ABB INDUSTRIAL DRIVES

ACS880-14 and -34 single drive module packages (160 to 2200 kW)

Hardware manual

List of related manuals

General manuals	Code (English)
Safety instructions for ACS880 multidrive cabinets and modules	3AUA0000102301
Electrical planning instructions for ACS880 multidrive cabinets and modules	3AUA0000102324
Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules	3AUA0000107668
Supply module manuals	
ACS880-204 IGBT supply modules hardware manual	3AUA0000131525
ACS880 IGBT supply control program firmware manual	3AUA0000131562
ACS880-304 +A003 diode supply modules hardware manual	3AUA0000102452
ACS880-304 +A018 diode supply modules hardware manual	3AXD50000010104
ACS880 diode supply control program firmware manual	3AUA0000103295
ACS880-904 regenerative rectifier modules hardware manual	3AXD50000020457
ACS880 regenerative rectifier control program firmware manual	3AXD50000020827
Inverter module manuals	
ACS880-104 inverter modules hardware manual	3AUA0000104271
ACS880 primary control program firmware manual	3AUA0000085967
ACS880 primary control program quick start-up guide	3AUA0000098062
Manuals for application programs (Crane, Winder, etc.)	
Brake module and DC/DC converter module manuals	
ACS880-604 1-phase brake chopper units as modules hardware manual	3AUA0000106244
ACS880-604 3-phase brake modules hardware manual	3AXD50000022033
ACS880 brake control program firmware manual	3AXD50000020967
ACS880-1604 DC/DC converter modules hardware manual	3AXD50000023642
ACS880 DC/DC converter control program firmware manual	3AXD50000024671
Module package hardware manuals	
ACS880-04 single drive module packages (560 to 2200 kW) hardware manual	3AUA0000138495
ACS880-14 and -34 single drive module packages (160 to 2200 kW) hardware manual	3AXD50000022021
Option manuals and guides	
ACS880 +C132 marine type-approved drive modules and module packages supplement	3AXD50000037752
ACX-AP-x assistant control panels user's manual	3AUA0000085685
Drive composer start-up and maintenance PC tool user's manual	3AUA0000094606
Installation frames for ACS880 multidrive modules hardware manual	3AXD50000010531
FDPI-02 diagnostics and panel interface user's manual	3AUA0000113618
Manuals and quick guides for I/O extension modules, fieldbus adapters, safety options etc.	

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

Hardware manual

ACS880-14 and -34 single drive module packages (160 to 2200 kW)

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Introduction to the manual

Contents of this chapter

This chapter gives basic information on the manual.

Applicability

The manual is applicable to ACS880-14 and ACS880-34 single drive module packages used for user-defined cabinet installations.

Safety instructions

Follow all safety instructions delivered with the drive.

- Read the **complete safety instructions** before you install, commission, use or service the drive. The complete safety instructions are given in *ACS880 multidrive and multidrive modules safety instructions* (3AUA0000102301 [English]).
- Read the **task-specific safety instructions** before starting the task. See the section describing the task.

Target audience

This manual is intended for people who install, start-up, use and service ACS880-14 and ACS880-34 single drive module packages. Read the manual before working on the modules. You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

Contents of the manual

- *Operation principle and hardware description*
- *Moving and unpacking the modules*
- *Cabinet construction*
- *Electrical installation*
- *Installation checklist*
- *Start-up*
- *Maintenance*
- *Ordering information*
- *Technical data*
- *Control units of the drive*
- *The Safe torque off function*
- *Dimension drawings*
- *Example circuit diagrams*.

Related documents

User documentation of the delivery includes a USB memory stick with all manuals of the product series.

You can find instructions on equipment kits on the Internet. Go to https://sites-apps.abb.com/sites/lvacdrivesengineeringsupport/content.

For other manuals, see the inside of the front cover. If needed, contact your local ABB representative.

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.

The ACS880-14 and -34 size can be identified from the basic code, for example, ACS880-14-0620A-3 where 0620A is the size. The option codes are listed after the plus sign. Section *Type designation key* on page *44* explains the type designation code in detail.

The frame size of the supply and inverter module is R8i. The *Ratings* table on page *285* lists the frame sizes.

Use of component designations

Some device names in the manual include the component designations in brackets, for example [Q1] to make it possible to identify the components in the circuit diagrams of the drive.

Terms and abbreviations

Term/Abbreviation	Description
BCON	Type of a control board
BCU	Type of a control unit (contains BCON)
BDFC	DOL fan control board. For more information, see the diagram in *Module fiber optic connectors*.
BDPS	Type of the module internal power supply board. BDPS board is a double fed (AC/DC) power supply, which internally powers up the circuit boards of the module. The board switches between AC and DC supply automatically. The board switches from external AC supply to internal DC supply always when the DC voltage level is above 300 V DC.
BFPS	Type of a power supply and control board for the speed-controlled cooling fans of frame R8i IGBT supply modules. The BFPS board is located below the module cooling fan. For more information, see the diagram in *Module fiber optic connectors*.
Brake chopper	Conducts the surplus energy from the intermediate circuit of the drive to the brake resistor when necessary. The chopper operates when the DC link voltage exceeds certain maximum limit. The voltage rise is typically caused by deceleration (braking) of a high inertia motor.
Control board	Circuit board in which the control program runs.
Control unit	Control board built in a rail-mountable housing
Cubicle	One section of a cabinet-installed drive. A cubicle is typically behind a door of its own.
CVAR	Varistor board (for UL/CSA installations)
DC link	DC circuit between rectifier and inverter
DDCS	Distributed drives communication system; a protocol used in optical fiber communication
DI	Digital input
DPMP	Optional mounting platform for door mounting of control panel
Drive	Frequency converter for controlling AC motors
EMC	Electromagnetic compatibility
FCAN-01	Optional CANopen® adapter module
FCNA-01	Optional ControlNet™ adapter module
FDCO-01	Optional DDCS communication module
FDNA-01	Optional DeviceNet™ adapter module
FDPI-02	Diagnostics and panel interface
FEA-03	Optional option module extension adapter
FECA-01	Optional EtherCAT® adapter module
FENA-11	Optional EtherNet/IP™, Modbus TCP® and PROFINET IO® adapter module
FENA-21	Optional high-performance EtherNet/IP, Modbus TCP and PROFINET IO adapter module, 2-port (check availability with your local ABB representative)
FEPL-01	FEPL-01 Ethernet POWERLINK adapter module

Term/Abbreviation	Description
FIO-01	Optional digital I/O extension module
FIO-11	Optional analog I/O extension module
Flat-PLS	Rittal Flat-PLS, a busbar system for standard, commercially available flat bars
FPBA-01	Optional PROFIBUS DP® adapter module
Frame (size)	Refers to power modules that share a similar mechanical construction, for example: • IGBT supply modules of frame R8i • frame 2×R8i includes two size R8i IGBT supply modules. To determine the frame size of a component, refer to the rating tables in chapter *Technical data*.
FSCA-01	Optional Modbus RTU adapter module
FSO-xx	Safety functions module for inverter modules
Generic enclosure	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 modifications and/or additional parts to be fully usable.
I/O	Input/Output
ICU	In cabinet-installed drives, ICU is the incoming unit (cubicle) which contains main circuit breaker and the busbars for the input power cable.
IGBT	Insulated gate bipolar transistor
Intermediate circuit	See *DC link*.
INU	*Inverter unit*
Inverter	Converts direct current and voltage to alternating current and voltage.
Inverter module	Inverter bridge, related components and drive DC link capacitors enclosed inside a metal frame or enclosure. Intended for cabinet installation.
Inverter unit	Inverter module(s) under control of one control board, and related components. One inverter unit typically controls one motor. See *Inverter module*.
Main contactor	Electrically-controlled main switching device
Main switch-disconnector	Manually-controlled main switch/disconnector
Multidrive	Drive for controlling several motors which are typically coupled to the same machinery. Includes one supply unit, and one or several inverter units.
Parameter	User-adjustable operation instruction to the drive, or signal measured or calculated by the drive
PLC	Programmable logic controller
RDCO-0x	Optional DDCS communication module
Rectifier	Converts alternating current and voltage to direct current and voltage.
Single drive	Drive for controlling one motor
STO	Safe torque off function
Supply module	Rectifier and related components enclosed inside a metal frame or enclosure. Intended for cabinet installation.

Term/Abbreviation	Description
Supply unit	Part of the drive system that rectifies the AC supply voltage and outputs a DC voltage. The supply modules under control of one control board, and related components such as main contactor, fuses etc. See *Supply module*.
VX25	Enclosure system by Rittal (www.rittal.com)
ZMU	Type of a memory unit attached to the control unit

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Operation principle and hardware description

Contents of this chapter

This chapter describes the operation and the hardware of the ACS880-14 and -34 single drive module packages.

Operation principle

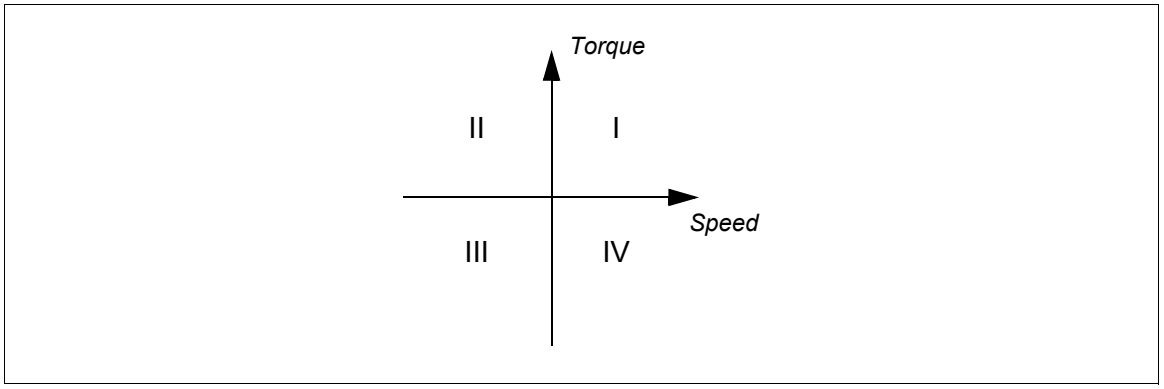
ACS880-14 and -34 single drive module packages consist of IGBT supply module(s) of type ACS880-204, frame size R8i, and of inverter modules of type ACS880-104, frame size R8i. The supply unit contains also LCL filter module(s).

Supply unit rectifies three-phase AC current to direct current for the intermediate DC link of the drive. The intermediate DC link supplies the inverters that run the motor. There can be one inverter unit only (single drives) or several inverter units (multidrives) connected to the intermediate circuit.

The LCL filter is an essential part of the IGBT supply module and it does not work without the filter. The IGBT supply module uses the filter to actively shape the AC line current to resemble sinusoidal waveform and to filter most of the current ripple at the switching frequency and higher frequencies. The IGBT supply module used with the filter produces a low-harmonic input current.

The ACS880-14

The ACS880-14 operates in four quadrants. Operation of a machine as a motor or generator in quadrants I, II, III and IV is shown below. In quadrants I and III, the machine operates as a motor, whereas in quadrants II and IV as a generator (regenerative braking).



The IGBT supply module is a four-quadrant switching-mode converter, ie, the power flow through the converter is reversible.

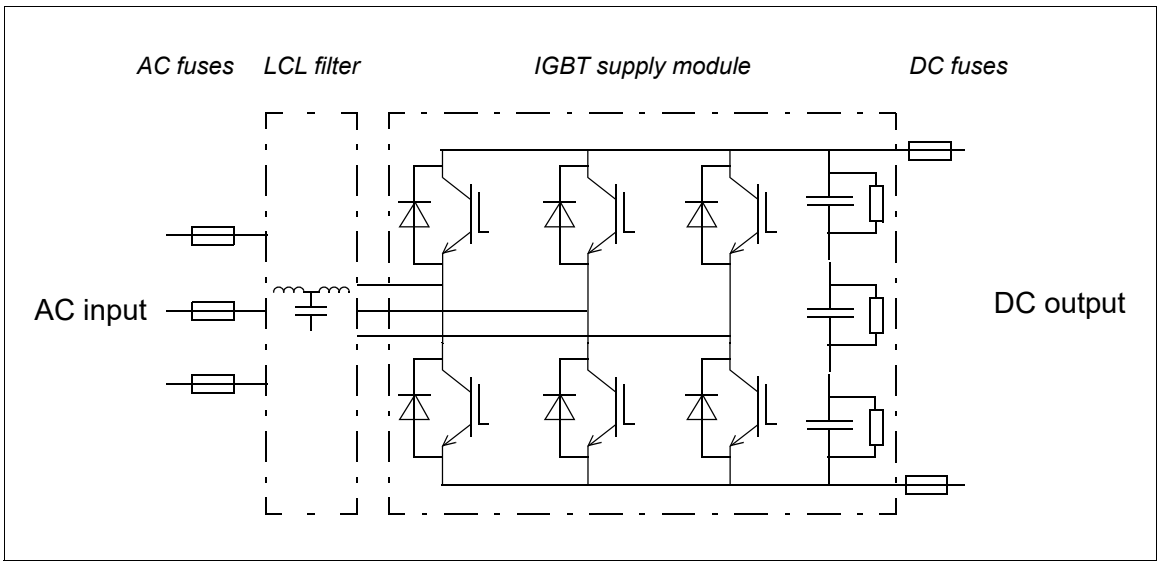
The ACS880-34

The ACS880-34 is an ultra-low harmonic single drive module package. It is not a regenerative drive.

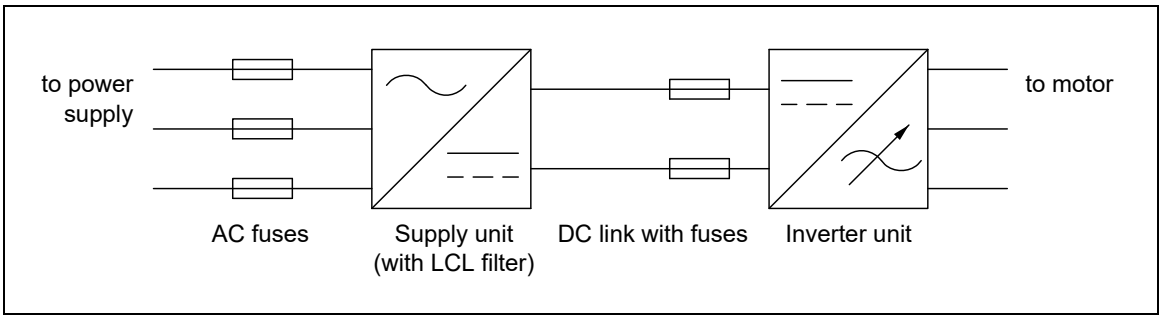
The supply module (frame R8i) in ACS880-34 has hardware license (+N8201) which allows the use of the supply module with dedicated ultra-low harmonic control program only. The licensed supply module is compatible with the ultra-low harmonic control program only. It is though possible to use a frame R8i module without hardware license (+N8201) with the ultra-low harmonic software. Therefore it is possible to use an R8i module without hardware license (+N8201) as a spare part module for ACS880-34.

Simplified main circuit diagram

The following figure shows the simplified main circuit diagram of the IGBT supply module and LCL filter.



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



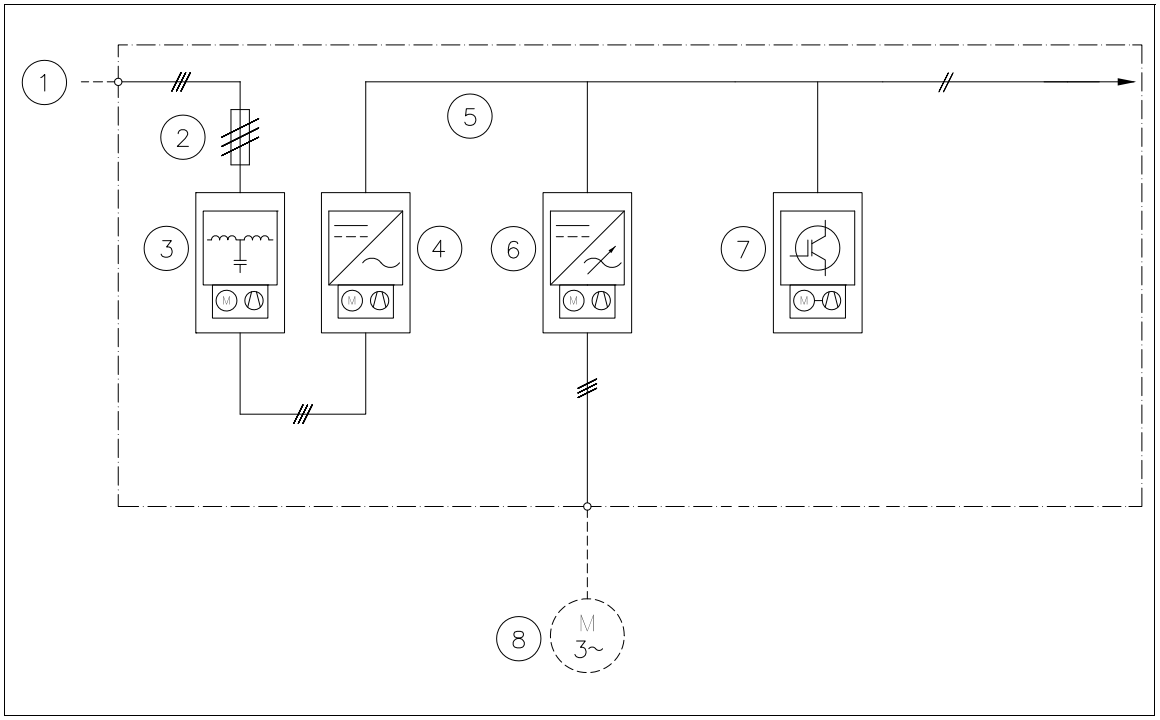
Charging

Charging is always needed to power up the DC link capacitors smoothly. Discharged capacitors can not be connected to the full supply voltage. The voltage must be increased gradually until the capacitors are charged and ready for normal use. The charging circuit consists of external components that are not in-built in the supply modules.

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

Simplified main circuit diagram of the drive system

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



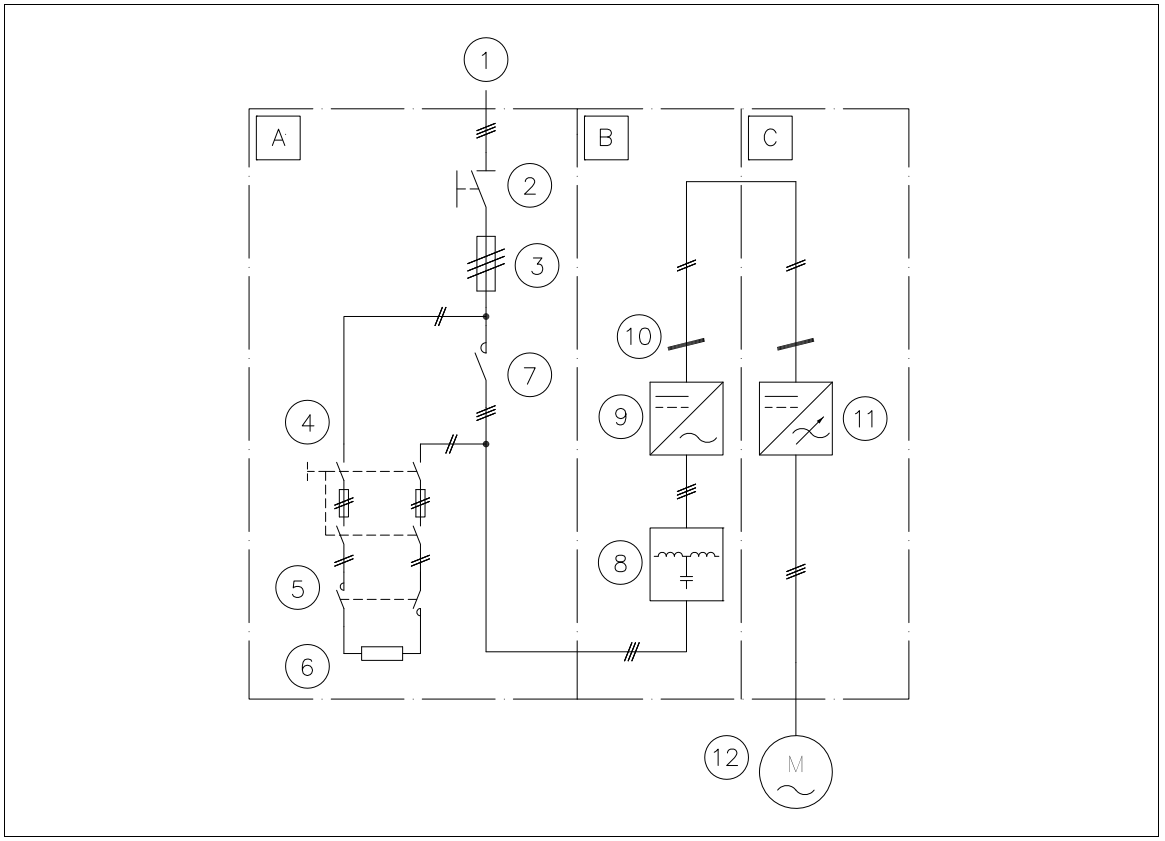
	Description
1.	AC supply
2.	Input AC fuses
3.	LCL filter
4.	IGBT supply unit
5.	DC bus
6.	Inverter unit
7.	Optional brake chopper
8.	Motor

Single-line circuit diagrams of ACS880-14 and -34 single drive module packages

The following figures are examples of possible configurations of ACS880-14 and -34 single drive module packages. The figures show connection examples of ACS880-14 and -34 with supply and inverter modules of frame size R8i.

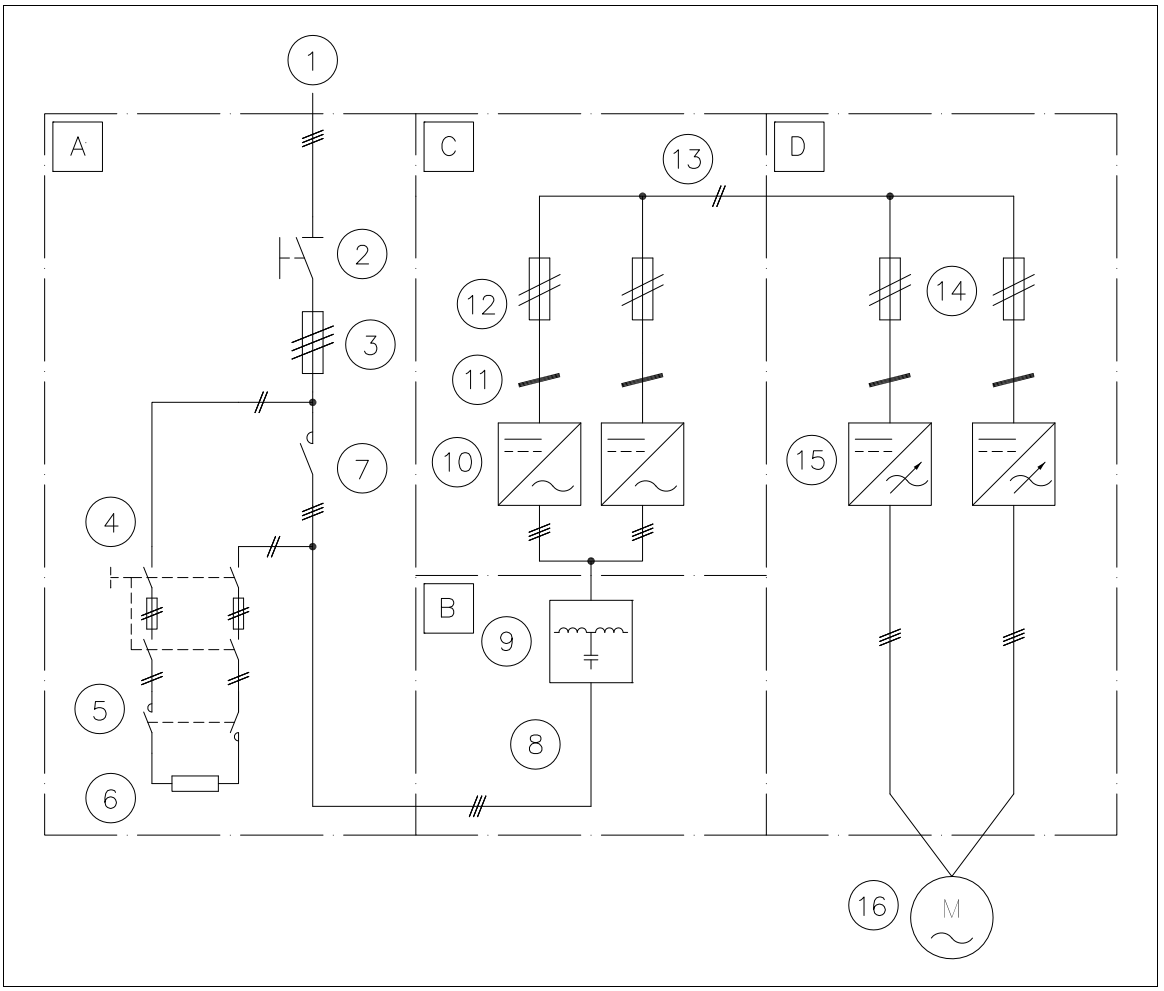
The tables give explanations for the numbers and letters used in the diagram. They also indicate if the customer can order components from ABB or if the customer needs to acquire them separately. For components, see chapter *Ordering information*.

1×R8i + 1×R8i



	Cubicle	No.	Explanation	Available through
		1.	AC supply network	-
A	Incoming cubicle (ICU)	2.	Main switch-disconnector	ABB or third party
A	ICU cubicle	3.	Main AC fuses	ABB or third party
A	ICU cubicle	4.	Charging switch-fuse	ABB or third party
A	ICU cubicle	5.	Charging contactor	ABB or third party
A	ICU cubicle	6.	Charging resistors	ABB or third party
A	ICU cubicle	7.	Main contactor	ABB or third party
B	IGBT supply module (ISU) cubicle	8.	LCL filter	ABB
B	ISU cubicle	9.	IGBT supply module	ABB
C	ISU cubicle	10.	Common mode filter	ABB
C	Inverter module cubicle	11.	Inverter module	ABB
		12.	Motor	-

2×R8i + 2×R8i



	Cubicle	No.	Explanation	Available through
		1.	AC supply network	-
A	Incoming cubicle (ICU)	2.	Main switch-disconnector	ABB or third party
A	ICU cubicle	3.	Main AC fuses	ABB or third party
A	ICU cubicle	4.	Charging switch-fuse	ABB or third party
A	ICU cubicle	5.	Charging contactor	ABB or third party
A	ICU cubicle	6.	Charging resistors	ABB or third party
A	ICU cubicle	7.	Main contactor	ABB or third party
B	IGBT supply module (ISU) cubicle: LCL filter section	8.	AC supply for LCL filter	ABB or third party
B	ISU cubicle: LCL filter section	9.	LCL filter	ABB
B	ISU cubicle: IGBT supply module section	10.	IGBT supply module	ABB
B	ISU cubicle: ISU module section	11.	Common mode filters	ABB
B	ISU cubicle: ISU module section	12.	Supply DC fuses	ABB or third party
B	ISU cubicle: ISU module section	13.	DC link	-
D	Inverter module cubicle	14.	Inverter DC fuses	ABB or third party
D	Inverter module cubicle	15.	Inverter module	ABB
		16.	Motor	-

Hardware of the supply, inverter and LCL 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.

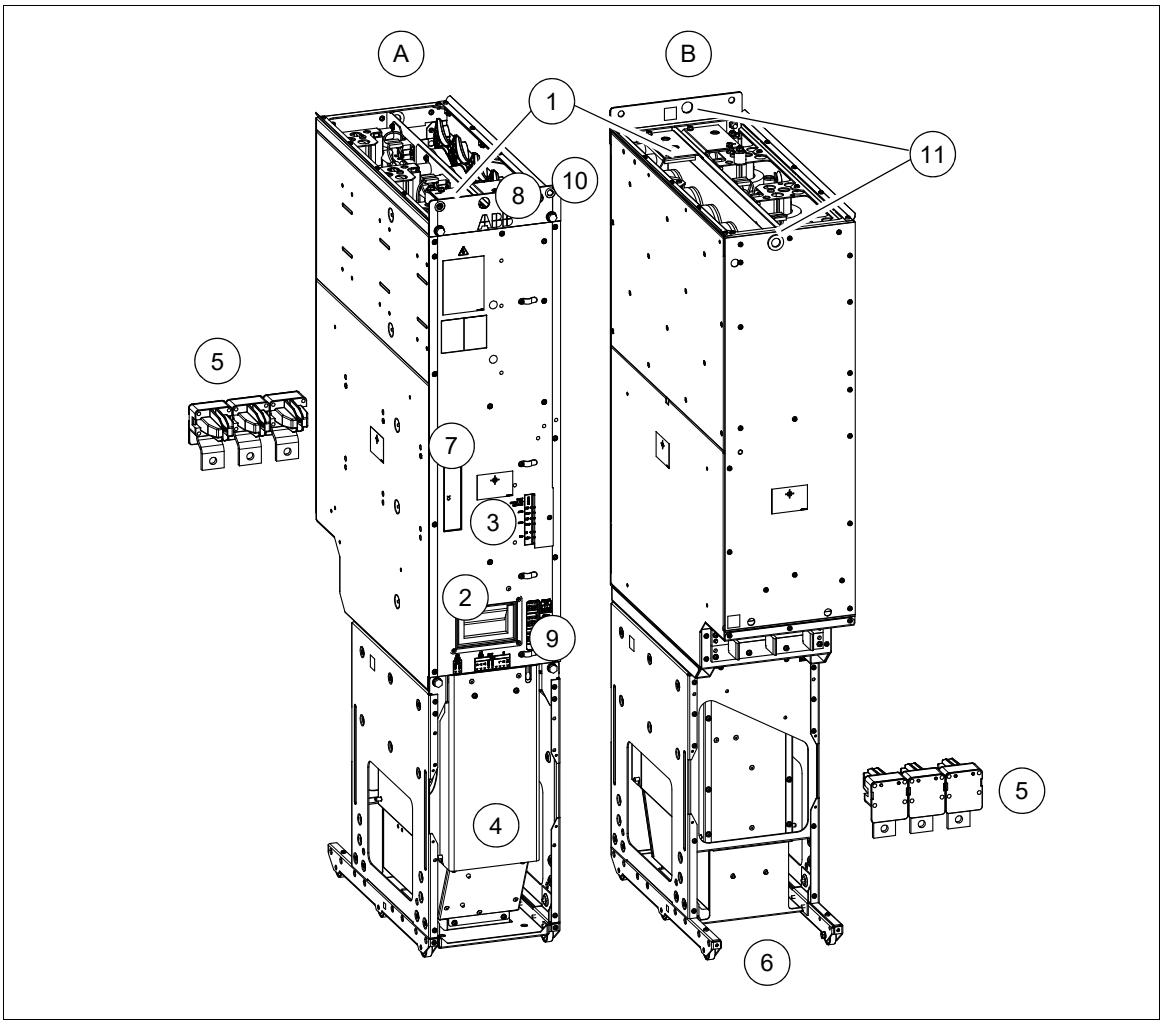
The quick connector at the back of the module couples when the module is inserted into the cubicle. Each parallel-connected module is cabled separately, or connected by busbars to adjacent modules to reduce the number of cables.

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

Frame R8i supply and inverter modules are controlled by BCU control units installed separately from the modules. The control units are connected to each supply / inverter module by a fiber optic link. The control unit can be powered from a module connector [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. For descriptions of the I/O terminals on the control unit, see chapter *Control units of the drive* (page *313*). Other equipment is primarily installed on separate mounting plates.

The following figures show the layout of the supply, inverter and LCL filter modules.

Supply and inverter module (frame R8i)



	Description
A	Frame size R8i module, front
B	Frame size R8i module, back
1.	DC busbars
2.	Handle
3.	LEDs (see section *LEDs and other status indicators* on page *171*) Fiber optic connectors (see section *Module fiber optic connectors* on page *130*)
4.	Cooling fan (standard speed-controlled fan shown; a direct-on-line fan is available as option +C188)
5.	Quick connector (AC connection) (The counterpart fastened to the cabinet behind the module.)
6.	Wheels
7.	Type designation label of the module
8.	Terminal block [X50] (power supply for internal boards and module heating element, option +C183; module direct-on-line fan, option +C188)
9.	Connectors [X51], [X52], [X53]. See chapter *The Safe torque off function* on page *327*.
10.	The unpainted grounding point (PE) between module frame and cabinet frame.
11.	Lifting eyes

Connectors X50…X53

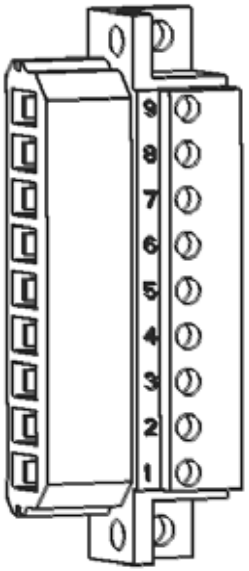
The cabinet builder must arrange an auxiliary voltage of 230 V AC (or 115 V AC with option +G304) to connector X50 to power the electronics of the supply module. It is recommended for the cabinet builder to arrange an auxiliary voltage of 230 V AC (or 115 V AC with option +G304) to connector X50 to power the electronics of the inverter module. This 230 V AC / 115 V AC auxiliary voltage powers up the internal power supply board (BDPS), which then powers up the other internal circuit boards of the module with 24 V DC voltage even if the DC voltage of the intermediate circuit is low. 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 up 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].

If the Safe torque off (STO) function is used, STO OUT on the BCU control unit is wired to X52 (STO IN). X52 is wired to X51 (STO OUT) on the R8i module internally; see chapter *The Safe torque off function* (page *327*). X51 on the R8i module forwards the STO signals to the X52 connector of the next module (if present).

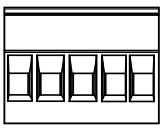
If the Safe torque off function is not used, the “24V” inputs on X52 must be connected to +24 V (X53, for example) on each inverter module. X51 is to be left unconnected.

Note: As a factory standard, Safe torque off is disabled by a jumper connection between connectors X52 and X53.

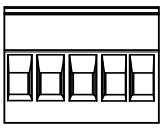


Connector X50

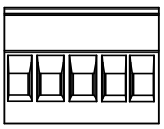
#		Description
9	Not in use.	
8	N	115/230 V AC (50/60 Hz) input for optional heating element (+C183)
7	L	
6	Not in use.	
5	N	115/230 V AC 50 Hz input for internal power supply (BDPS) (115V AC 60 Hz with option +G304)
4	L	
3	W	400 V AC (50/60 Hz) supply for optional DOL (direct-on-line) cooling fan (option +C188).
2	V	
1	U	**Note:** In modules without +C188, the DOL wiring is present but not in use.



STO OUT				
X51				
FE	GND	24V	GND	24V



STO IN				
X52				
FE	GND	24V	GND	24V

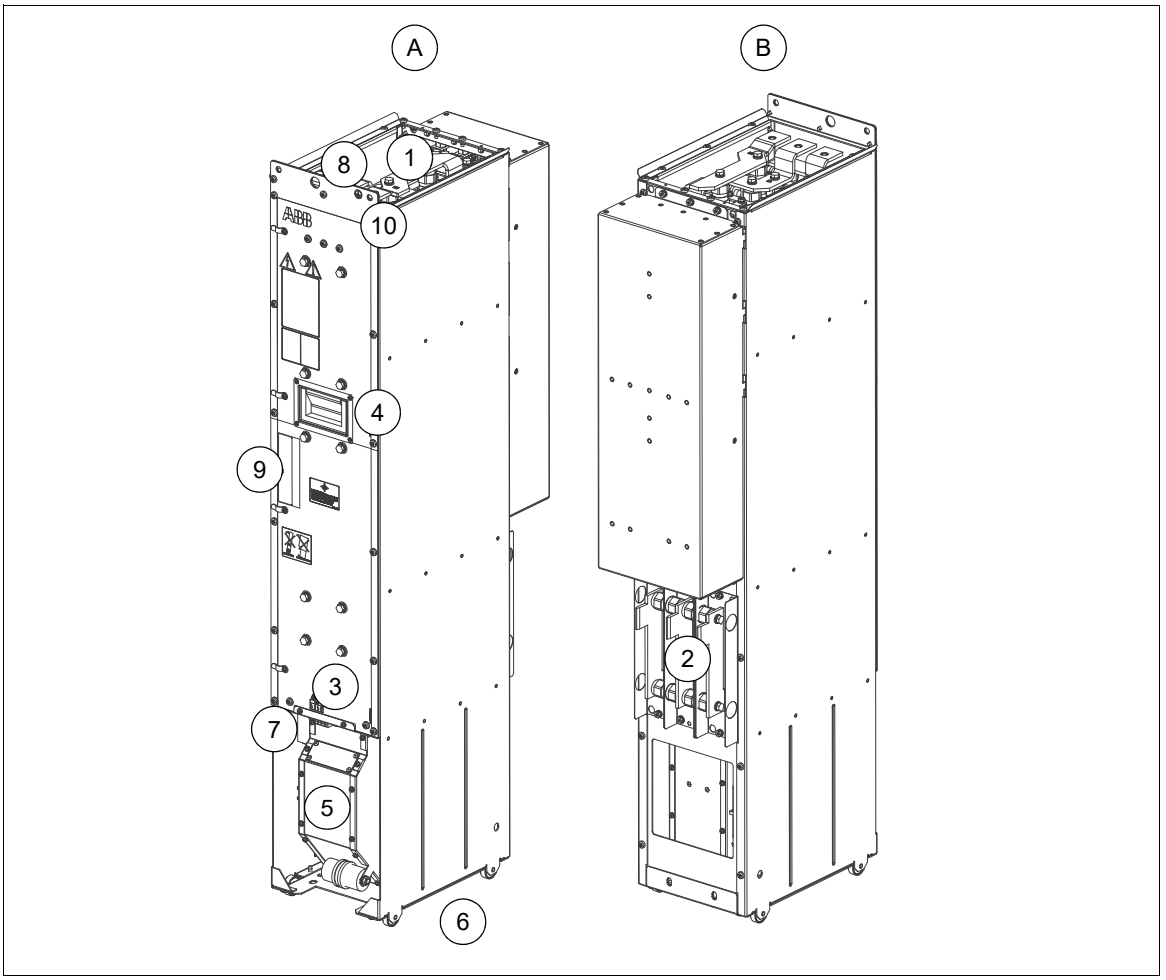


24V OUT				
X53				
FE	24V	GND	24V	GND

Connectors X51, X52, X53

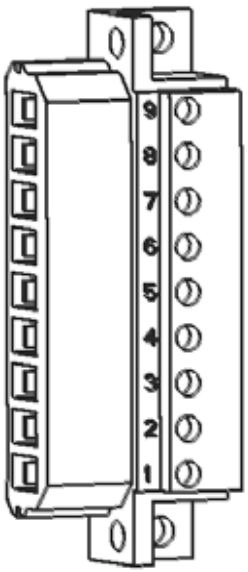
#	Name	Description
X51	STO OUT	Supply modules: Not in use. Inverter modules: STO signal forwarding output to next inverter module (if present).
X52	STO IN	Supply modules: STO connectors of the module. Must be connected to 24 V DC for the rectifier module to start. Inverter modules: STO signals from BCU control unit or from previous unit (if present) X51 STO OUT.
X53	24V OUT	24 V DC output (for BCU control unit)
Note: The Safe torque off (STO) safety function is only implemented in inverter units. Therefore, the STO function can not be used in supply and brake units. In supply and brake units, de-energizing any connection of STO IN (X52) connector stops the drive. Note that this stop in supply or brake module is not safety related and must not be used in safety function purposes.		

LCL filter module (type BLCL-1x-x)



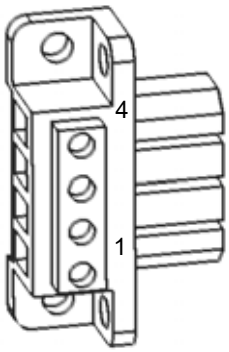
	Description
A	LCL filter module, front
B	LCL filter module, back
1.	Input (AC) connection
2.	Output (AC) connection
3.	Terminal block [X55] (power supply for module heating element, option +C183; direct-on-line fan supply, option +C188) (ready-connected)
4.	Handle
5.	Fan
6.	Wheels
7.	Fiber optic connections and LEDs of the BDFC board
8.	Terminal block [X30] (power supply for module direct-on-line fan, option +C188 and heating element, option +C183; module thermal cutoff circuit)
9.	Type designation label
10.	The unpainted grounding point (PE)

Connectors X30 and X55



BLCL-1x-x module connector X30

#	Description
9	Option +C183: Heating element N (230 V AC or 115 V AC)
8	Option +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	Option +C188: DOL fan N (230 V AC or option +G304: 115 V AC)
1	Option +C188: DOL fan L (230 V AC or option +G304: 115 V AC)

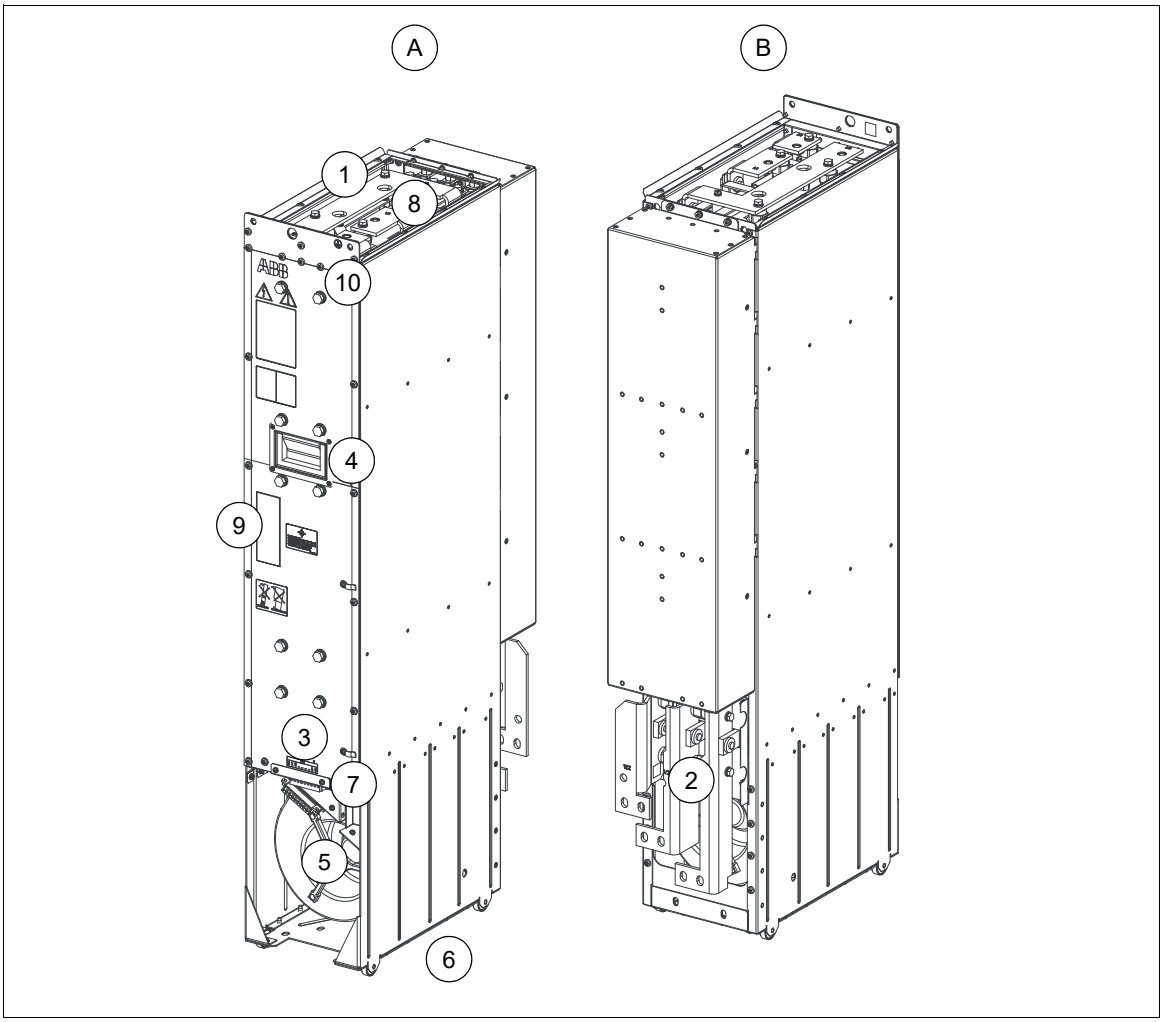


BLCL-1x-x module connector X55

Note: Connections of the connector X55 are ready-made at the factory.

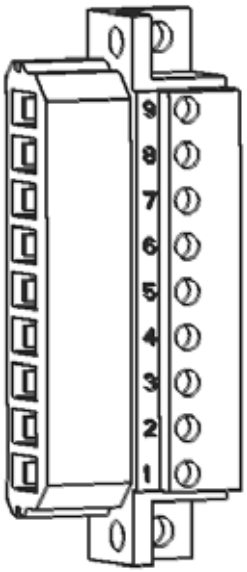
#	Description
4	Option +C183: Heating element N (230 V AC or 115 V AC)
3	Option +C183: Heating element L (230 V AC or 115 V AC)
2	Option +C188: DOL fan N (230 V AC or option +G304: 115 V AC)
1	Option +C188: DOL fan L (230 V AC or option +G304: 115 V AC)

LCL filter module (type BLCL-2x-x)



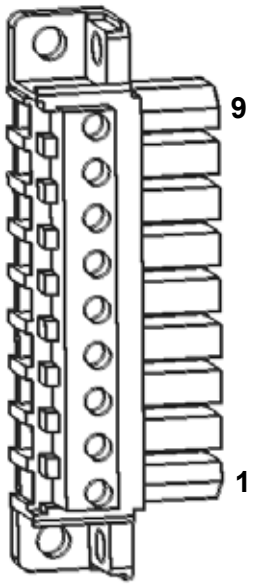
	Description
A	LCL filter module, front
B	LCL filter module, back
1.	Input (AC) connection
2.	Output (AC) connection
3.	Terminal block [X55] (power supply for module heating element, option +C183 and direct-on-line fan, option +C188) (ready-connected)
4.	Handle
5.	Fan
6.	Wheels
7.	Fiber optic connections and LEDs of the BDFC board
8.	Terminal block [X30] (power supply for module direct-on-line fan, option +C188; heating element, option +C183; module thermal cutoff circuit)
9.	Type designation label
10.	The unpainted grounding point (PE)

Connectors X30 and X55



BLCL-2x-x module connector X30

#	Description	
9	Option +C183: Heating element N (230 V AC or 115 V AC)	
8	Option +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	Option +C188: DOL fan W	400 V AC or option +G427: 208 V AC)
2	Option +C188: DOL fan V	
1	Option +C188: DOL fan U	



BLCL-2x-x module connector X55

Note: Connections of the connector X55 are ready-made at the factory.

#	Description	
9	Option +C183: Heating element N (230 V AC or 115 V AC)	
8	Option +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	Option +C188: DOL fan W	400 V AC or option +G427: 208 V AC
2	Option +C188: DOL fan V	
1	Option +C188: DOL fan U	

Overview of power and control connections

Input power connection of the supply module is located on the rear side of the module (AC input connection), and the output power connection is located on top of the module (DC output connection). Input power connection of the inverter module is located on top of the module (DC input connection), and the output power connection is located on the rear side of the module (AC output connection).

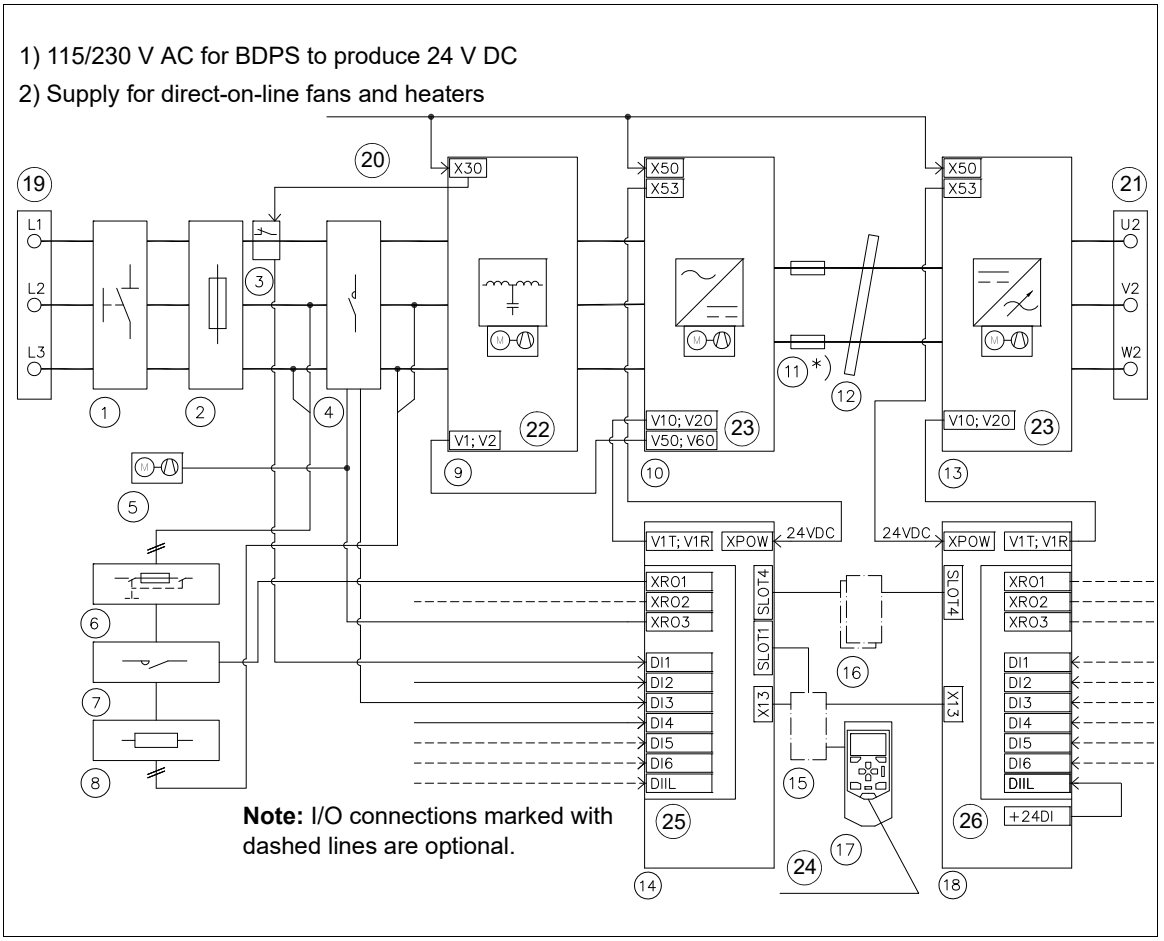
A cabinet-installed unit is typically controlled using the local control devices installed on the cabinet door. No additional control connections are needed. However, it is possible to:

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

The I/O control interface is mostly in internal use. RDCO-04C DDCS communication option module is to be installed on the BCU control unit of the supply unit and the inverter unit to enable communication between them.

Simplified power and control connection diagram

The following figure shows a simplified diagram of the power and control connections of ACS880-14 and -34.

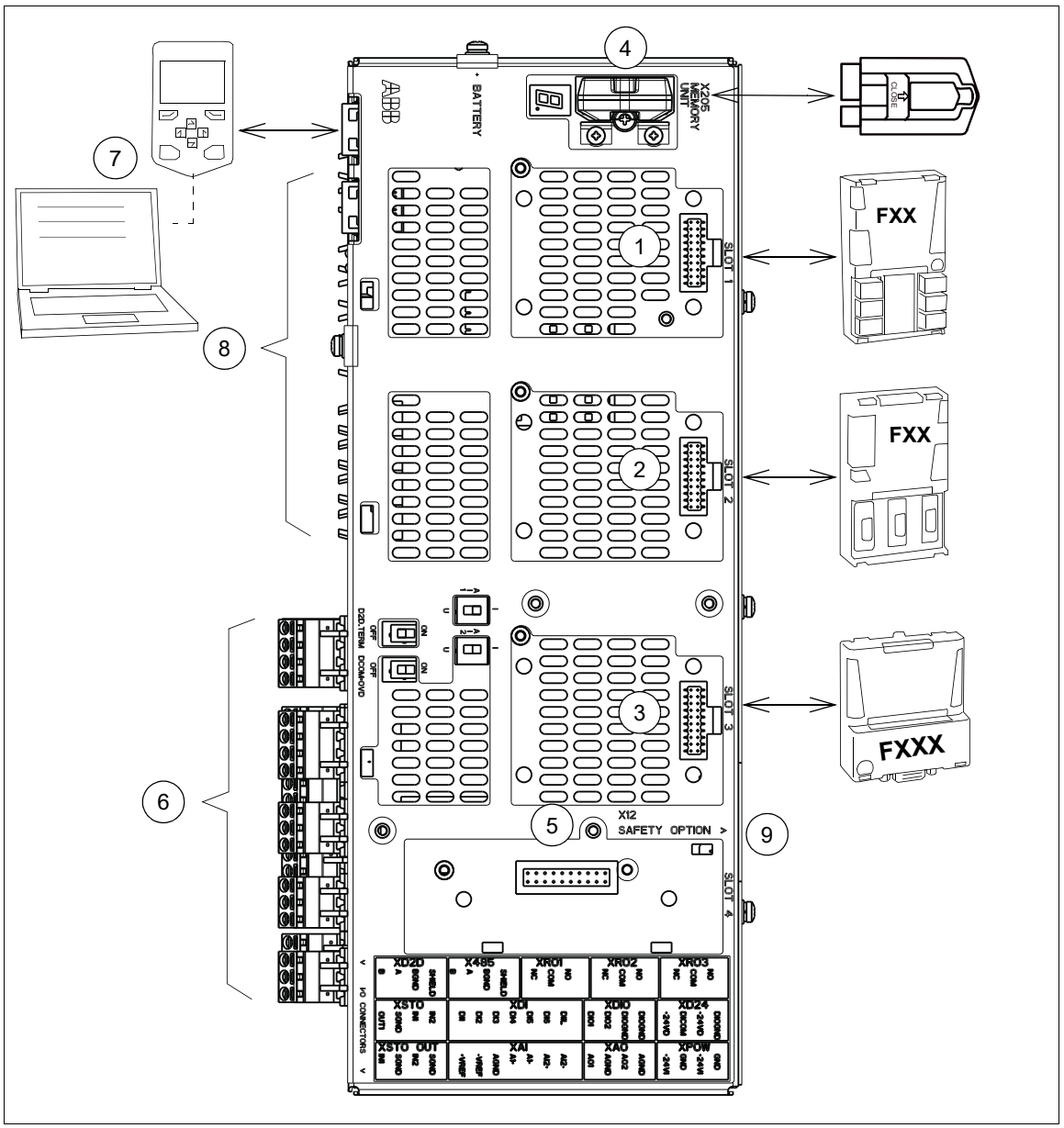


#	Description
1.	Main switch-disconnector
2.	Main AC fuses
3.	Thermal switch
4.	Main contactor
5.	Cabinet cooling fan
6.	Charging switch fuse
7.	Charging contactor
8.	Charging resistors
9.	LCL filter module
10.	IGBT supply module (frame size R8i)
11.	DC fuses *) for multiple R8i inverter modules
12.	Common mode filter
13.	Inverter module (frame size R8i)
14.	Control unit (BCU-x2) of the supply unit
15.	Diagnostic and panel interface board (FDPI-02)

#	Description
16.	Communication option modules (RDCO-0x)
17.	ACS-AP-x control panel and door mounting kit
18.	Control unit (BCU-x2) of the inverter unit
19.	AC supply
20.	Choke temperature fault
21.	Motor out
22.	Fan control
23.	Module control
24.	USB connection
25.	I/O connections of the supply unit: • XRO1: Charging contactor control • XRO2: Fault • XRO3: Main breaker, cabinet fan control • DI1: Temperature fault • DI2: Run enable • DI3: Main breaker closed • DI4: Auxiliary circuit breaker fault • DI5: Earth fault monitoring • DI6: Reset • DIIL: Emergency stop
26.	I/O connections of the inverter unit: • XRO1: Ready • XRO2: Running • XRO3: Faulted • DI1: Start / Stop • DI2: Forward / Reverse • DI3: Reset • DI4: Acceleration / deceleration time set • DI5: Constant speed • DI6: Not specified • DIIL: Interlock

Overview of the control connections on the BCU control unit

BCU control unit is used with frame size R8i IGBT supply modules / inverter modules. The diagram shows the control connections and interfaces of the BCU control unit.



No.	Description	No.	Description
1 2 3	Analog and digital I/O extension modules and fieldbus communication modules can be inserted into slots 1, 2 and 3.	7	Control panel. See also section *Connecting a PC* on page *132*.
4	Memory unit	8	Fiber optic links to supply / inverter modules
5	Slot 4 for RDCO-0x	9	Safety functions module (FSO-xx) used in inverter modules only
6	Terminal blocks. See chapter *Control units of the drive* on page *313*.		

Control devices

Main disconnecting device

The unit must be equipped with a main switch-disconnector [Q1.1] or main circuit 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

The unit can be equipped 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 via the supply module. After the DC link is charged, the main contactor [Q2] will be closed and the charging contactor [Q4] opened. The supply module starts operating.
- The OFF position: The control program opens the main contactor [Q2] and the supply 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 an emergency stop function of the 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 BCU control unit

The supply and inverter modules are controlled by BCU control units.

For more information, see chapter *Control units of the drive* on page *313*.

The ACS-AP-x control panel

The ACS-AP-x 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.

The Run enable command at the digital input DI2 must be on (1) so that the supply module can be started and stopped with the control panel in the local 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 appropriate 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. See also section *Connecting a PC* on page *132*.

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 appropriate firmware manual.

Note: To be able to switch the main contactor [Q1.2] 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).

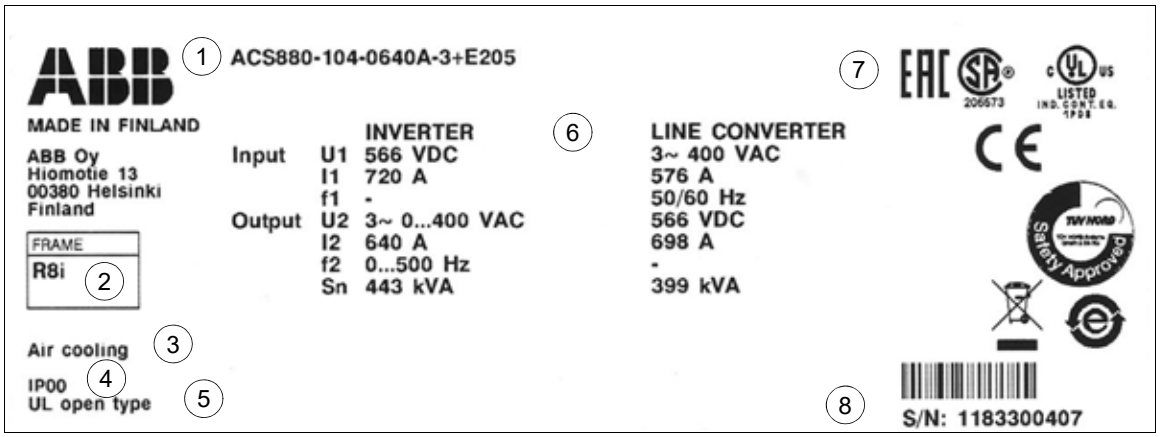
Type designation labels

Each supply, inverter and LCL filter module has a type designation label attached to it. The type designation stated on the label contains information on the specifications and configuration of the module.

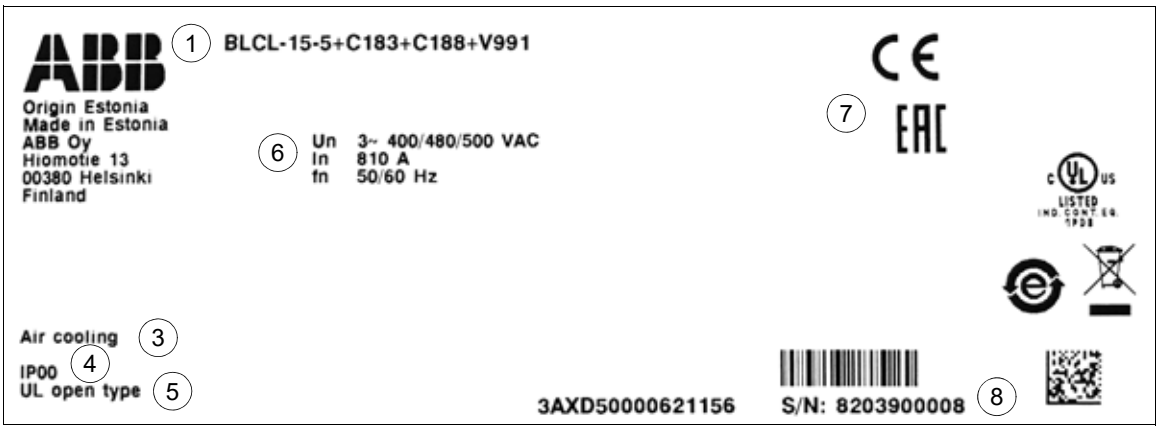
Quote the complete type designation and serial number when contacting technical support on the subject of ACS880-14 and -34.

Example labels are shown below.

Supply / inverter module



LCL filter module



No.	Description
1.	Type designation, see section *Type designation key* on page *44*.
2.	Frame size
3.	Cooling method and additional information
4.	Degree of protection
5.	UL/CSA data
6.	Ratings. See also section *Ratings* on page *285*.
7.	Valid markings. See *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).
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 key

Type designation describes the composition of the supply and inverter modules in short. The type designation is visible on the labels (stickers) which are attached to the supply and inverter modules. For the supply and inverter module types, see section *Type equivalence table* on page *288*.

ACS880-14 and -34

The complete designation code of ACS880-14 and -34 is divided in subcodes:

- The first 1…17 digits form the basic code. It describes the basic construction of the unit. 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 following table lists the fields of basic code ACS880-14-0620A-3 as an example, and the plus codes of the modules.

CODE	DESCRIPTION
Basic codes	
ACS880	Product series
14	Construction: ACS880-14 single drive module package. As standard, the delivery includes speed-controlled cooling fans for supply and inverter modules, and on/off-controlled cooling fans for LCL filter modules.
Size	
0620A	Refer to the rating tables on page *285.*
Voltage range	
3	Input voltage range: 380…415 V. This is indicated in type designation label as typical input voltage levels (3~ 400 V AC).
5	Input voltage range: 380…500 V. This is indicated in type designation label as typical input voltage levels (3~ 400/480/500 V AC).
7	Input voltage range: 525…690 V. This is indicated in type designation label as typical input voltage levels (3~ 525/600/690 V AC).
Plus codes	
For the plus codes, see chapter *Ordering information*.	
C132	Marine type-approved module. See *ACS880+C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]).
C183	Internal heating element
C188	Direct-on-line cooling fan
E205	Internal du/dt filters (included as standard in all supply and inverter modules in the ACS880-14 and -34 module packages)
G304	115 V AC auxiliary voltage supply
P904	Extended warranty 24/30
P909	Extended warranty 36/42
N8201	ACS880-34 only: hardware license (ultra-low harmonic)

LCL filter

CODE	DESCRIPTION
Basic codes	
BLCL	LCL filter for frame R8i IGBT supply module. The delivery includes on/off-controlled cooling fan as standard.
Size	
13, 15, 24, 25	See chapter *Technical data*.
Voltage range	
5	Voltage rating: 380…500 V. This is indicated in type designation label as typical input voltage levels (3~ 400/480/500 V AC).
7	Voltage rating: 525…690 V. This is indicated in type designation label as typical input voltage levels (3~ 525/600/690 V AC).
Plus codes	
For the plus codes, see chapter *Ordering information*.	
C183	Internal heating element (included in the delivery as standard)
C188	Direct-on-line cooling fan (included in the delivery as standard with 230 V supply for BLCL-1x-x / 400 V AC supply for BLCL-2x-x)
G304	BLCL-1x-x only: 115 V AC 1-phase fan supply
G427	BLCL-2x-x only: 208 V AC 3-phase fan supply
V991	Hardware version. LCL filter modules with or without this code are interchangeable.

3

Moving and unpacking the modules

Contents of this chapter

This chapter contains moving, lifting and unpacking instructions for the modules.

Moving and lifting the transport package

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

Unpacking

The modules are 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 modules.
5. Lift off the modules.
6. Check that there are no signs of damage.

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

If you need to pack the modules, see the package information in section *Materials* on page *308*.

Lifting the modules

Lift the unpacked module only from its lifting holes.

Moving the modules

WARNING! If you ignore the following instructions, injury or death, or damage to the equipment can occur.

- Use extreme caution when maneuvering a module that runs on wheels.
- The modules are heavy and have a high center of gravity. They topple over easily if handled carelessly.
- Do not tilt the module. Do not leave the module unattended on a sloping floor.
- Use protective gloves! The edges of the module are sharp!

For moving and lifting the modules, see section *Replacing the supply and inverter module (frame R8i)* on page *163*, and *Replacing the LCL filter* on page *166*.

4

Cabinet construction

Contents of this chapter

This chapter instructs in placing ACS880-14 and -34 single drive module packages and additional equipment into a cabinet.

For general instructions, see *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]). See chapter *Technical data* for module-specific cooling requirements and allowable mounting orientations.

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.

Switching, disconnecting and protecting solution

To arrange the switching, disconnection and protection of the ACS880-204 module, you can use the following solution. The switching, disconnecting and protecting equipment can be placed **outside** the drive cabinet in the following way:

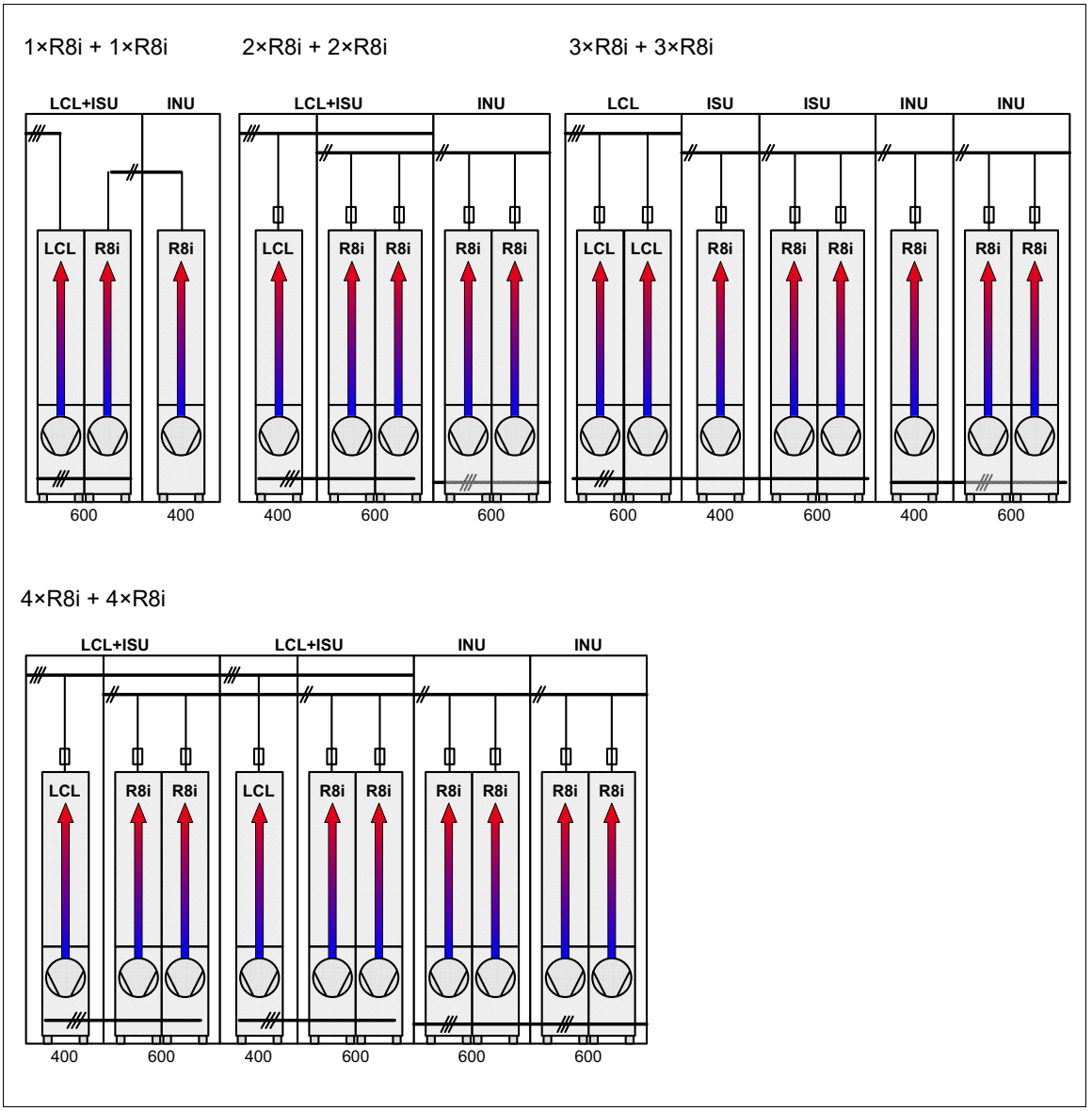
1. The AC supply is first connected to the main switch-disconnector [Q1].
2. The AC fuses are connected after the switch-disconnector.
3. The main contactor [Q2] is connected between the AC fuses and the LCL filter.
4. A charging circuit for precharging the DC link capacitors is connected over the main contactor [Q2]. See section *Single-line circuit diagrams of ACS880-14 and -34 single drive module packages* on page *27*.

For the connection diagram, see chapter *Electrical installation*.

Cabinet configuration overview

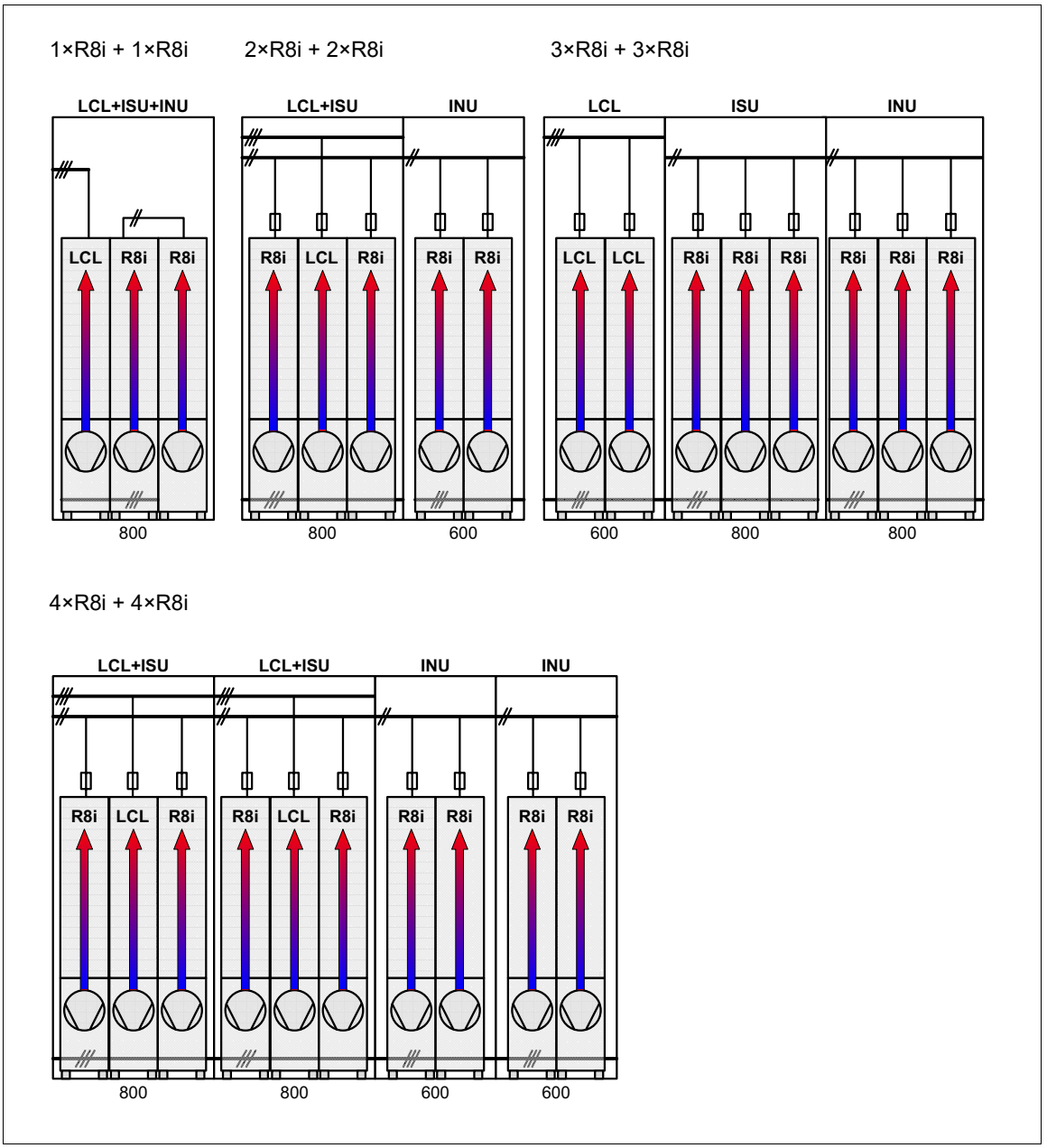
ACS880-14 and -34 configurations in Rittal VX25 enclosures

The following figures show all examples ACS880-14 and -34 configurations that can be installed in the Rittal VX25 enclosure.



ACS880-14 and -34 configurations in generic enclosures

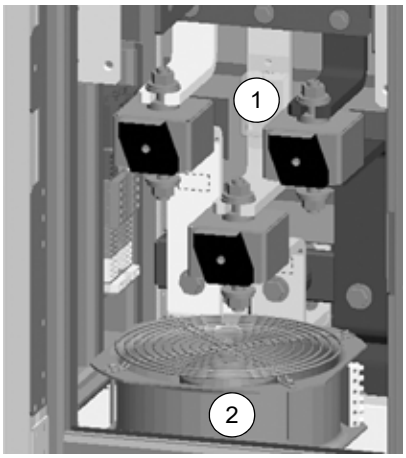
The following figures show examples ACS880-14 and -34 configurations that can be installed in generic enclosure.



Incoming cubicle

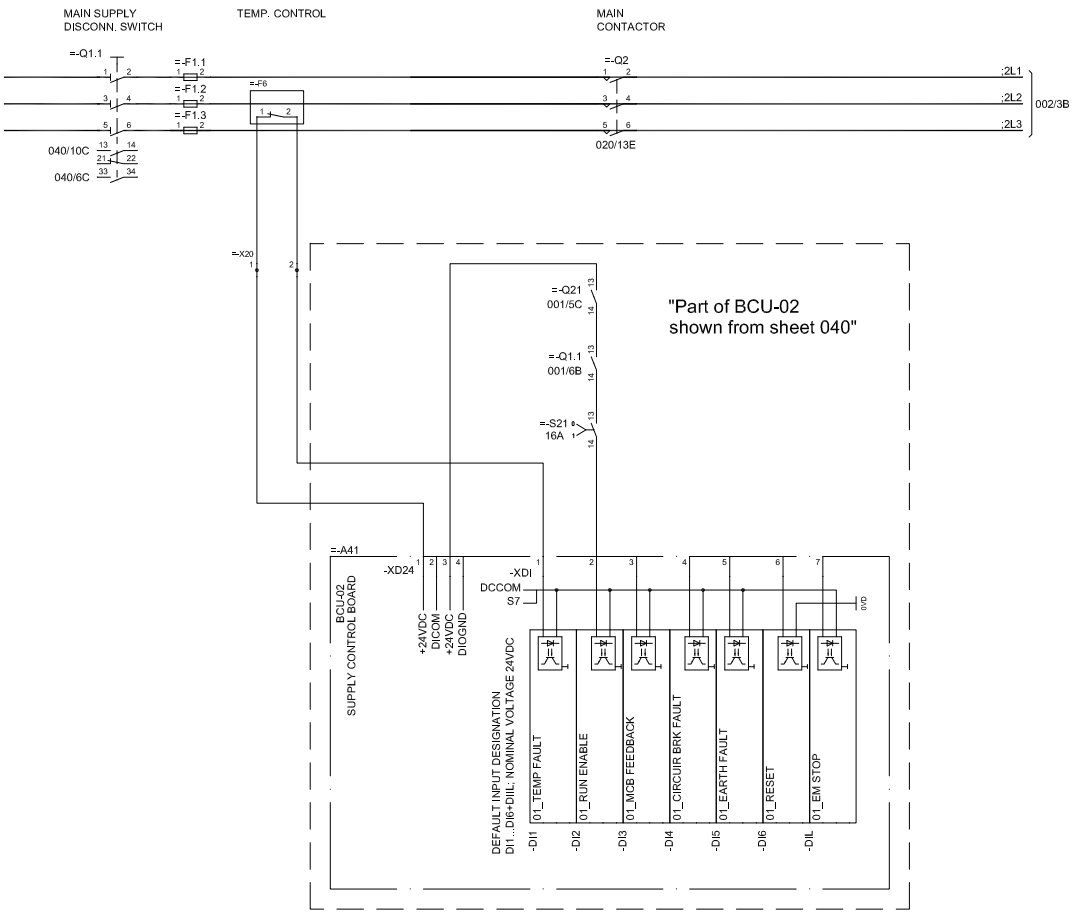
Example of the AC fuse cooling

The AC fuses must be cooled by forced cooling. If the fuses are not located in the same cubicle with the supply 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 by the AC fuses.



#	Description
1.	Thermal switch
2.	Cooling fan

Example of the AC fuse cooling and temperature monitoring



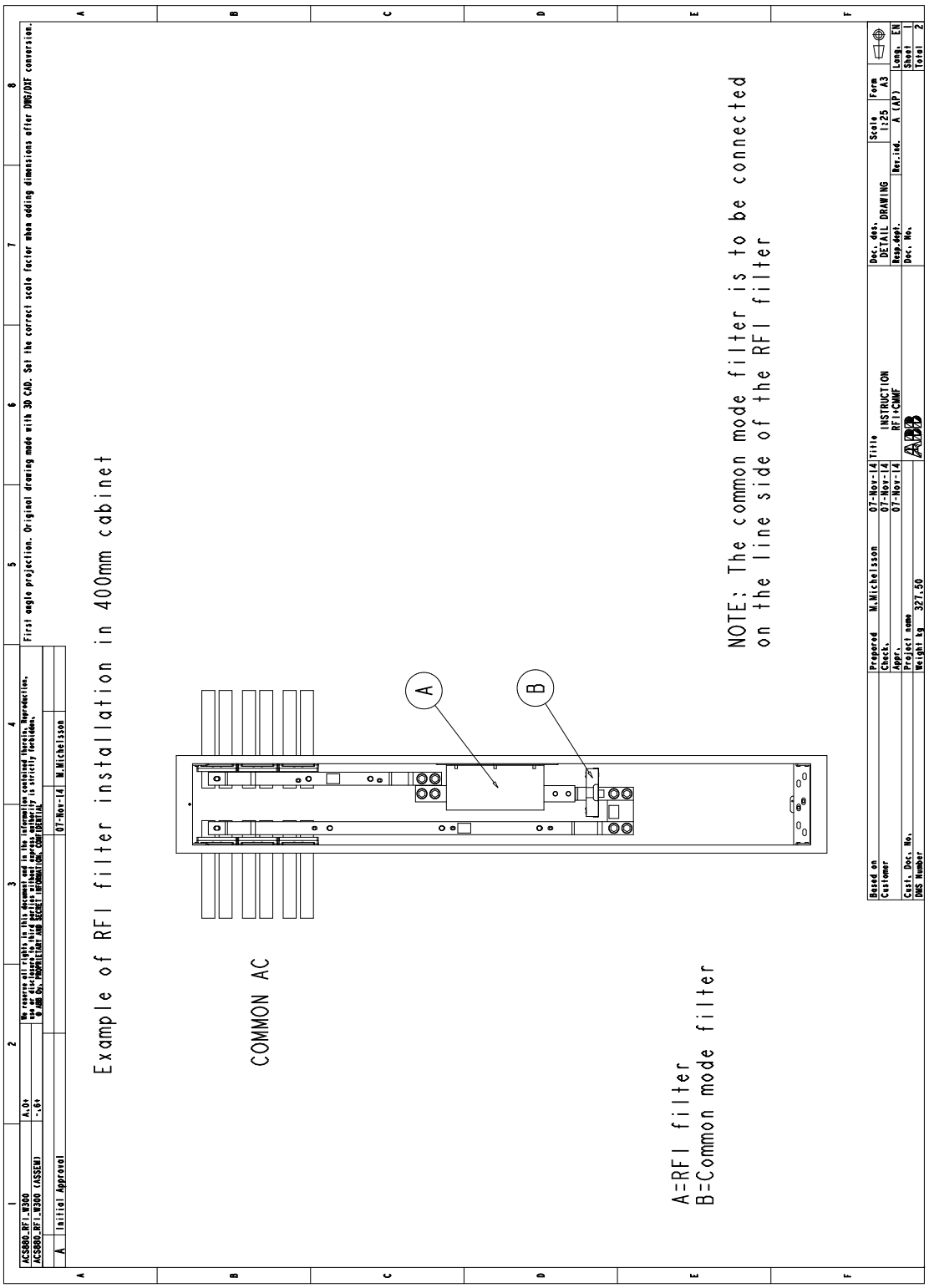
Example connection for the temperature monitoring

The references in this figure refer to the *Example circuit diagrams*, page *373*.

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

RFI filter

The following figure shows an example of installing RFI filter to the cabinet. For more information about EMC requirements, see *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).



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 includes installation examples of the ACS880-14 and -34 single drive module packages in the Rittal VX25 and generic enclosure.

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.

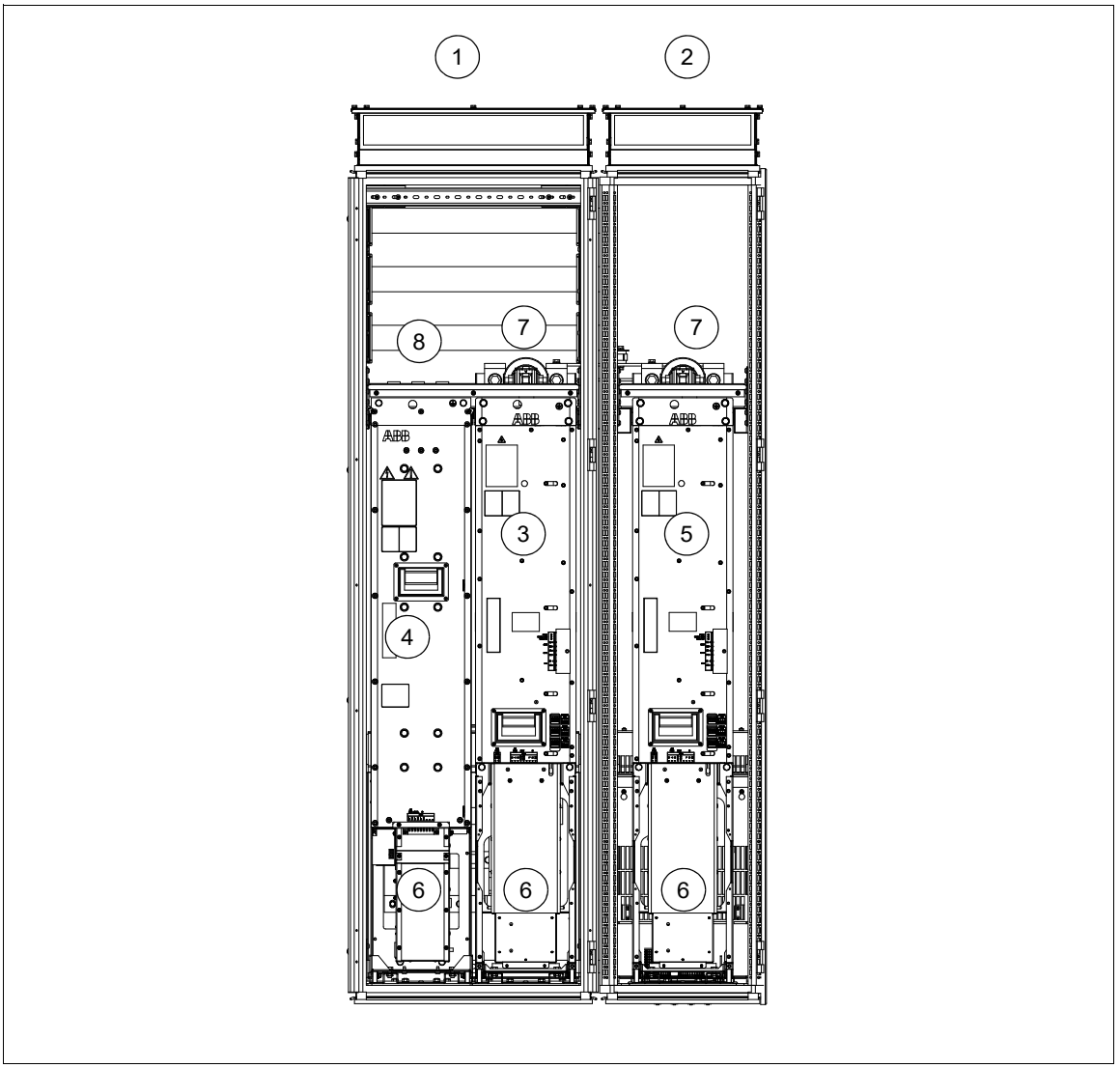
The example includes also cabinet assembly drawings that show each stage listed in the table. More detailed steps of each stage are described in the kit-specific assembly drawings.

For general instructions, see *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]).

ACS880-14/34 single drive module package (1×R8i + 1×R8i, Rittal VX25 enclosure)

Layout

The following figure shows an example layout of an ACS880-14/34 single drive module package (1×R8i + 1×R8i).

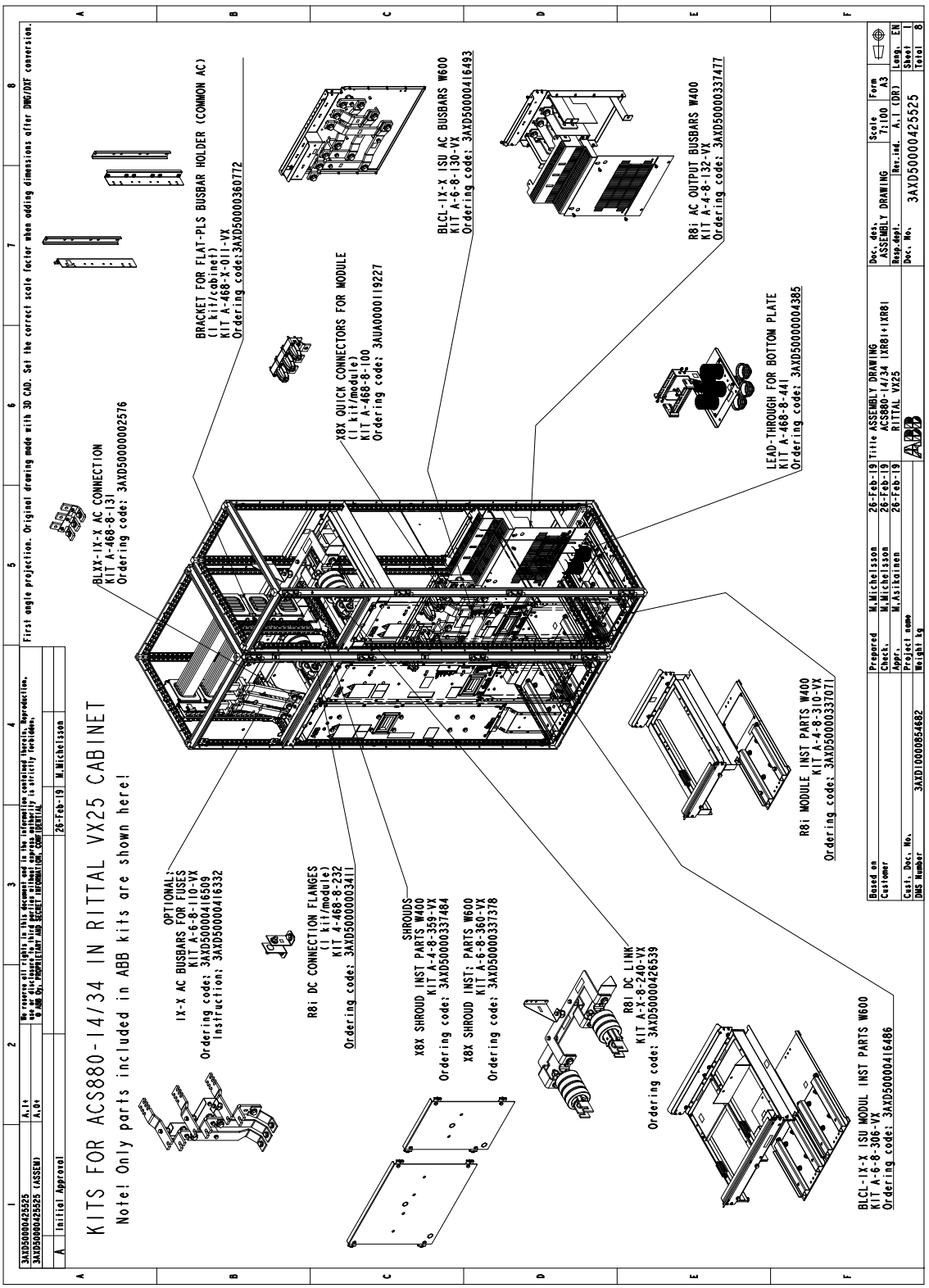


	Description
1.	IGBT supply module cubicle
2.	Inverter module cubicle
3.	IGBT supply module
4.	LCL filter module
5.	Inverter module
6.	Cooling fan
7.	Common mode filters / DC link
8.	AC input

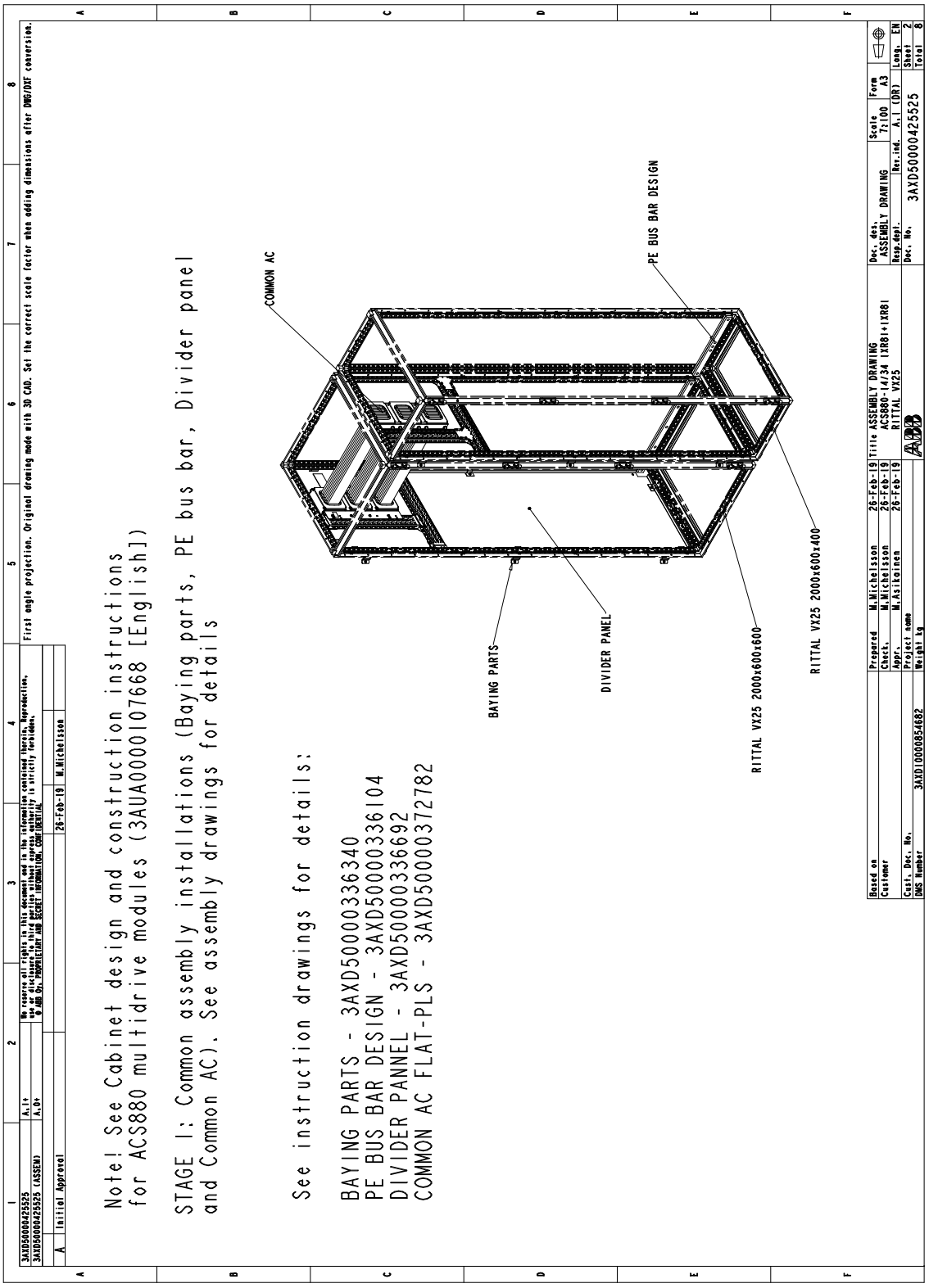
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1.	Installation of common parts: • Baying parts • PE busbar [PE] • Divider panel • Bracket for Flat-PLS busbar holder (common AC)	 • 3AXD50000336340 • 3AXD50000336104 • 3AXD50000336692 • 3AXD50000372782	 A-468-X-011-VX	
2.	Module installation parts	3AXD50000384914 3AXD50000335152	A-6-8-306-VX A-4-8-310-VX	3AXD50000416486 3AXD50000337071
3.	Lead-through for bottom plate installation	3AXD50000004817	A-468-8-441	3AXD50000004385
4.	BLCL-1x-x AC busbars, AC output busbars and quick connector installation	3AUA0000118667 3AXD50000384945 3AXD50000343492	A-468-8-100 A-6-8-130-VX A-4-8-132-VX	3AUA0000119227 3AXD50000416493 3AXD50000337477
5.	DC link, DC connection flanges and BLCL-1x-x AC connection installation	3AXD50000425426 3AXD50000003403 3AXD50000002577	A-X-8-240-VX A-468-8-131 A-468-8-232	3AXD50000426539 3AXD50000002576 3AXD50000003411
	• Optional kit	3AXD50000416332	A-6-8-110-VX	3AXD50000416509
6.	Shrouds installation	3AXD50000335022 3AXD50000335169	A-6-8-360-VX A-4-8-359-VX	3AXD50000337378 3AXD50000337484
7.	BLCL-1x-x and R8i modules installation	-	-	-

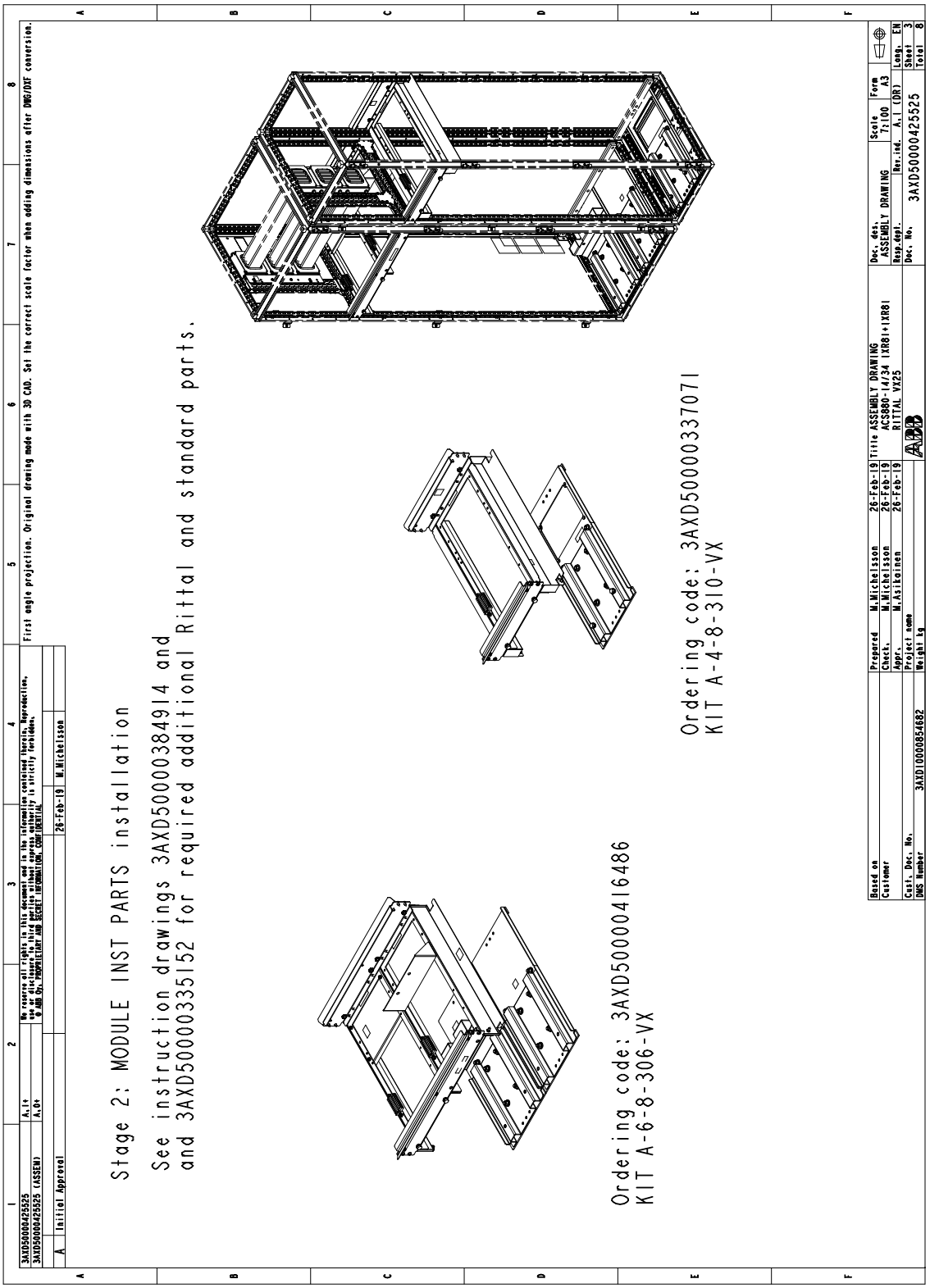
Kits for 1×R8i + 1×R8i



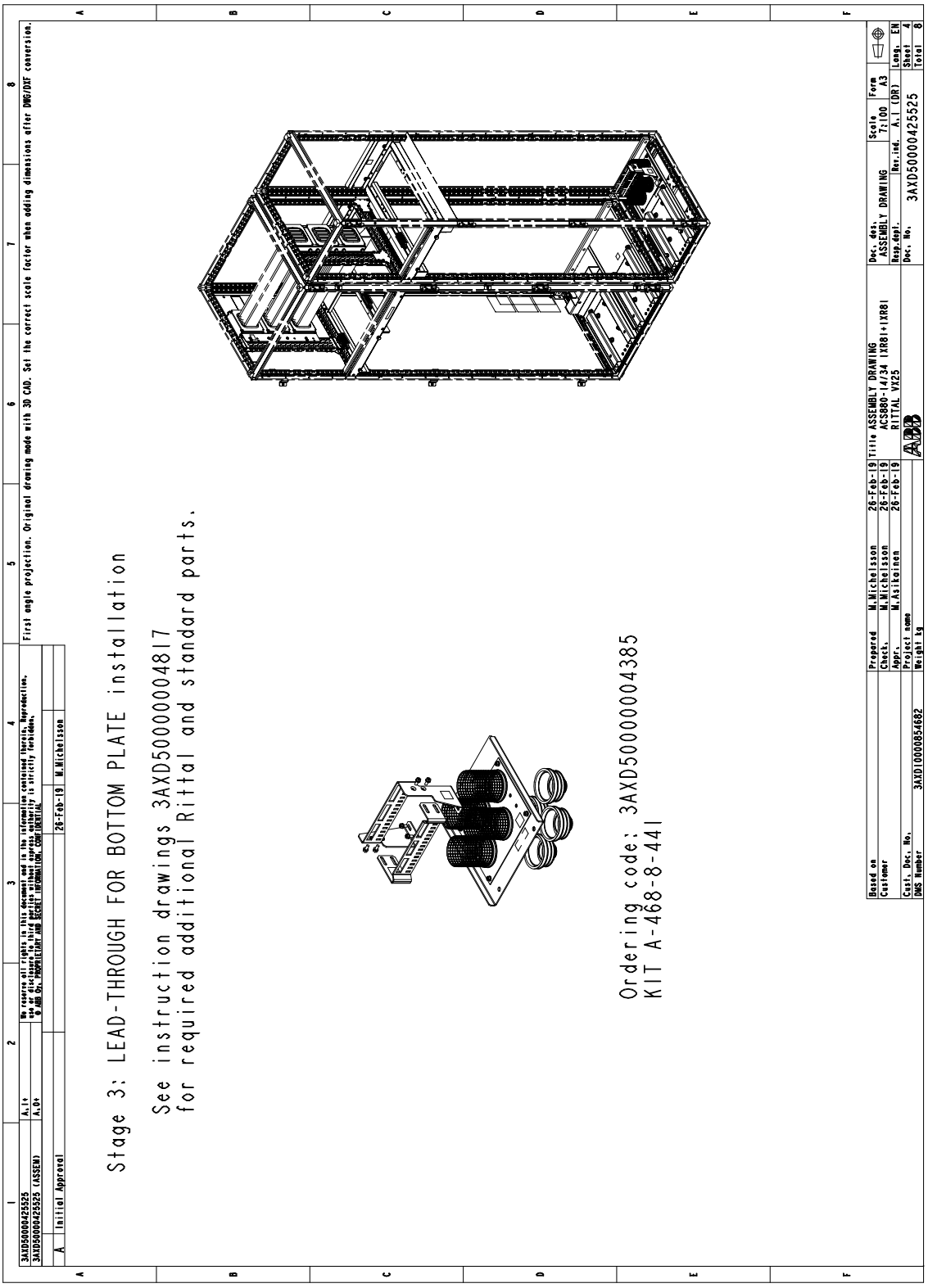
Stage 1: Installation of common parts



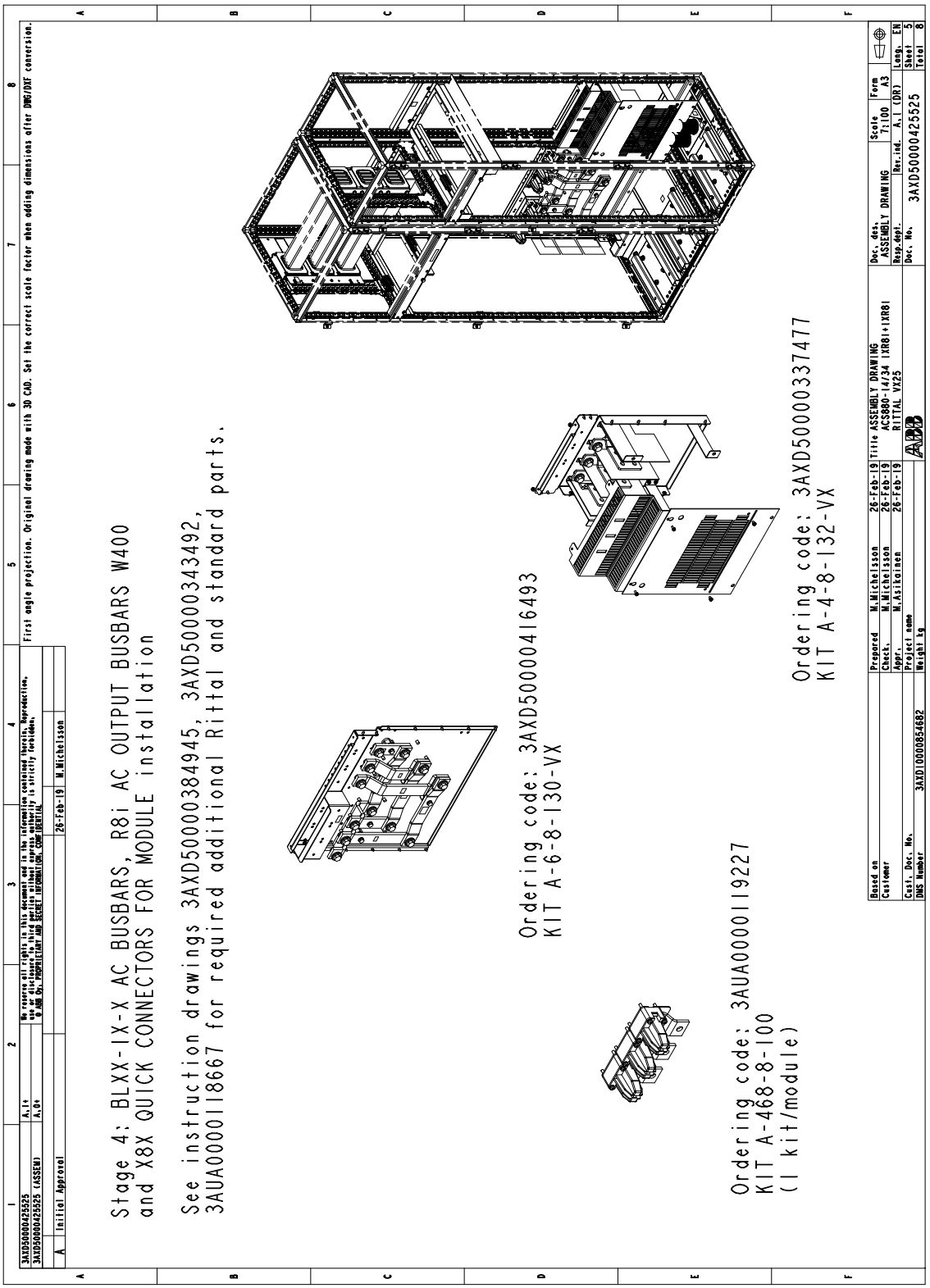
Stage 2: Module installation parts



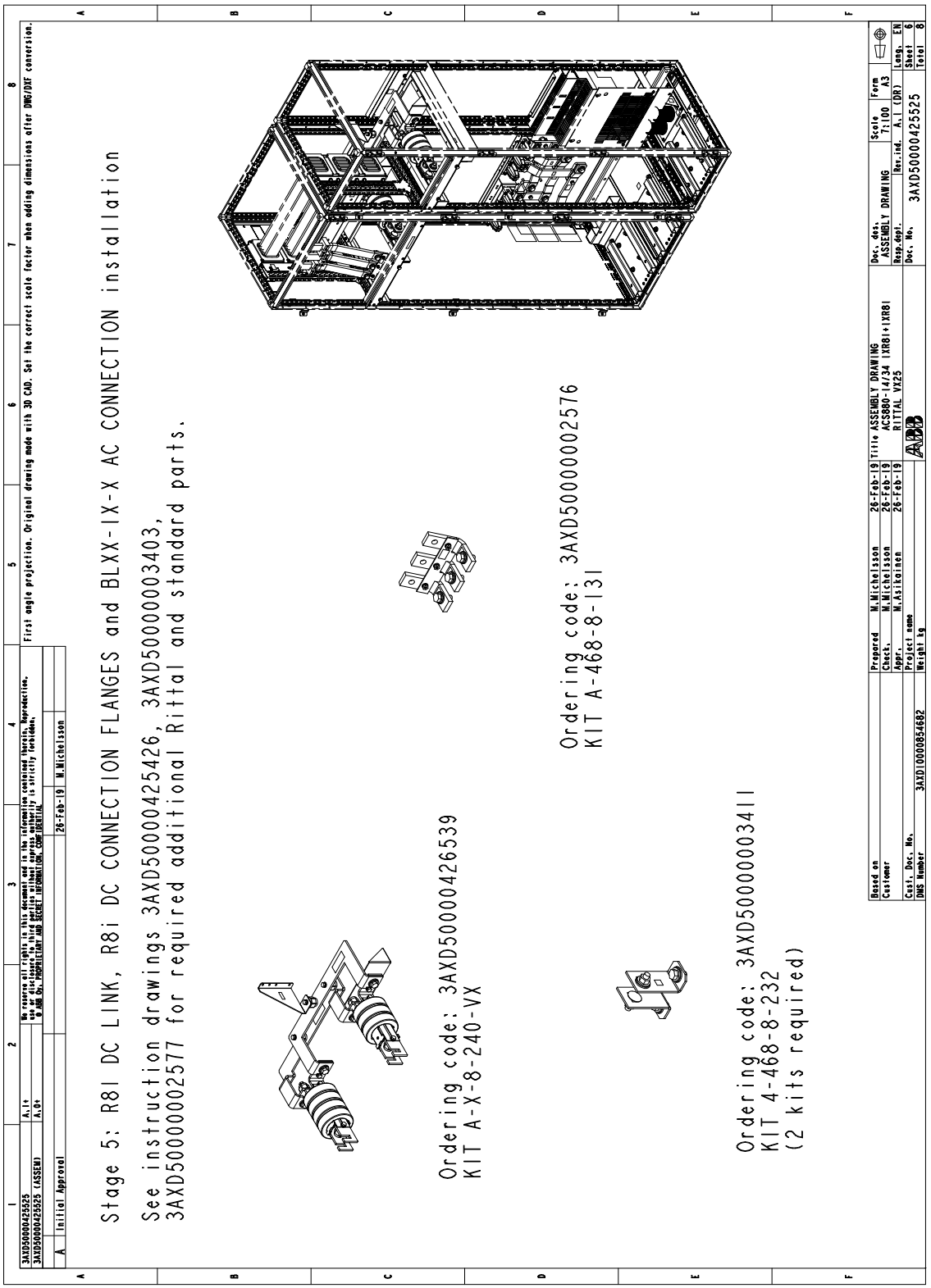
Stage 3: Lead-through for bottom plate installation



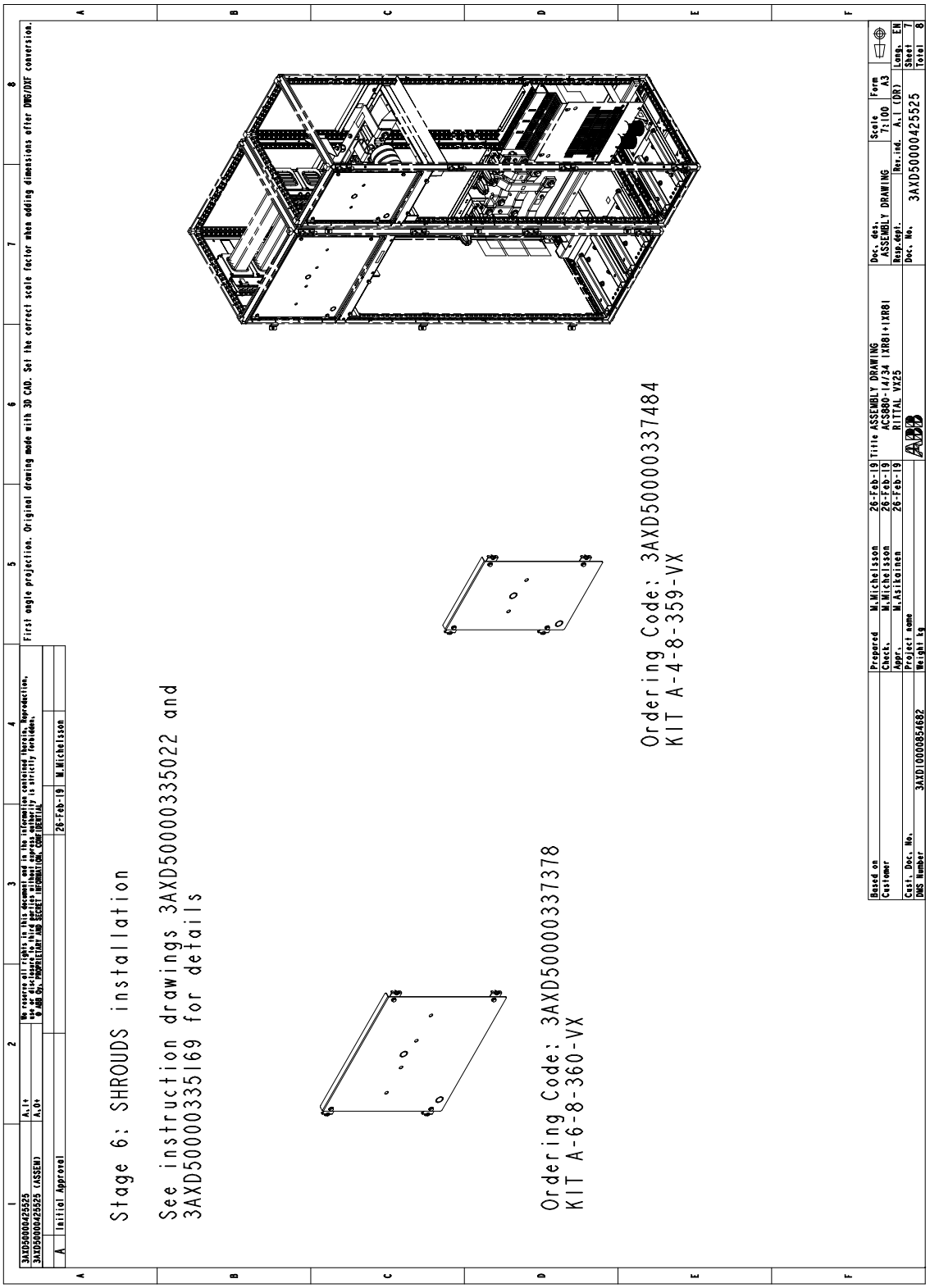
Stage 4: BLCL-1x-x AC busbars, AC output busbars and quick connector installation



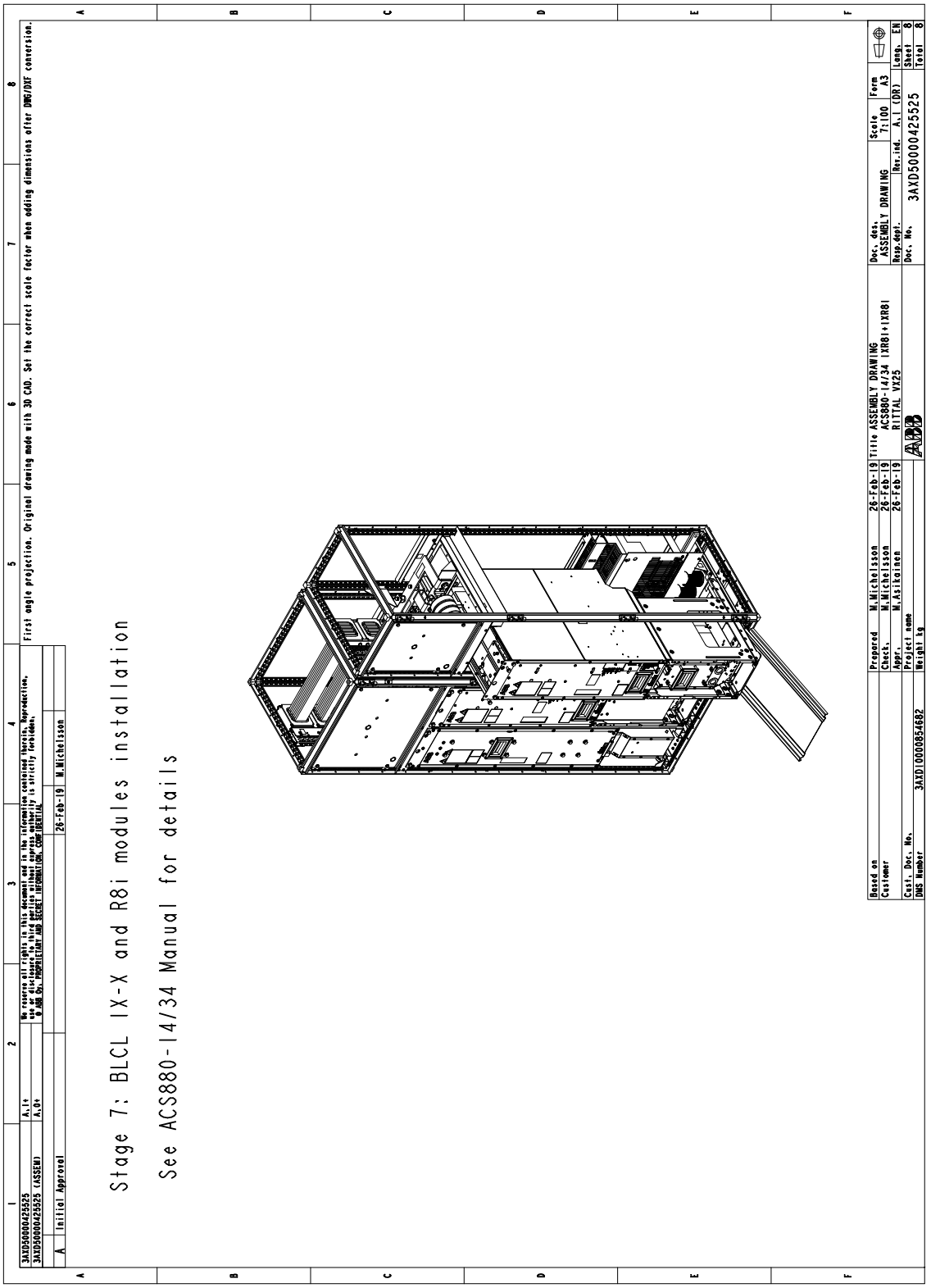
Stage 5: DC link, DC connection flanges and BLCL-1x-x AC connection installation



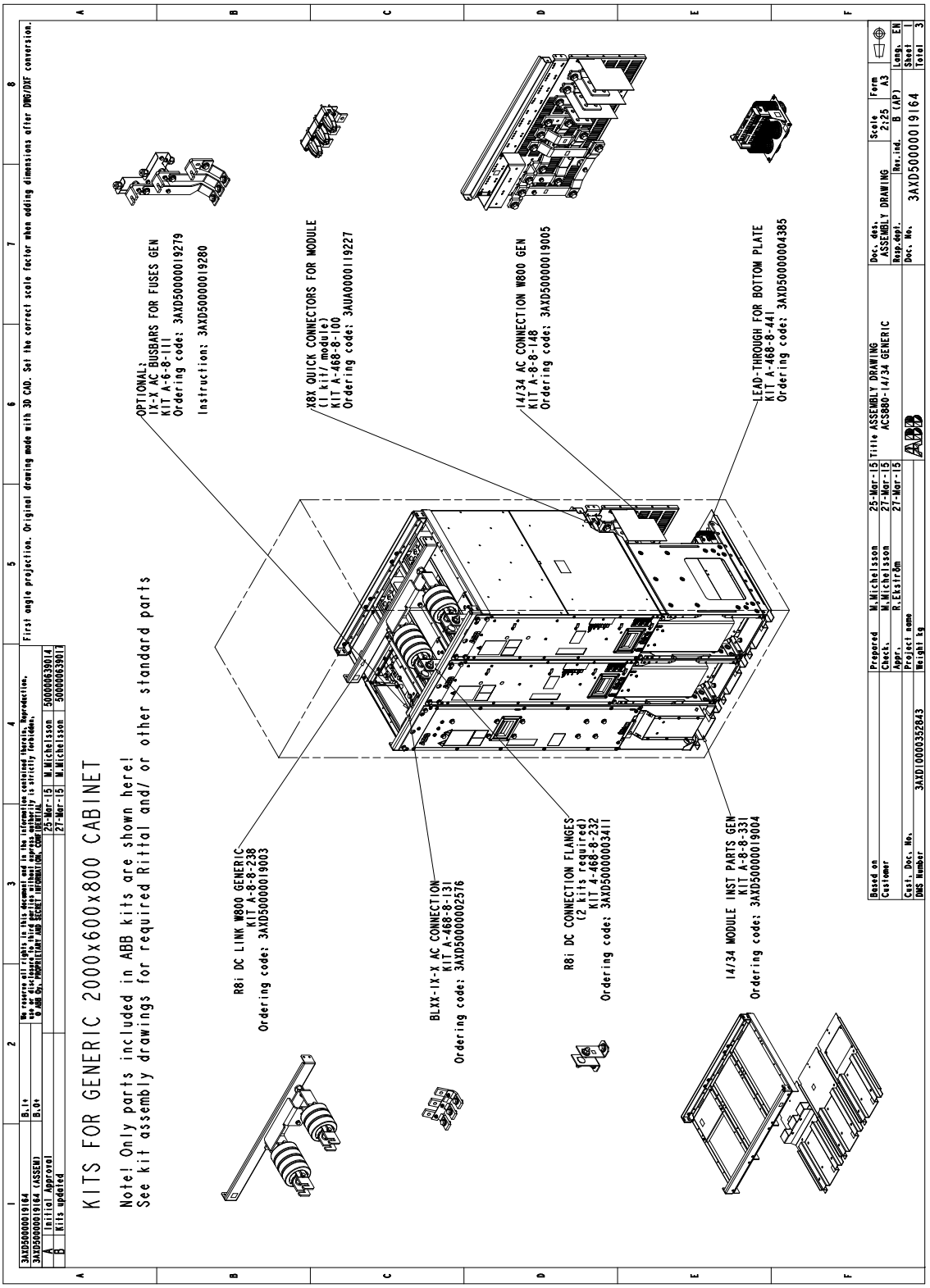
Stage 6: Shrouds installation



Stage 7: BLCL-1x-x and R8i modules installation



ACS880-14/34 single drive module package (1×R8i + 1×R8i, generic enclosure)



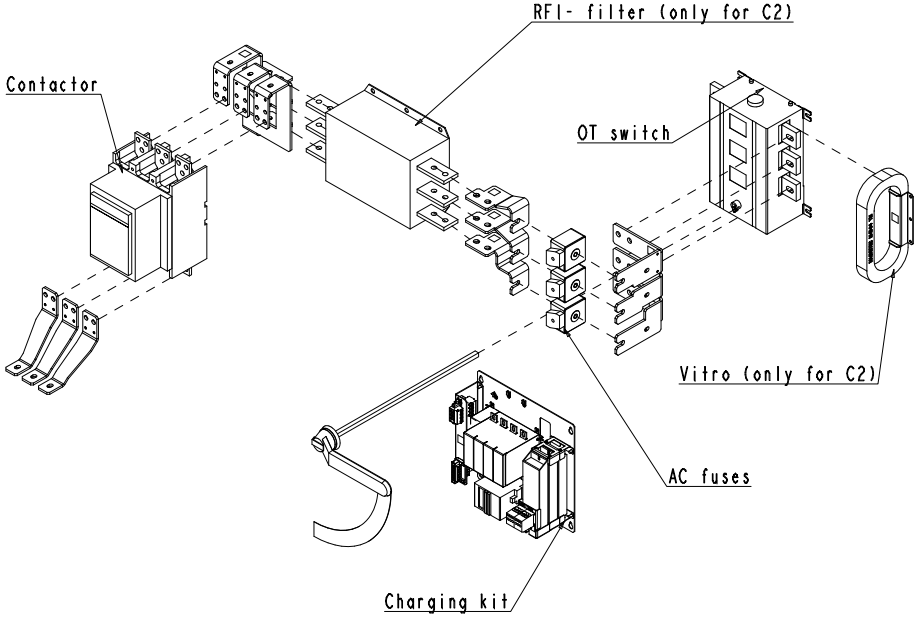
3AXD50000019164	B.1+	We reserve all rights in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden. © ABB Oy, PROPRIETARY AND SECRET INFORMATION, CONFIDENTIAL			
3AXD50000019164 (ASSEM)	B.0+				
A	Initial Approval		25-Mar-15	M.Michelsson	500000639014
B	Kits updated		27-Mar-15	M.Michelsson	500000639017

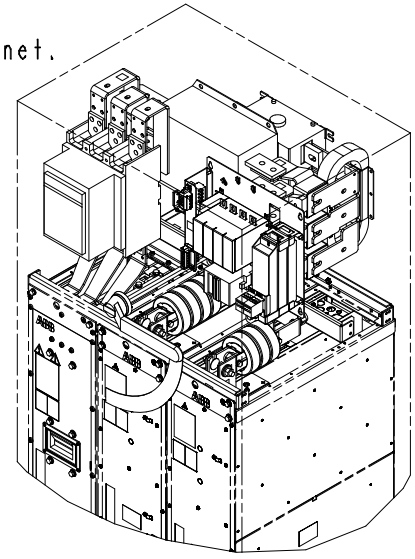
First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.

