
ABB INDUSTRIAL DRIVES

ACS880-904 regenerative rectifier modules

Hardware manual



ACS880-904 regenerative rectifier modules

Hardware manual

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Further information



1

Introduction to the manual

Contents of this chapter

This chapter gives basic information on the manual.

Applicability

The manual is applicable to the ACS880-904 regenerative rectifier modules for user-defined cabinet installations.

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 service 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 instructions and technical data which concern only certain module or frame sizes are marked with the size identifier. If there are several parallel modules, also the number of parallel modules is shown, for example 2×R8i.

The module size can be identified from the basic code visible on the type designation label, for example, ACS880-104-0810A-5 where 0810A is the module size. The option codes of the module are listed after the plus sign (option +C183).

The frame size of the regenerative rectifier module is, for example, R8i.

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
BCON	Type of control board
BCU	Type of control unit
BDFC	Control board for direct-on-line cooling fan
BDPS	Module internal power supply board
BFPS	Control and power supply board for speed-controlled cooling fan
BL	Series of L-filters, for example BL-15-5
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
DC link	DC circuit between rectifier and inverter
DI	Digital input
Drive	Frequency converter for controlling AC motors
EMC	Electromagnetic compatibility
Flat-PLS	Rittal Flat-PLS, a busbar system for standard, commercially available flat busbars
Frame, frame size	Physical size of the drive or power module
Generic enclosure	See chapter <i>Ordering information</i> .
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.
L-filter	Inductor filter
Multidrive	Drive for controlling several motors which are typically coupled to the same machinery. Includes one supply unit, and one or several inverter units.

Term	Description
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
Regenerative rectifier module	Rectifier bridge and related components enclosed in a metal frame or enclosure. Intended for cabinet installation.
Regenerative rectifier unit	Regenerative rectifier modules under control of one control board, and related components
RRU	Regenerative rectifier unit
Single drive	Drive for controlling one motor
VX25	Enclosure system by Rittal (www.rittal.com)

Related documents

Manual	Code
General manuals	
<i>ACS880 multidrive cabinets and modules safety instructions</i>	3AUA0000102301
<i>ACS880 multidrive cabinets and modules electrical planning instructions</i>	3AUA0000102324
<i>Drive modules cabinet design and construction instructions</i>	3AUA0000107668
<i>BCU-02/12/22 control units hardware manual</i>	3AUA0000113605
Supply module manuals	
<i>ACS880-204 IGBT supply modules hardware manual</i>	3AUA0000131525
<i>ACS880 IGBT supply control program firmware manual</i>	3AUA0000131562
<i>ACS880-304 +A003 diode supply modules hardware manual</i>	3AUA0000102452
<i>ACS880-304...+A018 diode supply modules hardware manual</i>	3AXD50000010104
<i>ACS880 diode supply control program firmware manual</i>	3AUA0000103295
<i>ACS880-904 regenerative rectifier modules hardware manual</i>	3AXD50000020457
<i>ACS880 regenerative rectifier control program firmware manual</i>	3AXD50000020827
Inverter module manuals and guides	
<i>ACS880-104 inverter modules hardware manual</i>	3AUA0000104271
<i>ACS880 primary control program firmware manual</i>	3AUA0000085967
<i>ACS880 primary control program quick start-up guide</i>	3AUA0000098062
Brake module and DC/DC converter module manuals	
<i>ACS880-604 1-phase brake chopper modules hardware manual</i>	3AUA0000106244
<i>ACS880-604 3-phase brake modules hardware manual</i>	3AXD50000022033
<i>ACS880 (3-phase) brake control program firmware manual</i>	3AXD50000020967
<i>ACS880-1604 DC/DC converter modules hardware manual</i>	3AXD50000023642
<i>ACS880 DC/DC converter control program firmware manual</i>	3AXD50000024671
Module package hardware manuals	
<i>ACS880-04 module packages hardware manual</i>	3AUA0000138495
<i>ACS880-14 and -34 module packages hardware manual</i>	3AXD50000022021
Option manuals	
<i>ACX-AP-x assistant control panels user's manual</i>	3AUA0000085685
<i>BAMU-12C auxiliary measurement unit hardware manual</i>	3AXD50000117840

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Manual	Code
<i>Drive composer start-up and maintenance PC tool user's manual</i>	3AUA0000094606
<i>Drive application programming (IEC 61131-3) manual</i>	3AUA0000127808
<i>Installation frames for ACS880 multidrive modules hardware manual</i>	3AXD50000010531
Manuals and quick guides for I/O extension modules, fieldbus adapters, safety functions modules, etc.	

See www.abb.com/drives/documents for all manuals on the Internet.

You can find all documentation related to the multidrive modules on the Internet at <https://sites-apps.abb.com/sites/lvacdrivesengineeringsupport/content>.

2

Operation principle and hardware description

Contents of this chapter

This chapter describes how the regenerative rectifier unit works and also the hardware of the ACS880-904 regenerative rectifier module

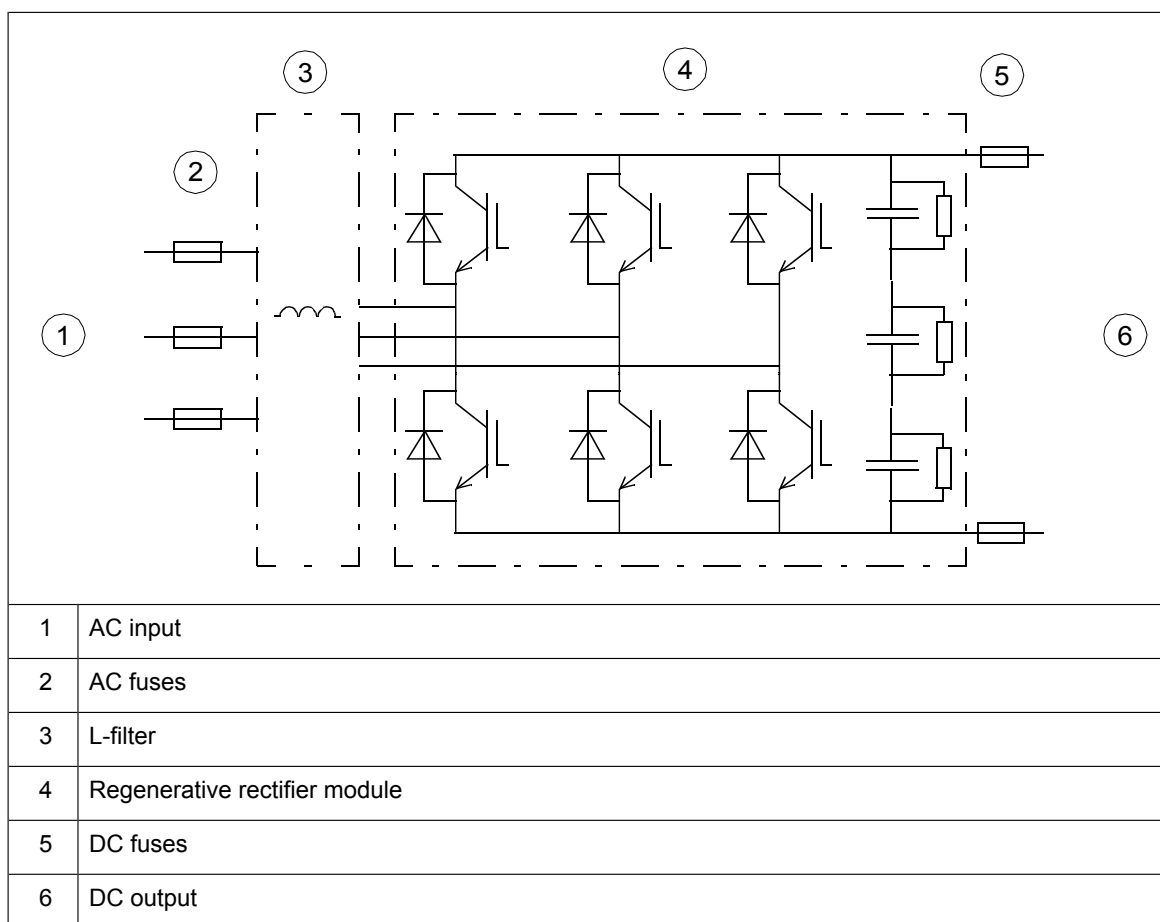
Operation principle

The regenerative rectifier unit (RRU) consists of one or more rectifier modules ($n \times R8i$) and an L-filter. Each R8i module consists of six IGBT components and six diodes connected in anti-parallel. In motoring mode, current flows from an AC supply through the diodes to a DC bus. In regenerating mode, current flows from the DC bus through the IGBTs to the supply network.

The IGBTs of the regenerative rectifier unit are switched, conducting only once during each network voltage half-cycle, which is comparable to a 6-pulse diode supply unit. This reduces switching losses and allows higher power ratings for the power module. Because the IGBTs can be switched off at any time, RRU – unlike a thyristor bridge – is reliable also during supply network failures when in regenerating mode.

■ Simplified main circuit diagram

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



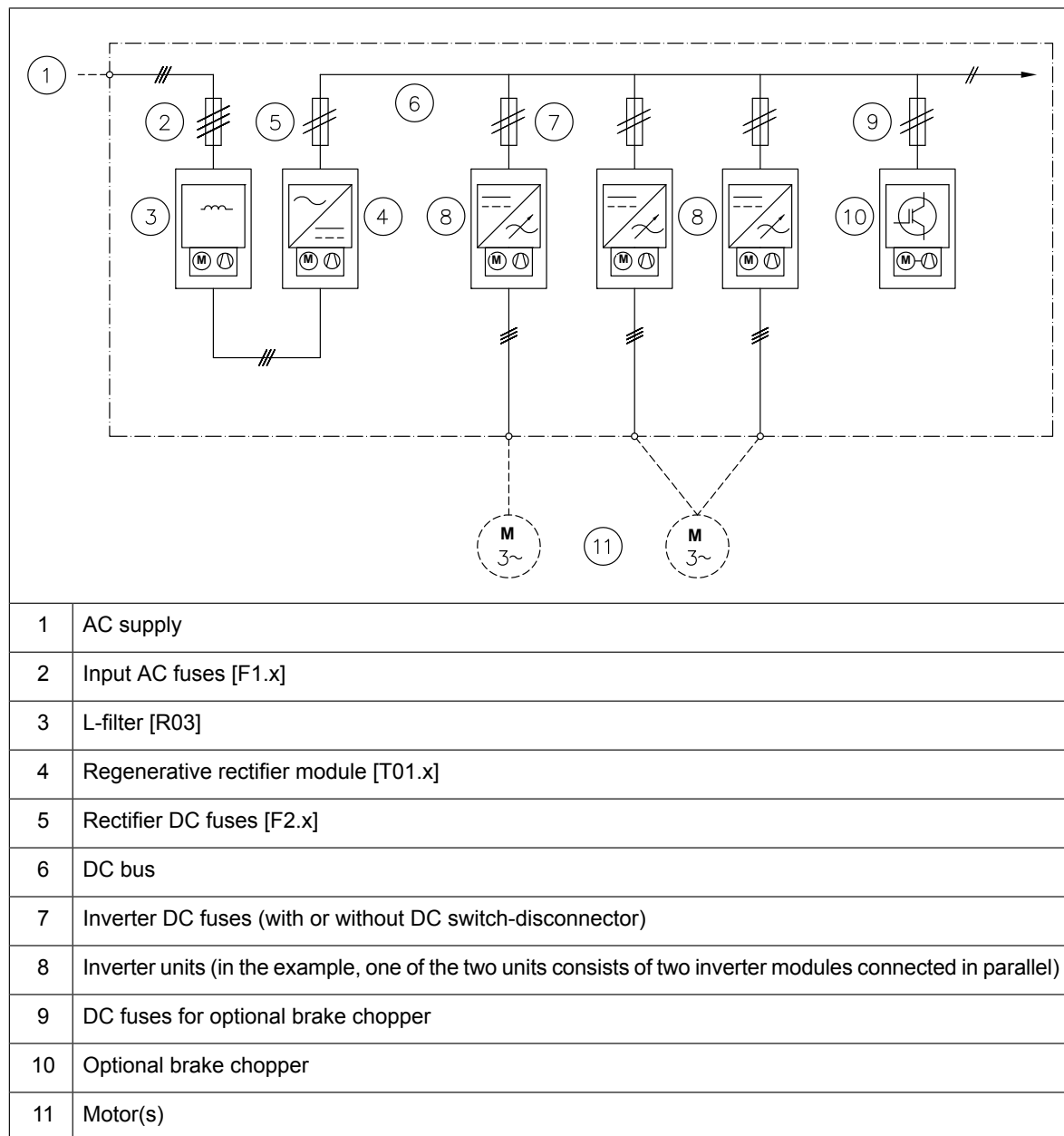
■ Charging

A charging circuit powers up the DC link capacitors of the drive system smoothly. Discharged capacitors cannot be directly connected to the full supply voltage. The charging current must be limited until the capacitors are charged and ready for normal use.

The control program has a function for controlling the charging circuit. For further information, see the firmware manual.

Overview diagram of the drive system

The following figure shows a simplified diagram of a common DC bus drive system.



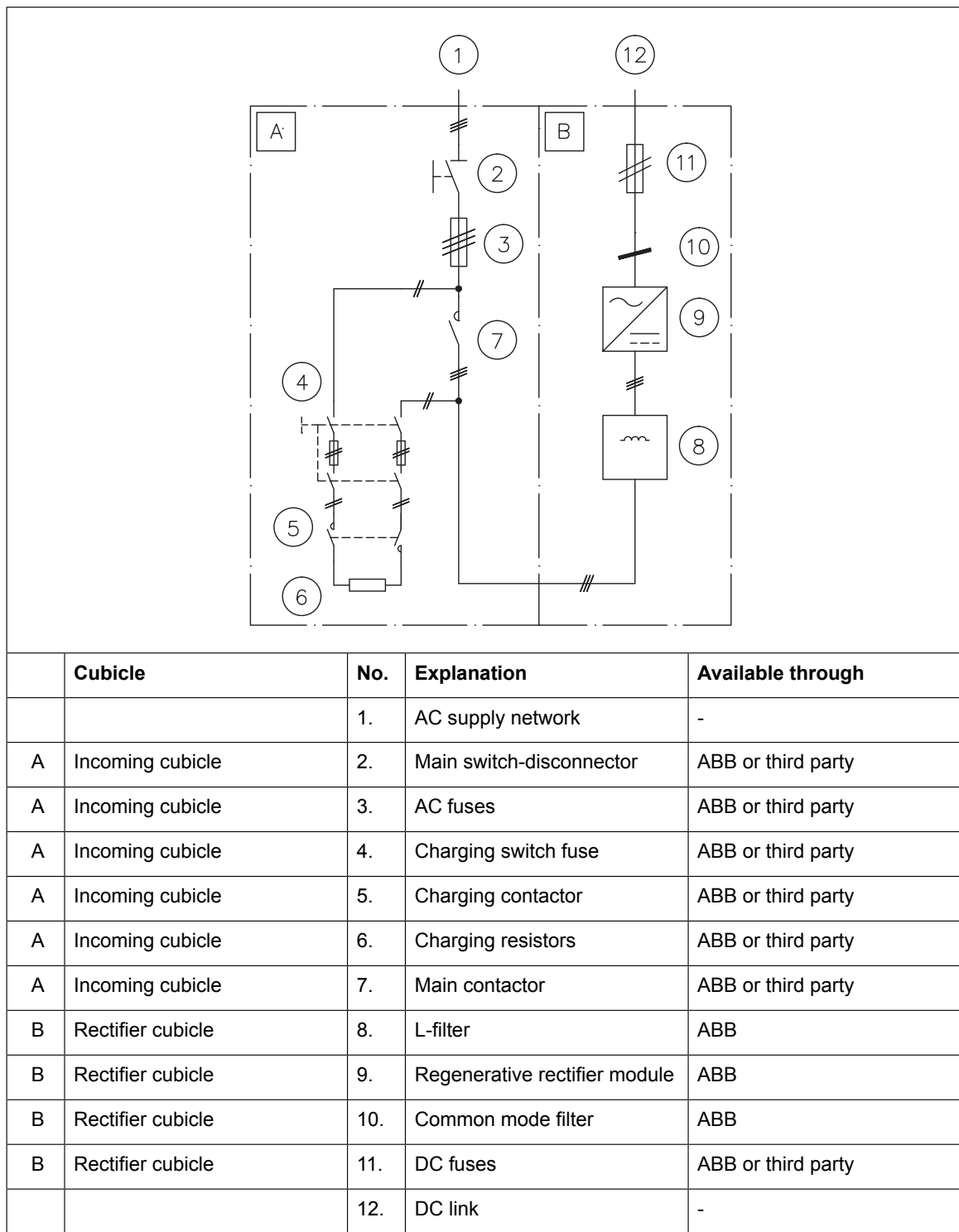
Single-line circuit diagrams of the rectifier unit

The following figures are examples of possible regenerative rectifier unit configurations.

■ Frame 1×R8i in Rittal VX25 and generic enclosure

The following figure shows a connection example of a rectifier unit with one frame R8i module. The connection is the same in both Rittal VX25 and generic enclosures.

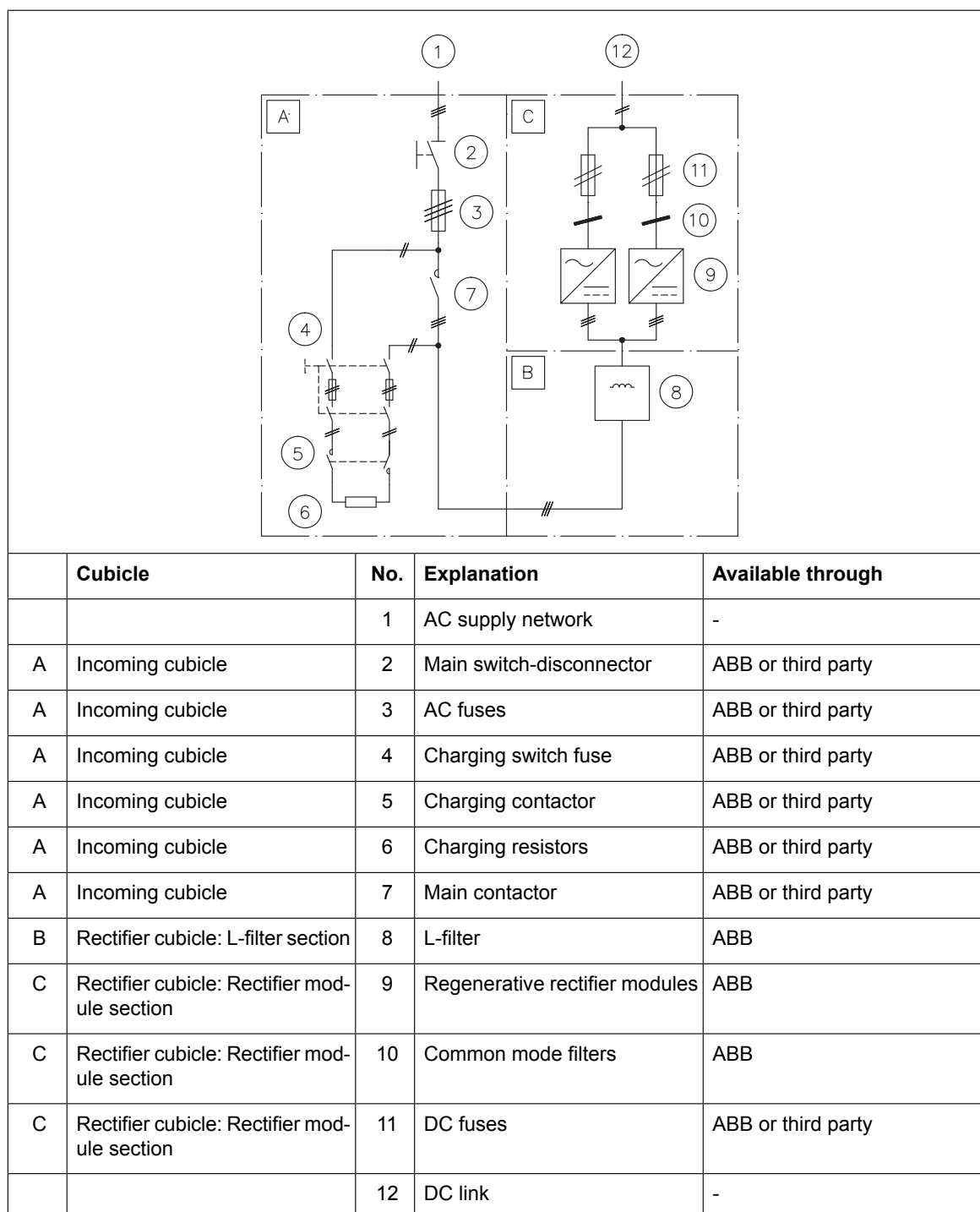
The table gives explanations for the numbers and letters used in the diagram. It also indicates if the customer can order the components from ABB or if the customer needs to acquire them separately.



■ Frame 2×R8i in Rittal VX25 enclosure

The following figure shows a connection example of a rectifier unit with multiple frame R8i modules (2×R8i) in Rittal VX25 enclosure.

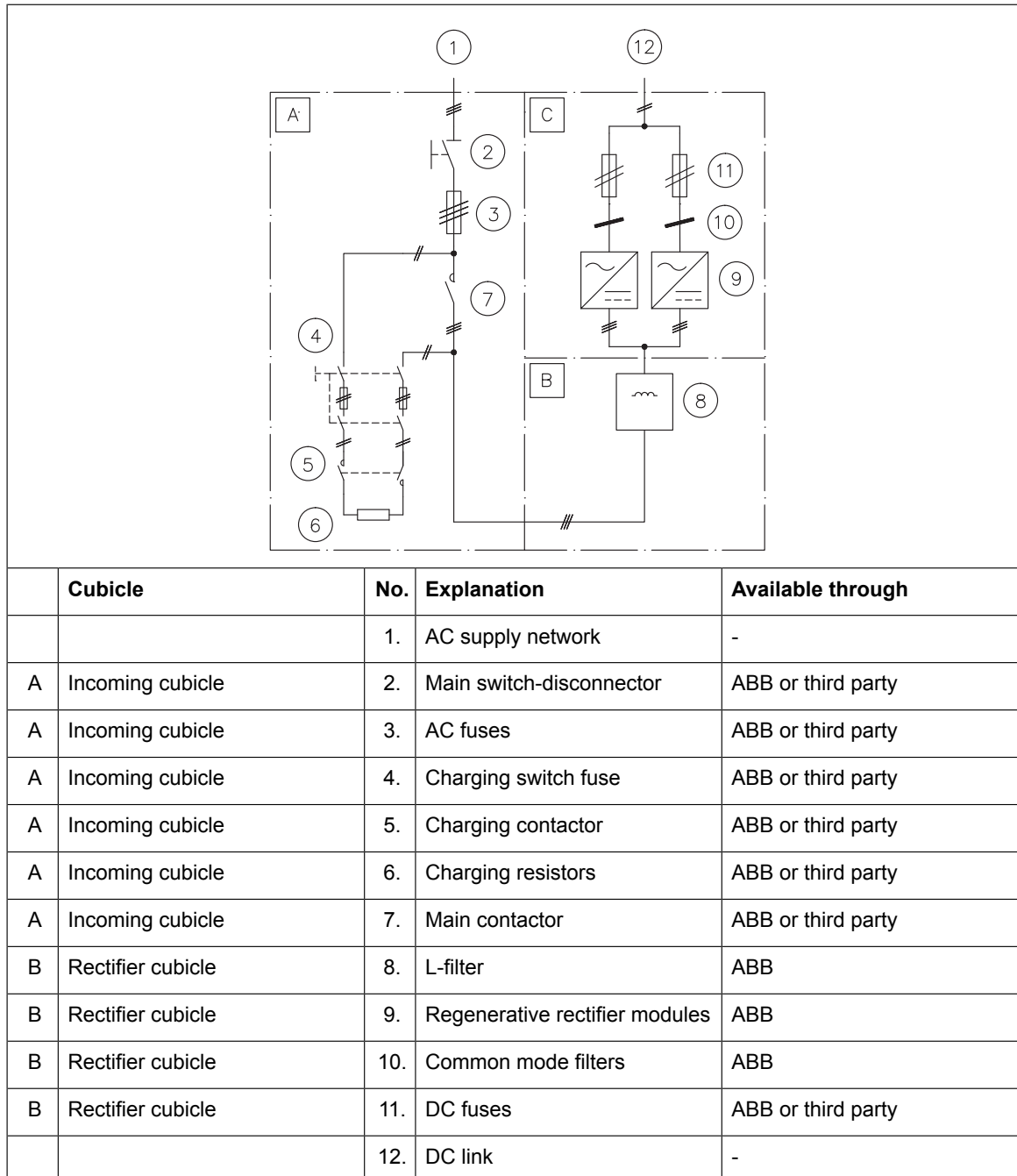
The table gives explanations for the numbers and letters used in the diagram. It also indicates if the customer can order the components from ABB or if the customer needs to acquire them separately.



■ Frame 2×R8i in generic enclosure

The following figure shows a connection example of a rectifier unit with multiple frame R8i modules (2×R8i) in generic enclosure.

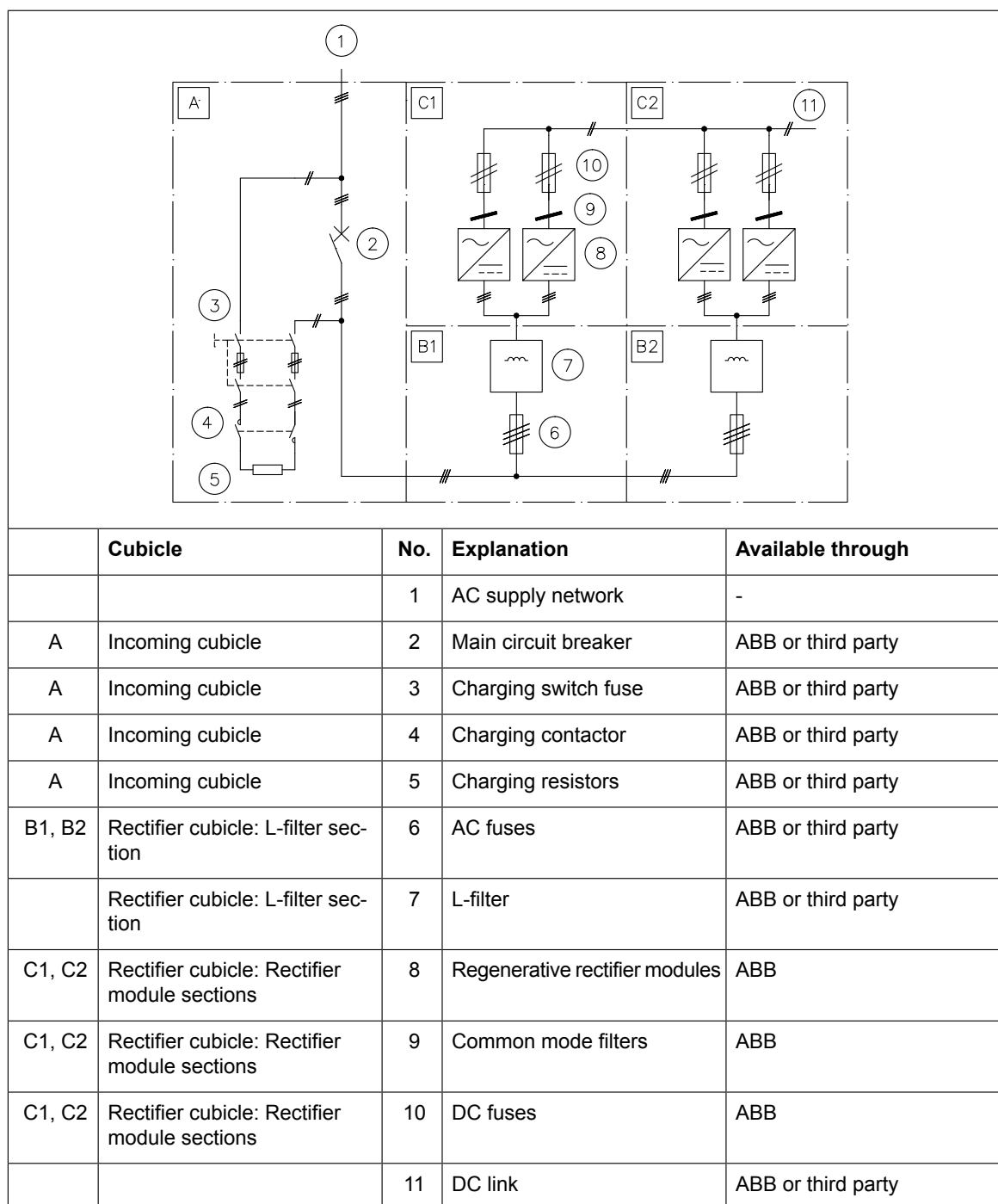
The table gives explanations for the numbers and letters used in the diagram. It also indicates if the customer can order the components from ABB or if the customer needs to acquire them separately.



■ Frame 4×R8i in Rittal VX25 enclosure

The following figure shows a connection example of a rectifier unit with multiple frame R8i modules (4×R8i) in Rittal VX25 enclosure.

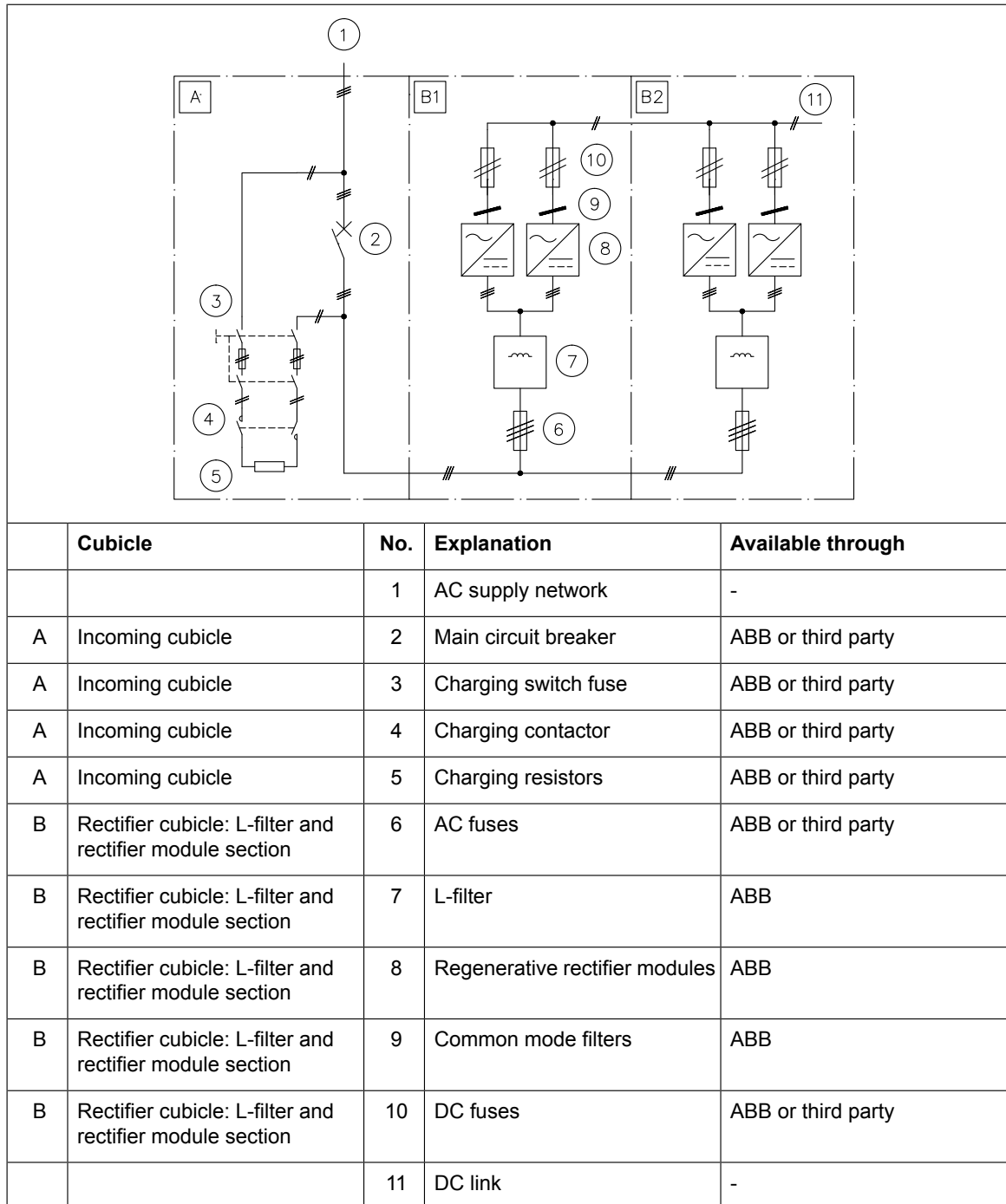
The table gives explanations for the numbers and letters used in the diagram. It also indicates if the customer can order the components from ABB or if the customer needs to acquire them separately.



■ Frame 4×R8i in generic enclosure

The following figure shows a connection example of a rectifier unit with multiple frame R8i modules (4×R8i) in a generic enclosure.

The table gives explanations for the numbers and letters used in the diagram. It also indicates if the customer can order the components from ABB or if the customer needs to acquire them separately.



Hardware of the regenerative rectifier and L-filter modules

Frame R8i modules are used in single or parallel configurations. R8i modules run on wheels, and can easily be removed from the cubicle for cable installation or service.

The quick connector at the back of the module couples when the module is inserted into the cubicle.

Each parallel-connected module is cabled separately, or connected by busbars to adjacent modules to reduce the number of cables.

The internal electronics of the R8i module need to be powered from an external auxiliary voltage source. The R8i speed-controlled cooling fan (delivered as standard) is supplied internally from DC.

If a direct-on-line fan (option +C188) is used, the user must connect the fan supply (400 V AC / 50/60 Hz or 320 V AC / 60 Hz) to the terminal block [X50].

L-filter modules run also on wheels. The direct-on-line fan of the L-filter is controlled internally by the R8i module. The user must connect the fan control to the R8i fiber optic connector [BSFC] and the fan supply to the L-filter connector [X30].

Frame R8i (and multiples, if any) modules are controlled by a single BCU control unit installed separately from the module(s). The control unit is connected to each module by a fiber optic link. The control unit can be powered from the module (terminal block X53), from an external 24 V DC supply, or both for redundancy. The control unit contains the basic I/Os and slots for optional I/O modules. Other equipment is primarily installed on separate mounting plates.

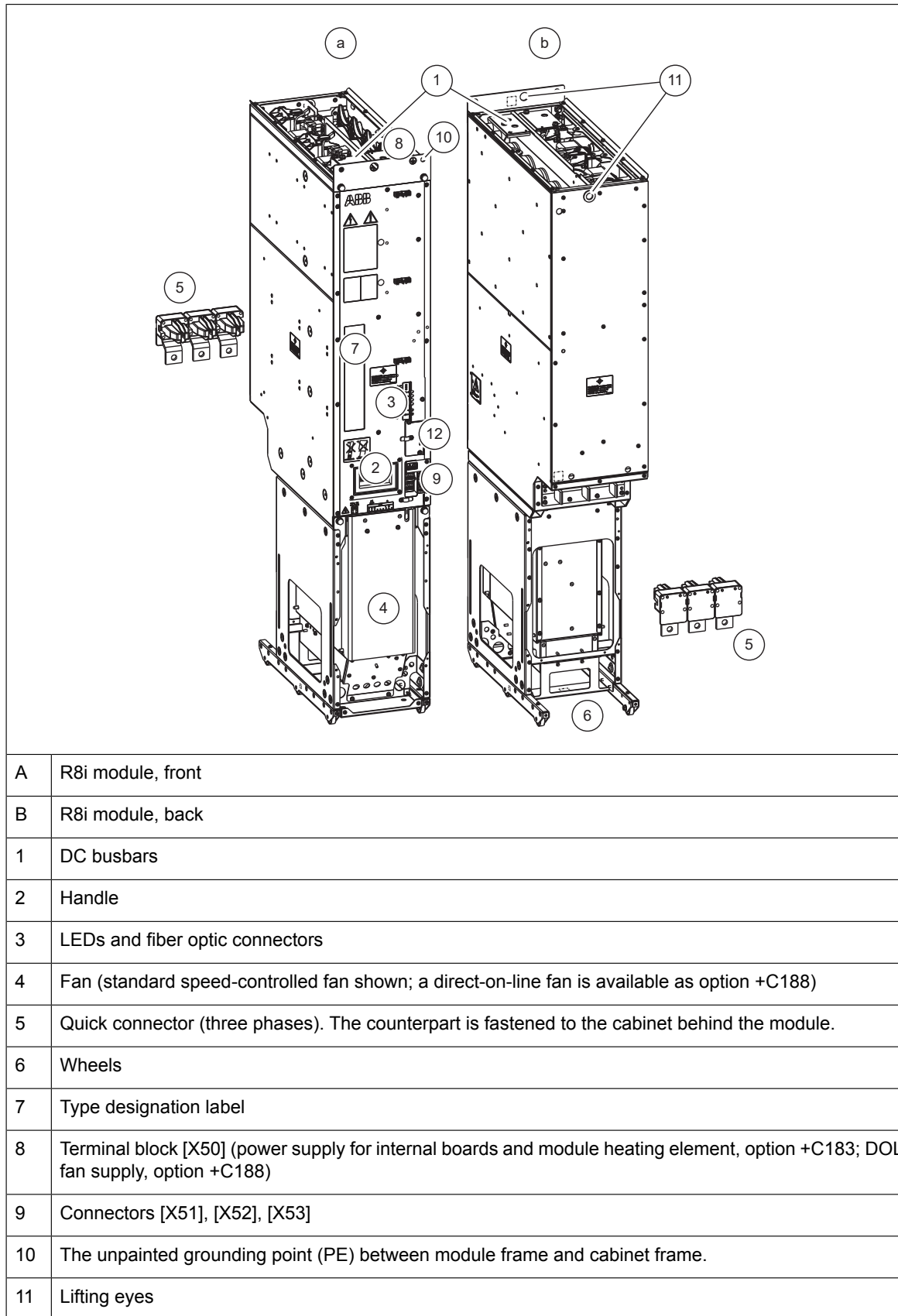
■ Licensing

The rectifier module (frame R8i) has a hardware license (+N8207) which allows the use of the module with the dedicated regenerative rectifier control program only. It is though possible to use a frame R8i module without the hardware license (+N8207) with the regenerative rectifier software. Therefore it is possible to use an R8i module without the hardware license (+N8207) as a spare part module for ACS880-90x.

■ Layout drawings

Frame R8i layout

This figure shows the layout of the R8i module.

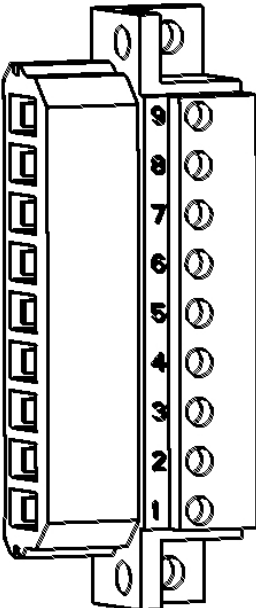


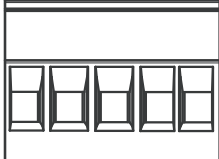
Connectors X50...X53

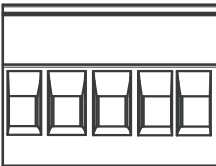
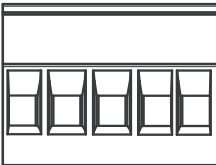
The cabinet builder must arrange an auxiliary voltage of 230 V AC (or 115 V AC with option +G304) to connector X50 to power the electronics of the power module. Also, the cabinet builder must arrange an auxiliary voltage of 230 V AC to connector X50 to power the main circuit interface board of the module during charging.

There is an internal power supply (BDPS) in the module that produces 24 V DC from the auxiliary voltage for the internal circuit boards. The 24 V DC voltage is available on X53 and it can be used to power the BCU control unit. It is not allowed to use the 24 V DC output on terminal X53 for any other purpose than for powering the BCU control unit. If the unit consists of parallel-connected R8i modules, ABB recommends to use an external 24 V DC supply to power the BCU control unit.

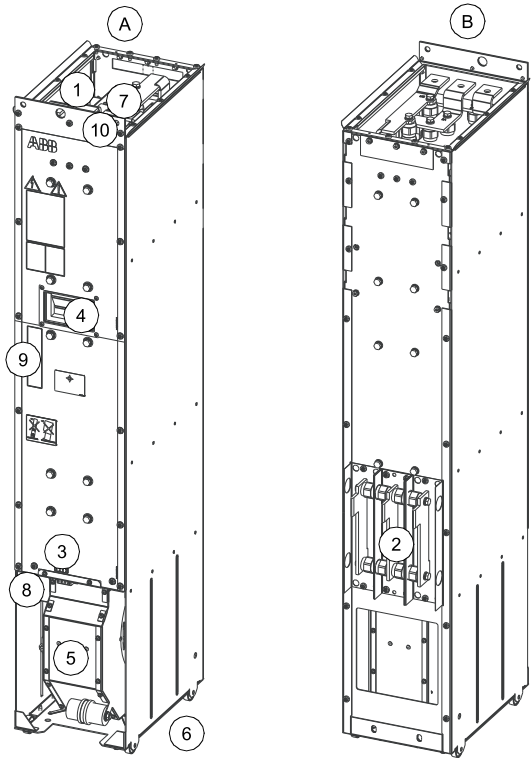
If a direct-on-line fan (option +C188) is used, the user must connect the fan supply (400 V AC 50 Hz or 60 Hz) to the module control connector [X50.1]. If an internal heating element (option +C183) is used, the user must connect the supply for the heating element to the module control connector [X50.7].

Connector X50		
	9	Not in use.
	8	N
	7	L
	6	Not in use.
	5	N
	4	L
	3	W
	2	V
	1	U
		Note: In modules without +C188, the DOL wiring is present but not in use.

Connectors X51, X52, X53																				
	<table border="1"><tr><th colspan="5">STO OUT</th></tr><tr><th colspan="5">X51</th></tr><tr><td>FE</td><td>GND</td><td>24V</td><td>GND</td><td>24V</td></tr></table>		STO OUT					X51					FE	GND	24V	GND	24V	X51	STO OUT	Not in use.
STO OUT																				
X51																				
FE	GND	24V	GND	24V																

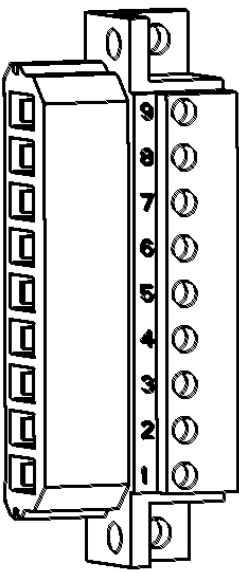
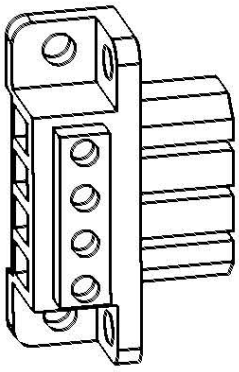
Connectors X51, X52, X53																				
	<table><tr><th colspan="5">STO IN</th></tr><tr><th colspan="5">X52</th></tr><tr><td>FE</td><td>GND</td><td>24V</td><td>GND</td><td>24V</td></tr></table>		STO IN					X52					FE	GND	24V	GND	24V	X52	STO IN	STO connectors of the module. Must be connected to 24 V DC for the module to start.
STO IN																				
X52																				
FE	GND	24V	GND	24V																
	<table><tr><th colspan="5">24V OUT</th></tr><tr><th colspan="5">X53</th></tr><tr><td>FE</td><td>24V</td><td>GND</td><td>24V</td><td>GND</td></tr></table>		24V OUT					X53					FE	24V	GND	24V	GND	X53	24V OUT	24 V DC for BCU and for STO IN to enable the module operation.
24V OUT																				
X53																				
FE	24V	GND	24V	GND																
Note: The Safe torque off (STO) safety function is only implemented in inverter units. Therefore, the STO function cannot be used in supply, rectifier, DC/DC converter and brake units. In these units, de-energizing any connection of STO IN (X52) connector stops the unit. Note that this stop is not safety related and must not be used for safety function purposes.																				

L-filter module (BL-1x-x)

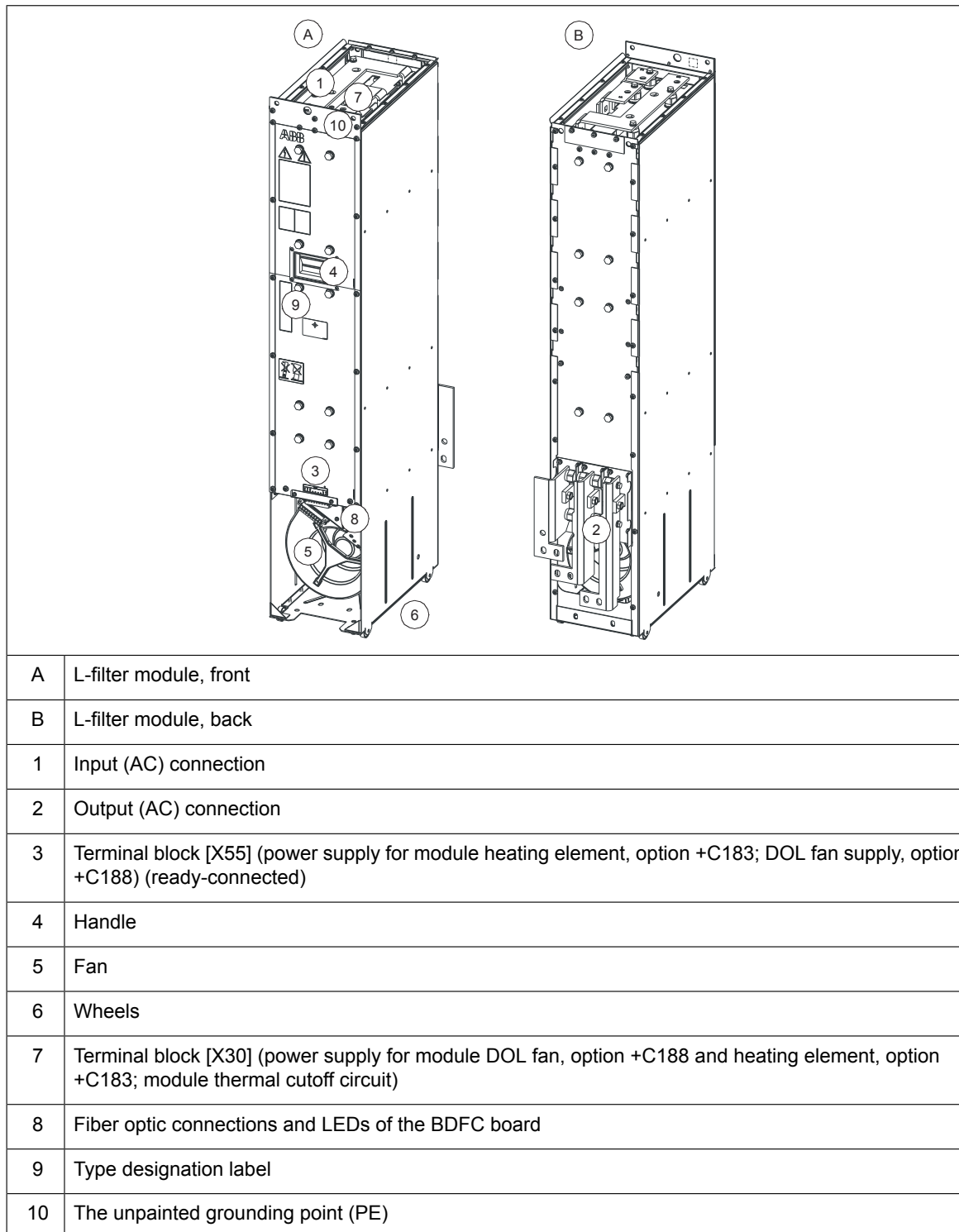
	
A	L-filter module, front
B	L-filter module, back
1	Input (AC) connection
2	Output (AC) connection
3	Terminal block [X55] (power supply for module heating element, option +C183; DOL fan supply, option +C188) (ready-connected)

4	Handle
5	Fan
6	Wheels
7	Terminal block [X30] (power supply for module DOL fan, option +C188 and heating element, option +C183; module thermal cutoff circuit)
8	Fiber optic connections and LEDs of the BDFC board
9	Type designation label
10	The unpainted grounding point (PE)

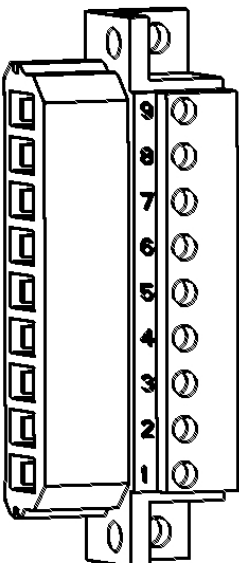
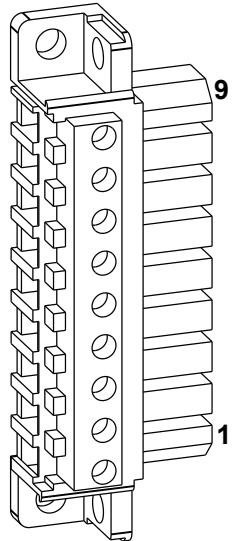
Connectors X30 and X55

Connector X30		
	9	+C183: Heating element N (230 V AC or 115 V AC)
	8	+C183: Heating element L (230 V AC or 115 V AC)
	7	Not in use
	6	TP2, thermal cutoff circuit
	5	TP1, thermal cutoff circuit
	4	Not in use
	3	Not in use
	2	+C188: DOL fan N (230 V AC or <u>option +G304</u> : 115 V AC)
	1	+C188: DOL fan L (230 V AC or <u>option +G304</u> : 115 V AC)
Connector X55		
Note: Connections of the connector X55 are ready-made at the factory.		
	4	+C183: Heating element N (230 V AC or 115 V AC)
	3	+C183: Heating element L (230 V AC or 115 V AC)
	2	+C188: DOL fan N (230 V AC or <u>option +G304</u> : 115 V AC)
	1	+C188: DOL fan L (230 V AC or <u>option +G304</u> : 115 V AC)

L-filter module (BL-2x-x)



Connectors X30 and X55

Connector X30		
	9	+C183: Heating element N (230 V AC or 115 V AC)
	8	+C183: Heating element L (230 V AC or 115 V AC)
	7	Not in use
	6	TP2, thermal cutoff circuit
	5	TP1, thermal cutoff circuit
	4	Not in use
	3	+C188: DOL fan W
	2	+C188: DOL fan V
	1	+C188: DOL fan U
		400 V AC or option +G427: 208 V AC
Connector X55		
Note: Connections of the connector X55 are ready-made at the factory.		
	9	+C183: Heating element N (230 V AC or 115 V AC)
	8	+C183: Heating element L (230 V AC or 115 V AC)
	7	Not in use
	6	Not in use
	5	Not in use
	4	Not in use
	3	+C188: DOL fan W
	2	+C188: DOL fan V
	1	+C188: DOL fan U
		400 V AC or option +G427: 208 V AC

Control interfaces

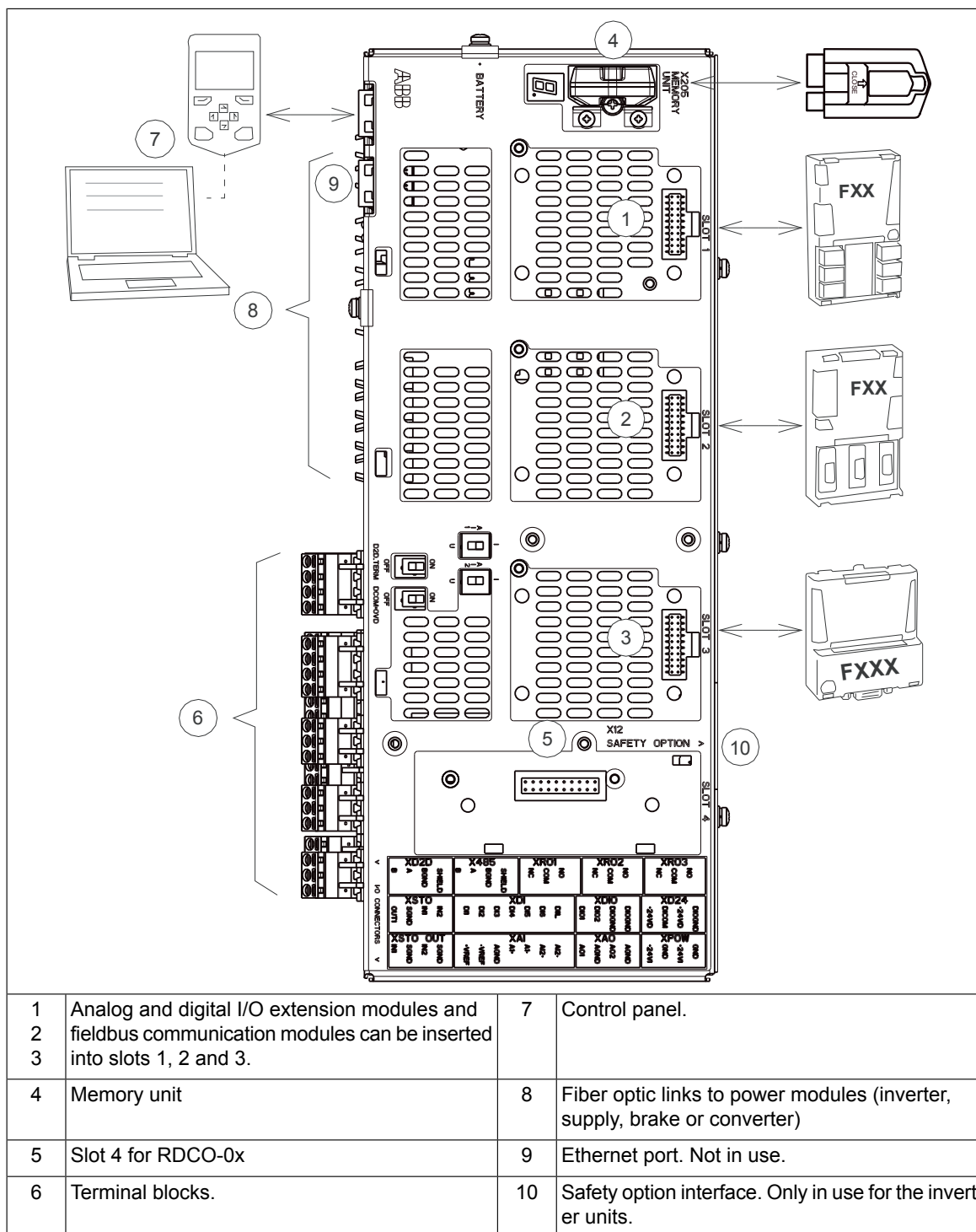
With rectifier unit control interfaces it is possible to:

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

The rectifier unit I/O control interface is mostly in internal use.

■ Overview of the control connections of the BCU control unit

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



Rectifier unit control devices

■ Main disconnecting device

You must equip the supply unit with a main disconnecting device. You can use either a main switch-disconnector [Q1.1] or a withdrawable main breaker [Q1]. With this switch, you can isolate the main circuit of the drive from the power line.



WARNING!

The switch does not isolate the input power terminals or the auxiliary circuit from the power line. To isolate the input power terminals, open the main breaker of the supply transformer and lock it to the open position.

■ Auxiliary voltage switch

You can equip the unit with an auxiliary voltage switch [Q21]. Using the switch, you can disconnect the auxiliary circuit from the power line.

■ Operating switch

The cabinet can be equipped with an operating switch [S21].

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

- The ENABLE/RUN position: The control program closes the charging contactor [Q4] and the main DC link is charged. After the DC link is charged, the main contactor [Q2] will be closed and the charging contactor [Q4] opened. The module starts operating.
- The OFF position: The control program opens the main contactor [Q2] and the module stops rectifying.

■ Emergency stop and emergency stop reset buttons

The cabinet can be equipped with an emergency stop button [S61] and an emergency stop reset button [S62]. Pressing the emergency stop button activates the emergency stop function of the supply unit. The button locks to open position automatically. You must release the button before you can return to the normal operation. Before the restart, you also need to reset the emergency stop circuit with the reset button.

Note: The customer is fully responsible for implementing and testing the functional safety circuits according to the relevant legislation and acceptance testing regulations. The functional safety option manuals give examples on implementing the safety circuits in ACS880 multidrives.

■ The control unit

The rectifier module is controlled by a BCU control unit.

For more information, see chapter Control unit.

■ 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 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] and the supply unit on and off (Run enable signal) through the fieldbus, the Run enable command at digital input DI2 must be on (1).

Type designation labels

■ Type designation labels of the regenerative rectifier module

Each regenerative rectifier module has type designation labels attached to it. The type designation stated on the labels contains information on the specifications and configuration of the unit.

Quote the complete type designation and serial number when contacting technical support on the subject of individual regenerative rectifier modules.

Example labels are shown below.

 1 ACS880-104-0600A-7+E205 7 EAC SP 206973 C UL US LISTED IND. CONT. L.G. 1P2A MADE IN FINLAND ABB Oy Hiomotie 13 00380 Helsinki Finland Input U1 742/849/976 VDC I1 675 A f1 - Output U2 3~ 0...525/600/690 VAC I2 600 A f2 0...500 Hz Sn 717 kVA 6 LINE CONVERTER 3~ 525/600/690 VAC 540 A 50/60 Hz 742/849/976 VDC 655 A - 645 kVA FRAME R8i 2 Air cooling 3 IP00 4 UL open type UL/CSA: max. 849 VDC/600 VAC 5 8 S/N: 1160600008	
 1 ACS880-104-0600A-7+E205 S/N: 1160600008 Input U1 742/849/976 VDC I1 1171 A f1 - Output U2 3x 0...742/849/976 VDC I2 3x 465 A f2 - Sn 1300 kVA 6 BRAKE CHOPPER 3~ 525/600/690 VAC 900 A 50/60 Hz 709/810/932 VDC 1091 A - 1076 kVA 6 REGENERATIVE RECTIFIER 3~ 525/600/690 VAC 900 A 50/60 Hz 709/810/932 VDC 1091 A - 1076 kVA DC/DC CONVERTER 742/849/976 VDC 600 A - 50...668/764/878 VDC 600 A - 527 kVA	
1.	Type designation
2.	Frame size
3.	Cooling method and additional information
4.	Degree of protection
5.	UL/CSA data
6.	Ratings
7.	Valid markings
8.	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 label of the L-filter module

Each L-filter module has a type designation label attached to it.

Quote the complete type designation and serial number when contacting technical support on the subject of individual L-filter modules.

An example label is shown below.

ABB	① BL-15-7+C183+C188	Rev. A	⑥  C 206573 US 
MADE IN FINLAND ABB Oy Hiomotie 13 00380 Helsinki Finland	④ Un 3~ 525/600/690 V In 900 A fn 50/60 Hz	 	
IP00 ② UL open type UL/CSA: max. 600 V AC	⑤ 3AUA0000169917	S/N: XXXXXXXX	
1.	Type designation		
2.	Degree of protection		
3.	UL/CSA data		
4.	Ratings		
5.	Ordering code of the L-filter		
6.	Valid markings		

Type designation keys

■ Type designation of the module

Type designation describes the composition of the module in short. The complete designation code is divided in subcodes:

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

The subcodes are described below.

CODE	DESCRIPTION
Basic codes	
ACS880	Product series
104	Construction: Inverter, supply, converter or brake module.
Size	
xxxxx	Refer to the ratings table in the technical data.
Voltage range	
3	DC voltage corresponding AC input voltages 3 ~ 380...415 V. This is indicated in the type designation label as typical input voltage level 566 V DC.
5	DC voltage corresponding AC input voltages 3 ~ 380...500 V. This is indicated in the type designation label as typical input voltage level 566/679/707 V DC.

CODE	DESCRIPTION
7	DC voltage corresponding AC input voltages 3 ~ 525...690 V. This is indicated in the type designation label as typical input voltage level 742/849/976 V DC.
Option codes (plus codes)	
C183	Internal heating element
C188	Direct-on-line (DOL) cooling fan
E205	Internal du/dt filtering. Standard with 690 V modules.
G304	115 V auxiliary voltage supply
N8207	Hardware license

■ Type designation key of the L-filter module

The designation code of the L-filter is divided in subcodes:

- The first 2 letters give the type of the L-filter, for example, **BL**-15-7. The numbers after the letters describe the rectifier modules with which the filter is used.
- The plus codes follow the basic code. Each plus code starts with an identifying letter (common for the whole product series), followed by descriptive digits. The plus codes are separated by plus signs.

CODE	DESCRIPTION
Basic codes	
BL-1x	L-filter for frame 1×R8i rectifier module
BL-2x	L-filter for frame 2×R8i rectifier modules
Voltage range	
5	380 ... 500 V. This is indicated in the type designation label as typical input voltage level 400/480/500 V AC.
7	525 ... 690 V. This is indicated in the type designation label as typical input voltage level 525/600/690 V AC (600 V AC UL, CSA).
Option codes (plus codes)	
C183	Heating element (included in the delivery as standard)
C188	Direct-on-line (DOL) cooling fan (included in the delivery as standard with 230 V supply for BL-1x-x / 400 V AC supply for BL-2x-x)
G304	BL-1x-x only: 115 V AC 1-phase fan supply
G427	BL-2x-x only: 208 V AC 3-phase fan supply

3

Moving and unpacking the module

Contents of this chapter

This chapter gives basic information on moving, unpacking and lifting the modules.



WARNING!

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

Moving and lifting the transport package

Move the transport package by a pallet truck or lift. Lift the transport package in a horizontal position. Use soft lifting slings.

Unpacking

The module is delivered on a wooden base, boxed in corrugated cardboard. The cardboard box is tied to the base with PET bands.

1. Cut off the bands.
2. Lift off the cardboard box.
3. Remove any filling material.
4. Cut open the plastic wrapping of the module.
5. Lift off the module.
6. Check that there are no signs of damage.

Dispose of or recycle the packaging according to the local regulations.

Lifting the modules

Lift the unpacked module only by its lifting eyes.

Moving the modules



WARNING!

For general safety instructions for moving the module, see *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]).

4

Cabinet construction



Contents of this chapter

This chapter instructs in placing the modules and additional equipment into a cabinet.

For general instructions, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).

Limitation of liability

The installation must always be designed and made according to applicable local laws and regulations. ABB does not assume any liability whatsoever for any installation which breaches the local laws and/or other regulations. Furthermore, if the recommendations given by ABB are not followed, the drive may experience problems that the warranty does not cover.

Switching, disconnecting and protecting solution

To arrange the switching, disconnection and protection of the ACS880-904 module, the switching, disconnecting and protecting equipment can be placed outside the drive cabinet in the following way:

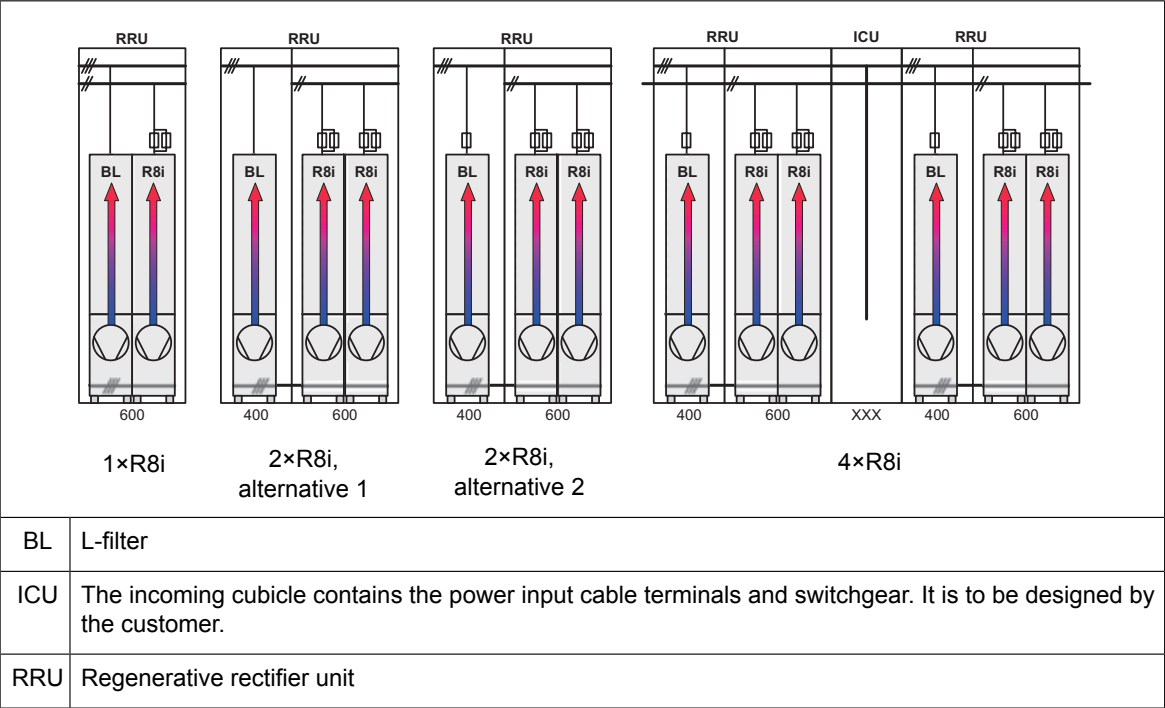
1. The AC supply is first connected to the main switch-disconnector or main breaker [Q1].
2. The AC fuses are connected after the switch-disconnector.
3. The main contactor [Q2] is connected between the AC fuses and the L-filter.
4. A charging circuit for precharging the DC link capacitors is connected over the main contactor [Q2]. See the [Single-line circuit diagrams of the rectifier units](#) in Operating principle and hardware description.

For the connection diagram, see chapter [Electrical installation](#).

Cabinet configuration overview

■ ACS880-904 configurations in Rittal VX25 enclosures

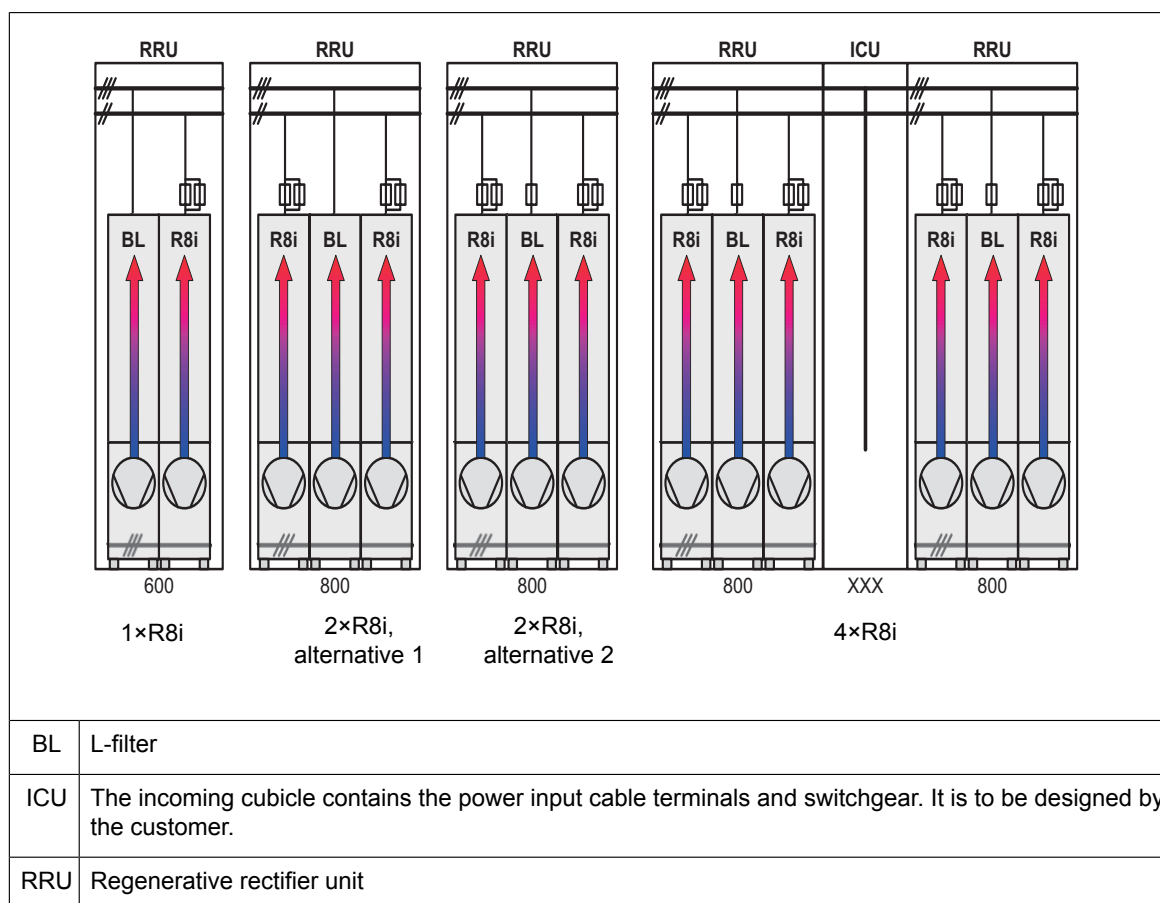
The following figures show examples of ACS880-904 configurations that can be installed in the VX25 enclosure.



