

ABB INDUSTRIAL DRIVES

ACS880-104LC inverter modules

Hardware manual



ACS880-104LC inverter modules

Hardware manual

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Further information



1

Introduction to the manual

Contents of this chapter

This chapter gives basic information on the manual.

Applicability

This manual is applicable to ACS880-104LC inverter modules for user-defined cabinet installations.

Safety instructions

Obey all safety instructions of the drive.

- Read the **complete safety instructions** before you install, commission, use or service the drive. The complete safety instructions are given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#).
- Read the warnings of the software function before you take the function in use or change its default parameter settings. Read the warnings of the parameter before you change its default setting. Refer to the firmware manual.

Target audience

This manual is intended for people who plan the installation, install, commission and do maintenance work on the drive, or create instructions for the end user of the drive concerning the installation and maintenance of the drive.

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

Categorization by frame size and option code

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

The module size can be identified from the basic code visible on the type designation label, for example, “ACS880-104LC-0850A-7”, where 0850A is the module size. The option codes of the module are listed after a plus sign. Chapter Ordering information, section Frame R8i and multiples explains the type designation code in detail.

The frame size of the module can be, for example, R8i or 2×R8i, the latter representing an inverter unit consisting of two parallel-connected R8i inverter modules. The table under section [Ratings \(page 247\)](#) lists the units and frame sizes.

Use of component designations

Some device names in the manual include the component designation in brackets (for example, [Q20]). This will help you to identify the components in the circuit diagrams of the drive.

Related documents

You can find manuals on the Internet. See below for the relevant code/link. For more documentation, go to www.abb.com/drives/documents.



[Manuals for ACS880 multidrives modules](#)

Terms and abbreviations

Term	Description
BCON	Type of control board
BCU	Type of control unit
BDPS	Module internal power supply board
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 a certain maximum limit. The voltage rise is typically caused by deceleration (braking) of a high inertia motor.
CIO	I/O module for controlling cooling fans
CMF	Common mode filtering
Cubicle	One section of a cabinet-installed drive. A cubicle is typically behind a door of its own.
DC link	DC circuit between rectifier and inverter
DC link capacitors	Energy storage which stabilizes the intermediate circuit DC voltage
DDCS	Distributed drives communication system protocol
DPMP	Optional mounting platform for door mounting of control panel
Drive	Frequency converter for controlling AC motors
EFB	Embedded fieldbus
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
FAIO	Analog I/O extension module
FBA	Fieldbus adapter
FCAN	Optional CANopen® adapter module
FCNA	Optional ControlNet™ adapter module
FDCO	Optical DDCS communication module
FDNA	Optional DeviceNet™ adapter module
FDPI	Diagnostics and panel interface board
FECA	Optional EtherCAT® adapter module
FEN-01	Optional TTL incremental encoder interface module
FEN-11	Optional absolute encoder interface module
FEN-21	Optional resolver interface module
FEN-31	Optional HTL incremental encoder interface module
FENA-11	Optional Ethernet adapter module for EtherNet/IP™, Modbus TCP® and PROFINET IO® protocols
FENA-21	Optional Ethernet adapter module for EtherNet/IP™, Modbus TCP and PROFINET IO protocols, 2-port
FEPL	Optional Ethernet POWERLINK adapter module
FIO-01	Optional digital I/O extension module
FIO-11	Optional analog I/O extension module
Four-quadrant operation	Operation of a machine in both the forward and reverse directions in both motoring and generating modes. Also used as an attribute of a drive; a regenerative drive can operate the electric machine in all four modes, while a non-regenerative drive can only operate the machine in motoring mode.
FPBA-01	Optional PROFIBUS DP® adapter module
Frame, frame size	Physical size of the drive or power module
FSCA	Optional Modbus RTU adapter module
FSO-12, FSO-21	Optional functional safety modules
Generic enclosure	See chapter Ordering information.
HTL	High-threshold logic
IGBT	Insulated gate bipolar transistor
Intermediate circuit	DC circuit between rectifier and inverter
INU	Inverter unit

Term	Description
Inverter	Converts direct current and voltage to alternating current and voltage.
Inverter module	Inverter bridge, related components and drive DC link capacitors enclosed in a metal frame or enclosure. Intended for cabinet installation.
Inverter unit	Inverter module(s) under control of one control unit, and related components. One inverter unit typically controls one motor.
Multidrive	Drive for controlling several motors which are typically coupled to the same machinery. Includes one supply unit, and one or several inverter units.
NBRA	Series of optional brake chopper modules
NBRW	Series of optional, liquid-cooled brake chopper modules
Parameter	In the drive control program, user-adjustable operation instruction to the drive, or signal measured or calculated by the drive. In some (for example fieldbus) contexts, a value that can be accessed as an object. For example, variable, constant, or signal.
PLC	Programmable logic controller
RFI	Radio-frequency interference
SIL	Safety integrity level (1...3) (IEC 61508, IEC 62061, IEC 61800-5-2)
STO	Safe torque off (IEC/EN 61800-5-2)
THD	Total harmonic distortion
TTL	Transistor-transistor logic
UPS	Uninterruptible power supply
VX25	Enclosure system by Rittal (http://www.rittal.com)
ZMU	Type of memory unit, attached to the control unit

2

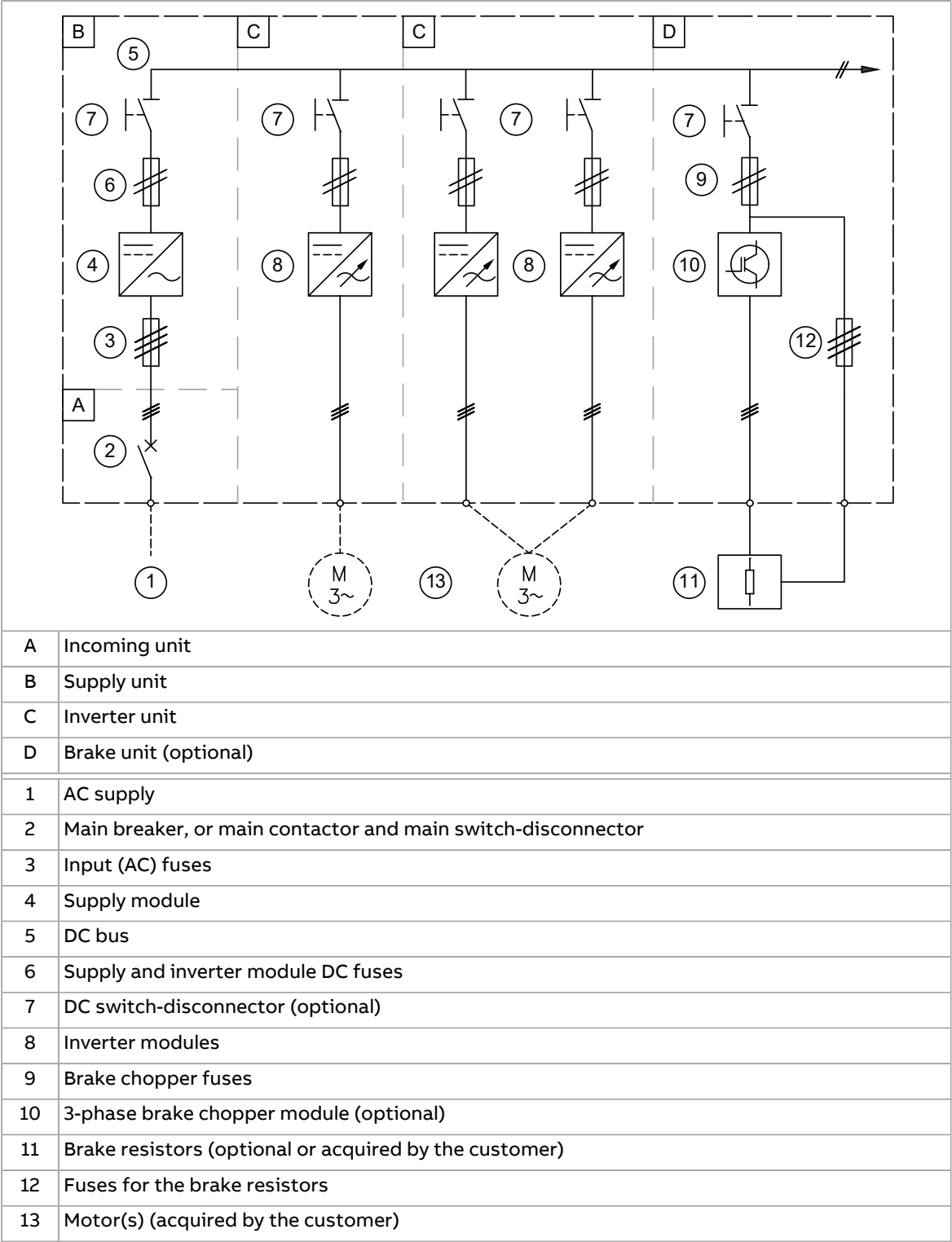
Operation principle and hardware description

Contents of this chapter

This chapter describes a typical drive system and the hardware of ACS880-104LC inverter modules.

Overview diagram of the drive system

The diagram that follows shows an example of a multidrive. The supply unit connects the drive to the AC supply network. It converts the AC voltage into DC. The DC voltage is distributed through the DC bus to all inverter units and optional brake units. The inverter unit converts the DC back to AC that rotates the motor. The brake unit (optional) conveys energy to brake resistors whenever needed.



Inverter module hardware

■ General

An inverter unit contains the components required to control one motor. These include one or more inverter modules connected in parallel, together with the necessary auxiliary equipment such as control electronics, fusing, cabling and switchgear.

ACS880-104LC modules can be used to construct inverter units with a power rating of 45 kW up to several megawatts. Up to approximately 800 kW, inverter units consist of one module only; higher power ratings are achieved by connecting multiple modules in parallel.

All inverter modules have coated circuit boards as standard.

■ DC connection and capacitor charging

The module must be equipped with external DC fuses.

A DC switch-disconnector can be installed if quick isolation of the module from the DC bus is required.

A capacitor charging circuit must be fitted if:

- the module is connected to the DC bus through a DC switch-disconnector, or
- the module is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

The charging circuit design presented in this manual consists of a charging switch, resistors and a charging controller. When the module is connected to an energized DC bus, the charging switch is closed first. When the charging is finished, the main DC switch-disconnector can be closed and the charging switch opened. The module will not start if the charging switch is closed.

Common mode filtering is implemented by running the DC busbars through ferrite cores. Common mode filtering protects the motor from common mode noise.

Frame R7i and R8i (and multiples, if any) modules are controlled by a single BCU control unit installed separately from the module(s). The control unit is connected to each module by a fiber optic link. The control unit can be powered from the module (terminal block X53), from an external 24 V DC supply, or both for redundancy. The control unit contains the basic I/Os and slots for optional I/O modules. Other equipment is primarily installed on separate mounting plates.

■ **Frame R7i and multiples**

Frame R7i modules provide output power in the range of 45 to 355 kW in single-module configurations, and 315 to 1400 kW in parallel configurations. The power range of parallel-connected R7i modules overlaps the range of single R8i modules, but parallel-connected R7i modules can be better suited for compact, low cabinet configurations than the taller frame R8i modules.

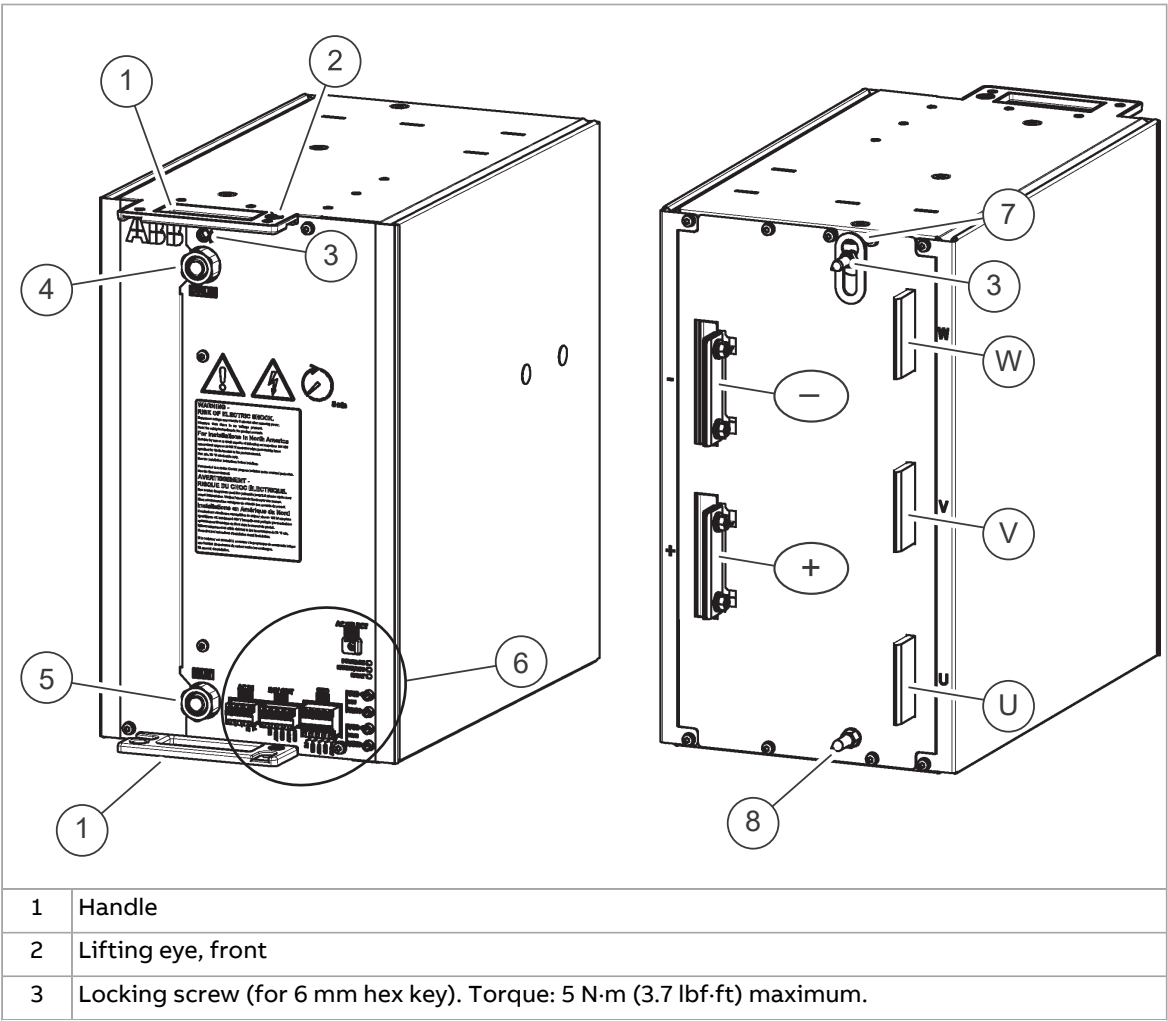
The R7i module is designed for mounting in an installation frame, which in turn is mounted into the cubicle. The AC and DC power connectors of the frame are bolted to busbars. When the module is inserted into the frame, the AC and DC power connections of the module engage with quick connectors in the frame. The module is secured by a locking screw that is accessible from the front.

The front cover plate of the module can be pulled out for access to the circuit board compartment without removing the module.

This manual presents cubicle designs for one and two modules. In the two-module design, each module has its own output terminals, so they can be cabled to the same motor or two different motors.

The modules have internal du/dt filtering as an option. In parallel configurations, du/dt filtering is mandatory. The du/dt filter decreases voltage spikes, which reduces stress on the motor insulation.

Module layout



4	Coolant out connector
5	Coolant in connector
6	Connectors X50, X52 and X53; fiber optic connectors; LEDs; auxiliary voltage selector X59.
7	Lifting ring, rear
8	Guide pin
+ –	DC connection busbars. The busbars engage with the quick connectors of the installation frame.
U V W	AC connection busbars. The busbars engage with the quick connectors of the installation frame.

Coolant connectors

The coolant pipe inlet and outlet connectors are located at the bottom front and top front of the module respectively. The connectors are for 16/13 millimeter PA (polyamide) pipe.

Installation frame

See the dimension drawings.

Connectors X50, X52 and X53; Auxiliary voltage selector X59

R7i modules contain a power supply board that provides 24 V DC for the circuit boards of the module. The 24 V DC voltage provided by the power supply board is also available on X53, and can be used to power the control unit of a single R7i module.

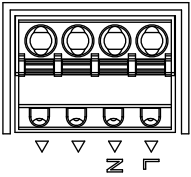
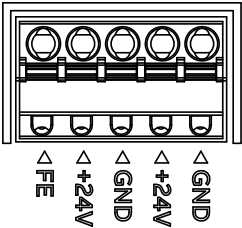
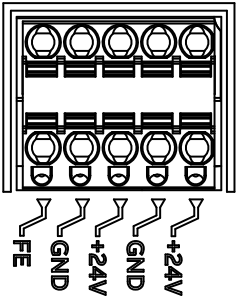
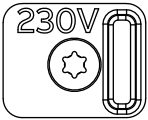
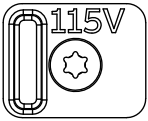
Note: With parallel-connected modules, it is strongly recommended to use an external 24 V DC supply to power the control unit.

The power supply board of the module is powered internally from the DC link. An auxiliary voltage of 230 V AC or 115 V AC (selectable) can optionally be connected to terminal block X50 to feed the power supply board even when the DC link is not live. The selection between 115 V and 230 V is made with selector plug X59. The setting can be changed by removing the screw, moving the plug into the 115 V position, and reinstalling the screw.

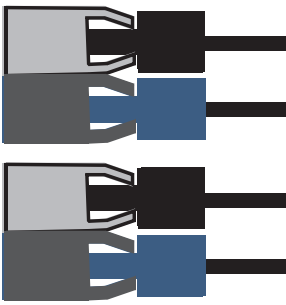
If the Safe torque off (STO) function is not used, the “24V” inputs on X52 must be connected to +24 V (on connector X53, for example) on the inverter module. On a new module, a jumper wire set installed at the factory makes this connection. If the STO function is to be implemented, the jumper wire set must be removed.

For STO, X52 (STO IN) is wired to the STO OUT connector on the control unit. Connector X51 on the module is wired to connector X52 on the next parallel-connected module (if present). For details, see chapter [The Safe torque off function \(page 289\)](#).

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AC IN X50 	Auxiliary voltage input for internal power supply of module. Voltage selected by X59.
24V OUT X53 	24 V DC output (for eg. control unit)
STO X52 	Incoming STO signals from the control unit, outgoing STO signals to next inverter module in parallel configurations (plug with twin connections included with multiples of frame R7i)
AC SELECT X59 	Auxiliary voltage: 230 V AC
AC SELECT X59 	Auxiliary voltage: 115 V AC

Fiber optic connectors

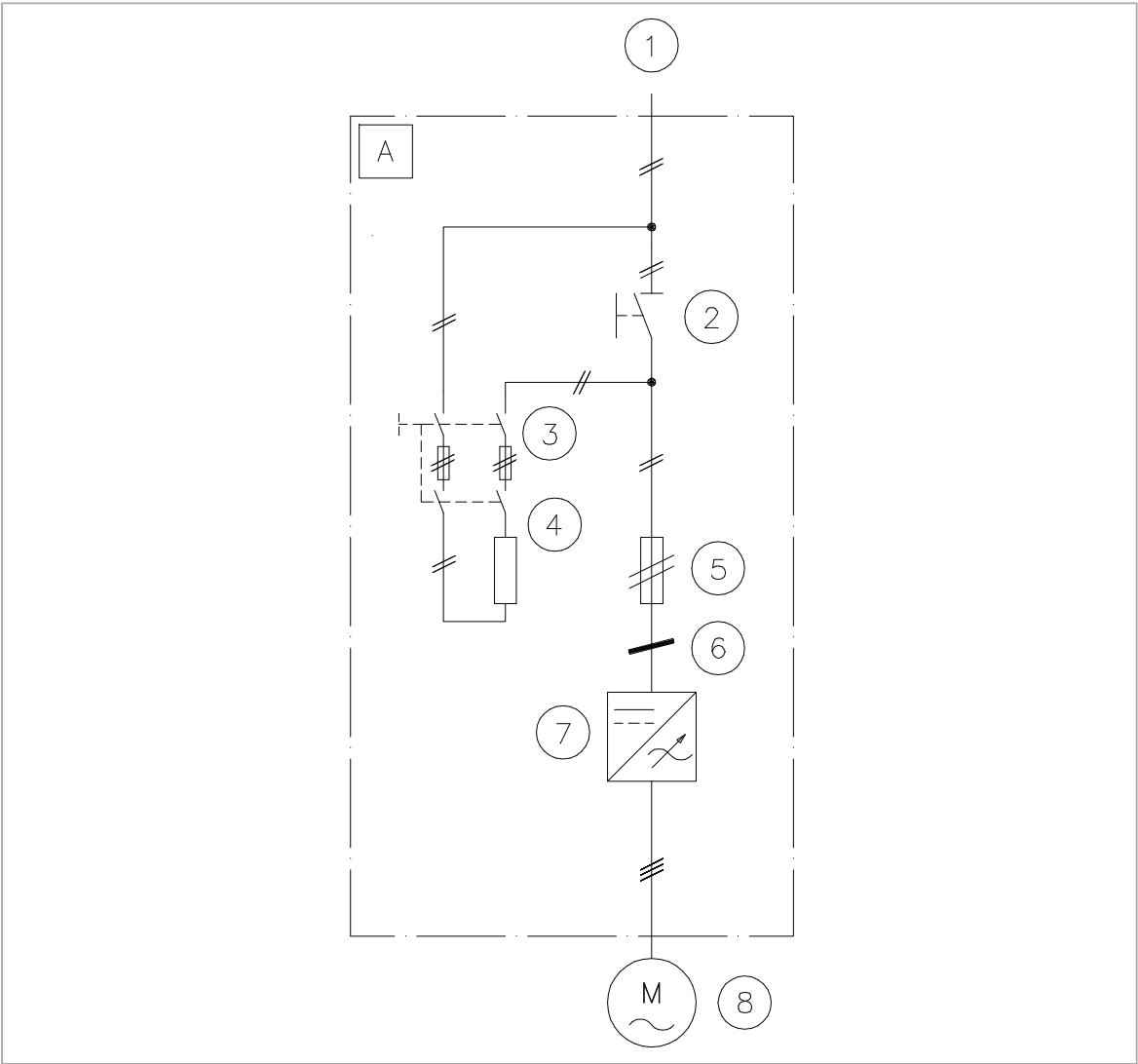
Control unit connection. Must be connected by the installer.	V20	
	V10	
Charging controller connection. Must be connected by the installer.	V60	
	V50	

LEDs

LED	Color	Indication
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).

Overview circuit diagram of a frame R7i inverter unit

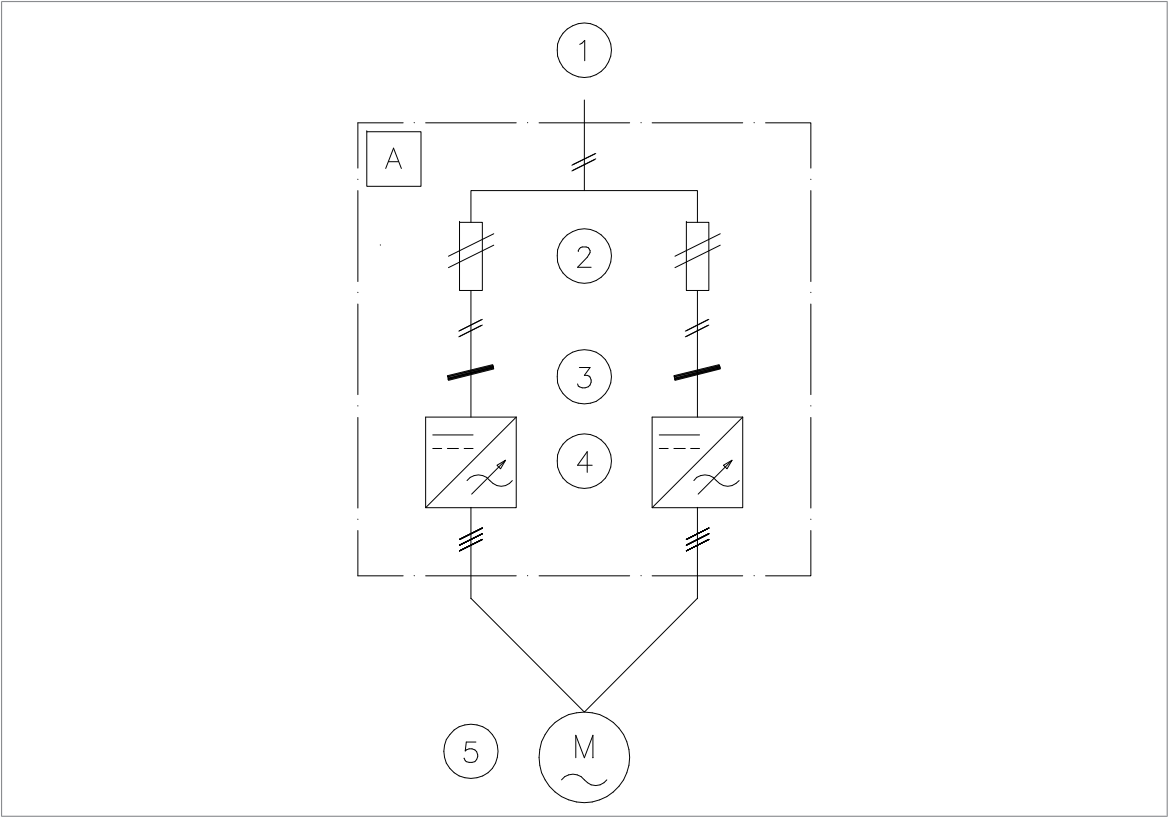
The following figure shows a simplified connection example of an inverter unit based on a single inverter module.



Item	Explanation	Available through
A	Inverter cubicle	-
1	DC supply	-
2	DC switch-disconnector (optional)	ABB or third party
3	Charging switch (optional)	ABB or third party
4	Charging resistor (optional)	ABB or third party
5	DC fuses	ABB or third party
6	Common mode filters	ABB
7	Inverter module	ABB
8	Motor	ABB (not part of ACS880-104LC product offering) or third party

Overview circuit diagram of a 2×R7i inverter unit

The diagram below shows the two-module cubicle design. The inverter modules are installed into the same cubicle and connected in parallel to control one motor.



Item	Explanation	Available through
A	Inverter cubicle	-
1	DC supply	-
2	DC fuses	ABB or third party
3	Common mode filter	ABB
4	Inverter module	ABB
5	Motor	ABB (not part of ACS880-104LC product offering) or third party

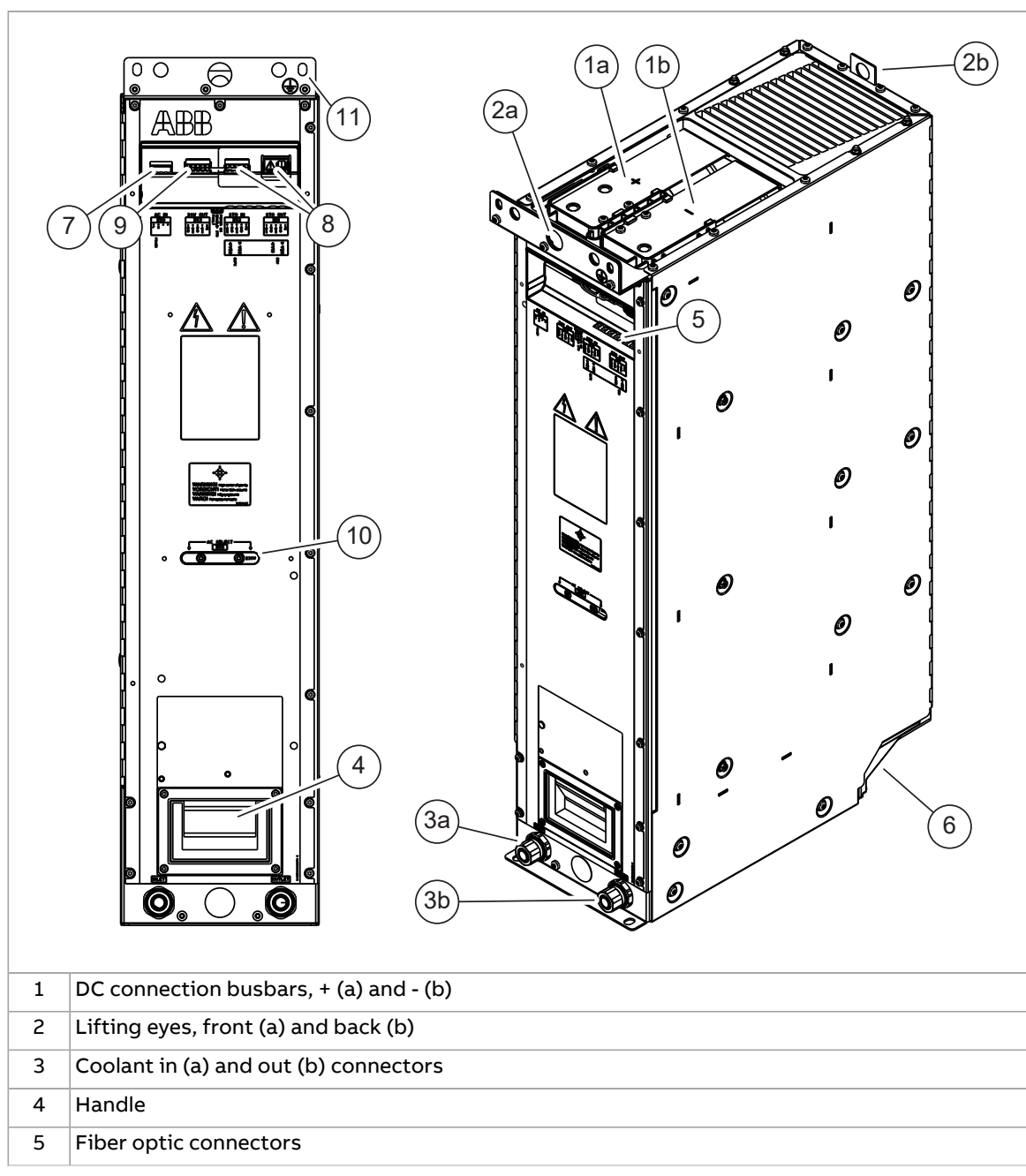
■ Frame R8i and multiples

Frame R8i modules are used to achieve output powers from approximately 350 kW upwards in single or parallel configurations.

The DC connection of the module is by busbars and located at the top. The motor connection is via a quick connector at the back of the module that couples when the module is inserted into the cubicle. Each parallel-connected module is cabled separately to the motor, or connected by busbars to adjacent modules to reduce the number of cables. It is also possible to build an AC bus from each module to a separate output cubicle.

Internal du/dt filtering is mandatory with all 690 volt units and all parallel-connected modules. 690 volt modules have internal du/dt filtering as standard. The du/dt filter decreases voltage spikes, which reduces stress on the motor insulation.

Module layout



6	Quick connector (AC connection) (the counterpart fastened to the cabinet behind the module)
7	Terminal block X50 (auxiliary power input for internal boards)
8	Terminal block X51 and X52 (Safe torque off in inverter modules only)
9	Terminal block X53 (24 V DC power output)
10	Auxiliary voltage selector X59 (115 or 230 V)
11	Unpainted fastening hole. The grounding point between module frame and cabinet frame.

Coolant connectors

The coolant pipe inlet and outlet connectors are located at the bottom front of the module. The connectors are for 16/13 millimeter PA (polyamide) pipe.

Connectors X50...X59

R8i modules contain a power supply (BDPS) that provides 24 V DC for the circuit boards of the module. The 24 V DC voltage provided by the BDPS is also available on X53, and can be used to power the control unit of a single R8i module.

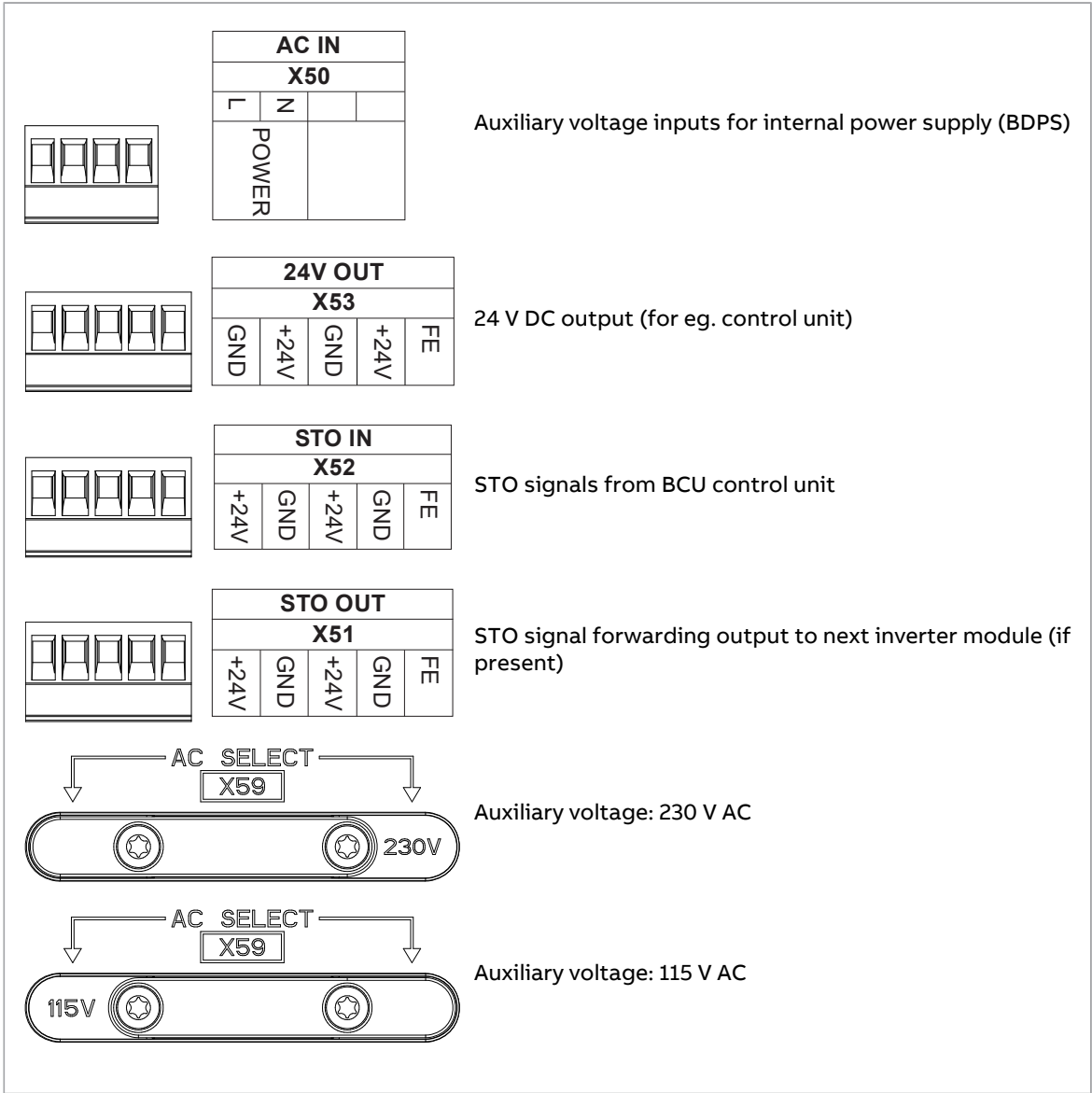
Note: With parallel-connected modules, it is strongly recommended to use an external 24 V DC supply to power the control unit.

The BDPS is powered internally from the DC link. An auxiliary voltage of 230 V AC or 115 V AC (selectable) can optionally be fed to terminal block X50 to power the BDPS even when the DC link is not live. The selection between 115 V and 230 V is made with selector plug X59. The setting can be changed by removing the two screws, turning the plug 180 degrees, and reinstalling the screws.

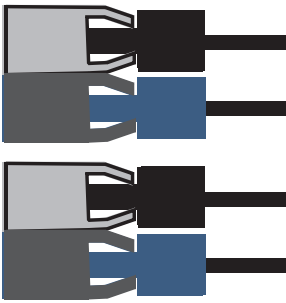
If the Safe torque off (STO) function is not used, the “24V” inputs on X52 must be connected to +24 V (on connector X53, for example) on each inverter module. On a new module, a jumper wire set installed at the factory makes this connection.

If the STO function is to be implemented, the jumper wire set must be removed – a mechanical interlocking device is factory-installed on connectors X51 and X52 to this effect.

For STO, X52 (STO IN) is wired to the STO OUT connector on the BCU control unit. Connector X51 on the module is wired to connector X52 on the next module (if present). For details, see chapter [The Safe torque off function \(page 289\)](#).



Fiber optic connectors

Control unit connection. Must be connected by the installer.	V20	
	V10	
Charging controller BSFC connection. Must be connected by the installer.	V60	
	V50	

LEDs

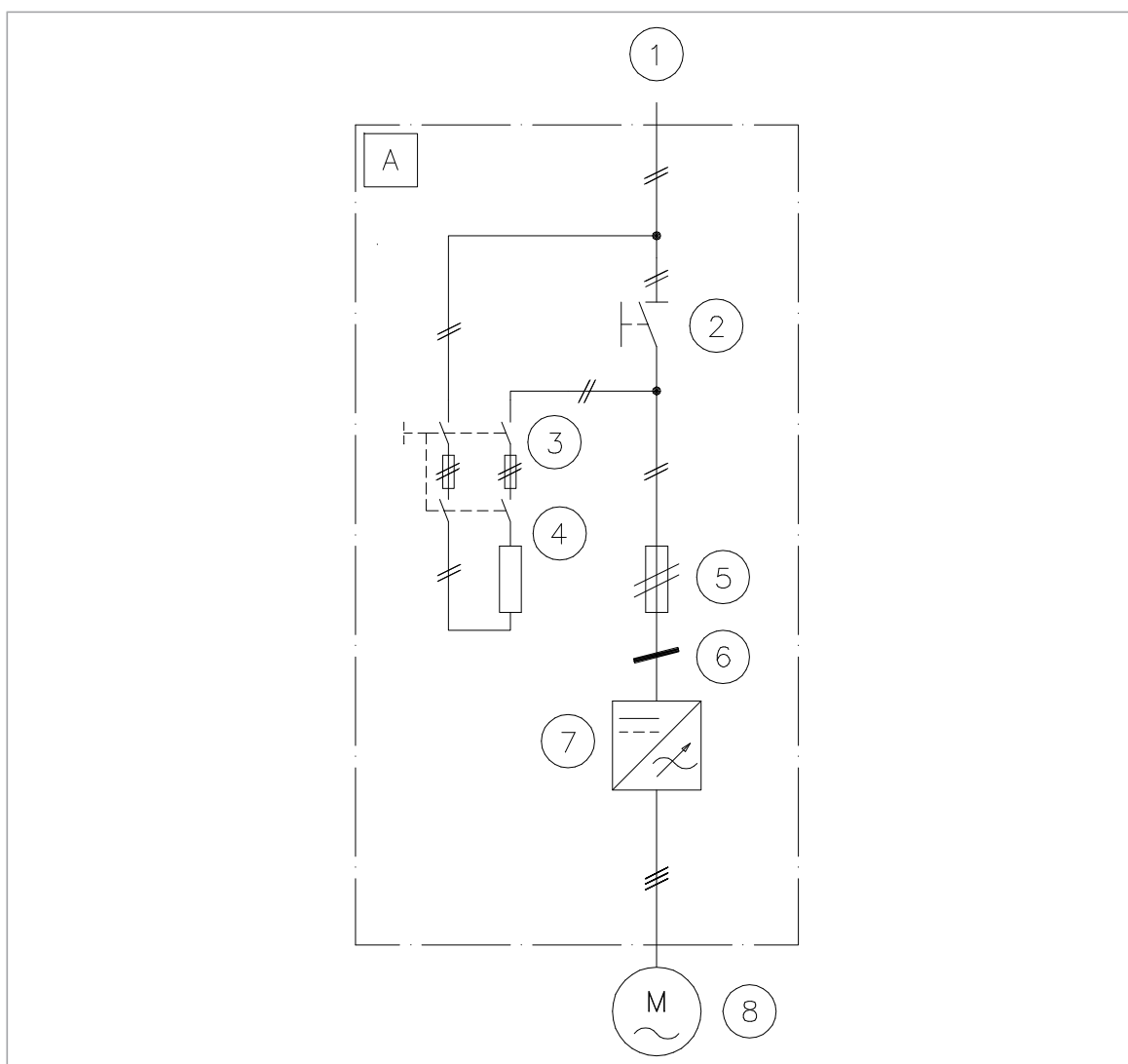
LED	Color	Indication
FAULT	Continuous red	There is an active fault in the module.

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LED	Color	Indication
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).

Overview circuit diagram of a frame R8i inverter unit

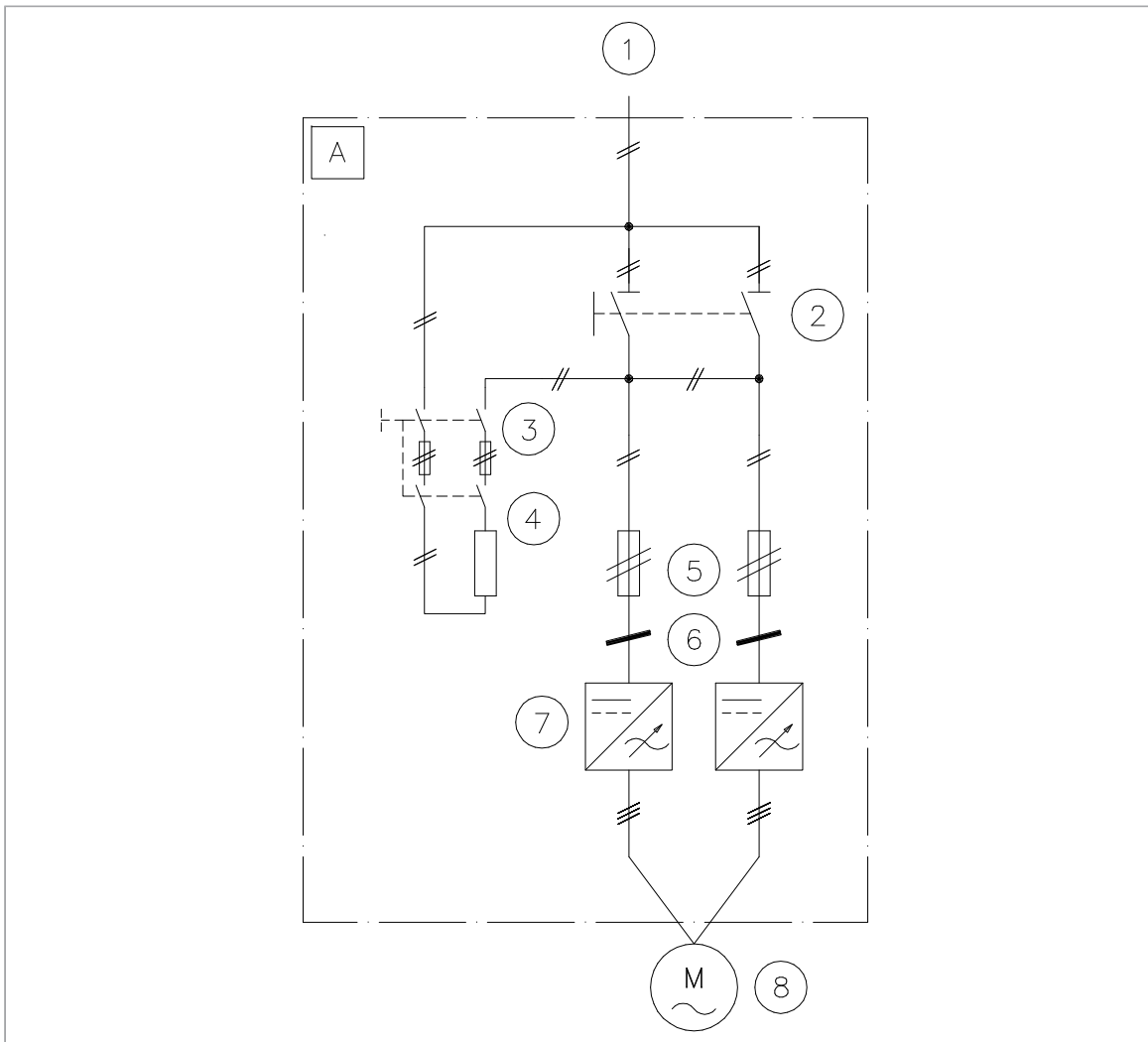
The following figure shows a simplified connection example of an inverter unit based on a single inverter module.



Item	Explanation	Available through
A	Inverter cubicle	-
1	DC supply	-
2	DC switch-disconnector (optional)	ABB or third party
3	Charging switch (optional)	ABB or third party
4	Charging resistor (optional)	ABB or third party
5	DC fuses	ABB or third party
6	Common mode filters	ABB
7	Inverter module	ABB
8	Motor	ABB (not part of ACS880-104LC product offering) or third party

Overview circuit diagram of a frame 2×R8i inverter unit

The following figure shows a simplified connection example of an inverter based on two parallel-connected frame R8i inverter modules.



Item	Explanation	Available through
A	Inverter cubicle	-
1	DC supply	-
2	DC switch-disconnector (optional)	ABB or third party
3	Charging switch (optional)	ABB or third party
4	Charging resistors (optional)	ABB or third party
5	DC fuses	ABB or third party
6	Common mode filters	ABB
7	Inverter modules	ABB
8	Motor	ABB (not part of ACS880-104LC product offering) or third party

Cooling system

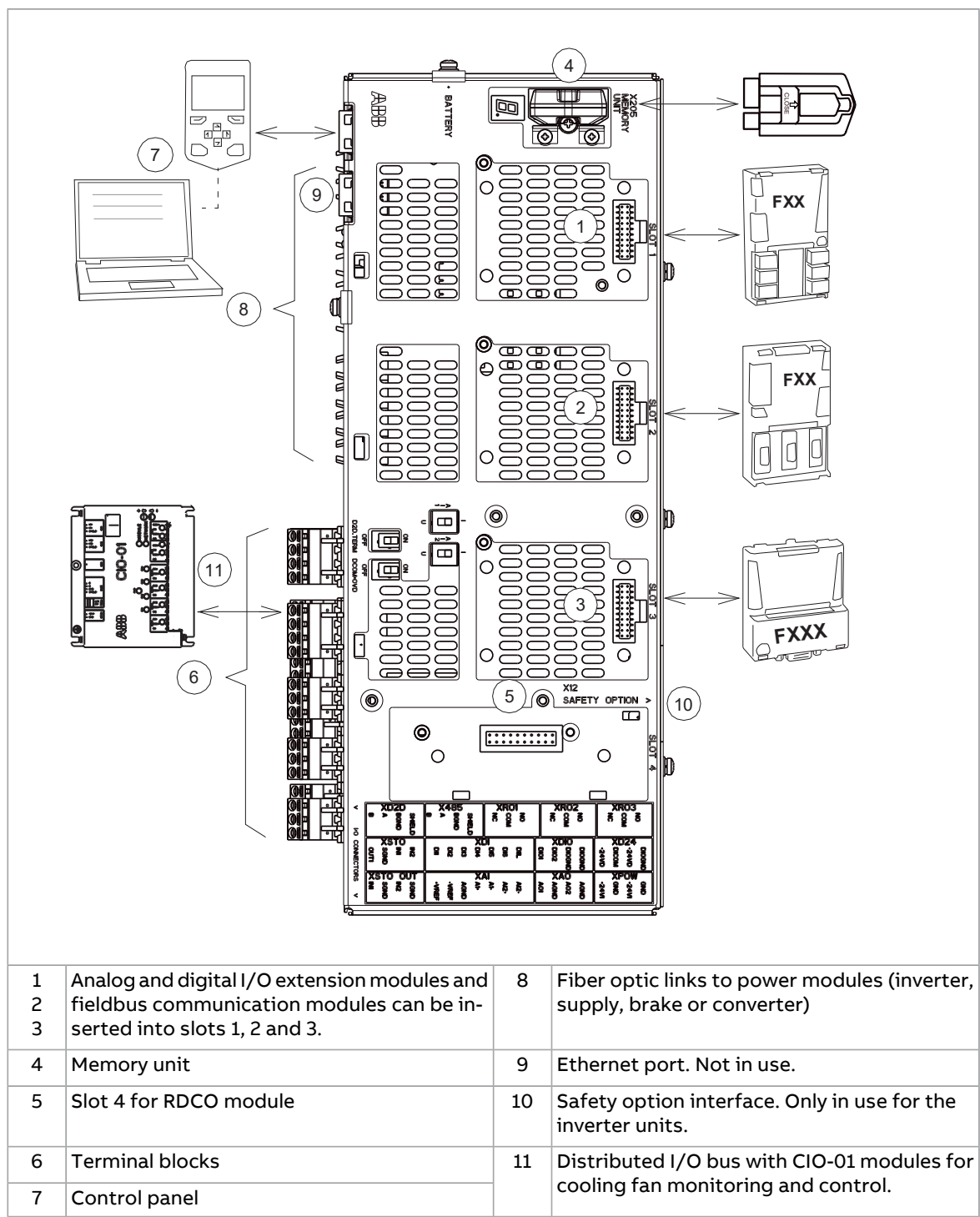
See chapter [Internal cooling circuit \(page 381\)](#).

Cabinet layout and cooling

See chapter [Cabinet construction \(page 43\)](#).

Control interfaces

■ Overview of the control connections of the BCU control unit



■ The control panel

The ACS-AP-W or ACS-AP-I control panel is the user interface of the inverter unit, providing the essential controls such as Start/Stop/Direction/Reset/Reference, and the parameter settings for the control program.

The control panel can be mounted on the cabinet door using a DPMP-01 or DPMP-02 mounting platform (available separately).

One control panel can be used to control several inverter units through a panel link provided that each unit is equipped with panel holder or an FDPI-02 module.

Note: A control panel is required for the commissioning of an ACS880 drive system, even if the Drive Composer PC tool is used.

For details on the control panel, refer to [ACS-AP-I, -S, -W and ACH-AP-H, -W Assistant control panels user's manual \(3AUA0000085685 \[English\]\)](#).

Control by PC tools

There is a USB connector on the front of the 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.

Type designation label

Each inverter 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 unit. The first digits express the basic construction of the unit, for example “ACS880-104LC-0850A-7”. Any optional selections are given thereafter, separated by plus signs.

Quote the complete type designation and serial number when contacting technical support on the subject of individual inverter modules. An example of the label is shown below.

	ACS880-104LC-0670A-7+C132+E205+P904 ①		CE	
Origin Finland Made in Finland ABB Oy Hiomotie 13 00380 Helsinki Finland	INVERTER Input U1 742/849/976 VDC ⑥ I1 754 A f1 - Output U2 3~ 0...525/600/690 VAC I2 670 A f2 0...500 Hz Sn 801 kVA	LINE CONVERTER 3~ 525/600/690 VAC 620 A 50/60 Hz 742/849/976 VDC 752 A - 741 kVA	EAC UK CA	
FRAME ② R8I		Liquid cooling ③ IP00 ④ UL open type ⑤ UL/CSA: max. 849 VDC/600 VAC		⑧  S/N: 1283605236
No. Description				
1	Type designation			
2	Frame size			
3	Cooling method			
4	Degree of protection			
5	UL/CSA data			
6	Ratings			
7	Valid markings. Refer to ACS880 liquid-cooled multidrive cabinets and modules Electrical planning (3AXD50000048634 [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 of the module

The type designation contains information on the specifications and configuration of the module. The first digits from left express the basic unit type. The optional selections are given thereafter, separated by plus signs, for example, +E205.

Code	Description
Basic code	
ACS880	Product series
104LC	Construction: Liquid-cooled inverter, supply, converter or brake module.

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Code	Description
Size	
xxxxx	Refer to the ratings table in the technical data.
Voltage range	
3	DC voltage corresponding AC input voltages 3 ~ 380...415 V. This is indicated in the type designation label as typical input voltage level 566 V DC.
5	DC voltage corresponding AC input voltages 3 ~ 380...500 V. This is indicated in the type designation label as typical input voltage level 566 / 679 / 707 V DC.
7	DC voltage corresponding AC input voltages 3 ~ 525...690 V. This is indicated in the type designation label as typical input voltage level 742 / 849 / 976 V DC.
Option codes	
C132	Marine type approval
C209	Marine product certification issued by Bureau Veritas
E205	Internal du/dt filtering
P904	Extended warranty (30 months from delivery or 24 months from commissioning)
P909	Extended warranty (42 months from delivery or 36 months from commissioning)
P911	Extended warranty (66 months from delivery or 60 months from commissioning)
P948	Customized extended warranty
Q971	ATEX-certified safe disconnection function

3

Moving and unpacking the module

Contents of this chapter

This chapter gives basic information on unpacking and moving the module.



WARNING!

Obey the safety instructions given in [ACS880 liquid-cooled multidrive cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#).

Moving and unpacking the module

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

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

If you need to pack the modules, see the package information in the technical data.

4

Cabinet construction



Contents of this chapter

This chapter gives instructions on how to install the modules and additional equipment into a cabinet.

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

Limitation of liability

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

■ North America

Installations must be compliant with NFPA 70 (NEC)¹⁾ and/or Canadian Electrical Code (CE) along with state and local codes for your location and application.

¹⁾ National Fire Protection Association 70 (National Electric Code).

Module-specific cooling requirements and allowable mounting orientations

Refer to chapter [Technical data \(page 247\)](#).

Installation and maintenance of the control unit

Refer to the hardware manual of the control unit:

Manual	Code
BCU-02/12/22 control units hardware manual	3AUA0000113605 (English)

Cabinet temperature supervision

You must ensure sufficient air flow inside the cabinet to cool down air-cooled components, such as fuses, busbars and filters. In liquid-cooled drive systems, the cabinet can be totally sealed from the ambient air. The air inside the cabinet must be able to circulate freely. Install a fan inside the cabinet to push air through a heat exchanger.

The inverter module has its own temperature supervision. For the diagnostics and settings, refer to the firmware manual of the inverter unit. The temperature supervision of frame R8i module is sufficient for the cabinet temperature supervision. Use thermal switches to supervise the temperature inside the R7i module cubicle. Wire the switches to a digital input (DI) of the supply control unit (1 = OK, 0 = overtemperature). In case of overtemperature, the switch opens and trips the supply unit on a fault. You can adjust the delay time by parameters.

ABB recommends to use thermal switches with the following temperature limits:

Frame	Voltage	Temperature limit
R7i	400...500 V	95 °C (203 °F)
2×R7i	400...500 V	85 °C (185 °F)
R7i	690 V	85 °C (185 °F)
2×R7i	690 V	85 °C (185 °F)

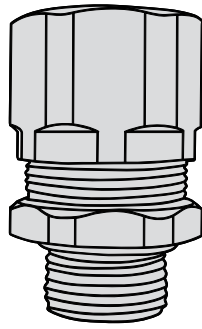
If you install the switches on the busbars, make sure there is correct insulation between the busbars and thermal switches.

Make sure that components located in other cubicles are correctly cooled.

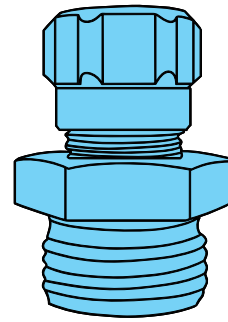
Liquid pipe connector installation instructions

These instructions are applicable to the liquid pipe connectors that are used in ABB drives. There are two types of pipe connectors: type A and type B. Refer to the illustrations below. When you install a pipe connector, identify the connector type first. Obey the type-specific instructions carefully.





Type A pipe connector



Type B pipe connector

**WARNING!**

Do the electrical safety precautions steps before you do work on the drive. Refer to the drive safety instructions. If you are not a qualified electrical professional, do not do work on the drive. If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

■ Type A pipe connector

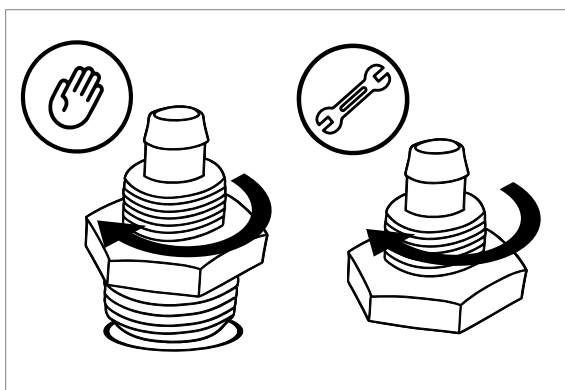
This section is applicable to type A pipe connectors.

Reserve these tools at hand:

- torque wrench.

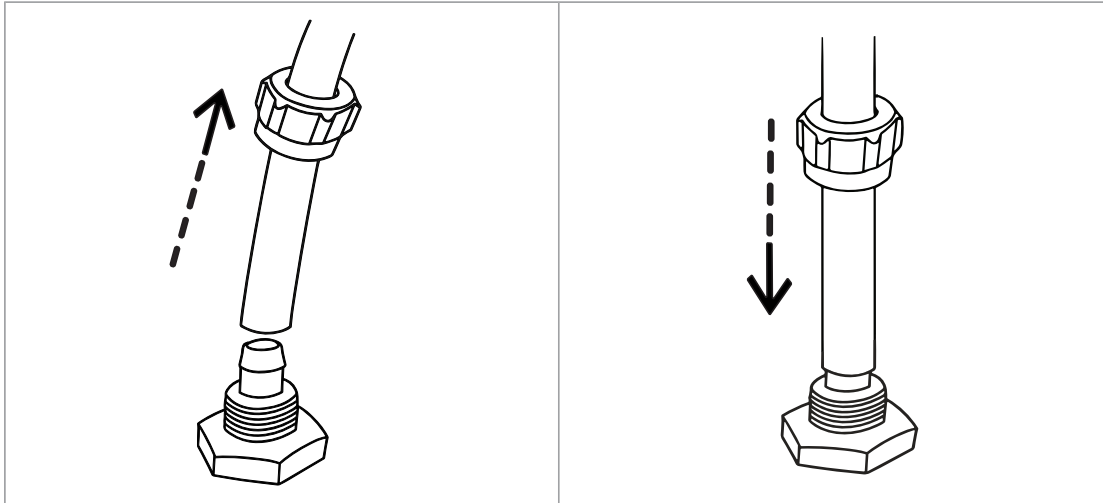
Installation procedure:

1. Make sure that the pipe connector has an O-ring.
2. Put the pipe connector base carefully onto the threads and start to turn it in by hand. Tighten the pipe connector base to 30 N·m (22.1 lbf·ft).

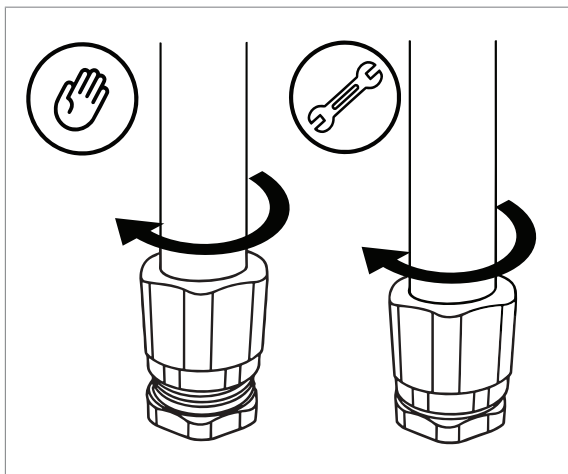


3. Push the locking ring onto the pipe.

4. Push the pipe onto the pipe connector base and pull down the locking ring. Make sure that the pipe is perpendicular to the pipe connector base.



5. Start to turn the locking ring by hand. Tighten the locking ring with a torque wrench to 20 N·m (14.8 lbf·ft).



■ Type B pipe connector

This section is applicable to type B pipe connectors.

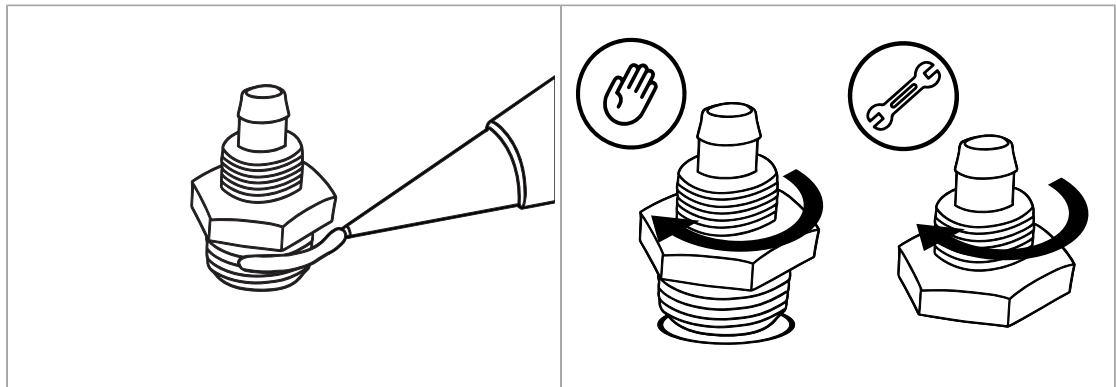
Reserve these materials and tools at hand:

- Loctite® 2700 threadlocker. If Loctite 2700 is not available, use an equivalent threadlocker.
- torque wrench
- adjustable pliers.

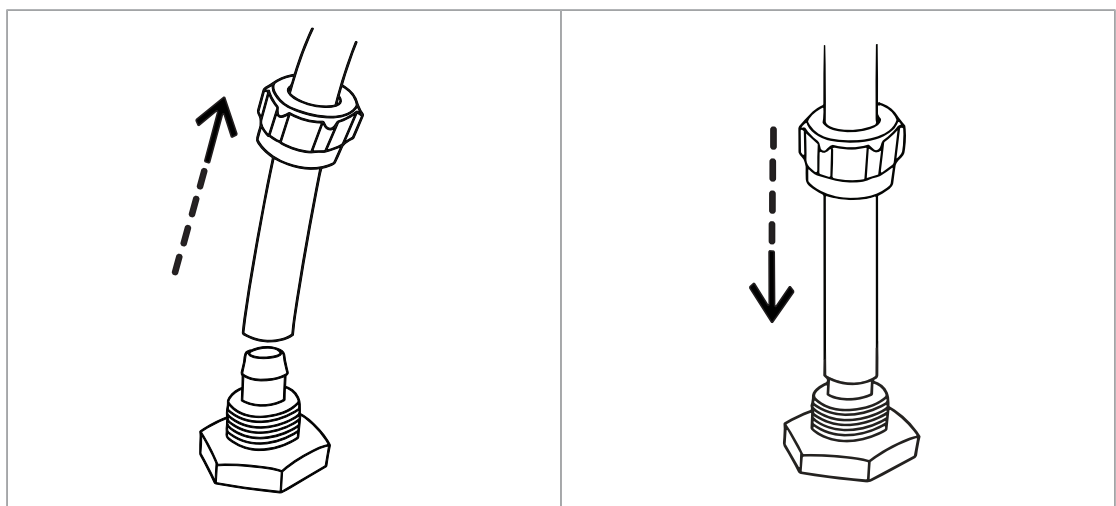
Installation procedure:

1. If the pipe connector has an O-ring, remove and discard the O-ring.
2. Apply threadlocker to the threads of the pipe connector base. Always add the threadlocker onto the outer thread. This prevents the threadlocker from entering the cooling circuit.

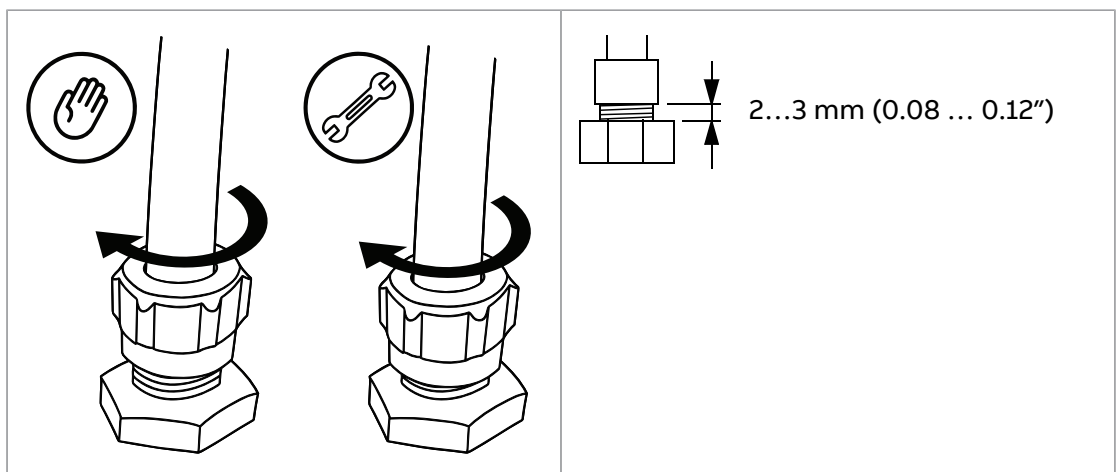
3. Put the pipe connector base carefully onto the threads and start to turn it in by hand. Tighten the pipe connector base to 20 N·m (14.8 lbf·ft). Wipe out extra threadlocker.



4. Push the locking ring onto the pipe.
5. Push the pipe onto the pipe connector base and pull down the locking ring. Make sure that the pipe is perpendicular to the pipe connector base.



6. Start to turn the locking ring by hand. Tighten the locking ring with adjustable pliers. Leave 2...3 mm thread visible.





WARNING!

Do not tighten the locking ring of the type B pipe connector too much. It can cause damage to the pipe.

7. Let the threadlocker dry completely before you fill the cooling circuit. The drying time for Loctite 2700 is 24 hours at room temperature.



Installation examples

This section includes installation examples of inverter modules in Rittal VX25 series as well as generic enclosures. 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 kit-specific assembly drawings, step-by-step instructions and kit information on the Internet

(<https://sites-apps.abb.com/sites/lvacdrivesengineeringsupport/content>).

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, refer to [Cabinet design and construction instructions for drive modules \(3AUA0000107668 \[English\]\)](#).



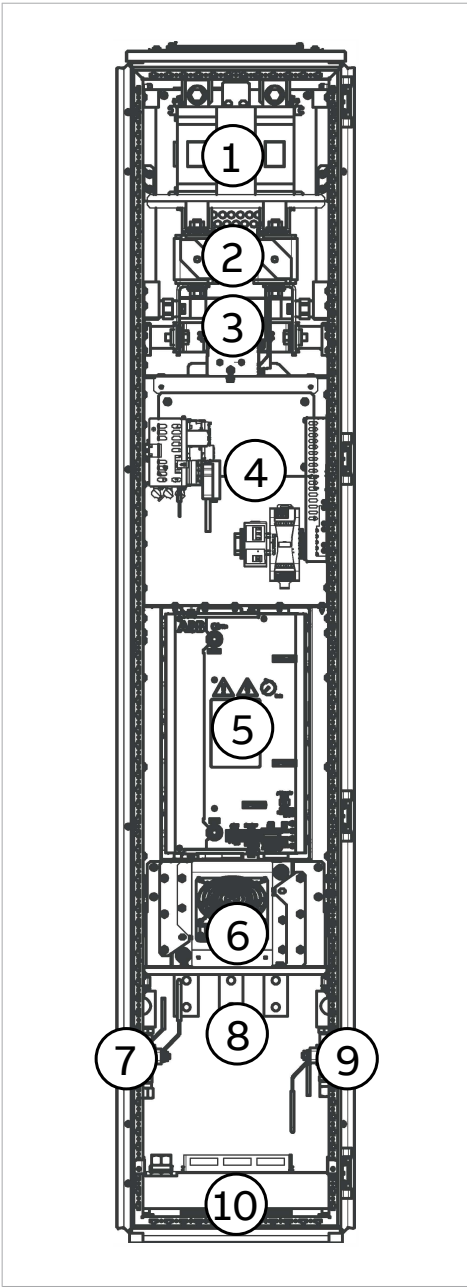
WARNING!

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



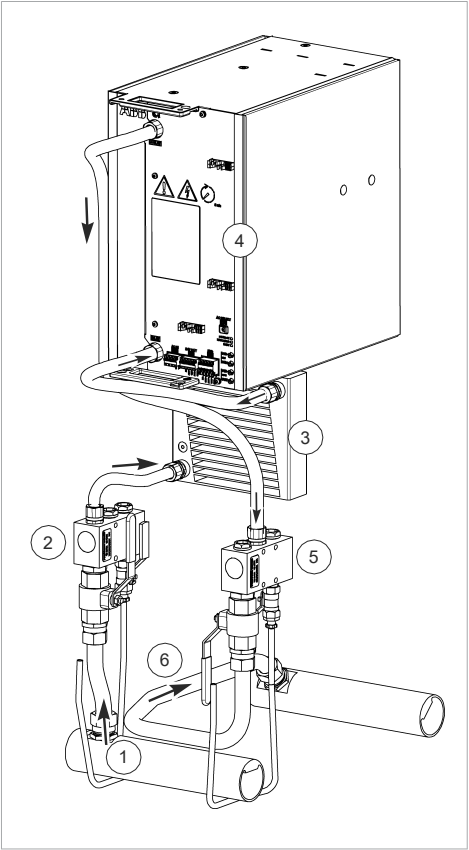
■ One R7i module in a 400 mm wide Rittal VX25 enclosure

Layout drawing



No.	Description
1	DC switch (optional)
2	DC fuses
3	Charging switch (with DC switch), common mode filters (obscured)
4	Compartment for electrical components (eg. control unit)
5	Inverter module
6	Cooling fan and heat exchanger
7	Inlet manifold with stop and drain valves
8	Output busbars
9	Outlet manifold with stop and drain valves
10	Cable entries

Pipe routing example



No.	Description
1	Coolant in
2	Inlet manifold with stop and drain valves
3	Heat exchanger
4	Inverter module
5	Outlet manifold with stop and drain valves
6	Coolant out



Installation stages

No.	Installation stage	Instruction code	Kit code	Kit ordering code
1	Baying parts	3AXD50000336340	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
	Main pipe support kit	3AXD50001155353	L-468-X-450-VX	3AXD50001155179
	PE busbar	3AXD50001155353	-	-
2	Enclosure parts	3AXD500000878673	-	-
3	Cable entries	3AXD50000004817	A-468-8-441	3AXD50000004385
	AC output busbars	3AXD50000860821	L-4-7-138-VX	3AXD50000860791
4	Module and electronics mounting parts (bottom part)	3AXD50000863679	L-4-7-035-VX	3AXD50000861637
5	Cooling fan/heat exchanger assembly (Kit contains heat exchanger; fan to be ordered separately)	3AXD50000863037	L-4-7-444-VX	3AXD50000861644
6	Module installation frame	3AXD50000837915	L-468-7-320	3AXD50000836444
7	DC busbars to module (including common mode filter holders)	3AXD50000862184	L-4-7-271-VX	3AXD50000861620
	Module mounting and electronics compartment mechanical parts (top part)	3AXD50000863679	L-4-7-035-VX	3AXD50000861637
	DC busbars from fuses to common mode filter (Selection depends on module rating – see ordering information)	3AXD50000862160 / 3AXD50000861996	L-4-7-269-VX / L-4-7-270-VX	3AXD50000861002 / 3AXD50000861613
8A	DC busbars from DC bus to fuses (for configuration without DC switch) (Selection depends on module rating – see ordering information)	3AXD50000865529 / 3AXD50000865536	L-4-7-214-VX / L-4-7-215-VX	3AXD50000861668 / 3AXD50000861675
8B	Mechanical parts for DC switch mounting (for configuration with DC switch) (Selection depends on module rating – see ordering information)	3AXD50000861897 / 3AXD50000861972	L-4-7-267-VX / L-4-7-268-VX	3AXD50000860999 / 3AXD50000860982
	DC connection parts (from DC bus to DC switch) (Selection depends on module rating – see ordering information)	3AXD50000862122 / 3AXD50000862139	L-4-7-212-VX / L-4-7-213-VX	3AXD50000860951 / 3AXD50000860975
9	Marine support kit	3AXD50000899098	L-4-7-502-VX	3AXD50000897506
10	Shrouding	3AXD50000863563	L-4-7-351-VX	3AXD50000861651
	Coolant distribution manifolds	3AXD50000048217	L-468-8-448	3AXD50000899111



No.	Installation stage	Instruction code	Kit code	Kit ordering code
11	Module	-	-	-
12	Pressure relief	3AXD50000666430	L-4-X-460-VX	3AXD50000667260
	Enclosure panels	-	-	-



[illegible]

Stage 1: Installation of common parts

Technical drawing of the ACS880 multidrive module assembly, showing the main pipe, support kit, and busbar design. The drawing includes dimensions and labels for various components.

Labels and dimensions:

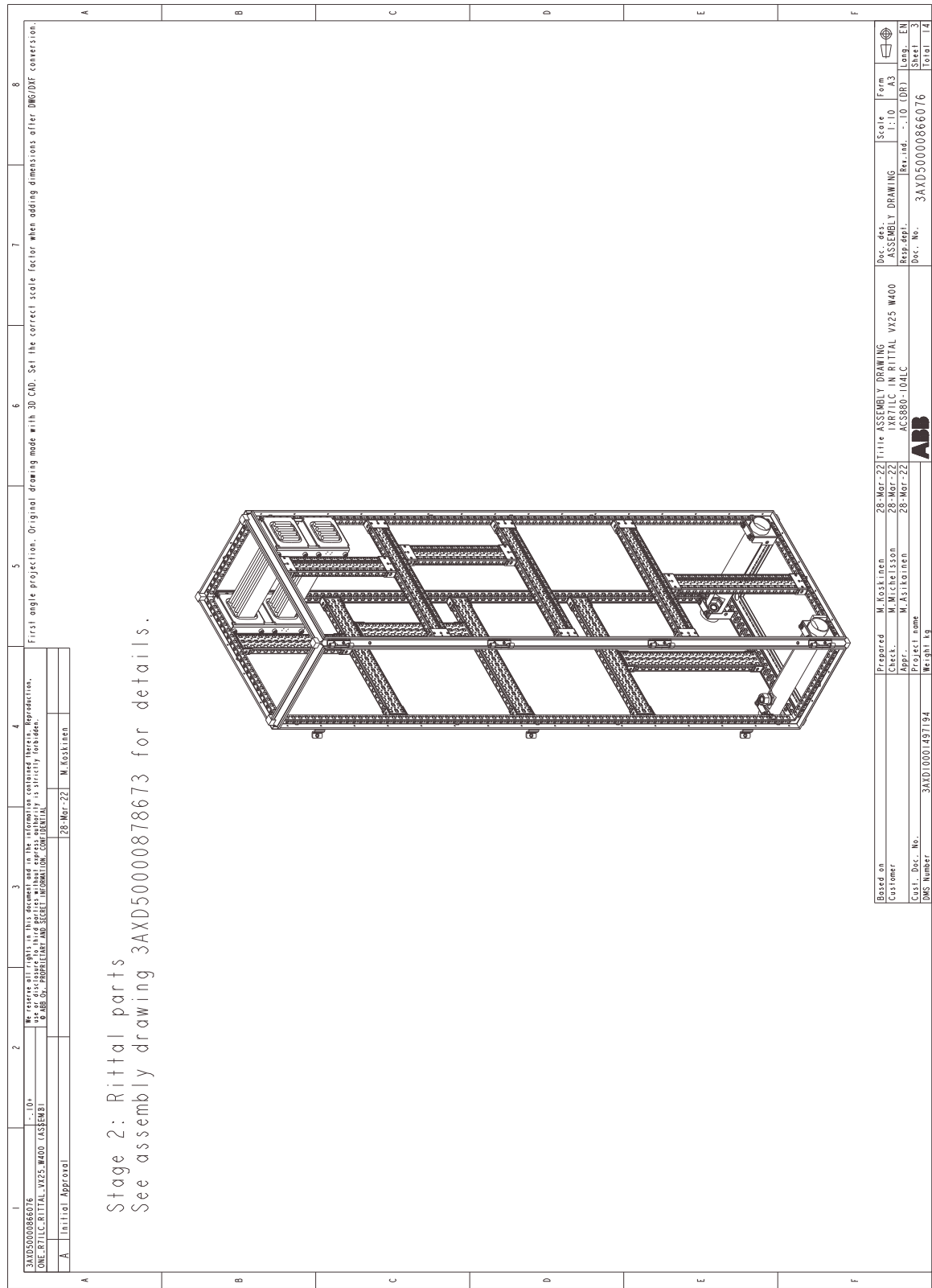
- 1: 1000
- 2: 1000
- 3: 1000
- 4: 1000
- 5: 1000
- 6: 1000
- 7: 1000
- 8: 1000

Labels:

- 1: 1000
- 2: 1000
- 3: 1000
- 4: 1000
- 5: 1000
- 6: 1000
- 7: 1000
- 8: 1000



Stage 2: Installation of enclosure parts



Stage 3: Installation of output busbars and cable entries

The drawing shows a perspective view of a lead-through assembly for a bottom plate. The assembly consists of a rectangular frame with a central lead-through component. The lead-through component has a cylindrical body with a flange and a mounting bracket. The assembly is shown in a perspective view, with the lead-through component in the foreground and the frame in the background. A detailed view of the lead-through component is shown in the bottom right corner, showing its internal structure and mounting points.

Stage 3: R7i AC OUTPUT BUSBARS KIT and LEAD-THROUGH FOR BOTTOM PLATE installation

See assembly drawings for details.

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

3AXD5000086076 - KIT A-468-8-441

Ordering code: 3AXD50000860791

See drawing: 3AXD50000860821

Ordering code: 3AXD50000860791

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Ordering code: 3AXD50000860791

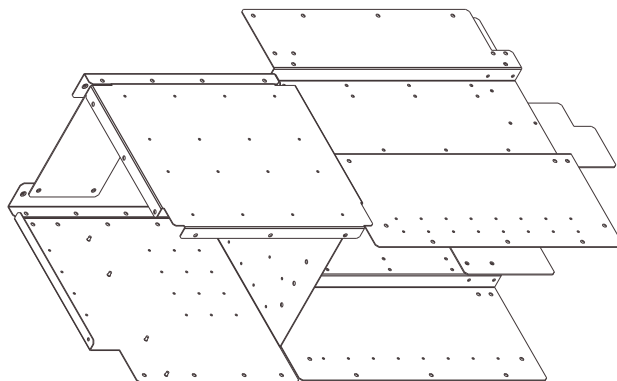
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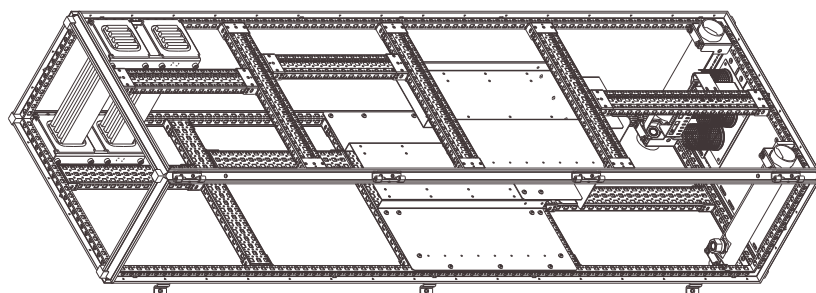
See drawing: 3AXD50000860821



Stage 4: R7i MODULE AND BCU MECHANICS KIT installation
See assembly drawings for details.
Note that only the bottom part of the kit
is convenient to install at this stage.



R71 MODULE AND BCU MECH KIT
KIT L-4-7-035-VX
Ordering code: 3AXD50000861637
See drawing: 3AXD50000863679



Stage 5: Installation of fan/heat exchanger assembly

1 2 3 4 5 6 7 8

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1-10+
ONE R71LC, RITTAL VY25 W400 (ASSEMBLY)

A Initial Approval

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

A B C D E F

A B C D E F

Stage 5: R7i HEAT EXCHANGER AND FAN MECHANICS KIT installation
See assembly drawings for details.

A B C D E F

R7i HEAT EX. AND FAN MECH KIT
KIT L-4-7-444-VX
Ordering code: 3AXD50000861644
See drawing: 3AXD50000863037

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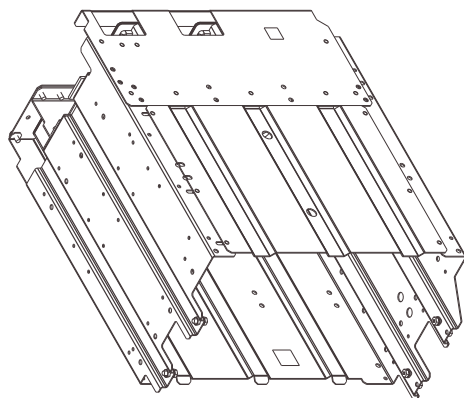
Based on: Prepared M. Koskinen 28-Mar-22 Title ASSEMBLY DRAWING
Customer: Check. M. Michelsson 28-Mar-22 1XR71LC IN RITTAL VY25 W400
Appr. M. Asikainen 28-Mar-22 ACS880-104LC
Project name: 3AXD50000866076

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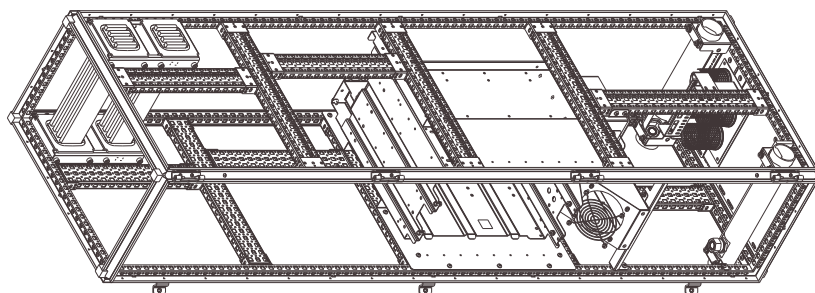
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Stage 6: RTi INSTALLATION FRAME KIT installation
See assembly drawings for details.



RTI INSTALLATION FRAME KIT
KIT L-468-7-320
Ordering code: 3AXD50000836444
See drawing: 3AXD50000837915



Based on	Prepared	M Koskinen	28-Mar-22	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Customer	Check.	M Michéllsson	28-Mar-22		IMRTILC IN RITTAL Vx25 W400	ASSEMBLY DRAWING	1:25	A3
	Appr.	M Asikainen	28-Mar-22		ACS880 - IOLC	Resp. despt.	[Rev. ind.] - , 10 [DR]	
Custl. Doc. No.	Project name					Dec. No.	Sheet	EN
DMS Number	34JDT00001497194						Total	I.A
						ABB		
						3AXD50000866076		

Stage 7: Installation of DC busbars between fuses and module

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ONE R71LC IN RITVAL VZ25 W400 (ASSEMBLY)
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Stage 7: R7i COMMON MODE FILTER BUSBAR KIT and DC FUSE BUSBAR KIT installation.
See assembly drawings for details.

Note that the suitable DC FUSE BUSBAR KIT depends on the R7i module rating (fuse size).

Install the upper part of the KIT L-4-7-035-VX after these kits have been installed.

DC FUSE BUSBARS KIT SIZE1
KIT L-4-7-269-VX
Ordering code: 3AXD50000861002
See drawing: 3AXD50000862160

DC FUSE BUSBARS KIT SIZE3
KIT L-4-7-270-VX
Ordering code: 3AXD50000861613
See drawing: 3AXD50000861996

R7i COMMON MODE BUSBAR KIT I
KIT L-4-7-271-VX
Ordering code: 3AXD50000861620
See drawing: 3AXD50000862184

Based on
Customer
Customer
Custl. Dec. No.
Project name

Prepared M. Koskinen
Check. M. Michelsson
Appr. M. Asikainen

28-Mar-22
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28-Mar-22

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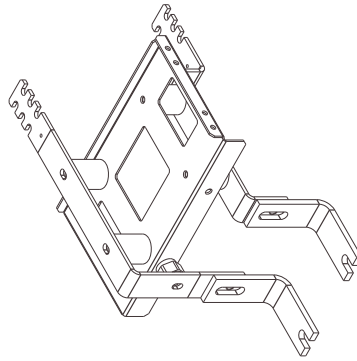
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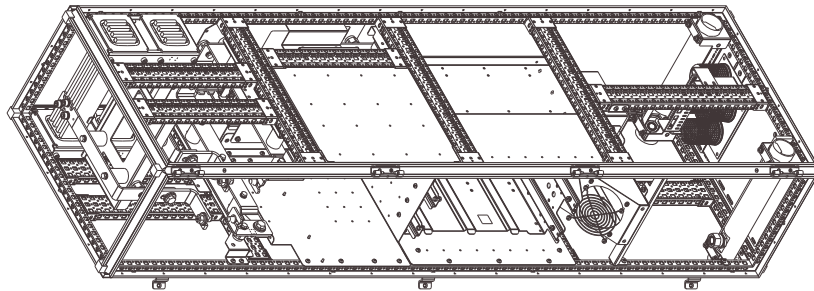
Stage 8A: DC CONNECTION KIT FOR FUSE installation.
See assembly drawings for details.

Note that the suitable kit depends on the R7i module rating (fuse size).



DC CONN KIT FOR FUSE SIZE1
KIT L-4-7-214-VX
Ordering code: 3AXD50000861668
See drawing: 3AXD50000865529

DC CONN KIT FOR FUSE SIZE3
KIT L-4-7-215-VX
Ordering code: 3AXD50000861675
See drawing: 3AXD50000865536



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ONE-STEP-INITIAL-VY25-W400 (ASSEMBLY)							
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Stage 8B: Installation of DC switch mechanics and busbars

1 2 3 4 5 6 7 8

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ONE R7ILC, RITAL VY25, W400 (ASSEMBLY)
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Stage 8B: DC CONNECTION KIT FOR SWITCH and
DC SWITCH MECHANICS KIT installation.
See assembly drawings for details.

Note that the suitable kits depend
on the R7i module rating (fuse and switch size).

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

DC CONNECTION KIT FOR SWITCH SIZE1
KIT L-4-7-212-VX
Ordering code: 3AXD50000860951
See drawing: 3AXD50000862122

DC CONNECTION KIT FOR SWITCH SIZE3
KIT L-4-7-213-VX
Ordering code: 3AXD50000860915
See drawing: 3AXD50000862139

DC SWITCH MECHANICS KIT SIZE1
KIT L-4-7-267-VX
Ordering code: 3AXD50000860999
See drawing: 3AXD50000861897

DC SWITCH MECHANICS KIT SIZE3
KIT L-4-7-268-VX
Ordering code: 3AXD50000860982
See drawing: 3AXD50000861972

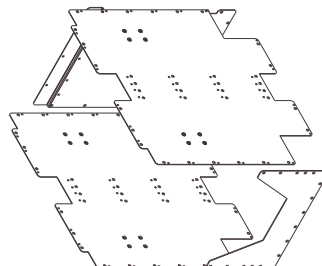
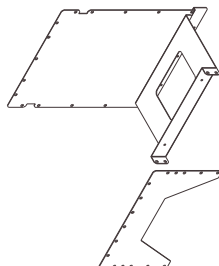
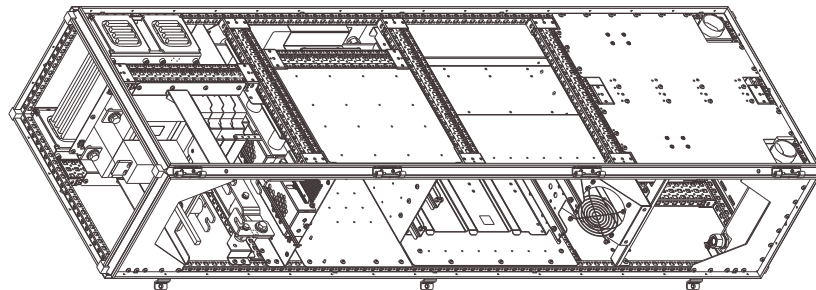
Prepared M. Koskinen 28-Mar-22 Title ASSEMBLY DRAWING
Check M. Michelsson 28-Mar-22 1XR7ILC IN RITAL VY25 W400
Appr. M. Asikainen 28-Mar-22 ACS880-104LC
Project name

Based on Customer
Cust. Doc. No.

Scale 1:25 Form A3
ASSEMBLY DRAWING
Doc. No. 3AXD50000866076
Rev. Ind. - 10 (DR)
Long. EN
Sheet 10



Stage 9: MARINE SUPPORT KIT IxR7i installation. Optional. See assembly drawings for details.

