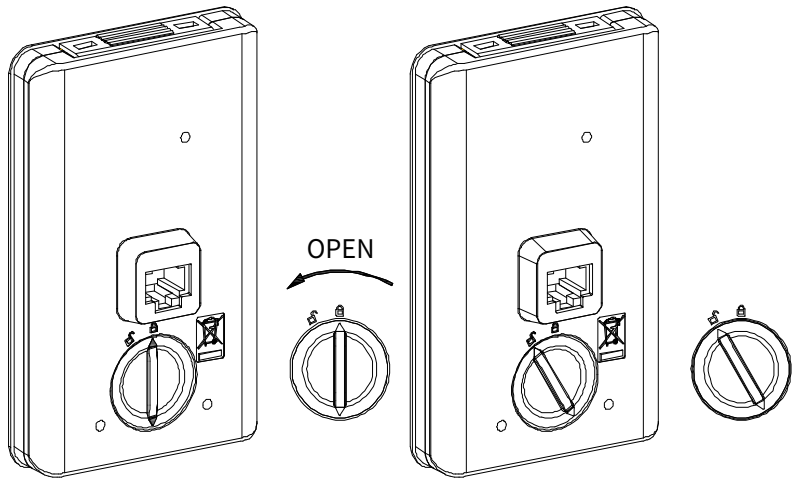

Step 4 Dispose of waste batteries in accordance with local disposal rules or applicable laws.

- Replace the SOP battery.

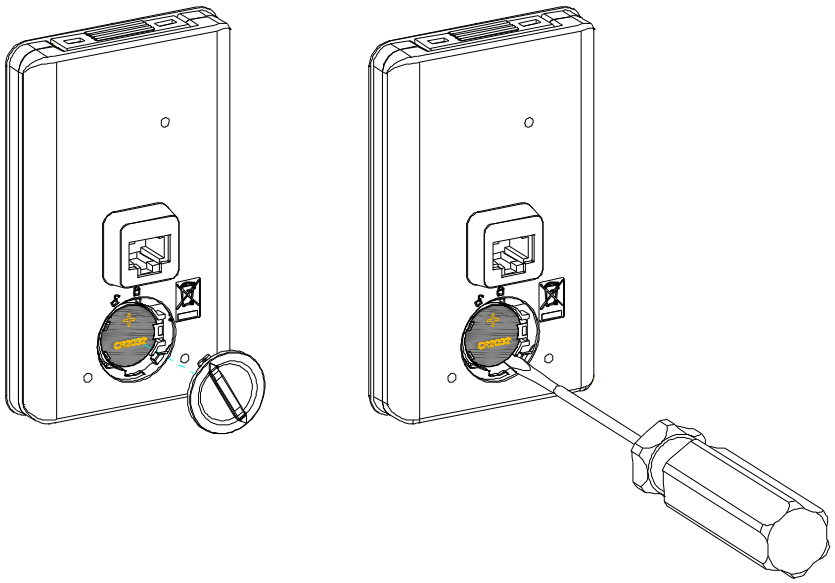
**Note:**The battery type is CR2032 (MAXELL).

The procedure is as follows:

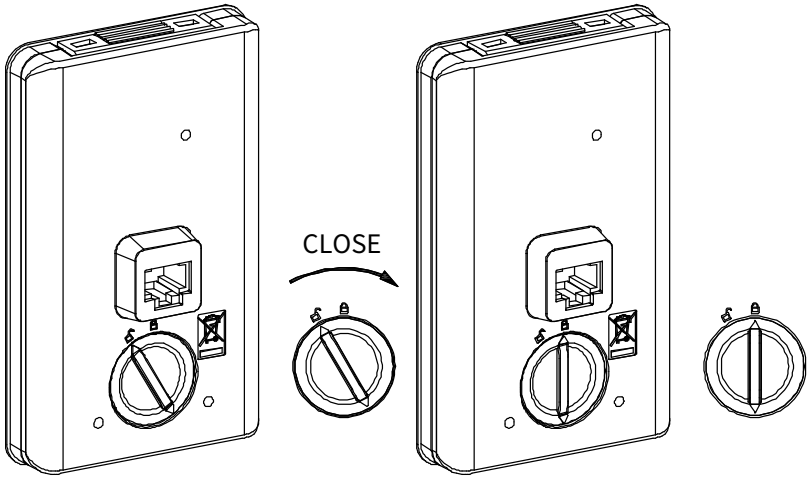
Step 1 Rotate the battery cover counterclockwise by 30° by hand until the cover opens.




Step 2 Remove the cover, press one side of the battery with a screwdriver, remove and replace the battery with a new one.



Step 3 Close the cover and rotate it clockwise by 30° to tighten it.




Step 4 Dispose of waste batteries in accordance with local disposal rules or applicable laws.

# Appendix A Technical data

## A.1 Capacity

Choose an active rectifier model based on the rated current and power of the motor. To endure the rated power of the motor, the rated output current of the active rectifier must be larger or equal to the rated current of the motor. The rated power of the active rectifier must be higher or equal to that of the motor.

**Note:**

- The maximum allowable shaft power of the motor is limited to 1.5 times the rated power of the motor. If the limit is exceeded, the active rectifier automatically restricts the torque and current of the motor. This function effectively protects the input shaft against overload.
- The rated capacity is the capacity at the ambient temperature of 40°C.
- You need to check and ensure that the power flowing through the common DC connection in the common DC system does not exceed the rated power of the motor.

## A.2 Grid specifications

| | |
|---|---|
| Grid voltage | 380–440VAC 3PH±10%, -15%<1min<br>520–690VAC 3PH±10%, -15%<1min |
| Short-circuit capacity | According to the definition of IEC61439-1, the short-circuit capacity indicates the apparent power during 3PH short circuit when the power system is in the specified running mode, the size of which is equal to the product of the short-circuit current and the rated voltage at the short-circuit. According to the short-circuit current requirement, the maximum allowable short-circuit current at the incoming end is 100kA. Therefore, the product is applicable to scenarios where the transmitted current in the circuit is no larger than 100kA when the VFD runs at the maximum rated voltage. |
| Frequency | 50/60Hz±5%, with a maximum change rate of 20%/s |

## A.3 Environment condition

| Item | Run | Storage | Transportation |
|---|---|---|---|
| Ambient temperature | -10–+50°C<br>40°C–50°C. Derating is required. | -40–+70°C<br>The air temperature change rate is less than 1°C/min. | -40–+70°C |
| Relative air humidity | 5%–95%, no condensation<br>Not less than 3K3 | 5%–95%, no condensation<br>Not less than 1K4 | 5%–95%, no condensation<br>Not less than 2K3 |
| | No oil mist, salt spray, freezing, condensation, dripping water, spraying, and splashing. The max. allowable relative humidity is 60% in the scenarios with corrosive gases. | | |
| Environmental class/hazardous chemicals | EN 60721-3-3 3 C2 | EN 60721-3-1 1 C2 | EN 60721-3-2 2 C2 |
| Mechanical active substance | EN 60721-3-3 3 S1 | EN 60721-3-1 1 S1 | EN 60721-3-2 2 S1 |

| Item | | Run | Storage | Transportation |
|---|---|---|---|---|
| Organic/biological impact | | EN 60721-3-3 3 B1 | EN 60721-3-1 1 B1 | EN 60721-3-2 2 B1 |
| Pollution level | | EN 61800-5-1, level 2 | | |
| Installation altitude | | 0–2000m. Derating is required when the altitude exceeds 1000m. | | |
| **Mechanical stability** | | | | |
| Vibration stress | Displacement | 10–57Hz, 0.075mm<br>Cabinet: 5–13.2Hz, 1mm | 5~9Hz, 1.5mm | 5~9Hz, 3.1mm |
| | Acceleration | 58−200Hz, 9.8m/s²mm<br>Cabinet: 13.2–100Hz, 0.7g | 9–200Hz, 4.9m/s² | 9–200Hz, 9.8m/s² |
| | Compliant level | 2M2 | 1M2 | 2M2 |
| Shock stress | Acceleration | 20ms, 98m/s² | 11ms, 100m/s² | 11ms, 100m/s² |
| | Compliant level | 3M4 | 1M2 | 2M2 |

# A.4 Application standards

The following table describes the standards that our active rectifier products comply with.

| | |
|---|---|
| EN/ISO 13849-1 | Safety of machinery—Safety-related parts of control systems—Part 1: General principles for design |
| IEC/EN 60204-1 | Safety of machinery. Electrical equipment of machines. Part 1: General requirements |
| IEC/EN 62061 | Safety of machinery—Safety-related functional safety of electrical, electronic, and programmable electronic control systems |
| IEC/EN 61800-3 | Adjustable speed electrical power drive systems. Part 3: EMC requirements and specific test methods |
| IEC/EN 61800-5-1 | Adjustable speed electrical power drive systems—Part 5-1: Safety requirements—Electrical, thermal and energy |
| IEC/EN 61800-5-2 | Adjustable speed electrical power drive systems—Part 5-2: Safety requirements—Function |
| GB/T 30844.1-2014 | General-purpose variable-frequency adjustable-speed equipment of 1 kV and lower—Part 1: Technical conditions |
| GB/T 30844.2-2014 | General-purpose variable-frequency adjustable-speed equipment of 1 kV and lower—Part 2: Test methods |
| GB/T 30844.3-2017 | General-purpose variable-frequency adjustable-speed equipment of 1 kV and lower—Part 3: Safety requirements |

## A.4.1 CE marking

The CE marking on the product nameplate indicates that the product is CE-compliant, meeting the regulations of the European low-voltage directive (2014/35/EU) and EMC directive (2014/30/EU).

## A.4.2 EMC compliance declaration

European union (EU) stipulates that the electric and electrical devices sold in Europe cannot generate electromagnetic disturbance that exceeds the limits stipulated in related standards, and can work properly in environments with certain electromagnetic interference. The EMC product standard (EN 61800-3) describes the EMC standards and specific test methods for adjustable speed electrical power drive systems. Our products have been compliant with these regulations.

# A.5 EMC regulations

The EMC product standard (EN 61800-3) describes the EMC requirements on VFDs.

- Application environment categories:
  - ✧ First environment: Civilian environment, including application scenarios where VFDs are directly connected to the civil power supply low-voltage grids without intermediate transformers.
  - ✧ Second environment: All environments except those in Category I.
- Active rectifier categories:
  - ✧ C1: Rated voltage lower than 1000V, applied to the first environment.
  - ✧ C2: Rated voltage lower than 1000V, non-plug, socket, or mobile devices; power drive systems that must be installed and operated by specialized personnel when applied to environments of Category I

  **Note:** The EMC standard IEC/EN 61800-3 no longer restricts the power distribution of the active rectifier, but it specifies their use, installation, and commissioning. Specialized personnel or organizations must have the necessary skills (including the EMC-related knowledge) for installing and/or performing commissioning on the electrical drive systems.
  - ✧ C3: Rated voltage lower than 1000 V, applied to environments of Category II. They cannot be applied to environments of Category I.
  - ✧ C4: Rated voltage higher than 1000 V, or rated current higher or equal to 400 A, applied to complex systems in the second environment.

## A.5.1 VFD category of C2

The induction disturbance limit meets the following stipulations:

1. Select the motor and control cables according to the description in the manual.
2. Install the rectifier according to the description in the manual.

| | |
|---|---|
| ⚠ | The product may generate radio interference, you need to take measures to reduce the interference. |

## A.5.2 VFD category of C3

The anti-interference performance of the rectifier meets the requirements of the second environment in the IEC/EN 61800-3 standard.