Note: Parallel DC fuses are only for 690 V units.

■ ACS880-904 configurations in generic enclosures

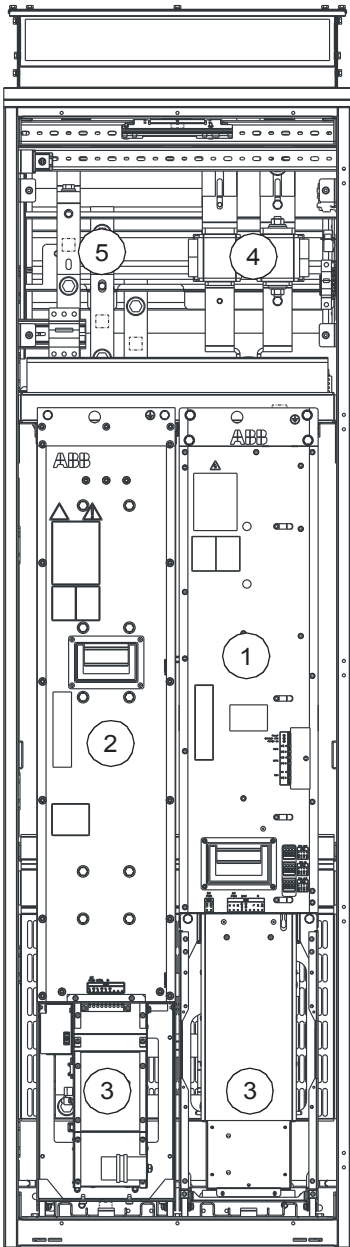
The following figures show examples of ACS880-904 configurations that can be installed in a generic enclosure.



Note: Parallel DC fuses are only for 690 V units.

■ **ACS880-907 rectifier unit with a regenerative rectifier module**

The following figure shows an example of a cabinet-installed ACS880-907 regenerative rectifier unit with frame 1×R8i rectifier module.



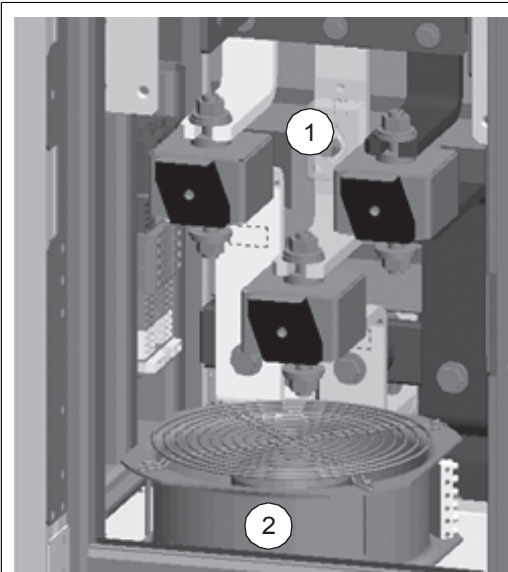
1	Regenerative rectifier module
2	L-filter module
3	Module cooling fan
4	DC fuses
5	AC busbars

Incoming cubicle

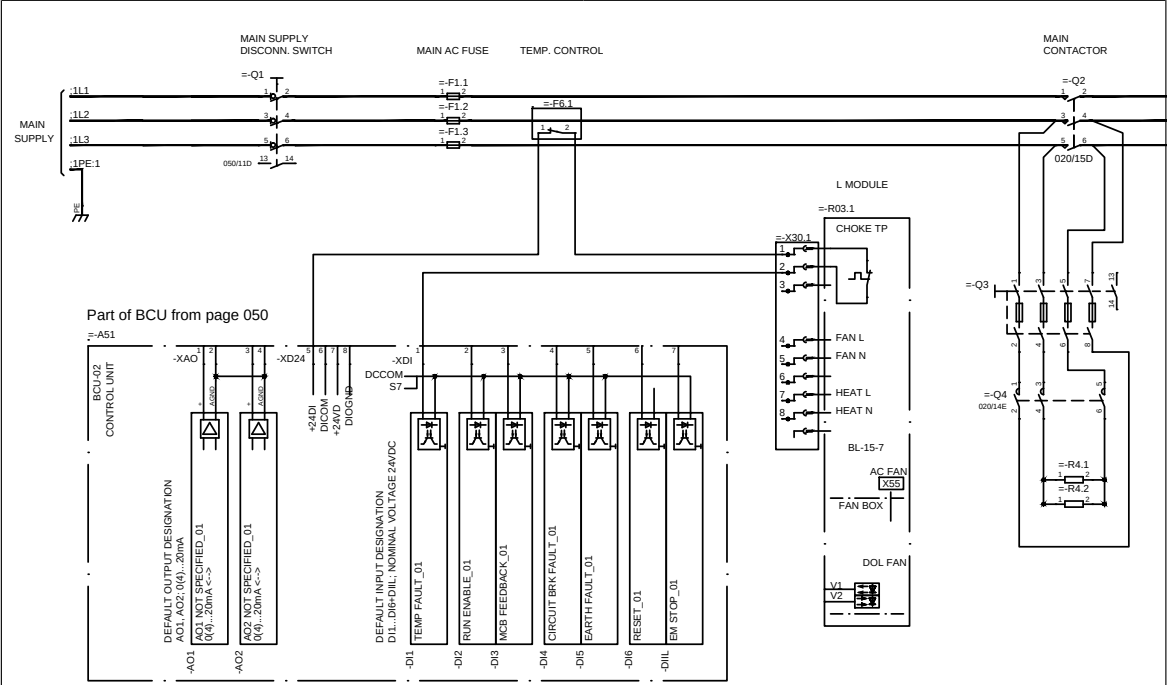
■ Example of the AC fuse cooling

The AC fuses must be cooled by forced cooling. If the fuses are not located in the same cubicle with the supply/rectifier module, the module cooling fan does not supply the cooling air for the fuses but you must use a separate cooling fan.

The following figures show an example of the cooling system using a thermal switch for the air temperature monitoring near the AC fuses.



	Description
1	Thermal switch
2	Cooling fan



Note: The connection of temperature monitoring requires proper insulation between busbars and thermal switch.

Installation examples



WARNING!

The code labels attached to mechanical parts such as busbars, shrouds and sheet metal parts must be removed before installation as they may cause bad electrical connections, or, after peeling off and collecting dust in time, cause arcing or block the cooling air flow.

This section instructs in placing the modules and additional equipment into a user-defined cabinet.

Each example includes a table that lists:

- installation stages of different equipment in the order in which the installation into the cabinet should be performed
- code of the step-by-step instructions
- equipment kit code
- kit ordering code.

You can find the kit-specific assembly drawings, step-by-step instructions and kit information on the Internet. Go to <https://sites-apps.abb.com/sites/lvacdrivesengineeringsupport/content>. If needed, contact your local ABB representative.

The example includes also cabinet assembly drawings that show each stage listed in the table. More detailed steps of each stage are described in the kit-specific assembly drawings.

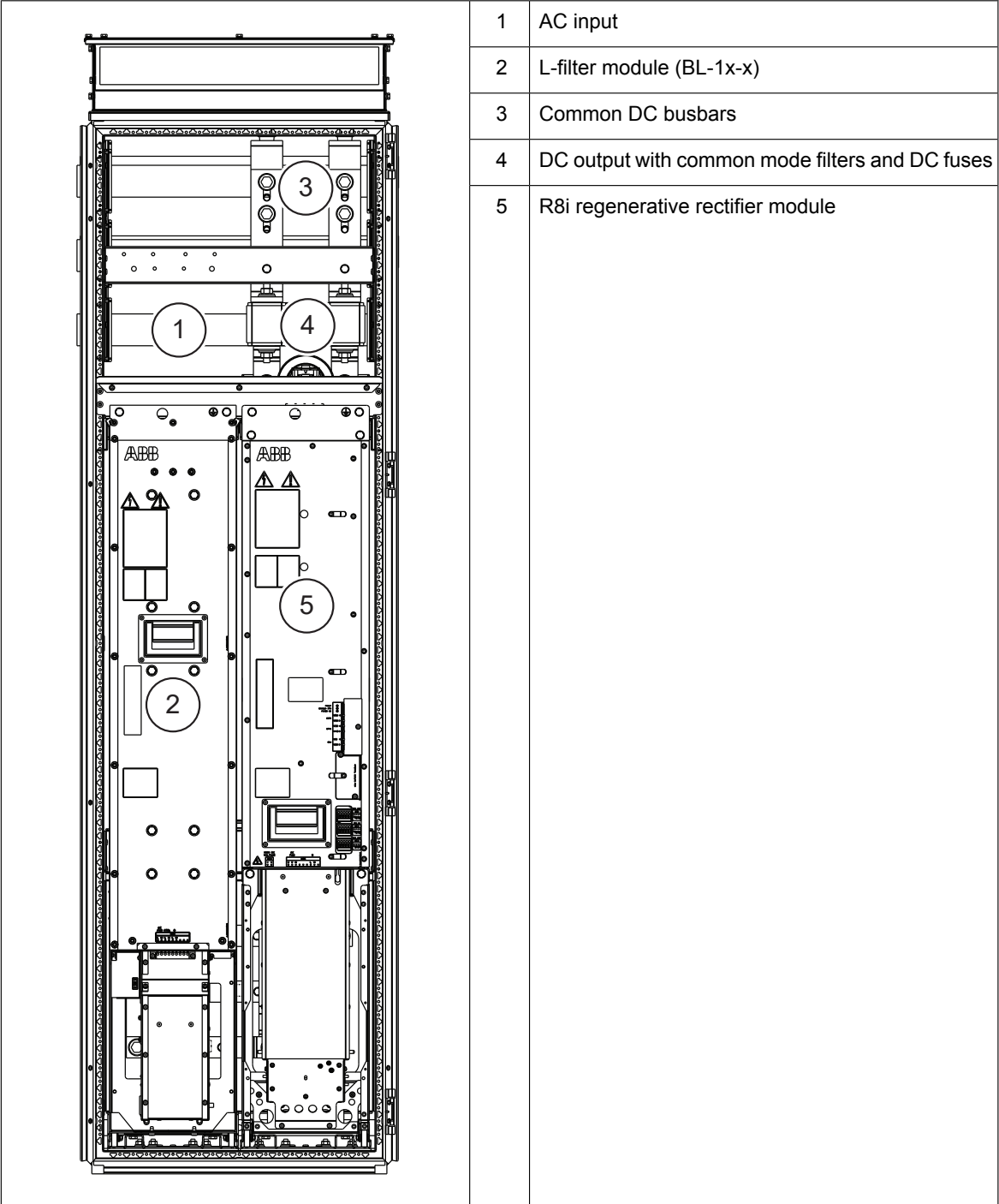
For general instructions, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).



■ 1×R8i module in 600 mm wide Rittal VX25 enclosure

Layout

The following figure shows an example of the 1×R8i module in the Rittal VX25 enclosure. The customer must place the control equipment in a separate cabinet.



Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1.	Installation of common parts:			
	- Baying parts	3AXD50000336340	-	-
	- PE busbar [PE]	3AXD50000336104	-	-
	- Divider panel	3AXD50000336692	-	-
	- Common AC Flat-PLS assembly	3AXD50000372782	A-468-X-011-VX	3AXD50000360772
	- Common DC Flat-PLS assembly	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2.	Module installation parts	3AXD50000384914	A-6-8-306-VX	3AXD50000416486
3.	AC busbars and quick connectors	3AXD50000384945	A-6-8-130-VX	3AXD50000416493
			A-468-8-100	3AUA0000119227
4.	DC connection:			
	- 400/500 V module	3AXD50000384990	A-6-8-204-VX	3AXD50000416714
	- 690 V module	3AXD50000469505	A-6-8-214-VX	3AXD50000488360
5.	Common mode filter busbars:			
	- 400/500 V module	3AXD50000002502	A-468-8-231	3AXD50000002492
	- 690 V module	3AXD50000017978	A-468-8-237	3AXD50000016952
	and DC connection flanges	3AXD50000003403	A-468-8-232	3AXD50000003411
6.	L-filter AC connection	3AXD50000002577	A-468-8-131	3AXD50000002576
	- optional ¹⁾	3AXD50000416332	A-6-8-110-VX	3AXD50000416509
7.	Shroud installation parts	3AXD50000335022	A-6-8-360-VX	3AXD50000337378
8.	Module installation	-	-	-

¹⁾ **Note:** This kit is not included in ABB's standard design but may be used if you wish to have AC fuses on top of the BL-1x-x filter module.

Kits for R8i module in 600 mm wide Rittal VX25 enclosure

1 2 3 4 5 6 7 8

3AXD50000471331
R81-1XR81-W600-VX25 (ASSEMBLY)
A. 2:
A. 1

Initial Approval 12-Aug-19 M. Michelsson

3AXD50000471331
R81-1XR81-W600-VX25 (ASSEMBLY)
A. 2:
A. 1

Initial Approval 12-Aug-19 M. Michelsson

KITS FOR ACS880-904 1XR81 IN RITTAL VX25 2000x600x600 CABINETS

See kit assembly drawings for required Rittal and/or other standard parts.

OPTIONAL:
IX-X AC BUSBARS FOR FUSES
KIT A-6-8-110-VX
Ordering code: 3AXD50000416509
Instruction: 3AXD50000416332

RRU COMMON MODE FILTER BUSBARS R81:
KIT A-468-8-237 (690V)
Ordering code: 3AXD50000016952
KIT A-468-8-231 (400V/500V)
Ordering code: 3AXD5000002492

BRACKET FOR FLAT-PLS BUSBAR HOLDER (COMMON DC)
(1 kit/cabinet)
KIT A-468-X-001-VX
Ordering code: 3AXD50000333387

BRACKET FOR FLAT-PLS BUSBAR HOLDER (COMMON AC)
(1 kit/cabinet)
KIT A-468-X-011-VX
Ordering code: 3AXD50000360772

IX-X AC CONNECTION
KIT A-468-8-131
Ordering code: 3AXD5000002576

IX-X AC BUSBARS W600
KIT A-6-8-214-VX (690V)
Ordering code: 3AXD50000488360
KIT A-6-8-204-VX (400V/500V)
Ordering code: 3AXD50000416714

DC CONNECTION FLANGES
(1 kit/cabinet)
KIT A-468-8-232
KIT A-468-8-231
Ordering code: 3AXD5000003411

X8X SHROUD INST: PARTS W600
KIT A-6-8-360-VX
Ordering code: 3AXD50000337378

X8X QUICK CONNECTORS FOR MODULE
(1 kit/module)
KIT A-468-8-100
Ordering code: 3AXD50000119227

BLCL-IX-X ISU MODUL INST PARTS W600
KIT A-6-8-306-VX
Ordering code: 3AXD50000416486

BLCL-IX-X ISU AC BUSBARS W600
KIT A-6-8-130-VX
Ordering code: 3AXD50000416493

Note! Only parts included in ABB kits are shown here!

Based on:
Customer:
Project:
Dec. No. 3AXD50000017629

Prepared: M. Michelsson
Checked: M. Michelsson
Approved: M. Asikainen

12-Aug-19 12-Aug-19 12-Aug-19

RRU 1XR81 W600
ACS880-904 FOR RITTAL VX

ASSEMBLY DRAWING
Title: RRU 1XR81 W600
Scale: 7:100
Form: A3
Drawing: A.2 (DR)
Sheet: 0

Dec. des. 3AXD50000471331

Dec. No. 3AXD50000471331

Form: A3

Scale: 7:100

Drawing: A.2 (DR)

Sheet: 0

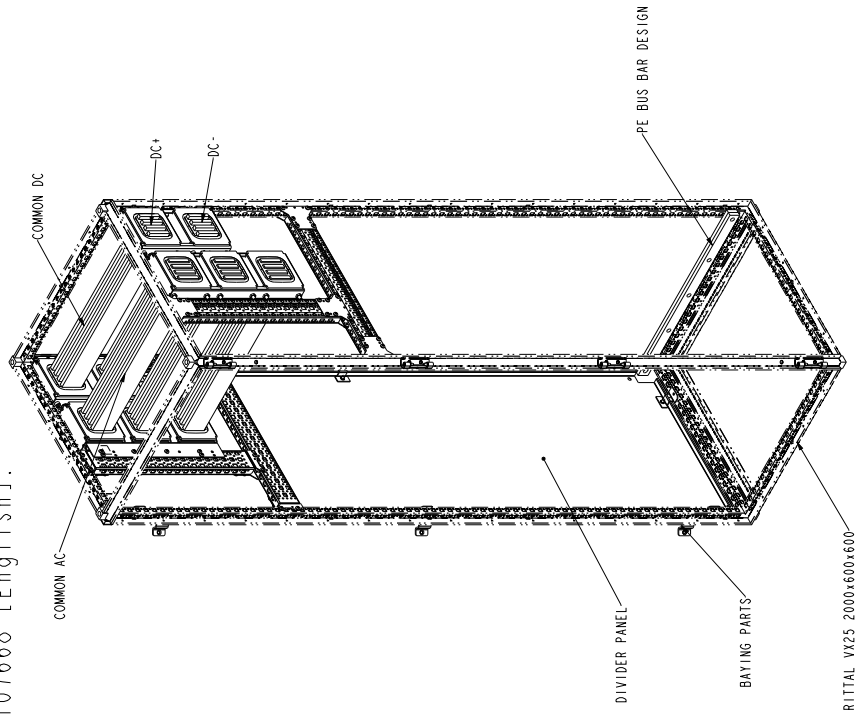


Note: Cabinet design and construction instructions for ACS880 multidrive modules (3AUA0000107668 [English]).

Stage 1: Installation of common parts.

See instruction drawings for details:

BAYING PARTS - 3AXD50000336340
PE BUS BAR DESIGN - 3AXD50000336104
DIVIDER PANEL - 3AXD50000336692
COMMON AC FLAT-PLS - 3AXD50000337282
COMMON DC FLAT-PLS - 3AXD50000333639



Prepared	M. Michelsson	12-Aug-19	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Check.	M. Michelsson	12-Aug-19	RRU 1XR81 W600		ASSEMBLY	1:10	A3
Appr.	M. Asikainen	12-Aug-19	ACS880-904 FOR RITTAL VX		Resp. Appl.	Rev. ind.	EN
Project name					Doc. No.		Sheet 2
Weight kg					Doc. No.		Total 9
Cust. Order No.							
DMS Number	3AXD10000913762						

Stage 2: Module installation parts

STAGE 2: BLCL IX-X ISU MODUL INST PARTS W600 installation

See assembly drawing 3AXD50000384914 for details
and required additional Rittal and standard parts.

Ordering code: 3AXD50000416486
KIT A-6-8-306-VX

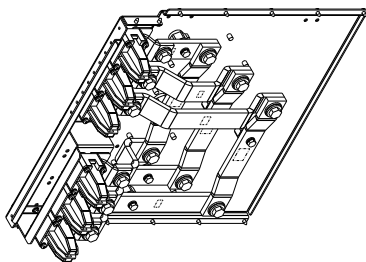
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Customer	Check.	M. Michelsson	12-Aug-19	RRU 1XR81 W600	RRU 1XR81 W600	7:50	A3
Cust. Dec. No.	Appr.	M. Jasilainen	12-Aug-19	ACS880-304 FOR RITTAL VX	ACS880-304 FOR RITTAL VX	Rev. Ind.	A. Z (DR)
Proj. No.	Project name						
3AXD50000013429	3AXD500000416486						

Doc. No. 3AXD50000416486 Sheet 3

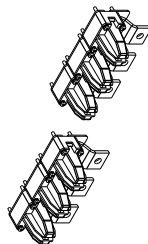


STAGE 3: BLCL IX-X ISU AC BUSBARS W600 and X8X QUICK CONNECTORS FOR MODULE installation

See assembly drawing 3AXD50000384945 for details and required additional Rittal and standard parts.



Ordering Code: 3AXD50000416493
KIT A-6-8-130-VX



Ordering Code: 3AUA0000119227
KIT A-468-8-100
(1 kit/module)

1	2	3	4	5	6	7	8
3AXD50000471331 RRIU-1XR8I-W600-VX2S (ASSEMB)		A. 2+ A. 1		First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DRG/DWG conversion.			
A	Initial Approval						

STAGE 3: BLCL IX-X ISU AC BUSBARS W600 and X8X QUICK CONNECTORS FOR MODULE installation

See assembly drawing 3AXD50000384945 for details and required additional Rittal and standard parts.

Ordering Code: 3AXD500000416493
KIT A-6-8-130-VX

Ordering Code: 3AUA0000119227
KIT A-468-8-100
(1 kit/module)

Based on	Prepared	M. Michelsson	12-Aug-19	Title	ASSEMBLY DRAWING	Scale	Form
Customer	Check.	M. Michelsson <td>12-Aug-19</td> <td>RRIU 1XR8I W600</td> <td>ASSEMBLY DRAWING</td> <td>1:50</td> <td>A3</td>	12-Aug-19	RRIU 1XR8I W600	ASSEMBLY DRAWING	1:50	A3
Cust. Desc. No.	Appr.	M. Astikainen <td>12-Aug-19</td> <td>AC8860-SUB FOR RITIAL VX</td> <td>Res.app.</td> <td>Rev. no.</td> <td>7:50 DWY</td>	12-Aug-19	AC8860-SUB FOR RITIAL VX	Res.app.	Rev. no.	7:50 DWY
DWG Number	Product name	Project name					
3AXD50000913762	Metahl vs						
Doc des:						Sch.	Etl
3AXD50000471331						Total	9

Stage 4: DC connection

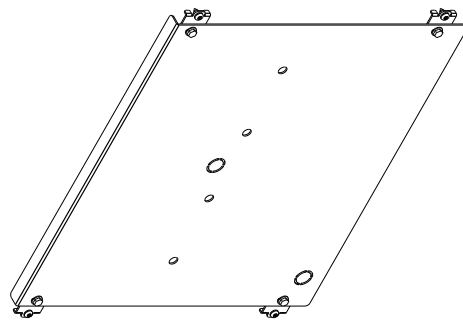
[illegible]

Stage 6: L-filter AC connection

[illegible]

Stage 7: X8X W600 SHROUD installation

See instruction drawing 3AXD50000335022 for details



Ordering Code: 3AXD50000337378
KIT A-6-8-360-VX

1	2	3	4	5	6	7	8
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3AXD50000471331		A.2+					
RRT-1XR81-W600-VX25 (ASSEMB)		A.1					
A Initial Approval							

Stage 7: X8X W600 SHROUD installation

See instruction drawing 3AXD500000335022 for details

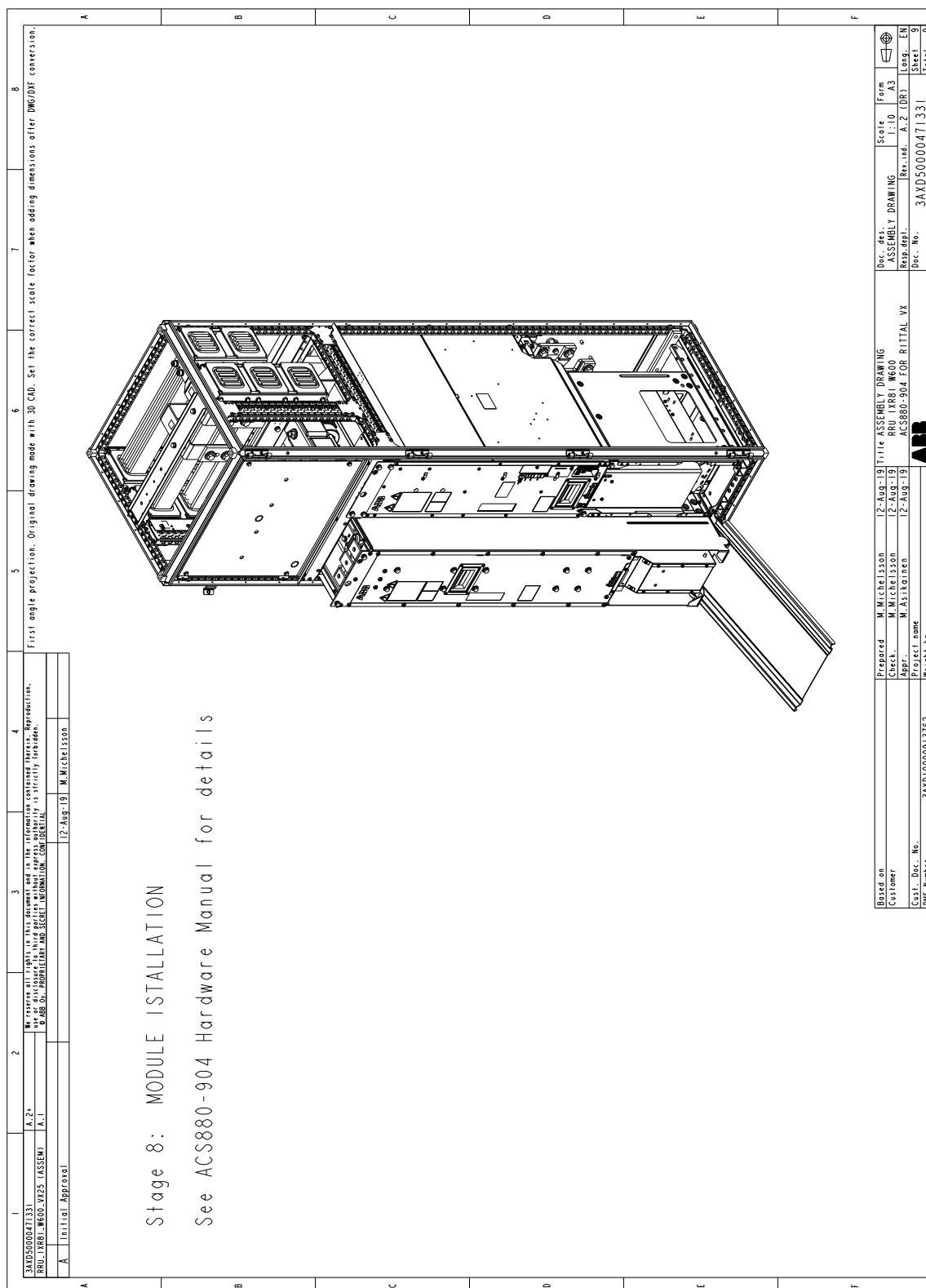
Ordering Code: 3AXD500000337378

KIT A-6-8-360-VX

First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.

Based on	Prepared	M. Michelsson	12-Aug-19	Title	ASSEMBLY DRAWING	Scale	Form
Customer	Check.	M. Michelsson	12-Aug-19	RRU 1XR81 W600	ASSEMBLY DRAWING	1:5	A3
	Appr.	M. Asikainen	12-Aug-19	AC880-504 FOR RITTAL VX	Rev. inf.	A.2 (DR)	Lang. EN
Cost. Dec. No.	Project name			Doc. N. No.	3AXD50000471331	Sheet	8

Stage 8: Module installation



■ 1×R8i module in 600 mm wide generic enclosure

Parts to be installed

Parts to be installed	Instruction code	Kit code	Kit ordering code
Module installation parts	3AXD50000013903	A-6-8-328	3AXD50000013842
AC busbars and quick connector	3AXD50000013902	A-6-8-146 A-468-8-100	3AXD50000013790 3AUA0000119227
DC kit for fuses	3AXD50000025693	A-468-8-245	3AXD50000025659
Common mode filter busbars - 400/500 V module	- 3AXD50000002502	- A-468-8-231	- 3AXD50000002492
- 690 V module	3AXD50000017978	A-468-8-237	3AXD50000016952
and DC connection flanges	3AXD50000003403	A-468-8-232	3AXD50000003411
L-filter AC connection	3AXD50000002577	A-468-8-131	3AXD50000002576
- optional 1)	3AXD50000019280	A-6-8-111	3AXD50000019279
Shroud installation parts	-	-	-
Module installation	-	-	-

¹⁾ **Note:** This kit is not included in ABB's standard design but may be used if you wish to have AC fuses on top of the BL-1x-x filter module.

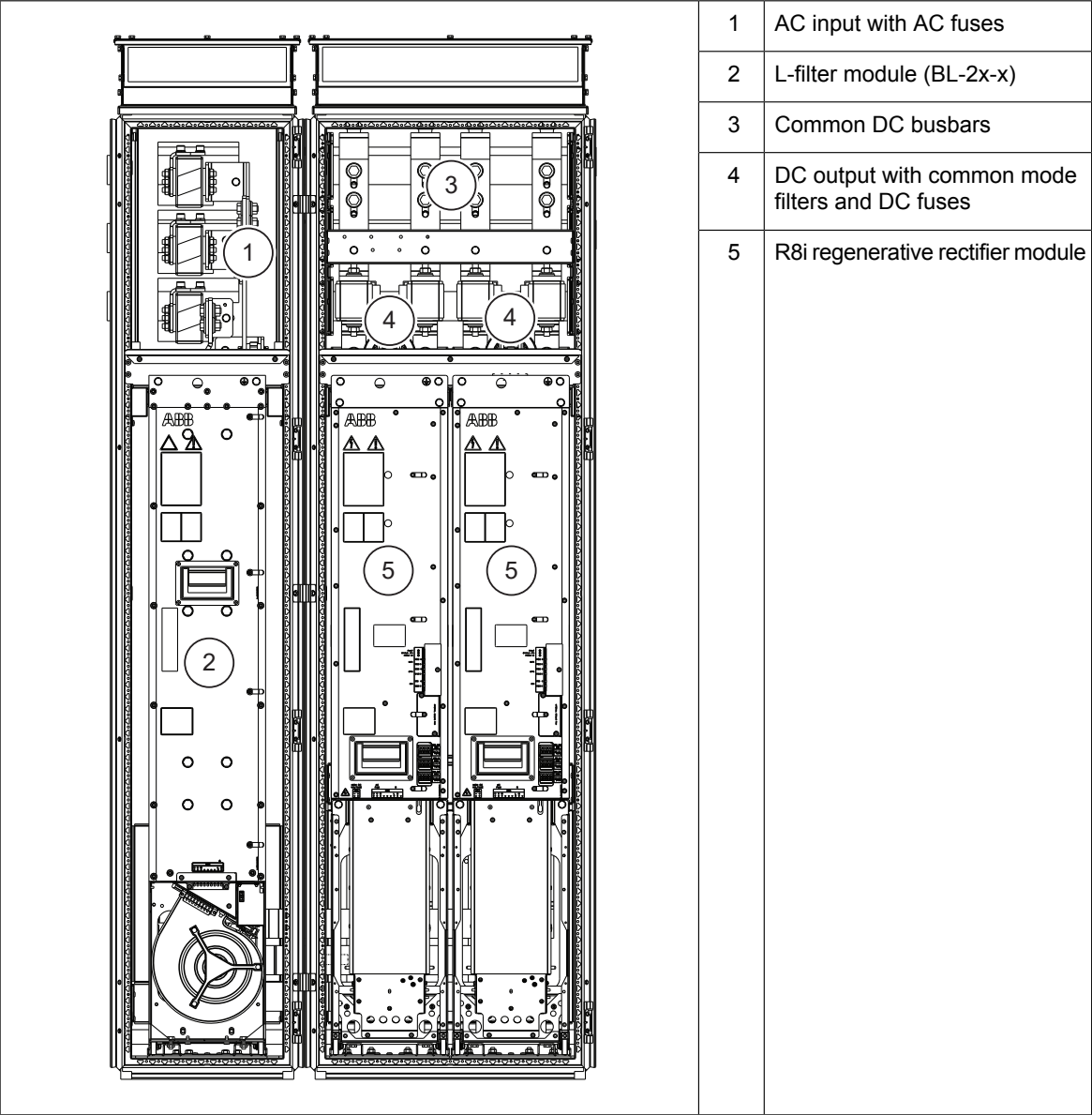
Kits for 1×R8i module in 600 mm wide generic enclosure

[illegible]

■ 2×R8i modules in 1000 mm wide Rittal VX25 enclosure

Layout

The following figure shows an example of the 2×R8i modules in the Rittal VX25 enclosure. The customer must place the control equipment in a separate cabinet.



Installation stages

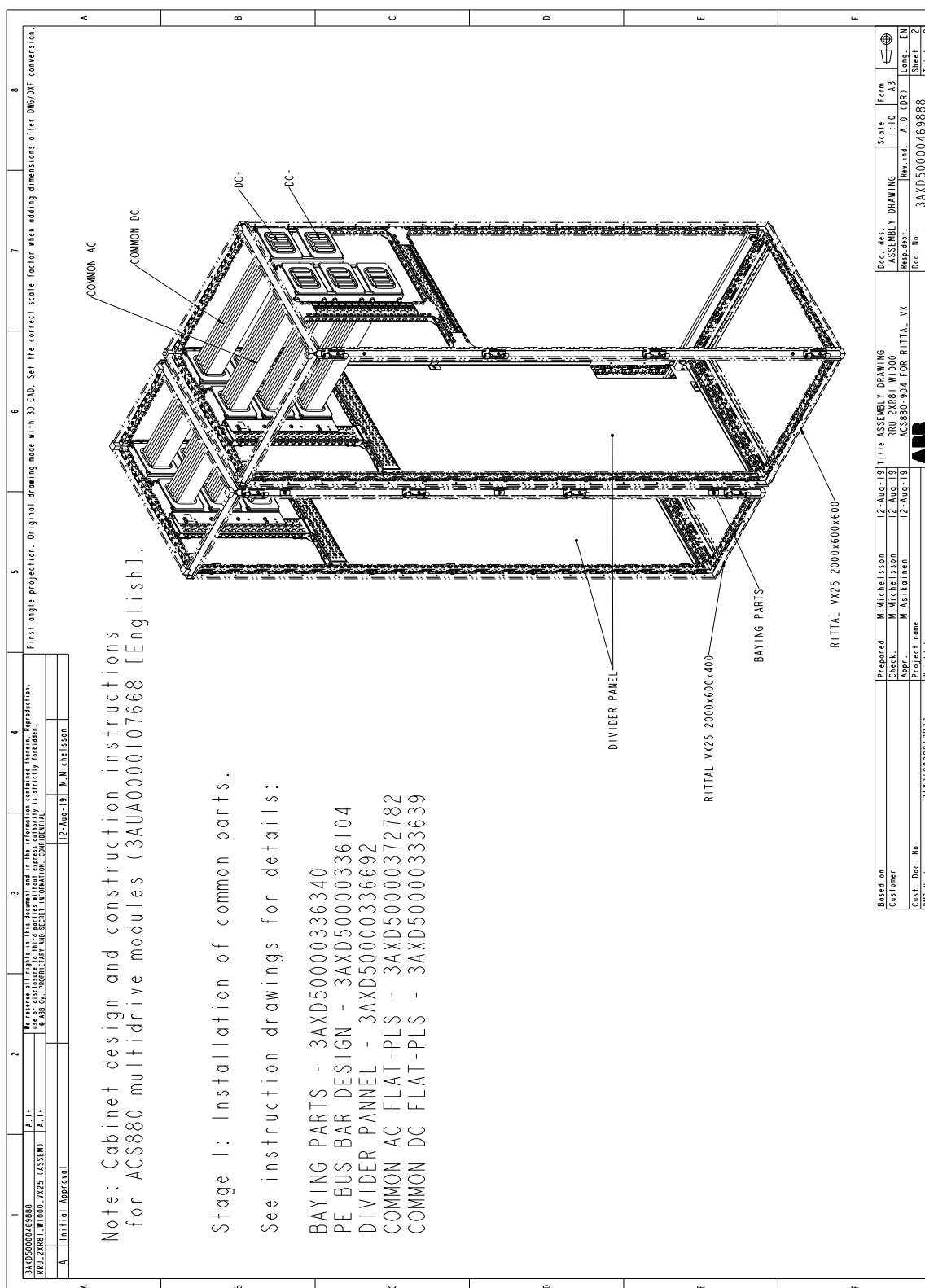
#	Installation stage	Instruction code	Kit code	Kit ordering code
1.	Installation of common parts:			
	- Baying parts	3AXD50000336340	-	-
	- PE busbar [PE]	3AXD50000336104	-	-
	- Divider panel	3AXD50000336692	-	-
	- Common AC Flat-PLS assembly	3AXD50000372782	A-468-X-011-VX	3AXD50000360772
	- Common DC Flat-PLS assembly	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2.	Module installation parts	3AXD50000349982	A-4-8-321-VX	3AXD50000360802
		3AXD50000351756	A-6-8-323-VX	3AXD50000361670
3.	Rear AC busbars and quick connectors	3AXD50000353477	A-X-8-142-VX	3AXD50000361687
			A-468-8-100	3AUA0000119227
4.	L-filter AC busbars and AC flanges	3AXD50000353491	A-4-8-107-VX	3AXD50000360796
		3AXD50000012934	A-468-8-106	3AXD50000011084
5.	DC connection:			
	- 400/500 V module	3AXD50000353507	A-6-8-212-VX	3AXD50000361663
	- 690 V module	3AXD50000469567	A-6-8-213-VX	3AXD50000488384
6.	Common mode filter busbars	-	-	-
	- 400/500 V module	3AXD50000002502	A-468-8-231	3AXD50000002492
	- 690 V module	3AXD50000017978	A-468-8-237	3AXD50000016952
	and DC connection flanges	3AXD50000003403	A-468-8-232	3AXD50000003411
7.	Shroud installation parts	3AXD50000335169	A-6-8-359-VX	3AXD50000337484
		3AXD50000335022	A-4-8-360-VX	3AXD50000337378
8.	Module installation	-	-	-



KITS FOR ACS880-904 2xR8i IN RITTAL VX25 CABINETS

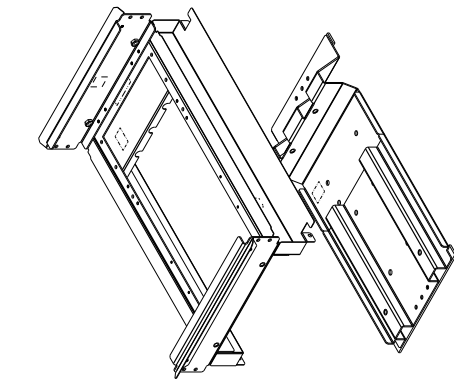
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Customer	Check.	M. Michelsson	12-Aug-19		RRI 2980-W1000		7:100	A3
	Appl.	M. Asikainen	12-Aug-19		ACS980-904 FOR RITILL VX	Resp. Appl.	Rev. det.	Long. EN
Cust. Code No.	Project name						Rev. det.	Long. EN
DMS Number	Weight kg						Doc. No.	Sheet
3XND10000913833							3XND5000046988	Total 9

Stage 1: Installation of common parts

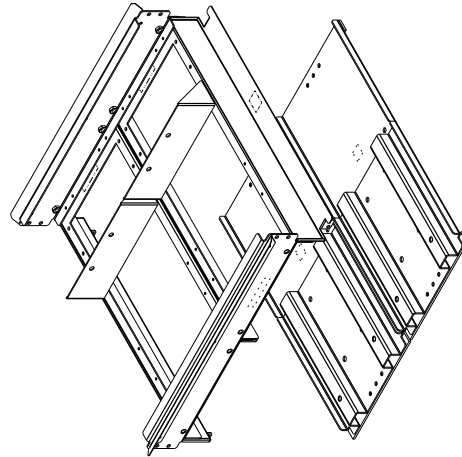


Stage 2: Module installation parts.

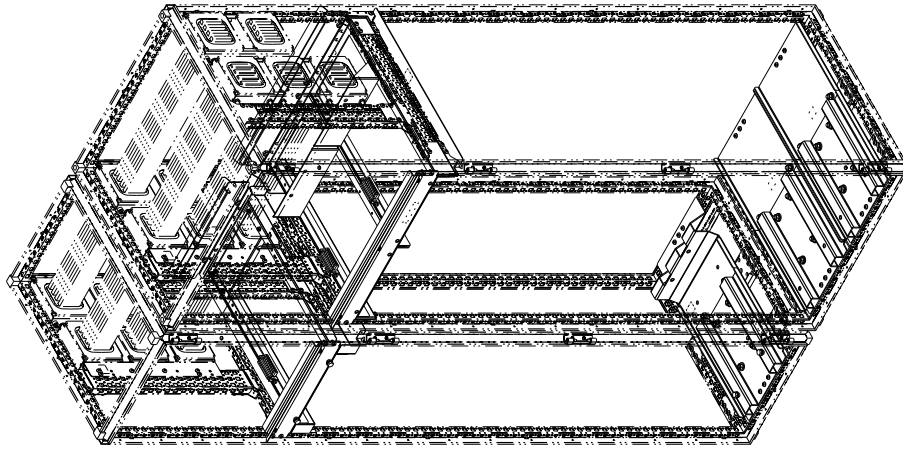
See instruction drawings 3AXD500000349982 and 3AXD50000351756 for details.



Ordering Code: 3AXD50000360802
KIT A-4-8-32I-VX

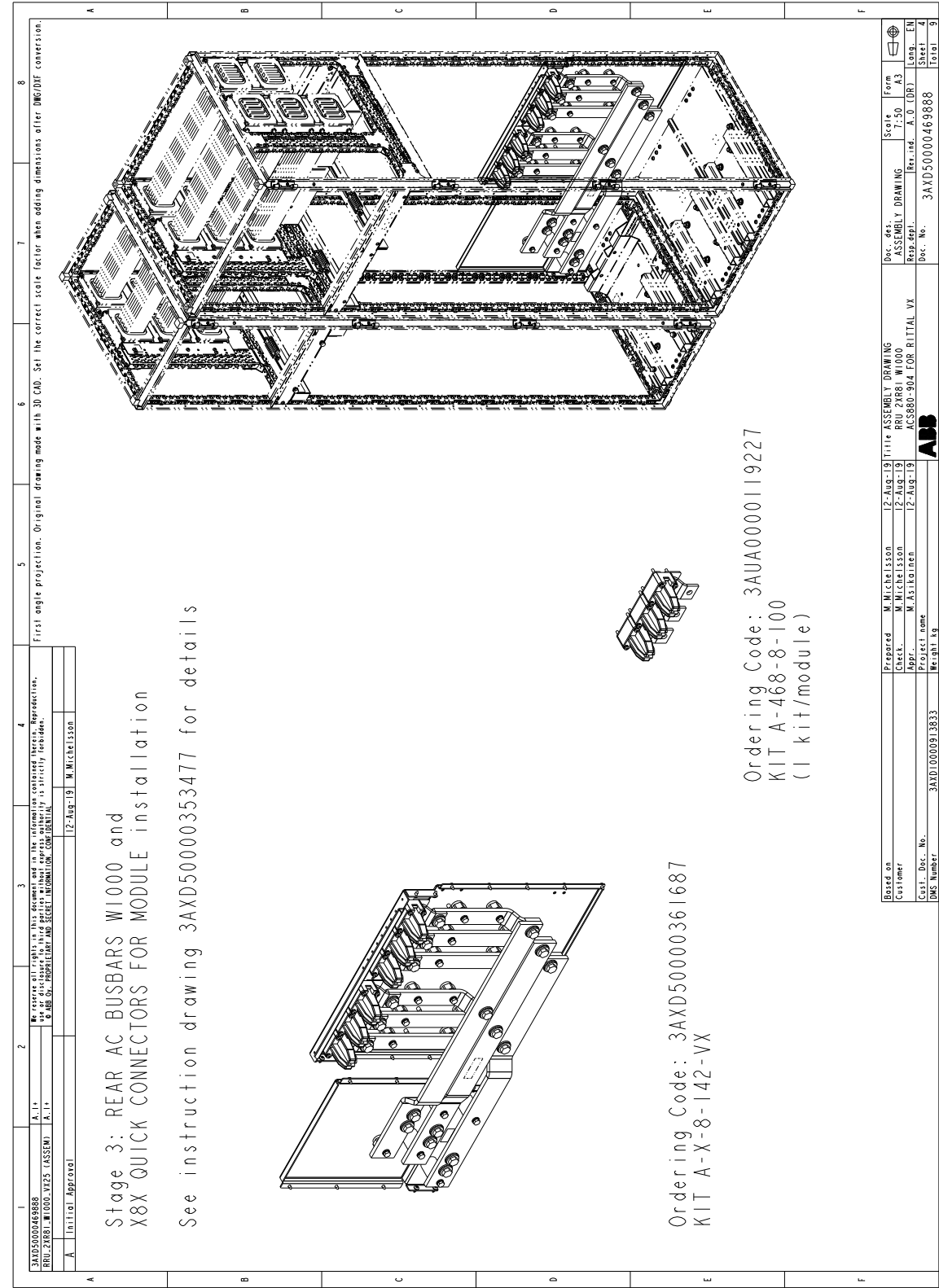


Ordering Code: 3AXD50000361670
KIT A-6-8-323-VX



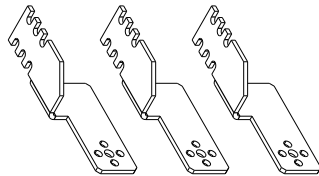
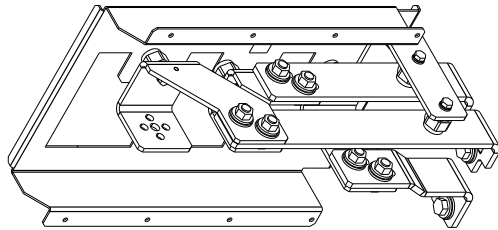
Prepared	M. Michelsson	12-Aug-99	Title	ASSEMBLY DRAWING		Doc. des.	Scale	Form
Check	M. Michelsson	12-Aug-99	R/RU	248R1 WI000		Assembl.	7-50	A3
Appr.	M. Asikainen	12-Aug-99	C/S	88000-904 FOR RITTAL VX		Resp. des.	Rev. ind.	A.O. (DR)
Project name							Doc. No.	3X4D500000469888
Cust. Doc. No.							Sheet	3
DMS Number							Total	9
Weight kg								

Stage 3: Rear AC busbars and quick connectors

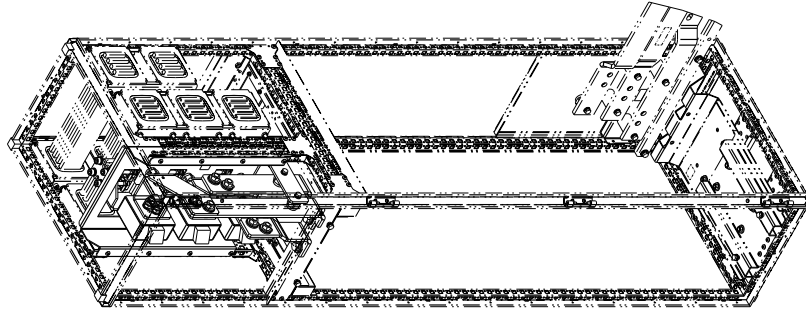


Stage 4: BLXX 2X-X TOP AC BUSBARS and AC FLANGES installation

See instruction drawings 3AXD50000353491 and 3AXD50000012934 for details



Ordering Code: 3AXD50000011084
KIT A-468-8-106

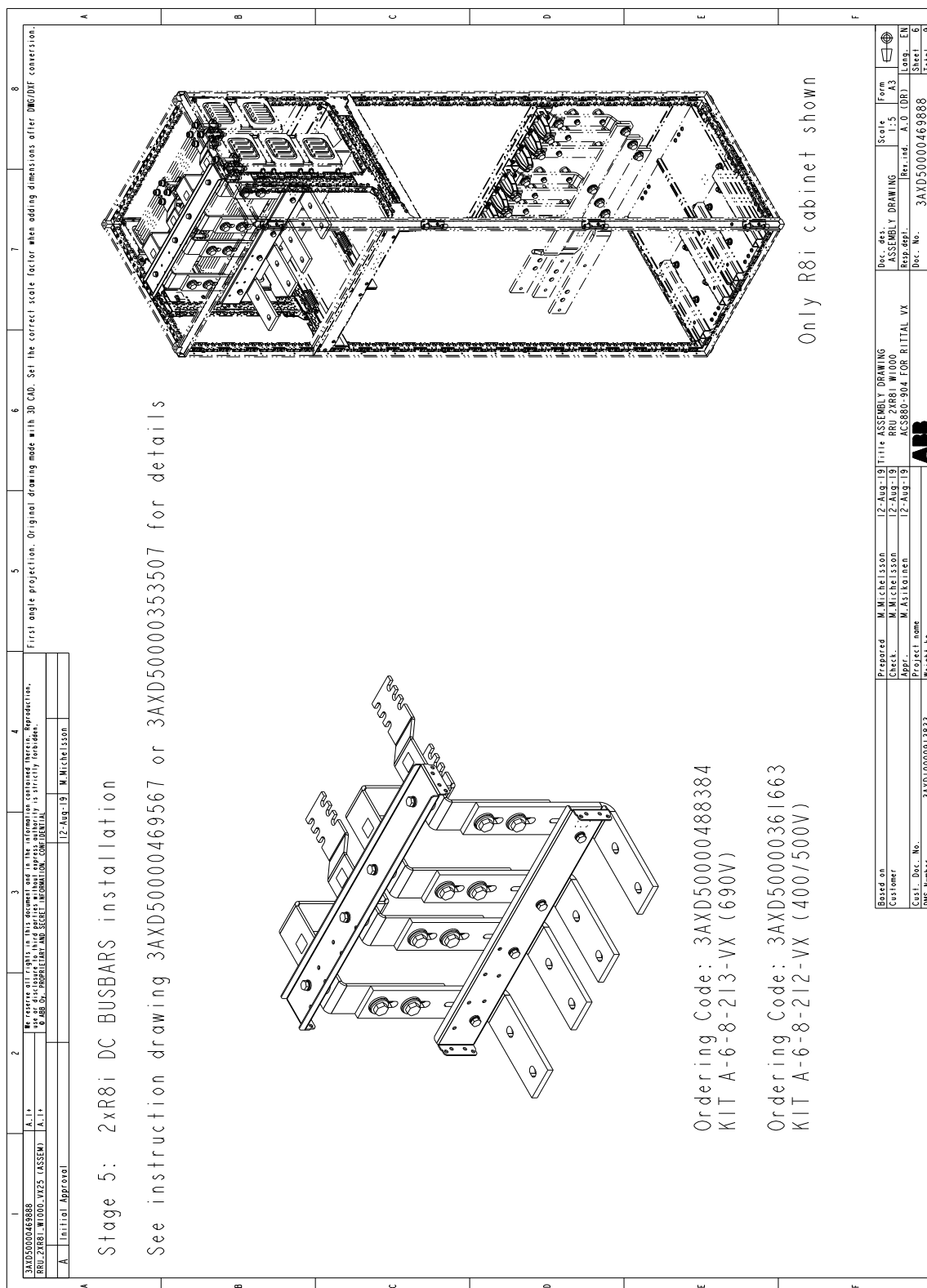


Only BCL 2X-X cabinet shown

Ordering Code: 3AXD50000360796
KIT A-4-8-107-VX

Based on	Prepared	12-Aug-19	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Customer	Check:	M.Michelsson	12-Aug-19	RRI 2981 WI000	ASSEMBLY DRAWING	1:5	A3
	Appr:	M.Asikinen	12-Aug-19	ACS880-90R FOR RITTAL VK	Reg.appl.	Rev. inf.	Long. EN
Cust. Contr. No.	Project name				Doc. No.		Sheet 5
DMS Number	Weight kg						Total 9
3AXD100009138333					3AXD50000463888		

Stage 5: DC connection



Stage 6: COMMON MODE FILTER BUSBARS and R8i DC CONNECTION FLANGES installation

Ordering Code: 3AXD50000002492
KIT A-468-8-231 (400/500V)

A technical drawing showing a bolt and nut being assembled onto a metal plate. The bolt is shown passing through the plate, with the nut being tightened onto the threaded end. The plate has a square hole in the center.

Ordering Code: 3AXD50000003411
KIT A-468-8-232
(1 kit/module)

Only R8i cabinet shown

Prepared	By	M. Michelsson	12-Aug-19	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Check	By	M. Michelsson	12-Aug-19	Customer	RRU 2XR81 WI000	Res. dep.	1:5	A3
Appr.	By	M. Asthagen	12-Aug-19		ACS880-904 FOR RITTAL VX	Res. ind.	A.0 (DR)	
Project name	Cust.	No.				Long.	EN	
Weight	34XD10000913833					Sheet	7	
DWG. Number						Total	9	
						Doc. No.	34XD50000469888	

Stage 7: Shroud installation parts

1 2 3 4 5 6 7 8

3AXD50000469888
RRL 24R81 W1000 X425 (ASSEM)
A.1+
A.1+
A Initial Approval
12-Aug-19 M. Michelsson

First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.

Stage 7: SHROUDS installation

See instruction drawings 3AXD50000335169 and 3AXD50000335022 for details

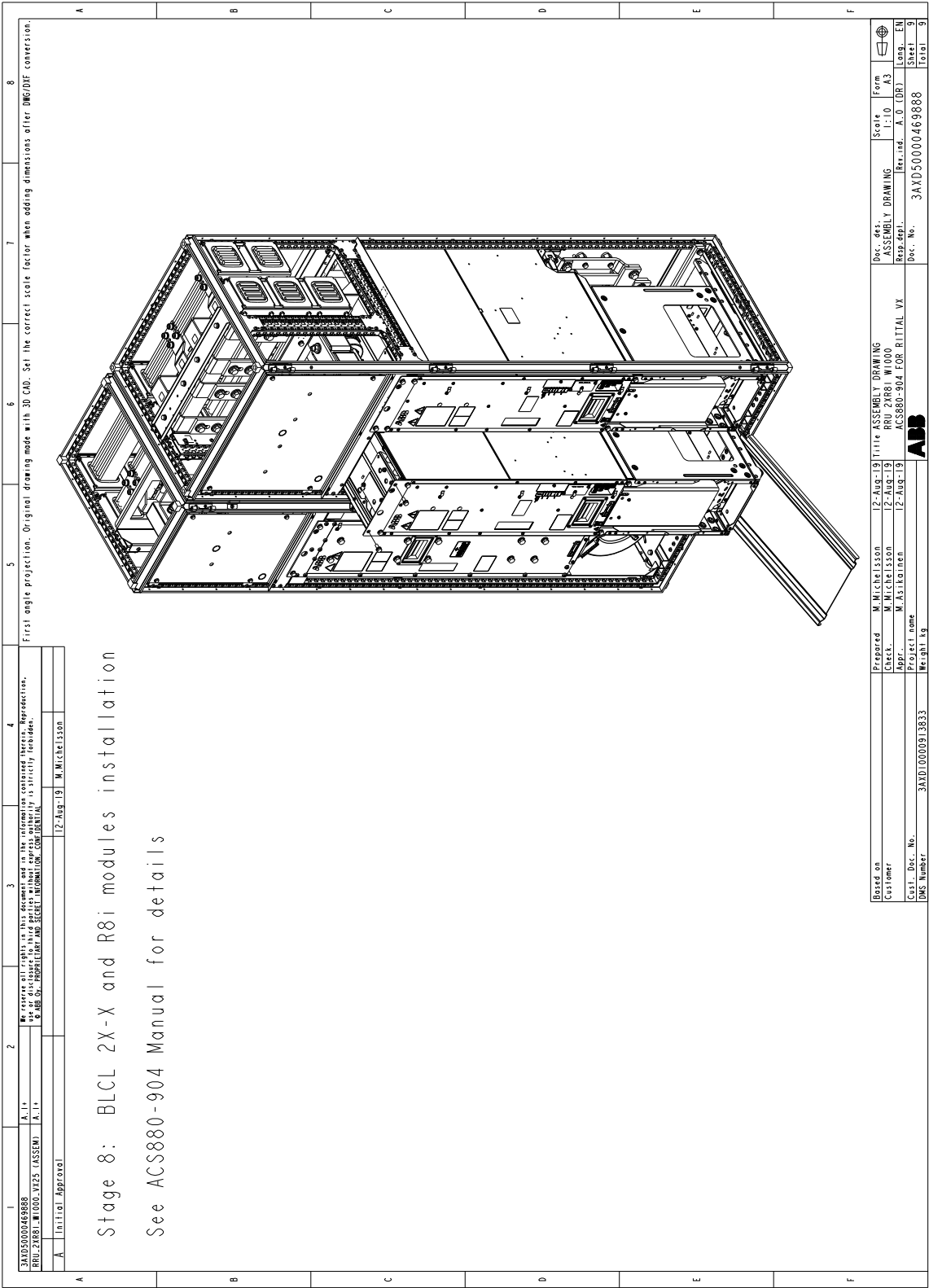
Ordering Code: 3AXD50000337484
KIT A-4-8-359-VX

Ordering Code: 3AXD50000337378
KIT A-6-8-360-VX

Dec. des. ASSEMBLY DRAWING Scale 1:5 Form A3
Dec. No. 3AXD50000469888 Rev. no. A.0 (DR) Sheet 8
Project name 3AXD50000013923
Based on Customer RRL 24R81 W1000 X425 (ASSEM)
Prepared M. Michelsson 12-Aug-19 Title ASSEMBLY DRAWING
Checked M. Michelsson 12-Aug-19 RRL 24R81 W1000
Appr. M. Asikainen 12-Aug-19 ACS880-904 FOR RITVAL VY
Cust. Dec. No. 3AXD50000013923 Project name



Stage 8: Module installation



■ 2×R8i modules in 800 mm wide generic enclosure

Parts to be installed

Parts to be installed	Instruction code	Kit code	Kit ordering code
Module installation parts	3AXD50000013143	A-6-8-328	3AXD50000013842
AC busbars and quick connector	3AXD50000013187	A-6-8-146 A-468-8-100	3AXD50000013790 3AUA0000119227
DC kit for fuses	3AXD50000025693	A-468-8-245	3AXD50000025659
Common mode filter busbars	-	-	-
- 400/500 V module	3AXD50000002502	A-468-8-231	3AXD50000002492
- 690 V module	3AXD50000017978	A-468-8-237	3AXD50000016952
and DC connection flanges	3AXD50000003403	A-468-8-232	3AXD50000003411
L-filter AC connection	3AXD50000013246	A-468-8-109	3AXD50000011155
Shroud installation parts	-	-	-
Module installation	-	-	-



KITS FOR ACS880-904 2xR8i MODULE IN GENERIC 2000x600x800 CABINET

Note! Only parts included in ABB kits are shown here!
See kit assembly drawings for required Rittal and/ or other standard parts



5

Electrical installation

Contents of this chapter

This chapter describes the electrical installation of the modules.

The wiring diagrams in this chapter are simplified presentations. For details, see the example circuit diagrams included in the manual.

Note: The instructions do not cover all possible cabinet constructions.

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

Safety and liability

**WARNING!**

Only qualified electricians are allowed to do the work described in this chapter. 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]).

Note: The installation must always be designed and made according to applicable local laws and regulations. ABB does not assume any liability whatsoever for any installation which breaches the local laws and/or other regulations. Furthermore, if the recommendations given by ABB are not followed, the drive system may experience problems that the warranty does not cover.

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 electrician, 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 disconnecter 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.)
 - 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 DC busbars (+ and -) 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.
6. 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 of the assembly

■ Measuring the insulation of the drive system



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 cable

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

Checking the compatibility with IT (ungrounded) systems

The RFI filter is not suitable for use in IT (ungrounded) systems. Disconnect the filter before connecting the drive to the supply network. For instructions on how to do this, contact your local ABB representative.



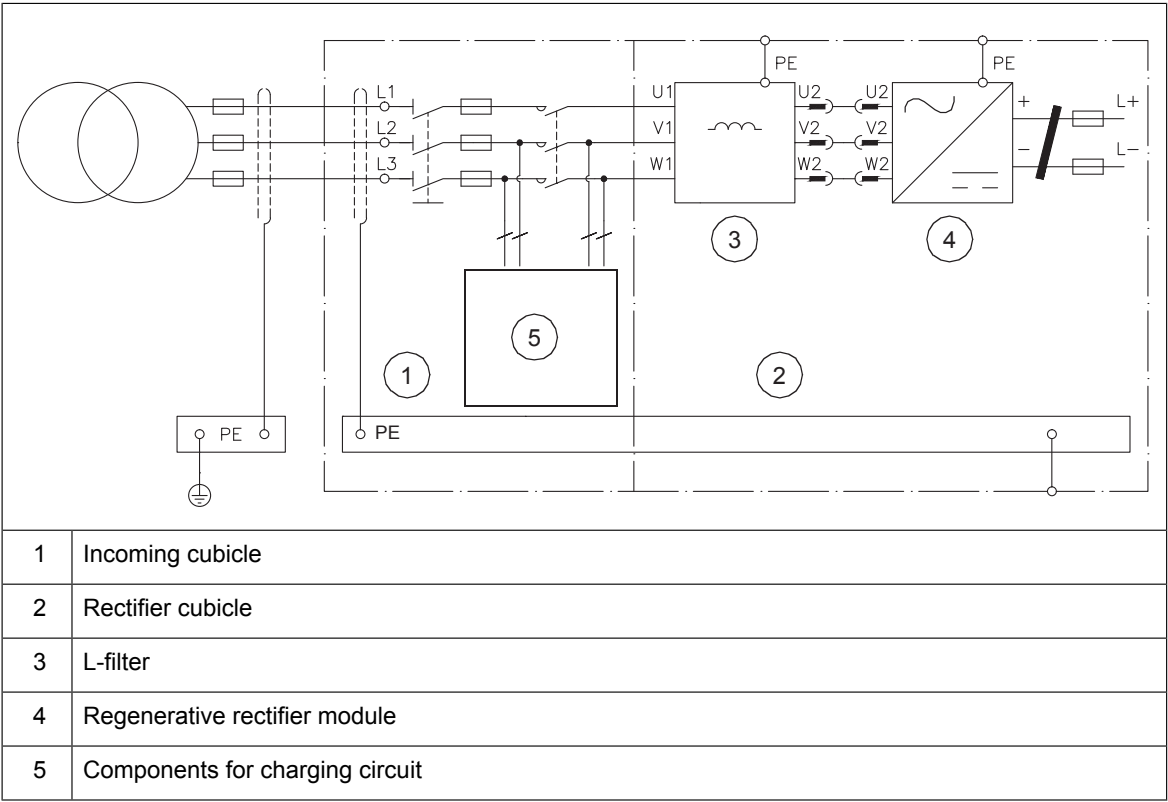
WARNING!

If a drive with an RFI filter is installed on an IT system (an ungrounded power system), the system will be connected to earth potential through the filter capacitors of the drive. This can cause danger, or damage the unit.



Connecting the input power cables

■ Connection diagram (frame 1×R8i)



Notes:

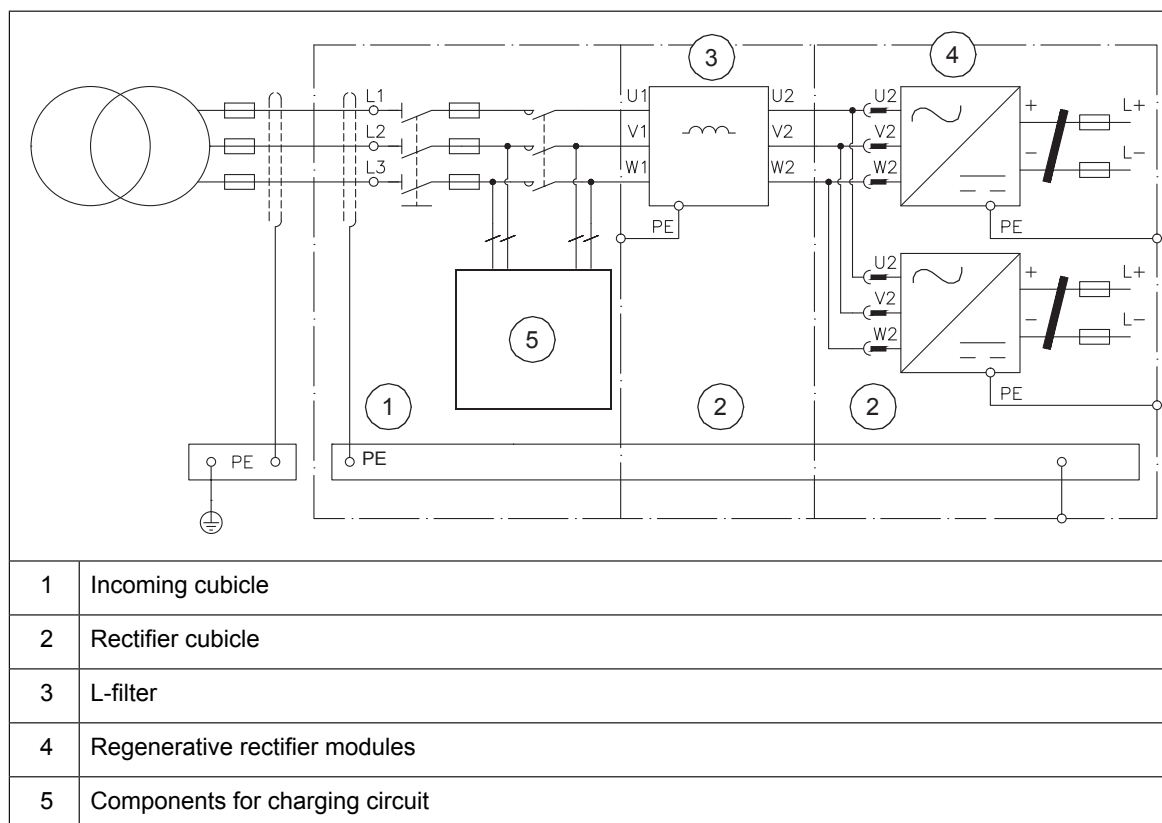
Use a separate PE conductor in addition if the conductivity of the shield does not meet the requirement for the PE conductor. See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

For charging circuit connections, see [Example circuit diagrams](#).

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

For tightening torques, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).