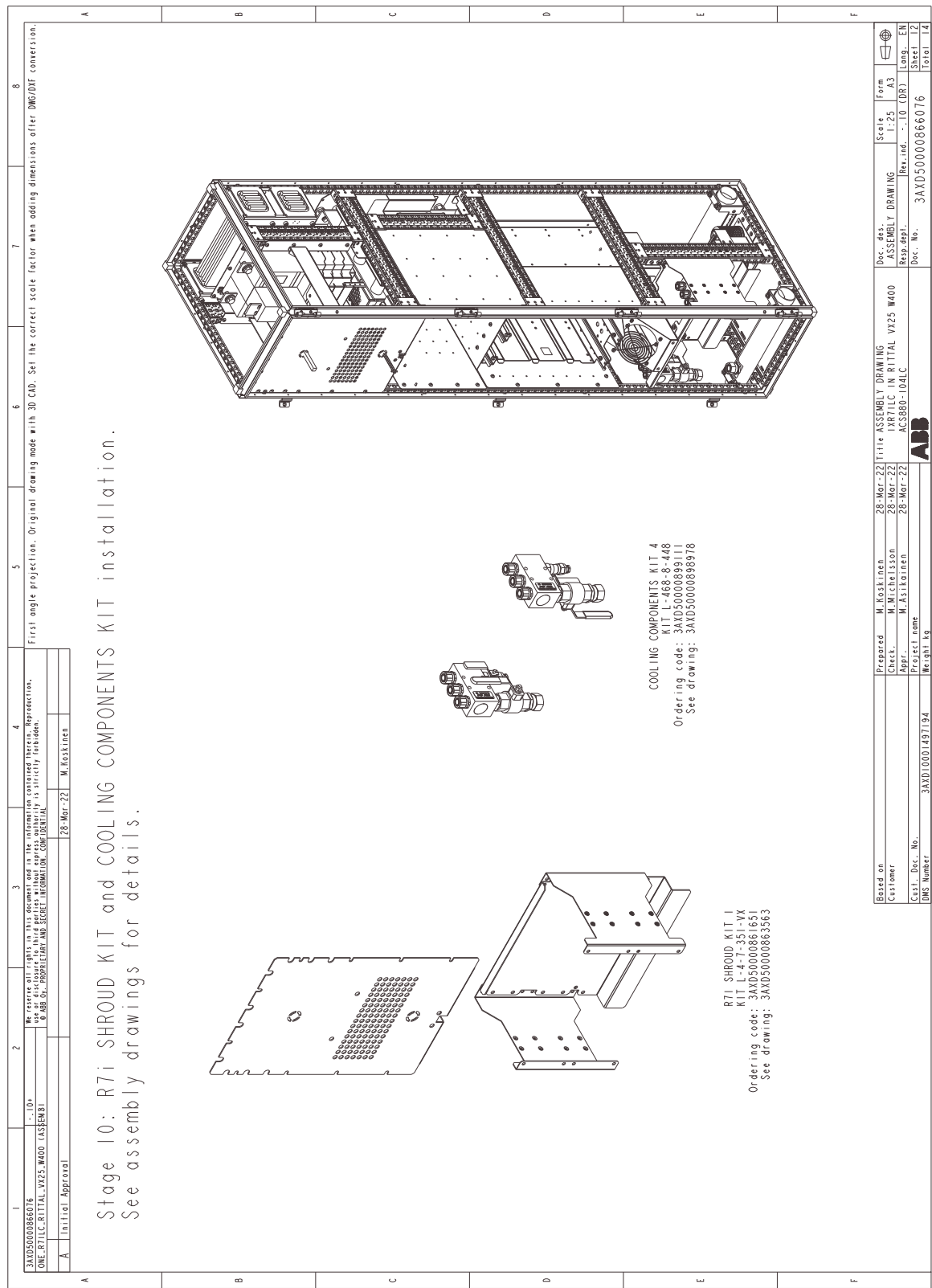


MARINE SUPPORT KIT 1xR7i
KIT L-4-7-502-VX
Ordering code: 3AXD50000897506
See drawing: 3AXD50000899098

NOTE: must be installed before buying cabinets!

[illegible]

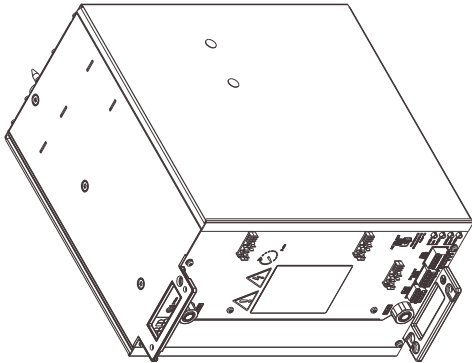
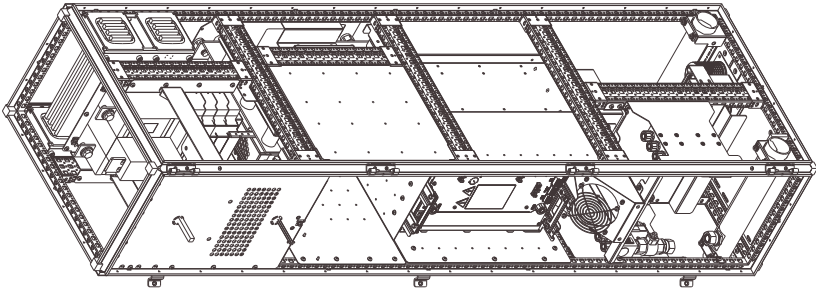
Stage 10: Installation of shrouding and coolant distribution manifolds



Stage 11: R7i module installation.

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ONE RITLC RITVAL VZ25 W400 (ASSEMBLY)							
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Stage II: R7i module installation.

Stage 12: Installation of enclosure panels and pressure relief

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3AXD50000866076		...10+ ONE, RITLIC, RITTAL, VY25, W400 (ASSEMBLY)		We reserve all rights in this drawing. It is the property of Rittal GmbH & Co. KG. No part of this drawing may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without express written permission from Rittal GmbH & Co. KG. All rights are reserved.		First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.	
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Stage 12: PRESSURE RELIEF VENT KIT and cabinet covers installation.

See drawing for details.

PRESSURE RELIEF VENT KIT I

KIT L-4-X-460-VX

Ordering code: 3AXD50000866260

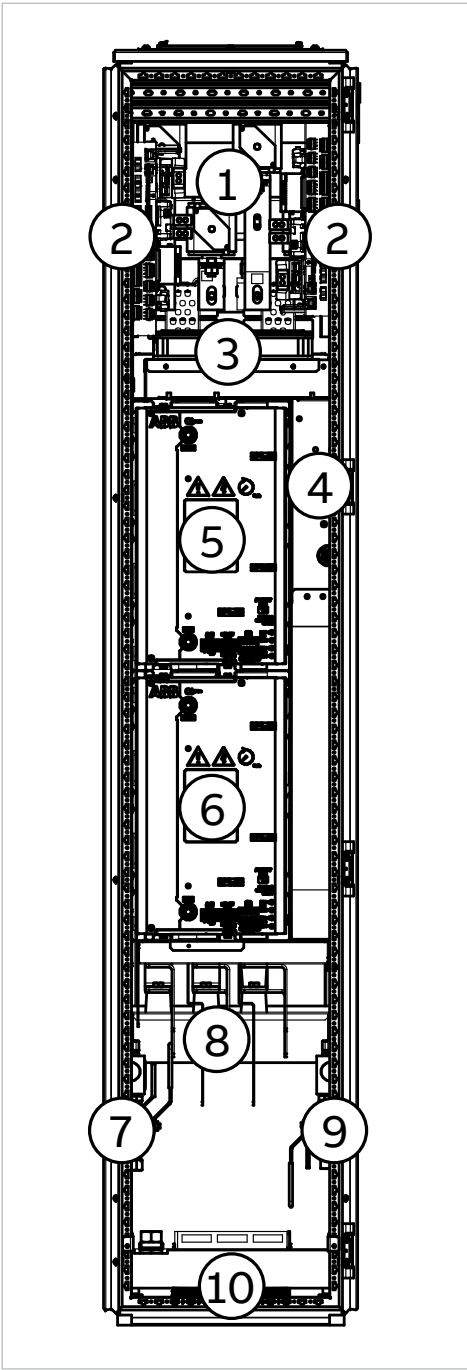
See drawing: 3AXD50000866430

Based on	Prepared	M. Koskinen	28-Mar-22	Title	ASSEMBLY DRAWING	Scale	Form
Customer	Check	M. Michelsson	28-Mar-22	1XR7ILC IN RITTAL VY25 W400	ASSEMBLY DRAWING	1:25	A3
Cust. Dec. No.	Appr.	M. Asikainen	28-Mar-22	ACS880-104LC	Resp. appl.	Rev. no.	Long. EN
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				ABB		Total	14



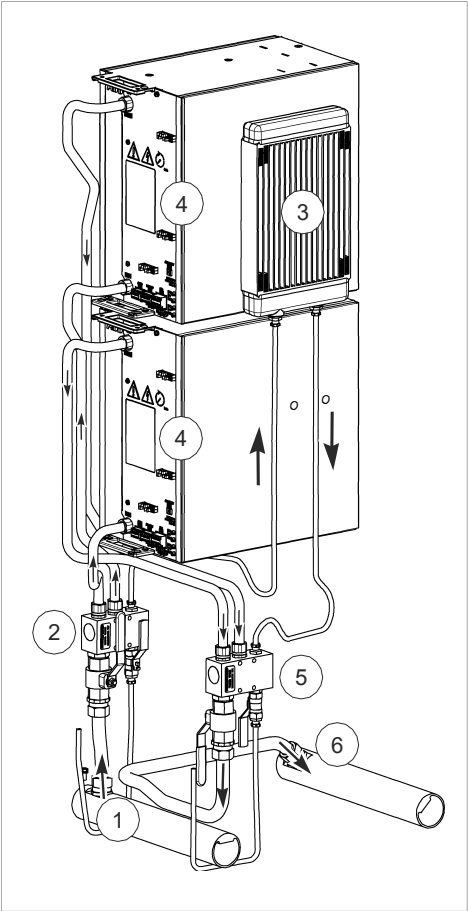
■ Two R7i modules in a 400 mm wide Rittal VX25 enclosure

Layout drawing



No.	Description
1	DC fuses
2	Control units
3	Cooling fans Common mode filters (obscured)
4	Heat exchanger
5	Upper inverter module
6	Lower inverter module
7	Inlet manifold with stop and drain valves
8	Output busbars
9	Outlet manifold with stop and drain valves
10	Cable entries

Pipe routing example



No.	Description
1	Coolant in
2	Inlet manifold with stop and drain valves
3	Heat exchanger
4	Inverter module
5	Outlet manifold with stop and drain valves
6	Coolant out



Installation stages

No.	Installation stage	Instruction code	Kit code	Kit ordering code
1	Baying parts	3AXD50000336340	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
	Main pipe support kit	3AXD50001155353	L-468-X-450-VX	3AXD50001155179
	PE busbar	3AXD50001155353	-	-
2	Module and electronics mounting parts (bottom part)	3AXD50000879212	L-4-7-036-VX	3AXD50000866892
3	Cable entry	3AXD50000004817	A-468-8-441	3AXD50000004385
	AC output busbars	3AXD50000879229	L-4-7-139-VX	3AXD50000866601
4	DC busbars from common mode filter to lower module	3AXD50000879236	L-4-7-273-VX	3AXD50000866861
	DC busbars from common mode filter to upper module (with supports)	3AXD50000879045	L-4-7-274-VX	3AXD50000866908
5	Heat exchanger assembly	3AXD50000879243	L-4-7-445-VX	3AXD50000866946
6	Module installation frames	3AXD50000837915	L-468-7-320	3AXD50000836444
7	DC busbars from DC bus to fuses DC busbars from fuses to common mode filter (Selection depends on module rating – see ordering information)	3AXD50000879250 / 3AXD50000879267	L-4-7-216-VX / L-4-7-217-VX	3AXD50000866915 / 3AXD50000866922
	DC busbars with common mode filter holder	3AXD50000879274	L-4-7-272-VX	3AXD50000866878
8	Mechanical parts for cooling fans	3AXD50000879281	L-4-7-407-VX	3AXD50000866939
9	Shrouding	3AXD50000879052	L-4-7-352-VX	3AXD50000866953
	Coolant distribution manifolds	3AXD50000048258	L-468-8-447	3AXD50000899128
10	Modules	-	-	-
11	Marine support kit	3AXD50000897186	L-4-7-503-VX	3AXD50000897490
12	Pressure relief	3AXD50000666430	L-4-X-460-VX	3AXD50000667260
	Enclosure panels	-	-	-



Overview of kits

3AXD50000870069
TWO RT1LC-RT1TLC VX25 M40D CASEM42Z

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Initial Approval

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RT1 SHROUD KIT
KIT L-4-7-352-VX
3AXD50000866953
1 per module

RT1 DC BUSBAR KIT FUSE SIZE1
KIT L-4-7-216-VX
3AXD50000866915
1 per module

RT1 DC BUSBAR KIT FUSE SIZE3
KIT L-4-7-217-VX
3AXD50000866922
1 per module

RT1 COMMON MODE BUSBAR KIT 2
KIT L-4-7-272-VX
3AXD50000866878
1 per module

2xRT1 FAN MECHANICS KIT
KIT L-4-7-407-VX
3AXD50000866939

2xRT1 HEAT EXCHANGER MECH KIT
KIT L-4-7-445-VX
3AXD50000866946

2xRT1 DC BUSBAR SUPPORTS
KIT L-4-7-274-VX
3AXD50000866908

RT1 PRESSURE RELIEF VENT KIT 1
KIT L-4-7-160-VX
3AXD5000067260

RT1 INSTALLATION FRAME KIT
KIT L-468-T-320
3AXD50000836444
1 per module

2xRT1 MODULE AND BCU MECH KIT
KIT L-4-7-036-VX
3AXD50000866892

MAIN PIPE SUPPORT KIT
KIT L-468-X-450-VX
3AXD5000004385
1 per module

LEAD-THROUGH FOR BOTTOM PLATE
KIT A-468-8-441
3AXD5000004385
1 per module

FLAT-PLS SUPPORT KIT FOR DC
KIT L-4-468-X-001-VX
3AXD5000033387

RT1 LONG DC BUSBAR KIT
KIT L-4-7-1273-VX
3AXD50000866861

RT1 AC OUTPUT BUSBARS KIT
KIT L-4-7-139-VX
3AXD50000866801

COOLING COMPONENTS KIT 5
KIT L-468-8-447
3AXD50000899128

2xRT1 DC BUSBAR KIT
KIT L-4-7-216-VX
3AXD50000866915

RT1 SHROUD KIT
KIT L-4-7-352-VX
3AXD50000866953

RT1 COMMON MODE BUSBAR KIT 2
KIT L-4-7-272-VX
3AXD50000866878

2xRT1 FAN MECHANICS KIT
KIT L-4-7-407-VX
3AXD50000866939

2xRT1 HEAT EXCHANGER MECH KIT
KIT L-4-7-445-VX
3AXD50000866946

2xRT1 DC BUSBAR SUPPORTS
KIT L-4-7-274-VX
3AXD50000866908

RT1 PRESSURE RELIEF VENT KIT 1
KIT L-4-7-160-VX
3AXD5000067260

RT1 INSTALLATION FRAME KIT
KIT L-468-T-320
3AXD50000836444

2xRT1 MODULE AND BCU MECH KIT
KIT L-4-7-036-VX
3AXD50000866892

MAIN PIPE SUPPORT KIT
KIT L-468-X-450-VX
3AXD5000004385

LEAD-THROUGH FOR BOTTOM PLATE
KIT A-468-8-441
3AXD5000004385

FLAT-PLS SUPPORT KIT FOR DC
KIT L-4-468-X-001-VX
3AXD5000033387

RT1 LONG DC BUSBAR KIT
KIT L-4-7-1273-VX
3AXD50000866861

RT1 AC OUTPUT BUSBARS KIT
KIT L-4-7-139-VX
3AXD50000866801

COOLING COMPONENTS KIT 5
KIT L-468-8-447
3AXD50000899128

2xRT1 DC BUSBAR KIT
KIT L-4-7-216-VX
3AXD50000866915

RT1 SHROUD KIT
KIT L-4-7-352-VX
3AXD50000866953

RT1 COMMON MODE BUSBAR KIT 2
KIT L-4-7-272-VX
3AXD50000866878

2xRT1 FAN MECHANICS KIT
KIT L-4-7-407-VX
3AXD50000866939

2xRT1 HEAT EXCHANGER MECH KIT
KIT L-4-7-445-VX
3AXD50000866946

2xRT1 DC BUSBAR SUPPORTS
KIT L-4-7-274-VX
3AXD50000866908

RT1 PRESSURE RELIEF VENT KIT 1
KIT L-4-7-160-VX
3AXD5000067260

RT1 INSTALLATION FRAME KIT
KIT L-468-T-320
3AXD50000836444

2xRT1 MODULE AND BCU MECH KIT
KIT L-4-7-036-VX
3AXD50000866892

MAIN PIPE SUPPORT KIT
KIT L-468-X-450-VX
3AXD5000004385

LEAD-THROUGH FOR BOTTOM PLATE
KIT A-468-8-441
3AXD5000004385

FLAT-PLS SUPPORT KIT FOR DC
KIT L-4-468-X-001-VX
3AXD5000033387

RT1 LONG DC BUSBAR KIT
KIT L-4-7-1273-VX
3AXD50000866861

RT1 AC OUTPUT BUSBARS KIT
KIT L-4-7-139-VX
3AXD50000866801

COOLING COMPONENTS KIT 5
KIT L-468-8-447
3AXD50000899128

2xRT1 DC BUSBAR KIT
KIT L-4-7-216-VX
3AXD50000866915

RT1 SHROUD KIT
KIT L-4-7-352-VX
3AXD50000866953

RT1 COMMON MODE BUSBAR KIT 2
KIT L-4-7-272-VX
3AXD50000866878

2xRT1 FAN MECHANICS KIT
KIT L-4-7-407-VX
3AXD50000866939

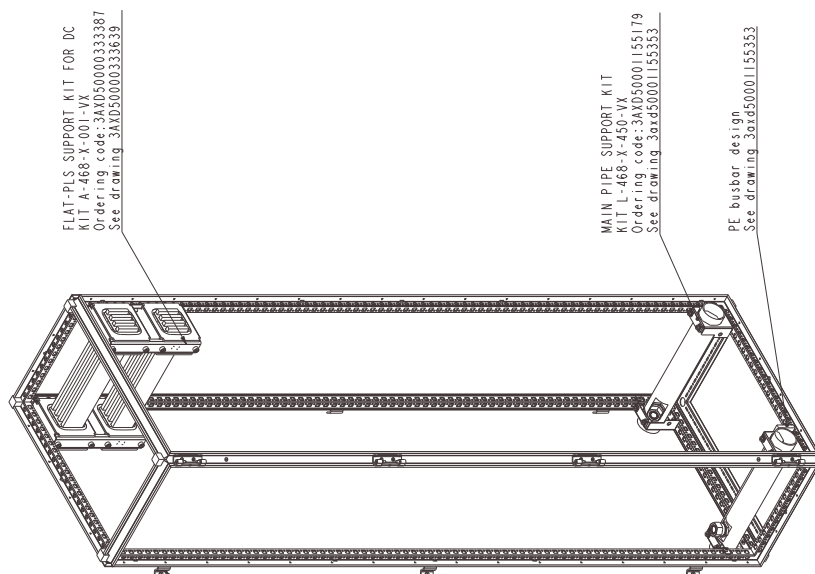
2xRT1 HEAT EXCHANGER MECH KIT
KIT L-4-7-445-VX
3AXD50000866946

2xRT1 DC BUSBAR SUPPORTS
KIT L-4-7-274-VX
3AXD50000866908

RT1 PRESS

NOTE! See Cabinet design and construction instructions for ACS880 multidrive modules (3AUA0000107668 [English])

STAGE 1: Common assembly installations (Flat-PLS Support kit, Baying parts, main pipe, PE) See assembly drawings for details.



Prepared	M. Michellison	06-Mar-24	Title	ASSEMBLY DRAWING	Scale	Form
Check.	M. Michellison	06-Mar-24	2MR11LC STAGE	DRAWING	1:25	A3
Appr.	M. Asikainen	06-Mar-24	ACS880LC	Resp. appl.	Rev. ind.	-5 (DR)
Project name					Long.	EN
Draw. Dec. No.					Sheet	2
DWG. No.	342010001518332			Dec. No.	3AXD50000879069	Sheet
						13

Stage 2: Installation of module and electronics mounting parts

STAGE 2: 2xR7i MODULE AND BCU MECHANICS KIT installation.
See assembly drawing for details.

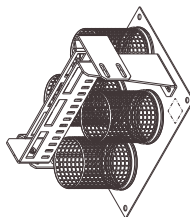
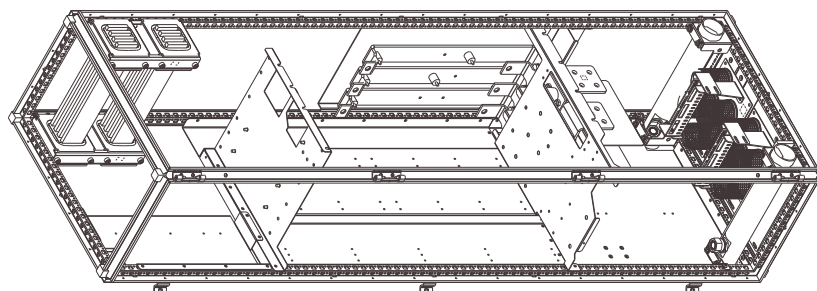
3A050000879089	1-5*	2	3	4	5	6	7	8
2ND R7ILC INITIAL -V25-M400-1A5349422								
A Initial Approval								

2xR7i MODULE AND BCU MECH KIT
KIT CODE: 3A050000879089
Ordering code: 3A050000879089
Drawing code: 3A050000879089

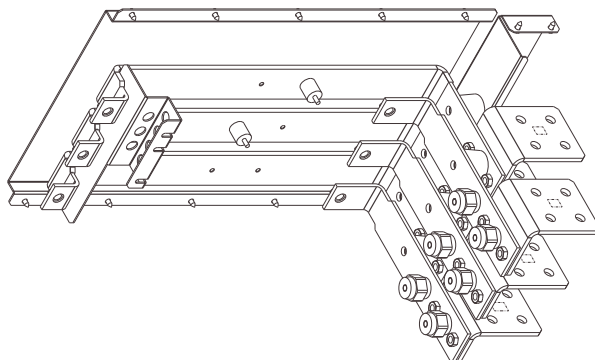
Based on	Prepared	M. Michelsson	06-Mar-24	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Customer	Check.	M. Michelsson	06-Mar-24	2xR7i Llc STAGE	ASSEMBLY DRAWING	Rep. appl.	1:25	A3
Cust. Doc. No.	Appr.	M. Asikainen	06-Mar-24	ACS880LC	Rep. appl.	Doc. No.	-5 (DR)	Long. EN
	Project name							Sheet 3



Stage 3: R7i AC OUTPUT BUSBARS KIT and LEAD-THROUGH FOR BOTTOM PLATE installation
See assembly drawings for details.



LEAD-THROUGH FOR BOTTOM PLATE
KIT A-468-8-441
Ordering code: 3AXD50000004385
See drawing: 3AXD50000004817
1 per module



2xRTI AC OUTPUT BUSBARS KIT
KIT L-4-7-139-VX
Ordering code: 3AXD50000866601
Drawing code: 3AXD50000879229

Prepared	M. Michelsson	06-Mar-24	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Check.	M. Michelsson	06-Mar-24	24V71LC STAGE	ASSEMBLY DRAWING	1:25	A3	
Appr.	M. Asikainen	06-Mar-24	AC9880LC	Res. ind.	- 5 (DR)		
Project name							
Customer, Doc. No.							
QMS Number	3AXD0001518332						
Drawings							
Sheet 4							
Total 13							

Stage 4: Installation of DC busbars between modules and common mode filters



Stage 5: R7i HEAT EXCHANGER KIT installation
See assembly drawings for details.

3AXD50000879069
2ND-IT/LLC-INITIAL-VEZS-W400-ASSEMBLY KIT

1Initial Approval

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

Stage 5: R7i HEAT EXCHANGER KIT installation
See assembly drawings for details.

2xRTi HEAT EXCHANGER MECH KIT
KIT L-47-445-VX
Ordering code: 3AXD50000866946
Drawing code: 3AXD50000879069

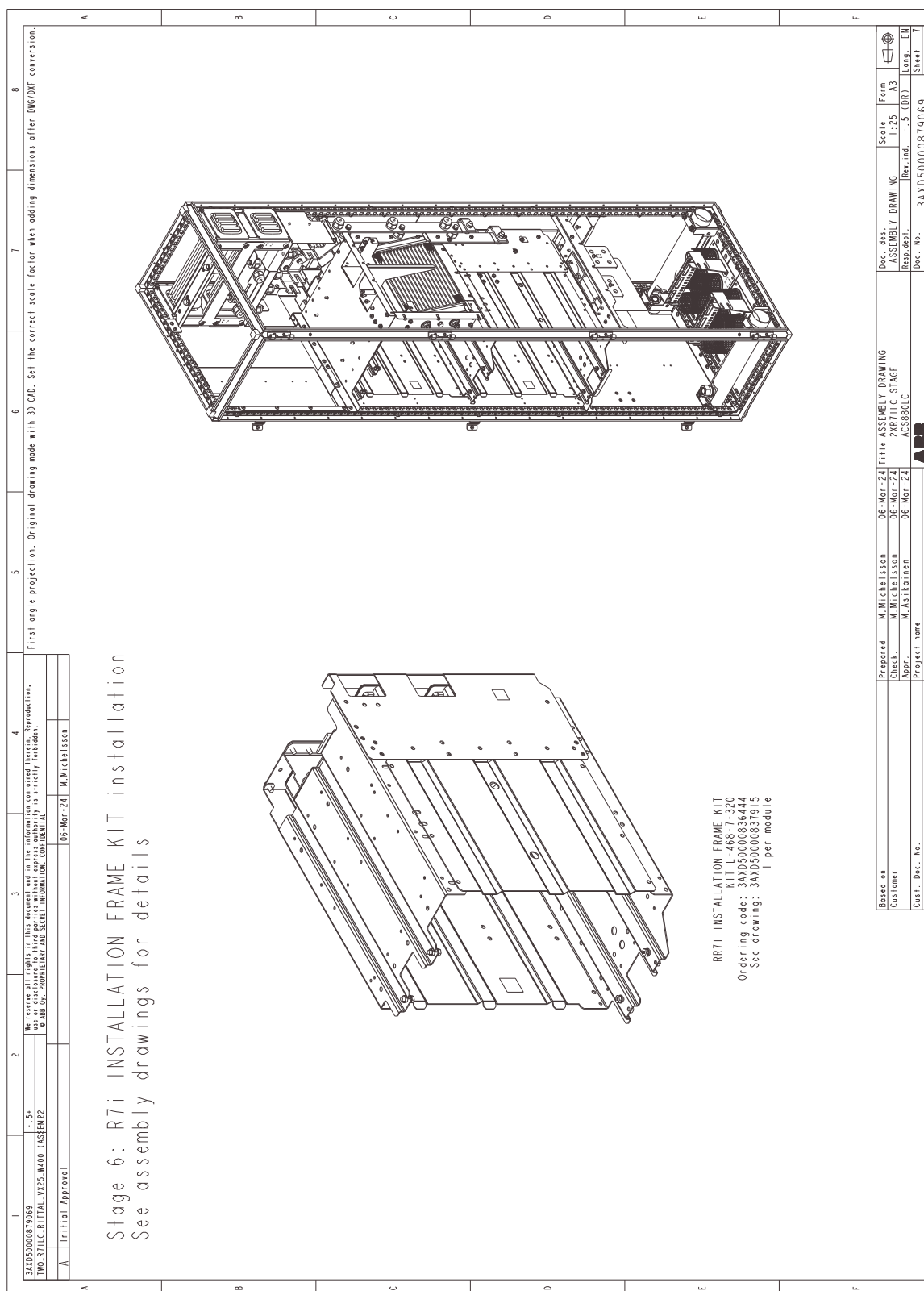
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Customer	Check.	M. Michelsson	06-Mar-24	2xRTi/LLC STAGE	ASSEMBLY DRAWING	1:25	A3
Customer	Appr.	M. Michelsson	06-Mar-24	2xRTi/LLC STAGE	Rev. no.	Rev. rev.	Rev. rev.
Customer	Project name	M. Michelsson	06-Mar-24	2xRTi/LLC STAGE	Doc. No.	3AXD50000879069	Form
DWG Number	3AXD50000879069						

3AXD50000879069

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Stage 6: Installation of module installation frames



	5	6	7	8
first angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.				

Stage 7: R7i COMMON MODE FILTER BUSBAR KIT and DC FUSE BUSBAR KIT installation.

See assembly drawings for details.
Note that the suitable DC FUSE BUSBAR KIT depends of the R7i module rating (fuse size).

R7i DC BUSBAR KIT FUSE SIZE1
KIT L-4-7-216-VX
Ordering code: 3AXD50000866915
Drawing code: 3AXD50000879250
1 per module

R7i DC BUSBAR KIT FUSE SIZE3
KIT L-4-7-217-VX
Ordering code: 3AXD50000866922
Drawing code: 3AXD50000879267
1 per module

R7i COMMON MODE BUSBAR KIT 2
KIT L-4-7-272-VX
Ordering code: 3AXD50000866878
Drawing code: 3AXD50000879274
1 per module

1	2	3	4	5	6	7	8
We reserve all rights in this document as the information contained therein, its use or disclosure is, during periods without express authorisation, strictly forbidden.							
© All Rights Reserved. CONFIDENTIAL AND SECRET INFORMATION - CONFIDENTIAL							
Initial Approval		06-Mar-24		M. Michelsson			

Based on	Prepared	M. Michelsson	06-Mar-24	Title	ASSEMBLY DRAWING	Scale	Form
Customer	Check	M. Michelsson	06-Mar-24	2XR7ILC STAGE	ACSR80LC	1:25	A3
Cust. Dec. No.	Appr.	M. Asikainen	06-Mar-24	Doc. No.	3AXD50000879069	Rev. ref.	--S (DR)
				Rep. appl.		Long. EN Sheet 8	

Stage 8: Installation of cooling fan assembly

3AXD50000879069
TWO-DIMENSIONAL DRAWING
Initial Approval

1 2 3 4 5 6 7 8

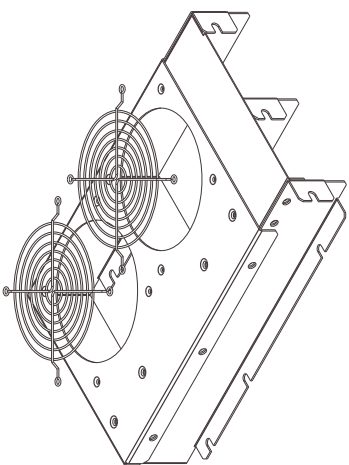
WARRANTY: 12 MONTHS. THE WARRANTY IS VOID IF THE PRODUCT IS NOT USED IN ACCORDANCE WITH THE INSTRUCTIONS. THE WARRANTY IS VOID IF THE PRODUCT IS USED IN A MANNER THAT IS NOT INTENDED BY THE MANUFACTURER. THE WARRANTY IS VOID IF THE PRODUCT IS USED IN A MANNER THAT IS NOT INTENDED BY THE MANUFACTURER. THE WARRANTY IS VOID IF THE PRODUCT IS USED IN A MANNER THAT IS NOT INTENDED BY THE MANUFACTURER.

0 AUG 07, PROPRIETARY AND SECRET INFORMATION, CONFIDENTIAL

06-Mar-24 M. Michelsson

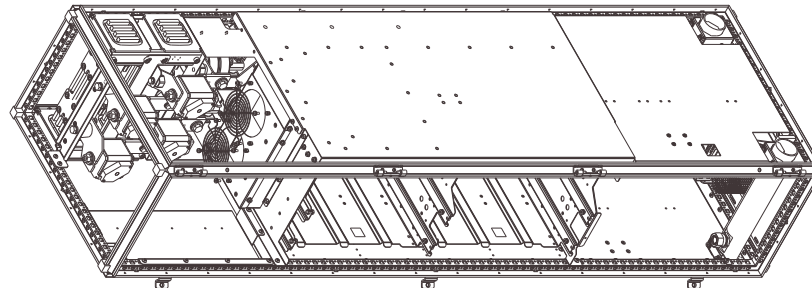
Stage 8: 2xR7i FAN MECHANICS KIT installation.

See assembly drawings for details.



2xR7i FAN MECHANICS KIT
KIT L-4-7-40T-VX

Ordering code: 3AXD50000866939
Drawing code: 3AXD50000879281



Initial Approval

1 2 3 4 5 6 7 8

WARRANTY: 12 MONTHS. THE WARRANTY IS VOID IF THE PRODUCT IS NOT USED IN ACCORDANCE WITH THE INSTRUCTIONS. THE WARRANTY IS VOID IF THE PRODUCT IS USED IN A MANNER THAT IS NOT INTENDED BY THE MANUFACTURER. THE WARRANTY IS VOID IF THE PRODUCT IS USED IN A MANNER THAT IS NOT INTENDED BY THE MANUFACTURER. THE WARRANTY IS VOID IF THE PRODUCT IS USED IN A MANNER THAT IS NOT INTENDED BY THE MANUFACTURER.

0 AUG 07, PROPRIETARY AND SECRET INFORMATION, CONFIDENTIAL

06-Mar-24 M. Michelsson



Stage 9: 2xR7i SHROUD KIT and COOLING COMPONENTS KIT installation.
See assembly drawings for details.

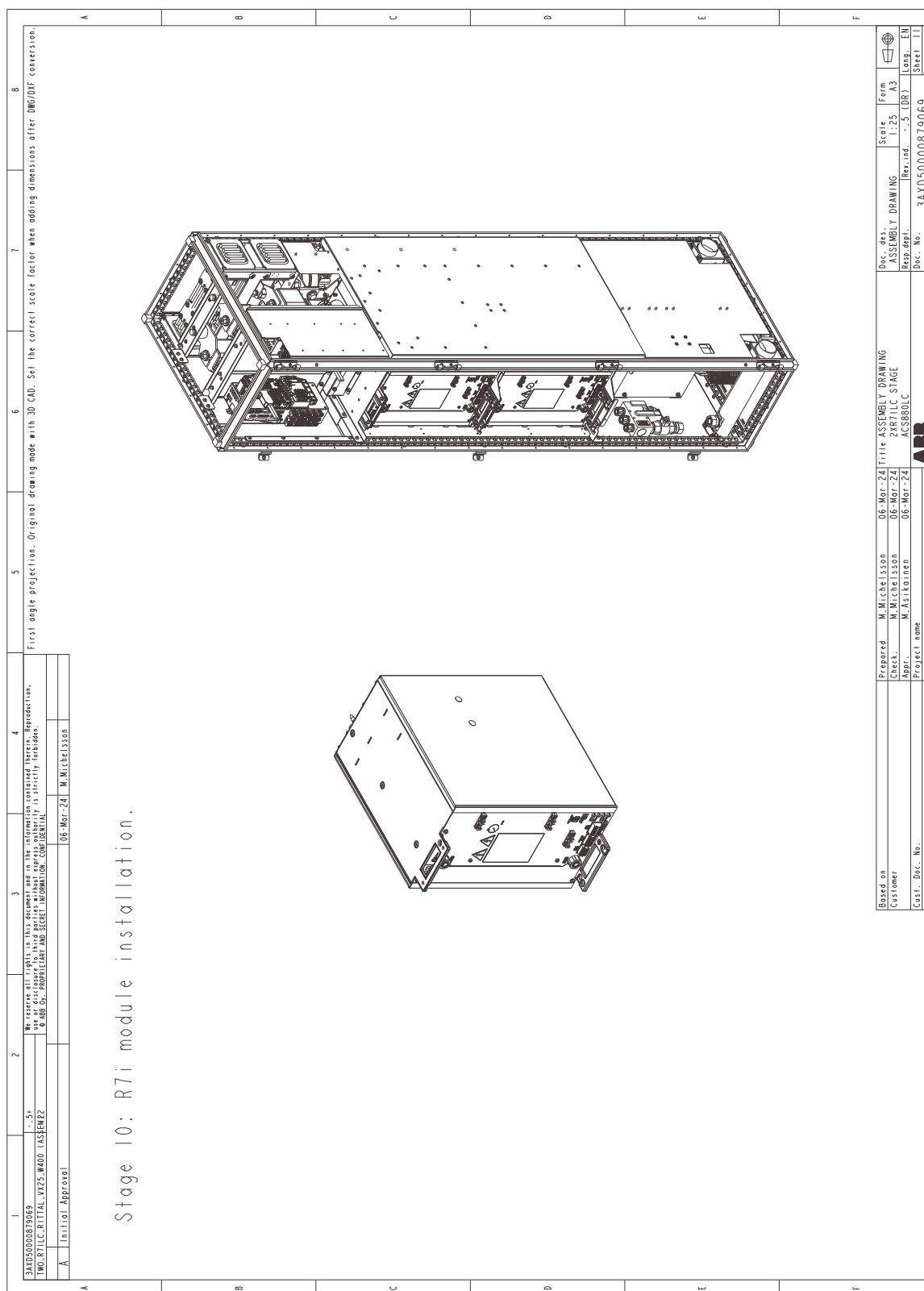
Stage 9: 2xR7i SHROUD KIT and COOLING COMPONENTS KIT installation.
See assembly drawings for details.

3AXD50000879069	1-5*	2	3	4	5	6	7	8
2xR7iLCC-RITIAL-VZ25-W400-1ASSENZ2								
A	Initial Approval							

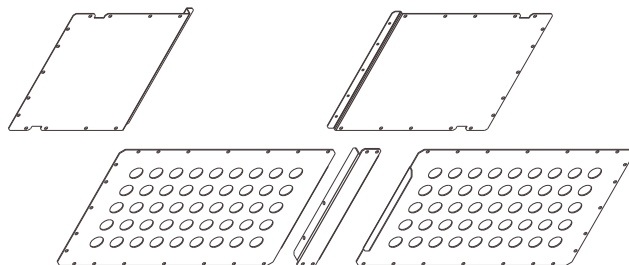
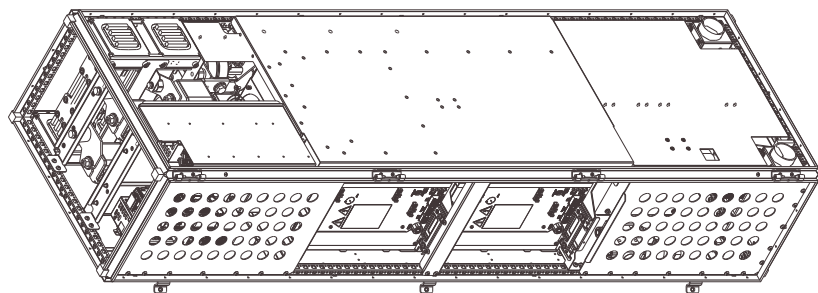
3AXD50000879069
2xR7iLCC-RITIAL-VZ25-W400-1ASSENZ2
A Initial Approval

3AXD50000879069
2xR7iLCC-RITIAL-VZ25-W400-1ASSENZ2
A Initial Approval

Stage 10: Installation of modules



Stage II: MARINE SUPPORT KIT installation.
See drawing for details.



KIT L-4-7-503-VX
MARINE SUPPORT KIT 2xR7i
Ordering code: 3AXD50000897490
Drawing code: 3AXD50000897186

3AXD50000879069
1WD-ITLCC-INITIAL-VZ25-W400-ASSEMBLY

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Initial Approval

06-Mar-24 M. Michelissoon

Stage II: MARINE SUPPORT KIT installation.
See drawing for details.

KIT L-4-7-503-VX
MARINE SUPPORT KIT 2XR7i
Ordering code: 3AXD50000897490
Drawing code: 3AXD50000897186

Prepared M. Michelissoon 06-Mar-24 Title ASSEMBLY DRAWING
Checked M. Michelissoon 06-Mar-24 2XR7ITLCC STAGE
Approved M. Asikainen 06-Mar-24 ALCS80ULC
Project name
Weight kg

3AXD50000879069
1WD-ITLCC-INITIAL-VZ25-W400-ASSEMBLY
06-Mar-24 M. Michelissoon

Doc. No. 3AXD50000879069
Rev. No. 1.25
Scale 1:25
Form A3

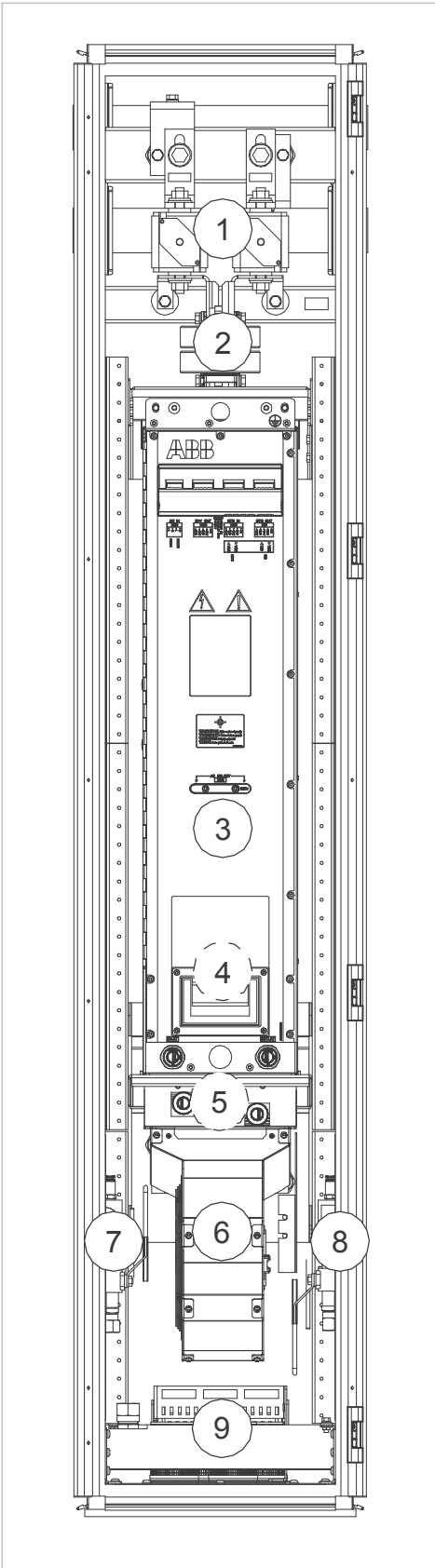
Doc. No. 3AXD50000879069
Rev. No. 1.25
Scale 1:25
Form A3

Stage 12: Installation of enclosure panels and pressure relief



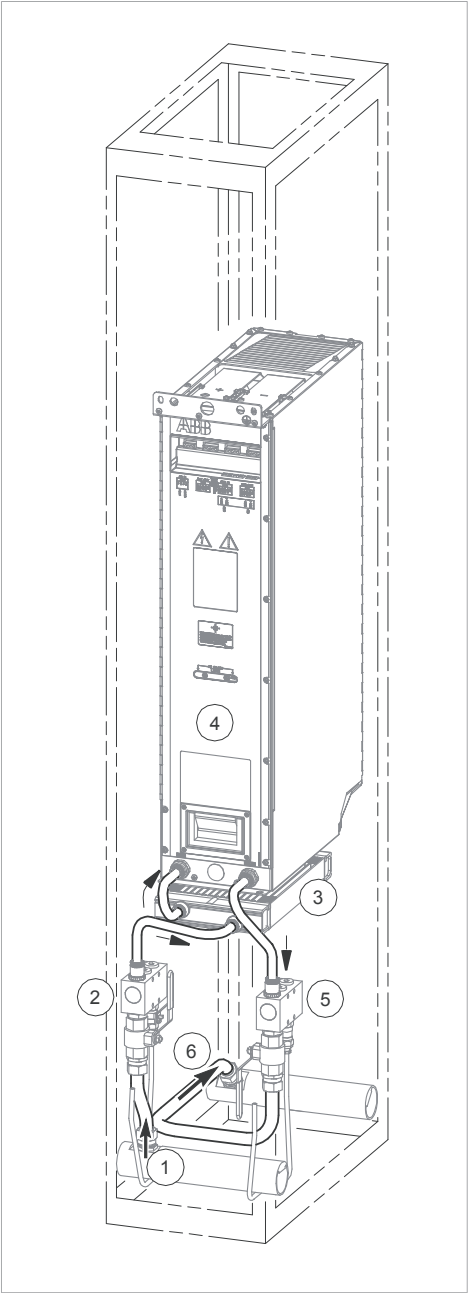
■ One R8i module in a 400 mm wide Rittal VX25 enclosure

Layout drawing



No.	Description
1	DC fuses (DC switch optional)
2	Common mode filters
3	Inverter module
4	Output busbars
5	Heat exchanger (between module and cooling fan)
6	Cooling fan
7	Inlet manifold with stop and drain valves
8	Outlet manifold with stop and drain valves
9	Cable entries

Pipe routing example



No.	Description
1	Coolant in
2	Inlet manifold with stop and drain valves
3	Heat exchanger
4	Inverter module
5	Outlet manifold with stop and drain valves
6	Coolant out



Installation stages

No.	Installation stage	Instruction code	Kit code	Kit ordering code
1	Baying parts	3AXD50000336340	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
	Main pipe support kit	3AXD50001155353	L-468-X-450-VX	3AXD50001155179
	PE busbar	3AXD50001155353	-	-
	Side plates	3AXD50000327591	L-468-8-020-VX	3AXD50000360543
2	Module mounting mechanics	3AXD50000330461	L-4-8-301-VX	3AXD50000360598
	Quick connector	-	A-468-8-100	3AUA0000119227
3A	AC output terminals (for cabling)	3AXD50000330874	L-468-8-131-VX	3AXD50000360550
	Cable entry	3AXD50000004817	A-468-8-441	3AXD50000004385
3B	Common AC bus support kit	3AXD50000370870	L-468-X-012-VX	3AXD50000371013
	AC output busbars (for connection to common AC bus)	3AXD50000352791	L-468-8-121-VX	3AXD50000371037
4	Cooling fan	-	-	3AXD50000043886 / 3AXD50000045414
	Heat exchanger	-	L-468-8-440	3AXD50000041265
	Coolant distribution manifolds	3AXD50000048217	L-468-8-441	3AXD50000044084
5A	DC busbars (for configuration without DC switch)	3AXD50000332861	L-4-8-201-VX	3AXD50000360604
		3AXD50000332885	L-4-8-251-VX	3AXD50000361021
		3AXD50000041311	L-468-8-230	3AXD50000041264
5B	DC switch and busbars	3AXD50000342600	L-4-8-254-VX	3AXD50000361038
		3AXD50000343614	L-46-8-207-VX	3AXD50000360567
		3AXD50000205042	L-46-8-233	3AXD50000200368
6	Module installation	-	-	-
7	Swing-out frame	3AXD50000345106	L-4-X-051-VX	3AXD50000361045
	Shrouding	3AXD50000353354	L-4-8-022-VX	3AXD50000361083



Overview of kits

First angle projection. Original drawing made with 30 CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.

KITS FOR ACS880-104LC 1xR8i IN RITTAL VX25 2000x600x400 CABINET
 Note! Only parts included in ABB kits are shown here!
 See kit assembly drawings for required Rittal and/or other standard parts.

A MAIN BUSBAR KIT
 KIT L-4-8-201-VX
 Ordering code: 3A050000360567

B DC CONNECTION KIT W400
 KIT L-4-8-201-VX
 Ordering code: 3A050000360567

C DC SWITCH KIT W400
 KIT L-4-8-201-VX
 Ordering code: 3A050000360567

D DC FUSE BUSBAR KIT W400
 KIT L-4-8-251-VX
 Ordering code: 3A050000360567

E MAIN PIPE SUPPORT KIT
 KIT L-4-8-201-VX
 Ordering code: 3A050000360567

F MAIN PIPE SUPPORT KIT FOR AC
 KIT L-4-8-012-VX
 Ordering code: 3A050000360567

Other components shown:
 SHROUD KIT W400
 KIT L-4-8-021-VX
 Ordering code: 3A050000360567

SWING FRAME KIT W400
 KIT L-4-X-051-VX
 Ordering code: 3A050000360567

ACS880LC HEAT EXCHANGER KIT
 KIT L-4-8-440
 Ordering code: 3A050000360567

R8i FAN KIT
 MECH KIT W400
 KIT L-4-8-301-VX
 Ordering code: 3A050000360567

MODULE MOUNTING KIT
 KIT L-4-8-301-VX
 Ordering code: 3A050000360567

COOLING COMPONENTS KIT J
 KIT L-4-8-841
 Ordering code: 3A05000044084

LEAD-THROUGH KIT FOR BOTTOM PLATE
 KIT L-4-8-441
 Ordering code: 3A05000044084

Prepared by: L. Lehtisalo
Checked by: M. Koskinen
Approved by: M. Asikainen
Project name: ACS880-104LC

Based on: Customer
Customer: B. Z. (DR)
Scale: 1:25
Form: A3
Sheet: 1



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

STAGE 1: Common assembly installations (Flat-PLS Support kit, Side plate kit, Baying parts, main pipe, PE).

See assembly drawings for details

FLAT-PLS SUPPORT KIT FOR DC

Based on	Prepared	L. Lehtisalo	20-Feb-19	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Customer	Checked	M. Kosinen	06-Mar-24	Y881 IN RITTAL W25 W400	ASSEMBLY DRAWING	1:25	A3
	Appr.	M. Asikainen	06-Mar-24	ACS880-104C	Req. app.	Rev. ind.	B, Z (DR)
Cust. No.	Project name				Doc. No.	3AYD50000434961	
DWG Number	Weight kg	3AXD00000868527			Sheet 2	Total 10	
ABB							
							

Stage 2: Installation of module mounting mechanics and quick connector

AC3880-104LC-VX25-W400
AC3880-104LC-VX25-W400 (ASSEMBLY) - 20+
A Milling approx
B Mill pipe support kit 04646

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STAGE2: MODULE MOUNTING MECHANICS KIT
AND QUICK CONNECTOR KIT INSTALLATION
See assembly drawings for details and required
additional Rittal and standard parts.

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

MODULE MOUNTING
MECH KIT W400
KIT L-4-6-301-VX
Ordering code: 3XU05000360596
See drawing: 3XU05000350461

X88 QUICK CONNECTORS FOR MODULE
KIT A-468-8-100
Ordering code: 3XU0000119227

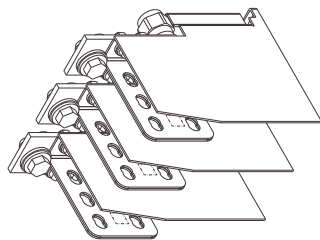
Prepared L. Lehtisalo 20-Feb-19 Title ASSEMBLY DRAWING
Check M. Koskinen 06-Mar-24 1XR81 IN RITTAL VX25 W400
Appr. M. Asikainen 06-Mar-24 ACS880-104LC
Project name
Cust. Dec. No. **ABB**

Scale 1:25 Form A3
ASSEMBLY DRAWING
Rep. inf. B.2 (DR)
Doc. No. 3XU05000043496.1
Sheet 3

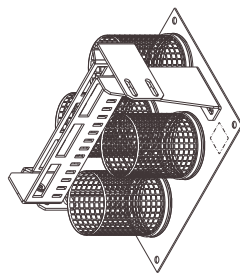


STAGE3A: R8I AC OUTPUT BUSBARS KIT AND LEAD-THROUGH KIT FOR BOTTOM PLATE INSTALLATION

See assembly drawings for details and required additional Rittal and standard parts.

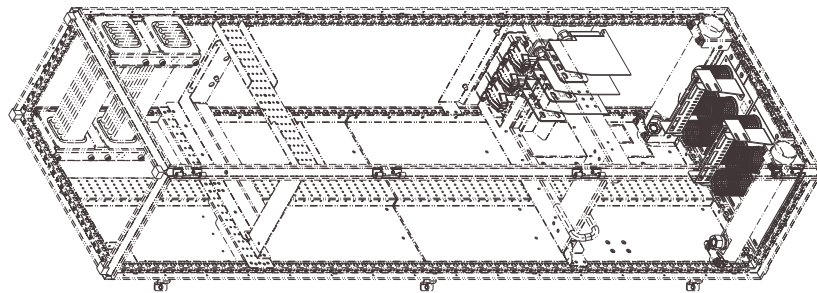


R8I AC OUTPUT BUSBARS KIT
KIT L-468-8-131-VX
Ordering code: 3AXD50000360550
See drawing: 3AXD50000330874



LEAD-THROUGH KIT FOR BOTTOM PLATE
KIT A-468-8-441
Ordering code: 3AXD5000004385
I kit/module (default)
See drawing: 3AXD50000004817

Note: one kit includes 4x6mm diam. lead-throughs



In this example two lead-through kits are shown.

Based on	Prepared	L. Lehtisalo	20-Feb-19	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Customer	Checkd.	M. Koskinen	06-Mar-24	INR81 IN RITTAL VV25 W400		1:25	A3	
	Appr.	M. Asikainen	06-Mar-24					
Cust. Doc. No.	Project name					Resp. empl.	[Rev. ind.] B. 2 (DR)	Long. EN
DMS Number	Weight [kg]					Dec. No.	3AYD50000434961	Sheet 4 Total 10

Stage 3B: Installation of AC busbars (for common AC bus)



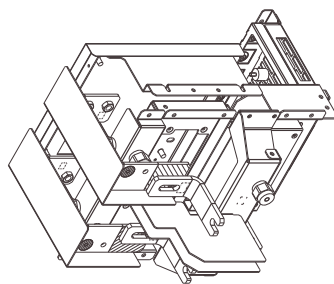
STAGE4: R81 LC FAN KIT, ACS880LC HEAT EXCHANGER KIT AND COOLING COMPONENTS KIT INSTALLATION
See assembly drawings for details and required additional Rittal and standard parts.

[illegible]

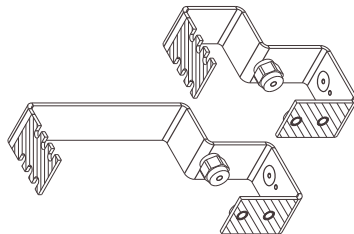
Stage 5A: Installation of DC busbars (units without DC switch)



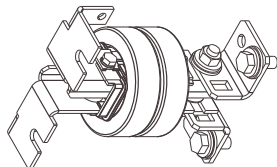
STAGE5B: DC SWITCH KIT W400, DC CONNECTION KIT W400 AND R81 CMMF BUSBARS KIT INSTALLATION
See assembly drawings for details and required additional Rittal and standard parts.



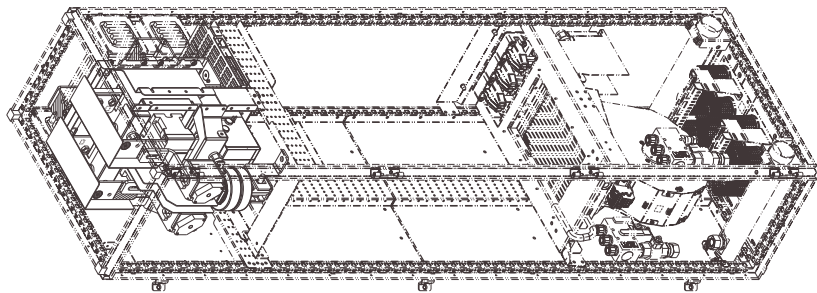
DC SWITCH KIT W400
KIT L-4-8-254-VX
Ordering code: 3AXD50000361038
See drawing: 3AXD50000342600



DC CONNECTION W400/W600
KIT L-46-8-207-VX
Ordering code: 3AXD50000360567
See drawing: 3AXD50000343614

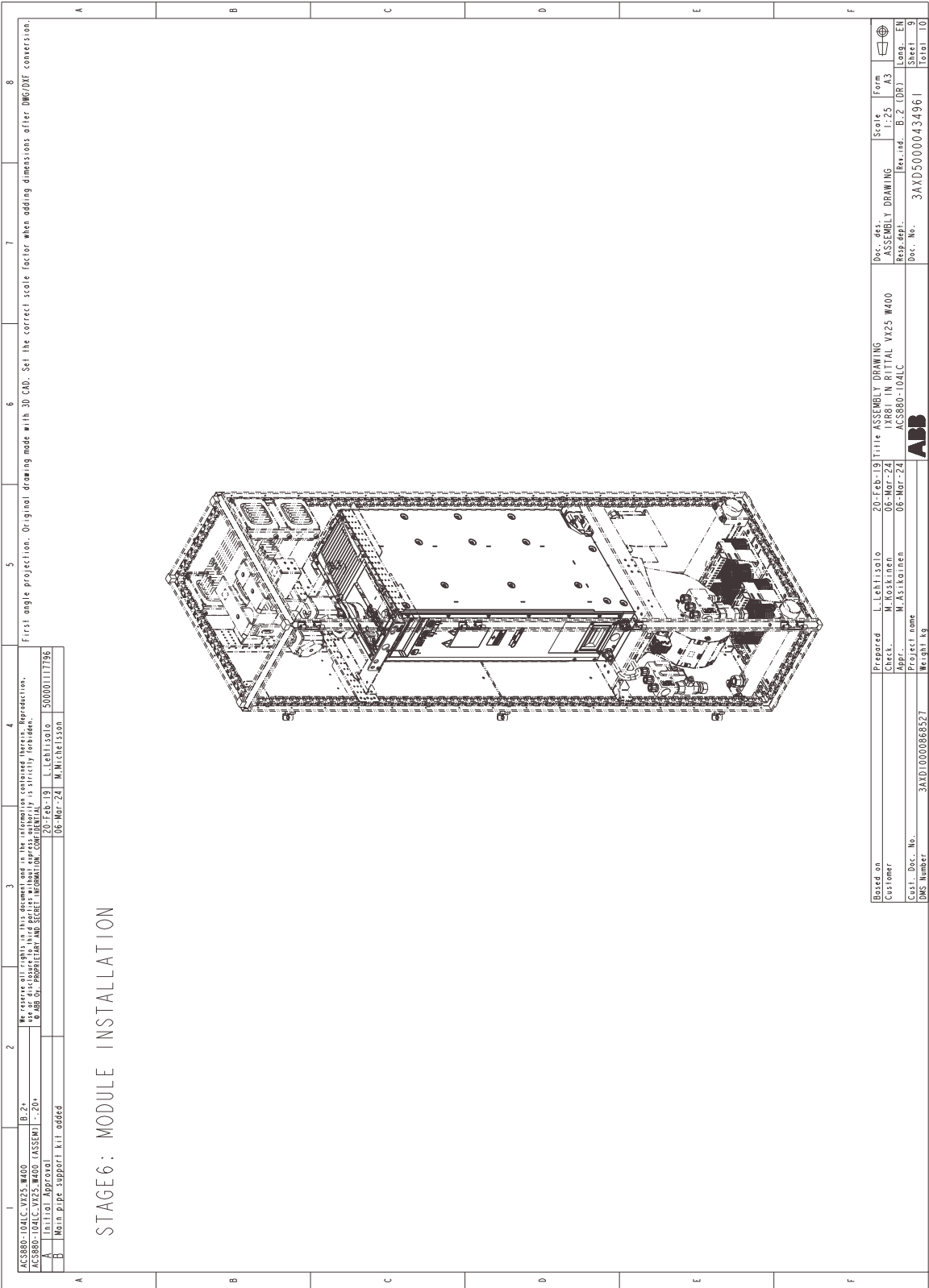


R81 CMMF BUSBAR KIT
KIT L-46-8-233
Ordering code: 3AXD50000200368
See drawing: 3AXD50000205042



Prepared	L. Lehtisalo	20-Feb-19	Title	ASSEMBLY DRAWING	Scale	Form
Check.	M. Koskinen	06-Mar-24	1XR81 IN RITTAL VXS W400	1:25	A3	
Appr.	M. Aiskonen	06-Mar-24	ACS880-104LC	Rev. ind.	B. 2 (DR)	
Project name				Long.	EN	
Draw. No.				Sheet	8	
Draw. No.	34YD1000066527			Sheet	10	
Draw. No.	34YD500000434961			Total	10	

Stage 6: Installation of module

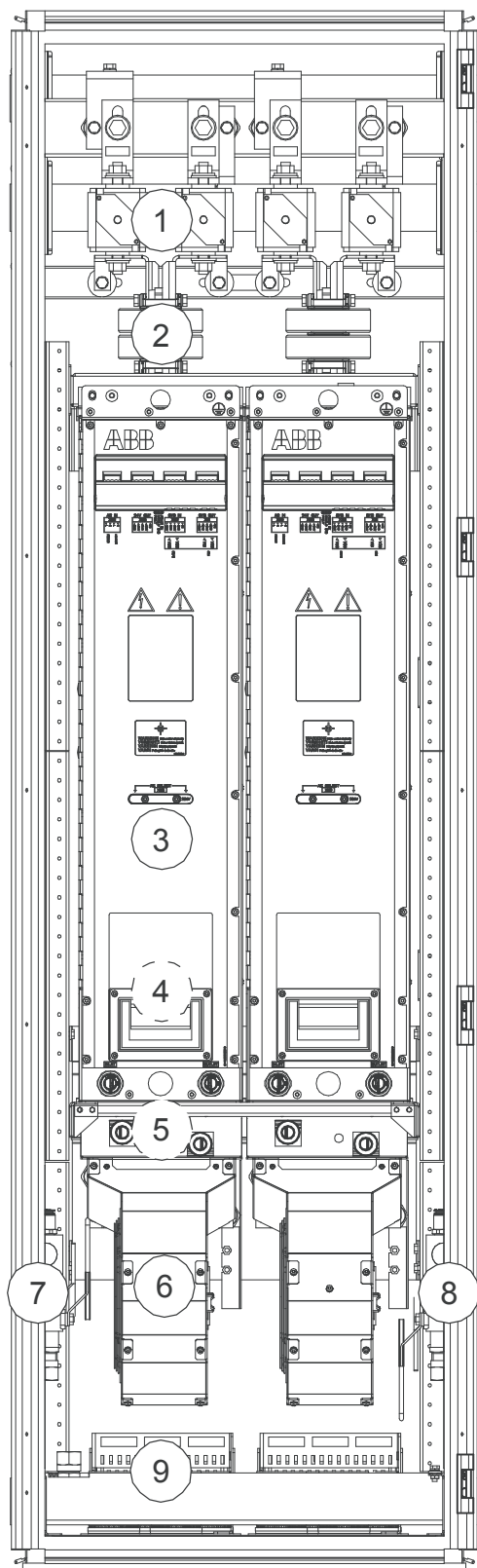


STAGE7: SWING FRAME KIT W400 AND SHROUD KIT W400 INSTALLATION
See assembly drawings for details and required additional Rittal and standard parts.

Based on	Prepared	L. Lehtilä	20-Feb-19	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Customer	Check.	M. Koskinen	06-Mar-24	Y881 IN RITTAL V225 M400	Y881 IN RITTAL V225 M400	ASSEMBLY DRAWING	1:25	A3
	Appr.	M. Asikainen	06-Mar-24	ACS880-104LC	ACS880-104LC	Rep. appl.	Rev. 01	Long. EN
	Project name					Doc. No.	3AYD50000434961	Sheet 10
	Weight kg					Doc. No.	3AYD50000434961	Total 10
Cust. Doc. No.	3XND10000868527							
DWG Number								

■ Two R8i modules in a 600 mm wide Rittal VX25 enclosure

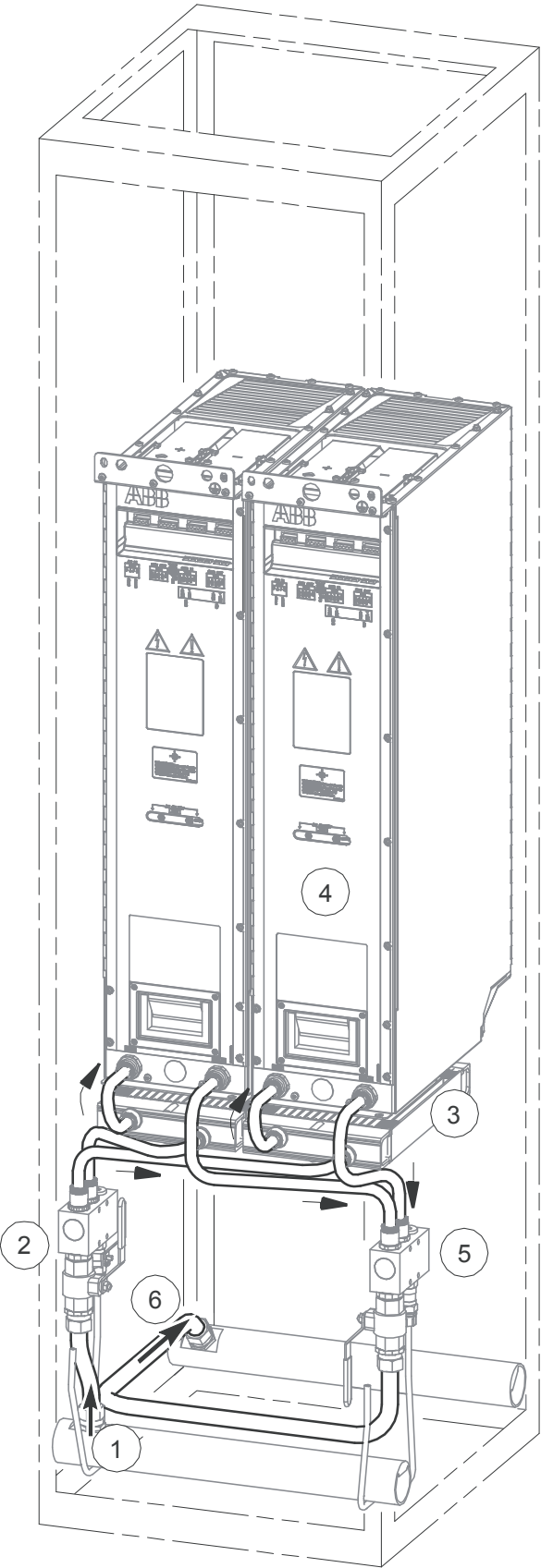
Layout drawing



No.	Description
1	DC fuses (DC switch can alternatively be installed)
2	Common mode filters
3	Inverter module
4	Output busbars (located behind module)
5	Heat exchanger (between module and cooling fan)
6	Cooling fan
7	Inlet manifold with stop and drain valves
8	Outlet manifold with stop and drain valves
9	Cable entries



Pipe routing example



No.	Description
1	Coolant in
2	Inlet manifold with stop and drain valves
3	Heat exchanger
4	Inverter module
5	Outlet manifold with stop and drain valves
6	Coolant out

Installation stages

No.	Installation stage	Instruction code	Kit code	Kit ordering code
1	Baying parts	3AXD50000336340	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
	Main pipe support kit	3AXD50001155353	L-468-X-450-VX	3AXD50001155179
	PE busbar	3AXD50001155353	-	-
	Side plates	3AXD50000327591	L-468-8-020-VX	3AXD50000360543
2	Module mounting mechanics	3AXD50000330201	L-6-8-302-VX	3AXD50000361090
	Quick connector	-	A-468-8-100	3AUA0000119227
3A	AC output terminals (for cabling)	3AXD50000330874	L-468-8-131-VX	3AXD50000360550
	Cable entry	3AXD50000004817	A-468-8-441	3AXD50000004385
3B	Common AC bus support kit	3AXD50000370870	L-468-X-012-VX	3AXD50000371013
	AC output busbars (for connection to common AC bus)	3AXD50000352791	L-468-8-121-VX	3AXD50000371037
4	Cooling fans	-	-	3AXD50000043886 / 3AXD50000045414
	Heat exchangers	-	L-468-8-440	3AXD50000041265
	Coolant distribution manifolds	3AXD50000048258	L-468-8-442	3AXD50000044182
5A	DC busbars (for configuration without DC switch)	3AXD50000332229	L-6-8-202-VX	3AXD50000361106
		3AXD50000332106	L-6-8-252-VX	3AXD50000361229
		3AXD50000041311	L-468-8-230	3AXD50000041264
5B	DC switch and busbars	3AXD50000338740	L-6-8-255-VX	3AXD50000361243
		3AXD50000343614	L-46-8-207-VX	3AXD50000360567
		3AXD50000205042	L-46-8-233	3AXD50000200368
6	Module installation	-	-	-
7	Swing-out frame	3AXD50000345069	L-6-X-052-VX	3AXD50000361250
	Shrouding	3AXD50000353521	L-6-8-023-VX	3AXD50000361267



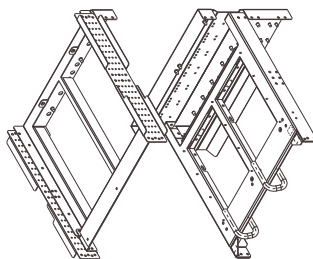
1		2		3		4		5		6		7		8	
ACS800-104LC VX25 W600		B.2x		We reserve all rights in this document and in the information contained herein. Reproduction, use or distribution in third parties without express written permission is strictly forbidden.		20-Feb-19		L. Lehtisalo		50000117805		First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.			
A Initial Approval				06-Mar-24		M. Michelsson									
B Main pipe support kit added															
KITS FOR ACS880-104LC 2xR81 IN RITTAL VX25 2000x600x600 CABINET Note! Only parts included in ABB kits are shown here! See kit assembly drawings for required Rittal and/or other standard parts.															
SIDE PLATE KIT KIT L-6-8-020-VX Ordering code: 3AXD50000360545				SHROUD KIT W600 KIT L-6-X-032-VX Ordering code: 3AXD50000361261				SWING FRAME KIT W600 KIT L-6-X-032-VX Ordering code: 3AXD50000361250				ACS880LC HEAT EXCHANGER KIT KIT L-468-8-440 Ordering code: 3AXD50000041265			
DC SWITCH KIT W600 KIT L-6-8-225-VX Ordering code: 3AXD50000361243				DC CONNECTION W400/W600 KIT L-46-8-201-VX Ordering code: 3AXD50000360561				R81 DC CONN BUSBAR KIT W600 KIT L-6-8-202-VX Ordering code: 3AXD50000361106				R81 CHMF BUSBAR KITS FOR FUSE ONLY: KIT L-468-8-230 Ordering code: 3AXD50000041264			
DC FUSE BUSBAR KIT L-6-8-232-VX Ordering code: 3AXD50000361279				FLAT-PLS SUPPORT KIT FOR DC KIT L-468-X-001-VX Ordering code: 3AXD50000333387				COMMON AC CONNECTION BUSBARS KIT L-468-8-121-VX Ordering code: 3AXD50000310037				R81 AC OUTPUT BUSBARS KIT KIT L-468-8-131-VX Ordering code: 3AXD50000360550			
MAIN PIPE SUPPORT KIT KIT L-468-X-450-VX Ordering code: 3AXD50000155179				801 OUTLINE CONNECTIONS FOR MODULE KIT L-468-8-000 Ordering code: 3AXD5000019227				801 AC OUTPUT BUSBARS KIT KIT L-468-8-131-VX Ordering code: 3AXD50000360550				DC SWITCH KIT W600 KIT L-6-8-225-VX Ordering code: 3AXD50000361243			
COOLING COMPONENTS KIT 2 KIT L-468-8-442 Ordering code: 3AXD50000040462				FLAT-PLS SUPPORT KIT FOR AC KIT L-468-X-012-VX Ordering code: 3AXD50000371013				801 AC OUTPUT BUSBARS KIT KIT L-468-8-131-VX Ordering code: 3AXD50000360550				DC SWITCH KIT W600 KIT L-6-8-225-VX Ordering code: 3AXD50000361243			
LEAD-THROUGH KIT KIT L-468-8-442 Ordering code: 3AXD50000040462				801 AC OUTPUT BUSBARS KIT KIT L-468-8-131-VX Ordering code: 3AXD50000360550				DC SWITCH KIT W600 KIT L-6-8-225-VX Ordering code: 3AXD50000361243				FLAT-PLS SUPPORT KIT FOR DC KIT L-468-X-001-VX Ordering code: 3AXD50000333387			

[illegible]

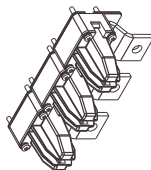
Stage 1: Installation of common parts

[illegible]

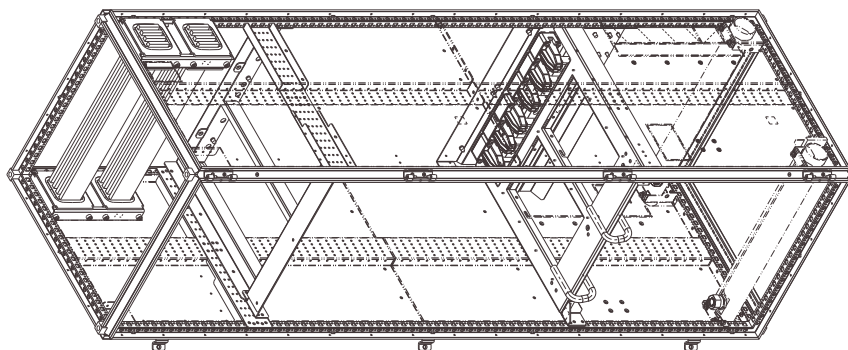
STAGE2: MODULE MOUNTING MECHANICS KIT
AND QUICK CONNECTOR KIT INSTALLATION
See assembly drawings for details and required
additional Rittal and standard parts.



MODULE MOUNTING
MECH KIT W600
KIT L-6-8-302-VX
Ordering code: 3AXD50000361090
See drawing: 3AXD50000330201



X8X QUICK CONNECTORS FOR MODULE
KIT A-468-8-100
Ordering code: 3AUA000119227
Note!
1 kit/module



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

[illegible]

Stage 3A: Installation of output terminals (for cabling) and cable entries

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ACS880-104LC-VX25-W600
ACS880-104LC-VX25-W600 (ASSEMBLY) - 13
Initial Approval
Main pipe support kit added

20-FEB-19
06-MAR-24

L. Lehtilä
M. Koskinen

50000117805

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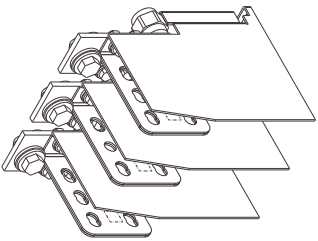
ACS880-104LC-VX25-W600
ACS880-104LC-VX25-W600 (ASSEMBLY) - 13
Initial Approval
Main pipe support kit added

20-FEB-19
06-MAR-24

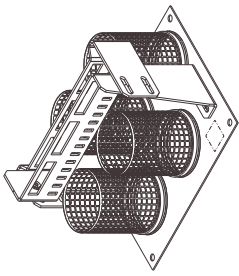
L. Lehtilä
M. Koskinen

50000117805

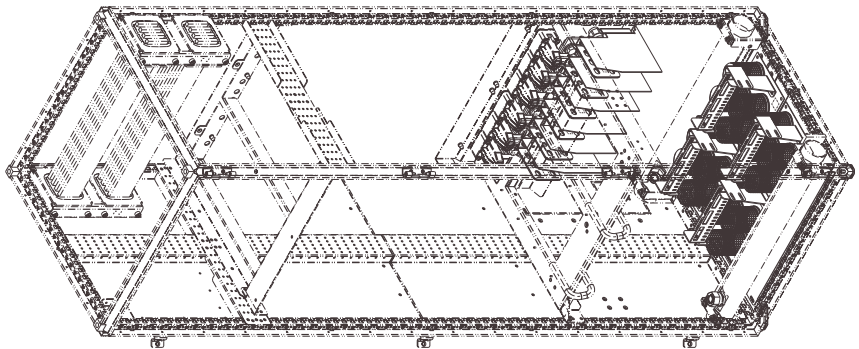
STAGE3A: R81 AC OUTPUT BUSBARS KIT AND LEAD-THROUGH KIT
FOR BOTTOM PLATE INSTALLATION
See assembly drawings for details and required
additional Rittal and standard parts.



R81 AC OUTPUT BUSBARS KIT
KIT L-468-8-131-VX
Ordering code: 3AXD50000360550
Note!
1 kit/module
See drawing: 3AXD50000330874



LEAD-THROUGH KIT FOR BOTTOM PLATE
KIT A-468-8-441
Ordering code: 3AXD5000004385
1 kit/module (delault)
See drawing: 3AXD5000004817
Note: one kit includes 4x60mm diam. lead-throughs



In this example four lead-through kits are shown.

Doc. des.
ASSEMBLY DRAWING
Resp. des.
3AXD50000435630

20-FEB-19
06-MAR-24

L. Lehtilä
M. Koskinen

50000117805

20-FEB-19
06-MAR-24

L. Lehtilä
M. Koskinen

50000117805

20-FEB-19
06-MAR-24

L. Lehtilä
M. Koskinen

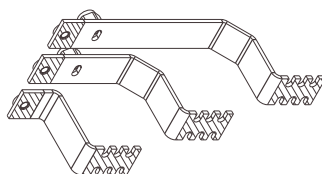
50000117805

20-FEB-19
06-MAR-24

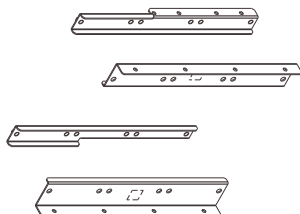
L. Lehtilä
M. Koskinen

50000117805

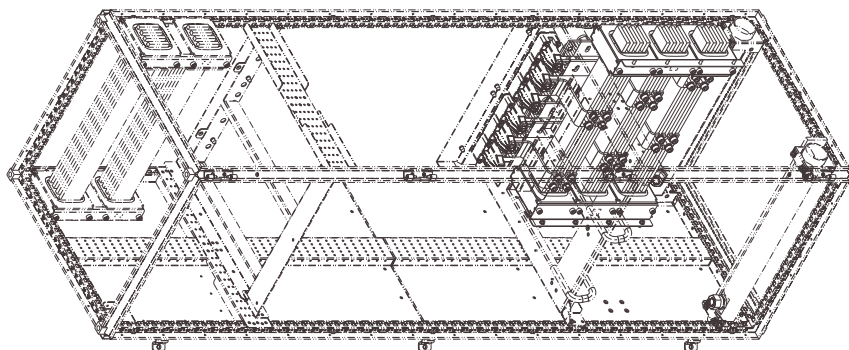
STAGESB: FLAT-PLS SUPPORT KIT FOR AC AND COMMON AC CONNECTION BUSBARS INSTALLATION
See assembly drawings for details and request additional Rittal and standard parts.



COMMON AC CONNECTION BUSBARS
KIT L-468-8-121-VX
Ordering code: 3AXD50000371037
Note!
1 kit/module
See drawing: 3AXD50000352791



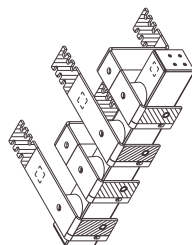
FLAT-PLS SUPPORT KIT FOR AC
KIT L-468-X-012-VX
Ordering code: 3AXD50000371013
See drawing: 3AXD50000370870

[illegible]

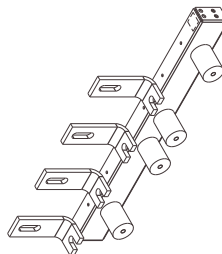
Stage 4: Installation of cooling components

[illegible]

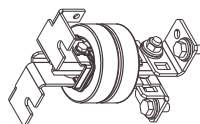
STAGE5A: R81 DC CONN BUSBAR KIT W600, DC FUSE BUSBAR KIT W600 AND R81 CMF BUSBARS KIT INSTALLATION
See assembly drawings for details and required additional Rittal and standard parts.



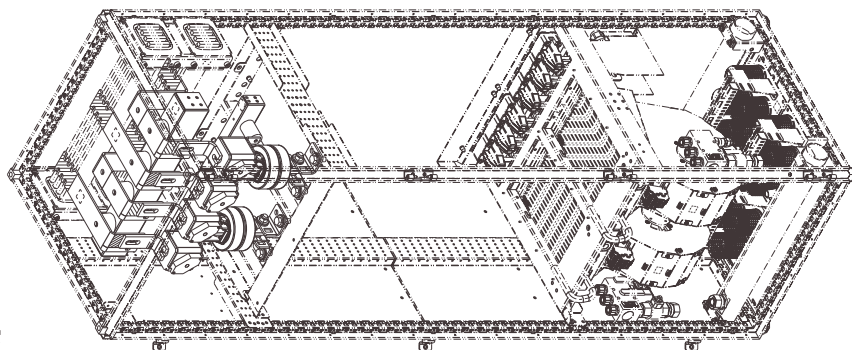
R8I DC CONN BUSBAR KIT W600
KIT L-6-8-202-VX
Ordering code: 3AXD50000361106
See drawing: 3AXD50000332229



DC FUSE BUSBAR KIT W600
KIT L-6-8-252-VX
Ordering code: 3AXD50000361229
See drawing: 3AXD50000332106



R81 CMMF BUSBAR KIT
KIT L-468-8-230
Ordering code: 3AXD50000041264
Note!
I kit/module
See instruction: 3AXD500000041311



Prepared	L. Lehtilä	20-Feb-19	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Check.	M. Koskinen	06-Mar-24	2481	IN RITTAL V25 W600	1:25	A3	
Appr.	M. Asikainen	06-Mar-24			Resub dep.	[Rev. ind. B. 2. (DR)]	
Project name					Doc. No.	3AXD50000435630	
Drawings	347D 00000869117				Sheet 1	Total 10	

Stage 5B: Installation of DC switch and busbars

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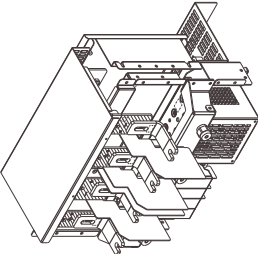
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8

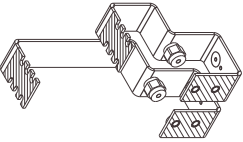
ACS880-104LC-VX25-W600
ACS880-104LC-VX25-W600 (ASSEMBLY) - 13
Initial Approval
Main pipe support kit added

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CONFIDENTIAL
20-FEB-19 L. Lehtilä
06-MAR-24 M. Kukkila
06-MAR-24 M. Kukkila

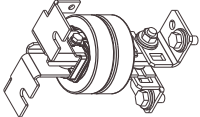
STAGE5B: DC SWITCH KIT W600, DC CONNECTION KIT W600 AND R81 CMMF BUSBARS KIT INSTALLATION
See assembly drawings for details and required additional Rittal and standard parts.



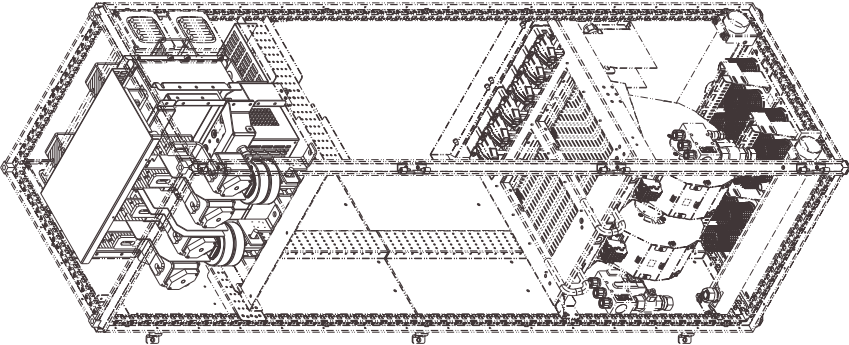
DC SWITCH KIT W600
KIT L-6-8-255-VX
Ordering code: 3AXD50000361243
See drawing: 3AXD50000338740



DC CONNECTION KIT W600
KIT L-46-8-207-VX
Ordering code: 3AXD50000360567
Note:
1 kit/module
See drawing: 3AXD50000343614



R81 CMMF BUSBAR KIT
KIT L-46-8-233
Ordering code: 3AXD50000200368
Note:
1 kit/module
See drawing: 3AXD50000205042



Based on Customer
Cust. Doc. No.
DMS Number

Prepared L. Lehtilä
Check M. Kukkila
Appr. M. Kukkila
Project name
Weight kg

20-FEB-19
06-MAR-24
06-MAR-24
3AXD10000869117

Final ASSEMBLY DRAWING
2XR81 IN RITTAL VX25 W600
ACS880-104LC
3AXD50000435630

Scale
1:25
A3
Long
8
Total
10

Stage 6: Installation of module



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ACS880-104LC-VX25-W600

ACS880-104LC-VX25-W600 (ASSEMB)

Initial Approval

Main pipe support kit added

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20-Feb-19

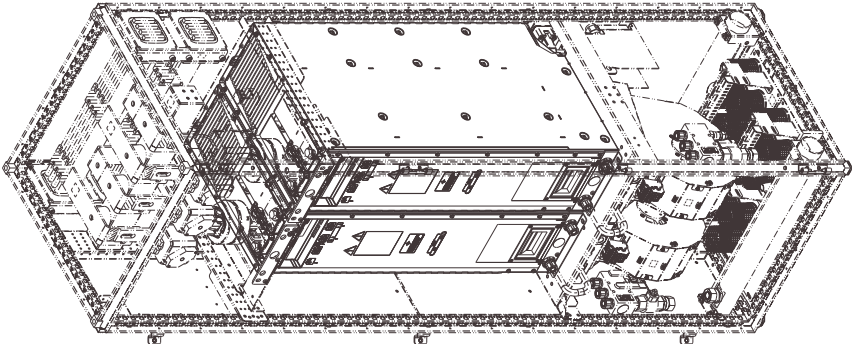
06-Mar-24

L. Lehtilä

M. Miettinen

500001117805

STAGE6: MODULE INSTALLATION



Based on

Customer

Cost. Doc. No.

DNS Number

Prepared

Check

Appr.

Project name

Weight, kg

20-Feb-19

06-Mar-24

06-Mar-24

ABB

3AXD50000435630

Title

ASSEMBLY DRAWING

24X81 IN RITTAL VX25 W600

ACS880-104LC

Dec. des.

ASSEMBLY DRAWING

Dec. No.

3AXD50000435630

Scale

1:25

1:25

1:25

Form

A3

EN

EN

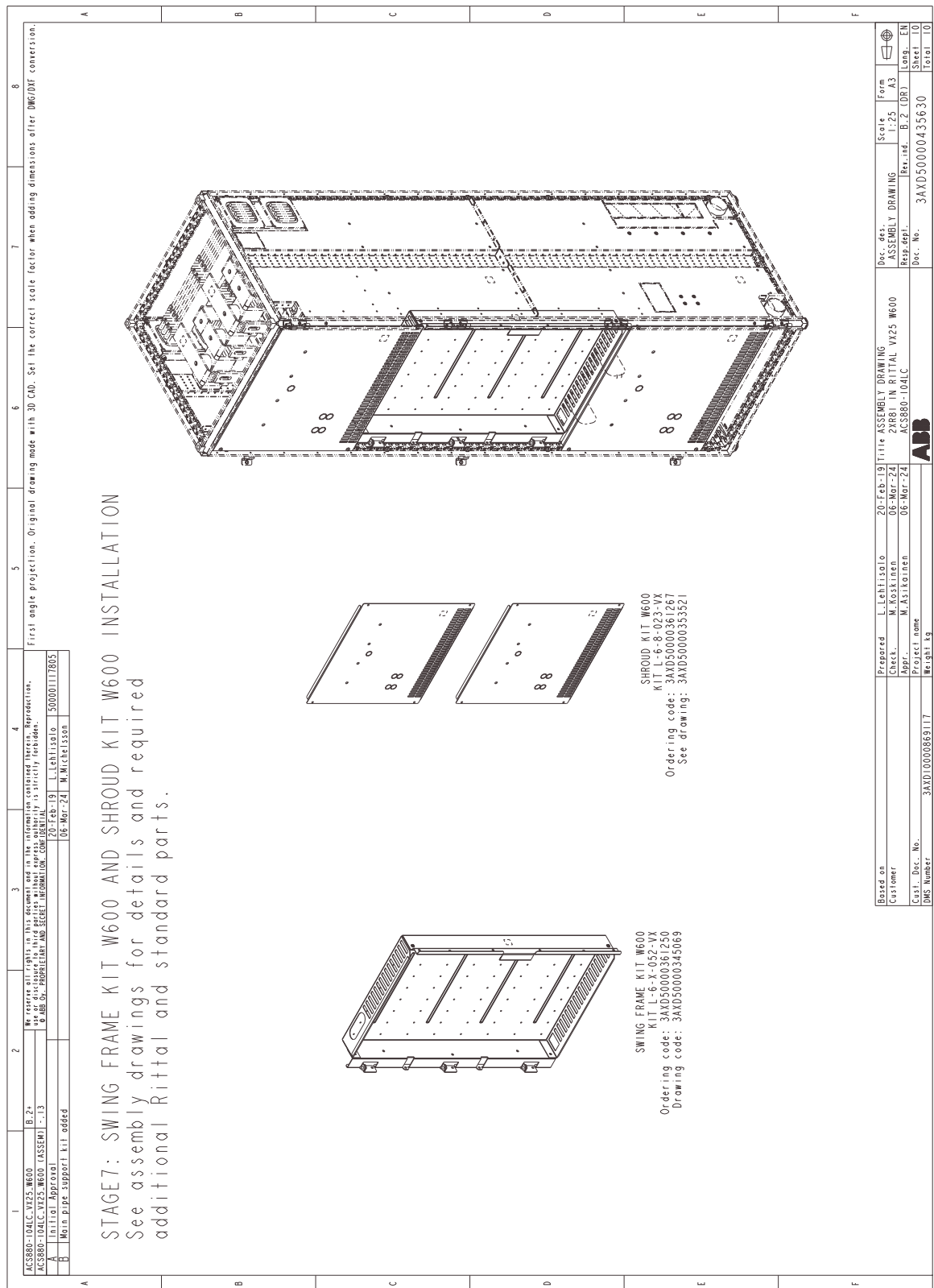
Long.

