ABB INDUSTRIAL DRIVES

# ACS880-307...+A003 diode supply units

Hardware manual

# List of related manuals

| General manuals | Code (English) |
|---|---|
| ACS880 multidrives cabinets and modules safety instructions | 3AUA0000045495 |
| ACS880 multidrive cabinets mechanical installation instructions | 3AUA0000101764 |
| ACS880 multidrive cabinets and modules electrical planning instructions | 3AUA0000102324 |
| **Supply unit manuals** | |
| ACS880-207 IGBT supply units hardware manual | 3AUA0000130644 |
| ACS880 IGBT supply control program firmware manual | 3AUA0000131562 |
| ACS880-307…+A003 diode supply units hardware manual | 3AUA0000102453 |
| ACS880-307…+A018 diode supply units hardware manual | 3AXD50000011408 |
| ACS880 diode supply control program firmware manual | 3AUA0000103295 |
| ACS880-907 regenerative rectifier units hardware manual | 3AXD50000020546 |
| ACS880 regenerative rectifier control program firmware manual | 3AXD50000020827 |
| **Inverter unit manuals and guides** | |
| ACS880-107 inverter units hardware manual | 3AUA0000102519 |
| ACS880 primary control program firmware manual | 3AUA0000085967 |
| ACS880 primary control program quick start-up guide | 3AUA0000098062 |
| **Brake unit manuals and DC/DC converter unit manuals** | |
| ACS880-607 1-phase brake units hardware manual | 3AUA0000102559 |
| ACS880-607 3-phase brake units hardware manual | 3AXD50000022034 |
| ACS880 brake control program firmware manual | 3AXD50000020967 |
| ACS880-1607 DC/DC converter units hardware manual | 3AXD50000023644 |
| ACS880 DC/DC converter control program firmware manual | 3AXD50000024671 |
| **Option manuals and guides** | |
| ACX-AP-x Assistant control panels user's manual | 3AUA0000085685 |
| Drive composer start-up and maintenance PC tool user’s manual | 3AUA0000094606 |
| Manuals and quick guides for I/O extension modules, fieldbus adapter, etc. | |

You can find manuals and other product documents in PDF format on the Internet. See section Document library on the Internet on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

The code below opens an online listing of the manuals applicable to the product:

# ACS880-307…+A003 diode supply units

Hardware manual



3AUA0000102453 Rev C
EN
EFFECTIVE: 2020-03-20

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### 3. Electrical installation



### 4. Installation checklist



### 5. Start-up



### 6. Maintenance

### *7. Technical data*

## 8. Supply control unit



### Further information

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# Introduction to the manual

## Contents of this chapter

This chapter gives basic information on the manual.

## Applicability

The manual is applicable to the cabinet-installed ACS880-307…+A003 diode supply units that form a part of an ACS880 multidrive system.

## Safety instructions

Follow all safety instructions delivered with the drive.

- Read the **complete safety instructions** before you install, commission, use or service the drive. The complete safety instructions are given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]).
- Read the **software-function-specific warnings and notes** before changing the default settings of the function. For each function, the warnings and notes are given in the section describing the related user-adjustable parameters.
- Read the **task-specific safety instructions** before starting the task. See the section describing the task.

## Target audience

This manual is intended for people who install, start up, and service multidrives. Read the manual before working on the drive. You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

## Contents of the manual



## Related documents

The multidrive user documentation consists of technical drawings and a set of manuals. The technical drawings are tailor-made for each drive. The composition of the manual set depends on the composition of the drive, eg, which supply unit type, options and inverter control program has been ordered by the customer. The manuals have been listed on the back of the front cover.

## Categorization by frame size, option code and item designation

The instructions and technical data which concern only certain unit or frame sizes are marked with the size identifier.

The unit size can be identified from the basic code visible on the type designation label, for example, ACS880-307-0070A-3+A003 where 0070A is the unit size. The option codes of the unit are listed after the plus sign. Section *Type designation key of the cabinet-installed supply unit* on page *29* explains the type designation code in detail.

The frame size of the diode supply module is, for example, D8D. The *Ratings* table on page *80* lists the DSU unit and frame sizes.

Some device names in the manual include the item designations in brackets, for example [Q11] to make it possible to identify the components in the circuit diagrams of the drive.

# Terms and abbreviations

| Term/Abbreviation | Description |
|---|---|
| Auxiliary control cubicle | The cubicle with auxiliary devices such as auxiliary voltage circuit breakers, control electronics, measurement boards, etc. In ACS880-307…+A003, the options that do not fit in the diode supply unit cubicle are located in the auxiliary control cubicle. |
| Control board | Circuit board in which the control program runs |
| Control unit | Control board built in a rail-mountable housing |
| Cubicle | One section of a cabinet-installed drive. A cubicle is typically behind a door of its own. |
| CVAR | Varistor board (for UL/CSA only) |
| DC link | DC circuit between rectifier and inverter |
| DI | Digital input |
| Diode supply module | Diode rectifier and related components enclosed in a metal frame or enclosure. Intended for cabinet installation. |
| Diode supply unit | Diode supply modules under control of one control board, and related components. |
| Drive | Frequency converter for controlling AC motors |
| DSU | Diode supply unit |
| FCAN-01 | Optional CANopen adapter module |
| FCNA-01 | Optional ControlNet™ adapter module |
| FDCO-01 | Optional DDCS communication module |
| FDCO-02 | Optional DDCS communication module |
| FDNA-01 | Optional DeviceNet™ adapter module |
| FECA-01 | Optional EtherCAT adapter module |
| FENA-21 | Optional high-performance Ethernet/IP™, Modbus/TCP and PROFINET adapter module |
| FEPL-01 | Optional FEPL-01 Ethernet POWERLINK adapter module |
| FIO-01 | Optional digital I/O extension module |
| FIO-11 | Optional analog I/O extension module |
| FPBA-01 | Optional PROFIBUS DP adapter module |
| FSCA-01 | Optional Modbus/RTU adapter module |
| Frame (size) | Physical size of the diode supply module, for example, D6D. |
| Intermediate circuit | DC circuit between rectifier and inverter |
| INU | Inverter unit |
| Inverter | Converts direct current and voltage to alternating current and voltage. |
| Inverter module | Inverter bridge, related components and drive DC link capacitors enclosed inside a metal frame or enclosure. Intended for cabinet installation. |
| Inverter unit | Inverter module(s) under control of one control board, and related components. One inverter unit typically controls one motor. |

| Term/Abbreviation | Description |
|---|---|
| I/O | Input/Output |
| Multidrive | Drive for controlling several motors which are typically coupled to the same machinery. Includes one supply unit, and one or several inverter units. |
| Parameter | In the control program, user-adjustable operation instruction to the drive, or signal measured or calculated by the drive |
| Rectifier | Converts alternating current and voltage to direct current and voltage |
| Single drive | Drive for controlling one motor |
| ZCU | Type of a control unit |

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# Operation principle and hardware description

## Contents of this chapter

This chapter describes how the diode supply unit works. It also describes the hardware of the diode supply unit. The information is valid for cabinet-installed ACS880-307…+A003 diode supply units.

## Operation principle

The diode supply unit uses a six-pulse diode bridge to rectify three-phase alternating current to direct current for the DC bus of the drive. The DC bus supplies electrical power to the inverters, which control the motors.

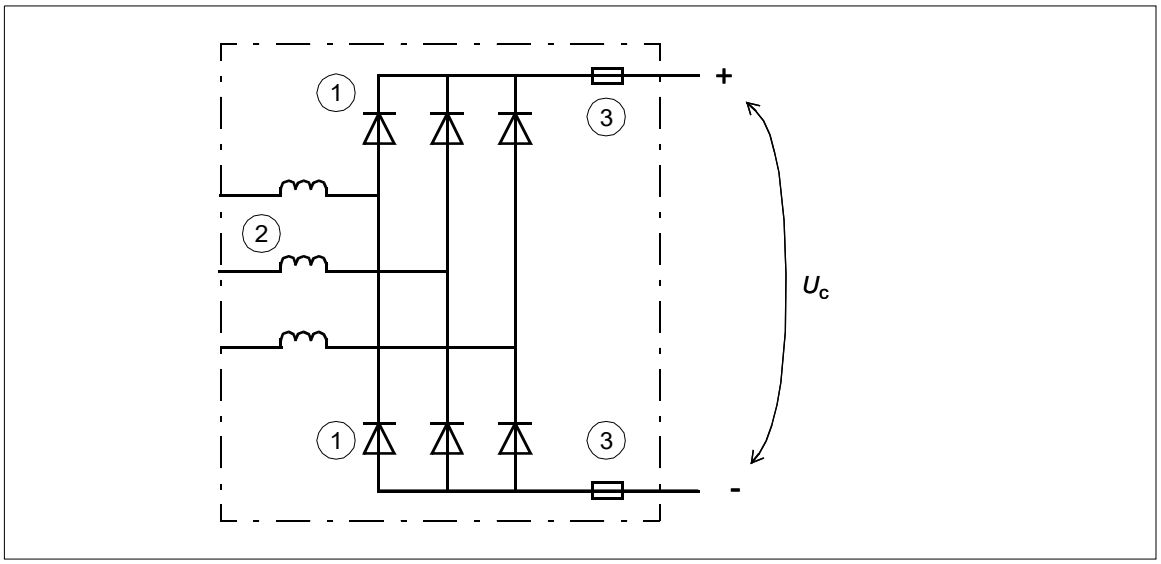
With option +A003, the diode bridge of the supply unit is uncontrolled. An uncontrolled diode bridge cannot control the charging of the inverter unit DC capacitors. Because of this, you can only connect this supply unit to inverter units that have a charging circuit. The supply unit does not have a charging circuit.

The unit has an AC choke as standard equipment. The AC choke smoothens the current waveform in the power supply network and voltage in the DC bus of the drive.

This type of diode supply unit has one ACS880-304…+A003 diode supply module (frame size D6D, D7D or D8D).

# Main circuit diagram

The following figure shows a simplified main circuit diagram of the rectifier.:




| | Description |
|---|---|
| 1. | Diodes |
| 2. | AC choke |
| 3. | DC fuses |

## Overcurrent and short-circuit protection

The main circuit of the supply unit is equipped with AC and DC fuses. The fuses protect the unit against overcurrent or short circuit.

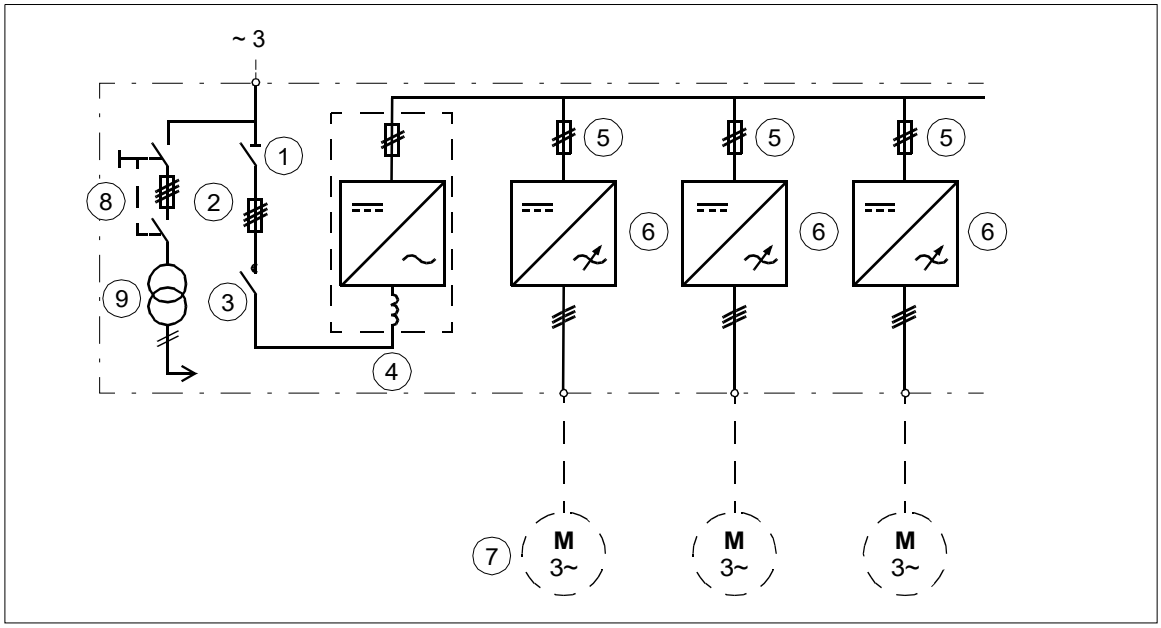
## Temperature supervision

Thermal switches supervise the temperature inside the diode supply module and cubicle. The switches are wired in series and to a digital input (DI) of the ZCU control unit (1 = OK, 0 = overtemperature). In case of overtemperature, a switch opens and the control program generates first a warning, and then, if the overtemperature indication remains over a predefined delay, trips the supply unit to a fault. You can adjust the delay time with parameters.

A temperature sensor integrated into the ZCU control unit supervises the board operating temperature. In case of overtemperature, the control program generates a warning or a fault. In a fault, the control program trips the supply unit to a fault.

# Overview diagram of the drive

The following figure shows a drive with a diode supply unit (frame size D8D) and three inverter units.




The figure includes:

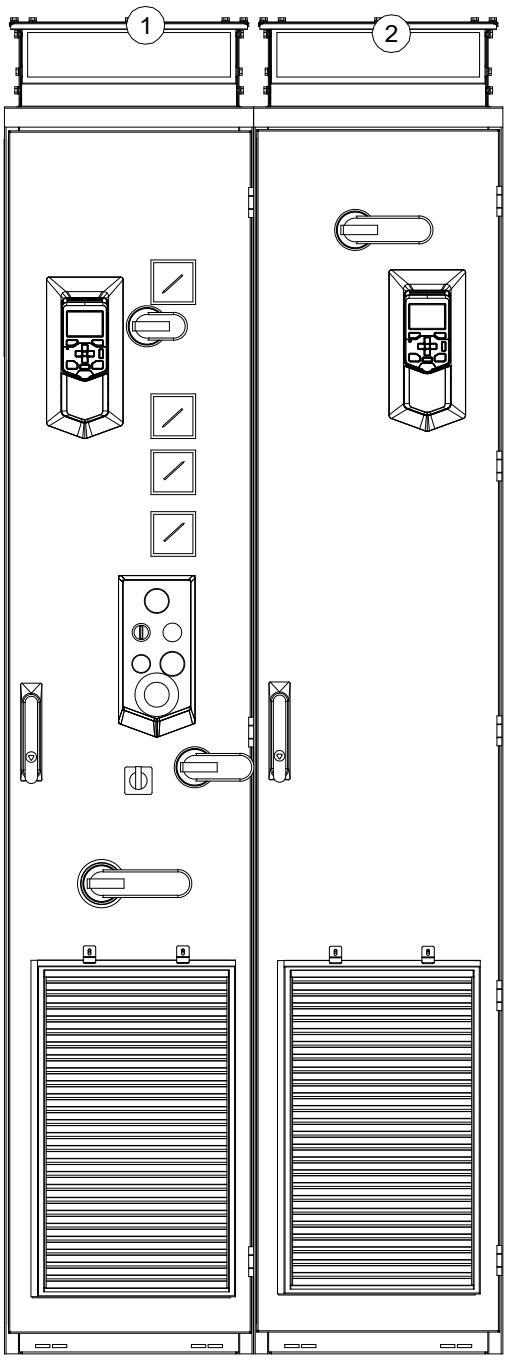
| | **Description** |
|---|---|
| 1. | Main switch-disconnector ([Q1], option +F253) |
| 2. | AC fuses |
| 3. | Main contactor [Q2] |
| 4. | Supply module [T01] (including choke, rectifier and DC fuses) |
| 5. | Inverter DC fuses |
| 6. | Inverter module [T11…] |
| 7. | Motor |
| 8. | Auxiliary voltage switch [Q21] |
| 9. | Auxiliary voltage transformer ([T21], option +G344) |

# Overview of the drive

The layout of the drives with the D6D and D7D supply modules is quite similar. The layout of the drive with the D7D module is shown here as an example.

## Drive with the D7D supply module

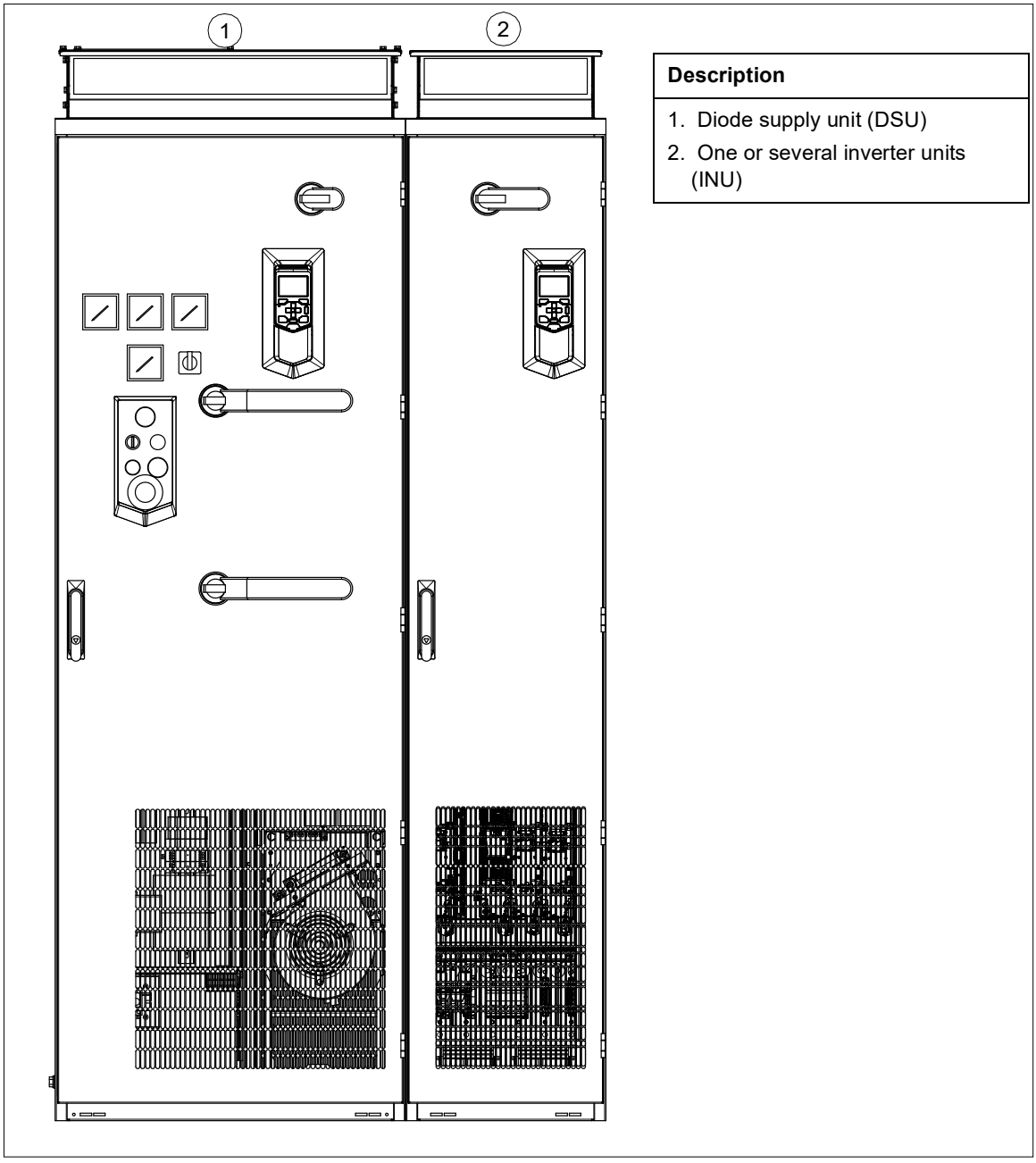
The following figure shows an example of a drive with a diode supply unit and an inverter unit. In the figure, the size of the supply module is D7D. The power cables are routed to the cabinet through the bottom and there is no auxiliary control cubicle. The extra cubicle is added if there is a lot of options. If the cables are routed through the top, a narrow extra cubicle is added, too.




| Description |
| --- |
| 1. Diode supply unit (DSU) |
| 2. One or several inverter units (INU) |

## Drive with the D8D supply module

The following figure shows an example of a drive with a diode supply unit and an inverter unit. In the figure, the size of the supply module is D8D. The power cables are routed to the cabinet through the bottom and there is no auxiliary control cubicle. The extra cubicle is added if there is a lot of options. For the supply unit with the D8D module, no extra cubicle is needed if the cables are routed through the top.



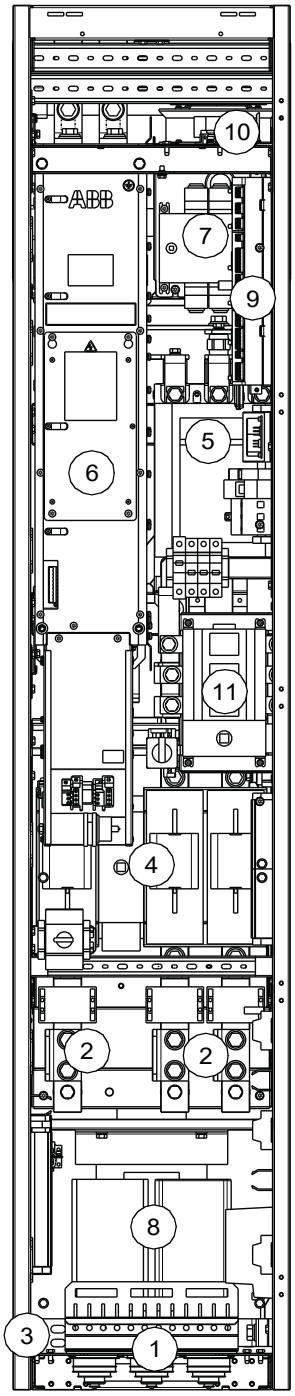

| Description |
| --- |
| 1. Diode supply unit (DSU) |
| 2. One or several inverter units (INU) |

# Layout of the supply unit

The layout of the drives with the D6D and D7D supply modules is quite similar. The layout of the drive with the D7D module is shown here as an example.

## Supply unit with the D7D supply module

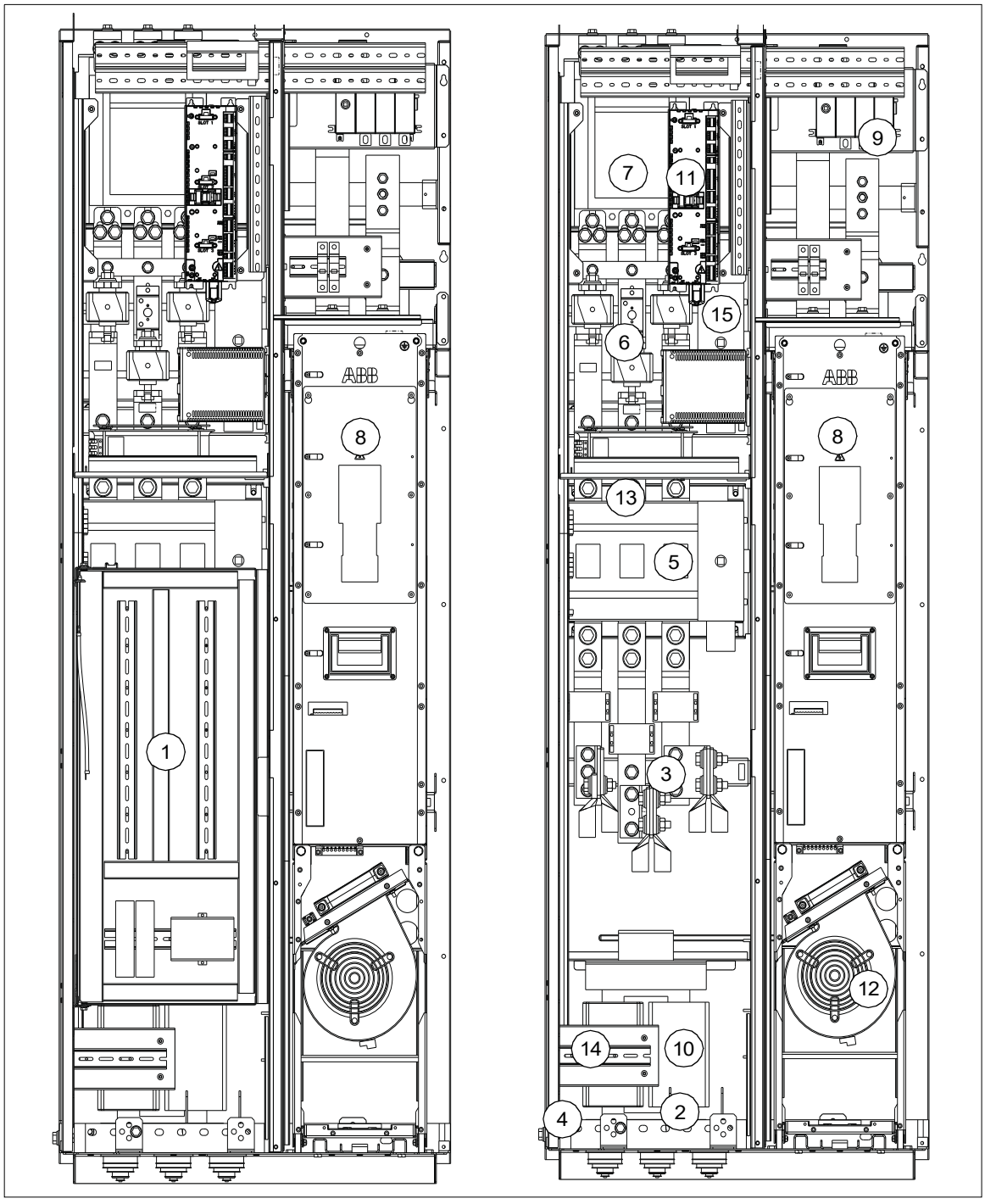
The following figure shows an example of a diode supply unit. Size of the supply module is D7D. In the example, the power cables are routed to the cabinet through the bottom and there is no auxiliary control cubicle. The extra cubicle is added if there is a lot of options. If the cables are routed through the top, a narrow extra cubicle is added.




| Description |
|---|
| 1. Input cable entries |
| 2. Input cable connections [L1, L2, L3] |
| 3. PE busbar [PE] |
| 4. Main switch-disconnector ([Q1], option +F253) |
| 5. Main contactor [Q2] |
| 6. Diode supply module [T01] |
| 7. Auxiliary voltage switch [Q21] |
| 8. Auxiliary voltage transformer ([T21], option +G344) |
| 9. Control unit [A41] |
| 10. Cabinet cooling fan [G24] |
| 11. Grounding switch ([Q9], option +F259)] |

