ABB INDUSTRIAL DRIVES

ACS880-104 inverter modules

Hardware manual

ACS880-104 inverter modules

Hardware manual

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3AUA0000104271 Rev J
EN
Original instructions
EFFECTIVE: 2022-04-05

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Further information

1

Introduction to the manual

Contents of this chapter

This chapter gives the basic information on the manual.

Applicability

The manual applies to ACS880-104 inverter modules intended for user-defined cabinet installations.

Safety instructions

Obey all safety instructions delivered with the drive.

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

Target audience

This manual is intended for people who plan the installation, install, 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 working 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 the size identifier.

The module size can be identified from the basic code visible on the type designation label, for example, ACS880-104-0100A-3 where 0100A is the module size. The option codes of the module are listed after the plus sign.

The frame size of a module can be, for example, R1i, R4i, R7i, R8i or 3×R8i (the latter describing an inverter unit consisting of three parallel-connected R8i inverter modules). See the technical data for the units and frame sizes.

Use of component designations

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

Terms and abbreviations

Term	Description
BCON	Type of control board
BCU	Type of control unit
BDPS	Module internal power supply board
BFPS	Control and power supply board for speed-controlled cooling fan
BLHF	Inductor-type filter. See *ACS880 multidrive for high-speed test benches supplement* (3AXD50000818013 [English]).
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.
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
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
FDPI	Diagnostics and panel interface board
FECA	Optional EtherCAT® adapter module
FEN-01	Optional TTL incremental encoder interface module
FEN-11	Optional TTL 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

Term	Description
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*.
HSFU	High-speed filter unit containing BLHF filters. See *ACS880 multidrive for high-speed test benches supplement* (3AXD50000818013 [English]).
HTL	High-threshold logic
IGBT	Insulated gate bipolar transistor
Intermediate circuit	DC circuit between rectifier and inverter
INU	Inverter unit
Inverter	Converts direct current and voltage to alternating current and voltage.
Inverter module	Inverter bridge, related components and drive DC link capacitors enclosed in a metal frame or enclosure. Intended for cabinet installation.
Inverter unit	Inverter module(s) under control of one control 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
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
TS 8	Enclosure system by Rittal (www.rittal.com)
TTL	Transistor-transistor logic
UPS	Uninterruptible power supply
ZCON	Type of control board
ZCU	Type of control unit
ZMU	Type of memory unit, attached to the control unit

Related documents

Manual	Code
General manuals	
ACS880 multidrive cabinets and modules safety instructions	3AUA0000102301
ACS880 multidrive cabinets and modules electrical planning instructions	3AUA0000102324
Drive modules cabinet design and construction instructions	3AUA0000107668

Manual	Code
BCU-02/12/22 control units hardware manual	3AUA0000113605
ACS880 multidrive for high-speed test benches supplement	3AXD50000818013
Supply module manuals	
ACS880-204 IGBT supply modules hardware manual	3AUA0000131525
ACS880 IGBT supply control program firmware manual	3AUA0000131562
ACS880-304…+A003 diode supply modules hardware manual	3AUA0000102452
ACS880-304…+A018 diode supply modules hardware manual	3AXD50000010104
ACS880 diode supply control program firmware manual	3AUA0000103295
ACS880-904 regenerative rectifier modules hardware manual	3AXD50000020457
ACS880 regenerative rectifier control program firmware manual	3AXD50000020827
Inverter module manuals and guides	
ACS880-104 inverter modules hardware manual	3AUA0000104271
ACS880 primary control program firmware manual	3AUA0000085967
ACS880 primary control program quick start-up guide	3AUA0000098062
Brake module and DC/DC converter module manuals	
ACS880-604 1-phase brake chopper modules hardware manual	3AUA0000106244
ACS880-604 3-phase dynamic brake modules as units hardware manual	3AXD50000022033
ACS880 (3-phase) brake control program firmware manual	3AXD50000020967
ACS880-1604 DC/DC converter modules hardware manual	3AXD50000023642
ACS880 DC/DC converter control program firmware manual	3AXD50000024671
Module package hardware manuals	
ACS880-04 single drive module packages (560 to 2200 kW) hardware manual	3AUA0000138495
ACS880-14 and -34 single drive module packages (160 to 2200 kW) hardware manual	3AXD50000022021
Option manuals	
ACS880 +C132 marine type-approved drive modules and module packages supplement	3AXD50000037752
ACX-AP-x assistant control panels user's manual	3AUA0000085685
BAMU-12C auxiliary measurement unit hardware manual	3AXD50000117840
Drive composer start-up and maintenance PC tool user's manual	3AUA0000094606
Drive application programming (IEC 61131-3) manual	3AUA0000127808
Converter module lifting device for drive cabinets hardware manual	3AXD50000210268
Installation frames for ACS880 multidrive modules hardware manual	3AXD50000010531
Manuals and quick guides for I/O extension modules, fieldbus adapters, safety functions modules, etc.	

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

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

2

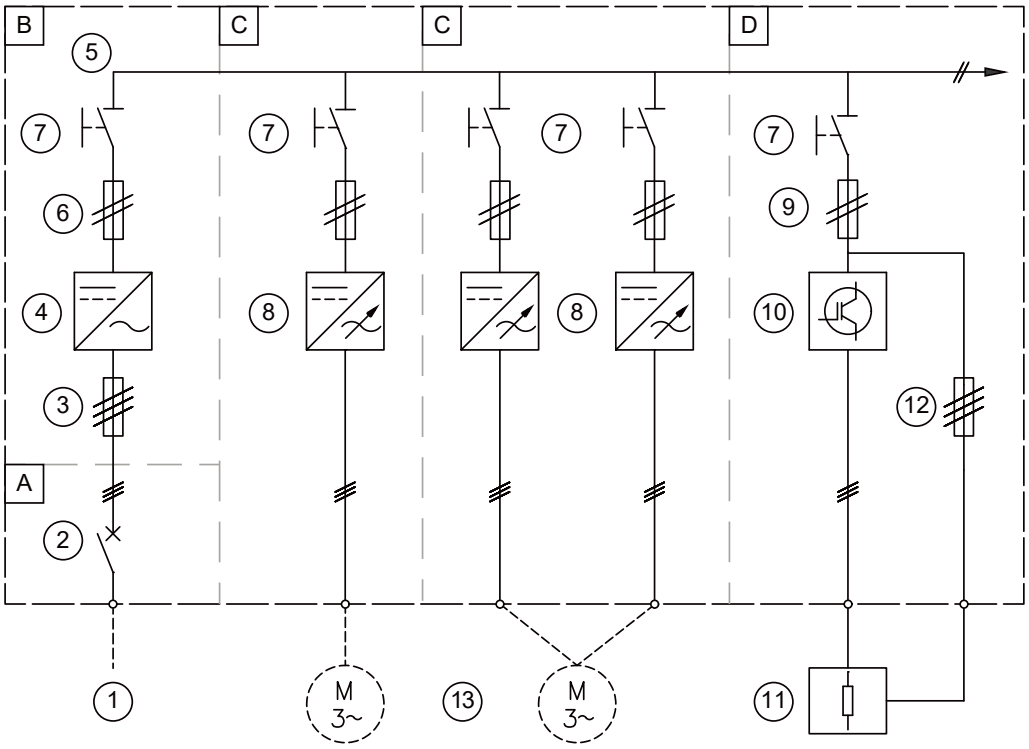
Hardware description

Contents of this chapter

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

Overview diagram of the drive system

This diagram 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.



A	Incoming unit
B	Supply unit
C	Inverter unit
D	Brake unit (optional)
1	AC supply
2	Main breaker, or main contactor and main switch-disconnector
3	Input (AC) fuses
4	Supply module
5	DC bus
6	Supply and inverter module DC fuses
7	DC switch/disconnector (optional)
8	Inverter modules
9	Brake chopper fuses
10	3-phase brake chopper module (optional)
11	Brake resistors (optional or acquired by user)
12	Fuses for the brake resistors
13	Motor(s) (acquired by user)

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.

ACS880-104 inverter modules can be used to construct inverter units with a power rating from 2.5 kW up to several megawatts. Up to approximately 500 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.

The dimension drawings of the inverter modules are presented in a separate chapter.

Frames R1i to R4i

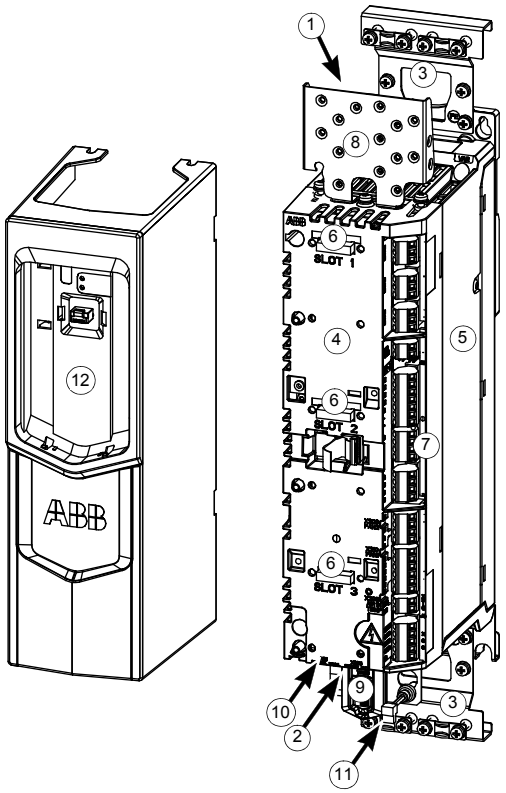
General

The DC input terminals are located at the top of the module; the AC output are located at the bottom. The ZCU-14 control unit is mounted onto the module; the control unit contains the basic I/Os and slots for optional I/O modules. Other optional equipment is primarily installed on separate mounting plates.

The module should be fitted with external DC fuses. Frame R1i…R4i modules have an internal capacitor pre-charge circuit.

Frame R1i layout

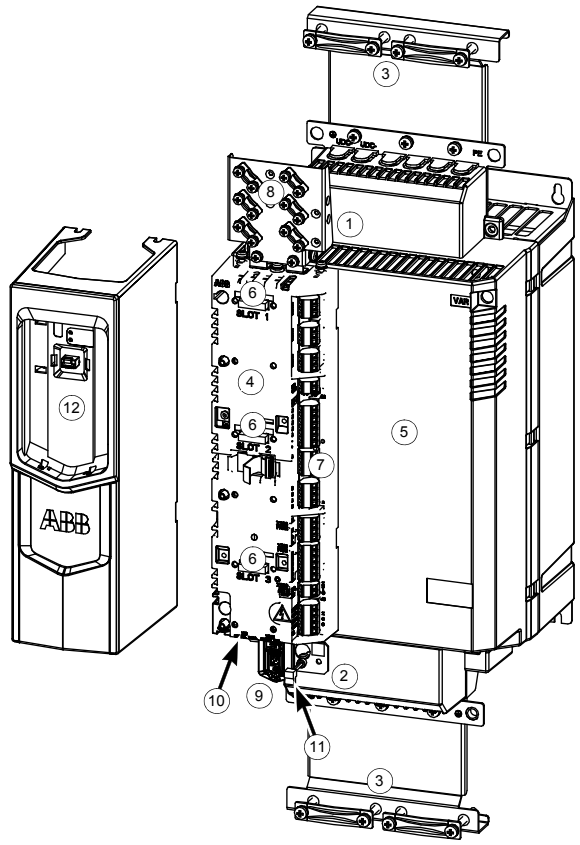
Frame R1i is pictured (frame R2i has a similar layout).



Item	Explanation
1	DC connection (obscured)
2	AC connection (obscured)
3	Grounding/clamping plates for power cables
4	ZCU control unit
5	Power unit
6	Slots for optional I/O modules
7	I/O terminal blocks
8	Grounding/clamping plate for control cables
9	Memory unit
10	Control panel connector
11	Air temperature sensor
12	Cover with recess for control panel (can optionally be left out)

Frame R4i layout

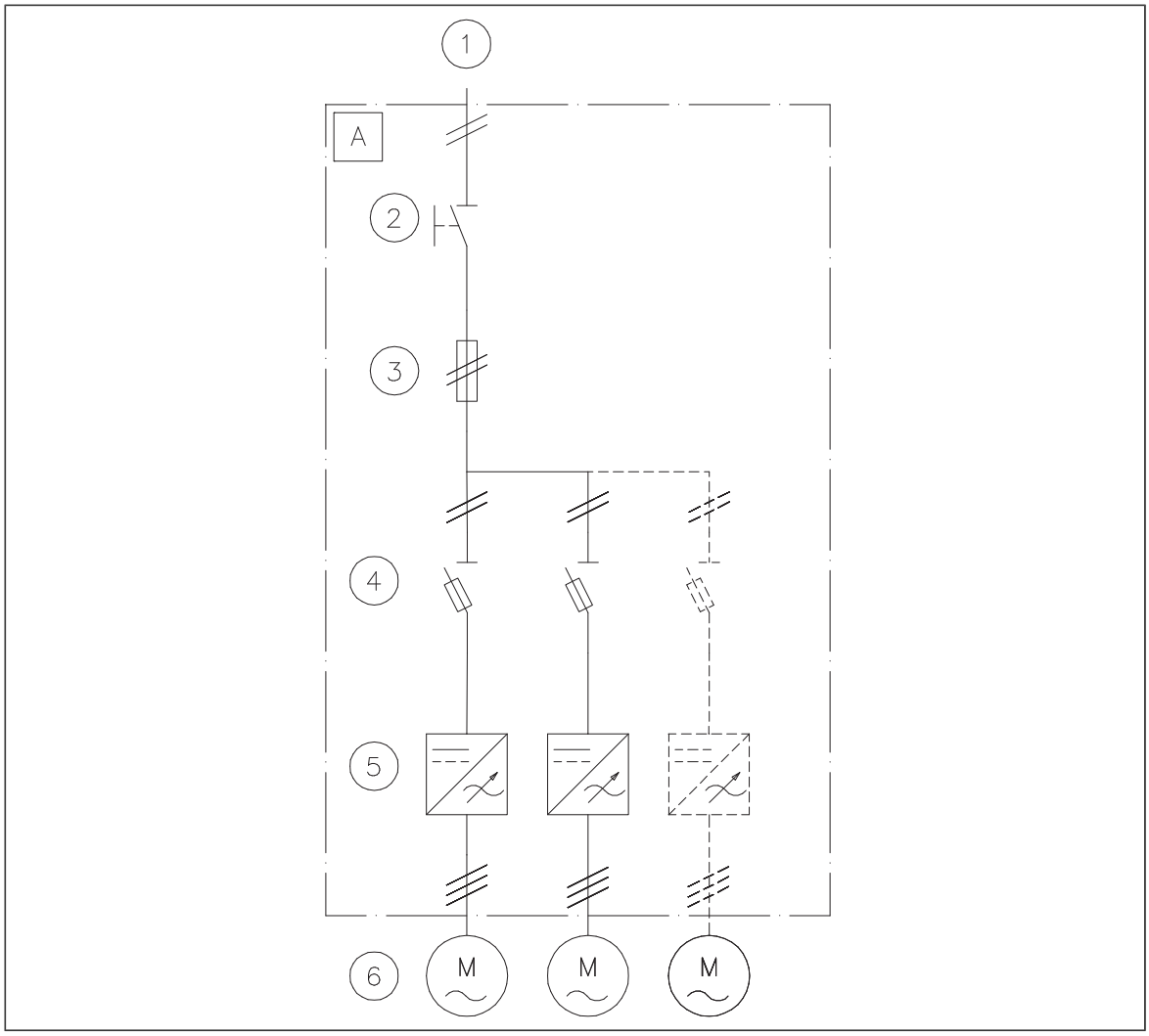
Frame R4i is pictured (frame R3i has a similar layout).



1	DC connection (under connector cover)
2	AC connection (under connector cover)
3	Grounding/clamping plates for power cables
4	ZCU control unit
5	Power unit
6	Slots for optional I/O modules
7	I/O terminal blocks
8	Grounding/clamping plate for control cables
9	Memory unit
10	Control panel connector
11	Air temperature sensor
12	Cover with panel mounting platform (can optionally be left out)

Overview circuit diagram of an inverter cubicle (frames R1i…R4i)

The following figure shows a simplified connection example of an inverter cubicle containing several frame R1i…R4i inverter modules.



Item	Explanation	Available through
A	Inverter cubicle	-
1	DC supply	-
2	DC switch/disconnector	ABB or third party
3	Common DC fuses	ABB or third party
4	Fuse disconnector	ABB or third party
5	Inverter modules	ABB
6	Motor	ABB (not part of ACS880-104 product offering) or third party

Cabinet layout and cooling

See chapter *Cabinet construction (page 45)*.

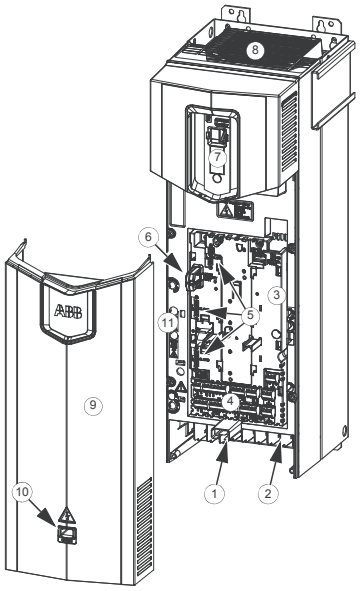
Frame R5i

General

The DC input and AC output terminals are located at the bottom of the module. The ZCU-12 control unit is mounted underneath the front cover; the control unit contains the basic I/Os and slots for optional I/O modules. Other optional equipment is primarily installed on separate mounting plates.

The module should be fitted with external DC fuses. Frame R5i modules have an internal capacitor pre-charge circuit.

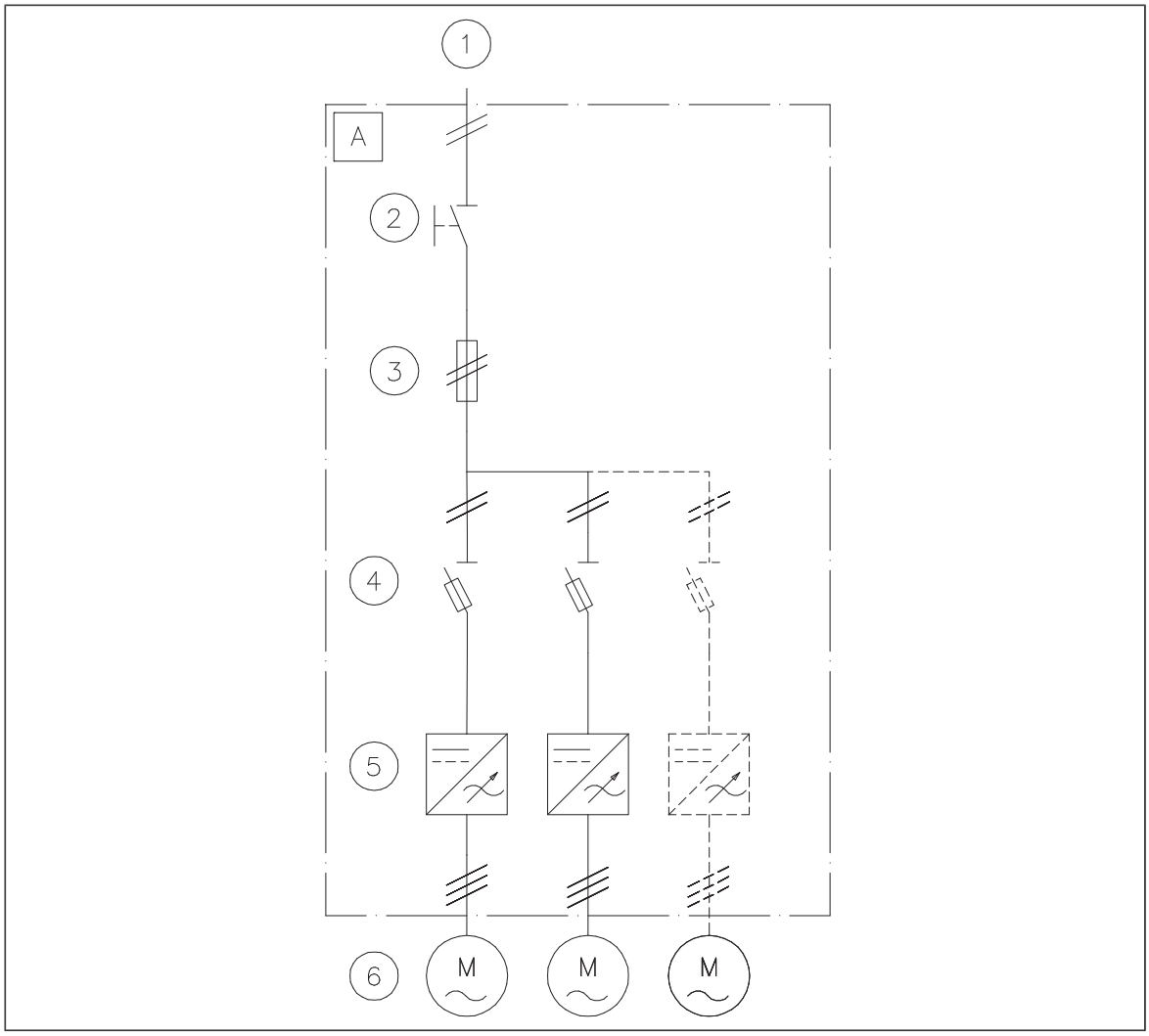
Frame R5i layout



Item	Explanation
1	DC connection
2	AC connection
3	ZCU control unit
4	I/O terminal blocks
5	Slots for optional I/O modules
6	Memory unit
7	Control panel holder
8	Cooling fan
9	Front cover
10	Front cover retaining clip To remove the front cover, use a screwdriver to push the clip down, and pull cover outwards by its bottom edge.
11	Varistor board and EMC filter connecting screws (VAR and EMC). Should not be present in an ACS880-104.

Overview circuit diagram of an inverter cubicle (frame R5i)

The following figure shows a simplified connection example of an inverter cubicle containing several frame R5i inverter modules.



Item	Explanation	Available through
A	Inverter cubicle	-
1	DC supply	-
2	DC switch/disconnector	ABB or third party
3	Common DC fuses	ABB or third party
4	Fuse disconnector	ABB or third party
5	Inverter modules	ABB
6	Motor	ABB (not part of ACS880-104 product offering) or third party

Cabinet layout and cooling

See chapter *Cabinet construction (page 45)*.

Frames R6i and R7i

The DC input terminals are located at the top of the module; the AC output are located at the bottom. The ZCU-14 control unit is mounted onto the module; the control unit contains the basic I/Os and slots for optional I/O modules. Other equipment is primarily installed on separate mounting plates.

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:

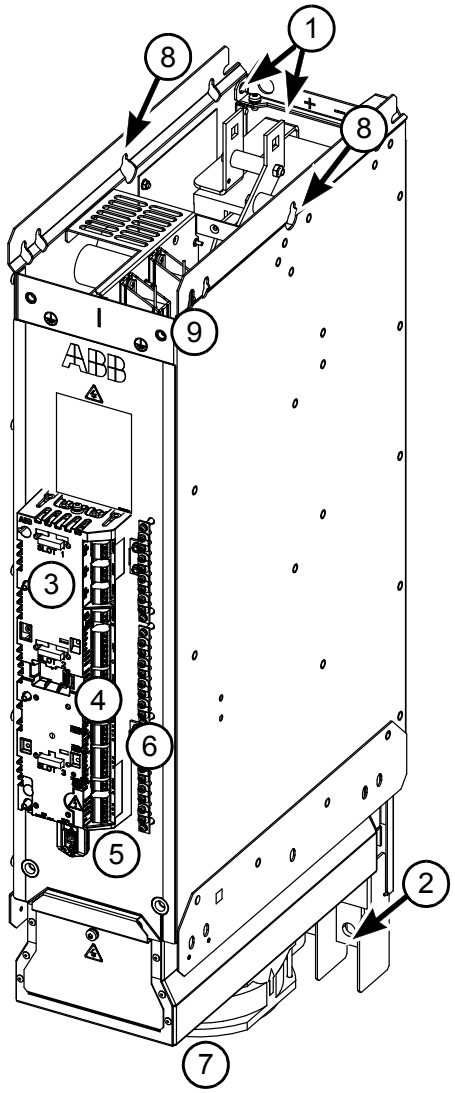
- the module is connected to the DC bus through a DC switch/disconnector, or
- the module is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

Frame R6i modules ordered with option +F272 have an internal capacitor charging circuit.

Frame R7i modules require, in addition to option +F272, a charging contactor and charging resistors which must be fitted outside the module. The contactor is controlled by an internal monitoring board using a voltage of 230 V DC.

Common mode filtering is implemented by running the DC bus through ferrite cores at the input of the module.

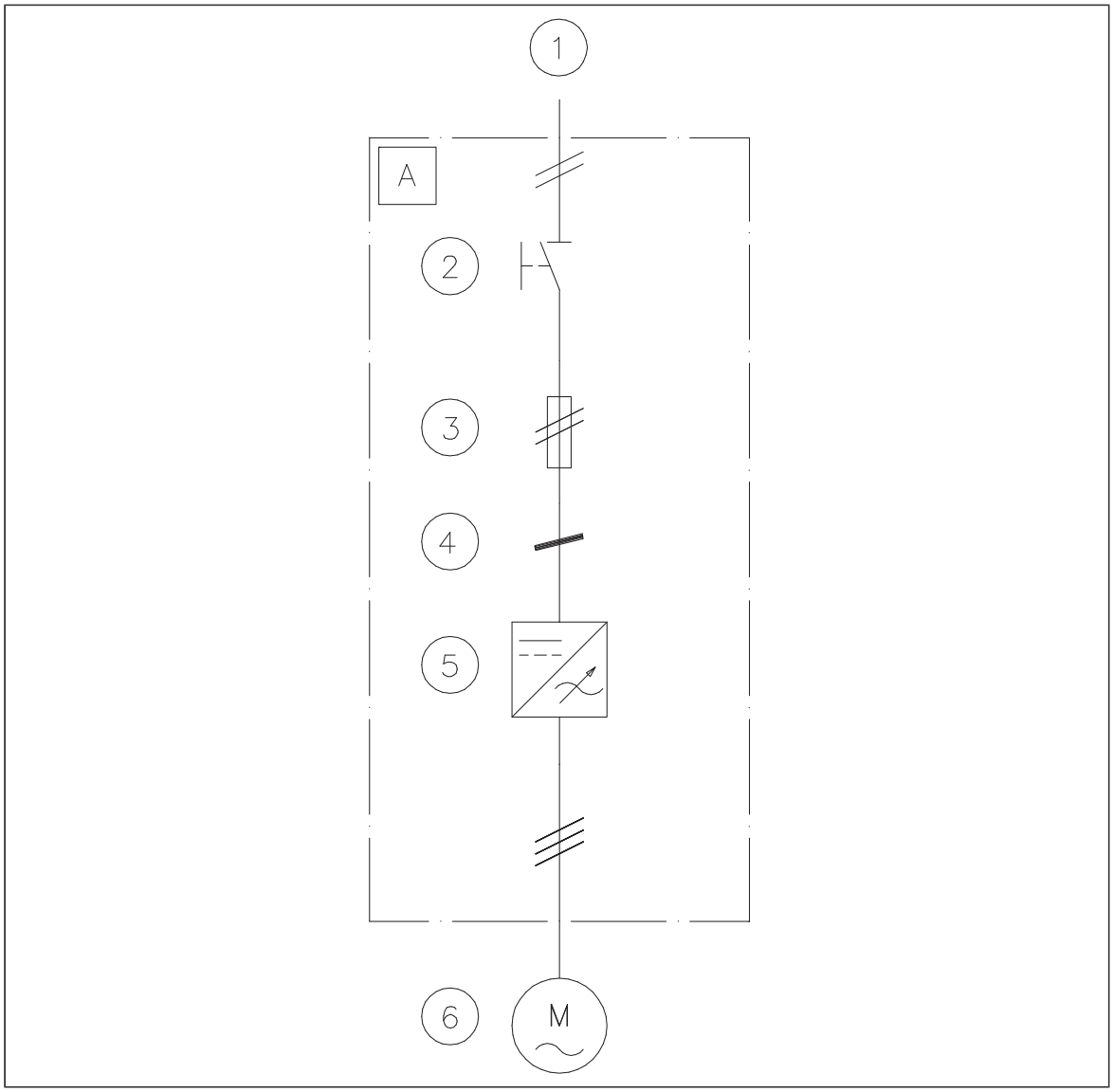
Frame R6i and R7i layout



Item	Explanation
1	DC connection
2	AC connection
3	ZCU control unit (with slots for optional I/O modules)
4	I/O terminal blocks
5	Control panel connector, memory unit
6	Grounding/clamping plates for control cables
7	Cooling fan holder (frame R6i has one fan, R7i has two)
8	Lifting eyes
9	The grounding point (PE) between module frame and cabinet frame

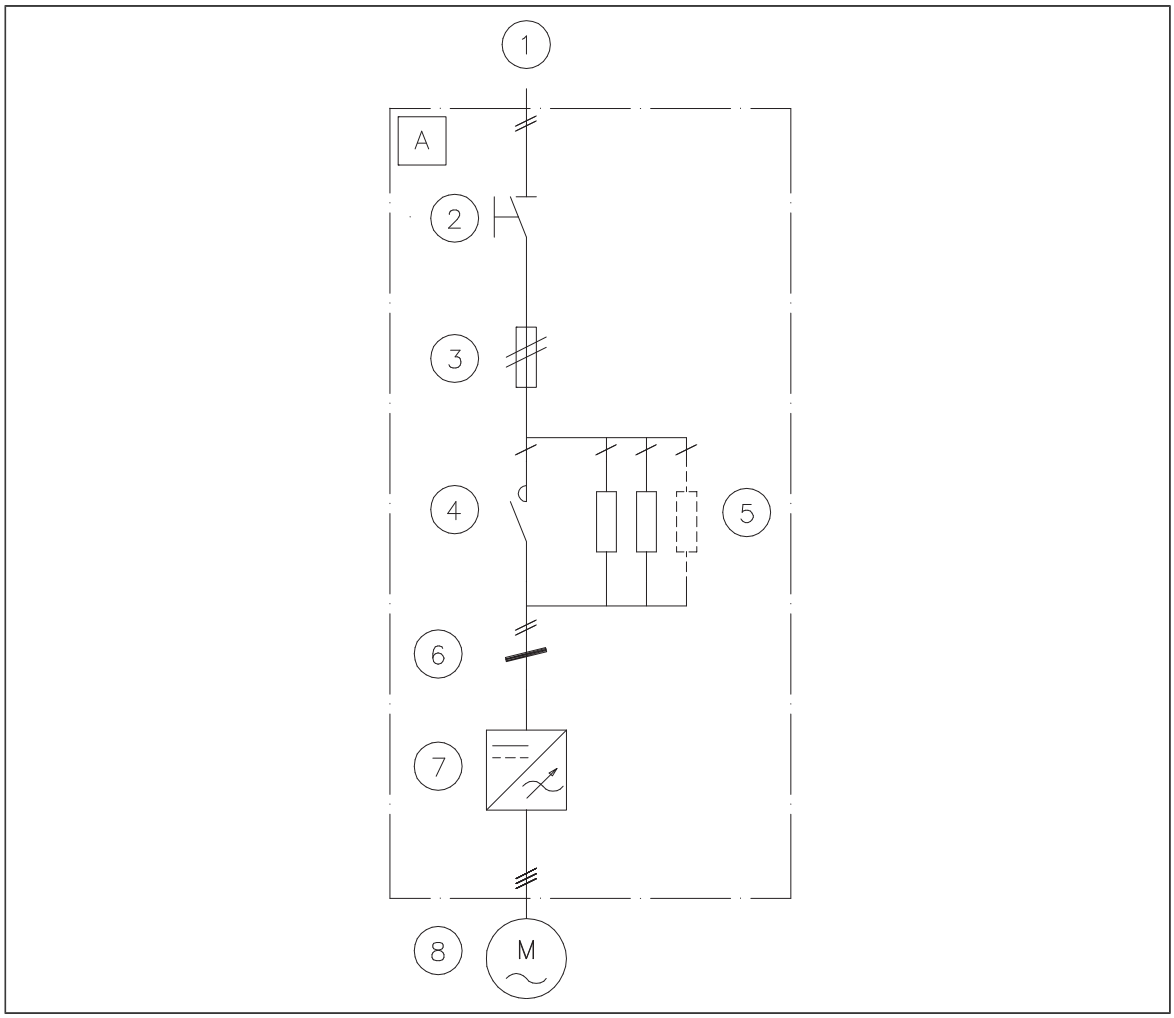
Overview circuit diagram of an inverter cubicle (frame R6i)

The following figure shows a simplified connection example of an inverter unit based on a frame R6i inverter module.



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

Overview circuit diagram of an inverter cubicle (frame R7i)



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

Cabinet layout and cooling

See chapter *Cabinet construction (page 45)*.

Frame R8i and multiples

Frame R8i modules are used to achieve output powers from approximately 250 kW upwards.

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

The 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.

As standard, the cooling fan is automatically speed-controlled according to the loading of the inverter module. The fan is supplied internally.

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

Internal du/dt filtering is optional for single-module 400/500 volt inverter units, but mandatory with all 690 volt units and all parallel-connected modules.

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

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:

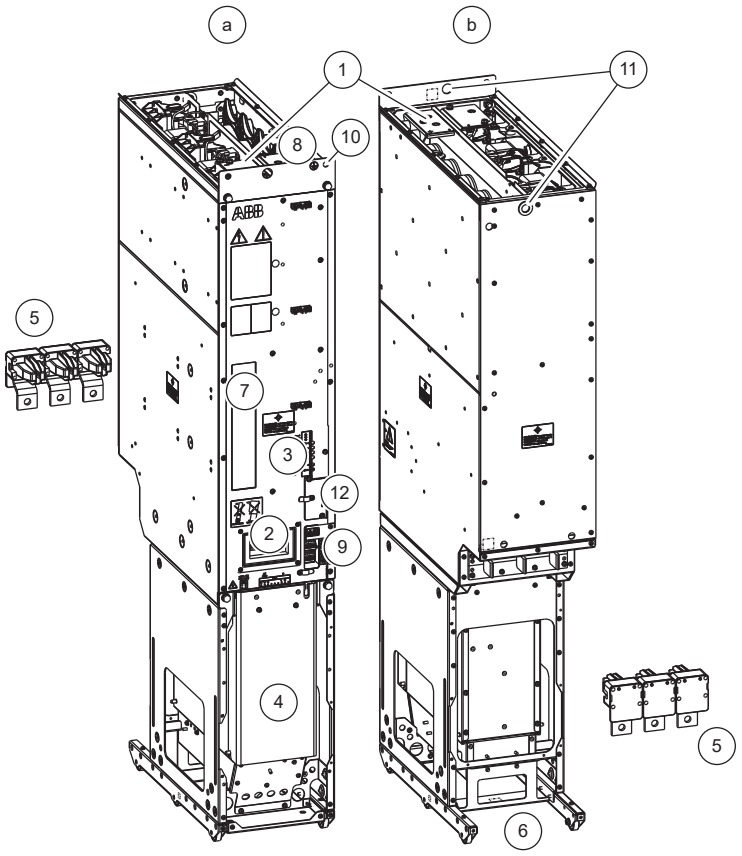
- the module is connected to the DC bus through a DC switch/disconnector, or
- the module is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

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 bus through ferrite cores at the input of the module.

Frame R8i layout

This figure shows the layout of the R8i module.



A	R8i module, front
B	R8i module, back
1	DC busbars
2	Handle
3	LEDs and fiber optic connectors
4	Fan (standard speed-controlled fan shown; a direct-on-line fan is available as option +C188)
5	Quick connector (three phases). The counterpart is fastened to the cabinet behind the module.
6	Wheels
7	Type designation label
8	Terminal block [X50] (power supply for internal boards and module heating element, option +C183; DOL fan supply, option +C188)
9	Connectors [X51], [X52], [X53]
10	The unpainted grounding point (PE) between module frame and cabinet frame.
11	Lifting eyes
12	Circuit board compartment fan

Connectors X50…X53

R8i modules contain a power supply (BDPS) that provides 24 V DC for the circuit boards of the module. The BDPS is powered internally from the DC link. An auxiliary voltage of 230 V AC (standard) or 115 V AC (option +G304) can optionally be fed to X50 (X50:4 and X50:5) to power the BDPS even when the DC link is not live. The 24 V DC voltage provided by the BDPS is available on X53, and can be used to power the BCU control unit of a single R8i inverter module.

Note: With an inverter unit consisting of parallel-connected R8i modules, it is strongly recommended to use an external 24 V DC supply to power the BCU control unit.

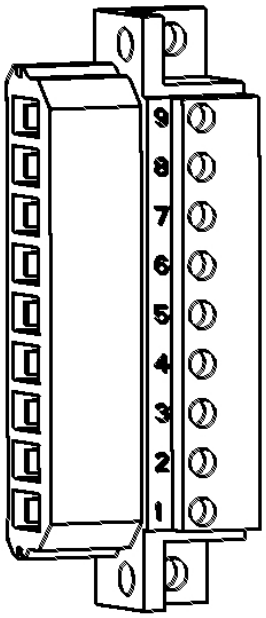
If a direct-on-line fan (option +C188) is used, the user must connect the fan supply (400 V AC 50 Hz or 60 Hz) to the module control connector [X50.1]. If an internal heating element (option +C183) is used, the user must connect the supply for the heating element to the module control connector [X50.7].

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

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

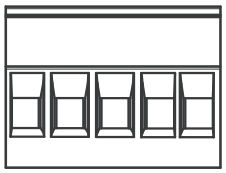
Note: As a factory standard, Safe torque off is disabled by a jumper connection between connectors X52 and X53.

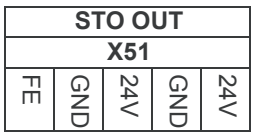
Connector X50



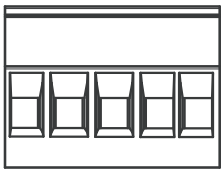
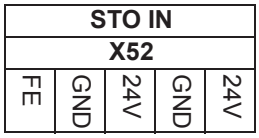
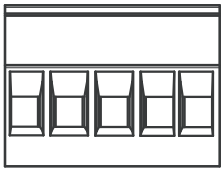
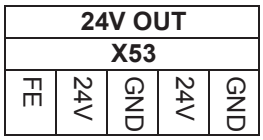
9	Not in use.	
8	N	115/230 V AC (50/60 Hz) input for optional heating element (+C183). The cabinet builder must connect this when the option is in use.
7	L	
6	Not in use.	
5	N	115/230 V AC 50 Hz input for internal power supply (BDPS) (115 V AC 60 Hz with option +G304). The cabinet builder must connect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

Connectors X51, X52, X53





X51	STO OUT	STO signal forwarding output to next inverter module (if present). The cabinet builder must connect this in a unit with parallel modules.

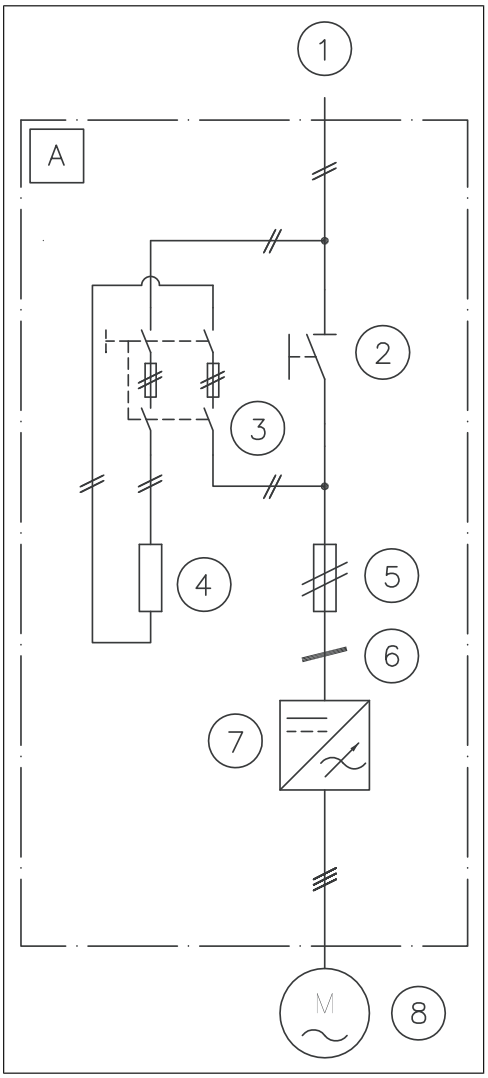
Connectors X51, X52, X53				
		X52	STO IN	24 V STO signals from BCU control unit
		X53	24V OUT	24 V DC output (for eg. BCU control unit)
		Note: The Safe torque off (STO) safety function is only implemented in inverter units. Therefore, the STO function cannot be used in supply, rectifier, DC/DC converter and brake units. In these units, de-energizing any connection of STO IN (X52) connector stops the unit. Note that this stop is not safety related and must not be used for safety function purposes.		

Fiber optic connectors

			Name	**Description**
BSFC	V50		BSFC	Charging controller connection. Must be connected by the installer.
	V60			
BFPS	V30		BFPS	Fan control connection (to fan control box). Connected at the factory.
	V40			
BCU	V10		BCU	Control unit connection. Must be connected by the installer.
	V20			

Overview circuit diagram of a frame R8i inverter unit

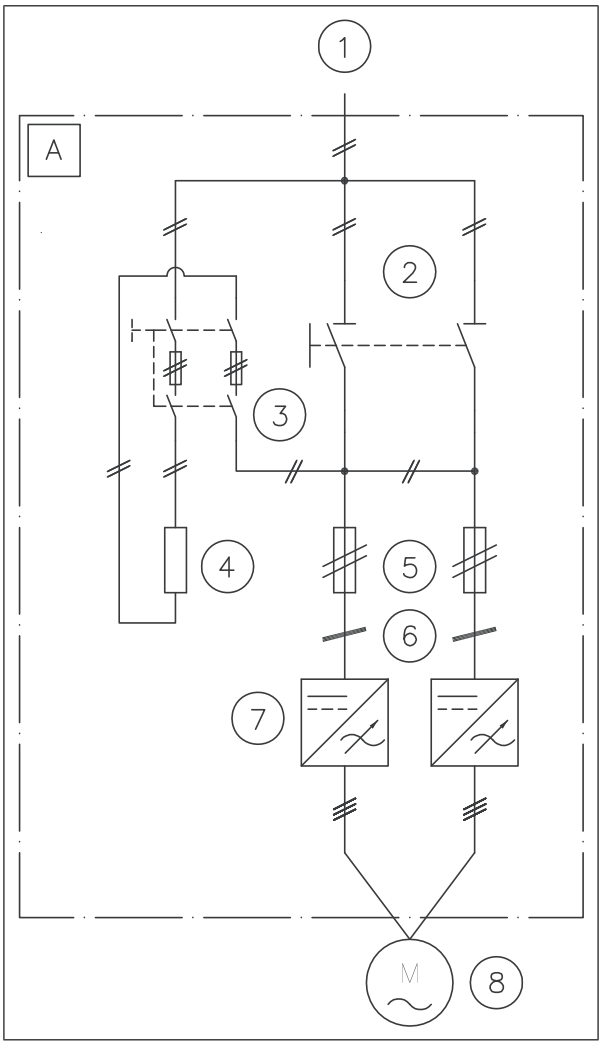
The following figure shows a simplified connection example of an inverter unit based on a single inverter module.



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

Cabinet layout and cooling

See chapter *Cabinet construction (page 45)*

Module variant with capability for increased switching frequency

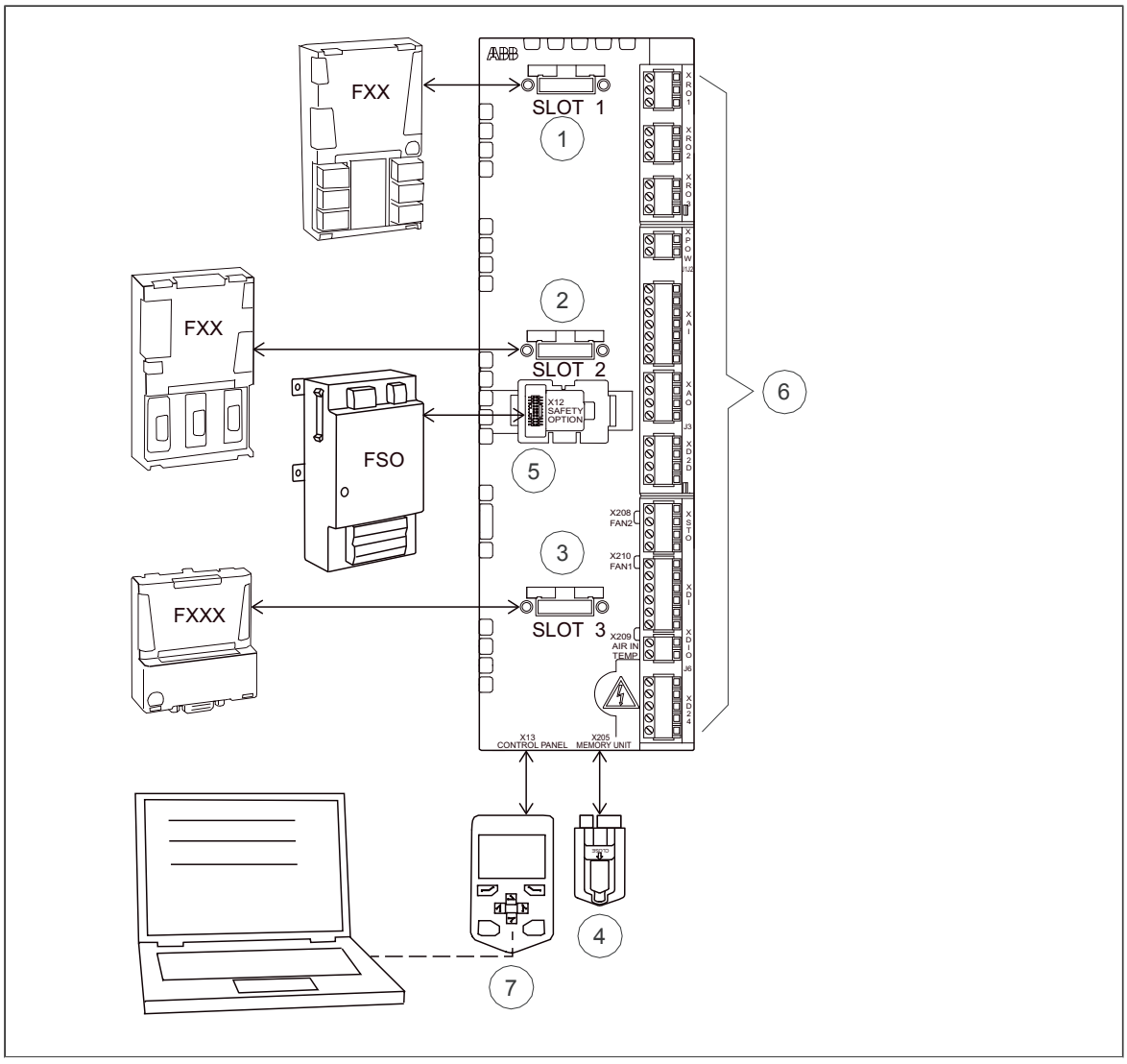
Module variant with capability for increased switching frequency (option +P967) is also available. The high-speed option is intended for test bench applications with high-speed permanent magnet motors. The option involves installing a BLHF-2x-7 filter to the drive output. See *ACS880 multidrive for high-speed test benches supplement* (3AXD50000818013 [English]).

Inverter unit control interfaces

Overview of control connections of the ZCU control unit

The diagram shows the control connections and interfaces of the ZCU-14 control unit.

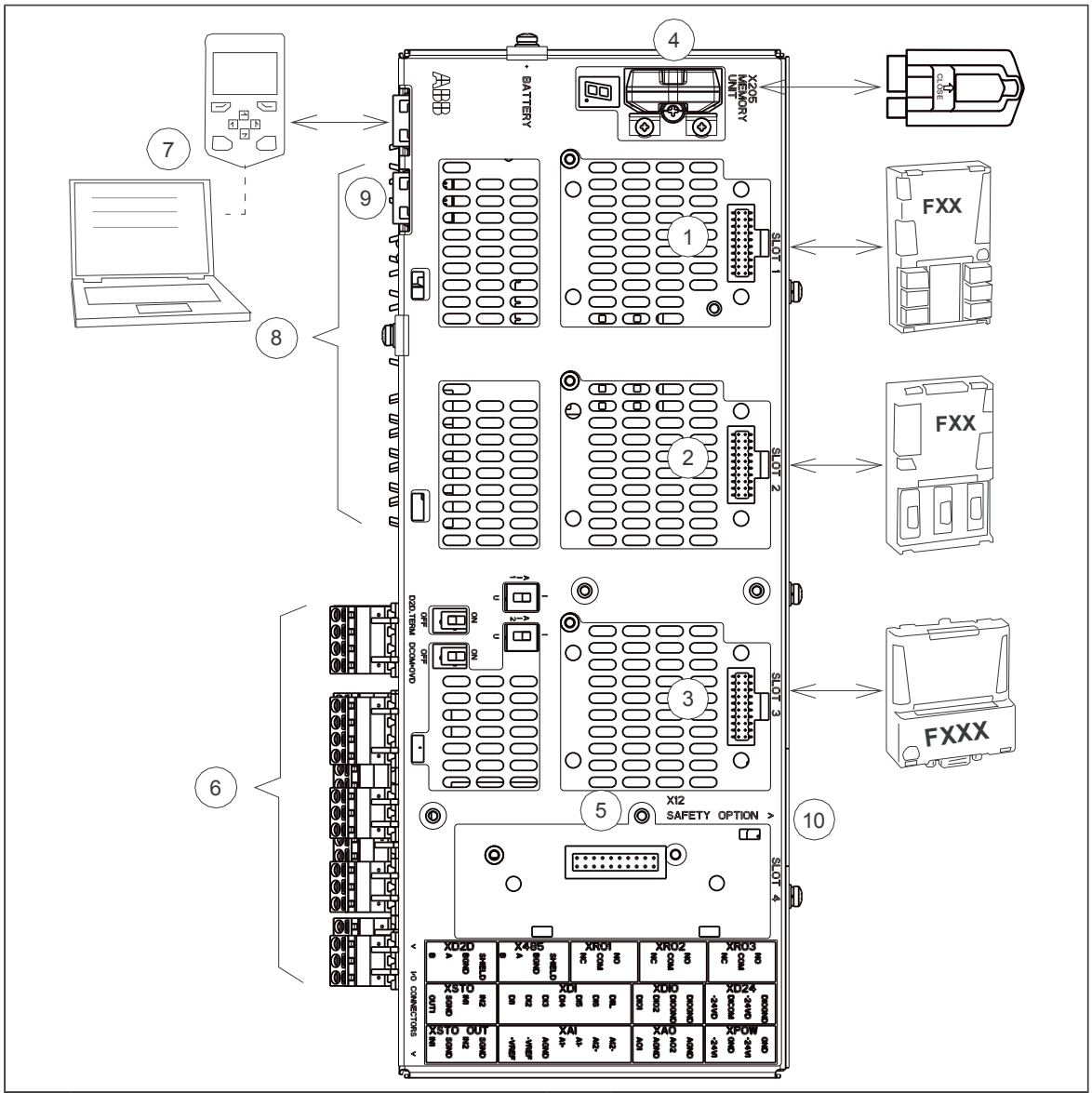
It is used with module frame sizes R1i…R7i. Frame R5i modules employ a type ZCU-12 unit which has a different layout but the same connectivity as the ZCU-14.



1 2 3	Option modules can be inserted into slots 1, 2 and 3 as follows: **Modules** — **Slots** Analog and digital I/O extension modules — 1, 2, 3 Feedback interface modules — 1, 2, 3 Fieldbus communication modules — 1, 2, 3 FSO-xx safety functions module — 2 (X12) When installed into slot 3 of a ZCU-14 control unit, the module will extend over the edge. We recommend you use slot 1 or 2 instead whenever possible.
4	Memory unit.
5	Connector for FSO-xx safety functions module (X12). The module reserves slot 2 when connected.
6	I/O terminal blocks. See chapter Control unit.
7	See section The ACx-AP-x control panel.

Overview of the control connections of the BCU control unit

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



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

The ACx-AP-x control panel

The ACx-AP-x 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 mounting platform (available separately).

With frame R1i…R5i inverter modules, the panel can be mounted on the panel holder on the cover of the module.

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, see *ACX-AP-x Assistant control panels User's manual* (3AUA0000085685 [English]).

Control by PC tools

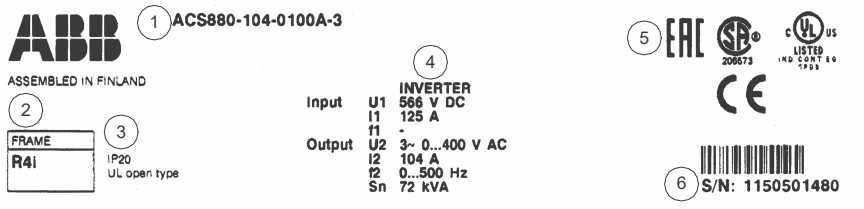
There is a USB connector on the front of the panel that can be used to connect a PC to the drive. When a PC is connected to the control panel, the control panel keypad is disabled.

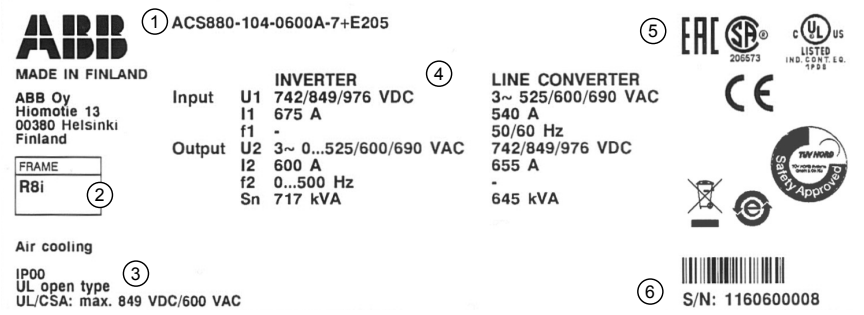
For more information, see section Connecting a PC.

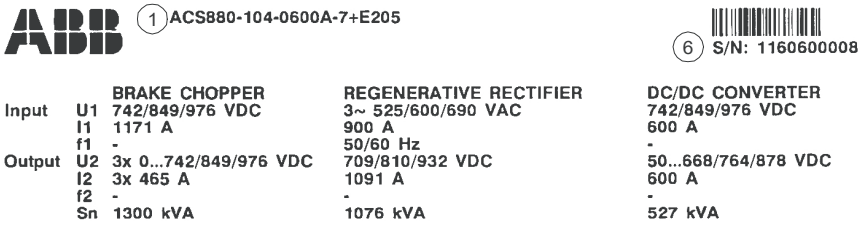
Type designation label

Each module has a type designation label attached to it. The type designation stated on the label contains information on the specifications and configuration of the module. The first digits express the basic construction, for example “ACS880-104-0100A-3”. Any optional selections are given thereafter, separated by plus signs.

Examples of the label are shown below.







1	Type designation.
2	Frame size.
3	Degree of protection; additional UL/CSA specifications.
4	Ratings. The labels show ratings for inverter module (INVERTER), IGBT supply module (LINE CONVERTER), brake chopper module (BRAKE CHOPPER), regenerative rectifier module (REGENERATIVE RECTIFIER) and DC/DC converter module (DC/DC CONVERTER).
5	Valid markings.
6	Serial number. The first digit refers to the manufacturing plant. The next four digits indicate manufacturing year and week respectively (yyww). The remaining digits complete the serial number so that there are no two units with the same number.

3

Moving and unpacking the module

Contents of this chapter

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



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

Moving and lifting the transport package

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

Unpacking

Frames R1i…R5i

The module is delivered in a corrugated cardboard box. The module and its parts (such as grounding/clamp plates, terminal blocks, etc.) are placed in the different compartments of the box.

1. Remove any banding and lift off the cover of the box.
2. Lift the module out of the box.
3. Check all the compartments in the box for accessories.
   Note: Some parts may be placed in a compartment directly underneath the module.

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

Frames R6i…R8i

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

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

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

Lifting the unpacked modules

Lift the unpacked module only by its lifting eyes.

Moving the unpacked modules

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

4

Cabinet construction

Contents of this chapter

This chapter 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.

General

See the technical data for module-specific cooling requirements and allowable mounting orientations.

Installation examples

This section gives examples of how to place the drive and additional equipment into a Rittal VX25 enclosure.

Each example includes a table that lists:

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

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

The example includes also cabinet assembly drawings that show each stage listed in the table. More detailed steps of each stage are described in the kit-specific assembly drawings. The tightening torques are listed in the kit-specific assembly drawings. See the hardware manual for the tightening torques of drive module input and output terminals.

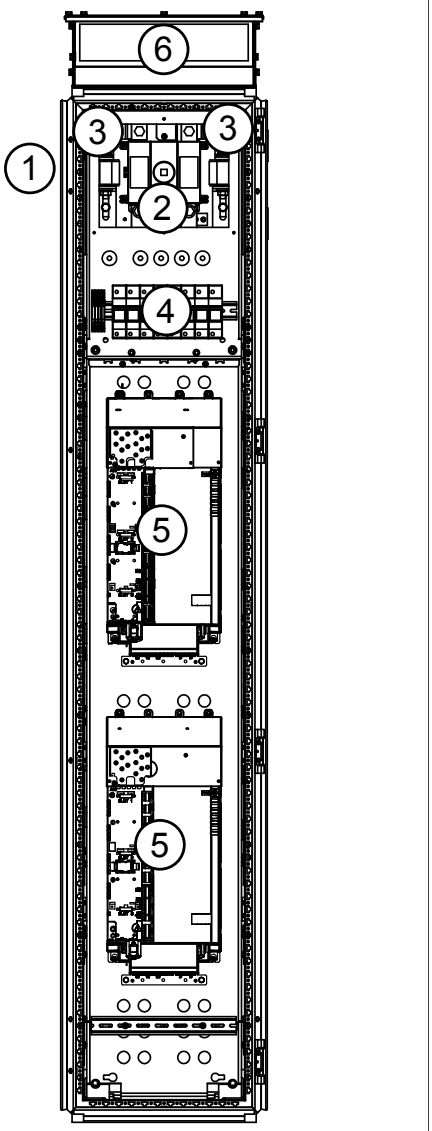
For general instructions, see *Drive modules cabinet design and construction instructions* (3AUA0000107668 [English]).



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.

R1i…R4i modules in a 400 mm wide Rittal VX25 enclosure

A maximum of four frame R1i or R2i modules, or two frame R3i or R4i modules can be fitted into a 400 mm wide VX25 enclosure, but the number can be reduced by optional equipment.

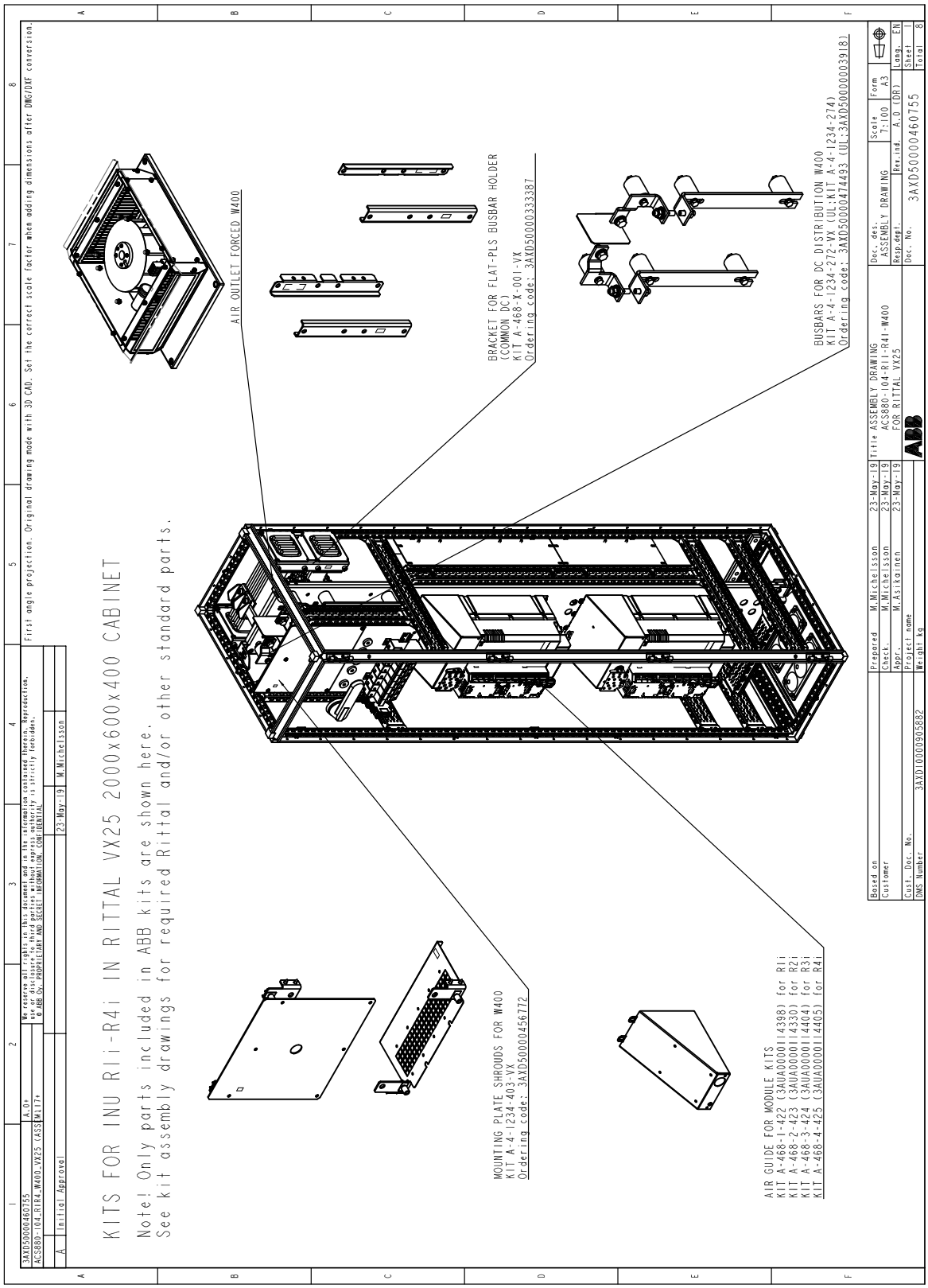


Description
Cubicle including: 1. DC input 2. DC switch/disconnector for all inverter modules 3. Main DC fuses 4. DC fuse disconnectors for each inverter module 5. Inverter modules 6. Air outlet with exhaust fan

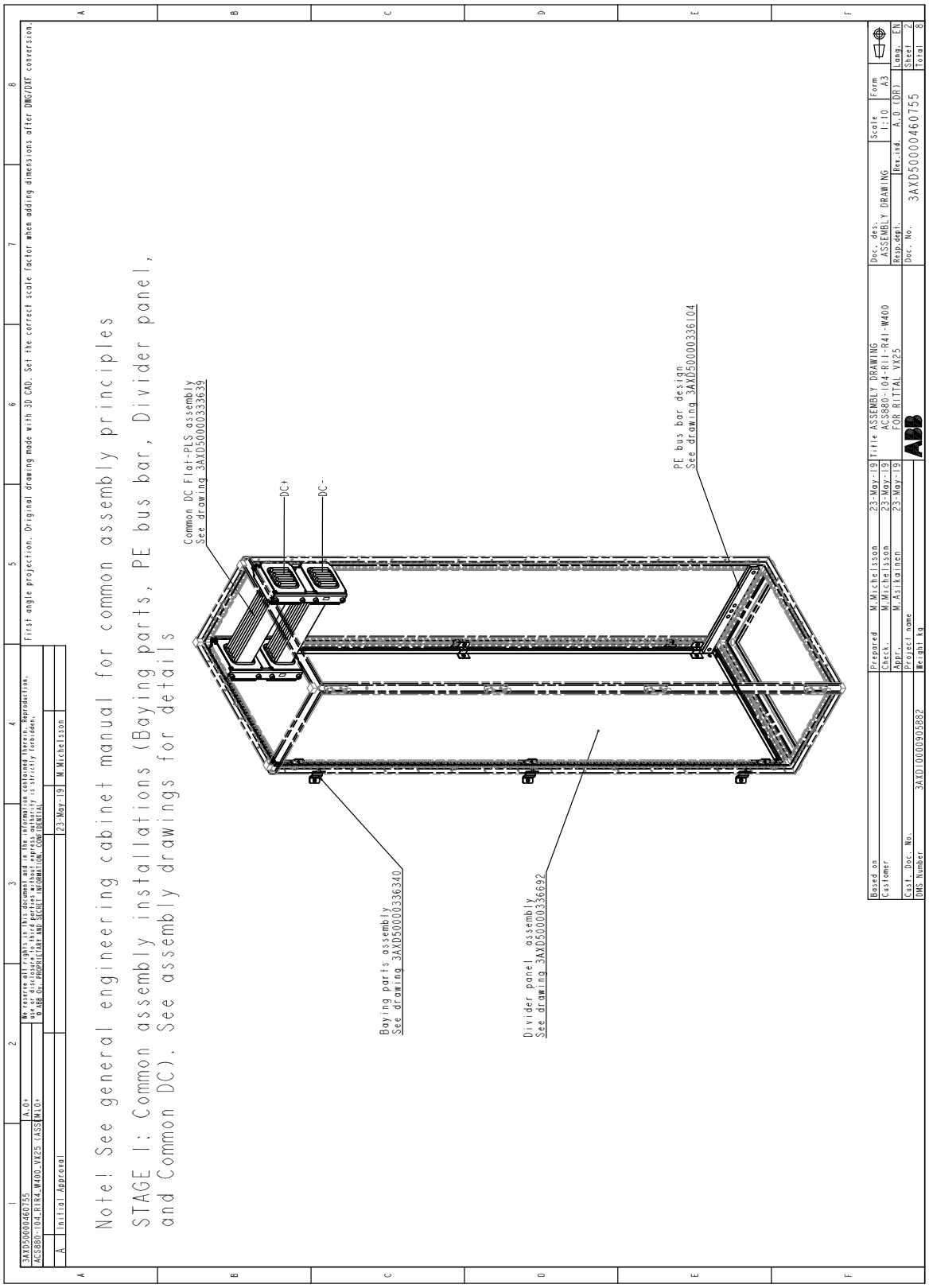
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbars	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2	Bottom plate	-	-	-
3	Mounting plate (IEC)	3AXD50000444588	-	-
	Mounting plate (UL)	3AXD50000003890	-	-
4	DC busbars (IEC)	3AXD50000453108	A-4-1234-272-VX	3AXD50000474493
	DC busbars (UL)	3AXD50000003895	A-4-1234-274	3AXD50000003918
5	Mounting plate shrouds	3AXD50000450060	A-4-1234-403-VX	3AXD50000456772
6	Inverter modules and air guides:			
	R1i	3AUA0000114397	A-468-1-422	3AUA0000114398
	R2i	3AUA0000114397	A-468-2-423	3AUA0000114330
	R3i	3AUA0000114397	A-468-3-424	3AUA0000114404
	R4i	3AUA0000114397	A-468-4-425	3AUA0000114405
7	du/dt filters	3AXD50000458721	-	See *AC-side components (page 236)*

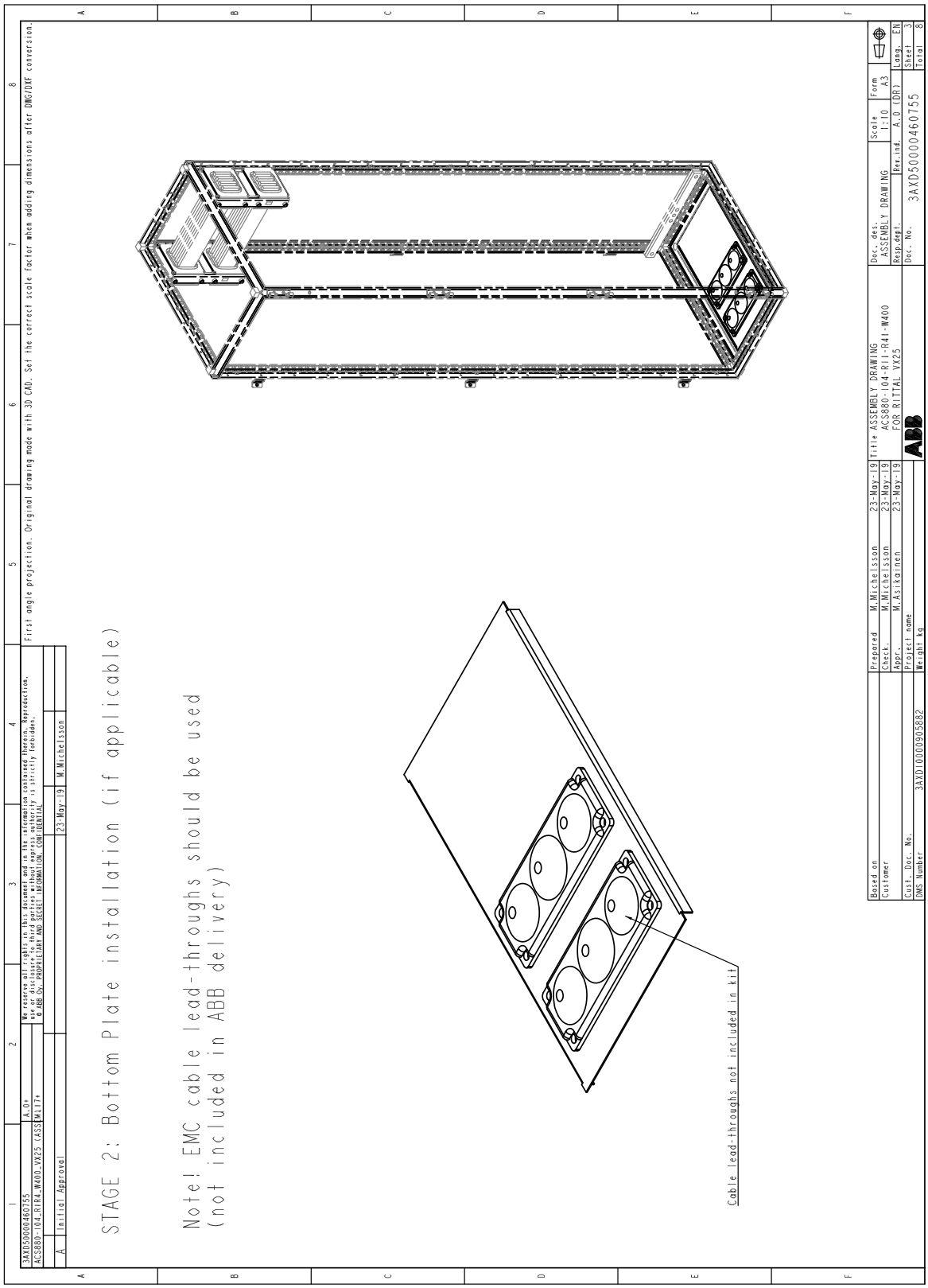
Overview of kits



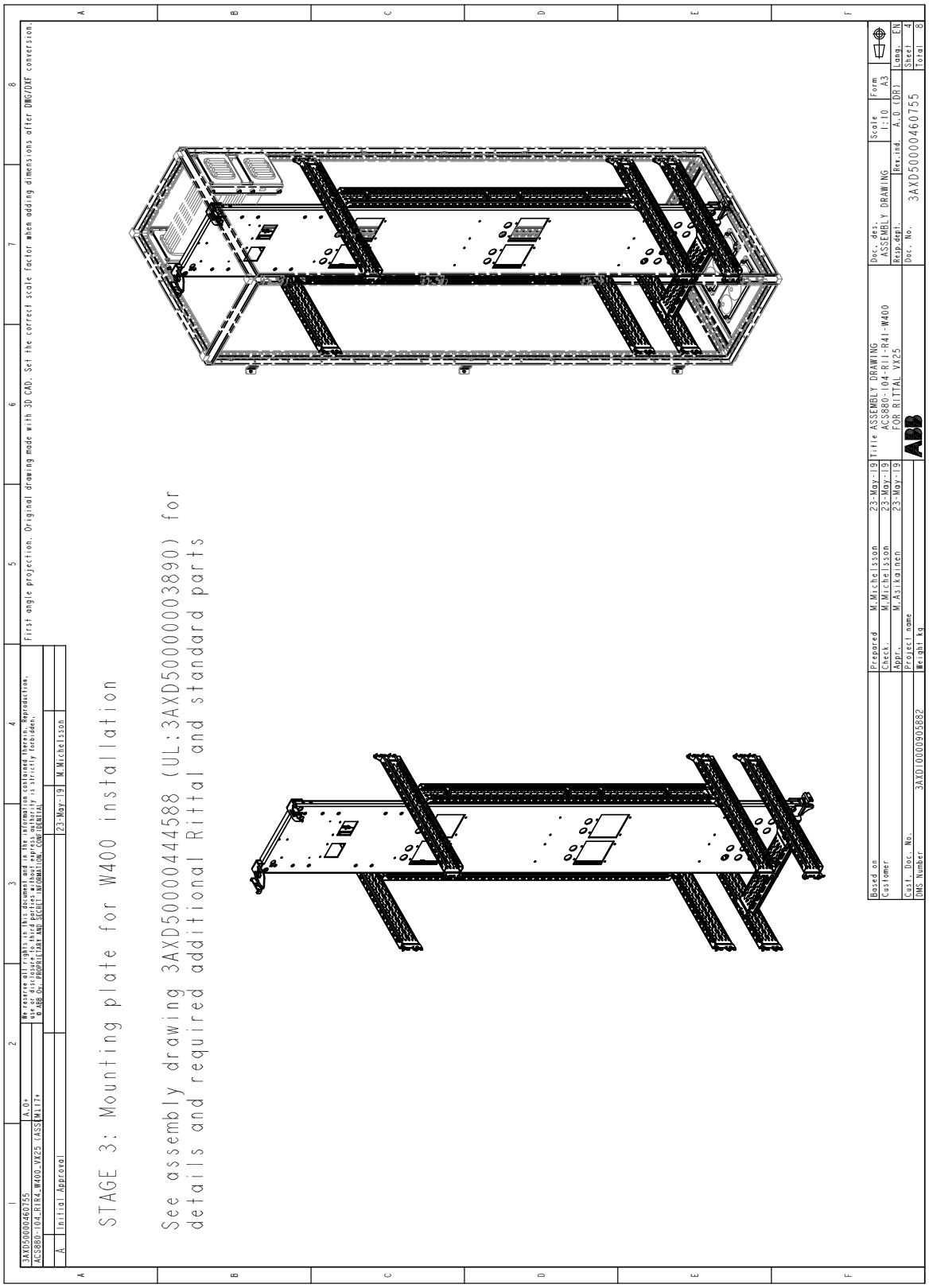
Stage 1: Installation of common parts



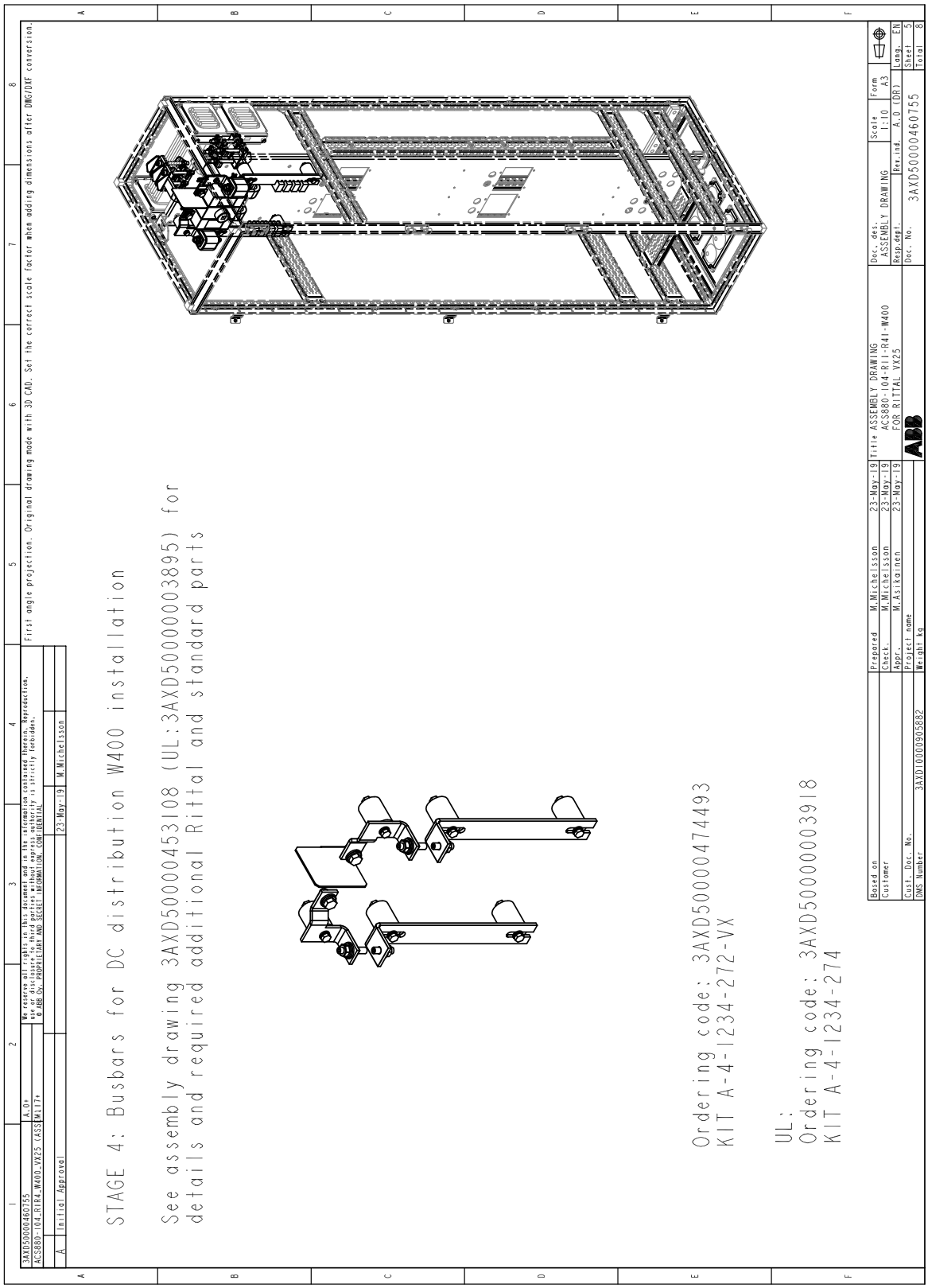
Stage 2: Installation of bottom plate



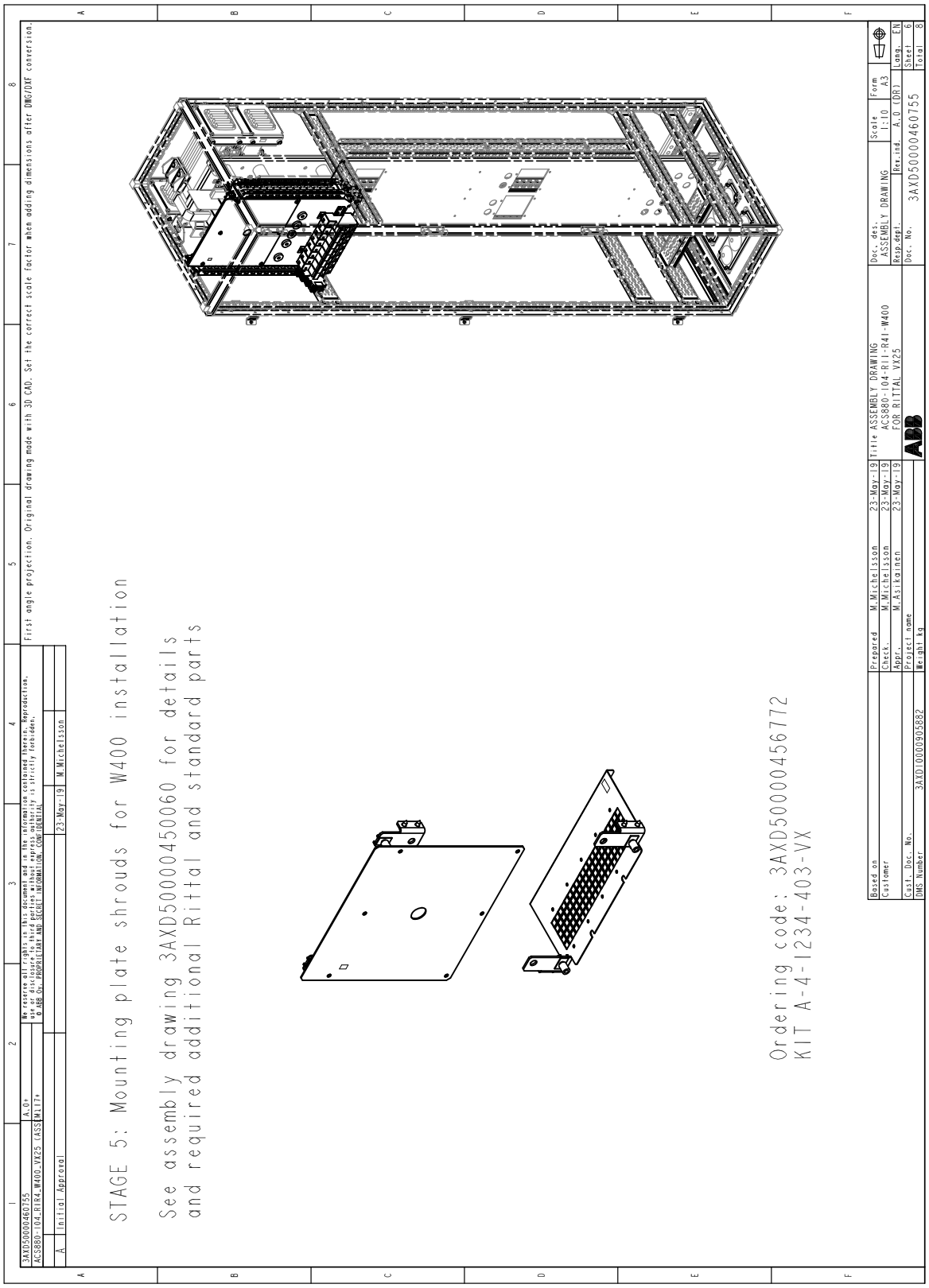
Stage 3: Installation of mounting plate



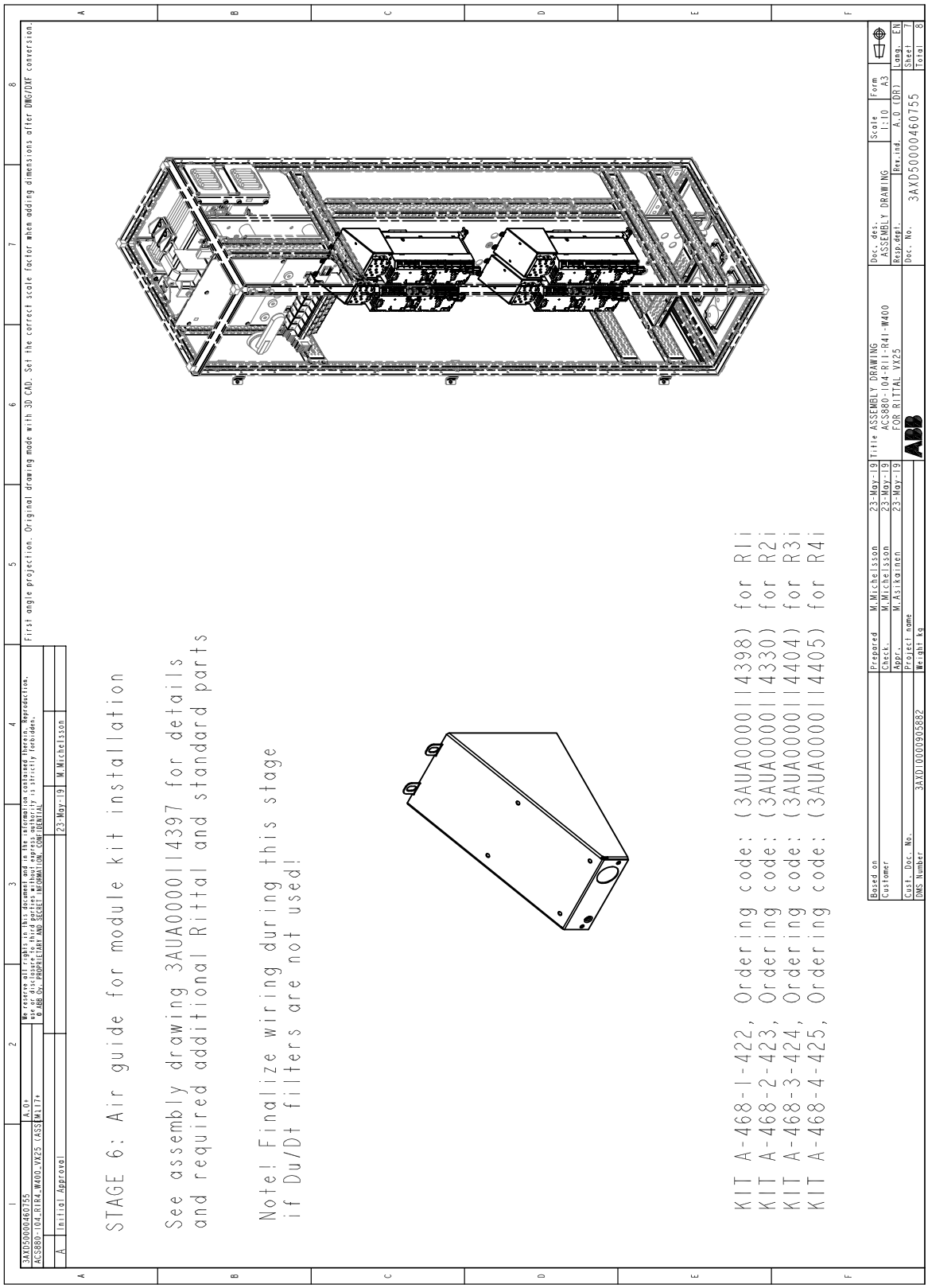
Stage 4: Installation of DC busbars



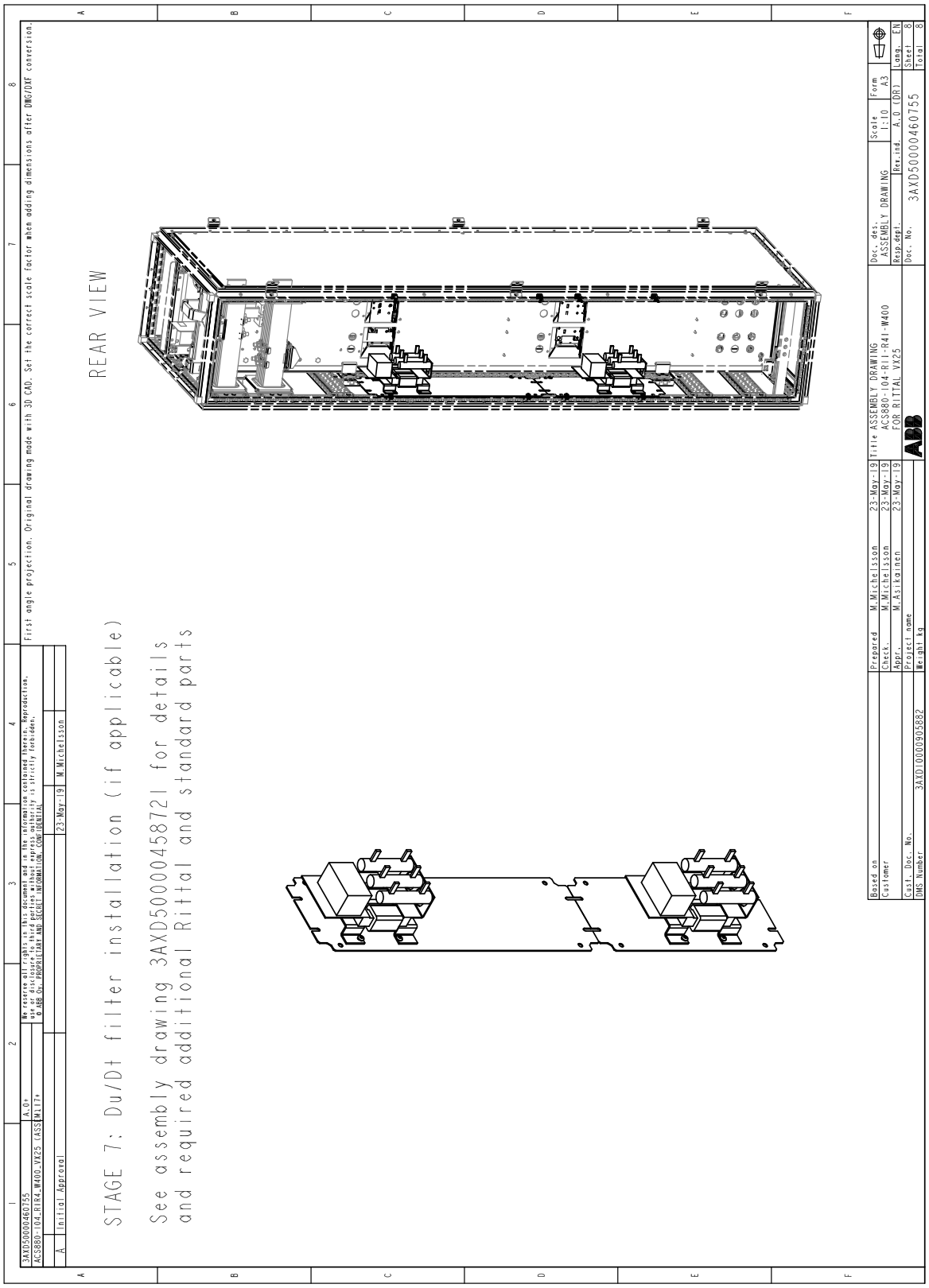
Stage 5: Installation of mounting plate shrouds



Stage 6: Installation of inverter modules and air guides

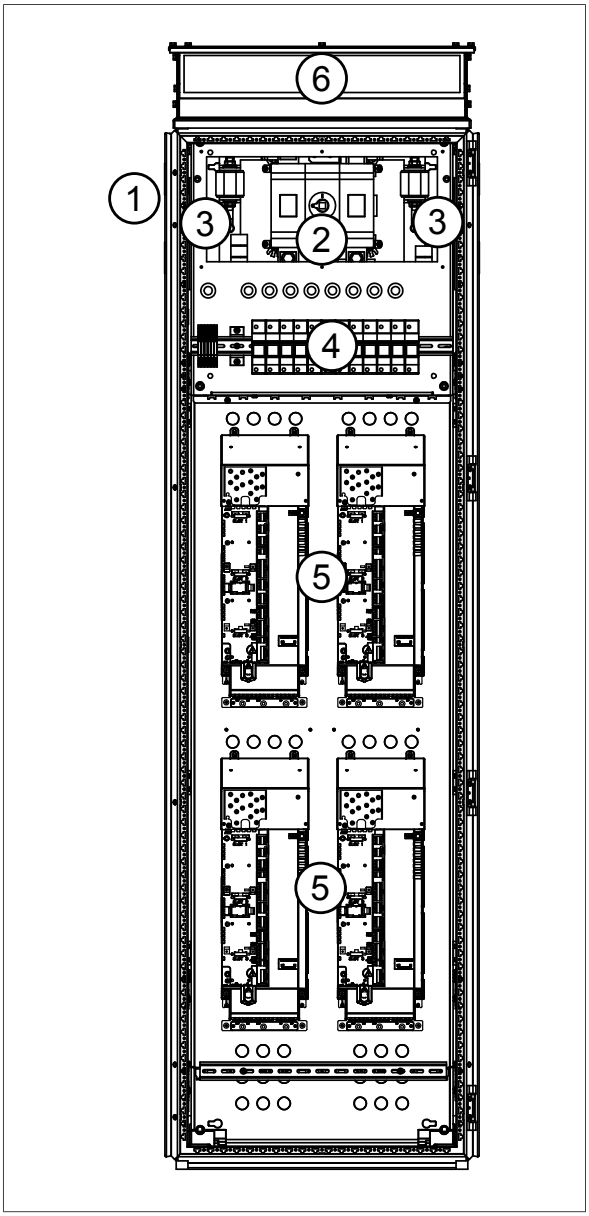


Stage 7: Installation of du/dt filters



R1i…R4i modules in a 600 mm wide Rittal VX25 enclosure

A maximum of eight frame R1i or R2i modules, or four frame R3i or R4i modules can be fitted into a 600 mm wide VX25 enclosure, but the number can be reduced by optional equipment.