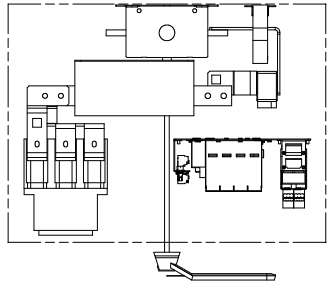
SAMPLE! This is an example how switch, RFI- filter, contactor, charging kit and AC fuses could be fitted into the cabinet.

Note that supporting mechanics (busbars) shown here are not included in any kits and not available from ABB.

See 3AXD50000019164 3D-model for overview and dependencies of ISU 14/34 generic kits.







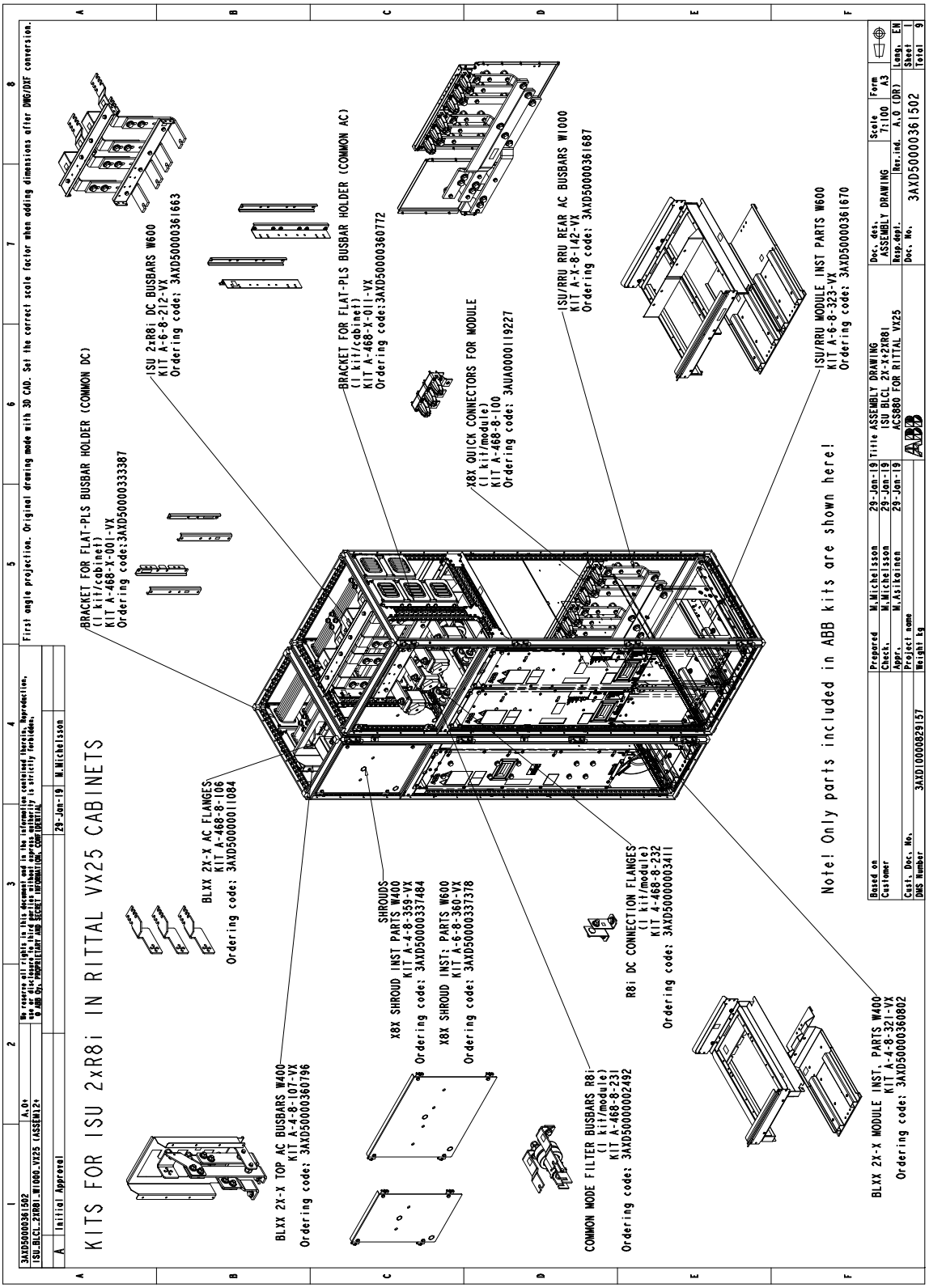
Based on	Prepared	M.Michelsson	25-Mar-15	Title ASSEMBLY DRAWING	Doc. des. ASSEMBLY DRAWING
Customer	Check.	M.Michelsson	27-Mar-15	ACS880-14/34 GENERIC	Scale 1:10
	Appr.	R.Ekström	27-Mar-15		Form A3
Cust. Doc. No.	Project name				Resp.dept. Rev.ind. B (AP)
DMS Number 3AXD10000352843	Weight kg				Doc. No. 3AXD50000019164
					Lang. EN
					Sheet 3
					Total 3

ACS880-14/34 single drive module package (2×R8i + 2×R8i, Rittal VX25 enclosure)

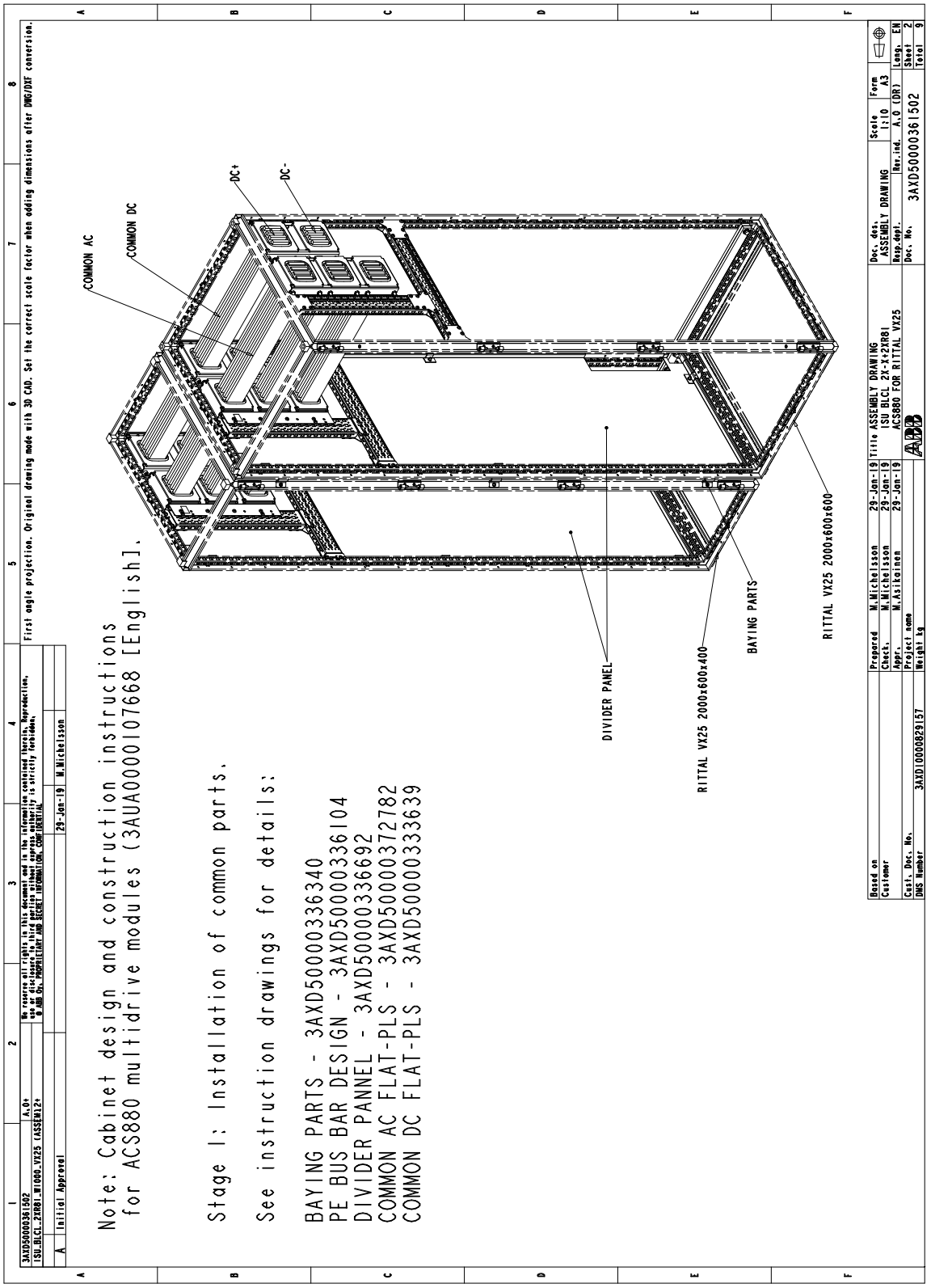
Supply modules and LCL filter

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

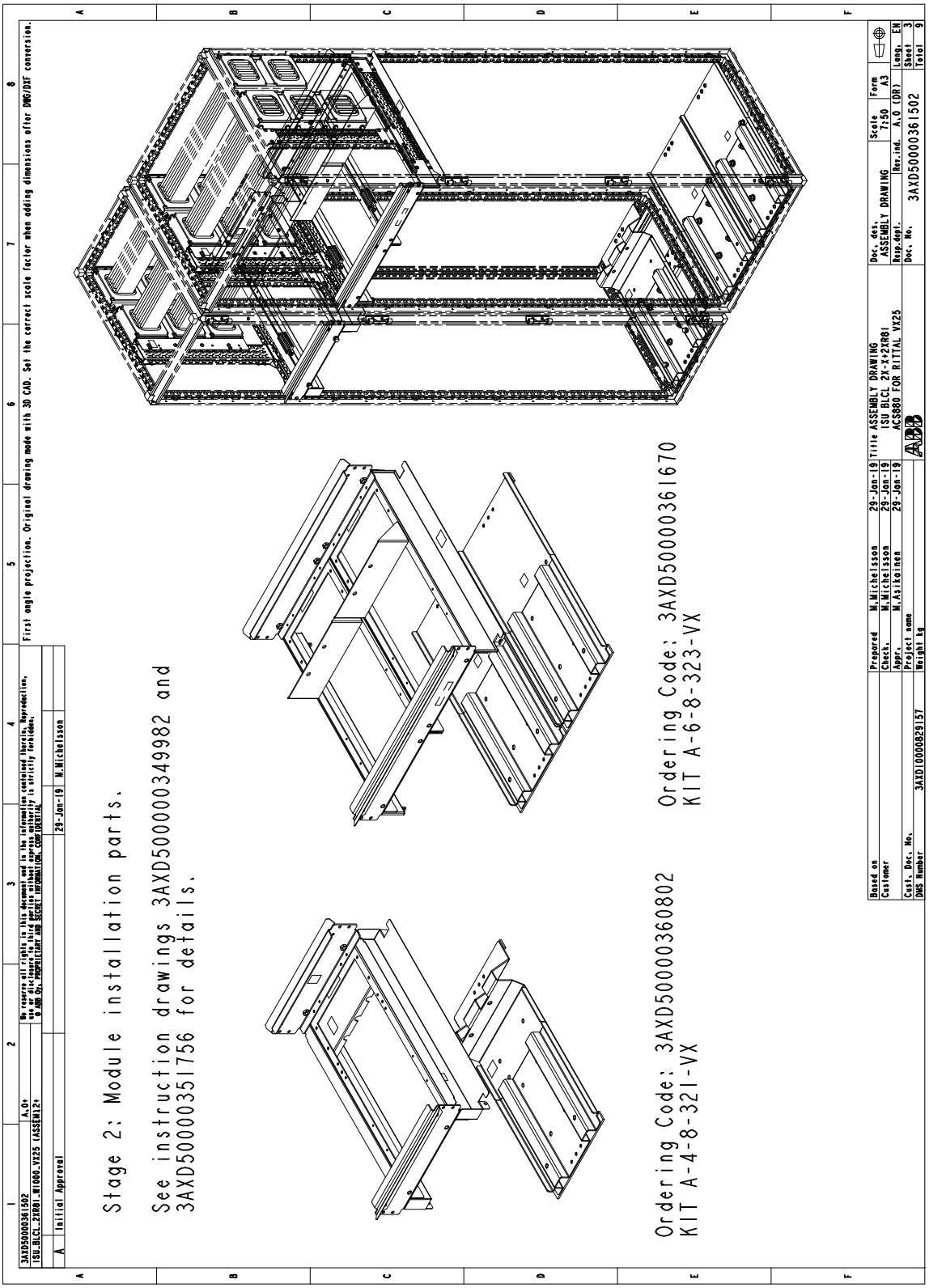
Kits for 2×R8i supply modules and LCL filter



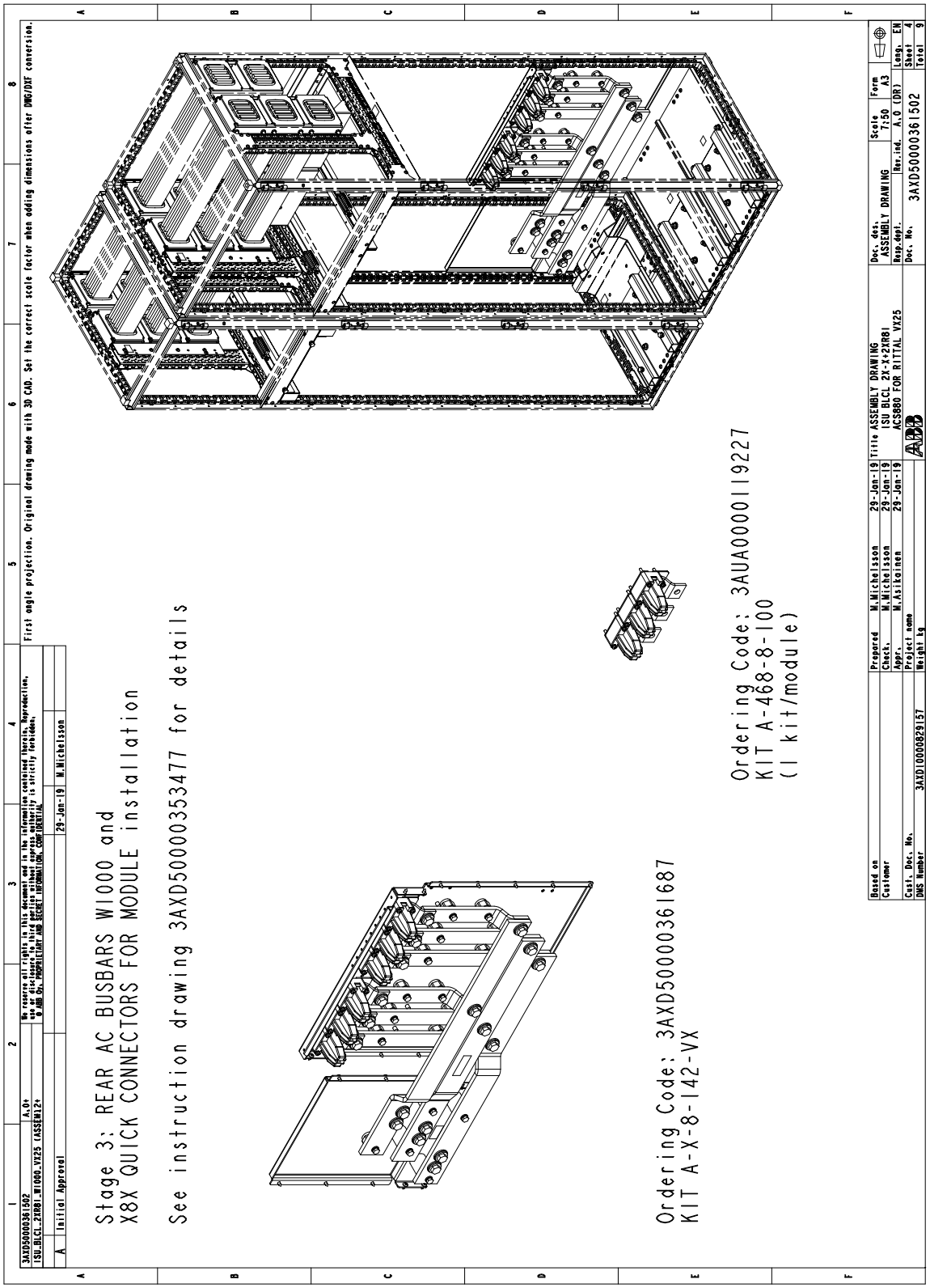
Stage 1: Installation of common parts



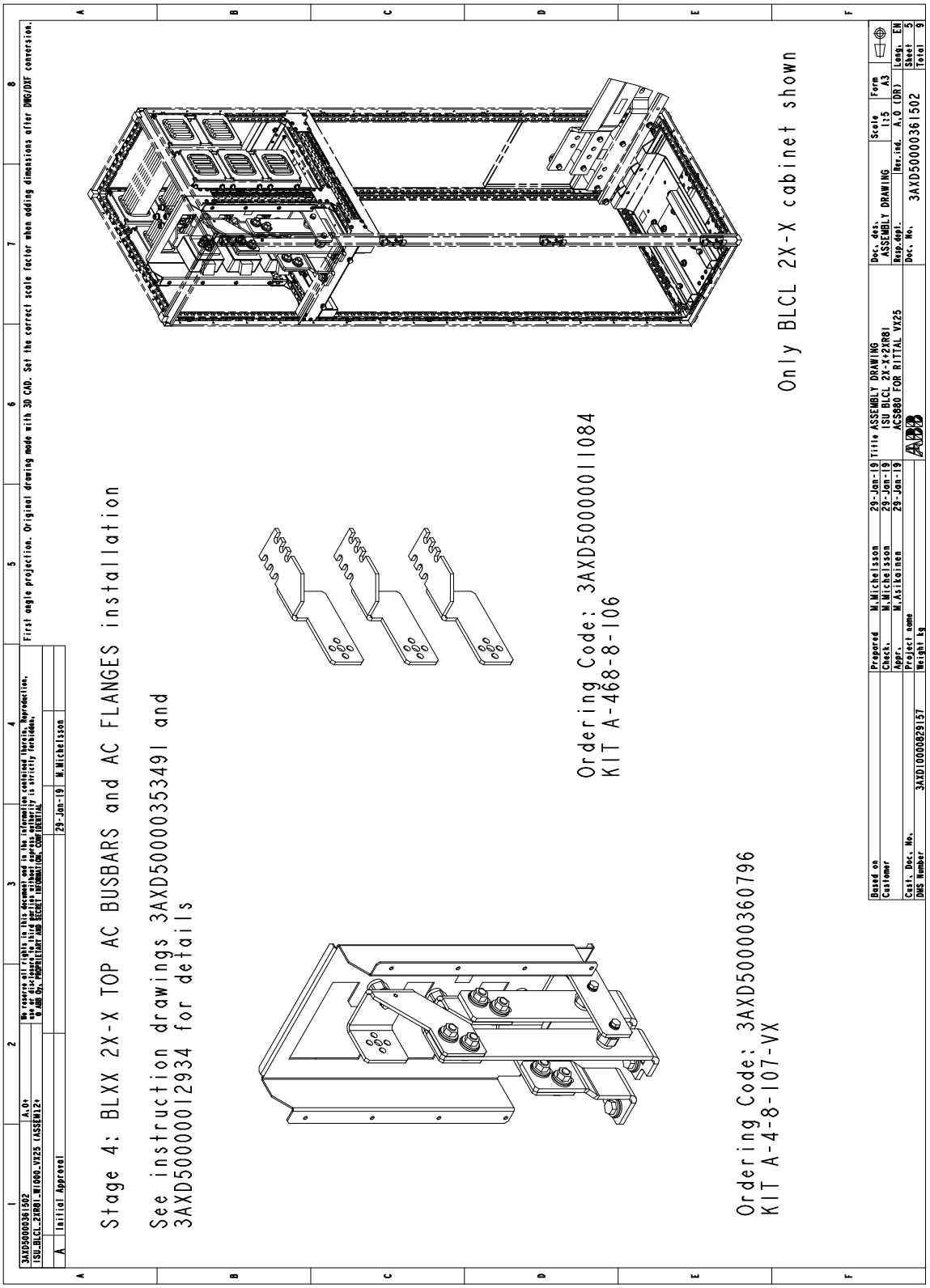
Stage 2: Module installation parts



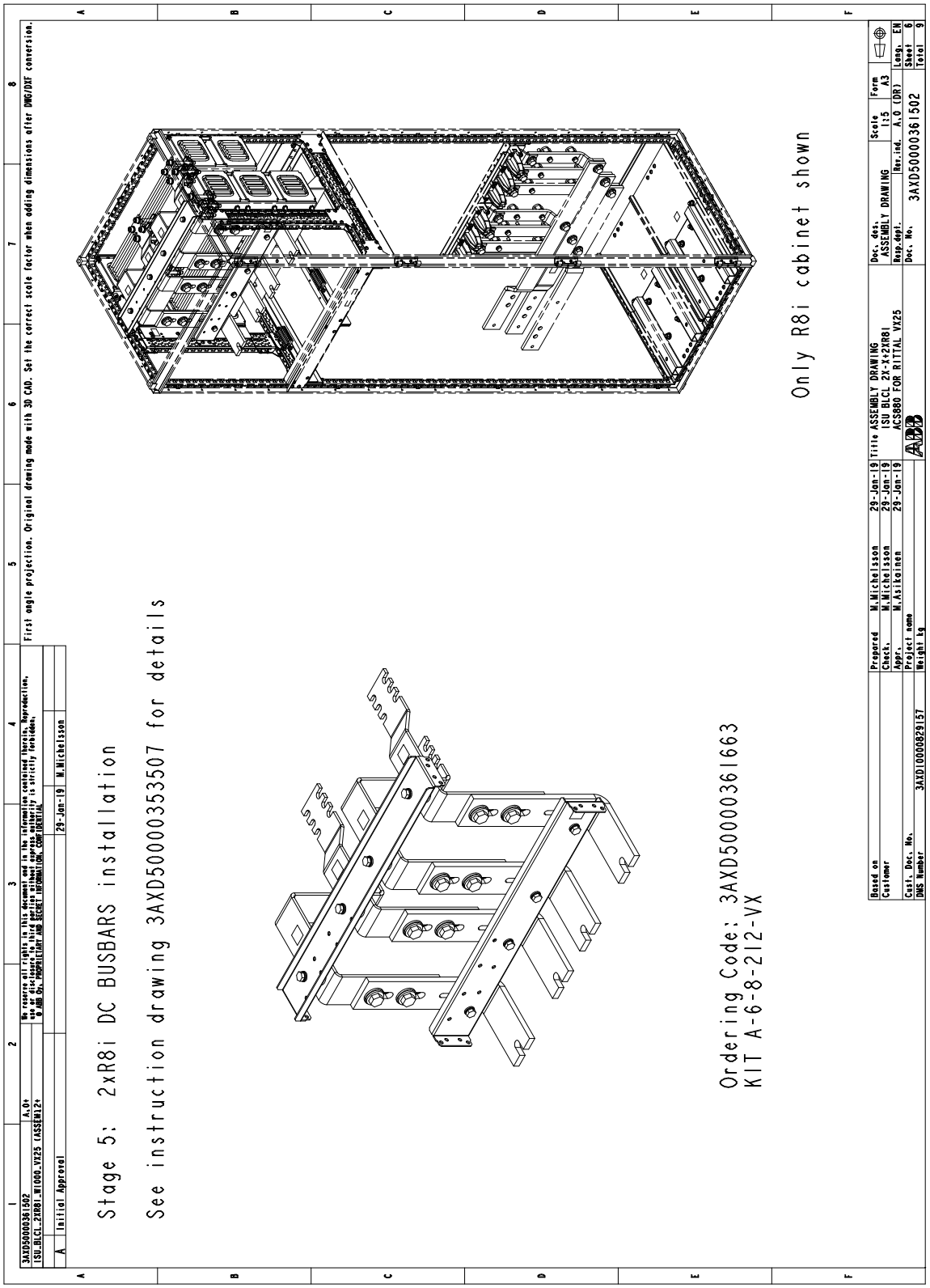
Stage 3: Rear AC busbars and quick connectors



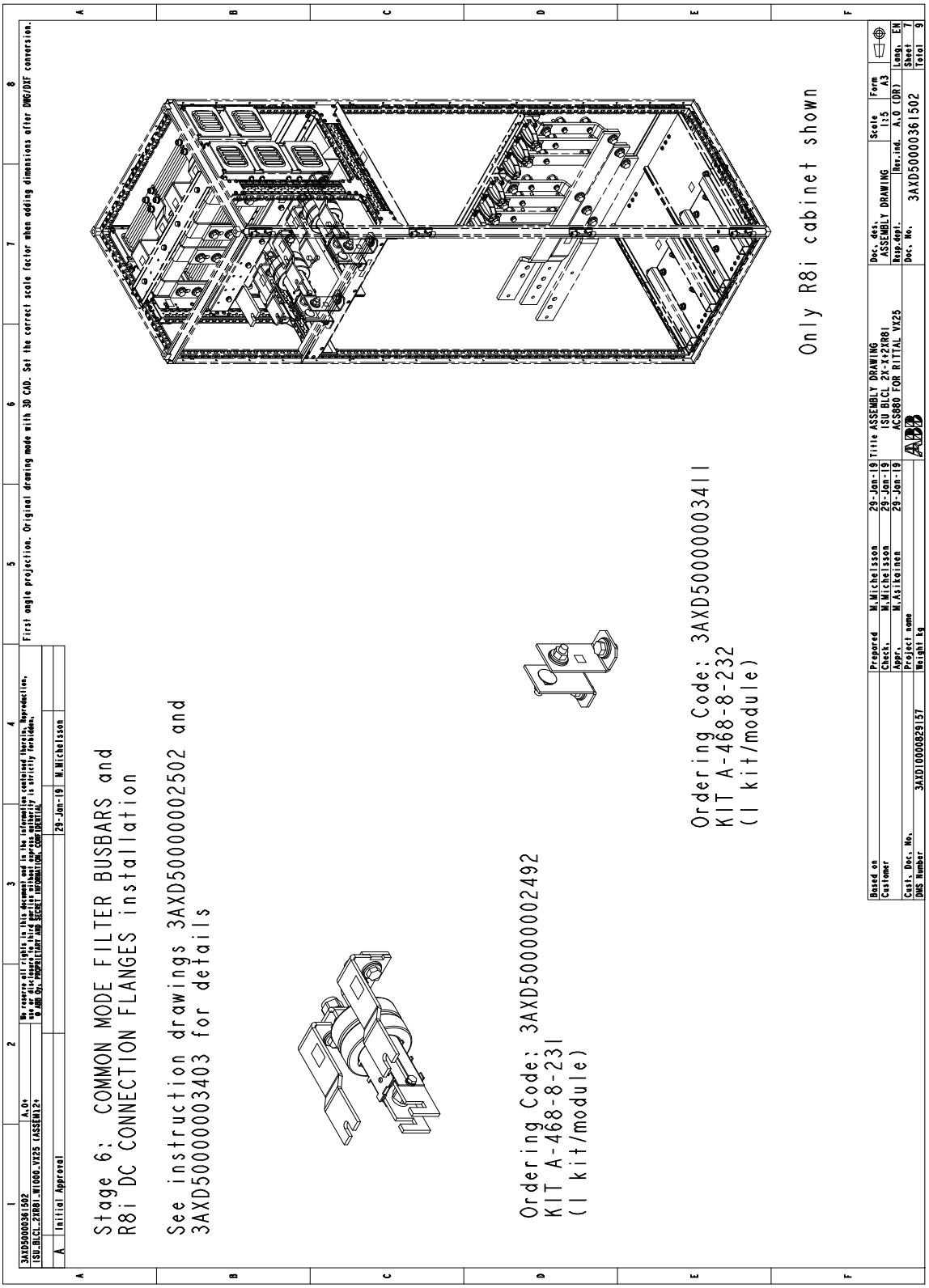
Stage 4: BLCL AC busbars and AC flanges



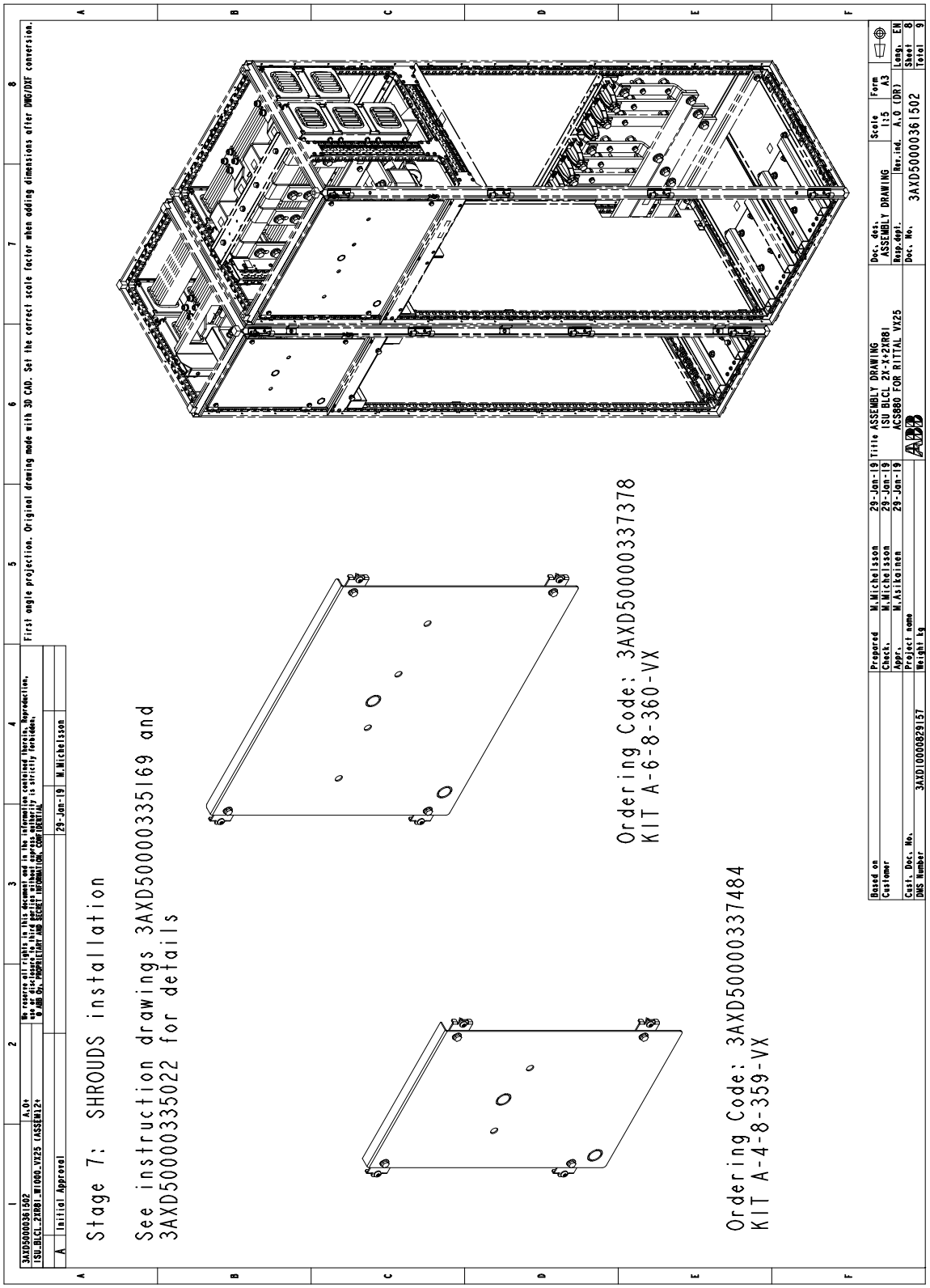
Stage 5: DC busbars



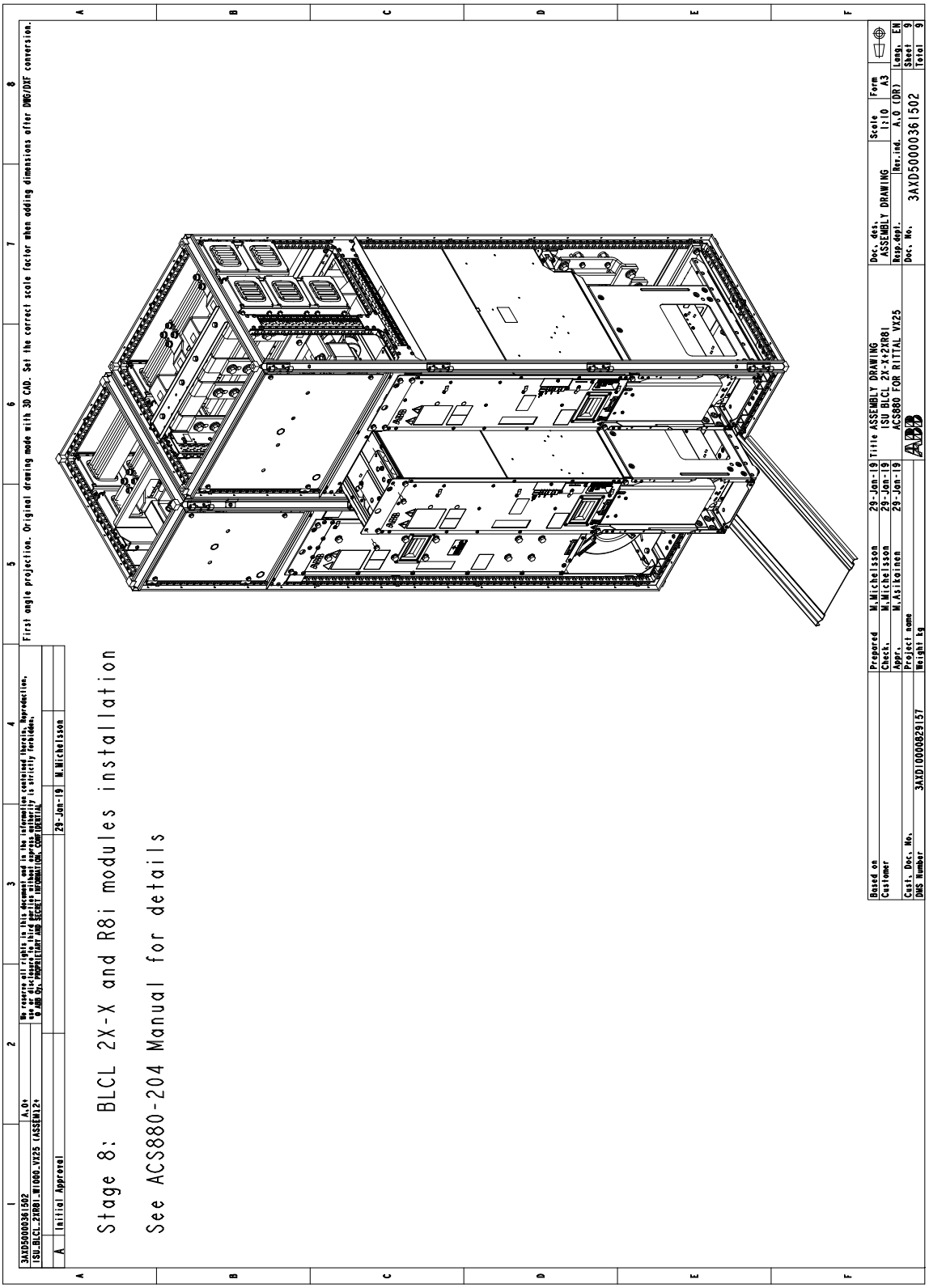
Stage 6: Common mode filter busbars and DC connection flanges



Stage 7: Shroud installation parts



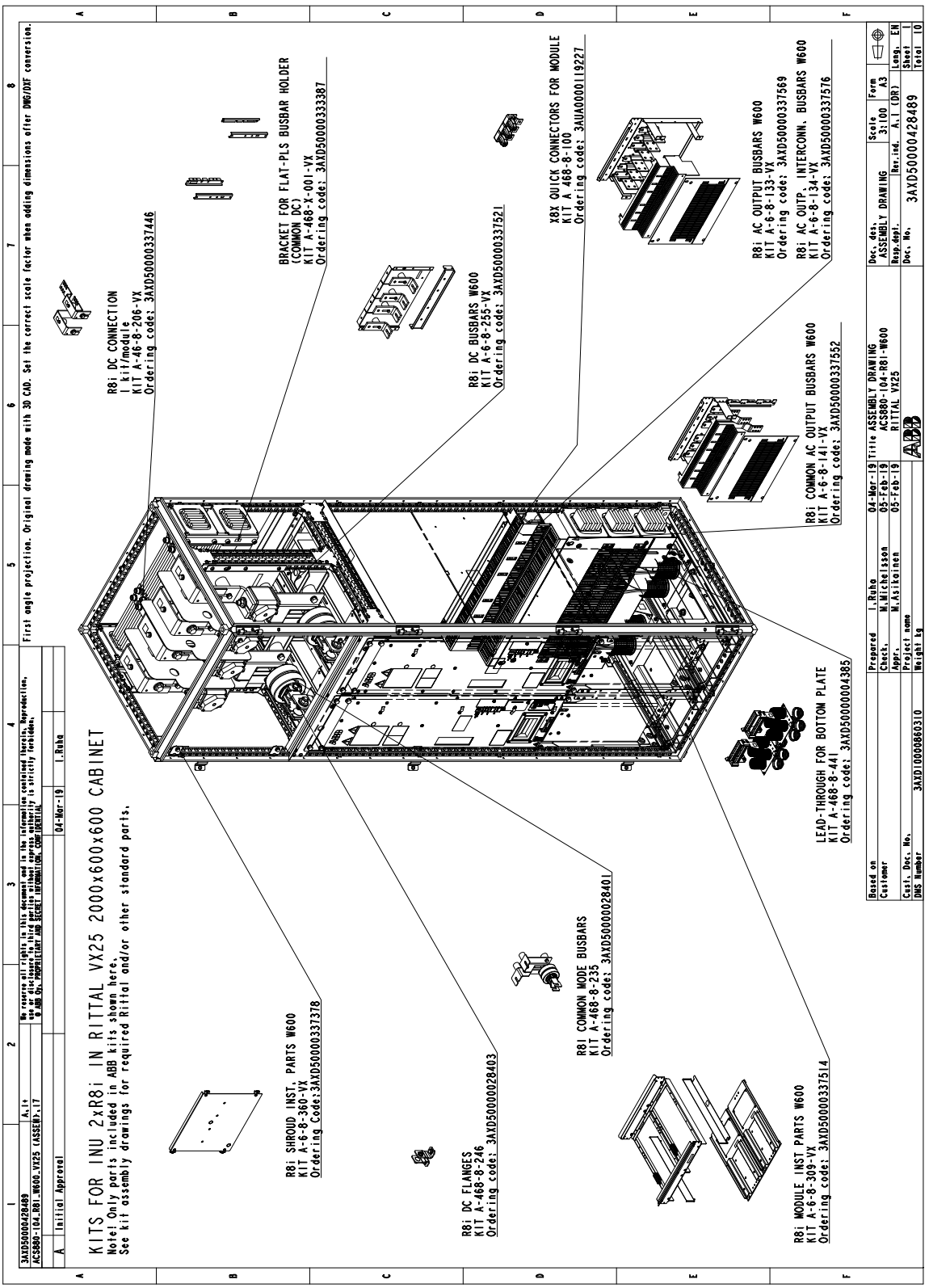
Stage 8: Modules installation



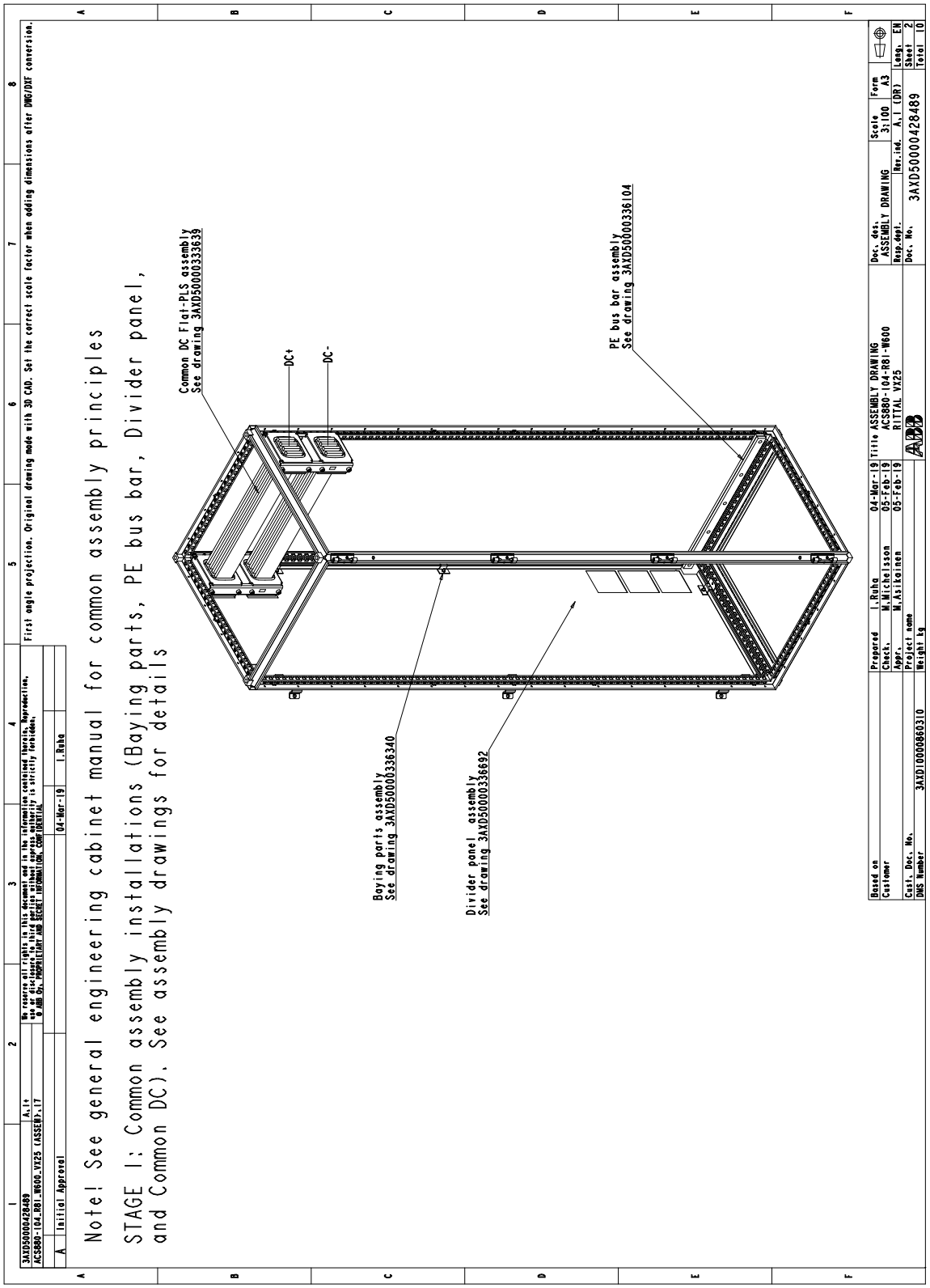
Inverter modules

#	Installation stage	Instruction code	Kit code	Kit ordering code
1.	Installation of common parts: • Baying parts • PE busbar [PE] • Divider panel • Bracket for Flat-PLS busbar holder (common DC)	 3AXD50000336340 3AXD50000336104 3AXD50000336692 3AXD50000333639	 A-468-X-001-VX	 3AXD50000333387
2.	DC busbars and DC connection	3AXD50000342471 3AXD50000345915	A-6-8-255-VX A-46-8-206-VX	3AXD50000337521 3AXD50000337446
3.	Module installation parts and lead-through for bottom plate	3AXD50000345052 3AXD50000004817	A-6-8-309-VX A-468-8-441	3AXD50000337514 3AXD50000004385
4.	4A. Quick connectors and AC output busbars installation	3AUA0000118667 3AXD50000345526	A-468-8-100 A-6-8-133-VX	3AUA0000119227 3AXD50000337569
	4B. Quick connectors and AC output interconnection busbars installation	3AUA0000118667 3AXD50000345632	A-468-8-100 A-6-8-134-VX	3AUA0000119227 3AXD50000337576
	4C. Quick connectors for module and common AC output busbars installation	3AUA0000118667	A-468-8-100 A-6-8-141-VX	3AUA0000119227 3AXD50000337552
5.	Common mode busbars and DC flanges installation	3AXD50000028384 3AXD50000028418	A-468-8-246 A-468-8-235	3AXD50000028403 3AXD50000028401
6.	Shroud installation parts	3AXD50000335022	A-6-8-360-VX	3AXD50000337378
7.	Module installation	-	-	-

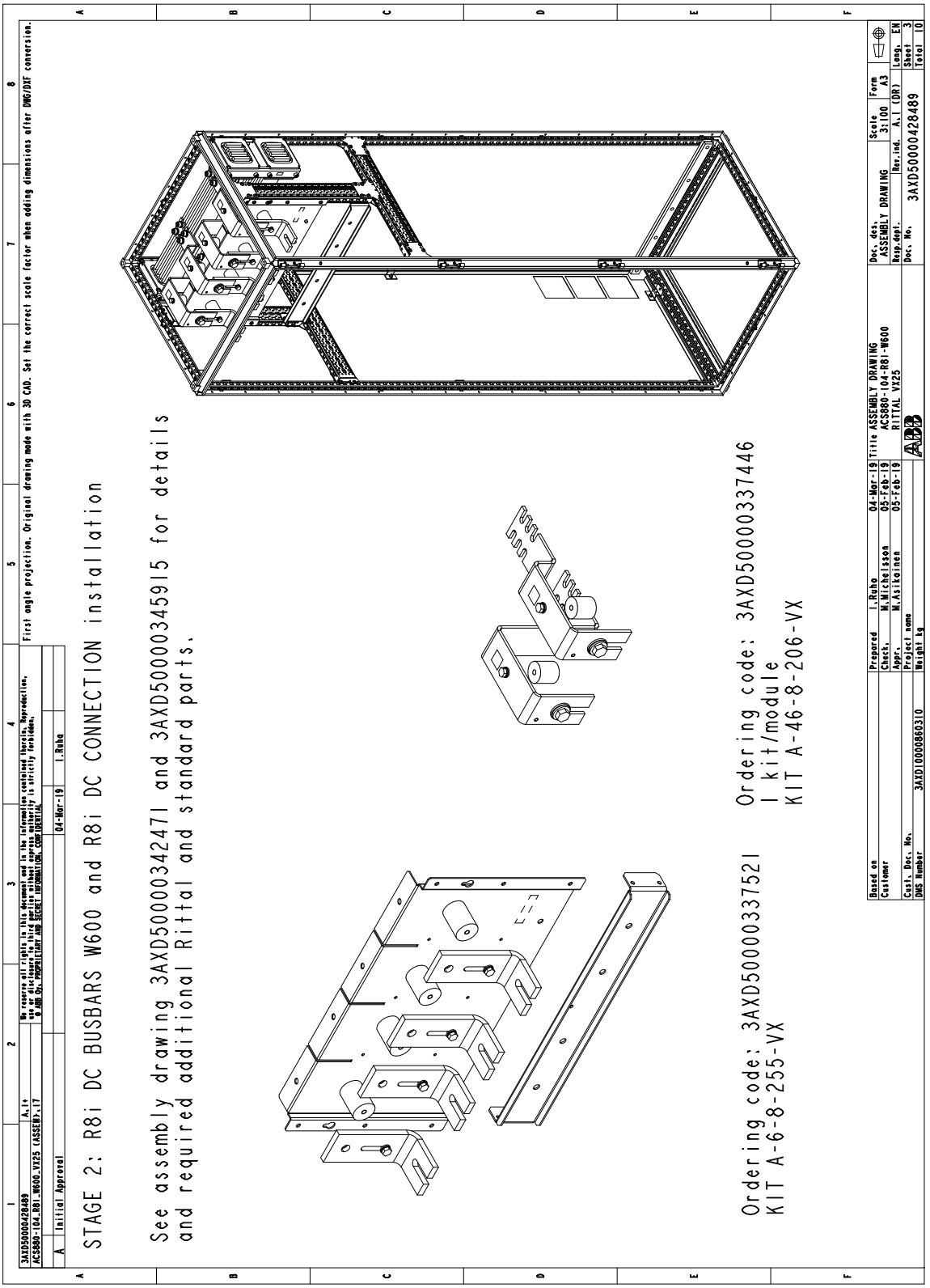
Kits for 2×R8i



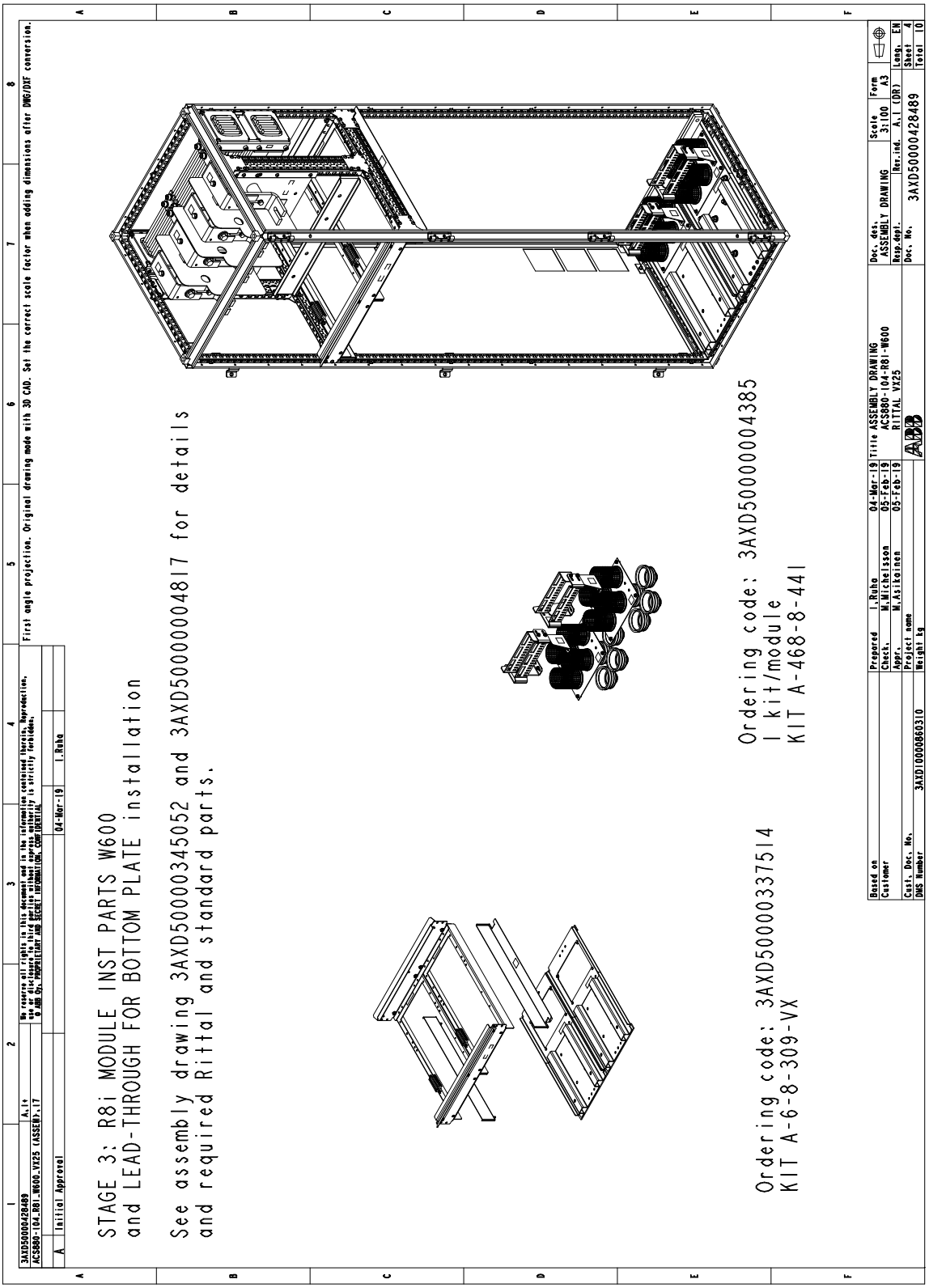
Stage 1: Installation of common parts



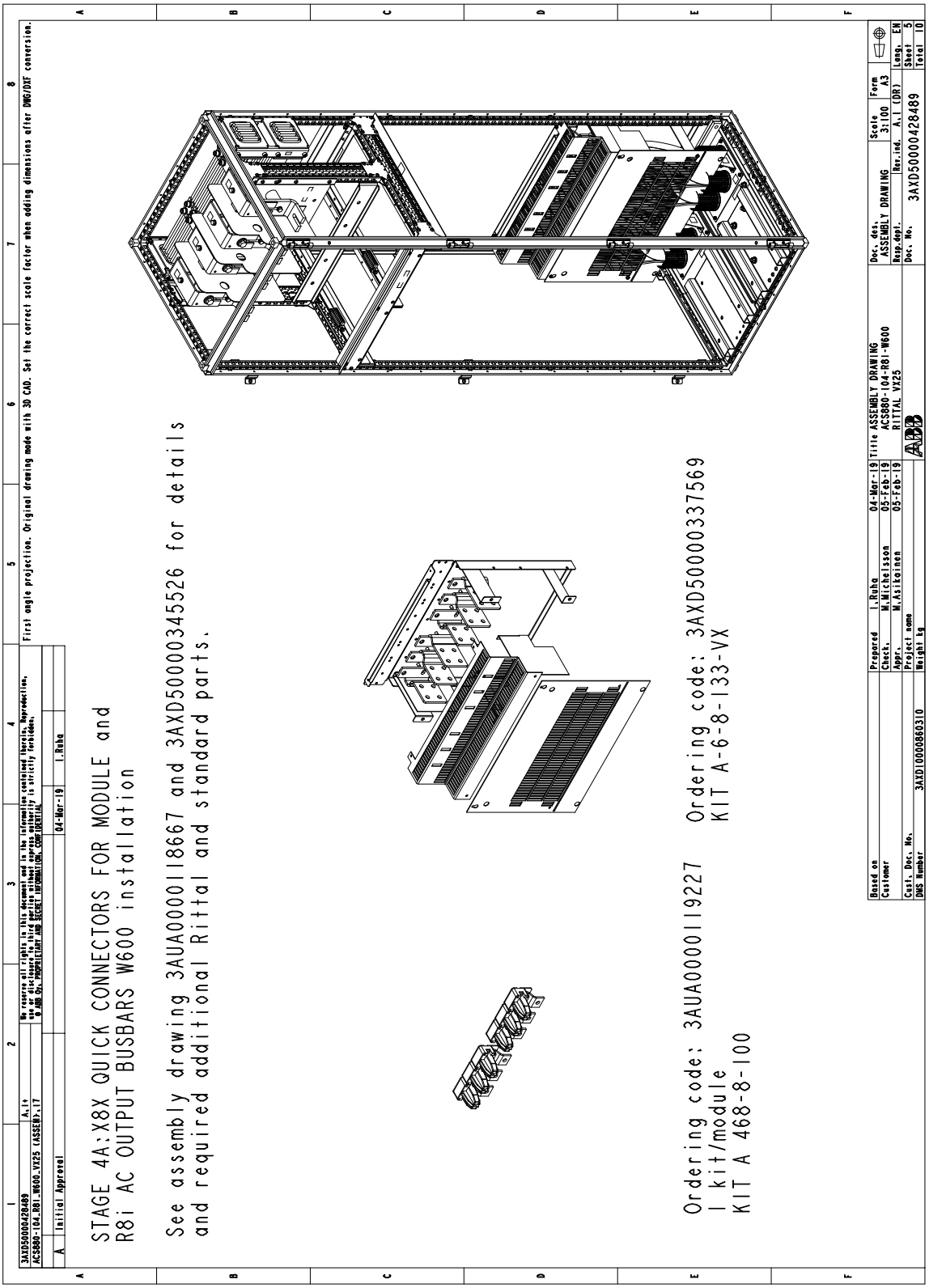
Stage 2: DC busbars and DC connection



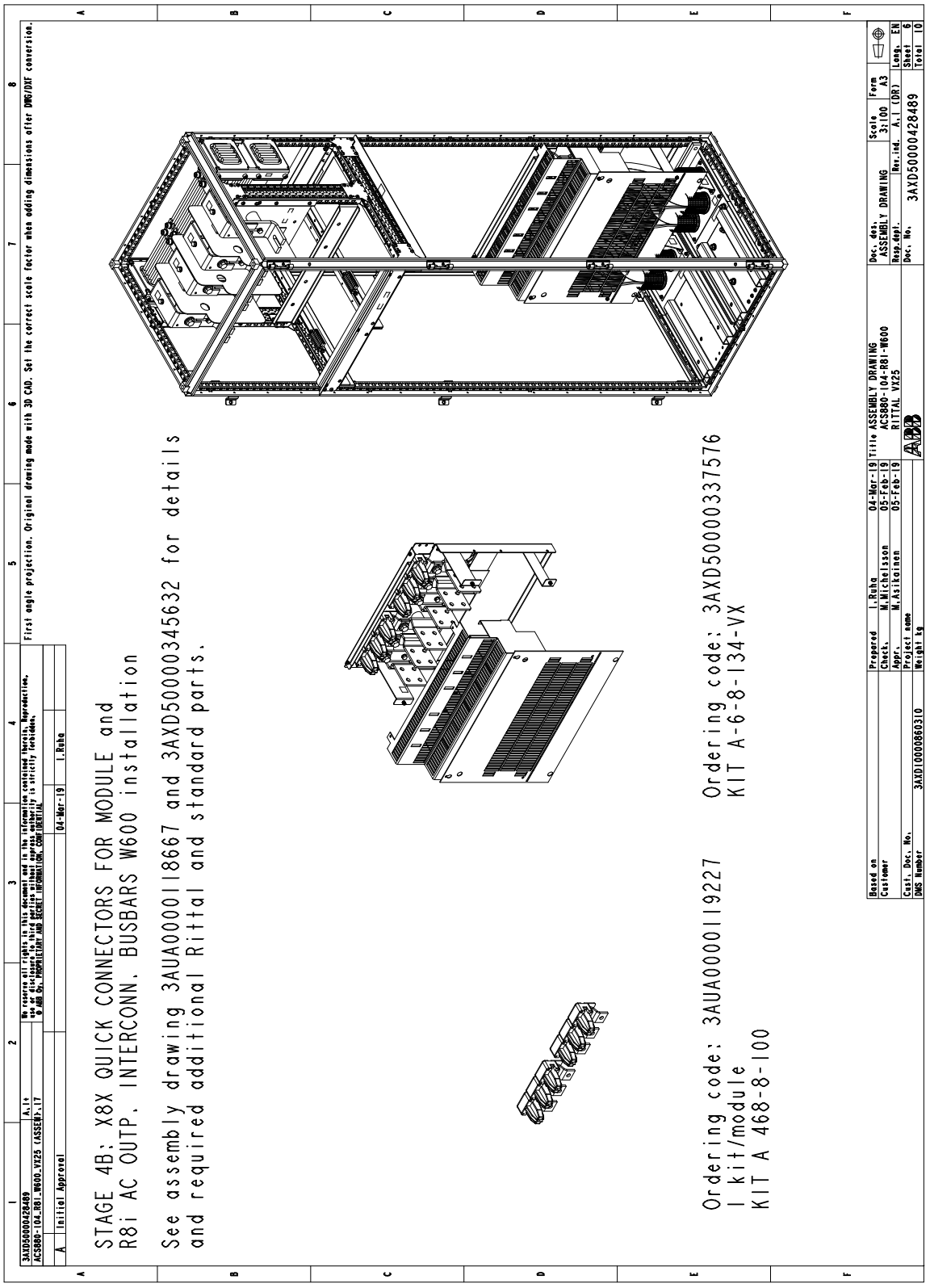
Stage 3: Module installation parts and lead-through for bottom plate



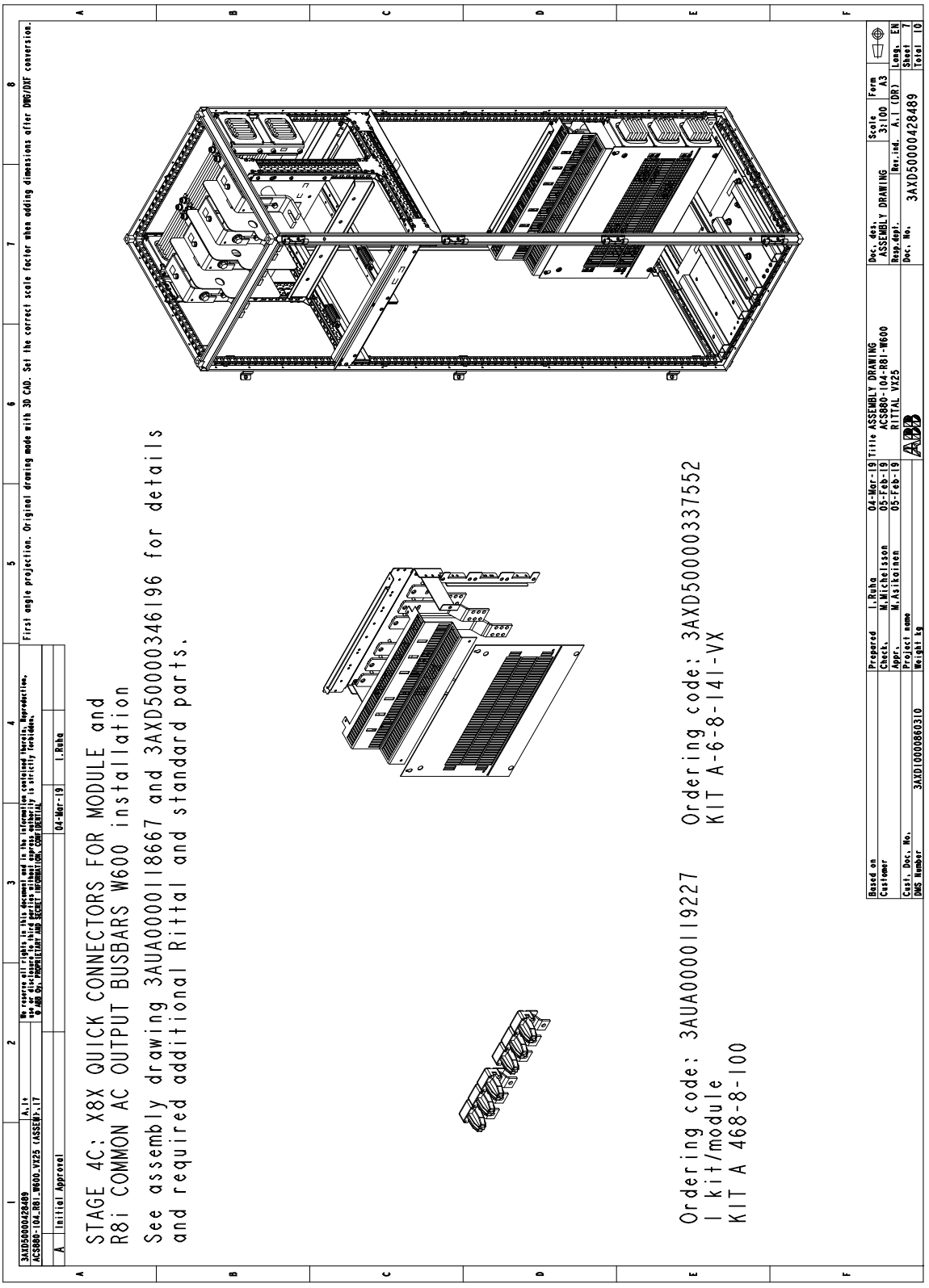
Stage 4A: Quick connectors and AC output busbars installation



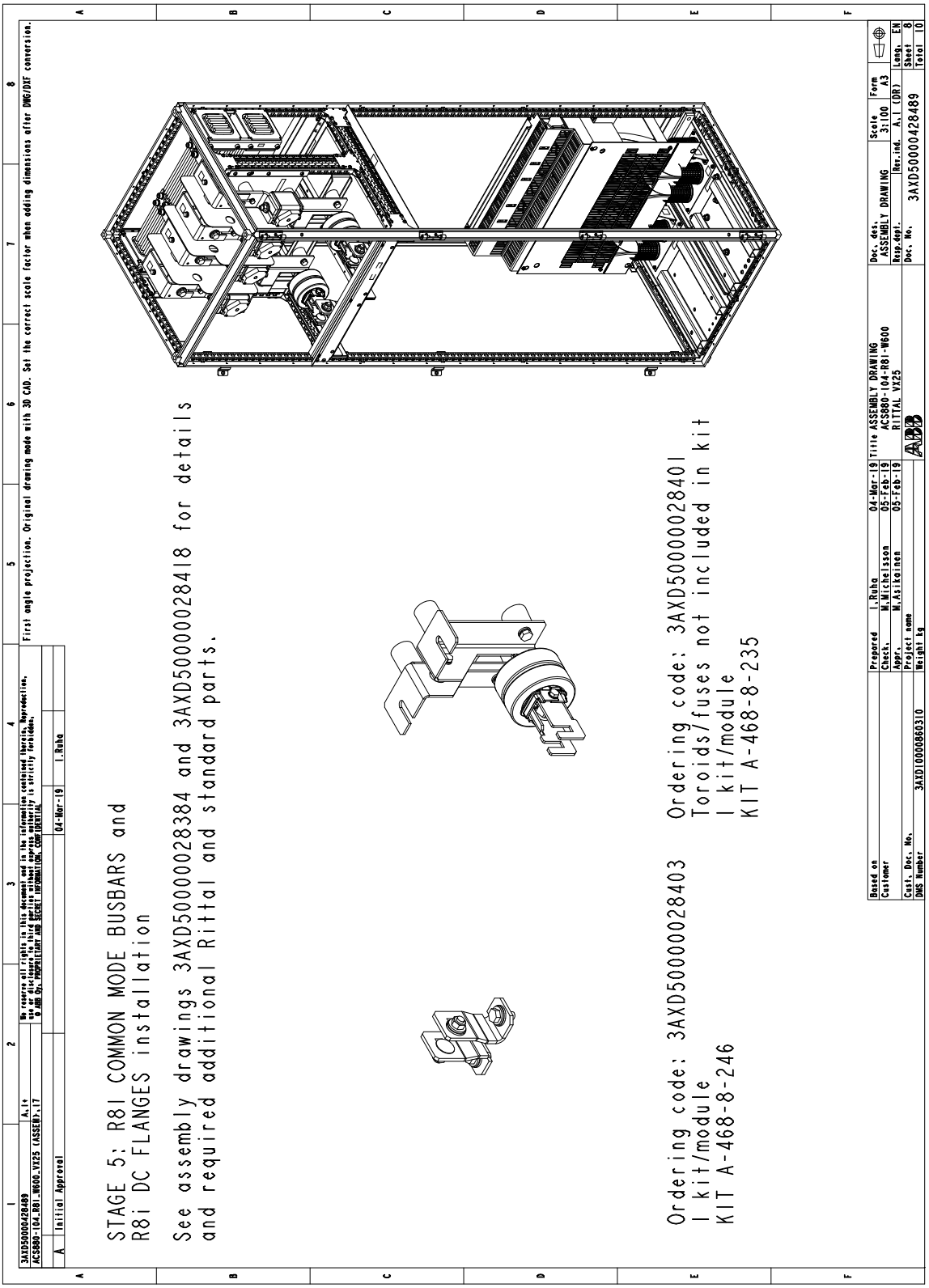
Stage 4B: Quick connectors for module and AC output interconnection busbars installation



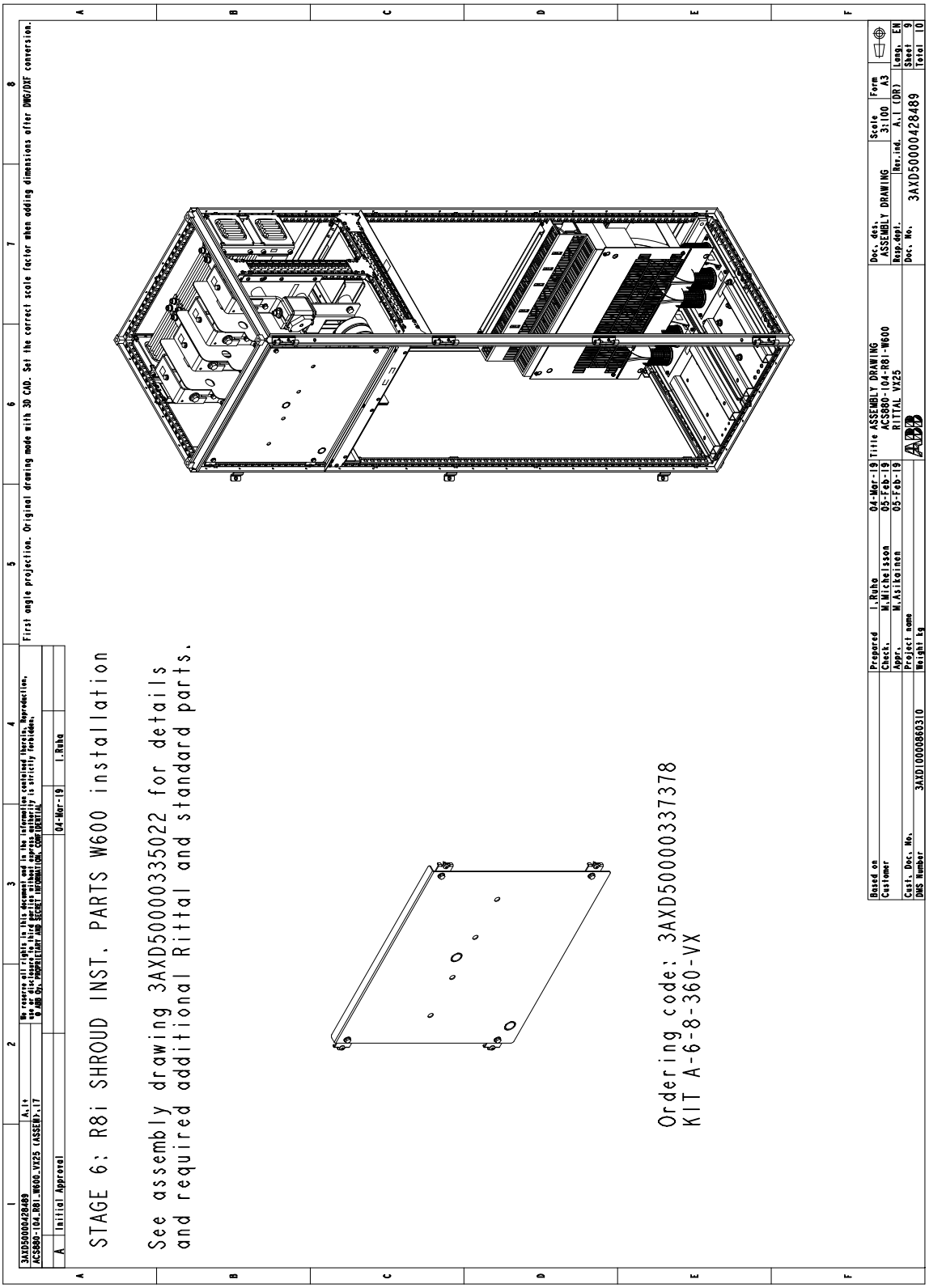
Stage 4C: Quick connectors for module and common AC output busbars installation



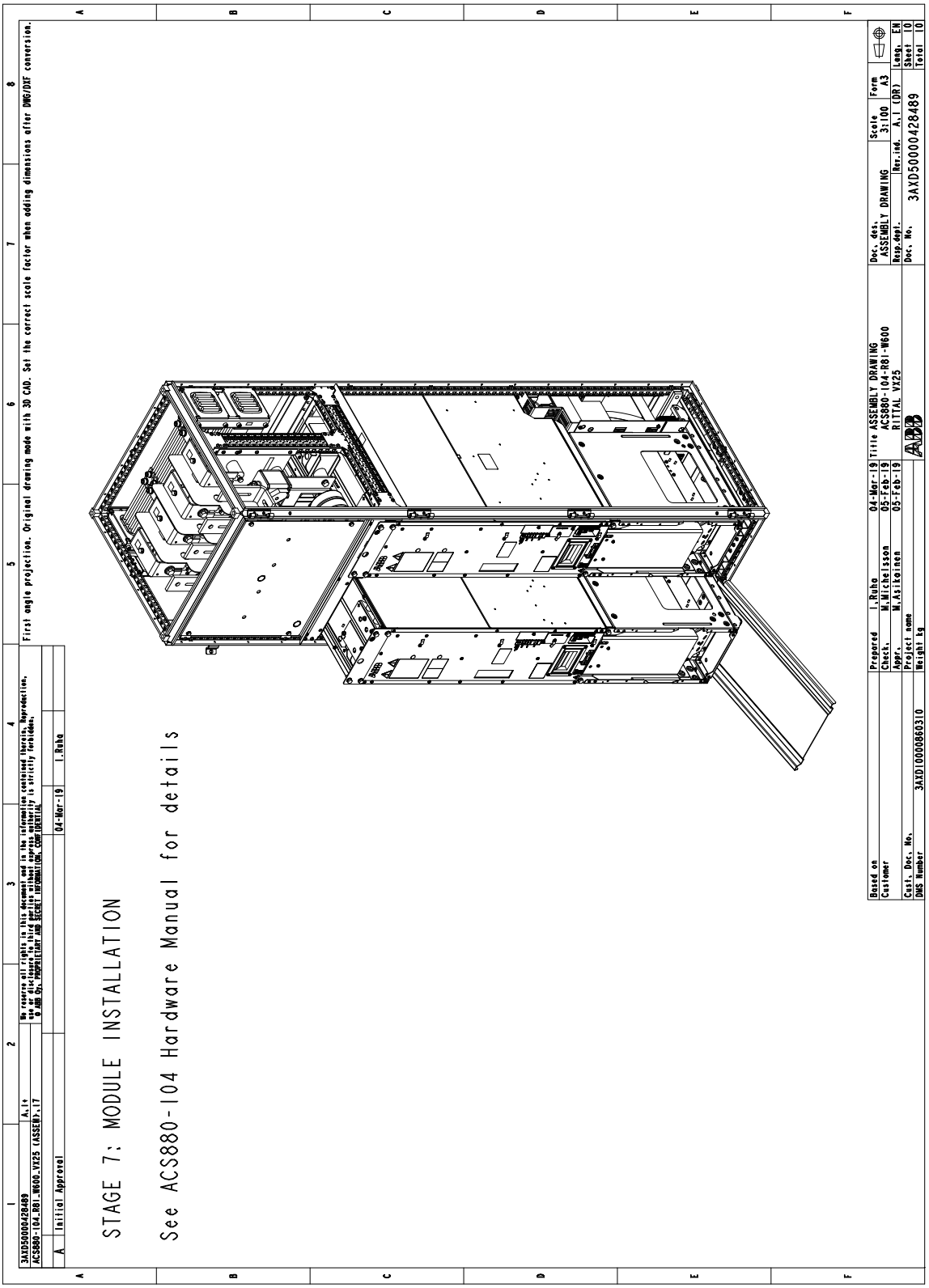
Stage 5: Common mode busbars and DC flanges installation



Stage 6: Shroud installation parts

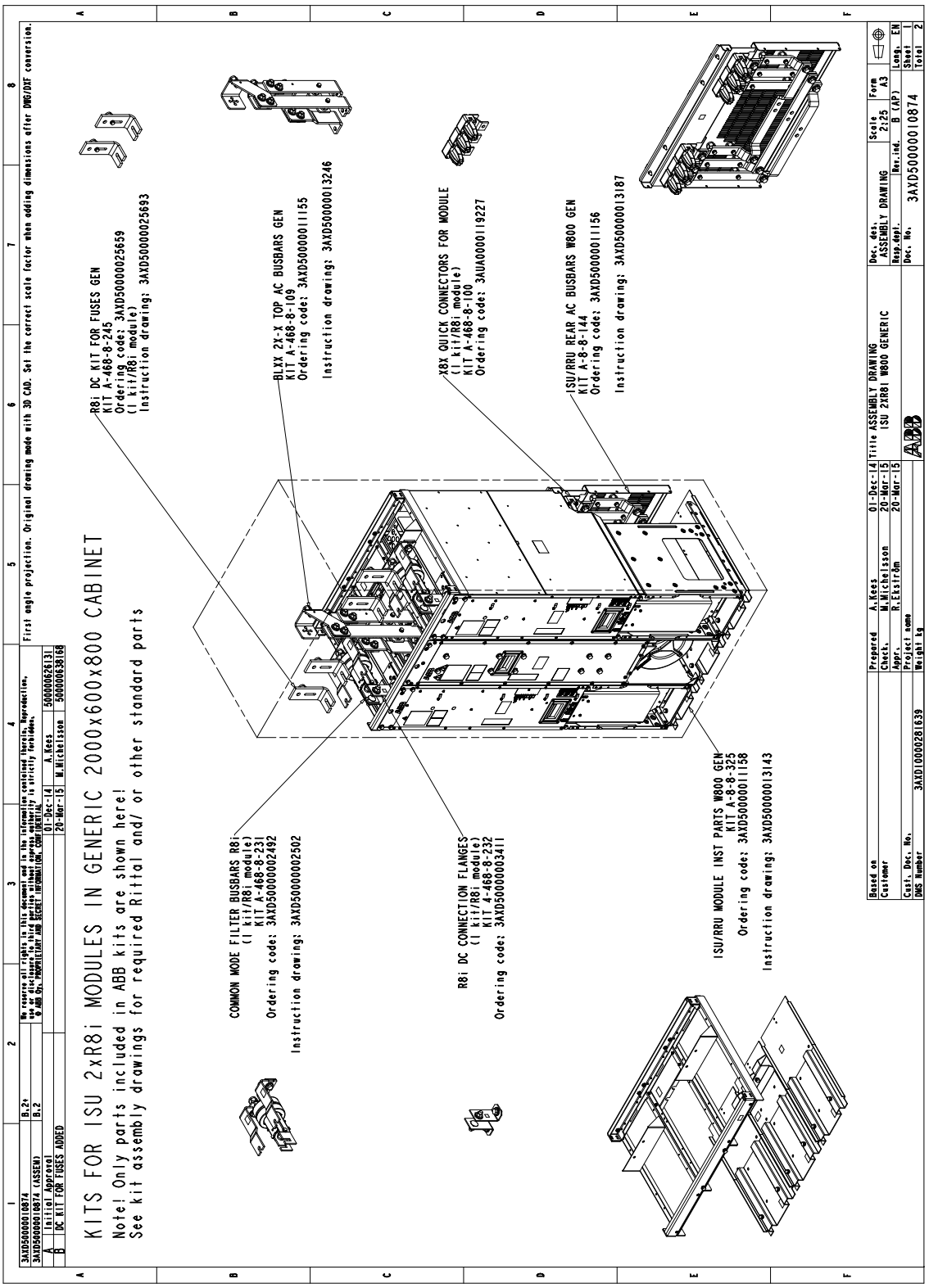


Stage 7: Module installation

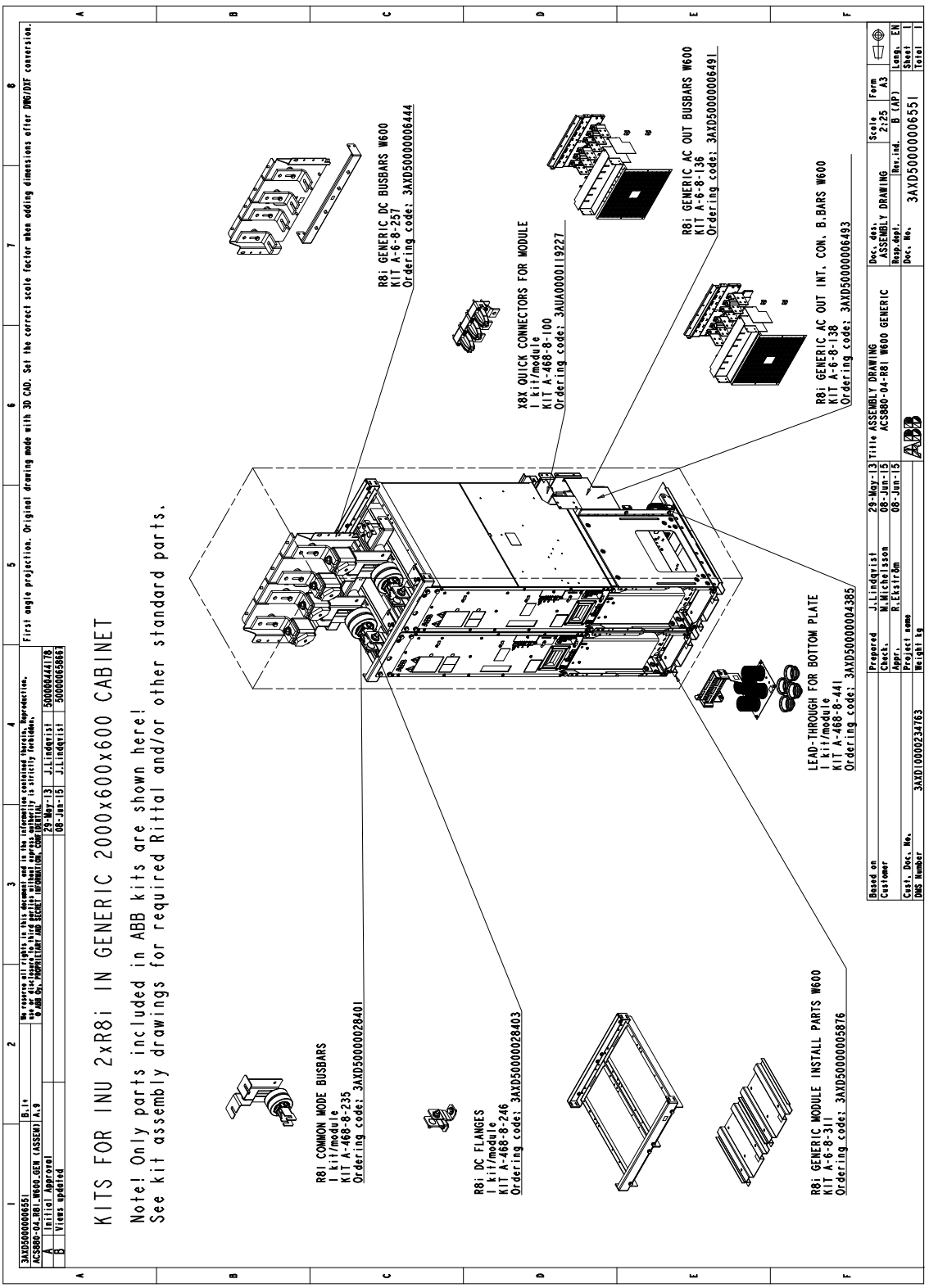


ACS880-14/34 single drive module package (2×R8i + 2×R8i, generic enclosure)

Supply modules and LCL filter



Inverter modules

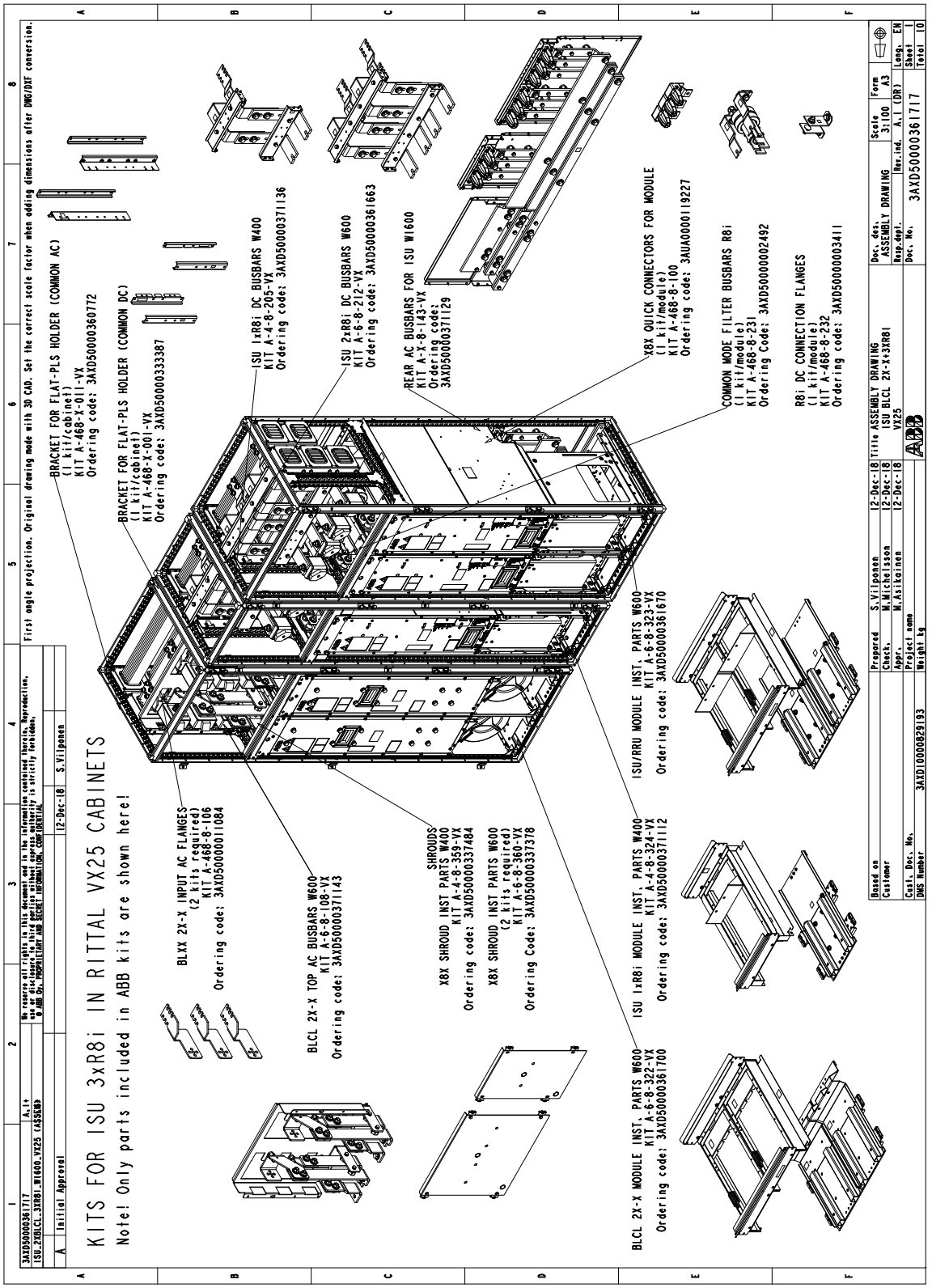


ACS880-14/34 single drive module package (3×R8i + 3×R8i, Rittal VX25 enclosure)

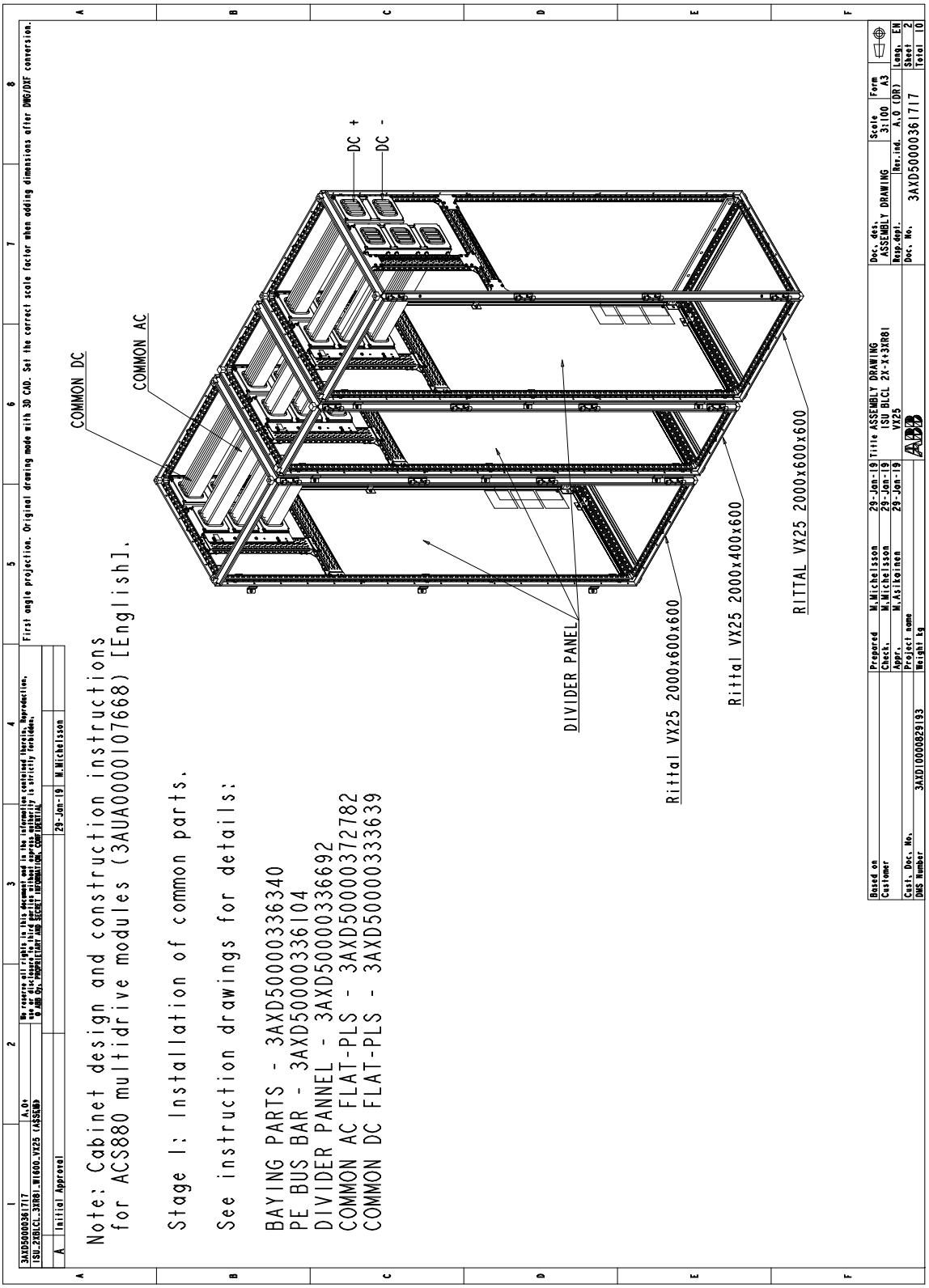
Supply modules and LCL filter

#	Installation stage	Instruction code	Kit code	Kit ordering code
1.	Installation of common parts: • Baying parts • PE busbar [PE] • Divider panel • Common AC Flat-PLS assembly • Common DC Flat-PLS assembly	 • 3AXD50000336340 • 3AXD50000336104 • 3AXD50000336692 • 3AXD50000372782 • 3AXD50000333639	 A-468-X-011-VX A-468-X-001-VX	 3AXD50000360772 3AXD50000333387
2.	Module installation parts	3AXD50000372935 3AXD50000351756 3AXD50000351930	A-4-8-324-VX A-6-8-323-VX A-6-8-322-VX	3AXD50000371112 3AXD50000361670 3AXD50000361700
3.	BLCL rear AC busbars and quick connectors	3AXD50000360444	A-X-8-143-VX A-468-8-100	3AXD50000371129 3AUA0000119227
4.	BLCL top AC busbars and AC flanges	3AXD50000352999 3AXD50000012934	A-468-8-106 A-6-8-108-VX	3AXD50000011084 3AXD50000371143
5.	DC busbars	3AXD50000360987 3AXD50000353507	A-6-8-212-VX A-4-8-205-VX	3AXD50000361663 3AXD50000371136
6.	Common mode filter busbars and DC connection flanges	3AXD50000002502 3AXD50000003403	A-468-8-231 A-468-8-232	3AXD50000002492 3AXD50000003411
7.	Shroud installation parts	3AXD50000335169 3AXD50000335022	A-6-8-360-VX A-4-8-359-VX	3AXD50000337378 3AXD50000337484
8.	Modules installation	-	-	-

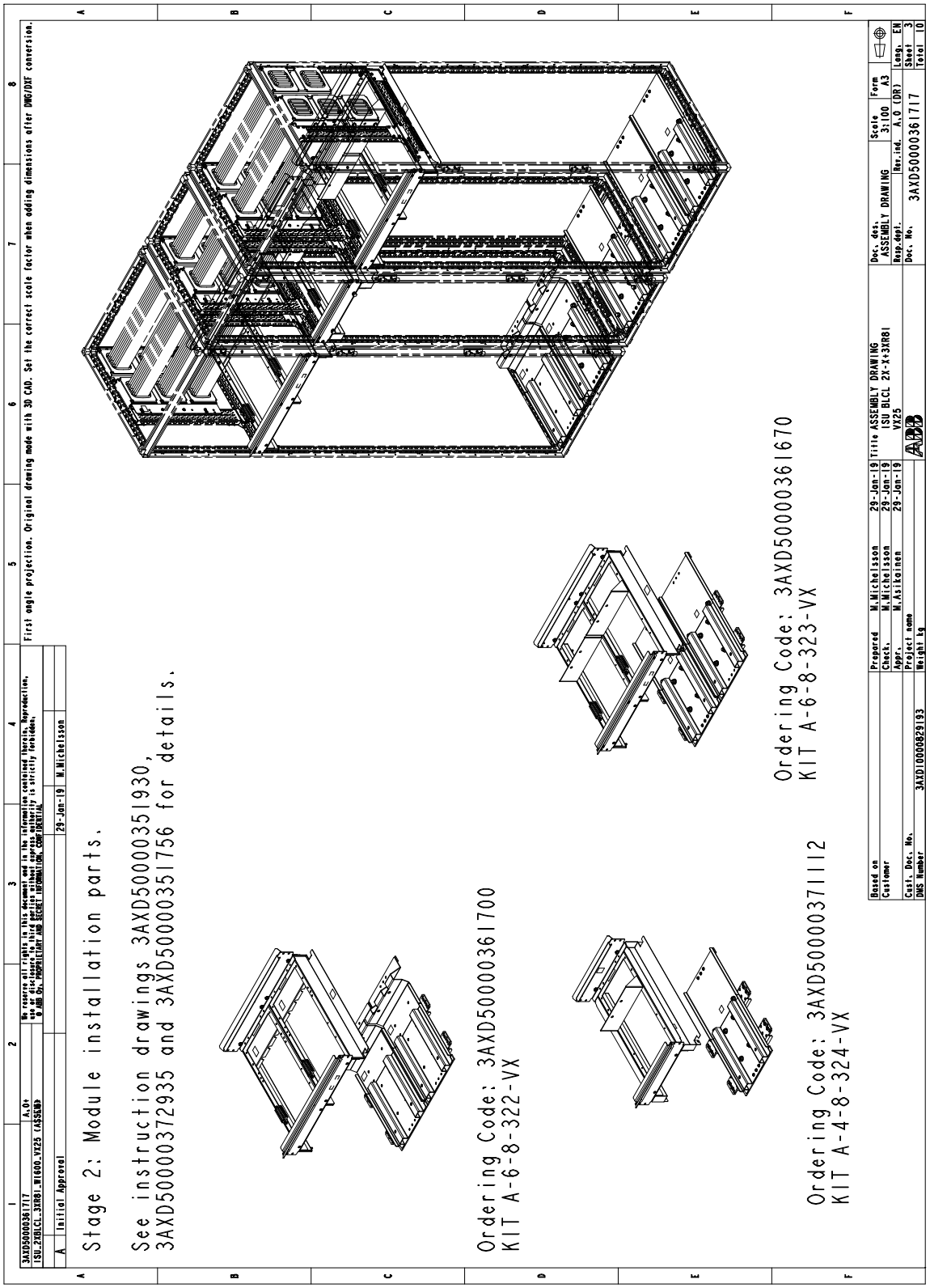
Kits for 3×R8i supply modules and LCL filters