The induction disturbance limit meets the following stipulations:

1. Select the motor and control cables according to the description in the manual.
2. Install the rectifier according to the description in the manual.

| | |
|---|---|
| ⚠ | Rectifiers of category C3 cannot be applied to civilian low-voltage common grids. When applied to such grids, the rectifier may generate radio frequency electromagnetic interference. |

# Appendix B Dimension drawings

Figure B-1 A3 frame dimensions (unit: mm)

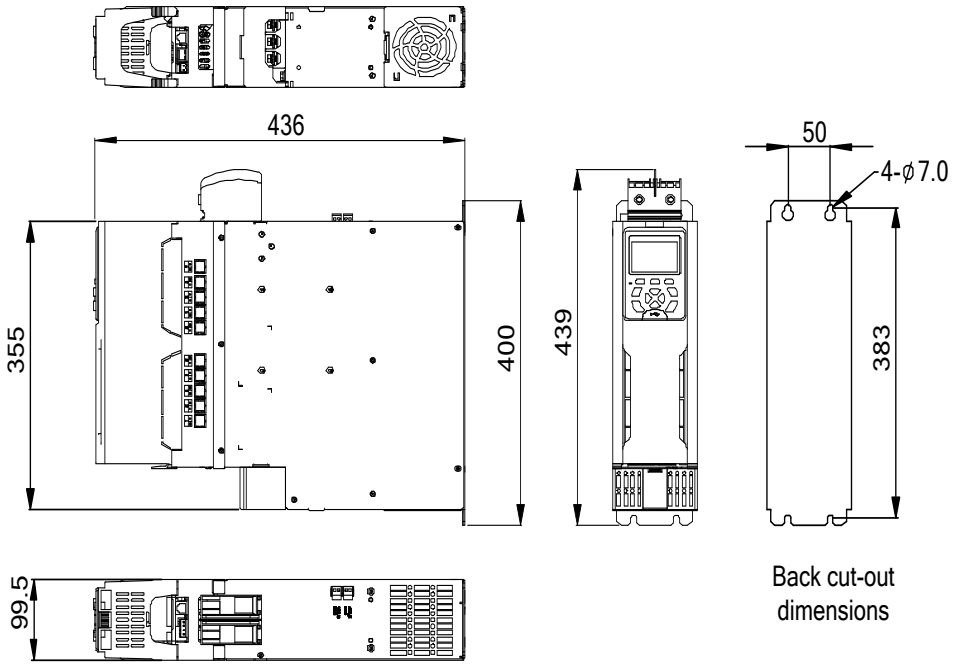



Figure B-2 A4 frame dimensions (unit: mm)

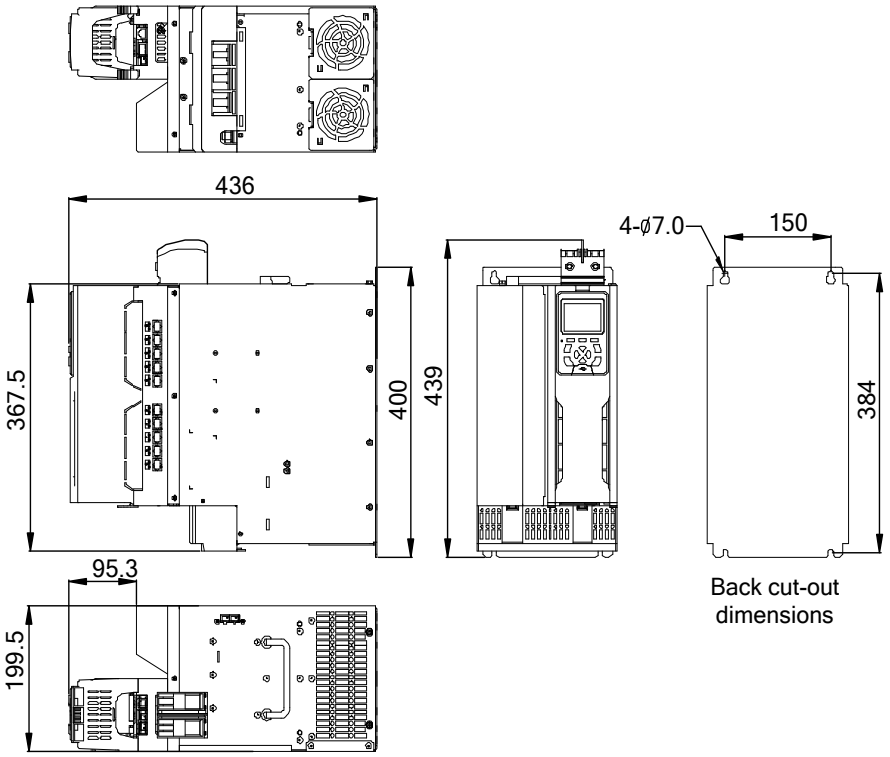


Figure B-3 A6 unit installation dimensions (unit: mm)

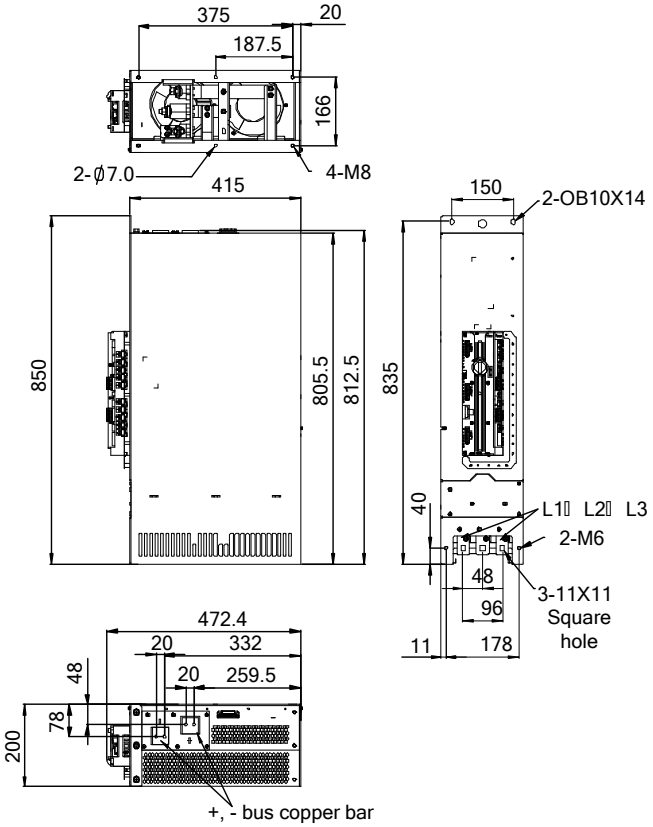



Figure B-4 A7 unit installation dimensions (unit: mm)

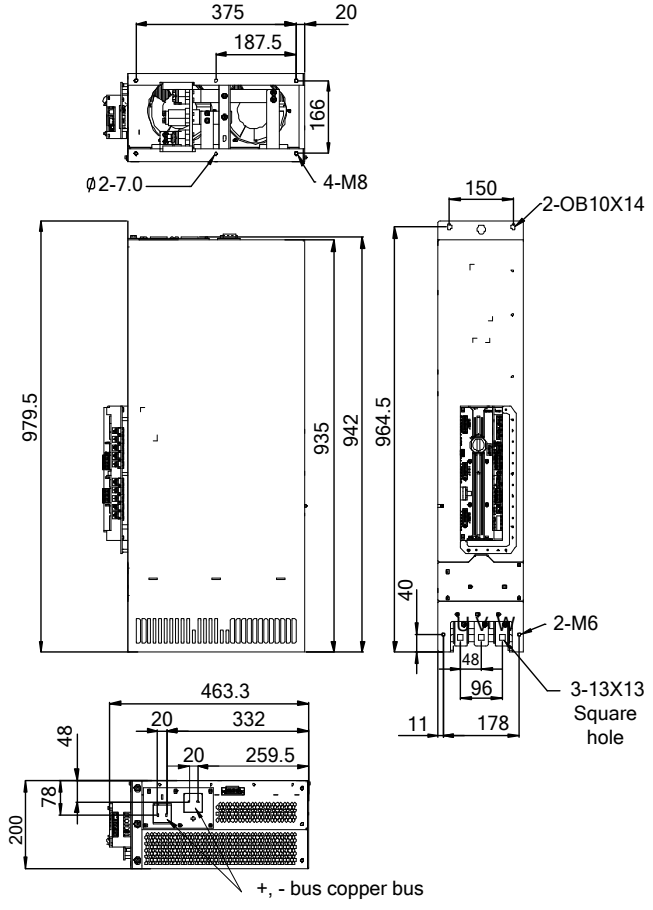


Figure B-5 A8 unit installation dimensions (unit: mm)

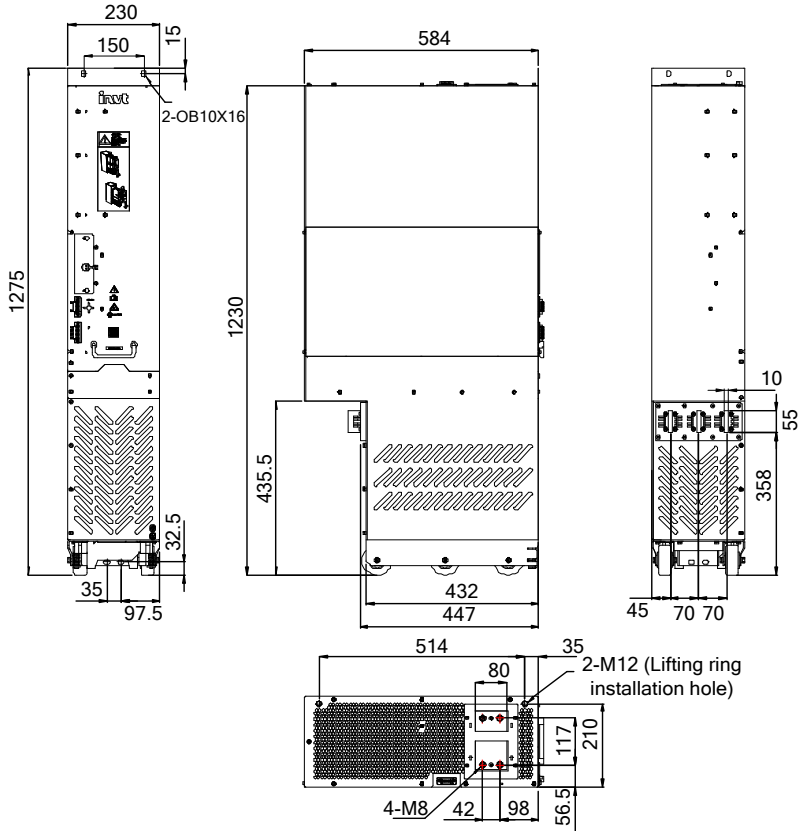



Figure B-6 Installation dimensions of A8 unit fast connector (unit: mm)