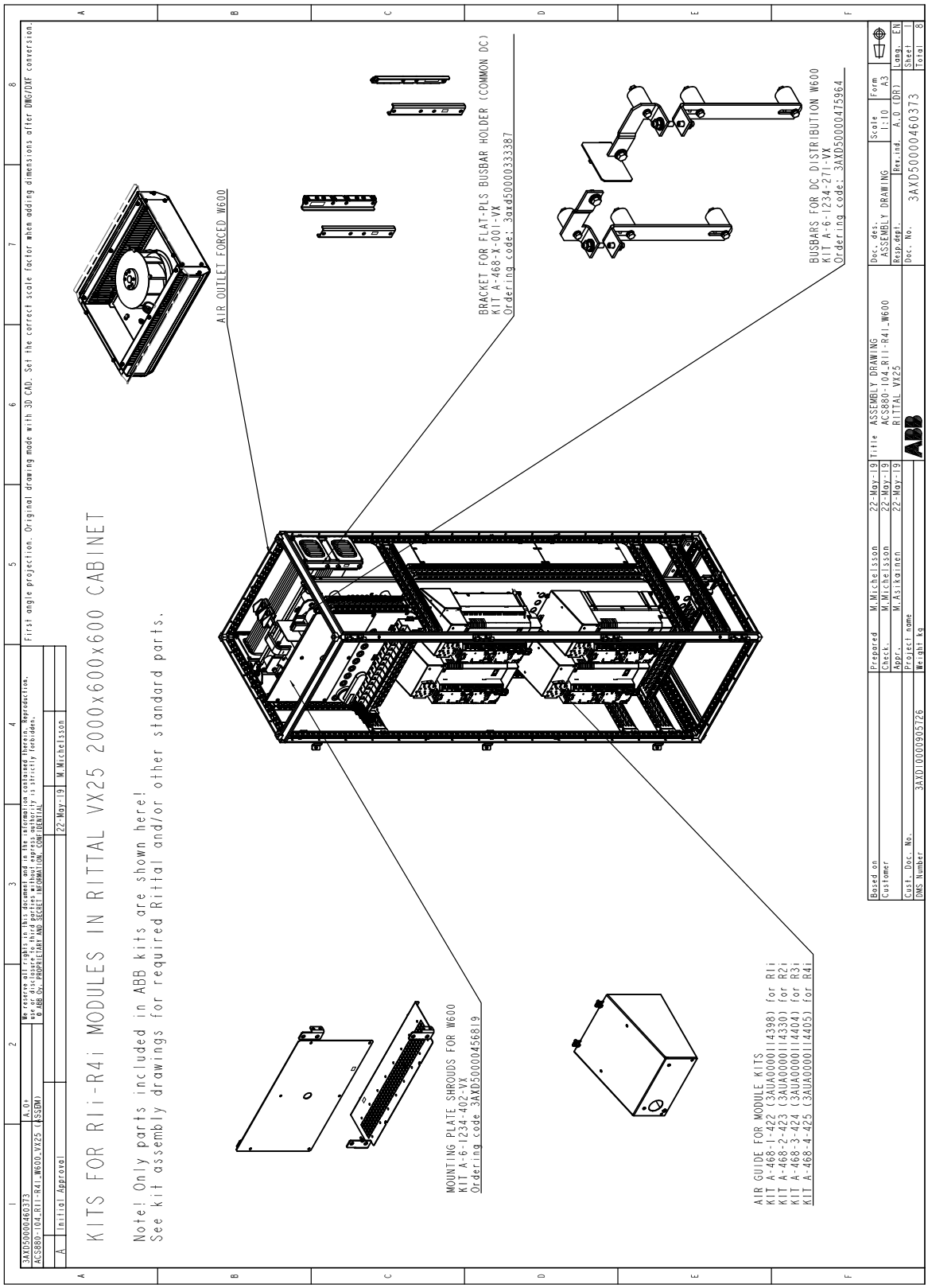


Description
Cubicle including: 1. DC input 2. DC switch/disconnector for all inverter modules 3. Main DC fuses 4. DC fuse disconnector for each inverter 5. Inverter modules 6. Air outlet with exhaust fan

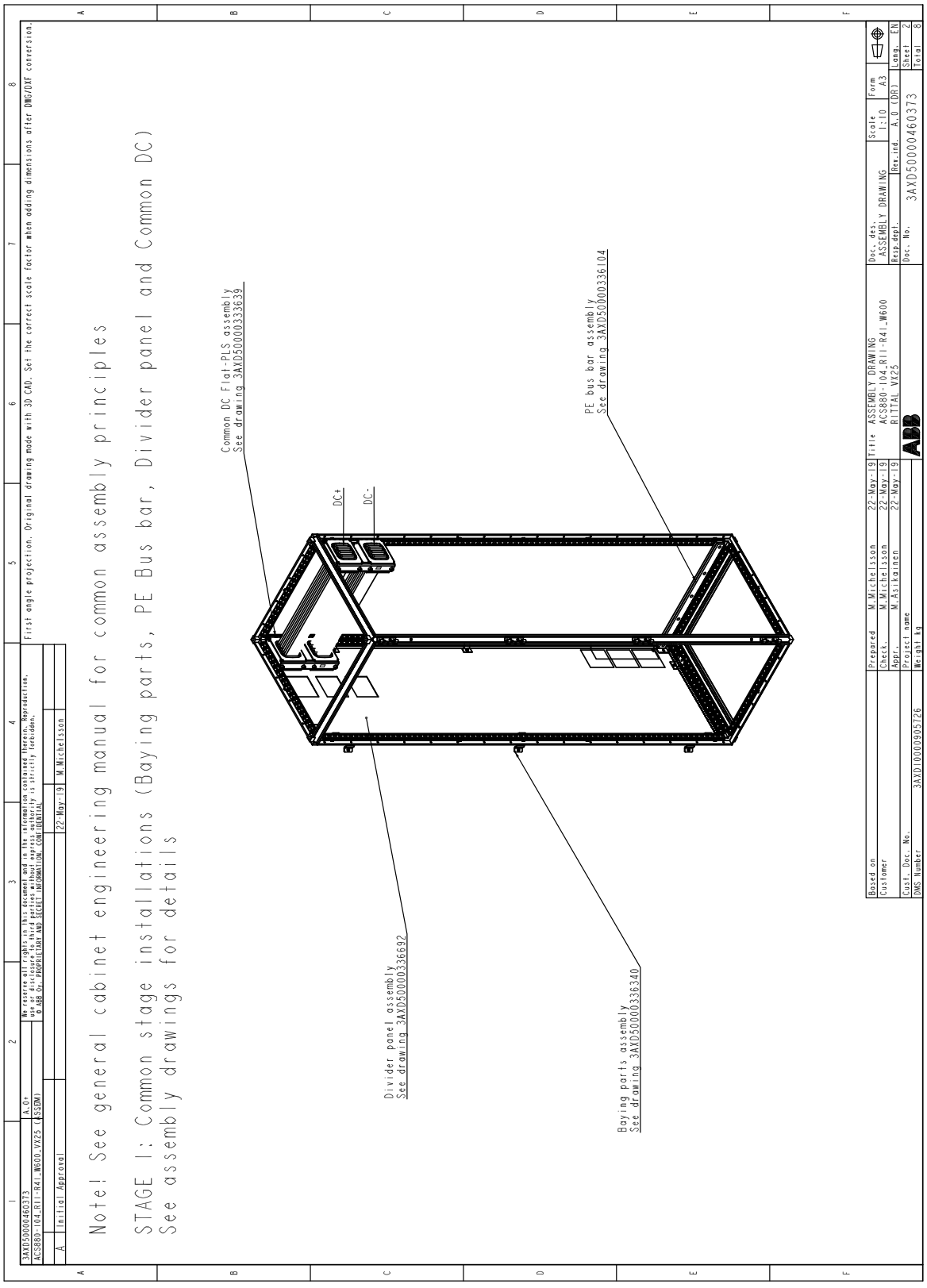
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbars	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2	Bottom plate	-	-	-
3	Mounting plate	3AXD50000468195	-	-
4	DC busbars	3AXD50000460779	A-6-1234-271-VX	3AXD50000475964
5	Mounting plate shrouds	3AXD50000461691	A-6-1234-402-VX	3AXD50000456819
6	Inverter modules and air guides:			
	R1i	3AUA0000114397	A-468-1-422	3AUA0000114398
	R2i	3AUA0000114397	A-468-2-423	3AUA0000114330
	R3i	3AUA0000114397	A-468-3-424	3AUA0000114404
	R4i	3AUA0000114397	A-468-4-425	3AUA0000114405
7	du/dt filters	3AXD50000471713	-	See *AC-side components (page 236)*

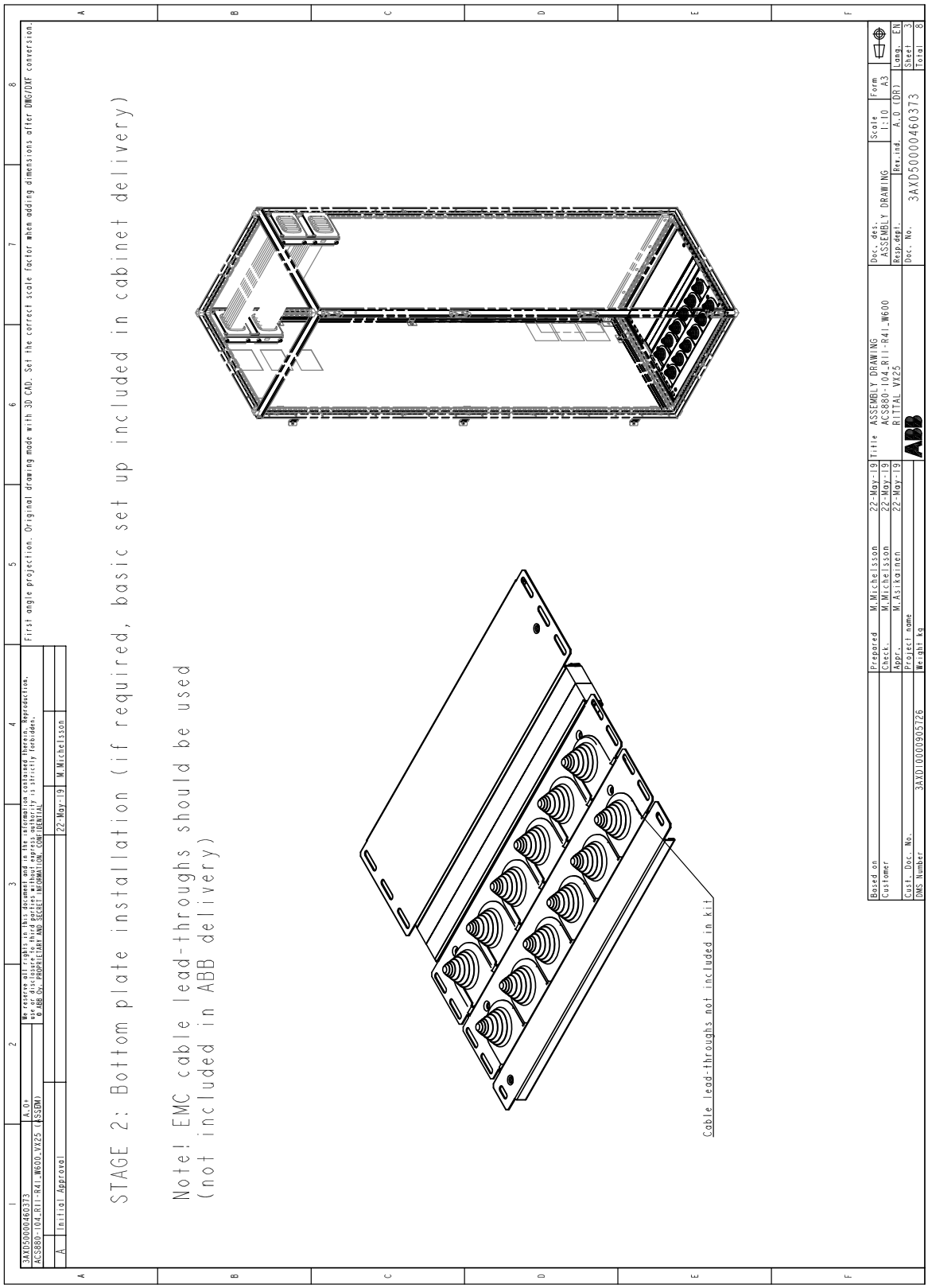
Overview of kits



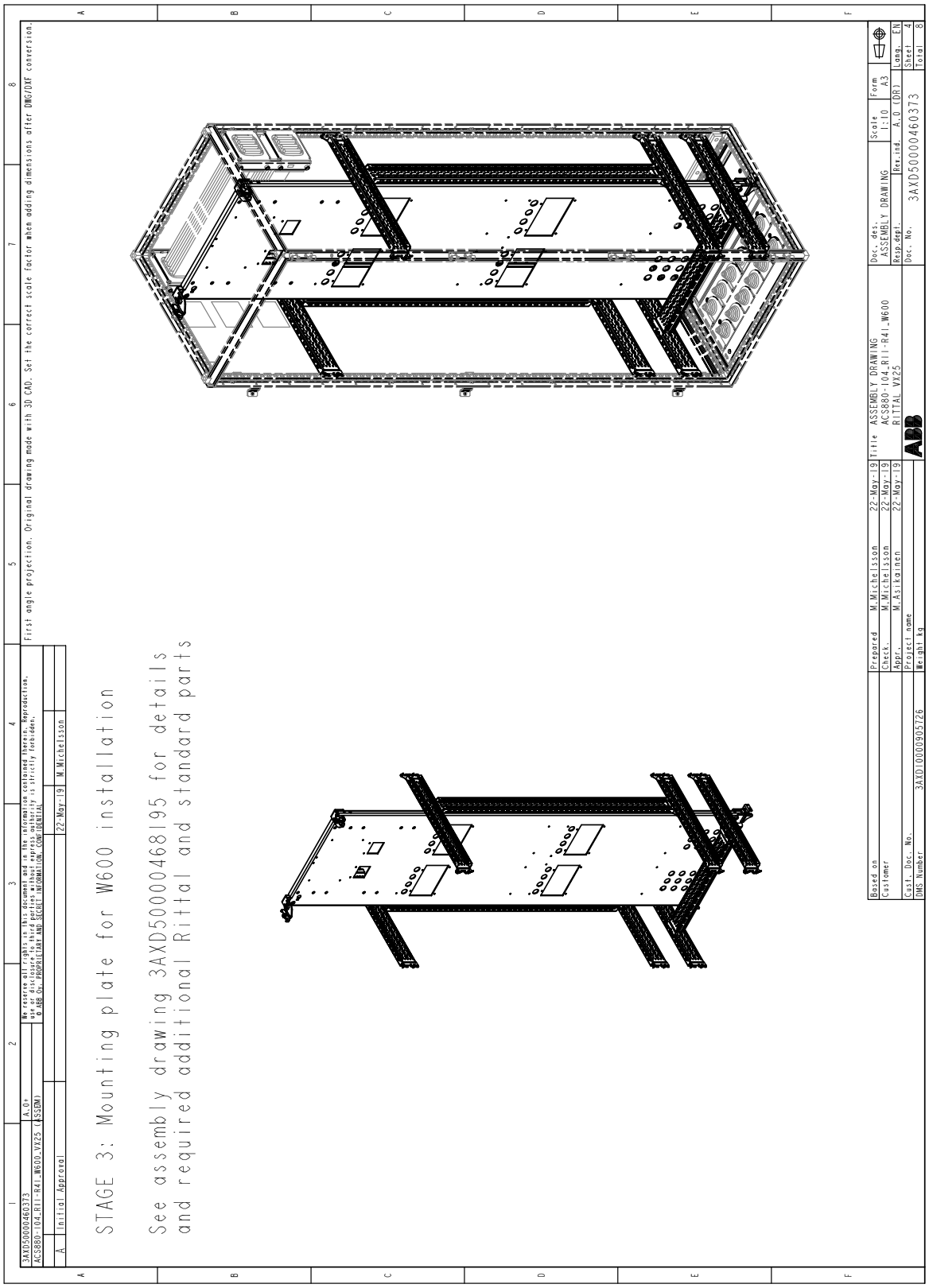
Stage 1: Instalation of common parts



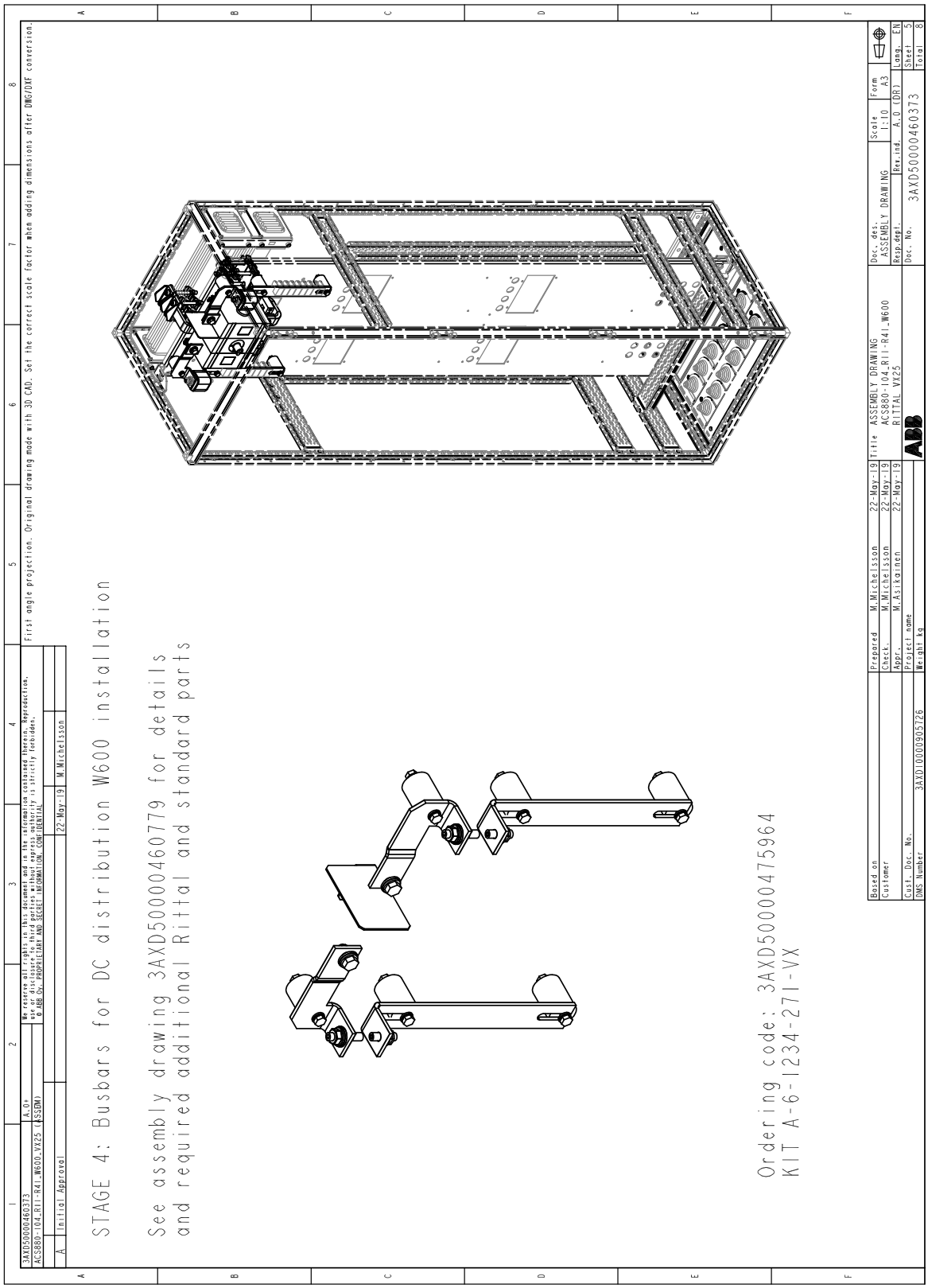
Stage 2: Installation of bottom plate



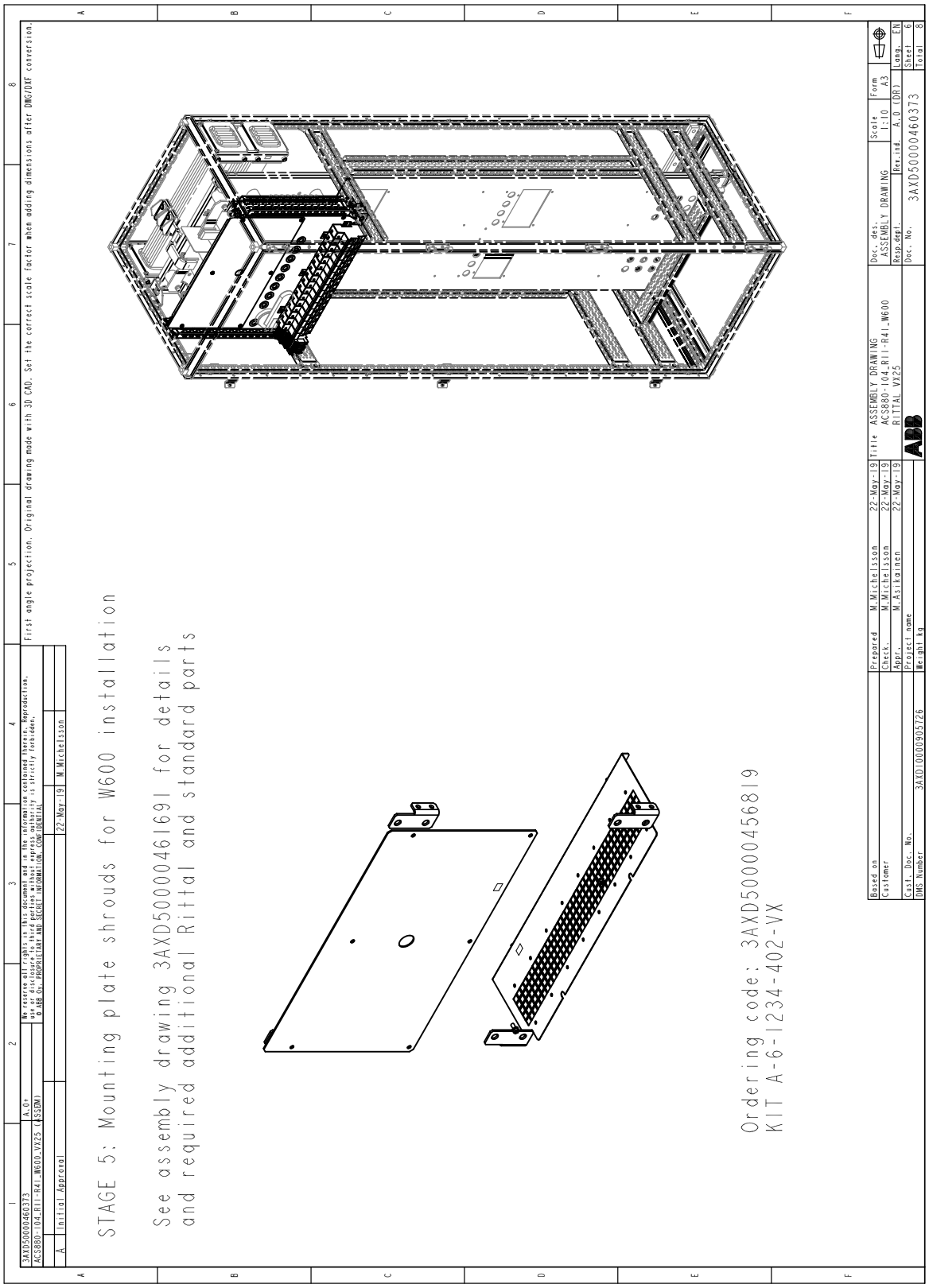
Stage 3: Installation of mounting plate



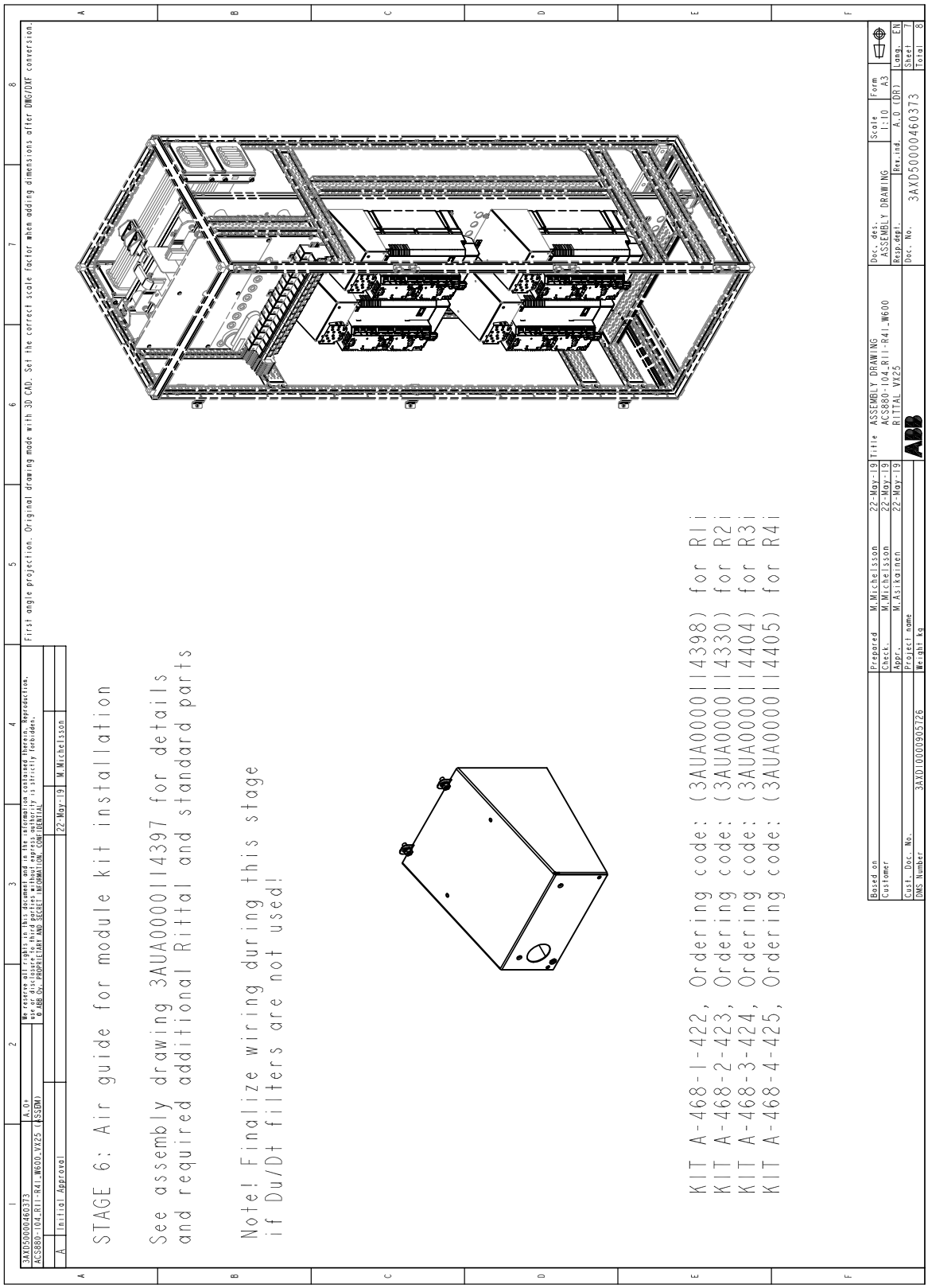
Stage 4: Installation of DC busbars



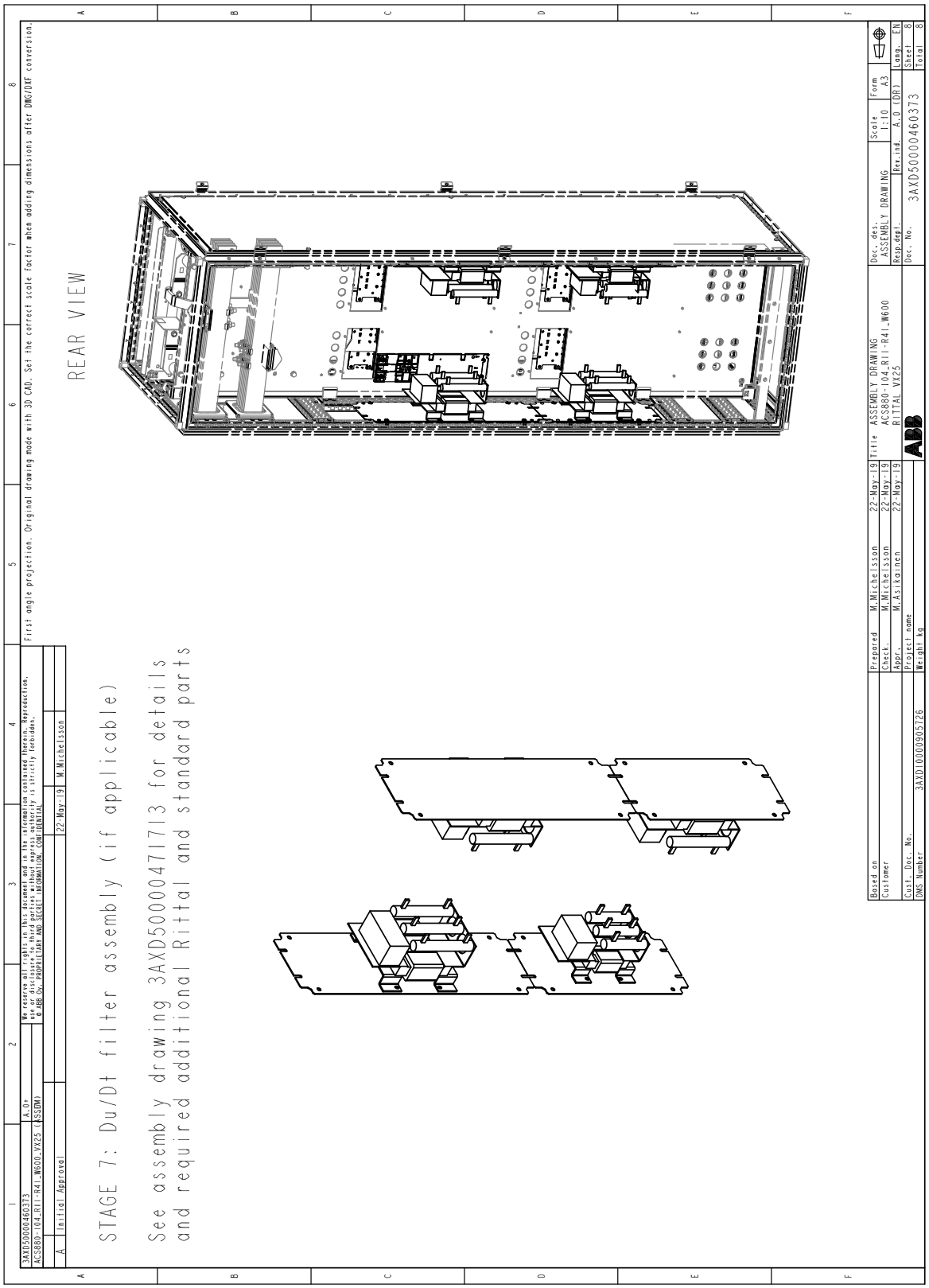
Stage 5: Installation of mounting plate shrouds



Stage 6: Installation of inverter modules and air guides

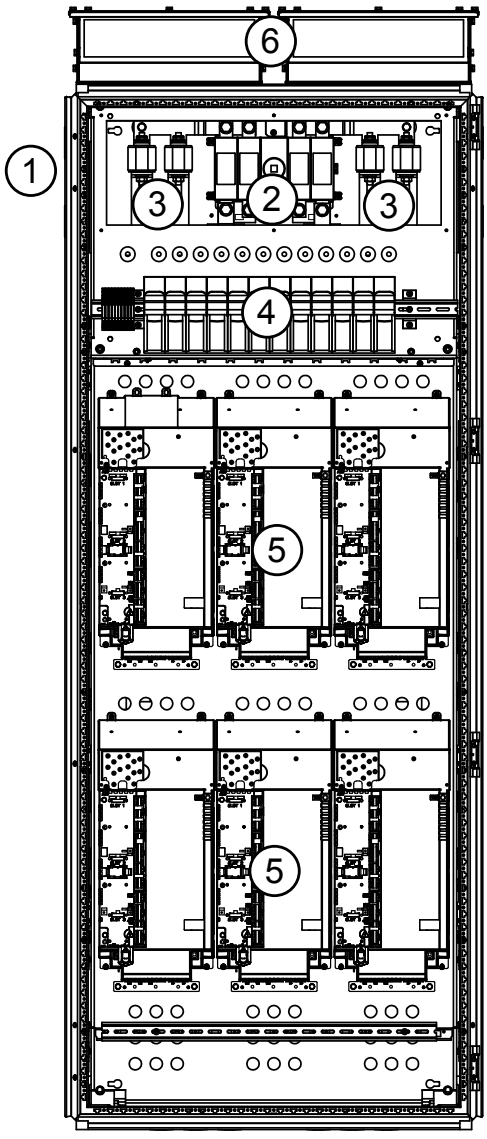


Stage 7: Installation of du/dt filter



R1i…R4i modules in a 800 mm wide Rittal VX25 enclosure

A maximum of twelve frame R1i or R2i modules, or six frame R3i or R4i modules can be fitted into a 800 mm wide VX25 enclosure, but the number can be reduced by optional equipment.

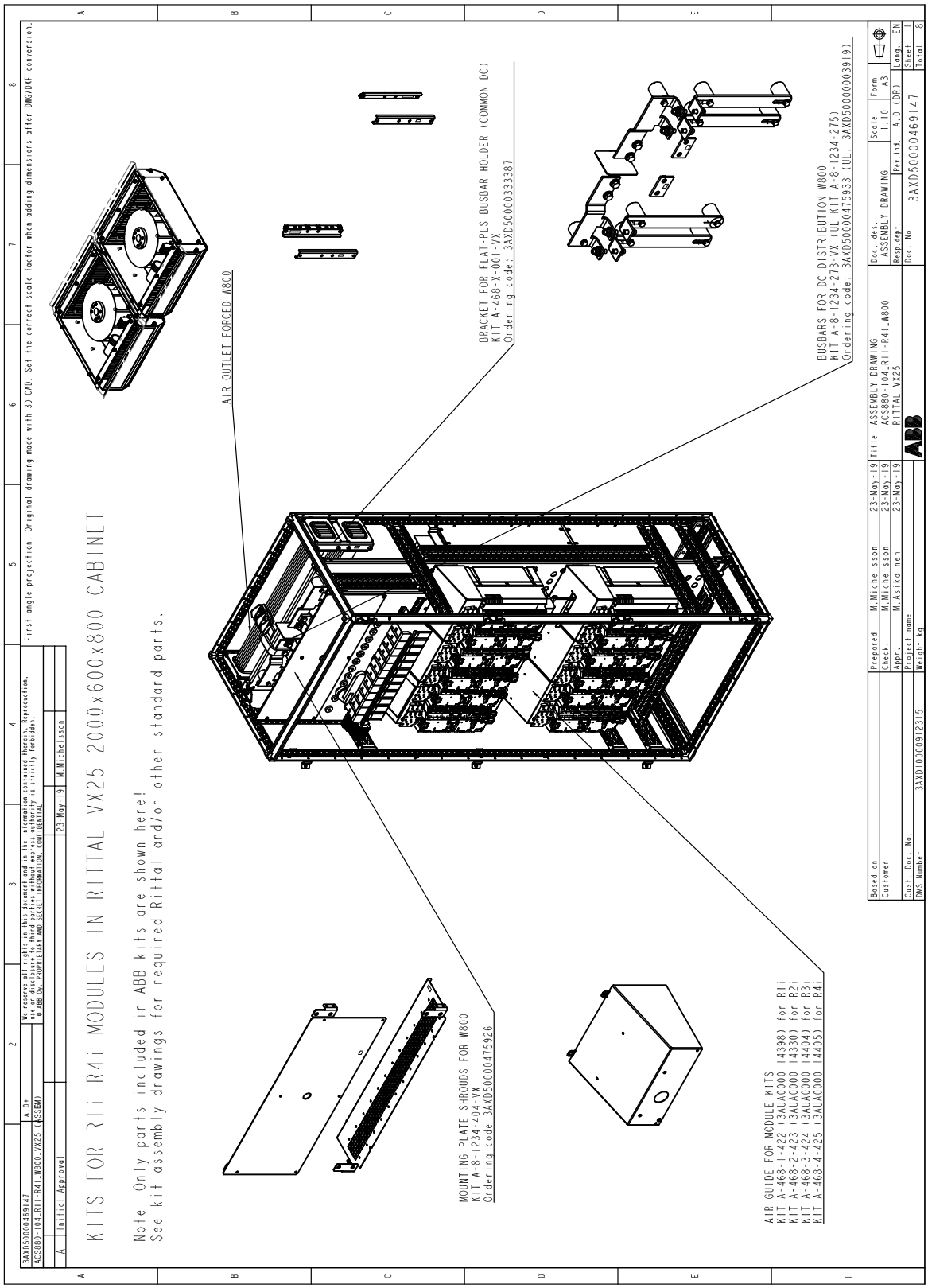


Description
Cubicle including: 1. DC input 2. DC switch/disconnector for all inverter modules 3. Main DC fuses 4. DC fuse disconnectors for each inverter module 5. Inverter modules 6. Air outlet with exhaust fan

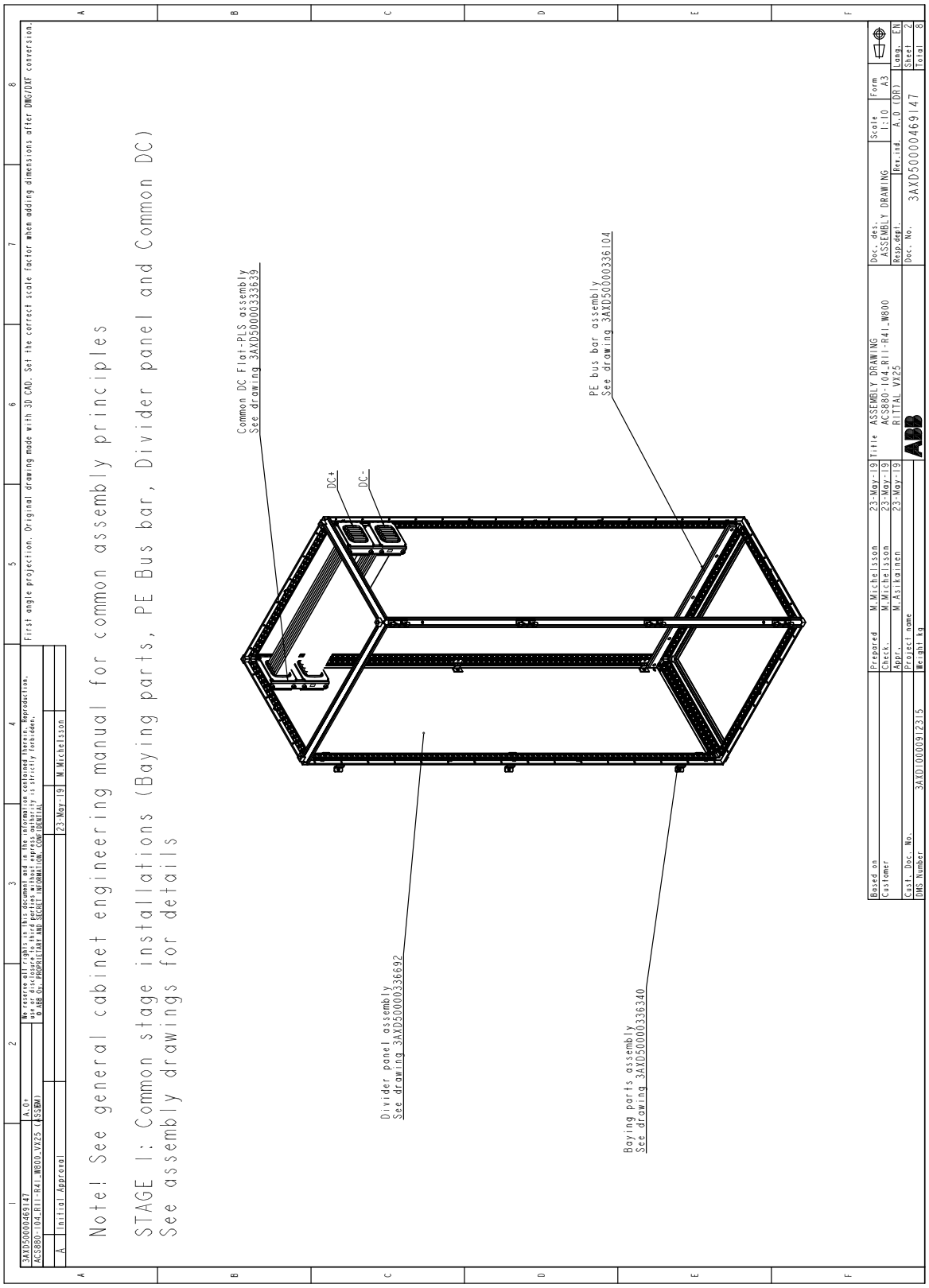
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbars	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2	Bottom plate	-	-	-
3	Mounting plate	3AXD50000474158	-	-
4	DC busbars	3AXD50000474516	A-8-1234-273-VX	3AXD50000475933
5	Mounting plate shrouds	3AXD50000474882	A-8-1234-404-VX	3AXD50000475926
6	Inverter modules and air guides:			
	R1i	3AUA0000114397	A-468-1-422	3AUA0000114398
	R2i	3AUA0000114397	A-468-2-423	3AUA0000114330
	R3i	3AUA0000114397	A-468-3-424	3AUA0000114404
	R4i	3AUA0000114397	A-468-4-425	3AUA0000114405
7	du/dt filters	3AXD50000475810	-	See *AC-side components (page 236)*

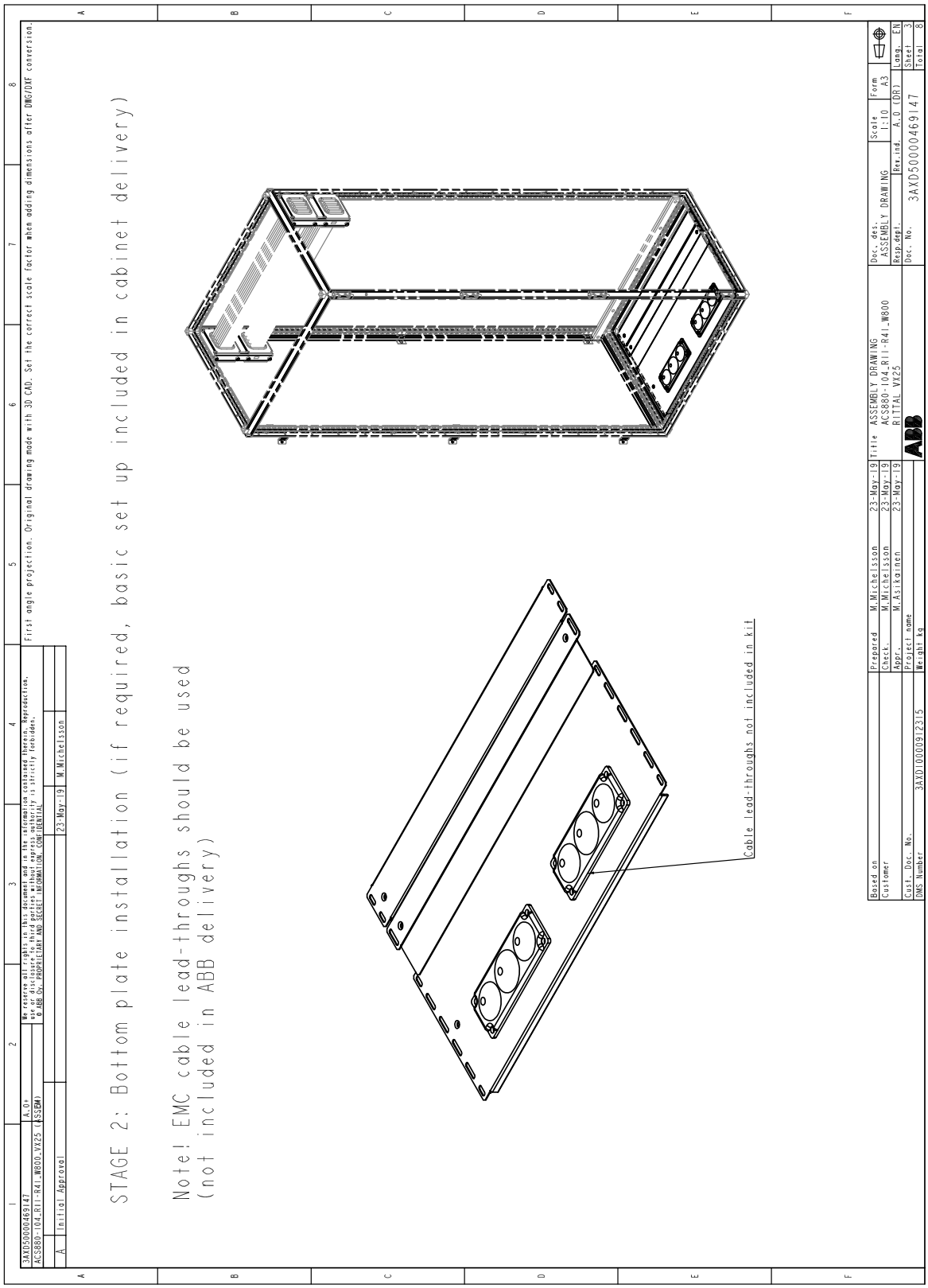
Overview of kits



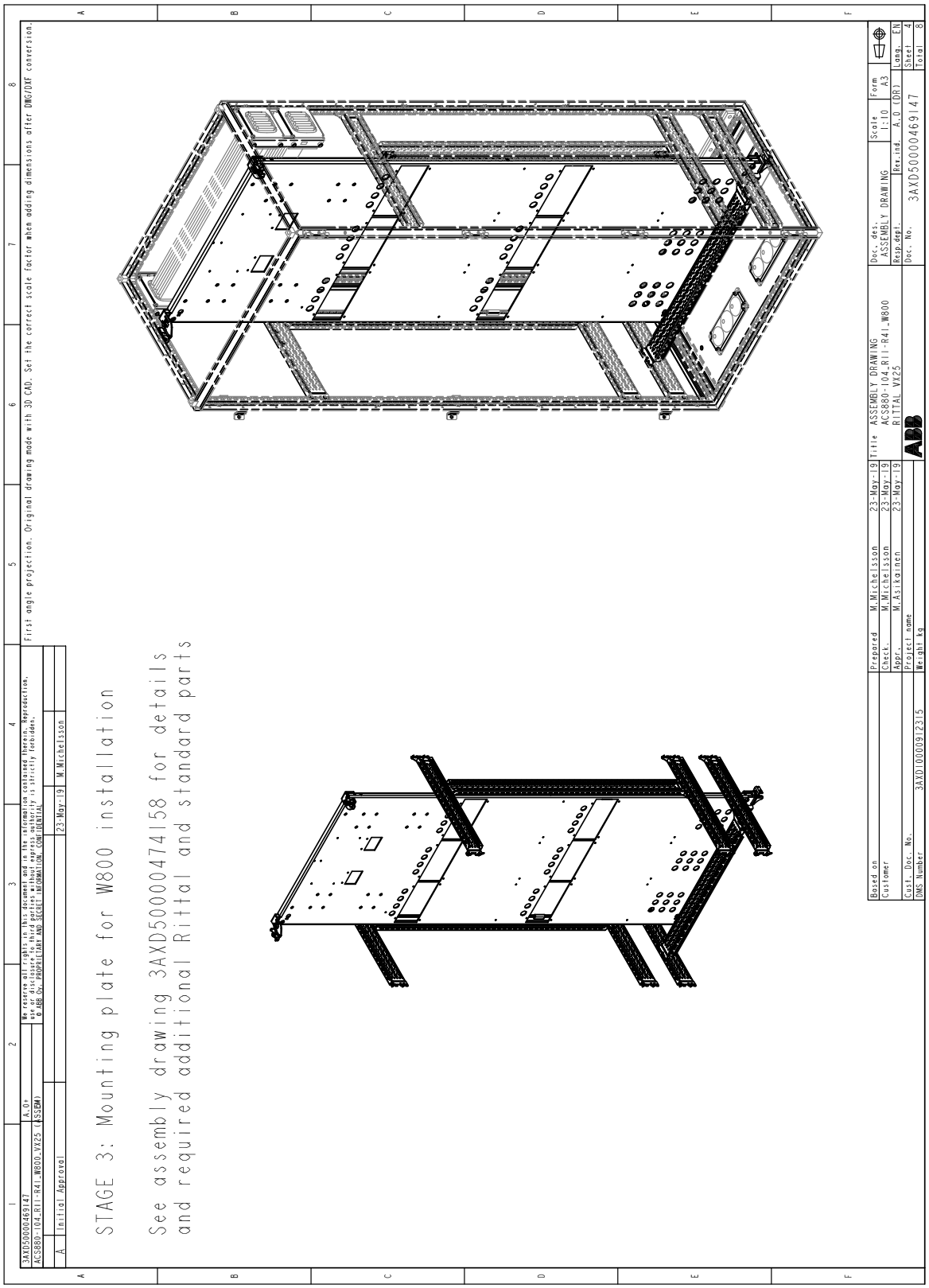
Stage 1: Installation of common parts



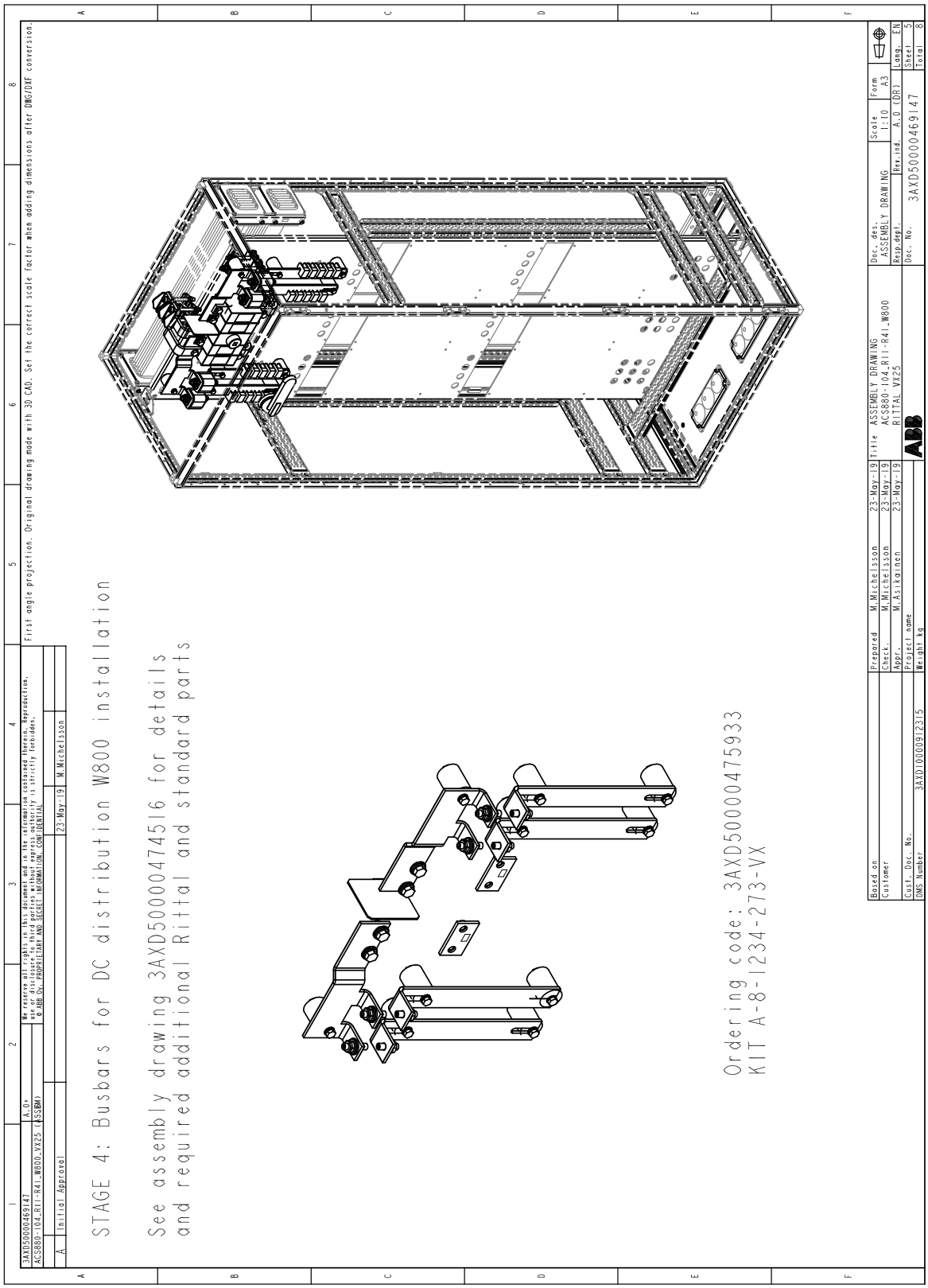
Stage 2: Installation of bottom plate



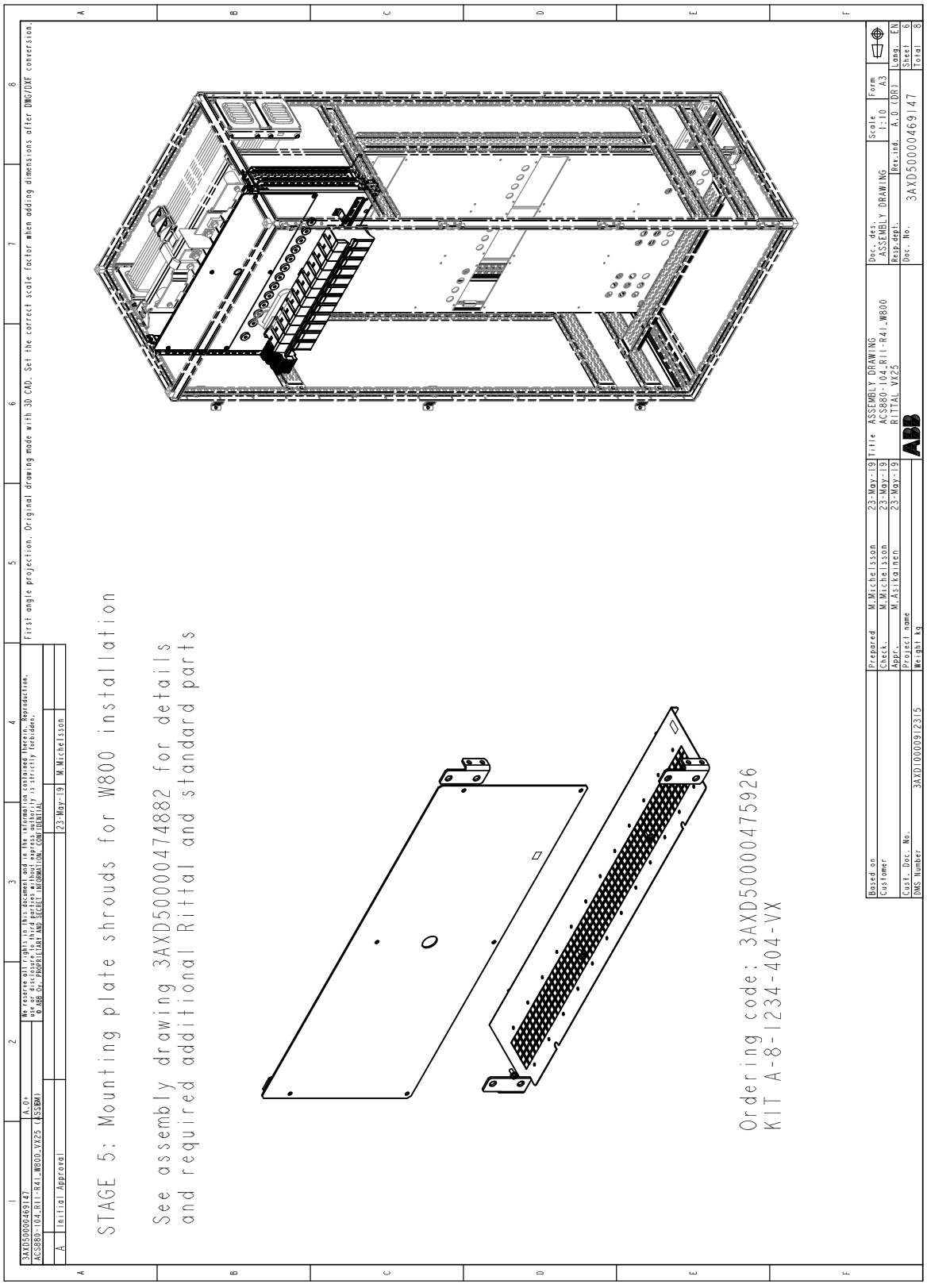
Stage 3: Installation of mounting plate



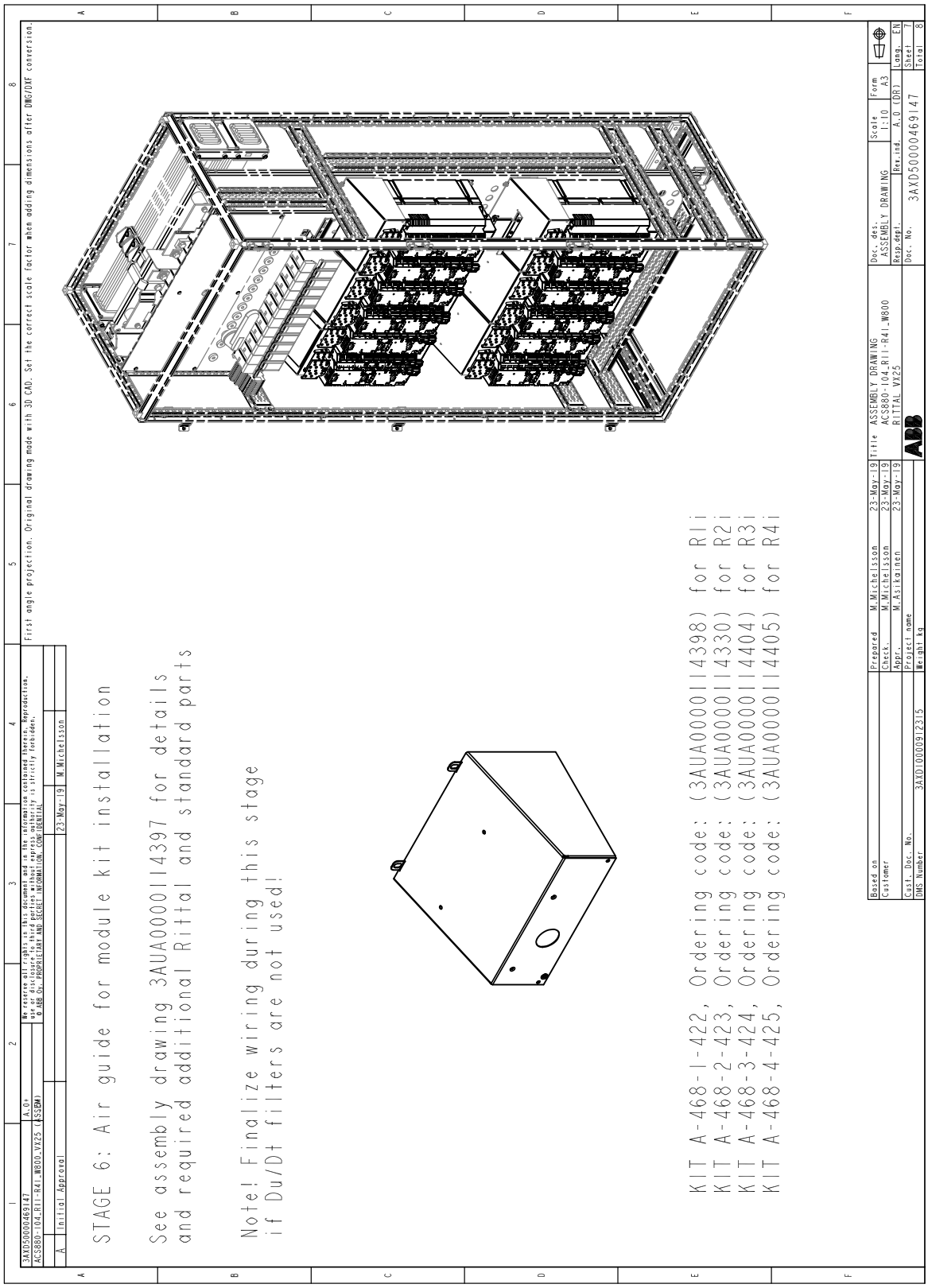
Stage 4: Installation of DC busbars



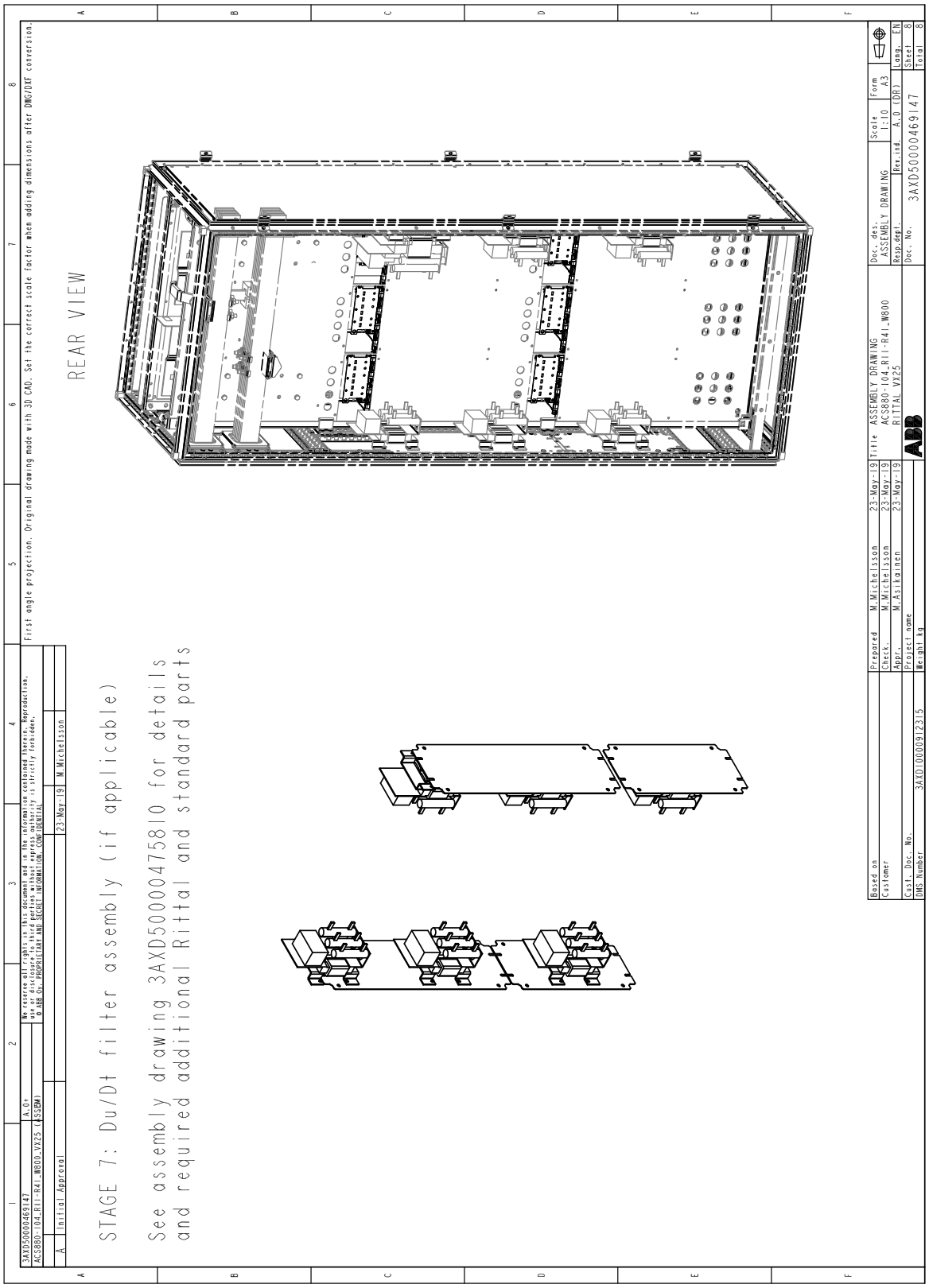
Stage 5: Installation of mounting plate shrouds



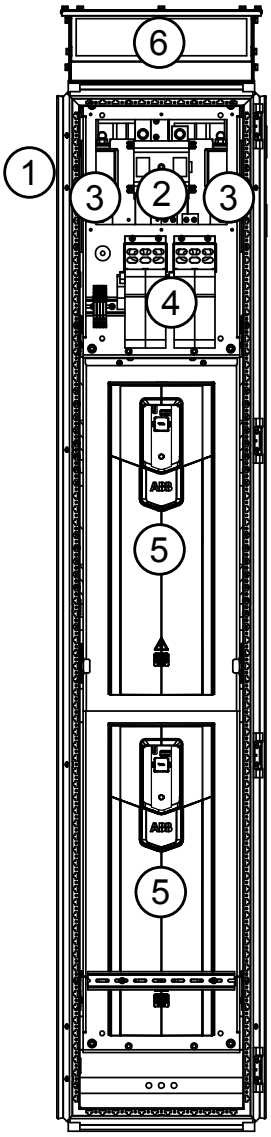
Stage 6: Installation of inverter modules and air guides



Stage 7: Installation of du/dt filters



R5i modules in a 400 mm wide Rittal VX25 enclosure

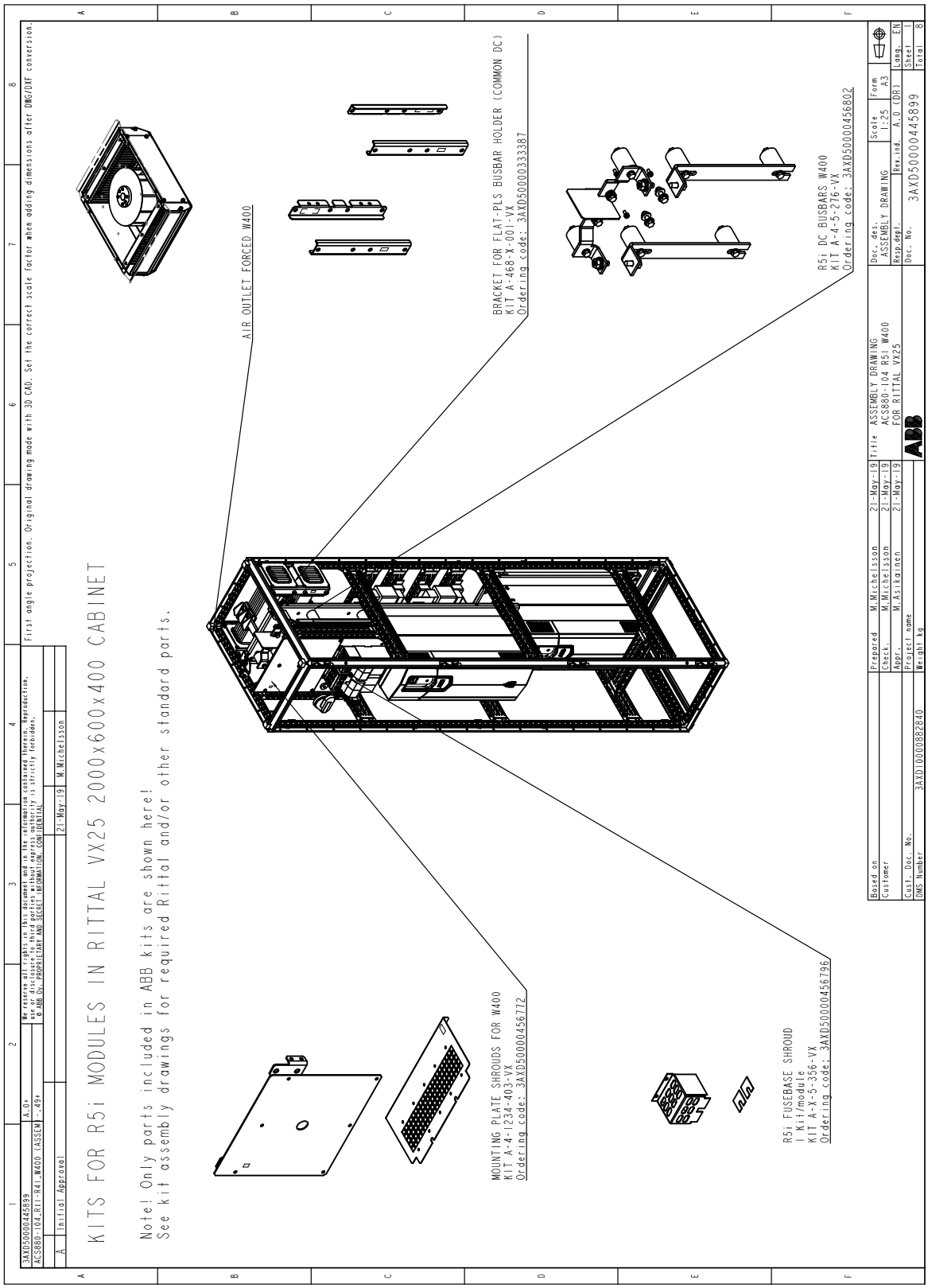


Description
Cubicle including: 1. DC input 2. DC switch/disconnector for all inverter modules 3. Main DC fuses 4. DC fuse disconnectors for each inverter module 5. Inverter modules 6. Air outlet with exhaust fan

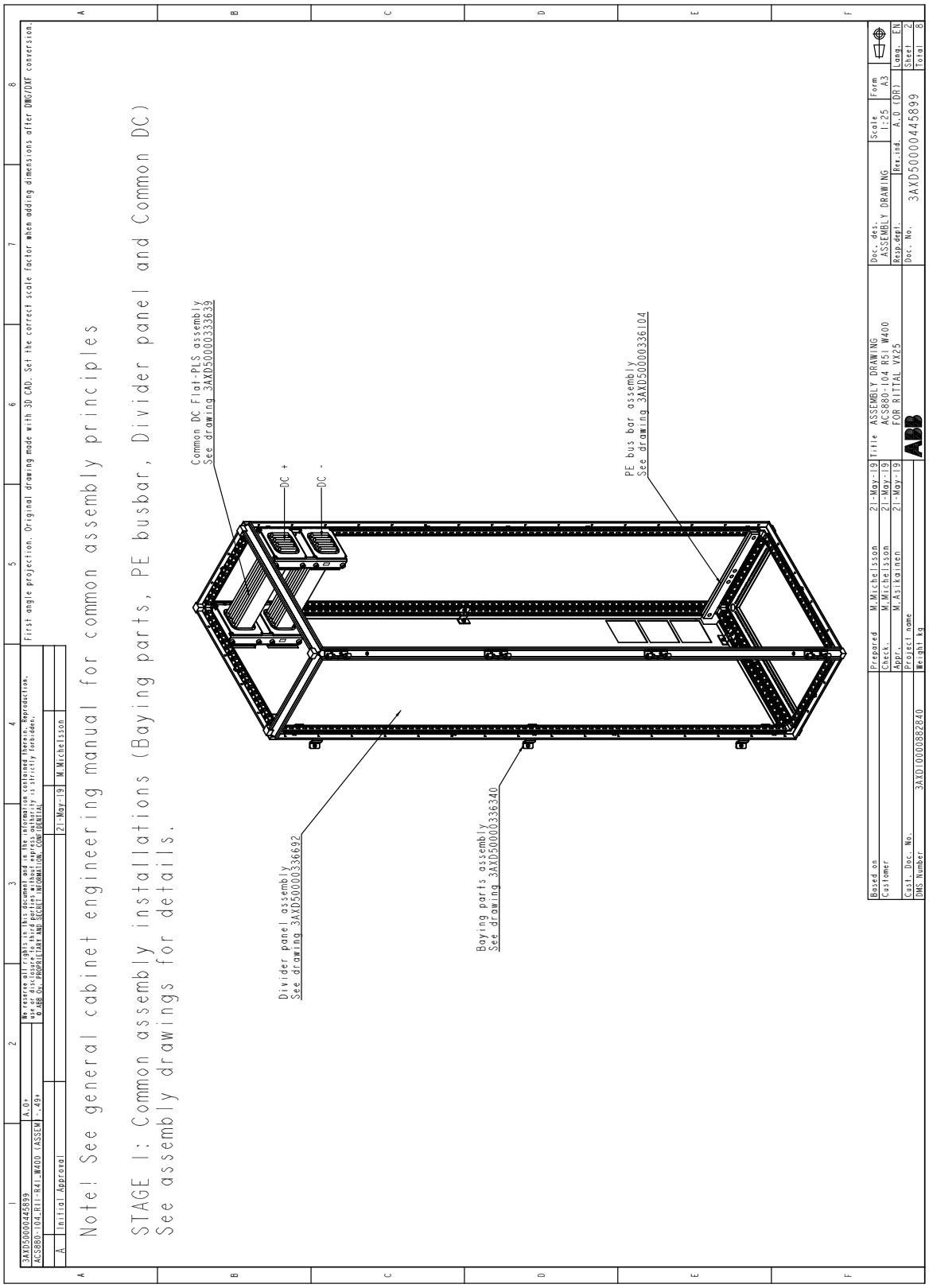
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbars	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2	Bottom plate	-	-	-
3	Mounting plate	3AXD50000455188	-	-
4	DC busbars	3AXD50000458110	A-4-5-276-VX	3AXD50000456802
5	Mounting plate shrouds	3AXD50000450060	A-4-1234-403-VX	3AXD50000456772
	Fuse base shroud	3AXD50000458424	A-X-5-356-VX	3AXD50000456796
6	Inverter modules	-	-	-
7	du/dt filters	3AXD50000462094	-	See *AC-side components (page 236)*

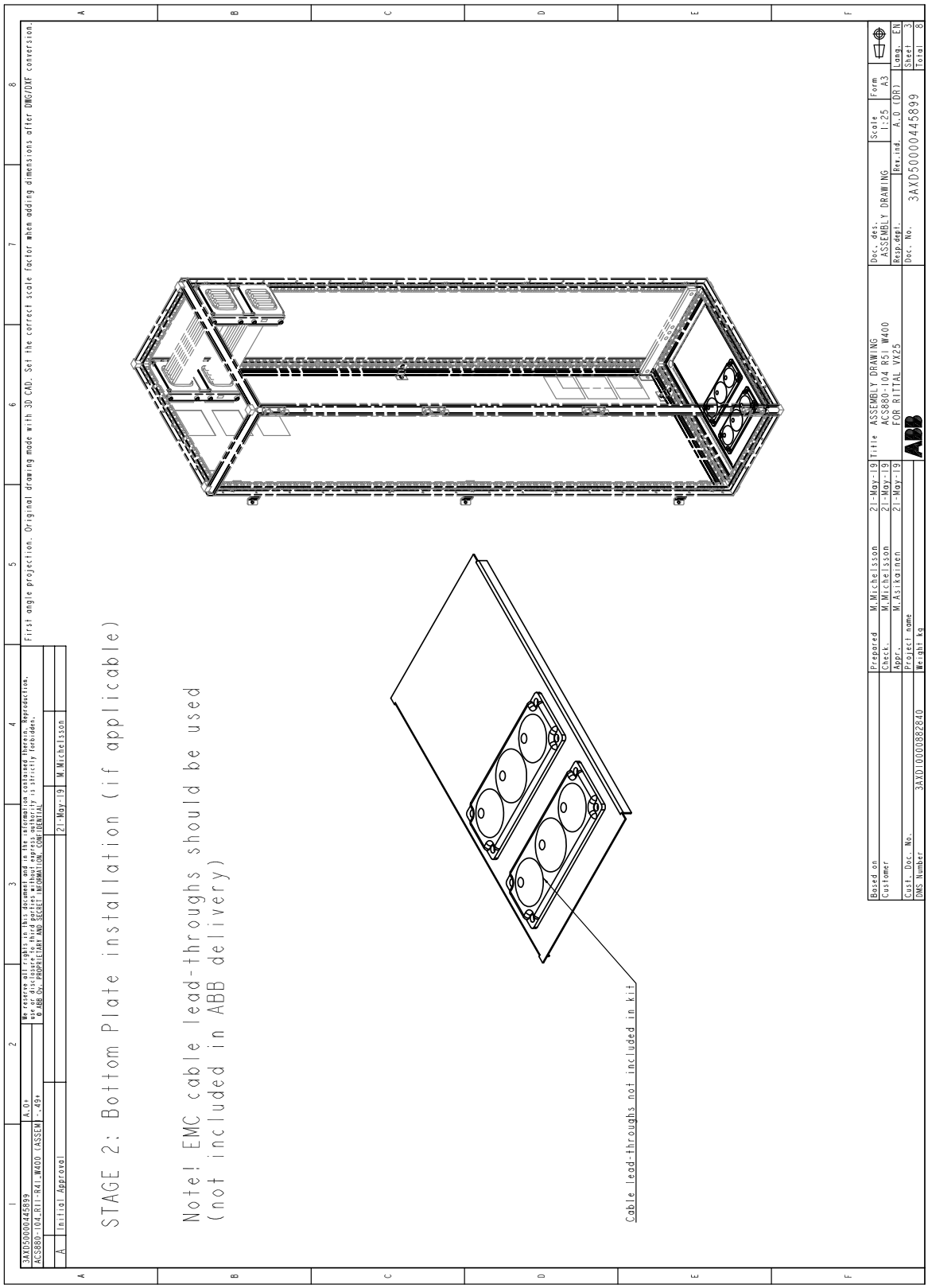
Overview of kits



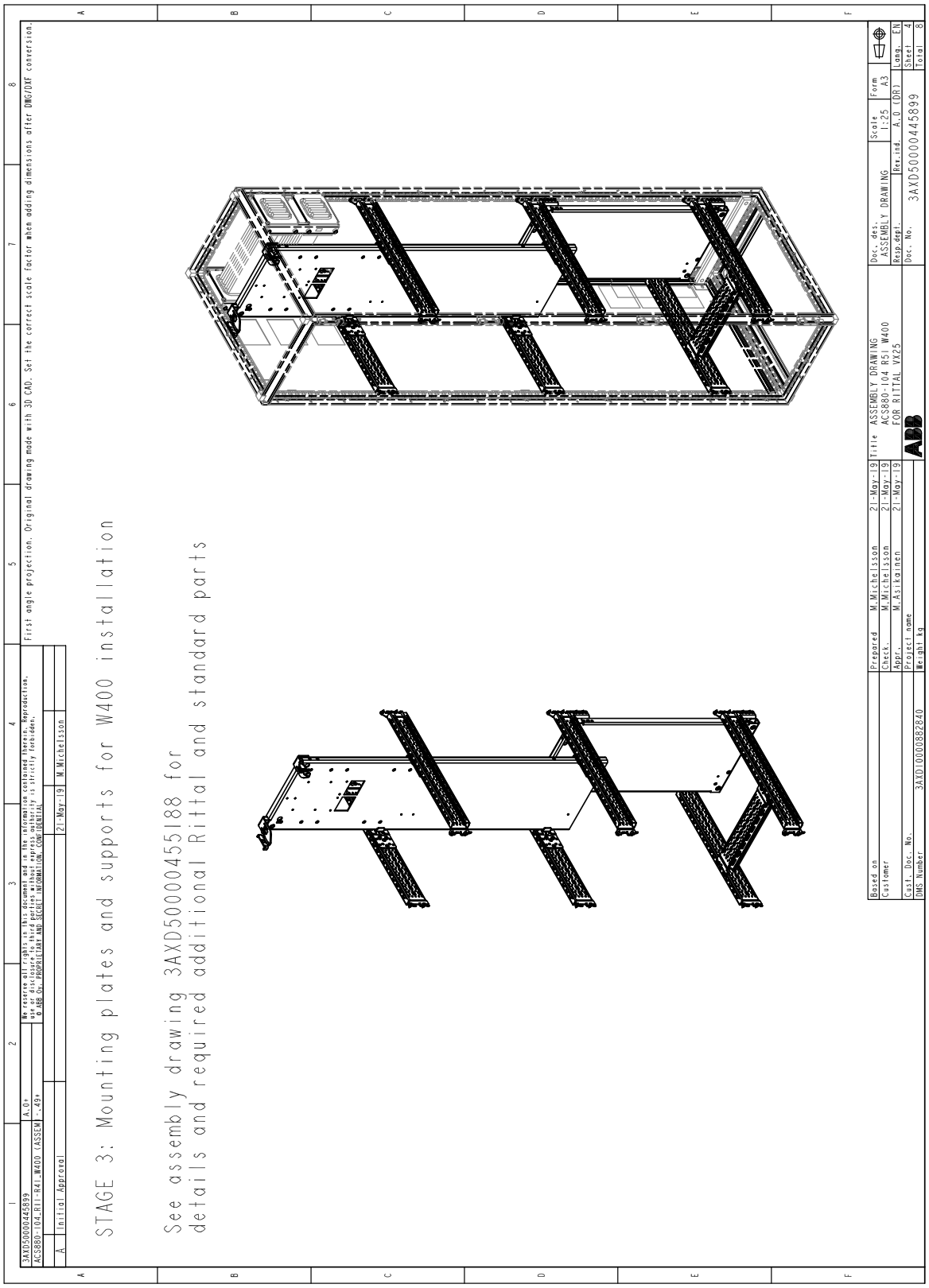
Stage 1: Installation of common parts



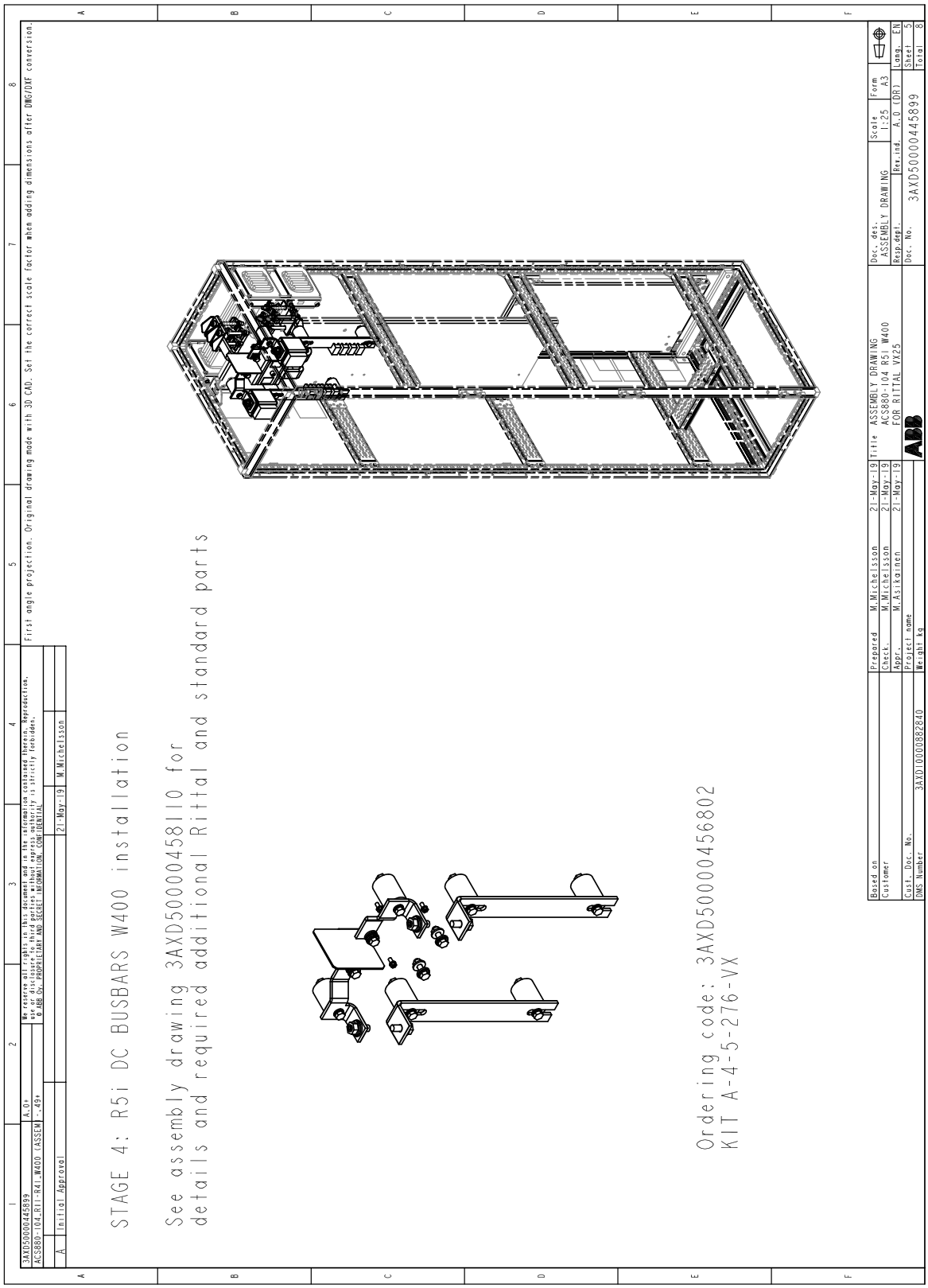
Stage 2: Installation of bottom plate



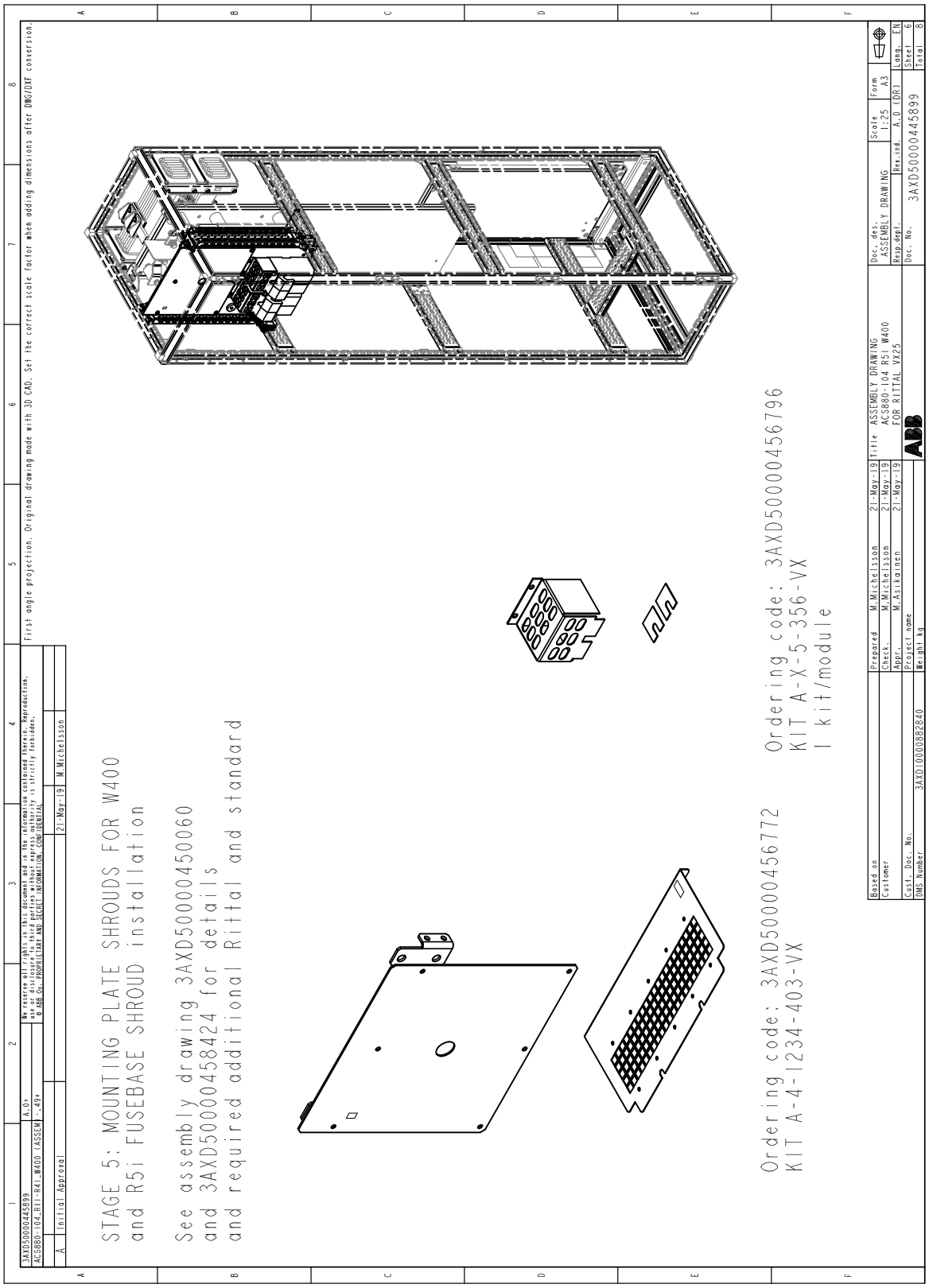
Stage 3: Installation of inverter module mounting plate



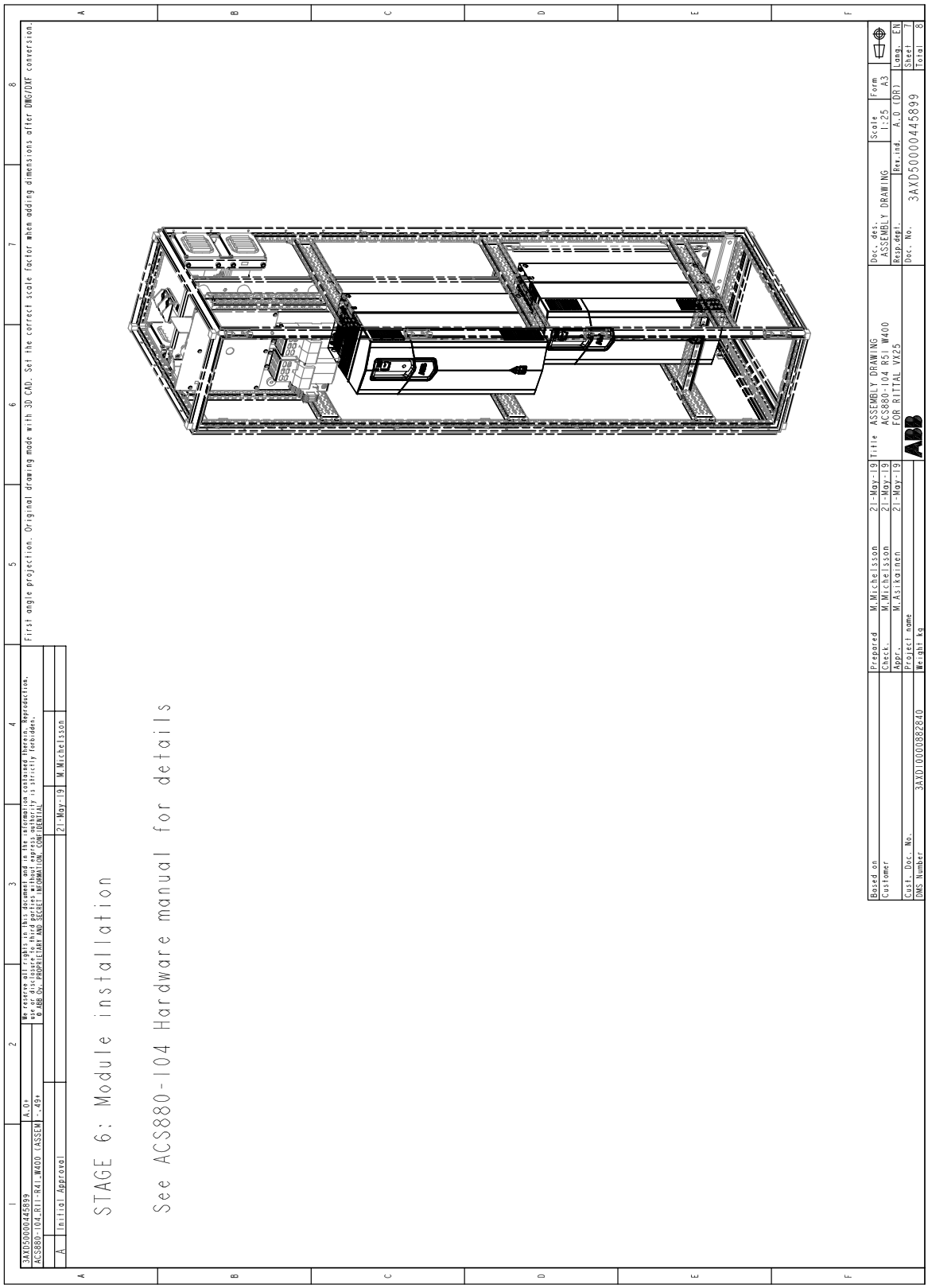
Stage 4: Installation of DC busbars



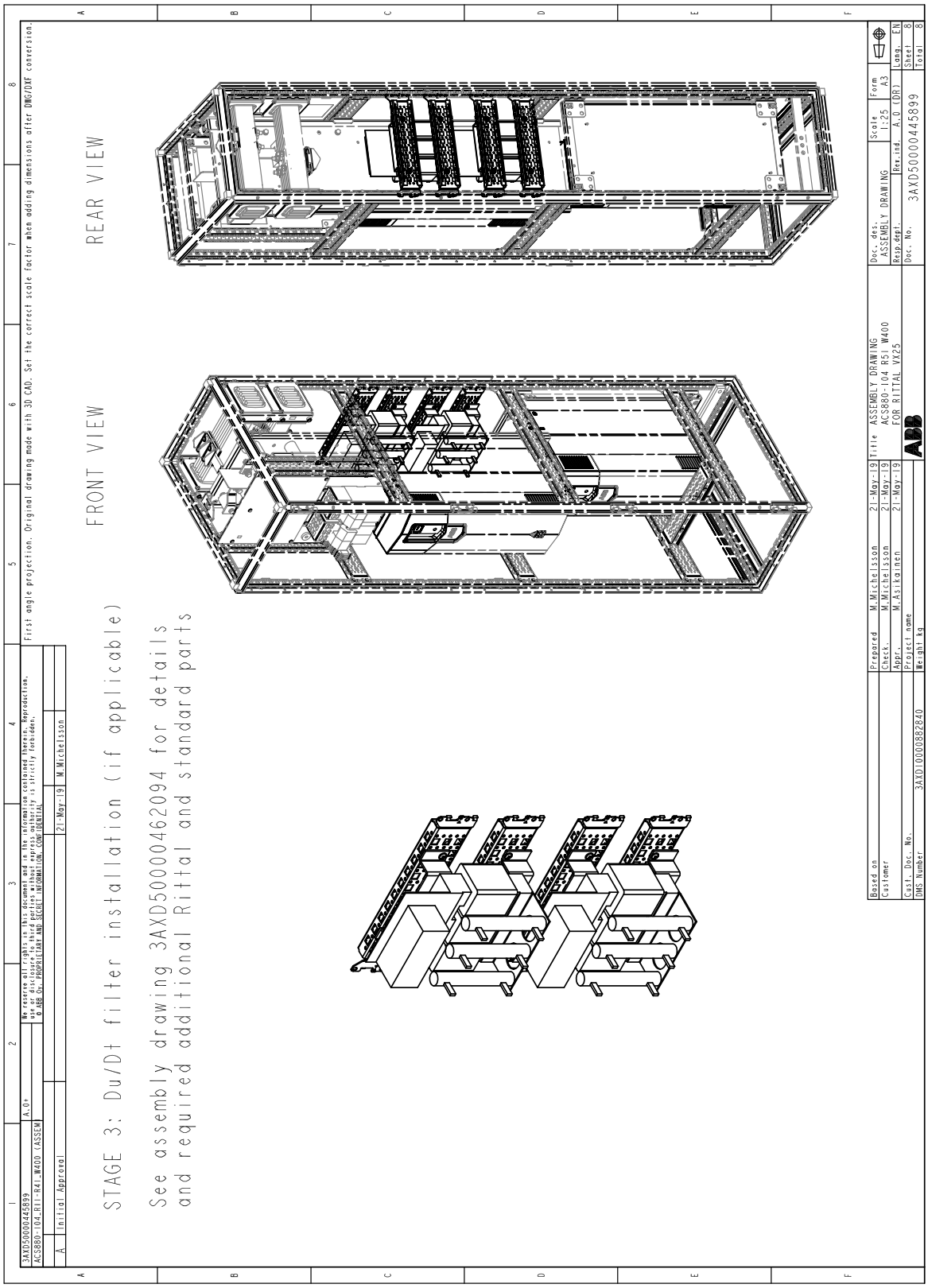
Stage 5: Installation of front mounting plate



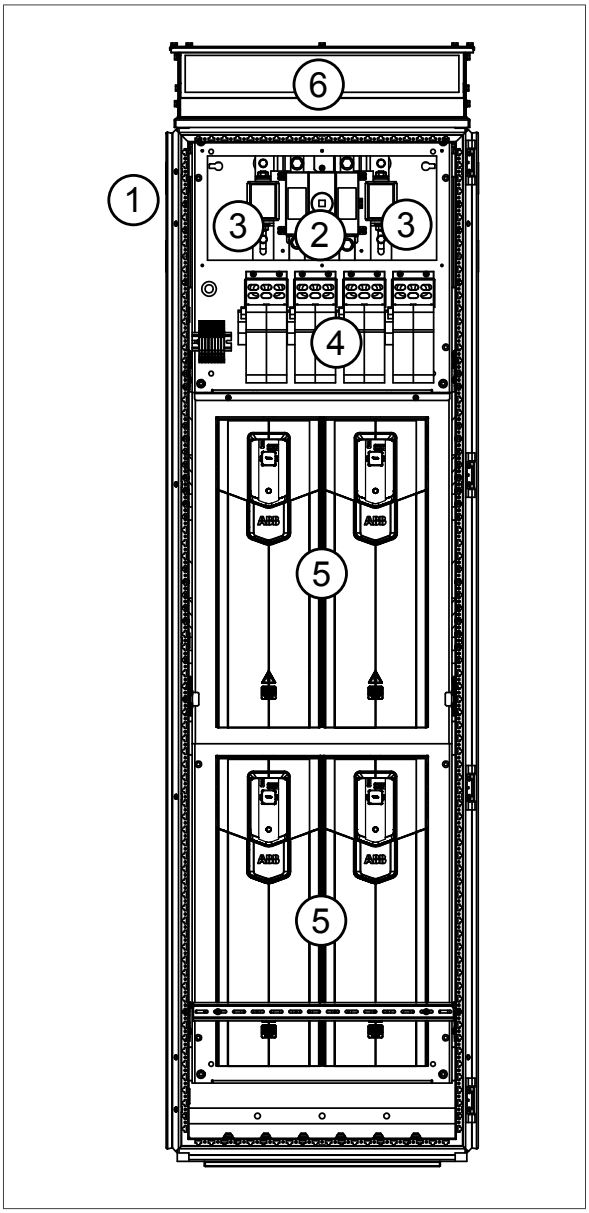
Stage 6: Installation of inverter modules



Stage 7: Installation of du/dt filters



R5i modules in a 600 mm wide Rittal VX25 enclosure

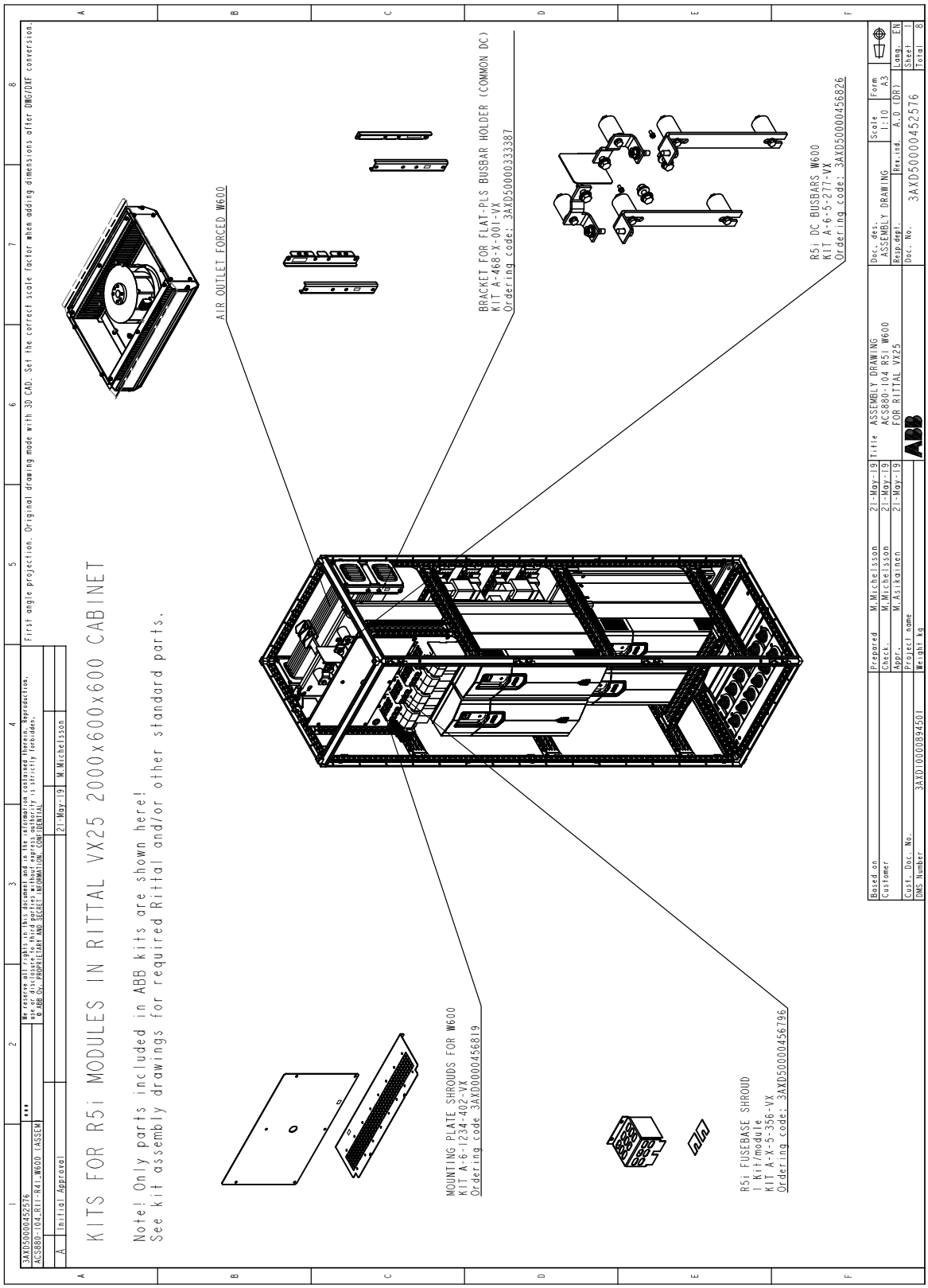


Description
Cubicle including: 1. DC input 2. DC switch/disconnector for all inverter modules 3. Main DC fuses 4. DC fuse disconnectors for each inverter module 5. Inverter modules 6. Air outlet with exhaust fan