■ **Connection diagram (frame 2×R8i in Rittal VX25 enclosure)**



Notes:

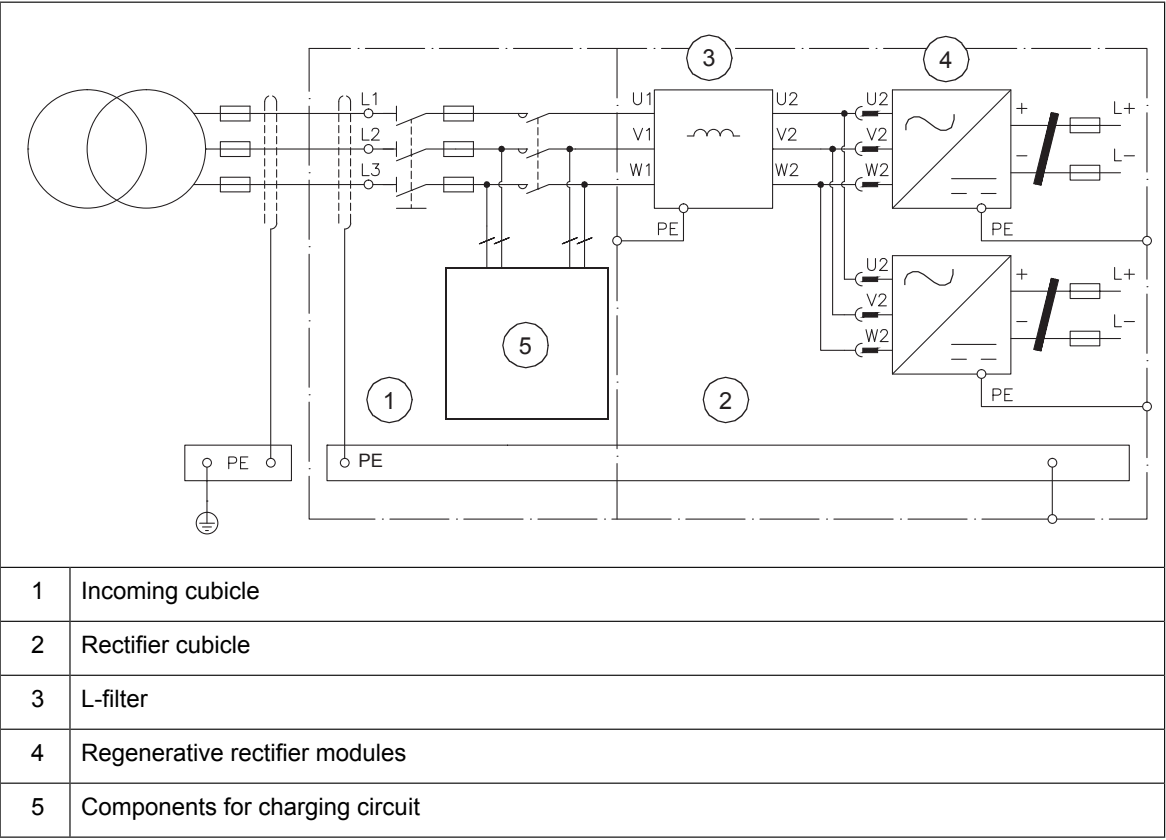
Use a separate PE conductor in addition if the conductivity of the shield does not meet the requirement for the PE conductor. See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

For charging circuit connections, see [Example circuit diagrams](#).

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

For tightening torques, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).

■ Connection diagram (frame 2×R8i in generic enclosure)



Notes:

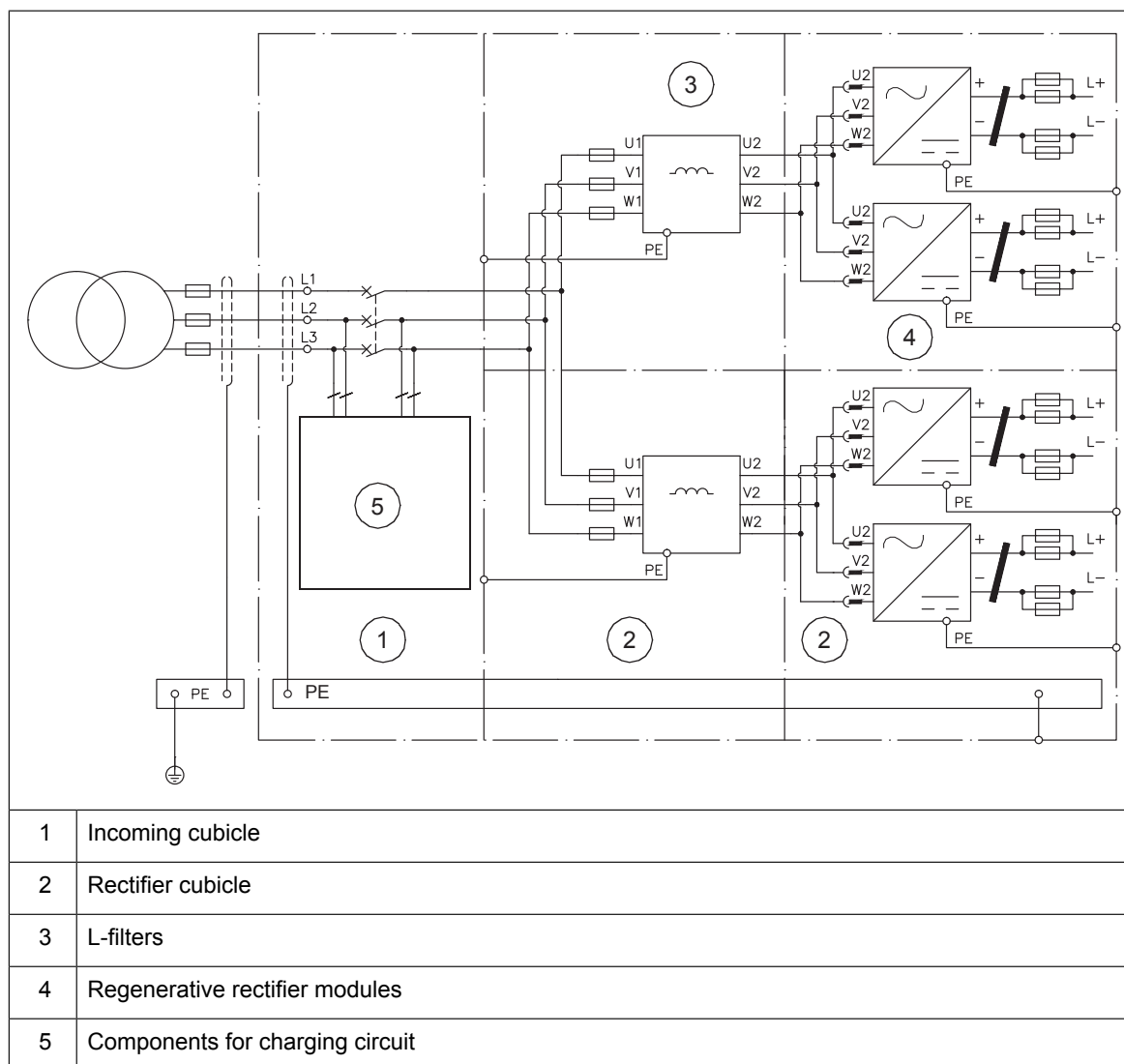
Use a separate PE conductor in addition if the conductivity of the shield does not meet the requirement for the PE conductor. See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

For charging circuit connections, see [Example circuit diagrams](#).

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

For tightening torques, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).

■ Connection diagram (frame 4×R8i in Rittal VX25 enclosure)



Notes:

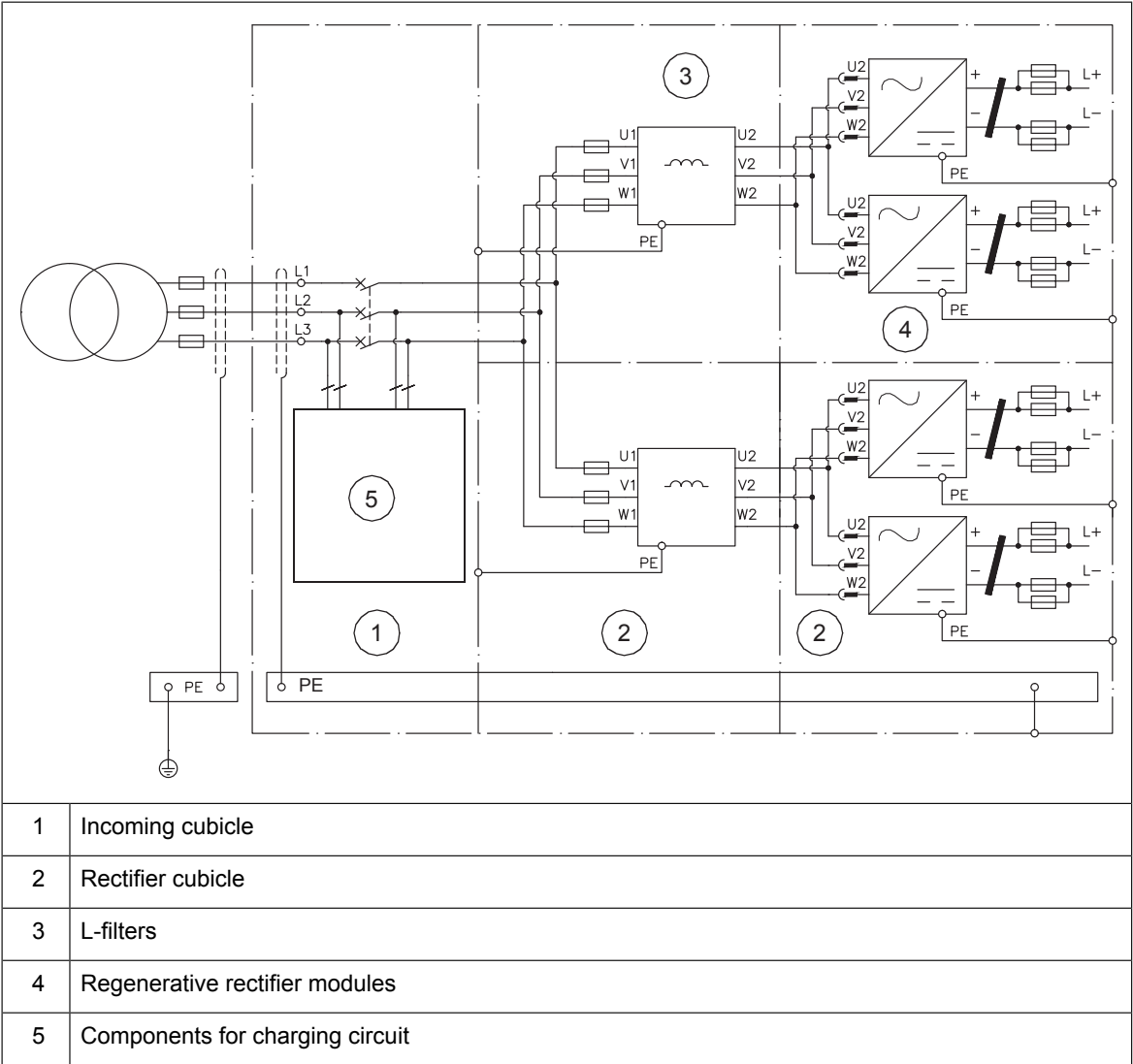
Use a separate PE conductor in addition if the conductivity of the shield does not meet the requirement for the PE conductor. See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

For charging circuit connections, see [Example circuit diagrams](#).

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

For tightening torques, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).

■ Connection diagram (frame 4×R8i in generic enclosure)



Notes:

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

For charging circuit connections, see [Example circuit diagrams](#).

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

For tightening torques, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).

■ Connection procedure (frame R8i)



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!

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.

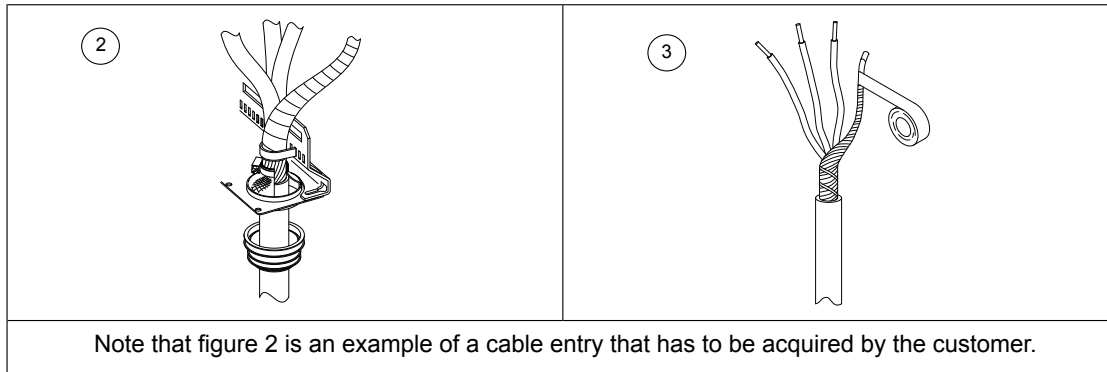
With the R8i modules, the input power cables are connected outside the supply/rectifier unit cabinet, typically inside the incoming cubicle.

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 74\)](#) before you start the work.
2. Lead the cables into the inside of the cabinet. 360° grounding of the cable shield at the entry is recommended to suppress interference.
3. Twist the cable shields to bundles and connect to the cabinet PE (ground) busbar. Connect the separate ground conductors/cables to the cabinet PE (ground) busbar.
4. Connect the phase conductors to the input terminals of the main switch-disconnector [Q1]. For tightening torques, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).
5. Connect the output terminals of the main switch-disconnector [Q1] to the main fuses [F1.x].
6. Connect the main fuses [F1.x] to the main contactor [Q2] input terminals.
7. Connect the contactor [Q2] output terminals to the AC busbars of the filter in the supply/rectifier unit cabinet by cabling, busbars or equivalent.
8. Inside the supply/rectifier unit cabinet, push the R8i module into the quick connectors.
L-filter module of type BL-1x-x: Push the L-filter module into the quick connectors.
L-filter module of type BL-2x-x: Remove the fan of the L-filter module (see the instructions in chapter Maintenance). Push the L-filter module into its place. Connect the filter output busbars (behind the filter module) to the busbars on the cabinet frame. Reinstall the fan of the L-filter module.
9. Ground the modules:
 - Ground the modules by the top edge of the front plate. The grounding point is marked on the module. Connect the front plate to the frame support bracket with screws. The frame support bracket should have a galvanic connection to the PE busbar through the cabinet frame.

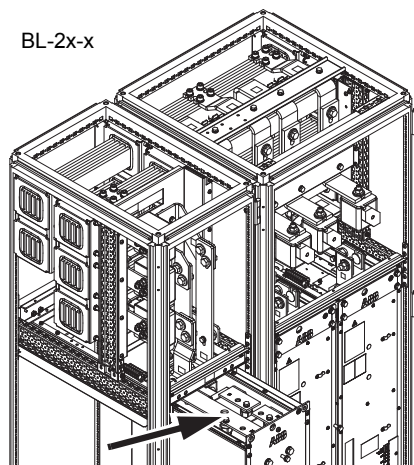
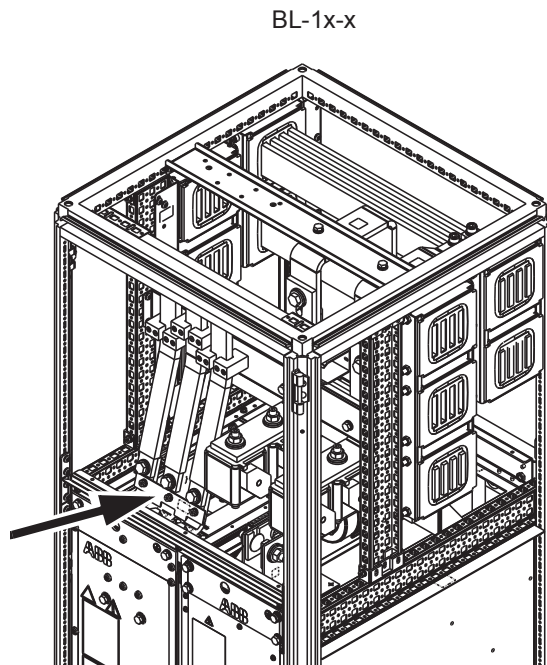
Note: If the cabinet frame is painted (such as with, Rittal VX25 enclosures), it is important to make sure that good galvanic connection to ground (PE busbar) is achieved. You can, for example, remove the paint from the connection points and use star washers.

Note: The connection to ground merely through the mounting screws and the cabinet chassis is not always good enough. To make sure the continuity of the protective bonding circuit, you can connect the modules to the cabinet PE busbar with a copper busbar or cable. The inductance and impedance of the PE conductor must be rated according to permissible touch voltage appearing under fault conditions (so that the fault point voltage will not rise excessively when a ground fault occurs). See *ACS880 multidrive cabinets and modules electrical planning instructions*(3AUA0000102324 [English]).

10. Connect the DC busbars of the rectifier module into the cabinet common DC busbars.

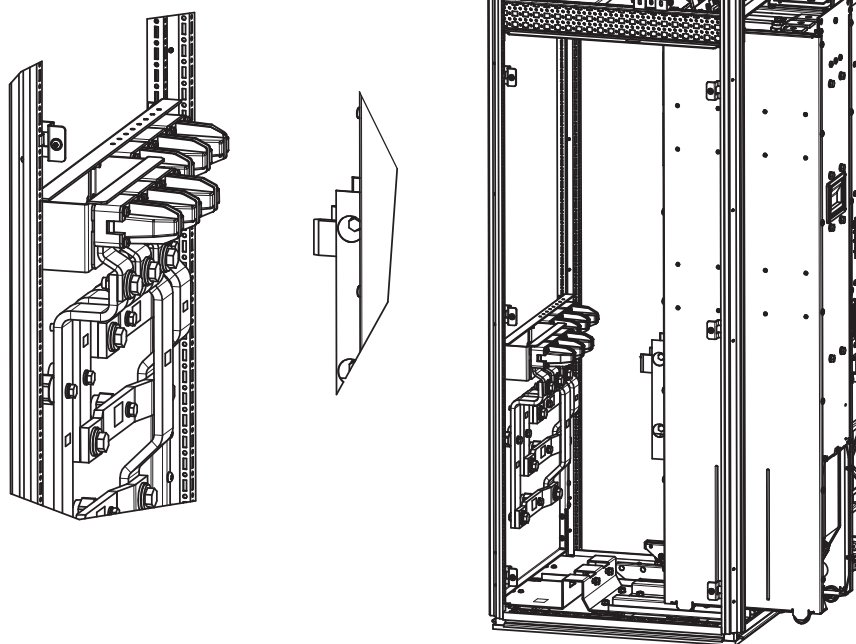


6. AC input of the L-filter module

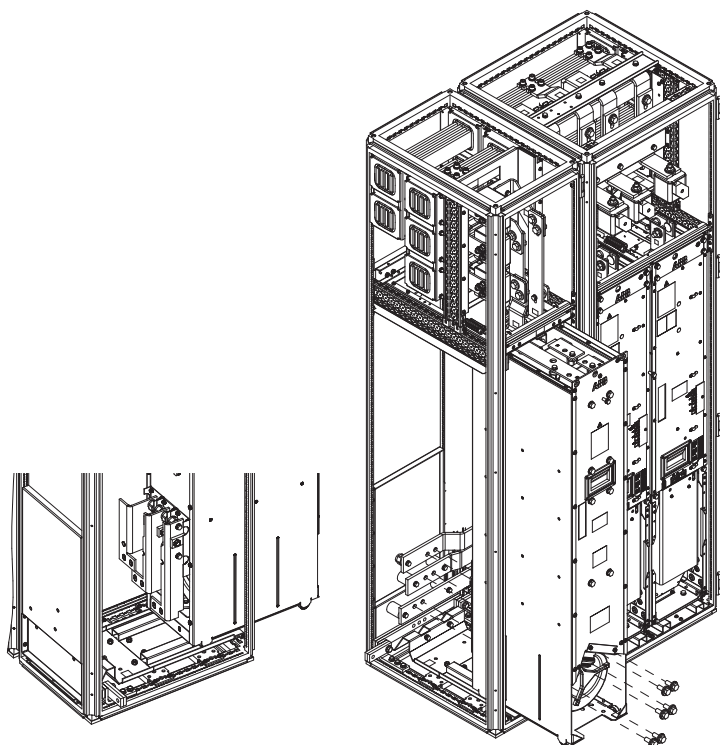


7. AC output of the L-filter module

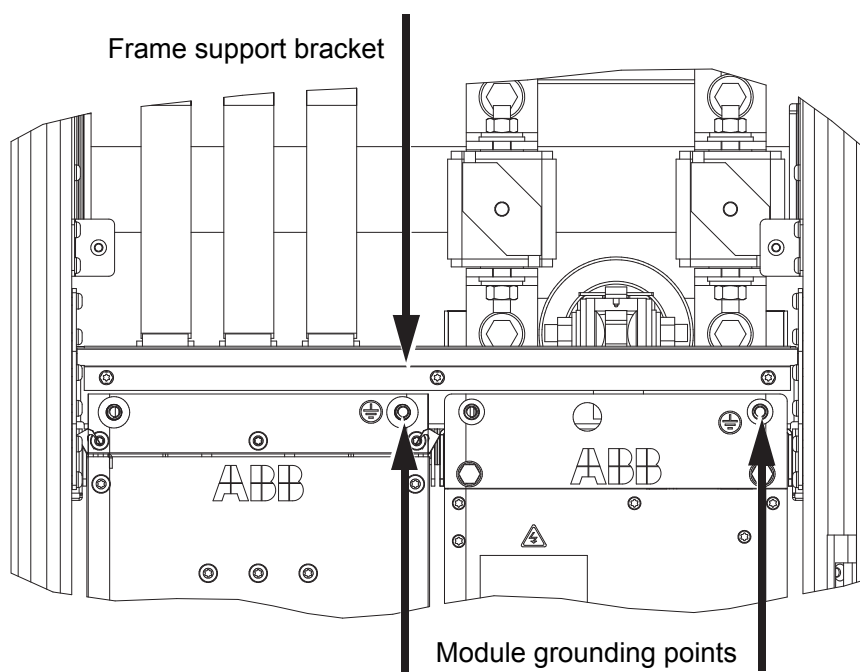
BL-1x-x



BL-2x-x



8.



Connecting the L-filter

Do the module connections. See [Electrical installation \(page 73\)](#) For installing the filter, see chapter [Cabinet construction](#).

By default, the L-filter is protected against overheating (caused by a faulty fan, for example) with a thermistor. If the filter temperature becomes too high, the rectifier module is automatically stopped. The thermistor must always be connected to digital input DI1 on the control unit.

**WARNING!**

If the overheating protection is removed with parameter settings, the filter may be damaged permanently or cause a fire.

**WARNING!**

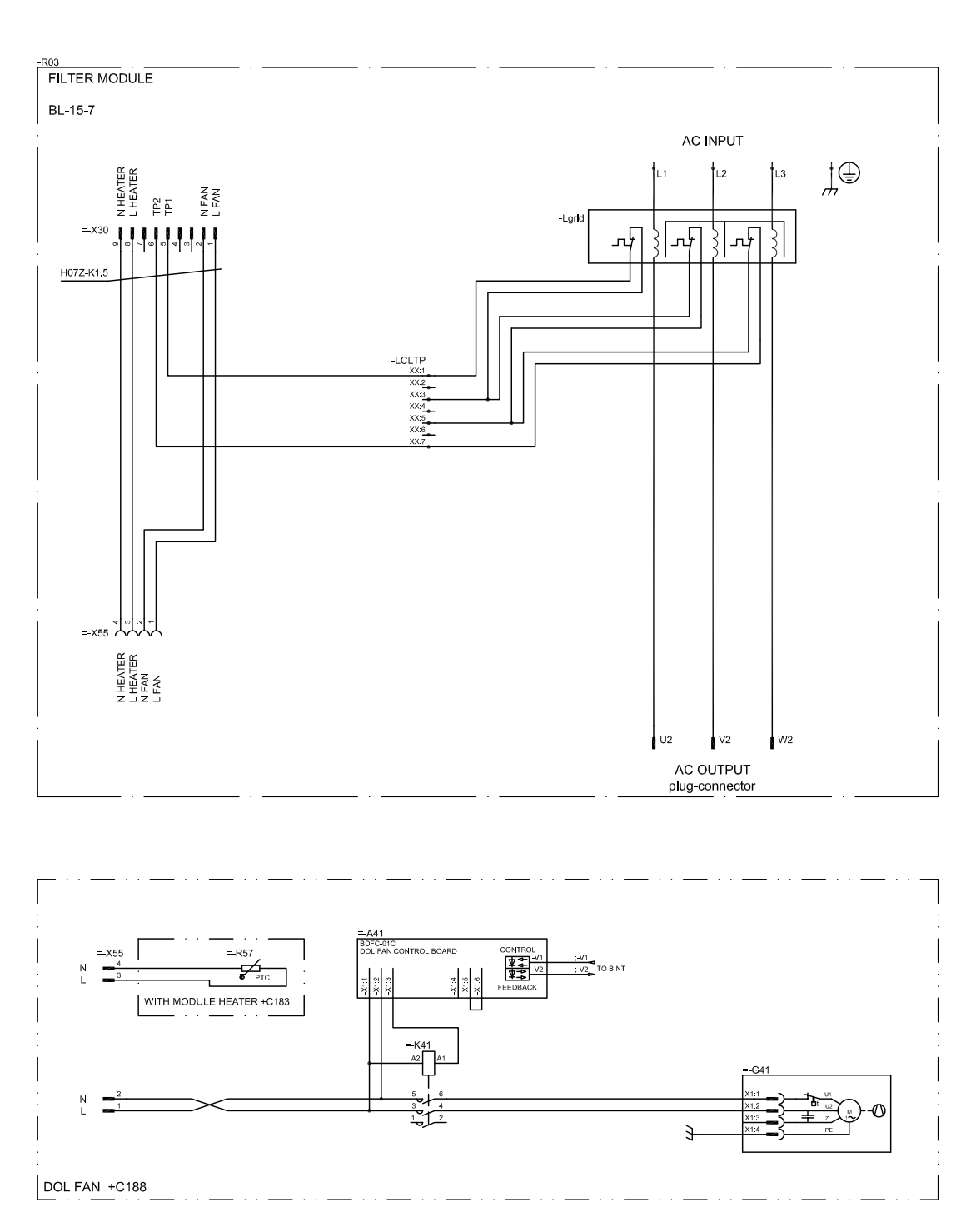
Use the L-filter only with an ACS880-904 regenerative rectifier module. Use the filter only with a rectifier module of an appropriate frame size. See the L-filter table in [Ordering information](#).

**WARNING!**

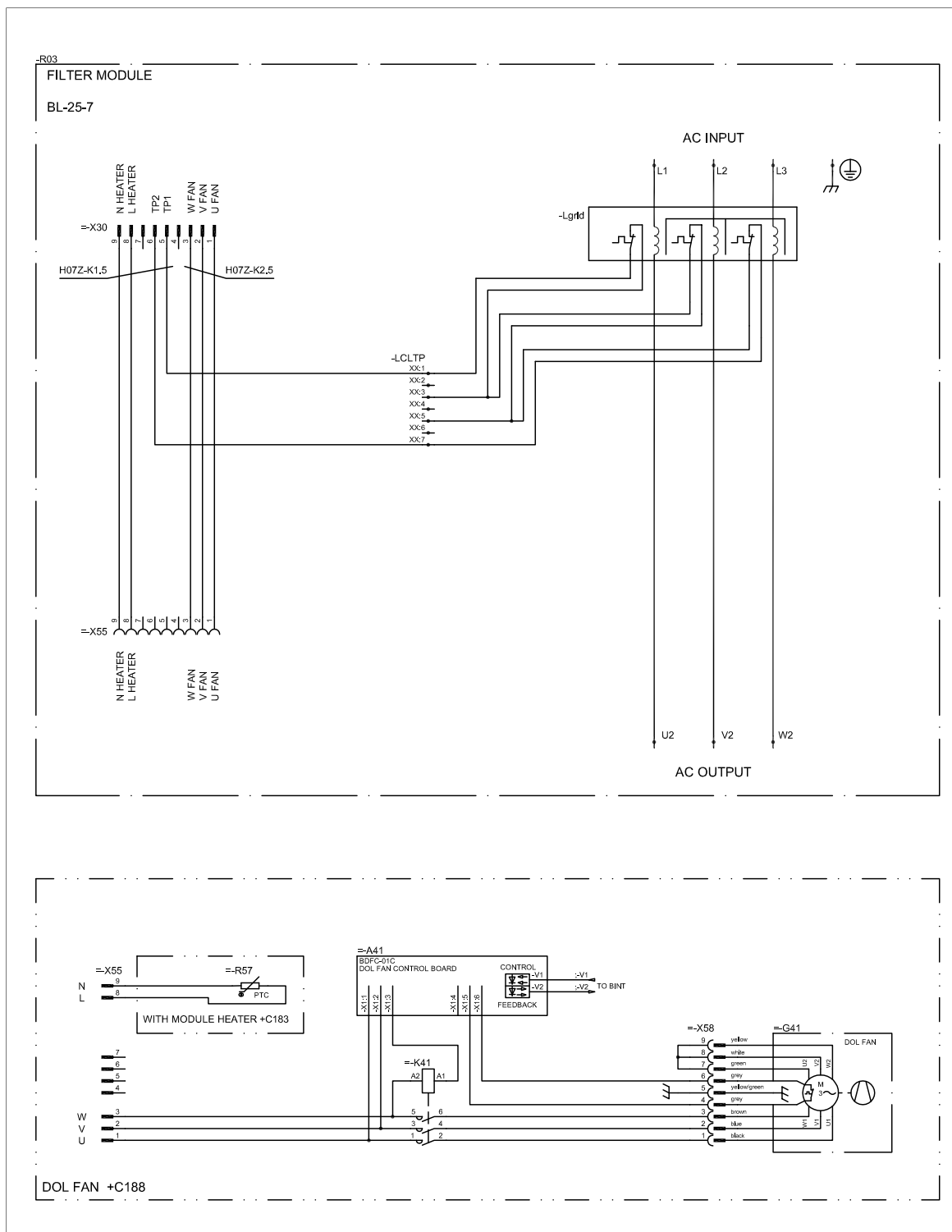
Do not lengthen the output cables.



BL-1x-x



BL-2x-x



Main contactor

A main contactor is needed for the following reasons:

- If the filter module is connected to the AC input power supply while the supply/regenerative rectifier module is not modulating/active, there is a risk that the filter responds to disturbance frequencies in a distorted AC input and starts resonating, which may cause permanent damage to the supply/rectifier module, filter and equipment connected to the DC bus. If the supply/rectifier module is stopped, faulty or otherwise inactive, it cannot counteract the resonance of the filter.
- The supply/rectifier module and the filter module cannot prevent power flow from the AC input to the DC bus and further to the ACS880-104 inverter module(s). Even if the modulation of the supply/rectifier module is stopped, the anti-parallel diodes in it enable power flow to the DC bus and to the inverter(s). In other words, merely stopping the supply/rectifier module does not stop the system.
- The supply/rectifier module is not protected against excessive current drawn from the DC bus. If the motoring power (power demanded from the DC bus) exceeds the supplying capability of the supply/rectifier module, it trips. If the current demand remains or increases, the supply/rectifier module is damaged.

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

Installing the charging circuit



The cabinet builder must install and connect the charging circuit. For connections, see the example circuit diagrams. Consult ABB for more information on the components and wirings needed.

Activate and tune the charging function in the control program. For information on tuning the parameters, see the firmware manual.

Connecting the external power supply cable for the auxiliary circuit

■ Regenerative rectifier module

The cabinet builder must arrange an auxiliary voltage of 230 V AC (or 115 V AC with option +G304) to connector X50 to power the electronics of the regenerative rectifier module. There is an internal power supply (BDPS) in the module that produces 24 V DC from the auxiliary voltage for the internal circuit boards. If a direct-on-line fan (option +C188) is used, the user must connect the fan supply (400 V AC / 50 Hz / 60 Hz) to the module control connector [X50.1].

If an internal heater (option +C183) is used, the user must connect the supply for the heating resistor to the rectifier module control connector [X50.7].

■ L-filter module

A direct-on-line fan (option +C188) is used in the L-filter module as standard. The user must connect a one or three phase supply to the L-filter control connector [X30] to supply the fan. The supply voltage is 230 V AC for BL-1x-x filters and 400 V AC for BL-2x-x filters as standard. Option +G304 provides 115 V AC 1-phase supply for BL-1x-x filters and option +G427 208 V AC 3-phase supply for BL-2x-x filters.

Connecting power supply for the control unit

There is a 24 V DC voltage output available on terminal X53, and it can be used to power up one BCU control unit. It is not allowed to use the 24 V DC output on terminal X53 for any other purpose than for powering the BCU control unit.

For more information on connecting power supply for the control unit, see:

- [Hardware of the regenerative rectifier and L-filter modules \(page 25\)](#),
- [Connectors X50...X53 \(page 27\)](#)
- [Control unit \(page 130\)](#) and
- [External power supply for the control unit \(XPOW\) \(page 190\)](#)

Connecting the control cables

■ Default I/O connection diagrams

See [Control units of the drive](#).

■ Connection procedure

Note: The instructions below are based on an example cabinet construction. They are not applicable to all possible solutions but only clarify the principles.

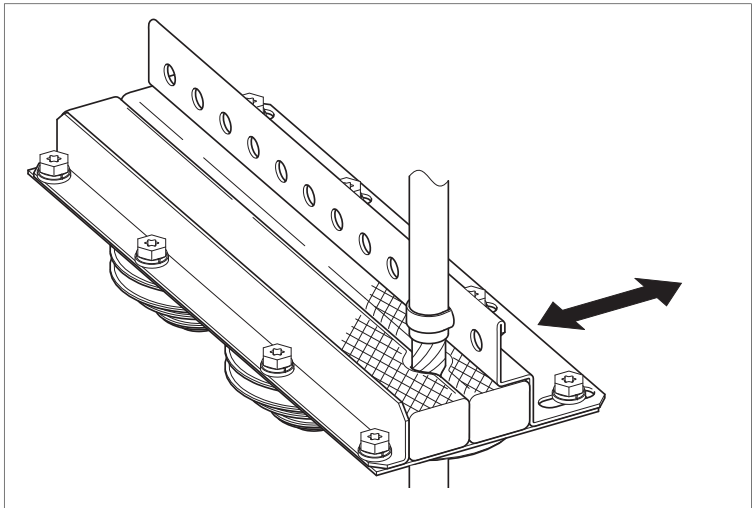
Note: The I/O of the supply/rectifier unit is mostly reserved for the internal use.

The following procedure instructs how to connect the control cables. In the example, the power cables are routed to the cabinet through the bottom. Note that the figures in the procedure are examples.

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 74\)](#) before you start the work.
2. Open the cubicle door.
3. Remove the shrouds (if any) from the cubicle.
4. Run the cables into the inside of the cabinet through a cable gland or grommet.
 - 360° grounding of the cable shield is recommended to suppress interference. In case a grounding cable gland is available, remove the outer jacket of the cable where it passes through the cable gland.
 - Seal the cable with a grommet.

Note: Note that the figure is an example of a control cable lead-through that has to be acquired by the customer.





-
- Run the cables to the appropriate terminals. Wherever possible:
 - Use the existing cable trunking in the cabinet.
 - Use sleeving wherever the cables are laid against sharp edges.
 - Tie the cables to provide strain relief.
 - Cut the cables to suitable length. Strip the cables and conductors.
 - Twist the cable shields into bundles and connect them to the ground terminal nearest to the terminal block. Keep the unshielded portion of the cables as short as possible.
 - Connect the conductors to appropriate terminals.
 - Fasten the shrouds (if any).
 - Close the doors.

■ **Module fiber optic connectors (frame R8i)**

The following figure shows the R8i module fiber optic connections.

			Name	Description
BSFC	V50		BSFC	Filter fan control Must be done by the user.
	V60			
BFPS	V30		BFPS	Control connection of the speed-controlled cooling fan Connected at the factory.
	V40			
BCU	V10		BCU	Control unit connection. Must be done by the user.
	V20			

The following figure shows the filter module fiber optic connections.

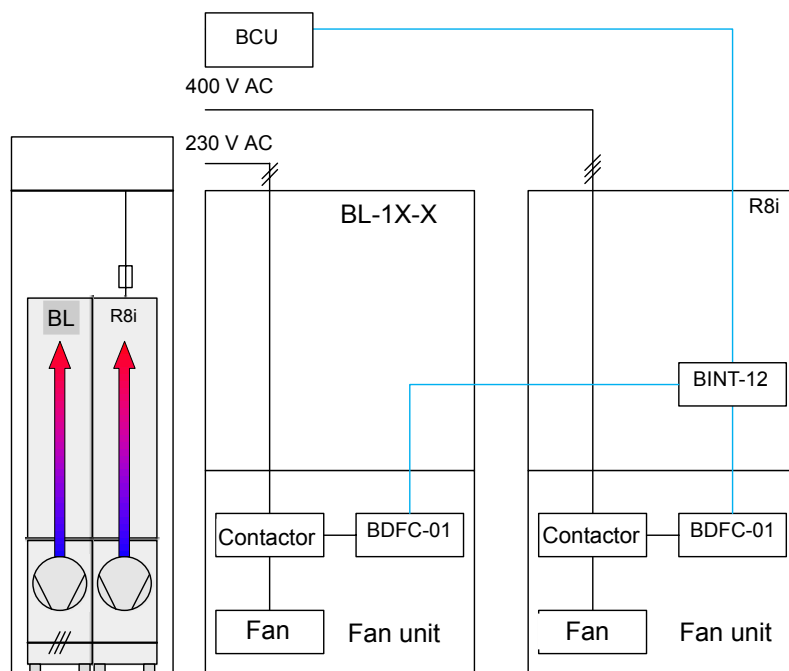
BL-1x-x		
Fan control signal feedback	V2	
Fan control signal	V1	

BL-2x-x		
---------	--	--

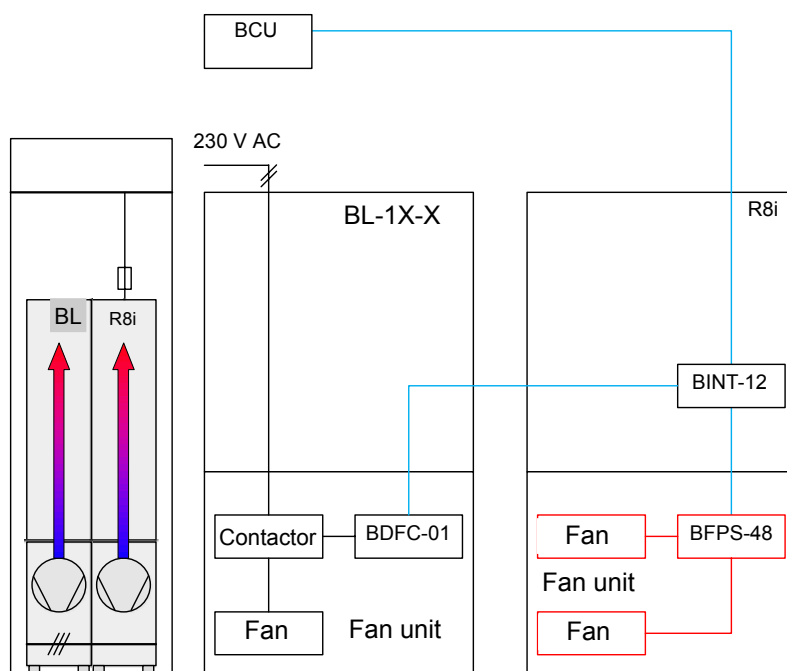
Fan control signal	V1	
Fan control signal feedback	V2	

The following figures show example fiber optic connections related to fan control.

Direct-on-line cooling fan (option +C188) in regenerative rectifier module (R8i) and L-filter module



Direct-on-line cooling fan (option +C188) in L-filter module and speed-controlled fan (standard) in rectifier (R8i) module



Note: Connection between BINT board and BDFC board in the module is ready-made at the factory.

Connecting a PC

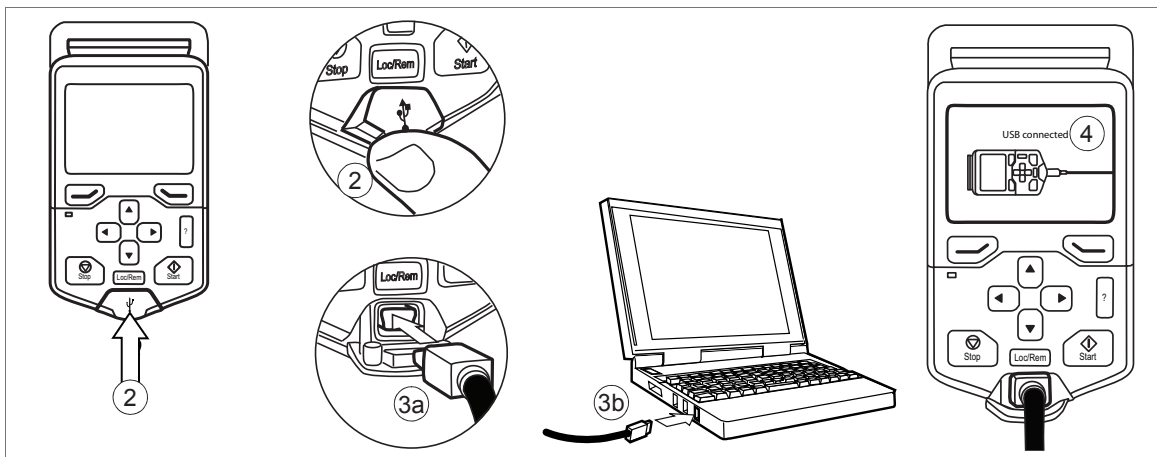


WARNING!

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.



Installing optional modules



WARNING!

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

Note: Pay attention to the free space required by the cabling or terminals coming to the optional modules.

1. Repeat the steps described in section [Electrical safety precautions \(page 74\)](#).
2. Ensure by measuring that the I/O terminals of the control unit (especially the relay output terminals) are safe.
3. Insert the module into a free option module slot on the control unit.
4. Fasten the module. For instructions, see the documentation of the optional module.
5. Connect the necessary wiring to the module following the instructions given in the documentation of the module.

6. Tighten the grounding screw to a torque of 0.8 N·m (7 lbf·in).

Note: The screw tightens the connections and grounds the module. It is essential for fulfilling the EMC requirements and for proper operation of the module.



6

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 \(page 74\)](#) 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 cooling air flows freely in and out of the drive. Air recirculation inside the cabinet is not be possible (air baffle plates are on place, or there is another air guiding solution).	☐

96 Installation checklist of the drive

Make sure that ...	☒
<u>If the drive is connected to a network other than a symmetrically grounded TN-S system:</u> 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.	☐
The enclosures of the equipment in the cabinet have proper galvanic connection to the cabinet protective earth (ground) busbar; The connection surfaces at the fastening points are bare (unpainted) and the connections are tight, or separate grounding conductors have been installed.	☐
The main circuit connections inside the drive cabinet correspond to the circuit diagrams.	☐
The control unit has been connected. See the circuit diagrams.	☐
Appropriate AC fuses and main disconnect are installed.	☐
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.	☐
<u>If a drive bypass connection will be used:</u> 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.	☐
<u>If the drive is stored for longer than one year:</u> The electrolytic DC capacitors in the DC link of the drive are reformed. Refer to <i>Converter module capacitor reforming instructions</i> (3BFE64059629 [English]).	☐
The motor and the driven equipment are ready for power-up.	☐

7

Start-up

Contents of this chapter

This chapter describes the start-up procedure of the regenerative rectifier unit.

The instructions are valid for the example rectifier unit with ACS880-904 rectifier modules. The underlined tasks are needed for certain cases only. The default device designations (if any) are given in square brackets, for example, main contactor [Q2]. The same device designations are also used in the circuit diagrams, typically. They refer to the circuit diagram of the example installation by ABB.

Note: The instructions do not cover all possible cabinet constructions.



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.



WARNING!

Before you activate the automatic fault reset or automatic restart functions of the drive control program, make sure that no dangerous situations can occur. These functions reset the drive automatically and continue operation after a fault or supply break. If these functions are activated, the installation must be clearly marked as defined in IEC/EN 61800-5-1, subclause 6.5.3, for example, "THIS MACHINE STARTS AUTOMATICALLY".

If you select an external source for the start command and it is on, the drive will start immediately after fault reset. See the firmware manual.

Start-up procedure

Tasks	☒
Safety	
 WARNING! Obey the safety instructions during the start-up procedure. See <i>ACS880 multidrive cabinets and modules safety instructions</i> (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.	☐
Checks/Settings with no voltage connected	
Make sure that it is safe to start the work. See Electrical safety precautions .	☐
 WARNING! Make sure that the disconnecter of the supply transformer is locked to the off (0) position, that means no voltage is, or cannot be, connected to the drive inadvertently.	☐
<u>Drives with a main switch-disconnector [Q1]:</u> Open and lock the main switch-disconnector of the drive. <u>Drives with a main breaker [Q1]:</u> Crank the main breaker to DISCONNECTED position.	☐
If the unit is equipped with a main breaker, 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 limit rules, see below. General rule Make sure that the selectivity condition is fulfilled, that is the breaker trips at a lower current than the protection device of the supplying network, and that the limit is high enough not 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.	☐
Open the auxiliary voltage switch [Q21].	☐
Open the charging circuit switch [Q3].	☐
Make sure that the mechanical and electrical installation of the unit has been inspected and is OK. See Installation checklist of the drive (page 95)	☐
Check the settings of breakers/switches in the auxiliary circuits.	☐
If time relays, or relays with delayed make-contact or break-contact are used, check the relay time settings.	☐
Check the voltage settings of the auxiliary voltage transformers (if any) are according to the actual power line voltage. See the final circuit diagrams by the designer of the cabinet-installed drive.	☐
Disconnect the 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 the XSTO terminal block of the BCU control unit are closed with jumper wires (IN1 and IN2 are connected to OUT).	☐
Make sure that both channels of the STO terminal block X52 of the rectifier module are connected with jumper wires to 24 V DC output of terminal block X53.	☐

Tasks	☒																																																									
Powering up the regenerative rectifier unit																																																										
Make sure that it is safe to connect voltage. Make sure that: - nobody is working on the unit or circuits that are wired from outside into the cabinets. - covers of the motor terminal boxes are on.	☐																																																									
Close the circuit breakers supplying the auxiliary circuits [F22,..., Fxx].	☐																																																									
Close the cabinet doors.	☐																																																									
Close the main breaker of the supply transformer.	☐																																																									
Close the auxiliary voltage switch [Q21].	☐																																																									
Setting the rectifier unit parameters																																																										
Rectifier modules with option +C188 (direct-on-line cooling fan): Set bit 13 of parameter 195.20 HW options word 1.	☐																																																									
If your rectifier unit consists of more than one module, parameter 195.31 Parallel connection rating id needs to be set first: - Select the correct voltage range with parameter 195.30 Parallel type filter. - Then select the correct rectifier 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 ranges by parameter 195.01 Supply voltage. - Reboot the control unit again by parameter 196.08 Control board boot. <table border="1"> <thead> <tr> <th>ACS880-90x-...</th> <th>Frame</th> <th>Parameter 195.31 Parallel connection rating id selection</th> </tr> </thead> <tbody> <tr><td>0600A-3</td><td>1×R8i</td><td>ACS880-90x-0600A-3 (707)</td></tr> <tr><td>0900A-3</td><td>1×R8i</td><td>ACS880-90x-0900A-3 (710)</td></tr> <tr><td>1180A-3</td><td>2×R8i</td><td>ACS880-90x-1180A-3 (7072)</td></tr> <tr><td>1770A-3</td><td>2×R8i</td><td>ACS880-90x-1770A-3 (7102)</td></tr> <tr><td>2310A-3</td><td>4×R8i</td><td>ACS880-90x-2310A-3 (7074)</td></tr> <tr><td>3460A-3</td><td>4×R8i</td><td>ACS880-90x-3460A-3 (7104)</td></tr> <tr><td>0600A-5</td><td>1×R8i</td><td>ACS880-90x-0600A-5 (717)</td></tr> <tr><td>0900A-5</td><td>1×R8i</td><td>ACS880-90x-0900A-5 (720)</td></tr> <tr><td>1180A-5</td><td>2×R8i</td><td>ACS880-90x-1180A-5 (7172)</td></tr> <tr><td>1770A-5</td><td>2×R8i</td><td>ACS880-90x-1770A-5 (7202)</td></tr> <tr><td>2310A-5</td><td>4×R8i</td><td>ACS880-90x-2310A-5 (7174)</td></tr> <tr><td>3460A-5</td><td>4×R8i</td><td>ACS880-90x-3460A-5 (7204)</td></tr> <tr><td>0600A-7</td><td>1×R8i</td><td>ACS880-90x-0600A-7 (727)</td></tr> <tr><td>0900A-7</td><td>1×R8i</td><td>ACS880-90x-0900A-7 (730)</td></tr> <tr><td>1180A-7</td><td>2×R8</td><td>ACS880-90x-1180A-7 (7272)</td></tr> <tr><td>1770A-7</td><td>2×R8</td><td>ACS880-90x-1770A-7 (7302)</td></tr> <tr><td>2310A-7</td><td>4×R8i</td><td>ACS880-90x-2310A-7 (7274)</td></tr> <tr><td>3460A-7</td><td>4×R8i</td><td>ACS880-90x-3460A-7 (7304)</td></tr> </tbody> </table> If you need more information on the use of the control panel, see ACS-AP-x assistant control panels user's manual (3AUA0000085685 [English]).	ACS880-90x-...	Frame	Parameter 195.31 Parallel connection rating id selection	0600A-3	1×R8i	ACS880-90x-0600A-3 (707)	0900A-3	1×R8i	ACS880-90x-0900A-3 (710)	1180A-3	2×R8i	ACS880-90x-1180A-3 (7072)	1770A-3	2×R8i	ACS880-90x-1770A-3 (7102)	2310A-3	4×R8i	ACS880-90x-2310A-3 (7074)	3460A-3	4×R8i	ACS880-90x-3460A-3 (7104)	0600A-5	1×R8i	ACS880-90x-0600A-5 (717)	0900A-5	1×R8i	ACS880-90x-0900A-5 (720)	1180A-5	2×R8i	ACS880-90x-1180A-5 (7172)	1770A-5	2×R8i	ACS880-90x-1770A-5 (7202)	2310A-5	4×R8i	ACS880-90x-2310A-5 (7174)	3460A-5	4×R8i	ACS880-90x-3460A-5 (7204)	0600A-7	1×R8i	ACS880-90x-0600A-7 (727)	0900A-7	1×R8i	ACS880-90x-0900A-7 (730)	1180A-7	2×R8	ACS880-90x-1180A-7 (7272)	1770A-7	2×R8	ACS880-90x-1770A-7 (7302)	2310A-7	4×R8i	ACS880-90x-2310A-7 (7274)	3460A-7	4×R8i	ACS880-90x-3460A-7 (7304)	☐
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0900A-3	1×R8i	ACS880-90x-0900A-3 (710)																																																								
1180A-3	2×R8i	ACS880-90x-1180A-3 (7072)																																																								
1770A-3	2×R8i	ACS880-90x-1770A-3 (7102)																																																								
2310A-3	4×R8i	ACS880-90x-2310A-3 (7074)																																																								
3460A-3	4×R8i	ACS880-90x-3460A-3 (7104)																																																								
0600A-5	1×R8i	ACS880-90x-0600A-5 (717)																																																								
0900A-5	1×R8i	ACS880-90x-0900A-5 (720)																																																								
1180A-5	2×R8i	ACS880-90x-1180A-5 (7172)																																																								
1770A-5	2×R8i	ACS880-90x-1770A-5 (7202)																																																								
2310A-5	4×R8i	ACS880-90x-2310A-5 (7174)																																																								
3460A-5	4×R8i	ACS880-90x-3460A-5 (7204)																																																								
0600A-7	1×R8i	ACS880-90x-0600A-7 (727)																																																								
0900A-7	1×R8i	ACS880-90x-0900A-7 (730)																																																								
1180A-7	2×R8	ACS880-90x-1180A-7 (7272)																																																								
1770A-7	2×R8	ACS880-90x-1770A-7 (7302)																																																								
2310A-7	4×R8i	ACS880-90x-2310A-7 (7274)																																																								
3460A-7	4×R8i	ACS880-90x-3460A-7 (7304)																																																								
Switch the control panel to the remote mode (Loc/Rem key) to enable control of the rectifier unit with the operating switch [S21].	☐																																																									
Switching the rectifier unit on																																																										



Tasks	☒
Drives with a main switch-disconnector [Q1]: Close the main switch-disconnector. Drives with a main circuit breaker [Q1]: Crank the breaker in.	☐
 WARNING! Start button of the air circuit breaker bypasses charging circuit and may damage the module.	
Close the charging circuit switch [Q3].	☐
Turn the operating switch [S21] to on (1) position to activate the Run enable signal and close the main contactor [Q2].	☐
On-load checks	
Check that the rectifier module cooling fan rotates freely in the right direction.	☐
Validate the operation of safety functions (for example, emergency stop). Safety functions are optional.  WARNING! The safety functions are not safe before they are validated according to the instructions. See the function-specific manual for the validation tasks.	☐

Switching the unit off

1. Stop the motors connected to inverter units.
2. Deactivate the Run enable signal to open the main contactor [Q2]. This can be done, for example, with an operating switch [S21].

Disconnecting and temporary grounding the drive (excluding the input power terminals)

See *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]).

Disconnecting and temporary grounding the drive (including the input power terminals)

See *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]).

8

Maintenance

Contents of this chapter

This chapter instructs how to maintain the regenerative rectifier module and how to interpret its fault indications. The information is valid for ACS880-904 regenerative rectifier modules and example cabinet installations of the modules.

Note: The instructions do not cover all possible cabinet constructions.

**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/driveservices). For more information, consult your local ABB Service representative (www.abb.com/searchchannels).

Maintenance task/object	Years from start-up												
	1	2	3	4	5	6	7	8	9	10	11	12	...
Cooling fans													
Main cooling fan (speed-controlled)									R				
Main cooling fan (direct-on-line, 50 Hz)									R				
Main cooling fan (direct-on-line, 60 Hz)									R				
L-filter cooling fan (DOL, 50 Hz)									R				
L-filter cooling fan (DOL, 60 Hz)						R						R	
Cooling fan for circuit boards									R				
Cabinet cooling fan, internal (50 Hz)									R				
Cabinet cooling fan, internal (60 Hz)						R						R	
Cabinet cooling fan, IP54 (50 Hz)									R				
Cabinet cooling fan, IP54 (60 Hz)						R						R	
Batteries													
Control panel battery									R				
Control unit battery						R						R	
Connections and environment													
Cabinet door filters IP54	R	R	R	R	R	R	R	R	R	R	R	R	R
Quality of supply voltage	P	P	P	P	P	P	P	P	P	P	P	P	P
Spare parts													
Spare parts	I	I	I	I	I	I	I	I	I	I	I	I	I
Reforming of DC circuit capacitors, spare modules and spare capacitors	P	P	P	P	P	P	P	P	P	P	P	P	P
Other useful tasks													
Cleaning IP22 and IP42 air inlet and outlet meshes	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
Checking ambient conditions (dustiness, corrosion, temperature)	I	I	I	I	I	I	I	I	I	I	I	I	I
Cleaning heatsinks of rectifier module	I	I	I	I	I	I	I	I	I	I	I	I	I
ABB SACE main circuit breaker maintenance	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.

Maintenance timers and counters

The control program has maintenance timers and counters that can be configured to generate a warning when a pre-defined limit is reached. Each timer/counter can be set to monitor any parameter. This feature is especially useful as a service reminder. For more information, see the firmware manual.

Cabinet

■ Cleaning the interior of the cabinet



WARNING!

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



WARNING!

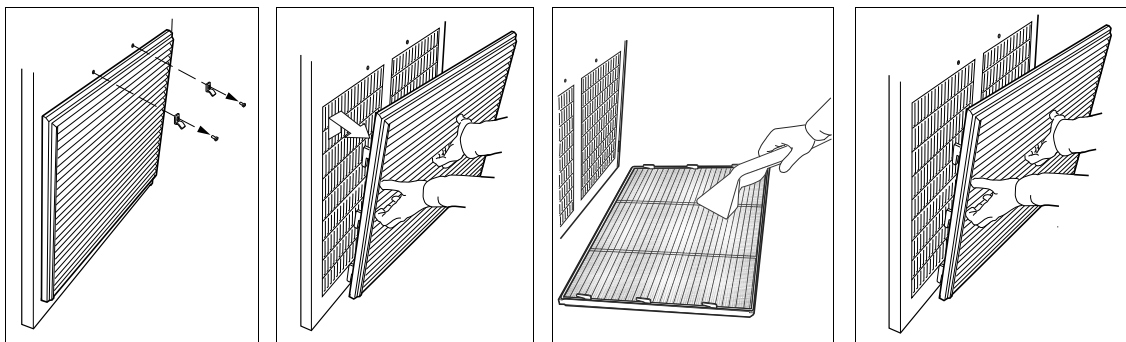
Use a vacuum cleaner with antistatic hose and nozzle, and wear a grounding wristband. Using a normal vacuum cleaner creates static discharges which can damage circuit boards.

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 74\)](#) 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)

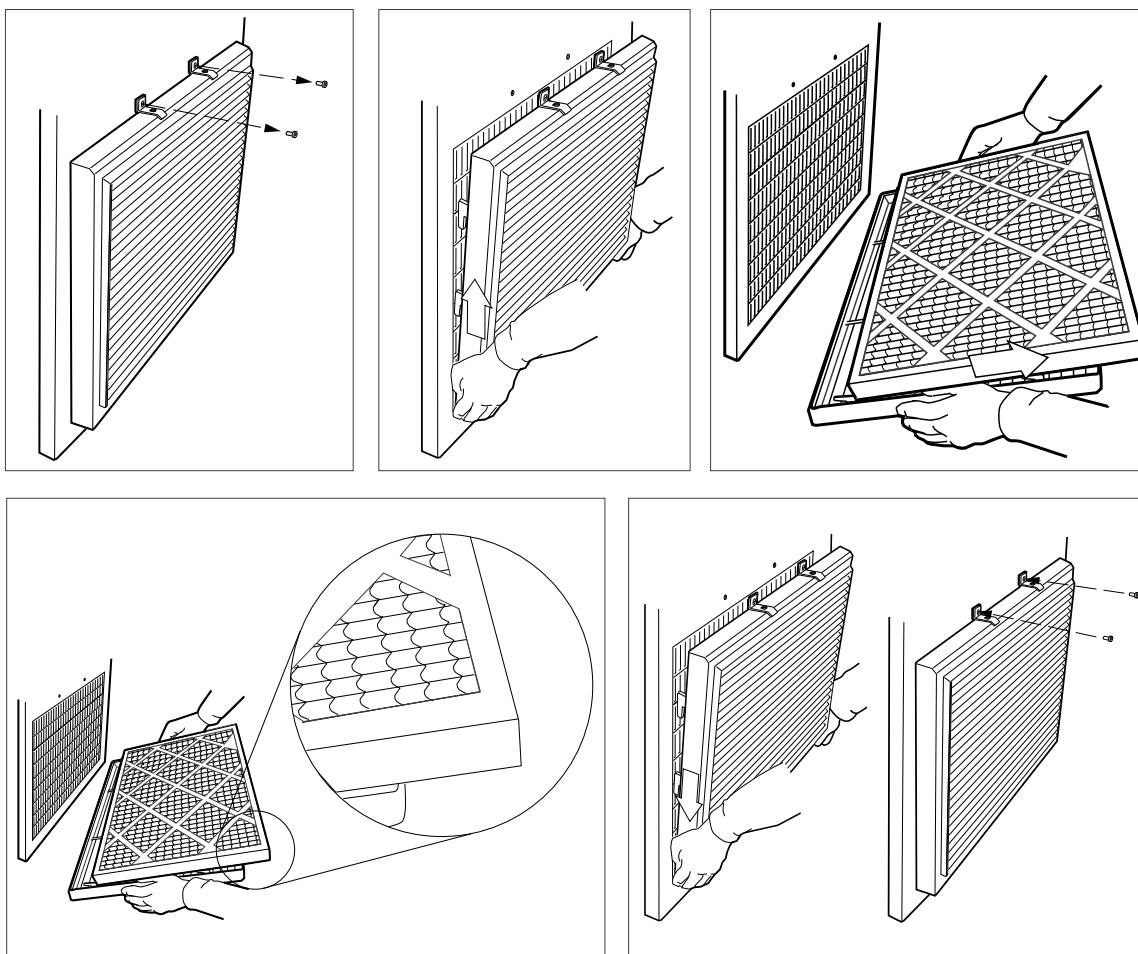
Check the dustiness of the air inlet meshes. If the dust cannot be removed by vacuum cleaning from outside through the grating holes with a small nozzle, proceed as follows:

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 74\)](#) 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 \(page 74\)](#) 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



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

1. Repeat the steps described in section [Electrical safety precautions \(page 74\)](#).
2. Check the tightness of the cable connections. Use the tightening torques given in the technical data.

Fans

The lifespan of the cooling fans of the drive depends on the running time, ambient temperature and dust concentration. See the firmware manual for the actual signal which indicates the running time of the cooling fan. Reset the running time signal after fan replacement.

Replacement fans are available from ABB. Do not use other than ABB specified spare parts.

■ Replacing R8i module cooling fan (speed-controlled version)

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.

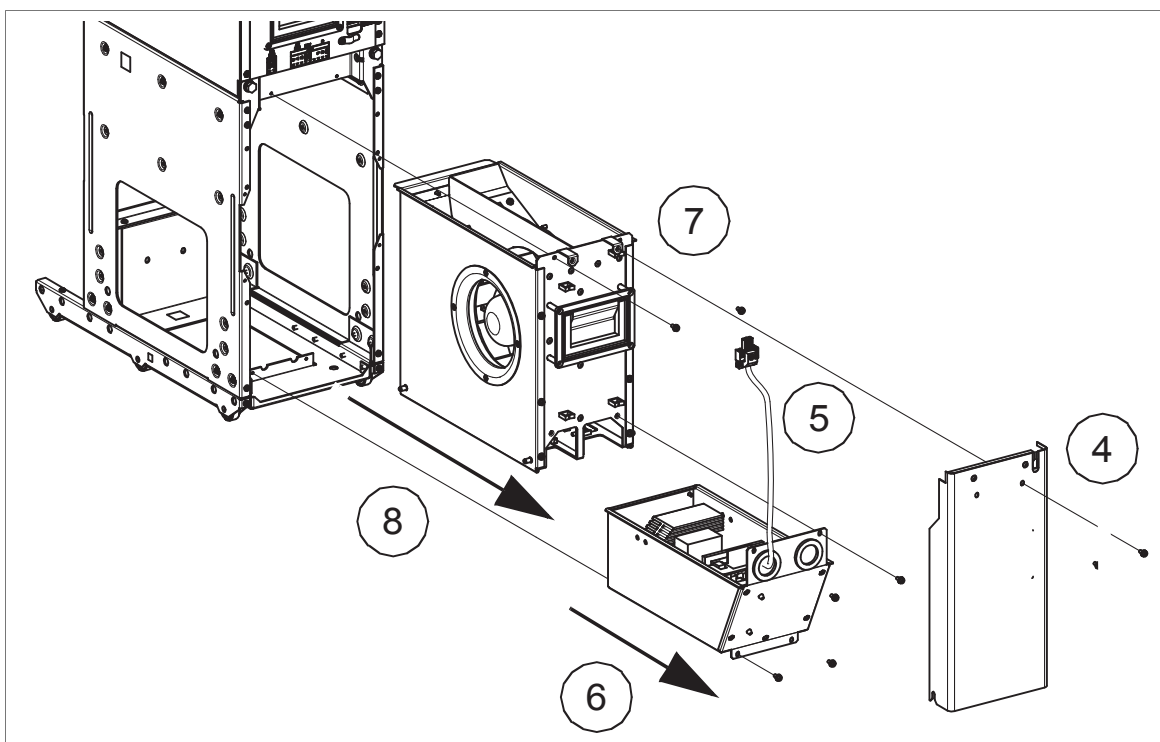
If you are not a qualified electrical professional, do not do installation or maintenance work.



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 74)* 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 R8i module cooling fan (direct-on-line version)



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.

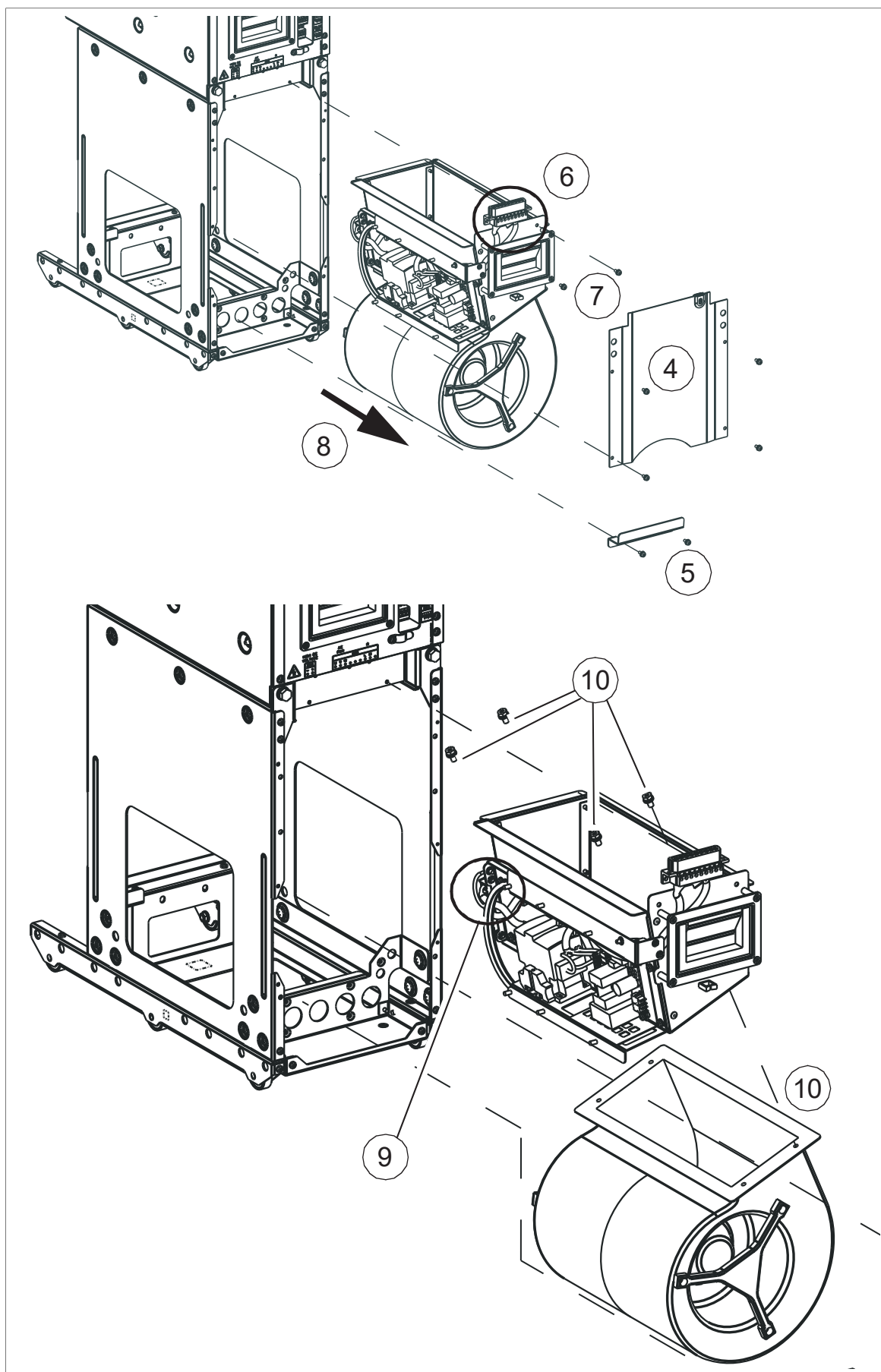
If you are not a qualified electrical professional, do not do installation or maintenance work.



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 \(page 74\)](#) 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.
-



■ Replacing the circuit board compartment fan

Frame R8i modules are equipped with a fan blowing air through the circuit board compartment.

The fan is accessible from the front of the module.

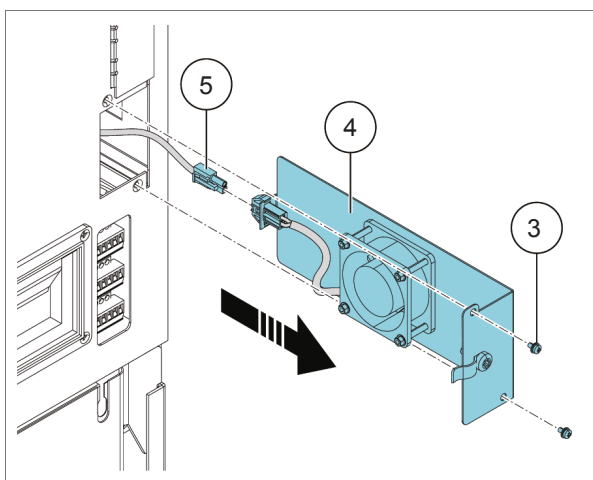


WARNING!

