ABB INDUSTRIAL DRIVES

ACS880-307...+A018 diode supply units

Hardware manual

ACS880-307…+A018 diode supply units

Hardware manual

3AXD50000011408 Rev C
EN
EFFECTIVE: 2020-02-19

Table of contents

7 Technical data

Further information

1

Introduction to the manual

Contents of this chapter

This chapter contains information on the manual.

Applicability

The manual is applicable to the cabinet-installed ACS880-307…+A018 diode supply units that form a part of an ACS880 multidrive system.

Safety instructions

Obey 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 a 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 plan the installation, install, start up and do maintenance work on the drive, or create instructions for the end user of the drive concerning the installation and maintenance of the drive.

Read the manual before working on the drive. You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

The manual is written for readers worldwide. Both SI and imperial units are shown.

Categorization by frame size and option code

The information which concerns only certain supply module frame sizes is marked with the frame size identifier. The frame size identifier is D7T or D8T. If there are several parallel modules, also the number of parallel modules is shown, for example 2×D8T. The supply unit types, module types and the frame sizes are listed in the technical data. The frame size is also shown on the type designation label of the supply unit.

The information which concern only certain option device or feature is marked with the option code in brackets, for example (option +F255). The option codes are indicated by a plus sign and the code. Option codes are listed in section *Type designation keys (page 34)*.

Use of component designations

Some device names in the manual include the item designation in brackets, for example [Q20], to make it possible to identify the components in the circuit diagrams of the drive.

Terms and abbreviations

Term	Description
ACU	Auxiliary control unit. Contains control electronics, auxiliary voltage circuitry, etc.
BCU	Type of control unit
BDPS	Module internal power supply board
BFPS	Control and power supply board for speed-controlled cooling fan
Control board	Circuit board in which the control program runs
Control unit	Control board built in a housing (often rail-mountable)
Cubicle	One section of a cabinet-installed drive. A cubicle is typically behind a door of its own.
CVAR	Varistor board
D7T	Frame size designation of the diode supply module
D8T	Frame size designation of the diode supply module
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	Optional CANopen® adapter module
FCNA-01	Optional ControlNet™ adapter module
FDCO-01	DDCS communication module with two pairs of 10 Mbit/s DDCS channels
FDNA-01	Optional DeviceNet™ adapter module
FEA-03	Optional I/O extension adapter
FECA-01	Optional EtherCAT® adapter module
FENA-11	Optional Ethernet adapter module for EtherNet/IP™, Modbus TCP® and PROFINET IO® protocols
FENA-21	Optional Ethernet adapter module for EtherNet/IP™, Modbus TCP® and PROFINET IO® protocols, 2-port
FEPL-01	Optional 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
Frame, frame size	Physical size of the drive or power module
FSCA-01	Optional RS-485 (Modbus/RTU) adapter

Term	Description
ICU	Incoming unit
Incoming unit	Part of the cabinet line-up that contains the input power cable terminals. Can also contain switching equipment etc.
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 in 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.
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 drive control program, user-adjustable operation instruction to the drive, or signal measured or calculated by the drive. In some (for example fieldbus) contexts, a value that can be accessed as an object, eg, variable, constant, or signal.
Rectifier	Converts alternating current and voltage to direct current and voltage
Single drive	Drive for controlling one motor
STO	Safe torque off (IEC/EN 61800-5-2)
ZCON	Type of control board
ZCU	Type of control unit

Related documents

Manual	Code
General manuals	
ACS880 multidrive cabinets and modules safety instructions	3AUA0000102301
ACS880 multidrive cabinets and modules electrical planning instructions	3AUA0000102324
ACS880 multidrive cabinets mechanical installation instructions	3AUA0000101764
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	
ACS880-107 inverter units hardware manual	3AUA0000102519
ACS880 primary control program firmware manual	3AUA0000085967
ACS880 primary control program quick start-up guide	3AUA0000098062
Manuals for application programs (Crane, Winder, etc.)	
Brake unit 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 (3-phase) brake control program firmware manual	3AXD50000020967
ACS880-1607 DC/DC converter units hardware manual	3AXD50000023644

Manual	Code
ACS880 DC/DC converter control program firmware manual	3AXD50000024671
Option manuals	
ACS880 +C132 marine type-approved cabinet-built drives supplement	3AXD50000039629
ACS-AP-x assistant control panels user's manual	3AUA0000085685
Drive composer start-up and maintenance PC tool user's manual	3AUA0000094606
Manuals for I/O extension modules, fieldbus adapters, safety options etc.	

You can find manuals on the Internet. See www.abb.com/drives/documents. For manuals not available in the document library, contact your local ABB representative.

2

Operation principle and hardware description

Contents of this chapter

This chapter describes how the diode supply unit operates. It also contains description on the diode supply unit hardware.

The information is valid for ACS880-307LC…+A018 diode supply units.

Operation principle

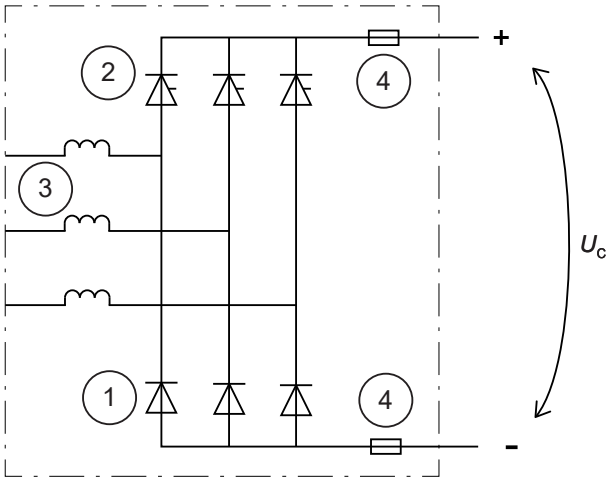
The heart of the diode supply unit is a diode-thyristor bridge. It rectifies three-phase AC current to direct current for the intermediate DC link of the drive. The intermediate DC link supplies the inverters that run the motors. There can be one inverter unit only (single drives) or several inverter units (multidrives) connected to the intermediate circuit. The DSU modules have inbuilt AC chokes. The AC chokes smoothen the current waveform in the power supply network and voltage in the DC link of the drive.

The main difference between the ordinary diode-diode bridge and the controlled diode-thyristor bridge is the controllability. You cannot control the operation of the diodes but you can control the thyristors. By controlling the thyristors, you can limit the AC current of the drive at the power up without additional charging circuit in the supply unit or in inverter units.

There are two control modes for the upper leg thyristor firing: the charging mode and the normal mode:

- The charging mode is in operation a short period after the power switch on: the supply control program controls the thyristor firing angle gradually towards zero while the intermediate circuit capacitors located in the inverter module(s) get charged.
- In the normal mode, the thyristor firing angle is 0 degrees: The thyristors operate as diodes.

Overview diagram of the rectifier bridge



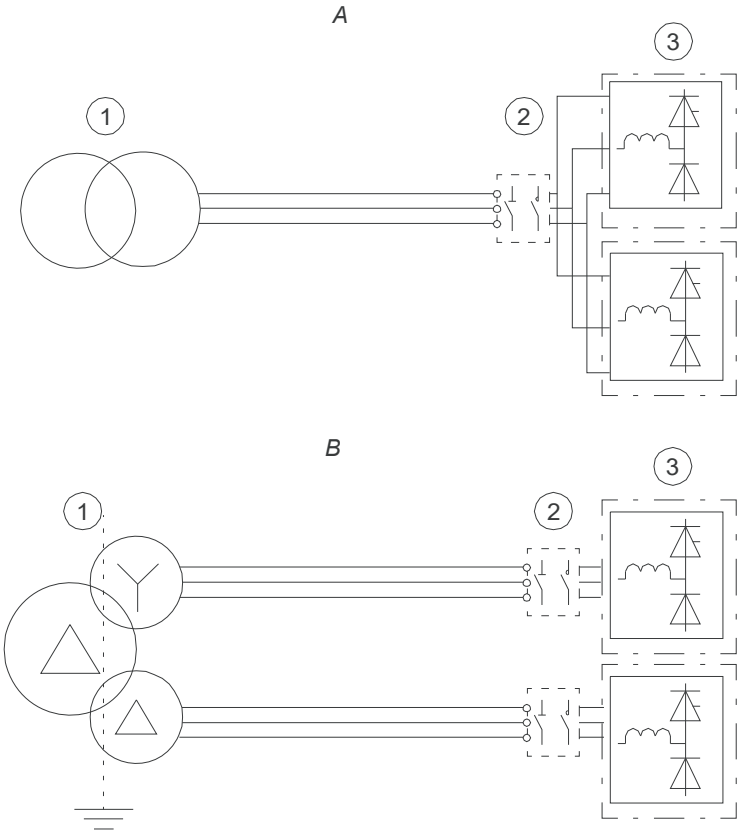
1	Diodes. The diodes connect the AC terminals in cyclic sequence to the lower DC busbar (-).
2	Thyristors. The thyristors connect the AC line terminals in cyclic sequence to the upper DC busbar (+).
3	AC chokes
4	DC fuses

6- and 12-pulse supply connections

The figure below illustrates the difference between 6-pulse and 12-pulse AC supply connections. The 6-pulse connection is standard. If the drive has an even number of supply modules, you can order it as a 12-pulse version (option +A004).

The 12-pulse supply connection eliminates the fifth and seventh harmonics, which remarkably reduces the harmonic distortion of the line current and the conducted emissions.

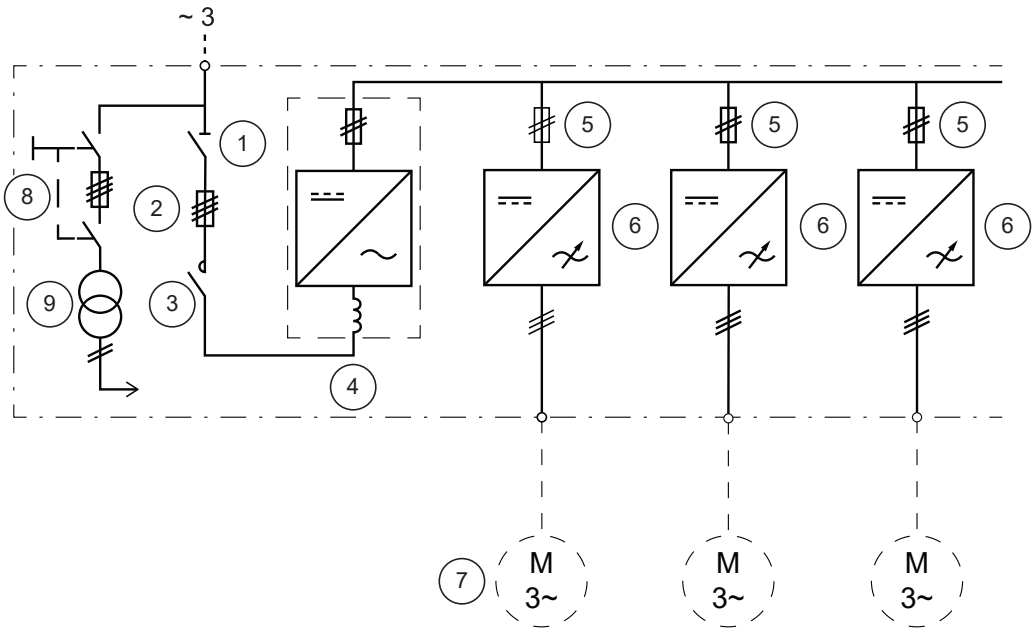
The 12-pulse connection requires a three-winding transformer, or two separate transformers. There is a phase shift of 30-degrees between the two 6-pulse supply lines, which are connected to different supply modules through electrically separate switching equipment.



A	6-pulse connection
B	12-pulse connection
1	Supply transformer
2	Switching equipment
3	Diode supply modules

Overview diagram of a drive

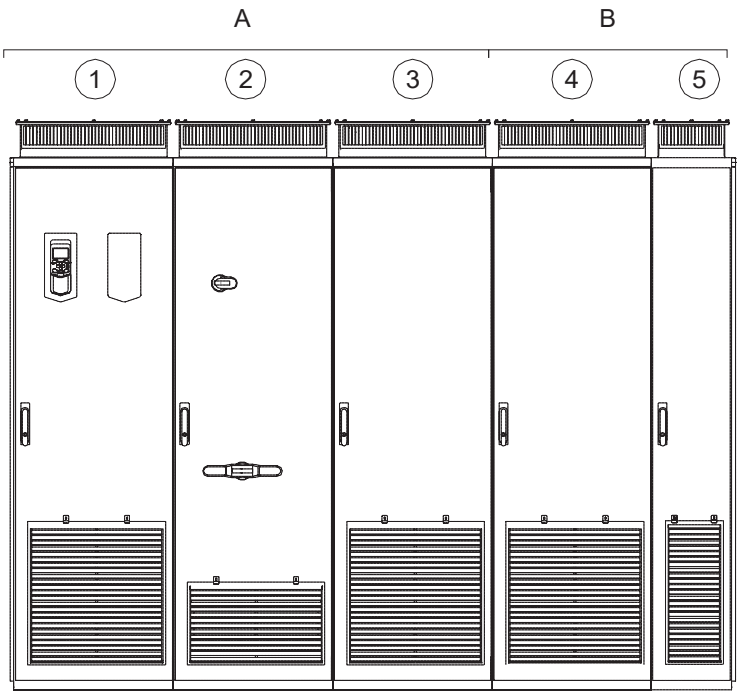
The following figure shows an example drive with a 6-pulse diode supply unit and three inverter units.



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 (with or without DC switch)
6	Inverter module [T11]
7	Motor
8	Auxiliary voltage switch [Q21]
9	Auxiliary voltage transformer ([T21], option +G344)

Overview drawing of a drive

This drawing shows an example of a drive with a diode supply unit and an inverter unit. Cables enter the cabinet through the bottom.



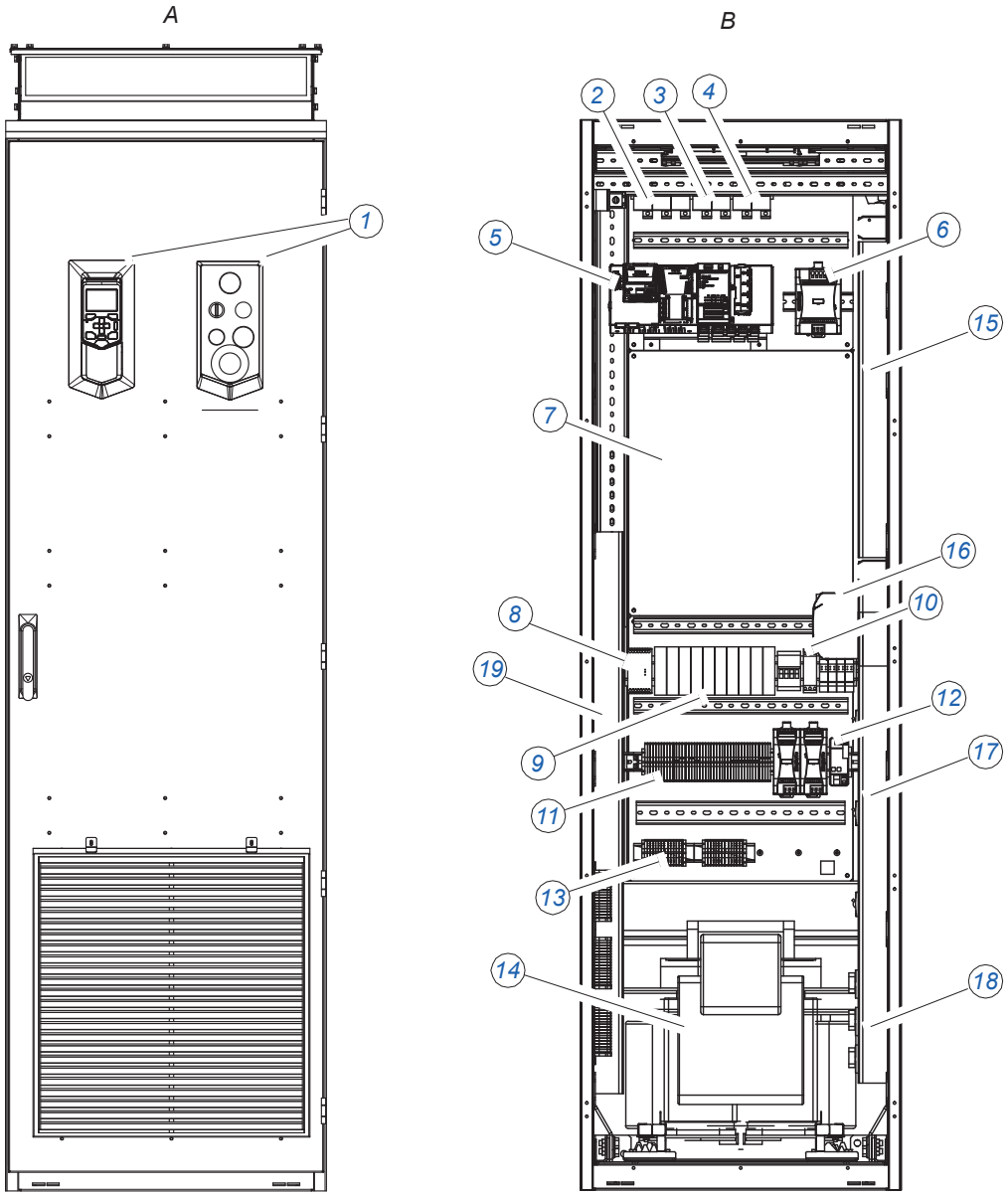
A	Supply unit
B	Inverter unit
1	Auxiliary control cubicle. Contains control electronics and customer I/O connections.
2	Incoming cubicle. Contains the power input cable terminals and switchgear.
3	Supply module cubicle. Contains two D8T supply modules.
4	Inverter module cubicle. Contains two R8i inverter modules. As standard, the motor cables are run from each inverter module. See *ACS880-107 inverter units Hardware manual* (3AUA0000102519 [English]).
5	Inverter control cubicle. Contains inverter control unit.

Layout drawings of the cubicles in the supply unit

This section contains layout drawings of cubicles that are included in a supply unit: auxiliary control cubicle, incoming cubicle and supply module cubicle. The components, layout and size of the cubicles vary depending on the supply unit size and options.

Layout drawing of an auxiliary control cubicle

This is an example of a 600 mm wide auxiliary control cubicle. The control unit of the supply unit, and auxiliary and control devices of the whole drive are located in the auxiliary cubicle, as well as the auxiliary voltage transformer(s) that supply the auxiliary circuits. The composition and size of the cubicle vary depending on the selected options.



A	Auxiliary control cubicle, door closed	
B	Auxiliary control cubicle, door open	
1	S21, etc	Control panel and operating switches
2	F111.1 … F111.3	Fuses, constant speed module cooling fans (option +C188)
3	F101	Fuses, IP54 roof fans (option +B055)
4	F21	Fuses, auxiliary voltage transformer
5	A41	Control unit (BCU) for diode supply unit ACS880-307…+A018
6	T130	24 V DC power supply for cabinet lighting (option +G301)
7		Reserved space for customer-defined equipment
	T21	At the backside of the assembly plate: Auxiliary voltage transformer (option +G344). Note: Connections are accessible from front. (Terminal block is at the lower part of cubicle.)
	T101	At the backside of the assembly plate: Auxiliary voltage transformer, IP54 roof fans (option +B055). Note: Connections are accessible from front. (Terminal block is at the lower part of cubicle.)

8	A61	Main safety relay (optional)
	A62	Safety relay (optional)
	A63	Safety relay (optional)
9	A611	Safety relay (optional)
	A612	
	A613	
	A614	
	A621	
	A622	
	A623	
	A624	
10	K61 … K66	Relays (optional)
11	X60	Terminal block, emergency stop circuit (optional)
12	T61	Power supply, safety circuit (optional)
	T62	Power supply, safety circuit (optional)
	F61	Protection switch, safety circuit (optional)
13	T21X1, T101X1	Terminal blocks, auxiliary voltage transformers [T21] and [T101] connections
14	T111	Auxiliary voltage transformer, constant speed module cooling fans (option +C188))
15	X22	Auxiliary circuit terminal block (on side plate)
16	T22, X21	24 V DC power supply (on side plate)
17	F20, F22	Circuit breakers, auxiliary voltage circuits (on side plate)
18	Q20	Connections and switches for external auxiliary voltage supplies (UPS), (option +G307, on side plate)
	Q95	
	Q130	
19	X60, X61	Terminal blocks, emergency stop circuits (option, on side plate)

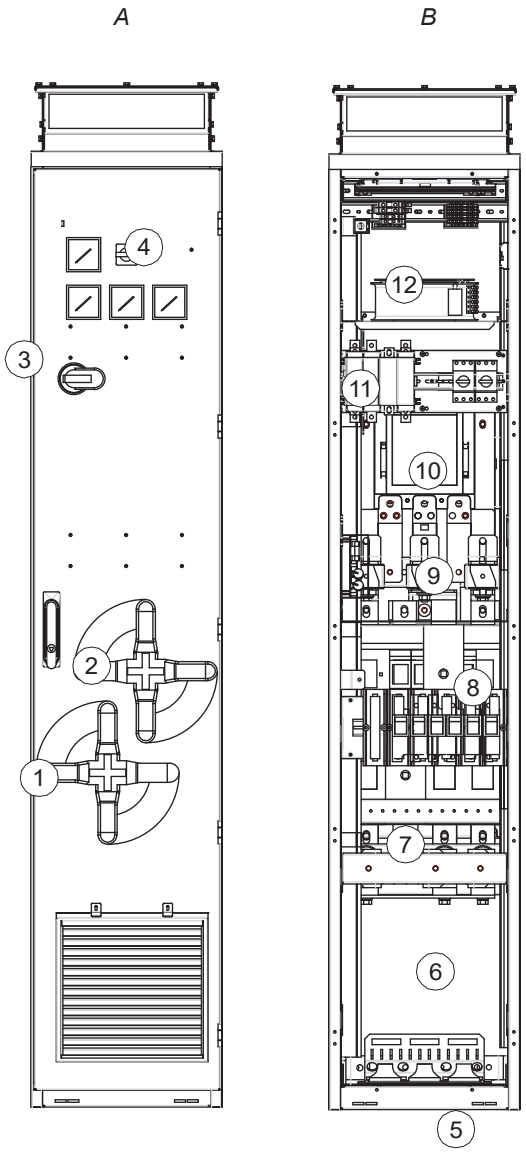
Layout drawings of incoming cubicles

This section shows examples of the incoming cubicle layouts. The input power cables are connected to the incoming cubicle and it contains the main switching and disconnecting devices. The components, layout and size vary depending on the supply unit size and options.

Layout drawing of a 400 mm incoming cubicle

These layout drawings show a 400 mm wide incoming cubicle. This cubicle is in supply units with:

- a 6-pulse connection, bottom cable entry, main switch-disconnector (option +F253)
- a 12-pulse connection (option +A004), bottom cable entry, main switch-disconnector (option +F253), and a earthing/grounding switch (option +F259). There are two similar cubicles, one for each input.



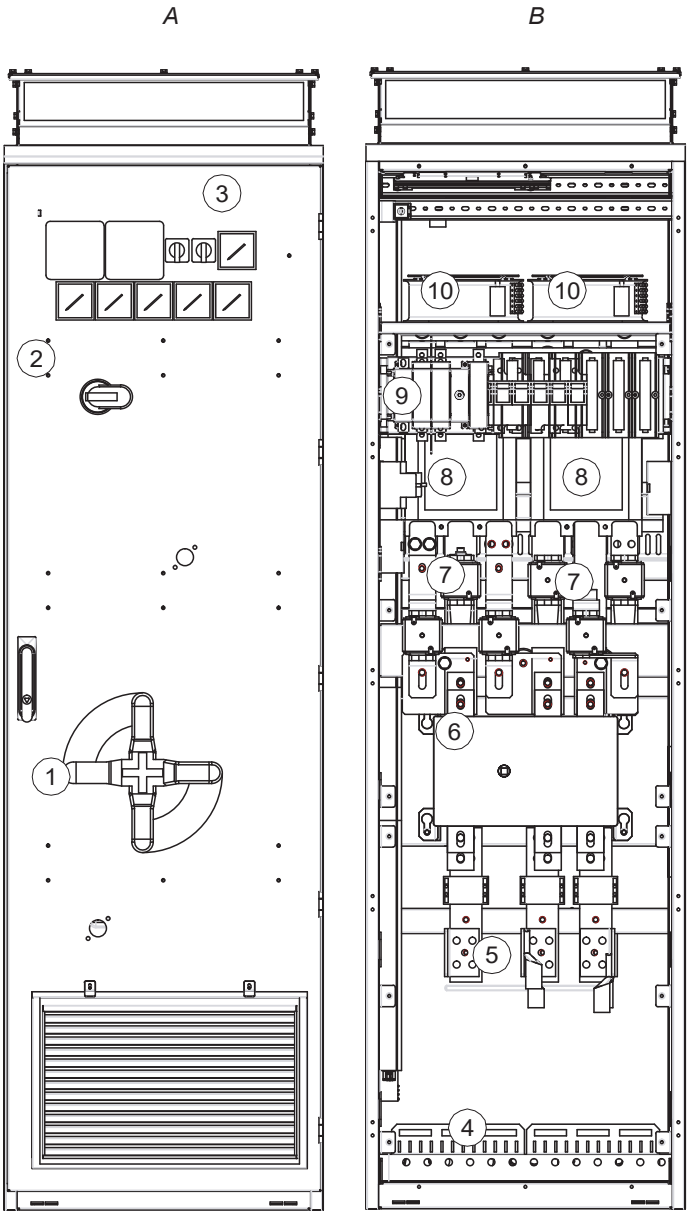
A	Incoming cubicle, door closed
B	Incoming cubicle, door open
1	Main switch-disconnector handle
2	Earthing/grounding switch handle ([Q9], option +F259)
3	Auxiliary voltage switch handle
4	Selector switch for V meter (option +G334)
5	Grounding busbar (PE)
6	Input power cable terminals ([1L1…2L3])
7	Main switch-disconnector [Q1]
8	Grounding/earthing switch ([Q9], option +F259)
9	Main AC fuses [F1…3]
10	Main contactor ([Q2], option +F250)
11	Auxiliary voltage switch [Q21]
12	Cubicle cooling fan

For the dimensions on the cable connections, see the technical data.

Layout drawing of a 600 mm incoming cubicle

These layout drawings show a 600 mm wide incoming cubicle. This cubicle is in supply units with a 12-pulse configuration (option +A004), bottom cable entry, main switch-disconnector (option +F253) and no earthing/grounding switch (no option +F259).

Note: 12-pulse supply units (option +A004), with earthing/grounding switch (option +F259) have two separate incoming cubicles. See section *Layout drawing of a 400 mm incoming cubicle (page 19)*.

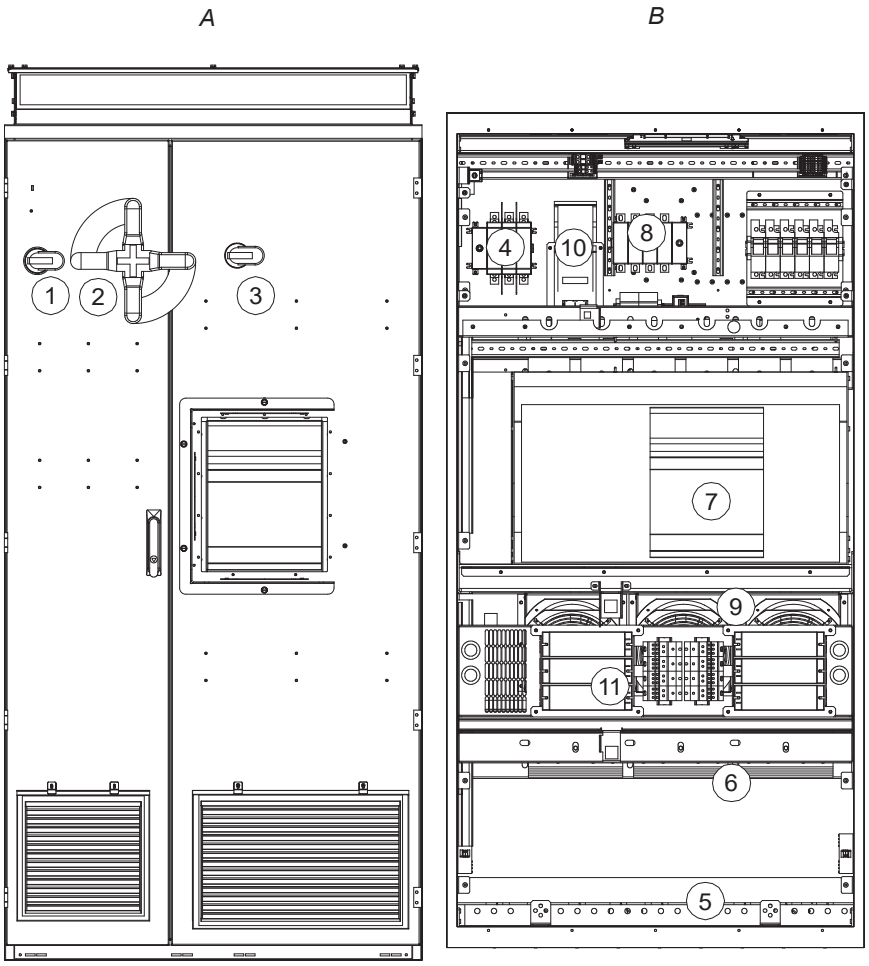


A	Incoming cubicle, door closed
B	Incoming cubicle, door open
1	Main switch-disconnector handle
2	Auxiliary voltage switch handle
3	Selector switch for V meter (option +G334)
4	Grounding (PE) busbar

5	Input power cable terminals [1L1…2L3]
6	Main switch-disconnectors [Q1.1, Q1.2]
7	Main AC fuses [F1.1…F2.3]
8	Main contactors ([Q2.1], [Q2.2], option +F250)
9	Auxiliary voltage switch [Q21]
10	Cubicle cooling fans

Layout drawing of a 1000 mm incoming cubicle

These layout drawings show a 1000 mm wide incoming cubicle. The cubicle contains the circuit breaker.

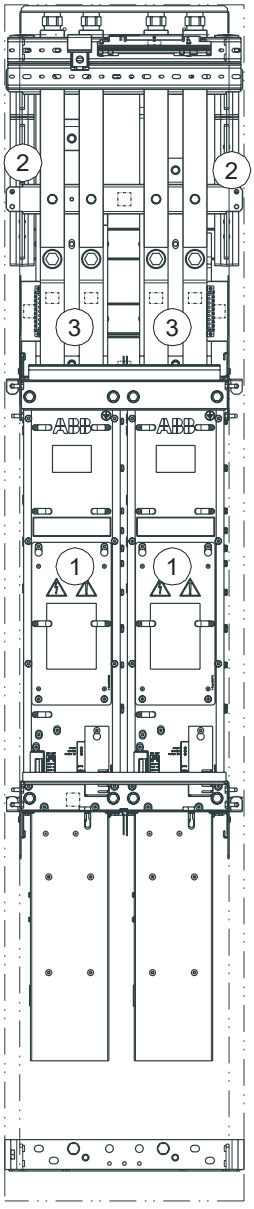


A	Incoming cubicle, door closed
B	Incoming cubicle, door open
1	Auxiliary voltage switch handle
2	Earthing/grounding switch handle ([Q9], option +F259)
3	Charging switch handle
4	Auxiliary voltage switch [Q21]
5	Grounding (PE) busbar
6	Input power cable terminals [L1…L3]
7	Circuit breaker [Q1]

8	Charging switch [Q3]
9	Cubicle cooling fans
10	Earthing/grounding switch ([Q9], option +F259)
11	Charging resistors

Layout drawing of a supply module cubicle 2×D7T

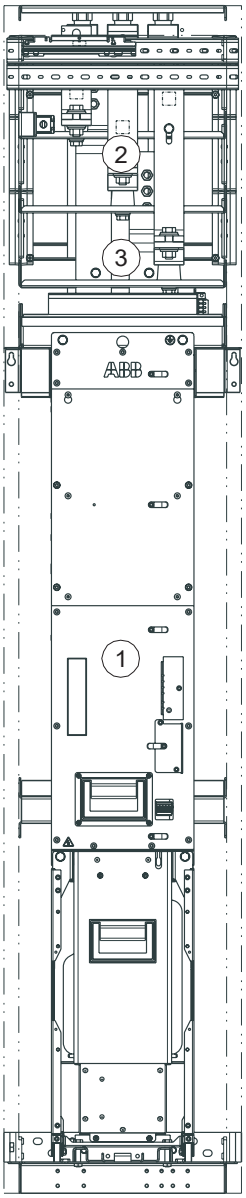
This is a layout drawing of the supply module cubicle with door open and shrouds removed.