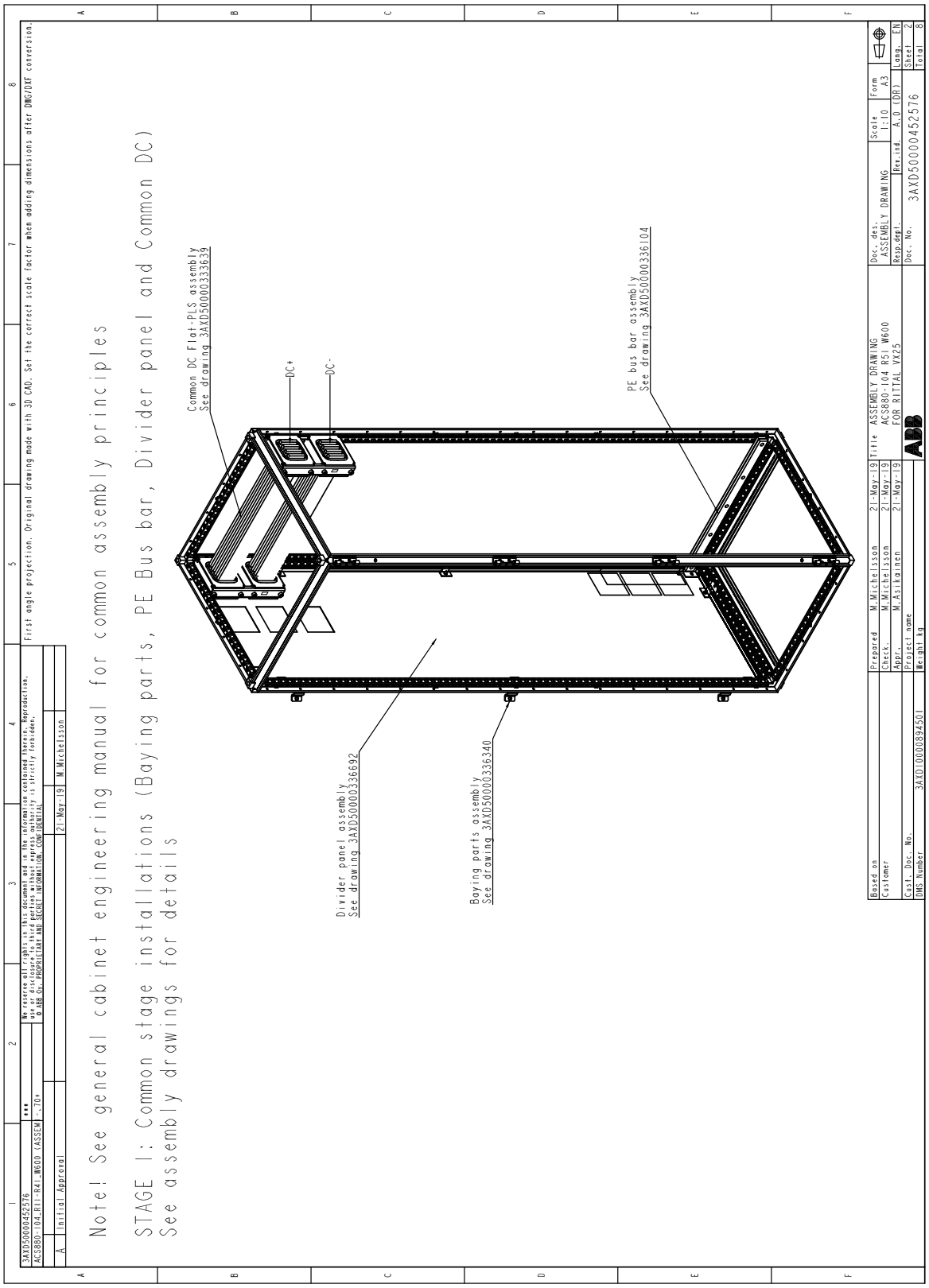
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbars	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC bus support kit	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2	Bottom plate	-	-	-
3	Mounting plate	3AXD50000455188	-	-
4	DC busbars	3AXD50000461332	A-6-5-277-VX	3AXD50000456826
5	Mounting plate shrouds	3AXD50000461691	A-6-1234-402-VX	3AXD50000456819
	Fuse base shroud	3AXD50000458424	A-X-5-356-VX	3AXD50000456796
6	Inverter modules	-	-	-
7	du/dt filters	3AXD50000462094	-	See *AC-side components (page 236)*

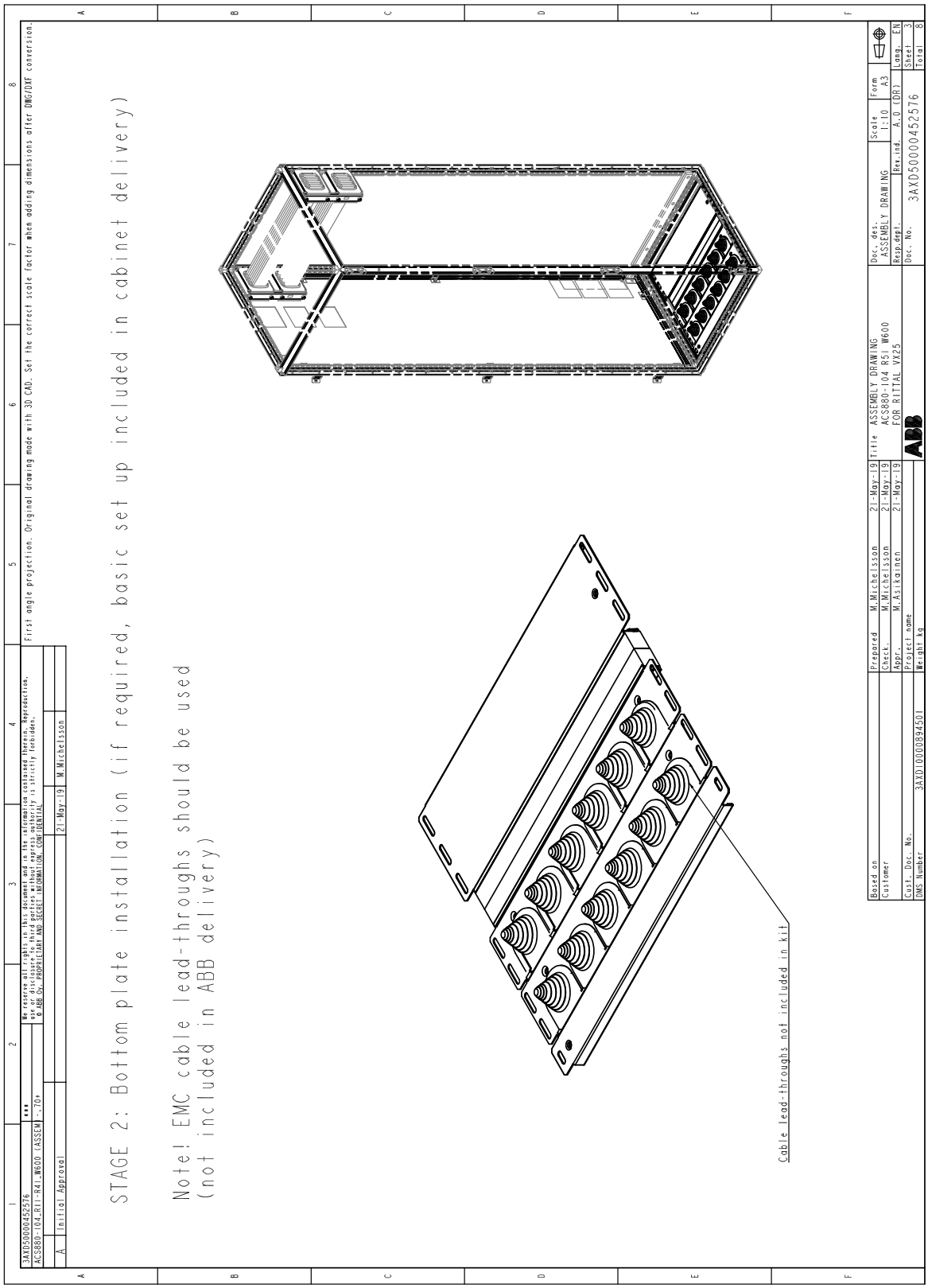
Overview of kits



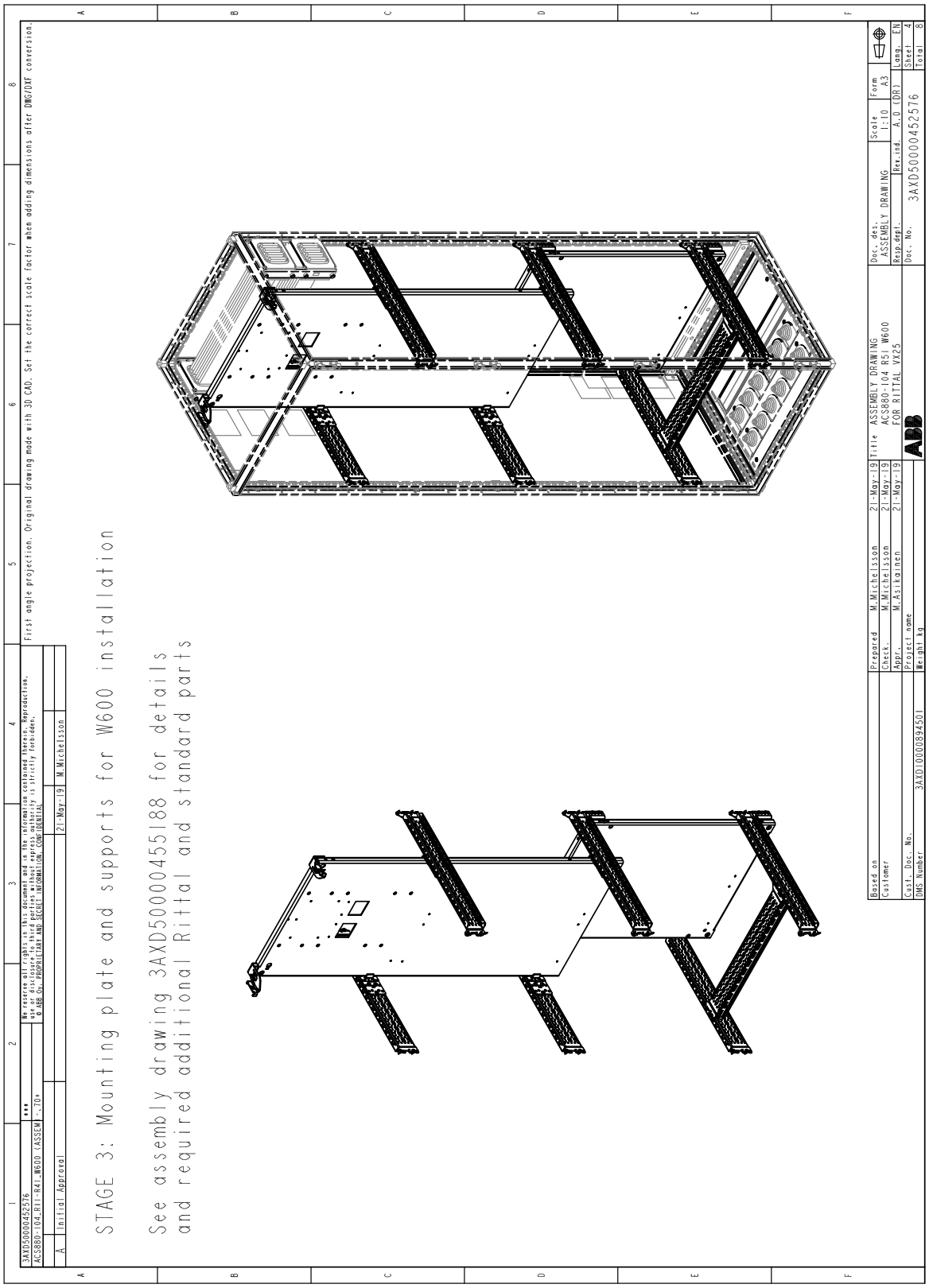
Stage 1: Installation of common parts



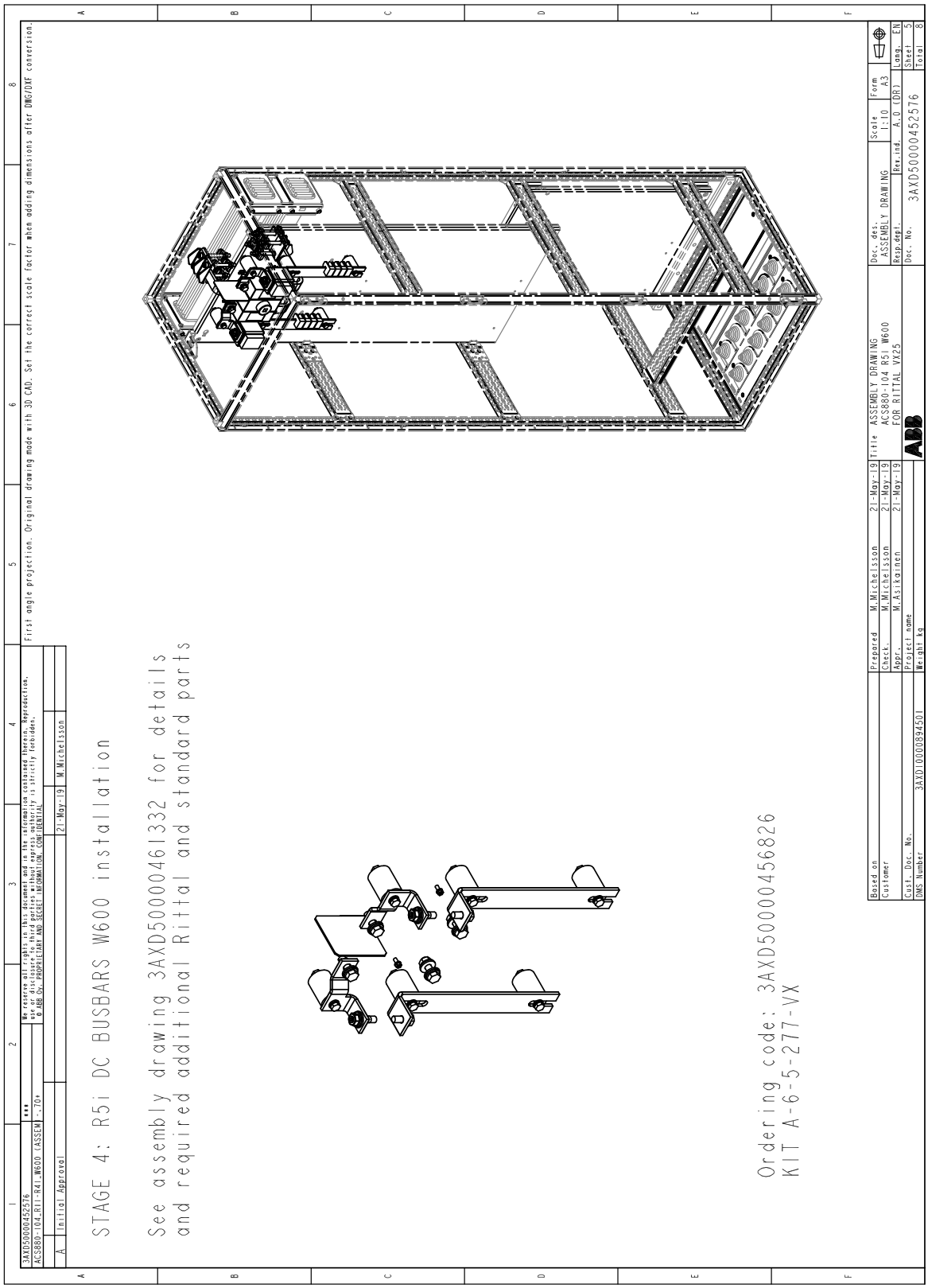
Stage 2: Installation of bottom plate



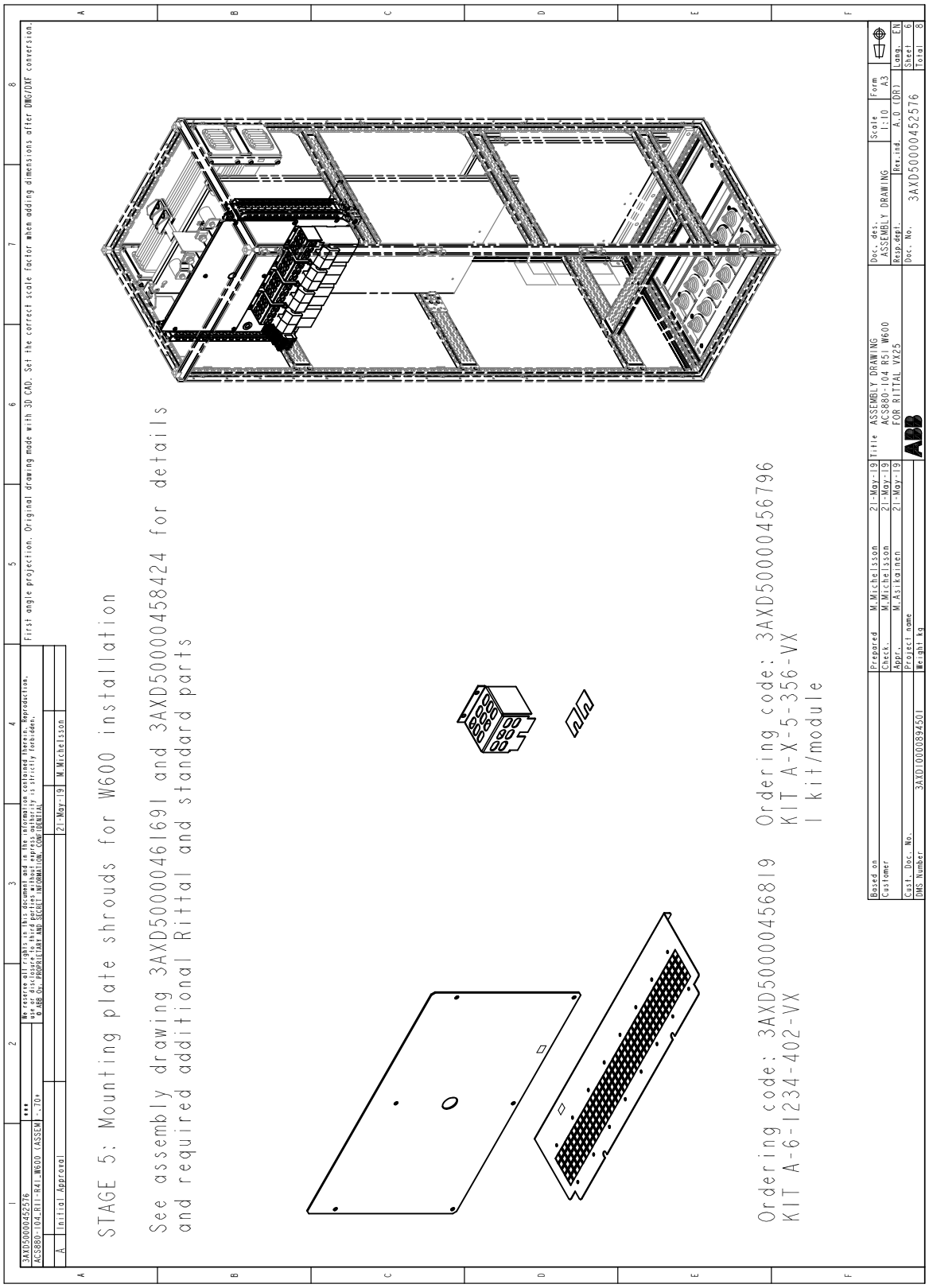
Stage 3: Installation of inverter module mounting plate



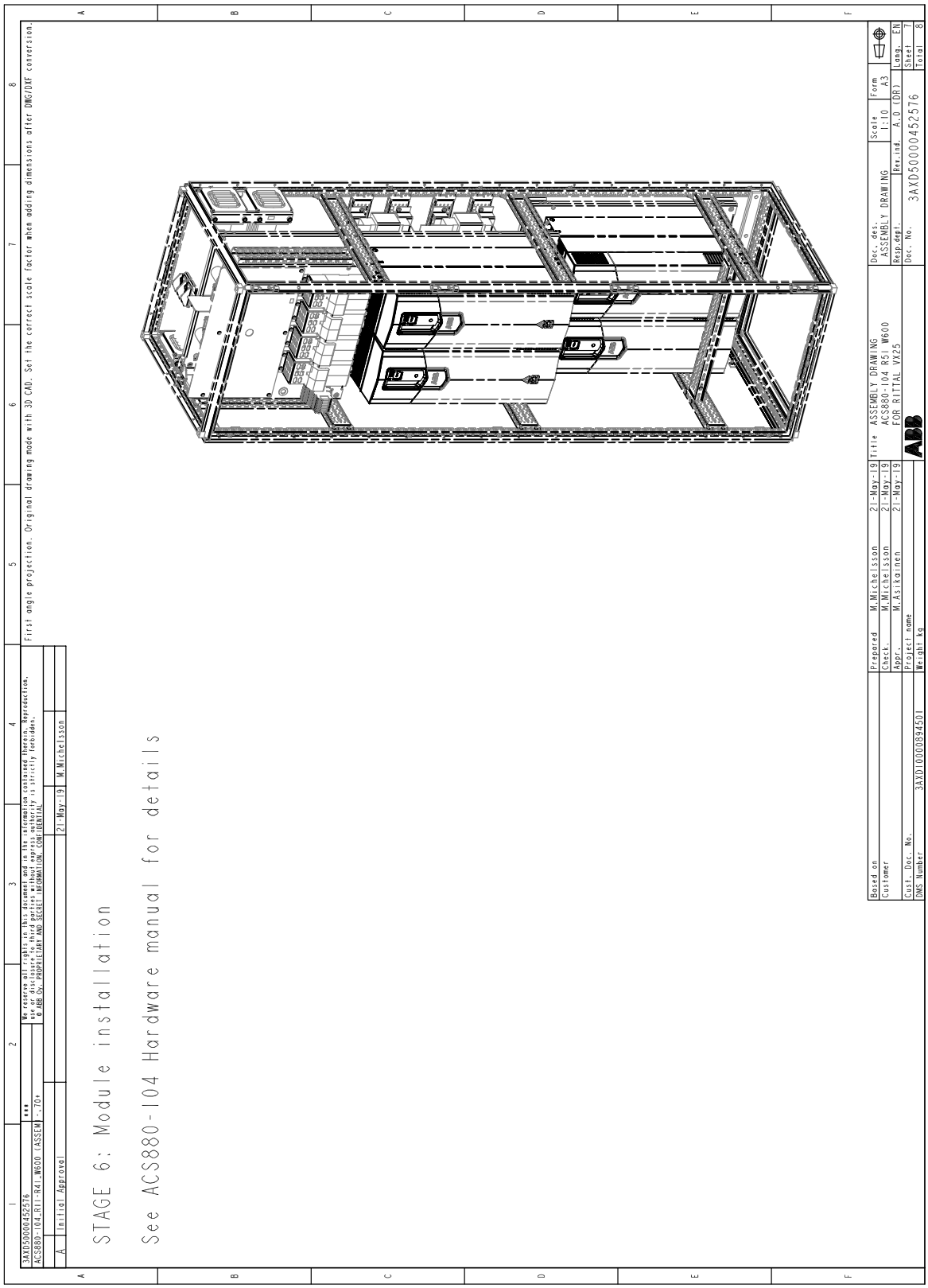
Stage 4: Installation of DC busbars



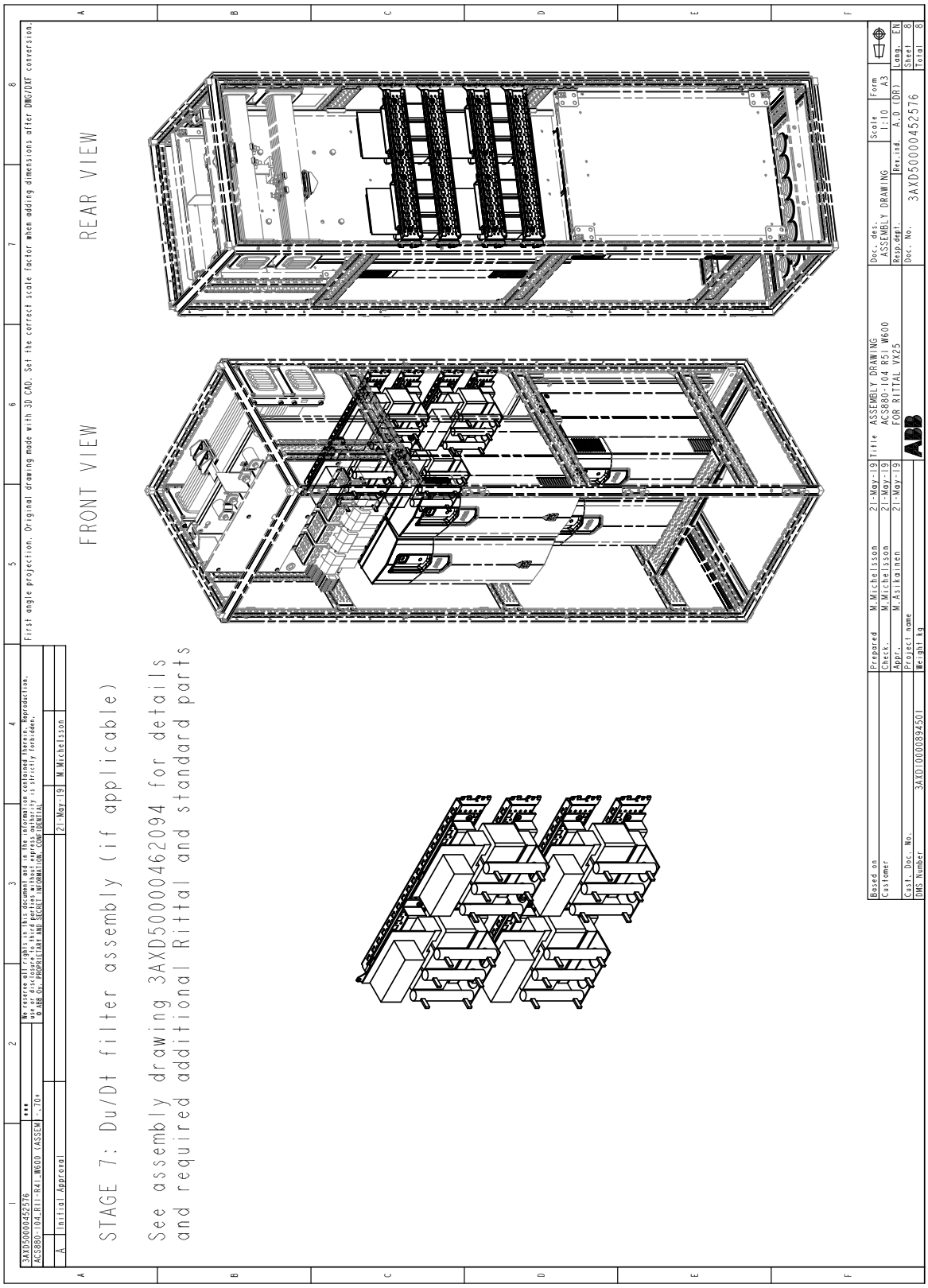
Stage 5: Installation of front mounting plate



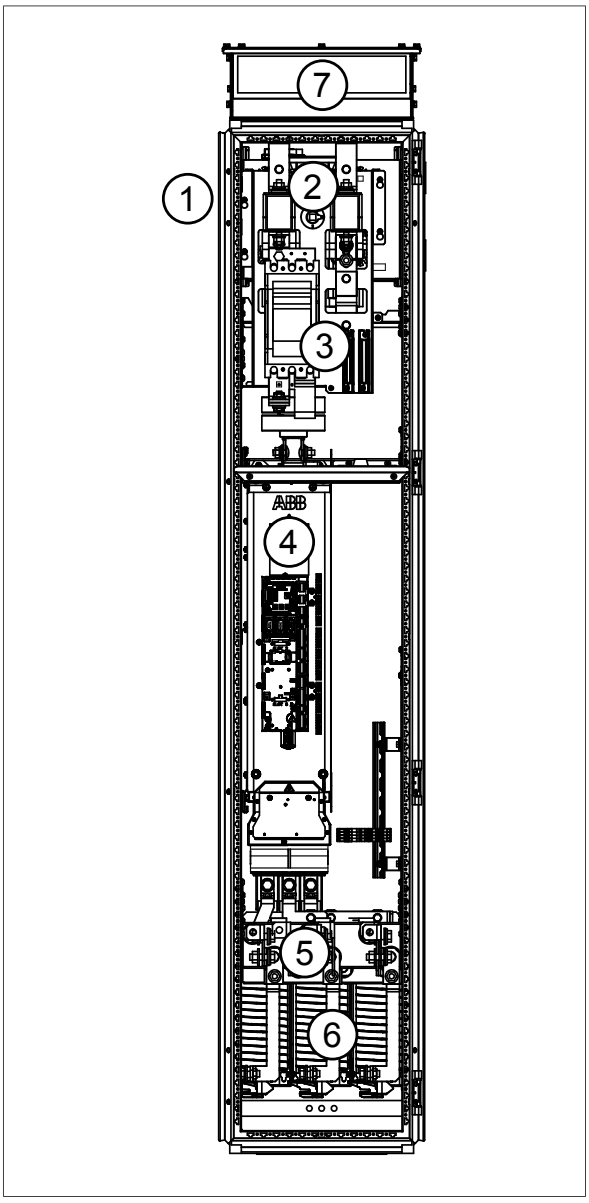
Stage 6: Installation of inverter modules



Stage 7: Installation of du/dt filters



One R6i/R7i module in a 400 mm wide Rittal VX25 enclosure

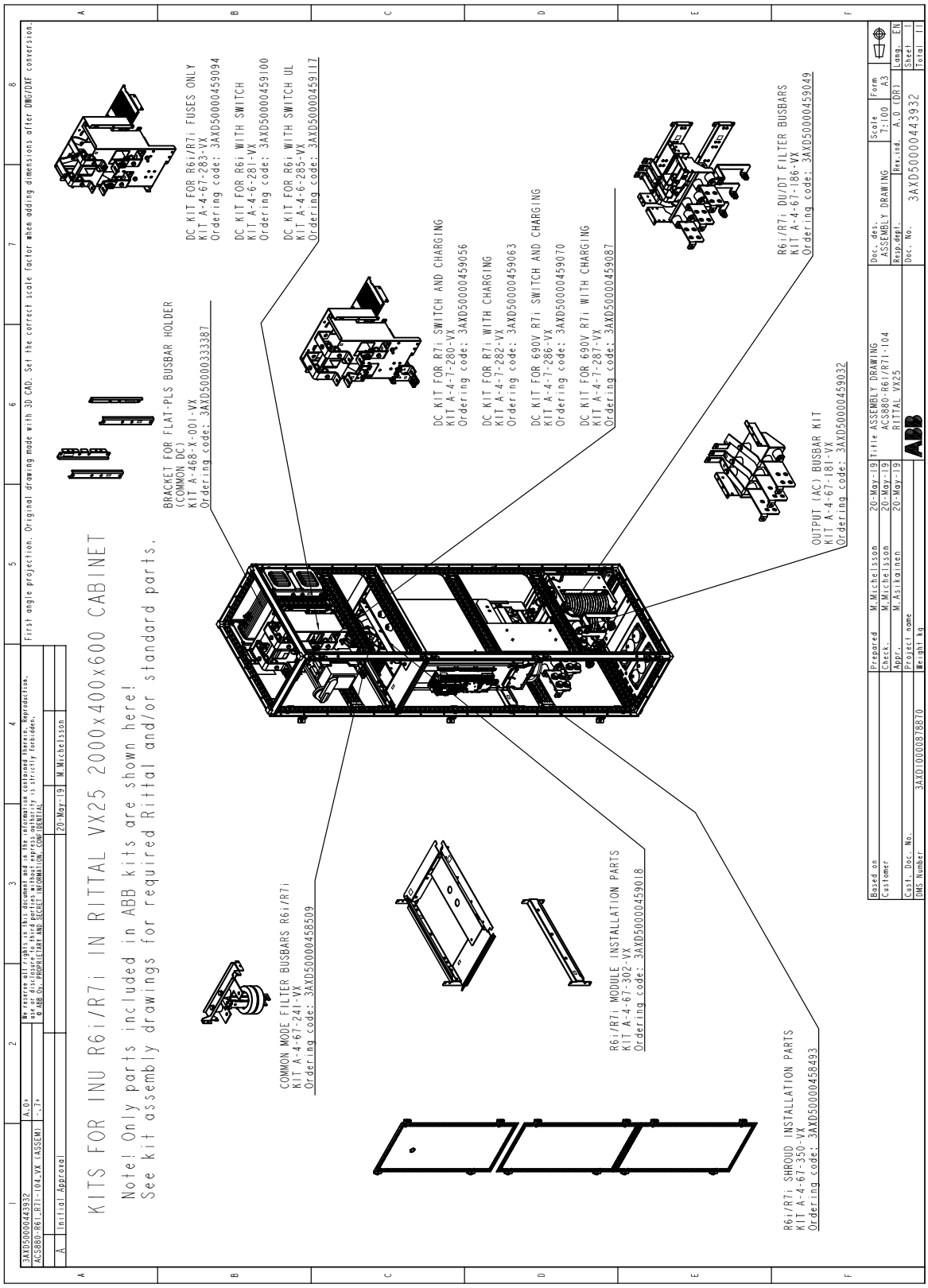


Description
Cubicle including: 1. DC bus 2. DC switch/disconnector and DC fuses 3. Charging contactor and resistors (frame R7i only) 4. Inverter module 5. AC output 6. du/dt filters (optional) 7. Air outlet

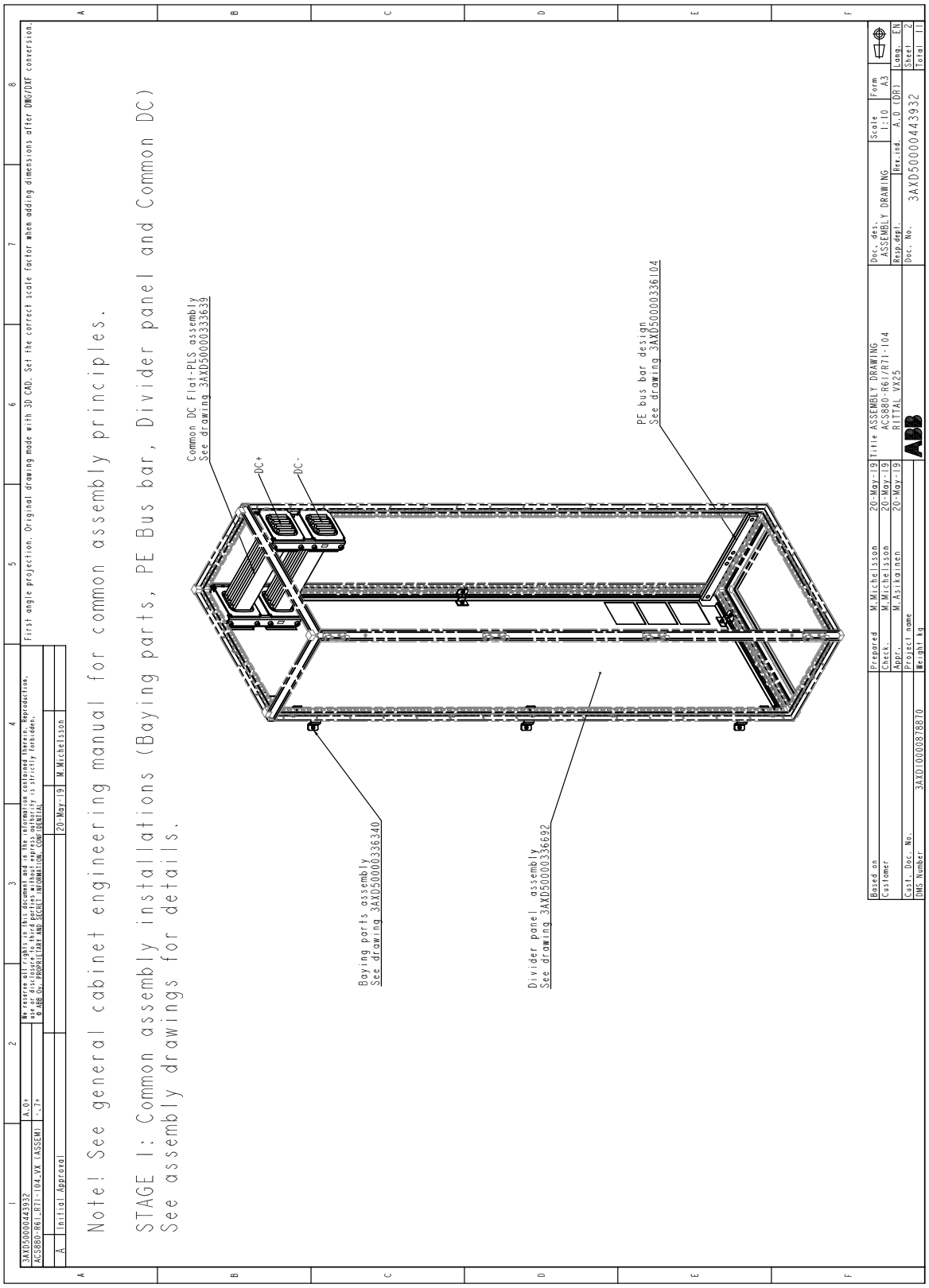
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbars	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC busbars	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2	Bottom plate	-	-	-
3	Support beams	3AXD50000452934	-	-
4	DC busbars and charging components:			
	R6i without DC switch	3AXD50000444489	A-4-67-283-VX	3AXD50000459094
	R6i with DC switch (IEC)	3AXD50000445202	A-4-6-281-VX	3AXD50000459100
	R6i with DC switch (UL)	3AXD50000445325	A-4-6-285-VX	3AXD50000459117
	R7i without DC switch or charging	3AXD50000444489	A-4-67-283-VX	3AXD50000459094
	R7i without DC switch, with charging	3AXD50000445097	A-4-7-282-VX	3AXD50000459063
	R7i (400/500 V) with DC switch and charging	3AXD50000445257	A-4-7-280-VX	3AXD50000459056
	R7i (690 V) with DC switch and charging	3AXD50000445356	A-4-7-286-VX	3AXD50000459070
	R7i (690 V) without DC switch, with charging	3AXD50000445332	A-4-7-287-VX	3AXD50000459087
5	Common mode filters (filters not included in kit)	3AXD50000444304	A-4-67-241-VX	3AXD50000458509
6 A	AC busbars without output (du/dt) filters	3AXD50000452798	A-4-67-181-VX	3AXD50000459032
6 B	AC busbars with output (du/dt) filters	3AXD50000452439	A-4-67-186-VX	3AXD50000459049
7	Inverter module installation parts	3AXD50000453337	A-4-67-302-VX	3AXD50000459018
8	Shroud brackets	3AXD50000453252	A-4-67-350-VX	3AXD50000458493

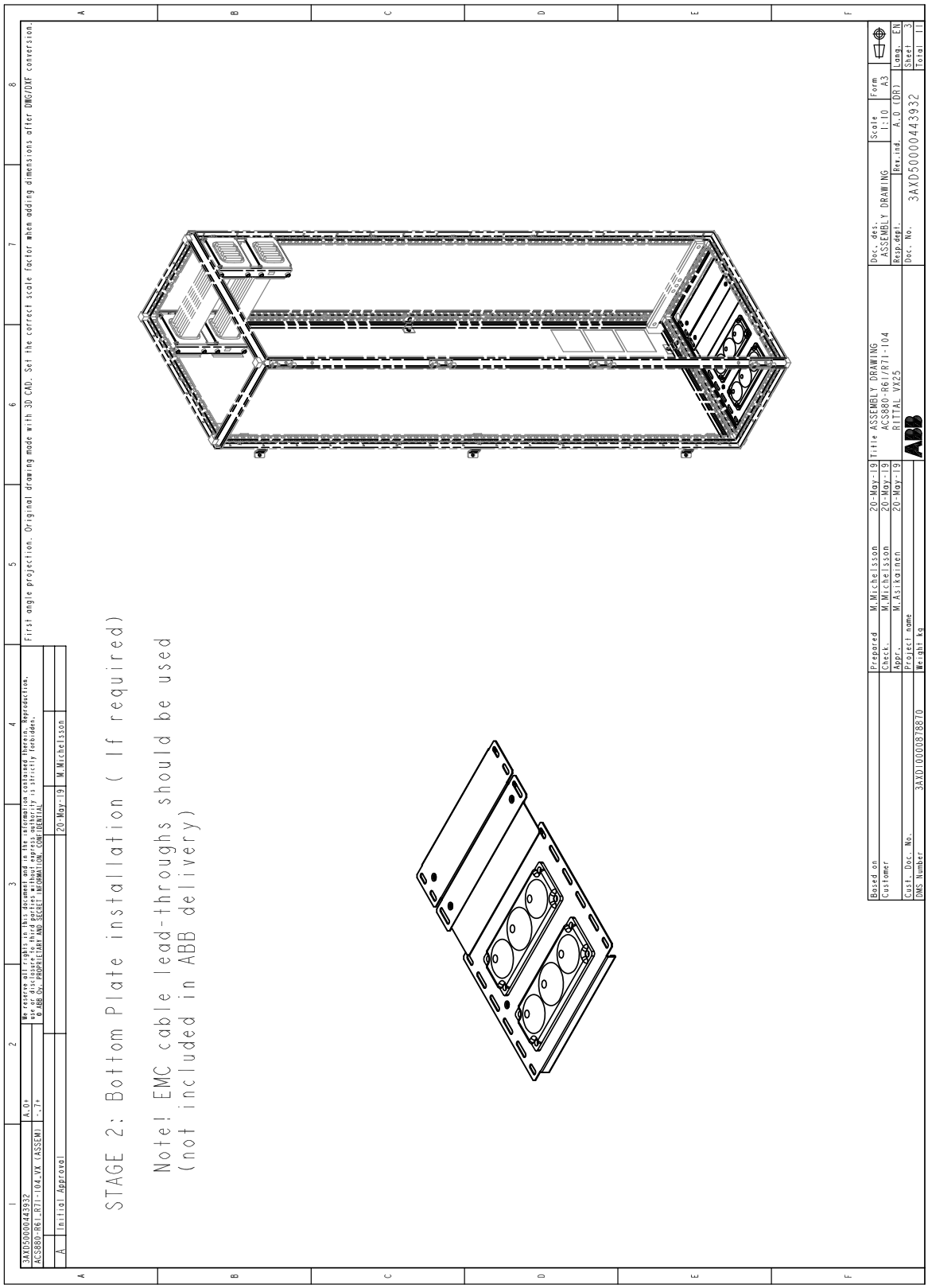
Overview of kits



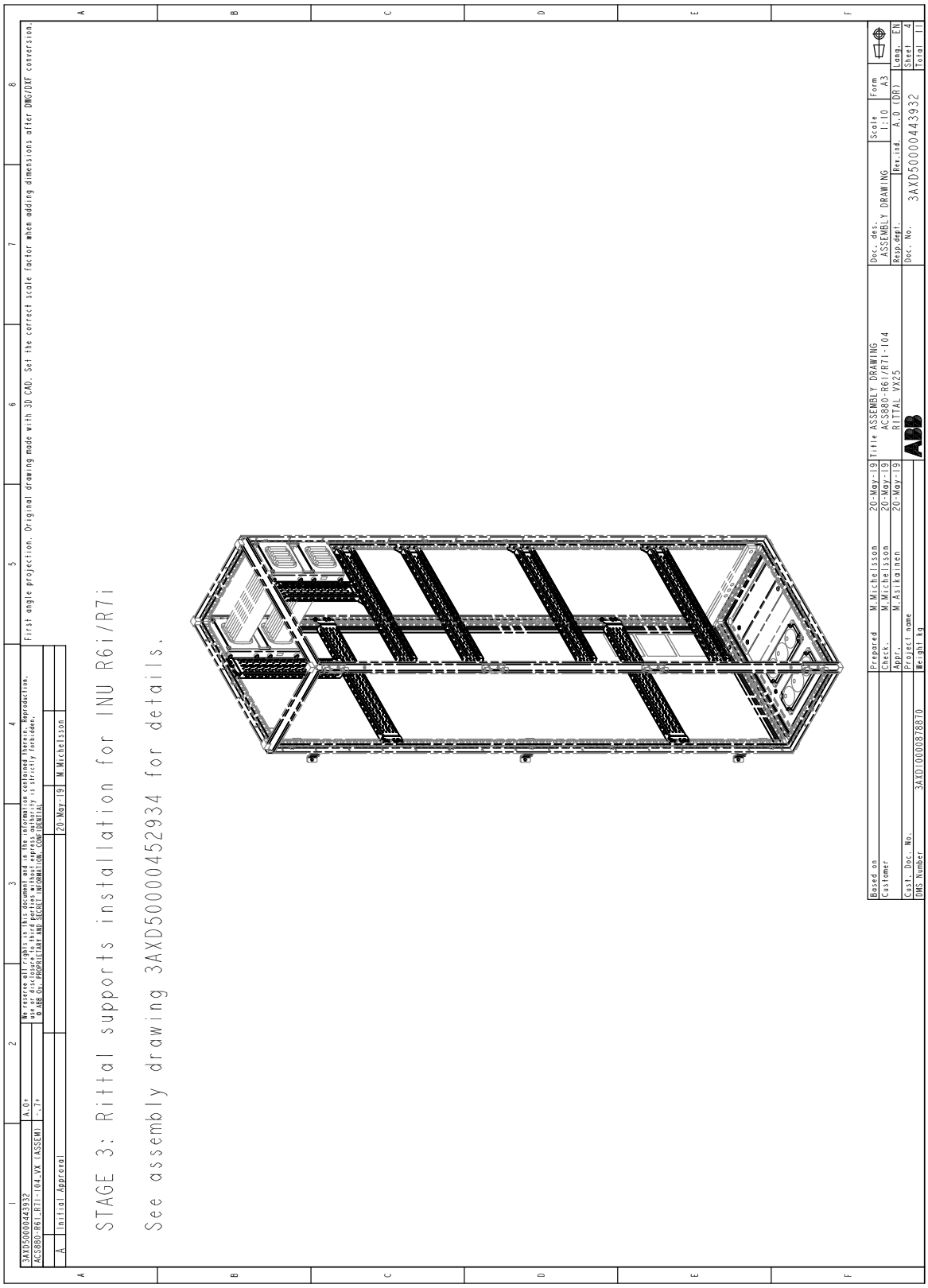
Stage 1: Installation of common parts



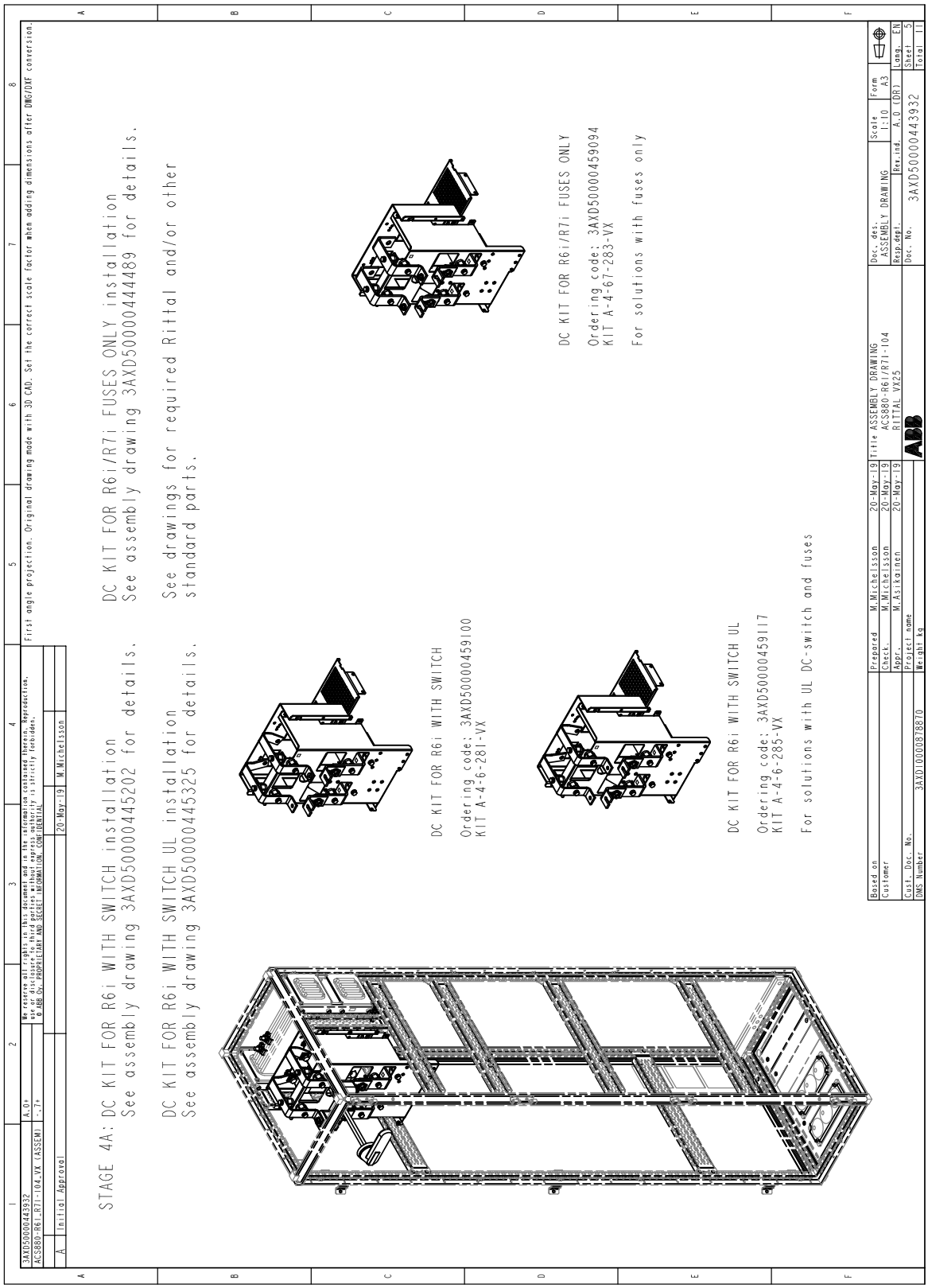
Stage 2: Installation of bottom plate



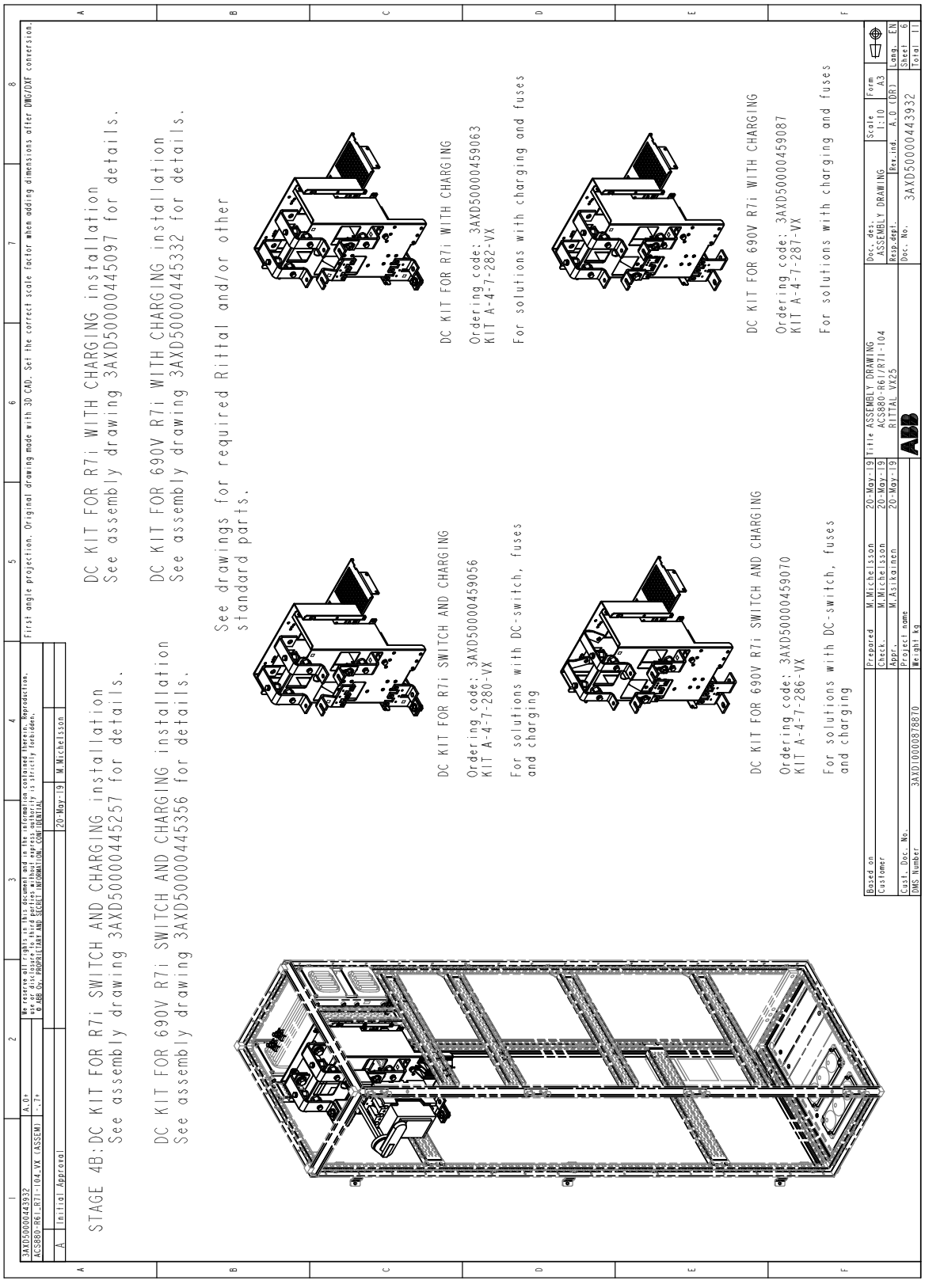
Stage 3: Installation of support beams



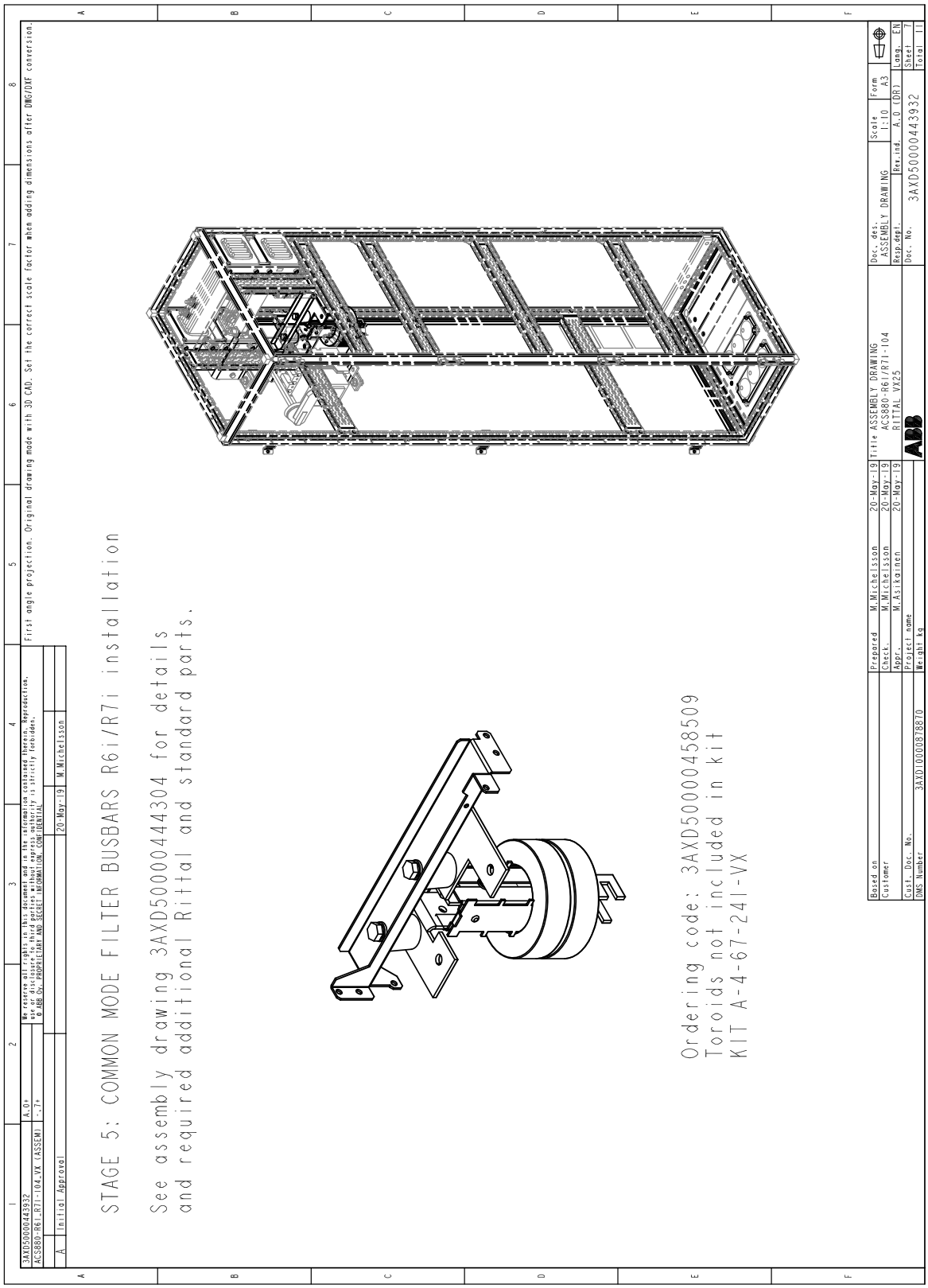
Stage 4 (R6i): Installation of DC busbars and charging components



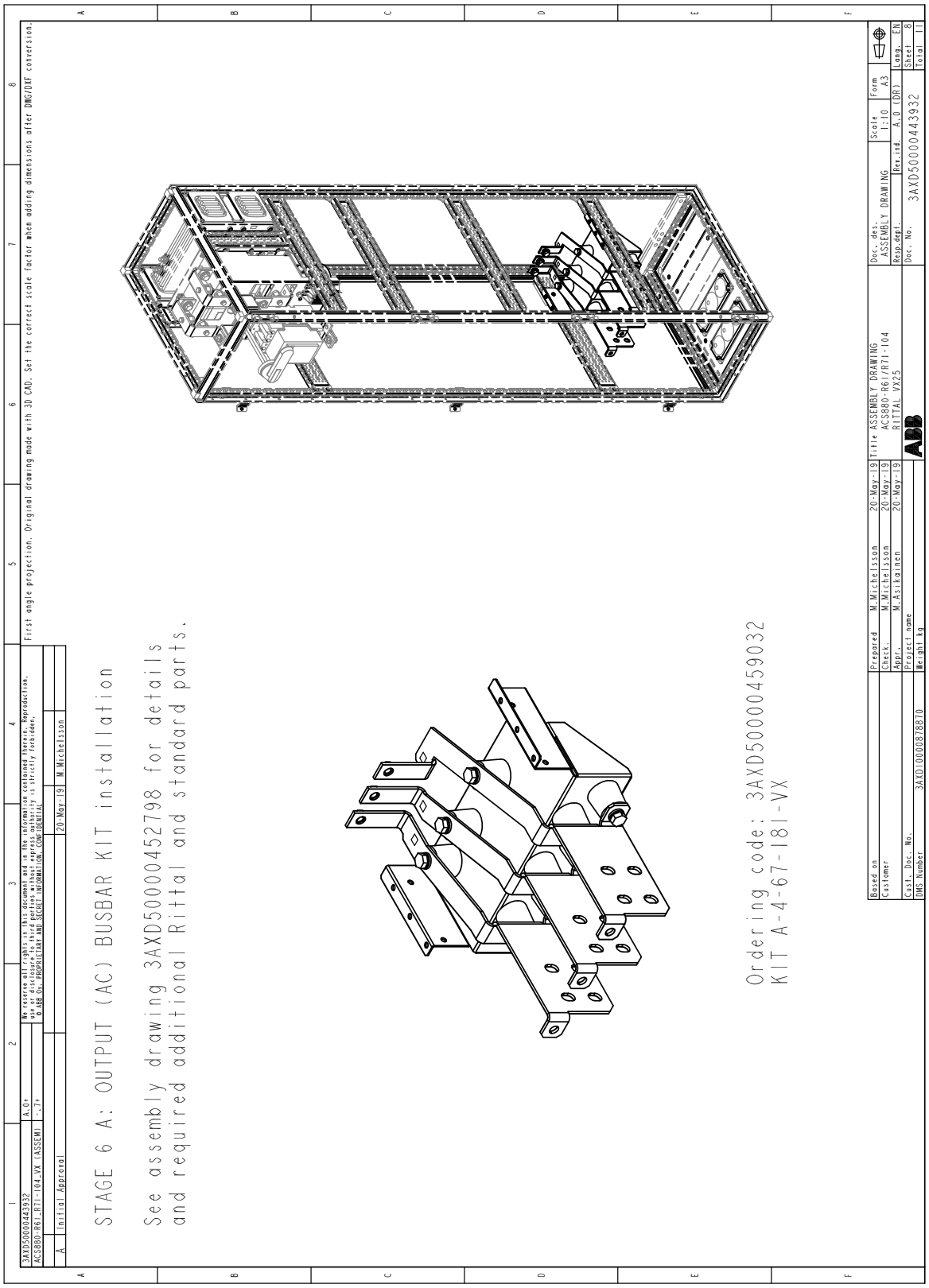
Stage 4 (R7i): Installation of DC busbars and charging components



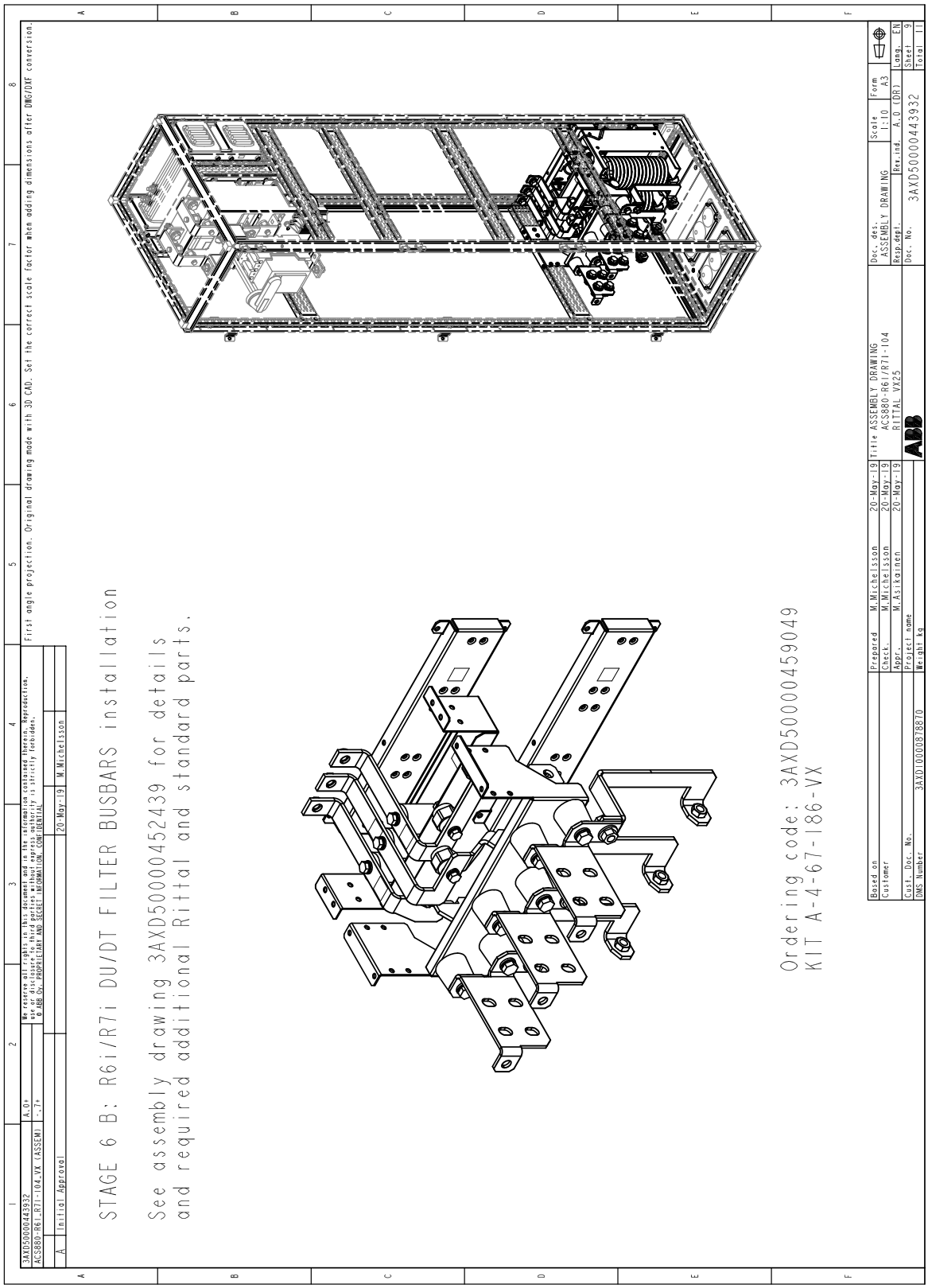
Stage 5: Installation of common mode filters



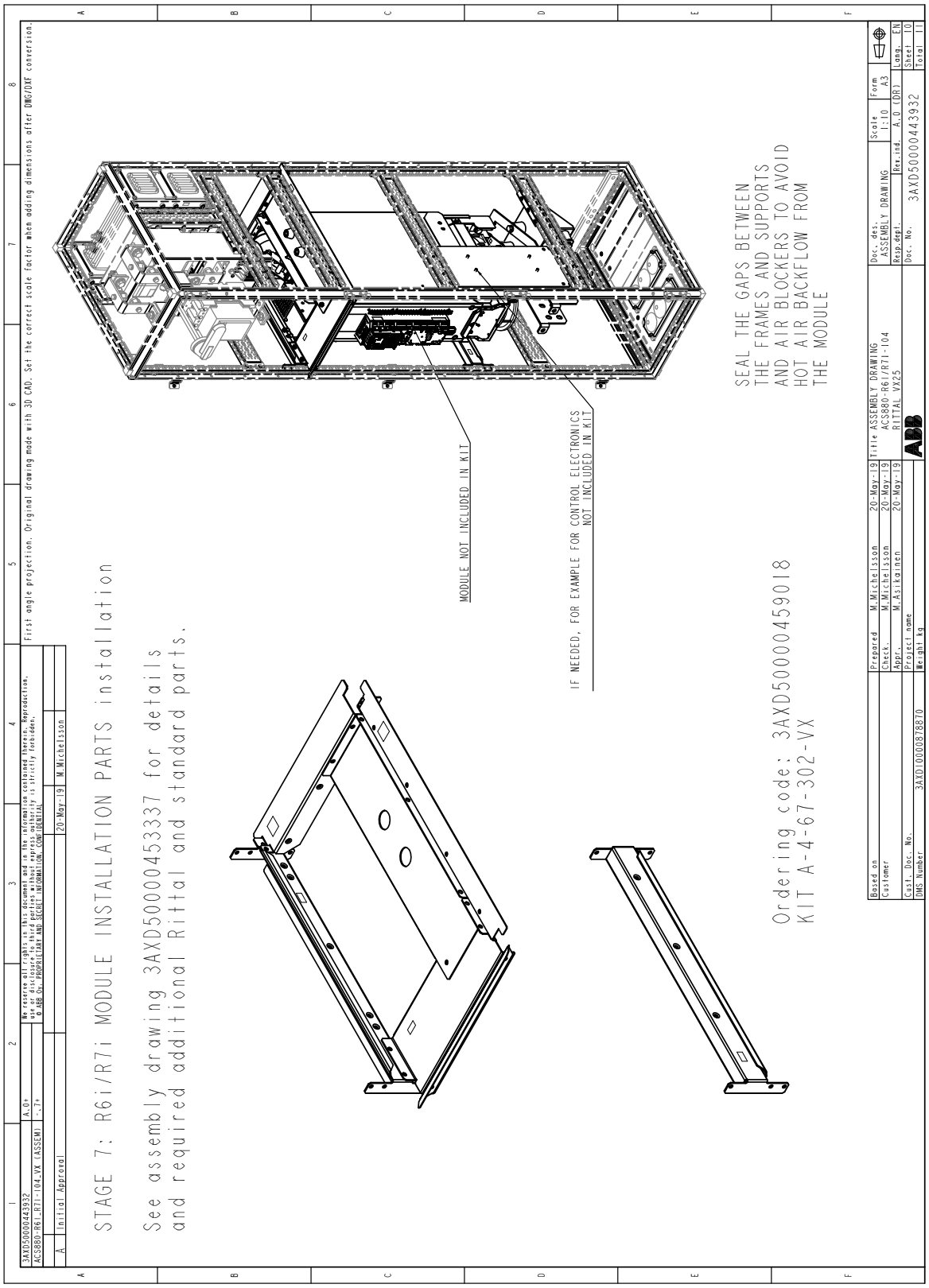
Stage 6 A: Installation of AC busbars (without du/dt filters)



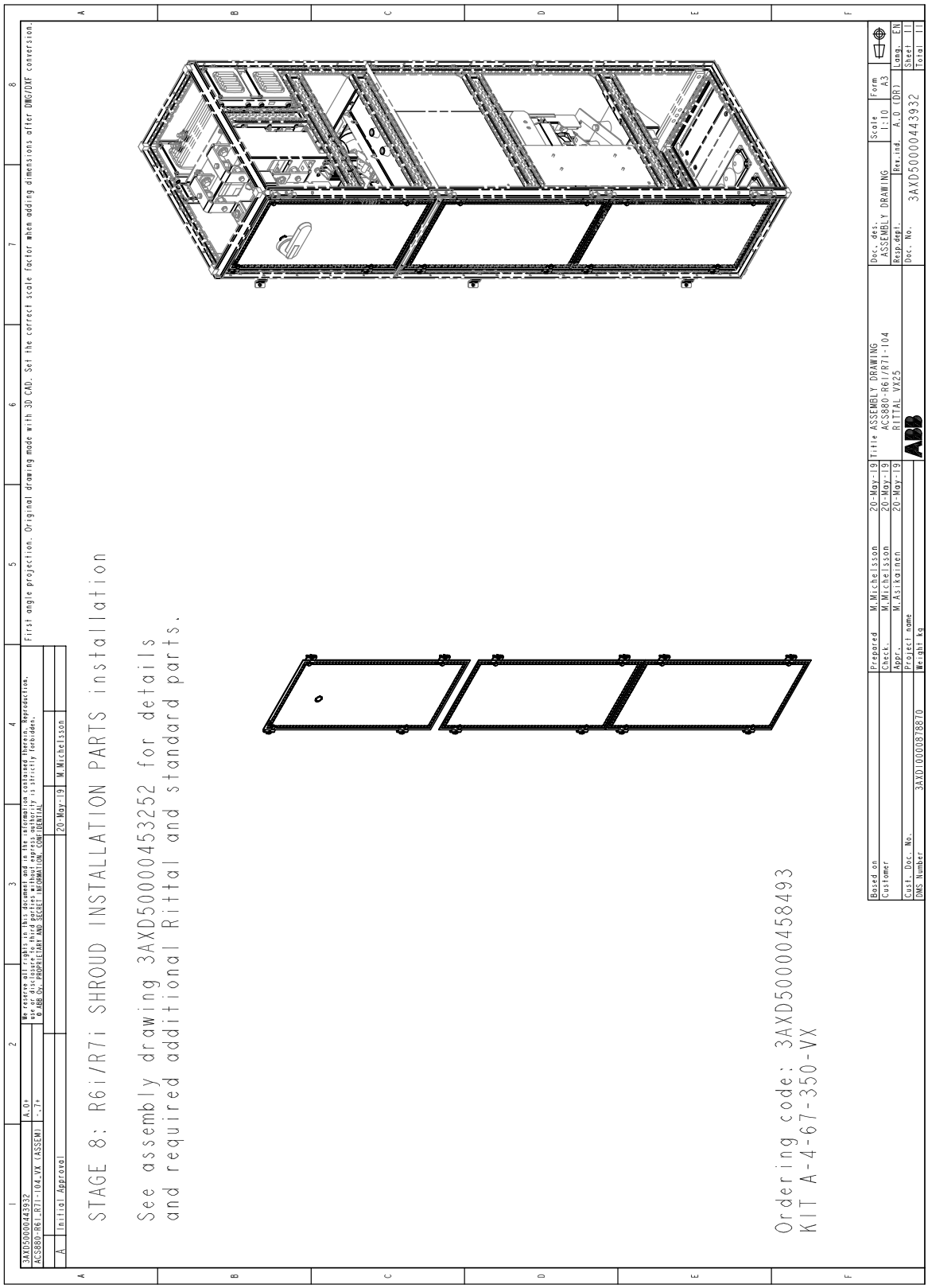
Stage 6 B: Installation of AC busbars (with du/dt filters)



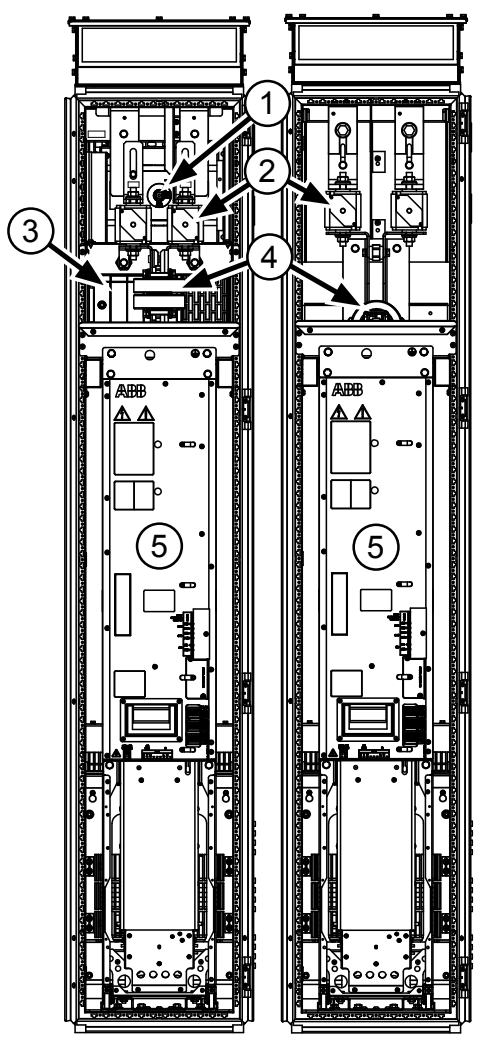
Stage 7: Installation of inverter module



Stage 8: Installation of shrouding brackets



One R8i module in a 400 mm wide Rittal VX25 enclosure

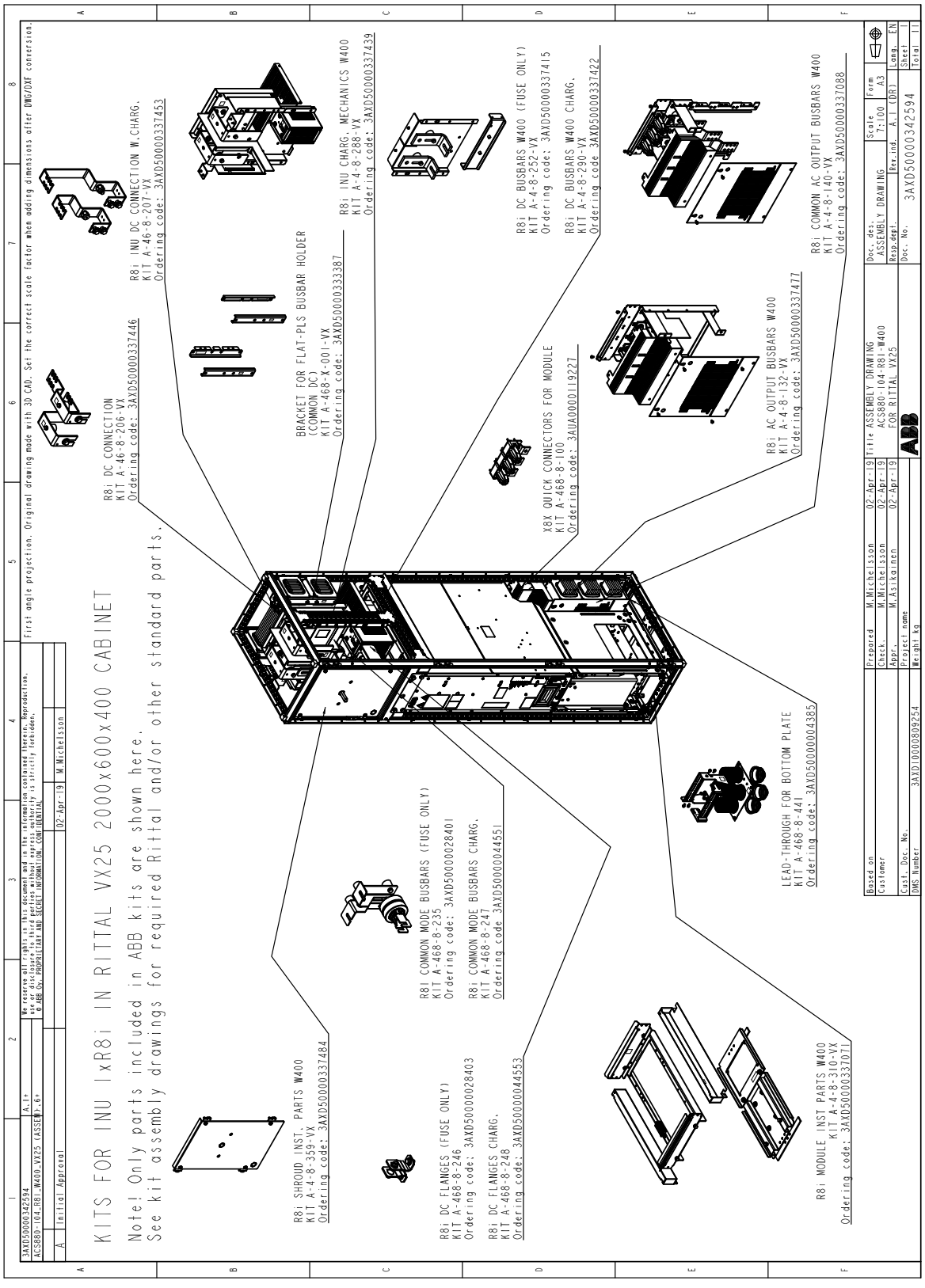


Description
Cubicle including: 1. DC switch/disconnector (obscured) 2. DC fuses 3. Charging switch 4. Common mode filters 5. Inverter module

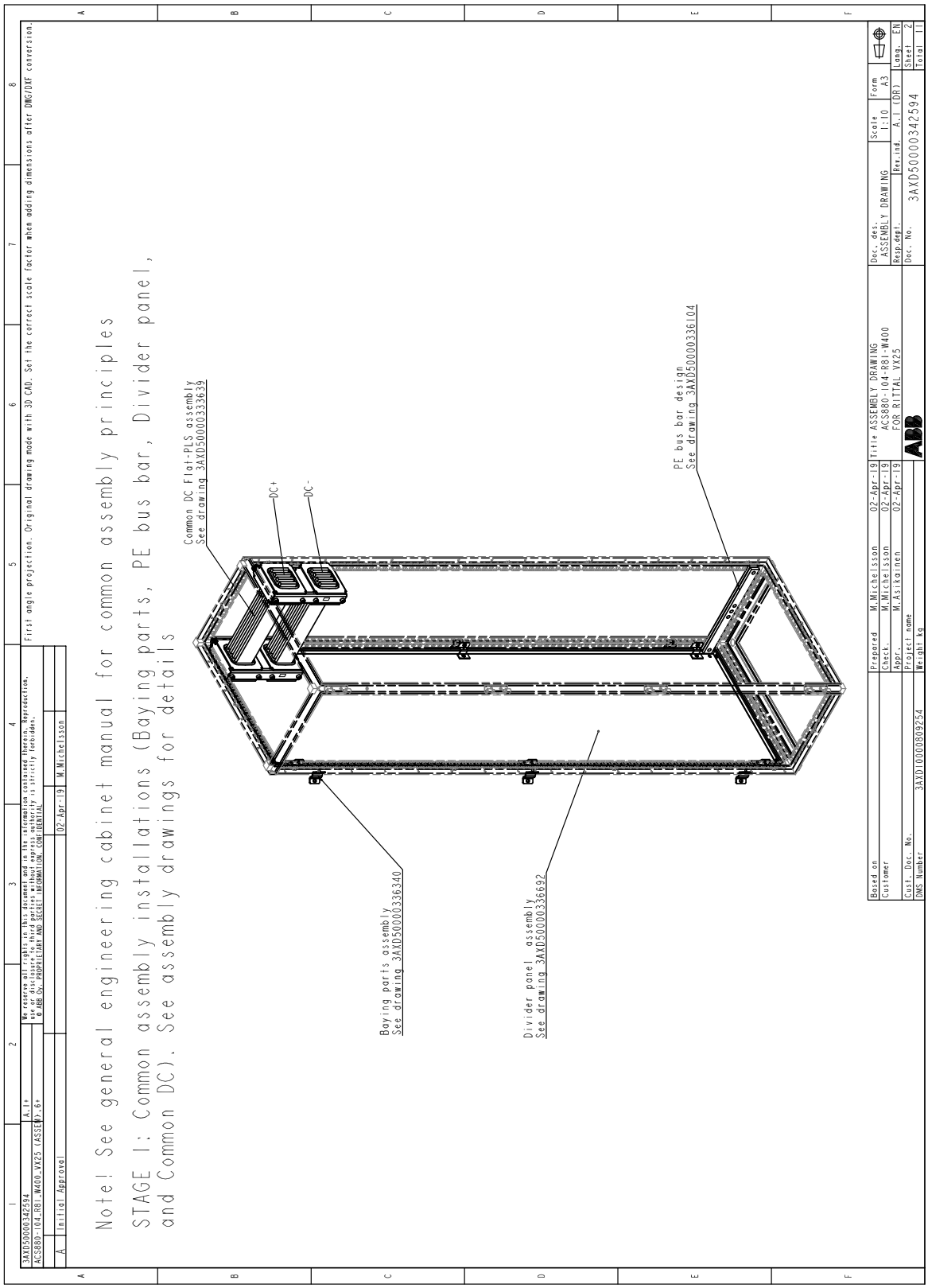
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbar	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC busbars	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2 A	DC connection 1 of 2 (from DC bus to DC fuses) without DC switch/charging:			
	Busbar assembly	3AXD50000345151	A-4-8-252-VX	3AXD50000337415
	Busbars	3AXD50000345915	A-46-8-206-VX	3AXD50000337446
2 B	DC connection 1 of 2 (from DC bus to DC fuses) with DC switch/charging:			
	DC switch/charging mechanics	3AXD50000342501	A-4-8-288-VX	3AXD50000337439
	Busbar assembly	3AXD50000345236	A-4-8-290-VX	3AXD50000337422
	Busbars	3AXD50000345458	A-46-8-207-VX	3AXD50000337453
3	Module mechanical installation parts, lead-throughs:			
	Module top/bottom guides	3AXD50000335152	A-4-8-310-VX	3AXD50000337071
	Lead-throughs	3AXD50000004817	A-468-8-441	3AXD50000004385
4 A	Quick connector, output (AC) busbars (cable connection):			
	Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
	Busbars and shrouds	3AXD50000343492	A-4-8-132-VX	3AXD50000337477
4 B	Quick connector, output (AC) busbars (common AC output busbar connection):			
	Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
	Busbars and shrouds	3AXD50000343928	A-4-8-140-VX	3AXD50000337088
5 A	DC connection 2 of 2 (from DC fuses to inverter module) without DC switch/charging:			
	DC connection flanges	3AXD50000028384	A-468-8-246	3AXD50000028403
	DC busbars with common mode filters (filters not included in kit)	3AXD50000028418	A-468-8-235	3AXD50000028401
5 B	DC connection 2 of 2 (from DC fuses to inverter module) with DC switch/charging:			
	DC connection flanges	3AXD50000043466	A-468-8-248	3AXD50000044553
	DC busbars with common mode filters (filters not included in kit)	3AXD50000043411	A-468-8-247	3AXD50000044551
6	Shrouding	3AXD50000335169	A-4-8-359-VX	3AXD50000337484
7	Inverter module	-	-	-

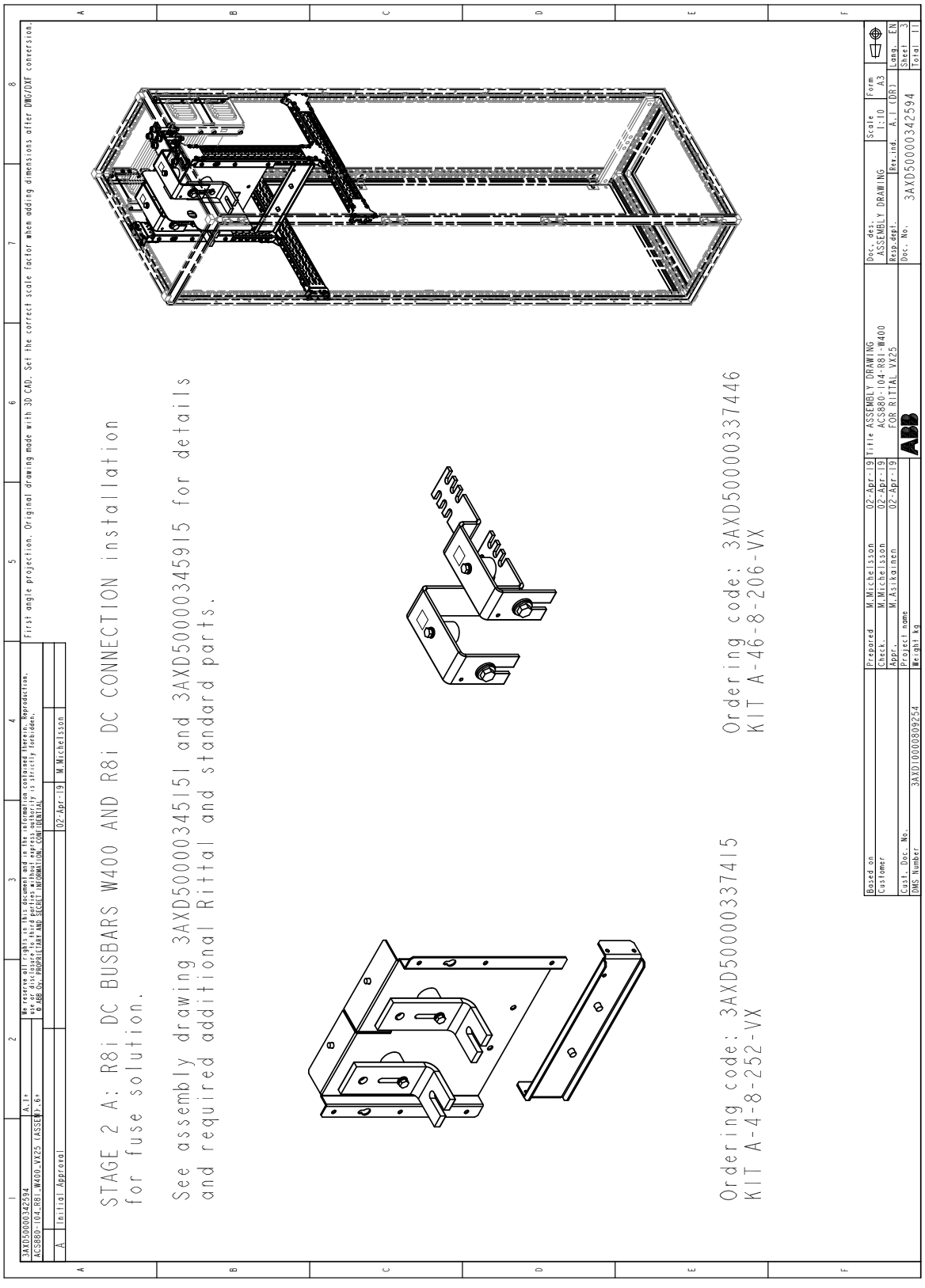
Overview of kits



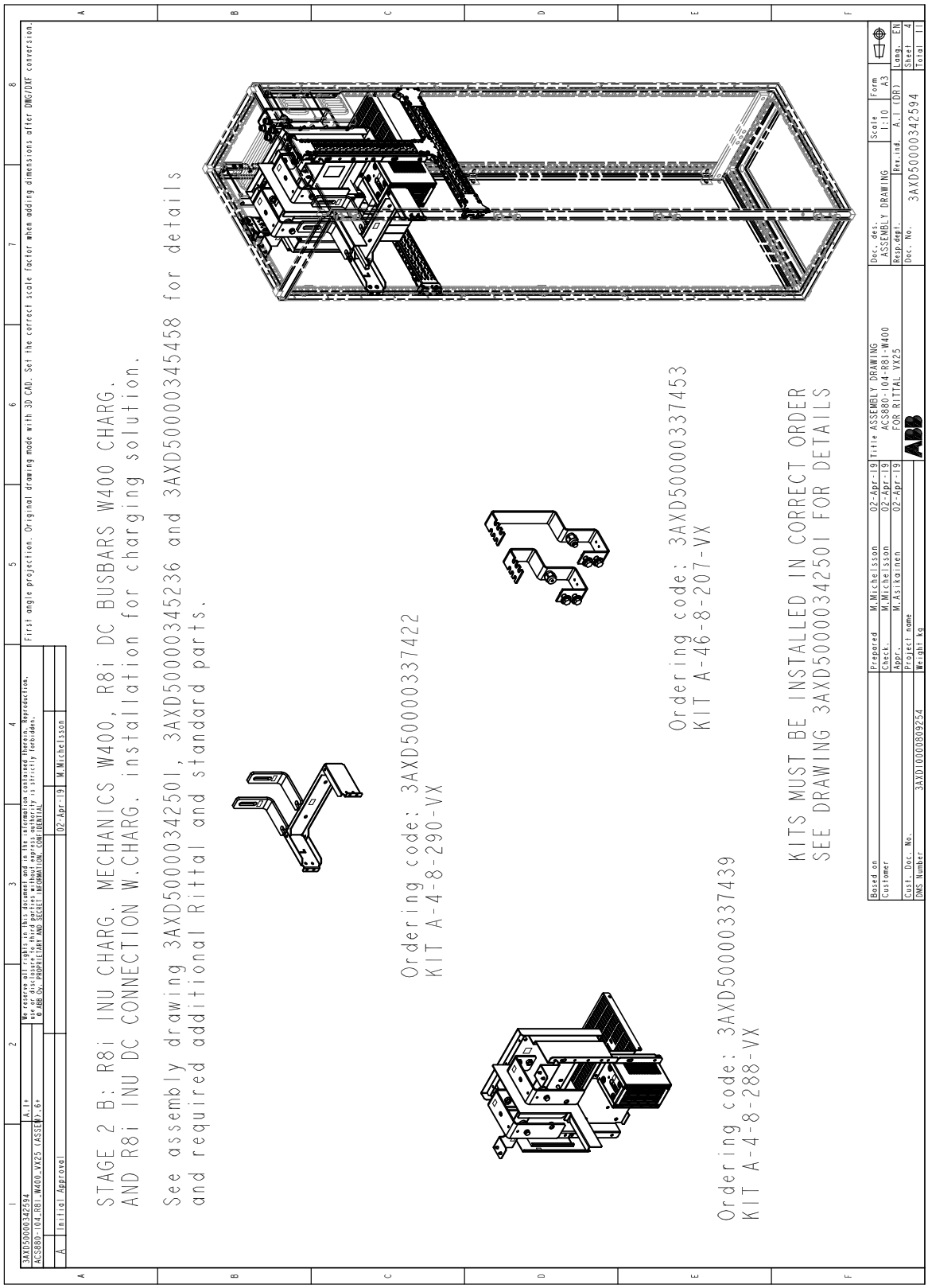
Stage 1: Installation of common parts



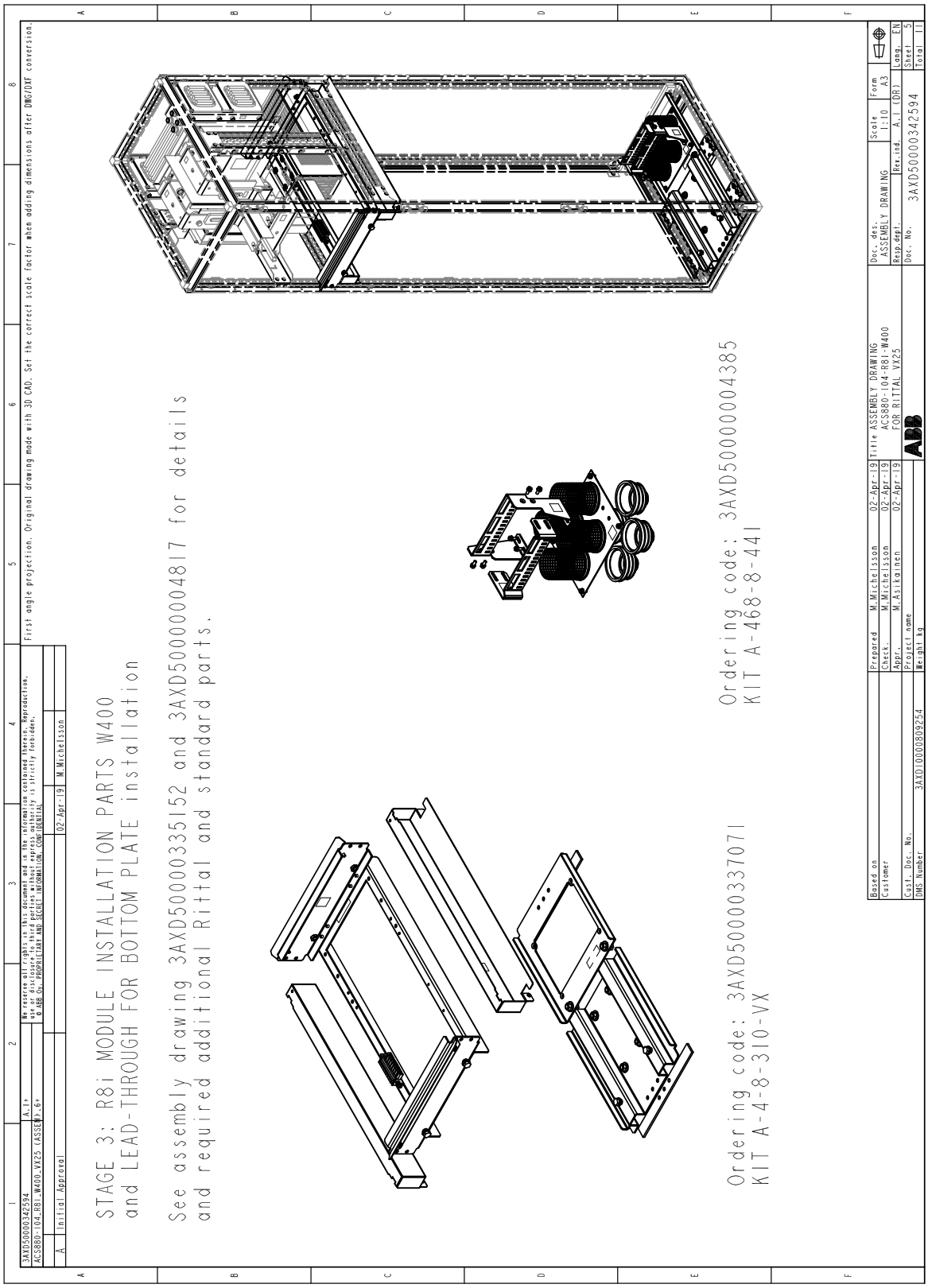
Stage 2 A: Installation of DC busbars (1) (without DC switch/charging)