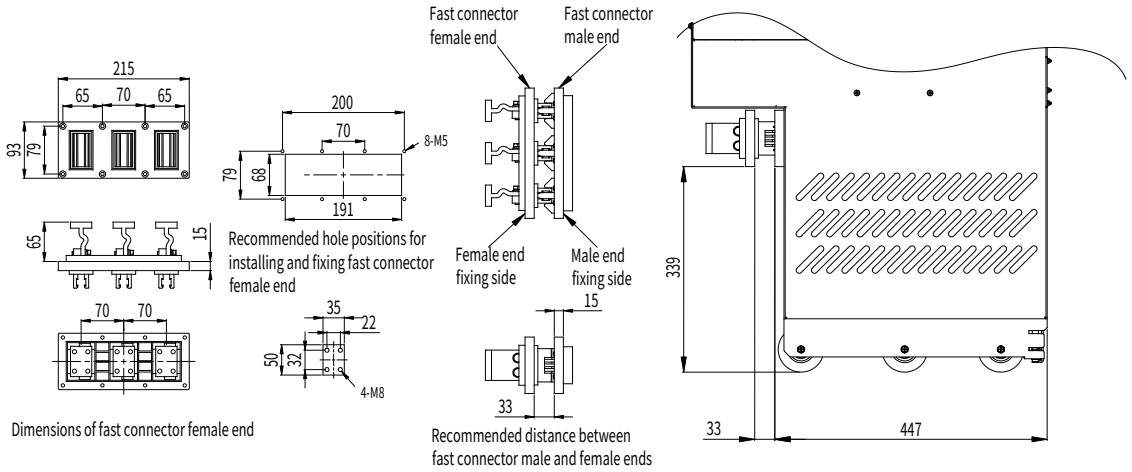


Figure B-7 Layout of 1*A8 frame bottom support

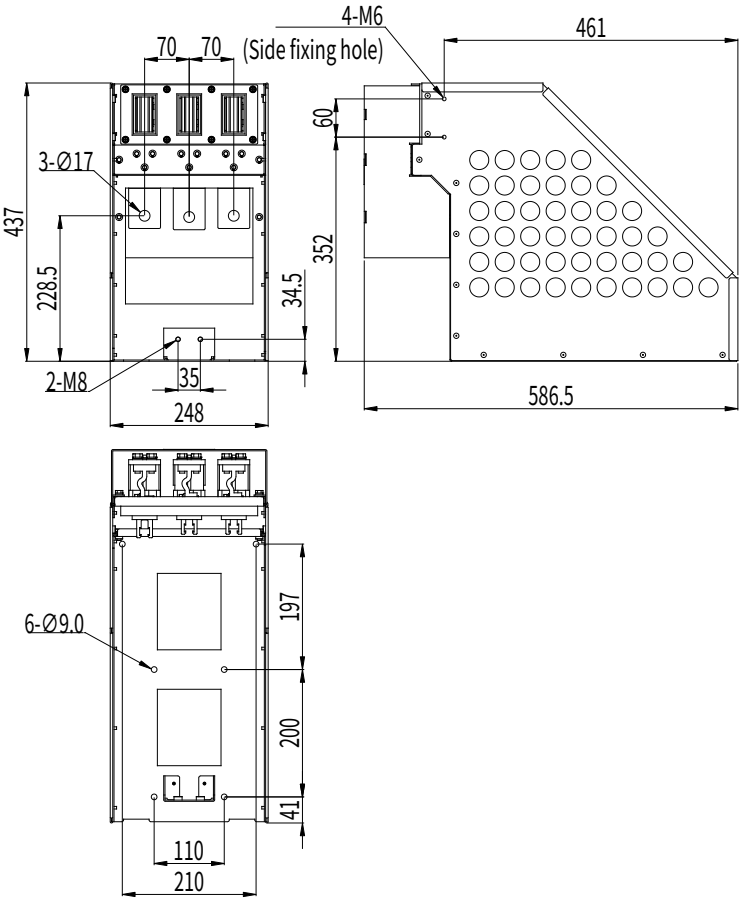



Figure B-8 A8+LCL frame installation dimensions (unit: mm)

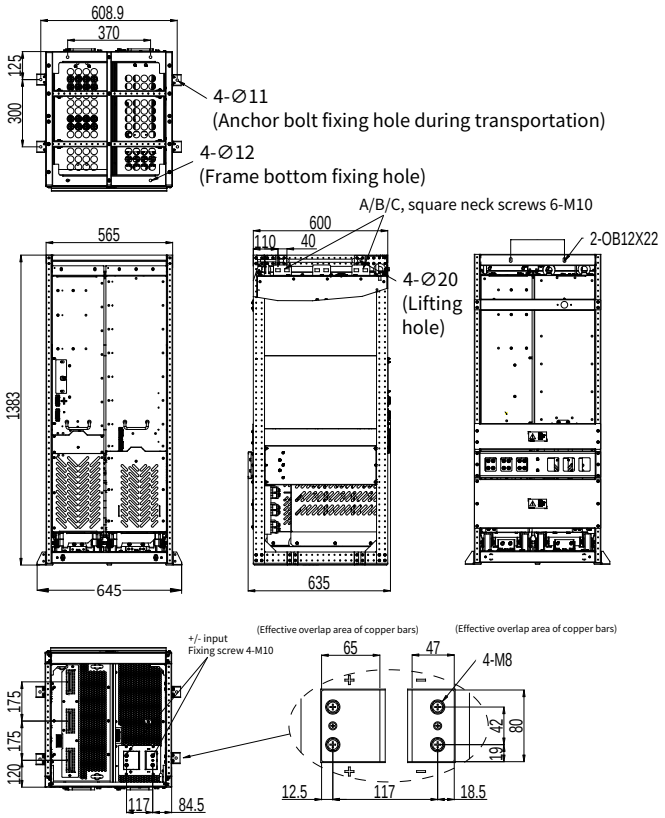
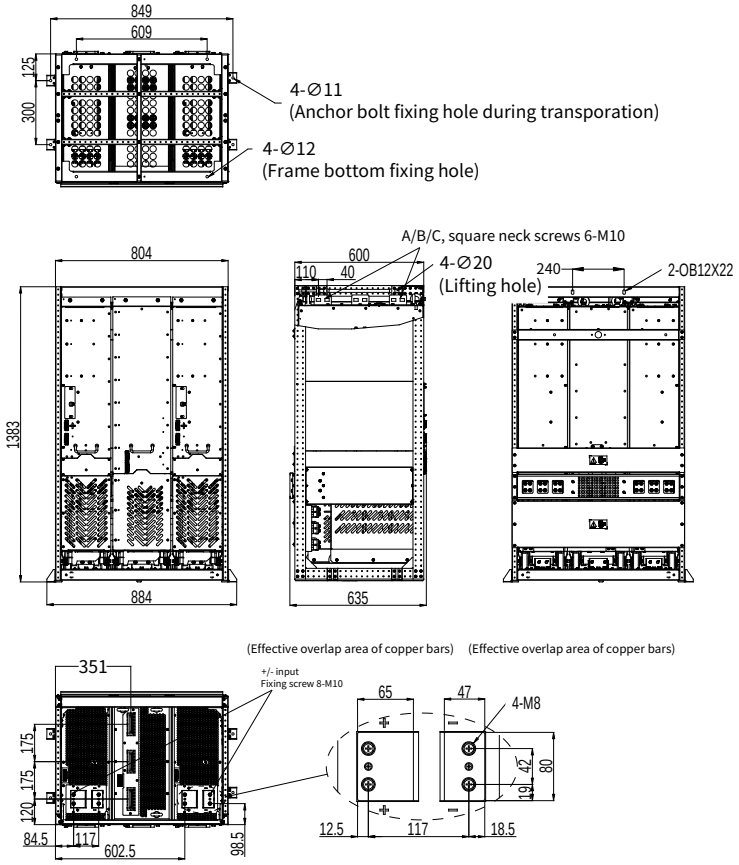
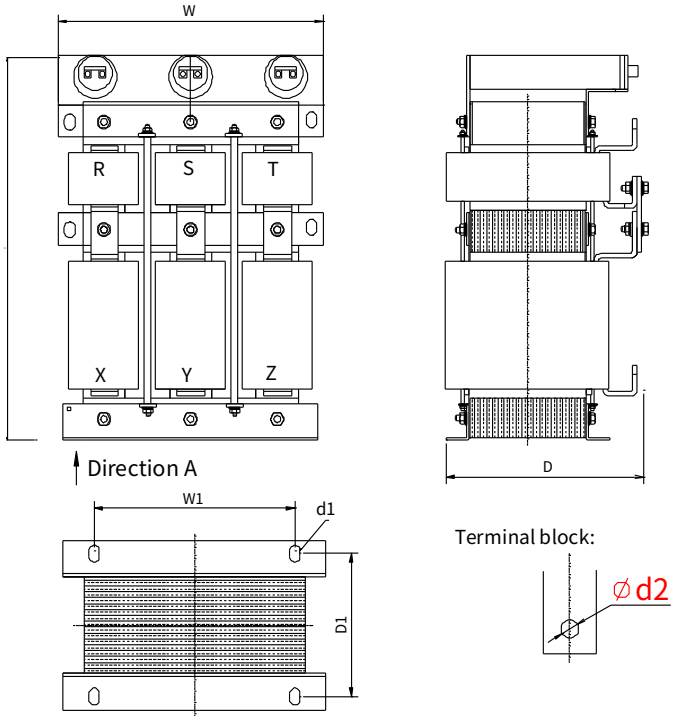


Figure B-9 2*A8+LCL frame installation dimensions (unit: mm)

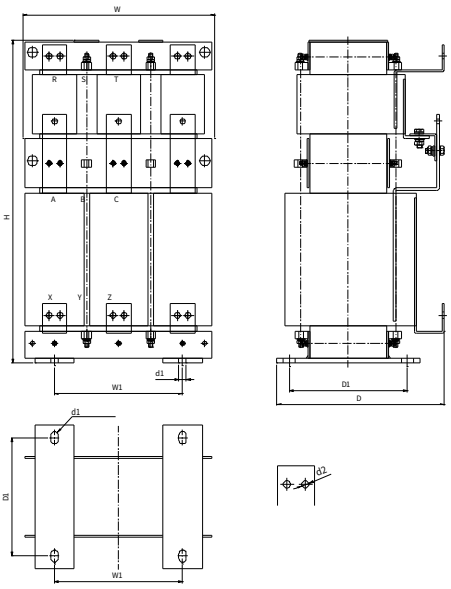



- 0094–0312 LCL filtering component dimensions (unit: mm):



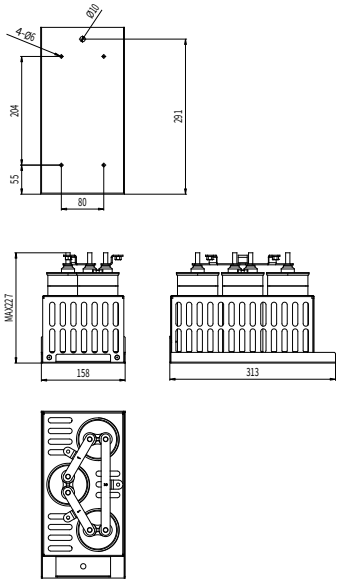
| LCL model | Outline dimension (mm) | | | Installation dimension (mm) | | | | Net weight (kg) | Heat dissipation (kW) |
|---|---|---|---|---|---|---|---|---|---|
| | W | H | D | W1 | D1 | d1 | d2 | | |
| LCL-0116-0.4SA-4149-RO | 325 | 560 | 285 | 243±1 | 149±2 | 4-M12 | 11 | 75 | 0.428 |
| LCL-0180-0.4SA-4149-RO | 390 | 590 | 330 | 260±1 | 174±2 | 4-M15 | 13 | 136 | 0.513 |
| LCL-0220-0.4SA-4149-RO | 630 | 390 | 340 | 260±1 | 184±2 | 4-M15 | 13 | 146 | 0.66 |
| LCL-0335-0.4SA-4149-RO | 430 | 725 | 350 | 350±1 | 196±2 | 4-M15 | 13 | 180 | 1.448 |