Sheet

9

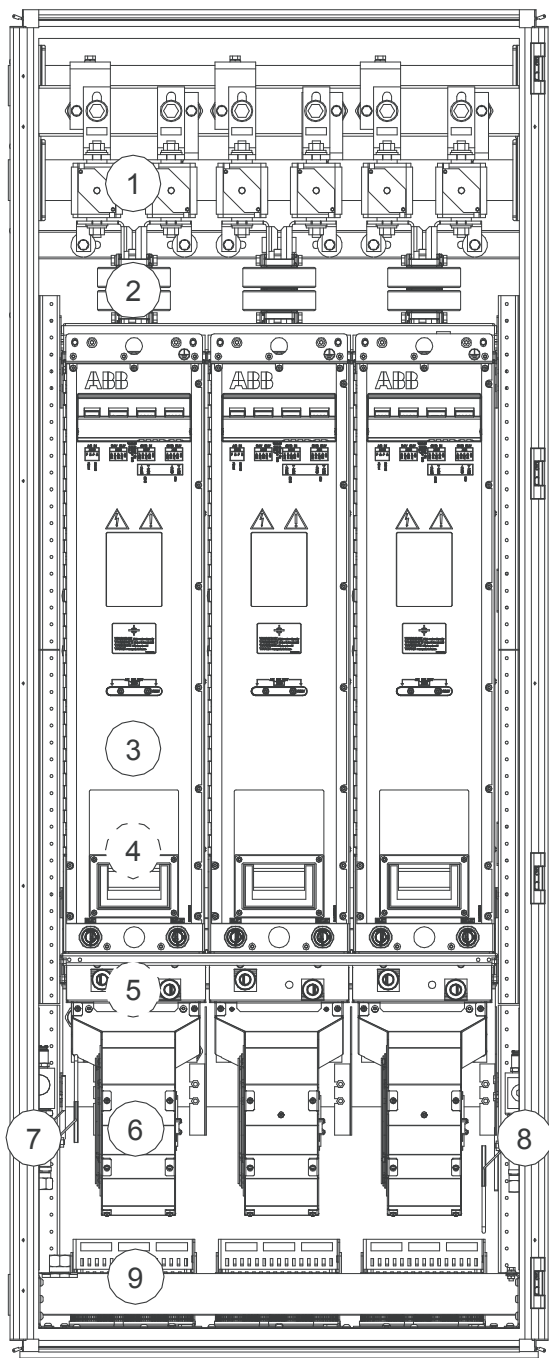
10

Stage 7: Installation of swing-out frame and shrouding

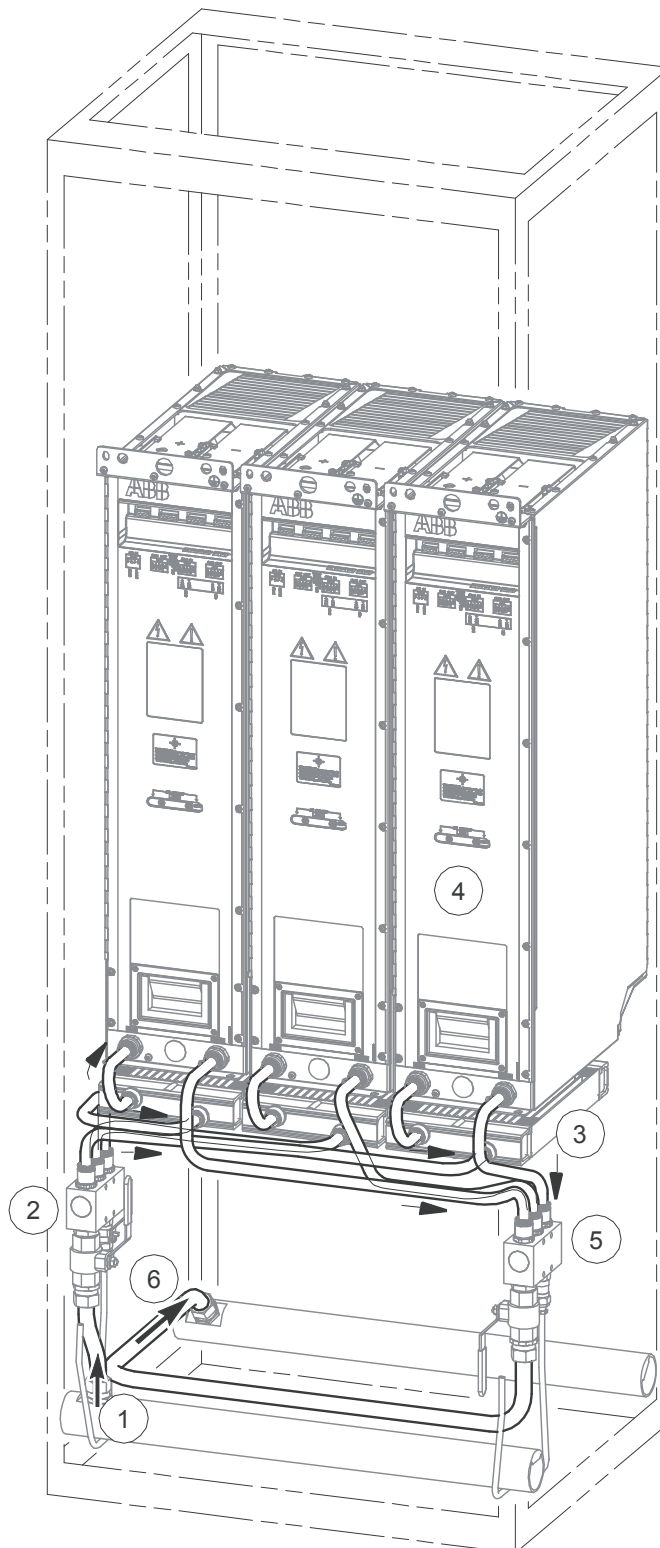


■ Three R8i modules in a 800 mm wide Rittal VX25 enclosure

Layout drawing



No.	Description
1	DC fuses (DC switch can alternatively be installed)
2	Common mode filters
3	Inverter module
4	Output busbars (located behind the module)
5	Heat exchanger (between module and cooling fan)
6	Cooling fan
7	Inlet manifold with stop and drain valves
8	Outlet manifold with stop and drain valves
9	Cable entries

Pipe routing example

No.	Description
1	Coolant in
2	Inlet manifold with stop and drain valves
3	Heat exchanger
4	Inverter module
5	Outlet manifold with stop and drain valves
6	Coolant out



Installation stages

No.	Installation stage	Instruction code	Kit code	Kit ordering code
1	Baying parts	3AXD50000336340	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
	Main pipe support kit	3AXD50001155353	L-468-X-450-VX	3AXD50001155179
	PE busbar	3AXD50001155353	-	-
	Side plates	3AXD50000327591	L-468-8-020-VX	3AXD50000360543
2	Module mounting mechanics	3AXD50000329502	L-8-8-303-VX	3AXD50000361274
	Quick connector	-	A-468-8-100	3AUA0000119227
3A	AC output terminals (for cabling)	3AXD50000330874	L-468-8-131-VX	3AXD50000360550
	Cable entry	3AXD50000004817	A-468-8-441	3AXD50000004385
3B	Common AC bus support kit	3AXD50000370870	L-468-X-012-VX	3AXD50000371013
	AC output busbars (for connection to common AC bus)	3AXD50000352791	L-468-8-121-VX	3AXD50000371037
4	Cooling fan	-	-	3AXD50000043886 / 3AXD50000045414
	Heat exchanger	-	L-468-8-440	3AXD50000041265
	Coolant distribution manifolds	3AXD50000048283	L-468-8-443	3AXD50000048136
	PE busbar	-	-	-
5A	DC busbars (for configuration without DC switch)	3AXD50000331567	L-8-8-203-VX	3AXD50000361281
		3AXD50000331765	L-8-8-253-VX	3AXD50000361298
		3AXD50000041311	L-468-8-230	3AXD50000041264
5B	DC switch and busbars	3AXD50000336999	L-8-8-256-VX	3AXD50000361304
		3AXD50000344185	L-8-8-208-VX	3AXD50000360574
		3AXD50000205226	L-8-8-234	3AXD50000200337
6	Module installation	-	-	-
7	Swing-out frame	3AXD50000345106	L-4-X-051-VX	3AXD50000361045
	Shrouding	3AXD50000353354	L-4-8-022-VX	3AXD50000361083



Overview of kits

ACS880-104LC: VX25: W800
ACS880-104LC: VX25: W800 (ASSEMBLY)
ACS880-104LC: VX25: W800 (ASSEMBLY)

Kit for ACS880-104LC 3xR8i in Rittal VX25 2000x600x800 cabinet
 Note: Only parts included in ABB kits are shown here!
 See kit assembly drawings for required Rittal and/or other standard parts.

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

Section A:
 DC CONNECTION KIT W800
 KIT L-8-8-208-VX
 Ordering code: 3A050000360514
 3A050000361304

Section B:
 DC SWITCH KIT W800
 KIT L-8-8-208-VX
 Ordering code: 3A050000360514
 3A050000361304

Section C:
 DC FUSE BUSBAR
 KIT L-8-8-253-VX
 Ordering code: 3A050000361298

Section D:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section E:
 R8i AC CONNECTION BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section F:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section G:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section H:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section I:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section J:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section K:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section L:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section M:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section N:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section O:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section P:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section Q:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section R:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section S:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section T:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section U:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section V:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section W:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section X:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section Y:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section Z:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AA:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AB:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AC:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AD:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AE:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AF:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AG:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AH:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AI:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AJ:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AK:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AL:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AM:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AN:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
 3A050000360550

Section AO:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
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Section AP:
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 KIT L-468-8-131-VX
 Ordering code: 3A050000360550
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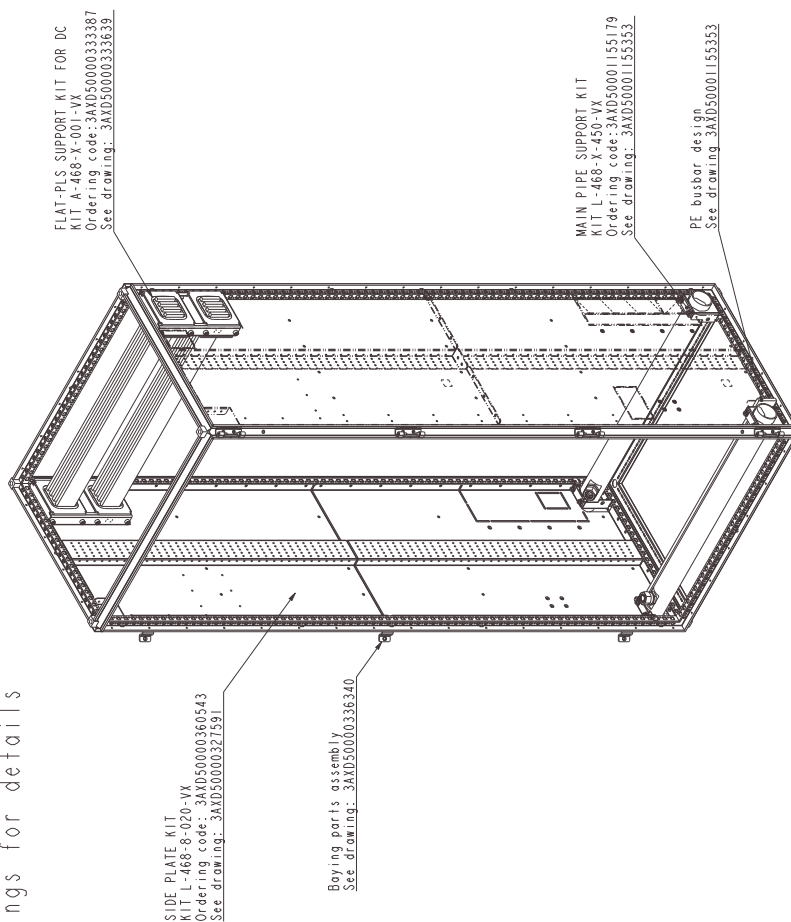
Section AQ:
 R8i AC OUTPUT BUSBARS KIT
 KIT L-468-8-131-VX
 Ordering code: 3A05000



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

STAGE 1: Common assembly installations (Flat-PLS Support kit, Side plate kit, Baying parts, main pipe, PE).

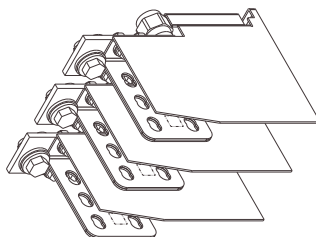
See assembly drawings for details

[illegible]

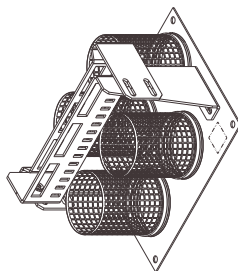
Stage 2: Installation of module mounting mechanics and quick connector

[illegible]

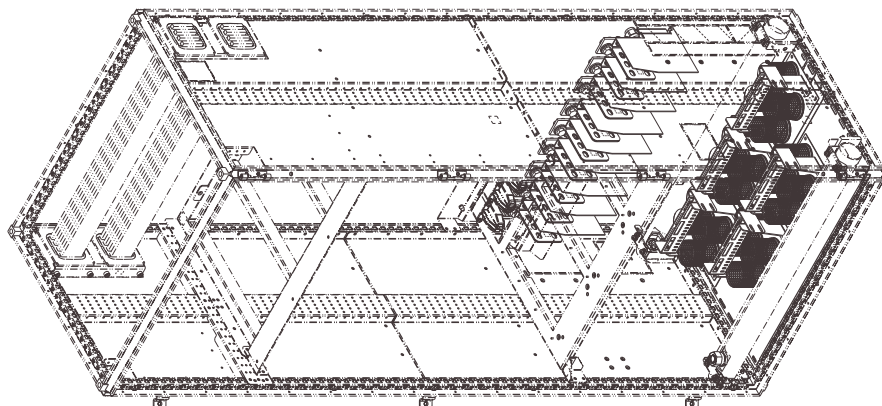
STAGE3A: R81 AC OUTPUT BUSBARS KIT AND LEAD-THROUGH KIT
FOR BOTTOM PLATE INSTALLATION
See assembly drawings for details and required
additional Rittal and standard parts.



R81 AC OUTPUT BUSBARS KIT
KIT L-468-8-131-VX
Ordering code: 3AXD50000360550
Note!
1 kit/module
See drawing: 3AXD50000330874



LEAD-THROUGH KIT FOR BOTTOM PLATE
KIT A-468-8-441
Ordering code: 3AXD50000004385
1 kit/module (default)
See drawing: 3AXD50000004817
cludes 4x60mm diam. lead-throughs



In this example five lead-through kits are shown.

Prepared	L. Lehtilä	21-Feb-19	Title	ASSEMBLY DRAWING	Doc. des.	Scale	Form
Check.	M. Koskinen	07-Mar-24		3X81 IN RITTAL V25 W800	1:25	A3	
Appr.	M. Asikainen	07-Mar-24		ACS880-04LC	Resp. des.		
Project name					Rev. ind.	B. 2. (DR)	
Project No.					Doc. No.	3AXD50000436415	
ONS Number	347H0000086991				Sheet	4	
					Total	10	

Stage 3B: Installation of AC busbars (for common AC bus)

1 2 3 4 5 6 7 8

AC880-104LC-VX25-WB00 B-2x
AC880-104LC-VX25-WB00 (ASSEMBLY) -16
A RITLIT APPROVAL
B Note: PLS SUPPORT KIT 04646

© 2000 L. Lehtisalo
07-Mar-24 M. Asikainen 50000117845

STAGE3B: FLAT-PLS SUPPORT KIT FOR AC AND
COMMON AC CONNECTION BUSBARS INSTALLATION
See assembly drawings for details and required
additional Rittal and standard parts.

FLAT-PLS SUPPORT KIT FOR AC
KIT L-468-X-012-VX
Ordering code: 3AXD50000371013
See drawing: 3AXD50000370870

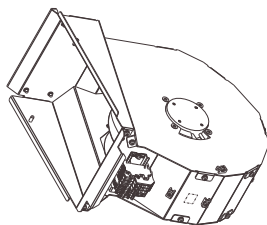
COMMON AC CONNECTION BUSBARS
KIT L-468-8-121-VX
Ordering code: 3AXD50000371037
Note:
1 kit/module
See drawing: 3AXD50000352791

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

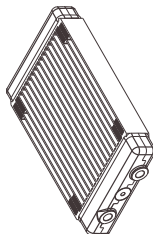
Based on: Prepared: L. Lehtisalo 21-Feb-19 Title: ASSEMBLY DRAWING Scale: 1:25 Form: A3
Customer: Check: M. Koskinen 07-Mar-24 3XR81 IN RITLIT VX25 WB00 Rev. no. B.2 (DR)
Appr.: M. Asikainen 07-Mar-24 ACS880-104LC Rev. no. B.2 (DR)
Project name: Doc. No. 3AXD50000436415 Sheet 5



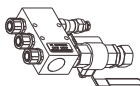
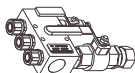
STAGE4: R81 LC FAN KIT, ACS880LC HEAT EXCHANGER KIT AND COOLING COMPONENTS KIT INSTALLATION
See assembly drawings for details and required additional Rittal and standard parts.



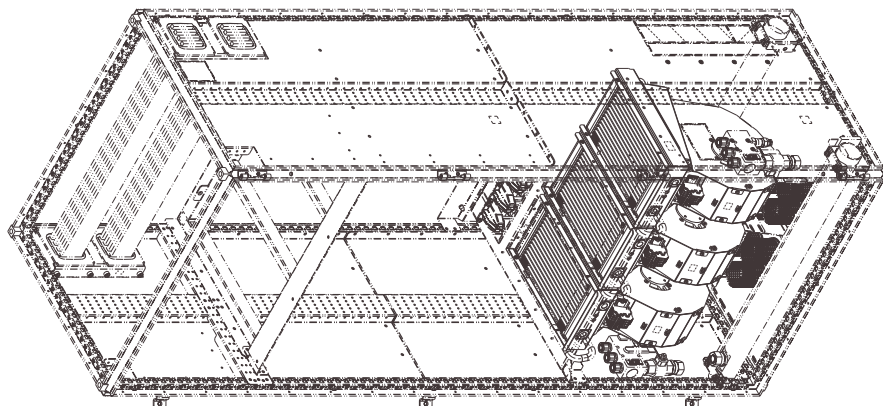
R8i FAN KIT
Ordering codes:
3AXD50000043886 (230V)
3AXD50000045414 (115V)
Note:
1 kit/module



ACS880LC HEAT EXCHANGER KIT
KIT L-468-8-440
Ordering code: 3AXD50000041265
Note!
1 kit/module

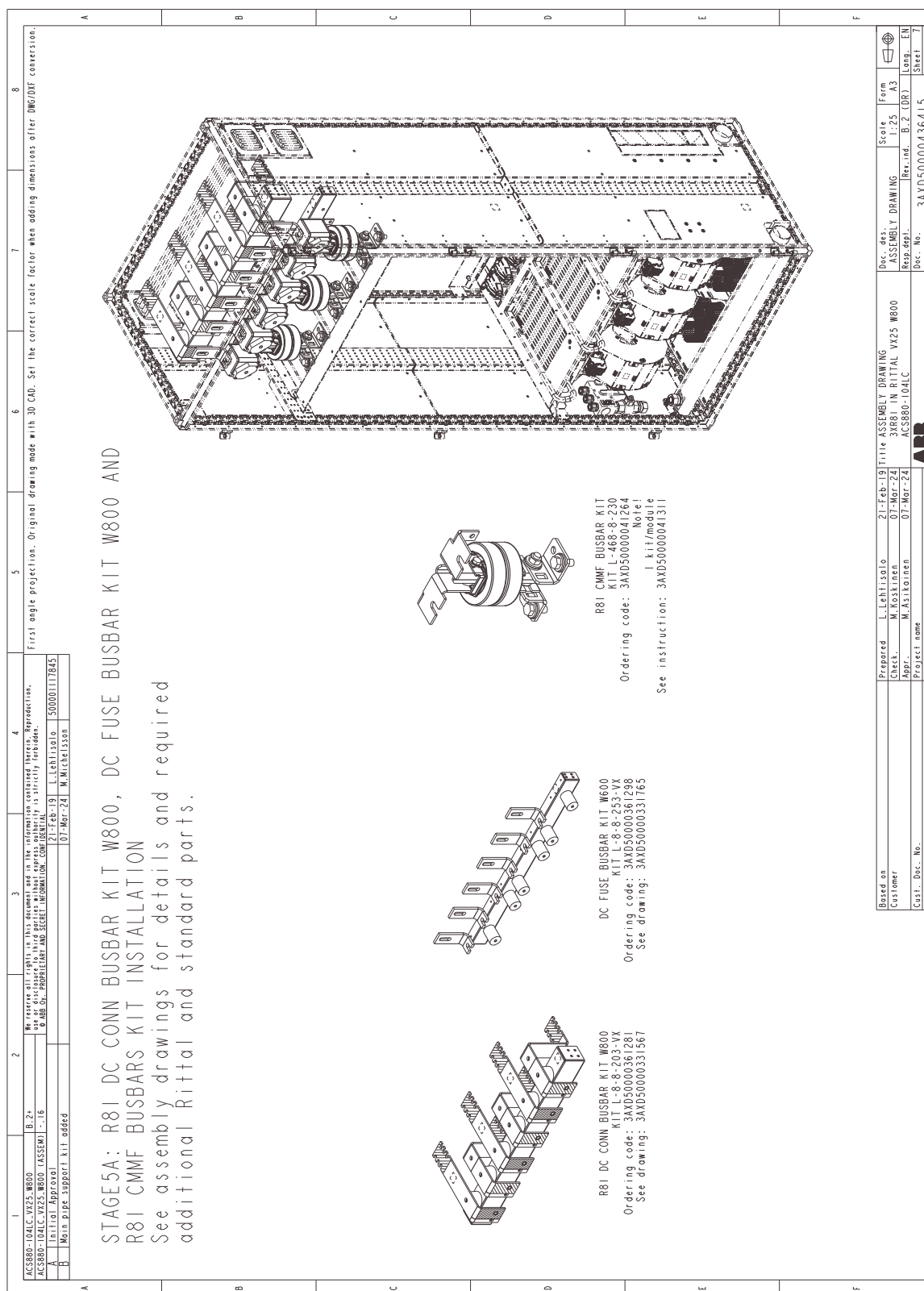


COOLING COMPONENTS KIT 3
KIT L-468-8-443
Ordering code: 3AXD50000048136
See drawing: 3AXD50000048283

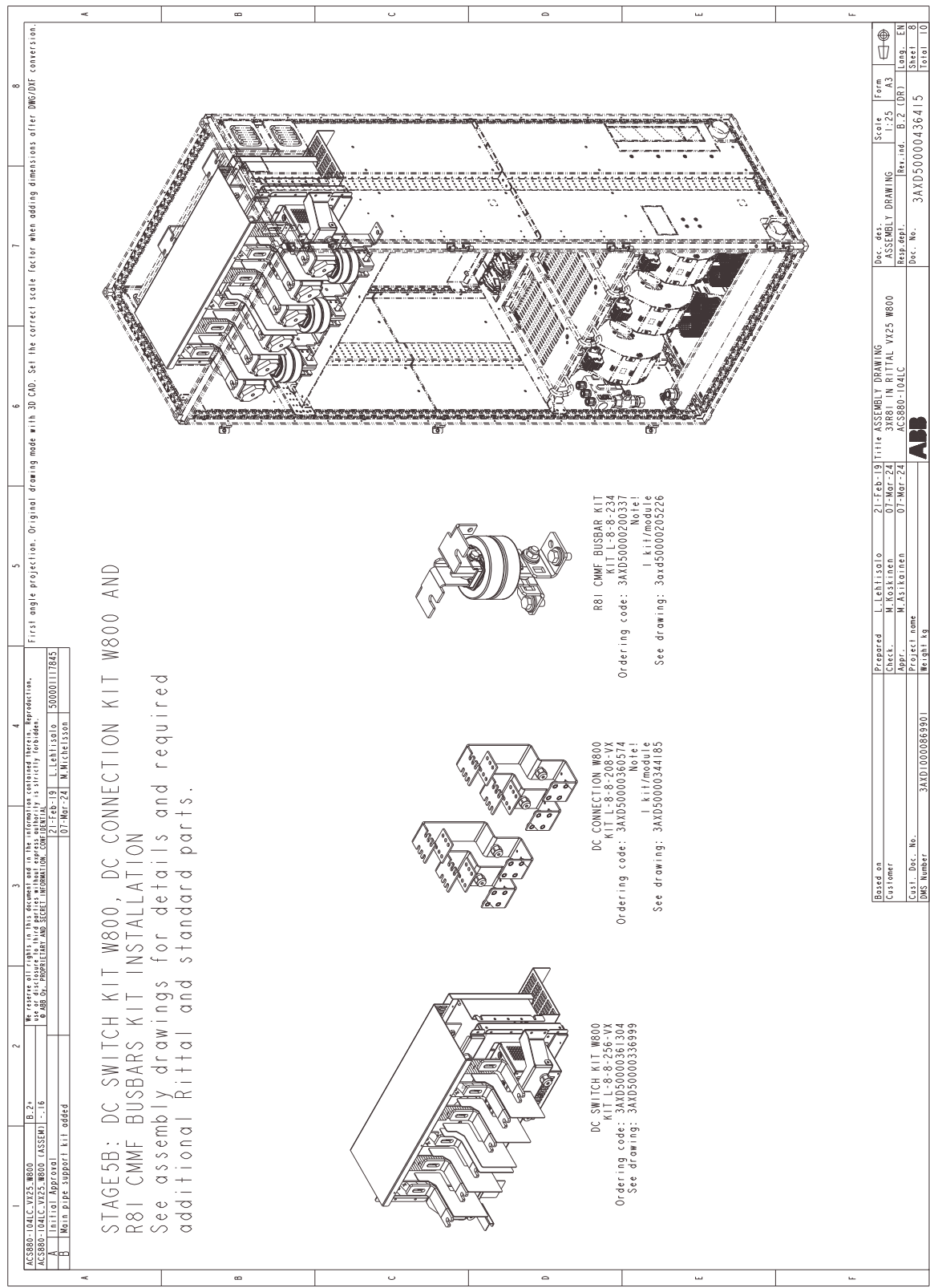


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	Appr.	M.Aiskinen	ACS880-104LC	B.2 (DR)	
Cust. Doc. No.	Project name			Res.p.depl.	Long. EN
DMS Number	Weight kg			Doc. No.	Sheet 6
					Total 10

Stage 5A: Installation of DC busbars (units without DC switch)



Stage 5B: Installation of DC switch and busbars



Stage 6: Installation of module

1	2	3	4	5	6	7	8
AC3880-104LC-VX25-W800		B-2x					
AC3880-104LC-VX25-W800 (ASSEMBLY) - 16							
A Initial Approval							
B Work prep. support kit added							

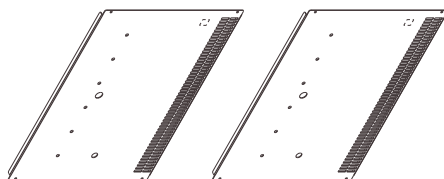
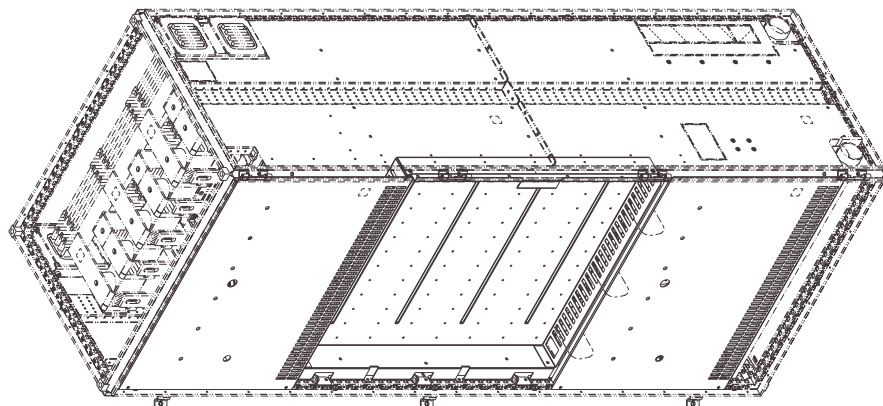
STAGE6: MODULE INSTALLATION

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

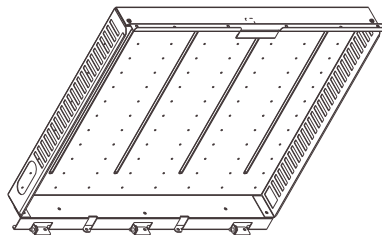
Based on	Prepared	21-Feb-19	Title	ASSEMBLY DRAWING	Scale	Form
Customer	Check.	07-Mar-24	3X881 IN RITTAL VX25 W800	ASSEMBLY DRAWING	1:25	A3
Appr.	Project name	07-Mar-24	ACS880-104LC	Res. red.	B-2 (DR)	Long. EN
Doc. No.	Project name			Doc. No.		Sheet - 9



STAGE7: SWING FRAME KIT W800 AND SHROUD KIT W800 INSTALLATION
See assembly drawings for details and required additional Rittal and standard parts.



SHROUD KIT W800
KIT L-8-024-VX
Ordering code: 3AXD5000361427
See drawing: 3AXD5000353125



SWING FRAME KIT W800
KIT L-8-X-053-VX
Ordering code: 3AXD50000361410
Drawing code: 3AXD50000344864

[illegible]

■ One R8i module in a 400 mm wide generic enclosure

Parts to be installed	Instruction code	Kit code	Kit ordering code
Cable entry	3AXD50000004817	A-468-8-441	3AXD50000004385
Cooling component kit	3AXD500000048217	L-468-8-441	3AXD500000044084
AC busbars	3AUA00000118667	A-468-8-100	3AUA00000119227
	3AXD500000043742	L-4-8-131	3AXD500000043691
Module mounting mechanics and cooling components	-	-	3AXD500000043886 / 3AXD500000045414
		L-468-8-440	3AXD500000041265
DC busbars (for configuration without DC switch)	3AXD500000540655	L-3-8-259	3AXD500000540150
	3AXD500000041311	L-468-8-230	3AXD500000041264
DC switch and busbars	3AXD500000342600	L-4-8-254-VX	3AXD500000361038
	3AXD500000205042	L-46-8-233	3AXD500000200368
Inverter module	-	-	-
Shrouding	-	-	-



KITS FOR ACS880-104LC 1XR8i IN GENERIC 2000x600x400 CABINET

Note! The generic kits can also be used in 300mm wide cabinets in some cases!
Only parts included in ABB kits are shown here!
See kit assembly drawings for details.

GENERIC FUSE BUSBARS W300
KIT L-3-8-258
Ordering code: 3AXD50000540150

R81 COMMON MODE BUSBAR KIT LC
KIT L-468-8-230
Ordering code: 3AXD50000041264

R81 MODULE MOUNTING MECH W400
KIT L-4-8-131
Ordering code: 3AXD50000043678

R81 AC OUTPUT BUSBAR KIT W400
KIT L-4-8-131
Ordering code: 3AXD50000043681

R81 FAN KIT
Ordering code: 3AXD50000043886
3AXD50000045414 (115V)

ACS880C HEAT EXCHANGER KIT
KIT L-468-8-440
Ordering code: 3AXD50000041265

LEAD-THROUGH KIT FOR BOTTOM PLATE
KIT A-468-8-441
Ordering code: 3AXD50000004385
1 KIT/module (default)

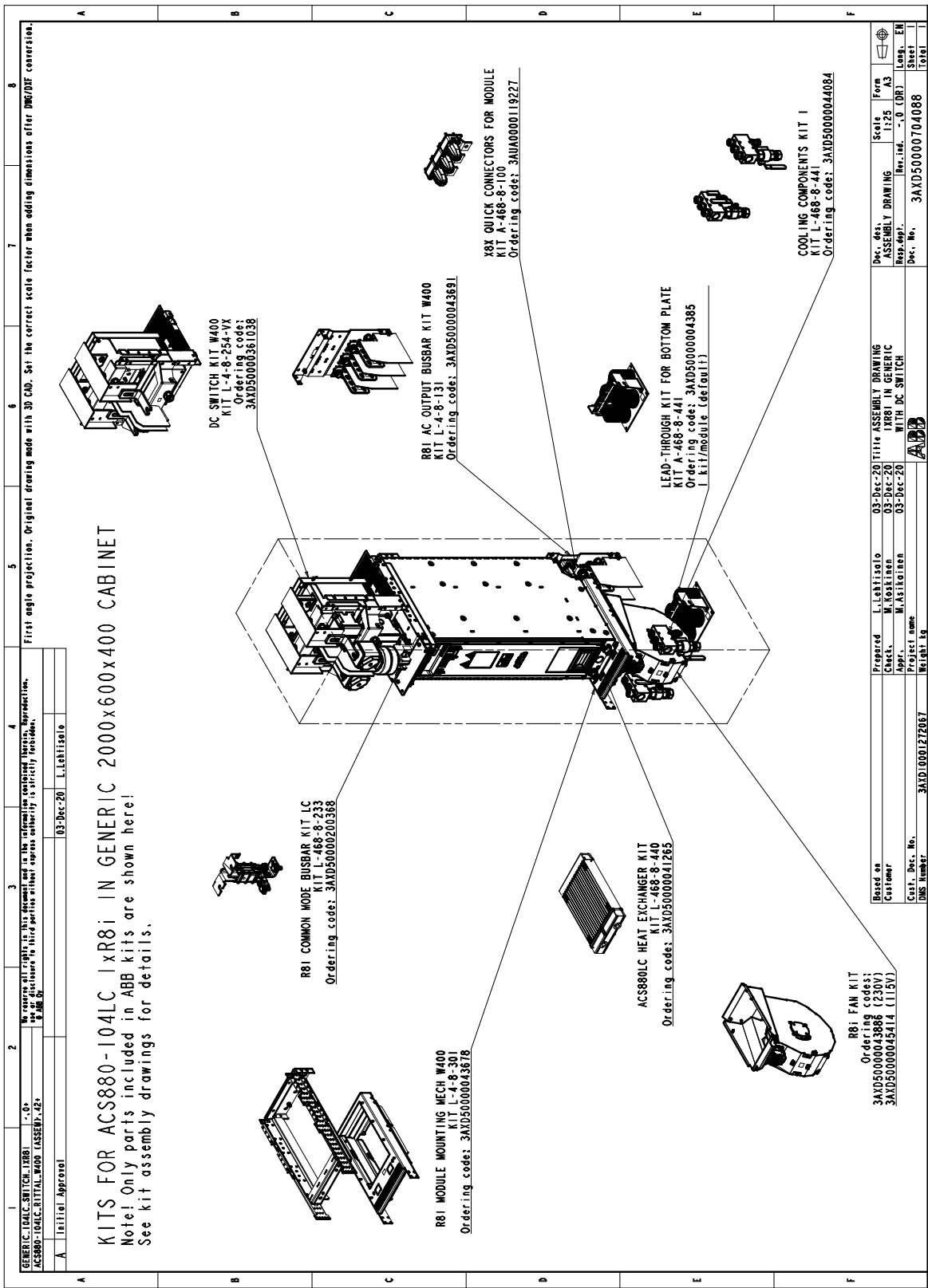
X8X QUICK CONNECTORS FOR MODULE
KIT A-468-8-100
Ordering code: 3AXD0000119227

COOLING COMPONENTS KIT I
KIT L-468-8-441
Ordering code: 3AXD50000044084

3AXD50000048321	16-Jan-17	M. Michelsson	16-Jan-17	M. Michelsson	Dec. des.	Scale	Form
ACS880-104LC RITVAL-W400 (ASSEMBLY)	19-Feb-21	L. Lehtisalo	19-Feb-21	M. Koskinen	ASSEMBLY DRAWING	1:25	A3
Initial Approval				M. Asikainen	1XR8i IN GENERIC		
Updated Fuse Busbars Kit				Project name			
				Customer			
				Based on			
				Cast, Dec. No.			
				Project name			
				Appr.			
				Check.			
				Prepared			

Dec. No. 3AXD50000048321
Sheet 1 of 1
Scale 1:25
Form A3
Title 1XR8i IN GENERIC
Customer
Project name
Based on
Cast, Dec. No.
Appr.
Check.
Prepared

With DC switch

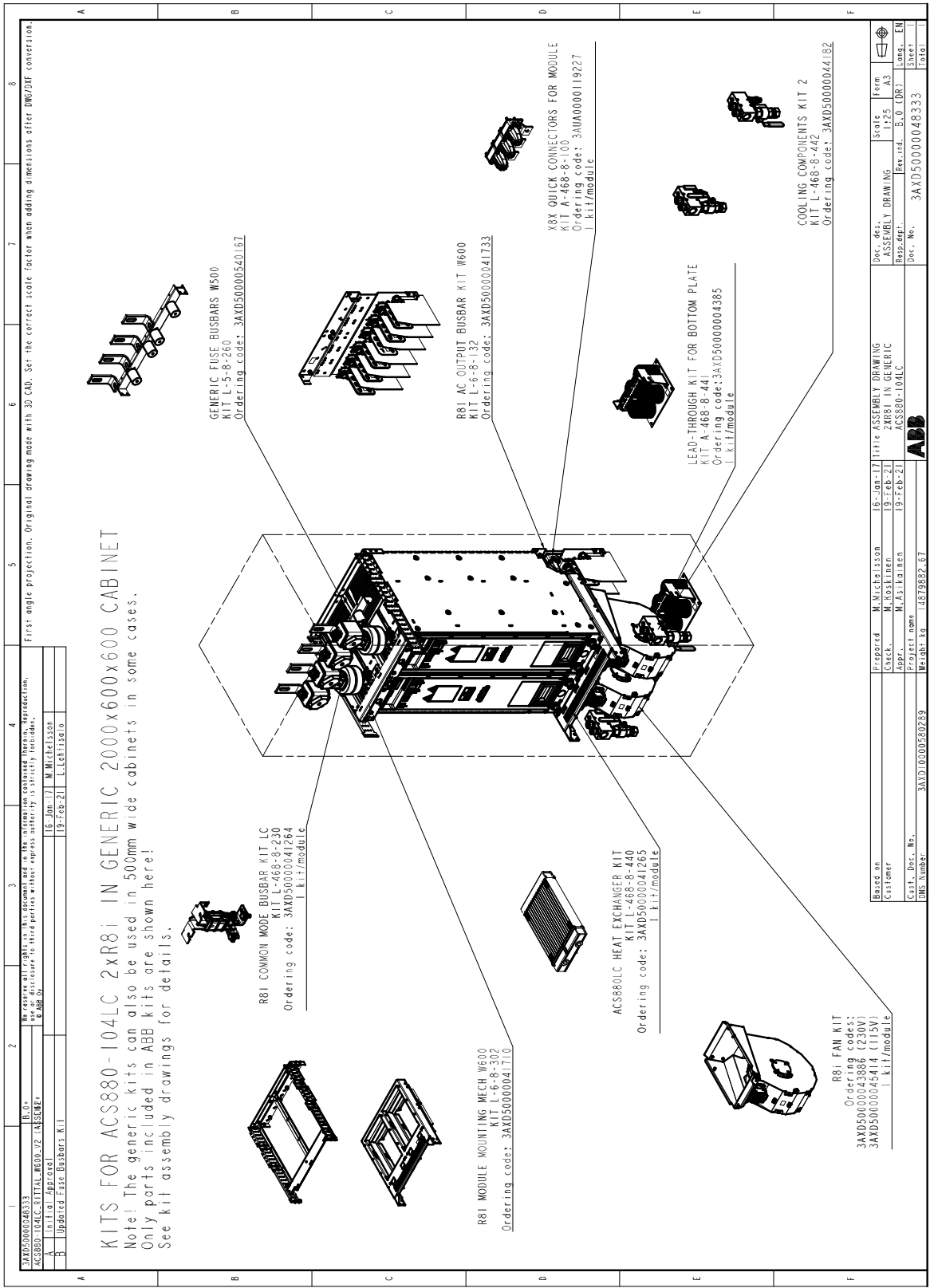


■ Two R8i modules in a 600 mm wide generic enclosure

Parts to be installed	Instruction code	Kit code	Kit ordering code
Cable entry	3AXD50000004817	A-468-8-441	3AXD50000004385
Cooling component kit	3AXD50000048258	L-468-8-442	3AXD50000044182
AC busbars	3AUA0000118667	A-468-8-100	3AUA0000119227
	3AXD50000041888	L-6-8-132	3AXD50000041733
Module mounting mechanics and cooling components	3AXD50000041836	L-6-8-302	3AXD50000041710
	-	-	3AXD50000043886 / 3AXD50000045414
		L-468-8-440	3AXD50000041265
DC busbars (for configuration without DC switch)	3AXD50000540723	L-5-8-260	3AXD50000540167
	3AXD50000041311	L-468-8-230	3AXD50000041264
DC switch and busbars	3AXD50000338740	L-6-8-255-VX	3AXD50000361243
	3AXD50000205042	L-46-8-233	3AXD50000200368
Inverter modules	-	-	-
Shrouding	-	-	-



Without DC switch



KITS FOR ACS880-104LC 2xR8i IN GENERIC 2000x600x600 CABINET
Note! Only parts included in ABB kits are shown here!
See kit assembly drawings for details.

A Initial Approval
 03-Dec-20 L.Lehilalo

B R81 COMMON MODE BUSBAR KIT LC
 KIT L-46-8-233
 Ordering code: 3AXD50000200368
 1 pcs/module

C R81 AC OUTPUT BUSBAR KIT W600
 KIT L-6-8-132
 Ordering code: 3AXD50000041733
 1 pcs/module

D R81 MODULE MOUNTING MECH W600
 KIT L-6-8-302
 Ordering code: 3AXD50000041710
 1 pcs/module

E X81 QUICK CONNECTORS FOR MODULE
 KIT A-468-8-100
 Ordering code: 3AUA0000119227
 1 pcs/module

F R81 FAN KIT
 Ordering code: 3AXD50000043886 (230V)
 3AXD50000045414 (115V)
 1 pcs/module

DC SWITCH KIT W600
 KIT L-6-8-255-VX
 Ordering code: 3AXD50000361243
 1 pcs/module

LEAD-THROUGH KIT FOR BOTTOM PLATE
 KIT A-468-8-441
 Ordering code: 3AXD5000004385
 1 pcs/module

ACS880LC HEAT EXCHANGER KIT
 KIT L-468-8-440
 Ordering code: 3AXD50000047265
 1 pcs/module

COOLING COMPONENTS KIT 2
 KIT L-468-8-442
 Ordering code: 3AXD50000044182
 1 pcs/module

■ Three R8i modules in a 800 mm wide generic enclosure

Parts to be installed	Instruction code	Kit code	Kit ordering code
Cable entry	3AXD50000004817	A-468-8-441	3AXD50000004385
Cooling component kit	3AXD500000048283	L-468-8-443	3AXD500000048136
AC busbars	3AUA0000118667	A-468-8-100	3AUA0000119227
	3AXD500000041909	L-8-8-133	3AXD500000041734
Module mounting mechanics and cooling components	3AXD500000041461	L-8-8-303	3AXD500000041248
	-	-	3AXD500000043886 / 3AXD500000045414
		L-468-8-440	3AXD500000041265
DC busbars (for configuration without DC switch)	3AXD50000540693	L-7-8-261	3AXD50000540174
	3AXD500000041311	L-468-8-230	3AXD500000041264
DC switch and busbars	3AXD50000336999	L-8-8-256-VX	3AXD50000361304
	3AXD50000205226	L-8-8-234	3AXD50000200337
Inverter modules	-	-	-
Shrouding	-	-	-



Without DC switch

3AXD50000048325

ACS880-104LC-R1TAL-W800 (ASSEMBLY)

Initial Approval

Updated Fuse Busbars Kit

18-Jan-17

M. Michelson

19-Feb-21

L. Lehtisalo

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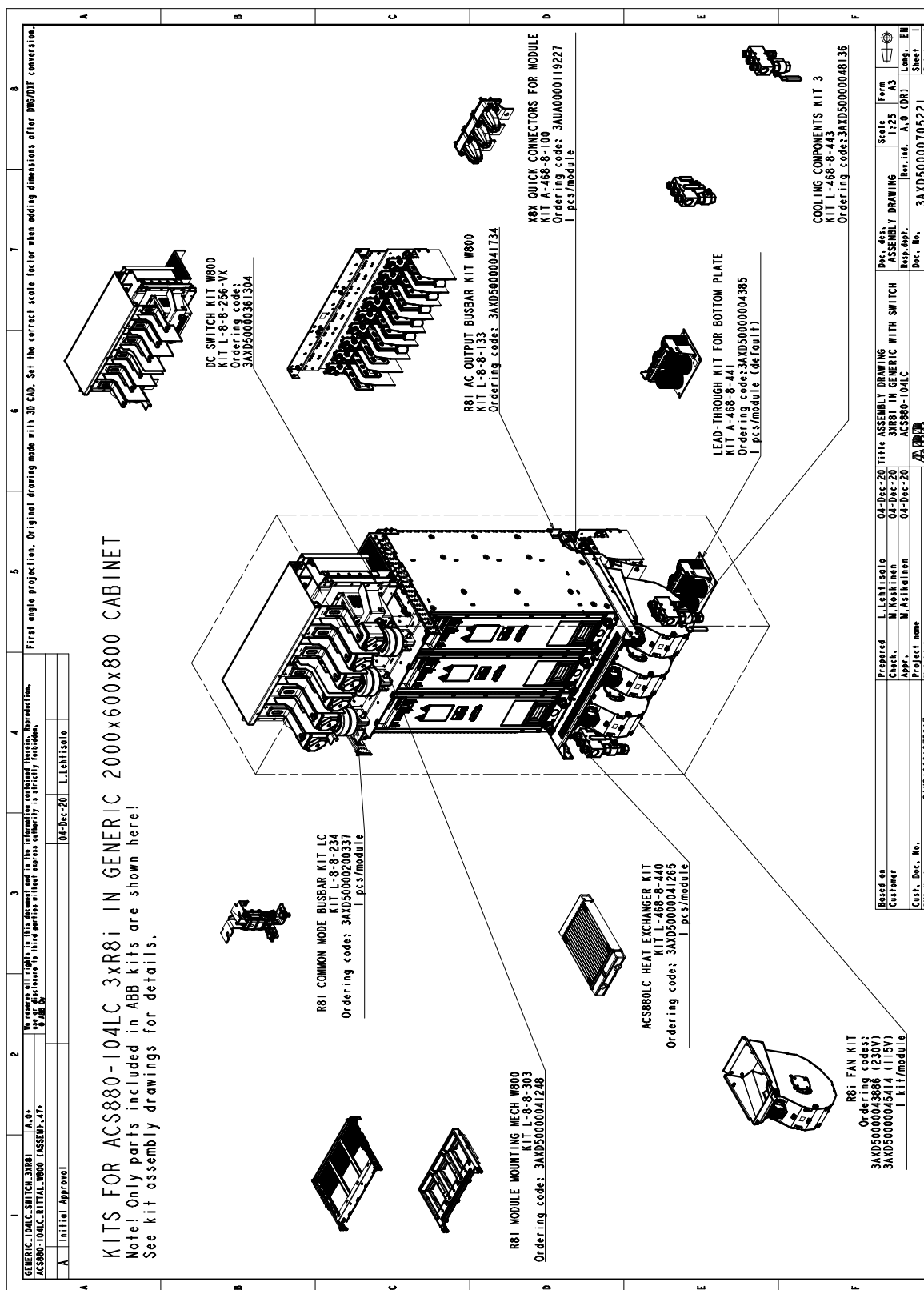
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With DC switch



5

Electrical installation

Contents of this chapter

This chapter describes the electrical installation of the modules.

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

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

For more information on electrical installation, see [ACS880 liquid-cooled multidrives cabinets and modules electrical planning \(3AXD50000048634 \[English\]\)](#).

Safety and liability



WARNING!

Only qualified electrical professionals are allowed to do the work described in this chapter. Read the **complete safety instructions** before you install, commission, use or service the drive. The complete safety instructions are given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#).

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

Electrical safety precautions

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

This procedure gives information on how to de-energize the drive and make it safe to do work on it. The procedure does not include all possible drive configurations.



WARNING!

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

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

Do these steps before you begin any installation or maintenance work.

1. Prepare for the work.
 - Make sure that you have a work order.
 - Do an on-site risk assessment or job hazard analysis.
 - Make sure that you have the correct tools available.
 - Make sure that the workers are qualified.
 - Select the correct personal protective equipment (PPE).
 - Stop the motor(s).
2. Clearly identify the work location and equipment.
3. Disconnect all possible voltage sources. Make sure that re-connection is not possible. Lock out and tag out.
 - If the drive is equipped with a DC/DC converter unit or a DC feeder unit: Open the disconnecting device of the energy storage connected to the unit. The disconnecting device is outside the drive cabinet. Then open the DC switch-disconnector [Q11] of the unit.
 - Open the main disconnecting device of the drive.
 - Open the charging switch if present.
 - Open the disconnecter of the supply transformer. (The main disconnecting device in the drive cabinet does not disconnect the voltage from the AC input power busbars of the drive cabinet.)
 - Open the auxiliary voltage switch-disconnector (if present), and all other possible disconnecting devices that isolate the drive from dangerous voltage sources.
 - In the liquid cooling unit (if present), open the switch-disconnector of the cooling pumps.
 - If you have a permanent magnet motor connected to the drive, disconnect the motor from the drive with a safety switch or by other means.
 - Open the main isolating device of the drive.
 - Disconnect all dangerous external voltages from the control circuits.
 - After you disconnect power from the drive, always wait 5 minutes to let the intermediate circuit capacitors discharge before you continue.
4. Protect other energized parts in the work location against contact and take special precautions when close to bare conductors.
5. Measure that the installation is de-energized. Use a quality voltage tester. If the measurement requires removal or disassembly of shrouding or other cabinet structures, obey the local laws and regulations applicable to live working (including – but not limited to – electric shock and arc protection).
 - Before and after you measure the installation, verify the operation of the voltage tester on a known voltage source.
 - Make sure that the voltage between the drive input power terminals (L1, L2, L3) and the grounding (PE) busbar is zero.

- Make sure that the voltage between the drive output terminals (T1/U, T2/V, T3/W) and the grounding (PE) busbar is zero.
Important! Repeat the measurement also with the DC voltage setting of the tester. Measure between each phase and ground. There is a risk of dangerous DC voltage charging due to leakage capacitances of the motor circuit. This voltage can remain charged for a long time after the drive power-off. The measurement discharges the voltage.
 - Make sure that the voltage between the drive DC busbars and the grounding (PE) busbar is zero.
 - If the drive is equipped with a DC/DC converter unit or a DC feeder unit: Make sure that the voltage between the energy storage terminals of the unit (ES+ and ES-) and the grounding (PE) busbar is zero.
6. Install temporary grounding as required by the local regulations.
 7. Ask for a permit to work from the person in control of the electrical installation work.

General notes

■ Printed circuit boards



WARNING!

Use a grounding wristband when you handle printed circuit boards. Do not touch the boards unnecessarily. The boards contain components sensitive to electrostatic discharge.

■ Handling fiber optic cables



WARNING!

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

- Handle the fiber optic cables with care.
- When you disconnect the fiber optic cables, always hold the connector, not the cable.
- Do not touch the ends of the fibers. They are sensitive to dirt.
- Do not bend the fiber optic cables too tightly. The minimum allowed bend radius is 35 mm (1.4 in).

Measuring the insulation resistance of the drive



WARNING!

Do not do voltage withstand or insulation resistance tests on the drive. The tests can cause damage to the drive. Every drive is tested for insulation between the main circuit and the chassis at the factory. Also, there are voltage-limiting circuits inside the drive which cut down the testing voltage automatically.

Measuring the insulation resistance of the motor and motor cable

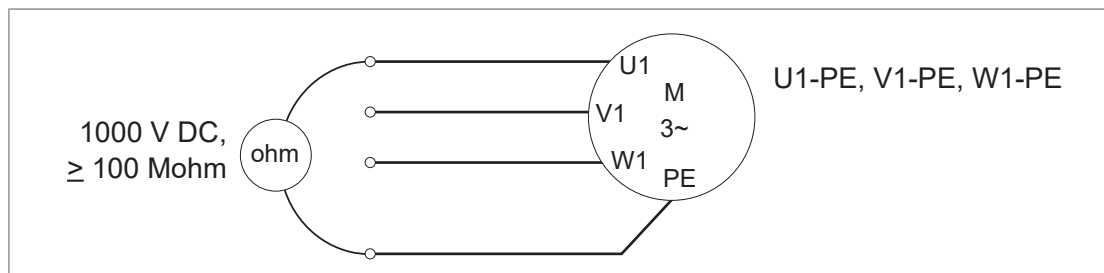


WARNING!

Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

1. Do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. Make sure that the motor cable is disconnected from the drive output terminals.
3. Measure the insulation resistance between each phase conductor and the protective earth conductor. Use a measuring voltage of 1000 V DC. The insulation resistance of an ABB motor must be more than 100 Mohm (reference value at 25 °C [77 °F]). For the insulation resistance of other motors, refer to the manufacturer's instructions.

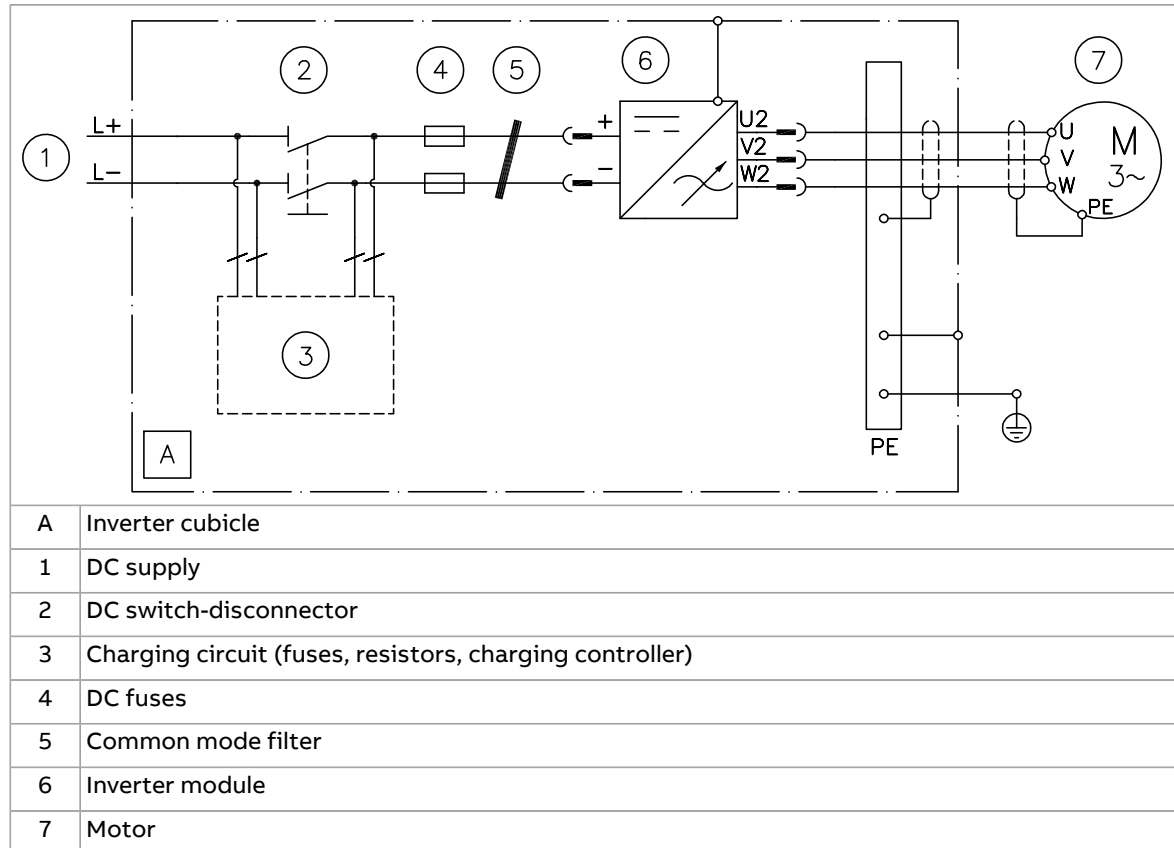
Note: Moisture inside the motor reduces the insulation resistance. If you think that there is moisture in the motor, dry the motor and do the measurement again.



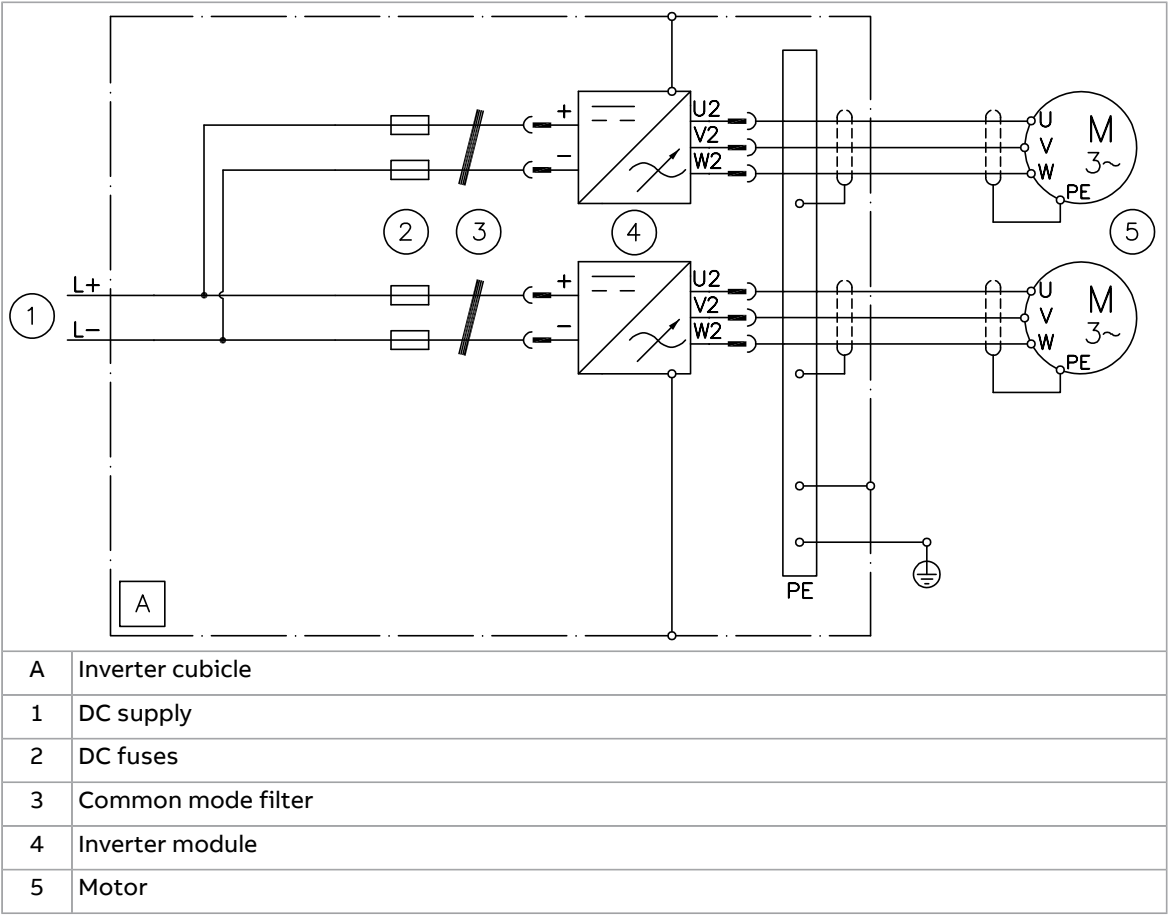
Power connections

Simplified diagrams of the power connections are presented below.

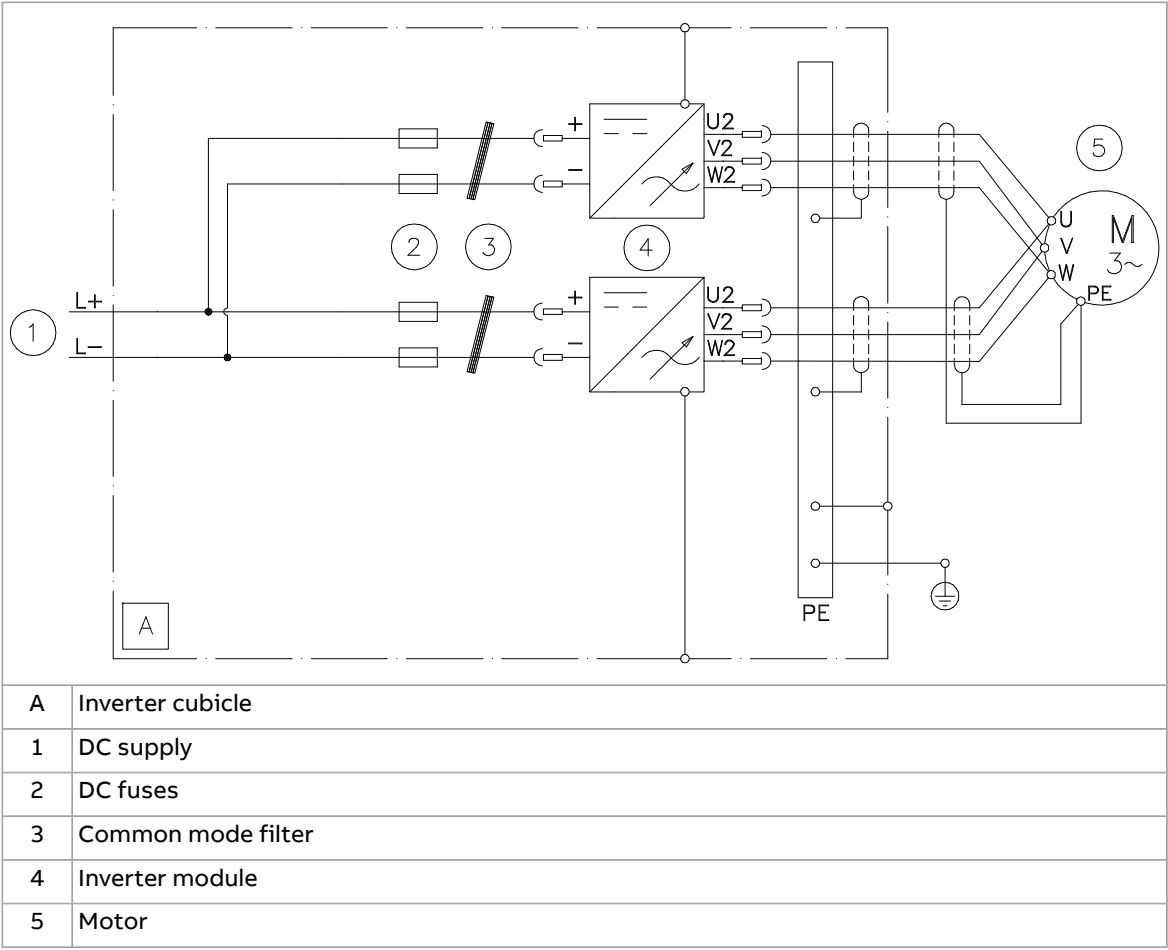
■ R7i inverter module



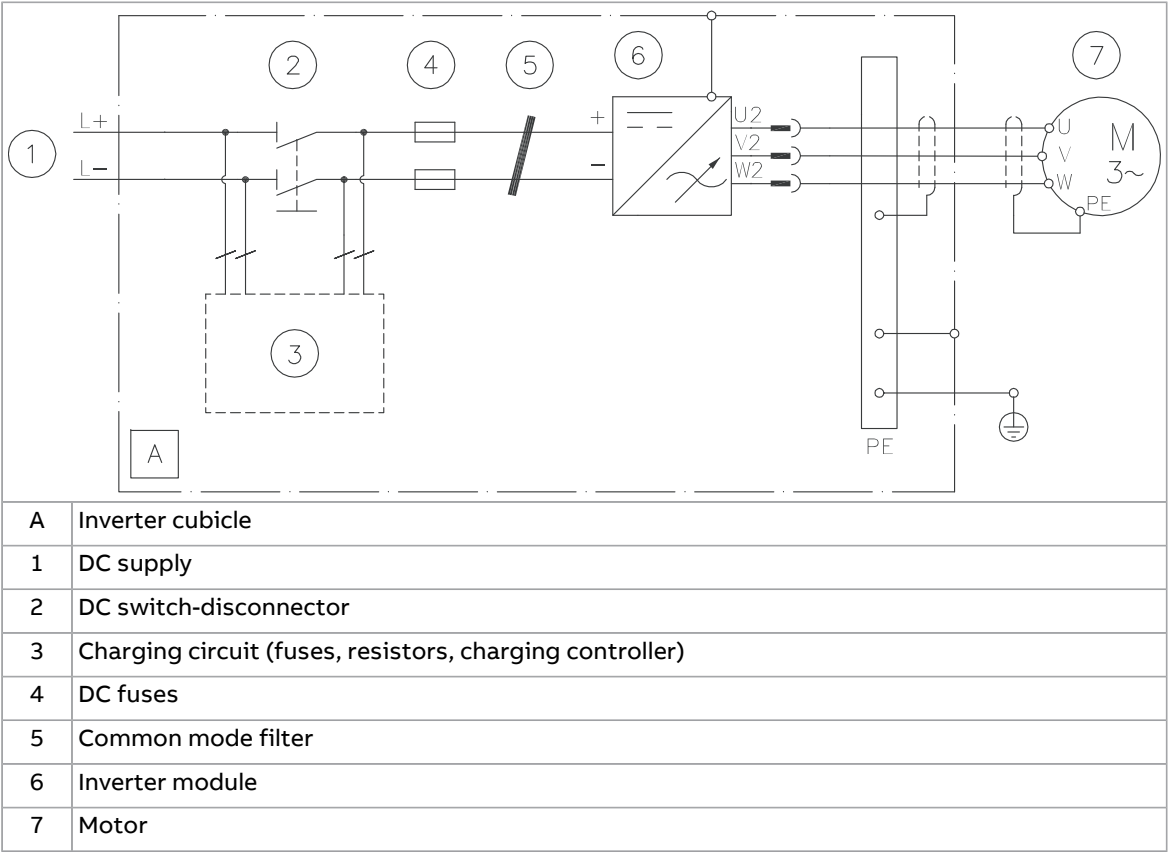
■ Two R7i inverter modules controlling different motors



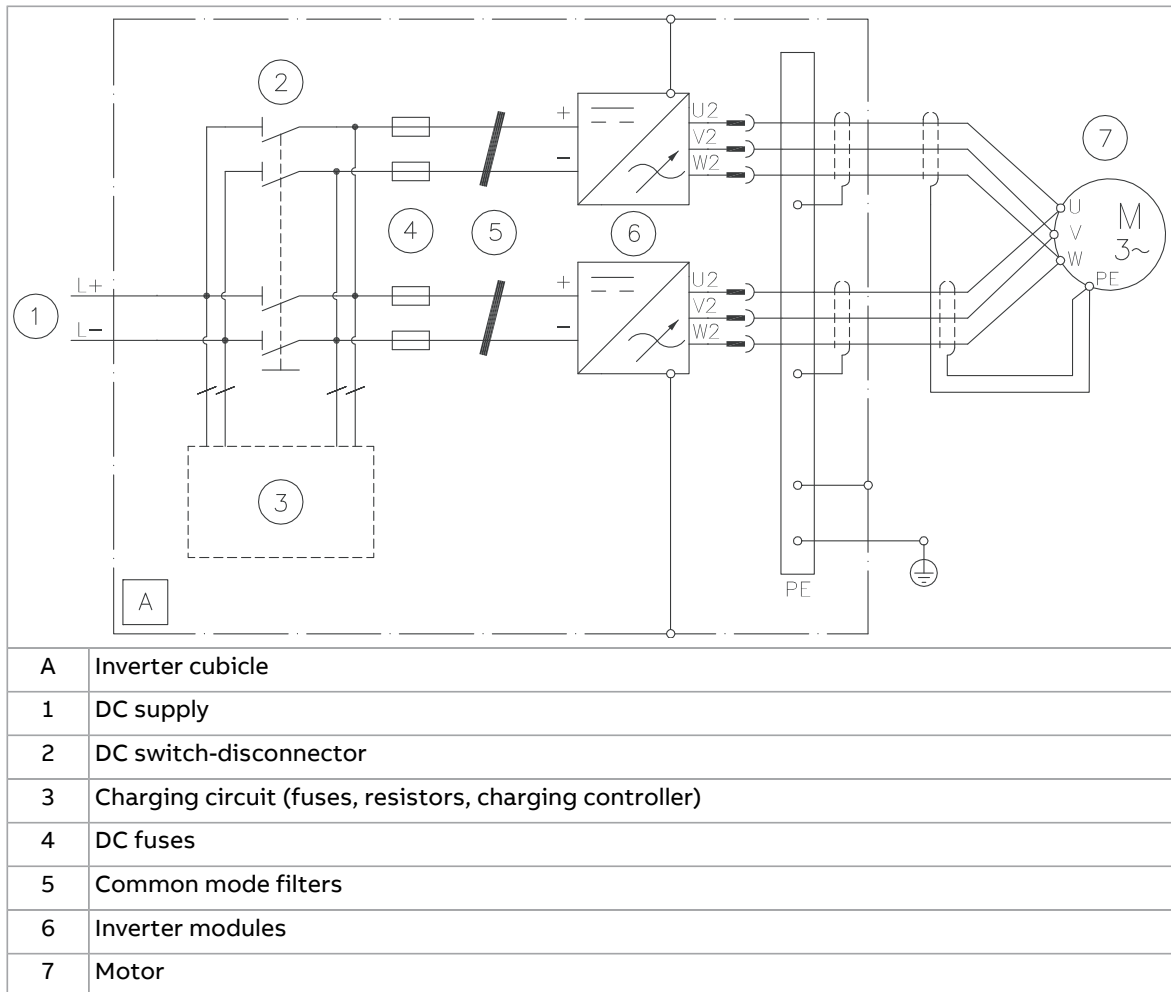
■ 2×R7i inverter unit



■ R8i inverter module



■ 2×R8i inverter unit



■ Connection procedure

**WARNING!**

Read and follow the instructions given in [ACS880 multidrives cabinets and modules safety instructions \(3AUA0000102301 \[English\]\)](#). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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.

Note:

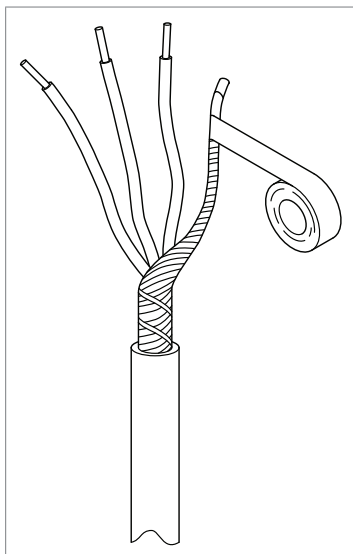
- If the cabinet frame is painted (such as with Rittal enclosures), it is important to make sure that a good galvanic connection to ground (PE busbar) is achieved. You can, for example, remove the paint from the connection points and use star washers.
- The connection to ground merely through the mounting 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 [ACS880 liquid-cooled multidrives cabinets and modules electrical planning instructions \(3AXD50000048634 \[English\]\)](#).

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.



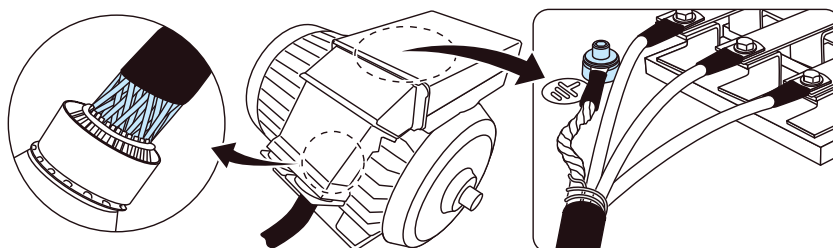
4. Twist the shield strands of the output cable together to form a separate conductor and wrap tape around it as shown.



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. In a two-module cubicle, the set of busbars nearer the back wall are the output of the upper module.
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° at the cable entry of the motor terminal box.



Connecting the control cables

For technical data and default I/O connections of the control unit, see [Control unit \(BCU\)](#) (page 153).

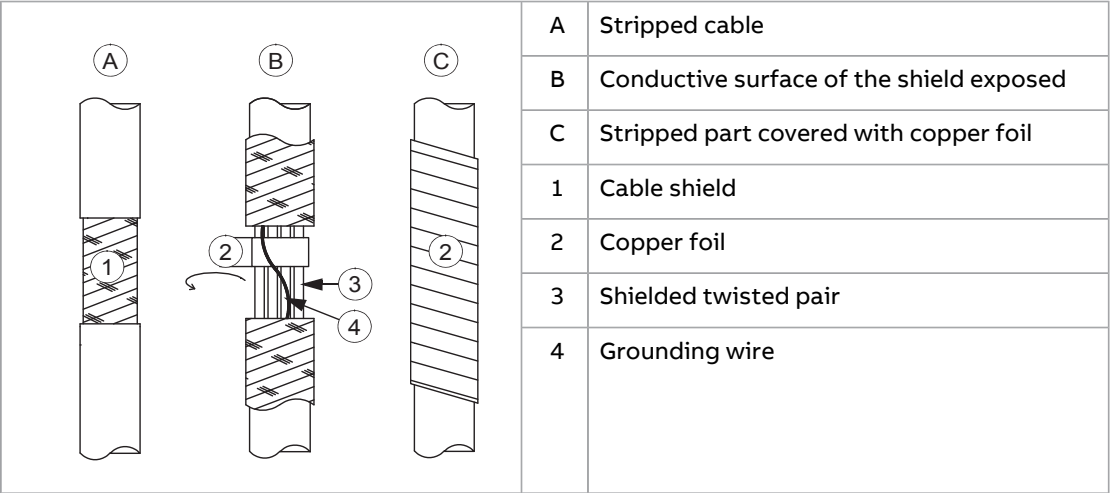


WARNING!
Obey the safety instructions given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

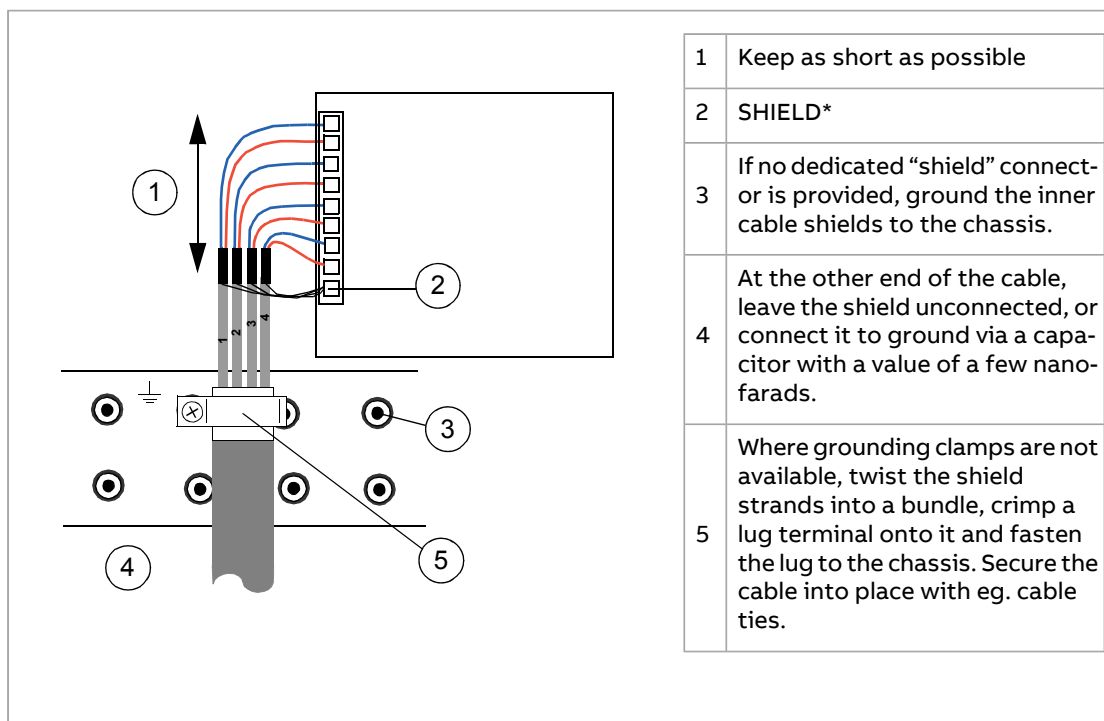
1. Remove shrouding to access the cable entries and trunking inside the cubicle.
2. Run the control cables into the cubicle. If possible, arrange for a 360° grounding of the cable shield at the cable entry.

If the outer surface of the shield is non-conductive, turn the shield inside out as shown below and wrap copper foil around the cable to keep the shielding continuous. Do not cut the grounding wire (if present).



3. Run the cables to the control unit (or other connection point). Use the existing trunking wherever possible.
4. Cut the cables to suitable length.

5. Strip the cable ends and conductors. When connecting to the drive I/O, also remove the shield along with the outer sheathing, and use electrical tape or shrink tubing to contain the strands. Elsewhere, twist the outer shield strands into a bundle, crimp a lug onto it and connect it to the nearest chassis grounding point.



6. Connect the conductors to appropriate terminals.
7. Refit any shrouds removed earlier.

Installing optional modules

■ Installation of I/O extension and fieldbus adapter modules on BCU



WARNING!

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

Pay attention to the free space required by the cabling or terminals coming to the option modules.

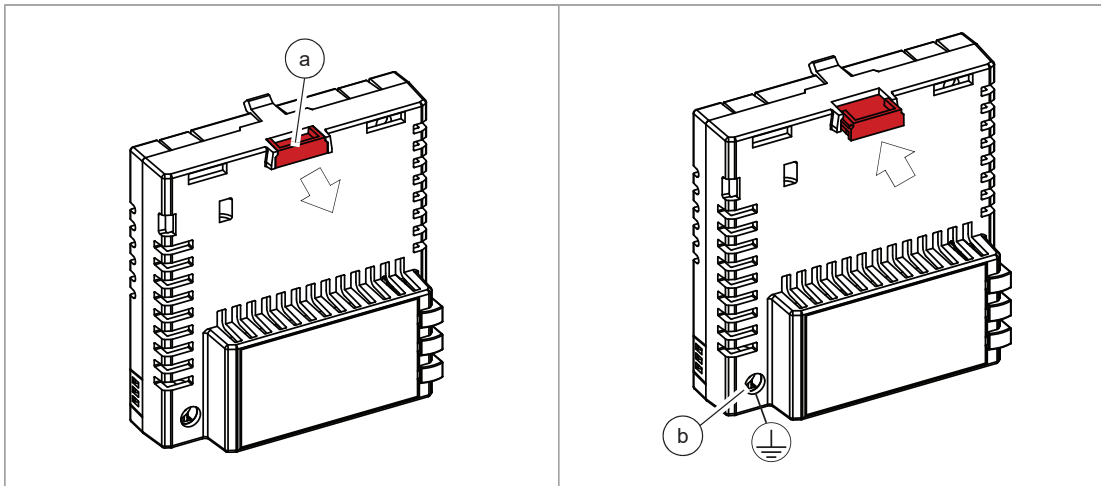
1. Do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. Pull out the lock (a) with a screw driver.
Note: The location of the lock depends on the module type.
3. Install the module to a free option module slot on the control unit.
4. Push in the lock (a).
5. Tighten the grounding screw (b) to a torque of 0.8 N·m (7 lbf·in).

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



WARNING!

Do not use excessive force, or leave the screw too loose. Over-tightening can cause damage to the screw or module. A loose screw can cause an operation failure.



6. Connect the wiring to the module. Obey the instructions given in the documentation of the module.

If you need to remove the option module after it has been installed into the drive, use a suitable tool (e.g. small pliers) to carefully pull out the lock.

■ Installation of an FSO safety functions module to BCU

Installation of an FSO safety functions module onto BCU



WARNING!

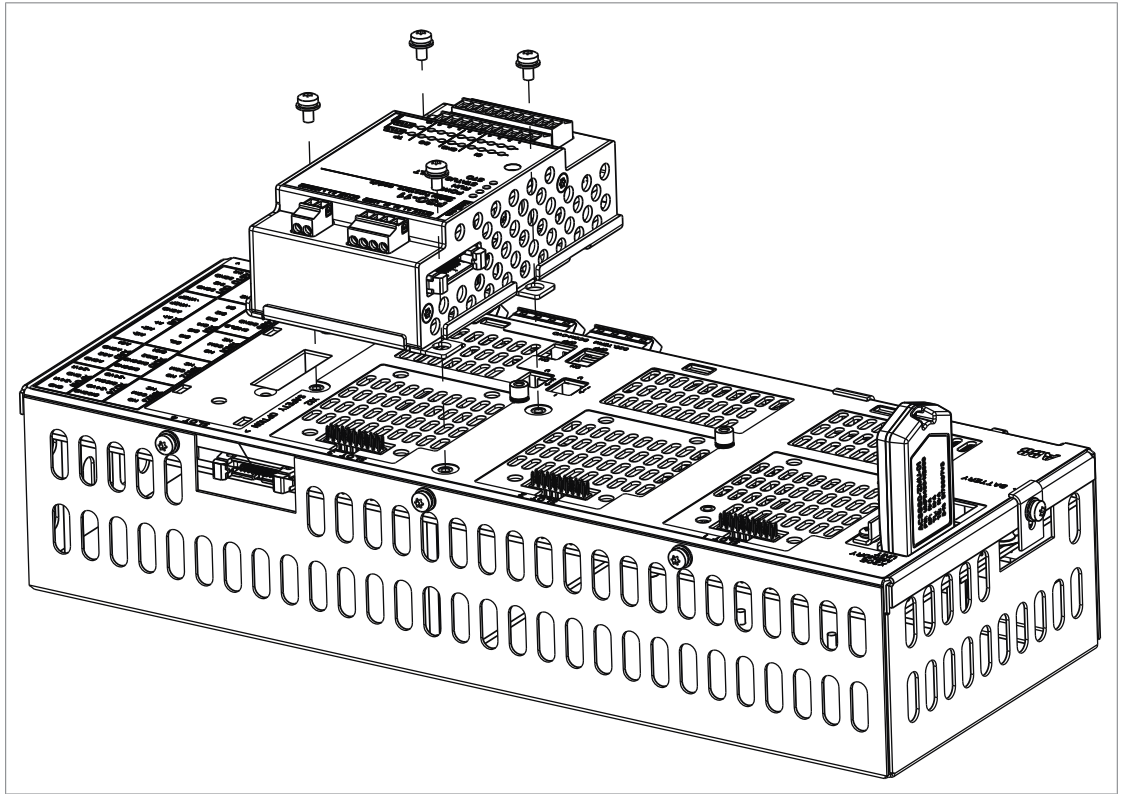
Obey the safety instructions given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

This procedure describes the installation of an FSO safety functions module onto the BCU control unit. As an alternative, the FSO module can be installed adjacent to the control unit, which is the standard method for factory-installed FSO modules. For instructions, refer to the applicable FSO module user's manual.

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. The FSO module comes with alternative bottom plates for installation onto different control units. For installation onto a BCU control unit, the mounting points should be located at the long edges of the module as shown in the illustration below. If necessary, replace the bottom plate of the FSO module.

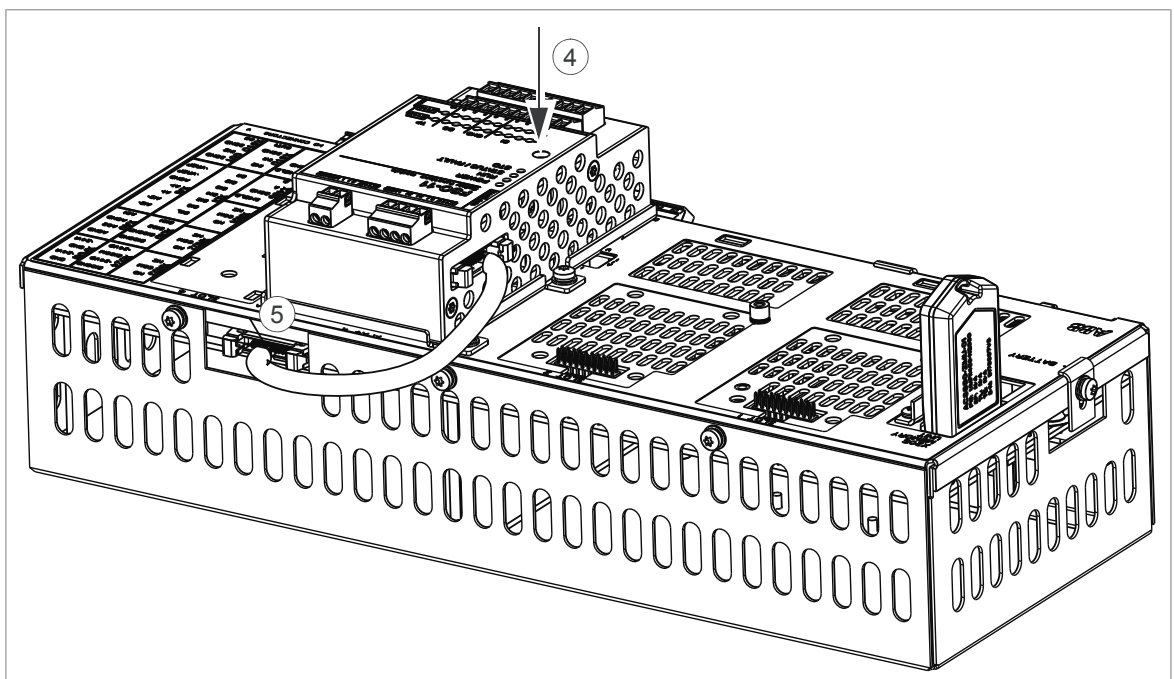
3. Attach the FSO module onto slot 3 of the BCU control unit [A41] with four screws.



4. Torque the FSO module electronics grounding screw to 0.8 N·m (7.1 lbf·in).

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

5. Connect the FSO module data cable between FSO connector X110 and BCU connector X12.
6. To complete the installation, refer to the instructions in the applicable FSO module user's manual.

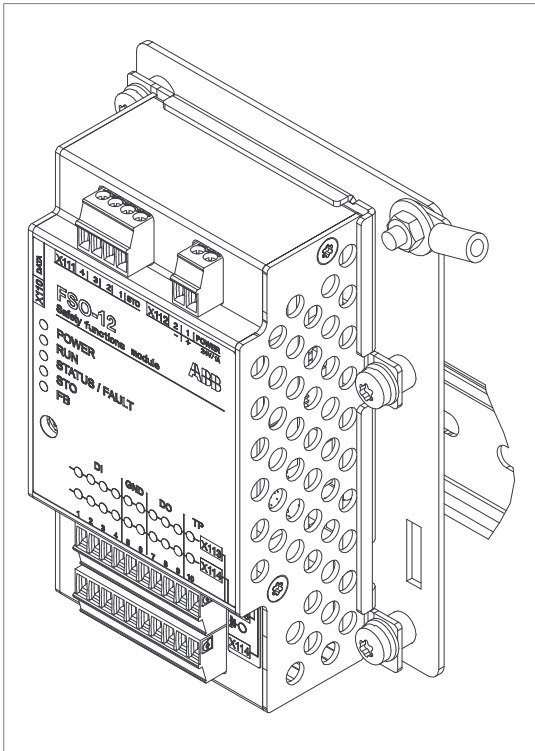


Installation of an FSO safety functions module adjacent to the control unit

To reserve the slots of the control unit for other modules, you can install the FSO module separately from the control unit using mounting kit 3AXD50000025495. The kit contains:

- parts for mounting the FSO module onto a DIN rail nearby the control unit
- longer cables for connecting the FSO module to the control unit
- installation instructions (assembly drawing).