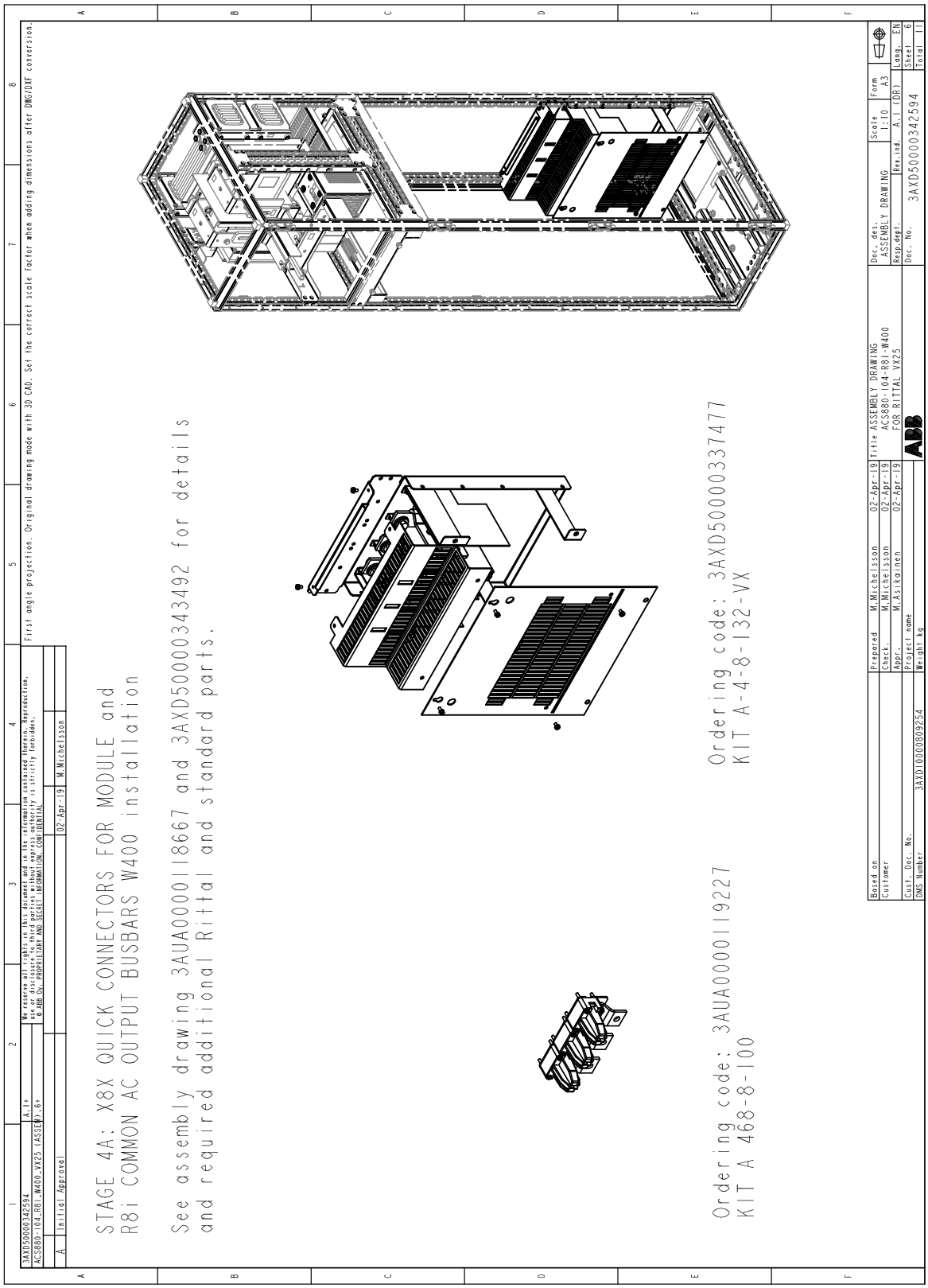
Stage 2 B: Installation of DC busbars (1) (with DC switch/charging)



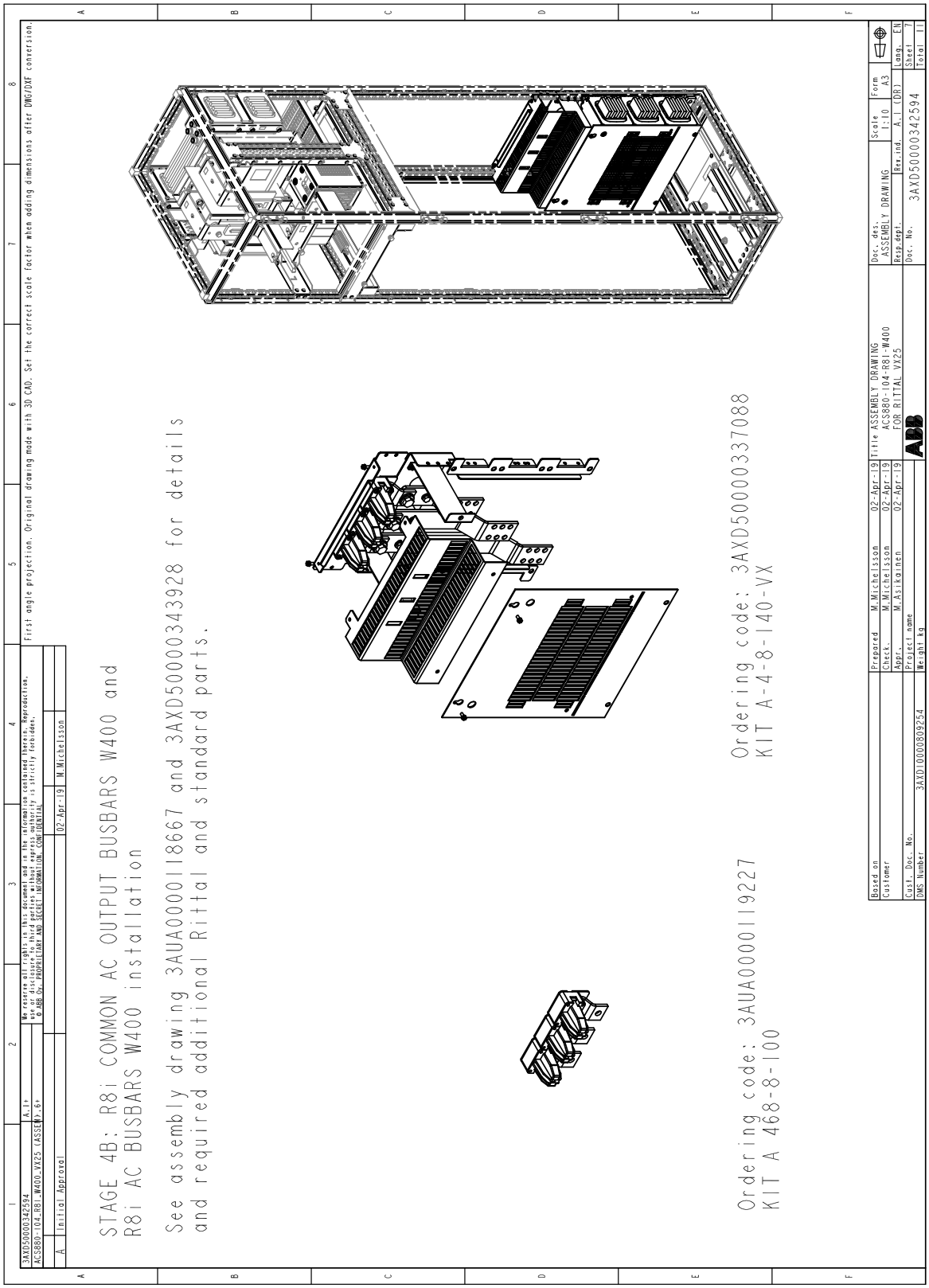
Stage 3: Installation of module installation parts and lead-throughs



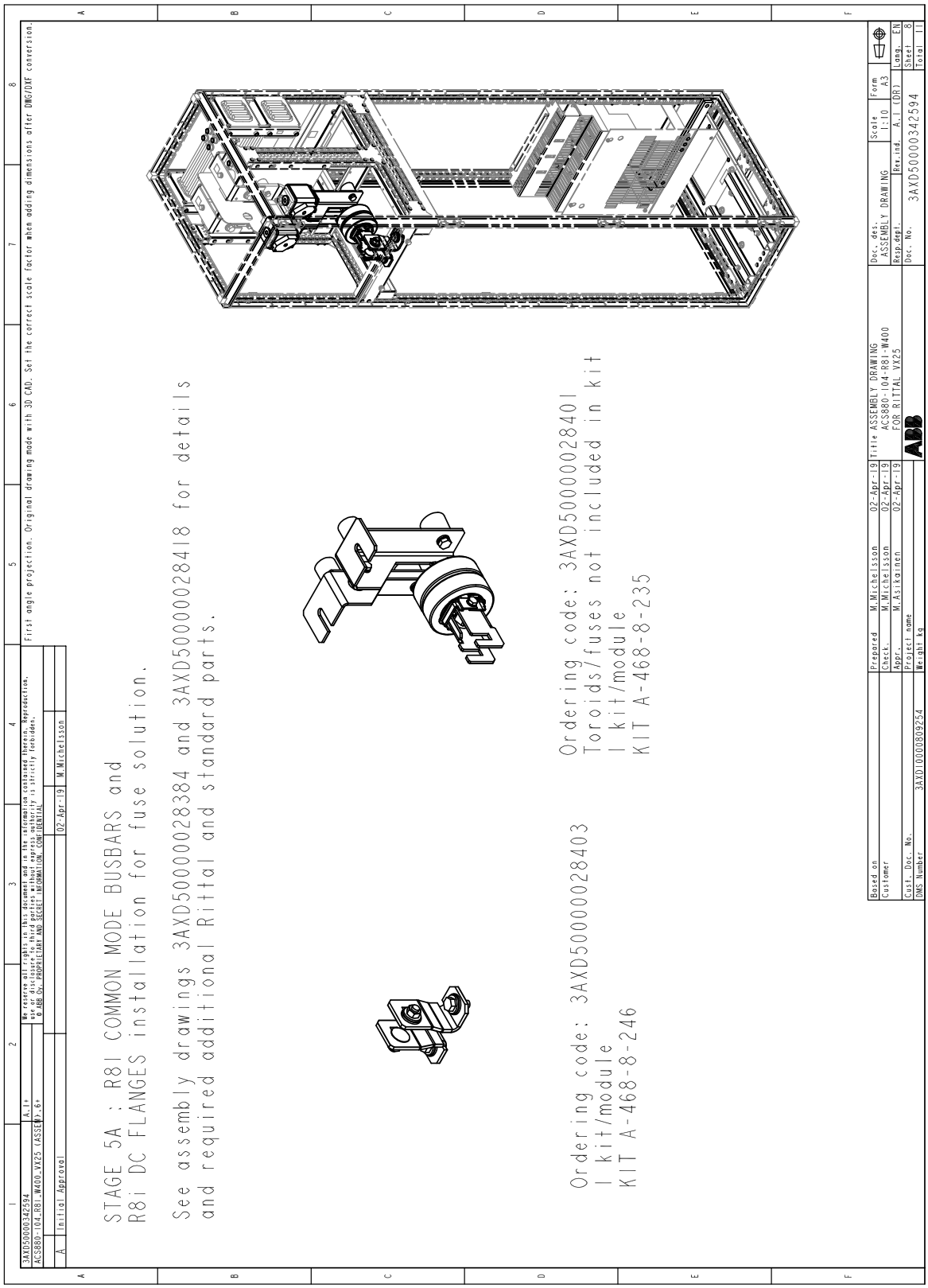
Stage 4 A: Installation of quick connector and output (AC) busbars (cable connection)



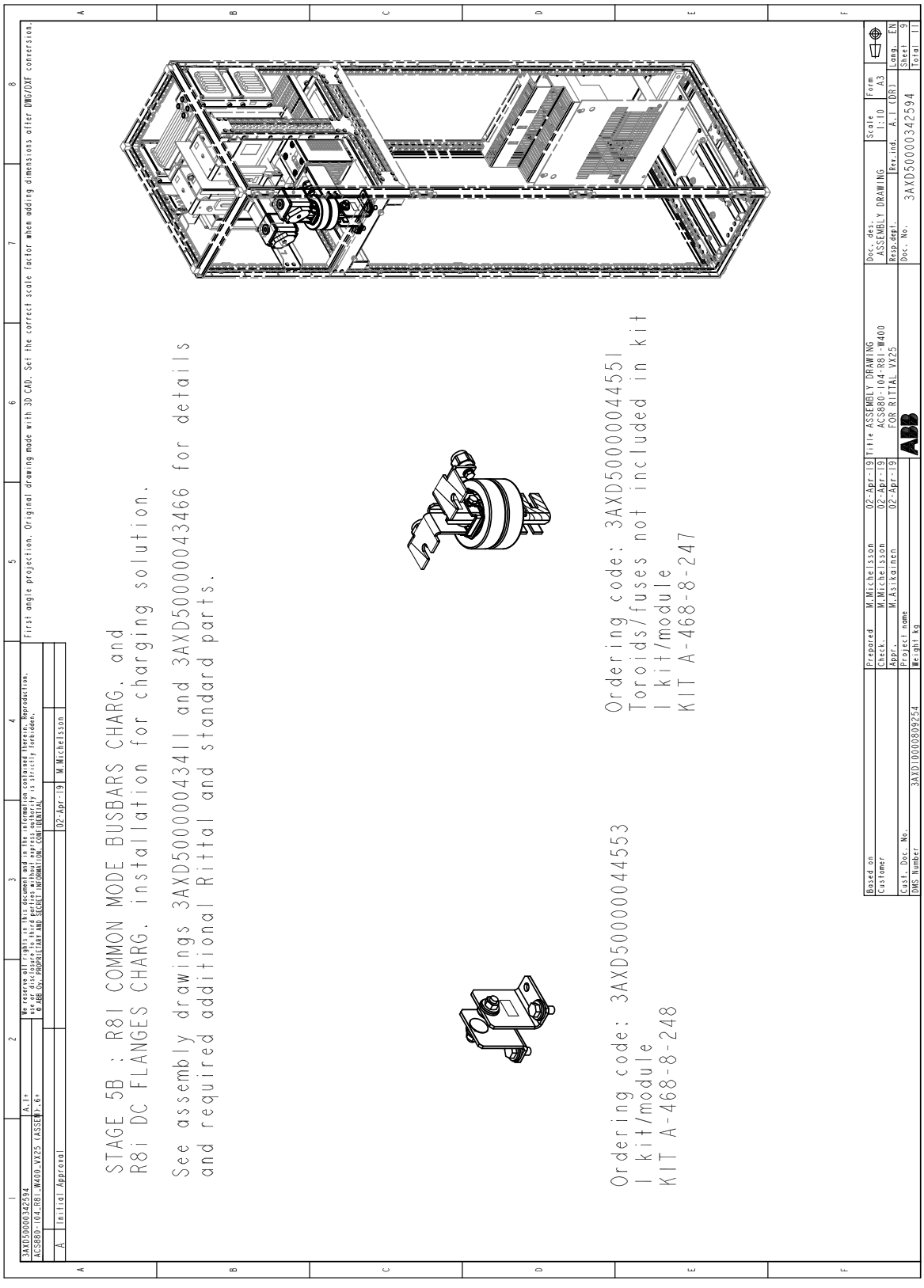
Stage 4 B: Installation of quick connector and output (AC) busbars (common AC output busbar connection)



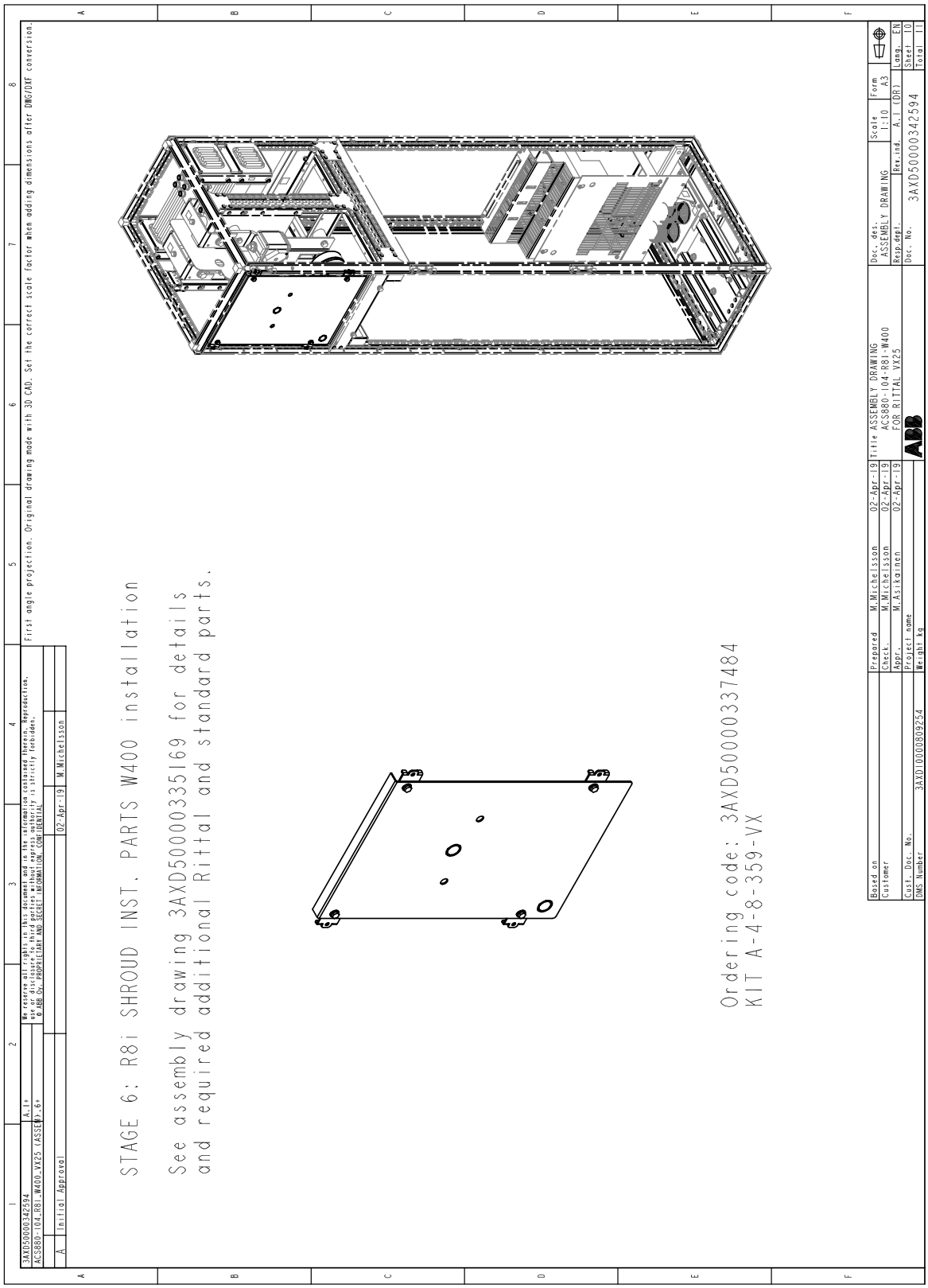
Stage 5 A: Installation of DC busbars (2) (without DC switch/charging)



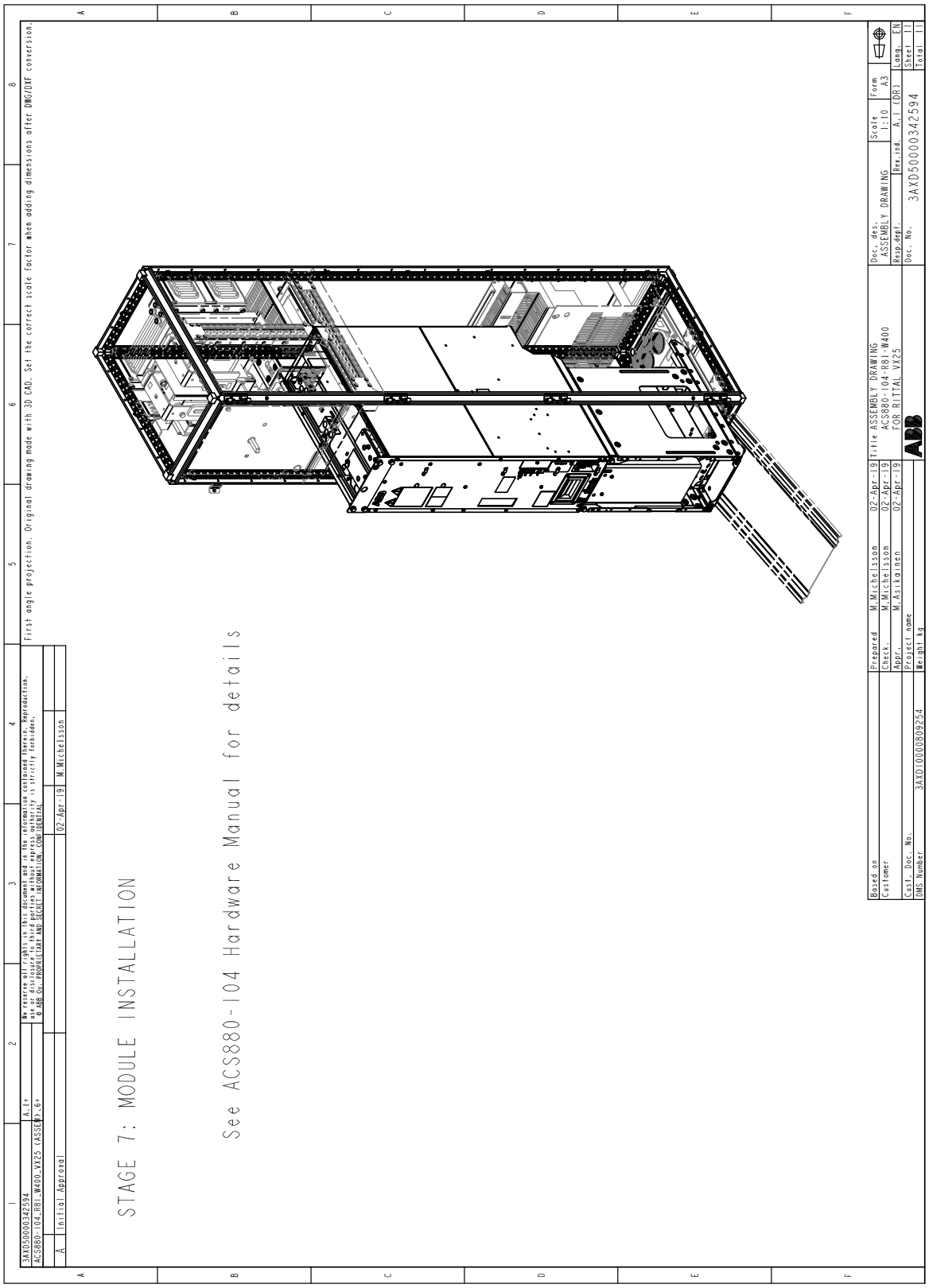
Stage 5 B: Installation of DC busbars (2) (with DC switch/charging)



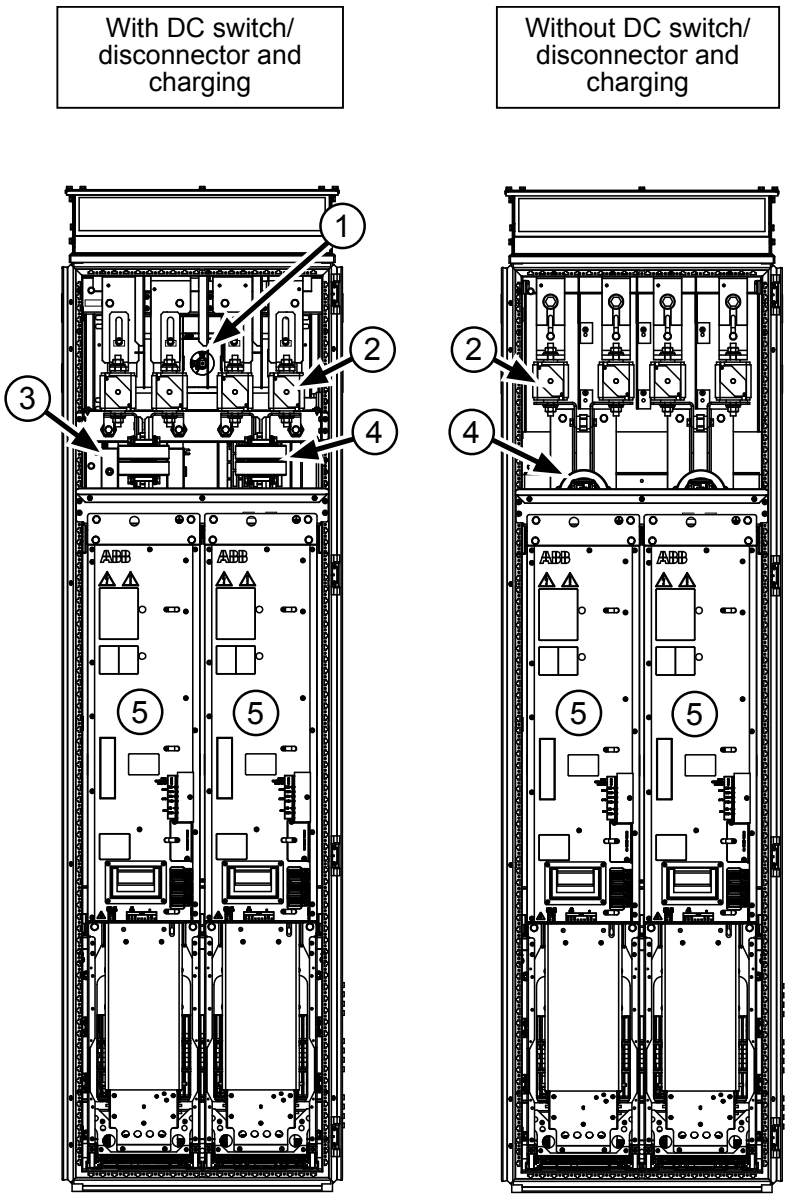
Stage 6: Installation of shrouding



Stage 7: Installation of inverter module



Two R8i modules in a 600 mm wide Rittal VX25 enclosure

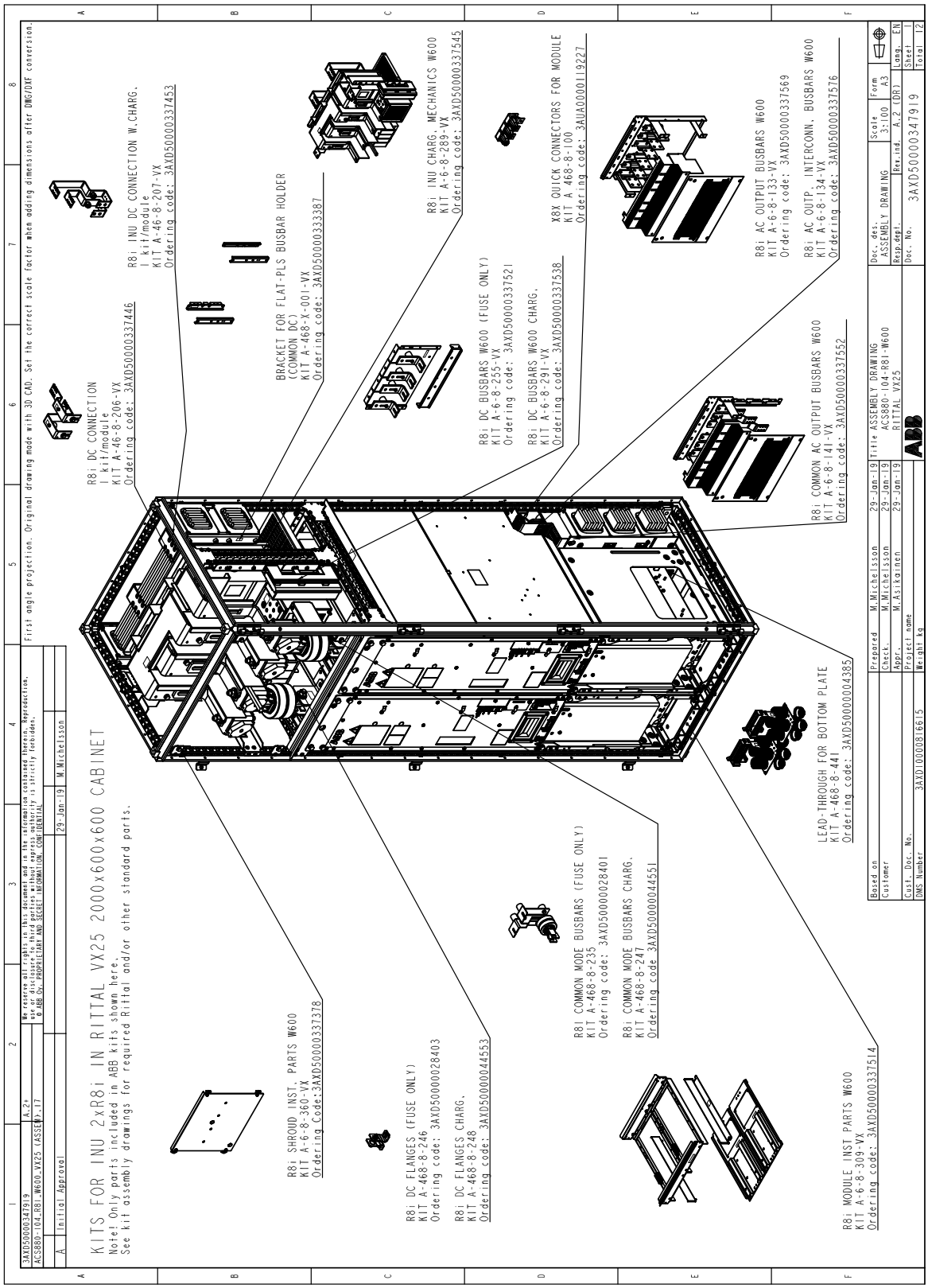


Description
Cubicle including: 1. DC switch/disconnector (obscured) 2. DC fuses 3. Charging switch 4. Common mode filters 5. Inverter module

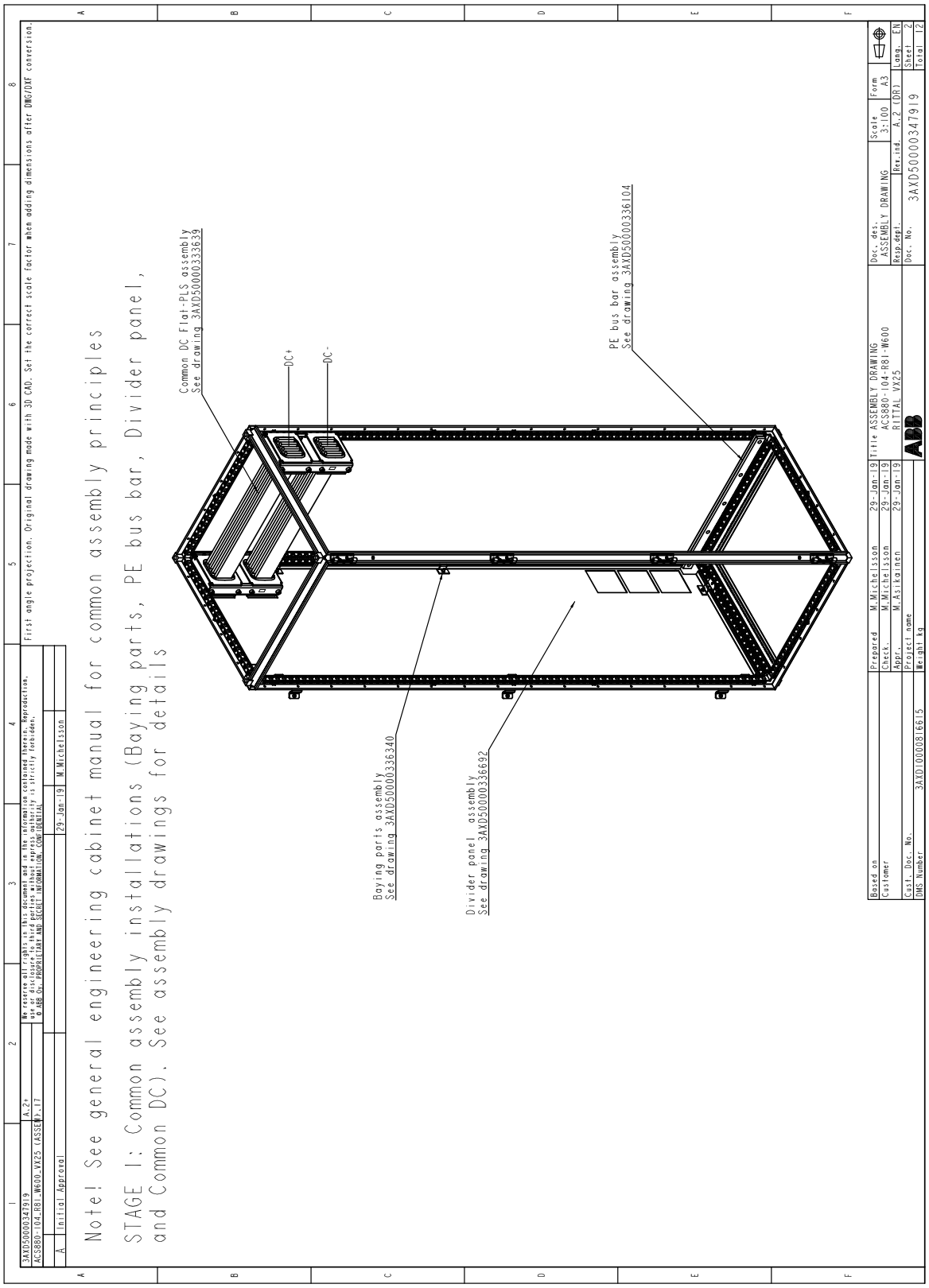
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbar	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
	DC busbars	3AXD50000333639	A-468-X-001-VX	3AXD50000333387
2 A	DC connection 1 of 2 (from DC bus to DC fuses) without DC switch/charging:			
	Busbar assembly	3AXD50000342471	A-6-8-255-VX	3AXD50000337521
	Busbars	3AXD50000345915	A-46-8-206-VX	3AXD50000337446
2 B	DC connection 1 of 2 (from DC bus to DC fuses) with DC switch/charging:			
	DC switch/charging assembly	3AXD50000342860	A-6-8-289-VX	3AXD50000337545
	Busbar assembly	3AXD50000342983	A-6-8-291-VX	3AXD50000337538
	Busbars	3AXD50000345458	A-46-8-207-VX	3AXD50000337453
3	Module mechanical installation parts, lead-throughs:			
	Module top/bottom guides	3AXD50000345052	A-6-8-309-VX	3AXD50000337514
	Lead-throughs	3AXD50000004817	A-468-8-441	3AXD50000004385
4 A	Quick connector, output (AC) busbars (cable connection without bridging):			
	Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
	Busbars and shrouds	3AXD50000345526	A-6-8-133-VX	3AXD50000337569
4 B	Quick connector, output (AC) busbars (cable connection with bridging):			
	Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
	Busbars and shrouds	3AXD50000345632	A-6-8-134-VX	3AXD50000337576
4 C	Quick connector, output (AC) busbars (common AC output busbar connection):			
	Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
	Busbars and shrouds	3AXD50000346196	A-6-8-141-VX	3AXD50000337552
5 A	DC connection 2 of 2 (from DC fuses to inverter module) without DC switch/charging:			
	DC connection flanges	3AXD50000028384	A-468-8-246	3AXD50000028403
	DC busbars with common mode filters	3AXD50000028418	A-468-8-235	3AXD50000028401
5 B	DC connection 2 of 2 (from DC fuses to inverter module) with DC switch/charging:			
	DC connection flanges	3AXD50000043466	A-468-8-248	3AXD50000044553
	DC busbars with common mode filters (filters not included in kit)	3AXD50000043411	A-468-8-247	3AXD50000044551
6	Shrouding	3AXD50000335022	A-6-8-360-VX	3AXD50000337378
7	Inverter module	-	-	-

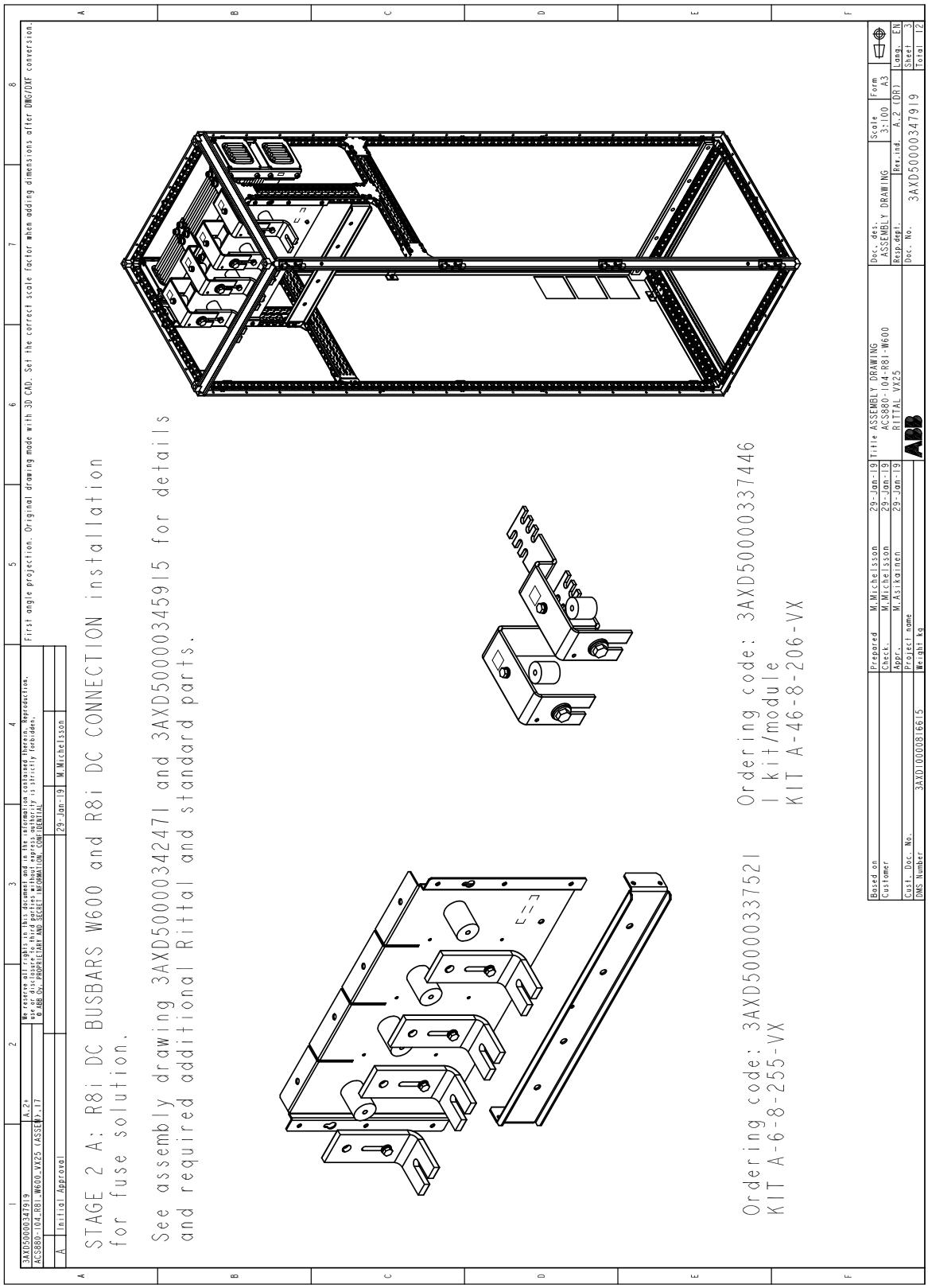
Overview of kits



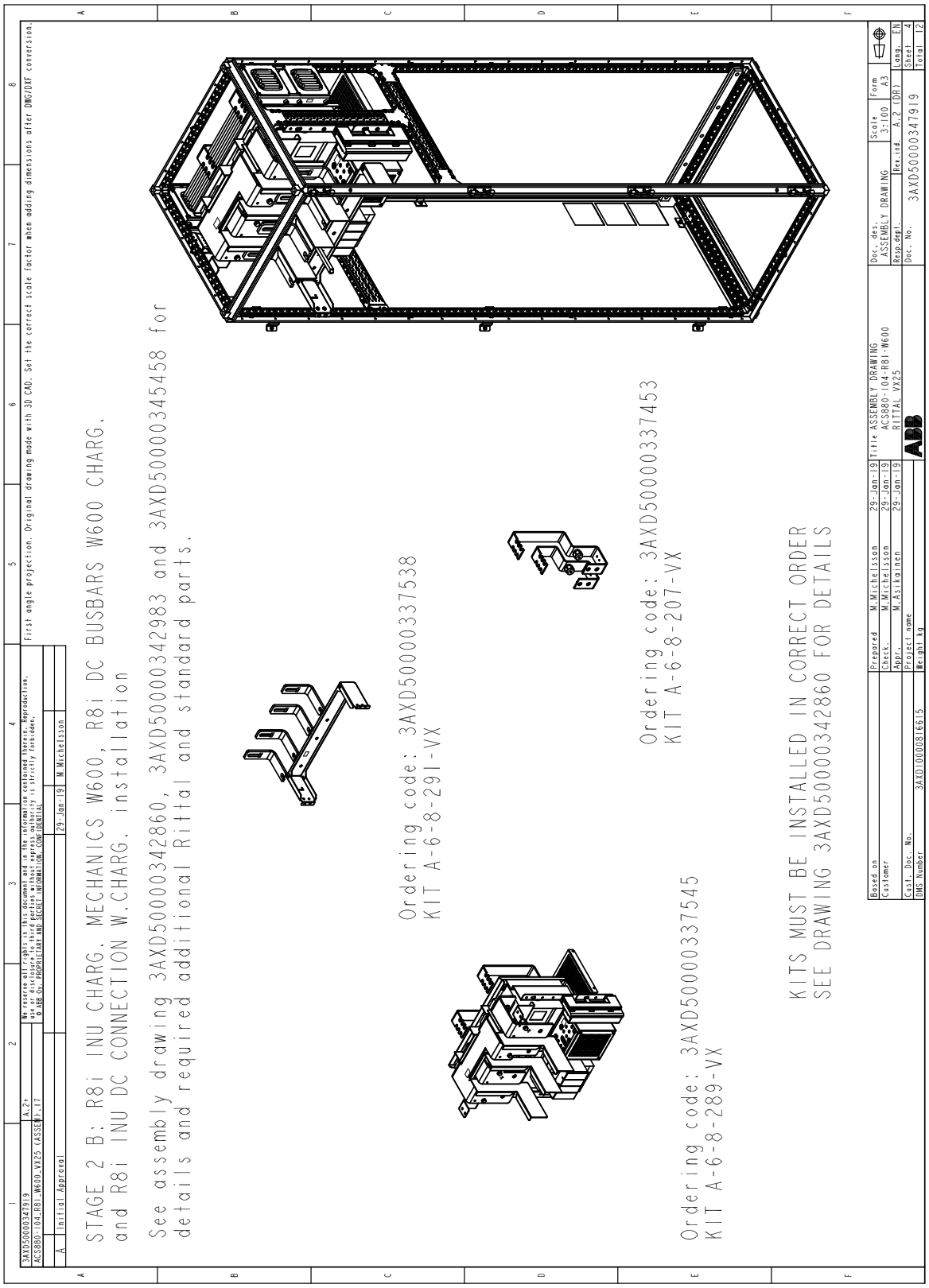
Stage 1: Installation of common parts



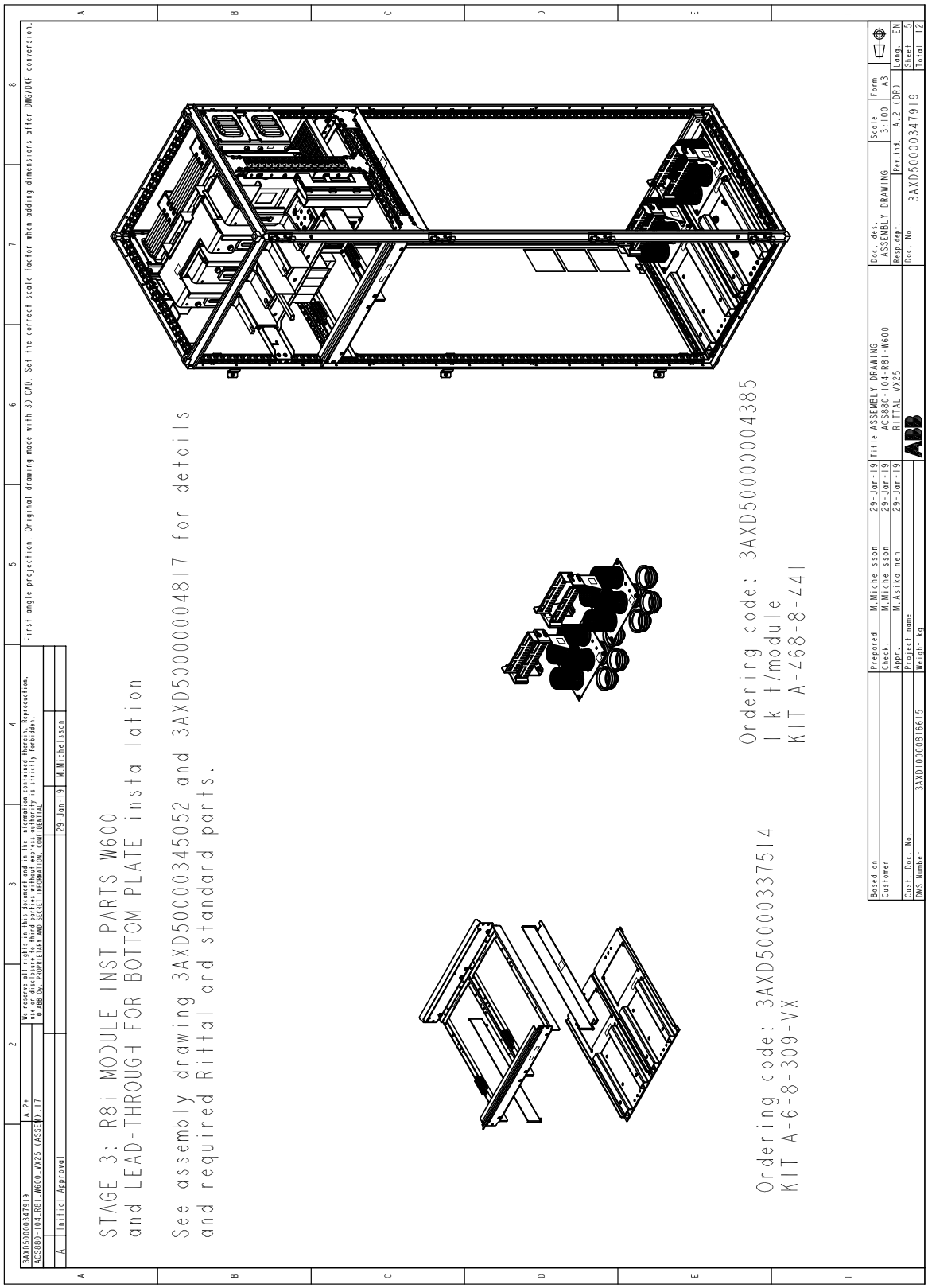
Stage 2 A: Installation of DC busbars (1) (without DC switch/charging)



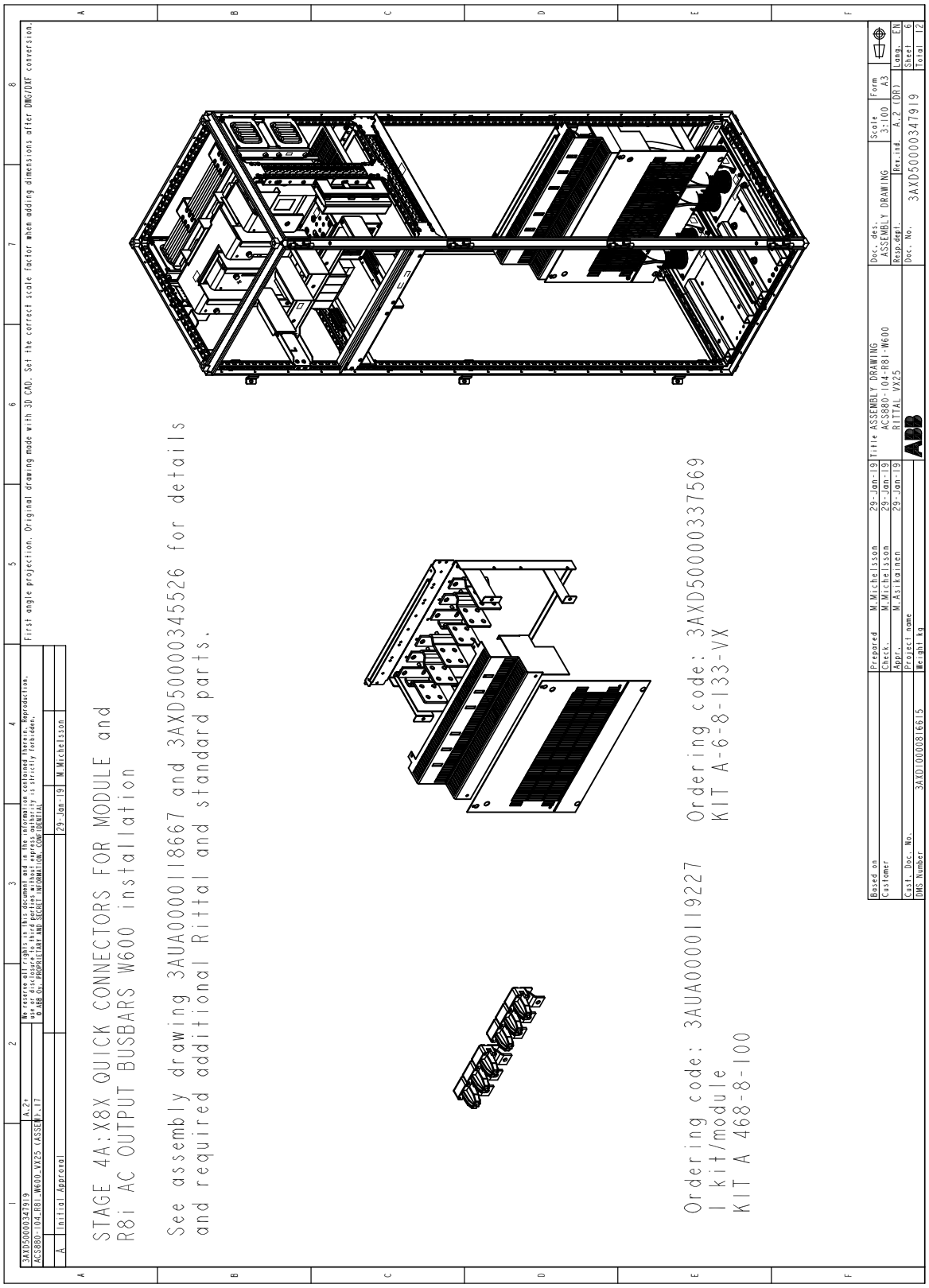
Stage 2 B: Installation of DC busbars (1) (with DC switch/charging)



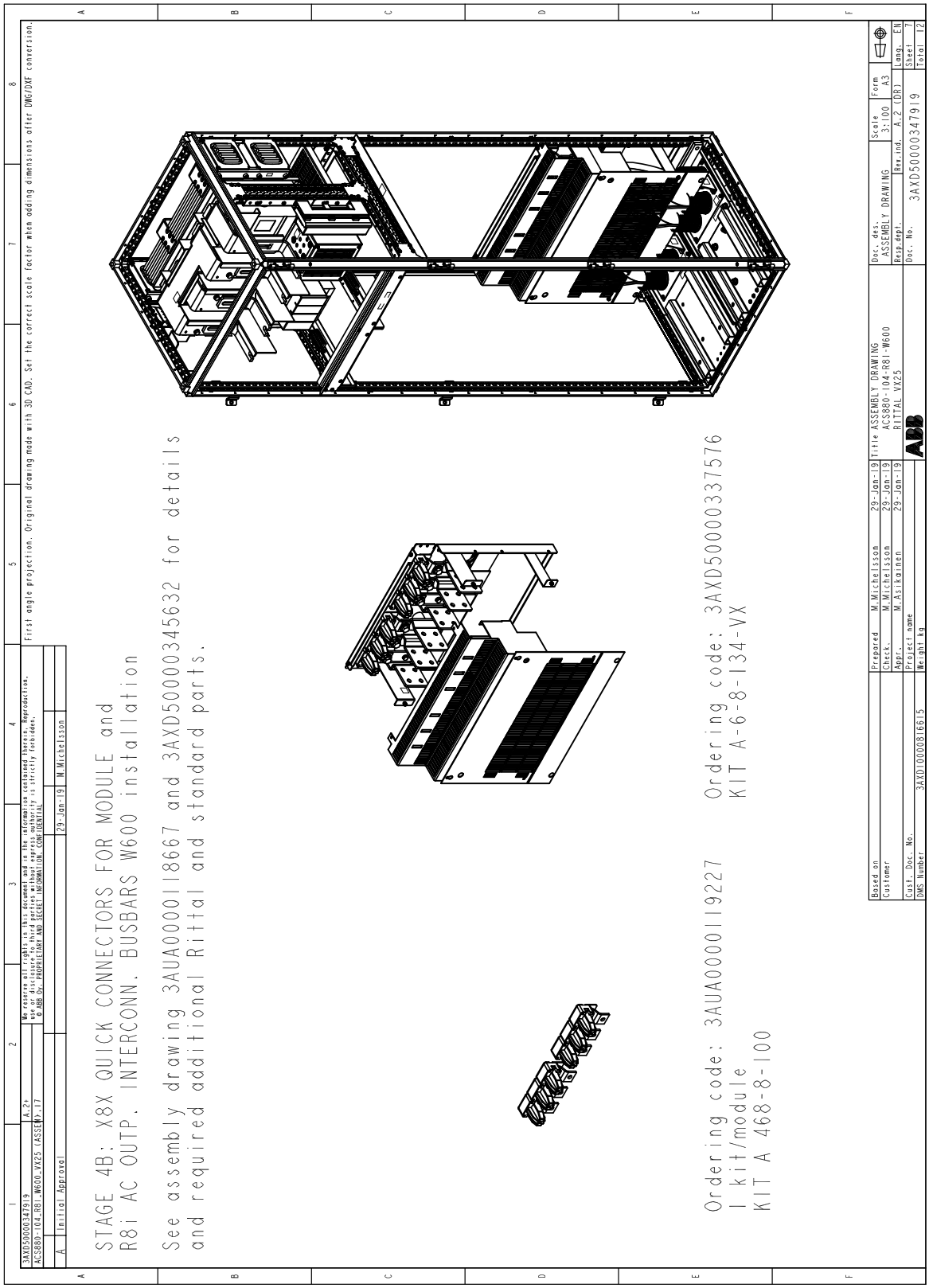
Stage 3: Installation of module installation parts and lead-throughs



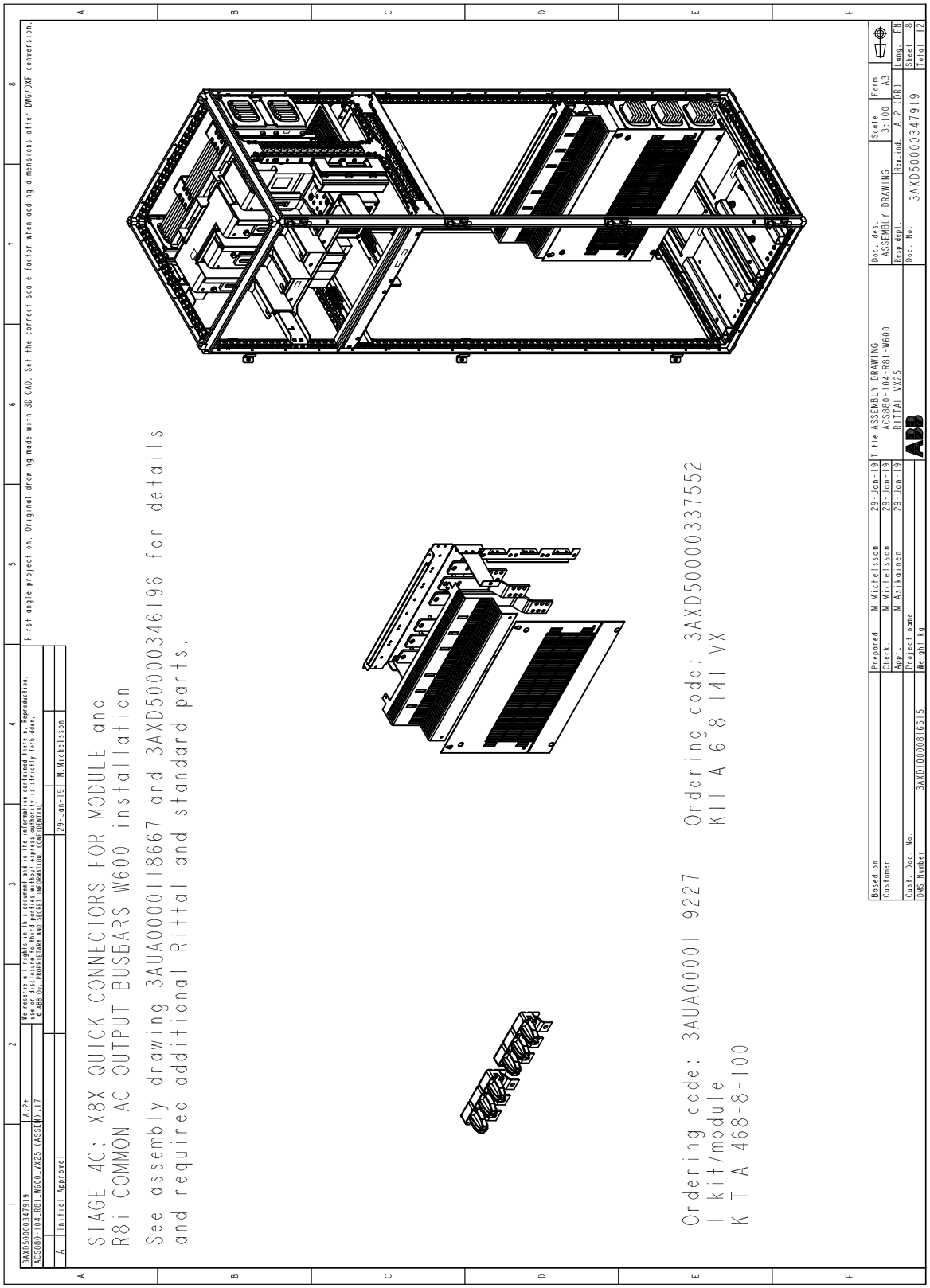
Stage 4 A: Installation of quick connector and output (AC) busbars (cable connection)



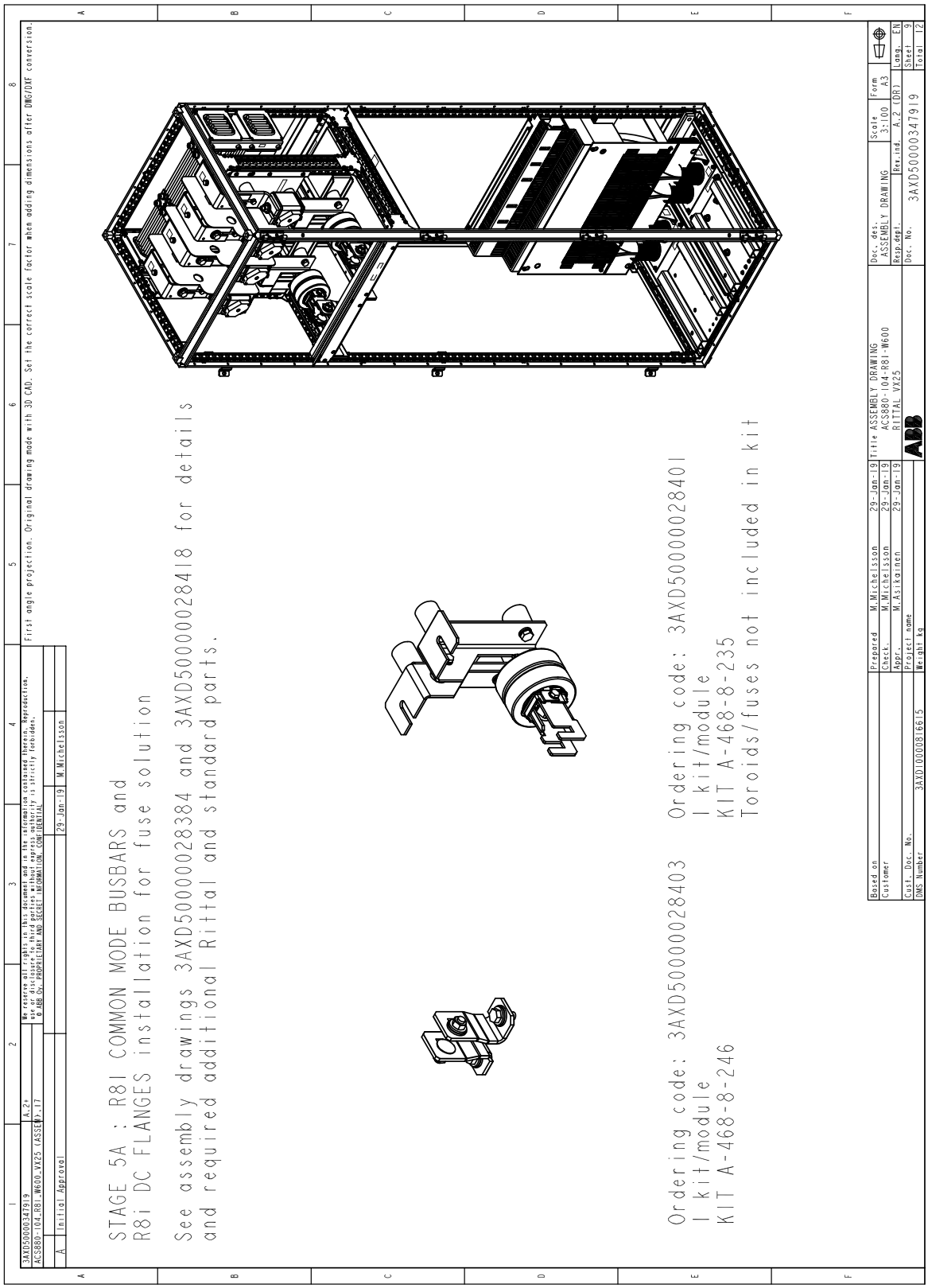
Stage 4 B: Installation of quick connector and output (AC) busbars (cable connection with bridging)



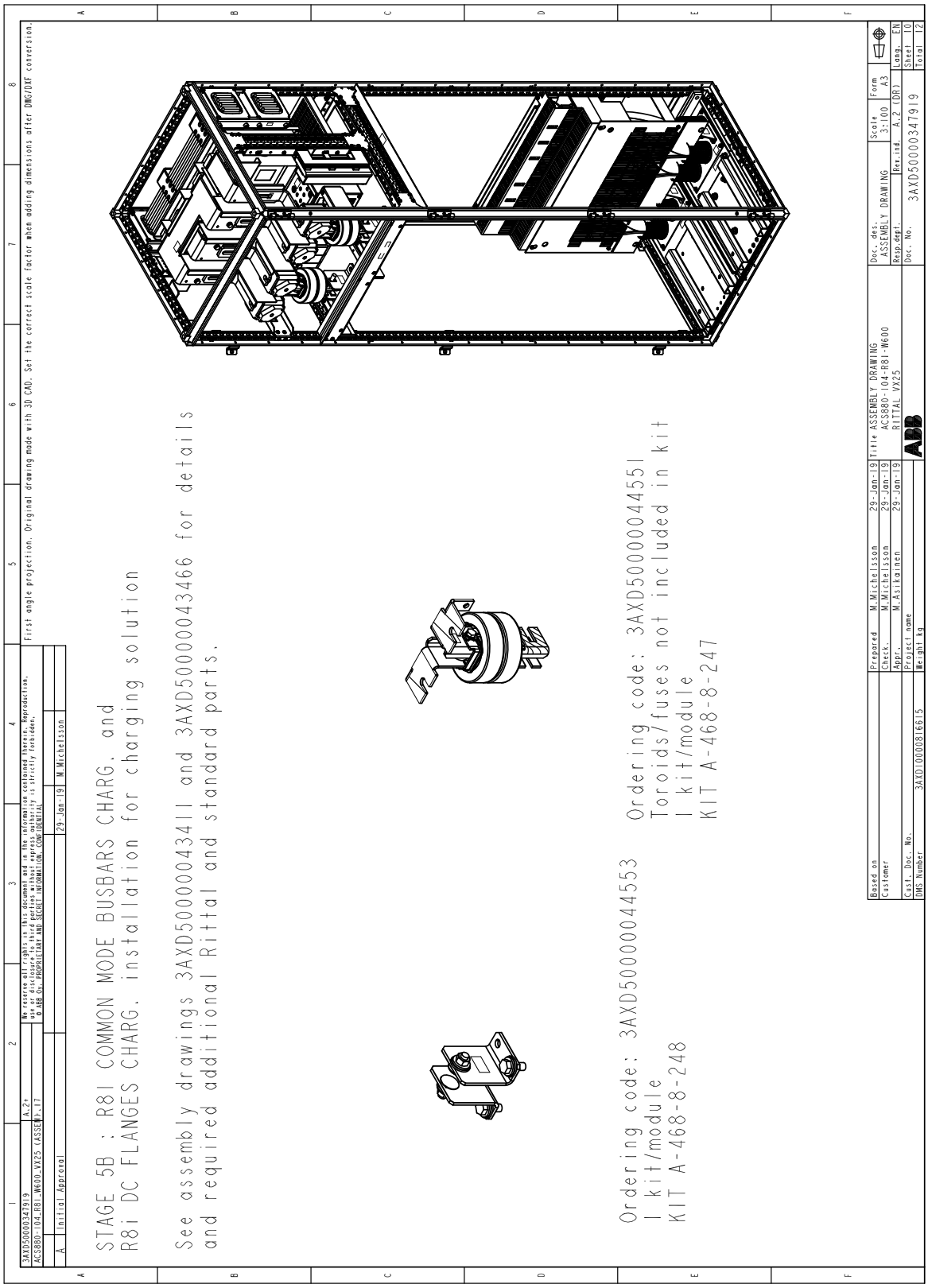
Stage 4 C: Installation of quick connector and output (AC) busbars (common AC output busbar connection)



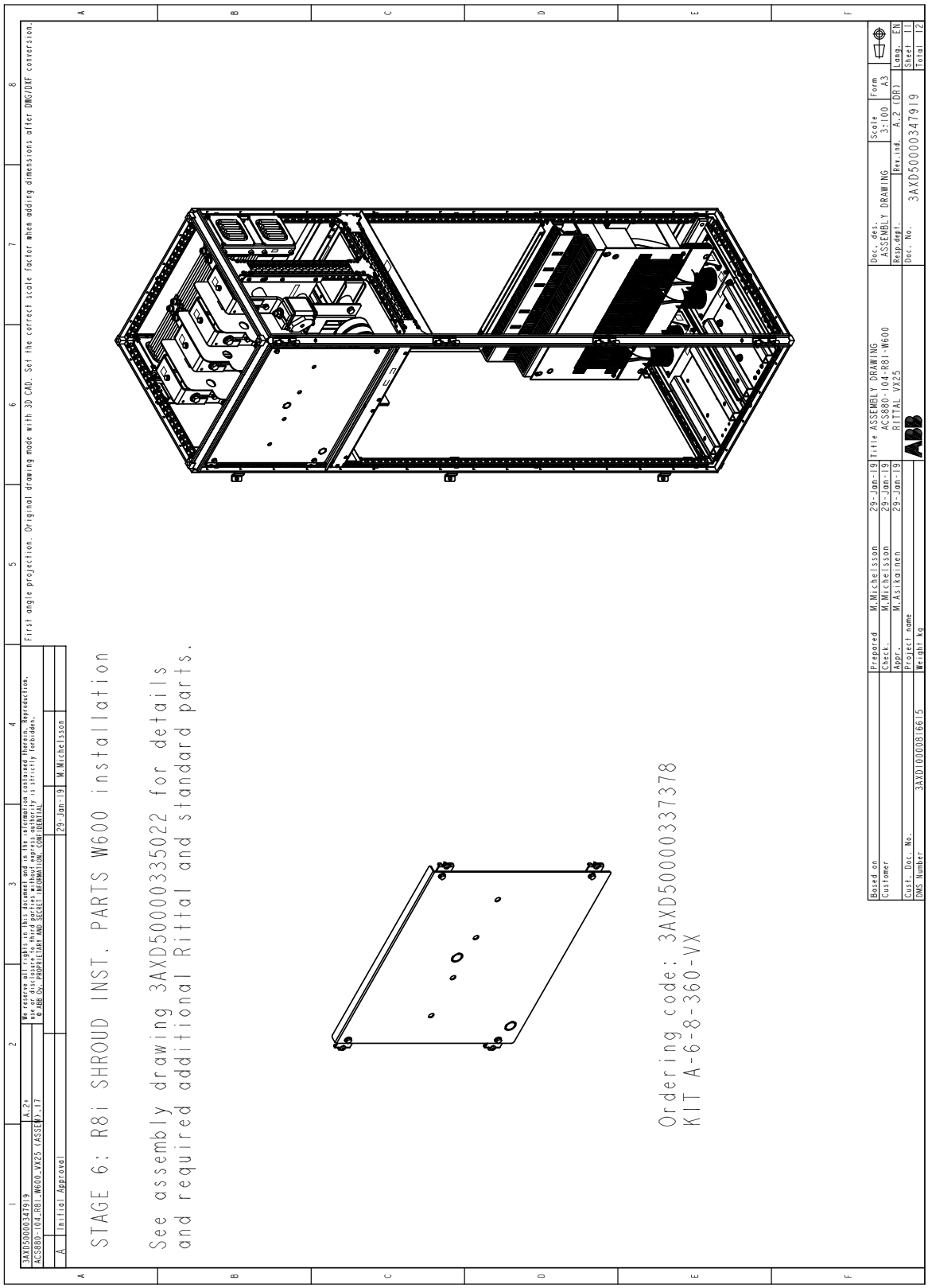
Stage 5 A: Installation of DC busbars (2) (without DC switch/charging)



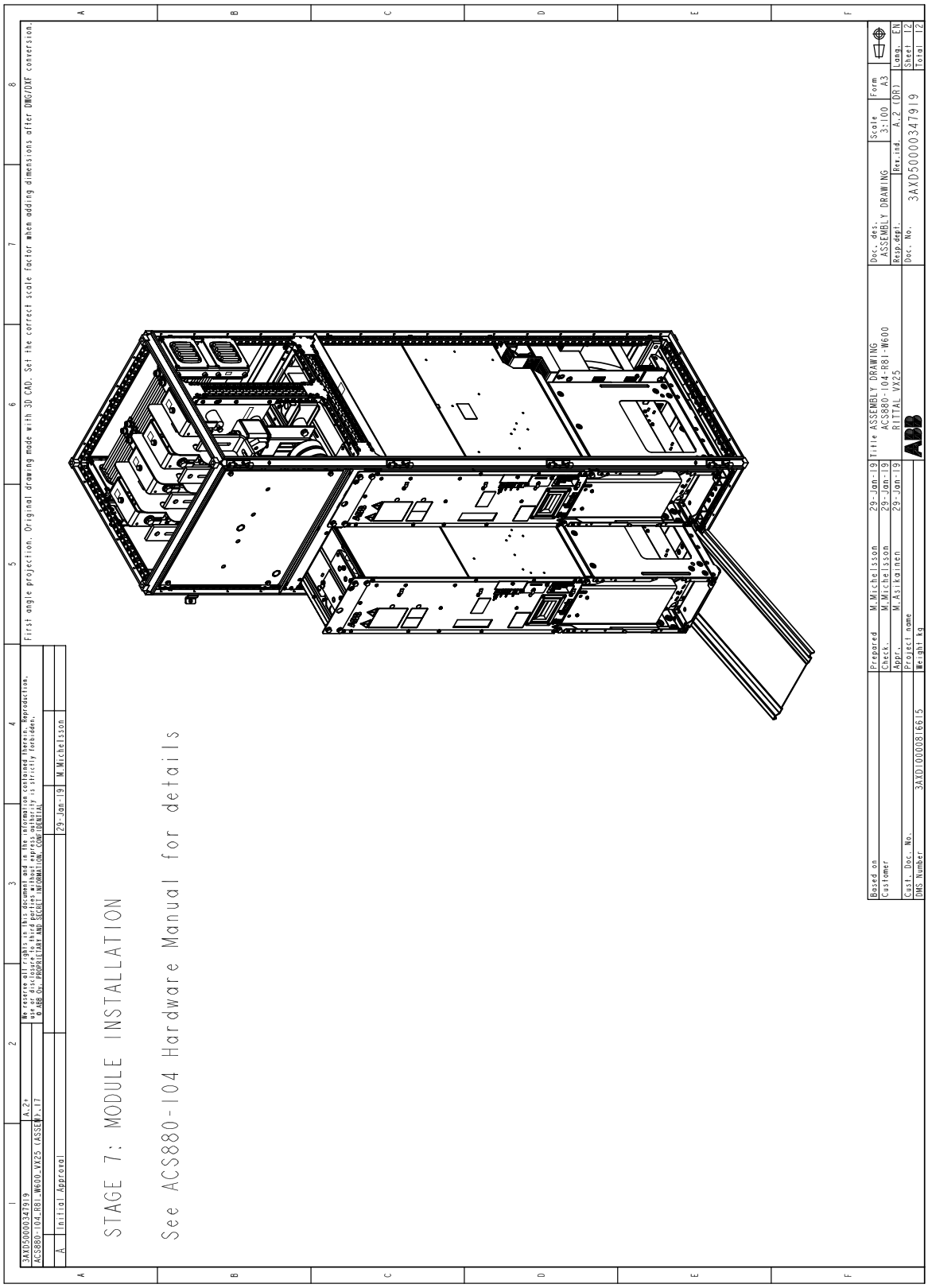
Stage 5 B: Installation of DC busbars (2) (with DC switch/charging)



Stage 6: Installation of shrouding



Stage 7: Installation of inverter modules



One R8i module in a 400 mm wide generic enclosure

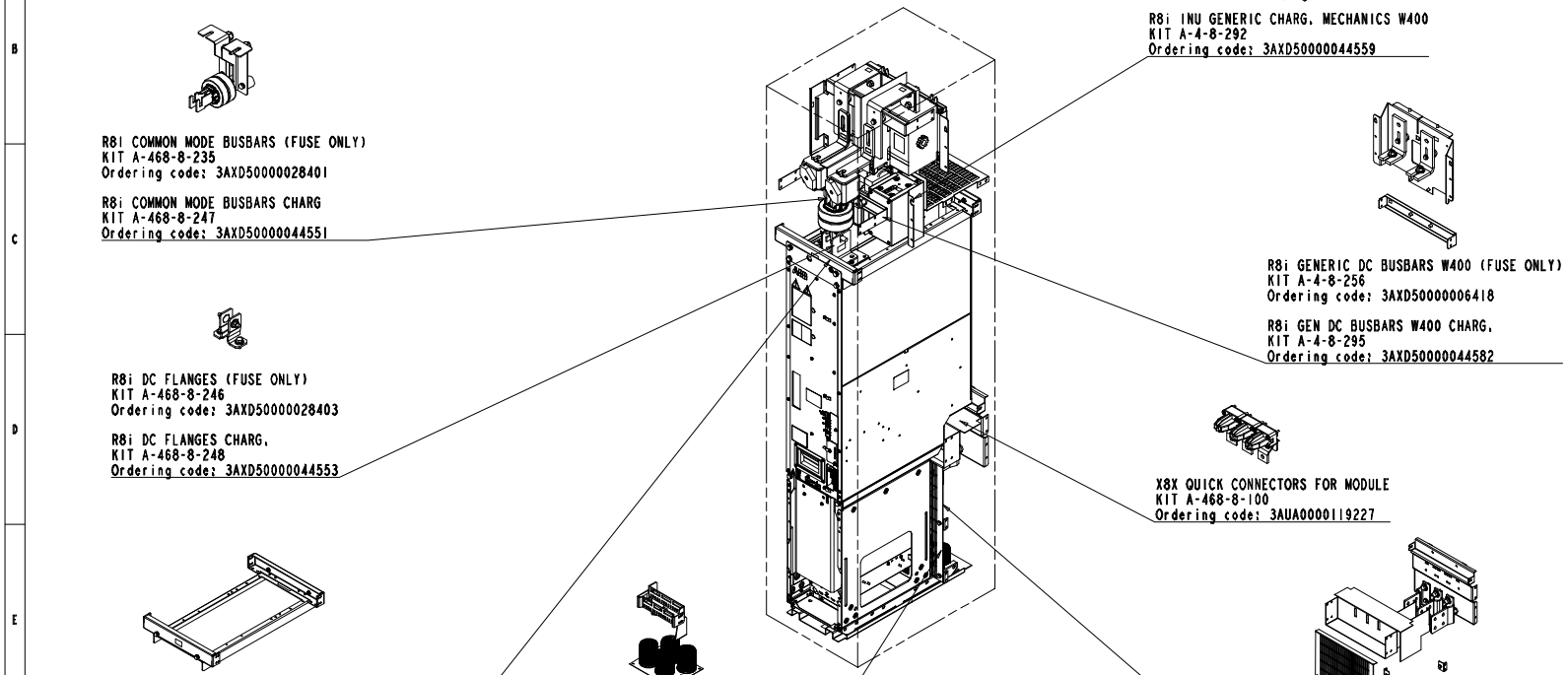
Parts installed	Instruction code	Kit code	Kit ordering code
DC switch/charging mechanics (optional)	3AXD50000043644	A-4-8-292	3AXD50000044559
DC busbars (without DC switch/charging):			
Busbar assembly	3AXD50000006441	A-4-8-256	3AXD50000006418
DC busbars with common mode filters (filters not included in kit)	3AXD50000028418	A-468-8-235	3AXD50000028401
DC connection flanges	3AXD50000028384	A-468-8-246	3AXD50000028403
DC busbars (with DC switch/charging):			
Busbar assembly	3AXD50000043686	A-4-8-295	3AXD50000044582
DC busbars with common mode filters (filters not included in kit)	3AXD50000043411	A-468-8-247	3AXD50000044551
DC connection flanges	3AXD50000043466	A-468-8-248	3AXD50000044553
Module mechanical installation parts, lead-throughs:			
Module top/bottom guides	3AXD50000005874	A-4-8-315	3AXD50000005875
Lead-throughs	3AXD50000004817	A-468-8-441	3AXD50000004385
Quick connector, output (AC) busbars:			
Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
Busbars and shrouds	3AXD50000006497	A-4-8-135	3AXD50000006435
Inverter module	-	-	-
Shrouding	-	-	-

3AXD50000009694	D.1+	We reserve all rights in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden. © ABB Oy, PROPRIETARY AND SECRET INFORMATION, CONFIDENTIAL			
ACS880-04_R8i_W400_GEN (ASSEM)	-.24				
C	Views updated		05-Jun-15	J.Lindqvist	500000658488
D	Charging kits updated		31-Oct-16	M.Michelsson	

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

KITS FOR INU 1xR8i IN GENERIC 2000x600x400 CABINET

Note! Only parts included in ABB kits are shown here!
See kit assembly drawings for required other standard parts.



R8i INU GENERIC CHARG, MECHANICS W400
KIT A-4-8-292
Ordering code: 3AXD50000044559

R8i COMMON MODE BUSBARS (FUSE ONLY)
KIT A-468-8-235
Ordering code: 3AXD50000028401

R8i COMMON MODE BUSBARS CHARG
KIT A-468-8-247
Ordering code: 3AXD50000044551

R8i GENERIC DC BUSBARS W400 (FUSE ONLY)
KIT A-4-8-256
Ordering code: 3AXD50000006418

R8i GEN DC BUSBARS W400 CHARG,
KIT A-4-8-295
Ordering code: 3AXD50000044582

R8i DC FLANGES (FUSE ONLY)
KIT A-468-8-246
Ordering code: 3AXD50000028403

R8i DC FLANGES CHARG,
KIT A-468-8-248
Ordering code: 3AXD50000044553

X8X QUICK CONNECTORS FOR MODULE
KIT A-468-8-100
Ordering code: 3AUA0000119227

R8i GENERIC MODULE INSTALL PARTS W400
KIT A-4-8-315
Ordering code: 3AXD50000005875

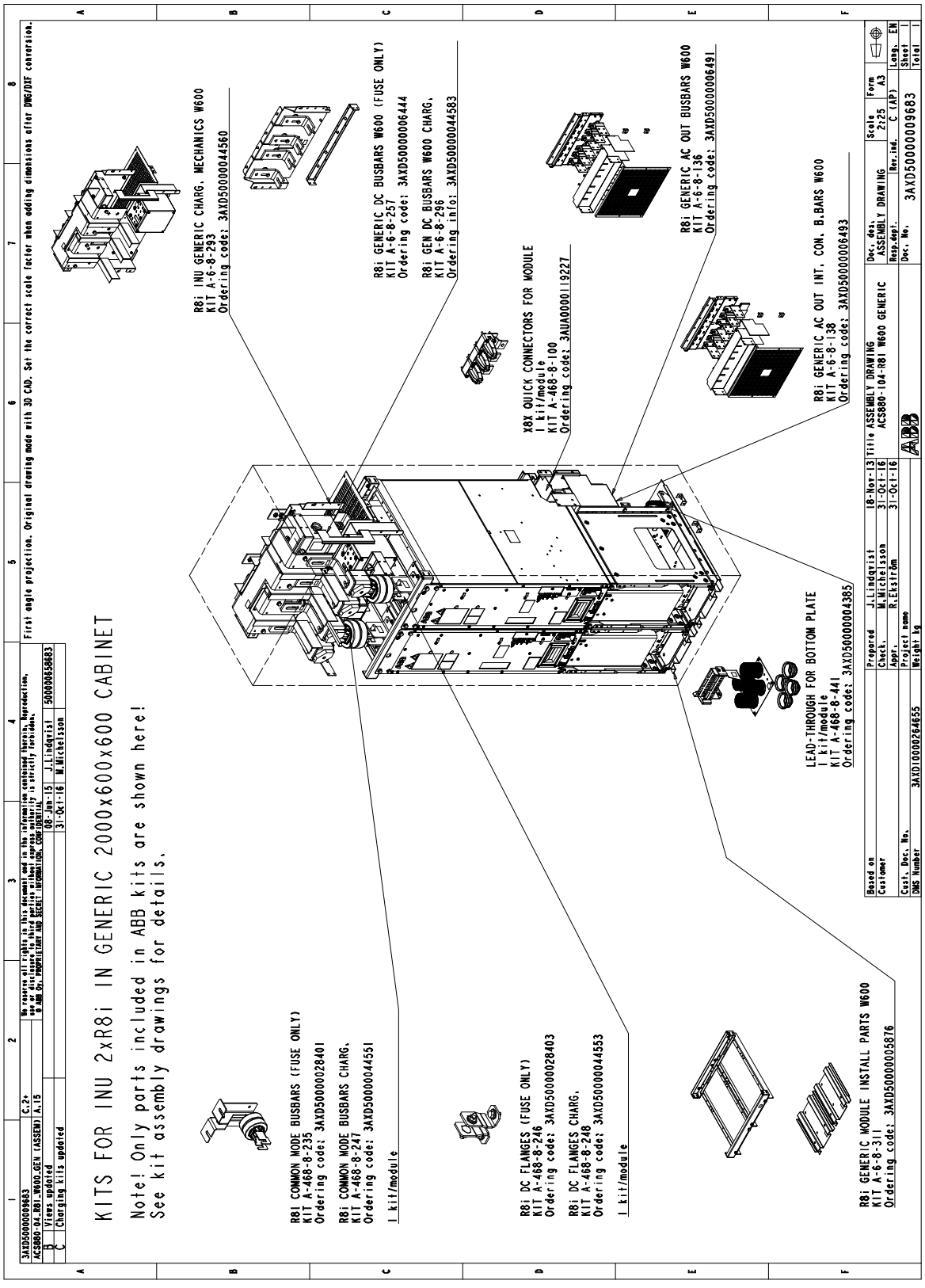
LEAD-THROUGH FOR BOTTOM PLATE
KIT A-468-8-441
Ordering code: 3AXD50000004385

R8i GENERIC AC OUT BUSBARS W400
KIT A-4-8-135
Ordering code: 3AXD50000006435

Based on		Prepared	J.Lindqvist	18-Nov-13	Title ASSEMBLY DRAWING	Doc. des.	Scale	Form
Customer		Check.	M.Michelsson	31-Oct-16	ACS880-104-R8i W400 GENERIC	ASSEMBLY DRAWING	2:25	A3
		Appr.	R.Ekström	31-Oct-16		Resp.dept.	Rev.ind.	D (AP)
Cust. Doc. No.		Project name			ABB	Doc. No.	3AXD50000009694	Lang. EN
DMS Number	3AXD10000264818	Weight kg						Sheet 1 / Total 1

Two R8i modules in a 600 mm wide generic enclosure

Parts installed	Instruction code	Kit code	Kit ordering code
DC switch/charging mechanics (optional)	3AXD50000043784	A-6-8-293	3AXD50000044560
DC busbars (without DC switch/charging):			
Busbar assembly	3AXD50000006447	A-6-8-257	3AXD50000006444
DC busbars with common mode filters (filters not included in kit)	3AXD50000028418	A-468-8-235	3AXD50000028401
DC connection flanges	3AXD50000028384	A-468-8-246	3AXD50000028403
DC busbars (with DC switch/charging):			
Busbar assembly	3AXD50000043737	A-6-8-296	3AXD50000044583
DC busbars with common mode filters (filters not included in kit)	3AXD50000043411	A-468-8-247	3AXD50000044551
DC connection flanges	3AXD50000043466	A-468-8-248	3AXD50000044553
Module mechanical installation parts, lead-throughs:			
Module top/bottom guides	3AXD50000005864	A-6-8-311	3AXD50000005876
Lead-throughs	3AXD50000004817	A-468-8-441	3AXD50000004385
Quick connector, output (AC) busbars:			
Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
Busbars and shrouds (without bridging)	3AXD50000006489	A-6-8-136	3AXD50000006491
Busbars and shrouds (with bridging)	3AXD50000006505	A-6-8-138	3AXD50000006493
Inverter module	-	-	-
Shrouding	-	-	-


KITS FOR INU 2xR8i IN GENERIC 2000x600x600 CABINET
Note! Only parts included in ABB kits are shown here!
See kit assembly drawings for details.
R8i INU GENERIC CHARG. MECHANICS W600
KIT A-6-8-293
Ordering code: 3AXD50000044560
R8i GENERIC DC BUSBARS W600 (FUSE ONLY)
KIT A-6-8-257
Ordering code: 3AXD50000006444
R8i GEN DC BUSBARS W600 CHARG,
KIT A-6-8-296
Ordering info: 3AXD50000044583
X8X QUICK CONNECTORS FOR MODULE
1 kit/module
KIT A-468-8-100
Ordering code: 3AUA0000119227
R8i GENERIC AC OUT BUSBARS W600
KIT A-6-8-136
Ordering code: 3AXD50000006491
R8i GENERIC AC OUT INT, CON. B.BARS W600
KIT A-6-8-138
Ordering code: 3AXD50000006493
LEAD-THROUGH FOR BOTTOM PLATE
1 kit/module
KIT A-468-8-441
Ordering code: 3AXD50000004385
R8i COMMON MODE BUSBARS (FUSE ONLY)
KIT A-468-8-235
Ordering code: 3AXD50000028401
R8i COMMON MODE BUSBARS CHARG.
KIT A-468-8-247
Ordering code: 3AXD50000044551
1 kit/module
R8i DC FLANGES (FUSE ONLY)
KIT A-468-8-246
Ordering code: 3AXD50000028403
R8i DC FLANGES CHARG.
KIT A-468-8-248
Ordering code: 3AXD50000044553
1 kit/module
R8i GENERIC MODULE INSTALL PARTS W600
KIT A-6-8-311
Ordering code: 3AXD50000005876
3AXD50000009683
ACS880-04,R8i,W600,GEN (ASSEM)
A.15
B Views updated
C Changing kits updated
6-Jun-16 J.Lindqvist
31-Oct-16 M.Michelsson
500000658683
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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.
Based on
Customer
Cust. Doc. No.
DMS Number
3AXD10000264655
Prepared J.Lindqvist 18-Nov-13
Check. M.Michelsson 31-Oct-16
Appr. R.Ekström 31-Oct-16
Project name
Weight kg
Title ASSEMBLY DRAWING
ACS880-104-R8i W600 GENERIC
Doc. No. 3AXD50000009683
Doc. des. ASSEMBLY DRAWING
Resp.dept.
Scale 2:25
Form A3
Rev.ind. C (AP)
Lang. EN
Sheet 1
Total 1

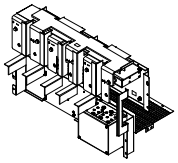
Three R8i modules in a 800 mm wide generic enclosure

Parts installed	Instruction code	Kit code	Kit ordering code
DC switch/charging mechanics (optional)	3AXD50000044586	A-8-8-294	3AXD50000044581
DC busbars (without DC switch/charging):			
Busbar assembly	3AXD50000006455	A-8-8-258	3AXD50000006450
DC busbars with common mode filters (filters not included in kit)	3AXD50000028418	A-468-8-235	3AXD50000028401
DC connection flanges	3AXD50000028384	A-468-8-246	3AXD50000028403
DC busbars (with DC switch/charging):			
Busbar assembly	3AXD50000044574	A-8-8-297	3AXD50000044584
DC busbars with common mode filters (filters not included in kit)	3AXD50000043411	A-468-8-247	3AXD50000044551
DC connection flanges	3AXD50000043466	A-468-8-248	3AXD50000044553
Module mechanical installation parts, lead-throughs:			
Module top/bottom guides	3AXD50000005848	A-8-8-312	3AXD50000005877
Lead-throughs	3AXD50000004817	A-468-8-441	3AXD50000004385
Quick connector, output (AC) busbars:			
Quick connector	3AUA0000118667	A-468-8-100	3AUA0000119227
Busbars and shrouds (without bridging)	3AXD50000006503	A-8-8-137	3AXD50000006492
Busbars and shrouds (with bridging)	3AXD50000006498	A-8-8-139	3AXD50000006494
Inverter module	-	-	-
Shrouding	-	-	-

3AXD50000009670	C.1+	We reserve all rights in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden. © ABB Oy, PROPRIETARY AND SECRET INFORMATION, CONFIDENTIAL	First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.		
ACS880-04_R8i_W800_GEN (ASSEM)	-.18				
B	Views updated		08-Jun-15	J.Lindqvist	500000658752
C	Charging kits updated		31-Oct-16	M.Michelsson	

KITS FOR INU 3xR8i IN GENERIC 2000x600x800 CABINET

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



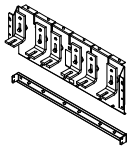
R8i INU GENERIC CHARG. MECHANICS W800
KIT A-8-8-294
Ordering code: 3AXD50000044581



R8I COMMON MODE BUSBARS (FUSE ONLY)
KIT A-468-8-235
Ordering code: 3AXD50000028401

R8i COMMON MODE BUSBARS CHARG.
KIT A-468-8-247
Ordering code: 3AXD50000044551

1 kit/module



R8i GENERIC DC BUSBARS W800 (FUSE ONLY)
KIT A-8-8-258
Ordering code: 3AXD50000006450

R8i GEN DC BUSBARS W800 CHARG.
KIT A-8-8-297
Ordering code: 3AXD50000044584



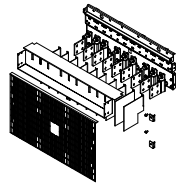
R8i DC FLANGES (FUSE ONLY)
KIT A-468-8-246
Ordering code: 3AXD50000028403

R8i DC FLANGES CHARG.
KIT A-468-8-248
Ordering code: 3AXD50000044553

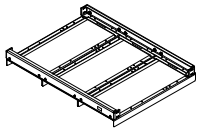
1 kit/module

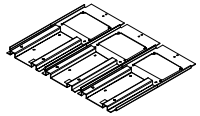


X8X QUICK CONNECTORS FOR MODULE
1 kit/module
KIT A-468-8-100
Ordering code: 3AUA0000119227

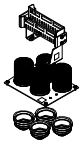


R8i GENERIC AC OUT BUSBARS W800
KIT A-8-8-137
Ordering code: 3AXD50000006492

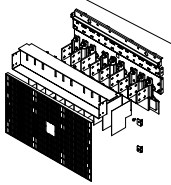




R8i GENERIC MODULE INSTALL PARTS W800
KIT A-8-8-312
Ordering code: 3AXD50000005877



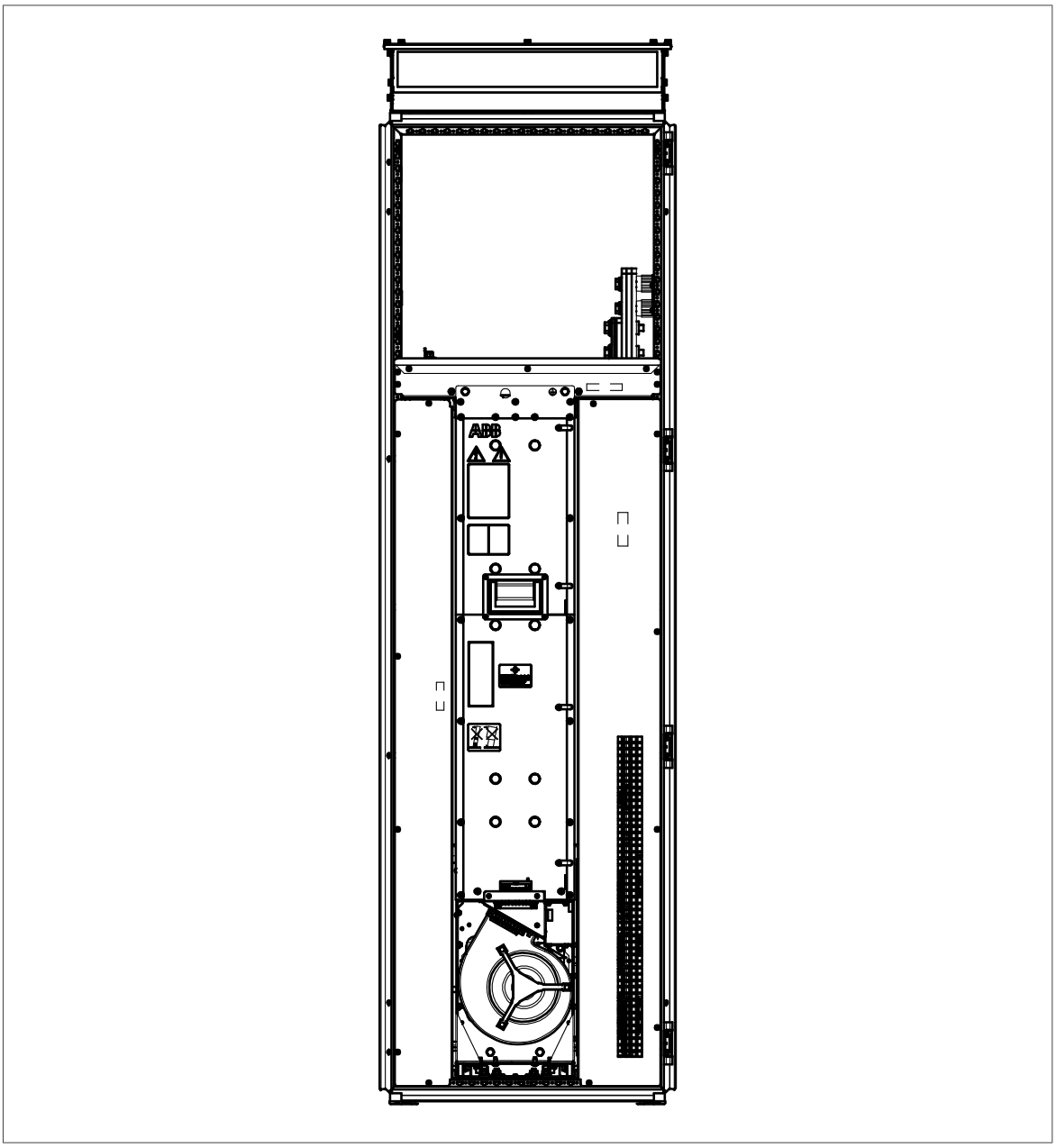
LEAD-THROUGH FOR BOTTOM PLATE
1 kit/module
KIT A-468-8-441
Ordering code: 3AXD50000004385