- 0395–0516 reactor component dimensions (unit: mm):




| Dual-L reactor model | Outline dimension (mm) | | | Installation dimension (mm) | | | | Net weight (kg) | Heat dissipation (kW) |
|---|---|---|---|---|---|---|---|---|---|
| | W | H | D | W1 | D1 | d1 | d2 | | |
| LCL-380A-00214-2 | 390 | 630 | 340 | 260±**2** | 184±3 | 4-M15 | 13 | 200 | 1.3 |
| LCL-516A-01504-2 | 390 | 665 | 350 | 260±1 | 240±2 | 4-M15 | 2*12 | 220 | 1.15 |

- 0395–0516 capacitor component dimensions (unit: mm):



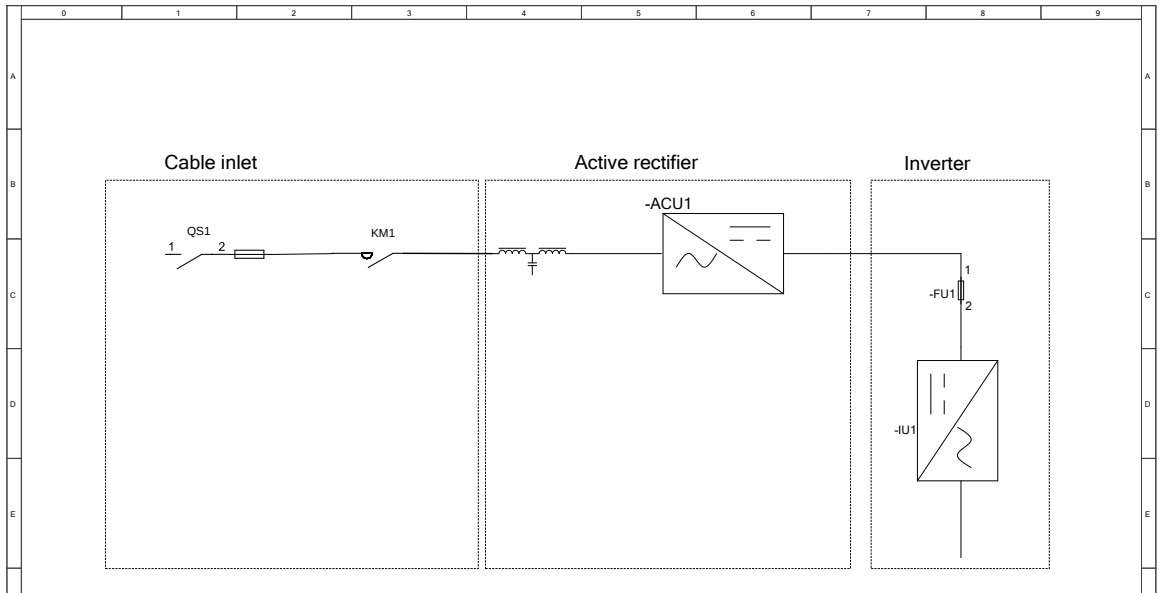
# Appendix C Example electrical diagram

## C.1 GD880 active rectifier basic example electrical diagram (A3–A7)

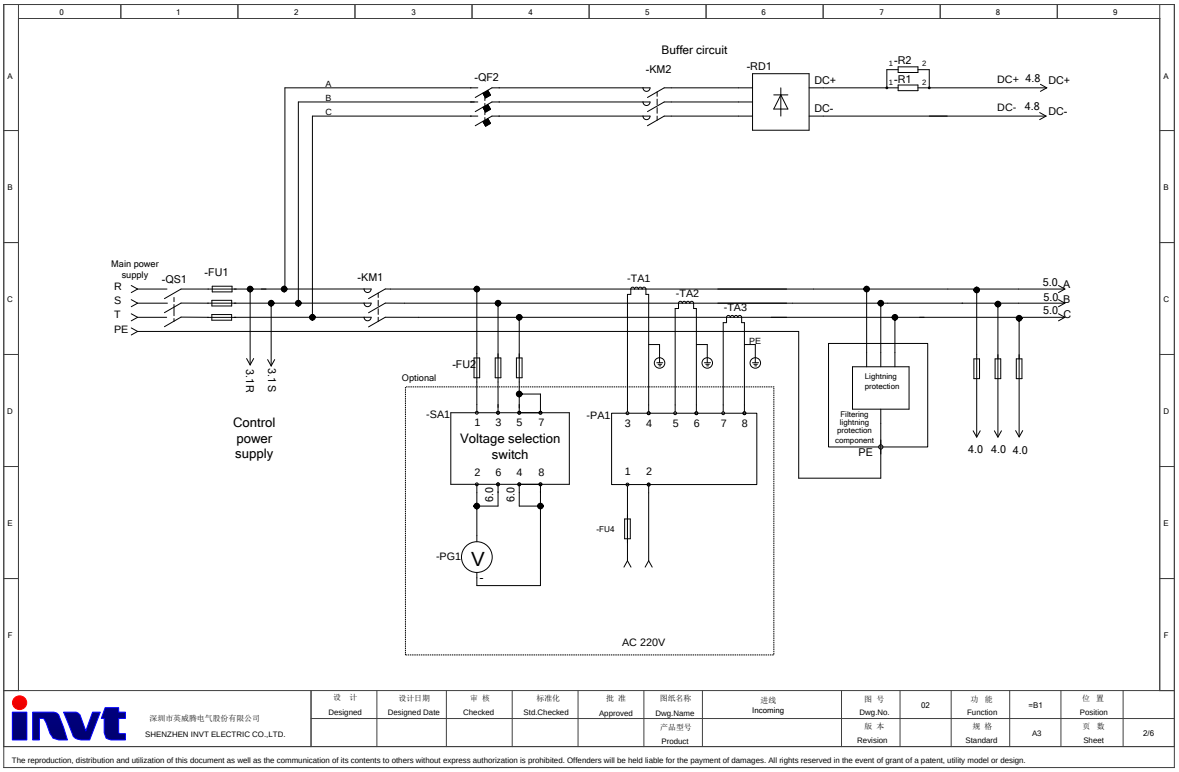
GD880 active rectifier basic electrical drawing (A3-A7)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 深圳市英威腾电气股份有限公司 SHENZHEN INVT ELECTRIC CO.,LTD. | 设 计 Designed | 设计日期 Designed Date | 审 核 Checked | 标准化 Std.Checked | 批 准 Approved | 图纸名称 Dwg.Name | 封面 Cover | 图 号 Dwg.No. | | 功 能 Function | =B0 | 位 置 Position | |
| | | | | | | 产品型号 Product | | 版 本 Revision | | 规 格 Standard | A3 | 页 数 Sheet | 1/1 |