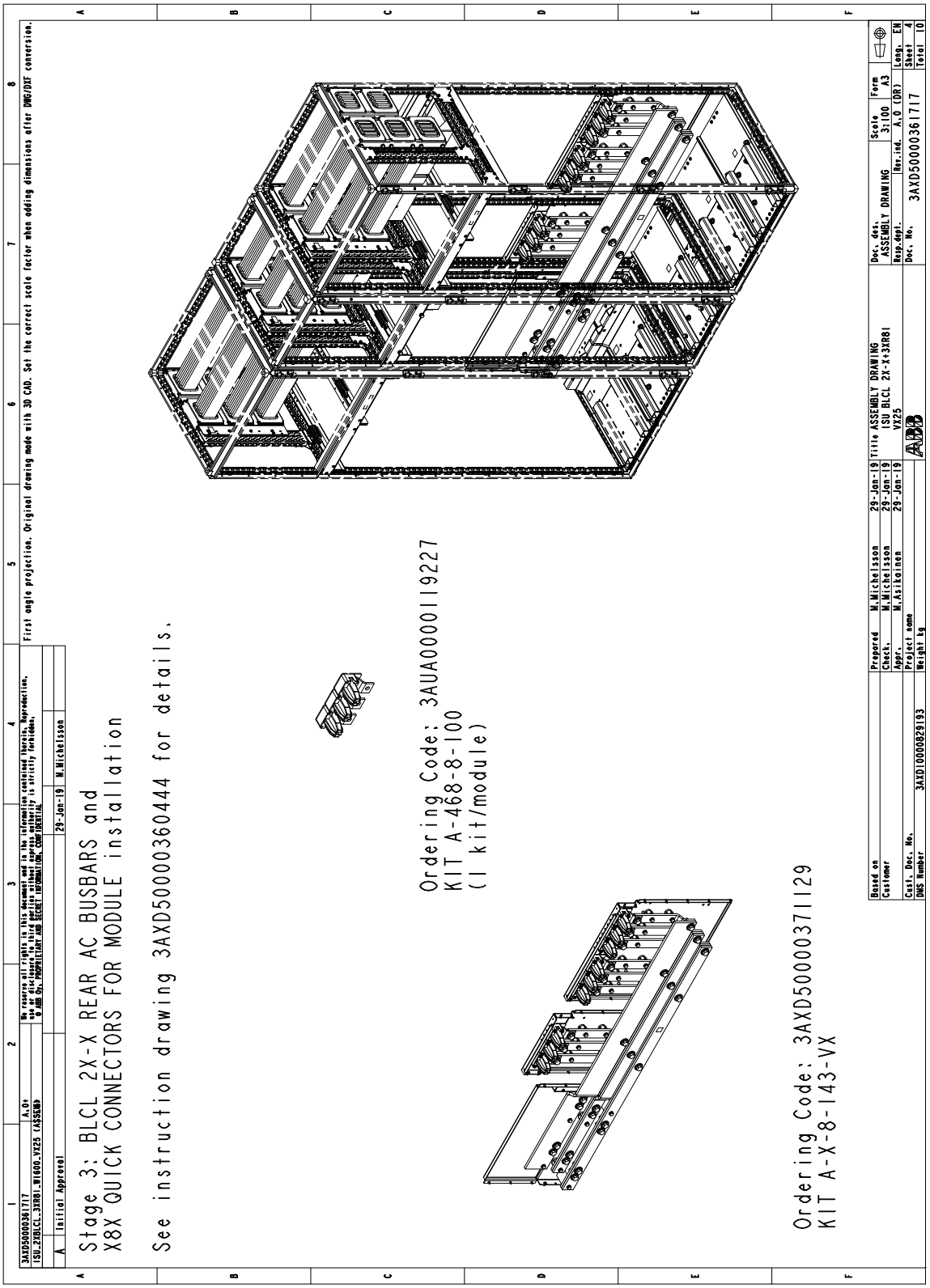
Stage 1: Installation of common parts



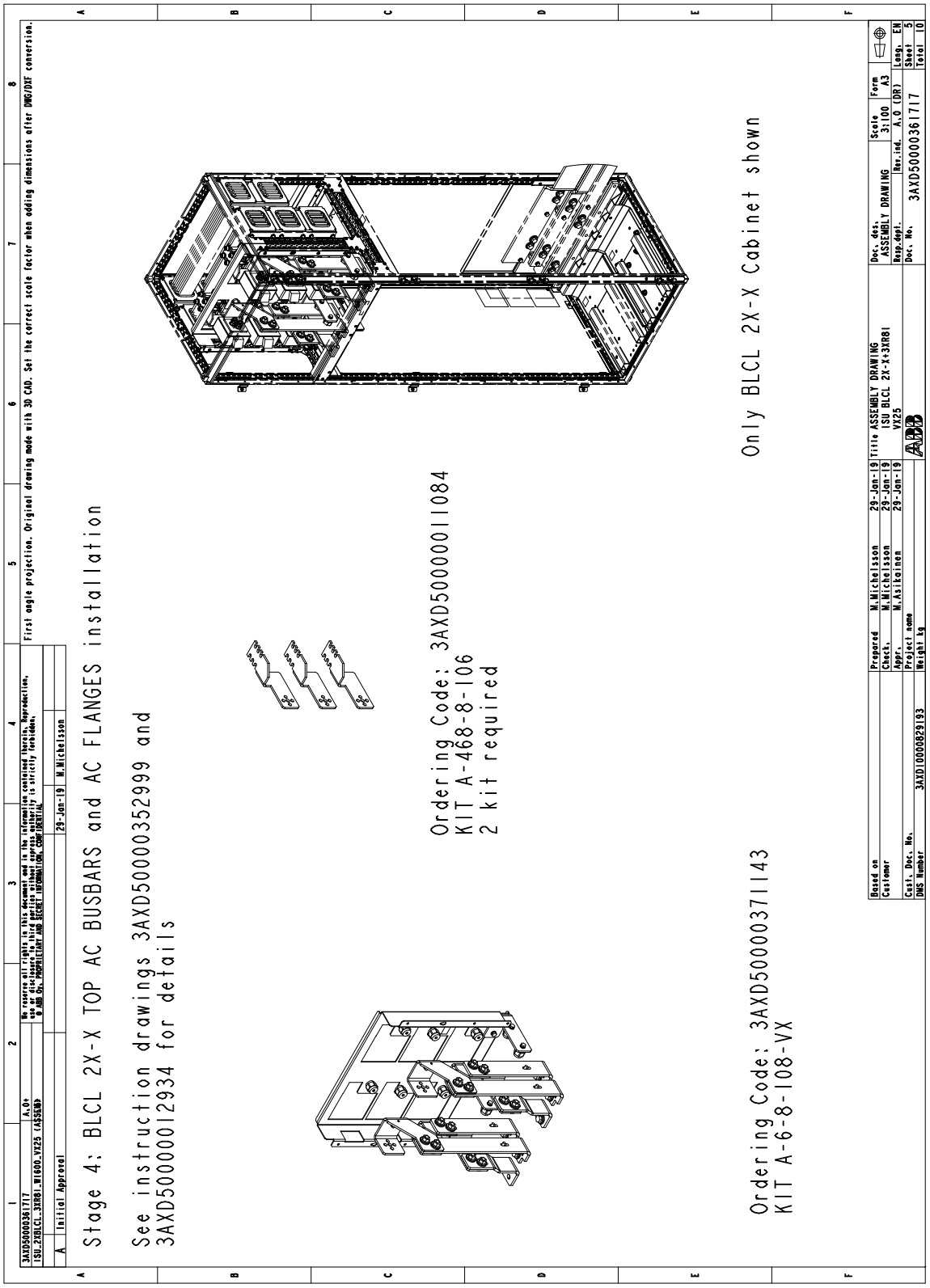
Stage 2: Module installation parts



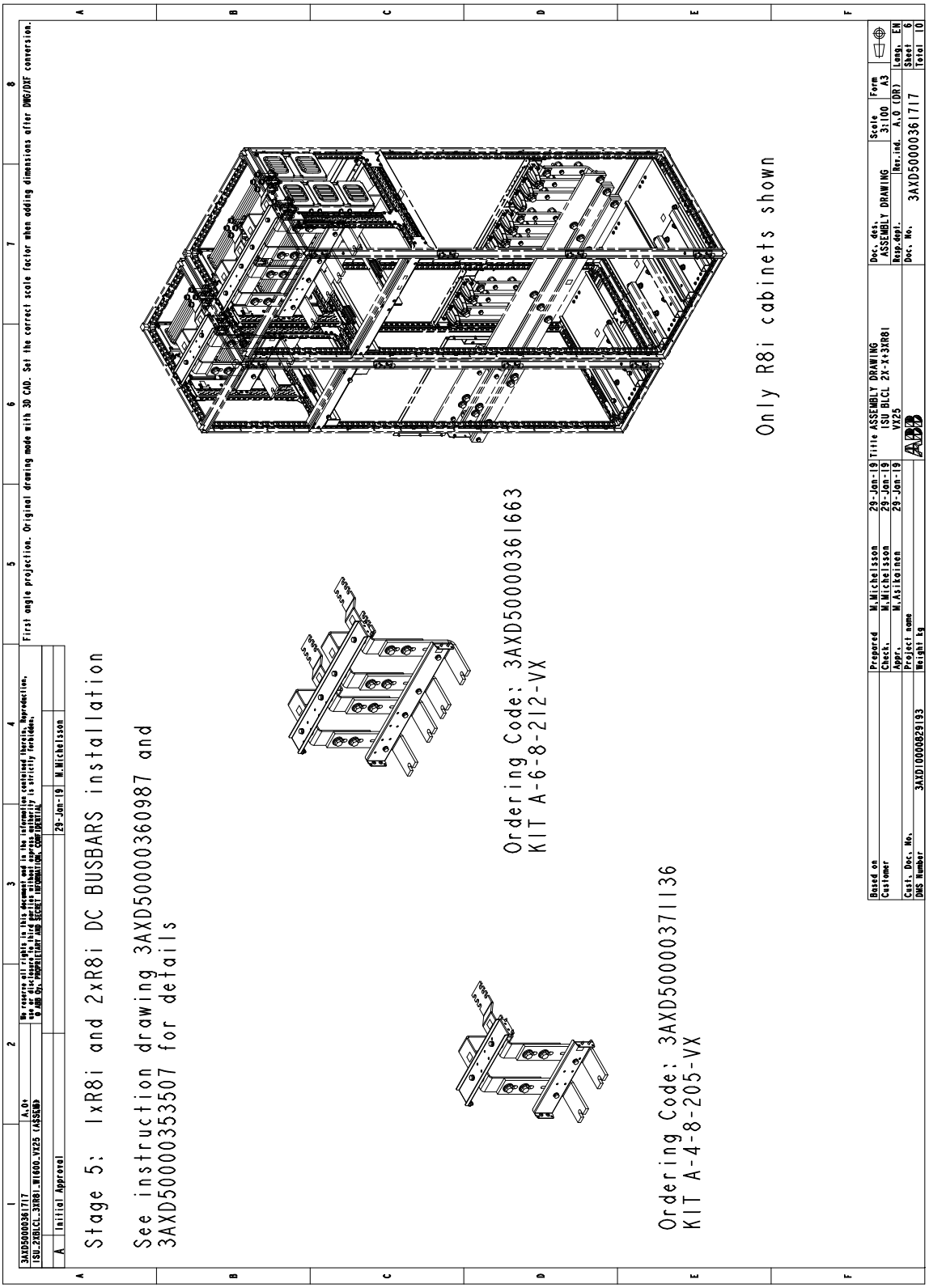
Stage 3: BLCL rear AC busbars and quick connectors



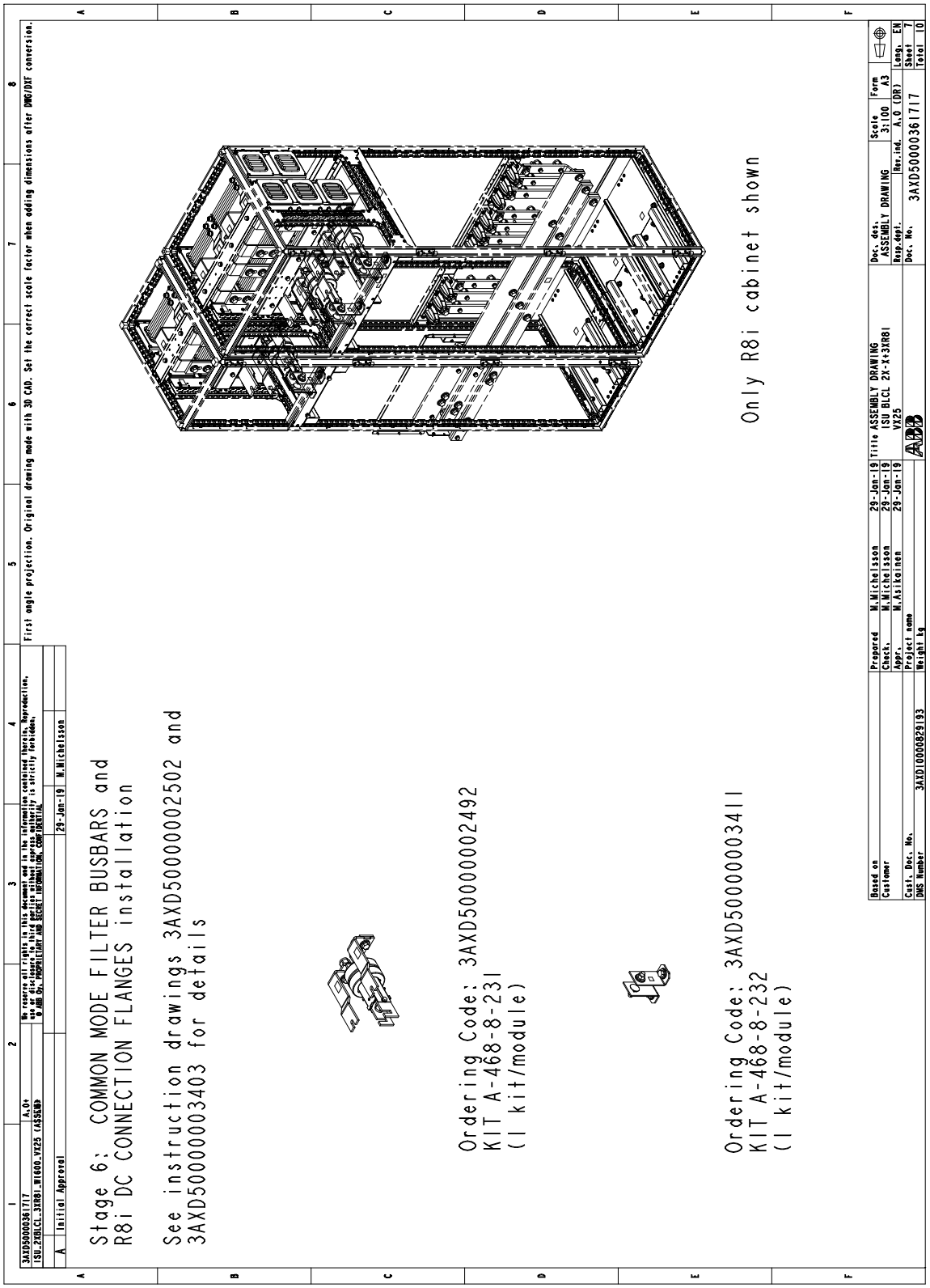
Stage 4: BLCL top AC busbars and AC flanges



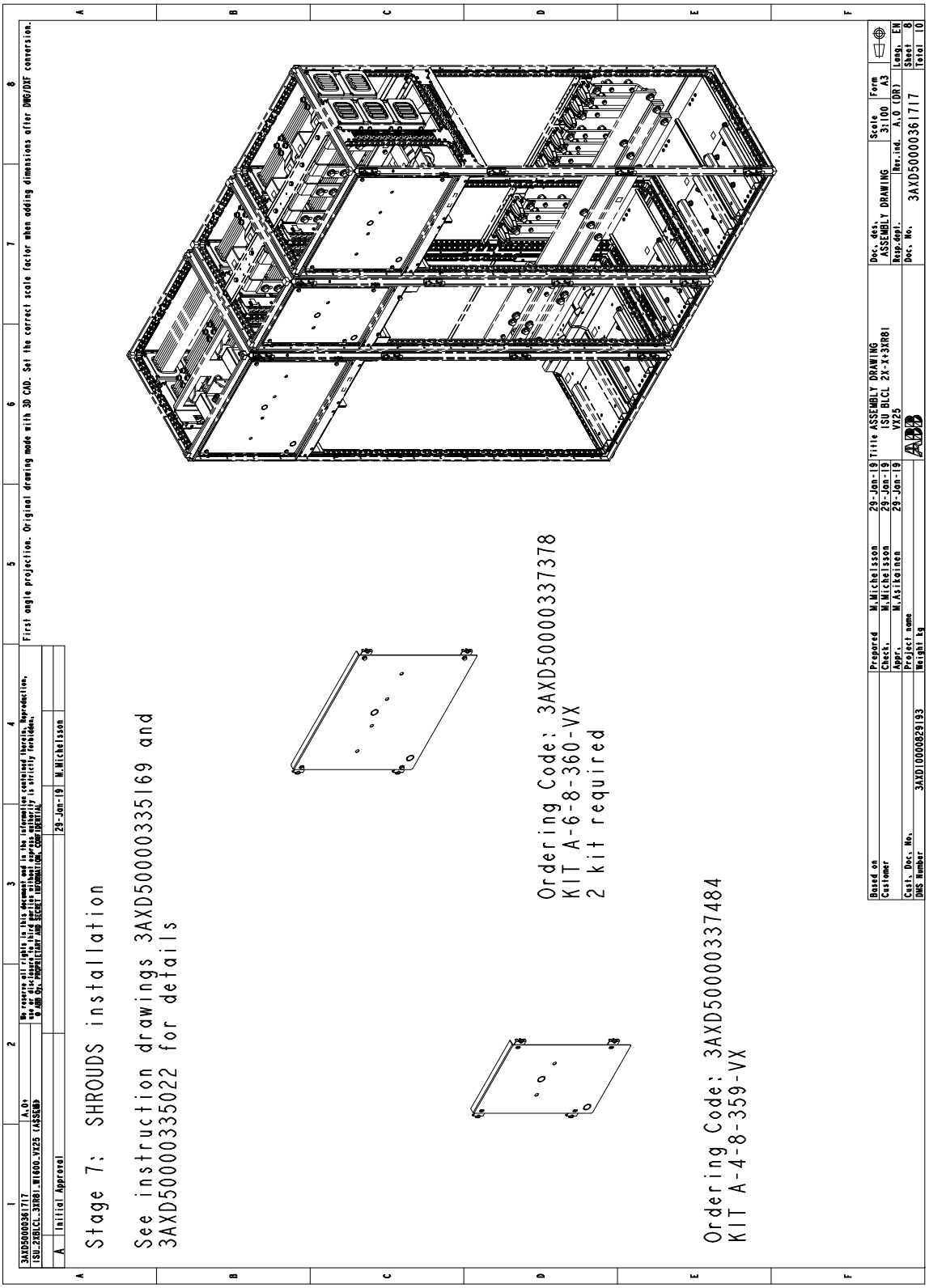
Stage 5: DC busbars



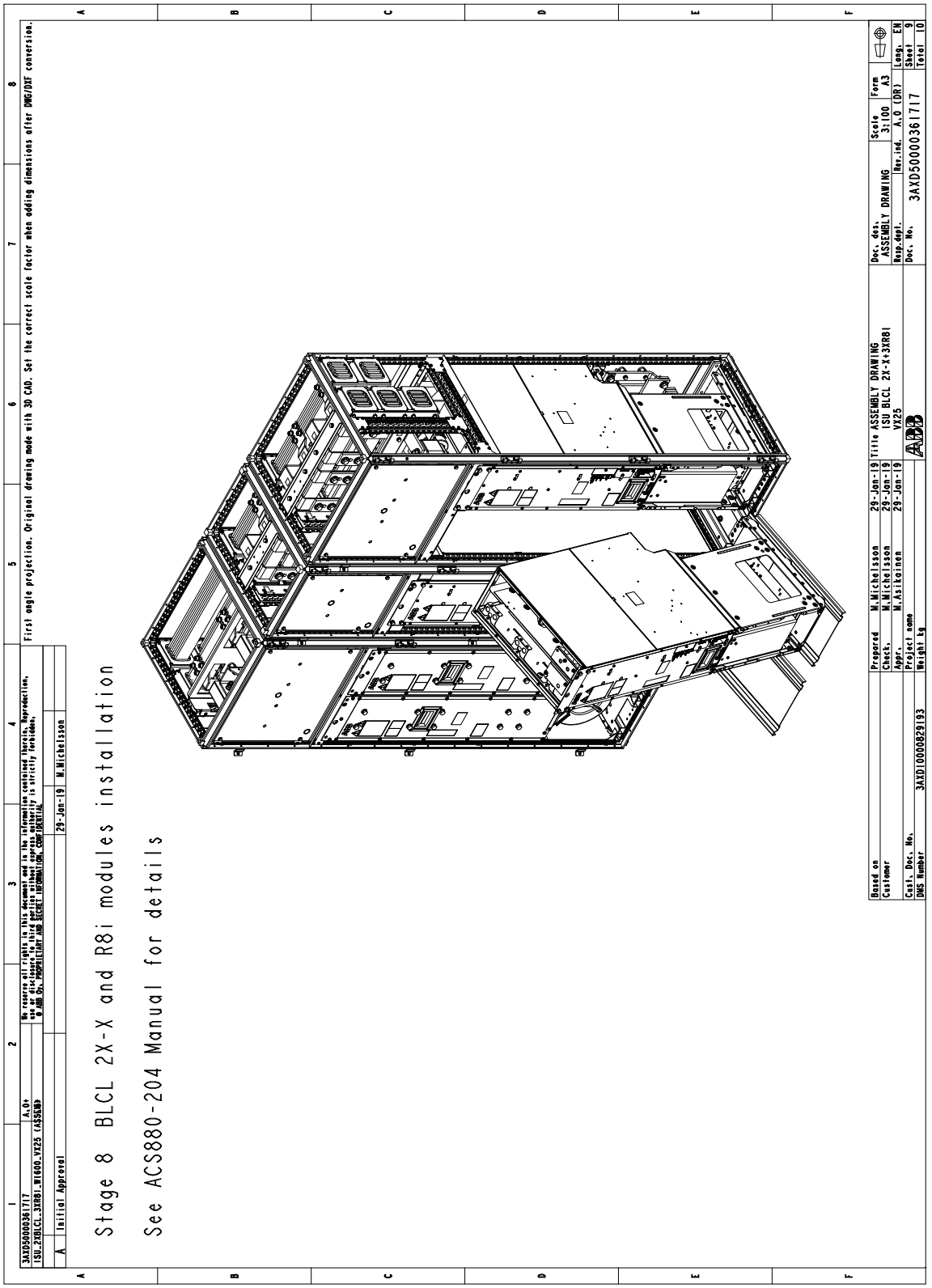
Stage 6: Common mode filter busbars and DC connection flanges



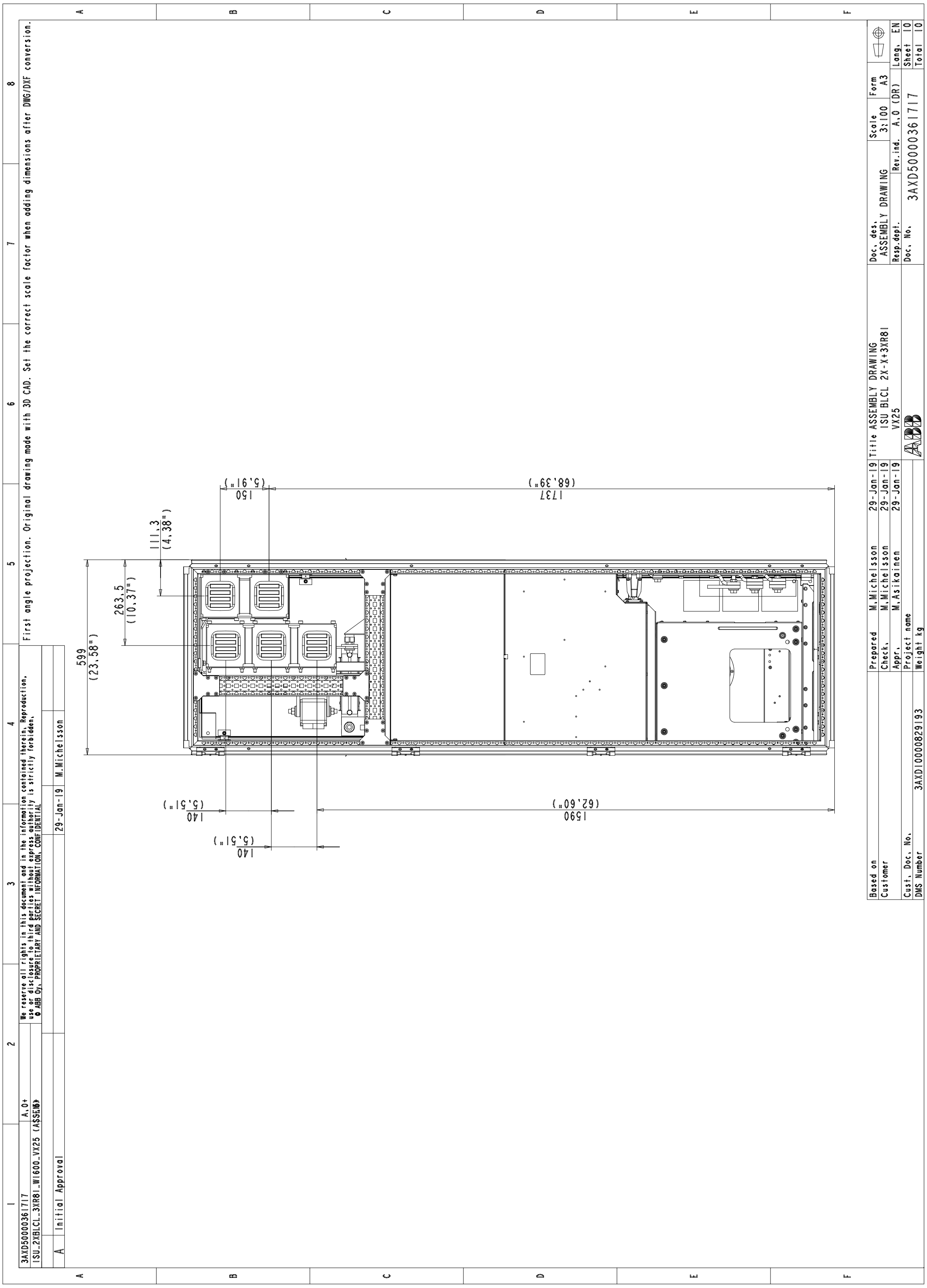
Stage 7: Shroud installation parts



Stage 8: Modules installation



Dimensions


150
(5.91")
1737
(68.39")
111.3
(4.38")
263.5
(10.37")
599
(23.58")
140
(5.51")
1590
(62.60")
140
(5.51")
First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
3AXD50000361717
ISU_2XBLCL_3XR8I_W1600_VX25 (ASSEMB)
A.0+
A Initial Approval 29-Jan-19 M.Michelsson
Prepared M.Michelsson 29-Jan-19
Check. M.Michelsson 29-Jan-19
Appr. M.Asikainen 29-Jan-19
Title ASSEMBLY DRAWING ISU BLCL 2X-X+3XR8I VX25
Doc. des. ASSEMBLY DRAWING
Scale 3:100
Form A3
Lang. EN
Sheet 10
Total 10
Resp.dept.
Rev.ind. A.0 (DR)
Doc. No. 3AXD50000361717
Based on
Customer
Cust. Doc. No.
DMS Number 3AXD10000829193
Project name
Weight kg

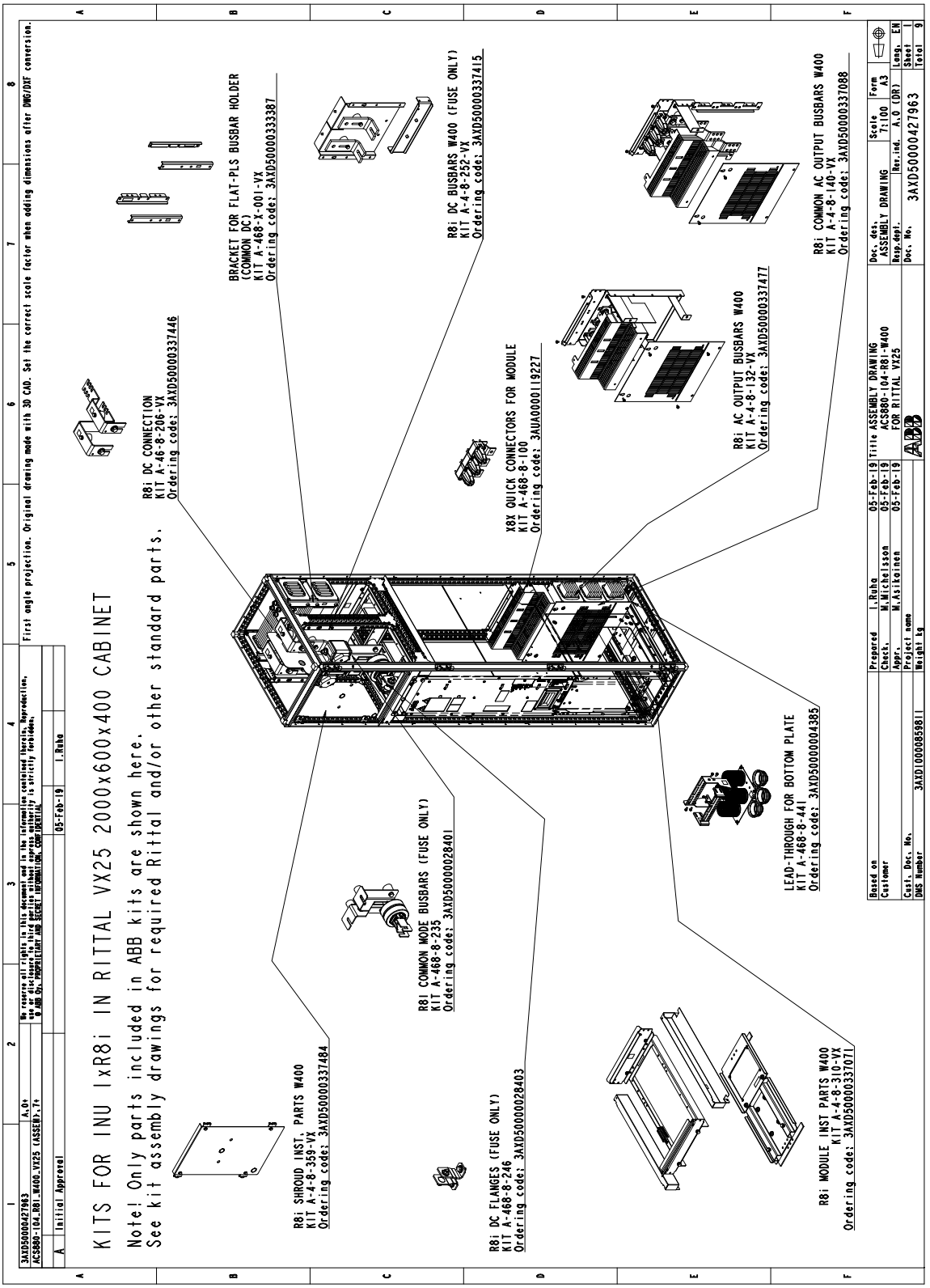
Inverter modules (2×R8i)

See section *Inverter modules* on page *78*.

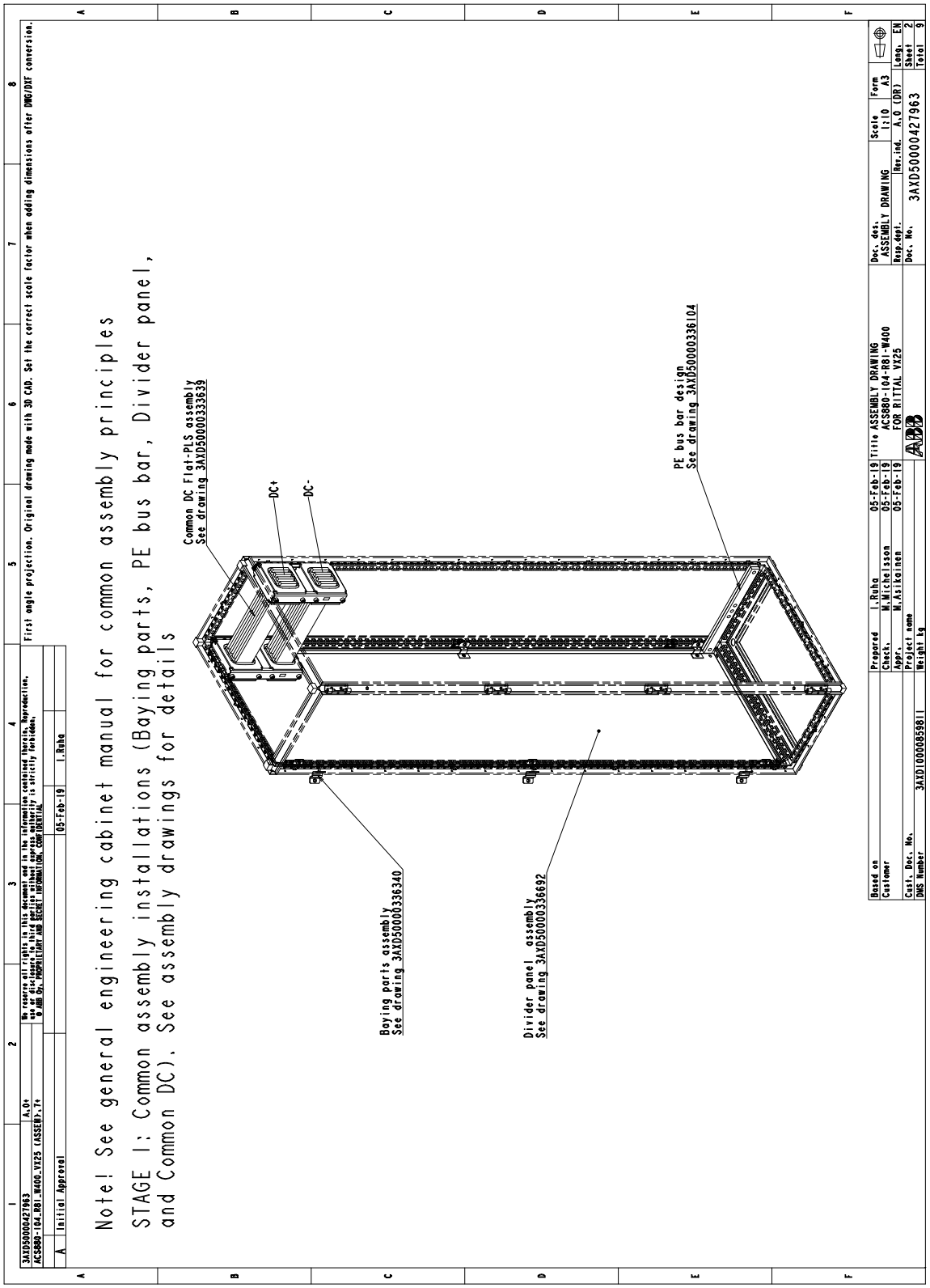
Inverter modules (1×R8i)

#	Installation stage	Instruction code	Kit code	Kit ordering code
1.	Installation of common parts: • Baying parts • PE busbar [PE] • Divider panel • Bracket for Flat-PLS busbar holder (common DC)	 3AXD50000336340 3AXD50000336104 3AXD50000336692 3AXD50000333639	 A-468-X-001-VX	 3AXD50000333387
2.	2A. DC busbars and DC connection (fuses in use)	3AXD50000345151 3AXD50000345915	A-4-8-252-VX A-46-8-206-VX	3AXD50000337415 3AXD50000337446
3.	Module installation parts and lead-through for bottom plate	3AXD50000335152 3AXD50000004817	A-4-8-310-VX A-468-8-441	3AXD50000337071 3AXD50000004385
4.	4A. Quick connectors and AC output busbars installation	3AUA0000118667 3AXD50000343492	A-468-8-100 A-4-8-132-VX	3AUA0000119227 3AXD50000337477
	4B. Common AC output busbars and AC busbars installation	3AUA0000118667 3AXD50000343928	A-468-8-100 A-4-8-140-VX	3AUA0000119227 3AXD50000337088
5.	Common mode busbars and DC flanges installation (fuses in use)	3AXD50000028384 3AXD50000028418	A-468-8-246 A-468-8-235	3AXD50000028403 3AXD50000028401
6.	Shroud installation parts	3AXD50000335169	A-4-8-359-VX	3AXD50000337484
7.	Module installation	-	-	-

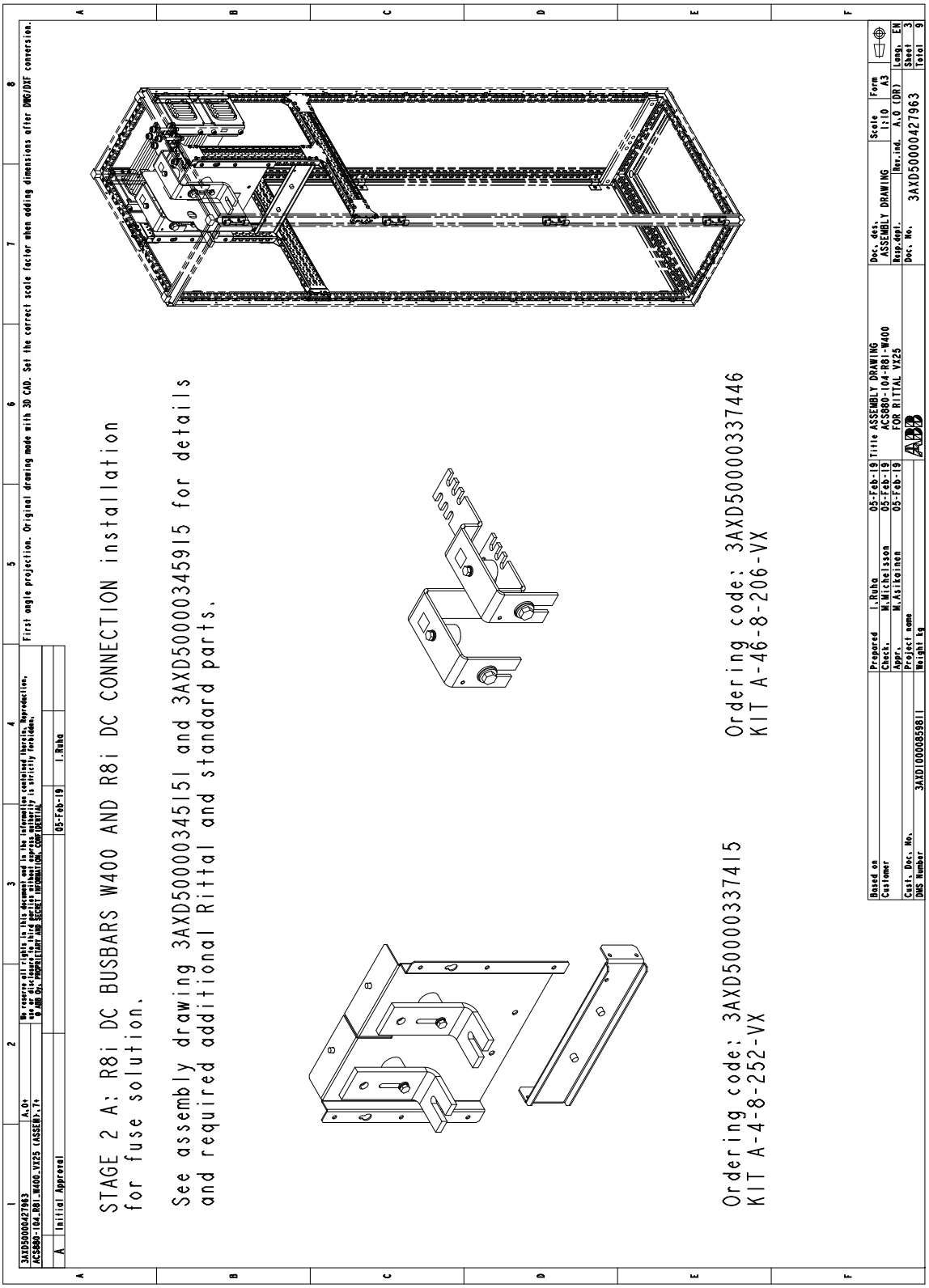
Kits for 1×R8i inverter modules



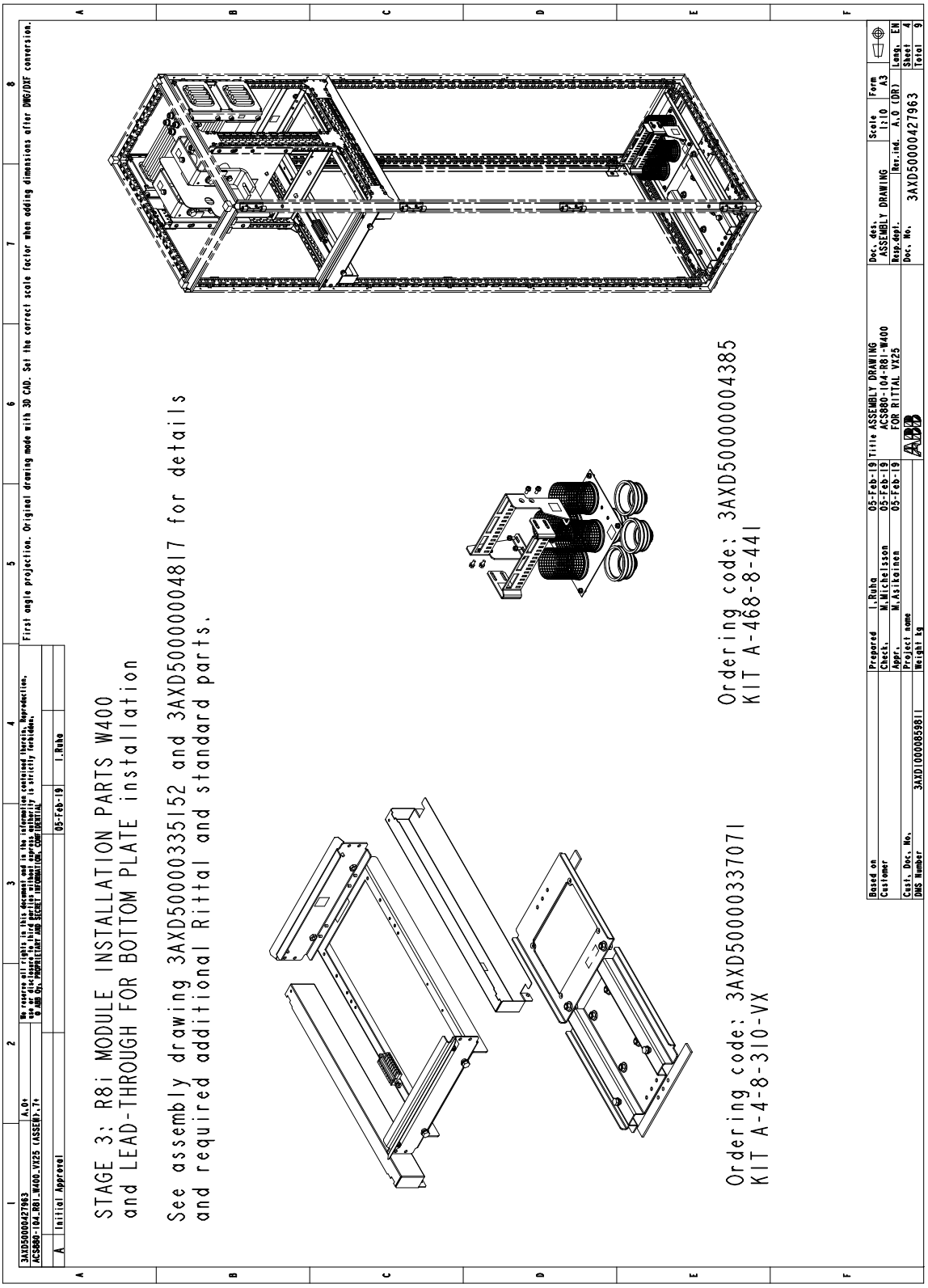
Stage 1: Installation of common parts



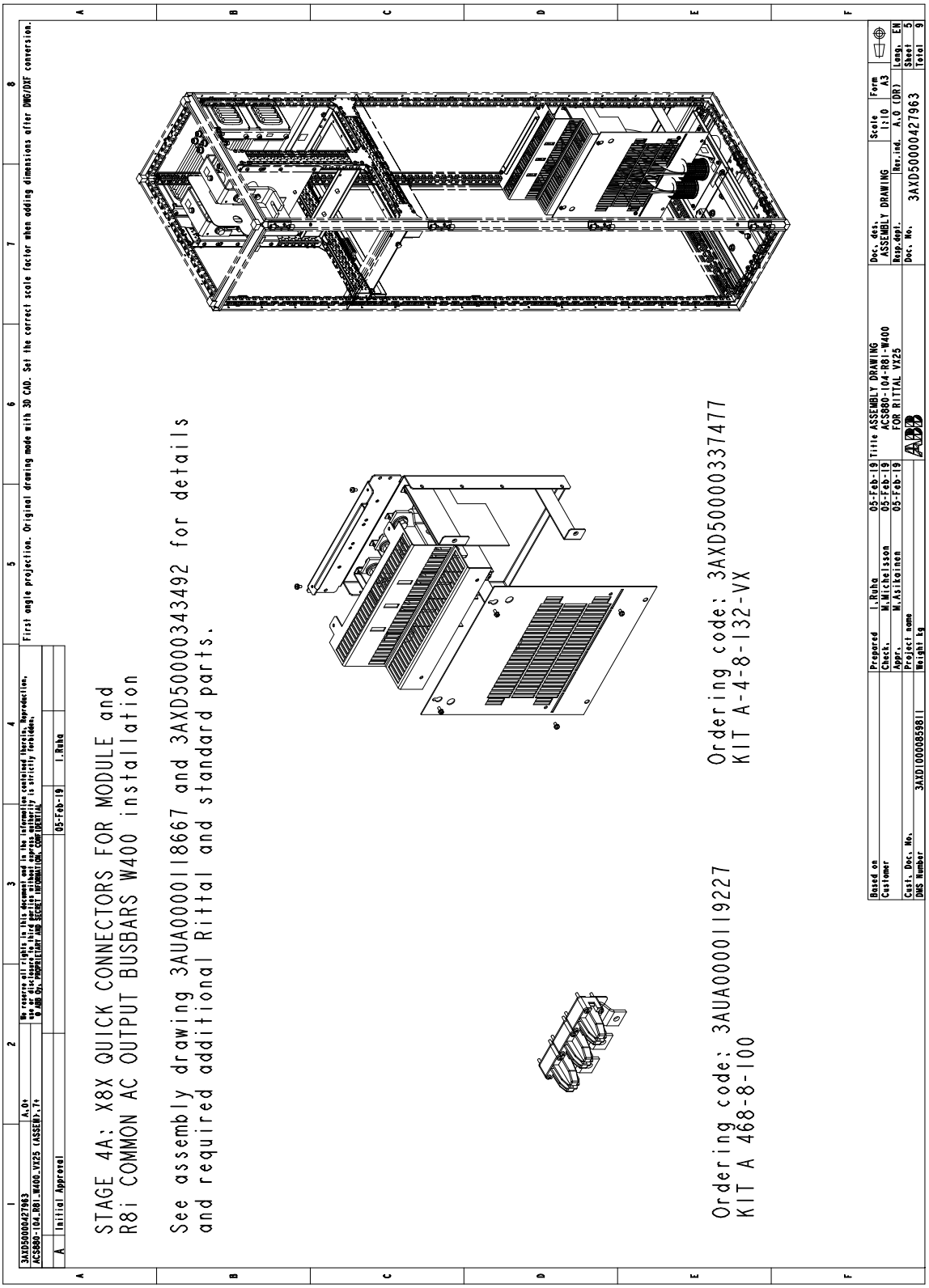
Stage 2A: DC busbars and DC connection (fuses in use)



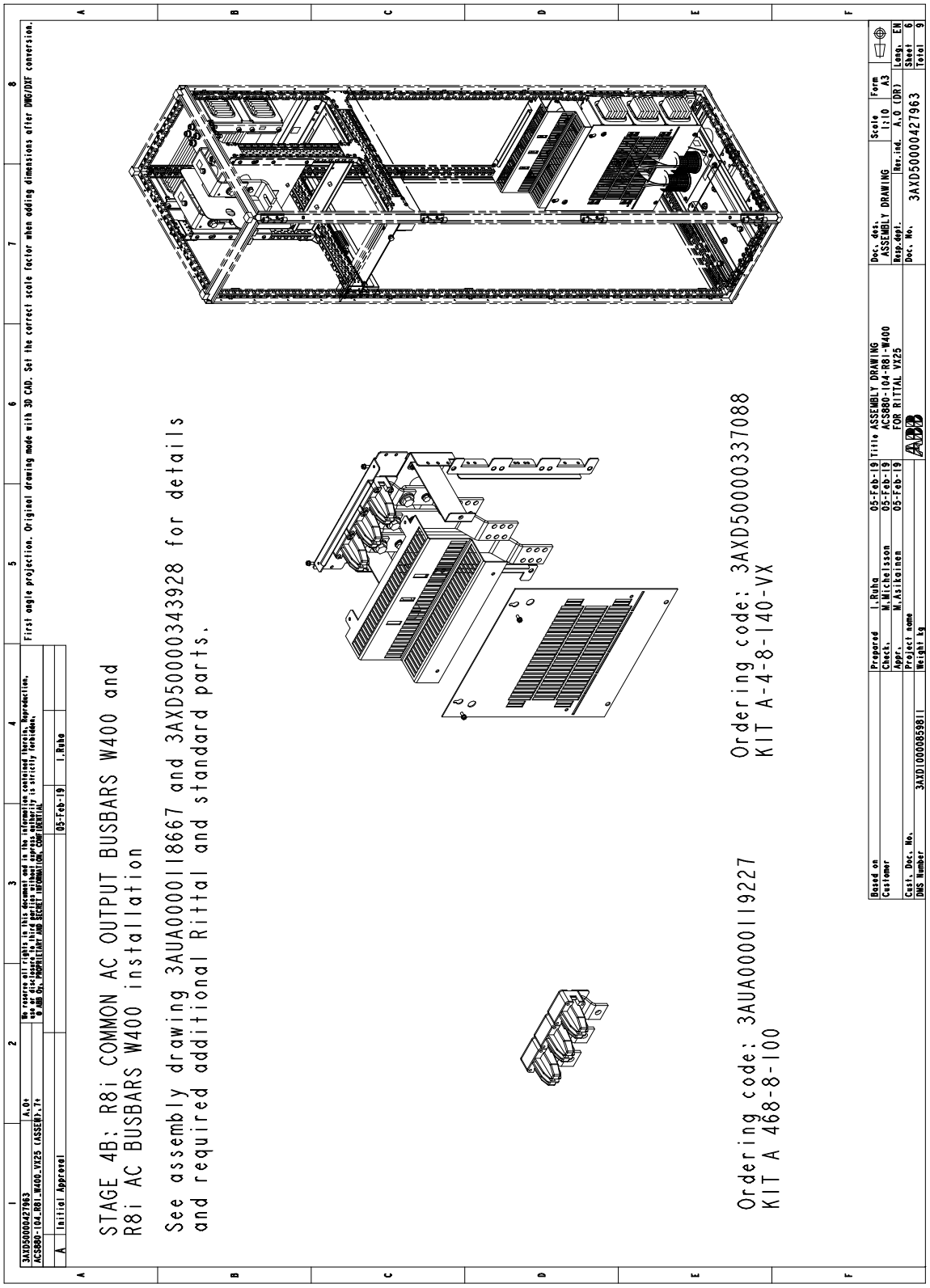
Stage 3: Module installation and lead-through for bottom plate installation



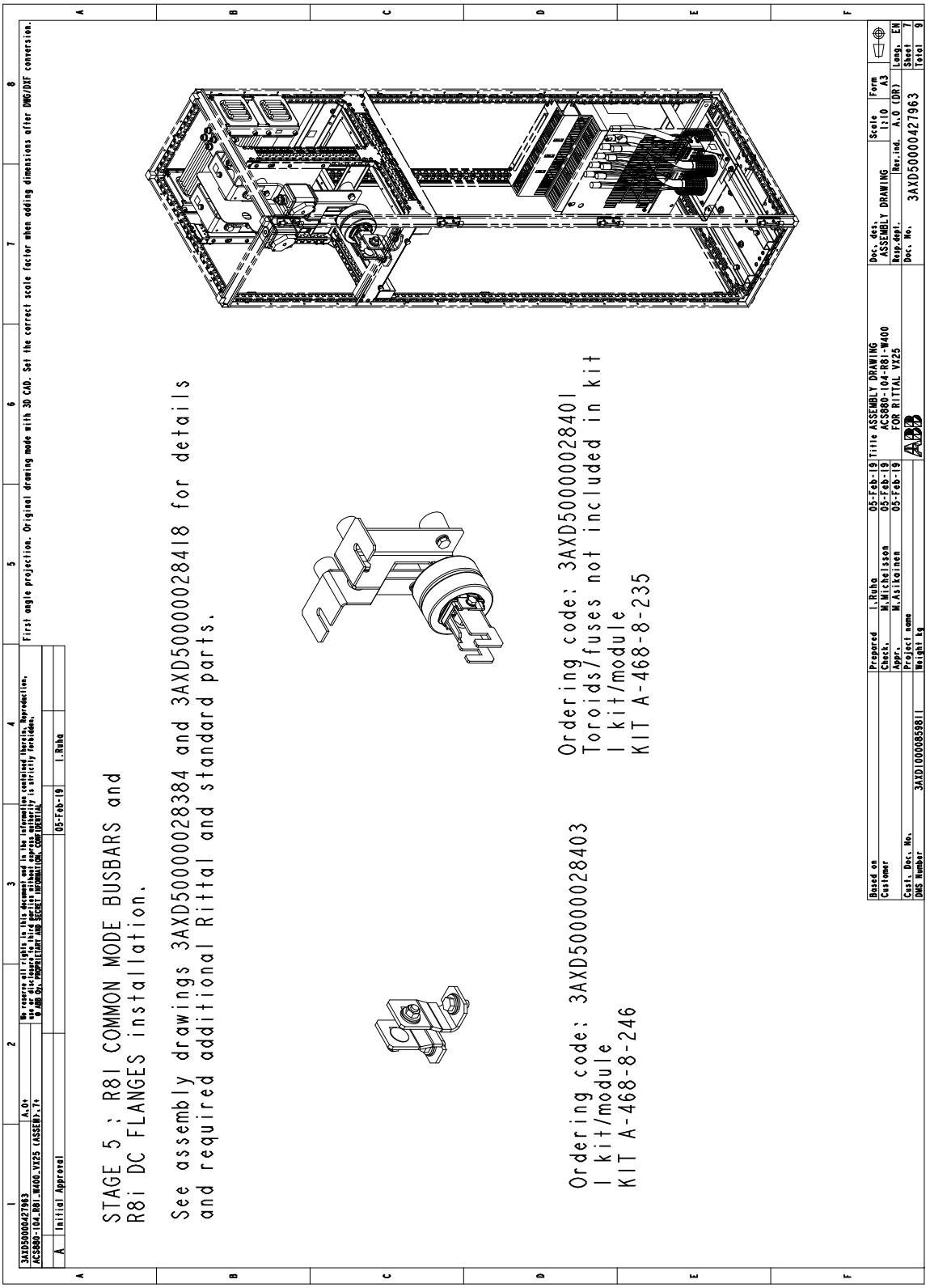
Stage 4A: Quick connectors and common AC output busbars installation



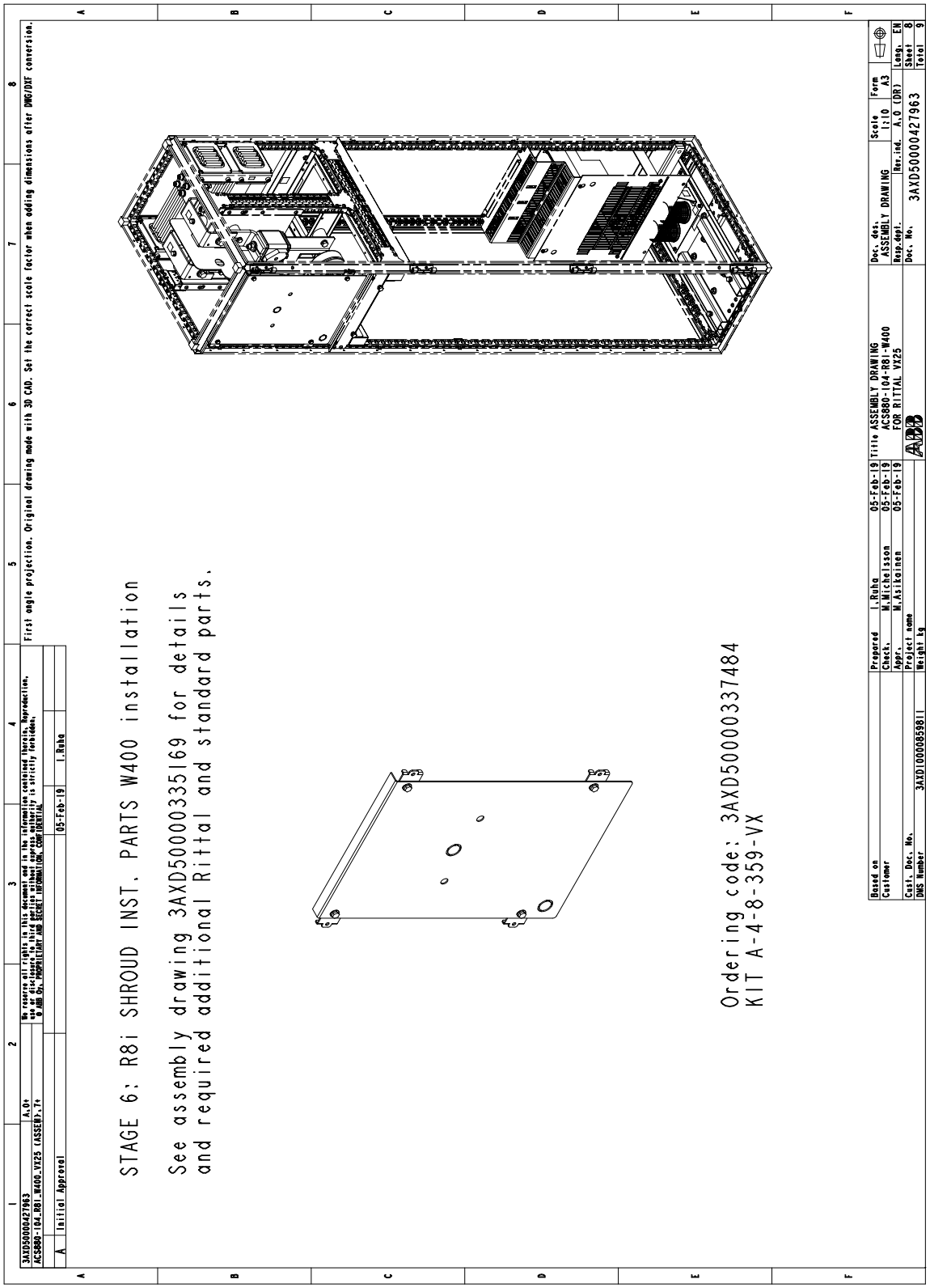
Stage 4B: Common AC output busbars and AC busbars installation



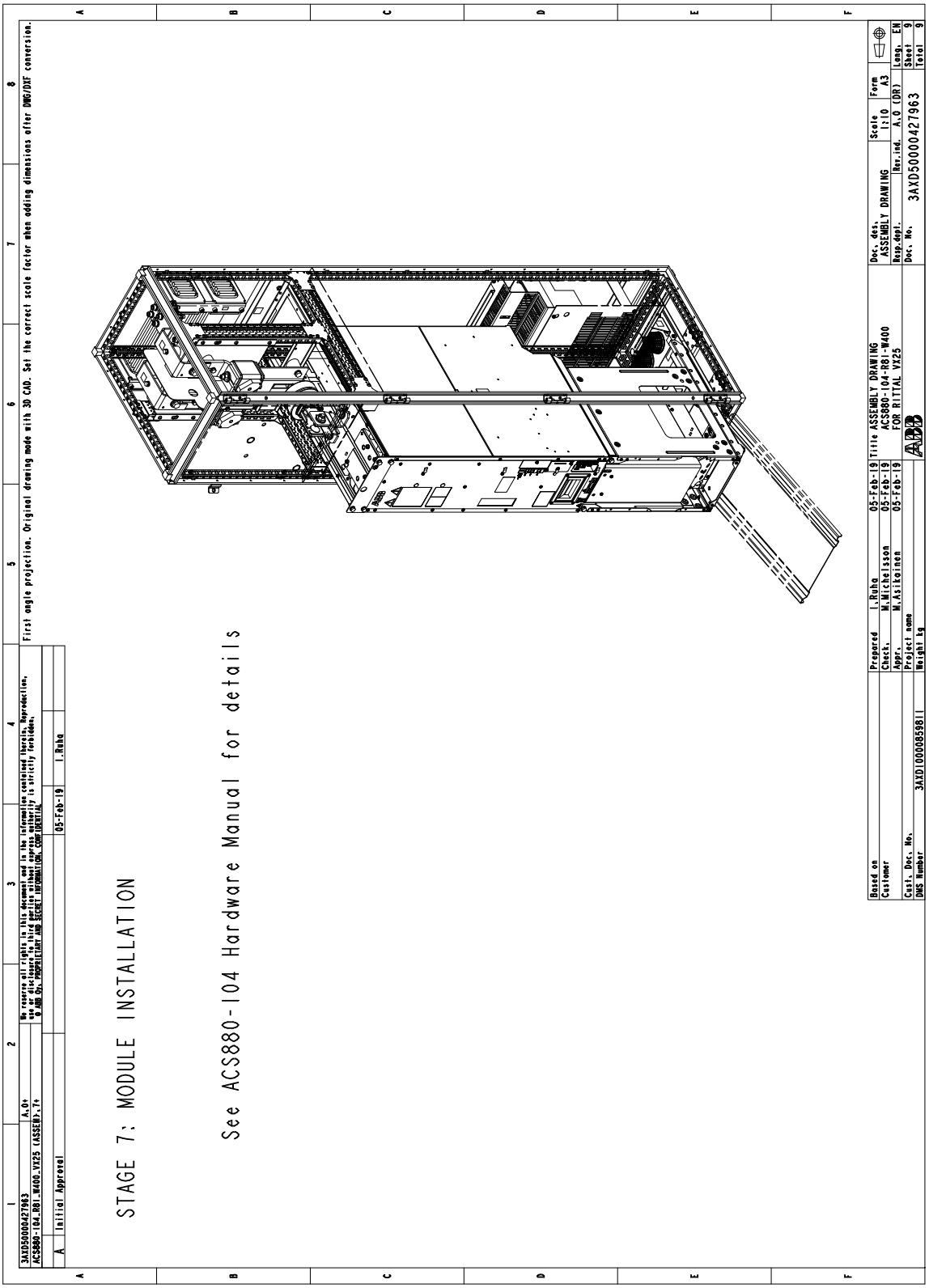
Stage 5: Common mode busbars and DC flanges installation (fuses in use)



Stage 6: Shroud installation parts

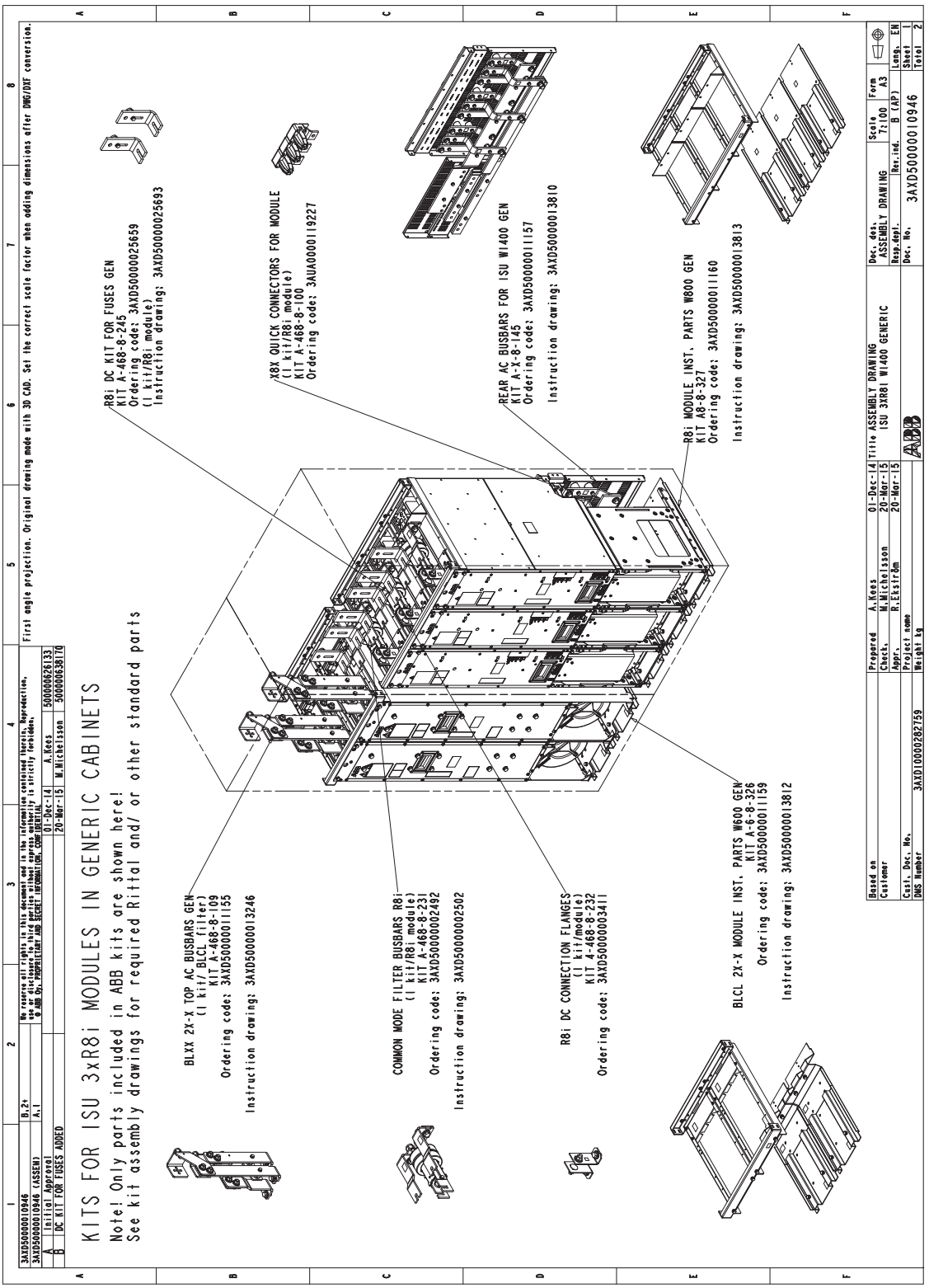


Stage 7: Module installation

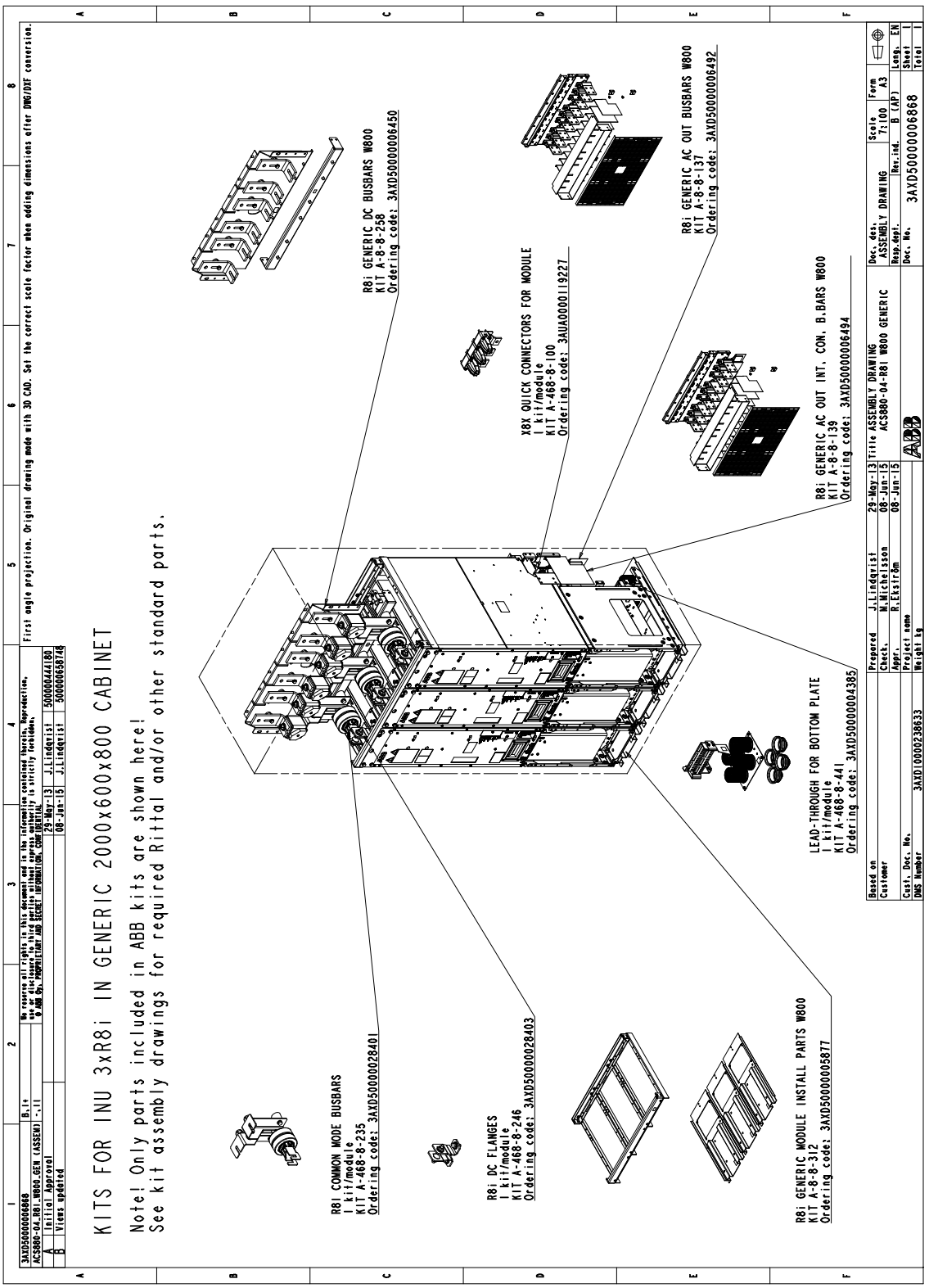


ACS880-14/34 single drive module package (3×R8i + 3×R8i, generic enclosure)

Supply modules and LCL filters



Inverter modules



ACS880-14/34 single drive module package (4×R8i + 4×R8i, Rittal VX25 enclosure)

Supply modules and LCL filters

See section *Supply modules and LCL filter* on page *68*.

Inverter modules

See section *Inverter modules* on page *78*.

ACS880-14/34 single drive module package (4×R8i + 4×R8i, generic enclosure)

Supply modules and LCL filters

See section *Supply modules and LCL filter* on page *89*.

Inverter modules

See section *Inverter modules* on page *90*.

5

Electrical installation

Contents of this chapter

This chapter describes the electrical installation of ACS880-14 and -34 single drive module packages.

The wiring diagrams in this chapter are simplified presentations. See chapter *Example circuit diagrams* for details.

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

For more information on cable selection, protections, etc, see *Electrical planning instructions for ACS880 multidrive cabinets and modules* (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 system. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]).

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.

Electrical safety precautions

This information is for all personnel who do work on ACS880-14 and -34.

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. Keep the covers/doors closed during the operation and when voltage is connected.
2. Clearly identify the work location.
3. Disconnect all possible voltage sources.
   - Open the main switch-disconnector [Q1], or rack out the main circuit breaker [Q1] (whichever is present).
   - Open the disconnector of the supply transformer as the main disconnecting device of the drive does not remove the voltage from the input busbars of the drive or from the voltmeter, if present.
   - Make sure that reconnection is not possible. Lock the disconnectors to open position and attach a warning notice to them.
   - Disconnect any external power sources from the control circuits before you do work on the control cables.
   - After you disconnect the drive, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you continue.
4. Protect any other energized parts in the work location against contact.
5. Take special precautions when close to bare conductors.
6. Measure that the installation is de-energized.
   - Use a multimeter with an impedance of at least 1 Mohm.
   - Make sure that the voltage between the drive input power terminals and the grounding (PE) busbar is close to 0 V.
7. Install temporary grounding as required by the local regulations. Close the grounding switch [Q9], if present.
8. Ask for a permit to work from the person in control of the electrical installation work.

General notes

Static electricity

WARNING! Circuit boards contain components sensitive to electrostatic discharge (ESD). Wear a grounding wrist band when handling the boards. Do not touch the boards unnecessarily.

Optical components

Handle fiber optic cables with care. When unplugging optic cables, always grab the connector, not the cable itself. Do not touch the ends of the fibers with bare hands as the fiber is extremely sensitive to dirt.

Checking the insulation of the assembly

WARNING! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). If you ignore them, physical injury or death, or damage to the equipment can occur.

ACS880-14 and -34

Do not make any voltage tolerance or insulation resistance tests on ACS880-14/34. Every supply and inverter module has been insulation tested between the main circuit and the chassis at the factory. Also, there may be voltage-limiting circuits inside the modules which cut down the testing voltage automatically.

Power cables

Check the insulation of the supply (input) and motor (output) cable according to local regulations before connecting it to the drive.

Checking the compatibility with IT (ungrounded) systems

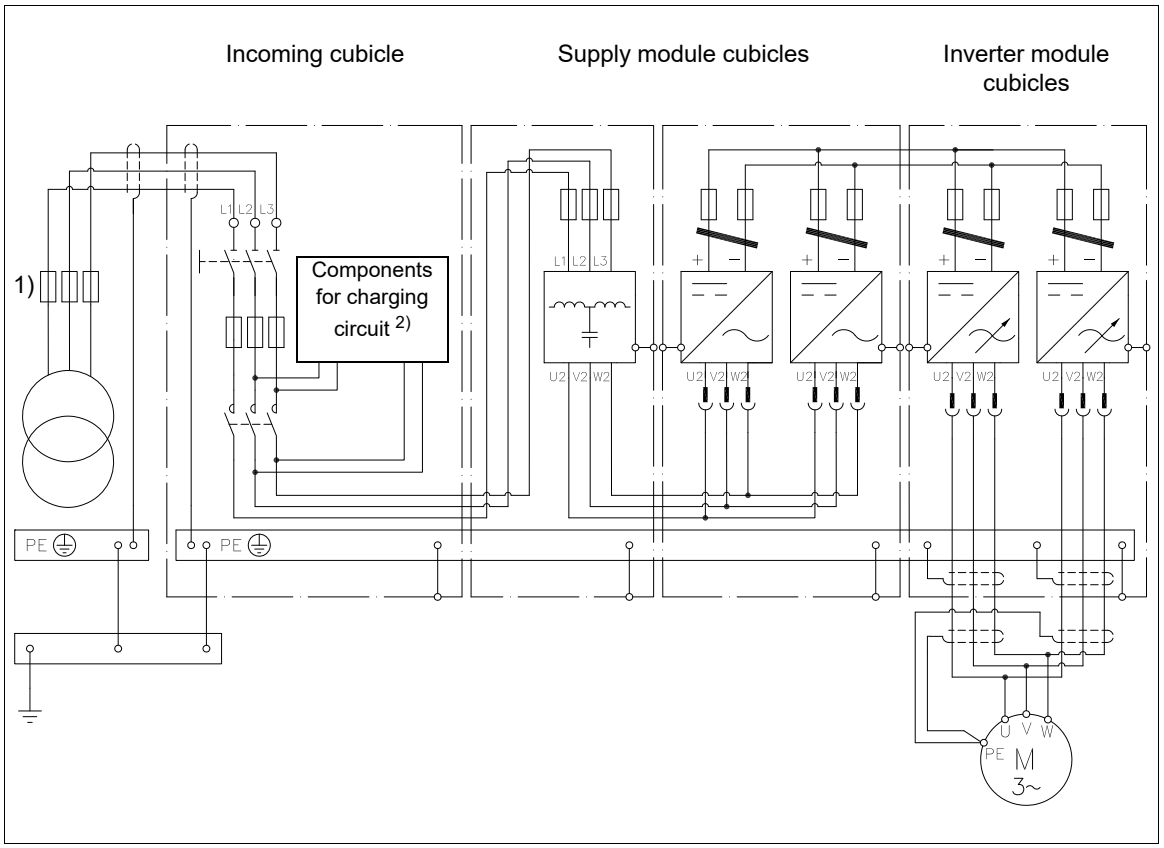
The RFI filter is not suitable for use in IT (ungrounded) systems. Disconnect the filter before connecting the drive to the supply network. For instructions on how to do this, contact your local ABB representative.

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 power cables

Connection diagram

Connection diagram for the power cables is shown below. Configuration 2×R8i + 2×R8i is used as an example.



Notes:

1) Fuses or other protection means.

2) For details, see chapter *Example circuit diagrams*.
Use a separate PE conductor in addition if the conductivity of the shield does not meet the requirement for the PE conductor. See *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).

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

For the tightening torques, see *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]).

Connection procedure of the supply cables

WARNING! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). If you ignore them, physical injury or death, or damage to the equipment can occur.

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

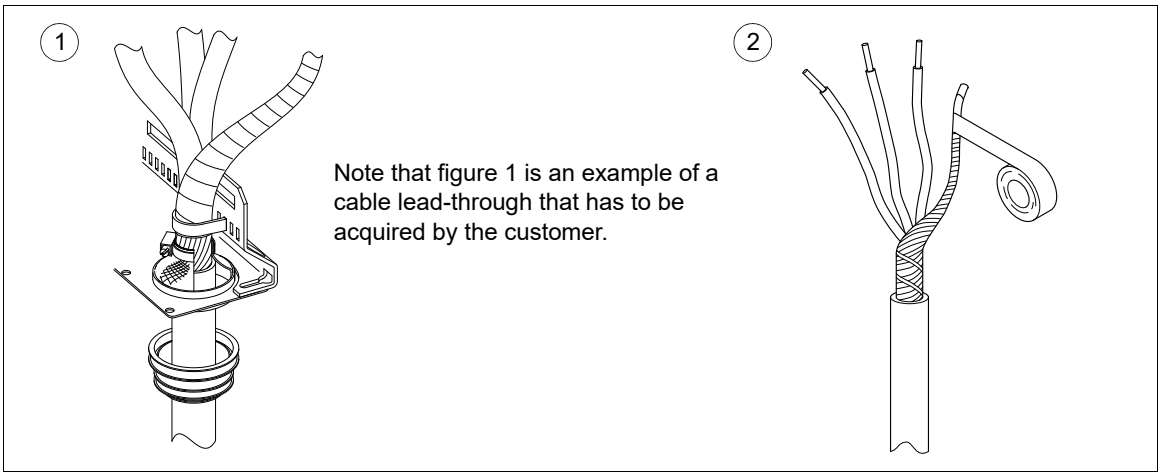
1. Lead the cables into the inside of the cabinet. 360° grounding of the cable shield at the lead-through is recommended to suppress interference.
2. Twist the cable shields to bundles and connect to the cabinet PE (ground) busbar. Connect the separate ground conductors/cables to the cabinet PE (ground) busbar.
3. Connect the phase conductors to the input terminals of the main switch-disconnector [Q1.1] / main circuit breaker [Q1]. For the tightening torques, see *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]).
4. Connect the output terminals of the main switch-disconnector [Q1.1] / main circuit breaker [Q1] to the main fuses [F1.x].
5. Connect the main fuses [F1.x] to the main contactor [Q1.2] input terminals.
6. Connect the contactor [Q1.2] output terminals to the AC busbars of the LCL filter in the ISU cabinet by cabling, busbars or equivalent.
7. Inside the ISU cabinet, push the IGBT supply module into the quick connectors.
   LCL filter module of type BLCL-1x-x: Push the LCL filter module into the quick connectors.
   LCL filter module of type BLCL-2x-x: Remove the fan of the LCL filter module (for details, see page *159*). Push the LCL filter module to its place. Connect the filter output busbars (behind the filter module) into the busbars on the cabinet frame. Reinstall the fan of the LCL filter module.
8. Ground the module:
   - Ground the module from the module front plate at top of the module. 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 galvanic connection to the PE busbar through the cabinet frame.

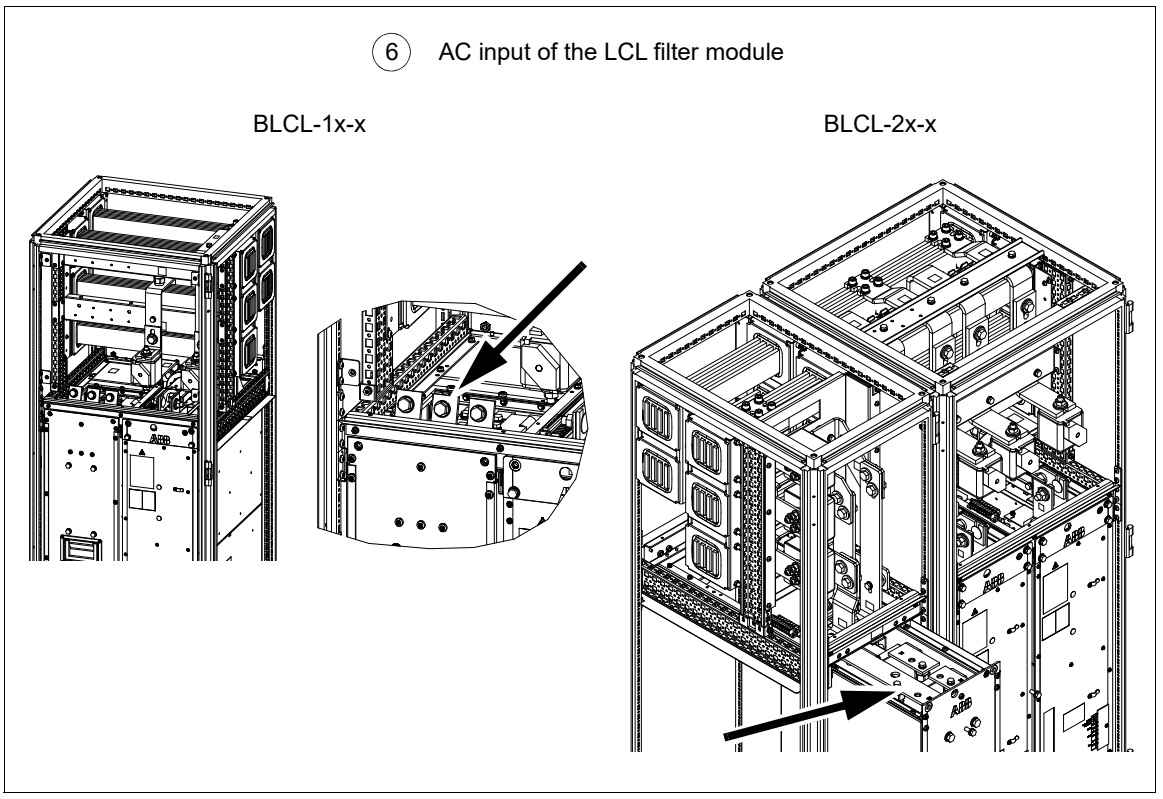
   Note: If the cabinet frame is painted (for example, Rittal VX25 cabinets), it is important to make sure that good galvanic connection to ground (PE busbar) is achieved. You can, for example, remove the paint from the connection points and use star washers.

   Note: Connection to ground through fixing screws and the cabinet chassis is not always good enough. To ensure 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/cable (grounding wire) 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 *Electrical*

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

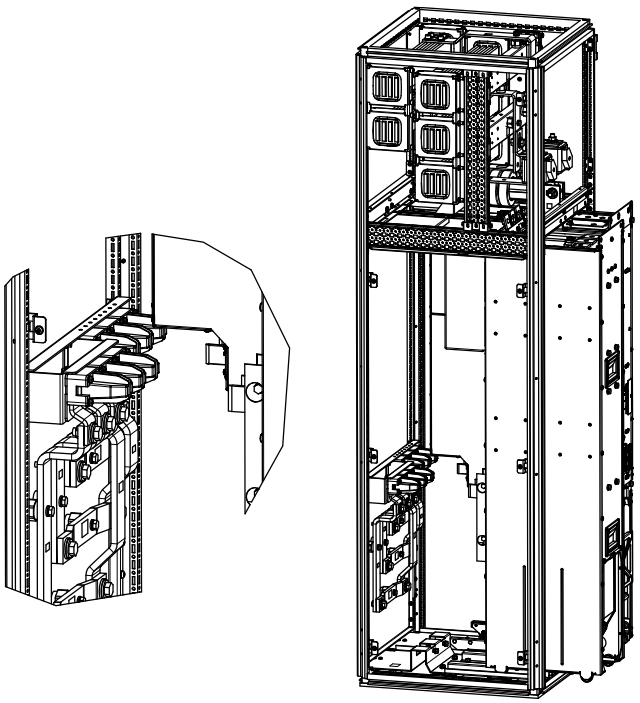
9. Connect the DC busbars of the supply module into the cabinet common DC busbars.



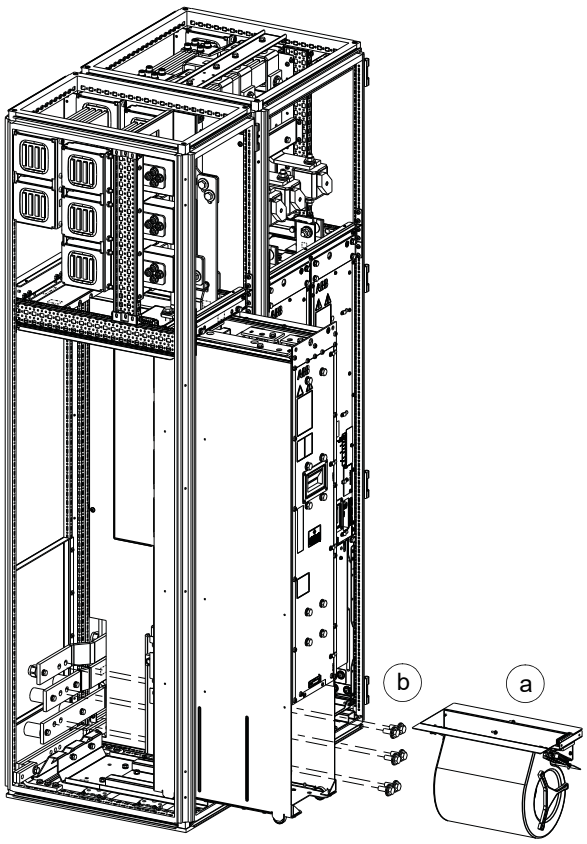


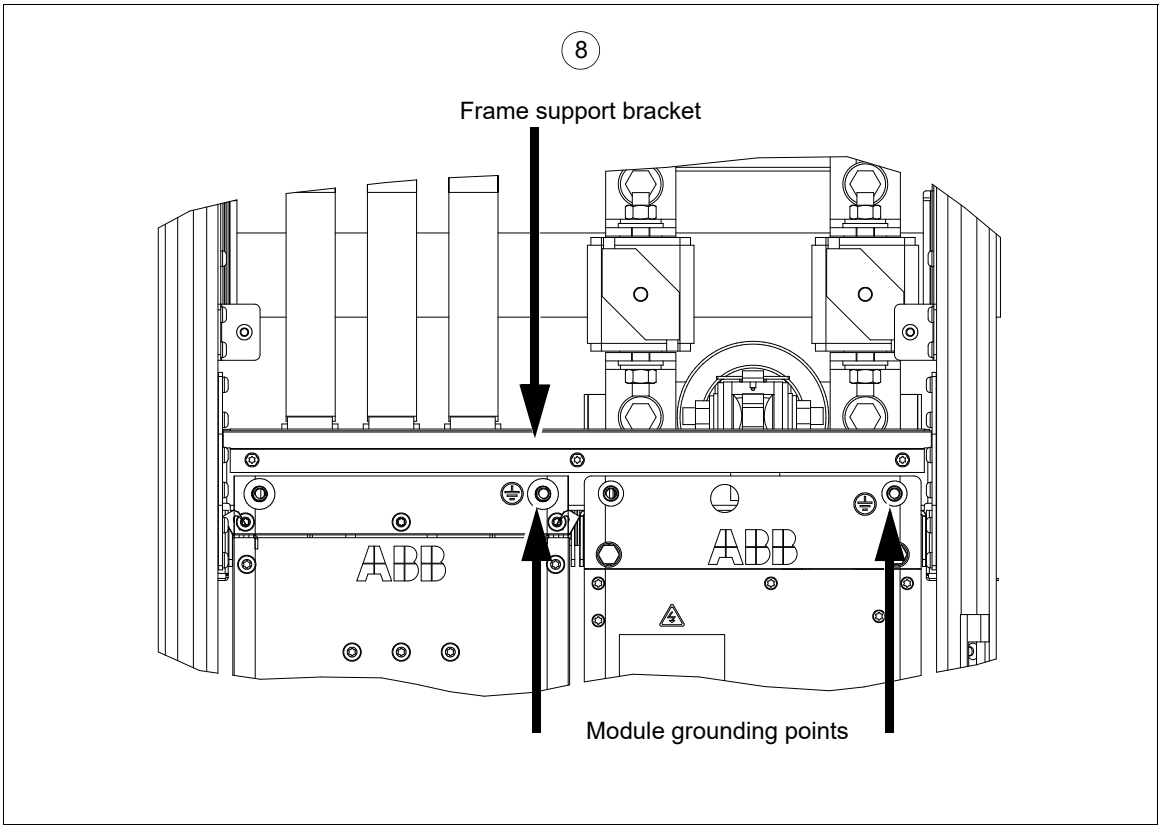
7 AC output of the LCL filter module

BLCL-1x-x



BLCL-2x-x




8
Frame support bracket
Module grounding points

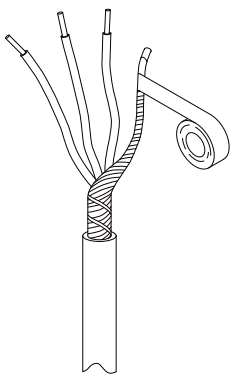
Connection procedure of the motor cables

WARNING! Read and follow the instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

1. Ground the inverter 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 bracket should have a galvanic connection to the PE busbar through the cabinet frame.

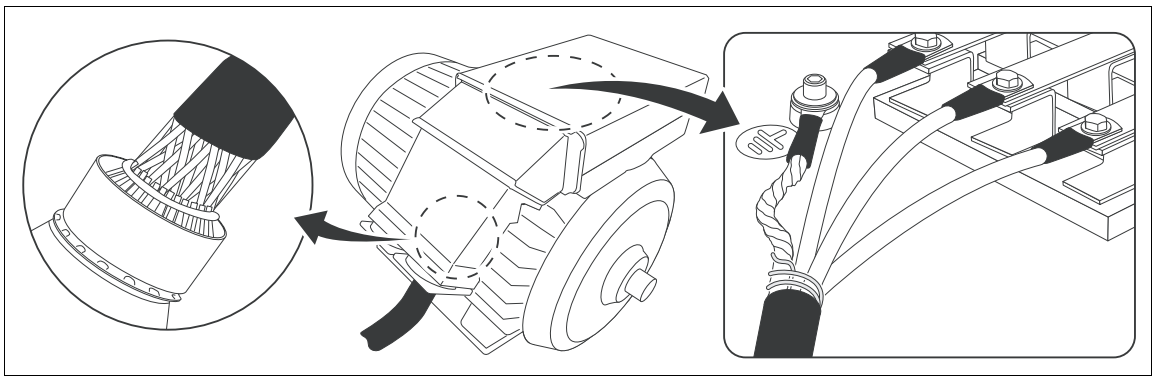
   Notes:
   - If the cabinet frame is painted (such as with Rittal VX25 enclosures), it is important to make sure that a good galvanic connection to ground (PE busbar) is achieved. You can, for example, remove the paint from the connection points and use star washers.
   - The connection to ground merely through the mounting screws and the cabinet chassis is not always good enough. To ensure 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 *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).
2. Run the output (motor) cable into the cubicle 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.
3. Cut the output cable to suitable length and strip the ends of the individual conductors.
4. Twist the shield strands of the output cable together to form a separate conductor and wrap tape around it as shown.



5. Crimp suitable cable lugs to the conductors as well as the twisted shield. Connect the phase conductors to the output busbars. Connect the cable shield to a PE busbar.
6. Secure the cables inside and outside the cabinet mechanically.
7. Tighten the cable gland if present.

Grounding the motor cable shield at the motor end

For minimum radio-frequency interference, ground the cable shield 360 degrees at the lead-through of the motor terminal box. See also *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]).



Connecting the LCL filter

By default, the LCL filter is protected against overheating (caused by a faulty fan, for example) with a thermistor. If the filter temperature becomes too high, the IGBT supply module is automatically stopped. The thermistor must always be connected to the digital input XDI1 on the control unit.

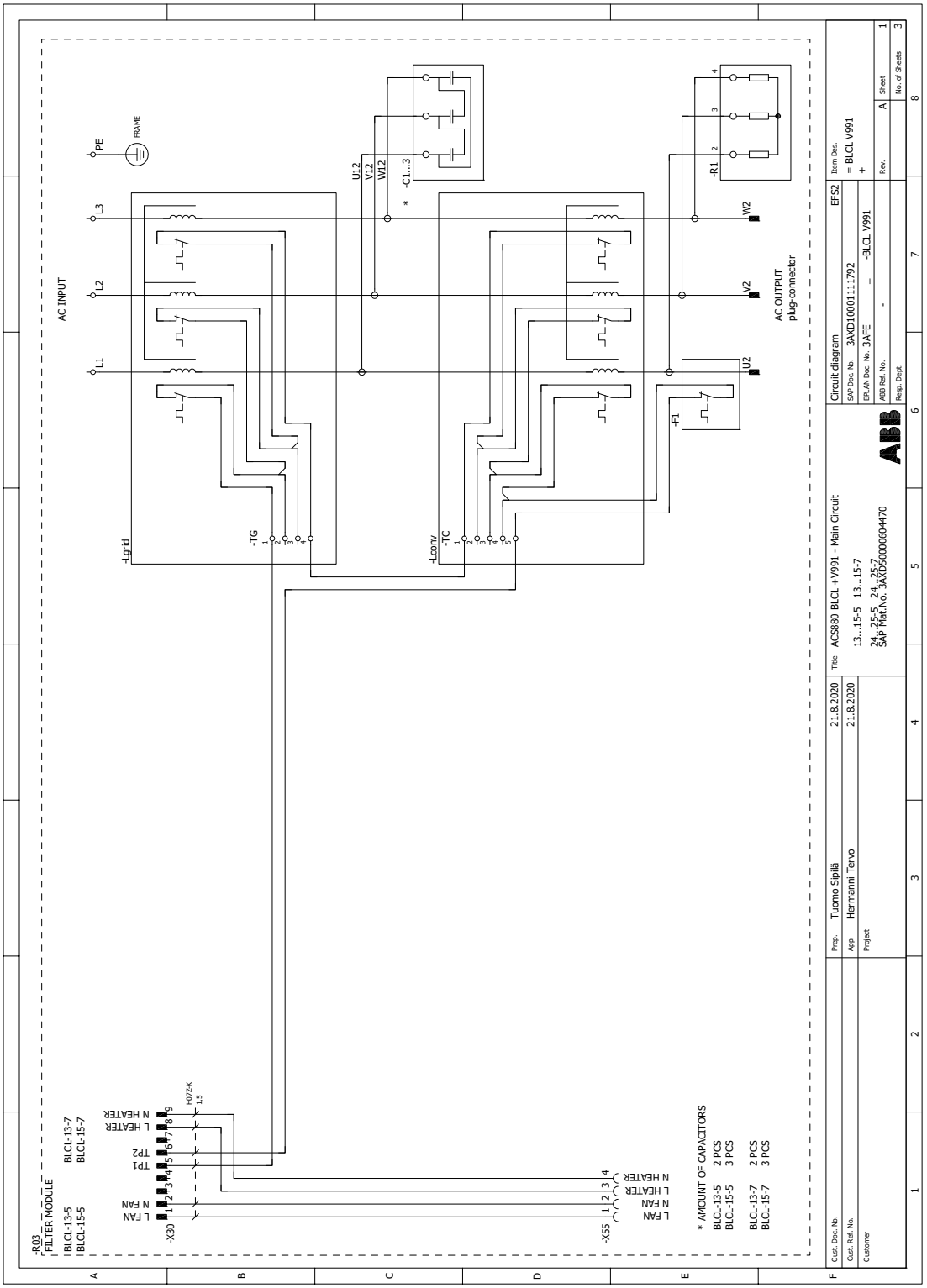
WARNING! If the overheating protection is removed with parameter settings, the filter may be damaged permanently or cause a fire.

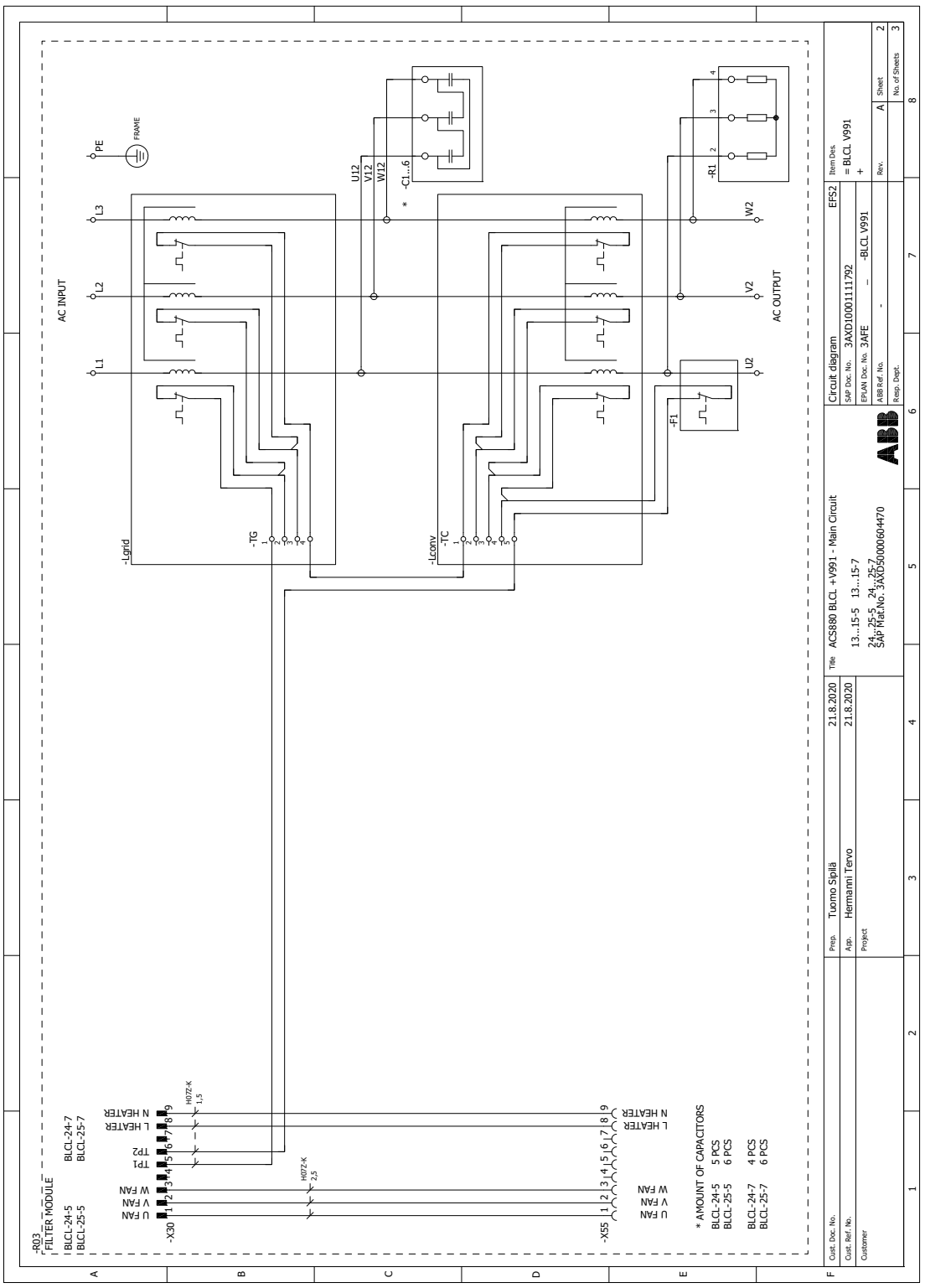
WARNING! Use the LCL filter only with an ACS880-204 IGBT supply module. Use the filter only with an IGBT supply module of an appropriate frame size. (In case of ACS880-14/34, use LCL filter of type BLCL-1x-x or BLCL-2x-x with ACS880-204 IGBT supply module of frame size R8i.)

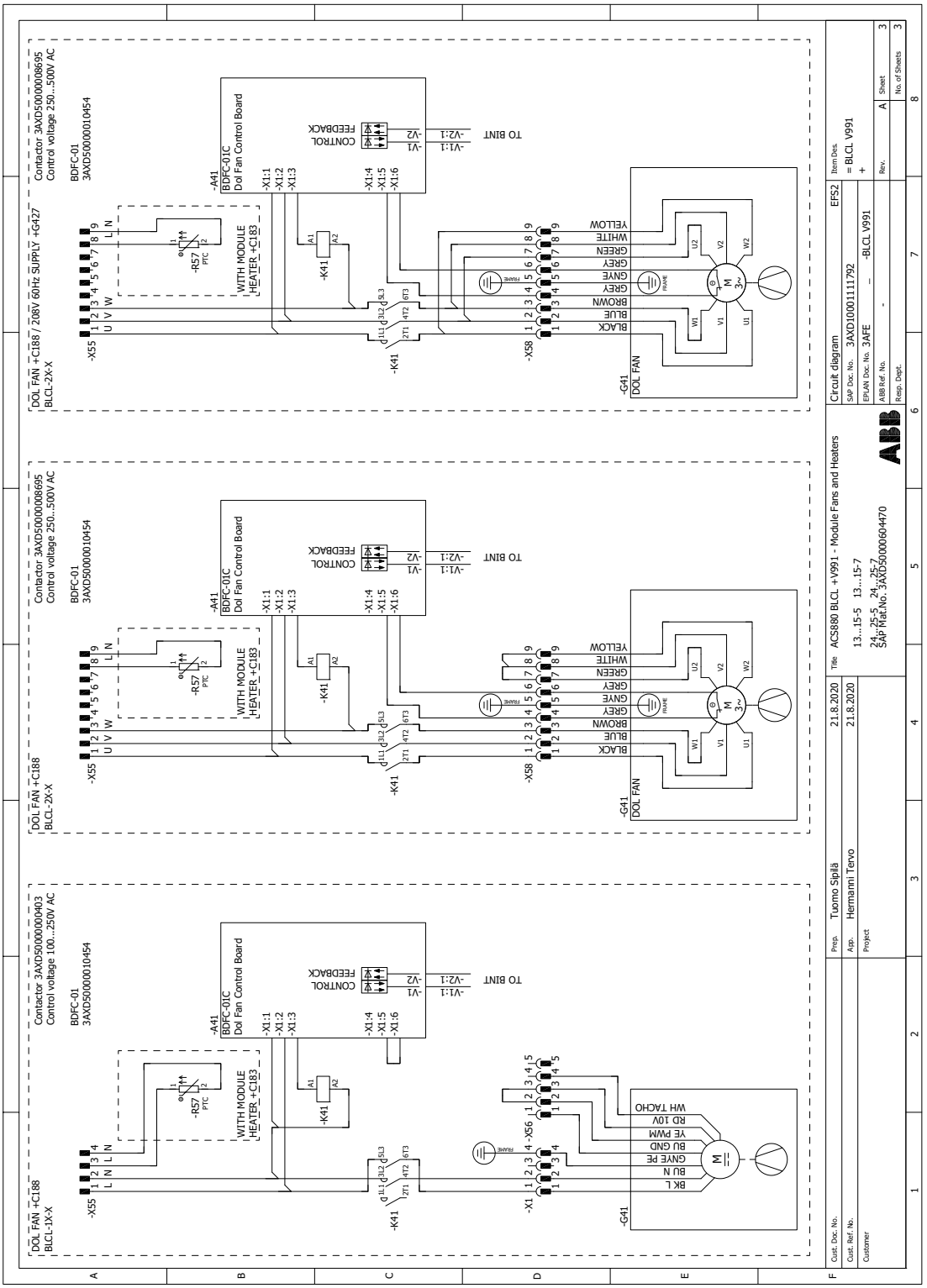
WARNING! Do not lengthen the output cables.

Internal circuit diagrams for LCL filters

The following circuit diagram shows the internal connections of the LCL filter modules.




AC INPUT
AC OUTPUT
PE
FRAME
L1
L2
L3
U2
V2
W2
U12
V12
W12
-C1...6
-R1
-F1
-Lgrid
-Lconv
-TG
-TC
-R03
FILTER MODULE
BLCL-24-5
BLCL-25-5
BLCL-24-7
BLCL-25-7
-X30
-X55
U FAN
V FAN
W FAN
TP1
TP2
L HEATER
N HEATER
H07Z-K 1,5
H07Z-K 2,5
* AMOUNT OF CAPACITORS
BLCL-24-5 5 PCS
BLCL-25-5 6 PCS
BLCL-24-7 4 PCS
BLCL-25-7 6 PCS
Circuit diagram
ACS880 BLCL +V991 - Main Circuit
SAP Doc. No. 3AXD10001111792
EPLAN Doc. No. 3AFE
ABB Ref. No.
Resp. Dept.
SAP Mat.No.: 3AXD50000604470
= BLCL V991
-BLCL V991
Item Des.
Rev.
Sheet
No. of Sheets
Prep. Tuomo Sipilä 21.8.2020
Appr. Hermanni Tervo 21.8.2020
Project
Cust. Doc. No.
Cust. Ref. No.
Customer


DÖL FAN +C188
BLCL-1X-X
Contactor 3AXD50000000403
Control voltage 100...250V AC
BDFC-01
3AXD50000010454
WITH MODULE HEATER +C183
-A41
BDFC-01C
Dol Fan Control Board
CONTROL
FEEDBACK
TO BINT
-V1:1
-V2:1
-X1:1
-X1:2
-X1:3
-X1:4
-X1:5
-X1:6
-R57
PTC
-K41
-X55
-X56
-X1
-G41
BK L
BU N
GNYE PE
BU GND
YE PWM
RD 10V
WH TACHO
DÖL FAN +C188
BLCL-2X-X
-X58
BLACK
BLUE
BROWN
GREY
GNYE
GREY
GREEN
WHITE
YELLOW
DÖL FAN +C188 / 208V 60Hz SUPPLY +G427
BLCL-2X-X
Contactor 3AXD50000008695
Control voltage 250...500V AC
Cust. Doc. No.
Cust. Ref. No.
Customer
Prep. Tuomo Siplä 21.8.2020
Appr. Hermanni Tervo 21.8.2020
Project
Title ACS880 BLCL +V991 - Module Fans and Heaters
13...15-5 13...15-7
24...25-5 24...25-7
SAP Part No. 3AXD50000604470
Circuit diagram EFS2
SAP Doc. No. 3AXD10001111792
EPLAN Doc. No. 3AFE – -BLCL V991
ABB Ref. No. - – -BLCL V991
Resp. Dept.
Item Des. = BLCL V991 +
Rev. A Sheet 3
No. of Sheets 3

Installing the charging circuit

The cabinet builder must install and connect the charging circuit. For connections, see chapter *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 *ACS880 IGBT supply control program firmware manual* (3AUA0000131562 [English]).

Connecting the external power supply cable for the auxiliary circuit

Supply and inverter module

Connectors are described on page *31*.

LCL filter module

Connectors are described on pages *34* and *36*.

Connecting the control cables

Default I/O connection diagram

See chapter *Control units of the drive*.

Connection procedure

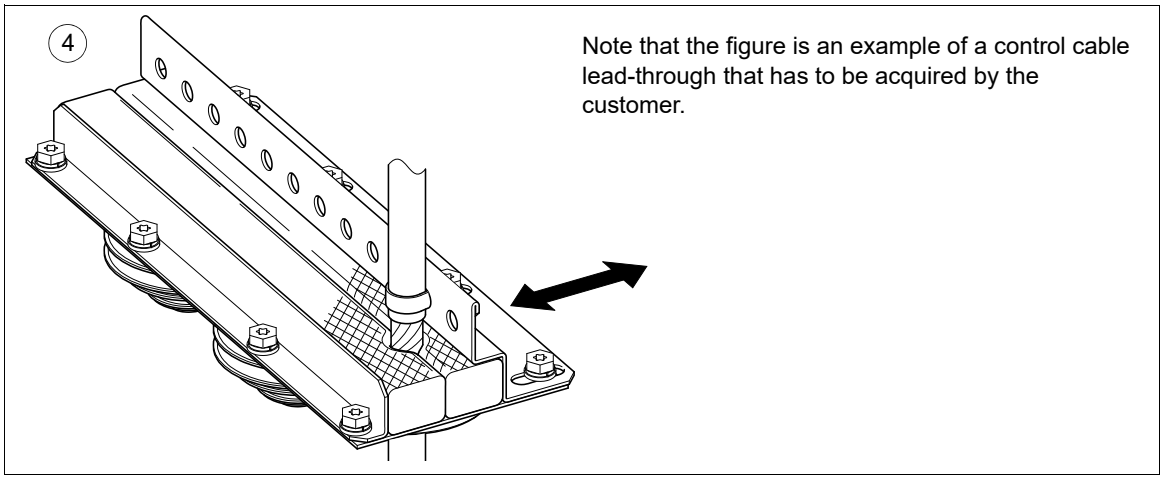
Note: The instructions below are based on an example cabinet construction. They are not applicable to all possible solutions but only clarify the principles.

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

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

WARNING! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). If you ignore them, physical injury or death, or damage to the equipment can occur.

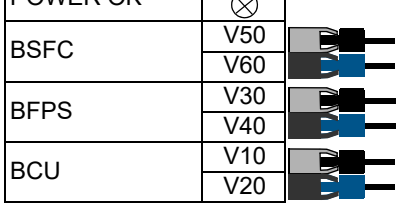
1. Repeat the steps described in section *Electrical safety precautions* on page *116*.
2. Open the cubicle door.
3. Remove the shrouds (if any) from the cubicle.
4. Run the cables into the inside of the cabinet through EMI conductive cushions.
   - Run the cables between the cushions. Strip the cable at this location to enable proper connection of the bare shield and the cushions. Tighten the cushions firmly onto the cable shields.
   - Seal the cable with a grommet.



5. 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.
6. Cut the cables to suitable length. Strip the cables and conductors.
7. Twist the cable shields into bundles and connect them to the ground terminal nearest to the terminal block. Keep the unshielded portion of the cables as short as possible.
8. Connect the conductors to appropriate terminals.
9. Fasten the shrouds (if any).
10. Close the doors.

Module fiber optic connectors

The following figure shows the supply / inverter module fiber optic connections.

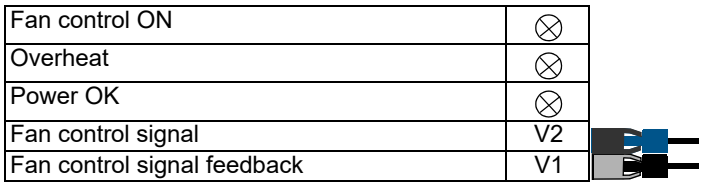


Fiber optic connections on the module

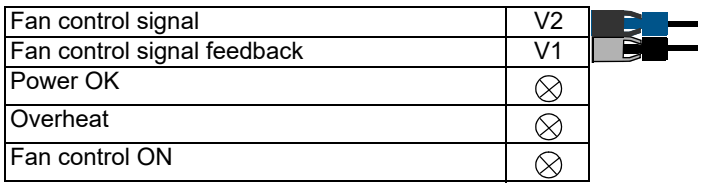
Name	Description
BSFC	Switch fuse controller connection (not in use in single drives) and control connection for the direct-on-line cooling fan of the LCL filter (used only in supply modules) Must be done by the user.
BFPS	Control connection of the speed-controlled cooling fans Connected at the factory.
BCU	Control unit connection. Must be done by the user.

The following figure shows the LCL filter module fiber optic connections.