## Supply unit with the D8D supply module

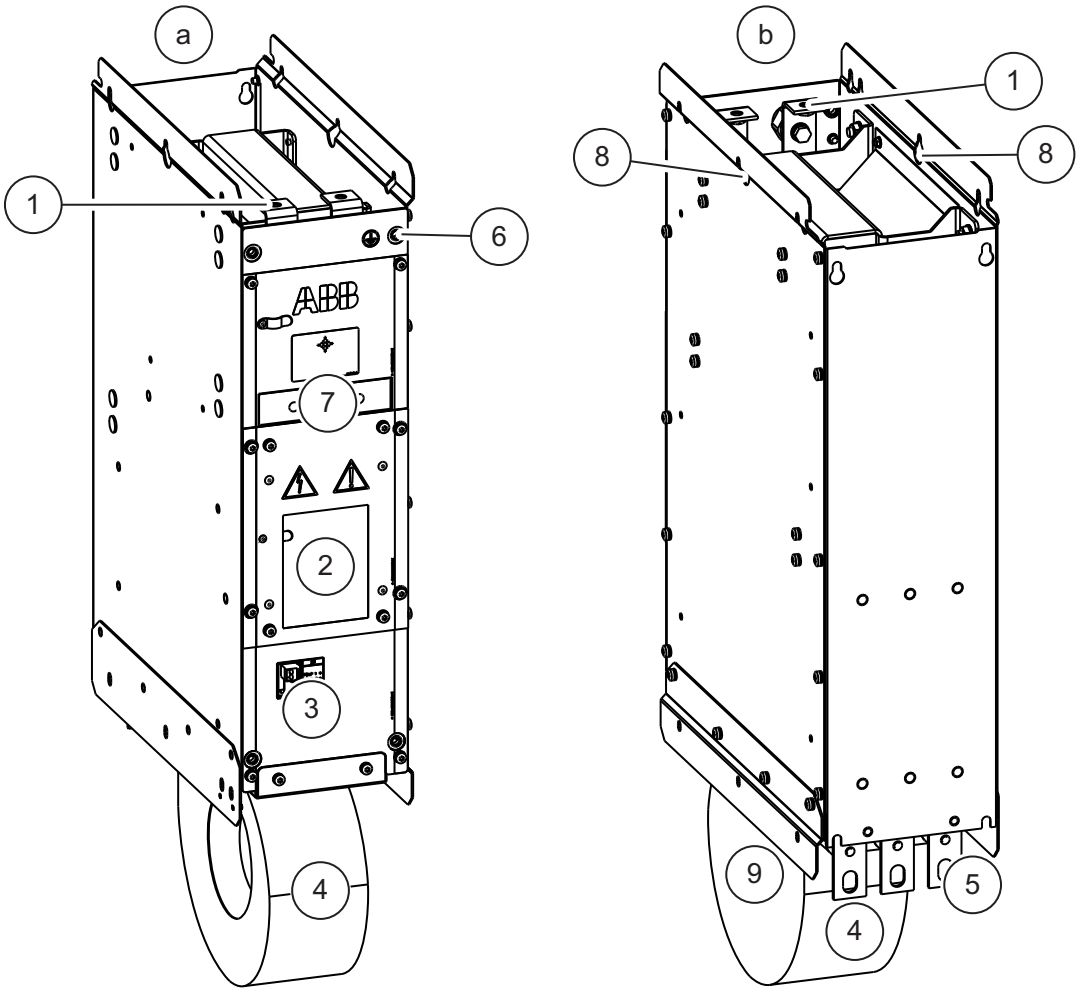
The following figures show an example of a diode supply unit, the figure on the left with the swing-out frame (1) on its place and the figure on the right with the swing-out frame removed. Size of the supply module is D8D. In the example, the power cables are routed to the cabinet through the bottom and there is no auxiliary control cubicle. The extra cubicle is added if there is a lot of options.



| | **Description** |
|---|---|
| 1. | Swing-out frame |
| 2. | Input power cable entries |
| 3. | Input power cable connections [L1, L2, L3] |
| 4. | PE busbar [PE] |
| 5. | Main switch-disconnector ([Q1], option +F253) |
| 6. | AC fuses |
| 7. | Main contactor [Q2] |
| 8. | Diode supply module [T01] |
| 9. | Auxiliary voltage switch [Q21] |
| 10. | Auxiliary voltage transformer ([T21], option +G344) |
| 11. | Control unit [A41] |
| 12. | Cooling fan of diode supply module [G41] |
| 13. | Cabinet cooling fan [G24] |
| 14. | Connection point for external auxiliary voltage, cabinet heating and lighting (option +G300, +G301, +G307) |
| 15. | Grounding switch ([Q9], option +F259) |

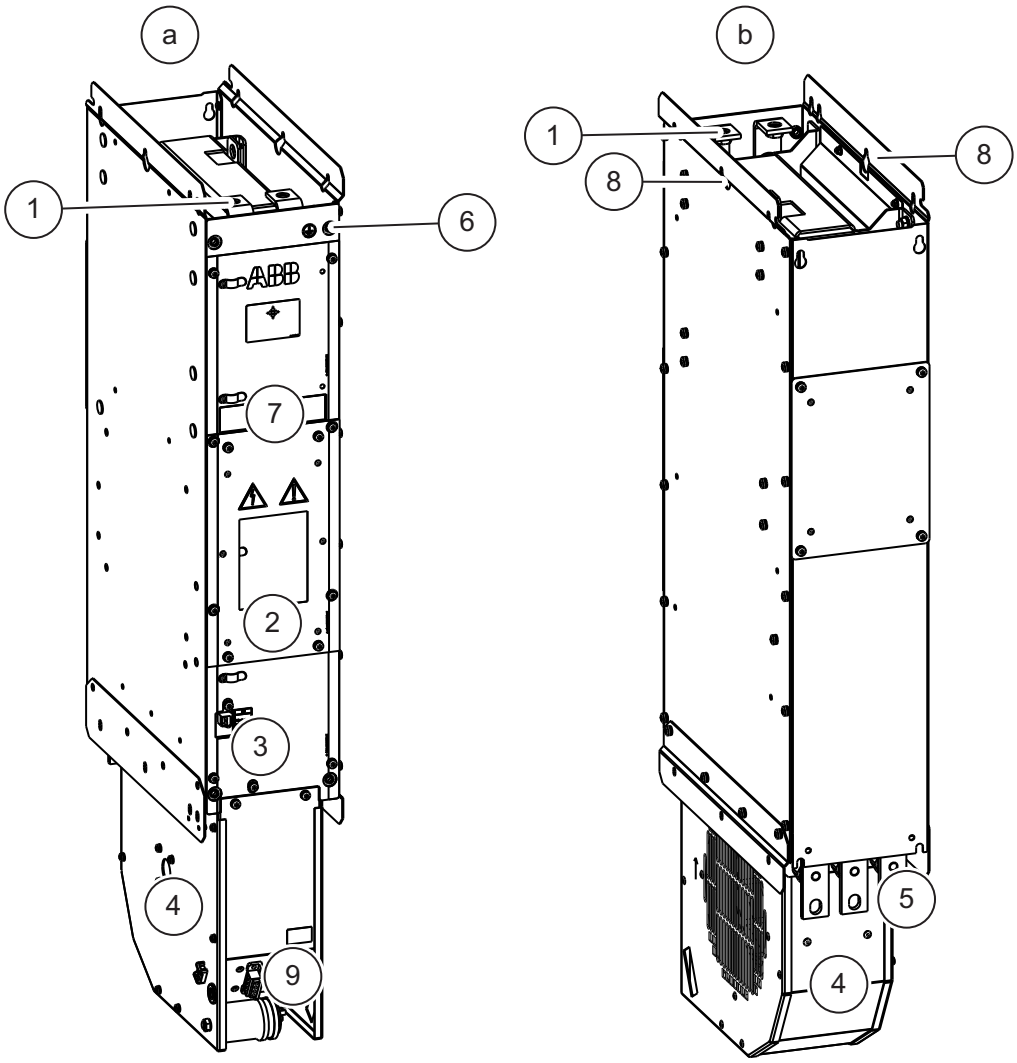
# Layout drawings of the supply modules

## D6D supply module



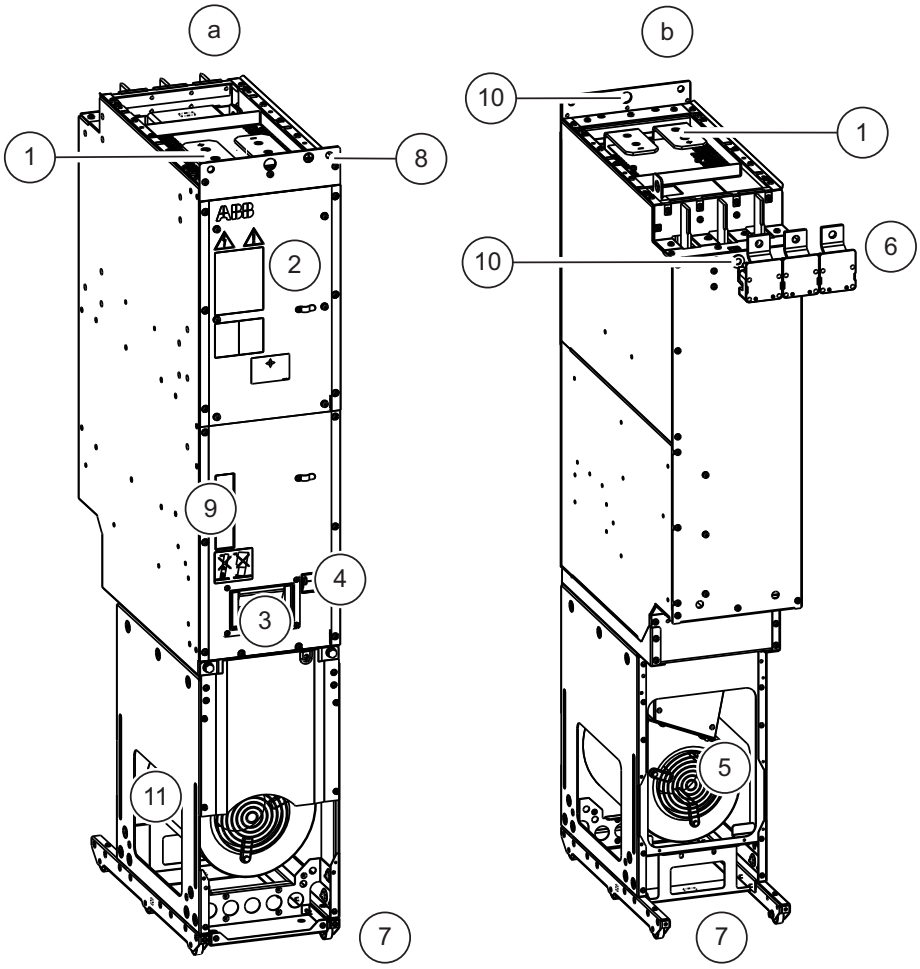

| | Description |
|---|---|
| a | Diode supply module, frame size D6D, front |
| b | Diode supply module, frame size D6D, back |
| 1. | DC output busbars |
| 2. | Cover panel of the module DC fuses |
| 3. | Connector for temperature protection circuit [X1] |
| 4. | Fan |
| 5. | AC input busbars |
| 6. | Unpainted fastening hole. The grounding point [PE] between module frame and cabinet. |
| 7. | Type designation label of the module |
| 8. | Lifting hole |
| 9. | Connector for fan power supply [X7] |

## D7D supply module




| | Description |
|---|---|
| a | Diode supply module, frame size D7D, front |
| b | Diode supply module, frame size D7D, back |
| 1. | DC output busbars |
| 2. | Cover panel of the module DC fuses |
| 3. | Connector for temperature protection circuit [X1] |
| 4. | Fan |
| 5. | AC input busbars |
| 6. | Unpainted fastening hole. The grounding point [PE] between module frame and cabinet frame. |
| 7. | Type designation label of the module |
| 8. | Lifting hole |
| 9. | Connector for fan power supply [X7] |

## D8D supply module




| | **Description** |
|---|---|
| a | Diode supply module, frame size D8D, front |
| b | Diode supply module, frame size D8D, back |
| 1. | DC output busbars |
| 2. | Cover panel of the module’s DC fuses |
| 3. | Handle |
| 4. | Connector for temperature protection circuit [X1] |
| 5. | Fan |
| 6. | Quick connector (AC input) |
| 7. | Wheels |
| 8. | Unpainted fastening hole. The grounding point [PE] between module frame and cabinet frame. |
| 9. | Type designation label of the module |
| 10. | Lifting hole |
| 11. | Connector for fan power supply [X7] |

# Overview of control connections of ZCU-14 control unit

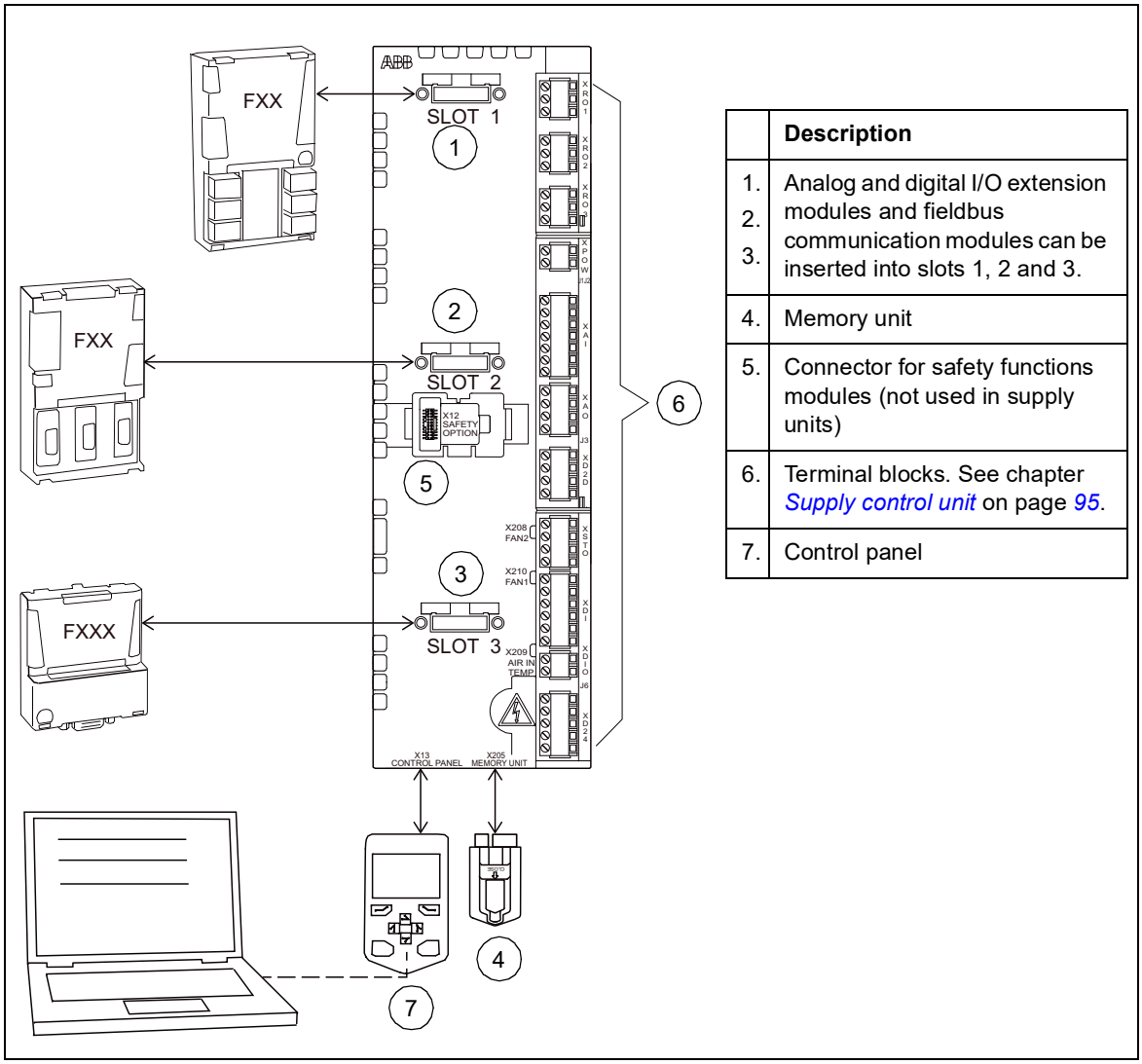
A cabinet-installed supply unit is typically controlled using the local control devices installed on the cabinet door. No additional control connections are needed. However, it is possible to:

- control the unit through the control panel and fieldbus
- read the DSU status information through the control panel, fieldbus and relay output
- stop the unit with an externally wired emergency stop button (if the unit is equipped with an emergency stop option).

The supply unit I/O control interface is in internal use. See section *Default I/O connection diagram* on page *100*.

## Overview of the supply unit control connections

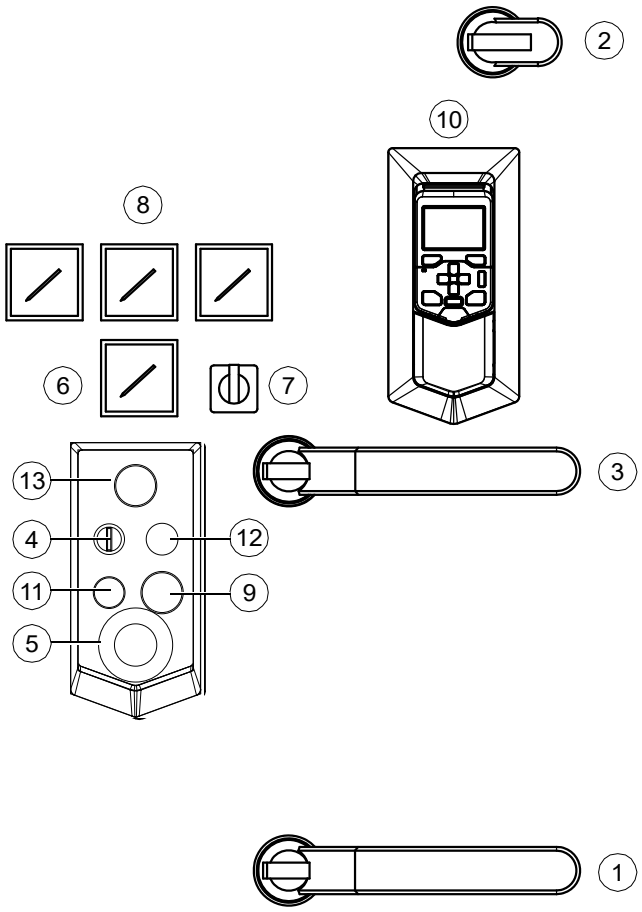
The diagram shows the control connections and interfaces of the diode supply unit.




| | Description |
|---|---|
| 1.<br>2.<br>3. | Analog and digital I/O extension modules and fieldbus communication modules can be inserted into slots 1, 2 and 3. |
| 4. | Memory unit |
| 5. | Connector for safety functions modules (not used in supply units) |
| 6. | Terminal blocks. See chapter *Supply control unit* on page *95*. |
| 7. | Control panel |

## Supply unit control devices

The following figure shows an example of the door control devices of the D8D supply module. The selection and exact location of control devices varies in different deliveries. The purpose of the devices is explained in the following sections.




| # | Description |
|---|---|
| 1. | *Main switch-disconnector* |
| 2. | *Auxiliary voltage switch* |
| 3. | *Grounding switch* |
| 4. | *Operating switch* |
| 5. | *Emergency stop button* |
| 6. | Voltage meter |
| 7. | Selector switch for voltage meter |
| 8. | Current meters |
| 9. | Tripping button for the supply breaker |
| 10. | *The ACS-AP-x control panel* |
| 11. | Ground fault indication |
| 12. | *Emergency stop reset button* |
| 13. | Electrical on/off push button |

### Main switch-disconnector

The supply unit is equipped with a main switch-disconnector ([Q1], option +F253) as standard. With this switch, you can isolate the main circuit of the drive from the power line. The switch has an operating handle on the cabinet door.

**WARNING!** The switch does not isolate the input power terminals, AC voltage meters ([P5], option +G334) or the auxiliary circuit from the power line. To isolate auxiliary voltage, use the auxiliary voltage switch [Q21]. To isolate the input power terminals and AC voltage meters, open the main breaker of the supply transformer.

**Note:** The grounding switch ([Q9], option +F259) and the main switch-disconnector are electrically interlocked: The grounding switch can be closed only when the main switch-disconnector is open. The main switch-disconnector can be closed only when the

grounding switch is open. That is, only one of the switches can be closed at a time. To close the switches, you must also have the auxiliary control voltage on.

### Auxiliary voltage switch

The supply unit is equipped with an auxiliary voltage switch [Q21] as standard. Using the switch, you can disconnect the auxiliary circuit from the power line. The switch has an operating handle on the cabinet door.

### Grounding switch

The supply unit can be equipped with an optional grounding switch ([Q9], option +F259). Using the switch, you can temporarily ground the main AC busbars of the supply unit during the maintenance work. The switch has an operating handle on the cabinet door.

**WARNING!** The grounding switch [Q9] does not ground the input power terminals or auxiliary circuits.

**Note:** The grounding switch and the main switch-disconnector ([Q1], option +F253) are electrically interlocked: The grounding switch can be closed only when the main switch-disconnector is open. The main switch-disconnector can be closed only when the grounding switch is open. That is, only one of the switches can be closed at a time. To close the switches, you must also have the auxiliary control voltage on.

### Operating switch

The operating switch [S21] is a standard device.

By default, the operating switch controls the unit as follows:

- The ENABLE/RUN position: The control program closes the main contactor [Q2] and the supply module starts to rectify.
- The OFF position: The control program opens the main contactor [Q2] and the supply module stops rectifying.

### Emergency stop button

The emergency stop button is an optional device ([S61], option +G331). Pressing the button activates the emergency stop function of the supply unit. The button locks to open position automatically. You must release the button before you can return to the normal operation. Before the restart, you also need to reset the emergency stop circuit with the emergency stop reset button [S62].

### Emergency stop reset button

The emergency stop reset button [S62] is installed on the door when the supply unit is equipped with an emergency stop function (options +Q951, +Q952, +Q963, +Q964 and +Q979). You can reset the emergency stop circuit with the button.

The safety options are described in separate option manuals.

### Other door controls

- A voltage meter is an optional device ([P5], option +G334). There is a meter on the door and a switch [S5] with which you can select which main voltage value to display.
- A single-phase AC current meter is an optional device (option +G335). A three-phase AC current meter is also available (option +3G335).
- Tripping button for the supply breaker ([S22], option +Q959) is a push button on the cabinet door for the user-defined use, for example, for tripping the breaker of the supply transformer of the drive. The button is wired to a terminal block at the factory. The user connects the external circuit to be controlled on site.
- An electrical on/off push button ([S23], option +G332) on the cabinet door for tripping the supply unit. The button is connected in series with the operating switch. The button trips the Run enable signal and further the main contactor of the drive.

### The ACS-AP-x control panel

With the control panel, you can:

- start and stop the supply unit
- view and reset the fault and warning messages, and view the fault history
- view actual signals
- change parameter settings
- change between local and external control.

The Run enable command at digital input DI2 must be on (1) so that the supply unit can be started and stopped with the control panel in the local mode. That is the case when the operating switch [S21] is switched to the on (1) position.

To change between local and remote control mode, press the Loc/Rem key of the control panel. For the instructions on the use of the panel, see *ACX-AP-x Assistant control panels user's manual* (3AUA0000085685 [English]). For the parameter settings, see *ACS880 diode supply control program firmware manual* (3AUA0000103295 [English]).

### PC connection

There is a USB connector on the front of the control panel that can be used to connect a PC to the drive. When a PC is connected to the control panel, the control panel keypad is disabled. See also section *Connecting a PC to the supply unit* on page *45*.

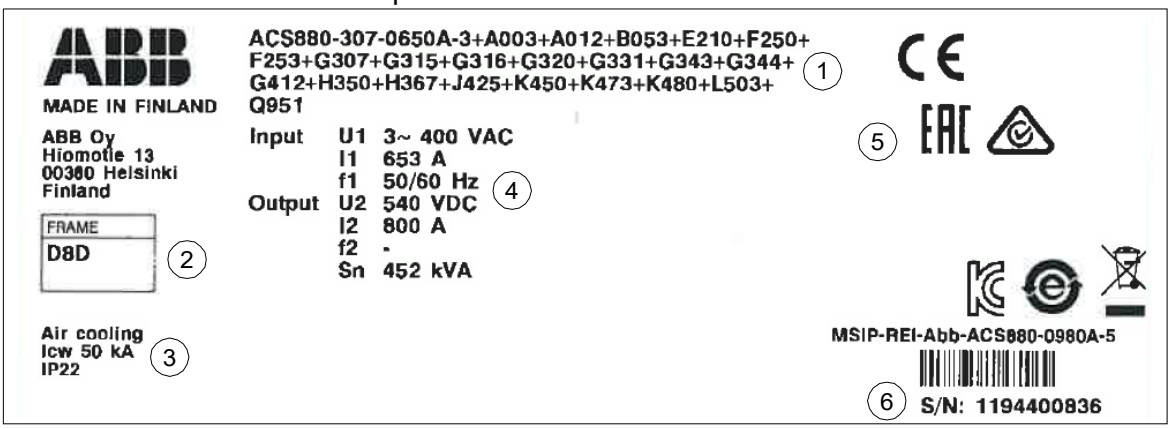
### Fieldbus control

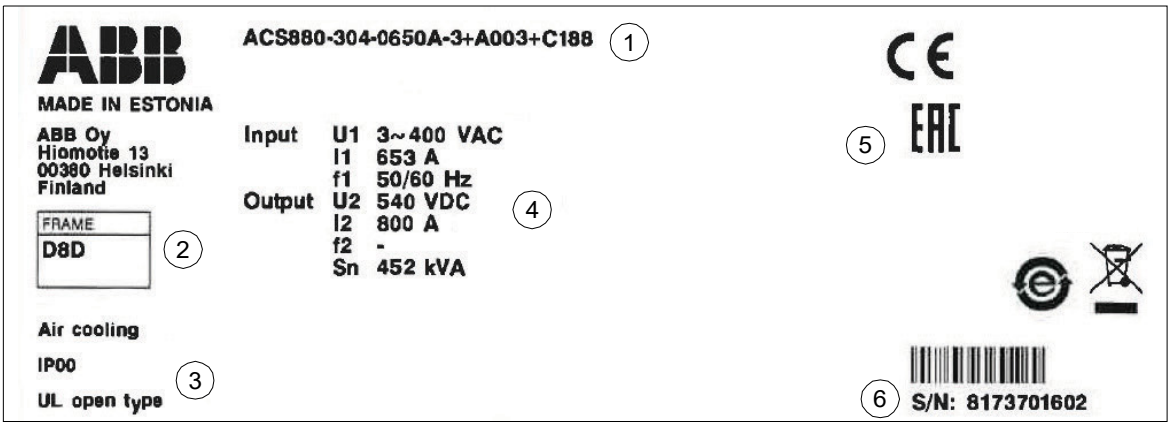
You can control the supply unit through a fieldbus interface if the unit is equipped with an optional fieldbus adapter (for example, option +K454), and when you have configured the control program for the fieldbus control with the parameters. For information on the parameters, see *ACS880 diode supply control program firmware manual* (3AUA0000103295 [English]).