R8i GENERIC AC OUT INT. CON. B.BARS W800
KIT A-8-8-139
Ordering code: 3AXD50000006494

Based on		Prepared	J.Lindqvist	18-Nov-13	Title ASSEMBLY DRAWING	Doc. des. ASSEMBLY DRAWING	Scale 7:100 / Form A3
Customer		Check.	M.Koskinen	31-Oct-16	ACS880-104-R8i W800 GENERIC		
		Appr.	M.Asikainen	31-Oct-16		Resp.dept.	Rev.ind. C (AP) / Lang. EN
Cust. Doc. No.		Project name			ABB	Doc. No. 3AXD50000009670	Sheet 1 / Total 1
DMS Number	3AXD10000264639	Weight kg					

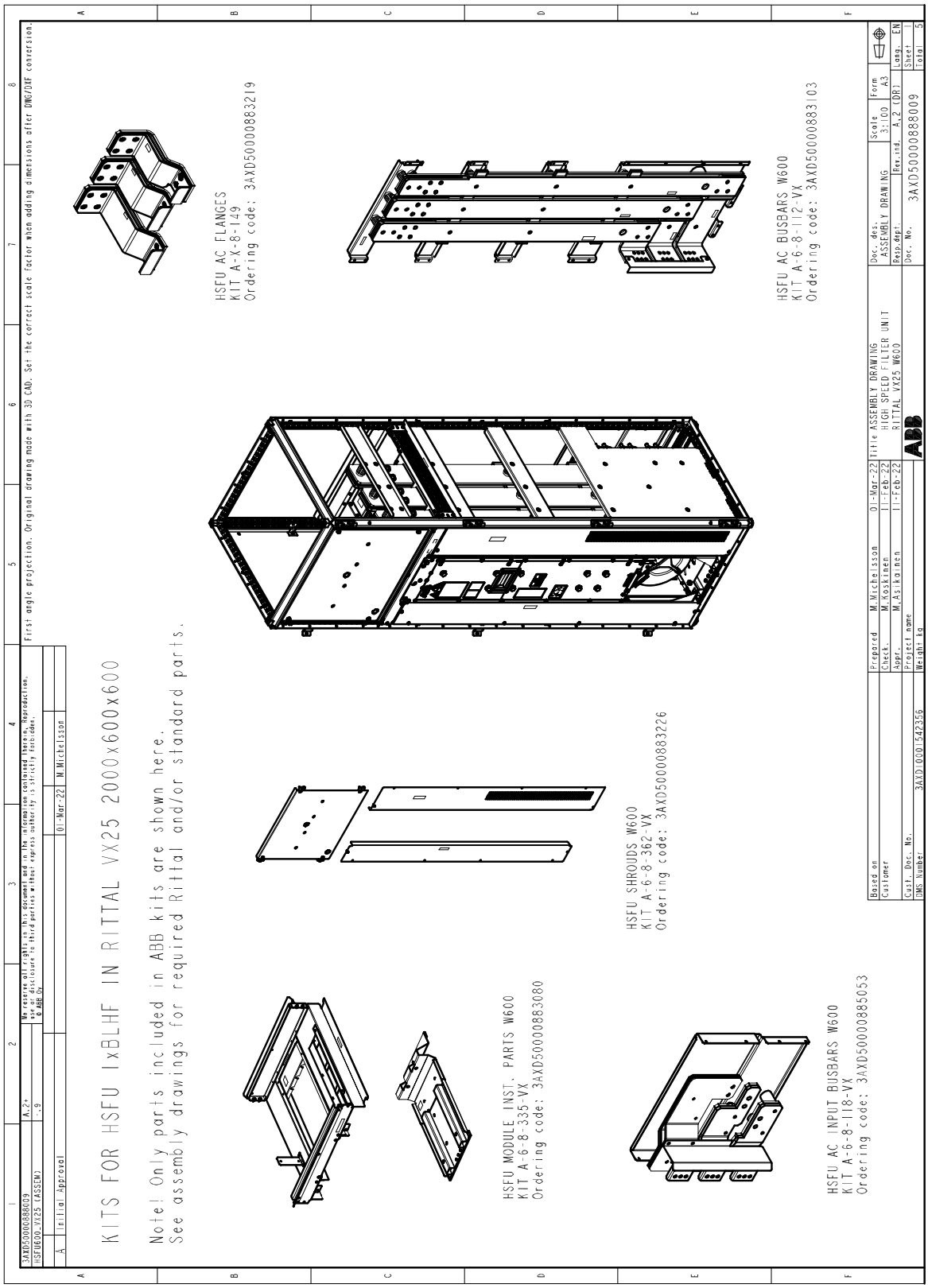
One BLHF filter in a 600 mm wide Rittal VX25 enclosure



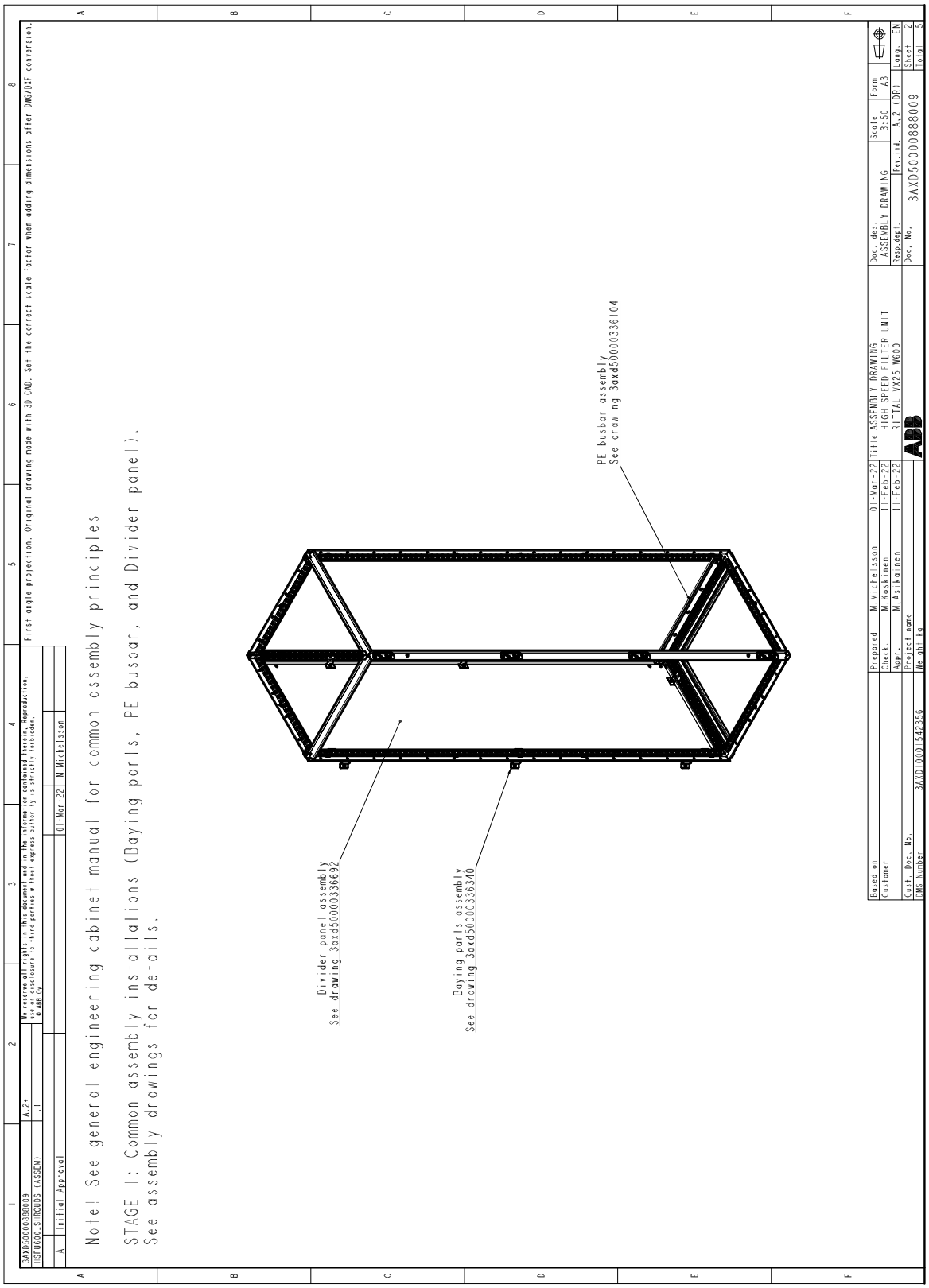
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbar	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
2	Module installation parts:			
	Module top/bottom guides	3AXD50000883684	A-6-8-335-VX	3AXD50000883080
3	AC busbars and AC input busbars installation:			
	AC busbars	3AXD50000887231	A-6-8-112-VX	3AXD50000883103
	AC input busbars	3AXD50000887347	A-6-8-118-VX	3AXD50000885053
4	Filter module, AC flanges and shrouds installation:			
	AC flanges	3AXD50000884216	A-X-8-149	3AXD50000883219
	Shrouds	3AXD50000887286	A-6-8-362-VX	3AXD50000883226

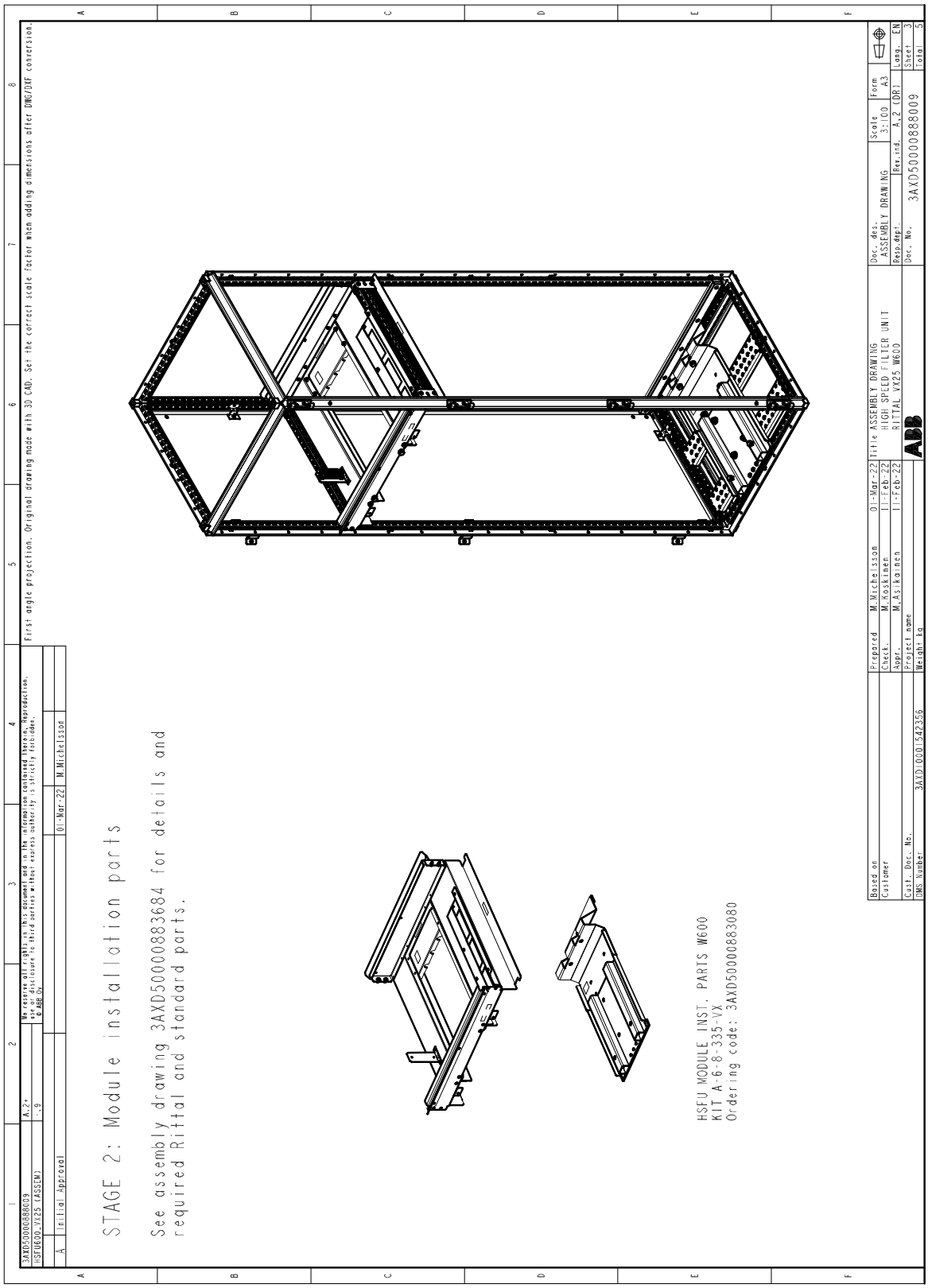
Overview of kits



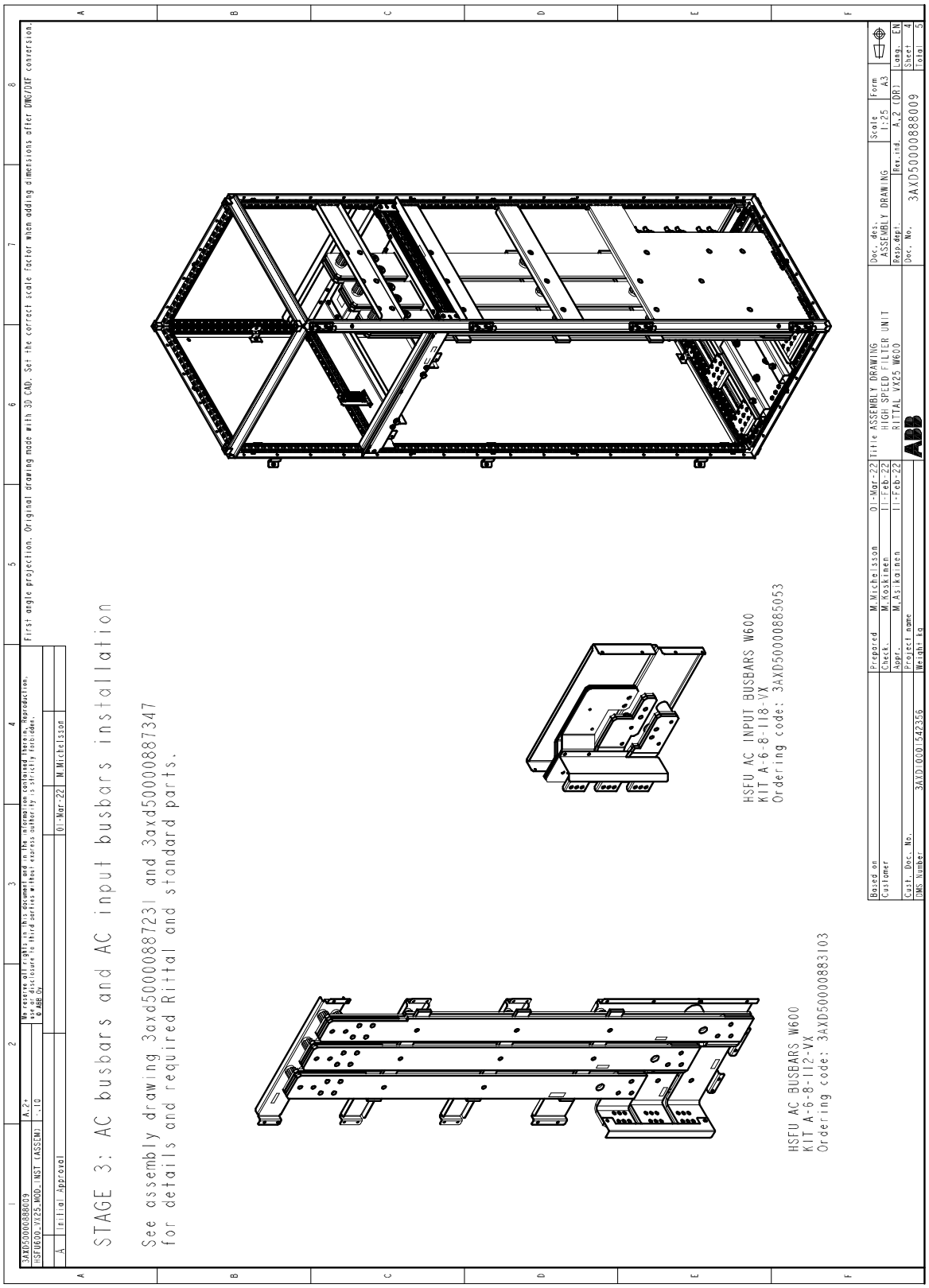
Stage 1: Installation of common parts



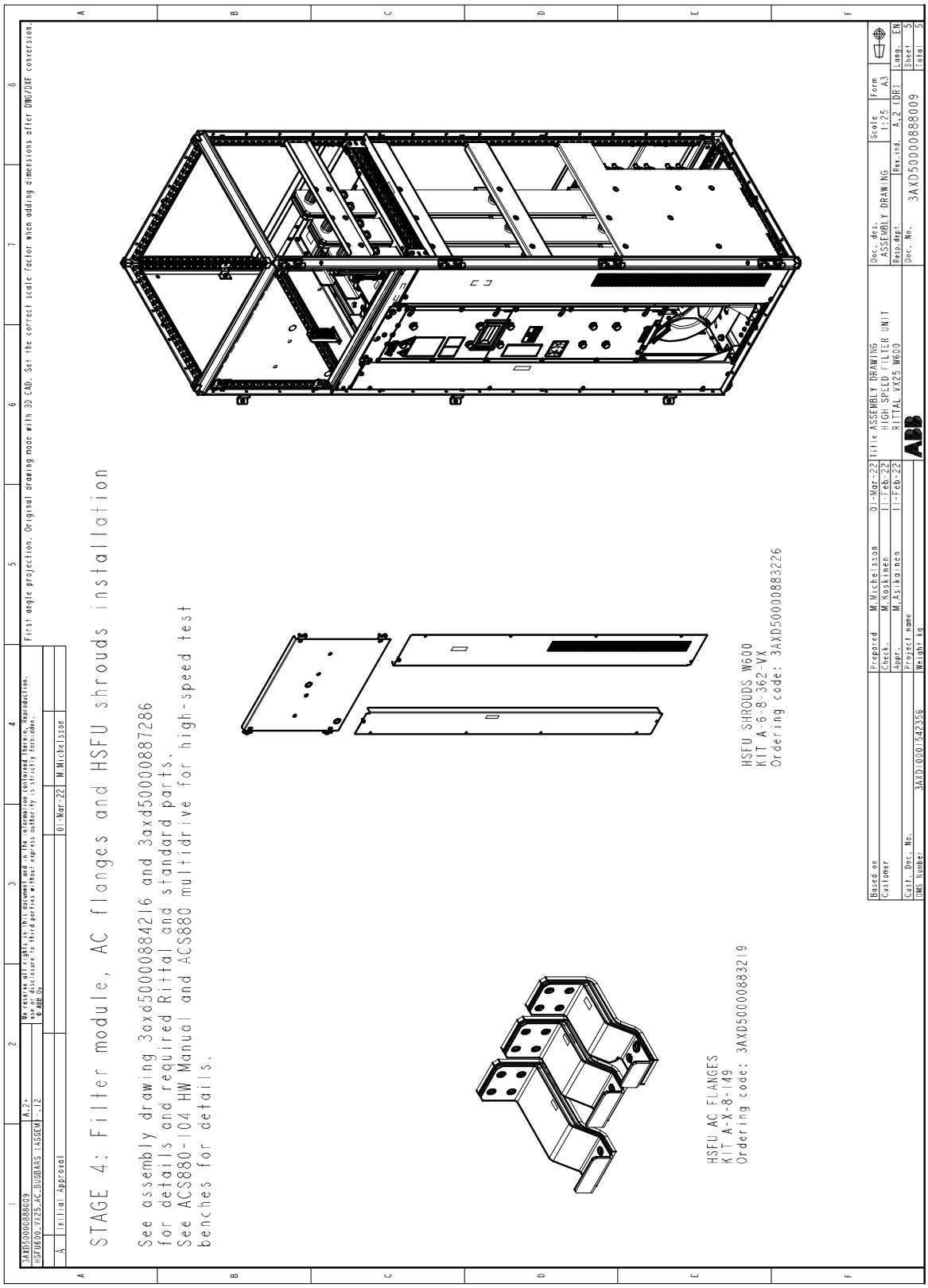
Stage 2: Installation of module installation parts



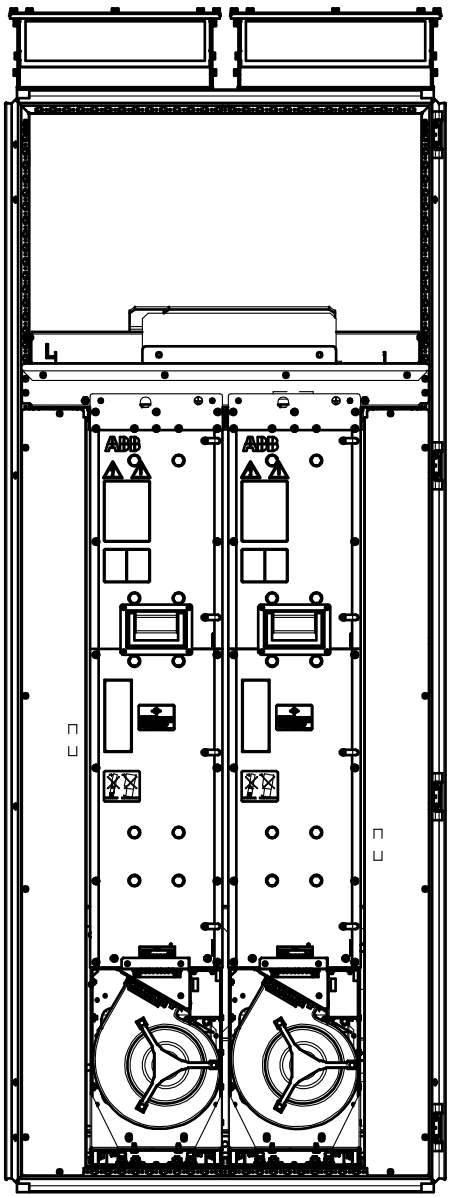
Stage 3: Installation of AC busbars and AC input busbars



Stage 4: Installation of filter module, AC flanges and shrouds



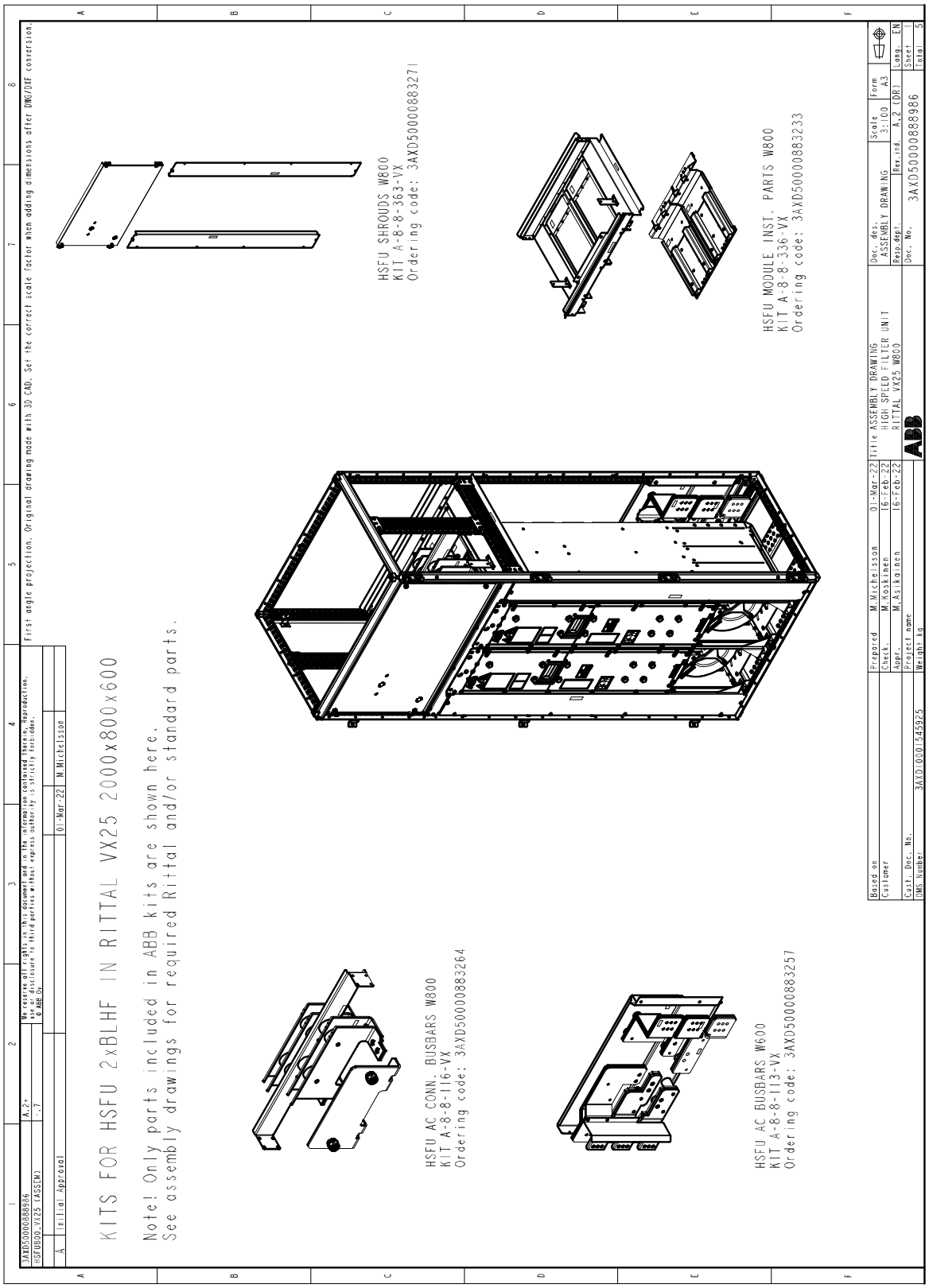
Two BLHF filters in a 800 mm wide Rittal VX25 enclosure



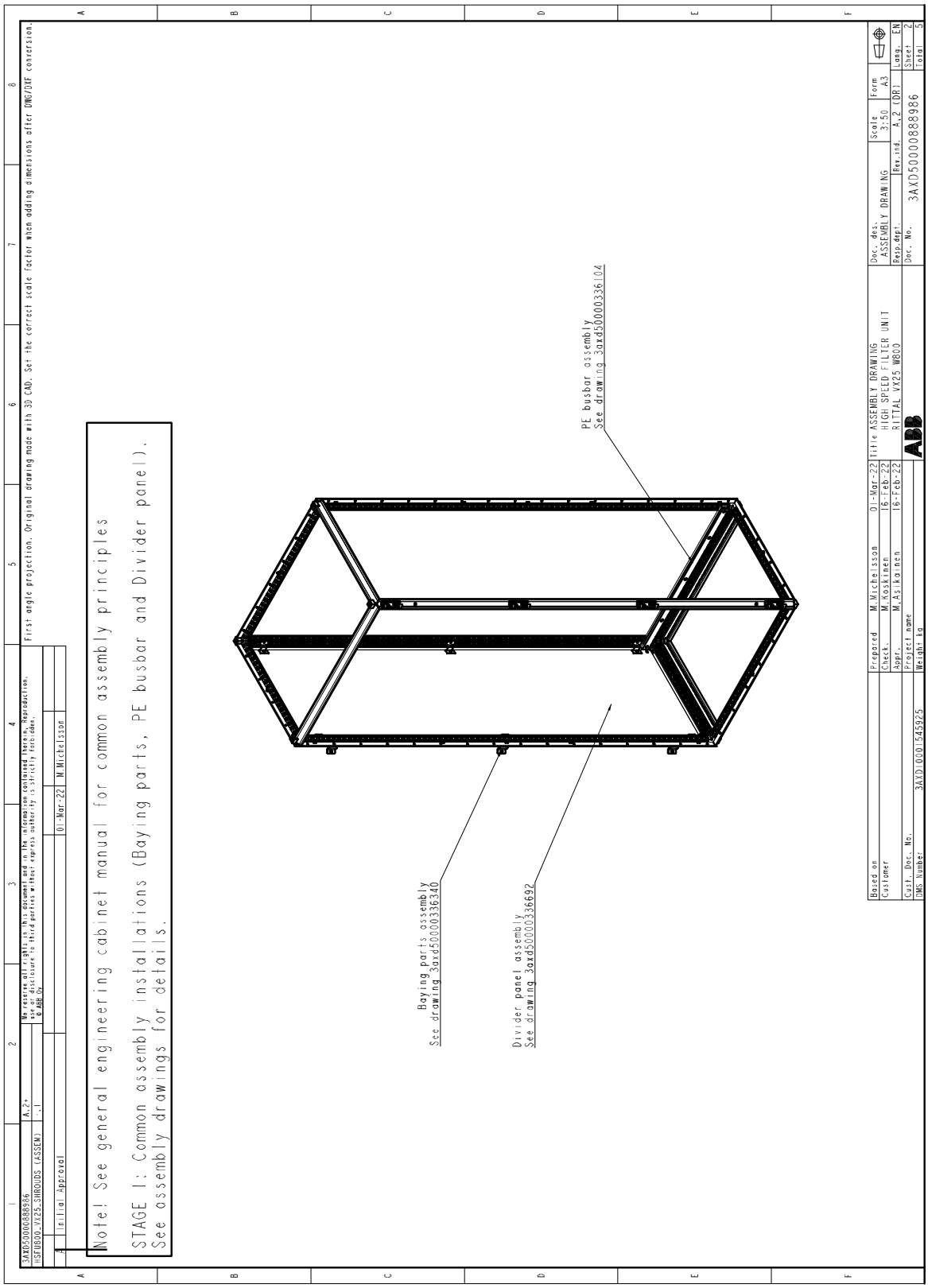
Installation stages

#	Installation stage	Instruction code	Kit code	Kit ordering code
1	Common parts:			
	Baying parts	3AXD50000336340	-	-
	PE busbar	3AXD50000336104	-	-
	Divider panel	3AXD50000336692	-	-
2	Module installation parts:			
	Module top/bottom guides	3AXD50000887408	A-8-8-336-VX	3AXD50000883233
3	AC busbars installation:			
	AC busbars	3AXD50000887569	A-8-8-113-VX	3AXD50000883257
4	Filter module, AC connection busbars and shrouds installation:			
	AC connection busbars	3AXD50000887576	A-8-8-116-VX	3AXD50000883264
	Shrouds	3AXD50000888016	A-8-8-363-VX	3AXD50000883271

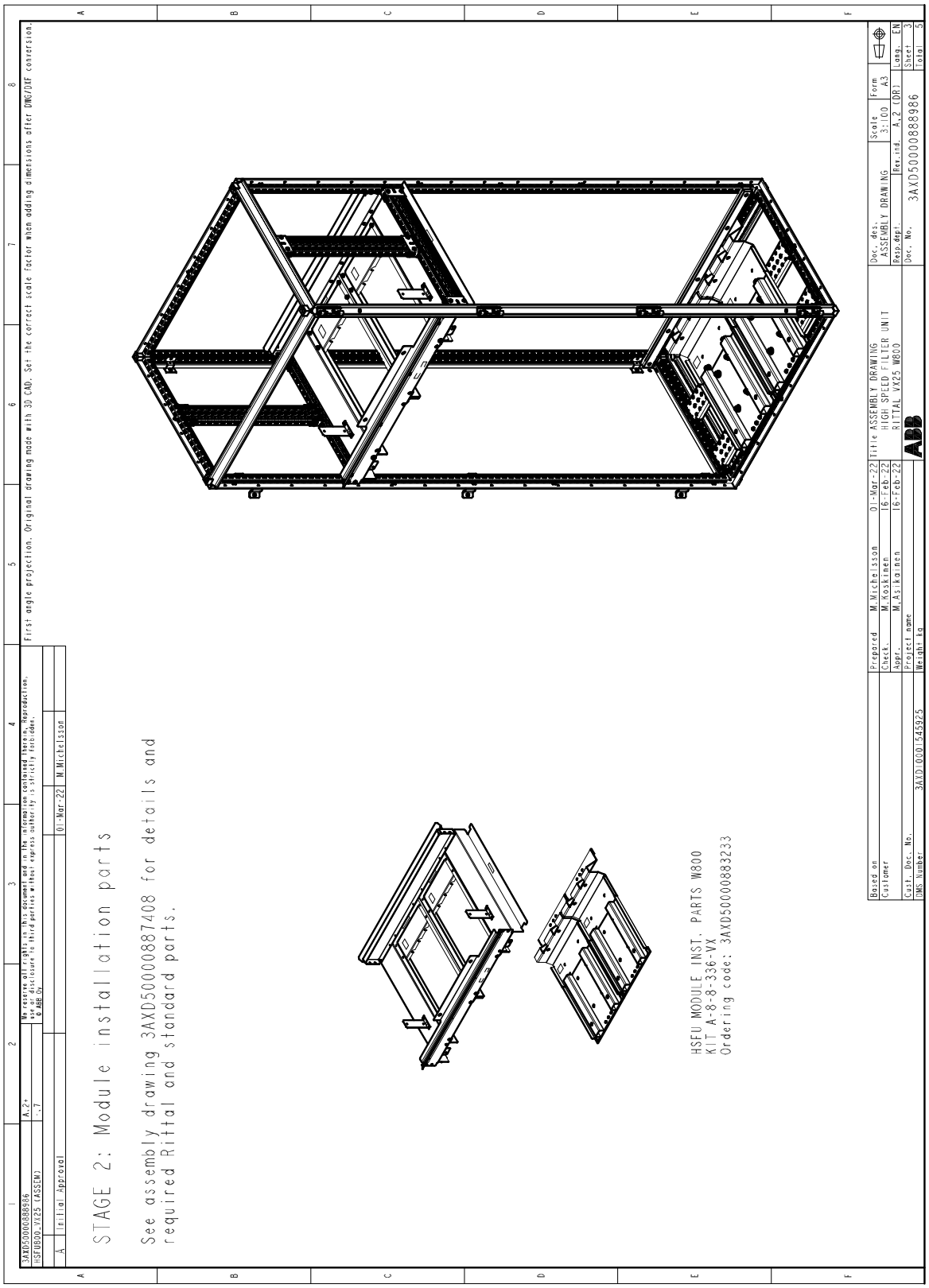
Overview of kits



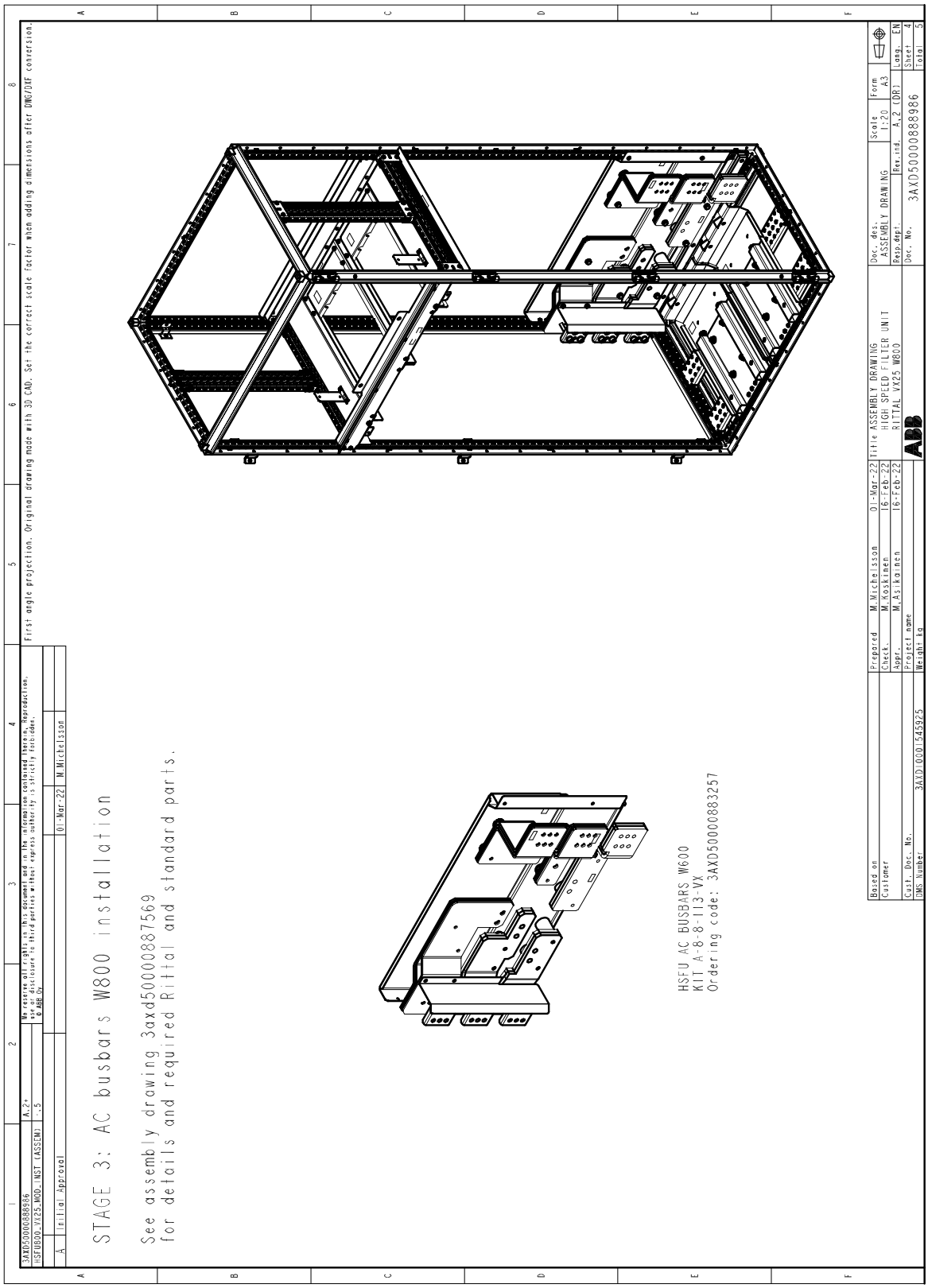
Stage 1: Installation of common parts



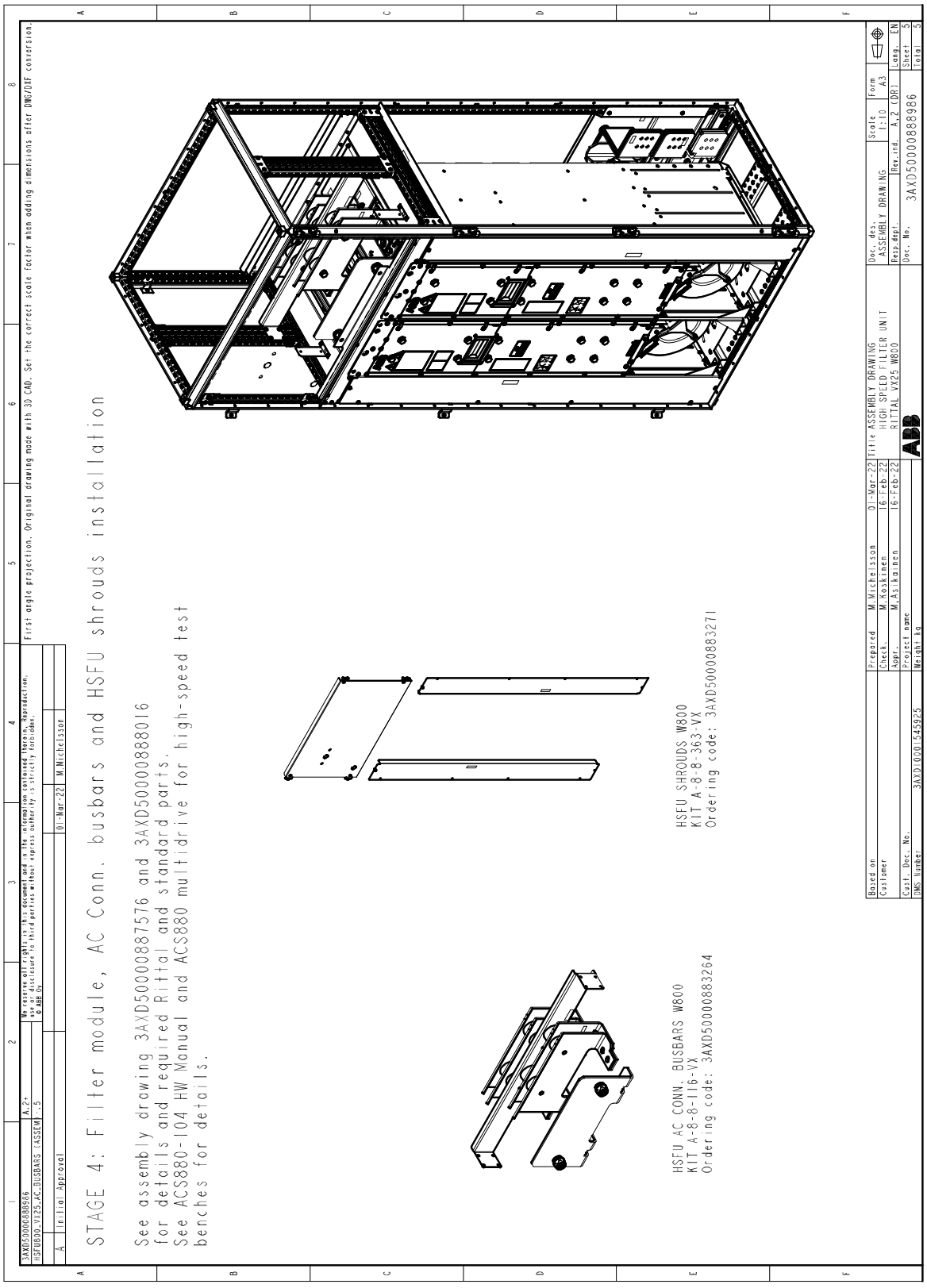
Stage 2: Installation of module installation parts



Stage 3: Installation of AC busbars

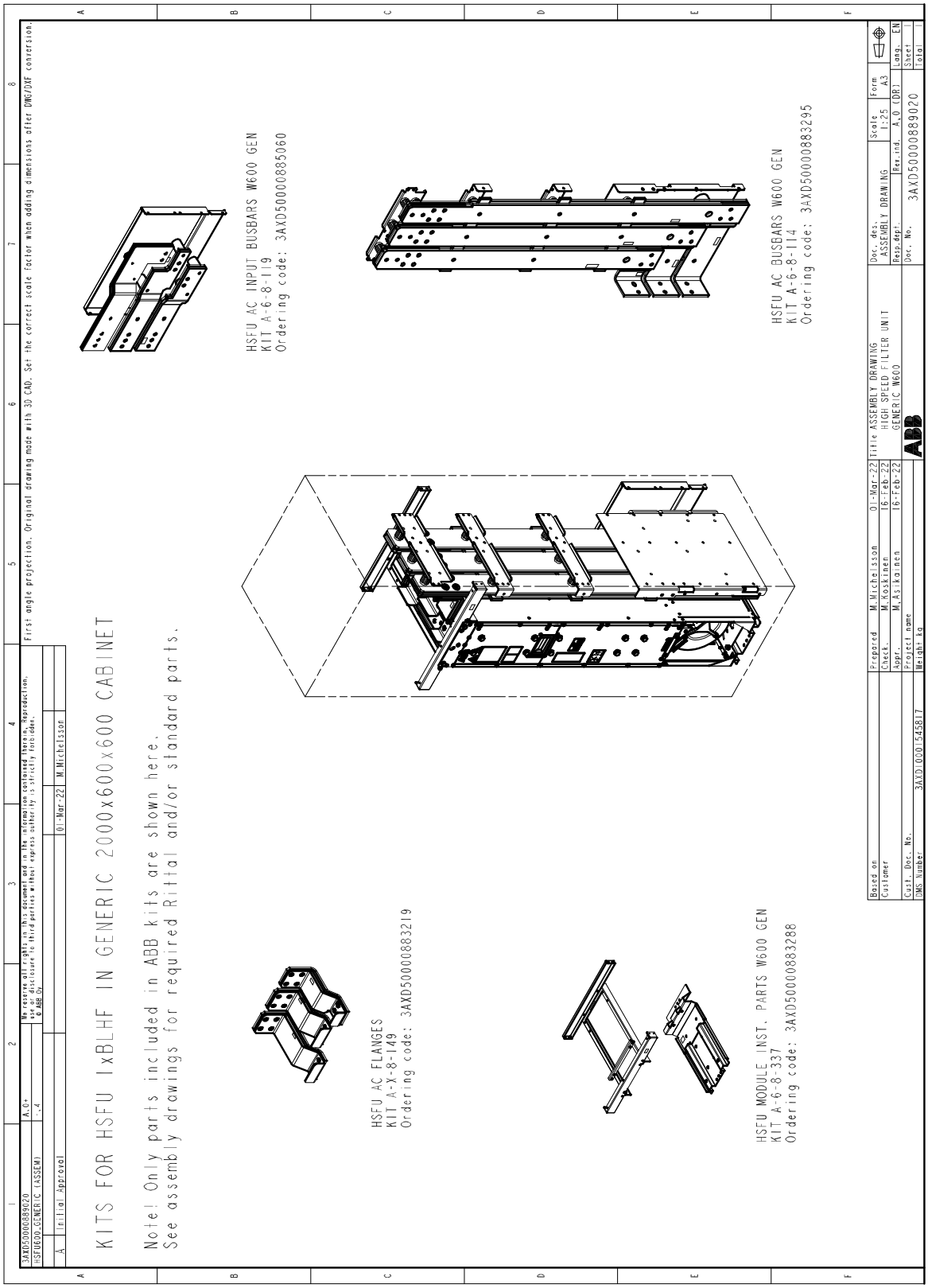


Stage 4: Installation of filter module, AC connection busbars and shrouds



One BLHF filter in a 600 mm wide generic enclosure

Parts installed	Instruction code	Kit code	Kit ordering code
Module top/bottom guides	3AXD50000887224	A-6-8-337	3AXD50000883288
AC flanges	3AXD50000884216	A-X-8-149	3AXD50000883219
AC input busbars	3AXD50000887323	A-6-8-119	3AXD50000885060
AC busbars	3AXD50000887330	A-6-8-114	3AXD50000883295


KITS FOR HSFU IxBLHF IN GENERIC 2000x600x600 CABINET
Note! Only parts included in ABB kits are shown here.
See assembly drawings for required Rittal and/or standard parts.
HSFU AC INPUT BUSBARS W600 GEN
KIT A-6-8-119
Ordering code: 3AXD50000885060
HSFU AC BUSBARS W600 GEN
KIT A-6-8-114
Ordering code: 3AXD50000883295
HSFU AC FLANGES
KIT A-X-8-149
Ordering code: 3AXD50000883219
HSFU MODULE INST. PARTS W600 GEN
KIT A-6-8-337
Ordering code: 3AXD50000883288
3AXD50000889020
HSFU600-GENERIC (ASSEM)
A Initial Approval 01-Mar-22 M.Michelsson
First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
Prepared M.Michelsson 01-Mar-22
Check. M.Koskinen 16-Feb-22
Appr. M.Asikainen 16-Feb-22
Project name
Weight kg
Title ASSEMBLY DRAWING
HIGH SPEED FILTER UNIT
GENERIC W600
Doc. des. ASSEMBLY DRAWING
Resp.dept.
Doc. No. 3AXD50000889020
Scale 1:25
Form A3
Rev.ind. A.0 CDR?
Lang. EN
Sheet 1
Total 1
Based on
Customer
Cust. Doc. No.
DMS Number 3AXD10001545817

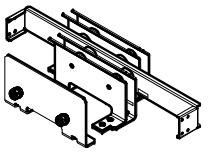
Two BLHF filters in a 800 mm wide generic enclosure

Parts installed	Instruction code	Kit code	Kit ordering code
Module top/bottom guides	3AXD50000887071	A-8-8-338	3AXD50000883318
AC busbars	3AXD50000887316	A-8-8-115	3AXD50000883332
AC connection busbars	3AXD50000887088	A-8-8-117	3AXD50000883349

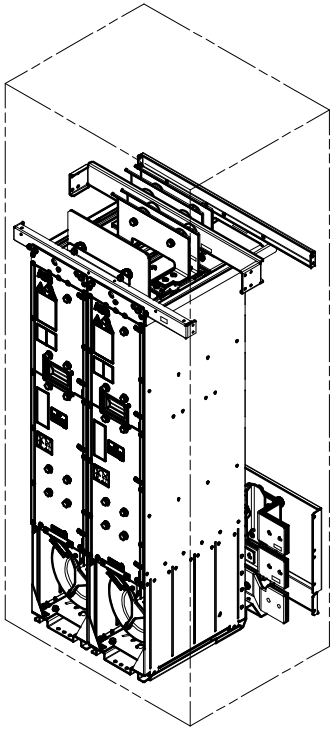
3AXD50000889037	A.0+	We reserve all rights in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden. © ABB Oy					First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
HSFU800_GENERIC (ASSEM)	-.3+						
A	Initial Approval			01-Mar-22	M.Michelsson		

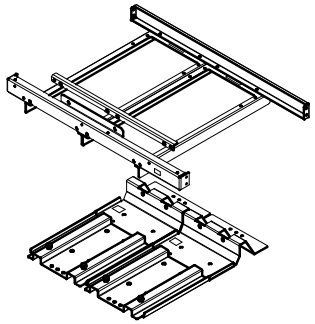
KITS FOR HSFU 2xBLHF IN GENERIC 2000x800x600 CABINET

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

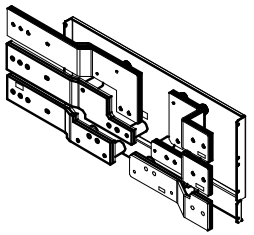


HSFU AC CONN. BUSBARS W800 GEN
KIT A-8-8-117
Ordering code: 3AXD50000883349





HSFU MODULE INST. PARTS W800 GEN
KIT A-8-8-338
Ordering code: 3AXD50000883318



HSFU AC BUSBARS W800 GEN
KIT A-8-8-115
Ordering code: 3AXD50000883332

Based on		Prepared	M.Michelsson	01-Mar-22	Title ASSEMBLY DRAWING	Doc. des.	Scale 1:25 / Form A3
Customer		Check.	M.Koskinen	16-Feb-22	HIGH SPEED FILTER UNIT	ASSEMBLY DRAWING	
		Appr.	M.Asikainen	16-Feb-22	GENERIC W800	Resp.dept.	Rev.ind. A.0 (DR) / Lang. EN
Cust. Doc. No.		Project name			ABB	Doc. No. 3AXD50000889037	Sheet 1 / Total 1
DMS Number	3AXD10001545857	Weight kg					

5

Electrical installation

Contents of this chapter

This chapter describes the electrical installation of the modules.

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

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

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

Safety and liability



WARNING!
Only qualified 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 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]).

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

Electrical safety precautions

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

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

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

Go through these steps before you begin any installation or maintenance work.

1. Clearly identify the work location and equipment.
2. Disconnect all possible voltage sources. Make sure that re-connection is not possible. Lock out and tag out.
   - Open the main disconnecting device of the drive.
   - Open the charging switch if present.
   - Open the disconnector of the supply transformer. (The main disconnecting device in the drive cabinet does not disconnect the voltage from the AC input power busbars of the drive cabinet.)
   - If the drive is equipped with a DC/DC converter unit (optional) or a DC feeder unit (optional): Open the DC switch-disconnector [Q11] of the unit. Open the disconnecting device of the energy storage connected to the unit (outside the drive cabinet).
   - Open the auxiliary voltage switch-disconnector (if present), and all other possible disconnecting devices that isolate the drive from dangerous voltage sources.
   - If you have a permanent magnet motor connected to the drive, disconnect the motor from the drive with a safety switch or by other means.
   - Disconnect 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.
3. Protect any other energized parts in the work location against contact.
4. Take special precautions when close to bare conductors.
5. Measure that the installation is de-energized. 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 measuring 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 terminals (UDC+ and UDC-) and the grounding (PE) terminal is zero. In cabinet-built drives, measure between the drive DC busbars (+ and -) and the grounding (PE) busbar.

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.

Optical components



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

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

Checking the insulation of the assembly

Measuring the insulation resistance of the drive



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

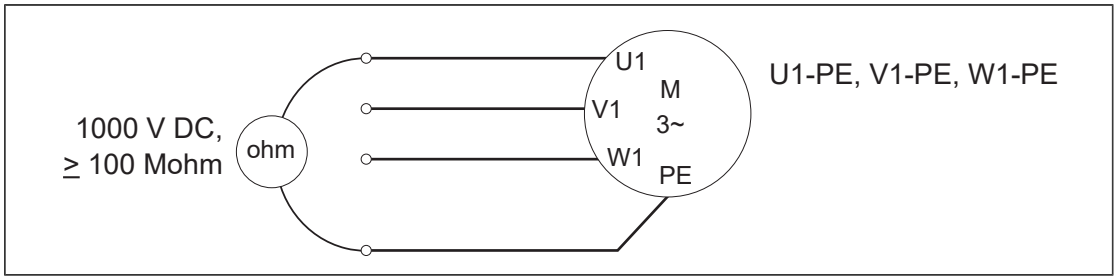
Measuring the insulation resistance of the motor and motor cable



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 161)* 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.

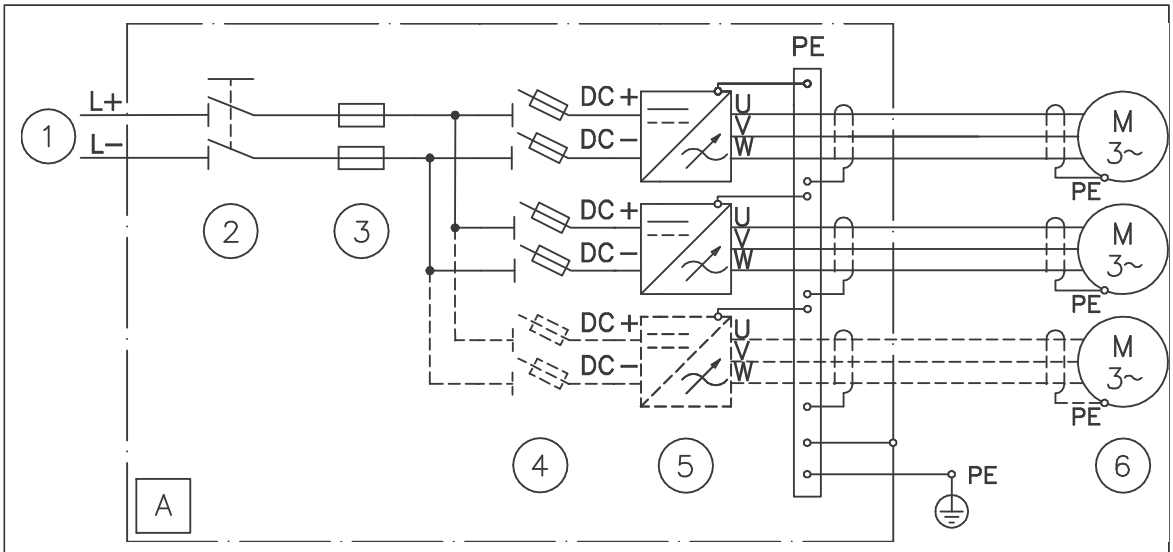


Brake resistor assembly

See section *Checking the insulation of the brake resistor assembly (page 374)*.

Power connections – Frames R1i…R5i

A simplified diagram of the power connections is presented below.



A	Inverter cubicle
1	DC supply
2	DC switch/disconnector for all inverter modules
3	Main DC fuses
4	DC fuse disconnectors for each inverter module
5	Inverter modules
6	Motors

Connection procedure

Frames R1i and R2i

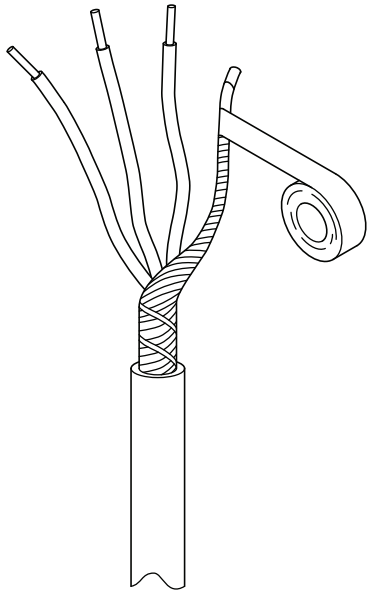
WARNING!
Read and follow the instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. Run the output (motor) cable into the cubicle through a cable gland or grommet. In case a grounding cable gland is available, remove the outer jacket of the cable where it passes through the cable gland.
2. Cut the input (DC) and output cables to suitable length and strip the ends of the individual conductors.
3. Twist the shield strands of the output cable together to form a separate conductor and crimp a ring terminal onto it. Do the same for the input cable if it is a shielded type.
4. Connect the conductors to the terminal blocks. Connect the cable shields to grounding terminals near the terminal blocks.
5. Secure the cables inside and outside the cabinet mechanically.
6. Tighten the cable gland if present.

7. Connect the motor cable as described under Grounding the motor cable shield at the motor end.

Frames R3i…R5i

1. 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.
2. Remove the shrouds covering the terminals of the inverter module.
3. Cut the input (DC) and output cables 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. Crimp a suitable ring terminal onto the end, and cover the remaining bare screen with tape as shown below. Do the same for the input cable if it is a shielded type.

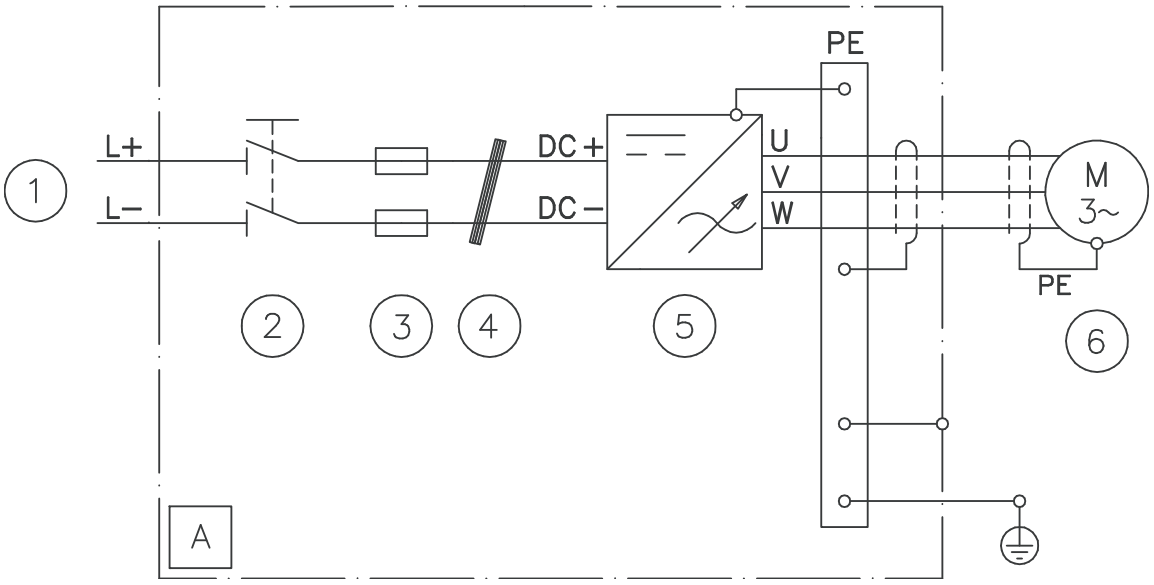


5. Insert the conductors to the terminals and tighten the Allen screw. Note that the original screw lugs can be replaced by crimp ring terminals connected directly to the connection post. Make note of the order and orientation of the washers on the connection post.
6. Connect the cable shields to ground near the terminals.
7. Reinstall the terminal covers.
8. Secure the cables inside and outside the cabinet mechanically.
9. Tighten the cable gland if present.
10. Connect the motor cable as shown below.

Power connections – Frames R6i…R8i

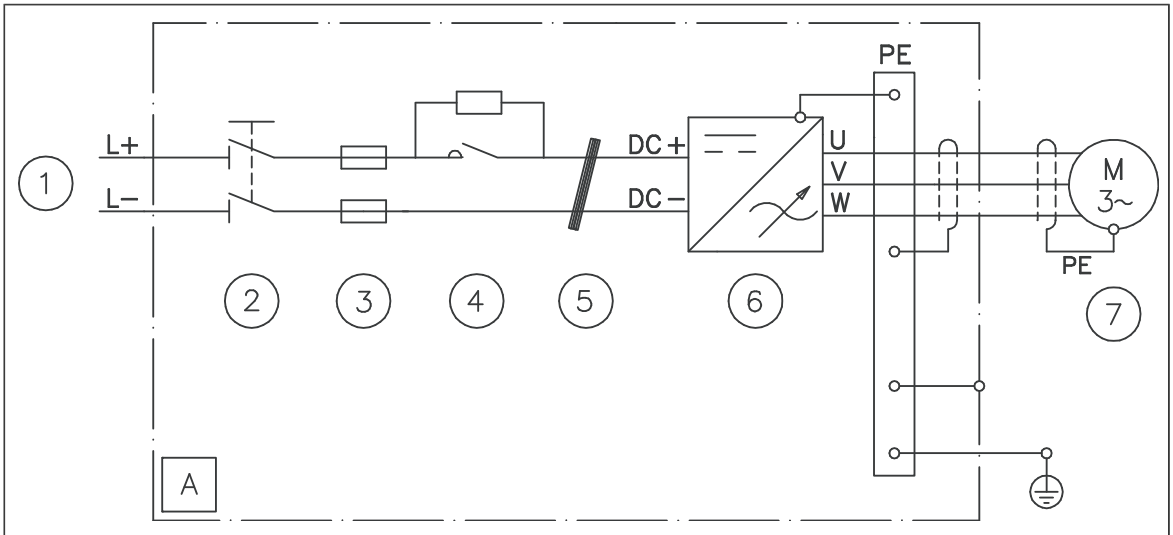
Simplified diagrams of the power connections are presented below.

R6i inverter module



A	Inverter cubicle
1	DC supply
2	DC switch/connector
3	DC fuses
4	Common mode filter
5	Inverter module
6	Motor

R7i inverter module

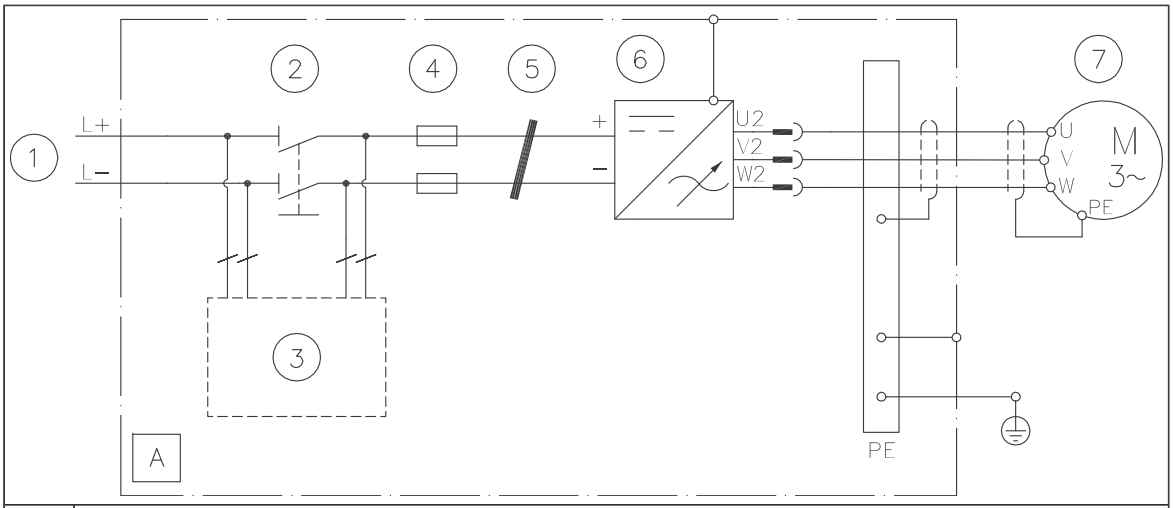


A	Inverter cubicle

1	DC supply
2	DC switch/connector
3	DC fuses
4	Charging circuit (contactor and resistors)
5	Common mode filter
6	Inverter module
7	Motor

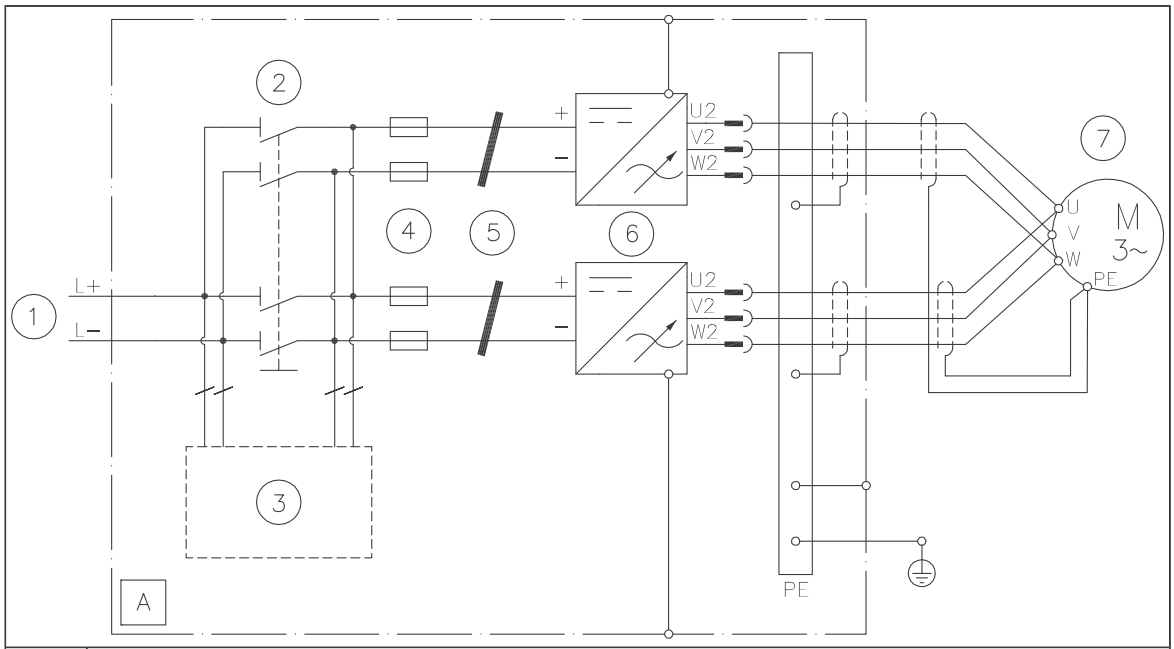
R8i inverter module

R8i inverter module



A	Inverter cubicle
1	DC supply
2	DC switch/disconnector
3	Charging circuit (fuses, resistors, charging controller)
4	DC fuses
5	Common mode filter
6	Inverter module
7	Motor

2×R8i inverter unit



A	Inverter cubicle
1	DC supply
2	DC switch/disconnector
3	Charging circuit (fuses, resistors, charging controller)
4	DC fuses
5	Common mode filters
6	Inverter modules
7	Motor

Connection procedure

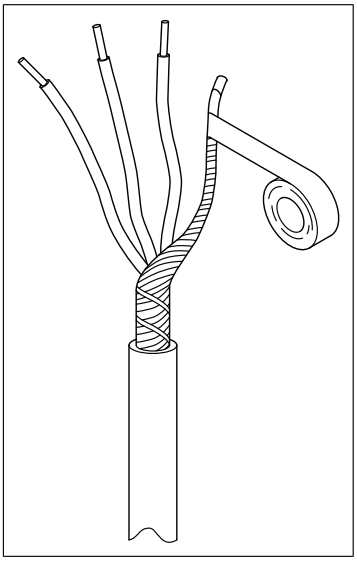
WARNING!
Read and follow the instructions given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

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

2. Run the output (motor) cable into the cubicle through a cable gland or grommet. 360° grounding of the cable shield is recommended to suppress interference. In case a grounding cable gland is available, remove the outer jacket of the cable where it passes through the cable gland.
3. Cut the output cable to suitable length and strip the ends of the individual conductors.
4. Twist the shield strands of the output cable together to form a separate conductor and wrap tape around it as shown.

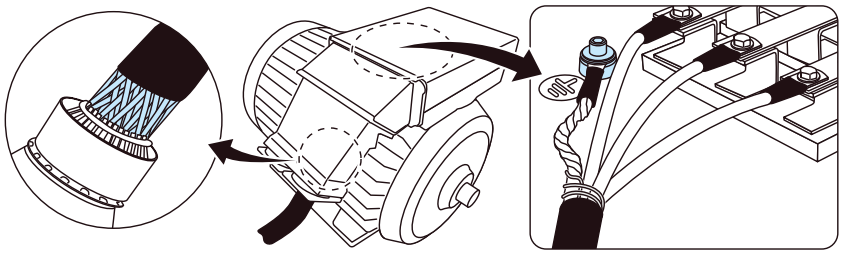


5. Crimp suitable cable lugs to the conductors as well as the twisted shield. Connect the phase conductors to the output busbars. Connect the cable shield to a PE busbar.

6. Secure the cables inside and outside the cabinet mechanically.
7. Tighten the cable gland if present.

Grounding the motor cable shield at the motor end

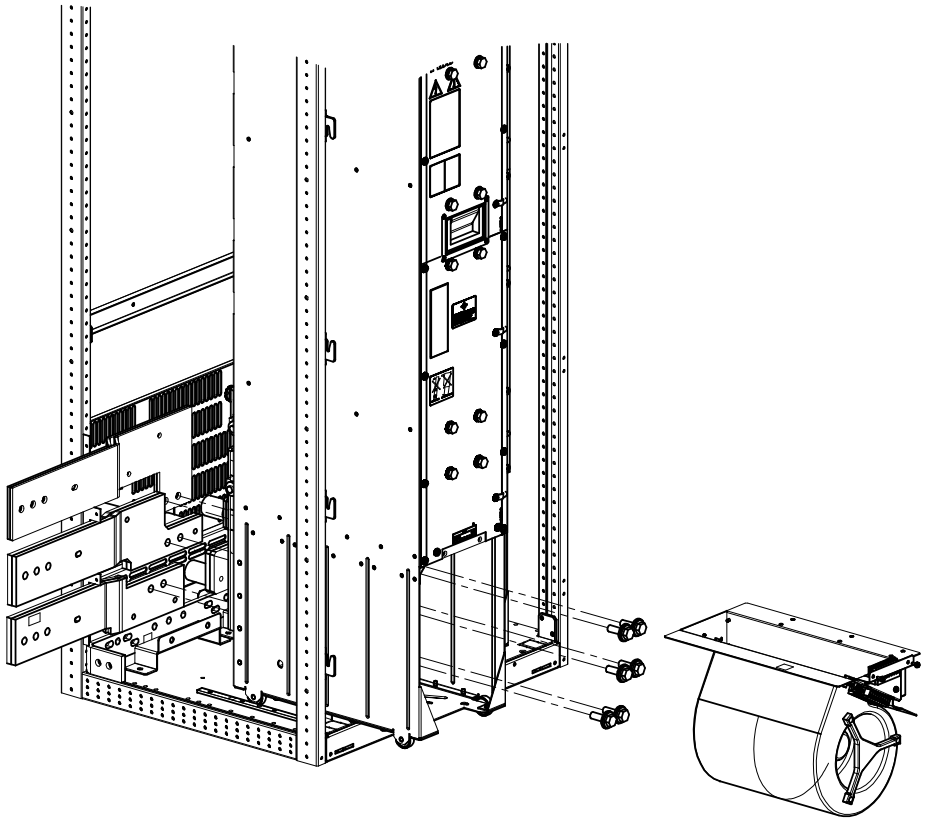
For minimum radio-frequency interference, ground the cable shield 360 degrees at the cable entry of the motor terminal box.

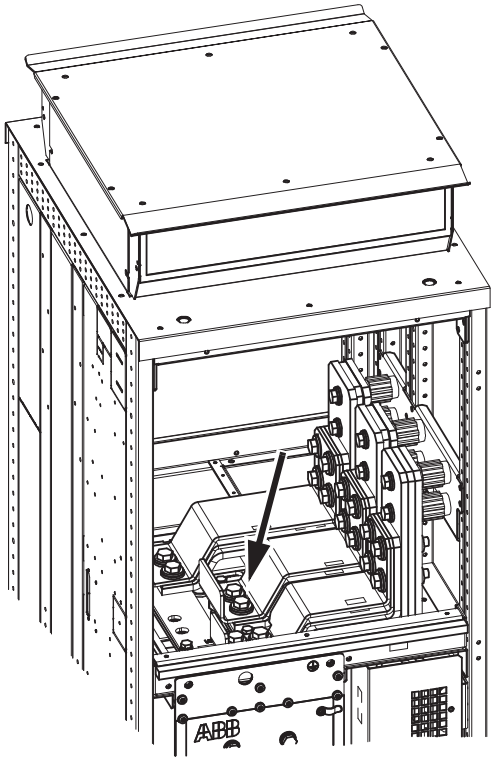
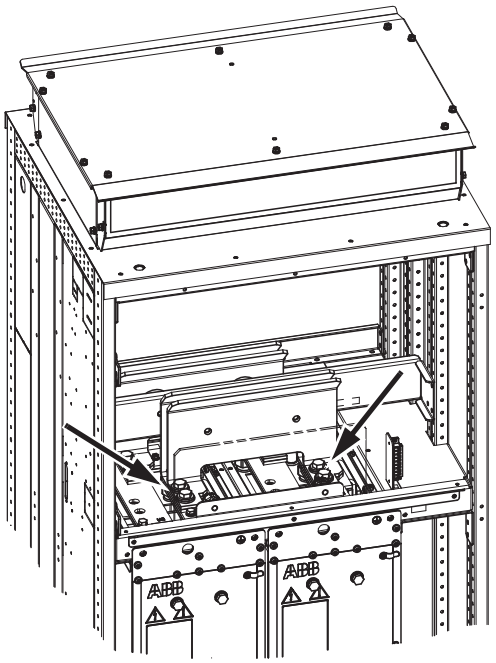


Installing the BLHF filter

Remove the fan of the BLHF filter module. For instructions, see *ACS880 multidrive for high-speed test benches supplement* (3AXD50000818013 [English]). Push the BLHF filter module into its place. Connect the filter AC busbars (behind the filter module) with six bolts to the busbars on the cabinet frame. Reinstall the fan of the BLHF filter module.

Bottom connection of the BLHF filter



Top connection of the 1×BLHF filter	Top connection of the 2×BLHF filter
	

Replacing ACS800 R8i modules with ACS880 R8i modules

ACS880 R8i modules can be ordered with option +P942 for mechanical compatibility with ACS800 R8i modules. A dimension drawing is presented on *Frame R8i with option +P942 (page 391)*.

The following procedure explains the additional wiring changes that are required.

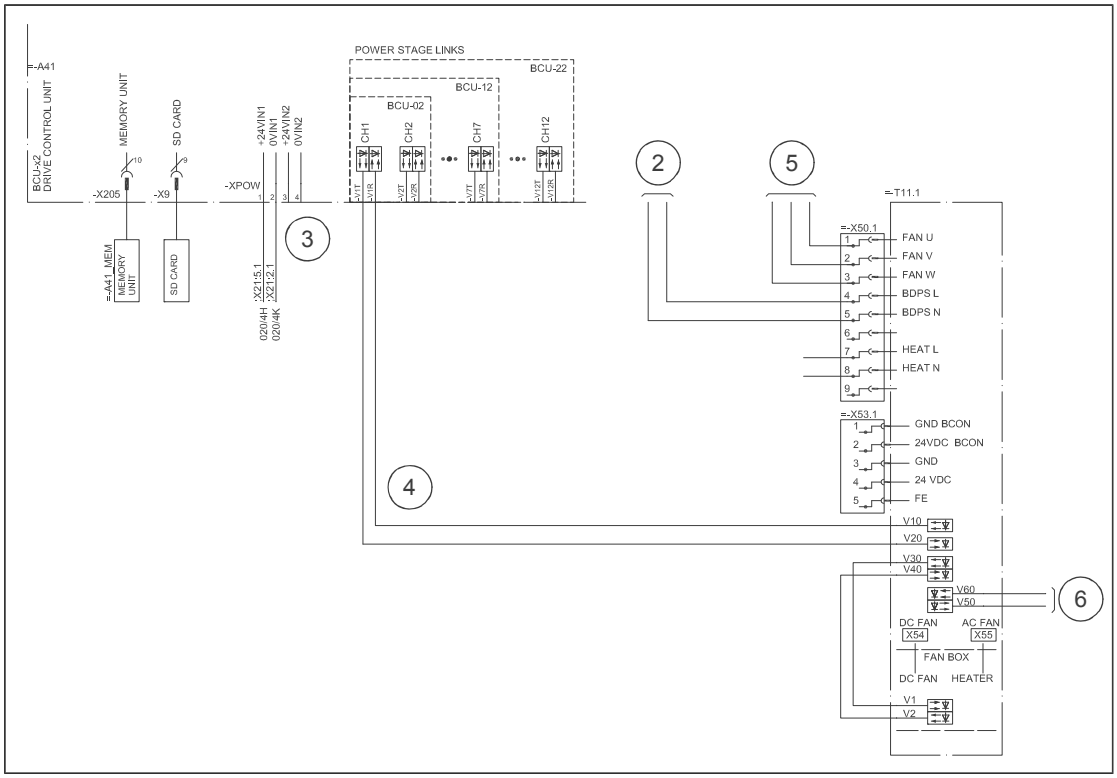


WARNING!
Repeat the steps described in section Electrical safety precautions. The complete safety instructions are given in *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

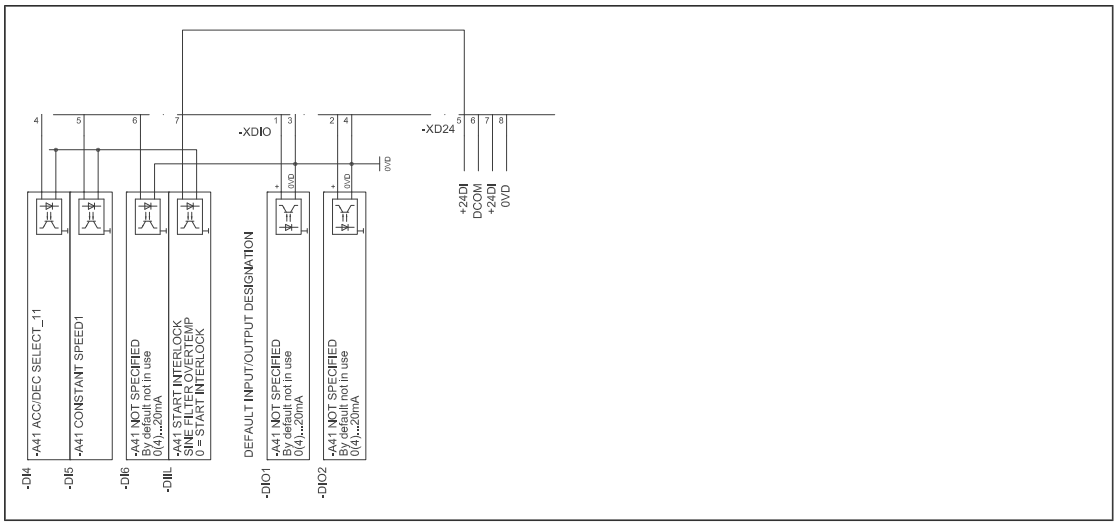
1. Replace the inverter module(s).

   Note: The DC fuses (F11.xx) and common mode filters (R11.xx) at the input of each inverter module need not be changed if the output currents of the inverter module(s) remain unchanged.
2. If needed, connect an auxiliary voltage supply of 230 V AC 50 Hz (standard) or 115 V AC 60 Hz (with option +G304) to X50:4…5 on the module to power the BDPS (internal power supply of the module) even when the DC link is not live.
3. Replace the RDCU control unit with a BCU-x2 inverter control unit (with a sufficient number of inverter module connections). Connect the control unit to a 24 V DC power supply. (An external power supply is recommended for an inverter unit consisting of parallel-connected modules; with a single-module configuration, connectors X53:1 and X53:2 on the module can be used.)
4. Connect the BCU to the inverter module(s) using fiber optic cables. In case of parallelconnected modules, remove the existing APBU branching unit.
5. If the module is equipped with option +C188 (direct-on-line cooling fan), connect a 3-phase 400 V 50/60 Hz (or 320 V 60 Hz) supply to X50:1…3.
6. If the inverter unit is equipped with a DC switch/disconnector and charging controller, connect terminals V50 and V60 of the inverter module to the charging controller using fiber optic cables.

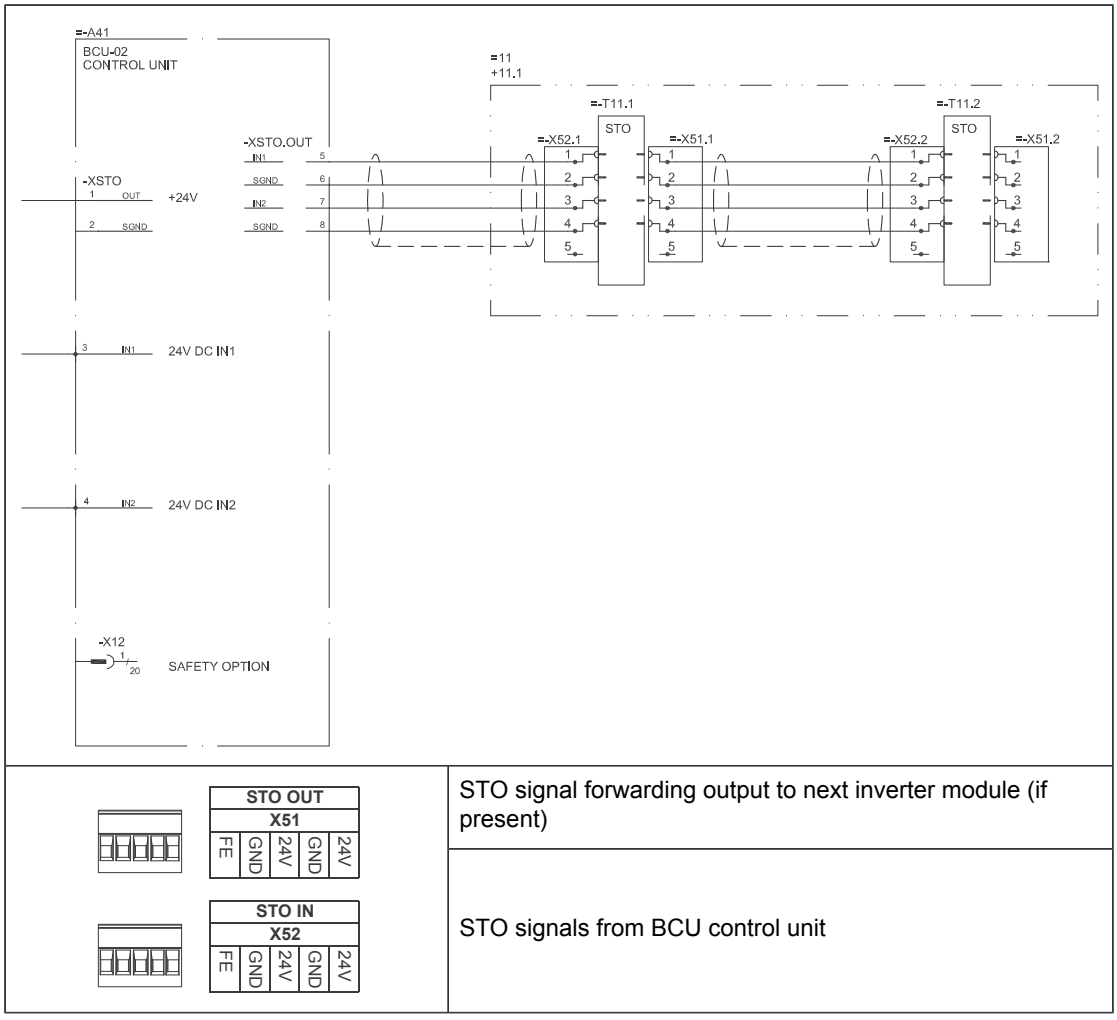
   Note: With an ACS880 R8i module used with the ACS800 charging circuit, only one charging cycle in five minutes is allowed.



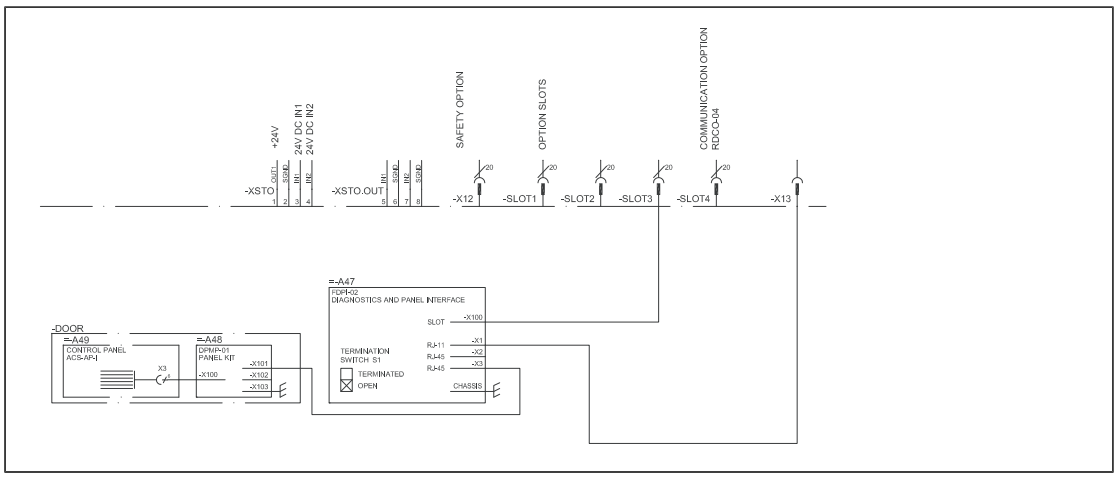
7. On the BCU control unit, connect the DIIL input to a +24VD terminal.



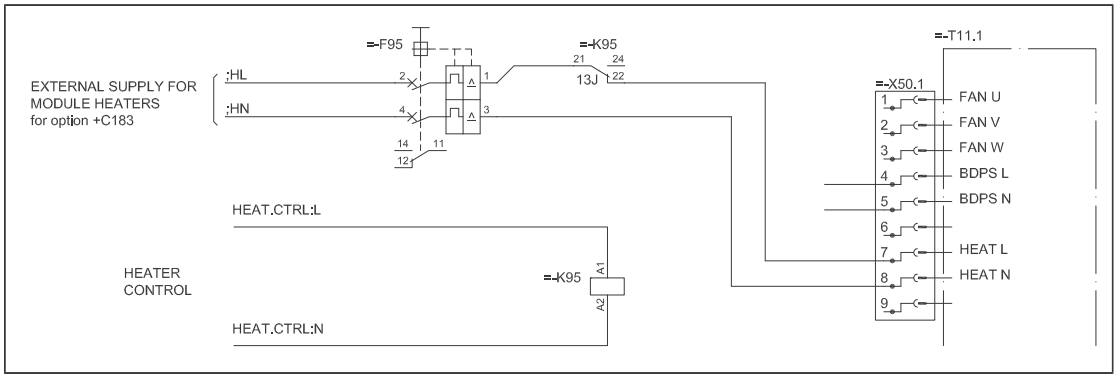
8. If the Safe torque off (STO) function is to be used, remove the jumper connection between X52 and X53 on each module. Wire the STO link to all inverter modules of the inverter unit. Connect the device triggering the STO function to the BCU control unit.



9. Connect an ACS-AP-x control panel to X13 on the BCU control unit.



10. If the modules are equipped with option +C183 (heating elements), connect a 230/115 V AC (50/60 Hz) supply to X50:7…8.


=-F95
=-K95
=-T11.1
21
24
13J
22
EXTERNAL SUPPLY FOR
MODULE HEATERS
for option +C183
;HL
;HN
2
4
1
3
14
12
11
=-X50.1
1
2
3
4
5
6
7
8
9
FAN U
FAN V
FAN W
BDPS L
BDPS N
HEAT L
HEAT N
HEAT.CTRL:L
HEATER
CONTROL
=-K95
A1
A2
HEAT.CTRL:N

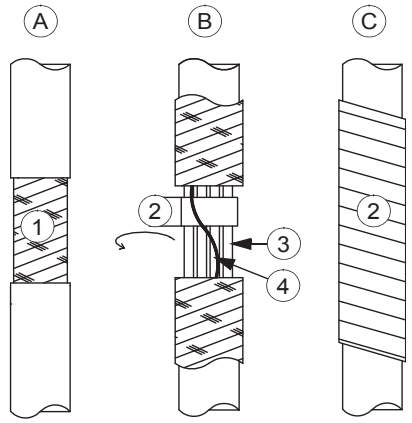
Connecting the control cables

For technical data and default I/O connections of the control unit, see *Control units of the drive (page 333)*.

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

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

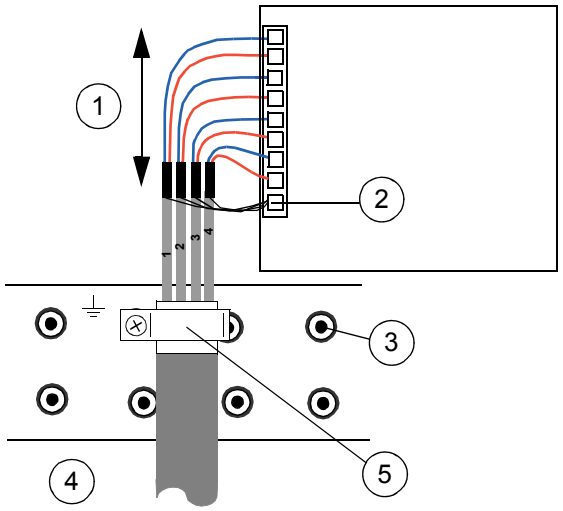
1. Remove shrouding to access the cable entries and trunking inside the cubicle.
2. Run the control cables into the cubicle. If possible, arrange for a 360° grounding of the cable shield at the cable entry.
   If the outer surface of the shield is non-conductive, turn the shield inside out as shown below and wrap copper foil around the cable to keep the shielding continuous. Do not cut the grounding wire (if present).



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

3. Run the cables to the control unit (or other connection point). Use the existing trunking wherever possible.
4. (Only when running the cable to the inverter module) The inverter control units have a clamp plate attached. Remove the outer sheathing of the cable at one of the clamps on the plate. Tighten the clamp onto the bare cable shield.
5. Cut the cables to suitable length.

6. 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.



1	Keep as short as possible
2	SHIELD*
3	If no dedicated “shield” connector is provided, ground the inner cable shields to the chassis.
4	At the other end of the cable, leave the shield unconnected, or connect it to ground via a capacitor with a value of a few nanofarads.
5	Where grounding clamps are not available, twist the shield strands into a bundle, crimp a lug terminal onto it and fasten the lug to the chassis. Secure the cable into place with eg. cable ties.

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

Installing optional modules

Installation of I/O extension and fieldbus adapter modules

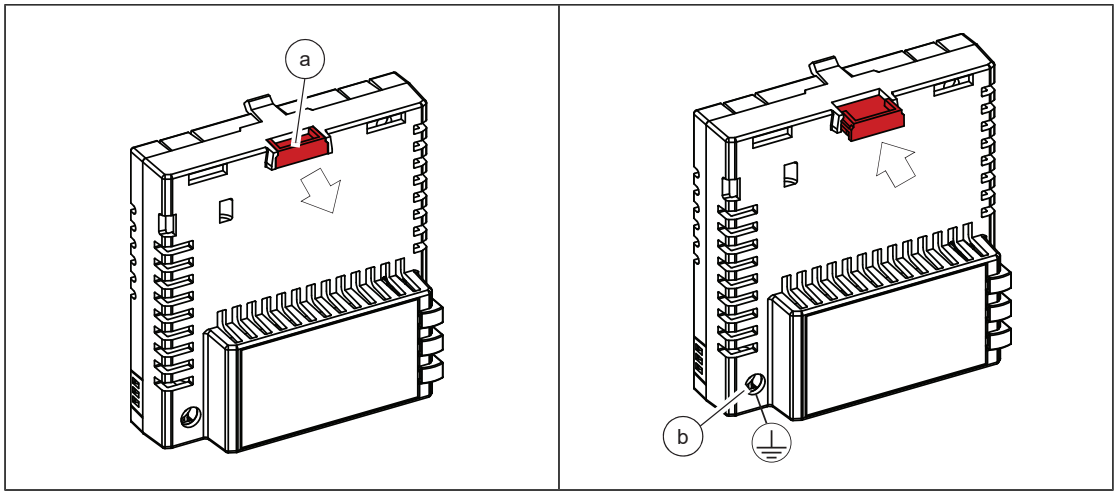
WARNING!
Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur.

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

1. Repeat the steps described in *Electrical safety precautions (page 161)*.
2. Pull out the lock (a).
   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 damage 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.

Installation of an FSO-xx safety functions module

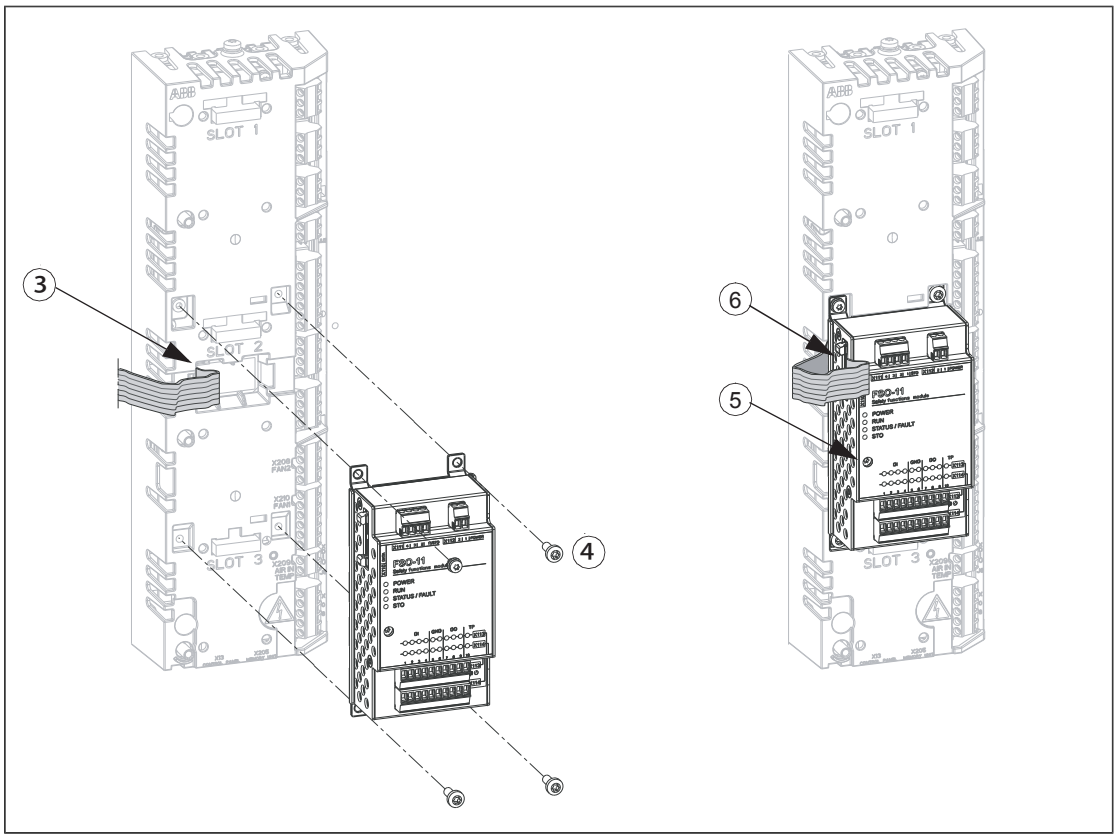
Frames R1i…R7i employ the ZCU control unit. The BCU control unit is used with frame R8i and multiples. The following sections describe installation of an FSO-xx safety functions module onto a ZCU and a BCU control unit.

Installation of an FSO-xx safety functions module onto ZCU-14

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. The FSO-xx comes with alternative bottom plates for mounting on different units. For mounting on the ZCU-14, the mounting points should be located at the short edges of the module as shown. Replace the bottom plate of the FSO-xx if necessary. For mounting on the ZCU-12, the mounting points should be located at the long edges. Replace the bottom plate of the FSO-xx if necessary.
3. Connect the data cable to connector X12 on the control unit.
4. Put the FSO-xx into its position on slot 2 of the control unit.
5. Tighten the FSO-xx electronics grounding screw to tightening torque **0.8** N·m.
   Note: The screw tightens the connections and grounds the module. It is essential for fulfilling the EMC requirements and for proper operation of the module.
6. Attach the module by the bottom plate with four screws.