BLCL-1x-x

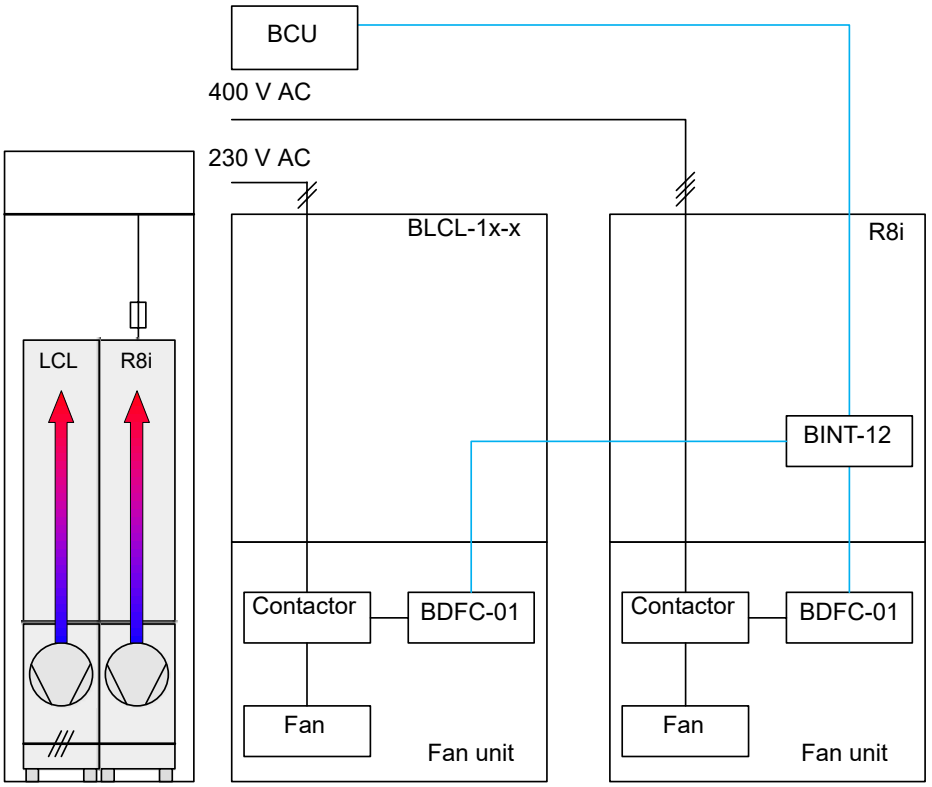


BLCL-2x-x

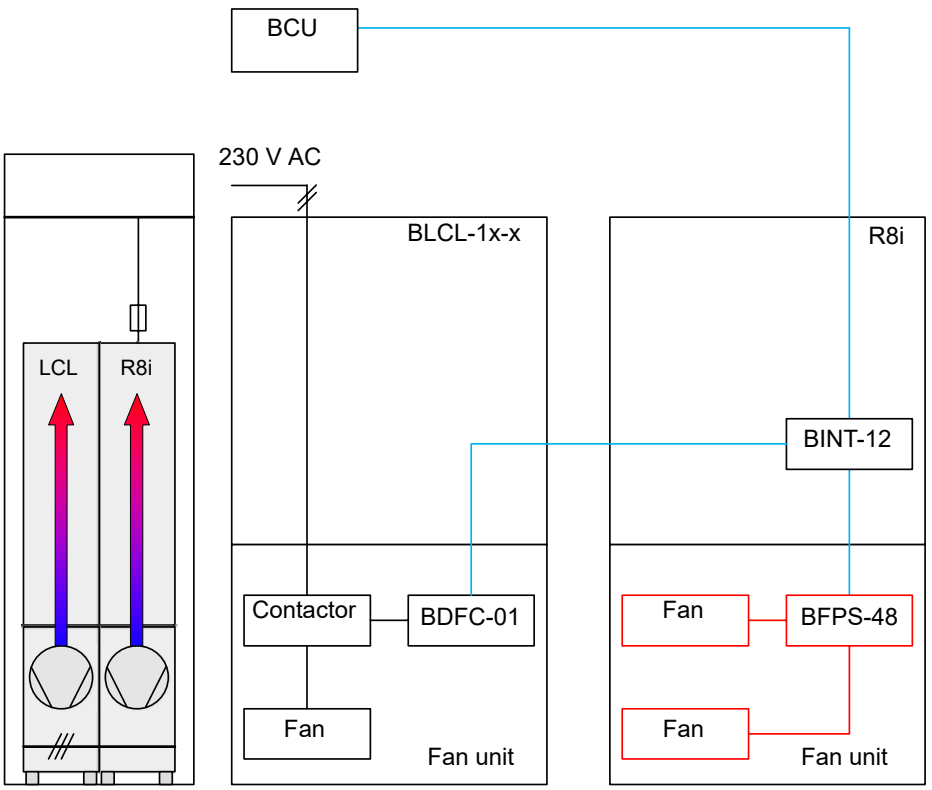


The following figures show example fiber optic connections related to fan control.

Direct-on-line cooling fan (option +C188) in IGBT supply module and LCL filter module



Direct-on-line cooling fan (option +C188) in LCL filter module and speed-controlled fan (standard) in IGBT supply module



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

Connecting a PC

Connection procedure

A PC (with eg, the Drive composer PC tool) can be connected to the supply / inverter unit as follows:

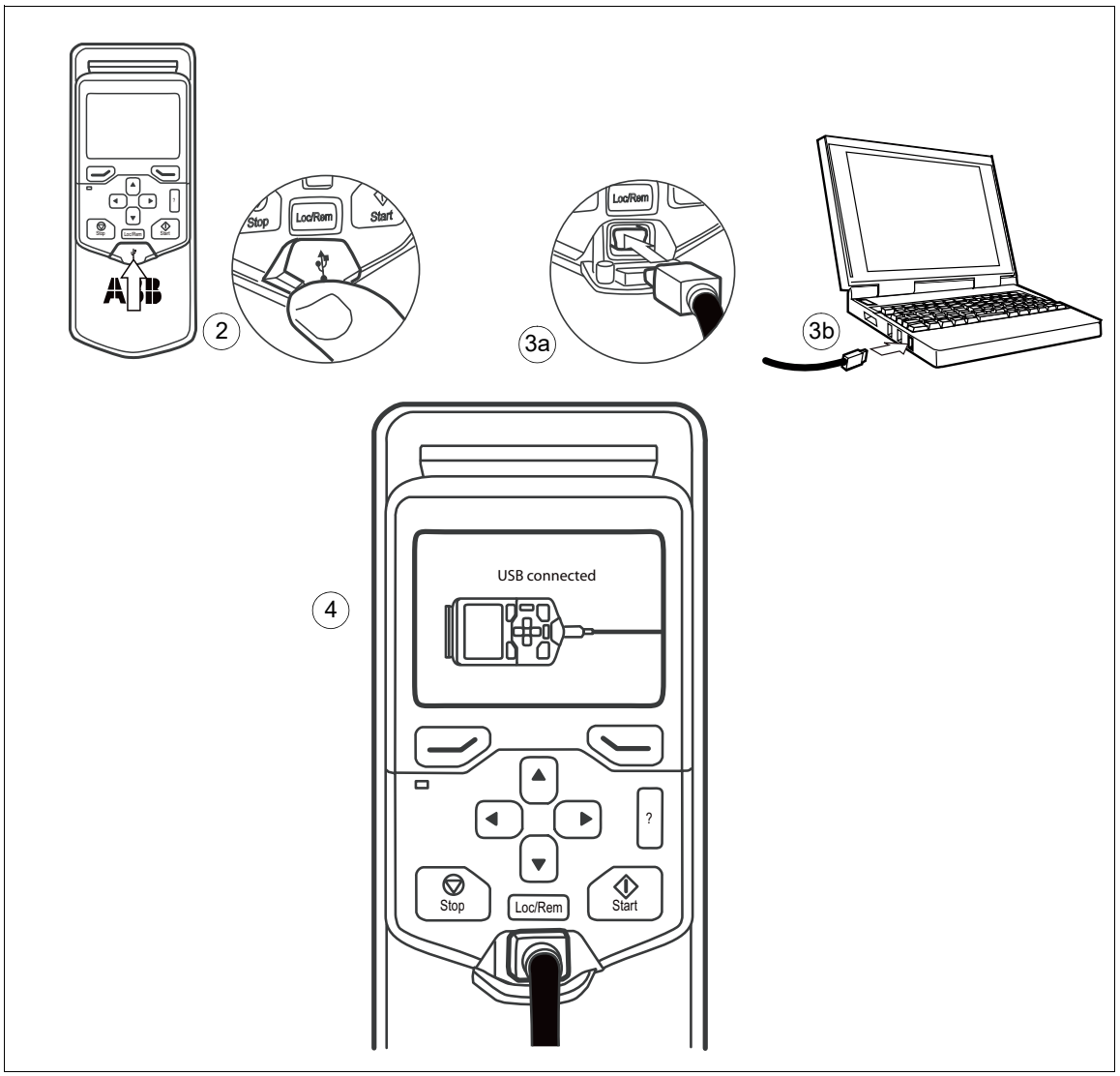
1. Connect an ACS-AP-x control panel to the supply / inverter control unit either by using an Ethernet (eg, CAT5E) networking cable, or by inserting the panel into the panel holder (if present).

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

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.

Note: It is also possible to connect the PC through an optional diagnostics and panel interface (FDPI). The FDPI is used for branching the panel bus and chaining a control panel or PC tool to several drives. See *FDPI-02 user's manual* (3AUA0000113618 [English]).

5. See the documentation of the PC tool for setup instructions.



For more information, see *ACX-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).

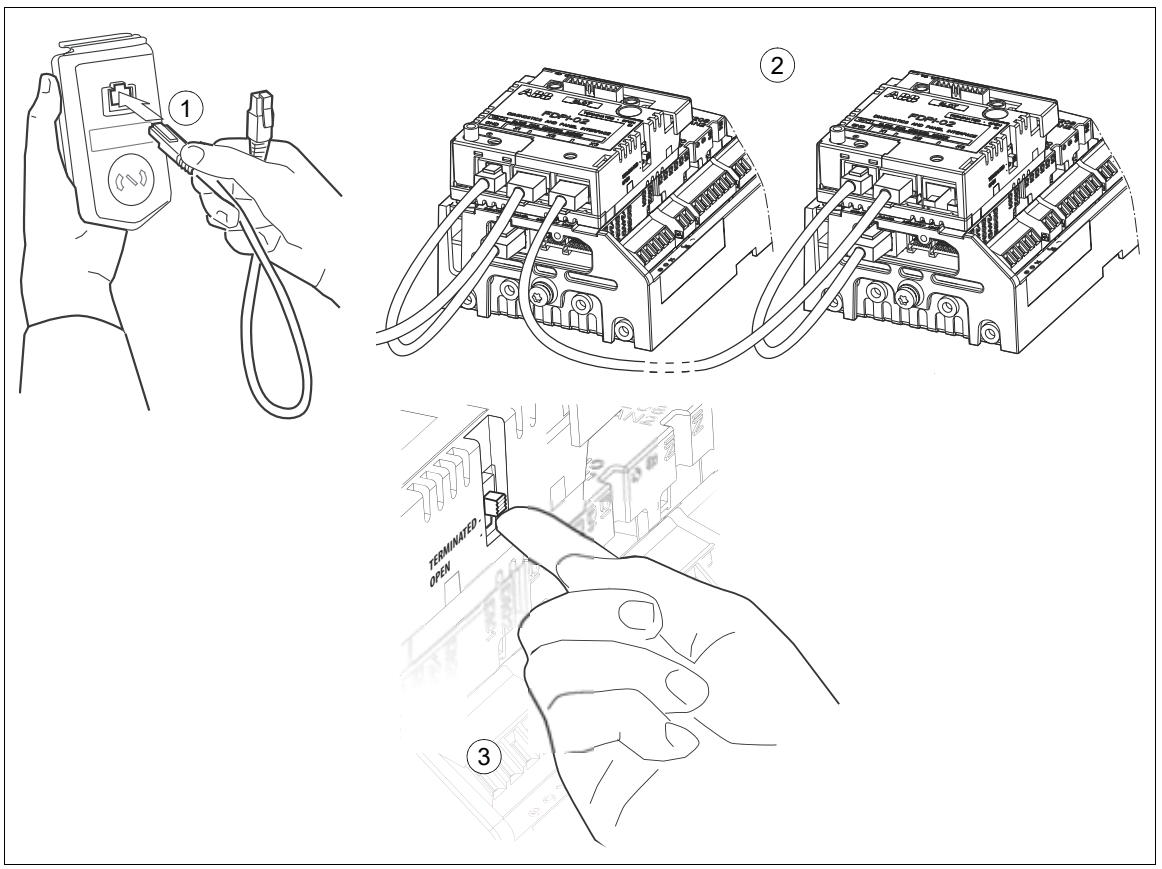
Panel bus (Control of several inverter units from one control panel)

One control panel (or PC) can be used to control several inverter units by constructing a panel bus. Each inverter unit must be equipped with a control panel mounting platform or an FDPI-02 module (available separately). For further information, see *FDPI-02 diagnostics and panel interface user's manual* (3AUA0000113618 [English]).

1. Connect the panel to one inverter unit using an Ethernet (eg, CAT5E) cable.
   - Use Menu – Settings – Edit texts – Drive to give a descriptive name to the unit
   - Use parameter 49.01 to assign the unit with a unique node ID number
   - Set other parameters in group 49 if necessary
   - Use parameter 49.06 to validate any changes.

   Repeat the above for each unit.
2. With the panel connected to one inverter unit, link the inverter units together using Ethernet cables.
3. On the FDPI module of the unit farthest away from the control panel, switch on bus termination by moving the termination switch into the TERMINATED position. Termination should be off (in the OPEN position) on all other FDPI modules. (The control panel automatically terminates the other end of the bus.)
4. On the control panel, switch on the panel bus functionality (Options – Select drive – Panel bus). The unit to be controlled can now be selected from the list under Options – Select drive.

   If a PC is connected to the control panel, the inverters on the panel bus are automatically displayed in the Drive composer tool.



A panel mounting platform kit (DPMP-0x) is available for mounting the control panel on a surface such as the cabinet door.

Installing optional modules

Installation of I/O extension and fieldbus adapter modules

Note: For the optional modules supported by the control program, see the appropriate firmware manual.

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

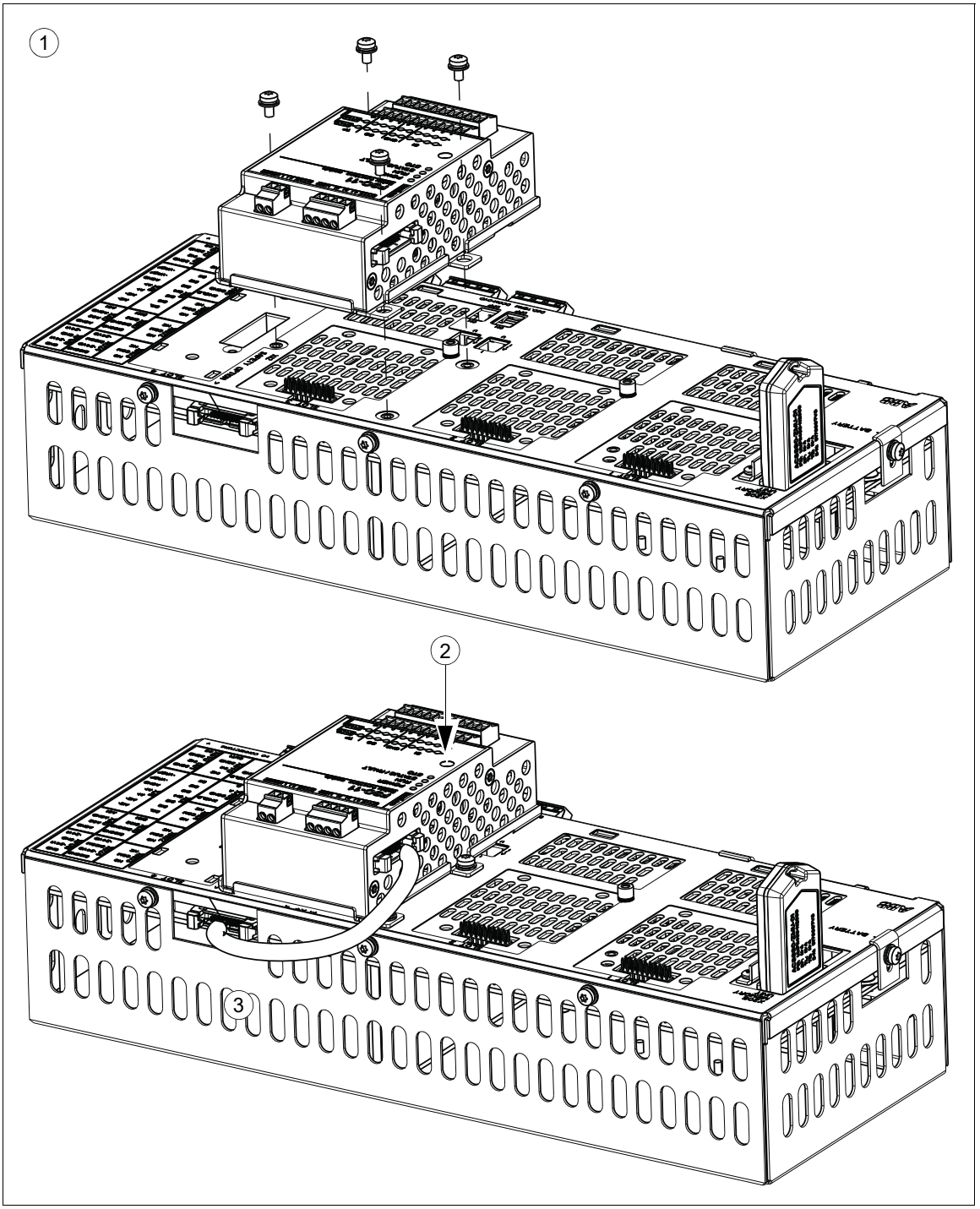
WARNING! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). If you ignore them, physical injury or death, or damage to the equipment can occur.

---

1. Repeat the steps described in section *Electrical safety precautions* on page *116*. Disconnect the unit from the supply, lock out the disconnecting device, and ensure by measuring that there is no voltage present.
2. Switch off any potentially dangerous control voltages coming to the unit. 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. Refer to chapter *Control units of the drive* (page *313*).
4. Fasten the mounting screw of the module.
5. Connect the necessary wiring to the module following the instructions given in the documentation of the module and section *Connecting the control cables* (page *128*).
6. Check the installation and that it is safe to reconnect power.
7. Configure the module. Refer to the instructions given in the documentation of the module as well as the appropriate firmware manual.

Installation of an FSO-xx safety functions module

1. Stop the inverter unit and do the steps in section *Electrical safety precautions* on page *116* before you start the work.
2. The FSO-xx comes with alternative bottom plates for mounting on different units. For mounting on the BCU, the mounting points should be located at the long edges of the module as shown. Replace the bottom plate of the FSO-xx if necessary.
3. Fasten the FSO-xx onto slot 3 of the BCU control unit.
4. Tighten the FSO-xx electronics grounding screw. **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.
5. Connect the data cable between connector X12 on the control unit and connector X110 on the FSO-xx.
6. To complete the installation, refer to the instructions in the *User's manual* delivered with the FSO-xx.

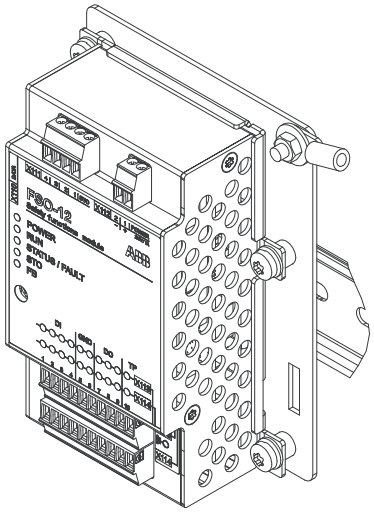

1
2
3

Installation beside the control unit

To reserve the slots of the control unit for other modules, you can install the FSO-xx separate from the control unit using mounting kit 3AXD50000025495. The kit contains the parts for mounting the FSO-xx onto a DIN rail nearby the BCU control unit. The kit also contains longer cables for connecting the FSO-xx to the control unit.

Refer to instruction 3AXD50000025583 for installation details.

Mounting on DIN rail



Implementing the Safe torque off function

See chapter *The Safe torque off function* on page *327*.

6

Installation checklist

Contents of this chapter

This chapter contains a list for checking the installation of the ACS880-14 and -34 single drive module packages.

Checklist

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

WARNING! Only qualified electricians are allowed to do the work described below. Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

Make sure that...	☑
The ambient operating conditions meet the specifications given in chapter *Technical data*.	☐
The unit is properly fastened to the floor. See *Mechanical installation instructions for ACS880 multidrive cabinets* (3AUA0000101764 [English]).	☐
The cooling air flows freely.	☐
There is sufficient free space around the unit. See *Mechanical installation instructions for ACS880 multidrive cabinets* (3AUA0000101764 [English]).	☐

Make sure that...	☑
If the drive has not been powered (either in storage or unused) for over one year: The electrolytic DC capacitors in the DC link of the drive have been reformed. See *Capacitor reforming instructions* (3BFE64059629 [English] (available in the Internet or from your local ABB representative).	☐
All protective ground conductors have been connected to the appropriate terminals and the terminals have been tightened (pull the conductors to check).	☐
The supply voltage matches the nominal input voltage of the unit. Check the type designation label.	☐
The power cables have been connected to the appropriate terminals, the phase order is right, and the terminals have been tightened. (Pull the conductors to check.)	☐
Appropriate AC fuses and main disconnector have been installed.	☐
The control cables (if any) have been connected to the appropriate terminals, and the terminals have been tightened. (Pull the conductors to check.)	☐
The control units have been connected to the supply / inverter modules.	☐
There are no tools, foreign objects or dust from drilling inside the cabinet.	☐
All shrouds and covers are in place. Cabinet doors have been closed.	☐

7

Start-up

Contents of this chapter

This chapter contains the start-up procedure of the ACS880-14/34.

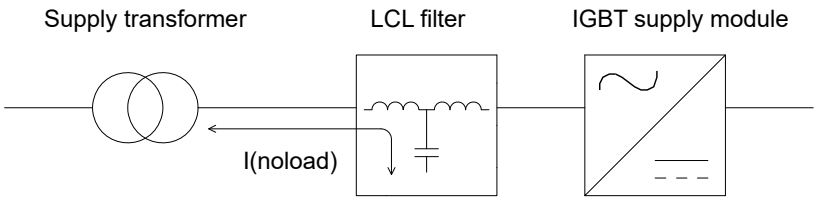
Note: These instructions may not contain all possible start-up tasks of a customized drive. Always refer to the delivery-specific circuit diagrams when you do the start-up.

WARNING! Only qualified electricians are allowed to do the work described in this chapter. Read the complete safety instructions and repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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.

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. For information on the Safe torque off function, see chapter *The Safe torque off function*.

Start-up procedure

Tasks	☑
Safety	
WARNING! Obey the safety instructions during the start-up procedure. See *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Only qualified electricians are allowed to start-up the drive.	☐
Checks/Settings with no voltage connected	
WARNING! Ensure that the disconnector of the supply transformer is locked to the off (0) position, that means no voltage is, or can not, be connected to drive inadvertently. The no-load current of the IGBT supply unit must be taken into account if pretests (eg, factory tests) are made on the IGBT supply unit by using a temporary main AC supply. The no-load current circulates between the supply network and the LCL filter capacitors and therefore stresses the supply transformer. To avoid supply transformer overload, the supply transformer must be dimensioned according to 15% of IGBT supply unit nominal current. The transformer should be dedicated for the IGBT supply unit only, no other (sensitive) load shall be connected in same transformer secondary to avoid disturbance and malfunction. In case a generator is used as a supply, it should be dimensioned according to the nominal current of the IGBT supply unit.  	☐
<u>If a generator is used as a supply:</u> The recommendation for ACS880 IGBT supply unit with generator supply is: • always use BAMU auxiliary measurement unit • short-circuit ratio of the grid > 3 • short-circuit ratio of the generator 1/Xk > 2 • generator nominal power $P_{gen} > 0.3 \times P_{ISU}$	☐
Check that the main switch-disconnector [Q1.1] is switched off, or the main circuit breaker [Q1] is cranked out.	☐
Check the mechanical and electrical installation. See *Installation checklist* on page *139*.	☐
Check the settings of breakers/switches in the auxiliary circuits.	☐
If time relays, or relays with delayed make contact or break contact are used in emergency stop circuits, check the relay time settings. See delivery-specific circuit diagrams and safety function specific documentation (if applicable).	☐
Disconnect the unfinished or unchecked 230 V AC cables that lead from the terminal blocks to the outside of the equipment.	☐
Check that both circuits of STO terminals on the supply control unit are closed as shown in *Default I/O connection diagram of the supply unit* on page *316* (IN1 and IN2 must be connected to OUT). The supply unit cannot start is either circuit is open. Refer to the wiring diagrams delivered with the drive. See chapters *Control units of the drive* (page *313*) and *The Safe torque off function* (page *327*).	☐
Check that STO terminals on the inverter control unit are wired as shown in *Default I/O connection diagram of the inverter unit* on page *318*. Refer to the wiring diagrams delivered with the drive. See chapters *Control units of the drive* (page *313*) and *The Safe torque off function* (page *327*).	☐

Tasks	☑
Check that the Safe torque off circuit is wired from the STO OUT terminal block of the inverter control unit [A51] to all inverter modules.	☐
Powering up the auxiliary circuit of the drive	
Make sure that it is safe to connect voltage. Ensure 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.	☐
Close the cabinet doors.	☐
Close the main breaker of the supply transformer.	☐
Switch on the auxiliary voltage switch [Q21].	☐
Setting the parameters, and performing the first start	
Supply modules: • Set the correct voltage range, supply unit parameter *195.01 Supply voltage*. • Supply modules with option +C188 (direct-on-line cooling fan): Set bit 5 of *195.20 HW options word 1*. • If your supply unit consists of more than one module, parameters *195.30 Parallel type filter* and *195.31 Parallel connection rating id* need to be set. First, select the correct voltage range with parameter *195.30 Parallel type filter*. Then, select the correct supply unit type with parameter *195.31 Parallel connection rating id*. Inverter modules: • With inverter modules with option +C188 (direct-on-line cooling fan), set bit 14 of *95.20 HW options word 1*. • With parallel-connected R8i modules, select the inverter unit type in parameter *95.31 Parallel connection rating id*. You can filter the list using parameter *95.30*.	☐
• If the drive is powered from external power supplies, some parameter adjustments need to be made (eg, inverter unit parameter *95.04 Control board supply*). See the inverter unit firmware manual. • Check that inverter unit parameter *95.09 Fuse switch control* is set to *Disable*. • Setup the drive control program, and perform the first start of the drive and motor. See the appropriate start-up guide, or firmware manual. There is a separate start-up guide only for some control programs. • Set up the communication between inverter unit and supply unit. Connect the fiber optic cable between CH 0 (RDCO module) in supply unit and CH1 (RDCO module) in inverter unit. The communication also requires setting of parameter *95.20 HW options word 1* in inverter unit control program, and parameter *195.20 HW options word 1* in supply unit control program. See the firmware manuals. • For commissioning both supply unit and inverter unit with a single control panel, a panel bus configuration (via FDPI-02) is needed. See section *Panel bus (Control of several inverter units from one control panel)* on page *134*. • Set up the panel bus: For the inverter unit, check and select (if needed) **node 1** with the parameter *49.01 Node ID number.* For the supply unit, check and select (if needed) **node 2** with the parameter *149.01 Node ID.* **Note:** The new settings take effect only after refreshing the parameter settings with parameter *49.06 Refresh settings* in inverter unit control program and *149.06 Refresh settings* in supply unit control program. If you need more information on the use of the control panel, see *ACX-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).	☐
Stop the motor and drive.	☐

Tasks	☑
Drives with a fieldbus adapter module (if applicable): Set the fieldbus parameters. Activate the appropriate assistant in the control program, or see the user's manual of the fieldbus adapter module, and the drive firmware manual. Not all control programs include assistants. Check that the communication works between the drive and the PLC.	☐
Drives with an encoder interface module (if applicable): Set the encoder parameters. Activate the appropriate assistant in the control program, or see the user's manual of the encoder interface module, and the drive firmware manual. Not all control programs include assistants.	☐
Powering up the main circuit of the drive	
Switch the grounding switch [Q9] off.	☐
Drives with a main switch-disconnector [Q1.1]: Close the main switch-disconnector. Drives with a main circuit breaker ([Q1]: Crank in the main circuit breaker. ⚠ **WARNING!** Never use the Start button of the main circuit breaker [Q1] for closing. The Start button of the main circuit breaker bypasses the charging circuit and may damage the converter module. **Note:** Do not use excessive force. The main switch-disconnector (or main circuit breaker) can only be closed when • the main input terminals [L1, L2, L3] are powered, and • auxiliary voltage is switched on [Q21], and • grounding switch is off [Q9].	☐
Turn the operating switch [S21] to the ON (1) position to activate the run enable signal. Depending on control source settings, this may also close the main contactor (if present). If a main contactor is present and does not close, refer to the circuit diagrams delivered by the drive as well as the appropriate firmware manuals.	☐
On-load checks	
Start the motor to perform the ID run.	☐
Check that the module cooling fans rotate freely in the right direction. The fans run noiselessly.	☐
Check that the motor starts, stops and follows the speed reference in right direction when controlled with the control panel.	☐
Check that the motor starts, stops and follows the speed reference in right direction when controlled through the customer-specific I/O or fieldbus.	☐
Drives in which the Safe torque off control circuit is connected in use: Test and validate the operation of the Safe torque off function. See *Start-up including validation test* (page *334*).	☐
Drives with other safety functions: Test and validate the operation of other safety functions (for example, emergency stop). ⚠ **WARNING!** The safety functions are not safe before they are validated according to the instructions. Safety functions are optional. 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 [Q1.2]. This can be done, for example, with an operating switch [S21].

8

Maintenance

Contents of this chapter

This chapter instructs how to maintain the ACS880-14 and -34 single drive module packages and how to interpret their fault indications. The information is valid for ACS880-14 and -34 single drive module packages and example cabinet installations of the modules.

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

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 *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]).

Maintenance intervals

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

Maintenance task/object	Years from start-up													
	0	1	2	3	4	5	6	7	8	9	10	11	12	…
Cooling fans														
Main cooling fan of supply / inverter module (speed-controlled)										R				
Cooling fan of LCL filter (50 Hz, direct-on-line)										R				
Cooling fan of LCL filter (60 Hz, direct-on-line)							R						R	
Internal cooling fan for circuit boards										R				
Cabinet cooling fan (internal, 50 Hz)										R				
Cabinet cooling fan (internal, 60 Hz)							R						R	
Cabinet cooling fan (door, 50/60 Hz)										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	
Quality of supply voltage		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	
Reforming of DC circuit capacitors (spare modules and spare capacitors)		P	P	P	P	P	P	P	P	P	P	P	P	
Inspections by user														
Cleaning IP22 and IP42 air inlet and outlet meshes		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	
Checking ambient conditions (dustiness, corrosion, temperature)		I	I	I	I	I	I	I	I	I	I	I	I	
Cleaning the heatsinks of supply / inverter module		I	I	I	I	I	I	I	I	I	I	I	I	
Other														
ABB-SACE main circuit breaker maintenance		I	I	I	I	I	I	I	I	I	I	I	I	
Functional safety														
Safety function test	I See the maintenance information of the safety function.													
Safety component expiry (Mission time, T_M)	20 years													

4FPS10000239703

Legend

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 programs have maintenance timers or 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 of the supply / inverter unit.

Cabinet

Cleaning the interior of the cabinet

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

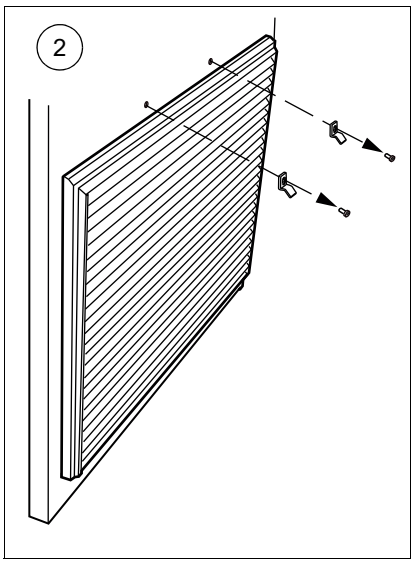
1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
2. Open the cubicle door.
3. Clean the interior of the cabinet. Use a vacuum cleaner and a soft brush.
4. Clean the air inlets of the fans and air outlets of the modules (top).
5. Clean the air inlet grating of the door (see section *Cleaning the door air inlets (IP22 and IP42)* on page *148*).
6. Close the door.

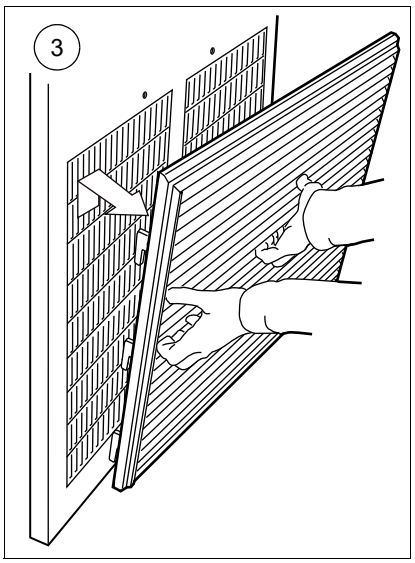
Cleaning the door air inlets (IP22 and IP42)

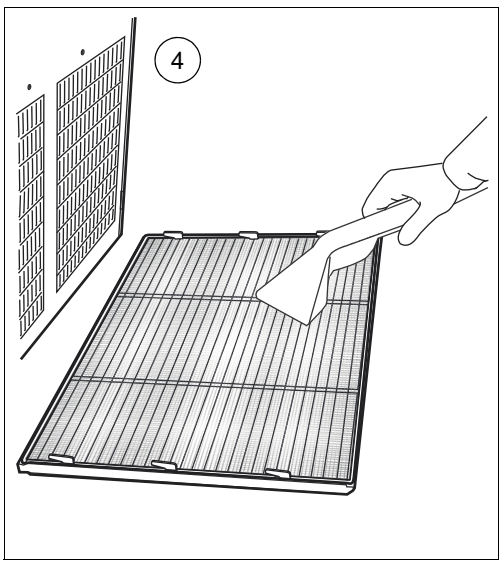
WARNING! Use a vacuum cleaner with an antistatic hose and nozzle, and wear a grounding wristband. Otherwise an electrostatic charge might build up and damage the circuit boards.

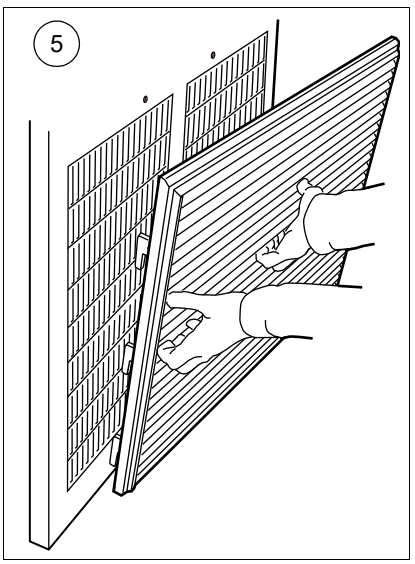
Check the dustiness of the air inlet meshes. If the dust cannot be removed by vacuum cleaning from outside through the grating holes with a small nozzle, proceed as follows:

1. Recommendation: De-energize the fans by switching off the unit. Obey the instructions in section *Electrical safety precautions* on page *116*.
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.





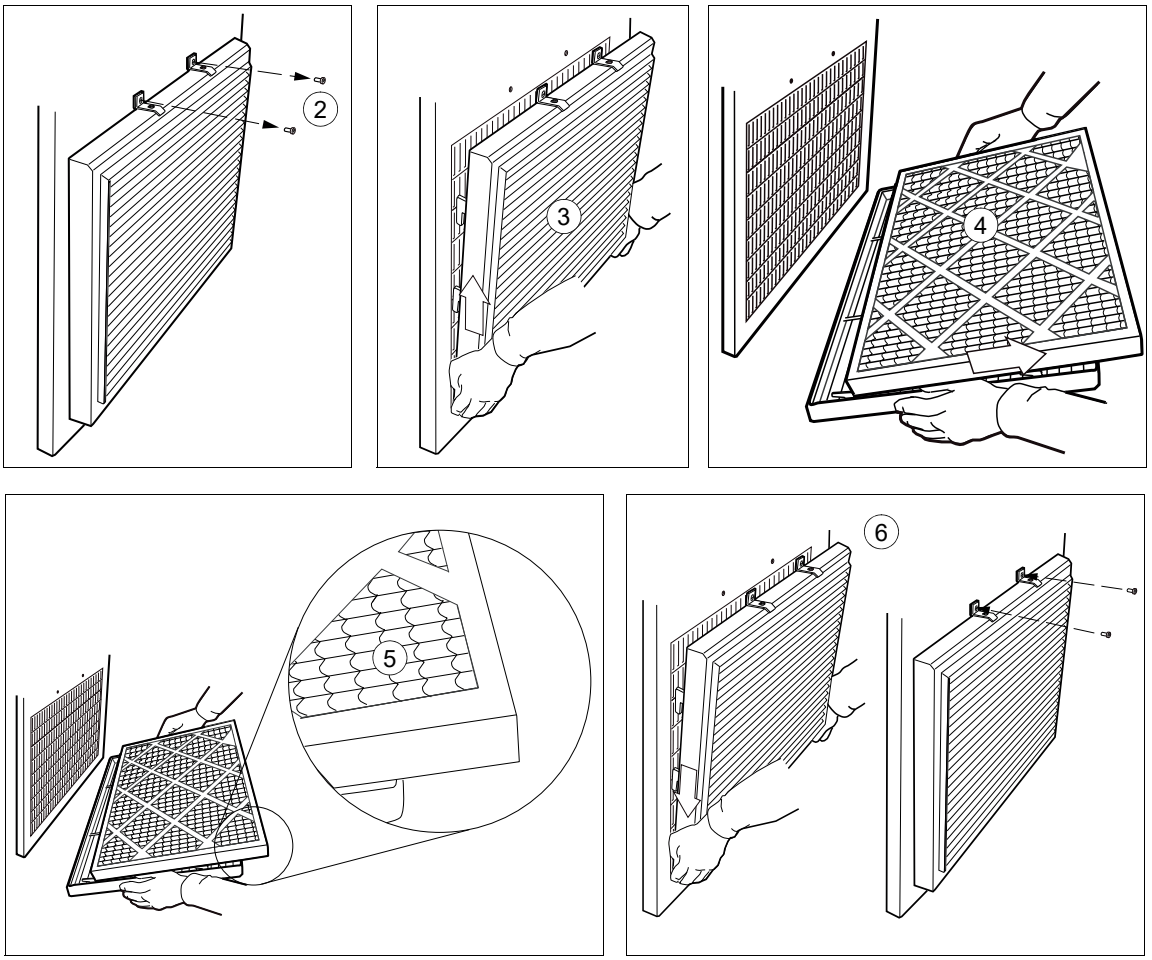




Cleaning the door air inlets (IP54)

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. Recommendation: De-energize the fans by switching off the unit. Obey the instructions in section *Electrical safety precautions* on page *116*.
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.
5. Place the new filter in the grating the metal wire side facing the door.
6. Reinstall the grating in reverse order.



Cleaning the outlet (roof) filters (IP54)

The outlet (roof) filter in IP54 units can be accessed by pulling the grating upwards.

Power connections

Tightening

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
2. Check the tightness of the cable connections. For the tightening torques, see *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]).

Fans

The lifespan of the cooling fan depends on the running time of the fan, ambient temperature and dust concentration. See the firmware manuals for the actual signal which indicates the running time of the cooling fan. For resetting the running time signal after a fan replacement, contact ABB. Replacement fans are available from ABB. Do not use other than ABB specified spare parts.

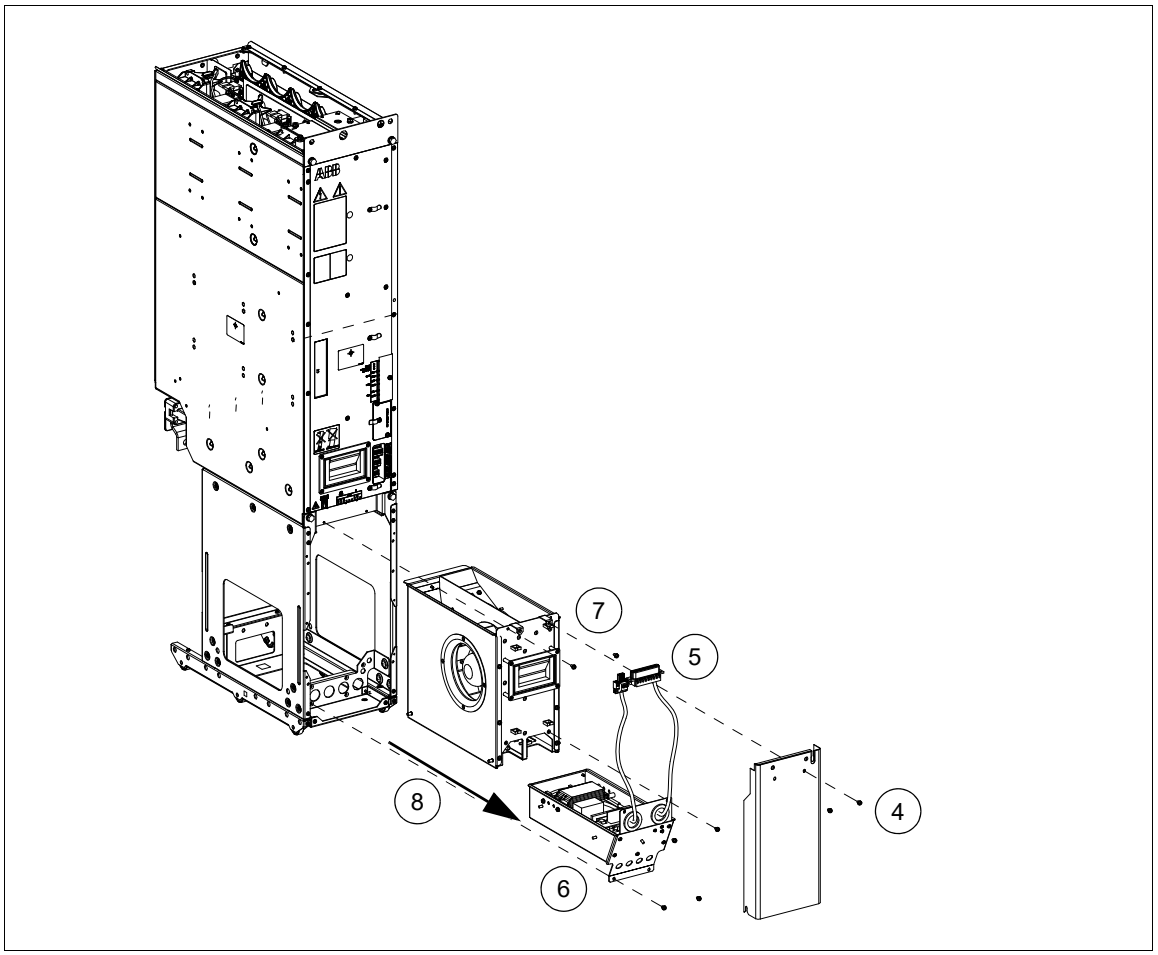
Replacing the cooling fan of the supply and inverter module

If the module is equipped with a direct-on-line cooling fan (option +C188), see page *153*.

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

WARNING! Use protective gloves! Beware of the sharp edges when removing the fan!

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
2. Open the door.
3. Remove the shroud in front of the fan.
4. Remove the cover panel in front of the fan.
5. Unplug the wiring of the fan.
6. Remove the fan control box.
7. Undo the screws of the fan unit.
8. Pull the fan unit out.
9. Install a new fan in reverse order.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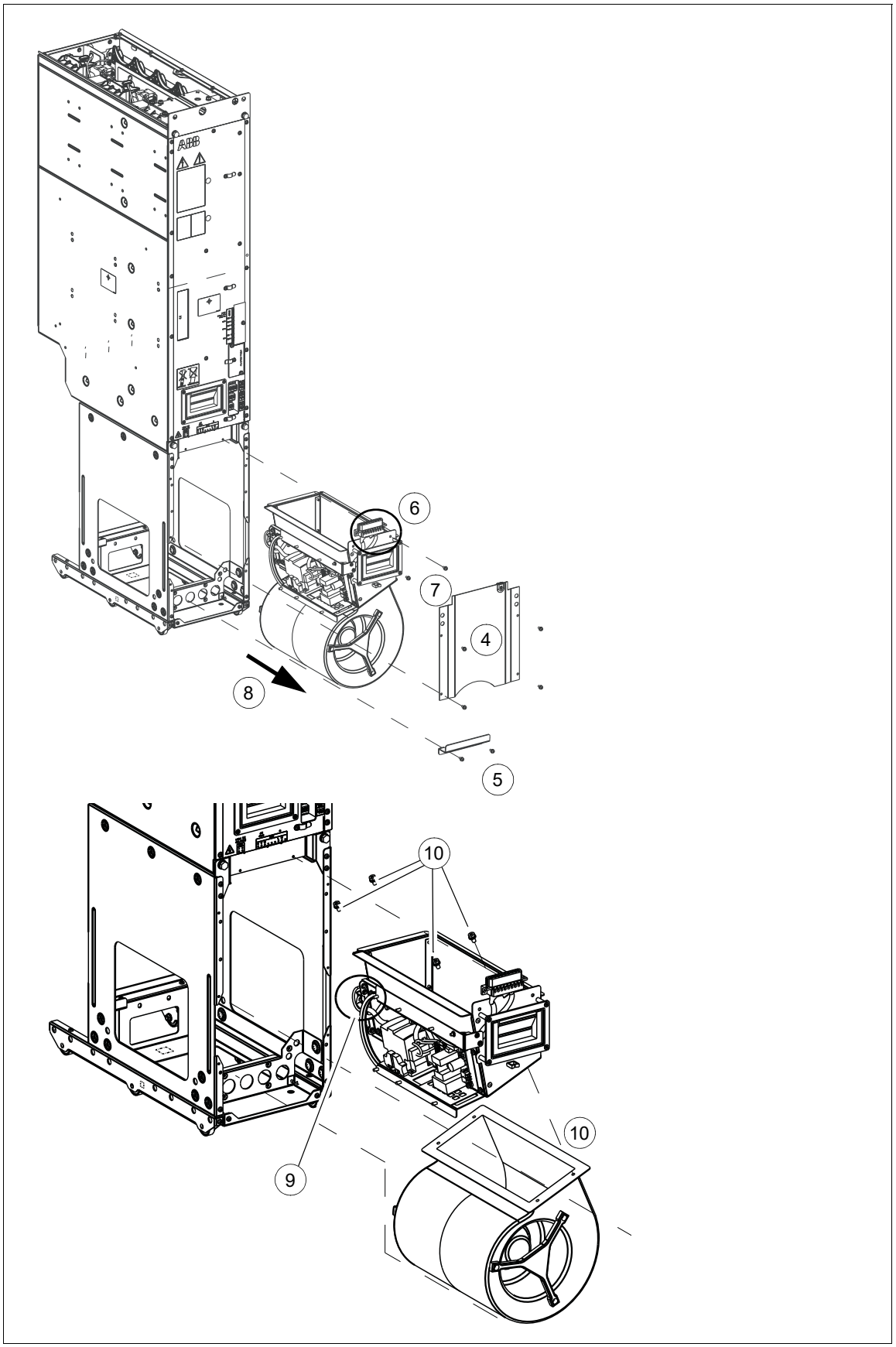
Replacing the direct-on-line cooling fan of the supply and inverter module (option +C188)

If the module is equipped with a standard speed-controlled cooling fan, see page *151*.

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

WARNING! Use protective gloves! Beware of the sharp edges when removing the fan!

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
2. Open the door.
3. Remove the shroud in front of the fan.
4. Remove the cover panel.
5. Remove the bracket.
6. Unplug the wiring of the fan assembly.
7. Undo the screws of the fan assembly.
8. Pull out the fan assembly.
9. Unplug fan wire from the fan assembly.
10. Undo the screws of the fan.
11. Install a new fan in reverse order.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Replacing the internal circuit board compartment fan

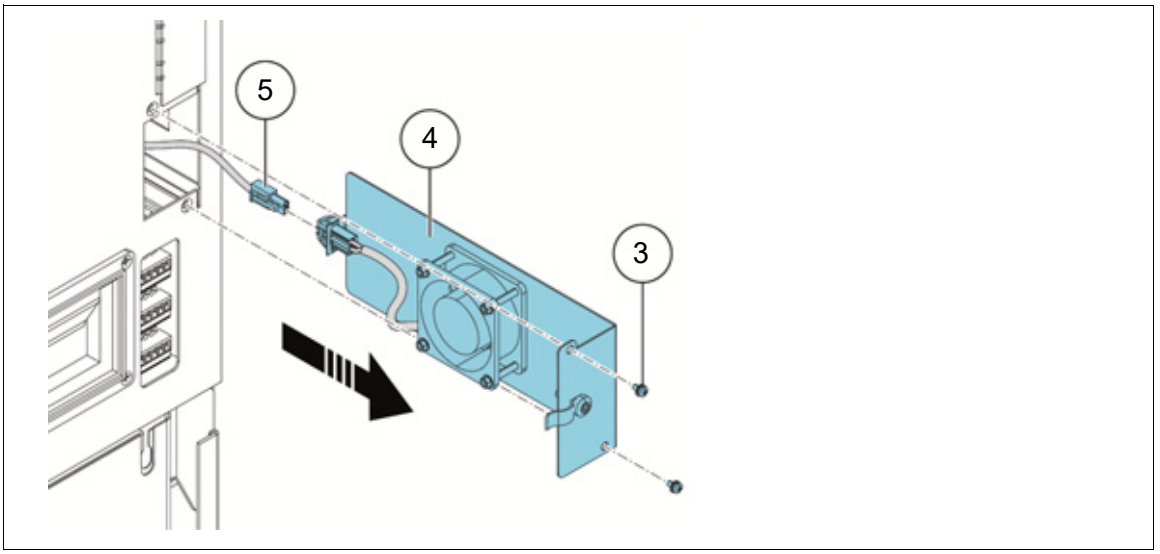
The supply and inverter module of frame R8i is equipped with a fan blowing air through the circuit board compartment. The fan is accessible from the front of the module.

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

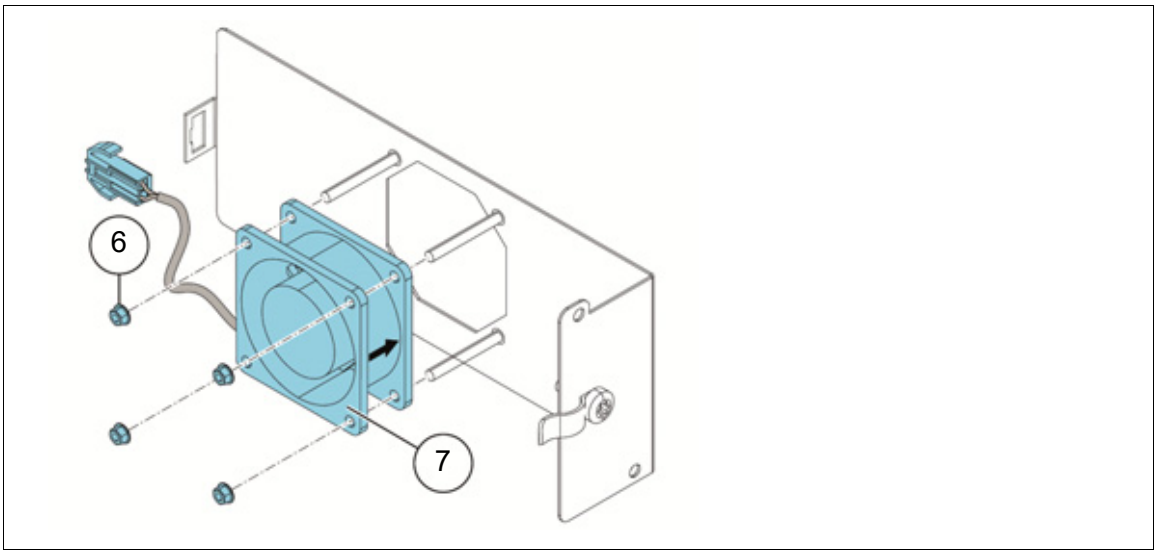
WARNING! Wear protective gloves and long sleeves! Some parts have sharp edges.

1. Disconnect the drive from the AC power line and make sure it is safe to start the work. See section *Electrical safety precautions* on page *116*.
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.

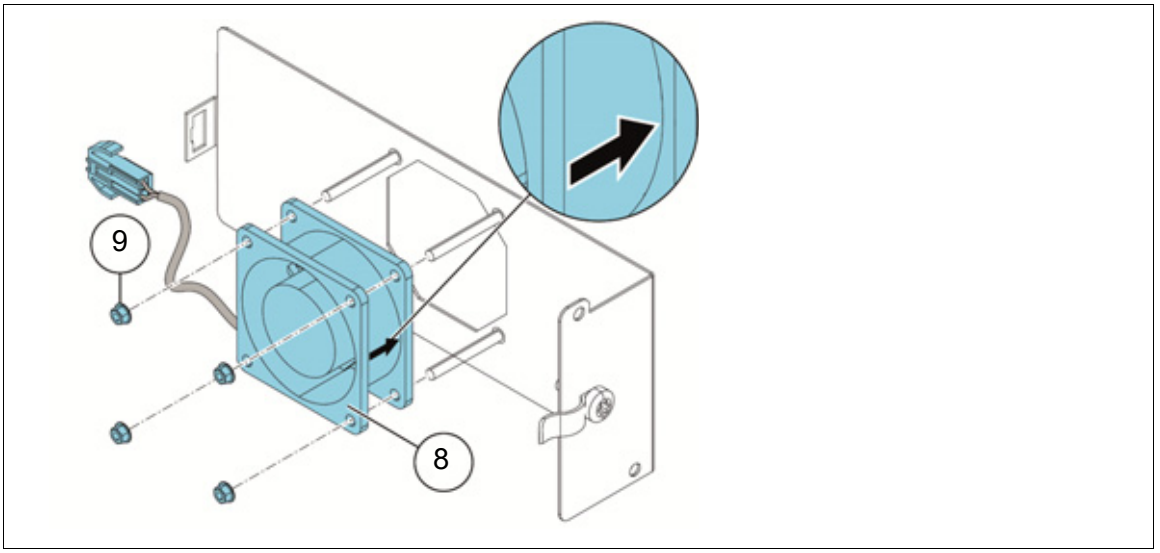
5. Disconnect the fan cable.



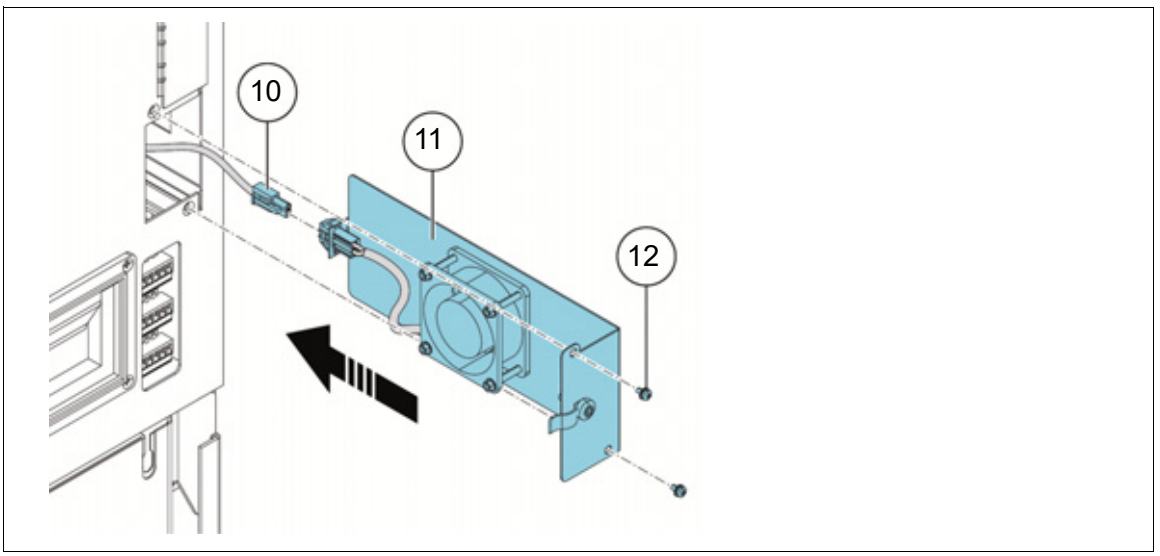
6. Remove the four M3 (5.5 mm) nuts which hold the fan.
7. Remove the fan from the fan holder.



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.

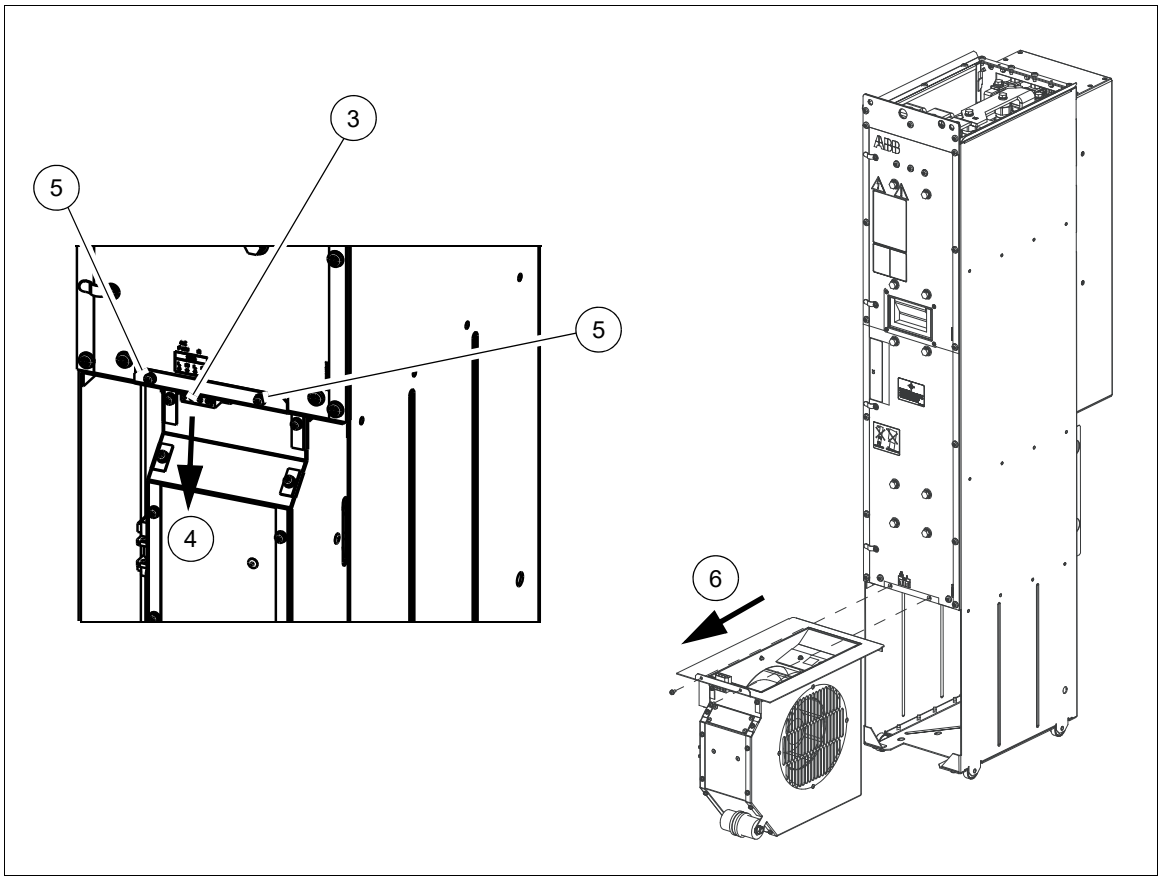


Replacing the fan of the LCL filter (BLCL-1x-x)

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

WARNING! Use protective gloves! Beware of the sharp edges when removing the fan!

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
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 the two screws in front of the fan unit.
6. Pull the fan unit out.
7. Install a new fan unit in reverse order.

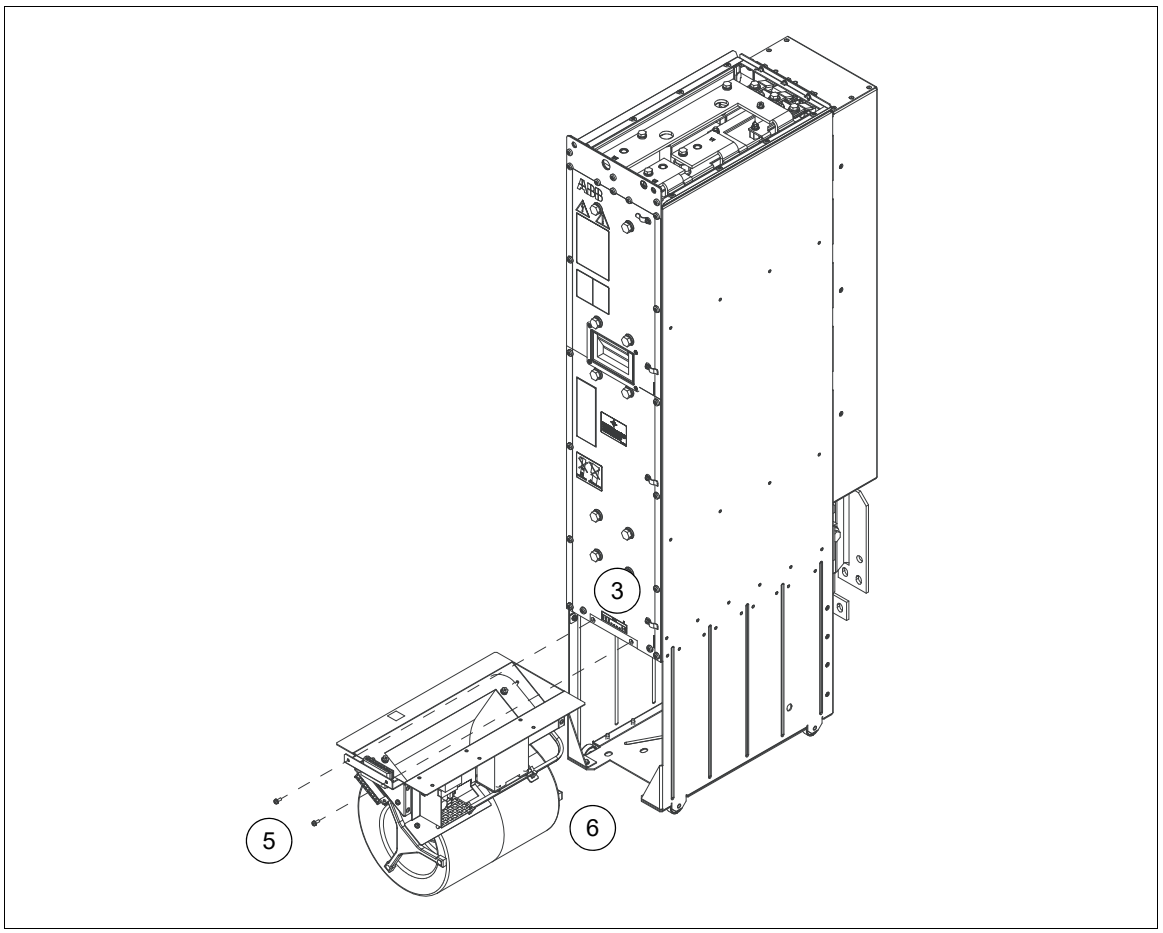


Replacing the fan of the LCL filter (BLCL-2x-x)

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

WARNING! Use protective gloves! Beware of the sharp edges when removing the fan!

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
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 the two screws in front of the fan unit.
6. Pull the fan unit out.
7. Install a new fan in reverse order.



Replacing the IP54 cooling fan

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
2. Remove all ventilation covers and filters, and finally remove the roof plate on top of the outlet. Unscrew all necessary screws securing the fan and remove the fan. In case the room height is extremely limited, 600 mm outlet allows fan to be removed directly through front opening without removing the roof plate. See instructions 3AXD50000010284 (400 mm) and 3AXD50000010004 (600 mm) for further details. For the kit illustrations of the IP54 cooling fans, see chapter *Ordering information*.
3. Pull the fan unit out.
4. Install a new fan in reverse order.

Replacing the cabinet cooling fans

Cabinets with ABB air outlet kits

WARNING! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* (page *116*).
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! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* (page *116*).
2. Follow the instructions of the manufacturer of the air outlet or enclosure system.

Supply and inverter modules

Cleaning the module

The module heatsink fins pick up dust from the cooling air. Modules run into overtemperature warnings and faults if the heatsink is not clean. In a “normal” environment (neither especially dusty nor clean), the heatsink should be checked annually, in a dusty environment more often.

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
2. Remove the cooling fan of the supply module as described under *Fans* elsewhere in this chapter.
3. Blow clean and dry compressed air through the module from bottom to top, simultaneously using a vacuum cleaner at the air outlet to trap the dust. **Note:** Prevent the dust from entering adjoining equipment.
4. Refit the cooling fan.

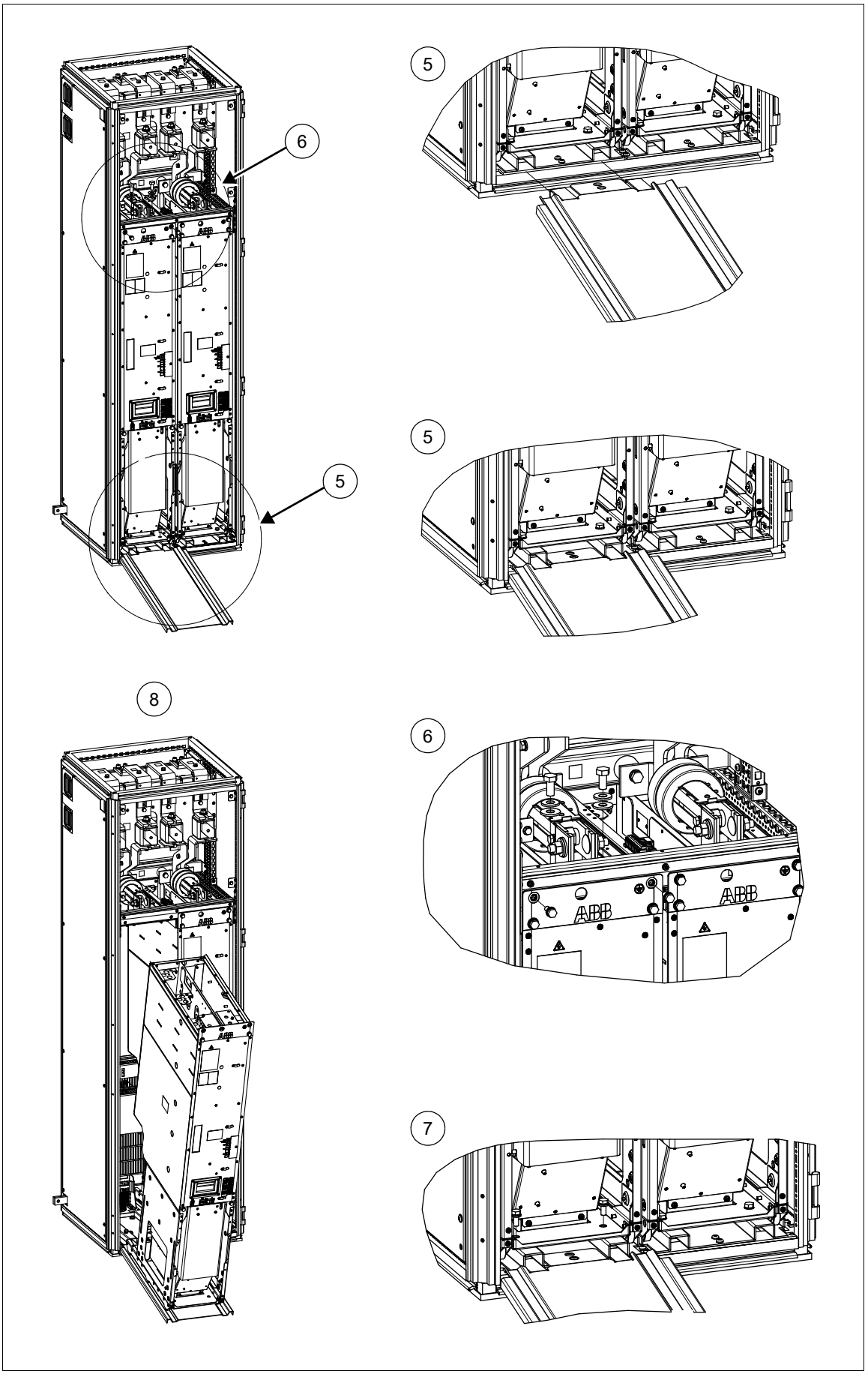
Replacing the supply and inverter module (frame R8i)

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

WARNING! Ignoring the following instructions can cause physical injury or death, or damage to the equipment:

- Use extreme caution when maneuvering an inverter module that runs on wheels. The modules are heavy and have a high center of gravity. They topple over easily if handled carelessly.
- When removing a module which is equipped with wheels, pull the module carefully out of the cubicle along the ramp. While pulling on the handle, keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back.
- When replacing a module which is equipped with wheels, push the module up the ramp and back into the cubicle. Keep your fingers away from the edge of the module front plate to avoid pinching them between the module and the cubicle. Also, keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back.
- Do not tilt the module. Do not leave the module unattended on a sloping floor.
- Wear protective gloves and long sleeves! Some parts have sharp edges.
- Do not use the module pull-out ramp with plinth heights over 100 mm. The ramp is designed for a plinth height of 100 mm (the standard plinth height of Rittal VX25 cabinets).

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*. Turn the main switch-disconnector [Q1.1] handle to the open position or secure the main circuit breaker [Q1] to the disconnected position (racked out) if the cabinet is equipped with corresponding equipment. If the disconnecting equipment is located outside the cabinet, make sure that it is in the disconnected position.
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. Unplug the fiber optic cables.
5. 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.
6. Remove the module 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 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 locking screws: tighten the fastening screws of the module to 22 N·m (16.2 lbf·ft) and fastening bolts of the DC 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.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LCL filter

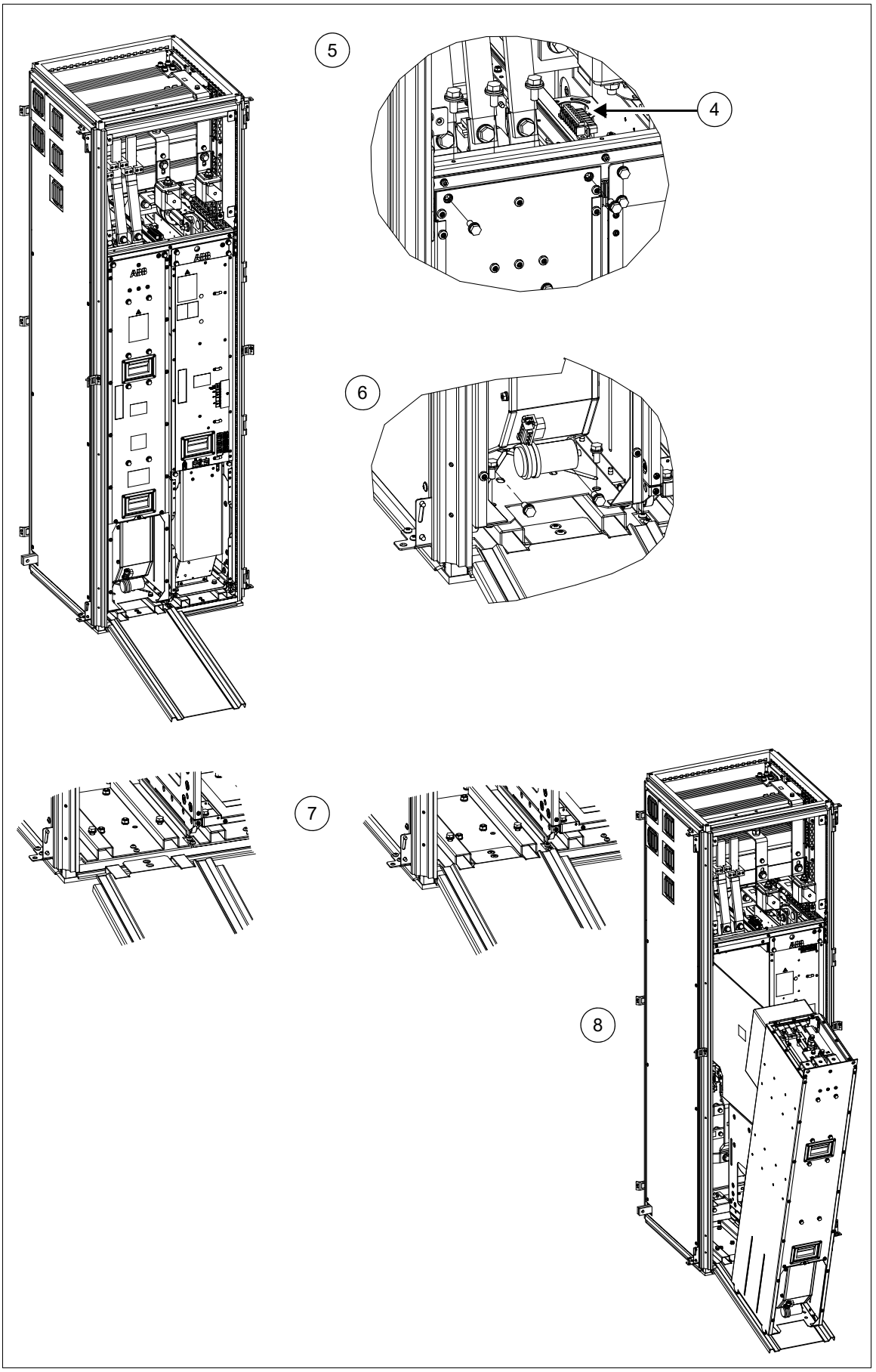
Replacing the LCL filter

WARNING! Only qualified electricians are allowed to do the work described below. Read the complete safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) before you service the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

WARNING! Ignoring the following instructions can cause physical injury or death, or damage to the equipment:

- Use extreme caution when maneuvering a module that runs on wheels. The modules are heavy and have a high center of gravity. They topple over easily if handled carelessly.
- When removing a module which is equipped with wheels, pull the module carefully out of the cubicle along the ramp. While pulling on the handle, keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back.
- When replacing a module which is equipped with wheels, push the module up the ramp and back into the cubicle. Keep your fingers away from the edge of the module front plate to avoid pinching them between the module and the cubicle. Also, keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back.
- Use protective gloves! The edges of the module are sharp!
- Do not tilt the module. Do not leave the module unattended on a sloping floor.
- 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 cabinets).

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
2. Open the cubicle door.
3. Remove the shrouds (if any).
4. Unplug the signal connector cable on top of the LCL filter module. Unplug the fiber optic cables.
5. Remove the five screws in the upper part of the LCL filter module.
6. Remove the four screws in the lower part of the LCL 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 module signal connector.
   - Remove the module pull-out ramp, attach the shrouds (if any) and close the cabinet doors.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Capacitors

The DC circuit contains several electrolytic capacitors. Their lifespan depends on the operating time, loading and ambient temperature. Capacitor life can be prolonged by lowering the ambient temperature. In frame R8i, the capacitors are separate.

Capacitor failure is usually followed by damage to the unit and an input fuse failure, or a fault trip. Contact ABB if capacitor failure is suspected. Replacements are available from ABB. Do not use other than ABB-specified spare parts. Contact an ABB service representative for spare parts and repair services.

Reforming the capacitors

The DC circuit capacitors must be reformed if the module has been stored for a year or more. See section *Type designation labels* (page *43*) for information on finding out the manufacturing date. For information on reforming the capacitors, see *Converter module capacitor reforming instructions* (3BFE64059629 [English]).

Control panel

Replacing the battery

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

Cleaning the control panel

See *ACX-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).

Control units

BCU control unit types

There are three variants of the BCU control unit used in ACS880 drives: 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.

Memory unit

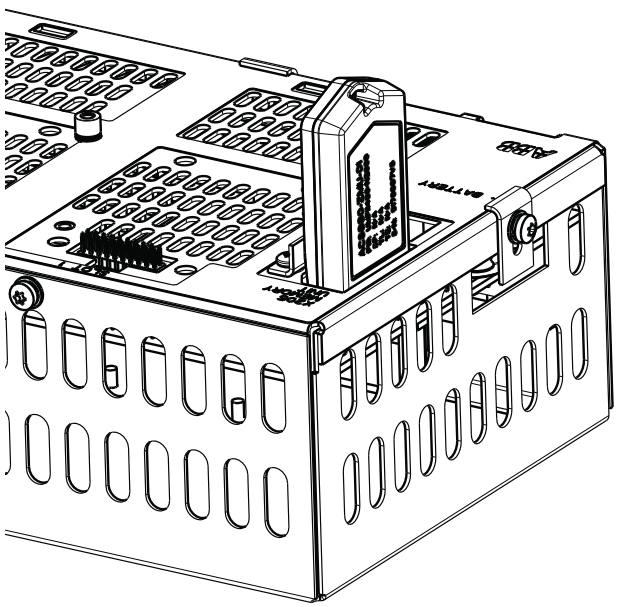
After replacing a control unit, the existing parameter settings can be retained by transferring the memory unit from the defective unit to the new unit.

WARNING! Only qualified electricians are allowed to do this work. Read the complete safety instructions of the drive. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

1. Stop the drive and disconnect it from the AC power line. Obey the instructions in section *Electrical safety precautions* on page *116*.
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.

End of the BCU control unit



For other maintenance instructions concerning the BCU control unit, see *BCU-02/12/22 control units hardware manual* (3AUA0000113605 [English]).

LEDs and other status indicators

Warnings and faults reported by the control program are displayed on the control panel or in the Drive composer PC tool. For further information, see the appropriate firmware manual.

The ACS-AP-x control panel has a status LED. The control panel door mounting kit DPMP-xx has two status LEDs. Frame R8i modules have three LEDs. The indications of all these LEDs are shown in the table below.

Location	LED	Indication
ACS-AP-x control panel (status LED)	Continuous green	The module is functioning normally.
	Flickering green	Data is transferred between the PC and the module through the USB connection of the control panel.
	Blinking green	There is an active warning in the module.
	Continuous red	There is an active fault in the module.
ACS-AP-W control panel (status LED)	Blinking blue	Bluetooth interface is enabled. It is in discoverable mode and ready for pairing.
	Flickering blue	Data is transfered through the Bluetooth interface of the control panel.
Control panel door mounting kit	Red	There is an active fault in the module.
	Green	Power supply for the control board of the module is OK.
Inverter module (frame R8i)	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)	Safe torque off function is active.
	POWER OK (continuous green)	Supply voltage of the internal circuit boards is OK (> 21 V).
IGBT supply module (frame R8i)	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 and inverter 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 the motor with enough magnetizing current.

Starting reduced run operation

WARNING! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

WARNING! 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* on page *116*.
2. If the supply / inverter control unit is powered from the faulty module, connect the control unit to another 24 V DC power supply. We strongly recommend using an external power supply with supply / inverter units consisting of parallel-connected modules.
3. Remove the module to be serviced from its bay.
4. If the STO (Safe torque off) function is in use, install the STO jumper wire set in place of the missing module (unless the module was the last on the chain).
5. Install an air baffle to the top module guide to block the airflow through the empty module bay.
6. In case the inverter unit has a DC switch with a charging circuit, disable the appropriate channel on the charging monitoring unit.
7. Switch on the power to the drive.
8. Enter the number of supply / inverter modules present into parameter *195.13* / *95.13 Reduced run mode*.
9. Reset all faults and start the supply / inverter unit. The maximum current is now automatically limited according to the new configuration. A mismatch between the number of detected modules (*195.14* / *95.14*) and the value set in *195.13* / *95.13* will generate a fault.
10. If the STO function is in use, validate it as described in chapter *The Safe torque off function* (page *327*).

Resuming normal operation

WARNING! Repeat the steps described in section *Electrical safety precautions* on page *116*. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. Remove the STO (Safe torque off) jumper wire set (if present).
2. Remove the air baffle from the module bay.
3. Reinstall the module into its bay.
4. Reconnect the STO wiring (if used) to the module.
5. In case the inverter unit has a DC switch with a charging circuit, re-enable all channels on the charging monitoring unit.
6. Switch on the power to the drive.
7. Enter “0” into parameter *195.13* / *95.13 Reduced run mode*.
8. If the STO function is in use, validate it as described in chapter *The Safe torque off function* (page *327*).

Functional safety components

The mission time of functional safety components is 20 years which equals the time during which failure rates of electronic components remain constant. This applies to the components of the standard Safe torque off circuit as well as any modules, relays and, typically, any other components that are part of functional safety circuits.

The expiry of mission time terminates the certification and SIL/PL classification of the safety function. The following options exist:

- Renewal of the whole drive and all optional functional safety module(s) and components.
- Renewal of the components in the safety function circuit. In practice, this is economical only with larger drives that have replaceable circuit boards and other components such as relays.

Note that some of the components may already have been renewed earlier, restarting their mission time. The remaining mission time of the whole circuit is however determined by its oldest component.

Contact your local ABB service representative for more information.

9

Ordering information

Contents of this chapter

This chapter lists the types and ordering codes of the components related to ACS880-14 and -34 single drive module packages. The data is valid for ACS880-14 and -34 single drive module packages and related accessories.

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/lvacdrivesengineeringsupport/content. If needed, contact your local ABB representative.

Notes:

- 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/lvacdrivesengineeringsupport/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.
- Connection examples of ACS880-14 and -34 single drive module packages can be found in section *Single-line circuit diagrams of ACS880-14 and -34 single drive module packages* on pages *27* and *28*.

Kit code

The format of the kit code is A-w-s-xxx, for example, A-4-8-353 where:

- A = air-cooled
- w = cabinet width
  - 4 = 400 mm
  - 6 = 600 mm
  - 8 = 800 mm
- s = module size / sizes
  - 8 = R8i
  - X = all modules or size not defined.
- xxx = consecutive numbering
  - 001…099 = Kits related to cabinets, for example, air inlets and outlets

    001…019 Common AC- and DC-related kits
    020…039 Air inlets
    040…059 Air outlets
    060…070 Air outlets with a fan

  - 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

    420…439 Air guides

  - 500…599 = Marine kits
- -VX = Rittal VX25 kits.

1×R8i + 1×R8i

ACS880-14 and -34 single drive module packages

Delivery of the ACS880-14/34 single drive module package includes the following items:

Ordering code	Contents and option codes
U_N = 400 V (Range 380 … 415 V): ACS880-14/34-0450A-3 ACS880-14/34-0620A-3 ACS880-14/34-0870A-3 **U_N = 500 V (Range 380 … 500 V):** ACS880-14/34-0420A-5 ACS880-14/34-0570A-5 ACS880-14/34-0780A-5 **U_N = 690 V (Range 525 … 690 V):** ACS880-14/34-0320A-7 ACS880-14/34-0390A-7 ACS880-14/34-0580A-7	• Supply and inverter modules with speed-controlled cooling fans • LCL filter module with on/off controlled cooling fan • **+C132**: Marine type approval. For more information, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]). • **+C183**: Heating element mounted to module base • **+C188**: Direct-on-line cooling fan • **+E205**: Internal du/dt filters (included as standard in all supply and inverter modules in the ACS880-14 and -34 module packages) • **+G304:** 115 V auxiliary voltage supply

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

- BCU control unit kits (one for supply, one for inverter),
- fiber optic cables,
- RDCO-04C DDCS communication option modules (68882915, own for supply and inverter),
- common mode filters for each supply / inverter module (3AUA0000032859, consists of two toroidal cores),
- control circuit plug connectors (3AUA0000059813) for each module,
- control circuit plug connectors (3AXD50000003541) for each inverter module,
- quick connectors (3AUA0000119227) for each module.

Suitable kits and components for each ACS880-14/34 type are listed in this chapter.

The other parts listed in this chapter

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

Weak supply networks: In weaker supply networks with a short-circuit ratio less than 8, it is highly recommended to install a BAMU auxiliary measurement unit to the drive. In such networks, there is a risk of nuisance DC overvoltage tripping due to disturbances caused by probable high-voltage THD in the supply voltage. Short-circuit ratio is defined as the supply network's apparent short-circuit power $S_{k,net}$ divided by the drive's nominal apparent power S_n ($S_{k,net}$ / S_n < 8).

LCL filters (+C183+C188+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 400 V (Range 380 … 415 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan with 230 V supply for BLCL-1x-x / 400 V AC supply for BLCL-2x-x • **+V991**: Hardware version
0450A-3	BLCL-13-5+C183+C188+V991	1	3AXD50000621149	
0620A-3	BLCL-13-5+C183+C188+V991	1	3AXD50000621149	
0870A-3	BLCL-15-5+C183+C188+V991	1	3AXD50000621156	
U_N = 500 V (Range 380 … 500 V)				
0420A-5	BLCL-13-5+C183+C188+V991	1	3AXD50000621149	
0570A-5	BLCL-13-5+C183+C188+V991	1	3AXD50000621149	
0780A-5	BLCL-15-5+C183+C188+V991	1	3AXD50000621156	
U_N = 690 V (Range 525 … 690 V)				
0320A-7	BLCL-13-7+C183+C188+V991	1	3AXD50000621187	
0390A-7	BLCL-13-7+C183+C188+V991	1	3AXD50000621187	
0580A-7	BLCL-15-7+C183+C188+V991	1	3AXD50000621194	

LCL filters (+C183+C188+G304+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 400 V (Range 380 … 415 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan • **+G304**: 115 V AC 1-phase fan supply for BLCL-1x-x • **+V991**: Hardware version
0450A-3	BLCL-13-5+C183+C188+G304+V991	1	3AXD50000621255	
0620A-3	BLCL-13-5+C183+C188+G304+V991	1	3AXD50000621255	
0870A-3	BLCL-15-5+C183+C188+G304+V991	1	3AXD50000621262	
U_N = 500 V (Range 380 … 500 V)				
0420A-5	BLCL-13-5+C183+C188+G304+V991	1	3AXD50000621255	
0570A-5	BLCL-13-5+C183+C188+G304+V991	1	3AXD50000621255	
0780A-5	BLCL-15-5+C183+C188+G304+V991	1	3AXD50000621262	
U_N = 690 V (Range 525 … 690 V)				
0320A-7	BLCL-13-7+C183+C188+G304+V991	1	3AXD50000621279	
0390A-7	BLCL-13-7+C183+C188+G304+V991	1	3AXD50000621279	
0580A-7	BLCL-15-7+C183+C188+G304+V991	1	3AXD50000621286	

RFI filters

RFI filter is used for improving the EMC characteristics of the unit and to fulfill category C2 requirements. See *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).

ACS880-14/34-…	RFI filter				Assembly kit for toroid		
	Type	Data	Qty	Ordering code	Type	Qty	Ordering code
U_N = 400 V (Range 380 … 415 V)							
0450A-3	B84143B 1250S080	1250 A, 500 V	1	3AXD50000009256	Assembly kit including 20 µH toroid	1	3AUA0000094324
0620A-3							
0870A-3							
U_N = 500 V (Range 380 … 500 V)							
0420A-5	B84143B 1250S080	1250 A, 500 V	1	3AXD50000009256	Assembly kit including 20 µH toroid	1	3AUA0000094324
0570A-5							
0780A-5							

For dimension drawing, see section *RFI filter and related accessories* on page *369*. When using RFI filter and related accessories, check the number of common mode filters to be used.

Control electronics for 1×R8i supply

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

You must equip each supply and inverter unit with one control unit (and memory unit). Supply modules and inverter modules require their own control units. The delivery includes the control units.

ACS880-14:

Frame size	ACS880-14 control unit kit		
	Type	Qty	Ordering code
1×R8i supply	BCU-02 KIT	1	3AXD50000002937

Frame size	ACS880-14 application programming kit		
	Type	Qty	Ordering code
1×R8i supply	BCU-02 N8010 KIT	1	3AXD50000011538

ACS880-34:

Frame size	ACS880-34 control unit kit		
	Type	Qty	Ordering code
1×R8i supply	BCU-02 +N8012 KIT	1	3AXD50000020828

Frame size	ACS880-34 application programming kit		
	Type	Qty	Ordering code
1×R8i supply	BCU-02 N8012+N8010 LOW H	1	3AXD50000022037

The BCU control unit kit contains:
- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:
- RDCO-04C DDCS communication option module (ordering code: 68882915).

Fiber optic cables

The fiber optic cables are needed for supply / inverter modules and LCL filters. You need one pair of cables (kit) per each module and between the two RDCO-04 option modules. Select a kit with suitable length.

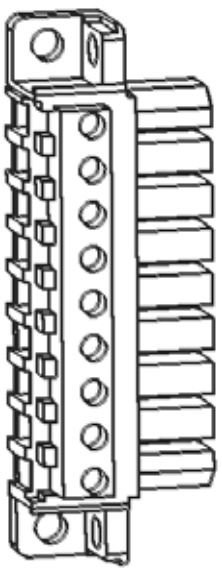
The following kits, each consisting of a pair of plastic fiber optic cables, are available from ABB:

Type	Data	Ordering code
NLWC-02	2 × 2 m single core cables with connectors	58988821
NLWC-03	2 × 3 m single core cables with connectors	58948233
NLWC-05	2 × 5 m single core cables with connectors	58948250
NLWC-07	2 × 7 m single core cables with connectors	58948268
NLWC-10	2 × 10 m single core cables with connectors	58948276

Control circuit plug connectors

The control circuit plug connector X50 is not included in the module kit and you must order it separately.

Note: Plug connectors for X51, X52 and X53 are included in the module kit.

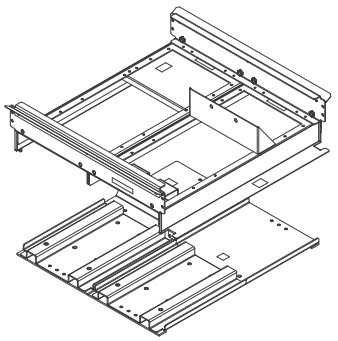
Connector	Data	Qty	Ordering code	Illustration
X50 for R8i X30 for BLCL filter module	STV S 9 SB 9-pole 6 KV/3 (female) 4 mm^2, 500 V, 32 A	1 per module	3AUA0000059813	

Mechanical installation accessories and tools (1×R8i supply, Rittal VX25 enclosure)

In Rittal installations, 1×R8i supply module cubicle consist of one cubicle containing 1×R8i supply module and one LCL filter.

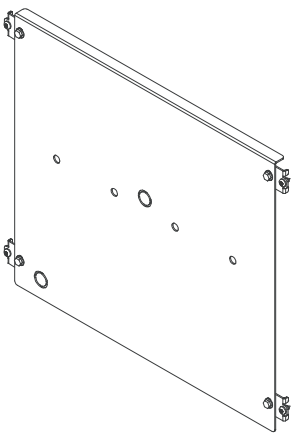
Module installation parts

Module installation parts include, for example, top and bottom supports for the modules.

Frame size	Enclosure	Qty	Kit code	Ordering code	Illustration
1×R8i	600 mm	1	A-6-8-306-VX	3AXD50000416486	 Instruction code: 3AXD50000384914

Shrouds

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

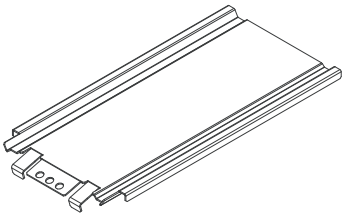
Frame size	Enclosure	Qty	Kit code	Ordering code	Illustration
1×R8i	600 mm	1	A-6-8-360-VX	3AXD50000337378	 Instruction code: 3AXD50000335169

Ramp

The ramp is used for installing and replacing the modules in the Rittal enclosure.

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 cabinets).

See the dimension drawing, see section *Ramp* on page *367*.

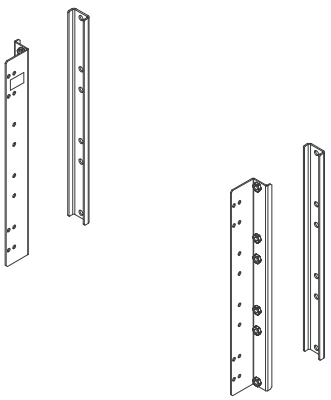
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i, BLCL-xx-x	All	1	3AXD50000438037	A-468-8-304-VX	

AC-side components (1×R8i supply, Rittal VX25 enclosure)

Common AC Flat-PLS assembly

When using the Rittal Flat-PLS system, this kit is used for correct positioning of the common AC bus in the Rittal VX25 enclosure. Note that typically this kit not needed in 1×R8i supply.

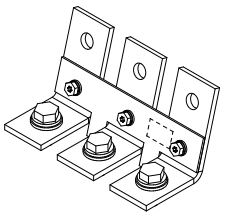
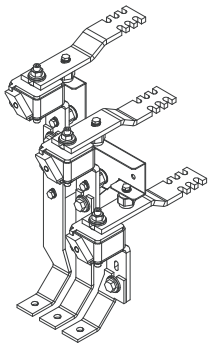
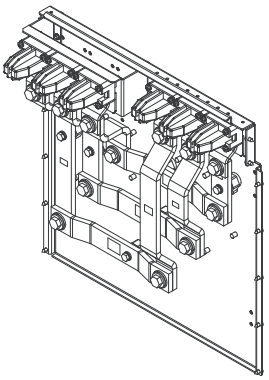
Note: The designs presented in this manual for Rittal enclosures employ the Rittal Flat-PLS busbar system. Make sure that the current carrying capability of the busbars is not exceeded at any point of the drive system.

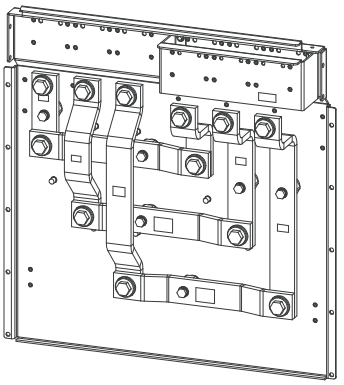
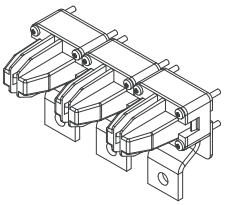
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
All	600 mm Rittal	1 per cubicle	3AXD50000360772	A-468-X-011-VX	 Instruction code: 3AXD50000372782

AC busbars and quick connectors

The power input of the supply module is connected to the module through a quick connector. Each supply module requires quick connectors.

For the dimension drawing, see section *Quick connector* on page *345*.

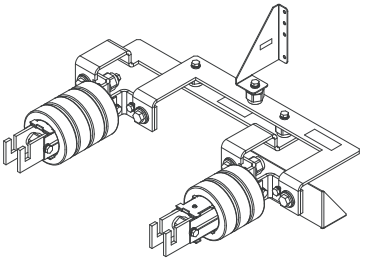
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
BLCL-1x-x	All	1 per module	3AXD50000002576	A-468-8-131	 Instruction code: 3AXD50000002577
BLCL-1x-x	Rittal	1 per module	3AXD50000416509 **Note:** This kit not included in ABB standard design, but it can be used for installing AC fuses on top of BLCL-1x-x filter module.	A-6-8-110-VX	 Instruction code: 3AXD50000416332
1×R8i	600 mm Rittal	1	3AXD50000416493	A-6-8-130-VX	 Instruction code: 3AXD50000384945

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	600 mm Rittal	1	3AXD50000702251 **Note:** This kit is mirror image of kit A-6-8-130-VX.	A-6-8-154-VX	 Instruction code: 3AXD50000700998
R8i	All	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

DC-side components (1×R8i supply, Rittal VX25 enclosure)

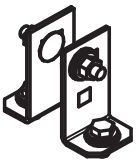
DC busbars (DC link)

DC link connects the DC output of the supply module and DC input of the inverter module together. **Note:** The toroids are not included in this kit, they must be ordered separately. There is space for up to eight toroids in total in this kit.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i + 1×R8i	600 mm	1	3AXD50000426539	A-X-8-240-VX	 Instruction code: 3AXD50000425426

DC connection flanges

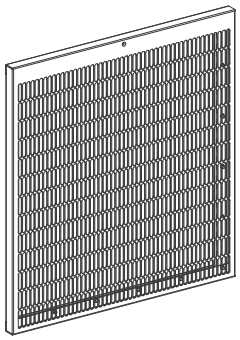
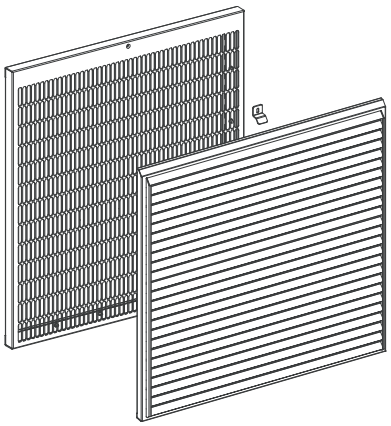
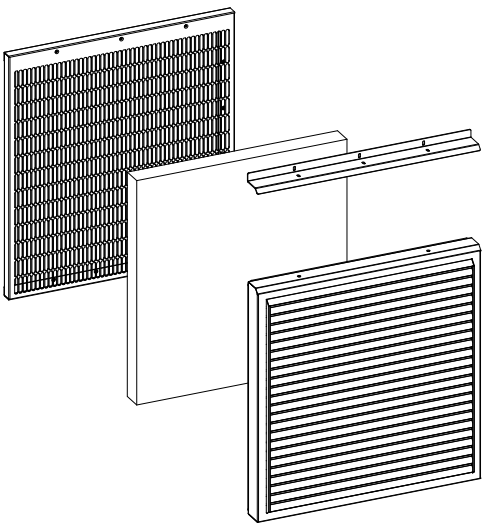
Each supply module requires DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403

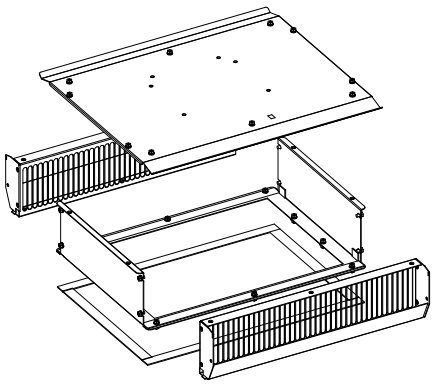
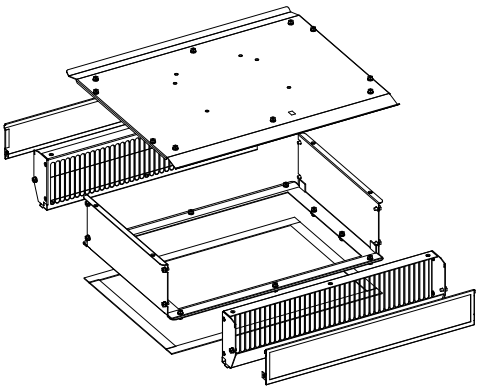
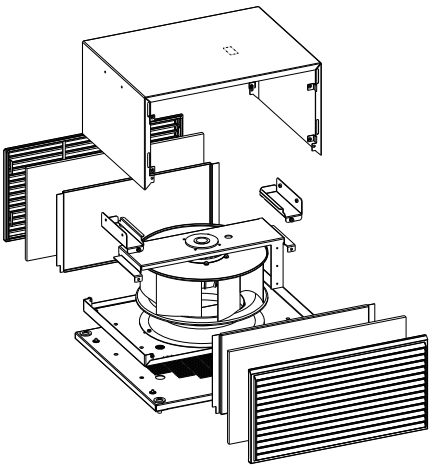
Cabinet ventilation kits (600 mm)

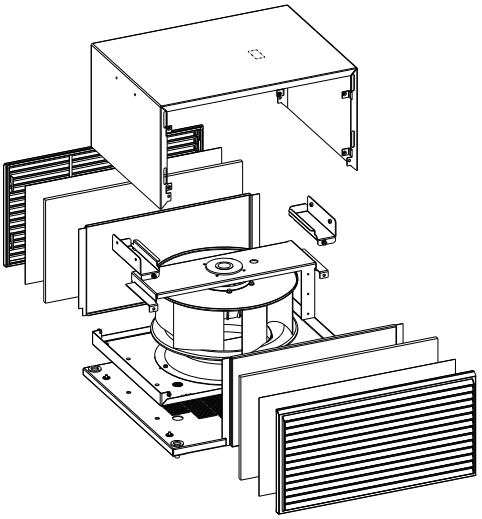
Air inlet kits

Mounting screws are included.

Enclosure / Degree of protection	Ordering code	Kit code	Illustration
600 mm / IP20	3AUA0000117003	A-6-X-022	 Instruction code: 3AUA0000116880
600 mm / IP42	3AUA0000117008	A-6-X-025	 Instruction code: 3AUA0000116874
600 mm / IP54	3AXD50000009185	A-6-X-028	 Instruction code: 3AXD50000009990

Air outlet kits

Enclosure / Degree of protection	Qty	Ordering code	Kit code	Illustration
600 mm / IP20 cubicle with natural convection cooling	1	3AUA0000125204	A-6-X-043	 Instruction code: 3AXD50000001981
600 mm / IP42 cubicle with natural convection cooling	1	3AUA0000114789	A-6-X-041	 Instruction code: 3AUA0000115166
600 mm / IP54 cubicle with forced cooling	1	3AXD50000009189	A-6-X-065	 Instruction code: 3AXD50000010004 **Note:** Fan to be ordered separately.

Enclosure / Degree of protection	Qty	Ordering code	Kit code	Illustration
600 mm / IP54, UL and CSA cubicle with forced cooling	1	3AXD50000010327	A-6-X-066	 Instruction code: 3AXD50000010004 **Note:** Fan to be ordered separately.

Cooling fans

IEC				
Enclosure / Degree of protection	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
600 mm / IP54 / 230 V, 50/60 Hz	Fan	2.3 A; 230 V; 540 W; 50 Hz 3 A; 230 V; 690 W; 60 Hz	1	3AXD50000006111
	Capacitor	12 µF, 600 V	1	3AXD50000006885
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724

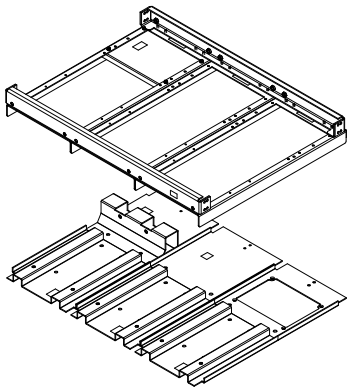
UL, CSA				
Enclosure / Degree of protection	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
600 mm / IP54 / 230 V, 50/60 Hz	Fan	2.3 A; 230 V; 540 W; 50 Hz 3 A; 230 V; 690 W; 60 Hz	1	3AXD50000006111
	Capacitor	12 µF, 600 V	1	3AXD50000006885
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
600 mm / IP54 / 115 V, 50/60 Hz	Fan	6.3 A; 115 V; 680 W; 60 Hz	1	64750038
	Capacitor	25 µF; 220 V	2	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724

Mechanical installation accessories and tools (1×R8i supply, generic enclosure)

In generic installations, 1×R8i supply module, LCL filter and 1×R8i inverter module are in the same cubicle. Mechanics allow also a mirror setup: 1×R8i inverter, 1×R8i supply module and LCL filter module. See kit instructions for details.

Module installation parts

Module installation parts include, for example, top and bottom supports for the modules.

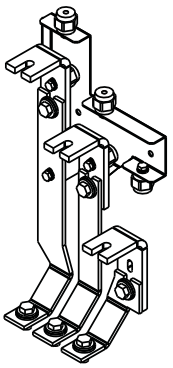
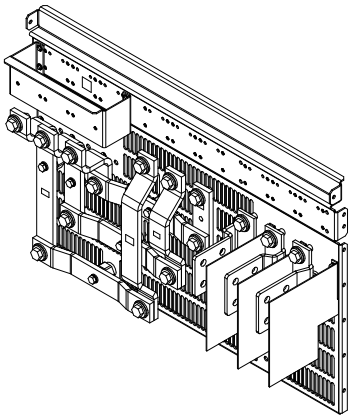
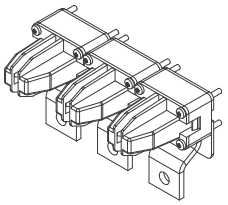
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i + 1×R8i	800 mm generic	1	3AXD50000019004	A-8-8-331	 Instruction code: 3AXD50000019165

AC-side components (1×R8i supply, generic enclosure)

AC busbars and quick connectors

The power connection of the module is done via a quick connector. Each module requires quick connectors.

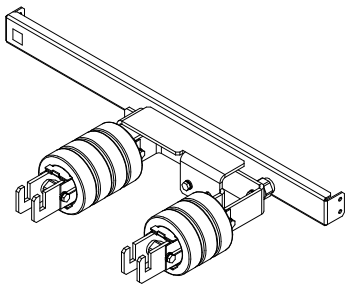
For the dimension drawing, see section *Quick connector* on page *345*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
BLCL-1x-x	generic	1 per module	3AXD50000019279 **Note:** This kit not included in ABB standard design, but it can be used for installing AC fuses on top of BLCL-1x-x filter module.	A-6-8-111	 Instruction code: 3AXD50000019280
1×R8i + 1×R8i	800 mm generic	1	3AXD50000019005	A-8-8-148	 Instruction code: 3AXD50000019166
R8i	All	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

DC-side components (1×R8i supply, generic enclosure)

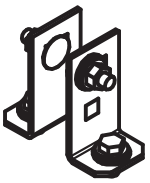
DC busbars (DC link)

DC link connects the DC output of the supply module and DC input of the inverter module together. **Note:** The toroids are not included in this kit, they must be ordered separately. There is space for up to eight toroids in total in this kit.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i + 1×R8i	800 mm	1	3AXD50000019003	A-8-8-238	 Instruction code: 3AXD50000019167

DC connection flanges

Each supply module requires DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	400 mm	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403

Cabinet ventilation kits

See section *Cabinet ventilation kits (600 mm)* on page *186*.

Main switch-disconnectors

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.

ACS880-14/34-…	Main switch-disconnectors (IEC)			
	Type	Data	Ordering code	Qty
U_N = 400 V (Range 380 … 415 V)				
0450A-3	Switch kit OT-type IEC 630 E03	630 A, 690 V	3AXD50000026879	1
0620A-3	Switch kit OT-type IEC 800 E03	800 A, 690 V	3AXD50000026880	1
0870A-3	Switch kit OT-type IEC 1000 E03	1000 A, 690 V	3AXD50000000894	1
U_N = 500 V (Range 380 … 500 V)				
0420A-5	Switch kit OT-type IEC 630 E03	630 A, 690 V	3AXD50000026879	1
0570A-5	Switch kit OT-type IEC 800 E03	800 A, 690 V	3AXD50000026880	1
0780A-5	Switch kit OT-type IEC 1000 E03	1000 A, 690 V	3AXD50000000894	1
U_N = 690 V (Range 525 … 690 V)				
0320A-7	Switch kit OT-type IEC 630 E03	630 A, 690 V	3AXD50000026879	1
0390A-7	Switch kit OT-type IEC 630 E03	630 A, 690 V	3AXD50000026879	1
0580A-7	Switch kit OT-type IEC 800 E03	800 A, 690 V	3AXD50000026880	1

ACS880-14/34-…	Main switch-disconnectors (UL, CSA)			
	Type		Ordering code	Qty
U_N = 400 V (Range 380 … 415 V)				
0450A-3	Switch kit OT-type UL 600 U03	50 kA, 600 V, 600 A	3AXD50000026901	1
0620A-3	Switch kit OT-type UL 800 U12	50 kA, 600 V, 800 A	3AXD50000026902	1
0870A-3	Switch kit OT-type UL 1200 U12	50 kA, 600 V, 1200 A	3AXD50000010814	1
U_N = 500 V (Range 380 … 500 V)				
0420A-5	Switch kit OT-type UL 600 U03	50 kA, 600 V, 600 A	3AXD50000026901	1
0570A-5	Switch kit OT-type UL 800 U12	50 kA, 600 V, 800 A	3AXD50000026902	1
0780A-5	Switch kit OT-type UL 1200 U12	50 kA, 600 V, 1200 A	3AXD50000010814	1
U_N = 690 V (Range 525 … 690 V)				
0320A-7	Switch kit OT-type UL 600 U03	50 kA, 600 V, 600 A	3AXD50000026901	1
0390A-7	Switch kit OT-type UL 600 U03	50 kA, 600 V, 600 A	3AXD50000026901	1
0580A-7	Switch kit OT-type UL 800 U12	50 kA, 600 V, 800 A	3AXD50000026902	1

The main switch-disconnector kit contains:

- main switch-disconnector unit
- shaft (12 × 280 mm)
- handle OHB125J12 or OHB274J12 with on/off indication
- normally-open auxiliary contact OA1G10
- terminal bolts M8X25 (IEC only).

For the dimension drawings, see section *Main switch-disconnector* on page *348*.

Main AC fuses

The main AC fuses protect the input cables, main contactor and the supply module against short circuits. For the dimension drawings, see section *AC fuses* on page *360*.

ACS880-14/34-…	Fuse (IEC)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
0450A-3	170M6411	700 A, 690 V	3	3AXD50000000175
0620A-3	170M6413	900 A, 690 V	3	3AXD50000000148
0870A-3	170M6416	1250 A, 690 V	3	68244463
U_N = 500 V (Range 380 … 500 V)				
0420A-5	170M6411	700 A, 690 V	3	3AXD50000000175
0570A-5	170M6413	900 A, 690 V	3	3AXD50000000148
0780A-5	170M6416	1250 A, 690 V	3	68244463
U_N = 690 V (Range 525 … 690 V)				
0320A-7	170M6408	500 A, 690 V	3	3AUA0000136232
0390A-7	170M6410	630 A, 690 V	3	68335418
0580A-7	170M6413	900 A, 690 V	3	3AXD50000000148

ACS880-14/34-…	Fuse (UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
0450A-3	170M6411	700 A, 690 V	3	3AXD50000000175
0620A-3	170M6413	900 A, 690 V	3	3AXD50000000148
0870A-3	170M6416	1250 A, 690 V	3	68244463
U_N = 500 V (Range 380 … 500 V)				
0420A-5	170M6411	700 A, 690 V	3	3AXD50000000175
0570A-5	170M6413	900 A, 690 V	3	3AXD50000000148
0780A-5	170M6416	1250 A, 690 V	3	68244463
U_N = 690 V (Range 525 … 690 V)				
0320A-7	170M6408	500 A, 690 V	3	3AUA0000136232
0390A-7	170M6410	630 A, 690 V	3	68335418
0580A-7	170M6413	900 A, 690 V	3	3AXD50000000148

Main contactors

You can use the main contactors for the on-off control of the AC input power. The contactors can make and break the full load current.

ACS880-14/34-…	Main contactor (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
0450A-3	AF400-30-22-70	600 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399730
0620A-3	AF580-30-22-70	800 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399756
0870A-3	AF750-30-22-70	1050 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399772
U_N = 500 V (Range 380 … 500 V)				
0420A-5	AF400-30-22-70	600 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399730
0570A-5	AF580-30-22-70	800 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399756
0780A-5	AF750-30-22-70	1050 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399772
U_N = 690 V (Range 525 … 690 V)				
0320A-7	AF400-30-22-70	600 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399730
0390A-7	AF400-30-22-70	600 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399730
0580A-7	AF580-30-22-70	800 A (I_{Th}), 1000 V (U_E), 100…250 V / 50…60 Hz	1	64399756

The contactor package includes:

- contactor unit
- fixing screws
- 2 × normally-open + 2 × normally-closed auxiliary contacts.

For the dimension drawings, see section *Main contactor* on page *354*.

Charging kits

The capacitor bank of the IGBT supply module needs to be charged during the start-up before connecting the module to a three-phase power line. 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. The following table shows the charging kits available for each ACS880-14/34 type.

ACS880-14/34-…	Ordering code (IEC)*	Ordering code (UL and CSA)**
U_N = 400 V (Range 380 … 415 V)		
0450A-3	3AXD50000021092	3AXD50000021095
0620A-3	3AXD50000021092	3AXD50000021095
0870A-3	3AXD50000022093	3AXD50000021096
U_N = 500 V (Range 380 … 500 V)		
0420A-5	3AXD50000021092	3AXD50000003929
0570A-5	3AXD50000021092	3AXD50000003929
0780A-5	3AXD50000022094	3AXD50000003929
U_N = 690 V (Range 525 … 690 V)		
0320A-7	3AXD50000015666	3AXD50000022261
0390A-7	3AXD50000015666	3AXD50000022261
0580A-7	3AXD50000022093	3AXD50000003929

*IEC kits also include:

- OSS160GT1S/4 terminal shrouds (2 pcs)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- handle and shaft with P-type fuse switch

**UL/CSA kits also include:

- handle OHB65J6 (1 pc)
- shaft OXP6X161 (1 pc)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- auxiliary contact mounting frame OSZ4

For the charging kit contents, see page *290*.

Varistor kit (UL/CSA)

Varistor kit is for UL/CSA installations.

The CVAR varistor board is used to protect the IGBT supply 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 and must have a PE connection as well. For best results, use as short connection wiring as possible. For the detailed connection, see chapter *Example circuit diagrams* on page *373*.

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

The varistor kit ACS880 contains:

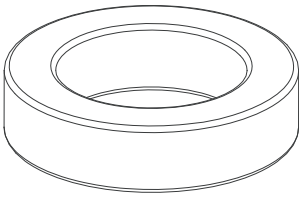
- CVAR varistor board with fastening items (ie, stand-offs and fastening screws).

For the dimension drawing, see section *CVAR board* on page *368*.

Common mode filters

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 input busbars.

DC busbar kit contains a holder for the filters.