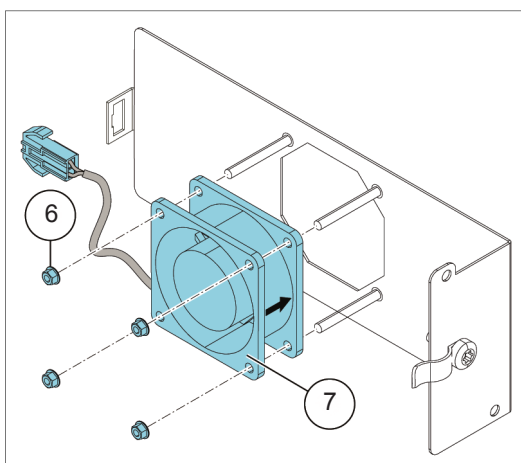
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

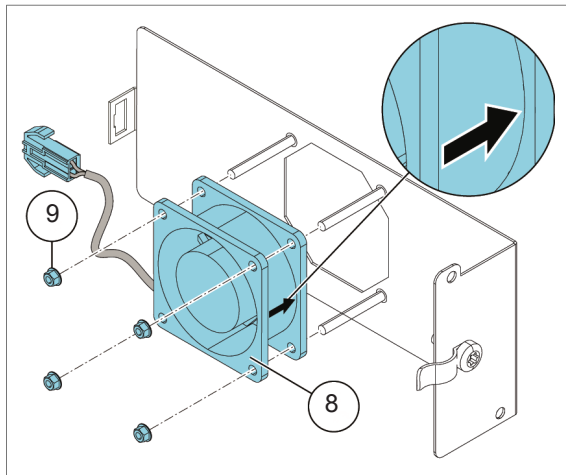
1. Stop the drive and do the steps in section [Electrical safety precautions \(page 74\)](#) before you start the work.
2. Open the door of the module cubicle.
3. Remove the two M4×12 (T20) screws which lock the fan holder.
4. Pull the fan holder out of the module.
5. Disconnect the fan cable.



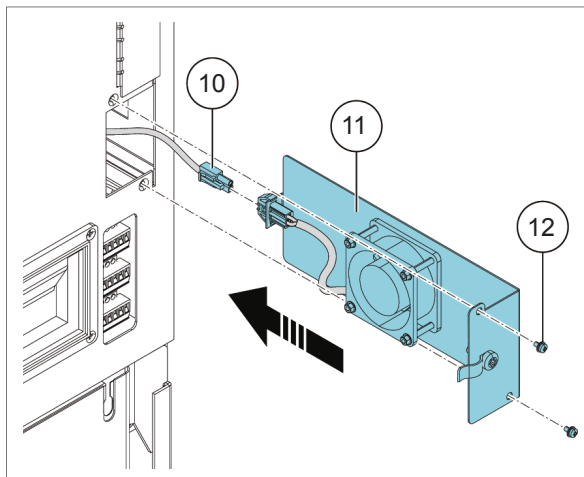
6. Remove the four M3 (5.5 mm) nuts which hold the fan.
7. Remove the fan from the fan holder.



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 fan of the L-filter (BL-1x-x)

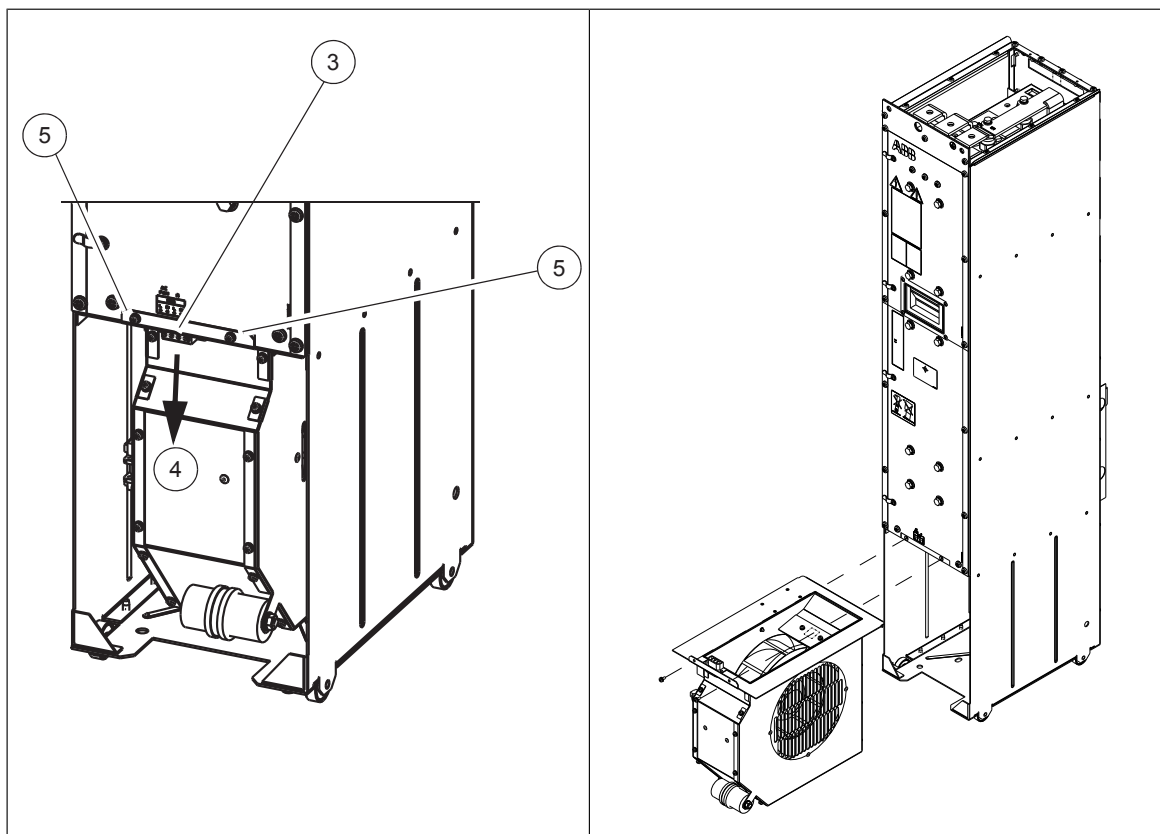


WARNING!

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 \(page 74\)](#) before you start the work.
2. Open the door.
3. Remove the two locking screws of fan supply plug connector.
4. Pull the plug connector downwards to unplug the fan wiring.
5. Remove two screws in front of the fan unit.
6. Pull the fan unit out.
7. Install a new fan in reverse order.



■ Replacing the fan of the L-filter (BL-2x-x)

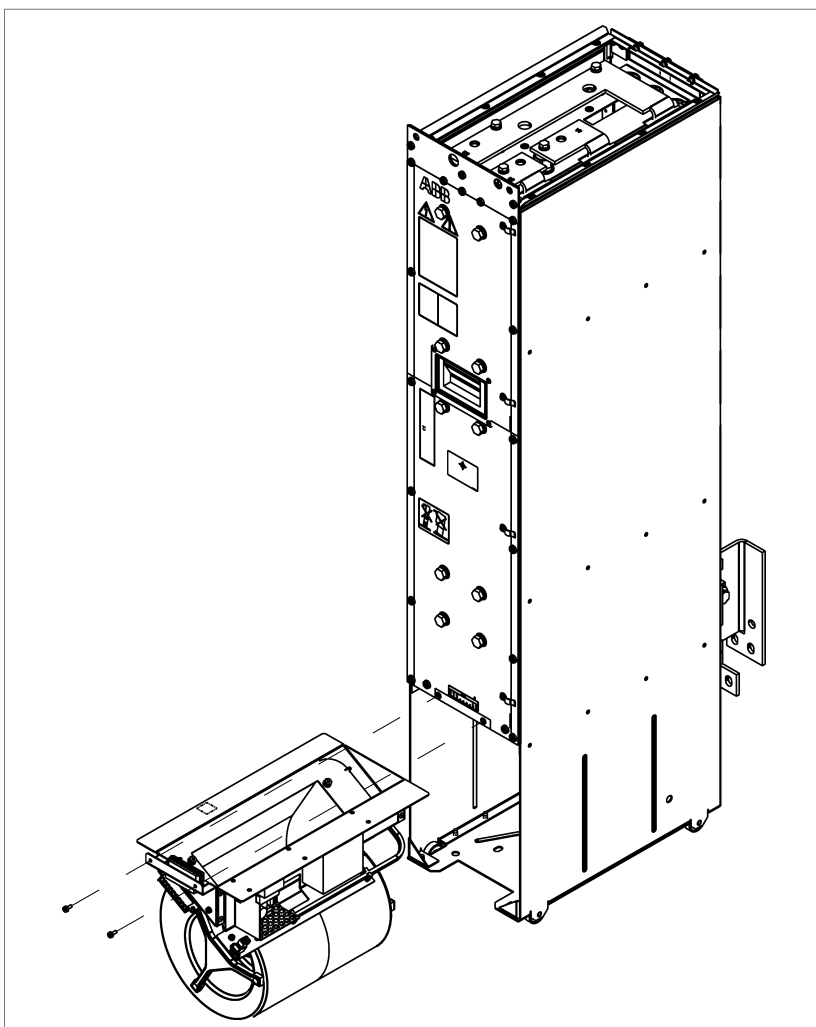


WARNING!

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 \(page 74\)](#) before you start the work.
2. Open the door.
3. Remove the screws in front of the fan unit.
4. Unplug the wiring of the fan.
5. Pull the fan unit out.
6. Install a new fan in reverse order.



■ Replacing the cabinet cooling fans

Cabinets with ABB air outlet kits



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 \(page 74\)](#) before you start the work.
2. The instruction mentioned at each air outlet kit in chapter Ordering information contains an exploded view of the outlet. Remove all gratings and filters, and finally remove the plate on top of the outlet. Unscrew all necessary screws securing the fan and remove it.
3. Install new fan in reverse order.

Cabinets with other fan types



WARNING!

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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 \(page 74\)](#) before you start the work.
2. Follow the instructions of the manufacturer of the air outlet or enclosure system.

Regenerative rectifier 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!

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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 74)* 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 R8i module

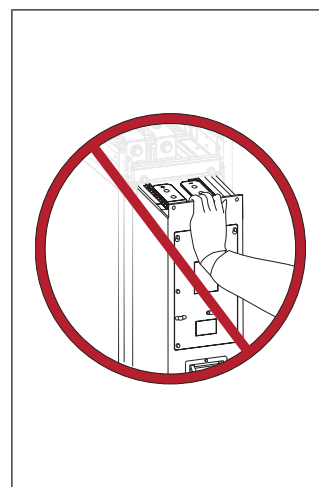
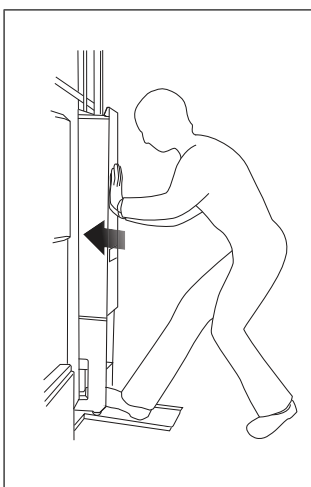
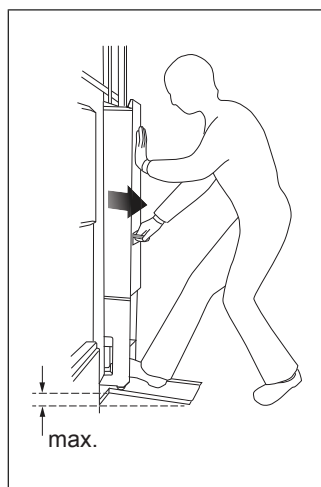
**WARNING!**

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

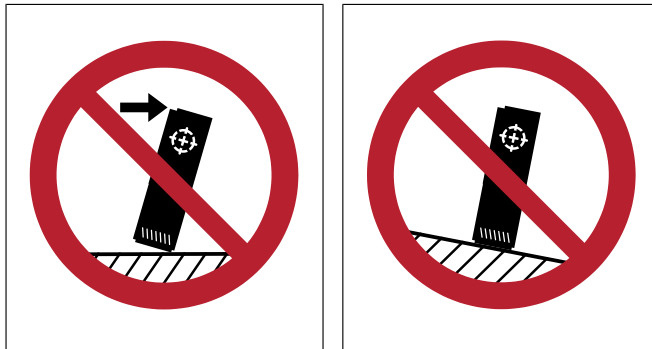
**WARNING!**

- Do not use the module extraction/installation ramp with plinth heights which exceeds the maximum allowed height.
- Secure the module extraction/installation ramp carefully.
- Push the module into the cabinet and pull it from the cabinet carefully preferably with help from another person. Keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back. Keep your fingers away from the edges of the front flange of the module.



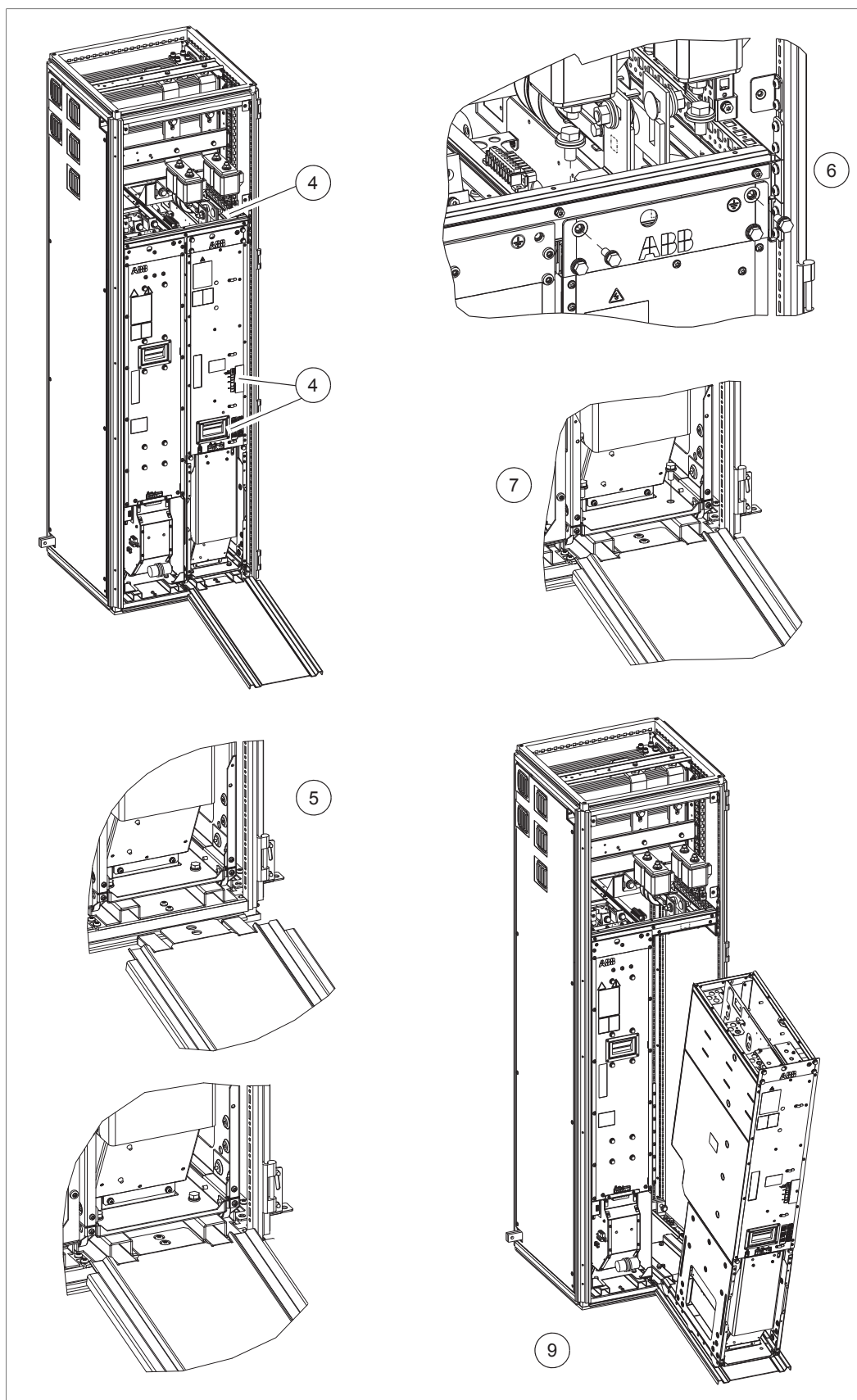
- Be careful when handling a tall module. The module overturns easily because it is heavy and has a high center of gravity. Whenever possible, secure the

module with chains. Do not leave an unsupported module unattended especially on a sloping floor.



- Wear protective gloves and long sleeves! Some parts have sharp edges.

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 74\)](#) before you start the work.
2. Open the cubicle door.
3. Remove the shrouds (if any).
4. Unplug the wiring on the front of the module. Unplug the connector (X50) at the top of the module. Move the wires aside.
5. Use a module pull out ramp or other lifting device to remove the module from the cabinet. If the ramp designed for Rittal enclosures is used, install it by placing the hooks of the ramp between the bottom plate and enclosure frame.
6. Remove the two fastening bolts in the DC output busbars. Remove the two fastening screws on the top part of the module.
7. Remove the module fastening screws on the lower part of the module.
8. Pull the module carefully out of the cabinet along the ramp, or use another lifting device to remove the module.
9. Replace the module:
 - Push the module back in and fasten. Tighten the fastening screws of the module to 22 N·m (16.2 lbf·ft) and fastening bolts of the DC input busbars to 70 N·m (51.6 lbf·ft).
 - Reconnect connector X50 at the top of the module.
 - Reconnect the wiring and fiber optic cables to their respective terminals on the front of the module.
 - Remove the module pull-out ramp, attach the shrouds (if any) and close the cabinet doors.



L-filter

■ Replacing the L-filter

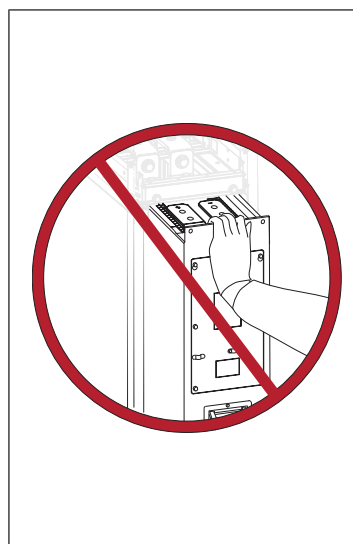
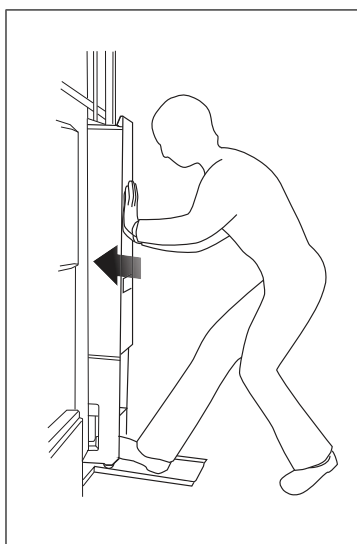
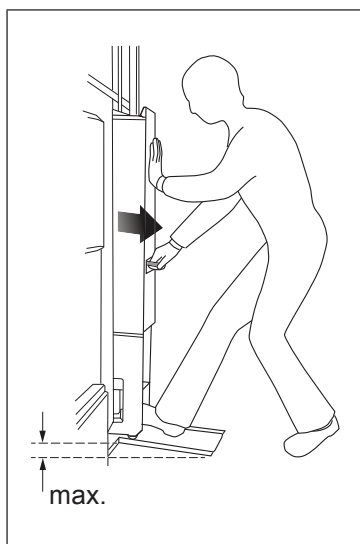


WARNING!

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.

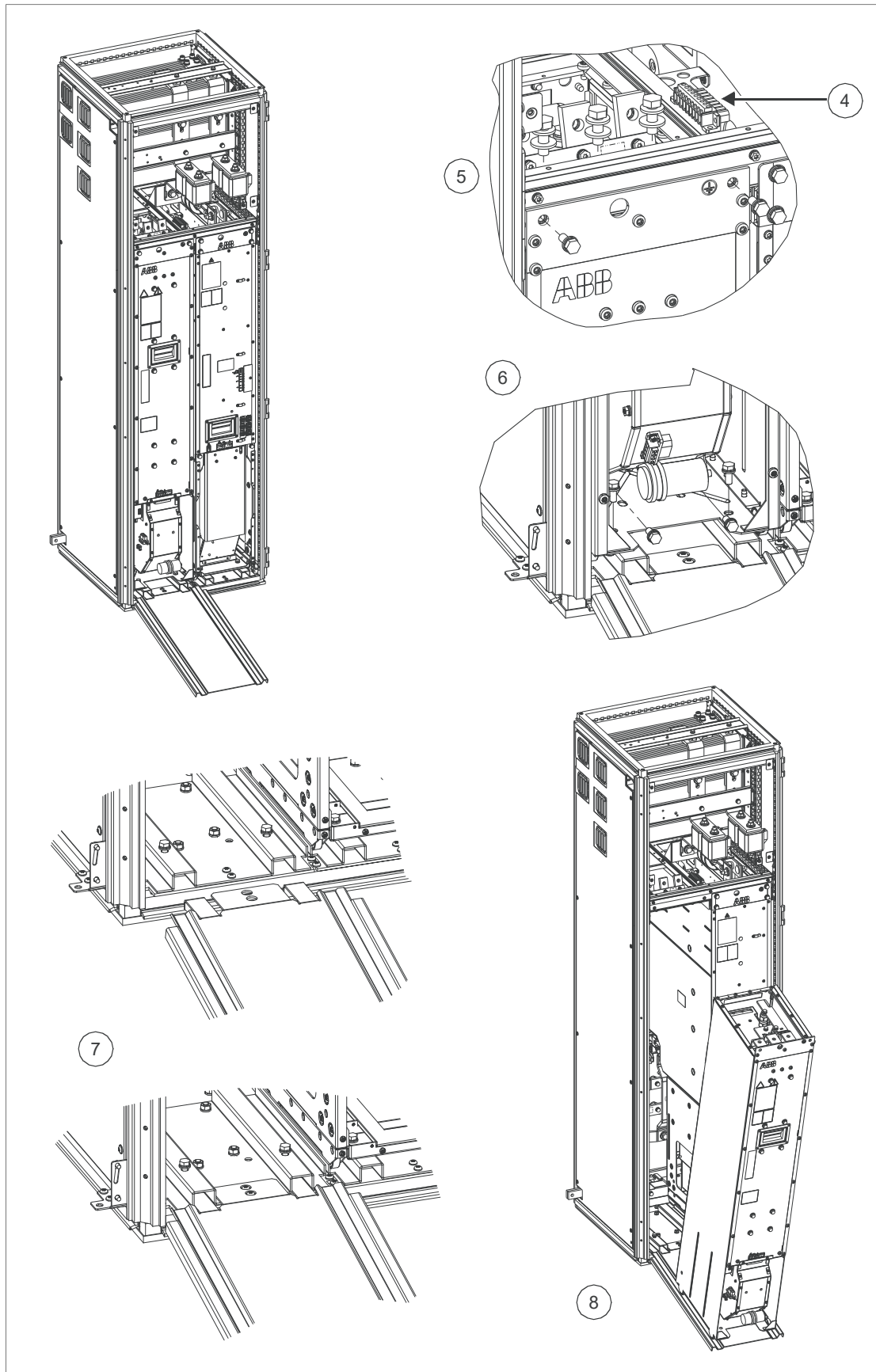
- Do not use the module extraction/installation ramp with plinth heights which exceeds the maximum allowed height.
- Secure the module extraction/installation ramp carefully.
- Push the module into the cabinet and pull it from the cabinet carefully preferably with help from another person. Keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back. Keep your fingers away from the edges of the front flange of the module.



- Be careful when handling a tall module. The module overturns easily because it is heavy and has a high center of gravity. Whenever possible, secure the module with chains. Do not leave an unsupported module unattended especially on a sloping floor.



- 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 \(page 74\)](#)
 - 2. Open the cubicle door.
 - 3. Remove the shrouds (if any).
 - 4. Unplug the terminal block [X30] on top of the filter module.
 - 5. Remove the two fastening screws in front of the filter module. Unscrew and remove the bolts on the AC connection.
In BL-2x-x:
 - On top of the filter module, loosen the screws on the AC busbars and lift the busbars up slightly so that the module can be removed.
 - To gain access to the output (AC) connections in the back, remove fan of the filter. See section Replacing the fan of the L-filter (BL-2x-x) in Maintenance.
 - Undo the bolts from the AC busbars and reinstall the fan.
 - 6. Remove the four fastening screws in the lower part of the filter module.
 - 7. Use a module pull out ramp or other lifting device to remove the module from the cabinet. If the ramp is used, install it by placing the hooks of the ramp between the bottom plate and Rittal frame.
 - 8. Pull the module carefully out of the cabinet along the ramp or use any other lifting device to remove the module.
 - 9. Replace the module:
 - Push the module back in and fasten. Be careful not to break the fastening screws: tighten the fastening screws to 22 N·m (16.2 lbf.ft) and fastening bolts to 70 N·m (51.6 lbf.ft).
 - Plug the module signal wire set to the terminal block [X30].
 - Remove the module pull-out ramp, attach the shrouds (if any) and close the cabinet doors.
-



Capacitors

The DC link of the drive contains several electrolytic capacitors. Operating time, load, and surrounding air temperature have an effect on the life of the capacitors. Capacitor life can be extended by decreasing the surrounding air temperature.

Capacitor failure is usually followed by damage to the unit and an input cable fuse failure, or a fault trip. If you think that any capacitors in the drive have failed, contact ABB.

■ Reforming the capacitors

The capacitors must be reformed if the drive has not been powered (either in storage or unused) for a year or more. The manufacturing date is on the type designation label. For information on reforming the capacitors, see *Converter module capacitor reforming instructions* (3BFE64059629 [English]) in the ABB Library (<https://library.abb.com/en>).

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 the separate *ACx-AP-x assistant control panels user's manual* document (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

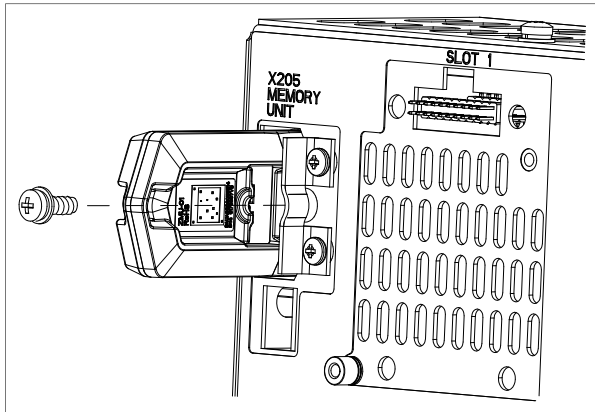
After replacing a control unit, you can retain the existing parameter settings by transferring the memory unit from the defective control unit to the new control unit.



WARNING!

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

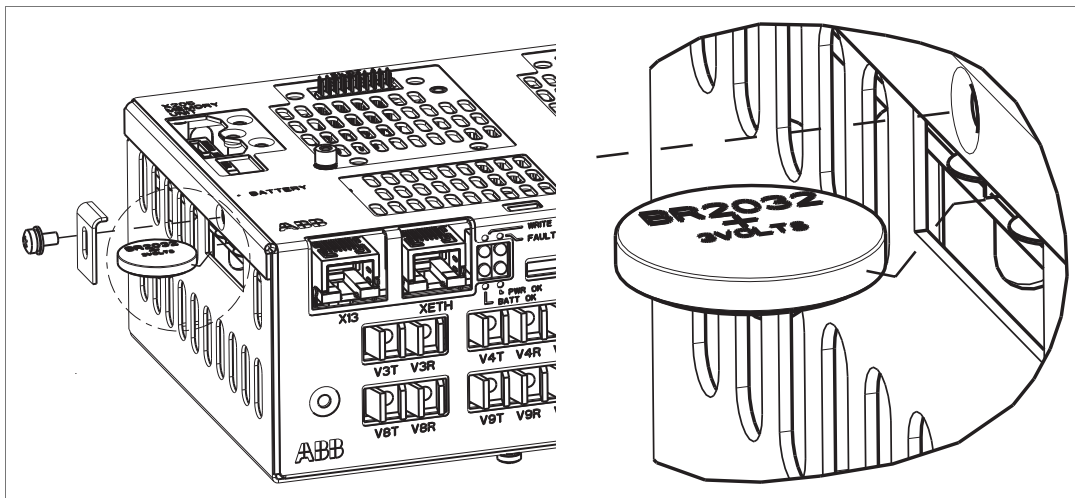
1. Stop the drive and do the steps in section *Electrical safety precautions (page 74)* before you start the work.
 2. Make sure that the control unit is not powered.
 3. Undo the fastening screw and pull the memory unit out.
 4. Install a memory unit in reverse order.
-



■ 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 \(page 74\)](#) 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 ACS880-907 regenerative rectifier unit.

■ Control panel and panel platform/holder LEDs

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

Location	LED	Indication
Control panel	Continuous green	The unit is functioning normally.
	Flickering green	Data is transferred between the PC and the unit through the USB connection of the control panel.
	Blinking green	There is an active warning in the unit.
	Continuous red	There is an active fault 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.

■ R8i module LEDs

Frame R8i modules have three LEDs. For their indications, see the following table.

Location	LED	Indication
R8i module	FAULT (continuous red)	There is an active fault in the module.
	ENABLE / STO (continuous green)	The module is ready for use.
	ENABLE / STO (continuous yellow)	XSTO connectors are de-energized.
	POWER OK (continuous green)	Supply voltage of the internal circuit boards is OK (> 21 V).

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, but the physical requirements of operating the motor still apply; for example, the modules remaining in use must be able to provide enough current.

4×R8i unit consist of two 2×R8i+BL sets. When one rectifier unit fails, whole set of 2×R8i+BL is first removed as shown below:

4 -> 2 -> 1 RRU modules

that is

4×R8i+2×BL -> 2×R8i+1×BL -> 1×R8i+1×BL.

■ 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 74)* 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.
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 74)* 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*.

9

Ordering information

Contents of this chapter

This chapter lists the types and ordering codes of the unit components.

You can find the kit-specific assembly drawings, step-by-step instructions and detailed kit information on the Internet. Go to

<https://sites-apps.abb.com/sites/lvacdrivesengineeringssupport/content>. If needed, contact your local ABB representative.

Note:

- This chapter only lists the installation accessories available from ABB. All other parts must be sourced from a third party (such as Rittal) by the system integrator. For a listing, refer to the kit-specific installation instructions available at <https://sites-apps.abb.com/sites/lvacdrivesengineeringssupport/content>. For access, contact your local ABB representative.
- Parts that are labeled suitable for generic enclosures are not designed for any specific enclosure system. These parts are intended as a basis for further engineering, and may require additional parts to be fully usable.

Installation accessories designed for generic enclosures are in fact designed for an inside width of 50 mm less than the nominal width of the enclosure. For example, a mechanical kit intended for 800 mm wide generic enclosure is designed for an inside width of 750 mm, and will not fit a 800 mm wide Rittal VX25 enclosure.

Kit code key

The kit codes shown in this chapter break down as follows.

The format of the kit code is x-w-s-yyy(-VX), for example, L-6-8-401 where:

- x = cooling method
 - A = air-cooled (some of these kits are also used with liquid-cooled drives)
 - L = liquid-cooled
-

- w = cabinet width
 - 4 = 400 mm
 - 6 = 600 mm
 - 8 = 800 mm
 - s = module frame size / sizes
 - 1 = R1i
 - 2 = R2i
 - 3 = R3i
 - 4 = R4i
 - 5 = R5i
 - 6 = R6i/D6D
 - 7 = R7i/D7D/D7T
 - 8 = R8i/D8D/D8T
 - X = any, or not defined.
 - yyy = consecutive numbering
 - 001...099 = Kits related to cabinets, for example, adapter plates
 - 001...019 Common AC- and DC-related kits
 - 020...049 Cabinet mechanics kits
 - 050...059 Swing frame kits
 - 100...199 = Kits related to AC connection, for example, busbars
 - 100...129 Kits with connection to AC
 - 130...149 Kits with connection to module
 - 150...199 Other kits related to AC connection
 - 200...299 = Kits related to DC connection, for example, busbars
 - 200...229 Kits with connection to common DC
 - 230...249 Kits with connection to module
 - 250...299 Other kits related to DC connection
 - 300...399 = Kits related to module installation, for example, mechanical supports
 - 300...330 Module supporting kits, basic mechanical support
 - 350...379 Shroud kits
 - 400...499 = Other kits
 - 400...419 Fan kits
 - 420...439 Air guides
 - 440...459 Cooling circuit kits
-

- VX = Kit specifically designed for the Rittal VX25 enclosure system. Many kits without this designation are also used with the VX25 system.

Regenerative rectifier modules

Regenerative rectifier units consisting of frame R8i modules are to be ordered as separate modules.

Regenerative rectifier unit		Modules used		Contents
Type	Frame size	Qty	Ordering code (for options see below)	
$U_N = 400\text{ V}$				• regenerative rectifier module(s) (frame R8i) with speed-controlled cooling fan(s) as standard
ACS880-904-0600A-3	1×R8i	1	ACS880-104-0640A-3+E205+N8207	
ACS880-904-0900A-3	1×R8i	1	ACS880-104-0900A-3+E205+N8207	
ACS880-904-1180A-3	2×R8i	2	ACS880-104-0640A-3+E205+N8207	
ACS880-904-1770A-3	2×R8i	2	ACS880-104-0900A-3+E205+N8207	
ACS880-904-2310A-3	4×R8i	4	ACS880-104-0640A-3+E205+N8207	
ACS880-904-3460A-3	4×R8i	4	ACS880-104-0900A-3+E205+N8207	
$U_N = 500\text{ V}$				
ACS880-904-0600A-5	1×R8i	1	ACS880-104-0590A-5+E205+N8207	
ACS880-904-0900A-5	1×R8i	1	ACS880-104-0810A-5+E205+N8207	
ACS880-904-1180A-5	2×R8i	2	ACS880-104-0590A-5+E205+N8207	
ACS880-904-1770A-5	2×R8i	2	ACS880-104-0810A-5+E205+N8207	
ACS880-904-2310A-5	4×R8i	4	ACS880-104-0590A-5+E205+N8207	
ACS880-904-3460A-5	4×R8i	4	ACS880-104-0810A-5+E205+N8207	
$U_N = 690\text{ V}$				
ACS880-904-0600A-7	1×R8i	1	ACS880-104-0410A-7+E205+N8207	
ACS880-904-0900A-7	1×R8i	1	ACS880-104-0600A-7+E205+N8207	
ACS880-904-1180A-7	2×R8i	2	ACS880-104-0410A-7+E205+N8207	
ACS880-904-1770A-7	2×R8i	2	ACS880-104-0600A-7+E205+N8207	
ACS880-904-2310A-7	4×R8i	4	ACS880-104-0410A-7+E205+N8207	
ACS880-904-3460A-7	4×R8i	4	ACS880-104-0600A-7+E205+N8207	

Ordering code format	Option codes
[Module type] + code [+code] ... For example, ACS880-104-0640A-3 +E205	+C183: Internal heating element +C188: Direct-on-line (DOL) cooling fan +E205: Internal du/dt filters (When the module is used as an RRU, it must always be ordered with +E205.) +G304: 115 V auxiliary voltage supply +N8207: Hardware license.

Note: The following components are always required to construct a working unit and must be ordered separately:

- L-filters. For more information, see [L-filters \(page 128\)](#)
- Common mode filter (consists of two toroidal cores, 2 × 3AUA0000032859). For more information, see [Common mode filters \(page 159\)](#).
- BCU control unit kit. For the contents of the kit, see [Control unit \(page 130\)](#)
- [Fiber optic cables \(page 131\)](#)
- 1 × Control circuit plug connector (3AUA0000059813). See [Control circuit plug connectors \(page 131\)](#)
- 1 × Control circuit plug connector (3AXD50000012975). See [Control circuit plug connectors \(page 131\)](#)
- Quick connectors, 1 kit/1 rectifier or filter module (3AUA0000119227). For the contents of the kit, see [AC busbars and quick connectors \(page 155\)](#)
- Varistor board CVAR-01C (UL/CSA installations only). For more information, see [Varistor kit ACS880 for UL/CSA installations \(page 153\)](#)

The other parts listed

- may be required by the application, or
- make the installation or use of the module easier.

L-filters

■ L-filters (+C183+C188)

The L-filters must be ordered separately.

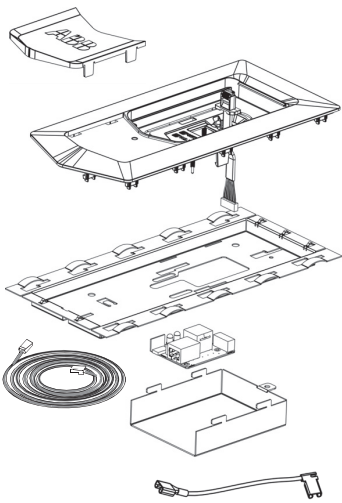
■ L-filters (+C183+C188 and +G304 or +G427)

The L-filters must be ordered separately.

Control panel

The control panel is not included with the module but must be ordered separately. One control panel is required for the commissioning of an ACS880 drive system, even if the Drive composer PC tool is used.

The control panel can be flush mounted on the cabinet door with the help of a door mounting kit. For more information on the control panel, see *ACX-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).

Type	Description	Ordering code	Illustration
ACS-AP-W	Control panel with Bluetooth	3AXD50000025965	
DPMP-01	Door mounting kit (IP55)	3AUA0000108878	

The door mounting kit contains:

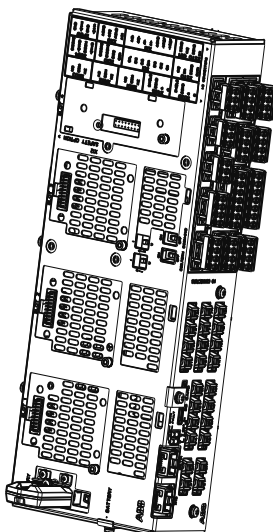
- front cover
- flat cable (between DDPI-01 board and the panel)
- DDPI-01 board, cover and M4×8 combi screw for the cover
- EMC shield
- control panel mounting platform
- grounding wire
- Ethernet cable (3 m).
- *DPMP-01 mounting platform for ACS-AP control panel installation guide* [3AUA0000100140 (English)].

Control electronics

Cabling of the electronics outside the module must be done by the customer. The current consumption of the main components in the auxiliary circuit is shown in [Auxiliary circuit current consumption \(page 181\)](#)

■ Control unit

You must equip each rectifier unit with one control unit (and memory unit).

Rectifier module	Frame size	Control unit	Qty	Ordering code	Illustration
$U_N = 400\text{ V}$					
ACS880-904-0600A-3	1×R8i	Control unit BCU-02 kit for R8i RRU	1	3AXD50000020676	
ACS880-904-0900A-3					
ACS880-904-1180A-3	2×R8i				
ACS880-904-1770A-3					
ACS880-904-2310A-3	4×R8i	Control unit BCU-12 kit for R8i RRU	1	3AXD50000020677	
ACS880-904-3460A-3					
$U_N = 500\text{ V}$					
ACS880-904-0600A-5	1×R8i	Control unit BCU-02 kit for R8i RRU	1	3AXD50000020676	
ACS880-904-0900A-5					
ACS880-904-1180A-5	2×R8i				
ACS880-904-1770A-5					
ACS880-904-2310A-5	4×R8i	BCU-12 kit for R8i RRU	1	3AXD50000020677	
ACS880-904-3460A-5					
$U_N = 690\text{ V}$					
ACS880-904-0600A-7	1×R8i	Control unit BCU-02 kit for R8i RRU	1	3AXD50000020676	
ACS880-904-0900A-7					
ACS880-904-1180A-7	2×R8i				
ACS880-904-1770A-7					
ACS880-904-2310A-7	4×R8i	Control unit BCU-12 kit for R8i RRU	1	3AXD50000020677	
ACS880-904-3460A-7					

The BCU control unit kit contains:

- BCU-02 or BCU-12 control unit
- memory unit with regenerative rectifier control program.

You must connect the control unit to each rectifier module with a pair of fiber optic cables. You can order them from ABB. See section [Fiber optic cables on page 147](#).

You can supply 24 V DC for the control unit from the rectifier module. (Alternatively, you can take the power supply from another suitable power source or use both for redundancy.) You must acquire the wiring separately. Use a suitable standard installation cable. Use appropriate [X53] plug connector for the connection to the rectifier module. See sections [Connectors X50...X53 \(page 27\)](#) and [Control circuit plug connectors \(page 131\)](#)

For more information on the control unit, see chapter [Control units of the drive \(page 185\)](#)
For the dimension drawings, see section [BCU control unit \(page 203\)](#)

■ Fiber optic cables

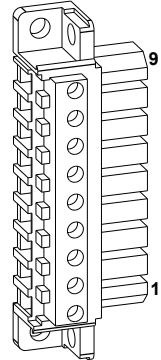
The following kits, each consisting of a pair of plastic fiber optic cables, are available from ABB:

Length	Kit type designation	Ordering code
2 m	NLWC-02	58988821
3 m	NLWC-03	58948233
5 m	NLWC-05	58948250
7 m	NLWC-07	58948268
10 m	NLWC-10	58948276

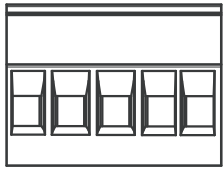
■ Control circuit plug connectors

The control circuit plug connectors are not included in the module kit but you must order them separately.

- You need one plug connector X30 or X50 for the AC auxiliary power supply connection for each regenerative rectifier or filter module. See the table below.
- If you supply 24 V DC for the control unit from one regenerative rectifier module, you need one plug connector X53.

Connector	Data	Qty	Ordering code	Illustration
X50 for R8i X30 for BL-15-7 and BL-25-7 module	STV S 9 SB 9-pole 6 KV/3 (female) 4 mm ² , 500 V, 32 A,	1 per mod- ule	3AUA0000059813	

Plug connectors for X51, X52 and X53 are included in the module kit. Plug connectors can be ordered separately as spare parts.

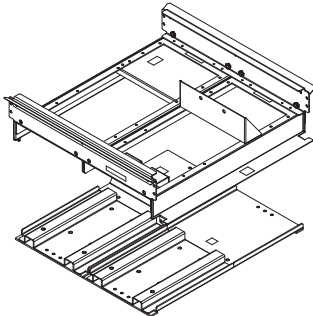
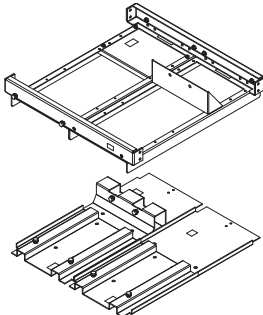
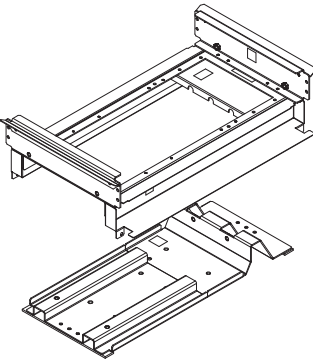
X51-X53 for R8i	1 x MSTB 2.5/5-ST- 5.08 BK 2 x MSTB 2,5/5-ST- 5,08 YE 2.50 mm ² , 12 A, 320 V	1 per mod- ule	3AXD40000003541	
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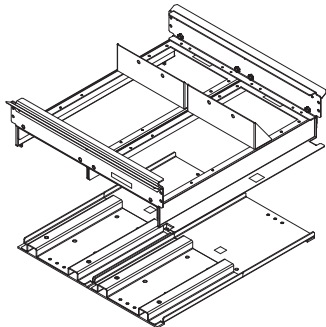
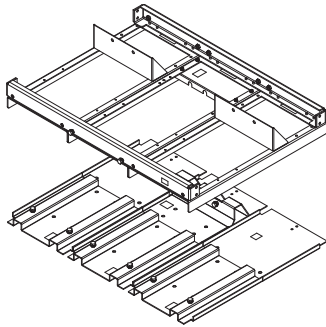
Mechanical installation accessories and tools

■ Module installation parts

Module installation parts include, for example, top and bottom supports and air baffles for the rectifier and L-filter modules.

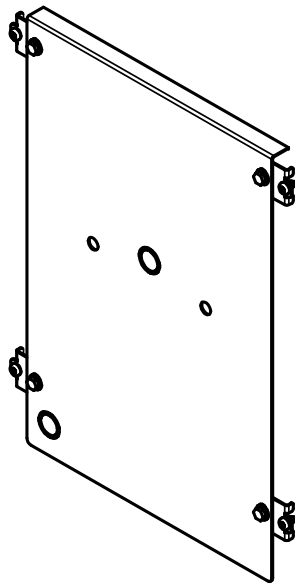
Note: The designs presented in this manual for Rittal VX25 enclosures employ the Rittal Flat-PLS busbar system. Make sure that the current carrying capability of the busbars is not exceeded at any point of the drive system.

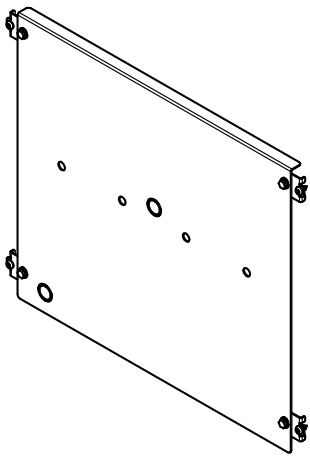
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i + BL-1x-x	600 mm Rittal VX25	1	3AXD50000416486	A-6-8-306-VX	 Instruction code: 3AXD50000384914
1×R8i + BL-1x-x	600 mm generic	1	3AXD50000013842	A-6-8-328	 Instruction code: 3AXD50000013903
BL-2x-x	400 mm Rittal VX25	1	3AXD50000360802	A-4-8-321-VX	 Instruction code: 3AXD50000349982

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm Rittal VX25	1	3AXD50000361670	A-6-8-323-VX	 Instruction code: 3AXD50000351756
2×R8i + BL-2x-x	800 mm generic	1	3AXD50000011158	A-8-8-325	 Instruction code: 3AXD50000013143

■ Shrouds

Shrouds are used for IP20 touch protection with the cabinet doors open.

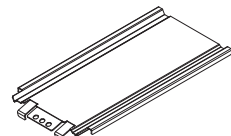
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm Rittal VX25	1 per cubicle	3AXD50000337484	A-4-8-359-VX	 Instruction code: 3AXD50000335169

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm Rittal VX25	1 per cubicle	3AXD50000337378	A-6-8-360-VX	 Instruction code: 3AXD50000335022

■ Ramp

The ramp can be used when installing or removing an R8i module.

Note: Do not use the ramp with plinth heights over 100 mm. The ramp is designed for a plinth height of 100 mm (the standard plinth height of Rittal VX25 enclosures).

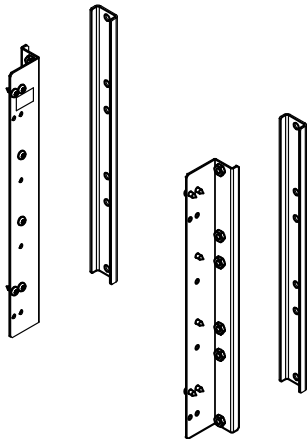
Used with ...	Qty	Ordering code	Kit code	Illustration
All VX25 enclosures	1	3AXD50000438037	A-468-8-304-VX	

AC-side components

■ AC bus installation parts (for Rittal VX25 enclosures)

The brackets in this kit act as a mounting base for the busbar supports of the Rittal Flat-PLS AC bus and ensure its correct placement and alignment inside the cabinet line-up.

Note: The designs presented in this manual for Rittal VX25 enclosures employ the Rittal Flat-PLS busbar system. Make sure that the current carrying capability of the busbars is not exceeded at any point of the drive system.

Used with ...	Qty	Ordering code	Kit code	Illustration
400/600/800 mm VX25 enclosure	1 kit per cubicle	3AXD50000360772	A-468-X-011-VX	 Instruction code: 3AXD50000372782

■ Main switch-disconnector kits

You must equip the electric supply of a machinery with a main disconnecting device (IEC/EN60204-1). The main power line is equipped with a main switch-disconnector or a main circuit breaker [Q1]. This section lists suitable main switch-disconnectors.

Note: For the high power units, you can use a withdrawable main circuit breaker instead of the main contactor and main switch-disconnector. For some of the IEC lower power units, you can use either the main switch-disconnector or the main circuit breaker. In the table, these lower power units are marked with¹⁾ in the first column.

Note: See also [Main circuit breakers and wagons \(page 136\)](#) and [Main contactor \(page 147\)](#)

Main switch-disconnectors (IEC)

ACS880-904-...	Frame size	Main switch-disconnector		Qty	Ordering code
		Type	Data		
U _N = 400 V					
0600A-3	1×R8i	Switch kit OT - type IEC 1250 E12	50 kA, 1000 V, 1250 A	1	3AXD50000006185*
0900A-3					
1180A-3 ¹⁾	2×R8i	Switch kit OT - type IEC 2000 E12	55 kA, 1000 V, 2000 A	1	3AXD50000006186**
1770A-3 ¹⁾					
U _N = 500 V					
0600A-5	1×R8i	Switch kit OT - type IEC 1250 E12	50 kA, 1000 V, 1250 A	1	3AXD50000006185*
0900A-5					
1180A-5 ¹⁾	2×R8i	Switch kit OT - type IEC 1250 E12	55 kA, 1000 V, 2000 A	1	3AXD50000006186**
1770A-5 ¹⁾					
U _N = 690 V					
0600A-7	1×R8i	Switch kit OT - type IEC 1250 E12	50 kA, 1000 V, 1250 A	1	3AXD50000006185*
0900A-7					
1180A-7 ¹⁾	2×R8i	Switch kit OT - type IEC 2000 E12	55 kA, 1000 V, 2000 A	1	3AXD50000006186**
1770A-7 ¹⁾					

Main switch-disconnectors (UL/CSA)

ACS880-904-...	Frame size	Main switch-disconnector		Qty	Ordering code
		Type	Data		
U _N = 400 V					
0420A-3	1×R8i	Switch kit OT - type UL 1200 U12	1200 A, 600 V	1	3AXD50000010814*
0580A-3					
U _N = 500 V					
0400A-5	1×R8i	Switch kit OT - type UL 1200 U12	1200 A, 600 V	1	3AXD50000010814*
0530A-5					
U _N = 690 V					
0310A-7	1×R8i	Switch kit OT - type UL 1200 U12	1200 A, 600 V	1	3AXD50000010814*
0370A-7					

The main switch-disconnector kit contains:

- main switch disconnector unit, shaft * (12 × 395 mm) or ** (12 × 465 mm), handle OHB150J12P with on/off indication and normally-open auxiliary contact OA1G10.

For more information, see the dimension drawings.

■ Main circuit breakers and wagons

You can use the main circuit breakers below for the on-off control of the AC input power. The breakers can make and break the full load current and also break a fault current. When installed in a wagon, the breakers are withdrawable and operate as main disconnecting device for the supply units.

You must equip the electric supply of a machinery with a main disconnecting device (IEC/EN60204-1). The main power line is equipped with a main switch-disconnector or a

main circuit breaker [Q1]. This section lists suitable main circuit breakers. For illustrations and dimensions, see the ABB SACE catalogs in the Internet.

Note: For some of the IEC lower power units, you can use either the main switch-disconnector or the main circuit breaker. In the table, these lower power units are marked with 1) in the first column.

Note: UL-type air circuit breakers have IEC certification according to IEC 60947. See ABB SACE catalogs for further details.

See also [Main switch-disconnector kits \(page 135\)](#) and [Main contactor \(page 147\)](#)

Main circuit breakers (230 V IEC)

ACS880-904-...	Frame size	Main circuit breaker			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3 ¹⁾	2×R8i	E2.2S-A 1200	1200 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048328
1770A-3 ¹⁾		E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048330
2310A-3	4×R8i	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343
3460A-3		E6.2V-A 4000	4000 A, 690 V, 3P, 100 kA, UL	1	3AXD50000048348
U _N = 500 V					
1180A-5 ¹⁾	2×R8i	E2.2S-A 1200	1200 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048328
1770A-5 ¹⁾		E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048330
2310A-5	4×R8i	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343
3460A-5		E6.2V-A 4000	4000 A, 690 V, 3P, 100 kA, UL	1	3AXD50000048348
U _N = 690 V					
1180A-7 ¹⁾	2×R8i	E2.2S-A 1200	1200 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048328
1770A-7 ¹⁾		E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048330
2310A-7	4×R8i	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343
3460A-7		E6.2V-A 4000	4000 A, 690 V, 3P, 100 kA, UL	1	3AXD50000048348

Content of the 230 V air circuit breakers:

- Ekip Dip LI 3p WMP 1SDA077648R1 (E2.2S-A 1200)
1SDA077668R1 (E2.2S-A 2000)
1SDA078458R1 (E4.2S-A 2500)
1SDA079128R1 (E6.2V-A 4000)
- YO E1.2..E6.2 220-240 Vac/dc 1SDA073674R1
- YC E1.2..E6.2 220-240 Vac/dc 1SDA073687R1
- YU E1.2..E6.2 220-240 Vac/dc 1SDA073700R1
- M E2.2..E6.2 220-250 Vac/dc 1SDA073725R1
- MOC E2.2..E6.2 1SDA073781R1
- AUX 6Q 400V E2.2..E6.2 1SDA073756R1
- KLC-S Key lock open N.20005 E2.2..E6.2 1SDA073792R1
- KLP-S Key lock racked in/out N.20005 E2.2...E6.2 1st key 1SDA073807R1

- TRIPLE CERTIFIC: UL/IEC/CCC 1SDA083022R1 (E2.2S)
1SDA083025R1 (E4.2S)
1SDA083028R1 (E6.2V)

For adapting E2.2S-A, E4.2S-A and E6.2V-A air circuit breakers to IEC bus bars, use bus bar shim kit. See section [Content of the 115 V wagons: \(page 144\)](#)

Wagons (230 V IEC)

ACS880-904-...	Frame size	Wagon			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-3		E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
2310A-3	4×R8i	E4.2-A_W_FP_2500HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048355
3460A-3		E6.2-A_W_FP_5000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048402
U _N = 500 V					
1180A-5	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-5		E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
2310A-5	4×R8i	E4.2-A_W_FP_2500HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048355
3460A-5		E6.2-A_W_FP_5000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048402
U _N = 690 V					
1180A-7	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-7		E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
2310A-7	4×R8i	E4.2-A_W_FP_2500HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048355
3460A-7		E6.2-A_W_FP_5000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048402

Content of the 230 V wagons:

- W FP $I_u=2000\text{ 3p HR HR UL}$ / 1SDA079698R1 (E2.2-A_W_FP_2000)
W FP $I_u=2500\text{ 3p HR HR UL}$ / 1SDA079700R1 (E4.2-A_W_FP_2500)
WAGON W FP $I_u=5000\text{ HR HR UL}$ 1SDA079706R1 (E6.2-A_W_FP_5000)
- AUP 5 contacts 400V E2.2...E6.2 - 1SDA080373R1
left set

For adapting E2.2S-A, E4.2S-A and E6.2V-A air circuit breakers to IEC bus bars, use bus bar shim kit. See section [Content of the 115 V wagons: \(page 144\)](#)

Main circuit breakers (115 V IEC)

ACS880-904-...	Frame size	Main circuit breaker			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3	2×R8i	E2.2S-A 1200	1200 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048351
1770A-3		E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048342
2310A-3	4×R8i	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345
3460A-3		E6.2V-A 4000	4000 A, 690 V, 3P, 100 kA, UL	1	3AXD50000048347
U _N = 500 V					
1180A-5	2×R8i	E2.2S-A 1200	1200 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048351
1770A-5		E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048342
2310A-5	4×R8i	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345
3460A-5		E6.2V-A 4000	4000 A, 690 V, 3P, 100 kA, UL	1	3AXD50000048347
U _N = 690 V					
1180A-7 ¹⁾	2×R8i	E2.2S-A 1200	1200 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048351
1770A-7 ¹⁾		E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048342
2310A-7	4×R8i	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345
3460A-7		E6.2V-A 4000	4000 A, 690 V, 3P, 100 kA, UL	1	3AXD50000048347

Content of the 115 V air circuit breakers:

- Ekip Dip LI 3p WMP
 - 1SDA077648R1 (E2.2S-A 1200)
 - 1SDA077668R1 (E2.2S-A 2000)
 - 1SDA078458R1 (E4.2S-A 2500)
 - 1SDA079128R1 (E6.2V-A 4000)
- YO E1.2..E6.2 110-120 Vac/dc 1SDA073672R1
- YC E1.2..E6.2 110-120 Vac/dc 1SDA073685R1
- YU E1.2..E6.2 110-120 Vac/dc 1SDA073698R1
- M E2.2...E6.2 100-130 Vac/dc 1SDA073724R1
- MOC E2.2..E6.2 1SDA073781R1
- AUX 6Q 400V E2.2..E6.2 1SDA073756R1
- KLC-S Key lock open N.20005 E2.2..E6.2 1SDA073792R1
- KLP-S Key lock racked in/out N.20005 E2.2..E6.2 1st key 1SDA073807R1

- TRIPLE CERTIFIC: UL/IEC/CCC 1SDA083022R1 (E2.2S),
1SDA083025R1 (E4.2S),
1SDA083028R1 (E6.2V)

For adapting E2.2S-A, E4.2S-A and E6.2V-A air circuit breakers to IEC bus bars, use bus bar shim kit. See section [Content of the 115 V wagons: \(page 144\)](#)

Wagons (115 V IEC)

ACS880-904-...	Frame size	Wagon			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-3		E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
2310A-3	4×R8i	E4.2-A_W_FP_2500HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048355
3460A-3		E6.2-A_W_FP_5000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048402
U _N = 500 V					
1180A-5	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-5		E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
2310A-5	4×R8i	E4.2-A_W_FP_2500HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048355
3460A-5		E6.2-A_W_FP_5000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048402
U _N = 690 V					
1180A-7 ¹⁾	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-7 ¹⁾		E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
2310A-7	4×R8i	E4.2-A_W_FP_2500HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048355
3460A-7		E6.2-A_W_FP_5000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048402

Content of the 115 V wagons:

W FP I_u=2000 3p HR HR UL / 1SDA079698R1 (E2.2-A_W_FP_2000)
W FP I_u=2500 3p HR HR UL / 1SDA079700R1 (E4.2-A_W_FP_2500)
WAGON W FP I_u=5000 HR HR UL 1SDA079706R1 (E6.2-A_W_FP_5000)
AUP 5 contacts 400V E2.2...E6.2 - left 1SDA080373R1
set

For adapting E2.2S-A, E4.2S-A and E6.2V-A air circuit breakers to IEC bus bars, use bus bar shim kit. See section [Content of the 115 V wagons: \(page 144\)](#)

Main circuit breakers (230 V UL/CSA)

ACS880-904-...	Frame size	Main circuit breaker			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3	2×R8i	E2.2S-A 1200	1200 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048328
1770A-3		E2.2S-A 2000	2000 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048330
2310A-3	4×R8i	E4.2S-A 2500	2500 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048343
3460A-3		E6.2V-A 4000	4000 A, 600 V, 3P, 100 kA, UL	1	3AXD50000048348
U _N = 500 V					
1180A-5	2×R8i	E2.2S-A 1200	1200 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048328
1770A-5		E2.2S-A 2000	2000 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048330
2310A-5	4×R8i	E4.2S-A 2500	2500 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048343
3460A-5		E6.2V-A 4000	4000 A, 600 V, 3P, 100 kA, UL	1	3AXD50000048348
U _N = 690 V					
1180A-7	2×R8i	E2.2S-A 1200	1200 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048328
1770A-7		E2.2S-A 2000	2000 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048330
2310A-7	4×R8i	E4.2S-A 2500	2500 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048343
3460A-7		E6.2V-A 4000	4000 A, 600 V, 3P, 100 kA, UL	1	3AXD50000048348

Content of the 230 V air circuit breakers:

- Ekip Dip LI 3p WMP
 - 1SDA077648R1 (E2.2S-A 1200)
 - 1SDA077668R1 (E2.2S-A 2000)
 - 1SDA078458R1 (E4.2S-A 2500)
 - 1SDA079128R1 (E6.2V-A 4000)
- YO E1.2..E6.2 220-240 Vac/dc 1SDA073674R1
- YC E1.2..E6.2 220-240 Vac/dc 1SDA073687R1
- YU E1.2..E6.2 220-240 Vac/dc 1SDA073700R1
- M E2.2..E6.2 220-250 Vac/dc 1SDA073725R1
- MOC E2.2..E6.2 1SDA073781R1
- AUX 6Q 400V E2.2..E6.2 1SDA073756R1
- KLC-S Key lock open N.20005 E2.2..E6.2 1SDA073792R1
- KLP-S Key lock racked in/out N.20005 E2.2..E6.2 1st key 1SDA073807R1

- TRIPLE CERTIFIC: UL/IEC/CCC 1SDA083022R1 (E2.2S)
1SDA083025R1 (E4.2S)
1SDA083028R1 (E6.2V)

Wagons (230 V UL/CSA)

ACS880-904-...	Frame size	Wagon			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 poles, rear hor. term.	1	3AXD50000048354
1770A-3				1	
2310A-3	4×R8i	E4.2-A_W_FP_2500HR-HR_UL		1	3AXD50000048355
3460A-3		E6.2-A_W_FP_5000HR-HR_UL		1	3AXD50000048402
U _N = 500 V					
1180A-5	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 poles, rear hor. term.	1	3AXD50000048354
1770A-5				1	
2310A-5	4×R8i	E4.2-A_W_FP_2500HR-HR_UL		1	3AXD50000048355
3460A-5		E6.2-A_W_FP_5000HR-HR_UL		1	3AXD50000048402
U _N = 690 V					
1180A-7	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 poles, rear hor. term.	1	3AXD50000048354
1770A-7				1	
2310A-7	4×R8i	E4.2-A_W_FP_2500HR-HR_UL		1	3AXD50000048355
3460A-7		E6.2-A_W_FP_5000HR-HR_UL		1	3AXD50000048402

Content of the 230 V wagons:

- W FP I_u=2000 3p HR HR UL / 1SDA079698R1 (E2.2-A_W_FP_2000)
W FP I_u=2500 3p HR HR UL / 1SDA079700R1 (E4.2-A_W_FP_2500)
WAGON W FP I_u=5000 HR HR UL 1SDA079706R1 (E6.2-A_W_FP_5000)
- AUP 5 contacts 400V E2.2...E6.2 - 1SDA080373R1
left set

Main circuit breakers (115 V UL/CSA)

ACS880-904-...	Frame size	Main circuit breaker			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3	2×R8i	E2.2S-A 1200	1200 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048351
1770A-3		E2.2S-A 2000	2000 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048342
2310A-3	4×R8i	E4.2S-A 2500	2500 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048345
3460A-3		E6.2V-A 4000	4000 A, 600 V, 3P, 100 kA, UL	1	3AXD50000048347
U _N = 500 V					
1180A-5	2×R8i	E2.2S-A 1200	1200 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048351
1770A-5		E2.2S-A 2000	2000 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048342
2310A-5	4×R8i	E4.2S-A 2500	2500 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048345
3460A-5		E6.2V-A 4000	4000 A, 600 V, 3P, 100 kA, UL	1	3AXD50000048347
U _N = 690 V					
1180A-7	2×R8i	E2.2S-A 1200	1200 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048351
1770A-7		E2.2S-A 2000	2000 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048342
2310A-7	4×R8i	E4.2S-A 2500	2500 A, 600 V, 3P, 65 kA, UL	1	3AXD50000048345
3460A-7		E6.2V-A 4000	4000 A, 600 V, 3P, 100 kA, UL	1	3AXD50000048347

Content of the 115 V air circuit breakers:

- Ekip Dip LI 3p WMP
 - 1SDA077648R1 (E2.2S-A 1200)
 - 1SDA077668R1 (E2.2S-A 2000)
 - 1SDA078458R1 (E4.2S-A 2500)
 - 1SDA079128R1 (E6.2V-A 4000)
- YO E1.2..E6.2 110-120 Vac/dc 1SDA073672R1
- YC E1.2..E6.2 110-120 Vac/dc 1SDA073685R1
- YU E1.2..E6.2 110-120 Vac/dc 1SDA073698R1
- M E2.2...E6.2 100-130 Vac/dc 1SDA073724R1
- MOC E2.2..E6.2 1SDA073781R1
- AUX 6Q 400V E2.2..E6.2 1SDA073756R1
- KLC-S Key lock open N.20005 1SDA073792R1
E2.2..E6.2

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- KLP-S Key lock racked in/out N.20005 E2.2...E6.2 1st key 1SDA073807R1
- TRIPLE CERTIFIC: UL/IEC/CCC 1SDA083022R1 (E2.2S),
1SDA083025R1 (E4.2S),
1SDA083028R1 (E6.2V)

Wagons (115 V UL/CSA)

ACS880-904-...	Frame size	Wagon			
		Type	Data	Qty	Ordering code
U _N = 400 V					
1180A-3	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-3				1	
2310A-3	4×R8i	E4.2-A_W_FP_2500HR-HR_UL		1	3AXD50000048355
3460A-3		E6.2-A_W_FP_5000HR-HR_UL		1	3AXD50000048402
U _N = 500 V					
1180A-5	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-5				1	
2310A-5	4×R8i	E4.2-A_W_FP_2500HR-HR_UL		1	3AXD50000048355
3460A-5		E6.2-A_W_FP_5000HR-HR_UL		1	3AXD50000048402
U _N = 690 V					
1180A-7	2×R8i	E2.2-A_W_FP_2000HR-HR_UL	3 pole, rear hor. term., UL	1	3AXD50000048354
1770A-7				1	
2310A-7	4×R8i	E4.2-A_W_FP_2500HR-HR_UL		1	3AXD50000048355
3460A-7		E6.2-A_W_FP_5000HR-HR_UL		1	3AXD50000048402

Content of the 115 V wagons:

- W FP Iu=2000 3p HR HR UL / 1SDA079698R1 (E2.2-A_W_FP_2000)
W FP Iu=2500 3p HR HR UL / 1SDA079700R1 (E4.2-A_W_FP_2500)
WAGON W FP Iu=5000 HR HR UL 1SDA079706R1 (E6.2-A_W_FP_5000)
- AUP 5 contacts 400V E2.2...E6.2 - 1SDA080373R1
left set

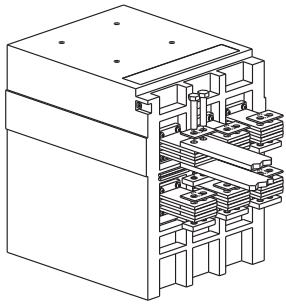
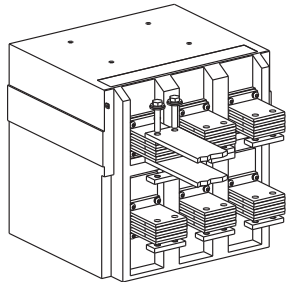
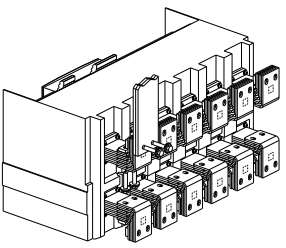
Main circuit breaker and wagon cover

One cover is needed for each main circuit breaker/wagon pair. See *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]) for further details regarding arc protection.

Type		Data	Ordering code
1SDA073869R1	IEC	IP54 flange, key N.20005 E2.2...E6.2	3AXD50000049760
APWK2016H	UL	Hinged Window	3AUA0000222786

IEC bus bar shim kit

The following shim kits are available for adapting E2.2S-A, E4.2S-A and E6.2V-A air circuit breakers to IEC bus bars.