7. Connect the other end of the data cable to connector X110 on the FSO-xx.
8. To complete the installation, refer to the instructions in the user's manual delivered with the FSO-xx.



Installation of an FSO safety functions module onto BCU

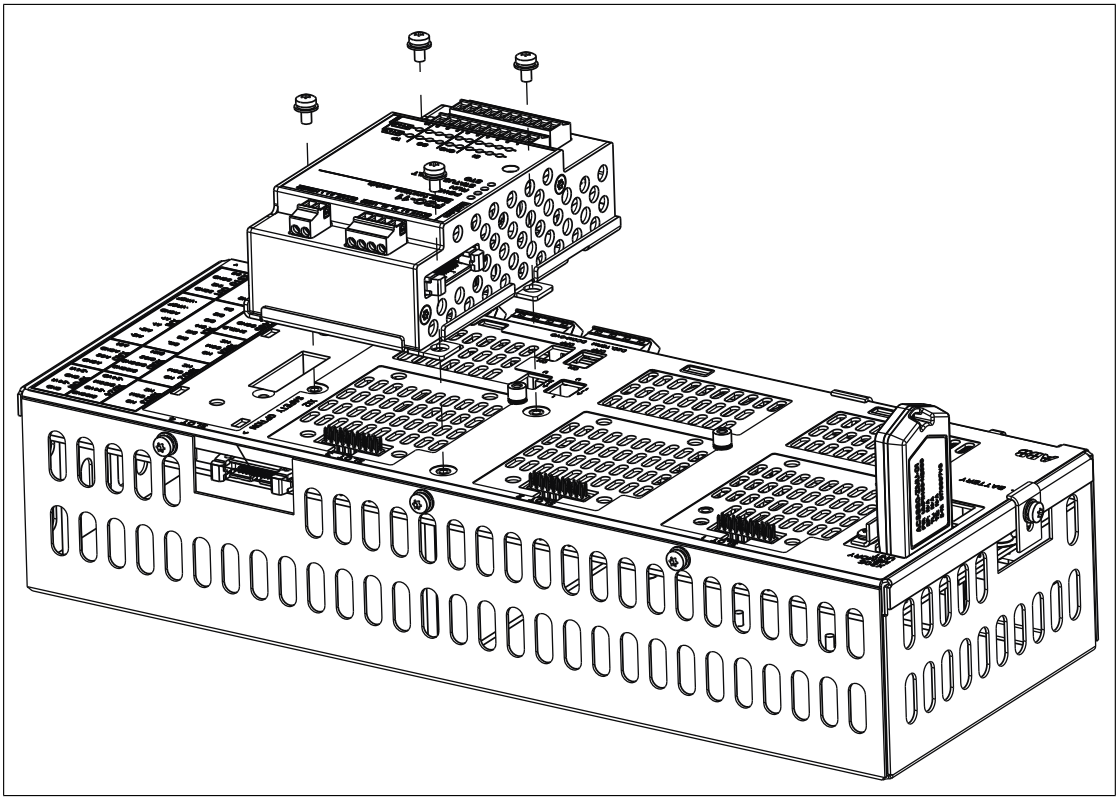
WARNING!
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

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 161)* 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.

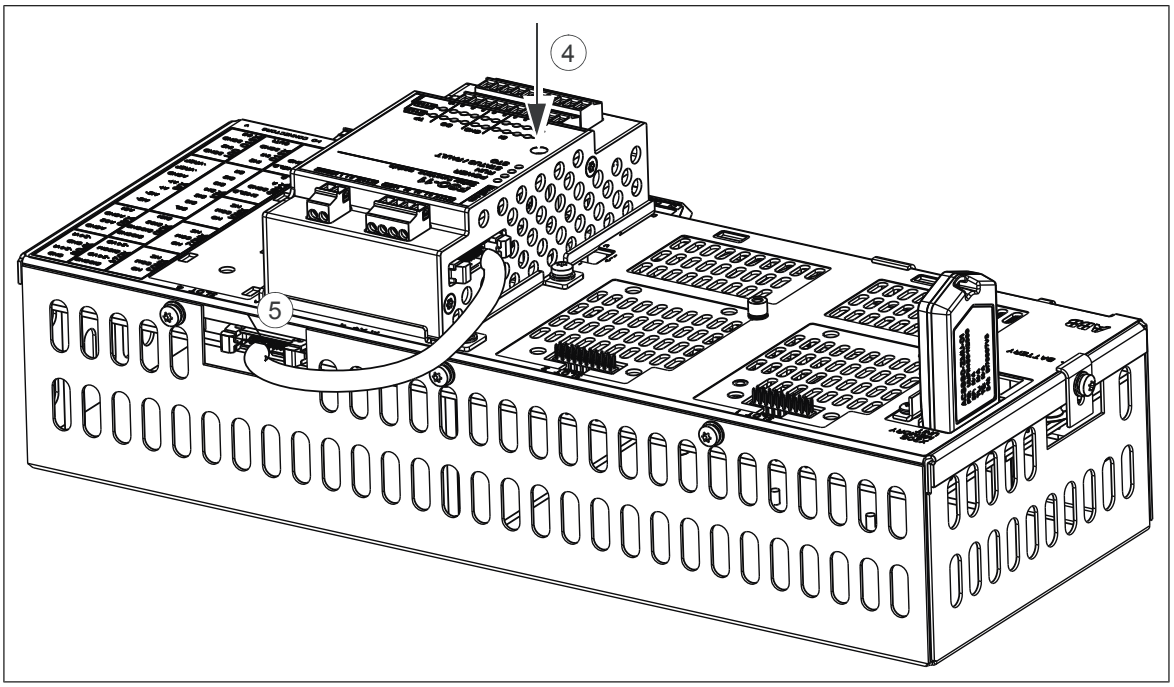


4. Tighten the FSO module electronics grounding screw.

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

5. Connect the 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.

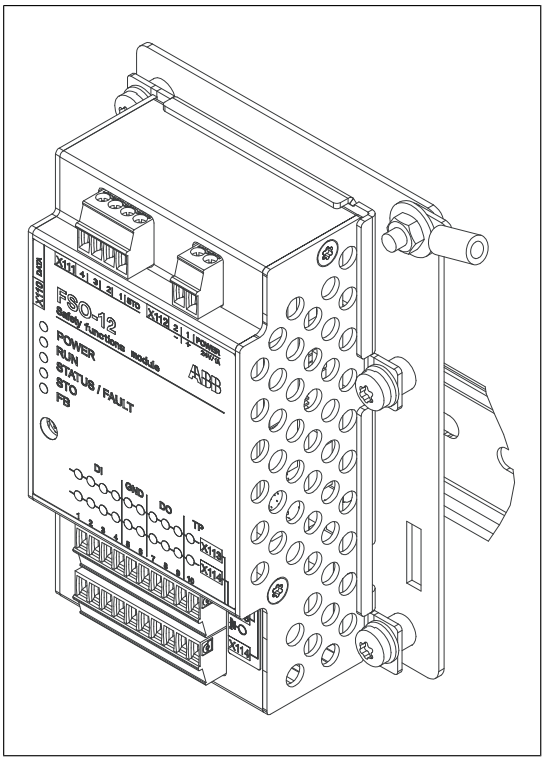


Installation of FSO-xx adjacent to the control unit

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

- parts for mounting the FSO-xx onto a DIN rail nearby the control unit
- parts for mounting the FSO-xx onto the grounding/clamping plate of a ZCU-14 control unit in ACS880-104 frames R1i…R4i
- longer cables for connecting the FSO-xx to the control unit
- installation instructions (assembly drawing).

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

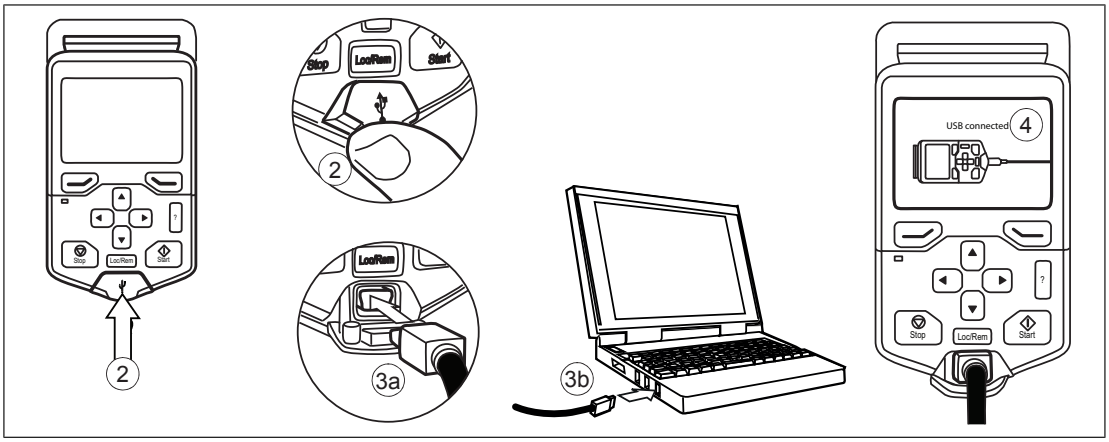


Connecting a PC

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

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

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



Panel bus (Control of several 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.

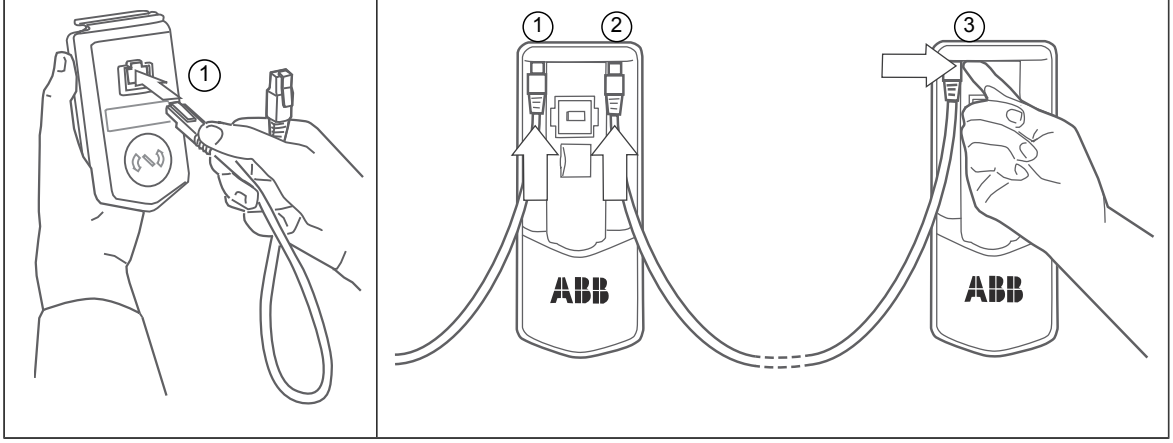
- With drives that have the panel mounted on the front cover, move the terminating switch into the outer position.
- With an FDPI-02 module, move termination switch S2 into the TERMINATED position.

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

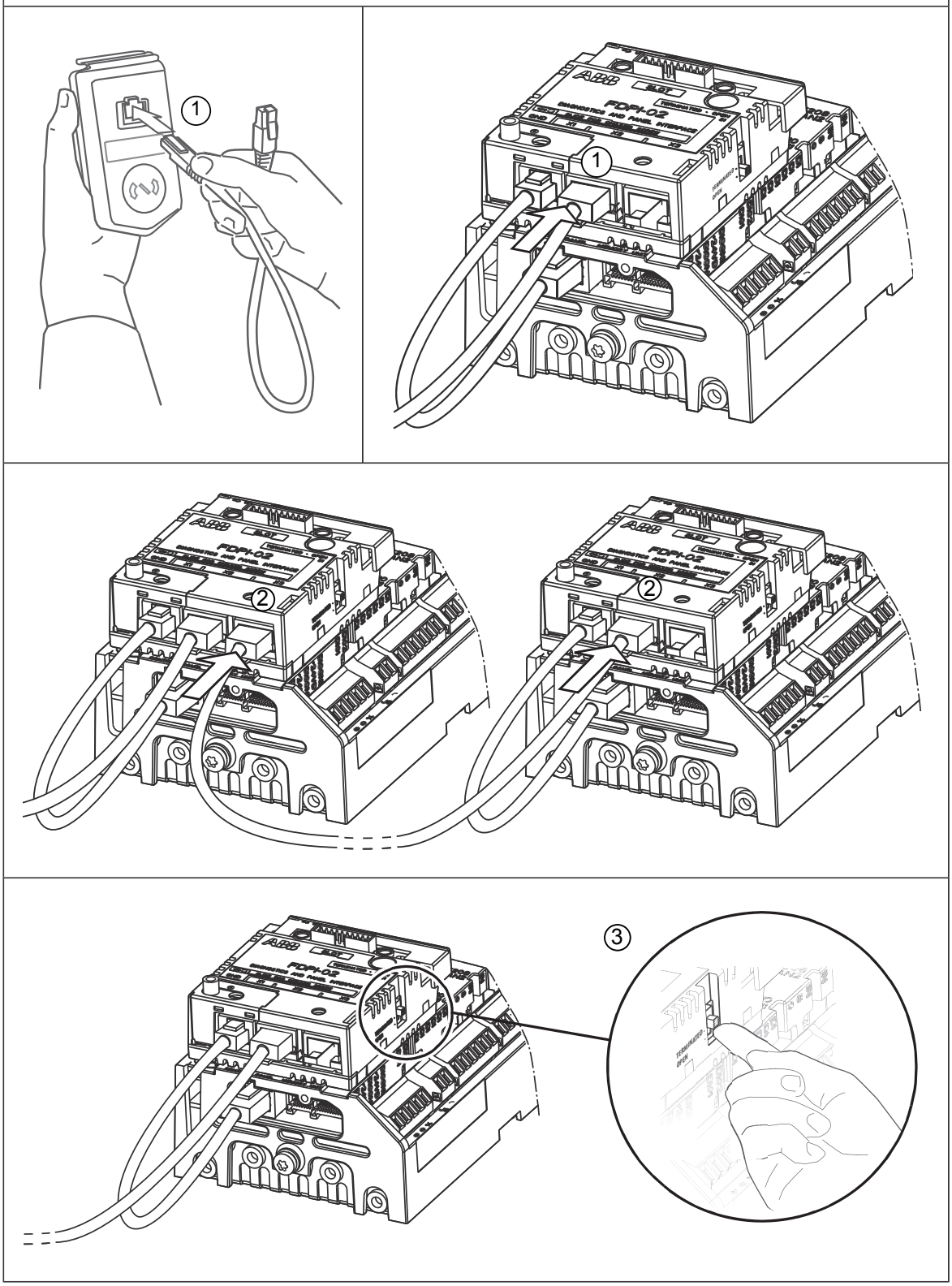
4. On the control panel, switch on the panel bus functionality (Options - Select drive - Panel bus). The drive to be controlled can now be selected from the list under Options - Select drive.

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

With twin connectors in the control panel holder:



With FDPI-02 modules:



6

Installation checklist

Contents of this chapter

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

Checklist

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



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



WARNING!
Stop the drive and do the steps in section *Electrical safety precautions (page 161)* 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 …	☑
The cooling air flows freely in and out of the drive. Air recirculation inside the cabinet is not possible (air baffle plates are on place, or there is another air guiding solution).	☐
If the drive is connected to a network other than a symmetrically grounded TN-S system: You have done all the required modifications (for example, you may need to disconnect the EMC filter or ground-to-phase varistor). See the electrical installation instructions in the supply unit manual.	☐
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. Proper grounding has also been measured according to the regulations.	☐
If the drive is equipped with a DC/DC converter unit: There is an adequately sized protective earth (ground) conductor between the energy storage and the DC/DC converter, the conductor has been connected to appropriate terminal, and the terminal has been tightened to the proper torque. Proper grounding has also been measured according to the regulations.	☐
If the drive is equipped with a DC/DC converter unit: The energy storage cable has been connected to the correct terminals of the DC/DC converter and energy storage, and the terminals have been tightened to the proper torque.	☐
If the drive is equipped with a DC/DC converter unit: The energy storage has been equipped with fuses for protecting energy storage cable in a cable short-circuit situation.	☐
If the drive is equipped with a DC/DC converter unit: The energy storage has been 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, and the conductor is connected to the correct terminal, and the terminal is tightened to the correct torque. Proper grounding has also been measured according to the regulations.	☐
The motor cable is connected to the correct terminals, the phase order is correct, and the terminals are tightened to the correct torque.	☐
The motor cable is routed away from other cables.	☐
No power factor compensation capacitors are connected to the motor cable.	☐
If an external brake resistor is connected to the drive: 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. Proper grounding has also been measured according to the regulations.	☐
If an external brake resistor is connected to the drive: The brake resistor cable is connected to the correct terminals, and the terminals are tightened to the correct torque.	☐
If an external brake resistor is connected to the drive: 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.	☐
If a drive bypass connection will be used: The Direct On Line contactor of the motor and the drive output contactor are either mechanically and/or electrically interlocked, that is, they cannot be closed at the same time. A thermal overload device must be used for protection when bypassing the drive. Refer to local codes and regulations.	☐
There are no tools, foreign objects or dust from drilling inside the drive.	☐

Make sure that …	☑
The area in front of the drive is clean: the drive cooling fan cannot draw any dust or dirt inside.	☐
Cover(s) of the motor connection box are in place. Cabinet shrouds are in place and doors are closed.	☐
The motor and the driven equipment are ready for power-up.	☐

7

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.

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

Note: The customer is fully responsible for implementing and testing the functional safety circuits according to the relevant legislation and acceptance testing regulations. The functional safety option manuals give examples on implementing the safety circuits in ACS880 multidrives. For information on the Safe torque off function, see chapter *The Safe torque off function (page 353)*.

Start-up procedure

Tasks	☑
Safety	
WARNING! Obey the safety instructions during the start-up procedure. See *Safety instructions for ACS880 multidrive cabinets and modules* (3AUA0000102301 [English]) and Electrical safety precautions.	☐
Checks/Settings with no voltage connected	
Check the mechanical and electrical installation.	☐

Tasks	☑
Make sure that the insulation resistance of the assembly has been checked. See *Checking the insulation of the assembly (page 163)*.	☐
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.	☐
Check that any 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.	☐
For start-up of the module variant with capability for increased switching frequency (option +P967), see *ACS880 multidrive for high-speed test benches supplement* (3AXD50000818013 [English]).	☐
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 cannot be switched on inadvertently by remote control.	☐
Be ready to trip the main breaker of the supply transformer in case something abnormal occurs.	☐
Ensure 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	
Check that the cooling fans rotate freely in the right direction, and the air flows upwards. **Note:** • Speed-controlled cooling fans of frame R8i modules (ie. without option +C188) will not rotate until the DC voltage to the module is connected. • Depending on the wiring of the drive system and the type of inverter modules, it may 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 31.23 Wiring or earth fault to “No action”.	☐
• Set 95.04 Control board supply according to how the inverter control unit is powered.	☐
• Edit 95.08 DC switch monitoring if necessary (ie. with R1i…R7i modules equipped with a DC switch/disconnector).	☐
• Edit 95.09 Fuse switch control if necessary (ie. with R8i modules without a DC switch/disconnector and charging controller).	☐
• With R8i modules with option +C188 (direct-on-line cooling fan), set bit 14 of 95.20 HW options word 1.	☐
• With parallel-connected R8i modules, select the inverter unit type in parameter 95.31 Parallel connection rating id. You can filter the list using parameter 95.30.	☐
• Reboot the control unit either by cycling the power, or by 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. Ensure that: • nobody is working on the unit or circuits that have been wired from outside into the cabinets • cover of the motor terminal box is on.	☐
Close the main disconnecting device of the drive system. **WARNING!** When connecting voltage to the supply unit, the DC busbars will become live, as will all the inverters connected to the DC bus. **WARNING!** Inverter units with a DC switch-disconnector: Some types of inverter module may be energized through a charging circuit even when the DC switch-disconnector is open or the DC fuses are removed. Inverter units without a DC switch-disconnector: 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/contactor closes. To prevent this, remove the fuses from the inverter units which are to remain unenergized before connecting voltage. **When the main breaker/contactor of the supply unit is closed (DC busbars are live), never remove or insert the DC fuses of an inverter unit.** Inverter cubicles with frame R1i…R5i modules: Before closing the main DC switch-disconnector of the cubicle, leave open the fuse disconnectors of those inverter modules that need not be powered at this time. Do not open or close any fuse disconnectors under load.	☐
Inverter units equipped with DC switch-disconnector (or fuse disconnectors): Close the DC switch/disconnector (or fuse disconnectors) of the inverter units that are to be powered up.	☐
Inverter cubicles equipped with main DC switch-disconnector (frames R1i…R5i): Close the main DC switch/disconnector.	☐
WARNING! Before closing the main contactor/air circuit 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 (Pbr.max) (if present). If the above-mentioned rules are not followed, the DC fuses of the connected inverter units may blow, or the brake chopper (if present) may be damaged.	☐

Tasks	☑
Close the main contactor (or breaker) of the supply unit. The DC bus is now powered, along with all inverters that are connected to it.	☐
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 362)*. **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 appropriate procedures. **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.	☐

8

Maintenance

Contents of this chapter

This chapter contains maintenance instructions.

Maintenance intervals

The tables below show the maintenance tasks which can be done by the end user. The complete maintenance schedule is available on the Internet (https://new.abb.com/drives/services/maintenance/preventive-maintenance). For more information, 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

Maintenance task/object	Years from start-up													
	0	1	2	3	4	5	6	7	8	9	10	11	12	…
Cooling														
Inverter module main cooling fan										R				
Frame R5i auxiliary cooling fan										R				
Frame R8i circuit board compartment fan										R				
Cabinet cooling fan (50 Hz)										R				
Cabinet cooling fan (60 Hz)							R						R	
Batteries														
Control unit battery							R						R	
Control panel battery										R				
Connections and environment														
Air inlet and outlet cleaning (IP20/IP42)		I	I	I	I	I	I	I	I	I	I	I	I	I
Cabinet door filter change (IP54)		R	R	R	R	R	R	R	R	R	R	R	R	R
Checking tightness of cable and busbar terminals. Tightening if needed.		I	I	I	I	I	I	I	I	I	I	I	I	I
Checking ambient conditions (dustiness, corrosion, temperature)		I	I	I	I	I	I	I	I	I	I	I	I	I
Cleaning of heatsinks		I	I	I	I	I	I	I	I	I	I	I	I	I
Quality of supply voltage		P	P	P	P	P	P	P	P	P	P	P	P	P
Spare parts														
Spare parts		I	I	I	I	I	I	I	I	I	I	I	I	I
DC circuit capacitor reforming (spare modules and spare capacitors)		P	P	P	P	P	P	P	P	P	P	P	P	P
Functional safety														
Safety function test	I See the maintenance information of the safety function.													
Safety component expiry (Mission time, T_M)	20 years													
4FPS10000292961														

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.

Cleaning

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 161)* before you start the work.
2. Open the cabinet door.
3. Clean the interior of the cabinet. Use a vacuum cleaner and a soft brush.
4. Clean the air inlets of the fans and air outlets of the modules (top).
5. Clean the air inlet gratings (if any) on the door.
6. Close the door.

Cleaning the heatsink

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



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



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

Cleaning the door air inlets

Follow the instructions of the manufacturer of the cabinet system.

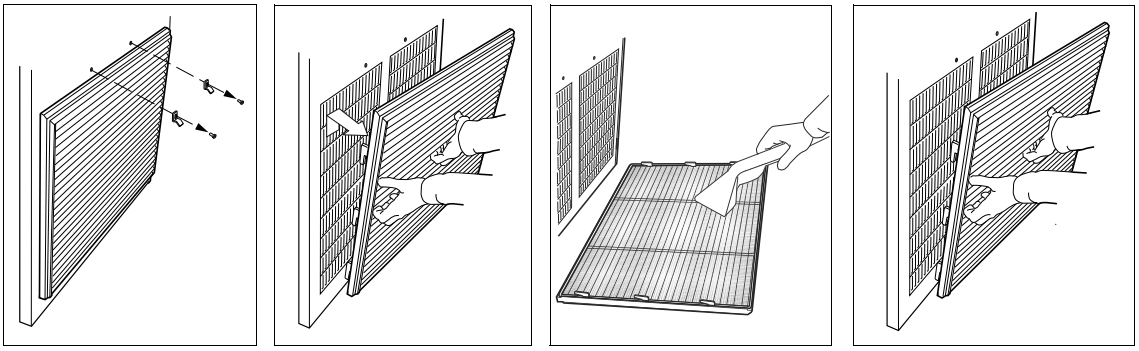
Cleaning the door air inlets (IP20)

Use a vacuum cleaner and brush to clean the grating.

Cleaning the door air inlets (IP22 and IP42)

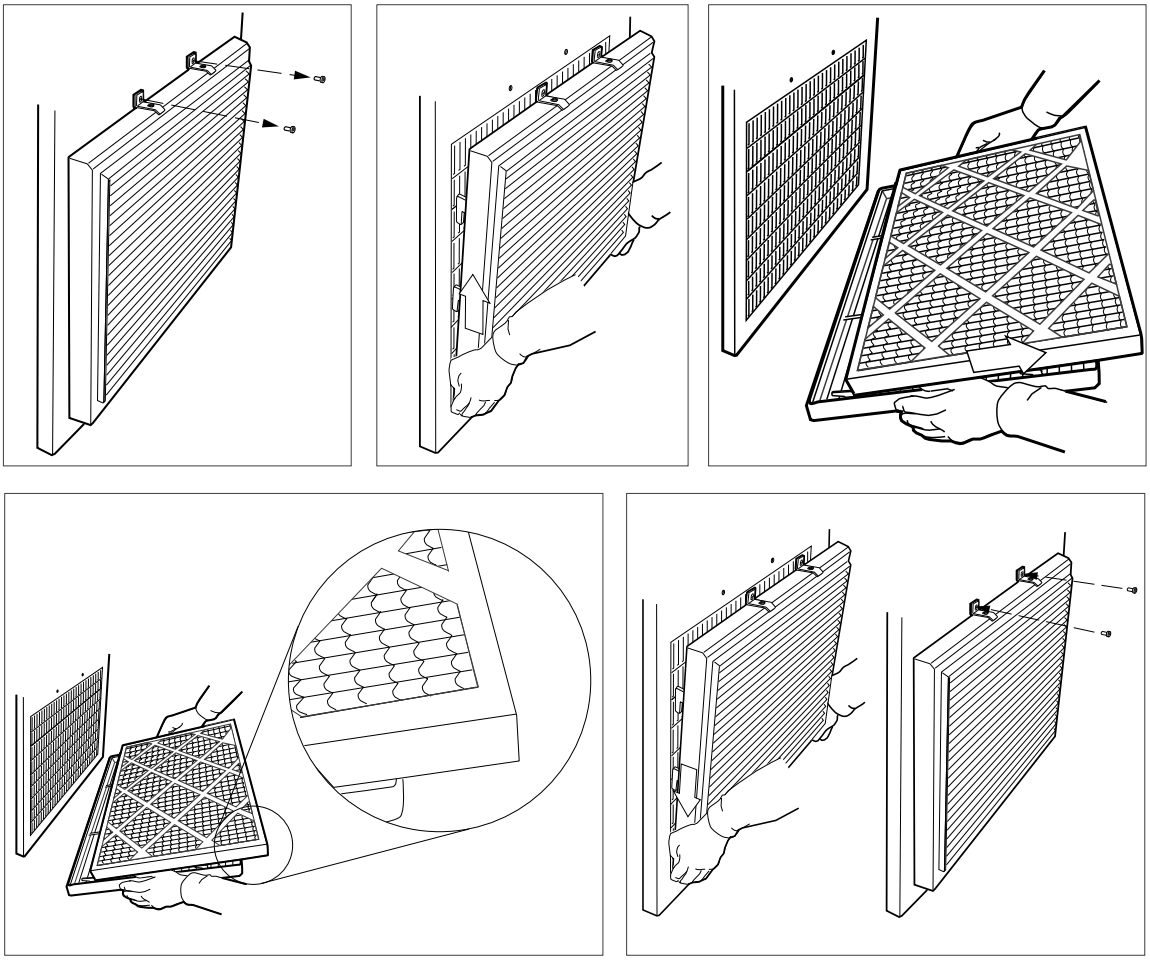
Check the dustiness of the air inlet meshes. If the dust cannot be removed by vacuum cleaning from outside through the grating holes with a small nozzle, proceed as follows:

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Remove the fasteners at the top of the grating.
3. Lift the grating and pull it away from the door.
4. Vacuum clean or wash the grating on both sides.
5. Reinstall the grating in reverse order.



Replacing the inlet door filters (IP54)

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Remove the fasteners at the top of the grating.
3. Lift the grating and pull it away from the door.
4. Remove the air filter mat.
5. Place the new filter mat in the grating the metal wire side facing the door.
6. Reinstall the grating in reverse order.



Cooling fans

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

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

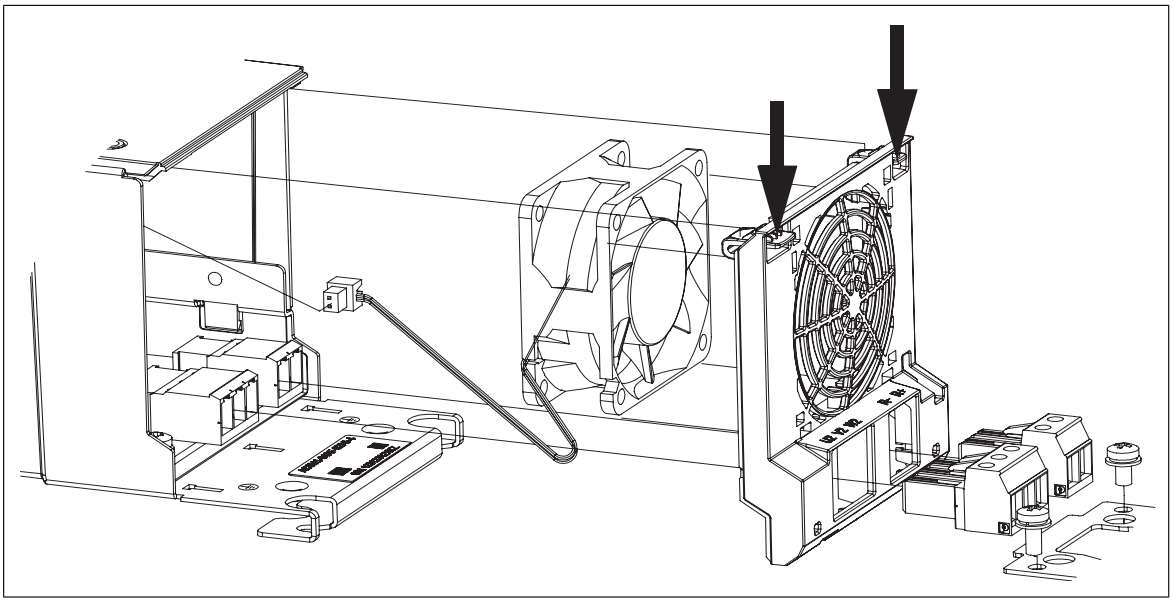
Replacing the module cooling fans

Replacing the R1i and R2i module cooling fan

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Detach the power cable clamp plate and terminal blocks.
3. Release the retaining clips (arrowed) carefully using a screwdriver.
4. Pull the fan holder out.
5. Disconnect the fan cable.
6. Carefully bend the clips on the fan holder to free the fan.
7. Install new fan in reverse order.

Note: The airflow direction is bottom-to-top. Install the fan so that the arrow on it points up.



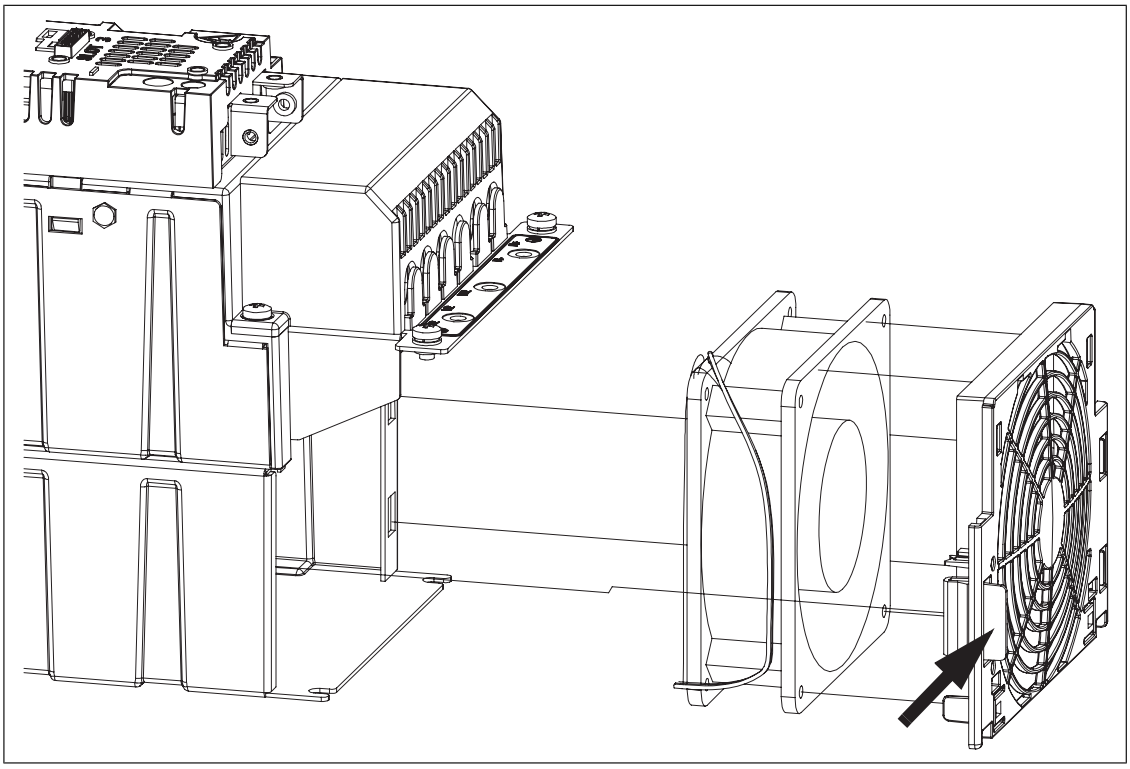
In the drawing, the direction of airflow is from right to left.

Replacing the R3i and R4i module cooling fan

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. To remove the fan, release the retaining clip (arrowed) carefully using a screwdriver.
3. Pull the fan holder out.
4. Disconnect the fan cable.
5. Carefully bend the clips on the fan holder to free the fan.
6. Install new fan in reverse order.

Note: The airflow direction is bottom-to-top. Install the fan so that the airflow arrow points up.



In the picture diretion of airflow is from right to left.

Replacing the R5i module main cooling fan

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Disconnect the drive from the power line. Lock the main disconnecting device and ensure by measuring that there is no voltage.
3. Lift the fan mounting plate by the front edge.
4. Unplug the power supply wires.
5. Lift the fan assembly off.
6. Install the new fan assembly in reverse order. Make sure that the fan blows upwards.







Replacing the R5i module auxiliary cooling fan

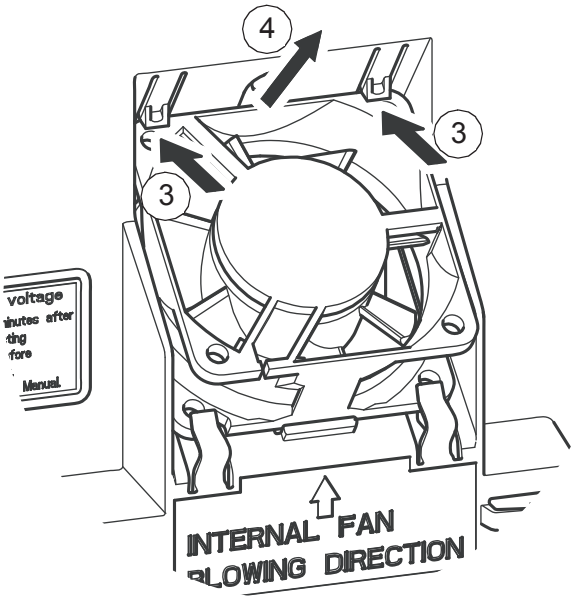
Frame R5i modules have an auxiliary fan located at the top front of the module.

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Unplug the fan from the control unit. Make note of the connector the plug is connected to.

3. Push the two locking tabs gently inwards to release the fan.
4. Remove the fan.

Install new fan in reverse order. Make sure that the fan blows upwards (the arrows on the fan frame and the fan holder point in the same direction).



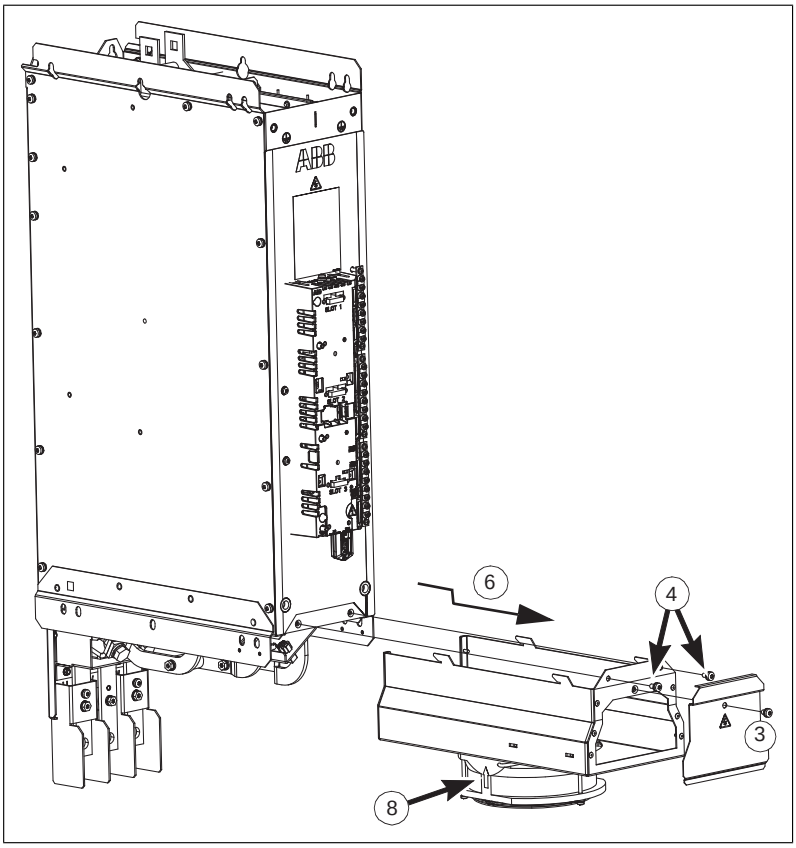
Replacing the R6i and R7i module cooling fan

Frame R6i modules have one fan, R7i modules have two.

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Open the door. Remove any shrouding in front of the fan unit.
3. Remove the front plate.
4. Remove the two screws that lock the fan unit
5. Unplug the power supply wire(s) of the fan(s).
6. To free the fan holder, pull it slightly outwards (about 5 mm), then downwards.
7. Detach the fan(s) from the fan holder.
8. Install new fan(s) in reverse order to the above.

Note: The airflow direction is bottom-to-top. Make sure that the airflow direction arrow on the fan points upward.



Replacing R8i module cooling fan (speed-controlled version)

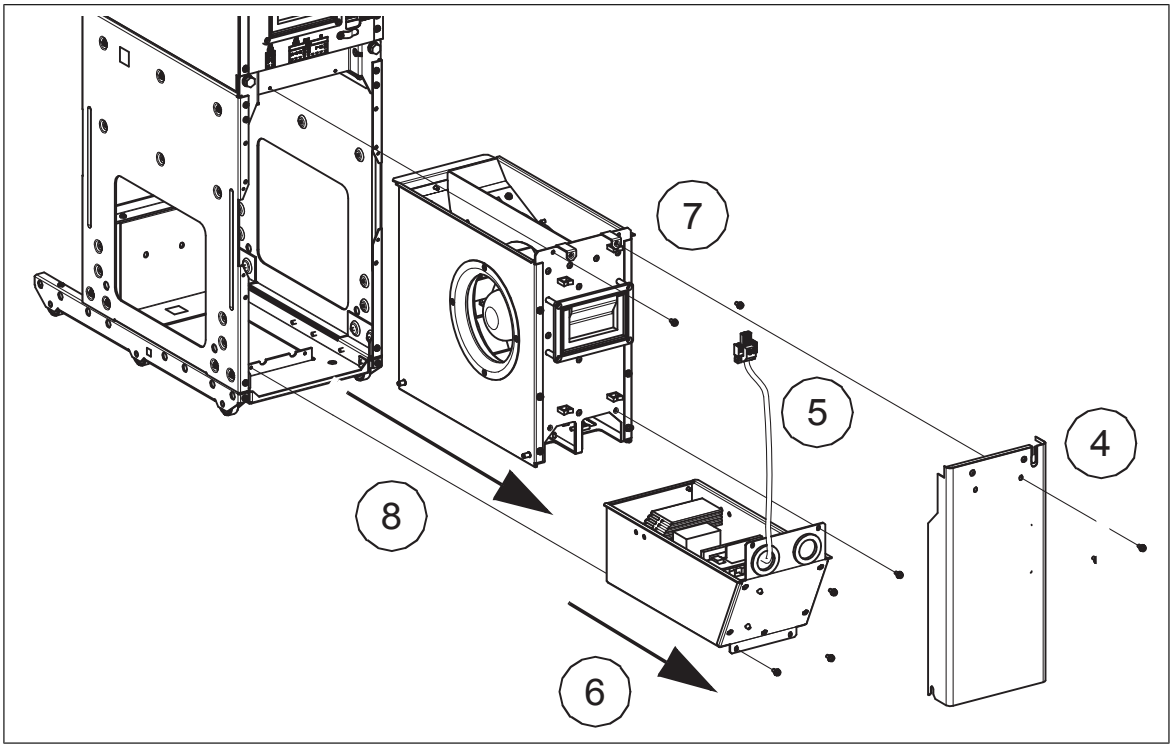
The module is equipped with a fan unit that contains two cooling fans.

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

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

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Open the cubicle door.
3. Remove the shroud in front of the fan (if any).
4. Remove the screws holding the front cover plate. Lift the cover plate somewhat to release it.
5. Disconnect the fan wiring.
6. Remove the unit below the fan.
7. Remove the screws of the fan unit.
8. Pull out the fan unit.
9. Install a new fan in reverse order.



Replacing R8i module cooling fan (direct-on-line version)



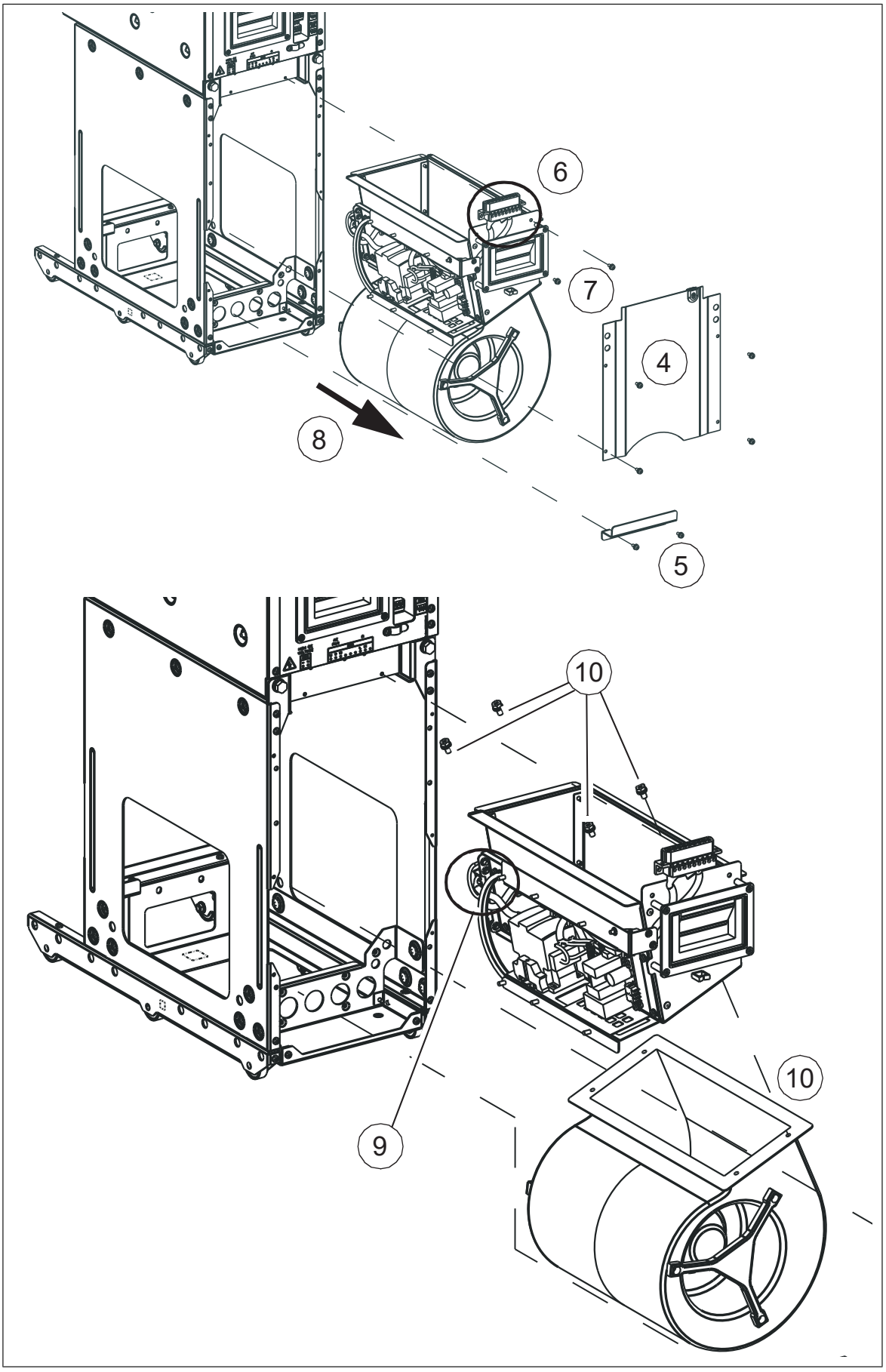
WARNING!
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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



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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Open the door.
3. Remove the shroud in front of the fan (if any).
4. Remove the screws holding the front cover plate. Lift the cover plate somewhat to release it.
5. Remove the bracket.
6. Disconnect the wiring of the fan unit.
7. Remove the screws of the fan unit.
8. Pull out the fan unit.
9. Disconnect the fan wire from the fan unit.
10. Remove the screws of the fan.
11. Install a new fan in reverse order.


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Replacing the circuit board compartment fan

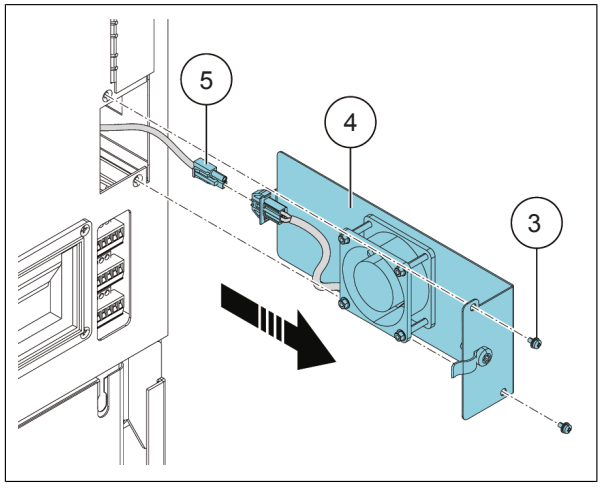
Frame R8i modules are equipped with a fan blowing air through the circuit board compartment.

The fan is accessible from the front of the module.

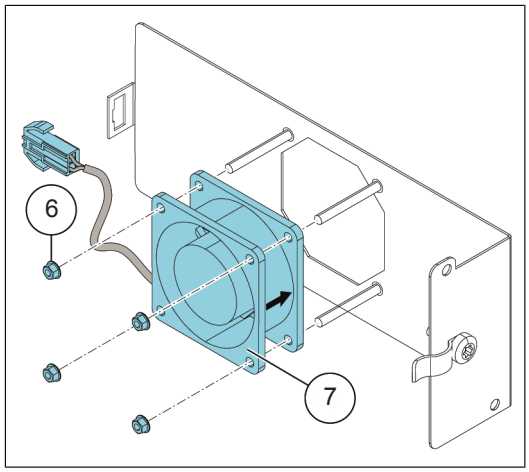
WARNING!
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

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

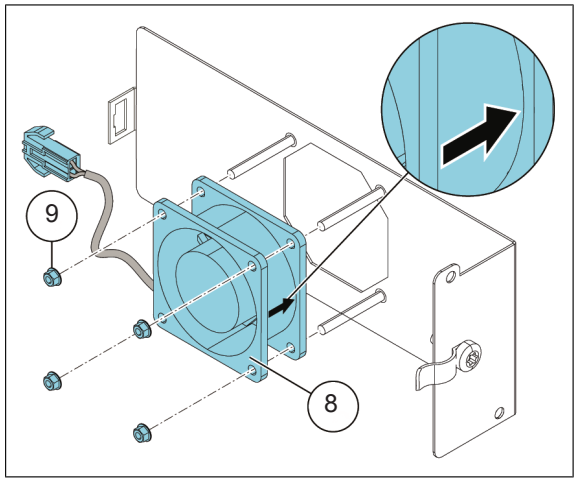
1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Open the door of the module cubicle.
3. Remove the two M4×12 (T20) screws which lock the fan holder.
4. Pull the fan holder out of the module.
5. Disconnect the fan cable.



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

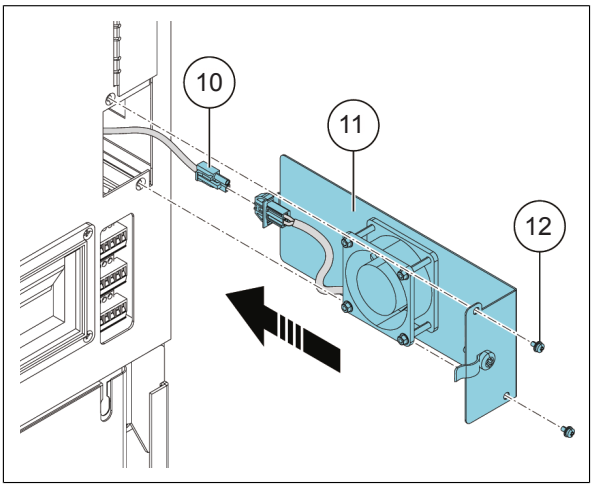


8. Put the fan onto the threaded studs on the fan holder with the airflow direction arrow pointing towards the fan holder.
9. Install and tighten the four nuts removed earlier.



10. Connect the fan cable.

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



Replacing the cabinet cooling fans

Cabinets with ABB air outlet kits

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

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. The instruction mentioned at each air outlet kit in chapter Ordering information contains an exploded view of the outlet. Remove all gratings and filters, and finally remove the plate on top of the outlet. Unscrew all necessary screws securing the fan and remove it.
3. Install new fan in reverse order.

Cabinets with other fan types

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

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Follow the instructions of the manufacturer of the air outlet or enclosure system.

Replacing R6i/R7i module

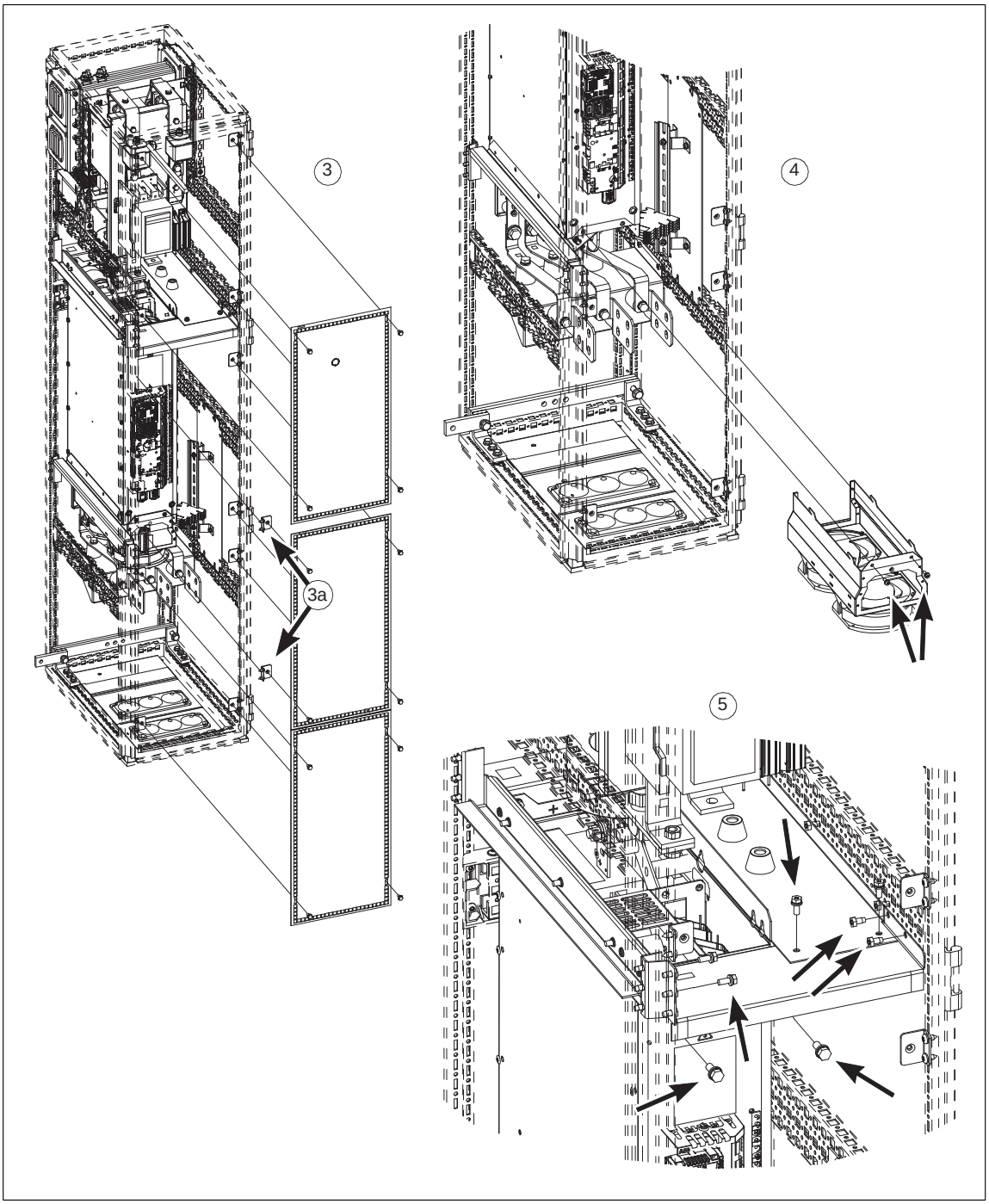
The following procedure describes the replacement of a frame R6i or R7i inverter module.

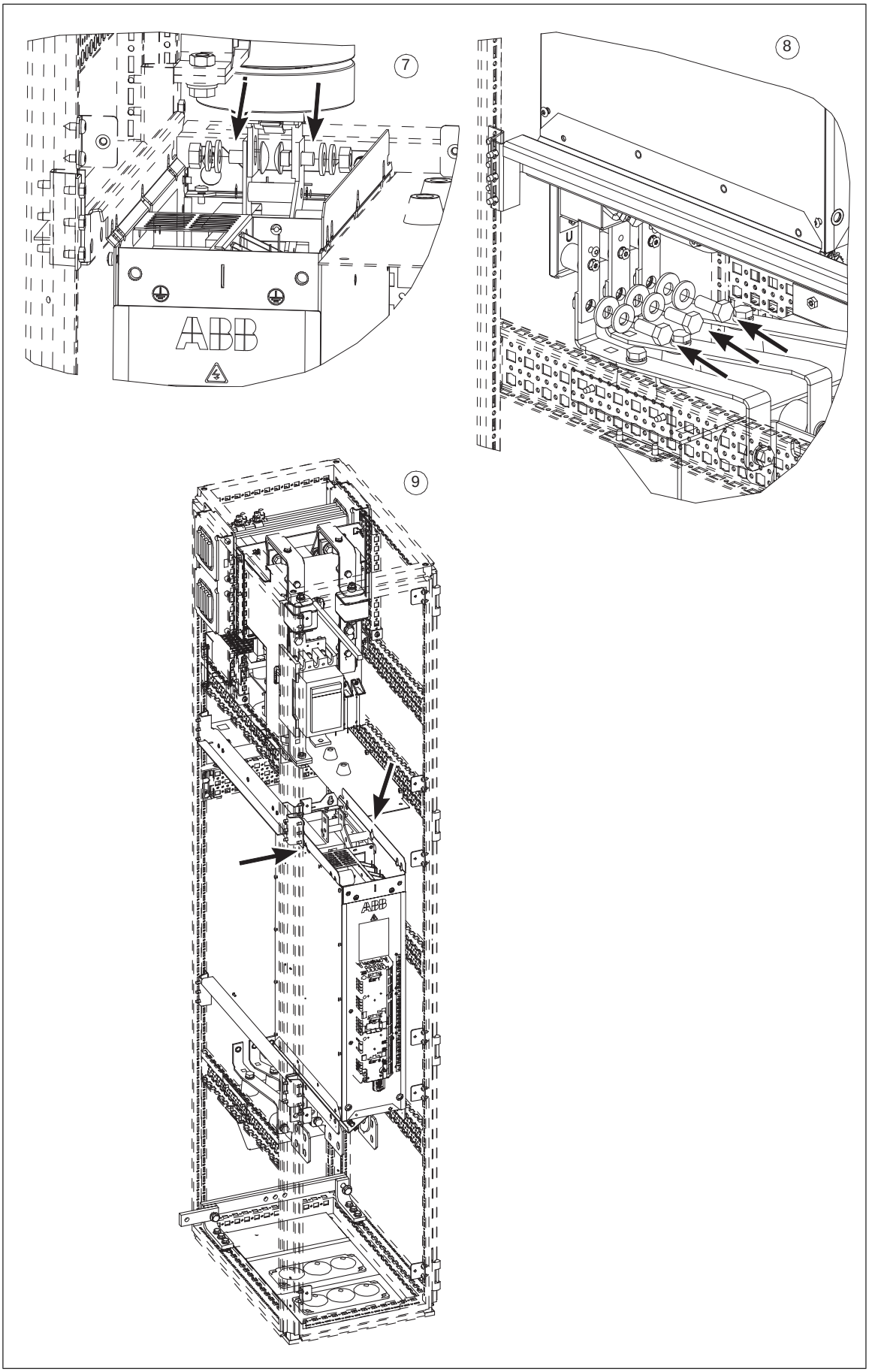
The procedure applies to the design presented in this manual.

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

Refer to the drawings below.

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Disconnect the drive system from the AC power line.
3. Open the cubicle door.
4. Remove the shrouds. Also remove the mounting brackets of the middle shroud (3a) on the left.
5. Remove the two screws holding the fan unit (arrowed). Remove the fan unit by pulling it slightly outwards, then downwards.
6. Remove the mounting screws (arrowed) of the front air baffle. Remove the baffle.
7. Disconnect all control cabling coming to the control unit at the front of the module. Move the cabling aside and tie it out of the way.
8. Disconnect the DC busbars.
9. Disconnect the AC busbars.
10. Pull out the module until the lifting device (or a suitable hoist) can be attached to the lifting eyes at the top of the module (arrowed).
11. Make sure the lifting device is carrying the weight of the module, and pull the module out completely.
12. Install the module in reverse order to the above.


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Replacing R8i module

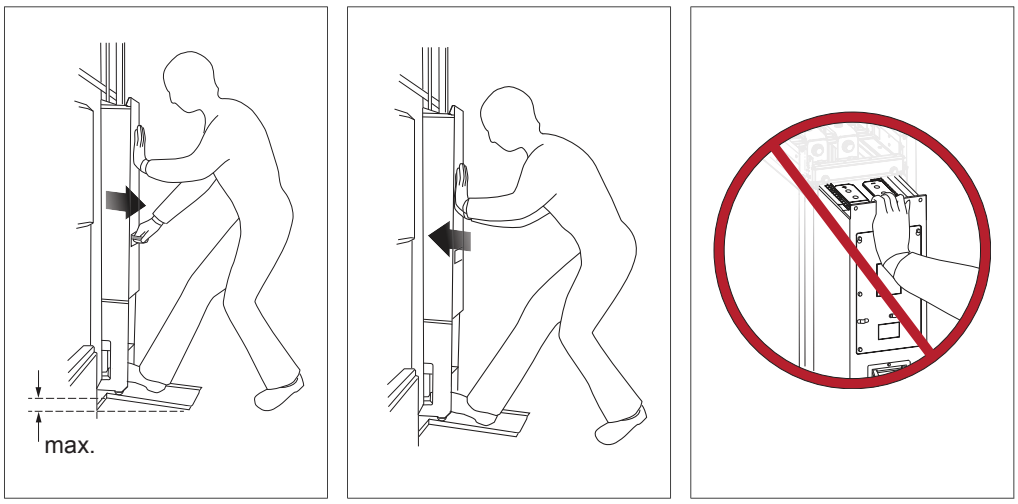


WARNING!
Obey the safety instructions given in *ACS880 multidrive cabinets and modules safety instructions* (3AUA0000102301 [English]). If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

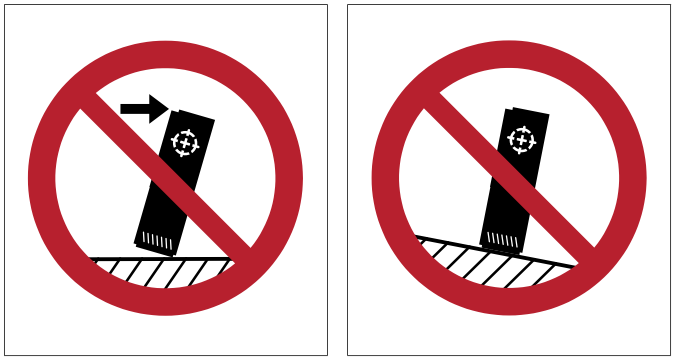
If you are not a qualified electrical professional, do not do installation or maintenance work.

WARNING!

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



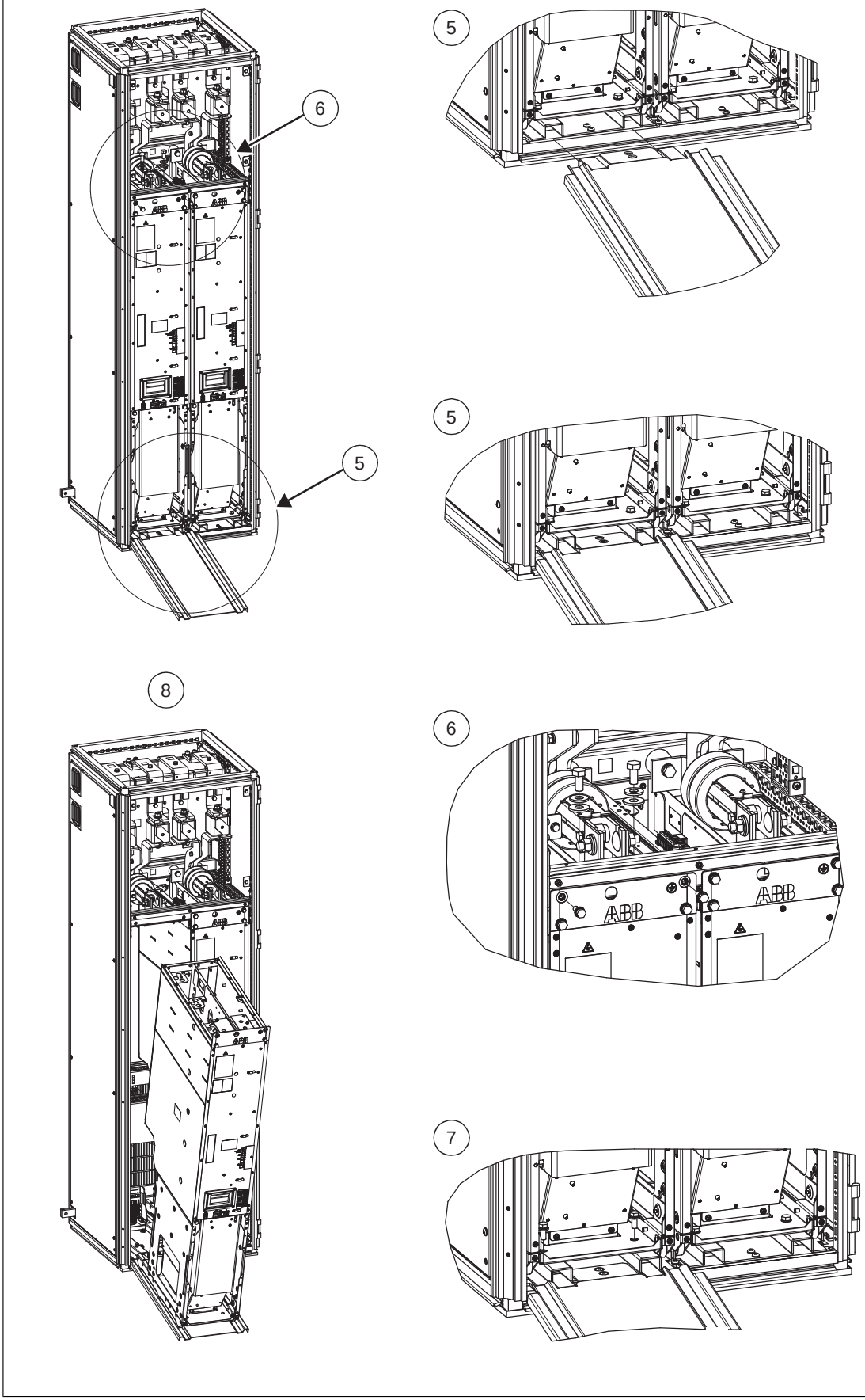
- Do not roll the module on its wheels for a longer distance than what is required for inserting or extracting the module. To move the module to or from the vicinity of the cabinet, lay the module on its side on a pallet or equivalent, and use a forklift or pallet truck.
- Be careful when handling a tall module. The module overturns easily because it is heavy and has a high center of gravity. Whenever possible, secure the module with chains. Do not leave an unsupported module unattended especially on a sloping floor.



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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Open the cubicle door.

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


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BLHF filters

For maintenance of BLHF filter, see *ACS880 multidrive for high-speed test benches supplement* (3AXD50000818013 [English]).

Capacitors

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

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

Reforming the capacitors

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

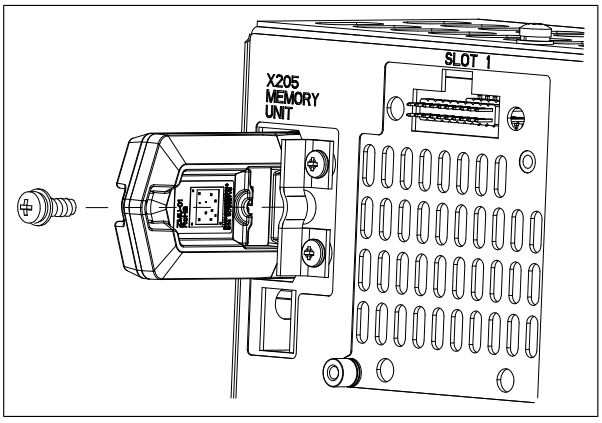
Control units

Replacing the memory unit

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

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

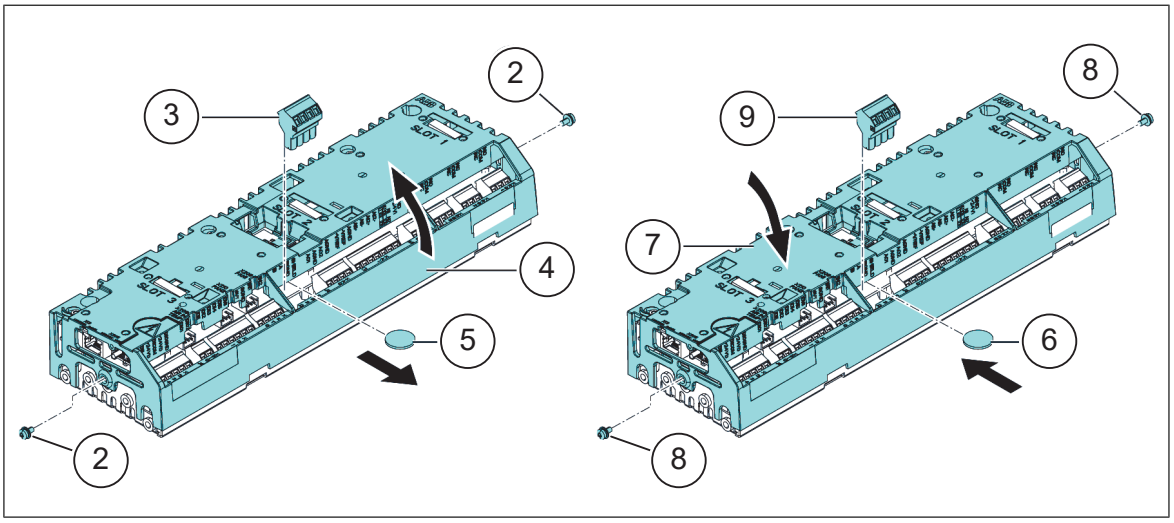
1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Make sure that the control unit is not powered.
3. Remove the fastening screw and pull the memory unit out.
4. Install a memory unit in reverse order.



Replacing the ZCU-14 control unit battery

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 161)* before you start the work.
2. Remove the M4×8 (T20) screws at the ends of the control unit.
3. To see the battery, remove the XD2D terminal block.
4. Carefully lift the edge of the control unit cover on the side with the I/O terminal blocks.
5. Carefully pull the battery out of the battery holder.
6. Carefully put a new CR2032 battery into the battery holder.
7. Close the control unit cover.
8. Tighten the M4×8 (T20) screws.
9. Install the XD2D terminal block.

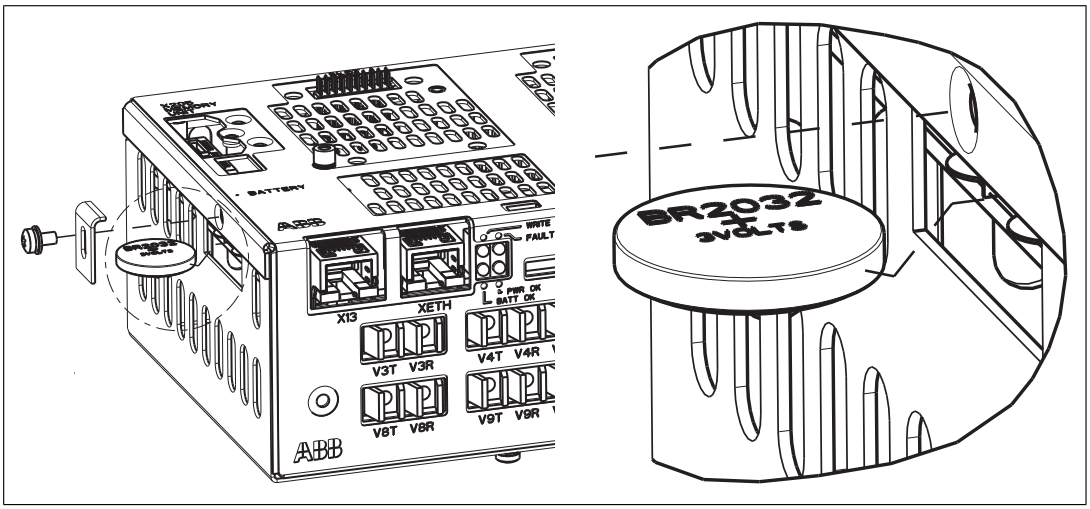


Replacing the BCU control unit battery

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* before you start the work.
2. Undo the fastening screw and remove the battery.
3. Replace the battery with a new BR2032 battery.

4. Dispose of the old battery according to local disposal rules or applicable laws.
5. Set the real-time clock.



Control panel

See *ACS-AP-I, -S, -W and ACH-AP-H, -W assistant control panels user's manual* (3AUA0000085685 [English]).

LEDs and other status indicators

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

R8i module LEDs

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).

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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* 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. If the STO (Safe torque off) function is in use, install the STO jumper wire set in place of the missing module (unless the module was the last on the chain).
5. Install an air baffle to the top module guide to block the airflow through the empty module bay.
6. In case the inverter unit has a DC switch with a charging circuit, disable the appropriate channel on the charging monitoring unit.
7. Switch on the power to the inverter unit.
8. Enter the number of inverter modules present into parameter **95.13 Reduced run mode**.
9. 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.
10. If the STO function is in use, validate it as described in chapter *The Safe torque off function (page 353)*.

Resuming normal operation



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

1. Stop the drive and do the steps in section *Electrical safety precautions (page 161)* 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. Reconnect the STO wiring (if used) to the module.
6. In case the inverter unit has a DC switch with a charging circuit, re-enable all channels on the charging monitoring unit.
7. Switch on the power to the inverter unit.

8. Enter “0” into parameter **95.13 Reduced run mode**.
9. If the STO function is in use, validate it as described in chapter *The Safe torque off function (page 353)*.

Functional safety components

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

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

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

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

Contact your local ABB service representative for more information.

9

Ordering information

Contents of this chapter

This chapter lists the types and ordering codes of the 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

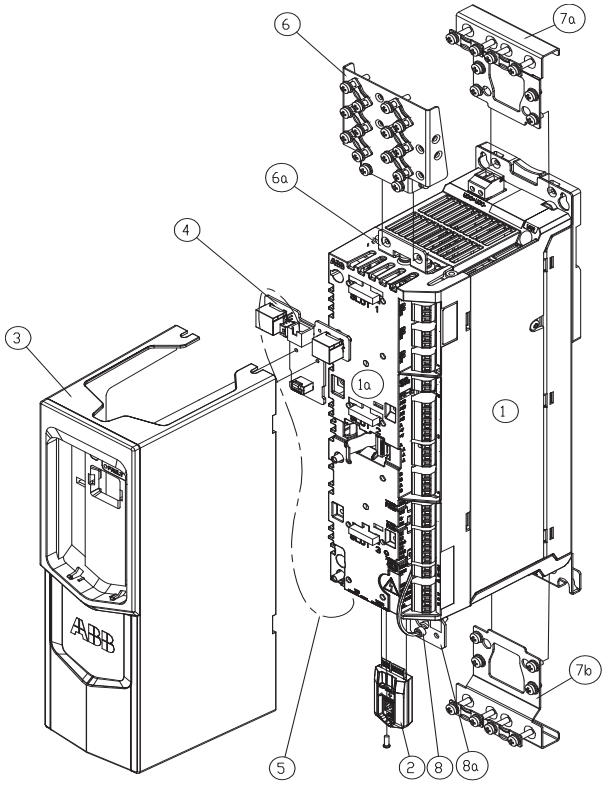
- VX = Kit specifically designed for the Rittal VX25 enclosure system. Many kits without this designation are also used with the VX25 system.

Frames R1i…R4i

Inverter modules

As standard, frame R1i to R4i inverter modules come with a cover that also acts as a control panel holder. The cover is fitted with a panel interface board (ZDPI-01) which enables the construction of a panel bus. The panel bus makes it possible to control several inverter units from a single control panel.

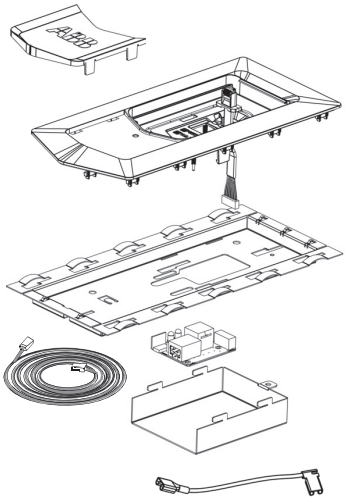
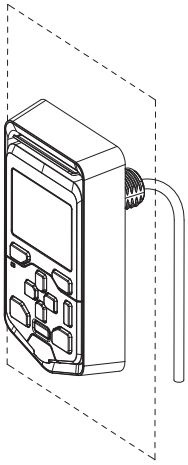
The modules can be ordered without the cover by specifying option code +0J414. (If desired, the panel bus can be constructed using FDPI-02 modules which are available separately.)

Ordering code	Contents
[Module type] For example, **ACS880-104-008A0-3**	• Inverter module (1) with ZCU control unit (1a) • ZMU memory unit (2) with ACS880 primary control program. For availability of other control programs, contact your local ABB representative. • Module cover with control panel holder (3) • ZDPI-01 panel interface board (4) • Cable from ZDPI-01 to control unit (5) • Control cable grounding/strain relief plate (6) with adapter (6a) • Two power cable grounding/strain relief plates (7a, 7b) • Module air temperature sensor (8) with mounting plate (8a) • Cabinet cooling fan wire (connector with a stretch of wire).
[Module type] +0J414 For example, **ACS880-104-008A0-3 +0J414**	• Inverter module (1) with ZCU control unit (1a) • ZMU memory unit (2) with ACS880 primary control program. For availability of other control programs, contact your local ABB representative. • Control cable grounding/strain relief plate (6) with adapter (6a) • Two power cable grounding/strain relief plates (7a, 7b) • Module air temperature sensor (8) with mounting plate (8a) • Cabinet cooling fan wire (connector with a stretch of wire).
[Module type] +N8010 For example, **ACS880-104-008A0-3 +N8010** **ACS880-104-008A0-3 +0J414+N8010**	• ACS880 primary control program with application programmability using function blocks based on the IEC 61131-3 standard. For more information, see *Programming manual: Drive application programming (IEC 61131-3)* (3AUA0000127808 [English]).
	
For module types, see Ratings.	

Control panel

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

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

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

DC-side components

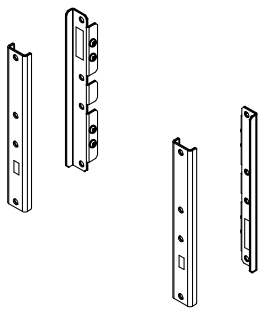
Frame R1i…R4i inverter modules are connected to the DC bus through individual fuses. The fuses are installed on fuse bases that can be opened under no load. Microswitches are used for monitoring the open/closed state of the fuse bases. The fuse bases specified for frame sizes R3i and R4i include the microswitches as standard; the microswitches must be ordered separately for R1i and R2i fuse bases.

A main DC switch/disconnector and DC fuses for all the modules in the same enclosure can optionally be added. The main DC fuses are typically used to protect against short-circuits in the DC path to the module fuses when a high-power supply unit is used.

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

Module-specific DC fuses (IEC, UL)

Module type ACS880-104-…		Fuse		Qty	Ordering code
		Type	Data		
004A8-3 006A0-3	003A6-5 004A8-5	Bussmann FWP-10A14Fa*	10 A, 660 V	2	3AUA0000089115
008A0-3	006A0-5	Bussmann FWP-15A14Fa*	15 A, 660 V	2	3AUA0000089116
0011A-3	008A0-5	Bussmann FWP-20A14Fa*	20 A, 660 V	2	3AUA0000089117
0014A-3	0011A-5	Bussmann FWP-25A14Fa*	25 A, 660 V	2	3AUA0000089118
0018A-3	0014A-5 0018A-5	Bussmann FWP-32A14Fa*	32 A, 660 V	2	3AUA0000089119
0025A-3	0025A-5	Mersen 6,921 CP URQ 27x60/50**	50 A, 690 V	2	3AXD50000000189
0035A-3	0030A-5	Mersen 6,921 CP URQ 27x60/63**	63 A, 690 V	2	3AXD50000000211
0044A-3	0035A-5	Mersen 6,921 CP URQ 27x60/80**	80 A, 690 V	2	3AXD50000000213
0050A-3	0050A-5	Mersen 6,921 CP URQ 27x60/100**	100 A, 690 V	2	3AXD50000000215
0061A-3	0061A-5	Mersen 6,921 CP URQ 27x60/125**	125 A, 690 V	2	3AXD50000000217
0078A-3	0078A-5	Mersen 6,921 CP URQ 27x60/160**	160 A, 690 V	2	3AXD50000000219
0094A-3 0100A-3	0094A-5	Mersen 6,921 CP URQ 27x60/200**	200 A, 690 V	2	3AXD50000000221
*Size: 14 × 51 mm **Size: 27 × 60 mm					

Module-specific DC fuse bases (IEC, UL)

Module type ACS880-104-…		Fuse base		Qty	Ordering code
		Type	Data		
004A8-3 … 0018A-3	003A6-5 … 0018A-5	Mersen US141 (Z331153F)	14 × 51 mm 50 A, 690 V	2	3AUA0000089224 (fuse base)
				2	3AUA0000089228 (microswitch)
0025A-3 … 0100A-3	0025A-5 … 0094A-5	Mersen US271MI (R227600C)	27 × 60 mm 140 A, 800 V	2	3AUA0000089227 (microswitch included)

Main DC switch/disconnector kits

IEC				
Enclosure width	**DC switch/disconnector**		**Qty**	**Ordering code**
	Type	**Data**		
400 mm	ABB OT400E11	2-pole, 400 A	1	3AXD50000000891
600 mm	ABB OT630E11	2-pole, 630 A	1	3AXD50000000892
800 mm	ABB OT400E22	4-pole, 400 A	1	3AXD50000000893

UL				
Enclosure width	**DC switch/disconnector**		**Qty**	**Ordering code**
	Type	**Data**		
400 mm	ABB OT400U11	2-pole, 400 A	1	3AXD50000002764
600 mm	ABB OT600U11	2-pole, 600 A	1	3AXD50000002765
800 mm	ABB OT400U22	4-pole, 400 A	1	3AXD50000002767

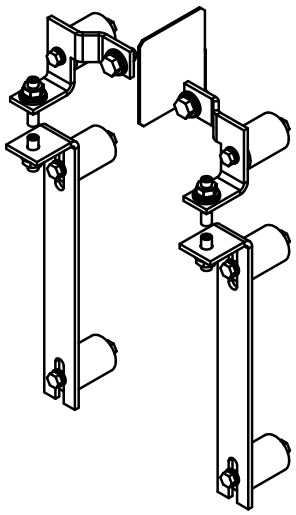
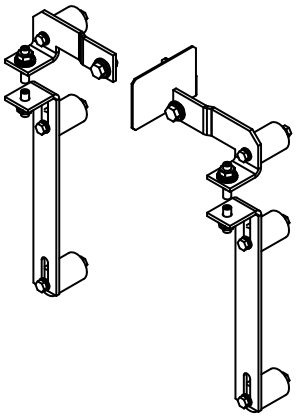
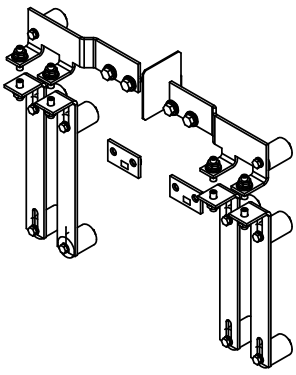
Kit contents:

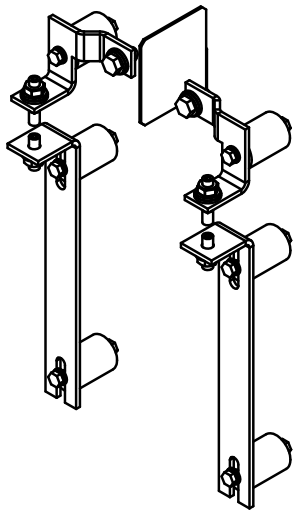
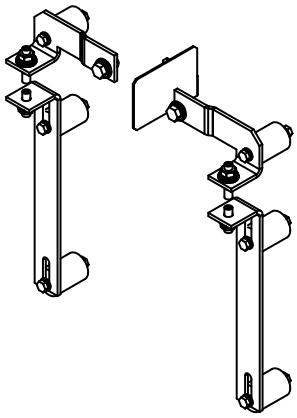
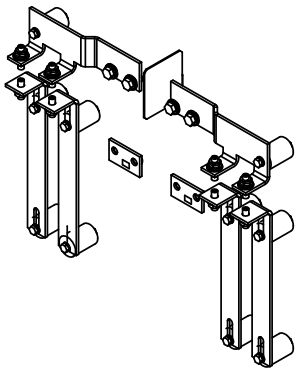
- DC switch/disconnector
- Shaft (12 × 325 mm)
- OHB___J12 handle with off/on indication
- OA1G10 normally-open auxiliary contact block.

Main DC fuses (IEC, UL)

Enclosure width	**DC switch/disconnector**		**Qty**	**Ordering code**
	Type	**Data**		
400 mm	Bussmann 170M4413	2-pole, 400 A	1	3AXD50000002764
600 mm	ABB OT600U11	2-pole, 600 A	1	3AXD50000002765
800 mm	ABB OT400U22	4-pole, 400 A	1	3AXD50000002767

Busbars between main DC switch/disconnector and fuses

Used with…	Qty	Ordering code	Kit code	Illustration
400 mm IEC	1	3AXD50000474493	A-4-1234-272-VX	 Instruction code: 3AXD50000453108
600 mm IEC	1	3AXD50000475964	A-6-1234-271-VX	 Instruction code: 3AXD50000460779
800 mm IEC	1	3AXD50000475933	A-8-1234-273-VX	 Instruction code: 3AXD50000474516

Used with…	Qty	Ordering code	Kit code	Illustration
400 mm UL	1	3AXD50000003918	A-4-1234-274	 Instruction code: 3AXD50000003895
600 mm UL	1	3AXD50000475964	A-6-1234-271-VX	 Instruction code: 3AXD50000460779
800 mm UL	1	3AXD50000003919	A-8-1234-275	 Instruction code: 3AXD50000003875

AC-side components

Output (du/dt) filters

For information on the usage of output (du/dt) filters, see document *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

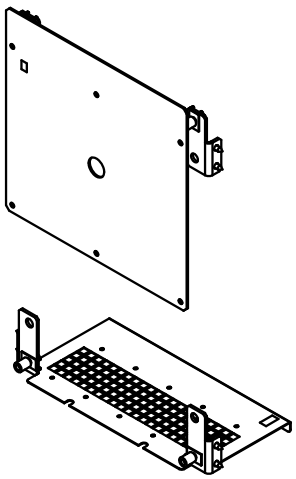
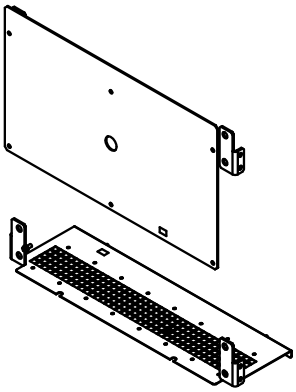
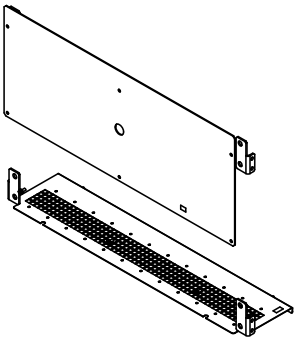
Module type ACS880-104-…		Fuse base		Qty	Ordering code
		Type	Data		
004A8-3 006A0-3 008A0-3 0011A-3 0014A-3 0018A-3	003A6-5 004A8-5 006A0-5 008A0-5 0011A-5 0014A-5 0018A-5	NOCH0016-60	I_{RMS}: 15 A L: 150 µH Power loss: 110 W Cable size: 0.2 … 10 mm^2 Connection: M5	1	58982784
0025A-3 0035A-3	0025A-5 0030A-5 0035A-5	NOCH0030-60	I_{RMS}: 28 A L: 140 µH Power loss: 167 W Cable size: 0.5 … 16 mm^2 Connection: M5	1	58982792
0044A-3 0050A-3 0061A-3 0078A-3 0094A-3 0100A-3	0050A-5 0061A-5 0078A-5 0094A-5	NOCH0070-60	I_{RMS}: 65 A L: 115 µH Power loss: 210 W Cable size: 10…35 mm^2 Connection: M6	1	58982806

Mechanical installation accessories

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

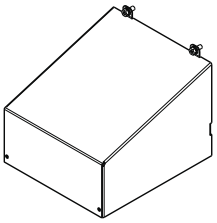
Mounting plate shroud kits

The plates are installed in front of the main DC switch and fuses. The module-specific fuse disconnectors are installed onto this plate.

Enclosure width	Qty	Ordering code	Kit code	Illustration
400 mm	1	3AXD50000456772	A-4-1234-403-VX	 Instruction code: 3AXD50000450060
600 mm	1	3AXD50000456819	A-6-1234-402-VX	 Instruction code: 3AXD50000461691
800 mm	1	3AXD50000475926	A-8-1234-404-VX	 Instruction code: 3AXD50000474882

Air guide kits

The air guide directs the hot air exiting the inverter module into the hot area at the rear of the cubicle.

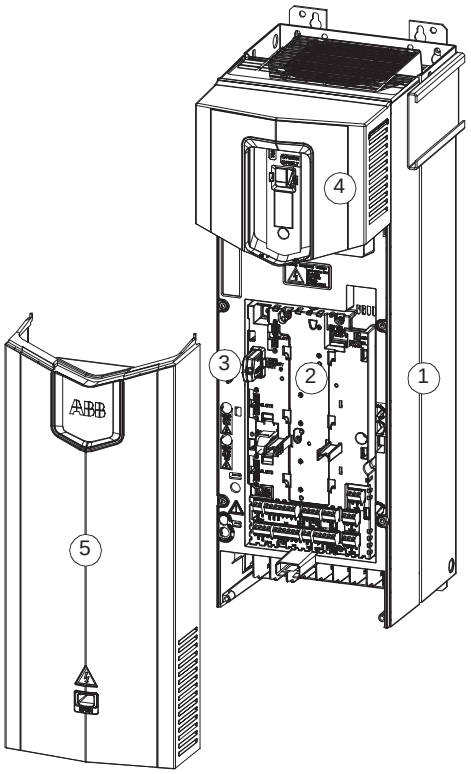
Frame size	Qty	Ordering code	Kit code	Illustration
R1i	1	3AUA0000114398	A-468-1-422	 Instruction code: 3AUA0000114397
R2i	1	3AUA0000114330	A-468-2-423	
R3i	1	3AUA0000114404	A-468-3-424	
R4i	1	3AUA0000114405	A-468-4-425	

Frame R5i

Inverter module

As standard, frame R5i inverter modules come with a two-part front cover, the top part of which also acts as a control panel holder. The holder is fitted with a panel interface board (ZDPI-01) which enables the construction of a panel bus. The panel bus makes it possible to control several inverter units from a single control panel.

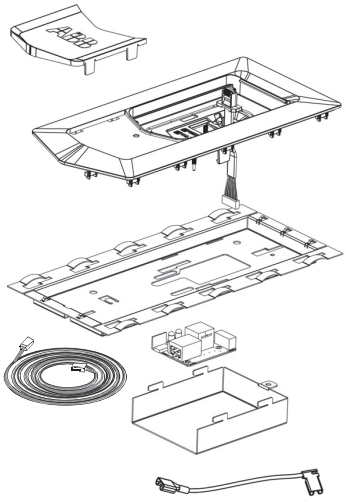
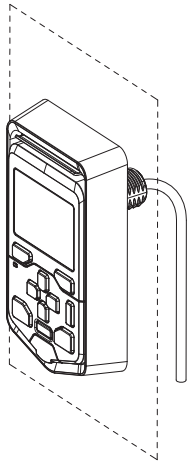
The modules can be ordered without the front covers by specifying option code +0J414. (If desired, the panel bus can be constructed using FDPI-02 modules which are available separately.)

Ordering code	Contents
[Module type] For example, **ACS880-104-007A3-7**	• Inverter module (1) with ZCU-12 control unit (2) • ZMU memory unit (3) with ACS880 primary control program. For availability of other control programs, contact your local ABB representative. • Module front cover, top (4) including • Control panel holder • ZDPI-01 panel interface board • Cable from ZDPI-01 to control unit • Module front cover, bottom (5) • Cabinet cooling fan wire (connector with a stretch of wire).
[Module type] +C132 For example, **ACS880-104-007A3-7 +C132** **ACS880-104-007A3-7 +C132+0J414**	• Marine type approval. For more information, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]).
[Module type] +0J414 For example, **ACS880-104-007A3-7 +0J414**	• Inverter module (1) with ZCU-12 control unit (2) • ZMU memory unit (3) with ACS880 primary control program. For availability of other control programs, contact your local ABB representative. • Cabinet cooling fan wire (connector with a stretch of wire).
[Module type] +N8010 For example, **ACS880-104-007A3-7 +N8010** **ACS880-104-007A3-7 +0J414+N8010**	• ACS880 primary control program with application programmability using function blocks based on the IEC 61131-3 standard. For more information, see *Programming manual: Drive application programming (IEC 61131-3)* (3AUA0000127808 [English]).
	
For module types, see Ratings.	

Control panel

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

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

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

DC-side components

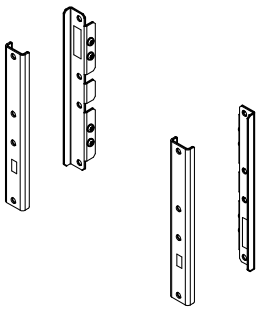
Frame R5i inverter modules are connected to the DC bus through individual fuses. The fuses are installed on fuse bases that can be opened under no load. Microswitches are used for monitoring the open/closed state of the fuse bases. The fuse bases listed below include the microswitches as standard.

A main DC switch/disconnector and DC fuses for all the modules in the same enclosure can optionally be added. The main DC fuses are typically used to protect against short-circuits in the DC path to the module fuses when a high-power supply unit is used.

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

Module-specific DC fuses (IEC, UL)

Module type ACS880-104-…	Fuse		Qty	Ordering code
	Type	Data		
007A3-7 009A8-7 014A2-7 0018A-7	Mersen 1021 CP URB 27x60/40*	40 A, 1000 V	2	3AUA0000089197
0022A-7 0027A-7 0035A-7 0042A-7 0052A-7	Mersen 1021 CP URB 27x60/100*	100 A, 1000 V	2	3AUA0000089211
*Size: 27 × 60 mm				

Module-specific DC fuse bases (IEC, UL)

Module type ACS880-104-…	Fuse base		Qty	Ordering code
	Type	Data		
007A3-7 009A8-7 014A2-7 0018A-7 0022A-7 0027A-7 0035A-7 0042A-7 0052A-7	Mersen PS272PREMCPS (N220076)	27 × 60 mm 250 A, 1250 V DC	1	3AXD50000012958 (microswitch included)

Main DC switch/disconnector kits

IEC					
Enclosure width	Qty of modules	DC switch/disconnector		Qty	Ordering code
		Type	Data		
400 mm	2 × R5i	ABB OT200E11	2-pole, 200 A	1	3AXD50000015608
600 mm	4 × R5i	ABB OT630E11	2-pole, 400 A	1	3AXD50000000891

UL					
Enclosure width	Qty of modules	DC switch/disconnector		Qty	Ordering code
		Type	Data		
400 mm	2 × R5i	ABB OT200U11	2-pole, 200 A	1	3AXD50000024411
600 mm	4 × R5i	ABB OT400U11	2-pole, 400 A	1	3AXD50000002764

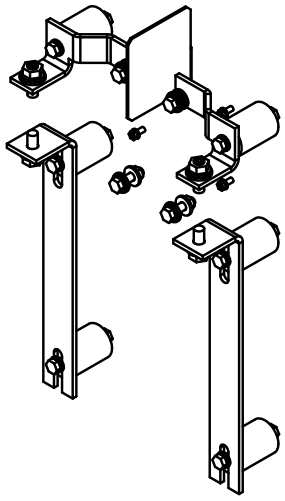
Kit contents:

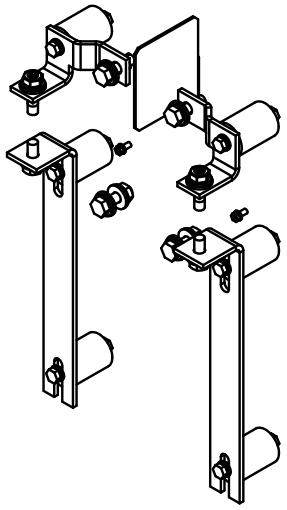
- DC switch/disconnector
- Shaft (6 × 430 mm for 400 mm enclosure width, 12 × 325 mm for 600 mm enclosure width)
- Handle with off/on indication (OHB65J6 for 400 mm enclosure width, OHB125J12 for 600 mm enclosure width)
- OA1G10 normally-open auxiliary contact block.