1	Supply module
2	AC busbars (on back)
3	DC busbars

Layout drawing of a supply module cubicle 1×D8T

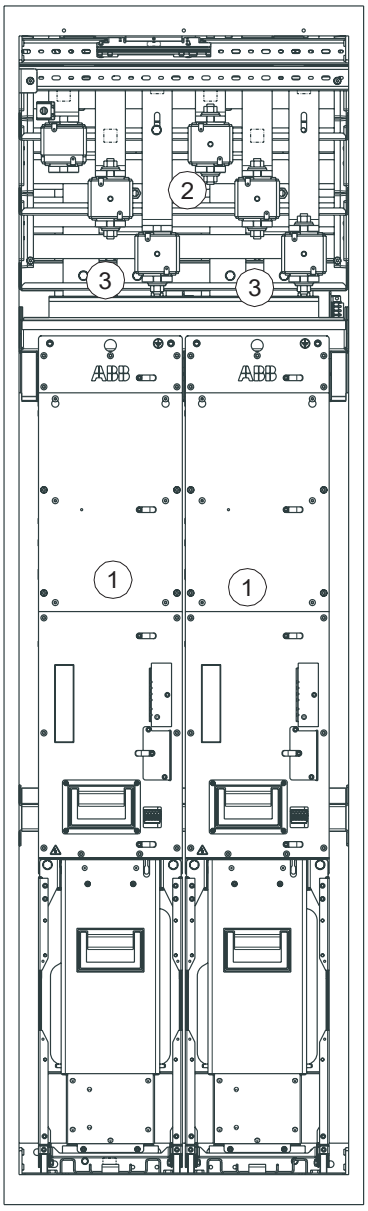
This is a layout drawing of the supply module cubicle with door open and shrouds removed.



1	Supply module
2	AC busbars
3	DC busbars

Layout drawing of a supply module cubicle 2×D8T

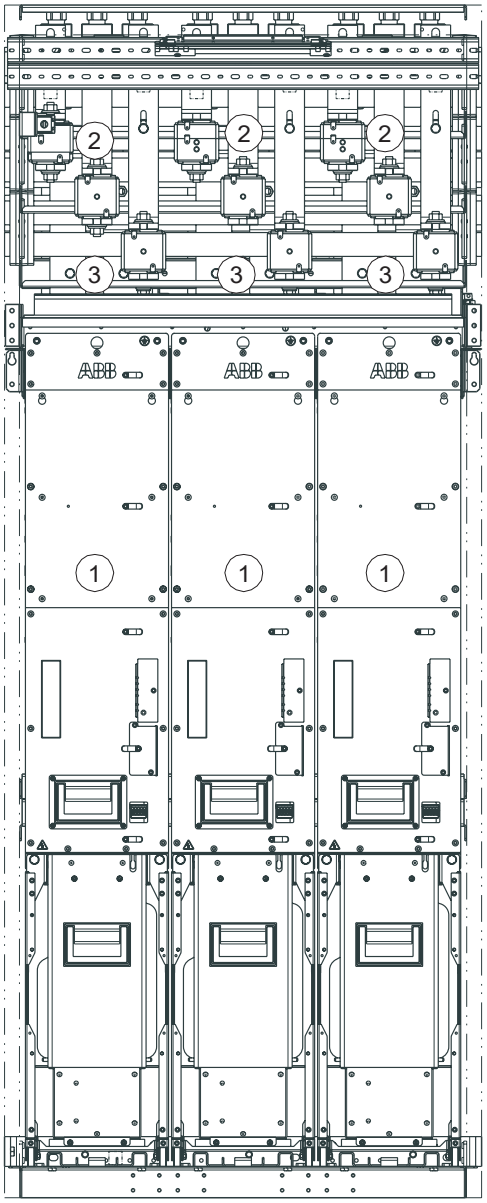
This is a layout drawing of the supply module cubicle with door open and shrouds removed.



1	Supply module
2	AC busbars with module-specific AC fuses (no fuses in 12-pulse 2×D8T supply unit)
3	DC busbars

Layout drawing of a supply module cubicle 3×D8T

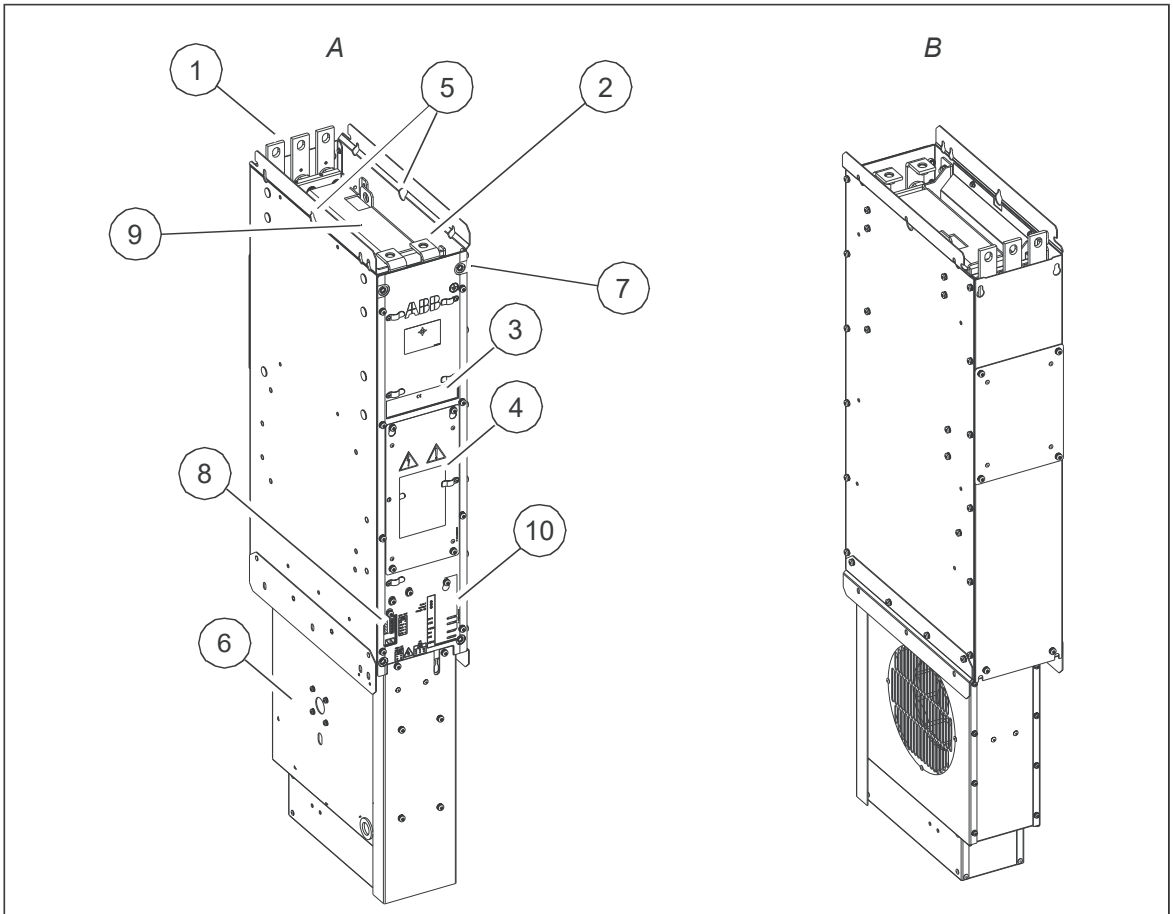
This is a layout drawing of the supply module cubicle with door open and shrouds removed.



1	Supply module
2	AC busbars with module-specific AC fuses
3	DC busbars

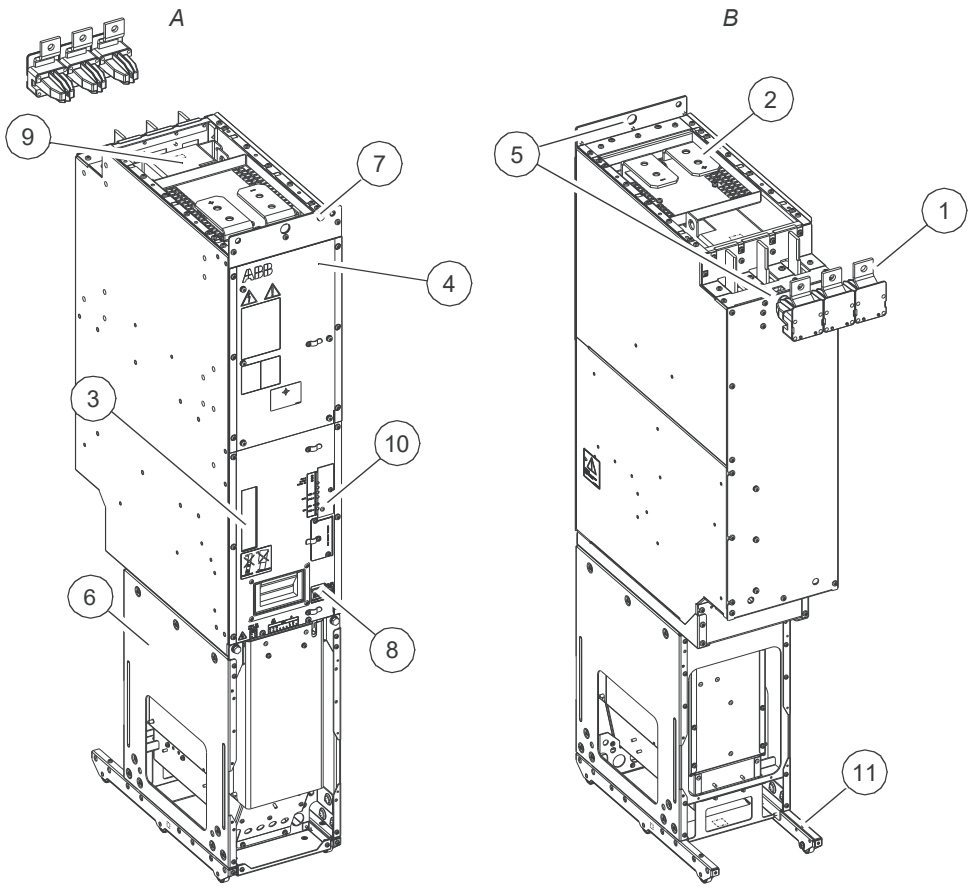
Layout drawings of the supply modules

Layout drawing of D7T supply module



A	D7T supply module, front
B	D7T supply module, back
1	AC input busbars
2	DC output busbars
3	Type designation label
4	Cover of the module's DC fuses
5	Lifting eyes
6	Fan
7	Unpainted fastening hole. Grounding point (PE) between module frame and cabinet frame.
8	Terminal block [X53]. 24 V DC power for supply module control unit.
9	Terminal block [X50] (DOL fan supply, option +C188)
10	Fiber optic connectors. Communication link to the supply module control unit. When speed-controlled fan is in use: Communication link to fan control unit.

Layout drawing of D8T supply module



A	D8T supply module, front
B	D8T supply module, back
1	AC quick connector and AC input busbars
2	DC output busbars
3	Type designation label
4	Cover of the module's DC fuses
5	Lifting eyes
6	Fan
7	Unpainted fastening hole. Grounding point (PE) between module frame and cabinet frame.
8	Terminal block [X53] (24 V DC power for supply module control unit)
9	Terminal block [X50] (power supply for internal boards and module heating element, option +C183; DOL fan supply, option +C188)
10	Fiber optic connectors. Communication link to the supply module control unit. When speed-controlled fan is in use: Communication link to fan control unit.
11	Wheels

Control of the supply unit

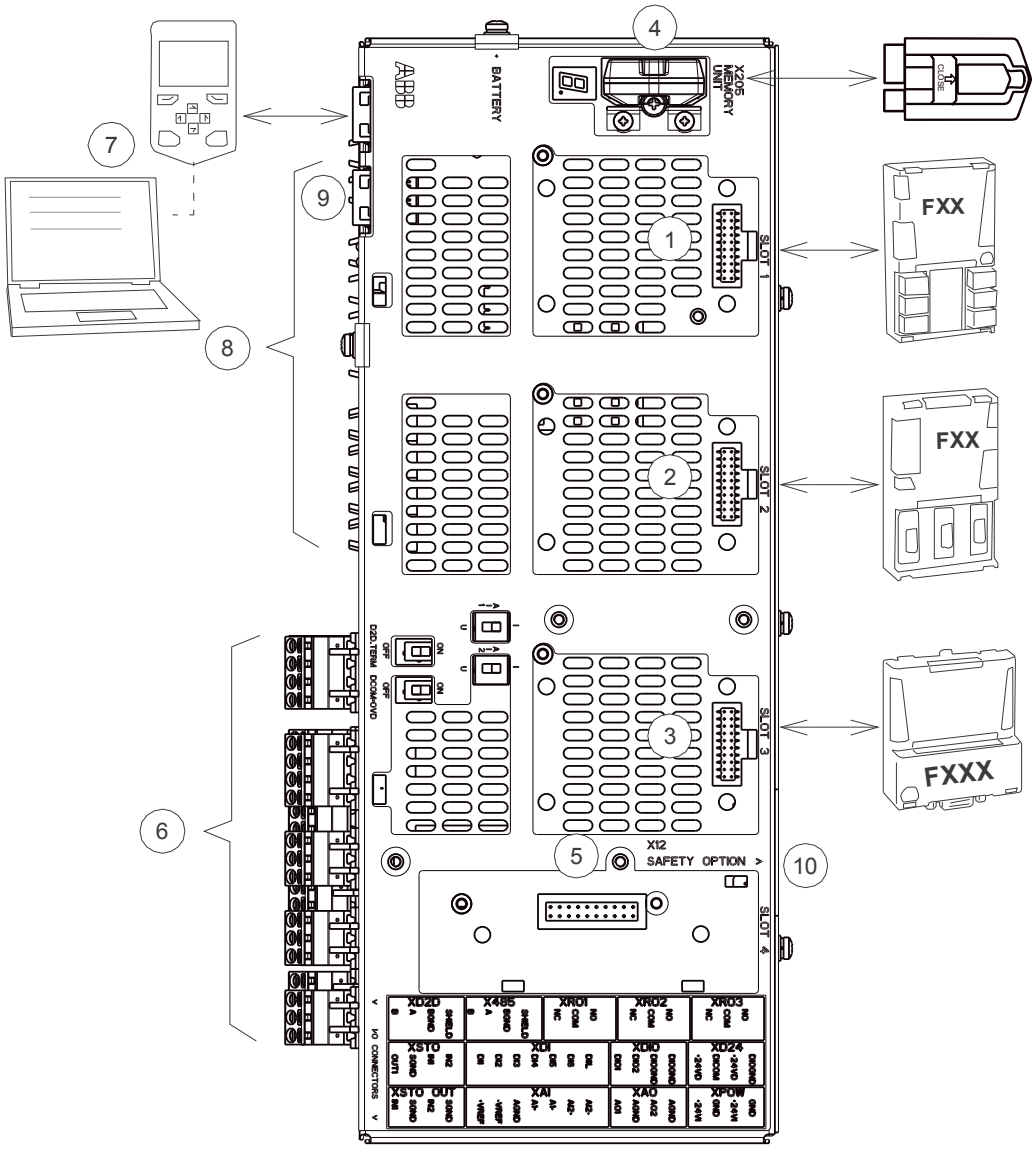
A cabinet-installed supply unit is typically controlled using the local control devices installed on the cabinet door. No additional control connections are needed. However, it is possible to:

- control the supply unit through the control panel and fieldbus
- read the status information of the supply unit through the control panel, fieldbus and relay output
- stop the supply 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 chapter *Control units of the drive (page 117)*.

Overview of the control connections of the BCU control unit

The diagram shows the control connections and interfaces of the BCU control unit.

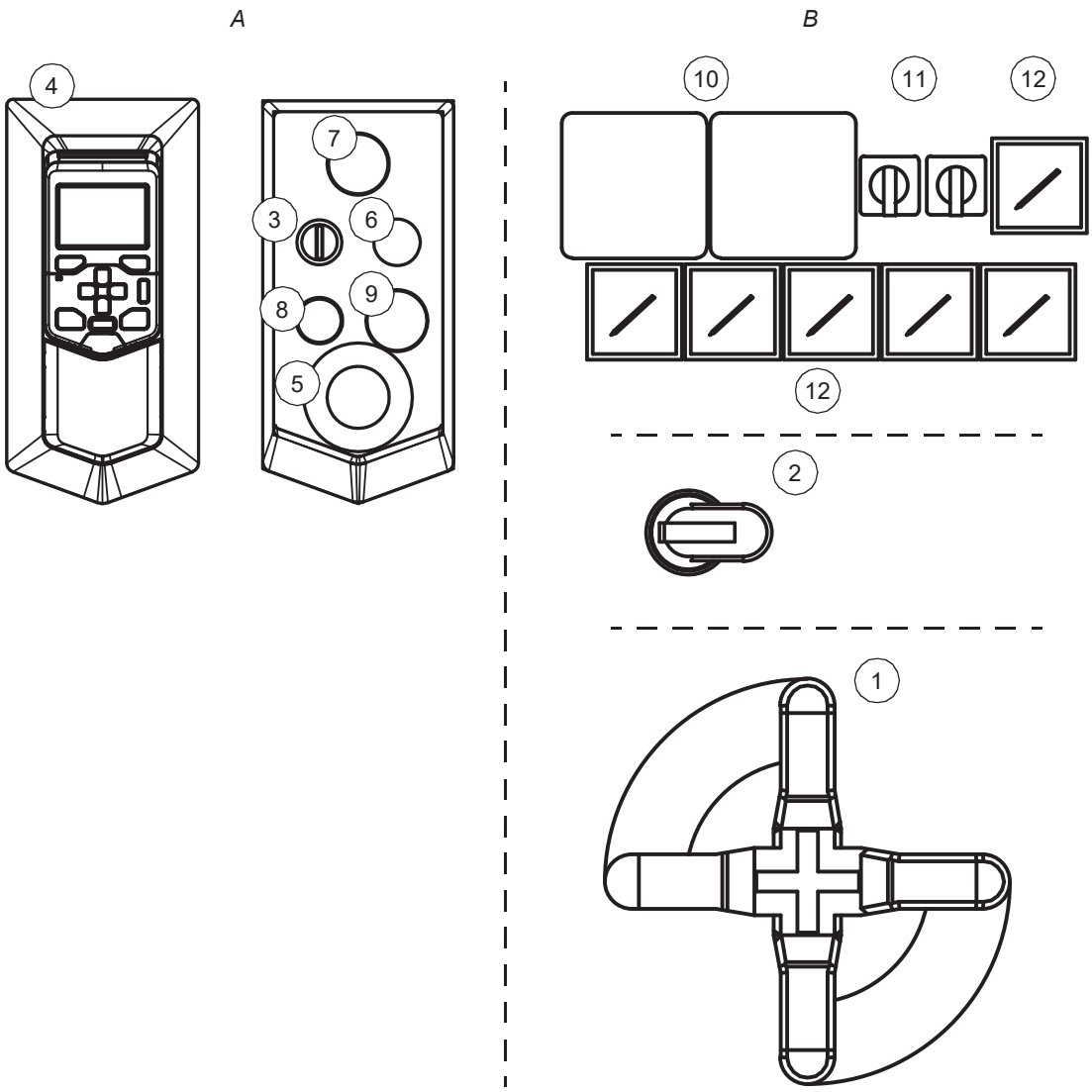


1 2 3	Analog and digital I/O extension modules and fieldbus communication modules can be inserted into slots 1, 2 and 3.	7	Control panel.
4	Memory unit	8	Fiber optic links to power modules (inverter, supply, brake or converter)
5	Slot 4 for RDCO-0x	9	Ethernet port. Not in use.
6	Terminal blocks.	10	Safety option interface. Only in use for the inverter units.

Supply unit control devices

Door switches and lights

This figure shows an example of the door control devices. The devices and their exact locations varies depending on the options selected.



A	Auxiliary control cubicle	
B	Incoming cubicle	
1	Q1	Main disconnector
2	Q21	Auxiliary voltage switch
3	S21	Operating switch
4	A59	ACS-AP-x control panel
5	S61	Emergency stop button
6	S62	E-stop reset button and indication lamp
7	S23	Electrical disconnect push button
8	S90	Ground/Earth fault indicator light (option +Q954)
9	S22	Tripping button for the breaker of the supply transformer

10	P5.x	Voltage meters (optional). One meter in 6-pulse supply unit and two in 12-pulse. Size of the meters vary.
11	S5.x	Selector switches for voltage meters (optional). There is one switch in 6-pulse supply unit and two in 12-pulse.
12	P2.x	AC phase current meters (optional). Number of current meters depends on option selection. There is a maximum of 6 current meters in 12-pulse unit. See section Other door controls on page 33.

Main disconnector [Q1]

The supply unit is equipped with a main switch-disconnector ([Q1], option +F253) or a main circuit breaker ([Q1], option +F255). With the switch or the breaker, you can isolate the main circuit of the drive from the power line. The switch has an operating handle on the cabinet door. The main breaker is withdrawable: to disconnect the drive, crank the breaker out with a separate loose handle (included in the delivery). For the 12-pulse supply unit there are two main switch-disconnectors ([Q1.1] and [Q1.2]).

WARNING!
The main disconnector 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 earthing/grounding switch ([Q9], option +F259) and the main switch-disconnector are electrically interlocked: The earthing/grounding switch can be closed only when the main switch-disconnector is open. The main switch-disconnector can be closed only when the earthing/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 [Q21]

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 [Q9]

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 earthing/grounding switch and the main switch-disconnector ([Q1], option +F253) are electrically interlocked: The earthing/grounding switch can be closed only when the main switch-disconnector is open. The main switch-disconnector can be closed only when the earthing/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 [S21]

The operating switch [S21] is a standard device. By default, the operating switch controls the unit as follows:

- ON position energizes digital input DI2 of the control unit: Control program receives Run enable command and it closes main contactor [Q2] or main breaker. Supply module starts to rectify: it first charges DC link capacitors and then feeds inverter units and motors.
- OFF position de-energizes digital input DI2 of the control unit: Control program does not receive Run enable command and it opens the main contactor [Q2] or main breaker. Supply module stops rectifying.

Emergency stop button [S61]

The emergency stop button [S61] is an optional device (option +G331). Pressing the button activates an 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 a separate reset button [S62].

E-stop reset button [S62] and indication lamp [P62]

The emergency stop reset button [S62] is automatically installed on the door when the supply unit is equipped with an emergency stop function (eg, options +Q951,+Q952, etc). The button is illuminated, ie it includes an indication lamp [P62]. You can reset the emergency stop circuit with the button.

Note: The functional safety options, for example the options +Q951, +Q952, etc. 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 phase voltage value to display.
- An AC phase current meter is an optional device ([P2], option +G335). It is also possible to have three meters on the door - one for each phase currents.
- 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.

ACX-AP-x control panel

The ACX-AP-x control panel is the user interface of the unit. With the control panel, you can:

- start and stop the 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.

To be able to start and stop the unit by the control panel, you must have the parameter-defined Run enable signal and Start enable signal on (1). The control panel must also be in local control mode.

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 the firmware manual.

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.

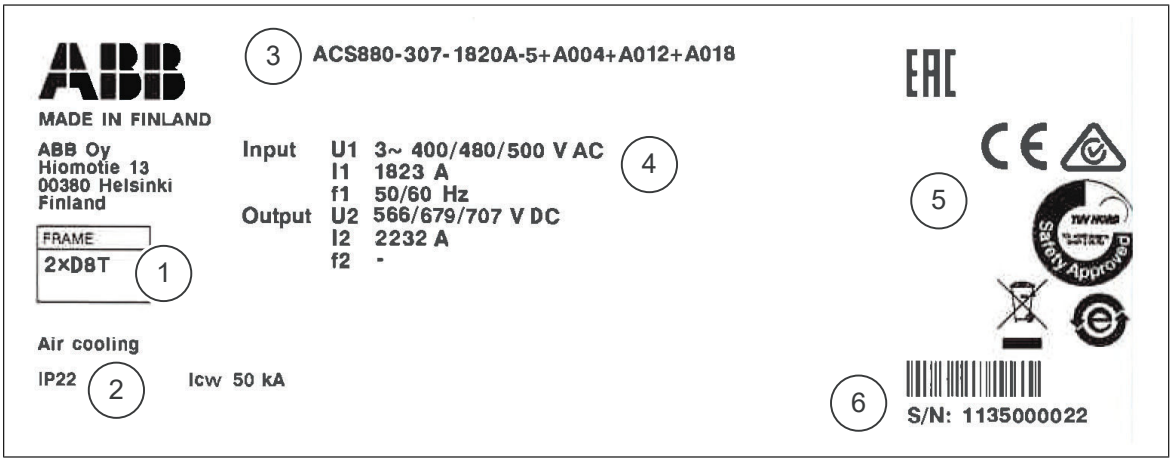
Fieldbus control

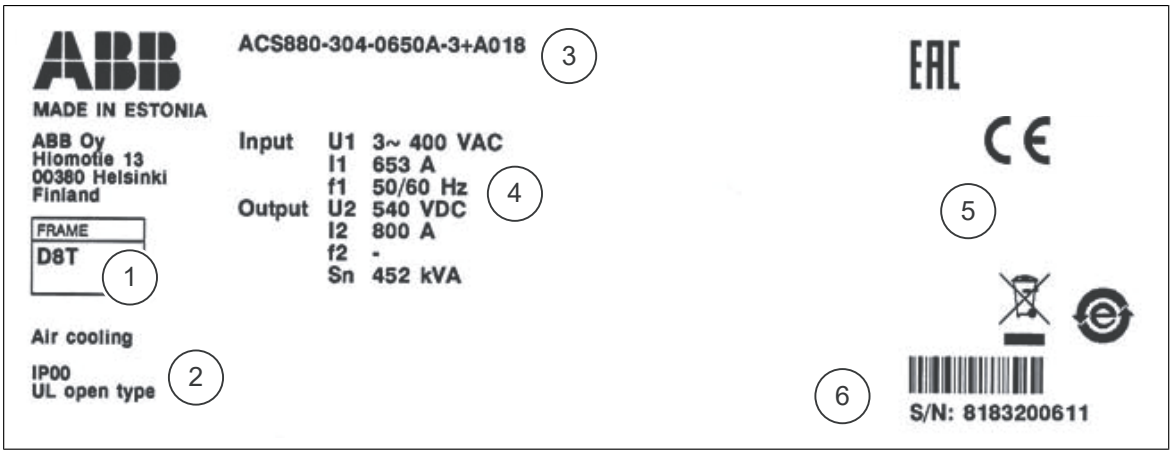
You can control the unit through a fieldbus interface if the unit is equipped with an optional fieldbus adapter (for example, option +K454), and when you have configured the control program for the fieldbus control with the parameters. For information on the parameters, see the firmware manual.

Note: To be able to switch the main contactor [Q2] (or breaker) and the supply unit on and off (Run enable signal) through the fieldbus, the Run enable command (by default 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 of the supply unit is attached to the cabinet on the inside of the door. The type designation label of the module is attached to the module. Example labels are shown below.





No.	Description
1	Supply module frame size
2	Degree of protection
3	Type designation
4	Ratings. See the technical data.
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 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.

Code	Description
Basic code	
ACS880	Product series
ACS880-307	Default configuration: cabinet-installed diode unit supply unit: supply frequency 50 Hz, control (auxiliary) voltage 230 V AC, half-controlled diode thyristor bridge, IEC industrial cabinet construction, degree of protection IP22 (UL type 1), EN/IEC approved components, speed-controlled module cooling fans, line contactor (standard in small power), disconnector switch (door interlocked), circuit breaker (standard in high power), DC busbar material aluminum and copper, cable supply conductors, standard wiring material, power and control cabling through the bottom of the cabinet, European motor cabling, complete documentation in English in a USB memory stick.
Size	
xxxxx	Refer to the rating tables
Voltage range	
3	380…415 V AC. This is indicated in the type designation label as typical input voltage level (3~ 400 V AC)
5	380…500 V AC. This is indicated in the type designation label as typical input voltage levels (3~ 400/480/500 V AC)
7	525…690 V AC. This is indicated in the type designation label as typical input voltage levels (3~ 525/600/690 V AC)
Option codes (plus codes)	
Supply connection	
A004	12-pulse supply connection
A012	50 Hz supply frequency
A013	60 Hz supply frequency
A018	Half-controlled diode-thyristor bridge
Degree of protection	
B053	IP22 (UL Type 1)
B054	IP42 (UL Type 1)
B055	IP54 (UL Type 12)
Construction	
C121	Marine construction.
C128	Air inlet through bottom of cabinet.
C129	UL Listed.
C130	Channeled air outlet.
C132	Marine type approval. Refer to *ACS880 +C132 marine type-approved cabinet-built drives supplement* (3AXD50000039629 [English]).
C134	CSA approved.
C164	Plinth height 100 mm.
C176	Door hinges on left
C179	Plinth height 200 mm.
C180	Seismic design.

Code	Description
C188	Direct-on-line module cooling fans
Filters	
E202	EMC filter for 1st environment TN (grounded) system, category C2
E210	EMC filter for 2nd environment TN (grounded) or IT (ungrounded) system, category C3
Switching and grounding	
F250	Main (line) contactor
F253	Disconnect switch
F255	Main circuit breaker
F259	Grounding (earthing) switch
F285	Input grounding terminals
Cabinet equipment	
G300	Cabinet and module heating elements (external supply).
G301	Cabinet lighting.
G304	Control (auxiliary) voltage 115 V AC
G307	Terminals for connecting external control voltage (230 V AC or 115 V AC, eg. UPS).
G314	Aluminum busbars (standard up to 3200 A)
G315	Tin-plated copper busbars (optional up to 3200 A, standard from 3200 A up)
G316	Cable supply conductors
G317	Supply connection by busbars
G320	Control (auxiliary) voltage 230 V AC
G330	Halogen-free wiring and materials
G331	Emergency stop push button on the door (red)
G332	Electrical disconnect push button on the door (black, opens main contactor / ACB)
G333	kW-meter on door
G334	V-meter with selector switch
G335	A-meter in one phase
G336	Arc monitoring
G337	Arc monitoring with current monitoring unit
G343	Corrosion indicator
G344	Auxiliary voltage transformer
G426	Arc monitoring extension unit
Cabling	
H350	Supply cabling direction down.
H351	Supply cabling direction up.
H358	Cable conduit entry (US/UK).
H364	Gland plate out of 3 mm thick aluminum, blind
H365	Blind 6 mm brass cable gland plates
H367	Control cable entry through floor of cabinet
H368	Control cabling through roof of cabinet
Control panel	
J400	ACS-AP-W control panel (with Bluetooth)
J410	Control panel mounting platform (max. 4 per door)

Code	Description
J412	Common control panel
Fieldbus adapters, diverse communication options	
K450	Panel bus (control of several units from one control panel)
K451	FDNA-01 DeviceNet™ adapter module
K454	FPBA-01 PROFIBUS DP adapter module
K457	FCAN-01 CANopen adapter module
K458	FSCA-01 RS-485 (Modbus/RTU) adapter module
K462	FCNA-01 ControlNet™ adapter module
K469	FECA-01 EtherCat adapter module
K470	FEPL-02 EtherPOWERLINK adapter module
K473	FENA-11 Ethernet adapter module for EtherNet/IP™, Modbus TCP and PROFINET IO protocols
K475	FENA-21 Ethernet adapter module for EtherNet/IP™, Modbus TCP and PROFINET IO protocols, 2-port
K480	Ethernet switch for PC tool or control network (for max. 6 inverter units)
K483	Ethernet switch with optical link for PC tool or control network (for max. 6 inverter units)
I/O extensions and feedback interfaces	
L500	FIO-11 analog I/O extension module (1, 2 or 3 pcs)
L501	FIO-01 digital I/O extension module (1, 2 or 3 pcs)
L503	FDCO-01 optical DDCS communication adapter module
L504	Additional I/O terminal block.
L509	RDCO-04 optical DDCS communication for BCU-xx (4xTransmitter/Receiver)
L515	FEA-03 I/O extension adapter
Starter for auxiliary motor fan	
4	Trip limit setting range: 1.6 … 2.5 A
Control program	
Specialties	
P913	Special color
Safety functions	
Q951	Emergency stop (category 0) with safety relays, by opening the main breaker/contactor
Q952	Emergency stop (category 1) with safety relays, by opening the main breaker/contactor
Q954	Earth fault monitoring for IT (ungrounded) systems
Q959	Supply transformer breaker disconnect push button (red, wired to terminals) on the door
Q963	Emergency stop (category 0) with safety relays, by activating the Safe torque off function
Q964	Emergency stop (category 1) with safety relays, by activating the Safe torque off function
Q979	Emergency stop (configurable for category 0 or 1) with FSO-xx safety functions module, by activating the Safe torque off function
Full set of printed manuals in the selected language **Note:** The delivery may include manuals in English if the requested language is not available.	
R700	English
R701	German
R702	Italian
R703	Dutch
R704	Danish

Code	Description
R705	Swedish
R706	Finnish
R707	French
R708	Spanish
R709	Portuguese
R711	Russian
R712	Chinese
R713	Polish
R715	Complete documentation, user manuals in memory stick
R716	Hard copies of documentation
R717	Second set of hard copies of documentation

Type designation key of the diode 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 following table lists the subcodes. The example code is: ACS880-304-0980A-3+A018.