The illustration below shows the FSO module installed onto a DIN rail.



Connecting a PC

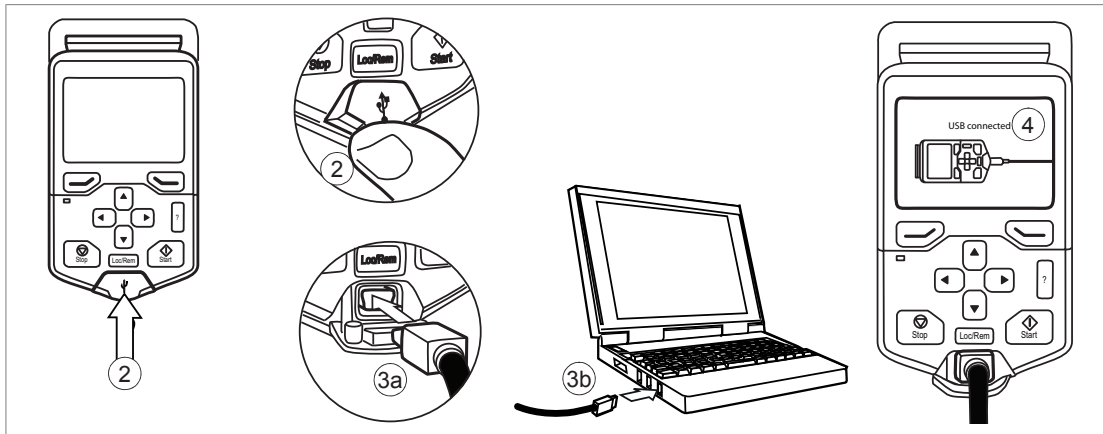


WARNING!

Do not connect the PC directly to the control panel connector of the control unit. It can cause damage.

A PC (with, for example, the Drive Composer PC tool) can be connected as follows:

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



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

One control panel (or PC) can be used to control several drives (or inverter units, supply units etc.) by constructing a panel bus. This is done by daisy-chaining the panel connections of the drives. Some drives have the necessary (twin) panel connectors in the control panel holder; those that do not require the installation of an FDPI-02 module (available separately). For further information, see the hardware description and [FDPI-02 diagnostics and panel interface user's manual \(3AUA0000113618 \[English\]\)](#).

The maximum allowed length of the cable chain is 100 m (328 ft).

1. Connect the panel to one drive using an Ethernet (for example Cat 5e) cable.
 - Use Menu - Settings - Edit texts - Drive to give a descriptive name to the drive
 - Use parameter 49.01* to assign the drive with a unique node ID number
 - Set other parameters in group 49* if necessary
 - Use parameter 49.06* to validate any changes.

*The parameter group is 149 with supply (line-side), brake or DC/DC converter units.

Repeat the above for each drive.

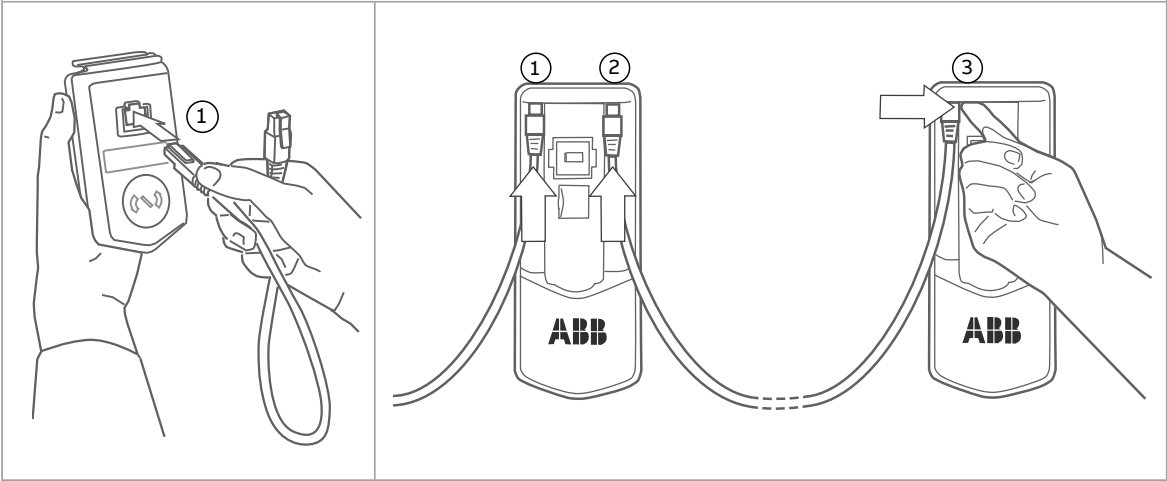
2. With the panel connected to one unit, link the units using Ethernet cables.
3. Switch on the bus termination on the drive that is farthest from the control panel in the chain.
 - With drives that have the panel mounted on the front cover, move the terminating switch into the outer position.
 - With the FDPI-02 module: move termination switch S1 on the FDPI-02 module into the TERMINATED position.

Make sure that bus termination is off on all other drives.

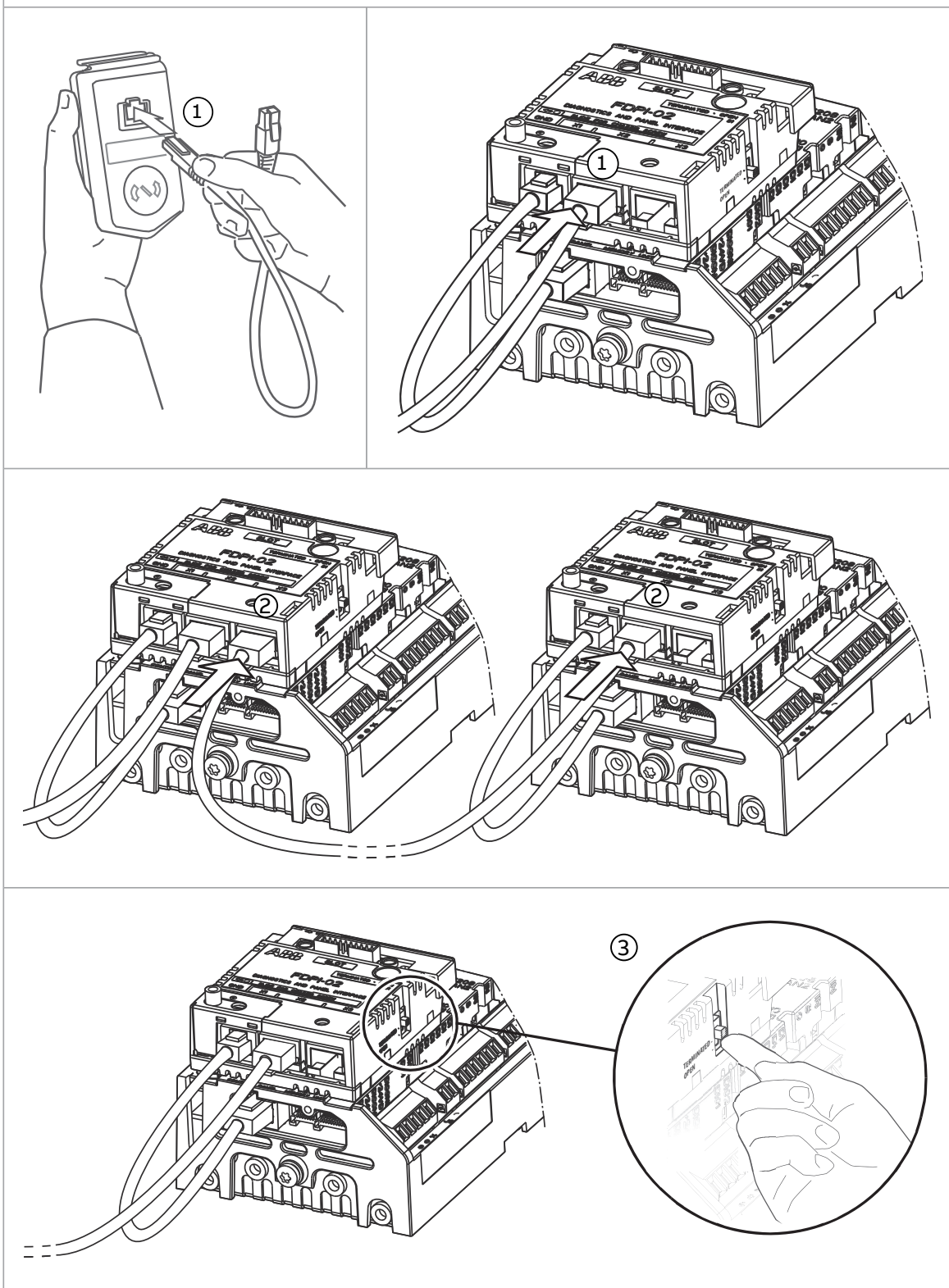
4. On the control panel, switch on the panel bus functionality (Options - Select drive - Panel bus). The drive to be controlled can now be selected from the list under Options - Select drive.

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

With twin connectors in the control panel holder:



With FDPI-02 modules:



6

Control unit (BCU)

Contents of this chapter

This chapter

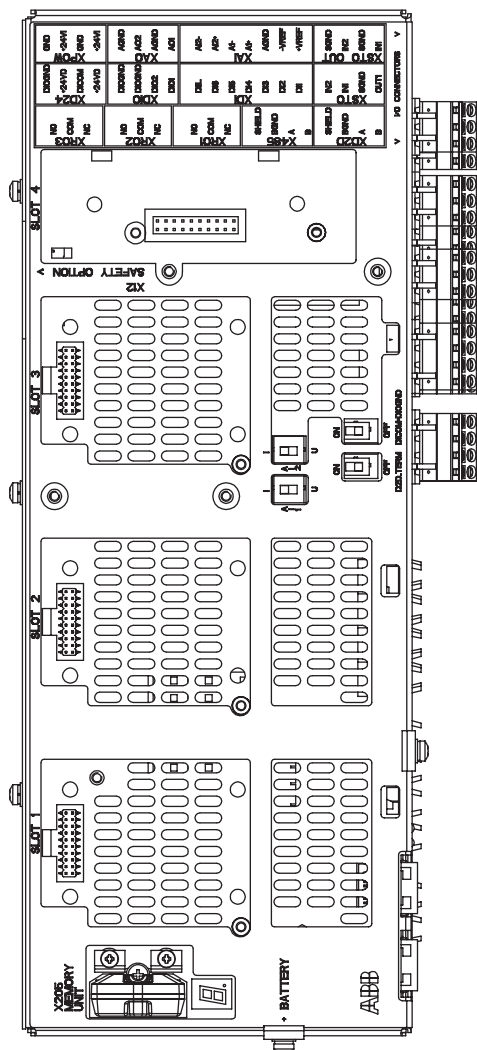
- describes the connections of the control unit(s) used in the drive,
- contains the specifications of the inputs and outputs of the control unit(s).

General

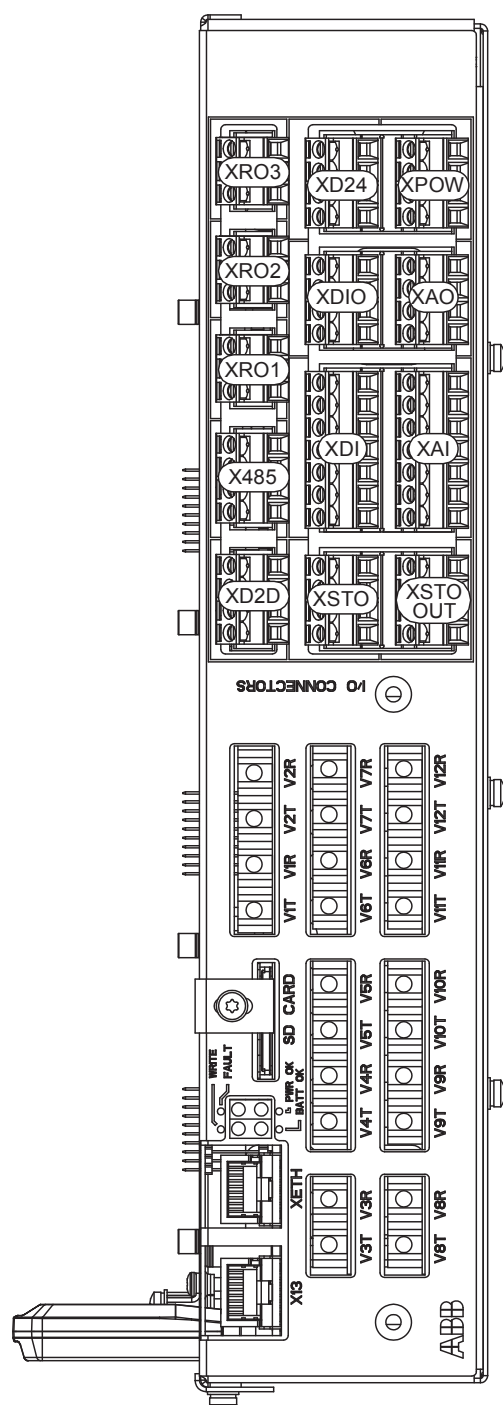
The BCU-x2 is used with frame sizes R7i and R8i in single and parallel configurations. The BCU-x2 consists of a BCON-12 control board (and a BIOC-01 I/O connector board and power supply board) built in a metal housing. The control unit is connected to the inverter module(s) by fiber optic cables.

In this manual, the name “BCU-x2” represents the control unit types BCU-02, BCU-12 and BCU-22. These have a different number of power module connections (2, 7 and 12 respectively) but are otherwise similar.

BCU layout



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



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

Default I/O diagram of the inverter control unit (BCU)

The table below describes the use of the connections in the inverter unit.

The wire size accepted by all screw terminals (for both stranded and solid wire) is 0.5 ... 2.5 mm² (22...12 AWG). The tightening torque is 0.45 N·m (4 lbf·in).

Terminal			Description	
XD2D			Drive-to-drive link	
1	1	B	Drive-to-drive link. Refer to section The XD2D connector (page 160) .	
2	2	A		
3	3	BGND		
4	4	Shield		
	D2D.TERM		Drive-to-drive link termination switch. Must be set to ON when the inverter unit is the first or last unit in the drive-to-drive (D2D) link. On intermediate units, set termination to OFF.	
X485			RS485 connection	
5	5	B	Not in use by default	
6	6	A		
7	7	BGND		
8	8	Shield		
XRO1, XRO2, XRO3			Relay outputs	
11	11	NC	Norm. closed	XRO1: Ready (Energized = Ready) 250 V AC / 30 V DC, 2 A
12	12	COM	Common	
13	13	NO	Norm. open	
21	21	NC	Norm. closed	XRO2: Running (Energized = Running) 250 V AC / 30 V DC, 2 A
22	22	COM	Common	
23	23	NO	Norm. open	
31	31	NC	Norm. closed	XRO3: Fault (-1) (Energized = No fault) 250 V AC / 30 V DC, 2 A
32	32	COM	Common	
33	33	NO	Norm. open	
XSTO, XSTO OUT			Safe torque off	
1	1	OUT	XSTO: Factory connection. Both circuits must be closed for the drive to start (IN1 and IN2 must be connected to OUT). Refer to chapter The Safe torque off function .	
2	2	SGND		
3	3	IN1		
4	4	IN2		
5	5	IN1	XSTO OUT: Safe torque off output to inverter modules.	
6	6	SGND		
7	7	IN2		
8	8	SGND		
XDI			Digital inputs	

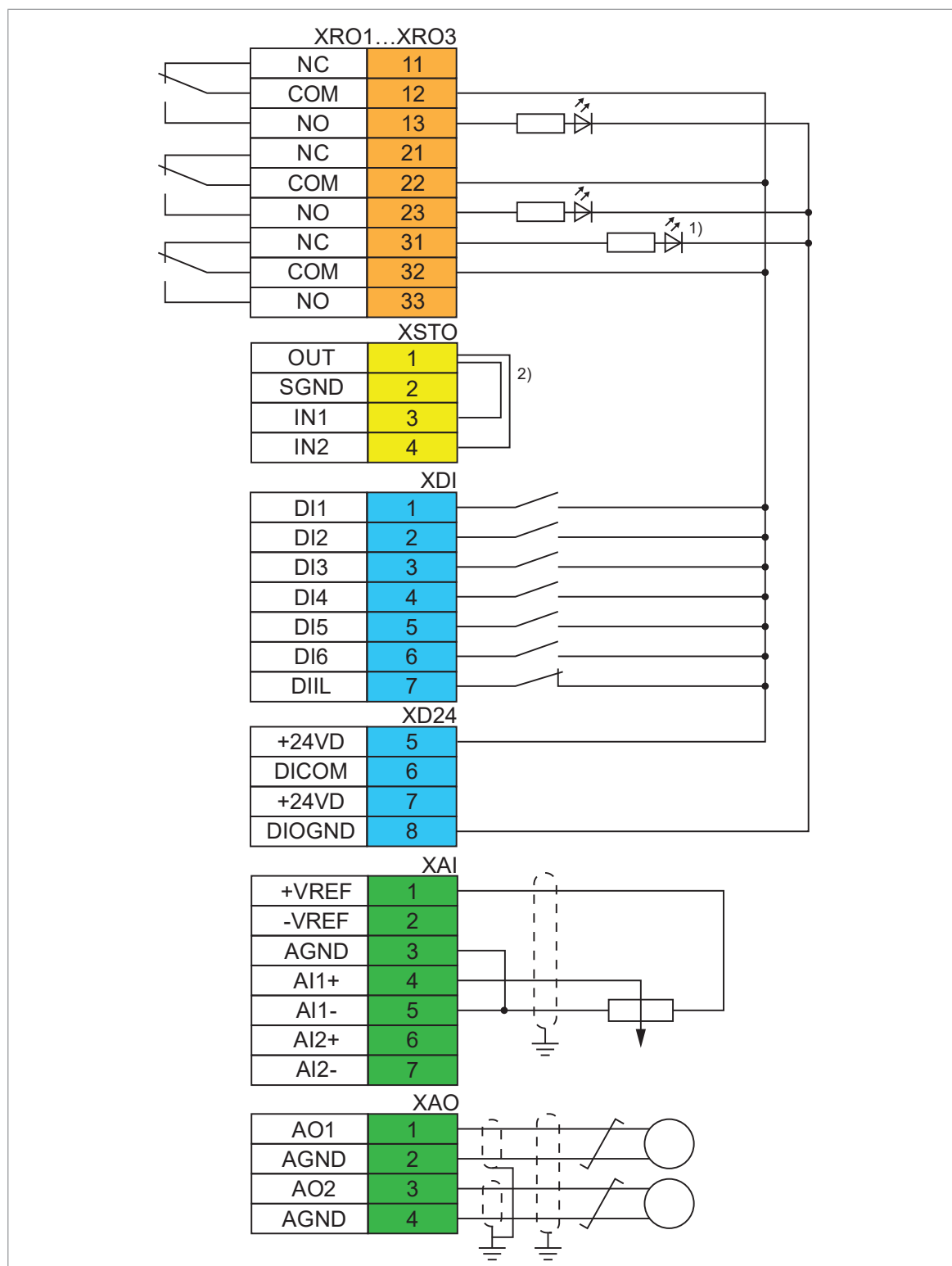
Terminal			Description
1 2 3 4 5 6 7	1	DI1	Stop (0) / Start (1)
	2	DI2	Forward (0) / Reverse (1)
	3	DI3	Reset
	4	DI4	Acceleration & deceleration select ¹⁾
	5	DI5	Constant speed 1 select (1 = on) ²⁾
	6	DI6	Not in use by default.
	7	DIIL	Run enable ³⁾
XDIO			Digital input/outputs
1 2 3 4	1	DIO1	Output: Ready
	2	DIO2	Output: Running
	3	DIOGND	Digital input/output ground
	4	DIOGND	Digital input/output ground
XD24			Auxiliary voltage output
5 6 7 8	5	+24VD	+24 V DC 200 mA ⁴⁾
	6	DICOM	Digital input ground
	7	+24VD	+24 V DC 200 mA ⁴⁾
	8	DIOGND	Digital input/output ground
	DICOM=DIOGND		Ground selection switch. Determines whether DICOM is separated from DIOGND (ie, common reference for digital inputs floats). ON: DICOM connected to DIOGND. OFF: DICOM and DIOGND separate.
XAI			Analog inputs, reference voltage output
1 2 3 4 5 6 7	1	+VREF	10 V DC, R_L 1 ... 10 kohm
	2	-VREF	-10 V DC, R_L 1 ... 10 kohm
	3	AGND	Ground
	4	AI1+	Speed reference. 0(2)...10 V, R_{in} > 200 kohm ⁵⁾
	5	AI1-	
	6	AI2+	Not in use by default. 0(4)...20 mA, R_{in} = 100 ohm ⁶⁾
	7	AI2-	
	AI1		AI1 current/voltage selection switch
	AI2		AI2 current/voltage selection switch
XAO			Analog outputs
1 2 3 4	1	AO1	Motor speed rpm 0 ... 20 mA, R_L < 500 ohm
	2	AGND	
	3	AO2	Motor current 0 ... 20 mA, R_L < 500 ohm
	4	AGND	
XPOW			External power input
1 2 3 4	1	+24VI	24 V DC, 2.05 A Two supplies can be connected for redundancy.
	2	GND	
	3	+24VI	
	4	GND	
X12			Safety functions module connection
X13			Control panel connection

158 Control unit (BCU)

Terminal	Description
X205	Memory unit connection

- 1) 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.
 - 2) Constant speed 1 is defined by parameter 22.26.
 - 3) The DIIL input is configured to stop the unit when the input signal is removed. This input does not have a SIL or PL classification.
 - 4) Total load capacity of these outputs is 4.8 W (200 mA at 24 V) minus the power taken by DIO1 and DIO2.
 - 5) Current [0(4)...20 mA, $R_{in} = 100 \text{ ohm}$] or voltage [0(2)...10 V, $R_{in} > 200 \text{ kohm}$] input selected by switch AI1. Change of setting requires reboot of control unit.
 - 6) Current [0(4)...20 mA, $R_{in} = 100 \text{ ohm}$] or voltage [0(2)...10 V, $R_{in} > 200 \text{ kohm}$] input selected by switch AI2. Change of setting requires reboot of control unit.
-

The diagram below shows the default I/O connections on the inverter control unit (A41).



1) Fault

2) If necessary, you can connect a safety device (for example, a safety relay) to the XSTO terminal. Refer to chapter [The Safe torque off function](#).

Additional information on the connections

■ Power supply for the control unit (XPOW)

The control unit is powered from a 24 V DC, 2 A supply through terminal block XPOW.

A second supply can be connected to the same terminal block for redundancy. Use a second supply, if:

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

■ DIIL input

The DIIL input is used for the connection of safety circuits. The input is parametrized to stop the unit when the input signal is lost.

Note: This input is **not** SIL or PL classified.

■ The XD2D connector

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

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

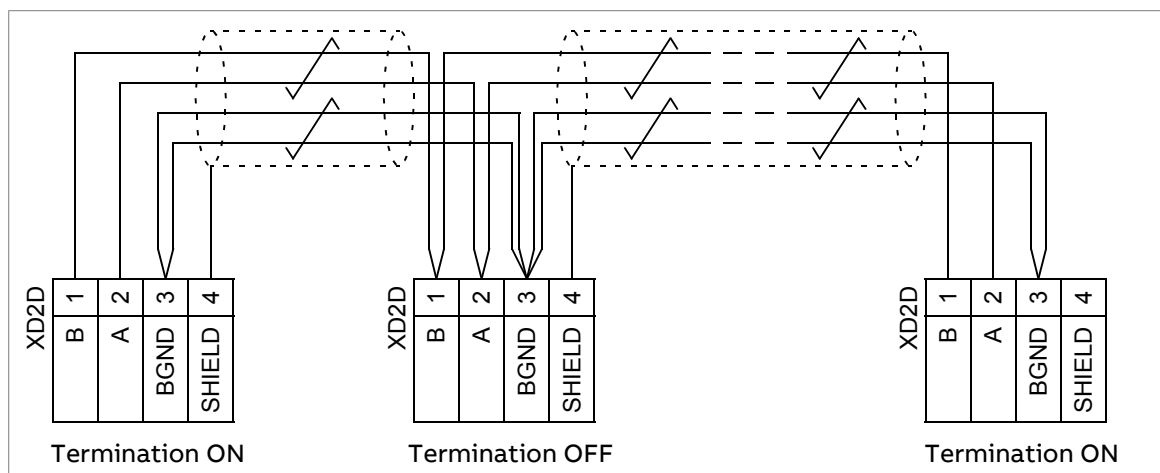
See the firmware manual of the drive for the related parameter settings.

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

Use a shielded twisted-pair cable for data, and another pair or a wire for signal ground (nominal impedance 100...165 ohm, for example Belden 9842). For the best immunity, ABB recommends high quality cable. Keep the cable as short as possible. Avoid unnecessary loops and parallel runs near power cables such as motor cables.

The diagram that follows shows the wiring of the drive-to-drive link. The diagram is applicable to these control units:

- BCU-02/12/22



■ Safe torque off (XSTO, XSTO OUT)

See chapter [The Safe torque off function \(page 289\)](#).

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

■ FSO safety functions module connection (X12)

Refer to the applicable FSO module user's manual. Note that the FSO safety functions module is not used in supply, DC/DC converter or brake units.

Note: Inverter modules and control units that have a sticker with the text “No FSO support” are not compatible with the FSO safety functions module.

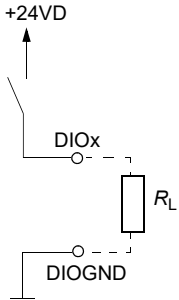
■ SDHC memory card slot

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

Connector data

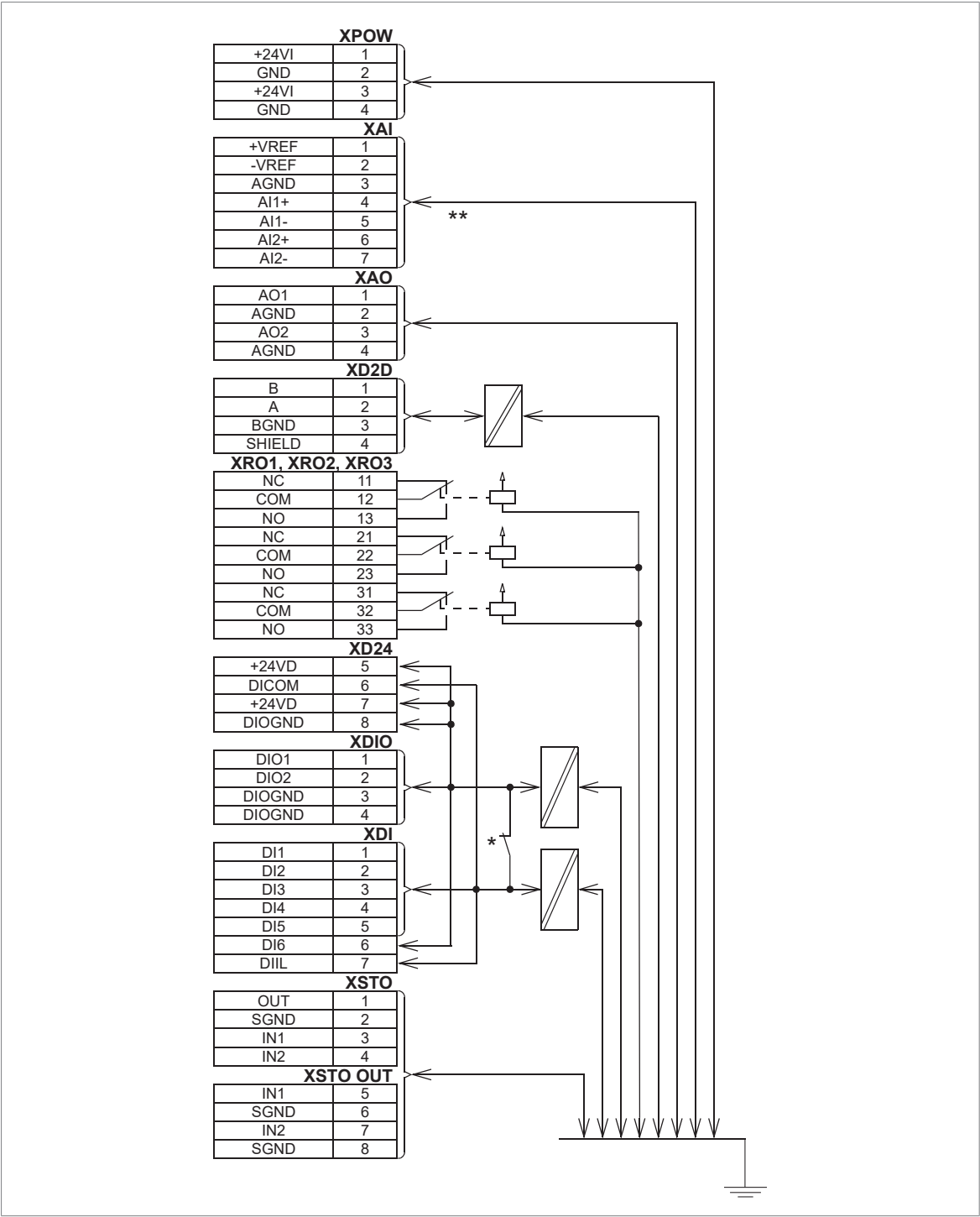
The wire size accepted by all screw terminals (for both stranded and solid wire) is 0.5 ... 2.5 mm² (22...12 AWG). Connector pitch is 5 mm.

The maximum tightening torque for screw terminals is 0.45 N·m (4 lbf·in)

Power supply (XPOW)	24 V (±10%) DC, 2 A External power input. Two supplies can be connected to the BCU control unit for redundancy.
Relay outputs RO1...RO3 (XRO1...XRO3)	250 V AC / 30 V DC, 2 A Protected by varistors
+24 V output (XD24:5 and XD24:7)	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)	24 V logic levels: "0" < 5 V, "1" > 15 V R_{in} : 2.0 kohm Input type: NPN/PNP (DI1...DI5), PNP (DI6) Hardware filtering: 0.04 ms, digital filtering up to 8 ms I_{max} : 15 mA (DI1...DI5), 5 mA (DI6)
Start interlock input DIIL (XDI:7)	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). In some control programs, DIO2 can be configured as a 24 V level square wave frequency output. Refer to the firmware manual, parameter group 11.	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)	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	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 Resolution: 11 bit + sign bit Inaccuracy: 1% of full scale range
Analog outputs AO1 and AO2 (XAO)	0...20 mA, R_{load} < 500 ohm Frequency range: 0...500 Hz Resolution: 11 bit + sign bit Inaccuracy: 2% of full scale range

XD2D connector	Physical layer: RS-485 Transmission rate: 8 Mbit/s Cable type: Shielded twisted-pair cable with a twisted pair for data and a wire or another pair for signal ground (nominal impedance 100 ... 165 ohm, for example Belden 9842) Maximum length of link: 50 m (164 ft) Termination by switch
RS-485 connection (X485)	Physical layer: RS-485 Cable type: Shielded twisted-pair cable with a twisted pair for data and a wire or another pair for signal ground (nominal impedance 100 ... 165 ohm, for example Belden 9842) Maximum length of link: 50 m (164 ft)
Safe torque off connection (XSTO)	Input voltage range: -3...30 V DC Logic levels: "0" < 5 V, "1" > 17 V. Note: For the unit to start, both connections must be "1". This applies to all control units (including drive, inverter, supply, brake, DC/DC converter etc. control units), but SIL/PL classified Safe torque off functionality is only achieved through the XSTO connector of the drive/inverter control unit. Current consumption: 66 mA (continuous) per STO channel per inverter module Current consumption: 66 mA (continuous) per STO channel per drive/inverter module EMC (immunity) according to IEC 61326-3-1 and IEC 61800-5-2 See also chapter The Safe torque off function (page 289) .
Safe torque off output (XSTO OUT)	To STO connector of inverter module.
Control panel connection (X13)	Connector: RJ-45 Cable length < 100 m (328 ft)
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
Battery	Real-time clock battery type: BR2032
The terminals of the control unit fulfill the Protective Extra Low Voltage (PELV) requirements. The PELV requirements of a relay output are not fulfilled if a voltage higher than 48 V is connected to the relay output.	

■ BCU ground isolation diagram



***Ground selector (DICOM=DIOGND) settings**

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

******The maximum common mode voltage between each AI input and AGND is +30 V

7

Installation checklist

Contents of this chapter

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

Checklist

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



WARNING!

Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.



WARNING!

Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.

Make sure that ...	☒
The ambient operating conditions meet the drive ambient conditions specification and enclosure rating (IP code).	☐
The supply voltage matches the nominal input voltage of the drive. See the type designation label.	☐
The insulation resistance of the input power cable, motor cable and motor is measured according to local regulations and the manuals of the drive.	☐
The drive cabinet is attached to the floor, and if necessary due to vibration etc, also by its top to the wall or roof.	☐
The drive module is fastened properly to the enclosure.	☐

Make sure that ...	☒
<u>If the drive is connected to a network other than a symmetrically grounded TN-S system:</u> You have done all the required modifications (for example, you may need to disconnect the EMC filter or ground-to-phase varistor) See the electrical installation instructions in the supply unit manual.	☐
The enclosures of the equipment in the cabinet have proper galvanic connection to the cabinet protective earth (ground) busbar; The connection surfaces at the fastening points are bare (unpainted) and the connections are tight, or separate grounding conductors have been installed.	☐
The main circuit connections inside the drive cabinet correspond to the circuit diagrams.	☐
The control unit has been connected. See the circuit diagrams.	☐
Appropriate AC fuses and main disconnecting device are installed.	☐
There is an adequately sized protective earth (ground) conductor(s) between the drive and the switchboard, the conductor is connected to correct terminal, and the terminal is tightened to the correct torque. Grounding has also been measured according to the regulations.	☐
<u>If the drive is equipped with a DC/DC converter unit:</u> There is an adequately sized protective earth (ground) conductor between the energy storage and the DC/DC converter, the conductor is connected to the correct terminal, and the terminal is tightened to the correct torque. Proper grounding has also been measured according to the regulations.	☐
<u>If the drive is equipped with a DC/DC converter unit:</u> The energy storage cable is connected to the correct terminals of the DC/DC converter and energy storage, and the terminals are tightened to the correct torque.	☐
<u>If the drive is equipped with a DC/DC converter unit:</u> The energy storage is equipped with fuses for protecting the energy storage cable in a cable short-circuit situation.	☐
<u>If the drive is equipped with a DC/DC converter unit:</u> The energy storage is equipped with a disconnecting device.	☐
The input power cable is connected to the correct terminals, the phase order is correct, and the terminals are tightened to the correct torque.	☐
There is an adequately sized protective earth (ground) conductor between the motor and the drive. The conductor is connected to the correct terminal, and the terminal is tightened to the correct torque. Grounding has also been measured according to the regulations.	☐
The motor cable is connected to the correct terminals, the phase order is correct, and the terminals are tightened to the correct torque.	☐
The motor cable is routed away from other cables.	☐
No power factor compensation capacitors are connected to the motor cable.	☐
<u>If an external brake resistor is connected to the drive:</u> There is an adequately sized protective earth (ground) conductor between the brake resistor and the drive, and the conductor is connected to the correct terminal, and the terminals are tightened to the correct torque. Grounding has also been measured according to the regulations.	☐
<u>If an external brake resistor is connected to the drive:</u> The brake resistor cable is connected to the correct terminals, and the terminals are tightened to the correct torque.	☐
<u>If an external brake resistor is connected to the drive:</u> The brake resistor cable is routed away from other cables.	☐
The control cables are connected to the correct terminals, and the terminals are tightened to the correct torque.	☐
<u>If a drive bypass connection will be used:</u> The direct-on-line contactor of the motor and the drive output contactor are either mechanically and/or electrically interlocked, that is, they cannot be closed at the same time. A thermal overload device must be used for protection when bypassing the drive. Refer to local codes and regulations.	☐
There are no tools, foreign objects or dust from drilling inside the drive.	☐
The terminal box cover of the motor is in place. Cabinet shrouds are in place and doors are closed.	☐
The motor and the driven equipment are ready for power-up.	☐

Make sure that ...	☒
The coolant connections between cubicles (if any) and to the cooling circuit are tight.	☐
<u>If the drive is equipped with a cooling unit:</u> Make sure that the mechanical and electrical installation of the cooling unit is completed. Refer to the cooling unit documentation.	☐

8

Start-up

Contents of this chapter

This chapter contains the start-up procedure of the inverter.

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

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 functions, see chapter [The Safe torque off function \(page 289\)](#).



Start-up procedure

Tasks	☒
Safety	
 WARNING! Obey the safety instructions during the start-up procedure. See ACS880 liquid-cooled multidrives cabinets and modules safety instructions (3AXD50000048633 [English]) . If you ignore the safety instructions, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation or maintenance work.	☐
Checks/Settings with no voltage connected	
Examine the mechanical and electrical installation. Refer to chapter Installation checklist .	☐
The insulation resistance of the motor and motor cable has been measured.	☐
The supply unit of the drive system has been set up according to the instructions in its manuals.	☐
The supply unit is off, and the drive system has been isolated from the supply network.	☐

170 Start-up

Tasks	☒
Make sure that circuit breakers and protection switches in the cooling fan supply circuit are closed. Refer to the circuit diagrams.	☐
Check the following data for each inverter unit and note down any deviations from delivery documents.	
• Motor, pulse encoder and cooling fan rating plate data correspond to the values in the motor list.	☐
• Motor temperature method: Pt100, PTC, KTY84, other?	☐
• Motor fan of separately ventilated motors. Check the current, the overcurrent protection setting and the functioning of the fan output control circuit.	☐
• Direction of motor rotation.	☐
• Maximum and minimum speeds, fixed speeds.	☐
• Speed scaling factor, gear ratio, roll diameter, etc.	☐
• Acceleration and deceleration times.	☐
• Inertia compensation.	☐
• Operating modes, stop mode, emergency stop mode, etc.	☐
Starting and checking the cooling system	
Fill up and bleed the internal cooling circuit. Start the cooling unit up. Refer to section Filling up and bleeding the internal cooling circuit (page 384) .	☐
Check the cooling system for leaks. Make sure that cooling circuit joints at the shipping split joining cubicles are tight and that all drain valves are closed.	☐
Make sure that the coolant can flow freely in all cubicles. Make sure that the drive system cools down.	☐
Connecting voltage to the auxiliary circuits	
Disconnect any auxiliary voltage (230 or 115 V AC) cables that lead from the terminal blocks to the outside of the equipment and have not yet been checked. Also disconnect any uncompleted wiring.	☐
Disconnect the communication link between the drive system and any overriding system.	☐
Make sure the main contactor/breaker of the supply unit cannot be switched on accidentally by remote control.	☐
Be ready to trip the main breaker of the supply transformer in case something unusual occurs.	☐
Make sure that all cabinet doors are closed.	☐
Close the main breaker of the supply transformer. This will energize the input terminals of the drive system.	☐
Close the auxiliary voltage switch (if present).	☐
Checks with auxiliary voltage connected	
Make sure that the cooling fans rotate freely in the right direction, and the air flows upwards.	☐
Note: Depending on the wiring of the drive system, it can be necessary to have the supply unit powered before the fans are started. If so, check the cooling fans after powering the supply unit.	



Tasks	☒
Set the parameters for each inverter unit. Refer to the firmware manual and/or start-up guide of the control program. You can also use the start-up assistant if available in the particular control program. In addition to the parameter settings required by the application, make the following settings:	
• Set parameter 31.23 Wiring or earth fault to value No action.	☐
• Set parameter 95.04 Control board supply according to how the inverter control unit is powered.	☐
• Edit parameter 95.09 Fuse switch control if necessary (ie. with R8i modules without a DC switch-disconnector and charging controller).	☐
• With parallel-connected inverter modules, select the inverter unit type with parameter 95.31 Parallel type configuration. You can filter the list using parameter 95.30.	☐
• Reboot the control unit. You can cycle the power or use parameter 96.08 Control board boot.	☐
Powering up the inverter unit	
Close the cabinet doors.	☐
Make sure that it is safe to connect voltage to the drive system. Make sure that: - nobody is working on the unit or circuits that have been wired from outside into the cabinets - the cover of the motor terminal box is installed.	☐
Close the main disconnecting device of the drive system.  WARNING! When connecting voltage to the supply unit, the DC busbars and all inverters connected to the DC bus will become energized.  WARNING! <u>Inverter units with a DC switch-disconnector:</u> Some types of inverter module can be energized through a charging circuit even when the DC switch-disconnector is open or the DC fuses are removed. <u>Inverter units without a DC switch-disconnector:</u> If the inverter unit only has DC fuses without a switch fuse, all the inverter units with the DC fuses in place will be energized when the main breaker/contactors closes. To prevent this, remove the fuses from the inverter units which are to remain unenergized before connecting voltage. When the main breaker/contactors of the supply unit is closed (DC busbars are live), never remove or insert the DC fuses of an inverter unit.	☐
<u>Inverter units equipped with DC switch-disconnector (or fuse disconnectors):</u> Close the DC switch-disconnector (or fuse disconnectors) of the inverter units that are to be powered up. Note: Inverter units that have a manually-operated charging circuit (charging switch) should be connected to a live DC bus later during the procedure.	☐
 WARNING! Before closing the main contactor/breaker, make sure that sufficient inverter power is connected to the intermediate (DC) bus. As a rule of thumb, - the sum power of the inverters connected must be at least 30% of the sum power of all inverters - the sum power of the inverters connected must be at least 30% of the rated power of the brake unit ($P_{br,max}$) (if present). If the above-mentioned rules are not followed, the DC fuses of the connected inverter units can blow, or the brake chopper (if present) can be damaged.	☐
Close the main contactor (or breaker) of the supply unit. The DC bus is now powered, along with all inverters and other units that are directly connected to it.	☐



Tasks	☒
Inverter units equipped with a charging switch: Close the charging switch. Wait for the charging to finish (indicated by a "charging OK" light if the wiring presented in this manual has been implemented). Close the DC switch-disconnector. Open the charging switch.	☐
Checks with voltage connected to the inverter unit	
Complete the pending ID (motor identification) run. Refer to the firmware manual and/or start-up guide of the control program.  WARNING! Make sure the motor can be started and rotated as required by the selected ID run mode (parameter 99.13 ID run requested).	☐
Check the rotation direction of the motor.	☐
Check the operation of the pulse encoder (if present). Refer to the user manual of the pulse encoder interface module.	☐
Check the functioning of the emergency stop function from each operating location.	☐
Validate the Safe torque off function. Refer to chapter The Safe torque off function , section Start-up including validation test (page 298) .  WARNING! The safety functions cannot be considered safe until they are validated.	☐
Validate any other safety functions (Emergency stop, Prevention of unexpected start-up, etc.) according to the applicable procedures. Refer to the applicable safety function user's manual.  WARNING! The safety functions cannot be considered safe until they are validated.	☐
Control from an overriding system	
Disconnect all voltages from the drive system.	☐
Connect the communication link between the overriding system and the inverter unit.	☐
Power up the drive system.	☐
Check the start/stop functions.	☐
Check the references received from the overriding system.	☐
Check the warning/fault words.	☐
Check the reaction of the inverter unit in case of a communication break.	☐
Check the updating intervals of the communication.	☐
Check any other relevant points.	☐



9

Maintenance

Contents of this chapter

This chapter instructs how to maintain the inverter module and how to interpret its fault conditions. The information is valid for ACS880-104LC inverter modules and the cabinet construction examples presented in this manual.

**WARNING!**

Only qualified electrical professionals can do the work described in this chapter. Read the complete safety instructions before you install, commission, use or service the converter. The safety instructions are given in [ACS880 liquid-cooled multidrive cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#).

Maintenance intervals

The tables below show the maintenance tasks which can be done by the end user. For ABB Service offering, refer to www.abb.com/drivesservices or consult your local ABB Service representative (www.abb.com/searchchannels).

■ Description of symbols

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

■ Recommended maintenance intervals after start-up

Recommended annual actions by the user	
Connections and environment	
Quality of supply voltage	P
Spare parts	
Spare parts	I
DC circuit capacitors reforming, spare modules and spare capacitors	P
Inspections by user	
Tightness of terminals	I
Dustiness, corrosion and temperature	I
Cooling liquid pipe connections	I
Coolant antifreeze concentration	P
Other	
ABB-SACE Air circuit breaker maintenance	I
ABB Contactors maintenance	I

Recommended every 2nd year actions by the user	
Inspection of coolant quality	P
Inspection of expansion tank air pressure	P
External circuit of Main heat exchanger (Temperature/Flow/Pressure)	I

Item	Years from start-up						
	3	6	9	12	15	18	21
Coolant							
Coolant draining and refill*		R		R		R	
Internal cooling fan for circuit boards							
Frame R7i			R			R	
Internal cooling fan for circuit boards							
Control unit battery		R		R		R	
Control panel battery (Real-time clock)			R			R	
Functional safety							
Safety function test	I Refer to the maintenance information of the safety function.						
Safety component expiry (Mission time T_M)	20 years						

Note:

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

Maintenance timers and counters

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

Cabinet

■ Cleaning the interior of the cabinet

**WARNING!**

Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

**WARNING!**

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

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. Open the cabinet door.
3. Clean the interior of the cabinet. Use a vacuum cleaner and a soft brush.
4. Clean the air inlets of the fans and air outlets of the modules (top).
5. Clean the air inlet gratings (if any) on the door.
6. Close the door.

Power connections

■ Retightening the power connections

**WARNING!**

Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. Examine the tightness of the cable connections. Use the tightening torques given in the technical data.

Liquid cooling system

For instructions on coolant replacement and checking the cooling system, see chapter [Internal cooling circuit \(page 381\)](#).

Cooling fans

The lifespan of the cooling fans of the drive depends on running time, ambient temperature and dust concentration. See the firmware manual for the actual signal which indicates the running time of the cooling fan. Reset the running time signal after fan replacement. See also [CIO-01 I/O module and distributed I/O bus user's manual \(3AXD50000126880 \[English\]\)](#).

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

■ Frame R7i – internal module fan replacement

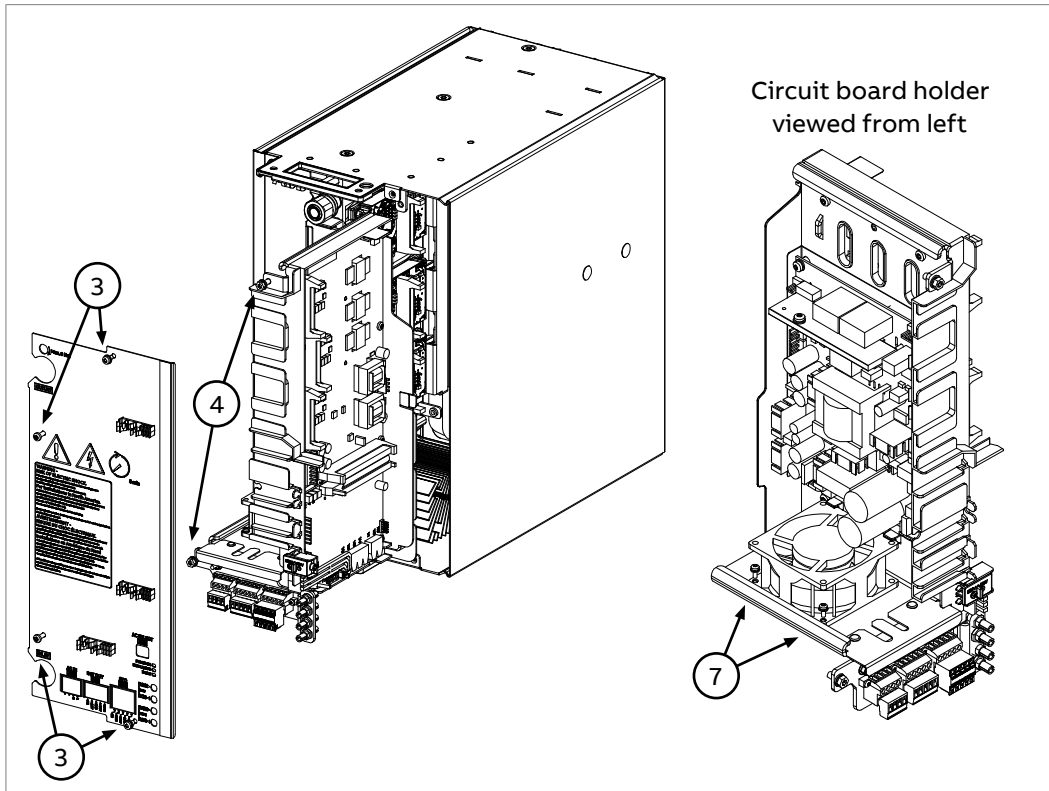
**WARNING!**

Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

**WARNING!**

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

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. Detach and move aside the wiring in front of the module.
3. Remove the four screws that hold the faceplate of the module. Remove the faceplate.
4. Remove the two screws that attach the circuit board holder to the module frame.
5. Carefully pull the circuit board holder outward until you have access to the cooling fan at the bottom of the holder. Detach the wiring coming to the circuit boards if necessary.
6. Disconnect the wiring of the fan.
7. Remove the two screws that hold the fan. Remove the fan.
8. Install a new fan in reverse order to the above. Note that the direction of airflow is up.



■ Frame R8i fan replacement



WARNING!

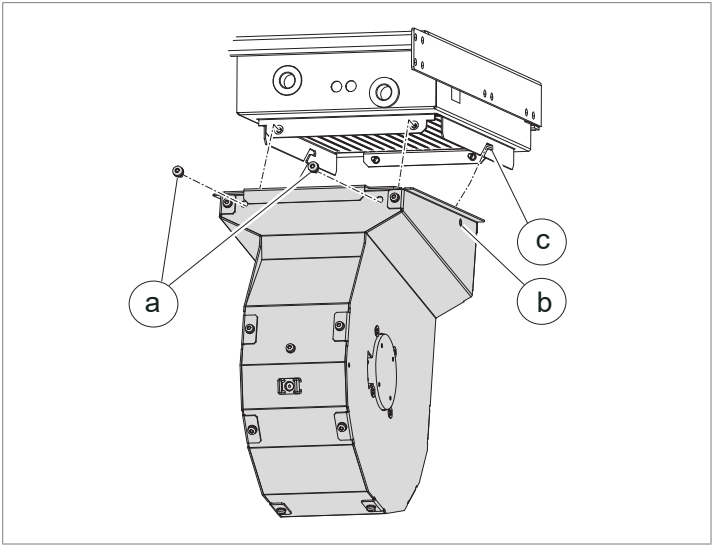
Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.



WARNING!

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

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. Remove any shrouding in front of the cooling fan in case of marine construction.
3. Disconnect the fan wiring. Remove the CIO module.
4. Remove the two retaining screws (a).
5. Pull the fan outwards to separate it from the heat exchanger housing.
6. Install new fan in reverse order. Align the guide pins (b) at the rear of the fan cowling with the slots (c) in the module bottom guide, then install the retaining screws (a).



Inverter module

■ Frame R7i

**WARNING!**

Obey the safety instructions given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

**WARNING!**

Make sure that the replacement module has exactly the same type code as the old module.

**WARNING!**

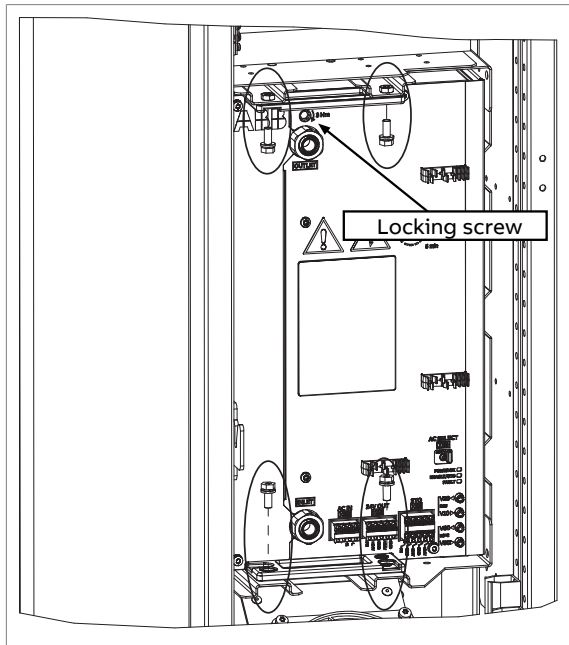
Stop the pumps and drain the coolant before you do work on the liquid cooling system. There is high-pressure hot coolant (6 bar, max. 50 °C) in the cooling circuit when it is in operation.

**WARNING!**

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

Removing the module

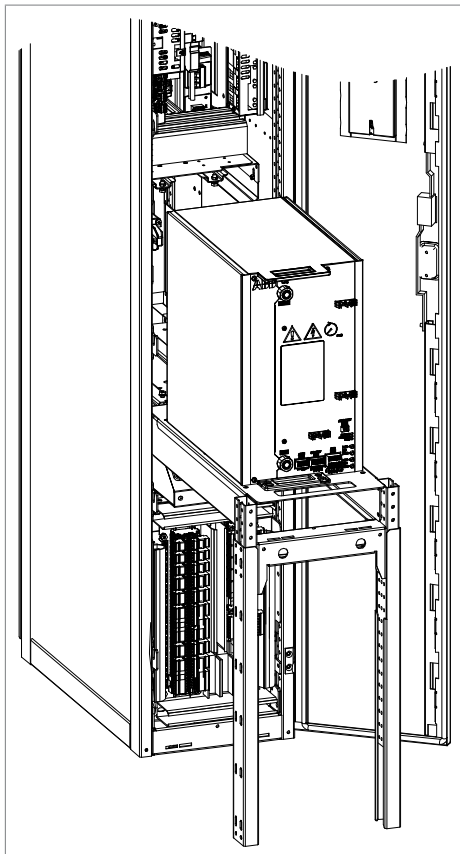
1. Do the steps in section [Electrical safety precautions \(page 133\)](#).
2. Disconnect the wiring from the R7i module. Move the wiring aside.
3. Close the inlet and outlet valves of the cubicle.
4. Lead the drain hoses (on the left-hand and right-hand sides of the cubicle) into a suitable container. Open the drain valves. This will drain all the equipment in the cubicle.
5. After the module has drained, disconnect the coolant piping from the module.
6. Install a service platform (or equal) where you can pull the module out of the cubicle.
7. Remove the module retaining screws at the top and the bottom of the module (two screws each). Undo the locking screw (6 mm hex key) at the top of the module.



8. Pull the module carefully out onto a suitable platform, eg, a service platform. For information on using the lifting device, see [Converter module lifting device for drive cabinets hardware manual \(3AXD50000210268 \[English\]\)](#).



WARNING! Move the module with another person as it is heavy. Keep the module secured to a hoist or equivalent to prevent the module from falling.



Installing the module

1. Push the module carefully into its bay.
2. Tighten the locking screw (6 mm hex key) at the top of the module to 5 N·m (3.6 lbf·ft) maximum.
3. Fasten the module retaining screws at the top and the bottom of the module (two screws each).
4. Reconnect the coolant pipes to the module. Tighten to 20 N·m (14.75 lbf·ft).
5. Reconnect the control wiring to the module.
6. Fill up the cooling system. For instructions, see section [Filling up and bleeding the internal cooling circuit](#).
7. If the Safe torque off function is in use, perform a validation test as described under [Start-up including validation test \(page 298\)](#).

■ Frame R8i

Replacing an inverter module



WARNING!

Obey the safety instructions given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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



WARNING!

Make sure that the replacement module has exactly the same type code as the old module.



WARNING!

Stop the pumps and drain the coolant before you do work on the liquid cooling system. There is high-pressure hot coolant (6 bar, max. 50 °C) in the cooling circuit when it is in operation.



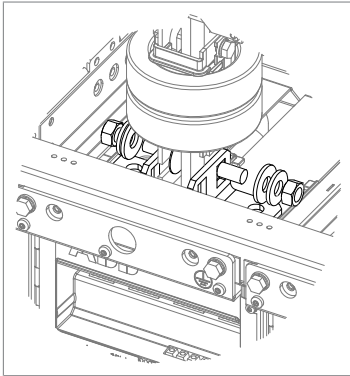
WARNING!

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

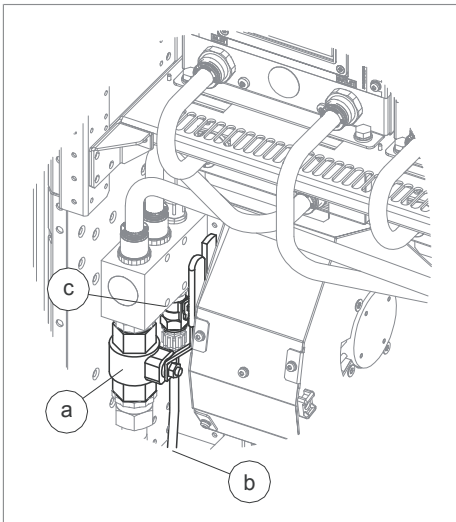
Removing the module

1. Do the steps in section [Electrical safety precautions \(page 133\)](#).
2. Remove the shrouding in front of the module.
3. Remove the locking screws of the swing-out frame (if present) and open it.
4. Disconnect the wiring from the module and move it aside. Use cable ties to keep the wiring out of the way.

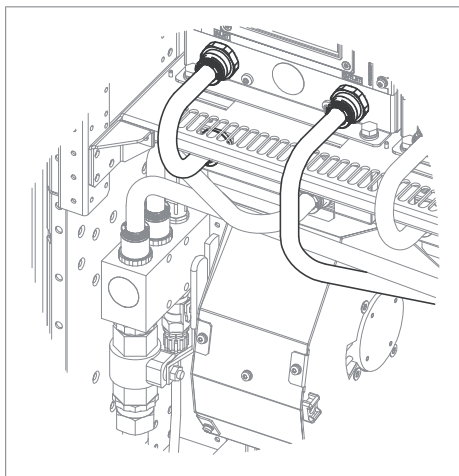
5. Remove the L-shaped DC busbars at the top of the module. Make note of the orientation of the screws as well as the order of the washers.



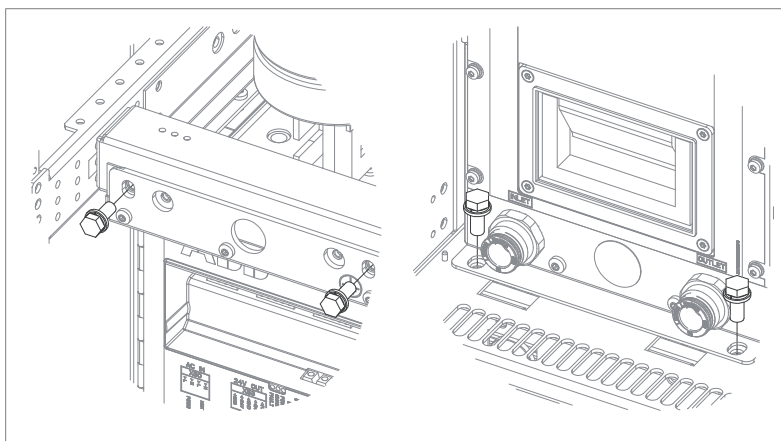
6. Close the inlet valve (a) and outlet valve (located on the right-hand side of the cubicle). Lead the drain hoses (b, on both sides of the cubicle) into a suitable container. Open the drain valves (c, on both sides of the cubicle). This will drain all modules in the cubicle.



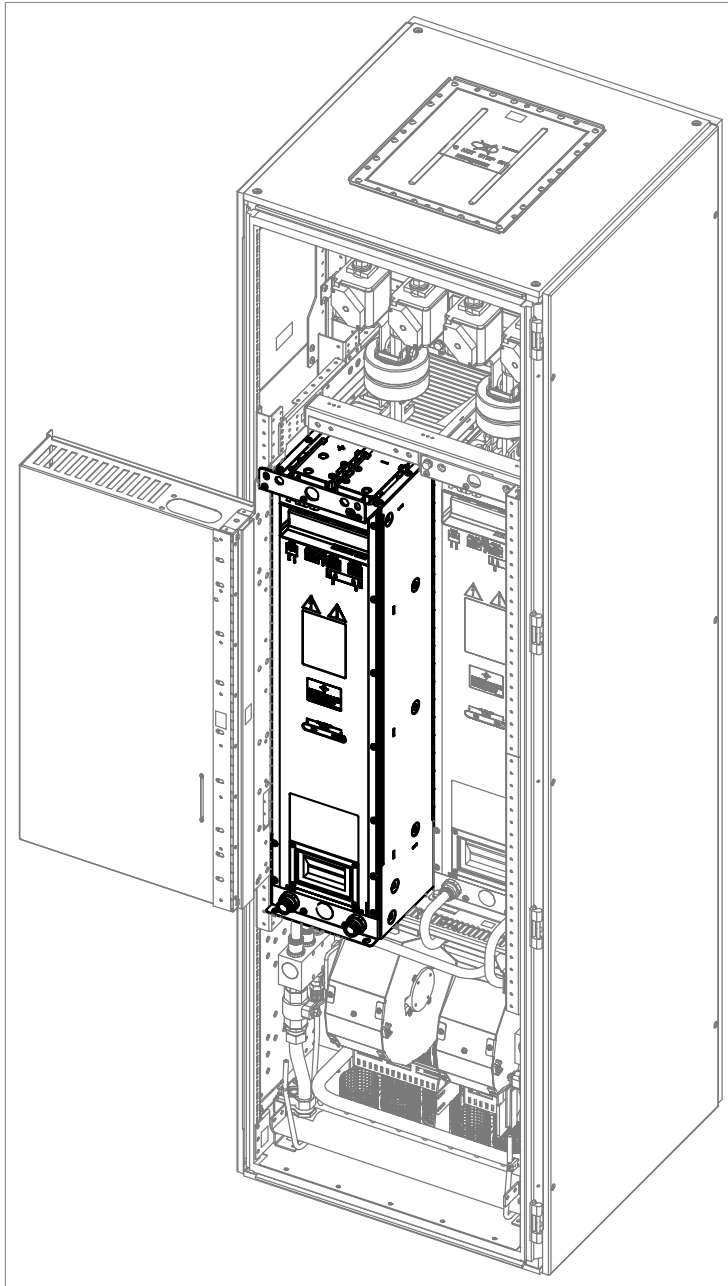
7. After the module has drained, disconnect the piping from the module.



8. Remove the module retaining screws at the top and the bottom of the module.



9. Pull the module carefully out onto a suitable platform. Keep the module secured to a hoist or equivalent to prevent the module from falling. For information on using the lifting device, see [Converter module lifting device for drive cabinets hardware manual \(3AXD50000210268 \[English\]\)](#).



Installing the module

1. Push the module carefully into its bay.
 2. Fasten the retaining screws at the top and the bottom of the module.
 3. Reinstall the DC busbars at the top of the module.
 4. Reconnect the coolant pipes to the module. Tighten to specified torque. R8i module coolant connections: 15 N·m (11.1 lbf·ft). Other connections: 20 N·m (14.75 lbf·ft).
 5. Reconnect the control wiring to the module.
-

6. Fill up the cooling system. For instructions, see section [Filling up and bleeding the internal cooling circuit](#).
7. Close the swing-out frame (if present). Reinstall all shrouds removed earlier.

Activating the reduced run function of the inverter unit

A “reduced run” function is available for inverter units consisting of parallel-connected inverter 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.

The wiring accessories needed during the procedure are available from ABB.

Starting reduced run operation



WARNING!

Obey the safety instructions given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. If the 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 inverter units consisting of parallel-connected modules.
3. Remove the module to be serviced from its bay.
4. Plug the coolant pipes that were disconnected from the module.
5. 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).
6. Install an air baffle to the top module guide to block the airflow through the empty module bay.
7. In case the inverter unit has a DC switch with a charging circuit, disable the appropriate channel on the charging monitoring unit.
8. Switch on the power to the inverter unit.
9. Enter the number of inverter modules present into parameter 95.13 Reduced run mode.
10. Reset all faults and start the inverter unit. The maximum current is now automatically limited according to the new inverter configuration. A mismatch between the number of detected modules (95.14) and the value set in 95.13 will generate a fault.
11. If the STO function is in use, validate it as described in chapter [The Safe torque off function \(page 289\)](#).

Resuming normal operation**WARNING!**

Obey the safety instructions given in [ACS880 liquid-cooled multidrives cabinets and modules safety instructions \(3AXD50000048633 \[English\]\)](#). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

1. Stop the drive and do the steps in section [Electrical safety precautions \(page 133\)](#) before you start the work.
2. Remove the STO (Safe torque off) jumper wire set (if present).
3. Remove the air baffle from the module bay.
4. Reinstall the module into its bay.
5. Remove the plugs from the coolant pipes and reconnect the pipes to the module.
6. Reconnect the STO wiring (if used) to the module.
7. In case the inverter unit has a DC switch with a charging circuit, re-enable all channels on the charging monitoring unit.
8. Switch on the power to the inverter unit.
9. Enter "0" into parameter 95.13 Reduced run mode.
10. If the STO function is in use, validate it as described in chapter [The Safe torque off function \(page 289\)](#).

Control panel

Refer to [ACS-AP-I, -S, -W Assistant control panels user's manual \(3AUA0000085685 \[English\]\)](#).

Refer to [ACS-BP-S basic control panels user's manual \(3AXD50000032527 \[English\]\)](#).

BCU control unit

Refer to [BCU-02/12/22 control units hardware manual \(3AUA0000113605 \[English\]\)](#) for replacement of

- real-time clock battery
- memory unit
- SD/SDHC memory card
- control unit.

Capacitors

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

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

■ Reforming the capacitors

The capacitors must be reformed if the drive has not been powered (either in storage or unused) for a year or more. The manufacturing date is on the type designation label. For information on reforming the capacitors, refer to [Capacitor reforming instructions \(3BFE64059629 \[English\]\)](#).

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.

LED indications

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 firmware manual of the inverter control program.

■ Control panel and panel platform/holder LEDs

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

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

■ R7i and R8i module LEDs

See chapter [Operation principle and hardware description \(page 21\)](#).

10

Ordering information

Contents of this chapter

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

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

Note:

- This chapter only lists the installation accessories available from ABB. All other parts must be sourced from a third party (such as Rittal) by the system integrator. For a listing, refer to the kit-specific installation instructions available at <https://sites-apps.abb.com/sites/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.
-

Kit code key

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

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

- x = cooling method
 - A = air-cooled (some of these kits are also used with liquid-cooled drives)
 - L = liquid-cooled
 - w = cabinet width
 - 4 = 400 mm
 - 6 = 600 mm
 - 8 = 800 mm
 - s = module frame size / sizes
 - 1 = R1i
 - 2 = R2i
 - 3 = R3i
 - 4 = R4i
 - 5 = R5i
 - 6 = R6i/D6D
 - 7 = R7i/D7D/D7T
 - 8 = R8i/D8D/D8T
 - X = any, or not defined.
 - yyy = consecutive numbering
 - 001...099 = Kits related to cabinets, for example, adapter plates
 - 001...019 Common AC- and DC-related kits
 - 020...049 Cabinet mechanics kits
 - 050...059 Swing frame kits
 - 100...199 = Kits related to AC connection, for example, busbars
 - 100...129 Kits with connection to AC
 - 130...149 Kits with connection to module
 - 150...199 Other kits related to AC connection
 - 200...299 = Kits related to DC connection, for example, busbars
 - 200...229 Kits with connection to common DC
 - 230...249 Kits with connection to module
 - 250...299 Other kits related to DC connection
-

- 300...399 = Kits related to module installation, for example, mechanical supports
 - 300...330 Module supporting kits, basic mechanical support
 - 350...379 Shroud kits
 - 400...499 = Other kits
 - 400...419 Fan kits
 - 420...439 Air guides
 - 440...459 Cooling circuit kits
 - VX = Kit specifically designed for the Rittal VX25 enclosure system. Many kits without this designation are also used with the VX25 system.
-

Frame R7i and multiples

■ Inverter modules

Inverter units consisting of frame R7i inverter modules are to be ordered as separate modules. For inverter unit ratings, see the technical data.

Inverter unit		Modules used	
Type	Frame size	Qty	Ordering code (for options see below)
$U_n = 400 \text{ V}$			
ACS880-104LC-0094A-3	R7i	1	ACS880-104LC-0094A-3(+E205)
ACS880-104LC-0120A-3	R7i	1	ACS880-104LC-0120A-3(+E205)
ACS880-104LC-0140A-3	R7i	1	ACS880-104LC-0140A-3(+E205)
ACS880-104LC-0170A-3	R7i	1	ACS880-104LC-0170A-3(+E205)
ACS880-104LC-0210A-3	R7i	1	ACS880-104LC-0210A-3(+E205)
ACS880-104LC-0250A-3	R7i	1	ACS880-104LC-0250A-3(+E205)
ACS880-104LC-0300A-3	R7i	1	ACS880-104LC-0300A-3(+E205)
ACS880-104LC-0380A-3	R7i	1	ACS880-104LC-0380A-3(+E205)
ACS880-104LC-0470A-3	R7i	1	ACS880-104LC-0470A-3(+E205)
The units below consist of multiple R7i modules connected in parallel. The power ratings of these units overlap the ratings of units built out of frame R8i modules. R8i modules are likely to be suitable for most applications, but these units can be considered instead if vertical space is limited, for example.			
ACS880-104LC-0590A-3	2×R7i	2	ACS880-104LC-0300A-3+E205
ACS880-104LC-0740A-3	2×R7i	2	ACS880-104LC-0380A-3+E205
ACS880-104LC-0910A-3	2×R7i	2	ACS880-104LC-0470A-3+E205
ACS880-104LC-1120A-3	3×R7i	3	ACS880-104LC-0380A-3+E205
ACS880-104LC-1350A-3	3×R7i	3	ACS880-104LC-0470A-3+E205
ACS880-104LC-1460A-3	4×R7i	4	ACS880-104LC-0380A-3+E205
ACS880-104LC-1790A-3	4×R7i	4	ACS880-104LC-0470A-3+E205
$U_n = 500 \text{ V}$			
ACS880-104LC-0094A-5	R7i	1	ACS880-104LC-0094A-5(+E205)
ACS880-104LC-0120A-5	R7i	1	ACS880-104LC-0120A-5(+E205)
ACS880-104LC-0140A-5	R7i	1	ACS880-104LC-0140A-5(+E205)
ACS880-104LC-0170A-5	R7i	1	ACS880-104LC-0170A-5(+E205)
ACS880-104LC-0200A-5	R7i	1	ACS880-104LC-0200A-5(+E205)
ACS880-104LC-0240A-5	R7i	1	ACS880-104LC-0240A-5(+E205)
ACS880-104LC-0300A-5	R7i	1	ACS880-104LC-0300A-5(+E205)
ACS880-104LC-0380A-5	R7i	1	ACS880-104LC-0380A-5(+E205)
ACS880-104LC-0460A-5	R7i	1	ACS880-104LC-0460A-5(+E205)
The units below consist of multiple R7i modules connected in parallel. The power ratings of these units overlap the ratings of units built out of frame R8i modules. R8i modules are likely to be suitable for most applications, but these units can be considered instead if vertical space is limited, for example.			
ACS880-104LC-0590A-5	2×R7i	2	ACS880-104LC-0300A-5+E205
ACS880-104LC-0740A-5	2×R7i	2	ACS880-104LC-0380A-5+E205
ACS880-104LC-0900A-5	2×R7i	2	ACS880-104LC-0460A-5+E205

Inverter unit		Modules used	
Type	Frame size	Qty	Ordering code (for options see below)
ACS880-104LC-1110A-5	3×R7i	3	ACS880-104LC-0380A-5+E205
ACS880-104LC-1340A-5	3×R7i	3	ACS880-104LC-0460A-5+E205
ACS880-104LC-1460A-5	4×R7i	4	ACS880-104LC-0380A-5+E205
ACS880-104LC-1770A-5	4×R7i	4	ACS880-104LC-0460A-5+E205
$U_n = 690 \text{ V}$			
ACS880-104LC-0062A-7	R7i	1	ACS880-104LC-0062A-7(+E205)
ACS880-104LC-0082A-7	R7i	1	ACS880-104LC-0082A-7(+E205)
ACS880-104LC-0100A-7	R7i	1	ACS880-104LC-0100A-7(+E205)
ACS880-104LC-0130A-7	R7i	1	ACS880-104LC-0130A-7(+E205)
ACS880-104LC-0140A-7	R7i	1	ACS880-104LC-0140A-7(+E205)
ACS880-104LC-0190A-7	R7i	1	ACS880-104LC-0190A-7(+E205)
ACS880-104LC-0220A-7	R7i	1	ACS880-104LC-0220A-7(+E205)
ACS880-104LC-0290A-7	R7i	1	ACS880-104LC-0290A-7(+E205)
ACS880-104LC-0340A-7	R7i	1	ACS880-104LC-0340A-7(+E205)
ACS880-104LC-0389A-7	R7i	1	ACS880-104LC-0389A-7(+E205)
The units below consist of multiple R7i modules connected in parallel. The power ratings of these units overlap the ratings of units built out of frame R8i modules. R8i modules are likely to be suitable for most applications, but these units can be considered instead if vertical space is limited, for example.			
ACS880-104LC-0560A-7	2×R7i	2	ACS880-104LC-0290A-7+E205
ACS880-104LC-0660A-7	2×R7i	2	ACS880-104LC-0340A-7+E205
ACS880-104LC-0760A-7	2×R7i	2	ACS880-104LC-0389A-7+E205
ACS880-104LC-0840A-7	3×R7i	3	ACS880-104LC-0290A-7+E205
ACS880-104LC-0980A-7	3×R7i	3	ACS880-104LC-0340A-7+E205
ACS880-104LC-1130A-7	3×R7i	3	ACS880-104LC-0389A-7+E205
ACS880-104LC-1300A-7	4×R7i	4	ACS880-104LC-0340A-7+E205
ACS880-104LC-1490A-7	4×R7i	4	ACS880-104LC-0389A-7+E205

Ordering code format	Option codes
[Module type] +code [+code] ... For example, ACS880-104LC-0062A-7 +E205	+E205: Internal du/dt filtering (mandatory for parallel-connected modules). +C132: Marine type approval (pending).

Note: These components are required to construct a working unit and must be ordered separately:

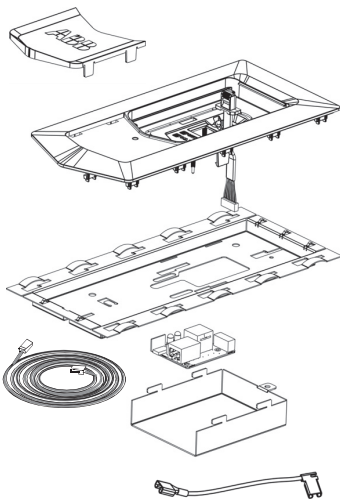
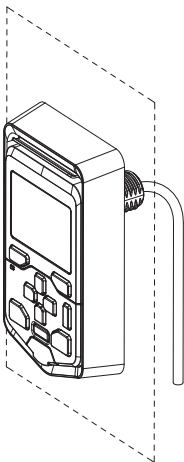
- Inverter module(s)
- Common mode filters
- ACS-AP-W or ACS-AP-I control panel (required for commissioning)
- Control unit kit
- Fiber optic cables
- Installation frame (3AXD50000836444). One installation frame is necessary for each inverter module.

Other parts given in this chapter can be required by the application or make the installation of the module easier.

■ Control panel

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

The control panel can be flush mounted on the cabinet door with the help of a door mounting kit. For more information on the control panel, see [ACS-AP-I, -S, -W and ACH-AP-H, -W 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	
DPMP-02	Door mounting kit (IP65)	3AXD50000009374	

For more information on the door mounting kits, such as the contents of the kit, see the installation manuals:

- [DPMP-01 mounting platform for control panels installation guide \(3AUA0000100140 \[English\]\)](#)
- [DPMP-02/03 mounting platform for control panels installations guide \(3AUA0000136205 \[English\]\)](#).

■ Control electronics

Inverter control unit

One control unit is required for each inverter unit. The type of the control unit depends on the number of inverter modules as shown below. The control unit is delivered with a memory unit containing the ACS880 primary control program, optionally with application programmability. For availability of other control programs, contact your local ABB representative.

Frame size	Control unit type	Application programmability	Ordering code
R7i 2×R7i	BCU-02	No	3AXD50000003417
		*Yes	3AXD500000011540
3×R7i 4×R7i	BCU-12	No	3AXD50000006340
		*Yes	3AXD500000011541

*Application programmability using function block based on the IEC 61131-3 standard. For more information, see [Programming manual: Drive application programming \(IEC 61131-3\) \(3AUA0000127808 \[English\]\)](#).

Note: Fiber optic communication with another control unit (such as that of the supply unit) requires an RDCO or FDCO DDCS communication module. For more information, see [RDCO-01/02/03/04 DDCS communication option modules \(3AFE64492209 \[English\]\)](#) and [FDCO-01/02 DDCS communication modules user's manual \(3AUA0000114058 \[English\]\)](#).

Fiber optic cables

Each frame R7i module is connected to the inverter control unit with a pair of fiber optic cables.

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

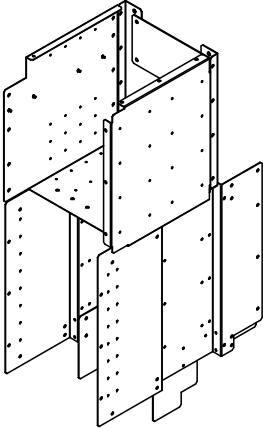
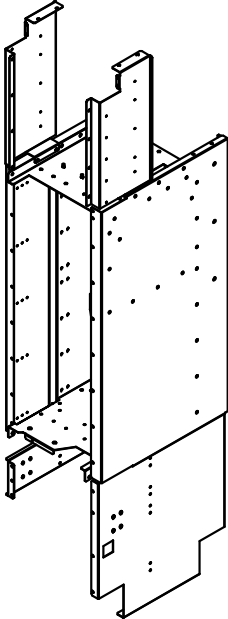
Length	Kit type designation	Ordering code
2 m (6.6 ft)	NLWC-02	58988821
3 m (9.8 ft)	NLWC-03	58948233
5 m (16.4 ft)	NLWC-05	58948250
7 m (23 ft)	NLWC-07	58948268
10 m (32.8 ft)	NLWC-10	58948276

■ **Mechanical installation accessories**

These kits include parts that are used for installing the module in the enclosure.

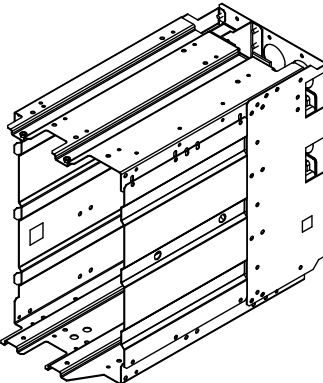
Module and electronics mounting parts

These parts attach to the VX25 enclosure frame and act as a mounting base for the module installation frame, the control unit, and other components.

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module	1	3AXD50000861637	L-4-7-035-VX	 Instruction code: 3AXD50000863679
400 mm VX25 enclosure with 2 modules	1	3AXD50000866892	L-4-7-036-VX	 Instruction code: 3AXD50000879212

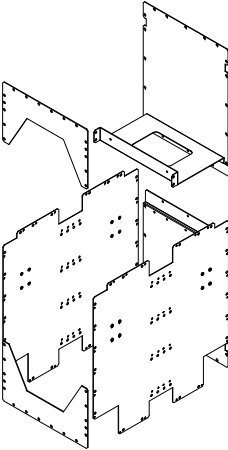
Module installation frame

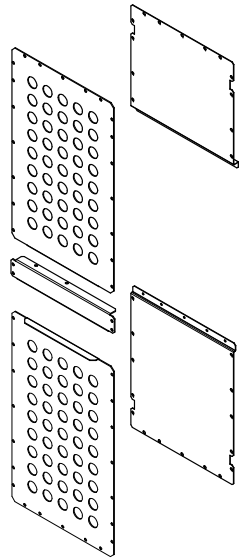
The module can easily be inserted into (and extracted from) the installation frame. The frame has quick connectors at the back for the AC and DC power connections. The DC connection is placed at either the rear top or rear right edge of the frame depending on the way the frame is assembled.

Used with...	Qty	Ordering code	Kit code	Illustration
R7i	1 per module	3AXD50000836444	L-468-7-320	 Instruction code: 3AXD50000837915

Marine support kit

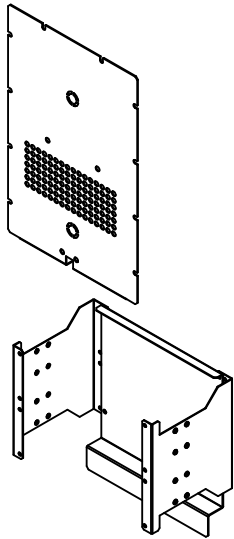
This kit contains parts that can be used for reinforcing the cabinet structure for installation sites with vibration, for example in marine applications.

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module	1	3AXD50000897506	L-4-7-502-VX	 Instruction code: 3AXD50000899098

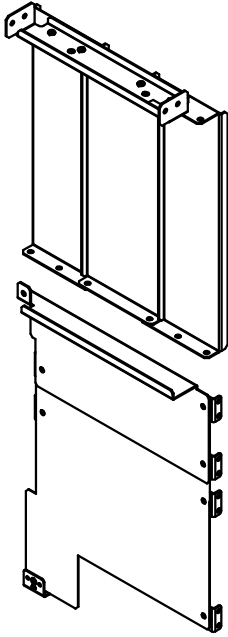
Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 2 modules	1	3AXD50000897490	L-4-7-503-VX	 Instruction code: 3AXD50000897186

Shrouding

This kit contains the shrouds, as well as the necessary brackets and screws, to cover the top and bottom parts of the cubicle.

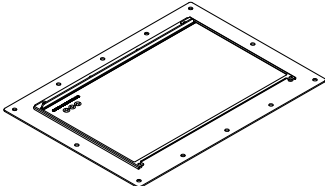
Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module	1	3AXD50000861651	L-4-7-351-VX	 Instruction code: 3AXD50000863563

200 Ordering information

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 2 modules	1	3AXD50000866953	L-4-7-352-VX	 Instruction code: 3AXD50000879052

Pressure relief kit

The explosion exhaust plate acts as a pressure relief vent in case of arcing inside the cubicle. This part is installed on the roof of the cabinet.

Used with ...	Qty	Ordering code	Kit code	Illustration
VX25 enclosure	1 per cubicle	3AXD50000667260	L-4-X-460-VX	 Instruction code: 3AXD50000666430

■ DC-side components

Frame R7i modules are connected to the DC bus through fuses. The designs presented in this manual have flush-end fuse blocks bolted to the DC busbars.

If quick isolation of the module from the DC bus is required, a switch-disconnector can be installed in 400 mm wide cubicles with one R7i module. (The design for two modules presented in this manual has DC fuses only without a DC switch-disconnector.) One of the auxiliary contacts of the switch is used for monitoring the open/closed state of the switch. A capacitor charging circuit is to be installed with the DC switch-disconnector.

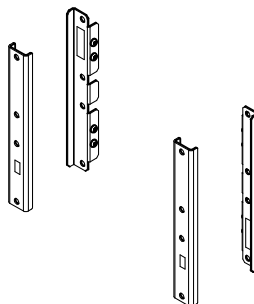
Note: A separate capacitor charging circuit must be designed and installed by the customer if the inverter unit is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

The common mode filters are mounted onto the busbars that connect to the DC input of the inverter module.

DC bus installation parts (for Rittal VX25 enclosures)

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

The designs shown in this manual for Rittal VX25 enclosures use the Rittal Flat-PLS busbar system. Make sure that the current in the drive system does not exceed the current-carrying capacity of the busbars.

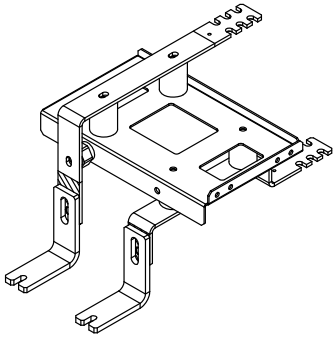
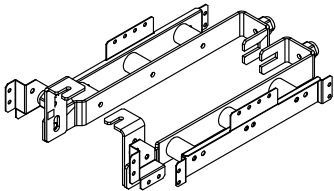
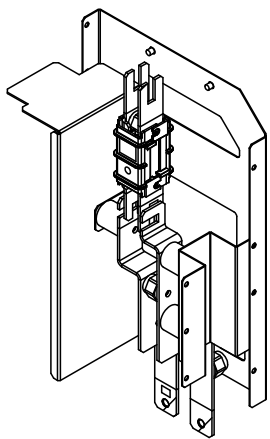
Used with ...	Qty	Ordering code	Kit code	Illustration
VX25 enclosure	1 kit per cubicle	3AXD50000333387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

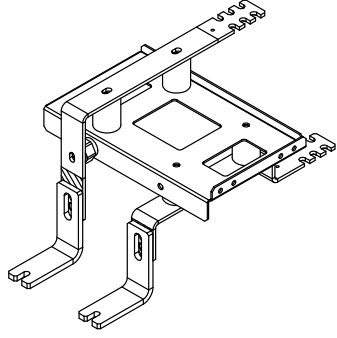
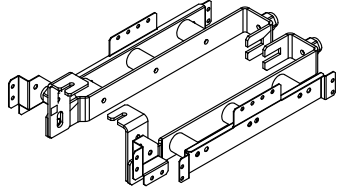
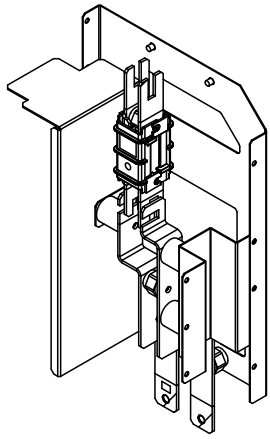
DC connection parts (for Rittal VX25 enclosures)

These parts connect the Flat-PLS busbars to the DC input of the module. The holders for fuses and common mode filters are included. When applicable, the mounting parts for the DC switch-disconnector are also included. For fuse sizes, see section [DC fuses \(IEC, UL\) \(page 209\)](#).

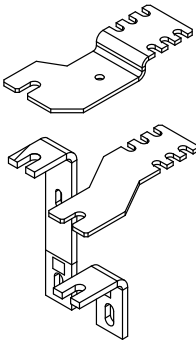
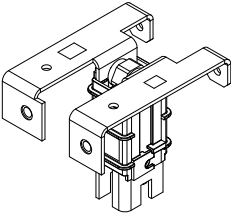
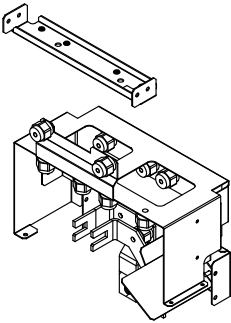
Note: DC fuses, switch-disconnectors, charging components and common mode filters are not included in the kits and must be ordered separately.