Frame size	Common mode filter (IEC, UL and CSA)		Qty	Ordering code	Illustration
	Type	Data			
1×R8i + 1×R8i	VITROPERM 250F	250 F / 4.2 µH	2+2	3AUA0000032859	 Instruction code: 3AUA0000123359

* For EMC category C2, 4 pcs for supply and 3 pcs for inverter. As standard, 2 pcs for supply and 2 pcs for inverter.

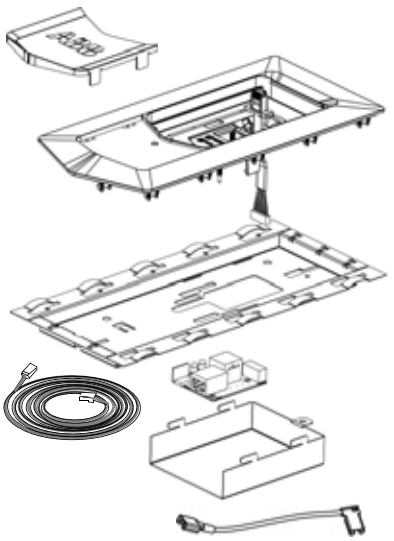
For the dimension drawing, see section *Common mode filter* on page *368*.

Control panel (1×R8i inverter)

The control panel is not included with the inverter modules 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 for 1×R8i inverter

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

Supply modules and inverter modules require their own control units. The delivery includes the control units.

Frame size	Control unit kit for inverter		
	Type	Qty	Ordering code
1×R8i	BCU-02 KIT	1	3AXD50000003417

Frame size	Application programming kit for inverter		
	Type	Qty	Ordering code
1×R8i	BCU-02 N8010 KIT	1	3AXD50000011540

The BCU control unit kit contains:
- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:
- RDCO-04C DDCS communication option module (ordering code: 68882915).

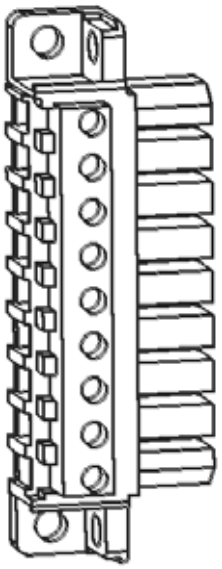
Fiber optic cables

See page *180*.

Control circuit plug connectors

The control circuit plug connector X50 is not included in the module kit and you must order it separately.

Note: Plug connectors for X51, X52 and X53 are included in the module kit.

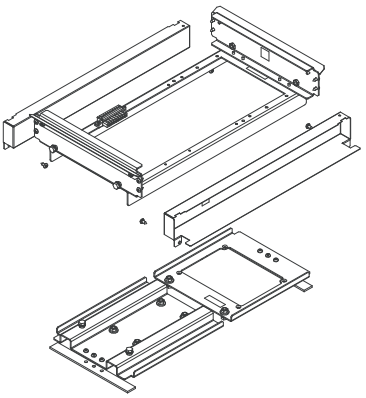
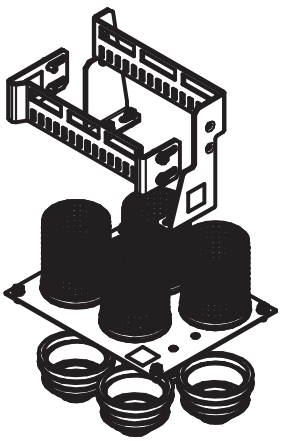
Connector	Data	Qty	Ordering code	Illustration
X50 for R8i X30 for BLCL filter module	STV S 9 SB 500 V, 32 A, 9-pole 6 KV/3 (female) 4 mm^2, 1	1 per module	3AUA0000059813	

Mechanical installation accessories and tools (1×R8i inverter, Rittal VX25 enclosure)

In Rittal installations, 1×R8i inverter module cubicle consist of one 1×R8i inverter module cubicle.

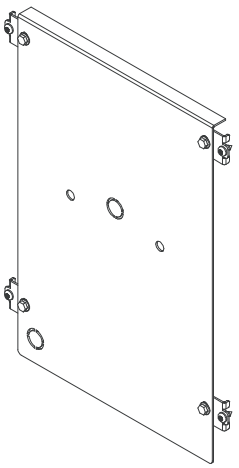
Module installation parts and lead-through for bottom plate

Module installation parts include, for example, top and bottom supports for the module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm	1	3AXD50000337071	A-4-8-310-VX	 Instruction code: 3AXD50000335152
1×R8i	600 mm	1	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

Shrouds

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

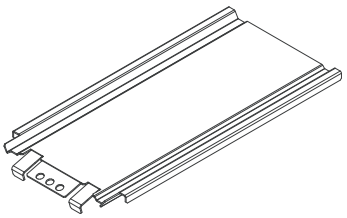
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm	1	3AXD50000337484	A-4-8-359-VX	 Instruction code: 3AXD50000335169

Ramp

The ramp is used for installing and replacing the modules in the Rittal enclosure.

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 cabinets).

See the dimension drawing, see section *Ramp* on page *367*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i, BLCL-xx-x	All	1	3AXD50000438037	A-468-8-304-VX	

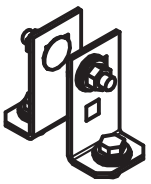
DC-side components (1×R8i inverter, Rittal VX25 enclosure)

DC busbars

DC busbars are common with the supply module. See page 185.

DC connection flanges

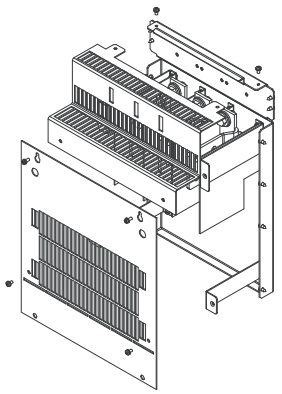
Each inverter module requires DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	400 mm	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403

AC-side components (1×R8i inverter, Rittal VX25 enclosure)

AC output busbars

These kits include mounting parts for quick connectors and output busbars. Motor cables are connected to output busbars.

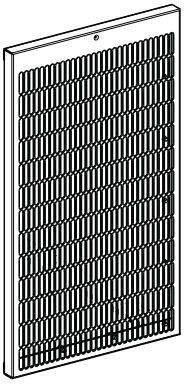
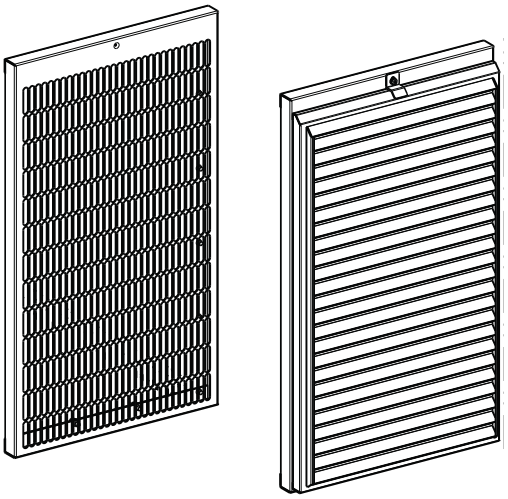
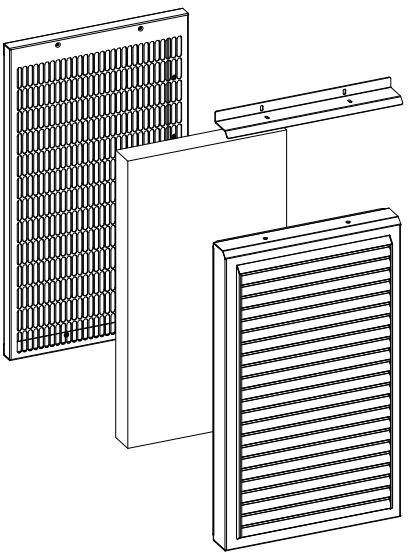
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm	1	3AXD50000337477	A-4-8-132-VX	 Instruction code: 3AXD50000343492

Quick connector

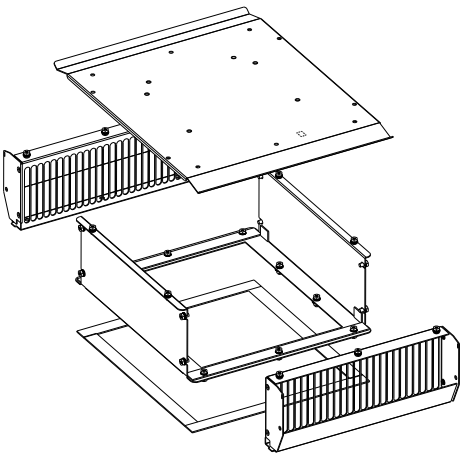
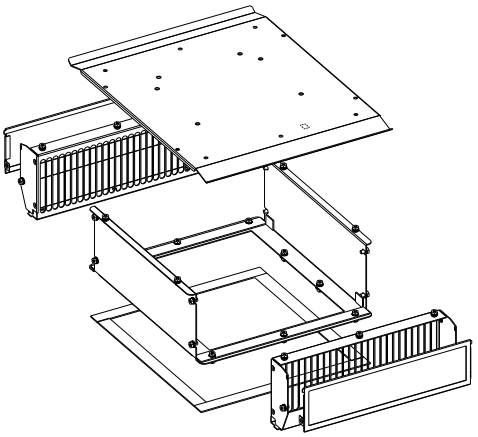
See page 183.

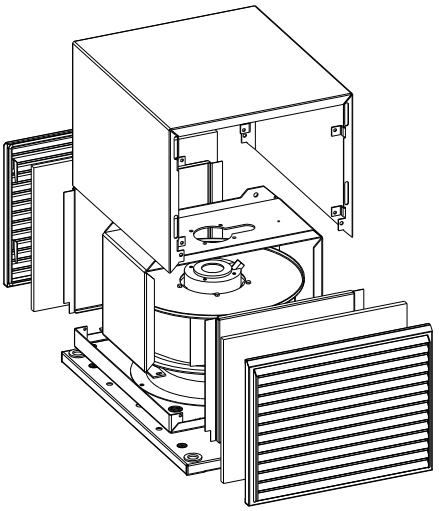
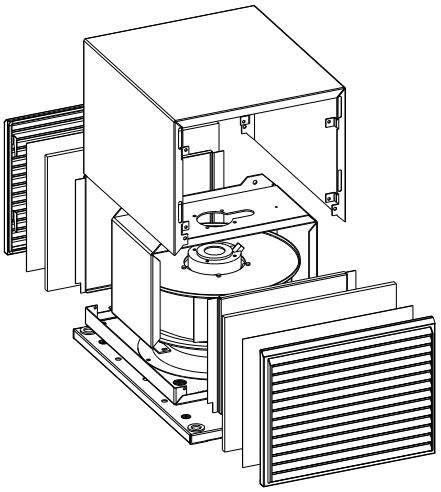
Cabinet ventilation kits (400 mm)

Air inlet kits

Enclosure / Degree of protection	Qty	Ordering code	Kit code	Illustration
400 mm / IP20	1	3AUA0000117002	A-4-X-021	 Instruction code 3AUA0000116879
400 mm / IP42	1	3AUA0000117007	A-4-X-024	 Instruction code 3AUA0000116873
400 mm / IP54	1	3AXD50000009184	A-4-X-027	 Instruction code 3AXD50000010482

Air outlet kits

Enclosure / Degree of protection	Qty	Ordering code	Kit code	Illustration
400 mm / IP20 cubicle with natural convection cooling	1	3AUA0000125203	A-4-X-042	 See the Instruction code 3AXD50000001983 for the cutting instructions of the cabinet roof plate.
400 mm / IP42 cubicle with natural convection cooling	1	3AUA0000114968	A-4-X-040	 See the Instruction code 3AUA0000115292 for the cutting instructions of the cabinet roof plate.

Enclosure / Degree of protection	Qty	Ordering code	Kit code	Illustration
400 mm / IP54 cubicle with forced cooling	1	3AXD50000009187	A-4-X-064	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately.
400 mm / IP54, UL and CSA cubicle with forced cooling	1	3AXD50000010362	A-4-X-067	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately.

Cooling fans

IEC				
Enclosure / Degree of protection	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm / IP54 / 230 V, 50/60 Hz	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	1	3AXD50000006934
	Capacitor	6 µF, 600 V	1	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724

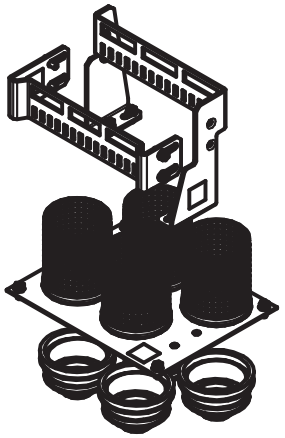
UL, CSA				
Enclosure / Degree of protection	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm / IP54 / 230 V, 50/60 Hz	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	1	3AXD50000006934
	Capacitor	6 µF, 600 V	1	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm / IP54 / 115 V, 50/60 Hz	Fan	3.1 A; 115 V; 300 W; 50 Hz 3.9 A; 115 V; 430 W; 60 Hz	1	64750062
	Capacitor	25 µF; 220 V	1	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724

Mechanical installation accessories and tools (1×R8i inverter, generic enclosure)

In generic installations, 1×R8i supply module, LCL filter and 1×R8i inverter module are in the same cubicle.

Module installation parts and lead-through for bottom plate

Module installation parts include, for example, top and bottom supports for the modules. Module installation parts are common with the supply module, see page *189*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm	1	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

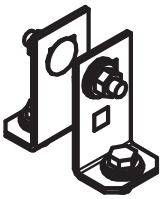
DC-side components (1×R8i inverter, generic enclosure)

DC busbars

DC busbars are common with the supply module. See page *191*.

DC connection flanges

Each inverter module requires DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	400 mm	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403

AC-side components (1×R8i inverter, generic enclosure)

AC output busbars

AC output busbars are common with the supply module. See page 190.

Cabinet ventilation kits

See section Cabinet ventilation kits (400 mm) page 203.

2×R8i + 2×R8i

ACS880-14 and -34 single drive module packages

Delivery of the ACS880-14/34 single drive module package includes the following items:

Ordering code	Contents and option codes
U_N = 400 V (Range 380 … 415 V): ACS880-14/34-1210A-3 ACS880-14/34-1430A-3 ACS880-14/34-1700A-3 **U_N = 500 V (Range 380 … 500 V):** ACS880-14/34-1110A-5 ACS880-14/34-1530A-5 **U_N = 690 V (Range 525 … 690 V):** ACS880-14/34-0770A-7 ACS880-14/34-0950A-7 ACS880-14/34-1130A-7	• Supply and inverter modules with speed-controlled cooling fans • LCL filter module(s) with on/off controlled cooling fan • **+C132**: Marine type approval. For more information, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]). • **+C183**: Heating element mounted to module base • **+C188**: Direct-on-line cooling fan • **+E205**: Internal du/dt filters (included as standard in all supply and inverter modules in the ACS880-14 and -34 module packages) • **+G304:** 115 V auxiliary voltage supply

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

- BCU control unit kits (one for supply, one for inverter),
- fiber optic cables,
- RDCO-04C DDCS communication option modules (68882915, own for supply and inverter),
- common mode filters for each supply / inverter module (consists of two toroidal cores, 2 × 3AUA0000032859),
- control circuit plug connectors (3AUA0000059813) for each module,
- control circuit plug connectors (3AXD50000003541) for each inverter module,
- quick connectors (3AUA0000119227) for each module.

Suitable kits and components for each ACS880-14/34 type are listed in this chapter.

The other parts listed in this chapter

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

Weak supply networks: In weaker supply networks with a short-circuit ratio less than 8, it is highly recommended to install a BAMU auxiliary measurement unit to the drive. In such networks, there is a risk of nuisance DC overvoltage tripping due to disturbances caused by probable high-voltage THD in the supply voltage. Short-circuit ratio is defined as the supply network's apparent short-circuit power $S_{k,net}$ divided by the drive's nominal apparent power S_n ($S_{k,net}$ / S_n < 8).

LCL filters (+C183+C188+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 400 V (Range 380 … 415 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan with 400 V AC supply for BLCL-2x-x • **+V991**: Hardware version
1210A-3	BLCL-24-5+C183+C188+V991	1	3AXD50000621163	
1430A-3	BLCL-24-5+C183+C188+V991	1	3AXD50000621163	
1700A-3	BLCL-25-5+C183+C188+V991	1	3AXD50000621170	
U_N = 500 V (Range 380 … 500 V)				
1110A-5	BLCL-24-5+C183+C188+V991	1	3AXD50000621163	
1530A-5	BLCL-25-5+C183+C188+V991	1	3AXD50000621170	
U_N = 690 V (Range 525 … 690 V)				
0770A-7	BLCL-24-7+C183+C188+V991	1	3AXD50000621200	
0950A-7	BLCL-25-7+C183+C188+V991	1	3AXD50000621217	
1130A-7	BLCL-25-7+C183+C188+V991	1	3AXD50000621217	

LCL filters (+C183+C188+G427+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 400 V (Range 380 … 415 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan • **+G427**: 208 V AC 3-phase fan supply for BLCL-2x-x • **+V991**: Hardware version
1210A-3	BLCL-24-5+C183+C188+G427+V991	1	3AXD50000621293	
1430A-3	BLCL-24-5+C183+C188+G427+V991	1	3AXD50000621293	
1700A-3	BLCL-25-5+C183+C188+G427+V991	1	3AXD50000621309	
U_N = 500 V (Range 380 … 500 V)				
1110A-5	BLCL-24-5+C183+C188+G427+V991	1	3AXD50000621293	
1530A-5	BLCL-25-5+C183+C188+G427+V991	1	3AXD50000621309	
U_N = 690 V (Range 525 … 690 V)				
0770A-7	BLCL-24-7+C183+C188+G427+V991	1	3AXD50000621316	
0950A-7	BLCL-25-7+C183+C188+G427+V991	1	3AXD50000621323	
1130A-7	BLCL-25-7+C183+C188+G427+V991	1	3AXD50000621323	

Control electronics for 2×R8i supply

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

Supply modules and inverter modules require their own control units. The delivery includes the control units.

ACS880-14:

Frame size	ACS880-14 control unit kit		
	Type	Qty	Ordering code
2×R8i supply	BCU-02 KIT	1	3AXD50000002937

Frame size	ACS880-14 application programming kit		
	Type	Qty	Ordering code
2×R8i supply	BCU-02 N8010 KIT	1	3AXD50000011538

ACS880-34:

Frame size	ACS880-34 control unit kit		
	Type	Qty	Ordering code
2×R8i supply	BCU-02 +N8012 KIT	1	3AXD50000020828

Frame size	ACS880-34 application programming kit		
	Type	Qty	Ordering code
2×R8i supply	BCU-02 N8012+N8010 LOW H	1	3AXD50000022037

The BCU control unit kit contains:

- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:

- RDCO-04C DDCS communication option module (ordering code: 68882915).

Fiber optic cables

See page *180*.

Control circuit plug connectors

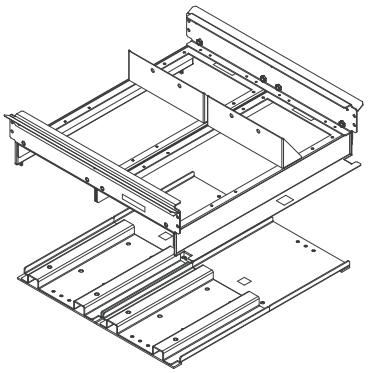
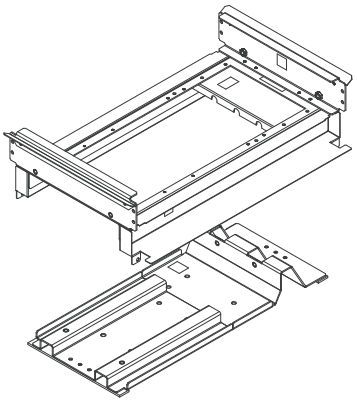
See page *180*.

Mechanical installation accessories and tools (2×R8i supply, Rittal VX25 enclosure)

In Rittal installations, 2×R8i supply consists of one 2×R8i supply module cubicle and one LCL filter cubicle.

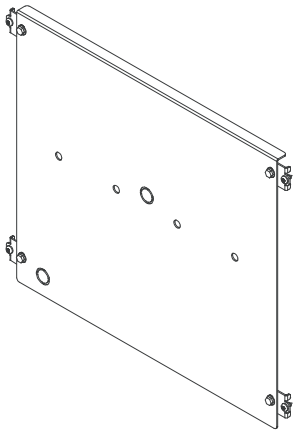
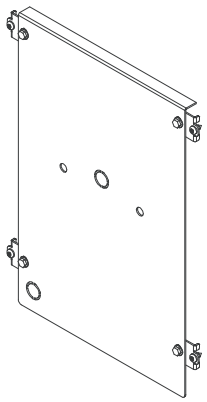
Module installation parts

Module installation parts include, for example, top and bottom supports for the modules.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm Rittal	1	3AXD50000361670	A-6-8-323-VX	 Instruction code: 3AXD500000349982
BLCL-2x-x	400 mm Rittal	1	3AXD50000360802	A-4-8-321-VX	 Instruction code: 3AXD50000351756

Shrouds

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

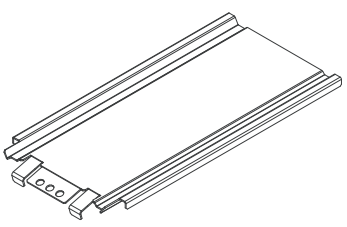
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	1	3AXD50000337378	A-6-8-360-VX	 Instruction code: 3AXD50000335169
BLCL-2x-x	400 mm	1 per cubicle	3AXD50000337484	A-4-8-359-VX	 Instruction code: 3AXD50000335022

Ramp

The ramp is used for installing and replacing the modules in the Rittal enclosure.

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 cabinets).

See the dimension drawing, see section *Ramp* on page *367*.

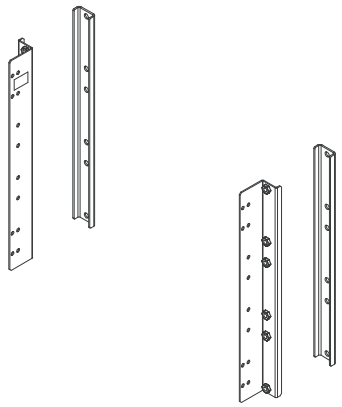
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i, BLCL-xx-x	All	1	3AXD50000438037	A-468-8-304-VX	

AC-side components (2×R8i supply, Rittal VX25 enclosure)

Common AC Flat-PLS assembly

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

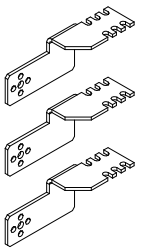
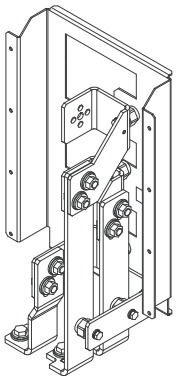
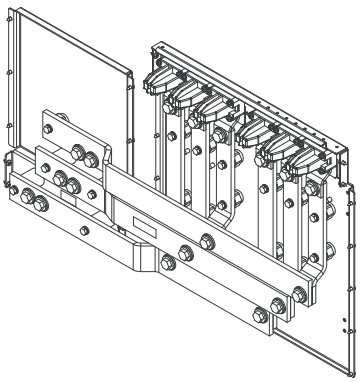
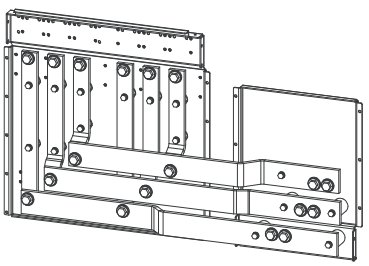
Note: The designs presented in this manual for Rittal enclosures employ the Rittal Flat-PLS busbar system. Make sure that the current carrying capability of the busbars is not exceeded at any point of the drive system.

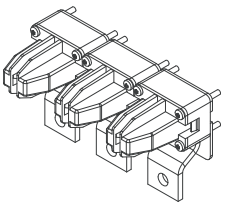
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
All	600 mm	1 per cubicle	3AXD50000360772	A-468-X-011-VX	 Instruction code: 3AXD50000372782

AC busbars and quick connectors

In BLCL-2x-x, AC busbars provide connection from the filter input to the common AC bus. The power input of the supply module is connected to the module through a quick connector. Each supply module requires quick connectors.

For the dimension drawing, see section *Quick connector* on page *345*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
BLCL-2x-x	All	1	3AXD50000011084	A-468-8-106	 Instruction code: 3AXD50000012934
BLCL-2x-x	Rittal	1	3AXD50000360796	A-4-8-107-VX	 Instruction code: 3AXD50000353491
2×R8i	1000 mm Rittal	1	3AXD50000361687	A-X-8-142-VX	 Instruction code: 3AXD50000353477
2×R8i	1000 mm Rittal	1	3AXD50000702268 **Note:** This kit is mirror image of kit A-X-8-142-VX.	A-X-8-155-VX	 Instruction code: 3AXD50000701674

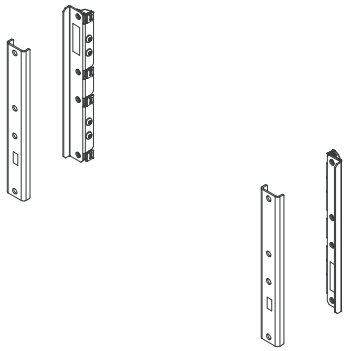
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

DC-side components (2×R8i supply, Rittal VX25 enclosure)

Common DC Flat-PLS assembly

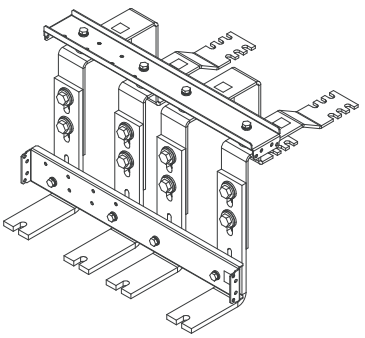
When using the Rittal Flat-PLS system, this kit is used for correct positioning of the common DC bus in the Rittal VX25 enclosure.

Note: The designs presented in this manual for Rittal 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
All	400 mm	1 per cubicle	3AXD50000333387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

DC busbars

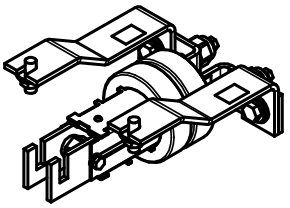
DC busbars provide connection from DC fuses to the common DC bus.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm Rittal	1	3AXD50000361663	A-6-8-212-VX	 Instruction code: 3AXD50000353507

Common mode filter busbars and DC connection flanges

A common mode filter is needed with each IGBT supply module. Toroids are not included in the delivery, they must be ordered separately. See page *233*.

There is space for up to four toroidal cores. For the dimension drawing, see section *Common mode filter* on page *368*. Each supply module requires DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AXD50000002492	A-468-8-231	 Instruction code: 3AXD50000002502
R8i	All	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403

Cabinet ventilation kits

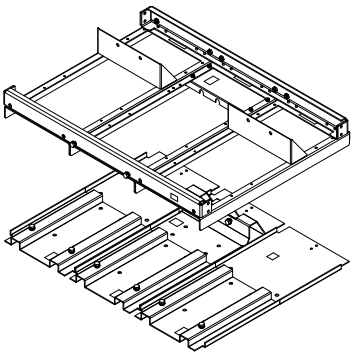
See *Cabinet ventilation kits (600 mm)* on page *186*, and *Cabinet ventilation kits (400 mm)* on page *203*.

Mechanical installation accessories and tools (2×R8i supply, generic enclosure)

In generic installations, 2×R8i supply modules and LCL filter are in the same cubicle.

Module installation parts

Module installation parts include, for example, top and bottom supports for the modules.

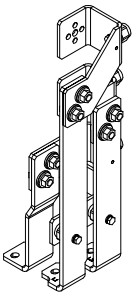
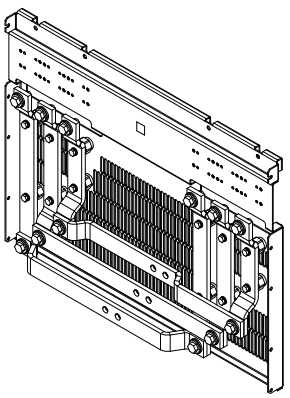
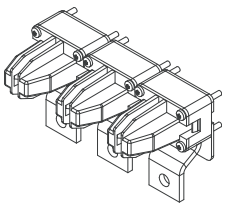
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	800 mm Generic	1	3AXD50000011158	A-8-8-325	 Instruction code: 3AXD50000013143

AC-side components (2×R8i supply, generic enclosure)

AC busbars and quick connectors

In BLCL-2x-x, AC busbars provide connection from the filter input to the AC fuses. The power connection of the module is done via a quick connector. Each module requires quick connectors.

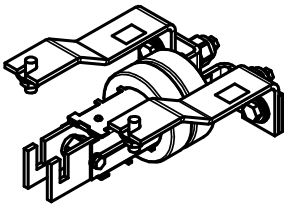
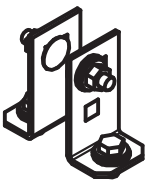
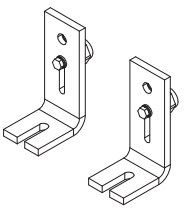
For the dimension drawing, see section *Quick connector* on page *345*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
BLCL-2x-x	Generic	1	3AXD50000011155	A-468-8-109	 Instruction code: 3AXD50000013246
2×R8i	800 mm Generic	1	3AXD50000011156	A-8-8-144	 Instruction code: 3AXD50000013187
R8i	All	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

DC-side components (2×R8i supply, generic enclosure)

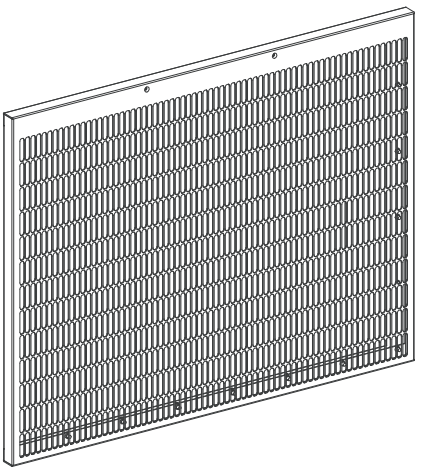
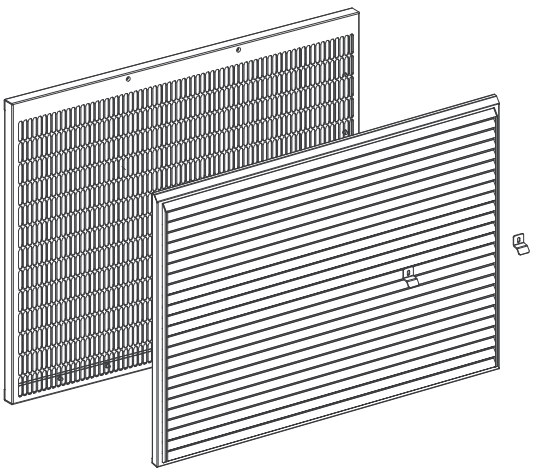
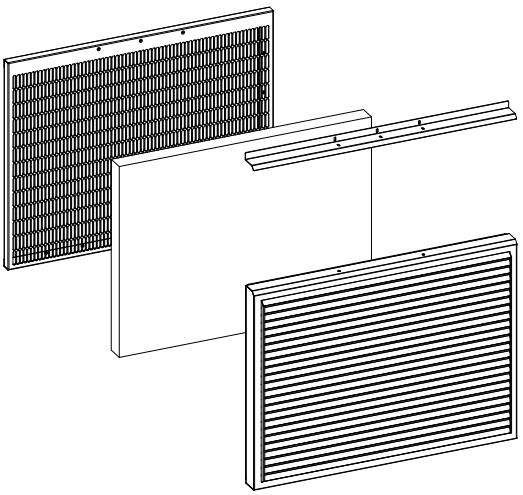
Common mode filter busbars and DC connection flanges

Each supply module requires DC connection flanges.

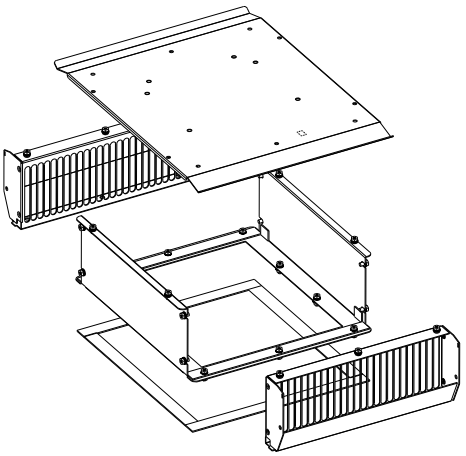
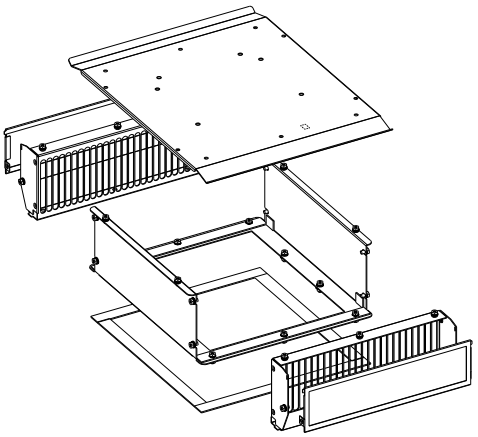
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AXD50000002492	A-468-8-231	 Instruction code: 3AXD50000002502
R8i	400 mm	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403
R8i	Generic	1 per module	3AXD50000025659	A-468-8-245	 Instruction code: 3AXD50000025693

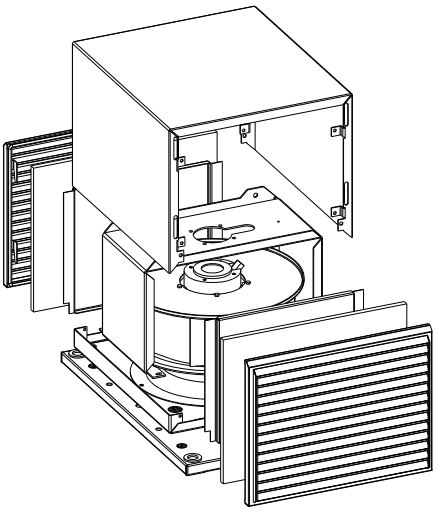
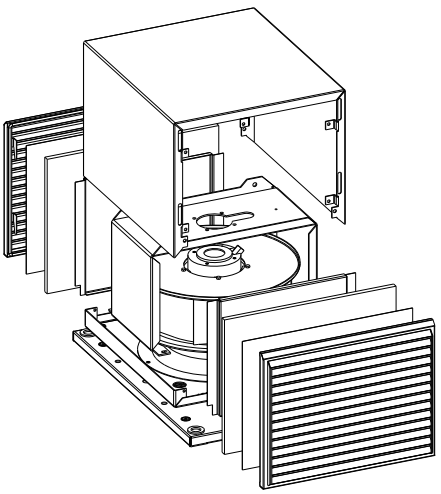
Cabinet ventilation kits (800 mm)

Air inlet kits

Enclosure width / Degree of protection	Qty	Ordering code	Kit code	Illustration
800 mm/ IP20	1	3AUA0000117005	A-8-X-023	 Instruction code 3AUA0000116887
800 mm/ IP42	1	3AUA0000117009	A-8-X-026	 Instruction code 3AUA0000116875
800 mm/ IP54	1	3AXD50000009186	A-8-X-029	 Instruction code 3AXD50000010001

Air outlet kits

Enclosure width / Degree of protection	Qty	Ordering code	Kit code	Illustration
800 mm, IP20 cubicle with natural convection cooling	2	3AUA0000125203	A-4-X-042	 See the Instruction code 3AXD50000001983 for the cutting instructions of the cabinet roof plate.
800 mm, IP42 cubicle with natural convection cooling	2	3AUA0000114968	A-4-X-040	 See the Instruction code 3AUA0000115292 for the cutting instructions of the cabinet roof plate.

Enclosure width / Degree of protection	Qty	Ordering code	Kit code	Illustration
400 mm, IP54 cubicle with forced cooling	2	3AXD50000009187	A-4-X-064	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately.
400 mm, IP54, UL and CSA cubicle with forced cooling	2	3AXD50000010362	A-4-X-067	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately.

Cooling fans

IEC				
Enclosure / Degree of protection	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm / IP54 / 230 V, 50/60 Hz	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	2	3AXD50000006934
	Capacitor	6 µF, 600 V	2	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724

UL, CSA				
Enclosure / Degree of protection	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm / IP54 / 230 V, 50/60 Hz	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	2	3AXD50000006934
	Capacitor	6 µF, 600 V	2	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724
400 mm / IP54 / 115 V, 50/60 Hz	Fan	3.1 A; 115 V; 300 W; 50 Hz 3.9 A; 115 V; 430 W; 60 Hz	2	64750062
	Capacitor	25 µF; 220 V	2	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724

Main switch-disconnectors

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 some of the IEC high power units, you can use withdrawable main circuit breaker instead of the main switch-disconnector. In the table below, these high power units are marked with *. See section *Main circuit breakers* on page *227*.

ACS880-14/34-…	Main switch-disconnector (IEC)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
1210A-3*	Switch kit OT-type IEC 2000 E12	2000 A, 1000 V, 55 kA	1	3AXD50000006186
1430A-3*	Switch kit OT-type IEC 2000 E12	2000 A, 1000 V, 55 kA	1	3AXD50000006186
1700A-3*	Switch kit OT-type IEC 2000 E12	2000 A, 1000 V, 55 kA	1	3AXD50000006186
U_N = 500 V (Range 380 … 500 V)				
1110A-5	Switch kit OT-type IEC 1250 E12	1250 A, 1000 V, 50 kA	1	3AXD50000006185
1530A-5*	Switch kit OT-type IEC 2000 E12	2000 A, 1000 V, 55 kA	1	3AXD50000006186
U_N = 690 V (Range 525 … 690 V)				
0770A-7	Switch kit OT-type IEC 1250 E12	1250 A, 1000 V, 50 kA	1	3AXD50000006185
0950A-7	Switch kit OT-type IEC 1250 E12	1250 A, 1000 V, 50 kA	1	3AXD50000006185
1130A-7	Switch kit OT-type IEC 1250 E12	1250 A, 1000 V, 50 kA	1	3AXD50000006185

ACS880-14/34-…	Main switch-disconnector (UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 500 V (Range 380 … 500 V)				
1110A-5	Switch kit OT-type UL 1200 U12	1200 A, 600 V, 50 kA	1	3AXD50000010814
U_N = 690 V (Range 525 … 690 V)				
0770A-7	Switch kit OT-type UL 1200 U12	1200 A, 600 V, 50 kA	1	3AXD50000010814
0950A-7	Switch kit OT-type UL 1200 U12	1200 A, 600 V, 50 kA	1	3AXD50000010814
1130A-7	Switch kit OT-type UL 1200 U12	1200 A, 600 V, 50 kA	1	3AXD50000010814

The main switch-disconnector kit contains:

- main switch-disconnector unit
- shaft OXP12X395 or OXP12X465
- handle OHB150J12P
- normally-open auxiliary contact OA1G10
- terminal bolts M8X25 (IEC only).

For the dimension drawings, see section *Main switch-disconnector* on page *348*.

Main circuit breakers

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 *.

ACS880-14/34-…	Main circuit breaker (230 V, IEC)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
1210A-3*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1430A-3*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1700A-3*	E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048330	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
U_N = 500 V (Range 380 … 500 V)						
1530A-5*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

ACS880-14/34-…	Main circuit breaker (115 V, IEC)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
1210A-3*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1430A-3*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1700A-3*	E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048342	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
U_N = 500 V (Range 380 … 500 V)						
1530A-5*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

ACS880-14/34-…	Main circuit breaker (230 V, UL and CSA)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
1210A-3	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1430A-3	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

ACS880-14/34-…	Main circuit breaker (230 V, UL and CSA)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
1700A-3	E2.2S-A 2000	2000 A, 600 V, 65 kA, UL	1	3AXD50000048330	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
U_N = 500 V (Range 380 … 500 V)						
1530A-5	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

ACS880-14/34-…	Main circuit breaker (115 V, UL and CSA)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
1210A-3	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1430A-3	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1700A-3	E2.2S-A 2000	2000 A, 600 V, 65 kA, UL	1	3AXD50000048342	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
U_N = 500 V (Range 380 … 500 V)						
1530A-5	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

For the contents of the main circuit breakers, see section *Contents of the main circuit breakers* on page *292*. For the dimension drawing of the main circuit breaker, see section *Main circuit breaker* on page *358*.

Main circuit breaker and wagon cover

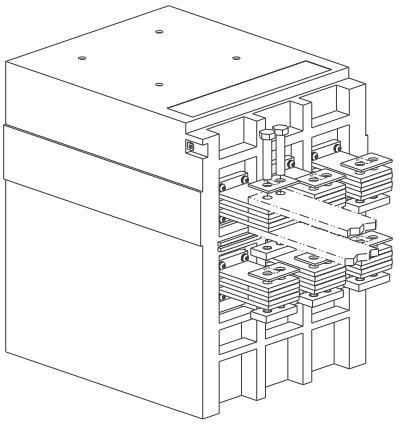
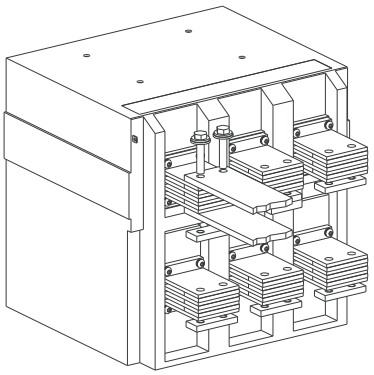
One cover is needed for each main circuit breaker/wagon pair. See *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]) for further details regarding arc protection.

IEC: IP54 flange, key N.20005 E2.2…E6.2, 1SDA073869R1, ordering code: 3AXD50000049760

UL: Hinged Window, APWK2016H, ordering code 3AUA0000222786.

IEC busbar shim kits

Use busbar shim kit for adapting E2.2S-A and E4.2S-A main circuit breakers to IEC busbars.

Type	Data	Ordering code	Illustration
E2.2S-A	EMAX2 E2.2 busbar shim kit	3AXD50000286324	 Instruction code: 3AXD50000286072
E4.2S-A	EMAX E4.2 busbar shim kit	3AXD50000286782	 Instruction code: 3AXD50000286973

Main AC fuses

The main AC fuses protect the input cables, main contactor and the supply module against short circuits. For the dimension drawings, see section *AC fuses* on page *360*.

ACS880-14/34-…	Fuse (IEC)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
1210A-3	170M7062	2000 A, 690 V	3	68689589
1430A-3	170M7063	2500 A, 690 V	3	68752591
1700A-3	170M7063	2500 A, 690 V	3	68752591
U_N = 500 V (Range 380 … 500 V)				
1110A-5	170M6419	1600 A, 690 V	3	68393108
1530A-5	170M7063	2500 A, 690 V	3	68752591
U_N = 690 V (Range 525 … 690 V)				
0770A-7	170M6416	1250 A, 690 V	3	68244463
0950A-7	170M6417	1400 A, 690 V	3	3AXD50000000150
1130A-7	170M6419	1600 A, 690 V	3	68393108

ACS880-14/34-…	Fuse (UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 500 V (Range 380 … 500 V)				
1110A-5	170M6419	1600 A, 690 V	3	68393108
U_N = 690 V (Range 525 … 690 V)				
0770A-7	170M6416	1250 A, 690 V	3	68244463
0950A-7	170M6417	1400 A, 690 V	3	3AXD50000000150
1130A-7	170M6419	1600 A, 690 V	3	68393108

Supply unit AC fuses

These fuses protect the LCL filter and the IGBT supply modules for short circuits. Supply unit AC fuses are needed when 1) main circuit breaker is used 2) always when there are more than one LCL filter in use.

ACS880-14/34-…	Fuse (IEC)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
1210A-3	170M7062[1)]	2000 A, 690 V	3	68689589
1430A-3	170M7063[1)]	2500 A, 690 V	3	68752591
1700A-3	170M7063[1)]	2500 A, 690 V	3	68752591
U_N = 500 V (Range 380 … 500 V)				
1530A-5	170M7063[1)]	2500 A, 690 V	3	68752591

[1)] When there is a main circuit breaker in use.

ACS880-14/34-…	Fuse (UL, CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
1210A-3	170M7062	2000 A, 690 V	3	68689589
1430A-3	170M7063	2500 A, 690 V	3	68752591
1700A-3	170M7063	2500 A, 690 V	3	68752591
U_N = 500 V (Range 380 … 500 V)				
1530A-5	170M7063	2500 A, 690 V	3	68752591

For the dimension drawings, see section *AC fuses* on page *360*.

Main contactors

You can use the main contactors for the on-off control of the AC input power. The contactors can make and break the full load current.

ACS880-14/34-…	Main contactor (IEC)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
1210A-3	AF1650-30-22-70	1650 A (I_{Th}), 1000 V (U_e)	1	64731378
1430A-3	AF1650-30-22-70	1650 A (I_{Th}), 1000 V (U_e)	1	64731378
1700A-3	AF2050-30-22-70	2050 A (I_{Th}), 1000 V (U_e)	1	3AUA0000051805
U_N = 500 V (Range 380 … 500 V)				
1110A-5	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284
1530A-5	AF2050-30-22-70	2050 A (I_{Th}), 1000 V (U_e)	1	3AUA0000051805
U_N = 690 V (Range 525 … 690 V)				
0770A-7	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284
0950A-7	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284
1130A-7	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284

ACS880-14/34-…	Main contactor (UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 500 V (Range 380 … 500 V)				
1110A-5	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284
U_N = 690 V (Range 525 … 690 V)				
0770A-7	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284
0950A-7	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284
1130A-7	AF1250-30-22-70	1250 A (I_{Th}), 1000 V (U_e)	1	68687284

The contactor package includes:

- contactor unit
- fixing screws
- 2 × normally-open + 2 × normally-closed auxiliary contacts.

For the dimension drawings, see section *Main contactor* on page *354*.

Charging kits

The capacitor bank of the IGBT supply module needs to be charged during the start-up before connecting the module to a three-phase power line. 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. The following table shows the charging kits available for each ACS880-14/34 type.

ACS880-14/34-…	Ordering code (IEC)*	Ordering code (UL and CSA)**
U_N = 400 V (Range 380 … 415 V)		
1210A-3	3AXD50000016056	3AXD50000022218
1430A-3	3AXD50000016056	3AXD50000022218
1700A-3	3AXD50000016056	3AXD50000022218
U_N = 500 V (Range 380 … 500 V)		
1110A-5	3AXD50000016056	3AXD50000022218
1530A-5	3AXD50000021093	3AXD50000022219
U_N = 690 V (Range 525 … 690 V)		
0770A-7	3AXD50000016056	3AXD50000022218
0950A-7	3AXD50000016056	3AXD50000022262
1130A-7	3AXD50000016056	3AXD50000022262

*IEC kits also include:

- OSS160GT1S/4 terminal shrouds (2 pcs)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- handle and shaft with P-type fuse switch

**UL/CSA kits also include:

- handle OHB65J6 (1 pc)
- shaft OXP6X161 (1 pc)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- auxiliary contact mounting frame OSZ4

For the charging kit contents, see page 290.

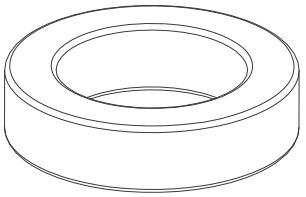
Varistor kit (UL/CSA)

See page 195.

Common mode filters

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 input busbars.

DC busbar kit contains a holder for the filters.

Frame size	Common mode filter (IEC, UL and CSA)		Qty	Ordering code	Illustration
	Type	Data			
2×R8i + 2× R8i	VITROPERM 250F	250 F / 4.2 µH	4+4	3AUA0000032859	 Instruction code: 3AUA0000123359

For the dimension drawing, see section *Common mode filter* on page *368*.

Supply DC fuses

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
1210A-3	170M6416	1250 A, 690 V	4	68244463
1430A-3	170M6417	1400 A, 690 V	4	3AXD50000000150
1700A-3	170M6419	1600 A, 690 V	4	68393108
U_N = 500 V (Range 380 … 500 V)				
1110A-5	170M6415	1100 A, 690 V	4	68731658
1530A-5	170M6417	1400 A, 690 V	4	3AXD50000000150
U_N = 690 V (Range 525 … 690 V)				
0770A-7	170M6546	800 A, 1250 V	4	63919128
0950A-7	170M6548	1000 A, 1100 V	4	63916749
1130A-7	170M6549	1100 A, 1000 V	4	68736021

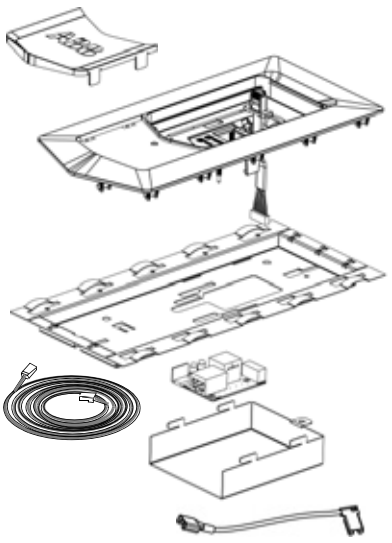
For the dimension drawings, see section *DC fuses* on page *362*.

Control panel (2×R8i inverter)

The control panel is not included with the inverter modules 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 for 2×R8i inverter

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

Supply modules and inverter modules require their own control units. The delivery includes the control units.

Frame size	Control unit kit for inverter		
	Type	Qty	Ordering code
2×R8i inverter	BCU-02 KIT	1	3AXD50000003417

Frame size	Application programming kit for inverter		
	Type	Qty	Ordering code
2×R8i inverter	BCU-02 N8010 KIT	1	3AXD50000011540

The BCU control unit kit contains:
- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:
- RDCO-04C DDCS communication option module (ordering code: 68882915).

Fiber optic cables

See page *180*.

Control circuit plug connectors

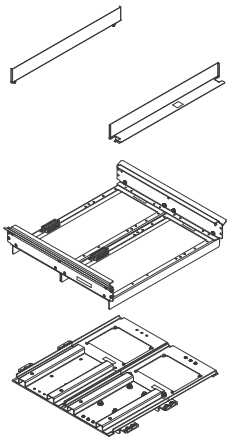
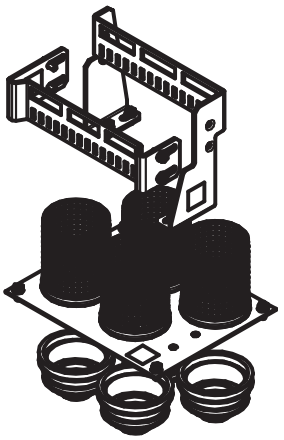
See page *199*.

Mechanical installation accessories and tools (2×R8i inverter, Rittal VX25 enclosure)

In Rittal installations, 2×R8i inverter consists of one 2×R8i inverter module cubicle.

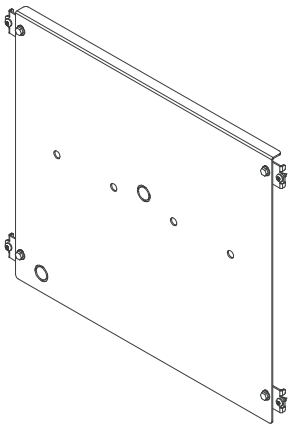
Module installation parts and lead-through for bottom plate

Module installation parts include, for example, top and bottom supports for the module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	1	3AXD50000337514	A-6-8-309-VX	 Instruction code: 3AXD50000345052
2×R8i	600 mm	2	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

Shrouds

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

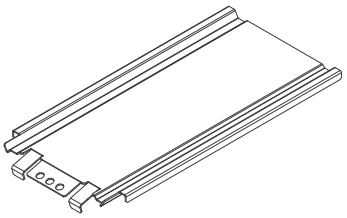
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	1	3AXD50000337378	A-6-8-360-VX	 Instruction code: 3AXD50000335022

Ramp

The ramp is used for installing and replacing the modules in the Rittal enclosure.

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 cabinets).

See the dimension drawing, see section *Ramp* on page *367*.

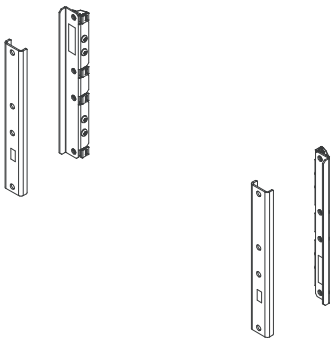
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i, BLCL-xx-x	All	1	3AXD50000438037	A-468-8-304-VX	

DC-side components (2×R8i inverter, Rittal VX25 enclosure)

Common DC Flat-PLS assembly

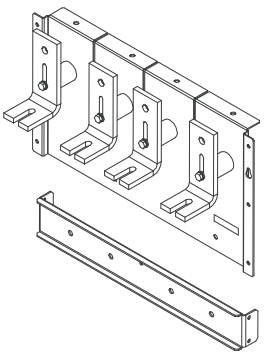
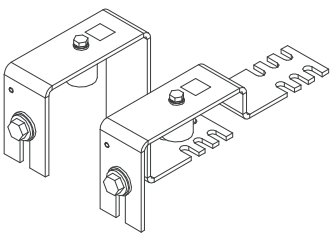
When using the Rittal Flat-PLS system, this kit is used for correct positioning of the common DC bus in the Rittal VS25 enclosure.

Note: The designs presented in this manual for Rittal 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
All	600 mm	1	3AXD50000333387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

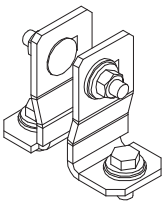
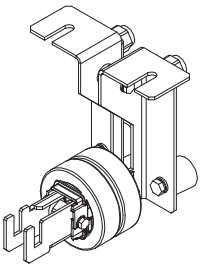
DC busbars

DC busbars provide connection from DC fuses to the common DC bus.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i (fuses in use)	600 mm	1	3AXD50000337521	A-6-8-255-VX	 Instruction code: 3AXD50000342471
2×R8i (fuses in use)	600 mm	2	3AXD50000337446	A-46-8-206-VX	 Instruction code: 3AXD50000345915

Common mode busbars and DC connection flanges

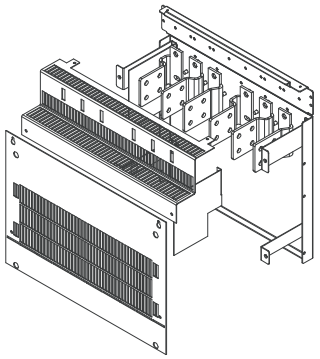
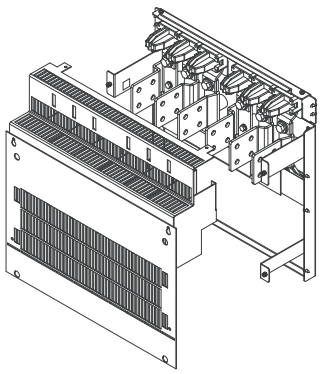
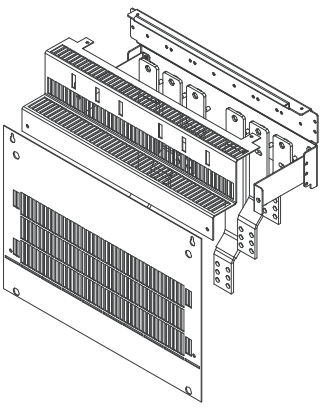
Each inverter module requires common mode busbars and DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	600 mm	2	3AXD50000028403	A-468-8-246	 Instruction code: 3AXD50000028384
R8i	600 mm	2	3AXD50000028401	A-468-8-235	 Instruction code: 3AXD50000028418

AC-side components (2×R8i inverter, Rittal VX25 enclosure)

AC output busbars

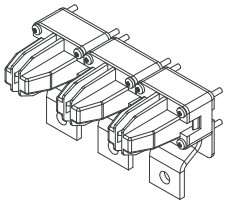
These kits include mounting parts for quick connectors and output busbars. Motor cables are connected to output busbars. Kit A-6-8-134-VX contains busbars for connecting two inverter modules together, so that no identical motor cable is needed for every module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	1	3AXD50000337569	A-6-8-133-VX	 Instruction code: 3AXD50000345526
2×R8i	600 mm	1	3AXD50000337576	A-6-8-134-VX	 Instruction code: 3AXD50000345632
2×R8i	600 mm	1	3AXD50000337552	A-6-8-141-VX	 Instruction code:

Quick connector

The power input of the inverter module is connected to the module through a quick connector. Each module requires quick connectors.

For the dimension drawing, see section *Quick connector* on page *345*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	600 mm	1	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

Cabinet ventilation kits

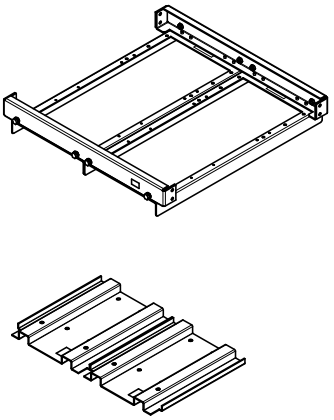
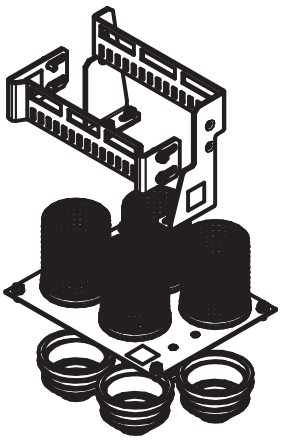
See section *Cabinet ventilation kits (600 mm)* page *186*.

Mechanical installation accessories and tools (2×R8i inverter, generic enclosure)

In generic installations, 2×R8i inverter consists of one 2×R8i inverter module cubicle.

Module installation parts and lead-through for bottom plate

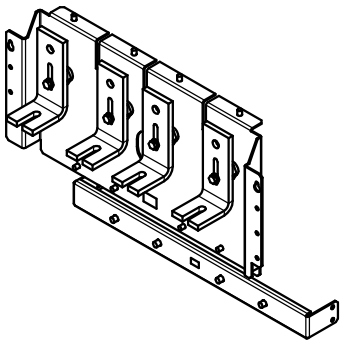
Module installation parts include, for example, top and bottom supports for the module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	1	3AXD50000005876	A-6-8-311	 Instruction code: 3AXD50000005864
2×R8i	600 mm	2	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

DC-side components (2×R8i inverter, generic enclosure)

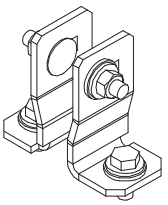
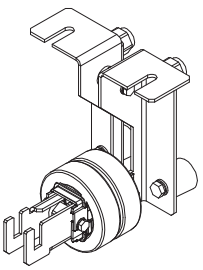
DC busbars

DC busbars provide connection from DC fuses to the common DC bus.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	1	3AXD50000006444	A-6-8-257	 Instruction code: 3AXD50000006447

Common mode busbars and DC connection flanges

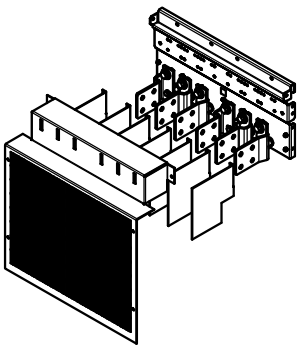
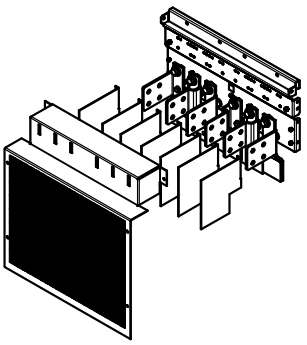
Each inverter module requires common mode busbars and DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	600 mm	2	3AXD50000028403	A-468-8-246	 Instruction code: 3AXD50000028384
R8i	600 mm	2	3AXD50000028401	A-468-8-235	 Instruction code: 3AXD50000028418

AC-side components (2×R8i inverter, generic enclosure)

AC output busbars

These kits include mounting parts for quick connectors and output busbars. Motor cables are connected to output busbars. Kit A-6-8-138 contains busbars for connecting two inverter modules together, so that no identical motor cable is needed for every module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	1	3AXD50000006491	A-6-8-136	 Instruction code: 3AXD50000006489
2×R8i	600 mm	1	3AXD50000006493	A-6-8-138	 Instruction code: 3AXD50000006505

Cabinet ventilation kits

See section *Cabinet ventilation kits (600 mm)* page *186*.

Inverter DC fuses

DC fuses protect the modules and drive DC bus against short circuits. For dimension drawings, see section *DC fuses* on page *362*.

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
1210A-3	170M6416	1250 A, 690 V	4	68244463
1430A-3	170M6417	1400 A, 690 V	4	3AXD50000000150
1700A-3	170M6419	1600 A, 690 V	4	68393108
U_N = 500 V (Range 380 … 500 V)				
1110A-5	170M6415	1100 A, 690 V	4	68731658
1530A-5	170M6417	1400 A, 690 V	4	3AXD50000000150
U_N = 690 V (Range 525 … 690 V)				
0770A-7	170M6546	800 A, 1250 V	4	63919128
0950A-7	170M6548	1000 A, 1100 V	4	63916749
1130A-7	170M6549	1100 A, 1000 V	4	68736021

3×R8i + 3×R8i

ACS880-14 and -34 single drive module packages

Delivery of the ACS880-14/34 single drive module package includes the following items:

Ordering code	Contents and option codes
U_N = 400 V (Range 380 … 415 V): ACS880-14/34-2060A-3 ACS880-14/34-2530A-3 **U_N = 500 V (Range 380 … 500 V):** ACS880-14/34-1980A-5 ACS880-14/34-2270A-5 **U_N = 690 V (Range 525 … 690 V):** ACS880-14/34-1450A-7 ACS880-14/34-1680A-7	• Supply and inverter modules with speed-controlled cooling fans • LCL filter module(s) with on/off controlled cooling fan • **+C132**: Marine type approval. For more information, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]). • **+C183**: Heating element mounted to module base • **+C188**: Direct-on-line cooling fan • **+E205**: Internal du/dt filters (included as standard in all supply and inverter modules in the ACS880-14 and -34 module packages) • **+G304:** 115 V auxiliary voltage supply

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

- BCU control unit kits (one for supply, one for inverter),
- fiber optic cables,
- RDCO-04C DDCS communication option modules (68882915, own for supply and inverter),
- common mode filters for each supply / inverter module (consists of two toroidal cores, 2 × 3AUA0000032859),
- control circuit plug connectors (3AUA0000059813) for each module,
- control circuit plug connectors (3AXD50000003541) for each inverter module,
- quick connectors (3AUA0000119227) for each module.

Suitable kits and components for each ACS880-14/34 type are listed in this chapter.

The other parts listed in this chapter

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

Weak supply networks: In weaker supply networks with a short-circuit ratio less than 8, it is highly recommended to install a BAMU auxiliary measurement unit to the drive. In such networks, there is a risk of nuisance DC overvoltage tripping due to disturbances caused by probable high-voltage THD in the supply voltage. Short-circuit ratio is defined as the supply network's apparent short-circuit power $S_{k,net}$ divided by the drive's nominal apparent power S_n ($S_{k,net}$ / S_n < 8).

LCL filters (+C183+C188+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 400 V (Range 380 … 415 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan with 400 V AC supply for BLCL-2x-x • **+V991**: Hardware version
2060A-3	BLCL-24-5+C183+C188+V991	2	3AXD50000621163	
2530A-3	BLCL-24-5+C183+C188+V991	2	3AXD50000621163	
U_N = 500 V (Range 380 … 500 V)				
1980A-5	BLCL-24-5+C183+C188+V991	2	3AXD50000621163	
2270A-5	BLCL-24-5+C183+C188+V991	2	3AXD50000621163	
U_N = 690 V (Range 525 … 690 V)				
1450A-7	BLCL-24-7+C183+C188+V991	2	3AXD50000621200	
1680A-7	BLCL-24-7+C183+C188+V991	2	3AXD50000621200	

LCL filters (+C183+C188+G427+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 400 V (Range 380 … 415 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan • **+G427**: 208 V AC 3-phase fan supply for BLCL-2x-x • **+V991**: Hardware version
2060A-3	BLCL-24-5+C183+C188+G427+V991	2	3AXD50000621293	
2530A-3	BLCL-24-5+C183+C188+G427+V991	2	3AXD50000621293	
U_N = 500 V (Range 380 … 500 V)				
1980A-5	BLCL-24-5+C183+C188+G427+V991	2	3AXD50000621293	
2270A-5	BLCL-24-5+C183+C188+G427+V991	2	3AXD50000621293	
U_N = 690 V (Range 525 … 690 V)				
1450A-7	BLCL-24-7+C183+C188+G427+V991	2	3AXD50000621316	
1680A-7	BLCL-24-7+C183+C188+G427+V991	2	3AXD50000621316	

Control electronics for 3×R8i supply

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

Supply modules and inverter modules require their own control units. The delivery includes the control units.

ACS880-14:

Frame size	ACS880-14 control unit kit		
	Type	Qty	Ordering code
3×R8i supply	BCU-12 KIT	1	3AXD50000015806

Frame size	ACS880-14 application programming kit		
	Type	Qty	Ordering code
3×R8i supply	BCU-12 N8010 KIT	1	3AXD50000015807

ACS880-34:

Frame size	ACS880-34 control unit kit		
	Type	Qty	Ordering code
3×R8i supply	BCU-12 +N8012 KIT	1	3AXD50000020829

Frame size	ACS880-34 application programming kit		
	Type	Qty	Ordering code
3×R8i supply	BCU-12 N8012+N8010 LOW H	1	3AXD50000022038

The BCU control unit kit contains:

- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:

- RDCO-04C DDCS communication option module (ordering code: 68882915).

Fiber optic cables

See page *180*.

Control circuit plug connectors

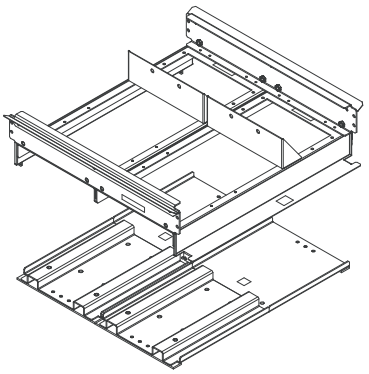
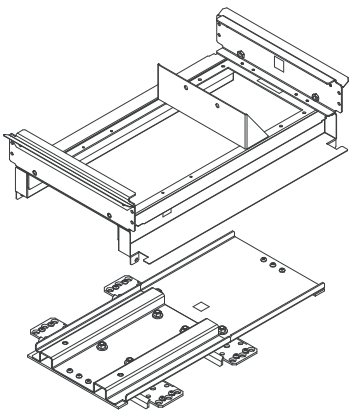
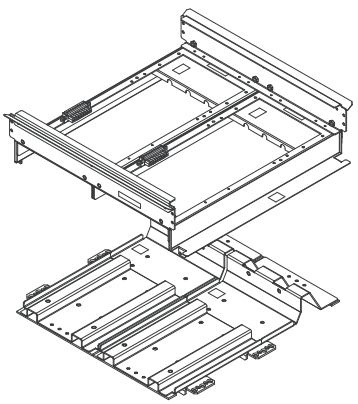
See page *180*.

Mechanical installation accessories and tools (3×R8i supply, Rittal VX25 enclosure)

In Rittal installations, 3×R8i supply consists of one 2×R8i supply module cubicle, one 1×R8i supply module cubicle, and one LCL filter cubicle.

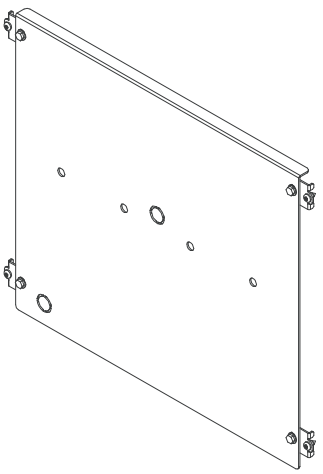
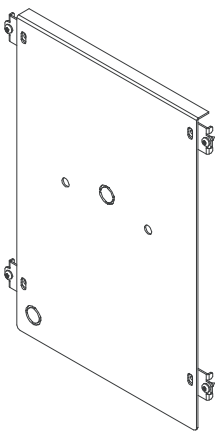
Module installation parts

Module installation parts include, for example, top and bottom supports for the modules.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm Rittal	1	3AXD50000361670	A-6-8-323-VX	 Instruction code: 3AXD50000351756
1×R8i	400 mm Rittal	1	3AXD50000371112	A-4-8-324-VX	 Instruction code: 3AXD50000372935
2×BLCL-2x-x	600 mm Rittal	1	3AXD50000361700	A-6-8-322-VX	 Instruction code: 3AXD50000351930

Shrouds

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

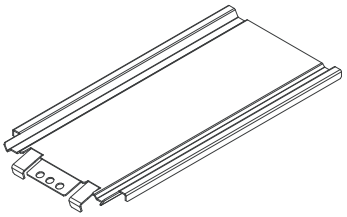
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
2×R8i	600 mm	2	AXD50000337378	A-6-8-354-VX	 Instruction code: 3AXD50000335169
1×R8i	400 mm	1 per cubicle	3AXD50000337484	A-4-8-353-VX	 Instruction code: 3AXD50000335022

Ramp

The ramp is used for installing and replacing the modules in the Rittal enclosure.

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 cabinets).

See the dimension drawing, see section *Ramp* on page *367*.

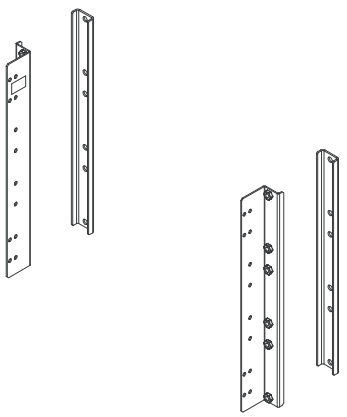
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i, BLCL-xx-x	All	1	3AXD50000438037	A-468-8-304-VX	

AC-side components (3×R8i supply, Rittal VX25 enclosure)

Common AC Flat-PLS assembly

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

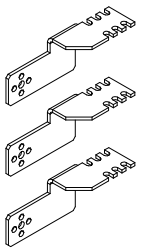
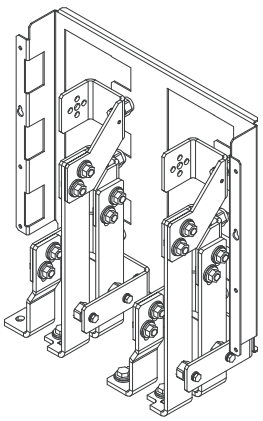
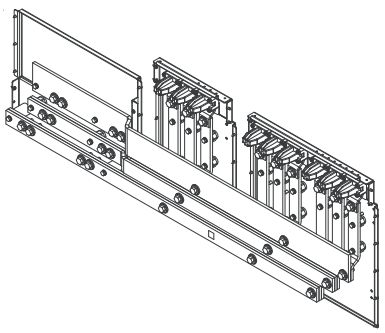
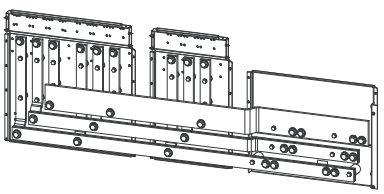
Note: The designs presented in this manual for Rittal enclosures employ the Rittal Flat-PLS busbar system. Make sure that the current carrying capability of the busbars is not exceeded at any point of the drive system.

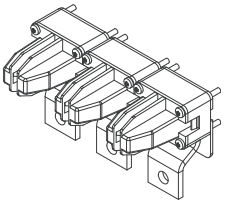
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
All	600 mm	1 per cubicle	3AXD50000360772	A-468-X-011-VX	 Instruction code: 3AXD50000372782

AC busbars and quick connectors

In BLCL-2x-x, AC busbars provide connection from the filter input to the common AC bus. The power input of the supply module is connected to the module through a quick connector. Each supply module requires quick connectors.

For the dimension drawing, see section *Quick connector* on page *345*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
BLCL-2x-x	All	2	3AXD50000011084	A-468-8-106	 Instruction code: 3AXD50000012934
2×BLCL-2x-x	600 mm Rittal	1	3AXD50000371143	A-6-8-108-VX	 Instruction code: 3AXD50000352999
3×R8i	1600 mm Rittal	1	3AXD50000371129	A-X-8-143-VX	 Instruction code: 3AXD50000360444
3×R8i	1600 mm Rittal	1	3AXD50000702275 **Note:** This kit is mirror image of kit A-X-8-143-VX.	A-X-8-156-VX	 Instruction code: 3AXD50000701773

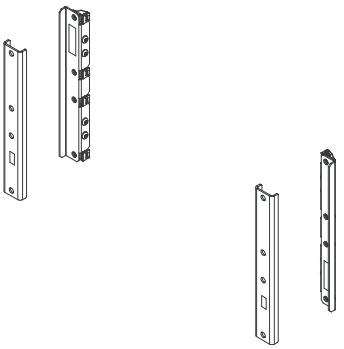
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

DC-side components (3×R8i supply, Rittal VX25 enclosure)

Common DC Flat-PLS assembly

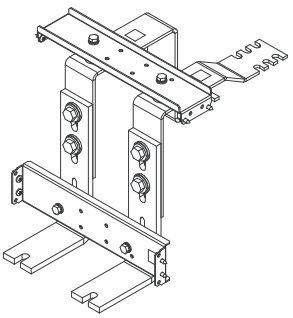
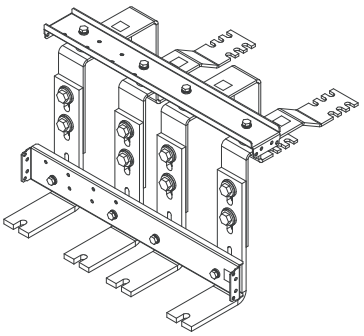
When using the Rittal Flat-PLS system, this kit is used for correct positioning of the common DC bus in the Rittal VX25 enclosure.

Note: The designs presented in this manual for Rittal 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
All	400 mm	1 per cubicle	3AXD50000333387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

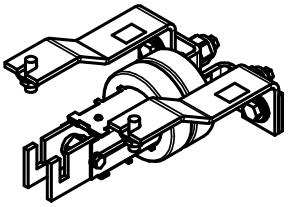
DC busbars

DC busbars provide connection from the DC fuses to the common DC bus.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm Rittal	1	3AXD50000371136	A-4-8-205-VX	 Instruction code: 3AXD50000360987
2×R8i	600 mm Rittal	1	3AXD50000361663	A-6-8-212-VX	 Instruction code: 3AXD50000353507

Common mode filter busbars and DC connection flanges

A common mode filter is needed with each IGBT supply module. Toroids are not included in the delivery, they must be ordered separately. See page *263*. There is space for up to four toroidal cores. For the dimension drawing, see section *Common mode filter* on page *368*. Each supply module requires DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AXD50000002492	A-468-8-231	 Instruction code: 3AXD50000002502
R8i	All	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403

Cabinet ventilation kits

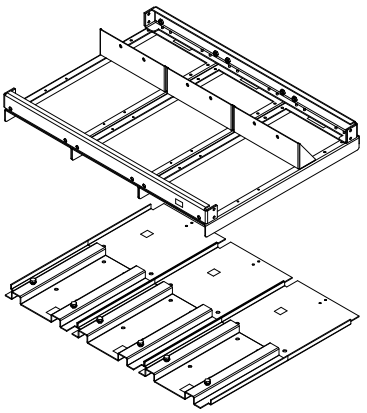
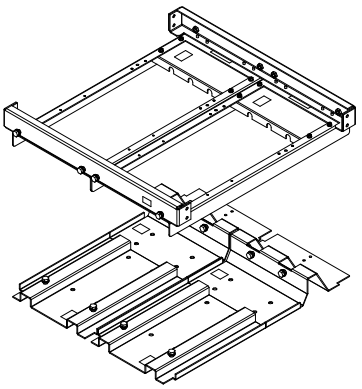
See *Cabinet ventilation kits (600 mm)* on page *186*, and *Cabinet ventilation kits (400 mm)* on page *203*.

Mechanical installation accessories and tools (3×R8i supply, generic enclosure)

In generic installations, 3×R8i supply consists of one 3×R8i supply module cubicle and one LCL filter cubicle.

Module installation parts

Module installation parts include, for example, top and bottom supports for the modules.

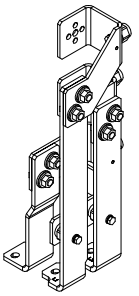
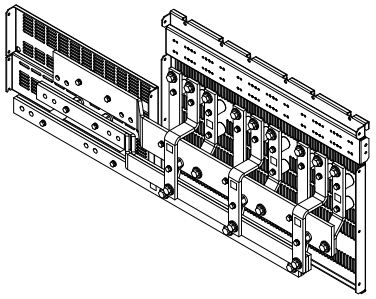
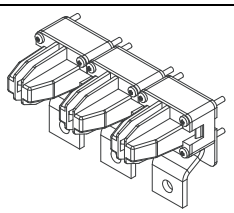
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
3×R8i	800 mm Generic	1	3AXD50000011160	A-8-8-327	 Instruction code: 3AXD50000013813
2×BLCL-2x-x	600 mm Generic	1	3AXD50000011159	A-6-8-326	 Instruction code: 3AXD50000013812

AC-side components (3×R8i supply, generic enclosure)

AC busbars and quick connectors

In BLCL-2x-x, AC busbars provide connection from the filter input to the common AC bus. The power connection of the module is done via a quick connector. Each module requires quick connectors.

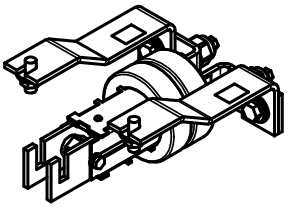
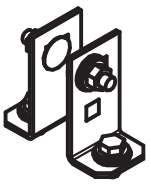
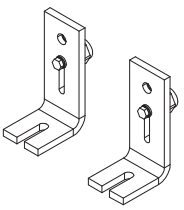
For the dimension drawing, see section *Quick connector* on page *345*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
BLCL-2x-x	Generic	2	3AXD50000011155	A-468-8-109	 Instruction code: 3AXD50000013246
3×R8i	1400 mm Generic	1	3AXD50000011157	A-X-8-145	 Instruction code: 3AXD50000013810
R8i	All	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

DC-side components (3×R8i supply, generic enclosure)

Common mode filter busbars and DC connection flanges

Each supply module requires DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AXD50000002492	A-468-8-231	 Instruction code: 3AXD50000002502
R8i	400 mm	1 per module	3AXD50000003411	A-468-8-232	 Instruction code: 3AXD50000003403
R8i	Generic	1 per module	3AXD50000025659	A-468-8-245	 Instruction code: 3AXD50000025693

Cabinet ventilation kits

See section *Cabinet ventilation kits (600 mm)* on page *186*, and *Cabinet ventilation kits (800 mm)* on page *222*.

Main switch-disconnectors

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 some of the IEC high power units, you can use withdrawable main circuit breaker instead of the main switch-disconnector. In the table below, these high power units are marked with *. See section *Main circuit breakers* on page *259*.

ACS880-14/34-…	Main switch-disconnector (IEC)		Qty	Ordering code
	Type	Data		
U_N = 690 V (Range 525 … 690 V)				
1450A-7*	Switch kit OT-type IEC 2000 E12	2000 A, 1000 V, 55 kA	1	3AXD50000006186**
1680A-7*	Switch kit OT-type IEC 2000 E12	2000 A, 1000 V, 55 kA	1	3AXD50000006186**

The main switch-disconnector kit contains:

- main switch-disconnector unit
- shaft OXP12X465
- handle OHB150J12P** with on/off indication
- normally-open auxiliary contact OA1G10
- terminal bolts M8X25 (IEC only).

For the dimension drawings, see section *Main switch-disconnector* on page *348*.

Main circuit breakers

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 *.

ACS880-14/34-…	Main circuit breaker (230 V, IEC)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
2060A-3	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2530A-3	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 500 V (Range 380 … 500 V)						
1980A-5	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2270A-5	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 690 V (Range 525 … 690 V)						
1450A-7*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1680A-7*	E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048330	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

ACS880-14/34-…	Main circuit breaker (230 V, UL and CSA)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
2060A-3	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2530A-3	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 500 V (Range 380 … 500 V)						
1980A-5	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2270A-5	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 690 V (Range 525 … 690 V)						
1450A-7	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048327	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1680A-7	E2.2S-A 2000	2000 A, 600 V, 65 kA, UL	1	3AXD50000048330	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

ACS880-14/34-…	Main circuit breaker (115 V, IEC)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
2060A-3	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2530A-3	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 500 V (Range 380 … 500 V)						
1980A-5	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2270A-5	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 690 V (Range 525 … 690 V)						
1450A-7*	E2.2S-A 1600	1600 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1680A-7*	E2.2S-A 2000	2000 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048342	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

ACS880-14/34-…	Main circuit breaker (115 V, UL and CSA)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 400 V (Range 380 … 415 V)						
2060A-3	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2530A-3	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 500 V (Range 380 … 500 V)						
1980A-5	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
2270A-5	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355
U_N = 690 V (Range 525 … 690 V)						
1450A-7	E2.2S-A 1600	1600 A, 600 V, 65 kA, UL	1	3AXD50000048329	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354
1680A-7	E2.2S-A 2000	2000 A, 600 V, 65 kA, UL	1	3AXD50000048342	E2.2-A_W_FP_2000HR-HR_UL	3AXD50000048354

For the contents of the main circuit breakers, see section *Contents of the main circuit breakers* on page *292*. For the dimension drawing of the main circuit breaker, see section *Main circuit breaker* on page *358*.

Main circuit breaker and wagon cover

See page *228*.

IEC busbar shim kits

See page *229*.

Main AC fuses

The main AC fuses protect the input cables, main contactor and the supply module against short circuits. For the dimension drawings, see section *AC fuses* on page *360*.

ACS880-14/34-…	Fuse (IEC)		Qty	Ordering code
	Type	Data		
U_N = 690 V (Range 525 … 690 V)				
1450A-7	170M7063	2500 A, 690 V	3	68752591
1680A-7	170M7063	2500 A, 690 V	3	68752591

Supply unit AC fuses

These fuses protect the LCL filter and the IGBT supply modules for short circuits. Supply unit AC fuses are needed when 1) main circuit breaker is used 2) always when there are more than one LCL filter in use.

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
2060A-3	170M7062	2000 A, 690 V	6	68689589
2530A-3	170M7062	2000 A, 690 V	6	68689589
U_N = 500 V (Range 380 … 500 V)				
1980A-5	170M7062	2000 A, 690 V	6	68689589
2270A-5	170M7062	2000 A, 690 V	6	68689589
U_N = 690 V (Range 525 … 690 V)				
1450A-7	170M7059	1250 A, 690 V	6	68704227
1680A-7	170M7059	1250 A, 690 V	6	68704227

For the dimension drawings, see section *AC fuses* on page *360*.

Main contactors

You can use the main contactors for the on-off control of the AC input power. The contactors can make and break the full load current.

ACS880-14/34-…	Main contactor (IEC)		Qty	Ordering code
	Type	Data		
U_N = 690 V (Range 525 … 690 V)				
1450A-7	AF1650-30-22-70	1650 A (I_{Th}), 1000 V (U_e)	1	64731378
1680A-7	AF2050-30-22-70	2050 A (I_{Th}), 1000 V (U_e)	1	3AUA0000051805

The contactor package includes:

- contactor unit
- fixing screws
- 2 × normally-open + 2 × normally-closed auxiliary contacts.

For the dimension drawings, see section *Main contactor* on page *354*.

Charging kits

The capacitor bank of the IGBT supply module needs to be charged during the start-up before connecting the module to a three-phase power line. 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. The following table shows the charging kits available for each ACS880-14/34 type.

ACS880-14/34-…	Ordering code (IEC)*	Ordering code (UL and CSA)**
U_N = 400 V (Range 380 … 415 V)		
2060A-3	3AXD50000016058	3AXD50000017058
2530A-3	3AXD50000016058	3AXD50000017058
U_N = 500 V (Range 380 … 500 V)		
1980A-5	3AXD50000021094	3AXD50000022220
2270A-5	3AXD50000021094	3AXD50000022220
U_N = 690 V (Range 525 … 690 V)		
1450A-7	3AXD50000021093	3AXD50000022263
1680A-7	3AXD50000021093	3AXD50000022263

*IEC kits also include:

- OSS160GT1S/4 terminal shrouds (2 pcs)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- handle and shaft with P-type fuse switch

**UL/CSA kits also include:

- handle OHB65J6 (1 pc)
- shaft OXP6X161 (1 pc)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- auxiliary contact mounting frame OSZ4

For the charging kit contents, see page *290*.

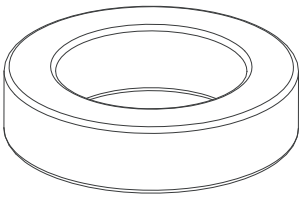
Varistor kit (UL/CSA)

See page *195*.

Common mode filters

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 input busbars.

DC busbar kit contains a holder for the filters.

Frame size	Common mode filter (IEC, UL and CSA)		Qty	Ordering code	Illustration
	Type	Data			
3×R8i + 3×R8i	VITROPERM 250F	250 F / 4.2 µH	6+6	3AUA0000032859	 Instruction code: 3AUA0000123359

For the dimension drawing, see section *Common mode filter* on page *368*.

Supply DC fuses

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
2060A-3	170M6417	1400 A, 690 V, size 3	6	3AXD50000000150
2530A-3	170M6419	1600 A, 690 V	6	68393108
U_N = 500 V (Range 380 … 500 V)				
1980A-5	170M6417	1400 A, 690 V, size 3	6	3AXD50000000150
2270A-5	170M6417	1400 A, 690 V, size 3	6	3AXD50000000150
U_N = 690 V (Range 525 … 690 V)				
1450A-7	170M6548	1000 A, 1100 V	6	63916749
1680A-7	170M6549	1100 A, 1000 V	6	68736021

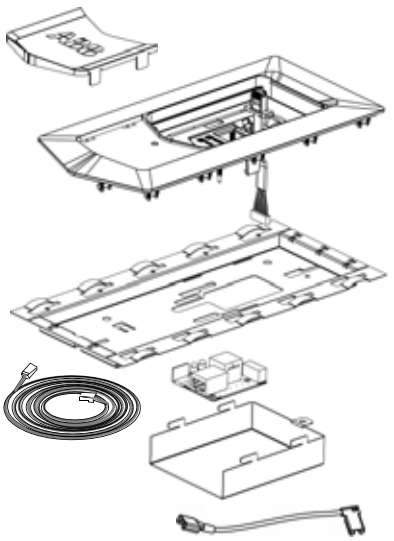
For the dimension drawings, see section *DC fuses* on page *362*.

Control panel (3×R8i inverter)

The control panel is not included with the inverter modules 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 for 3×R8i inverter

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

Supply modules and inverter modules require their own control units. The delivery includes the control units.

Frame size	Control unit kit for inverter		
	Type	Qty	Ordering code
3×R8i inverter	BCU-12 KIT	1	3AXD50000006340

Frame size	Application programming kit for inverter		
	Type	Qty	Ordering code
3×R8i inverter	BCU-12 N8010 KIT	1	3AXD50000011541

The BCU control unit kit contains:
- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:
- RDCO-04C DDCS communication option module (ordering code: 68882915).

Fiber optic cables

See page *180*.

Control circuit plug connectors

See page *199*.

Kits for 2×R8i inverter modules (Rittal VX25 enclosure)

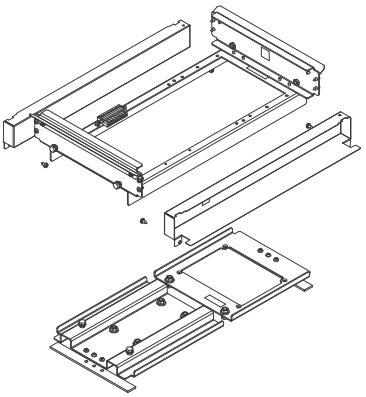
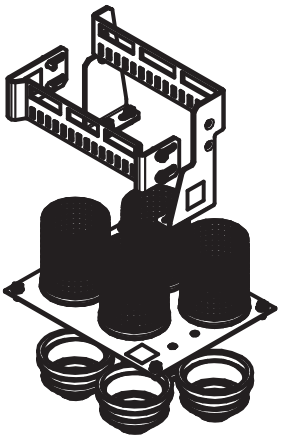
In Rittal installations, 3×R8i inverter consists of one 1×R8i inverter module cubicle and one 2×R8i inverter module cubicle.

Kits for 2×R8i inverter modules: see pages *236*…*241*.

Mechanical installation accessories and tools (1×R8i inverter, Rittal VX25 enclosure)

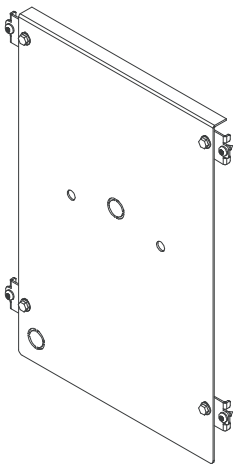
Module installation parts and lead-through for bottom plate

Module installation parts include, for example, top and bottom supports for the module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm	1	3AXD50000337071	A-4-8-310-VX	 Instruction code: 3AXD50000335152
1×R8i	400 mm	1	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

Shrouds

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

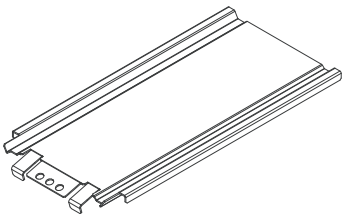
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm	1	3AXD50000337484	A-4-8-359-VX	 Instruction code: 3AXD50000335169

Ramp

The ramp is used for installing and replacing the modules in the Rittal VX25 enclosure.

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 cabinets).

See the dimension drawing, see section *Ramp* on page *367*.

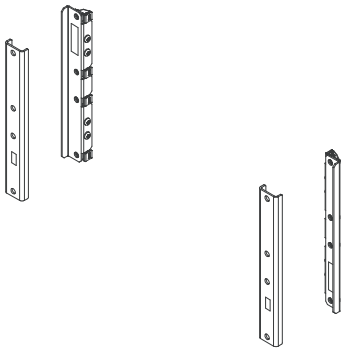
Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i, BLCL-xx-x	All	1	3AXD50000438037	A-468-8-304-VX	

DC-side components (1×R8i inverter, Rittal VX25 enclosure)

Common DC Flat-PLS assembly

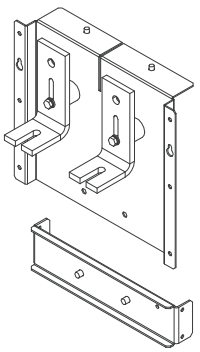
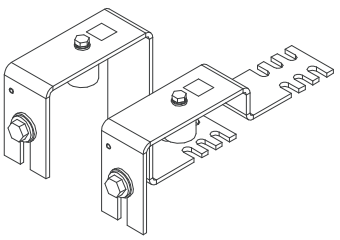
When using the Rittal Flat-PLS system, this kit is used for correct positioning of the common DC bus in the Rittal VX25 enclosure.

Note: The designs presented in this manual for Rittal 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
All	400 mm	1	3AXD50000333387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

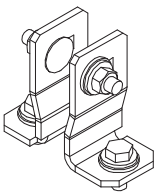
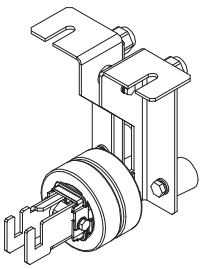
DC busbars

DC busbars provide connection from DC fuses to common DC bus.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i (fuses in use)	400 mm	1 per module	3AXD50000337415	A-4-8-252-VX	 Instruction code: 3AXD50000345151
R8i (fuses in use)	400 mm	1 per module	3AXD50000337446	A-46-8-206-VX	 Instruction code: 3AXD50000345915

Common mode busbars and DC connection flanges

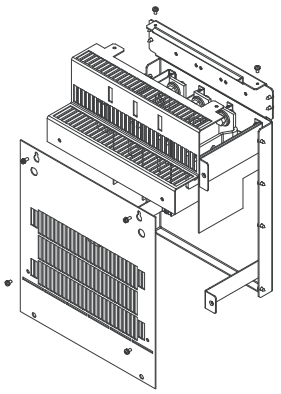
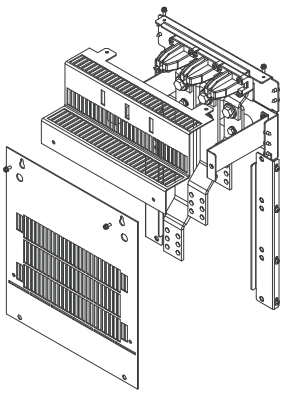
Each inverter module requires common mode busbars and DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i (fuses in use)	400 mm	1	3AXD50000028403	A-468-8-246	 Instruction code: 3AXD50000028384
R8i (fuses in use)	600 mm	1	3AXD50000028401	A-468-8-235	 Instruction code: 3AXD50000028418

AC-side components (1×R8i inverter, Rittal VX25 enclosure)

AC output busbars

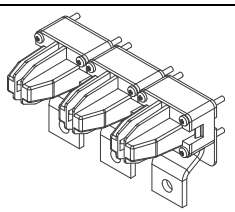
This kit includes mounting parts for quick connectors and output busbars. Motor cables are connected to output busbars.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
1×R8i	400 mm	1	3AXD50000337477	A-4-8-132-VX	 Instruction code: 3AXD50000343492
1×R8i	400 mm	1	3AXD50000337088	A-4-8-140-VX	 Instruction code: 3AXD50000343928

Quick connector

The power input of the inverter module is connected to the module through a quick connector. Each module requires quick connectors.

For the dimension drawing, see section *Quick connector* on page *345*.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	All	1 per module	3AUA0000119227	A-468-8-100	 Instruction code: 3AUA0000118667

Cabinet ventilation kits

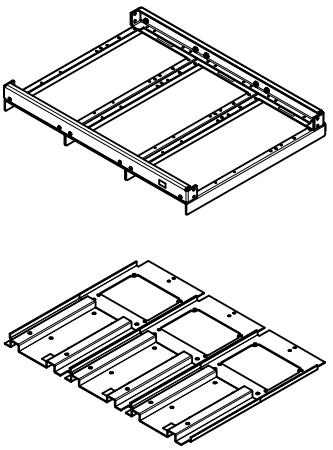
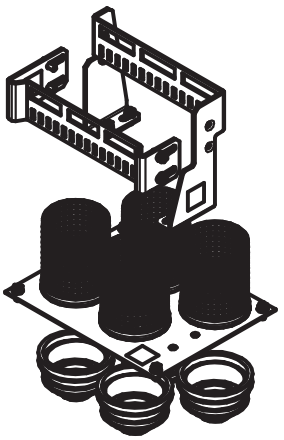
See section *Cabinet ventilation kits (400 mm)* on page *203*.

Mechanical installation accessories and tools (3×R8i inverter, generic enclosure)

In generic installations, 3×R8i inverter consists of one 3×R8i inverter module cubicle.

Module installation parts and lead-through for bottom plate

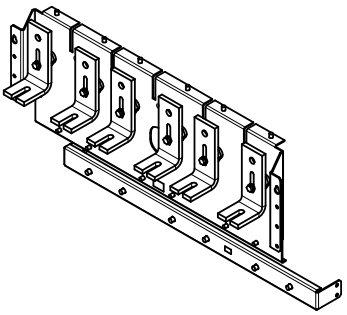
Module installation parts include, for example, top and bottom supports for the module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
3×R8i	800 mm	1	3AXD50000005877	A-8-8-312	 Instruction code: 3AXD50000005848
3×R8i	800 mm	3	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

DC-side components (3×R8i inverter, generic enclosure)

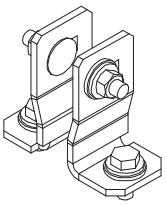
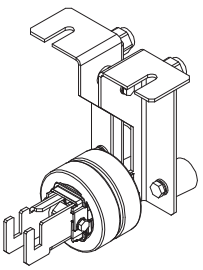
DC busbars

DC busbars provide connection from the DC fuses to common DC bus.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
3×R8i	800 mm	1	3AXD50000006450	A-8-8-258	 Instruction code: 3AXD50000006455

Common mode busbars and DC connection flanges

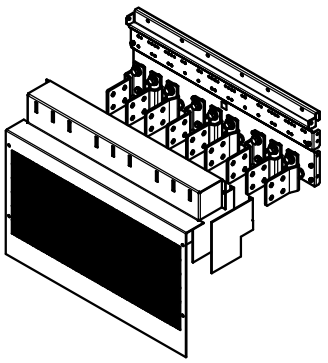
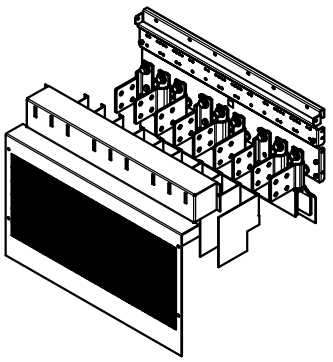
Each inverter module requires common mode busbars and DC connection flanges.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
R8i	800 mm	3	3AXD50000028403	A-468-8-246	 Instruction code: 3AXD50000028384
R8i	800 mm	3	3AXD50000028401	A-468-8-235	 Instruction code: 3AXD50000028418

AC-side components (3×R8i inverter, generic enclosure)

AC output busbars

These kits include mounting parts for quick connectors and output busbars. Motor cables are connected to output busbars. Kit A-8-8-139 contains busbars for connecting the inverter modules together, so that no identical motor cable is needed for every module.

Frame size	Enclosure	Qty	Ordering code	Kit code	Illustration
3×R8i	800 mm	1	3AXD50000006492	A-8-8-137	 Instruction code: 3AXD50000006503
3×R8i	800 mm	1	3AXD50000006494	A-8-8-139	 Instruction code: 3AXD50000006498

Cabinet ventilation kits

See page 222.

Inverter DC fuses

DC fuses protect the modules and drive DC bus against short circuits. For dimension drawings, see section *DC fuses* on page *362*.

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 400 V (Range 380 … 415 V)				
2060A-3	170M6417	1400 A, 690 V, size 3	6	3AXD50000000150
2530A-3	170M6419	1600 A, 690 V	6	68393108
U_N = 500 V (Range 380 … 500 V)				
1980A-5	170M6417	1400 A, 690 V, size 3	6	3AXD50000000150
2270A-5	170M6417	1400 A, 690 V, size 3	6	3AXD50000000150
U_N = 690 V (Range 525 … 690 V)				
1450A-7	170M6548	1000 A, 1100 V	6	63916749
1680A-7	170M6549	1100 A, 1000 V	6	68736021

4×R8i + 4×R8i

ACS880-14 and -34 single drive module packages

Delivery of the ACS880-14/34 single drive module package includes the following items:

Ordering code	Contents and option codes
U_N = 690 V (Range 525 … 690 V): ACS880-14/34-2230A-7	• Supply and inverter modules with speed-controlled cooling fans • LCL filter module(s) with on/off controlled cooling fan • **+C132**: Marine type approval. For more information, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]). • **+C183**: Heating element mounted to module base • **+C188**: Direct-on-line cooling fan • **+E205**: Internal du/dt filters (included as standard in all supply and inverter modules in the ACS880-14 and -34 module packages) • **+G304:** 115 V auxiliary voltage supply

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

- BCU control unit kits (one for supply, one for inverter),
- fiber optic cables,
- RDCO-04C DDCS communication option modules (68882915, own for supply and inverter),
- common mode filters for each supply / inverter module (consists of two toroidal cores, 2 × 3AUA0000032859),
- control circuit plug connectors (3AUA0000059813) for each module,
- control circuit plug connectors (3AXD50000003541) for each inverter module,
- quick connectors (3AUA0000119227) for each module.

Suitable kits and components for each ACS880-14/34 type are listed in this chapter.

The other parts listed in this chapter

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

Weak supply networks: In weaker supply networks with a short-circuit ratio less than 8, it is highly recommended to install a BAMU auxiliary measurement unit to the drive. In such networks, there is a risk of nuisance DC overvoltage tripping due to disturbances caused by probable high-voltage THD in the supply voltage. Short-circuit ratio is defined as the supply network's apparent short-circuit power $S_{k,net}$ divided by the drive's nominal apparent power S_n ($S_{k,net}$ / S_n < 8).

LCL filters (+C183+C188+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 690 V (Range 525 … 690 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan with 400 V AC supply for BLCL-2x-x • **+V991**: Hardware version
2230A-7	BLCL-25-7+C183+C188+V991	2	3AXD50000621217	

LCL filters (+C183+C188+G427+V991)

ACS880-14/34-…	LCL filter			
	Type ACS880-…	Qty	Ordering code	Contents
U_N = 690 V (Range 525 … 690 V)				• **+C183**: Internal heating element • **+C188**: Direct-on-line (DOL) cooling fan • **+G427**: 208 V AC 3-phase fan supply for BLCL-2x-x • **+V991**: Hardware version
2230A-7	BLCL-25-7+C183+C188+G427+V991	2	3AXD50000621323	

Control electronics for 4×R8i supply

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

Supply modules and inverter modules require their own control units. The delivery includes the control units.

ACS880-14:

Frame size	ACS880-14 control unit kit		
	Type	Qty	Ordering code
4×R8i supply	BCU-12 KIT	1	3AXD50000015806

Frame size	ACS880-14 application programming kit		
	Type	Qty	Ordering code
4×R8i supply	BCU-12 N8010 KIT	1	3AXD50000015807

ACS880-34:

Frame size	ACS880-34 control unit kit		
	Type	Qty	Ordering code
4×R8i supply	BCU-12 +N8012 KIT	1	3AXD50000020829

Frame size	ACS880-34 application programming kit		
	Type	Qty	Ordering code
4×R8i supply	BCU-12 N8012+N8010 LOW H	1	3AXD50000022038

The BCU control unit kit contains:
- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:
- RDCO-04C DDCS communication option module (ordering code: 68882915).

Fiber optic cables

See page *180*.

Control circuit plug connectors

See page *180*.

Kits for 4×R8i supply modules

The kits are the same with 2×R8i supply. See pages *212*…*222*.

Main circuit breakers

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 circuit breaker [Q1]. This section lists suitable main circuit breakers.

ACS880-14/34-…	Main circuit breaker (230 V, IEC)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 690 V (Range 525 … 690 V)						
2230A-7	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355

ACS880-14/34-…	Main circuit breaker (230 V, UL and CSA)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 690 V (Range 525 … 690 V)						
2230A-7	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048343	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355

ACS880-14/34-…	Main circuit breaker (115 V, IEC)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 690 V (Range 525 … 690 V)						
2230A-7	E4.2S-A 2500	2500 A, 690 V, 3P, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355

ACS880-14/34-…	Main circuit breaker (115 V, UL and CSA)		Qty	Ordering code	Wagon	Ordering code
	Type	Data				
U_N = 690 V (Range 525 … 690 V)						
2230A-7	E4.2S-A 2500	2500 A, 600 V, 65 kA, UL	1	3AXD50000048345	E4.2-A_W_FP_2500HR-HR_UL	3AXD50000048355

For the contents of the main circuit breakers, see section *Contents of the main circuit breakers* on page *292*. For the dimension drawing, see section *Main circuit breaker* on page *358*.

Main circuit breaker and wagon cover

See page *228*.

IEC busbar shim kits

See page *229*.

Supply unit AC fuses

These fuses protect the LCL filter and the IGBT supply modules for short circuits. Supply unit AC fuses are needed when 1) main circuit breaker is used 2) always when there are more than one LCL filter in use.

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 690 V (Range 525 … 690 V)				
2230A-7	170M7062	2000 A, 690 V	6	68689589

For the dimension drawings, see section *AC fuses* on page *360*.

Charging kits

The capacitor bank of the IGBT supply module needs to be charged during the start-up before connecting the module to a three-phase power line. 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. The following table shows the charging kits available for each ACS880-14/34 type.

ACS880-14/34-…	Ordering code (IEC)*	Ordering code (UL and CSA)**
U_N = 690 V (Range 525 … 690 V)		
2230A-7	3AXD50000021094	3AXD50000017058

*IEC kits also include:
- OSS160GT1S/4 terminal shrouds (2 pcs)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- handle and shaft with P-type fuse switch

**UL/CSA kits also include:
- handle OHB65J6 (1 pc)
- shaft OXP6X161 (1 pc)
- auxiliary contact (normally-open) OA1G10 (1 pc)
- auxiliary contact mounting frame OSZ4

For the charging kit contents, see page *290*.

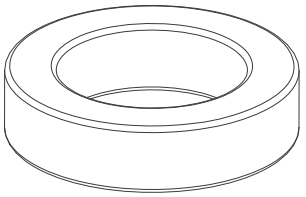
Varistor kit (UL/CSA)

See page *195*.

Common mode filters

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 input busbars.

DC busbar kit contains a holder for the filters.

Frame size	Common mode filter (IEC, UL and CSA)		Qty	Ordering code	Illustration
	Type	Data			
4×R8i + 4×R8i	VITROPERM 250F	250 F / 4.2 µH	8+8	3AUA0000032859	 Instruction code: 3AUA0000123359

For the dimension drawing, see section *Common mode filter* on page *368*.

Supply DC fuses

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 690 V (Range 525 … 690 V)				
2230A-7	170M6549	1100 A, 1000 V	8	68736021

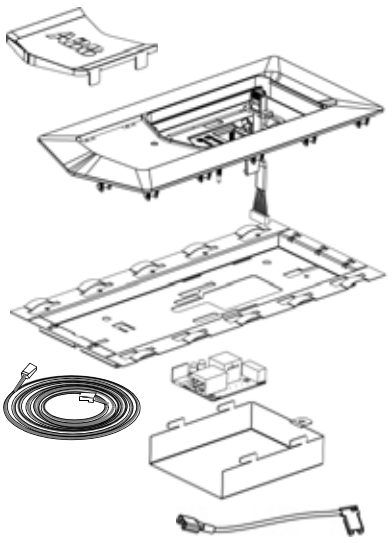
For the dimension drawings, see section *DC fuses* on page *362*.

Control panel (4×R8i inverter)

The control panel is not included with the inverter modules 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 for 4×R8i inverter

Cabling of the electronics outside the supply and inverter 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* on page *311*.

Control unit

Supply modules and inverter modules require their own control units. The delivery includes the control units.

Frame size	Control unit kit for inverter		
	Type	Qty	Ordering code
4×R8i inverter	BCU-12 KIT	1	3AXD50000006340

Frame size	Application programming kit for inverter		
	Type	Qty	Ordering code
4×R8i inverter	BCU-12 N8010 KIT	1	3AXD50000011541

The BCU control unit kit contains:
- BCU control unit
- ZMU memory unit with the control program.

For the dimension drawings, see section *BCU control unit* on page *365*.

The following option module is to be installed on the BCU control unit and must be ordered separately:
- RDCO-04C DDCS communication option module (ordering code: 68882915).

Fiber optic cables

See page *180*.

Control circuit plug connectors

See page *199*.

Kits for 4×R8i inverter modules

The kits are the same with 2×R8i inverter. See pages *236*…*244*.

Inverter DC fuses

DC fuses protect the modules and drive DC bus against short circuits. For dimension drawings, see section *DC fuses* on page *362*.

ACS880-14/34-…	Fuse (IEC, UL and CSA)		Qty	Ordering code
	Type	Data		
U_N = 690 V (Range 525 … 690 V)				
2230A-7	170M6549	1100 A, 1000 V	8	68736021

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Technical data

Contents of this chapter

This chapter contains the technical data for ACS880-14 and -34 single drive module packages.

Ratings

ACS880-14/34-…	Frame	I_1	No-overload use				Light-overload use		Heavy-duty use	
			I_N	I_{max}	P_N	S_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
		A	A	A	kW	kVA	A	kW	A	kW
U_N = 400 V (Range 380 … 415 V)										
0450A-3	1×R8i + 1×R8i	418	450	590	250	312	432	200	337	160
0620A-3	1×R8i + 1×R8i	575	620	810	355	430	595	315	464	250
0870A-3	1×R8i + 1×R8i	807	870	1050	500	603	835	450	651	355
1210A-3	2×R8i + 2×R8i	1123	1210	1580	710	838	1162	630	905	500
1430A-3	2×R8i + 2×R8i	1327	1430	1860	800	991	1373	710	1070	560
1700A-3	2×R8i + 2×R8i	1577	1700	2040	1000	1178	1632	900	1272	710
2060A-3	3×R8i + 3×R8i	1911	2060	2680	1200	1427	1978	1100	1541	800
2530A-3	3×R8i + 3×R8i	2347	2530	3040	1400	1753	2429	1200	1892	1000
U_N = 500 V (Range 380 … 500 V)										
0420A-5	1×R8i + 1×R8i	390	420	550	250	364	403	250	314	200
0570A-5	1×R8i + 1×R8i	529	570	750	400	494	547	355	426	250
0780A-5	1×R8i + 1×R8i	724	780	1020	560	675.5	749	500	583	400
1110A-5	2×R8i + 2×R8i	1030	1110	1450	800	961	1066	710	830	560
1530A-5	2×R8i + 2×R8i	1420	1530	1990	1100	1325	1469	1000	1144	800
1980A-5	3×R8i + 3×R8i	1837	1980	2580	1400	1715	1901	1300	1481	1000
2270A-5	3×R8i + 3×R8i	2106	2270	2960	1600	1966	2179	1500	1698	1200

ACS880-14/34-…	Frame	I_1	No-overload use				Light-overload use		Heavy-duty use	
			I_N	I_{max}	P_N	S_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
		A	A	A	kW	kVA	A	kW	A	kW
U_N = 690 V (Range 525…690 V)										
0320A-7	1×R8i + 1×R8i	297	320	480	315	382	307	250	239	200
0390A-7	1×R8i + 1×R8i	362	390	590	355	466	374	355	292	250
0580A-7	1×R8i + 1×R8i	538	580	870	560	693	557	500	434	400
0770A-7	2×R8i + 2×R8i	714	770	1160	710	920	739	710	576	560
0950A-7	2×R8i + 2×R8i	881	950	1430	900	1135	912	800	711	710
1130A-7	2×R8i + 2×R8i	1048	1130	1700	1100	1350	1085	1000	845	800
1450A-7	3×R8i + 3×R8i	1345	1450	2180	1400	1733	1392	1300	1085	1000
1680A-7	3×R8i + 3×R8i	1559	1680	2520	1600	2008	1613	1500	1257	1200
2230A-7	4×R8i + 4×R8i	2069	2230	3350	2200	2665	2141	2000	1668	1600

3AXD00000601909

Definitions

Nominal ratings

U_N supply voltage range (see also section *Electrical power network specification* on page *304*)

I_1 nominal rms input current

I_N nominal output current (available continuously with no over-loading)

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 apparent power in no-overload use

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.

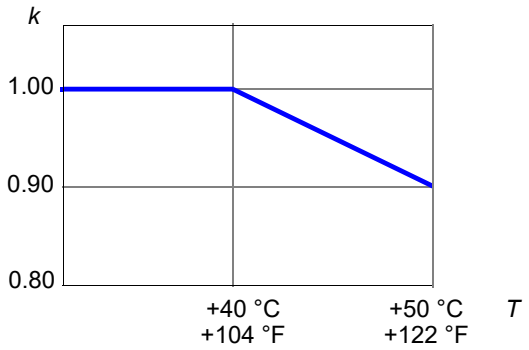
P_{Hd} output power in heavy-duty use

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

Derating

Ambient temperature derating

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



Altitude derating

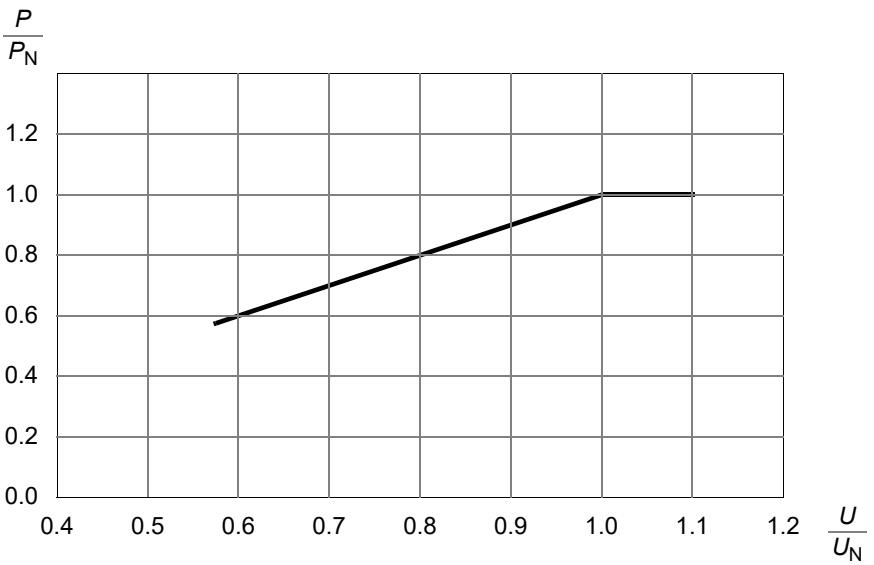
At altitudes from 1000 to 4000 m (3300 to 13123 ft) above sea level, the continuous output currents given above must be derated 1% for every 100 m (328 ft). For a more accurate derating, use the DriveSize PC tool.