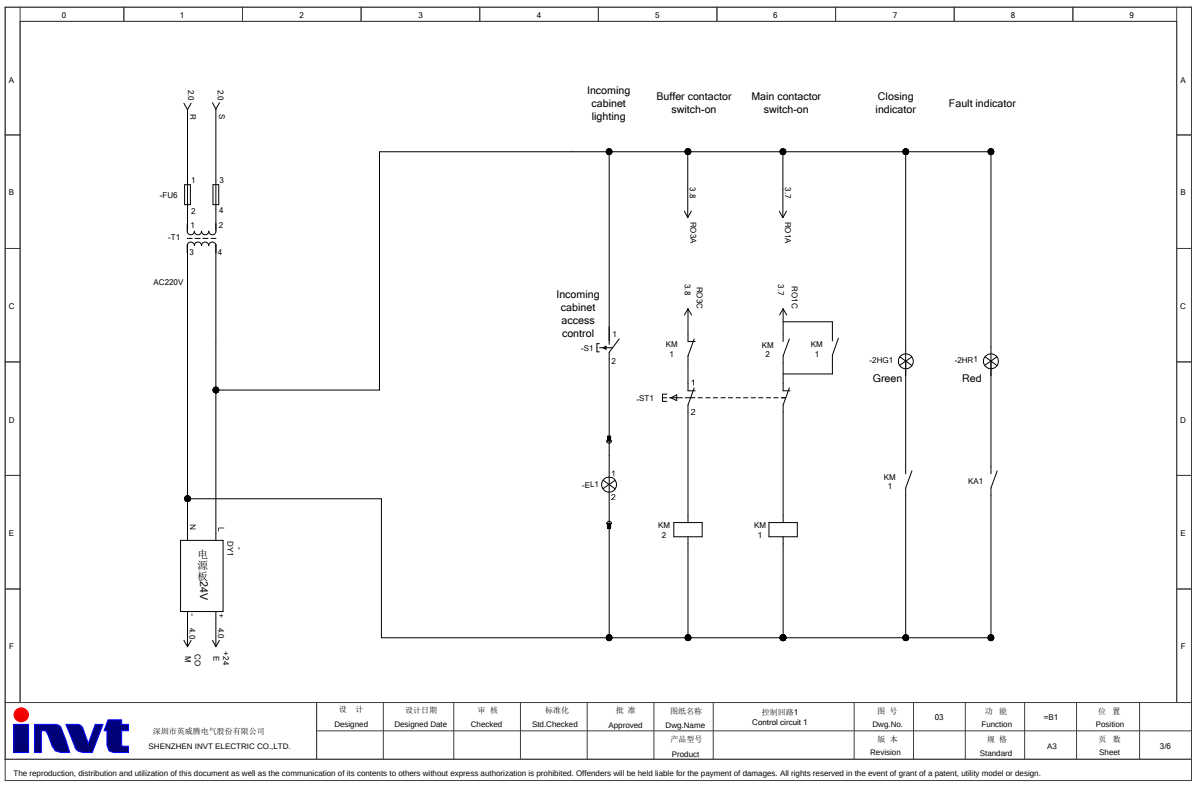


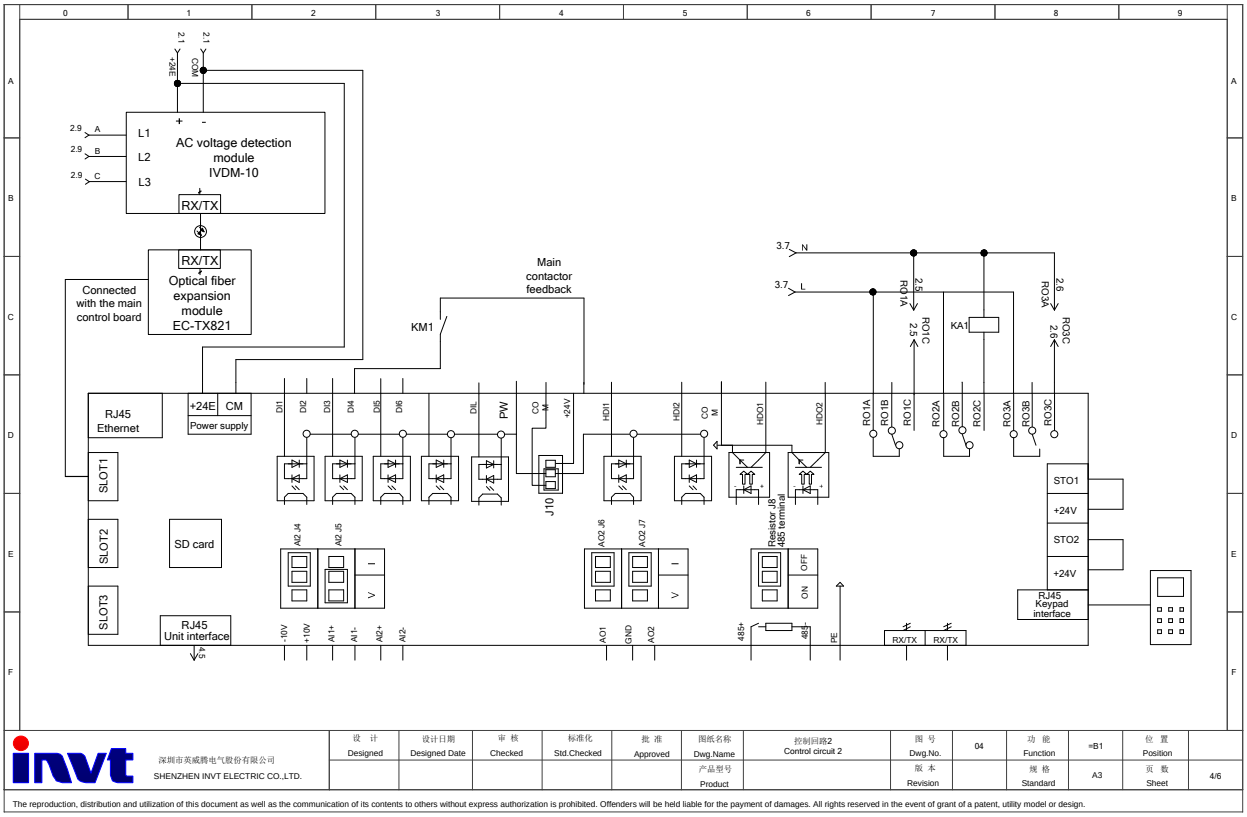



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 深圳市英威腾电气股份有限公司 SHENZHEN INVT ELECTRIC CO.,LTD. | 设 计 Designed | 设计日期 Designed Date | 审 核 Checked | 标准化 Std.Checked | 批 准 Approved | 图纸名称 Dwg.Name | 系统图 System electrical diagram | 图 号 Dwg.No. | 01 | 功 能 Function | =B1 | 位 置 Position | |
| | | | | | | 产品型号 Product | | 版 本 Revision | | 规 格 Standard | A3 | 页 数 Sheet | 1/6 |






AC voltage detection module IVDM-10
RX/TX
Optical fiber expansion module EC-TX821
Connected with the main control board
Main contactor feedback
KM1
KA1
RJ45 Ethernet
Power supply
SLOT1
SLOT2
SLOT3
SD card
RJ45 Unit interface
RJ45 Keypad interface
STO1
STO2
+24V
Resistor of 485 terminal
SHENZHEN INVT ELECTRIC CO.,LTD.
Control circuit 2
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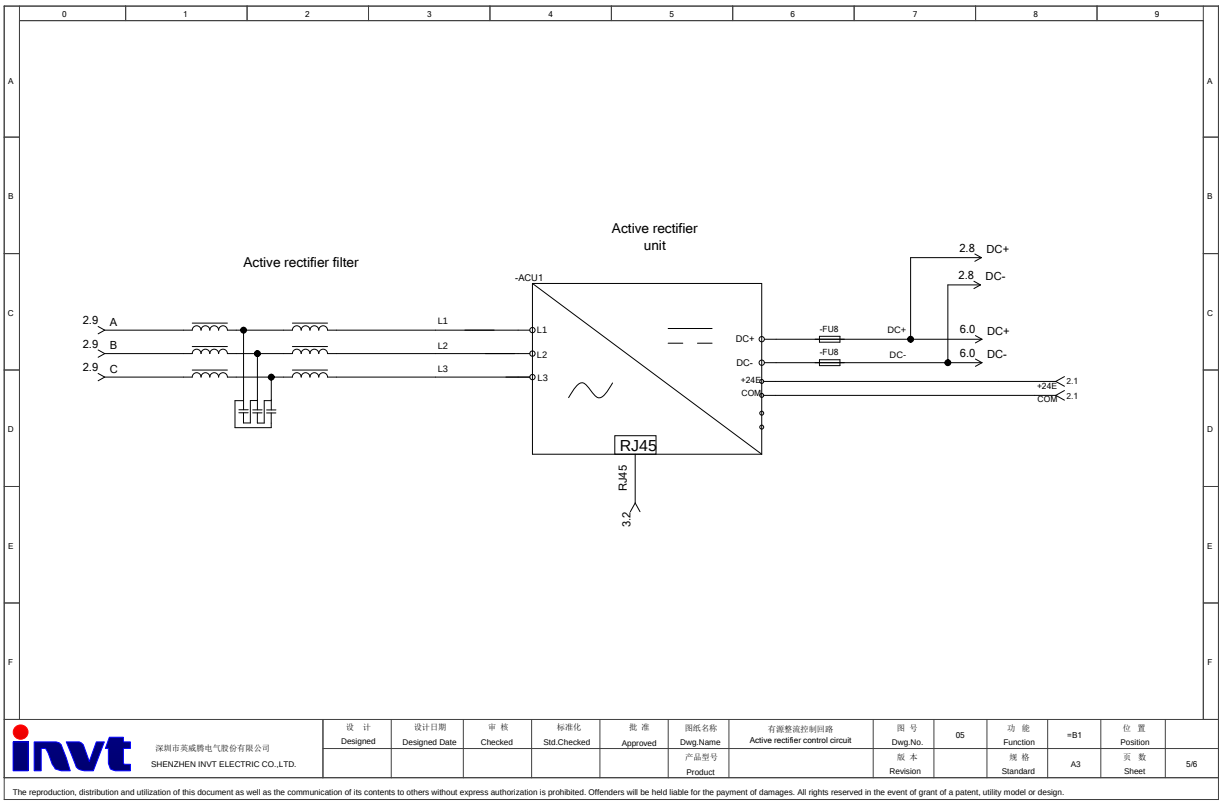
Active rectifier filter
Active rectifier unit
-ACU1
-FU8
RJ45
SHENZHEN INVT ELECTRIC CO.,LTD.
Active rectifier control circuit
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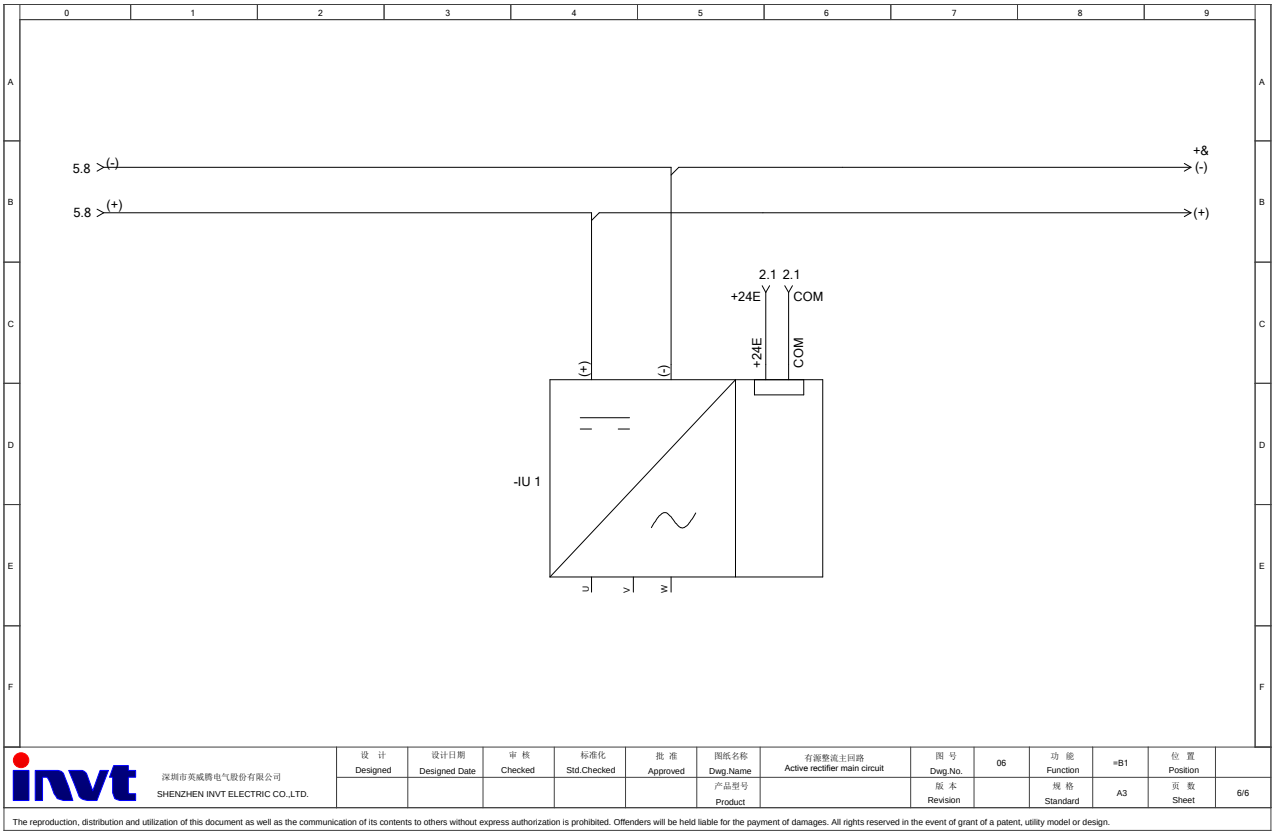


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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 深圳市英威腾电气股份有限公司 SHENZHEN INVT ELECTRIC CO.,LTD. | 设 计 Designed | 设计日期 Designed Date | 审 核 Checked | 标准化 Std.Checked | 批 准 Approved | 图纸名称 Dwg.Name | 有源整流主回路 Active rectifier main circuit | 图 号 Dwg.No. | 06 | 功 能 Function | =B1 | 位 置 Position | |
| | | | | | | 产品型号 Product | | 版 本 Revision | | 规 格 Standard | A3 | 页 数 Sheet | 6/6 |