Code	Description
Basic code	
ACS880	Product series
304	Construction: module for the cabinet installation. The module delivery includes a speed-controlled cooling fan supplied from the DC bus as standard.
Size	
0980A	Size. See the technical data.
Voltage range	
3	380…415 V. This is indicated in the type designation label as typical input voltage level 3 ~ 400 V AC.
5	380…500 V. This is indicated in the type designation label as typical input voltage levels 3 ~ 400/480/500 V AC.
7	525…690 V (525…600 V AC for UL/CSA). This is indicated in the type designation label as typical input voltage levels 3 ~ 525/600/690 V AC (600 V AC for UL/CSA).
Option codes	
A004	12-pulse option of half-controlled diode-thyristor bridge
A018	Half-controlled diode-thyristor bridge (as standard)
C129	cULus listed (as standard for D7T, optional for D8T)
C132	Marine type approval
C134	CSA certified (as standard for D7T, optional for D8T)
C183	Internal heating element in the module (D8T)
C188	Direct-on-line (DOL) cooling fan

Code	Description
G304	115 V auxiliary voltage supply for the module

3

Electrical installation

Contents of this chapter

This chapter instructs how to check the insulation of the assembly and how to install the input power cables and control cables.

The information is valid for ACS880-307…+A018 diode supply units.

For 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-disconnector (if present), 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”).

Checking the insulation

Measuring the insulation of the drive

WARNING!
Do not do any 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

Before you connect the input power cable to the drive, measure its insulation according to local regulations.

Setting the voltage range of auxiliary voltage transformers [T21, T101, T111]

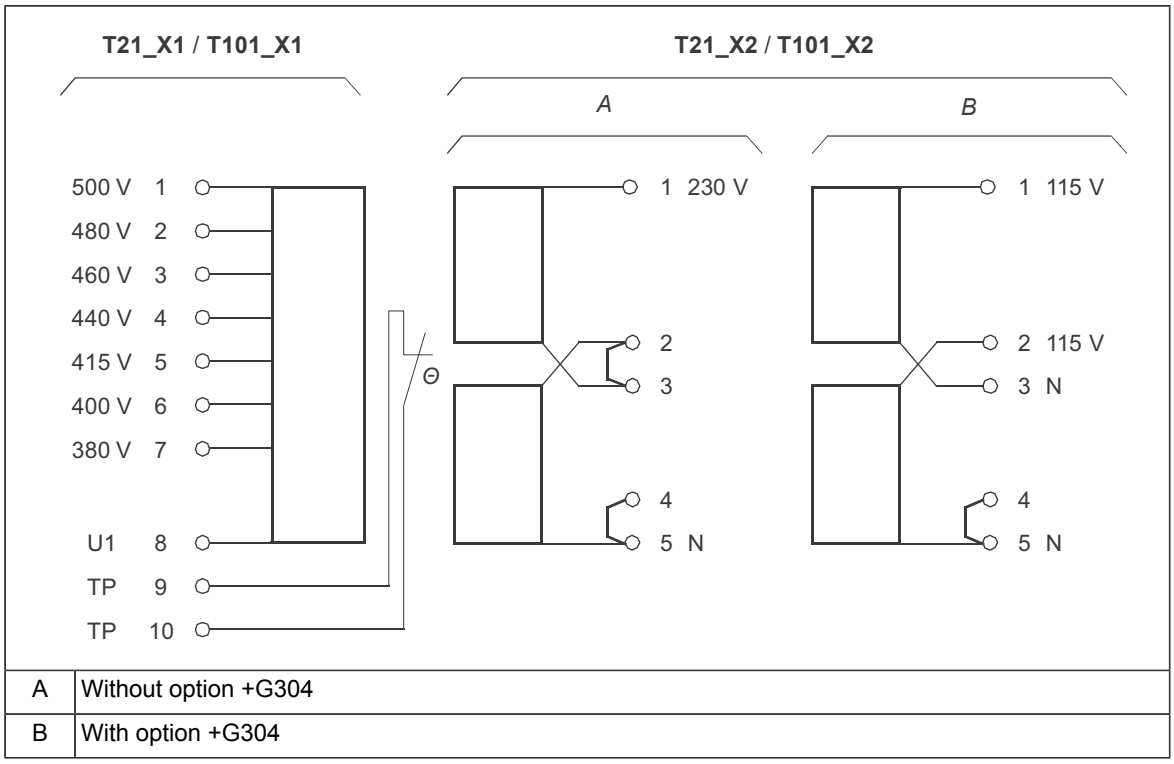
Auxiliary voltage transformer [T21, T101, T111] connections are made at the factory according to the supply voltage and desired output voltage and you do not need to change the settings during the installation. If needed (for example, due to a later part replacement), check the connections using the diagrams below.

Transformer [T21] is a standard equipment. Transformers [T101] and [T111] are present if required by the options specified by the customer.

The voltage settings of the transformers [T21] and [T101] are made at terminal blocks [T21_X1/X2] and [T101_X1/X2] respectively. The settings of transformer [T111] are made on the transformer itself. The locations of the transformers and the terminal blocks are shown

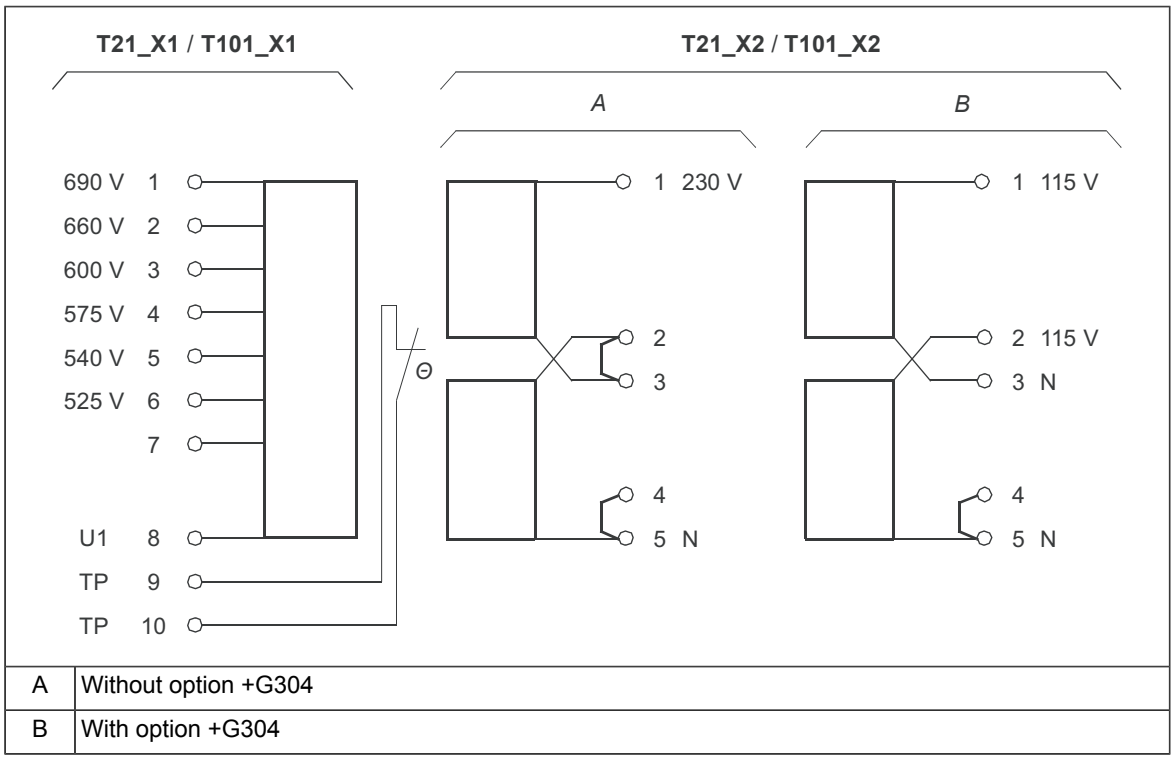
in section *Layout drawing of an auxiliary control cubicle (page 17)* and the circuit diagrams delivered with the drive.

[T21/T101] connections (400…500 V units)



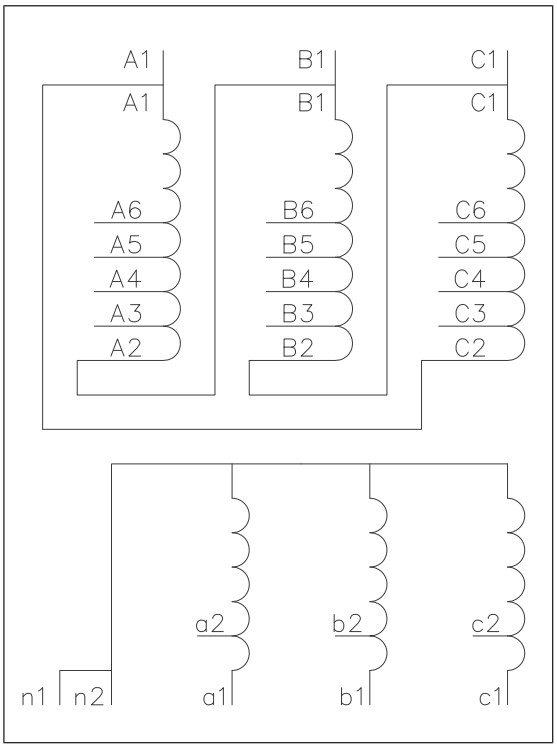
A	Without option +G304
B	With option +G304

[T21/T101] connections (690 V units)



A	Without option +G304
B	With option +G304

[T111] connections



Voltage	Terminals
3~ input	
380…690 V	A1, B1, C1
3~ output	
400 V (50 Hz)	a1, b1, c1
320/340 V (60 Hz)	a2, b2, c2

Supply voltage	Tap settings		
	A1–	**B1–**	**C1–**
690 V	C2	A2	B2
660 V	C2	A2	B2
600 V	C3	A3	B3
575 V	C3	A3	B3
540 V	C4	A4	B4
525 V	C4	A4	B4
500 V	C4	A4	B4
480 V	C5	A5	B5
460 V	C5	A5	B5
440 V	C5	A5	B5
415 V	C6	A6	B6
400 V	C6	A6	B6
380 V	C6	A6	B6

Compatibility check - IT (ungrounded) earthing system

A drive with no EMC filter, or with a category 3 EMC filter (option +E210), is compatible with an IT (ungrounded) earthing system.

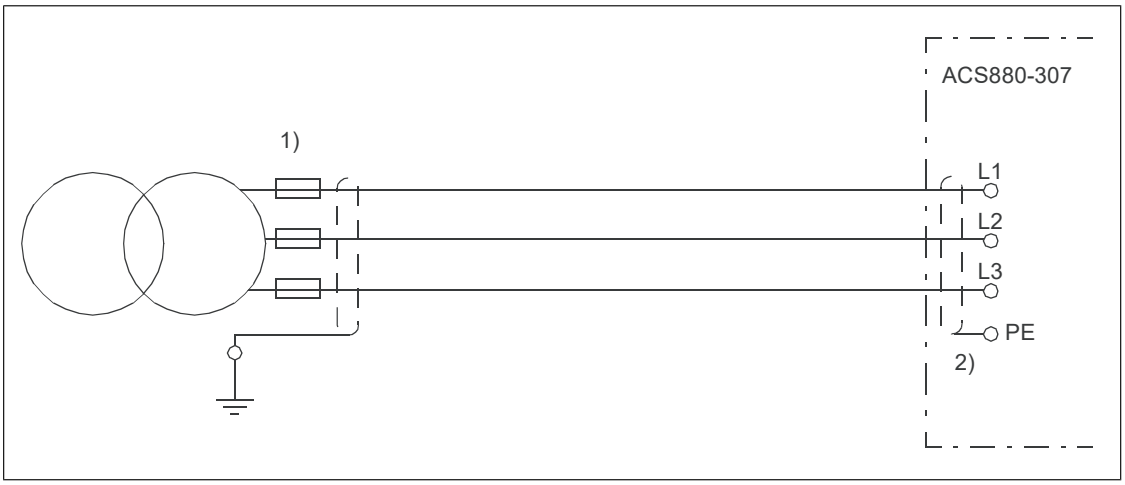
A drive with category 2 EMC filter (option +E202) is not suitable for use in an IT earthing system. If the drive is equipped with the filter, disconnect it before connecting the drive to the IT supply network. Contact ABB for instructions.

WARNING!
Do not install a drive equipped with EMC filter +E202 on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system). The system will be connected to ground potential through the EMC filter capacitors of the drive. This can cause danger, or damage the drive.

Connecting the input power cables

Connection diagram – 6-pulse supply unit

This is a connection diagram for the 6-pulse supply unit. See also the delivery-specific circuit diagrams.



1) Fuses or other protection means.

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

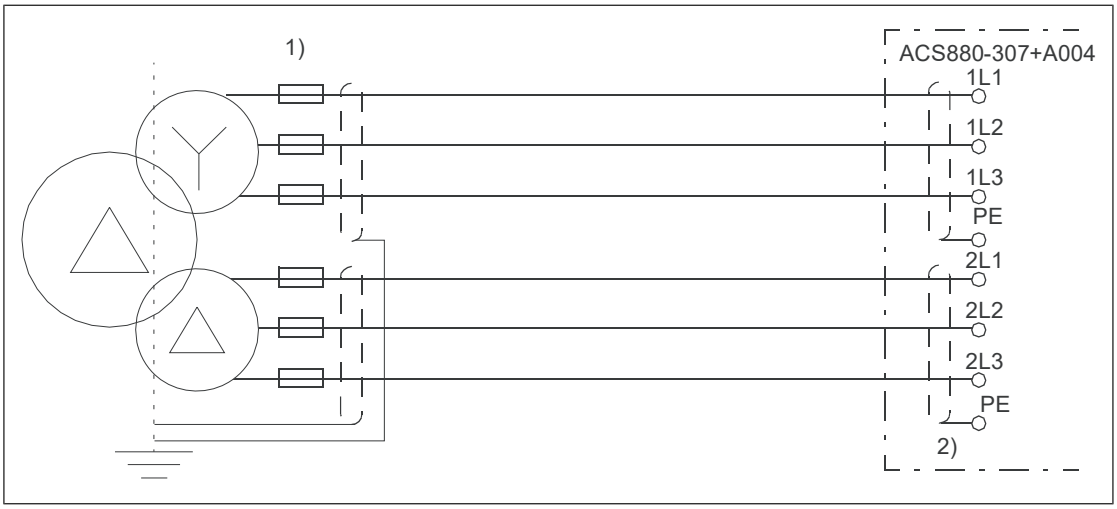
Note: See the technical data for the terminal dimensions and tightening torques.

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]).

Connection diagram – 12-pulse supply unit (option +A004)

This is a connection diagram for the 12-pulse supply unit (option +A004). See also the delivery-specific circuit diagrams.



1) Fuses or other protection means.

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

Note: See the technical data for the terminal dimensions and tightening torques.

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]).

Connection procedure

The cable entry details, and cable connection details are shown in chapter *Terminal and lead-through data for the input power cable (page 103)*. The details vary depending on the supply unit size and options.

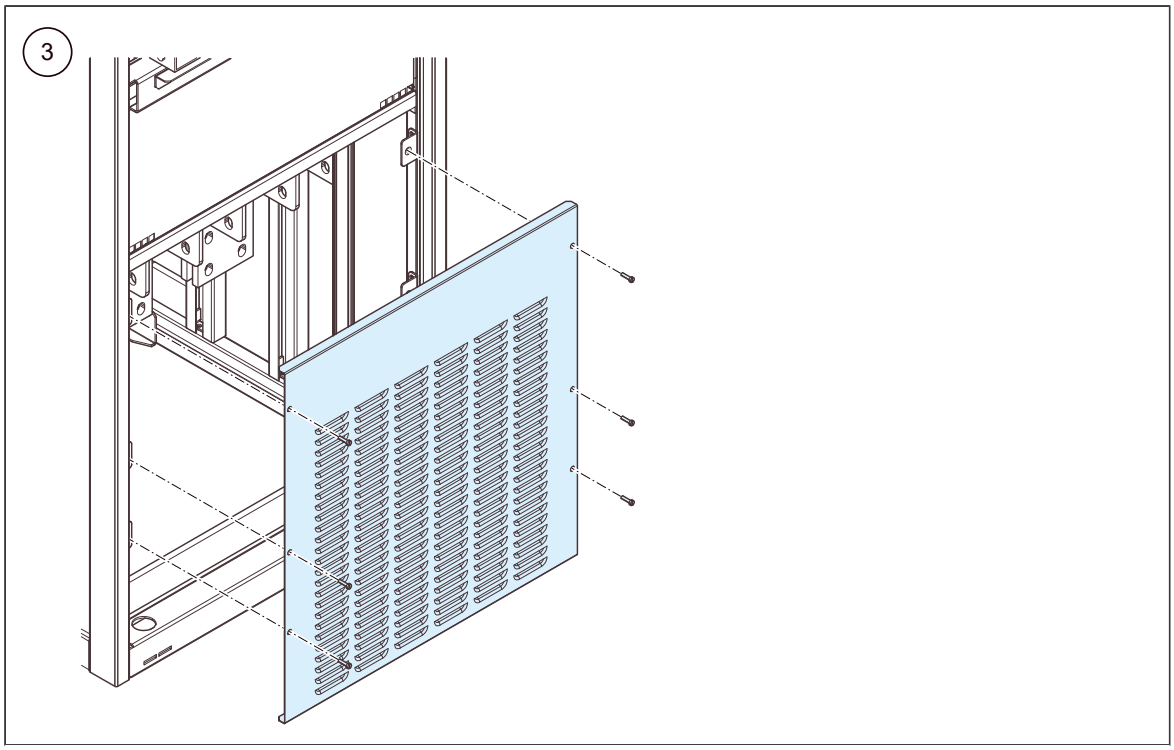
WARNING!
Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur.

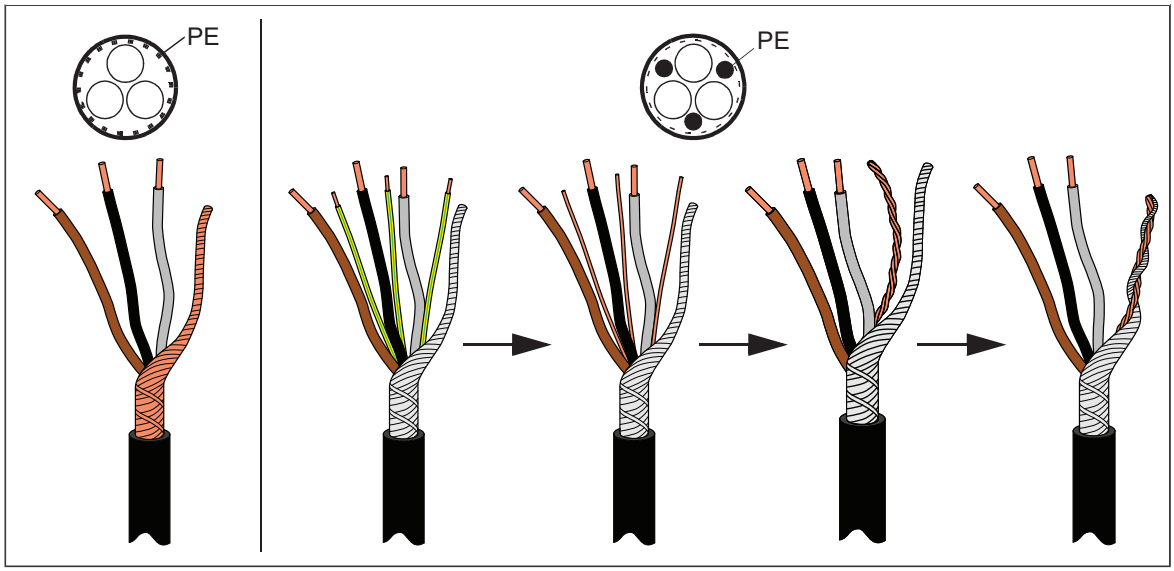
If you are not a qualified electrical professional, do not do installation or maintenance work.

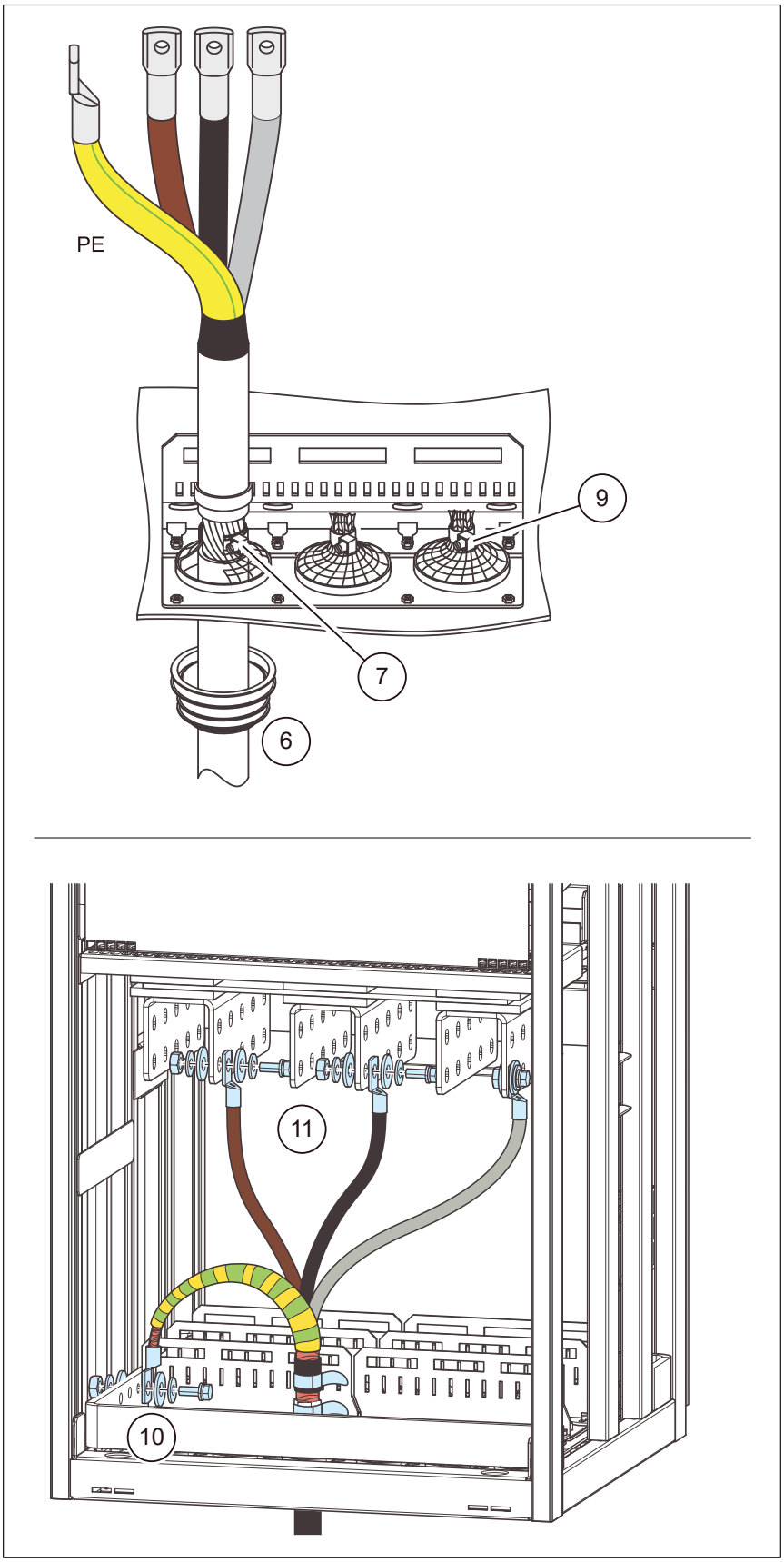
WARNING!
Apply grease to stripped aluminum conductors before attaching them to non-coated aluminum cable lugs. Obey the grease manufacturer's instructions. Aluminum-aluminum contact can cause oxidation in the contact surfaces.

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Open the door of the incoming cubicle.
3. Remove the shrouding covering the input terminals.
4. Peel off 3 to 5 cm of the outer insulation of the cables above the lead-through plate for 360° high-frequency grounding.

5. Prepare the ends of the cables.
6. Remove the rubber grommets from the lead-through plate for the cables to be connected. Cut sufficient holes into the rubber grommets. Slide the grommets onto the cables. Slide the cables through the lead-throughs with the conductive sleeves and attach the grommets to the holes.
7. Fasten the conductive sleeves to the cable shields with cable ties.
8. Seal the slot between the cable and mineral wool sheet (if used) with sealing compound (eg, CSD-F, ABB brand name DXXT-11, code 35080082).
9. Tie up the unused conductive sleeves with cable ties.
10. Connect the twisted shields of the cables to the PE busbar of the cabinet. Tighten the screws to the torque given under *Tightening torques (page 110)*.
11. Connect the phase conductors of the input cable to the L1, L2 and L3 terminals. Tighten the screws to the torque given under *Tightening torques (page 110)*.
12. Reinstall the shrouding removed earlier.
13. Close the door.




PE
PE


PE
9
7
6
11
10

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

WARNING!
Obey the safety instructions of the drive. 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.

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

Wiring the functional safety options

The wiring instructions for the functional safety options such as +Q951, +Q952, etc are in separate option manuals.

Connecting the control cables

See the chapter on control units for the default I/O connections. Note that the default I/O connections can be affected by some options. See the circuit diagrams delivered with the drive for the actual wiring.

Control cable connection procedure

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.

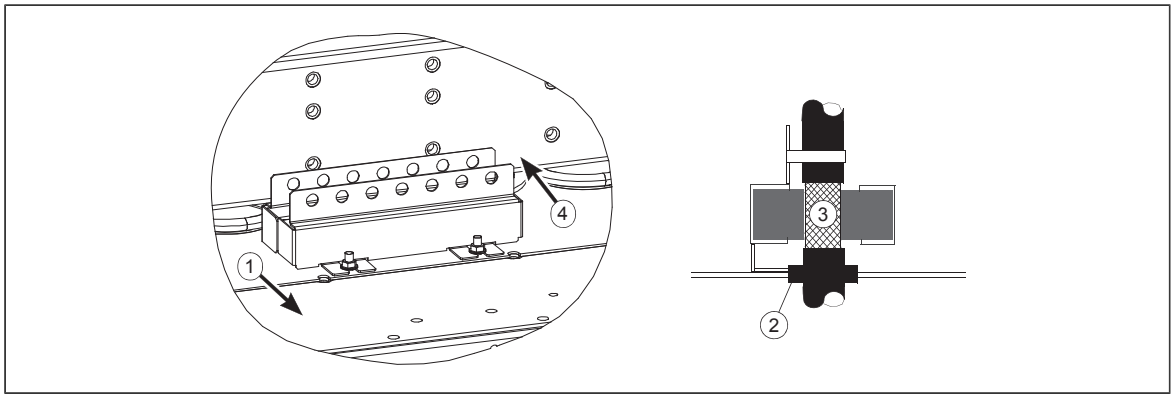
1. Stop the drive (if running) and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Run the control cables into the cabinet as described in section *Grounding the outer shields of the control cables at the cabinet entry* below.
3. Route the control cables as described in section *Routing the control cables inside the cabinet*.
4. Connect the control cables as described in section *Connecting control cabling*.

Grounding the outer shields of the control cables at the cabinet entry

Ground the outer shields of all control cables 360 degrees at the EMI conductive cushions as follows (example constructions are shown below, the actual hardware may vary):

1. Loosen the tightening screws of the EMI conductive cushions and pull the cushions apart.
2. Cut adequate holes to the rubber grommets in the entry plate and put the cables through the grommets and the cushions.
3. Strip off the cable plastic sheath above the entry plate just enough to ensure proper connection of the bare shield and the EMI conductive cushions.

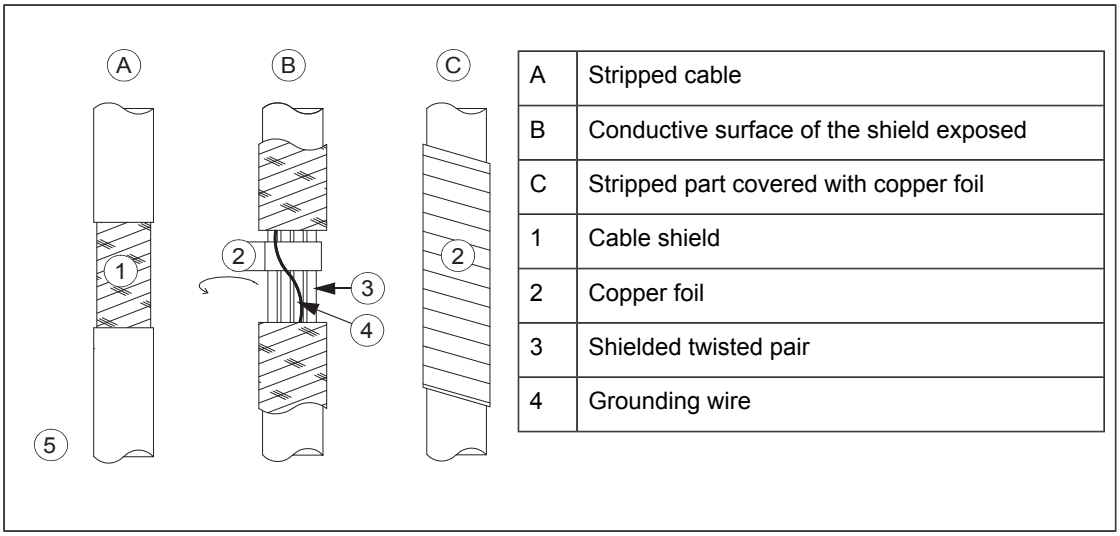
4. Tighten the two tightening screws so that the EMI conductive cushions press tightly round the bare shield.



Note 1: Keep the shields continuous as close to the connection terminals as possible. Secure the cables mechanically at the entry strain relief.

Note 2: If the outer surface of the shield is non-conductive:

- Cut the shield at the midpoint of the bare part. Be careful not to cut the conductors or the grounding wire (if present).
- Turn the shield inside out to expose its conductive surface.
- Cover the turned shield and the stripped cable with copper foil to keep the shielding continuous.



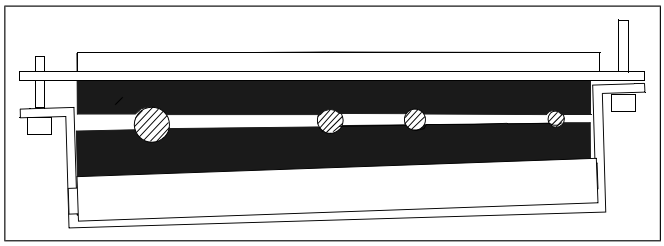
A	Stripped cable
B	Conductive surface of the shield exposed
C	Stripped part covered with copper foil
1	Cable shield
2	Copper foil
3	Shielded twisted pair
4	Grounding wire

Note for top entry of cables: When each cable has its own rubber grommet, sufficient IP and EMC protection can be achieved. However, if very many control cables come to one cabinet, plan the installation beforehand as follows:

1. Make a list of the cables coming to the cabinet.
2. Sort the cables going to the left into one group and the cables going to the right into another group to avoid unnecessary crossing of cables inside the cabinet.
3. Sort the cables in each group according to size.
4. Group the cables for each grommet as follows ensuring that each cable has a proper contact to the cushions on both sides.

Cable diameter in mm	Max. number of cables per grommet
≤ 13	4
≤ 17	3
< 25	2
≥ 25	1

5. Arrange the bunches according to size from thickest to the thinnest between the EMI conductive cushions.



6. If more than one cable go through a grommet, seal the grommet by applying Loctite 5221 (catalogue number 25551) inside the grommet.

Routing the control cables inside the cabinet

Use the existing trunking in the cabinet wherever possible. Use sleeving if cables are laid against sharp edges. When running cables to or from a swing-out frame, leave enough slack at the hinge to allow the frame to open fully.

Connecting control cabling

Connect the conductors to the appropriate terminals. Refer to the wiring diagrams delivered with the drive.