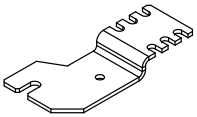
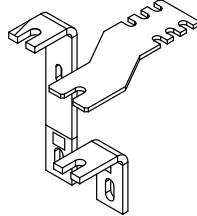
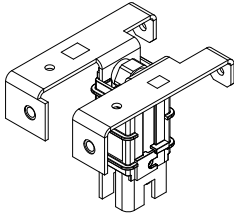
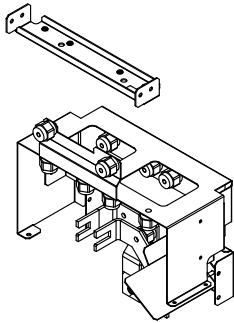
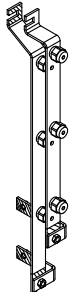
Units without DC switch-disconnector

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module, fuse sizes 1* and 1	1	3AXD50000861668	L-4-7-214-VX	 Instruction code: 3AXD50000865529
	1	3AXD50000861002	L-4-7-269-VX	 Instruction code: 3AXD50000862160
	1	3AXD50000861620	L-4-7-271-VX	 Instruction code: 3AXD50000862184

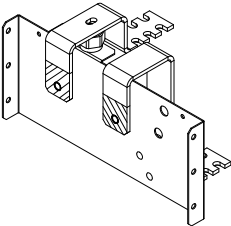
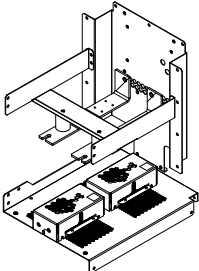
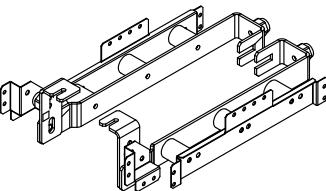
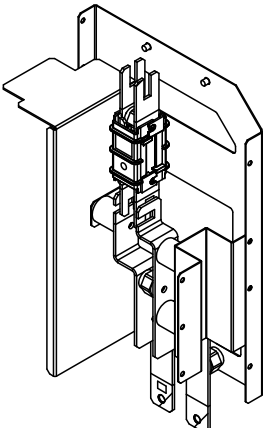
Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module, fuse size 3	1	3AXD50000861675	L-4-7-215-VX	 Instruction code: 3AXD50000865536
	1	3AXD50000861613	L-4-7-270-VX	 Instruction code: 3AXD50000861996
	1	3AXD50000861620	L-4-7-271-VX	 Instruction code: 3AXD50000862184

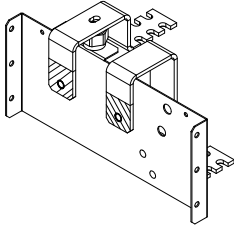
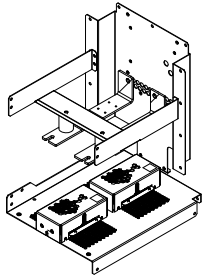
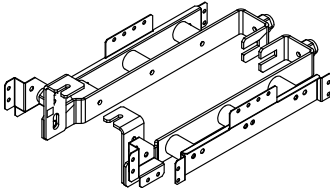
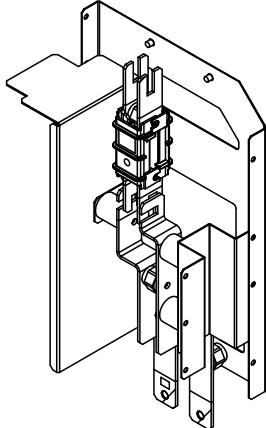
204 Ordering information

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 2 modules, fuse sizes 1* and 1	2	3AXD50000866915	L-4-7-216-VX	 Instruction code: 3AXD50000879250
	2	3AXD50000866878	L-4-7-272-VX	 Instruction code: 3AXD50000879274
	1	3AXD50000866908	L-4-7-274-VX	 Instruction code: 3AXD50000879045
	1	3AXD50000866861	L-4-7-273-VX	 Instruction code: 3AXD50000879236

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 2 modules, fuse size 3	2	3AXD50000866922	L-4-7-217-VX	  Instruction code: 3AXD50000879267
	2	3AXD50000866878	L-4-7-272-VX	 Instruction code: 3AXD50000879274
	1	3AXD50000866908	L-4-7-274-VX	 Instruction code: 3AXD50000879045
	1	3AXD50000866861	L-4-7-273-VX	 Instruction code: 3AXD50000879236

Units with DC switch-disconnector

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module, with DC switch, fuse sizes 1* and 1	1	3AXD50000860951	L-4-7-212-VX	 Instruction code: 3AXD50000862122
	1	3AXD50000860999	L-4-7-267-VX	 Instruction code: 3AXD50000861897
	1	3AXD50000861002	L-4-7-269-VX	 Instruction code: 3AXD50000862160
	1	3AXD50000861620	L-4-7-271-VX	 Instruction code: 3AXD50000862184

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module, with DC switch, fuse size 3	1	3AXD50000860975	L-4-7-213-VX	 Instruction code: 3AXD50000862139
	1	3AXD50000860982	L-4-7-268-VX	 Instruction code: 3AXD50000861972
	1	3AXD50000861613	L-4-7-270-VX	 Instruction code: 3AXD50000861996
	1	3AXD50000861620	L-4-7-271-VX	 Instruction code: 3AXD50000862184

DC switch-disconnector kits

Used with... ACS880-104LC-...	IEC/UL	Switch type Handle type Shaft type	Qty	Ordering code	Instruction code
0094A-3 ... 0210A-3 0094A-5 ... 0200A-5 0062A-7 ... 0220A-7	IEC	OT400E11 OHB125J12 OXP12X395	1	3AXD50000823369	3AXD50000823352
	UL	OT400U11 OHB125J12 OXP12X395	1	3AXD50000823383	3AXD50000823352
0250A-3 ... 0470A-3 0240A-5 ... 0460A-5 0290A-7 ... 0389A-7	IEC	OT630E11 OHB145J12 OXP12X465	1	3AXD50000823376	3AXD50000823352
	UL	OT600U11 OHB145J12 OXP12X465	1	3AXD50000823390	3AXD50000823352

The kit contains the following components:

- DC switch-disconnector (type indicated in table)
- Operating handle (type indicated in table)
- Operating shaft (type indicated in table)
- Two OA1G10 and two OA3G01 auxiliary contacts
- OTZT2A (OT4...) or OTZT3A (OT6...) interlock
- PDAL2/24DC interlock
- OHZX10 alignment ring.

DC charging components (for units with DC switch-disconnector)

A charging circuit is required if the unit is equipped with a DC switch-disconnector.

Note: A separate capacitor charging circuit must be designed and installed by the customer if the inverter unit is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

Charging switch kit

IEC/UL	Switch type	Qty	Ordering code	Instruction code
IEC	OS160GD04F	1	3AXD50000826933	3AXD50000827046
UL	OS100GJ04F	1	3AXD50000826940	3AXD50000827046 3AXD50000008591

The kit contains the following components:

- Charging switch (type indicated in table) with terminal shrouds
- OHB65J6 operating handle
- OXP6X430 operating shaft
- 2 pcs of OA3G01 auxiliary contacts
- BSFC-12C charging controller

- 4 pcs 170M2676 fuses and fuse holders (kit 3AXD50000826940 contains FWJ-30A fuses and conversion parts)
- OHZX10 alignment ring.

Charging resistors

Used with...	Qty	Ordering code	Data
Frame R7i with DC switch (IEC, UL)	4	10028531	33 ohm

Fiber optic cables

A pair of optical cables is needed to connect the charging controller to the inverter module.

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

Length	Kit type designation	Ordering code
2 m (6.6 ft)	NLWC-02	58988821
3 m (9.8 ft)	NLWC-03	58948233
5 m (16.4 ft)	NLWC-05	58948250
7 m (23 ft)	NLWC-07	58948268
10 m (32.8 ft)	NLWC-10	58948276

DC fuses (IEC, UL)

See also [Fuse data \(page 264\)](#).

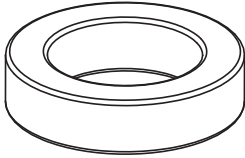
Unit type ACS880- 104LC-	Frame size	Qty	Ordering code	Fuse		
				Type (Bussmann)	Rating	Size
U _n = 400 V						
0094A-3	R7i	2	3AUA0000114934	170M4388	160 A	1
0120A-3	R7i	2	3AXD50000010195	170M4389	200 A	1
0140A-3	R7i	2	3AUA0000114933	170M4390	250 A	1
0170A-3	R7i	2	3AXD50000010196	170M4391	315 A	1
0210A-3	R7i	2	3AUA0000076327	170M4393	400 A	1
0250A-3	R7i	2	68735971	170M6541	450 A	3
0300A-3	R7i	2	3AXD50000698752	170M6543	550 A	3
0380A-3	R7i	2	68735980	170M6545	700 A	3
0470A-3	R7i	2	63919381	170M6547	900 A	3
0590A-3	2×R7i	4	3AXD50000698752	170M6543	550 A	3
0740A-3	2×R7i	4	68735980	170M6545	700 A	3
0910A-3	2×R7i	4	63919381	170M6547	900 A	3
1120A-3	3×R7i	6	68735980	170M6545	700 A	3
1350A-3	3×R7i	6	63919381	170M6547	900 A	3
1460A-3	4×R7i	8	68735980	170M6545	700 A	3
1790A-3	4×R7i	8	63919381	170M6547	900 A	3

210 Ordering information

Unit type ACS880- 104LC-	Frame size	Qty	Ordering code	Fuse		
				Type (Bussmann)	Rating	Size
U _n = 500 V						
0094A-5	R7i	2	3AUA0000114934	170M4388	160 A	1
0120A-5	R7i	2	3AXD50000010195	170M4389	200 A	1
0140A-5	R7i	2	3AUA0000114933	170M4390	250 A	1
0170A-5	R7i	2	3AXD50000010196	170M4391	315 A	1
0200A-5	R7i	2	3AUA0000076327	170M4393	400 A	1
0240A-5	R7i	2	68735971	170M6541	450 A	3
0300A-5	R7i	2	3AXD50000698752	170M6543	550 A	3
0380A-5	R7i	2	68735980	170M6545	700 A	3
0460A-5	R7i	2	63919381	170M6547	900 A	3
0590A-5	2×R7i	4	63919381	170M6547	900 A	3
0740A-5	2×R7i	4	63919381	170M6547	900 A	3
0900A-5	2×R7i	4	63919381	170M6547	900 A	3
1110A-5	3×R7i	6	63919381	170M6547	900 A	3
1340A-5	3×R7i	6	63919381	170M6547	900 A	3
1460A-5	4×R7i	8	63919381	170M6547	900 A	3
1770A-5	4×R7i	8	63919381	170M6547	900 A	3
U _n = 690 V						
0062A-7	R7i	2	3AXD50000010198	170M3392	125 A	1*
0082A-7	R7i	2	3AUA0000114934	170M4388	160 A	1
0100A-7	R7i	2	3AXD50000010195	170M4389	200 A	1
0130A-7	R7i	2	3AUA0000114933	170M4390	250 A	1
0140A-7	R7i	2	3AXD50000010196	170M4391	315 A	1
0190A-7	R7i	2	3AXD50000010197	170M4392	350 A	1
0220A-7	R7i	2	3AUA0000076327	170M4393	400 A	1
0290A-7	R7i	2	3AXD50000698752	170M6543	550 A	3
0340A-7	R7i	2	63903167	170M6544	630 A	3
0389A-7	R7i	2	68735980	170M6545	700 A	3
0560A-7	2×R7i	4	3AXD50000698752	170M6543	550 A	3
0660A-7	2×R7i	4	63903167	170M6544	630 A	3
0760A-7	2×R7i	4	68735980	170M6545	700 A	3
0840A-7	3×R7i	6	3AXD50000698752	170M6543	550 A	3
0980A-7	3×R7i	6	63903167	170M6544	630 A	3
1130A-7	3×R7i	6	68735980	170M6545	700 A	3
1300A-7	4×R7i	8	63903167	170M6544	630 A	3
1490A-7	4×R7i	8	68735980	170M6545	700 A	3

Common mode filters

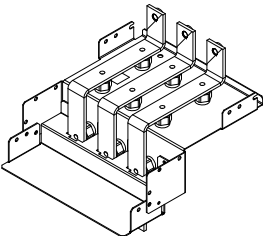
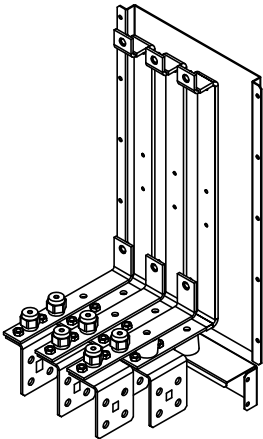
Common mode filtering reduces bearing currents and is required for electromagnetic compatibility (EMC). The filtering is implemented by installing two toroidal cores onto the DC busbars.

Used with	Qty	Ordering code	Kit code	Illustration
All enclosure types	2 per module	3AXD50000566785	-	

■ AC-side components

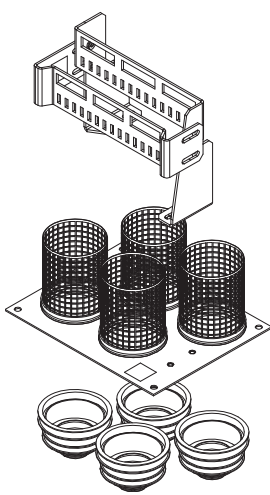
Output busbars

This kit contains the AC busbars between the module installation frame and the cable terminals.

Used with	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module	1	3AXD50000860791	L-4-7-138-VX	 Instruction code: 3AXD50000860821
400 mm VX25 enclosure with 2 modules	1	3AXD50000866601	L-4-7-139-VX	 Instruction code: 3AXD50000879229

Cable entry kit

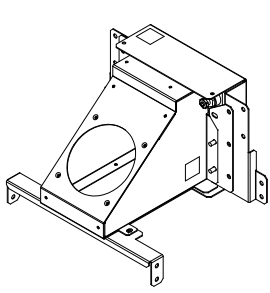
Cable entry kit, to be installed on the bottom plate of the enclosure, contains four 60 mm diameter inlets for cables with grommets, wire meshing for 360° grounding, and a strain relief bracket.

Used with ...	Qty	Ordering code	Kit code	Illustration
All enclosure types	1 per module (minimum)	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

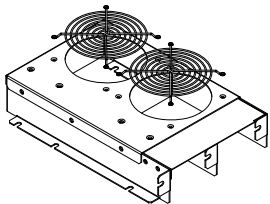
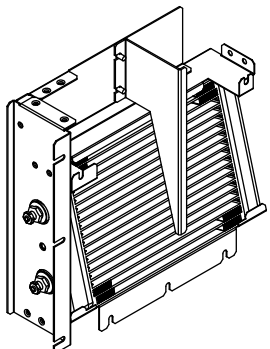
■ Cooling system parts

The heat exchanger kits include the heat exchanger.

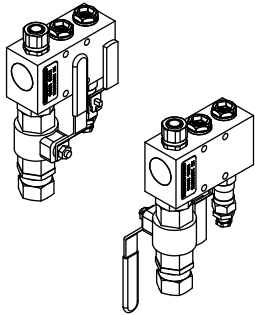
Module cooling fan and related parts (400 mm VX25 enclosure with 1 module)

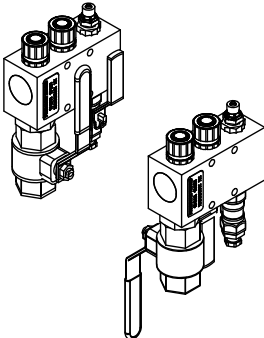
Component	Qty	Ordering code	Kit code	Illustration
Fan holder/Heat exchanger assembly	1	3AXD50000861644	L-4-7-444-VX	 Instruction code: 3AXD50000863037
Fan	1	3AUA0000077627	-	-
Wire set for cooling fan (consists of connector and 270 mm of wire)	1	3AXD50000747467	-	-

Module cooling fan and related parts (400 mm VX25 enclosure with 2 modules)

Component	Qty	Ordering code	Kit code	Illustration
Fan holder assembly	1	3AXD50000866939	L-4-7-407-VX	 Instruction code: 3AXD50000879281
Fan	2	3AUA0000077627	-	-
Wire set for cooling fan (consists of connector and 270 mm of wire)	1	3AXD50000747467	-	-
Heat exchanger assembly	1	3AXD50000866946	L-4-7-445-VX	 Instruction code: 3AXD50000879243

Coolant distribution manifold kits

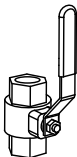
Enclosure	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 1 module	1	3AXD50000899111	L-468-8-448	 Instruction code: 3AXD50000898978

Enclosure	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with 2 modules	1	3AXD50000899128	L-468-8-447	 Instruction code: 3AXD50000899142

The manifold kits contain:



Inlet and outlet manifolds



Inlet and outlet valves



Drain valves



Nipples for connecting the valves to manifolds



Connectors for PA piping



Plugs for unused piping connectors



Chokes for flow limitation – not used with the ACS880-104LC.

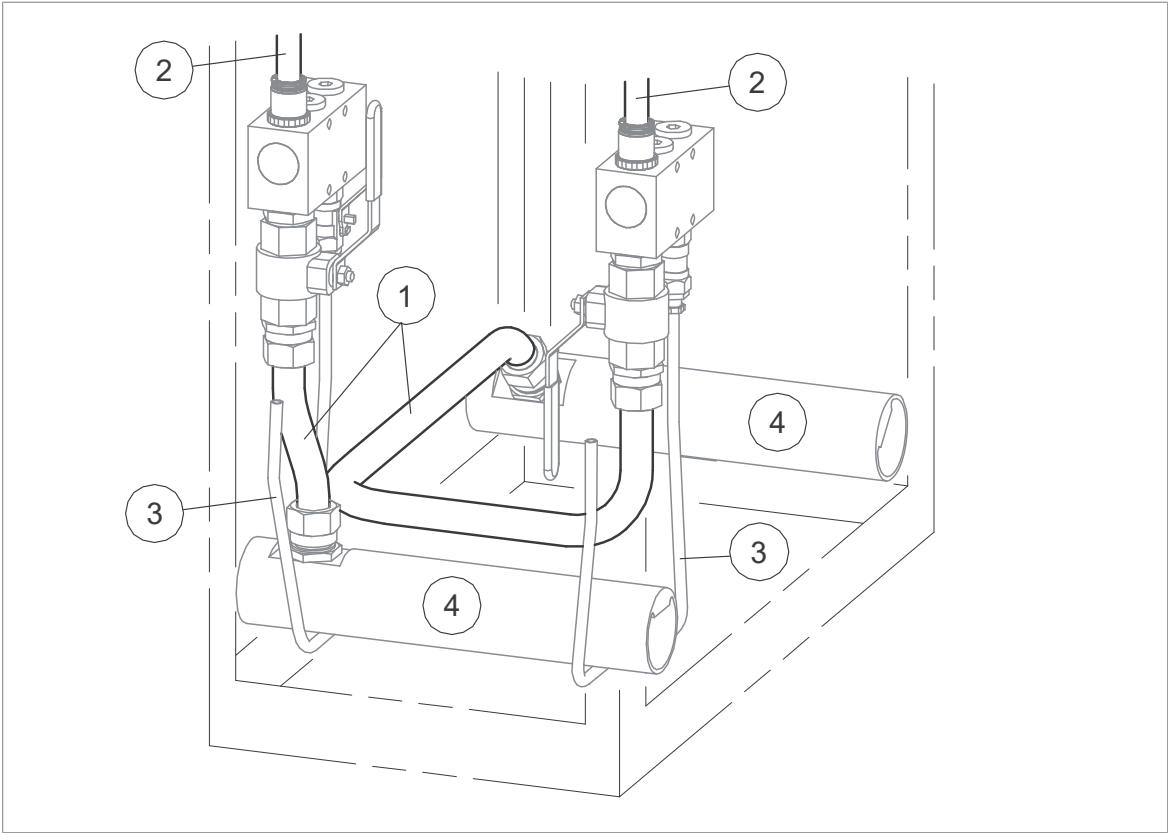
You must order the following parts separately as they are not included in the manifold kits:

- Connectors to attach to inlet, outlet and drain valves
- Connectors to attach to main pipes
- Pipes between main pipe and inlet/outlet valves
- Main pipes
- Drain pipes.

Note: The inlet and outlet valves have an R3/4" internal thread. The drain valves have an R3/8" internal thread.

Piping

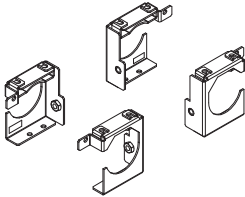
PA (polyamide) pipe is available in various diameters on reels. Refer to the figure for application.



Item	Data	Ordering code
1	PA12P40, 22/18 mm, 50 m	3AXD50000441419
2 ¹⁾	PA12P40, 16/13 mm, 50 m PA12P40, 6/4 mm, 100 m	3AXD50000047488 3AXD50001075316
3	PA11P40, 8/6 mm, 50 m	3AXD50000419302
4	Not part of standard product offering	

1) Use 16/13 mm pipe between the modules and the manifolds. If the heat exchanger is connected in parallel with the module(s), use 8/6 mm or 6/4 mm pipe between the heat exchanger and the manifolds. If the heat exchanger is connected in series with the module(s), use 16/13 mm pipe.

Main pipe support kit

Used with ...	Qty	Ordering code	Kit code	Illustration
Rittal VX25 enclosure	1	3AXD50001155179	L-468-X-450-VX	 Instruction code: 3AXD50001155353

CIO-01 I/O module

CIO-01 I/O module for distributed I/O bus control is not included in the module delivery, but can be ordered separately. The distributed I/O bus controls and supervises each cabinet fan separately. It indicates malfunctioning fans by warning or fault messages. One CIO-01 can monitor and control up to 4 cabinet fans.

For more information, see [CIO-01 I/O module and distributed I/O bus user's manual \(3AXD50000126880 \[English\]\)](#).

Type	Data	Qty	Ordering code
CIO-01	CIO-01 I/O module for distributed I/O bus control	1	3AXD50000041983

Frame R8i and multiples

■ Inverter modules

Inverter units consisting of frame R8i inverter modules are to be ordered as separate modules. For inverter unit ratings, see the technical data.

Inverter unit		Modules used	
Type	Frame size	Qty	Ordering code (for options see below)
$U_n = 690 \text{ V}$			
ACS880-104LC-0390A-7	R8i	1	ACS880-104LC-0390A-7+E205
ACS880-104LC-0430A-7	R8i	1	ACS880-104LC-0430A-7+E205
ACS880-104LC-0480A-7	R8i	1	ACS880-104LC-0480A-7+E205
ACS880-104LC-0530A-7	R8i	1	ACS880-104LC-0530A-7+E205
ACS880-104LC-0600A-7	R8i	1	ACS880-104LC-0600A-7+E205
ACS880-104LC-0670A-7	R8i	1	ACS880-104LC-0670A-7+E205
ACS880-104LC-0750A-7	R8i	1	ACS880-104LC-0750A-7+E205
ACS880-104LC-0850A-7	R8i	1	ACS880-104LC-0850A-7+E205
ACS880-104LC-1030A-7	2×R8i	2	ACS880-104LC-0530A-7+E205
ACS880-104LC-1170A-7	2×R8i	2	ACS880-104LC-0600A-7+E205
ACS880-104LC-1310A-7	2×R8i	2	ACS880-104LC-0670A-7+E205
ACS880-104LC-1470A-7	2×R8i	2	ACS880-104LC-0750A-7+E205
ACS880-104LC-1660A-7	2×R8i	2	ACS880-104LC-0850A-7+E205
ACS880-104LC-1940A-7	3×R8i	3	ACS880-104LC-0670A-7+E205
ACS880-104LC-2180A-7	3×R8i	3	ACS880-104LC-0750A-7+E205
ACS880-104LC-2470A-7	3×R8i	3	ACS880-104LC-0850A-7+E205
ACS880-104LC-2880A-7	4×R8i	4	ACS880-104LC-0750A-7+E205
ACS880-104LC-3260A-7	4×R8i	4	ACS880-104LC-0850A-7+E205

Ordering code format	Option codes
[Module type] +code [+code] ... For example, ACS880-104LC-0480A-7 +E205	+E205: Internal du/dt filtering. Standard with 690 V modules. +C132: Marine type approval.

Note: These components are required to construct a working unit and must be ordered separately:

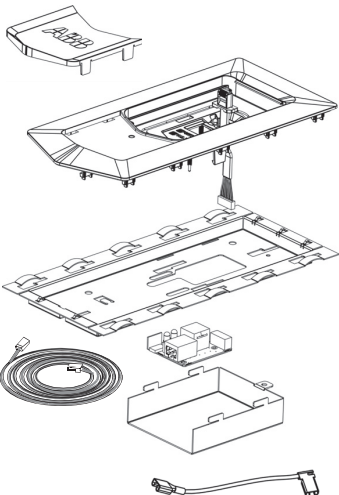
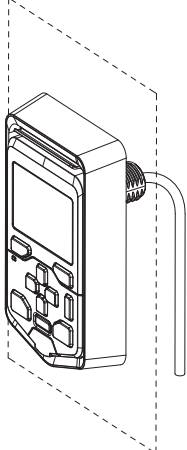
- Inverter module(s)
- Common mode filters
- ACS-AP-W or ACS-AP-I control panel (required for commissioning)
- Control unit kit
- Fiber optic cables
- Quick connector.

Other parts given in this chapter can be required by the application or make the installation of the module easier.

■ Control panel

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

The control panel can be flush mounted on the cabinet door with the help of a door mounting kit. For more information on the control panel, see [ACS-AP-I, -S, -W and ACH-AP-H, -W 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	
DPMP-02	Door mounting kit (IP65)	3AXD50000009374	

For more information on the door mounting kits, such as the contents of the kit, see the installation manuals:

- [DPMP-01 mounting platform for control panels installation guide \(3AUA0000100140 \[English\]\)](#)
- [DPMP-02/03 mounting platform for control panels installations guide \(3AUA0000136205 \[English\]\)](#).

■ Control electronics

Inverter control unit

One control unit is required per inverter unit. The type of the control unit depends on the number of inverter modules as shown below. The control unit is delivered with a memory unit containing the ACS880 primary control program, optionally with application programmability. For availability of other control programs, contact your local ABB representative.

Frame size	Control unit type	Application programmability	Ordering code
R8i, 2×R8i	BCU-02	No	3AXD50000003417
		*Yes	3AXD50000011540
3×R8i...6×R8i	BCU-12	No	3AXD50000006340
		*Yes	3AXD50000011541

*Application programmability using function block based on the IEC 61131-3 standard. For more information, see [Programming manual: Drive application programming \(IEC 61131-3\) \(3AUA0000127808 \[English\]\)](#).

Note: Fiber optic communication with another control unit (such as that of the supply unit) requires an RDCO or FDCO DDCS communication module. For more information, see [RDCO-01/02/03/04 DDCS communication option modules \(3AFE64492209 \[English\]\)](#) and [FDCO-01/02 DDCS communication modules user's manual \(3AUA0000114058 \[English\]\)](#).

Fiber optic cables

Each frame R8i module is connected to the inverter control unit with a pair of fiber optic cables.

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

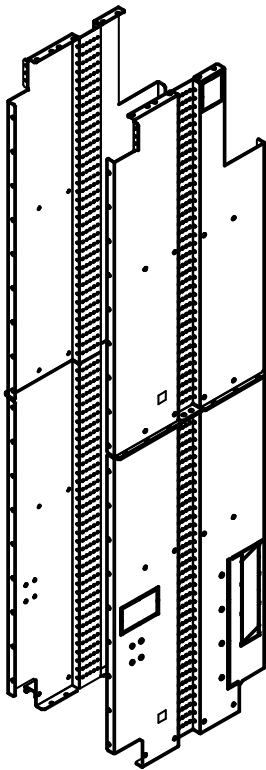
Length	Kit type designation	Ordering code
2 m (6.6 ft)	NLWC-02	58988821
3 m (9.8 ft)	NLWC-03	58948233
5 m (16.4 ft)	NLWC-05	58948250
7 m (23 ft)	NLWC-07	58948268
10 m (32.8 ft)	NLWC-10	58948276

■ **Mechanical installation accessories**

These kits include parts that are used for installing the module in the enclosure.

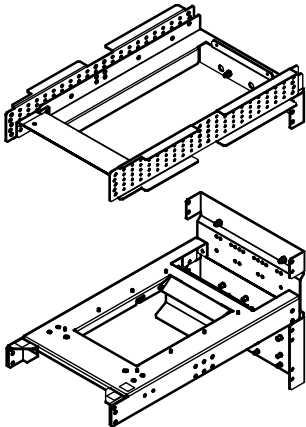
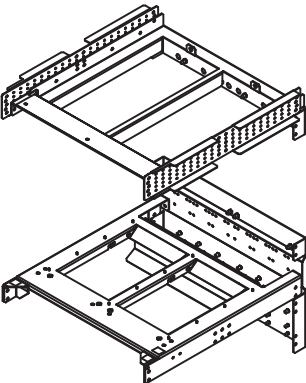
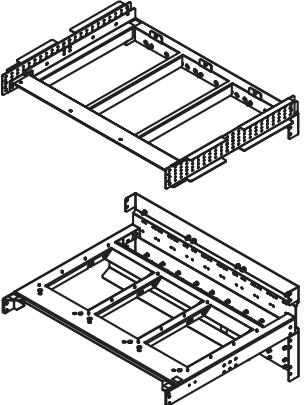
Side plate kit

These parts attach to the left-hand and right-hand sides of the VX25 enclosure frame and act as a mounting base for the module guides.

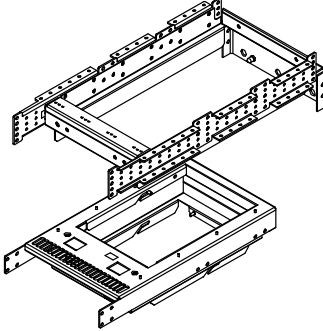
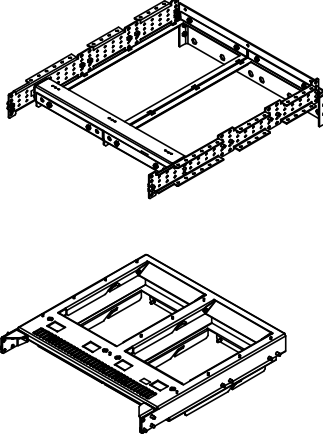
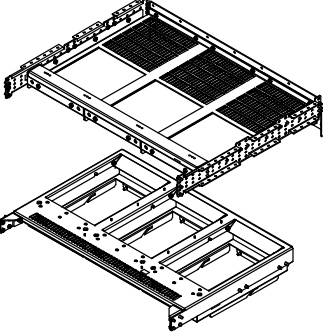
Used with...	Qty	Ordering code	Kit code	Illustration
400/600/800 mm VX25 enclosure	1	3AXD50000360543	L-468-8-020-VX	 Instruction code: 3AXD50000327591

Module top/bottom guides

This kit contains the frames that support the module at the top and the bottom.

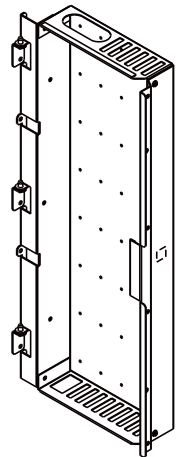
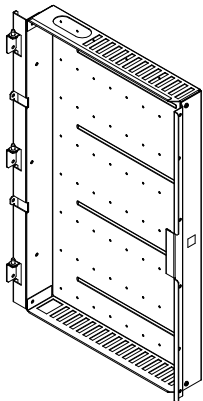
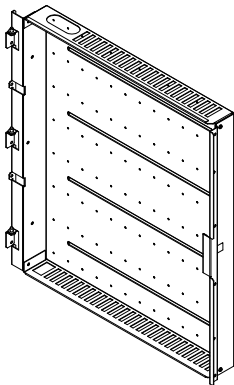
Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure	1	3AXD50000360598	L-4-8-301-VX	 Instruction code: 3AXD50000330461
600 mm VX25 enclosure	1	3AXD50000361090	L-6-8-302-VX	 Instruction code: 3AXD50000330201
800 mm VX25 enclosure	1	3AXD50000361274	L-8-8-303-VX	 Instruction code: 3AXD50000329502

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Used with...	Qty	Ordering code	Kit code	Illustration
400 mm generic enclosure	1	3AXD50000043678	L-4-8-301	 Instruction code: 3AXD50000043726
600 mm generic enclosure	1	3AXD50000041710	L-6-8-302	 Instruction code: 3AXD50000041836
800 mm generic enclosure	1	3AXD50000041248	L-8-8-303	 Instruction code: 3AXD50000041461

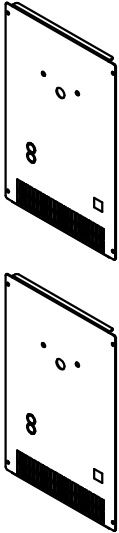
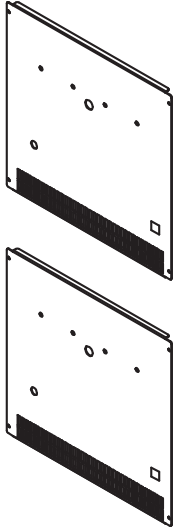
Swing-out frame

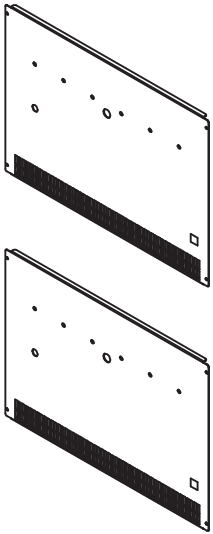
The swing-out frame is a hinged compartment that can be used as a mounting base for eg. control electronics and auxiliary voltage circuit components.

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure	1	3AXD50000361045	L-4-X-051-VX	 Instruction code: 3AXD50000345106
600 mm VX25 enclosure	1	3AXD50000361250	L6-X-052-VX	 Illustration code: 3AXD50000345069
800 mm VX25 enclosure	1	3AXD50000361410	L-8-X-053-VX	 Instruction code: 3AXD50000344864

Shrouding

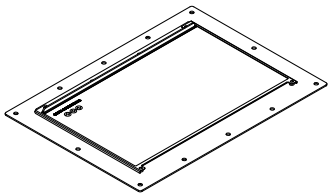
This kit contains the shrouds, as well as the necessary brackets and screws, to cover the top and bottom parts of the cubicle.

Frame size	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure	1	3AXD50000361083	L-4-8-022-VX	 Instruction code: 3AXD50000353354
600 mm VX25 enclosure	1	3AXD50000361267	L-6-8-023-VX	 Instruction code: 3AXD50000353521

Frame size	Qty	Ordering code	Kit code	Illustration
800 mm VX25 enclosure	1	3AXD50000361427	L-8-8-024-VX	 Instruction code: 3AXD50000353125

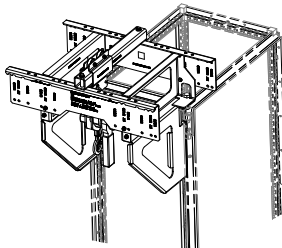
Pressure relief kit

The explosion exhaust plate acts as a pressure relief vent in case of arcing inside the cubicle. This part is installed on the roof of the cabinet.

Used with ...	Qty	Ordering code	Kit code	Illustration
VX25 enclosure	1 per cubicle	3AXD50000667260	L-4-X-460-VX	 Instruction code: 3AXD50000666430

Lifting device

Use the lifting device when replacing a module in the Rittal VX25 enclosure.

Frame	Enclosure	Qty	Ordering code	Illustration
R7i, R8i	Rittal VX25	1	3AXD50000439997	 Instruction code: 3AXD50000210268, 3AXD50000439409

■ **DC-side components**

Frame R8i modules are connected to the DC bus through fuses. The design presented in this manual has flush-end fuse blocks bolted to the DC busbars.

A DC switch-disconnector can be installed if quick isolation of the module from the DC bus is required. One of the auxiliary contacts of the switch is used for monitoring the open/closed state of the switch. A capacitor charging circuit is to be installed with the DC switch-disconnector.

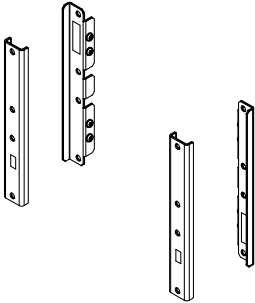
Note: A separate capacitor charging circuit must be designed and installed by the customer if the inverter unit is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

The common mode filters are mounted onto the busbars that connect to the DC input of the inverter module.

DC bus installation parts (for Rittal VX25 enclosures)

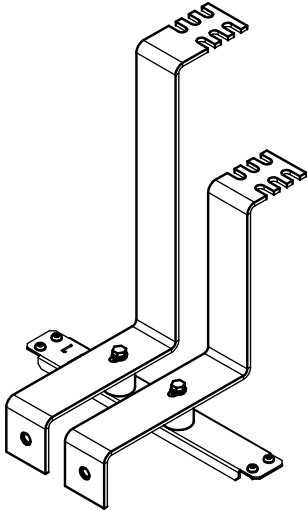
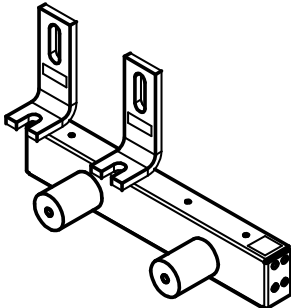
The brackets in this kit act as a mounting base for the busbar supports of the Rittal Flat-PLS DC bus and ensure its correct placement and alignment inside the cabinet line-up.

The designs shown in this manual for Rittal VX25 enclosures use the Rittal Flat-PLS busbar system. Make sure that the current in the drive system does not exceed the current-carrying capacity of the busbars.

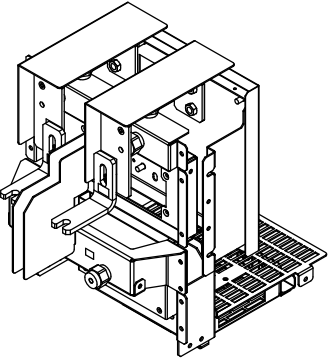
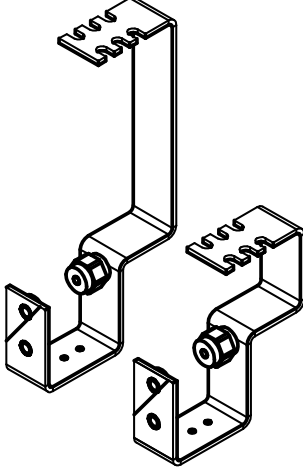
Used with ...	Qty	Ordering code	Kit code	Illustration
VX25 enclosure	1 kit per cubicle	3AXD50000333387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

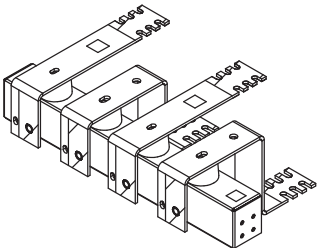
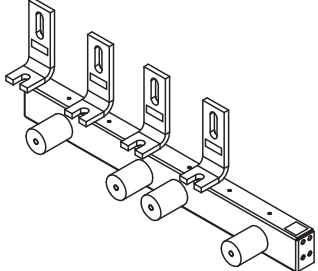
DC connection parts 1 of 2 (for Rittal VX25 enclosures)

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

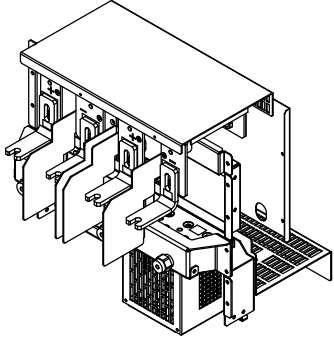
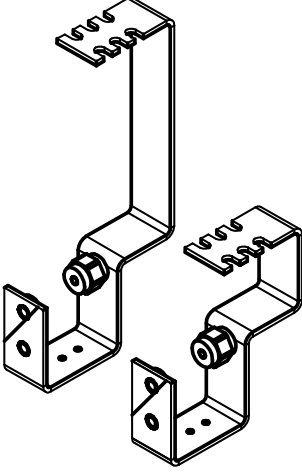
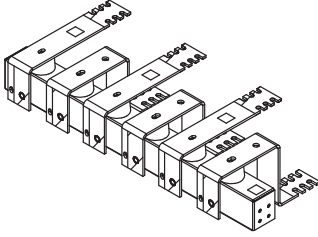
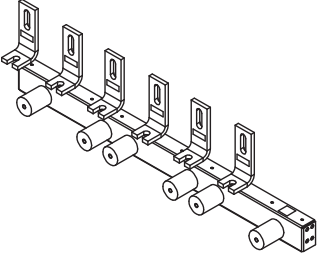
Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure without DC switch	1	3AXD50000360604	L-4-8-201-VX	 Instruction code: 3AXD50000332861
	1	3AXD50000361021	L-4-8-251-VX	 Instruction code: 3AXD50000332885

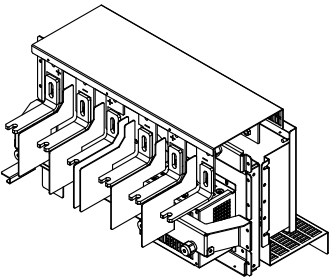
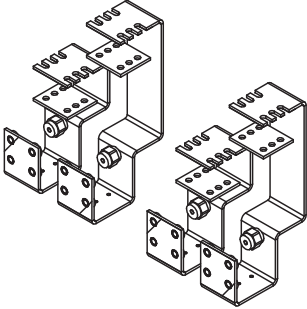
230 Ordering information

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with DC switch	1	3AXD50000361038	L-4-8-254-VX	 Instruction code: 3AXD50000342600
	1	3AXD50000360567	L-46-8-207-VX	 Instruction code: 3AXD50000343614

Used with...	Qty	Ordering code	Kit code	Illustration
600 mm VX25 enclosure without DC switch	1	3AXD50000361106	L-6-8-202-VX	 Instruction code: 3AXD50000332229
	1	3AXD50000361229	L-6-8-252-VX	 Instruction code: 3AXD50000332106

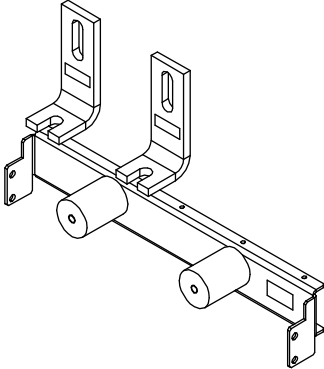
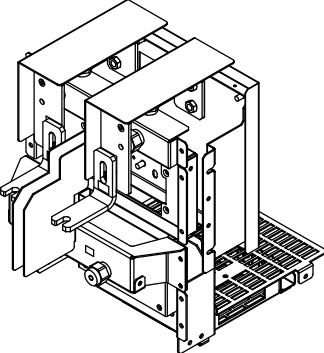
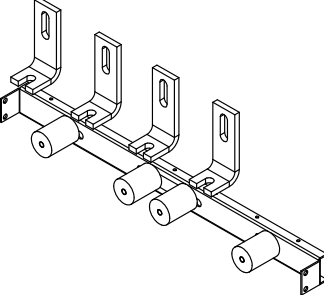
232 Ordering information

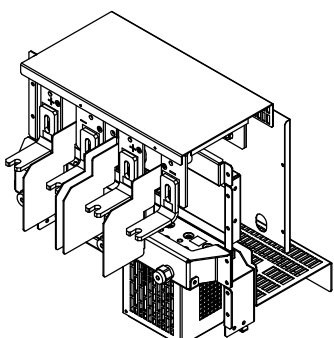
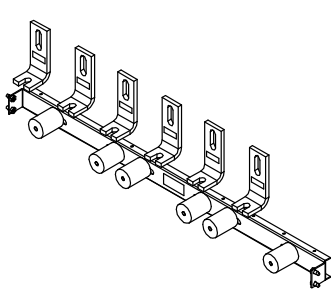
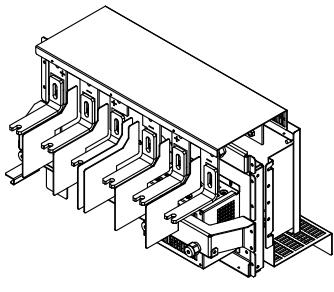
Used with...	Qty	Ordering code	Kit code	Illustration
600 mm VX25 enclosure with DC switch	1	3AXD50000361243	L-6-8-255-VX	 Instruction code: 3AXD50000338740
	2	3AXD50000360567	L-46-8-207-VX	 Instruction code: 3AXD50000343614
800 mm VX25 enclosure without DC switch	1	3AXD50000361281	L-8-8-203-VX	 Instruction code: 3AXD50000331567
	1	3AXD50000361298	L-8-8-253-VX	 Instruction code: 3AXD50000331765

Used with...	Qty	Ordering code	Kit code	Illustration
800 mm VX25 enclosure with DC switch	1	3AXD50000361304	L-8-8-256-VX	 Instruction code: 3AXD50000336999
	1	3AXD50000360574	L-8-8-208-VX	 Instruction code: 3AXD50000344185

DC connection parts 1 of 2 (for generic enclosures)

These parts provide the DC connection between the DC input (busbars or otherwise) and the DC fuses.

Used with...	Qty	Ordering code	Kit code	Illustration
400 mm generic enclosure without DC switch	1	3AXD50000540150	L-3-8-259	 Instruction code: 3AXD50000540655
400 mm generic enclosure with DC switch	1	3AXD50000361038	L-4-8-254-VX	 Instruction code: 3AXD50000342600
600 mm generic enclosure without DC switch	1	3AXD50000540167	L-5-8-260	 Instruction code: 3AXD50000540723

Used with...	Qty	Ordering code	Kit code	Illustration
600 mm generic enclosure with DC switch	1	3AXD50000361243	L-6-8-255-VX	 Instruction code: 3AXD50000338740
800 mm generic enclosure without DC switch	1	3AXD50000540174	L-7-8-261	 Instruction code: 3AXD50000540693
800 mm generic enclosure with DC switch	1	3AXD50000361304	L-8-8-256-VX	 Instruction code: 3AXD50000336999

DC switch-disconnector kits (for Rittal VX25 or generic enclosures)

Used with...	Switch type Handle type	Qty	Ordering code	Instruction code
Frame R8i with DC switch (IEC)	OT1600E11 OHB150J12P	1	3AXD50000227037	3AXD50000330720
Frame R8i with DC switch (UL)	OT1200U11 OHB150J12P	1	3AXD50000227068	
Frame 2×R8i with DC switch (IEC)	OT1600E22 OHB274J12	1	3AXD50000227044	
Frame 2×R8i with DC switch (UL)	OT1200U22 OHB274J12	1	3AXD50000227075	
Frame 3×R8i with DC switch (IEC)	OT2500E22 OHB274J12	1	3AXD50000227051	

The kit contains the following components:

- DC switch-disconnector (type indicated in table)
- Operating handle (type indicated in table)
- OXP12X395 operating shaft
- Two OA1G10 and two OA3G01 auxiliary contacts
- OTZT4A and PDAL2/24DC interlocks
- OHZX10 alignment ring.

DC charging components

A charging circuit is required if the unit is equipped with a DC switch-disconnector.

Note: A separate capacitor charging circuit must be designed and installed by the customer if the inverter unit is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

Charging switch kits

Used with...	Switch type	Qty	Ordering code	Instruction code
Frames R8i and 2×R8i with DC switch (IEC)	OS160GD04F	1	3AXD50000226801	3AXD50000450978
Frames R8i and 2×R8i with DC switch (UL)	OS100GJ04FP	1	3AXD50000227013	
Frame 3×R8i with DC switch (IEC)	OS200DZ22F	1	3AXD50000227020	

The kit contains the following components:

- Charging switch (type indicated in table) with terminal shrouds
- OHB65J6 operating handle
- OXP6X290 operating shaft
- 2 pcs of OA3G01 auxiliary contacts
- BSFC-12C charging controller

- 170M2676 fuses (kit 3AXD50000227013 contains FWJ-30A fuses and conversion parts)
- OHZX10 alignment ring.

Note: Charging resistors are not included in the kit and must be ordered separately.

Charging resistors

Used with...	Qty	Ordering code	Data
Frame R8i with DC switch (IEC, UL)	4	10028531	33 ohm
Frame 2×R8i with DC switch (IEC, UL)	6		
Frame 3×R8i with DC switch (IEC)	8		
Frame 3×R8i with DC switch (UL)	10		
Frame 4×R8i with DC switch (IEC, UL)	12		

Fiber optic cables

A pair of optical cables is needed to connect the charging controller to the inverter module.

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

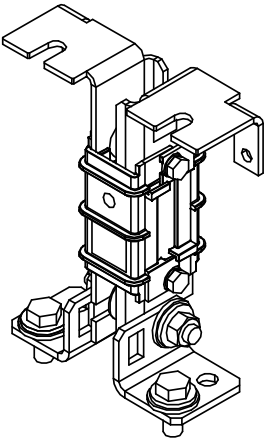
Length	Kit type designation	Ordering code
2 m (6.6 ft)	NLWC-02	58988821
3 m (9.8 ft)	NLWC-03	58948233
5 m (16.4 ft)	NLWC-05	58948250
7 m (23 ft)	NLWC-07	58948268
10 m (32.8 ft)	NLWC-10	58948276

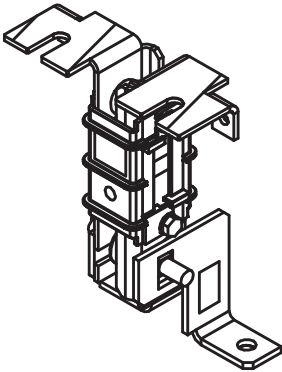
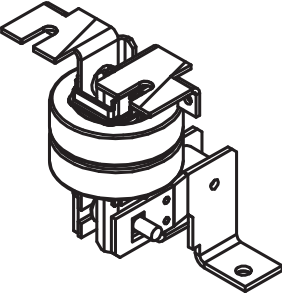
DC fuses (IEC, UL)See also [Fuse data \(page 264\)](#).

Unit type ACS880- 104LC-	Frame size	Qty	Ordering code	Fuse		
				Type (Bussmann)	Data	Size
0390A-7	R8i	2	63919128	170M6546	800 A	3
0430A-7	R8i	2	63919128	170M6546	800 A	3
0480A-7	R8i	2	63919381	170M6547	900 A	3
0530A-7	R8i	2	63916749	170M6548	1000 A	3
0600A-7	R8i	2	68736021	170M6549	1100 A	3
0670A-7	R8i	2	63919462	170M6500	1250 A	3*
0750A-7	R8i	2	3AUA0000086673	170M6501	1400 A	3*
0850A-7	R8i	2	3AUA0000086673	170M6501	1400 A	3*
1030A-7	2×R8i	4	63916749	170M6548	1000 A	3
1170A-7	2×R8i	4	68736021	170M6549	1100 A	3
1310A-7	2×R8i	4	63919462	170M6500	1250 A	3*
1470A-7	2×R8i	4	3AUA0000086673	170M6501	1400 A	3*
1660A-7	2×R8i	4	3AUA0000086673	170M6501	1400 A	3*
1940A-7	3×R8i	6	63919462	170M6500	1250 A	3*
2180A-7	3×R8i	6	3AUA0000086673	170M6501	1400 A	3*
2470A-7	3×R8i	6	3AUA0000086673	170M6501	1400 A	3*
2880A-7	4×R8i	8	3AUA0000086673	170M6501	1400 A	3*
3260A-7	4×R8i	8	3AUA0000086673	170M6501	1400 A	3*

DC connection parts 2 of 2 (for Rittal VX25 or generic enclosures)

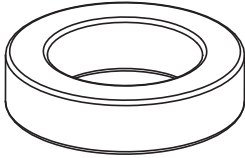
These parts connect the DC fuses to the inverter module.

Used with	Qty	Ordering code	Kit code	Illustration
All VX25 and generic enclosures (without DC switch)	1 per module	3AXD50000041264	L-468-8-230	 Instruction code: 3AXD50000041311 Note: Filters to be ordered separately

Used with	Qty	Ordering code	Kit code	Illustration
400 mm and 600 mm VX25 enclosures (with DC switch)	1 per mod- ule	3AXD50000200368	L-46-8-233	 Instruction code: 3AXD50000205042 Note: Filters to be ordered sep- arately
800 mm VX25 enclosures (with DC switch)	3	3AXD50000200337	L-8-8-234	 Instruction code: 3AXD50000205226 Note: Filters to be ordered sep- arately

Common mode filters

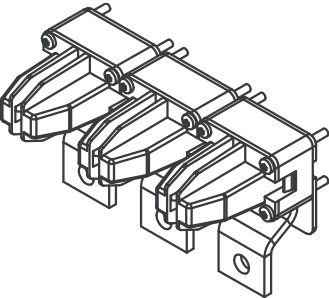
Common mode filtering reduces bearing currents and is required for electromagnetic compatibility (EMC). The filtering is implemented by installing two toroidal cores onto the DC busbars.

Used with	Qty	Ordering code	Kit code	Illustration
All enclosure types	2 per mod- ule	3AXD50000566785	-	

■ AC-side components

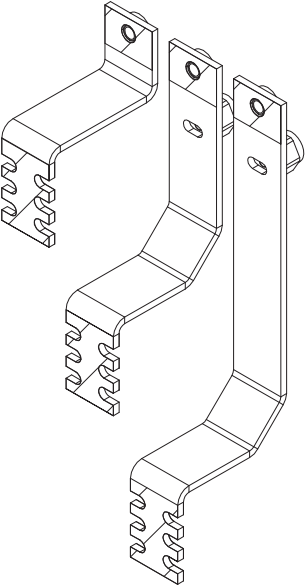
Quick connector

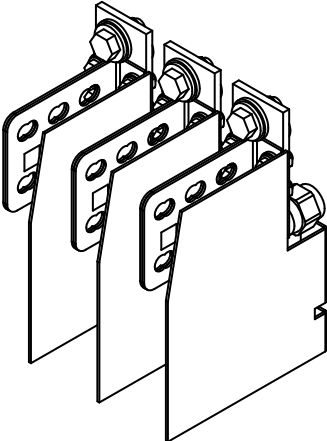
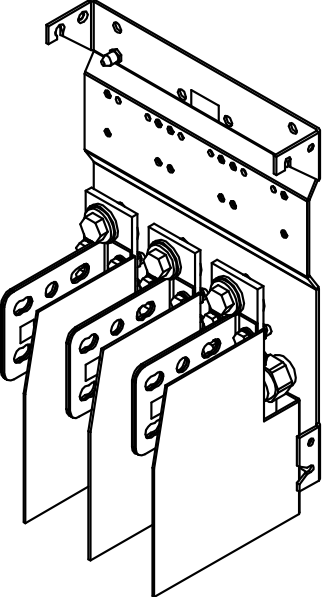
The power input is connected to the module through a quick connector.

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

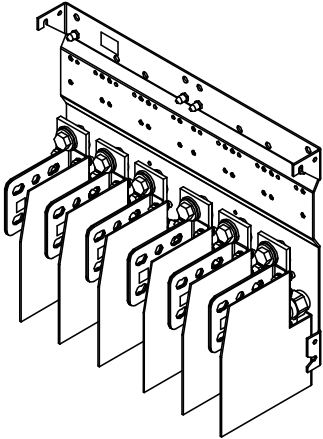
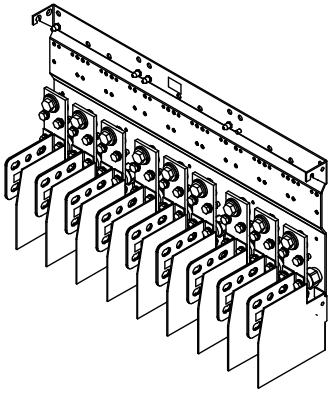
Output busbars

This kit contains busbars that attach to the quick connector, and the terminals for the motor cables. Note that the kits for multiple modules have no built-in interconnections, so each module in the same cubicle must be separately (and identically) cabled to the motor.

Used with	Qty	Ordering code	Kit code	Illustration
400/600/800 mm VX25 enclosure	1 per module	3AXD50000371037	L-468-8-121-VX	

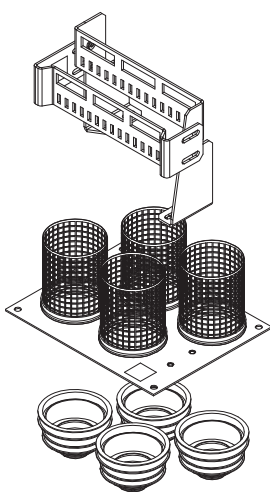
Used with	Qty	Ordering code	Kit code	Illustration
400/600/800 mm VX25 enclosure	1 per module	3AXD50000360550	L-468-8-131-VX	 Instruction code: 3AXD50000330874
400 mm generic enclosure	1	3AXD50000043691	L-4-8-131	 Instruction code: 3AXD50000043742

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Used with	Qty	Ordering code	Kit code	Illustration
600 mm generic enclosure	1	3AXD50000041733	L-6-8-132	 Instruction code: 3AXD50000041888
800 mm generic enclosure	1	3AXD50000041734	L-8-8-133	 Instruction code: 3AXD50000041909

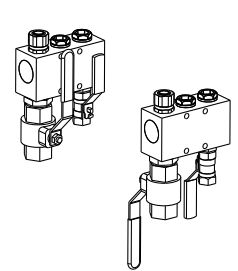
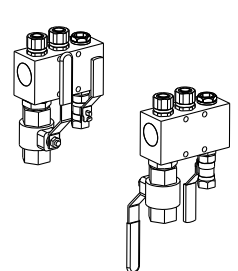
Cable entry kit

Cable entry kit, to be installed on the bottom plate of the enclosure, contains four 60 mm diameter inlets for cables with grommets, wire meshing for 360° grounding, and a strain relief bracket.

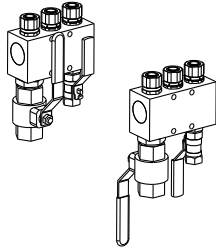
Used with ...	Qty	Ordering code	Kit code	Illustration
All enclosure types	1 per module (minimum)	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

■ Cooling system parts

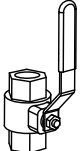
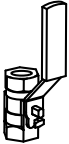
Coolant distribution manifold kits

Enclosure	Qty	Ordering code	Kit code	Illustration
400/600/800mm VX25 and generic enclosure (1 module)	1	3AXD500000044084	L-468-8-441	 Instruction code: 3AXD500000048217
400/600/800mm VX25 and generic enclosure (2 modules)	1	3AXD500000044182	L-468-8-442	 Instruction code: 3AXD500000048258

244 Ordering information

Enclosure	Qty	Ordering code	Kit code	Illustration
400/600/800mm VX25 and gener- ic enclosure (3 modules)	1	3AXD50000048136	L-468-8-443	 Instruction code: 3AXD50000048283

The manifold kits contain:

-  Inlet and outlet manifolds
-  Inlet and outlet valves
-  Drain valves
-  Nipples for connecting the valves to manifolds
-  Connectors for PA piping
-  Plugs for unused piping connectors
-  Chokes for flow limitation – not used with the ACS880-104LC.

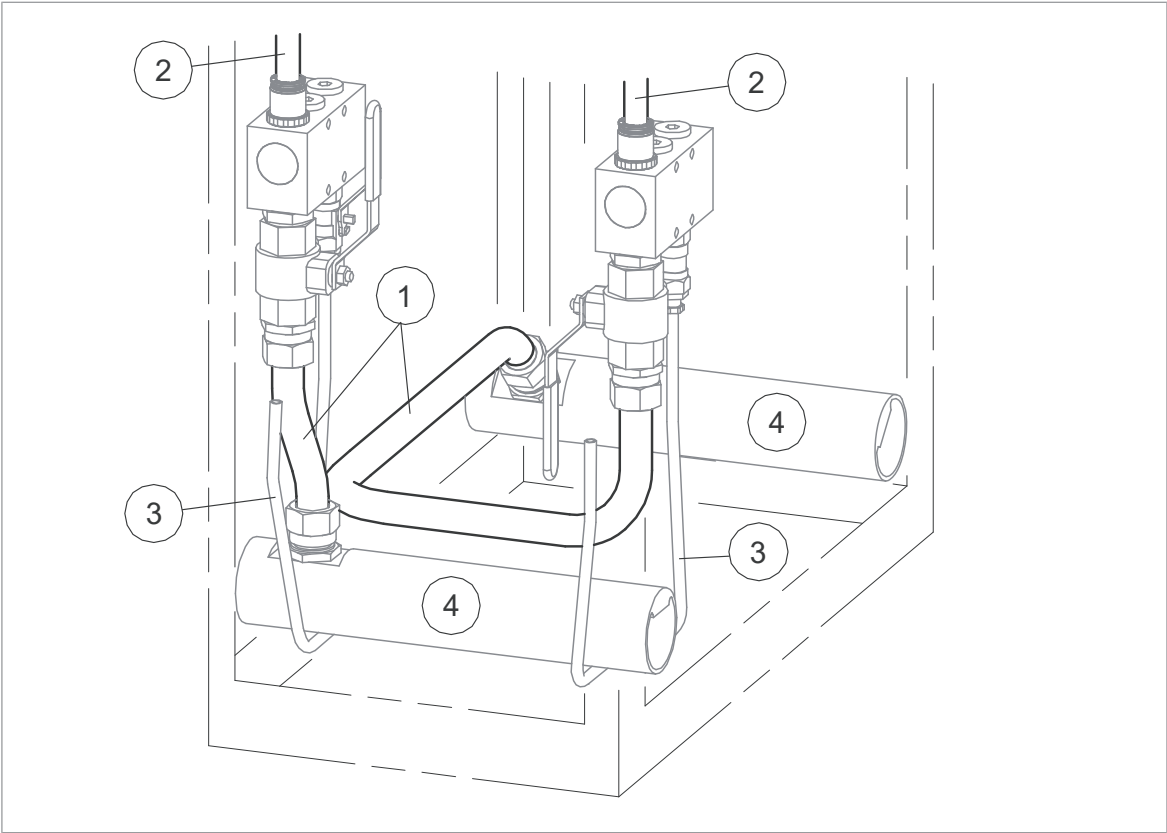
You must order the following parts separately as they are not included in the manifold kits:

- Connectors to attach to inlet, outlet and drain valves
- Connectors to attach to main pipes
- Pipes between main pipe and inlet/outlet valves
- Main pipes
- Drain pipes.

Note: The inlet and outlet valves have an R3/4" internal thread. The drain valves have an R3/8" internal thread.

Piping

PA (polyamide) pipe is available in various diameters on reels. Refer to the figure for application.



Item	Data	Ordering code
1	PA12P40, 22/18 mm, 50 m	3AXD50000441419
2 ¹⁾	PA12P40, 16/13 mm, 50 m PA12P40, 6/4 mm, 100 m	3AXD50000047488 3AXD50001075316
3	PA11P40, 8/6 mm, 50 m	3AXD50000419302
4	Not part of standard product offering	

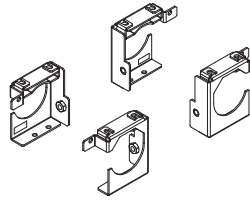
1) Use 16/13 mm pipe between the modules and the manifolds. If the heat exchanger is connected in parallel with the module(s), use 8/6 mm or 6/4 mm pipe between the heat exchanger and the manifolds. If the heat exchanger is connected in series with the module(s), use 16/13 mm pipe.

Heat exchanger

The kit includes the heat exchanger and the connectors for piping.

Used with ...	Qty	Ordering code	Kit code	Illustration
All enclosure types	1 per module	3AXD50000041265	L-468-8-440	

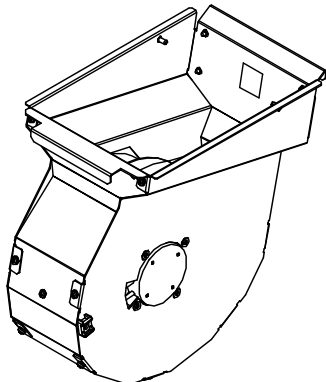
Main pipe support kit

Used with ...	Qty	Ordering code	Kit code	Illustration
Rittal VX25 enclosure	1	3AXD50001155179	L-468-X-450-VX	 Instruction code: 3AXD50001155353

Cooling fan

The fan blows air through the heat exchanger, circulating the air inside the cabinet. The kit contains the fan installed into its cowling which mounts to the module bottom guide.

The fan is selected according to the auxiliary voltage.

Auxiliary voltage	Qty	Ordering code	Illustration
230 V AC (50/60 Hz)	1 / module	3AXD50000043886	
115 V AC (50/60 Hz)	1 / module	3AXD50000045414	

CIO-01 I/O module

CIO-01 I/O module for distributed I/O bus control is not included in the module delivery, but can be ordered separately. The distributed I/O bus controls and supervises each cabinet fan separately. It indicates malfunctioning fans by warning or fault messages. One CIO-01 can monitor and control up to 4 cabinet fans.

For more information, see [CIO-01 I/O module and distributed I/O bus user's manual \(3AXD50000126880 \[English\]\)](#).

Type	Data	Qty	Ordering code
CIO-01	CIO-01 I/O module for distributed I/O bus control	1	3AXD50000041983

11

Technical data

Contents of this chapter

This chapter contains the technical specifications of the inverter modules and associated components.

Ratings

Inverter unit type ACS880- 104LC-	Frame size	Input rat- ings	Output ratings										
			$I_{\max}$	No-overload use				Light-overload use			Heavy-duty use		
		I_1		I_n	P_n		S_n	I_{Ld}	P_{Ld}		I_{Hd}	P_{Hd}	
		A		A	A	kW	hp	kVA	A	kW	hp	A	kW
$U_n = 400\text{ V}$													
0094A-3	R7i	106	150	94	45	-	65	90	45	-	70	37	-
0120A-3	R7i	129	180	115	55	-	80	110	55	-	86	45	-
0140A-3	R7i	159	220	141	75	-	98	135	55	-	105	55	-
0170A-3	R7i	191	260	170	90	-	118	163	75	-	127	55	-
0210A-3	R7i	232	310	206	110	-	143	198	90	-	154	75	-
0250A-3	R7i	277	370	246	132	-	170	236	110	-	184	90	-
0300A-3	R7i	340	460	302	160	-	209	290	132	-	226	110	-
0380A-3	R7i	428	570	380	200	-	263	365	160	-	284	132	-
0470A-3	R7i	523	700	465	250	-	322	446	200	-	348	160	-
0590A-3	2×R7i	664	890	590	315	-	409	566	250	-	441	200	-
0740A-3	2×R7i	833	1110	740	400	-	513	710	355	-	554	250	-
0910A-3	2×R7i	1024	1370	910	500	-	630	874	450	-	681	355	-
1120A-3	3×R7i	1260	1680	1120	630	-	776	1075	560	-	838	450	-

Inverter unit type ACS880-104LC-	Frame size	Input ratings	Output ratings										
			$I_{\max}$	No-overload use				Light-overload use			Heavy-duty use		
				I_n	P_n		S_n	I_{Ld}	P_{Ld}		I_{Hd}	P_{Hd}	
					kW	hp	kVA		kW	hp		kW	hp
1350A-3	3×R7i	1519	2030	1350	710	-	935	1296	710	-	1010	560	-
1460A-3	4×R7i	1643	2190	1460	800	-	1012	1402	710	-	1092	560	-
1790A-3	4×R7i	2014	2690	1790	1000	-	1240	1718	900	-	1339	710	-
$U_n = 500\text{ V}$													
0094A-5	R7i	106	150	94	55	60	81	90	55	60	70	45	50
0120A-5	R7i	129	180	115	75	75	100	110	75	75	86	55	60
0140A-5	R7i	158	210	140	90	100	121	134	90	100	105	55	75
0170A-5	R7i	191	260	170	110	125	147	163	110	125	127	75	100
0200A-5	R7i	225	300	200	132	150	173	192	132	150	150	90	100
0240A-5	R7i	270	360	240	160	200	208	230	160	200	180	110	150
0300A-5	R7i	340	460	302	200	250	262	290	200	200	226	132	150
0380A-5	R7i	428	570	380	250	300	329	365	200	250	284	160	200
0460A-5	R7i	519	700	461	315	400	399	443	315	350	345	200	250
0590A-5	2×R7i	664	890	590	400	500	511	566	355	450	441	315	350
0740A-5	2×R7i	833	1110	740	500	600	641	710	450	600	554	355	450
0900A-5	2×R7i	1013	1350	900	630	700	779	864	560	700	673	450	500
1110A-5	3×R7i	1249	1670	1110	710	1000	961	1066	710	900	830	560	700
1340A-5	3×R7i	1508	2010	1340	900	1000	1160	1286	900	1000	1002	710	900
1460A-5	4×R7i	1643	2190	1460	1000	1250	1264	1402	1000	1250	1092	710	900
1770A-5	4×R7i	1991	2660	1770	1200	1500	1533	1699	1200	1500	1324	900	1000
$U_n = 690\text{ V}$													
0062A-7	R7i	70	93	62	55	60	74	60	55	60	46	45	40
0082A-7	R7i	92	130	82	75	75	98	79	75	75	61	55	50
0100A-7	R7i	111	150	99	90	100	118	95	90	75	74	55	60
0130A-7	R7i	141	190	125	110	125	149	120	110	100	94	75	75
0140A-7	R7i	162	220	144	132	150	172	138	132	125	108	90	100
0190A-7	R7i	216	290	192	160	200	229	184	160	150	144	132	125
0220A-7	R7i	244	330	217	200	250	259	208	200	200	162	160	150
0290A-7	R7i	325	440	289	250	300	345	277	250	250	216	200	200
0340A-7	R7i	383	510	340	315	350	406	326	250	300	254	200	250
0389A-7	R7i	439	590	390	355	400	466	374	355	350	292	250	300
0560A-7	2×R7i	630	840	560	500	600	669	538	500	500	419	400	400
0660A-7	2×R7i	743	990	660	630	700	789	634	500	600	494	400	500
0760A-7	2×R7i	855	1140	760	710	800	908	730	710	700	568	500	600
0840A-7	3×R7i	945	1260	840	800	900	1004	806	800	900	628	500	600
0980A-7	3×R7i	1103	1470	980	900	1000	1171	941	900	1000	733	710	700
1130A-7	3×R7i	1271	1700	1130	1000	1250	1350	1085	1000	1000	845	800	900
1300A-7	4×R7i	1463	1950	1300	1200	1250	1554	1248	1200	1250	972	900	1000

Inverter unit type ACS880-104LC-	Frame size	Input ratings	Output ratings										
			$I_{\max}$	No-overload use			Light-overload use			Heavy-duty use			
		I_1		I_n	P_n		S_n	I_{Ld}	P_{Ld}		I_{Hd}	P_{Hd}	
		A		A	A	kW	hp	kVA	A	kW	hp	A	kW
1490A-7	4×R7i	1676	2240	1490	1400	1500	1781	1430	1400	1500	1115	1000	1000
0390A-7	R8i	439	590	390	355	400	466	374	355	350	292	250	300
0430A-7	R8i	484	650	430	400	450	514	413	355	450	322	250	300
0480A-7	R8i	540	720	480	450	500	574	461	400	450	359	315	350
0530A-7	R8i	596	800	530	500	550	633	509	450	500	396	355	400
0600A-7	R8i	675	900	600	560	600	717	576	560	600	449	400	450
0670A-7	R8i	754	1010	670	630	700	801	643	630	700	501	450	500
0750A-7	R8i	844	1130	750	710	800	896	720	710	700	561	500	600
0850A-7	R8i	956	1280	850	800	900	1016	816	800	900	636	560	600
1030A-7	2×R8i	1159	1550	1030	1000	1000	1231	989	900	1000	770	710	800
1170A-7	2×R8i	1316	1760	1170	1100	1250	1398	1123	1100	1250	875	800	900
1310A-7	2×R8i	1474	1970	1310	1200	1250	1566	1258	1200	1250	980	900	1000
1470A-7	2×R8i	1654	2210	1470	1400	1500	1757	1411	1200	1500	1100	1000	1000
1660A-7	2×R8i	1868	2490	1660	1600	1750	1984	1594	1400	1750	1242	1200	1250
1940A-7	3×R8i	2183	2910	1940	1800	2000	2319	1862	1800	2000	1451	1400	1500
2180A-7	3×R8i	2453	3270	2180	2000	-	2605	2093	2000	-	1631	1400	1750
2470A-7	3×R8i	2779	3710	2470	2300	-	2952	2371	2300	-	1848	1800	2000
2880A-7	4×R8i	3240	4320	2880	2700	-	3442	2765	2700	-	2154	2000	-
3260A-7	4×R8i	3668	4890	3260	3000	-	3896	3130	3000	-	2438	2300	-

■ Definitions

U_n	Nominal AC supply voltage of drive system
I_1	Nominal DC input current
I_n	Nominal output current (available continuously with no overloading)
P_n	Typical motor power in no-overload use The horsepower ratings are typical NEMA motor sizes at 460 V (ACS880-104LC-xxxxA-5) and 575 V (ACS880-104LC-xxxxA-7) respectively.
S_n	Apparent power in no-overload use
I_{Ld}	Continuous rms output current allowing 10% overload for 1 minute every 5 minutes
P_{Ld}	Typical motor power in light-overload use
$I_{\max}$	Maximum output current. Available for 10 seconds at start; otherwise as long as allowed by drive temperature.
I_{Hd}	Continuous rms output current allowing 50% overload for 1 minute every 5 minutes
P_{Hd}	Typical motor power in heavy-duty use

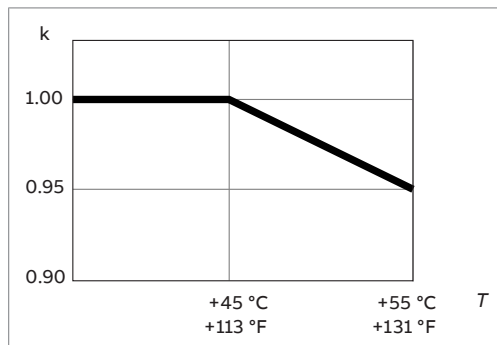
Note:

- The ratings apply at an ambient temperature of 45 °C (113 °F) and a coolant temperature of 40 °C (104 °F).
- To achieve the rated motor power given in the table, the rated current of the drive must be higher than or equal to the rated motor current.
- The DriveSize dimensioning tool available from ABB is recommended for selecting the drive, motor and gear combination.

Derating

■ Surrounding air temperature derating

In the temperature range +45...55 °C (+113...131 °F), the rated output current is derated by 0.5 percentage points 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):



■ Coolant temperature derating

See section [Temperature limits \(page 386\)](#).

■ Antifreeze content derating

See section [Temperature limits \(page 386\)](#).

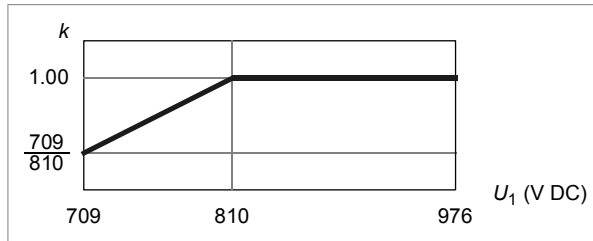
■ Altitude derating

At altitudes more than 1000 m (3281 ft) above sea level, the output current derating is 1 percentage point for every added 100 m (328 ft). For example, the derating factor for 1500 m (4921 ft) is 0.95. The maximum permitted installation altitude is given in the technical data.

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

■ Supply voltage derating (frame n×R8i inverter units with diode supply unit)

If the DC supply voltage of the inverter unit (U_1) is below 810 V (which corresponds to a drive supply voltage of 600 V AC when a diode supply unit is used), the rated output current must be derated by multiplying by $U_1/810$ (represented by k in the diagram).



■ Switching frequency derating

Switching frequency derating is necessary, if the switching frequency is more than 3.0 kHz.

Frame R7i

$U_n = 400$ V: In the switching frequency range 3.0 ... 10.5 kHz, the output current is derated by 6 percentage points for each kHz.

$U_n = 500$ V: In the switching frequency range 3.0 ... 10.5 kHz, the output current is derated by 7 percentage points for each kHz.

$U_n = 690$ V: In the switching frequency range 3.0 ... 7.5 kHz, the output current is derated by 10 percentage points for each kHz.

For example, for a 690 V inverter with a switching frequency of 5 kHz, the derating factor is 0.80.

Frame R8i

$U_n = 690$ V: In the switching frequency range 3.0 ... 7.5 kHz, the output current is derated by 8 percentage points for each kHz.

For example, for a 690 V inverter with a switching frequency of 5 kHz, the derating factor is 0.84.

■ Output frequency derating

Output frequency derating is necessary, if:

- the output frequency is continuously or frequently less than 12 Hz, or
- the inverter has du/dt filtering, and the output frequency is more than 150 Hz.

Temporary use at an output frequency of less than 12 Hz does not require derating.

When the switching frequency and the output frequency are both in a frequency range that requires derating, only the larger derating factor needs to be considered.

Frame R7i without du/dt filtering

This section is applicable to R7i modules without du/dt filtering (without option +E205).

At an output frequency of less than 12 Hz, the output current is derated by 3.5 percentage points for each Hz. For example, the derating factor for 9 Hz is 0.895.

Frame R7i with du/dt filtering

This section is applicable to R7i modules with du/dt filtering (with option +E205).

At an output frequency of less than 12 Hz, the output current is derated by 3.5 percentage points for each Hz. For example, the derating factor for 9 Hz is 0.895.

At an output frequency of more than 150 Hz, the output current is derated by 0.7 percentage points for each 10 Hz. For example, the derating factor for 250 Hz is 0.93.

Frame R8i

This section is applicable to R8i modules, which have du/dt filtering as standard.

At an output frequency of less than 12 Hz, the output current is derated by 3.5 percentage points for each Hz. For example, the derating factor for 9 Hz is 0.895.

At an output frequency of more than 150 Hz, the output current is derated by 1 percentage point for each 10 Hz. For example, the derating factor for 250 Hz is 0.90.

Cooling characteristics

Inverter unit type ACS880-104LC-	Frame size	Power loss ¹⁾		Coolant volume		Coolant flow rate ²⁾	Pressure loss ³⁾
		Into coolant	Into air surrounding cabinet	Modules including heat exchanger	Cabinet piping including main pipes and manifolds		
		W	W	l (US qt)	l (US qt)		
U _n = 400 V							
0094A-3	R7i	900	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0120A-3	R7i	1100	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0140A-3	R7i	1300	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0170A-3	R7i	1500	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0210A-3	R7i	1900	30	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0250A-3	R7i	2400	40	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0300A-3	R7i	3100	40	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0380A-3	R7i	4300	60	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0470A-3	R7i	5900	70	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0590A-3	2×R7i	6000	90	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0740A-3	2×R7i	8300	110	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0910A-3	2×R7i	11200	140	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1120A-3	3×R7i	12300	160	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1350A-3	3×R7i	17200	210	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1460A-3	4×R7i	16400	220	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1790A-3	4×R7i	22300	280	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
U _n = 500 V							
0094A-5	R7i	970	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0120A-5	R7i	1200	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0140A-5	R7i	1500	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0170A-5	R7i	1700	30	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0200A-5	R7i	2000	30	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0240A-5	R7i	2500	40	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0300A-5	R7i	3300	50	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120

Inverter unit type ACS880-104LC-	Frame size	Power loss ¹⁾		Coolant volume		Coolant flow rate ²⁾	Pressure loss ³⁾
		Into coolant	Into air surrounding cabinet	Modules including heat exchanger	Cabinet piping including main pipes and manifolds		
		W	W	l (US qt)	l (US qt)		
0380A-5	R7i	4600	60	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0460A-5	R7i	6100	80	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0590A-5	2×R7i	6400	90	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0740A-5	2×R7i	8800	120	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0900A-5	2×R7i	11700	140	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1110A-5	3×R7i	13300	170	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1340A-5	3×R7i	17600	220	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1460A-5	4×R7i	17400	230	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
1770A-5	4×R7i	23300	290	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
$U_n = 690 \text{ V}$							
0062A-7	R7i	1190	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0082A-7	R7i	1470	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0100A-7	R7i	1730	20	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0130A-7	R7i	2100	30	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0140A-7	R7i	2500	30	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0190A-7	R7i	3300	40	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0220A-7	R7i	3700	50	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0290A-7	R7i	4600	60	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0340A-7	R7i	5600	70	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0389A-7	R7i	6700	80	0.5 (0.5) ⁴⁾	1.9 (2.0) ⁵⁾	13 (3.4) ⁶⁾	120
0560A-7	2×R7i	8800	110	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	26 (6.9) ⁸⁾	120
0660A-7	2×R7i	10800	130	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	26 (6.9) ⁸⁾	120
0760A-7	2×R7i	13100	160	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	26 (6.9) ⁸⁾	120
0840A-7	3×R7i	13300	160	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	39 (10.3) ⁸⁾	120
0980A-7	3×R7i	16100	200	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	39 (10.3) ⁸⁾	120
1130A-7	3×R7i	19500	230	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	39 (10.3) ⁸⁾	120
1300A-7	4×R7i	21400	260	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	52 (13.7) ⁸⁾	120
1490A-7	4×R7i	25700	310	0.5 (0.5) ⁷⁾	1.9 (2.0) ⁵⁾	52 (13.7) ⁸⁾	120
0390A-7	R8i	5000	100	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120
0430A-7	R8i	5500	100	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120
0480A-7	R8i	6200	200	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120
0530A-7	R8i	7000	200	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120
0600A-7	R8i	8000	200	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120
0670A-7	R8i	9200	200	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120
0750A-7	R8i	10500	300	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120
0850A-7	R8i	12400	300	1.9 (2.0)	2.4 (2.5)	16 (4.2)	120

Inverter unit type ACS880-104LC-	Frame size	Power loss ¹⁾		Coolant volume		Coolant flow rate ²⁾	Pressure loss ³⁾
		Into coolant	Into air surrounding cabinet	Modules including heat exchanger	Cabinet piping including main pipes and manifolds		
		W	W	l (US qt)	l (US qt)		
1030A-7	2×R8i	13600	300	3.8 (4.0)	4.0 (4.2)	32 (8.5)	120
1170A-7	2×R8i	15600	400	3.8 (4.0)	4.0 (4.2)	32 (8.5)	120
1310A-7	2×R8i	17900	500	3.8 (4.0)	4.0 (4.2)	32 (8.5)	120
1470A-7	2×R8i	20600	500	3.8 (4.0)	4.0 (4.2)	32 (8.5)	120
1660A-7	2×R8i	24200	600	3.8 (4.0)	4.0 (4.2)	32 (8.5)	120
1940A-7	3×R8i	26500	700	5.7 (6.0)	5.7 (6.0)	48 (12.5)	120
2180A-7	3×R8i	30600	800	5.7 (6.0)	5.7 (6.0)	48 (12.5)	120
2470A-7	3×R8i	36000	900	5.7 (6.0)	5.7 (6.0)	48 (12.5)	120
2880A-7	4×R8i	40400	1000	7.6 (8.0)	8.0 (8.5)	64 (17)	120
3260A-7	4×R8i	47500	1200	7.6 (8.0)	8.0 (8.5)	64 (17)	120

¹⁾ These losses are not calculated according to IEC 61800-9-2.

²⁾ The mass flow values are for modules only. Additional heat exchangers, which might be needed for cooling of cabinet, are not included in these mass flow values.

³⁾ Per cubicle (applicable to designs presented in this manual).

⁴⁾ Single-module cabinet configuration. 0.7 (0.75) for both modules combined in two-module cabinet configuration.

⁵⁾ Single-module cabinet configuration. 2.5 (2.6) for two-module cabinet configuration.

⁶⁾ Single-module cabinet configuration. 28 (7.4) for two-module cabinet configuration.

⁷⁾ One module in single-module cabinet configuration. 0.7 (0.75) for both modules combined in two-module cabinet configuration.

⁸⁾ One module in single-module cabinet configuration. 28 (7.4) for two modules in two-module cabinet configuration).

Modules used, noise, DC capacitance

Inverter unit type ACS880-104LC-	Inverter modules used		Noise level*	DC capacitance
	Qty	Type ACS880-104LC-	dB(A)	μF
$U_n = 400\text{ V}$				
0094A-3	1	0094A-3	63	4800
0120A-3	1	0120A-3	63	4800
0140A-3	1	0140A-3	63	4800
0170A-3	1	0170A-3	63	6400
0210A-3	1	0210A-3	63	6400
0250A-3	1	0250A-3	63	6400
0300A-3	1	0300A-3	63	6400
0380A-3	1	0380A-3	63	9600
0470A-3	1	0470A-3	63	9600
0590A-3	2	0300A-3	66	19200
0740A-3	2	0380A-3	66	19200
0910A-3	2	0470A-3	66	19200
1120A-3	3	0380A-3	68	28800

Inverter unit type ACS880- 104LC-	Inverter modules used		Noise level*	DC capacitance
	Qty	Type ACS880-104LC-	dB(A)	µF
1350A-3	3	0470A-3	68	28800
1460A-3	4	0380A-3	69	38400
1790A-3	4	0470A-3	69	38400
$U_n = 500 \text{ V}$				
0094A-5	1	0094A-5	63	4800
0120A-5	1	0120A-5	63	4800
0140A-5	1	0140A-5	63	4800
0170A-5	1	0170A-5	63	6400
0200A-5	1	0200A-5	63	6400
0240A-5	1	0240A-5	63	6400
0300A-5	1	0300A-5	63	6400
0380A-5	1	0380A-5	63	9600
0460A-5	1	0460A-5	63	9600
0590A-5	2	0300A-5	66	19200
0740A-5	2	0380A-5	66	19200
0900A-5	2	0460A-5	66	19200
1110A-5	3	0380A-5	68	28800
1340A-5	3	0460A-5	68	28800
1460A-5	4	0380A-5	69	38400
1770A-5	4	0460A-5	69	38400
$U_n = 690 \text{ V}$				
0062A-7	1	0062A-7	63	2130
0082A-7	1	0082A-7	63	2130
0100A-7	1	0100A-7	63	2130
0130A-7	1	0130A-7	63	2130
0140A-7	1	0140A-7	63	2130
0190A-7	1	0190A-7	63	3200
0220A-7	1	0220A-7	63	3200
0290A-7	1	0290A-7	63	5330
0340A-7	1	0340A-7	63	5330
0389A-7	1	0389A-7	63	5330
0390A-7	1	0390A-7	63	6000
0430A-7	1	0430A-7	63	6000
0480A-7	1	0480A-7	63	6000
0530A-7	1	0530A-7	63	6000
0600A-7	1	0600A-7	63	9000
0670A-7	1	0670A-7	63	9000
0750A-7	1	0750A-7	63	9000
0850A-7	1	0850A-7	63	9000
1030A-7	2	0530A-7	66	12000

Inverter unit type ACS880-104LC-	Inverter modules used		Noise level*	DC capacitance
	Qty	Type ACS880-104LC-	dB(A)	μF
1170A-7	2	0600A-7	66	18000
1310A-7	2	0670A-7	66	18000
1470A-7	2	0750A-7	66	18000
1660A-7	2	0850A-7	66	18000
1940A-7	3	0670A-7	68	27000
2180A-7	3	0750A-7	68	27000
2470A-7	3	0850A-7	68	27000
2880A-7	4	0750A-7	69	36000
3260A-7	4	0850A-7	69	36000
0560A-7	2	0290A-7	63	10670
0660A-7	2	0340A-7	63	10670
0760A-7	2	0389A-7	63	10670
0840A-7	3	0290A-7	63	16000
0980A-7	3	0340A-7	63	16000
1130A-7	3	0389A-7	63	16000
1300A-7	4	0340A-7	63	21330
1490A-7	4	0389A-7	63	21330

*Measured in a typical ABB (ACS880-107LC) cabinet installation.

Dimensions and weights

The weights of the ACS880-104LC modules are shown below. For the dimensions, see chapter [Dimension drawings](#).

Module type	Weight (without option +E205)		Weight (with option +E205)	
	kg	lbs	kg	lbs
ACS880-104LC-0094A-3 ... -0140A-3 ACS880-104LC-0094A-5 ... -0140A-5 ACS880-104LC-0062A-7 ... -0140A-7	29	64	37	82
ACS880-104LC-0170A-3 ... -0250A-3 ACS880-104LC-0170A-5 ... -0240A-5 ACS880-104LC-0190A-7 ... -0220A-7	30	66	38	84
ACS880-104LC-0300A-3 ... -0470A-3 ACS880-104LC-0300A-5 ... -0460A-5	32	71	40	88
ACS880-104LC-0290A-7 ... -0389A-7	33	73	41	90
ACS880-104LC-0390A-7 ... -0530A-7	-	-	59	130
ACS880-104LC-0600A-7 ... -0850A-7	-	-	63	139

Free space required by cooling

Frame R7i

- Left and right sides, below, above, back: None, but the return flow of air must not be restricted.
- Front: Space needed by coolant piping.

Frame R8i

- Left and right sides, back: None, but the return flow of air must not be restricted.
- Front: Space needed by coolant piping.
- Below: Space needed by heat exchanger and cooling fan.
- Above: The cooling air flow through the module should not be restricted.

For an example, see layout drawings.

Allowable mounting positions

- Upright
- On left-hand side (viewed from the front)

Input power (DC) connection

Voltage (U1)	ACS880-104LC-xxxxx-3: 513...566 V DC. This is indicated in the type designation label as typical input voltage level (566 V DC). ACS880-104LC-xxxxx-5: 513...707 V DC. This is indicated in the type designation label as typical input voltage levels (566/679/707 V DC). ACS880-104LC-xxxxx-7: 709...976 V DC. This is indicated in the type designation label as typical input voltage levels (742/849/976 V DC).
Drive AC supply network type	TN (grounded) and IT (ungrounded) systems up to 690 V AC. Corner-grounded systems up to 600 V AC.
Input terminals	<u>Frame R7i:</u> Quick connectors to installation frame. Fastener size and tightening torque: • Busbars to installation frame: M12. Torque: 70 N·m (52 lbf·ft) <u>Frame R8i:</u> Fastener size and tightening torque: • M12, maximum intrusion into module 20 mm (0.8 in). Torque: 70 N·m (52 lbf·ft).