Derating for output voltage boosting

Note: This information is only valid for drives whose BLCL filters have the type code marking +V991.

The drive can output a higher motor voltage than the supply voltage. This can require derating of the drive output power depending on the difference between the supply voltage and the output voltage to the motor for continuous operation.

This drawing shows the required derating. It is valid for all supply voltage ranges.



Note: The drive voltage rating must always be selected according to the boosted voltage value.

Note: Auxiliary voltage transformer must be set according to supply voltage levels. If drive selection based on boosted voltage level causes unsuitable tap setting to auxiliary voltage transformer, consult your local ABB representative.

Type equivalence table

ACS880-14/34-…	Supply module type ACS880-204-…	Basic module type ACS880-104-…	Number of supply modules	Inverter module type ACS880-104-…	Basic module type ACS880-104-…	Number of inverter modules
U_N = 400 V (Range 380 … 415 V)						
0450A-3	0420A-3	0470A-3	1	0470A-3	0470A-3	1
0620A-3	0580A-3	0640A-3	1	0640A-3	0640A-3	1
0870A-3	0810A-3	0900A-3	1	0900A-3	0900A-3	1
1210A-3	1130A-3	0640A-3	2	1250A-3	0640A-3	2
1430A-3	1330A-3	0760A-3	2	1480A-3	0760A-3	2
1700A-3	1580A-3	0900A-3	2	1760A-3	0900A-3	2
2060A-3	2350A-3	0900A-3	3	2210A-3	0760A-3	3
2530A-3	2350A-3	0900A-3	3	2610A-3	0900A-3	3
U_N = 500 V (Range 380 … 500 V)						
0420A-5	0400A-5	0440A-5	1	0440A-5	0440A-5	1
0570A-5	0530A-5	0590A-5	1	0590A-5	0590A-5	1
0780A-5	0730A-5	0810A-5	1	0810A-5	0810A-5	1
1110A-5	1040A-5	0590A-5	2	1150A-5	0590A-5	2
1530A-5	1420A-5	0810A-5	2	1580A-5	0810A-5	2
1980A-5	2120A-5	0810A-5	3	2150A-5	0740A-5	3
2270A-5	2120A-5	0810A-5	3	2350A-5	0810A-5	3
U_N = 690 V (Range 525 … 690 V)						
0320A-7	0310A-7	0340A-7	1	0340A-7	0340A-7	1
0390A-7	0370A-7	0410A-7	1	0410A-7	0410A-7	1
0580A-7	0540A-7	0600A-7	1	0600A-7	0600A-7	1
0770A-7	0720A-7	0410A-7	2	0800A-7	0410A-7	2
0950A-7	1050A-7	0600A-7	2	1030A-7	0530A-7	2
1130A-7	1050A-7	0600A-7	2	1170A-7	0600A-7	2
1450A-7	1570A-7	0600A-7	3	1540A-7	0530A-7	3
1680A-7	1570A-7	0600A-7	3	1740A-7	0600A-7	3
2230A-7	2070A-7	0600A-7	4	2300A-7	0600A-7	4

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Fuses

AC and DC fuses are given in chapter *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 to keep the fuse temperature under 100 °C (212 °F). 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.

See an example solution for fuse cooling and cooling fan status measurement on page *52*.

Fuses on BFPS board

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

Fuses on CVAR board

Note: The CVAR board is needed in the UL/CSA installations only.

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 kit contents

IEC

Kit code	Charging contactor		Charging resistors	
	Type	Qty	Rating	Qty
U_N = 400 V (Range 380 … 415 V)				
3AXD50000021092	AF96-30-22-13	1	5 ohm	2
3AXD50000022093	AF96-30-22-13	1	5 ohm	2
3AXD50000016056	AF116-30-22-13	1	5 ohm	3
3AXD50000016058	AF146-30-22B-13	1	5 ohm	5
U_N = 500 V (Range 380 … 500 V)				
3AXD50000021092	AF96-30-22-13	1	5 ohm	2
3AXD50000022094	AF96-30-22-13	1	5 ohm	3
3AXD50000016056	AF116-30-22-13	1	5 ohm	3
3AXD50000021093	AF146-30-22B-13	1	5 ohm	4
3AXD50000021094	AF190-30-22-13	1	5 ohm	6
U_N = 690 V (Range 525 … 690 V)				
3AXD50000015666	AF96-30-22-13	1	5 ohm	1
3AXD50000022093	AF96-30-22-13	1	5 ohm	2
3AXD50000016056	AF116-30-22-13	1	5 ohm	3
3AXD50000021093	AF146-30-22B-13	1	5 ohm	4
3AXD50000021094	AF190-30-22-13	1	5 ohm	6

Kit code	Charging fuses		Fuse switch	
	Type	Qty	Type	Qty
U_N = 400 V (Range 380 … 415 V)				
3AXD50000021092	OFAA000GG20	4	OS160GD04FP	1
3AXD50000022093	OFAA000GG25	4	OS160GD04FP	1
3AXD50000016056	OFAA000GG40	4	OS160GD04FP	1
3AXD50000016058	OFAA000GG63	4	OS160GD04FP	1
U_N = 500 V (Range 380 … 500 V)				
3AXD50000021092	OFAA000GG20	4	OS160GD04FP	1
3AXD50000022094	OFAA000GG35	4	OS160GD04FP	1
3AXD50000016056	OFAA000GG40	4	OS160GD04FP	1
3AXD50000021093	OFAA000GG50	4	OS160GD04FP	1
3AXD50000021094	OFAA00GG80	4	OS160GD04FP	1
U_N = 690 V (Range 525 … 690 V)				
3AXD50000015666	OFAA000GG16	4	OS160GD04FP	1
3AXD50000022093	OFAA000GG25	4	OS160GD04FP	1
3AXD50000016056	OFAA000GG40	4	OS160GD04FP	1
3AXD50000021093	OFAA000GG50	4	OS160GD04FP	1
3AXD50000021094	OFAA00GG80	4	OS160GD04FP	1

UL/CSA

Kit code	Charging contactor		Charging resistors	
	Type	**Qty**	**Rating**	**Qty**
U_N = 400 V (Range 380 … 415 V)				
3AXD50000021095	AF96-30-22-13	1	5 ohm	3
3AXD50000021096	AF96-30-22-13	1	5 ohm	3
3AXD50000022218	AF116-30-22-13	1	5 ohm	3
3AXD50000017058	AF190-30-22-13	1	5 ohm	6
U_N = 500 V (Range 380 … 500 V)				
3AXD50000003929	AF96-30-22-13	1	5 ohm	3
3AXD50000022218	AF116-30-22-13	1	5 ohm	3
3AXD50000022219	AF146-30-22B-13	1	5 ohm	6
3AXD50000022220	AF205-30-22-13	1	5 ohm	6
U_N = 690 V (Range 525 … 690 V)				
3AXD50000022261	AF96-30-22-13	1	5 ohm	1
3AXD50000003929	AF96-30-22-13	1	5 ohm	3
3AXD50000022218	AF116-30-22-13	1	5 ohm	3
3AXD50000022262	AF116-30-22-13	1	5 ohm	4
3AXD50000022263	AF146-30-22B-13	1	5 ohm	5
3AXD50000017058	AF190-30-22-13	1	5 ohm	6

Kit code	Charging fuses		Fuse switch	
	Type	**Qty**	**Type**	**Qty**
U_N = 400 V (Range 380 … 415 V)				
3AXD50000021095	LPJ-20SP	4	OS30FAJ22F	1
3AXD50000021096	LPJ-25SP	4	OS30FAJ22F	1
3AXD50000022218	LPJ-30SP	4	OS30FAJ22F	1
3AXD50000017058	LPJ-60SP	4	OS60GJ22F	1
U_N = 500 V (Range 380 … 500 V)				
3AXD50000003929	LPJ-30SP	4	OS30FAJ22F	1
3AXD50000022218	LPJ-30SP	4	OS30FAJ22F	1
3AXD50000022219	LPJ-60SP	4	OS60GJ22F	1
3AXD50000022220	LPJ-60SP	4	OS60GJ22F	1
U_N = 690 V (Range 525 … 690 V)				
3AXD50000022261	LPJ-10SP	4	OS30FAJ22F	1
3AXD50000003929	LPJ-30SP	4	OS30FAJ22F	1
3AXD50000022218	LPJ-30SP	4	OS30FAJ22F	1
3AXD50000022262	LPJ-50SP	4	OS60GJ22F	1
3AXD50000022263	LPJ-60SP	4	OS60GJ22F	1
3AXD50000017058	LPJ-60SP	4	OS60GJ22F	1

Contents of the main circuit breakers

IEC

Main circuit breakers (230 V)

• 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)

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

Main circuit breakers (115 V)

• 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)

Wagons (115 V)

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

UL/CSA

Main circuit breakers (230 V)

• 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)

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

Main circuit breakers (115 V)

• 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)

Wagons (115 V)

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

Dimensions and weights

Supply module

ACS880-14/34-…	Supply module type ACS880-204-…	Number of supply modules	Height		Width		Depth		Weight	
			mm	in	mm	in	mm	in	kg	lb
U_N = 400 V (Range 380 … 415 V)										
0450A-3	0420A-3	1	1397	55.0	240	9.5	583	23.0	125	276
0620A-3	0580A-3	1	1397	55.0	240	9.5	583	23.0	125	276
0870A-3	0810A-3	1	1397	55.0	240	9.5	583	23.0	125	276
1210A-3	1130A-3	2	1397	55.0	240	9.5	583	23.0	125	276
1430A-3	1330A-3	2	1397	55.0	240	9.5	583	23.0	125	276
1700A-3	1580A-3	2	1397	55.0	240	9.5	583	23.0	125	276
2060A-3	2350A-3	3	1397	55.0	240	9.5	583	23.0	125	276
2530A-3	2350A-3	3	1397	55.0	240	9.5	583	23.0	125	276
U_N = 500 V (Range 380 … 500 V)										
0420A-5	0400A-5	1	1397	55.0	240	9.5	583	23.0	125	276
0570A-5	0530A-5	1	1397	55.0	240	9.5	583	23.0	125	276
0780A-5	0730A-5	1	1397	55.0	240	9.5	583	23.0	125	276
1110A-5	1040A-5	2	1397	55.0	240	9.5	583	23.0	125	276
1530A-5	1420A-5	2	1397	55.0	240	9.5	583	23.0	125	276
1980A-5	2120A-5	3	1397	55.0	240	9.5	583	23.0	125	276
2270A-5	2120A-5	3	1397	55.0	240	9.5	583	23.0	125	276
U_N = 690 V (Range 525 … 690 V)										
0320A-7	0310A-7	1	1397	55.0	240	9.5	583	23.0	125	276
0390A-7	0370A-7	1	1397	55.0	240	9.5	583	23.0	125	276
0580A-7	0540A-7	1	1397	55.0	240	9.5	583	23.0	125	276
0770A-7	0720A-7	2	1397	55.0	240	9.5	583	23.0	125	276
0950A-7	1050A-7	2	1397	55.0	240	9.5	583	23.0	125	276
1130A-7	1050A-7	2	1397	55.0	240	9.5	583	23.0	125	276
1450A-7	1570A-7	3	1397	55.0	240	9.5	583	23.0	125	276
1680A-7	1570A-7	3	1397	55.0	240	9.5	583	23.0	125	276
2230A-7	2070A-7	4	1397	55.0	240	9.5	583	23.0	125	276

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LCL filter module

ACS880-14/34-…	LCL filter type	Number of LCL filter modules	Height		Width		Depth		Weight	
			mm	in	mm	in	mm	in	kg	lb
U_N = 400 V (Range 380 … 415 V)										
0450A-3	ACS880-BLCL-13-5+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	195	429.9
0620A-3	ACS880-BLCL-13-5+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	195	429.9
0870A-3	ACS880-BLCL-15-5+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	220	485.0
1210A-3	ACS880-BLCL-24-5+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	321	707.7
1430A-3	ACS880-BLCL-24-5+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	321	707.7
1700A-3	ACS880-BLCL-25-5+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	329	725.3
2060A-3	ACS880-BLCL-24-5+C183+C188+V991	2	1397	55.0	240	9.5	581	22.9	321	707.7
2530A-3	ACS880-BLCL-24-5+C183+C188+V991	2	1397	55.0	240	9.5	581	22.9	321	707.7
U_N = 500 V (Range 380 … 500 V)										
0420A-5	ACS880-BLCL-13-5+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	195	429.9
0570A-5	ACS880-BLCL-13-5+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	195	429.9
0780A-5	ACS880-BLCL-15-5+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	220	485.0
1110A-5	ACS880-BLCL-24-5+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	321	707.7
1530A-5	ACS880-BLCL-25-5+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	329	725.3
1980A-5	ACS880-BLCL-24-5+C183+C188+V991	2	1397	55.0	240	9.5	581	22.9	321	707.7
2270A-5	ACS880-BLCL-24-5+C183+C188+V991	2	1397	55.0	240	9.5	581	22.9	321	707.7
U_N = 690 V (Range 525 … 690 V)										
0320A-7	ACS880-BLCL-13-7+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	202	445.3
0390A-7	ACS880-BLCL-13-7+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	202	445.3
0580A-7	ACS880-BLCL-15-7+C183+C188+V991	1	1355	53.3	240	9.5	505	19.9	215	474.0
0770A-7	ACS880-BLCL-24-7+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	307	676.8
0950A-7	ACS880-BLCL-25-7+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	325	716.5
1130A-7	ACS880-BLCL-25-7+C183+C188+V991	1	1397	55.0	240	9.5	581	22.9	325	716.5
1450A-7	ACS880-BLCL-24-7+C183+C188+V991	2	1397	55.0	240	9.5	581	22.9	307	676.8
1680A-7	ACS880-BLCL-24-7+C183+C188+V991	2	1397	55.0	240	9.5	581	22.9	307	676.8
2230A-7	ACS880-BLCL-25-7+C183+C188+V991	2	1397	55.0	240	9.5	581	22.9	325	716.5

Inverter module

ACS880-14/34-…	Inverter module type ACS880-104-…	Number of inverter modules	Height		Width		Depth		Weight	
			mm	in	mm	in	mm	in	kg	lb
U_N = 400 V (Range 380 … 415 V)										
0450A-3	0470A-3	1	1397	55.0	240	9.5	583	23.0	125	276
0620A-3	0640A-3	1	1397	55.0	240	9.5	583	23.0	125	276
0870A-3	0900A-3	1	1397	55.0	240	9.5	583	23.0	125	276
1210A-3	1250A-3	2	1397	55.0	240	9.5	583	23.0	125	276
1430A-3	1480A-3	2	1397	55.0	240	9.5	583	23.0	125	276
1700A-3	1760A-3	2	1397	55.0	240	9.5	583	23.0	125	276
2060A-3	2210A-3	3	1397	55.0	240	9.5	583	23.0	125	276
2530A-3	2610A-3	3	1397	55.0	240	9.5	583	23.0	125	276
U_N = 500 V (Range 380 … 500 V)										
0420A-5	0440A-5	1	1397	55.0	240	9.5	583	23.0	125	276
0570A-5	0590A-5	1	1397	55.0	240	9.5	583	23.0	125	276
0780A-5	0810A-5	1	1397	55.0	240	9.5	583	23.0	125	276
1110A-5	1150A-5	2	1397	55.0	240	9.5	583	23.0	125	276
1530A-5	1580A-5	2	1397	55.0	240	9.5	583	23.0	125	276
1980A-5	2150A-5	3	1397	55.0	240	9.5	583	23.0	125	276
2270A-5	2350A-5	3	1397	55.0	240	9.5	583	23.0	125	276
U_N = 690 V (Range 525 … 690 V)										
0320A-7	0340A-7	1	1397	55.0	240	9.5	583	23.0	125	276
0390A-7	0410A-7	1	1397	55.0	240	9.5	583	23.0	125	276
0580A-7	0600A-7	1	1397	55.0	240	9.5	583	23.0	125	276
0770A-7	0800A-7	2	1397	55.0	240	9.5	583	23.0	125	276
0950A-7	1030A-7	2	1397	55.0	240	9.5	583	23.0	125	276
1130A-7	1170A-7	2	1397	55.0	240	9.5	583	23.0	125	276
1450A-7	1540A-7	3	1397	55.0	240	9.5	583	23.0	125	276
1680A-7	1740A-7	3	1397	55.0	240	9.5	583	23.0	125	276
2230A-7	2300A-7	4	1397	55.0	240	9.5	583	23.0	125	276

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Free space requirements

ACS880-14/34-…	Above		Front		Left		Right	
	mm	in	mm	in	mm	in	mm	in
U_N = 400 V (Range 380 … 415 V)								
0450A-3	200	7.9	10	0.4	10	0.4	10	0.4
0620A-3	200	7.9	10	0.4	10	0.4	10	0.4
0870A-3	200	7.9	10	0.4	10	0.4	10	0.4
1210A-3	200	7.9	10	0.4	10	0.4	10	0.4
1430A-3	200	7.9	10	0.4	10	0.4	10	0.4
1700A-3	200	7.9	10	0.4	10	0.4	10	0.4
2060A-3	200	7.9	10	0.4	10	0.4	10	0.4
2530A-3	200	7.9	10	0.4	10	0.4	10	0.4
U_N = 500 V (Range 380 … 500 V)								
0420A-5	200	7.9	10	0.4	10	0.4	10	0.4
0570A-5	200	7.9	10	0.4	10	0.4	10	0.4
0780A-5	200	7.9	10	0.4	10	0.4	10	0.4
1110A-5	200	7.9	10	0.4	10	0.4	10	0.4
1530A-5	200	7.9	10	0.4	10	0.4	10	0.4
1980A-5	200	7.9	10	0.4	10	0.4	10	0.4
2270A-5	200	7.9	10	0.4	10	0.4	10	0.4
U_N = 690 V (Range 525 … 690 V)								
0320A-7	200	7.9	10	0.4	10	0.4	10	0.4
0390A-7	200	7.9	10	0.4	10	0.4	10	0.4
0580A-7	200	7.9	10	0.4	10	0.4	10	0.4
0770A-7	200	7.9	10	0.4	10	0.4	10	0.4
0950A-7	200	7.9	10	0.4	10	0.4	10	0.4
1130A-7	200	7.9	10	0.4	10	0.4	10	0.4
1450A-7	200	7.9	10	0.4	10	0.4	10	0.4
1680A-7	200	7.9	10	0.4	10	0.4	10	0.4
2230A-7	200	7.9	10	0.4	10	0.4	10	0.4

Definitions

Above As required by cooling air flow

Front Additional free space may be required by options installed on control unit, and control wiring

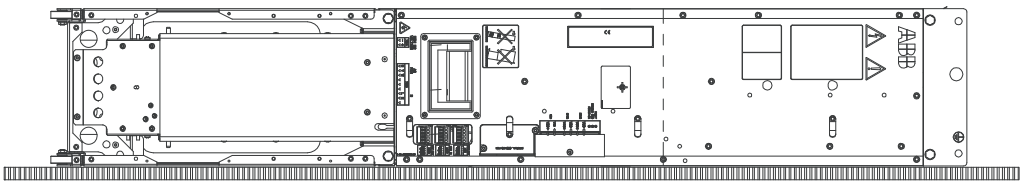
Left As required for smooth installation

Right As required for smooth installation

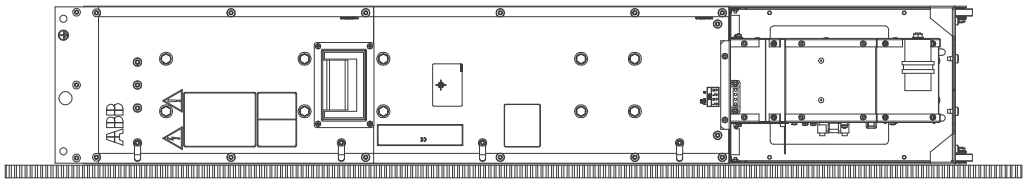
Allowable mounting orientations

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

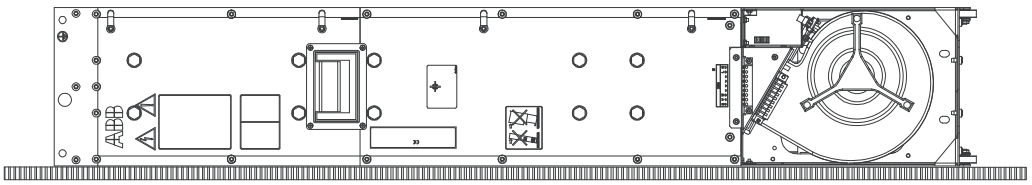
Frame R8i: Installation on right-hand side (viewed from the front) allowed.



BLCL-1x-x modules: Installation on left-hand side (viewed from the front) allowed.



BLCL-2x-x modules: Installation on left-hand side (viewed from the front) allowed.



Losses, cooling data and noise

ACS880-14/34-…	P_{loss}	Air flow		Noise
	kW	m^3/h	ft^3/min	dB
U_N = 400 V (Range 380 … 415 V)				
0450A-3	11	3760	2213	75
0620A-3	16	3760	2213	75
0870A-3	23	3760	2213	75
1210A-3	29	7220	4250	77
1430A-3	34	7220	4250	77
1700A-3	45	7220	4250	77
2060A-3	56	11580	6816	78
2530A-3	68	11580	6816	78
U_N = 500 V (Range 380 … 500 V)				
0420A-5	11	3760	2213	75
0570A-5	15	3760	2213	75
0780A-5	21	3760	2213	75
1110A-5	28	7220	4250	77
1530A-5	41	7220	4250	77
1980A-5	51	11580	6816	78
2270A-5	60	11580	6816	78
U_N = 690 V (Range 525 … 690 V)				
0320A-7	13	3760	2213	75
0390A-7	16	3760	2213	75
0580A-7	23	3760	2213	75
0770A-7	29	7220	4250	77
0950A-7	38	7220	4250	77
1130A-7	44	7220	4250	77
1450A-7	54	11580	6816	78
1680A-7	64	11580	6816	78
2230A-7	88	14440	8499	79

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Definitions

P_{loss} Heat dissipation. Total losses of the ACS880-14/-34 with nominal power

Noise Noise with fans running at nominal speed

Losses and cooling data for supply and inverter modules

ACS880-14/34-…	Supply modules					Inverter modules				
	Basic module type ACS880-104-…	Number of modules	$P_{lossISU}$	Air flow		Basic module type ACS880-104-…	Number of modules	$P_{lossINU}$	Air flow	
			kW	m^3/h	ft^3/min			kW	m^3/h	ft^3/min
U_N = 400 V (Range 380 … 415 V)										
0450A-3	0470A-3	1	4.4	1300	765	0470A-3	1	4.8	1300	765
0620A-3	0640A-3	1	6.1	1300	765	0640A-3	1	6.7	1300	765
0870A-3	0900A-3	1	9.4	1300	765	0900A-3	1	10.0	1300	765
1210A-3	0640A-3	2	6.1	1300	765	0640A-3	2	6.7	1300	765
1430A-3	0760A-3	2	8.0	1300	765	0760A-3	2	8.0	1300	765
1700A-3	0900A-3	2	9.4	1300	765	0900A-3	2	10.0	1300	765
2060A-3	0900A-3	3	9.4	1300	765	0760A-3	3	8.0	1300	765
2530A-3	0900A-3	3	9.4	1300	765	0900A-3	3	10.0	1300	765
U_N = 500 V (Range 380 … 500 V)										
0420A-5	0440A-5	1	4.5	1300	765	0440A-5	1	4.7	1300	765
0570A-5	0590A-5	1	6.0	1300	765	0590A-5	1	6.3	1300	765
0780A-5	0810A-5	1	8.6	1300	765	0810A-5	1	9.3	1300	765
1110A-5	0590A-5	2	6.0	1300	765	0590A-5	2	6.3	1300	765
1530A-5	0810A-5	2	8.6	1300	765	0810A-5	2	9.3	1300	765
1980A-5	0810A-5	3	8.6	1300	765	0740A-5	3	8.1	1300	765
2270A-5	0810A-5	3	8.6	1300	765	0810A-5	3	9.3	1300	765
U_N = 690 V (Range 525 … 690 V)										
0320A-7	0340A-7	1	6.1	1300	765	0340A-7	1	5.2	1300	765
0390A-7	0410A-7	1	7.1	1300	765	0410A-7	1	6.1	1300	765
0580A-7	0600A-7	1	10.2	1300	765	0600A-7	1	9.0	1300	765
0770A-7	0410A-7	2	7.1	1300	765	0410A-7	2	6.1	1300	765
0950A-7	0600A-7	2	10.2	1300	765	0530A-7	2	7.9	1300	765
1130A-7	0600A-7	2	10.2	1300	765	0600A-7	2	9.0	1300	765
1450A-7	0600A-7	3	10.2	1300	765	0530A-7	3	7.9	1300	765
1680A-7	0600A-7	3	10.2	1300	765	0600A-7	3	9.0	1300	765
2230A-7	0600A-7	4	10.2	1300	765	0600A-7	4	9.0	1300	765

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Definitions

$P_{lossISU}$ Heat dissipation. Losses of one IGBT supply module with nominal power.

$P_{lossINU}$ Heat dissipation. Losses of one inverter module with nominal power.

Losses and cooling data for LCL filter modules

ACS880-14/34-…	LCL filter modules				
	LCL filter type	Number of modules	$P_{lossLCL}$	Air flow	
			kW	m^3/h	ft^3/min
U_N = 400 V (Range 380 … 415 V)					
0450A-3	ACS880-BLCL-13-5+C183+C188+V991	1	2.2	900	530
0620A-3	ACS880-BLCL-13-5+C183+C188+V991	1	3.2	900	530
0870A-3	ACS880-BLCL-15-5+C183+C188+V991	1	3.9	900	530
1210A-3	ACS880-BLCL-24-5+C183+C188+V991	1	5.0	1500	883
1430A-3	ACS880-BLCL-24-5+C183+C188+V991	1	5.9	1500	883
1700A-3	ACS880-BLCL-25-5+C183+C188+V991	1	7.3	1500	883
2060A-3	ACS880-BLCL-24-5+C183+C188+V991	2	5.9	1500	883
2530A-3	ACS880-BLCL-24-5+C183+C188+V991	2	5.9	1500	883
U_N = 500 V (Range 380 … 500 V)					
0420A-5	ACS880-BLCL-13-5+C183+C188+V991	1	2.1	900	530
0570A-5	ACS880-BLCL-13-5+C183+C188+V991	1	2.9	900	530
0780A-5	ACS880-BLCL-15-5+C183+C188+V991	1	3.4	900	530
1110A-5	ACS880-BLCL-24-5+C183+C188+V991	1	4.5	1500	883
1530A-5	ACS880-BLCL-25-5+C183+C188+V991	1	6.6	1500	883
1980A-5	ACS880-BLCL-24-5+C183+C188+V991	2	9.1	1500	883
2270A-5	ACS880-BLCL-24-5+C183+C188+V991	2	9.1	1500	883
U_N = 690 V (Range 525 … 690 V)					
0320A-7	ACS880-BLCL-13-7+C183+C188+V991	1	2.5	900	530
0390A-7	ACS880-BLCL-13-7+C183+C188+V991	1	3.0	900	530
0580A-7	ACS880-BLCL-15-7+C183+C188+V991	1	4.5	900	530
0770A-7	ACS880-BLCL-24-7+C183+C188+V991	1	4.1	1500	883
0950A-7	ACS880-BLCL-25-7+C183+C188+V991	1	7.6	1500	883
1130A-7	ACS880-BLCL-25-7+C183+C188+V991	1	7.6	1500	883
1450A-7	ACS880-BLCL-24-7+C183+C188+V991	2	9.1	1500	883
1680A-7	ACS880-BLCL-24-7+C183+C188+V991	2	9.1	1500	883
2230A-7	ACS880-BLCL-25-7+C183+C188+V991	2	7.6	1500	883

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Definitions

$P_{lossLCL}$ Heat dissipation. Losses of one LCL filter module with nominal power.

Tightening torques

For the tightening torques, see *Cabinet design and construction instructions for ACS880 air-cooled and liquid-cooled multidrive modules* (3AUA0000107668 [English]).

Electrical power network specification

Supply voltage

400 V AC units; 380/400/415 V AC 3-phase ± 10%. This is indicated in type designation label as typical input voltage levels (3~ 400 V AC).

500 V AC units; 380/400/415/440/460/480/500 V AC 3-phase ± 10%. This is indicated in type designation label as typical input voltage levels (3~ 400/480/500 V AC).

690 V AC units; 525…690 V AC 3-phase ± 10%. This is indicated in type designation label as typical input voltage levels (3~ 525/600/690 V AC).

Network type

TN (grounded) and IT (ungrounded) systems. 525…600 V AC in corner-grounded TN systems

Frequency

50/60 Hz, Variation ± 5% of the nominal frequency

Imbalance

Maximum 3% of nominal phase-to-phase voltage

Short-circuit withstand strength

IEC/EN 61439-1:2009

Supply units with the ABB-defined main switch-disconnector and fuses:

- Rated peak withstand current I_{pk} = 105 kA
- Rated short-time withstand current I_{cw} = 50 kA/1 s

Supply units with the ABB-defined main breaker and fuses:

- 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)

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 T class fuses.

Short-circuit current protection (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 T class fuses.

Power factor

cosphi 1 = 1, cosphi (total) = 0.99

Overvoltage category

OVCIII (altitude 4000 m)

Harmonic distortion

Harmonics are below the limits defined in IEEE519. Measurements are done according to IEC 61000-4-7.

R_{sc}	THD Voltage [%]	THD Current [%]
20	3	2.5*
100	0.8	2.5*

$$THD = \sqrt{\sum_{2}^{50}\left(\frac{I_n}{I_N}\right)^2}$$

I_n nth harmonic component

I_N nominal current

THD = Total Harmonic Distortion (THD). The voltage THD depends on the short-circuit ratio (R_{sc}). The spectrum of the distortion also contains interharmonics.

$R_{sc} = I_{sc}/I_N$

I_{sc}= short-circuit current at point of common coupling (PCC)

I_N= IGBT supply unit nominal current

*Other loads may influence the THD value.

Motor connection data

Motor types	Asynchronous AC induction motors, permanent magnet synchronous motors and AC induction servomotors, ABB synchronous reluctance (SynRM) motors
Voltage (U_2)	0 to U_1, 3-phase symmetrical, U_{max} at the field weakening point
Frequency (f_2)	0…500 Hz • For higher operational output frequencies, contact your local ABB representative. • Operation above 150 Hz may require type-specific derating. For more information, contact your local ABB representative.
Current	See the rating tables.
Switching frequency	3 kHz (typical). The switching frequency can vary per frame and voltage. For exact values, contact your local ABB representative.
Maximum recommended motor cable length	500 m (1640 ft). **Note:** Tested with 100 m (328 ft) for EMC Category C3. See standards and markings information in *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]). **Note:** Longer cables cause a motor voltage decrease which limits the available motor power. The decrease depends on the motor cable length and characteristics. Contact ABB for more information. Note that a sine filter (optional) at the drive output also causes a voltage decrease. **Note:** With motor cables longer than 100 m (328 ft) the EMC Directive requirements may not be fulfilled.

Control unit connection data (BCU)

See chapter *Control units of the drive* on page *313*.

Optical components

The specifications of the optic cable are as follows:

- Storage temperature: -55 … +85 °C
- Installation temperature: -20 … +70 °C
- Maximum short-term tensile force: 50 N
- Minimum short-term bend radius: 25 mm
- Minimum long-term bend radius: 35 mm
- Maximum long-term tensile load: 1 N
- Flexing: Max. 1000 cycles

ABB drive products in general utilize 5 and 10 MBd (megabaud) optical components from Avago Technologies' Versatile Link range. Please 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 respectively.

HCS® is a trademark of SpecTran Corporation.

Efficiency

95.7 … 96.8% at nominal power level depending on drive type

Protection classes

Degrees of protection (IEC/EN 60529): Module IP00, UL open type

Ambient conditions

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

	Operation	Storage	Transportation
Altitude above sea level	0…4000 m (0…13123 ft). Corner-grounded TN, TT and IT network systems up to 600 V. Output derated above 1000 m (3281 ft). See section *Altitude derating* (page *287*).	-	-
Temperature	0…+40 °C (+32 …+104 °F), no condensation 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) above 40 °C (+104 °F). For more information, see *Ambient temperature derating* on page *287*.		
Relative humidity	Maximum 95%, no condensation allowed	Maximum 95%, no condensation allowed	Maximum 95%, no condensation allowed
Vibration IEC/EN 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	IEC/EN 60721-3-1:1997 10…57 Hz: max. 0.075 mm amplitude 57…150 Hz: 1 *g*	IEC/EN 60721-3-2:1997 2…9 Hz: max. 3.5 mm amplitude 9…200 Hz: 10 m/s^2 (32.8ft/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
Contamination	IEC/EN 60721-3-3:2002: Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities Stationary use of weather protected locations	IEC 60721-3-1	IEC 60721-3-2
	Chemical gases: Class 3C2	Chemical gases: Class 1C2	Chemical gases: Class 2C2
	Solid particles: Class 3S1 with IP20/21, 3S2 with higher IP class	Solid particles: Class 1S3 (packing must support this, otherwise 1S2)	Solid particles: Class 2S2
	No conductive dust allowed.		

Materials

Module enclosure	Hot-dip zinc coated steel sheet 1.5 … 3.0 mm (0.059 … 0.12 in), thickness of coating 20 micrometers
Module paint coating	PMS 1C Cool Gray / RAL 9002
Fire safety of materials (IEC 60332-1)	Insulating materials & non-metallic items: Mostly self-extinctive
Package	Plywood base, boxed in corrugated cardboard, PET straps. A heavy-duty cardboard package consists of a two-piece cardboard hood and a plywood pallet. The product is either screwed onto the pallet or wedged with plywood supports to keep it in position inside the package. Protection against conditions causing corrosion is achieved by wrapping the product in polyethylene sheet. Alternatively VCI protection is used. Packaging is secured with plastic straps.
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. Please 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.

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).

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

Auxiliary circuit current consumption

Type	U_n V	f Hz	I_{cont} A	I_{start} A	P_{cont} W
BCU control unit	24±10%	-	2.00	-	48
R8i module: internal electronics	230 +15%/-20%	50/60	0.45	-	105
• Option +G304	115 +15%/-20%	50/60	0.90	-	105
R8i module: direct-on-line fan (option +C188)	400	50	1.50	3.00	-
	400	60	1.90	3.80	-
	320	60	-	4.40	-
LCL filter module (BLCL-1x-x) fan (+C188)	230	50	1.4	-	-
	230	60	1.4	-	-
• Options +C188+G304	115	60	2.4	-	-
LCL filter module (BLCL-2x-x) fan (+C188)	400	50	1.50	3.00	-
	400	60	1.90	3.80	-
	320	60	-	4.40	-
• Options +C188+G427	208	60	2.88	-	-
R8i module: heating element (option +C183)	115	60	-	-	40
	230	50/60	-	-	40
LCL filter module: heating element (option +C183)	115	60	-	-	13
	230	50/60	-	-	13

Cooling fans

Cabinet fans	U_N V AC	f Hz	I_{cont} A
R8i IP54 roof fan	230	50	1.10
		60	1.45
	230	50	2.30
		60	3.00
	115	50	3.1
		60	3.9
	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 *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).

Markings

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

Disclaimers

Generic disclaimer

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

Cybersecurity disclaimer

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

11

Control units of the drive

Contents of this chapter

This chapter

- describes the connections of the control units used in the drive
- contains the specifications of the inputs and outputs of the control units.

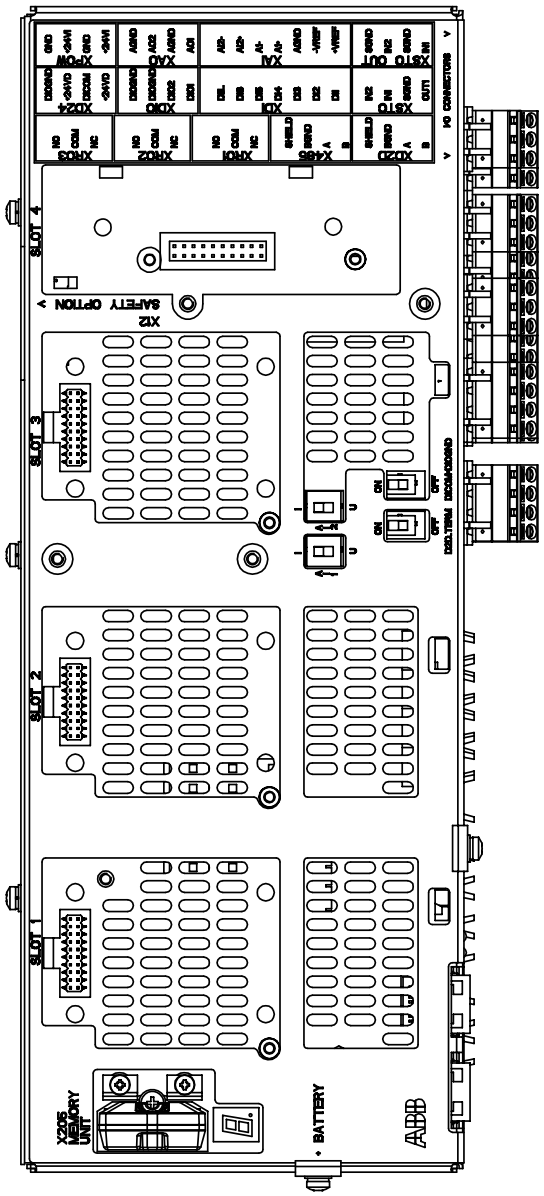
General

BCU control unit types

The BCU control unit is used with frame size R8i and multiples. The BCU consists of a BCON control board (and a BIOC I/O and power supply board) built in a metal housing. The BCU is mounted separately from the supply / inverter module(s), and connected to the module(s) by fiber optic cables.

In this manual, the name “BCU” represents the control unit types BCU-02, BCU-12 and BCU-22. These have a different number of supply / inverter module connections (2, 7 and 12 respectively) but are otherwise similar.

Layout and connections



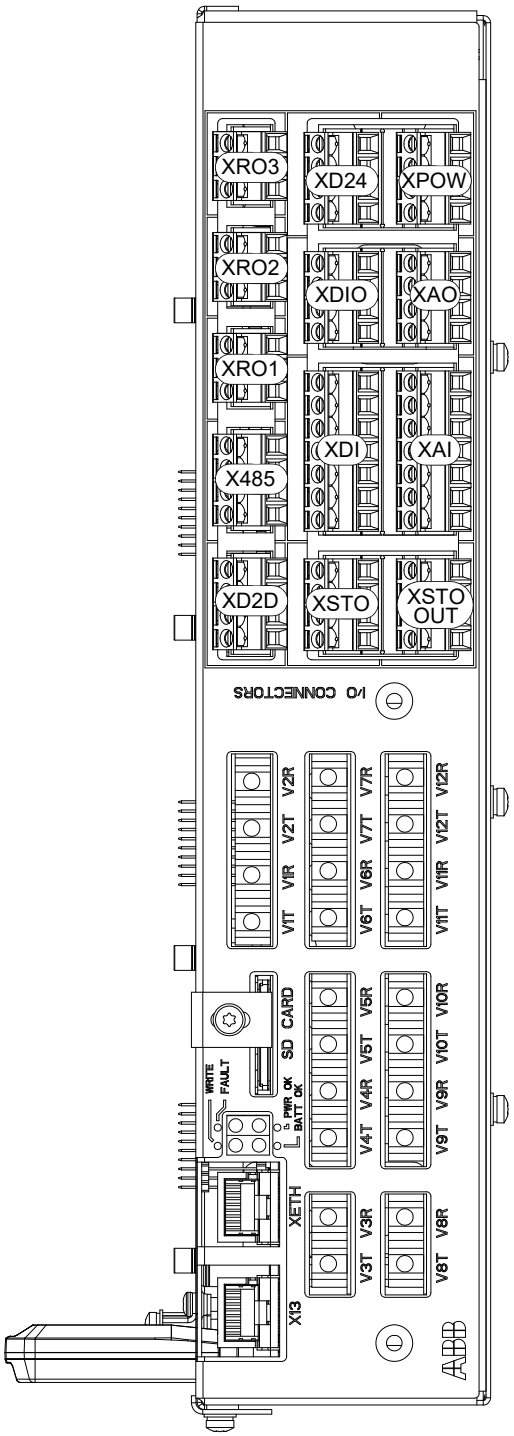
	Description
I/O	I/O terminals (see following diagrams)

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 in inverter modules
SLOT 4	RDCO-0x DDCS communication option module connection

X205	Memory unit connection
BATTERY	Holder for real-time clock battery (CR 2032)

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 (BCU)* (page *325*).

7-segment display Multicharacter indications are displayed as repeated sequences of characters	
o	(“U” is indicated briefly before “o”.) Control program starting up or running
U	(Flashing) Firmware cannot be started. Memory unit missing or corrupted
L	Firmware download from PC to control unit in progress
1	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.
2	



	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 in inverter modules. Not in use in supply modules.
X13	Control panel 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 supply / 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 appropriate firmware manual.
PWR OK	Internal voltage supply is OK
WRITE	Writing to memory card in progress. Do not remove the memory card.

Default I/O connection diagram of the supply unit

XD2D		**Drive-to-drive link**
1	B	Drive-to-drive link (not in use by default)
2	A	
3	BGND	
4	Shield	
D2D.TERM		**Drive-to-drive link termination** [1]
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** [2] (Energized = Closes charging contactor.) 250 V AC / 30 V DC / 2 A
12	COM	
13	NO	
21	NC	XRO2: **Fault(-1)** [3] (Energized = Indicates no fault.) 250 V AC / 30 V DC / 2 A
22	COM	
23	NO	
31	NC	XRO3: **MCB ctrl** [2] (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 supply unit to start. (IN1 and IN2 must be connected to OUT.) [4]
2	SGND	
3	IN1	
4	IN2	
5	IN1	Not in use
6	SGND	
7	IN2	
8	SGND	
XDI		**Digital inputs**
1	DI1	Temp fault [3] (0 = overtemperature)
2	DI2	Run / enable [3] (1 = run / enable)
3	DI3	MCB fb [2] (0 = main contactor/breaker open)
4	DI4	Not in use by default. Can be used for eg, auxiliary circuit breaker fault
5	DI5	Not in use by default. Can be used for eg, earth fault monitoring.
6	DI6	Reset [3] (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 [7]
6	AI2+	Not in use by default.
7	AI2-	0(4)…20 mA, R_{in} = 100 ohm [8]
XAO		**Analog outputs**
1	AO1	**Zero** [3] 0…20 mA, R_L < 500 ohm
2	AGND	
3	AO2	**Zero** [3] 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		**Safety functions module connection** (not in use in supply units)
X13		**Control panel connection**
X205		**Memory unit connection**

The table above shows the control connections of the IGBT supply unit, and the default meaning or use of the signals in the control program. Most I/O connections are reserved and wired for the internal use at the factory. Do not change the connections.

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

Notes:

[1)] Switch D2D.TERM. Must be set to ON when the supply unit is the first or last unit on the drive-to-drive (D2D) link. On intermediate supply units, set termination to OFF. See section *Drive-to-drive link (XD2D)* (page *321*).

[2)] Use of the signal in the control program. When parameter *120.30 External charge enable* has value *Yes* (default setting), the control program reserves this I/O terminal for external charging circuit control and monitoring, and parameters *110.24 RO1 source* and *110.30 RO3 source* are write-protected. If the value is *No*, you can use the I/O terminal for other purposes.

[3)] Default use of the signal in the control program. The use can be changed by a parameter. For the delivery-specific use, see the delivery-specific circuit diagrams.

[4)] The Safe torque off (STO) function is only implemented in the inverter units. When the control board is used in the supply or brake unit, de-energizing IN1 or IN2 of XSTO connector only stops the operation of the supply or brake unit. This stopping is not safety related and can not be used in safety purposes.

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

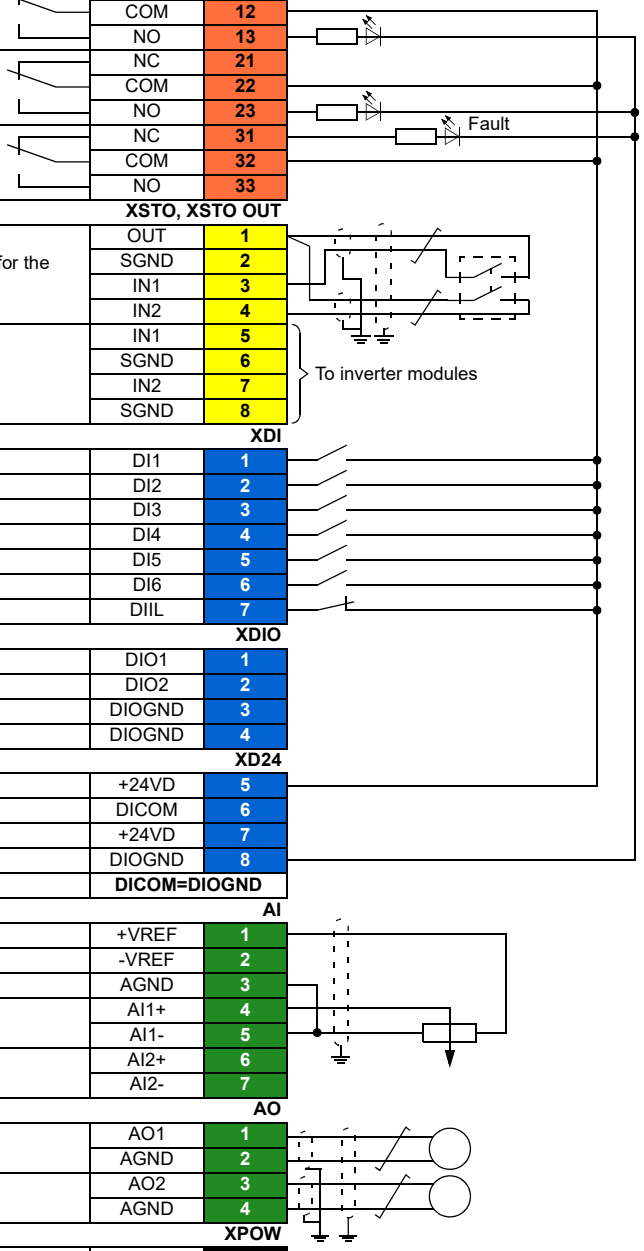
[6)] Determines whether DICOM is separated from DIOGND (ie, common reference for digital inputs floats). **DICOM=DIOGND** ON: DICOM connected to DIOGND. OFF: DICOM and DIOGND separate.

[7)] Current [0(4)…20 mA, R_{in} = 100 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch AI1. Change of setting requires reboot of control unit.

[8)] Current [0(4)…20 mA, R_{in} = 100 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch AI2. Change of setting requires reboot of control unit.

Default I/O connection diagram of the inverter unit

Drive-to-drive link		**XD2D**
Drive-to-drive link [1]	B	1
	A	2
	BGND	3
	Shield	4
RS485 connection		**X485**
Not in use	B	5
	A	6
	BGND	7
	Shield	8
Relay outputs		**XRO1…XRO3**
Ready 250 V AC / 30 V DC 2 A	NC	11
	COM	12
	NO	13
Running 250 V AC / 30 V DC 2 A	NC	21
	COM	22
	NO	23
Faulted(-1) 250 V AC / 30 V DC 2 A	NC	31
	COM	32
	NO	33
Safe torque off		**XSTO, XSTO OUT**
Safe torque off input. Both circuits must be closed for the drive to start. [2]	OUT	1
	SGND	2
	IN1	3
	IN2	4
Safe torque off output to inverter modules [2]	IN1	5
	SGND	6
	IN2	7
	SGND	8
Digital inputs		**XDI**
Stop (0) / Start (1)	DI1	1
Forward (0) / Reverse (1)	DI2	2
Reset	DI3	3
Acceleration & deceleration select [3]	DI4	4
Constant speed 1 select (1 = on) [4]	DI5	5
By default not in use.	DI6	6
Run enable [5]	DIIL	7
Digital input/outputs		**XDIO**
Output: Ready	DIO1	1
Output: Running	DIO2	2
Digital input/output ground	DIOGND	3
Digital input/output ground	DIOGND	4
Auxiliary voltage output		**XD24**
+24 V DC 200 mA [6]	+24VD	5
Digital input ground	DICOM	6
+24 V DC 200 mA [6]	+24VD	7
Digital input/output ground	DIOGND	8
Ground selection switch [7]	**DICOM=DIOGND**	
Analog inputs, reference voltage output		**AI**
10 V DC, R_L 1…10 kohm	+VREF	1
-10 V DC, R_L 1…10 kohm	-VREF	2
Ground	AGND	3
Speed reference 0(2)…10 V, R_{in} > 200 kohm [8]	AI1+	4
	AI1-	5
By default not in use. 0(4)…20 mA, R_{in} = 100 ohm [9]	AI2+	6
	AI2-	7
Analog outputs		**AO**
Motor speed rpm 0…20 mA, R_L < 500 ohm	AO1	1
	AGND	2
Motor current 0…20 mA, R_L < 500 ohm	AO2	3
	AGND	4
External power input		**XPOW**
24 V DC, 2.05 A Two supplies can be connected for redundancy.	+24VI	1
	GND	2
	+24VI	3
	GND	4
Safety functions module connection		**X12**
Control panel connection		**X13**
Memory unit connection		**X205**



The table above shows the control connections of the unit, and the default meaning or use of the signals in the control program. Most I/O connections are reserved and wired for the internal use at the factory. Do not change the connections.

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

Notes:

[1] See section *Drive-to-drive link (XD2D)* (page *321*).

[2] See chapter *The Safe torque off function* (page *327*).

[3] 0 = Acceleration/deceleration ramps defined by parameters 23.12/23.13 in use.
1 = Acceleration/deceleration ramps defined by parameters 23.14/23.15 in use.

[4] Constant speed 1 is defined by parameter 22.26.

[5] See section *DIIL input* (page *321*).

[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; in practice, selects whether the digital inputs are used in current sinking or sourcing mode). See also *Ground isolation diagram (BCU)* (page *325*).
DICOM=DIOGND ON: DICOM connected to DIOGND. OFF: DICOM and DIOGND separate.

[8] Current [0(4)…20 mA, R_{in} = 100 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch **AI1**. Change of setting requires reboot of control unit.

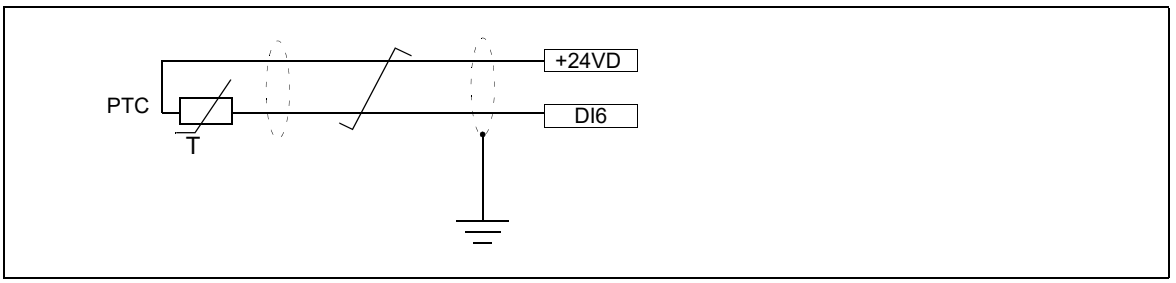
[9] Current [0(4)…20 mA, R_{in} = 100 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch **AI2**. Change of setting requires reboot of control unit.

External power supply for the control unit (XPOW)

The BCU must be powered from a 24 V DC, 2 A power supply. The power supply is connected to terminal block XPOW. A second supply can be connected to the same terminal block for redundancy.

DI6 as PTC sensor input

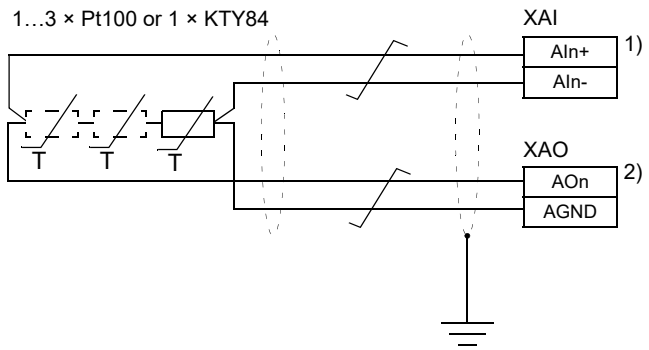
A PTC sensor can be connected to this input for motor temperature measurement as follows. The sensor can alternatively be connected to FEN-xx encoder interface module. At the sensor end of the cable, leave the shields unconnected or ground them indirectly via a high-frequency capacitor with a few nanofarads, eg, 3.3 nF / 630 V. The shield can also be grounded directly at both ends if they are in the same ground line with no significant voltage drop between the end points. See the firmware manual for parameter settings.



WARNING! As the inputs pictured above are not insulated according to IEC 60664, the connection of the motor temperature sensor requires double or reinforced insulation between motor live parts and the sensor. If the assembly does not fulfill the requirement, the I/O board terminals must be protected against contact and must not be connected to other equipment or the temperature sensor must be isolated from the I/O terminals.

AI1 or AI2 as a Pt100, Pt1000, PTC or KTY84 sensor input

Three Pt100/Pt1000/PTC sensors or one KTY84 sensor for motor temperature measurement can be connected between an analog input and output as shown below. (Alternatively, you can connect the KTY to an FIO-11 or FAIO-01 analog I/O extension module or FEN-xx encoder interface module.) At the sensor end of the cable, leave the shields unconnected or ground them indirectly via a high-frequency capacitor with a few nanofarads, eg, 3.3 nF / 630 V. The shield can also be grounded directly at both ends if they are in the same ground line with no significant voltage drop between the end points.



1) For AI1, set input type to voltage with switch AI1 (BCU). For AI2, set input type with AI2 (BCU). Set the appropriate analog input unit to V (volt) in parameter group **12 Standard AI**.
2) Select the excitation mode in parameter group **13 Standard AO**.

WARNING! As the inputs pictured above are not insulated according to IEC 60664, the connection of the motor temperature sensor requires double or reinforced insulation between motor live parts and the sensor. If the assembly does not fulfill the requirement, the I/O board terminals must be protected against contact and must not be connected to other equipment or the temperature sensor must be isolated from the I/O terminals.

DIIL input

The DIIL input is used for the connection of safety circuits. By default, the input is parametrized to stop the unit when the input signal is lost.

Drive-to-drive link (XD2D)

The drive-to-drive link is a daisy-chained RS-485 transmission line that can be used for

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

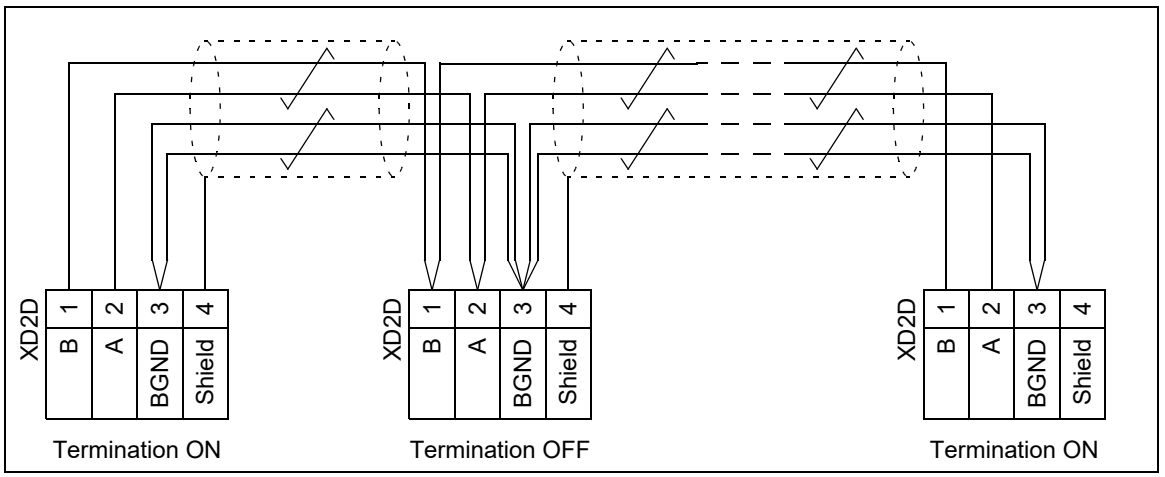
See the firmware manual of the drive for the related parameter settings.

Enable bus termination on the drives at the ends of the drive-to-drive link. On intermediate drives, disable bus termination. The settings are:

Control unit type	Switch designation	Settings
BCU-x2	D2D.TERM	ON = Termination enabled.
		OFF = Termination disabled.

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 running the cable near power cables (such as motor cables).

The following diagram shows the wiring of the drive-to-drive link.



Safe torque off (XSTO, XSTO OUT)

For the drive to start, both connections (OUT1 to IN1 and IN2) must be closed. By default, the terminal block has jumpers to close the circuit. Remove the jumpers before connecting an external Safe torque off circuit to the drive.

The XSTO OUT connector on BCU-x2 control units is wired to the STO IN connector of one inverter module. In case the inverter unit consists of multiple modules, the STO OUT connector of one module is wired to the STO IN connector of the next module etc. so that all modules are part of the chain.

For information on the implementation of a Safe torque off function, see chapter *The Safe torque off function*.

FSO-xx safety functions module connection (X12)

See *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]), and the user manual of the FSO-xx module.

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.

Control unit connector data

Power supply (XPOW)

Connector pitch 5 mm, wire size 2.5 mm^2
24 V (±10%) DC, 2 A
External power input. Two supplies can be connected to BCU for redundancy.

Relay outputs RO1…RO3 (XRO1…XRO3)

Connector pitch 5 mm, wire size 2.5 mm^2
250 V AC / 30 V DC, 2 A
Protected by varistors

+24 V output (XD24:2 and XD24:4)

Connector pitch 5 mm, wire size 2.5 mm^2
Total load capacity of these outputs is 4.8 W (200 mA / 24 V) minus the power taken by DIO1 and DIO2.

Digital inputs DI1…DI6 (XDI:1…XDI:6)

Connector pitch 5 mm, wire size 2.5 mm^2
24 V logic levels: “0” < 5 V, “1” > 15 V
R_{in}: 2.0 kohm
Input type: NPN/PNP (DI1…DI5), NPN (DI6)
Hardware filtering: 0.04 ms, digital filtering up to 8 ms
DI6 (XDI:6) can alternatively be used as an input for a PTC sensor.
“0” > 4 kohm, “1” < 1.5 kohm
I_{max}: 15 mA (DI1…DI5), 5 mA (DI6)

Start interlock input DIIL (XDI:7)

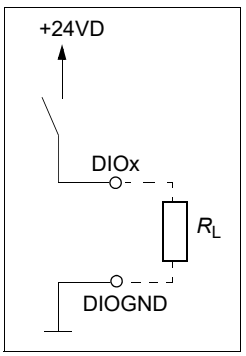
Connector pitch 5 mm, wire size 2.5 mm^2
24 V logic levels: “0” < 5 V, “1” > 15 V
R_{in}: 2.0 kohm
Input type: NPN/PNP
Hardware filtering: 0.04 ms, digital filtering up to 8 ms

Digital inputs/outputs DIO1 and DIO2 (XDIO:1 and XDIO:2)

Input/output mode selection by parameters.

DIO1 can be configured as a frequency input (0…16 kHz with hardware filtering of 4 microseconds) for 24 V level square wave signal (sinusoidal or other wave form cannot be used). DIO2 can be configured as a 24 V level square wave frequency output. See the firmware manual of the supply / inverter unit, parameter groups 111 / 11.

Connector pitch 5 mm, wire size 2.5 mm^2
As inputs:
24 V logic levels: “0” < 5 V, “1” > 15 V
R_{in}: 2.0 kohm
Filtering: 1 ms
As outputs:
Total output current from +24VD is limited to 200 mA



Reference voltage for analog inputs +VREF and -VREF (XAI:1 and XAI:2)

Connector pitch 5 mm, wire size 2.5 mm^2
10 V ±1% and –10 V ±1%, R_{load} 1…10 kohm
Maximum output current: 10 mA

Analog inputs AI1 and AI2 (XAI:4 … XAI:7).

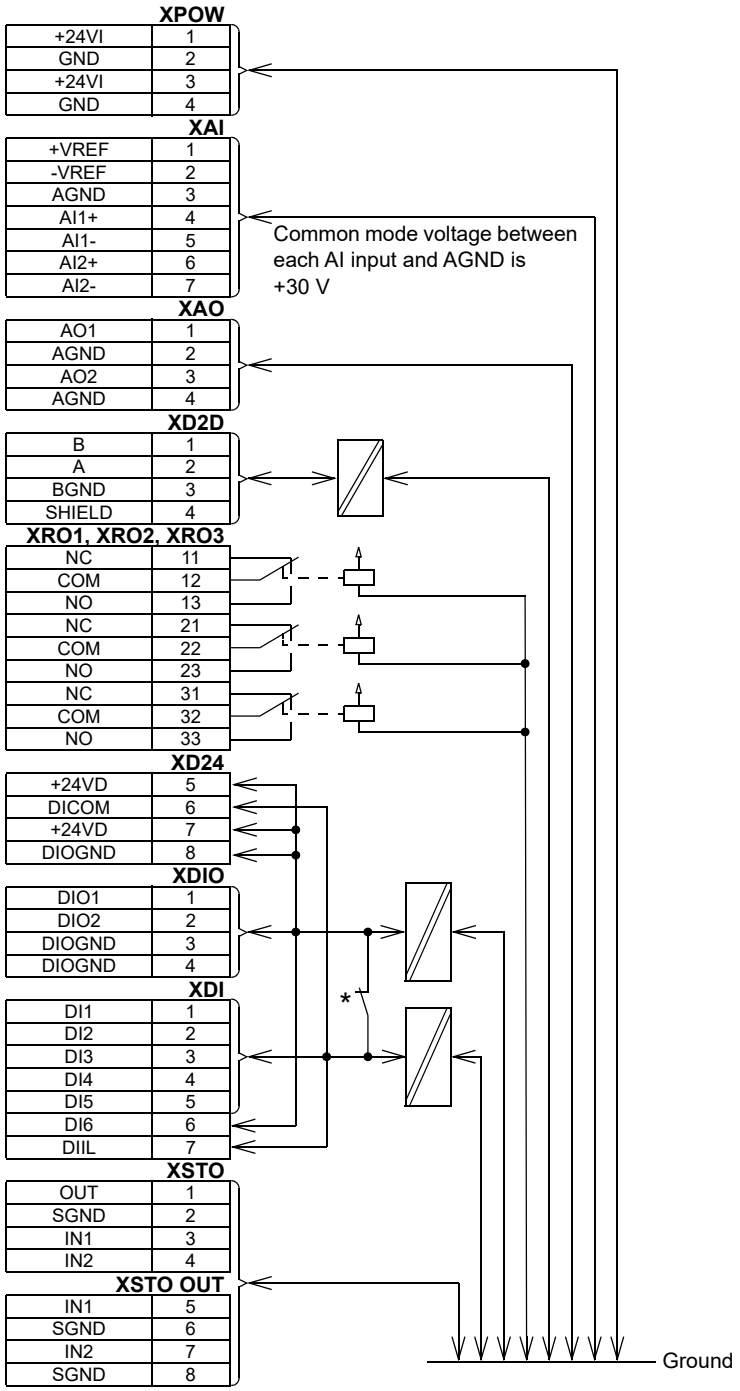
Current/voltage input mode selection by switches.

Connector pitch 5 mm, wire size 2.5 mm^2
Current input: –20…20 mA, R_{in} = 100 ohm
Voltage input: –10…10 V, R_{in} > 200 kohm
Differential inputs, common mode range ±30 V
Sampling interval per channel: 0.25 ms
Hardware filtering: 0.25 ms, adjustable digital filtering up to 8 ms
Resolution: 11 bit + sign bit
Inaccuracy: 1% of full scale range

Analog outputs AO1 and AO2 (XAO)	Connector pitch 5 mm, wire size 2.5 mm^2 0…20 mA, R_{load} < 500 ohm Frequency range: 0…500 Hz Resolution: 11 bit + sign bit Inaccuracy: 2% of full scale range
Drive-to-drive link (XD2D)	Connector pitch 5 mm, wire size 2.5 mm^2 Physical layer: RS-485 Maximum cable length of the link: 50 m Cable type: Shielded twisted pair cable with twisted pair for data and a wire or pair for signal ground, nominal impedance 100…165 ohm, for example Belden 9842 Transmission rate: 8 Mbit/s Termination by switch
Embedded Modbus RTU (XD2D):	Connector pitch 5 mm, wire size 2.5 mm^2 Physical layer: RS-485 Cable type: Shielded twisted pair cable with twisted pair for data and a wire or pair for signal ground, nominal impedance 100…165 ohm, for example Belden 9842 Transmission rate: 9.6…115.2 kbit/s 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 For the drive to start, both connections must be “1” Current consumption: 66 mA (continuous) per STO channel per R8i inverter module 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 IN connector of inverter module. See chapter *The Safe torque off function* (page *327*).
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.

Ground isolation diagram (BCU)



***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.

12

The Safe torque off function

Contents of this chapter

This chapter describes the Safe torque off (STO) function of the inverter and gives instructions for its use.

Description

WARNING! In case of parallel-connected drives or dual-winding motors, the STO must be activated on each drive to remove the torque from the motor.

The Safe torque off function can be used, for example, as the final actuator device of safety circuits that stop the inverter in case of danger (such as an emergency stop circuit). Another typical application is a prevention of unexpected start-up function that enables short-time maintenance operations like cleaning or work on non-electrical parts of the machinery without switching off the power supply to the inverter.

When activated, the Safe torque off function disables the control voltage of the power semiconductors of the inverter output stage (A, see diagram below), thus preventing the inverter from generating the torque required to rotate the motor. If the motor is running when Safe torque off is activated, it coasts to a stop.

The Safe torque off function has a redundant architecture, that is, both channels must be used in the safety function implementation. The safety data given in this manual is calculated for redundant use, and does not apply if both channels are not used.

The Safe torque off function complies with these standards:

Standard	Name
IEC 60204-1:2016 EN 60204-1:2018	*Safety of machinery – Electrical equipment of machines – Part 1: General requirements*
IEC 61000-6-7:2014	*Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations*
IEC 61326-3-1:2017	*Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 3-1: Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) – General industrial applications*
IEC 61508-1:2010	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements*
IEC 61508-2:2010	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems*
IEC 61511-1:2016	*Functional safety – Safety instrumented systems for the process industry sector*
IEC 61800-5-2:2016 EN 61800-5-2:2007	*Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional*
IEC 62061:2005 + A1:2012 + A2:2015 EN 62061:2005 + AC:2010 + A1:2013 + A2:2015	*Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*
EN ISO 13849-1:2015	*Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*
EN ISO 13849-2:2012	*Safety of machinery – Safety-related parts of control systems – Part 2: Validation*

The function also corresponds to Prevention of unexpected start-up as specified by EN ISO 14118:2018 (ISO 14118:2017), and Uncontrolled stop (stop category 0) as specified in EN/IEC 60204-1.

Compliance with the European Machinery Directive

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

Wiring

For information on the specifications of the STO input, see chapter *Control units of the drive* (page *313*).

Activation switch

In the wiring diagrams below, the activation switch has the designation [K]. This represents a component such as a manually operated switch, an emergency stop push button switch, or the contacts of a safety relay or safety PLC.

- If a manually operated activation switch is used, the switch must be of a type that can be locked out to the open position.
- The STO inputs must be switched on/off within 200 ms of each other.
- An FSO-xx safety functions module or an FPTC-0x thermistor protection module can also be used. For more information, see the module documentation.

Cable types and lengths

- Double-shielded twisted-pair cable is recommended.
- Maximum cable lengths:
  - 300 m (1000 ft) between activation switch [K] and inverter control unit
  - 60 m (200 ft) between multiple inverter units
  - 60 m (200 ft) between external power supply and first inverter unit
  - With frame n×R8i inverter units: 30 m (100 ft) between BCU control unit and last inverter module in the chain.

Note: A short-circuit in the wiring between the switch and an STO terminal causes a dangerous fault. Therefore, it is recommended to use a safety relay (including wiring diagnostics) or a wiring method (shield grounding, channel separation) which reduces or eliminates the risk caused by the short-circuit.

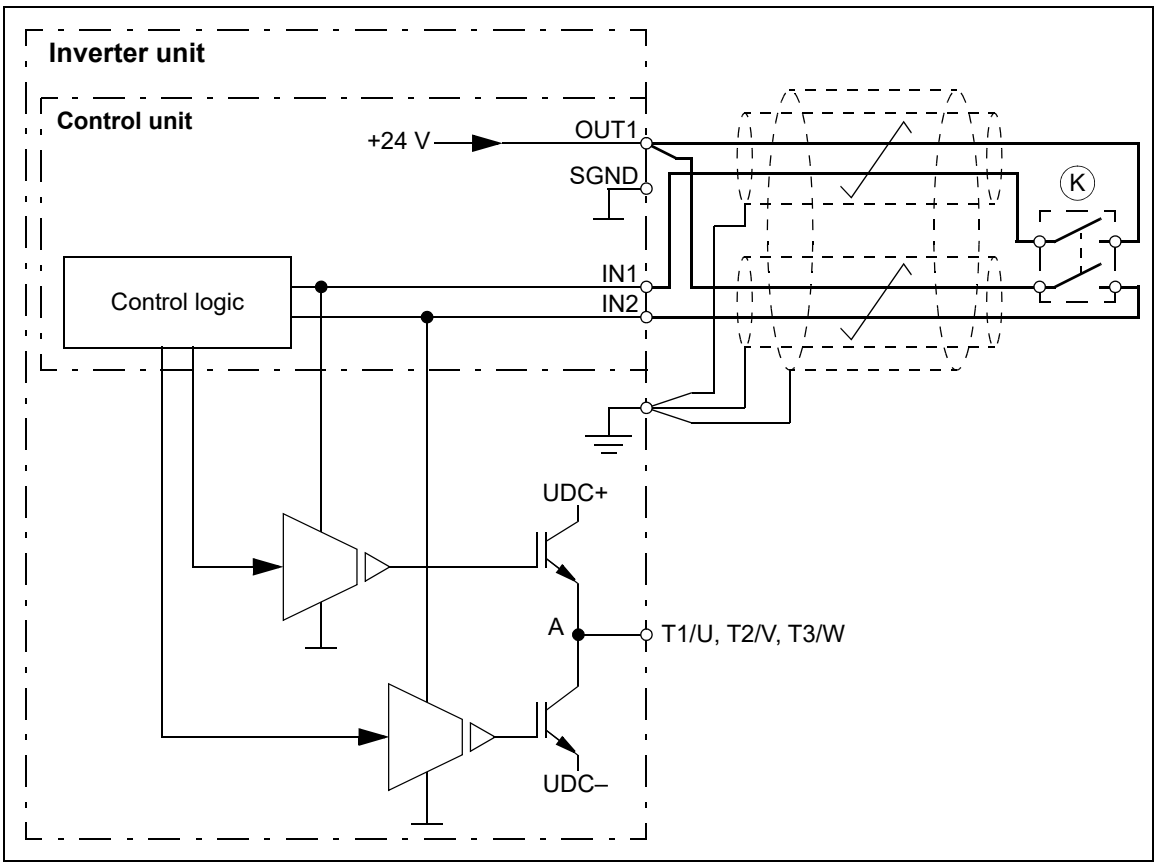
Note: The voltage at the STO input terminals of the inverter control unit (or frame R8i inverter module) must be at least 17 V DC to be interpreted as “1”. The pulse tolerance of the input channels is 1 ms.

Grounding of protective shields

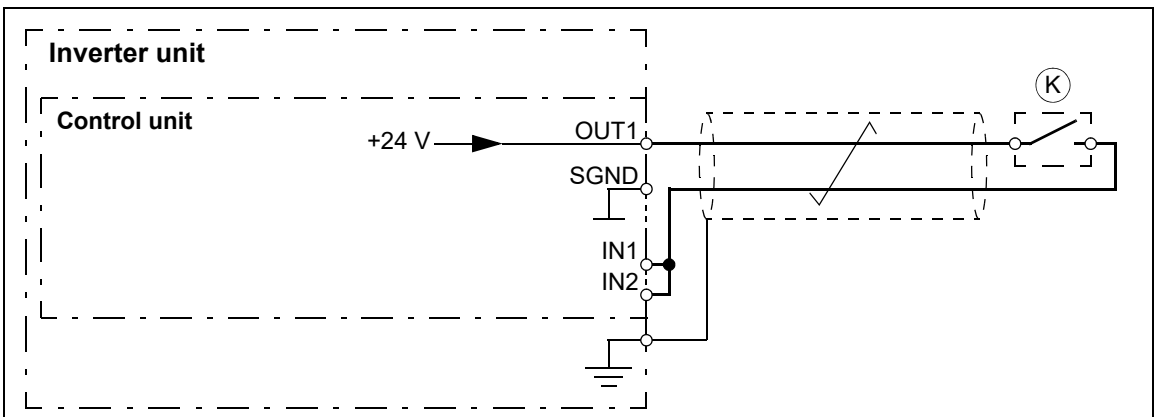
- Ground the shield in the cabling between the activation switch and the control unit at the control unit.
- Ground the shield in the cabling between two control units at one control unit only.
- Do not ground the shield in the cabling between BCU and frame R8i module, or between R8i modules.

Single inverter unit (internal power supply)

Dual-channel connection



Single-channel connection

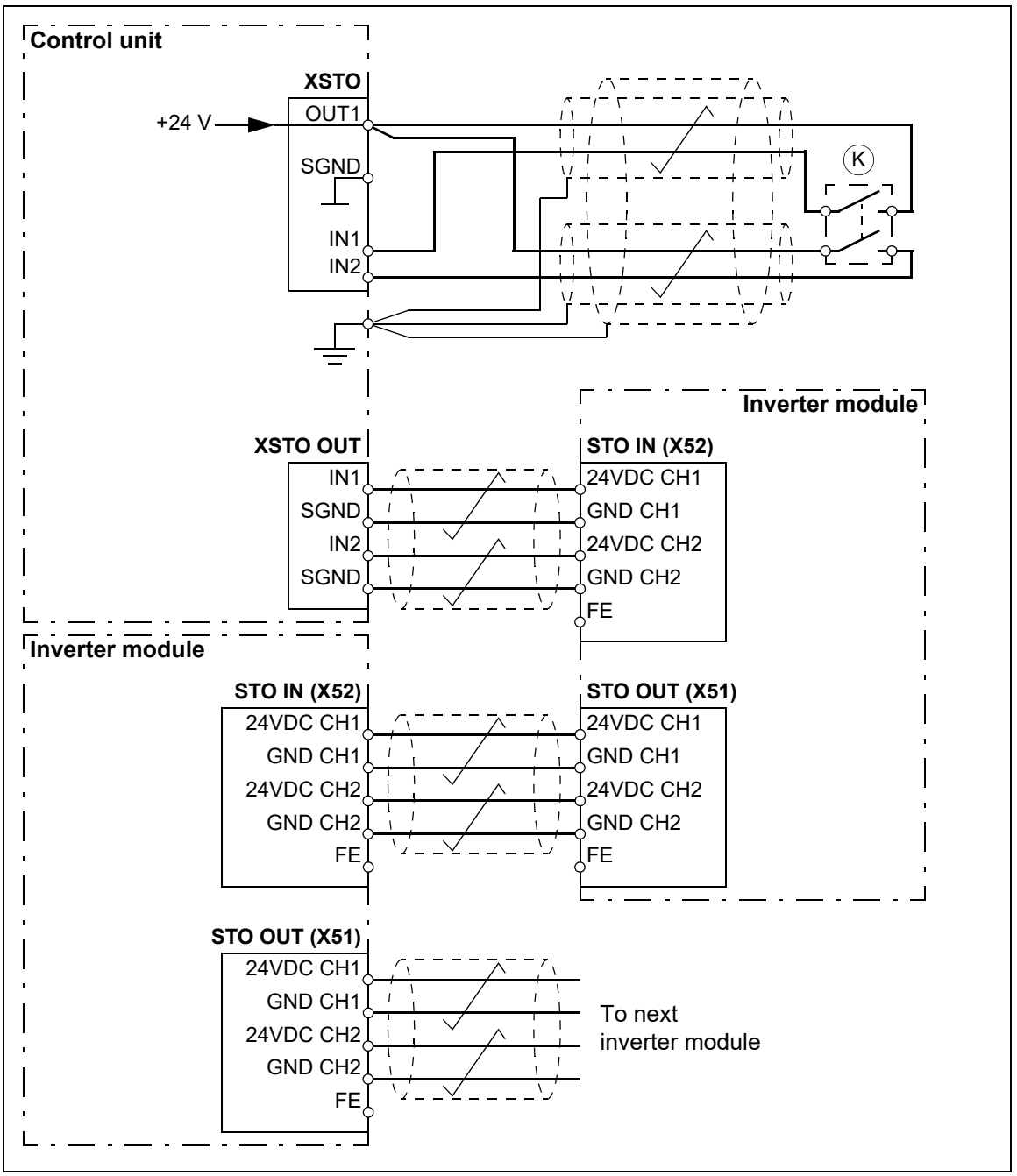


Notes:

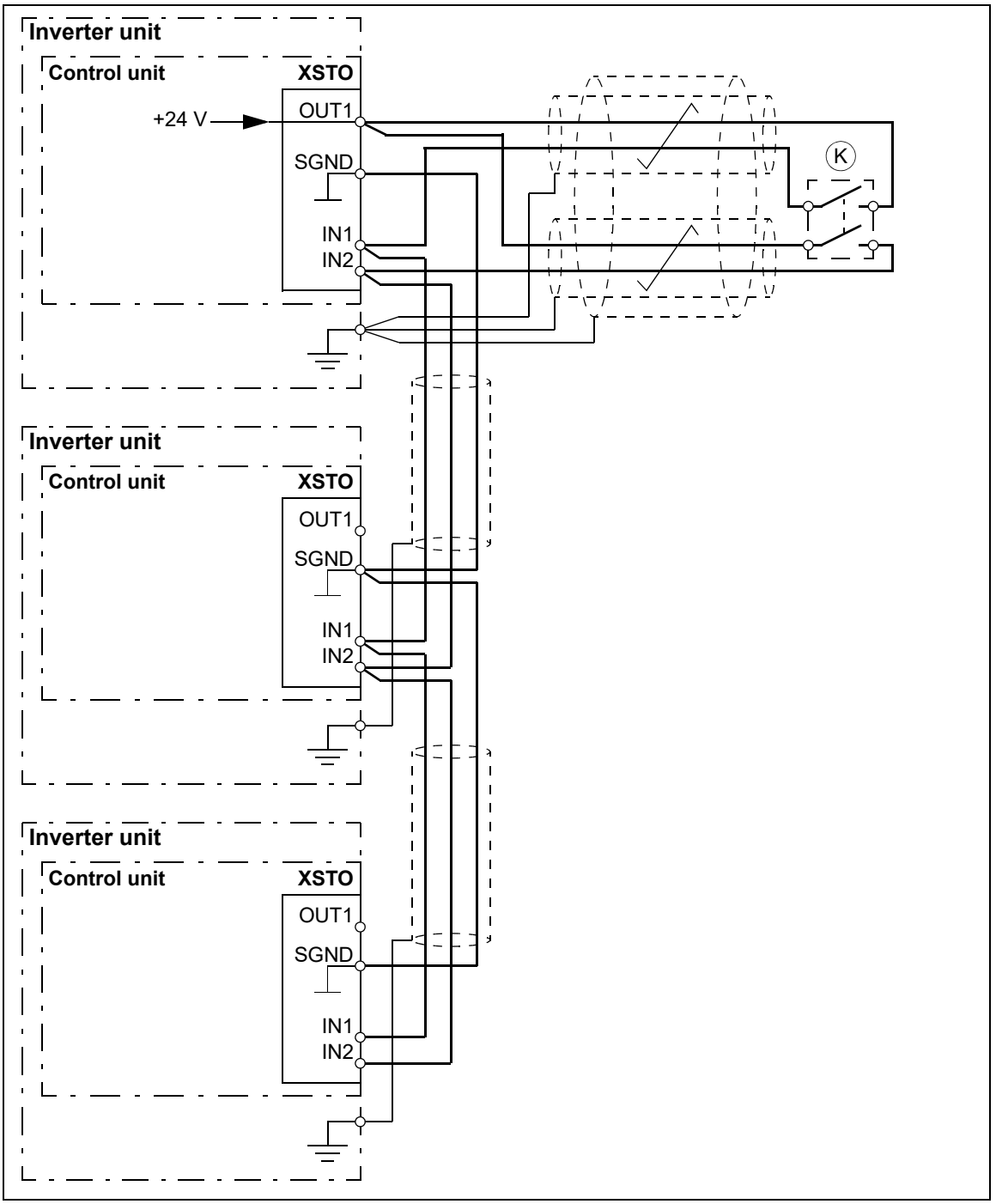
- Both STO inputs (IN1, IN2) must be connected to the activation switch. Otherwise, no SIL/PL classification is given.
- Pay special attention to avoiding any potential failure modes for the wiring. For example, use shielded cable. For measures for fault exclusion of wiring, see eg. EN ISO 13849-2:2012, table D.4.

Frame n×R8i inverter unit (internal power supply)

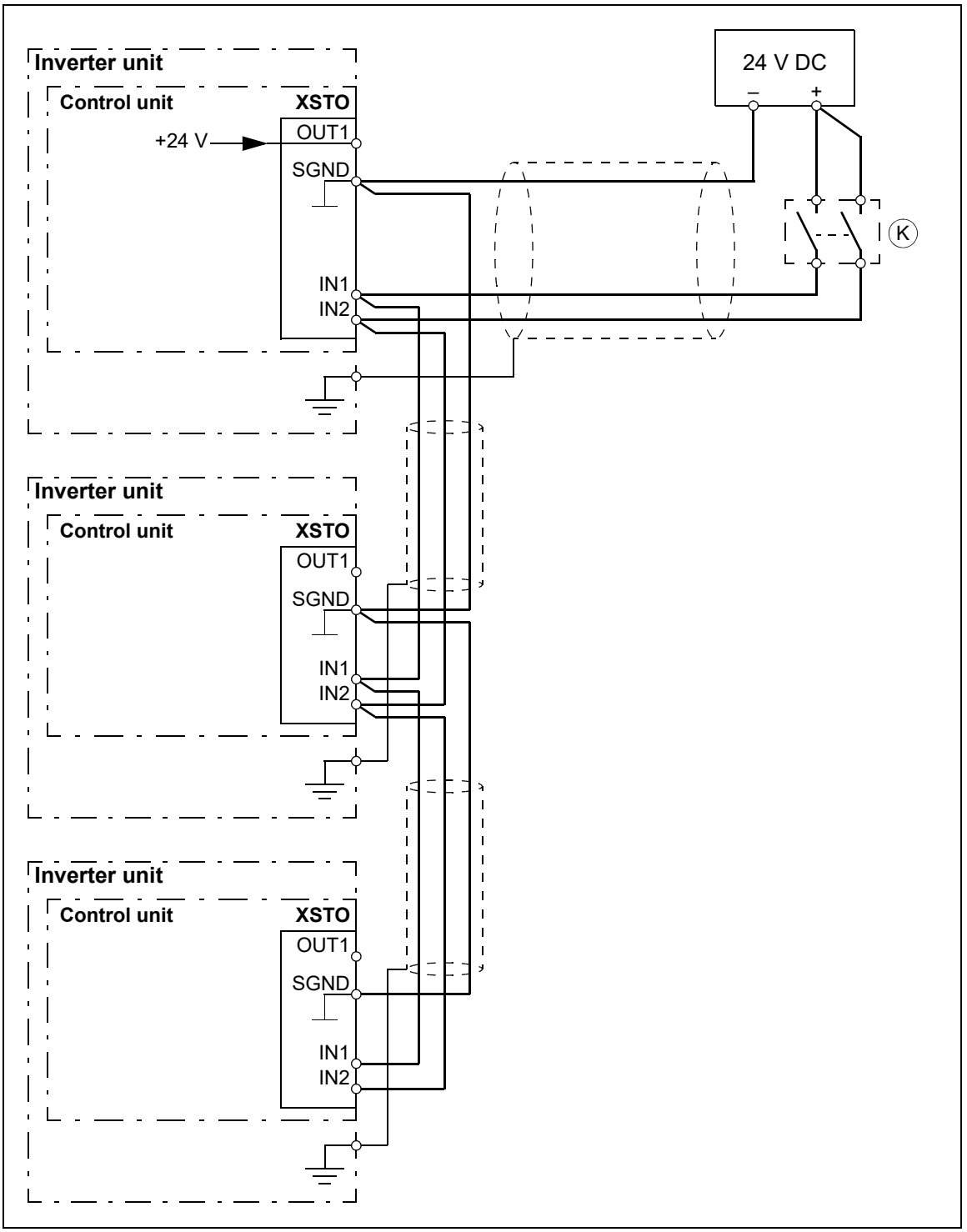
WARNING! Frame R8i inverter modules are as standard delivered with a jumper wire set that supplies 24 V from connector X53 to connector X52. The jumper wire set must be removed before wiring the Safe torque off circuit.



Multiple inverter units (internal power supply)



Multiple inverter units (external power supply)



Operation principle

1. The Safe torque off activates (the activation switch is opened, or safety relay contacts open).
2. The STO inputs of the inverter control unit de-energize.
3. The control unit cuts off the control voltage from the output IGBTs.
4. The control program generates an indication as defined by parameter *31.22* (see the firmware manual of the inverter).

   The parameter selects which indications are given when one or both STO signals are switched off or lost. The indications also depend on whether the inverter is running or stopped when this occurs.

   Note: This parameter does not affect the operation of the STO function itself. The STO function will operate regardless of the setting of this parameter: a running drive will stop upon removal of one or both STO signals, and will not start until both STO signals are restored and all faults reset.

   Note: The loss of only one STO signal always generates a fault as it is interpreted as a malfunction of STO hardware or wiring.
5. The motor coasts to a stop (if running). The inverter cannot restart while the activation switch or safety relay contacts are open. After the contacts close, a reset may be needed (depending on the setting of parameter *31.22)*. A new start command is required to start the inverter.

Start-up including validation test

To ensure the safe operation of a safety function, validation is required. The final assembler of the machine must validate the function by performing a validation test. The validation test must be performed

- at initial start-up of the safety function
- after any changes related to the safety function (circuit boards, wiring, components, settings, etc.)
- after any maintenance work related to the safety function.

Competence

The validation test of the safety function must be carried out by a competent person with adequate expertise and knowledge of the safety function as well as functional safety, as required by IEC 61508-1 clause 6. The test procedures and report must be documented and signed by this person.

Validation test reports

Signed validation test reports must be stored in the logbook of the machine. The report shall include documentation of start-up activities and test results, references to failure reports and resolution of failures. Any new validation tests performed due to changes or maintenance shall be logged into the logbook.

Validation test procedure

After wiring the Safe torque off function, validate its operation as follows.

Note: If an FSO-xx safety functions module or an FPTC-0x module is installed, refer to its documentation.

Note: All inverter modules must be powered and connected to the STO circuit during the validation test.

Action	☑
WARNING! Obey the safety instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). If you ignore them, injury or death, or damage to the equipment can occur.	☐
Make sure that the inverter can be run and stopped freely during start-up.	☐
Stop the inverter (if running), switch the input power off and isolate the inverter from the power line using a disconnector.	☐
Check the STO circuit connections against the wiring diagram.	☐
Close the disconnector and switch the power on.	☐
Test the operation of the STO function when the motor is stopped. • Give a stop command for the inverter (if running) and wait until the motor shaft is at a standstill. Ensure that the inverter operates as follows: • Open the STO circuit. The inverter generates an indication if one is defined for ‘stopped’ state in parameter *31.22* (see the firmware manual). • Give a start command to verify that the STO function blocks the inverter’s operation. The inverter generates a warning. The motor should not start. • Close the STO circuit. • Reset any active faults. Restart the inverter and check that the motor runs normally.	☐
Test the operation of the STO function when the motor is running. • Start the inverter and make sure the motor is running. • Open the STO circuit. The motor should stop. The inverter generates an indication if one is defined for ‘running’ state in parameter *31.22* (see the firmware manual). • Reset any active faults and try to start the inverter. • Make sure that the motor stays at a standstill and the inverter operates as described above in testing the operation when the motor is stopped. • Close the STO circuit. • Reset any active faults. Restart the inverter and check that the motor runs normally.	☐
Test the operation of the failure detection of the inverter. The motor can be stopped or running. • Open the 1st channel of the STO circuit (wire coming to IN1). If the motor was running, it should coast to a stop. The inverter generates a *FA81 Safe torque off 1 loss* fault indication (see the firmware manual). • Give a start command to verify that the STO function blocks the inverter’s operation. The motor should not start. • Close the STO circuit. • Reset any active faults. Restart the inverter and check that the motor runs normally. • Open the 2nd channel of the STO circuit (wire coming to IN2). If the motor was running, it should coast to a stop. The inverter generates a *FA82 Safe torque off 2 loss* fault indication (see the firmware manual). • Give a start command to verify that the STO function blocks the inverter’s operation. The motor should not start. • Close the STO circuit. • Reset any active faults. Restart the inverter and check that the motor runs normally.	☐
Document and sign the validation test report which verifies that the safety function is safe and accepted for operation.	☐

Use

1. Open the activation switch, or activate the safety functionality that is wired to the STO connection.
2. The STO inputs on the inverter control unit de-energize, and the inverter control unit cuts off the control voltage from the output IGBTs.
3. The control program generates an indication as defined by parameter 31.22 (refer to the firmware manual of the inverter).
4. The motor coasts to a stop (if running). The inverter will not restart while the activation switch or safety relay contacts are open.
5. Deactivate the STO by closing the activation switch, or resetting the safety functionality that is wired to the STO connection.
6. Reset any faults before restarting.

WARNING! The Safe torque off function does not disconnect the voltage of the main and auxiliary circuits from the inverter. Therefore maintenance work on electrical parts of the inverter or the motor can only be carried out after isolating the inverter from the supply and all other voltage sources.

WARNING! The Safe torque off functionality is only achieved through the XSTO connector of the inverter control unit. True Safe torque off functionality is not achieved through the XSTO connectors of other control units (such as the supply control unit or the brake control unit).

The Safe torque off function is supported by inverter firmware. It is not supported by supply unit, brake unit or DC/DC converter unit firmware.

WARNING! The drive cannot detect or memorize any changes in the STO circuitry when the drive control unit is not powered. If both STO circuits are closed and a level-type start signal is active when the power is restored, it is possible that the drive starts without a fresh start command. Take this into account in the risk assessment of the system.

WARNING! (With permanent magnet or synchronous reluctance [SynRM] motors only) In case of a multiple IGBT power semiconductor failure, the inverter can produce an alignment torque which maximally rotates the motor shaft by 180/*p* degrees (with permanent magnet motors) or 180/2*p* degrees (with synchronous reluctance [SynRM] motors) regardless of the activation of the Safe torque off function. *p* denotes the number of pole pairs.

Notes:

- If a running inverter is stopped by using the Safe torque off function, the inverter will cut off the motor supply voltage and the motor will coast to a stop. If this causes danger or is not otherwise acceptable, stop the inverter and machinery using the appropriate stop mode before activating the Safe torque off function.
- The Safe torque off function overrides all other functions of the inverter unit.
- The Safe torque off function is ineffective against deliberate sabotage or misuse.

- The Safe torque off function has been designed to reduce the recognized hazardous conditions. In spite of this, it is not always possible to eliminate all potential hazards. The assembler of the machine must inform the final user about the residual risks.

Maintenance

After the operation of the circuit is validated at start-up, the STO function shall be maintained by periodic proof testing. In high demand mode of operation, the maximum proof test interval is 20 years. In low demand mode of operation, the maximum proof test interval is 5 or 2 years; see section *Safety data* (page *338*). It is assumed that all dangerous failures of the STO circuit are detected by the proof test. To perform the proof test, do the *Validation test procedure* (page *334*).

Note: See also the Recommendation of Use CNB/M/11.050 (published by the European co-ordination of Notified Bodies) concerning dual-channel safety-related systems with electromechanical outputs:

- When the safety integrity requirement for the safety function is SIL 3 or PL e (cat. 3 or 4), the proof test for the function must be performed at least every month.
- When the safety integrity requirement for the safety function is SIL 2 (HFT = 1) or PL d (cat. 3), the proof test for the function must be performed at least every 12 months.

The STO function does not contain any electromechanical components.

In addition to proof testing, it is a good practice to check the operation of the function when other maintenance procedures are carried out on the machinery.

Include the Safe torque off operation test described above in the routine maintenance program of the machinery that the inverter runs.

If any wiring or component change is needed after start up, or the parameters are restored, do the test given in section *Validation test procedure* (page *334*).

Use only spare parts approved by ABB.

Record all maintenance and proof test activities in the machine logbook.

Competence

The maintenance and proof test activities of the safety function must be carried out by a competent person with adequate expertise and knowledge of the safety function as well as functional safety, as required by IEC 61508-1 clause 6.

Fault tracing

The indications given during the normal operation of the Safe torque off function are selected by inverter parameter *31.22*. The indications can be read via fieldbus. The indications are not safety-classified signals.

The diagnostics of the Safe torque off function cross-compare the status of the two STO channels. In case the channels are not in the same state, a fault reaction function is performed and the inverter trips on an “STO hardware failure” fault. An attempt to use the STO in a non-redundant manner, for example activating only one channel, will trigger the same reaction.

See the inverter firmware manual for the indications generated by the inverter, and for details on directing fault and warning indications to an output on the control unit for external diagnostics.

Any failures of the Safe torque off function must be reported to ABB.

Safety data

The safety data for the Safe torque off function is given below.

Note: The safety data is calculated for redundant use, and does not apply if both STO channels are not used.

Frame size	SIL/ SILCL	PL	SFF (%)	PFH (T_1 = 20 a) (1/h)	PFD_{avg} (T_1 = 2 a)	PFD_{avg} (T_1 = 5 a)	$MTTF_D$ (a)	DC (%)	Cat.	SC	HFT	CCF	T_M (a)
R8i	3	e	>99	5.0E-11	4.5E-07	1.1E-06	23970	≥90	3	3	1	80	20
2×R8i	3	e	>99	6.2E-11	5.5E-07	1.3E-06	16330	≥90	3	3	1	80	20
3×R8i	3	e	>99	7.3E-11	6.5E-07	1.6E-06	12390	≥90	3	3	1	80	20
4×R8i	3	e	>99	8.4E-11	7.6E-07	1.9E-06	9980	≥90	3	3	1	80	20

3AXD10000078136 F

- The following temperature profile is used in safety value calculations:
  - 670 on/off cycles per year with $\triangle T$ = 71.66 °C
  - 1340 on/off cycles per year with $\triangle T$ = 61.66 °C
  - 30 on/off cycles per year with $\triangle T$ = 10.0 °C
  - 32 °C board temperature at 2.0% of time
  - 60 °C board temperature at 1.5% of time
  - 85 °C board temperature at 2.3% of time.
- The STO is a type B safety component as defined in IEC 61508-2.
- Relevant failure modes:
  - The STO trips spuriously (safe failure)
  - The STO does not activate when requested

  A fault exclusion on the failure mode “short circuit on printed circuit board” has been made (EN 13849-2, table D.5). The analysis is based on an assumption that one failure occurs at one time. No accumulated failures have been analyzed.
- STO reaction time (shortest detectable break): 1 ms
- STO response time:
  - Frame sizes 1×R8i…4×R8i: 2 ms (typical), 25 ms (maximum)
- Fault detection time: Channels in different states for longer than 200 ms
- Fault reaction time: Fault detection time + 10 ms
- STO fault indication (parameter *31.22*) delay: < 500 ms
- STO warning indication (parameter *31.22*) delay: < 1000 ms

Abbreviations

Abbr.	Reference	Description
Cat.	EN ISO 13849-1	Classification of the safety-related parts of a control system in respect of their resistance to faults and their subsequent behavior in the fault condition, and which is achieved by the structural arrangement of the parts, fault detection and/or by their reliability. The categories are: B, 1, 2, 3 and 4.
CCF	EN ISO 13849-1	Common cause failure
DC	EN ISO 13849-1	Diagnostic coverage
HFT	IEC 61508	Hardware fault tolerance
$MTTF_D$	EN ISO 13849-1	Mean time to dangerous failure: (Total number of life units) / (Number of dangerous, undetected failures) during a particular measurement interval under stated conditions
PFD_{avg}	IEC 61508	Average probability of dangerous failure on demand, that is, mean unavailability of a safety-related system to perform the specified safety function when a demand occurs
PFH	IEC 61508	Average frequency of dangerous failures per hour, that is, average frequency of a dangerous failure of a safety related system to perform the specified safety function over a given period of time
PL	EN ISO 13849-1	Performance level. Levels a…e correspond to SIL
SC	IEC 61508	Systematic capability
SFF	IEC 61508	Safe failure fraction (%)
SIL	IEC 61508	Safety integrity level (1…3)
SILCL	IEC/EN 62061	Maximum SIL (level 1…3) that can be claimed for a safety function or subsystem
STO	IEC/EN 61800-5-2	Safe torque off
T_1	IEC 61508-6	Proof test interval. T_1 is a parameter used to define the probabilistic failure rate (PFH or PFD) for the safety function or subsystem. Performing a proof test at a maximum interval of T_1 is required to keep the SIL capability valid. The same interval must be followed to keep the PL capability (EN ISO 13849) valid. See also section *Maintenance* (page *337*).
T_M	EN ISO 13849-1	Mission time: the period of time covering the intended use of the safety function/device. After the mission time elapses, the safety device must be replaced. Note that any T_M values given cannot be regarded as a guarantee or warranty.

Declaration of conformity

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

TÜV certificate

The TÜV certificate is available on the Internet. See *Document library on the Internet* on the inside of the back cover.

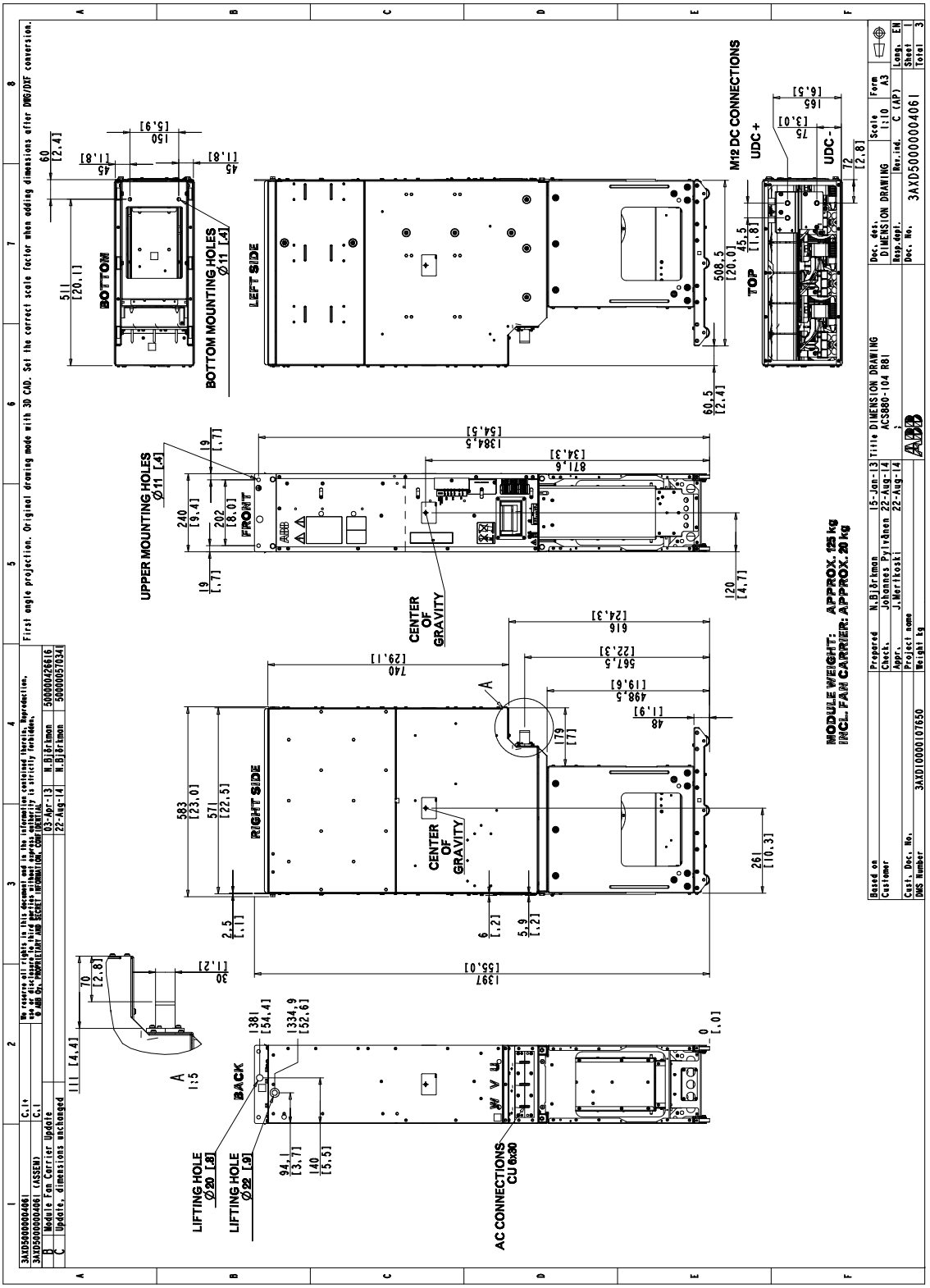
13

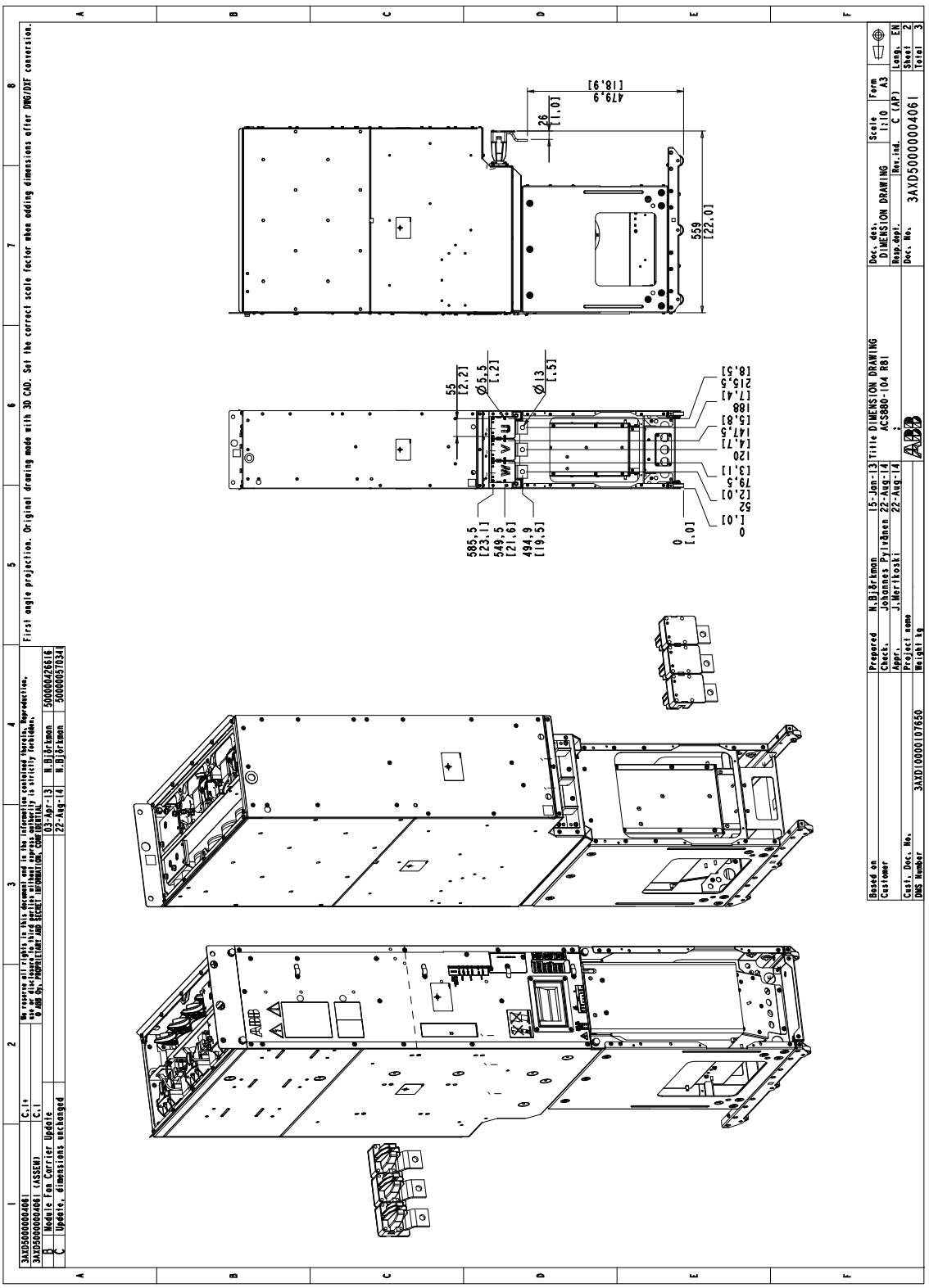
Dimension drawings

Contents of this chapter

This chapter shows dimensions of the supply and inverter modules, and accessories related to ACS880-14 and -34.