**Note**: To be able to switch the main contactor [Q2] and the supply unit on and off (Run enable signal) through the fieldbus, the Run enable command at digital input DI2 must be on (1). That is the case when the operating switch [S21] is switched to the on (1) position.

# Type designation labels

The type designation label includes the ratings, applicable markings, a type designation and a serial number of the unit. The type designation label of the supply unit is attached to the cabinet on the inside of the door. The type designation label of the supply module is attached to the module. Example labels are shown below.




| No. | Description |
|---|---|
| 1. | Type designation. See section *Type designation keys* on page *29*. |
| 2. | Supply module frame size |
| 3. | Degree of protection |
| 4. | Ratings. See section *Ratings* on page *80*. |
| 5. | Valid markings. See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]). |
| 6. | Serial number. The first digit of the serial number refers to the manufacturing plant. The next four digits refer to the unit's manufacturing year and week, respectively. The remaining digits complete the serial number so that there are no two units with the same number. |

# Type designation keys

## Type designation key of the cabinet-installed supply unit

Type designation describes the composition of the unit in short. The type designation is visible on the label (sticker) which is attached to the cabinet. The complete designation code is divided in subcodes:

- The first 1…18 digits form the basic code. It describes the basic construction of the unit. The fields in the basic code are separated by hyphens.
- The option codes follow the basic code. Each option code starts with an identifying letter (common for the whole product series), followed by descriptive digits. The option codes are separated by plus signs.

The subcodes are described below. An example type code: ACS880-307-0980A-5+A003.

| Code | Description |
|---|---|
| **Basic codes** | |
| ACS880 | Product series |
| 307 | Construction: cabinet-installed diode supply unit. When no options are selected: Supply frequency 50 Hz, control voltage 230 V AC, IP22 (UL Type 1), EN/IEC industrial cabinet construction, power and control cabling through the bottom of the cabinet, input power connection by cabling, aluminum DC busbars in D6D and D7D, copper in D8D, AC busbars of copper, ACS880 diode supply control program, complete documentation in English delivered on USB memory. |
| **Size** | |
| xxxxA | Refer to the rating tables on page *80*. |
| **Voltage range** | |
| 3 | Input voltage range 3~ 380 … 415 V. This is indicated in the type designation label as typical input voltage level (3~ 400 V AC). |
| 5 | Input voltage range 3~ 380 … 500 V. This is indicated in the type designation label as typical input voltage level (3~ 400/480/500 V AC). |
| **Option codes (plus codes)** | |
| A003 | Uncontrolled diode-diode bridge (standard) |
| **Supply frequency** | |
| A012 | 50 Hz |
| A013 | 60 Hz |
| **Degree of protection** | |
| B053 | IP22 (UL Type 1) |
| B054 | IP42 (UL Type 1) |
| **Construction** | |
| C164 | Plinth height 1 (100 mm) |
| C179 | Plinth height 2 (200 mm) |
| **Standards** | |
| C129 | UL approved |
| **Filter options** | |
| E210 | EMC filtering (2nd environment) |
| **Line options** | |
| F250 | Line contactor (standard, always with option +F253) |
| F253 | Main switch-disconnector, door interlocked (standard, always with option +F250) |
| F259 | Grounding switch |
| **Cabinet equipment** | |
| G300 | Cabinet heater |
| G301 | Cabinet lighting |
| G307 | Terminals for external control voltage |
| G314 | Aluminum DC busbars (standard in frame sizes D6D and D7D) |
| G315 | Tin-plated copper DC busbars (standard in frame size D8D) |

| Code | Description |
|---|---|
| G316 | Cable supply conductors (standard) |
| G320 | Control (auxiliary) voltage 230 V AC |
| G330 | Halogen-free wiring materials |
| G331 | Emergency stop button on the door (red) |
| G332 | Electrical on/off push button on the cabinet door for tripping the supply unit. The button is connected in series with the operating switch. The button trips the Run enable signal and further the main contactor of the drive. |
| G334 | Voltage meter with selector switch |
| G335 | Current meter (one phase) |
| 3G335 | Current meter (three phases) |
| G336 | Arc monitoring unit, 1 loop, Rea 101, including cable |
| G337 | Arc monitoring with current monitoring unit |
| G338 | Wire marking class A1 |
| G339 | Wire marking class A2 |
| G340 | Wire marking class A3 |
| G341 | Wire marking class B1 |
| G342 | Wire marking class C1 |
| G343 | Corrosion coupons in auxiliary control cubicle (test coupons for monitoring corrosion rate, for example, sulphur in the environment) |
| G344 | Auxiliary voltage transformer |
| G412 | Light-duty DC busbars (standard) |
| G426 | Arc monitoring unit, extension for 1 loop, Rea 105 |
| Q959 | Tripping button for the supply breaker. A push button on the cabinet door for the user-defined use, for example, for tripping the supply transformer of the drive. The button is wired to a terminal block at the factory. The user connects the external circuit to be controlled on site. |
| **Cabling** | |
| H350 | Power cabling entry through the bottom of the cabinet |
| H351 | Power cabling entry through the top of the cabinet |
| H352 | Power cabling exit through the bottom of the cabinet |
| H353 | Power cabling exit through the top of the cabinet |
| H358 | Cable gland plates (steel 3 mm, undrilled) |
| H367 | Control cabling through the bottom of the cabinet |
| H368 | Control cabling through the top of the cabinet |
| **Control panel and PC options** | |
| J400 | Bluetooth control panel |
| J410 | Control panel connection kit |
| J412 | Common control panel |
| J425 | Non-Bluetooth control panel |
| K450 | Panel bus |
| K480 | Ethernet switch for PC tool and control network |
| K483 | Ethernet switch with optical link for PC tool or control network |
| **Fieldbus adapters** | |
| K451 | FDNA-01 DeviceNet™ adapter module |
| K454 | FPBA-01 PROFIBUS DP adapter module |
| K457 | FCAN-01 CANopen adapter module |
| K458 | FSCA-01 Modbus/RTU adapter module |
| K462 | FCNA-01 ControlNet™ adapter module |
| K469 | FECA-01 EtherCAT adapter module |
| K470 | FEPL-01 Ethernet POWERLINK adapter module |
| K475 | FENA-21 high-performance Ethernet/IP™, Modbus/TCP and PROFINET adapter module, Daisy chain |
| **I/O extensions and feedback interfaces** | |
| L500 | FIO-11 analog I/O extension module |

| Code | Description |
|---|---|
| L501 | FIO-01 digital I/O extension module |
| L503 | FDCO-01 DDCS communication module |
| L508 | FDCO-02 DDCS communication module |
| L525 | FAIO-01 analog I/O extension module |
| L526 | FDIO-01 digital I/O extension module |
| **Color options** | |
| P913 | Special color (RAL colors) |
| P966 | Special color (other than RAL colors) |
| **Safety functions** | |
| Q951 | Emergency stop, stop category 0 with opening the main contactor or breaker, with safety relay |
| Q952 | Emergency stop, stop category 1 with opening the main contactor or breaker, with safety relay |
| Q963 | Emergency stop, stop category 0 without opening the main contactor or breaker, with safety relay |
| Q964 | Emergency stop, stop category 1 without opening the main contactor or breaker, with safety relay |
| Q979 | Emergency stop, configurable stop category 0 or 1 with STO and safety functions module (FSO-12 or FSO-21) |
| **Ground fault monitoring** | |
| Q954 | Earth fault monitoring, unearthed mains |
| **Documentation** | |
| R716 | Complete documentation, paper copy of product manual set |
| **Manual language** | |
| R701 | German |
| R702 | Italian |
| R705 | Swedish |
| R706 | Finnish |
| R707 | French |
| R708 | Spanish |
| R711 | Russian |

## Type designation key of the supply module

Type designation describes the composition of the supply module in short. The type designation is visible on the label (sticker) which is attached to the module. The complete designation is divided in subcodes:

- The first 1…18 digits form the basic code. It describes the basic construction of the unit. The fields in the basic code are separated with hyphens.
- The option codes follow the basic code. Each option code starts with an identifying letter (common for the whole product series), followed by descriptive digits. The option codes are separated by plus signs.

The subcodes are described below. An example type code: ACS880-304-0980A-5+A003.

| Code | Description |
|---|---|
| **Basic codes** | |
| ACS880 | Product series |
| 304 | Diode supply module for cabinet installation |
| **Size** | |
| xxxxA | Refer to the rating tables on page *80.* |
| **Voltage range** | |
| 3 | Input voltage range: 3~ 380 … 415 V AC. This is indicated in type designation label as typical input voltage level (3~ 400 V AC). |
| 5 | Input voltage range: 3~ 380 … 500 V AC. This is indicated in type designation label as typical input voltage level (3~ 400/480/500 V AC). |
| **Option codes (plus codes)** | |
| A003 | Uncontrolled diode-diode bridge (standard) |
| C129 | cULus listed (frame D8D only) |
| C134 | CSA certified (frame D8D only) |
| C188 | Direct-on-line cooling fan (standard) |

3

# Electrical installation

## Contents of this chapter

This chapter instructs how to measure the insulation of the assembly and how to install the input power cables and control cables. The information is valid for cabinet-installed ACS880-307…+A003 diode supply units.

For more information on cable selection, protections, etc, see *ACS880 multidrive cabinets and modules* electrical planning instructions (3AUA0000102324 [English]).

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

# Electrical safety precautions

These electrical safety precautions are for all personnel who do work on the drive, motor cable or motor.

**WARNING!** Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work. Go through these steps before you begin any installation or maintenance work.

1. Clearly identify the work location and equipment.
2. Disconnect all possible voltage sources. Make sure that re-connection is not possible. Lock out and tag out.
   - Open the main disconnecting device of the drive.
   - Open the charging switch if present.
   - Open the disconnector of the supply transformer. (The main disconnecting device in the drive cabinet does not disconnect the voltage from the AC input power busbars of the drive cabinet.)
   - Close the grounding switch or switches ([Q9], option +F259) if present. Do not use excessive force as the switch has electromagnetic interlocking.
   - If the drive is equipped with a DC/DC converter unit (optional): Open the DC switch-disconnector ([Q11], option +F286) of the DC/DC converter. Open the disconnecting device of the energy storage connected to the DC/DC converter unit (outside the drive cabinet).
   - Open the auxiliary voltage switch [Q21] and all other possible disconnecting devices that isolate the drive from dangerous voltage sources.
   - If you have a permanent magnet motor connected to the drive, disconnect the motor from the drive with a safety switch or by other means.
   - Disconnect any dangerous external voltages from the control circuits.
   - After you disconnect power from the drive, always wait 5 minutes to let the intermediate circuit capacitors discharge before you continue.
3. Protect any other energized parts in the work location against contact.
4. Take special precautions when close to bare conductors.
5. Measure that the installation is de-energized. If the measurement requires removal or disassembly of shrouding or other cabinet structures, obey the local laws and regulations applicable to live working (including – but not limited to – electric shock and arc protection).
   - Use a multimeter with an impedance greater than 1 Mohm.
   - Make sure that the voltage between the drive input power terminals (L1, L2, L3) and the grounding (PE) busbar is close to 0 V.
   - Make sure that the voltage between the drive output terminals (T1/U, T2/V, T3/W) and the grounding (PE) busbar is close to 0 V.
   - Make sure that the voltage between the drive DC busbars (+ and -) and the grounding (PE) busbar is close to 0 V.
6. If the drive is not equipped with a grounding switch, install temporary grounding as required by the local regulations.
7. Ask the person in control of the electrical installation work for a permit to work.

# General notes

## Printed circuit boards

**WARNING!** Use a grounding wrist band when you handle printed circuit boards. Do not touch the boards unnecessarily. The boards contain components sensitive to electrostatic discharge.

## Optical components

**WARNING!** Obey these instructions. If you ignore them, damage to the equipment can occur.

- Handle the fiber optic cables with care.
- When you unplug the fiber optic cables, always hold the connector, not the cable itself.
- Do not touch the ends of the fibers with bare hands as the ends are extremely sensitive to dirt.
- Do not bend the fiber optic cables too tightly. The minimum allowed bend radius is 35 mm (1.4”).

# Measuring the insulation

## Measuring the insulation of the drive

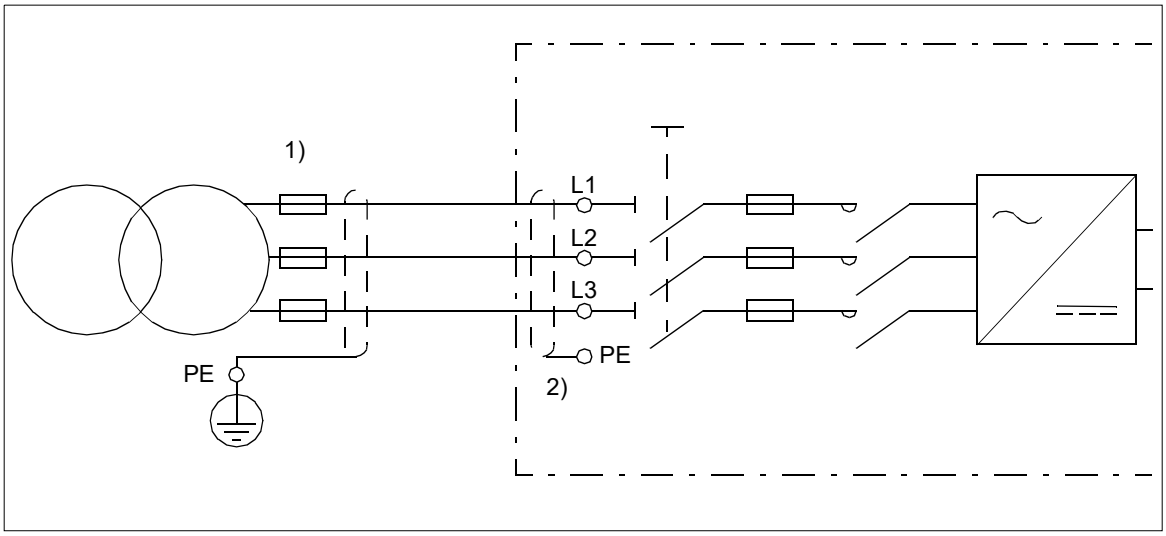
**WARNING!** Do not do voltage withstand or insulation resistance tests on any part of the drive as testing can damage the drive. Every drive has been tested for insulation between the main circuit and the chassis at the factory. Also, there are voltage-limiting circuits inside the drive which cut down the testing voltage automatically.

## Measuring the insulation of the input power cable

Measure the insulation of the supply (input) cable according to local regulations before connecting to the drive.

# Connecting the input power cables

## Connection diagram




1) Fuses or other protection means. Always use fuses for the cabling of the supply unit with D6D or D7D supply module. See section *Short-circuit withstand strength* on page *87*.

2) Ground the cable shield 360 degrees at the cable entry. See section *Connection procedure* on page *37*.

Notes:

Use a separate PE conductor in addition if the conductivity of the shields does not meet the requirement for the PE conductor. See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

For the cable selection instructions, see *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

The cable entry details and cable connection details are given in section *Terminal and cable entry data for the input power cable*, page *85*.

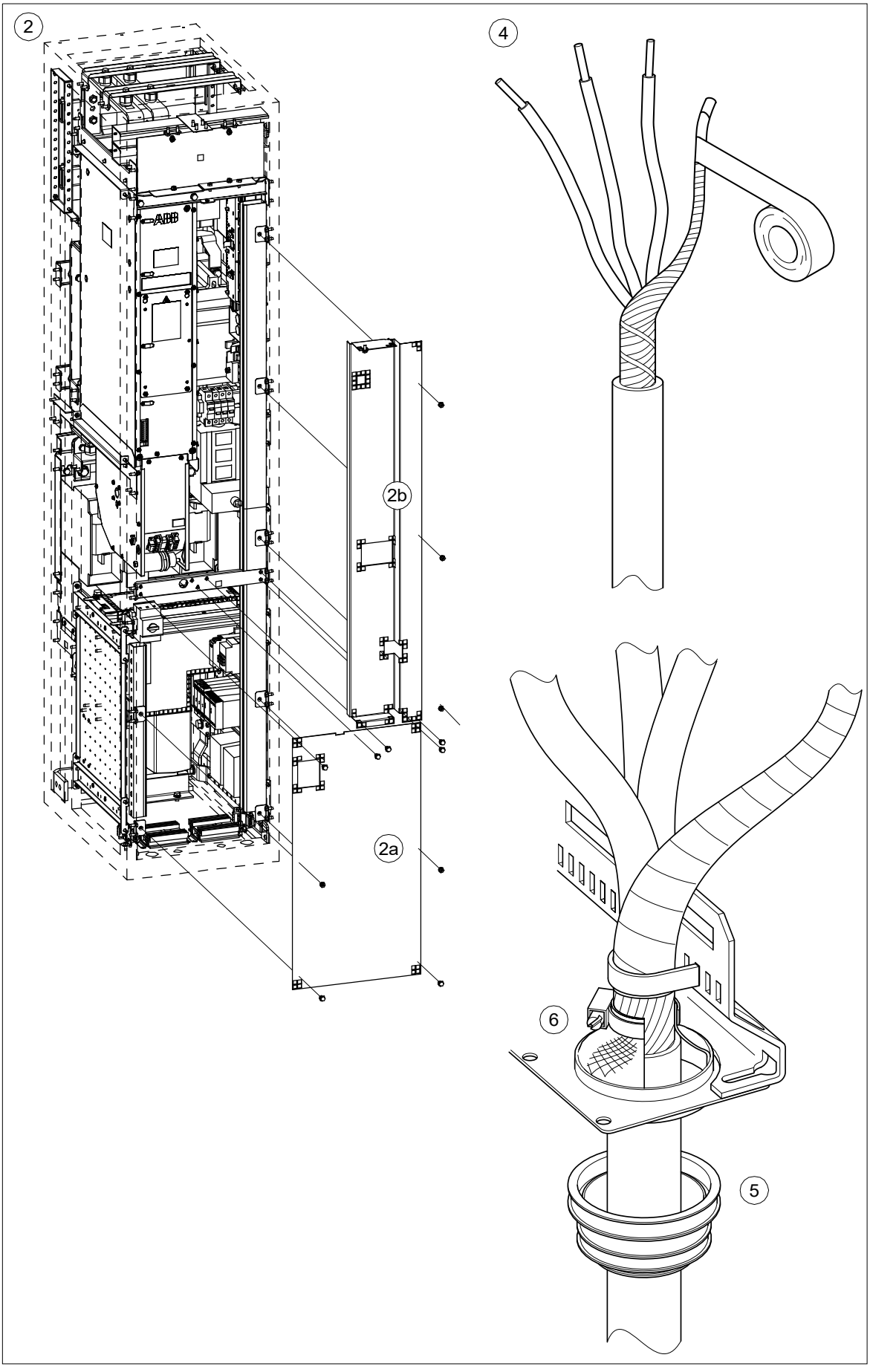
## Connection procedure

### Supply unit with the D6D or D7D supply module

The following procedure instructs how to connect the input power cables. The figures show the supply unit with the D7D module as an example.

**WARNING!** Apply grease to stripped aluminum conductors before attaching them to non-coated aluminum cable lugs. Obey the grease manufacturer's instructions. Aluminum-aluminum contact can cause oxidation in the contact surfaces.

1. Open the cubicle door.
2. Remove the screws of the shroud in the lower part of the cubicle and remove the shroud (2a). Then do the same to the shroud that covers the input power terminals (2b).
3. Remove 3 … 5 cm of insulation from the cables above the cable entry plate for 360-degree grounding.
4. Prepare the ends of the cables.
5. Remove the rubber grommets from the cable entry plate. Cut holes into the rubber grommets and slide the grommets onto the cables. Put the cables through the cable entry holes with the conductive sleeves and attach the grommets to the holes.
6. Attach the conductive sleeves to the cable shields with cable ties.
7. Tie up the unused conductive sleeves with cable ties.
8. Twist the shields of the cables, then connect them to the cabinet PE (ground) busbar. Torque to 70 N·m (51.6 lbf·ft). For the location of the busbar, see section *Supply unit with the D7D supply module* on page *18*.
9. Connect the phase conductors of the input cable to the L1, L2 and L3 terminals. Torque to 70 N·m (51.6 lbf·ft).
10. Connect separate ground conductors/cables to the cabinet PE (ground) busbar.
11. Connect the control cables. See section *Connecting the control cables* on page *43*.
12. Install the shrouds.
13. Close the door.

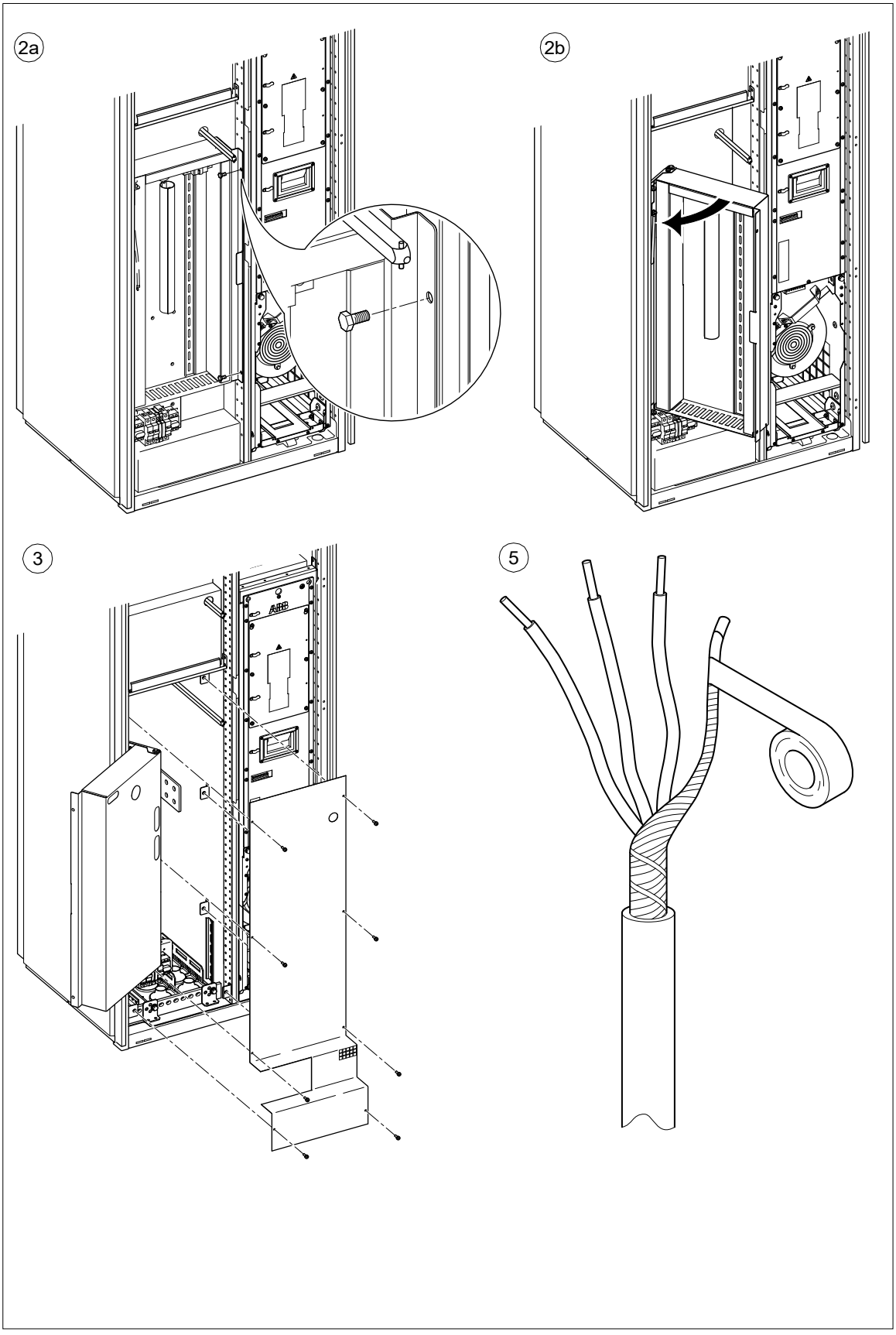

2
2b
2a
4
6
5

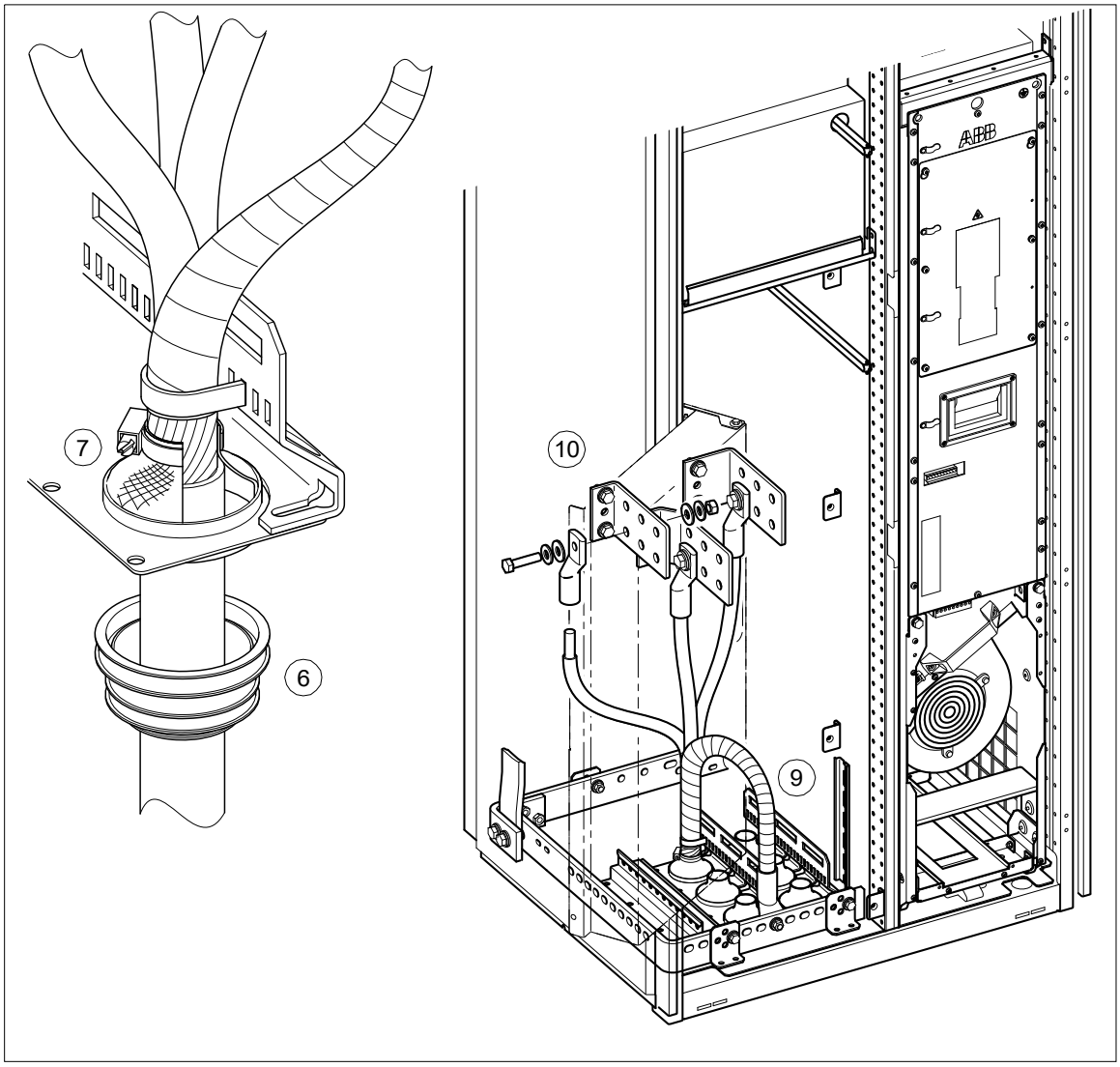
### Supply unit with the D8D supply module

The following procedure instructs how to connect the input power cables.