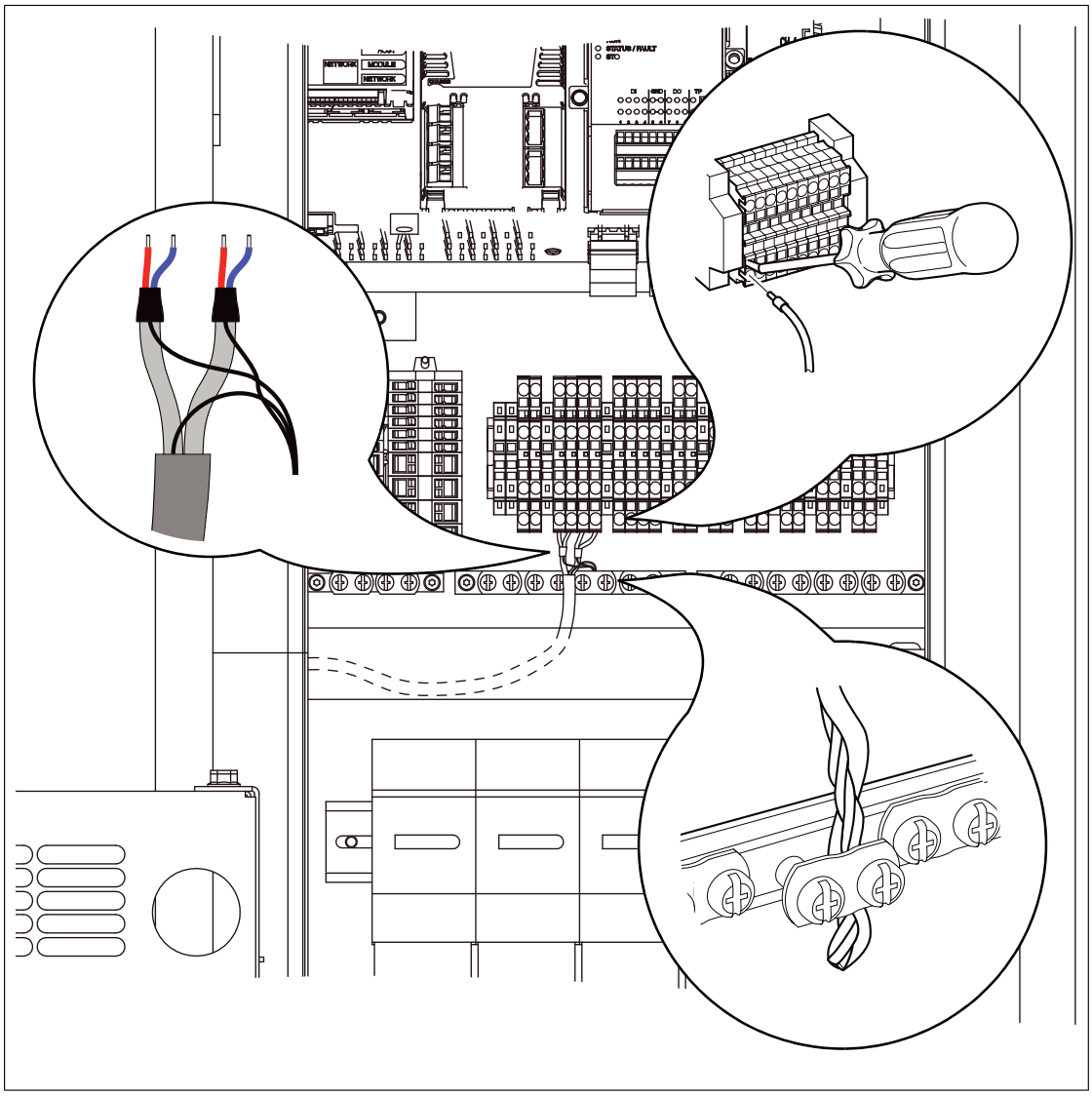
With option +L504, the terminals of the inverter control unit are available on terminal block X504.

Connect the inner twisted pair shields and all separate grounding wires to the grounding clamps closest to the terminals.

The drawing below represents the grounding of the control cabling when connecting to a terminal block inside the cabinet. The grounding is done in the same way when connecting directly to a component such as the control unit.

Notes:

- Do not ground the outer shield of the cable here since it is grounded at the cable entry.
- Keep any signal wire pairs twisted as close to the terminals as possible. Twisting the wire with its return wire reduces disturbances caused by inductive coupling.



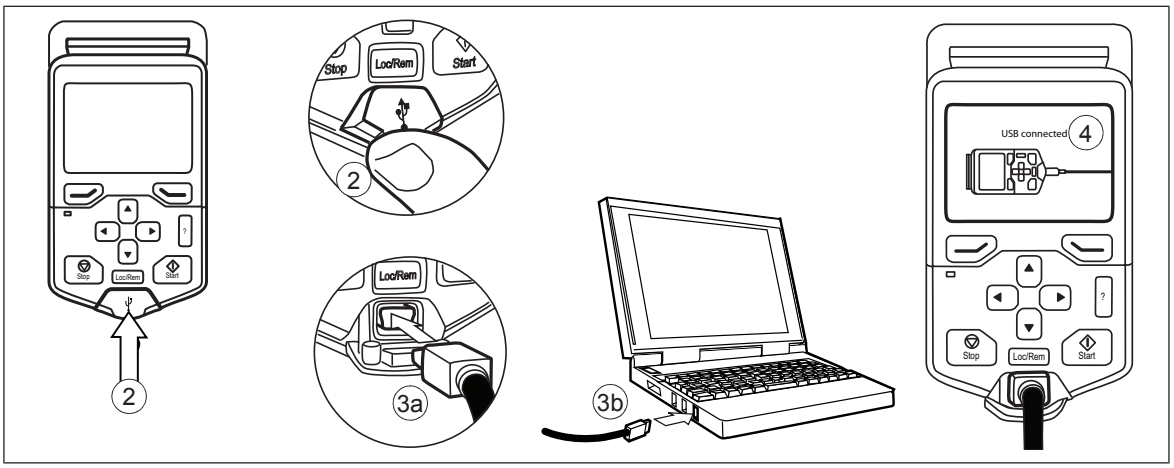
At the other end of the cable, leave the shields unconnected or ground them indirectly via a high-frequency capacitor with a few nanofarads, eg. 3.3 nF / 630 V. The shield can also be grounded directly at both ends if they are in the same ground line with no significant voltage drop between the end points.

Connecting a PC

WARNING!
Do not connect the PC directly to the control panel connector of the control unit as this can cause damage.

A PC (with eg, the Drive composer PC tool) can be connected as follows:

1. Connect an ACx-AP-x control panel to the unit either
   - by inserting the control panel into the panel holder or platform, or
   - by using 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 whenever the connection is active.
5. See the documentation of the PC tool for setup instructions.



4

Installation checklist of the drive

Contents of this chapter

This chapter contains a checklist of the mechanical and electrical installation of the drive.

Checklist

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

WARNING!
Obey the safety instructions of the drive. 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.

WARNING!
Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.

Make sure that …	☑
The ambient operating conditions meet the drive ambient conditions specification, and enclosure rating (IP code or UL enclosure type).	☐
The supply voltage matches the nominal input voltage of the drive. See the type designation label.	☐
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 drive module is fastened properly to the cabinet.	☐
The cooling air flows freely in and out of the drive.	☐

Make sure that …	☑
If the drive is connected to a network other than a symmetrically grounded TN-S system: You have done all the required modifications (for example, you may need to disconnect the EMC filter or ground-to-phase varistor). See the electrical installation instructions in the supply unit manual.	☐
There is an adequately sized protective earth (ground) conductor(s) between the drive and the switchboard, the conductor is connected to correct terminal, and the terminal is tightened to the correct torque. Proper grounding has also been measured according to the regulations.	☐
The input power cable is connected to the correct terminals, the phase order is correct, and the terminals are tightened to the correct torque.	☐
There is an adequately sized protective earth (ground) conductor between the motor and the drive, and the conductor is connected to the correct terminal, and the terminal is tightened to the correct torque. Proper grounding has also been measured according to the regulations.	☐
The motor cable is connected to the correct terminals, the phase order is correct, and the terminals are tightened to the correct torque.	☐
The motor cable is routed away from other cables.	☐
No power factor compensation capacitors are connected to the motor cable.	☐
Proper grounding has also been measured according to the regulations.	☐
The control cables are connected to the correct terminals, and the terminals are tightened to the correct torque.	☐
The voltage setting of the auxiliary voltage transformers (if any) is correct. See the electrical installation instructions.	☐
If a drive bypass connection will be used: The direct-on-line contactor of the motor and the drive output contactor are either mechanically and/or electrically interlocked, that is, they cannot be closed at the same time. A thermal overload device must be used for protection when bypassing the drive. Refer to local codes and regulations.	☐
There are no tools, foreign objects or dust from drilling inside the drive.	☐
The area in front of the drive is clean: the drive cooling fan cannot draw any dust or dirt inside.	☐
Cover(s) of the motor connection box are in place. Cabinet shrouds are in place and doors are closed.	☐
The motor and the driven equipment are ready for power-up.	☐

5

Start-up

Contents of this chapter

This chapter contains start-up instructions of the diode supply unit.

The underlined tasks are needed for certain cases only. The symbols in brackets, for example [Q1], refer to the item 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).

Note: The instructions do not cover all possible cabinet constructions. Always refer to the delivery-specific circuit diagrams when proceeding with the start-up.

Note: For the functional safety options, the start-up instructions are given in separate option manuals, not in this chapter. Reserve the necessary option manuals at hand before performing the supply unit start-up and follow also their instructions.

WARNING!
Obey the safety instructions during the start-up procedure. See *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.

Start-up procedure

Action	☑
Basic checks with no voltage connected	
Make sure that the disconnector of the supply transformer is locked to the *off* (0) position, that means no voltage is, or cannot be connected to drive inadvertently.	☐

Action	☑
Disconnect the drive from the AC power line and make sure it is safe to start the work. Obey the instructions in section *Electrical safety precautions (page 41)*.	☐
Make sure that the disconnecting device [Q1] is open and locked.	☐
Drive with earthing/grounding switch [Q9] (option +F259): Close the earthing/grounding switch. **Note:** You cannot close the earthing/grounding switch before the auxiliary circuits are energized and the disconnecting device [Q1] is open.	☐
If the supply unit is equipped with a main breaker [Q1]: Set the current trip limits of the breaker. The trip limits have been preset to generic values by the breaker manufacturer. The generic limits do not correspond the protection requirements of the application. For the limits, see below. **General rule** Make sure that the selectivity condition is fulfilled, that is the breaker trips at the lower current than the protection device of the supplying network, and that the limit is high enough to cause unnecessary trips during the intermediate DC circuit load peak at start. **Long term current limit** Rule of thumb: Set to the rated AC current of the module. **Peak current limit** Rule of thumb: Set to a value 3…4 times the rated AC current of the module.	☐
Make sure that the installation has been checked. See *Installation checklist of the drive (page 57)*.	☐
Check the settings of breakers/switches in the auxiliary circuits.	☐
If time relays, or relays with delayed make-contact or break-contact are used, for example, in emergency stop circuits, check the relay time settings. See the delivery-specific circuit diagrams and safety function specific documentation (if applicable).	☐
Make sure that the voltage settings of the auxiliary voltage transformers (if any) are according to the actual power line voltage. See the delivery-specific circuit diagrams. Transformer [T21] is selected by option +G344; [T101] and [T111] are present if required by the options specified by the customer.	☐
Disconnect any unfinished or unchecked 230 V AC cables that lead from the terminal blocks to the outside of the equipment.	☐
Make sure that both circuits of STO terminals on the control boards are closed as shown in *Default I/O diagram of the supply control unit (page 120)* for the supply unit to start. (IN1 and IN2 must be connected to OUT.) The control program enables the start/stop control only with both circuits closed. See delivery-specific circuit diagrams and safety function specific documentation (if applicable).	☐
Connecting voltage to input terminals and auxiliary circuit	
Make sure that it is safe to connect voltage: • nobody is working on the unit or circuits that are wired from outside into the cabinets • covers of the motor terminal boxes are on • the disconnecting device [Q1] is open.	☐
Drive with voltage meters (option +G334): Close the circuit breaker for the voltage meters [F5].	☐
Close the circuit breakers supplying the auxiliary circuits [F22, …, F26].	☐
Drive with an external control voltage supply (option +G307): Close the circuit breaker of the external control voltage supply.	☐
Close the cabinet doors.	☐
Drive with the earthing/grounding switch [Q9] (option +F259): Open the earthing/grounding switch.	☐

Action	☑
Close the main breaker of the supply transformer.	☐
Close the auxiliary voltage switch [Q21].	☐
Setting the supply unit parameters	
Supply modules with option +C188 (direct-on-line cooling fan): Set bit 13 of parameter *195.20 HW options word 1*.	☐
If your supply unit consists of one module: • Check the correct voltage ranges by parameter *195.01 Supply voltage*. • Reboot the control unit by parameter *196.08 Control board boot*.	☐
If your supply unit consists of more than one module: Make sure that the value of parameter *195.31 Parallel connection rating id* corresponds to the actual number of parallel-connected diode supply modules: • Select the correct voltage range with parameter *195.30 Parallel type filter*. • Then select the correct supply unit type with parameter *195.31 Parallel connection rating id*. • Reboot the control unit by parameter *196.08 Control board boot*. • Check the correct voltage range, parameter *195.01 Supply voltage*. • Reboot the control unit by parameter *196.08 Control board boot*. If you need more information on the use of the control panel, see *ACX-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).	☐
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	
If the supply unit is equipped with a main breaker [Q1] (option +F255): Unlock the withdrawn breaker and rack it in. **WARNING!** Never use the start button of the air circuit breaker to close it. Start button bypasses charging circuit and may damage the module.	☐
If the supply unit is equipped with a main switch-disconnector [Q1] (option +F253): Unlock the main switch-disconnector [Q1] and turn it into the closed position. **WARNING!** Do not use excessive force. If the unit is equipped with a grounding switch [Q9], electromagnetic interlocking is also used. You cannot switch the main switch-disconnector [Q1] before its lock release relay [K1] is energized, ie. before the earthing/grounding switch is open and auxiliary circuit is energized.	☐
Turn the operating switch [S21] to *on* (1) position to activate the Run enable signal and to close the main contactor [Q2] / main breaker [Q1].	☐
On-load checks	
Check that the supply module cooling fan [G41] rotates freely in the right direction.	☐
Validate the operation of safety functions (for example, emergency stop). **WARNING!** The safety functions are not safe before they are validated according to the instructions. See the function-specific manual for the validation tasks. Safety functions are optional. See the function-specific manual for the validation tasks.	☐

Switching the supply unit off

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 and to switch off the main contactor [Q2]/ main breaker [Q1].

Disconnecting and temporary grounding the drive

See *Electrical safety precautions (page 41)*.

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 ACS880-307…+A018 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	…	6	…	9	…	12	…	15	…	18	…	21
Cooling fans															
Main cooling fan (D7T speed-controlled)							R						R		
Main cooling fan (D8T speed-controlled)							R						R		
Main cooling fan (D7T DOL 50 Hz)							R						R		
Main cooling fan (D7T DOL 60 Hz)							R						R		
Main cooling fan (D8T DOL 50 Hz)							R						R		
Internal cooling fan for circuit boards (D8T)							R						R		
Cabinet cooling fan, internal, 50 Hz							R						R		
Cabinet cooling fan, internal 60 Hz					R				R				R		
Cabinet cooling fan, roof (IP54), 50 Hz							R						R		
Cabinet cooling fan, roof (IP54), 60 Hz					R				R				R		
Batteries															
Control unit BCU battery					R				R				R		
Control panel battery							R						R		
Connections and environment															
Cabinet door filters (IP54)	R	R	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	P	P
Spare parts															
Spare part stock	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Other useful tasks															
Cleaning IP42 air inlet and outlet meshes	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Checking tightness of cable and busbar terminals. Tightening if needed.	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Checking ambient conditions (dustiness, corrosion, temperature)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Heat sink cleaning	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I

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.

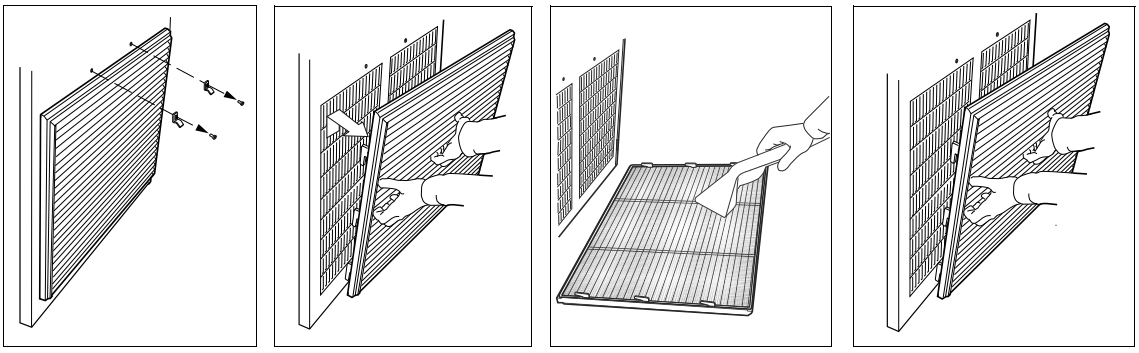
WARNING!
Use a vacuum cleaner with antistatic hose and nozzle, and wear a grounding wristband. Using a normal vacuum cleaner creates static discharges which can damage circuit boards.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Open the cabinet door.
3. Clean the interior of the cabinet. Use a vacuum cleaner and a soft brush.
4. Clean the air inlets of the fans and air outlets of the modules (top).
5. Clean the air inlet gratings (if any) on the door.
6. Close the door.

Cleaning the door air inlets (IP22 and IP42)

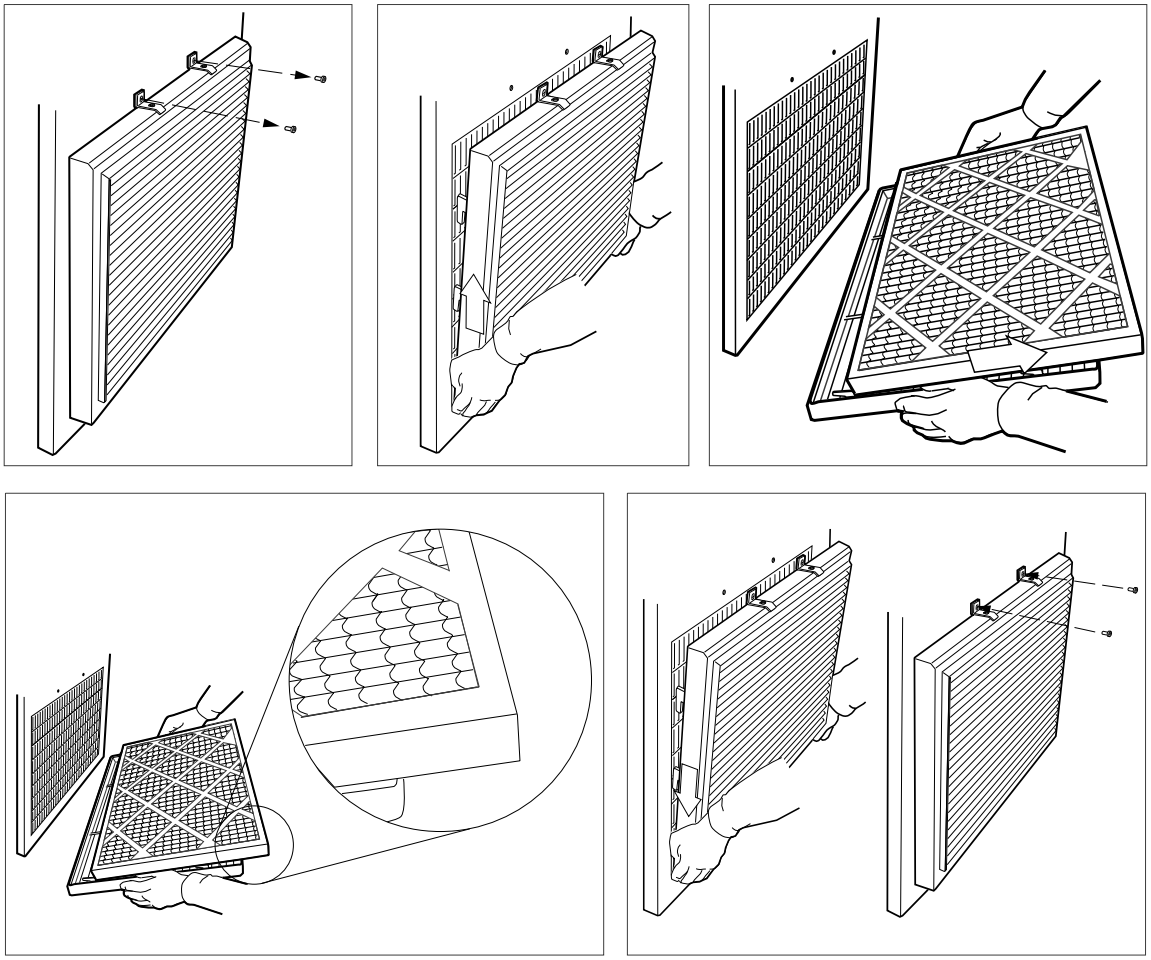
Check the dustiness of the air inlet meshes. If the dust cannot be removed by vacuum cleaning from outside through the grating holes with a small nozzle, proceed as follows:

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Remove the fasteners at the top of the grating.
3. Lift the grating and pull it away from the door.
4. Vacuum clean or wash the grating on both sides.
5. Reinstall the grating in reverse order.



Replacing the inlet door filters (IP54)

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Remove the fasteners at the top of the grating.
3. Lift the grating and pull it away from the door.
4. Remove the air filter mat.
5. Place the new filter mat in the grating the metal wire side facing the door.
6. Reinstall the grating in reverse order.



Cleaning the roof outlet filters (IP54)

The outlet filters on the roof of IP54 units can be accessed by pulling the gratings upwards.

Power connections

Retightening the power connections

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 (page 41)* before you start the work.
2. Examine the tightness of the cable connections. Use the tightening torques given in the technical data.

Fuses

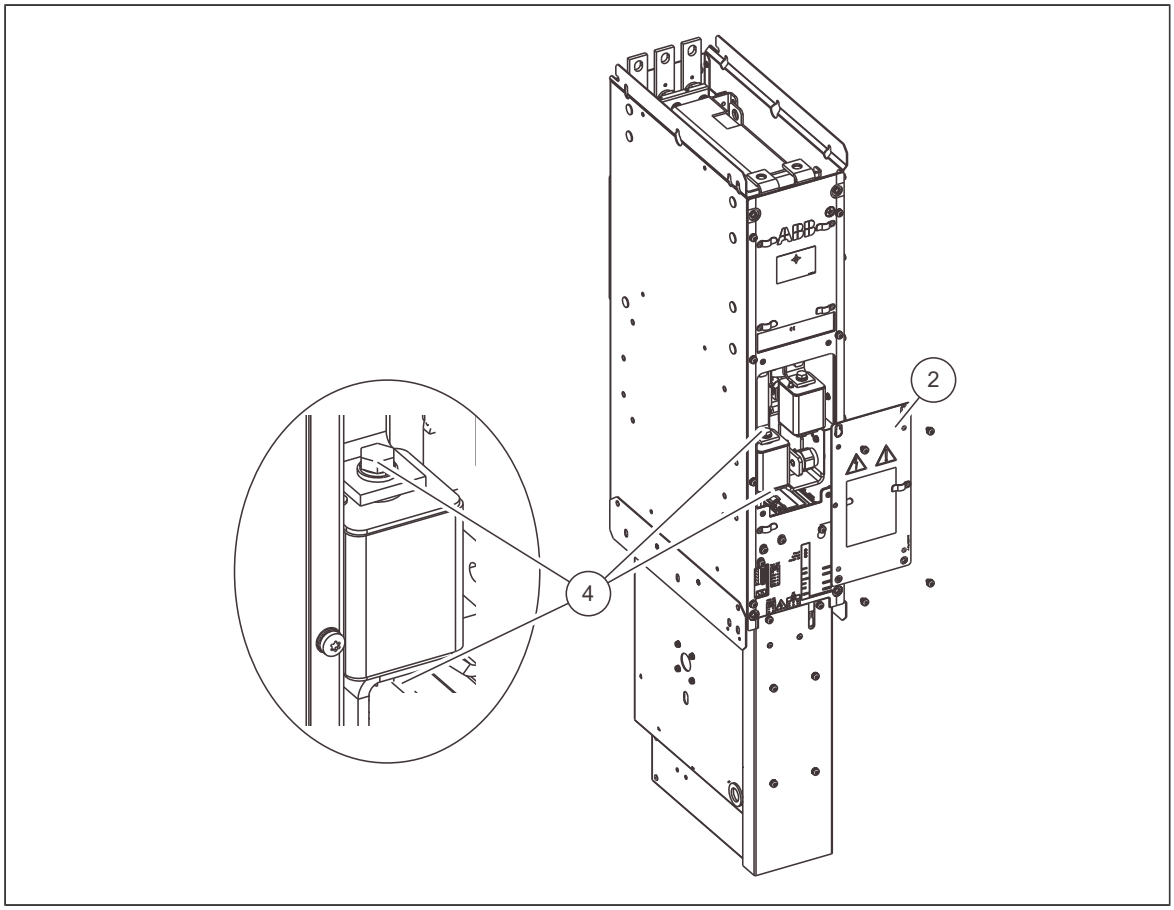
Checking and replacing the DC fuses of a D7T supply module

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.

WARNING!
Use the required personal protective equipment. Wear protective gloves and long sleeves. Some parts have sharp edges.

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Undo the screws of the cover panel of the module's DC fuses and lift and remove the panel.
3. Check the condition of the fuses and replace if necessary.
4. To replace a fuse, remove two M10×20 (17 mm) bolts which connect the DC fuse to the DC busbar.
5. When you replace the fuse, make sure that the possible fuse indicators point to the module to prevent a short circuit or earth fault with the cover plate.
6. Tighten two M10×20 (17 mm) bolts to 42 N·m to attach the fuse.
7. Attach the cover and close the door.



Checking and replacing the DC fuses of a D8T supply module

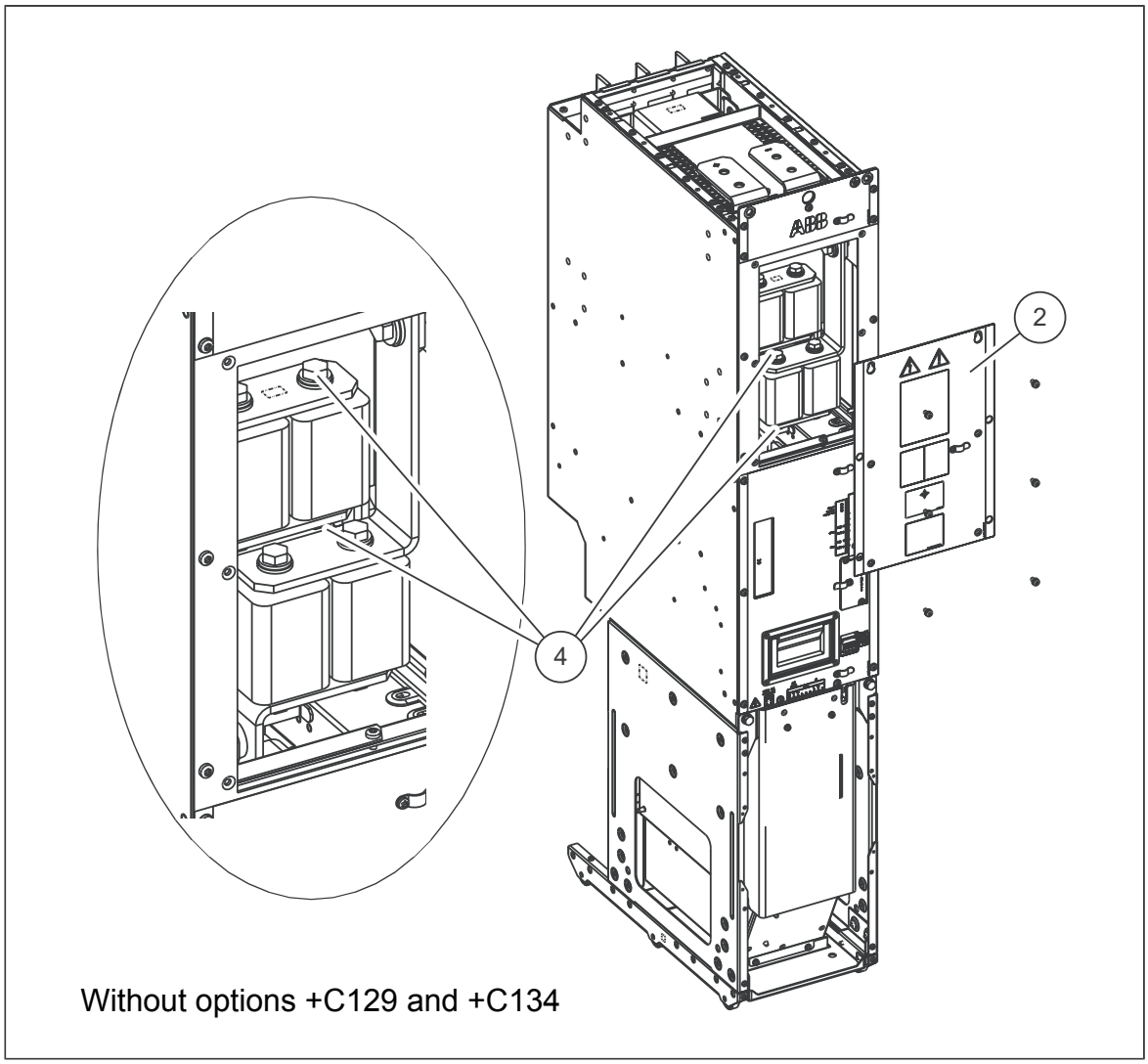
WARNING!
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

If you are not a qualified electrical professional, do not do installation or maintenance work.

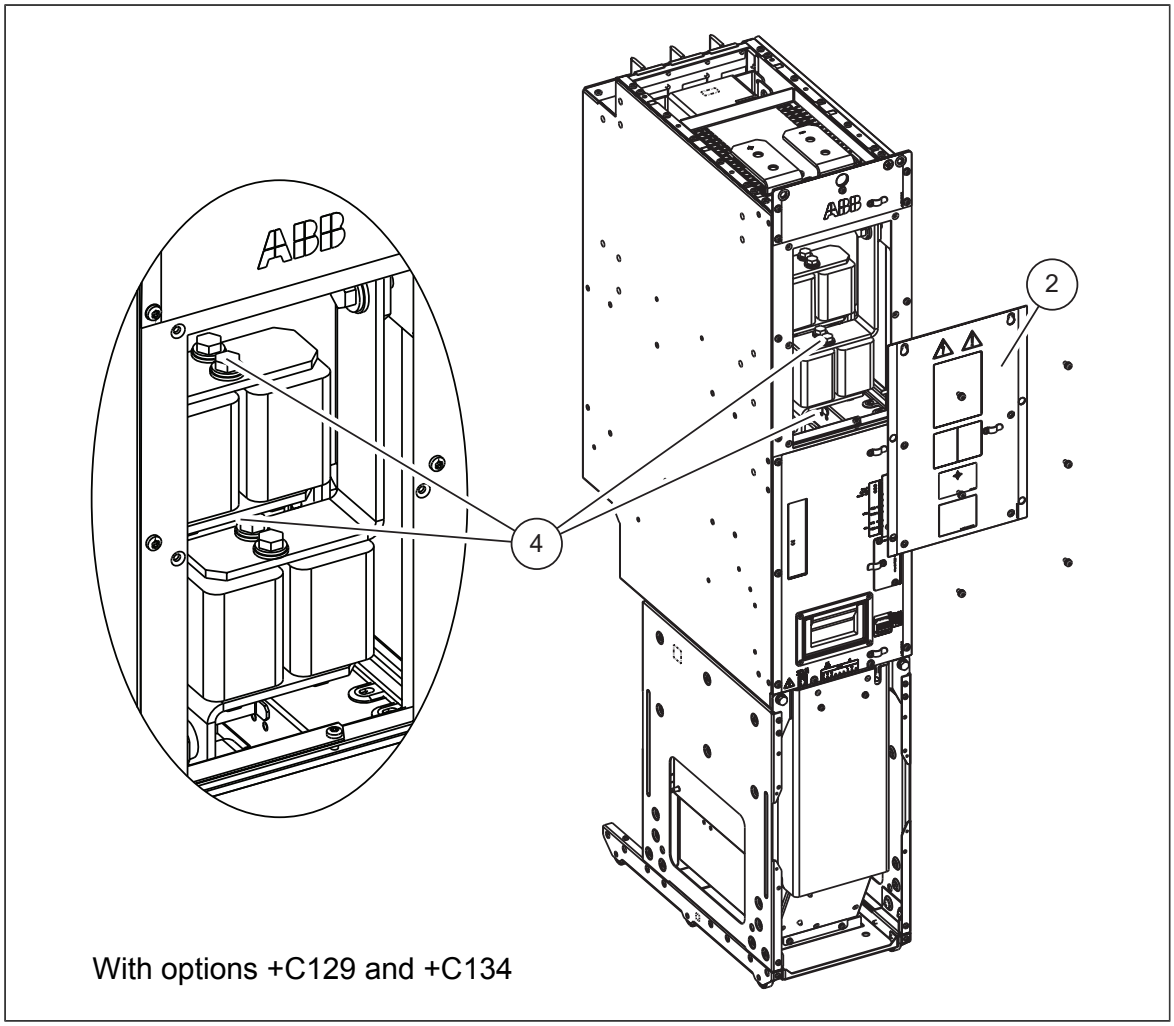
WARNING!
Use the required personal protective equipment. Wear protective gloves and long sleeves. Some parts have sharp edges.