Type	Data	Ordering code	Illustration
E2.2S-A	EMAX2 E2.2 busbar shim kit	3AXD50000286324	 Instruction code: 3AXD50000286072
E4.2S-A	EMAX2 E4.2 busbar shim kit	3AXD50000286782	 Instruction code: 3AXD50000286973
E6.2V-A	EMAX2 E6.2 bus bar shim kit	3AXD50000287369	 Instruction code: 3AXD50000287468

■ AC fuses

The AC fuses protect the input cables, main contactor [Q2] and the module against short circuits. Main AC fuses are used only with the main contactor [Q2] solution. Module-specific AC fuses are used with the main circuit breaker [Q1] solution.

Main AC fuses (IEC)

ACS880-904-...	Frame size	Fuse (IEC)		Qty	Ordering code
		Type	Data		
U _N = 400 V					
0600A-3	1×R8i	170M6415	1100 A, 690 V	3	68731658
0900A-3		170M6417	1400 A, 690 V	3	3AXD50000000150
1180A-3	2×R8i	170M7062	2000 A, 690 V	3	68689589
1770A-3		170M7064	3000 A, 690 V	3	3AXD50000001059
U _N = 500 V					
0600A-5	1×R8i	170M6415	1100 A, 690 V	3	68731658
0900A-5		170M6417	1400 A, 690 V	3	3AXD50000000150
1180A-5	2×R8i	170M7062	2000 A, 690 V	3	68689589
1770A-5		170M7064	3000 A, 690 V		3AXD50000001059
U _N = 690 V					
0600A-7	1×R8i	170M6415	1100 A, 690 V	3	68731658
0900A-7		170M6417	1400 A, 690 V	3	3AXD50000000150
1180A-7	2×R8i	170M7062	2000 A, 690 V	3	68689589
1770A-7		170M7064	3000 A, 690 V	3	3AXD50000001059

Main AC fuses (UL/CSA)

ACS880-904-...	Frame size	Fuse		Qty	Ordering code
		Type	Data		
U _N = 400 V					
0600A-3	1×R8i	170M6415	1100 A, 690 V	3	68731658
0900A-3		170M6417	1400 A, 690 V	3	3AXD50000000150
U _N = 500 V					
0600A-3	1×R8i	170M6415	1100 A, 690 V	3	68731658
0900A-3		170M6417	1400 A, 690 V	3	3AXD50000000150
U _N = 690 V					
0600A-3	1×R8i	170M6415	1100 A, 690 V	3	68731658
0900A-3		170M6417	1400 A, 690 V	3	3AXD50000000150

Module-specific AC fuses (IEC)

ACS880-904-...	Frame size	Fuse (IEC)		Qty	Ordering code
		Type	Data		
U _N = 400 V					
2310A-3	4×R8i	170M7062	2000 A, 690 V	6	68689589
3460A-3		170M7064	3000 A, 690 V	6	3AXD50000001059
U _N = 500 V					
2310A-5	4×R8i	170M7062	2000 A, 690 V	6	68689589
3460A-5		170M7064	3000 A, 690 V	6	3AXD50000001059
U _N = 690 V					
2310A-7	4×R8i	170M7062	2000 A, 690 V	6	68689589
3460A-7		170M7064	3000 A, 690 V	6	3AXD50000001059

Module-specific AC fuses (UL/CSA)

ACS880-904-....	Frame size	Fuse		Qty	Ordering code
		Type	Data		
U _N = 400 V					
1180A-3	2×R8i	170M7062	2000 A, 690 V	3	68689589
1770A-3		170M7064	3000 A, 690 V	3	3AXD50000001059
2310A-3	4×R8i	170M7062	2000 A, 690 V	6	68689589
3460A-3		170M7064	3000 A, 690 V	6	3AXD50000001059
U _N = 500 V					
1180A-5	2×R8i	170M7062	2000 A, 690 V	3	68689589
1770A-5		170M7064	3000 A, 690 V	3	3AXD50000001059
2310A-5	4×R8i	170M7062	2000 A, 690 V	6	68689589
3460A-5		170M7064	3000 A, 690 V	6	3AXD50000001059
U _N = 690 V					
1180A-7	2×R8i	170M7062	2000 A, 690 V	3	68689589
1770A-7		170M7064	3000 A, 690 V	3	3AXD50000001059
2310A-7	4×R8i	170M7062	2000 A, 690 V	6	68689589
3460A-7		170M7064	3000 A, 690 V	6	3AXD50000001059

■ **Main contactor**

The main power line is equipped with the main contactor [Q2]. The contactor is used for the on-off control of the main AC input power.

Note: For the high power units, you can use a withdrawable main circuit breaker instead of the main contactor and main switch-disconnector.

Main contactor (IEC)

ACS880-904-...	Frame size	Main contactor		Qty	Ordering code
		Type	Data		
U _N = 400 V					
0600A-3	1×R8i	AF1250-30-22-70	1260 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	68687284
0900A-3				1	
1180A-3	2×R8i	AF1650-30-22-70	1650 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	64731378
1770A-3		AF2050-30-22-70	2050 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	3AUA0000051805
U _N = 500 V					
0600A-5	1×R8i	AF1250-30-22-70	1260 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	68687284
0900A-5				1	
1180A-5	2×R8i	AF1650-30-22-70	1650 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	64731378
1770A-5		AF2050-30-22-70	2050 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	3AUA0000051805
U _N = 690 V					
0600A-7	1×R8i	AF1250-30-22-70	1260 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	68687284
0900A-7				1	
1180A-7	2×R8i	AF1650-30-22-70	1650 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	64731378
1770A-7		AF2050-30-22-70	2050 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	3AUA0000051805

Main contactor (UL/CSA)

ACS880-904-...	Frame size	Main contactor		Qty	Ordering code
		Type	Data		
U _N = 400 V					
0600A-3	1×R8i	AF1250-30-22-70	1260 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	68687284
0900A-3				1	
U _N = 500 V					
0600A-5	1×R8i	AF1250-30-22-70	1260 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	68687284
0900A-5				1	
U _N = 690 V					
0600A-7	1×R8i	AF1250-30-22-70	1260 A (I _{Th}), 1000 V (U _E); 100...250 V / 50...60 Hz	1	68687284
0900A-7				1	

The contactor package includes:

- contactor unit

■ Charging kits

The capacitor bank of the regenerative rectifier module needs to be charged during the start-up before connecting the module to a three-phase power line.

Note: The charging components are dimensioned for DC link capacitances equal to

- 3 × regenerative rectifier unit DC capacitance (1×RRU + 2×INU),
- 5 × regenerative rectifier unit DC capacitance (1×RRU + 4×INU) and
- 7 × regenerative rectifier unit DC capacitance (1×RRU + 6×INU).

If the total DC link capacitance (including regenerative rectifier and inverter module DC capacitances) exceeds these limits, the components must be re-dimensioned. Contact your local ABB representative for more information. The capacitances of the regenerative rectifier module types and the inverter module types are specified in their technical data tables. The maximum allowed number of charging cycles of the DC capacitors (ie. power-ups by applying power) is two in five minutes.

Dimensioning of these charging kits is based on the assumptions that the modules are supplied with 230/115 V AC auxiliary voltage in connector X50.

Charging kits (IEC)

The following table shows the IEC charging kits available for each module type.

ACS880-904-...	1×RRU + 2×INU		1×RRU + 4×INU		1×RRU + 6×INU	
	Ordering code (IEC)	Max. capacitance (mF)	Ordering code (IEC)	Max. capacitance (mF)	Ordering code (IEC)	Max. capacitance (mF)
$U_N = 400\text{ V}$						
0600A-3	3AXD50000022523	40.5	3AXD50000022524	67.5	3AXD50000022524	394.5
0900A-3	3AXD50000022523	54	3AXD50000022524	90	3AXD50000022525	126
1180A-3	3AXD50000022524	81	3AXD50000022525	135	3AXD50000022525	186
1770A-3	3AXD50000022524	108	3AXD50000022525	180	3AXD50000022526	252
2310A-3	3AXD50000022526	162	3AXD50000022527	270	3AXD50000022527	378
3460A-3	3AXD50000022526	216	3AXD50000022527	360	3AXD50000022527	504
$U_N = 500\text{ V}$						
0600A-5	3AXD50000022528	40.5	3AXD50000022529	67.5	3AXD50000022529	94.5
0900A-5	3AXD50000022528	54	3AXD50000022529	90	3AXD50000022526	126
1180A-5	3AXD50000022529	81	3AXD50000022526	135	3AXD50000022526	186
1770A-5	3AXD50000022529	108	3AXD50000022526	180	3AXD50000022530	252
2310A-5	3AXD50000022526	162	3AXD50000022531	270	3AXD50000022532	378
3460A-5	3AXD50000022530	216	3AXD50000022531	360	3AXD50000022532	504
$U_N = 690\text{ V}$						
0600A-7	3AXD50000022533	18	3AXD50000022534	30	3AXD50000022535	42
0900A-7	3AXD50000022534	27	3AXD50000022535	45	3AXD50000022536	63
1180A-7	3AXD50000022534	36	3AXD50000022536	60	3AXD50000022537	84
1770A-7	3AXD50000022536	54	3AXD50000022537	90	3AXD50000022538	126
2310A-7	3AXD50000022537	162	3AXD50000022538	270	3AXD50000022539	378
3460A-7	3AXD50000022537	108	3AXD50000022538	180	3AXD50000022539	252

Charging kit contents (IEC)

The charging kit contains:

- switch disconnecter unit (switch fuse type), see [Charging kit contents \(IEC\)](#).
- shaft OXP6X161 or OXP6X210, see also content of OS_P switches
- handle OHB65J6 with ON/OFF indication, see also content of OS_P switches
- terminal covers for the switch disconnecter (2×4 pcs)
- contactor, see [Charging kit contents \(IEC\)](#).
- fuses (4 pcs, IEC: gG type), see [Charging kit contents \(IEC\)](#).
- resistors, see [Charging kit contents \(IEC\)](#).
- normally-open auxiliary contact OA1G10.

Charging kit code	Charging fuse			Charging contactor	
	Type	Rating	Data	Type	Rating
3AXD50000022523	OFAA000GG16	16 A, 690 V, IEC 000	HRC fuse link	AF16-30-10-13	100...250 V AC/DC, 50/60 Hz
3AXD50000022524	OFAA000GG25	25 A, 690 V, IEC 000	HRC fuse link	AF26-30-00-13	
3AXD50000022525	OFAA000GG40	40 A, 690 V, IEC 000	HRC fuse link	AF52-30-11-13	
3AXD50000022526	OFAA000GG50	50 A, 690 V, IEC 000	HRC fuse link	AF52-30-11-13	
3AXD50000022527	OFAA000GG80	80 A, 690 V, IEC 000	HRC fuse link	AF116-30-22-13	
3AXD50000022528	OFAA000GG20	20 A, 690 V, IEC 000	HRC fuse link	AF26-30-00-13	
3AXD50000022529	OFAA000GG35	35 A, 690 V, IEC 000	HRC fuse link	AF52-30-11-13	
3AXD50000022530	OFAA000GG63	63 A, 690 V, IEC 000	HRC fuse link	AF96-30-22-13	
3AXD50000022531	OFAA000GG80	80 A, 690 V, IEC 000	HRC fuse link	AF116-30-22-13	
3AXD50000022532	OFAA000GG80	80 A, 690 V, IEC 000	HRC fuse link	AF146-30-22B-13	
3AXD50000022533	OFAA000GG16	16 A, 690 V, IEC 000	HRC fuse link	AF30-30-00-13	
3AXD50000022534	OFAA000GG20	20 A, 690 V, IEC 000	HRC fuse link	AF30-30-00-13	
3AXD50000022535	OFAA000GG35	35 A, 690 V, IEC 000	HRC fuse link	AF65-30-11-13	
3AXD50000022536	OFAA000GG40	40 A, 690 V, IEC 000	HRC fuse link	AF65-30-11-13	
3AXD50000022537	OFAA000GG50	50 A, 690 V, IEC 000	HRC fuse link	AF116-30-22-13	
3AXD50000022538	OFAA000GG80	80 A, 690 V, IEC 000	HRC fuse link	AF146-30-22B-13	
3AXD50000022539	OFAA000GG80	80 A, 690 V, IEC 000	HRC fuse link	AF190-30-22-13	

Charging kit code	Charging resistor			Charging contactor	
	Type	Rating	Qty	Type	Rating
3AXD50000022523	CBH 215 C H 414 5R0	5 ohm	1	OS160GD04F	160 A, 690 V, 50 kA, 4-p.
3AXD50000022524	CBH 215 C H 414 5R0	5 ohm	2		
3AXD50000022525	CBH 215 C H 414 5R0	5 ohm	3		
3AXD50000022526	CBH 215 C H 414 5R0	5 ohm	4		
3AXD50000022527	CBH 215 C H 414 5R0	5 ohm	8		
3AXD50000022528	CBH 215 C H 414 5R0	5 ohm	1		
3AXD50000022529	CBH 215 C H 414 5R0	5 ohm	2		
3AXD50000022530	CBH 215 C H 414 5R0	5 ohm	4		
3AXD50000022531	CBH 215 C H 414 5R0	5 ohm	6		
3AXD50000022532	CBH 215 C H 414 5R0	5 ohm	8		
3AXD50000022533	CBH 215 C H 414 5R0	5 ohm	1		
3AXD50000022534	CBH 215 C H 414 5R0	5 ohm	1		
3AXD50000022535	CBH 215 C H 414 5R0	5 ohm	2		
3AXD50000022536	CBH 215 C H 414 5R0	5 ohm	2		
3AXD50000022537	CBH 215 C H 414 5R0	5 ohm	3		
3AXD50000022538	CBH 215 C H 414 5R0	5 ohm	5		
3AXD50000022539	CBH 215 C H 414 5R0	5 ohm	7		

Charging kits (UL/CSA)

The following table shows the UL charging kits available for each module type.

ACS880-904-...	1×RRU + 2×INU		1×RRU + 4×INU		1×RRU + 6×INU	
	Ordering code (UL/CSA)	Max. capacitance (mF)	Ordering code (UL/CSA)	Max. capacitance (mF)	Ordering code (UL/CSA)	Max. capacitance (mF)
$U_N = 400\text{ V}$						
0600A-3	3AXD50000024591	40.5	3AXD50000024591	67.5	3AXD50000024592	94.5
0900A-3	3AXD50000024591	54	3AXD50000024592	90	3AXD50000024592	126
1180A-3	3AXD50000024592	81	3AXD50000024592	135	3AXD50000024593	189
1770A-3	3AXD50000024592	108	3AXD50000024594	180	3AXD50000024593	252
2310A-3	3AXD50000024593	162	3AXD50000024593	270	3AXD50000024593	378
3460A-3	3AXD50000024593	216	3AXD50000024593	360	3AXD50000024595	504
$U_N = 500\text{ V}$						
0600A-5	3AXD50000024596	40.5	3AXD50000024592	67.5	3AXD50000024598	94.5
0900A-5	3AXD50000024596	54	3AXD50000024598	90	3AXD50000024599	126
1180A-5	3AXD50000024598	81	3AXD50000024600	135	3AXD50000024600	186
1770A-5	3AXD50000024599	108	3AXD50000024600	180	3AXD50000024600	252
2310A-5	3AXD50000024600	162	3AXD50000024600	270	3AXD50000024602	378
3460A-5	3AXD50000024600	216	3AXD50000024601	360	3AXD50000024602	504
$U_N = 690\text{ V}$						
0600A-7	3AXD50000024603	18	3AXD50000024604	30	3AXD50000024604	42
0900A-7	3AXD50000024604	27	3AXD50000024604	45	3AXD50000024604	63

ACS880-904-...	1×RRU + 2×INU		1×RRU + 4×INU		1×RRU + 6×INU	
	Ordering code (UL/CSA)	Max. capacitance (mF)	Ordering code (UL/CSA)	Max. capacitance (mF)	Ordering code (UL/CSA)	Max. capacitance (mF)
1180A-7	3AXD50000024604	36	3AXD50000024604	60	3AXD50000024605	84
1770A-7	3AXD50000024604	54	3AXD50000024605	90	3AXD50000024605	126
2310A-7	3AXD50000024606	162	3AXD50000024606	270	3AXD50000024606	378
3460A-7	3AXD50000024606	108	3AXD50000024606	180	3AXD50000024607	252

Charging kit contents (UL/CSA)

The charging kit contains:

- switch disconnecter unit (switch fuse type), see [Charging kit contents \(UL/CSA\)](#).
- shaft OXP6X161 or OXP6X210, see also content of OS_P switches.
- handle OHB65J6 with ON/OFF indication, see also content of OS_P switches.
- terminal covers for the switch disconnecter (2×4 pcs)
- contactor, see [Charging kit contents \(UL/CSA\)](#).
- fuses (4 pcs, UL: class J), see [Charging kit contents \(UL/CSA\)](#).
- resistors, see [Charging kit contents \(UL/CSA\)](#).
- normally-open auxiliary contact OA1G10.

Charging kit code	Charging fuse			Charging contactor	
	Type	Rating	Data	Type	Rating
3AXD50000024591	LPJ-25SP	25 A, 600 V AC	Class J	AF52-30-11-13	100...250 V AC/DC, 50/60 Hz
3AXD50000024592	LPJ-30SP	30 A, 600 V AC	Class J	AF52-30-11-13	
3AXD50000024593	LPJ-60SP	60 A, 600 V AC	Class J	AF116-30-22-13	
3AXD50000024594	LPJ-50SP	50 A, 600 V AC	Class J	AF96-30-22-13	
3AXD50000024595	LPJ-100SP	100 A, 600 V AC	Class J	AF146-30-22B-13	
3AXD50000024596	LPJ-10SP	10 A, 600 V AC	Class J	AF26-30-00-13	
3AXD50000024598	LPJ-40SP	40 A, 600 V AC	Class J	AF96-30-22-13	
3AXD50000024599	LPJ-50SP	50 A, 600 V AC	Class J	AF116-30-22-13	
3AXD50000024600	LPJ-60SP	60 A, 600 V AC	Class J	AF116-30-22-13	
3AXD50000024601	LPJ-100SP	100 A, 600 V AC	Class J	AF146-30-22B-13	
3AXD50000024602	LPJ-125SP	125 A, 600 V AC	Class J	AF190-30-22-13	
3AXD50000024603	LPJ-15SP	15 A, 600 V AC	Class J	AF30-30-00-13	
3AXD50000024604	LPJ-30SP	30 A, 600 V AC	Class J	AF65-30-11-13	
3AXD50000024605	LPJ-60SP	60 A, 600 V AC	Class J	AF116-30-22-13	
3AXD50000024606	LPJ-70SP	70 A, 600 V AC	Class J	AF146-30-22B-13	
3AXD50000024607	LPJ-100SP	100 A, 600 V AC	Class J	AF190-30-22-13	

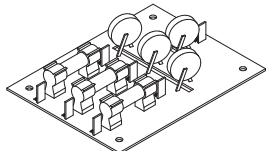
Charging kit code	Charging resistor			Charging switch	
	Type	Rating	Qty	Type	Rating
3AXD50000024591	CBH 215 C H 414 5R0	5 ohm	3	OS30FAJ22F	30 A, 600 V AC, 4-p.
3AXD50000024592	CBH 215 C H 414 5R0	5 ohm	3	OS30FAJ22F	30 A, 600 V AC, 4-p.
3AXD50000024593	CBH 215 C H 414 5R0	5 ohm	7	OS60GJ22FP	60 A, 600 V AC, 4-p.

Charging kit code	Charging resistor			Charging switch	
	Type	Rating	Qty	Type	Rating
3AXD50000024594	CBH 215 C H 414 5R0	5 ohm	6	OS60GJ22FP	60 A, 600 V AC, 4-p.
3AXD50000024595	CBH 215 C H 414 5R0	5 ohm	11	OS100GJ22FP	100 A, 600 V AC, 4-p.
3AXD50000024596	CBH 215 C H 414 5R0	5 ohm	1	OS30FAJ22F	30 A, 600 V AC, 4-p.
3AXD50000024598	CBH 215 C H 414 5R0	5 ohm	4	OS60GJ22FP	60 A, 600 V AC, 4-p.
3AXD50000024599	CBH 215 C H 414 5R0	5 ohm	5	OS60GJ22FP	60 A, 600 V AC, 4-p.
3AXD50000024600	CBH 215 C H 414 5R0	5 ohm	6	OS60GJ22FP	60 A, 600 V AC, 4-p.
3AXD50000024601	CBH 215 C H 414 5R0	5 ohm	10	OS100GJ22FP	100 A, 600 V AC, 4-p.
3AXD50000024602	CBH 215 C H 414 5R0	5 ohm	11	OS200J04FP	200 A, 600 V AC, 4-p.
3AXD50000024603	CBH 215 C H 414 5R0	5 ohm	1	OS30FAJ22F	30 A, 600 V AC, 4-p.
3AXD50000024604	CBH 215 C H 414 5R0	5 ohm	2	OS30FAJ22F	30 A, 600 V AC, 4-p.
3AXD50000024605	CBH 215 C H 414 5R0	5 ohm	4	OS60GJ22FP	60 A, 600 V AC, 4-p.
3AXD50000024606	CBH 215 C H 414 5R0	5 ohm	5	OS100GJ22FP	100 A, 600 V AC, 4-p.
3AXD50000024607	CBH 215 C H 414 5R0	5 ohm	7	OS100GJ22FP	100 A, 600 V AC, 4-p.

■ Varistor kit ACS880 for UL/CSA installations

The CVAR varistor board is used to protect the supply/rectifier module against excessive voltages peaks. The board shunts the current created by high voltage.

The CVAR board must be attached into the cabinet and connected to the main circuit after the main contactor [Q2] and must have a PE connection as well. For best results, use as short connection wiring as possible. For the detailed connection, see the example circuit diagrams.

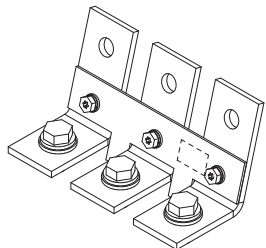
Module type	Type	Qty	Ordering code	Illustration
All	Varistor board kit	1	3AXD50000005122	

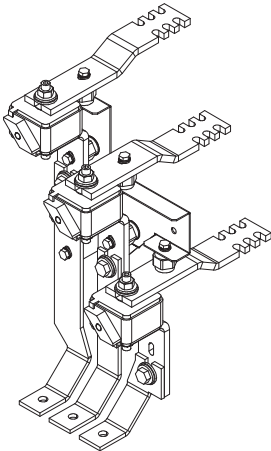
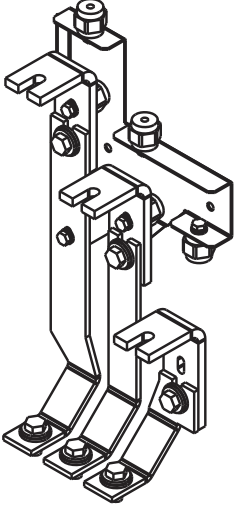
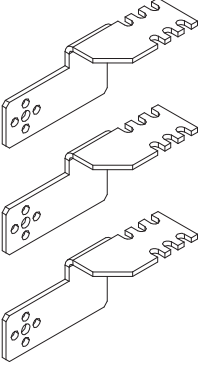
The varistor kit ACS880 contains:

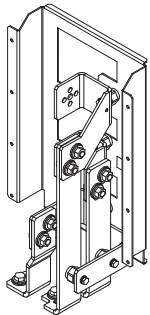
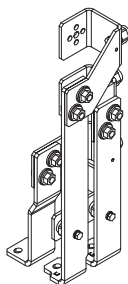
- CVAR varistor board with fastening items (ie. stand-offs and fastening screws).

For the dimension drawing, see section CVAR board.

■ AC connection of the L-filter

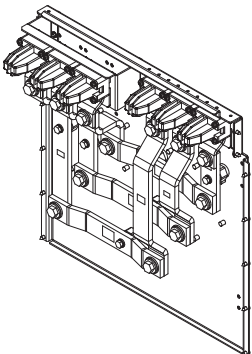
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i, BL-1x-x	All	1 per module	3AXD50000002576	A-468-8-131	 Instruction code: 3AXD50000002577

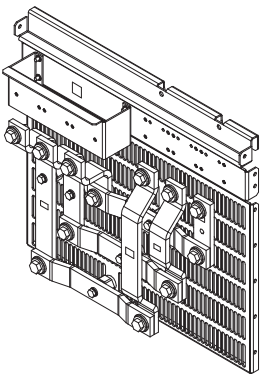
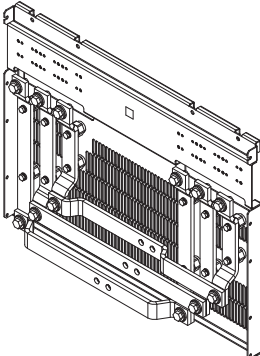
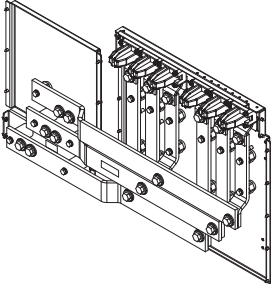
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i, BL-1x-x	600 mm Rittal VX25	1 per module	3AXD50000416509 Note: This kit is not included in ABB's standard design but may be used if you wish to have AC fuses on top of the BL-1x-x filter module.	A-6-8-110-VX	 Instruction code: 3AXD50000416332
1×R8i, BL-1x-x	600 mm Generic	1 per module	3AXD50000019279 Note: This kit is not included in ABB's standard design but may be used if you wish to have AC fuses on top of the BL-1x-x filter module.	A-6-8-111	 Instruction code: 3AXD50000019280
BL-2x-x	Rittal VX25	1 per module	3AXD50000011084	A-468-8-106	 Instruction code: 3AXD50000012934

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
BL-2x-x	400 mm Rittal VX25	1 per module	3AXD50000360796	A-4-8-107-VX	 Instruction code: 3AXD50000353491
2xR8i, BL-2x-x	Generic	1 per module	3AXD50000011155	A-468-8-109	 Instruction code: 3AXD50000013246

■ AC busbars and quick connectors

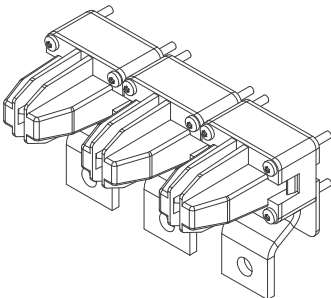
The power input of the rectifier module is connected to the rectifier module through a quick connector. AC busbars provide connection from the rectifier module to the L-filter. For the dimension drawing of the quick connector, see section [CVAR board \(page 235\)](#)

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1xR8i + BL-1x-x	600 mm Rittal VX25	1	3AXD50000416493	A-6-8-130-VX	 Instruction code: 3AXD50000384945

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i + BL-1x-x	600 mm generic	1	3AXD50000013790	A-6-8-146	 Instruction code: 3AXD50000013902
2×R8i + BL-2x-x	800 mm generic	1	3AXD50000011156	A-8-8-144	 Instruction code: 3AXD50000013187
2×R8i + BL-2x-x	1000 mm Rittal VX25	1	3AXD50000361687	A-X-8-142-VX	 Instruction code: 3AXD50000353477

Quick connector

The power input is connected to the module through a quick connector.

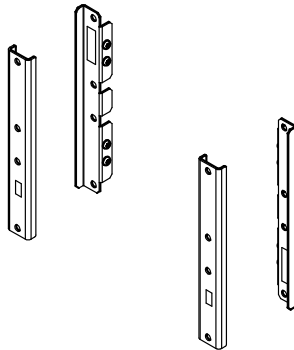
Used with	Qty	Ordering code	Kit code	Illustration
All enclosure types	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

DC-side components

■ Common DC Flat-PLS assembly

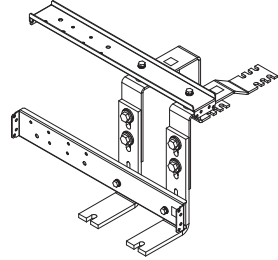
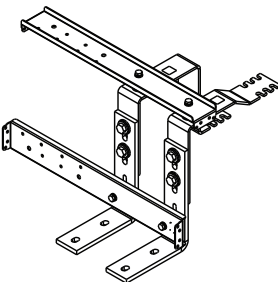
When using the Rittal Flat-PLS system, this kit is used for correct positioning of the common DC bus in the Rittal VX25 enclosure.

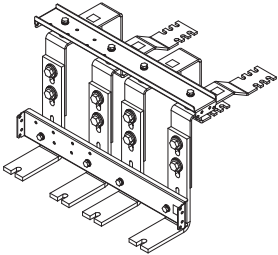
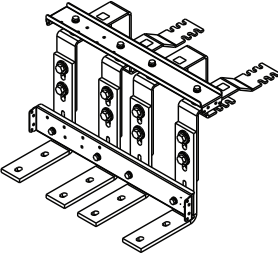
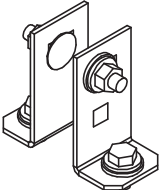
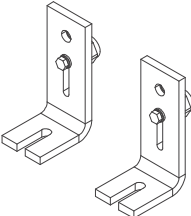
Note: The designs presented in this manual for Rittal VX25 enclosures employ the Rittal Flat-PLS busbar system. Make sure that the current carrying capability of the busbars is not exceeded at any point of the drive system.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
400/600/800 mm enclosure	Rittal VX25	1 per cubicle	3AXD5000033387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

■ DC busbars

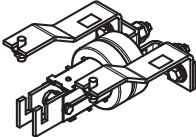
DC busbars connect the Flat-PLS busbars to the DC fuses.

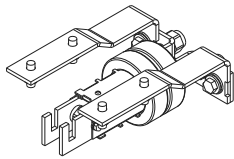
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i, 400 V and 500 V modules	600 mm Rittal VX25	1	3AXD50000416714	A-6-8-204-VX	 Instruction code: 3AXD50000384990
1×R8i, 690 V modules	600 mm Rittal VX25	1	3AXD50000488360	A-6-8-214-VX	 Instruction code: 3AXD50000469505

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i, 400 V and 500 V mod- ules	600 mm Rittal VX25	1	3AXD50000361663	A-6-8-212-VX	 Instruction code: 3AXD50000353507
2×R8i, 690 V mod- ules	600 mm Rittal VX25	1	3AXD50000488384	A-6-8-213-VX	 Instruction code: 3AXD50000469567
All	All	1 per R8i module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403
R8i	Generic	1 per R8i module	3AXD50000025659	A-468-8-245	 Instruction code: 3AXD50000025693

■ Module and common mode filter busbars

A common mode filter is needed with each IGBT supply module. There is space for up to four toroidal cores. For the dimension drawing, see section [Common mode filters](#)

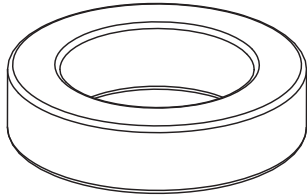
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i and 2×R8i, 400 V and 500 V modules	All	1 per module	3AXD50000002492	A-468-8-231	 Instruction code: 3AXD50000002502

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i and 2×R8i, 690 V modules	All	1 per module	3AXD50000016952	A-468-8-237	 Instruction code: 3AXD50000017978

■ Common mode filters

You must equip each module with a common mode filter.

Common mode filtering reduces bearing currents and is required for electromagnetic compatibility (EMC). The filtering is implemented by installing two toroidal cores onto the DC busbars. The cores must be ordered separately.

Used with	Qty	Ordering code	Kit code	Illustration
All enclosure types	2 per module	3AUA0000032859	-	 Instruction code: 3AXD50000002502 and 3AXD50000017978

■ DC fuses

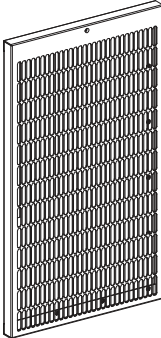
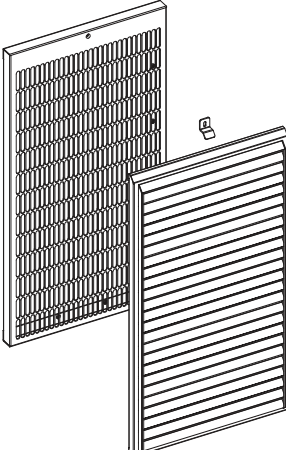
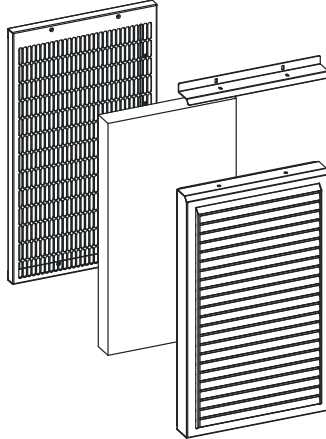
DC fuses protect the module and drive DC bus against short circuits.

ACS880-904-...	Frame size	Fuse (IEC and UL)			Qty
		Type	Data	Ordering code	
$U_N = 400\text{ V}$					
0600A-3	1×R8i	Bussmann 170M6416	1250 A, 690 V, size 3	68244463	2
0900A-3		Bussmann 170M6420	1800 A, 690 V, size 3*	3AXD50000019937	2
1180A-3	2×R8i	Bussmann 170M6416	1250 A, 690 V, size 3	68244463	4
1770A-3		Bussmann 170M6420	1800 A, 690 V, size 3*	3AXD50000019937	4
2310A-3	4×R8i	Bussmann 170M6416	1250 A, 690 V, size 3	68244463	8
3460A-3		Bussmann 170M6420	1800 A, 690 V, size 3*	3AXD50000019937	8
$U_N = 500\text{ V}$					
0600A-5	1×R8i	Bussmann 170M6416	1250 A, 690 V, size 3	68244463	2
0900A-5		Bussmann 170M6420	1800 A, 690 V, size 3*	3AXD50000019937	2
1180A-5	2×R8i	Bussmann 170M6416	1250 A, 690 V, size 3	68244463	4
1770A-5		Bussmann 170M6420	1800 A, 690 V, size 3*	3AXD50000019937	4
2310A-5	4×R8i	Bussmann 170M6416	1250 A, 690 V, size 3	68244463	8
3460A-5		Bussmann 170M6420	1800 A, 690 V, size 3*	3AXD50000019937	8
$U_N = 690\text{ V}$					
0600A-7	1×R8i	Bussmann 170M6545	700 A, 1250 V, size 3	68735980	4
0900A-7		Bussmann 170M6547	900 A, 1100 V, size 3	63919381	4
1180A-7	2×R8i	Bussmann 170M6545	700 A, 1250 V, size 3	68735980	8
1770A-7		Bussmann 170M6547	900 A, 1100 V, size 3	63919381	8
2310A-7	4×R8i	Bussmann 170M6545	700 A, 1250 V, size 3	68735980	16
3460A-7		Bussmann 170M6547	900 A, 1100 V, size 3	63919381	16

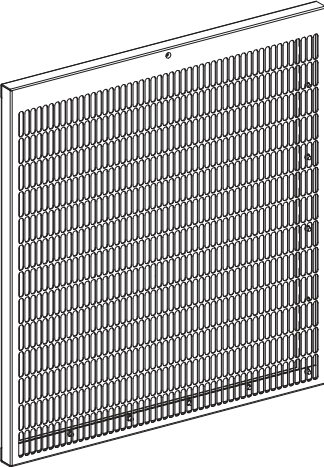
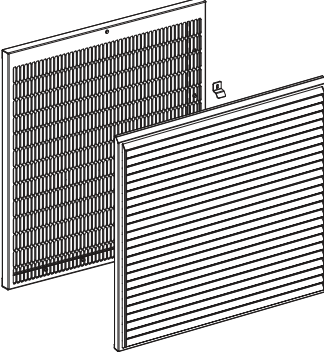
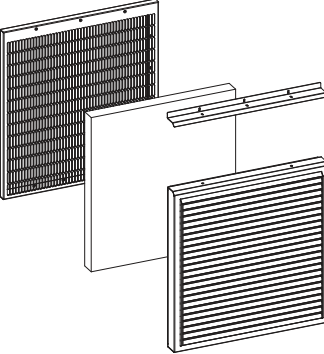
Cabinet ventilation kits

■ Air inlet kits

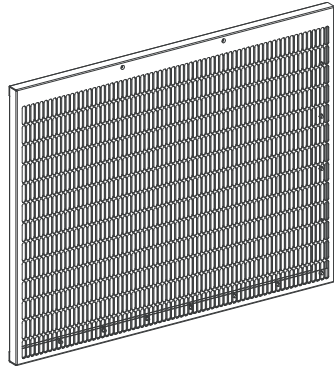
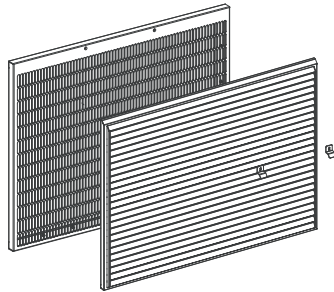
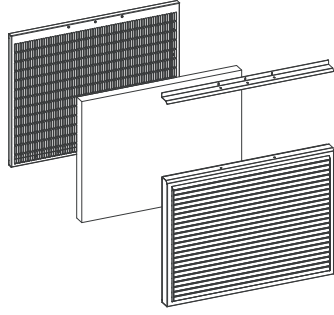
Air inlet kits 400 mm cabinet

Used with ...	Qty	Ordering code	Kit code	Illustration
IP20	1	3AUA0000117002	A-4-X-021	 Instruction code: 3AUA0000116879
IP42	1	3AUA0000117007	A-4-X-024	 Instruction code: 3AUA0000116873
IP54	1	3AXD50000009184	A-4-X-027	 Instruction code: 3AXD50000009989

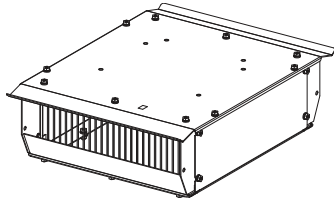
Air inlet kits 600 mm cabinet

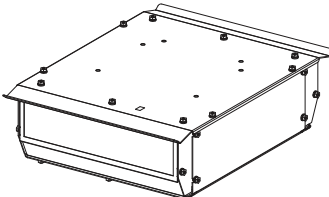
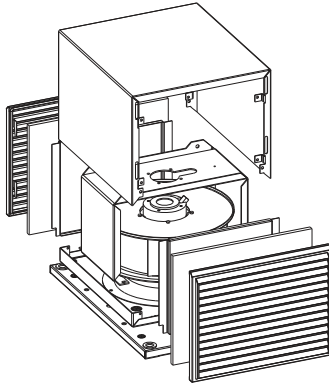
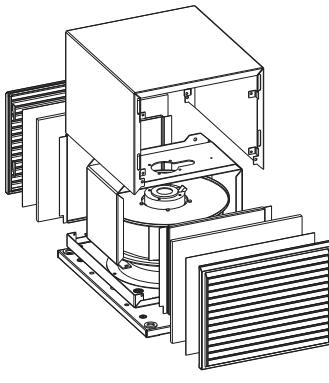
Used with ...	Qty	Ordering code	Kit code	Illustration
IP20	1	3AUA0000117003	A-6-X-022	 Instruction code: 3AUA0000116880
IP42	1	3AUA0000117008	A-6-X-025	 Instruction code: 3AUA0000116874
IP54	1	3AXD50000009185	A-6-X-028	 Instruction code: 3AXD50000009990

Air inlet kits 800 mm cabinet

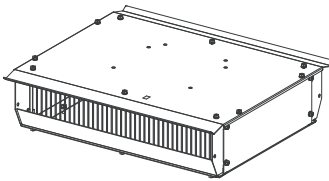
Used with ...	Qty	Ordering code	Kit code	Illustration
IP20	1	3AUA0000117005	A-8-X-023	 Instruction code: 3AUA0000116887
IP42	1	3AUA0000117009	A-8-X-026	 Instruction code: 3AUA0000116875
IP54	1	3AXD50000009186	A-8-X-029	 Instruction code: 3AXD50000010001

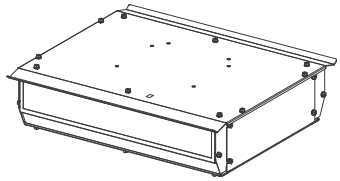
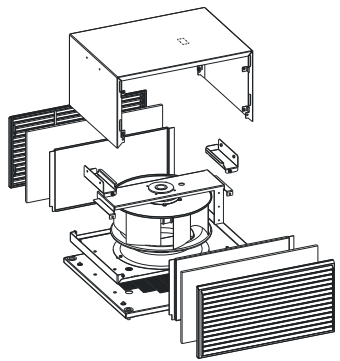
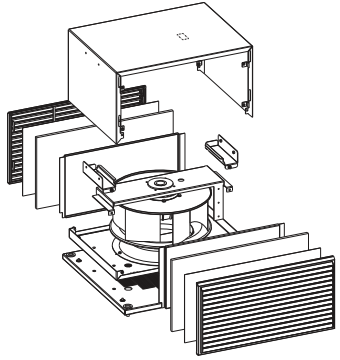
■ **Air outlet kits****Air outlet kits 400 mm cabinet**

Used with ...	Qty	Ordering code	Kit code	Illustration
IP20 (IEC)	1	3AUA0000125203	A-4-X-042	 Instruction code: 3AXD50000001983

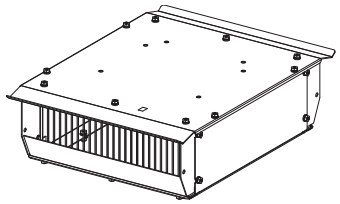
Used with ...	Qty	Ordering code	Kit code	Illustration
IP42 (IEC)	1	3AUA0000114968	A-4-X-040	 Instruction code: 3AUA0000115292
IP54 (IEC)	1	3AXD50000009187	A-4-X-064	 Instruction code: 3AXD50000010001 Note: Fan to be ordered separately
IP54 (UL)	1	3AXD50000010362	A-4-X-067	 Instruction code: 3AXD50000010284 Note: Fan to be ordered separately

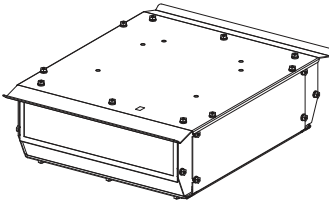
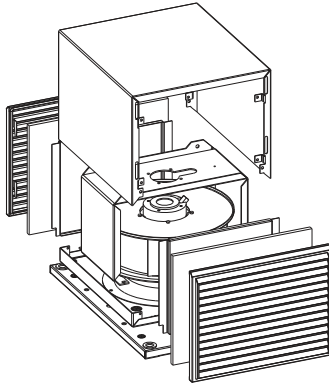
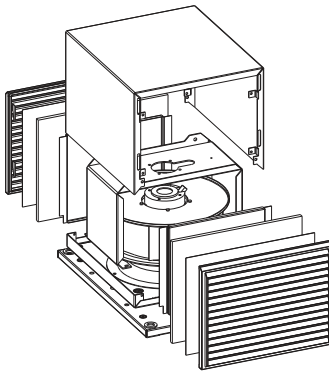
Air outlet kits 600 mm cabinet

Used with ...	Qty	Ordering code	Kit code	Illustration
IP20 (IEC)	1	3AUA0000125204	A-6-X-043	 Instruction code: 3AXD50000001981

Used with ...	Qty	Ordering code	Kit code	Illustration
IP42 (IEC)	1	3AUA0000114789	A-6-X-041	 Instruction code: 3AUA0000115166
IP54 (IEC)	1	3AXD50000009189	A-6-X-065	 Instruction code: 3AXD50000010004 Note: Fan to be ordered separately
IP54 (UL)	1	3AXD50000010327	A-6-X-066	 Instruction code: 3AXD50000010004 Note: Fan to be ordered separately

Air outlet kits 800 mm cabinet

Used with ...	Qty	Ordering code	Kit code	Illustration
IP20 (IEC)	2	3AUA0000125203	A-4-X-042	 Instruction code: 3AUA0000116887

Used with ...	Qty	Ordering code	Kit code	Illustration
IP42 (IEC)	2	3AUA0000114968	A-4-X-040	 Instruction code: 3AUA0000116875
IP54 (IEC)	2	3AXD50000009187	A-4-X-064	 Instruction code: 3AXD50000010001 Note: Fan to be ordered separately
IP54 (UL)	2	3AXD50000010362	A-4-X-067	 Instruction code: 3AXD50000010284 Note: Fan to be ordered separately

■ Cooling fans

One or two cooling fans are to be installed inside the air outlet compartment to ensure sufficient cooling of the cabinet.

IEC/UL				
Enclosure / Degree of protection (Auxiliary voltage)	Component		Qty	Ordering code
	Name	Data		
400 mm / IP54 (230 V, 50/60 Hz)	Fan	RB4C-355/170	1	3AXD50000006934
	Capacitor	MSB MKP 6/603/E1679	1	3AXD50000006959
	Connector	SPB2,5/7 (2.5 mm ² , 12AWG)	1	3AXD50000000723
	Connector	SC 2,5-RZ/7 (2.5 mm ² , 12AWG)	1	3AXD50000000724
600 mm / IP54 (230 V, 50/60 Hz)	Fan	CRBB/4-400/188	1	3AXD50000006111
	Capacitor	MSB MKP 12/603/E1679	1	3AXD50000006885
	Connector	SPB2,5/7 (2.5 mm ² , 12AWG)	1	3AXD50000000723
	Connector	SC 2,5-RZ/7 (2.5 mm ² , 12AWG)	1	3AXD50000000724
800 mm / IP54 (230 V, 50/60 Hz)	Fan	RB4C-355/170	2	3AXD50000006934
	Capacitor	MSB MKP 6/603/E1679	2	3AXD50000006959
	Connector	SPB2,5/7 (2.5 mm ² , 12AWG)	2	3AXD50000000723
	Connector	SC 2,5-RZ/7 (2.5 mm ² , 12AWG)	2	3AXD50000000724

UL/CSA				
Enclosure / Degree of protection (Auxiliary voltage)	Component		Qty	Ordering code
	Name	Data		
400 mm / IP54 (115 V, 50/60 Hz)	Fan	RH35M-4EK.4F.1R (115 V)	1	64750062
	Capacitor	25 µF; 220 V	1	68713188
	Connector	SPB2,5/7 (2.5 mm ² , 12AWG)	1	3AXD50000000723
	Connector	SC 2,5-RZ/7 (2.5 mm ² , 12AWG)	1	3AXD50000000724
600 mm / IP54 (115 V, 50/60 Hz)	Fan	RH40M-4EK.4I.1R (115 V)	1	64750038
	Capacitor	25 µF; 220 V	1	68713188
	Connector	SPB2,5/7 (2.5 mm ² , 12AWG)	1	3AXD50000000723
	Connector	SC 2,5-RZ/7 (2.5 mm ² , 12AWG)	1	3AXD50000000724
800 mm / IP54 (115 V, 50/60 Hz)	Fan	RB4C-355/170	2	64750062
	Capacitor	MSB MKP 6/603/E1679	2	68713188
	Connector	SPB2,5/7 (2.5 mm ² , 12AWG)	2	3AXD50000000723
	Connector	SC 2,5-RZ/7 (2.5 mm ² , 12AWG)	2	3AXD50000000724

Contents of this chapter

Ratings

Regenerative rectifier module type ACS880-904-...	Frame	No-overload use						Light-over- load use		Heavy-duty use		Capa- cit- ance
		I_1	I_2	$I_{\max}$	$I_{\max}$	S_N	P_N	I_{Ld}	P_{Ld}	I_{Hd}	PHd	C
		A (AC)	A (DC)	A (AC)	A (DC)	kVA	kW (DC)	A (DC)	kW	A (DC)	kW	mF
U _N = 400 V												
0600A-3	1×R8	600	727	780	955	416	393	698	377	544	294	13.5
0900A-3	1×R8	900	1091	1170	1433	624	589	1048	566	816	441	18.0
1180A-3	2×R8i	1180	1431	1534	1879	818	773	1374	742	1070	578	27.0
1770A-3	2×R8i	1770	2146	2301	2818	1226	1159	2060	1113	1605	867	36.0
2310A-3	4×R8i	2310	2801	3003	3678	1600	1512	2689	1452	2095	1131	54.0
3460A-3	4×R8i	3460	4195	4498	5509	2397	2265	4027	2175	3138	1695	72.0
U _N = 500 V												
0600A-5	1×R8	600	727	780	955	520	491	698	471	544	367	13.5
0900A-5	1×R8	900	1091	1170	1433	779	737	1047	707	816	551	18.0
1180A-5	2×R8i	1180	1431	1534	1879	1022	966	1374	927	1070	722	27.0
1770A-5	2×R8i	1770	2146	2301	2818	1533	1449	2060	1391	1605	1084	36.0
2310A-5	4×R8i	2310	2801	3003	3678	2001	1891	2689	1815	2095	1414	54.0
3460A-5	4×R8i	3460	4195	4498	5509	2996	2832	4027	2719	3138	2118	72.0
U _N = 690 V												

Regenerative rectifier module type ACS880-904-...	Frame	No-overload use						Light-over- load use		Heavy-duty use		Capa- cit- ance
		I_1	I_2	$I_{\max}$	$I_{\max}$	S_N	P_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}	C
		A (AC)	A (DC)	A (AC)	A (DC)	kVA	kW (DC)	A (DC)	kW	A (DC)	kW	mF
0600A-7	1×R8	600	727	900	1102	717	678	698	651	544	507	6.00
0900A-7	1×R8	900	1091	1350	1653	1076	1016	1048	976	816	760	9.00
1180A-7	2×R8i	1180	1431	1770	2168	1410	1333	1374	1279	1070	997	12.00
1770A-7	2×R8i	1770	2146	2655	3252	2115	1999	2060	1919	1605	1495	18.00
2310A-7	4×R8i	2310	2801	3465	4244	2761	2609	2689	2505	2095	1952	24.00
3460A-7	4×R8i	3460	4195	5190	6356	4135	3908	4027	3752	3138	2923	36.00

■ Definitions

Nominal ratings

U_N Nominal input voltage. For U_1 , see [Electrical power network specification \(page 179\)](#) For U_2 , see DC connection data on page 202.

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

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

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

P_N nominal output power

S_N nominal apparent power

Light-overload use (10% overload capability) ratings

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

P_{Ld} output power in light-overload use

Heavy-duty use (50% overload capability) ratings

I_{Hd} continuous rms current. 50% overload is allowed for one minute every 5 minutes.

P_{Hd} output power in heavy-duty use

Capacitance

C Nominal DC link capacitance

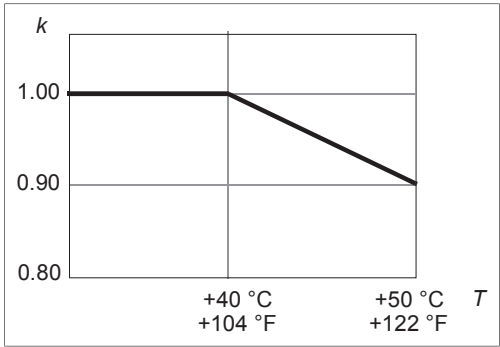
For input frequency f_1 , see [Electrical power network specification \(page 179\)](#)

Note: The ratings apply at an ambient temperature of 40 °C (104 °F).

■ Derating

Ambient temperature derating

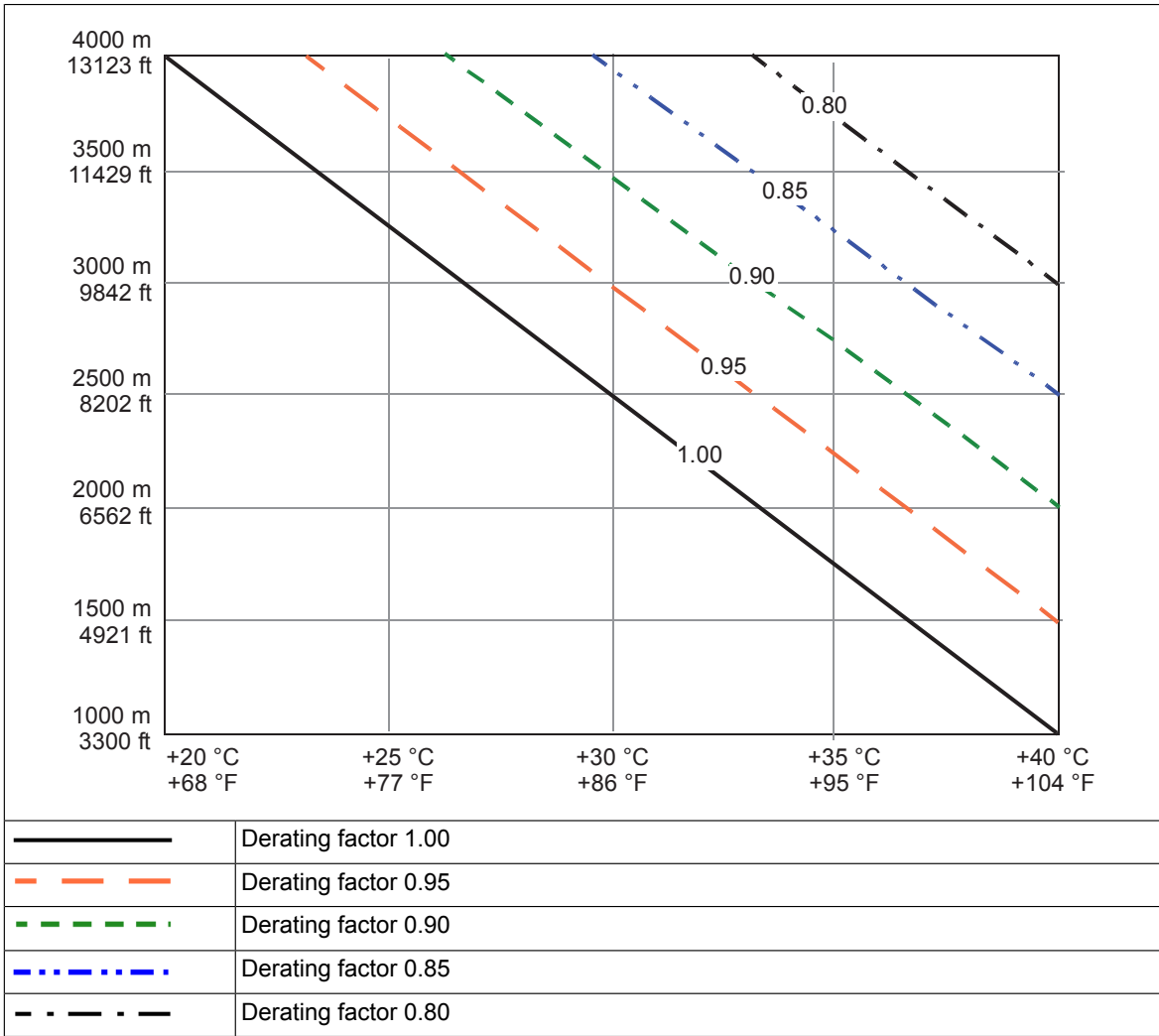
In the temperature range +40...50 °C (+104...122 °F), the rated output current is derated by 1 percentage point for every added 1 °C (1.8 °F). The output current can be calculated by multiplying the current given in the rating table by the derating factor (k):



Altitude derating

At altitudes from 1000 to 4000 m (3281 to 13123 ft) above sea level, the output current derating is 1 percentage point for every added 100 m (328 ft). For example, the derating factor for 1500 m (4921 ft) is 0.95.

If ambient temperature is below $+40\text{ }^{\circ}\text{C}$ ($+104\text{ }^{\circ}\text{F}$), the derating can be reduced by 1.5 percentage points for every $1\text{ }^{\circ}\text{C}$ ($1.8\text{ }^{\circ}\text{F}$) reduction in temperature. A few altitude derating curves are shown below.



For a more accurate derating, use the DriveSize PC tool.

Type equivalence table

Cabinet-installed unit type ACS880-907... ¹⁾	Regenerative rectifier unit type ACS880-904-... ²⁾	Basic module type ACS880-104-... ³⁾	Frame
$U_N = 400\text{ V}$			
0600A-3	0600A-3	0640A-3	1×R8i
0900A-3	0900A-3	0900A-3	
1180A-3	1180A-3	0640A-3	2×R8i
1770A-3	1770A-3	0900A-3	
2310A-3	2310A-3	0640A-3	4×R8i
3460A-3	3460A-3	0900A-3	
$U_N = 500\text{ V}$			
0600A-5	0600A-5	0590A-5	1×R8i
0900A-5	0900A-5	0810A-5	
1180A-5	1180A-5	0590A-5	2×R8i
1770A-5	1770A-5	0810A-5	
2310A-5	2310A-5	0590A-5	4×R8i
3460A-5	3460A-5	0810A-5	
$U_N = 690\text{ V}$			
0600A-7	0600A-7	0410A-7	1×R8i
0900A-7	0900A-7	0600A-7	
1180A-7	1180A-7	0410A-7	2×R8i
1770A-7	1770A-7	0600A-7	
2310A-7	2310A-7	0410A-7	4×R8i
3460A-7	3460A-7	0600A-7	

¹⁾ Cabinet-installed units available from ABB

²⁾ Regenerative rectifier unit types available from ABB as modules

³⁾ Regenerative rectifier modules used. The quantity of the modules is shown in the Frame column.

For the L-filters used with the regenerative rectifier units, see [L-filters \(page 128\)](#)

Fuses

For fuse types, see the ordering information.

Note: The recommended fuses are for branch circuit protection per NEC as required for the UL/CSA approval.

Forced cooling is recommended for the AC fuses of the R8i supply modules to keep the fuse temperature under 100 °C. Monitoring of cooling fan status or fuse temperature is also recommended.

If the AC fuses are located in another cabinet (eg. ICU), the suitable fan unit for AC fuse cooling depends on the cabinet design. It is recommended to install the fan in such a way that it directly cools the fuses.

■ Fuses on BFPS board

The fuse type is Mersen (Ferraz-Shawmut) A070GRB05T13 (5 A 690 V AC).

■ Fuses on CVAR board

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

■ Fuses on BDFC board

1 A, 400 V DC, 500 V AC.

Charging component ratings

Charging kit contents (IEC) on page 159 and Charging kit contents (UL) on page 160.

Dimensions and weights

■ Regenerative rectifier module

The dimensions of a regenerative rectifier module are:

- height 1397.0 mm (55.0 in)
- width 240.0 mm (9.45 in)
- depth 583.0 mm (22.95 in)
- weight 125.0 kg (275.6 lb).

For the dimensional drawing, see *Regenerative rectifier module (page 196)*

For the number of R8i modules in a given regenerative rectifier unit, see *Regenerative rectifier modules (page 127)*

■ L-filter module

The dimensions of the BL-1x-x module are:

- height 1397 mm (55.00 in)
- width 240.0 mm (9.45 in)
- depth 443.9 mm/ 17.47 in)
- weight 155.0 kg (341.7 lb).

For the dimensional drawing, see *BL-1x-x (page 200)*

The dimensions of the BL-2x-x module are:

- height 1397.0 mm (55.0 in)
- width 240.0 mm (9.45 in)
- depth 549.5 mm (21.64 in)
- weight 215.0 kg (474.0 lb).

For the dimensional drawing, see *BL-2x-x (page 201)*

For the number of filter modules in a given regenerative rectifier unit, see *L-filters (page 128)*

Free space requirements

Free space requirements for the regenerative rectifier modules are:

- above the module to enable cooling air flow 200.0 mm (7.87 in)

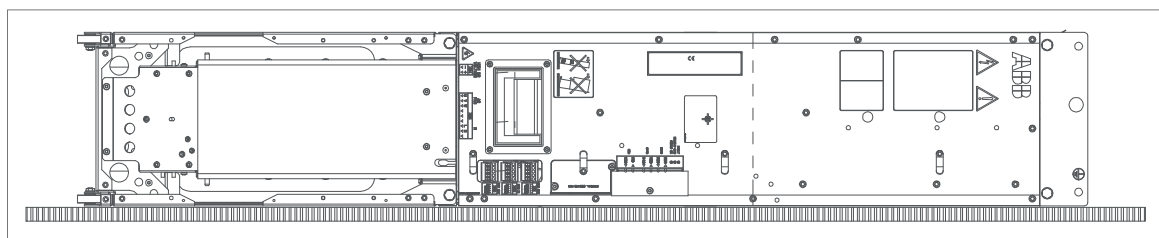
- in front of the module free space for cabling 10.0 mm (0.39 in)
- left and right of the module free space for smooth installation 10.0 mm (0.39 in).

For cooling the converter unit, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).

Allowable mounting orientations

The modules must be mounted upright unless other orientations are expressly allowed below.

Frame R8i: Installation on right-hand side (viewed from the front) allowed.



Losses, cooling data and noise

ACS880-904-....	Frame	P_{lossRRU}	P_{lossL}	$P_{\text{loss tot}}$	Noise	Efficiency
		kW	kW	m³/h	dB	%
$U_N = 400 \text{ V}$						
0600A-3	1×R8i	5.4	3.0	8.4	72	97.9
0900A-3	1×R8i	8.9	4.0	12.9	72	97.9
1180A-3	2×R8i	10.7	5.0	15.7	74	98.0
1770A-3	2×R8i	17.7	7.5	25.2	74	97.9
2310A-3	4×R8i	21.5	10.0	31.5	76	98.0
3460A-3	4×R8i	35.4	15.0	50.4	76	97.8
$U_N = 500 \text{ V}$						
0600A-5	1×R8i	5.5	3.0	8.5	72	98.3
0900A-5	1×R8i	9.0	4.0	13.0	72	98.3
1180A-5	2×R8i	11.1	5.0	16.1	74	98.4
1770A-5	2×R8i	18.1	7.5	25.6	74	98.3
2310A-5	4×R8i	22.2	10.0	32.2	76	98.3
3460A-5	4×R8i	36.1	15.0	51.1	76	98.2
$U_N = 690 \text{ V}$						
0600A-7	1×R8i	6.8	3.0	9.8	72	98.6
0900A-7	1×R8i	10.3	4.0	14.3	72	98.6
1180A-7	2×R8i	13.5	5.0	18.5	74	98.6
1770A-7	2×R8i	20.6	7.5	28.1	74	98.6
2310A-7	4×R8i	27.1	10.0	37.1	76	98.6
3460A-7	4×R8i	41.2	15.0	56.2	76	98.6

P_{loss} Heat dissipation. Total losses of the RRU, L-filter and RRU with L-filter at nominal power

Noise Noise with fans running at nominal speed

ACS880-904-...	Frame	Air flow _{RRU}		Air flow _L		Air flow _{tot}	
		m ³ /h	ft ³ /min	m ³ /h	ft ³ /min	m ³ /h	ft ³ /min
$U_N = 400\text{ V}$							
0600A-3	1×R8i	1300	765.2	900	529.7	2200	1294.9
0900A-3							
1180A-3	2×R8i	2600	1530.3	1500	882.9	4100	2413.2
1770A-3							
2310A-3	4×R8i	5200	3060.6	3000	1765.7	8200	4826.3
3460A-3							
$U_N = 500\text{ V}$							
0600A-5	1×R8i	1300	765.2	900	529.7	2200	1294.9
0900A-5							
1180A-5	2×R8i	2600	1530.3	1500	882.9	4100	2413.2
1770A-5							
2310A-5	4×R8i	22.2	3060.6	3000	1765.7	8200	4826.3
3460A-5							
$U_N = 690\text{ V}$							
0600A-7	1×R8i	1300	765.2	900	529.7	2200	1294.9
0900A-7							
1180A-7	2×R8i	2600	1530.3	1500	882.9	4100	2413.2
1770A-7							
2310A-7	4×R8i	5200	3060.6	3000	1765.7	8200	4826.3
3460A-7							

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

Copper cable		PVC insulation Conductor temperature 70°		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

Electrical power network specification

Voltage (U_1)	400 V units: 380...415 V AC 3-phase $\pm 10\%$. 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 $\pm 10\%$. This is indicated in the type designation label as typical input voltage levels (3~ 400/480/500 V AC). 690 V units: 525...690 V AC 3-phase $\pm 10\%$ (525...600 V AC $\pm 10\%$ 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 $\pm 5\%$ of nominal frequency
Imbalance	Max. $\pm 3\%$ of nominal phase-to-phase input voltage
Short-circuit withstand strength (IEC/EN 61439-1)	<u>Rectifier units with the ABB-defined main switch-disconnector and fuses:</u> Rated peak withstand current (I_{pk}): 105 kA Rated short-time withstand current (I_{cw}): 50 kA/1 s <u>Rectifier units with ABB-defined main breaker and fuses:</u> Rated peak withstand current (I_{pk}): 143 kA Rated short-time withstand current (I_{cw}): 65 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)

DC connection data

Voltage (U_2)	ACS880-904-xxxxA-3: 513... 560 V DC. This is indicated in the type designation label as typical output voltage level 540 V DC. ACS880-904-xxxxA-5: 513... 675 V DC. This is indicated in the type designation label as typical output voltage levels 540/648/675 V DC ACS880-904-xxxxA-7: 709 ... 932 V DC (709 ... 810 V DC for 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).
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Control unit connection data

See chapter [Control units of the drive \(page 185\)](#)

Protection classes

Degrees of protection (IEC/EN 60529):

Overvoltage category OVCIII (altitude 4000 m).

- Frames R1i...R4i: IP20
- Frames R6i, R8i: IP00, UL open type

Optical components

The specifications of the optic cable are as follows:

- Storage temperature: -55 ... +85 °C (-67 ... +185 °F)
- Installation temperature: -20 ... +70 °C (-4 ... +158 °F)

- Maximum short-term tensile force: 50 N (11.2 lbf)
- Minimum short-term bend radius: 25 mm (1.0 in)
- Minimum long-term bend radius: 35 mm (1.4 in)
- Maximum long-term tensile load: 1 N (3.6 ozf)
- Flexing: Max. 1000 cycles

ABB drive products in general utilize 5 and 10 MBd (megabaud) optical components from Avago Technologies' Versatile Link range. Note that the optical component type is not directly related to the actual communication speed.

Note: The optical components (transmitter and receiver) on a fiber optic link must be of the same type.

Plastic optical fiber (POF) cables can be used with both 5 MBd and 10 MBd optical components. 10 MBd components also enable the use of Hard Clad Silica (HCS®) cables, which allow longer connection distances thanks to their lower attenuation. HCS® cables cannot be used with 5 MBd optical components.

The maximum lengths of fiber optic links for POF and HCS® cables are 20 and 200 meters (65.6 ft and 656 ft) respectively.

Ambient conditions

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

	Operation	Storage	Transportation
Installation site altitude above sea level	0...1000 m (0...3300 ft) without derating 1000...4000 m (3300...13123 ft) with de- rating, See section Altitude derating (page 171)	-	-
Air temperature	0...+40 °C (+32 ...+104 °F), no condensa- tion allowed	40...+70 °C (-40 ... +158 °F)	-40...+70 °C (-40 ... +158 °F)
	+40...+50 °C (+104...+122 °F) derating 1% /1 °C (+1.8 °F). For more information, see Ambient temperature derating (page 170)		
Relative humidity	Maximum 95%, no con- densation allowed	Maximum 95%, no con- densation allowed	Maximum 95%, no con- densation allowed
Contamination	IEC/EN 60721-3-3:2002: Classification of environ- mental conditions - Part 3- 3: Classification of groups of environmental paramet- ers and their severities Stationary use of weather protected locations	IEC 60721-3-1	IEC 60721-3-2
Chemical gases Solid particles	Class 3C2	Class 1C2	Class 2C2
	Class 3S1	Class 1S3 (packing must support this, otherwise 1S2)	Class 2S2
	No conductive dust al- lowed.		

	Operation	Storage	Transportation
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 ABB multidrive cabinet (ACS880-x07) according to: Max. 1 mm (0.04 in) (5 ... 13.2 Hz), max. 0.7 g (13.2 ... 100 Hz) sinusoidal	For modules and cabinets in packages: IEC/EN 60721-3-1:1997 10...57 Hz max. 0.075 mm amplitude 57...150 Hz: 1 g	For cabinet package: IEC/EN 60721-3-1:1997 2...9 Hz: max. 3.5 mm amplitude 9...200 Hz: 10 m/s ² (32.8 ft/s ²)
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

Materials

Module housing	• Zinc coated steel sheet • Front plate covered with Lexan 8B35 polycarbonate film, color PMS 1C Cool Gray and PMS Process Black (frames R6i...R8i)
Fire safety of materials (IEC 60332-1)	Insulating materials and non-metallic items: mostly self-extinctive
Package	• Plywood base, corrugated cardboard, PET straps. • Product wrapping: polyethylene sheet or VCI protection bag
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.