**WARNING!** Apply grease to stripped aluminum conductors before attaching them to non-coated aluminum cable lugs. Obey the grease manufacturer's instructions. Aluminum-aluminum contact can cause oxidation in the contact surfaces.

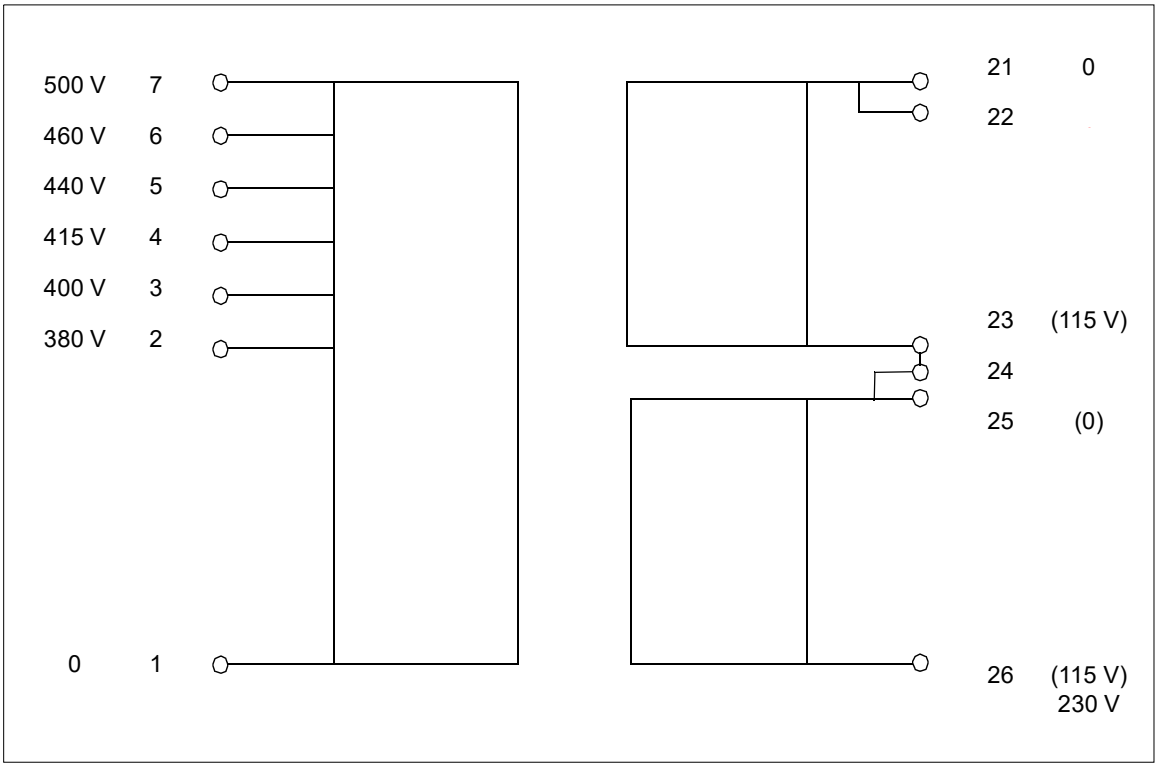
1. Open the cubicle door.
2. Remove the locking screws at the edge of the swing-out frame (2a) and open the frame (2b).
3. Remove the screws of the shroud in the lower part of the cubicle. Lift and remove the shroud.
4. Remove 3 … 5 cm of insulation from the cables above the cable entry plate for 360-degree grounding.
5. Prepare the ends of the cables.
6. Remove the rubber grommets from the cable entry plate. Cut holes into the rubber grommets and slide the grommets onto the cables. Put the cables through the cable entry holes with the conductive sleeves and attach the grommets to the holes.
7. Attach the conductive sleeves to the cable shields with cable ties.
8. Tie up the unused conductive sleeves with cable ties.
9. Twist the shields of the cables, then connect them to the cabinet PE (ground) busbar. Torque to 70 N·m (51.6 lbf·ft).
10. Connect the phase conductors of the input cable to the L1, L2 and L3 terminals. Torque to 70 N·m (51.6 lbf·ft).
11. Connect separate ground conductors/cables to the cabinet PE (ground) busbar.
12. Connect the control cables. See section *Connecting the control cables* on page *43*.
13. Install the shroud and swing-out frame.
14. Close the door.


2a
2b
3
5


7
6
10
9

## Checking the connections of the auxiliary voltage transformer (option +G344)

The auxiliary voltage transformer ([T21], option +G344) connections are made at the factory according to the supply voltage and desired output voltage. If necessary, check the connections using the diagram below.



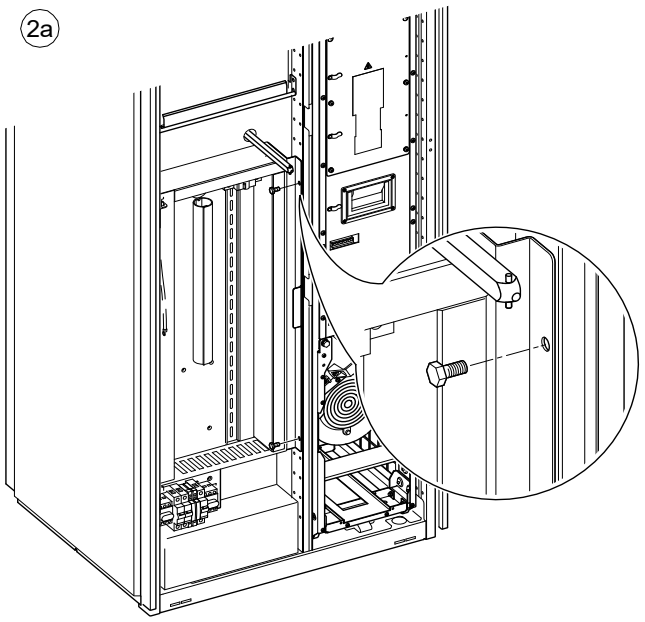

## Connecting the external power supply cable for the auxiliary circuit (option +G307)

For the connection diagram, see the delivery-specific circuit diagrams. For the auxiliary circuit current consumption of the drive, see the delivery-specific technical documentation.

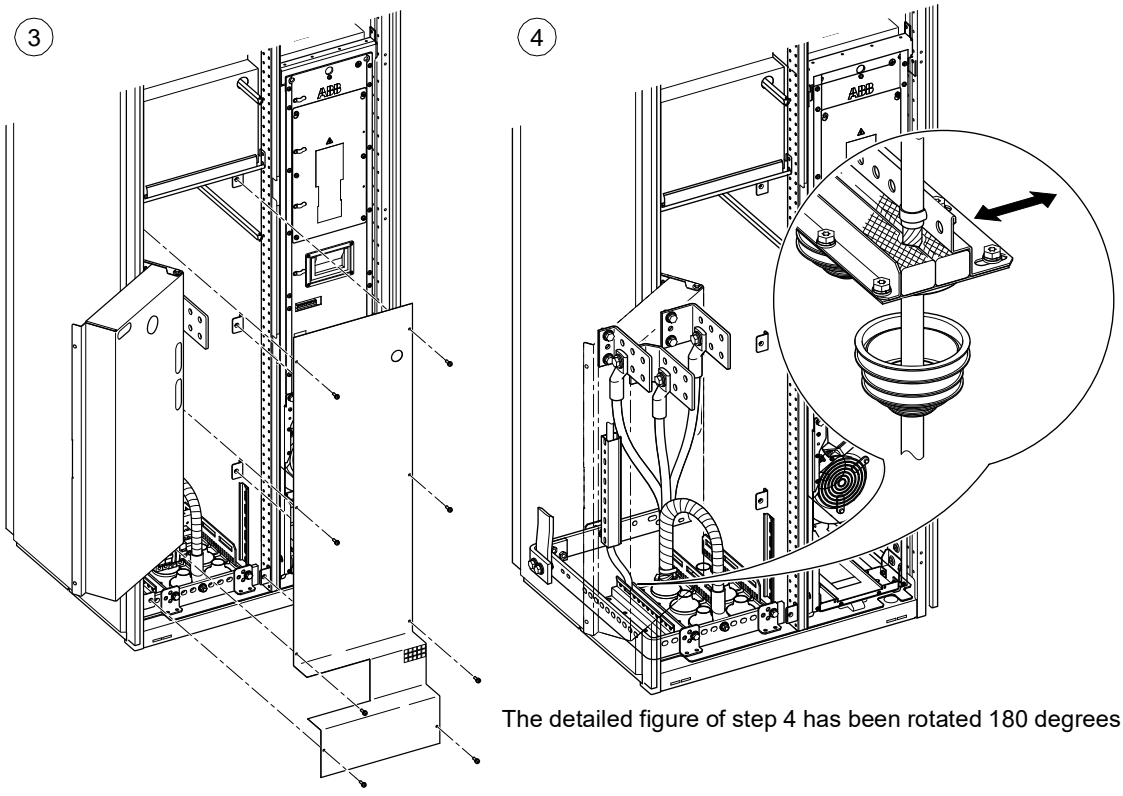
# Connecting the control cables

The following procedure instructs how to connect the control cables of a supply unit. The power cables are routed to the cabinet through the bottom and there is no auxiliary control cubicle. The extra cubicle is added if there is a lot of options. The figures show the supply unit with the D8D module as an example.

1. Open the cubicle door.
2. In a supply unit with the D8D supply module, remove the locking screws at the edge of the swing-out frame (2a) and open the frame (2b). Note that supply units with the D6D and D7D modules do not have a swing-out frame.
3. Remove the screws of the shroud in the lower part of the cubicle. Lift and remove the shroud.
4. Run the cables into the inside of the cabinet through grounding cushions.
   - Seal the cable with a grommet.
   - Run the cables between the cushions. Strip the cable at this location to enable proper connection of the bare shield and the cushions. Tighten the cushions firmly onto the cable shields.
   - Use a cable tie to attach the cable to the support above the cushions.
5. Run the cables to the applicable terminals. Where possible:
   - Use the existing cable trunking in the cabinet.
   - Use sleeving when the cables are laid against sharp edges.
   - Tie the cables to provide strain relief.
   - To allow the swing-out frame to open properly, leave some slack in the cable (if the cable needs to be run to a device in the frame).
6. Cut the cables to a suitable length. Strip the cables and conductors.
7. Twist the cable shields into bundles and connect them to the ground terminal nearest to the terminal block. Keep the unshielded portion of the cables as short as possible.
8. Connect the conductors to the applicable terminals (see the circuit diagrams delivered with the unit).
9. Install the shroud. In a supply unit with the D8D supply module, install also the swing-out frame.
10. Close the door.




Supply units with the D6D and D7D modules do not have a swing-out frame.




The detailed figure of step 4 has been rotated 180 degrees.

The lower shroud of the supply unit with the D7D module is shown in the figure in section *Supply unit with the D6D or D7D supply module* on page *37*.

# Wiring the functional safety options

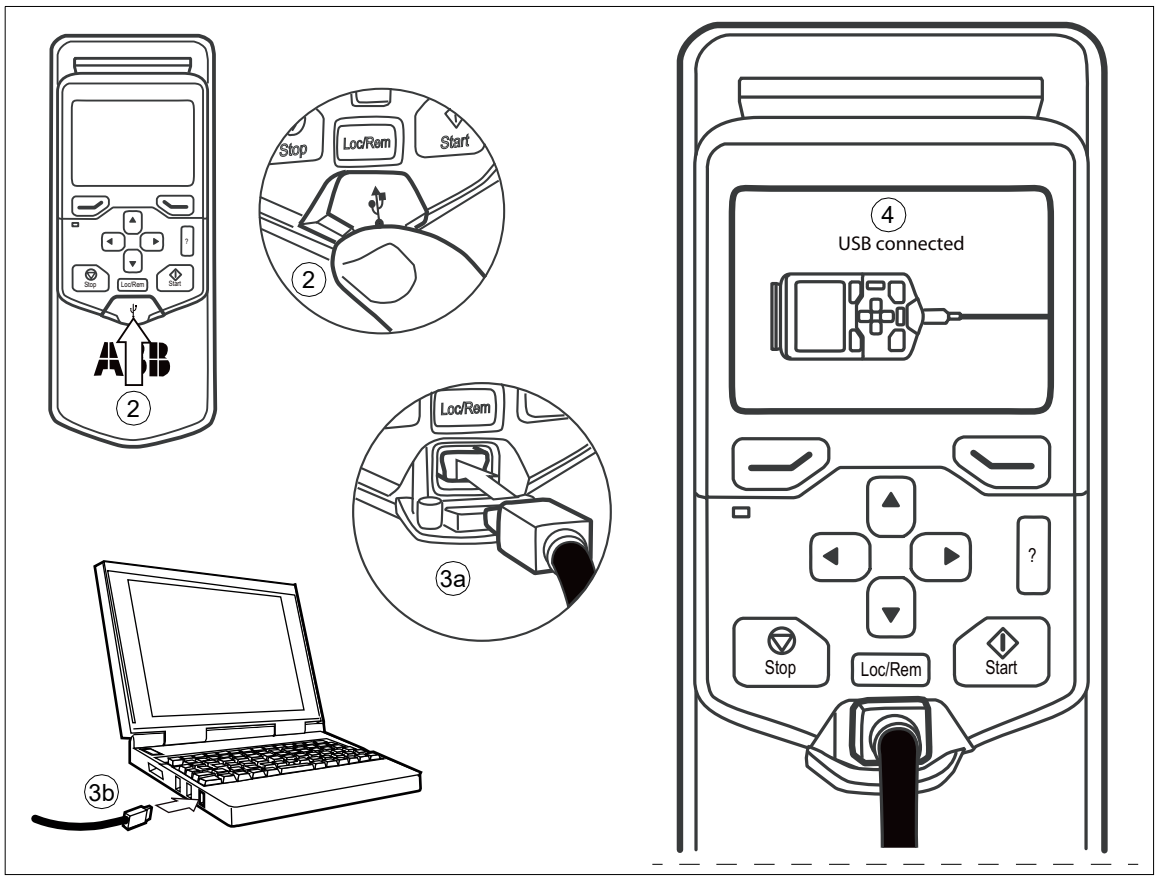
The wiring instructions for the functional safety options +Q951, +Q952, +Q963, +Q964 and +Q979 are given in separate option manuals.

# Connecting a PC to the supply unit

**WARNING!** Do not connect the PC directly to the control panel connector of the control unit.

You can connect a PC (with, for example, the Drive composer PC tool) as follows:

1. Connect an ACS-AP-x control panel to the unit:
   - insert the control panel into the panel holder or platform, or
   - use an Ethernet (eg, Cat 5e) networking cable.
2. Remove the USB connector cover on the front of the control panel.
3. Connect an USB cable (Type A to Type Mini-B) between the USB connector on the control panel (3a) and a free USB port on the PC (3b).
4. The panel will display an indication when the connection is active.
5. See the documentation of the PC tool for setup instructions.



4

# Installation checklist

## Contents of this chapter

This chapter contains a list for checking the installation of the diode supply unit.

## Checklist

Check the mechanical and electrical installation of the drive before start-up. Go through the checklist together with another person.

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

| **Make sure that...** | ☑ |
|---|---|
| The ambient operating conditions meet the specifications given in chapter *Technical data*. | ☐ |
| The drive cabinet is attached to the floor, and if necessary due to vibration etc, also by its top to the wall or roof. | ☐ |
| The cooling air flows freely in and out of the drive. | ☐ |
| There is sufficient free space around the unit. See *ACS880 multidrive cabinets mechanical installation instructions* (3AUA0000101764 [English]). | ☐ |
| The insulation resistance of the input power cable, motor cable and motor has been measured according to local regulations. | ☐ |

| **Make sure that...** | ☑ |
|---|---|
| There is an adequately sized protective earth (ground) conductor between the drive and the switchboard, the conductor is connected to correct terminal, and the terminal is tightened to the correct torque.<br>Proper grounding has also been measured according to the regulations. | ☐ |
| The supply voltage matches the nominal input voltage of the unit. See the type designation label. | ☐ |
| Supply units with auxiliary voltage transformer ([T21], option +G344): The voltage setting of the auxiliary voltage transformer is correct. See section *Checking the connections of the auxiliary voltage transformer (option +G344)* on page *42*. | ☐ |
| The input power cable is connected to the correct terminals, the phase order is correct, and the terminals are tightened. | ☐ |
| Appropriate AC fuses and main disconnector have been installed. | ☐ |
| The control cables are connected to the correct terminals, and the terminals are tightened. | ☐ |
| There are no tools, foreign objects or dust from drilling inside the cabinet. | ☐ |
| The area in front of the drive is clean: the drive cooling fans cannot draw any dust or dirt inside. | ☐ |
| All shrouds and covers are in place. Cabinet doors are closed. | ☐ |

5

# Start-up

## Contents of this chapter

This chapter instructs how to start up the diode supply unit. The symbols in square brackets, for example [Q1], refer to the device designations used in the circuit diagrams. If a task is valid only for a certain option device or feature, the option code is given in brackets, for example, (option +F259).

These instructions do not cover all start-up tasks of all possible variants of the supply unit. Always refer to the delivery-specific circuit diagrams when proceeding with the start-up.

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

**Note:** For the safety options +Q951, +Q952, +Q963, +Q964 and +Q979, the start-up instructions are given in separate option manuals, not in this chapter. Keep the necessary option manuals at hand before doing the supply unit start-up and obey also their instructions.

# Start-up procedure

| Action | ☑ |
|---|---|
| **Safety** | |
| **WARNING!** Obey the safety instructions during the start-up procedure. See *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). | ☐ |
| **Basic checks with no voltage connected** | |
| Disconnect all dangerous voltages from the drive and make sure that it is safe to start the work. Do the steps in section *Electrical safety precautions* on page *34*. | ☐ |
| Make sure that the mechanical and electrical installation of the drive is completed. See chapter *Installation checklist* on page *47*. | ☐ |
| Check the settings of breakers/switches in the auxiliary circuits. See the delivery-specific circuit diagrams. | ☐ |
| Make sure that both circuits of Safe torque off are closed as shown in *Default I/O connection diagram* on page *100* for the supply unit to start. (IN1 and IN2 must be connected to OUT.) | ☐ |
| **Connecting voltage to input terminals and auxiliary circuit** | |
| Make sure that it is safe to connect voltage. Make sure that:<br>• nobody is working on the unit or circuits that are wired from outside into the cabinets<br>• covers of the motor terminal boxes are on<br>• the disconnecting device [Q1] is open. | ☐ |
| Remove the temporary grounding system (if installed). | ☐ |
| Close the circuit breaker for the voltage meters ([F5], option +G334). | ☐ |
| Close the circuit breakers supplying the auxiliary circuits [F22…F26]. | ☐ |
| Close the cabinet doors. | ☐ |
| Open the grounding switch ([Q9], option +F259). | ☐ |
| Close the main breaker of the supply transformer. | ☐ |
| Close the auxiliary voltage switch [Q21]. | ☐ |
| **Setting the supply unit parameters** | |
| Check the correct voltage range, parameter *195.01 Supply voltage*.<br>Do not select the voltage range for the units that are not equipped with a charging circuit or the circuit for the DC bus voltage measurement. The cabinet-installed diode supply units do not have or need the circuits as standard. In this case, make sure that parameter *195.01 Supply voltage* value is *Not given*. | ☐ |
| Switch the control panel to the remote mode (Loc/Rem key) to enable control of the supply unit with the operating switch [S21]. | ☐ |
| **Switching the supply unit on** | |
| Close the main switch-disconnector [Q1].<br>**WARNING!** Do not use excessive force. If the unit is equipped with a grounding switch ([Q9], option +F259), electromagnetic interlocking is used. You cannot close the main switch-disconnector [Q1] before the grounding switch is open and the auxiliary circuit is energized. | ☐ |
| Set the operating switch [S21] to position *On* (1) to activate the Run enable signal and to switch the main contactor [Q2] on. | ☐ |

| Action | ☑ |
|---|---|
| **On-load checks** | |
| Make sure that the supply module cooling fan rotates freely in the correct direction. | ☐ |
| Validate the operation of safety functions (for example, emergency stop).<br>**WARNING!** The safety functions are not safe before they are validated according to the instructions.<br>**Note:** Safety functions are optional. See the function-specific manual for the validation tasks. | ☐ |

## Switching off the drive

1. Stop the motors connected to inverter units. See the inverter unit hardware and firmware manuals.
2. Turn the operating switch [S21] to the off (0) position to deactivate the Run enable signal of the supply unit and to switch the main contactor [Q2] off.

## Disconnecting and temporary grounding the drive

See section *Electrical safety precautions* on page *34*.

6

# Maintenance

## Contents of this chapter

This chapter instructs how to maintain the diode supply unit and how to interpret its fault indications. The information is valid for cabinet-installed ACS880-307…+A003 diode supply units.

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

# Maintenance intervals

The table below shows the maintenance tasks which can be done by the end user. The complete maintenance schedule is available on the Internet (www.abb.com/drivesservices). For more information, consult your local ABB Service representative (www.abb.com/searchchannels).

| Maintenance task/object | Years from start-up | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | … |
| Cooling | | | | | | | | | | | | | |
| Main cooling fan, D6D to D7D/D7T direct on line 50Hz | | | | | | | | | R | | | | |
| Main cooling fan, D6D to D7D/D7T direct on line 60Hz | | | | | | | | | R | | | | |
| Main cooling fan, D8D 50/60Hz | | | | | | | | | R | | | | |
| Cabinet cooling fan, internal 50Hz | | | | | | | | | R | | | | |
| Cabinet cooling fan, internal 60Hz | | | | | | R | | | | | | R | |
| Cabinet cooling fan, door 50/60 Hz | | | | | | | | | R | | | | |
| Cabinet cooling fan, IP54 50Hz | | | | | | | | | R | | | | |
| Cabinet cooling fan, IP54 60Hz | | | | | | R | | | | | | R | |
| Batteries | | | | | | | | | | | | | |
| Control unit battery | | | | | | R | | | | | | R | |
| Control panel battery | | | | | | | | | R | | | | |
| Connections and environment | | | | | | | | | | | | | |
| Cabinet door filters IP54 | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Quality of supply voltage | P | P | P | P | P | P | P | P | P | P | P | P | P |
| IP22 and IP42 air inlet and outlet meshes | I | I | I | I | I | I | I | I | I | I | I | I | I |
| Tightness of terminals | I | I | I | I | I | I | I | I | I | I | I | I | I |
| Ambient conditions (dustiness, corrosion and temperature) | I | I | I | I | I | I | I | I | I | I | I | I | I |
| Cleaning of heatsinks | I | I | I | I | I | I | I | I | I | I | I | I | I |
| Spare parts | | | | | | | | | | | | | |
| Spare part stock | I | I | I | I | I | I | I | I | I | I | I | I | I |
| Reforming DC circuit capacitors (spare modules and spare capacitors) | P | P | P | P | P | P | P | P | P | P | P | P | P |

4FPS10000292961

**Symbols**

- **I** Inspection (visual inspection and maintenance action if needed)
- **P** Performance of on/off-site work (commissioning, tests, measurements or other work)
- **R** Replacement

Maintenance and component replacement intervals are based on the assumption that the equipment is operated within the specified ratings and ambient conditions. ABB recommends annual drive inspections to ensure the highest reliability and optimum performance.

**Note:** Long term operation near the specified maximum ratings or ambient conditions may require shorter maintenance intervals for certain components. Consult your local ABB Service representative for additional maintenance recommendations.

# Cabinet

## Cleaning the interior of the cabinet

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

**WARNING!** Use a vacuum cleaner with an antistatic hose and nozzle, and wear a grounding wristband. Otherwise an electrostatic charge might build up and damage the circuit boards.

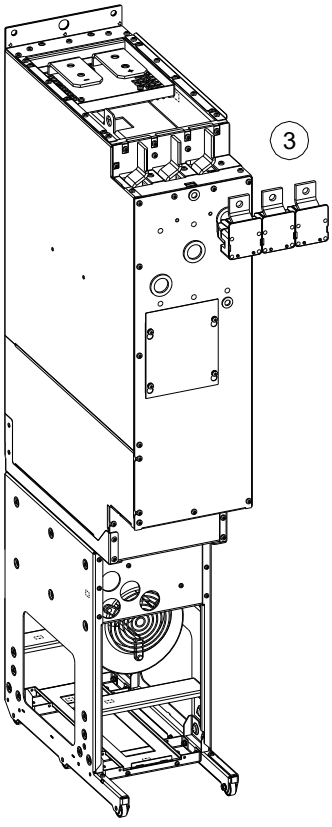
1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Clean the interior of the cabinet. Use a vacuum cleaner and a soft brush.
3. Clean the air inlets and outlets of the fans.
4. Clean the air inlet grating of the door.
5. Close the door.

# Power connections and quick connectors

## Cleaning and greasing the input power connections of the D8D supply module quick connector

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Remove the module from the cabinet. See section *Replacing the D8D supply module* on page *73*.
3. Clean all contact surfaces of the quick connectors and apply some antioxidant joint compound on them.
4. Reinstall the module.
5. Close the door.