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Undo the screws of the cover panel of the module's DC fuses and lift and remove the panel.
3. Check the condition of the fuses and replace if necessary.
4. To replace a fuse, remove two M10×20 (17 mm) bolts which connect the DC fuse to the DC busbar.
5. When you replace the fuse, make sure that the possible fuse indicators point to the module to prevent a short circuit or earth fault with the cover plate.
6. Tighten two M10×20 (17 mm) bolts to 42 N·m to attach the fuse.

7. Attach the cover and close the door.



Without options +C129 and +C134



With options +C129 and +C134

Checking and replacing the AC fuses

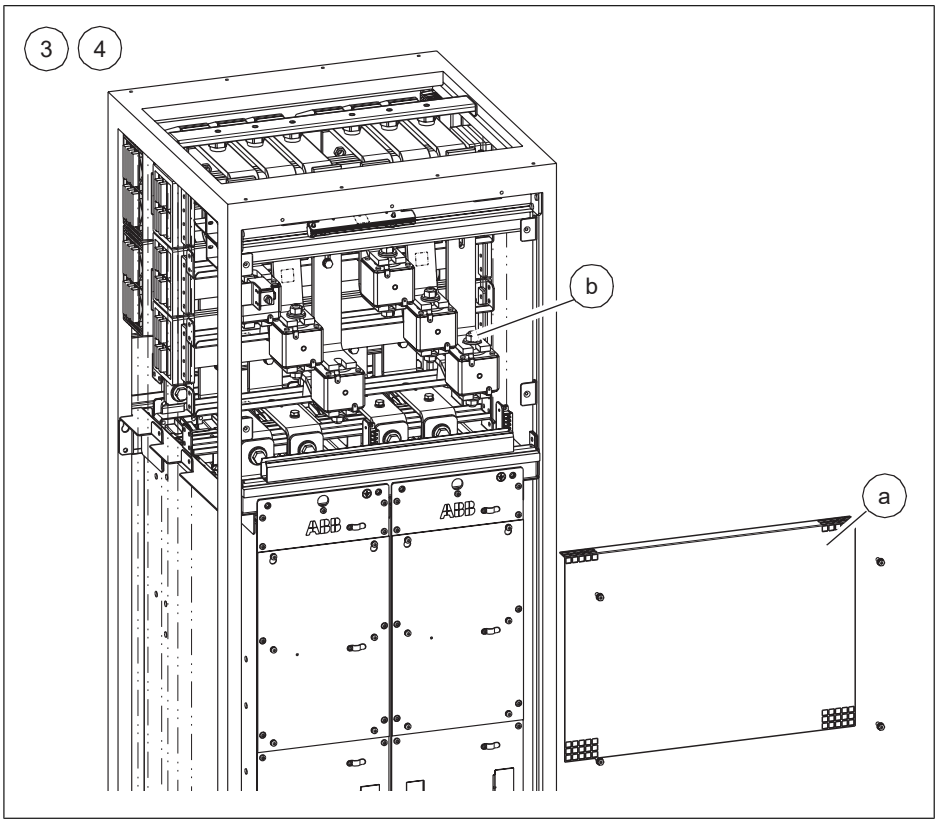
WARNING!
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

If you are not a qualified electrical professional, do not do installation or maintenance work.

WARNING!
Use the required personal protective equipment. Wear protective gloves and long sleeves. Some parts have sharp edges.

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Open the door of the cubicle(s) in which the fuses are.
3. Remove the shrouding (a) from in front of the fuses.
4. Slacken the nuts (b) of the headless screws of the fuses so that you can slide out the fuse blocks. Make note of the order of the washers on the screws.

5. Remove the screws, nuts and washers from the old fuses and attach them to the new fuses. Make sure to keep the washers in the original order.
6. Insert the new fuses into their slots in the cubicle.Tighten the nuts to torque as follows:
   - Bussmann fuses: 50 N·m (37 lbf·ft)
   - Mersen (Ferraz Shawmut): 46 N·m (34 lbf·ft)
   - Other: Refer to the fuse manufacturer’s instructions.
7. Reinstall the shrouding removed earlier and close the cubicle door.



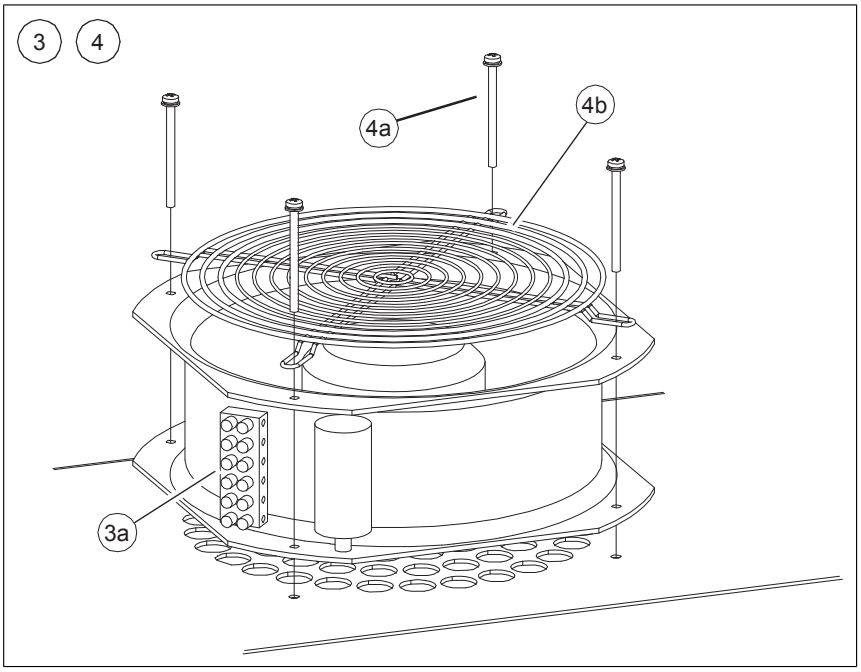
Fans

The lifespan of the cooling fan depends on the running time of the fan, ambient temperature and dust concentration.

Replacing the fan in the auxiliary control cubicle

WARNING!
Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Remove the shrouding (if any) in front of the fan.
3. Disconnect the fan wiring (a).
4. Remove the fastening screws (a) and finger guard (b) of the fan.
5. Install the new fan in reverse order. Make sure that the arrow indicating the air flow direction points up.



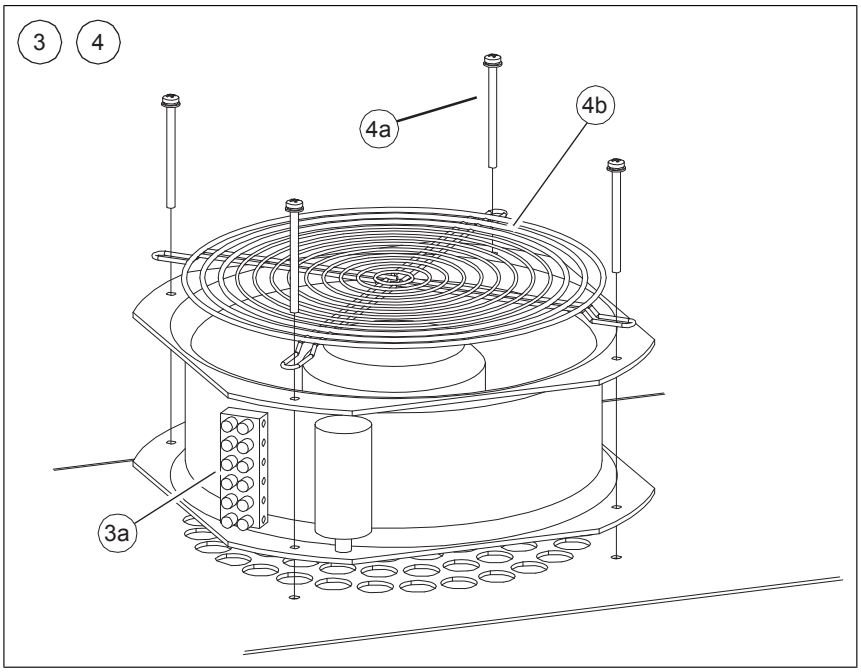
Replacing a fan in the incoming cubicle

One or two cooling fans are installed in the incoming cubicle.

WARNING!
Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Remove the shrouding (if any) in front of the fan.
3. Disconnect the fan wiring (a).
4. Remove the fastening screws (a) and finger guard (b) of the fan.

5. Install the new fan in reverse order. Make sure that the arrow indicating the air flow direction points up.



Replacing the fan of the D7T supply module

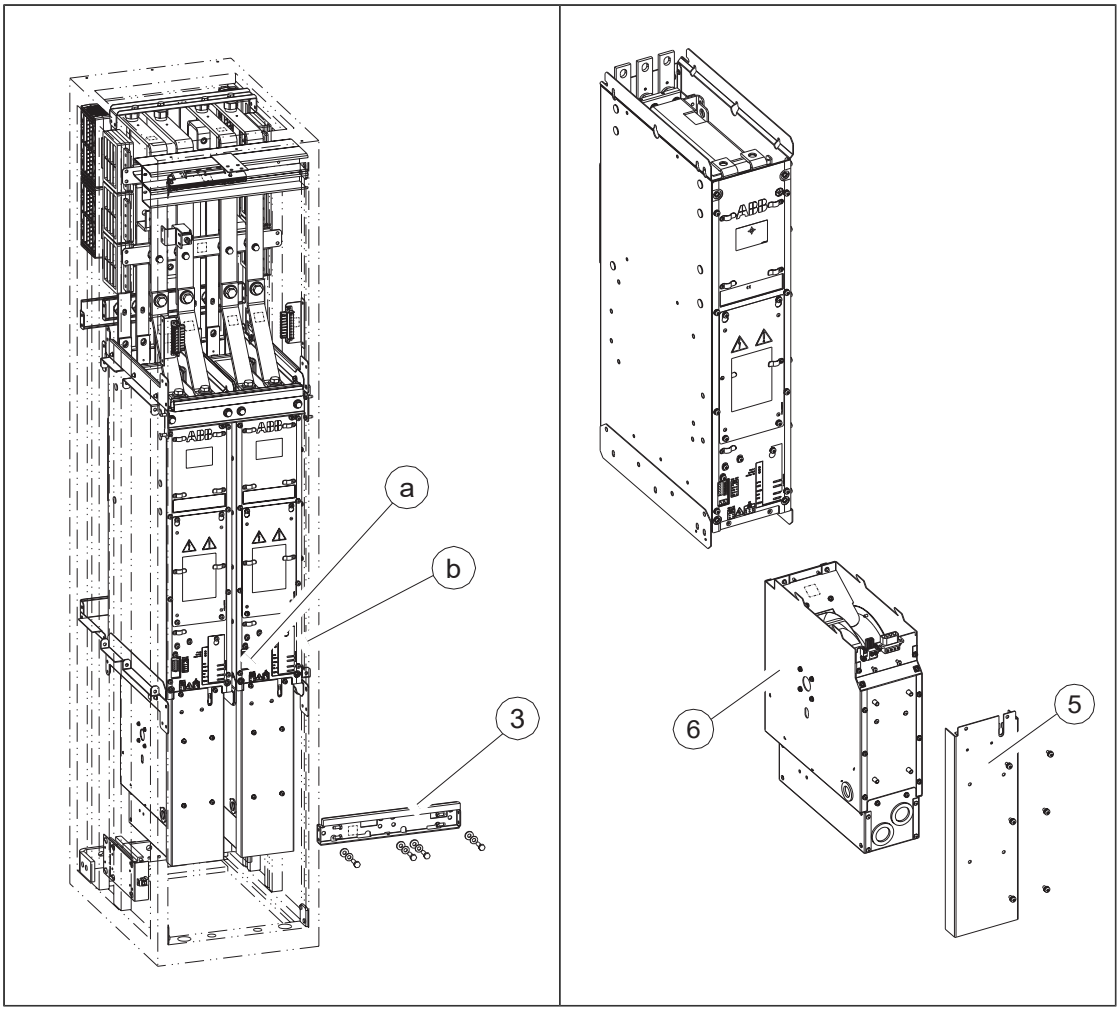
The fan replacement procedure is the same for both the standard speed-controlled cooling fan and direct-on-line fan (option +C188) of the D7T module.

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.

WARNING!
Use the required personal protective equipment. Wear protective gloves and long sleeves. Some parts have sharp edges.

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Open the cubicle door.
3. Remove the lower support bracket of the module.
4. Disconnect the fan wiring from the module: power supply plug (a) and the fiber optic cables (b).
5. Remove the front cover of the fan holder.
6. Support the fan holder from below and pull it to release it from the module.
7. Pull out the fan holder.
8. If you have spare fan without the holder: Remove the fan from the fan holder.
9. Install new fan and the fan holder in reverse order to the above.


a
b
3
6
5

Replacing the fan of the D8T supply module

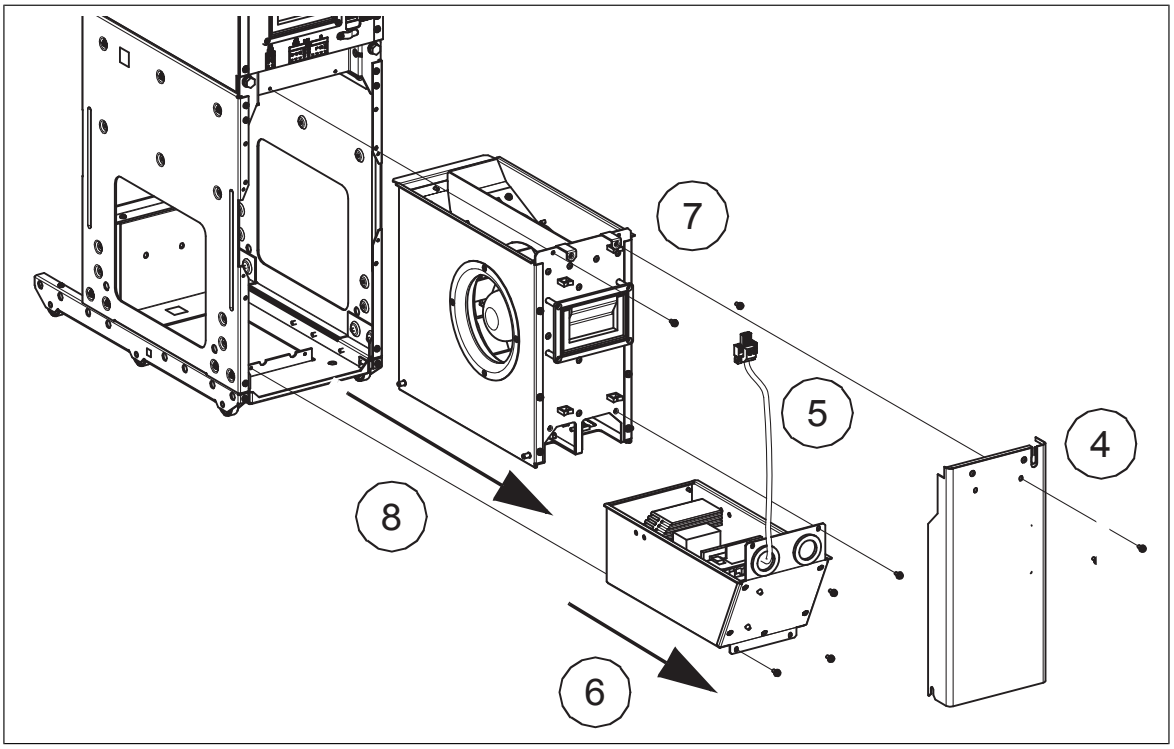
The module is equipped with a fan unit that contains two cooling fans.

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 the required personal protective equipment. Wear protective gloves and long sleeves. Some parts have sharp edges.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Open the cubicle door.
3. Remove the shroud in front of the fan (if any).
4. Remove the screws holding the front cover plate. Lift the cover plate somewhat to release it.
5. Disconnect the fan wiring.
6. Remove the unit below the fan.
7. Remove the screws of the fan unit.
8. Pull out the fan unit.
9. Install a new fan in reverse order.



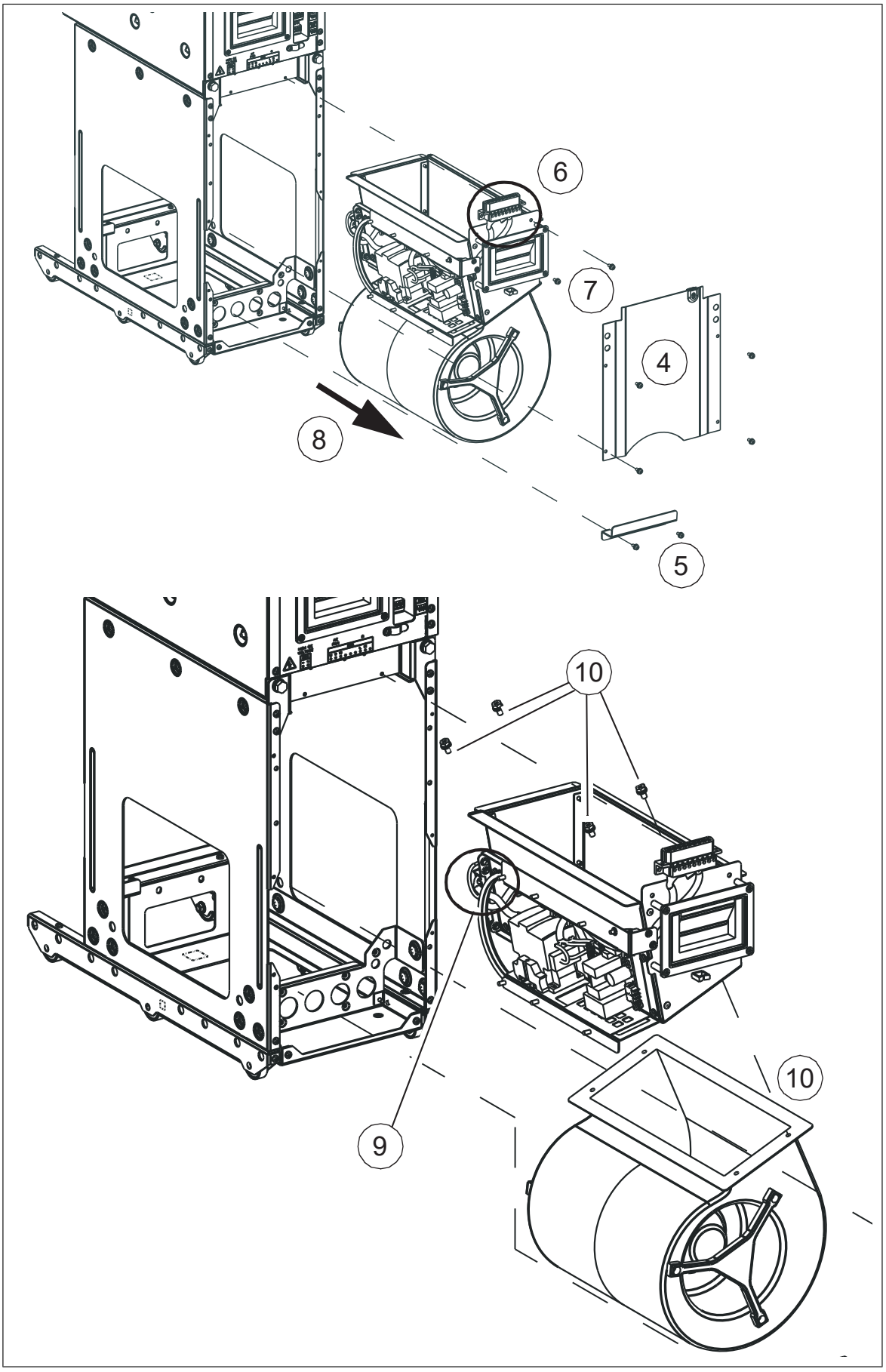
Replacing the direct-on-line fan (option +C188) of the D8T supply module

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.

WARNING!
Use the required personal protective equipment. Wear protective gloves and long sleeves. Some parts have sharp edges.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Open the door.
3. Remove the shroud in front of the fan (if any).
4. Remove the screws holding the front cover plate. Lift the cover plate somewhat to release it.
5. Remove the bracket.
6. Disconnect the wiring of the fan unit.
7. Remove the screws of the fan unit.
8. Pull out the fan unit.
9. Disconnect the fan wire from the fan unit.
10. Remove the screws of the fan.
11. Install a new fan in reverse order.


6
7
4
8
5
10
10
9

Replacing the circuit board compartment fan

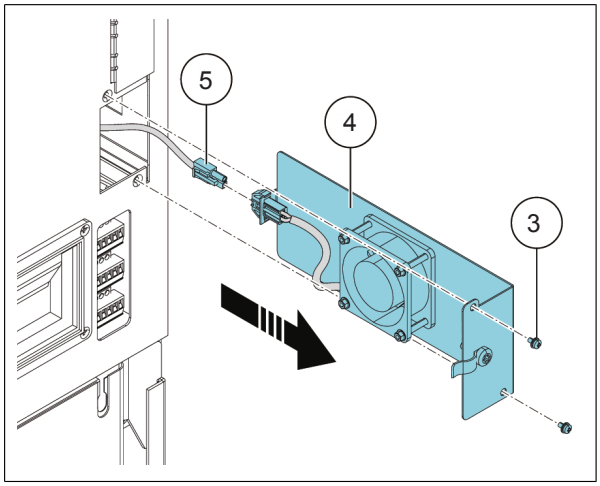
Frame D8T supply modules are equipped with a fan blowing air through the circuit board compartment.

The fan is accessible from the front of the module.

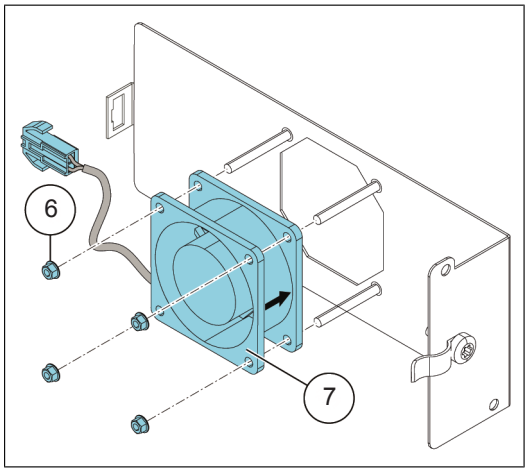
WARNING!
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

If you are not a qualified electrical professional, do not do installation or maintenance work.

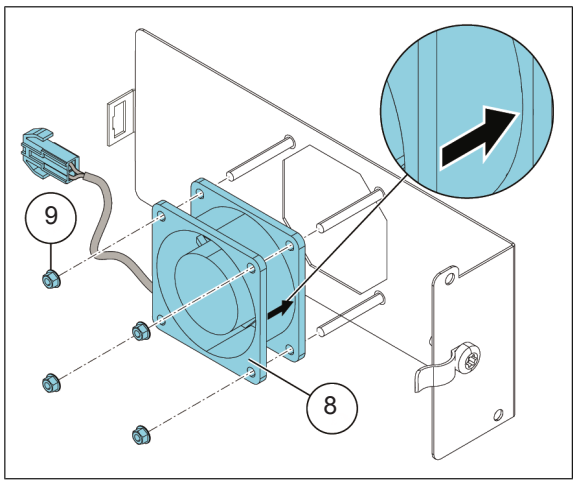
1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Open the door of the module cubicle.
3. Remove the two M4×12 (T20) screws which lock the fan holder.
4. Pull the fan holder out of the module.
5. Disconnect the fan cable.



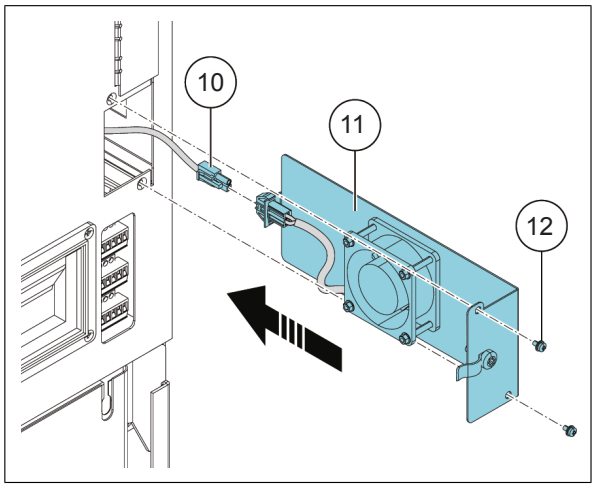
6. Remove the four M3 (5.5 mm) nuts which hold the fan.
7. Remove the fan from the fan holder.



8. Put the fan onto the threaded studs on the fan holder with the airflow direction arrow pointing towards the fan holder.
9. Install and tighten the four nuts removed earlier.



10. Connect the fan cable.
11. Align and push the fan holder into the module.
12. Install and tighten the two M4×12 (T20) screws.



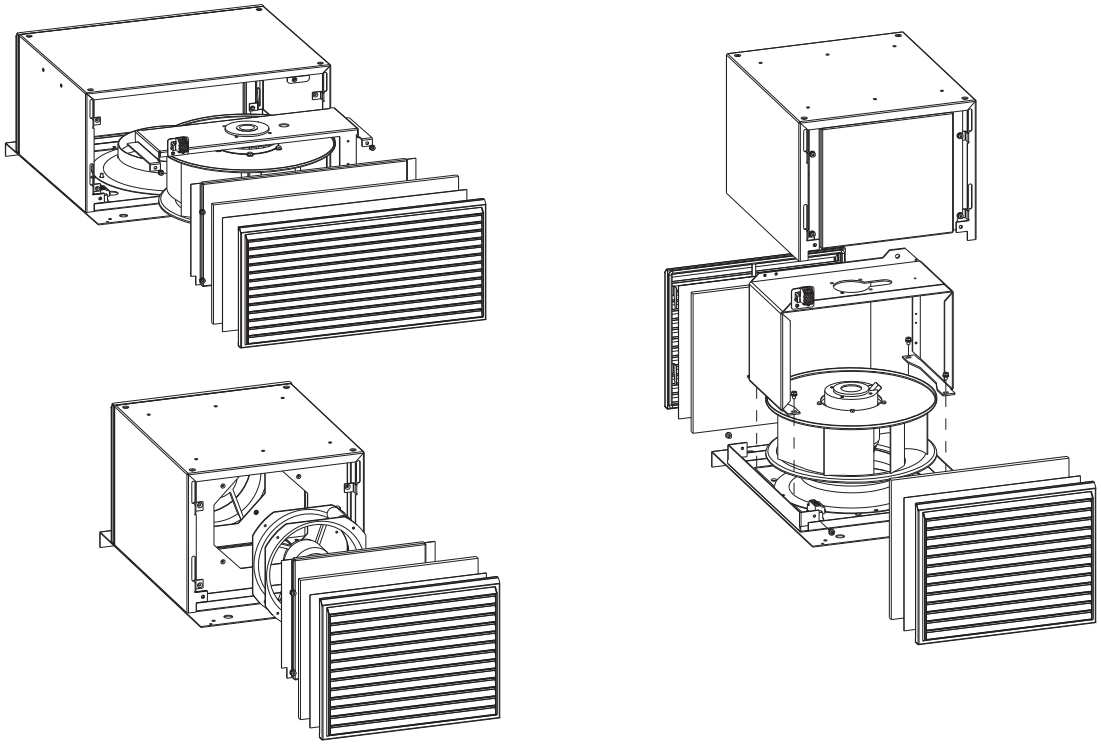
Replacing the roof fan for IP54 cabinet (option +B055)

WARNING!
Obey the safety instructions of the drive. 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.

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Open the door of the cubicle.
3. Remove the shroud in front of the fan.
4. Remove all ventilation covers (lift and pull) and filters, and finally remove the roof plate on top of the outlet. Unscrew all necessary screws securing the fan and remove the fan.
5. Pull the fan unit out.
6. Install a new fan in reverse order.

Different roof fan models



Supply module

Cleaning the heatsink

The drive module heatsink fins pick up dust from the cooling air. The drive runs into overtemperature warnings and faults if the heatsink is not clean. When necessary, clean the heatsink as follows.

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 antistatic hose and nozzle, and wear a grounding wristband. Using a normal vacuum cleaner creates static discharges which can damage circuit boards.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Remove the drive module from the cabinet.
3. Remove the module cooling fan(s). See the separate instructions.
4. Blow dry, clean and oil-free compressed air from bottom to top and simultaneously use a vacuum cleaner at the air outlet to trap the dust. If there is a risk of dust entering adjoining equipment, do the cleaning in another room.
5. Reinstall the cooling fan.

Replacing the D7T 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.

WARNING!
Use extreme caution when maneuvering the supply module. It is heavy and has a high center of gravity. Ignoring the following instructions can cause physical injury, or damage to the equipment.

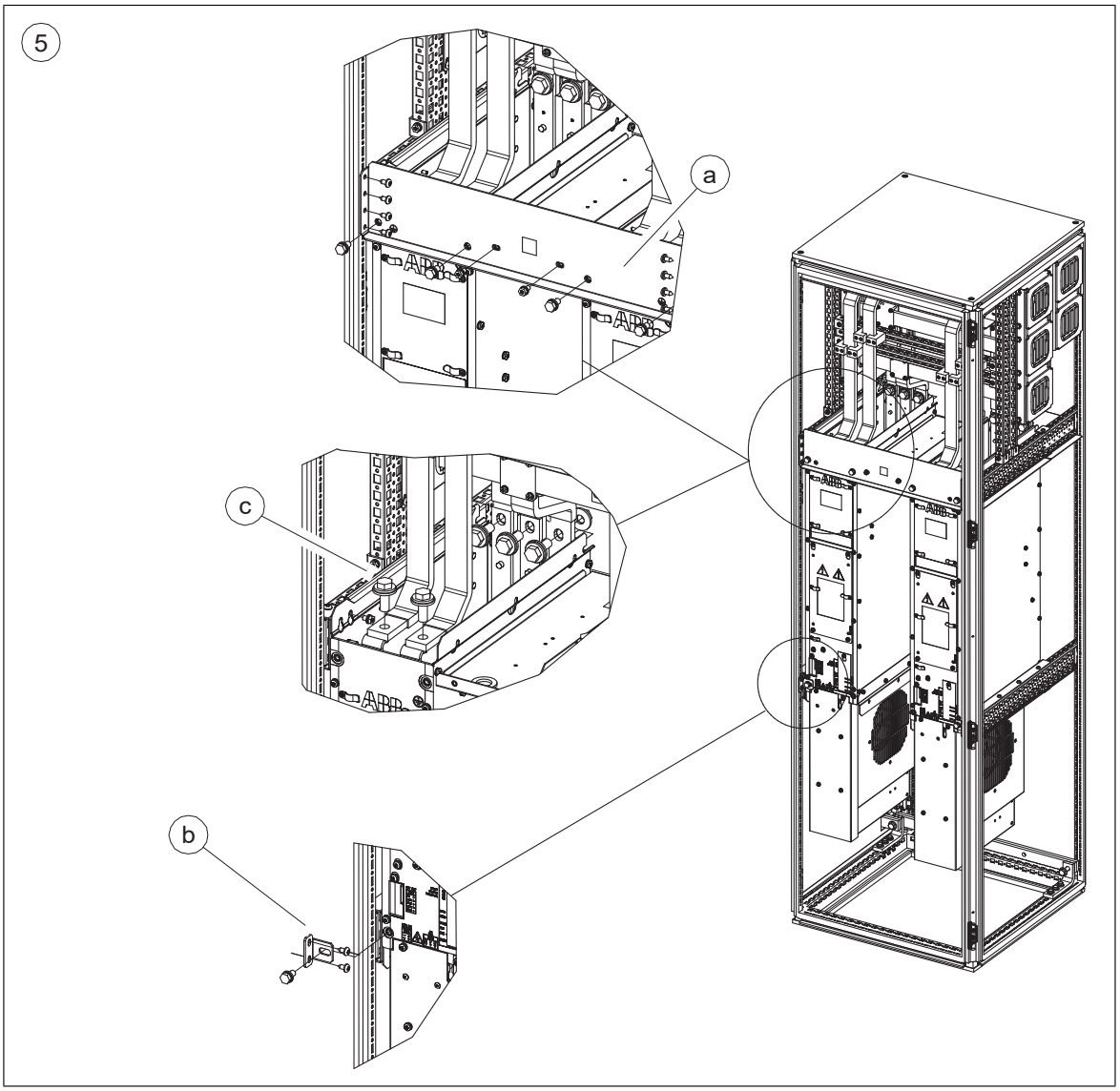
- Use a lifting device:
  - Attach the lifting device securely to the module lifting eyes before removing the module fastening screws. For the location of the lifting eyes, see *Layout drawing of D7T supply module (page 27)*.