Supply / inverter module (frame R8i)




3AXD50000004061
C.1*
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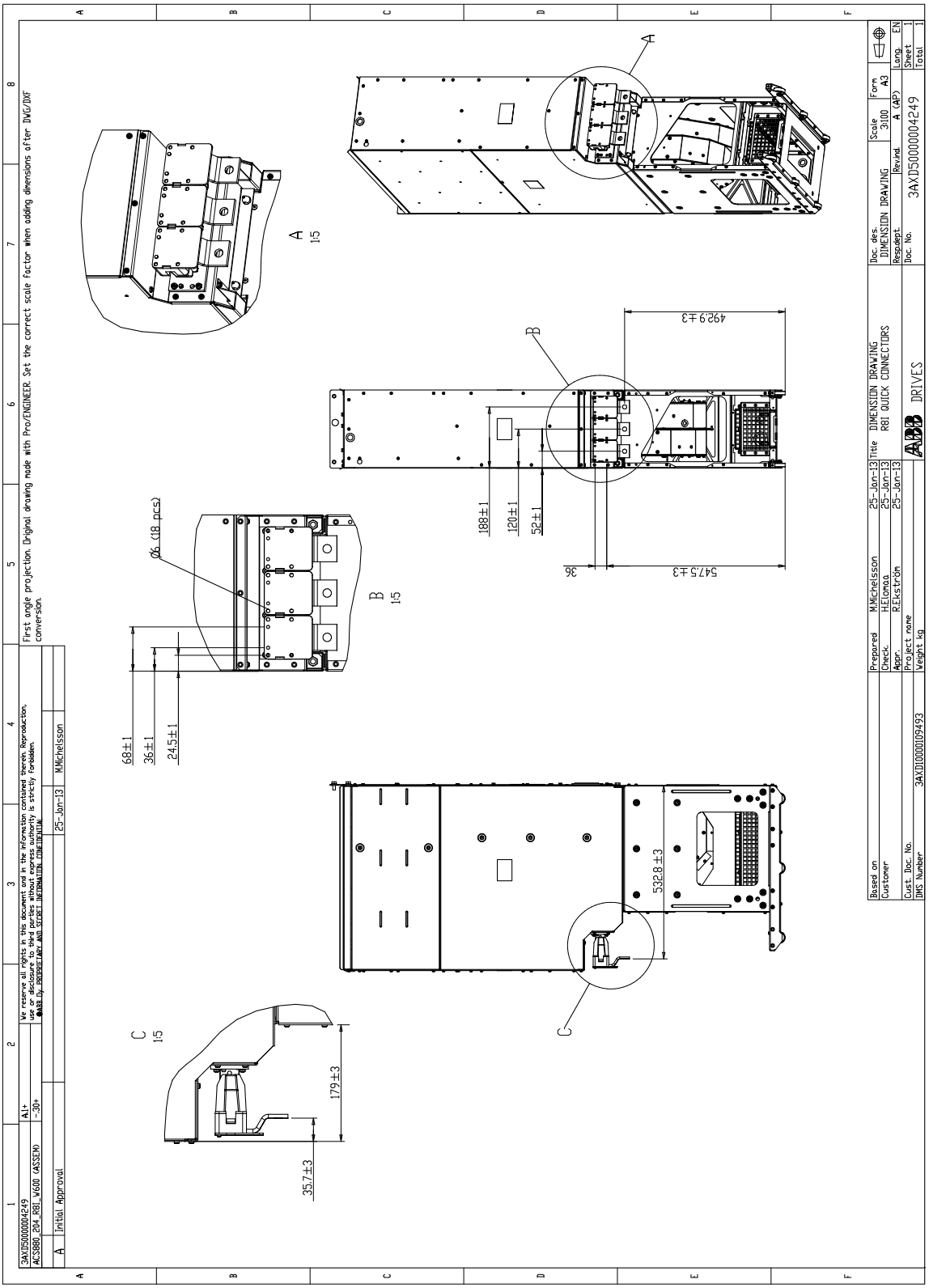
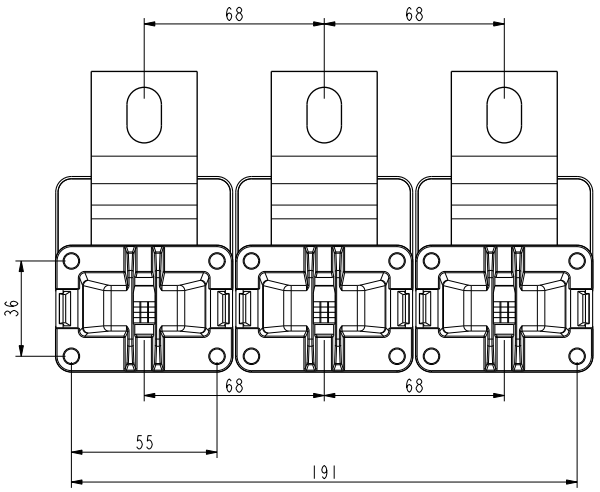
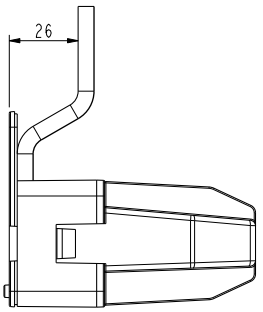
03-Apr-13
N.Björkman
5000004266
3AXD50000004061 (ASSEM)
C.1
Update
03-Apr-13
N.Björkman
5000004266
B
Update Fan Carrier
22-Aug-14
N.Björkman
5000005103
A
Update, dimensions unchanged
First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
Based on
Customer
Cust. Doc. No.
DMS Number
Prepared
Check.
Appr.
Project name
Weight kg
N.Björkman
15-Jan-13
Johannes Pylvänen
22-Aug-14
J.Meriläoski
22-Aug-14
3AXD10000107650
Title DIMENSION DRAWING
ACS880-104 R61
1
Doc. des.
DIMENSION DRAWING
Resp.dept.
Doc. No.
3AXD50000004061
Scale
1:10
Rev.ind.
C (AP)
Form
A3
Lang.
EN
Sheet
2
Total
3
479,9
[18,9]
26
[1.01]
559
[22.01]
55
[2.2]
Ø5,5
[.2]
Ø13
[.5]
585,5
[23.1]
549,5
[21.6]
494,9
[19.5]
0
[.0]
52
[2.0]
79,5
[3.1]
120
[4.7]
147,5
[5.8]
188
215,5
[7.4]
[8.5]

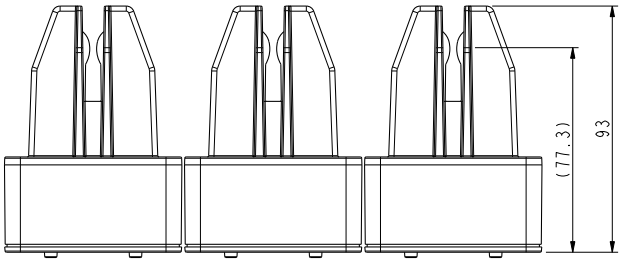
Quick connectors (frame R8i)

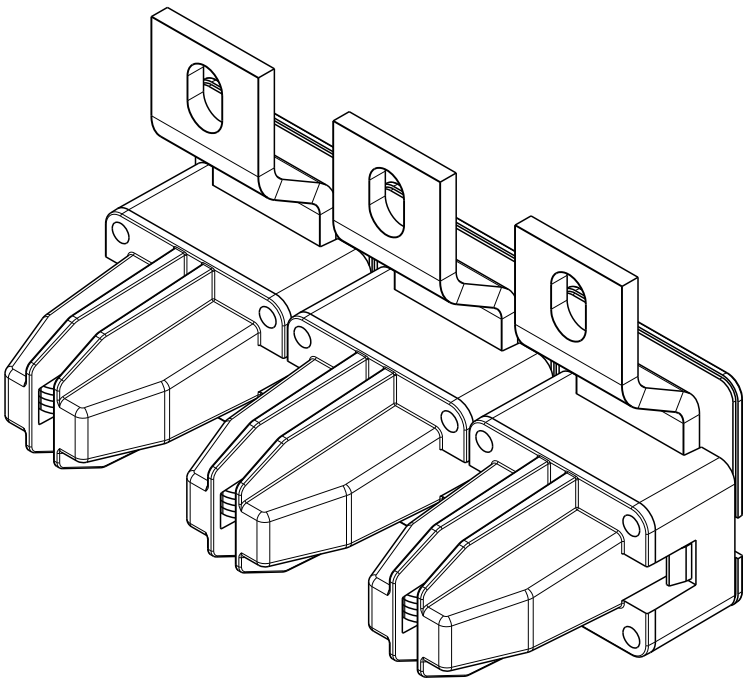


Quick connector





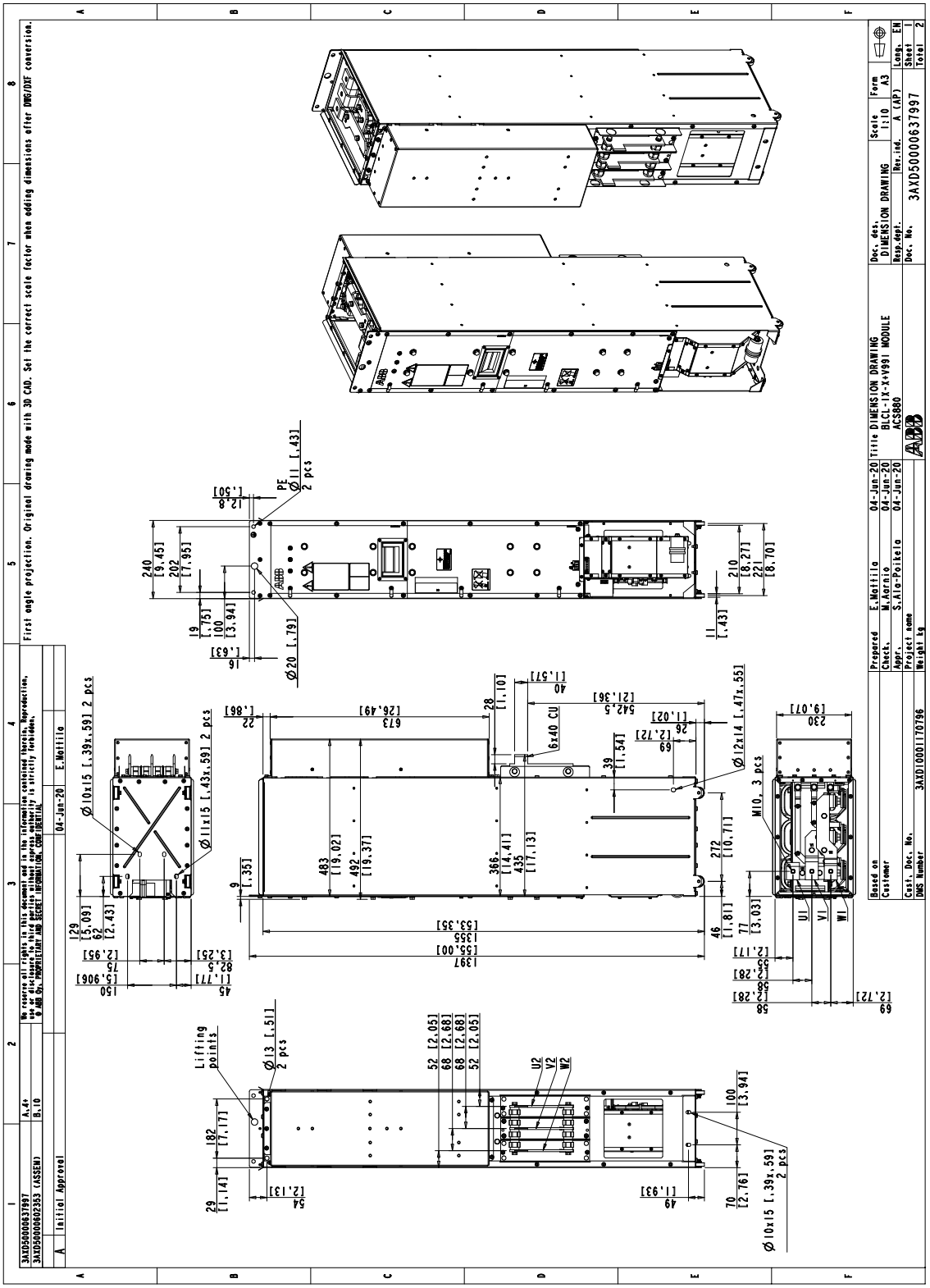




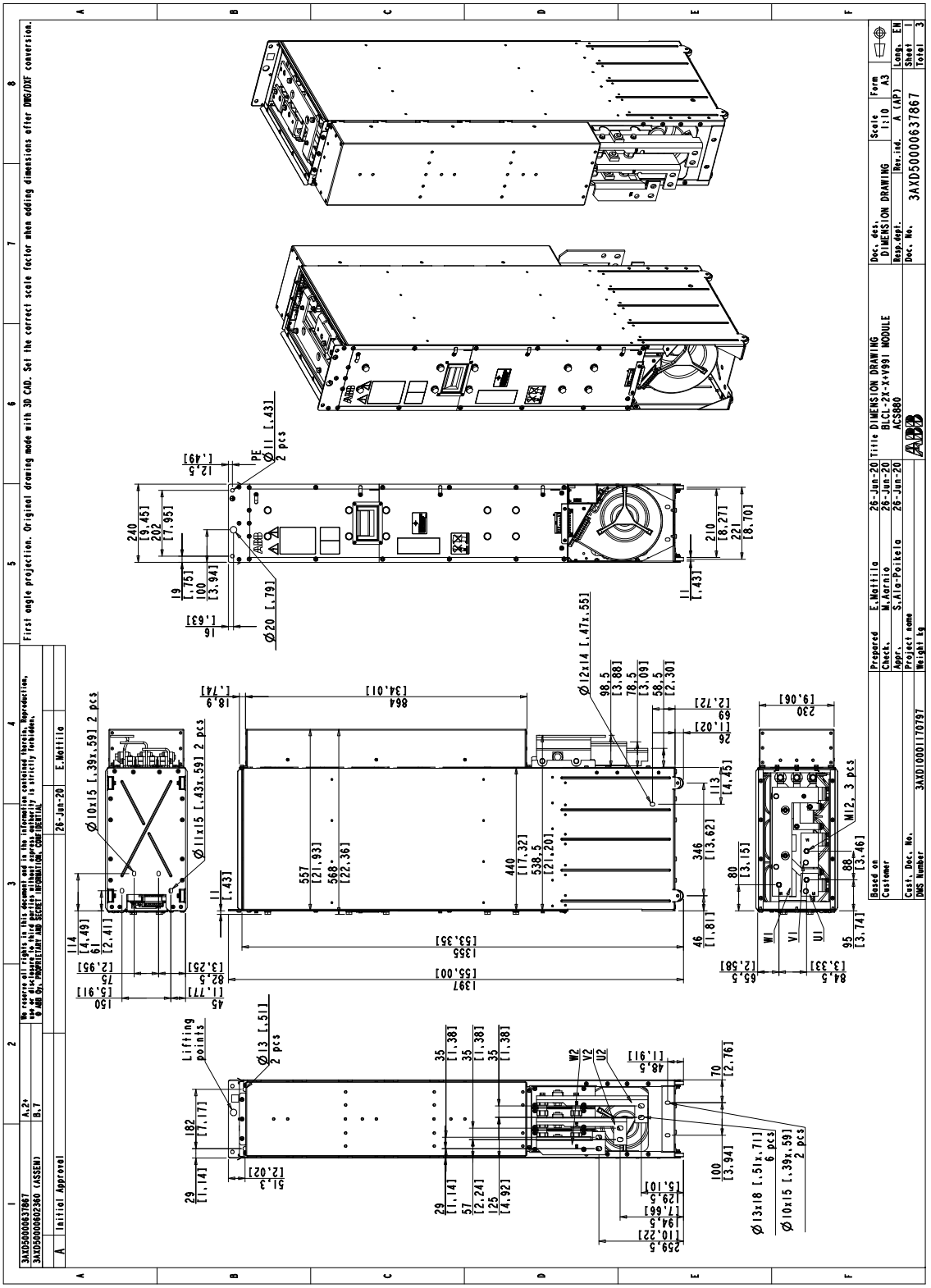
Dimensions in mm

1 mm = 0.0394 in

LCL filter module (BLCL-1x-x)

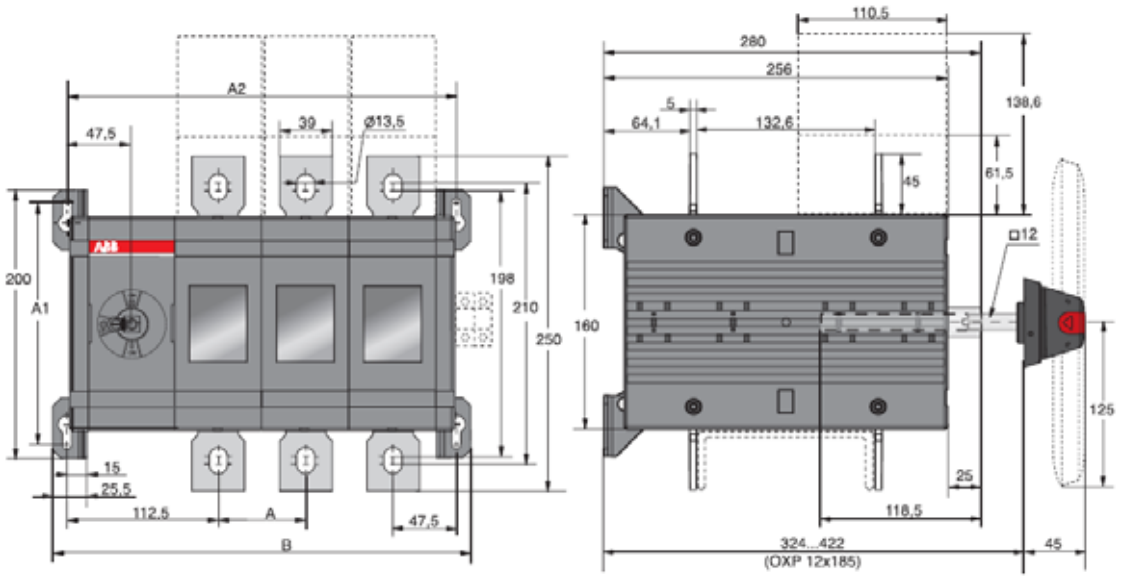


LCL filter module (BLCL-2x-x)



Main switch-disconnector

OT630E03, OT800E03 (IEC)

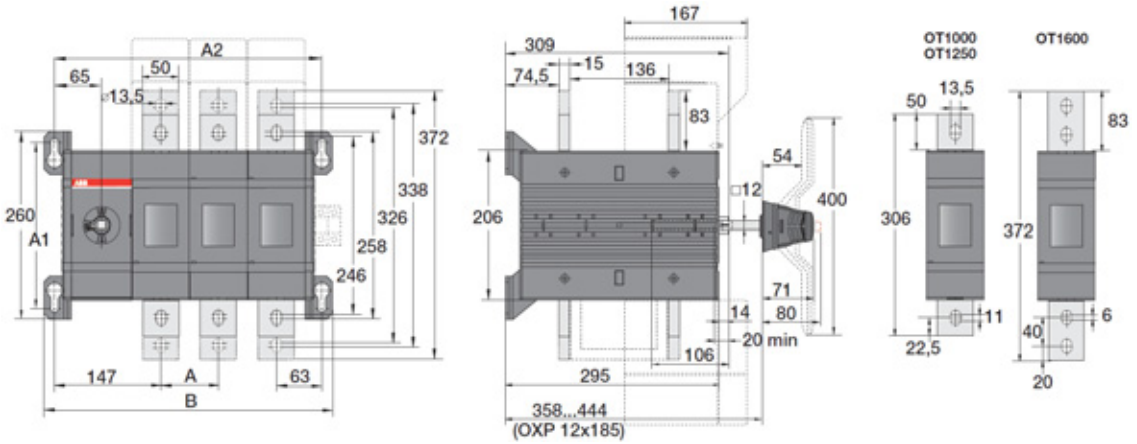


A	A1	A2	B
65	180	290	311

www.abb.com

Dimensions in mm
1 mm = 0.0394 in

OT1000E03 (IEC)

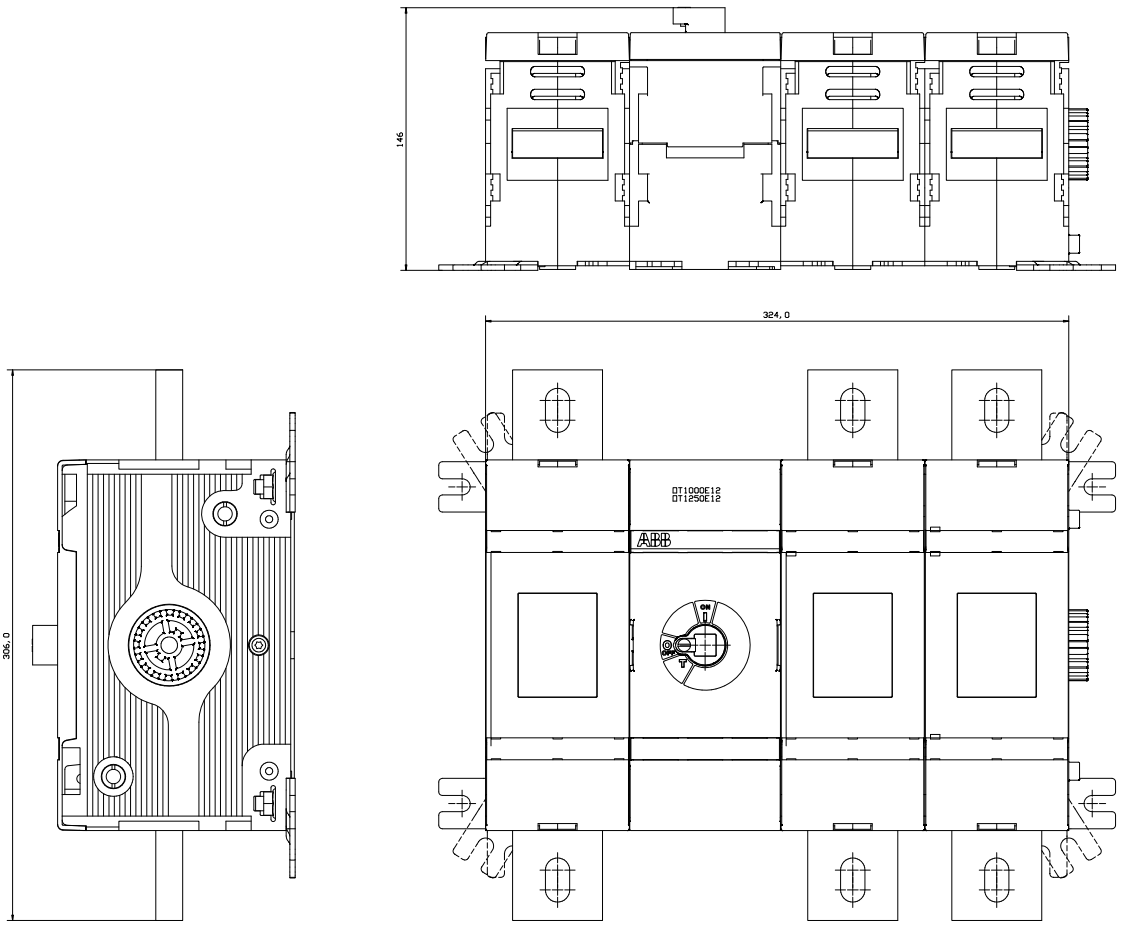


A	A1	A2	B
80	230	370	400

www.abb.com

Dimensions in mm
1 mm = 0.0394 in

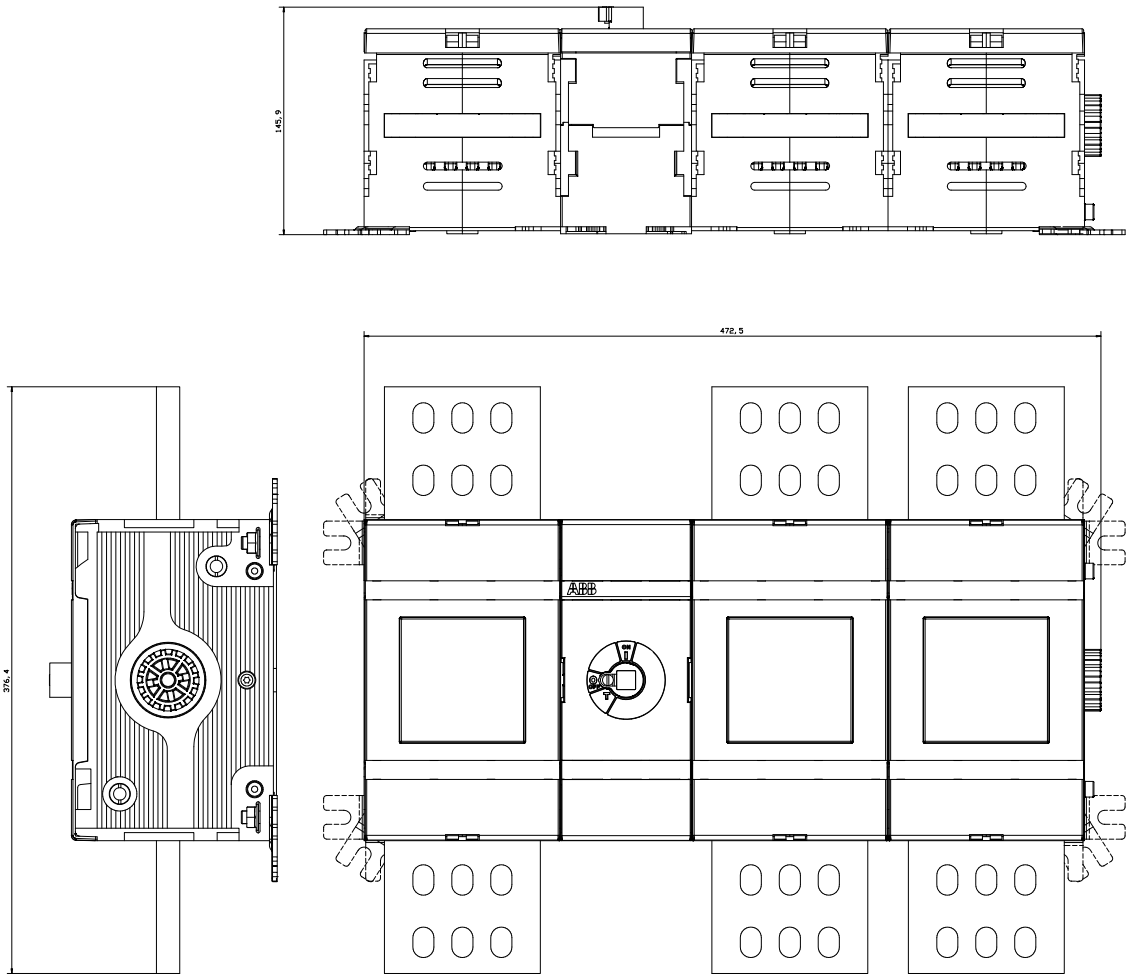
OT1250E12 (IEC)



www.abb.com

Dimensions in mm
1 mm = 0.0394 in

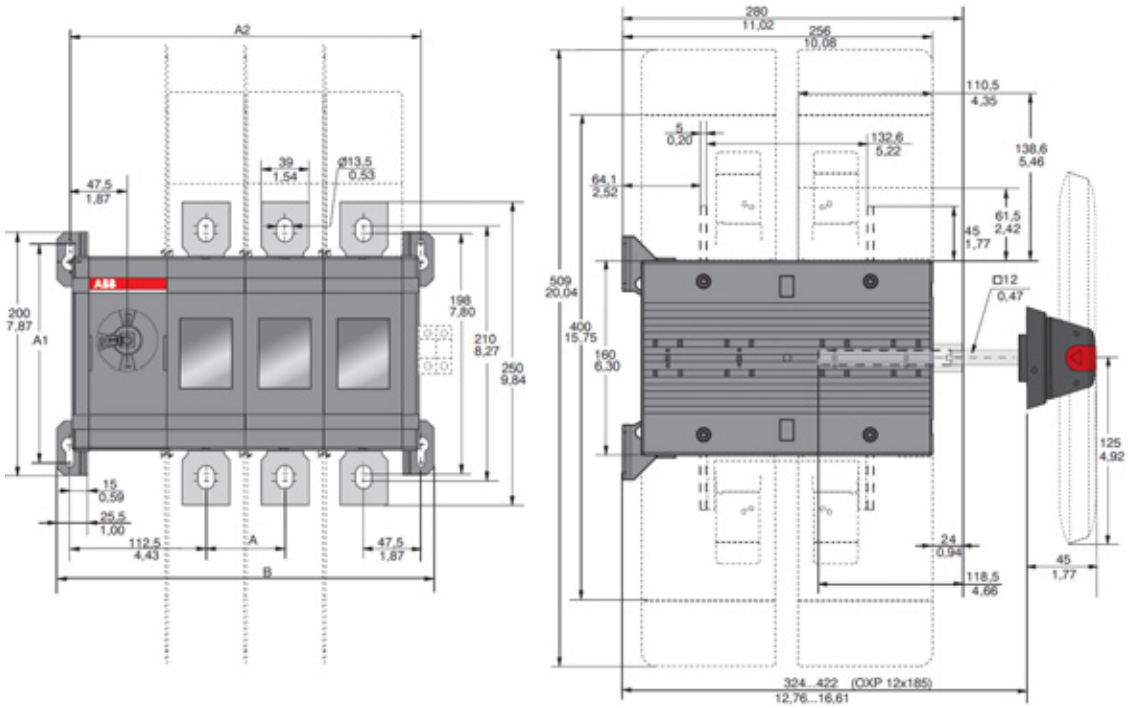
OT2000E12 (IEC)



www.abb.com

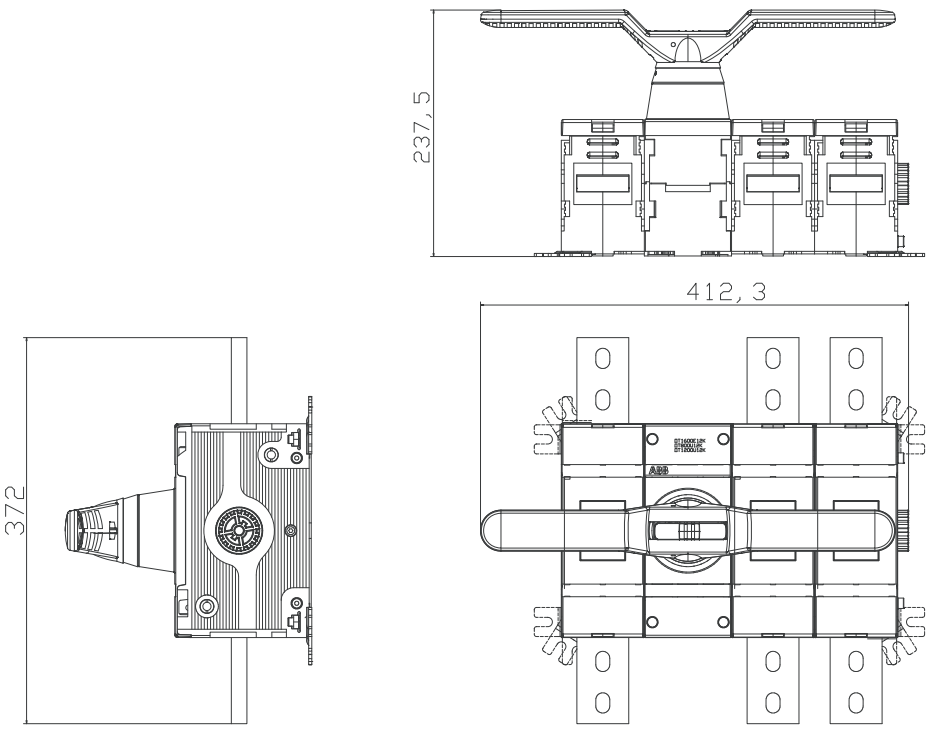
Dimensions in mm
1 mm = 0.0394 in

OT600U03 (UL/CSA)

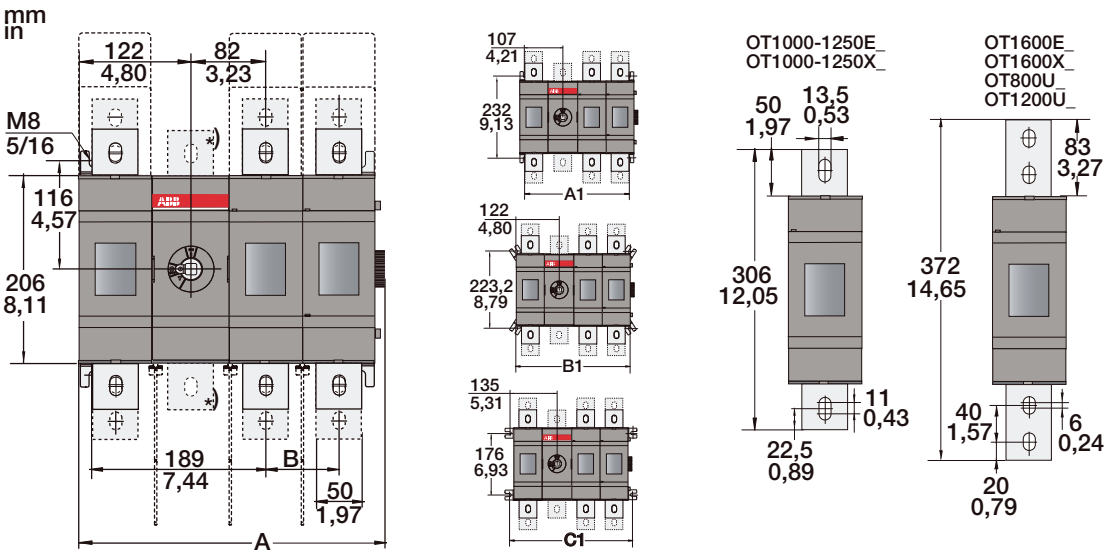


A	A1	A2	B
65	180	290	311

OT800U12 (UL/CSA)



OT1200U12 (UL/CSA)



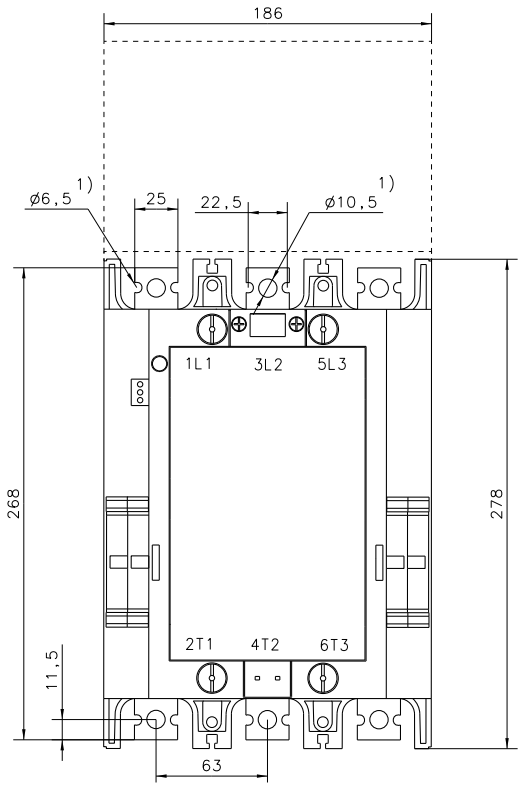
A	334.5
B	80
A1	294
B1	324
C1	350

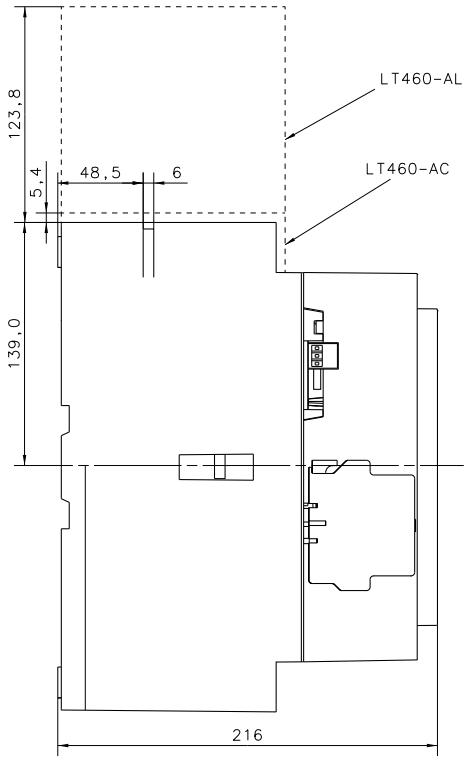
www.abb.com

Dimensions in mm
1 mm = 0.0394 in

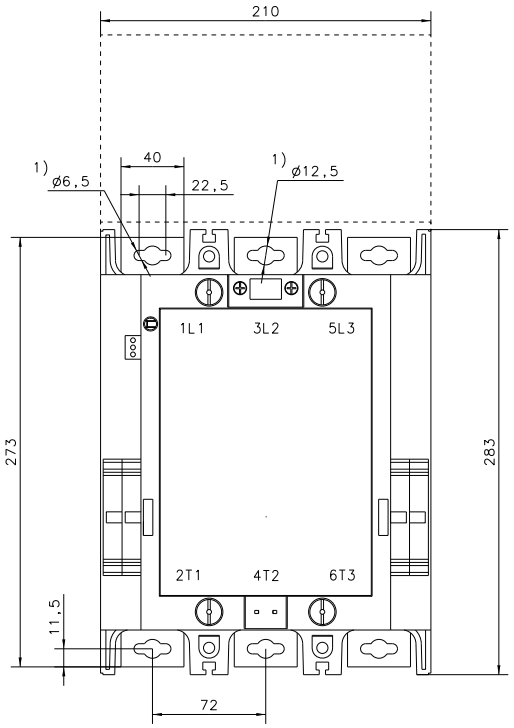
Main contactor

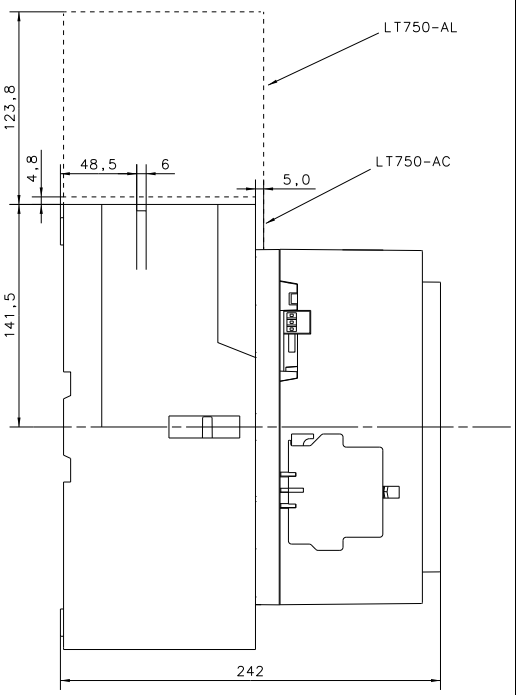
AF400-30-22-70 (IEC, UL and CSA)





AF580-30-22-70, AF750-30-22-70 (IEC, UL and CSA)



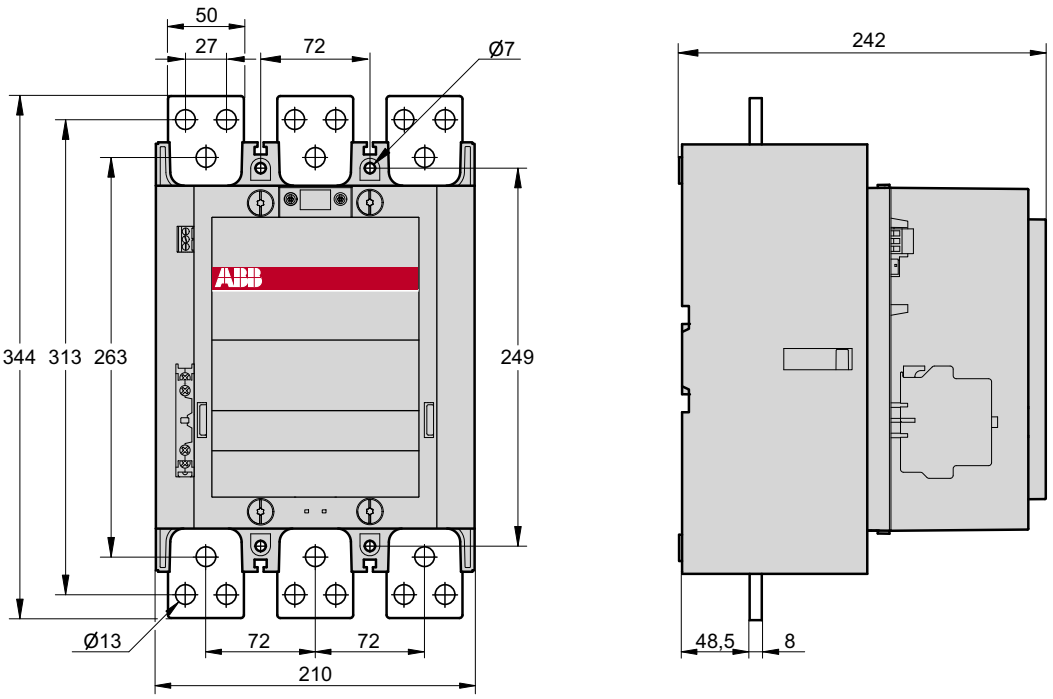


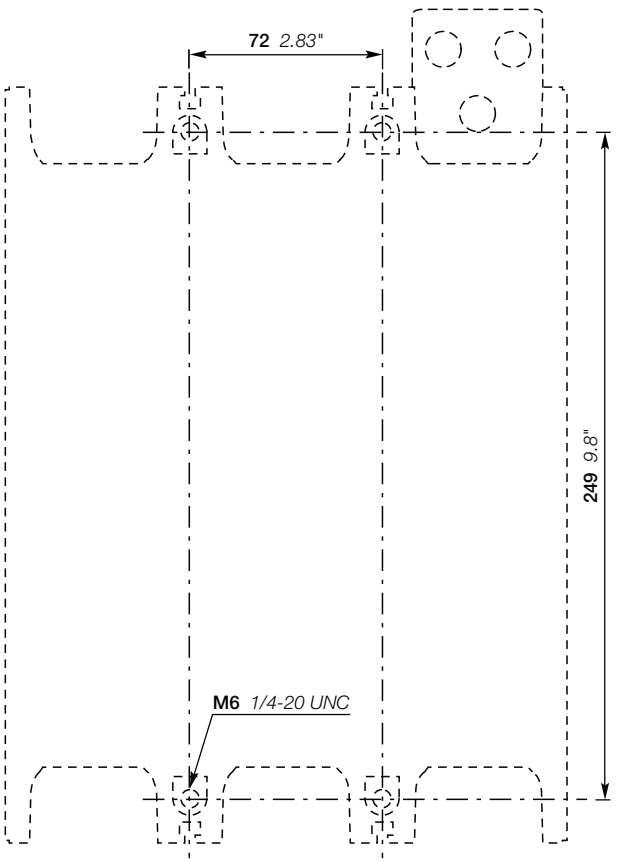
Dimensions in mm

1 mm = 0.0394 in

www.abb.com

AF1250-30-22-70 (IEC, UL and CSA)





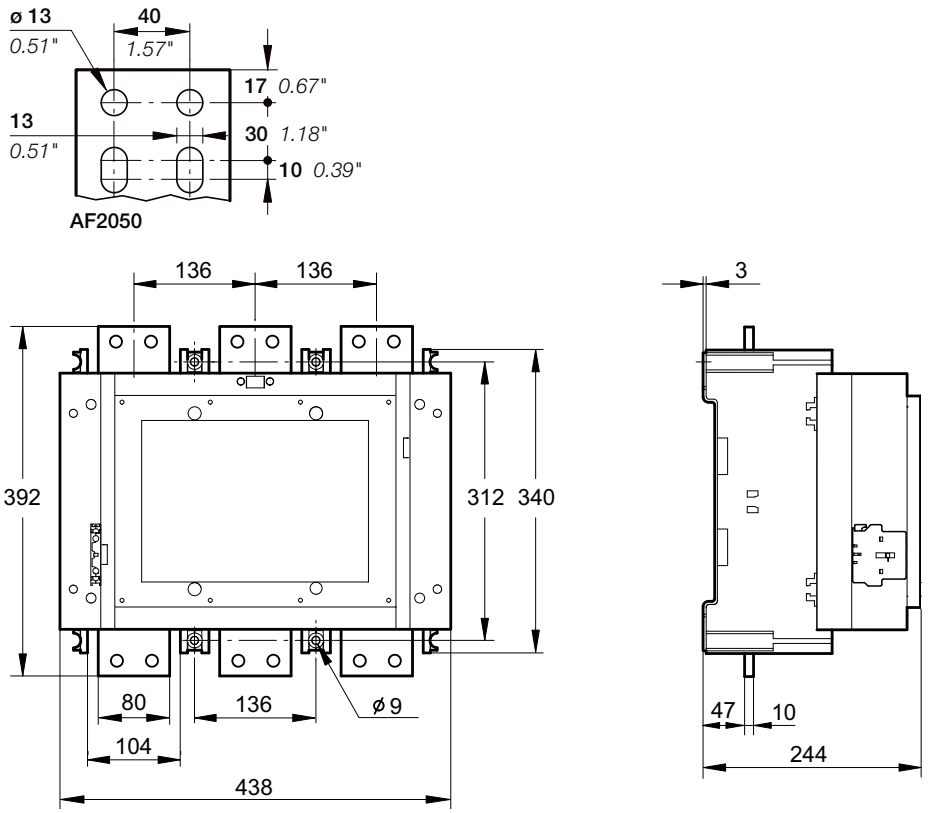
AF1250

Dimensions in mm

1 mm = 0.0394 in

www.abb.com

AF2050-30-22-70 (IEC, UL and CSA)



Dimensions in mm

1 mm = 0.0394 in

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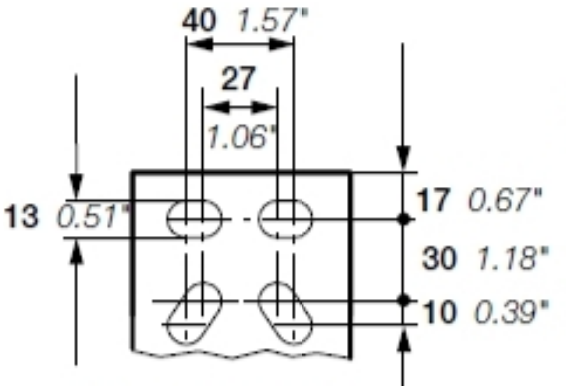
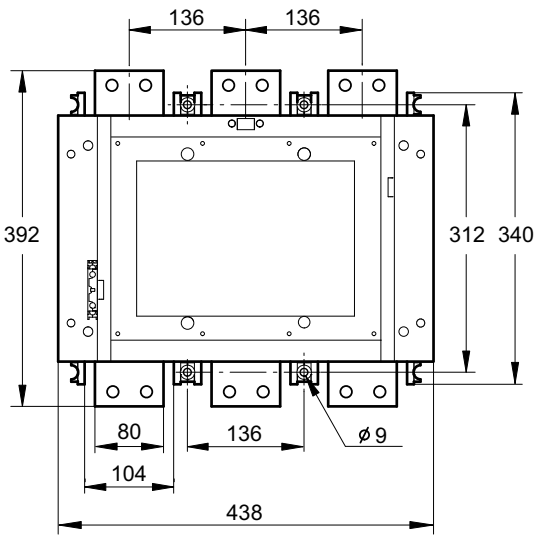
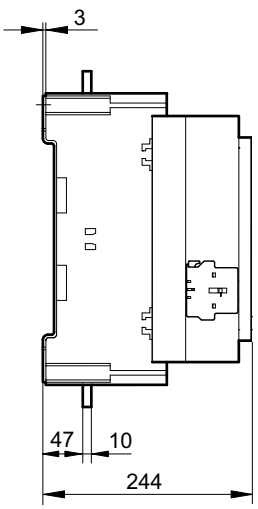
AF1650-30-22-70 (IEC, UL and CSA)







Dimensions in mm

1 mm = 0.0394 in

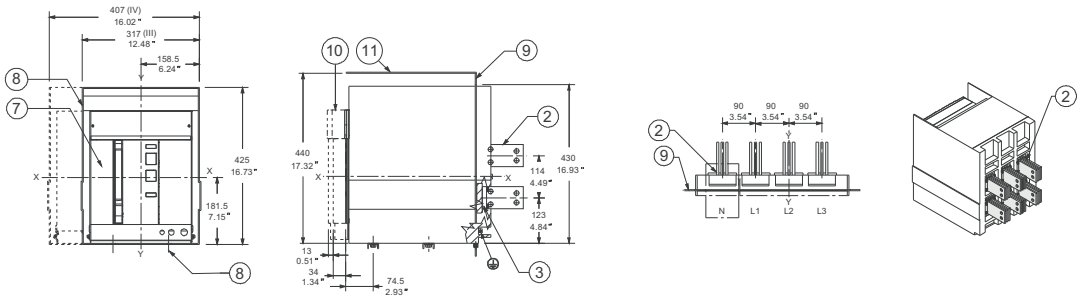
www.abb.com

Main circuit breaker

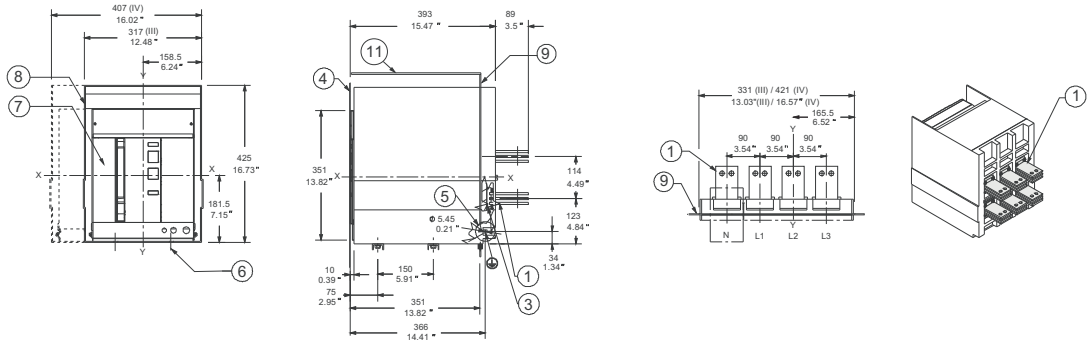
E2.2S-A (IEC/UL/CSA)

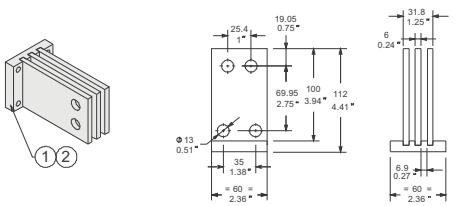
E2.2 B-A, N-A, S-A, H-A, V-A 250A - 2000A

VR adjustment



HR adjustment



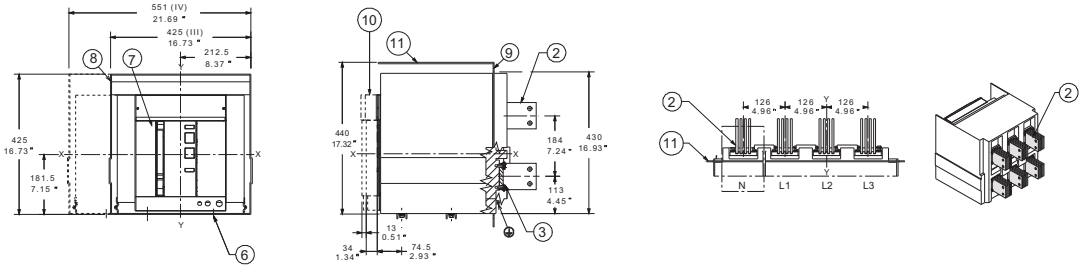


1	Horizontal terminals 1600 A - 2000 A	7	Moving part
2	Vertical terminals 1600 A - 2000 A	8	Fixed part
3	Tightening torque 8.6 N·m (76 lbf·in)	9	Segregation
4	Door position	10	Connected, test, disconnected distances
5	Grounding	11	Roof insulation or insulated material
6	Mounting fixed part screws		

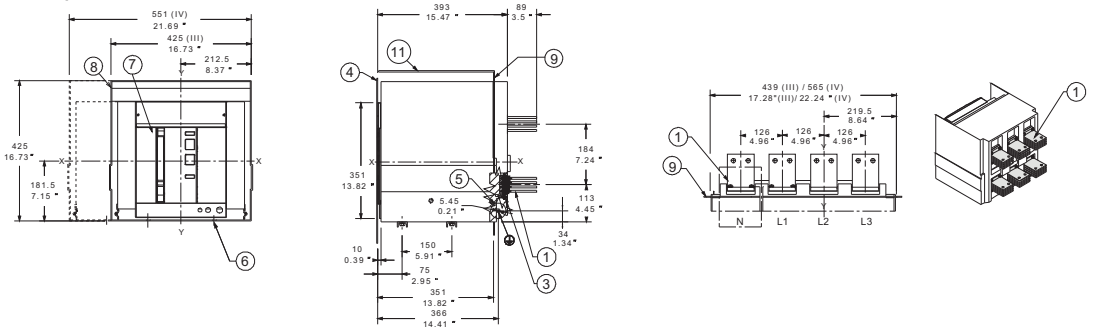
E4.2S-A (IEC/UL/CSA)

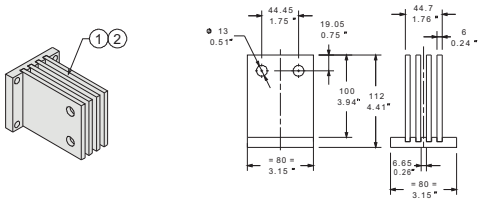
E4.2 S-A, H-A, V-A 800A - 2500A

VR adjustment



HR adjustment

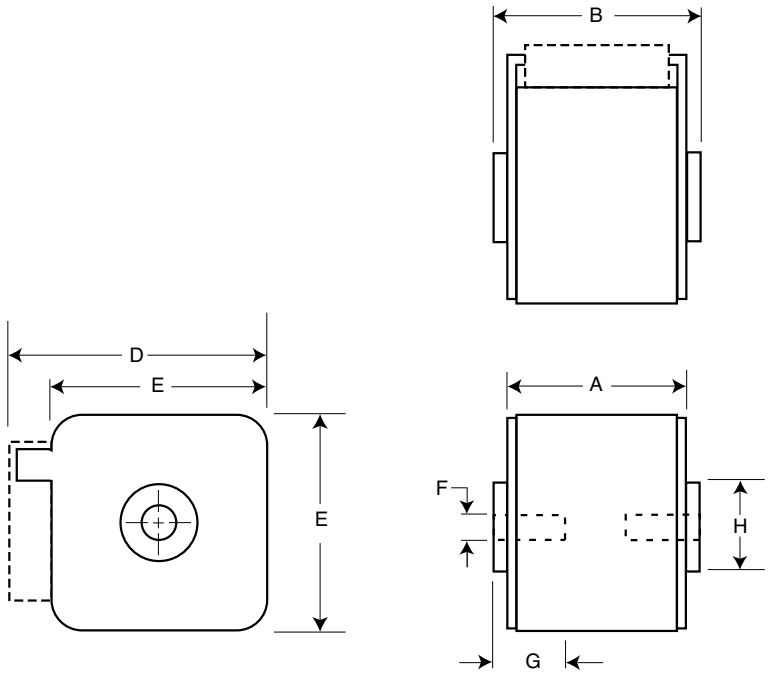




1	Horizontal terminals 2500 A	7	Moving part
2	Vertical terminals 2500 A	8	Fixed part
3	Tightening torque 20 N·m (177 lbf·in)	9	Segregation
4	Door position	10	Connected, test, disconnected distances
5	Grounding	11	Roof insulation or insulated material
6	Mounting fixed part screws		

AC fuses

170M6408, 170M6410, 170M6411, 170M6413, 170M6415, 170M6416, 170M6417, 170M6419



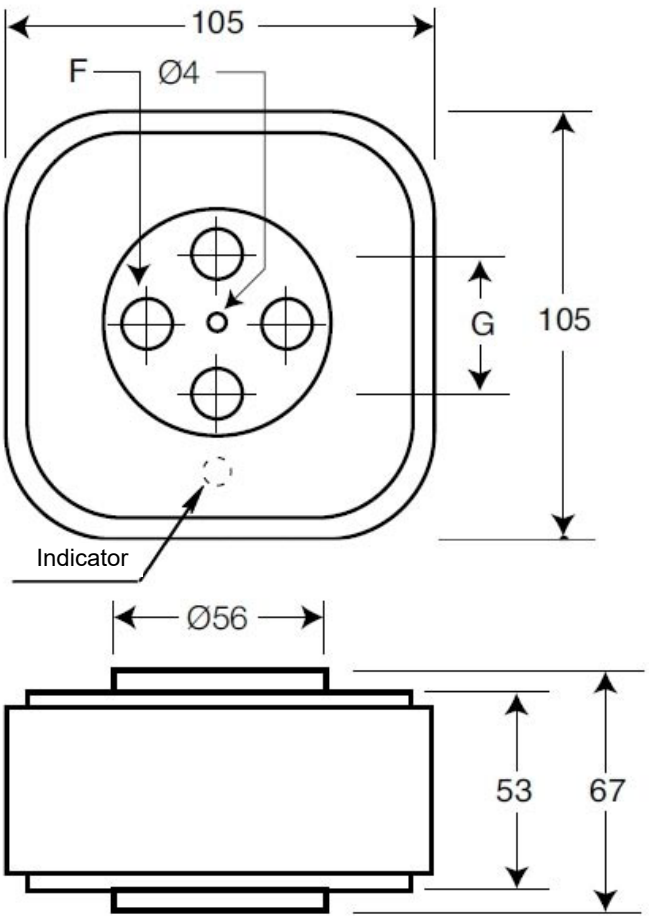
Size	A	B	D	E	F	G	H
3	51	53	92	76	M12	10	ø30
3*	51	65	92	76	M12	10	ø30

*For size 3 1600…2000 A

1 mm = 0.0394 in

www.cooperindustries.com

170M7059, 170M7062, 170M7063



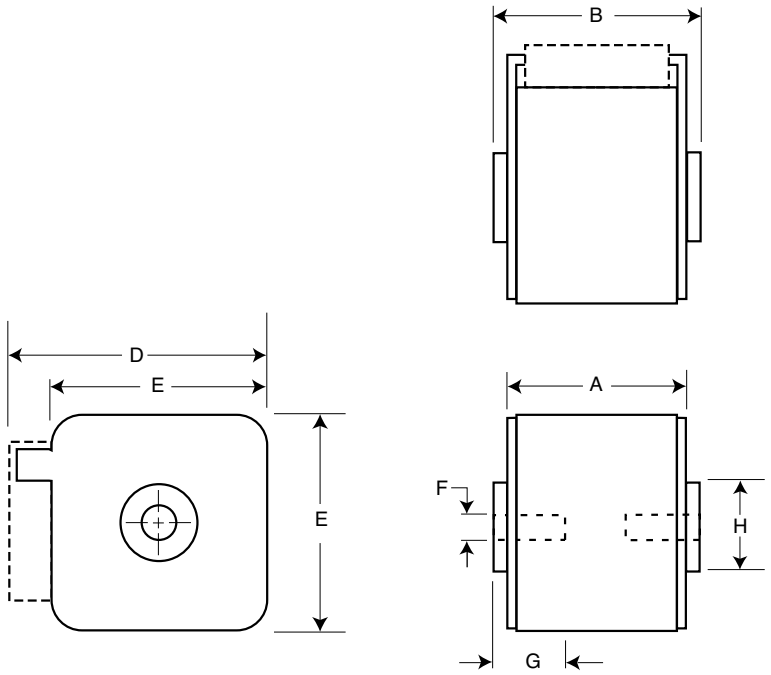
Size	F	G
4B	M10	33

1 mm = 0.0394 in

www.cooperindustries.com

DC fuses

170M6415, 170M6416, 170M6417, 170M6419



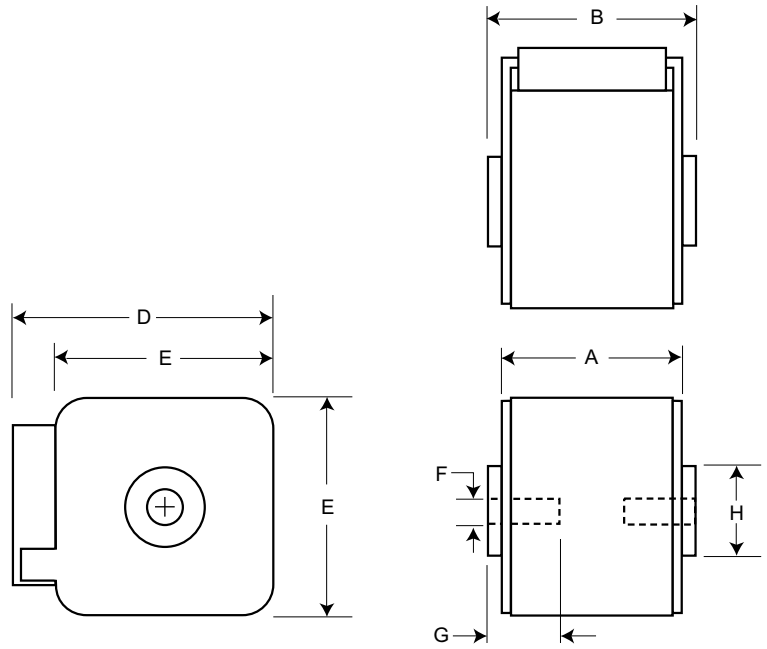
Size	A	B	D	E	F	G	H
3	51	53	92	76	M12	10	ø30
3*	51	65	92	76	M12	10	ø30

*For size 3 1600…2000 A

1 mm = 0.0394 in

www.cooperindustries.com

170M6546, 170M6549



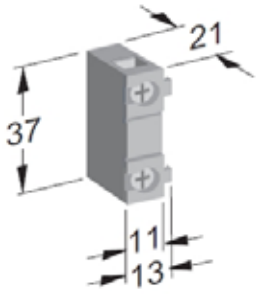
Size	A	B	D	E	F	G	H
3	81	83	92	76	M12	10	ø30

1 mm = 0.0394 in

www.cooperindustries.com

Auxiliary contacts

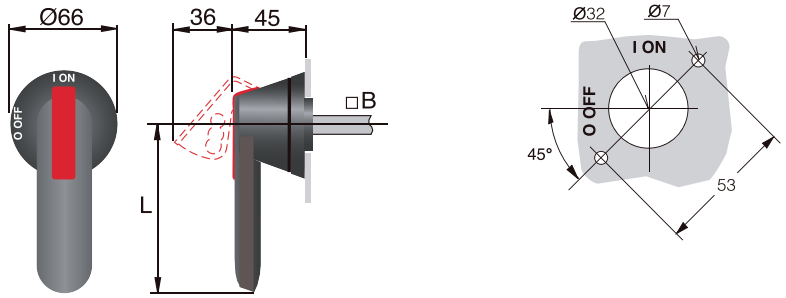
OA1G10, 0A3G01



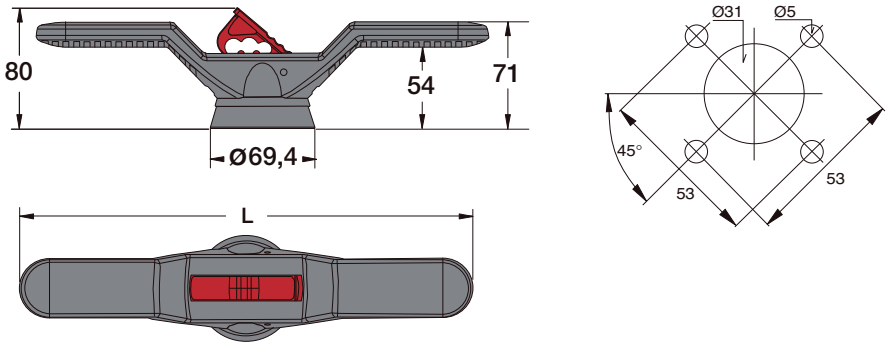
2×0.75…2.5 mm^2 (2×18…14 AWG)
0.8 N·m (7 lbf·in)
Pozidrive M3.5 Form 2

Handle

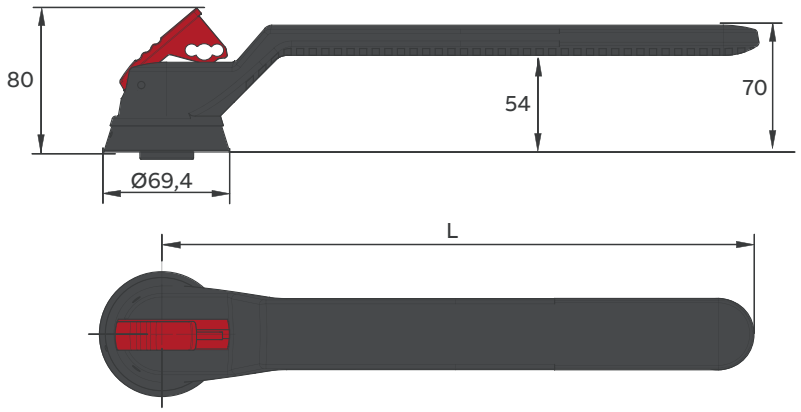
OHB65J6, OHB125J12



OHB150J12P, OHB200J12P



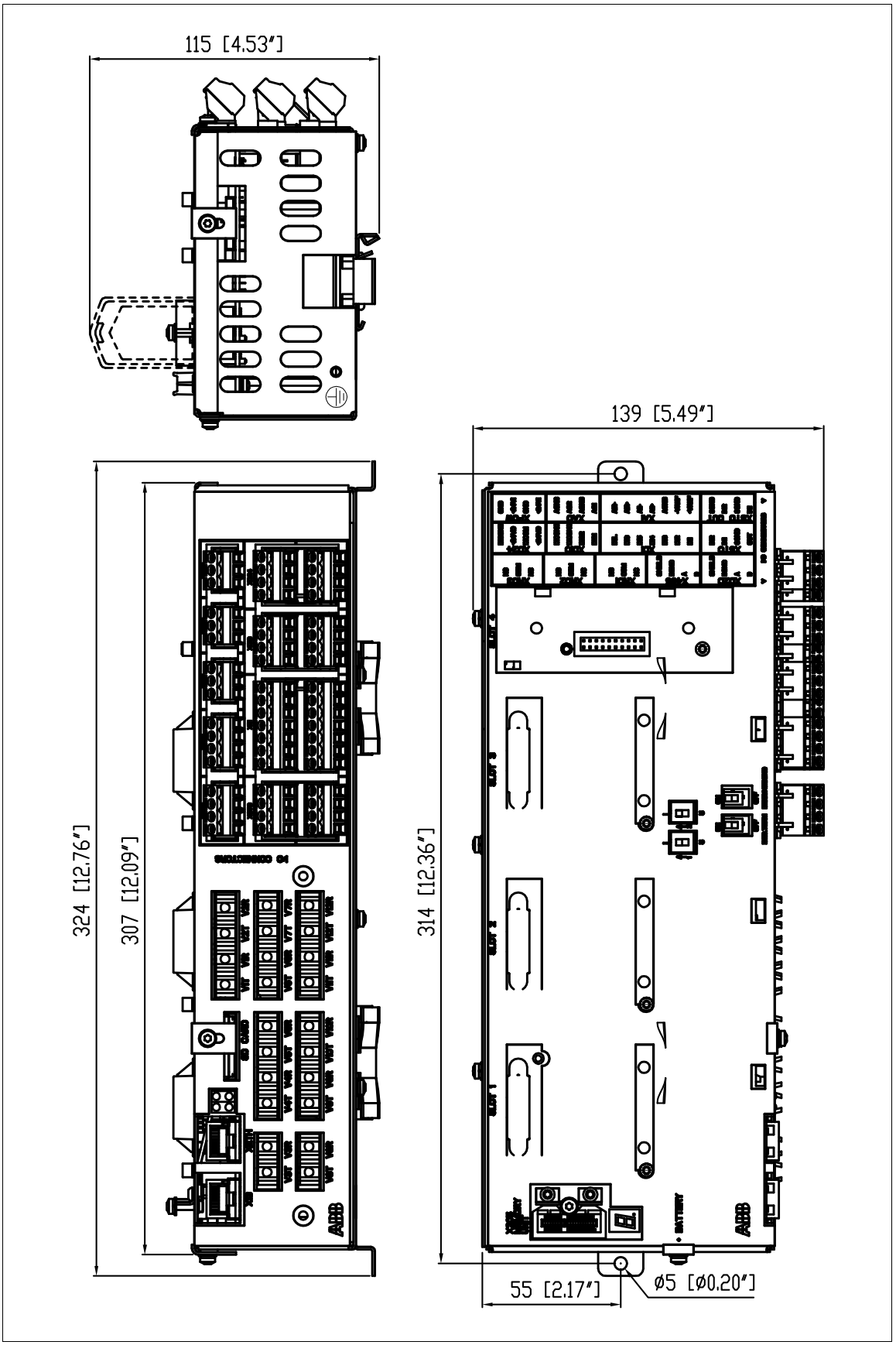
OHB274J12



Handle type	Length L [mm]
OHB65J6	65
OHB125J12	125
OHB150J12P	300
OHB200J12P	400
OHB274J12	274

1 mm = 0.0394 in

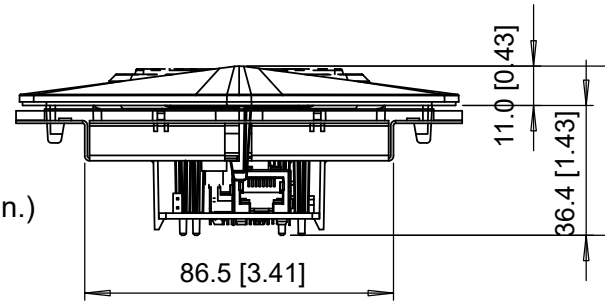
BCU control unit

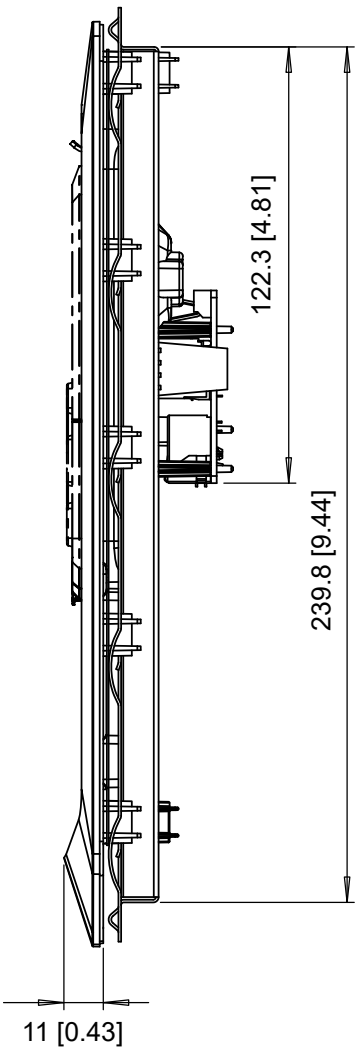


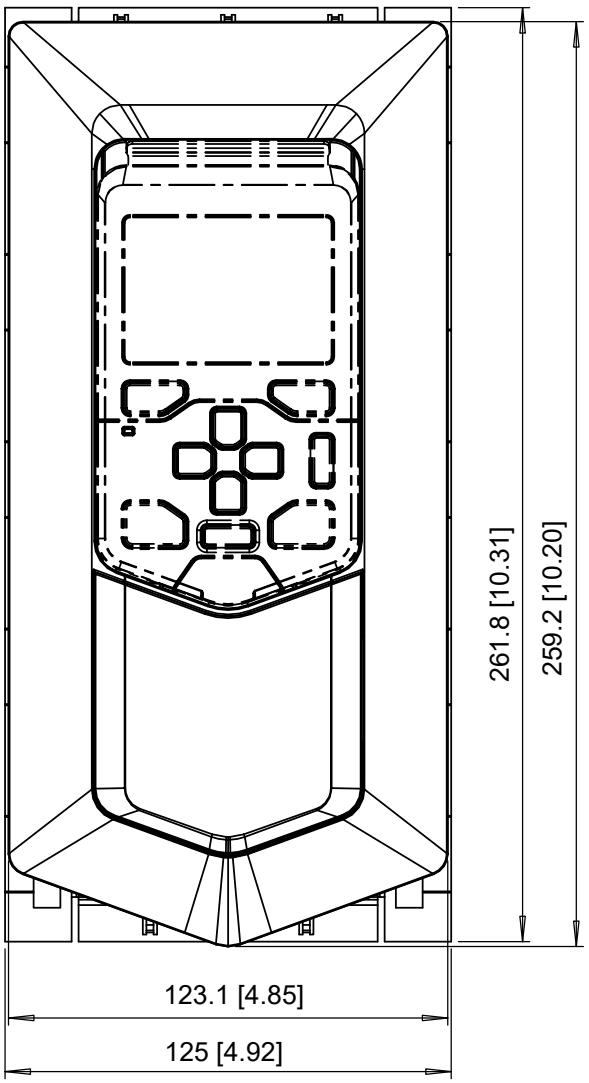
DPMP-01 door mounting kit

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

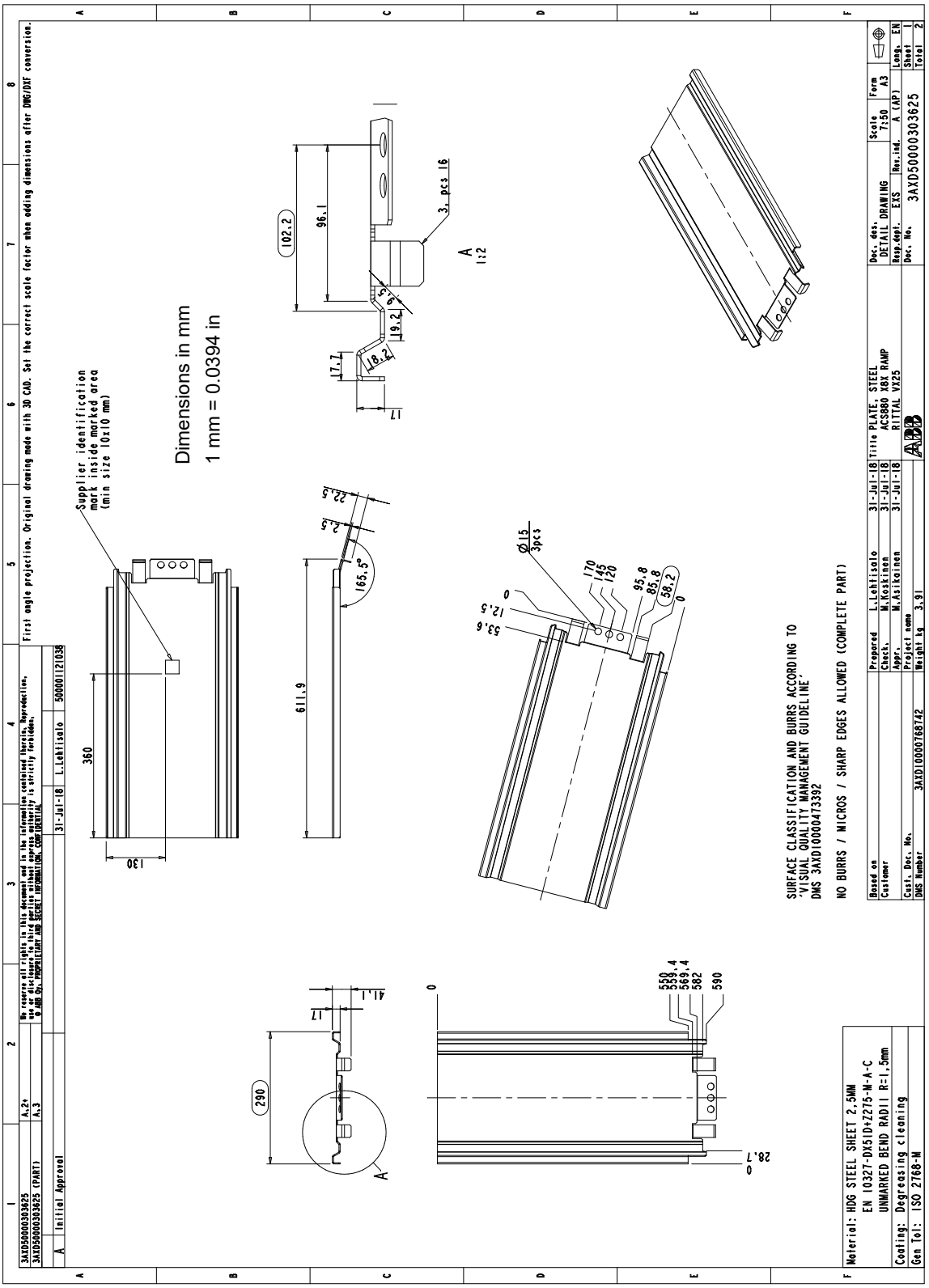
Plate thickness:
1.5…2.5 mm (0.059…0.098 in.)



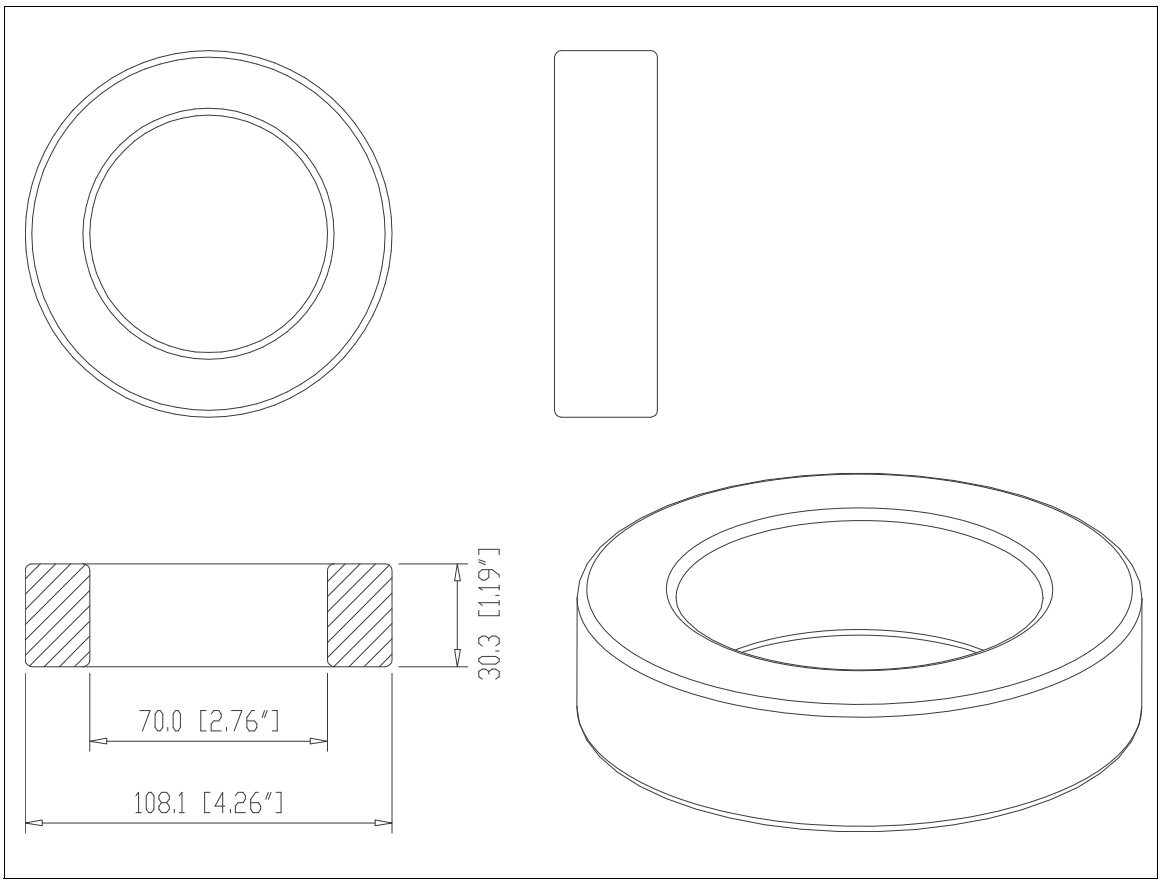




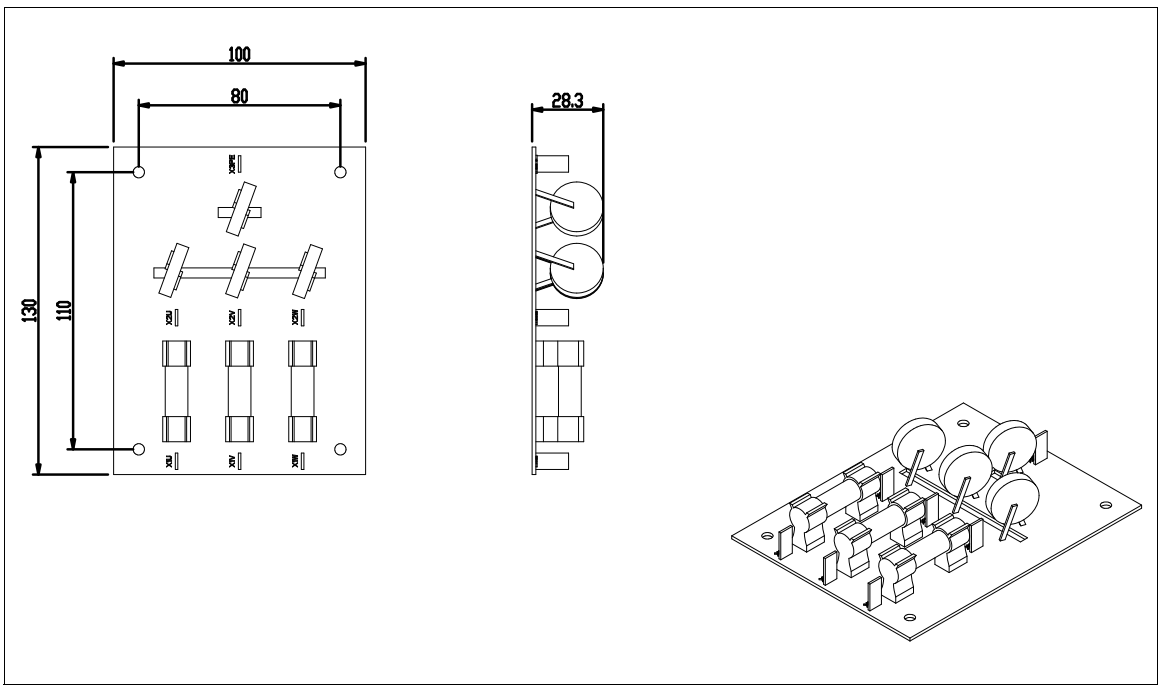
Ramp


Dimensions in mm
1 mm = 0.0394 in
Supplier identification
mark inside marked area
(min size 10x10 mm)
3. pcs 16
A
1:2
SURFACE CLASSIFICATION AND BURRS ACCORDING TO
'VISUAL QUALITY MANAGEMENT GUIDELINE'
DMS 3AXD10000473392
NO BURRS / MICROS / SHARP EDGES ALLOWED (COMPLETE PART)
Material: HDG STEEL SHEET 2.5MM
EN 10327-DX51D+Z275-M-A-C
UNMARKED BEND RADII R=1,5mm
Coating: Degreasing cleaning
Gen Tol: ISO 2768-M
3AXD50000303625
3AXD10000768742
ACS880 XBX RAMP
RITTAL VX25
DETAIL DRAWING
3AXD50000303625

Common mode filter

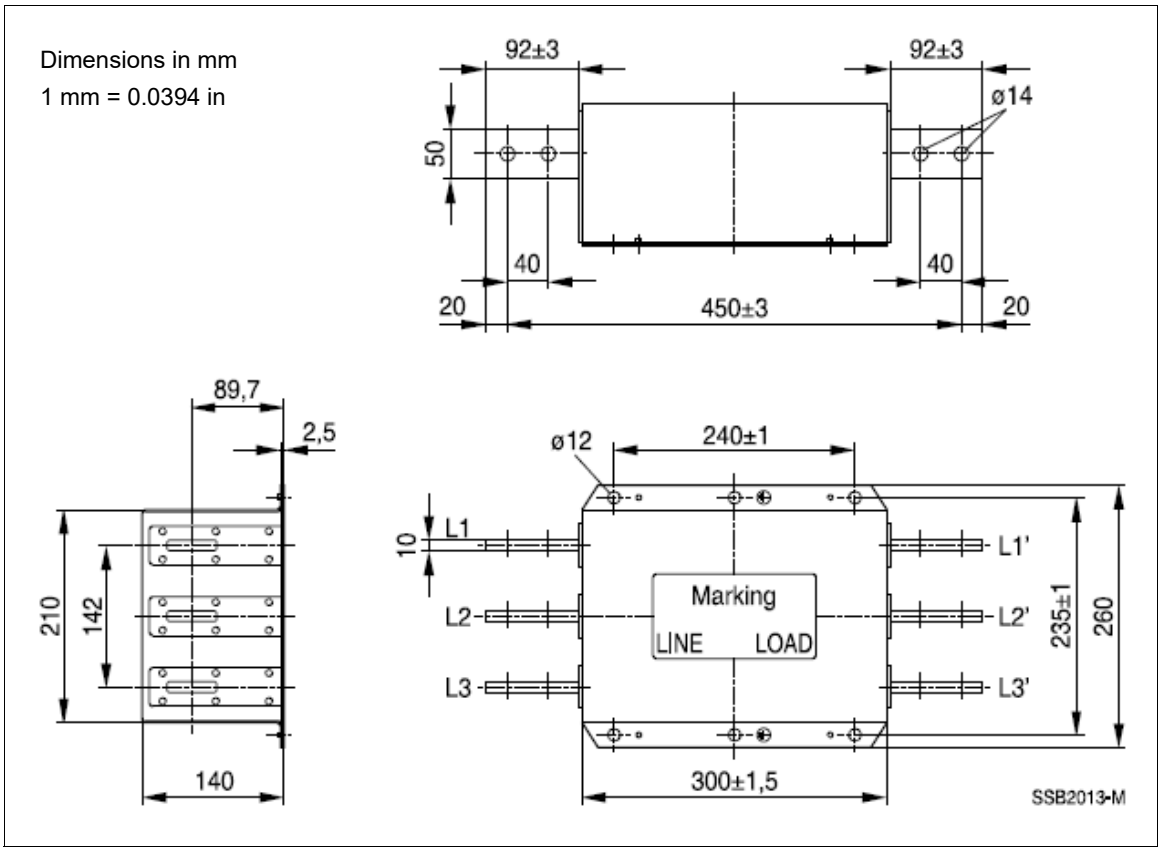


CVAR board

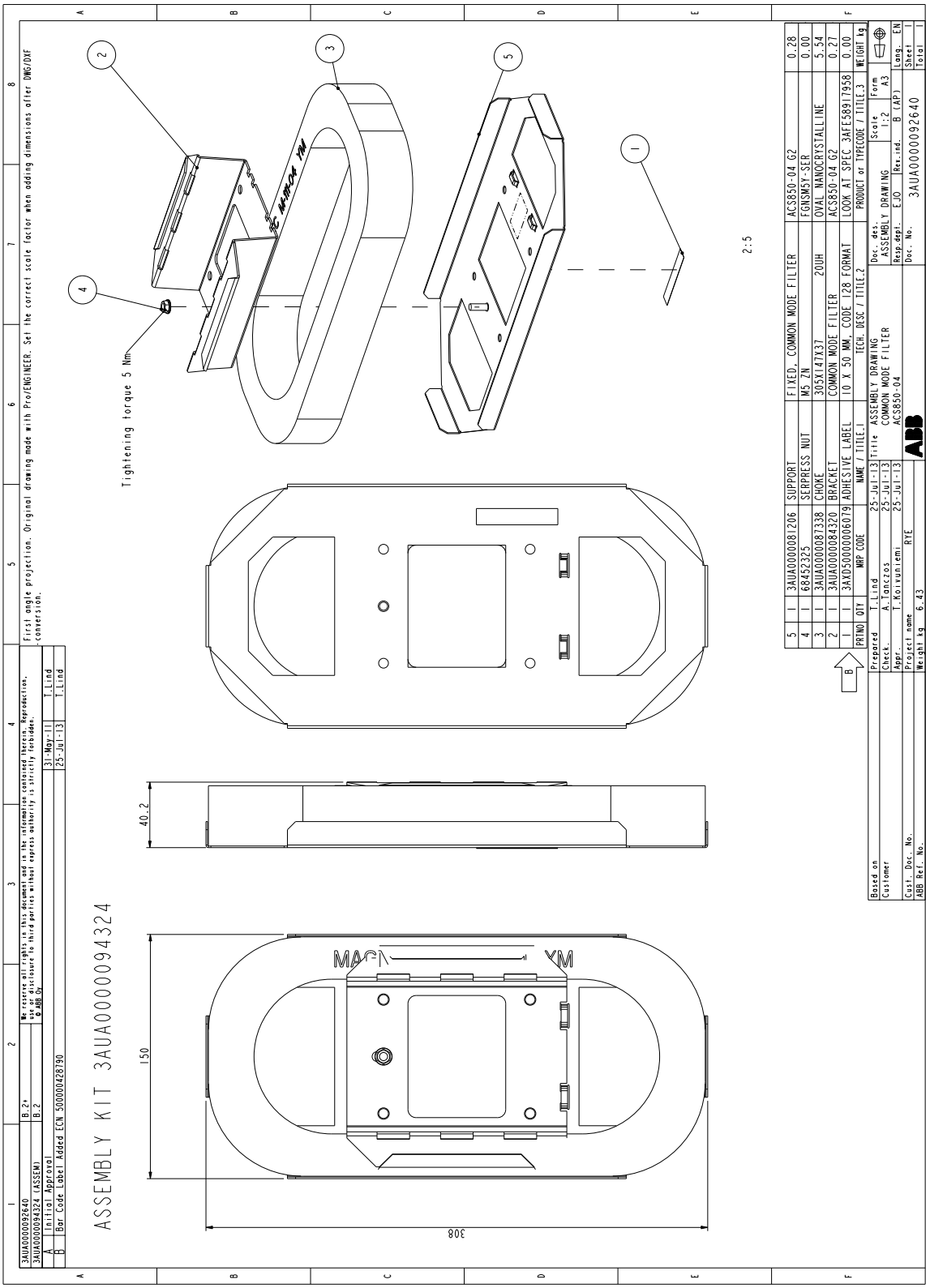


RFI filter and related accessories

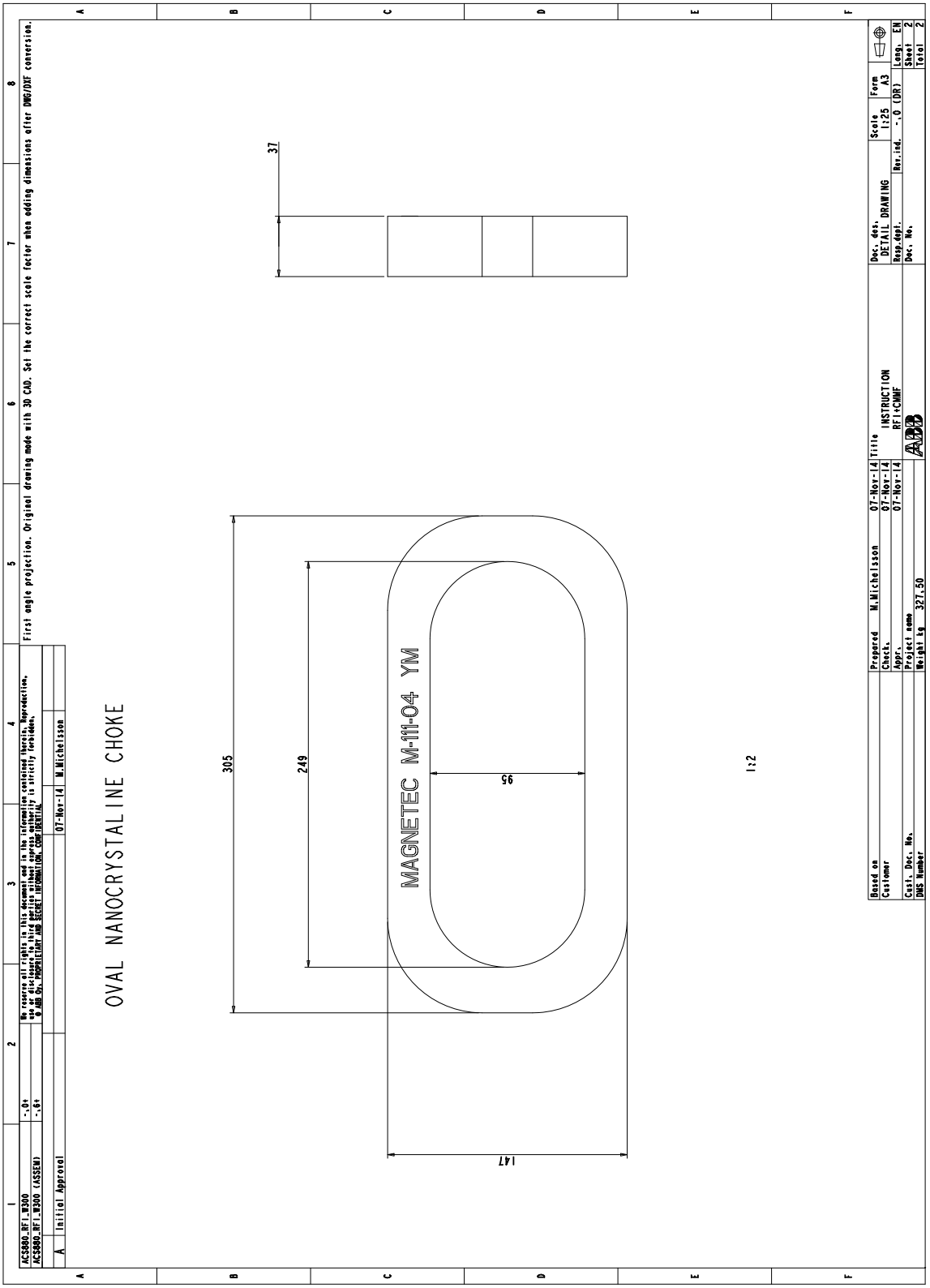
RFI filter



Oval toroid kit



Oval toroid


OVAL NANOCRYSTALINE CHOKE
MAGNETEC M-111-04 YM
305
249
95
147
37
1:2
First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
Initial Approval
07-Nov-14
M.Michelsson
Prepared
Check.
Appr.
Project name
Weight kg 327,50
Based on
Customer
Cust. Doc. No.
DMS Number
Title
INSTRUCTION
RF1+CMMF
DETAIL DRAWING
Doc. No.
Scale 1:25
Form A3
Rev.ind. -.0 (DR)
Lang. EN
Sheet 2
Total 2

14

Example circuit diagrams

Contents of this chapter

This chapter contains example circuit diagrams of ACS880-14/34 single drive module package.

Note: These diagrams do not necessarily match the installation-specific circuit diagrams of a tailor-made cabinet-installed unit.

The purpose of these diagrams is to help in:

- understanding the internal connections and operation of the cabinet-installed drive, and
- learning how to wire ACS880-14/34 when installed in a user-defined cabinet.

Note: By default, the Safe torque off (STO) function is not in use, and has been bridged at the factory as shown in the diagrams. For information on implementing the function, see chapter *The Safe torque off function* (page *327*).

Example circuit diagrams for 1×R8i + 1×R8i contain:

- main switch-disconnector
- main contactor
- EMC filters, C2
- LCL filter (type BLCL-xx-x)
- internal auxiliary voltage distribution
- control unit of the inverter module (type BCU-02)
- control unit of the IGBT supply module (type BCU-02)
- Safe torque off circuit.

Example circuit diagrams for 2×R8i + 2×R8i contain:

- main circuit breaker
- internal auxiliary voltage distribution
- control unit of the inverter modules (type BCU-02)
- control unit of the IGBT supply modules (type BCU-02)
- Safe torque off circuit.

Component designations used in the diagrams

Designation	Component
A1.x	Varistor board CVAR-01C (in UL/CSA installations only)
A41	BCU control unit for inverter module(s)
A51	BCU control unit for supply module(s)
A58	DPMP-01 control panel kit
A59	ACS-AP-x control panel
Fxx.xx	Fuses
Q1.x	Main switch/disconnector / main circuit breaker
Q2.x	Main contactor
Q3.x	Charging switch
Q4.x	Charging contactor
R03	LCL filter module (type BLCL-1x-x or BLCL-2x-x)
Rx.x	Charging resistors
Rx.x	Common mode filters
T01.x	Supply module(s) (type ACS880-204)
T11.x	Inverter module(s) (type ACS880-104)
T21	Auxiliary voltage transformer

1×R8i + 1×R8i

Project type	Example Circuit Diagrams
Converter type	ACS880-14/34 Regenerative/Low harmonic single drive package
Frame Size	R8i+R8i
Type Code	ACS880-14/34-0870A-3+C183
Revision	Revision B

Used EPLAN version: P8 2.9.4.14734

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Title page / cover sheet		Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	=	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 000A
			Resp. Dept.	Cont.	000B

Higher-level function	Page	Page description	Revision
	000A	Title page / cover sheet	B
	000C	Structured identifier overview	B
	000D	Summarized parts list	B
	000E	Summarized parts list	B
	300A	Symbol Overview	B
01	001a	Main Supply	B
	001b	Main Supply	B
	003a	Main line connections	B
	003c	Main line connections	B
	005a	Module connections	B
	020a	Aux. voltage distribution	B
	021a	Aux. voltage distribution	B
	040a	Inverter Control Board	B
	040b	Inverter Control Board	B
	040c	Inverter Control Board	B
	050a	Supply Control Card	B
	050b	Supply Control Card	B
	050c	Supply Control Card	B
	050d	Supply Control Card	B
	061a	Module connections	B
	095a	Module heater	B
	110a	DOL Fan Transformer	B

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Table of contents		Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	=	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 000B
			Resp. Dept.	Cont.	000C

Function designations

Designation	Structure description
=01	Drive unit

Location designations

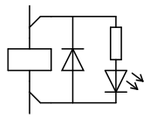
Designation	Structure description
+01.1	Auxiliary control unit (External)
+02.1	Incoming unit (External)
+03.1	IGBT supply cubicle
+11.1	Inverter cubicle

Electrical option designations

Designation	Material Code	Amount
CMF Filter	3AUA0000032859	7
CMF Filter C2	3AUA0000094324	1
Charging Kit	3AXD50000022093	1
Control Panel	3AXD50000025965	1
DDCS communication	68882915	2
Filter Module	3AXD50000621156	1
Fuse	68244463	3
Inverter Control Unit	3AXD50000003417	1
Inverter Module	ACS880-104-0900A-3	1
Main Contactor	64399772	1
Panel Interface	3AUA0000108650	1
Panel mounting kit	3AUA0000108878	1
RFI Filter	3AXD50000009256	1
Supply Control Unit	3AXD50000002937	1
Supply Module	ACS880-204-0810A-3	1
Switch Kit	3AXD50000000894	1

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Structured identifier overview		Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	=	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 000C
			Resp. Dept.	Cont.	000D

GENERAL/RELAY COIL, WITH PROTECTIVE CIRCUIT DIODE AND R+LED



GENERAL/RELAY COIL

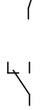
COIL WITH PICK-UP DELAY

COIL WITH OFF-DELAY

NO CONTACT

NC CONTACT

CHANGE OVER CONTACT



NO CONTACT, WITH CLOSING DELAY

TWO NO CONTACTS ONE INPUT, TWO OUTPUTS

TWO CONNECTED CHANGE OVER CONTACTS

POWER NO CONTACT OF A CONTACTOR

PUSH BUTTON WITH NO CONTACT

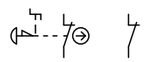
PUSH BUTTON WITH NC CONTACT

NO SWITCH, OPERATED BY TURNING, 2 POSITIONS

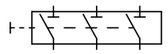
LIMIT SWITCH NC CONTACT MECHANICALLY OPERATED

NC SWITCH, TEMPERATURE OPERATED

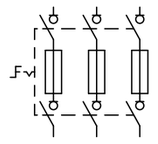
EMERGENCY STOP PUSH BUTTON



DISCONNECT SWITCH, THREE-POLE



SWITCH DISCONNECTOR WITH FUSES, THREE-POLE

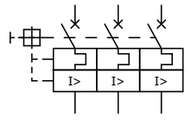


FUSE

FUSE DISCONNECTOR

CIRCUIT BREAKER

MOTOR OVERLOAD SWITCH WITH SWITCH MECHANISM



COMMON MODE FILTER FOR HIGH FREQUENCY CURRENTS

PROTECTIVE EARTH CONNECTED TO FRAME

PROTECTIVE EARTH CONNECTED TO TERMINAL / PE BUSBAR

FUNCTIONAL EARTHING CONNECTED TO TERMINAL

FUNCTIONAL BONDING TO FRAME

LIGHT

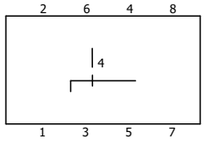
INDUCTOR

CAPACITOR

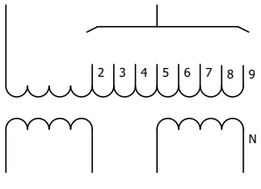
RESISTOR

POWER RESISTOR WITH FUSE

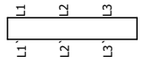
PHASE SELECTING SWITCH



TRANSFORMER



EMC FILTER



TERMINAL, FOUR POLE

PLUG AND SOCKET TERMINAL BLOCK WITH 4 CONNECTION POINTS

FEMALE AND MALE PLUG

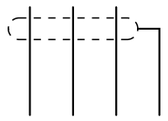
AMPERE METER

CURRENT TRANSFORMER

VOLTAGE METER

WIRE TERMINATION, INSULATED

SHIELDED CABLE



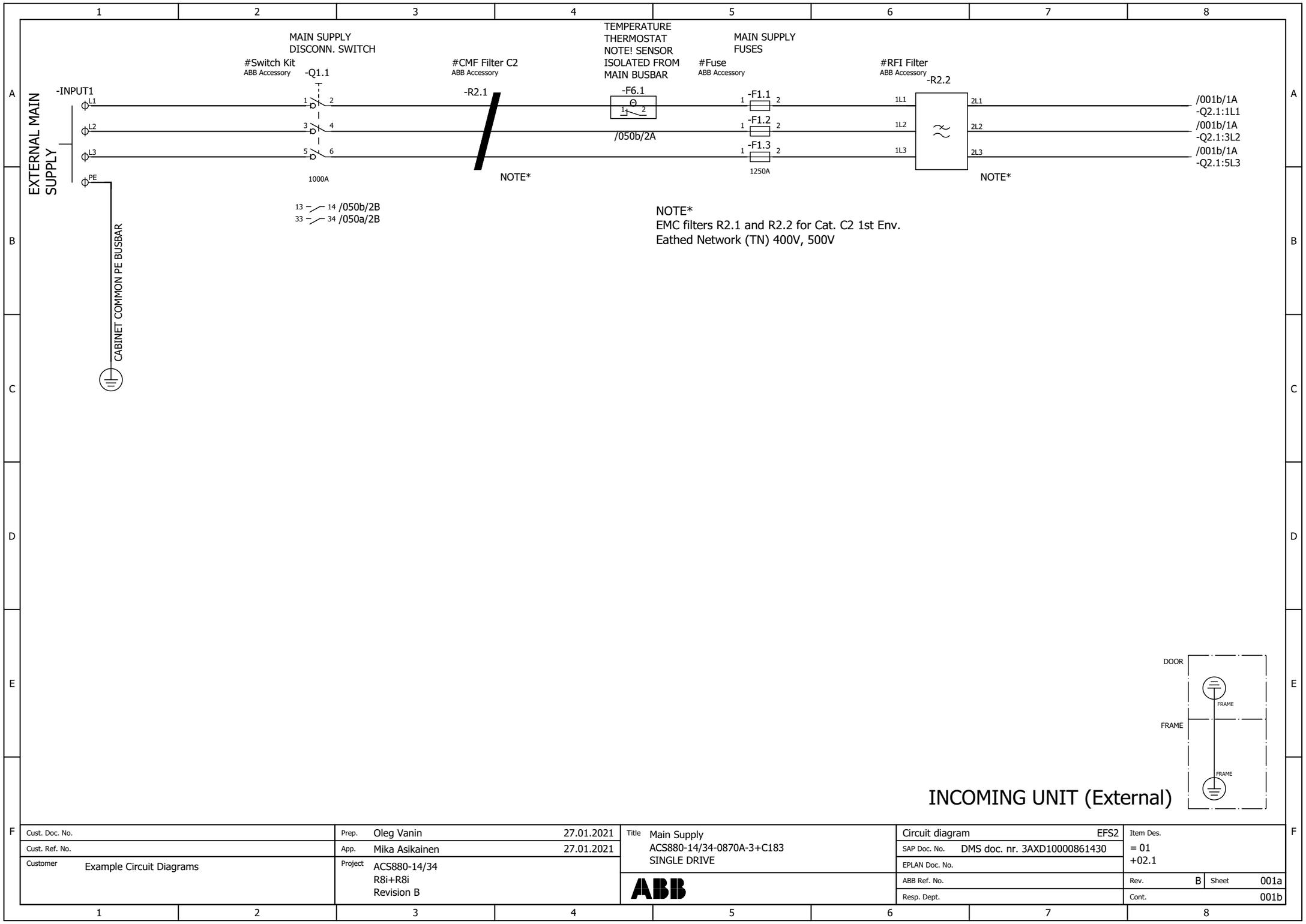
THERMAL OPERATION

DISCONNECT

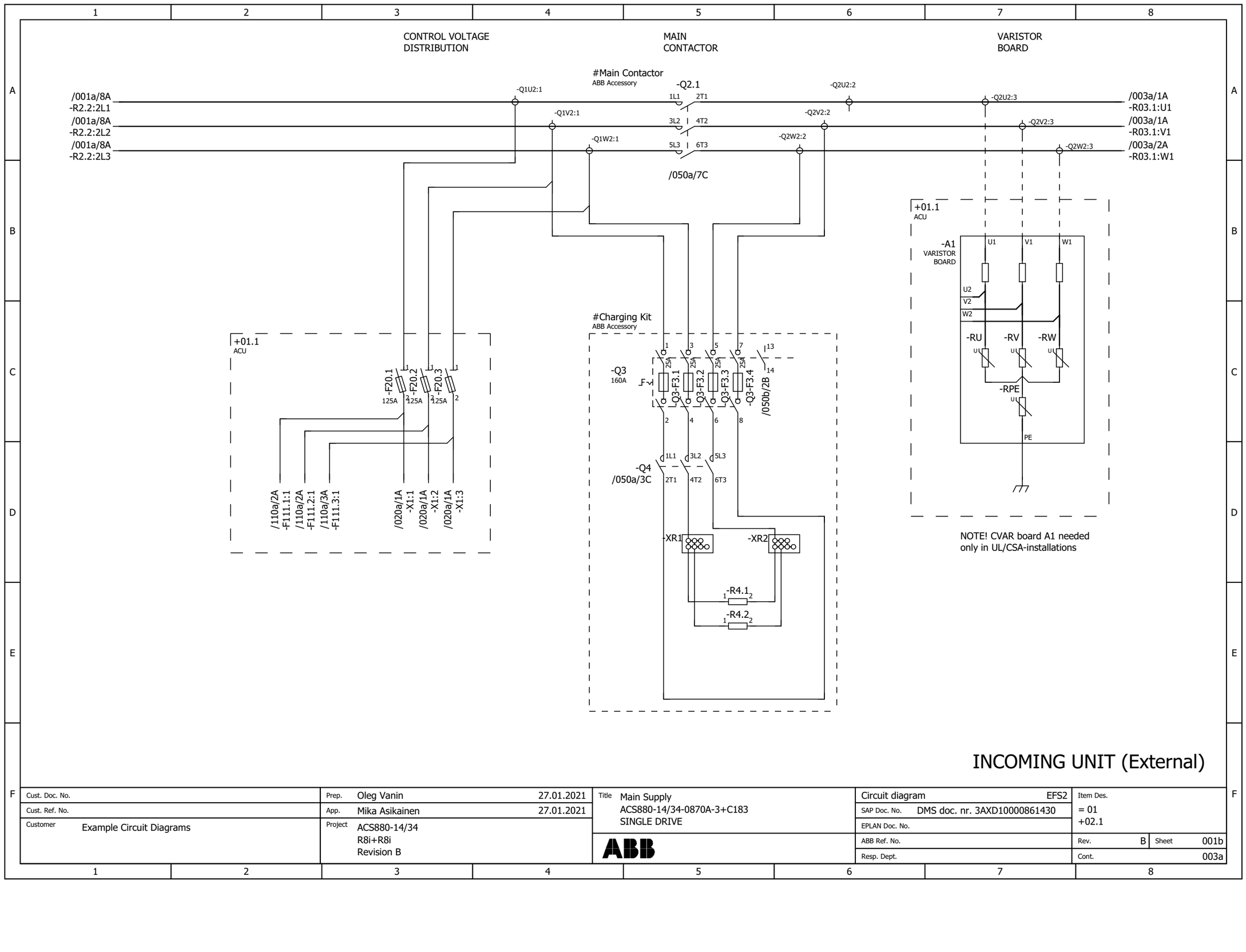
DISCONNECT, CAN BE OPERATED WHILE NOMINAL CURRENT IS APPLIED

BREAKER, SHORTCIRCUIT BREAKING CAPABILITY

Cust. Doc. No.		Prep. Oleg Vanin 27.01.2021	Title Symbol Overview			Item Des.	
Cust. Ref. No.		App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		=	
Customer Example Circuit Diagrams		Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.			
				ABB Ref. No.		Rev. B	Sheet 300A
				Resp. Dept.		Cont.	=01/001a



Cust. Doc. No.		Prep. Oleg Vanin	27.01.2021	Title Main Supply ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +02.1	
Cust. Ref. No.		App. Mika Asikainen	27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer	Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B			EPLAN Doc. No.		
				ABB	ABB Ref. No.	Rev. B	Sheet 001a
					Resp. Dept.	Cont.	001b



INCOMING UNIT (External)

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Main Supply ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +02.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 001b
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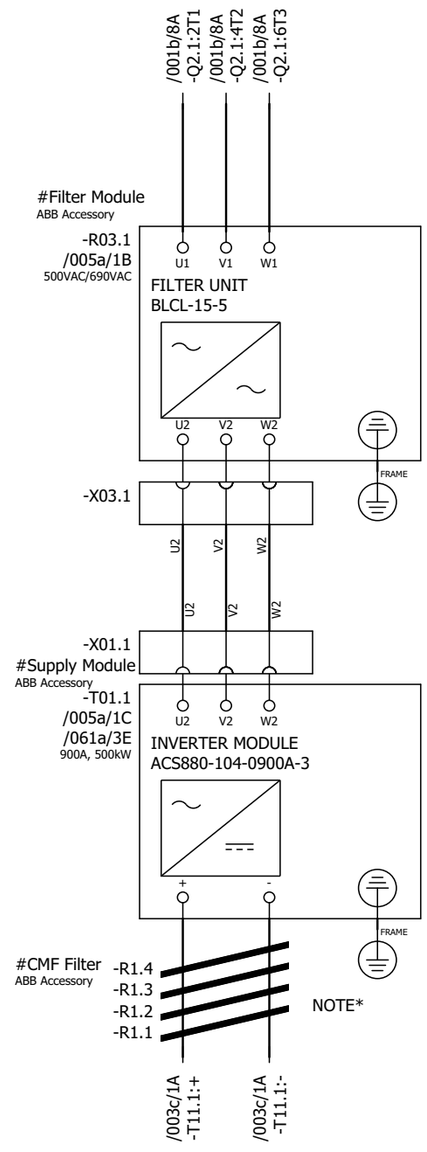


LCL MODULE

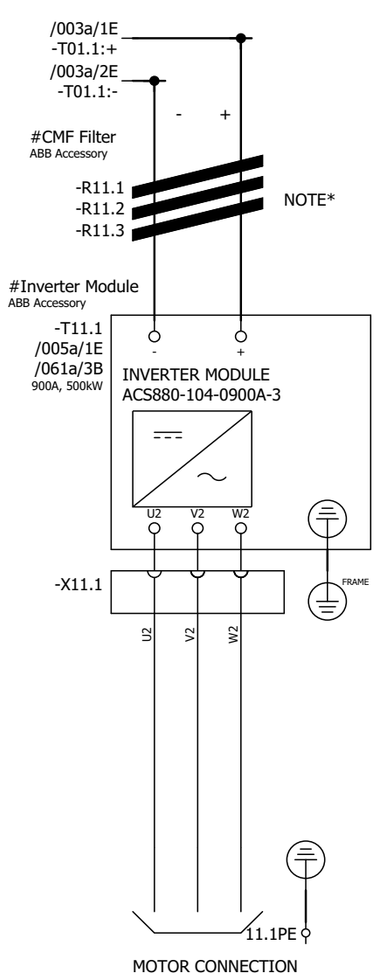
ISU MODULE

NOTE*
EMC filters R1.3 - R1.4 for Cat. C2 1st Env.
Eathed Network (TN) 400V, 500V

IGBT SUPPLY CUBICLE

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Main line connections ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	= 01 +03.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 003a
			Resp. Dept.	Cont.	003c

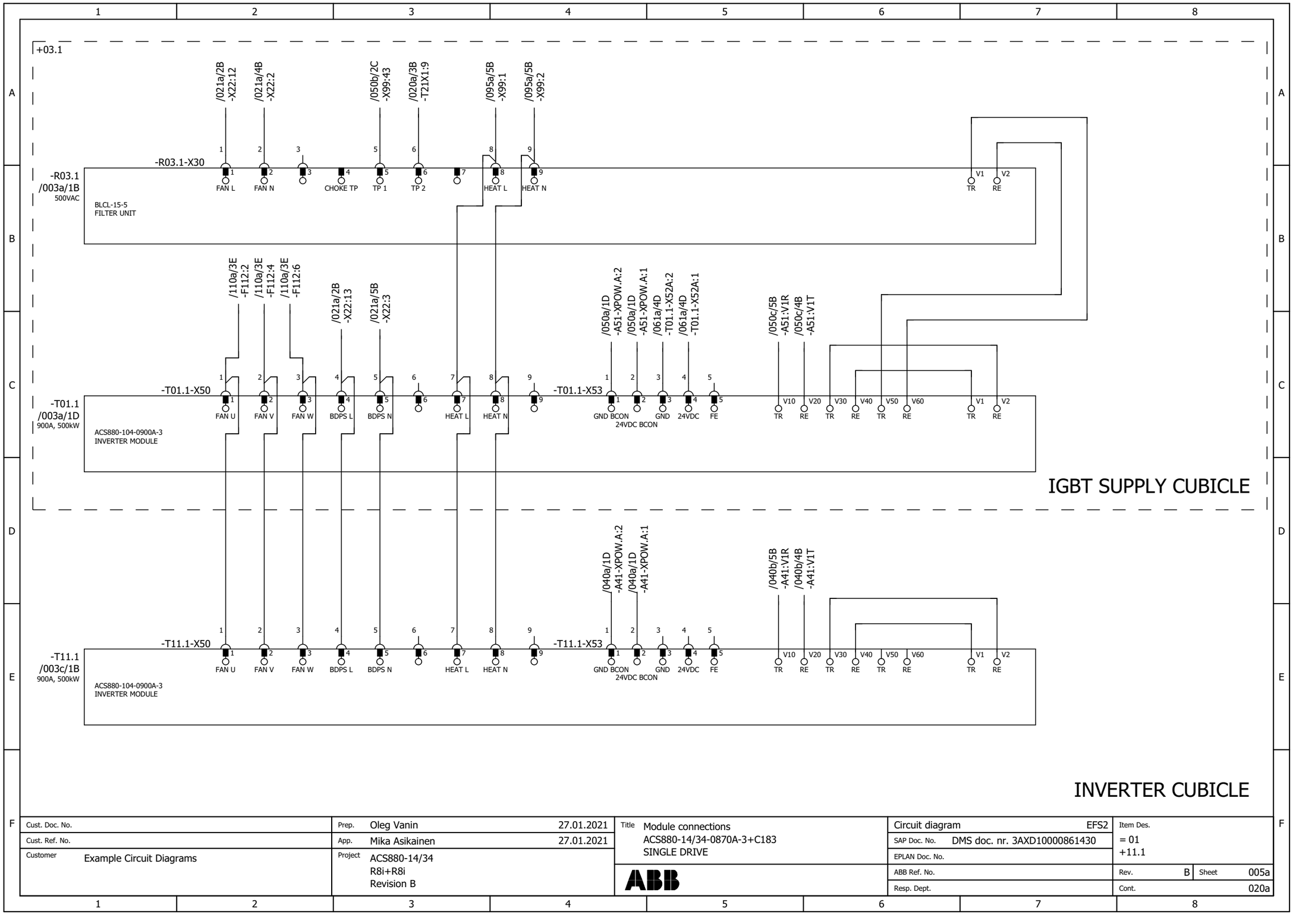
INU MODULE



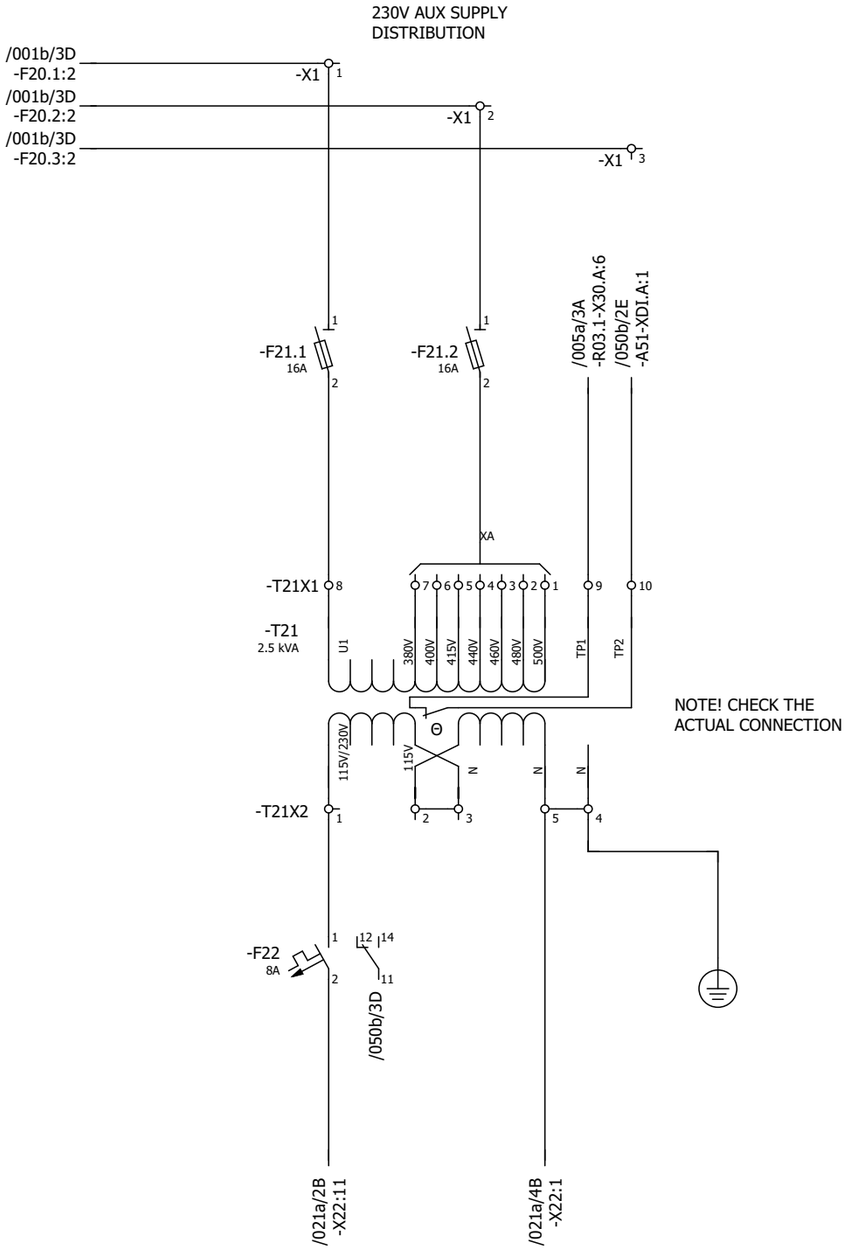
NOTE*
EMC filter R11.3 for Cat. C2 1st Env.
Eathed Network (TN) 400V, 500V

INVERTER CUBICLE

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Main line connections ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	= 01 +11.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 003c
			Resp. Dept.	Cont.	005a

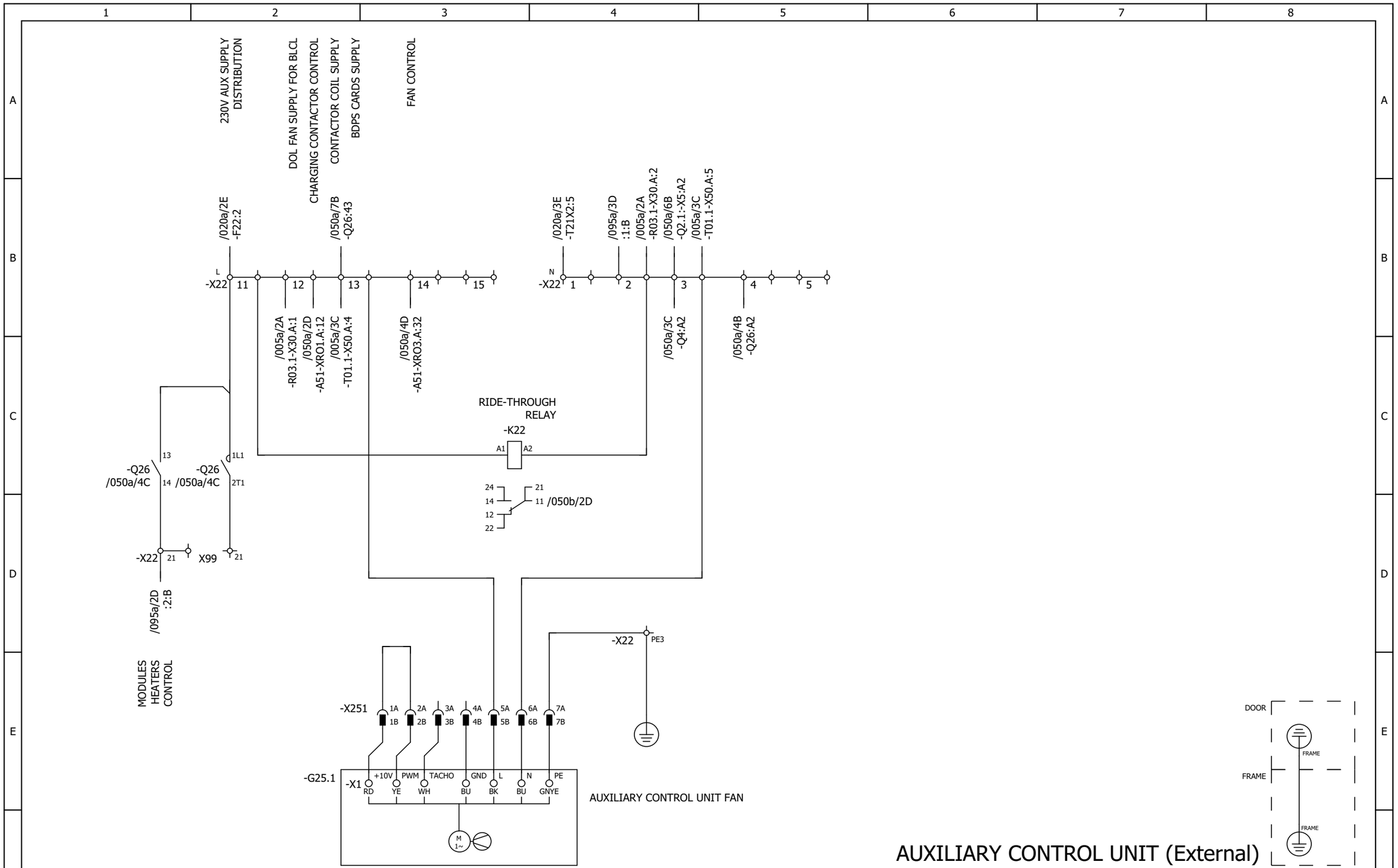


Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Module connections ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2 / Item Des.
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430 / = 01 +11.1
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No. / ABB Ref. No. / Resp. Dept. / Rev. B / Sheet 005a / Cont. 020a



AUXILIARY CONTROL UNIT (External)

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Aux. voltage distribution ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +01.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.	Rev. B	Sheet 020a
			ABB Ref. No.		Cont. 021a
			Resp. Dept.		