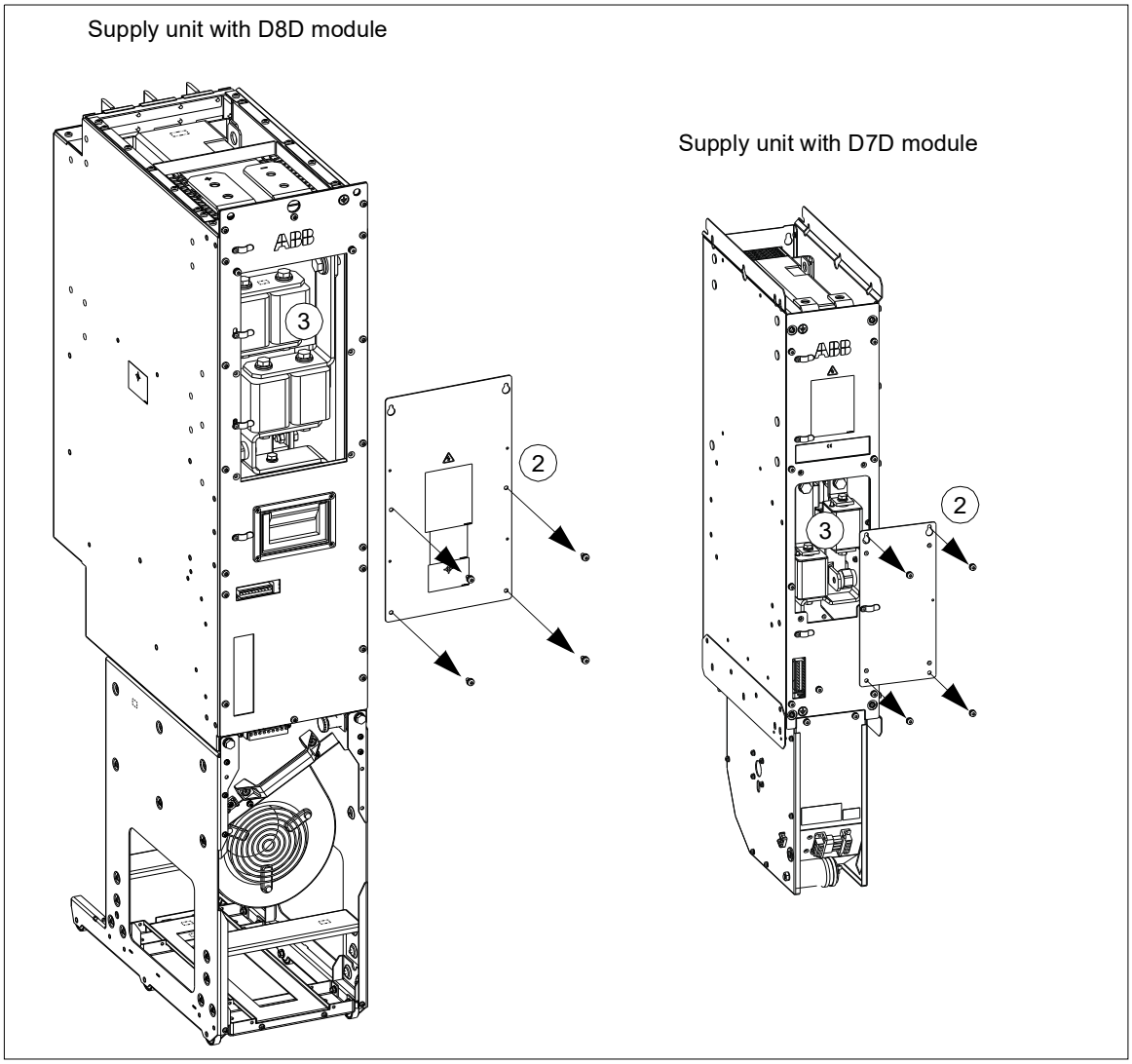

**Note:** The quick connectors are located at the back of the D8D supply module.

# Fuses

## Checking and replacing the module DC fuses

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Remove the screws of the cover panel. Then remove the panel.
3. Examine the fuses and replace if necessary.
4. To replace a fuse, remove the bolts that connect the fuse to the DC busbar. Then remove the fuse.
5. Install the new fuse(s). If there are fuse indicators, make sure that they point to the module to prevent a short-circuit or earth fault with the cover plate.
6. Tighten the bolts. Tightening torque:
   - M8 bolt: 22 N·m (16.2 lbf·ft)
   - M10 bolt: 42 N·m (31 lbf·ft).
7. Attach the cover panel with screws.




**Note:** The illustration above shows a D8D (IEC) module, which has two fuses connected in parallel for each DC busbar. D8D modules for UL/CSA (with options +C129 and +C134) have a different type of fuse and only one fuse for each DC busbar.

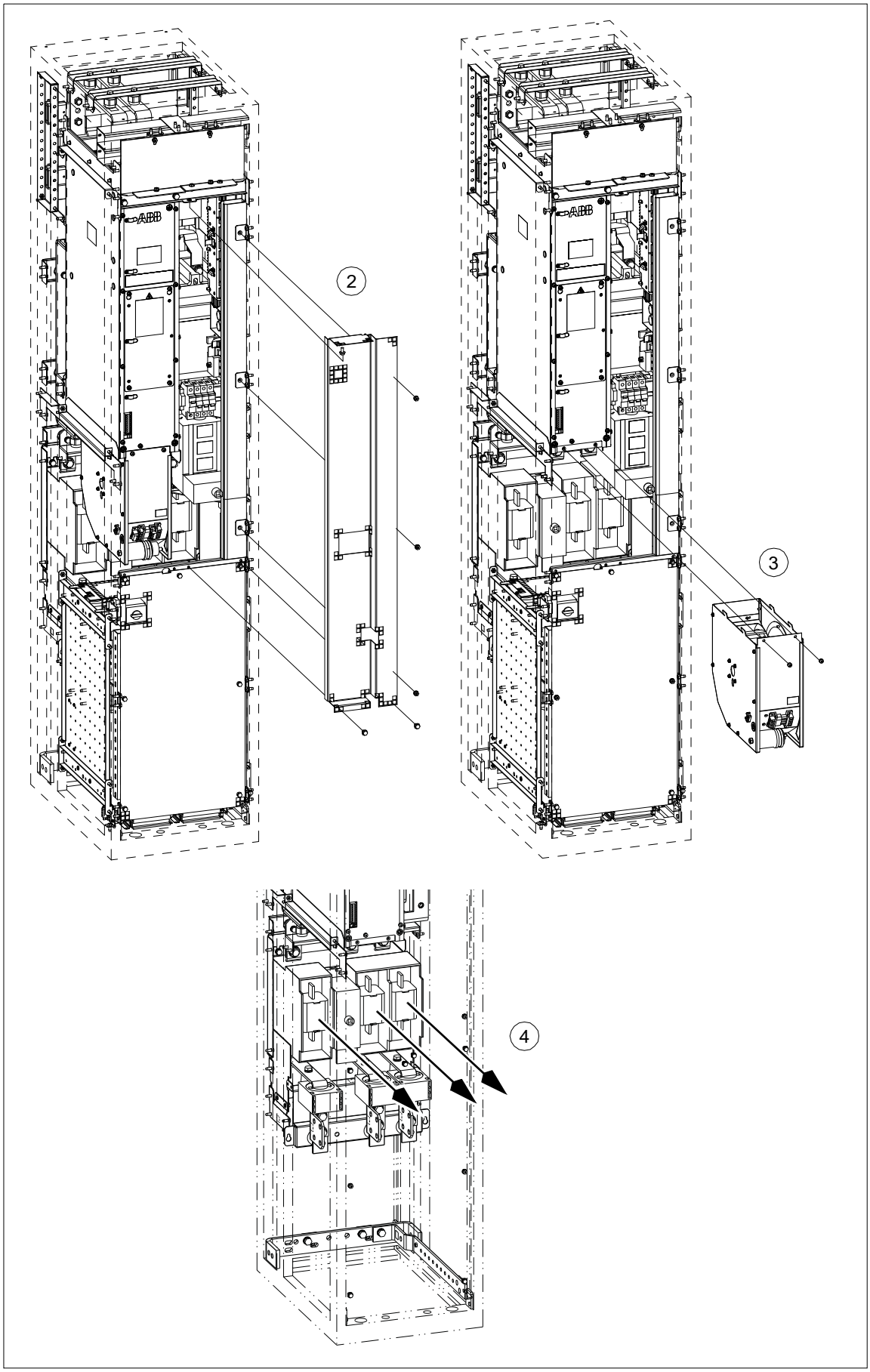
## Checking and replacing the AC fuses

### Supply units with the D6D and D7D supply modules

The following procedure instructs how to check and replace the AC fuses of the supply unit with the D6D and D7D supply modules. The figures show the supply unit with the D7D module as an example.

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Remove the screws of the shroud on the right. Lift and remove the shroud.
3. In the supply unit with the D7D module, remove the module fan. See section *Replacing the fan of the supply module* on page *64*.
4. Examine the cubicle AC fuses and replace if necessary.
5. Install the module fan (D7D) and shroud in reverse order and close the door.


2
3
4

### Supply unit with the D8D supply module

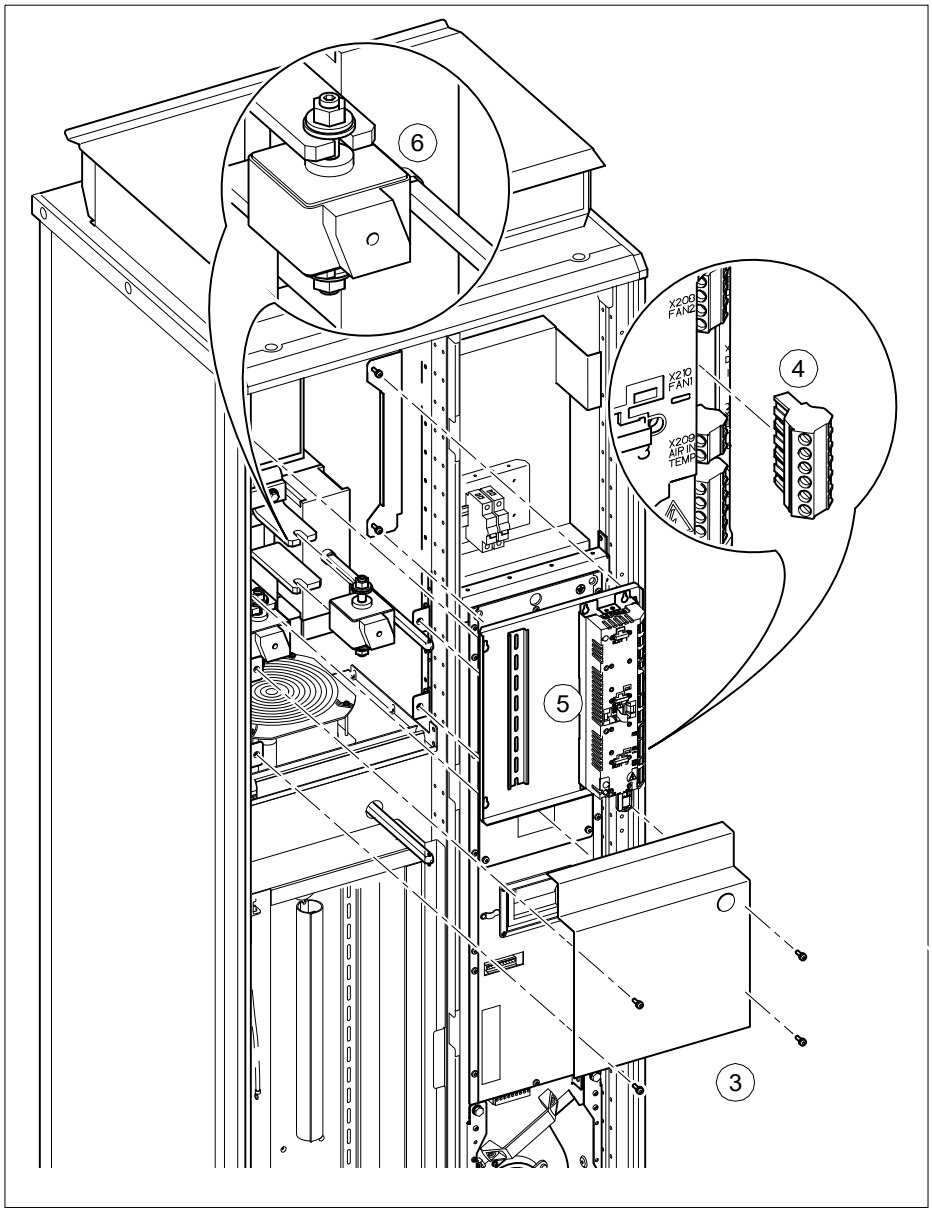
The following procedure instructs how to check and replace the AC fuses of the supply unit.

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Open the cubicle door.
3. Remove the screws of the shroud in the upper part of the cubicle. Lift and remove the shroud.
4. Disconnect the connectors on the control unit.
5. Remove the screws of the mounting plate of the control unit. Lift and remove the plate.
6. Examine the cubicle AC fuses and replace if necessary. To replace the fuses:
   - Loosen the nuts of the headless screws of the fuses, then slide the fuse block out.
   - Replace the fuses and attach them with the headless screws used with the old fuses.
   - Tighten the headless screws by hand or by applying a maximum force of 5 N·m (3.7 lbf·ft).
   - Tighten the nuts to the torque given in the table:

| Nut | Bussmann fuses | Mersen/Ferraz Shawmut fuses |
|---|---|---|
| M12 | 50 N·m (37 lbf·ft) | 46 N·m (34 lbf·ft) |

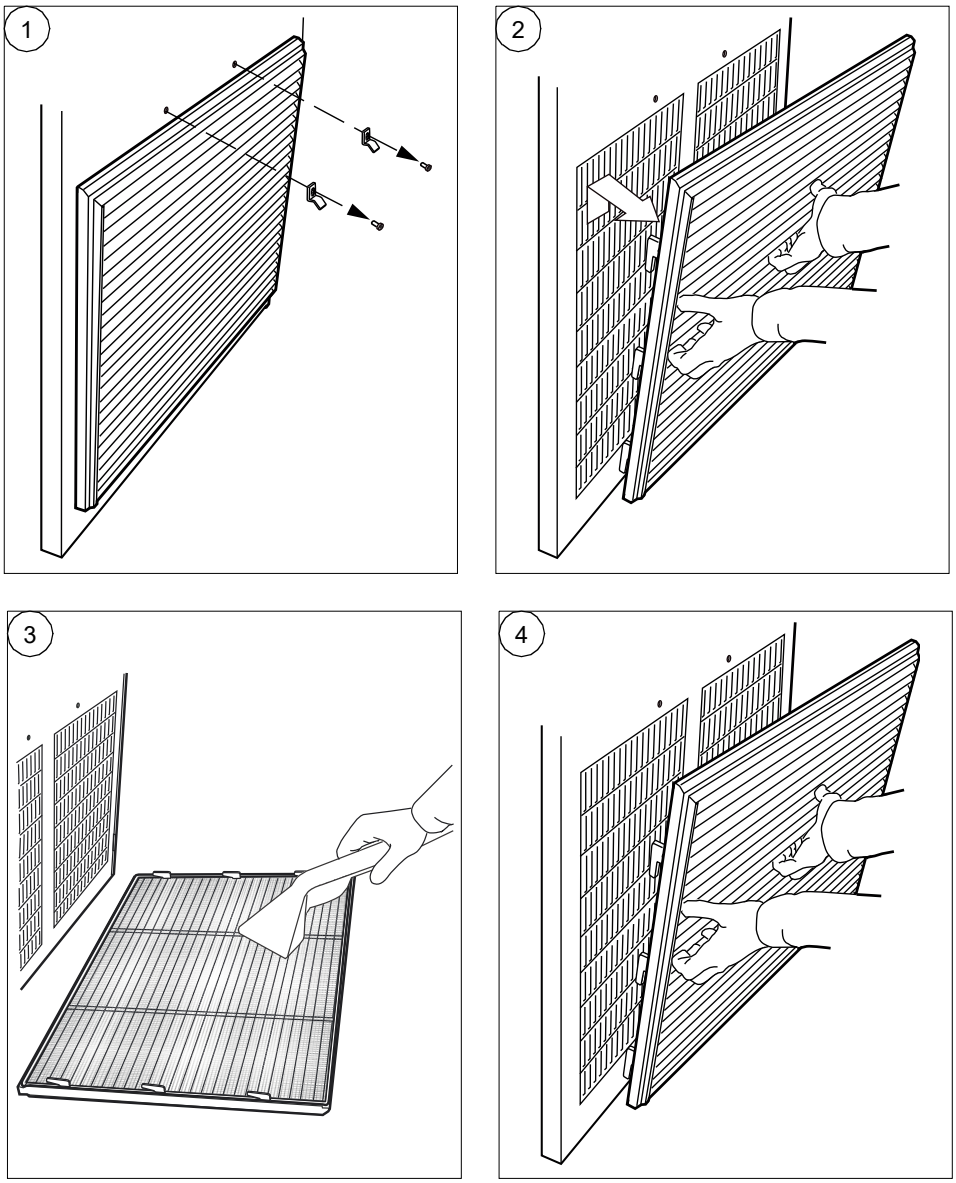
7. Install the mounting plate of the control unit and shrouds in reverse order.
8. Close the cubicle door.


6
X200
FAN2
X210
FAN1
X209
AIR IN
TEMP
4
5
3

# Air inlets

## Cleaning the door air inlets (IP22 and IP42)

1. Remove the fasteners at the top of the grating.
2. Lift the grating and pull it away from the door.
3. Vacuum clean or wash the grating on both sides.
4. Install the (mesh and) grating in reverse order.



# Fans

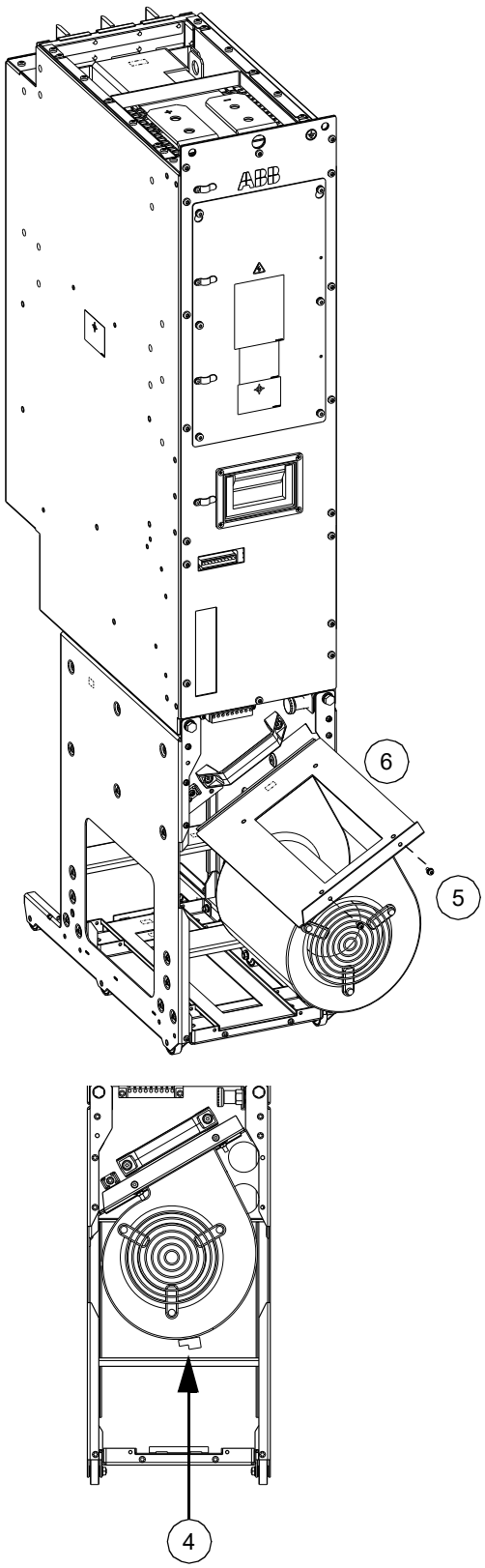
The lifespan of the cooling fan depends on the running time of the fan, surrounding air temperature and dust concentration. Replacement fans are available from ABB. Do not use other than ABB specified spare parts.

## Replacing the fan of the supply module

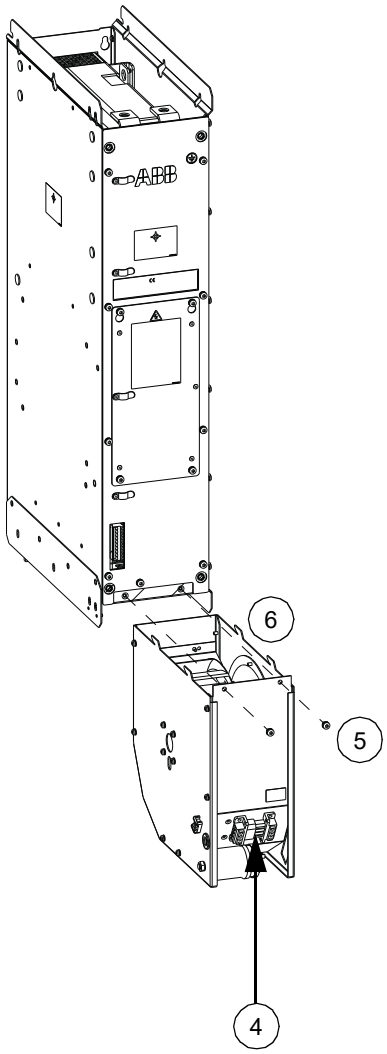
**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Open the door.
3. In the supply unit with the D6D module, remove the screws of the shroud located in front of the fan. Lift and remove the shroud. In the supply unit with the D7D module, remove the shroud if necessary. The supply unit with the D8D does not have a shroud in front of the module.
4. Disconnect the power supply wires of the fan. In the D6D module, the plug is on the right side of the fan.
5. Remove the screws of the fan.
6. Pull out the fan.
7. Install a new fan in reverse order

Supply unit with D8D module




Supply unit with D7D module

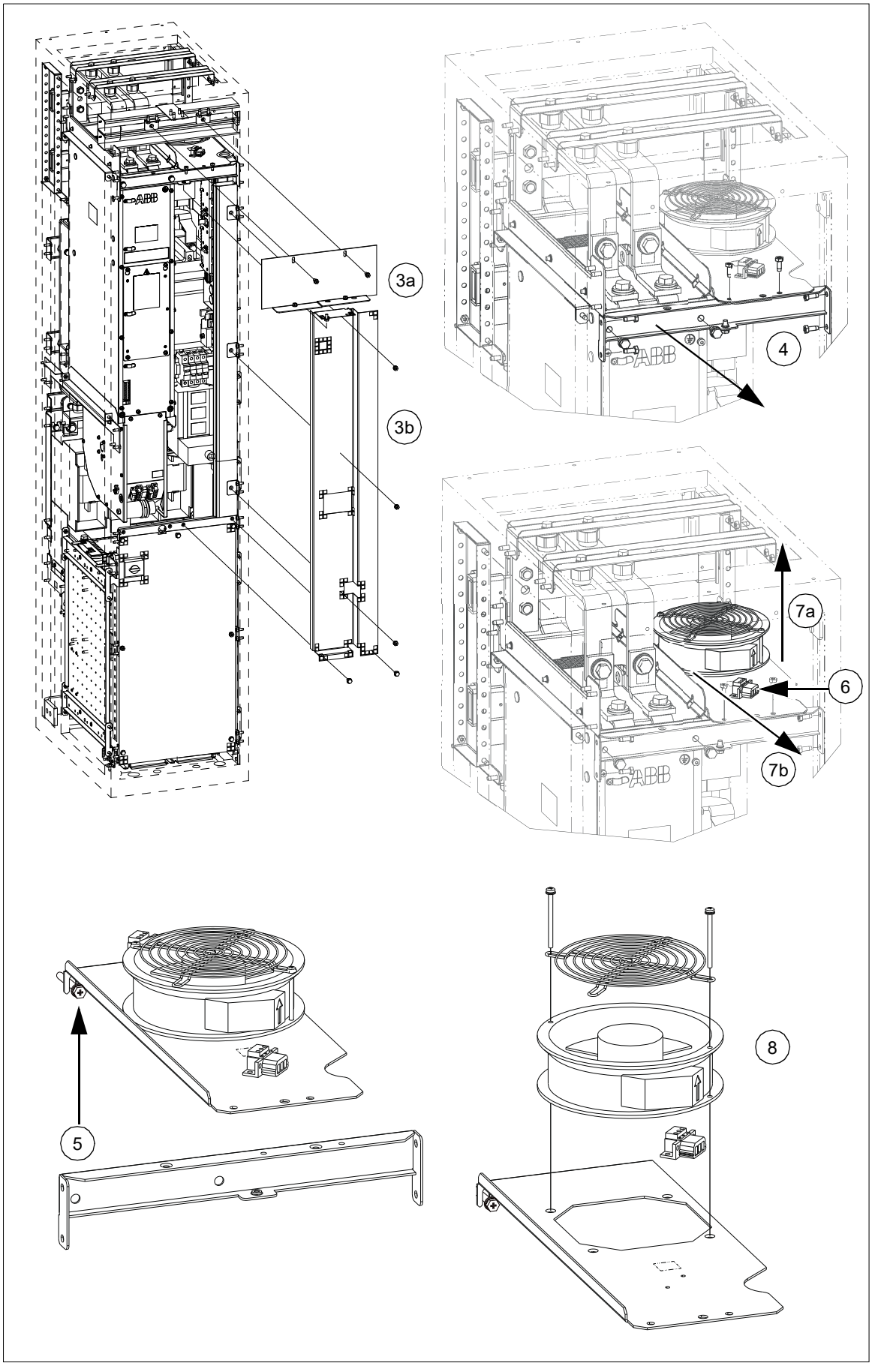


## Replacing the fan in the diode supply module (D6D/D7D) cubicle

The figures show the supply unit with the D7D module as an example.

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

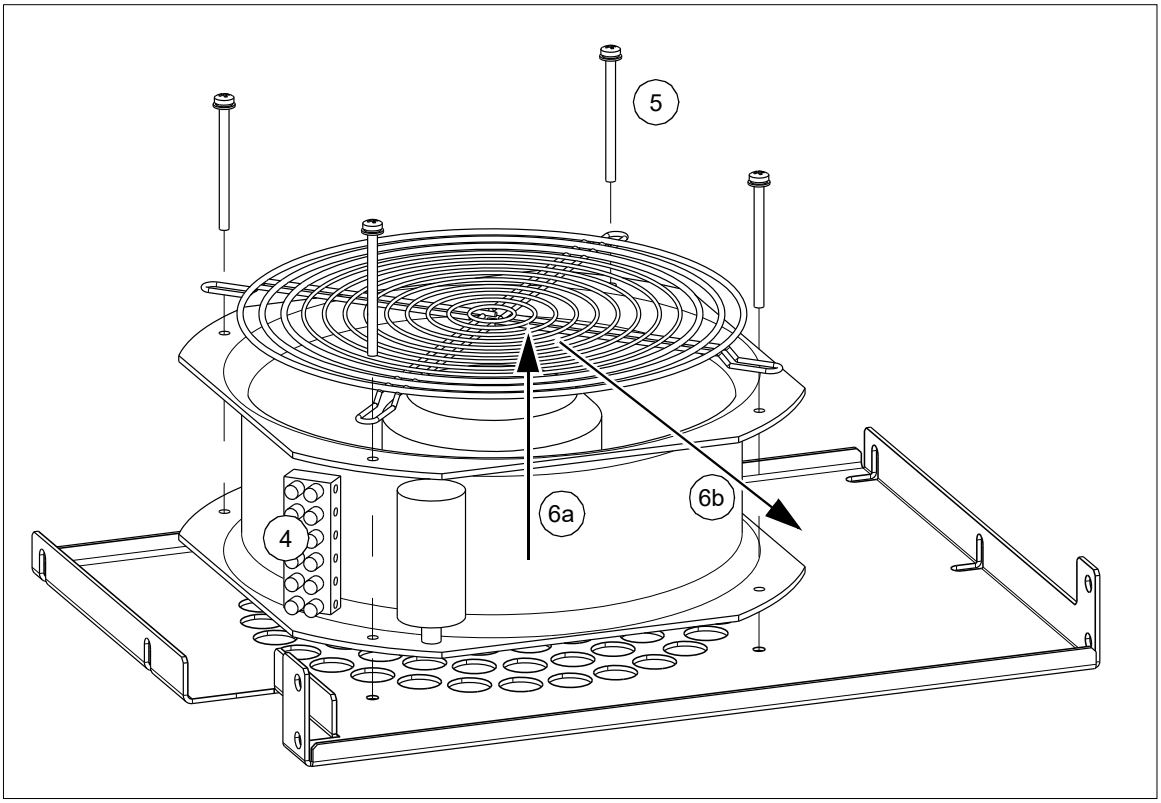
1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Open the cubicle door.
3. Remove the screws of the upper shroud located in front of the fan. Lift and remove the shroud (3a). Then do the same to the shroud on the right (3b).
4. Remove the screws of the bar located in front of the module and fan. Also remove the screws that attach the fan installation plate to the bar. Remove the bar.
5. Loosen the screws of the fan installation plate at the back. The screws are located on back wall under the installation plate of the fan.
6. Disconnect the power supply wires of the fan.
7. Lift (7a) and pull out the fan (7b) with its installation plate.
8. Remove the fan installation plate screws and remove the fan from the plate.
9. Install a new fan in reverse order. Make sure that the arrow indicating the air flow direction points away from the mounting base.