Auxiliary circuit current consumption

Device	U_N	f	I_{cont}	I_{start}	P_{cont}
	V	Hz	A	A	W
R8i module: internal electronics • Option +G304 (115 V auxiliary voltage supply)	230 V AC (+15%/-20%)	50/60	0.45	-	105
	115 V AC (+15%/-20%)	50/60	0.90	-	105
Control unit BCU-x2	24 V DC $\pm 10\%$	-	2.0	-	48
R8i module option +C188 (DOL fan)	400 V AC	50	1.50	3.00	-
	400 V AC	60	1.90	3.80	-
	320 V AC	60	1.50	4.40	-

Device	U_N	f	I_{cont}	I_{start}	P_{cont}
	V	Hz	A	A	W
L- filter (BL-1x-x) option +C188 (DOL fan as standard with 230 V supply) • Options +C188+G304 (DOL fan with 115 V AC supply)	230 V AC	50	0.60	1.20	-
	230 V AC	60	0.88	1.76	-
	115 V AC	60	1.80	3.60	-
L-filter (BL-2x-x) option +C188 (DOL fan as standard with 400 V supply) • Options +C188+G427 (DOL fan with 208 V AC supply)	400 V AC	50	1.50	3.00	-
	400 V AC	60	1.90	3.80	-
	208 V AC	60	2.88	-	-
R8i module heating element (option +C183)	230 V AC	50/60	-	-	40
	115 V AC	60	-	-	40
L-filter module heating element (option +C183)	230 V AC	50/60	-	-	13
	115 V AC	60	-	-	13

■ Cooling fans

Cabinet fans	Type	U_N V AC	f Hz	I_{cont} A
IP54 roof fan	RB4C-355/170	230	50	1.10
			60	1.45
	CRBB/4-400/188	230	50	2.30
			60	3.00
	RH35M-4EK.4F.1R (115 V)	115	50	3.1
			60	3.9
	RH40M-4EK.4I.1R (115 V)	115	50	5.5
			60	6.3

f	Supply frequency
I_{cont}	Continuous current consumption
I_{start}	Calculated load current at start
P_{cont}	Continuous input power
U_N	Voltage requirement

Applicable standards

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

Markings

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

Disclaimer

■ 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.

11

Control units of the drive

Contents of this chapter

This chapter

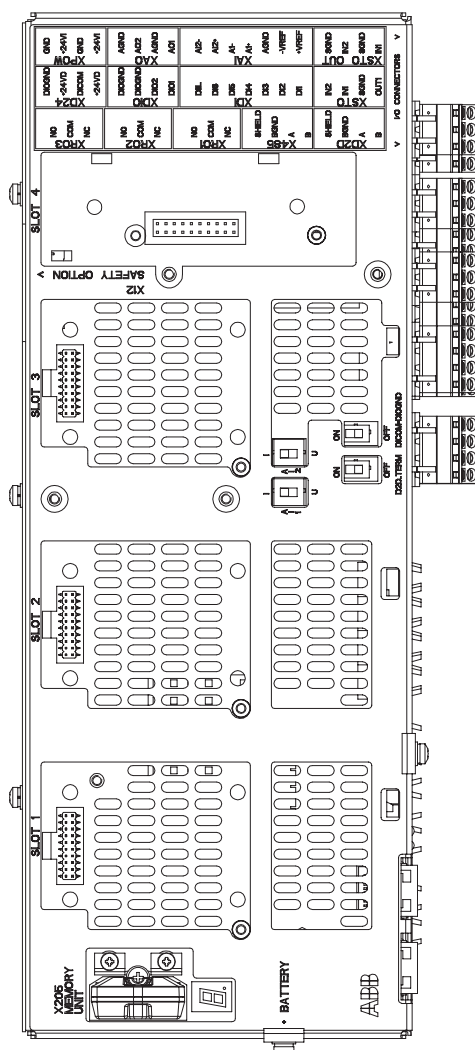
- describes the connections of the control unit
- contains the specifications of the inputs and outputs of the control unit.

General

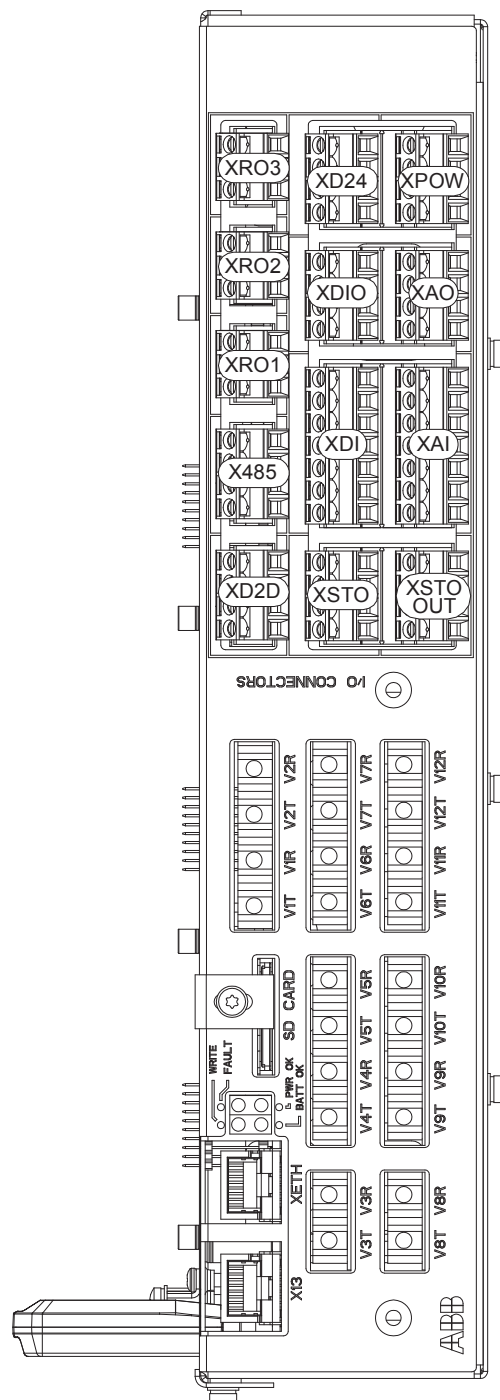
The rectifier unit is controlled by a BCU-x2 control unit. The BCU-x2 consists of a BCON-12 control board (and a BIOC-01 I/O connector board and power supply board) built in a metal housing. The control unit is connected to the rectifier module(s) by fiber optic cables.

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 control unit layout and connections



	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	
	("U" is indicated briefly before "o".) Control program running
	Control program startup in progress
	(Flashing) Firmware cannot be started. Memory unit missing or corrupted
	Firmware download from PC to control unit in progress
	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 signals/connections in the supply unit.

The wire size accepted by all screw terminals (for both stranded and solid wire) is 0.5 ... 2.5 mm² (24...12 AWG). The torque is 0.5 N·m (5 lbf·in).

XD2D		Drive-to-drive link	
1	B		Drive-to-drive link (not in use by default)
2	A		
3	BGND		
4	Shield		
X485		RS485 connection	
5	B		Not in use (not in use by default)
6	A		
7	BGND		
8	Shield		
XRO1...XRO3		Relay outputs	
11	NC		XRO1: Charging ¹⁾ (Energized = Closes charging contactor.) 250 V AC / 30 V DC / 2 A
12	COM		
13	NO		
21	NC		XRO2: Fault(-1) ²⁾ (Energized = Indicates no fault.) 250 V AC / 30 V DC / 2 A
22	COM		
23	NO		
31	NC		XRO3: MCB ¹⁾ (Energized = Closes main contactor/breaker.) 250 V AC / 30 V DC / 2 A
32	COM		
33	NO		
XSTO		XSTO connector	
1	OUT		XSTO connector. Both circuits (power module, control unit) must be closed for the rectifier unit to start. (IN1 and IN2 must be connected to OUT.) ⁷⁾
2	SGND		
3	IN1		
4	IN2		
5	IN1		Not in use
6	SGND		
7	IN2		
8	SGND		
XDI		Digital inputs	
1	DI1	Temp fault ²⁾ (0 = overtemperature)	
2	DI2	Run / enable ²⁾ (1 = run / enable)	
3	DI3	MCB fb ¹⁾ (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	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	+24VD	+24 V DC 200 mA ⁵⁾	
6	DICOM	Digital input ground	
7	+24VD	+24 V DC 200 mA ⁵⁾	
8	DIOGND	Digital input/output ground	
DICOM=DIOGND		Ground selection switch ⁶⁾	
XAI		Analog inputs, reference voltage output	
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.	
5	AI1-	0(2)...10 V, $R_{in} > 200$ kohm ³⁾	
6	AI2+	Not in use by default.	
7	AI2-	0(4)...20 mA, $R_{in} = 100$ ohm ⁴⁾	
XAO		Analog outputs	
1	AO1	Zero ²⁾ 0...20 mA, $R_L < 500$ ohm	
2	AGND		
3	AO2	Zero ²⁾ 0...20 mA, $R_L < 500$ ohm	
4	AGND		
XPOW		External power input	
1	+24VI		24 V DC, 2.05 A
2	GND		
3	+24VI		
4	GND		
X12		Not in use in rectifier units	
X13		Control panel connection	
X205		Memory unit connection	

Notes:

- 1) Use of the signal in the control program.
- 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) Current [0(4)...20 mA, $R_{in} = 100 \text{ ohm}$] or voltage [0(2)...10 V, $R_{in} > 200 \text{ kohm}$] input selected by switch AI1. Change of setting requires reboot of control unit.
- 4) Current [0(4)...20 mA, $R_{in} = 100 \text{ ohm}$] or voltage [0(2)...10 V, $R_{in} > 200 \text{ kohm}$] input selected by switch AI2. Change of setting requires reboot of control unit.
- 5) Must be set to ON when the rectifier unit is the first or last unit on the drive-to-drive (D2D) link. On intermediate units, set termination to OFF.
- 6) Total load capacity of these outputs is 4.8 W (200 mA at 24 V) minus the power taken by DIO1 and DIO2.
- 7) Determines whether DICOM is separated from DIOGND (ie, common reference for digital inputs floats).
DICOM=DIOGND ON: DICOM connected to DIOGND. OFF: DICOM and DIOGND separate.
- 8) This input only acts as a true Safe torque off input in inverter control units. In other applications (such as a rectifier unit), de-energizing the IN1 and/or IN2 terminal will stop the unit but not constitute a true safety function.

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.

The XD2D connector

The XD2D connector provides an RS-485 connection that can be used for

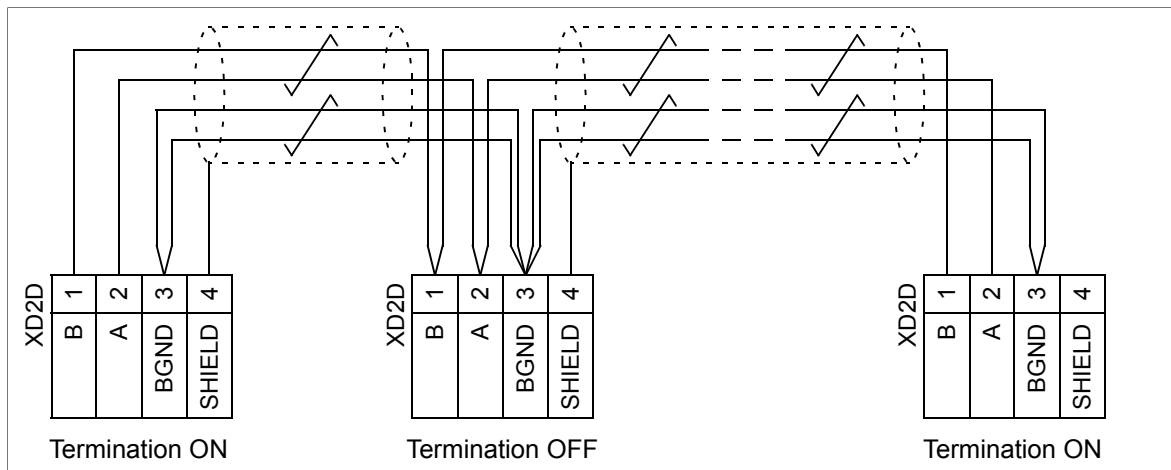
- basic master/follower communication with one master drive and multiple followers,
- fieldbus control through the embedded fieldbus interface (EFB), or
- drive-to-drive (D2D) communication implemented by application programming.

See the firmware manual of the drive for the related parameter settings.

Enable bus termination on the units at the ends of the drive-to-drive link. Disable bus termination on the intermediate units.

Use 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) for the wiring. For best immunity, ABB recommends high quality cable. Keep the cable as short as possible. Avoid unnecessary loops and parallel runs near power cables such as motor cables.

The following diagram shows the wiring between control units.

BCU-x2**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.

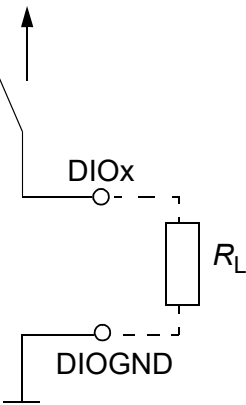
FSO-xx safety functions module connection (X12)

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

SDHC memory card slot

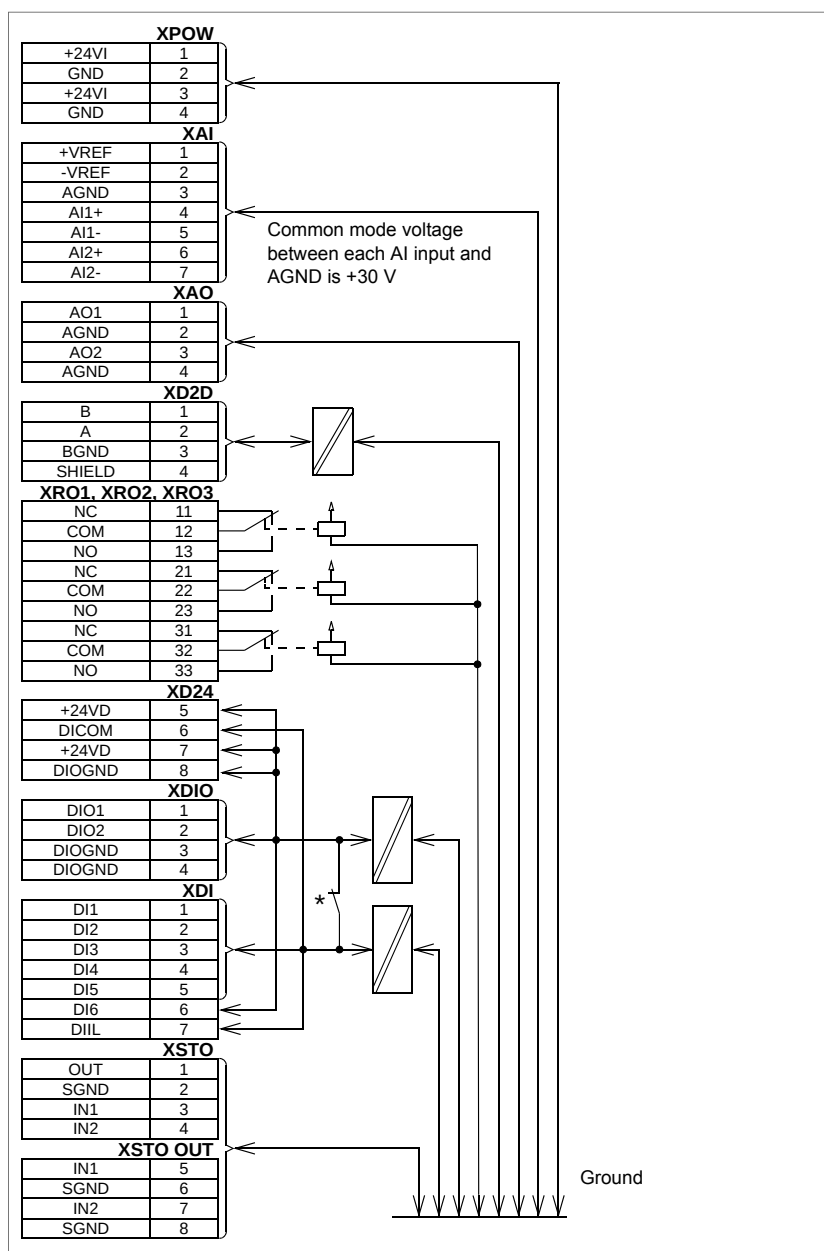
The BCU-x2 has an on-board data logger that collects real-time data from the power modules to help fault tracing and analysis. The data is stored onto the SDHC memory card inserted into the SD CARD slot and can be analyzed by ABB service personnel.

Connector data

Power supply (XPOW)	Connector pitch 5 mm, wire size 2.5 mm² 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 mm² 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 mm² 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 mm² 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 mm² 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 of the supply/inverter unit, parameter group 111/11.	Connector pitch 5 mm, wire size 2.5 mm² <u>As inputs:</u> 24 V logic levels: "0" < 5 V, "1" > 15 V. R_{in}: 2.0 kohm. Filtering: 1 ms. <u>As outputs:</u> Total output current from +24VD is limited to 200 mA +24VD  DIOx R_L DIOGND
Reference voltage for analog inputs +VREF and -VREF (XAI:1 and XAI:2)	Connector pitch 5 mm, wire size 2.5 mm² 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, $R_{in} = 100 \text{ ohm}$ Voltage input: -10...10 V, $R_{in} > 200 \text{ kohm}$ Differential inputs, common mode range $\pm 30 \text{ V}$ 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, $R_{load} < 500 \text{ ohm}$ 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

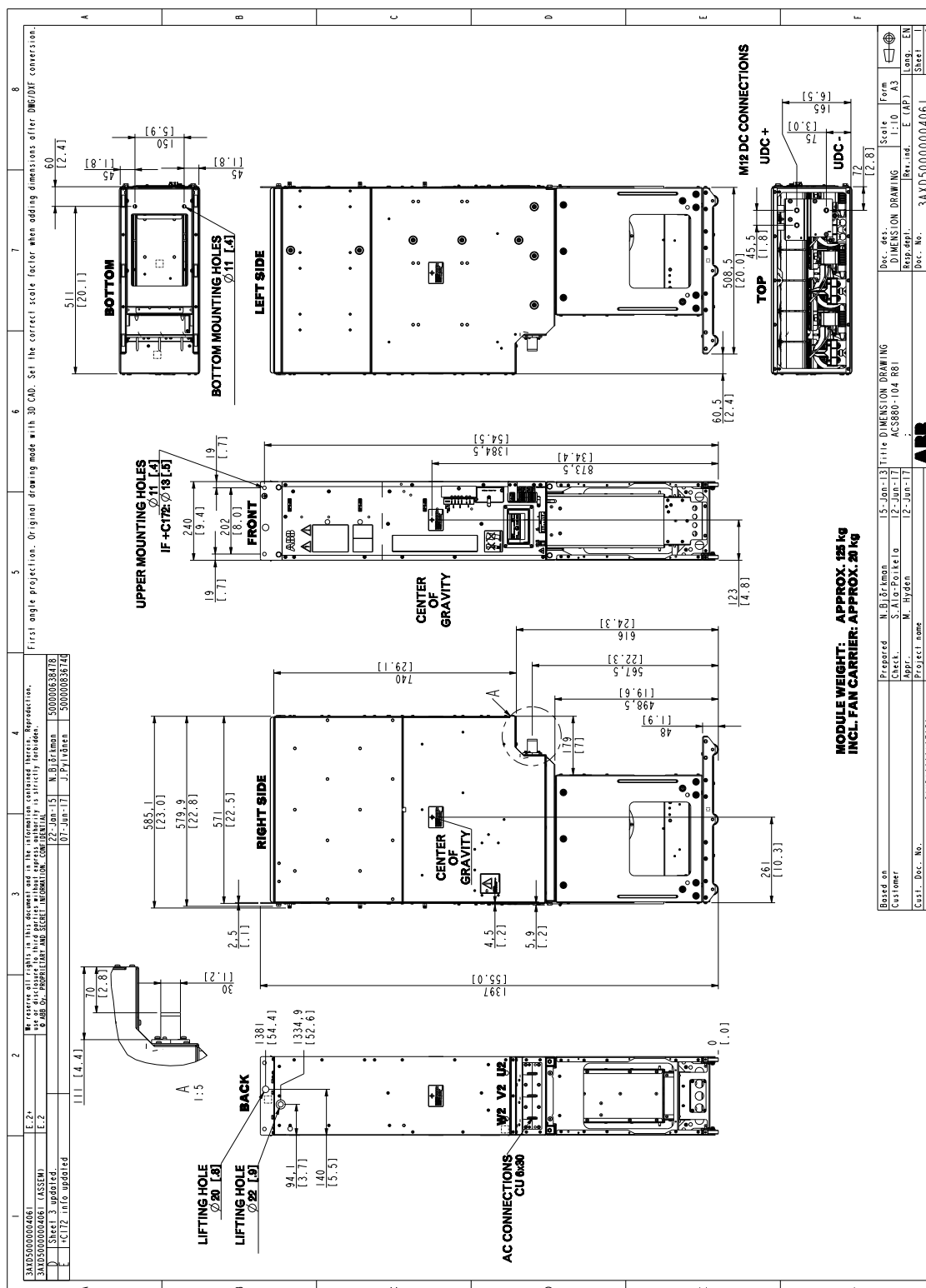
Ground of digital inputs DI1...DI5 and DIIL (DICOM) is isolated from DIO signal ground (DIOGND). Isolation voltage 50 V.

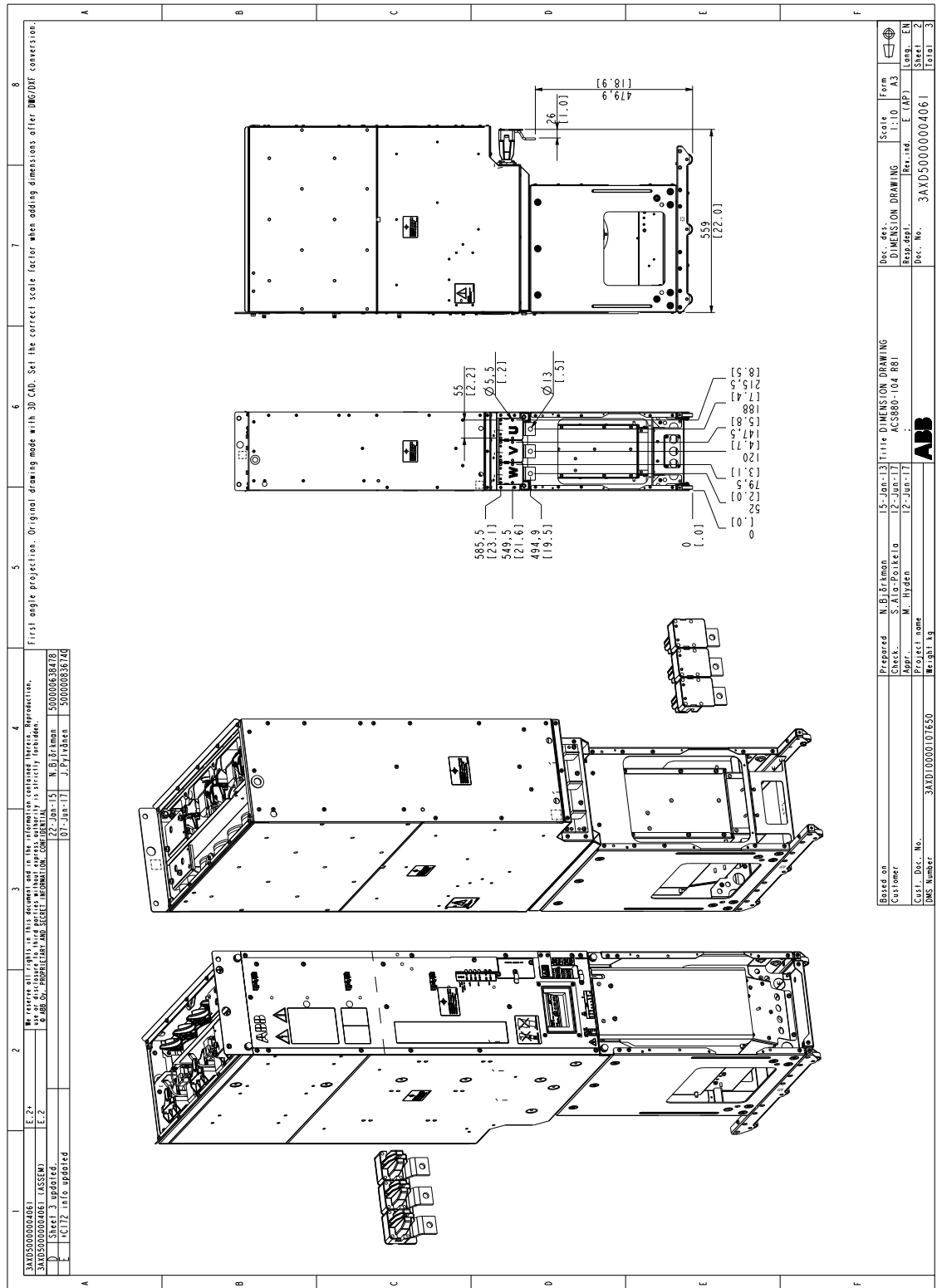
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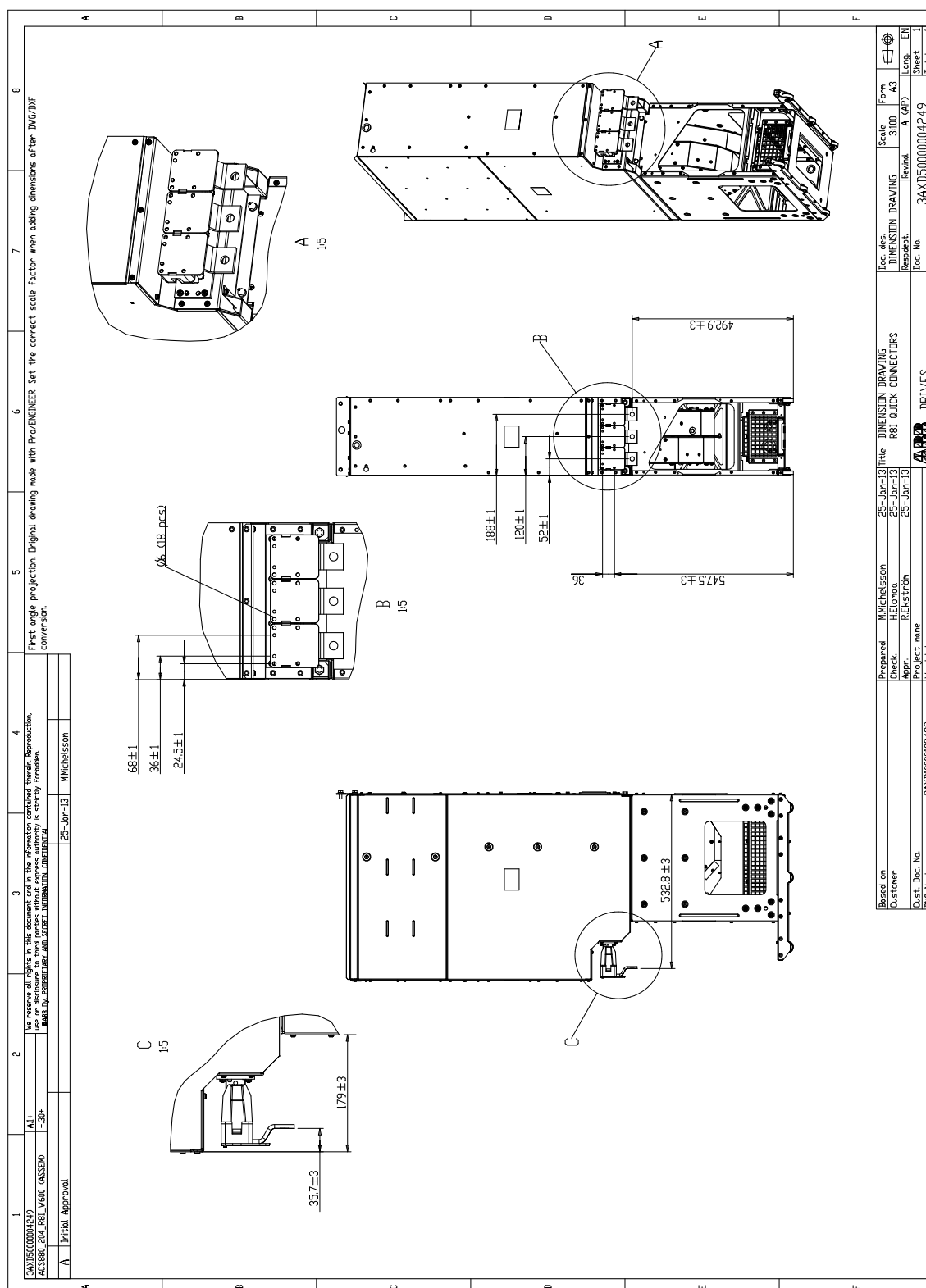
Dimension drawings

Contents of this chapter

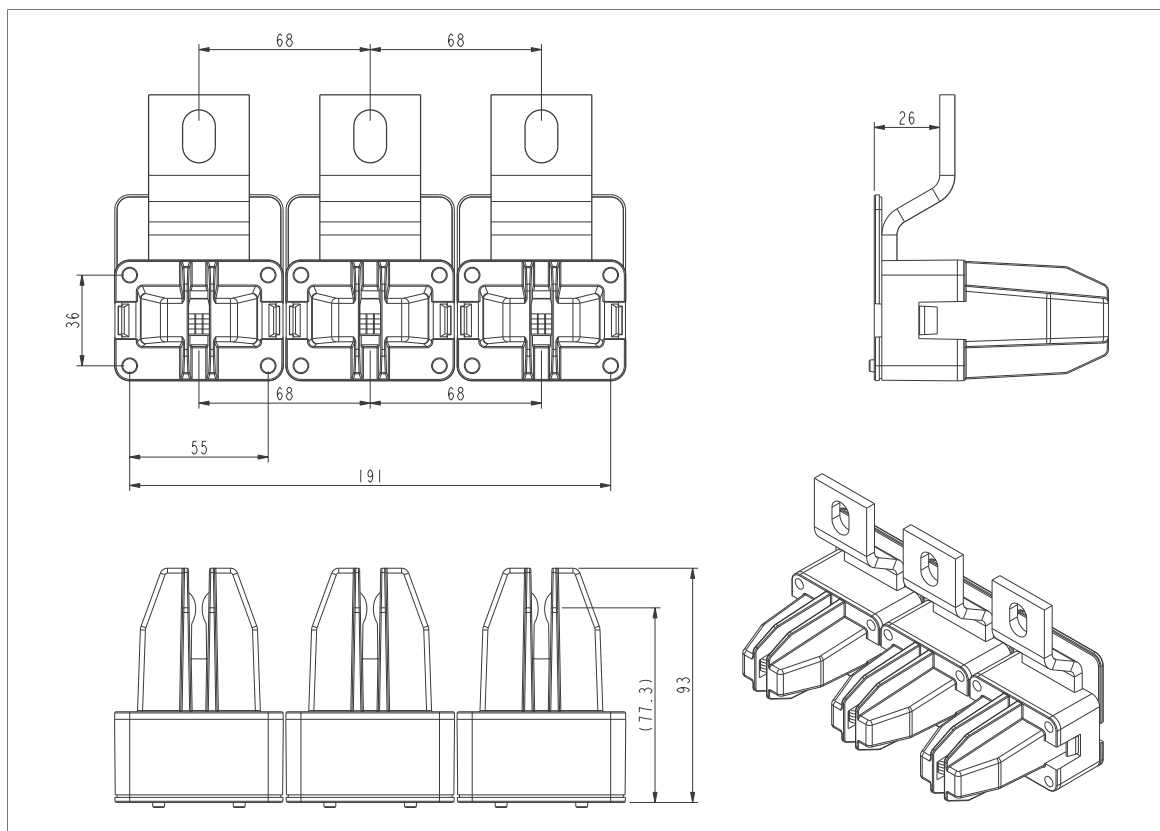
This chapter shows dimensions of the ACS880-904 regenerative rectifier modules and accessories.



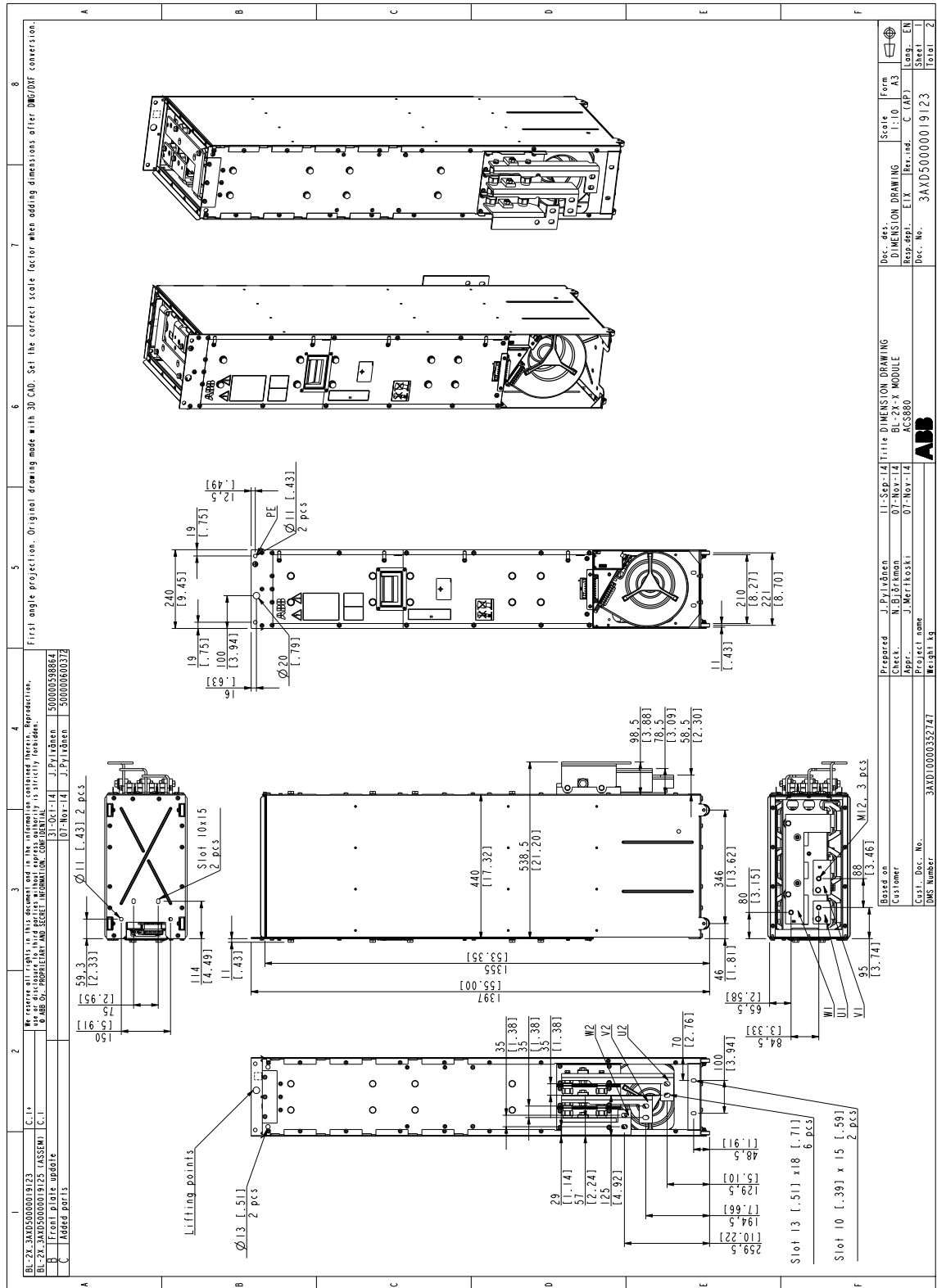




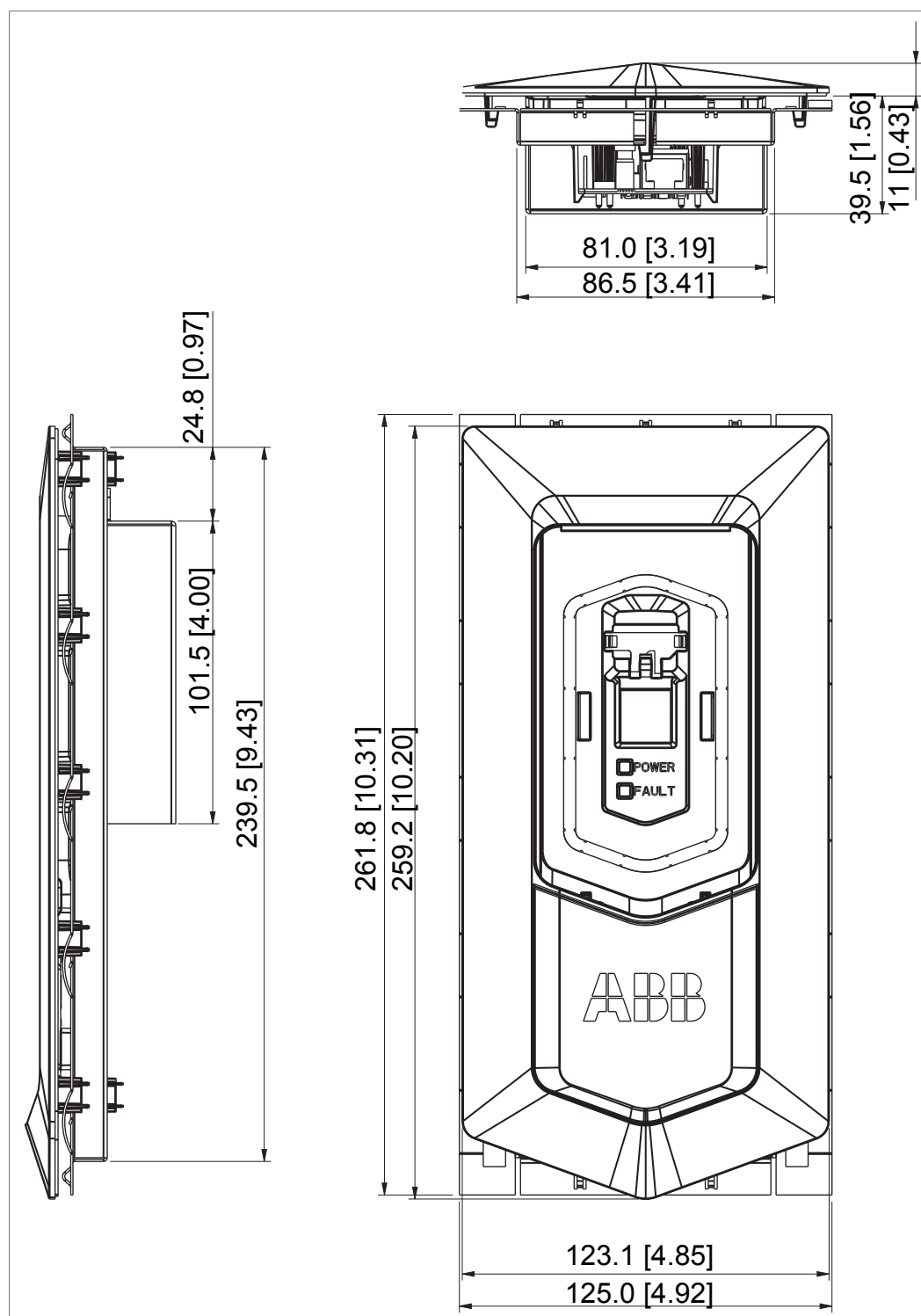
Quick connectors



■ BL-2x-x



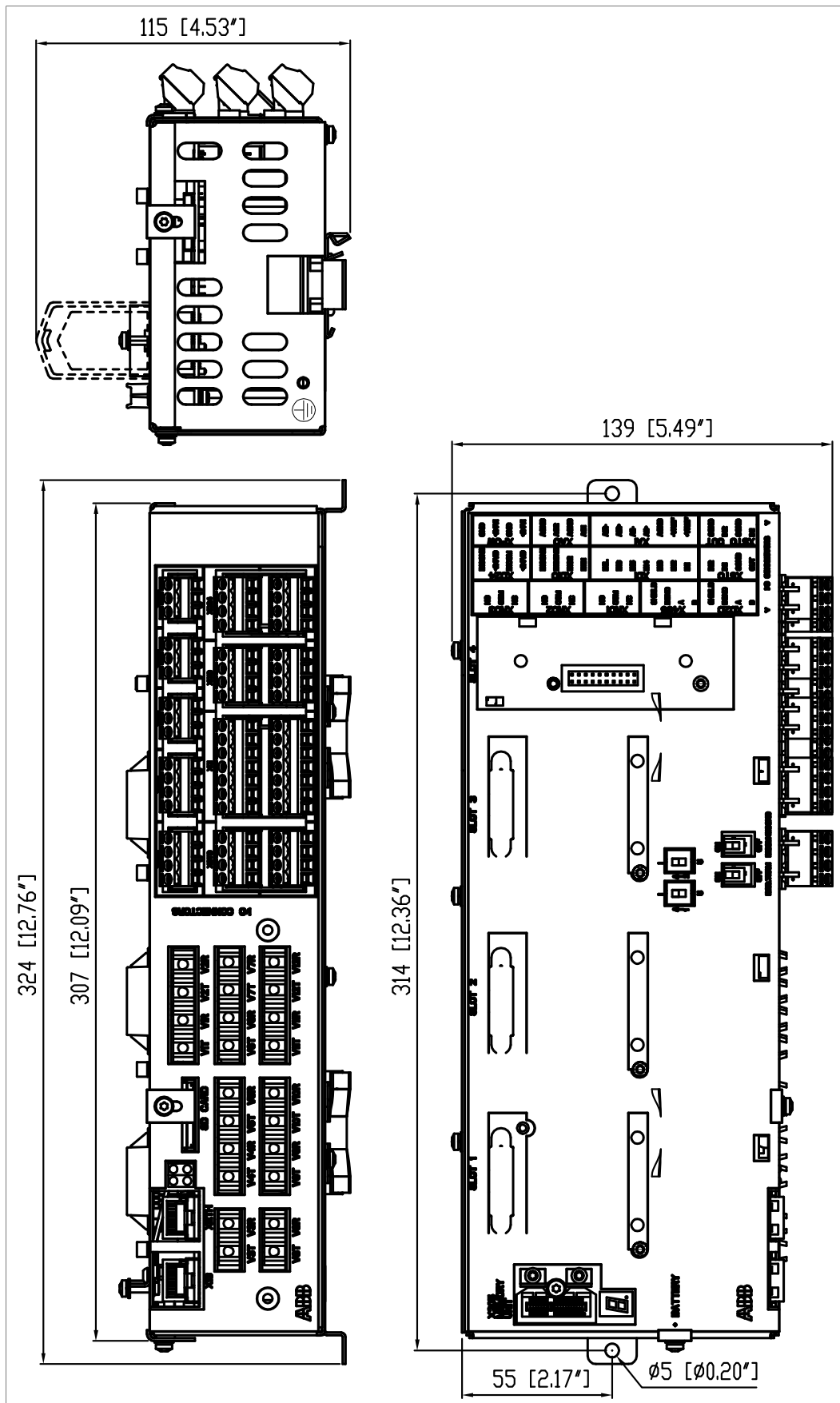
ACS-AP-x control panel with DPMP-01 door mounting kit

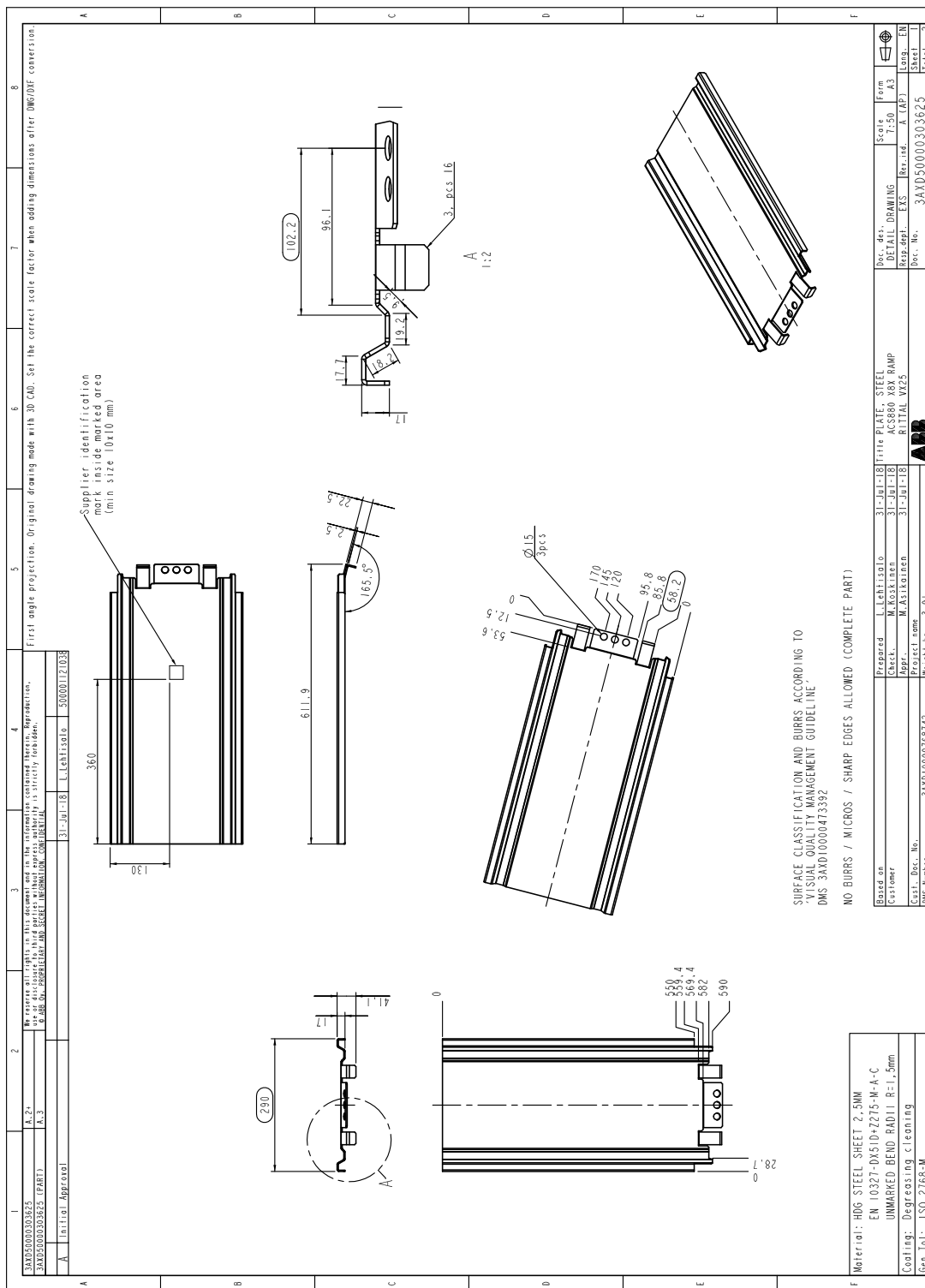


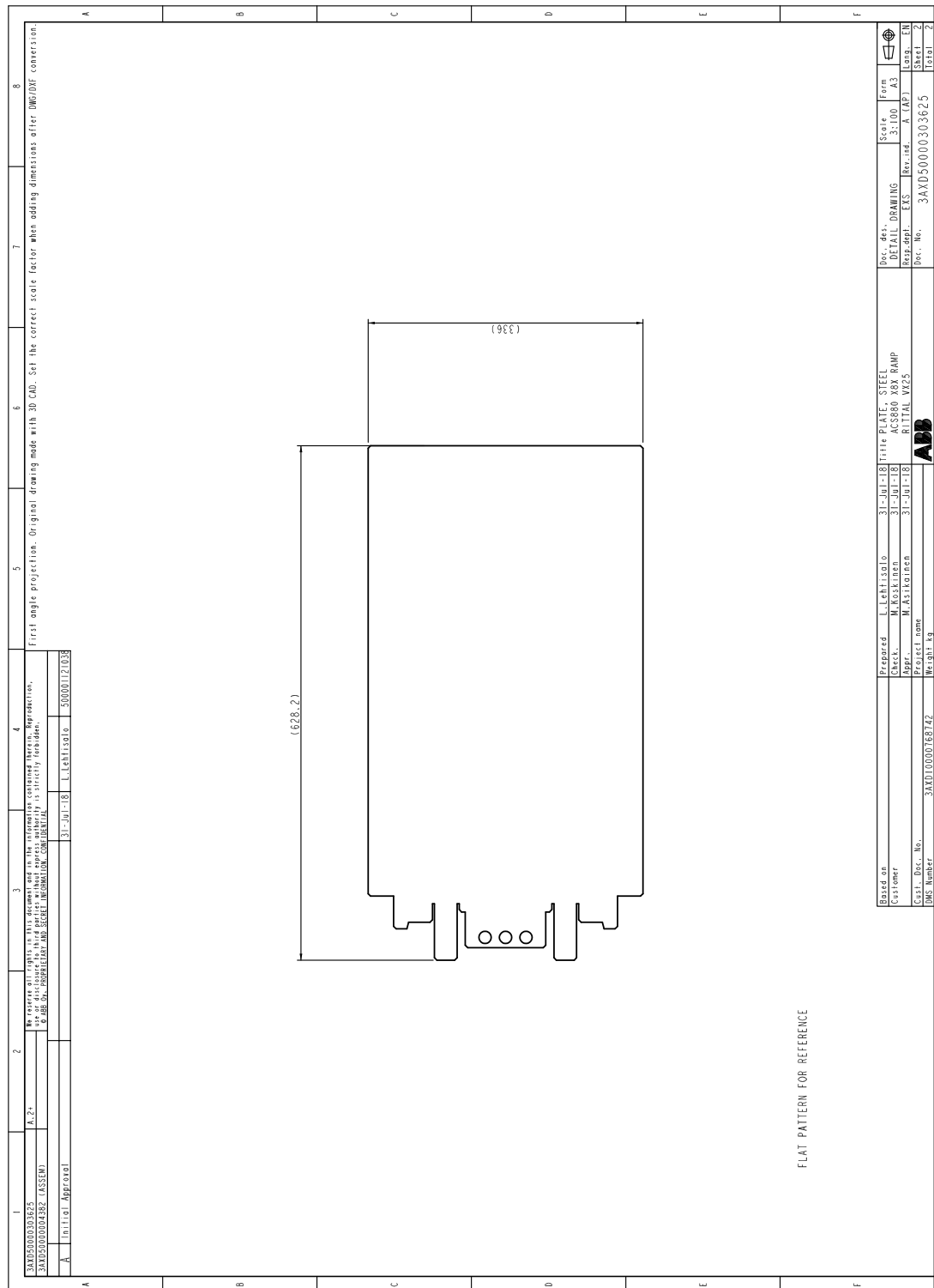
Cutting in the cabinet door: 109 mm × 223 mm (4.29 in. × 8.78 in.)

Plate thickness: 1.5...2.5 mm (0.06...0.10 in.)

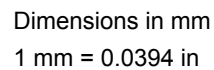
BCU control unit



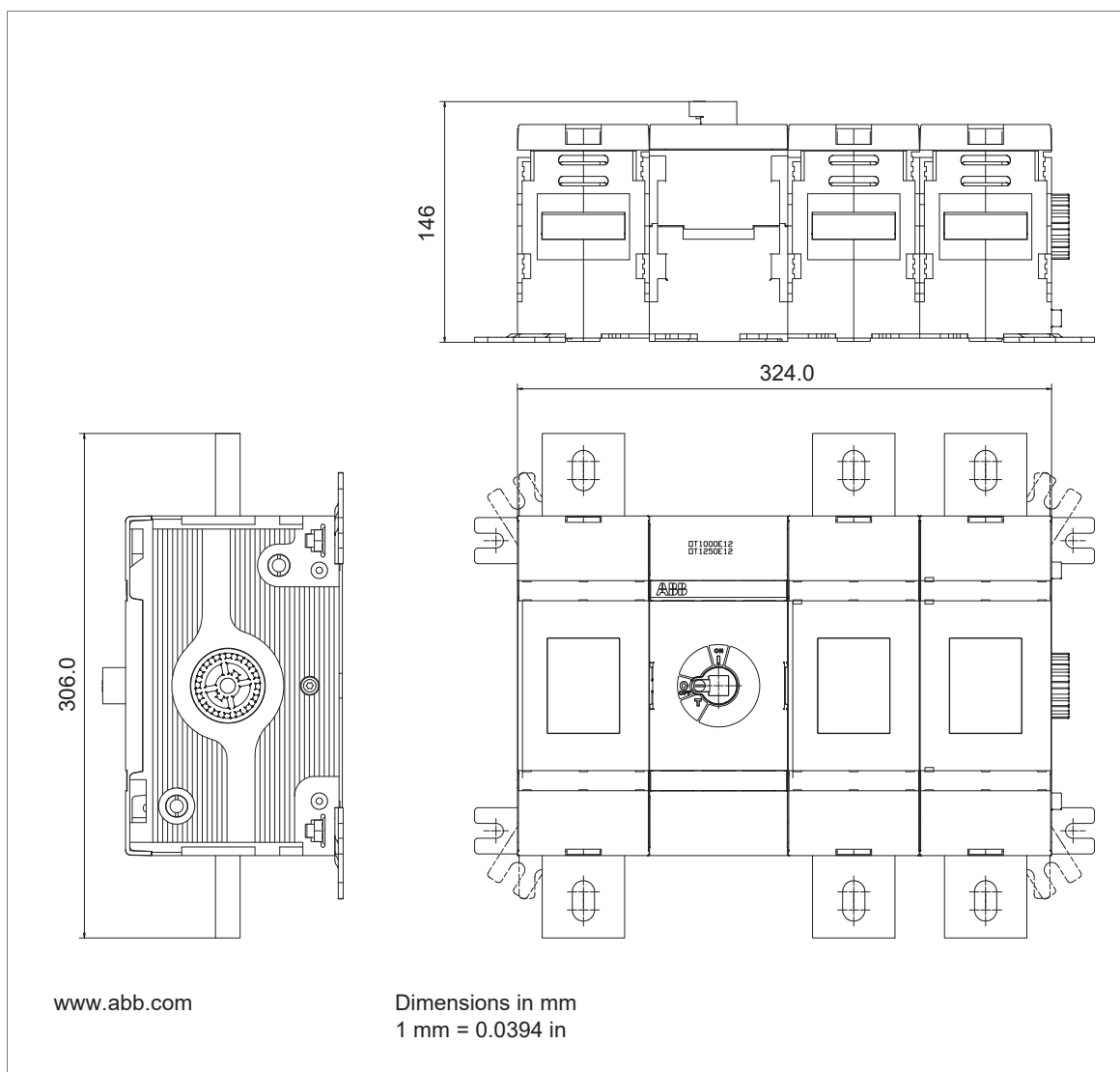




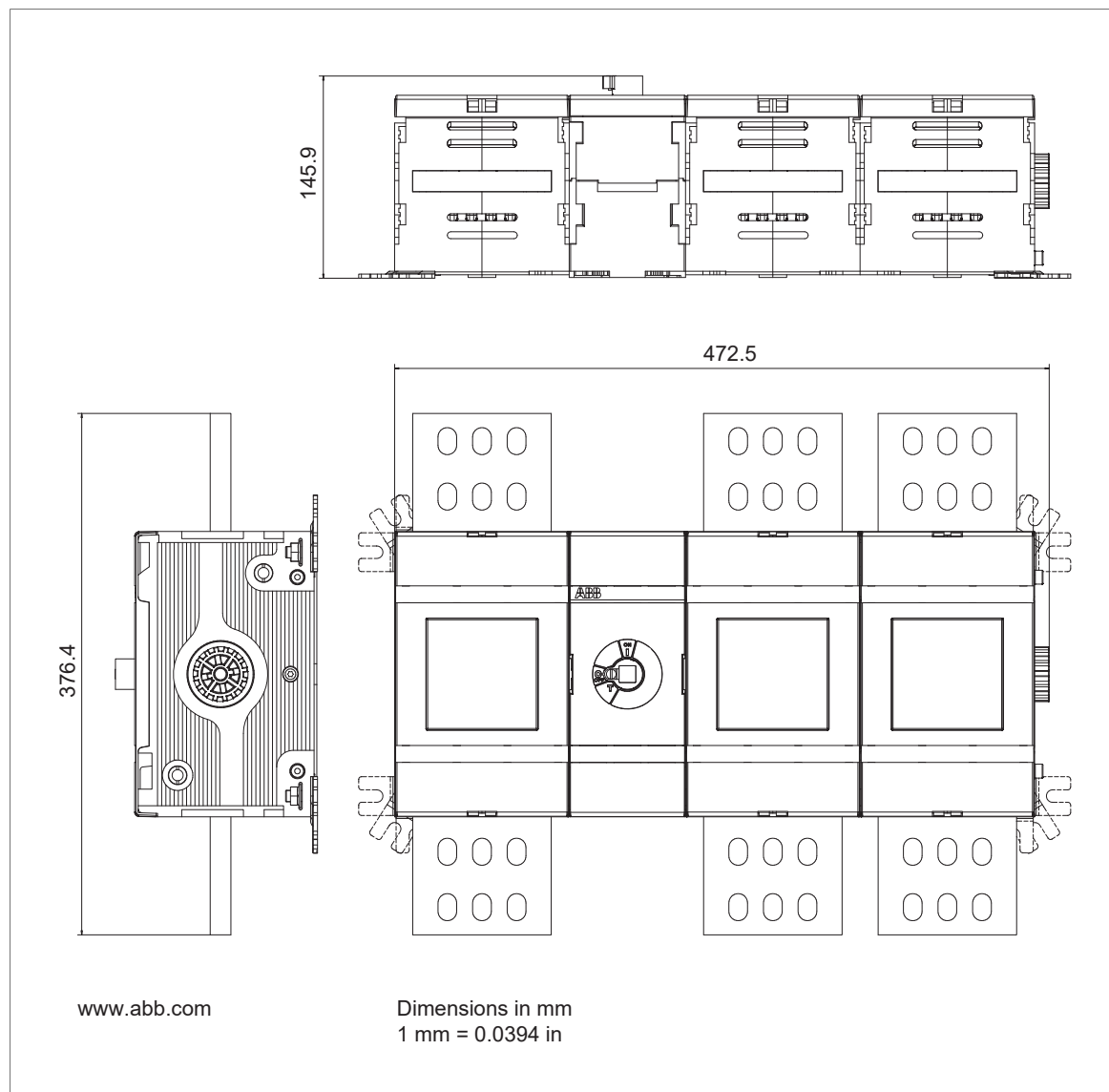
OT1200U12 (UL)



OT1250E12 (IEC)

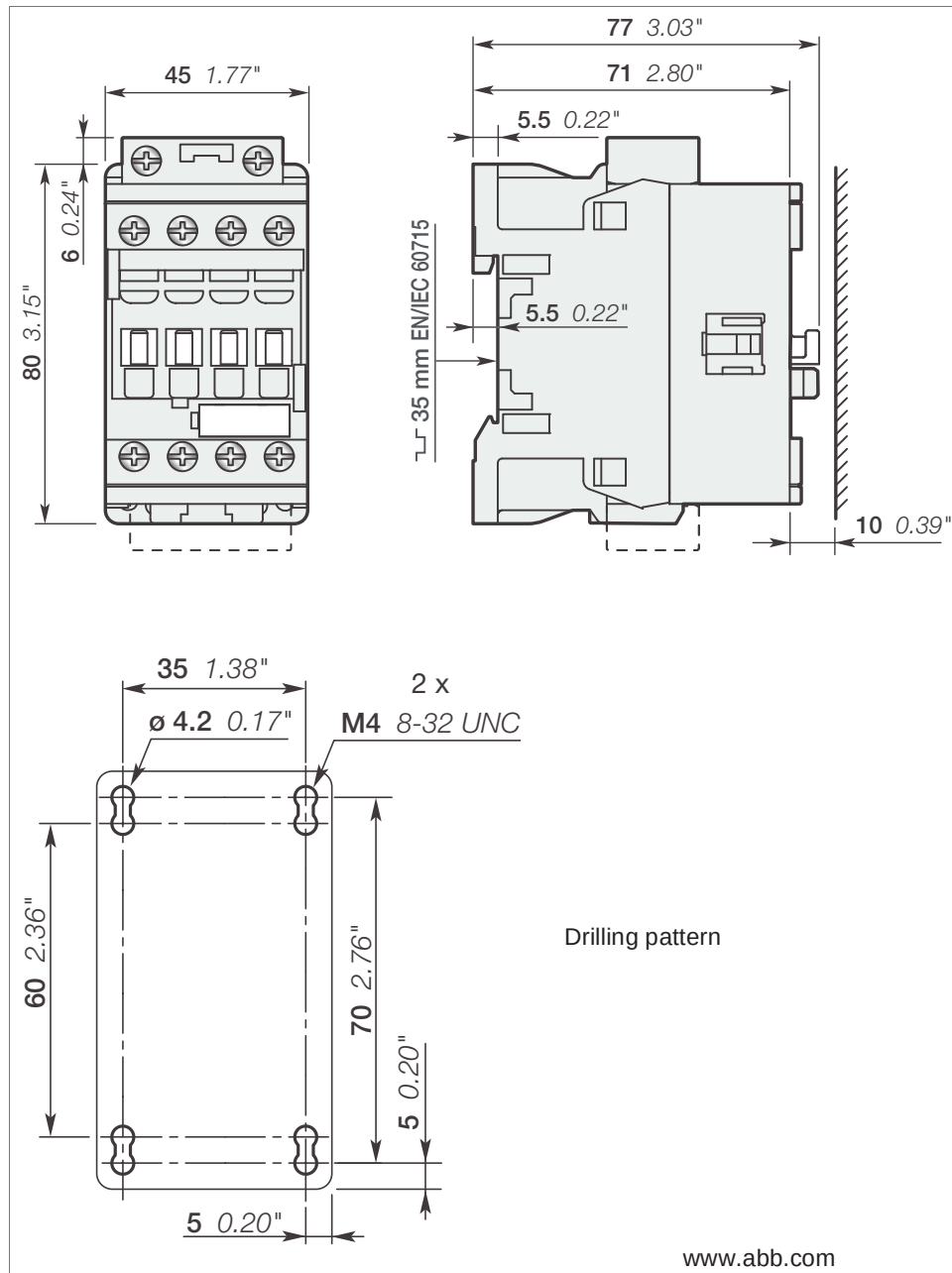


OT2000E12 (IEC)