# C.2 GD880 active rectifier basic example electrical diagram (A8)

GD880 active rectifier basic electrical drawing (A8)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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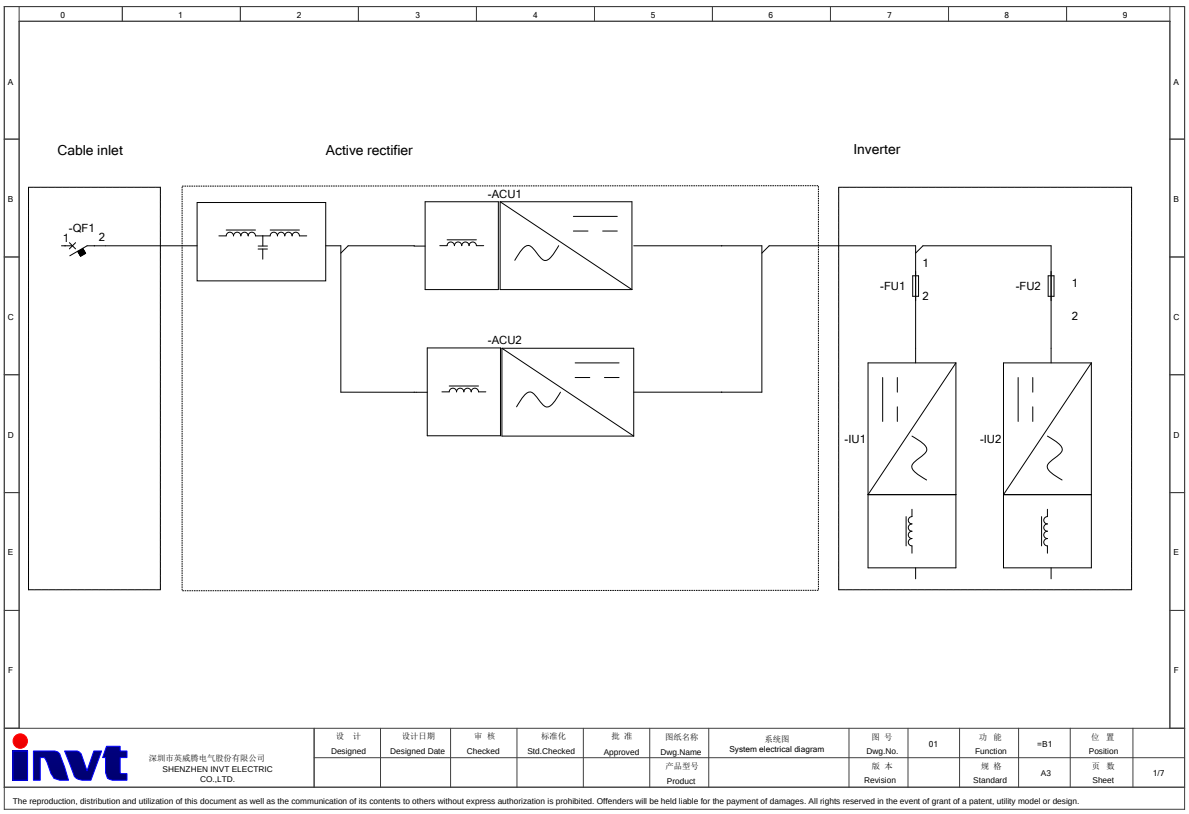
| | | | | | | 产品型号 Product | | 版 本 Revision | | 规 格 Standard | A3 | 页 数 Sheet | 1/1 |


Cable inlet
Active rectifier
Inverter
-QF1
-ACU1
-ACU2
-FU1
-FU2
-IU1
-IU2
深圳市英威腾电气股份有限公司
SHENZHEN INVT ELECTRIC CO.,LTD.
System electrical diagram
01
=B1
A3
1/7
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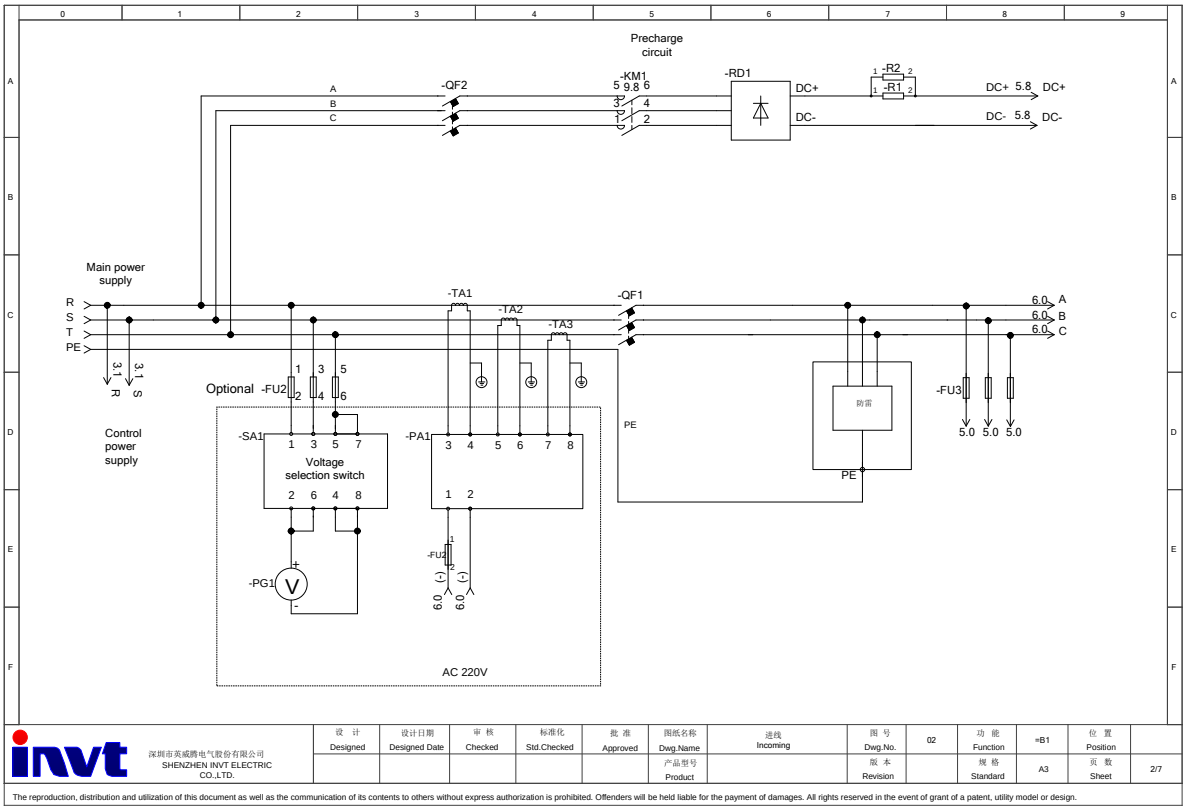
Precharge circuit
-QF2
-KM1
-RD1
-R2
-R1
DC+
DC-
Main power supply
R
S
T
PE
-TA1
-TA2
-TA3
-QF1
Optional -FU2
Control power supply
-SA1
Voltage selection switch
-PA1
-PG1
-FU2
-FU3
防雷
PE
AC 220V
深圳市英威腾电气股份有限公司
SHENZHEN INVT ELECTRIC CO.,LTD.
Incoming
02
=B1
A3
2/7
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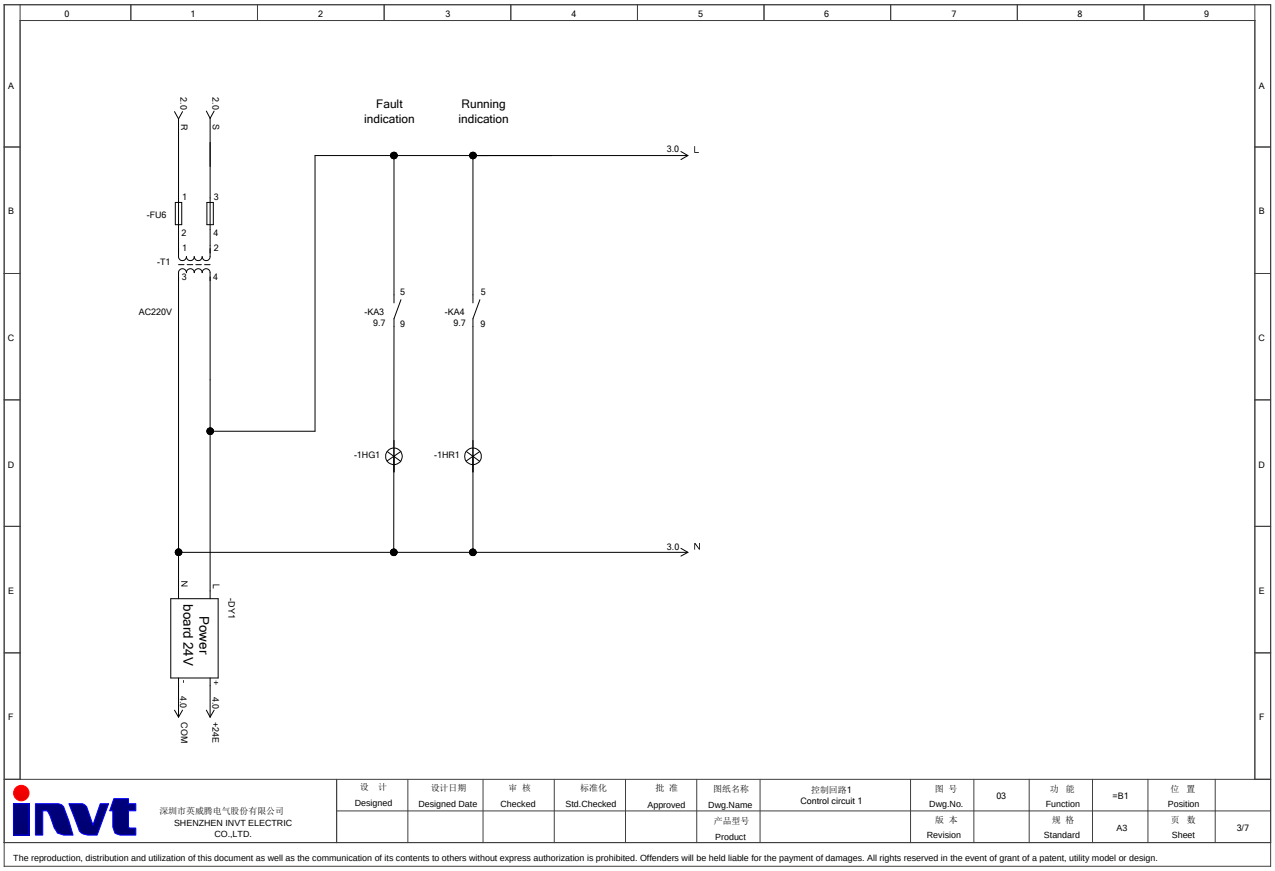


| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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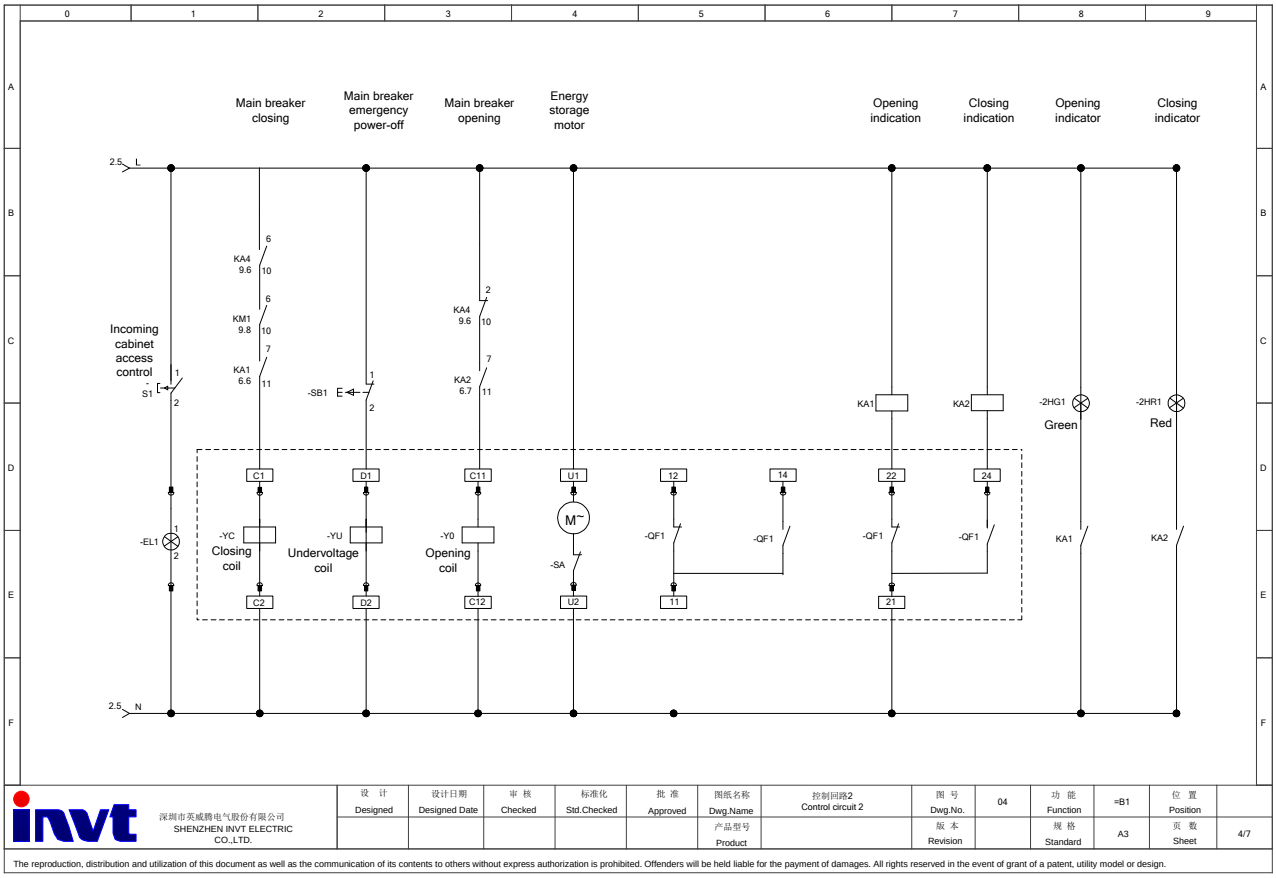
| | | | | | | 产品型号 Product | | 版 本 Revision | | 规 格 Standard | A3 | 页 数 Sheet | 3/7 |






| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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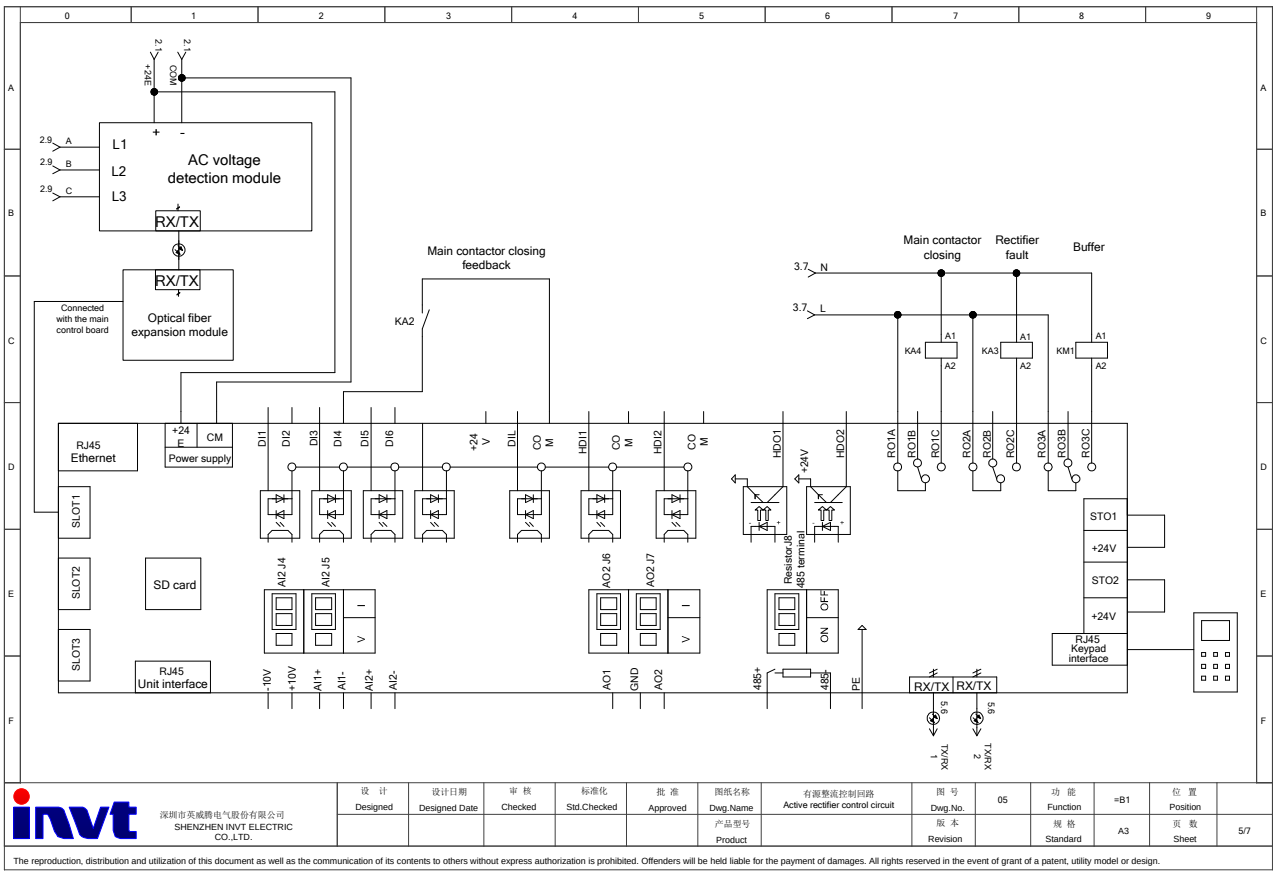
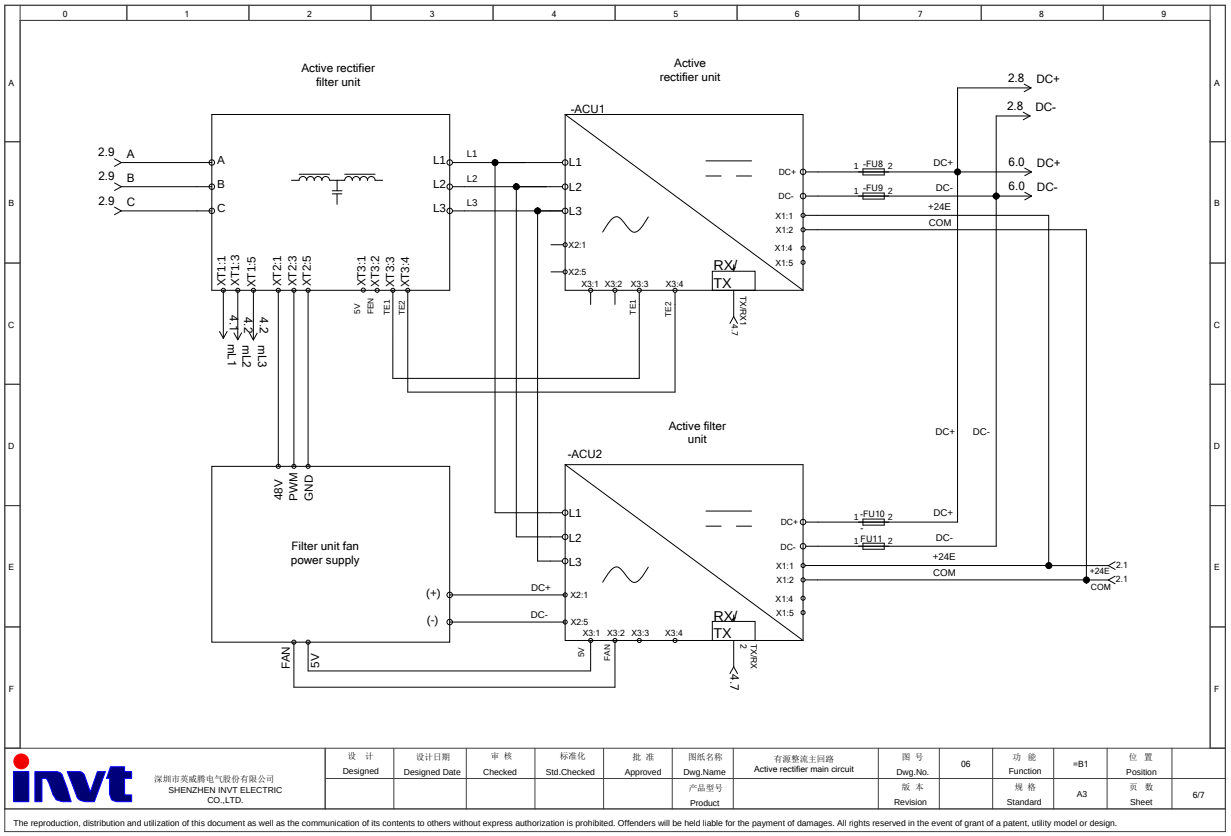
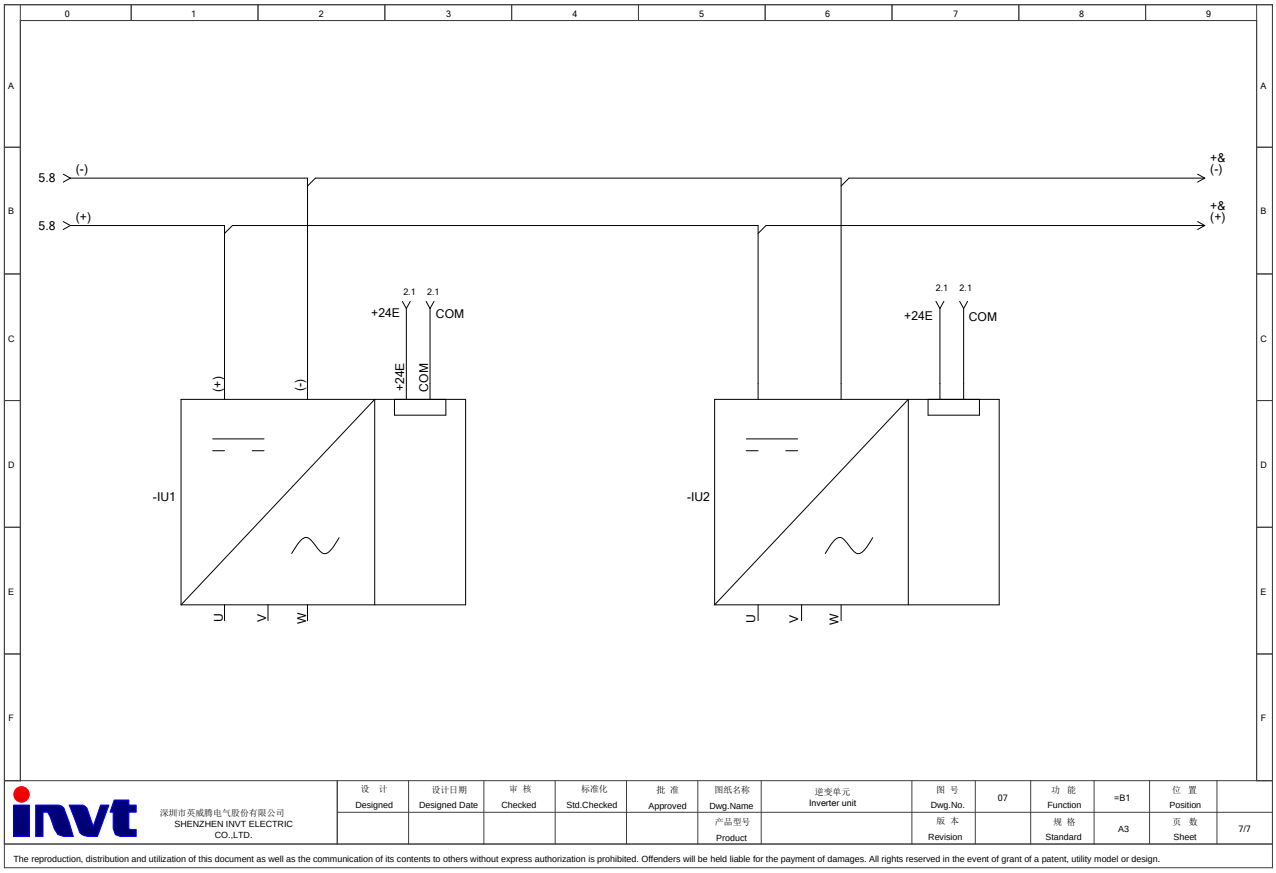
| | | | | | | 产品型号 Product | | 版 本 Revision | | 规 格 Standard | A3 | 页 数 Sheet | 4/7 |