Motor connection data

Motor types	Asynchronous AC induction motors, permanent magnet synchronous motors, AC induction servomotors and ABB synchronous reluctance (SynRM) motors
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Voltage (U₂)	3-phase symmetrical, U_{max} at field weakening point ACS880-104LC-xxxxx-3: 0...400 V AC. The maximum value (400 V) is a typical drive input voltage level shown on the type designation label of the supply unit corresponding to 380...415 V AC. ACS880-104LC-xxxxx-5: 0...400/480/500 V AC. The maximum values (400/480/500 V) are typical drive input voltage levels shown on the type designation label of the supply unit corresponding to 380...500 V AC. ACS880-104LC-xxxxx-7: 0...525/600/690 V AC. The maximum values (525/600/690 V) are typical drive input voltage levels shown on the type designation label of the supply unit corresponding to 525...690 V AC.
Frequency (f₂)	0...500 Hz - For higher operational output frequencies, contact your local ABB representative. - Operation at frequencies higher than 150 Hz can require derating. For more information, contact your local ABB representative.
Current	Refer to the technical data.
Switching frequency	3 kHz (typical)
Maximum recommended motor cable length	500 m (1640 ft) 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.
Output terminals	<u>Frame R7i:</u> Quick connectors to installation frame. Fastener sizes and tightening torques: - Busbars to installation frame: M12. Torque: 70 N·m (52 lbf·ft) - Cables to busbars: M12. Torque: 70 N·m (52 lbf·ft) <u>Frame R8i:</u> Quick connector. Fastener sizes and tightening torques: - Busbars to quick connector: M12. Torque: 70 N·m (52 lbf·ft) - Busbars to support insulators: M8. Torque: 9 N·m (6.5 lbf·ft) - Cables to busbars: M12. Torque: 70 N·m (52 lbf·ft)

Typical power cable sizes

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

The cable sizing is based on a maximum of 9 cables installed side by side on a ladder type cable tray, with three trays on top of each other (with 30 cm of space between the trays), and an ambient temperature of 30 °C (IEC 60364-5-52).

Conductor cross-section (copper)		PVC insulation Conductor temperature 70°		XLPE insulation Conductor temperature 90°		Typical dimensions of copper cable	
mm ²	AWG / kcmil	I_{Lmax} (A)	Time const. (s)	I_{Lmax} (A)	Time const. (s)	Size	ø [mm]
1.5	16	13	85	16	67	3 × 1.5 + 1.5	13
2.5	12	18	121	23	88	3 × 2.5 + 2.5	14
4	12	24	175	30	133	3 × 4 + 4	16
6	10	30	251	38	186	3 × 6 + 6	18
10	8	42	359	53	268	3 × 10 + 10	21

Conductor cross-section (copper)		PVC insulation Conductor temperature 70°		XLPE insulation Conductor temperature 90°		Typical dimensions of copper cable	
mm ²	AWG / kcmil	I_{Lmax} (A)	Time const. (s)	I_{Lmax} (A)	Time const. (s)	Size	ø [mm]
16	6	56	514	70	391	3 × 16 + 16	23
25	4	71	791	89	598	3 × 25 + 16	24
35	1	88	1000	110	760	3 × 35 + 16	26
50	1/0	107	1308	134	990	3 × 50 + 25	29
70	2/0	137	1613	171	1230	3 × 70 + 35	32
95	4/0	167	2046	209	1551	3 × 95 + 50	38
120	250	193	2441	241	1859	3 × 120 + 70	41
150	300	223	2820	279	2139	3 × 150 + 70	44
185	400	255	3329	319	2525	3 × 185 + 95	50
240	500	301	4073	376	3099	3 × 240 + 120	55
300	600	348	4779	435	3636	3 × 300 + 150	58

Conductor cross-section (aluminum)		PVC insulation Conductor temperature 70°		XLPE insulation Conductor temperature 90°		Typical dimensions of aluminum cable	
mm ²	AWG / kcmil	I_{Lmax} (A)	Time const. (s)	I_{Lmax} (A)	Time const. (s)	Size	ø [mm]
35	1	67	736	84	669	3 × 35 + 10 Cu	26
50	1/0	82	959	102	874	3 × 50 + 15 Cu	29
70	2/0	105	1182	131	1079	3 × 70 + 21 Cu	32
95	4/0	128	1492	159	1376	3 × 95 + 29 Cu	38
120	250	148	1776	184	1637	3 × 120 + 41 Cu	41
150	300	171	2042	213	1881	3 × 150 + 41 Cu	44
185	400	196	2422	243	2237	3 × 185 + 57 Cu	49
240	500	231	2967	286	2740	3 × 240 + 72 Cu	54
300	600	267	3478	330	3229	3 × 300 + 88 Cu	58

Control connections

See chapter [Control unit \(BCU\)](#).

Coolant connections

Inverter module: 16/13 mm, for polyamide (PA) pipe; heat exchanger: 8/6 mm pipe.

Efficiency

Approximately 98% at nominal power level.

The efficiency is not calculated according to IEC 61800-9-2.

Energy efficiency data (ecodesign)

Energy efficiency data is not provided for the drive/unit. Multidrive and multidrive modules are not in the scope of the EU ecodesign requirements (Regulation EU/2019/1781) or the UK ecodesign requirements (Regulation SI 2021 No. 745).

Protection classes

Degrees of protection (IEC/EN 60529)	IP00
Enclosure types (UL 50/50E)	UL Open Type
Overvoltage category (IEC/EN 60664-1)	III
Protective class (IEC/EN 61800-5-1)	I

Ambient conditions

This section gives the environmental requirements for the converter module. The converter module must be used in a heated indoor controlled environment.

	Operation installed for stationary use	Storage in protective package	Transportation in protective package
Altitude above sea level	0...4000 m (13123 ft)* Output derated above 1000 m (3281 ft). See section Altitude derating. *Neutral-grounded TN and TT network systems, non-corner-grounded IT network systems. Corner-grounded TN, TT and IT network systems up to 600 V.	-	-
Air temperature	0 ... +45 °C (+32 ... +113 °F), no condensation allowed. Output derated in the range +45 ... +55 °C (+113 ... +131 °F).	-40 ... +70 °C (-40 ... +158 °F)	-40 ... +70 °C (-40 ... +158 °F)
Relative humidity	Maximum 95%, no condensation allowed No condensation allowed. Maximum allowed relative humidity is 60% in the presence of corrosive gases.	Maximum 95%, no condensation allowed	Maximum 95%, no condensation allowed
Contamination	IEC/EN 60721-3-3:2002: Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use of weather protected locations	IEC 60721-3-1:1997	IEC 60721-3-2:1997
Chemical gases	Class 3C2	Class 1C2	Class 2C2

	Operation installed for stationary use	Storage in protective package	Transportation in protective package
Solid particles	Class 3S1	Class 1S3 (packing must support this, otherwise 1S2)	Class 2S2
	No conductive dust allowed.		
Vibration	IEC 61800-5-1 IEC 60068-2-6:2007, EN 60068-2-6:2008 Environmental testing Part 2: Tests -Test Fc: Vibration (sinusoidal) 10 ... 57 Hz, max. 0.075 mm amplitude 57 ... 150 Hz 1 g Tested in a typical cabinet assembly according to: Max. 1 mm (0.04 in.) (peak value, 5 ... 13.2 Hz), max. 0.7 g (13.2 ... 100 Hz) sinusoidal	IEC/EN 60721-3-1:1997	IEC/EN 60721-3-1:1997
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

Colors

PMS 1C Cool Gray, PMS Process Black

Materials

■ Module

Refer to [Recycling instructions and environmental information for ACS880 cabinet-installed drives and multidrive modules \(3AXD50000153909 \[English\]\)](#).

■ Packaging of module

This is a complete list of the package materials. The materials vary depending on the frame size (packages do not contain all materials listed below).

- Cardboard (heavy duty quality with wet strength glue in large modules)
 - Molded pulp
 - Plywood
 - Wood
 - PP (strapping)
 - EPP (foam)
-

- PE (plastic bag and/or VCI film)
- Metal (fixing clamps, screws).

■ **Packaging of options**

- Cardboard
- Kraft paper
- PP (straps)
- PE (film, bubble wrap)
- Plywood, wood (only for heavy components).

Materials vary according to the item type, size and shape. Typical package consists of a cardboard box with paper filling or bubble wrap. ESD-safe packing materials are used for printed circuit boards and similar items.

■ **Manuals**

Printed product manuals are made of recyclable paper. Product manuals are available on the Internet.

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 DC capacitors need selective treatment according to IEC 62635 guidelines.

To aid recycling, most plastic parts are marked with an appropriate identification code. In addition, components containing substances of very high concern (SVHCs) are listed in European Chemicals Agency's SCIP database. SCIP is the database for information on Substances of Concern in articles as such or in complex objects (Products) established under the Waste Framework Directive (2008/98/EC). For further information, contact your local ABB distributor or consult European Chemicals Agency's SCIP database to find out which SVHCs are used in the drive, and to find out where those components are located.

Contact your local ABB distributor for further information on environmental aspects. End of life treatment must follow international and national regulations.

For more information on ABB end of life services, refer to new.abb.com/service/end-of-life-services.

Standards

See [ACS880 liquid-cooled multidrive cabinets and modules electrical planning \(3AXD50000048634 \[English\]\)](#).

Markings

See [ACS880 liquid-cooled multidrive cabinets and modules electrical planning \(3AXD50000048634 \[English\]\)](#).

Auxiliary power consumption

■ Control equipment

Device	U_N	f Hz	I_{cont} A	I_{start} A	P_{cont} W	S_{cont} VA
BCU control unit	24 V DC ($\pm 10\%$)	-	2.0	-	48	-
BSFC-12C charging controller	24 V DC ($\pm 10\%$)	-	0.15	-	-	-
CIO-01 I/O module	24 V DC (+20%/-15%)	-	0.1	-	-	-
PDAL2 switch/disconnector or interlock coil	24 V DC (+10%/-30%)	-	-	-	-	9
R7i module: internal electronics	230 V AC (+15%/-20%)	50	0.37	-	85	-
	115 V AC (+15%/-20%)	60	0.74	-	85	-
R8i module: internal electronics	230 V AC (+15%/-20%)	50	0.41	-	95	-
	115 V AC (+15%/-20%)	60	0.83	-	95	-

■ Cooling fans

Frame size	U_N V AC	f Hz	I_{cont} A
R7i	14.0 ... 26.5 V DC	-	1.35
R8i	200...240 V AC	50/60	1.4
	100...130 V AC	50/60	2.4

■ Definitions

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

Fuse data

■ Flush-end fuse blocks used with 690 V units

Rating	Class	Example	Power loss at I_n	Clearing I^2t		Size	U_n
A rms			W	A ² s	V		V
125	aR	Bussmann 170M3392	35	9000	1000	1*	1250 (IEC) 1300 (UL)
160	aR	Bussmann 170M4388	45	11500	1000	1	1250 (IEC) 1300 (UL)
200	aR	Bussmann 170M4389	50	22500	1000	1	1250 (IEC) 1300 (UL)
250	aR	Bussmann 170M4390	60	46000	1000	1	1250 (IEC) 1300 (UL)
315	aR	Bussmann 170M4391	65	90000	1000	1	1250 (IEC) 1300 (UL)
350	aR	Bussmann 170M4392	70	125000	1000	1	1250 (IEC) 1300 (UL)
400	aR	Bussmann 170M4393	75	175000	1000	1	1250 (IEC) 1300 (UL)
550	aR	Bussmann 170M6543	110	325000	1000	3	1250 (IEC) 1300 (UL)
630	aR	Bussmann 170M6544	115	495000	1000	3	1250 (IEC) 1300 (UL)
800	aR	Bussmann 170M6546	125	995000	1000	3	1250 (IEC) 1300 (UL)
900	aR	Bussmann 170M6547	130	1500000	1000	3	1100 (IEC)
1000	aR	Bussmann 170M6548	135	2150000	1000	3	1100 (IEC)
1100	aR	Bussmann 170M6549	140	2800000	1000	3	1100 (IEC)
1250	aR	Bussmann 170M6500	145	3950000	1000	3*	1100 (IEC)
1400	aR	Bussmann 170M6501	150	6000000	1000	3*	1100 (IEC)

Tightening torques

For Rittal components, use the torques given in the Rittal assembly documentation. Unless a tightening torque is specified in the text, the following torques can be used.

■ Electrical connections

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

■ Mechanical connections

Size	Max. torque	Strength class
M5	6 N·m (53 lbf·in)	8.8
M6	10 N·m (7.4 lbf·ft)	8.8
M8	24 N·m (17.7 lbf·ft)	8.8

■ Insulation supports

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

■ Cable lugs

Size	Max. torque	Strength class
M8	15 N·m (11 lbf·ft)	8.8 (A2-70 or A4-70)
M10	32 N·m (23.5 lbf·ft)	8.8
M12	50 N·m (37 lbf·ft)	8.8

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.

■ Cyber security 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.

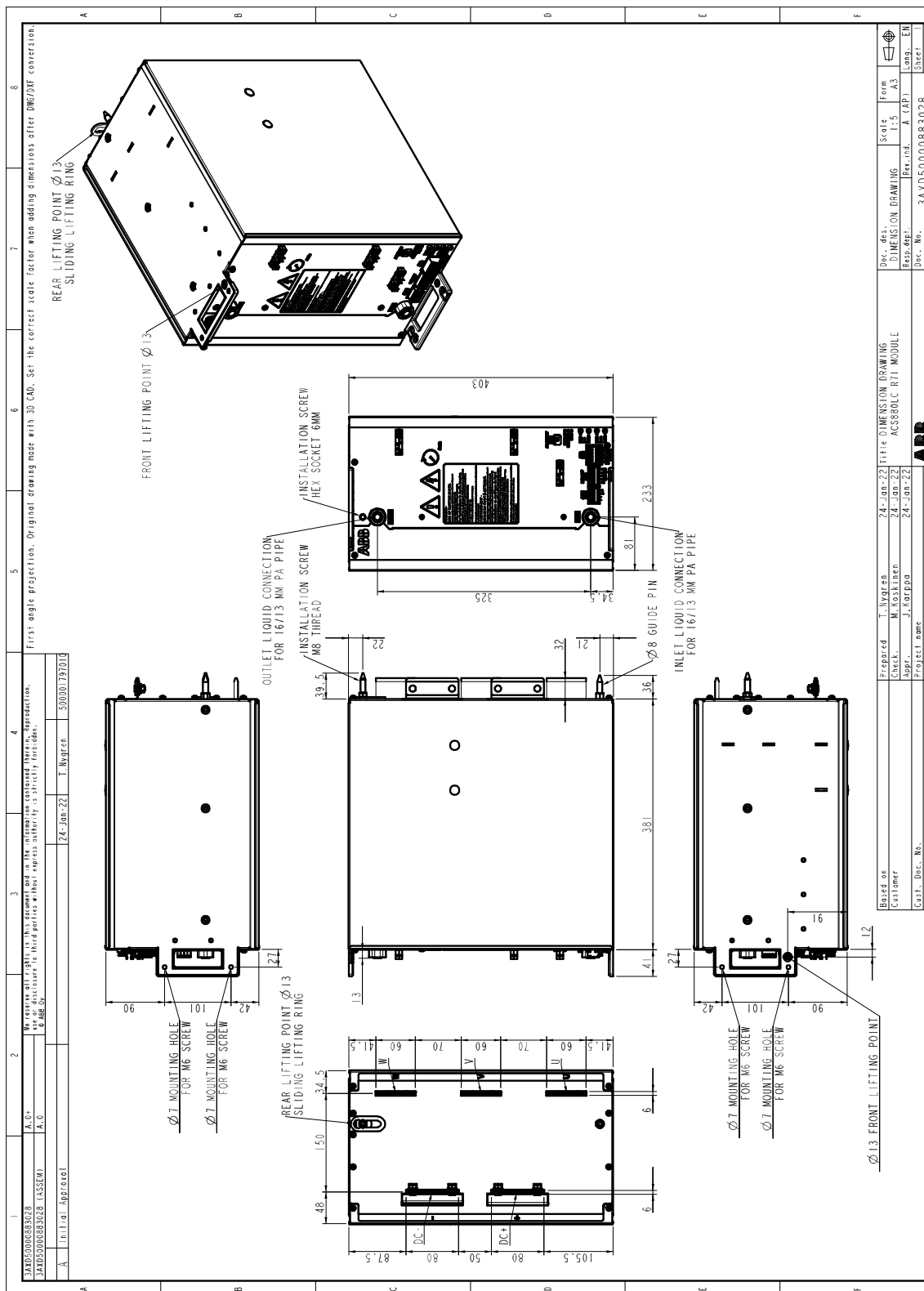
ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

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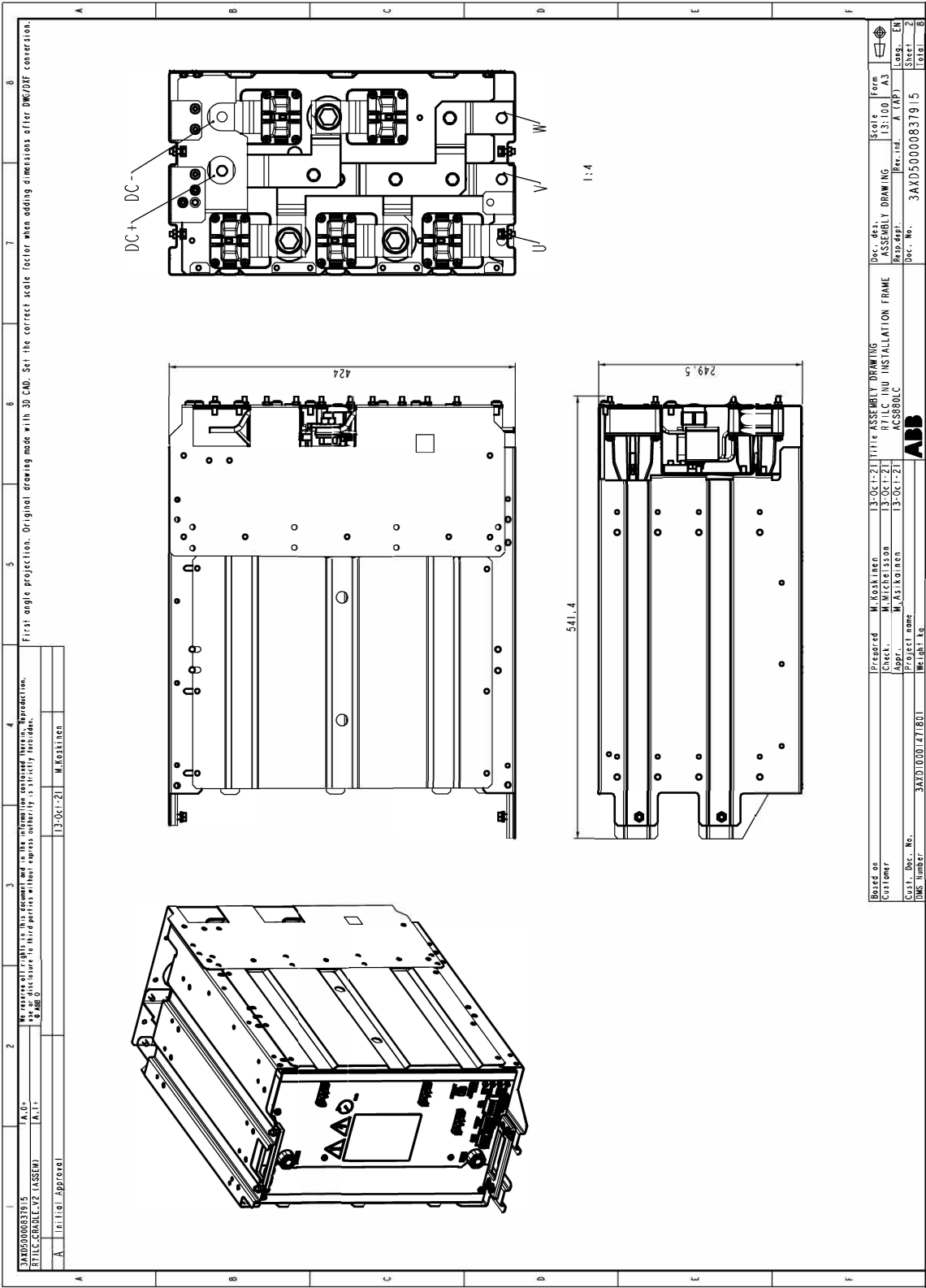
Dimension drawings

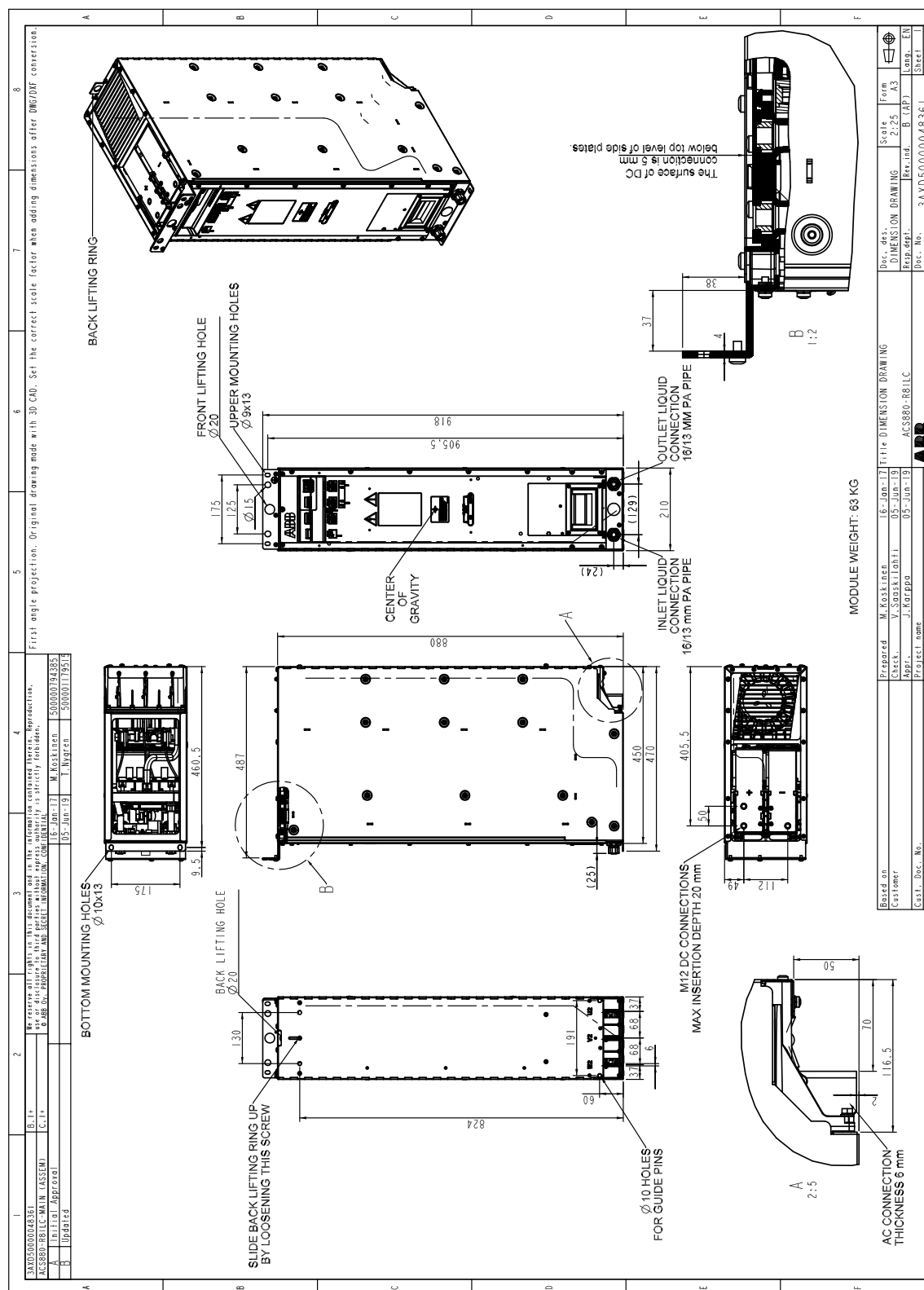
Contents of this chapter

This chapter contains dimension drawings of the ACS880-104LC inverter modules as well as auxiliary components. Dimensional drawings of most installation accessories are available from ABB on request.

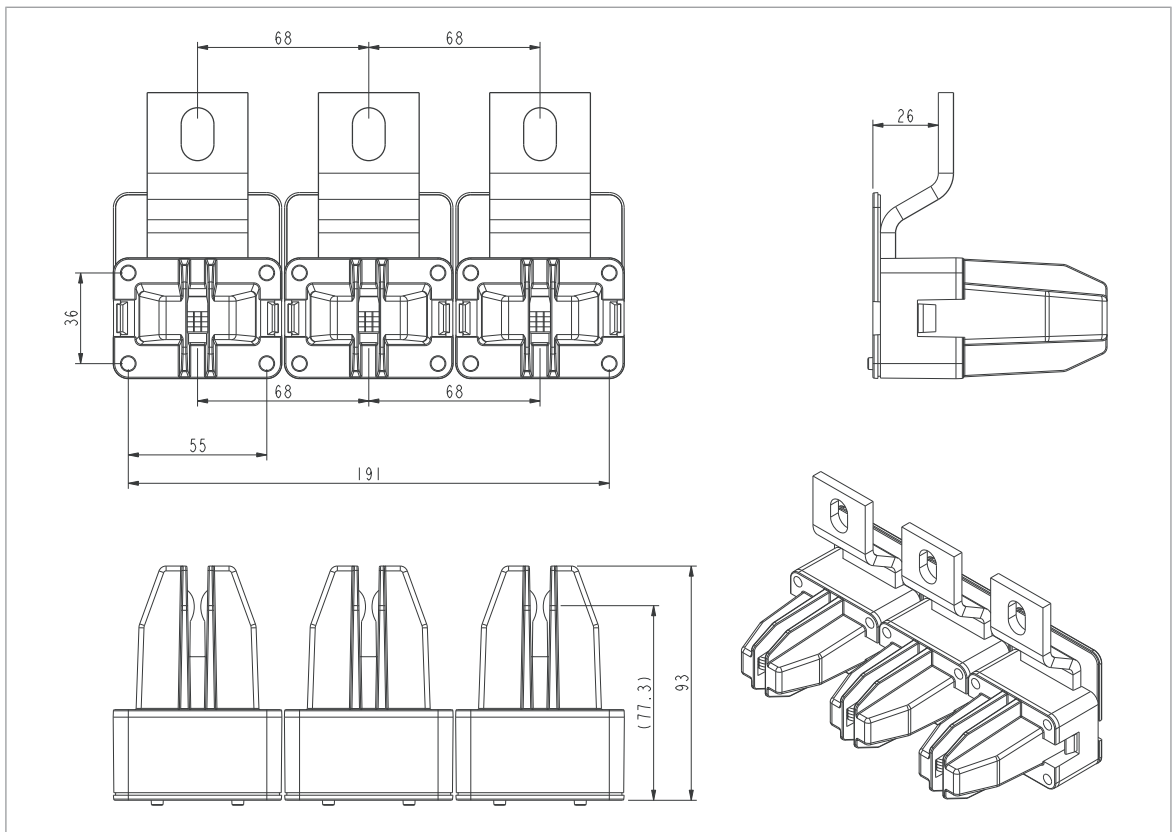


■ Installation frame



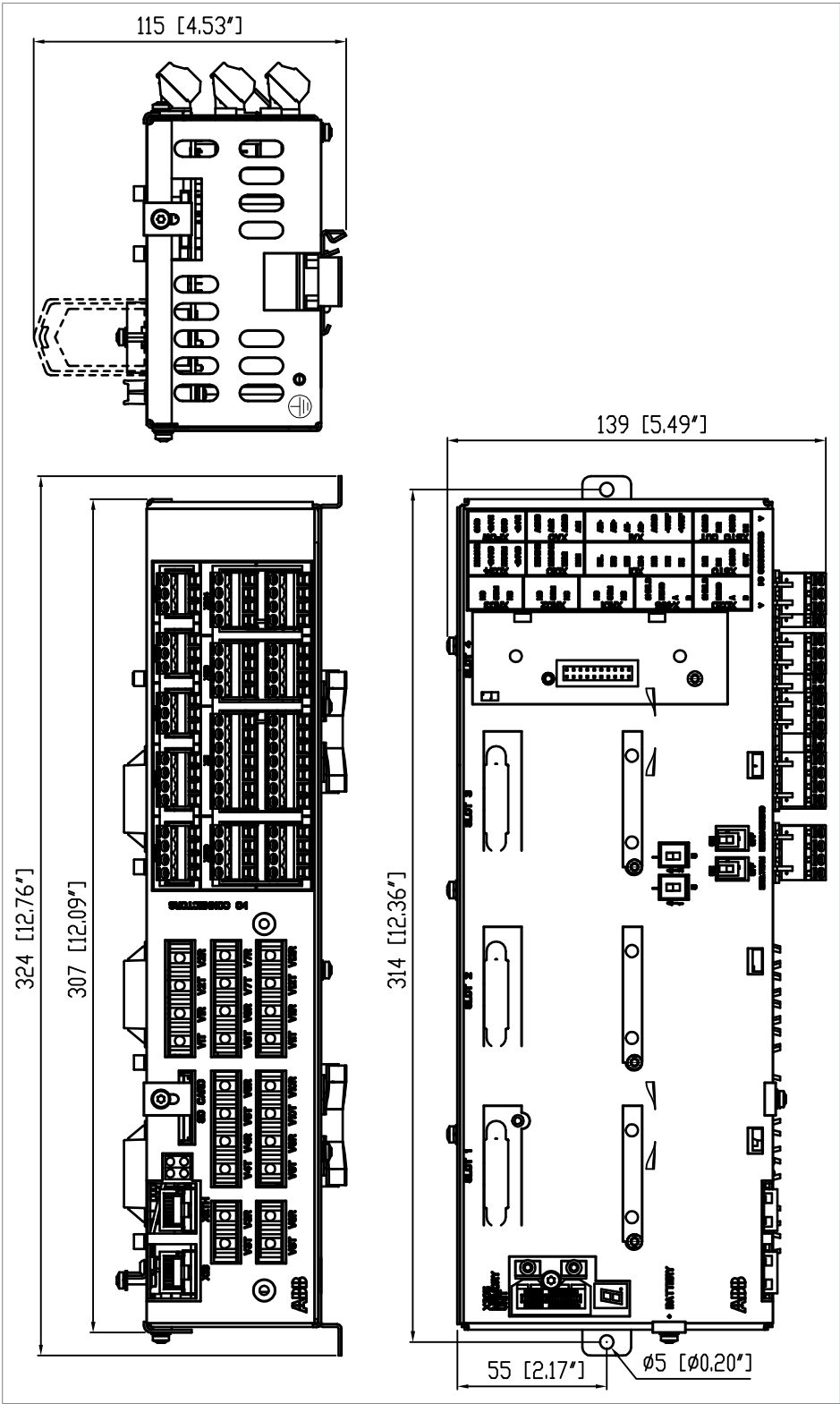


■ Quick connector

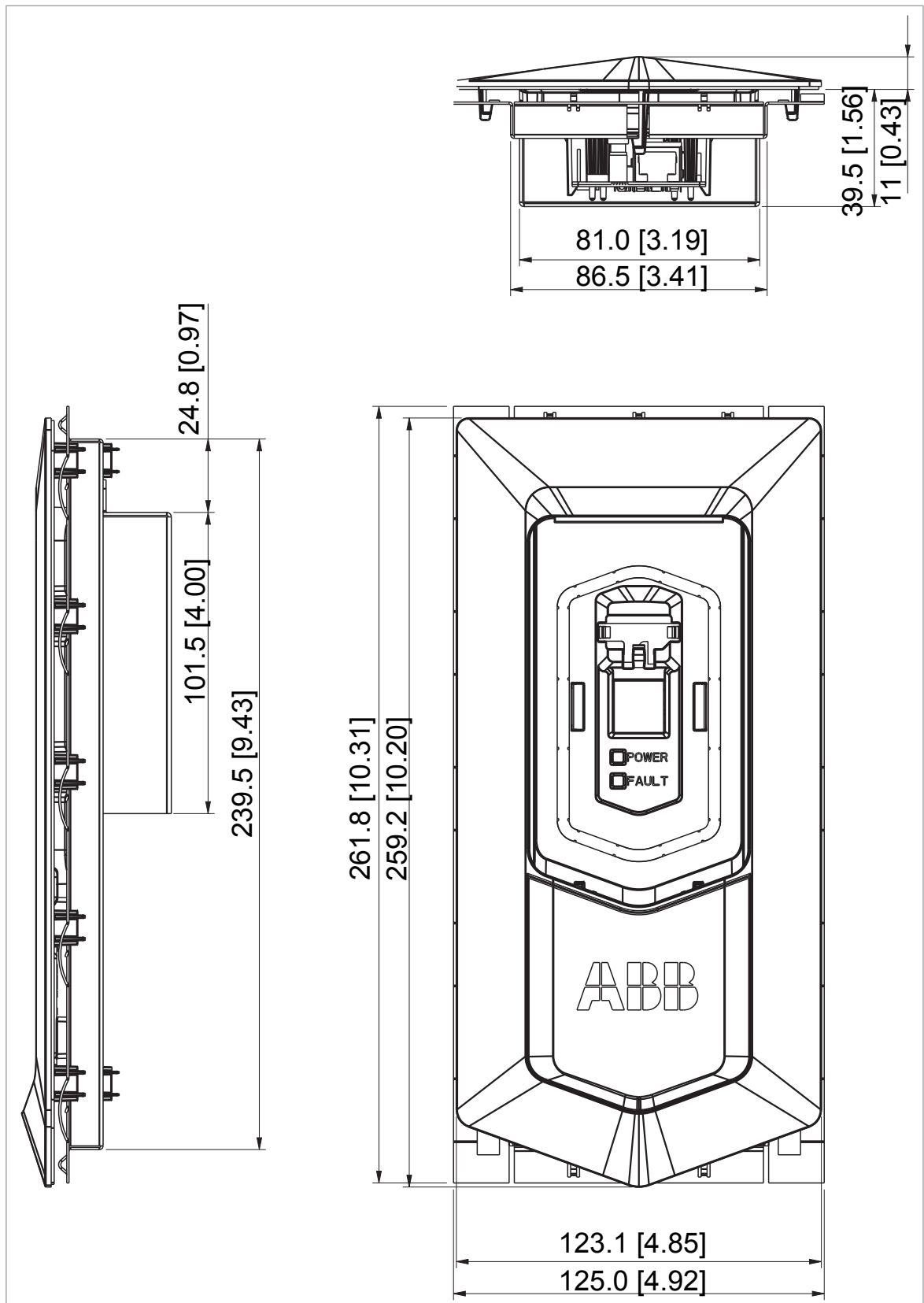


Control electronics

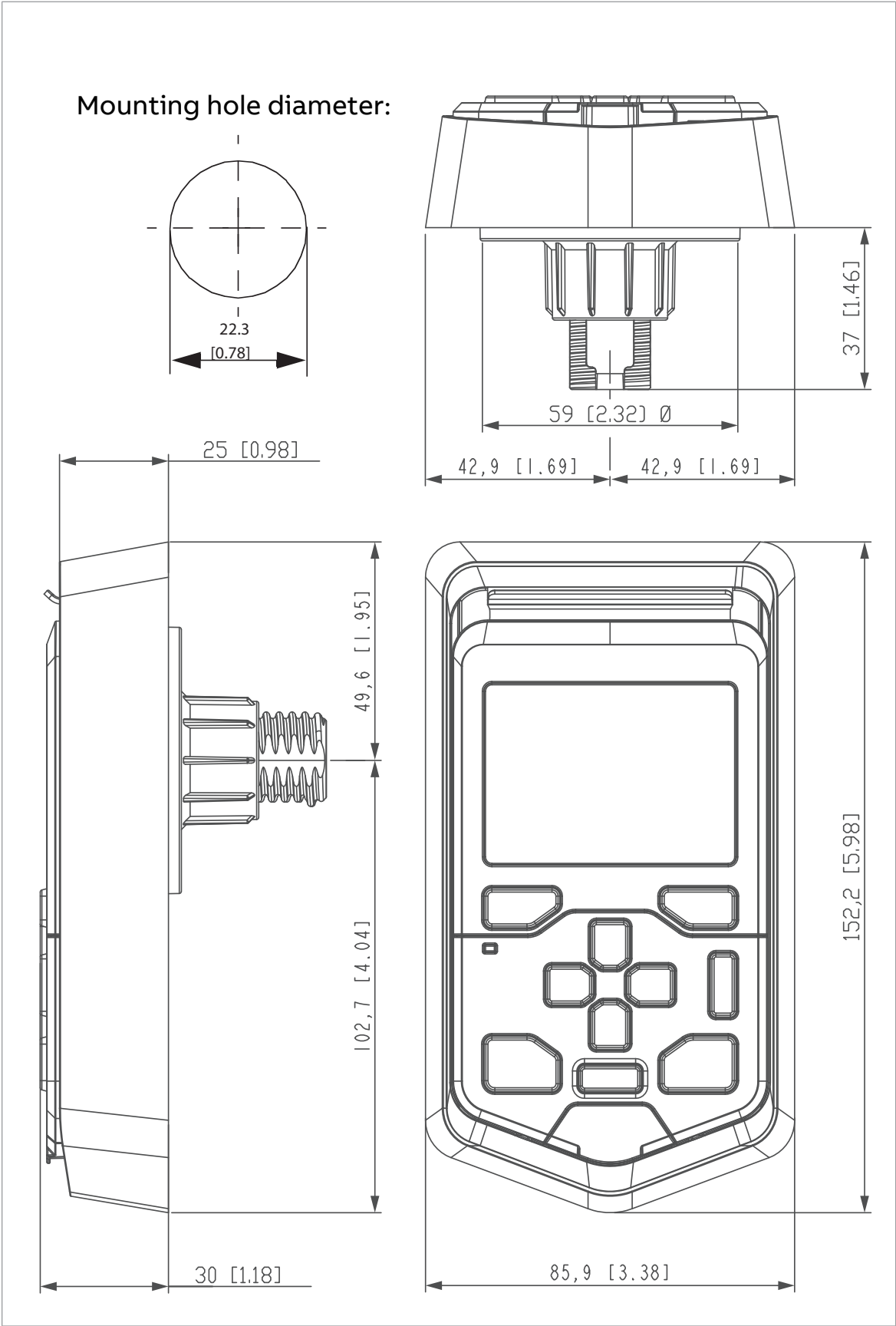
■ BCU control unit



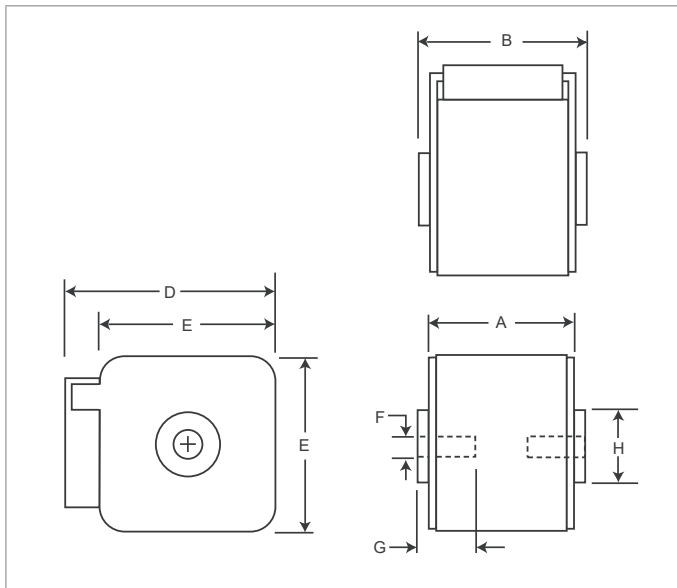
■ DPMP-01 door mounting kit



■ DPMP-02 door mounting kit



DC fuse blocks (Bussmann)

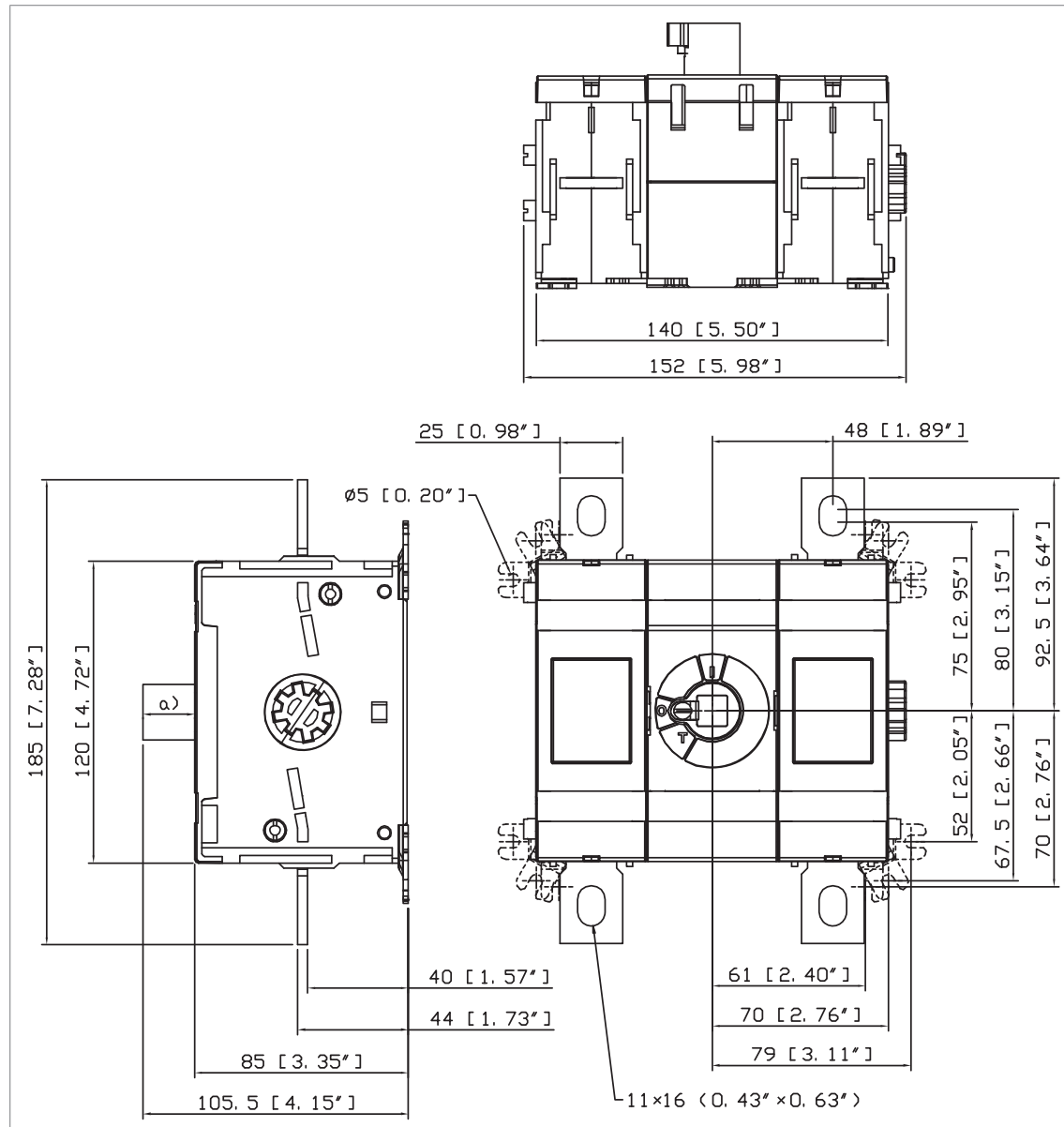


1000...1250 V fuses (as used with 690 V units)							
Size	A mm (inch)	B mm (inch)	D mm (inch)	E mm (inch)	F	G mm (inch)	H mm (inch)
1*	74 (2.91)	75 (2.95)	59 (2.32)	45 (1.77)	M8	5 (0.20)	17 (0.67)
1	74 (2.91)	75 (2.95)	69 (2.72)	53 (2.09)	M8	8 (0.31)	20 (0.79)
3	81 (3.19)	83 (3.27)	92 (3.62)	76 (2.99)	M12	10 (0.39)	30 (1.18)
3*	81 (3.19)	91 (3.58)	92 (3.62)	76 (2.99)	M12	10 (0.39)	30 (1.18)

Switchgear and charging components

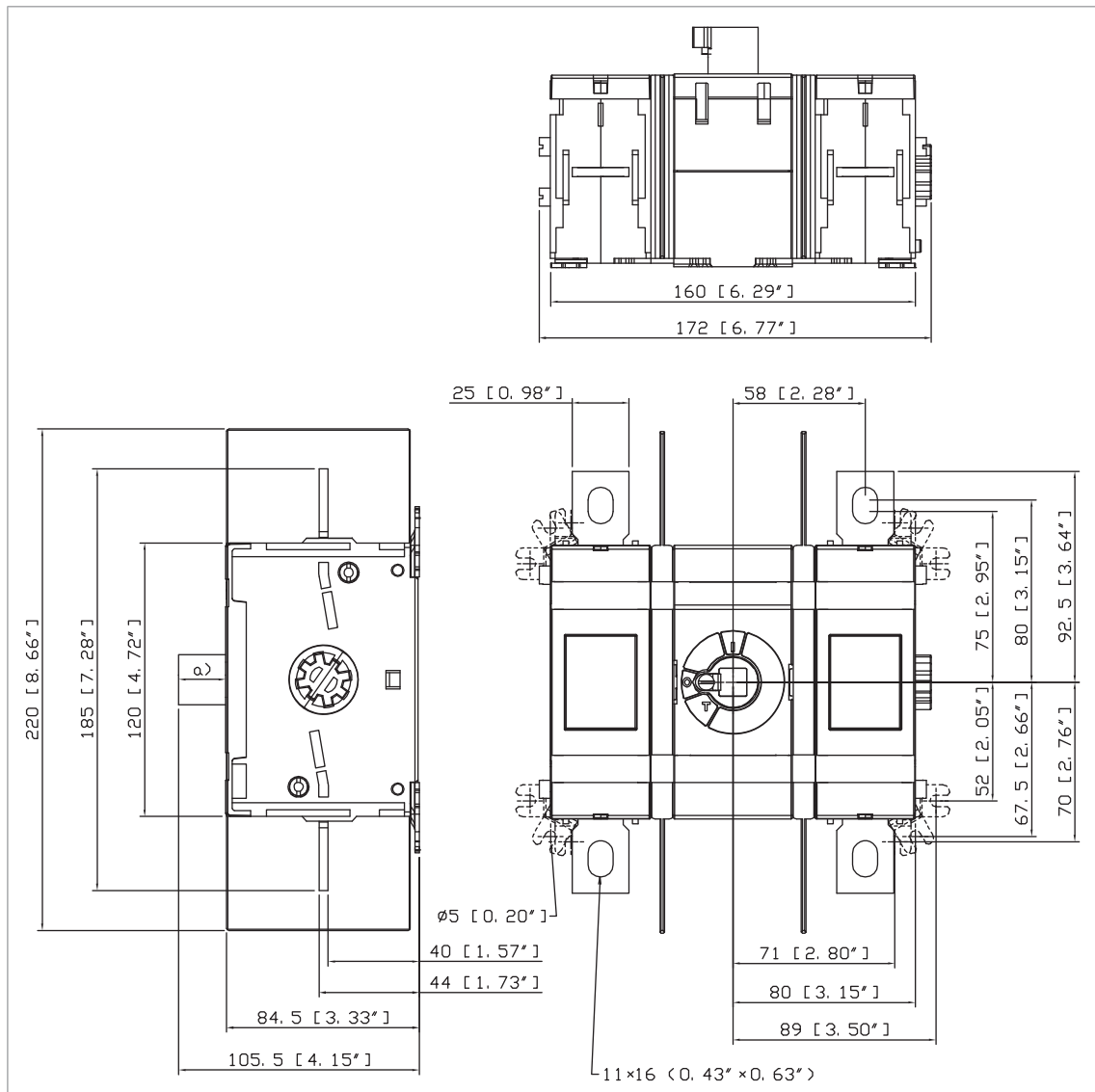
■ OT_DC switch-disconnectors

OT400E11



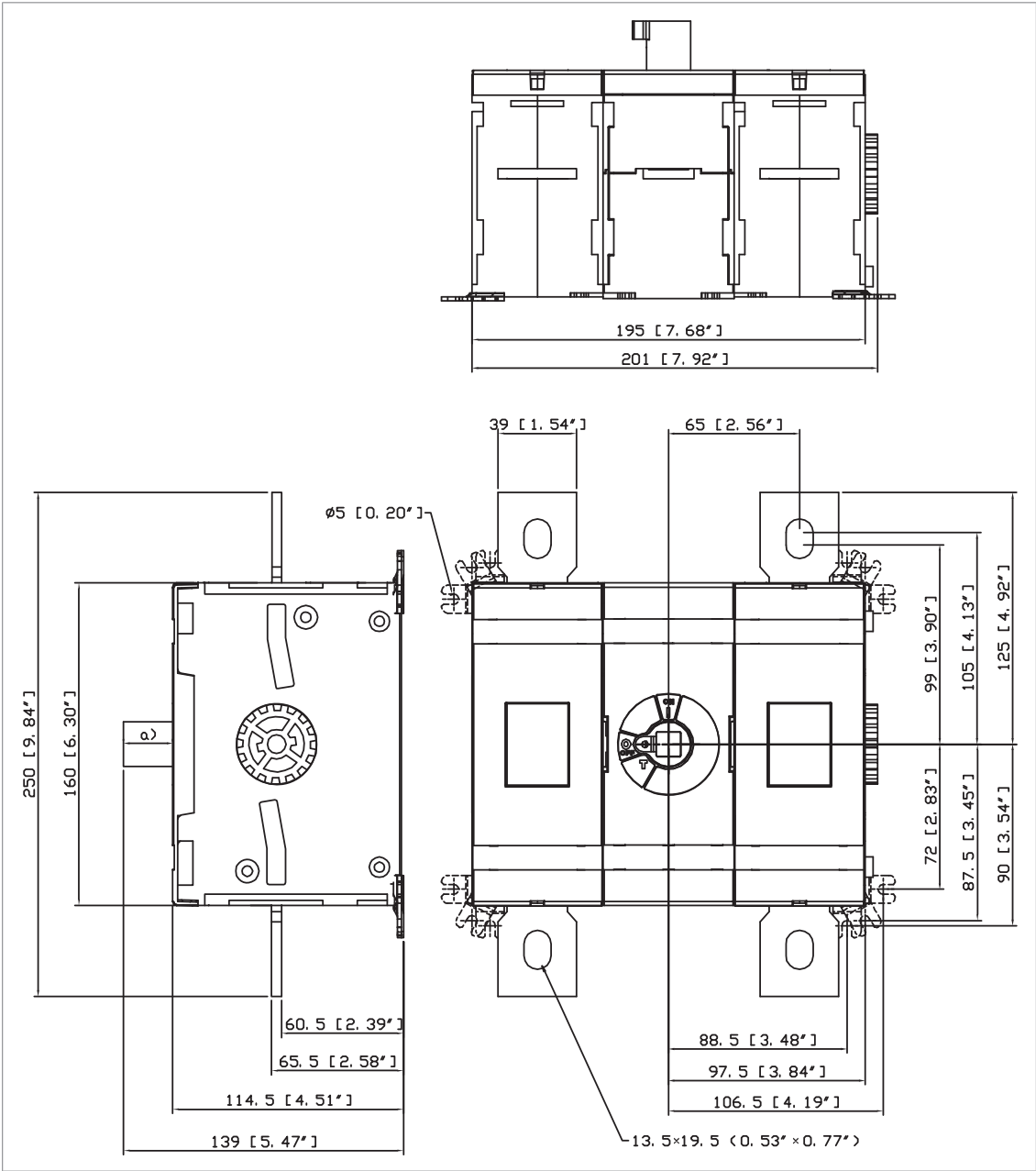
a) The shaft must extend into the switch at least 20 mm (0.79").

OT400U11



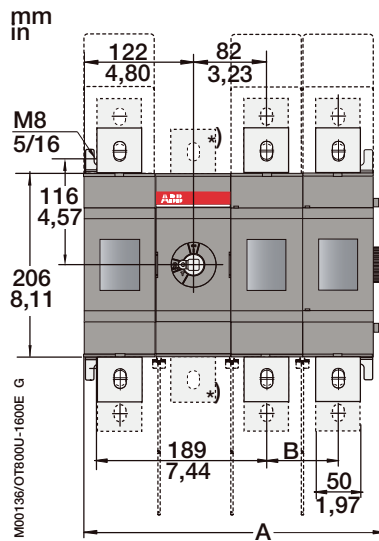
a) The shaft must extend into the switch at least 20 mm (0.79").

OT600U11, OT630E11



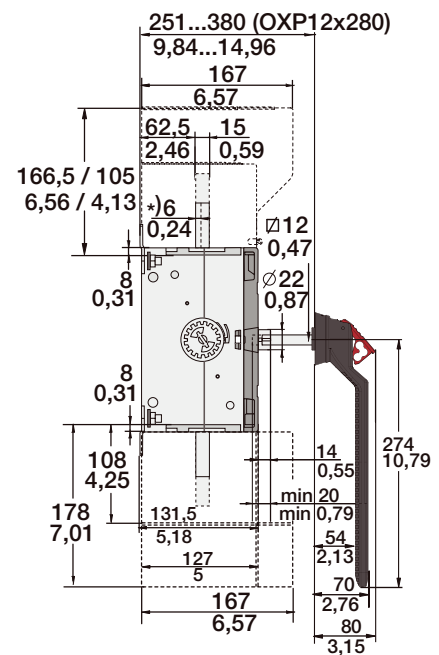
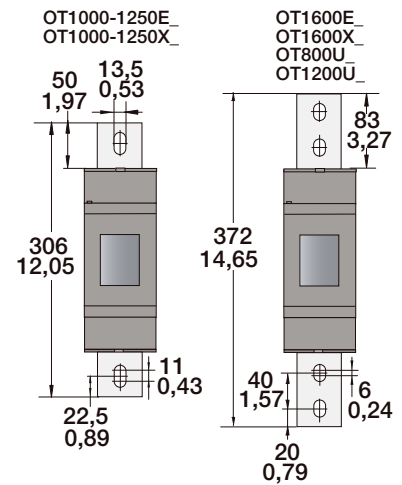
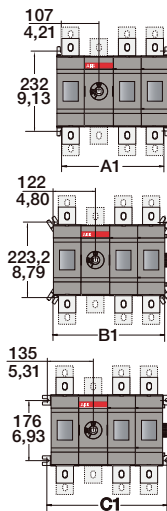
a) The shaft must extend into the switch at least 20 mm (0.79").

OT1600E11, OT1600E22

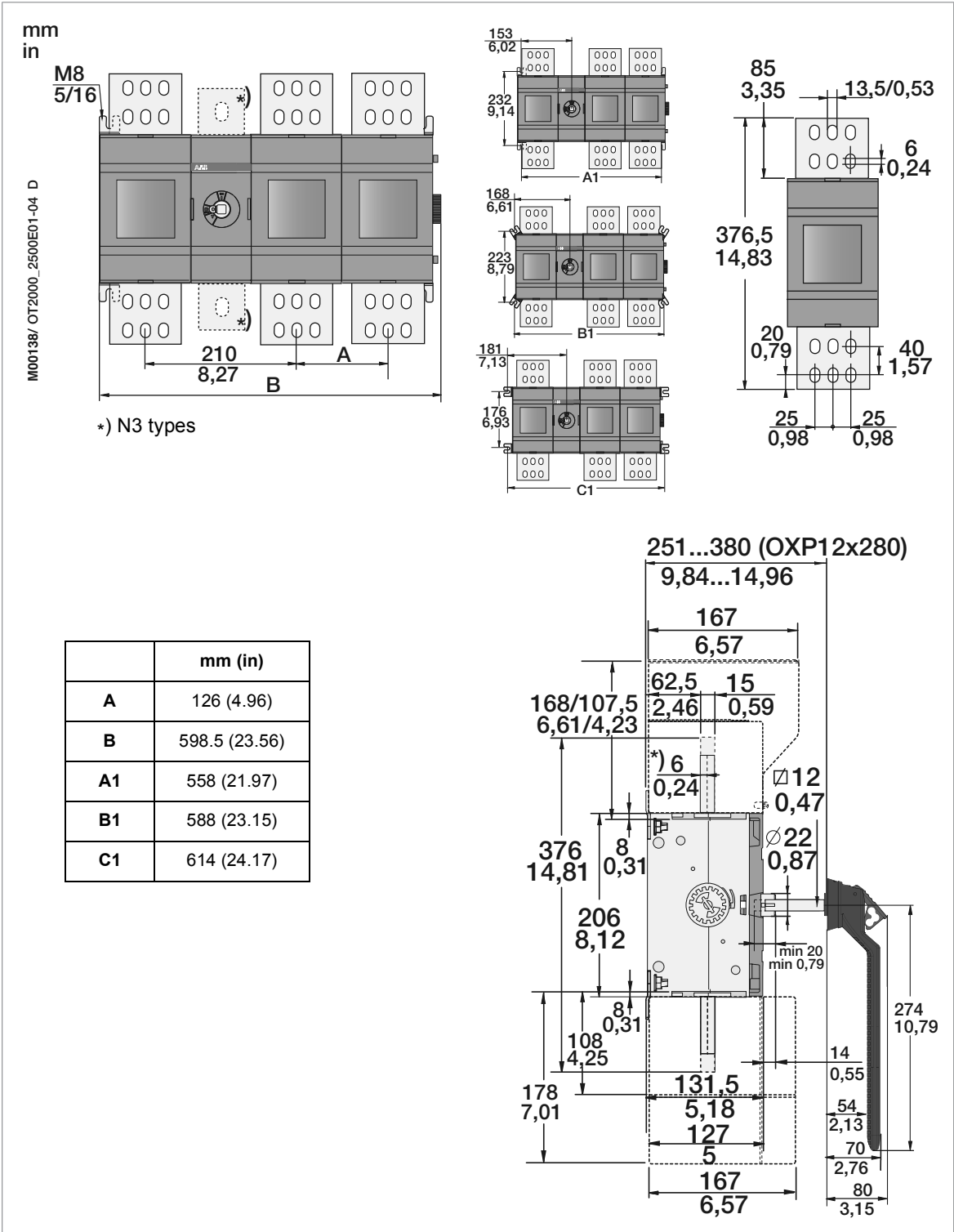


*) N3 types

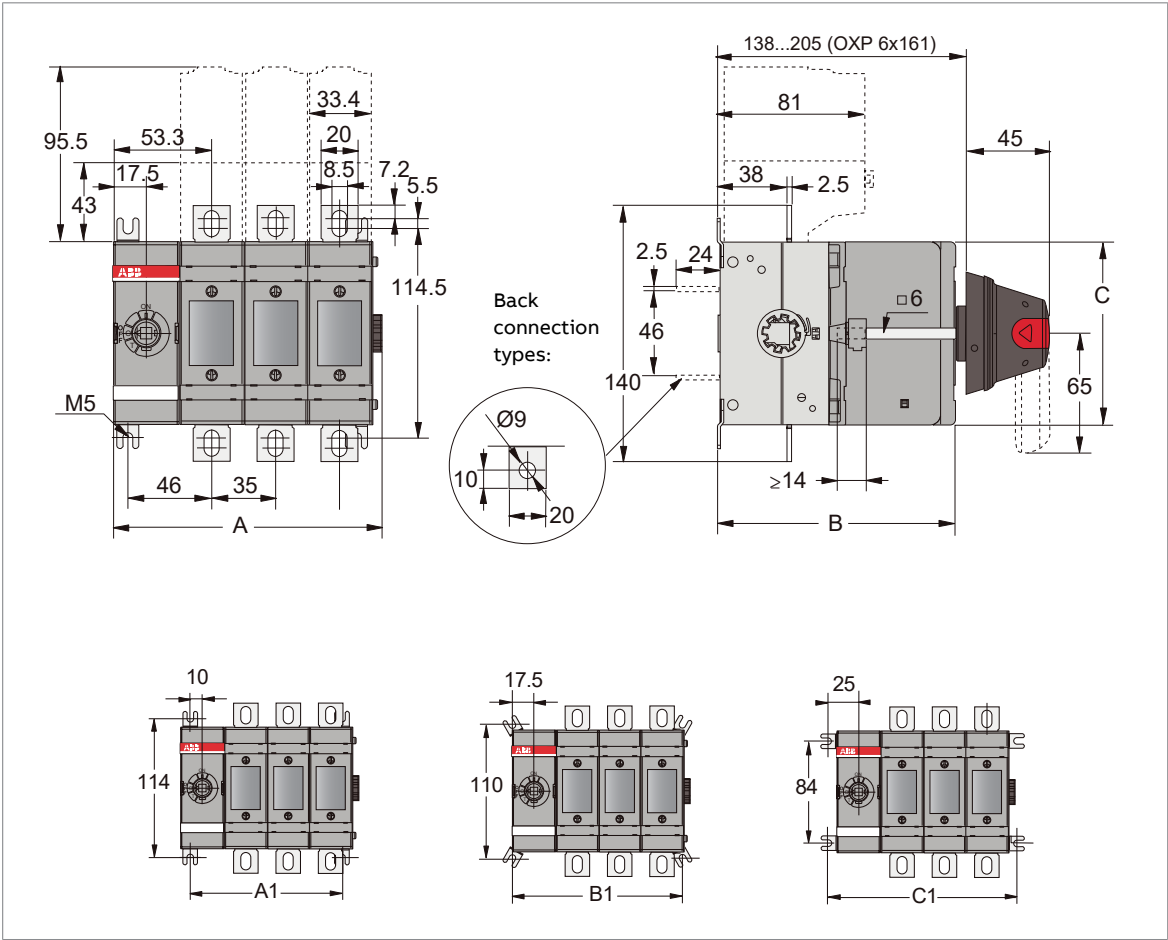
	_11 mm (in)	_22 mm (in)
A	254.50 (10.02)	414.50 (16.32)
B	-	80 (3.15)
A1	214 (8.43)	374 (14.72)
B1	244 (9.61)	404 (15.91)
C1	270 (10.63)	430 (16.93)



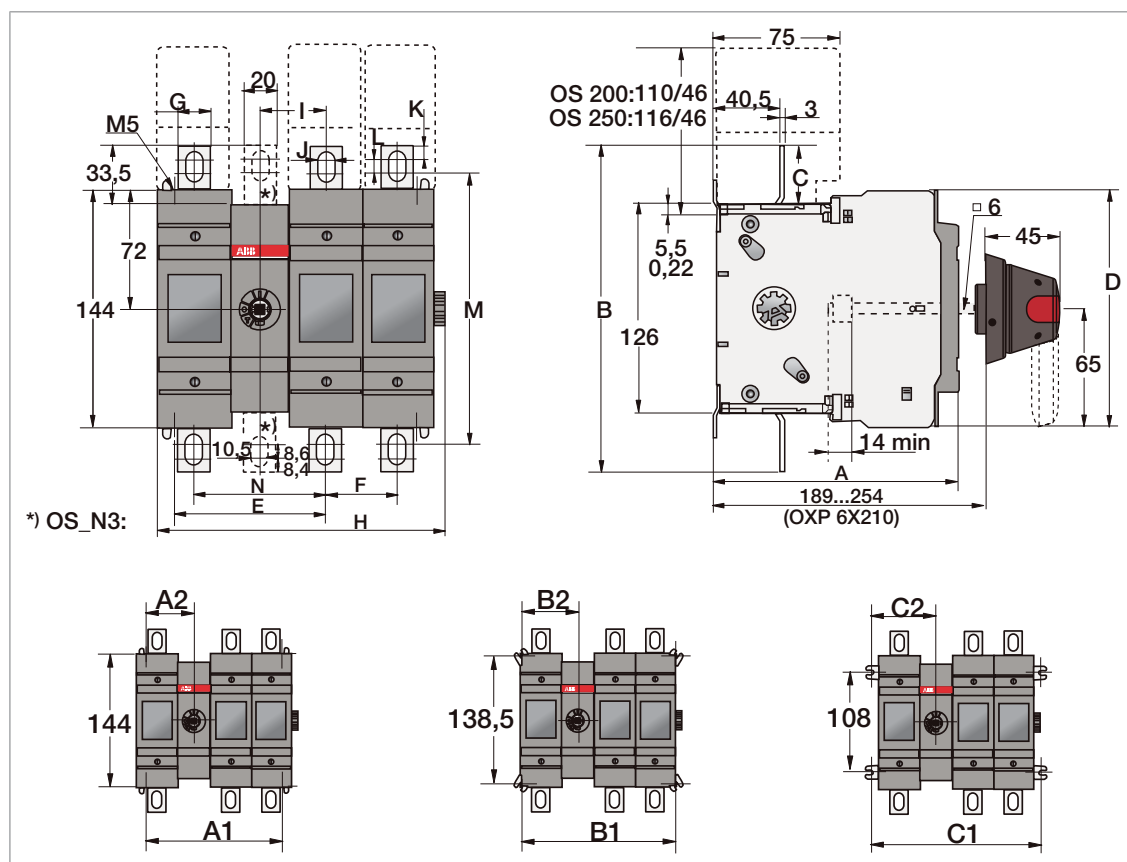
OT2500E22



OS160GD04F



OS200DZ22F

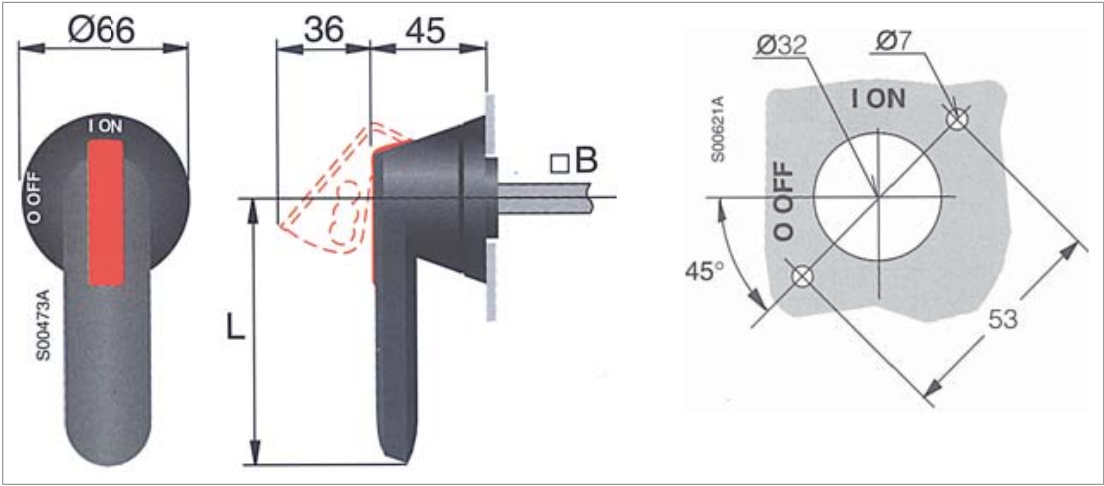


OS200			
D22	mm (in)	D22	mm (in)
A	149 (5.87)	K	8.4 (0.33)
B	199 (7.83)	L	8.6 (0.34)
C	36.5 (1.44)	M	165 (6.50)
D	144.5 (5.69)	N	80 (3.15)
E	135.5 (5.33)	A1	191 (7.52)
F	43.5 (1.71)	A2	95.5 (3.76)
G	20 (0.79)	B1	210 (8.27)
H	219 (8.62)	B2	105 (4.13)
I	40 8 (1.57)	C1	227 (8.94)
J	10 (0.39)	C2	113.5 (4.47)

■ OHB_ switch handles

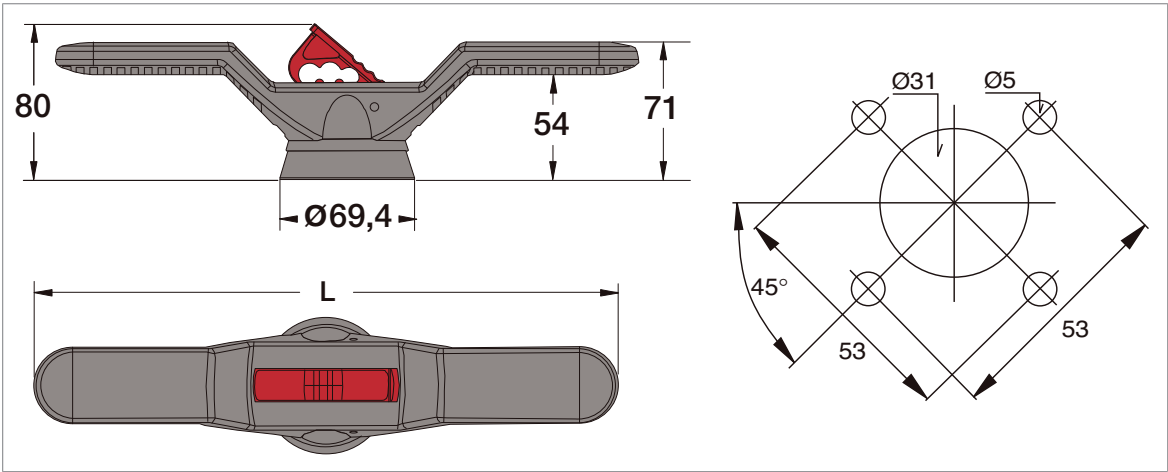
Note: The drawings are not to scale.

OHB65J6, OHB125J12, OHB145J12



Handle type	L mm (inch)	B mm (inch)	Notes
OHB65J6	65 (2.56)	6 × 6 (0.24 × 0.24)	Used with OS_, OT200_
OHB125J12	125 (4.92)	12 × 12 (0.47 × 0.47)	Used with OT400_
OHB145J12	145 (5.71)	12 × 12 (0.47 × 0.47)	Used with OT600_ and OT630_

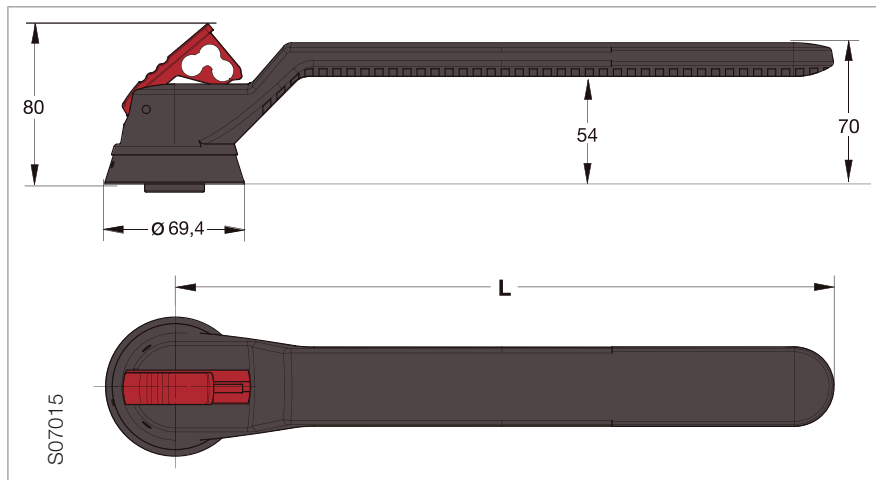
OHB150J12P



L = 300 mm (11.81")

Shaft: 12 × 12 mm (0.47 × 0.47")

OHB274J12



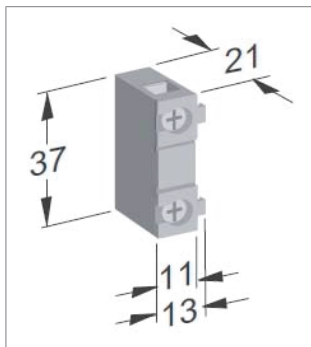
L = 274 mm (10.79")

Shaft: 12 × 12 mm (0.47 × 0.47")

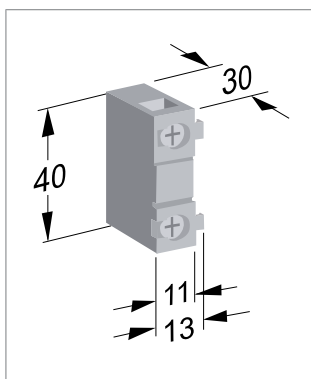
The drilling pattern is the same as OHB65J6.

■ Auxiliary contacts

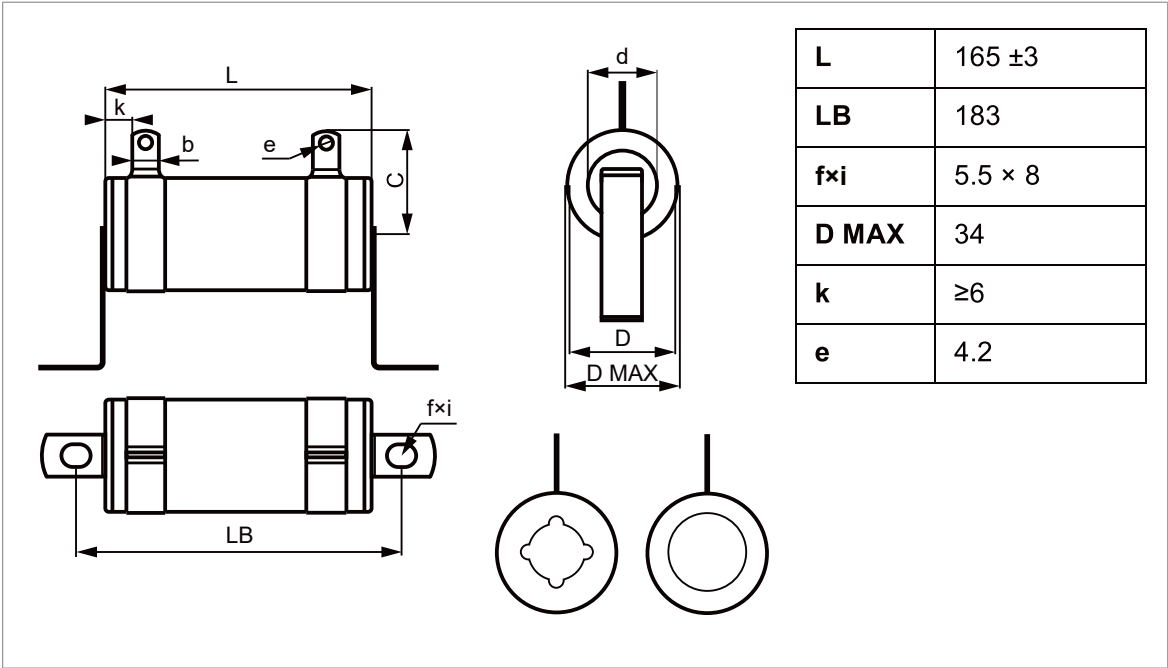
OA1G10



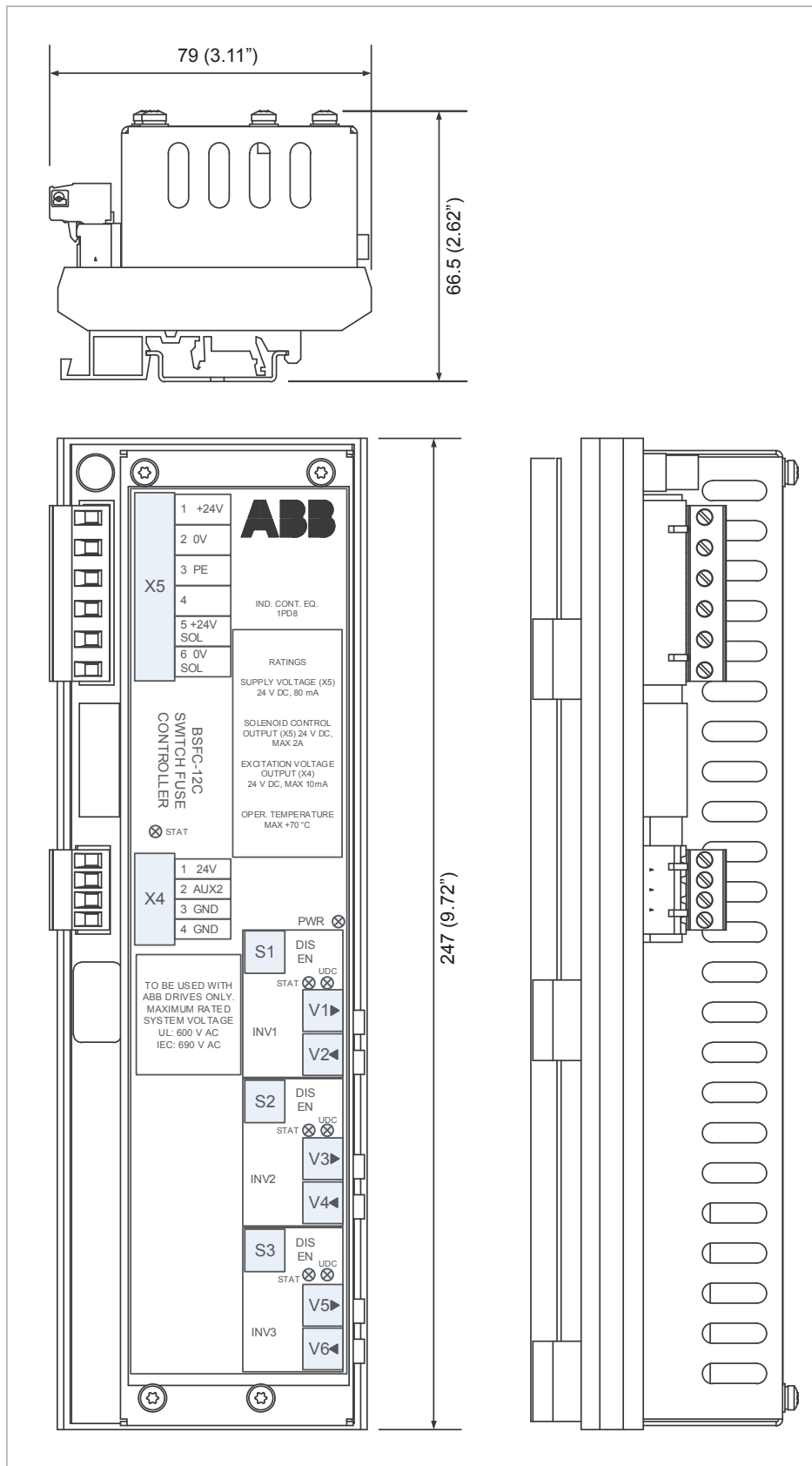
OA3G01



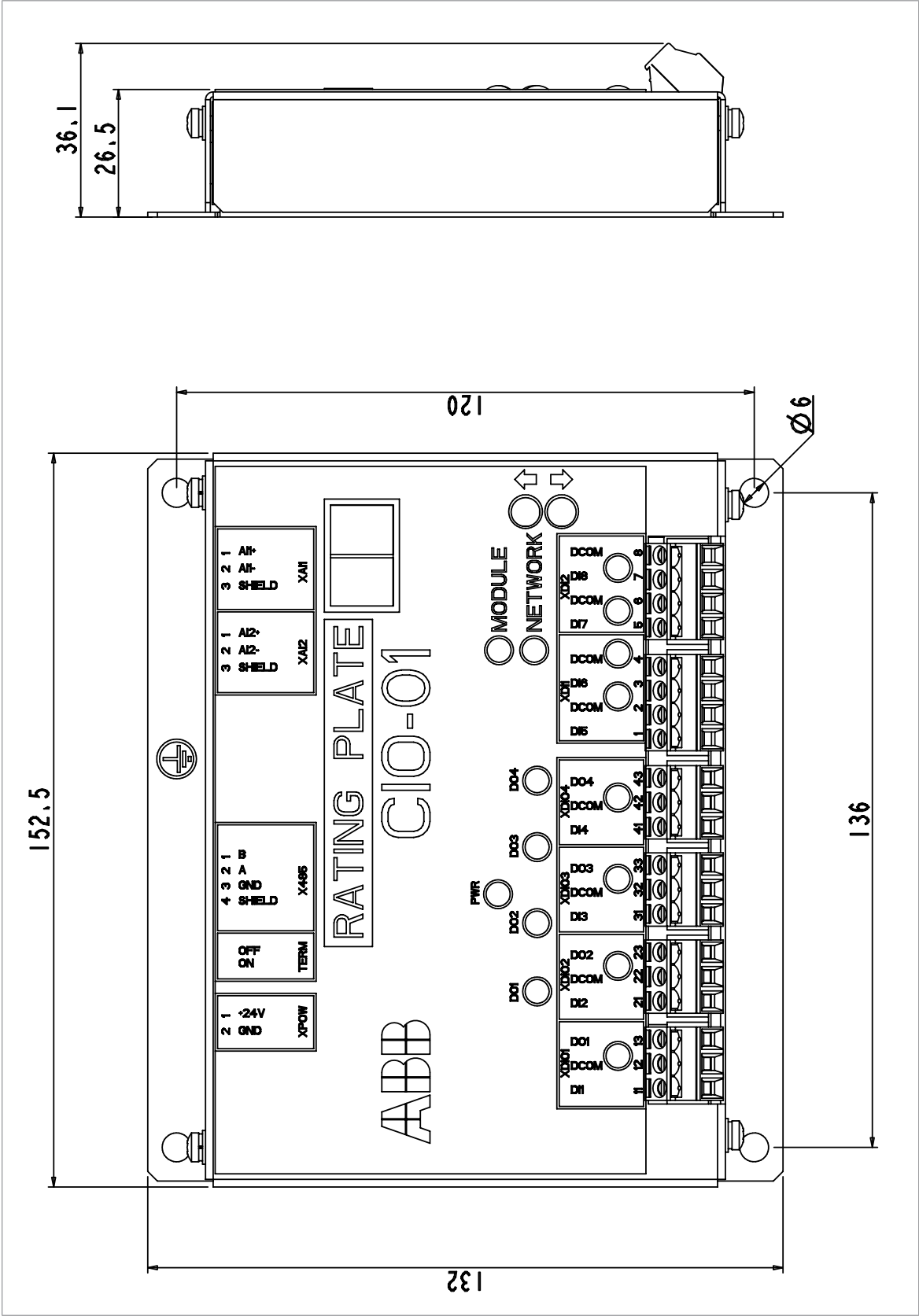
■ Charging resistor



■ BSFC-12C charging controller



CIO-01 I/O module



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The Safe torque off function

Contents of this chapter

This chapter describes the Safe torque off (STO) function of the drive and gives instructions for its use.

Note: In this chapter, the term 'drive' refers to one inverter unit of the drive system.

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 (such as an emergency stop circuit) that stop the drive in case of danger. 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 drive.

When activated, the Safe torque off function disables the control voltage for the power semiconductors of the drive output stage, thus preventing the drive 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 60204-1:2021 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 61511-1:2017	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
EN IEC 62061:2021	Safety of machinery – Functional safety of safety-related 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 and the UK Supply of Machinery (Safety) Regulations

See [Electrical planning instructions for ACS880 liquid-cooled multidrive cabinets and modules \(3AXD50000048634 \[English\]\)](#).

Wiring

For the electrical specifications of the STO connection, see the technical data of the control unit.

■ Activation switch

In the wiring diagrams, 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.

- In case a manually operated activation switch is used, the switch must be of a type that can be locked out to the open position.
- The contacts of the switch or relay must open/close within 200 ms of each other.
- An FSO safety functions module, an FSPS safety functions module or an FPTC thermistor protection module can also be used. For more information, see the module documentation.

■ Cable types and lengths

- ABB recommends double-shielded twisted-pair cable.
- Maximum cable lengths:
 - 300 m (1000 ft) between activation switch [K] and drive control unit
 - 60 m (200 ft) between multiple drives
 - 60 m (200 ft) between external power supply and first control unit
 - 30 m (100 ft) between 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 control unit (or frame R8i inverter module) must be at least 17 V DC to be interpreted as “1”.

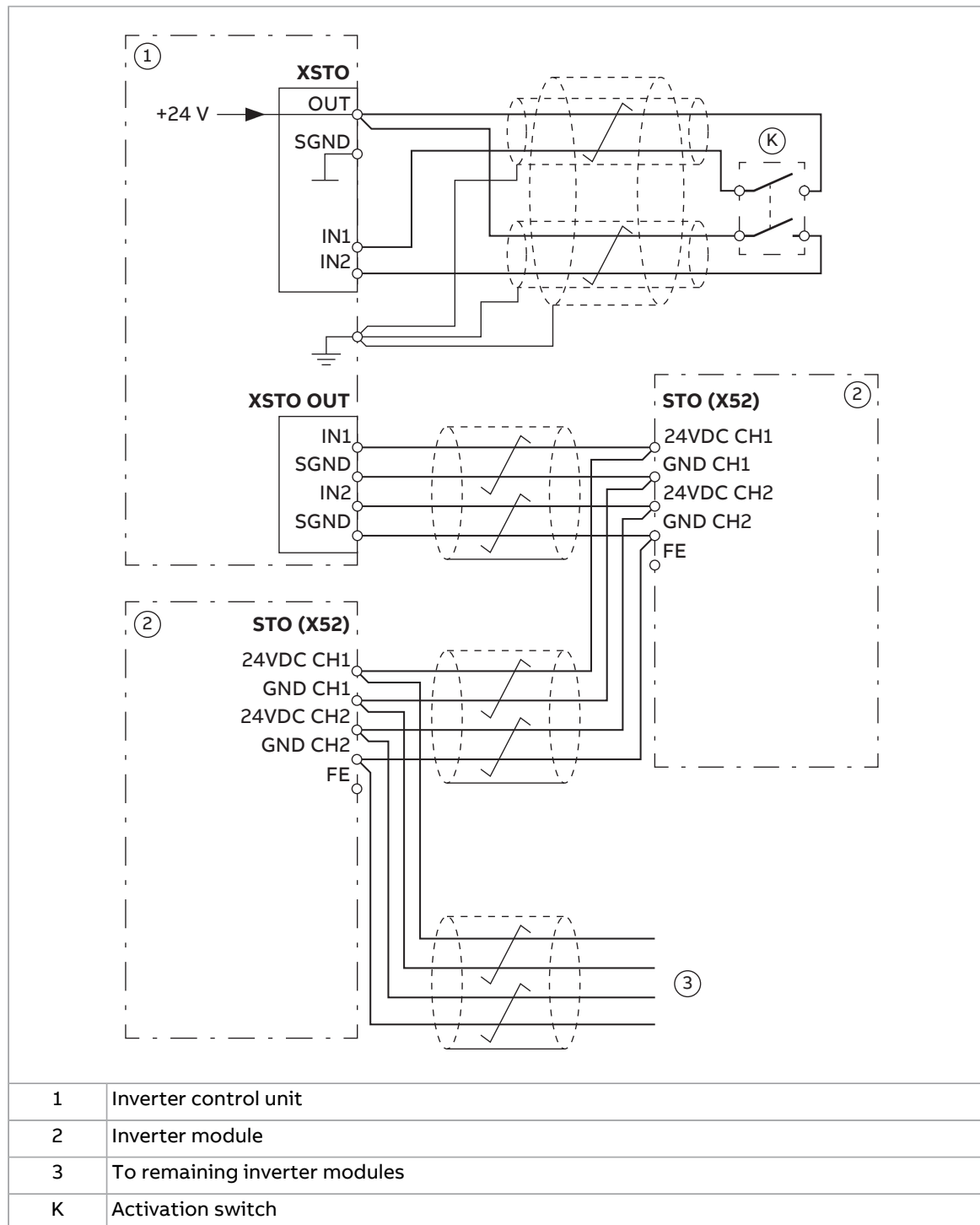
The pulse tolerance of the input channels is 1 ms.