- Keep the lifting device attached to the module until you have lifted the module onto a pallet (on a floor) and made sure that the module is supported and cannot topple over.
- Lift a replacement module only with a lifting device. Keep the lifting device attached to the module during the replacement work until you have tightened the module fastening screws.

- 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.
- Wear protective gloves and long sleeves! Some parts have sharp edges.
- Do not tilt the module. Do not leave the module unattended on a floor.

---

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Open the cubicle door.
3. Remove the shrouds (if any).
4. Unplug the plug connector [X53] and fiber optic connectors in front of the module and plug connector [X50] on top of the module. For the locations, see section *Layout drawing of D7T supply module (page 27)*.
5. Remove the module upper fastening screws and support bracket (a), and lower fastening screws and support bracket (b). Remove the fastening bolts of the DC (c) and AC busbars.
6. Attach the lifting hooks to the lifting eyes of the module:
   - Bend the DC busbars away from the module.
   - Carefully pull the module out along the module guide plates until you can attach the lifting hooks to the module. Tighten the chain.
7. Pull the module completely out of the cabinet along the module guide plates. Keep the weight constantly on the lifting device.
8. Remove the upper module guide plate.
9. Lift the module somewhat to disconnect it from the lower guide plate and lift the module down on a pallet.
10. Keep the lifting chain attached to the module and attach the module safely to the pallet to prevent it from toppling over.
11. Remove the lifting chain from the old module and move the module away.
12. Install the new module:
    - Attach the lifting hook to the module, lift the module and place it on the lower module guide plate. Keep the weight on the lifting device.
    - Install the upper module guide plate.
    - Push the module into cabinet along the guide plates and remove the lifting device.
    - Fasten the support brackets and the module fastening screws.
    - Tighten the fastening bolts of the DC and AC busbars to 70 N·m (51.6 lbf·ft).
    - Plug the module plug connectors and fiber optic connectors.
    - Fasten the shrouds.
    - Close the cubicle door.


5
a
c
b

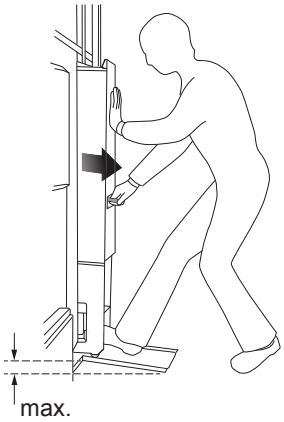
Replacing the D8T supply module

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.

WARNING!
Be very careful when you move a module that runs on wheels. Ignoring the following instructions can cause physical injury or death, or damage to the equipment.

- Do not move the module carelessly. It is heavy (approximately 175 kg) (386 lbs) and has a high center of gravity. It topples over easily.
- When you remove the module, use the module pull-out ramp. 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. We recommend that you attach a lifting device to the module before you remove the module and keep it attached while removing.
- When you install a module, use the module pull-out ramp. 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. We recommend that you attach a lifting device to the module before you install the module and keep it attached while installing.
- If you lift the module, use only the two lifting eyes on top of the module: one in front and the other in back. Never lift the module from the hole inside the module (visible from top). It cannot carry the weight of the whole module. For the location of the lifting eyes, see section *Layout drawing of D8T supply module (page 28)*.
- Do not tilt the module. Do not leave the module unattended on a sloping floor.
- Wear protective gloves and long sleeves! Some parts have sharp edges.
- Do not use the module pull-out ramp with plinth heights over 50 mm. The ramp is designed for a plinth height of 50 mm (the standard plinth height of ABB cabinets).

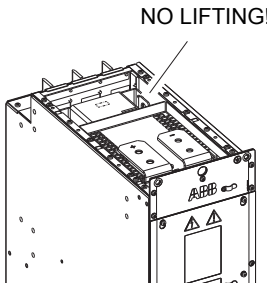


Support the top and bottom of the module!

max: 50 mm

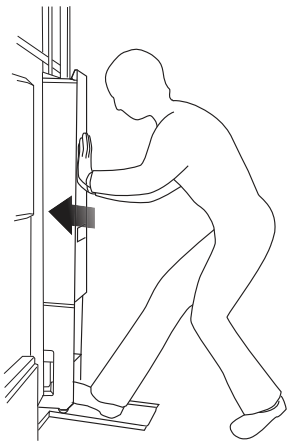
Do not tilt!

Do not leave the module unattended on a sloping floor!



Do not use this hole for lifting!

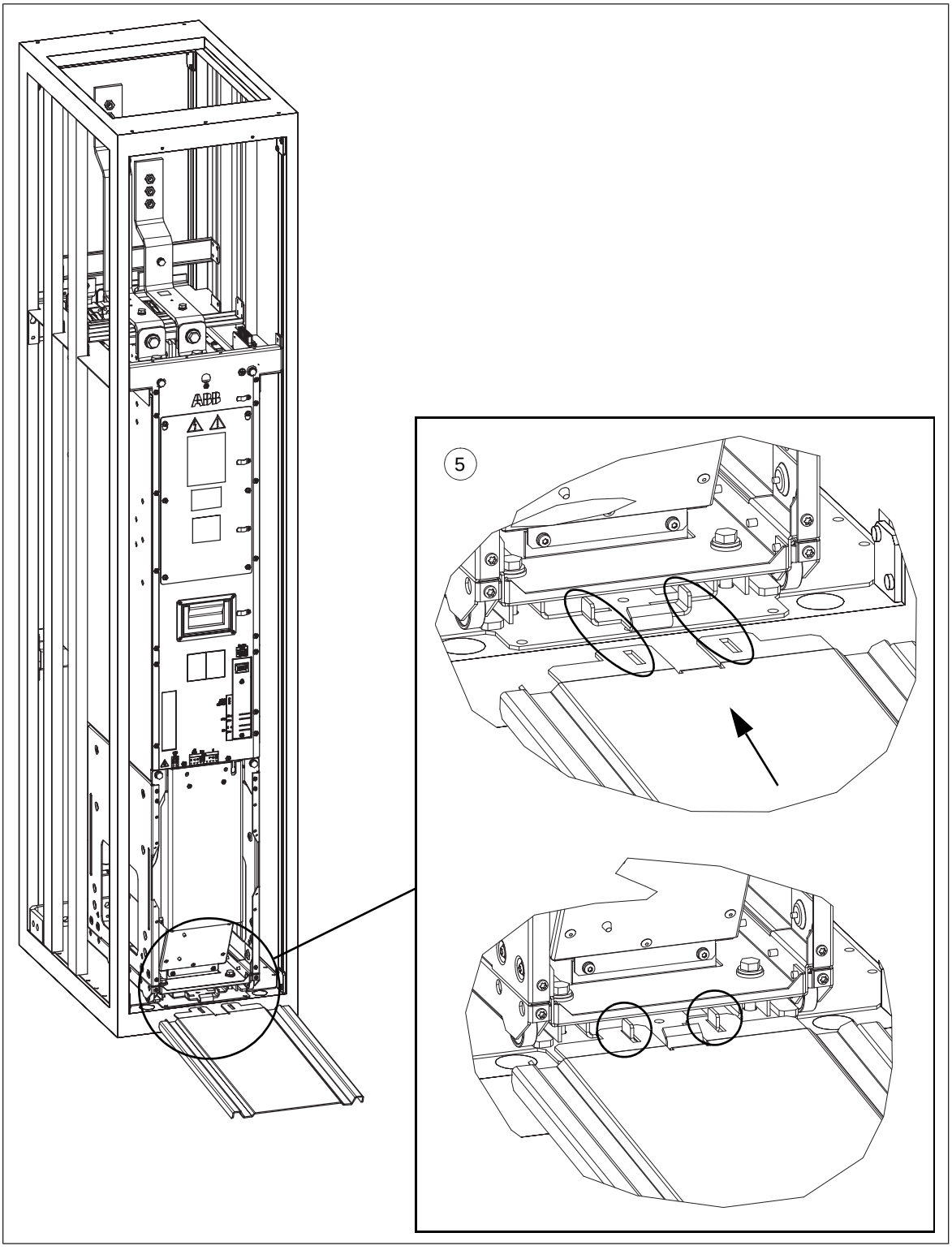
Mind your fingers!

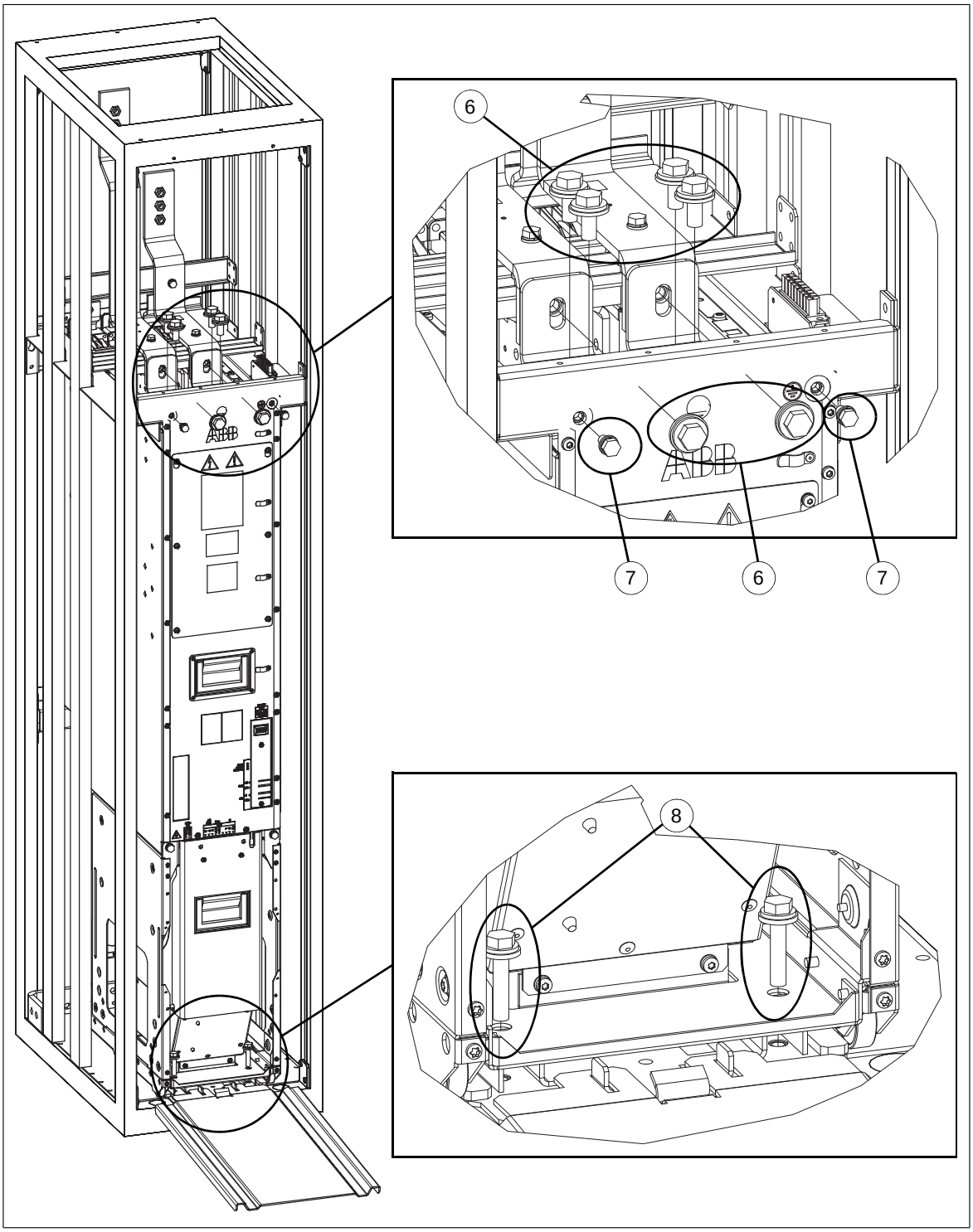


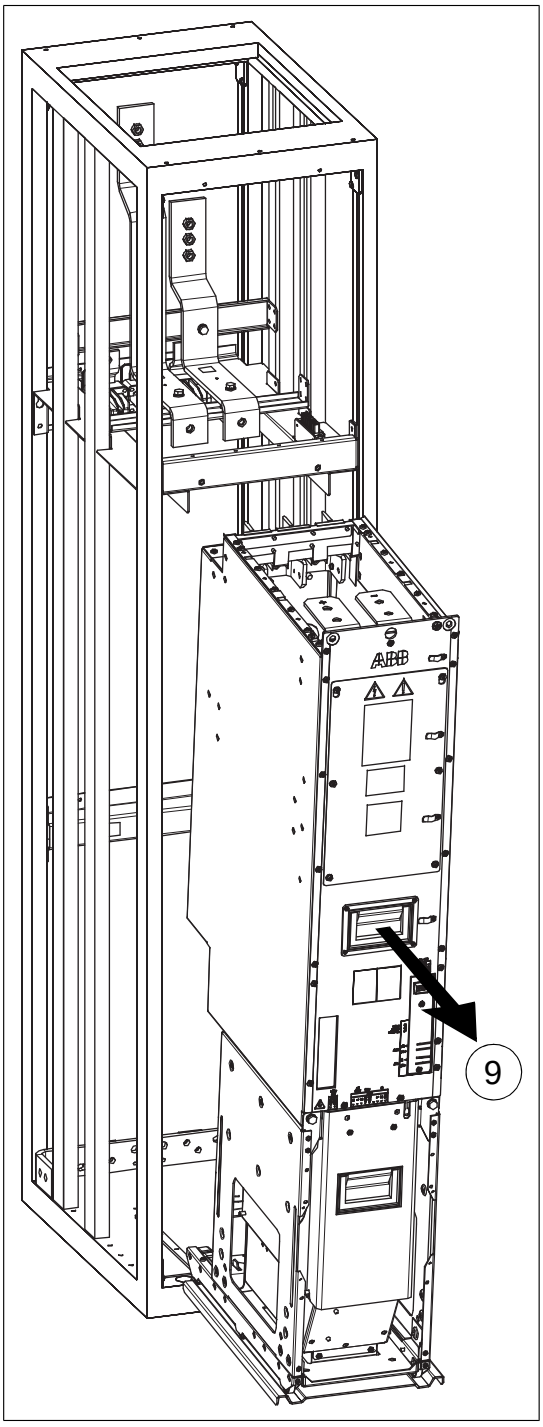
Support the top and bottom of the module!

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions (page 41)*.
2. Open the cubicle door.
3. Remove the shrouds (if any).
4. Disconnect the plug connector [X53] and fiber optic connectors in front of the module, and plug connector [X50] on top of the module. For the locations, see section *Layout drawing of D8T supply module (page 28)*.
5. Install the module pull-out ramp: Push its hooks inside the cabinet and lock them tight between the cabinet bottom plate and the cabinet frame.
6. Remove the module DC busbar bolts.
7. Remove the module fastening screws at the top of the module.
8. Remove the module fastening screws at the bottom of the module.
9. Pull the module carefully out of the cabinet 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.

10. Install the new module into the cubicle:
    - Push the module back in and attach. Be careful not to break the fastening screws: tighten the fastening screws of the module to 22 N·m (16.2 lbf·ft). Tighten the fastening bolts of the DC output busbars to 70 N·m (51.6 lbf·ft).
    - Connect the module plug connectors and fiber optic connectors that you disconnected earlier.
    - Remove the module pull-out ramp, attach the shrouds (if any) and close the cabinet doors.




6
7
6
7
8


9

Control panel

For detailed information on the control panel, see *ACx-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).

Cleaning the control panel

Use a soft damp cloth to clean the control panel. Avoid harsh cleaners which could scratch the display window.

Replacing the control panel battery

For instructions on how to replace the control panel battery, see *ACx-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).

Control unit

BCU control unit types

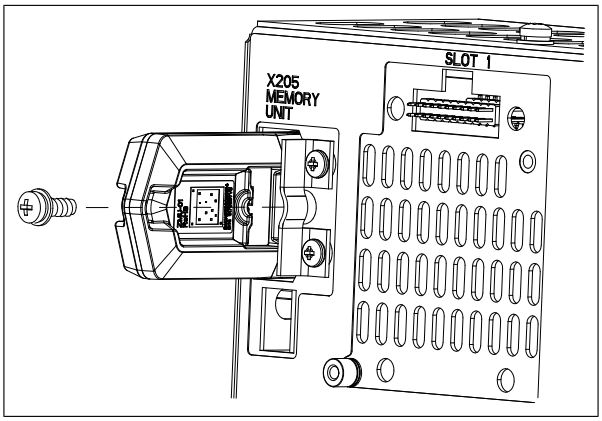
There are three variants of the BCU control unit used in ACS880: BCU-02, BCU-12 and BCU-22. These have a different number of converter module connections (2, 7 and 12 respectively) but are otherwise identical. The three BCU types are interchangeable as long as the number of connections is sufficient. For example, the BCU-22 can be used as a direct replacement for both BCU-02 and BCU-12.

Replacing the memory unit

After replacing a control unit, you can retain the existing parameter settings by transferring the memory unit from the defective control unit to the new control unit.

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

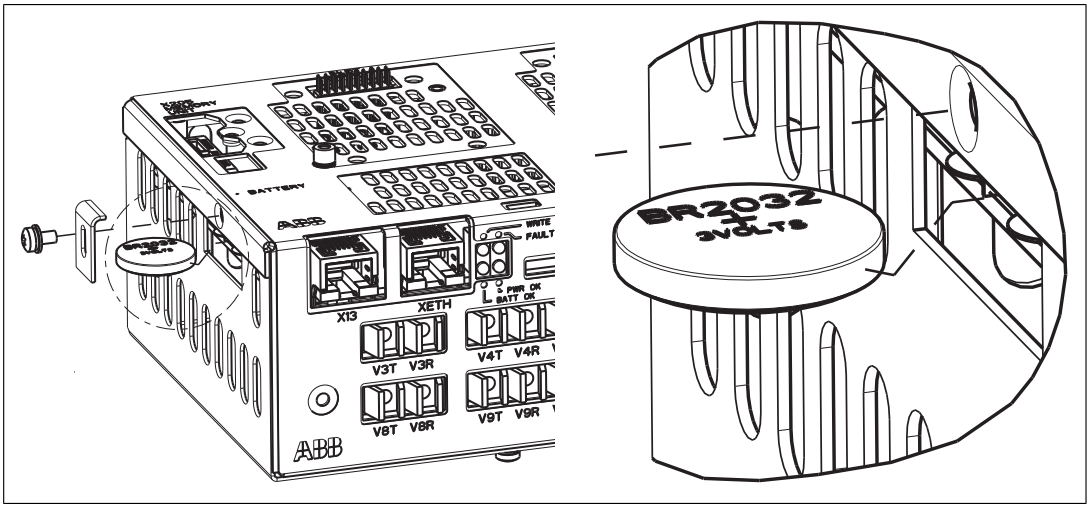
1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Make sure that the control unit is not powered.
3. Remove the fastening screw and pull the memory unit out.
4. Install a memory unit in reverse order.



Replacing the BCU control unit battery

Replace the real-time clock battery if the BATT OK LED is not illuminated when the control unit is powered.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. Undo the fastening screw and remove the battery
3. Replace the battery with a new BR2032 battery.
4. Dispose of the old battery according to local disposal rules or applicable laws.
5. Set the real-time clock.



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 displayed on the drive/converter/inverter control panel on the cabinet door are contained within the firmware manual delivered with the drive.

The ACS-AP-… 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 in the unit.
	Blinking red	There is a 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.

Reduced run

A “reduced run” function is available for supply/rectifier units consisting of parallel-connected modules. The function makes it possible to continue operation with limited current even if one (or more) module is out of service, for example, because of maintenance work.

In principle, reduced run is possible with only one module (or two modules in 12-pulse DSU), but the physical requirements of operating the motor still apply; for example, the modules remaining in use must be able to provide enough current.

Starting reduced run operation

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 the required personal protective equipment. Wear protective gloves and long sleeves. Some parts have sharp edges.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 41)* before you start the work.
2. If the control unit is powered from the faulty module, connect the control unit to another 24 V DC power supply. ABB strongly recommends using an external power supply with supply/rectifier units consisting of parallel-connected modules.

3. Remove the module to be serviced from its bay. In 12-pulse DSU setups, the number of modules in both windings must be equal, which means that at least two modules have to be removed at once.
4. Install an air baffle (for example, plexiglass) to the top module guide to block the airflow through the empty module bay.
5. Switch on the power to the supply/rectifier unit.
6. Enter the number of supply/rectifier modules present into parameter *195.13 Reduced run mode*.
7. Reset all faults and start the supply/rectifier unit. The maximum current limit is now automatically set according to the new configuration. A mismatch between the number of detected modules (parameter *195.14*) and the value set in *195.13* will generate a fault.

Resuming normal operation

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 (page 41)* before you start the work.
2. Remove the air baffle from the module bay.
3. Reinstall the module into its bay.
4. Switch on the power to the supply/rectifier unit.
5. Enter "0" into parameter *195.13 Reduced run mode*.

7

Technical data

Contents of this chapter

This chapter shows the technical data valid for the ACS880-307…+A018 diode supply units.

Ratings

ACS880-307-…	Nominal ratings			No overload use		Light overload use		Heavy-duty use	
	I_1	I_2	I_{max}	S_N	P_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
	A (AC)	A (DC)	A (DC)	kVA	KW	A (DC)	kW (DC)	A (DC)	kW (DC)
U_N = 400 V									
6-pulse									
0650A-3+A018	653	800	1120	452	432	768	415	598	323
0980A-3+A018	980	1200	1680	679	648	1152	622	898	485
1210A-3+A018	1215	1488	2083	842	804	1428	771	1113	601
1820A-3+A018	1823	2232	3125	1263	1205	2143	1157	1670	902
2730A-3+A018	2734	3348	4687	1894	1808	3214	1736	2504	1352
3640A-3+A018	3645	4464	6250	2525	2411	4285	2314	3339	1803
4560A-3+A018	4557	5580	7812	3157	3013	5357	2893	4174	2254
5470A-3+A018	5468	6696	9374	3788	3616	6428	3471	5009	2705
12-pulse									
0910A-3+A004+A018	912	1116	1562	632	625	1071	600	835	467
1210A-3+A004+A018	1215	1488	2083	842	833	1428	800	1113	623
1820A-3+A004+A018	1823	2232	3125	1263	1250	2143	1200	1670	935
2430A-3+A004+A018	2430	2976	4166	1684	1667	2857	1600	2226	1247

ACS880-307-…	Nominal ratings			No overload use		Light overload use		Heavy-duty use	
	I_1	I_2	I_{max}	S_N	P_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
	A (AC)	A (DC)	A (DC)	kVA	KW	A (DC)	kW (DC)	A (DC)	kW (DC)
3640A-3+A004+A018	3645	4464	6250	2525	2500	4285	2400	3339	1870
5470A-3+A004+A018	5468	6696	9374	3788	3750	6428	3600	5009	2805
U_N = 500 V									
6-pulse									
0650A-5+A018	653	800	840	566	540	768	518	598	404
0980A-5+A018	980	1200	1120	849	810	1152	778	898	606
1210A-5+A018	1215	1488	1680	1052	1004	1428	964	1113	751
1820A-5+A018	1823	2232	2083	1579	1507	2143	1446	1670	1127
2730A-5+A018	2734	3348	3125	2368	2260	3214	2170	2504	1690
3650A-5+A018	3645	4464	4687	3157	3013	4285	2893	3339	2254
4560A-5+A018	4557	5580	6250	3946	3767	5357	3616	4174	2817
5470A-5+A018	5468	6696	7812	4735	4520	6428	4339	5009	3381
12-pulse									
0910A-5+A004+A018	912	1116	1562	790	781	1071	750	835	584
1210A-5+A004+A018	1215	1488	2083	1052	1042	1428	1000	1113	779
1820A-5+A004+A018	1823	2232	3125	1579	1562	2143	1500	1670	1169
2430A-5+A004+A018	2430	2976	4166	2104	2083	2857	2000	2226	1558
3650A-5+A004+A018	3645	4464	6250	3157	3125	4285	3000	3339	2337
5470A-5+A004+A018	5468	6696	9374	4735	4687	6428	4500	5009	3506
U_N = 690 V									
6-pulse									
0570A-7+A018	572	700	980	684	652	672	626	524	488
0820A-7+A018	817	1000	1400	976	932	960	894	748	697
1060A-7+A018	1064	1302	1823	1272	1213	1250	1164	974	907
1520A-7+A018	1519	1860	2604	1815	1733	1786	1663	1391	1296
2280A-7+A018	2279	2790	3906	2724	2599	2678	2495	2087	1944
3040A-7+A018	3038	3720	5208	3631	3465	3571	3327	2783	2592
3800A-7+A018	3797	4650	6510	4538	4331	4464	4158	3478	3240
4560A-7+A018	4557	5580	7812	5446	5198	5357	4990	4174	3888
12-pulse									
0760A-7+A004+A018	760	930	1302	908	898	893	862	696	672
1060A-7+A004+A018	1064	1302	1823	1272	1258	1250	1207	974	941
1520A-7+A004+A018	1519	1860	2604	1815	1797	1786	1725	1391	1344
2130A-7+A004+A018	2127	2604	3646	2542	2515	2500	2415	1948	1882
3040A-7+A004+A018	3038	3720	5208	3631	3594	3571	3450	2783	2688
4560A-7+A004+A018	4557	5580	7812	5446	5390	5357	5175	4174	4032

Definitions

Nominal ratings

U_N Nominal input voltage

I_1 Continuous rms input (AC) current. No overload capability at 40 °C (104 °F).

I_2 Continuous output (DC) current. No overload capability at 40 °C (104 °F).

I_{max} Maximum output current

S_N Nominal apparent power

P_N Nominal output power

Light-overload use (10% overload capability) ratings

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

P_{Hd} Output power in heavy-duty use

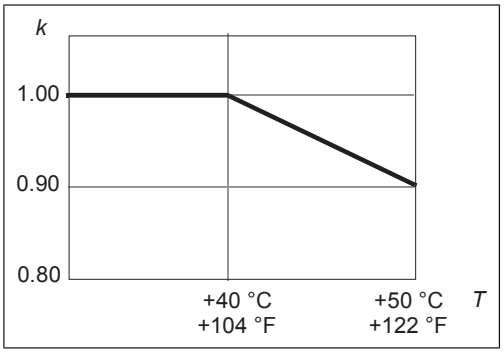
Note:

- The ratings apply to units without option +C132 (marine approval). For ratings of units with option +C132, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]).

Derating

Surrounding air temperature derating

In the temperature range +40…50 °C (+104…122 °F), the rated output current is derated by 1 percentage point 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 1000 … 2000 m (3281 … 6562 ft) above sea level, the output must be derated for 1% for every 100 m (328 ft). For derating at altitudes over 2000 m (6561.7 ft), contact ABB.

Supply module types and frame sizes

Supply unit type	Basic module type	Frame size
U_N = 400 V		
6-pulse		
ACS880-307-0650A-3+A018	ACS880-304-0650A-3+A018	D8T
ACS880-307-0980A-3+A018	ACS880-304-0980A-3+A018	D8T
ACS880-307-1210A-3+A018	ACS880-304-0650A-3+A018	2×D8T
ACS880-307-1820A-3+A018	ACS880-304-0980A-3+A018	2×D8T
ACS880-307-2730A-3+A018	ACS880-304-0980A-3+A018	3×D8T
ACS880-307-3640A-3+A018	ACS880-304-0980A-3+A018	4×D8T
ACS880-307-4560A-3+A018	ACS880-304-0980A-3+A018	5×D8T
ACS880-307-5470A-3+A018	ACS880-304-0980A-3+A018	6×D8T
12-pulse		
ACS880-307-0910A-3+A004+A018	ACS880-304-0490A-3+A018	2×D7T
ACS880-307-1210A-3+A004+A018	ACS880-304-0650A-3+A018	2×D8T
ACS880-307-1820A-3+A004+A018	ACS880-304-0980A-3+A018	2×D8T
ACS880-307-2430A-3+A004+A018	ACS880-304-0650A-3+A018	4×D8T
ACS880-307-3640A-3+A004+A018	ACS880-304-0980A-3+A018	4×D8T
ACS880-307-5470A-3+A004+A018	ACS880-304-0980A-3+A018	6×D8T
U_N = 500 V		
6-pulse		
ACS880-307-0650A-5+A018	ACS880-304-0650A-5+A018	D8T
ACS880-307-0980A-5+A018	ACS880-304-0980A-5+A018	D8T
ACS880-307-1210A-5+A018	ACS880-304-0650A-5+A018	2×D8T
ACS880-307-1820A-5+A018	ACS880-304-0980A-5+A018	2×D8T
ACS880-307-2730A-5+A018	ACS880-304-0980A-5+A018	3×D8T
ACS880-307-3650A-5+A018	ACS880-304-0980A-5+A018	4×D8T
ACS880-307-4560A-5+A018	ACS880-304-0980A-5+A018	5×D8T
ACS880-307-5470A-5+A018	ACS880-304-0980A-5+A018	6×D8T
12-pulse		
ACS880-307-0910A-5+A004+A018	ACS880-304-0490A-5+A018	2×D7T
ACS880-307-1210A-5+A004+A018	ACS880-304-0650A-5+A018	2×D8T
ACS880-307-1820A-5+A004+A018	ACS880-304-0980A-5+A018	2×D8T
ACS880-307-2430A-5+A004+A018	ACS880-304-0650A-5+A018	4×D8T
ACS880-307-3650A-5+A004+A018	ACS880-304-0980A-5+A018	4×D8T
ACS880-307-5470A-5+A004+A018	ACS880-304-0980A-5+A018	6×D8T
U_N = 690 V		
6-pulse		
ACS880-307-0570A-7+A018	ACS880-304-0570A-7+A018	D8T
ACS880-307-0820A-7+A018	ACS880-304-0820A-7+A018	D8T
ACS880-307-1060A-7+A018	ACS880-304-0570A-7+A018	2×D8T

Supply unit type	Basic module type	Frame size
ACS880-307-1520A-7+A018	ACS880-304-0820A-7+A018	2×D8T
ACS880-307-2280A-7+A018	ACS880-304-0820A-7+A018	3×D8T
ACS880-307-3040A-7+A018	ACS880-304-0820A-7+A018	4×D8T
ACS880-307-3800A-7+A018	ACS880-304-0820A-7+A018	5×D8T
ACS880-307-4560A-7+A018	ACS880-304-0820A-7+A018	6×D8T
12-pulse		
ACS880-307-0760A-7+A004+A018	ACS880-304-0410A-7+A018	2×D7T
ACS880-307-1060A-7+A004+A018	ACS880-304-0570A-7+A018	2×D8T
ACS880-307-1520A-7+A004+A018	ACS880-304-0820A-7+A018	2×D8T
ACS880-307-2130A-7+A004+A018	ACS880-304-0570A-7+A018	4×D8T
ACS880-307-3040A-7+A004+A018	ACS880-304-0820A-7+A018	4×D8T
ACS880-307-4560A-7+A004+A018	ACS880-304-0820A-7+A018	6×D8T

Fuses

AC fuses

There must always be the main AC fuses in the supply unit. If there are parallel modules after the main AC fuses, there must also be separate module-specific AC fuses for each module. For the locations of the AC fuses in the main circuit, see the overview diagrams.

ABB recommends forced cooling for the AC fuses to keep the fuse temperature under 100 °C (212 °F).

- When the AC fuses are located in the module cubicle, the cooling fan of the module cools also the fuses.
- When located in another cabinet (example, in incoming cubicle), use an extra fan. Install the fan in such a way that it directly cools the fuses.

ABB also recommends that you monitor the cooling fan status or fuse temperature.