Main DC fuses (IEC, UL)

Enclosure width	Qty of modules	Fuse			Qty	Ordering code
		Type	Data	Size		
400 mm	2 × R5i	Bussmann 170M4389	200 A, 1250 V	1	2	3AXD50000010195
600 mm	4 × R5i	Bussmann 170M4393	400 A, 1250 V	1	2	3AUA0000076327

DC busbars (IEC, UL)

Enclosure width	Qty	Ordering code	Kit code	Illustration
400 mm	1	3AXD50000456802	A-4-5-276-VX	 Instruction code: 3AXD50000458110

Enclosure width	Qty	Ordering code	Kit code	Illustration
600 mm	1	3AXD50000456826	A-6-5-277-VX	 Instruction code: 3AXD50000461332

AC-side components

Output (du/dt) filters

For information on the usage of output (du/dt) filters, see document *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

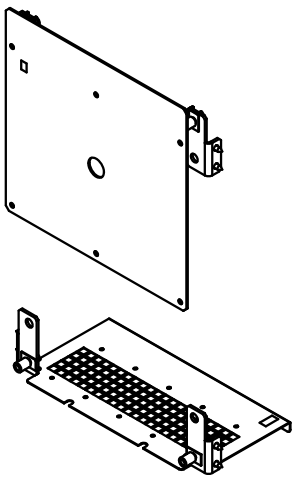
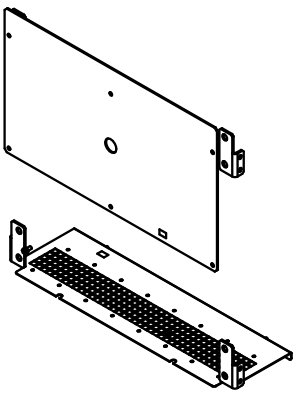
Module type ACS880-104-…	Filter		Qty	Ordering code
	Type	Data		
007A3-7 009A8-7 014A2-7	NOCH0016-60	I_{RMS}: 15 A *L*: 150 µH Power loss: 110vW Cable size: 0.2 … 10 mm^2 Connection: M5	1	58982784
0018A-7 0022A-7 0027A-7	NOCH0030-60	I_{RMS}: 28 A *L*: 140 µH Power loss: 167 W Cable size: 0.5 … 16 mm^2 Connection: M5	1	58982792
0035A-7 0042A-7 0052A-7	NOCH0070-60	I_{RMS}: 65 A *L*: 115 µH Power loss: 210 W Cable size: 10…35 mm^2 Connection: M6	1	58982806

Mechanical installation accessories

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

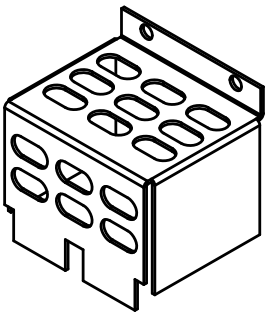
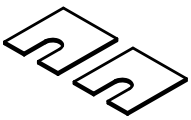
Mounting plate shroud kits

The shrouds are to be attached to the Rittal partial mounting plate mounted in front of the DC switch. The module-specific fuse disconnectors are to be installed onto the vertical plate.

Enclosure width	Qty	Ordering code	Kit code	Illustration
400 mm	1	3AXD50000456772	A-4-1234-403-VX	 Instruction code: 3AXD50000450060
600 mm	1	3AXD50000456819	A-6-1234-402-VX	 Instruction code: 3AXD50000461691

Fuse base shroud kit

IP20 protection of the DC fuse bases requires shrouding both above and below. One shroud kit contains the shrouds for each dual fuse base.

Used with…	Qty	Ordering code	Kit code	Illustration
R5i modules installed in 400 or 600 mm wide cubicles	1 per module	3AXD50000456796	A-X-5-356-VX	  Instruction code: 3AXD50000458424

Frames R6i and R7i

Inverter modules

Deliveries of frame R6i and R7i inverter modules include the following items:

Ordering code	Contents
[Module type] For example, ACS880-104-0210A-3	• Inverter module with ZCU control unit • ZMU memory unit with ACS880 primary control program. For availability of other control programs, contact your local ABB representative.
[Module type] +C132 For example, ACS880-104-0210A-3 +C132 ACS880-104-0210A-3 +C132 +F272	• Marine type approval. For more information, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]).
[Module type] +F272 For example, ACS880-104-0210A-3 +F272	• Inverter module with ZCU control unit and internal charging circuit (note that R7i requires additional external components) • ZMU memory unit with ACS880 primary control program. For availability of other control programs, contact your local ABB representative.
[Module type] +N8010 For example, ACS880-104-0210A-3 +N8010 ACS880-104-0210A-3 +F272 +N8010	• ACS880 primary control program with application programmability using function blocks based on the IEC 61131-3 standard. For more information, see *Programming manual: Drive application programming (IEC 61131-3)* (3AUA0000127808 [English]).
For module types, see Ratings.	

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

- An ACS-AP-x control panel is required for the commissioning of an ACS880 drive system, even if the Drive composer PC tool is used.
- Common mode filters.

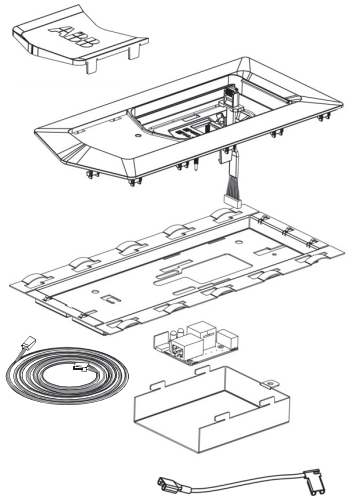
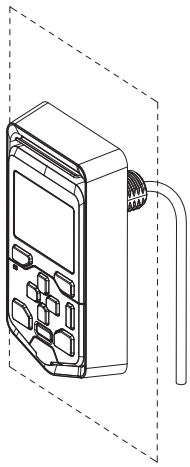
The other parts listed in this chapter for these frame sizes

- may be required by the application (such as a DC switch/disconnector), or
- make the installation or use 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 *ACX-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).

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

DC-side components

Frame R6i and R7i inverter 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 must be fitted if

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

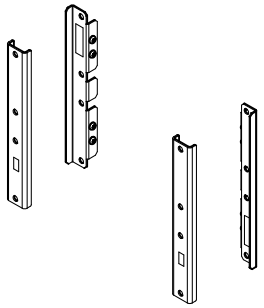
If a charging circuit is required, the inverter module is to be ordered using option code +F272. With frame R6i, all charging components are built into the module. R7i modules with option code +F272 require an external charging contactor and resistors, which are included in the DC connection kit for frame R7i.

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 fuses (IEC, UL)

Module type ACS880-104-…			Fuse			Qty	Ordering code
			Type (Bussmann)	Data	Size		
	0110A-5		170M4409	250 A, 690 V	1	2	3AUA0000066038
0140A-3	0140A-5		170M4410	315 A, 690 V	1	2	3AXD50000000234
0170A-3	0170A-5 0200A-5		170M4412	400 A, 690 V	1	2	3AXD50000000238
0210A-3			170M4413	450 A, 690 V	1	2	68731623
0250A-3	0240A-5		170M4414	500 A, 690 V	1	2	3AXD50000000242
0300A-3	0300A-5		170M4416	630 A, 690 V	1	2	3AXD50000000246
0350A-3	0340A-5		170M4417	700 A, 690 V	1	2	64607383
		0062A-7	170M3392	125 A, 1250 V	1*	2	3AXD50000010198
		0082A-7	170M4388	160 A, 1250 V	1	2	3AUA0000114934
		0100A-7	170M4389	200 A, 1250 V	1	2	3AXD50000010195
		0130A-7	170M4390	250 A, 1250 V	1	2	3AUA0000114933
		0140A-7	170M4391	315 A, 1250 V	1	2	3AXD50000010196
		0190A-7	170M4392	350 A, 1250 V	1	2	3AXD50000010197
		0220A-7	170M4393	400 A, 1250 V	1	2	3AUA0000076327
		0270A-7	170M4395	500vA, 1100 V	1	2	3AUA0000114932

DC switch/disconnector kits

IEC

Module type ACS880-104-…			DC switch/disconnector		Qty	Ordering code
			Type	Data		
0140A-3 0170A-3 0210A-3 0250A-3	0110A-5 0140A-5 0170A-5 0200A-5 0240A-5	0062A-7 0082A-7 0100A-7 0130A-7 0140A-7 0190A-7 0220A-7 0270A-7	ABB OT400E11	2-pole, 400 A	1	3AXD50000001306
0300A-3 0350A-3	0300A-5 0340A-5		ABB OT630E11	2-pole, 630 A	1	3AXD50000001307

UL						
Module type ACS880-104-…			**DC switch/disconnector**		**Qty**	**Ordering code**
			Type	**Data**		
0140A-3 0170A-3 0210A-3 0250A-3	0110A-5 0140A-5 0170A-5 0200A-5 0240A-5	0062A-7 0082A-7 0100A-7 0130A-7 0140A-7 0190A-7 0220A-7 0270A-7	ABB OT400U11	2-pole, 400 A	1	3AXD50000002791
0300A-3 0350A-3	0340A-5 0300A-5		ABB OT600U11	2-pole, 600 A	1	3AXD50000002792

Kit contents:

- DC switch/disconnector
- Shaft (12 × 395 mm)
- OHB___J12 handle with off/on indication
- OA1G10 normally-open auxiliary contact block.

Charging kit (R7i only)

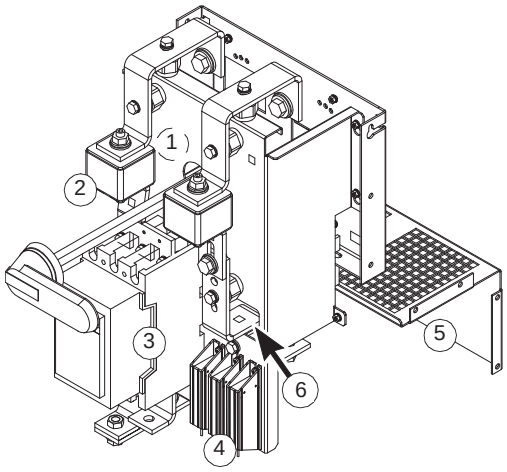
Module type ACS880-104-…			**Qty**	**Ordering code**
0300A-3 0350A-3	0300A-5 0340A-5		1	3AXD50000001328
		0220A-7 0270A-7	1	3AXD50000018982

Kit contents:

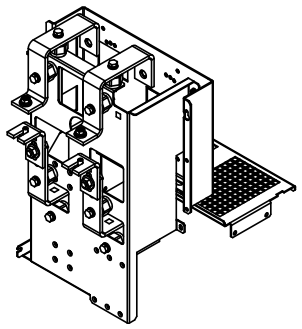
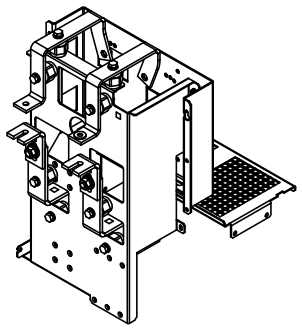
- ABB AF190-30-00-13 charging contactor (3AXD50000415984)
- 2 pcs CEL19-10 auxiliary contacts (3AXD50000415991)
- 2 pcs 36 ohm charging resistor (3AUA0000088634)
- Wire set (3AXD50000001360 for 400 and 500 V types, 3AXD50000005981 for 690 V).

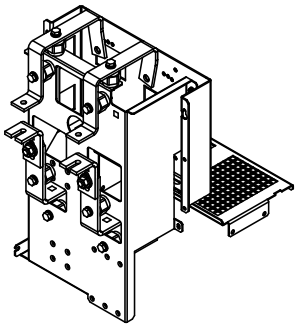
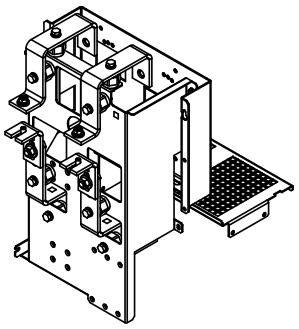
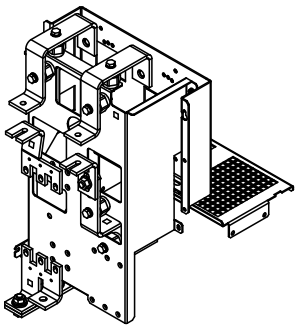
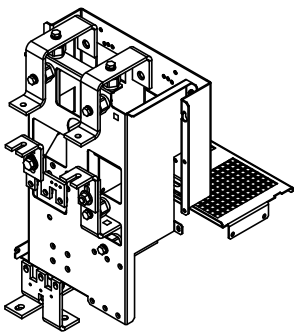
DC connection kit (for Rittal VX25 enclosures)

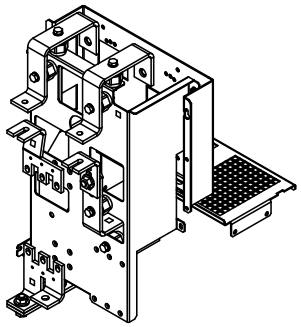
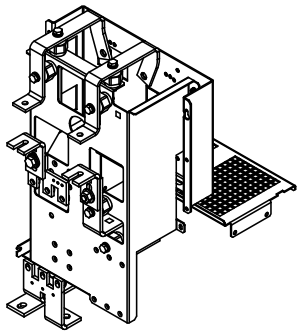
This kit contains the busbars from the DC bus towards the module as well as an air guide, mounting plate, insulators and screws. The assembly incorporates the electrical components (such as DC fuses, DC switch/disconnector, and charging components) whenever required; note that the electrical parts are to be ordered separately as detailed above.



Item	Explanation
1	DC switch/disconnector (obscured by mounting plate)
2	DC fuses
3	Charging contactor (R7i only)
4	Charging resistors (R7i only; two resistors)
5	Air guide
6	Connection to DC busbars

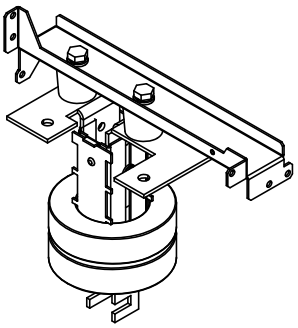
Used with…	Qty	Ordering code	Kit code	Illustration
Frame R6i without DC switch/disconnector	1	3AXD50000459094	A-4-67-283-VX	 Instruction code: 3AXD50000444489
Frame size R6i with DC switch/disconnector (IEC)	1	3AXD50000459100	A-4-6-281-VX	 Instruction code: 3AXD50000445202

Used with…	Qty	Ordering code	Kit code	Illustration
Frame size R6i with DC switch/disconnector (UL)	1	3AXD50000459117	A-4-6-285-VX	 Instruction code: 3AXD50000445325
Frame R7i without DC switch/disconnector or charging circuit	1	3AXD50000459094	A-4-67-283-VX	 Instruction code: 3AXD50000444489
Frame size R7i (400/500 V) without DC switch/disconnector, with charging circuit	1	3AXD50000459063	A-4-7-282-VX	 Instruction code: 3AXD50000445097
Frame size R7i (690 V) without DC switch/disconnector, with charging circuit	1	3AXD50000459087	A-4-7-287-VX	 Instruction code: 3AXD50000445332

Used with…	Qty	Ordering code	Kit code	Illustration
Frame size R7i (400/500 V) with DC switch/disconnector and charging circuit	1	3AXD50000459056	A-4-7-280-VX	 Instruction code: 3AXD50000445257
Frame size R7i (690 V) with DC switch/disconnector and charging circuit	1	3AXD50000459070	A-4-7-286-VX	 Instruction code: 3AXD50000445356

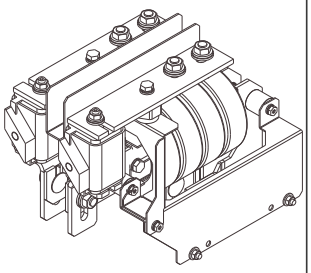
DC busbars with common mode filter holder (for Rittal VX25 enclosures)

This kit contains the busbars that connect to the DC input of the inverter module. The busbars have a holder for the common mode filters; note that the filters shown in the illustration are not included in the kit.

Used with…	Qty	Ordering code	Kit code	Illustration
R6i R7i	1	3AXD50000458509	A-4-67-241-VX	 Instruction code: 3AXD50000444304 **Note:** Filters to be ordered separately

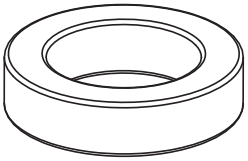
DC busbars with fuse and common mode filter holders (for generic enclosures)

This kit contains the busbars that connect to the DC input of the inverter module. The kit is mounted onto the module. It has screws for cable lug connection as well as a holder for the DC fuses and common mode filters. Note that the fuses and filters are not included in the kit.

Used with…	Qty	Ordering code	Kit code	Illustration
R6i R7i	1	3AXD50000023329	A-0-67-244	 Instruction code: 3AXD50000023500 **Note:** Fuses and filters to be ordered separately

Common mode filters

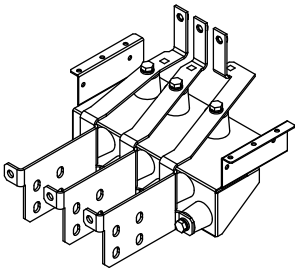
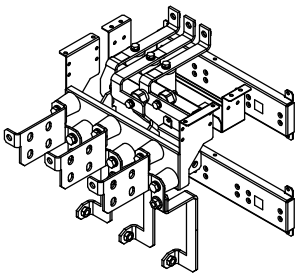
Common mode filtering reduces bearing currents and is required for electromagnetic compatibility (EMC). The filtering is implemented by installing two toroidal cores onto the DC busbars. The cores must be ordered separately.

Used with	Qty	Ordering code	Kit code	Illustration
All enclosure types	2 per module	3AUA0000032859	-	 Instruction code: 3AUA0000123359

AC-side components

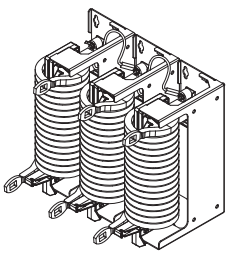
AC busbar kit

This kit contains the busbars for connection of the motor cable. Note that the output (du/dt) filters (if required) are to be ordered separately (see further below).

Used with…	Qty	Ordering code	Kit code	Illustration
R6i R7i (without output filters)	1	3AXD50000459032	A-4-67-181-VX	 Instruction code: 3AXD50000452798
R6i R7i (with output filters)	1	3AXD50000459049	A-4-67-186-VX	 Instruction code: 3AXD50000452439 **Note:** Filters to be ordered separately

Output (du/dt) filters

For information on the usage of output (du/dt) filters, see document *ACS880 multidrive cabinets and modules electrical planning instructions* (3AUA0000102324 [English]).

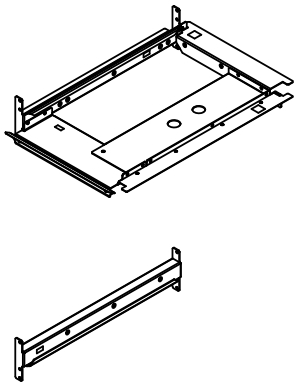
Used with…	Qty	Ordering code	Filter type	Illustration
R6i R7i	1	3AXD50000018892	BOCH-350A-7	 Instruction code: 3AXD50000018989, 3AXD50000027070

Mechanical installation accessories and tools

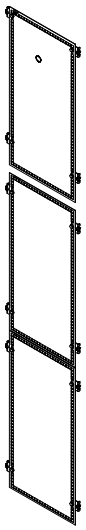
These kits include parts that are used for installing the inverter module in the Rittal VX25 enclosure.

Inverter module mounting parts

This kit contains the rails on which the inverter module rests, and provides air baffles for blocking unwanted air flow along the sides of the module.

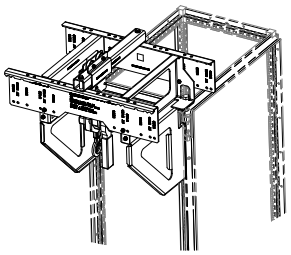
Used with…	Qty	Ordering code	Kit code	Illustration
R6i R7i	1	3AXD50000459018	A-4-67-302-VX	 Instruction code: 3AXD50000453337

Shrouding

Used with…	Qty	Ordering code	Kit code	Illustration
R6i R7i	1	3AXD50000458493	A-4-67-350-VX	 Instruction code: 3AXD50000453252

Lifting device

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

Frame	Enclosure	Qty	Ordering code	Illustration
R6i R7i	Rittal VX25	1	3AXD50000439997	 Instruction code: 3AXD50000210268, 3AXD50000439409

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 chapter Technical data.

Inverter unit		Modules used	
Type	**Frame size**	**Qty**	**Ordering code (for options, see below)**
U_N = 400 V			
ACS880-104-0470A-3	R8i	1	ACS880-104-0470A-3
ACS880-104-0640A-3	R8i	1	ACS880-104-0640A-3
ACS880-104-0760A-3	R8i	1	ACS880-104-0760A-3
ACS880-104-0900A-3	R8i	1	ACS880-104-0900A-3
ACS880-104-1250A-3	2×R8i	2	ACS880-104-0640A-3 +E205
ACS880-104-1480A-3	2×R8i	2	ACS880-104-0760A-3 +E205
ACS880-104-1760A-3	2×R8i	2	ACS880-104-0900A-3 +E205
ACS880-104-2210A-3	3×R8i	3	ACS880-104-0760A-3 +E205
ACS880-104-2610A-3	3×R8i	3	ACS880-104-0900A-3 +E205
ACS880-104-3450A-3	4×R8i	4	ACS880-104-0900A-3 +E205
ACS880-104-4290A-3	5×R8i	5	ACS880-104-0900A-3 +E205
ACS880-104-5130A-3	6×R8i	6	ACS880-104-0900A-3 +E205
U_N = 500 V			
ACS880-104-0440A-5	R8i	1	ACS880-104-0440A-5
ACS880-104-0590A-5	R8i	1	ACS880-104-0590A-5
ACS880-104-0740A-5	R8i	1	ACS880-104-0740A-5
ACS880-104-0810A-5	R8i	1	ACS880-104-0810A-5
ACS880-104-1150A-5	2×R8i	2	ACS880-104-0590A-5 +E205
ACS880-104-1450A-5	2×R8i	2	ACS880-104-0740A-5 +E205
ACS880-104-1580A-5	2×R8i	2	ACS880-104-0810A-5 +E205
ACS880-104-2150A-5	3×R8i	3	ACS880-104-0740A-5 +E205
ACS880-104-2350A-5	3×R8i	3	ACS880-104-0810A-5 +E205
ACS880-104-3110A-5	4×R8i	4	ACS880-104-0810A-5 +E205
ACS880-104-3860A-5	5×R8i	5	ACS880-104-0810A-5 +E205
ACS880-104-4610A-5	6×R8i	6	ACS880-104-0810A-5 +E205
U_N = 690 V			

Inverter unit		Modules used	
Type	**Frame size**	**Qty**	**Ordering code (for options, see below)**
ACS880-104-0340A-7	R8i	1	ACS880-104-0340A-7 +E205
ACS880-104-0410A-7	R8i	1	ACS880-104-0410A-7 +E205
ACS880-104-0530A-7	R8i	1	ACS880-104-0530A-7 +E205
ACS880-104-0600A-7	R8i	1	ACS880-104-0600A-7 +E205
ACS880-104-0800A-7	2×R8i	2	ACS880-104-0410A-7 +E205
ACS880-104-1030A-7	2×R8i	2	ACS880-104-0530A-7 +E205
ACS880-104-1170A-7	2×R8i	2	ACS880-104-0600A-7 +E205
ACS880-104-1540A-7	3×R8i	3	ACS880-104-0530A-7 +E205
ACS880-104-1740A-7	3×R8i	3	ACS880-104-0600A-7 +E205
ACS880-104-2300A-7	4×R8i	4	ACS880-104-0600A-7 +E205
ACS880-104-2860A-7	5×R8i	5	ACS880-104-0600A-7 +E205
ACS880-104-3420A-7	6×R8i	6	ACS880-104-0600A-7 +E205

Ordering code format	**Option codes**
[Module type] +code [+code] … For example, **ACS880-104-0470A-3 +E205**	**+C132**: Marine type approval. For more information, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English]). **+C183**: Heating element mounted to module base **+C188**: Direct-on-line (DOL) cooling fan **+E205**: Internal du/dt filtering. Standard with 690 V modules, required with parallel-connected modules for all nominal voltages **+G304**: 115 V AC auxiliary voltage supply **+P942**: Mechanical compatibility with ACS800 R8i **+P967**: Module variant with capability for increased switching frequency. See *ACS880 multidrive for high-speed test benches supplement* (3AXD50000818013 [English]).

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

- An ACS-AP-x control panel is required for the commissioning of an ACS880 drive system, even if the Drive composer PC tool is used. See section ACS-AP-W control panel below.
- Inverter control unit (see section Inverter control unit below)
- Fiber optic cabling from control unit to each inverter module (see section Fiber optic cables below)
- Common mode filters
- Control circuit plug connectors
- Quick connector.

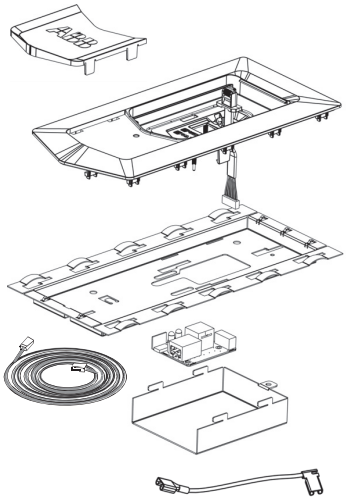
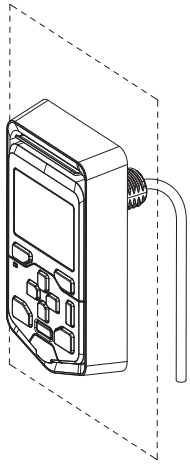
The other parts listed in this chapter for this frame size

- may be required by the application (such as a DC switch/disconnector), or
- make the installation or use 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 *ACX-AP-x assistant control panels user's manual* (3AUA0000085685 [English]).

Type	Description	Ordering code	Illustration
ACS-AP-W	Control panel with Bluetooth	3AXD50000025965	
DPMP-01	Door mounting kit (IP55)	3AUA0000108878	
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 BCU-0x 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 blocks based on the IEC 61131-3 standard. For more information, see *Programming manual: Drive application programming (IEC 61131-3)* (3AUA0000127808 [English]).

Fiber optic cables

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

If the inverter unit is equipped with a DC switch/disconnector, each inverter module is also connected to the charging controller by a pair of fiber optic cables.

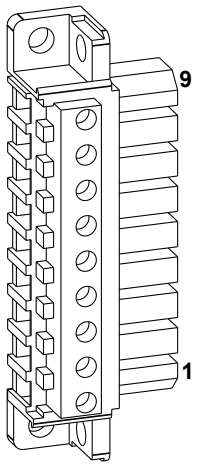
The following kits, each consisting of a pair of plastic fiber optic cables, are available from ABB:

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

Control circuit plug connectors

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

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

Used with…	Qty	Ordering code	Data	Illustration
X50	1 per module	3AUA0000059813	STV S 9 SB 500 V, 32 A, 9-pole	

Wire sets for use with the reduced run function

A “reduced run” function (for inverter unit frame sizes 3×R8i and above) makes it possible to continue operation with limited current even if some modules of the inverter unit are out of service. The wire set for the STO connection is available as shown below.

Use	Qty	Ordering code	Data
STO wiring in place of removed inverter module	1 per module	3AXD50000022694	PVC insulation
		3AXD50000022695	Halogen-free insulation

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.

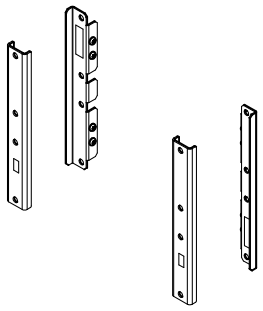
Note: A separate capacitor charging circuit must be designed and installed by the customer if the inverter unit is directly connected to the DC bus and the supply unit of the system does not have a charging capability.

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)

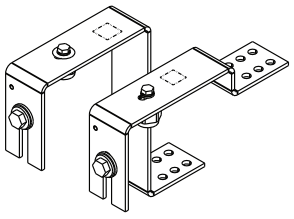
The brackets in this kit act as a mounting base for the busbar supports of the Rittal Flat-PLS DC bus and ensure its correct placement and alignment inside the cabinet line-up.

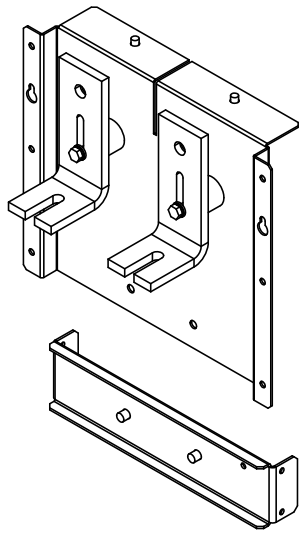
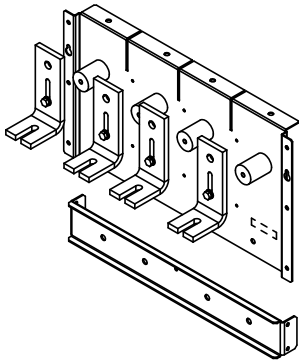
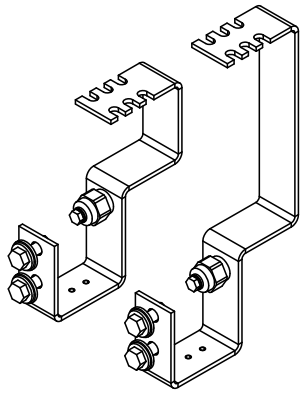
The designs shown in this manual for Rittal VX25 enclosures use the Rittal Flat-PLS busbar system. Make sure that the current in the drive system does not exceed the current-carrying capacity of the busbars.

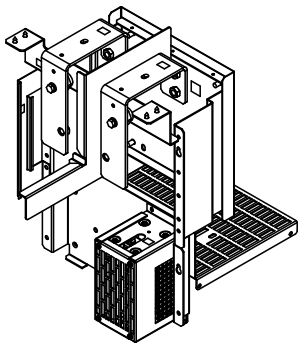
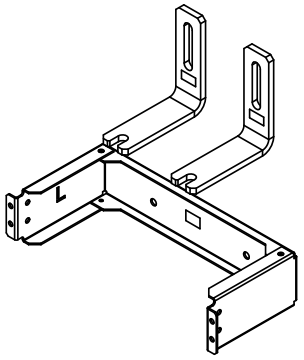
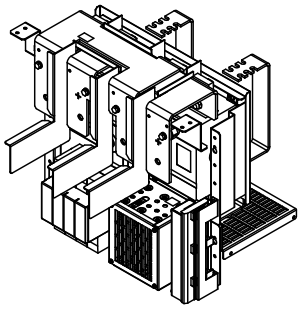
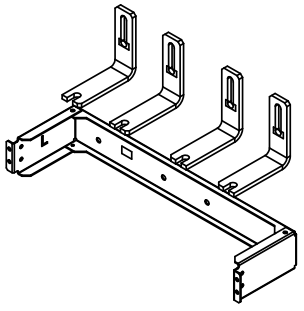
Used with …	Qty	Ordering code	Kit code	Illustration
VX25 enclosure	1 kit per cubicle	3AXD50000333387	A-468-X-001-VX	 Instruction code: 3AXD50000333639

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

These parts connect the Flat-PLS busbars to the DC fuses, and provide the mounting base for the charging components if required.

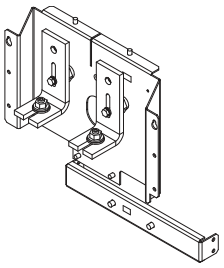
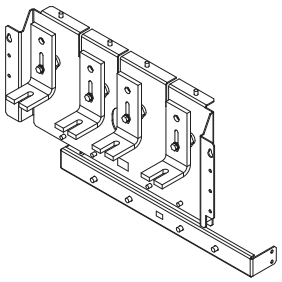
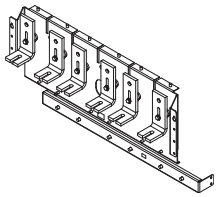
Used with…	Qty	Ordering code	Kit code	Illustration
400/600 mm VX25 enclosure without DC switch/disconnector and charging	1 per module	3AXD50000337446	A-46-8-206-VX	 Instruction code: 3AXD50000345915

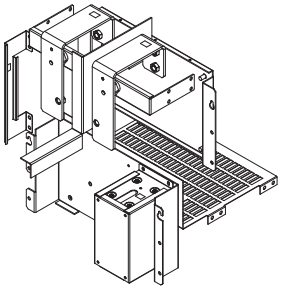
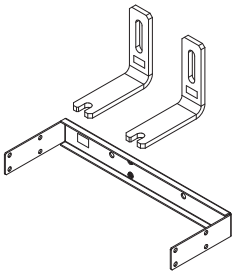
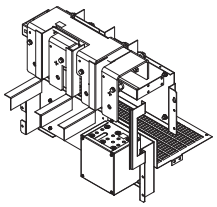
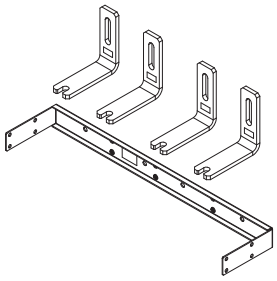
Used with…	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure without DC switch/disconnector and charging	1	3AXD50000337415	A-4-8-252-VX	 Instruction code: 3AXD50000345151
600 mm VX25 enclosure without DC switch/disconnector and charging	1	3AXD50000337521	A-6-8-255-VX	 Instruction code: 3AXD50000342471
400/600 mm VX25 enclosure with DC switch/disconnector and charging	1 per module	3AXD50000337453	A-46-8-207-VX	 Instruction code: 3AXD50000345458

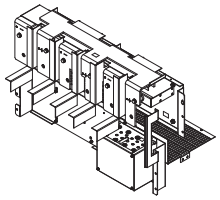
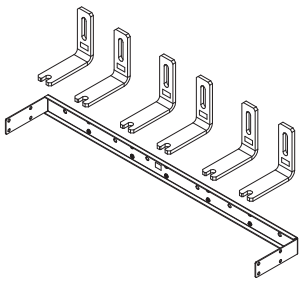
Used with…	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure with DC switch/disconnector and charging	1	3AXD50000337439	A-4-8-288-VX	 Instruction code: 3AXD50000342501
	1	3AXD50000337422	A-4-8-290-VX	 Instruction code: 3AXD50000345236
600 mm VX25 enclosure with DC switch/disconnector and charging	1	3AXD50000337545	A-6-8-289-VX	 Instruction code: 3AXD50000342860
	1	3AXD50000337538	A-6-8-291-VX	 Instruction code: 3AXD50000342983

DC connection parts 1 of 2 (for generic enclosures)

These parts provide the DC connection between the input busbars and the DC fuses (including a mounting base for the charging components if required).

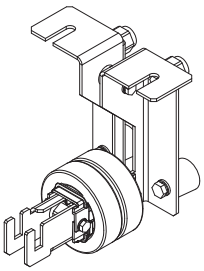
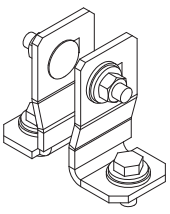
Used with…	Qty	Ordering code	Kit code	Illustration
400 mm generic enclosure without DC switch/disconnector and charging	1	3AXD50000006418	A-4-8-256	 Instruction code: 3AXD50000006441
600 mm generic enclosure without DC switch/disconnector and charging	1	3AXD50000006444	A-6-8-257	 Instruction code: 3AXD50000006447
800 mm generic enclosure without DC switch/disconnector and charging	1	3AXD50000006450	A-8-8-258	 Instruction code: 3AXD50000006455

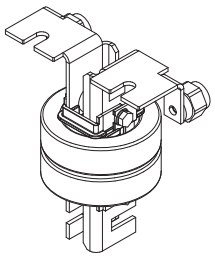
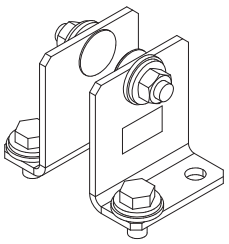
Used with…	Qty	Ordering code	Kit code	Illustration
400 mm generic enclosure with DC switch/disconnector and charging	1	3AXD50000044559	A-4-8-292	 Instruction code: 3AXD50000043644
	1	3AXD50000044582	A-4-8-295	 Instruction code: 3AXD50000043686
600 mm generic enclosure with DC switch/disconnector and charging	1	3AXD50000044560	A-6-8-293	 Instruction code: 3AXD50000043784
	1	3AXD50000044583	A-6-8-296	 Instruction code: 3AXD50000043737

Used with…	Qty	Ordering code	Kit code	Illustration
800 mm generic enclosure with DC switch/disconnector and charging	1	3AXD50000044581	A-8-8-294	 Instruction code: 3AXD50000044586
	1	3AXD50000044584	A-8-8-297	 Instruction code: 3AXD50000044574

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

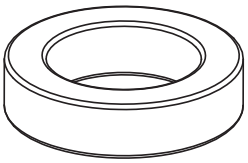
These parts connect the DC fuses to the inverter module.

Used with…	Qty	Ordering code	Kit code	Illustration
All VX25 and generic enclosures without DC switch/disconnector and charging	1 per module	3AXD50000028401	A-468-8-235	 Instruction code: 3AXD50000028418 **Note:** Filters to be ordered separately
	1 per module	3AXD50000028403	A-468-8-246	 Instruction code: 3AXD50000028384

Used with…	Qty	Ordering code	Kit code	Illustration
All VX25 and generic enclosures with DC switch/disconnector and charging	1 per module	3AXD50000044551	A-468-8-247	 Instruction code: 3AXD50000043411 **Note:** Filters to be ordered separately
	1 per module	3AXD50000044553	A-468-8-248	 Instruction code: 3AXD50000043466

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. The cores must be ordered separately.

Used with	Qty	Ordering code	Kit code	Illustration
All enclosure types	2 per module	3AUA0000032859	-	 Instruction code: 3AUA0000123359

DC fuses (IEC, UL)

Unit type ACS880-104-…			Fuse				
			Qty	Ordering code	Type	Data	Size
0470A-3			2	3AXD50000000148	Bussmann 170M6413	900 A, 690 V	3
0640A-3			2	68244463	Bussmann 170M6416	1250 A, 690 V	3
0760A-3			2	3AXD50000000150	Bussmann 170M6417	1400 A, 690 V	3
0900A-3			2	68393108	Bussmann 170M6419	1600 A, 690 V	3*
1250A-3			4	68244463	Bussmann 170M6416	1250 A, 690 V	3
1480A-3			4	3AXD50000000150	Bussmann 170M6417	1400 A, 690 V	3
1760A-3			4	68393108	Bussmann 170M6419	1600 A, 690 V	3*
2210A-3			6	3AXD50000000150	Bussmann 170M6417	1400 A, 690 V	3
2610A-3			6	68393108	Bussmann 170M6419	1600 A, 690 V	3*
3450A-3			8				
4290A-3			10				
5130A-3			12				
	0440A-5		2	3AXD50000000148	Bussmann 170M6413	900 A, 690 V	3
	0590A-5		2	68731658	Bussmann 170M6415	1100 A, 690 V	3
	0740A-5 0810A-5		2	3AXD50000000150	Bussmann 170M6417	1400 A, 690 V	3
	1150A-5		4	68731658	Bussmann 170M6415	1100 A, 690 V	3
	1450A-5 1580A-5		4	3AXD50000000150	Bussmann 170M6417	1400 A, 690 V	3
	2150A-5 2350A-5		6				
	3110A-5		8				
	3860A-5		10				
	4610A-5		12				
		0340A-7	2	63903167	Bussmann 170M6544	630 A, 1250 V	3
		0410A-7	2	63919128	Bussmann 170M6546	800 A, 1250 V	3
		0530A-7	2	63916749	Bussmann 170M6548	1000 A, 1100 V	3
		0600A-7	2	68736021	Bussmann 170M6549	1100 A, 1000 V	3
		0800A-7	4	63919128	Bussmann 170M6546	800 A, 1250 V	3
		1030A-7	4	63916749	Bussmann 170M6548	1000 A, 1100 V	3
		1170A-7	4	68736021	Bussmann 170M6549	1100 A, 1000 V	3
		1540A-7	6	63916749	Bussmann 170M6548	1000 A, 1100 V	3
		1740A-7	6	68736021	Bussmann 170M6549	1100 A, 1000 V	3
		2300A-7	8				
		2860A-7	10				
		3420A-7	12				

DC switch/disconnector kits

IEC – 230 V 50 Hz						
Unit type ACS880-104-…			**Enclosure type**	**Qty**	**Ordering code**	**Switch type**
0470A-3 0640A-3 0760A-3 0900A-3	0440A-5 0590A-5 0740A-5 0810A-5	0340A-7 0410A-7 0530A-7 0600A-7	Rittal VX25 or generic	1	3AXD50000009534	ABB OT1600E11
1250A-3 1480A-3 1760A-3	1150A-5 1450A-5 1580A-5	0800A-7 1030A-7 1170A-7	Rittal VX25 or generic	1	3AXD50000009535	ABB OT1600E22
2210A-3 2610A-3	2150A-5 2350A-5	1540A-7 1740A-7	Rittal VX25	1	3AXD50000009534	ABB OT1600E11
				1	3AXD50000009535	ABB OT1600E22
			Generic	1	3AXD50000009536	ABB OT2500E22
3450A-3	3110A-5	2300A-7	Rittal VX25 or generic	2	3AXD50000009535	ABB OT1600E22
4290A-3	3860A-5	2860A-7	Rittal VX25	1	3AXD50000009534	ABB OT1600E11
				2	3AXD50000009535	ABB OT1600E22
			Generic	1	3AXD50000009535	ABB OT1600E22
				1	3AXD50000009536	ABB OT2500E22
5130A-3	4610A-5	3420A-7	Rittal VX25	3	3AXD50000009535	ABB OT1600E22
			Generic	2	3AXD50000009536	ABB OT2500E22

IEC – 230 V 60 Hz						
Unit type ACS880-104-…			**Enclosure type**	**Qty**	**Ordering code**	**Switch type**
0470A-3 0640A-3 0760A-3 0900A-3	0440A-5 0590A-5 0740A-5 0810A-5	0340A-7 0410A-7 0530A-7 0600A-7	Rittal VX25 or generic	1	3AXD50000026854	ABB OT1600E11
1250A-3 1480A-3 1760A-3	1150A-5 1450A-5 1580A-5	0800A-7 1030A-7 1170A-7	Rittal VX25 or generic	1	3AXD50000026857	ABB OT1600E22
2210A-3 2610A-3	2150A-5 2350A-5	1540A-7 1740A-7	Rittal VX25	1	3AXD50000026854	ABB OT1600E11
				1	3AXD50000026857	ABB OT1600E22
			Generic	1	3AXD50000026860	ABB OT2500E22
3450A-3	3110A-5	2300A-7	Rittal VX25 or generic	2	3AXD50000026857	ABB OT1600E22
4290A-3	3860A-5	2860A-7	Rittal VX25	1	3AXD50000026854	ABB OT1600E11
				2	3AXD50000026857	ABB OT1600E22
			Generic	1	3AXD50000026857	ABB OT1600E22
				1	3AXD50000026860	ABB OT2500E22
5130A-3	4610A-5	3420A-7	Rittal VX25	3	3AXD50000026857	ABB OT1600E22
			Generic	2	3AXD50000026860	ABB OT2500E22

UL – 115 V 60 Hz						
Unit type ACS880-104-…			**Enclosure type**	**Qty**	**Ordering code**	**Switch type**
0470A-3 0640A-3 0760A-3 0900A-3	0440A-5 0590A-5 0740A-5 0810A-5	0340A-7 0410A-7 0530A-7 0600A-7	Rittal VX25 or generic	1	3AXD50000009540	ABB OT1200U11
1250A-3 1480A-3 1760A-3	1150A-5 1450A-5 1580A-5	0800A-7 1030A-7 1170A-7	Rittal VX25 or generic	1	3AXD50000009541	ABB OT1200U22
2210A-3 2610A-3	2150A-5 2350A-5	1540A-7 1740A-7	Rittal VX25 or generic	1	3AXD50000009540	ABB OT1200U11
				1	3AXD50000009541	ABB OT1200U22
3450A-3	3110A-5	2300A-7	Rittal VX25 or generic	2	3AXD50000009541	ABB OT1200U22
4290A-3	3860A-5	2860A-7	Rittal VX25 or generic	1	3AXD50000009540	ABB OT1200U11
				2	3AXD50000009541	ABB OT1200U22
5130A-3	4610A-5	3420A-7	Rittal VX25 or generic	3	3AXD50000009541	ABB OT1200U22

Kit contents:

- DC switch/disconnector(s)
- Shaft (12 × 395 mm)

- OHB150J12P (switch types …11) or OHB274J12 (switch types …22) handle with off/on indication
- Interlock kit OTZT4A with PDAL2 coil
- One normally-open (OA1G10) and one normally-closed (OA3G01) auxiliary contact block.

Charging kits

The charging kit contains the main parts of the charging circuit, such as the charging switch (with shaft, handle, terminal shrouds and a set of auxiliary contacts), fuses, connectors and the charging controller. Note that the charging resistors or fiber optic cables are not included in the kit and must be ordered separately.

IEC

Unit type ACS880-104-…			Enclosure type	Qty	Ordering code
0470A-3 0640A-3 0760A-3 0900A-3 1250A-3 1480A-3 1760A-3	0440A-5 0590A-5 0740A-5 0810A-5 1150A-5 1450A-5 1580A-5	0340A-7 0410A-7 0530A-7 0600A-7 0800A-7 1030A-7 1170A-7	Rittal VX25 or generic	1	3AXD50000009537
2210A-3 2610A-3	2150A-5 2350A-5	1540A-7 1740A-7	Rittal VX25	2	3AXD50000009537
			Generic	1	3AXD50000009539
3450A-3	3110A-5	2300A-7	Rittal VX25 or generic	2	3AXD50000009537
4290A-3	3860A-5	2860A-7	Rittal VX25	3	3AXD50000009537
			Generic	1	3AXD50000009537
				1	3AXD50000009539
5130A-3	4610A-5	3420A-7	Rittal VX25	3	3AXD50000009537
			Generic	2	3AXD50000009539

UL

Unit type ACS880-104-…			Enclosure type	Qty	Ordering code
0470A-3 0640A-3 0760A-3 0900A-3 1250A-3 1480A-3 1760A-3	0440A-5 0590A-5 0740A-5 0810A-5 1150A-5 1450A-5 1580A-5	0340A-7 0410A-7 0530A-7 0600A-7 0800A-7 1030A-7 1170A-7	Rittal VX25 or generic	1	3AXD50000009538
2210A-3 2610A-3 3450A-3	2150A-5 2350A-5 3110A-5	1540A-7 1740A-7 2300A-7	Rittal VX25 or generic	2	3AXD50000009538

UL					
Unit type ACS880-104-…			**Enclosure type**	**Qty**	**Ordering code**
4290A-3 5130A-3	3860A-5 4610A-5	2860A-7 3420A-7	Rittal VX25 or generic	3	3AXD50000009538

Kit contents:

Ordering code	Contents
3AXD50000009537	Switch fuse (OS160GD04F) with terminal shrouds (OSS160GT1S/4); shaft (6 × 290 mm); OHB65J6 handle; normally-closed auxiliary contacts (OA3G01, 2 pcs); 170M2676 fuses; charging controller
3AXD50000009538	Switch fuse (OS100GJ04FP) with terminal shrouds (OSS160GT1S/4); shaft (6 × 161 mm); OHB65J6 handle; normally-closed auxiliary contacts (OA3G01, 2 pcs); FWJ30A fuses and fuse holder modification parts; charging controller
3AXD50000009539	Switch fuse (OS200DZ22F) with terminal shrouds (OSS200G1S/4); shaft (6 × 210 mm); OHB65J6 handle; normally-closed auxiliary contacts (OA3G01, 2 pcs); 170M2676 fuses; charging controller

- Charging resistors are not included and must be ordered separately. See below.
- The charging controller connects to each inverter module by a pair of fiber optic cables. The cables are not included and must be ordered separately.

Charging resistors

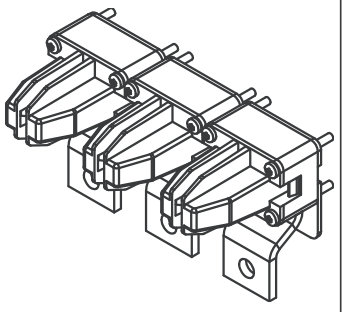
IEC						
Unit type ACS880-104-…			**Enclosure type**	**Qty**	**Ordering code**	**Data**
0470A-3 0640A-3 0760A-3 0900A-3	0440A-5 0590A-5 0740A-5 0810A-5		Rittal VX25 or generic	4	10037531	24 ohm
1250A-3 1480A-3 1760A-3	1150A-5 1450A-5 1580A-5		Rittal VX25 or generic	6	10037531	24 ohm
2210A-3 2610A-3	2150A-5 2350A-5		Rittal VX25	10	10037531	24 ohm
			Generic	8		
3450A-3	3110A-5		Rittal VX25 or generic	12	10037531	24 ohm
4290A-3	3860A-5		Rittal VX25	16	10037531	24 ohm
			Generic	14		
5130A-3	4610A-5		Rittal VX25	18	10037531	24 ohm
			Generic	16		
		0340A-7 0410A-7 0530A-7 0600A-7	Rittal VX25 or generic	4	10028531	33 ohm
		0800A-7 1030A-7 1170A-7	Rittal VX25 or generic	6	10028531	33 ohm
		1540A-7 1740A-7	Rittal VX25	10	10028531	33 ohm
			Generic	8		
		2300A-7	Rittal VX25 or generic	12	10028531	33 ohm
		2860A-7	Rittal VX25	16	10028531	33 ohm
			Generic	114		
		3420A-7	Rittal VX25	18	10028531	33 ohm
			Generic	16		

UL						
Unit type ACS880-104-…			**Enclosure type**	**Qty**	**Ordering code**	**Data**
0470A-3 0640A-3 0760A-3 0900A-3	0440A-5 0590A-5 0740A-5 0810A-5		Rittal VX25 or generic	4	10037531	24 ohm
1250A-3 1480A-3 1760A-3	1150A-5 1450A-5 1580A-5		Rittal VX25 or generic	6	10037531	24 ohm
2210A-3 2610A-3	2150A-5 2350A-5		Rittal VX25 or generic	10	10037531	24 ohm
3450A-3	3110A-5		Rittal VX25 or generic	12	10037531	24 ohm
4290A-3	3860A-5		Rittal VX25 or generic	16	10037531	24 ohm
5130A-3	4610A-5		Rittal VX25 or generic	18	10037531	24 ohm
		0340A-7 0410A-7 0530A-7 0600A-7	Rittal VX25 or generic	4	10028531	33 ohm
		0800A-7 1030A-7 1170A-7	Rittal VX25 or generic	6	10028531	33 ohm
		1540A-7 1740A-7	Rittal VX25 or generic	10	10028531	33 ohm
		2300A-7	Rittal VX25 or generic	12	10028531	33 ohm
		2860A-7	Rittal VX25 or generic	16	10028531	33 ohm
		3420A-7	Rittal VX25 or generic	18	10028531	33 ohm

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/shrouds kit

This kit contains the busbars that connect to the quick connector(s), the busbars for the motor cable connection, and shrouding.

The following types of kits are available:

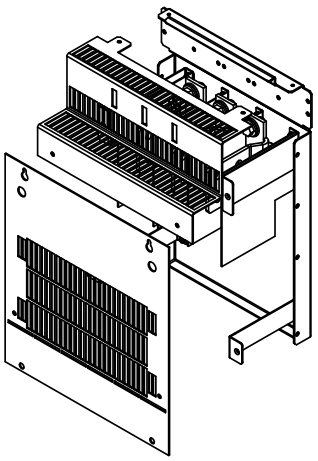
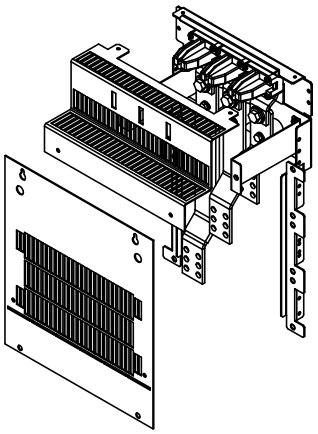
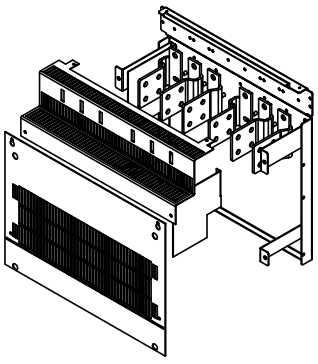
1. Kits with cable connections (all enclosure types).
   Each inverter module has its own motor cable connections. If the inverter unit consists of parallel-connected modules, each module must be separately (and identically) cabled to the motor.
2. Kits with bridging busbars (600 mm VX25 or generic enclosures, 800 mm generic enclosures).
   These kits connect the outputs of the modules in the same cubicle so that, for example, a single thicker cable can be used instead of separate cables for each module.

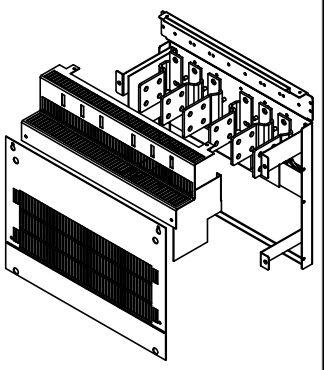
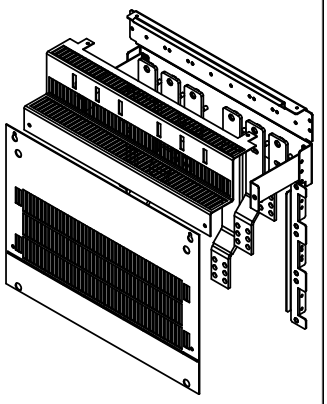
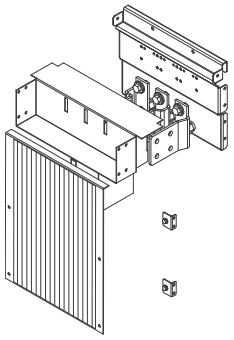
   WARNING!
   The bridging can carry the nominal output of one inverter module. In case of three parallel modules, ensure that the load capacity of the bridging is not exceeded. For example, if the cabling connects to the output busbars at one module only, use the module in the middle.

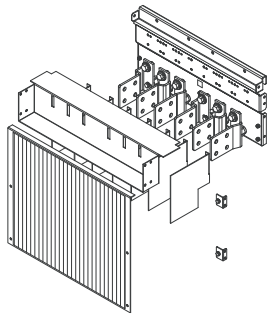
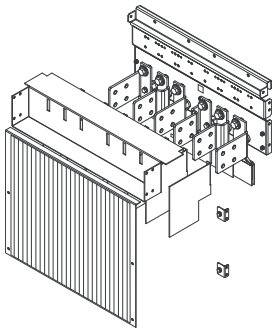
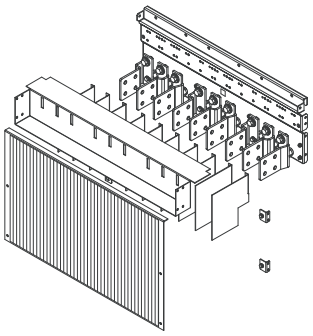
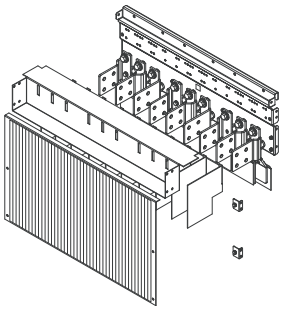
   If the inverter unit consists of modules installed in different cubicles, make sure that the load is distributed evenly between the modules:

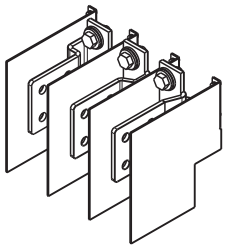
   - In case of two inverter cubicles of two modules, connect the same number of cables to each cubicle.
   - In case of one inverter cubicle with three modules and another with two, each cubicle requires a number of cables proportional to the number of modules within. For example, connect three out of five (or six out of ten, etc.) cables to the cubicle with three modules, the remaining two out of five (four out of ten) cables to the cubicle with two modules.

3. Kits with common AC output busbars (400 and 600 mm wide VX25 enclosures).
   These kits have connection points for busbars that join the outputs of inverter modules regardless of whether the modules are located in the same cubicle or not. Using these kits, it is possible to construct a common output cubicle where all motor cables connect to.

Used with…	Qty	Ordering code	Kit code	Illustration
400 mm VX25 enclosure (cable connection)	1	3AXD50000337477	A-4-8-132-VX	 Instruction code: 3AXD50000343492
400 mm VX25 enclosure (common AC output busbar connection)	1	3AXD50000337088	A-4-8-140-VX	 Instruction code: 3AXD50000337088
600 mm VX25 enclosure (cable connection)	1	3AXD50000337569	A-6-8-133-VX	 Instruction code: 3AXD50000345526

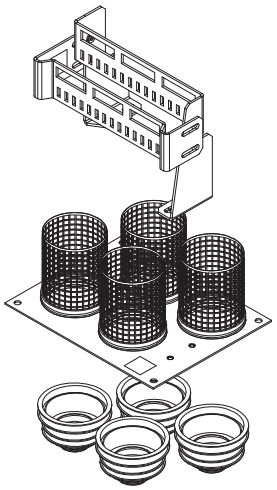
Used with…	Qty	Ordering code	Kit code	Illustration
600 mm VX25 enclosure (cable connection with bridging busbars)	1	3AXD50000337576	A-6-8-134-VX	 Instruction code: 3AXD50000345632
600 mm VX25 enclosure (common AC output busbar connection)	1	3AXD50000337552	A-6-8-141-VX	 Instruction code: 3AXD50000346196
400 mm generic enclosure (cable connection)	1	3AXD50000006435	A-4-8-135	 Instruction code: 3AXD50000006497

Used with…	Qty	Ordering code	Kit code	Illustration
600 mm generic enclosure (cable connection)	1	3AXD50000006491	A-6-8-136	 Instruction code: 3AXD50000006489
600 mm generic enclosure (cable connection with bridging busbars)	1	3AXD50000006493	A-6-8-138	 Instruction code: 3AXD50000006505
800 mm generic enclosure (cable connection)	1	3AXD50000006492	A-8-8-137	 Instruction code: 3AXD50000006503
800 mm generic enclosure (cable connection with bridging busbars)	1	3AXD50000006494	A-8-8-139	 Instruction code: 3AXD50000006498

Used with…	Qty	Ordering code	Kit code	Illustration
Generic enclosure (AC output busbars)	1 per module	3AXD50000008761	A-0-8-047	 Instruction code: 3AXD50000010859

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.

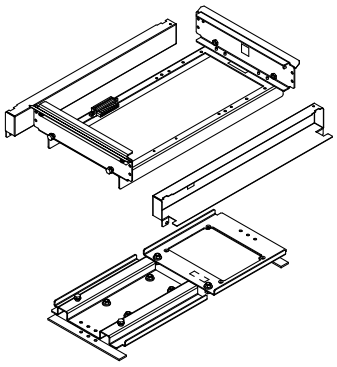
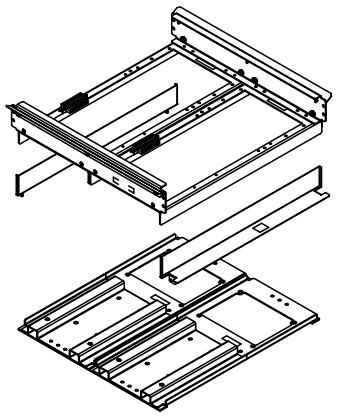
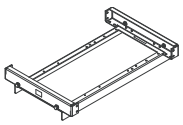
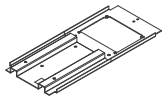
Used with …	Qty	Ordering code	Kit code	Illustration
All enclosure types	1 per module (minimum)	3AXD50000004385	A-468-8-441	 Instruction code: 3AXD50000004817

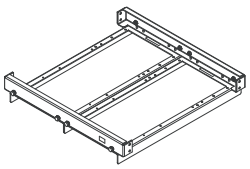
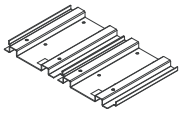
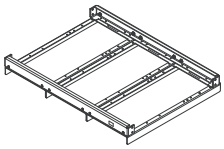
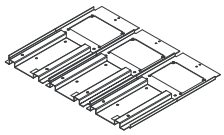
Mechanical installation accessories

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

Inverter module top/bottom guides

This kit contains the rails that guide the inverter module at the top and the bottom.

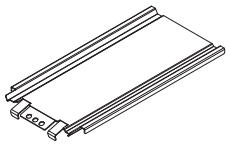
Used with …	Qty	Ordering code	Kit code	Illustration
400 mm Rittal VX25 enclosure	1	3AXD50000337071	A-4-8-310-VX	 Instruction code: 3AXD50000335152
600 mm Rittal VX25 enclosure	1	3AXD50000337514	A-4-8-309-VX	 Instruction code: 3AXD50000345052
400 mm generic enclosure	1	3AXD50000005875	A-4-8-315	  Instruction code: 3AXD50000005874

Used with …	Qty	Ordering code	Kit code	Illustration
600 mm generic enclosure	1	3AXD50000005876	A-6-8-311	  Instruction code: 3AXD50000005864
800 mm generic enclosure	1	3AXD50000005877	A-8-8-312	  Instruction code: 3AXD50000005848

Insertion/Extraction ramp

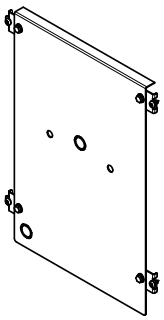
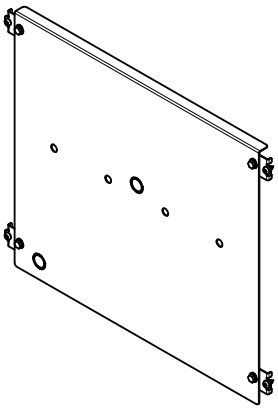
The ramp can be used when inserting or extracting wheeled modules.

Do not use the ramp with plinth heights over 100 mm (3.93 in). The ramp is designed for a plinth height of 100 mm (the standard plinth height of Rittal VX25 enclosures).

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

Shrouding

This kit contains the shroud for the top part of the cubicle with the necessary brackets and screws.

Used with …	Qty	Ordering code	Kit code	Illustration
400 mm Rittal VX25 enclosure	1	3AXD50000331484	A-4-8-359-VX	 Instruction code: 3AXD50000335169
600 mm Rittal VX25 enclosure	1	3AXD50000337378	A-6-8-360-VX	 Instruction code: 3AXD50000335022

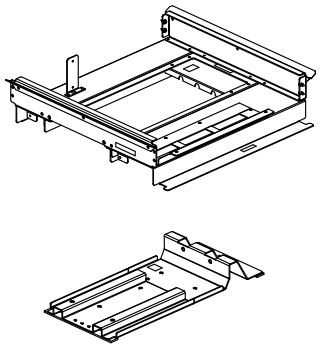
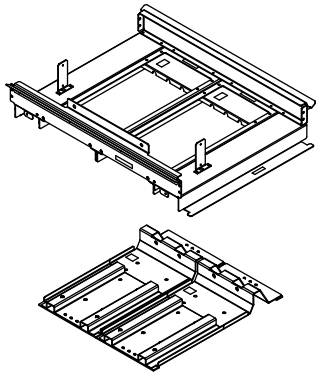
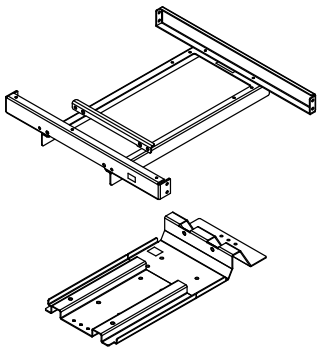
BLHF filters

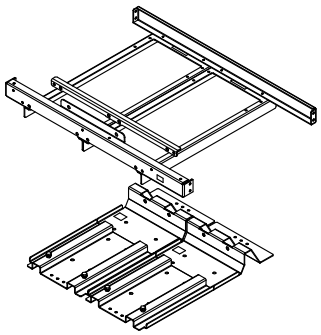
Filter modules

Filter module	Ordering code
BLHF-21-7+C188	3AXD50000766789
BLHF-21-7+C188+G427	3AXD50000766796
BLHF-22-7+C188	3AXD50000766802
BLHF-22-7+C188+G427	3AXD50000766918

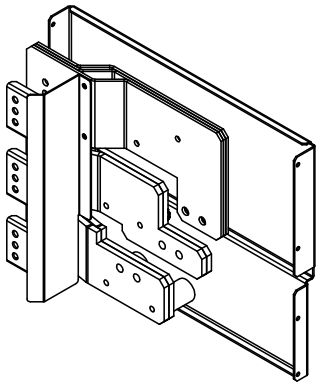
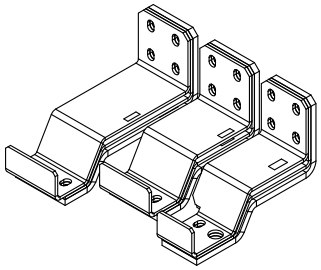
Filter module top/bottom guides

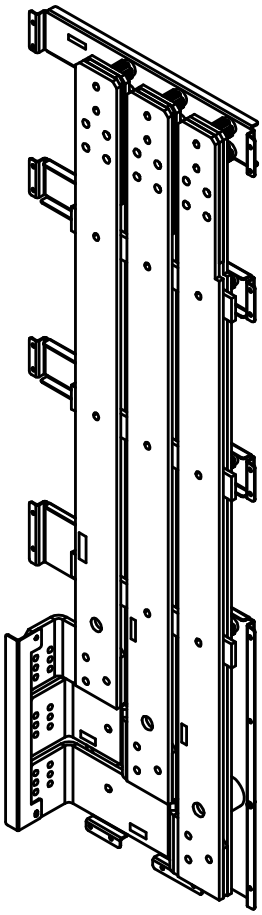
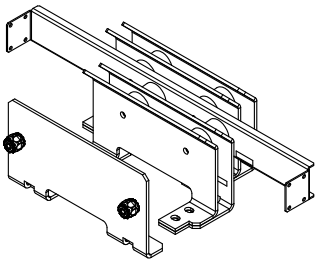
This kit contains the rails that guide the filter module at the top and the bottom.

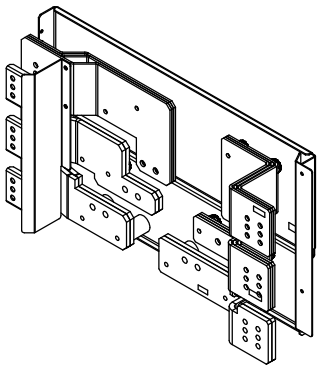
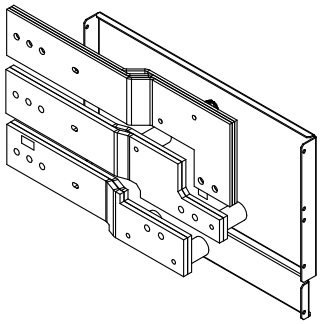
Used with …	Qty	Ordering code	Kit code	Illustration
600 mm Rittal VX25 enclosure	1	3AXD50000883080	A-6-8-335-VX	 Instruction code: 3AXD50000883684
800 mm Rittal VX25 enclosure	1	3AXD50000883233	A-8-8-336-VX	 Instruction code: 3AXD50000887408
600 mm generic enclosure	1	3AXD50000883288	A-6-8-337	 Instruction code: 3AXD50000887224

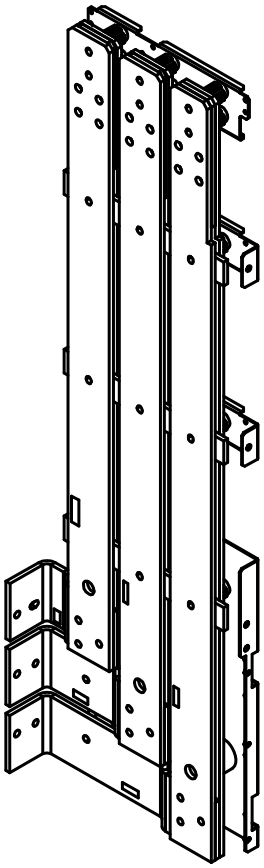
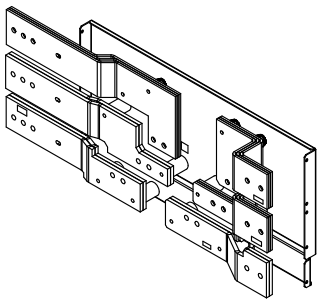
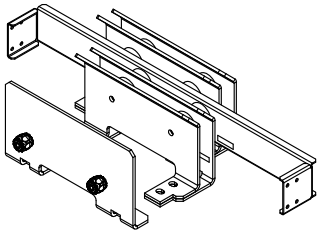
Used with …	Qty	Ordering code	Kit code	Illustration
800 mm generic enclosure	1	3AXD50000883318	A-8-8-338	 Instruction code: 3AXD50000887071

AC connection parts

Used with…	Qty	Ordering code	Kit code	Illustration
600 mm Rittal VX25 enclosure (AC input busbars)	1	3AXD50000885053	A-6-8-118-VX	 Instruction code: 3AXD50000887347
600 mm Rittal VX25 or generic enclosure (AC flanges)	1	3AXD50000883219	A-X-8-149	 Instruction code: 3AXD50000884216

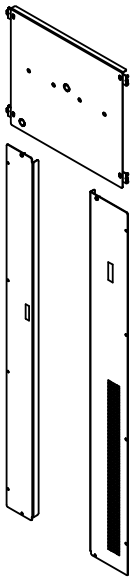
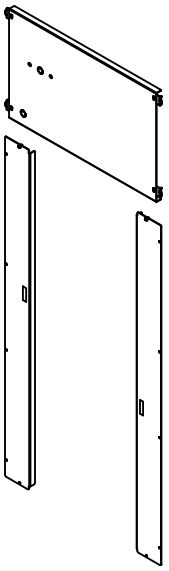
Used with…	Qty	Ordering code	Kit code	Illustration
600 mm Rittal VX25 enclosure (AC busbars)	1	3AXD50000883103	A-6-8-112-VX	 Instruction code: 3AXD50000887231
800 mm Rittal VX25 enclosure (AC connection busbars)	1	3AXD50000883264	A-8-8-116-VX	 Instruction code: 3AXD50000887576

Used with…	Qty	Ordering code	Kit code	Illustration
800 mm Rittal VX25 enclosure (AC busbars)	1	3AXD50000883257	A-8-8-113-VX	 Instruction code: 3AXD50000887569
600 mm generic enclosure (AC input busbars)	1	3AXD50000885060	A-6-8-119	 Instruction code: 3AXD50000887323

Used with…	Qty	Ordering code	Kit code	Illustration
600 mm generic enclosure (AC busbars)	1	3AXD50000883295	A-6-8-114	 Instruction code: 3AXD50000887330
800 mm generic enclosure (AC busbars)	1	3AXD50000883332	A-8-8-115	 Instruction code: 3AXD50000887316
800 mm generic enclosure (AC connection busbars)	1	3AXD50000883349	A-8-8-117	 Instruction code: 3AXD50000887088

Shrouding

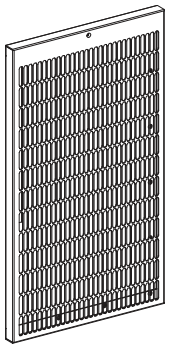
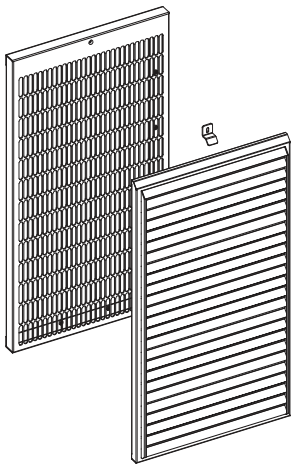
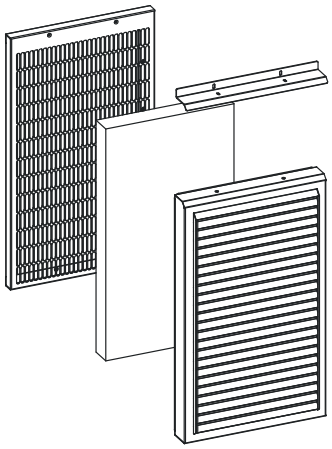
This kit contains the shroud with the necessary brackets and screws.

Used with …	Qty	Ordering code	Kit code	Illustration
600 mm Rittal VX25 enclosure	1	3AXD50000883226	A-6-8-362-VX	 Instruction code: 3AXD50000887286
800 mm Rittal VX25 enclosure	1	3AXD50000883271	A-8-8-363-VX	 Instruction code: 3AXD50000888016

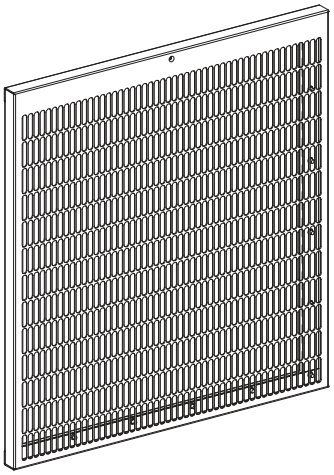
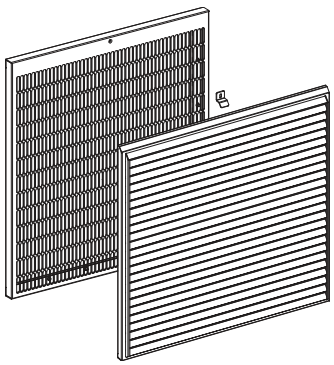
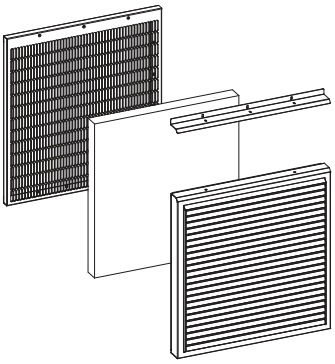
Cabinet ventilation

Air inlet kits

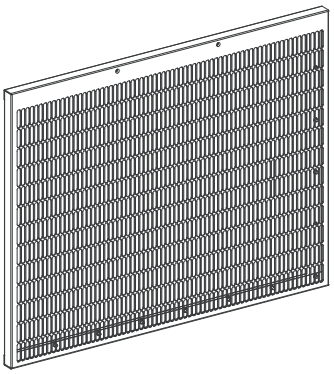
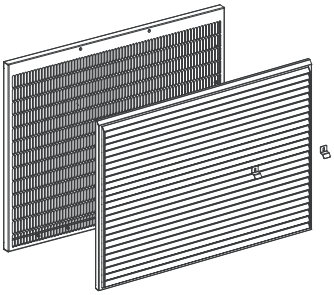
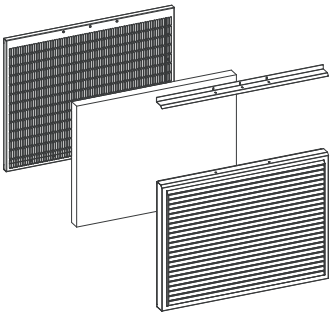
Air inlet kits 400 mm cabinet

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

Air inlet kits 600 mm cabinet

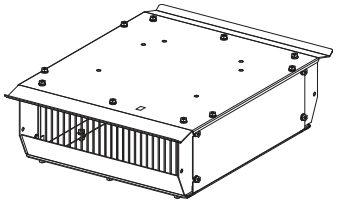
Used with …	Qty	Ordering code	Kit code	Illustration
IP20	1	3AUA0000117003	A-6-X-022	 Instruction code: 3AUA0000116880
IP42	1	3AUA0000117008	A-6-X-025	 Instruction code: 3AUA0000116874
IP54	1	3AXD50000009185	A-6-X-028	 Instruction code: 3AXD50000009990

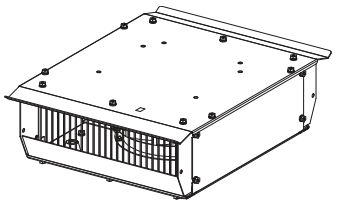
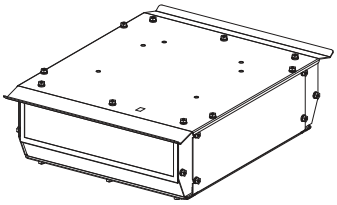
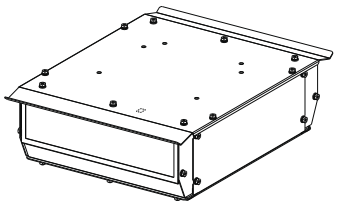
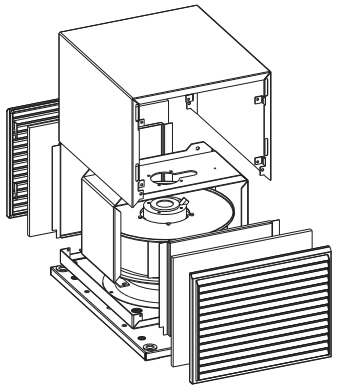
Air inlet kits 800 mm cabinet

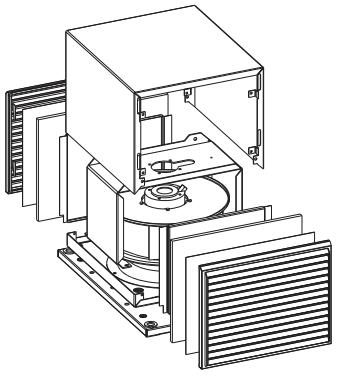
Used with …	Qty	Ordering code	Kit code	Illustration
IP20	1	3AUA0000117005	A-8-X-023	 Instruction code: 3AUA0000116887
IP42	1	3AUA0000117009	A-8-X-026	 Instruction code: 3AUA0000116875
IP54	1	3AXD50000009186	A-8-X-029	 Instruction code: 3AXD50000010001

Air outlet kits

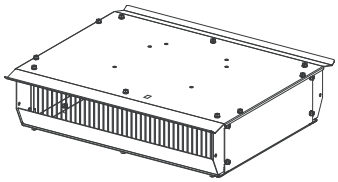
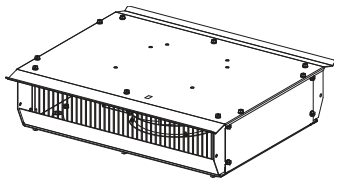
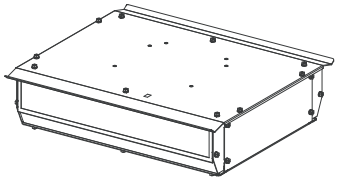
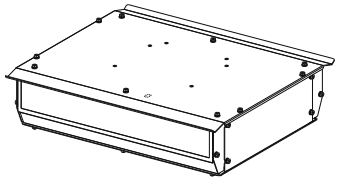
Air outlet kits 400 mm cabinet

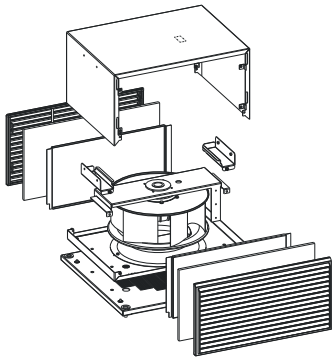
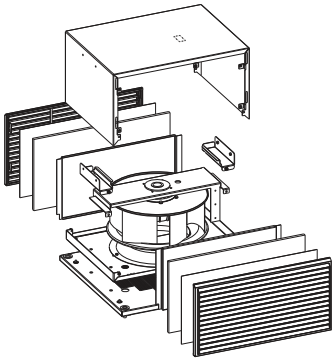
Used with …	Qty	Ordering code	Kit code	Illustration
IP20 (IEC)	1	3AUA0000125203	A-4-X-042	 Instruction code: 3AXD50000001983

Used with …	Qty	Ordering code	Kit code	Illustration
IP20 (IEC)	1	3AUA0000125201	A-4-X-062	 Instruction code: 3AXD50000001982 **Note:** Fan to be ordered separately
IP42 (IEC)	1	3AUA0000114968	A-4-X-040	 Instruction code: 3AUA0000115292
IP42 (IEC)	1	3AUA0000114967	A-4-X-060	 Instruction code: 3AUA0000115290 **Note:** Fan to be ordered separately
IP54 (IEC)	1	3AXD50000009187	A-4-X-064	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately

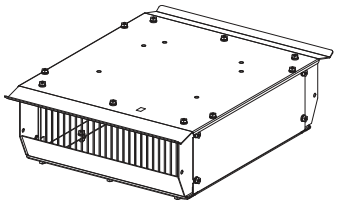
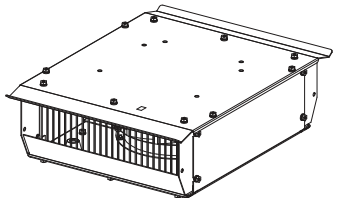
Used with …	Qty	Ordering code	Kit code	Illustration
IP54 (UL)	1	3AXD50000010362	A-4-X-067	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately

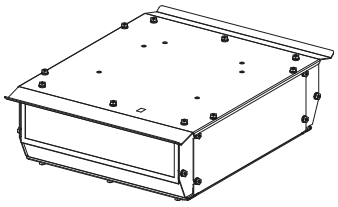
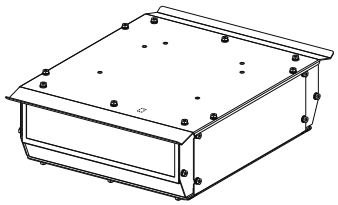
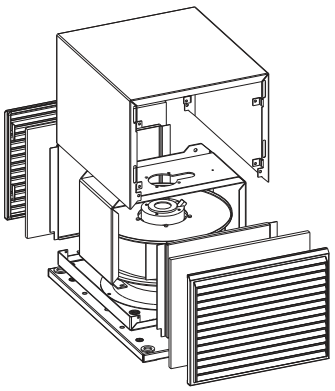
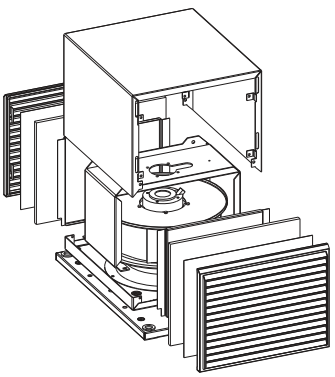
Air outlet kits 600 mm cabinet

Used with …	Qty	Ordering code	Kit code	Illustration
IP20 (IEC)	1	3AUA0000125204	A-6-X-043	 Instruction code: 3AXD50000001981
IP20 (IEC)	1	3AUA0000125202	A-6-X-063	 Instruction code: 3AXD50000001980 **Note:** Fan to be ordered separately
IP42 (IEC)	1	3AUA0000114789	A-6-X-041	 Instruction code: 3AUA0000115166
IP42 (IEC)	1	3AUA0000114971	A-6-X-061	 Instruction code: 3AUA0000115152 **Note:** Fan to be ordered separately

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

Air outlet kits 800 mm cabinet

Used with …	Qty	Ordering code	Kit code	Illustration
IP20 (IEC)	2	3AUA0000125203	A-4-X-042	 Instruction code: 3AXD50000001983
IP20 (IEC)	2	3AUA0000125201	A-4-X-062	 Instruction code: 3AXD50000001982 **Note:** Fan to be ordered separately

Used with …	Qty	Ordering code	Kit code	Illustration
IP42 (IEC)	2	3AUA0000114968	A-4-X-040	 Instruction code: 3AUA0000116875
IP42 (IEC)	2	3AUA0000114967	A-4-X-060	 Instruction code: 3AUA0000115290 **Note:** Fan to be ordered separately
IP54 (IEC)	2	3AXD50000009187	A-4-X-064	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately
IP54 (UL)	2	3AXD50000010362	A-4-X-067	 Instruction code: 3AXD50000010284 **Note:** Fan to be ordered separately

Cooling fans (frames R1i…R4i)

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

IEC				
Enclosure width / Degree of protection (Auxiliary voltage)	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm, 600 mm / IP20, IP42 (230 V 50/60 Hz)	Fan	0.77 A; 230 V; 96 W; 50/60 Hz	1	3AXD50000000592
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm / IP54 (230 V 50/60 Hz)	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	1	3AXD50000006934
	Capacitor	6 µF, 600 V	1	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
600 mm / IP54 (230 V 50/60 Hz)	Fan	2.3 A; 230 V; 540 W; 50 Hz 3 A; 230 V; 690 W; 60 Hz	1	3AXD50000006111
	Capacitor	12 µF, 600 V	1	3AXD50000006885
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
800 mm / IP20, IP42 (230 V 50/60 Hz)	Fan	0.77 A; 230 V; 96 W; 50/60 Hz	2	3AXD50000000592
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724
800 mm / IP54 (230 V 50/60 Hz)	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	2	3AXD50000006934
	Capacitor	6 µF, 600 V	2	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724

UL				
Enclosure width / Degree of protection (Auxiliary voltage)	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm, 600 mm / IP20, IP42 (230 V 50/60 Hz)	Fan	0.77 A; 230 V; 96 W; 50/60 Hz	1	3AXD50000000592
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm, 600 mm / IP20, IP42 (115 V 60 Hz)	Fan	115 V; 115 W; 50/60 Hz	1	3AXD50000700288
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724

UL				
Enclosure width / Degree of protection (Auxiliary voltage)	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm / IP54 (230 V 50/60 Hz)	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	1	3AXD50000006934
	Capacitor	6 µF, 600 V	1	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm / IP54 (115 V 50/60 Hz)	Fan	3.1 A; 115 V; 300 W; 50 Hz 3.9 A; 115 V; 430 W; 60 Hz	1	64750062
	Capacitor	25 µF, 220 V	1	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
600 mm / IP54 (230 V 50/60 Hz)	Fan	2.3 A; 230 V; 540 W; 50 Hz 3 A; 230 V; 690 W; 60 Hz	1	3AXD50000006111
	Capacitor	12 µF, 600 V	1	3AXD50000006885
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
600 mm / IP54 (115 V 50/60 Hz)	Fan	6.3 A; 115 V; 680 W; 60 Hz	1	64750038
	Capacitor	25 µF, 220 V	1	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
800 mm / IP20, IP42 (230 V 50/60 Hz)	Fan	0.77 A; 230 V; 96 W; 50/60 Hz	1	3AXD50000000592
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
800 mm / IP20, IP42 (115 V 60 Hz)	Fan	115 V; 115 W; 50/60 Hz	2	3AXD50000700288
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724
800 mm / IP54 (230 V 50/60 Hz)	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	2	3AXD50000006934
	Capacitor	6 µF, 600 V	2	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724
800 mm / IP54 (115 V 50/60 Hz)	Fan	3.1 A; 115 V; 300 W; 50 Hz 3.9 A; 115 V; 430 W; 60 Hz	2	64750062
	Capacitor	25 µF, 220 V	2	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724

The wiring diagram examples show a cabinet cooling fan circuit that energizes the fan when at least one inverter module installed in the cabinet is running. The fan will continue to run for 20 minutes after all inverter modules have been stopped.

The following parts (or equivalent) are used to implement the circuit. These parts are to be sourced by the customer.

- Phoenix Contact ST 2,5-DIO/L-R - 3036262 spring cage component terminal block with a 1N4007 diode
- Relpol PI84-24DC-M41G relay
  - Rated load (capacity): 8 A / 24 V DC
  - Rated power consumption: 0.40 … 0.48 W DC
  - GZT80 relay socket
- 600 mm of AWG24, 300 V, UL1569 (or equivalent material, valid for PVC insulation only) wire
- Favier SEP-4 light brown 4 kV fiberglass sleeving.

Cooling fans (frames R5i)

A cooling fan is to be installed inside the air outlet compartment to ensure sufficient cooling of the cabinet.

IEC				
Enclosure width / Degree of protection (Auxiliary voltage)	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm, 600 mm / IP20, IP42 (230 V 50/60 Hz)	Fan	0.77 A; 230 V; 96 W; 50/60 Hz	1	3AXD50000000592
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm / IP54 (230 V 50/60 Hz)	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	1	3AXD50000006934
	Capacitor	6 µF, 600 V	1	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
600 mm / IP54 (230 V 50/60 Hz)	Fan	2.3 A; 230 V; 540 W; 50 Hz 3 A; 230 V; 690 W; 60 Hz	1	3AXD50000006111
	Capacitor	12 µF, 600 V	1	3AXD50000006885
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724

UL				
Enclosure width / Degree of protection (Auxiliary voltage)	**Component**		**Qty**	**Ordering code**
	Name	**Data**		
400 mm, 600 mm / IP20, IP42 (230 V 50/60 Hz)	Fan	0.77 A; 230 V; 96 W; 50/60 Hz	1	3AXD50000000592
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm, 600 mm / IP20, IP42 (115 V 60 Hz)	Fan	R3G225-RE19-32	1	3AXD50000700288
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm / IP54 (230 V 50/60 Hz)	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	1	3AXD50000006934
	Capacitor	6 µF, 600 V	1	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm / IP54 (115 V 50/60 Hz)	Fan	3.1 A; 115 V; 300 W; 50 Hz 3.9 A; 115 V; 430 W; 60 Hz	1	64750062
	Capacitor	25 µF, 220 V	1	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724

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

The wiring diagram examples show a cabinet cooling fan circuit that energizes the fan when at least one inverter module installed in the cabinet is running. The fan will continue to run for 20 minutes after all inverter modules have been stopped.

The following parts (or equivalent) are used to implement the circuit. These parts are to be sourced by the customer.

- Phoenix Contact ST 2,5-DIO/L-R - 3036262 spring cage component terminal block with a 1N4007 diode
- Relpol PI84-24DC-M41G relay
  - Rated load (capacity): 8 A / 24 V DC
  - Rated power consumption: 0.40 … 0.48 W DC
  - GZT80 relay socket
- 600 mm of AWG24, 300 V, UL1569 (or equivalent material, valid for PVC insulation only) wire
- Favier SEP-4 light brown 4 kV fiberglass sleeving.

Cooling fans (frames R6i…R7i)

A cooling fan is to be installed inside the IP54 air outlet compartment to ensure sufficient cooling of the cabinet.