3a
3b
4
7a
6
7b
5
8

## Replacing the fan in the diode supply module (D8D) cubicle

**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Open the cubicle door. For the location of the fan in the diode supply module (D8D) cubicle, see *Supply unit with the D8D supply module* on page *19*.
3. Remove the screws of the shroud located in front of the fan. Lift and remove the shroud.
4. Disconnect the power supply wires of the fan.
5. Loosen the screws of the fan.
6. Lift (6a) and pull out the fan (6b).
7. Install a new fan in reverse order. Make sure that the arrow indicating the air flow direction points away from the mounting base.



# Supply module

## Replacing the D6D and D7D supply module

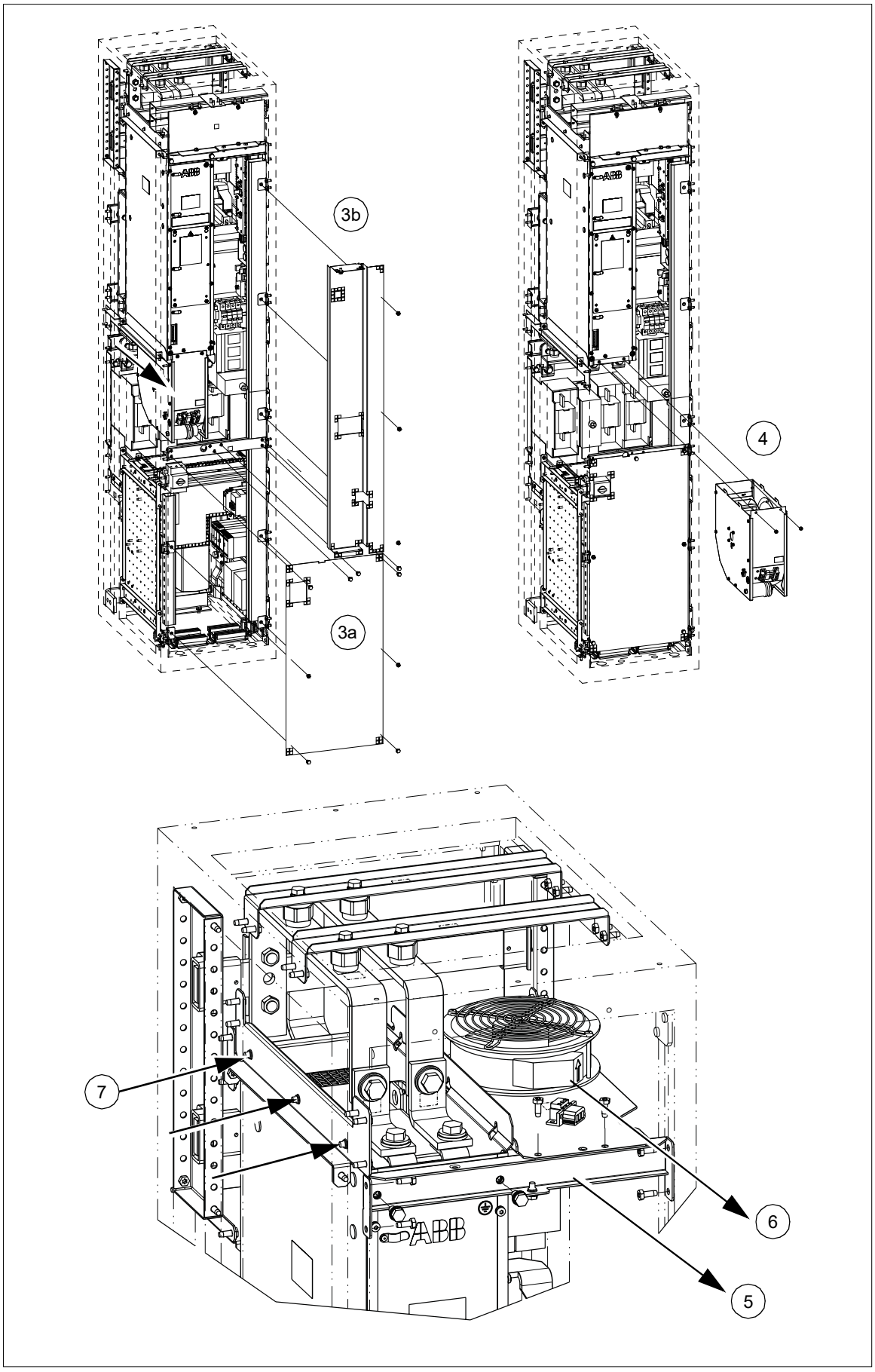
The figures show the supply unit with the D7D module as an example.

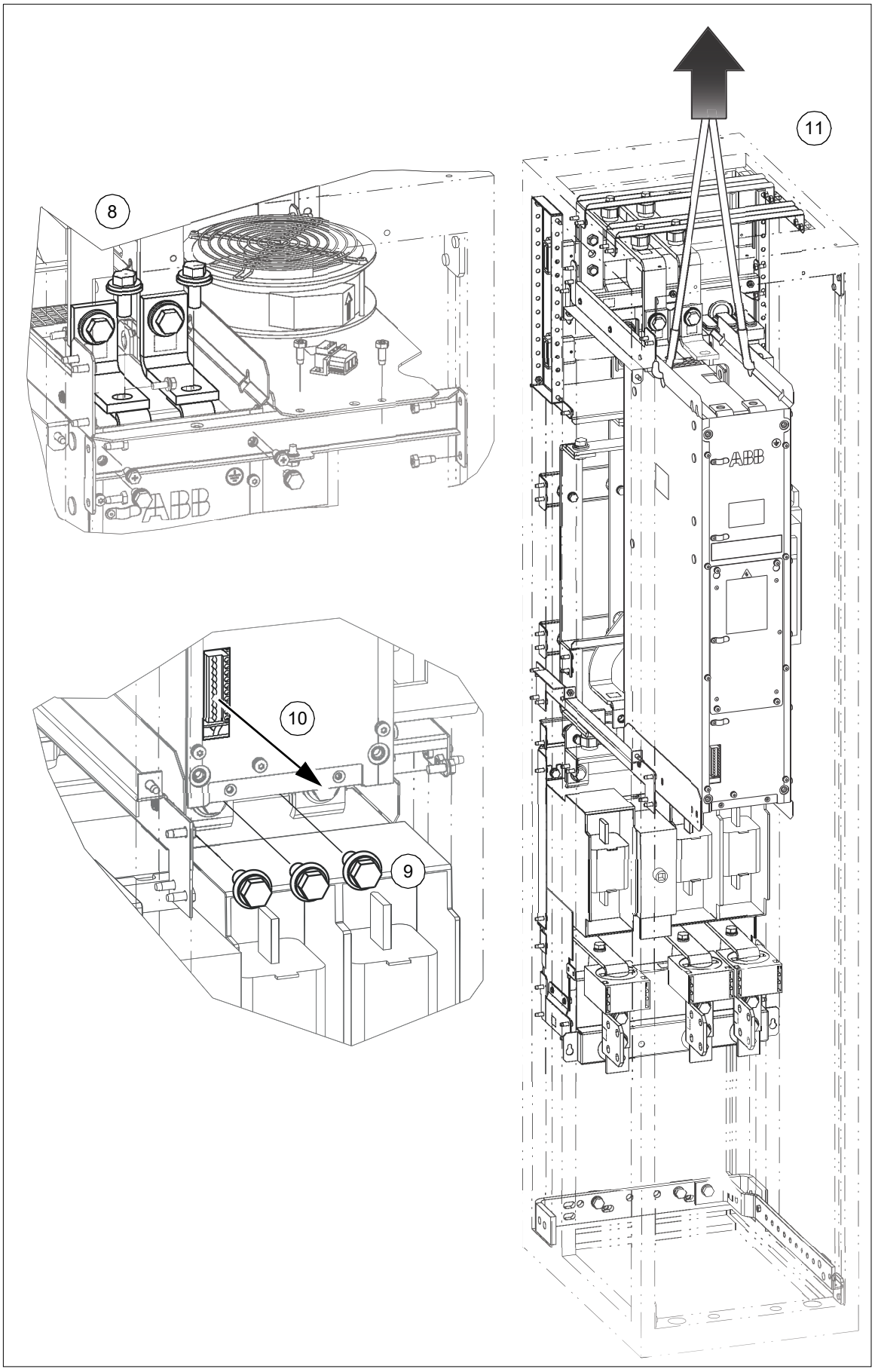
**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

- When replacing a module, keep your fingers away from the edge of the module front plate to avoid pinching them between the module and the cubicle.
- Do not tilt the module. The module is heavy. An overturning module can cause physical injury.
- Lift the module by the upper part using the lifting hole(s) at the top.

1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Open the cubicle door.
3. Remove the screws of the shroud in the lower part of the cubicle and remove the shroud (3a). Then do the same to the shroud in the middle (3b).
4. Remove the module fan. For the instructions, see section *Replacing the fan of the supply module* on page *64*.
5. Remove the screws of the bar located in front of the module and cabinet fan. Also remove the screws that attach the fan installation plate to the bar. Remove the bar.
6. Remove the cabinet fan. For the instructions, see section *Replacing the fan in the diode supply module (D6D/D7D) cubicle* on page *66*.
7. Remove the module screws.
8. Remove the fastening bolts of the DC busbars. If necessary, loosen the bolts used for DC busbar height adjustment.
9. Remove the fastening bolts of the AC busbars.
10. Disconnect the signal connector cable (if any) in the front of the module.
11. Pull the module out enough to attach a lifting chain to chain holes at the top of the module. Then pull the module out.

12. Replace the module:
    - Push the module back enough to detach the lifting chain. Push the module in and fasten. Tighten the fastening screws of the module.
    - Tighten the fastening bolts of the DC busbars and then the bolts used for DC busbar height adjustment of the D7D module to 70 N·m (51.6 lbf.ft). For D6D modules, the tightening torque for the DC busbar M8 bolts is 22 N·m (16.2 lbf.ft) and for the M12 adjustment bolts 70 N·m (51.6 lbf.ft).
    - Tighten the fastening bolts of the AC busbars to 70 N·m (51.6 lbf.ft).
    - Attach the upper bar to the front of the module.
    - Install the cabinet fan.
    - Install the module fan.
    - Install the shrouds.
    - Connect the module signal wire set to the module signal connector.
    - Close the door.

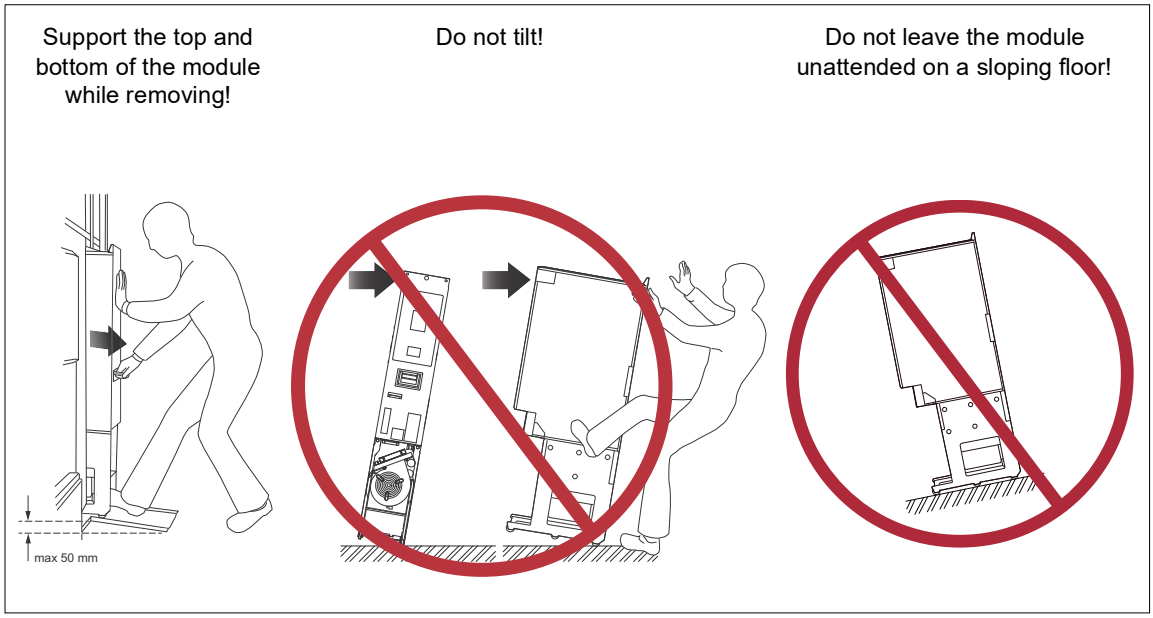

3b
3a
4
7
6
5

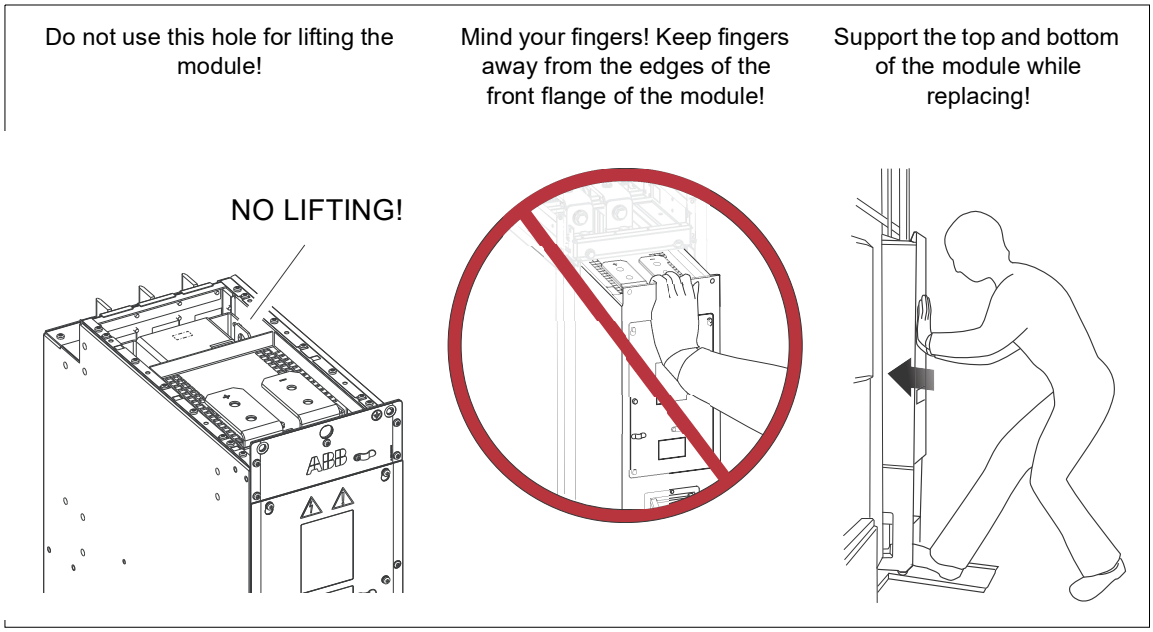

8
11
10
9

## Replacing the D8D supply module

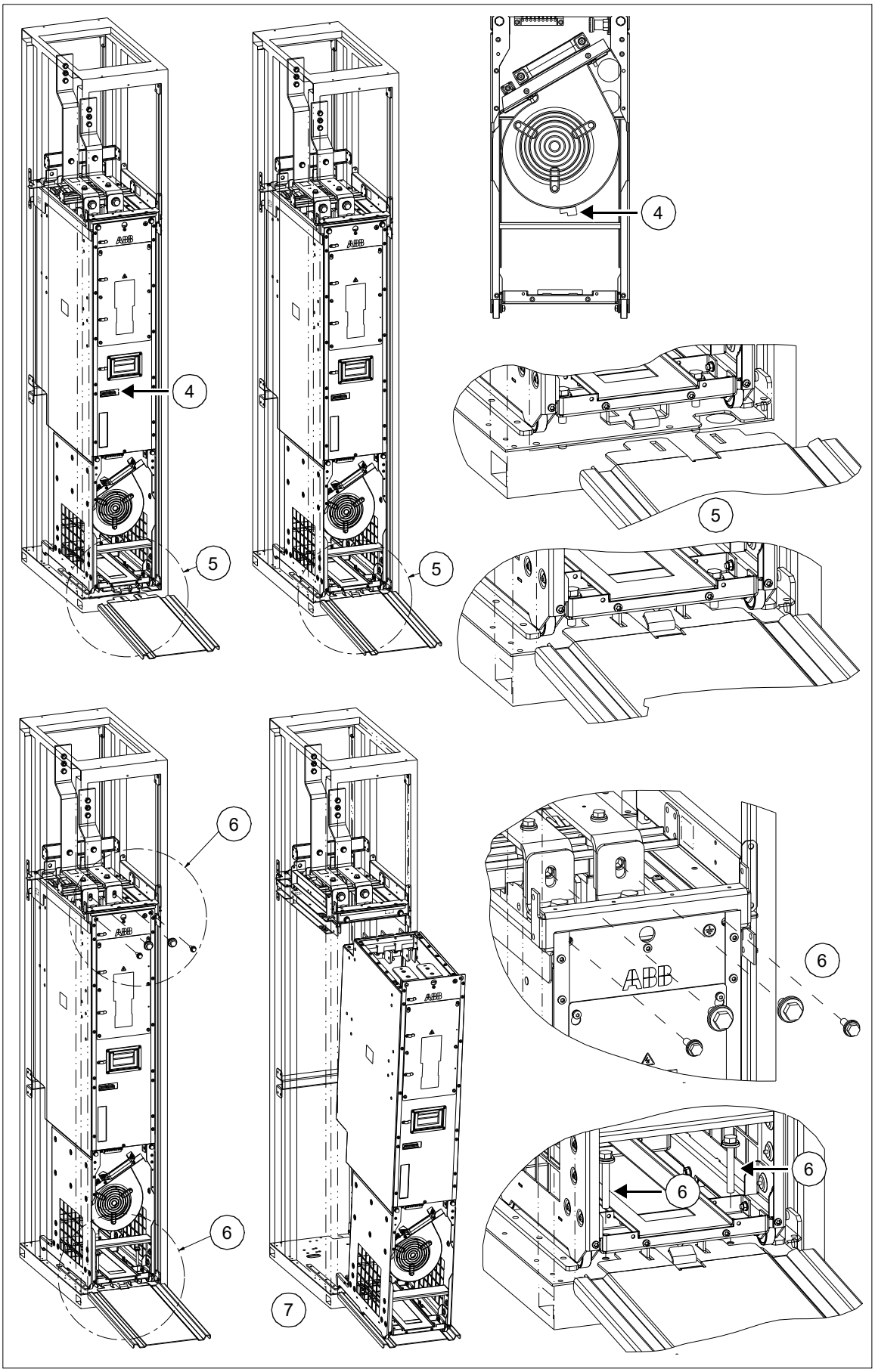
**WARNING!** Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.

- Use extreme caution when maneuvering a supply module that runs on wheels. The D8D module is heavy (173 kg [381 lbs]) and has a high center of gravity. It topples over easily if handled carelessly.
- When removing a module that is equipped with wheels, pull the module carefully out of the cubicle along the ramp. While pulling on the handle, keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back.
- When replacing a module that is equipped with wheels, push the module up the ramp and back into the cubicle. Keep your fingers away from the edge of the module front plate to avoid pinching them between the module and the cubicle. Also, keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back.
- Do not tilt the module. Do not leave the module unattened on a sloping floor.
- Do not use the ramp with plinth heights over 50 mm (1.97 in).The ramp supplied with the drive system is designed for a plinth height of 50 mm (the standard plinth height of ABB cabinets).






1. Stop the drive and do the steps in section *Electrical safety precautions* on page *34* before you start the work.
2. Open the cubicle door.
3. Remove the screws of the shroud in the upper part of the cubicle. Lift and remove the shroud.
4. Disconnect the signal connector cable (if any) in the front of the module and the power cable of the module fan [X41].
5. Lift the module pull-out ramp against the cabinet base so that the hooks of the base go into the ramp's holes.
6. Remove the module fastening screws and the fastening bolts of the DC output busbars.
7. Pull the module carefully out of the cabinet along the ramp.
8. Replace the module:
   - Push the module back in and fasten. Tighten the fastening screws of the module to 22 N·m (16.2 lbf·ft) and fastening bolts of the DC output busbars to 70 N·m (51.6 lbf·ft).
   - Connect the module signal wire set to the module signal connector.
   - Connect the power cable of the module fan [X41].
   - Install the shrouds.
   - Remove the module pull-out ramp and close the cabinet doors.


4
5
4
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5
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7
6
6
6

# Control panel

## Replacing the control panel battery

1. Turn the lid on the back of the panel counter-clockwise until the lid opens.
2. Replace the battery with a new CR2032 battery.
3. Put the lid back and tighten it by turning it clockwise.
4. Dispose of the old battery according to local disposal rules and applicable laws.

# Memory unit

After replacing a drive control unit (or a supply module control unit), you can keep the existing parameter settings by transferring the memory unit from the defective unit to the new unit.

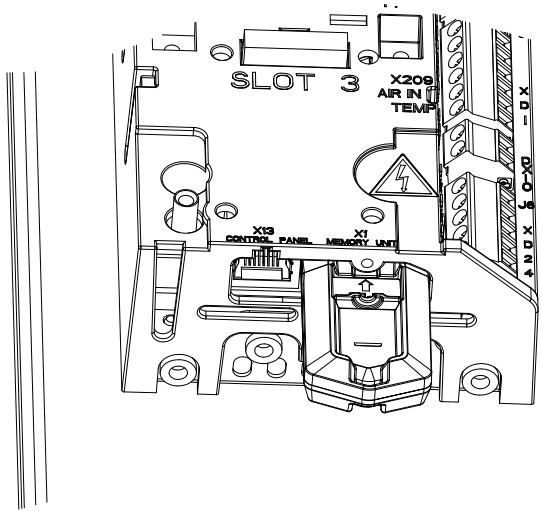
## Replacing the memory unit

**WARNING!** Do not remove or insert the memory unit when the drive control unit is powered.

To remove the memory unit:

1. Remove the fastening screw
2. Pull the memory unit out.

ZCU-14: end of control unit



# LEDS and other status indicators

This section instructs how to interpret the status indications of the diode supply unit.

Information on warnings and faults reported by the control program and shown on the drive/converter/inverter control panel on the cabinet door are contained within the firmware manual delivered with the drive.

The ACS-AP-x control panel has a status LED. The control panel mounting platform or holder has two status LEDs. For their indications, see the following table.

| Location | LED | Indication |
|---|---|---|
| Control panel | Continuous green | The unit is functioning normally. |
| | Flickering green | Data is transferred between the PC and the unit through the USB connection of the control panel. |
| | Blinking green | There is an active warning in the unit. |
| | Continuous red | There is an active fault that requires the stopping and restarting of the drive/converter/inverter. |
| | Blinking blue (ACS-AP-W only) | The Bluetooth interface is enabled, in discoverable mode, and ready for pairing. |
| | Flickering blue (ACS-AP-W only) | Data is being transferred through the Bluetooth interface of the control panel. |
| Control panel mounting platform or holder (with the control panel removed) | Red | There is an active fault in the unit. |
| | Green | Power supply for the control unit is OK. |

7

# Technical data

## Contents of this chapter

This chapter contains the technical data of the diode supply units.

# Ratings

| Unit | Module | | No-overload use | | | | | Light-overload use | | Heavy-duty use | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type ACS880-307-… | Type ACS880-304-… | Frame size | $I_N$ | $I_N$ | $I_{max}$ | $P_N$ | $S_N$ | $I_{Ld}$ | $P_{Ld}$ | $I_{Hd}$ | $P_{Hd}$ |
| | | | A (DC) | A (AC) | A (DC) | kW | kVA | A (DC) | kW(DC) | A (DC) | kW(DC) |
| $U_N$ = 400 V | | | | | | | | | | | |
| 0080A-3+A003 | 0080A-3+A003 | D6D | 98 | 80 | 137 | 53 | 55 | 94 | 51 | 78 | 42 |
| 0170A-3+A003 | 0170A-3+A003 | D6D | 212 | 173 | 297 | 114 | 120 | 203 | 110 | 170 | 92 |
| 0330A-3+A003 | 0330A-3+A003 | D7D | 400 | 327 | 561 | 216 | 227 | 384 | 208 | 320 | 173 |
| 0490A-3+A003 | 0490A-3+A003 | D7D | 600 | 490 | 840 | 324 | 339 | 576 | 311 | 480 | 259 |
| 0650A-3+A003 | 0650A-3+A003 | D8D | 800 | 653 | 1120 | 432 | 452 | 768 | 415 | 640 | 345 |
| 0980A-3+A003 | 0980A-3+A003 | D8D | 1200 | 980 | 1680 | 648 | 679 | 1152 | 622 | 960 | 519 |
| $U_N$ = 500 V | | | | | | | | | | | |
| 0080A-5+A003 | 0080A-5+A003 | D6D | 98 | 80 | 137 | 66 | 69 | 94 | 63 | 78 | 53 |
| 0170A-5+A003 | 0170A-5+A003 | D6D | 212 | 173 | 297 | 143 | 150 | 203 | 137 | 170 | 114 |
| 0330A-5+A003 | 0330A-5+A003 | D7D | 400 | 327 | 561 | 270 | 283 | 384 | 260 | 320 | 216 |
| 0490A-5+A003 | 0490A-5+A003 | D7D | 600 | 490 | 840 | 405 | 424 | 576 | 389 | 480 | 324 |
| 0650A-5+A003 | 0650A-5+A003 | D8D | 800 | 653 | 1120 | 540 | 566 | 768 | 518 | 640 | 432 |
| 0980A-5+A003 | 0980A-5+A003 | D8D | 1200 | 980 | 1680 | 810 | 849 | 1152 | 778 | 960 | 648 |

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## Definitions

**Nominal ratings**

$I_N$ Continuous rms input (AC) or output (DC) current. No overload capability at 40°C (104°F).