Module-specific AC fuses

Supply unit type ACS880-307…	Supply module		Fuse		
	Type ACS880-304…	Size	Type	Manuf.	Qty
U_N = 400 V					
6-pulse					
0650A-3+A018	0650A-3+A018	D8T	170M6415	Bussmann	3
0980A-3+A018	0980A-3+A018	D8T	170M6419	Bussmann	3
1210A-3+A018	0650A-3+A018	2xD8T	170M6415	Bussmann	6
-1820A-3+A018	0980A-3+A018	2xD8T	170M6419	Bussmann	6
2730A-3+A018	0980A-3+A018	3xD8T	170M6419	Bussmann	9
3640A-3+A018	0980A-3+A018	4xD8T	170M6419	Bussmann	12
4560A-3+A018	0980A-3+A018	5xD8T	170M6419	Bussmann	12
5470A-3+A018	0980A-3+A018	6xD8T	170M6419	Bussmann	18
12-pulse					

Supply unit type ACS880-307…	Supply module		Fuse		
	Type ACS880-304…	Size	Type	Manuf.	Qty
0910A-3+A004+A018	0490A-3+A018	2xD7T	170M6412	Bussmann	6
1210A-3+A004+A018	0650A-3+A018	2xD8T	170M6415	Bussmann	6
1820A-3+A004+A018	0980A-3+A018	2xD8T	170M6419	Bussmann	6
2430A-3+A004+A018	0650A-3+A018	4xD8T	170M6415	Bussmann	12
3640A-3+A004+A018	0980A-3+A018	4xD8T	170M6419	Bussmann	12
5470A-3+A004+A018	0980A-3+A018	6xD8T	170M6419	Bussmann	18
U_N = 500 V					
6-pulse					
0650A-5+A018	0650A-5+A018	D8T	170M6419	Bussmann	3
0980A-5+A018	0980A-5+A018	D8T	170M6419	Bussmann	3
1210A-5+A018	0650A-5+A018	2xD8T	170M6419	Bussmann	6
1820A-5+A018	0980A-5+A018	2xD8T	170M6419	Bussmann	6
2730A-5+A018	0980A-5+A018	3xD8T	170M6419	Bussmann	9
3640A-5+A018	0980A-5+A018	4xD8T	170M6419	Bussmann	12
4560A-5+A018	0980A-5+A018	5xD8T	170M6419	Bussmann	15
5470A-5+A018	0980A-5+A018	6xD8T	170M6419	Bussmann	18
12-pulse					
0910A-5+A004+A018	0490A-5+A018	2xD7T	170M6412	Bussmann	6
1210A-5+A004+A018	0650A-5+A018	2xD8T	170M6419	Bussmann	6
1820A-5+A004+A018	0980A-5+A018	2xD8T	170M6419	Bussmann	6
2430A-5+A004+A018	0650A-5+A018	4xD8T	170M6419	Bussmann	12
3640A-5+A004+A018	0980A-5+A018	4xD8T	170M6419	Bussmann	12
5470A-5+A004+A018	0980A-5+A018	6xD8T	170M6419	Bussmann	18
U_N = 690 V					
6-pulse					
0570A-7+A018	0570A-7+A018	D8T	170M6414	Bussmann	3
0820A-7+A018	0820A-7+A018	D8T	170M6417	Bussmann	3
1060A-7+A018	0570A-7+A018	2xD8T	170M6414	Bussmann	6
1520A-7+A018	0820A-7+A018	2xD8T	170M6417	Bussmann	6
2280A-7+A018	0820A-7+A018	3xD8T	170M6417	Bussmann	9
3040A-7+A018	0820A-7+A018	4xD8T	170M6417	Bussmann	12
3800A-7+A018	0820A-7+A018	5xD8T	170M6417	Bussmann	15
4560A-7+A018	0820A-7+A018	6xD8T	170M6417	Bussmann	18
12-pulse					
0760A-7+A004+A018	0410A-7+A018	2xD7T	PC31UD69 V700TF	Mersen	6
1060A-7+A004+A018	0570A-7+A018	2xD8T	170M6414	Bussmann	6
1520A-7+A004+A018	0820A-7+A018	2xD8T	170M6417	Bussmann	6
2130A-7+A004+A018	0570A-7+A018	4xD8T	170M6414	Bussmann	12
3040A-7+A004+A018	0820A-7+A018	4xD8T	170M6417	Bussmann	12

Supply unit type ACS880-307…	Supply module		Fuse		
	Type ACS880-304…	Size	Type	Manuf.	Qty
4560A-7+A004+A018	0820A-7+A018	6xD8T	170M6417	Bussmann	18

Supply module internal DC fuses

Each supply module has internal DC fuses.

Note: You can use fuses from other manufacturers if they meet the ratings and the melting curve of the fuse does not exceed the melting curve of the fuse in the table.

Supply module frame size and options	DC fuses in each supply module					
	I_N A	I^2t A^2s	U_N V	Manufacturer	Type	Qty
D7T	700	755000	1000	Bussmann	170M4908	2
D8T (IEC)	900	1750000*	1100	Bussmann	170M5499	4
D8T +C129+C134 (UL/CSA)	1800	7600000	1250	Bussmann	170M6783	2

* Clearing value at 1000 V DC.

Fuses on CVAR board

Type: G330010 by Mersen (Ferraz Shawmut) (10 A, 700 V AC Size: 10×38 mm).

Note: The CVAR board is included in the UL/CSA versions only (options +C129 and +C134).

Dimensions and weights

Supply unit type	Height 1 mm	Height 2 mm	Width 1 mm	Depth 1 mm	Depth 2 mm	Weight kg
U_N = 400 V						
6-pulse						
ACS880-307-0650A-3+A018	2145	2315	1400	636	756	850
ACS880-307-0980A-3+A018	2145	2315	1400	636	756	850
ACS880-307-1210A-3+A018	2145	2315	1600	636	756	1130
ACS880-307-1820A-3+A018	2145	2315	1600	636	756	1130
ACS880-307-2730A-3+A018	2145	2315	2000	636	756	1560
ACS880-307-3640A-3+A018	2145	2315	2800	744	864	2140
ACS880-307-4560A-3+A018	2145	2315	3000	744	864	2420
ACS880-307-5470A-3+A018	2145	2315	3200	744	864	2700
12-pulse						
ACS880-307-0910A-3+A004+A018	2145	2315	1800	636	756	900
ACS880-307-1210A-3+A004+A018	2145	2315	1800	636	756	1180
ACS880-307-1820A-3+A004+A018	2145	2315	1800	636	756	1180
ACS880-307-2430A-3+A004+A018	2145	2315	2400	636	756	1840
ACS880-307-3640A-3+A004+A018	2145	2315	3000	636	756	2040
ACS880-307-5470A-3+A004+A018	2145	2315	3400	636	756	2900

Supply unit type	Height 1 mm	Height 2 mm	Width 1 mm	Depth 1 mm	Depth 2 mm	Weight kg
U_N = 500 V						
6-pulse						
ACS880-307-0650A-5+A018	2145	2315	1400	636	756	850
ACS880-307-0980A-5+A018	2145	2315	1400	636	756	850
ACS880-307-1210A-5+A018	2145	2315	1600	636	756	1130
ACS880-307-1820A-5+A018	2145	2315	1600	636	756	1130
ACS880-307-2730A-5+A018	2145	2315	2000	636	756	1560
ACS880-307-3640A-5+A018	2145	2315	2800	744	864	2140
ACS880-307-4560A-5+A018	2145	2315	3000	744	864	2420
ACS880-307-5470A-5+A018	2145	2315	3200	744	864	2700
12-pulse						
ACS880-307-0910A-5+A004+A018	2145	2315	1800	636	756	900
ACS880-307-1210A-5+A004+A018	2145	2315	1800	636	756	1180
ACS880-307-1820A-5+A004+A018	2145	2315	1800	636	756	1180
ACS880-307-2430A-5+A004+A018	2145	2315	2400	636	756	1840
ACS880-307-3640A-5+A004+A018	2145	2315	3000	636	756	2040
ACS880-307-5470A-5+A004+A018	2145	2315	3400	636	756	2900
U_N = 690 V						
6-pulse						
ACS880-307-0570A-7+A018	2145	2315	1400	636	756	850
ACS880-307-0820A-7+A018	2145	2315	1400	636	756	850
ACS880-307-1060A-7+A018	2145	2315	1400	636	756	1130
ACS880-307-1520A-7+A018	2145	2315	1600	636	756	1130
ACS880-307-2280A-7+A018	2145	2315	2000	636	756	1560
ACS880-307-3040A-7+A018	2145	2315	2400	636	756	1940
ACS880-307-3800A-7+A018	2145	2315	3000	744	864	2420
ACS880-307-4560A-7+A018	2145	2315	3200	744	864	2700
12-pulse						
ACS880-307-0760A-7+A004+A018	2145	2315	1800	636	756	900
ACS880-307-1060A-7+A004+A018	2145	2315	1800	636	756	1180
ACS880-307-1520A-7+A004+A018	2145	2315	1800	636	756	1180
ACS880-307-2130A-7+A004+A018	2145	2315	2400	636	756	1840
ACS880-307-3040A-7+A004+A018	2145	2315	3000	636	756	2040
ACS880-307-4560A-7+A004+A018	2145	2315	3400	636	756	2900

Height 1 Height of IP22 cabinet

Height 2 Height of IP54 cabinet

Width 1 Width of supply unit including, auxiliary cubicle, incoming cubicle(s) and supply module cubicle(s)

Depth 1 Depth if there is no Cooling air through bottom (option +C128). No door switches included.

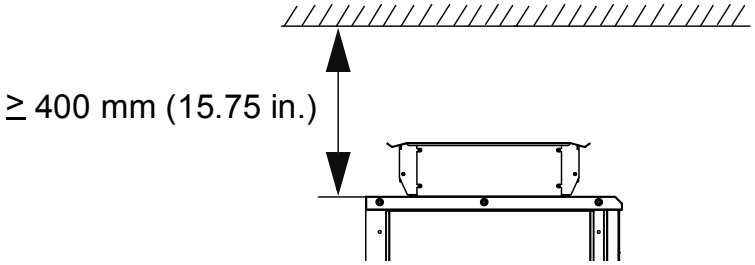
Depth 2 Depth if there is Cooling air through bottom (option +C128). No door switches included.

Free space requirements

The values are as required by cooling, maintenance and/or operation of the pressure relief (if present). Also obey the general mechanical installation instructions.

Front		Sides		Above [1]	
mm	in.	mm	in.	mm	in.
1500	59	0	0	400	15.75

[1] Measured from the base plate of the cabinet top.



Losses, cooling data and noise

ACS880-307-…	Losses kW	Air flow		Efficiency %	Noise level dB
		m^3/h	ft^3/min		
U_N = 400 V					
6-pulse					
0650A-3+A018	4.6	1300	765	99.0	72
0980A-3+A018	6.6	1300	765	99.0	72
1210A-3+A018	9.2	2600	1530	98.9	74
1820A-3+A018	13.3	2600	1530	99.0	74
2730A-3+A018	19.9	3900	2296	99.0	76
3640A-3+A018	26.6	5200	3061	99.0	76
4560A-3+A018	33.3	6500	3826	99.0	77
5470A-3+A018	40.0	7800	4591	99.0	78
12-pulse					
0910A-3+A004+A018	8.4	1800	1059	98.7	74
1210A-3+A004+A018	9.2	2600	1530	98.9	74
1820A-3+A004+A018	13.3	2600	1530	99.0	74
2430A-3+A004+A018	18.4	5200	3061	98.9	76
3640A-3+A004+A018	26.6	5200	3061	99.0	76
5470A-3+A004+A018	40.0	7800	4591	99.0	78
U_N = 500 V					
6-pulse					
0650A-5+A018	4.6	1300	765	99.2	72

ACS880-307-…	Losses kW	Air flow		Efficiency %	Noise level dB
		m^3/h	ft^3/min		
0980A-5+A018	6.6	1300	765	99.2	72
1210A-5+A018	9.2	2600	1530	99.1	74
1820A-5+A018	13.3	2600	1530	99.2	74
2730A-5+A018	19.9	3900	2296	99.2	76
3640A-5+A018	26.6	5200	3061	99.2	76
4560A-5+A018	33.3	6500	3826	99.2	77
5470A-5+A018	40.0	7800	4591	99.2	78
12-pulse					
0910A-5+A004+A018	8.4	1800	1059	99.0	74
1210A-5+A004+A018	9.2	2600	1530	99.1	74
1820A-5+A004+A018	13.3	2600	1530	99.2	74
2430A-5+A004+A018	18.4	5200	3061	99.1	76
3640A-5+A004+A018	26.6	5200	3061	99.2	76
5470A-5+A004+A018	40.0	7800	4591	99.2	78
U_N = 690 V					
6-pulse					
0570A-7+A018	4.5	1300	765	99.3	72
0820A-7+A018	5.8	1300	765	99.4	72
1060A-7+A018	9.0	2600	1530	99.3	74
1520A-7+A018	12.7	2600	1530	99.3	74
2280A-7+A018	19.1	3900	2296	99.3	76
3040A-7+A018	25.5	5200	3061	99.3	76
3800A-7+A018	32.0	6500	3826	99.3	77
4560A-7+A018	38.4	7800	4591	99.3	78
12-pulse					
0760A-7+A004+A018	7.7	1800	1059	99.2	74
1060A-7+A004+A018	9.0	2600	1530	99.3	74
1520A-7+A004+A018	12.7	2600	1530	99.3	74
2130A-7+A004+A018	18.1	5200	3061	99.3	76
3040A-7+A004+A018	25.5	5200	3061	99.3	76
4560A-7+A004+A018	38.4	7800	4591	99.3	78

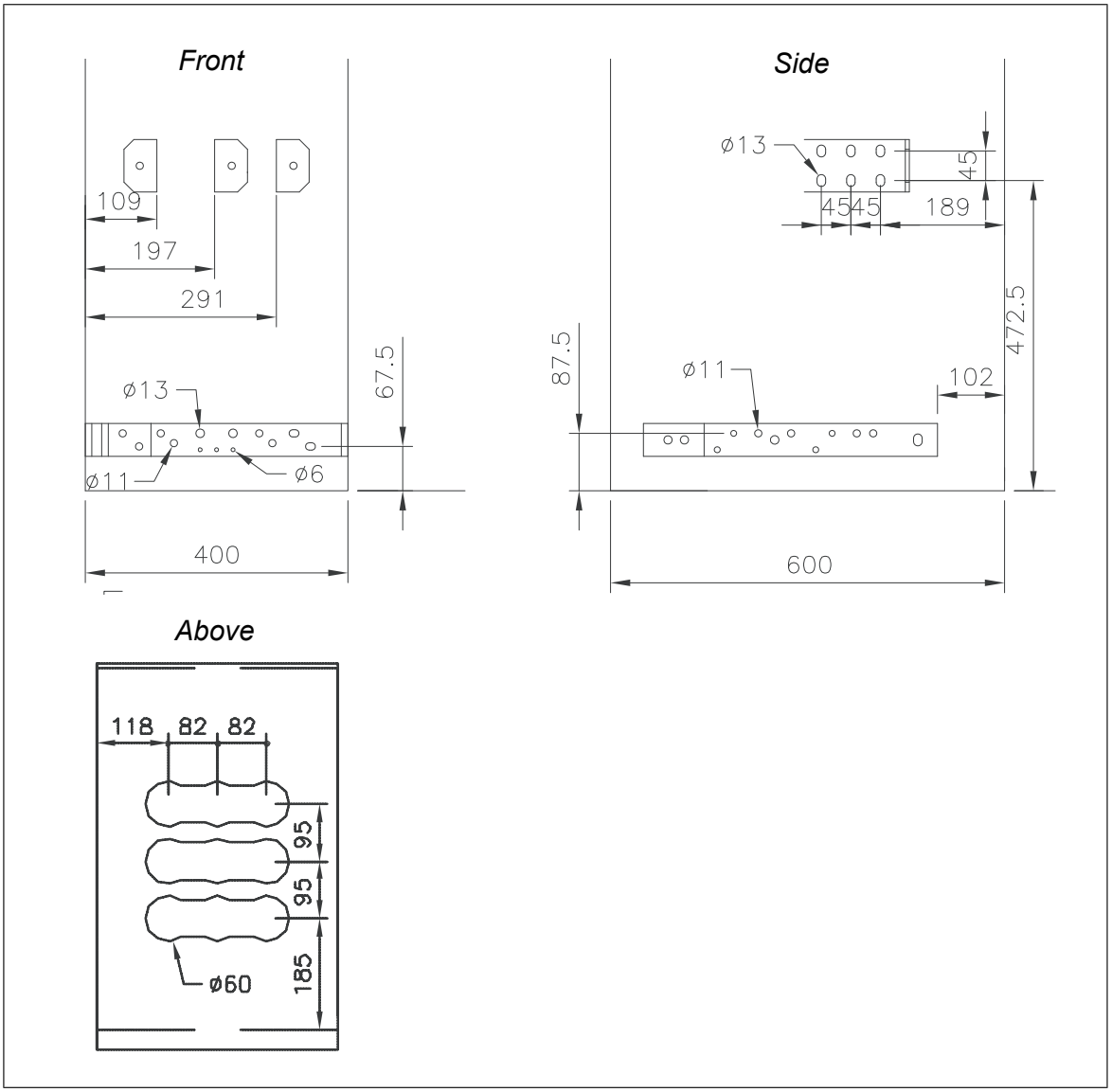
Terminal and lead-through data for the input power cable

This section shows the terminal and lead-through dimensions for incoming cubicles. The size vary depending on the supply unit size and options.

400 mm incoming cubicle – main switch (+F253)

These drawings show the terminal and lead-through dimensions for the 400 mm wide incoming cubicle. This cubicle is used in 6-pulse supply units with main switch-disconnector (option +F253) and bottom cable entry. See also section Layout drawings of incoming cubicles in the operation principle and hardware description.

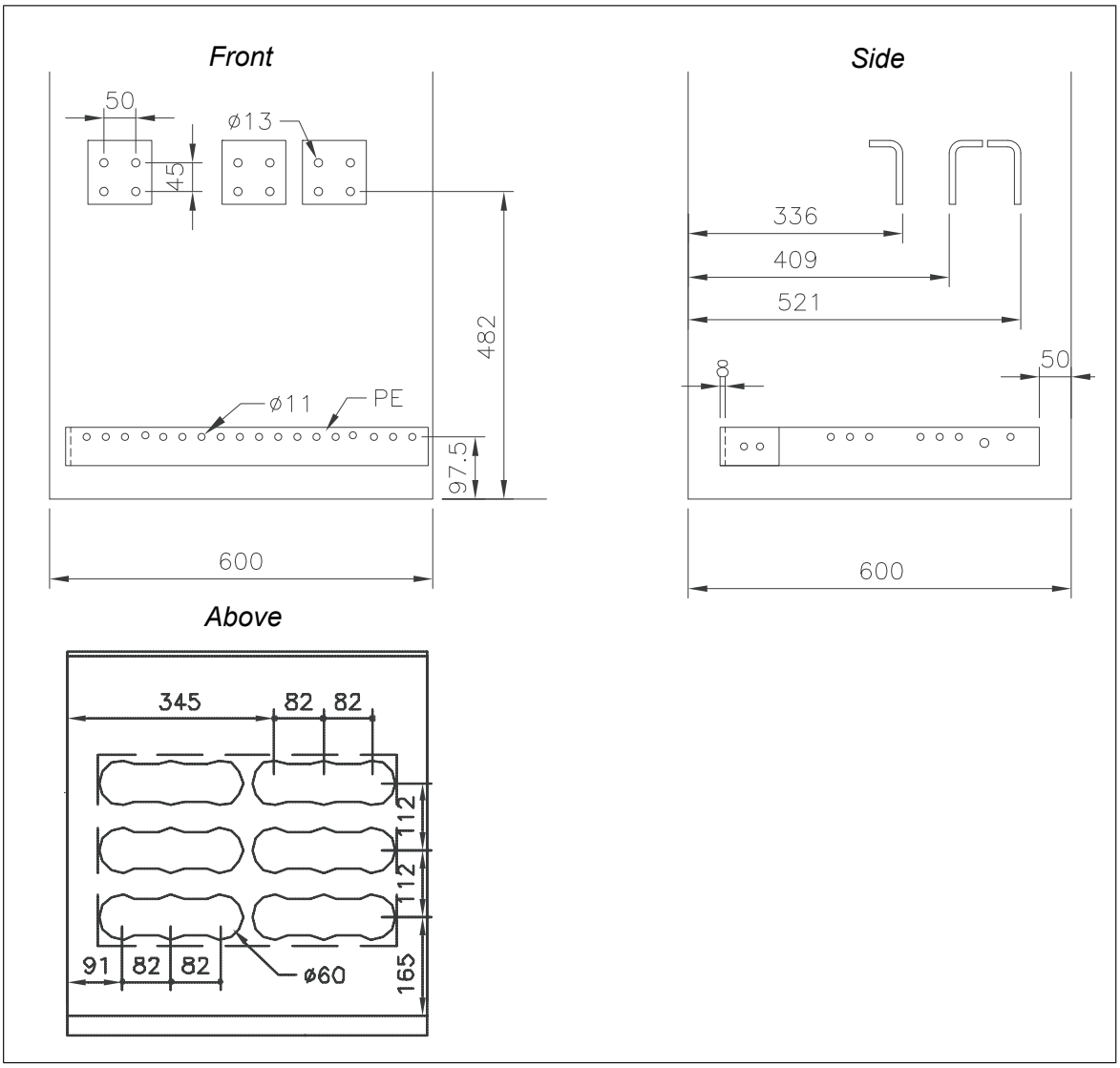
The dimensions are given in millimeters. Tightening torque for the cable lug connection depends on the bolt size and type. See the technical data.



600 mm incoming cubicle – main switch (+F253), 6-pulse

These drawings show the terminal and lead-through dimensions for a 600 mm wide incoming cubicle. This cubicle is used in 6-pulse supply units with main switch-disconnector (option +F253) and bottom cable entry.

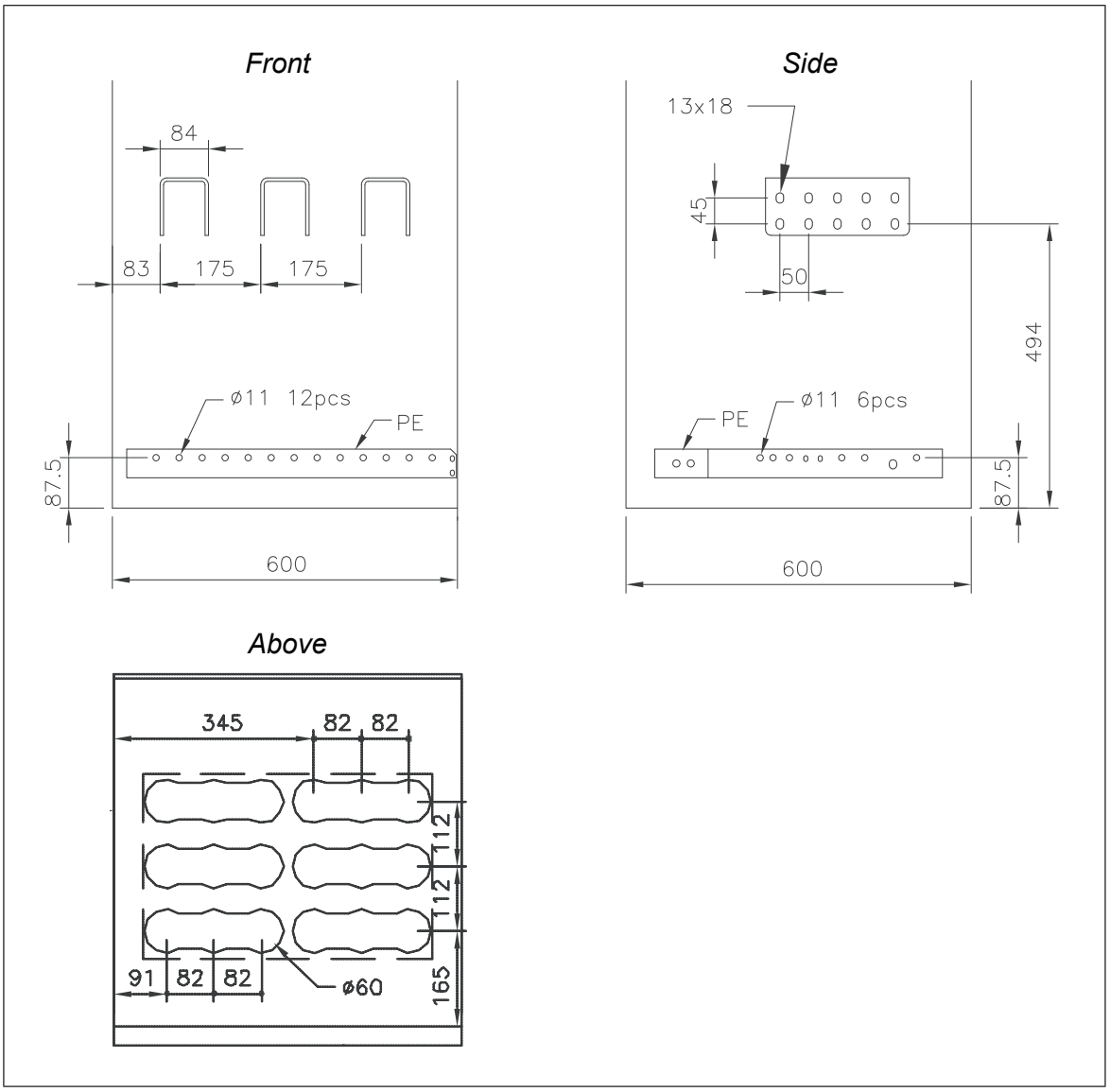
The dimensions are given in millimeters. Tightening torque for the cable lug connection depends on the bolt size and type. See the technical data.



600 mm incoming cubicle – main breaker (+F255), bottom cable entry, 12-pulse (+A004)

These drawings show the terminal and lead-through dimensions for a 600 mm wide incoming cubicle. This cubicle is in supply units with a main breaker (option +F255) and bottom cable entry. There is one cubicle for a 6-pulse supply unit and two cubicles for a 12-pulse supply unit.

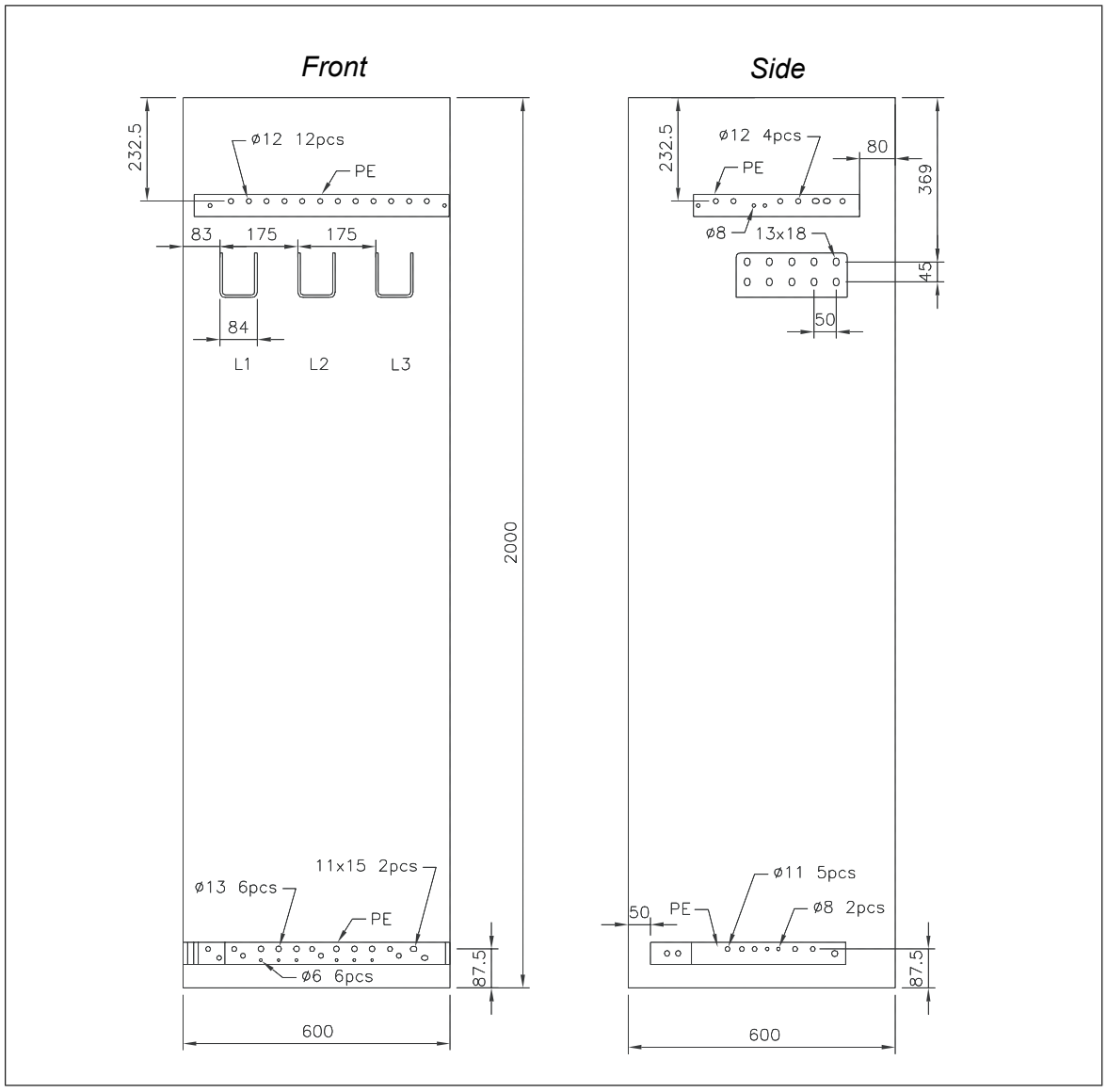
The dimensions are given in millimeters. Tightening torque for the cable lug connection depends on the bolt size and type. See the technical data.



600 mm incoming cubicle – main breaker (+F255), top cable entry

These drawings show the terminal and lead-through dimensions for a 600 mm wide incoming cubicle. This cubicle is in supply units with a main breaker (option +F255) and top cable entry.

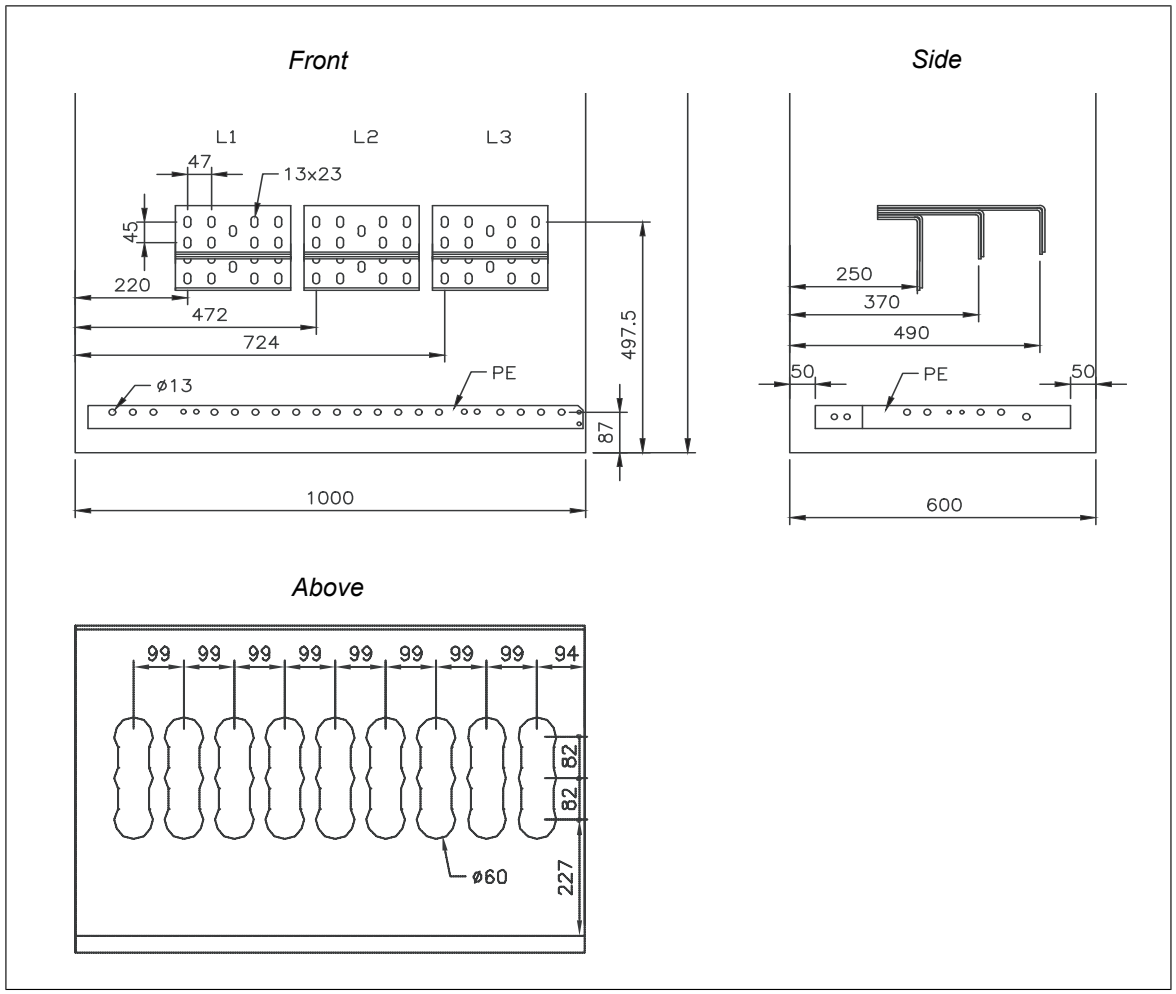
The dimensions are given in millimeters. Tightening torque for the cable lug connection depends on the bolt size and type. See the technical data.