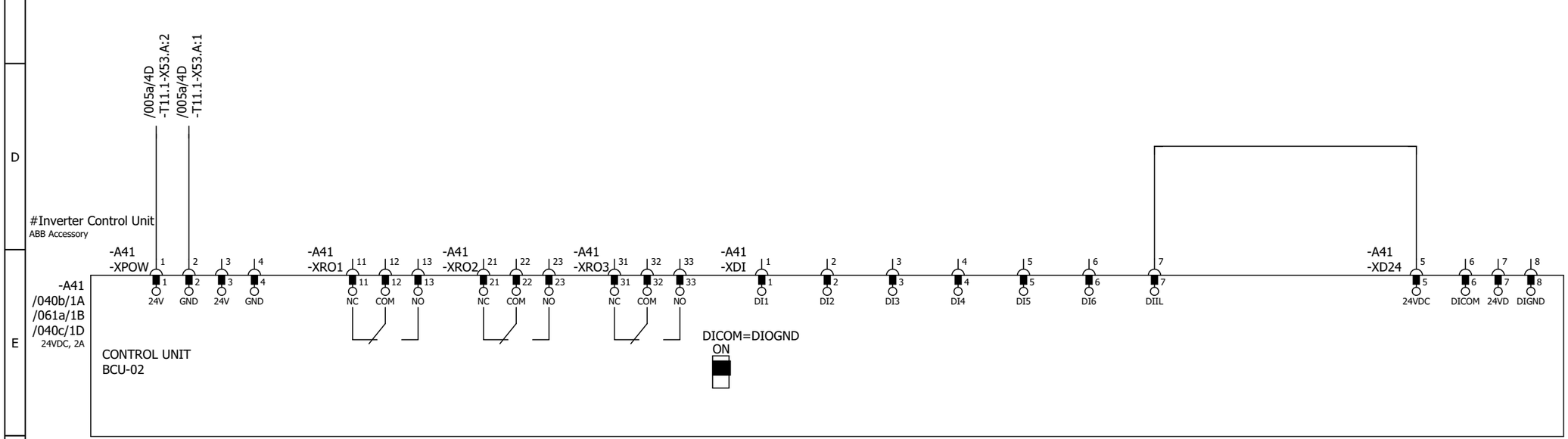


AUXILIARY CONTROL UNIT (External)

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Aux. voltage distribution ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No. ABB Ref. No. Resp. Dept.

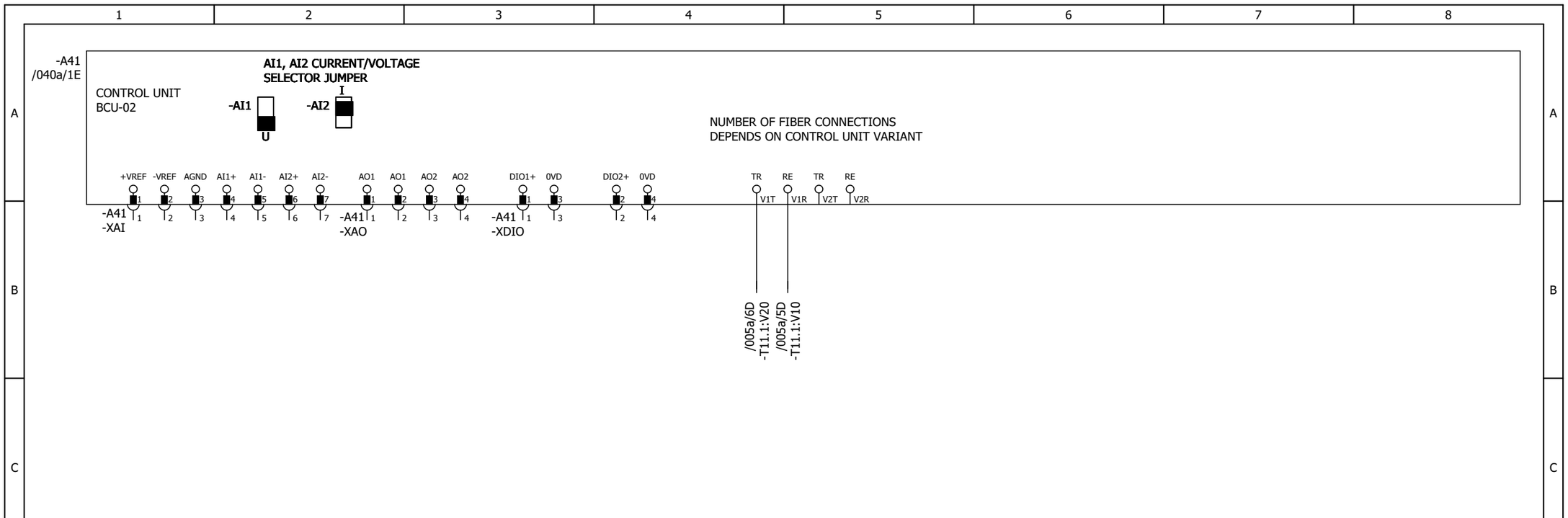
Item Des. = 01 +01.1			
Rev. B	Sheet 021a		
Cont. 040a			

Control and status signals	Terminal	Pin
-A41 START / STOP 1 - START / 0 - STOP	-XDI	1
-A41 FORWARD / REVERSE 0 - FORWARD / 1 - REVERSE	-XDI	2
-A41 RESET 1 - RESET	-XDI	3
-A41 ACC / DEC TIME SET 0 - SET 1 / 1 - SET 2	-XDI	4
-A41 CONSTANT SPEED 1 1 - ON	-XDI	5
-A41 DI6 NOT SPECIFIED BY DEFAULT NOT IN USE	-XDI	6
-A41 DIGITAL INTERLOCK 0 - ACTUATED	-XDI	7
-A41 READY 1 - READY, 250V AC / 30V DC / 2A	-XRO1	12
-A41 RUNNING 1 - RUNNING, 250V AC / 30V DC / 2A	-XRO2	22
-A41 FAULT (-1) 1 - NO FAULT, 250V AC / 30V DC / 2A	-XRO3	32



AUXILIARY CONTROL UNIT (External)

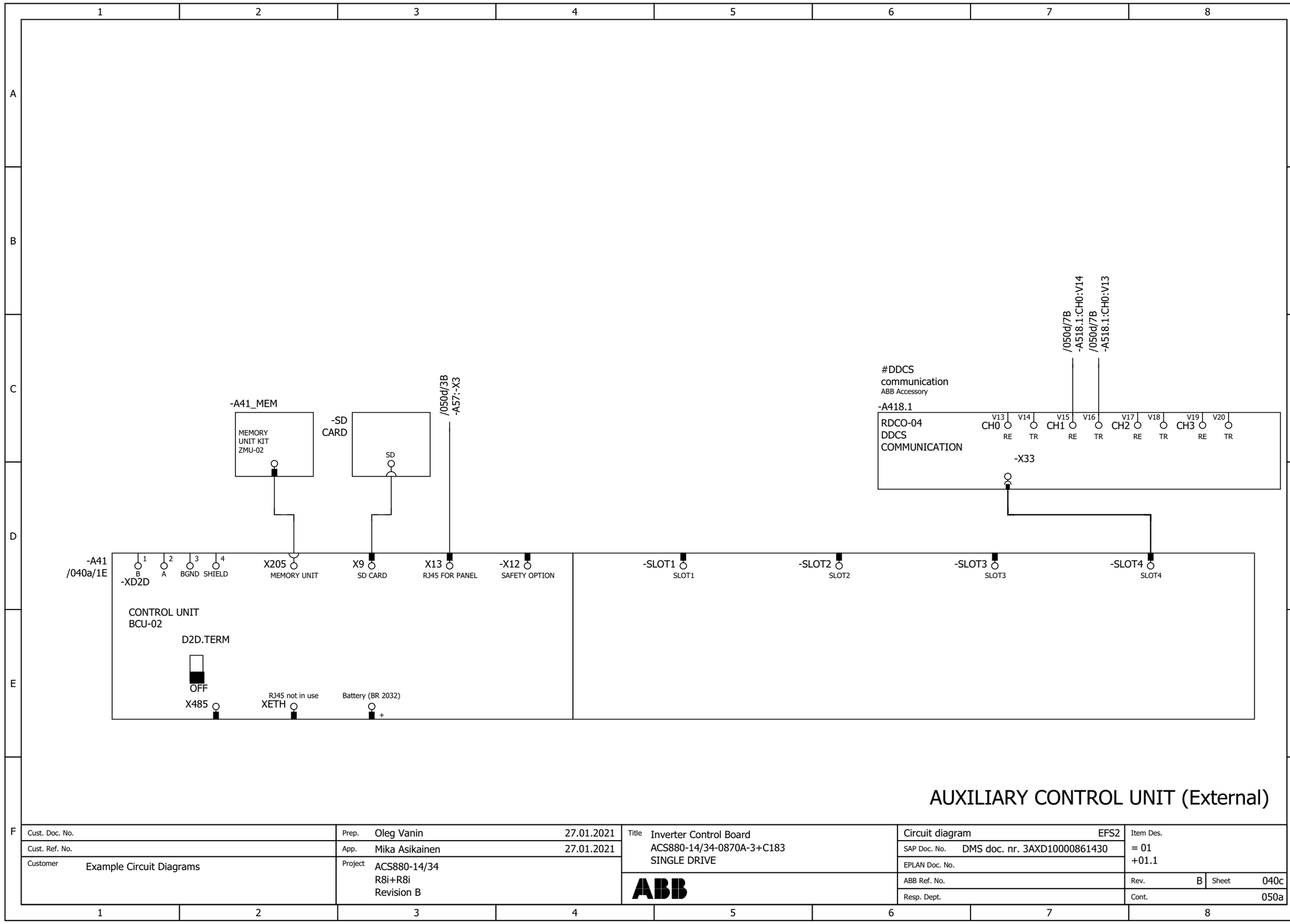
Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Inverter Control Board ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	= 01 +01.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 040a
			Resp. Dept.	Cont.	040b



Control and status signals	Terminal	Pin
-A41 SPEED REFERENCE 0(2)...10V, Rin > 200 kohm	-XAI	4
-A41 AI2 NOT SPECIFIED 0(4)...20mA	-XAI	6
-A41 MOTOR SPEED 0(4)...20mA, RL < 500 ohm	-XAO	1
-A41 MOTOR CURRENT 0(4)...20mA, RL < 500 ohm	-XAO	3
-A41 READY	-XDIO	1
-A41 RUNNING	-XDIO	2

AUXILIARY CONTROL UNIT (External)

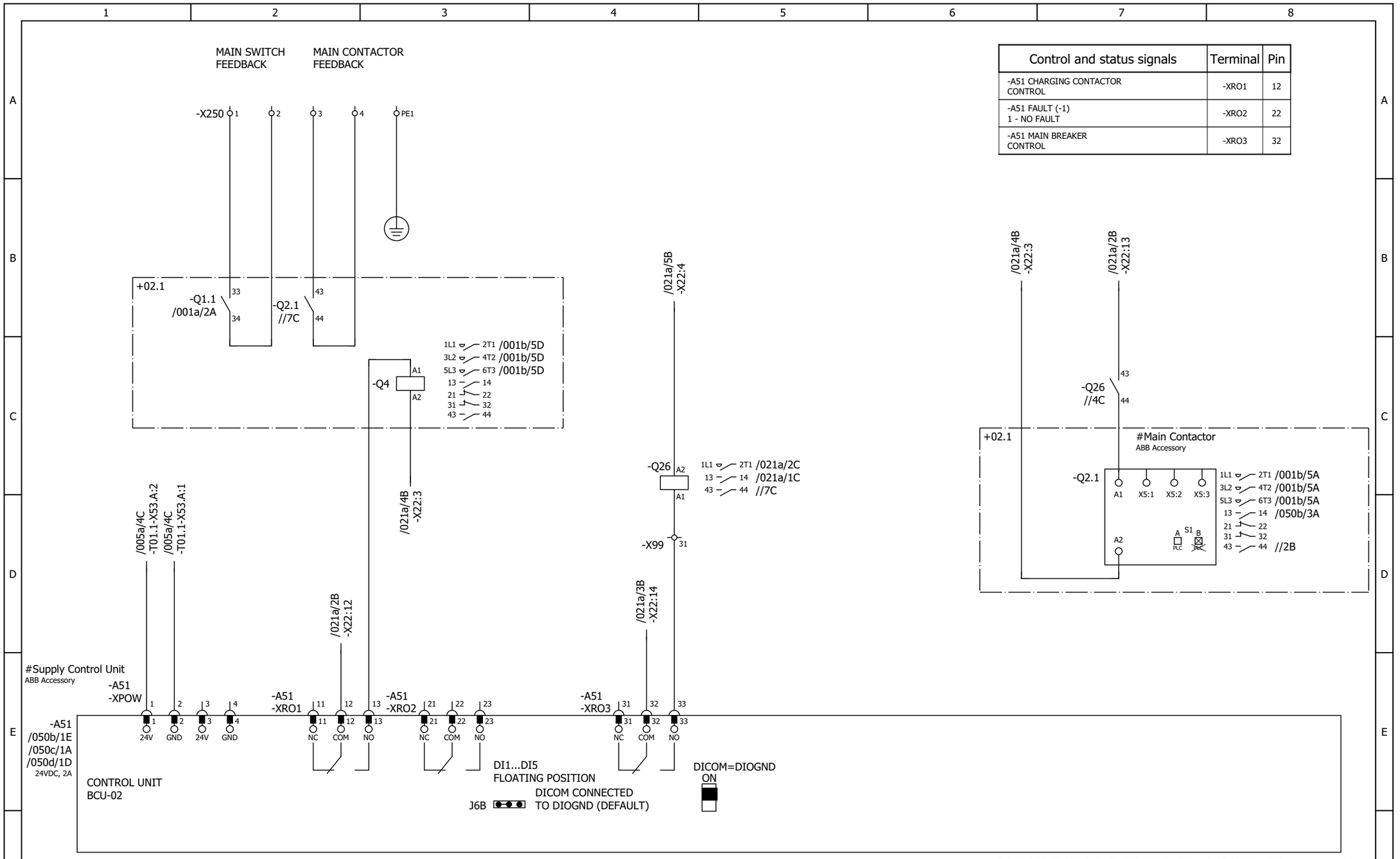
Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Inverter Control Board ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +01.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 040b
			Resp. Dept.	Cont.	040c



AUXILIARY CONTROL UNIT (External)

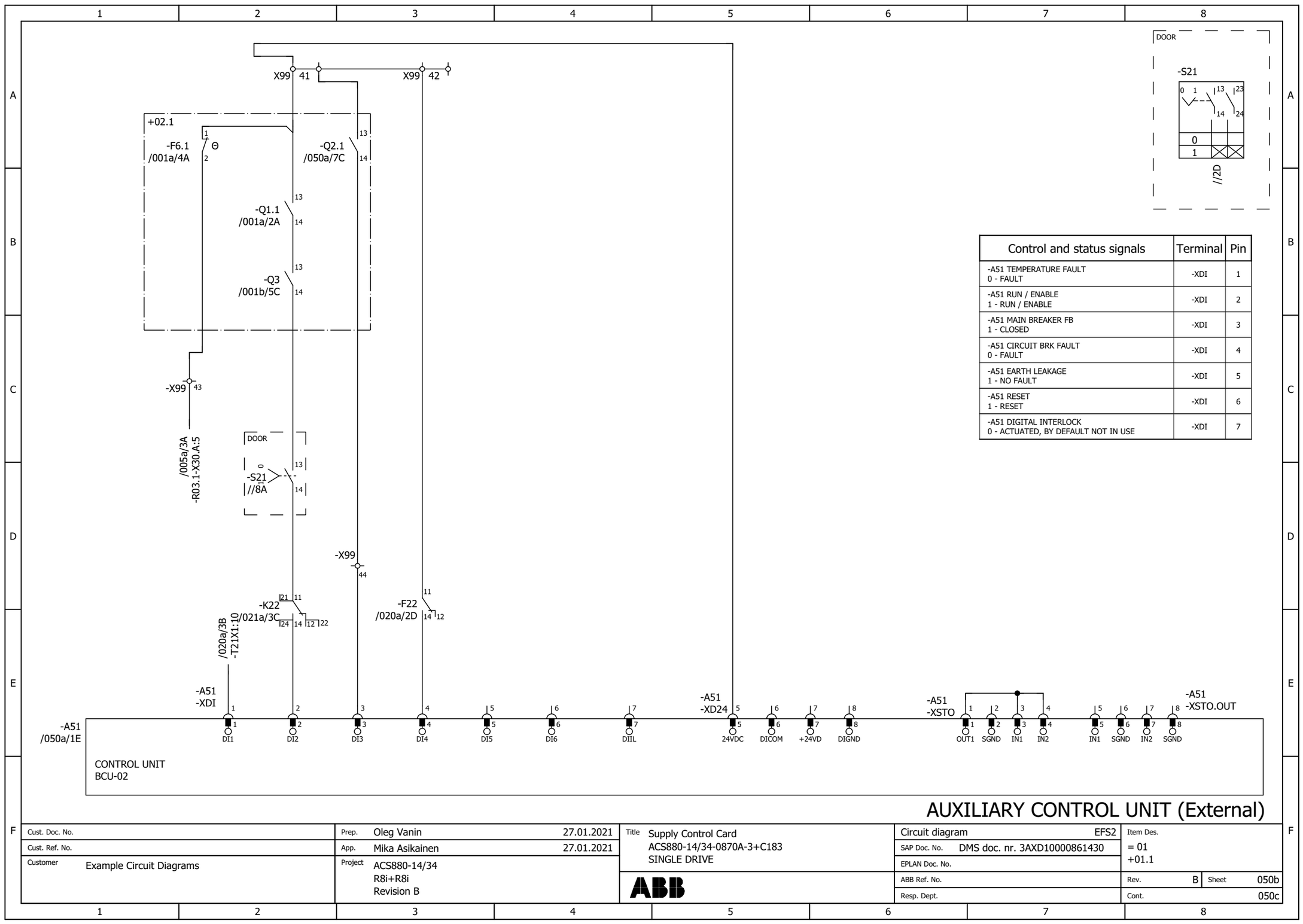
Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Inverter Control Board ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +01.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 040c
			Resp. Dept.	Cont.	050a

Control and status signals	Terminal	Pin
-A51 CHARGING CONTACTOR CONTROL	-XRO1	12
-A51 FAULT (-1) 1 - NO FAULT	-XRO2	22
-A51 MAIN BREAKER CONTROL	-XRO3	32



AUXILIARY CONTROL UNIT (External)

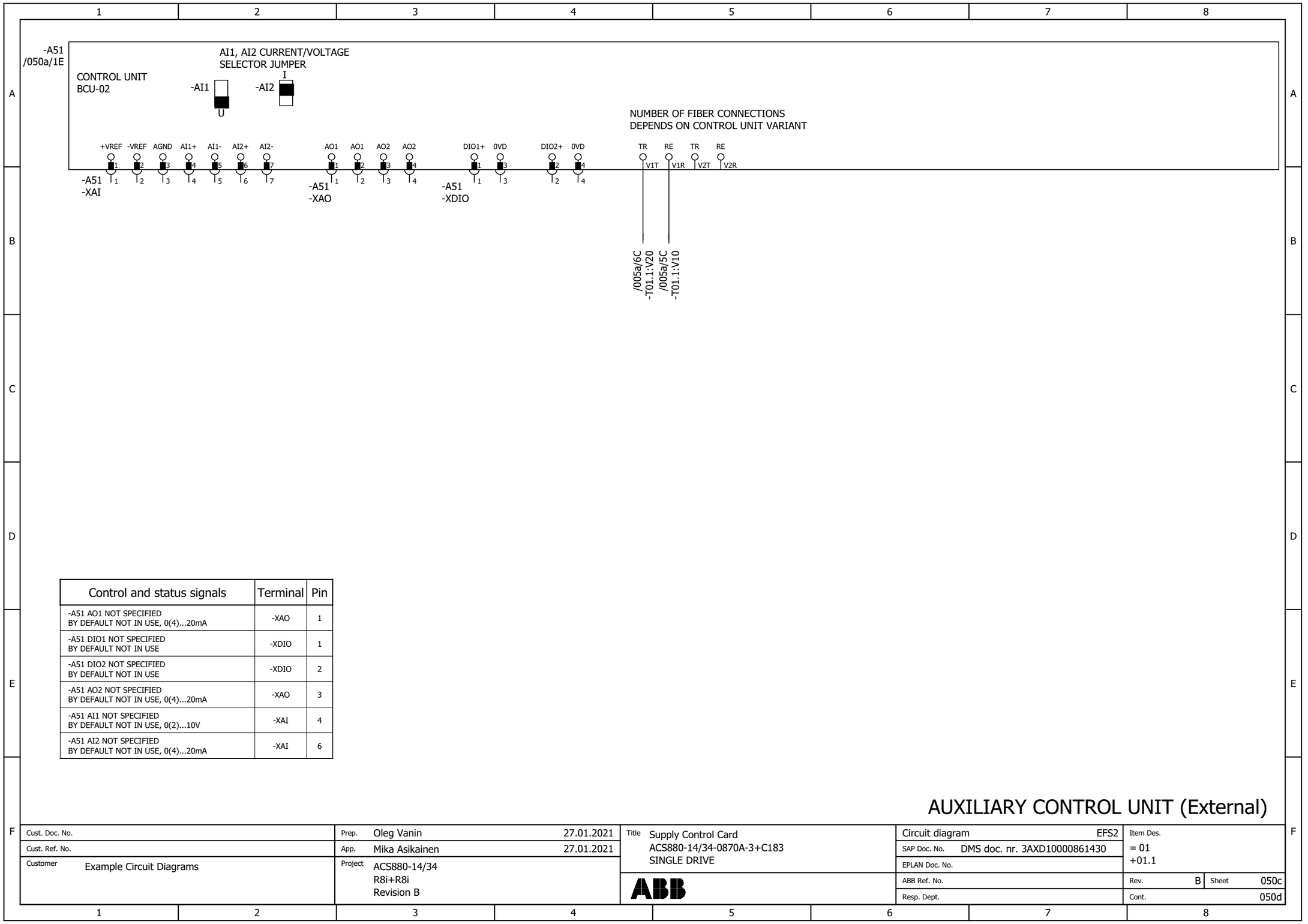
Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Supply Control Card ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +01.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 050a
			Resp. Dept.	Cont.	050b



Control and status signals	Terminal	Pin
-A51 TEMPERATURE FAULT 0 - FAULT	-XDI	1
-A51 RUN / ENABLE 1 - RUN / ENABLE	-XDI	2
-A51 MAIN BREAKER FB 1 - CLOSED	-XDI	3
-A51 CIRCUIT BRK FAULT 0 - FAULT	-XDI	4
-A51 EARTH LEAKAGE 1 - NO FAULT	-XDI	5
-A51 RESET 1 - RESET	-XDI	6
-A51 DIGITAL INTERLOCK 0 - ACTUATED, BY DEFAULT NOT IN USE	-XDI	7

AUXILIARY CONTROL UNIT (External)

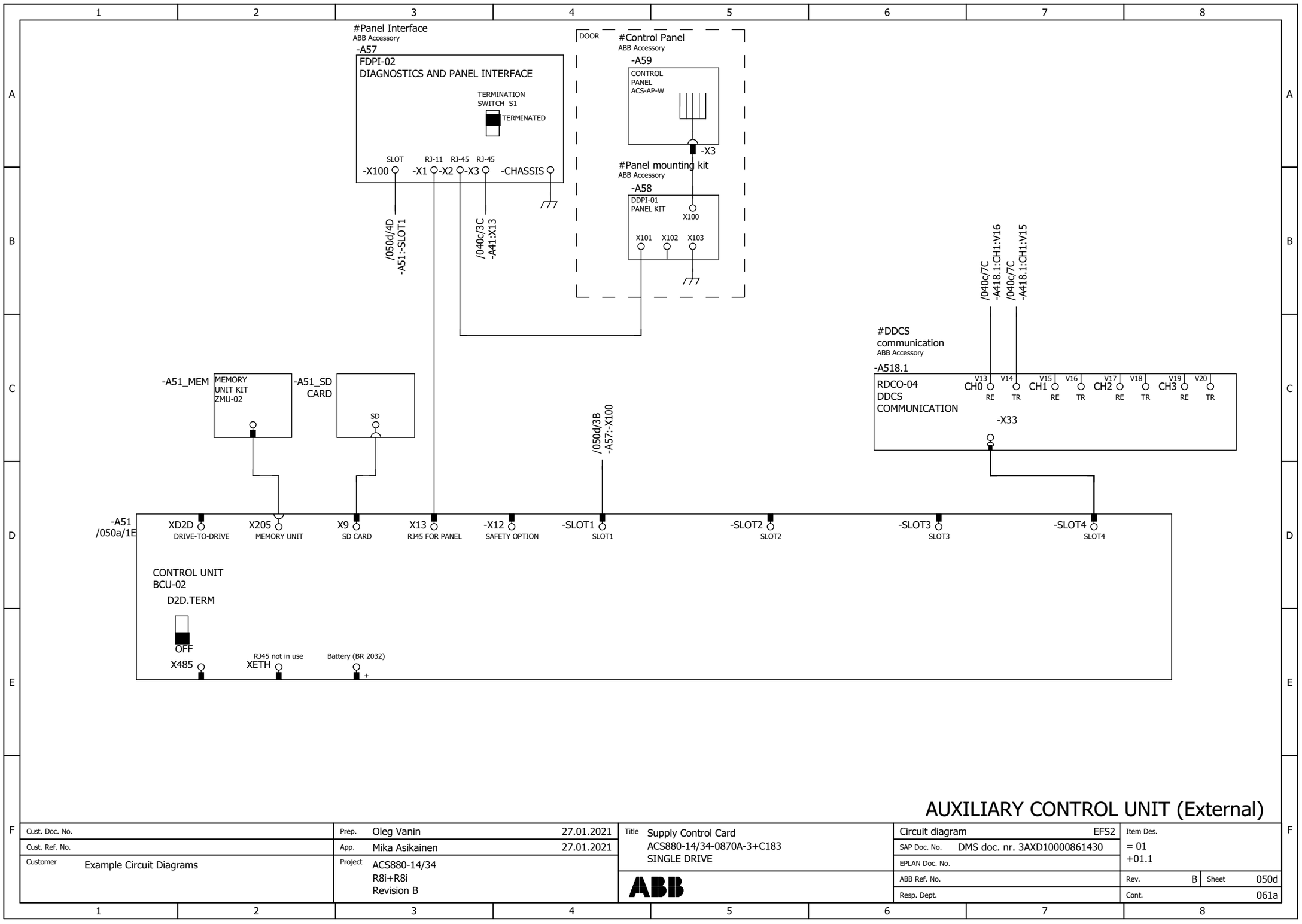
Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Supply Control Card ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	= 01 +01.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 050b
			Resp. Dept.	Cont.	050c



Control and status signals	Terminal	Pin
-A51 AO1 NOT SPECIFIED BY DEFAULT NOT IN USE, 0(4)...20mA	-XAO	1
-A51 DIO1 NOT SPECIFIED BY DEFAULT NOT IN USE	-XDIO	1
-A51 DIO2 NOT SPECIFIED BY DEFAULT NOT IN USE	-XDIO	2
-A51 AO2 NOT SPECIFIED BY DEFAULT NOT IN USE, 0(4)...20mA	-XAO	3
-A51 AI1 NOT SPECIFIED BY DEFAULT NOT IN USE, 0(2)...10V	-XAI	4
-A51 AI2 NOT SPECIFIED BY DEFAULT NOT IN USE, 0(4)...20mA	-XAI	6

AUXILIARY CONTROL UNIT (External)

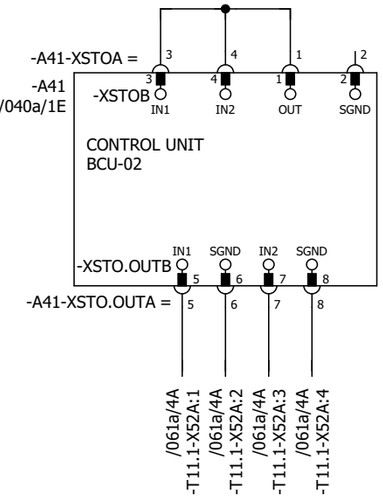
Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Supply Control Card ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +01.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 050c
			Resp. Dept.	Cont.	050d

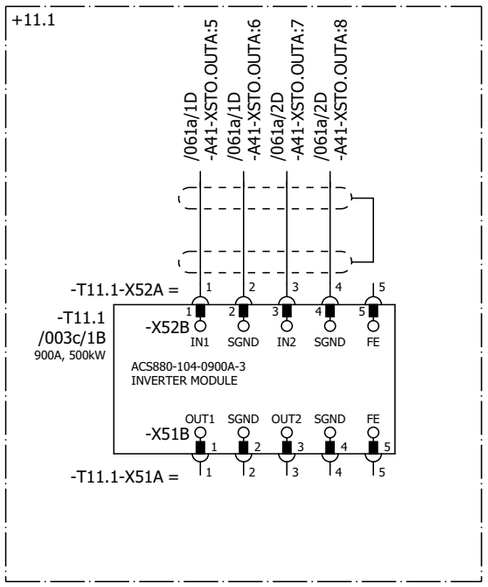


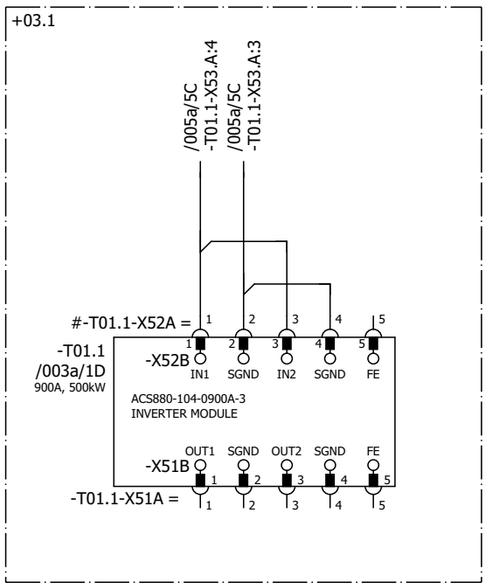
AUXILIARY CONTROL UNIT (External)

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Supply Control Card ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	= 01 +01.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 050d
			Resp. Dept.	Cont.	061a

STO CONNECTIONS
FOR INU MODULES







AUXILIARY CONTROL UNIT (External)

SAFETY CIRCUIT
GENERATED FROM SOLUTION REVISION RULES CONVERTED 30.5.2018

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Module connections ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430	= 01 +01.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 061a
			Resp. Dept.	Cont.	095a

EXTERNAL SUPPLY FOR
MODULES HEATERS
for option C183

-X300 2B 12L 1B 12N

-Q95 40A

-F95 4A

//3B

//3C

-K95 //3F

-X41

/095a/4B -X99:1

/095a/4B -X99:2

HEATERS
SUPERVISION

-XPE95 PE95 3B 12PE

-Q95 //1B 5B 4B 13 14

-F95 //1C 11 12 14

/095a/1E -X41:4:B

/095a/1E -X41:3:B

/005a/4A -R03.1-X30.A:8

/005a/4A -R03.1-X30.A:9

-X99 1 2

CABINET HEATER
PROVIDED BY USER

/021a/1D -X22:21

/021a/4B -X22:2

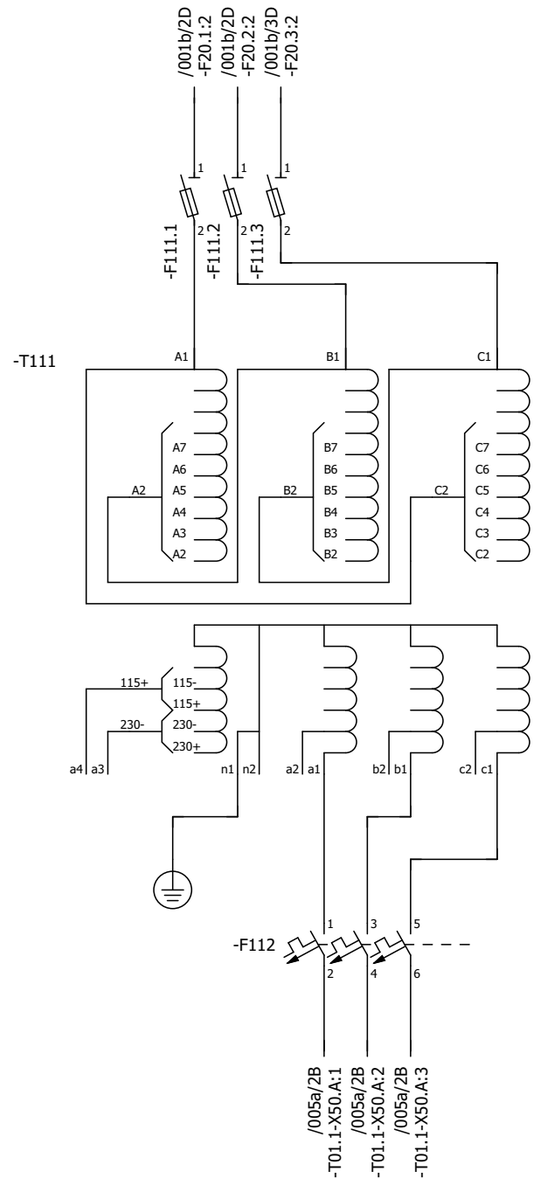
-K95 A1 A2 //1D

CABINET
HEATERS
CONTROL

AUXILIARY CONTROL UNIT (External)

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title Module heater ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +01.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B	ABB	EPLAN Doc. No.		
			ABB Ref. No.	Rev. B	Sheet 095a
			Resp. Dept.	Cont.	110a

3-PHASE
FAN SUPPLY



AUXILIARY CONTROL UNIT (External)

Cust. Doc. No.	Prep. Oleg Vanin 27.01.2021	Title DOL Fan Transformer ACS880-14/34-0870A-3+C183 SINGLE DRIVE	Circuit diagram EFS2	Item Des. = 01 +01.1	
Cust. Ref. No.	App. Mika Asikainen 27.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10000861430		
Customer Example Circuit Diagrams	Project ACS880-14/34 R8i+R8i Revision B		EPLAN Doc. No.		
		ABB	ABB Ref. No.	Rev. B	Sheet 110a
			Resp. Dept.	Cont.	

2×R8i + 2×R8i

Project type	Example Circuit Diagrams
Converter type	ACS880-14/34 Regenerative/Low harmonic single drive package
Frame Size	2xR8i+2xR8i
Type Code	ACS880-14/34-1530A-5+C183
Revision	Revision B

Used EPLAN version: P8 2.9.4.14734

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title Title page / cover sheet		Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10001140499	=	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i		EPLAN Doc. No. 3AFE _ -	+	
			ABB Ref. No. -	Rev. B	Sheet 000A
			Resp. Dept.		No. of Sheets 6

Higher-level function	Page	Page description	Revision
	000A	Title page / cover sheet	B
	000C	Structured identifier overview	B
	000D	Summarized parts list	B
	000E	Summarized parts list	B
	300A	Symbol Overview	B
01	001a	MAIN CIRCUIT	B
	003a	MAIN CIRCUIT	B
	003c	MAIN CIRCUIT	B
	005a	MODULE CONTROL CONNECTIONS	B
	005b	MODULE CONTROL CONNECTIONS	B
	020a	AUXILIARY VOLTAGE DISTRIBUTION	B
	021a	AUXILIARY VOLTAGE DISTRIBUTION	B
	026a	FAN SUPPLY CONTROL	B
	030a	AIR CIRCUIT BREAKER CONTROL	B
	040a	INU CONTROL BOARD	B
	040b	INU CONTROL BOARD	B
	040c	INU CONTROL BOARD	B
	050a	SUPPLY CONTROL BOARD	B
	050b	SUPPLY CONTROL BOARD	B
	050c	SUPPLY CONTROL BOARD	B
	050d	SUPPLY CONTROL BOARD	B
	061a	MODULE CONTROL CONNECTIONS	B
	095a	MODULE HEATER	B
	111a	AUXILIARY VOLTAGE DISTRIBUTION	B

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title Table of contents		Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10001140499	=	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i		EPLAN Doc. No. 3AFE _ -	+	
		ABB	ABB Ref. No. -	Rev. B	Sheet 000B
			Resp. Dept.		No. of Sheets 6

Function designations

Designation	Structure description
=01	Drive unit

Location designations

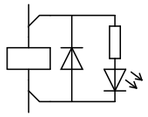
Designation	Structure description
+01.1	Auxiliary Control Cubicle (External)
+01.1.8	Auxiliary Control Cubicle Door (External)
+02.1	Incoming Cubicle (External)
+03.1	IGBT Supply Cubicle
+11.1	Inverter Cubicle

Electrical option designations

Designation	Material Code	Amount
Air Circuit Breaker	3AXD50000048327	1
CMF Filter	3AUA0000032859	8
Charging Kit	3AXD50000021093	1
Control Panel Kit	3AXD50000025965	1
DDCS Communication	68882915	2
Filter Module	3AXD50000621170	1
Fuse	68752591, 3AXD50000000150	11
Inverter Control Unit Kit	3AXD0000003417	1
Inverter Module	ACS880-104-0810A-5	2
Panel Interface	3AUA0000108650	1
Panel mounting Kit	3AUA0000108878	1
Supply Control Unit Kit	3AXD50000002937	1
Supply Module	ACS880-104-0810A-5	2

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title Structured identifier overview		Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10001140499	=	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i		EPLAN Doc. No. 3AFE _ -	+	
			ABB Ref. No. -	Rev. B	Sheet 000C
			Resp. Dept.		No. of Sheets 6

GENERAL/RELAY COIL, WITH PROTECTIVE CIRCUIT DIODE AND R+LED



GENERAL/RELAY COIL

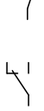
COIL WITH PICK-UP DELAY

COIL WITH OFF-DELAY

NO CONTACT

NC CONTACT

CHANGE OVER CONTACT



NO CONTACT, WITH CLOSING DELAY

TWO NO CONTACTS ONE INPUT, TWO OUTPUTS

TWO CONNECTED CHANGE OVER CONTACTS

POWER NO CONTACT OF A CONTACTOR

PUSH BUTTON WITH NO CONTACT

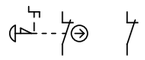
PUSH BUTTON WITH NC CONTACT

NO SWITCH, OPERATED BY TURNING, 2 POSITIONS

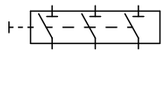
LIMIT SWITCH NC CONTACT MECHANICALLY OPERATED

NC SWITCH, TEMPERATURE OPERATED

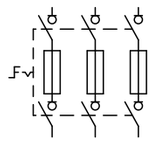
EMERGENCY STOP PUSH BUTTON



DISCONNECT SWITCH, THREE-POLE



SWITCH DISCONNECTOR WITH FUSES, THREE-POLE

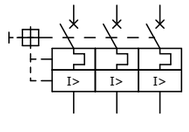


FUSE

FUSE DISCONNECTOR

CIRCUIT BREAKER

MOTOR OVERLOAD SWITCH WITH SWITCH MECHANISM



COMMON MODE FILTER FOR HIGH FREQUENCY CURRENTS

PROTECTIVE EARTH CONNECTED TO FRAME

PROTECTIVE EARTH CONNECTED TO TERMINAL / PE BUSBAR

FUNCTIONAL EARTHING CONNECTED TO TERMINAL

FUNCTIONAL BONDING TO FRAME

LIGHT

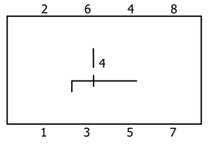
INDUCTOR

CAPACITOR

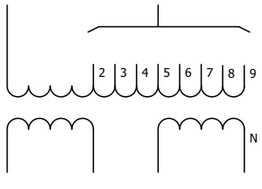
RESISTOR

POWER RESISTOR WITH FUSE

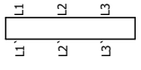
PHASE SELECTING SWITCH



TRANSFORMER



EMC FILTER



TERMINAL, FOUR POLE

PLUG AND SOCKET TERMINAL BLOCK WITH 4 CONNECTION POINTS

FEMALE AND MALE PLUG

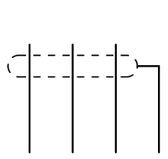
AMPERE METER

CURRENT TRANSFORMER

VOLTAGE METER

WIRE TERMINATION, INSULATED

SHIELDED CABLE



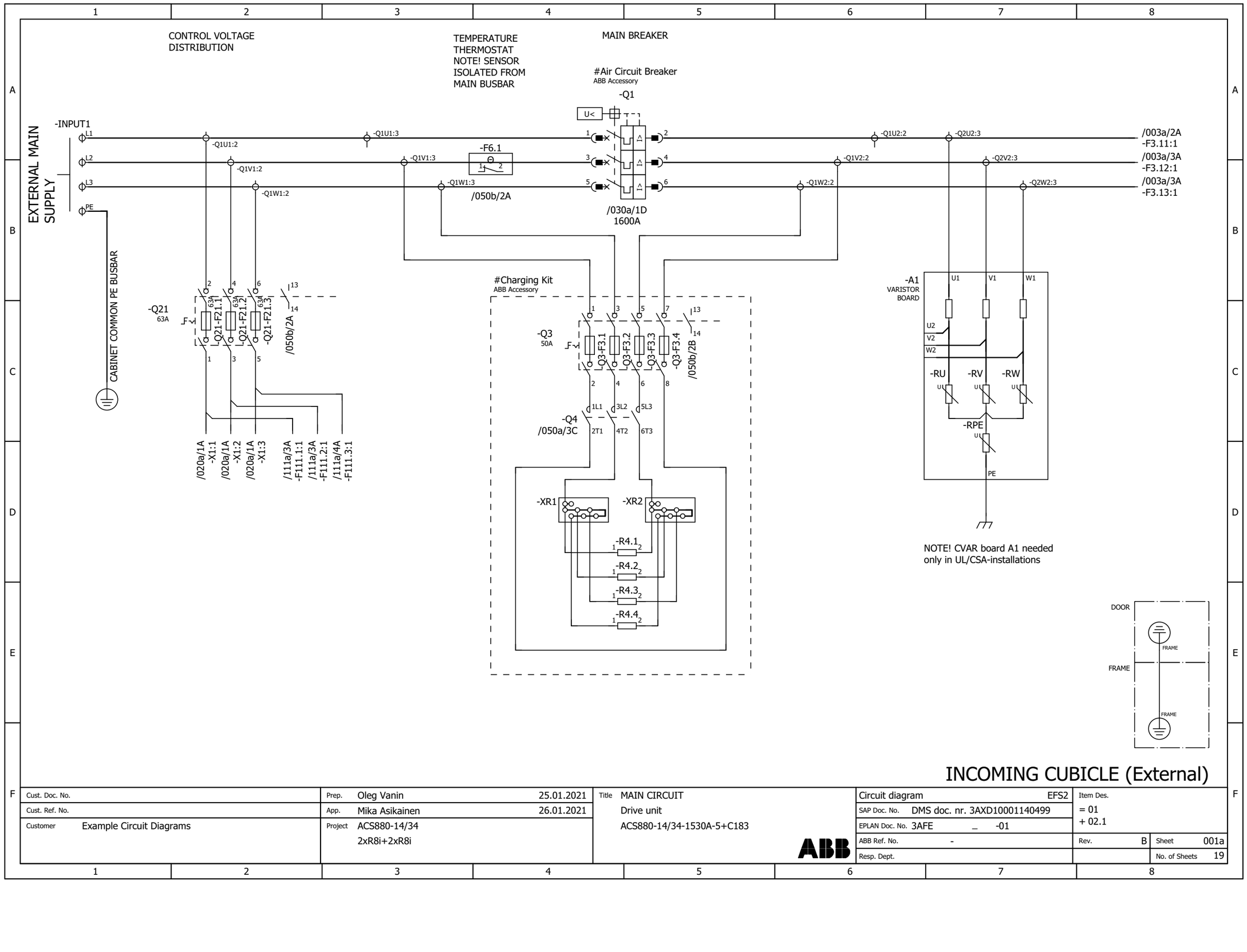
THERMAL OPERATION

DISCONNECT

DISCONNECT, CAN BE OPERATED WHILE NOMINAL CURRENT IS APPLIED

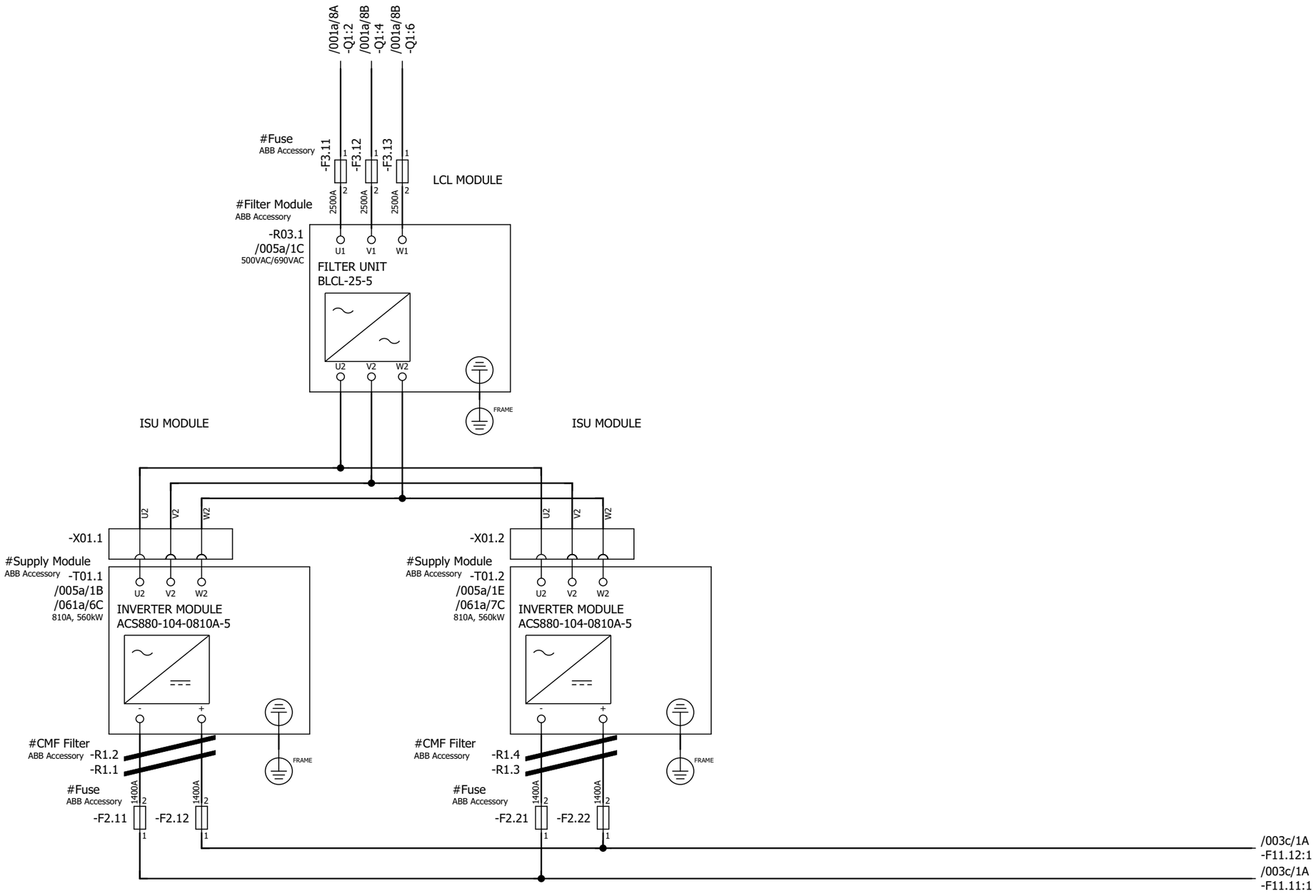
BREAKER, SHORTCIRCUIT BREAKING CAPABILITY

Cust. Doc. No.		Prep. Oleg Vanin	25.01.2021	Title Symbol Overview		Item Des.	
Cust. Ref. No.		App. Mika Asikainen	26.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10001140499	=	
Customer	Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i			EPLAN Doc. No. 3AFE _ -	+	
					ABB Ref. No. -	Rev. B	Sheet 300A
					Resp. Dept.		No. of Sheets 6



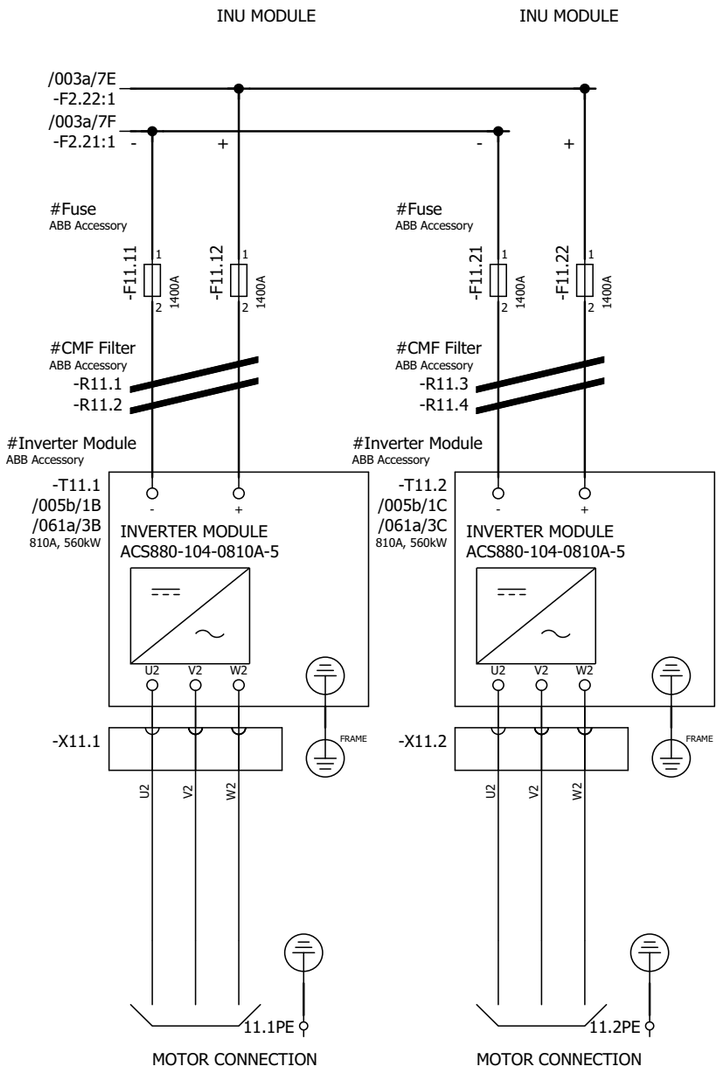
INCOMING CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title MAIN CIRCUIT	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 02.1	
		ABB	ABB Ref. No. -	Rev. B	Sheet 001a
			Resp. Dept.		No. of Sheets 19



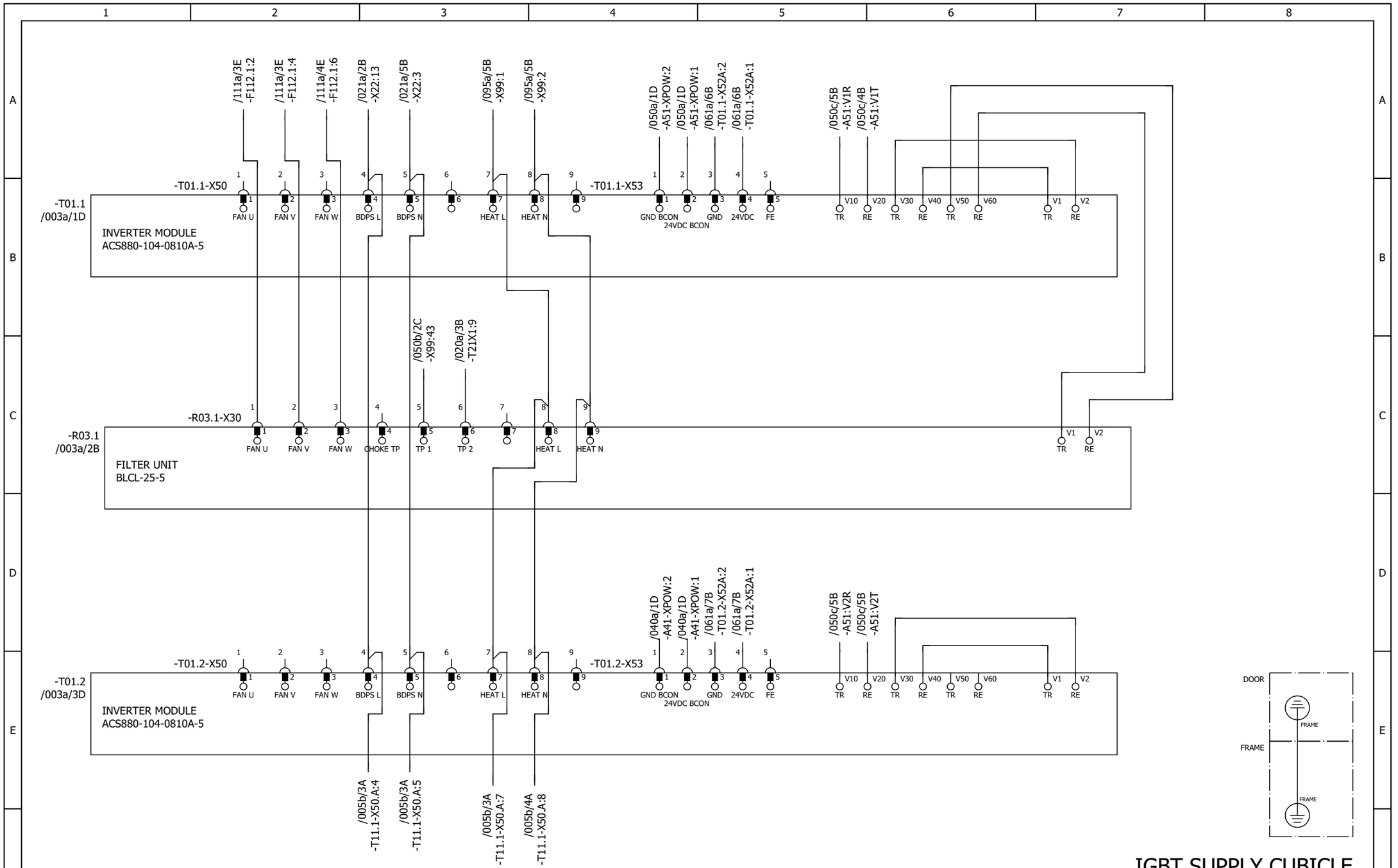
IGBT SUPPLY CUBICLE

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title MAIN CIRCUIT	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 03.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
			ABB Ref. No. -	Rev. B	Sheet 003a
			Resp. Dept.		No. of Sheets 19



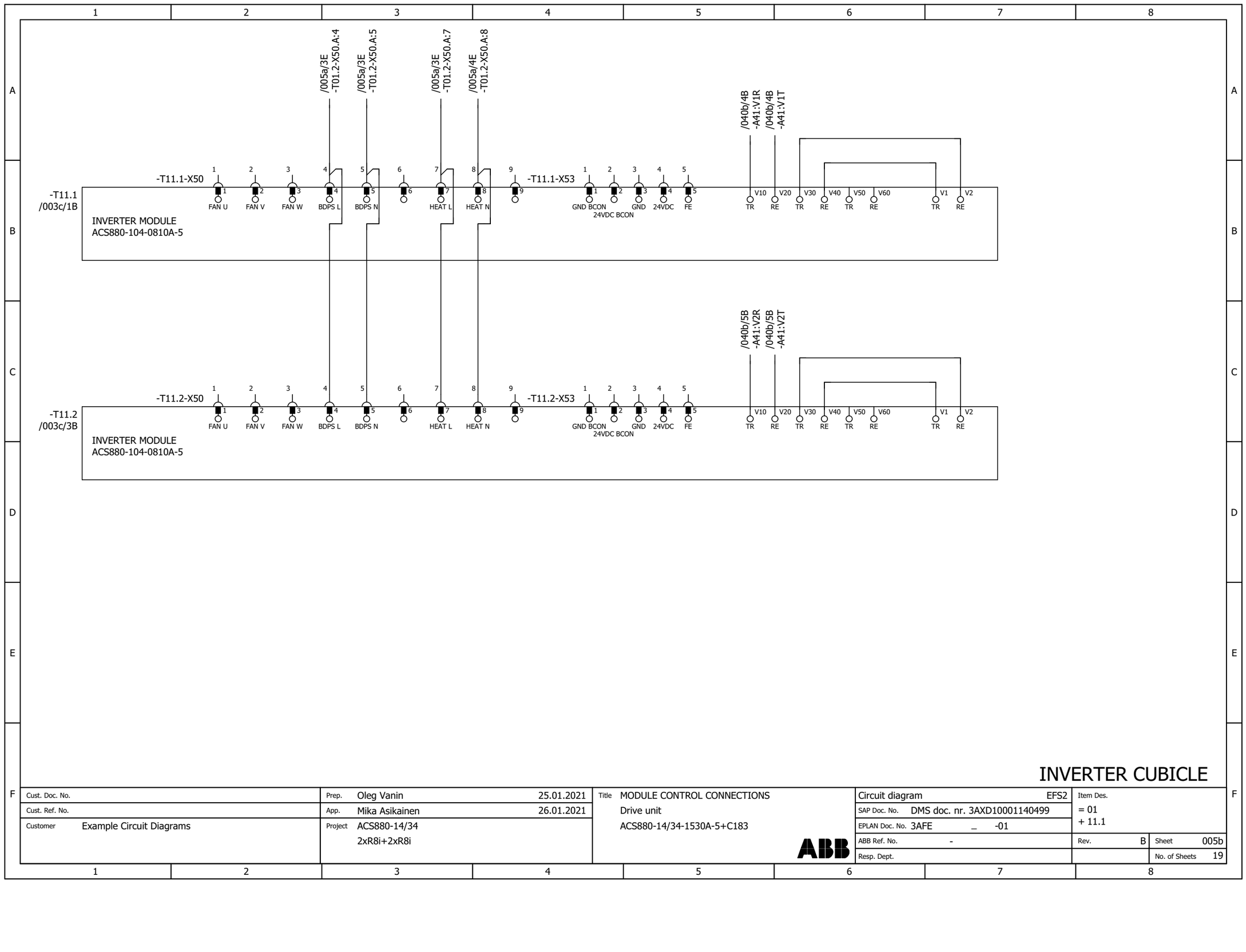
INVERTER CUBICLE

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title MAIN CIRCUIT	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 11.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
		ABB	ABB Ref. No. -	Rev. B	Sheet 003c
			Resp. Dept.		No. of Sheets 19



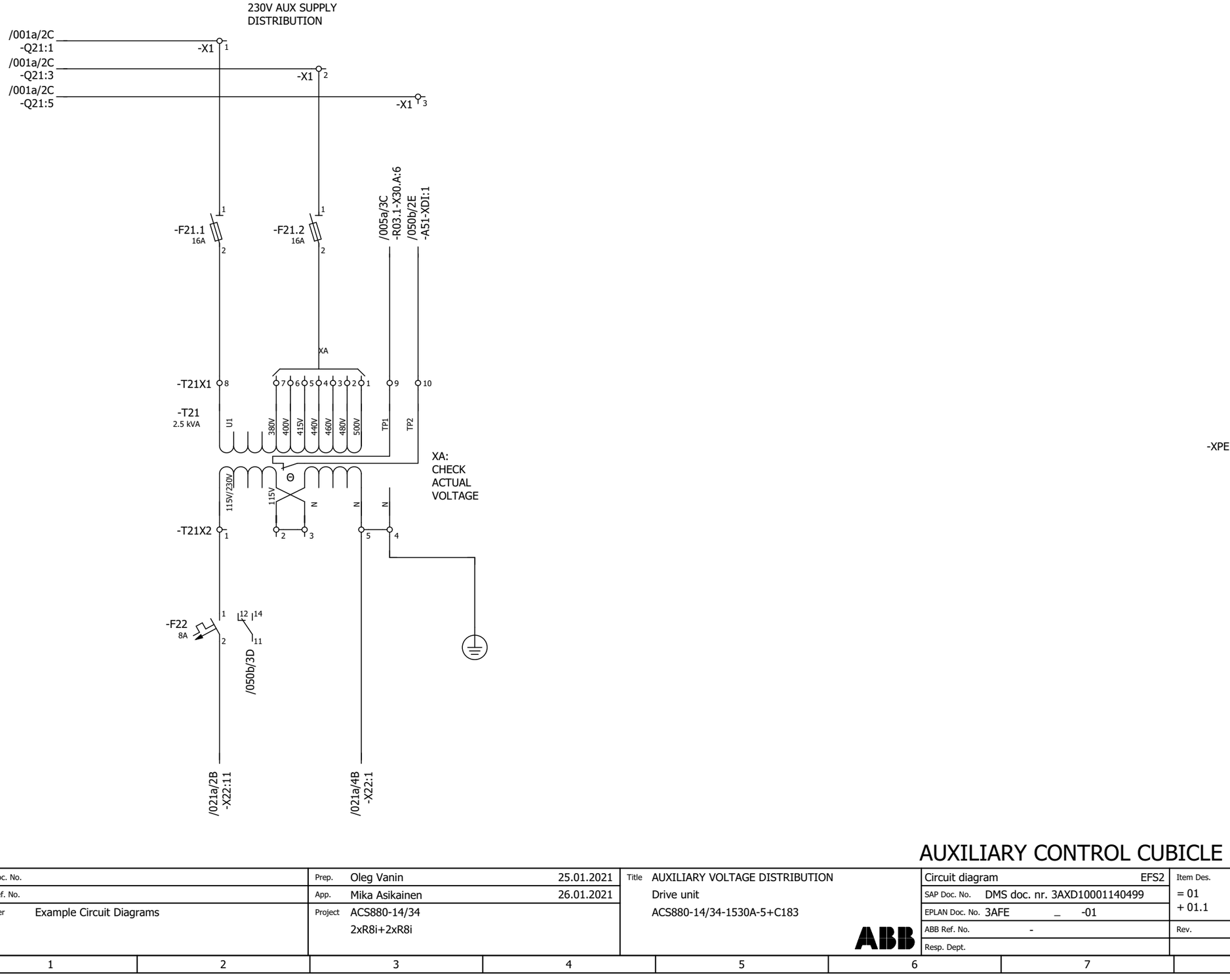
IGBT SUPPLY CUBICLE

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title MODULE CONTROL CONNECTIONS	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 03.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
		ABB	ABB Ref. No. -	Rev. B	Sheet 005a
			Resp. Dept.		No. of Sheets 19



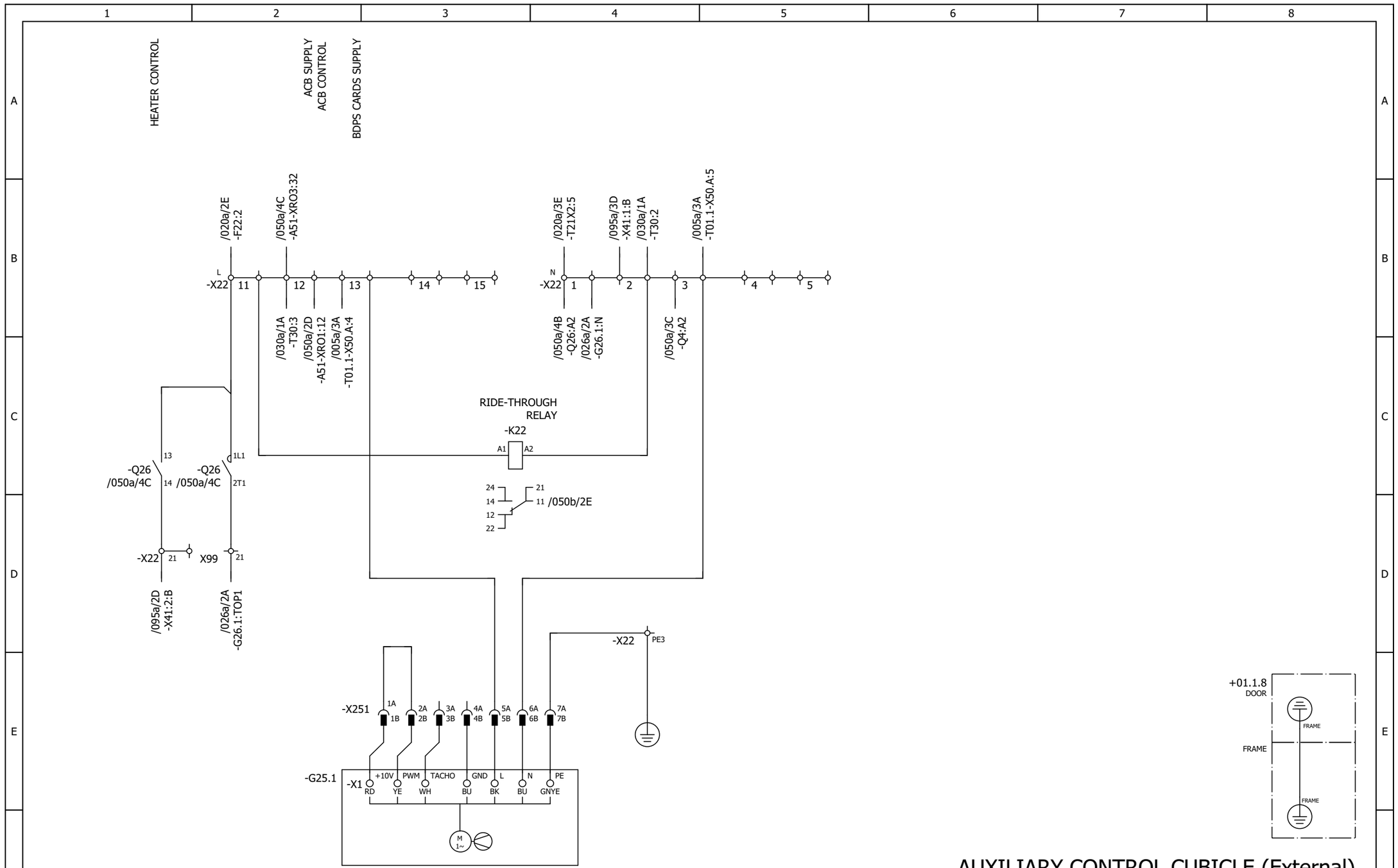
INVERTER CUBICLE

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title MODULE CONTROL CONNECTIONS	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 11.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
		ABB	ABB Ref. No. -	Rev. B	Sheet 005b
			Resp. Dept.		No. of Sheets 19



AUXILIARY CONTROL CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title AUXILIARY VOLTAGE DISTRIBUTION	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 01.1	
		ABB	ABB Ref. No. -	Rev. B	Sheet 020a
			Resp. Dept.		No. of Sheets 19

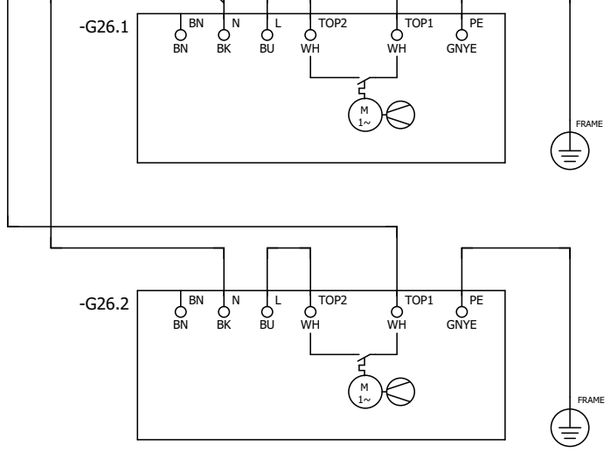


AUXILIARY CONTROL CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title AUXILIARY VOLTAGE DISTRIBUTION	Circuit diagram EFS2 / Item Des.
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499 / = 01
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01 / + 01.1
		ABB	ABB Ref. No. - / Rev. B / Sheet 021a
			Resp. Dept. / No. of Sheets 19

ICU CABINET
FAN CONTROL

/021a/4B
-X22:1
/021a/2D
-X99:21



INCOMING CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title FAN SUPPLY CONTROL	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 02.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
		ABB	ABB Ref. No. -	Rev. B	Sheet 026a
			Resp. Dept.		No. of Sheets 19

UNDERVOLTAGE RELEASE

ACB CONTROL

ACB FEEDBACK

/021a/4B -X22:2

/021a/2B -X22:12

-T30
1.3A

N

L

FE

DC+

DC-

/050a/4B -X99:31

/050a/4C -X99:32

-Q1 //4D

-Q1 //4D

-Q1

K1 K2 C3 C1 35 36 38 64 62 61 45 46 48 D1 C11 C13 34 32 31 U1

S33 Q6 RTC Q3

YC CIRCUIT BREAKER, AIR, LV YU YO

E2.2S-A1600EKIP DIP LI AC220V,IEC,UL,CCC

S51

C2 W3 W4 NE+ NE- D2 C12 95 96 98 U2

+01.1

-X250 1A 2A 3A 4A PE1

-Q1 //2D

/001a/4A

U<

CONTACT POSITION WHEN CIRCUIT-BREAKER OPEN

/050b/3A

//8C

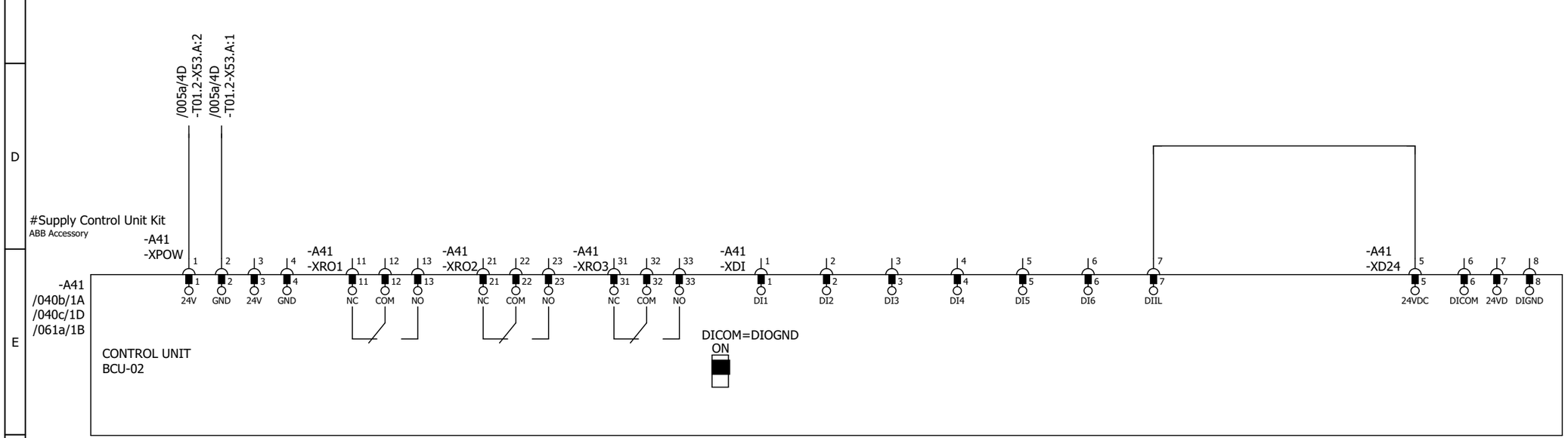
AUP CONTACT POSITIONS

RACKED IN	TEST	OUT		
0	1	1	102 – 101	//3D
1	0	0	104	
0	1	1	112 – 111	/050a/3C
1	0	0	114	
0	1	0	124 – 121	//3D
1	0	1	122	
0	0	1	134	
1	1	0	132 – 131	
0	0	1	144	
1	1	0	142 – 141	

INCOMING CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title AIR CIRCUIT BREAKER CONTROL	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 02.1	
	2xR8i+2xR8i	ABB	ABB Ref. No. -	Rev. B	Sheet 030a
			Resp. Dept.		No. of Sheets 19

Control and status signals	Terminal	Pin
-A41 START / STOP 1 - START / 0 - STOP	-XDI	1
-A41 FORWARD / REVERSE 0 - FORWARD / 1 - REVERSE	-XDI	2
-A41 RESET 1 - RESET	-XDI	3
-A41 ACC / DEC TIME SET 0 - SET 1 / 1 - SET 2	-XDI	4
-A41 CONSTANT SPEED 1 1 - ON	-XDI	5
BY DEFAULT: NOT IN USE	-XDI	6
-A41 DIGITAL INTERLOCK 0 - ACTUATED	-XDI	7
-A41 READY 1 - READY, 250V AC / 30V DC / 2A	-XRO1	12
-A41 RUNNING 1 - RUNNING, 250V AC / 30V DC / 2A	-XRO2	22
-A41 FAULT (-1) 1 - NO FAULT, 250V AC / 30V DC / 2A	-XRO3	32



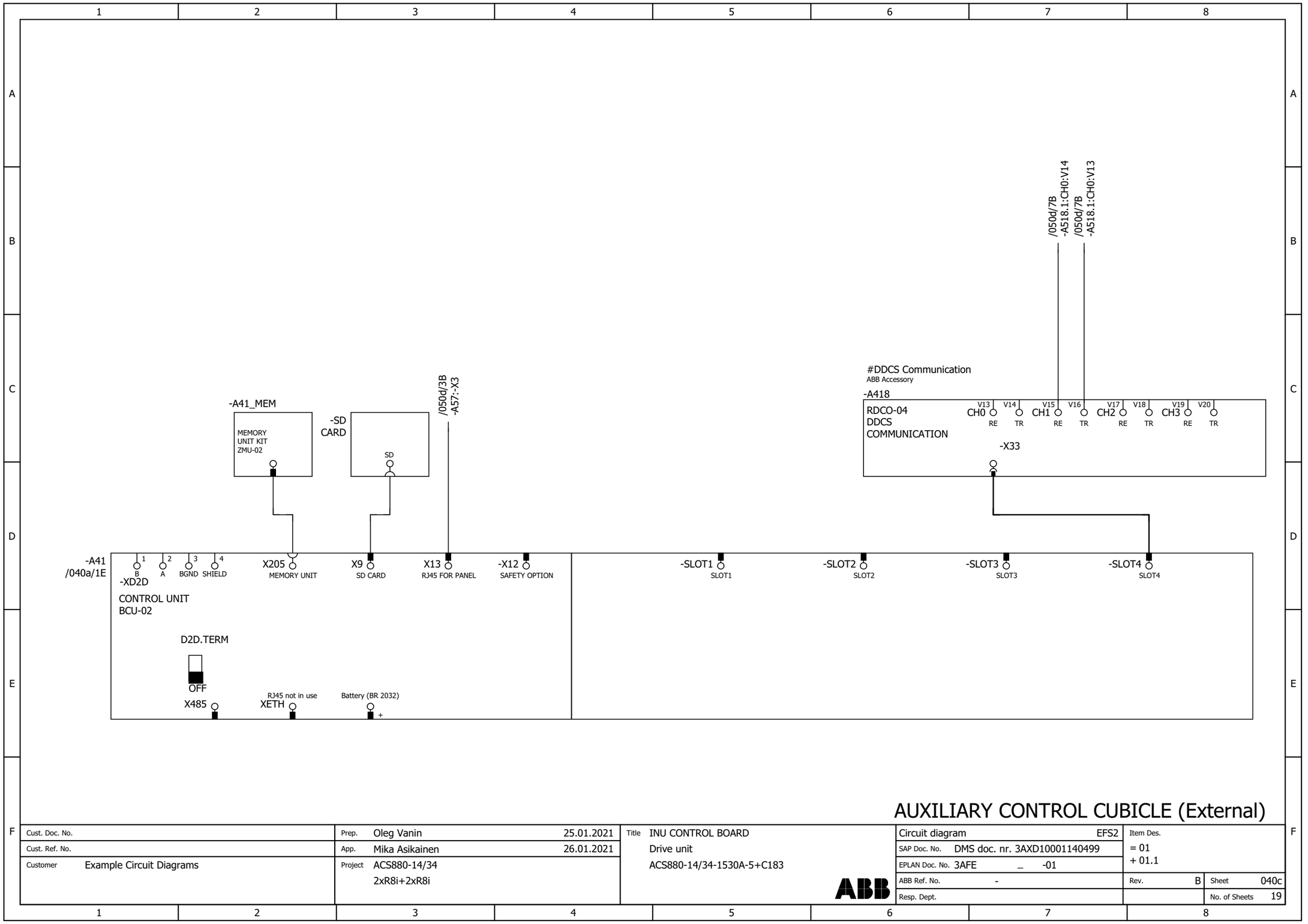
AUXILIARY CONTROL CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title INU CONTROL BOARD	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 01.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
		ABB	ABB Ref. No. -	Rev. B	Sheet 040a
			Resp. Dept.		No. of Sheets 19

Control and status signals	Terminal	Pin
-A41 SPEED REFERENCE 0(2)...10V, Rin > 200 kohm	-XAI	4
-A41 AI2 NOT SPECIFIED 0(4)...20mA	-XAI	6
-A41 MOTOR SPEED 0(4)...20mA, RL < 500 ohm	-XAO	1
-A41 MOTOR CURRENT 0(4)...20mA, RL < 500 ohm	-XAO	3
-A41 READY	-XDIO	1
-A41 RUNNING	-XDIO	2

AUXILIARY CONTROL CUBICLE (External)

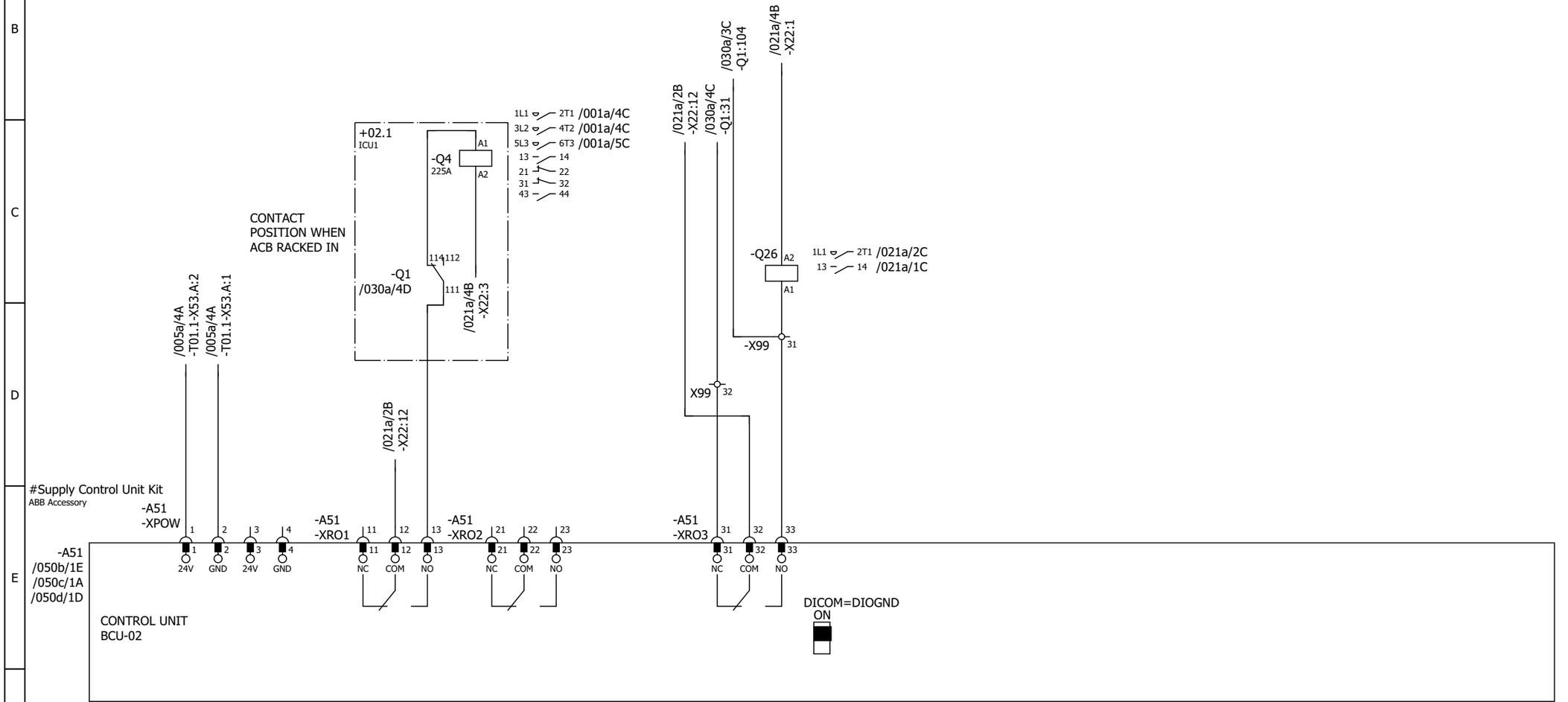
Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title INU CONTROL BOARD	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 01.1	
		ABB	ABB Ref. No. -	Rev. B	Sheet 040b
			Resp. Dept.		No. of Sheets 19



AUXILIARY CONTROL CUBICLE (External)

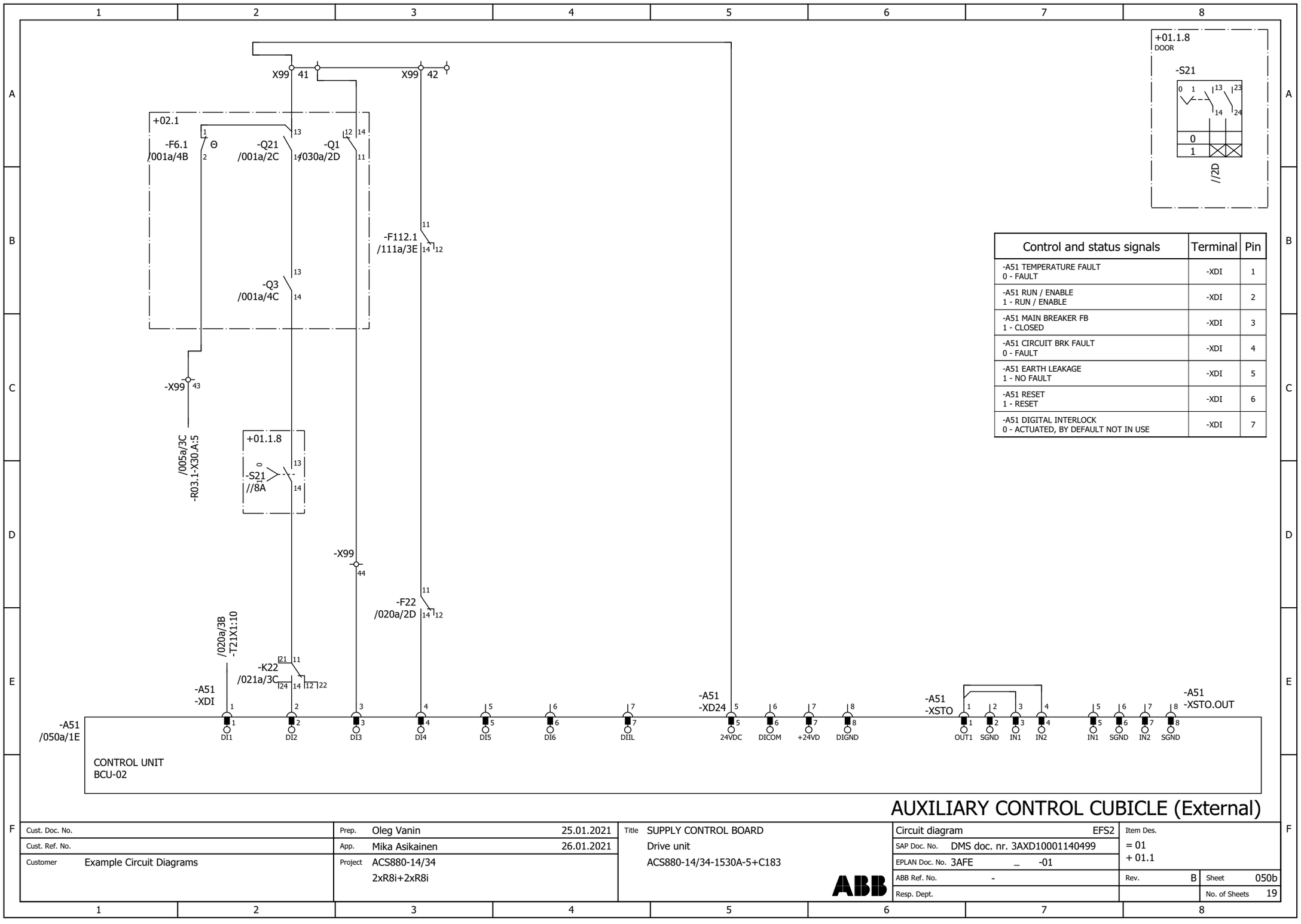
Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title INU CONTROL BOARD	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 01.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
			ABB Ref. No. -	Rev. B	Sheet 040c
			Resp. Dept.		No. of Sheets 19

Control and status signals	Terminal	Pin
-A51 CHARGING CONTACTOR CONTROL	-XRO1	12
-A51 FAULT (-1) 1 - NO FAULT	-XRO2	22
-A51 MAIN BREAKER CONTROL	-XRO3	32



AUXILIARY CONTROL CUBICLE (External)

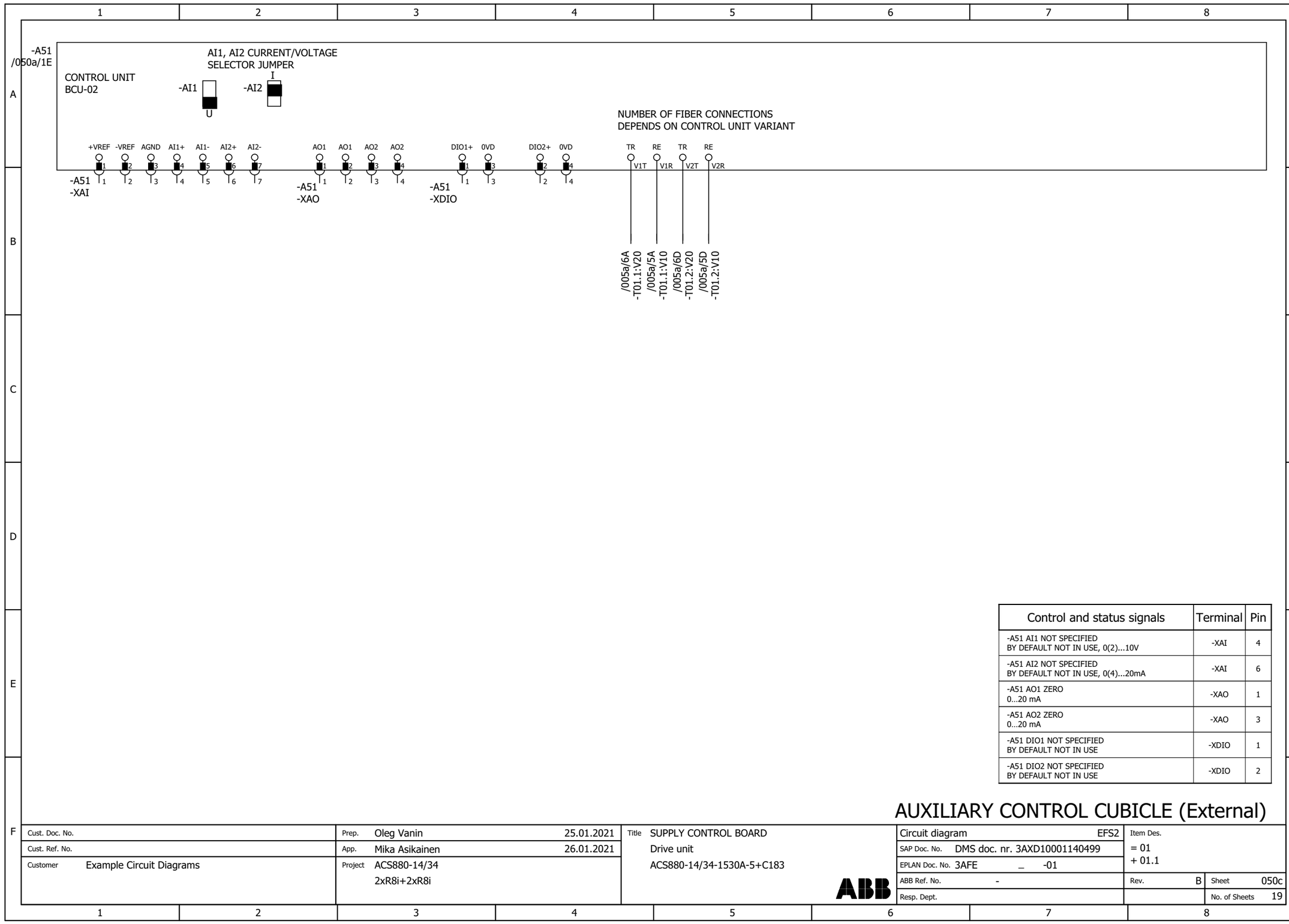
Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title SUPPLY CONTROL BOARD	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 01.1	
		ABB	ABB Ref. No. -	Rev. B	Sheet 050a
			Resp. Dept.		No. of Sheets 19



Control and status signals	Terminal	Pin
-A51 TEMPERATURE FAULT 0 - FAULT	-XDI	1
-A51 RUN / ENABLE 1 - RUN / ENABLE	-XDI	2
-A51 MAIN BREAKER FB 1 - CLOSED	-XDI	3
-A51 CIRCUIT BRK FAULT 0 - FAULT	-XDI	4
-A51 EARTH LEAKAGE 1 - NO FAULT	-XDI	5
-A51 RESET 1 - RESET	-XDI	6
-A51 DIGITAL INTERLOCK 0 - ACTUATED, BY DEFAULT NOT IN USE	-XDI	7

AUXILIARY CONTROL CUBICLE (External)

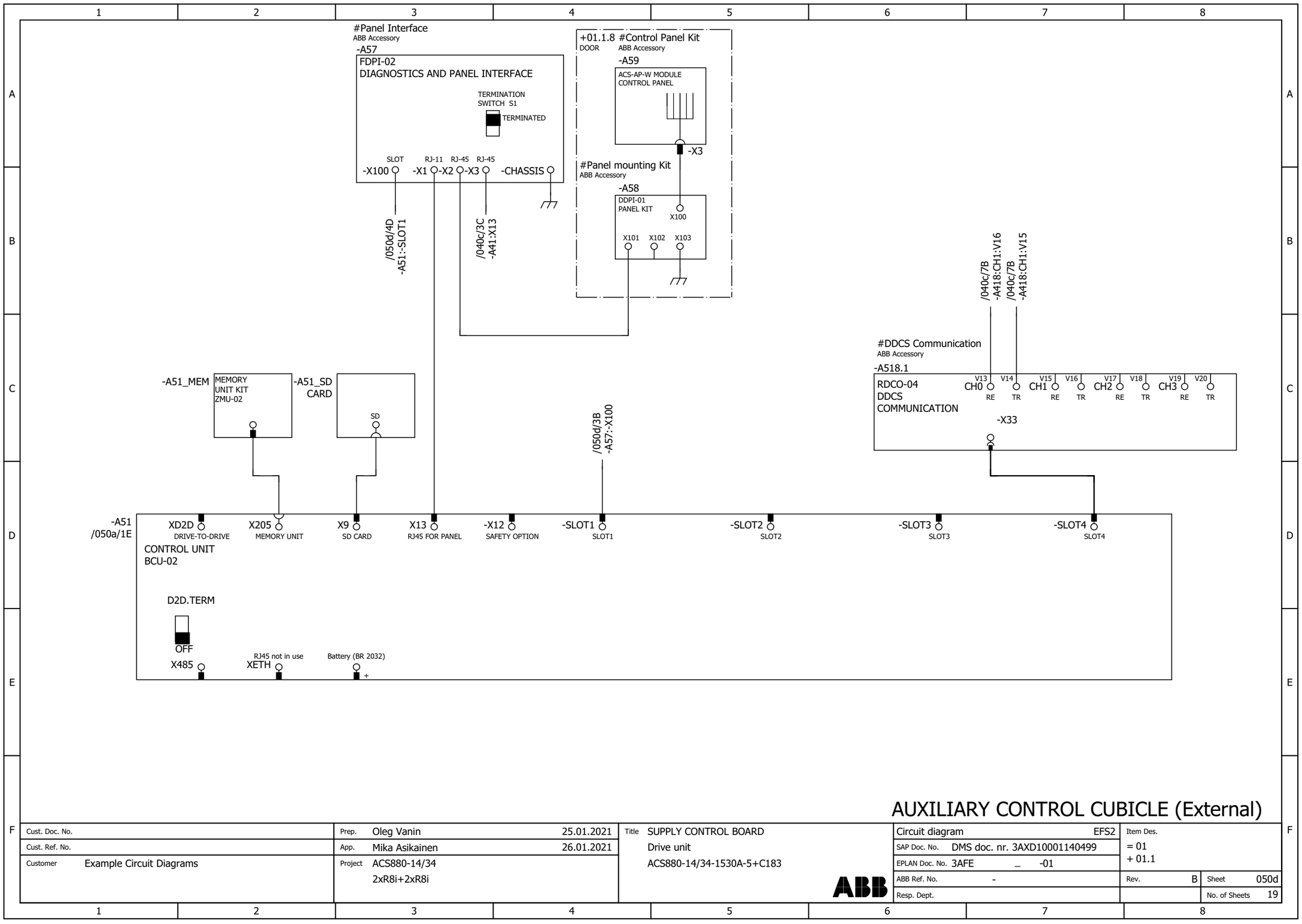
Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title SUPPLY CONTROL BOARD Drive unit ACS880-14/34-1530A-5+C183	Circuit diagram EFS2	Item Des. = 01 + 01.1	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021		SAP Doc. No. DMS doc. nr. 3AXD10001140499		
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i		EPLAN Doc. No. 3AFE _ -01		
			ABB Ref. No. -	Rev. B	Sheet 050b
			Resp. Dept.		No. of Sheets 19



Control and status signals	Terminal	Pin
-A51 AI1 NOT SPECIFIED BY DEFAULT NOT IN USE, 0(2)...10V	-XAI	4
-A51 AI2 NOT SPECIFIED BY DEFAULT NOT IN USE, 0(4)...20mA	-XAI	6
-A51 AO1 ZERO 0...20 mA	-XAO	1
-A51 AO2 ZERO 0...20 mA	-XAO	3
-A51 DIO1 NOT SPECIFIED BY DEFAULT NOT IN USE	-XDIO	1
-A51 DIO2 NOT SPECIFIED BY DEFAULT NOT IN USE	-XDIO	2

AUXILIARY CONTROL CUBICLE (External)

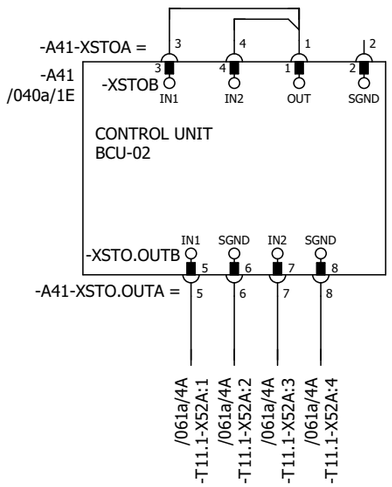
Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title SUPPLY CONTROL BOARD	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 01.1	
	2xR8i+2xR8i	ABB	ABB Ref. No. -	Rev. B	Sheet 050c
			Resp. Dept.		No. of Sheets 19

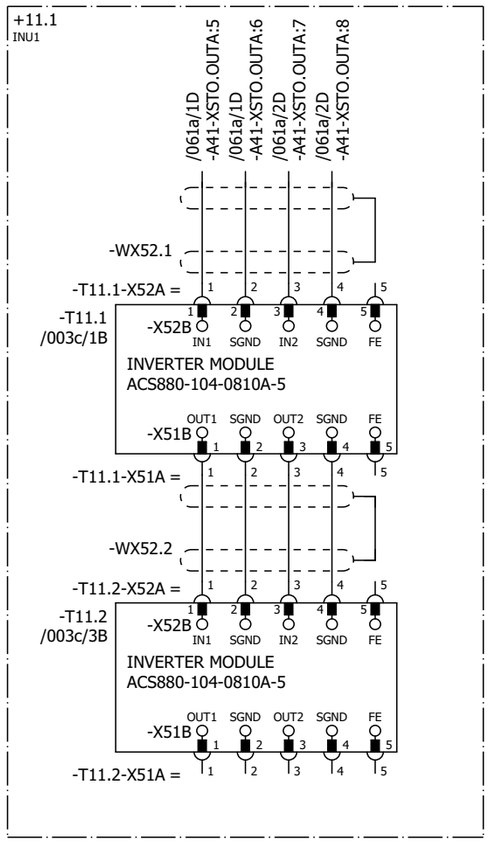


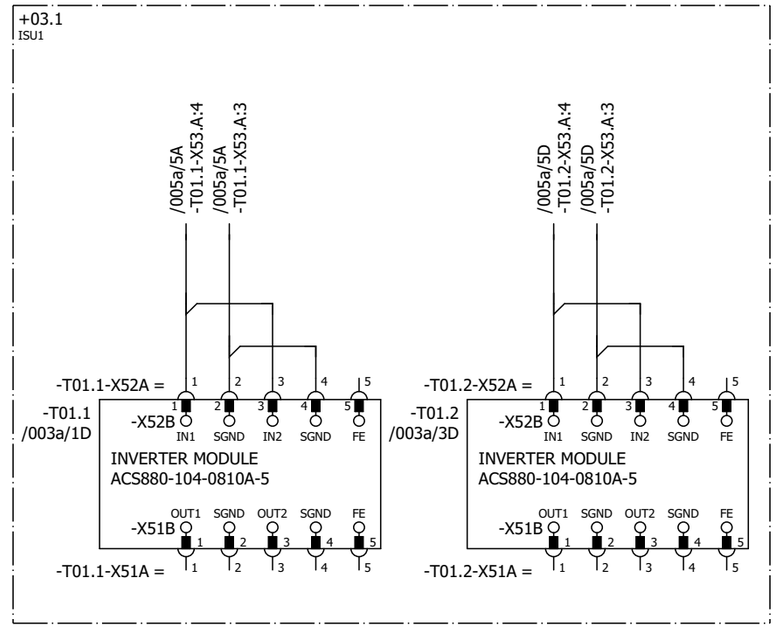
AUXILIARY CONTROL CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title SUPPLY CONTROL BOARD	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 01.1	
			ABB Ref. No. -	Rev. B	Sheet 050d
			Resp. Dept.		No. of Sheets 19

STO CONNECTIONS
FOR INU MODULES







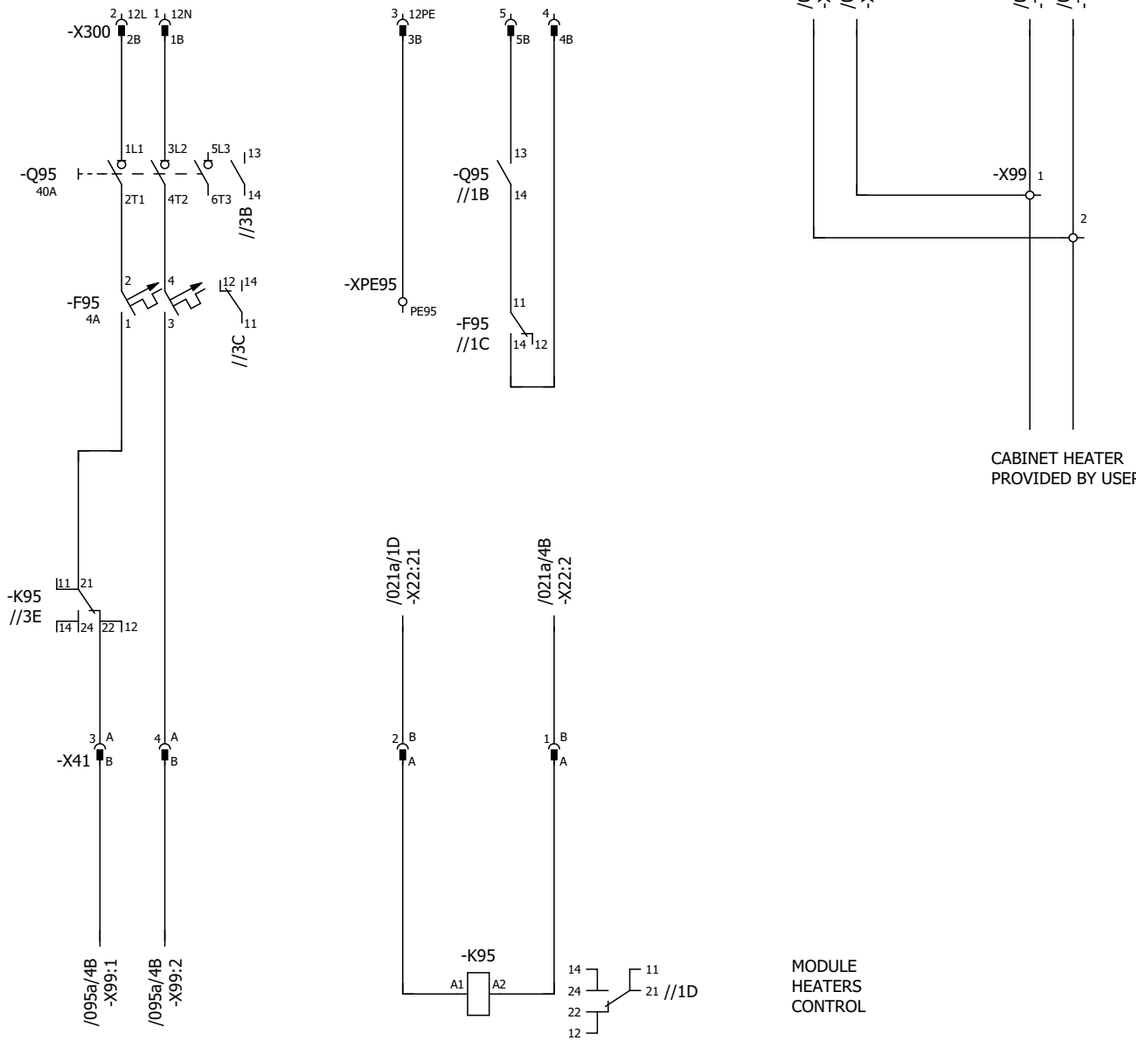
SAFETY CIRCUIT
GENERATED FROM SOLUTION REVISION RULES CONVERTED 28.2.2020

AUXILIARY CONTROL CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title MODULE CONTROL CONNECTIONS	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 01.1	
	2xR8i+2xR8i		ABB Ref. No. -	Rev. B	Sheet 061a
			Resp. Dept.		No. of Sheets 19

EXTERNAL SUPPLY FOR
MODULE/CABINET HEATERS
230VAC 115VAC
50Hz 60Hz

HEATERS
SUPERVISION



AUXILIARY CONTROL CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title MODULE HEATER	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01	
Customer Example Circuit Diagrams	Project ACS880-14/34	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01	+ 01.1	
	2xR8i+2xR8i	ABB	ABB Ref. No. -	Rev. B	Sheet 095a
			Resp. Dept.		No. of Sheets 19

DOL FANS
SUPPLY

/001a/2C
-Q21:1

/001a/2C
-Q21:3

/001a/3C
-Q21:5

-F111.1
8A

-F111.2
8A

-F111.3
8A

-T111
2.7kVA

A1 B1 C1

A7 A6 A5 A4 A3 A2 — A*
B7 B6 B5 B4 B3 B2 — B*
C7 C6 C5 C4 C3 C2 — C*

(NOTE*)
SET
ACTUAL
SUPPLY
VOLTAGE

115+ 115- 115+ 230- 230+ 230-
a4 a3 n1 n2 a2 a1 b2 b1 c2 c1

-11PE
1PE

-F112.1
4A

/005a/2A
-R03.1-X30.A:1

/005a/2A
-R03.1-X30.A:2

/005a/2A
-R03.1-X30.A:3

/050b/3B

AUXILIARY CONTROL CUBICLE (External)

Cust. Doc. No.	Prep. Oleg Vanin 25.01.2021	Title AUXILIARY VOLTAGE DISTRIBUTION	Circuit diagram EFS2	Item Des.	
Cust. Ref. No.	App. Mika Asikainen 26.01.2021	Drive unit	SAP Doc. No. DMS doc. nr. 3AXD10001140499	= 01 + 01.1	
Customer Example Circuit Diagrams	Project ACS880-14/34 2xR8i+2xR8i	ACS880-14/34-1530A-5+C183	EPLAN Doc. No. 3AFE _ -01		
		ABB	ABB Ref. No. -	Rev. B	Sheet 111a
			Resp. Dept.		No. of Sheets 19

Further information

Product and service inquiries

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