$I_{max}$ Maximum output current. Available for 10 s at start, otherwise as long as allowed by module temperature.

$P_N$ Nominal output power

$S_N$ Nominal apparent power

**Light-overload use (10% overload capability) ratings**

$I_{Ld}$ Continuous rms current. 10% overload is allowed for one minute every 5 minutes.

$P_{Ld}$ Output power in light-overload use

**Heavy-duty use (40% overload capability) ratings**

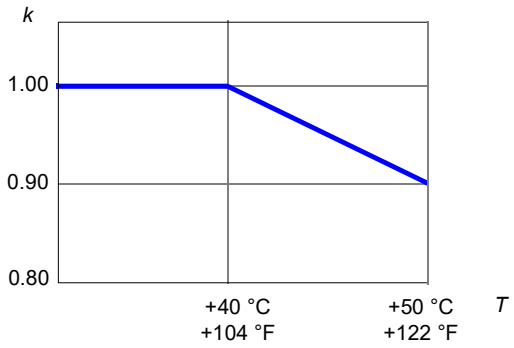
$I_{Hd}$ Continuous rms current. 40% overload is allowed for one minute every 5 minutes.

$P_{Hd}$ Output power in heavy-duty use

## Derating

### Surrounding air temperature derating

In the temperature range 40 … 50 °C (104 … 122 °F), the rated output current is derated by 1% for every added 1 °C (1.8 °F). The output current can be calculated by multiplying the current given in the rating table by the derating factor (*k*):




### Altitude derating

At altitudes 0 … 1000 m (3281 ft), no derating. At altitudes 1000 … 2000 m (3281 … 6562 ft) above sea level, the output current must be derated 1% for every 100 m (328 ft). For derating at altitudes over 2000 m (6562 ft), contact ABB.

# Fuses

## AC fuses

| Unit type ACS880-307-… | Rating | Type | Example | Qty | $I^2t$ clearing at 690 V $A^2s$ |
|---|---|---|---|---|---|
| $U_N$ = 400 V | | | | | |
| 0080A-3+A003 | 160 A, 690 V, size 1 | DIN 43620 | Bussmann 170M3814D | 3 | 8250 |
| 0170A-3+A003 | 315 A, 690 V, size 1 | DIN 43620 | Bussmann 170M3817D | 3 | 52000 |
| 0330A-3+A003 | 550 A, 690 V, size 3 | DIN 43620 | Bussmann 170M6809D | 3 | 140000 |
| 0490A-3+A003 | 800 A, 690 V, size 3 | DIN 43620 | Bussmann 170M6812D | 3 | 490000 |
| 0650A-3+A003 | 1100 A, 690 V, size 3 | Flush end contact | Bussmann 170M6415 | 3 | 1300000 (at 660 V) |
| 0980A-3+A003 | 1600 A, 690 V, size 3 | Flush end contact | Bussmann 170M6419 | 3 | 3900000 (at 660 V) |
| $U_N$ = 500 V | | | | | |
| 0080A-5+A003 | 160 A, 690 V, size 1 | DIN 43620 | Bussmann 170M3814D | 3 | 8250 |
| 0170A-5+A003 | 315 A, 690 V, size 1 | DIN 43620 | Bussmann 170M3817D | 3 | 52000 |
| 0330A-5+A003 | 550 A, 690 V, size 3 | DIN 43620 | Bussmann 170M6809D | 3 | 140000 |
| 0490A-5+A003 | 800 A, 690 V, size 3 | DIN 43620 | Bussmann 170M6812D | 3 | 490000 |
| 0650A-5+A003 | 1100 A, 690 V, size 3 | Flush end contact | Bussmann 170M6415 | 3 | 1300000 (at 660 V) |
| 0980A-5+A003 | 1600 A, 690 V, size 3 | Flush end contact | Bussmann 170M6419 | 3 | 3900000 (at 660 V) |

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## Internal DC fuses

| Supply module frame size and options | Supply module DC fuses | | | | | |
|---|---|---|---|---|---|---|
| | $I_N$ A | $I^2t$ $A^2s$ | $U_N$ V | Manufacturer | Type | Qty |
| D6D | 350 | 68500 [1] | 690 | Bussmann | 170M3418 | 2 |
| D7D | 700 | 755000 | 1000 | Bussmann | 170M4908 | 2 |
| D8D (IEC) | 900 | 1750000 [2] | 1100 | Bussmann | 170M5499 | 4 |
| D8D +C129+C134 (UL/CSA) | 1800 | 7600000 | 1250 | Bussmann | 170M6783 | 2 |

[1] Clearing at 660 V

[2] Clearing at 1000 V

## Fuses on CVAR board

The fuse type is Mersen/Ferraz Shawmut A070GRB10T13/G330010 (10 A, 700 V AC).

**Note:** The CVAR board is used in UL/CSA installations.

# Dimensions, weights and free space requirements

## Dimensions of the supply unit

| Unit type | Height | | Width 1 | | Width 2 | | Width 3 | | Width 2 | | Depth | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACS880-307-… | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | kg | lb |
| $U_N$ = 400 V | | | | | | | | | | | | | | |
| 0080A-3+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 300 | 670 |
| 0170A-3+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 300 | 670 |
| 0330A-3+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 350 | 780 |
| 0490A-3+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 350 | 780 |
| 0650A-3+A003 | 2150 | 84.6 | 700 | 27.6 | - | - | 1100 | 43.3 | - | - | 636 | 25 | 550 | 1212.5 |
| 0980A-3+A003 | 2150 | 84.6 | 700 | 27.6 | - | - | 1100 | 43.3 | - | - | 636 | 25 | 550 | 1212.5 |
| $U_N$ = 500 V | | | | | | | | | | | | | | |
| 0080A-5+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 300 | 670 |
| 0170A-5+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 300 | 670 |
| 0330A-5+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 350 | 780 |
| 0490A-5+A003 | 2150 | 84.6 | 400 | 15.7 | 600 | 23.6 | 800 | 31.5 | 1000 | 39.4 | 636 | 25 | 350 | 780 |
| 0650A-5+A003 | 2150 | 84.6 | 700 | 27.6 | - | - | 1100 | 43.3 | - | - | 636 | 25 | 550 | 1212.5 |
| 0980A-5+A003 | 2150 | 84.6 | 700 | 27.6 | - | - | 1100 | 43.3 | - | - | 636 | 25 | 550 | 1212.5 |

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**Definitions**

**Width 1** Without auxiliary control cubicle

**Width 2** Without auxiliary control cubicle but with cables routed through the top (only with D6D and D7D)

**Width 3** With auxiliary control cubicle

**Width 4** With auxiliary control cubicle and cables routed through the top (only with D6D and D7D)

**Weight** Weight without the auxiliary control cubicle

## Free space requirements for the multidrive cabinet

| Unit type ACS880-307-… | Above | | Front | | Left | | Right | |
|---|---|---|---|---|---|---|---|---|
| | mm | in | mm | in | mm | in | mm | in |
| $U_N$ = 400 V | | | | | | | | |
| 0080A-3+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0170A-3+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0330A-3+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0490A-3+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0650A-3+A003 | 400 | 15.7 | 700 | 27.6 | 15 | 0.6 | 15 | 0.6 |
| 0980A-3+A003 | 400 | 15.7 | 700 | 27.6 | 15 | 0.6 | 15 | 0.6 |
| $U_N$ = 500 V | | | | | | | | |
| 0080A-5+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0170A-5+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0330A-5+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0490A-5+A003 | 400 | 15.7 | 400 | 15.7 | 15 | 0.6 | 15 | 0.6 |
| 0650A-5+A003 | 400 | 15.7 | 700 | 27.6 | 15 | 0.6 | 15 | 0.6 |
| 0980A-5+A003 | 400 | 15.7 | 700 | 27.6 | 15 | 0.6 | 15 | 0.6 |

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**Definitions**

**Above** Free space measured from the base plate of the cabinet top to enable cooling air flow
**Front** Door turn radius (more space preferred for safety exit)
**Left** Possible end plate
**Right** Possible end plate

# Losses, cooling data and noise

| Unit type ACS880-307-… | $P_{loss}$ | Air flow | | Noise |
|---|---|---|---|---|
| | kW | $m^3/h$ | $ft^3/min$ | dB |
| $U_N$ = 400 V | | | | |
| 0080A-3+A003 | 1.4 | 720 | 424 | 62 |
| 0170A-3+A003 | 2.0 | 720 | 424 | 62 |
| 0330A-3+A003 | 3.0 | 1070 | 630 | 62 |
| 0490A-3+A003 | 4.1 | 1070 | 630 | 62 |
| 0650A-3+A003 | 5.8 | 1430 | 842 | 65 |
| 0980A-3+A003 | 7.6 | 1430 | 842 | 65 |
| $U_N$ = 500 V | | | | |
| 0080A-5+A003 | 1.4 | 720 | 424 | 62 |
| 0170A-5+A003 | 2.0 | 720 | 424 | 62 |
| 0330A-5+A003 | 3.0 | 1070 | 630 | 62 |
| 0490A-5+A003 | 4.1 | 1070 | 630 | 62 |
| 0650A-5+A003 | 5.8 | 1430 | 842 | 65 |
| 0980A-5+A003 | 7.6 | 1430 | 842 | 65 |

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**Definitions**

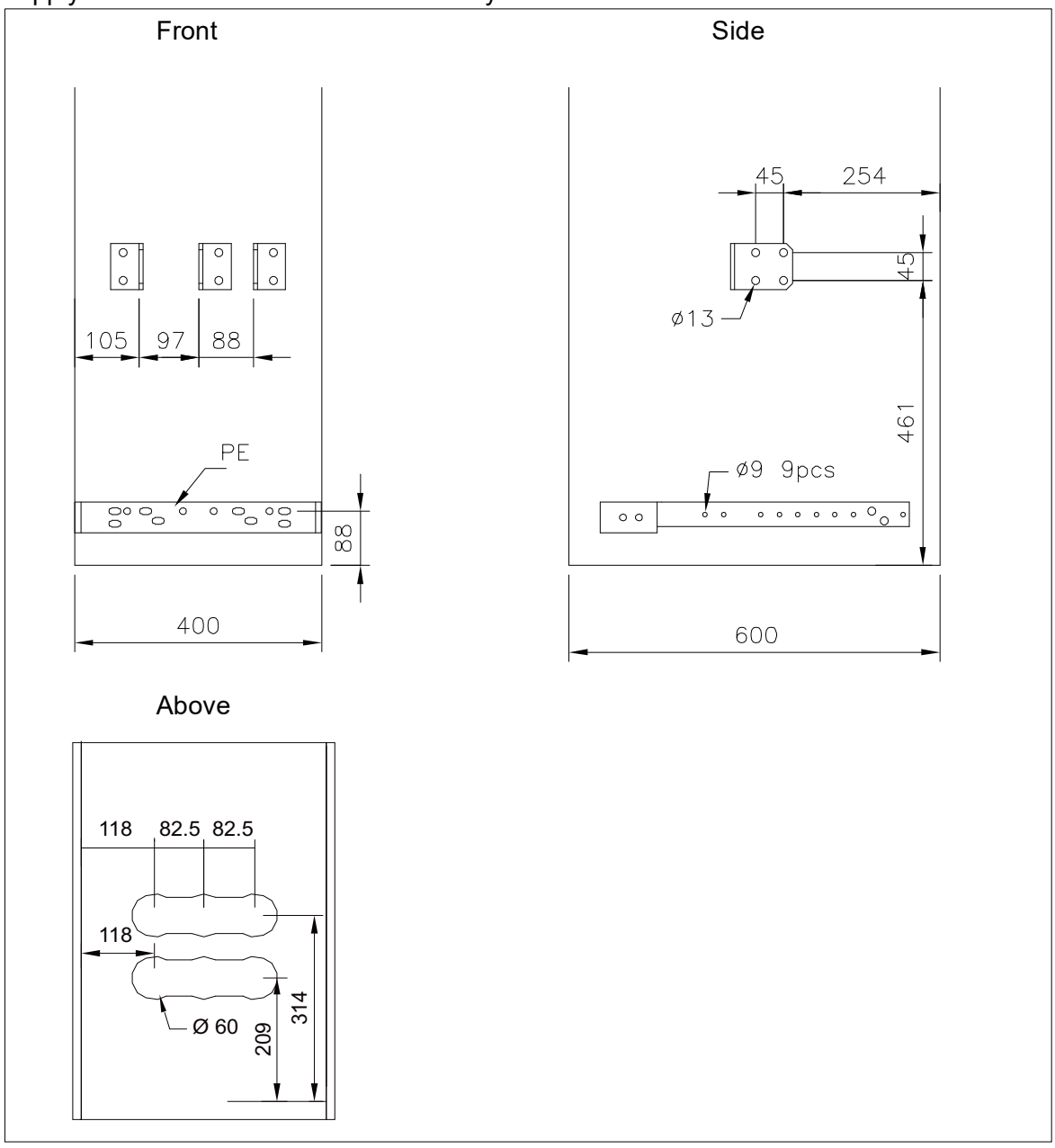
**$P_{loss}$** Heat dissipation. Total losses of the DSU unit (cabinet) with nominal power
**Noise** Noise with direct-on-line fans running at nominal speed

# Terminal and cable entry data for the input power cable

| Frame size | Busbar | Bolt size | Tightening torque | | Screw holes | | | Cable entry | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qty | | N·m | lbf·ft | Qty | mm | in | Qty | mm | in |
| **D6D** | 3 | M12 (½") | 70 | 51.6 | 4 | 13 | 0.50 | 3 | 60 | 2.36 |
| **D7D** | 3 | M12 (½") | 70 | 51.6 | 4 | 13 | 0.50 | 3 | 60 | 2.36 |
| **D8D** | 3 | M12 (½") | 70 | 51.6 | 6 | 14 | 0.55 | 6 | 60 | 2.36 |

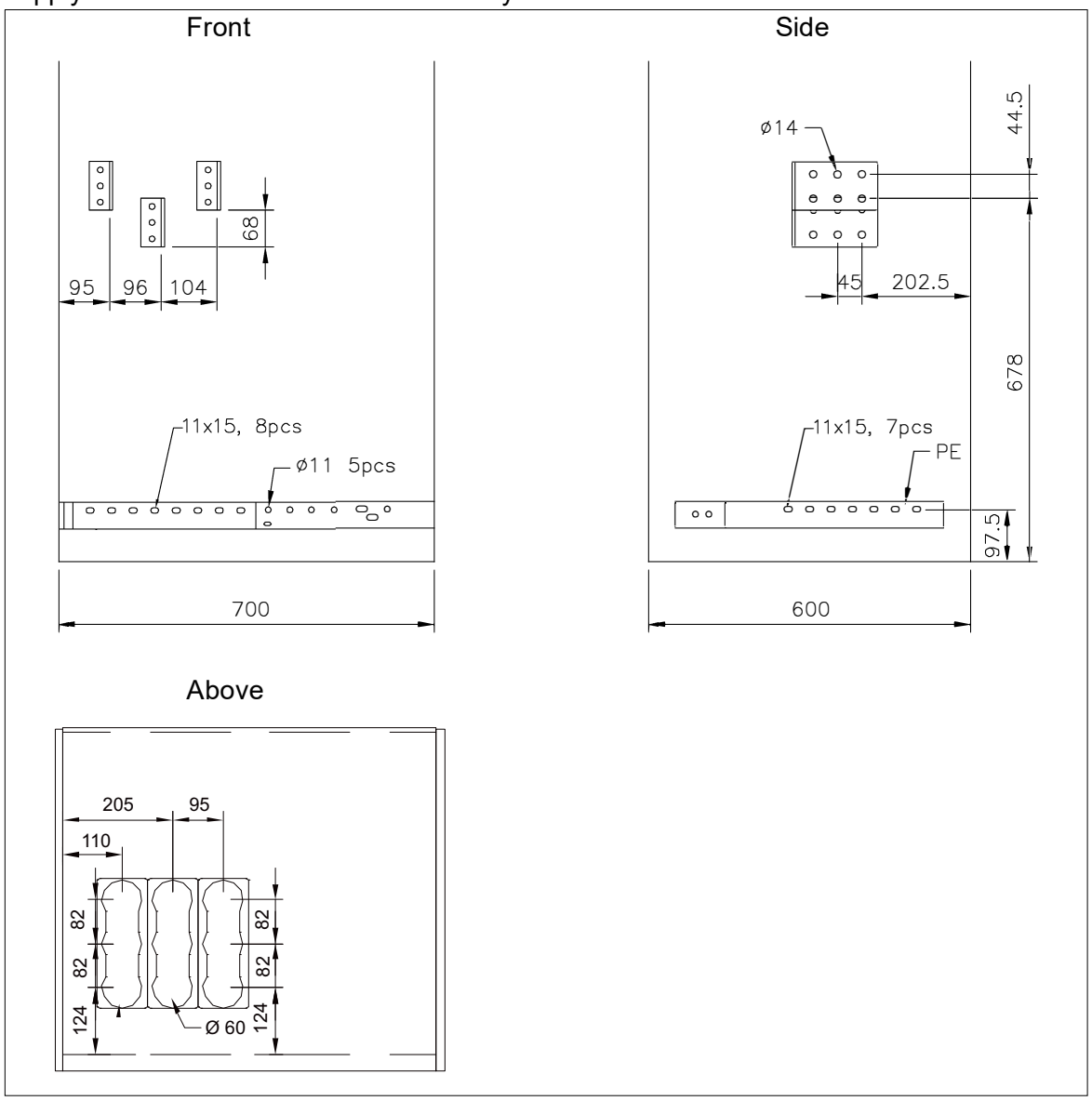
## 400 mm supply unit cubicle, bottom cable entry

These drawings show the terminal and cable entry dimensions for the 400 mm wide supply unit cubicle with bottom cable entry. Dimensions in mm.



## 700 mm supply unit cubicle, bottom cable entry

These drawings show the terminal and cable entry dimensions for the 700 mm wide supply unit cubicle with bottom cable entry. Dimensions in mm.



# Electrical power network specification

| | |
|---|---|
| **Supply voltage ($U_1$)** | 400V AC units: 380/400/415 V AC 3-phase ± 10%. This is indicated in the type designation label as typical input voltage (3~400 V AC).<br>500V AC units: 380/400/415/440/460/480/500 V AC 3-phase ± 10%. This is indicated in the type designation label as typical input voltage (3~500 V AC). |
| **Frequency** | 50/60 Hz, Variation ± 5% of the nominal frequency |
| **Imbalance** | Maximum 3% of nominal phase-to-phase voltage |
| **Short-circuit withstand strength** | IEC/EN 61439-1:2009<br>**For supply units with one D8D module:**<br>Rated peak withstand current $I_{pk}$ = 105 kA<br>Rated short-time withstand current $I_{cw}$ = 50 kA/1 s<br>**For supply units with one D6D/D7D module:**<br>Rated peak withstand current $I_{pk}$ = 73.5 kA<br>Rated short-time withstand current $I_{cw}$ = 35 kA/1 s<br>Maximum allowable prospective shortcircuit current $I_{cc}$ is 65 kA. In this case, the input cable must be equipped with fuses as follows:<br>• maximum 315 A gG* for frame size D6D<br>• maximum 800 A gG* for frame size D7D<br>*) Type gG according to IEC 60269<br>Maximum permitted operating time is <0.1s for the fuses mentioned above. |
| **Fundamental power factor (cos phi 1)** | 0.98 (at nominal load) |

# DC connection data

| | |
|---|---|
| **Voltage ($U_2$)** | ACS880-307-xxxxA-3+A003: 513 … 560 V DC. This is indicated in the type designation label as typical output voltage level 540 V DC.<br>ACS880-307-xxxxA-5+A003: 513 … 675 V DC. This is indicated in the type designation label as typical output voltage levels 540/648/675V DC. |

# Control unit connection data

See chapter *Supply control unit* on page *95*.

# Efficiency

> 98%

# Protection classes

| | |
|---|---|
| **Degrees of protection (IEC/EN 60529)** | IP22<br>IP42 (option +B054) |
| **Overvoltage category (IEC/EN 60664-1)** | III |
| **Protective class (IEC/EN 61800-5-1)** | I |

# Tightening torques

Unless a tightening torque is specified in the text, the following torques can be used.

## Cable lugs

| Size | Maximum torque | Note |
|---|---|---|
| M8 | 15 (11 lbf·ft) | Strength class 8.8 |
| M10 | 32 (23.5 lbf·ft) | Strength class 8.8 |
| M12 | 50 N·m (37 lbf·ft) | Strength class 8.8 |

## Electrical connections

| Size | Torque | Note |
|---|---|---|
| M3 | 0.5 N·m (4.4 lbf·in) | Strength class 4.6…8.8 |
| M4 | 1 N·m (9 lbf·in) | Strength class 4.6…8.8 |
| M5 | 4 N·m (35 lbf·in) | Strength class 8.8 |
| M6 | 9 N·m (6.6 lbf·ft) | Strength class 8.8 |
| M8 | 22 N·m (16 lbf·ft) | Strength class 8.8 |
| M10 | 42 N·m (31 lbf·ft) | Strength class 8.8 |
| M12 | 70 N·m (52 lbf·ft) | Strength class 8.8 |
| M16 | 120 N·m (90 lbf·ft) | Strength class 8.8 |

## Mechanical connections

| Size | Maximum torque | Note |
|---|---|---|
| M5 | 6 N·m (53 lbf·in) | Strength class 8.8 |
| M6 | 10 N·m (7.4 lbf·ft) | Strength class 8.8 |
| M8 | 24 N·m (17.7 lbf·ft) | Strength class 8.8 |

## Insulation supports

| Size | Maximum torque | Note |
|---|---|---|
| M6 | 5 N·m (44 lbf·in) | Strength class 8.8 |
| M8 | 9 N·m (6.6 lbf·ft) | Strength class 8.8 |
| M10 | 18 N·m (13.3 lbf·ft) | Strength class 8.8 |
| M12 | 31 N·m (23 lbf·ft) | Strength class 8.8 |

# Typical power cable sizes

The tables below give current carrying capacity ($I_{Lmax}$) for aluminum and copper PVC/XLPE insulated cables. A correction factor K = 0.70 is used. Time const is the temperature time constant of the cable.

The cable sizing is based on a maximum of 9 cables laid on the cable trays side by side, three ladder type trays one on top of the other, ambient temperature 30 °C (EN 60204-1 and IEC 60364-5-52).

| **Aluminum cable** | | **PVC insulation** Conductor temperature 70 °C | | **XLPE insulation** Conductor temperature 90 °C | |
|---|---|---|---|---|---|
| Size | ø [mm] | $I_{Lmax}$ [A] | Time const. [s] | $I_{Lmax}$ [A] | Time const. [s] |
| 3 × 35 + 10 Cu | 26 | 67 | 736 | 84 | 669 |
| 3 × 50 + 15 Cu | 29 | 82 | 959 | 102 | 874 |
| 3 × 70 + 21 Cu | 32 | 105 | 1182 | 131 | 1079 |
| 3 × 95 + 29 Cu | 38 | 128 | 1492 | 159 | 1376 |
| 3 × 120 + 41 Cu | 41 | 148 | 1776 | 184 | 1637 |
| 3 × 150 + 41 Cu | 44 | 171 | 2042 | 213 | 1881 |
| 3 × 185 + 57 Cu | 49 | 196 | 2422 | 243 | 2237 |
| 3 × 240 + 72 Cu | 54 | 231 | 2967 | 286 | 2740 |
| 3 × 300 + 88 Cu | 58 | 267 | 3478 | 330 | 3229 |
| 2 × (3 × 70 + 21 Cu) | 2 × 32 | 210 | 1182 | 262 | 1079 |
| 2 × (3 × 95 + 29 Cu) | 2 × 38 | 256 | 1492 | 318 | 1376 |
| 2 × (3 × 120 + 41 Cu) | 2 × 41 | 297 | 1776 | 368 | 1637 |
| 2 × (3 × 150 + 41 Cu) | 2 × 44 | 343 | 2042 | 425 | 1881 |
| 2 × (3 × 185 + 57 Cu) | 2 × 49 | 392 | 2422 | 486 | 2237 |
| 2 × (3 × 240 + 72 Cu) | 2 × 54 | 462 | 2967 | 572 | 2740 |
| 2 × (3 × 300 + 88 Cu) | 2 × 58 | 533 | 3478 | 659 | 3229 |
| 3 × (3 × 150 + 41 Cu) | 3 × 44 | 514 | 2042 | 638 | 1881 |
| 3 × (3 × 185 + 57 Cu) | 3 × 49 | 588 | 2422 | 728 | 2237 |
| 3 × (3 × 240 + 72 Cu) | 3 × 54 | 693 | 2967 | 859 | 2740 |
| 3 × (3 × 300 + 88 Cu) | 3 × 58 | 800 | 3478 | 989 | 3229 |
| 4 × (3 × 185 + 57 Cu) | 4 × 49 | 784 | 2422 | 971 | 2237 |
| 4 × (3 × 240 + 72 Cu) | 4 × 54 | 924 | 2967 | 1145 | 2740 |
| 4 × (3 × 300 + 88 Cu) | 4 × 58 | 1067 | 3478 | 1319 | 3229 |
| 5 × (3 × 185 + 57 Cu) | 5 × 49 | 980 | 2422 | 1214 | 2237 |
| 5 × (3 × 240 + 72 Cu) | 5 × 54 | 1155 | 2967 | 1431 | 2740 |
| 5 × (3 × 300 + 88 Cu) | 5 × 58 | 1333 | 3478 | 1648 | 3229 |
| 6 × (3 × 240 + 72 Cu) | 6 × 54 | 1386 | 2967 | 1718 | 2740 |
| 6 × (3 × 300 + 88 Cu) | 6 × 58 | 1600 | 3478 | 1978 | 3229 |
| 7 × (3 × 240 + 72 Cu) | 7 × 54 | 1617 | 2967 | 2004 | 2740 |
| 7 × (3 × 300 + 88 Cu) | 7 × 58 | 1867 | 3478 | 2308 | 3229 |
| 8 × (3 × 240 + 72 Cu) | 8 × 54 | 1848 | 2967 | 2290 | 2740 |
| 8 × (3 × 300 + 88 Cu) | 8 × 58 | 2133 | 3478 | 2637 | 3229 |
| 9 × (3 × 240 + 72 Cu) | 9 × 54 | 2079 | 2967 | 2577 | 2740 |
| 9 × (3 × 300 + 88 Cu) | 9 × 58 | 2400 | 3478 | 2967 | 3229 |
| 10 × (3 × 240 + 72 Cu) | 10 × 54 | 2310 | 2967 | 2867 | 2740 |
| 10 × (3 × 300 + 88 Cu) | 10 × 58 | 2667 | 3478 | 3297 | 3229 |