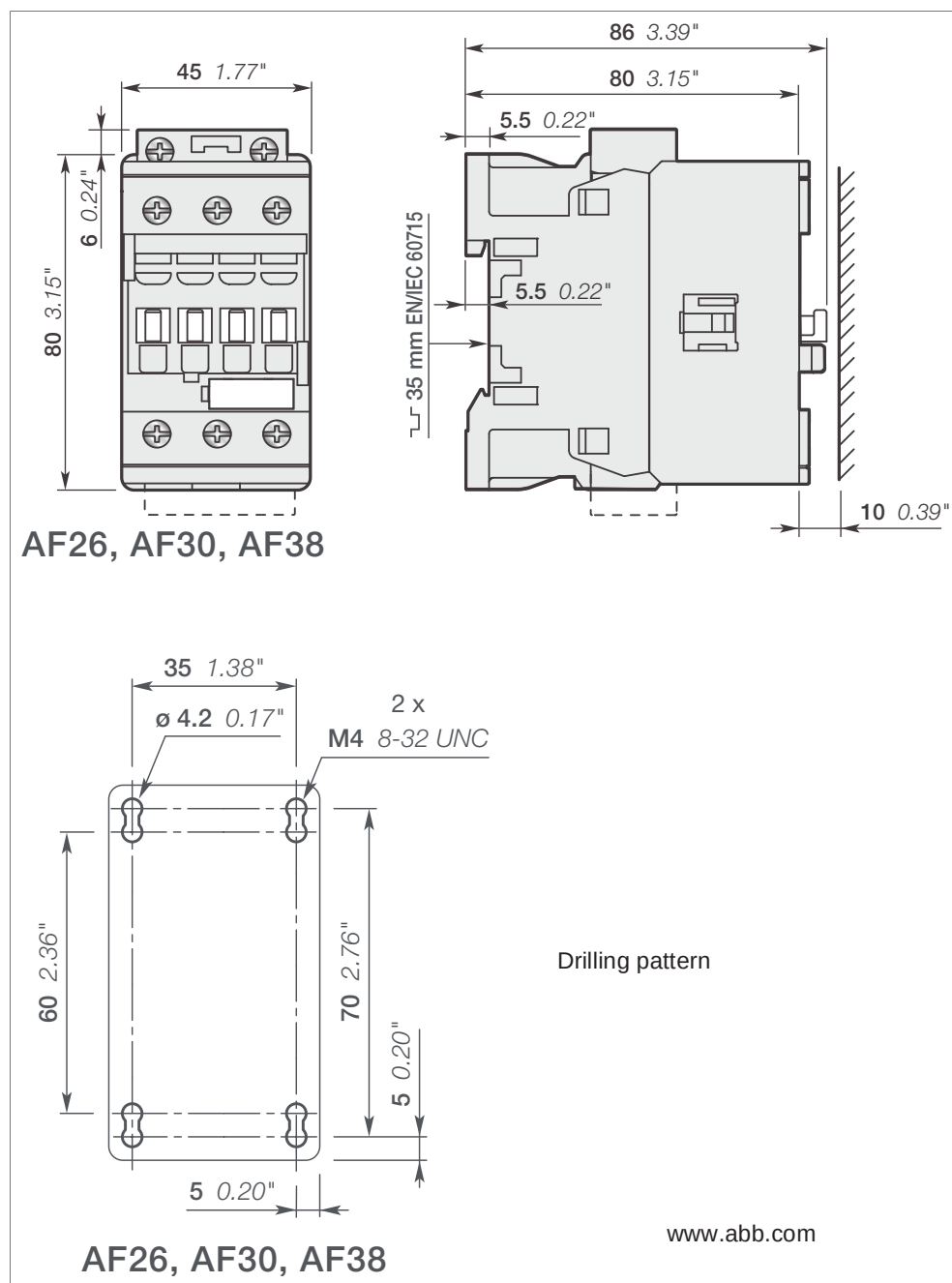


■ Contactors

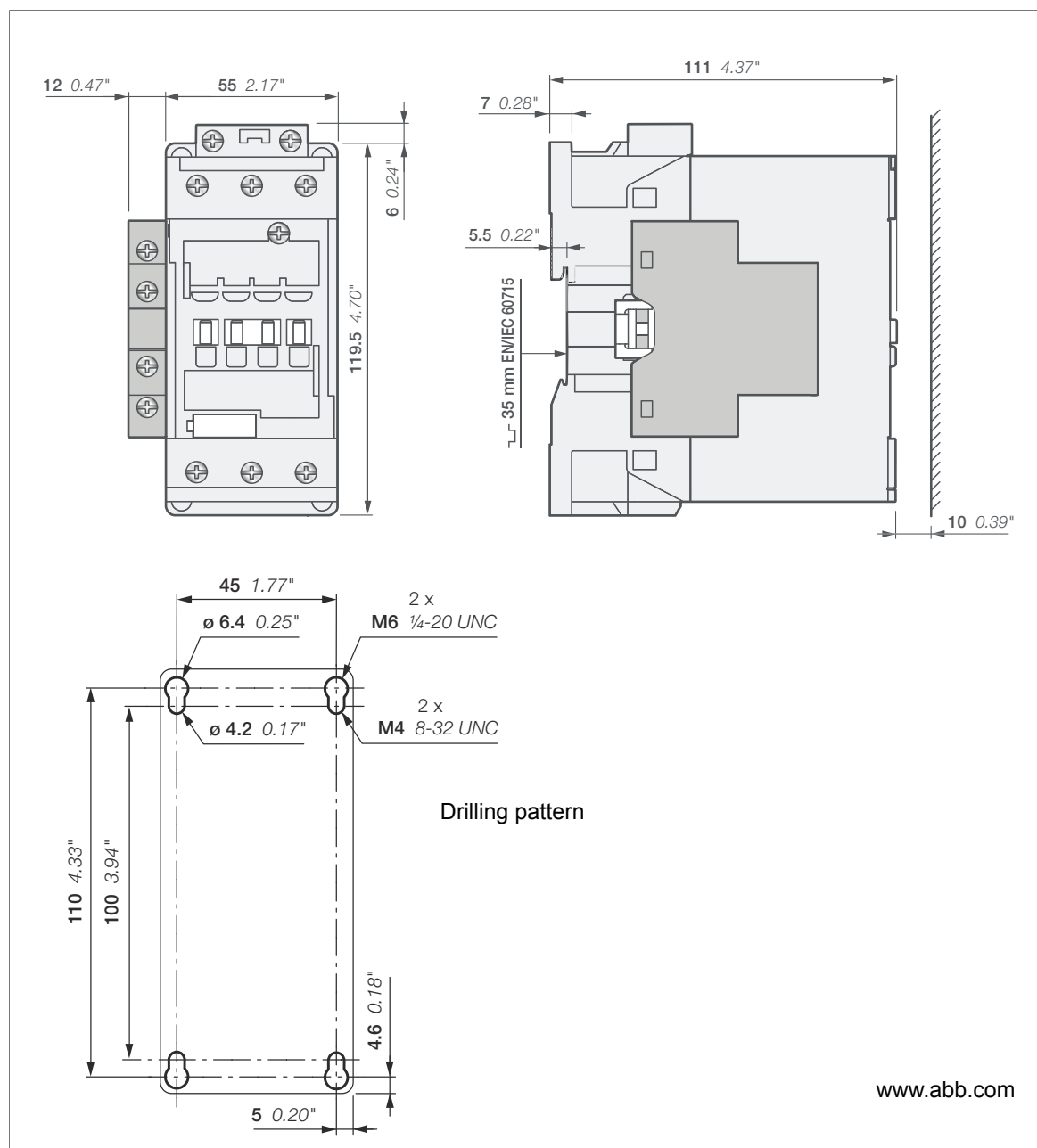
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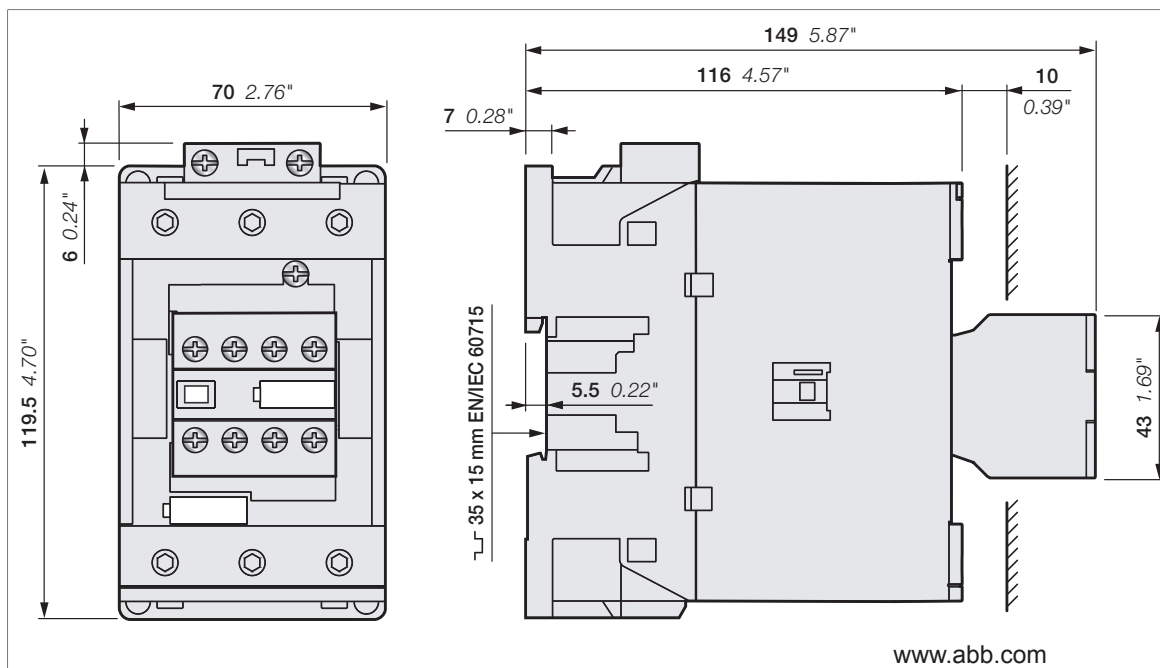
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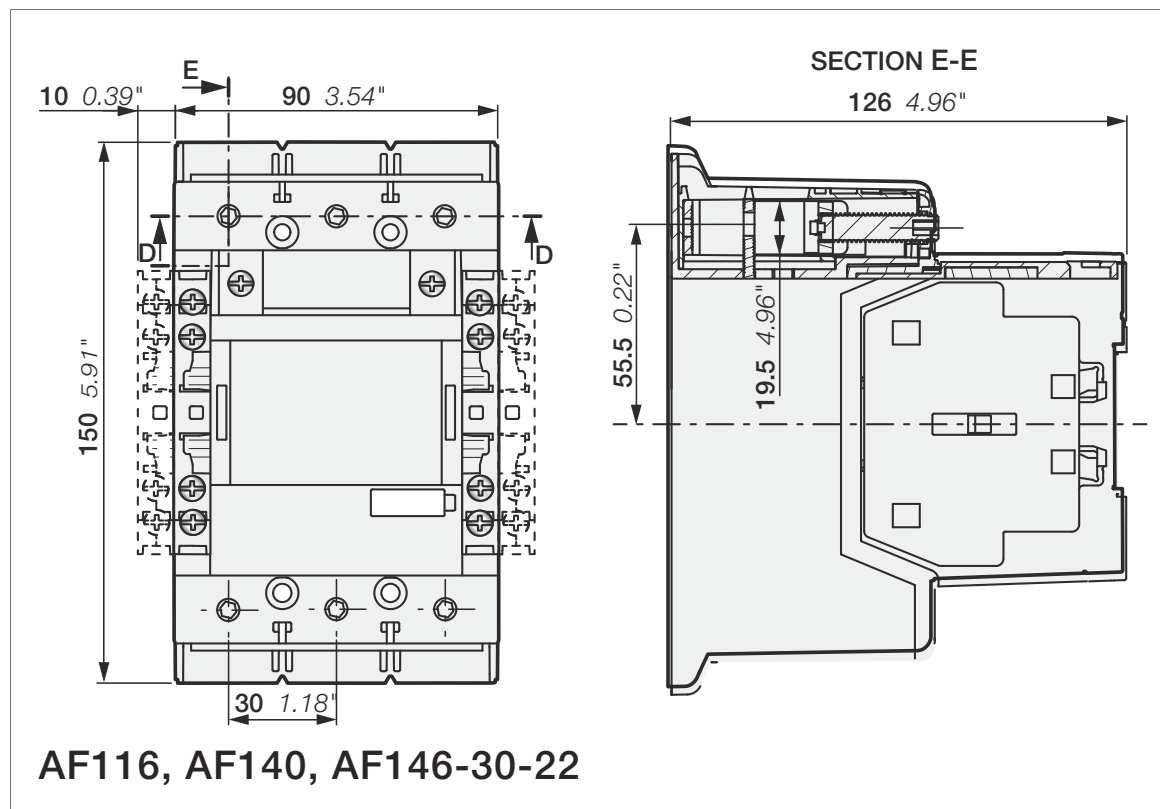
AF52-30-11-13, AF65-30-11-13



AF96-30-22-13

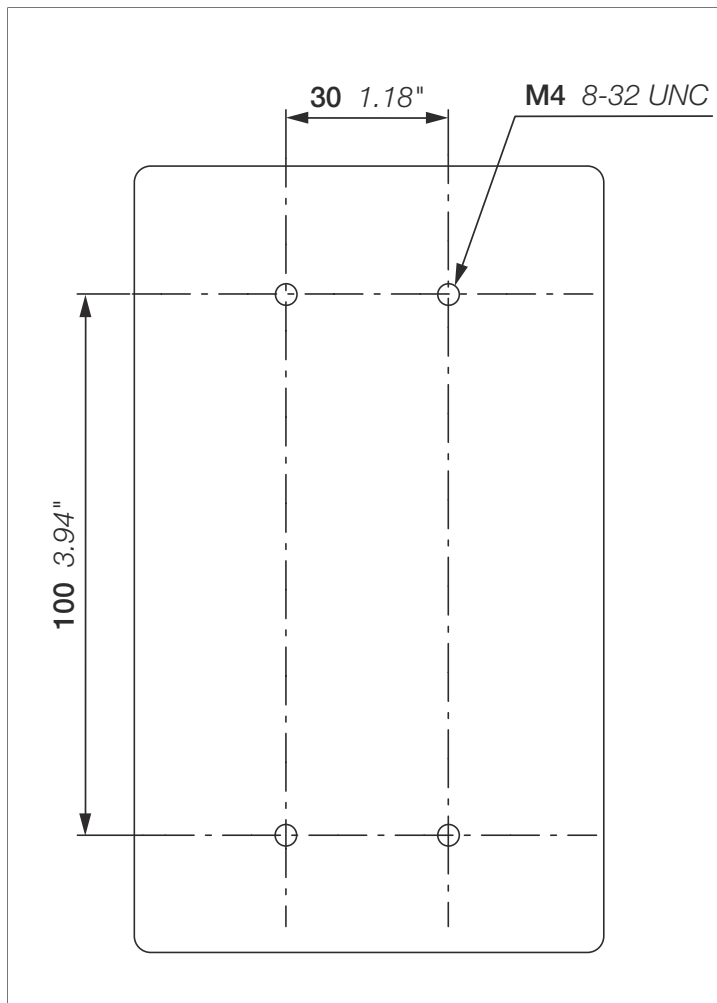


AF116-30-22-13

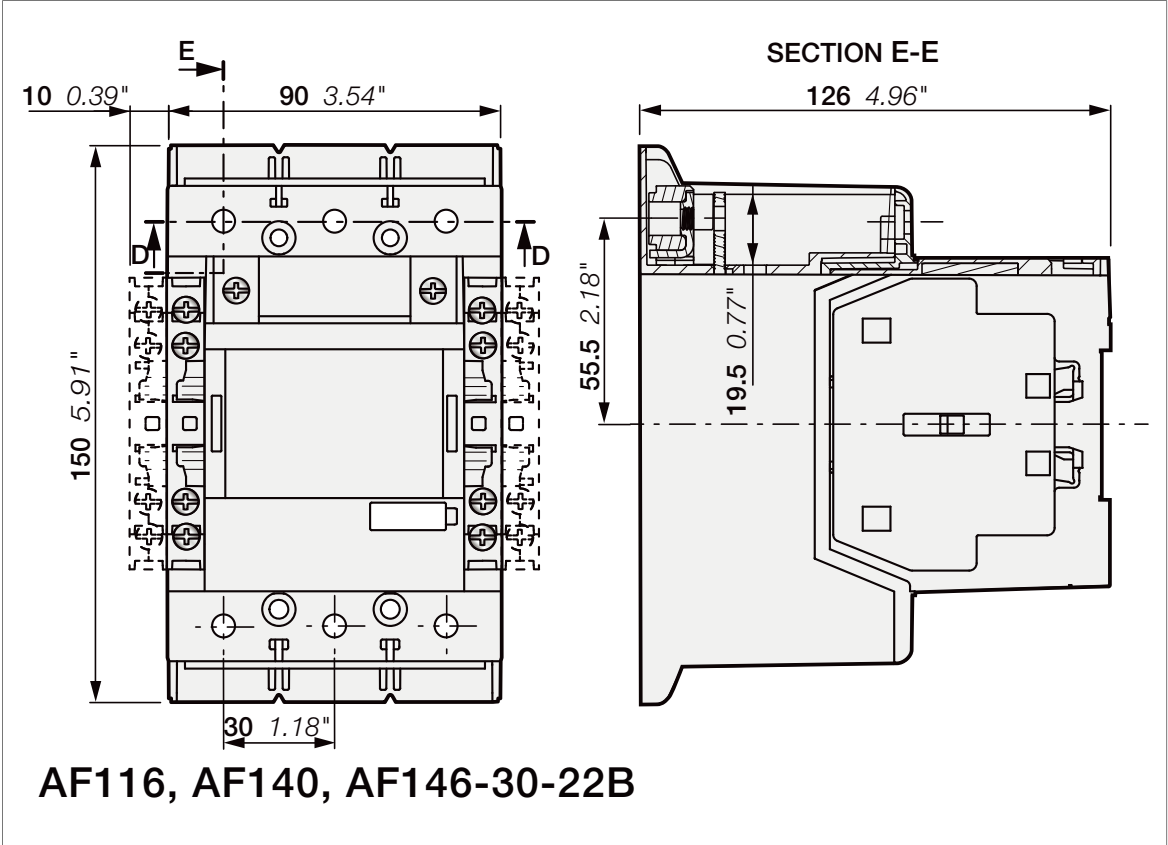


AF116, AF140, AF146-30-22

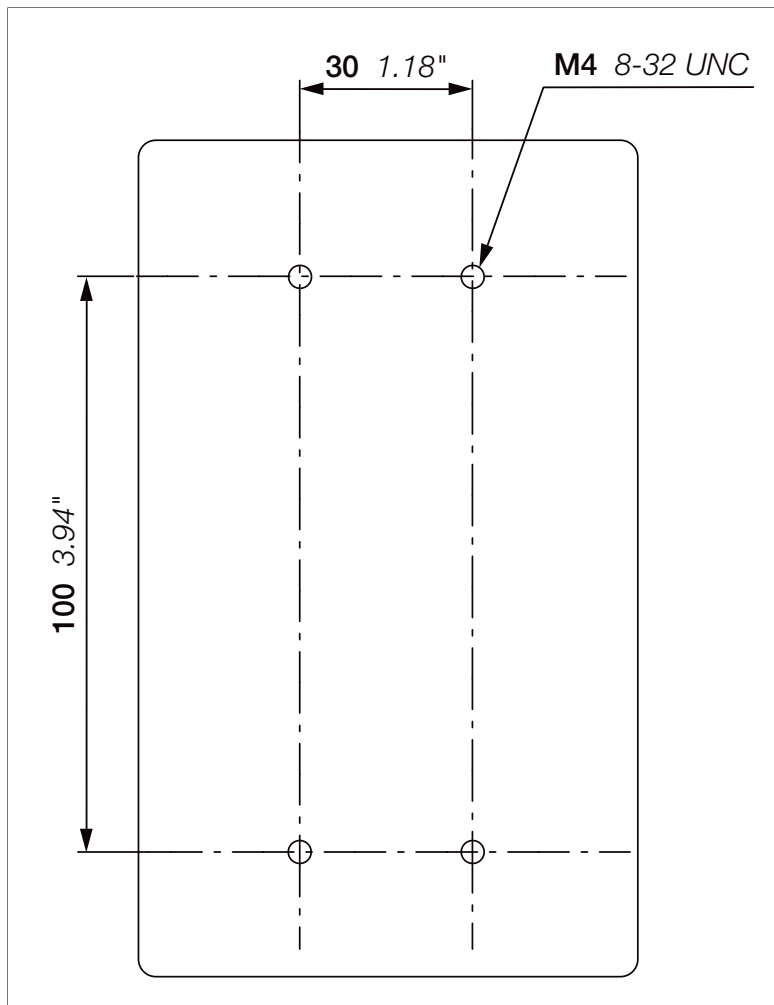
Drilling pattern



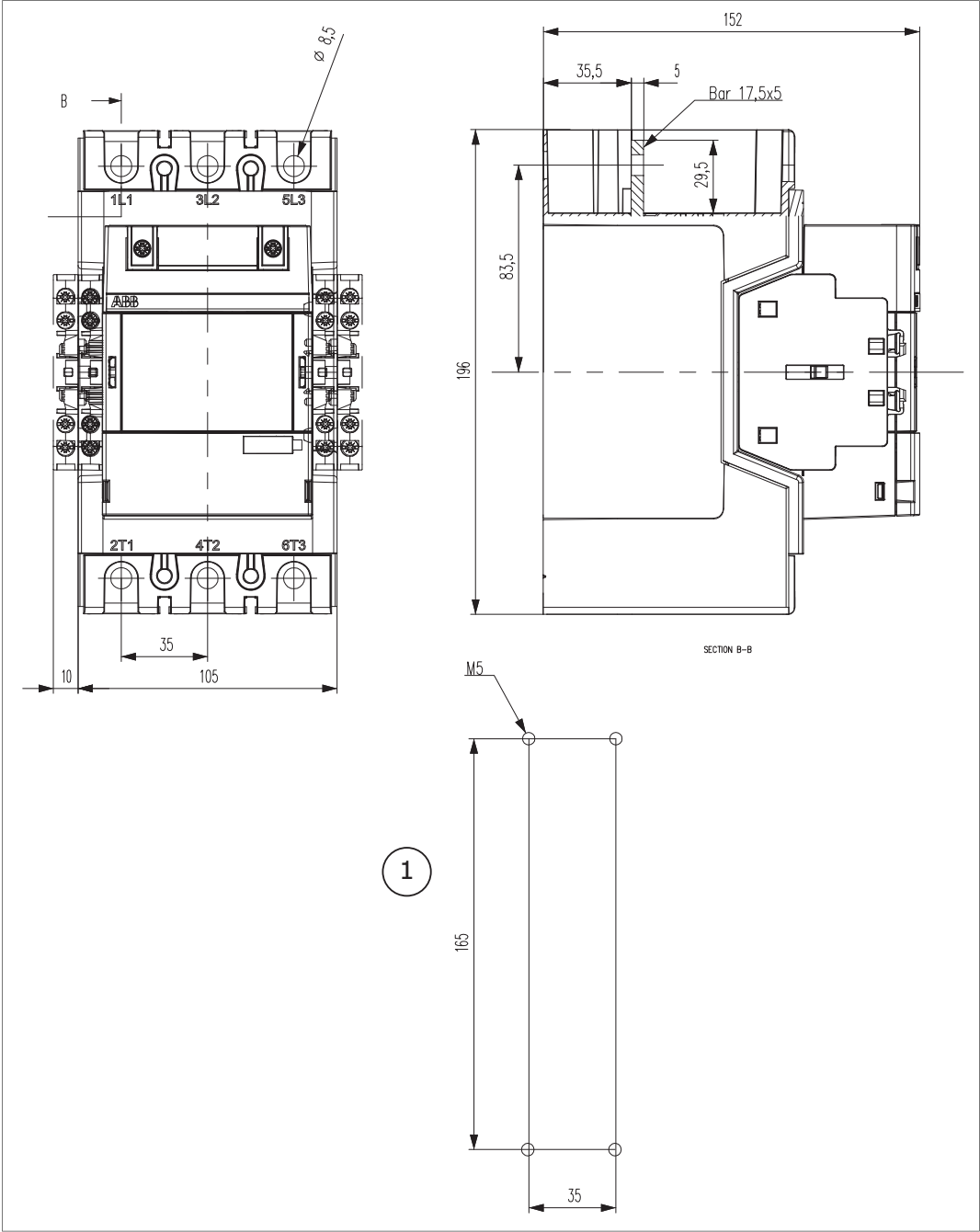
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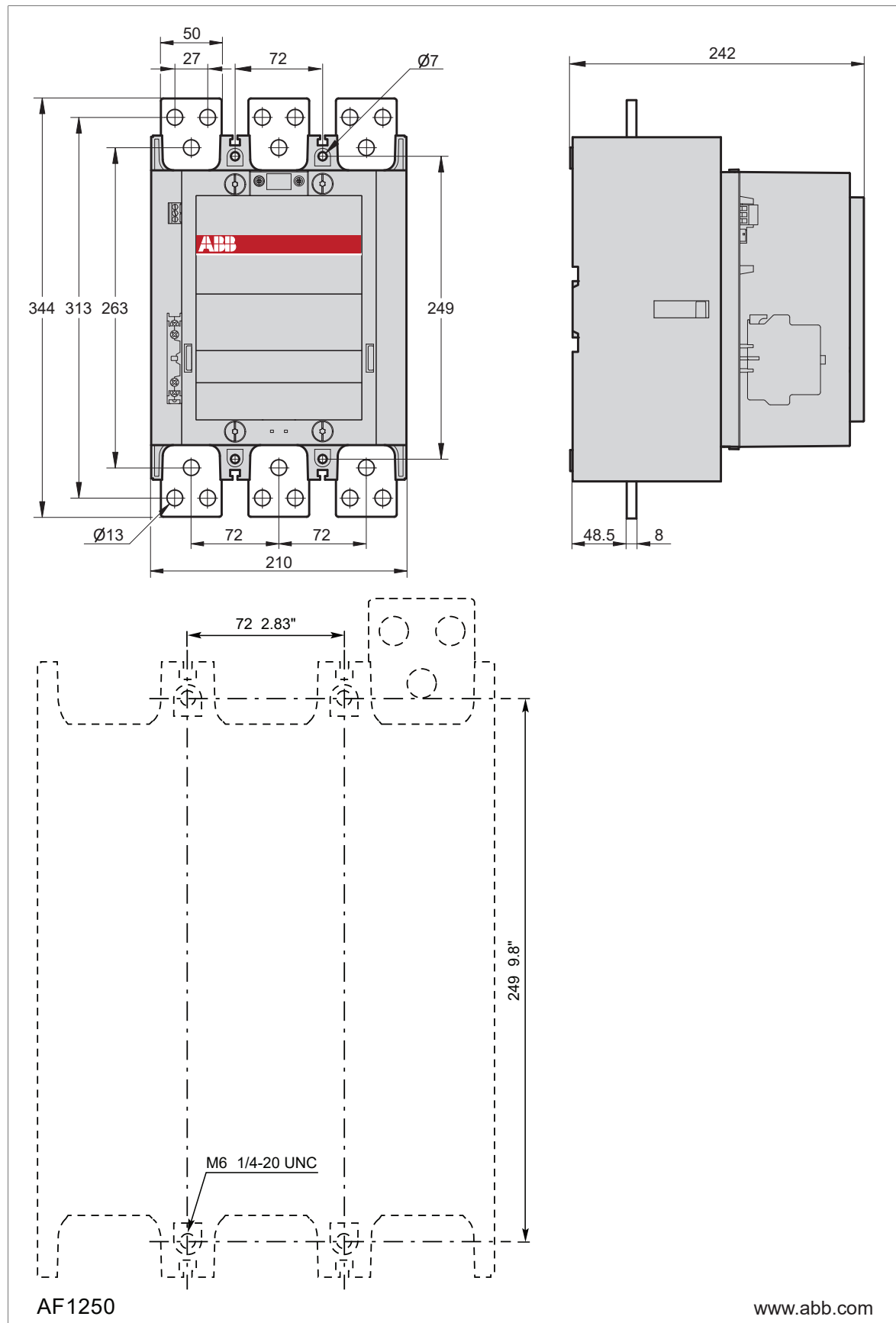
Drilling pattern



AF190-30-22-13



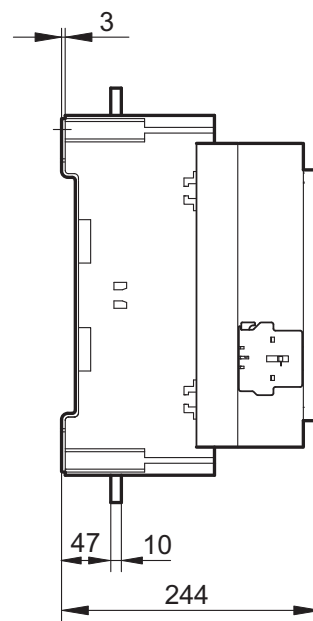
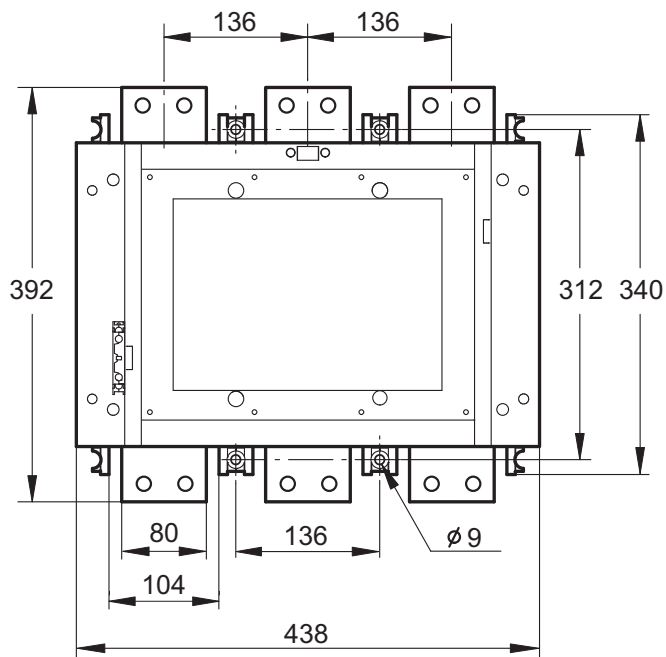
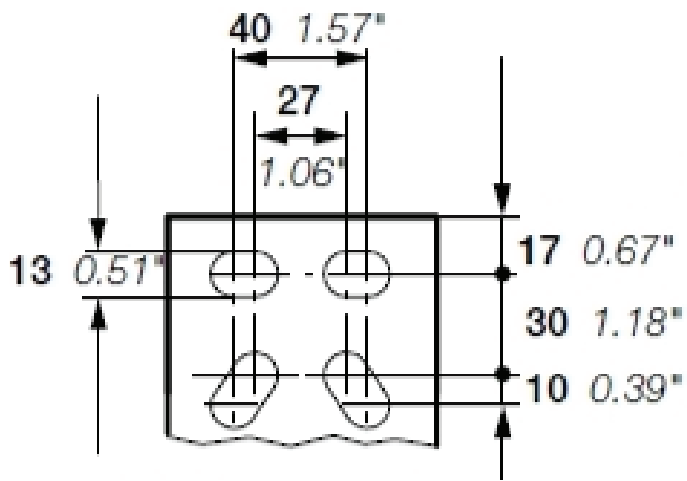
AF1250-30-22-70



Dimensions in mm

1 mm = 0.0394 in

AF1650-30-22-70

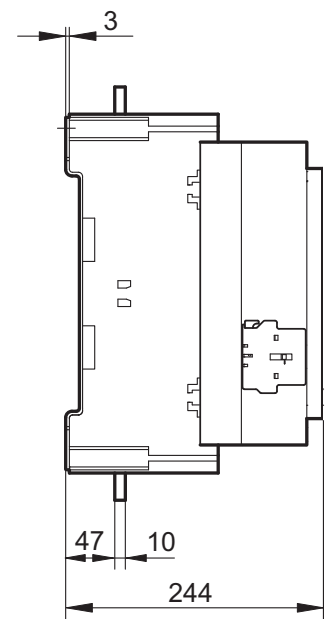
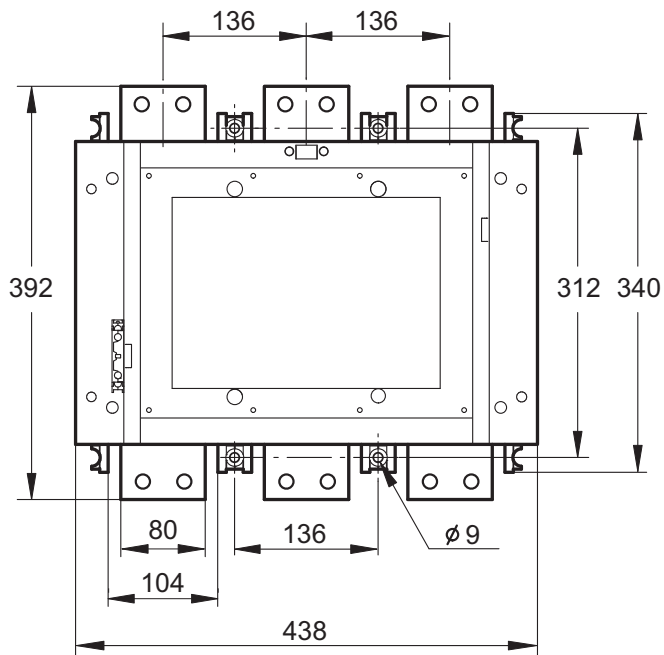
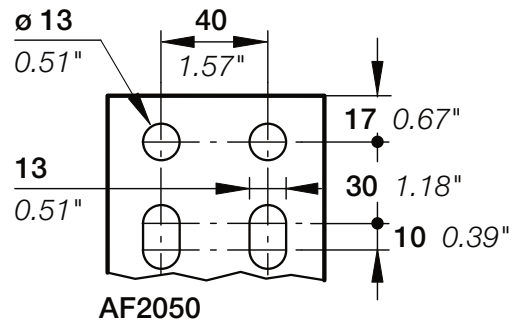


Dimensions in mm

1 mm = 0.0394 in

www.abb.com

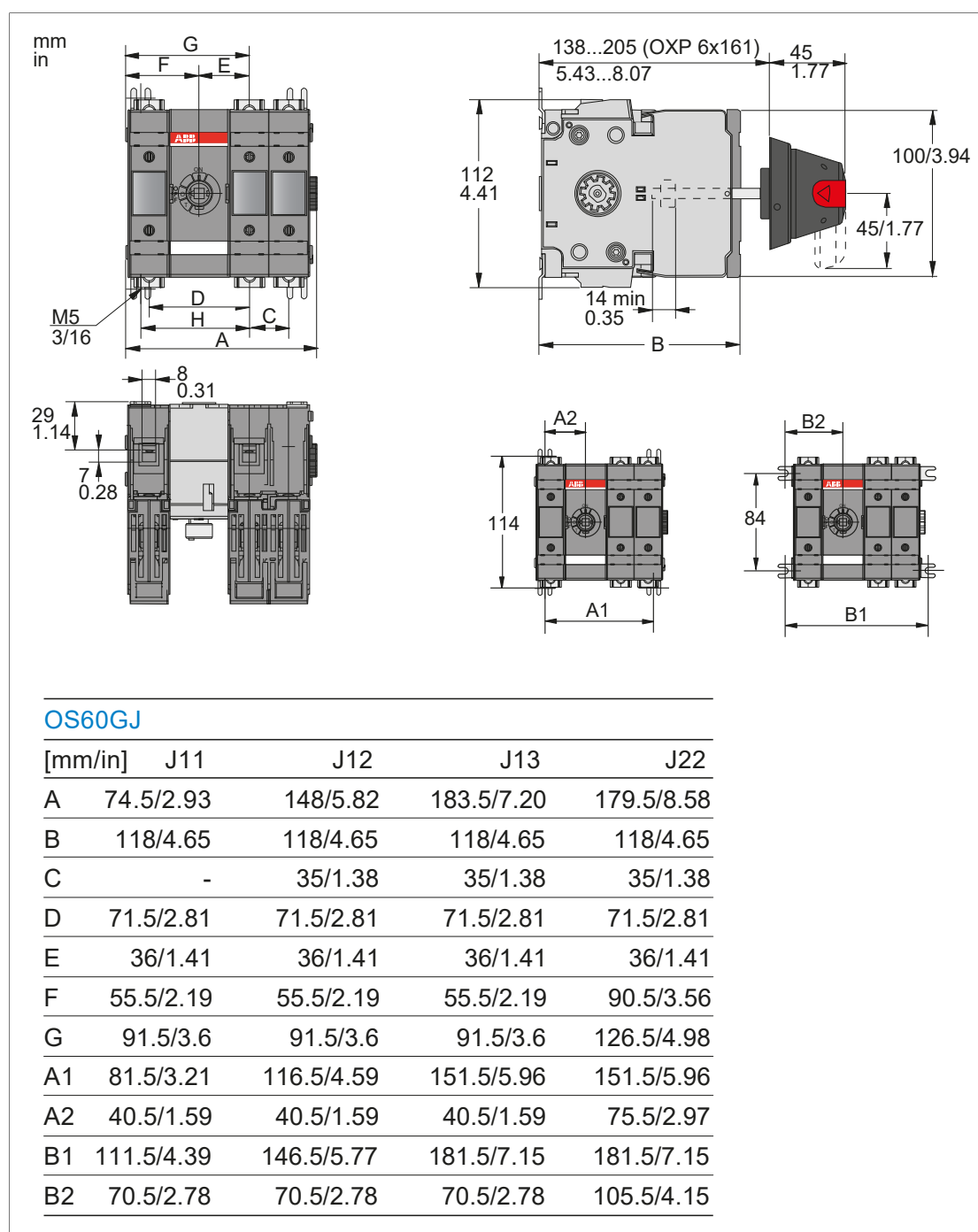
AF2050-30-22-70



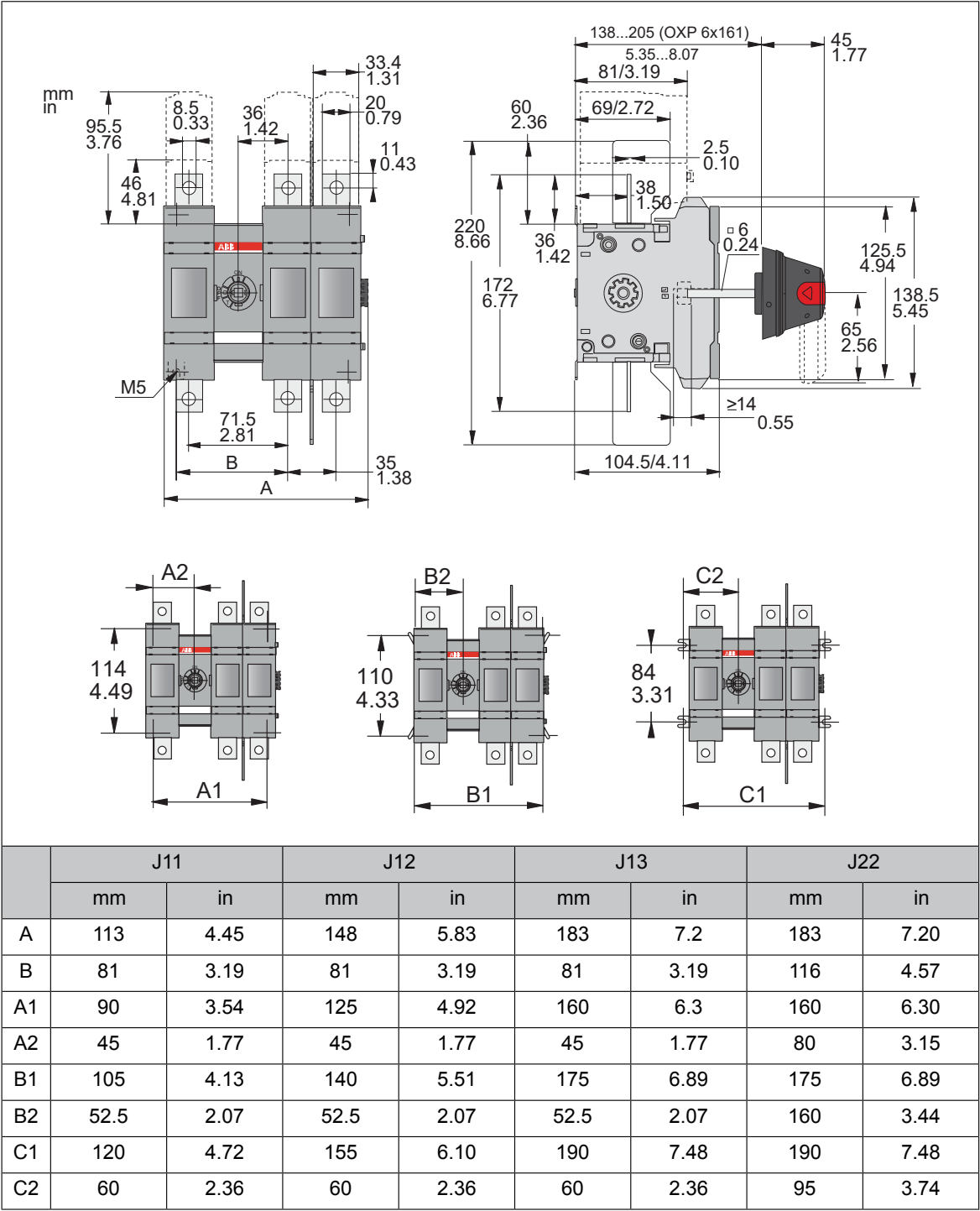
Dimensions in mm
1 mm = 0.0394 in

www.abb.com

OS60GJ22FP

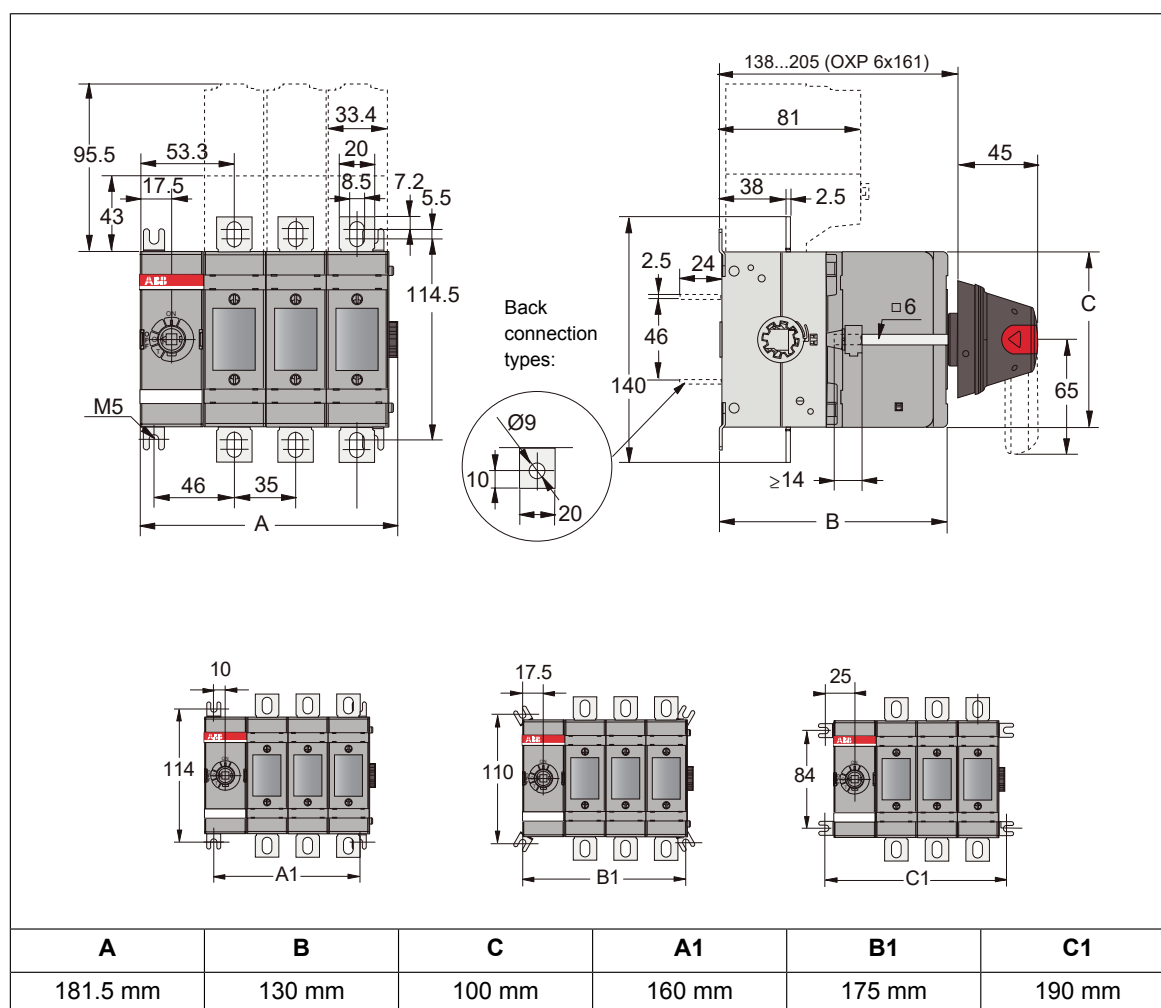


OS100GJ22FP

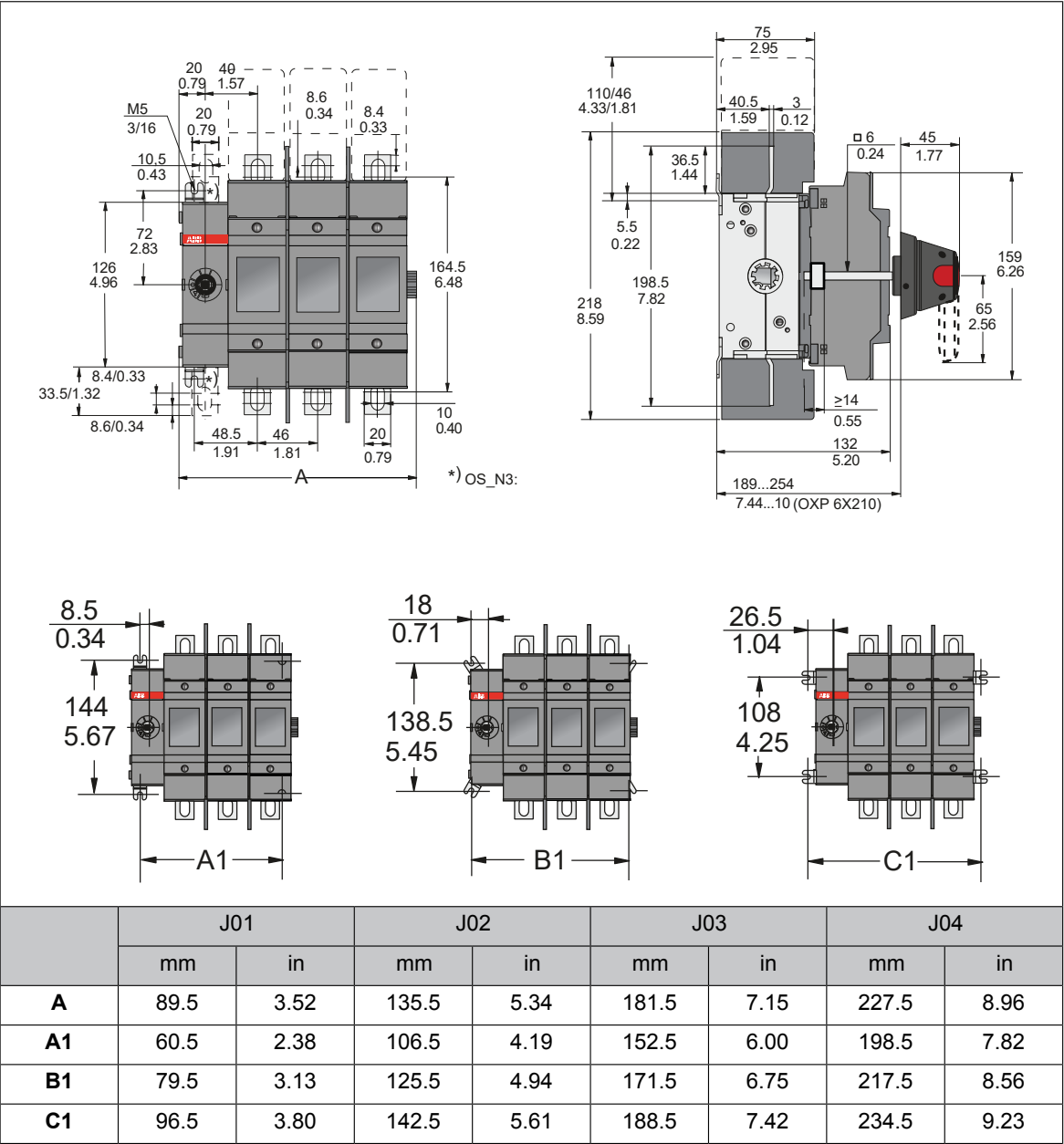


The measurements in the dimension drawings are preliminary and may be altered.

OS160GD04F

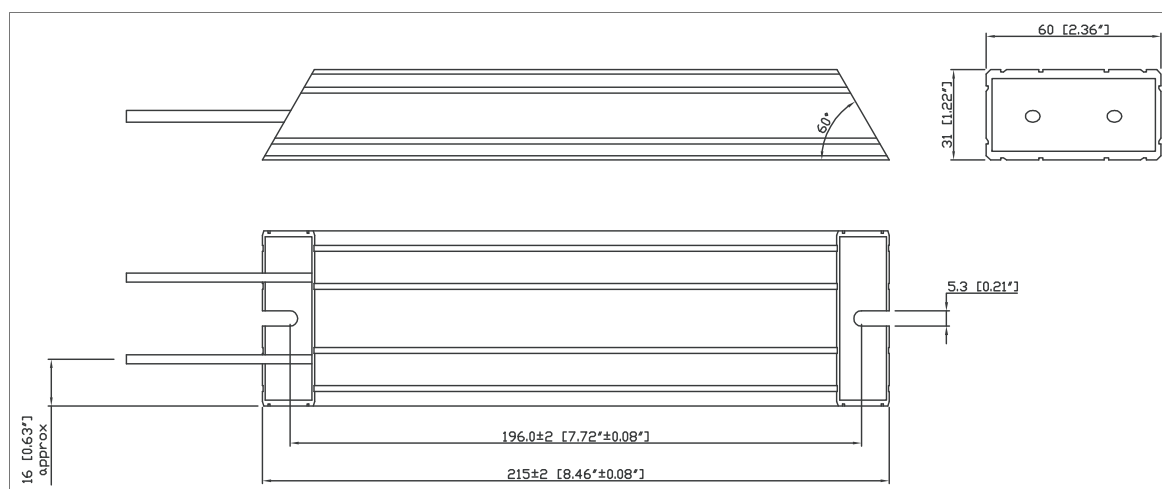


OS200J04FP



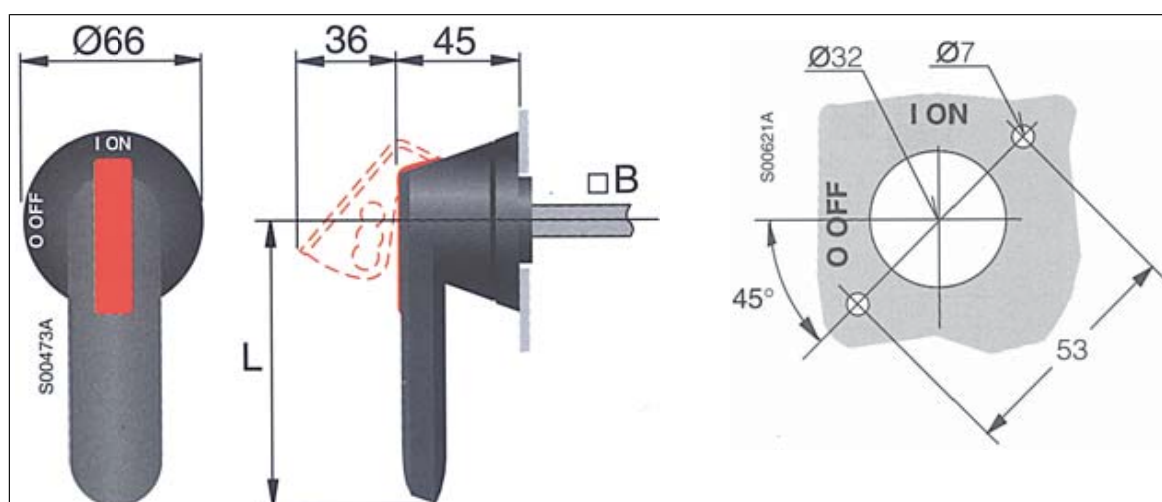
■ Resistors

CBH 215 C H 414 5R0



■ Handles

OHB65J6



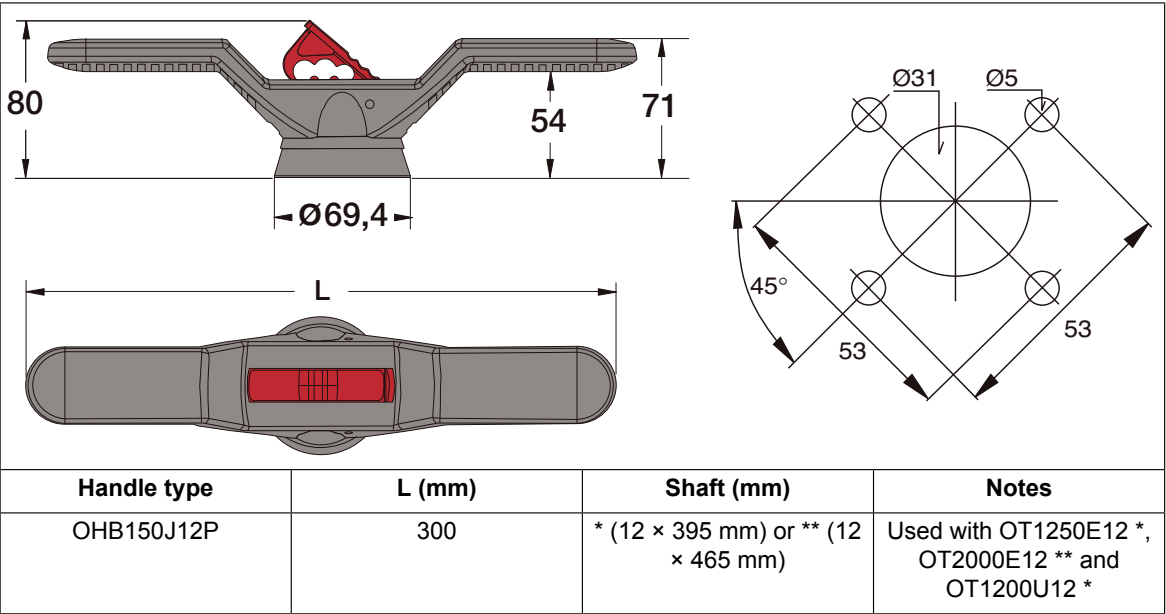
Handle type	L (mm)	B (mm)
OHB 45J6	45	6
OHB 45J10	45	10
OHB 65J6	65	6
OHB 65J8	65	8
OHB 65J10	65	10
OHB 80J6	80	6
OHB 80J8	80	8
OHB 80J10	80	10
OHB 95J10	95	10
OHB 95J12	95	12
OHB 125J10	125	10
OHB 125J12	125	12
OHB 145J12	145	12

OHB 175J12	175	12
OHB 275J12	275	12

Dimensions in mm

1 mm = 0.0394 in

OHB150J12P

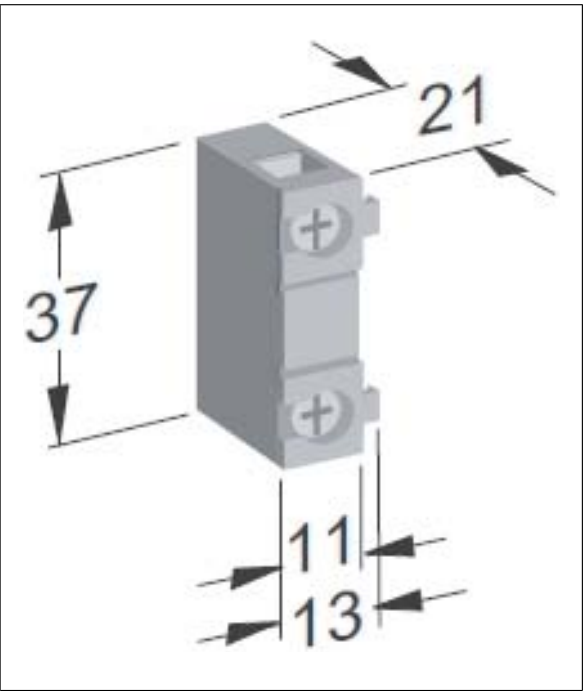


Dimensions in mm

1 mm = 0.0394 in

■ Contacts

Auxiliary contact OA1G10



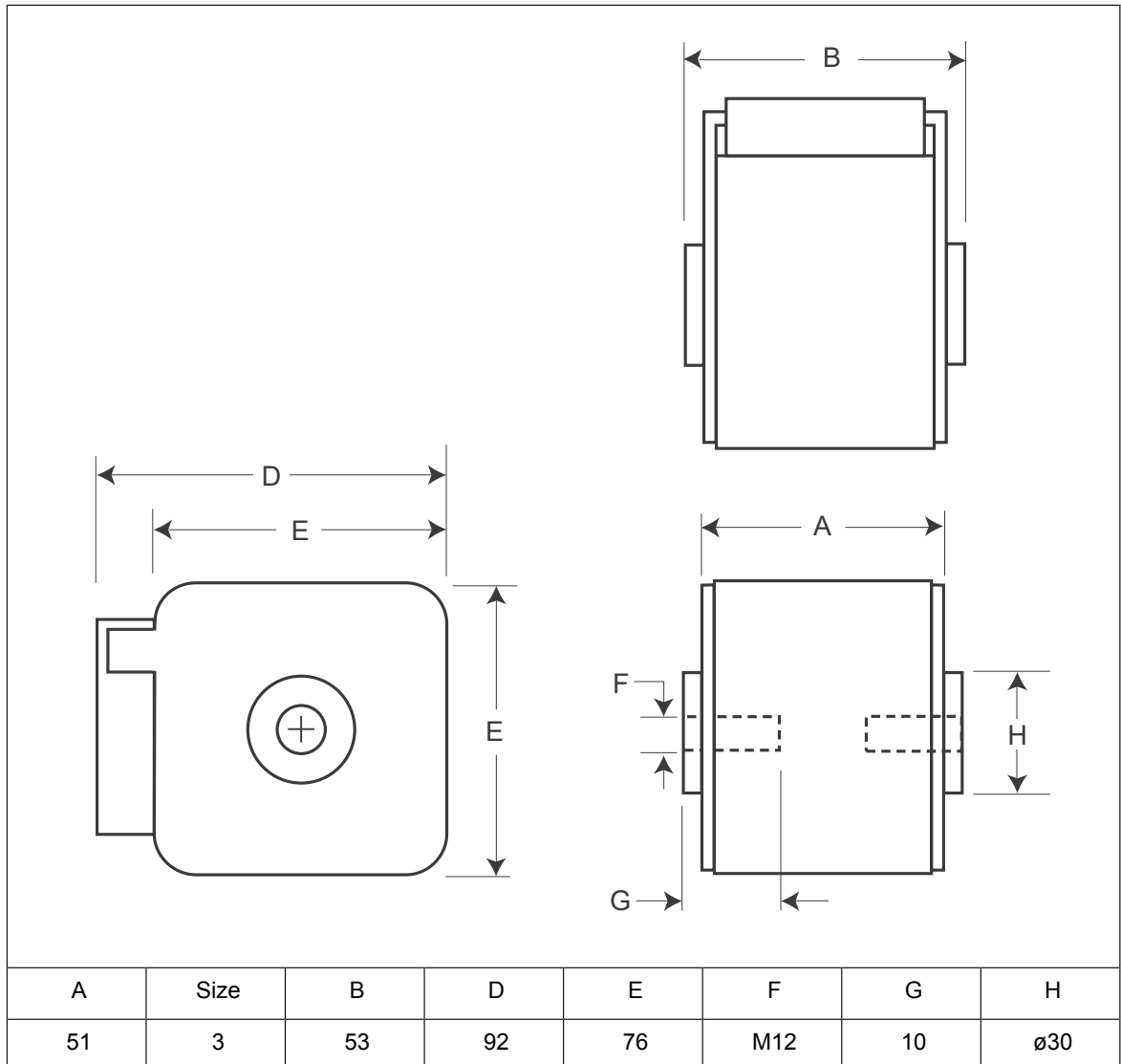
2×0.75...2.5 mm² (2×18...14 AWG)

0.8 N·m (7 lbf·in)

Pozidriv M3.5 Form 2

AC Fuses

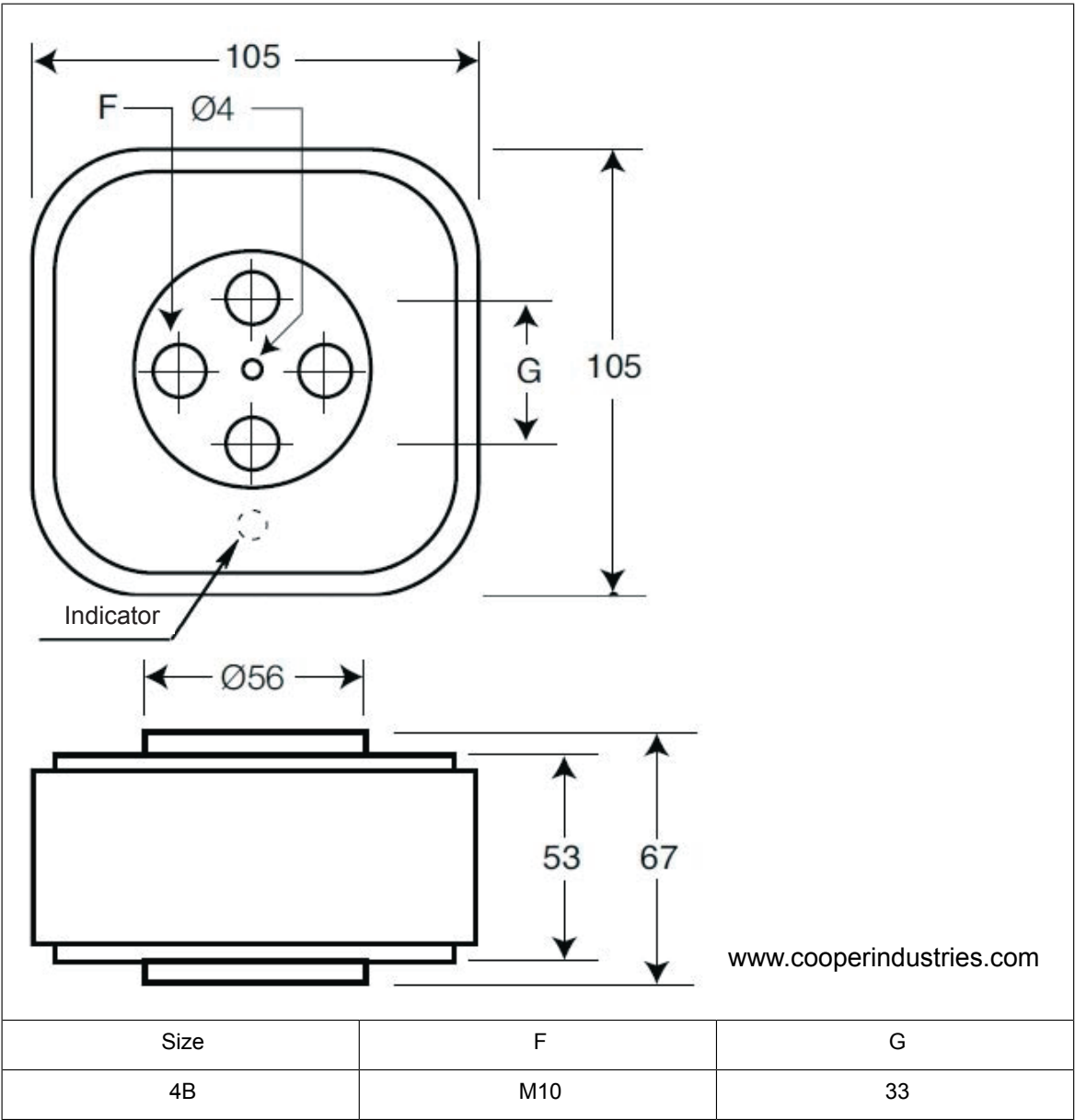
■ 170M6415, 170M6417



1 mm = 0.0394 in

www.cooperindustries.com

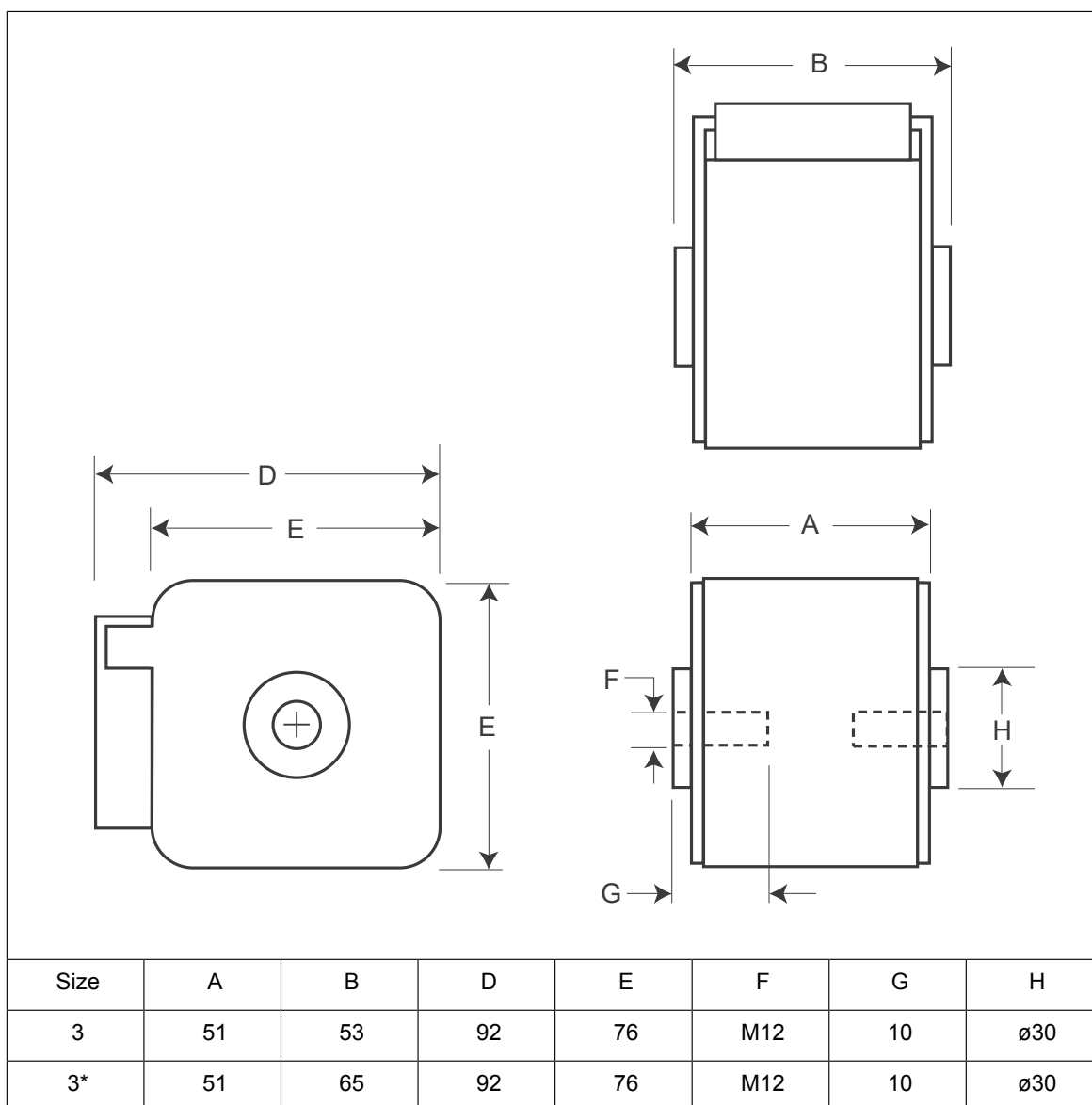
■ 170M7062, 170M7064



1 mm = 0.0394 in
www.cooperindustries.com

DC fuses

■ 170M6416, 170M6420

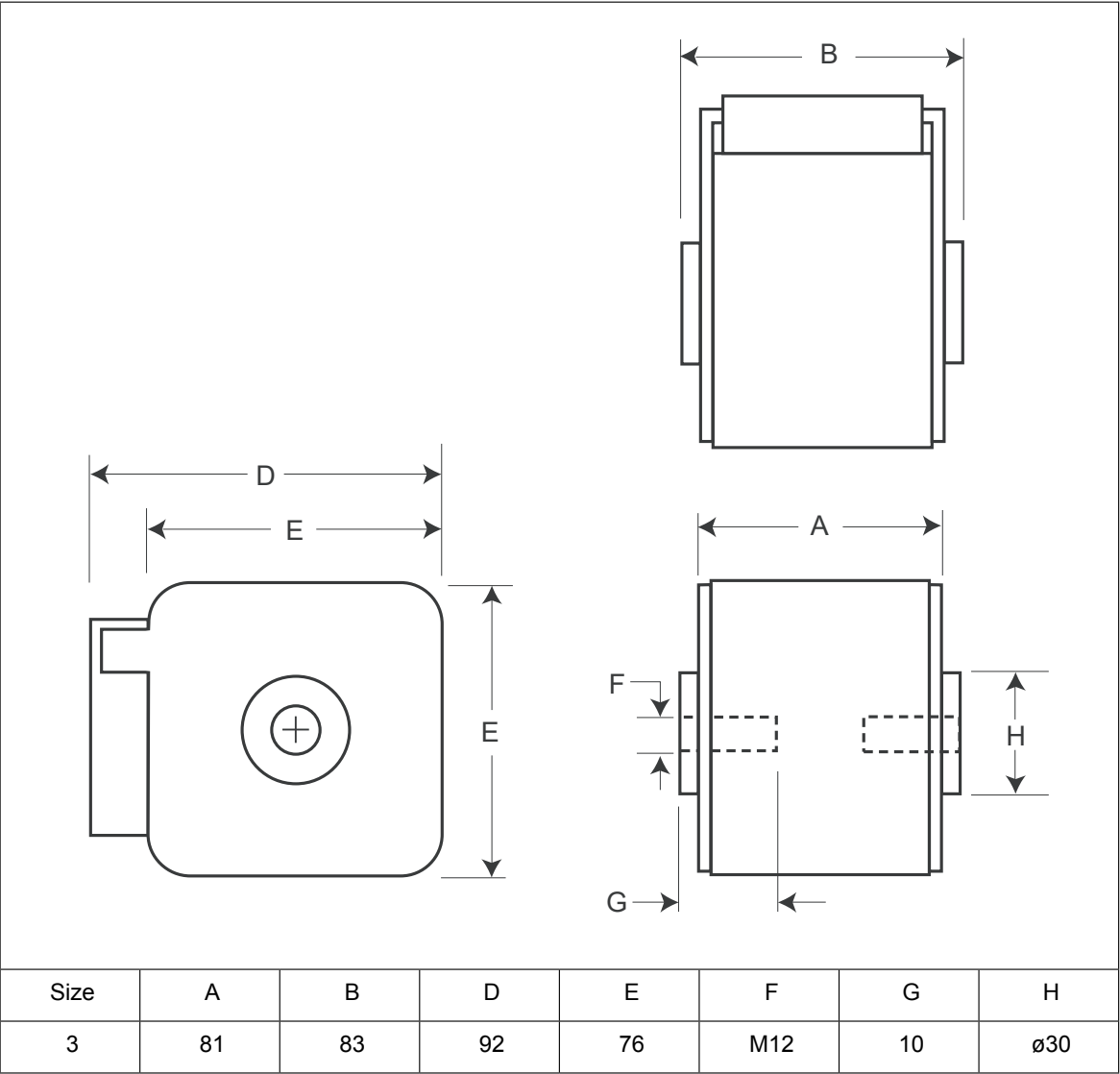


* For size 3 1600...2000 A

1 mm = 0.0394 in

www.cooperindustries.com

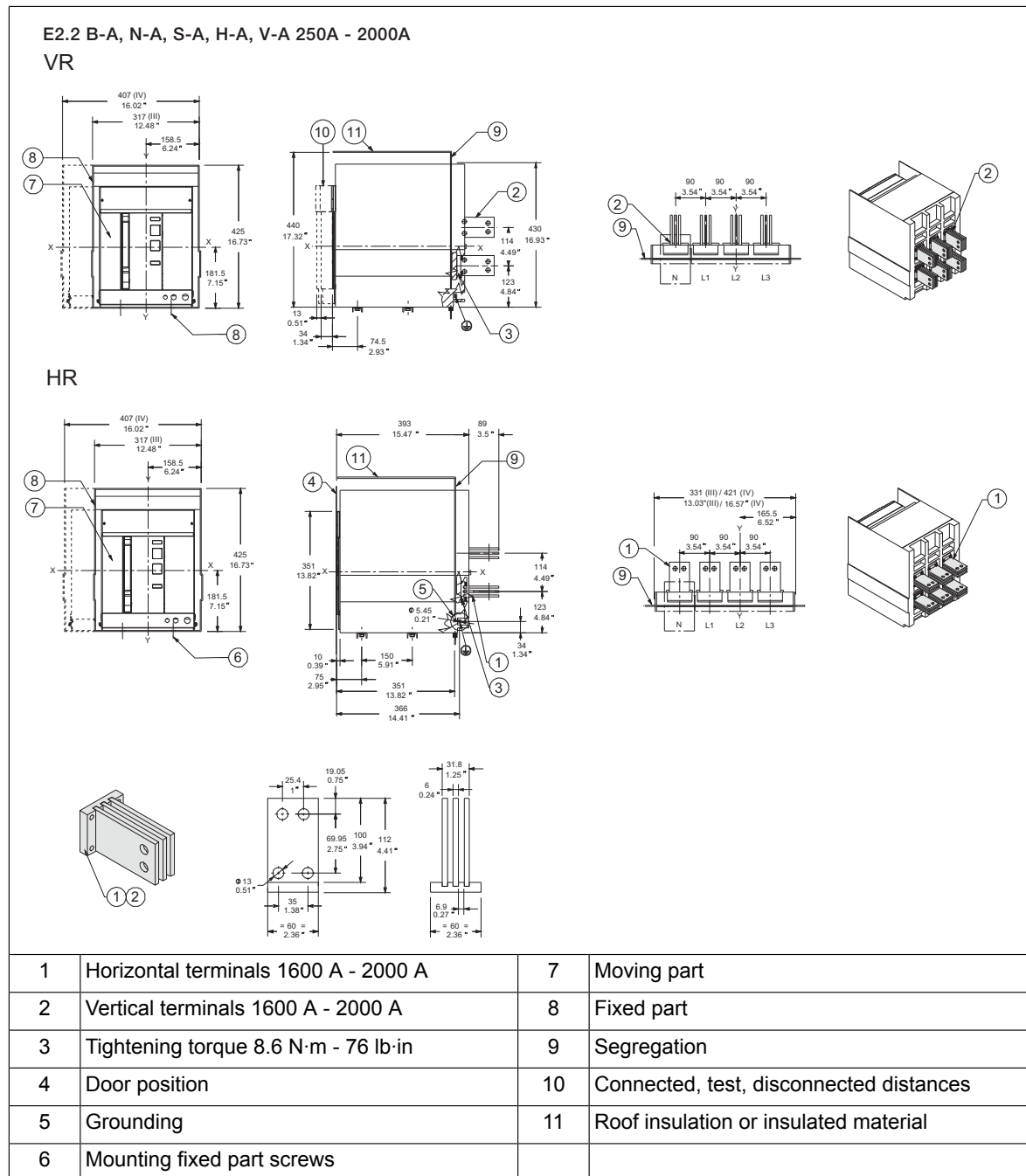
■ 170M6545, 170M6547



1 mm = 0.0394 in
www.cooperindustries.com

Air circuit breakers

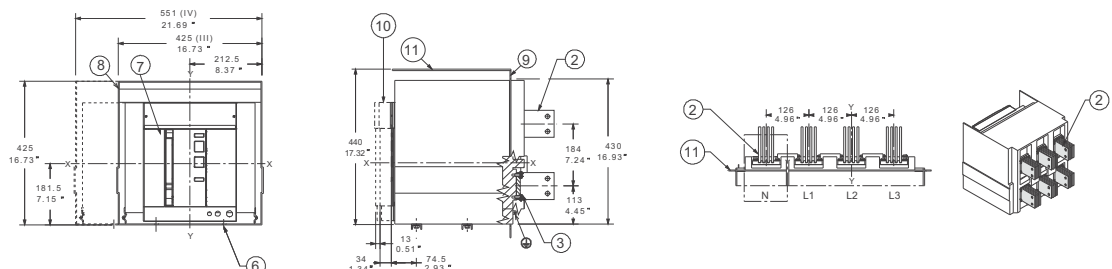
E2.2S-A (UL/CSA/IEC)