■ Grounding of protective shields

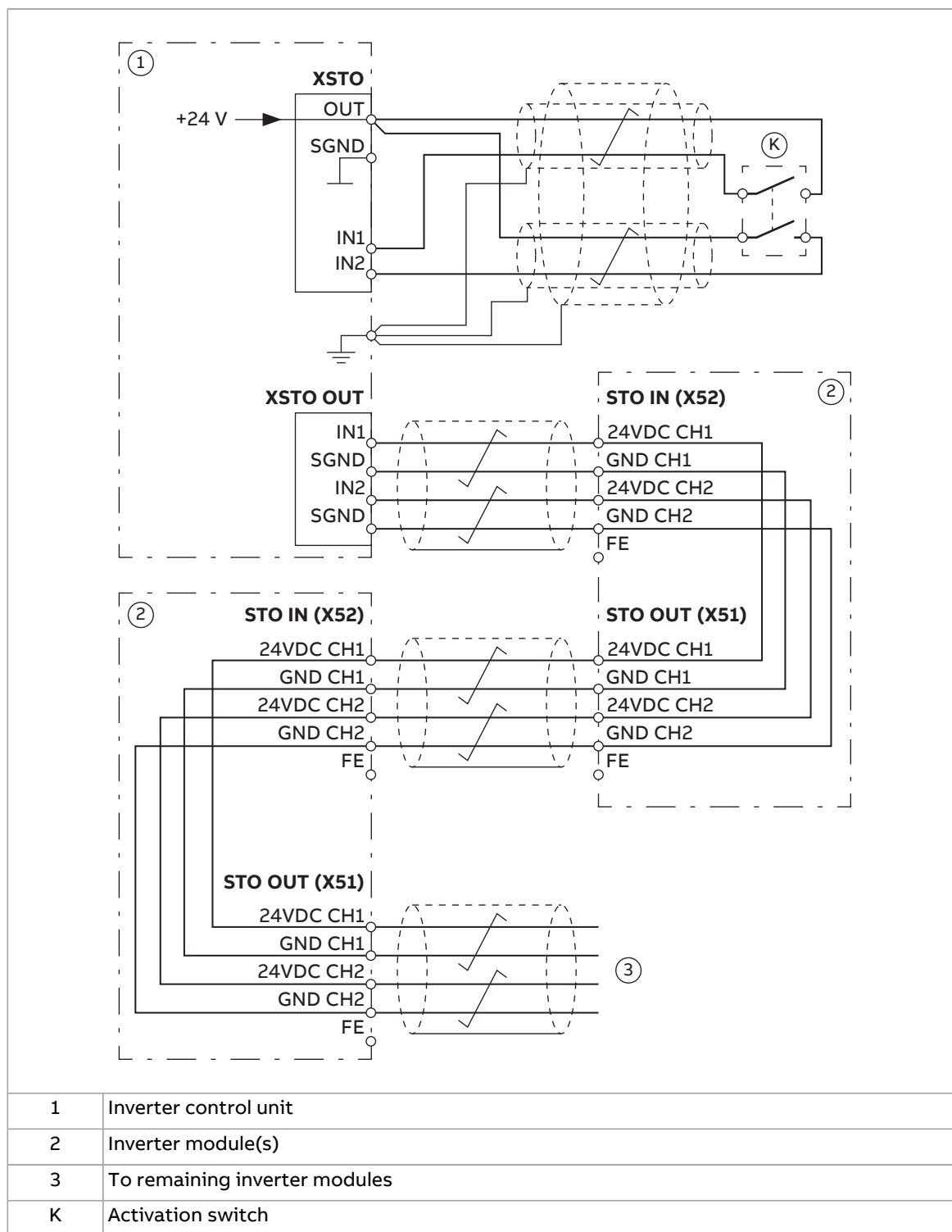
- Ground the shield in the cabling between the activation switch and the control unit at the control unit only.
- Ground the shield in the cabling between two control units at one control unit only.
- Do not ground the shield in the cabling between control unit and inverter module, or between inverter modules.

■ Dual-channel connection with internal power supply

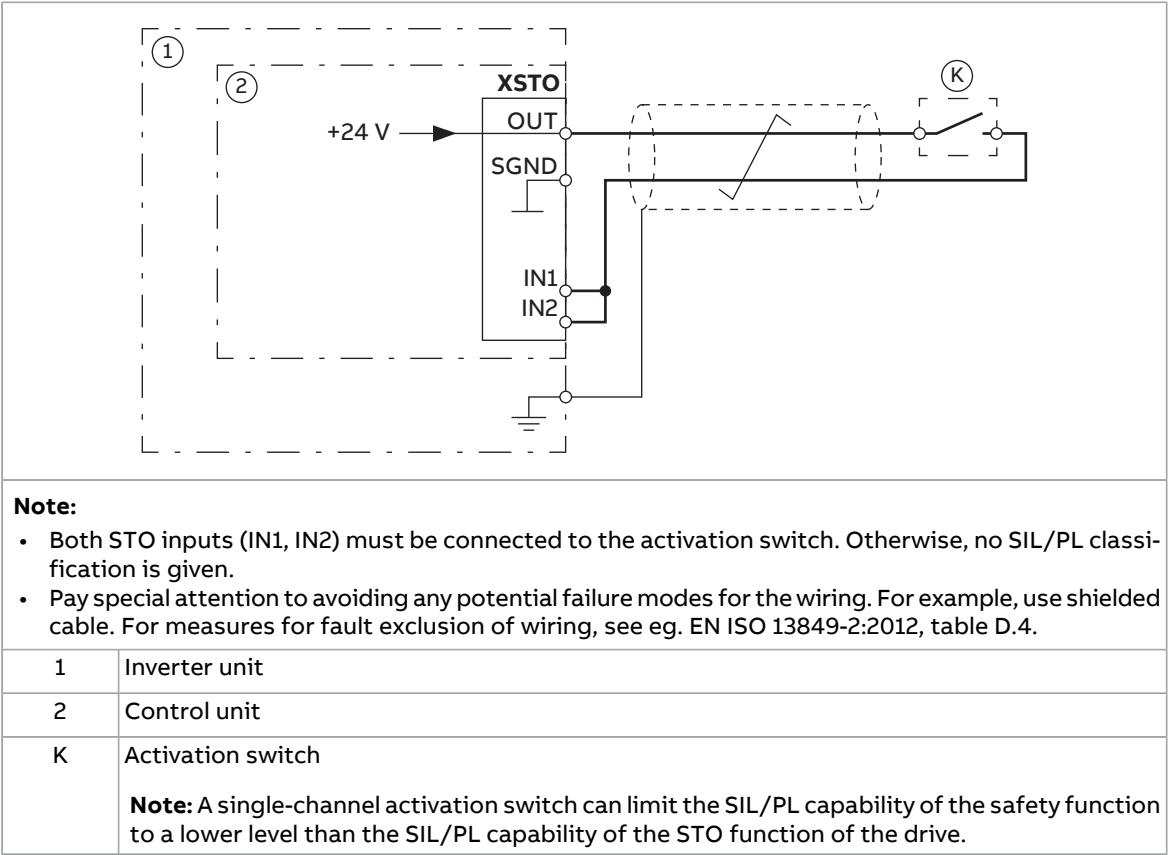
Frame R7i and multiples



Frame R8i and multiples

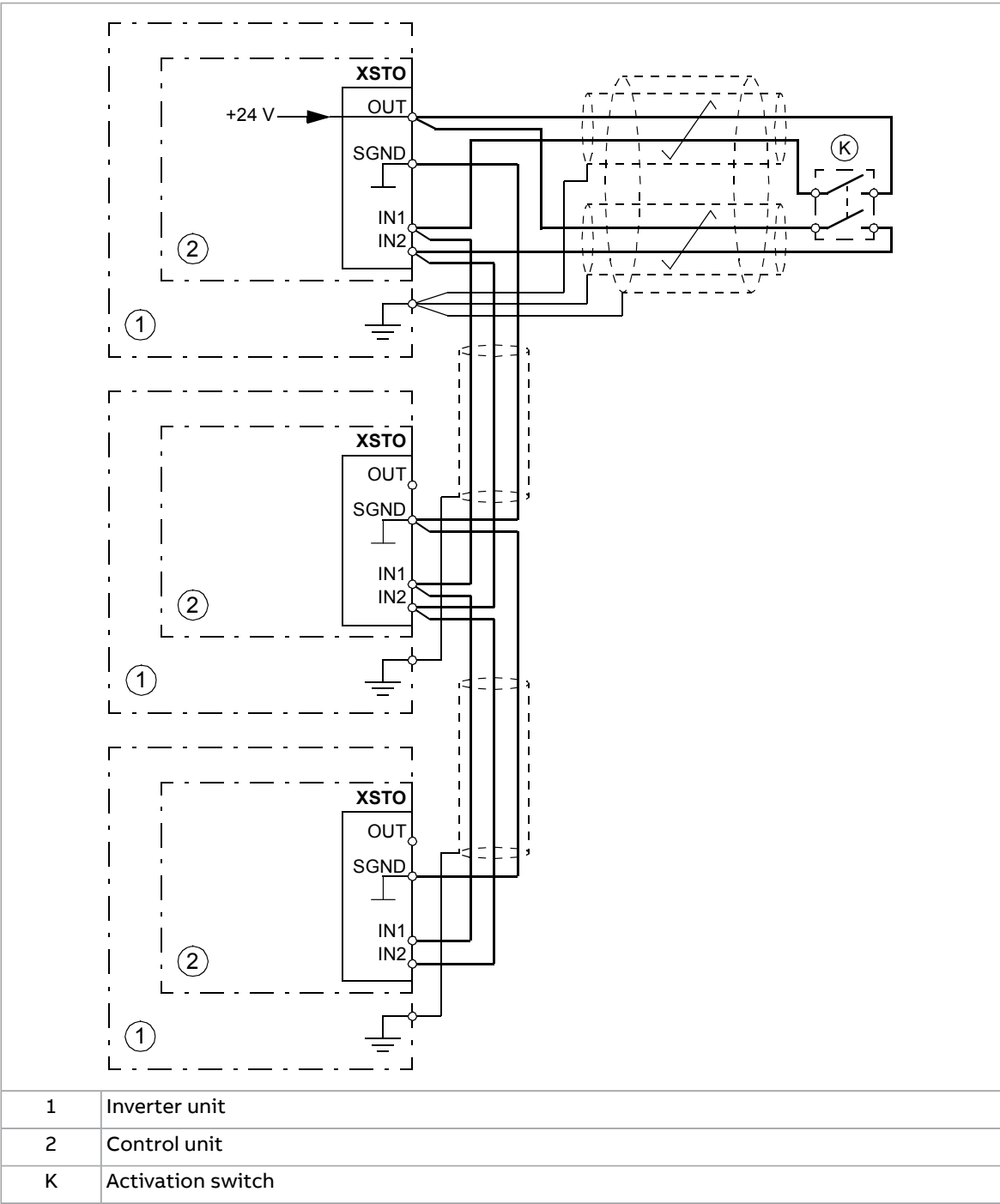


■ Single-channel connection of activation switch

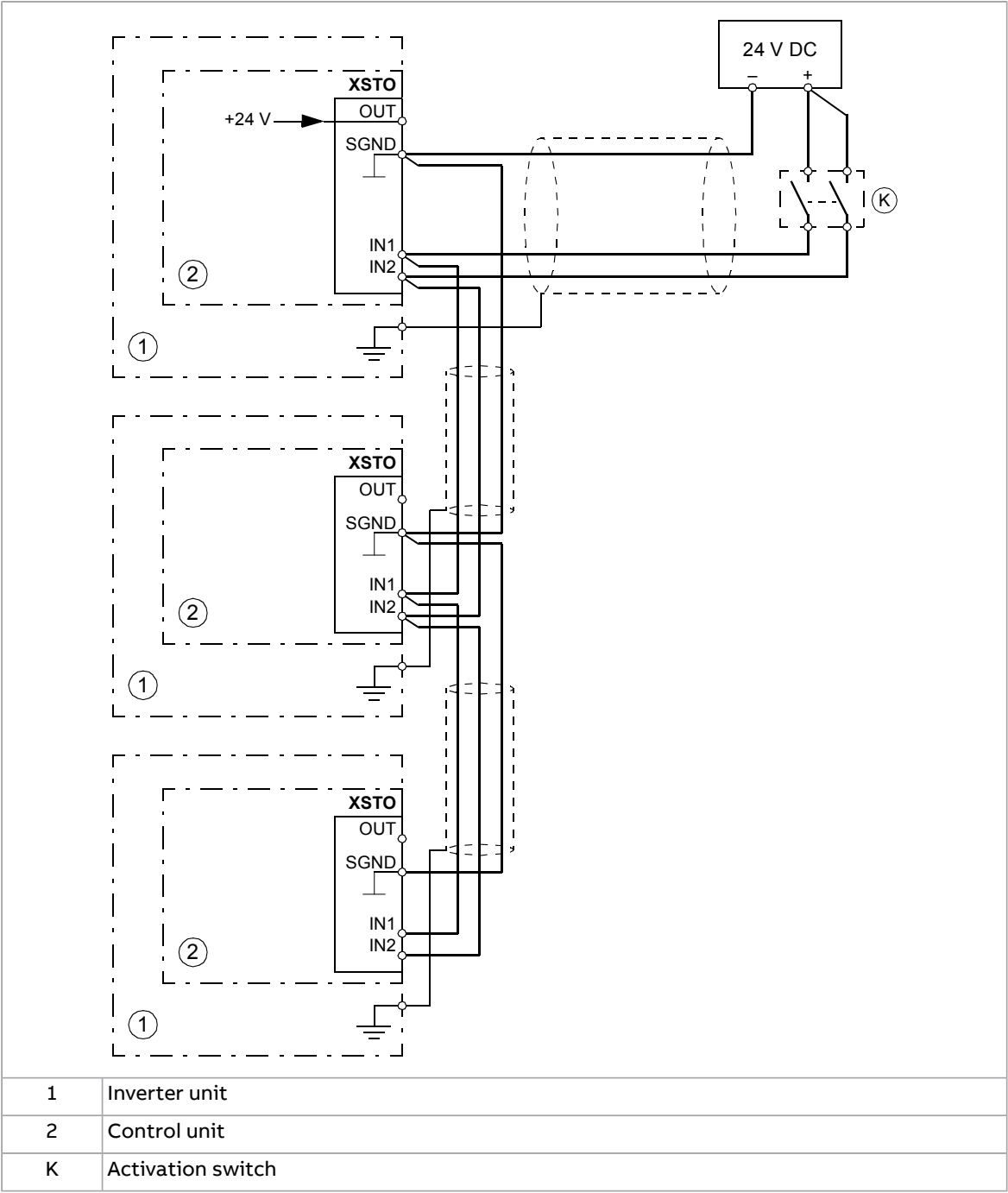


■ Multiple inverter units

Internal power supply



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 drive 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 drive).
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 drive 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 drive 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 drive.
-

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 test must be performed

1. at initial start-up of the safety function
2. after any changes related to the safety function (circuit boards, wiring, components, settings, replacement of inverter module, etc.)
3. after any maintenance work related to the safety function
4. after a drive firmware update
5. at the proof test of 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 safety functions module, FSPS-21 or FPTC module is installed, refer to its documentation.

Note: All inverter modules of the drive must be powered and connected to the STO circuit during the validation test.

Action	☒
 WARNING! Obey the safety instructions. If you ignore them, injury or death, or damage to the equipment can occur.	☐
Make sure that the motor can be run and stopped freely during start-up.	☐
Stop the drive (if running), switch the input power off and isolate the drive from the power line using a disconnecter.	☐
Check the STO circuit connections against the wiring diagram.	☐
Close the disconnecter and switch the power on.	☐
In case the drive consists of parallel-connected modules, check that the number of modules detected (parameter 95.14) matches the actual number of modules, and that the drive type is correctly set in parameter 95.31.	☐

Action	☒
Test the operation of the STO function when the motor is stopped. • Give a stop command for the drive (if running) and wait until the motor shaft is at a standstill. Make sure that the drive operates as follows: • Open the STO circuit. The drive generates an indication if one is defined for the 'stopped' state in parameter 31.22 (see the firmware manual). • Give a start command to verify that the STO function blocks the drive's operation. The motor should not start. • Close the STO circuit. • Reset any active faults. Restart the drive and check that the motor runs normally.	☐
Test the operation of the STO function when the motor is running. • Start the drive and make sure the motor is running. • Open the STO circuit. The motor should stop. The drive generates an indication if one is defined for the 'running' state in parameter 31.22 (see the firmware manual). • Reset any active faults and try to start the drive. • Make sure that the motor stays at a standstill and the drive operates as described above in testing the operation when the motor is stopped. • Close the STO circuit. • Reset any active faults. Restart the drive and check that the motor runs normally.	☐
Test the operation of the failure detection of the drive. The motor can be stopped or running. • Open the 1st input channel of the STO circuit. If the motor was running, it should coast to a stop. The drive generates an FA81 fault indication (see the firmware manual). • Give a start command to verify that the STO function blocks the drive's operation. The motor should not start. • Open the STO circuit (both channels). • Give a reset command. • Close the STO circuit (both channels). • Reset any active faults. Restart the drive and check that the motor runs normally. • Open the 2nd input channel of the STO circuit. If the motor was running, it should coast to a stop. The drive generates an FA82 fault indication (see the firmware manual). • Give a start command to verify that the STO function blocks the drive's operation. The motor should not start. • Open the STO circuit (both channels). • Give a reset command. • Close the STO circuit (both channels). • Reset any active faults. Restart the drive 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 drive control unit de-energize, and the control unit cuts off the control voltage from the output IGBTs.
3. The control program generates an indication as defined by parameter 31.22 (see the firmware manual of the drive).
4. The motor coasts to a stop (if running). The drive 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 drive. Therefore maintenance work on electrical parts of the drive or the motor can only be carried out after isolating the drive 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 (A41). 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 any ACS880 inverter or drive control program. It is not supported by supply, DC/DC converter or brake firmware.



WARNING!

The drive cannot detect or memorize any changes in the STO circuitry when the drive control unit is not powered or when the main power to the drive is off. 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!

Permanent magnet or synchronous reluctance [SynRM] motors only:

In case of a multiple IGBT power semiconductor failure, the drive can produce an alignment torque which maximally rotates the motor shaft by $180/p$ degrees (with permanent magnet motors) or $180/2p$ 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 drive is stopped by using the Safe torque off function, the drive 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 drive 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 drive.
 - 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 10 years; see section [Safety data \(page 305\)](#).

There are two alternative procedures for proof testing:

1. Perfect proof testing. It is assumed that all dangerous failures of the STO circuit are detected during the test. PFD_{avg} values for STO with the perfect proof testing procedure are given in the safety data section.
2. Simplified proof testing. This procedure is faster and simpler than perfect proof testing. Not all dangerous failures of the STO circuit are detected during the test. The PFD_{avg} value for STO with the simplified proof testing procedure is given in the safety data section.

Note: The proof testing procedures are only valid for proof testing (periodic test, item 5 under section [Start-up including validation test](#)) but not for re-validation after changes made in the circuit. Re-validation (items 1...4 under [Start-up including validation test](#)) must be done according to the initial validation procedure.

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 of the drive 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 drive 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 \(page 298\)](#).

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.

■ Perfect proof test procedure

Action	☒
 WARNING! Obey the safety instructions. If you ignore them, injury or death, or damage to the equipment can occur.	☐
Test the operation of the STO function. If the motor is running, it will stop during the test. - Give a stop command for the drive (if running) and wait until the motor shaft is at a standstill. Make sure that the drive operates as follows: - Open the STO circuit. The drive generates an indication if one is defined for the 'stopped' state in parameter 31.22 (see the firmware manual). - Close the STO circuit. - Reset any active faults. Restart the drive and check that the motor runs normally.	☐
Test the operation of the failure detection of the drive. The motor can be stopped or running. - Open the 1st input channel of the STO circuit. If the motor was running, it should coast to a stop. The drive generates an FA81 fault indication (see the firmware manual). - Open the STO circuit (both channels). - Give a reset command. - Close the STO circuit (both channels). - Reset any active faults. - Open the 2nd input channel of the STO circuit. If the motor was running, it should coast to a stop. The drive generates an FA82 fault indication (see the firmware manual). - Open the STO circuit (both channels). - Give a reset command. - Close the STO circuit (both channels). - Reset any active faults. Restart the drive and check that the motor runs normally.	☐
Document and sign the test report to verify that the safety function has been tested according to the procedure.	☐

■ Simplified proof test procedure

Action	☒
 WARNING! Obey the safety instructions. If you ignore them, injury or death, or damage to the equipment can occur.	☐
Test the operation of the STO function. If the motor is running, it will stop during the test. - Give a stop command for the drive (if running) and wait until the motor shaft is at a standstill. Make sure that the drive operates as follows: - Open the STO circuit. The drive generates an indication if one is defined for the 'stopped' state in parameter 31.22 (see the firmware manual). - Close the STO circuit. - Reset any active faults. Restart the drive and check that the motor runs normally.	☐
Document and sign the test report to verify that the safety function has been tested according to the procedure.	☐

Fault tracing

The indications given during the normal operation of the Safe torque off function are selected by drive control program parameter 31.22.

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 drive trips on an FA81 or FA82 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 firmware manual of the drive control program for the indications generated by the drive, 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 applies only if both STO channels are used.

- 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 response times:
 - STO reaction time (shortest detectable break): 1 ms
 - STO response time: 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.
- Indication delays:
 - STO fault indication (parameter 31.22) delay: < 500 ms
 - STO warning indication (parameter 31.22) delay: < 1000 ms.

■ Terms and abbreviations

Term or abbreviation	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
PFH _{diag}	IEC/EN 62061	Average frequency of dangerous failures per hour for the diagnostic function of STO
PL	EN ISO 13849-1	Performance level. Levels a...e correspond to SIL
Proof test	IEC 61508, IEC 62061	Periodic test performed to detect failures in a safety-related system so that, if necessary, a repair can restore the system to an "as new" condition or as close as practical to this condition
SC	IEC 61508	Systematic capability (1...3)
SFF	IEC 61508	Safe failure fraction (%)
SIL	IEC 61508	Safety integrity level (1...3)
STO	IEC/EN 61800-5-2	Safe torque off

Term or abbreviation	Reference	Description
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.
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.
λ_{Diag_d}	IEC 61508-6	Dangerous failure rate (per hour) of the diagnostics function of STO
λ_{Diag_s}	IEC 61508-6	Safe failure rate (per hour) of the diagnostics function of STO

■ TÜV certificate

The TÜV certificate is available on the Internet.

14

Example circuit diagrams

Contents of this chapter

This chapter contains connection diagram examples for the whole inverter unit.

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](#).

Electrical option designations

[illegible]

Function designations

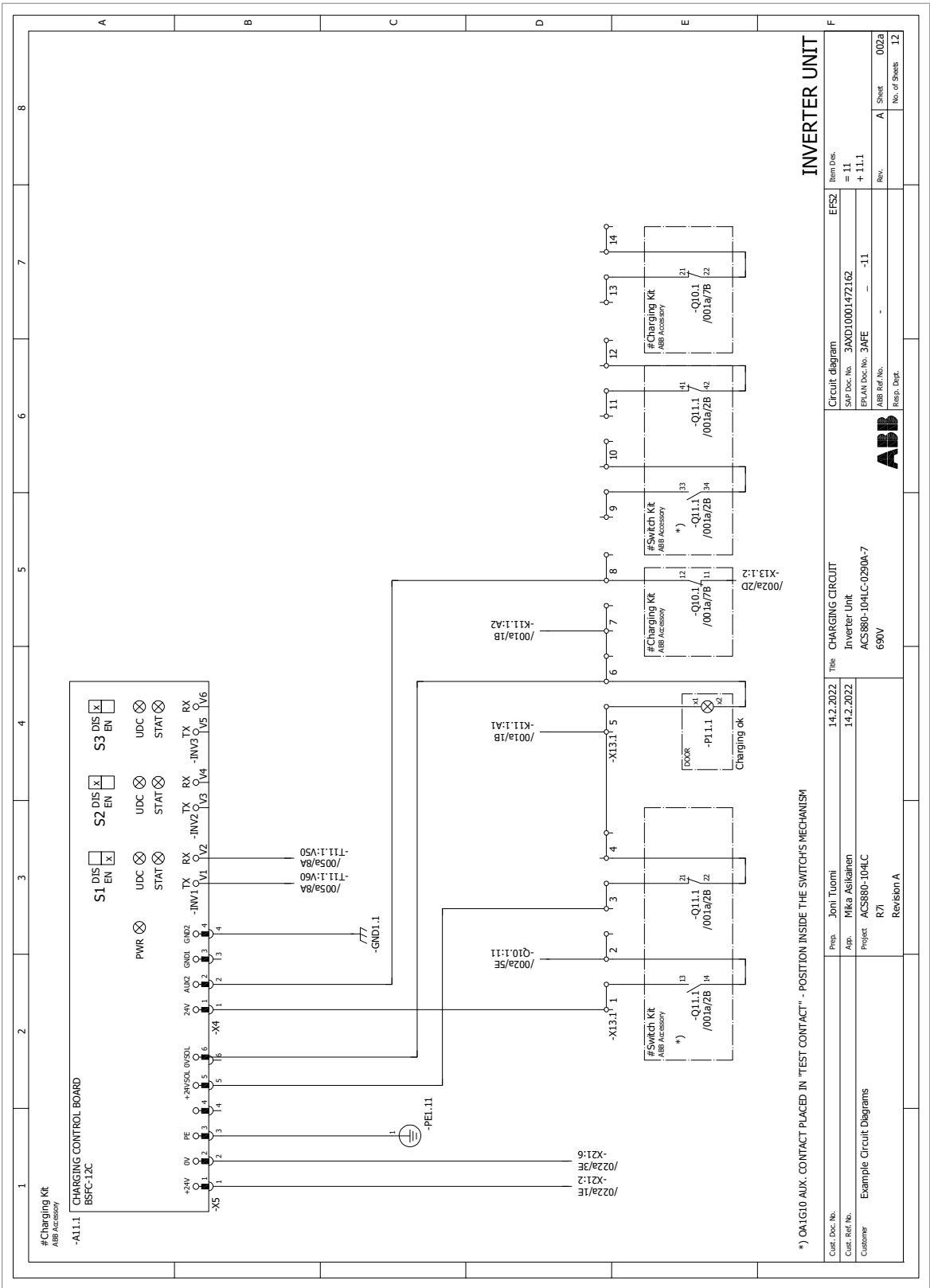
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=11	Inverter Unit

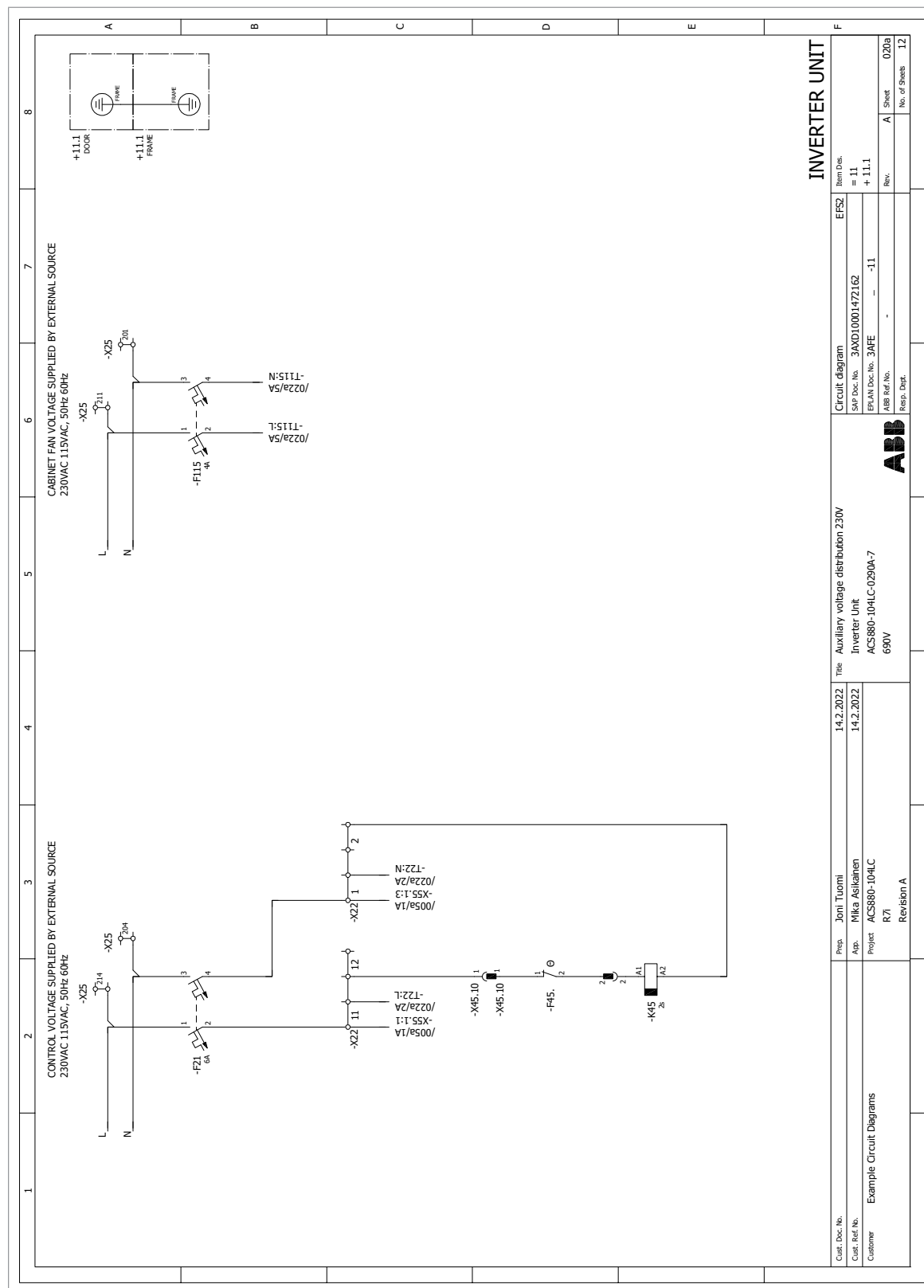
Location designations

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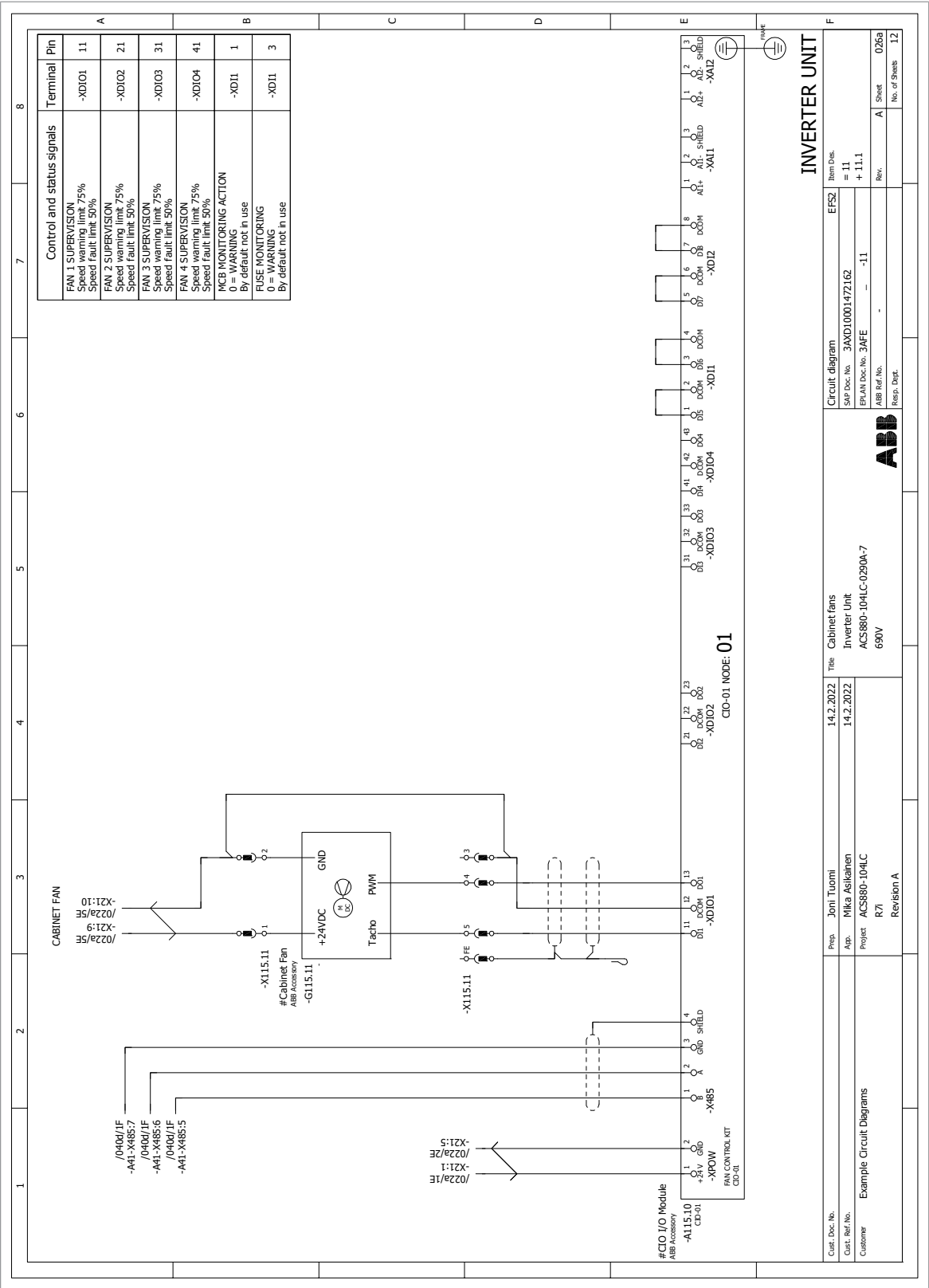
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Customer	Example Circuit Diagrams	Project	ACS880-104LC			SAP Doc. No.	+ 3AXD10001472162	
					EPLAN Doc. No.	- 3AFE		
		R71			AEB Ref. No.	-	Rev.	A Sheet 000C
			Revision A				No. of Sheets	6

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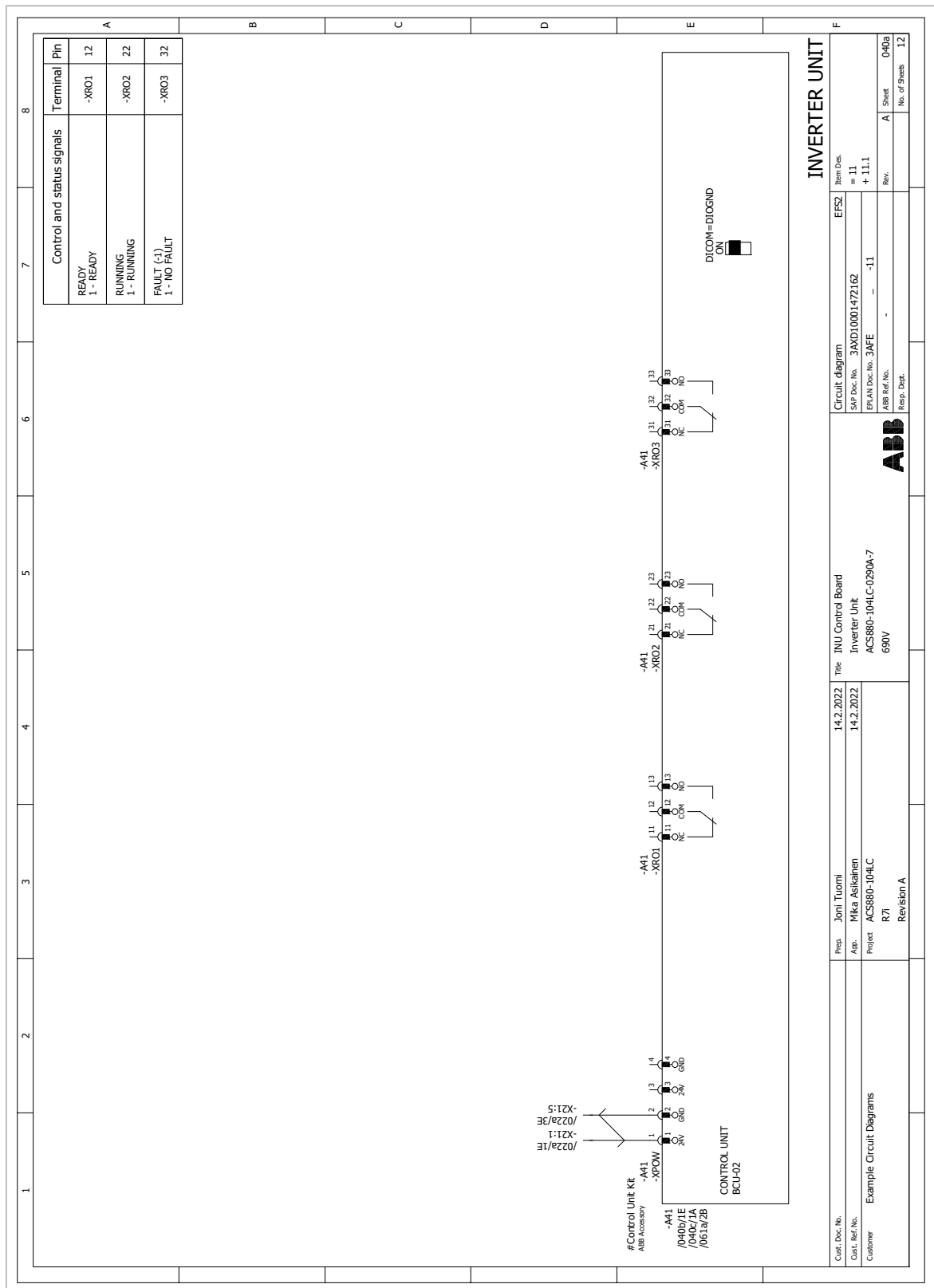


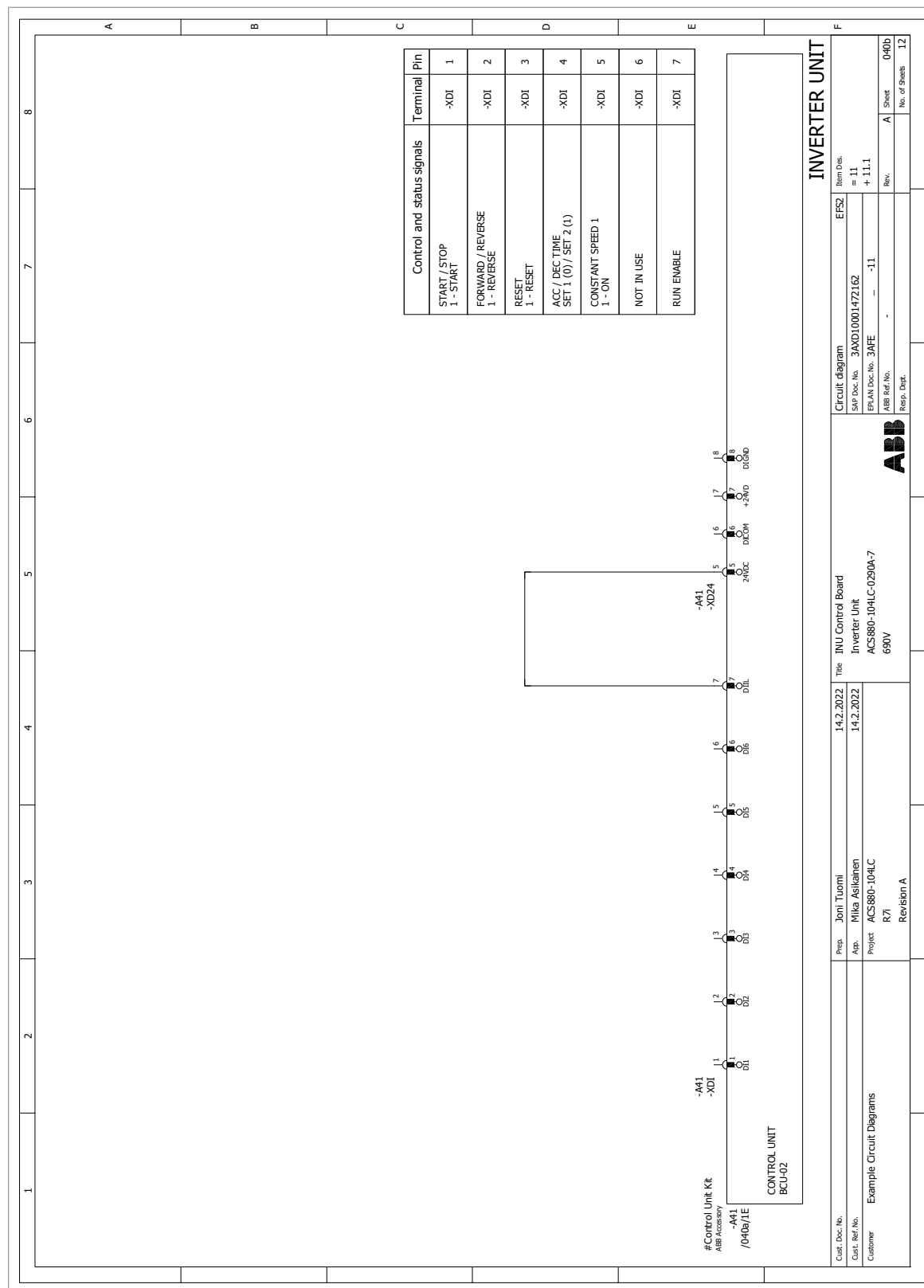


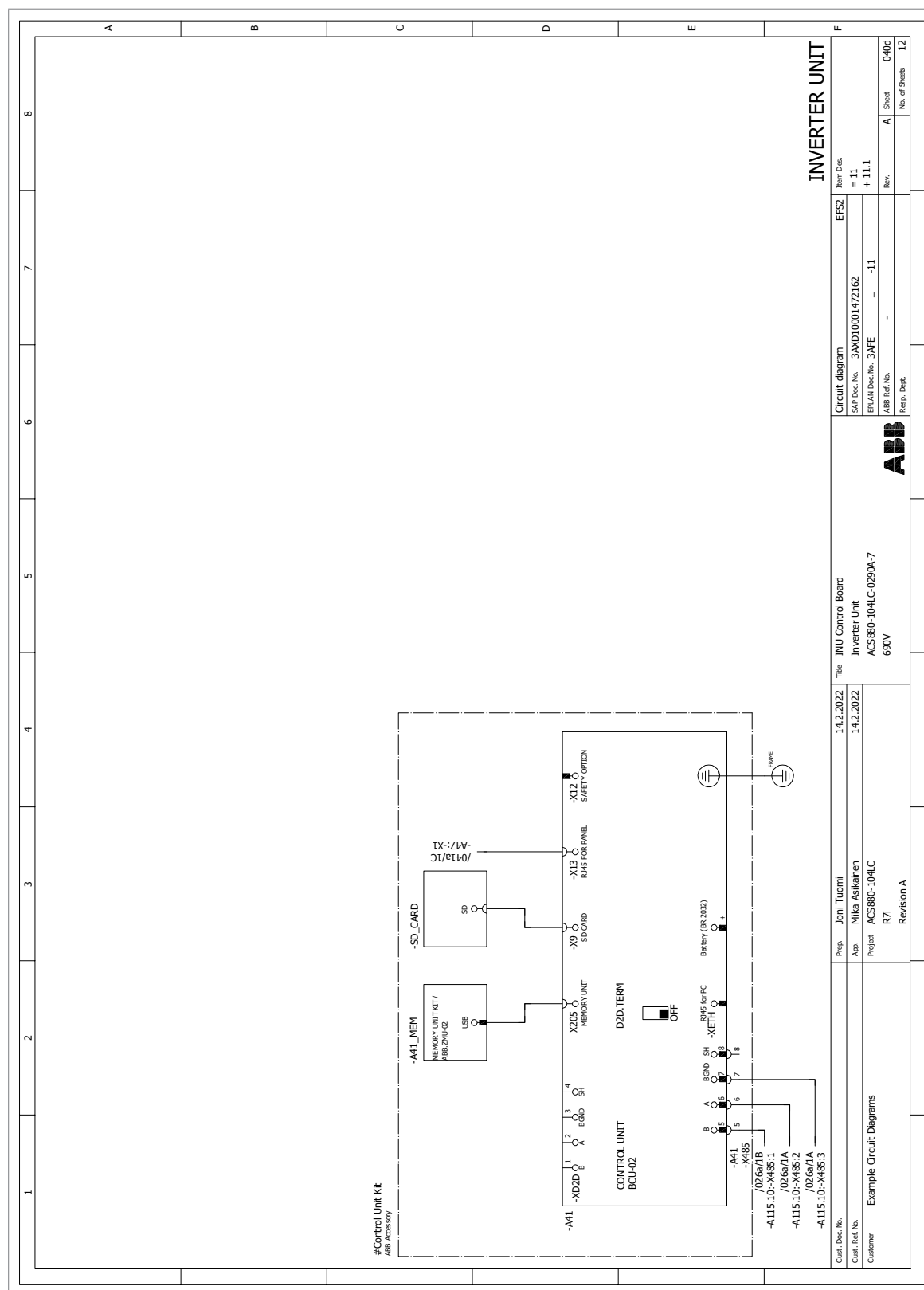
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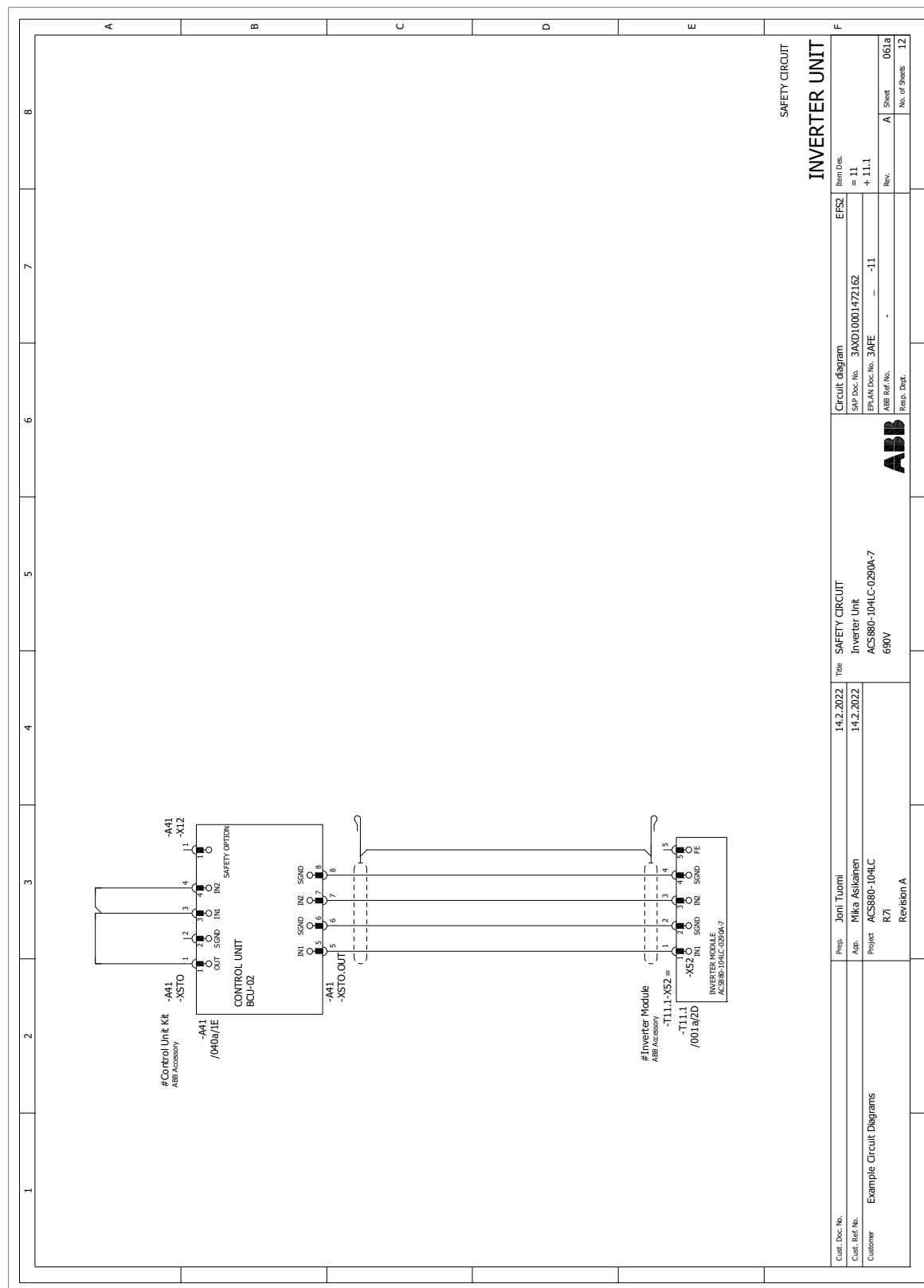


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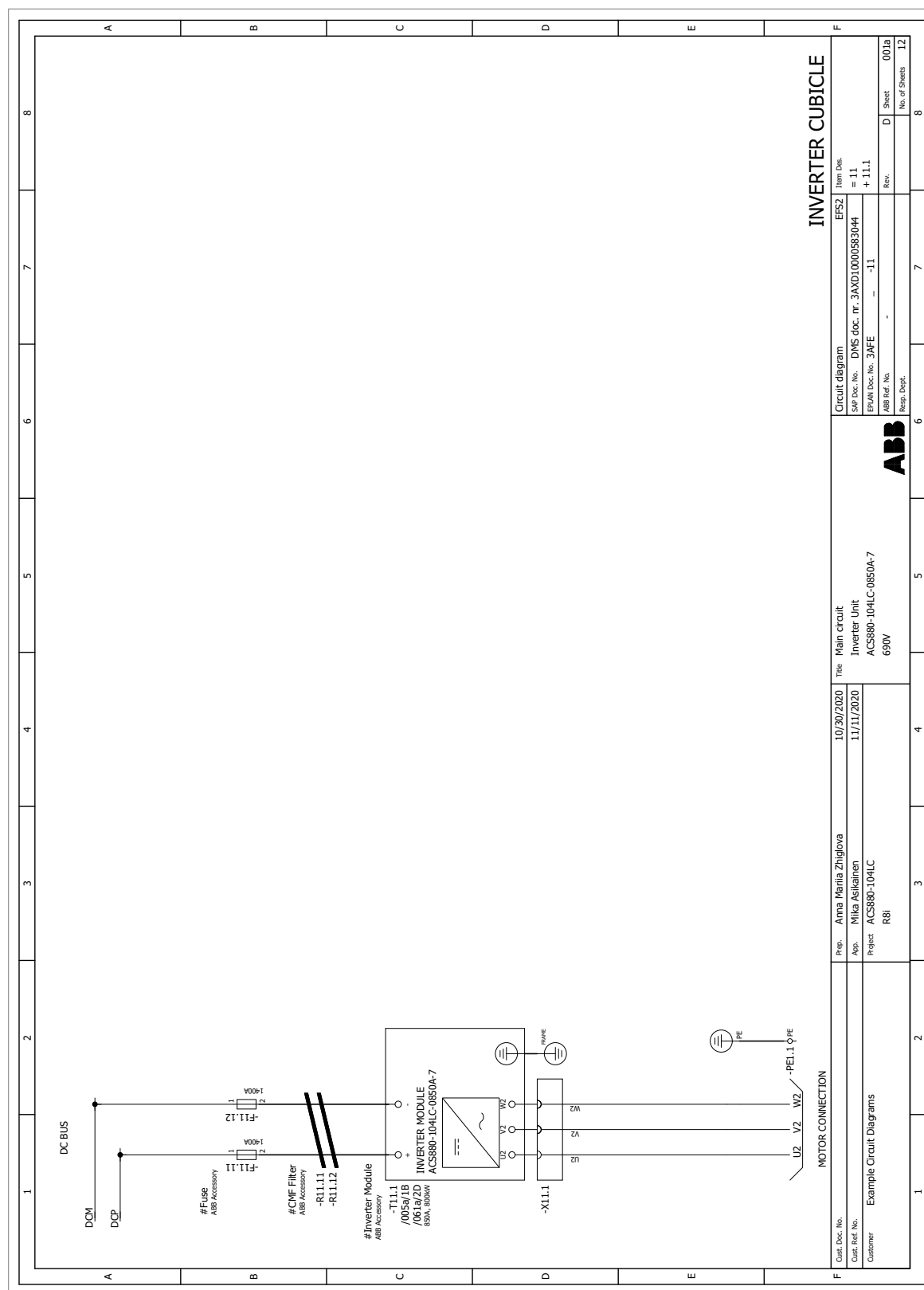


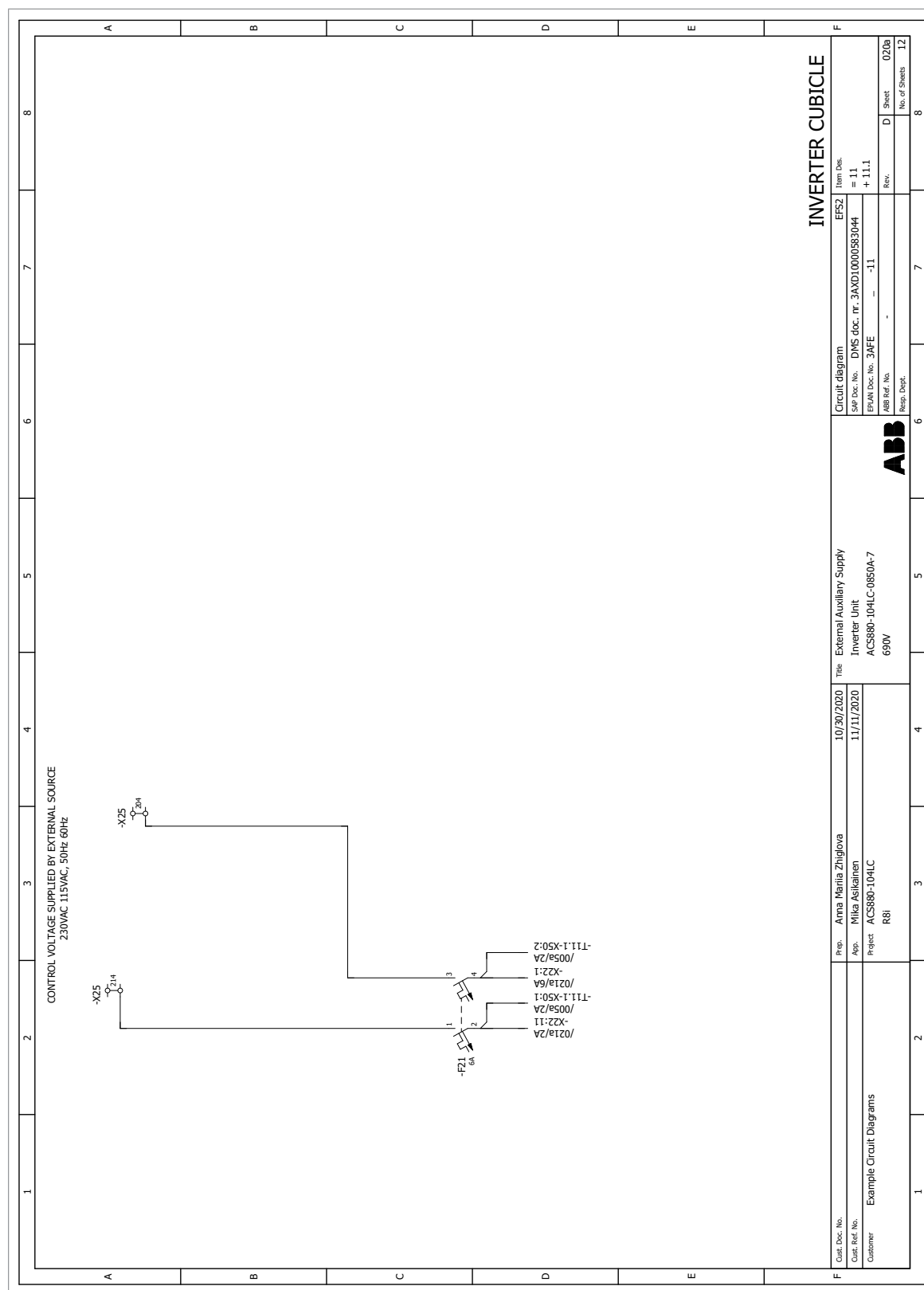


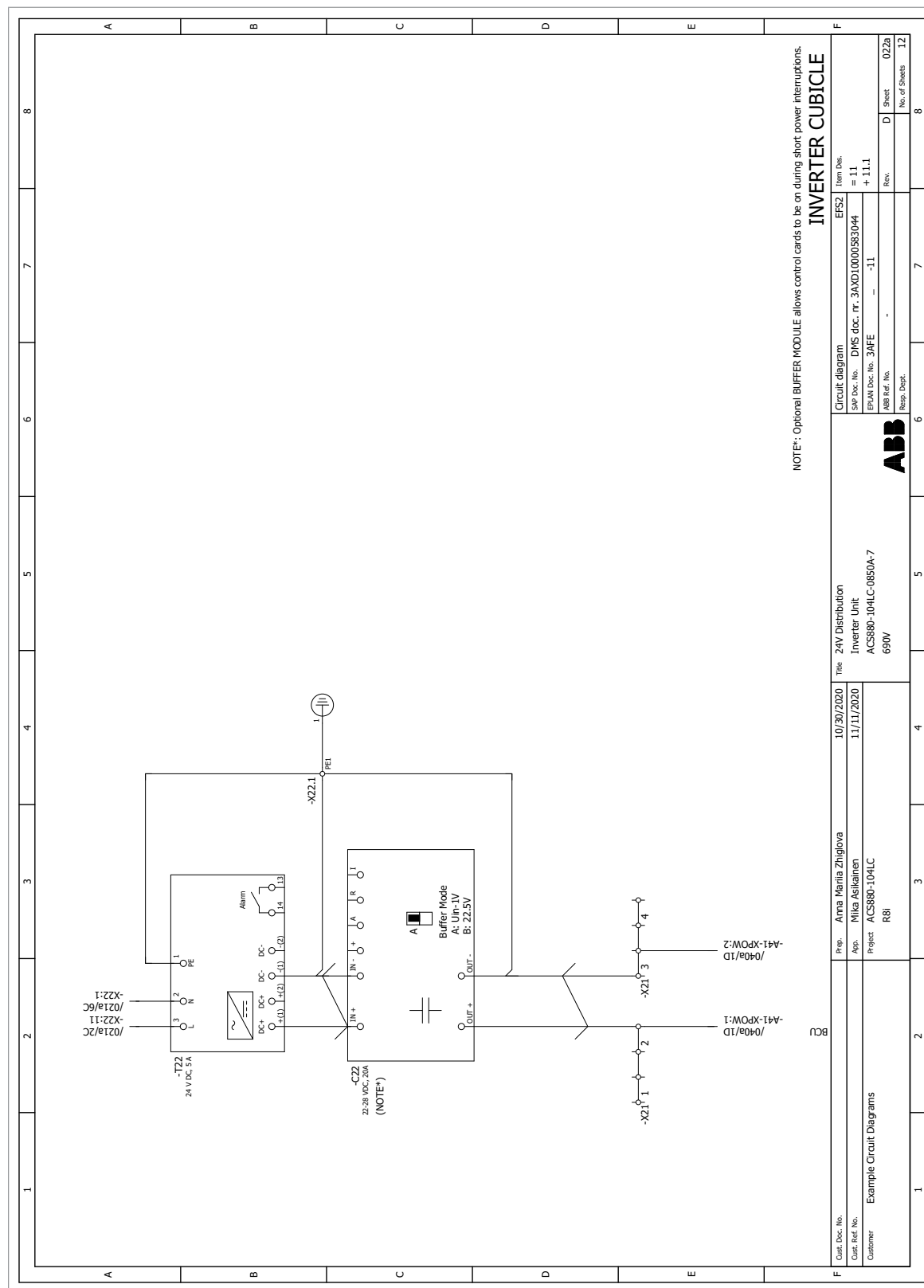
Frame R8i without DC switch-disconnector

■ Overview

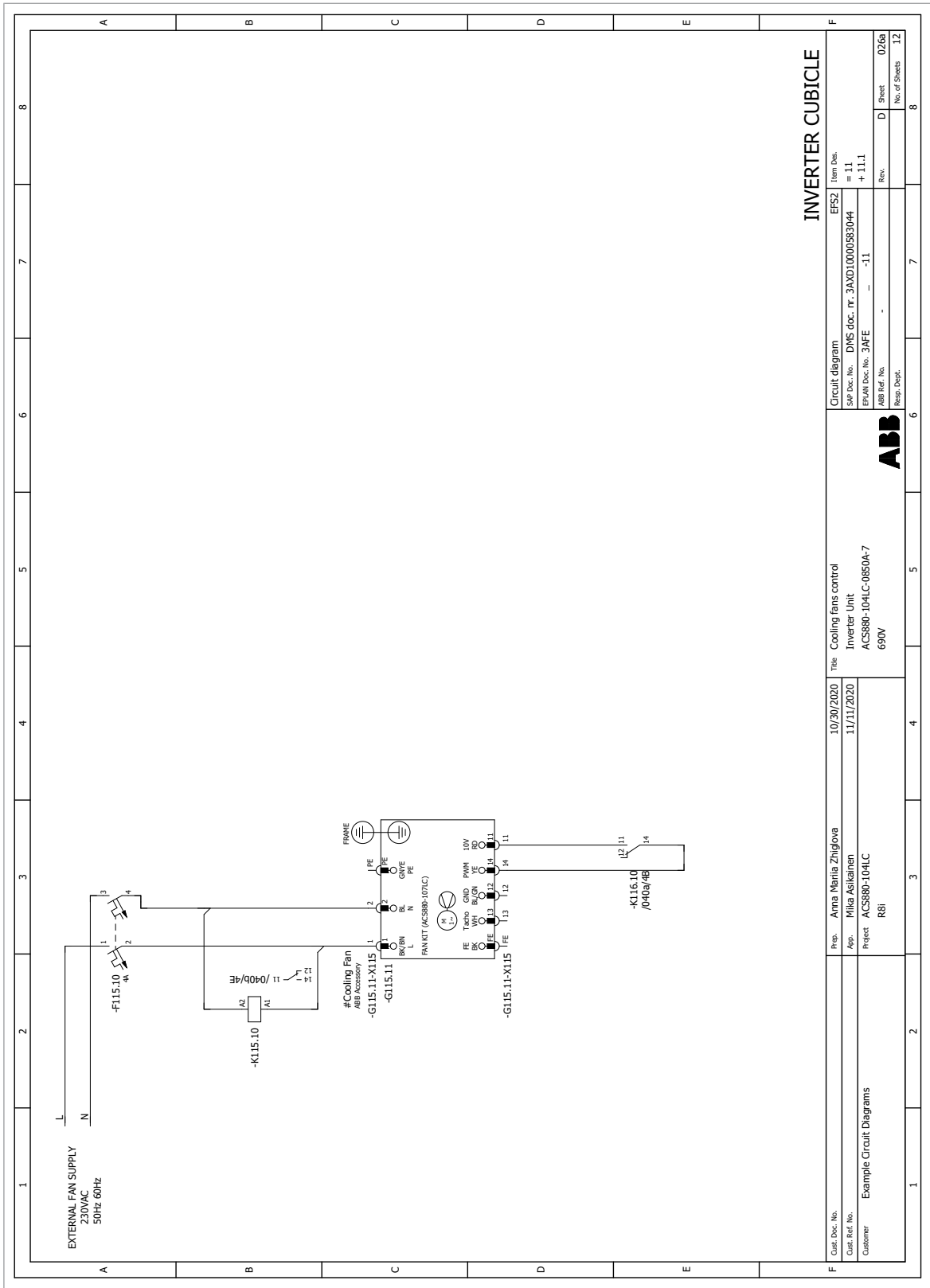
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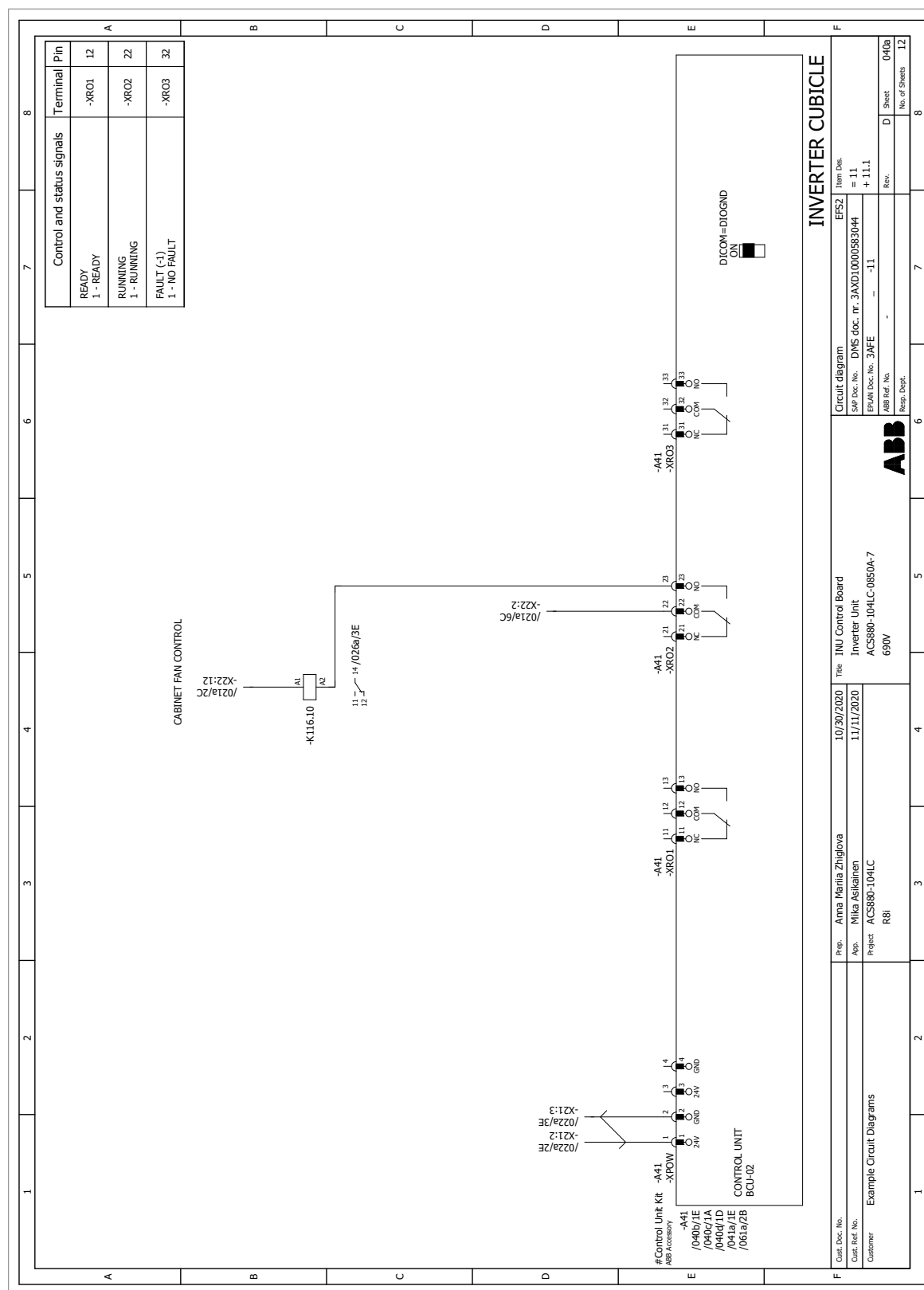


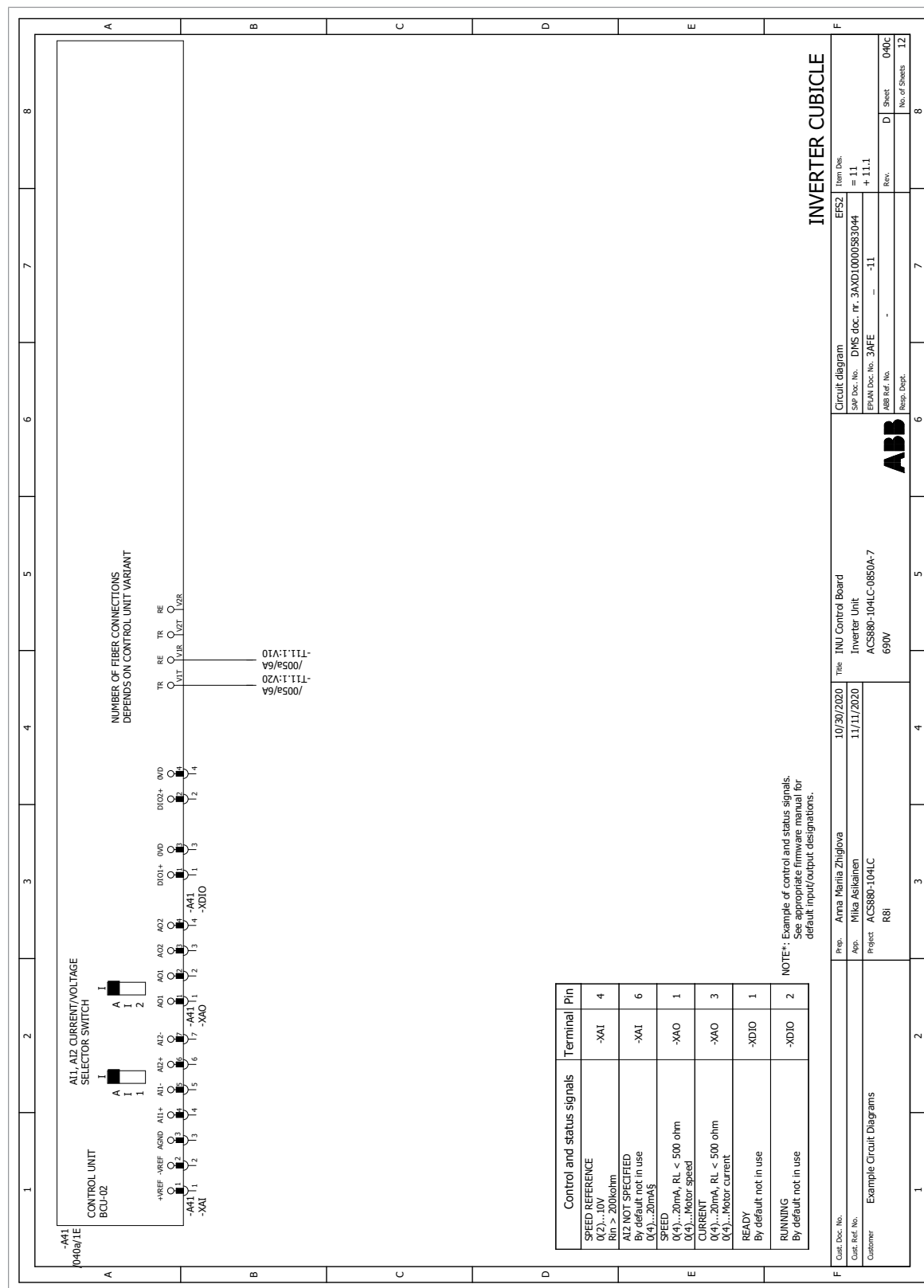


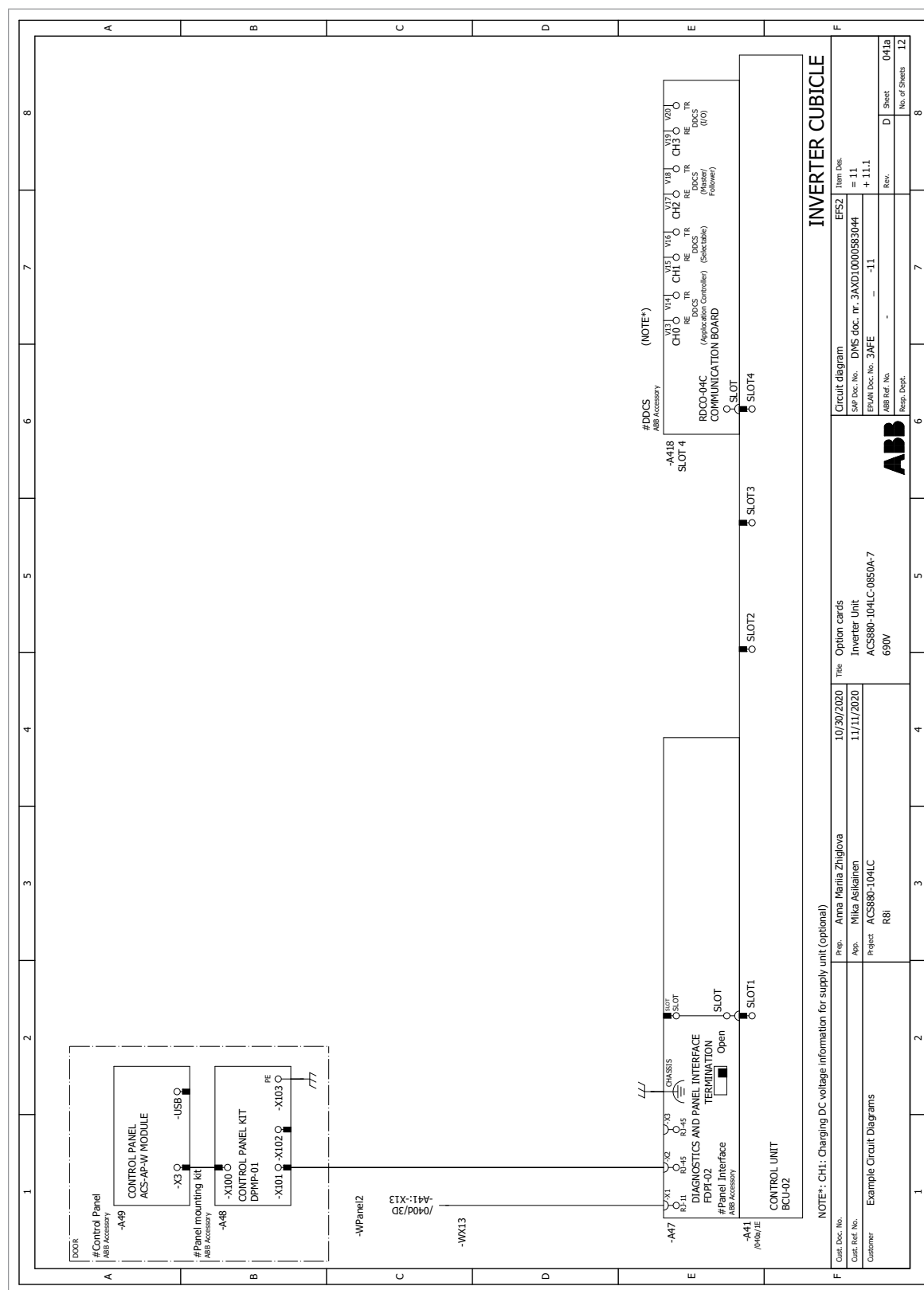


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■ Overview

Function designations

Designation	Structure description
=I1	Inverter Unit

Location designations

Designation	Structure description
+11.1	Inverter Cubicle

Electrical option designations

Designation	Material Code	Amount
Analog extension	688B3384	1
CIO I/O module	3AXD5000041983	1
CMF Filter	3AXD50000566785	4
Charging Kit	3AXD5000026801	1
Control Panel	3AXD50000025965	1
Control Unit Kit	3AXD5000003417	1
Cooling Fan	3AXD50000095414	1
DACS	688B3915	1
Fuse	3AUAD000066673	4
Inverter Module	ACSR80-104LC-0850A-7	2
Panel Interface	3AUAD000108650	1
Panel mounting kit	3AUAD000108678	1
Resistor	10028531	6
Switch Kit	3AXD50000227044	1

ABB

SAP Doc. No. DMS doc. nr. 3AXD100006003282

EPJAN Doc. No. 3AFE

ABB Ref. No. -

Rev.

DMS doc. nr. 3AXD100006003282

EPJAN Doc. No. 3AFE

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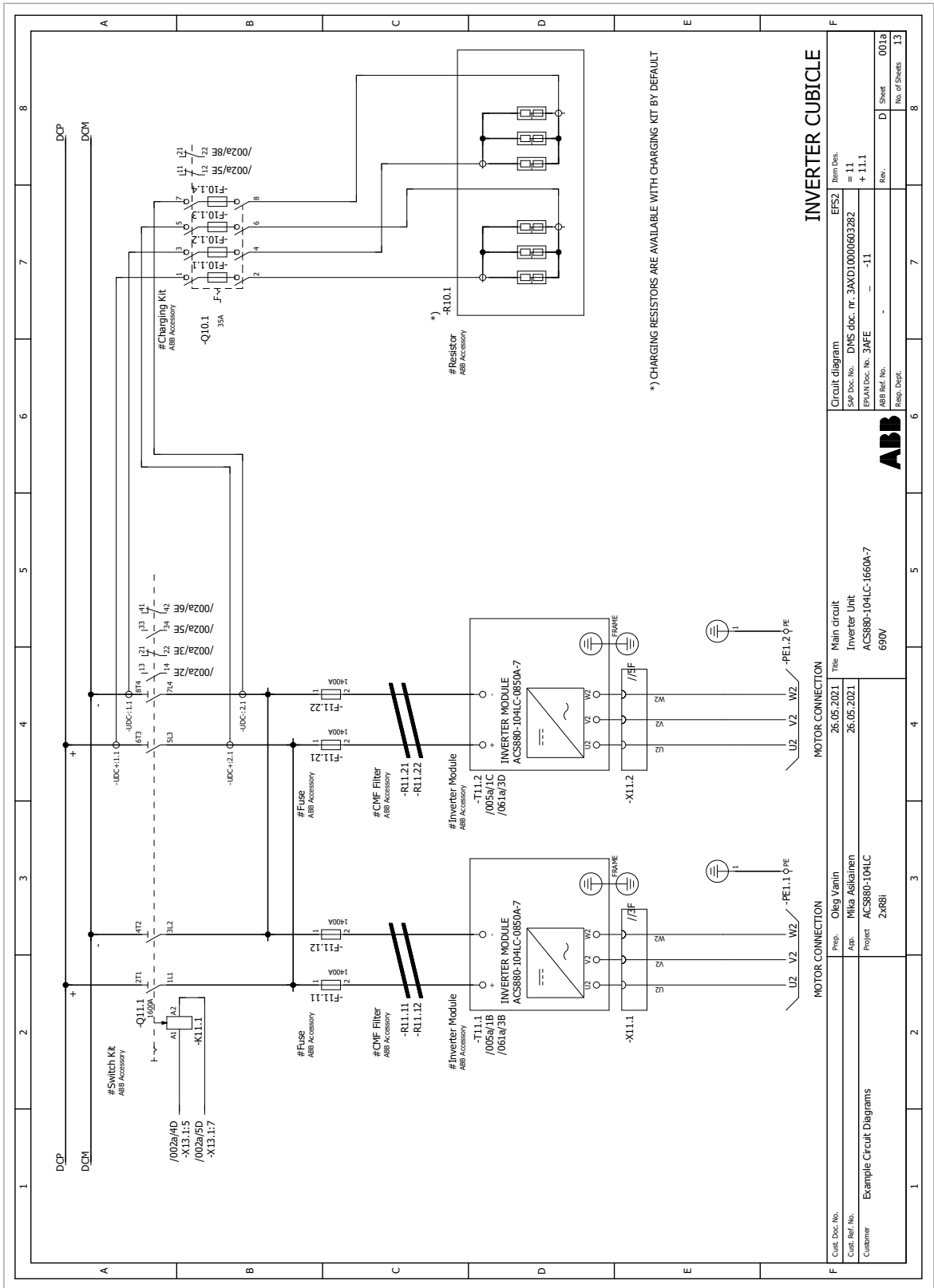
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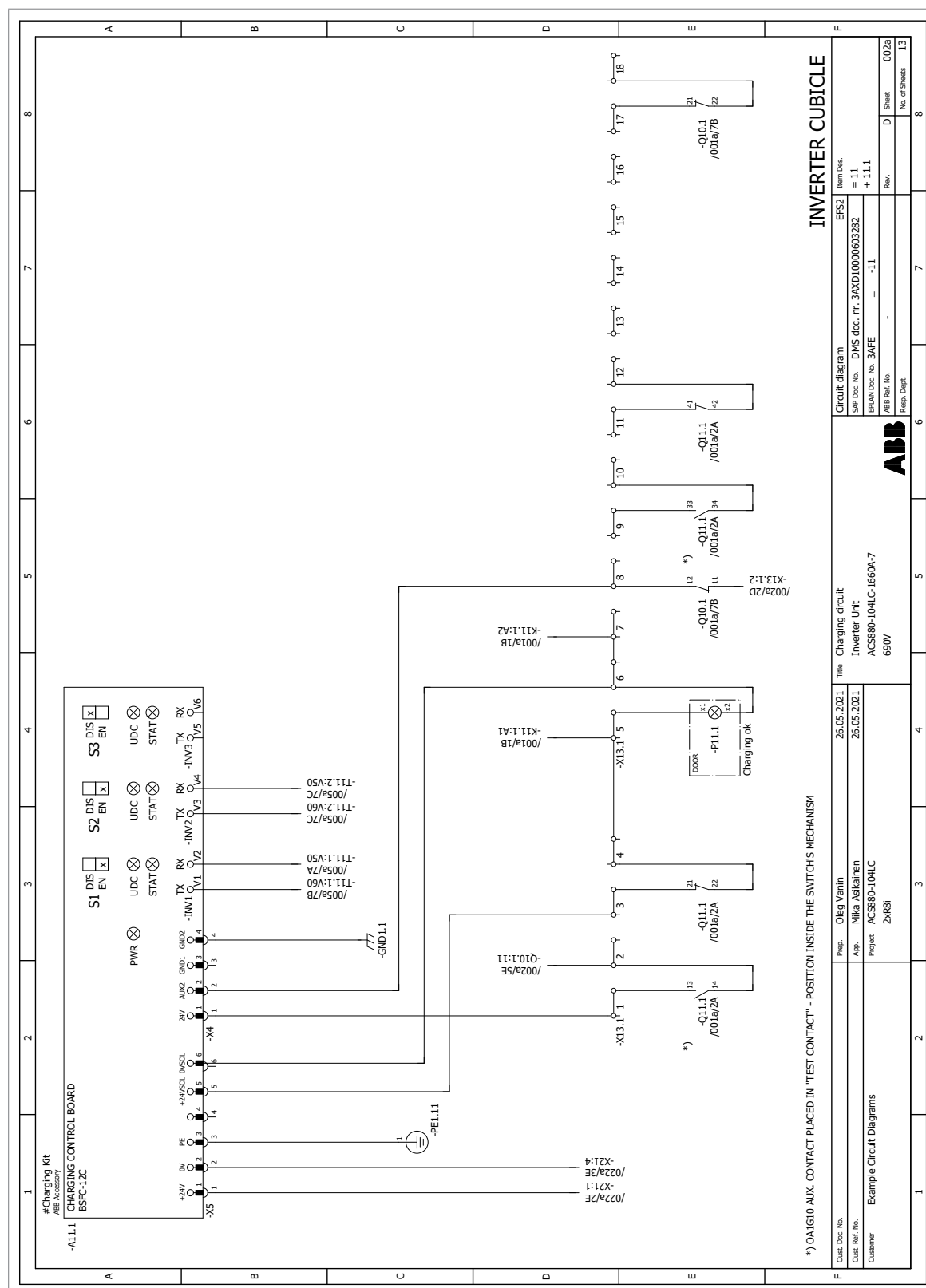
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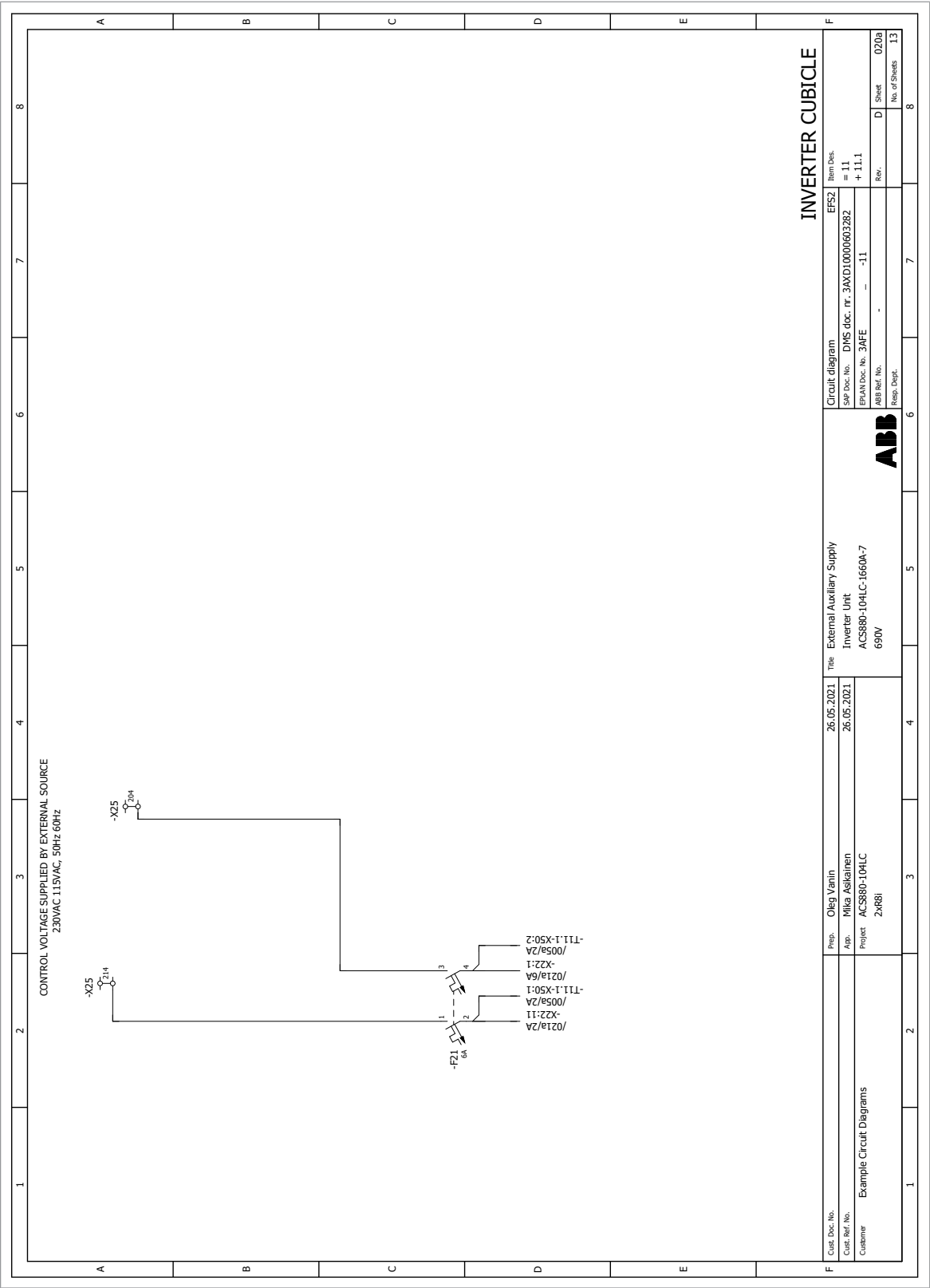
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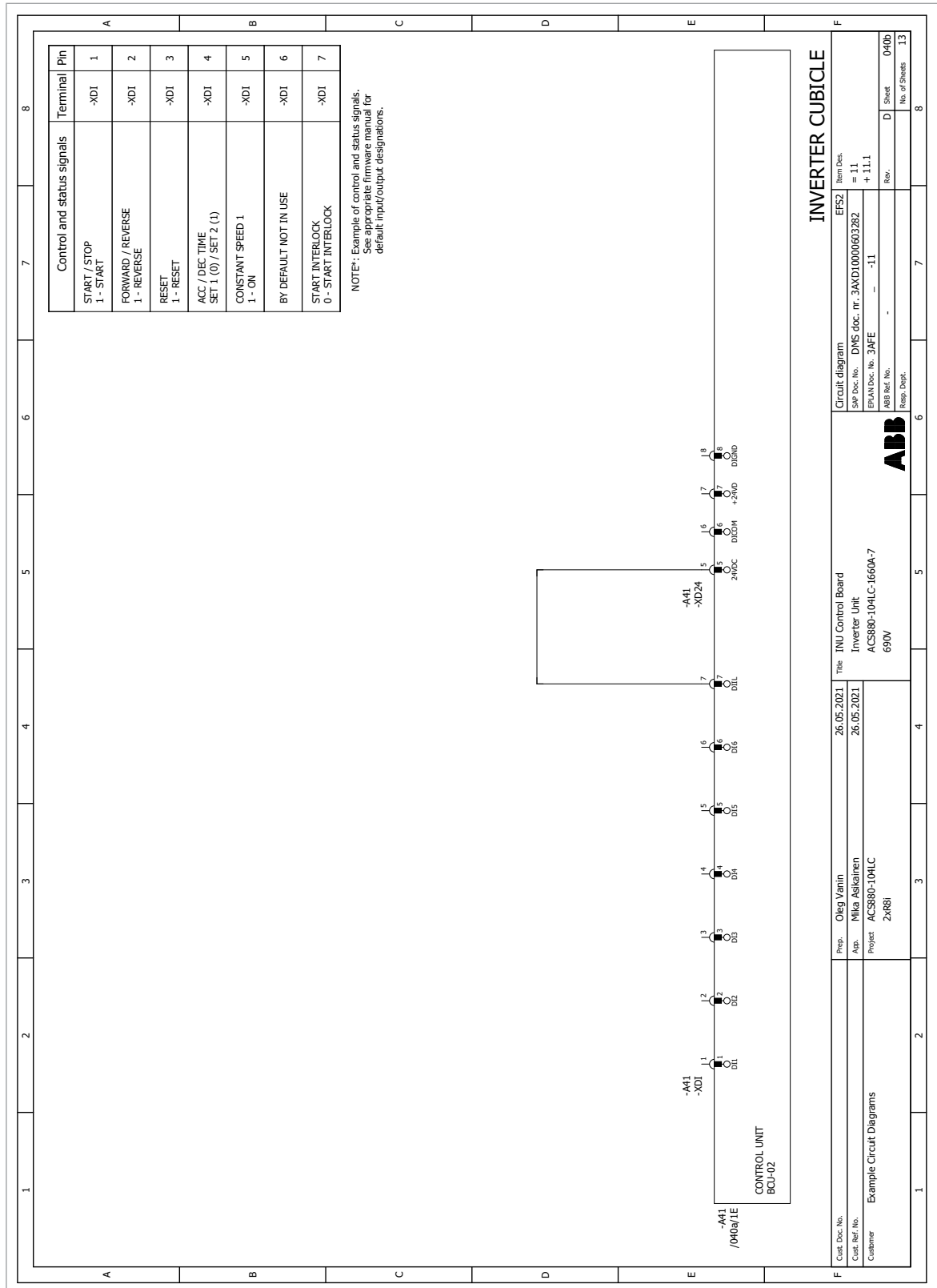