| **Copper cable** | | **PVC insulation** Conductor temperature 70 °C | | **XLPE insulation** Conductor temperature 90 °C | |
|---|---|---|---|---|---|
| Size | ø [mm] | $I_{Lmax}$ [A] | Time const. [s] | $I_{Lmax}$ [A] | Time const. [s] |
| 3 × 1.5 + 1.5 | 13 | 13 | 85 | 16 | 67 |
| 3 × 2.5 + 2.5 | 14 | 18 | 121 | 23 | 88 |
| (3 × 4 + 4) | 16 | 24 | 175 | 30 | 133 |
| 3 × 6 + 6 | 18 | 30 | 251 | 38 | 186 |
| 3 × 10 + 10 | 21 | 42 | 359 | 53 | 268 |
| 3 × 16 + 16 | 23 | 56 | 514 | 70 | 391 |
| 3 × 25 + 16 | 24 | 71 | 791 | 89 | 598 |
| 3 × 35 + 16 | 26 | 88 | 1000 | 110 | 760 |
| 3 × 50 + 25 | 29 | 107 | 1308 | 134 | 990 |
| 3 × 70 + 35 | 32 | 137 | 1613 | 171 | 1230 |
| 3 × 95 + 50 | 38 | 167 | 2046 | 209 | 1551 |
| 3 × 120 + 70 | 41 | 193 | 2441 | 241 | 1859 |
| 3 × 150 + 70 | 44 | 223 | 2820 | 279 | 2139 |
| 3 × 185 + 95 | 50 | 255 | 3329 | 319 | 2525 |
| 3 × 240 + 120 | 55 | 301 | 4073 | 376 | 3099 |
| 3 × 300 + 150 | 58 | 348 | 4779 | 435 | 3636 |
| 2 × (3 × 70 + 35) | 2 × 32 | 274 | 1613 | 342 | 1230 |
| 2 × (3 × 95 + 50) | 2 × 38 | 334 | 2046 | 418 | 1551 |
| 2 × (3 × 120 + 70) | 2 × 41 | 386 | 2441 | 482 | 1859 |
| 2 × (3 × 150 + 70) | 2 × 44 | 446 | 2820 | 558 | 2139 |
| 2 × (3 × 185 + 95) | 2 × 50 | 510 | 3329 | 638 | 2525 |
| 2 × (3 × 240 + 120) | 2 × 55 | 602 | 4073 | 752 | 3099 |
| 2 × (3 × 300 + 150) | 2 × 58 | 696 | 4779 | 869 | 3636 |
| 3 × (3 × 120 + 70) | 3 × 41 | 579 | 2441 | 723 | 1859 |
| 3 × (3 × 150 + 70) | 3 × 44 | 669 | 2820 | 837 | 2139 |
| 3 × (3 × 185 + 95) | 3 × 50 | 765 | 3329 | 957 | 2525 |
| 3 × (3 × 240 + 120) | 3 × 55 | 903 | 4073 | 1128 | 3099 |
| 3 × (3 × 300 + 150) | 3 × 58 | 1044 | 4779 | 1304 | 3636 |
| 4 × (3 × 150 + 70) | 4 × 44 | 892 | 2820 | 1116 | 2139 |
| 4 × (3 × 185 + 95) | 4 × 50 | 1020 | 3329 | 1276 | 2525 |
| 4 × (3 × 240 + 120) | 4 × 55 | 1204 | 4073 | 1504 | 3099 |
| 4 × (3 × 300 + 150) | 4 × 58 | 1391 | 4779 | 1304 | 3636 |
| 5 × (3 × 185 + 95) | 5 × 50 | 1275 | 3329 | 1595 | 2525 |
| 5 × (3 × 240 + 120) | 5 × 55 | 1505 | 4073 | 1880 | 3099 |
| 5 × (3 × 300 + 150) | 5 × 58 | 1739 | 4779 | 2173 | 3636 |
| 6 × (3 × 185 + 95) | 6 × 50 | 1530 | 3329 | 1914 | 2525 |
| 6 × (3 × 240 + 120) | 6 × 55 | 1806 | 4073 | 2256 | 3099 |
| 6 × (3 × 300 + 150) | 6 × 58 | 2087 | 4779 | 2608 | 3636 |
| 7 × (3 × 240 + 120) | 7 × 55 | 2107 | 4073 | 2632 | 3099 |
| 7 × (3 × 300 + 150) | 7 × 58 | 2435 | 4779 | 3043 | 3636 |
| 8 × (3 × 240 + 120) | 8 × 55 | 2408 | 4073 | 3008 | 3099 |
| 8 × (3 × 300 + 150) | 8 × 58 | 2783 | 4779 | 3477 | 3636 |

# Ambient conditions

The unit is to be used in a heated indoor controlled environment.

| | Operation | Storage | Transportation |
|---|---|---|---|
| **Altitude above sea level** | 0 … 2000 m (0 … 6562 ft).<br>Output current must be derated above 1000 m (3281 ft). See *Altitude derating* on page *81*.<br>For altitudes over 2000 m (6562 ft), contact ABB. | - | - |
| **Temperature** | 0 … 50 °C (32 … 122 °F)<br>Output current must be derated between 40 … 50°C (104 … 122°F). See *Surrounding air temperature derating* on page *81*. | -40 … +70 °C<br>(-40 … +158 °F) | -40 … +70 °C<br>(-40 … +158 °F) |
| **Relative humidity** | Maximum 95%, no condensation permitted | | |
| **Contamination** | IEC/EN 60721-3-3:2002: Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities Stationary use of weather protected locations | IEC 60721-3-1:1997 | IEC 60721-3-2:1997 |
| **Chemical gases** | Class 3C2 | Class 1C2 | Class 2C2 |
| **Solid particles** | Class 3S1 with IP20/21, 3S2 with higher IP class. No conductive dust permitted. | Class 1S3 (packing must support this, otherwise 1S2) | Class 2S2 |
| **Vibration**<br>**IEC/EN 61800-5-1**<br>**IEC 60068-2-6:2007, EN 60068-2-6:2008 Environmental testing Part 2: Tests –Test Fc: Vibration (sinusoidal)** | IEC/EN 60721-3-3:2002<br>10 … 57 Hz: max. 0.075 mm amplitude<br>57 … 150 Hz: 1 *g* | IEC/EN 60721-3-1:1997<br>10 … 57 Hz: max. 0.075 mm amplitude<br>57 … 150 Hz: 1 *g* | IEC/EN 60721-3-2:1997<br>2 … 9 Hz: max. 3.5 mm amplitude<br>9 … 200 Hz: 10 $m/s^2$ (32.8 $ft/s^2$) |
| **Shock**<br>**IEC 60068-2-27:2008**<br>**EN 60068-2-27:2009 Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock** | Not permitted | With packing max. 100 $m/s^2$ (330 $ft./s^2$) 11 ms | With packing max. 100 $m/s^2$ (330 $ft./s^2$) 11 ms |

# Cooling

| | |
|---|---|
| **Method** | Centrifugal module fan<br>Axial cabinet fan |
| **Air flow** | See *Losses, cooling data and noise*, page *84* |

# Materials

| | |
|---|---|
| **Cabinet** | Zinc coated steel sheet.<br>Polyester thermosetting powder coating on visible surfaces, color RAL 7035 and RAL 9017 |

| | |
|---|---|
| **Module housing** | Zinc coated steel sheet.<br>Front plate covered with Lexan 8B35 polycarbonate film, color PMS 1C Cool Gray / RAL 9002 and PMS Process Black. |
| **DC busbars** | Frame D6D and D7D: Aluminum (standard) or tin-plated copper (optional)<br>Frame D8D: Tin-plated copper |
| **AC busbars** | Tin-plated copper |
| **Fire safety of materials (IEC 60332-1)** | Insulating materials & non-metallic items: Mostly self-extinctive |
| **Package** | Standard package:<br>• timber, polyethylene sheet (thickness 0.15 mm), stretch film (thickness 0.023 mm), PP tape, PET strap, sheet metal (steel)<br>• for land and air transport when planned storage time is < 2 months or when storage can be arranged in clean and dry conditions < 6 months<br>• can be used when products will not be exposed to corrosive atmosphere during transport or storage<br>Container package:<br>• timber, VCI sheet film (PE, thickness 0.10 mm), VCI stretch film (PE, thickness 0.04 mm), VCI emitter bags, PP tape, PET strap, sheet metal (steel)<br>• for sea transport in containers<br>• recommended for land and air transport when storage time prior to installation exceeds 6 months or storage is arranged in partially weather-protected conditions<br>Seaworthy package:<br>• timber, plywood, VCI sheet film (PE, thickness 0.10 mm), VCI stretch film (PE, thickness (0.04 mm), VCI emitter bags, PP tape, PET strap, sheet metal (steel)<br>• for sea transport with or without containerization<br>• for long storage periods in environments where roofed and humidity-controlled storage cannot be arranged |
| **Disposal** | The main parts of the drive can be recycled to preserve natural resources and energy. Product parts and materials should be dismantled and separated.<br>Generally all metals, such as steel, aluminum, copper and its alloys, and precious metals can be recycled as material. Plastics, rubber, cardboard and other packaging material can be used in energy recovery. Printed circuit boards and large electrolytic capacitors need selective treatment according to IEC 62635 guidelines. To aid recycling, plastic parts are marked with an appropriate identification code.<br>Contact your local ABB distributor for further information on environmental aspects and recycling instructions for professional recyclers. End of life treatment must follow international and local regulations. |

# Standards

See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

# Markings

See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

# Disclaimers

## Generic disclaimer

The manufacturer shall have no obligation with respect to any product which (i) has been improperly repaired or altered; (ii) has been subjected to misuse, negligence or accident;(iii) has been used in a manner contrary to the manufacturer’s instructions; or (iv) has failed as a result of ordinary wear and tear.

## Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

8

# Supply control unit

## Contents of this chapter

This chapter

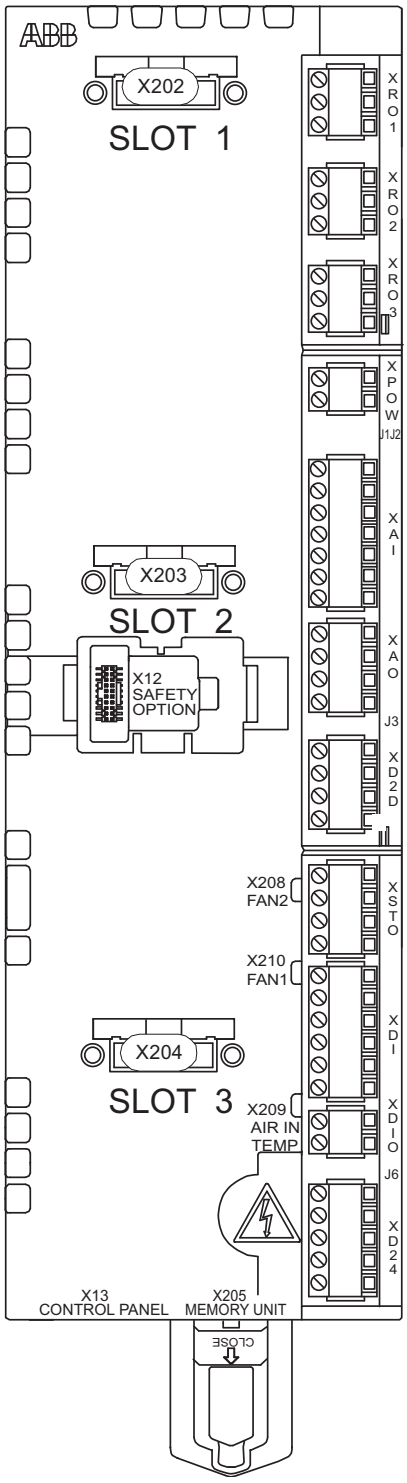
- describes the connections of the supply control units used in ACS880 multidrives
- contains the specifications of the inputs and outputs of the control unit.

## ZCU-14 control unit

The diode supply unit has a ZCU-14 control unit. The control unit controls the supply unit.

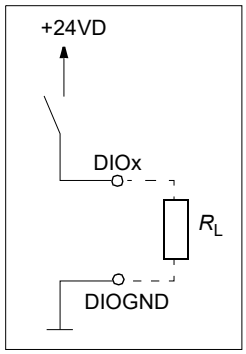
## Control unit layout

The layout of the ZCU-14 is shown below.



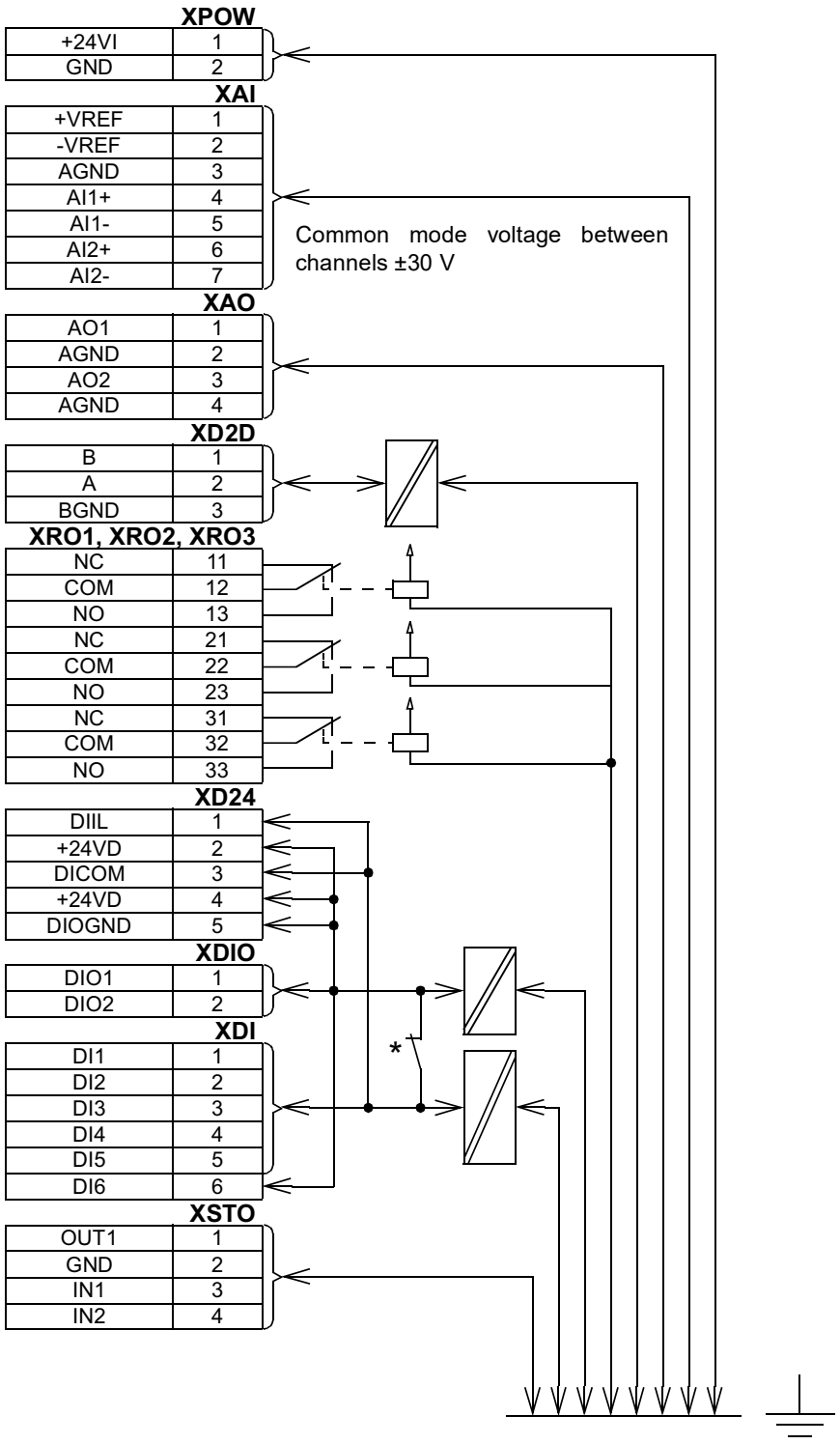

| | Description |
|---|---|
| XPOW | External power input |
| XAI | Analog inputs |
| XAO | Analog outputs |
| XD2D | Drive-to-drive link |
| XRO1 | Relay output RO1 |
| XRO2 | Relay output RO2 |
| XRO3 | Relay output RO3 |
| XD24 | Digital input interlock (DIIL) and +24 V output |
| XDIO | Digital input/outputs |
| XDI | Digital inputs |
| XSTO | Safe torque off connection (inverter unit only).<br>**Note:** This connection only acts as a true Safe torque off input when the ZCU is controlling an inverter unit. When the ZCU is controlling a supply unit, de-energizing the inputs will stop the unit but will not constitute a true safety function. |
| X12 | Connection for FSO safety functions module (inverter unit only). |
| X13 | Control panel connection |
| X202 | Option slot 1 |
| X203 | Option slot 2 |
| X204 | Option slot 3 |
| X205 | Memory unit connection (memory unit inserted in the drawing) |
| J1, J2 | Voltage/Current selection jumpers (J1, J2) for analog inputs |
| J3 | Drive-to-drive link termination switch (J3) |
| J6 | Common digital input ground selection jumper (J6). See section *Ground isolation diagram* (page 99). |

## Control unit connector data

| | |
|---|---|
| **Power supply (XPOW)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>24 V (±10%) DC, 2 A<br>External power input. |
| **Relay outputs RO1…RO3 (XRO1…XRO3)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>250 V AC / 30 V DC, 2 A<br>Protected by varistors |
| **+24 V output (XD24:2 and XD24:4)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>Total load capacity of these outputs is 4.8 W (200 mA / 24 V) minus the power taken by DIO1 and DIO2. |
| **Digital inputs DI1…DI6 (XDI:1…XDI:6)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>24 V logic levels: “0” < 5 V, “1” > 15 V<br>$R_{in}$: 2.0 kohm<br>Input type: NPN/PNP (DI1…DI5), NPN (DI6)<br>Hardware filtering: 0.04 ms, digital filtering up to 8 ms<br>DI6 (XDI:6) can alternatively be used as an input for a PTC sensor.<br>“0” > 4 kohm, “1” < 1.5 kohm<br>$I_{max}$: 15 mA (DI1…DI5), 5 mA (DI6) |
| **Start interlock input DIIL (XD24:1)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>24 V logic levels: “0” < 5 V, “1” > 15 V<br>$R_{in}$: 2.0 kohm<br>Input type: NPN/PNP<br>Hardware filtering: 0.04 ms, digital filtering up to 8 ms |
| **Digital inputs/outputs DIO1 and DIO2 (XDIO:1 and XDIO:2)**<br>Input/output mode selection by parameters.<br>DIO1 can be configured as a frequency input (0…16 kHz with hardware filtering of 4 microseconds) for 24 V level square wave signal (sinusoidal or other wave form cannot be used). DIO2 can be configured as a 24 V level square wave frequency output. See the firmware manual, parameter group 111/11. | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>As inputs:<br>24 V logic levels: “0” < 5 V, “1” > 15 V<br>$R_{in}$: 2.0 kohm<br>Filtering: 1 ms<br>As outputs:<br>Total output current from +24VDis limited to 200 mA<br>  <br> |
| **Reference voltage for analog inputs +VREF and -VREF (XAI:1 and XAI:2)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>10 V ±1% and –10 V ±1%, $R_{load}$ 1 … 10 kohm<br>Maximum output current: 10 mA |

| | |
|---|---|
| **Analog inputs AI1 and AI2 (XAI:4 … XAI:7).**<br>Current/voltage input mode selection by jumpers. | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>Current input: –20 … 20 mA, $R_{in:}$ 100 ohm<br>Voltage input: –10 … 10 V, $R_{in}$: 200 kohm<br>Differential inputs, common mode range ±30 V<br>Sampling interval per channel: 0.25 ms<br>Hardware filtering: 0.25 ms, adjustable digital filtering up to 8 ms<br>Resolution: 11 bit + sign bit<br>Inaccuracy: 1% of full scale range |
| **Analog outputs AO1 and AO2 (XAO)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>0 … 20 mA, $R_{load}$ < 500 ohm<br>Frequency range: 0 … 300 Hz<br>Resolution: 11 bit + sign bit<br>Inaccuracy: 2% of full scale range |
| **XD2D connector** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>Physical layer: RS-485<br>Transmission rate: 8 Mbit/s<br>Cable type: Shielded twisted-pair cable with a twisted pair for data and a wire or another pair for signal ground (nominal impedance 100 … 165 ohm, for example Belden 9842)<br>Maximum length of link: 50 m (164 ft)<br>Termination by jumper |
| **Safe torque off connection (XSTO)** | Connector pitch 5 mm, wire size 2.5 $mm^2$<br>Input voltage range: -3 … 30 V DC<br>Logic levels: “0” < 5 V, “1” > 17 V.<br>For the unit to start, both connections must be “1”. This applies to all control units (including drive, inverter, supply, brake, DC/DC converter etc. control units), but true Safe torque off functionality is only achieved through the XSTO connector of the drive/inverter control unit.<br>EMC (immunity) according to IEC 61326-3-1 |
| **Control panel connection (X13)** | Connector: RJ-45<br>Cable length < 3 m (9.8 ft) |
| The terminals of the control unit fulfill the Protective Extra Low Voltage (PELV) requirements. The PELV requirements of a relay output are not fulfilled if a voltage higher than 48 V is connected to the relay output. | |

## Ground isolation diagram




* Ground selector (J6) settings

All digital inputs share a common ground (DICOM connected to DIOGND). This is the default setting.

Ground of digital inputs DI1…DI5 and DIIL (DICOM) is isolated from DIO signal ground (DIOGND). Isolation voltage 50 V.

## Default I/O connection diagram

The table below shows the connectors on the ZCU-14 control unit, and describes the use of the signals/connections in the diode supply unit. Note that the IO connections have been wired at the factory. Do not change the connections wired at the factory. They are reserved for the internal use of the supply unit.

Wire sizes and tightening torques: 0.5 … 2.5 $mm^2$ (24 … 12 AWG) and 0.5 N·m (5 lbf·in) for both stranded and solid wiring.

| Relay outputs | | XRO1…XRO3 |
|---|---|---|
| XRO1: **Running** [1] (energized = running)<br>250 V AC / 30 V DC<br>2 A | NO | 13 |
| | COM | 12 |
| | NC | 11 |
| XRO2: **Fault** [1] (energized = fault)<br>250 V AC / 30 V DC<br>2 A | NO | 23 |
| | COM | 22 |
| | NC | 21 |
| XRO3: **MCB ctrl** [2] (energized = main contactor closed)<br>250 V AC / 30 V DC<br>2 A | NO | 23 |
| | COM | 22 |
| | NC | 21 |
| External power input | | XPOW |
| 24 V DC, 2 A minimum (without optional modules) | GND | 2 |
| | +24VI | 1 |
| AI current/voltage selection | | J1, J2 |
| AI1 current/voltage selection jumper |  | J1 |
| AI2 current/voltage selection jumper |  | J2 |
| Analog inputs, reference voltage output | | J1, J2, XAI |
| Not in use by default. 0(4)…20 mA, $R_{in}$ = 100 ohm [3] | AI2- | 7 |
| | AI2+ | 6 |
| Not in use by default. 0(2)…10 V, Rin > 200 kohm [4] | AI1- | 5 |
| | AI1+ | 4 |
| Ground | AGND | 3 |
| -10 V DC, $R_L$ 1…10 kohm | -VREF | 2 |
| 10 V DC, $R_L$ 1…10 kohm | +VREF | 1 |
| Analog outputs | | XAO |
| **Zero** [1] 0…20 mA, $R_L$ < 500 ohm | AGND | 4 |
| | AO2 | 3 |
| **Zero** [1] 0…20 mA, $R_L$ < 500 ohm | AGND | 2 |
| | AO1 | 1 |
| Drive-to-drive link termination | | J3 |
| Drive-to-drive link termination switch [5] |  | |
| Drive-to-drive link | | XD2D |
| Not in use by default | Shield | 4 |
| | BGND | 3 |
| | A | 2 |
| | B | 1 |
| Safe torque off [6] | | XSTO |
| Factory connection. Both circuits must be closed for the unit to start.<br>(IN1 and IN2 must be connected to OUT.) | IN2 | 4 |
| | IN1 | 3 |
| | SGND | 2 |
| | OUT | 1 |
| Digital inputs | | XDI |
| **Reset** [1] (0 -> 1 = fault reset) | DI6 | 6 |
| **Earth leakage** [1] (0 = earth leakage current monitoring tripped). Used with the earth fault monitoring option. | DI5 | 5 |
| **CB fault** [2] (0 = auxiliary circuit breaker or switch open) | DI4 | 4 |
| **MCB feedback** [2] (1 = main breaker/contactor closed) | DI3 | 3 |
| **Run / enable** [1] (1 = run enable) | DI2 | 2 |
| **Temp fault** [1] (0 = overtemperature) | DI1 | 1 |

| | | |
|---|---|---|
| Digital input/outputs | | XDIO |
| Not in use by default | DIO2 | 2 |
| Not in use by default | DIO1 | 1 |
| Auxiliary voltage output | | XD24 |
| Digital input/output ground | DIOGND | 5 |
| +24 V DC 200 mA [7)] | +24VD | 4 |
| Digital input ground | DICOM | 3 |
| +24 V DC 200 mA [7)] | +24VD | 2 |
| Not in use by default | DIIL | 1 |
| Ground selection | | J6 |
| Ground selection jumper [8)] | |  |
| Not in use in supply units | | X12 |
| Control panel connection | | X13 |
| Memory unit connection | | X205 |

1) Default use of the signal in the control program. The use can be changed by a parameter. See also the delivery-specific circuit diagrams.

2) Use of the signal in the control program (fixed). See also the delivery-specific circuit diagrams.

3) Current [0(4)…20 mA, Rin = 100 ohm] or voltage [0(2)…10 V, Rin > 200 kohm] input selected by jumper J2. Change of setting requires reboot of control unit.

4) Current [0(4)…20 mA, Rin = 100 ohm] or voltage [0(2)…10 V, Rin > 200 kohm] input selected by jumper J1. Change of setting requires reboot of control unit. **Note:** When Parameter *195.01 Supply voltage* has the default value (*Not given*), analog input AI1 is not in use. With other values of the parameter, the control program reads the measured DC voltage through AI1. See the delivery-specific circuit diagrams or consult ABB for the wirings and components of the measurement circuit.

5) Must be set to ON when the supply unit is the first or last unit on the drive-to-drive (D2D) link. On intermediate units, set termination to OFF.

6) This input only acts as a true Safe torque off input in inverter units. In other applications (such as a supply or brake unit), de-energizing the IN1 and/or IN2 terminal will stop the unit but not constitute a true safety function.

7) Total load capacity of these outputs is 4.8 W (200 mA at 24 V) minus the power taken by DIO1 and DIO2.

8) Determines whether DICOM is separated from DIOGND (ie, common reference for digital inputs floats).

 DICOM connected to DIOGND

 DICOM and DIOGND separate

# Further information

## Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to abb.com/searchchannels.

## Product training

For information on ABB product training, navigate to new.abb.com/service/training.

## Providing feedback on ABB Drives manuals

Your comments on our manuals are welcome. Navigate to new.abb.com/drives/manuals-feedback-form.

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