AC voltage detection module
L1
L2
L3
RX/TX
Optical fiber expansion module
Connected with the main control board
Main contactor closing feedback
KA2
Main contactor closing
Rectifier fault
Buffer
KA4
KA3
KM1
RJ45 Ethernet
Power supply
SLOT1
SLOT2
SLOT3
SD card
RJ45 Unit interface
Resistor 485 terminal
RJ45 Keypad interface
STO1
STO2
+24V
Active rectifier control circuit


Active rectifier filter unit
Active rectifier unit
-ACU1
Active filter unit
-ACU2
Filter unit fan power supply
Active rectifier main circuit




| | | | | | | | | | | | | | |
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| | | | | | | 产品型号 Product | | 版 本 Revision | | 规 格 Standard | A3 | 页 数 Sheet | 7/7 |

# Appendix D Ordering information

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| **400V rectifier** | | | | | |
| *** | GD880-91-0094-4-Z | A3+LCL | GD880-91-0094-4 | 1 | Rectifier unit |
| | | | LCL-0116-0.4SA-4149-RO | 1 | Filter reactor |
| | | | CBU-C65-3-D | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-D | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| *** | GD880-91-0116-4-Z | A4+LCL | GD880-91-0116-4 | 1 | Rectifier unit |
| | | | LCL-0116-0.4SA-4149-RO | 1 | Filter reactor |
| | | | CBU-C65-3-D | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-D | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| *** | GD880-91-0149-4-Z | A4+LCL | GD880-91-0149-4 | 1 | Rectifier unit |
| | | | LCL-0180-0.4SA-4149-RO | 1 | Filter reactor |
| | | | CBU-C65-3-D | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-D | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | HFBR-1M | 1 | 1M optical fiber cable |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| *** | GD880-91-0183-4-Z | A4+LCL | GD880-91-0183-4 | 1 | Rectifier unit |
| | | | LCL-0180-0.4SA-4149-RO | 1 | Filter reactor |
| | | | CBU-C65-3-D | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-D | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00472 | GD880-91-0220-4-Z | A6+LCL | GD880-91-0220-4 | 1 | Rectifier unit |
| | | | LCL220A00364-2 | 1 | Filter reactor |
| | | | CBU-C200-3-Y | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-Y | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00473 | GD880-91-0260-4-Z | A6+LCL | GD880-91-0260-4 | 1 | Rectifier unit |
| | | | LCL355A02604-2 | 1 | Filter reactor |
| | | | CBU-C200-3-Y | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-Y | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00474 | GD880-91-0312-4-Z | A7+LCL | GD880-91-0312-4 | 1 | Rectifier unit |
| | | | LCL355A02604-2 | 1 | Filter reactor |
| | | | CBU-C65-3-D | 1 | Filter capacitor component |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-D | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00475 | GD880-91-0395-4-Z | A7+LCL | GD880-91-0395-4 | 1 | Rectifier unit |
| | | | LCL380A00214-2 | 1 | Filter reactor |
| | | | CBU-C100-3-D | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-D | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00476 | GD880-91-0516-4-Z | A7+LCL | GD880-91-0516-4 | 1 | Rectifier unit |
| | | | LCL516A01504-2 | 1 | Filter reactor |
| | | | CBU-C100-3-D | 1 | Filter capacitor component |
| | | | BUB880-0516-4 | 1 | Precharge component |
| | | | GD880-LB-D | 1 | LCL filter component |
| | | | RV-380V | 1 | Lightning protection component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00477 | GD880-91-0615-4-Z | A8+LCL | GD880-91-0615-4-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-0900-4 | 1 | Precharge component |
| | | | PW-48-10-4 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| | | | | | module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 1 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00478 | GD880-91-0681-4-Z | A8+LCL | GD880-91-0681-4-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-0900-4 | 1 | Precharge component |
| | | | PW-48-10-4 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 1 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00479 | GD880-91-0810-4-Z | A8+LCL | GD880-91-0810-4-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-0900-4 | 1 | Precharge component |
| | | | PW-48-10-4 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 1 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00480 | GD880-91-0980-4-Z | 2*A8+LCL | GD880-91-0980-4-K | 1 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-1770-4 | 1 | Precharge component |
| | | | PW-48-10-4 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 2 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00481 | GD880-91-1168-4-Z | 2*A8+LCL | GD880-91-1168-4-K | 1 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| | | | BUB800-1770-4 | 1 | Precharge component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | PW-48-10-4 | 1 | Fan power component |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 2 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00482 | GD880-91-1295-4-Z | 2*A8+LCL | GD880-91-1295-4-K | 1 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-1770-4 | 1 | Precharge component |
| | | | PW-48-10-4 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 2 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00483 | GD880-91-1539-4-Z | 2*A8+LCL | GD880-91-1539-4-K | 1 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-1770-4 | 1 | Precharge component |
| | | | PW-48-10-4 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 2 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00484 | GD880-91-2336-4-Z | 2*(2*A8+LCL) | GD880-91-1168-4-K | 2 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-16 | 1 | Control unit |
| | | | BUB800-1770-4 | 2 | Precharge component |
| | | | PW-48-10-4 | 2 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-5M | 4 | 5M optical fiber cable |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00485 | GD880-91-3078-4-Z | 2*(2*A8+LCL) | GD880-91-1539-4-K | 2 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-16 | 1 | Control unit |
| | | | BUB800-1770-4 | 2 | Precharge component |
| | | | PW-48-10-4 | 2 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-5M | 4 | 5M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00486 | GD880-91-4617-4-Z | 3*(2*A8+LCL) | GD880-91-1539-4-K | 3 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-16 | 1 | Control unit |
| | | | BUB800-1770-4 | 3 | Precharge component |
| | | | PW-48-10-4 | 3 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-5M | 6 | 5M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| **690V rectifier** | | | | | |
| 11020-00487 | GD880-91-0369-6-Z | A8+LCL | GD880-91-0369-6-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-0900-6 | 1 | Precharge component |
| | | | PW-48-10-6 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 1 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00488 | GD880-91-0477-6-Z | A8+LCL | GD880-91-0477-6-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-0900-6 | 1 | Precharge component |
| | | | PW-48-10-6 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 1 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00489 | GD880-91-0540-6-Z | A8+LCL | GD880-91-0540-6-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-0900-6 | 1 | Precharge component |
| | | | PW-48-10-6 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 1 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00490 | GD880-91-0701-6-Z | 2*A8+LCL | GD880-91-0701-6-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-1770-6 | 1 | Precharge component |
| | | | PW-48-10-6 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 2 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00491 | GD880-91-0906-6-Z | 2*A8+LCL | GD880-91-0906-6-K | 1 | A8+LCL frame rectifier unit |
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-1770-6 | 1 | Precharge component |
| | | | PW-48-10-6 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 2 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00492 | GD880-91-1026-6-Z | 2*A8+LCL | GD880-91-1026-6-K | 1 | 2*A8+LCL frame rectifier unit |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| | | | GD880-ACU-12 | 1 | Control unit |
| | | | BUB800-1770-6 | 1 | Precharge component |
| | | | PW-48-10-6 | 1 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-3M | 2 | 3M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00493 | GD880-91-1402-6-Z | 2*(2*A8+LCL) | GD880-91-0701-6-K | 2 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-16 | 1 | Control unit |
| | | | BUB800-1770-6 | 2 | Precharge component |
| | | | PW-48-10-6 | 2 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-5M | 4 | 5M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00494 | GD880-91-2052-6-Z | 2*(2*A8+LCL) | GD880-91-1026-6-K | 2 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-16 | 1 | Control unit |
| | | | BUB800-1770-6 | 2 | Precharge component |
| | | | PW-48-10-6 | 2 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-5M | 4 | 5M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| 11020-00495 | GD880-91-3078-6-Z | 3*(2*A8+LCL) | GD880-91-1026-6-K | 3 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-16 | 1 | Control unit |
| | | | BUB800-1770-6 | 3 | Precharge component |
| | | | PW-48-10-6 | 3 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |

| Order No. | Drive model | Frame size | Component model | Qty | Remarks |
|---|---|---|---|---|---|
| | | | HFBR-5M | 6 | 5M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| *** | GD880-91-4104-6-Z | 4*(2*A8+LCL) | GD880-91-1026-6-K | 4 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-1A | 1 | Control unit |
| | | | BUB800-1770-6 | 4 | Precharge component |
| | | | PW-48-10-6 | 4 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-5M | 8 | 5M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |
| *** | GD880-91-5130-6-Z | 5*(2*A8+LCL) | GD880-91-1026-6-K | 5 | 2*A8+LCL frame rectifier unit |
| | | | GD880-ACU-1A | 1 | Control unit |
| | | | BUB800-1770-6 | 5 | Precharge component |
| | | | PW-48-10-6 | 5 | Fan power component |
| | | | SOP-880-01 | 1 | Chinese LCD keypad |
| | | | IVDM-10 | 1 | AC voltage detection module |
| | | | EC-TX821 | 1 | Optical fiber expansion module |
| | | | L=2M(CHV-SE) | 1 | 2M keypad cable |
| | | | HFBR-5M | 10 | 5M optical fiber cable |
| | | | HFBR-1M | 1 | 1M optical fiber cable |

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**Shenzhen INVT Electric Co., Ltd.**
Address: INVT Guangming Technology Building, Songbai Road, Matian, Guangming District, Shenzhen, China
**INVT Power Electronics (Suzhou) Co., Ltd.**
Address: No. 1 Kunlunshan Road, Science & Technology Town, Suzhou New District, Jiangsu, China
**Website: www.invt.com**

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