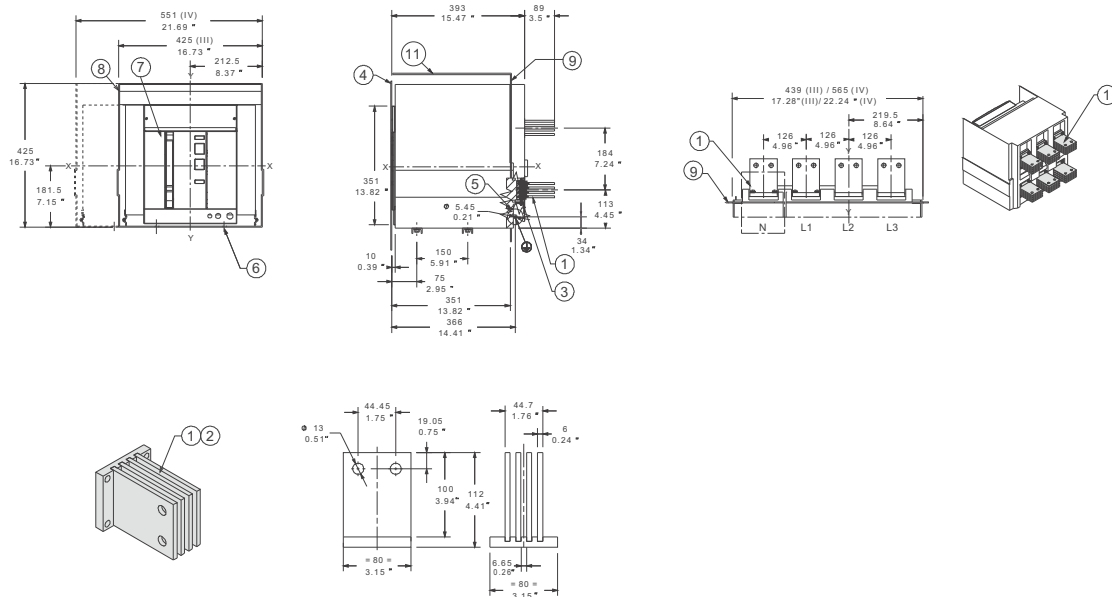
■ E4.2S-A (UL/CSA/IEC)

E4.2 S-A, H-A, V-A 800A - 2500A

VR



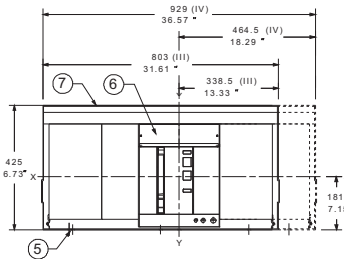
HR



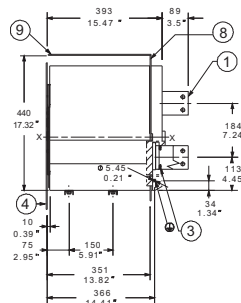
1	Horizontal terminals 2500 A	7	Moving part
2	Vertical terminals 2500 A	8	Fixed part
3	Tightening torque 20 N·m - 177 lb·in	9	Segregation
4	Door position	10	Connected, test, disconnected distances
5	Grounding	11	Roof insulation or insulated material
6	Mounting fixed part screws		

E6.2V-A (UL/CSA/IEC)

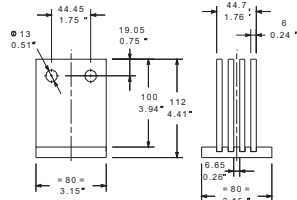
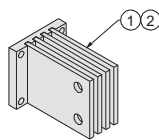
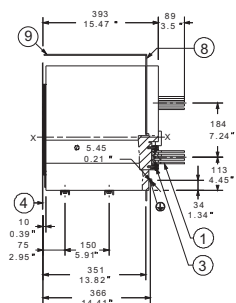
E6.2 H-A, V-A, L-A 4000A - 5000A



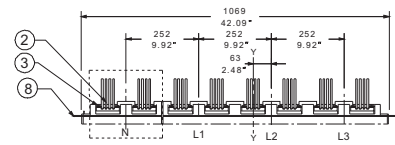
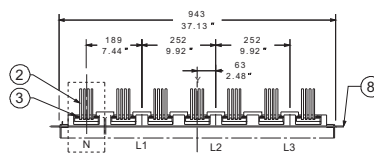
VR



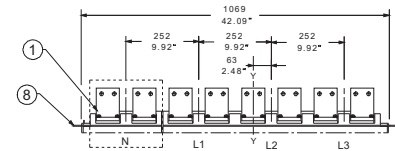
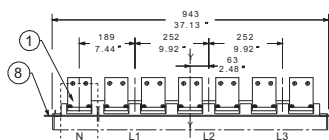
HR



VR adjustment



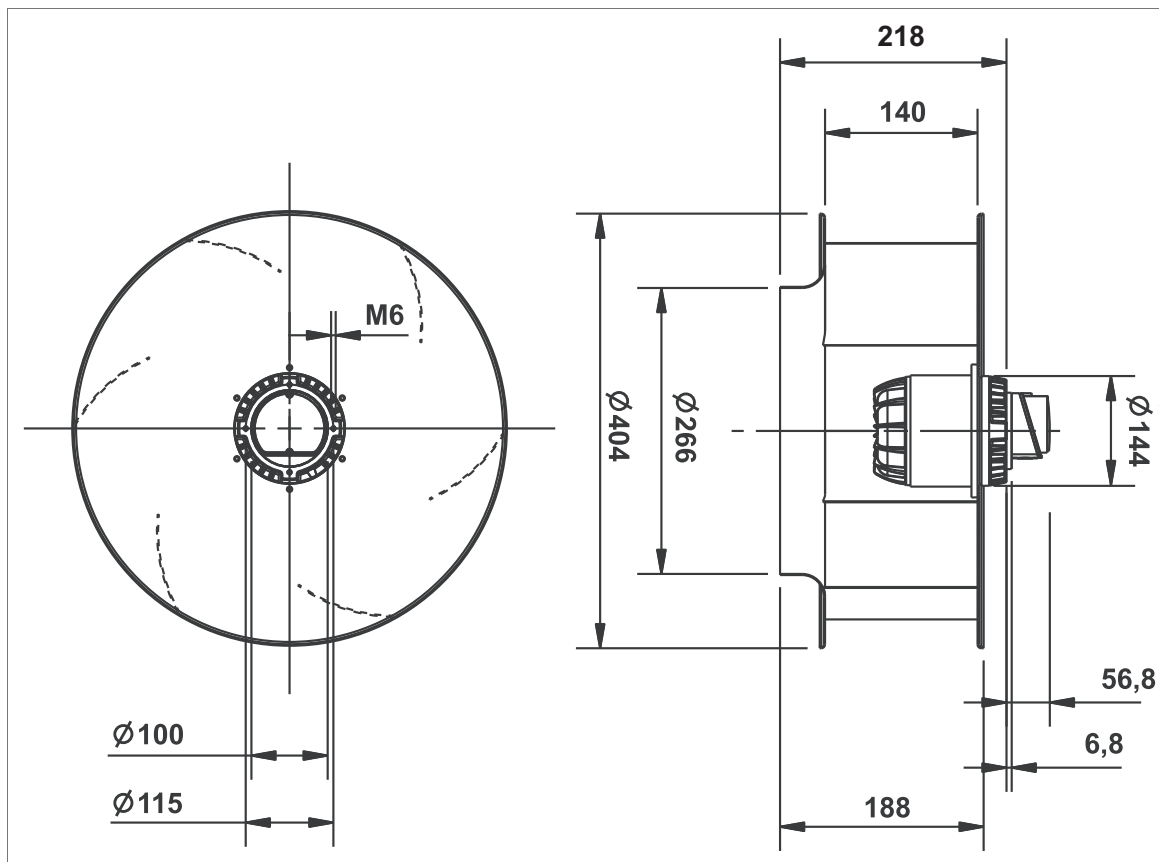
HR adjustment



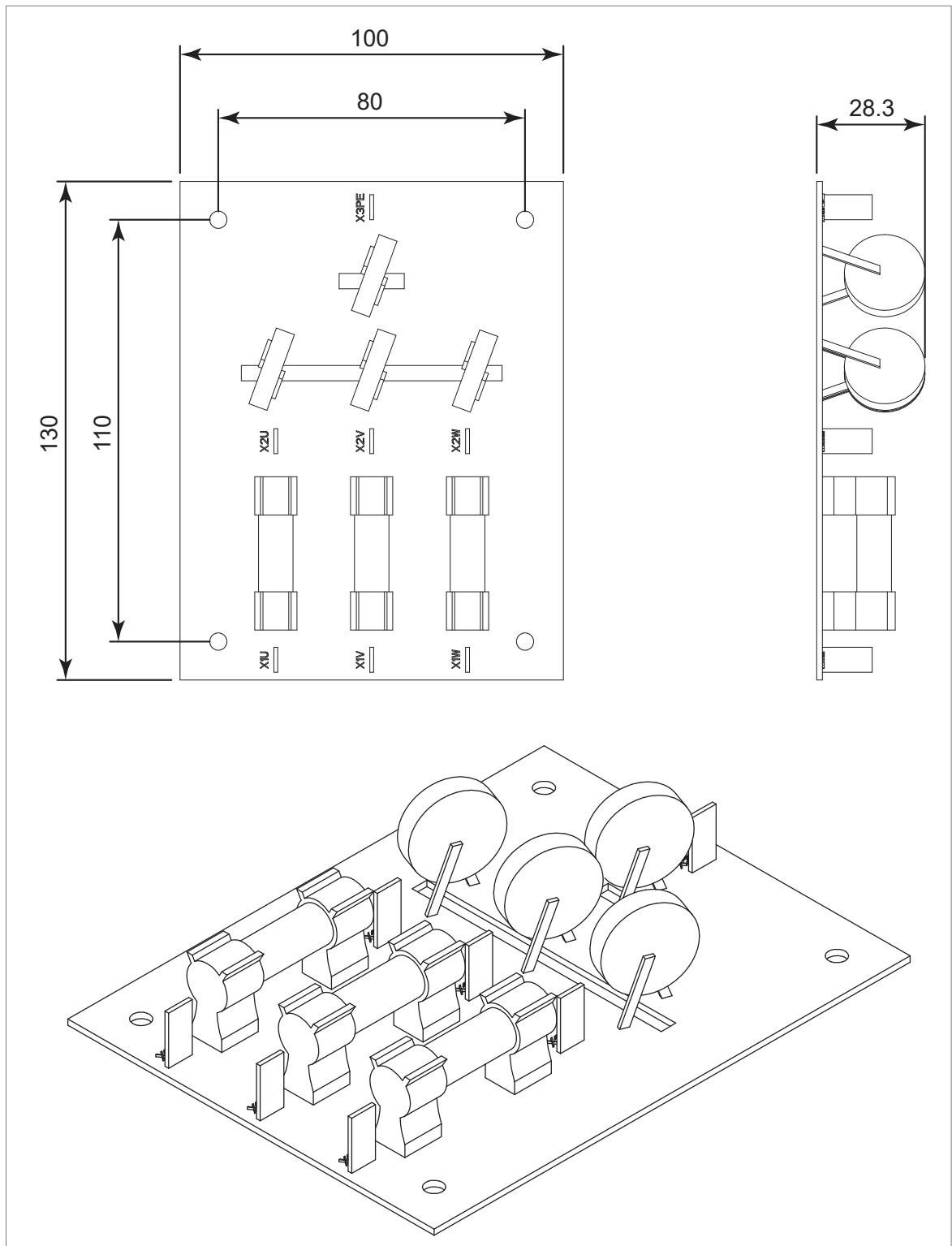
1	Horizontal terminals 5000 A	6	Moving part
2	Vertical terminals 5000 A	7	Fixed part
3	Tightening torque 20 N·m - 177 lb·in	8	Segregation
4	Door position	9	Roof insulation or insulated material
5	Mounting fixed part screws M8×25 provided Tightening torque 20·Nm - 177 lb·in		

Miscellaneous components

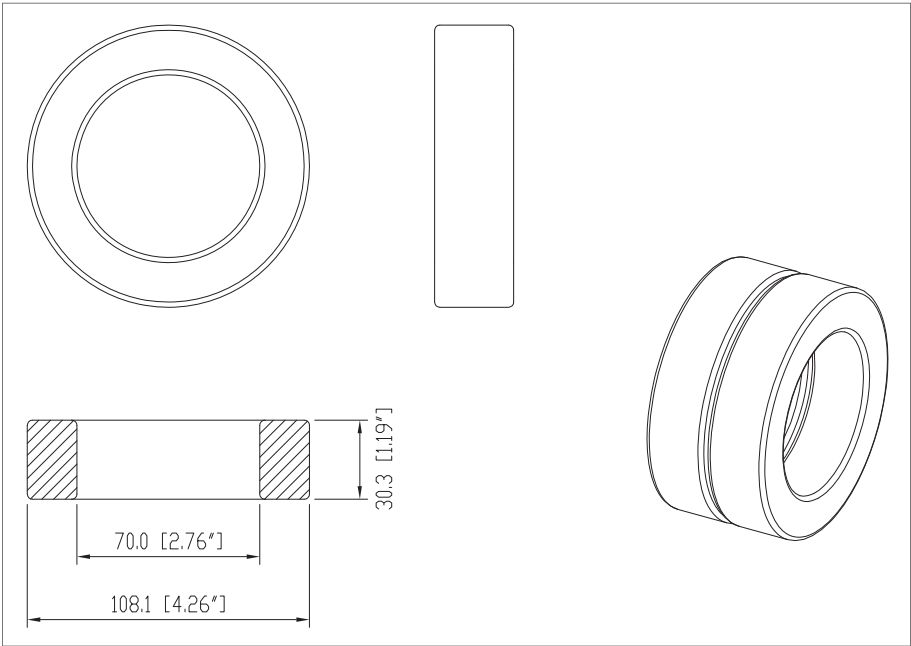
■ CRBB/4-400/188 cooling fan



■ CVAR board



■ Common mode filter



13. Example circuit diagrams

Contents of this chapter

This chapter contains example circuit diagrams of a regenerative rectifier module.

The purpose of these diagrams is to help in:

- understanding the internal connections and operation of the cabinet-installed drive with a regenerative rectifier unit, and
- learning how to wire (ACS880-904-0900A-3+C183+C188, ACS880-904-3460A-7+C183+C188) regenerative rectifier modules when installed in a user-defined cabinet.

Component designations used in the diagrams

■ 1×R8i circuit diagrams

The 1×R8i circuit diagrams include:

Designation	Component
A1	CVAR board for UL/CSA installations only
A51	BCU control unit
A58	DDPI board, included in door mounting kit for control panel
A59	ACS-AP-x control panel
F1.x	Main AC fuses for protecting the input cable and module
F2.x	DC fuses
G24	Incoming cubicle fan for cooling the AC fuses
Q1	Main switch-disconnector
Q2	Main contactor
Q21	Auxiliary voltage switch with fuses
R03	L-filter module (BL-15-7)
S21	Operating switch
T01.x	Frame R8i regenerative rectifier module(s)
T21	Auxiliary voltage transformer

The 1×R8i circuit diagrams also include an example of auxiliary voltage distribution.

■ 4×R8i circuit diagrams

The 4×R8i circuit diagrams include:

Designation	Component
A1	CVAR board for UL/CSA installations only
A51	BCU control unit
A58	DDPI board, included in door mounting kit for control panel
A59	ACS-AP-x control panel
F2.x	DC fuses

Designation	Component
F3.x	AC fuses for protecting the module
G24	Incoming cubicle fan for cooling the AC fuses
Q1	Main circuit breaker (air circuit breaker)
Q21	Auxiliary voltage switch with fuses
R03	L-filter module (BL-15-7)
S21	Operating switch
T01.x	Frame R8i regenerative rectifier module(s)
T111	3-phase DOL fan supply
T21	Auxiliary voltage transformer

The R8i circuit diagrams also include:

- an example of auxiliary voltage distribution
- DC capacitor charging circuit.

■ Differences of 1×R8i and 4×R8i circuit diagrams

The main difference between 1×R8i and 4×R8i is that in 4×R8i, the main AC fuses [F1.x], main switch-disconnector [Q1] and main contactor [Q2] are replaced with one component, main circuit breaker [Q1].

The ACS880-BL-15-7+C188 filter (for 1×R8i) has a 1-phase DOL fan, the ACS880-BL-25-7+C188 filter (for 4×R8i) has a 3-phase DOL fan (sheet 5). The diagrams of 1×R8i describe a rectifier module with the standard speed-controlled fan and the diagrams of 4×R8i describe rectifier modules with option +C188 (DOL fan).

Circuit diagram set contents

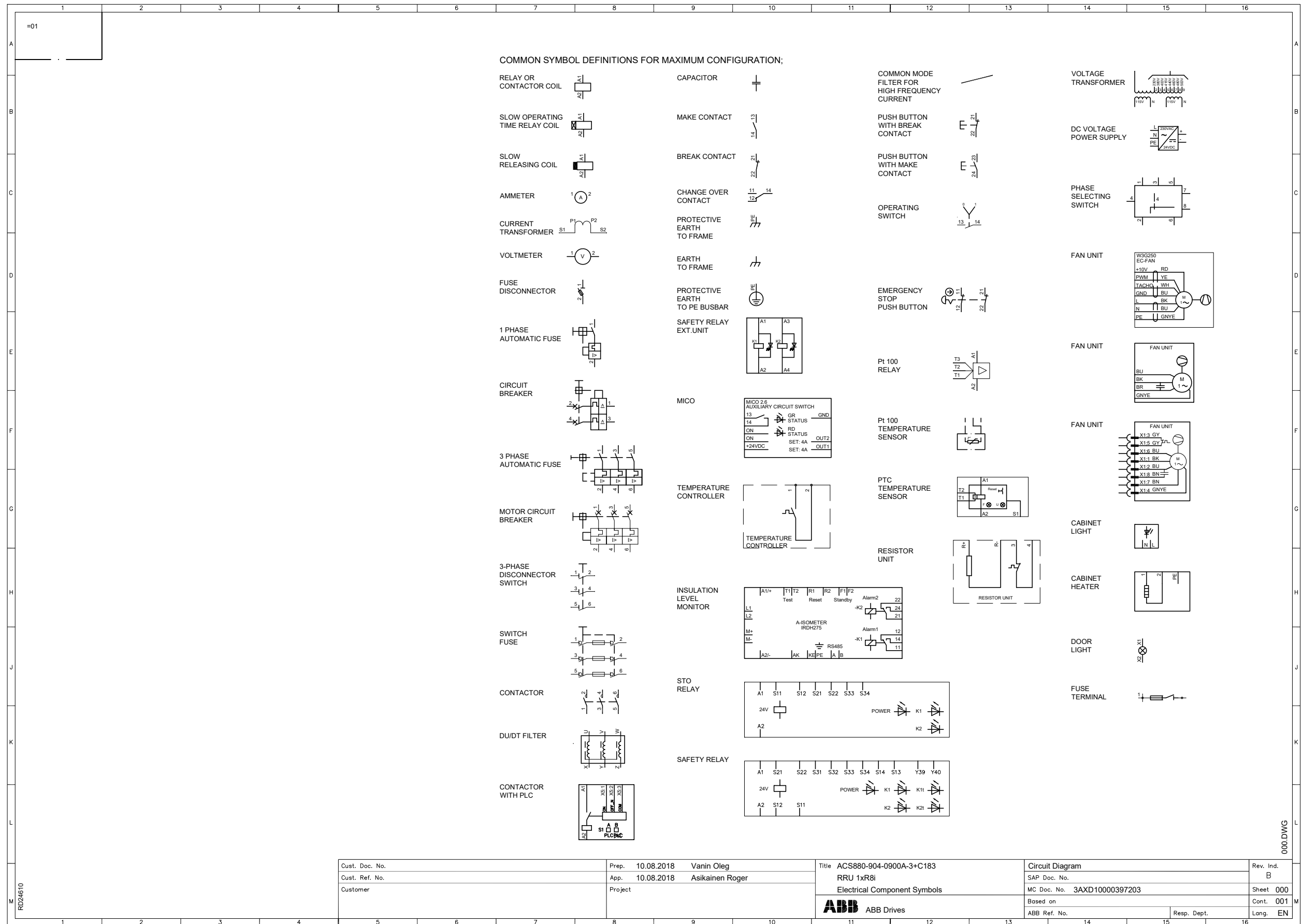
The contents of each circuit diagram set are listed below:

ACS880-904 RRU 1×R8i (3AXD10000397203)

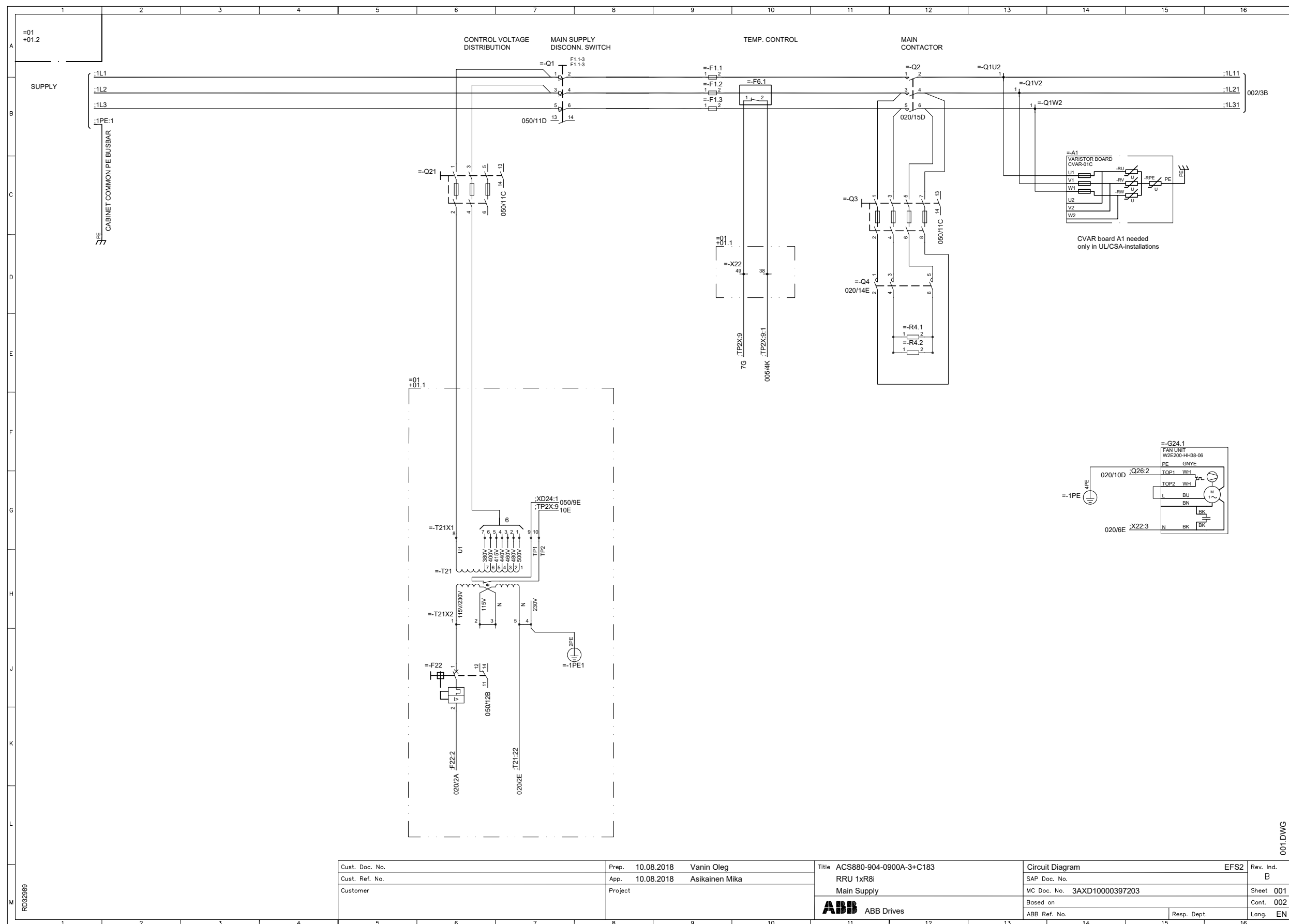
- Main switch disconnector
- Charging circuit
- L-filter (BL-15-7), R8i modules
- Module heaters (+C183)
- Internal auxiliary voltage distribution
- Control unit BCU-02
- Control panel

ACS880-904 RRU 4×R8i (3AXD10000371494)

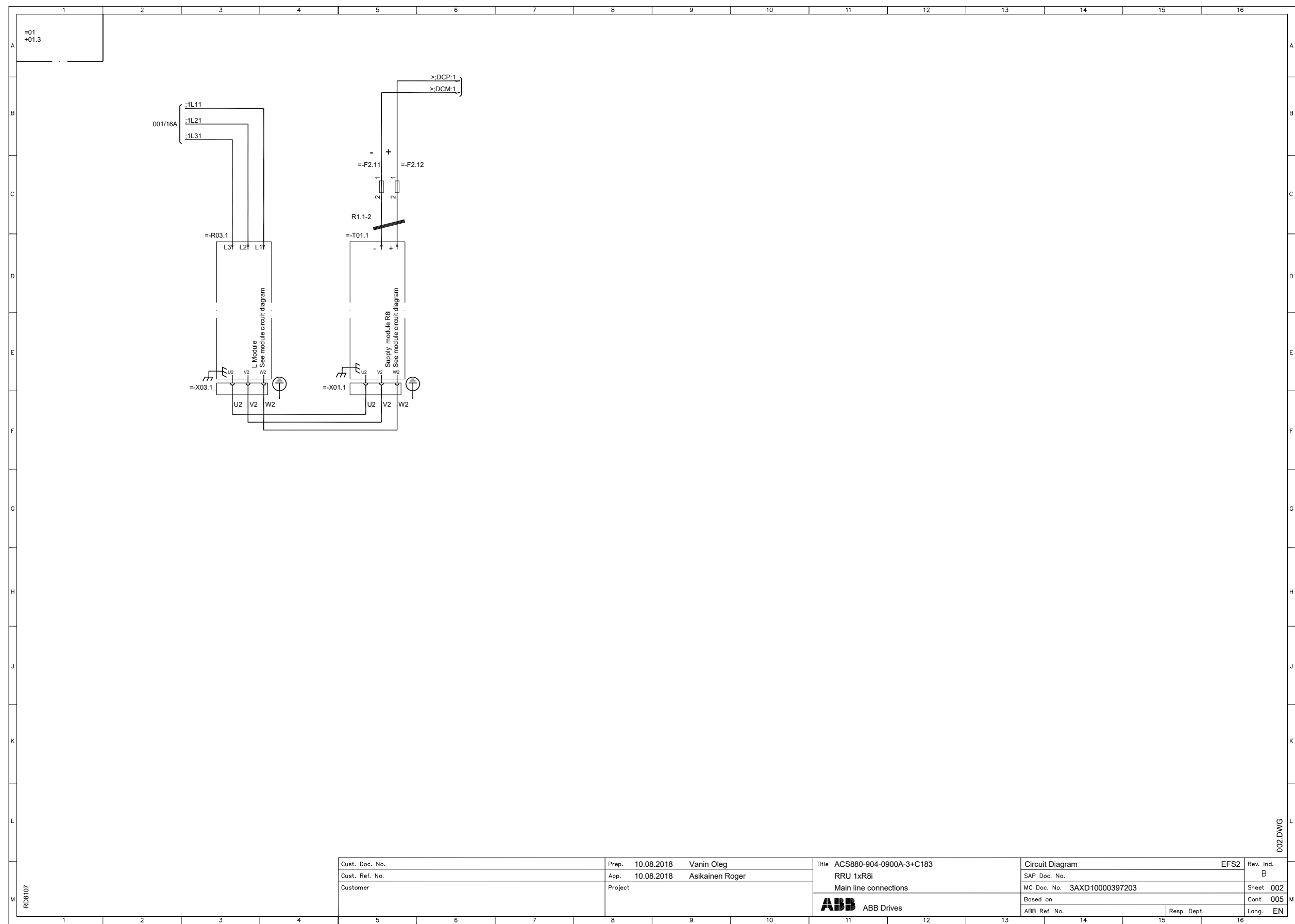
- Main air circuit breaker
- Charging circuit
- L-filters (BL-15-7), R8i modules
- Module heaters (+C183)
- Module DOL fan supply (+C188)
- Internal auxiliary voltage distribution
- Control unit BCU-02
- Control panel



Frame 1xR8i – Main supply (sheet 001)

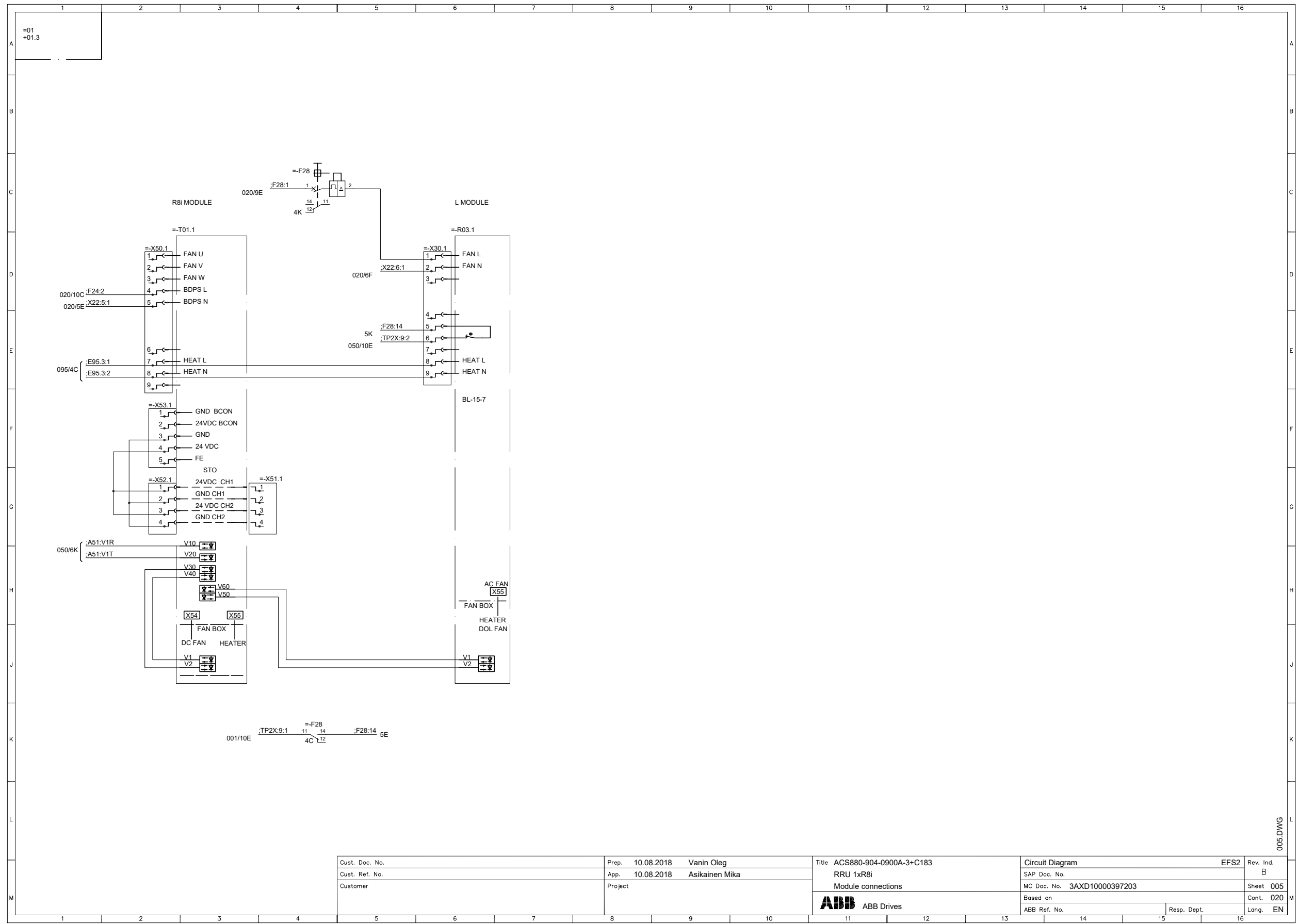


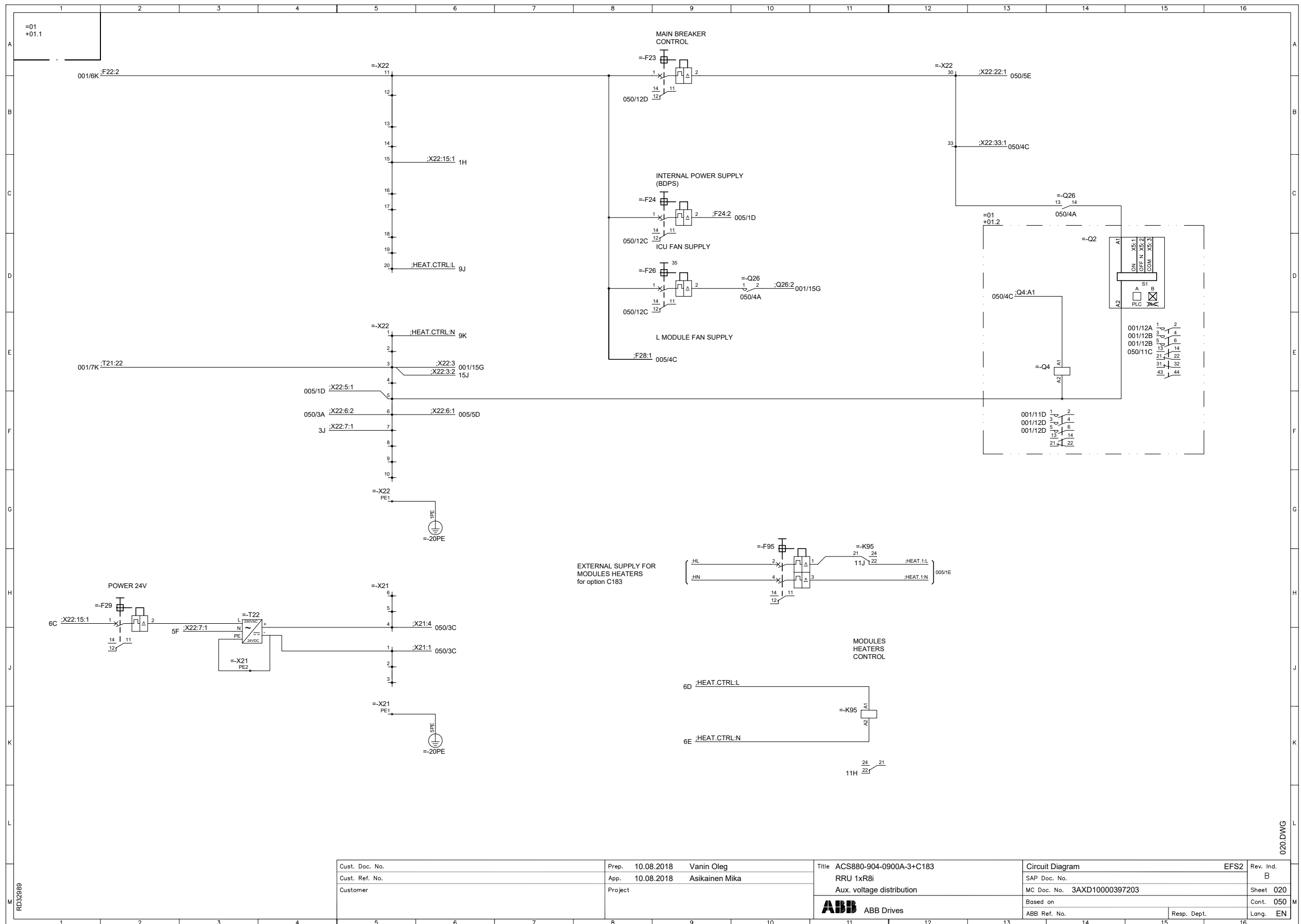
Frame 1×R8i – Main line connections (sheet 002)



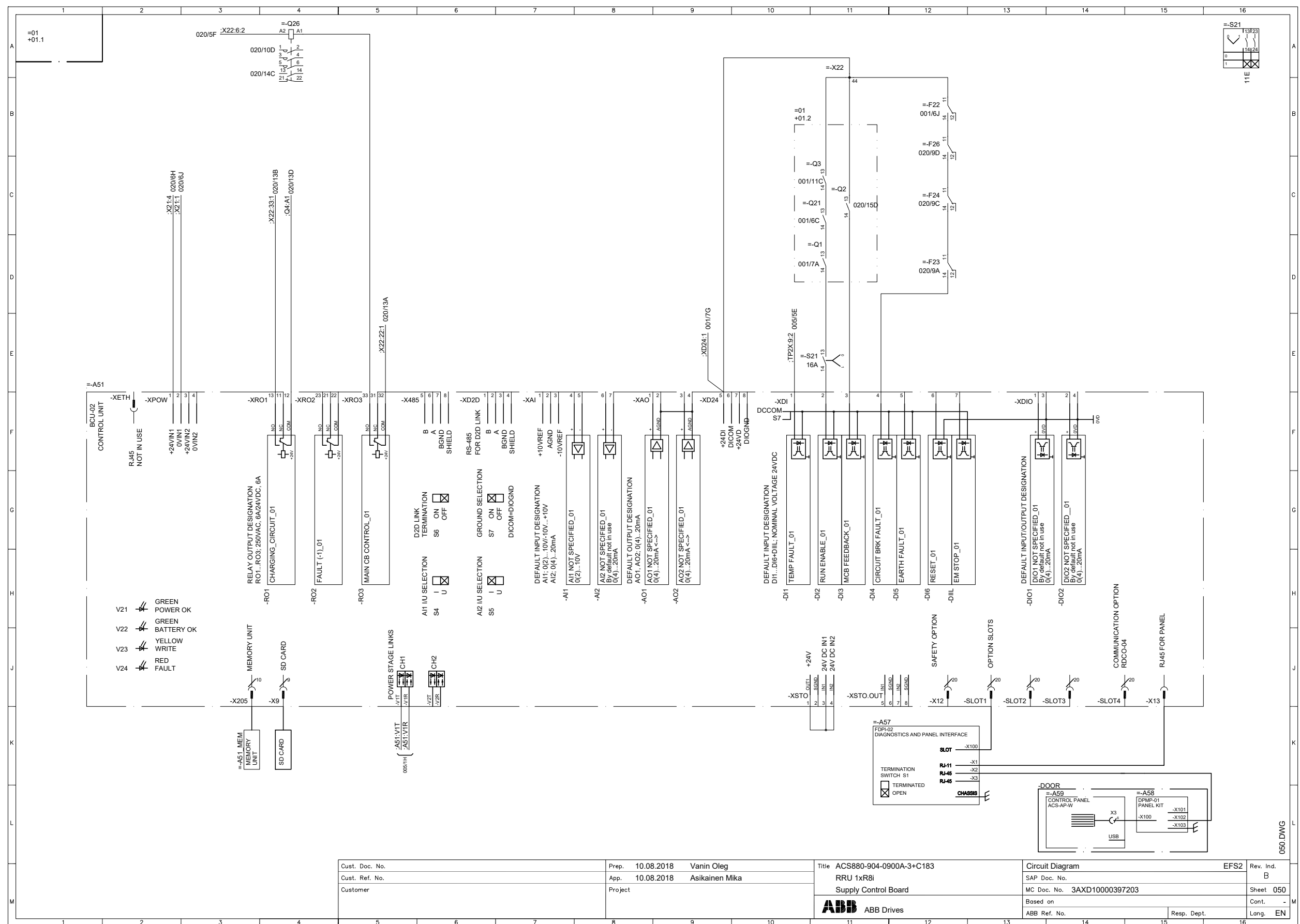
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Cust. Ref. No.	App. 10.08.2018 Asikainen Roger	RRU 1xR8i	SAP Doc. No.		
Customer	Project	Main line connections	MC Doc. No.	3AXD10000397203	Sheet 002
		ABB ABB Drives	Based on		Cont. 005
			ABB Ref. No.	Resp. Dept.	Lang. EN

Frame 1xR8i – Module connections (sheet 005)

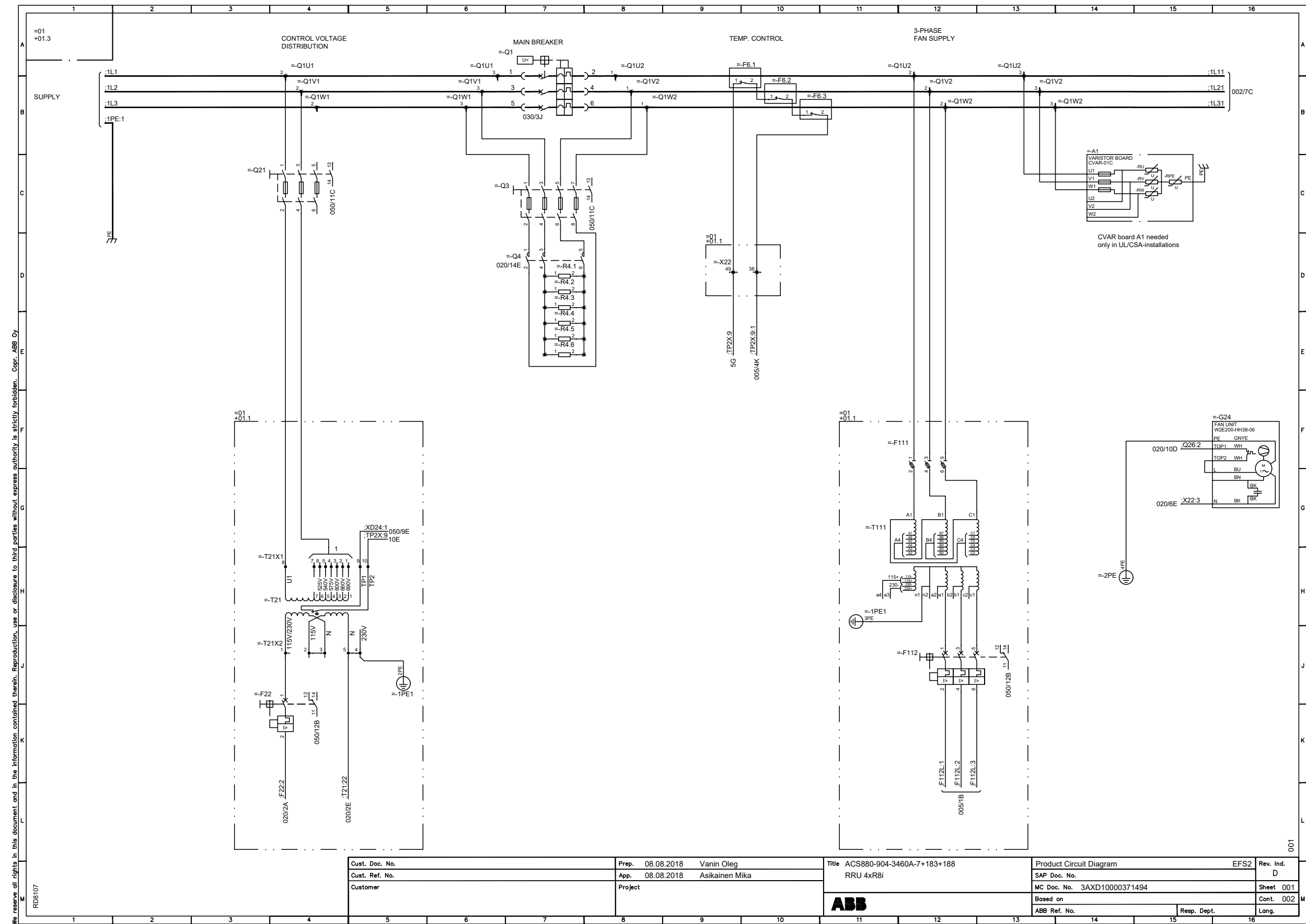




Frame 1×R8i – Control unit (sheet 050)

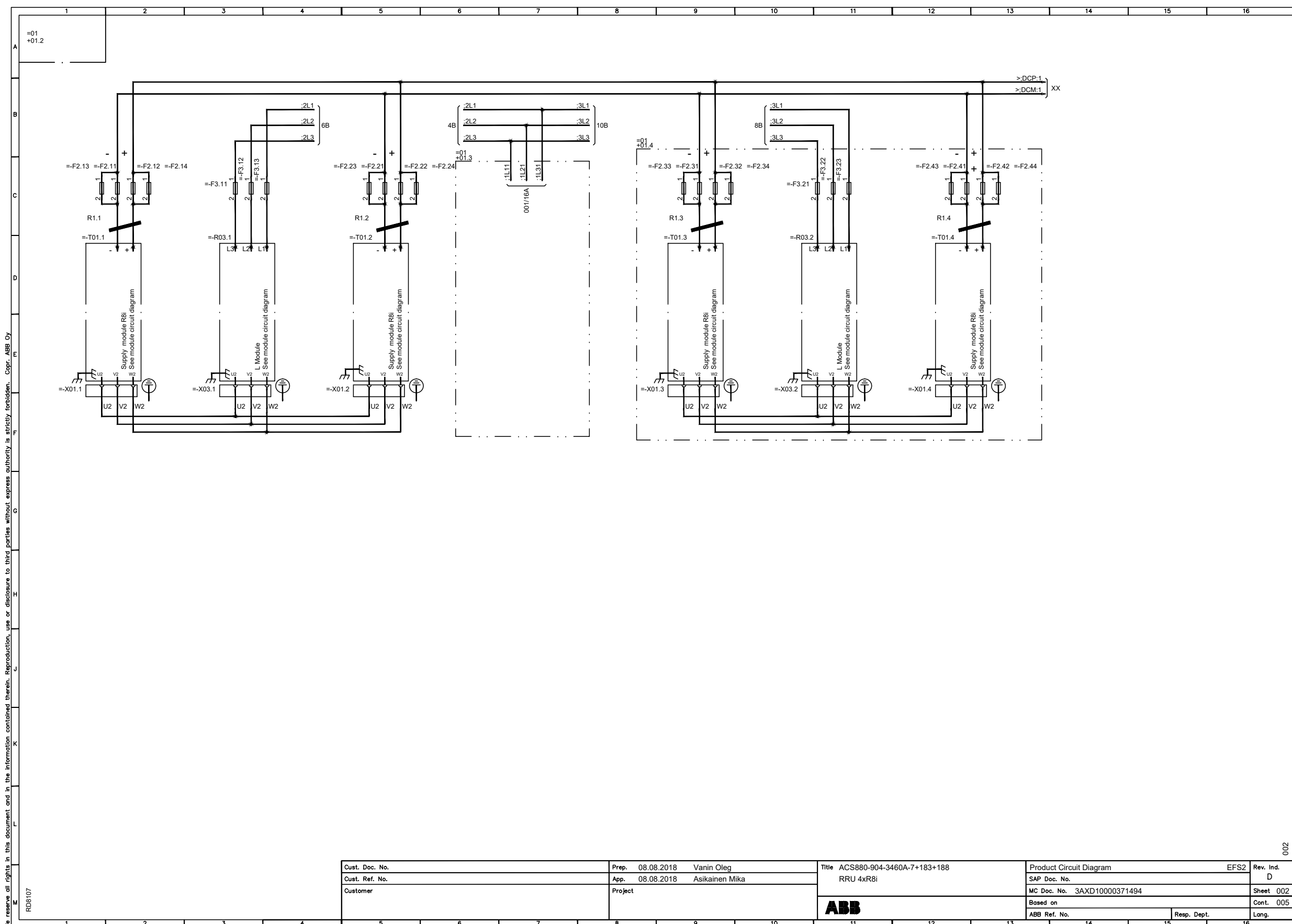


Frame 4×R8i – Main supply (sheet 001)

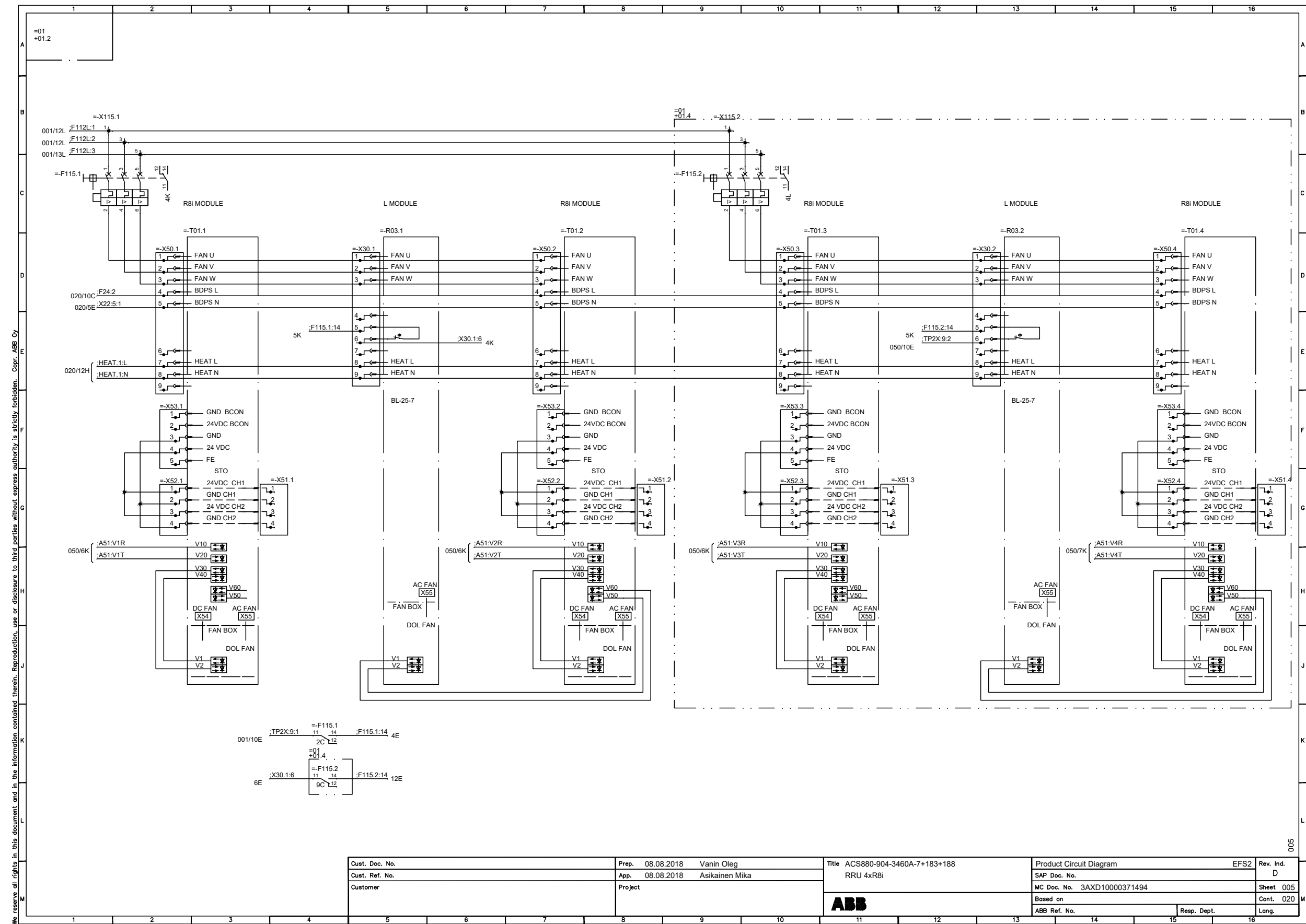


Cust. Doc. No.	Prep. 08.08.2018 Vanin Oleg	Title ACS880-904-3460A-7+183+188	Product Circuit Diagram	Rev. Ind.
Cust. Ref. No.	App. 08.08.2018 Asikainen Mika	RRU 4xR8i	SAP Doc. No.	D
Customer	Project	ABB	MC Doc. No. 3AXD10000371494	Sheet 001
			Based on	Cont. 002
			ABB Ref. No.	Lang.
			Resp. Dept.	

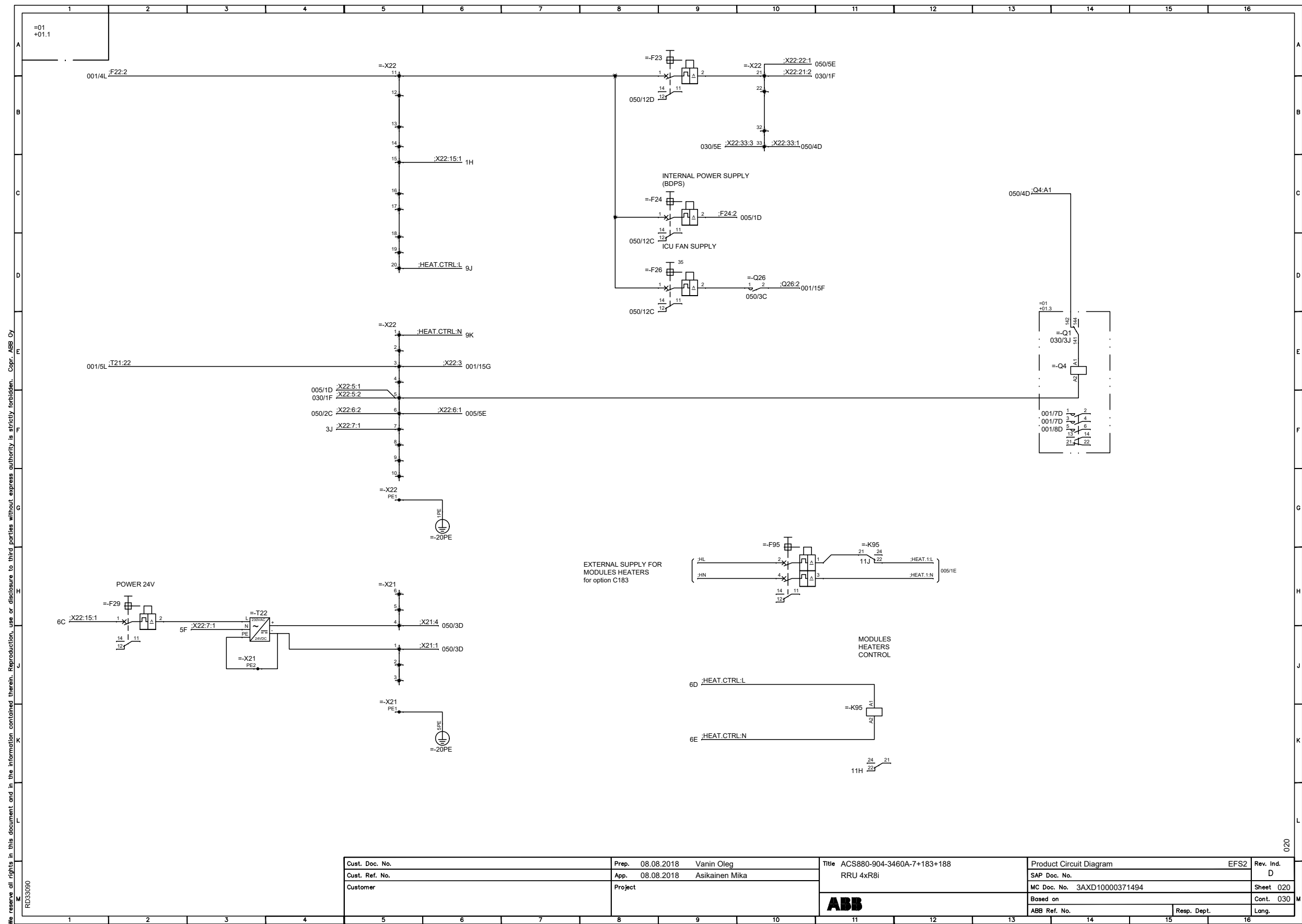
Frame 4xR8i – Main line connections (sheet 002)



Frame 4×R8i – Module connections (sheet 005)

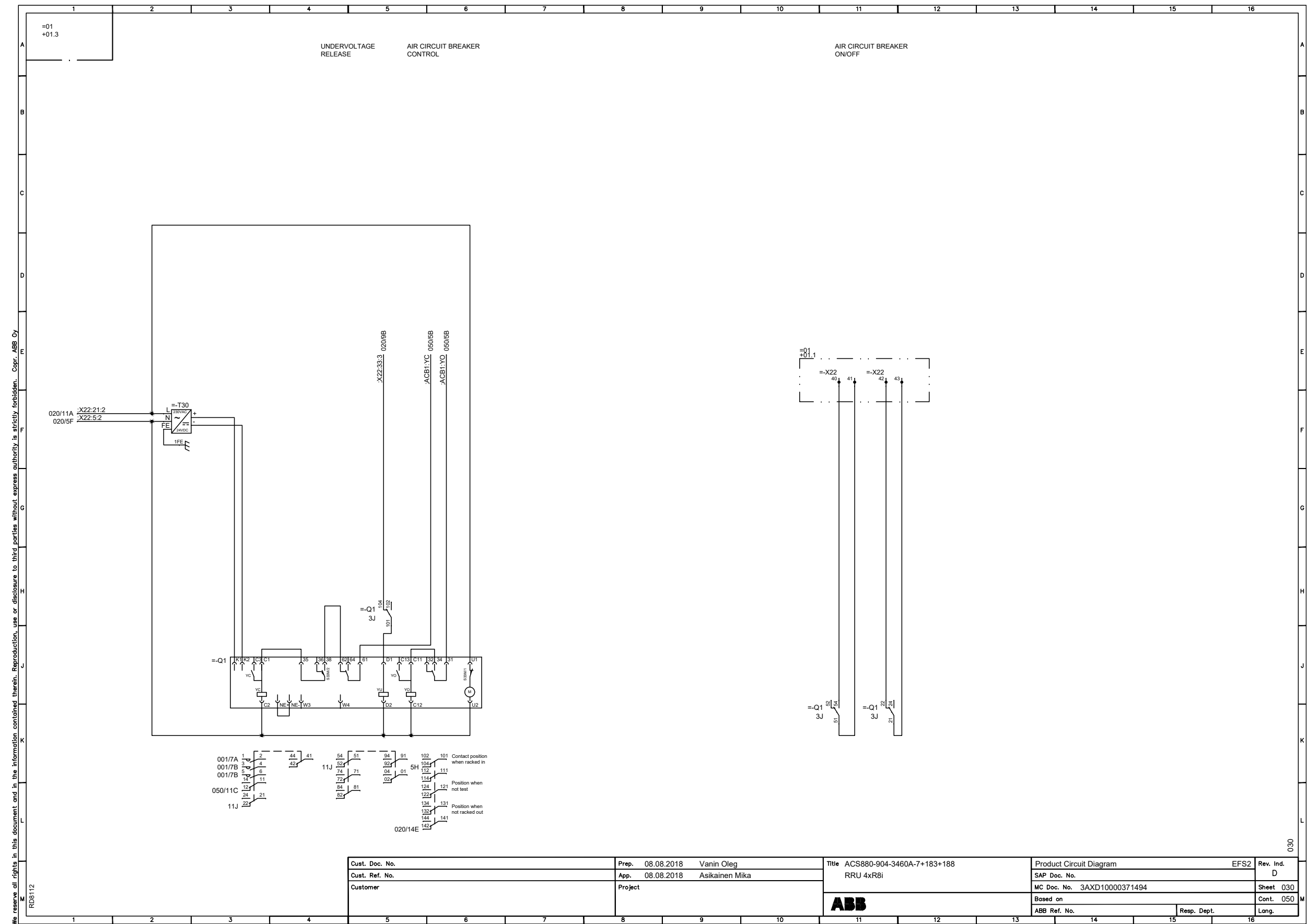


Frame 4xR8i – Auxiliary voltage distribution (sheet 020)

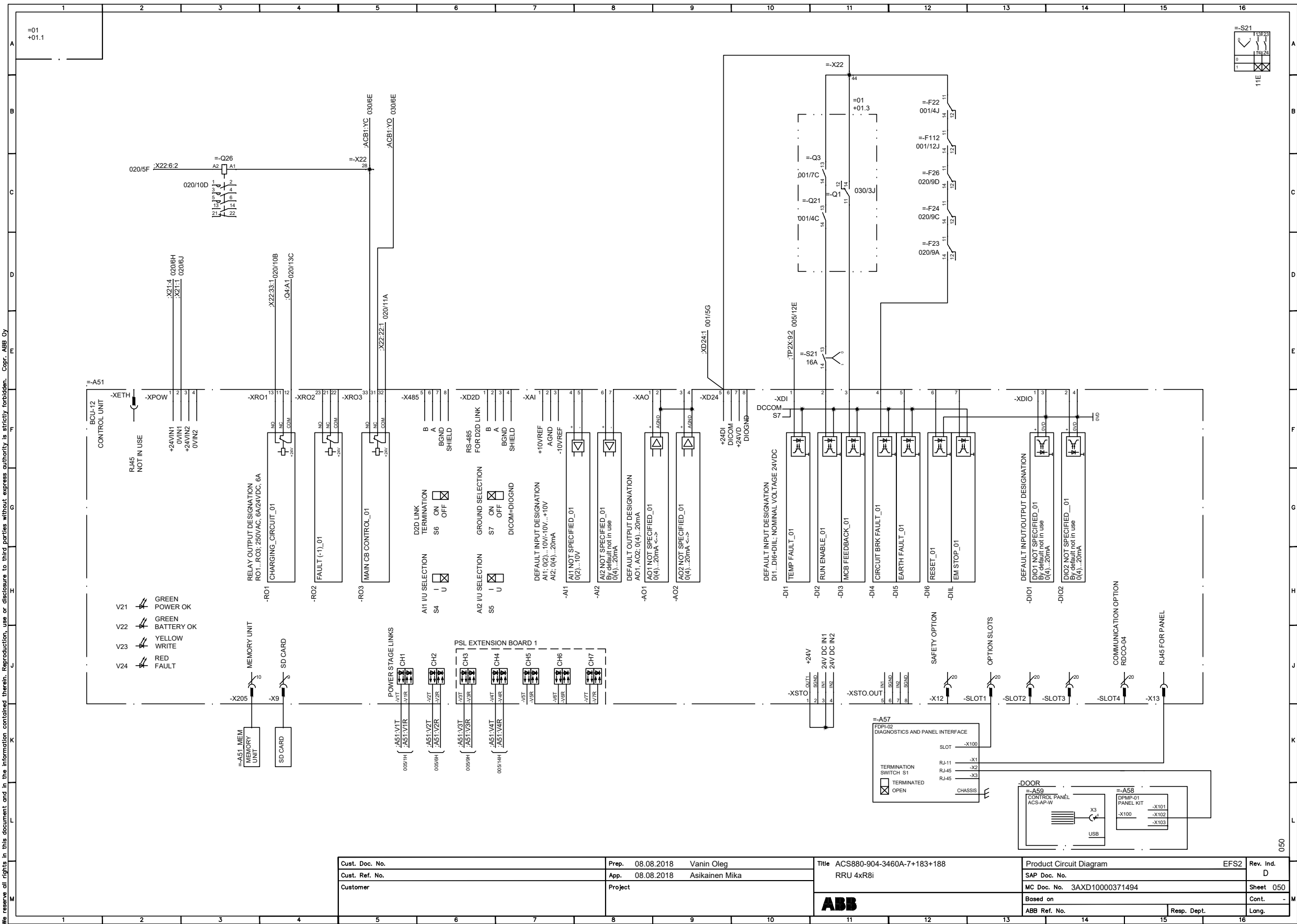


Cust. Doc. No.	Prep. 08.08.2018 Vanin Oleg	Title ACS880-904-3460A-7+183+188	Product Circuit Diagram	EFS2	Rev. Ind.
Cust. Ref. No.	App. 08.08.2018 Asikainen Mika	RRU 4xR8i	SAP Doc. No.		D
Customer	Project	ABB	MC Doc. No. 3AXD10000371494		Sheet 020
			Based on		Cont. 030
			ABB Ref. No.	Resp. Dept.	Lang.

Frame 4×R8i – Main circuit breaker control (sheet 030)



Frame 4xR8i – Control unit (sheet 050)



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.

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3AXD50000020457E