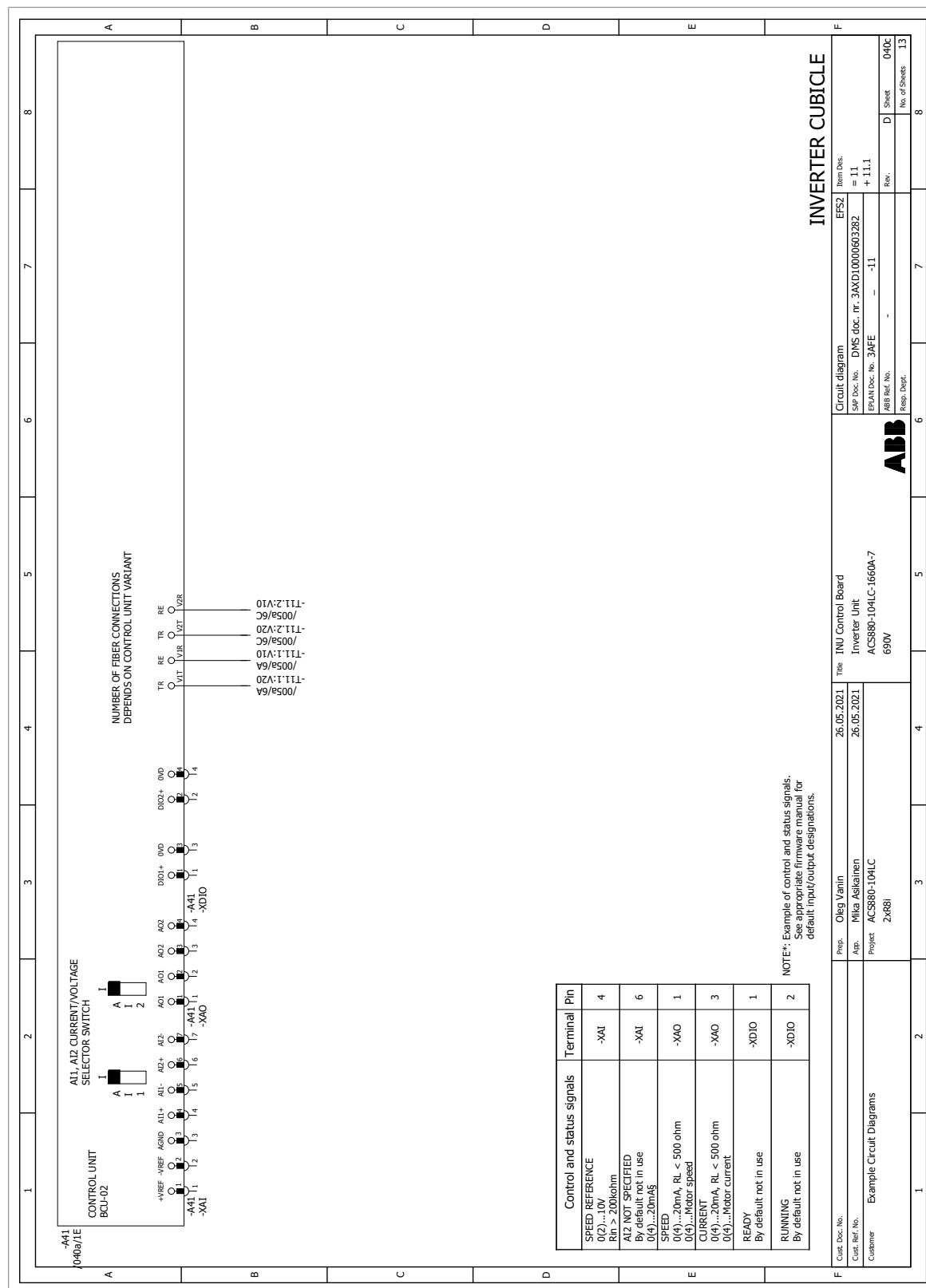


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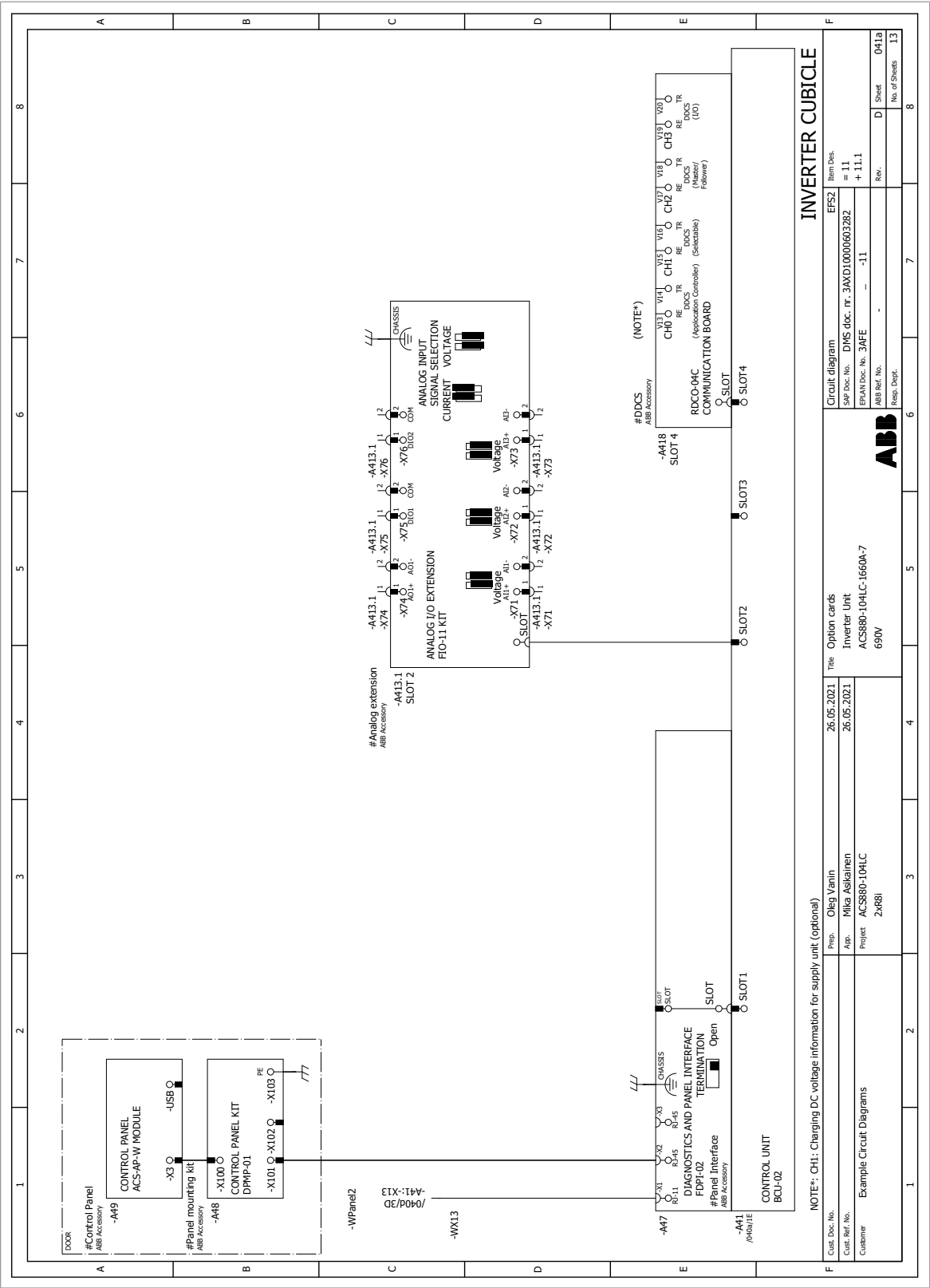


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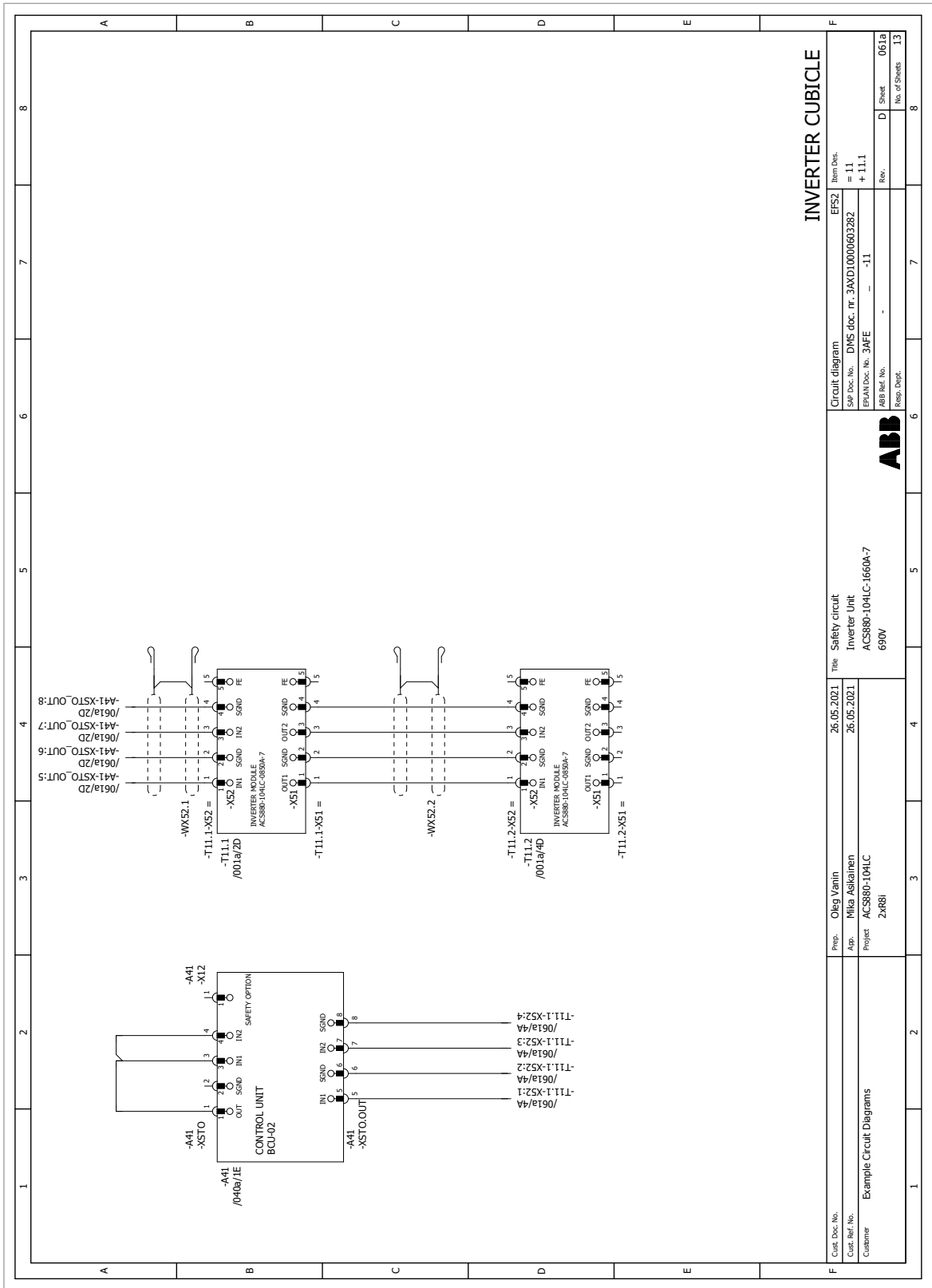
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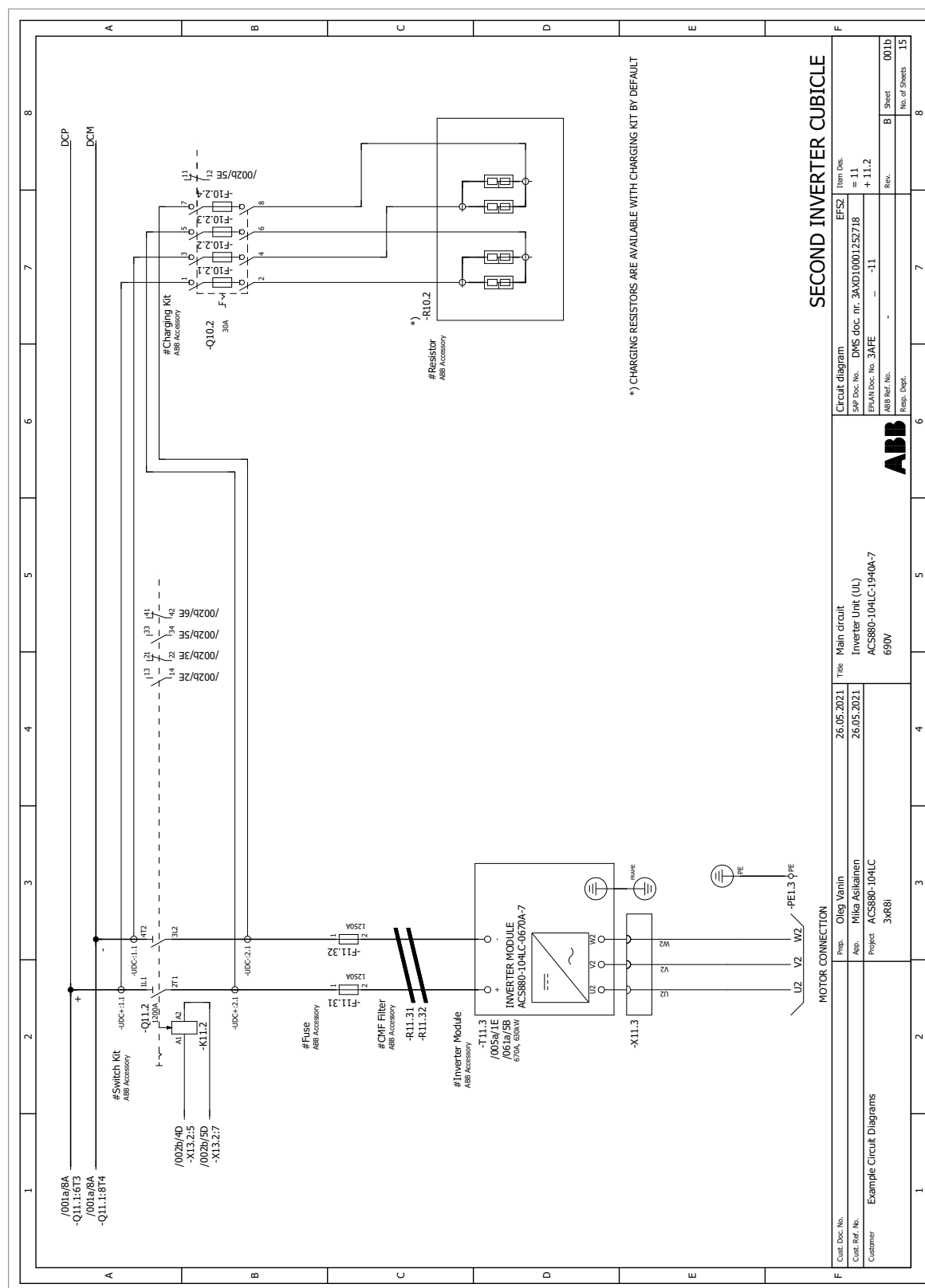
INVERTER CUBICLE

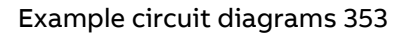
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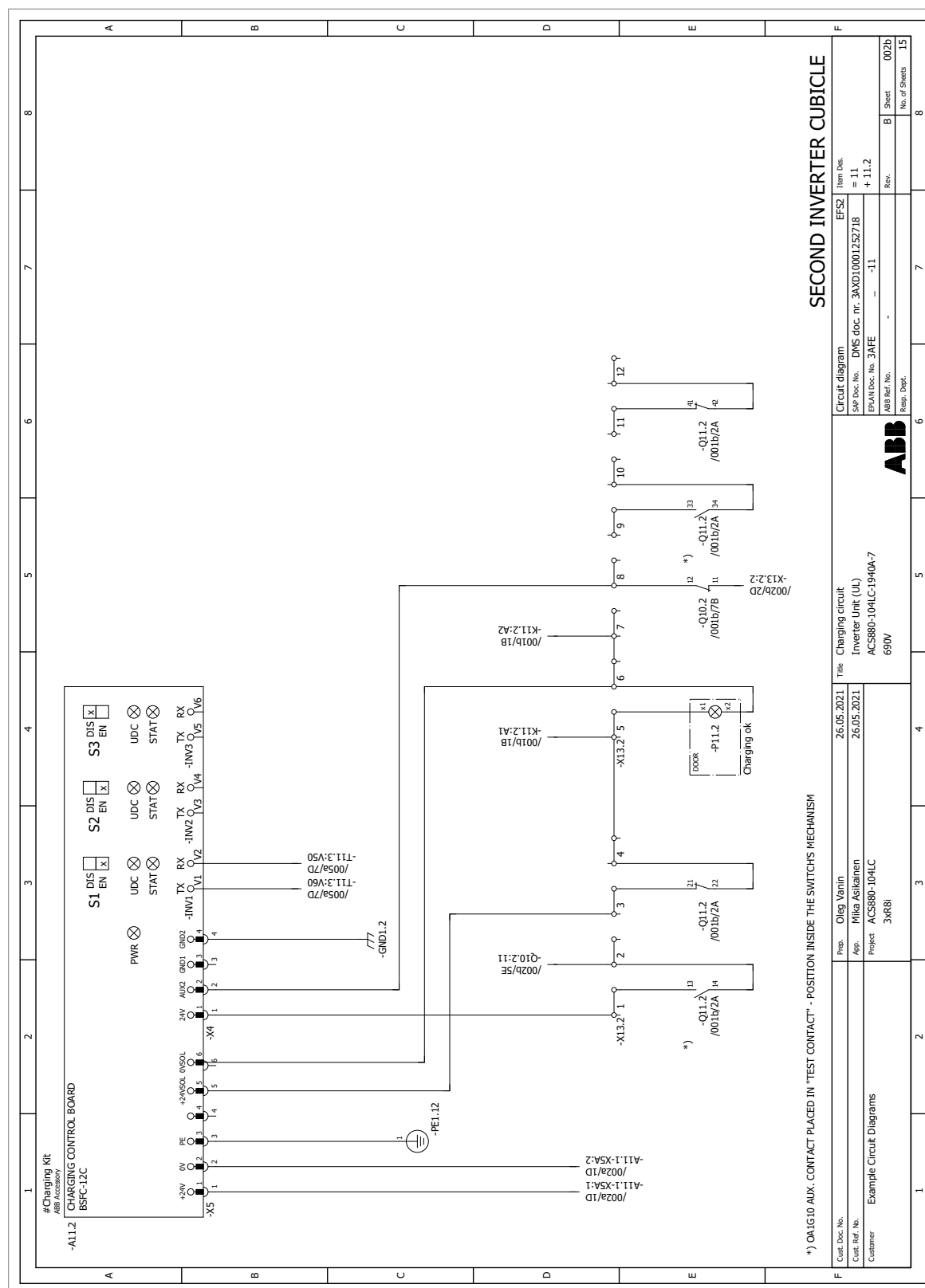
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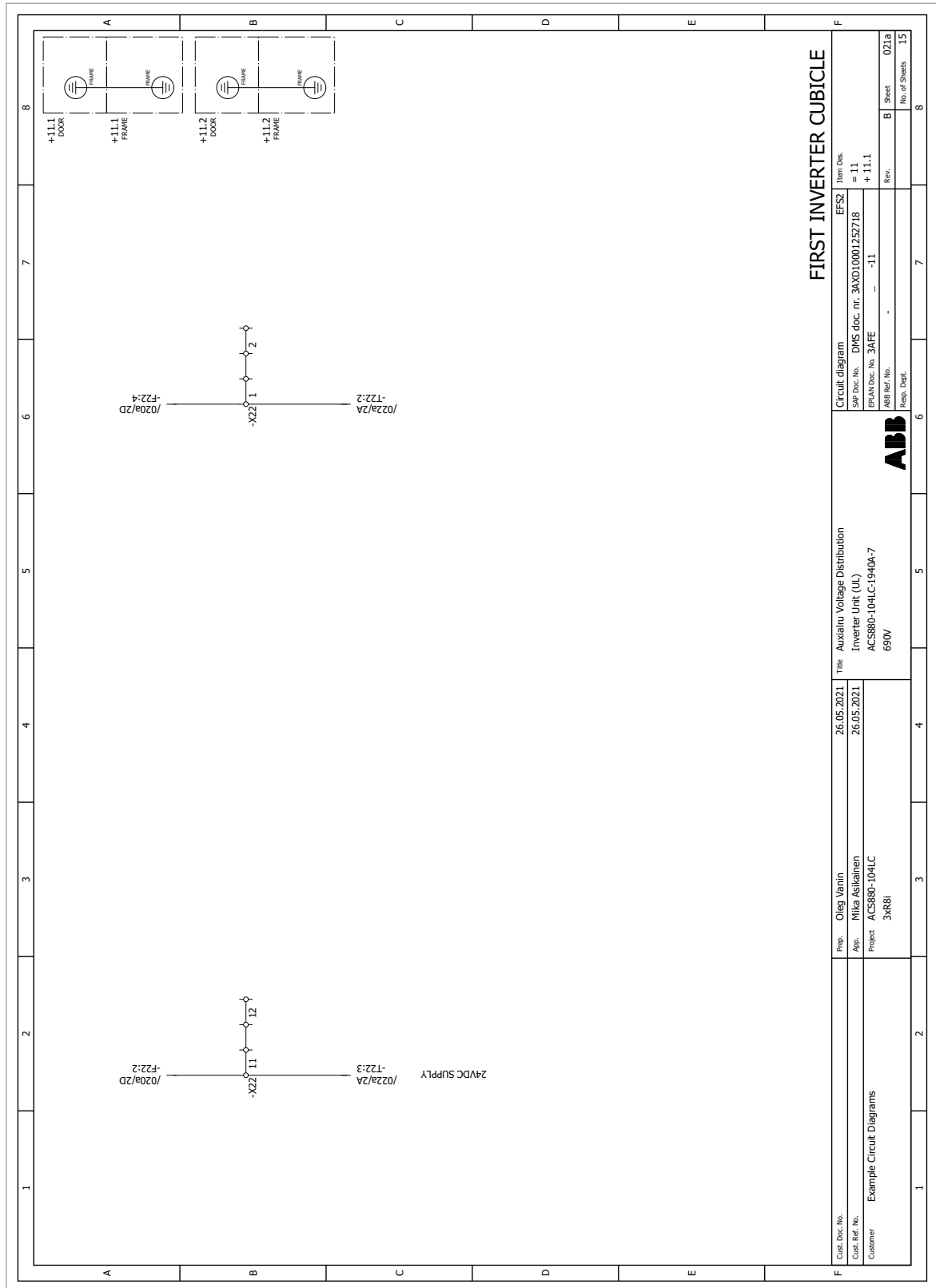
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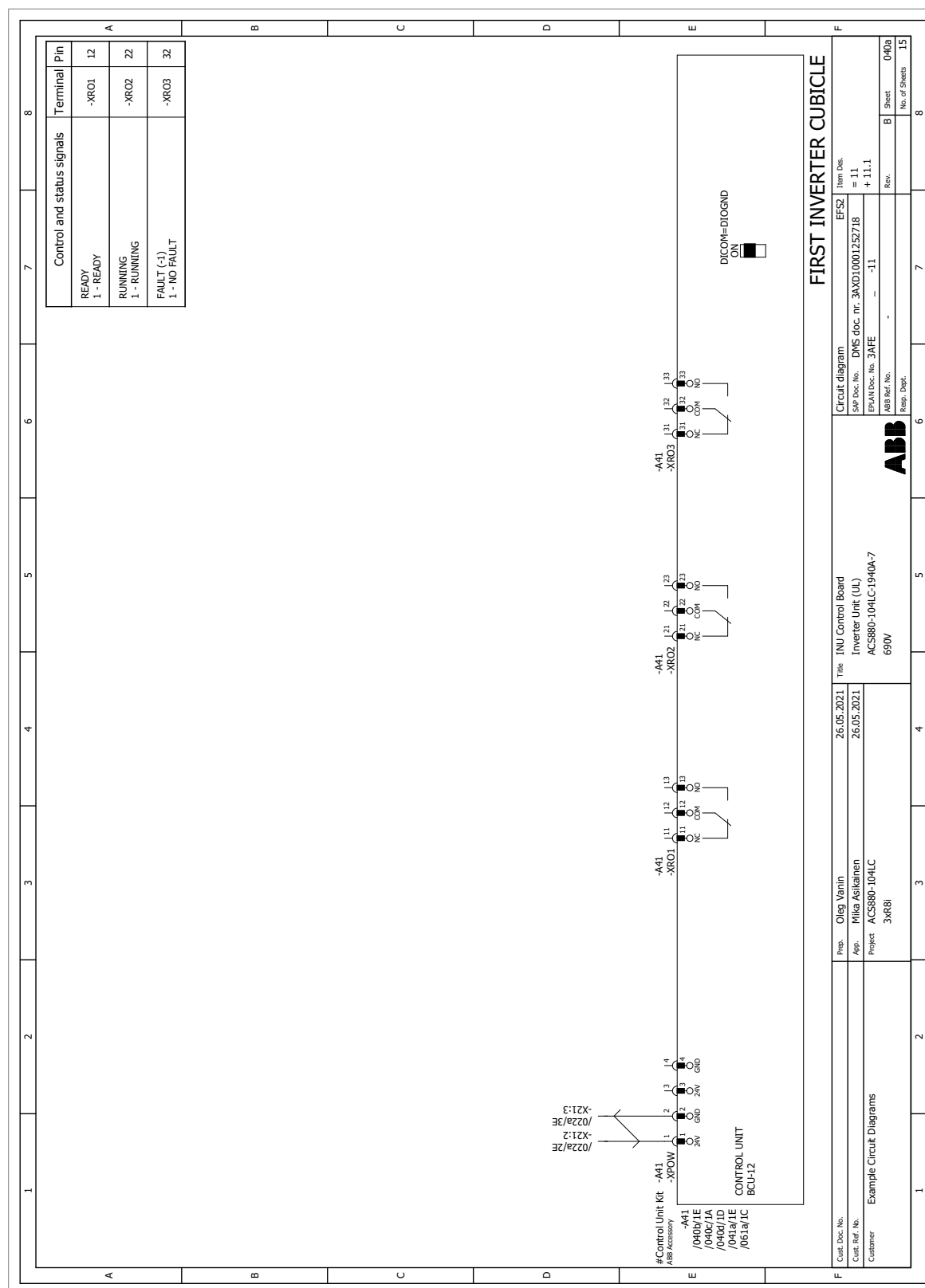




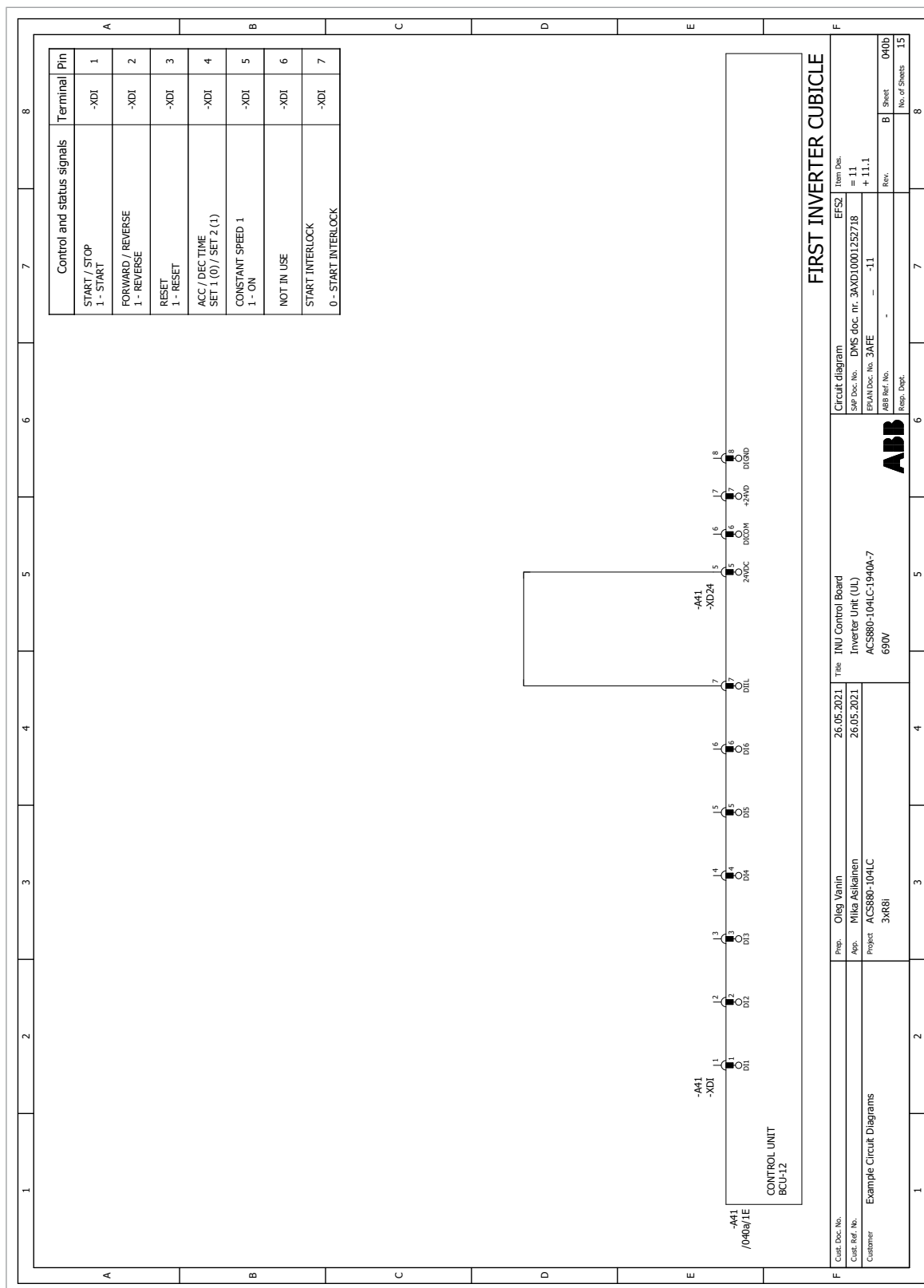


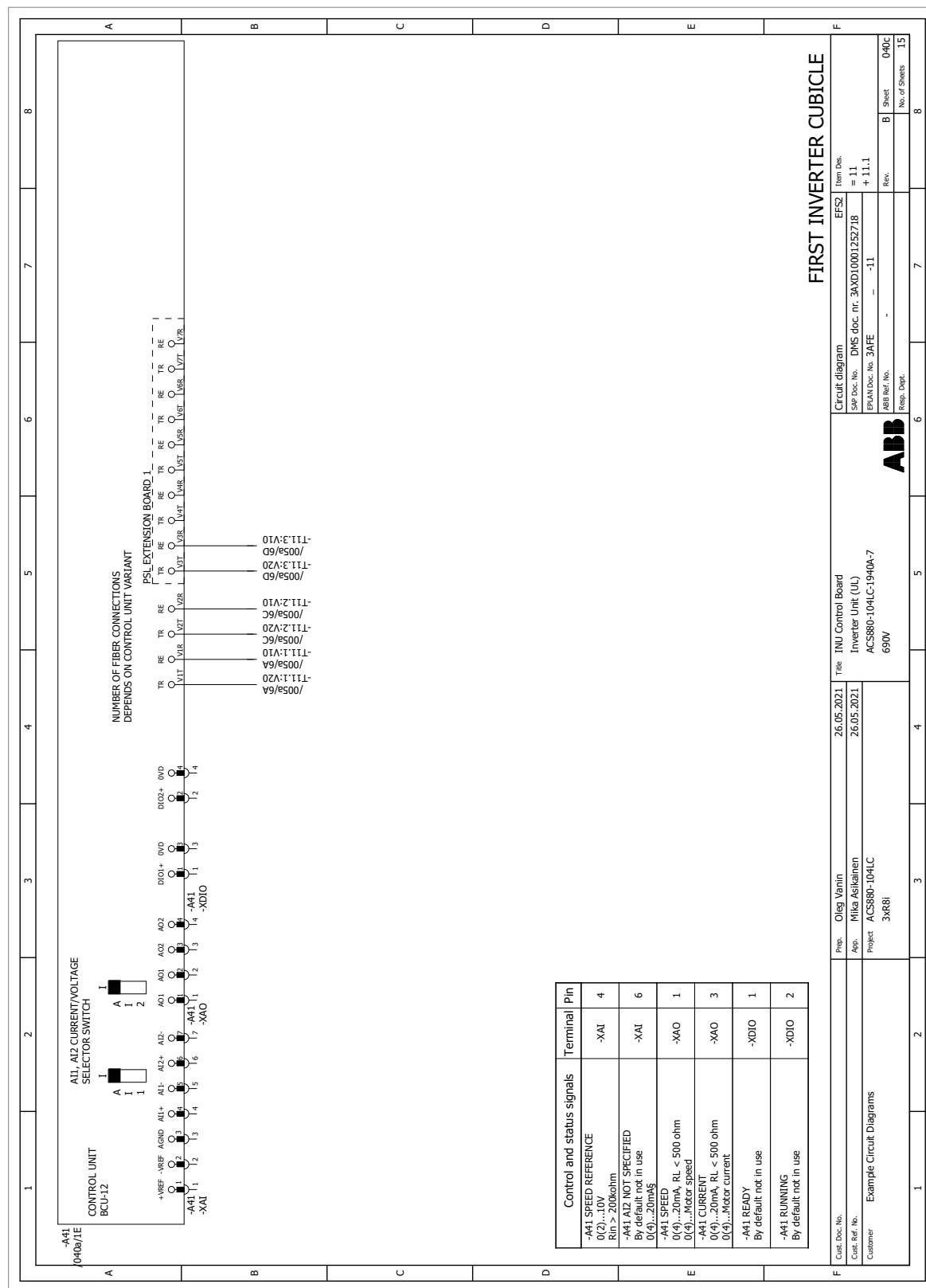
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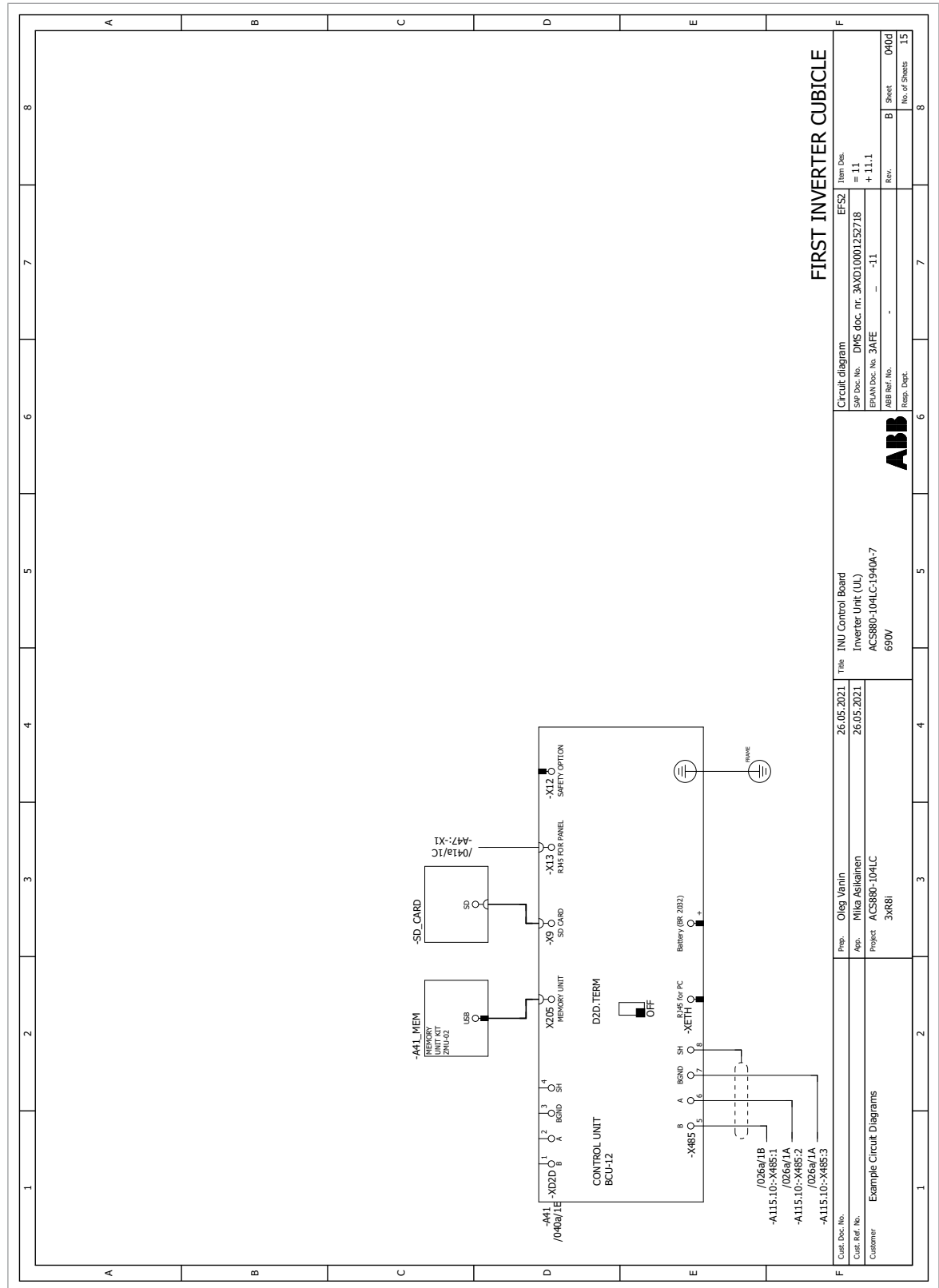


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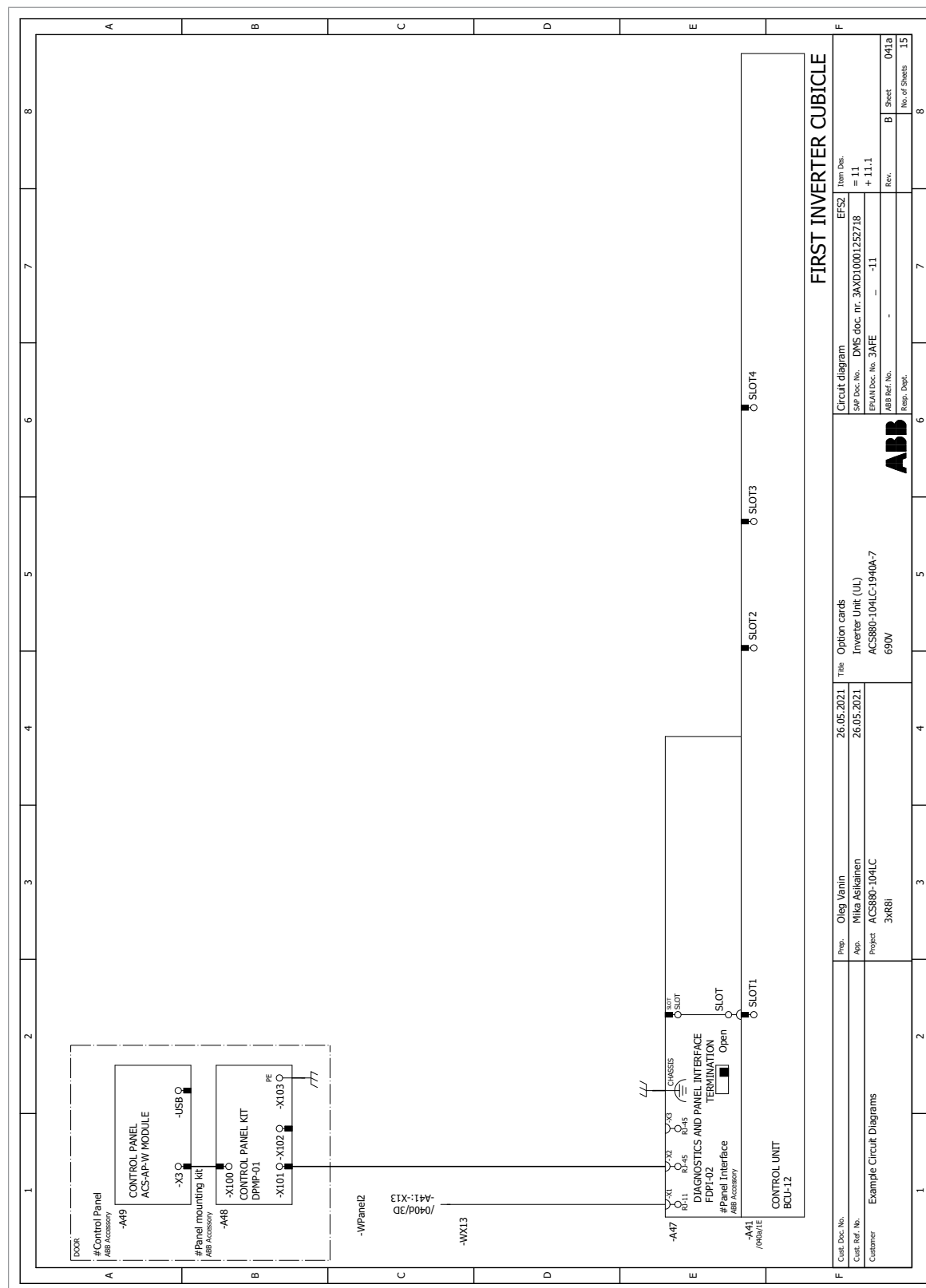




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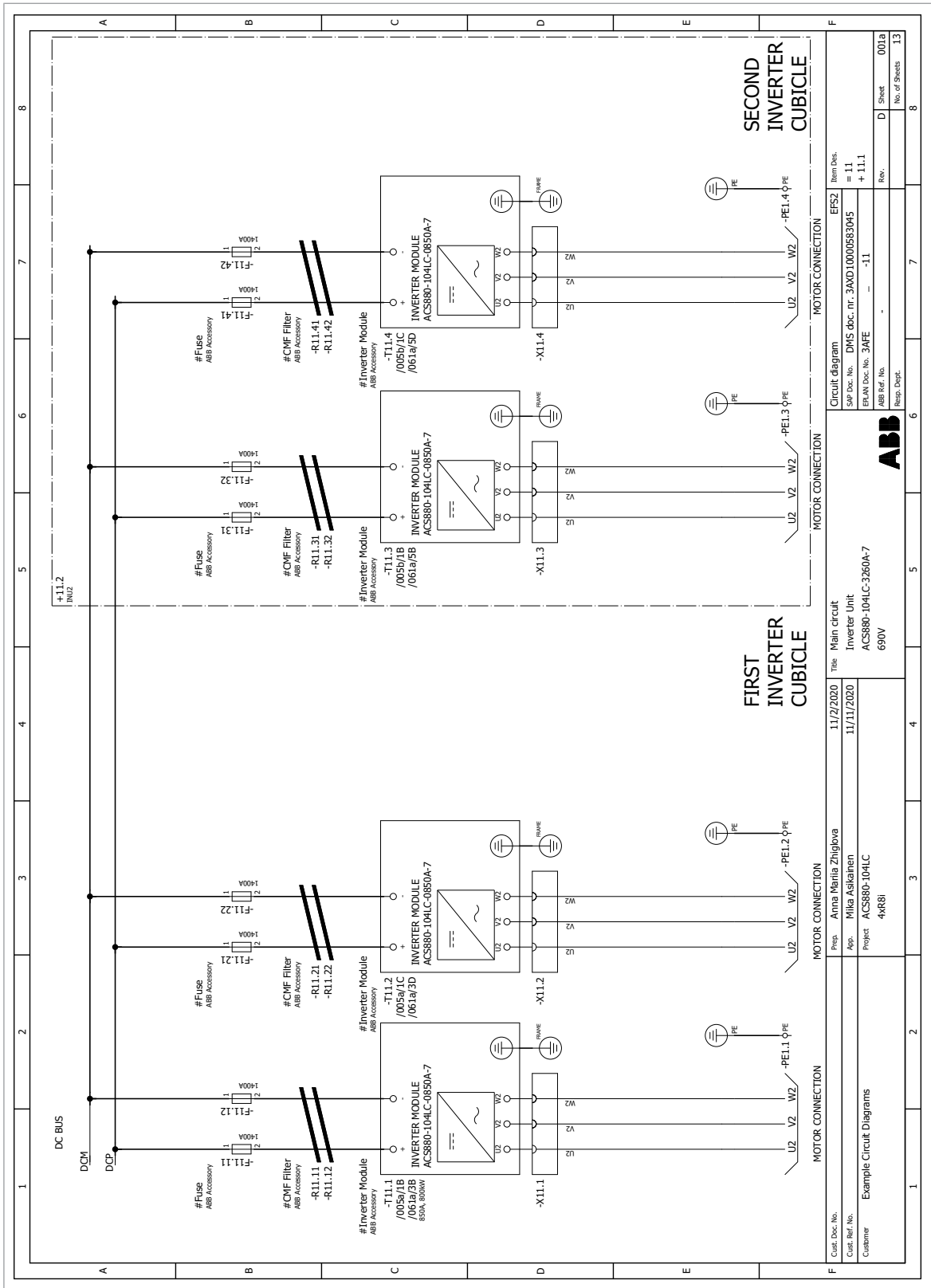


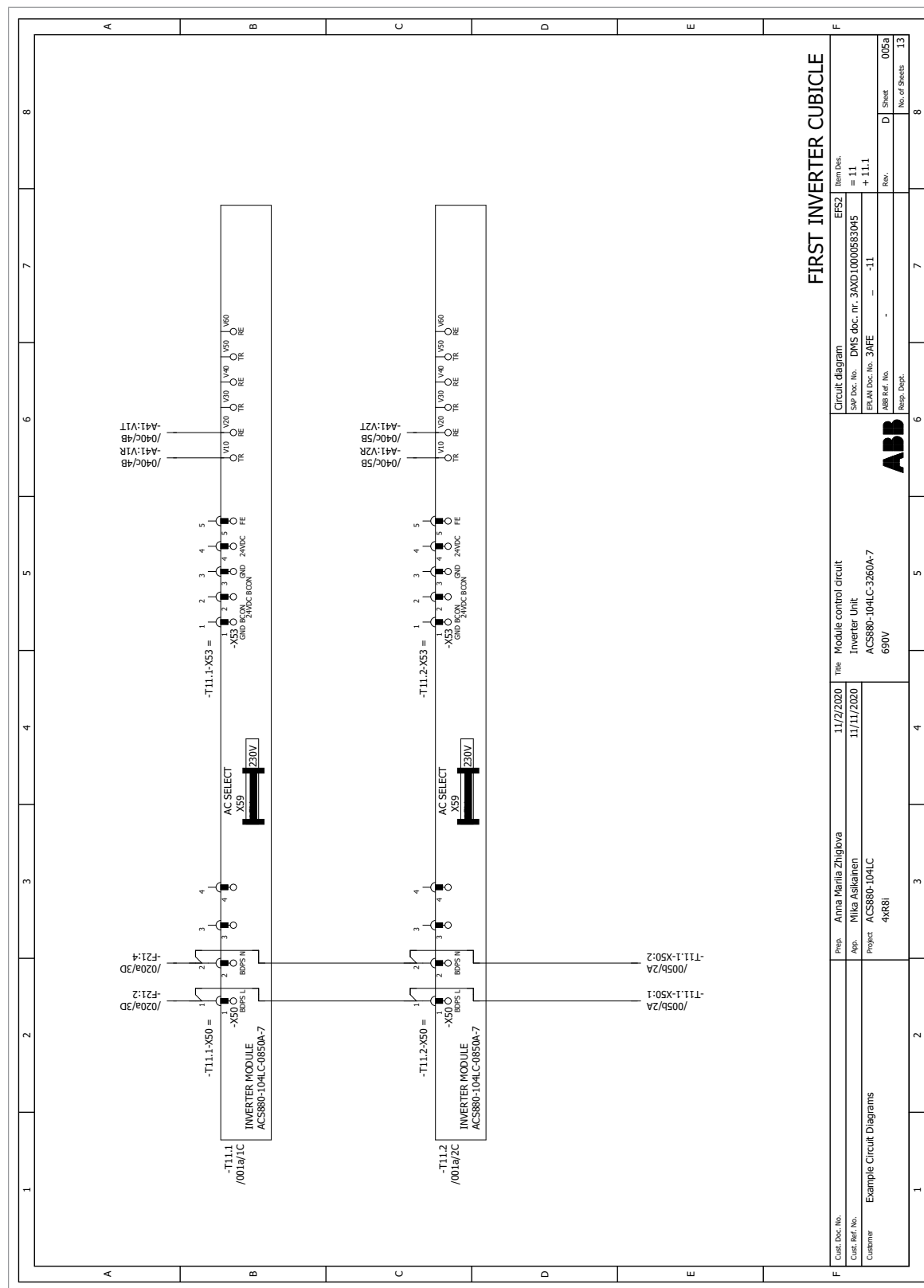
Frame 4×R8i without DC switch-disconnector

Overview

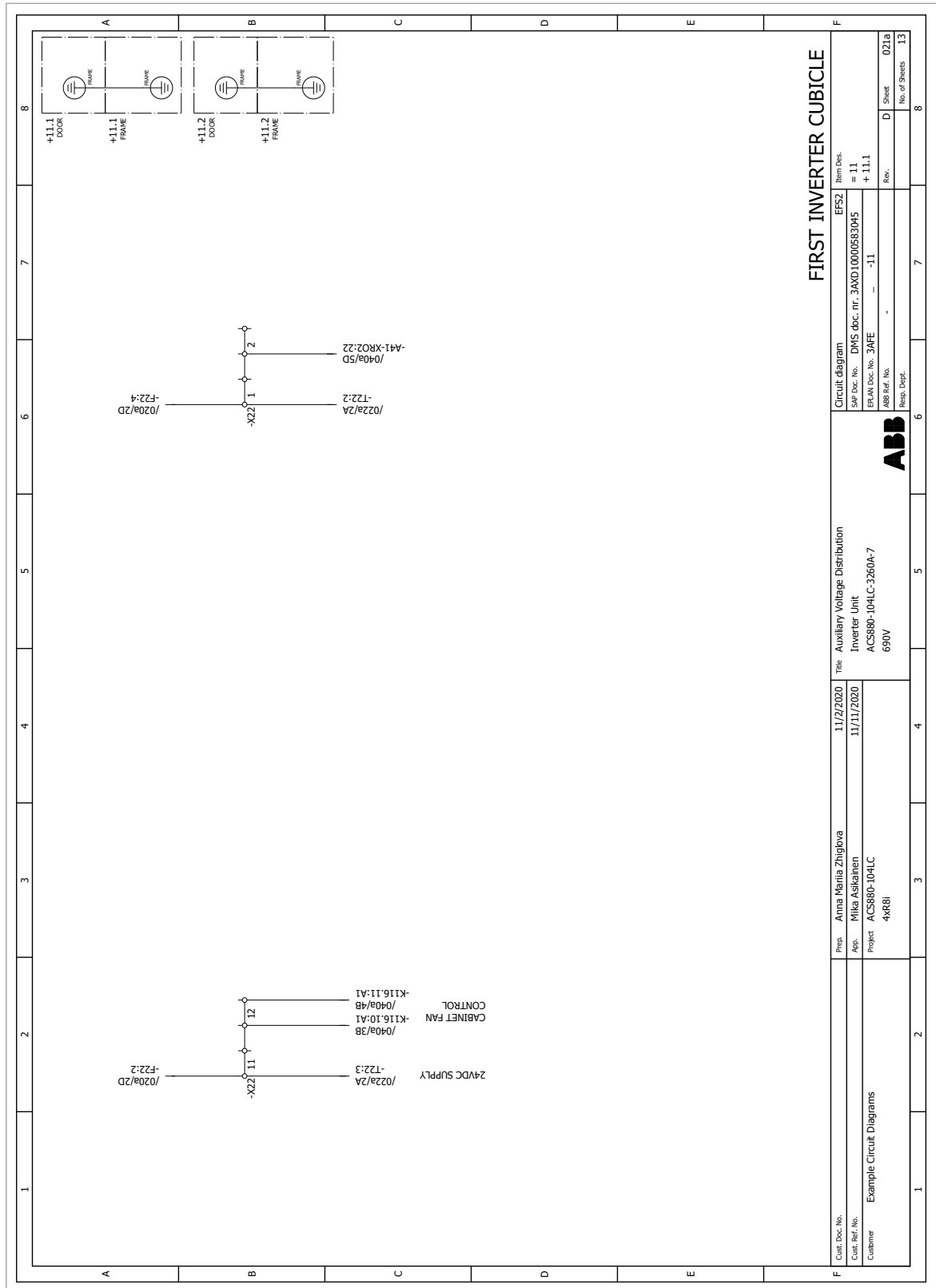
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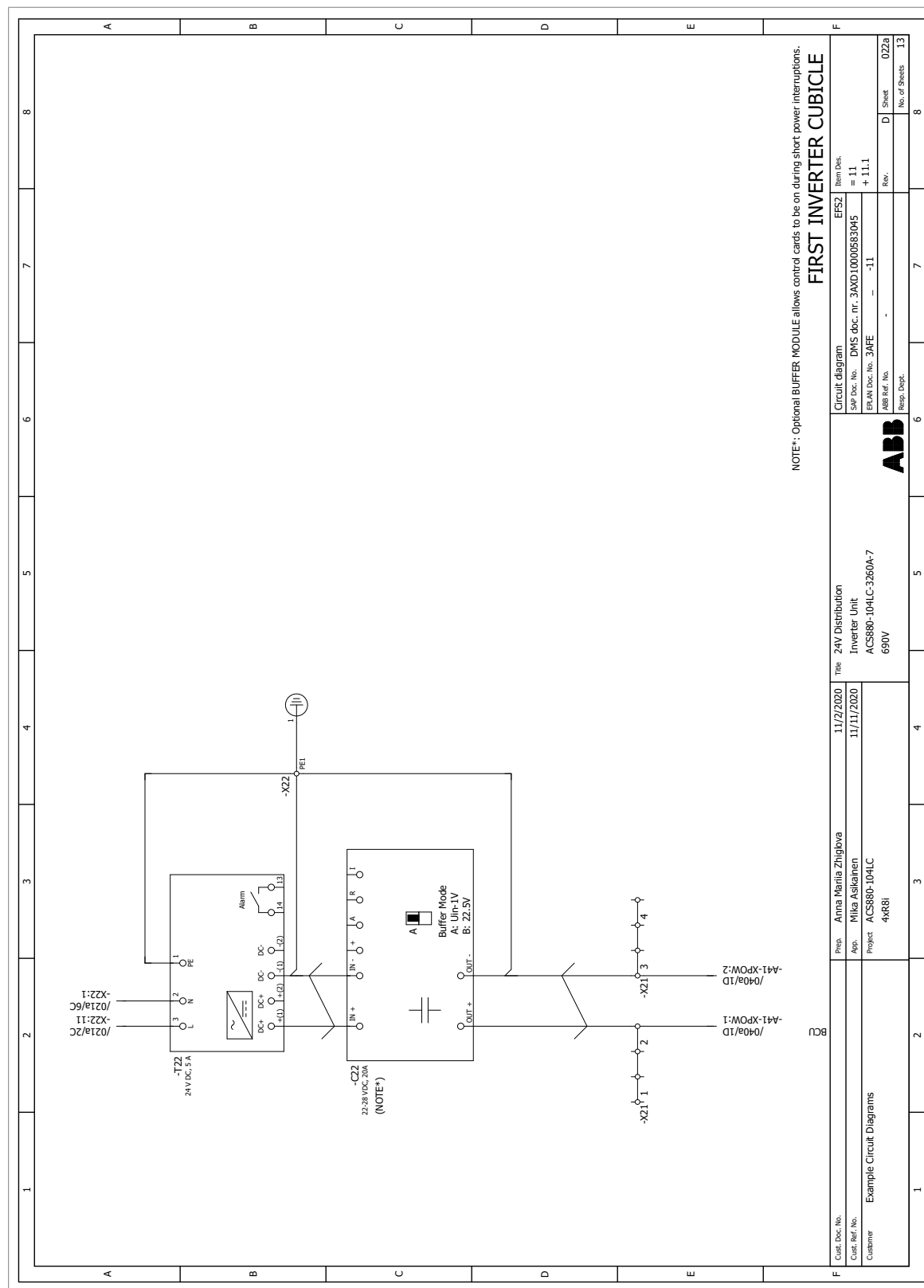
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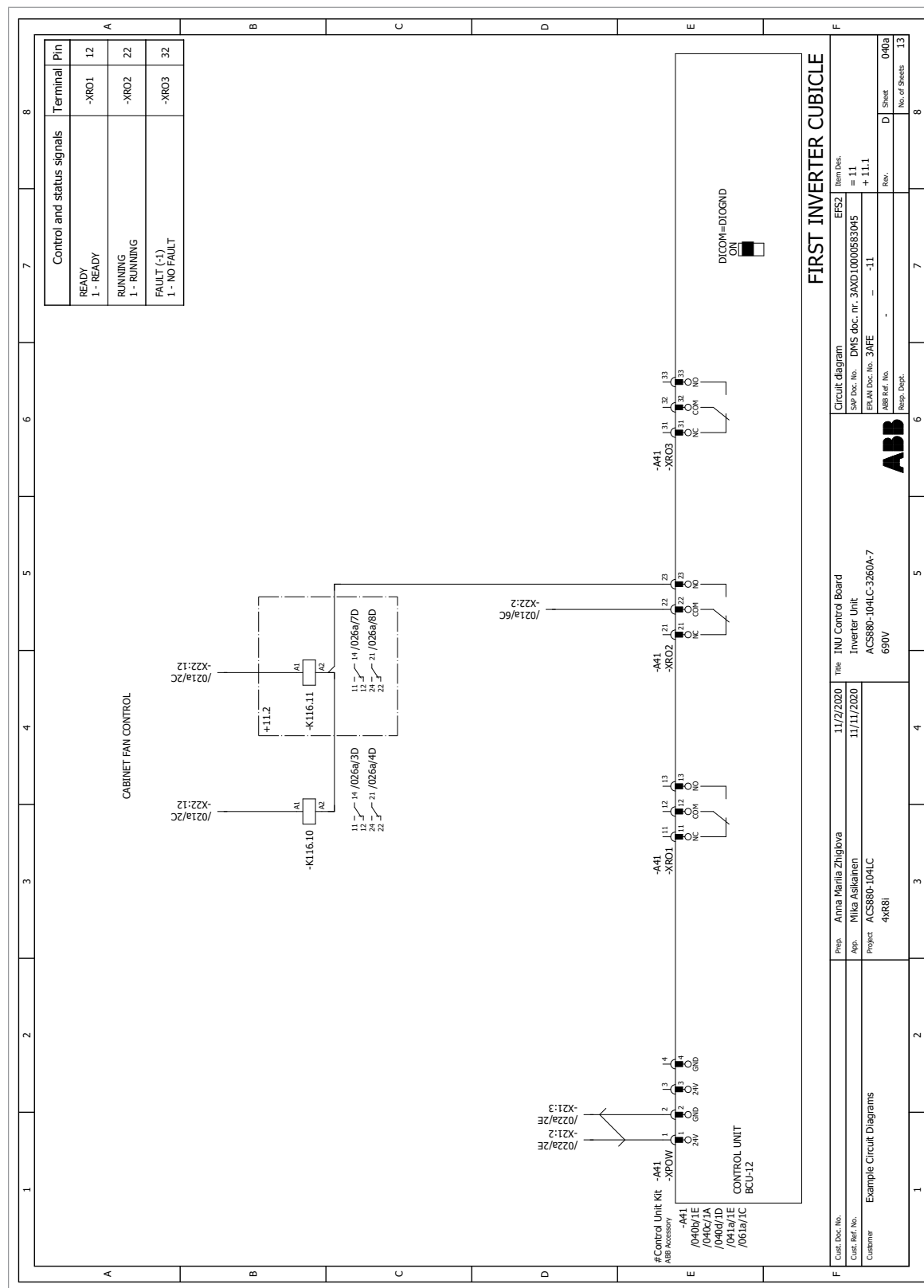




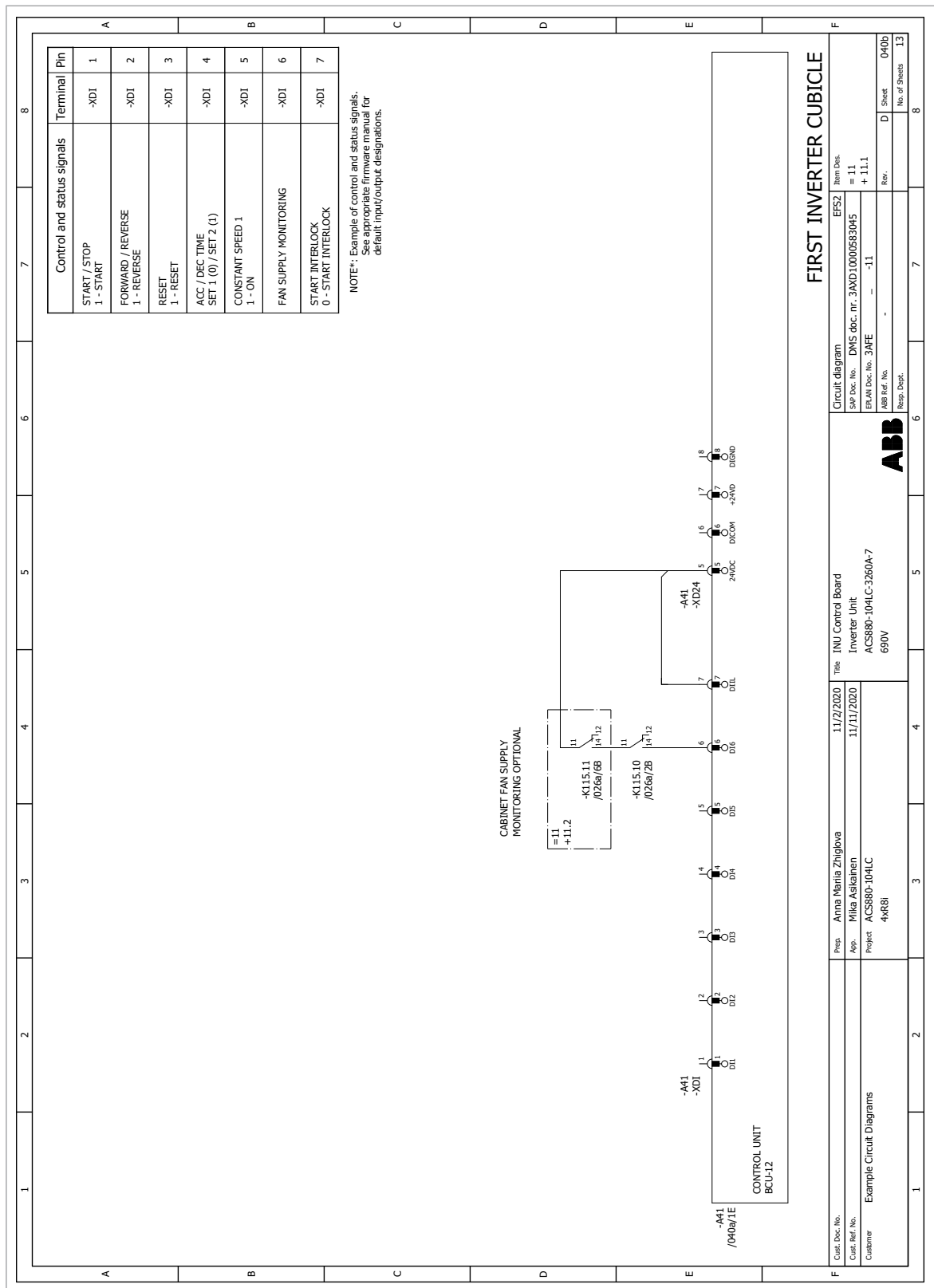
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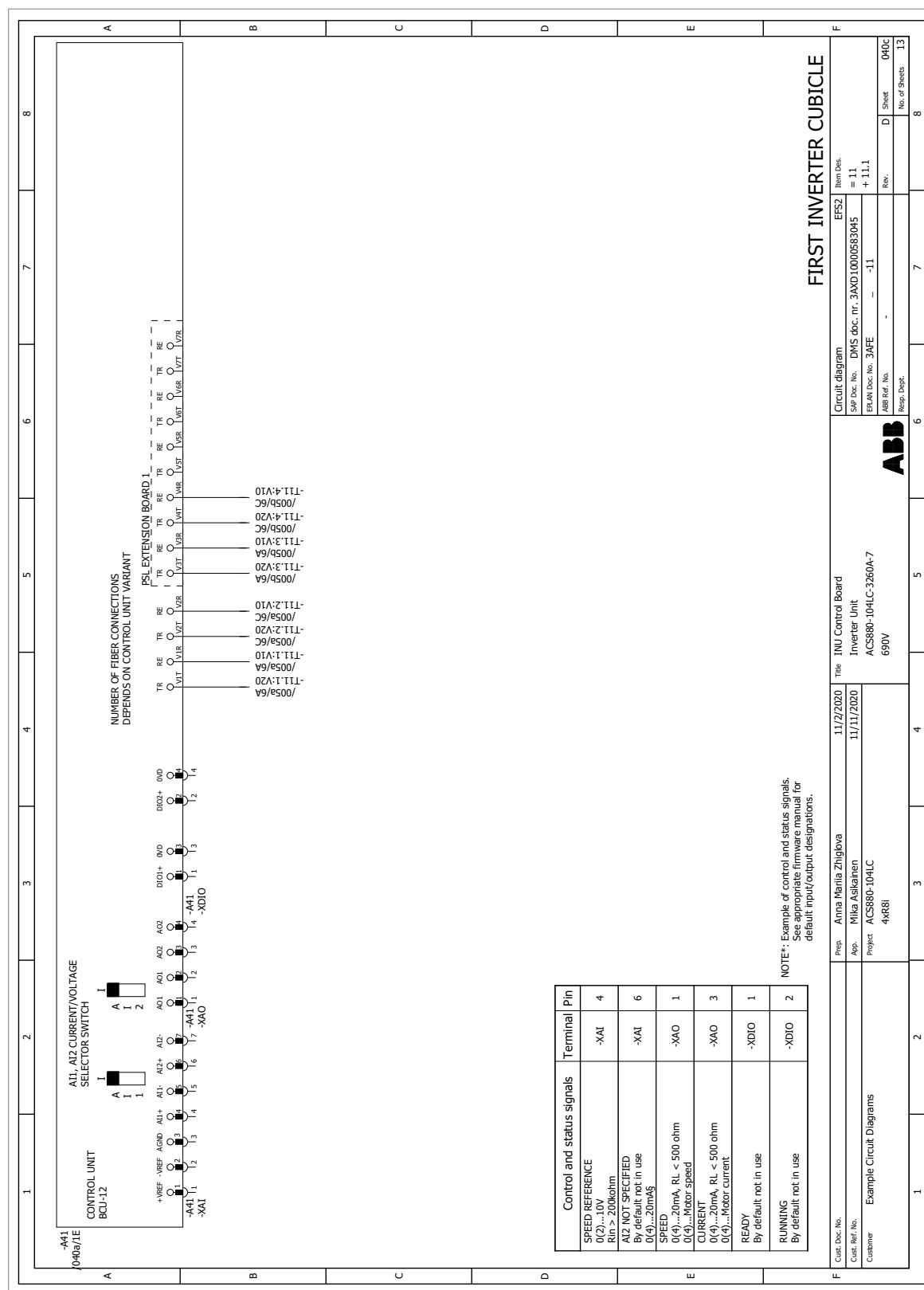


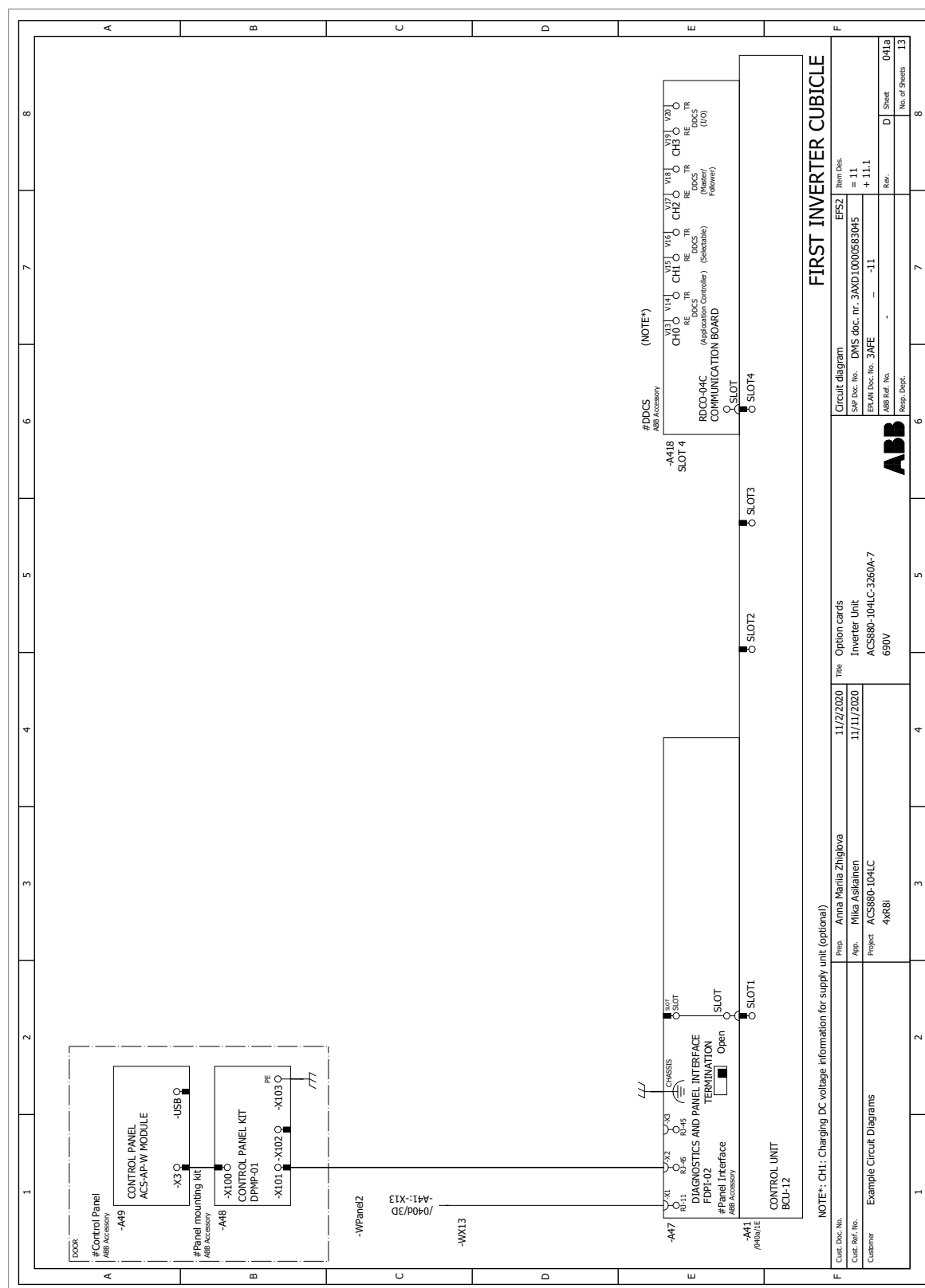




■ **040b**







15

Internal cooling circuit

Contents of this chapter

The cooling system of a liquid-cooled drive consists of two circuits: the internal cooling circuit and the external cooling circuit. The internal cooling circuit covers the heat-generating electrical components of the drive and transfers the heat to the cooling unit. In the cooling unit, the heat is transferred to the external cooling circuit which is usually part of a larger external cooling system. This chapter deals with the internal cooling circuit.

Applicability

The information in this chapter is applicable to cabinet-built ACS880 liquid-cooled drives. Except where otherwise indicated, the information is also applicable to drives built out of ACS880 liquid-cooled multidrives modules.

Internal cooling system

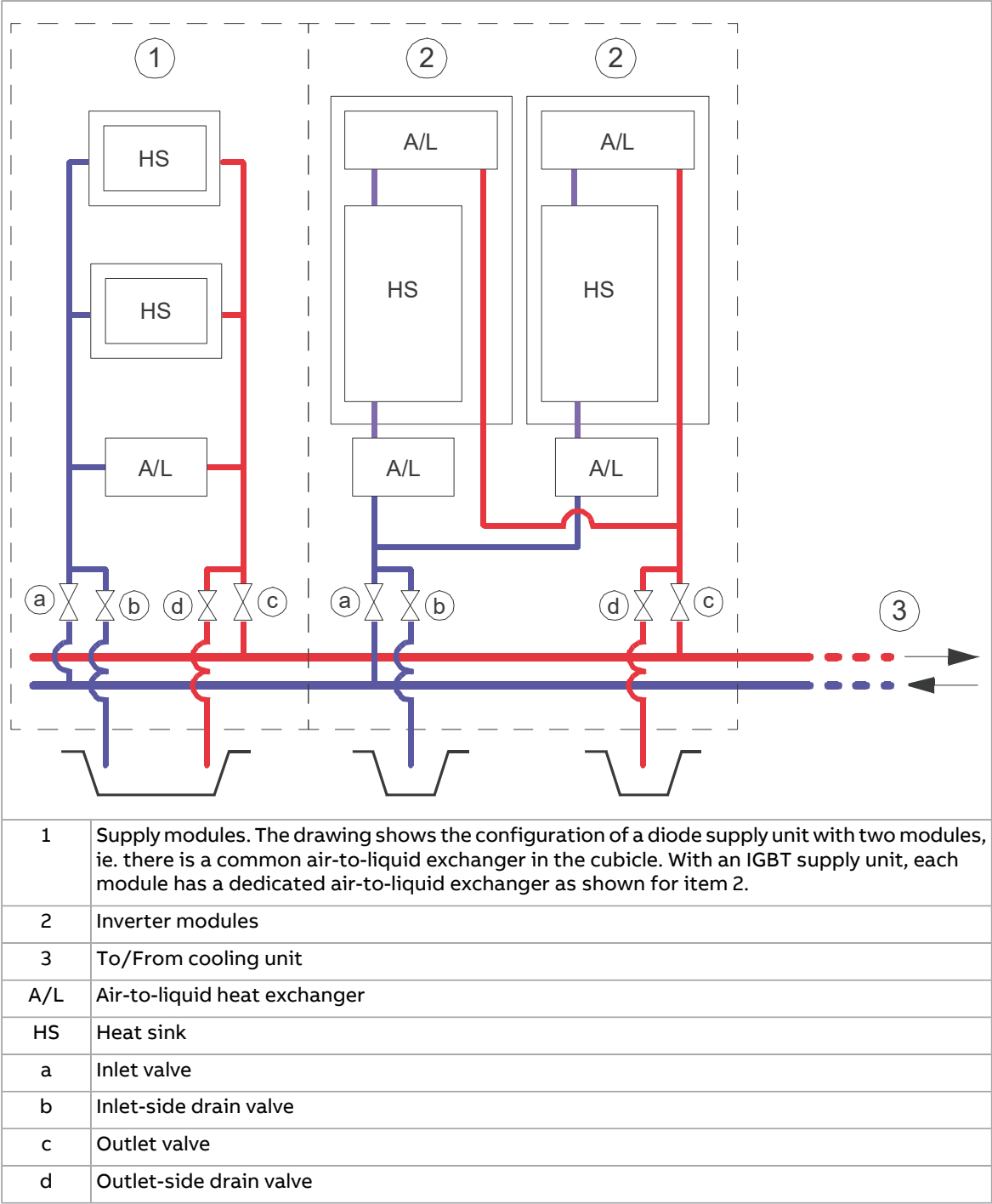
Each cubicle has an inlet and an outlet manifold, fitted with a stop valve and a drain valve. The stop valves can be closed to isolate all modules in the cubicle from the main cooling circuit.

In cabinet line-ups built by ABB, valves are color-coded:

- Blue – Open during operation
- Red – Closed during operation

The following diagram shows the coolant pipe connections in a drive system consisting of a supply unit and an inverter unit. Other units, such as brake units, DC/DC converter units have similar cooling arrangements. Other cubicles containing components that require cooling may also contain heat exchangers.

382 Internal cooling circuit



The coolant used with ACS880 liquid-cooled drive systems is Antifrogen® L 25% or 50% mixture. See [Coolant specification \(page 386\)](#).

Connection to a cooling unit

■ Connection to an ACS880-1007LC cooling unit

Refer to [ACS880-1007LC cooling unit user's manual \(3AXD50000129607 \[English\]\)](#).

■ Connection to a custom cooling unit

General requirements

Equip the system with an expansion vessel to damp pressure rise due to volume changes when the temperature varies. Equip the system with a pump that provides a nominal flow and pressure. Keep the pressure within the limits specified in [Technical data \(page 386\)](#). Install a pressure regulator to make sure that the maximum permissible operating pressure is not exceeded.

Install a bleed valve at the highest point of the cooling circuit, and a drain valve at the lowest point.

The materials that can be used are listed in [Cooling circuit materials \(page 388\)](#).

Coolant temperature control

The temperature of the coolant in the internal cooling circuit must be kept within the limits specified in [Technical data \(page 386\)](#). Note that the minimum temperature is dependent on ambient temperature and relative humidity.

Filling up and bleeding the internal cooling circuit

Both the drive and coolant must be at room temperature before filling up the cooling circuit.



WARNING!

Make sure that the maximum permissible operating pressure is not exceeded. When necessary regulate the pressure to appropriate level by draining excess coolant out of the system.



WARNING!

Bleeding of the cooling circuit is very important and has to be done with great care. Air bubbles in the cooling circuit may reduce or completely block coolant flow and lead to overheating. Let the air out of the cooling system while filling in coolant and, eg. after any power module replacements.

■ **Drive line-ups with an ACS880-1007LC cooling unit**

Obey the filling up and bleeding instructions in [ACS880-1007LC cooling unit user's manual \(3AXD50000129607 \[English\]\)](#).

■ **Drive line-ups with a custom cooling unit**

Note:

- In filling up the system, the drain valves in the line-up are used only to vent the air from the circuit so that it can be displaced by the coolant. The actual bleeding of the circuit must be done via an external bleed valve installed at the highest point of the cooling circuit. The most practical location for the valve is usually near or at the cooling unit.
 - Observe the instructions given by the manufacturer of the cooling unit. Pay special attention to filling up and bleeding the pumps properly as they may be damaged if operated when dry.
 - Draining coolant into the sewer system is not allowed.
1. Open the bleed valve at the cooling unit.
 2. Open the inlet valve and the outlet-side drain valve of one cubicle. Keep the outlet valve and the inlet-side drain valve closed.
 3. Attach a hose to the outlet-side drain valve and lead it into a suitable container.
 4. Fill the circuit with coolant. For the coolant specification, refer to section [Coolant specification \(page 386\)](#).
To minimize foaming, do not exceed the filling flow rate of 5 l/min (1.3 US gallon/min).
 5. As the piping and modules in the cubicle fills up, coolant starts to flow from the hose. Let some coolant flow out, then close the drain valve.
 6. Close the inlet valve.
 7. Repeat steps 2...6 for all cubicles in the line-up.
 8. Open the inlet and outlet valves in all cubicles. Let any air remaining in the system out through the bleed valve at the cooling unit.
-

9. Close the bleed valve at the cooling unit.
10. Continue to fill in coolant until a base pressure of approximately 250 kPa is achieved.
11. Open the bleed valve of the pump to let out any air.
12. Re-check the pressure and add coolant if necessary.
13. Start the coolant pump. Let any air remaining in the system out through the bleed valve at the cooling unit.
14. After one to two minutes, stop the pump or block the coolant flow with a valve.
15. Re-check the pressure and add coolant if necessary.
16. Repeat steps 13...15 a few times until all air is let out of the cooling circuit. Listen for a humming sound and/or feel the piping for vibration to find out if there is still air left in the circuit.

Draining the internal cooling circuit

The modules in each cubicle can be drained through the drain valves without draining the whole internal cooling circuit.



WARNING!

Hot, pressurized coolant can be present in the cooling circuit. Do not work on the cooling circuit before the pressure is released by stopping the pumps and draining coolant.

1. Attach hoses to each drain valve in the cubicle to be drained. Lead the hoses into a suitable container. Make sure the ends of the hoses are not immersed in coolant at any point so that air can displace the coolant in the system.
2. Open the drain valves. Wait until all coolant has drained.

Note: Draining coolant into the sewer system is not allowed.
3. If required, dry the piping with compressed oil-free air of less than 6 bar.
4. If the drive is to be stored in temperatures below 0 °C (32 °F),
 - dry the cooling circuit with air,
 - fill the cooling circuit with coolant specified under [Coolant specification \(page 386\)](#).
 - drain the cooling circuit again.

Maintenance intervals

As a general rule, the quality of the coolant should be checked at intervals of two years. This can be done by distributors of Antifrogen® L (see www.clariant.com) if a 250 milliliter sample is provided.

Technical data

■ Coolant specification

Coolant type

Antifrogen® L (by Clariant International Ltd, www.clariant.com) 25% or 50% mixture, available from Clariant distributors and ABB Service representatives.

Do not dilute the coolant. It is ready to use.

Antifrogen® L 25% mixture is usable in storage temperatures down to -16 °C (3.2 °F).
Antifrogen® L 50% mixture is usable in storage temperatures down to -40 °C (-40 °F).

Note that operation below 0 °C (32 °F) is not permitted regardless of the freezing point of the coolant.



WARNING!

The warranty does not cover damage that occurs from the use of incorrect coolant.

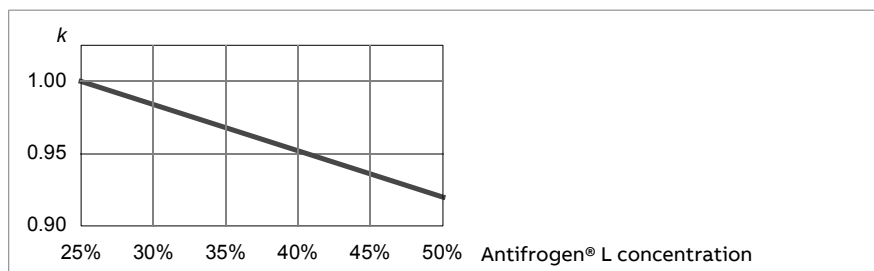
■ Temperature limits

Ambient temperature: See the technical data of the drive/unit.

Freeze protection: The freezing point of the coolant is determined by the concentration of heat transfer fluid in the mixture.

The higher the concentration of heat transfer fluid, the higher the viscosity of the coolant. This results in a higher pressure loss in the system. See [Pressure limits \(page 388\)](#).

The nominal current ratings of drive system modules apply to an Antifrogen® L / water solution of 25/75% (volume). With the Antifrogen® L concentration between 25% and 50%, the drive output current must be derated by 1/3 percentage point per 1 p.p. increase in Antifrogen® L concentration. The drawing below shows the derating factor (k) in relation to Antifrogen® L concentration.



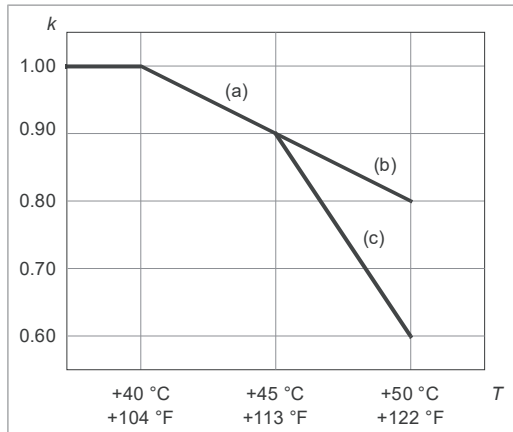
Incoming coolant temperature:

- 0...40 °C (32...104 °F): no drive output current derating required
- 40...45 °C (104...113 °F): drive output current must be derated by 2 percentage points per 1 °C (1.8 °F) temperature increase, as shown by curve (a).
- 45...50 °C (113...122 °F):
 - If components with a maximum operating temperature of 55 °C (131 °F) are installed in the same space as the drive modules, drive output current must

be derated by 6 percentage points per 1 °C (1.8 °F) temperature increase, as shown by curve (c).

- If there are no components with a maximum operating temperature of 55 °C (131 °F) installed in the same space as the drive modules, drive output current must be derated by 2 percentage points per 1 °C (1.8 °F) temperature increase, as shown by curve (b).

The drawing below shows the derating factor (k) in relation to coolant temperature.



Condensation is not permitted. The minimum coolant temperature to avoid condensation (at an atmospheric pressure of 1 bar) is shown below as a function of relative humidity (RH) and ambient temperature (T_{air}).

T_{air} (°C)	Min. T_{coolant} (°C)				
	RH = 95%	RH = 80%	RH = 65%	RH = 50%	RH = 40%
5	4.3	1.9	-0.9	-4.5	-7.4
10	9.2	6.7	3.7	-0.1	-3.0
15	14.2	11.5	8.4	4.6	1.5
20	19.2	16.5	13.2	9.4	6.0
25	24.1	21.4	17.9	13.8	10.5
30	29.1	26.2	22.7	18.4	15.0
35	34.1	31.1	27.4	23.0	19.4
40	39.0	35.9	32.2	27.6	23.8
45	44.0	40.8	36.8	32.1	28.2
50	49.0	45.6	41.6	36.7	32.8
55	53.9	50.4	46.3	42.2	37.1
	= Not permitted as standard but the coolant temperature must be 0 °C (32 °F) or more.				
Example:	At an air temperature of 45 °C and relative humidity of 65% the coolant temperature must not be less than +36.8 °C				

Maximum temperature rise: Depends on heat losses and mass flow. Typically 10 °C (18 °F) with nominal losses and flow.

■ Pressure limits

Base pressure: 250 kPa (recommended); 300 kPa (maximum). “Base pressure” denotes the pressure of the system compared with the atmospheric pressure when the cooling circuit is filled with coolant.

Air counterpressure in expansion vessel (with ACS880-1007LC cooling unit): 80 kPa

Design pressure (PS): 600 kPa

Nominal pressure difference: 120 kPa with Antifrogen® L 25% coolant solution, 140 kPa with Antifrogen® L 50% coolant solution. This has to be taken into account when dimensioning the liquid cooling circuit.

Maximum pressure difference: 160 kPa

■ Coolant flow rate limits

The maximum coolant flow rate for all drive equipment is $1.3 \times$ nominal. See the technical data chapter for nominal values.

■ Cooling circuit materials

Materials used in the internal cooling circuit are listed below.

- stainless steel AISI 316L (UNS 31603)
- heavy gauge aluminum
- plastic materials such as PA, PEX and PTFE

Note: PVC hoses are not suitable for use with antifreeze.

- rubber gasketing NBR (nitrile rubber).



WARNING!

If you connect external piping to the internal cooling circuit, use only materials that are specified above. Other materials can cause galvanic corrosion. If the external piping contains other materials, use a cooling unit with a heat exchanger (for example, ACS880-1007LC) to keep the external piping separate from the internal cooling circuit.



Further information

Product and service inquiries

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

Product training

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

Providing feedback on ABB manuals

Your comments on our manuals are welcome. Navigate to forms.abb.com/form-26567.

Document library on the Internet

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



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