1000 mm incoming cubicle – main breaker (+F255), bottom cable entry

These drawings show the terminal and lead-through dimensions for a 1000 mm wide incoming cubicle. This cubicle is in high-power supply units with a main breaker (option +F255) and bottom cable entry. There is one cubicle for a supply unit with a 6-pulse configuration.

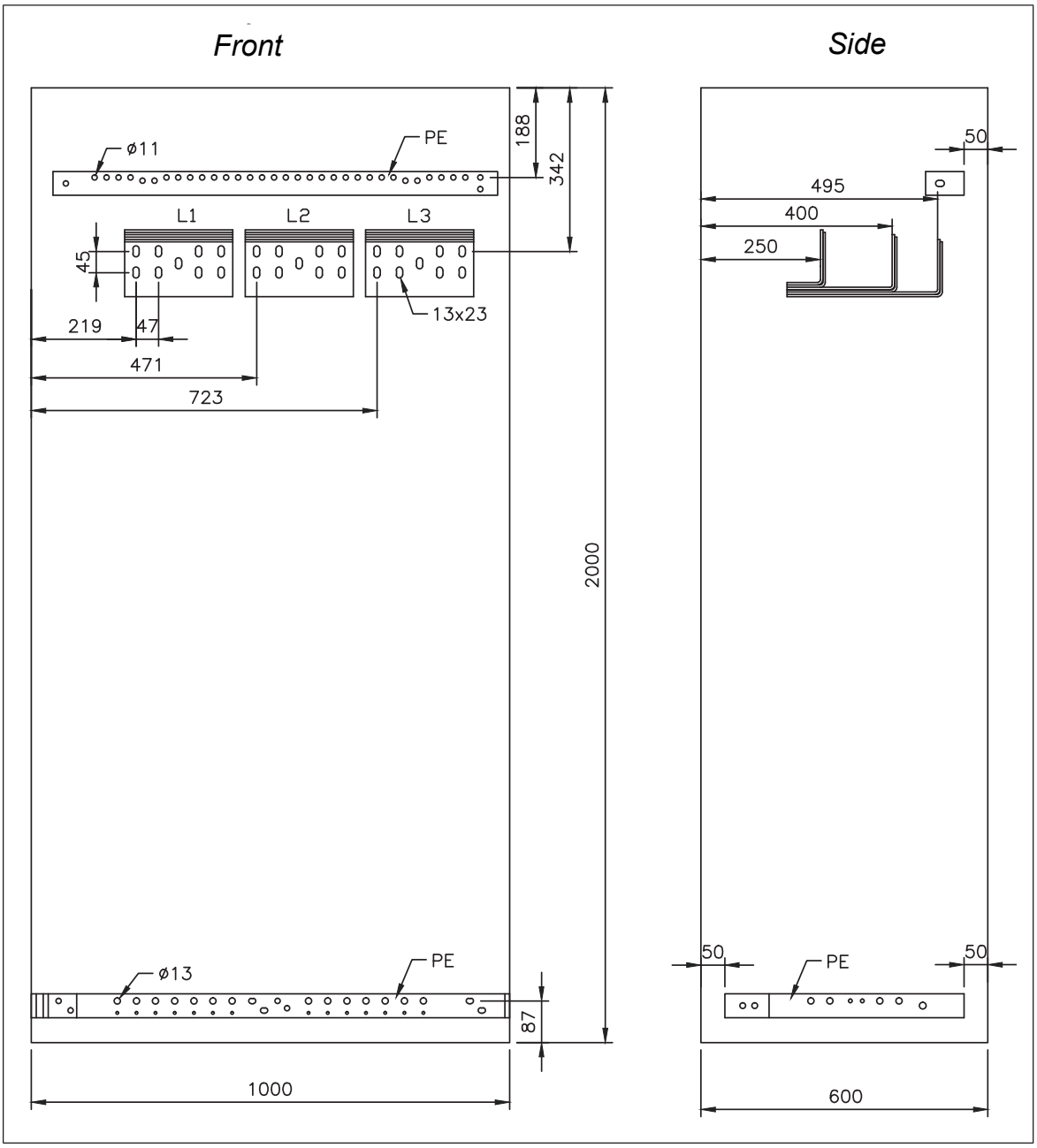
The dimensions are given in millimeters. Tightening torque for the cable lug connection depends on the bolt size and type. See the technical data.



1000 mm incoming cubicle – main breaker (+F255), top cable entry

These drawings show the terminal and lead-through dimensions for a 1000 mm wide incoming cubicle. This cubicle is in high-power supply units with a main breaker (option +F255) and top cable entry.

The dimensions are given in millimeters. Tightening torque for the cable lug connection depends on the bolt size and type. See the technical data.



Electrical power network specification

Voltage (U_1)	400 V units: 380…415 V AC 3-phase ± 10%. This is indicated in the type designation label as typical input voltage level (3~ 400 V AC). 500 V units: 380…500 V AC 3-phase ± 10%. This is indicated in the type designation label as typical input voltage levels (3~ 400/480/500 V AC). 690 V units: 25…690 V AC 3-phase ± 10% (525…600 V AC ± 10% in UL/CSA installations, or corner-grounded TN systems). This is indicated in the type designation label as typical input voltage levels (3~ 525/600/690 V AC).
Network type	TN (grounded) and IT (ungrounded) systems
Frequency	50/60 Hz, variation ± 5% of nominal frequency
Imbalance	Max. ± 3% of nominal phase-to-phase input voltage
Short-circuit withstand strength (IEC/EN 61439-1)	Supply units with main circuit breaker (option +F255) and without grounding/earthing switch (without option +F259): Rated peak withstand current (I_{pk}): 143 kA Rated short-time withstand current (I_{cw}): 65 kA/1 s All other configurations: Rated peak withstand current (I_{pk}): 105 kA Rated short-time withstand current (I_{cw}): 50 kA/1 s
Short-circuit current protection (UL 508A, CSA C22.2 No. 14-13)	The drive is suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes at 600 V maximum when the input cable is protected with class T fuses.
Fundamental power factor (cos phi_1)	0.98 (at nominal load)
Transformer specification for 12-pulse supply (IEC 60076-1:2011)	Connection: Dy 11 d0 or Dyn 11 d0 Phase shift between secondaries: 30° electrical Voltage difference between secondaries: < 0.5% Short-circuit impedance of secondaries: > 5% Short-circuit impedance difference between secondaries: ≤ 10% of the percentage impedance No grounding of the secondaries allowed. Static shield recommended.

DC connection data

Voltage (U_2), 6-pulse modules	ACS880-307-xxxxA-3+A018: 513…560 V DC. This is indicated in the type designation label as typical output voltage level 540 V DC. ACS880-307-xxxxA-5+A018: 513…675 V DC. This is indicated in the type designation label as typical output voltage levels 540/648/675 V DC. ACS880-307-xxxxA-7+A018: 709…932 V DC (709…810 V DCfor UL/CSA). This is indicated in the type designation label as typical output voltage levels 709/810/932 V DC (810 V DC for UL/CSA).
Voltage (U_2), 12-pulse modules	ACS880-307-xxxxA-3+A018: 532 … 581 V DC. This is indicated in the type designation label as typical output voltage level 560 V DC. ACS880-307-xxxxA-5+A018: 532 … 700 V DC. This is indicated in the type designation label as typical output voltage levels 560/672/700 V DC. ACS880-307-xxxxA-7+A018: 735 … 966 V DC (735 … 840 V DC for UL/CSA). This is indicated in the type designation label as typical output voltage levels 735/840/966 V DC (840 V DC for UL/CSA).

Efficiency

> 98%

Control unit connection data

See chapter *Control units of the drive (page 117)*.

Protection classes

Degrees of protection (IEC/EN 60529)	IP22 IP42 (option +B054) IP54 (option +B055)
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.

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	Max. 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	Max. 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

Cable lugs

Size	Max. torque	Note
M8	15 N·m (11 lbf·ft)	Strength class 8.8
M10	32 N·m (23.5 lbf·ft)	Strength class 8.8
M12	50 N·m (37 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 max. 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°**		**XLPE insulation Conductor temperature 90°**	
Size	**⌀ [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°**		**XLPE insulation Conductor temperature 90°**	
Size	⌀ **[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 installed for stationary use	**Storage** in protective package	**Transportation** in protective package
Altitude above sea level	0…2000 m (0…6561.7 ft) no derating. For altitudes over 2000 m (6561.7 ft), contact ABB.	-	-
Air temperature	0…+45 °C (+32…+113 °F), no condensation allowed. Output derated in the range +40…+50 °C (+113…+131 °F).	-40…+70 °C (-40…+158 °F)	-40…+70 °C (-40…+158 °F)
Relative humidity	Maximum 95%, no condensation allowed	Maximum 95%, no condensation allowed	Maximum 95%, no condensation allowed
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	IEC 60721-3-2
Chemical gases	Class 3C2	Class 1C2	Class 2C2
Solid particles	Class 3S1	Class 1S3 (packing must support this, otherwise 1S2)	Class 2S2
	No conductive dust allowed.		
Vibration IEC 61800-5-1 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 10…57 Hz, max. 0.075 mm amplitude 57…150 Hz 1 *g* Tested in a typical cabinet assembly according to: Max. 1 mm (0.04 in.) (peak value, 5 … 13.2 Hz), max. 0.7 *g* (13.2 … 100 Hz) sinusoidal	IEC/EN 60721-3-1:1997 10...57 Hz: max. 0.075 mm amplitude 57...150 Hz: 1g	IEC/EN 60721-3-2:1997 2...9 Hz: max. 3.5 mm amplitude 9...200 Hz: 10 m/s2 (32.8 ft/s2)
Shock IEC 60068-2-27:2008, EN 60068-2-27:2009 Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	Not allowed	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	Forced air cooling (fans)
Air flow	See *Losses, cooling data and noise (page 101)*

Materials

Cabinet	• Zinc coated steel sheet • Polyester thermosetting powder coating on visible surfaces, color RAL 7035 and RAL 9017
Busbars for user power connections	Tin-plated copper
Air filters of IP54 units (option +B055)	Inlet (door): Camfil/airComp 300-50 Outlet (roof): Camfil/airTex G150
Fire safety of materials (IEC 60332-1)	Insulating materials and non-metallic items: mostly self-extinctive
Package	Standard package: • timber, polyethylene sheet (thickness 0.15 mm), stretch film (thickness 0.023 mm), PP tape, PET strap, sheet metal (steel) • for land and air transport when planned storage time is less than 2 months or when storage can be arranged in clean and dry conditions less than 6 months • can be used when products will not be exposed to corrosive atmosphere during transport or storage Container package: • 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) • for sea transport in containers • recommended for land and air transport when storage time prior to installation exceeds 6 months or storage is arranged in partially weather-protected conditions Seaworthy package: • 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) • for sea transport with or without containerization • for long storage periods in environments where roofed and humidity-controlled storage cannot be arranged Cabinets are fastened to the pallet with screws and braced from the top end to the package walls to prevent swaying inside the package. Package elements are attached to each other with screws.
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. 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. 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

Control units of the drive

Contents of this chapter

This chapter

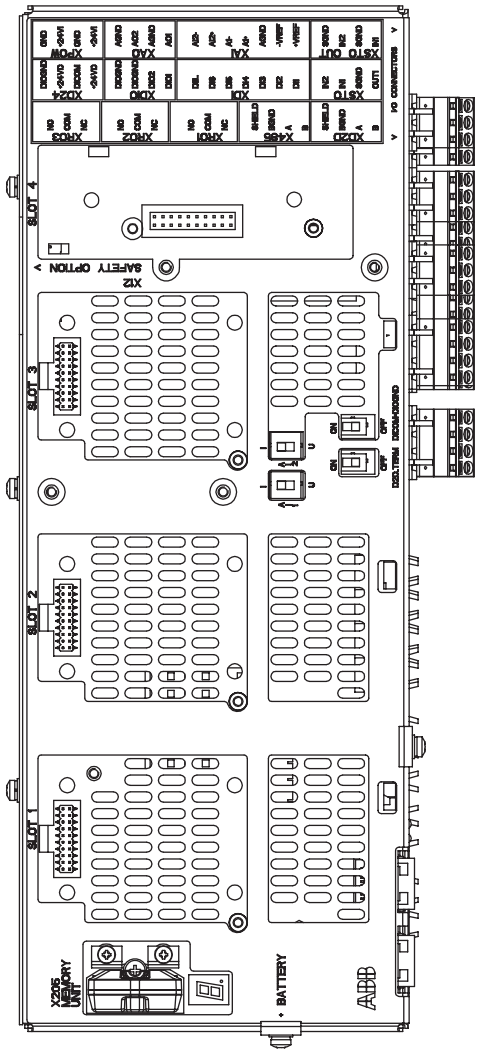
- describes the connections of the control unit
- contains the specifications of the inputs and outputs of the control unit.

General

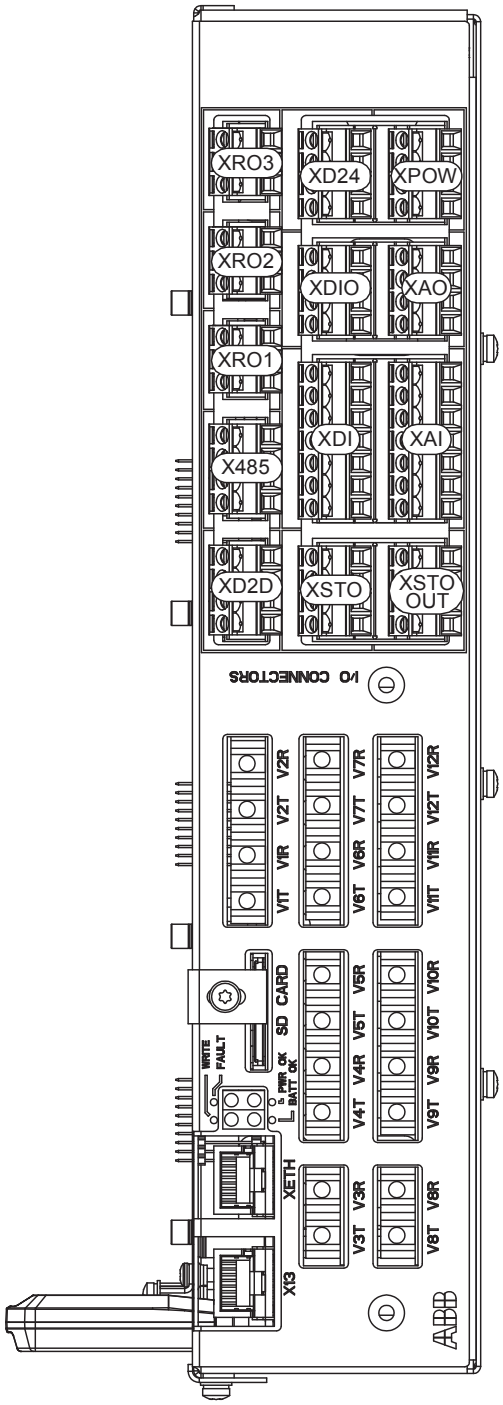
The supply unit is controlled by a BCU-x2 control unit. The BCU-x2 consists of a BCON-12 control board (and a BIOC-01 I/O connector board and power supply board) built in a metal housing. The control unit is connected to the supply module(s) by fiber optic cables.

In this manual, the name “BCU-x2” represents the control unit types BCU-02 and BCU-12. These have a different number of power module connections (2 and 7 respectively) but are otherwise similar.

BCU-x2 layout



	Description
I/O	I/O terminals (see following diagram)
SLOT 1	I/O extension, encoder interface or fieldbus adapter module connection. (This is the sole location for an FDPI-02 diagnostics and panel interface.)
SLOT 2	I/O extension, encoder interface or fieldbus adapter module connection
SLOT 3	I/O extension, encoder interface, fieldbus adapter or FSO-xx safety functions module connection
SLOT 4	RDCO-0x DDCS communication option module connection
X205	Memory unit connection
BATTERY	Holder for real-time clock battery (BR2032)
AI1	Mode selector for analog input AI1 (I = current, U = voltage)
AI2	Mode selector for analog input AI2 (I = current, U = voltage)
D2D TERM	Termination switch for drive-to-drive link (D2D)
DICOM= DIOGND	Ground selection. Determines whether DICOM is separated from DIOGND (ie. the common reference for the digital inputs floats). See the ground isolation diagram.
7-segment display Multicharacter indications are displayed as repeated sequences of characters	
o	(“U” is indicated briefly before “o”.) Control program running
U	Control program startup in progress
L	(Flashing) Firmware cannot be started. Memory unit missing or corrupted
1	Firmware download from PC to control unit in progress
2	At power-up, the display may show short indications of eg. “1”, “2”, “b” or “U”. These are normal indications immediately after power-up. If the display ends up showing any other value than those described, it indicates a hardware failure.



	Description
XAI	Analog inputs
XAO	Analog outputs
XDI	Digital inputs, Digital input interlock (DIIL)
XDIO	Digital input/outputs
XD2D	Drive-to-drive link
XD24	+24 V output (for digital inputs)
XETH	Ethernet port – Not in use
XPOW	External power input
XRO1	Relay output RO1
XRO2	Relay output RO2
XRO3	Relay output RO3
XSTO	Safe torque off connection (input signals)
XSTO OUT	Safe torque off connection (to inverter modules)
X12	(On the opposite side) Connection for FSO-xx safety functions module (optional)
X13	Control panel / PC connection
X485	Not in use
V1T/V1R, V2T/V2R	Fiber optic connection to modules 1 and 2 (VxT = transmitter, VxR = receiver)
V3T/V3R … V7T/V7R	Fiber optic connection to modules 3…7 (BCU-12/22 only) (VxT = transmitter, VxR = receiver)
V8T/V8R … V12T/V12R	Fiber optic connection to modules 8…12 (BCU-22 only) (VxT = transmitter, VxR = receiver)
SD CARD	Data logger memory card for inverter module communication
BATT OK	Real-time clock battery voltage is higher than 2.8 V. If the LED is off when the control unit is powered, replace the battery.
FAULT	The control program has generated a fault. See the firmware manual of the supply/inverter unit.
PWR OK	Internal voltage supply is OK
WRITE	Writing to memory card in progress. Do not remove the memory card.

Default I/O diagram of the supply control unit

The diagram below shows the default I/O connections on the supply control unit (A51), and describes the use of the connections in the supply unit. Under normal circumstances, the factory-made wiring should not be changed.

The wire size accepted by all screw terminals (for both stranded and solid wire) is 0.5 … 2.5 mm^2 (24…12 AWG). The torque is 0.5 N·m (5 lbf·in).

Terminal			Description	
XD2D			Drive-to-drive link	
1	1	B	Not in use by default	
2	2	A		
3	3	BGND		
4	4	Shield		
ON OFF	D2D.TERM		Drive-to-drive link termination switch [1]	
X485			RS485 connection	
5	5	B	Not in use by default	
6	6	A		
7	7	BGND		
8	8	Shield		
XRO1, XRO2, XRO3			Relay outputs	
11	11	NC	Norm. closed	XRO1: **Running** [2] (Energized = running) 250 V AC / 30 V DC, 2 A
12	12	COM	Common	
13	13	NO	Norm. open	
21	21	NC	Norm. closed	XRO2: **Fault (-1)** [2] (Energized = no fault) 250 V AC / 30 V DC, 2 A
22	22	COM	Common	
23	23	NO	Norm. open	
31	31	NC	Norm. closed	XRO3: **MCB ctrl** [3] (Energized = closes main contactor/breaker) 250 V AC / 30 V DC, 2 A
32	32	COM	Common	
33	33	NO	Norm. open	
XSTO, XSTO OUT			Safe torque off [4]	
1	1	OUT	XSTO: Factory connection. Both circuits must be closed for the drive to start (IN1 and IN2 must be connected to OUT).	
2	2	SGND		
3	3	IN1		
4	4	IN2		
5	5	IN1	XSTO OUT: Not in use.	
6	6	SGND		
7	7	IN2		
8	8	SGND		
XDI			Digital inputs	

Terminal			Description
1 2 3 4 5 6 7	1	DI1	**Temp fault**[2] (0 = overtemperature)
	2	DI2	**Run enable**[2] (1 = run enable)
	3	DI3	**MCB feedback**[3] (0 = main contactor/breaker open)
	4	DI4	**Auxiliary circuit breaker fault**[2]
	5	DI5	Not in use by default. Can be used for eg. earth fault monitoring.
	6	DI6	**Reset**[2] (0 -> 1 = fault reset)
	7	DIIL	Not in use by default. Can be used for eg. emergency stop.
XDIO			Digital input/outputs
1 2 3 4	1	DIO1	Not in use by default
	2	DIO2	Not in use by default
	3	DIOGND	Digital input/output ground
	4	DIOGND	Digital input/output ground
XD24			Auxiliary voltage output
5 6 7 8	1	+24VD	+24 V DC 200 mA[5]
	2	DICOM	Digital input ground
	3	+24VD	+24 V DC 200 mA[5]
	4	DIOGND	Digital input/output ground
ON OFF	DICOM=DIOGND		Ground selection switch[6]
XAI			Analog inputs, reference voltage output
1 2 3 4 5 6 7	1	+VREF	10 V DC, R_L 1…10 kohm
	2	-VREF	-10 V DC, R_L 1…10 kohm
	3	AGND	Ground
	4	AI1+	Not in use by default. 0(2)…10 V, R_{in} > 200 kohm[7]
	5	AI1-	
	6	AI2+	Not in use by default. 0(4)…20 mA, R_{in} = 100 ohm[8]
	7	AI2-	
– U	AI1		AI1 current/voltage selection switch
– U	AI2		AI2 current/voltage selection switch
XAO			Analog outputs
1 2 3 4	1	AO1	**Zero** (no signal indicated)[2] 0…20 mA, R_L < 500 ohm
	2	AGND	
	3	AO2	**Zero** (not signal indicated)[2] 0…20 mA, R_L < 500 ohm
	4	AGND	
XPOW			External power input
1 2 3 4	1	+24VI	24 V DC, 2.05 A
	2	GND	
	3	+24VI	
	4	GND	
X12			Not in use in supply units
X13			Control panel connection

Terminal	Description
X205	Memory unit connection

1) 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.
2) Default use of the signal in the control program. The use can be changed by a parameter. See also the delivery-specific circuit diagrams.
3) Use of the signal in the control program (fixed). See also the delivery-specific circuit diagrams.
4) 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.
5) Total load capacity of these outputs is 4.8 W (200 mA at 24 V) minus the power taken by DIO1 and DIO2.
6) Determines whether DICOM is separated from DIOGND (ie, common reference for digital inputs floats). ON: DICOM connected to DIOGND. OFF: DICOM and DIOGND separate.
7) Current [0(4)…20 mA, R_{in} = 100 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch AI1. Change of setting requires reboot of control unit.
8) Current [0(4)…20 mA, R_{in} = 100 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch AI2. Change of setting requires reboot of control unit.

External power supply for the control unit (XPOW)

The control unit is powered from a 24 V DC, 2 A supply through terminal block XPOW. With a type BCU control unit, a second supply can be connected to the same terminal block for redundancy.

Using an external supply is recommended if

- the control unit needs to be kept operational during input power breaks, for example, because of continuous fieldbus communication
- immediate restart is needed after a power break (that is, no control unit power-up delay is allowed).

Safe torque off (XSTO, XSTO OUT)

Note: The XSTO input only acts as a true Safe torque off input on the inverter control unit. De-energizing the IN1 and/or IN2 terminals of other units (supply, DC/DC converter, or brake unit) will stop the unit but not constitute a true safety function.

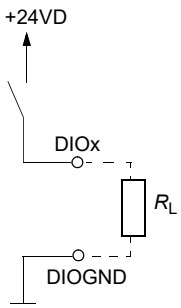
FSO-xx safety functions module connection (X12)

See the user manual of the FSO-xx module. Note that the FSO-xx safety functions module is not in use in supply, DC/DC converter or brake units.

SDHC memory card slot

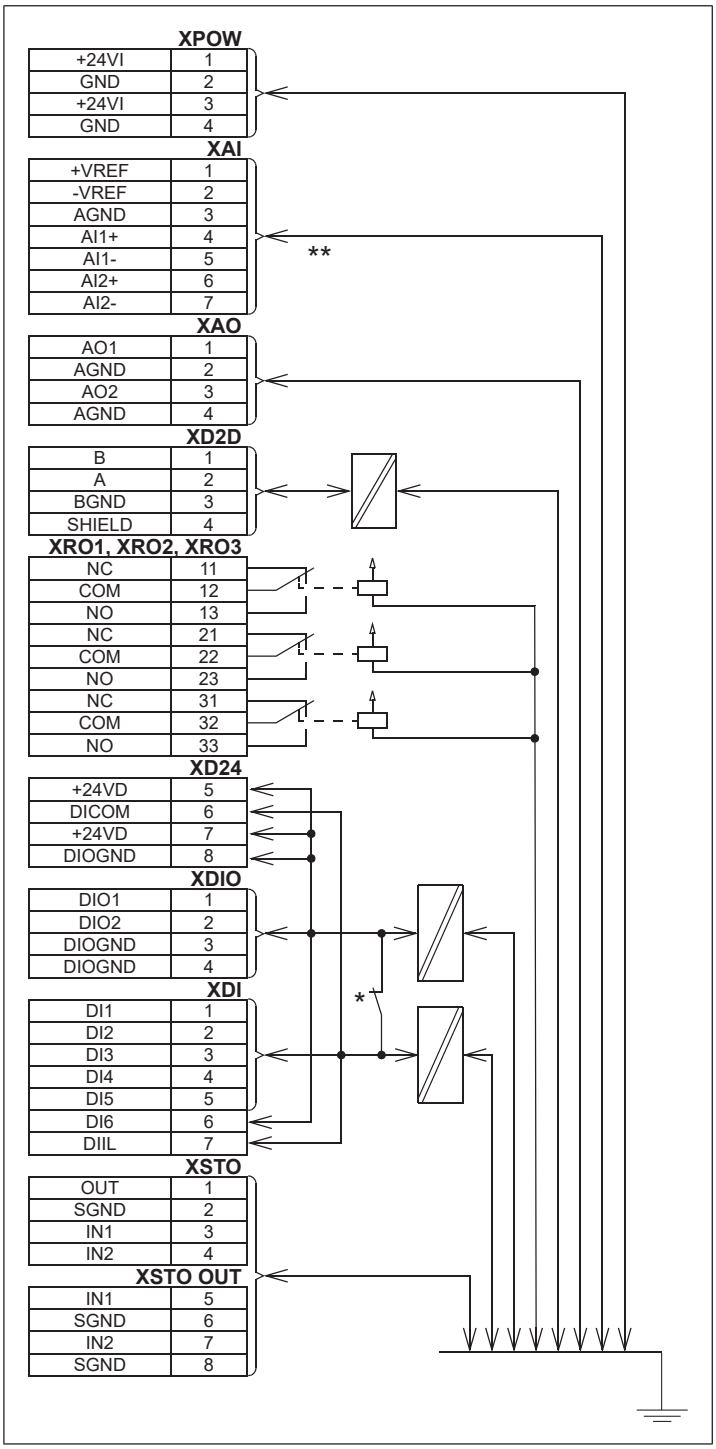
The BCU-x2 has an on-board data logger that collects real-time data from the power modules to help fault tracing and analysis. The data is stored onto the SDHC memory card inserted into the SD CARD slot and can be analyzed by ABB service personnel.

Connector data

Power supply (XPOW)	Connector pitch 5 mm, wire size 2.5 mm^2 24 V (±10%) DC, 2 A External power input. Two supplies can be connected for redundancy.
Relay outputs RO1…RO3 (XRO1…XRO3)	Connector pitch 5 mm, wire size 2.5 mm^2 250 V AC / 30 V DC, 2 A Protected by varistors
+24 V output (XD24:2 and XD24:4)	Connector pitch 5 mm, wire size 2.5 mm^2 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 24 V logic levels: “0” < 5 V, “1” > 15 V R_{in}: 2.0 kohm Input type: NPN/PNP (DI1…DI5), NPN (DI6) Hardware filtering: 0.04 ms, digital filtering up to 8 ms DI6 (XDI:6) can alternatively be used as an input for a PTC sensor. “0” > 4 kohm, “1” < 1.5 kohm. I_{max}: 15 mA (DI1…DI5), 5 mA (DI6)
Start interlock input DIIL (XDI:7)	Connector pitch 5 mm, wire size 2.5 mm^2 24 V logic levels: “0” < 5 V, “1” > 15 V R_{in}: 2.0 kohm Input type: NPN/PNP Hardware filtering: 0.04 ms, digital filtering up to 8 ms
Digital inputs/outputs DIO1 and DIO2 (XDIO:1 and XDIO:2) Input/output mode selection by parameters. 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 As inputs: 24 V logic levels: “0” < 5 V, “1” > 15 V. R_{in}: 2.0 kohm. Filtering: 1 ms. As outputs: Total output current from +24VD is limited to 200 mA 
Reference voltage for analog inputs +VREF and -VREF (XAI:1 and XAI:2)	Connector pitch 5 mm, wire size 2.5 mm^2 10 V ±1% and –10 V ±1%, R_{load} 1…10 kohm Maximum output current: 10 mA
Analog inputs AI1 and AI2 (XAI:4 … XAI:7). Current/voltage input mode selection by switches	Connector pitch 5 mm, wire size 2.5 mm^2 Current input: –20…20 mA, R_{in} = 100 ohm Voltage input: –10…10 V, R_{in} > 200 kohm Differential inputs, common mode range ±30 V Sampling interval per channel: 0.25 ms Hardware filtering: 0.25 ms, adjustable digital filtering up to 8 ms Resolution: 11 bit + sign bit Inaccuracy: 1% of full scale range

Analog outputs AO1 and AO2 (XAO)	Connector pitch 5 mm, wire size 2.5 mm^2 0…20 mA, R_{load} < 500 ohm Frequency range: 0…500 Hz Resolution: 11 bit + sign bit Inaccuracy: 2% of full scale range
XD2D connector	Connector pitch 5 mm, wire size 2.5 mm^2 Physical layer: RS-485 Transmission rate: 8 Mbit/s Cable type: Shielded twisted-pair cable with a twisted pair for data and a wire or another pair for signal ground (nominal impedance 100 to 165 ohm, for example Belden 9842) Maximum length of link: 50 m (164 ft) Termination by switch
RS-485 connection (X485)	Connector pitch 5 mm, wire size 2.5 mm^2 Physical layer: RS-485
Safe torque off connection (XSTO)	Connector pitch 5 mm, wire size 2.5 mm^2 Input voltage range: -3…30 V DC Logic levels: “0” < 5 V, “1” > 17 V. **Note:** 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. EMC (immunity) according to IEC 61326-3-1
Safe torque off output (XSTO OUT)	Connector pitch 5 mm, wire size 2.5 mm^2 To STO connector of inverter module.
Control panel connection (X13)	Connector: RJ-45 Cable length < 3 m
Ethernet connection (XETH)	Connector: RJ-45 This connection is not supported by the firmware.
SDHC memory card slot (SD CARD)	Memory card type: SDHC Maximum memory size: 4 GB
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.	

BCU-x2 ground isolation diagram



*Ground selector (DICOM=DIOGND) settings

DICOM=DIOGND: ON All digital inputs share a common ground (DICOM connected to DIOGND). This is the default setting.
DICOM=DIOGND: OFF Ground of digital inputs DI1…DI5 and DIIL (DICOM) is isolated from DIO signal ground (DIOGND). Isolation voltage 50 V.

**Common mode voltage between each AI input and AGND is +30 V

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 www.abb.com/searchchannels.

Product training

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

Providing feedback on ABB manuals

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

Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at www.abb.com/drives/documents.

a2 (frozen)
PDF-A4
Created 2020-02-19, 12:23:20

www.abb.com/drives

3AXD50000011408C

3AXD50000011408 Rev C (EN) EFFECTIVE 2020-02-19