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

Cooling fans (frames R8i)

Enclosure width / Degree of protection (Auxiliary voltage)	Component		Qty	Ordering code
	Name	Data		
400 mm / IP54 (230 V 50/60 Hz)	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	1	3AXD50000006934
	Capacitor	6 µF, 600 V	1	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
400 mm / IP54 (115 V 50/60 Hz)	Fan	3.1 A; 115 V; 300 W; 50 Hz 3.9 A; 115 V; 430 W; 60 Hz	1	64750062
	Capacitor	25 µF, 220 V	1	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
600 mm / IP54 (230 V 50/60 Hz)	Fan	2.3 A; 230 V; 540 W; 50 Hz 3 A; 230 V; 690 W; 60 Hz	1	3AXD50000006111
	Capacitor	12 µF, 600 V	1	3AXD50000006885
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
600 mm / IP54 (115 V 50/60 Hz)	Fan	6.3 A; 115 V; 680 W; 60 Hz	1	64750038
	Capacitor	25 µF, 220 V	1	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	1	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	1	3AXD50000000724
800vmm / IP54 (230 V 50/60 Hz	Fan	1.1 A; 230 V; 240 W; 50 Hz 1.45 A; 230 V; 350 W; 60 Hz	2	3AXD50000006934
	Capacitor	6 µF, 600 V	2	3AXD50000006959
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724
800 mm / IP54 (115 V 50/60 Hz)	Fan	3.1 A; 115 V; 300 W; 50 Hz 3.9 A; 115 V; 430 W; 60 Hz	2	64750062
	Capacitor	25 µF, 220 V	2	68713188
	Connector	PLUG; 12 AWG; 2.50 mm^2	2	3AXD50000000723
	Connector	SOCKET; 12 AWG; 2.50 mm^2	2	3AXD50000000724

10

Technical data

Contents of this chapter

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

Ratings

Inverter unit type ACS880-104- …	Frame size	Input ratings	Output ratings							
				No-overload use			Light-overload use		Heavy-duty use	
		I_1	I_{max}	I_2	P_N	S_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
		A	A	A	kW	kVA	A	kW	A	kW
U_N = 400 V										
004A8-3	R1i	5.8	7.0	4.8	1.5	3.3	4.5	1.5	4.0	1.5
006A0-3	R1i	7.2	8.8	6.0	2.2	4.2	5.5	2.2	5.0	1.5
008A0-3	R1i	9.6	10.5	8.0	3.0	5.5	7.6	3.0	6.0	2.2
0011A-3	R2i	12.6	13.5	10.5	4.0	7.3	9.7	4.0	9.0	3.0
0014A-3	R2i	16.8	16.5	14.0	5.5	9.7	13.0	5.5	11.0	4.0
0018A-3	R2i	21.6	21	18.0	7.5	12.5	16.8	7.5	14.0	5.5
0025A-3	R3i	30	33	25	11.0	17.0	23	11.0	19.0	7.5
0035A-3	R3i	42	44	35	15.0	24	32	15.0	29	11.0
0044A-3	R3i	53	53	44	18.5	30	41	18.5	35	15.0
0050A-3	R3i	60	66	50	22	35	46	22	44	22
0061A-3	R4i	73	78	61	30	42	57	30	52	22
0078A-3	R4i	94	100	78	37	54	74	37	69	30
0094A-3	R4i	113	124	94	45	65	90	45	75	37

Inverter unit type ACS880-104- …	Frame size	Input ratings	Output ratings							
				No-overload use			Light-overload use		Heavy-duty use	
		I_1	I_{max}	I_2	P_N	S_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
		A	A	A	kW	kVA	A	kW	A	kW
0100A-3	R4i	125	125	104	55	72	100	55	78	37
0140A-3	R6i	169	183	141	75	98	135	75	105	55
0170A-3	R6i	203	220	169	90	117	162	90	126	55
0210A-3	R6i	247	268	206	110	143	198	110	154	75
0250A-3	R6i	295	320	246	132	170	236	132	184	90
0300A-3	R7i	360	390	300	160	208	288	160	224	110
0350A-3	R7i	420	455	350	200	242	336	160	262	132
0470A-3	R8i	529	620	470	250	326	451	250	352	160
0640A-3	R8i	720	840	640	355	443	614	315	479	250
0760A-3	R8i	855	990	760	400	527	730	400	568	315
0900A-3	R8i	1013	1080	900	500	624	864	450	473	355
1250A-3	2×R8i	1406	1630	1250	630	866	1200	630	935	500
1480A-3	2×R8i	1665	1930	1480	800	1025	1421	800	1107	630
1760A-3	2×R8i	1980	2120	1760	1000	1219	1690	900	1316	710
2210A-3	3×R8i	2486	2880	2210	1200	1531	2122	1200	1653	900
2610A-3	3×R8i	2936	3140	2610	1400	1808	2506	1400	1952	1000
3450A-3	4×R8i	3881	4140	3450	1800	2390	3312	1800	2581	1400
4290A-3	5×R8i	4826	5150	4290	2400	2972	4118	2000	3209	1800
5130A-3	6×R8i	5771	6160	5130	2800	3554	4925	2400	3837	2000
U_N = 500 V										
003A6-5	R1i	4.3	5.3	3.6	1.5	3.1	3.4	1.5	3.0	1.5
004A8-5	R1i	5.8	7.0	4.8	2.2	4.2	4.5	2.2	4.0	1.5
006A0-5	R1i	7.2	8.8	6.0	3.0	5.2	5.5	3.0	5.0	2.2
008A0-5	R1i	9.6	10.5	8.0	4.0	6.9	7.6	4.0	6.0	3.0
0011A-5	R2i	12.6	13.5	10.5	5.5	9.1	9.7	5.5	9.0	4.0
0014A-5	R2i	16.8	16.5	14.0	7.5	12.1	13.0	7.5	11.0	5.5
0018A-5	R2i	21.6	21	18.0	11.0	16	16.8	11.0	14.0	7.5
0025A-5	R3i	30	33	25	15.0	22	23	15.0	19.0	11.0
0030A-5	R3i	36	36	30	18.5	26	28	18.5	24	15.0
0035A-5	R3i	42	44	35	22	30	32	22	29	18.5
0050A-5	R3i	60	66	50	30	43	45	30	44	22
0061A-5	R4i	73	78	61	37	53	57	37	52	30
0078A-5	R4i	94	100	78	45	68	74	45	59	45
0094A-5	R4i	113	124	94	55	81	90	55	75	45
0110A-5	R6i	136	147	113	75	98	108	75	85	55
0140A-5	R6i	163	177	136	90	118	131	90	102	55
0170A-5	R6i	198	215	165	110	143	158	110	123	75
0200A-5	R6i	236	256	197	132	171	189	132	147	90

Inverter unit type ACS880-104- …	Frame size	Input ratings	Output ratings							
				No-overload use			Light-overload use		Heavy-duty use	
		I_1	I_{max}	I_2	P_N	S_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
		A	A	A	kW	kVA	A	kW	A	kW
0240A-5	R6i	288	312	240	160	208	230	160	180	110
0300A-5	R7i	362	393	302	200	262	290	200	226	132
0340A-5	R7i	408	442	340	250	294	326	200	254	160
0440A-5	R8i	495	580	440	250	381	422	250	329	200
0590A-5	R8i	664	770	590	400	511	566	355	441	250
0740A-5	R8i	833	970	740	500	641	710	450	554	355
0810A-5	R8i	911	1060	810	560	701	778	500	606	400
1150A-5	2×R8i	1294	1500	1150	800	996	1104	710	860	560
1450A-5	2×R8i	1631	1890	1450	1000	1256	1392	900	1085	710
1580A-5	2×R8i	1778	2060	1580	1100	1368	1517	1000	1182	800
2150A-5	3×R8i	2419	2800	2150	1500	1862	2064	1400	1608	1100
2350A-5	3×R8i	1644	3060	2350	1600	2035	2256	1500	1758	1200
3110A-5	4×R8i	3499	4050	3110	2000	2693	2986	2000	2326	1600
3860A-5	5×R8i	4343	5020	3860	2400	3343	3706	2400	2887	2000
4610A-5	6×R8i	5186	6000	4610	3200	392	4426	2800	3448	2400
U_N = 600 V										
007A3-7	R5i	8.8	9.5	7.3	5.5	8.7	6.9	5.5	5.6	4.0
009A8-7	R5i	11.8	12.7	9.8	7.5	11.7	9.3	7.5	7.33	5.5
014A2-7	R5i	17.0	18.5	14.2	11.0	17.0	13.5	11.0	9.8	7.5
0018A-7	R5i	22	23	18.0	15.0	21.5	17.1	15.0	14.2	11.0
0022A-7	R5i	26	29	22	18.5	26	21	18.5	18.0	15.0
0027A-7	R5i	32	35	27	22	32	26	22	22	18.5
0035A-7	R5i	42	46	35	30	42	33	30	27	22
0042A-7	R5i	50	55	42	37	50	40	37	35	30
0052A-7	R5i	62	68	52	45	62	49	45	42	37
0062A-7	R6i	74	81	62	55	74	60	55	46	45
0082A-7	R6i	98	107	82	75	98	79	75	61	55
0100A-7	R6i	119	129	99	90	118	95	90	74	75
0130A-7	R6i	150	163	125	110	149	120	110	94	75
0140A-7	R6i	173	187	144	132	172	138	132	108	90
0190A-7	R6i	230	250	192	160	229	184	160	144	132
0220A-7	R7i	260	282	217	200	259	208	200	162	160
0270A-7	R7i	324	351	270	250	323	259	250	202	200
0340A-7	R8i	383	510	340	315	406	326	250	254	200
0410A-7	R8i	461	620	410	400	490	394	355	307	250
0530A-7	R8i	596	800	530	500	633	509	450	396	355
0600A-7	R8i	675	900	600	560	717	576	560	449	400
0800A-7	2×R8i	900	1200	800	800	956	768	710	598	560

Inverter unit type ACS880-104- …	Frame size	Input ratings	Output ratings							
				No-overload use			Light-overload use		Heavy-duty use	
		I_1	I_{max}	I_2	P_N	S_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}
		A	A	A	kW	kVA	A	kW	A	kW
1030A-7	2×R8i	1159	1550	1030	1000	1231	989	900	770	710
1170A-7	2×R8i	1316	1760	1170	1100	1398	1123	1000	875	800
1540A-7	3×R8i	1733	2310	1540	1400	1840	1478	1400	1152	1100
1740A-7	3×R8i	1958	2610	1740	1600	2080	1670	1600	1302	1200
2300A-7	4×R8i	2588	3450	2300	2000	2749	2208	2000	1720	1600
2860A-7	5×R8i	3218	4290	2860	2800	3418	2746	2400	2139	2000
3420A-7	6×R8i	3848	5130	3420	3200	4087	3283	3200	2558	2400

Definitions

U_N	Nominal AC supply voltage of drive system
I_1	Nominal rms input current
I_2	Nominal output current (available continuously with no over-loading)
P_N	Typical motor power in no-overload use The horsepower ratings are typical NEMA motor sizes at 460 V (ACS880-104-xxxxA-5) and 575 V (ACS880-104-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

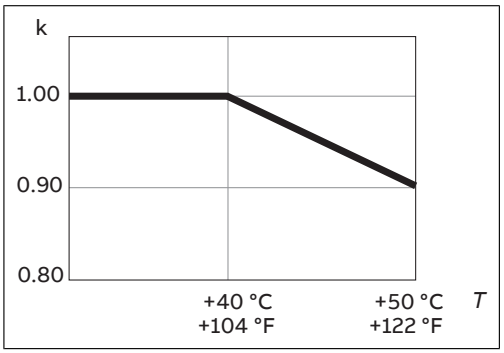
Note:

- The ratings apply at an ambient temperature of 40 °C (104 °F).
- The ratings apply to units without option +C132 (marine type approval). For ratings of units with option +C132, see *ACS880 +C132 marine type-approved drive modules and module packages supplement* (3AXD50000037752 [English])
- 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

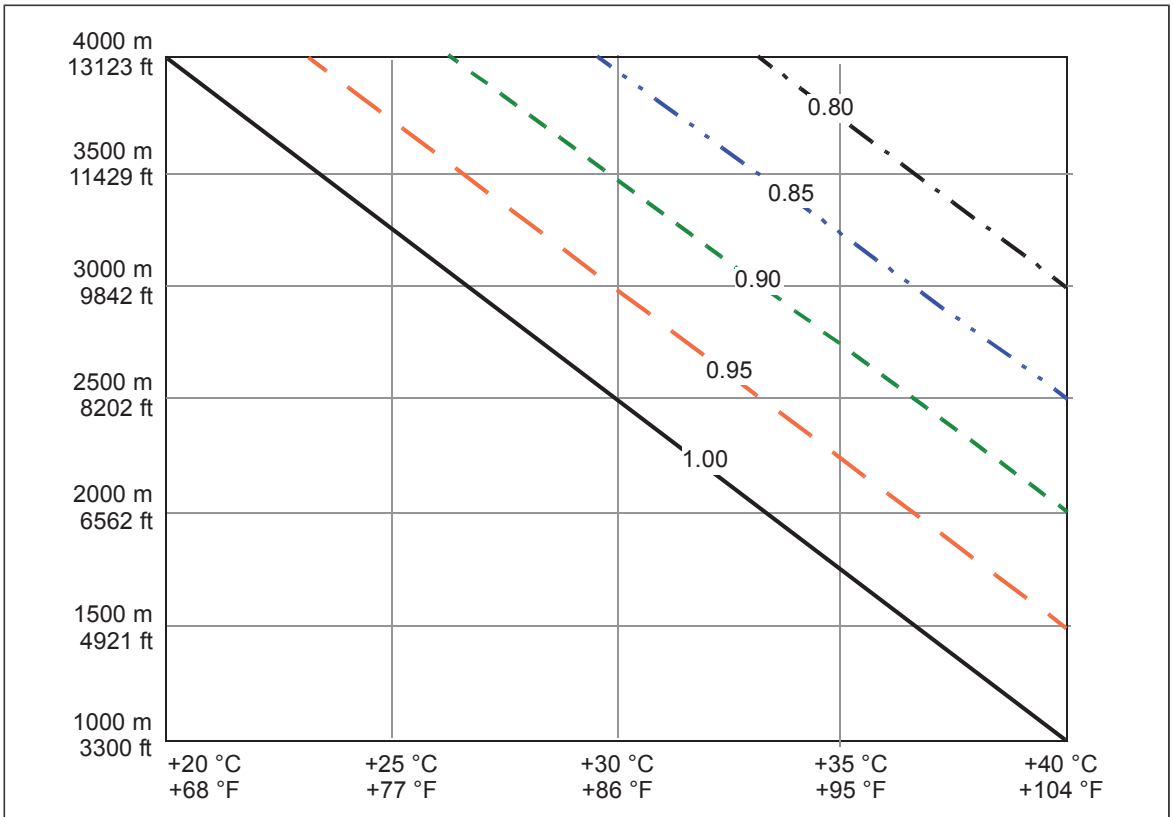
In the temperature range +40…50 °C (+104…122 °F), the rated output current is derated by 1 percentage point for every added 1 °C (1.8 °F). The output current can be calculated by multiplying the current given in the rating table by the derating factor *(k)*:



Altitude derating

At altitudes above 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.

If the surrounding air temperature is less than +40 °C (104 °F), the derating can be reduced by 1.5 percentage points for every 1 °C (1.8 °F) reduction in temperature. A few altitude derating curves are shown below.



———	Derating factor 1.00
– – –	Derating factor 0.95

	Derating factor 0.90
	Derating factor 0.85
	Derating factor 0.80

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

Switching frequency derating

Switching frequencies other than default can require output current derating. Contact ABB for more information.

Output frequency derating

Motor operation above 150 Hz can require type-specific output current derating. Contact ABB for more information.

Cooling characteristics, noise, DC capacitance

Inverter unit type ACS880-104-…	Power loss	Air flow		Noise level	DC capacitance
	W	m^3/h	ft^3/min	dB(A)	µF
U_N = 400 V					
004A8-3	70	24	14	47	280
006A0-3	80	24	14	47	280
008A0-3	90	24	14	47	280
0011A-3	110	48	28	39	435
0014A-3	140	48	28	39	865
0018A-3	170	48	28	39	865
0025A-3	200	142	84	63	785
0035A-3	300	142	84	63	785
0044A-3	350	200	118	71	1178
0050A-3	410	200	118	71	1178
0061A-3	500	290	171	70	1570
0078A-3	600	290	171	70	2355
0094A-3	740	290	171	70	2355
0100A-3	750	290	171	70	2355
0140A-3	1100	650	383	71	4500
0170A-3	1400	650	383	71	4500
0210A-3	1800	650	383	71	4500
0250A-3	2000	650	383	71	6750
0300A-3	2500	940	553	72	9000
0350A-3	3100	940	553	72	9000
0470A-3	4800	1300	765	72	11250
0640A-3	6700	1300	765	72	13500
0760A-3	8600	1300	765	72	18000
0900A-3	10000	1300	765	72	18000
1250A-3	13000	2600	1530	74	27000

Inverter unit type ACS880-104-…	Power loss	Air flow		Noise level	DC capacitance
	W	m^3/h	ft^3/min	dB(A)	µF
1480A-3	16000	2600	1530	74	36000
1760A-3	20000	2600	1530	74	36000
2210A-3	23000	3900	2295	76	54000
2610A-3	30000	3900	2295	76	54000
3450A-3	40000	5200	3060	76	72000
4290A-3	50000	6500	3825	77	90000
5130A-3	60000	7800	4590	78	108000
U_N = 500 V					
003A6-5	60	24	14	47	280
004A8-5	70	24	14	47	280
006A0-5	80	24	14	47	280
008A0-5	90	24	14	47	280
0011A-5	130	48	28	39	435
0014A-5	150	48	28	39	865
0018A-5	180	48	28	39	865
0025A-5	230	142	84	63	785
0030A-5	280	142	84	63	785
0035A-5	320	142	84	63	785
0050A-5	480	200	118	71	1178
0061A-5	550	290	171	70	1570
0078A-5	650	290	171	70	2355
0094A-5	800	290	171	70	2355
0110A-5	1000	650	383	71	4500
0140A-5	1200	650	383	71	4500
0170A-5	1500	650	383	71	4500
0200A-5	1800	650	383	71	4500
0240A-5	2000	650	383	71	6750
0300A-5	2700	940	553	72	9000
0340A-5	3200	940	553	72	9000
0440A-5	4700	1300	765	72	11250
0590A-5	6300	1300	765	72	13500
0740A-5	8100	1300	765	72	18000
0810A-5	9300	1300	765	72	78000
1150A-5	12000	2600	1530	74	27000
1450A-5	16000	2600	1530	74	36000
1580A-5	18000	2600	1530	74	36000
2150A-5	24000	3900	2295	76	54000
2350A-5	27000	3900	2295	76	54000
3110A-5	36000	5200	3060	76	72000
3860A-5	44000	6500	3825	77	90000

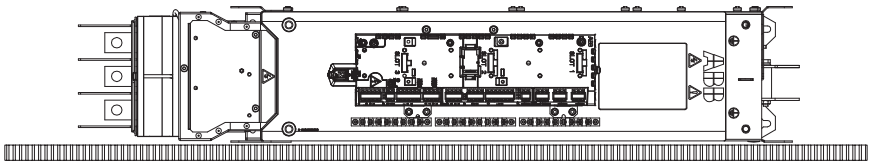
Inverter unit type ACS880-104-…	Power loss	Air flow		Noise level	DC capacitance
	W	m^3/h	ft^3/min	dB(A)	µF
4610A-5	53000	7800	4590	78	108000
U_N = 690 V					
007A3-7	220	280	165	62	343
009A8-7	280	280	165	62	343
014A2-7	400	280	165	62	343
0018A-7	490	280	165	62	343
0022A-7	580	280	165	62	687
0027A-7	660	280	165	62	687
0035A-7	860	280	165	62	687
0042A-7	1000	280	165	62	687
0052A-7	1120	280	165	62	687
0062A-7	800	650	383	71	1500
0082A-7	1100	650	383	71	1500
0100A-7	1300	650	383	71	1500
0130A-7	1500	650	383	71	3000
0140A-7	1800	650	383	71	3000
0190A-7	2500	650	383	71	3000
0220A-7	2800	940	553	72	4500
0270A-7	3300	940	553	72	4500
0340A-7	5200	1300	765	72	6000
0410A-7	6100	1300	765	72	6000
0530A-7	7900	1300	765	72	9000
0600A-7	9000	1300	765	72	9000
0800A-7	12000	2600	1530	74	12000
1030A-7	15000	2600	1530	74	18000
1170A-7	18000	2600	1530	74	18000
1540A-7	23000	3900	2295	76	27000
1740A-7	26000	3900	2295	76	27000
2300A-7	35000	5200	3060	76	36000
2860A-7	43000	6500	3825	77	45000
3420A-7	52000	7800	4590	78	54000

These losses are not calculated according to the ecodesign standard IEC 61800-9-2.

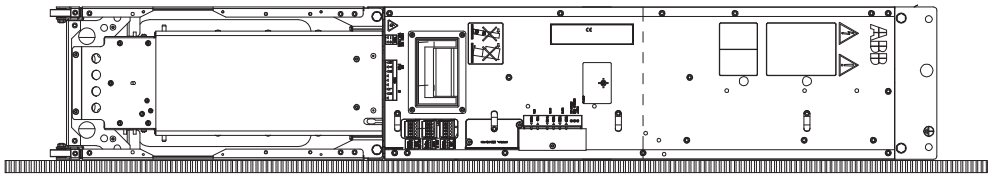
Allowable mounting orientations

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

Frames R6i…R7i: Installation on right-hand side (viewed from the front) allowed.



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



Dimensions and weights

The weights of the ACS880-104 modules are shown below. For the dimensions, see chapter Dimension drawings.

Inverter module type ACS880-104-…			Weight	
			kg	lbs
004A8-3 006A0-3 008A0-3	003A6-5 004A8-5 006A0-5 008A0-5		3	6.5
0011A-3 0014A-3 0018A-3	0011A-5 0014A-5 0018A-5		5	11
0025A-3 0035A-3 0044A-3 0050A-3	0025A-5 0030A-5 0035A-5 0050A-5		10	22
		007A3-7 009A8-7 014A2-7 0018A-7 0022A-7 0027A-7 0035A-7 0042A-7 0052A-7	14	31
0061A-3 0078A-3 0094A-3 0100A-3	0061A-5 0078A-5 0094A-5		17	38
0140A-3 0170A-3 0210A-3 0250A-3	0110A-5 0140A-5 0170A-5 0200A-5 0240A-5	0062A-7 0082A-7 0100A-7 0130A-7 0140A-7 0190A-7	38	84

Inverter module type ACS880-104-…			Weight	
			kg	lbs
0300A-3 0350A-3	0300A-5 0340A-5	0220A-7 0270A-7	39	86
0470A-3 0640A-3 0760A-3 0900A-3	0440A-5 0590A-5 0740A-5 0810A-5	0340A-7 0410A-7 0530A-7 0600A-7	125	275

Free space requirements

Inverter module type ACS880-104-…			Above (1		Below (3		Front (4		Left/Right (5	
			mm	inch	mm	inch	mm	inch	mm	inch
004A8-3 006A0-3 008A0-3 0011A-3 0014A-3 0018A-3	003A6-5 004A8-5 006A0-5 008A0-5 0011A-5 0014A-5 0018A-5		150 (2	5.9 (2	125	4.9	0	0.0	2.5	0.1
0025A-3 0035A-3 0044A-3 0050A-3	0025A-5 0030A-5 0035A-5 0050A-5		150 (2	5.9 (2	150	5.9	0	0.0	2.5	0.1
0061A-3 0078A-3 0094A-3 0100A-3	0061A-5 0078A-5 0094A-5		150 (2	5.9 (2	175	6.9	0	0.0	2.5	0.1
		007A3-7 009A8-7 014A2-7 0018A-7 0022A-7 0027A-7 0035A-7 0042A-7 0052A-7	200	7.9	150	5.9	0	0.0	10	0.4
0140A-3 0170A-3 0210A-3 0250A-3 0300A-3 0350A-3	0110A-5 0140A-5 0170A-5 0200A-5 0240A-5 0300A-5 0340A-5	0062A-7 0082A-7 0100A-7 0130A-7 0140A-7 0190A-7 0220A-7 0270A-7	150	5.9	150	5.9	0	0.0	25	1.0
0470A-3 0640A-3 0760A-3 0900A-3	0440A-5 0590A-5 0740A-5 0810A-5	0340A-7 0410A-7 0530A-7 0600A-7	200	7.9	-	-	10	0.4	10	0.4

1) As required by cooling air flow or 2) air guide

3) As required by cooling air flow and/or cabling

[4)] Additional free space may be required by options installed on control unit, and control wiring

[5)] As required for smooth installation

Typical power cable sizes

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

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

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

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

Input power (DC) connection

Voltage (U_1)	ACS880-104-xxxxx-3: 513…566 V DC. This is indicated in the type designation label as typical input voltage level (566 V DC). ACS880-104-xxxxx-5: 513…707 V DC. This is indicated in the type designation label as typical input voltage levels (566/679/707 V DC). ACS880-104-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	Frame R1i UDC+, UDC–: 0.25…4 mm_2, 0.5 … 0.6 N·m (4.4 …5.3 lbf·in) PE: 1.5 N·m (13 lbf·in) Frame R2i UDC+, UDC–: 0.5 … 6 mm^2, 1.2 … 1.5 N·m (10.6 … 13.3 lbf·in) PE: 1.5 N·m (13 lbf·in) Frames R3i, R4i and R5i UDC+, UDC–: 6…70 mm^2. Allen screw torque 15 N·m (11 lbf·ft), connection post torque 4 N·m (30 lbf·in). Other conductor sizes can be used by replacing the original lug with a suitable crimp ring terminal. PE: Screw size M5, torque 3 N·m (25 lbf·in) Connector cover screws: Torque 3 N·m (25 lbf·in) Frames R6i and R7i See chapter *Dimension drawings (page 381)*, and section *One R6i/R7i module in a 400 mm wide Rittal VX25 enclosure (page 97)* Frame R8i and multiples M12, maximum intrusion into module 20 mm (0.8”). See also chapter *Dimension drawings (page 381)*, and section *One R8i module in a 400 mm wide Rittal VX25 enclosure (page 110)*

Motor (AC) connection

Motor types	Asynchronous AC induction motors, permanent magnet synchronous motors, AC induction servomotors and ABB synchronous reluctance (SynRM) motors
Voltage (U_2)	3-phase symmetrical, *U*max at field weakening point: ACS880-104-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. ACS880-104-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. ACS880-104-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 (f_2)

0…500 Hz, except

0…120 Hz with sine output filters (option +E206)

0…120 Hz for frames R1i…R5i with du/dt filters (option +E205)

0…200 Hz for frames R6i and R7i with du/dt filters (option +E205)

For higher operational output frequencies, please contact your local ABB representative.

Operation above 150 Hz may require type-specific derating. For more information, contact your local ABB representative.

Current

See section *Ratings*.

Switching frequency

Frames R1i…R4i: 4.5 kHz (typical)

Frames R5i…R8i: 3 kHz (typical)

The switching frequency can vary per frame and voltage. For exact values, please contact your local ABB representative.

Maximum recommended motor cable length

*Frames R1i…R2i: 150 m (492 ft)

*Frames R3i…R7i: 300 m (984 ft)

Frame R8i and multiples: 500 m (1640 ft)

*Tested with 100 m (328 ft) for EMC Category C3. See standards and markings information in *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [English]).

Note: Longer cables cause a motor voltage decrease which limits the available motor power. The decrease depends on the motor cable length and characteristics. Contact ABB for more information. Note that a sine filter (optional) at the drive output also causes a voltage decrease.

Output terminals (Frame R1i)

U2, V2, W2: 0.25 … 4 mm^2, 0.5 … 0.6 N·m (4.4 … 5.3 lbf·in)
Ground: 1.5 N·m (13 lbf·in)

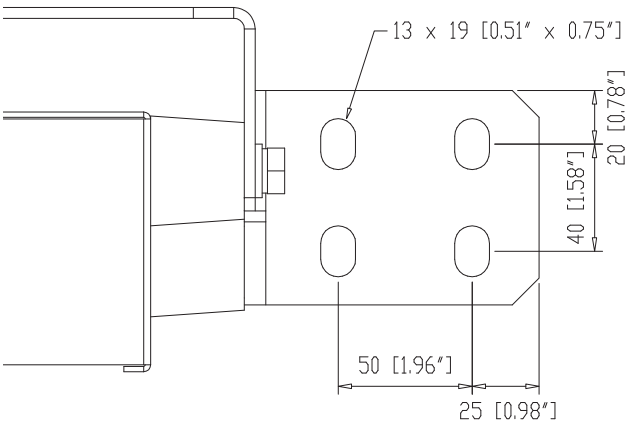
Output terminals (Frame R2i)

U2, V2, W2: 0.5 … 6 mm^2, 1.2 … 1.5 N·m (10.6 … 13.3 lbf·in)
Ground: 1.5 N·m (13 lbf·in)

Output terminals (Frames R3i…R5i)

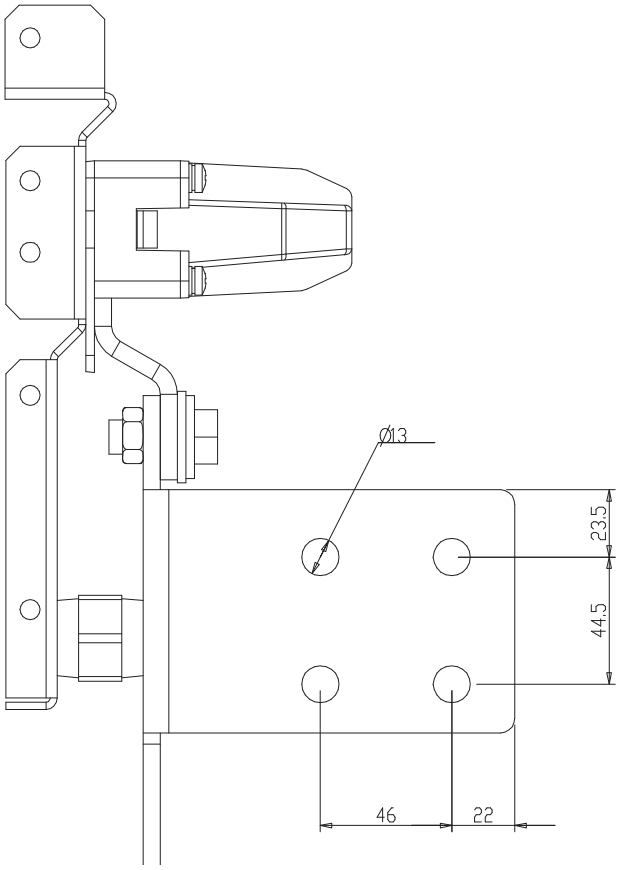
U2, V2, W2: 6 … 70 mm^2. Allen screw torque 15 N·m (11 lbf·ft), connection post torque 4 N·m (30 lbf·in). Other conductor sizes can be used by replacing the original lug with a suitable crimp ring terminal.
Ground: M5, torque 3 N·m (25 lbf·in)
Connector cover screws: Torque 3 N·m (25 lbf·in)

Output terminals (Frames R6i and R7i)– Side view



Screw size: M12 or ½″. Tightening torque: 70 N·m (52 lbf·ft)

Output terminals (Frame R8i) – Side view



Busbars to quick connector: M12. Torque: 50 N·m (37 lbf·ft)
Busbars to support insulators: M8. Torque: 9 N·m (6.5 lbf·ft)
Cables to busbars: M12 or ½″. Torque: 70 N·m (52 lbf·ft)

Control connections

See chapter *Control units of the drive (page 333)*.

Efficiency

Approximately 98% at nominal power level.

The efficiency is not calculated according to the ecodesign standard IEC 61800-9-2.

Protection classes for module

Degrees of protection (IEC/EN 60529)	IP00 (frames R6i…R8i)) IP20 (frames R1i…R5i)
Enclosure types (UL 50/50E)	UL Open Type
Overvoltage category (IEC/EN 60664-1)	III
Protective class (IEC/EN 61800-5-1)	I

Optical components

The specifications of the optic cable are as follows:

- Storage temperature: -55 … +85 °C (-67 … +185 °F)
- Installation temperature: -20 … +70 °C (-4 … +158 °F)
- Maximum short-term tensile force: 50 N (11.2 lbf)
- Minimum short-term bend radius: 25 mm (1.0 in)
- Minimum long-term bend radius: 35 mm (1.4 in)
- Maximum long-term tensile load: 1 N (3.6 ozf)
- Flexing: Max. 1000 cycles

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

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

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

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

Ambient conditions

Environmental limits for the drive system are given below. The drive system is to be used in a heated, indoor, controlled environment.

	Operation installed for stationary use	**Storage** in the protective package	**Transportation** in the protective package
Installation site altitude above sea level	1. 0…4000 m (13123 ft) 2. 0…2000 m (6561 ft)) Output derated above 1000 m (3281 ft).	-	-
	1. Frames R1i…R8i: Neutral-grounded TN and TT network systems, non-corner-grounded IT network systems Frame R8i: Corner-grounded TN, TT and IT network systems up to 600 V 2. Frames R1i…R7i: Corner-grounded TN, TT and IT network systems up to 500 V		
Air temperature	0 … +40 °C (+32 … +104 °F). No condensation allowed. Output derated in the range +40 … +50 °C (+104 … +122 °F). See section Ambient temperature derating.	-40 to +70 °C (-40 to +158 °F)	-40 to +70 °C (-40 to +158 °F)

Relative humidity	5 to 95%	Max. 95%	Max. 95%
	No condensation allowed. Maximum allowed relative humidity is 60% in the presence of corrosive gases.		
Contamination	IEC/EN 60721-3- 3:2002: Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use of weather protected locations	IEC 60721-3-1	IEC 60721-3-2
Chemical gases	Class 3C2	Class 1C2	Class 2C2
Solid particles	Class 3S1. No conductive dust allowed.	Class 1S3 (packing must support this, otherwise 1S2)	Class 2S2
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 58…150 Hz: 1 g Tested in ABB multidrive cabinet (ACS880-x07) according to: Max. 1 mm (0.04 in.) (5 … 13.2 Hz), max. 0.7 g (13.2 … 100 Hz) sinusoidal	For modules and cabinets in packages: IEC/EN 60721-3-1:1997 Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 1: Storage	For cabinet package: IEC/EN 60721-3-1:1997 Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 2: Transportation
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/s2 (330 ft./s2) 11 ms	With packing max. 100 m/s2 (330 ft./s2) 11 ms

Colors

RAL 9002 / PMS 1C Cool Gray, RAL 9017, NCS 1502-Y

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 [1)]
- Molded pulp
- Plywood
- Wood

- PP (strapping)
- EPP (foam)
- PE (plastic bag and/or VCI foil)
- Metal (fixing clamps, screws).

1) Cardboard heavy duty quality with wet strength glue in large modules.

Packaging of options

- Cardboard
- Kraft paper
- PP (straps)
- PE (foil, 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 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 large electrolytic capacitors need selective treatment according to IEC 62635 guidelines. To aid recycling, plastic parts are marked with an appropriate identification code.

Contact your local ABB distributor for further information on environmental aspects and recycling instructions for professional recyclers. End of life treatment must follow international and local regulations. See *ACS880 cabinet-installed drives and multidrive modules recycling instructions and environmental information* (3AXD50000153909 [English]).

Standards

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

Markings

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

Energy efficiency data (ecodesign)

Energy efficiency data is not provided for the drive/unit. Multidrives 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).

Auxiliary power consumptions

Control equipment

Device	U_N	f Hz	I_{cont} A	I_{start} A	P_{cont} W
ZCU/BCU control unit	24 V DC (+10%)	-	2.0	-	48
R8i module: internal electronics	230 V AC (+15%/-20%)	50/60	0.45	-	105
	115 V AC (+15%/-20%)	50/60	0.9	-	105
R8i module: heating element (option +C183)	230 V AC	50/60	-	-	40
	115 V AC	60	-	-	40
R8i module: direct-on-line fan (option +C188)	400 V AC	50	1.5	3.0	-
		60	1.9	3.8	-
	320 V AC	60	1.5	4.4	-
Charging controller	230 V AC (+10%/-15%)	50/60	0.04	-	-
	115 V AC (+10%/-15%)	50/60	0.08	-	-
PDAL2 switch/disconnector interlock coil	230 V AC (+10%/-30%)	50	-	-	6.5
	240 V AC (+10%/-30%)	60	-	-	6.5
	110 V AC (+10%/-30%)	60	-	-	6.5

Cabinet cooling fans

Frame size	Enclosure width (IEC, UL)	U_N V AC	f Hz	I_{cont} A
R1i…R5i (IP20/IP42 roof fan)	400/600 mm (UL)	230	50	0.7
	400/600/800 mm (IEC)		60	0.9
	400/600/800 mm (UL)	115	60	1.8
R1i…R8i (IP54 roof fan)	400/800 mm (IEC/UL)	230	50	1.1
			60	1.45
	600 mm (IEC/UL)	230	50	2.3
			60	3
	400/800mm (UL)	115	50	3.1
			60	3.9
	600 mm (UL)	115	50	5.5
			60	6.3

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

Ferrules used with 400 V and 500 V units

Rating	Class	Example	Power loss at I_n	Clearing I^2t		U_n
A rms			W	A^2s	V	V
10	aR	Bussmann FWP-10A14Fa	4	22	660	660 (IEC) 700 (UL)
15	aR	Bussmann FWP-15A14Fa	5.5	75	660	
20	aR	Bussmann FWP-20A14Fa	6	180	660	
25	aR	Bussmann FWP-25A14Fa	7	320	660	
32	aR	Bussmann FWP-32A14Fa	7.6	600	660	
50	aR	Mersen 6,921 CP URQ 27x60/50	16	610	690	690
63	aR	Mersen 6,921 CP URQ 27x60/63	21	860	690	
80	aR	Mersen 6,921 CP URQ 27x60/80	24	1880	690	
100	aR	Mersen 6,921 CP URQ 27x60/100	27	3210	690	
125	aR	Mersen 6,921 CP URQ 27x60/125	30	6970	690	
160	aR	Mersen 6,921 CP URQ 27x60/160	34	15000	690	
200	aR	Mersen 6,921 CP URQ 27x60/200	38	30000	690	

Ferrules used with 690 V units

Rating	Class	Example	Power loss at I_n	Clearing I^2t		U_n
A rms			W	A^2s	V	V
40	aR	Mersen 1021 CP URB 27x60/40	17	450	1000	1000
100	aR	Mersen 1021 CP URB 27x60/100	27	6000	1000	

Flush-end fuse blocks used with 400 V and 500 V units

Rating	Class	Example	Power loss at I_n	Clearing I^2t		Size	U_n
A rms			W	A^2s	V		V
250	aR	Bussmann 170M4409	55	21000	660	1	690 (IEC) 700 (UL)
315	aR	Bussmann 170M4410	58	42000	660		
400	aR	Bussmann 170M4412	65	91500	660		
450	aR	Bussmann 170M4413	70	120000	660		
500	aR	Bussmann 170M4414	72	170000	660		
630	aR	Bussmann 170M4416	80	350000	660		
700	aR	Bussmann 170M4417	85	465000	660		
800	aR	Bussmann 170M4418	95	725000	660		
900	aR	Bussmann 170M6413	120	670000	660	3	
1100	aR	Bussmann 170M6415	130	1300000	660		
1250	aR	Bussmann 170M6416	140	1950000	660		
1400	aR	Bussmann 170M6417	155	2450000	660		
1600	aR	Bussmann 170M6419	160	3900000	660		

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^2s	V		V
125	aR	Bussmann 170M3392	35	9000	1000	1*	690 (IEC) 700 (UL)
160	aR	Bussmann 170M4388	45	11500	1000	1	
200	aR	Bussmann 170M4389	50	22500	1000		
250	aR	Bussmann 170M4390	60	4600	1000		
315	aR	Bussmann 170M4391	65	9000	1000		
350	aR	Bussmann 170M4392	70	125000	1000		
400	aR	Bussmann 170M4393	75	175000	1000		
500	aR	Bussmann 170M4395	85	340000	1000		1100 (IEC)
630	aR	Bussmann 170M6544	115	495000	1000	3	1250 (IEC), 1300 (UL)
800	aR	Bussmann 170M6546	125	995000	1000		
1000	aR	Bussmann 170M6548	135	2150000	1000		1100 (IEC)
1100	aR	Bussmann 170M6549	140	2800000	1000		1000 (IEC)

Tightening torques

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
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.

Cybersecurity disclaimer

This product can be connected to and to communicate information and data via a network interface. The HTTP protocol, which is used between the commissioning tool (Drive Composer) and the product, is an unsecured protocol. For independent and continuous operation of product such connection via network to commissioning tool is not necessary. However 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, prevention of physical access, 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.

Notwithstanding any other provision to the contrary and regardless whether the contract is terminated or not, ABB and its affiliates are under no circumstances liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

11

Control units of the drive

Contents of this chapter

This chapter

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

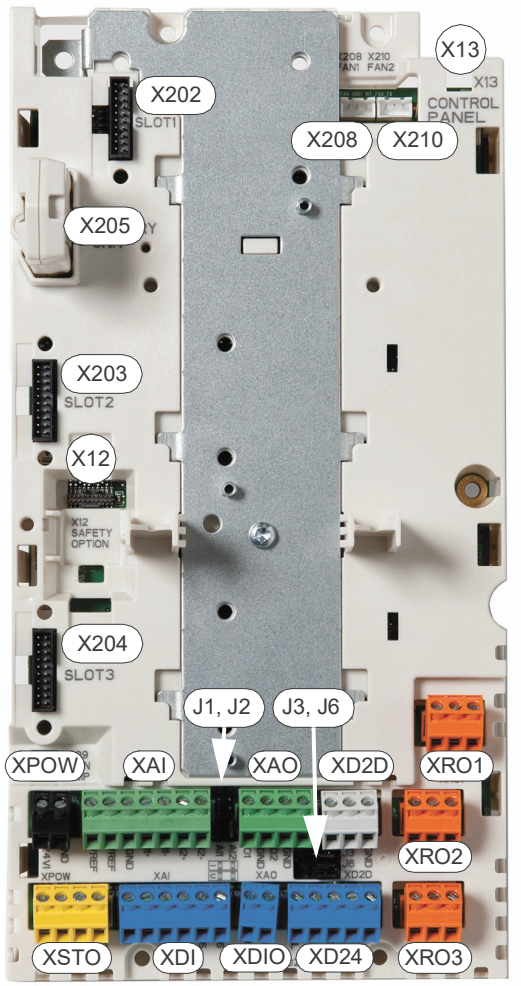
General

The ZCU-14 control unit is used with inverter module frame sizes R1i…R4i, R6i and R7i, while the ZCU-12 is used with frame size R5i. Both ZCU units consist of a ZCON control board contained in a plastic housing. The control unit is mounted on the inverter module.

The BCU-x2 control unit is used with frame size R8i and multiples. 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.

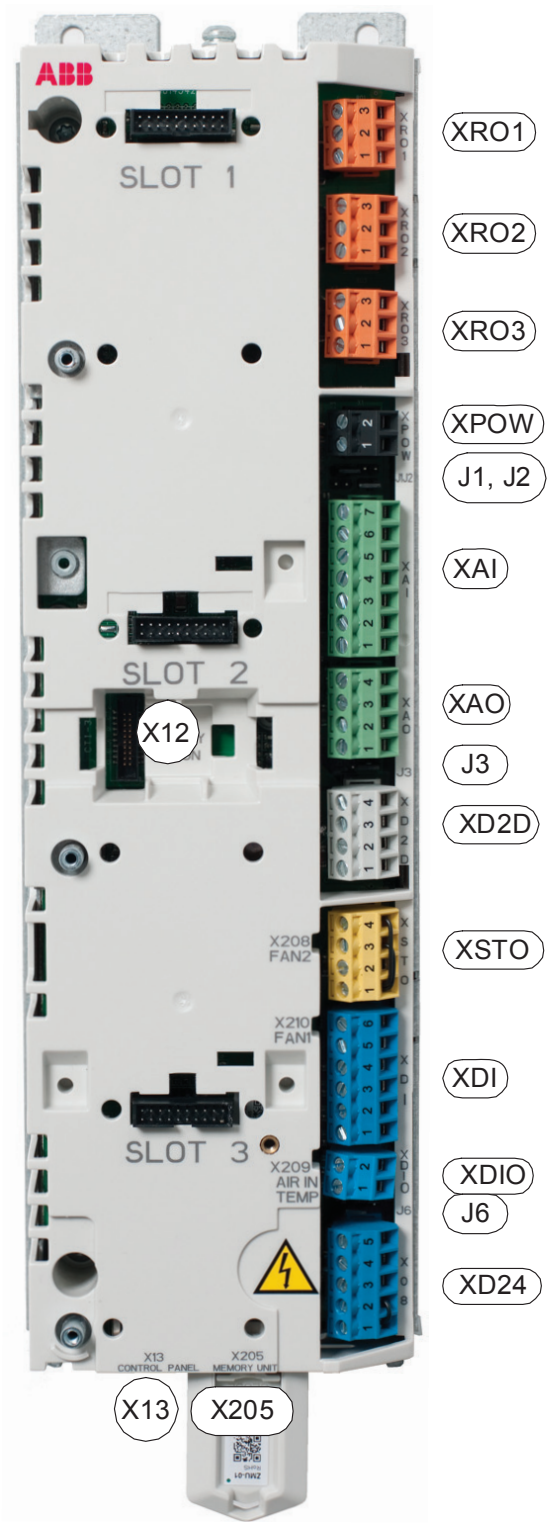
In this manual, the name “BCU-x2” represents the control unit types BCU-02, BCU-12 and BCU-22. These have a different number of power module connections (2, 7 and 12 respectively) but are otherwise similar.

ZCU-12 layout



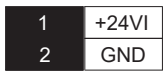
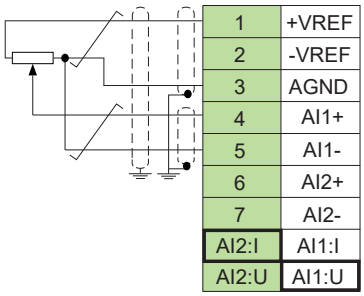
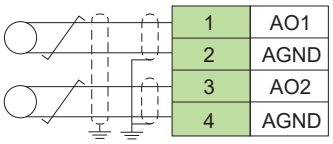
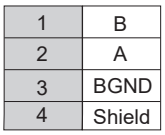
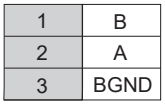
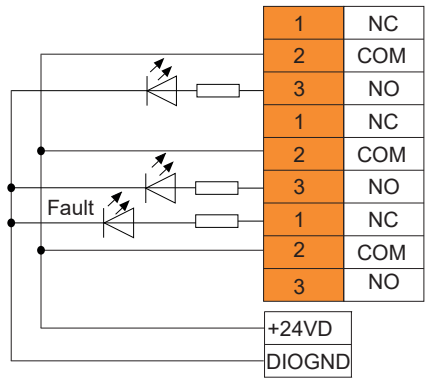
	Description
XAI	Analog inputs
XAO	Analog outputs
XDI	Digital inputs
XDIO	Digital input/outputs
XD24	Digital input interlock (DIIL) and +24 V output
XD2D	Drive-to-drive link
XPOW	External power input
XRO1	Relay output RO1
XRO2	Relay output RO2
XRO3	Relay output RO3
XSTO	Safe torque off connection
X12	Connection for FSO-xx safety functions module
X13	Control panel connection
X202	Option slot 1
X203	Option slot 2
X204	Option slot 3
X205	Memory unit connection (memory unit inserted in the picture)
X208	Cooling fan 1 connection
X210	Cooling fan 2 connection
J1, J2	Voltage/Current selection jumpers (J1, J2) for analog inputs
J3	Drive-to-drive link termination switch (J3)
J6	Common digital input ground selection switch (J6)

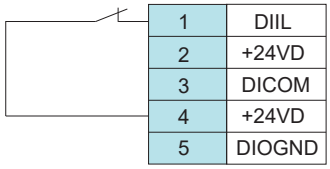
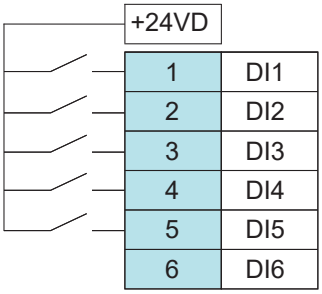
ZCU-14 layout



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

Default I/O diagram of the inverter control unit (ZCU-1x)

Connection	Term	Description
XPOW External power input		
	+24VI GND	24 V DC, 2 A min. (without optional modules)
J1, J2, XAI Reference voltage and analog inputs		
	+VREF	11 V DC, R_L 1…10 kohm
	-VREF	-11 V DC, R_L 1…10 kohm
	AGND	Ground
	AI1+	**Speed reference**
	AI1-	0(2)…11 V, R_{in} > 200 kohm [1)] selected by switch AI1.
	AI2+	By default not in use.
	AI2-	0(4)…22 mA, R_{in} = 100 ohm [2)]
	AI1: I	AI1/AI2 current/voltage selection
	AI1: U	
XAO Analog outputs		
	AO1	**Motor speed rpm**
	AGND	0…22 mA, R_L < 500 ohm
	AO2	**Motor current**
	AGND	0…22 mA, R_L < 500 ohm
XD2D Drive-to-drive link		
	B	Master/follower, drive-to-drive or embedded fieldbus connection [3)]
	A	
	BGND	
	Shield	
	**J3**	Drive-to-drive link termination [3)]
XRO1, XRO2, XRO3 Relay outputs		
	NC	**Ready run**
	COM	250 V AC / 30 V DC
	NO	2 A
	NC	**Running**
	COM	250 V AC / 30 V DC
	NO	2 A
	NC	**Fault (-1)**
	COM	250 V AC / 30 V DC
	NO	2 A

Connection	Term	Description
XD24 Auxiliary voltage output, digital interlock [4]		
	DIIL	Run enable [4]
	+24VD	+24 V DC 200 mA
	DICOM	Digital input ground
	+24VD	+24 V DC 200 mA [5]
	DIOGND	Digital input/output ground
XDIO Digital input/outputs		
	DIO1	Output: Ready run
	DIO2	Output: Running
	J6	Ground selection [6]
XDI Digital inputs		
	DI1	Stop (0) / Start (1)
	DI2	Forward (0) / Reverse (1)
	DI3	Reset
	DI4	Acc/Dec time select [7]
	DI5	Constant speed 1 (1 = On) [8]
	DI6	By default, not in use.
XSTO	Safe torque off circuits must be closed for the drive to start. [9]	
X12	Safety options connection	
X13	Control panel connection	
X205	Memory unit connection	

1) Current [0(4)…22 mA, R_{in} = 100 ohm] or voltage [0(2)…11 V, R_{in} > 200 kohm] input selected by switch AI1. Change of setting requires reboot of control unit.

2) Current [0(4)…22 mA, R_{in} = 100 ohm] or voltage [0(2)…11 V, R_{in} > 200 kohm] input selected by switch AI2. Change of setting requires reboot of control unit.

3) See section *The XD2D connector (page 345)*

4) See section *DIIL input (page 345)*.

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

6) Determines whether DICOM is separated from DIOGND (ie. common reference for digital inputs floats; in practice, selects whether the digital inputs are used in current sinking or sourcing mode). See also *ZCU-1x ground isolation diagram (page 351)*. DICOM=DIOGND ON: DICOM connected to DIOGND. OFF: DICOM and DIOGND separate.

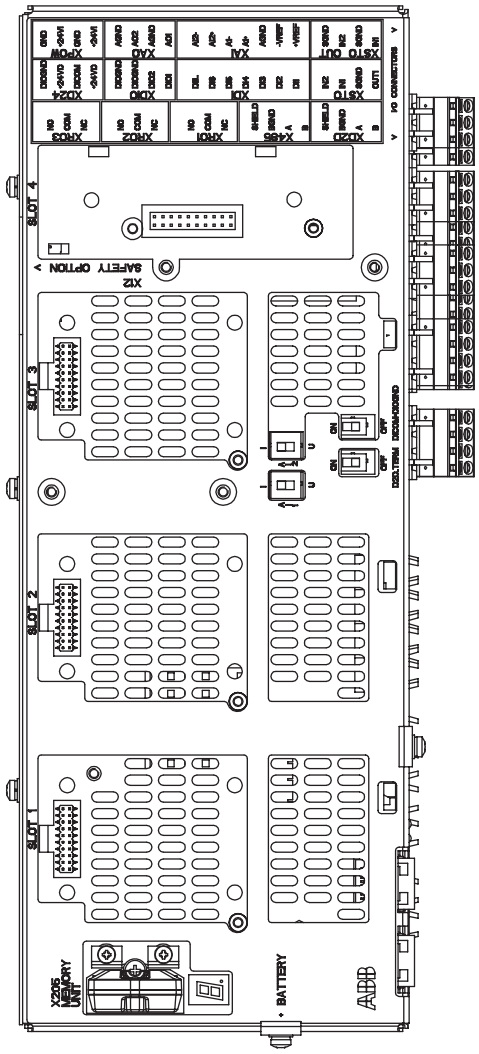
7) 0 = Acceleration/deceleration ramps defined by parameters *23.12*/*23.13* in use. 1 = Acceleration/deceleration ramps defined by parameters *23.14*/*23.15* in use.

8) Constant speed 1 is defined by parameter *22.26*.

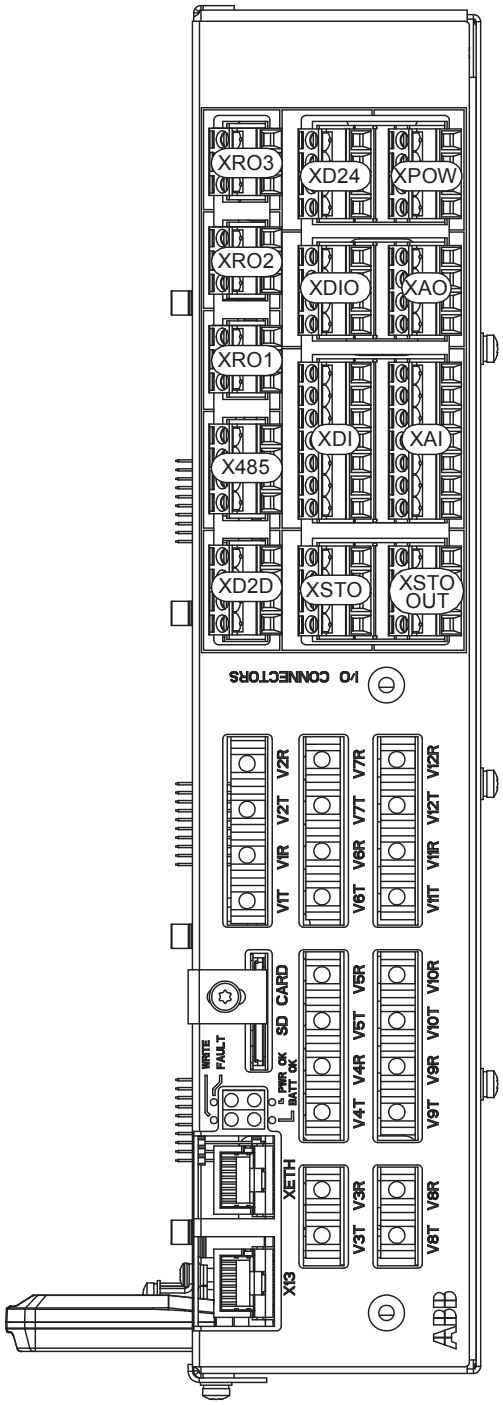
9) See chapter *The Safe torque off function (page 353)*.

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

BCU-x2 layout



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



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

Default I/O diagram of the inverter control unit (A41)

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 mm^2 (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 345)*.	
2	2	A		
3	3	BGND		
4	4	Shield		
ON OFF	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
ON OFF	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-	
– U	AI1		AI1 current/voltage selection switch
– U	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

Terminal	Description
X13	Control panel connection
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.

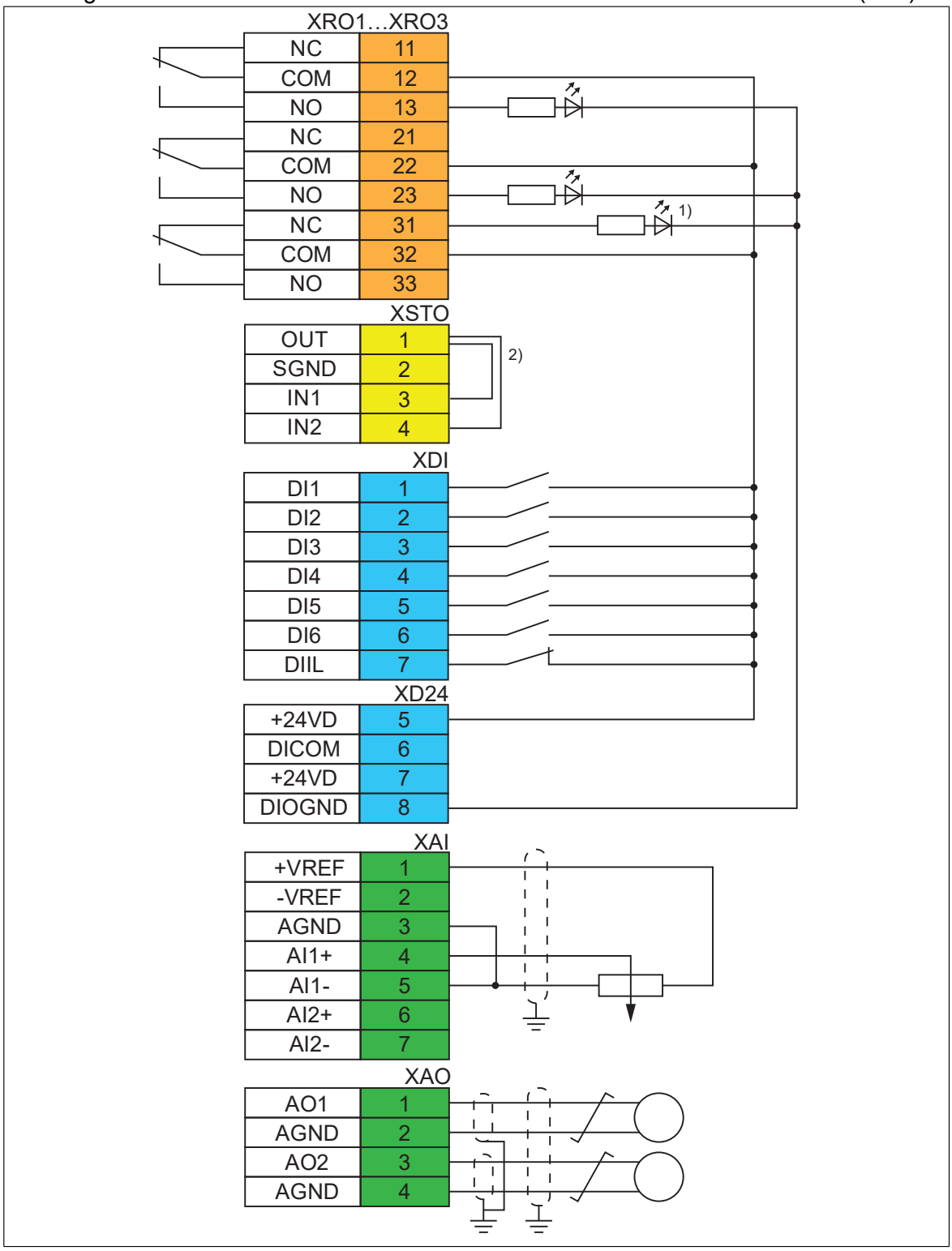
3) The DIIL input is configured to stop the unit when the input signal is removed. This input does not have a SIL or PL classification.

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 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch AI1. Change of setting requires reboot of control unit.

6) Current [0(4)…20 mA, R_{in} = 100 ohm] or voltage [0(2)…10 V, R_{in} > 200 kohm] input selected by switch AI2. Change of setting requires reboot of control unit.

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



1) Fault

2) If necessary, you can connect an emergency stop button to the XSTO terminal. Refer to chapter *The Safe torque off function*.

Additional information on the connections

External power supply for the control unit (XPOW)

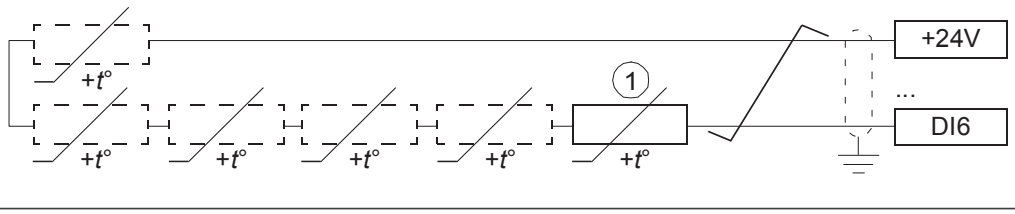
The control unit is powered from a 24 V DC, 2 A supply through terminal block XPOW. With a type BCU control unit, a second supply can be connected to the same terminal block for redundancy.

Using an external supply is recommended if

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

DI6 as a PTC sensor input

PTC sensors can be connected to this input for motor temperature measurement as follows. The sensor can alternatively be connected to a FEN encoder interface module. At the sensor end of the cable, leave the shields unconnected or ground them indirectly via a high-frequency capacitor with a few nanofarads, for example 3.3 nF / 630 V. The shield can also be grounded directly at both ends if they are in the same ground line with no significant voltage drop between the end points. See the firmware manual of the inverter unit for parameter settings.

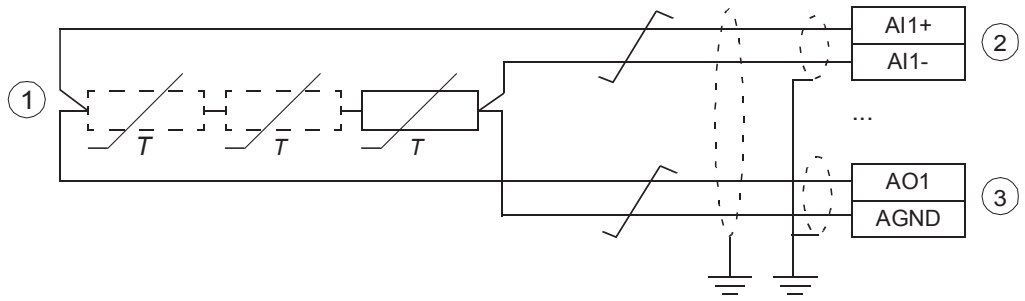


1	One to six PTC thermistors connected in series

WARNING!
As the inputs pictured above are not insulated according to IEC 60664, the connection of the motor temperature sensor requires double or reinforced insulation between motor live parts and the sensor. Make sure that the voltage does not exceed the maximum allowed voltage over the PTC sensor.

AI1 or AI2 as a Pt100, Pt1000, PTC or KTY84 sensor input

Sensors for motor temperature measurement can be connected between an analog input and output, an example connection is shown below. (Alternatively, you can connect the KTY to an FIO-11 or FAIO-01 analog I/O extension module or a FEN encoder interface module.) At the sensor end of the cable, leave the shields unconnected or ground them indirectly via a high-frequency capacitor with a few nanofarads, for example 3.3 nF / 630 V. The shield can also be grounded directly at both ends if they are in the same ground line with no significant voltage drop between the end points.



1	One, two or three Pt100, Pt1000 or PTC sensors; or one KTY84 sensor
2	Set the input type to voltage with the appropriate switch or jumper on the control unit. Make the corresponding setting in the control program in parameter group *12 Standard AI*.
3	Select the excitation mode in parameter group *13 Standard AO*.

WARNING!
As the inputs pictured above are not insulated according to IEC/EN 60664, the connection of the motor temperature sensor requires double or reinforced insulation between motor live parts and the sensor. Make sure that the current does not exceed the maximum allowed current through the Pt100/Pt1000 sensor.

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 certified.

The XD2D connector

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

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

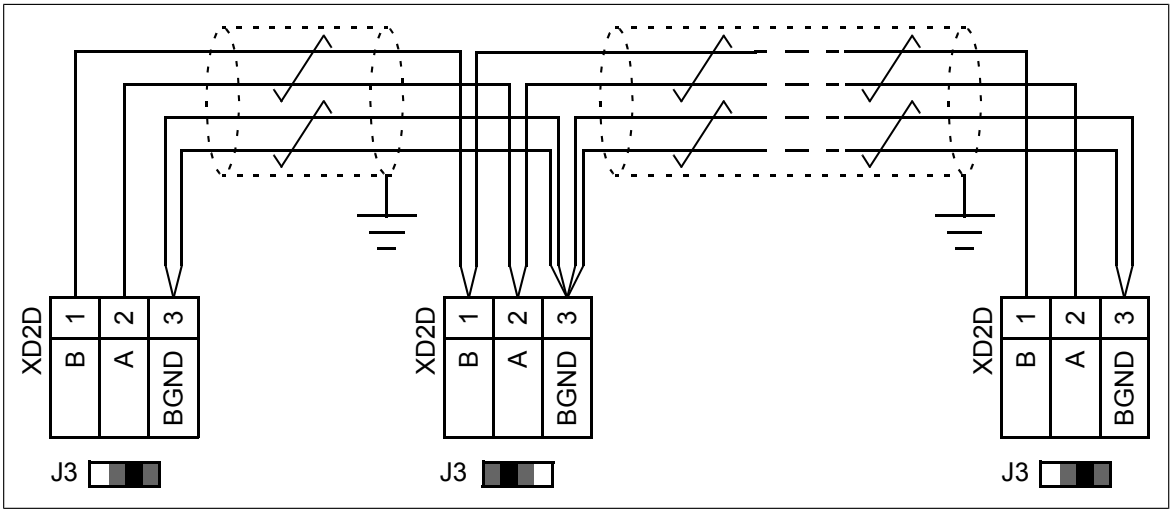
See the firmware manual of the drive for the related parameter settings.

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

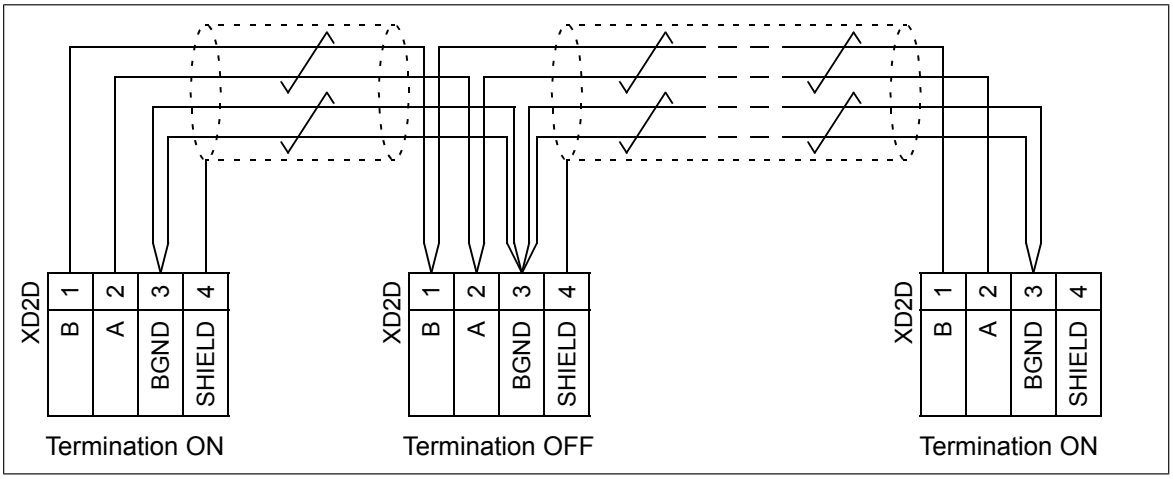
Use shielded twisted-pair cable with a twisted pair for data and a wire or another pair for signal ground (nominal impedance 100 … 165 ohm, for example Belden 9842) for the wiring. For best immunity, ABB recommends high quality cable. Keep the cable as short as possible. Avoid unnecessary loops and parallel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

The following diagram shows the wiring between control units.

ZCU-12



ZCU-14, BCU-x2



Safe torque off (XSTO, XSTO OUT)

See chapter *The Safe torque off function (page 353)*.

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

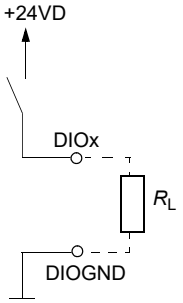
FSO safety functions module connection (X12)

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.

SDHC memory card slot

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

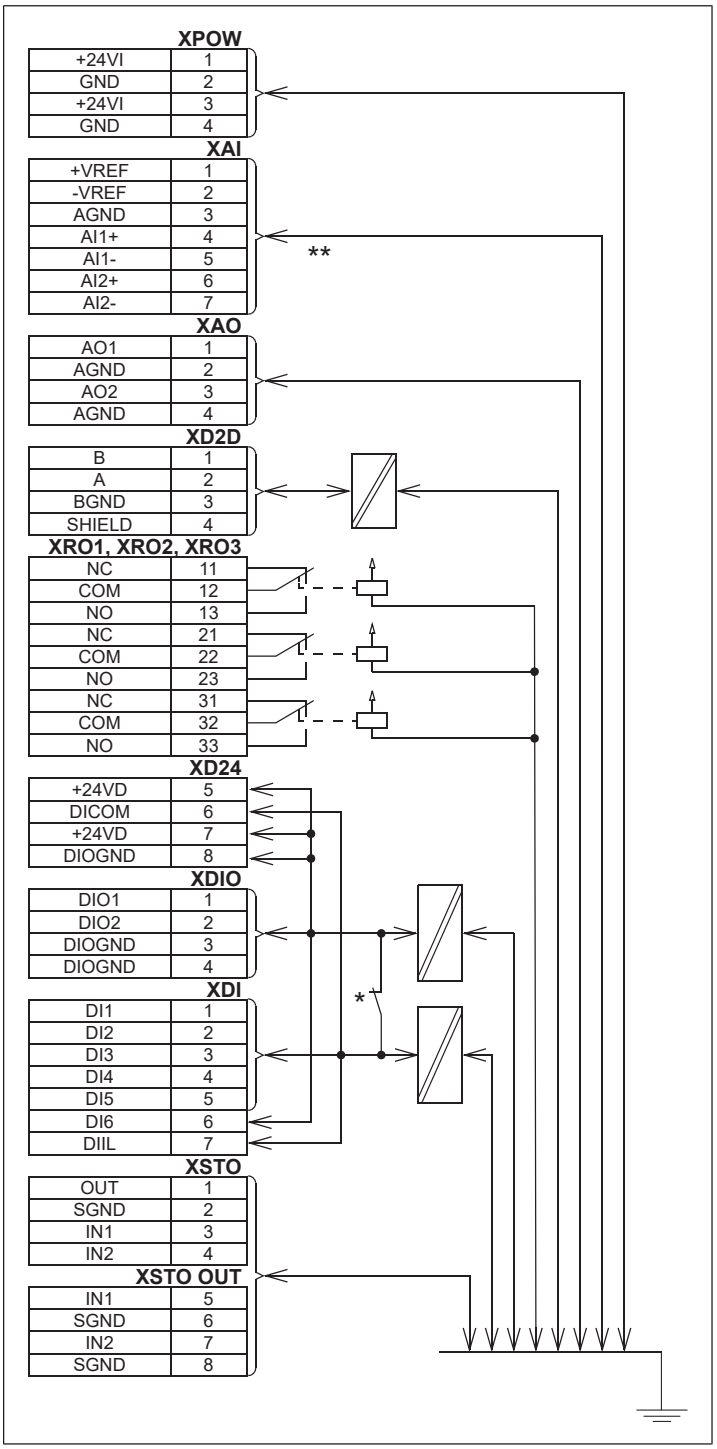
Connector data

Power supply (XPOW)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 24 V (±10%) DC, 2 A External power input. Two supplies can be connected to the BCU-x2 for redundancy.
Relay outputs RO1…RO3 (XRO1…XRO3)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 250 V AC / 30 V DC, 2 A Protected by varistors
+24 V output (XD24:2 and XD24:4)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) Total load capacity of these outputs is 4.8 W (200 mA / 24 V) minus the power taken by DIO1 and DIO2.
Digital inputs DI1…DI6 (XDI:1…XDI:6)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 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 DI6 (XDI:6) can alternatively be used as an input for a PTC sensor. "0" > 4 kohm, "1" < 1.5 kohm. I_{max}: 15 mA (DI1…DI5), 5 mA (DI6)
Start interlock input DIIL (XD24:1 [ZCU-1x], XDI:7 [BCU-x2])	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 24 V logic levels: "0" < 5 V, "1" > 15 V R_{in}: 2.0 kohm Input type: NPN/PNP Hardware filtering: 0.04 ms, digital filtering up to 8 ms
Digital inputs/outputs DIO1 and DIO2 (XDIO:1 and XDIO:2) Input/output mode selection by parameters. DIO1 can be configured as a frequency input (0…16 kHz with hardware filtering of 4 microseconds) for 24 V level square wave signal (sinusoidal or other wave form cannot be used). DIO2 can be configured as a 24 V level square wave frequency output. See the firmware manual, parameter group 111/11.	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) As inputs: 24 V logic levels: "0" < 5 V, "1" > 15 V. R_{in}: 2.0 kohm. Filtering: 1 ms. As outputs: Total output current from +24VD is limited to 200 mA 
Reference voltage for analog inputs +VREF and -VREF (XAI:1 and XAI:2)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 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 jumpers (ZCU-1x) or switches (BCU-x2)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) Current input: –20…20 mA, R_{in} = 100 ohm Voltage input: –10…10 V, R_{in} > 200 kohm Differential inputs, common mode range ±30 V Sampling interval per channel: 0.25 ms Hardware filtering: 0.25 ms, adjustable digital filtering up to 8 ms Resolution: 11 bit + sign bit Inaccuracy: 1% of full scale range
Analog outputs AO1 and AO2 (XAO)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 0…20 mA, R_{load} < 500 ohm Frequency range: 0…300 Hz (ZCU-1x), 0…500 Hz (BCU-x2) Resolution: 11 bit + sign bit Inaccuracy: 2% of full scale range
XD2D connector	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 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 jumper (ZCU-1x) or switch (BCU-x2)
RS-485 connection (X485) (BCU-x2 only)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) 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)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) Input voltage range: -3…30 V DC Logic levels: "0" < 5 V, "1" > 17 V. **Note:** For the unit to start, both connections must be “1”. This applies to all control units (including drive, inverter, supply, brake, DC/DC converter etc. control units), but true Safe torque off functionality is only achieved through the XSTO connector of the drive/inverter control unit. Current consumption: 66 mA (continuous) per STO channel per R8i module EMC (immunity) according to IEC 61326-3-1 See also chapter *The Safe torque off function (page 353)*.
Safe torque off output (XSTO OUT) (BCU-x2 only)	Connector pitch 5 mm, wire size 0.5 … 2.5 mm^2 (22…12 AWG) Tightening torque 0.45 N·m (4 lbf·in) To STO connector of inverter module.
Control panel connection (X13)	Connector: RJ-45 Cable length < 3 m (9.8 ft)
Ethernet connection (XETH) (BCU-x2 only)	Connector: RJ-45 This connection is not supported by the firmware.

SDHC memory card slot (SD CARD) (BCU-x2 only)	Memory card type: SDHC Maximum memory size: 4 GB
The terminals of the control unit fulfill the Protective Extra Low Voltage (PELV) requirements. The PELV requirements of a relay output are not fulfilled if a voltage higher than 48 V is connected to the relay output.	

BCU-x2 ground isolation diagram

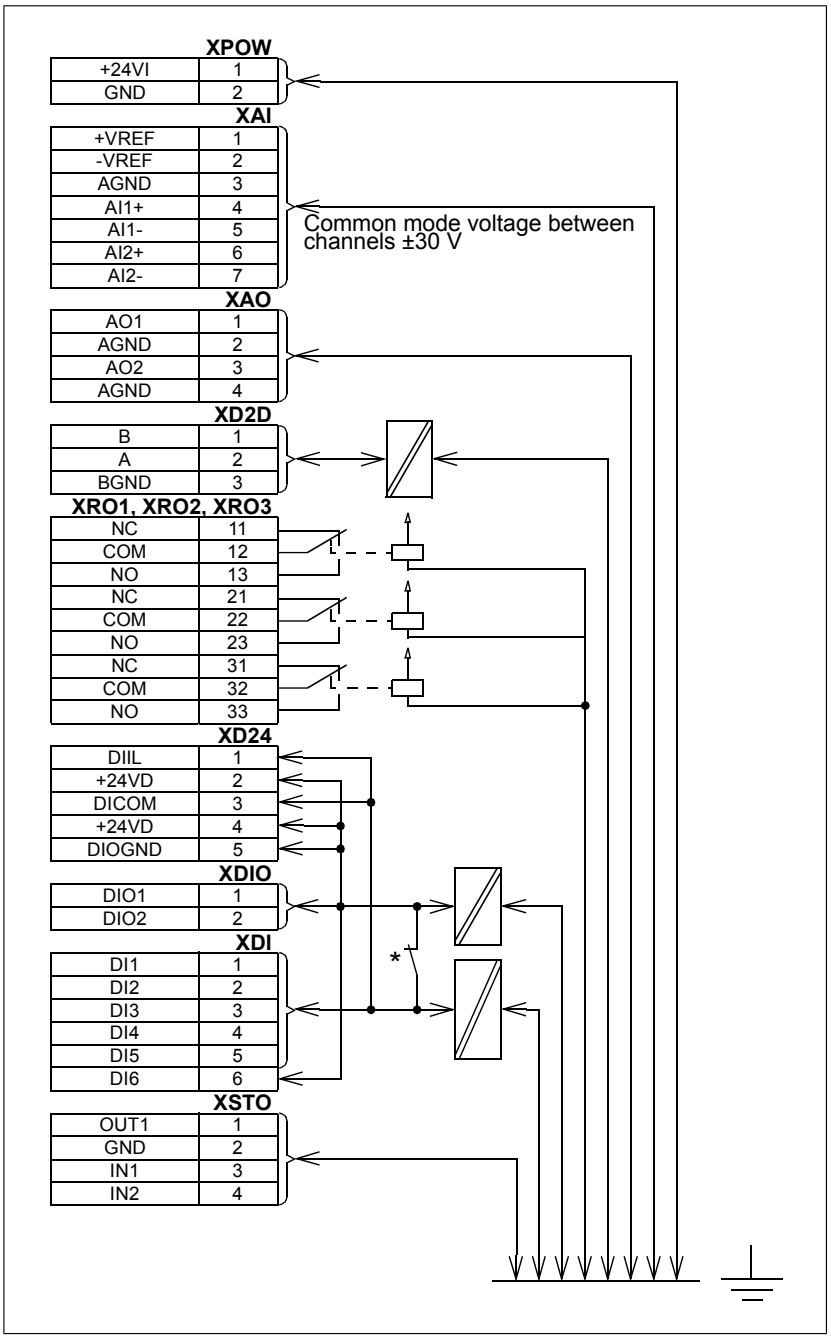


*Ground selector (DICOM=DIOGND) settings

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

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

ZCU-1x ground isolation diagram



* Ground selector (J6) settings

(ZCU-12)

• (ZCU-14)

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

(ZCU-12)

• (ZCU-14)

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

12

The Safe torque off function

Contents of this chapter

This chapter describes the Safe torque off (STO) function of the 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 that stop the drive in case of danger (such as an emergency stop circuit). Another typical application is a prevention of unexpected start-up function that enables short-time maintenance operations like cleaning or work on non-electrical parts of the machinery without switching off the power supply to the drive.

When activated, the Safe torque off function disables the control voltage for the power semiconductors of the drive output stage (A, see the diagrams below), 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 60204-1:2016 EN 60204-1:2018	*Safety of machinery – Electrical equipment of machines – Part 1: General requirements*
IEC 61000-6-7:2014	*Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations*
IEC 61326-3-1:2017	*Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 3-1: Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) – General industrial applications*
IEC 61508-1:2010	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements*
IEC 61508-2:2010	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems*
IEC 61511-1:2017	*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*
IEC 62061:2021 EN 62061:2005 + AC:2010 + A1:2013 + A2:2015	*Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*
EN ISO 13849-1:2015	*Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*
EN ISO 13849-2:2012	*Safety of machinery – Safety-related parts of control systems – Part 2: Validation*

The function also corresponds to Prevention of unexpected start-up as specified by EN ISO 14118:2018 (ISO 14118:2017), and Uncontrolled stop (stop category 0) as specified in EN/IEC 60204-1.

Compliance with the European Machinery Directive and the UK Supply of Machinery (Safety) Regulations

See *Electrical planning instructions for ACS880 multidrive cabinets and modules* (3AUA0000102324 [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 or an FPTC thermistor protection module can also be used. For more information, see the module documentation.

Cable types and lengths

- Double-shielded twisted-pair cable is recommended.
- Maximum cable lengths:
  - 300 m (1000 ft) between activation switch [K] and 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 BCU control unit and last inverter module in the chain.

Note: A short-circuit in the wiring between the switch and an STO terminal causes a dangerous fault. Therefore, it is recommended to use a safety relay (including wiring diagnostics) or a wiring method (shield grounding, channel separation) which reduces or eliminates the risk caused by the short-circuit.

Note: The voltage at the STO input terminals of the control unit (or frame R8i inverter module) must be at least 17 V DC to be interpreted as “1”.

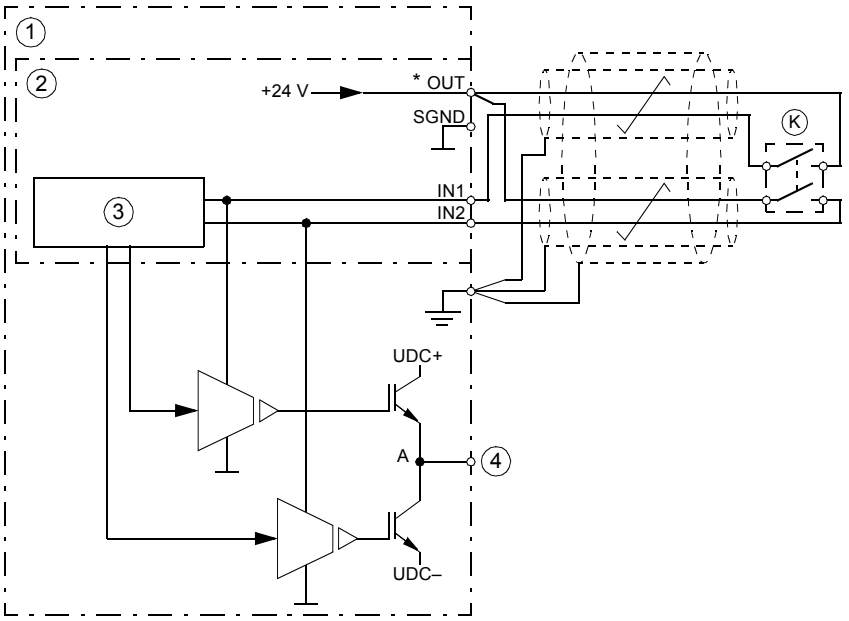
The pulse tolerance of the input channels is 1 ms.

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 BCU and R8i module, or between R8i modules.

Dual-channel connection with internal power supply

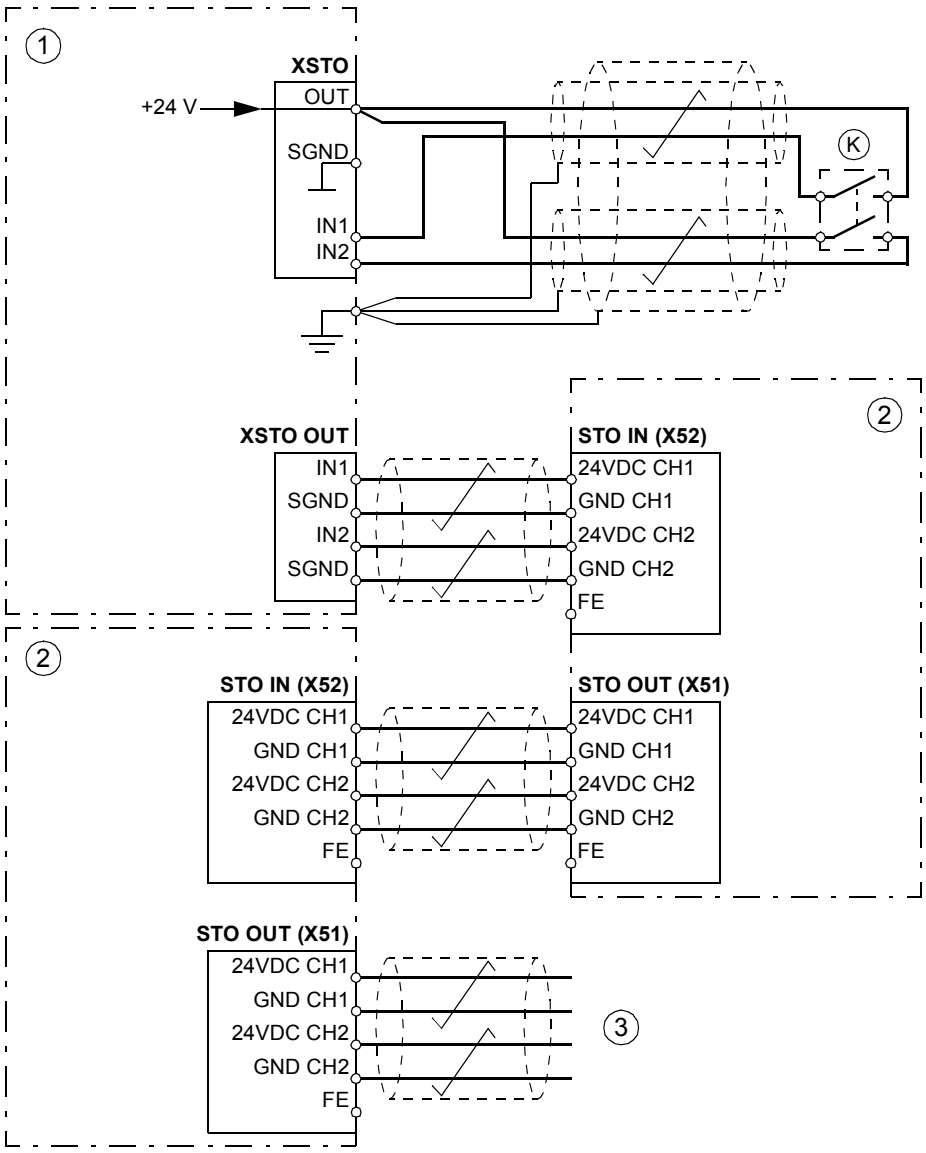
Frames R1i…R7i



1	Drive
2	Control unit
3	Control logic
4	To motor
K	Activation switch

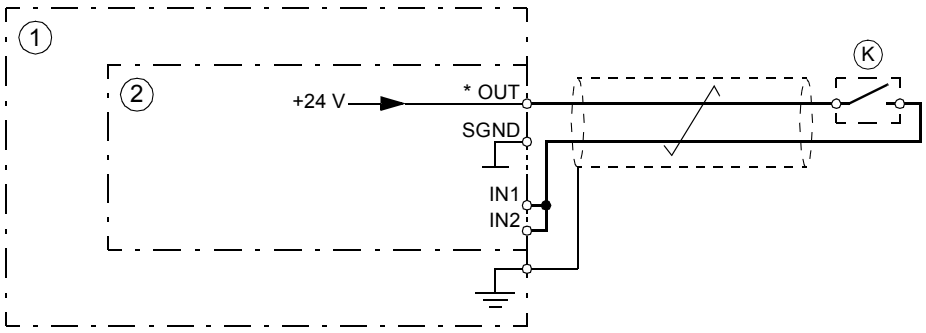
* "OUT1" with frame R5i

Frame R8i and multiples



1	Drive control unit
2	Inverter module(s)
3	To remaining inverter modules
K	Activation switch

Single-channel connection of activation switch



Note:

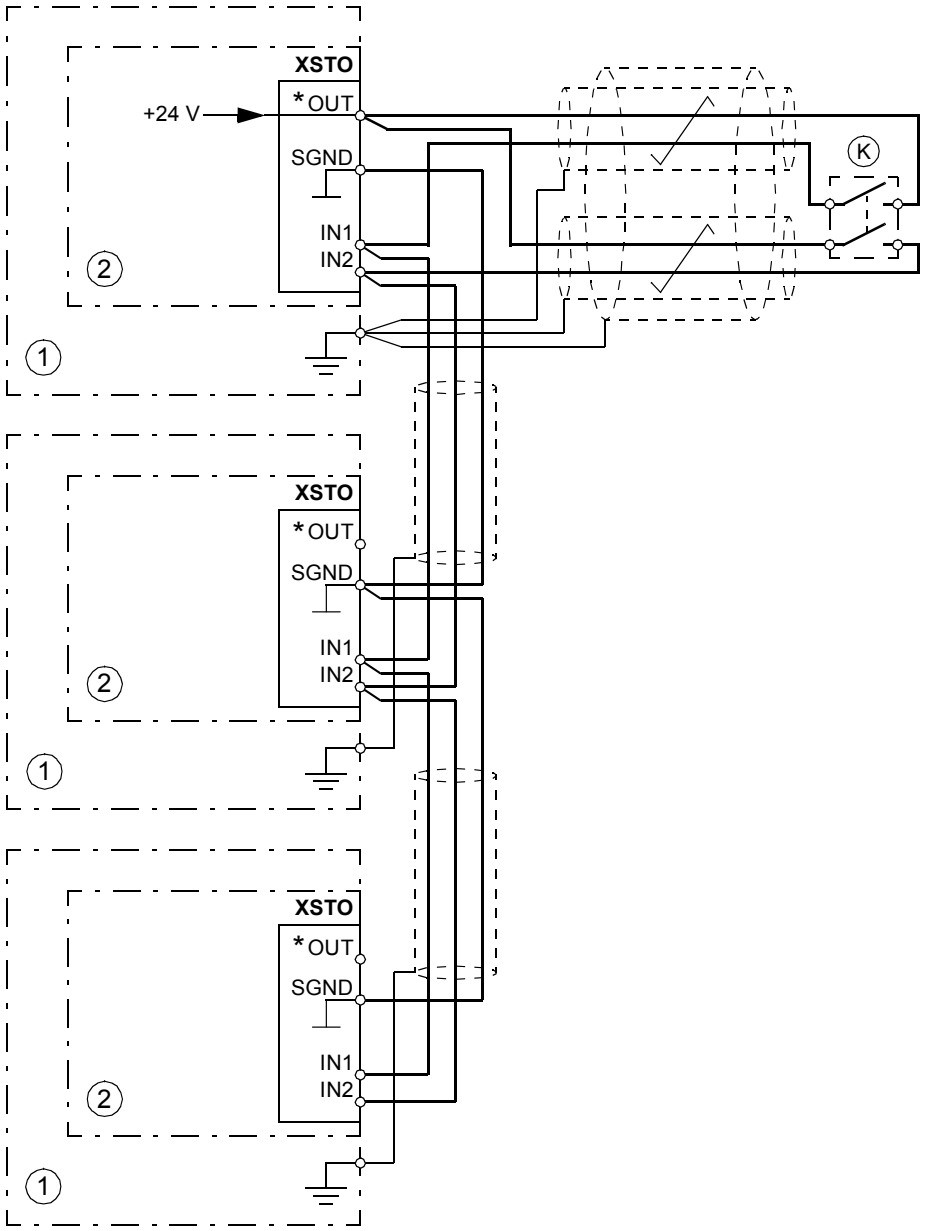
- Both STO inputs (IN1, IN2) must be connected to the activation switch. Otherwise, no SIL/PL classification is given.
- Pay special attention to avoiding any potential failure modes for the wiring. For example, use shielded cable. For measures for fault exclusion of wiring, see eg. EN ISO 13849-2:2012, table D.4.

1	Drive
2	Control unit
K	Activation switch

* "OUT1" with frame R5i

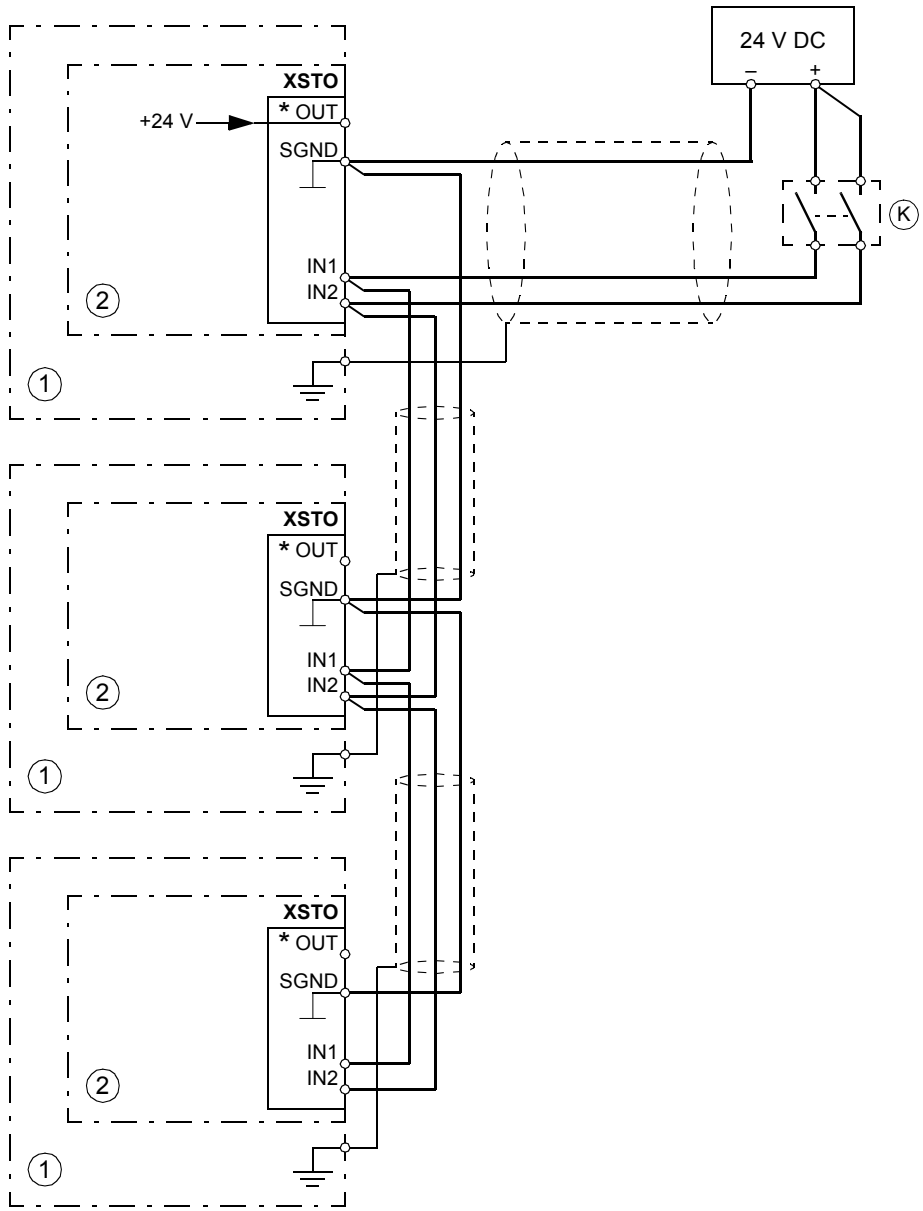
Multiple drives

Internal power supply



1	Drive
2	Control unit
K	Activation switch
* Terminal designation may vary depending on drive type	

External power supply



1	Drive
2	Control unit
K	Activation switch
* Terminal designation may vary depending on drive type	

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

- at initial start-up of the safety function
- after any changes related to the safety function (circuit boards, wiring, components, settings, etc.)
- after any maintenance work related to the safety function
- at the proof test of the safety function
- after a drive firmware update.

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 drive 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 disconnector.	☐
Check the STO circuit connections against the wiring diagram.	☐
Close the disconnector and switch the power on.	☐

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 drive generates a warning. 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 channel of the STO circuit. If the motor was running, it should coast to a stop. The drive generates a *FA81 Safe Torque Off 1 loss* fault indication (see the firmware manual). • Give a start command to verify that the STO function blocks the 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. • Open the 2nd channel of the STO circuit. If the motor was running, it should coast to a stop. The drive generates a *FA82 Safe Torque Off 2 loss* fault indication (see the firmware manual). • Give a start command to verify that the STO function blocks the 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.	☐
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. If both STO circuits are closed and a level-type start signal is active when the power is restored, it is possible that the drive starts without a fresh start command. Take this into account in the risk assessment of the system.

WARNING!
(With permanent magnet or synchronous reluctance [SynRM] motors only)

In case of a multiple IGBT power semiconductor failure, the drive can produce an alignment torque which maximally rotates the motor shaft by 180/*p* degrees (with permanent magnet motors) or 180/2*p* degrees (with synchronous reluctance [SynRM] motors) regardless of the activation of the Safe torque off function. *p* denotes the number of pole pairs.

Notes:

- If a running 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 5 or 2 years; see section *Safety data (page 368)*. It is assumed that all dangerous failures of the STO circuit are detected by the proof test. To perform the proof test, do the *Validation test procedure (page 362)*.

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 362)*.

Use only spare parts approved by ABB.

Record all maintenance and proof test activities in the machine logbook.

Competence

The maintenance and proof test activities of the safety function must be carried out by a competent person with adequate expertise and knowledge of the safety function as well as functional safety, as required by IEC 61508-1 clause 6.

Fault tracing

The indications given during the normal operation of the Safe torque off function are selected by 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 “STO hardware failure” fault. An attempt to use the STO in a non-redundant manner, for example activating only one channel, will trigger the same reaction.

See the 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 does not apply if both STO channels are not used.

Frame size	SIL	PL	SFF (%)	PFH (T_1 = 20 a) (1/h)	PFD_{avg} (T_1 = 2 a)	PFD_{avg} (T_1 = 5 a)	$MTTF_D$ (a)	DC (%)	Cat.	SC	HFT	CCF	T_M (a)
R1i R2i R3i R4i	3	e	98.8	3.23E-09	2.83E-05	7.08E-05	24293	≥90	3	3	1	80	20
R5i	3	e	96.7	3.36E-09	2.51E-05	6.27E-05	16946	≥90	3	3	1	80	20
R6i R7i	3	e	99.0	3.87E-09	3.39E-05	8.47E-05	6538	≥90	3	3	1	80	20
R8i	3	e	>99	5.0E-11	4.5E-07	1.1E-06	23970	≥90	3	3	1	80	20
2×R8i	3	e	>99	6.2E-11	5.5E-07	1.3E-06	16330	≥90	3	3	1	80	20
3×R8i	3	e	>99	7.3E-11	6.5E-07	1.6E-06	12390	≥90	3	3	1	80	20
4×R8i	3	e	>99	8.4E-11	7.6E-07	1.9E-06	9980	≥90	3	3	1	80	20
5×R8i	3	e	>99	9.5E-11	8.6E-07	2.1E-06	8360	≥90	3	3	1	80	20
6×R8i	3	e	>99	1.1E-10	9.6E-07	2.4E-06	7190	≥90	3	3	1	80	20
3AXD10000041323 F, 3AXD10000078136 G													

- The following temperature profile is used in safety value calculations:
  - 670 on/off cycles per year with ΔT = 71.66 °C
  - 1340 on/off cycles per year with ΔT = 61.66 °C
  - 30 on/off cycles per year with ΔT = 10.0 °C
  - 32 °C board temperature at 2.0% of time
  - 60 °C board temperature at 1.5% of time
  - 85 °C board temperature at 2.3% of time.
- The STO is a type A (frames R1i…R7i) or type B (frame R8i and multiples) 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:
    - Frames R1i…R7i: 2 ms (typical), 5 ms (maximum)
    - Frame R8i and multiples: 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
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
SFF	IEC 61508	Safe failure fraction (%)
SIL	IEC 61508	Safety integrity level (1…3)
STO	IEC/EN 61800-5-2	Safe torque off
T_1	IEC 61508-6	Proof test interval. T_1 is a parameter used to define the probabilistic failure rate (PFH or PFD) for the safety function or subsystem. Performing a proof test at a maximum interval of T_1 is required to keep the SIL capability valid. The same interval must be followed to keep the PL capability (EN ISO 13849) valid. See also section Maintenance.
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.

TÜV certificate

The TÜV certificate is available on the Internet at www.abb.com/drives/documents.

13

Resistor braking using frames R1i…R4i inverter modules

Contents of this chapter

This chapter deals with using the internal brake choppers of frame R1i…R4i inverter modules.

Using R1i…R4i modules for resistor braking

The internal brake choppers of frame R1i…R4i inverter modules can be used for resistor braking of other modules. Brake resistors are available from ABB as add-on kits and must be installed in separate cubicles; contact your local ABB representative for details.

Planning the braking system

- The continuous and maximum braking power ratings of individual inverter modules are listed on *Ratings (page 377)* .
  The total continuous braking power of parallel-connected modules is calculated with the formula
  $P_{brcont} = P_{brcont1} + 0.8 \times (P_{brcont2} + P_{brcont3} + \ldots)$
  where $P_{brcont1}$, $P_{brcont2}$, etc. are the P_{brcont} values of the connected modules from largest to smallest.
  The total maximum braking power of parallel-connected modules is calculated with the formula
  $P_{brmax} = P_{brmax1} + 0.7 \times (P_{brmax2} + P_{brmax3} + \ldots)$
  where P_{brmax1}, P_{brmax2}, etc. are the P_{brmax} values of the connected modules from largest to smallest.
- The resistance of the resistor must not be lower than R_{min}. The energy transferred by any inverter module to its resistor must not exceed the heat dissipation capacity (E_R) of the resistor.

Restrictions

- Internal brake choppers are only available for frame R1i…R4i, ACS880-104-xxxxx-3 and ACS880-104-xxxxx-5 inverter module types.
- The maximum number of modules doing the braking is 12 frame R1i…R2i modules or 6 frame R3i…R4i modules, ie. the number of modules that can be mounted into a 800 mm wide Rittal TS 8 cubicle.
- Each inverter module must have its own resistor(s).
- In case the braking power of the modules is not sufficient, a separate brake chopper must be used. It is not allowed to use the internal brake choppers simultaneously with a separate brake chopper.
- The cubicle with the braking modules must be next in the line-up to the inverter that needs to be braked.
- The internal brake choppers cannot be used if the system has an IGBT (regenerative) supply unit.

Selecting the brake resistor

Ratings (page 377) lists an example brake resistor for each inverter type. These resistors are available from ABB.

When sourcing a resistor from a third party, make sure that:

1. The resistance of the custom resistor is greater or equal than the minimum allowed resistance:
   $R \geq R_{min}$
   where

R	Resistance of the custom resistor. **WARNING!** Never use a brake resistor with a resistance smaller than *R*min. The inverter module and the chopper are not able to handle the overcurrent caused by the low resistance.
R_{min}	Minimum allowed resistance of the brake resistor. See section Ratings.

2. The load capacity of the custom resistor is higher than the instantaneous maximum power consumption of the resistor when it is connected to the DC link voltage by the chopper:
   $$P_r > \frac{{U_{DC}}^2}{R}$$
   where

P_r	Load capacity of the custom resistor
U_{DC}	Drive DC link voltage. 1.35 · 1.25 · 415 V DC (when supply voltage is 380 to 415 V AC) or 1.35 · 1.25 · 500 V DC (when supply voltage is 440 to 500 V AC)
R	Resistance of the custom resistor

Selecting and routing the brake resistor cables

Use the same cable type for resistor as for inverter input cabling to ensure that the inverter DC fuses also protect the resistor cable.

Minimizing electromagnetic interference

Obey these rules in order to minimize electromagnetic interference caused by the rapid current changes in the resistor cables:

- Shield the braking power line completely, either by using shielded cable or a metallic enclosure. Unshielded single-core cable can only be used if it is routed inside a cabinet that efficiently suppresses the radiated emissions.
- Install the cables away from other cable routes.
- Avoid long parallel runs with other cables. The minimum parallel cabling separation distance is 0.3 meters (1 ft).
- Cross the other cables at 90 degree angles.
- Keep the cable as short as possible in order to minimize the radiated emissions and stress on chopper IGBTs. The longer the cable the greater the radiated emissions, inductive load and voltage peaks over the IGBT semiconductors of the brake chopper.

Note: ABB has not verified that the EMC requirements are fulfilled with custom brake resistors and cabling. The customer must consider the EMC compliance of the complete installation.

Maximum cable length

The maximum cable length of the resistor cable is 10 m (33 ft).

Placing the brake resistors

Install the resistor assembly outside the drive in a place where it is able to cool effectively.

Arrange the cooling of the resistor so that:

- no danger of overheating is caused to the resistor or nearby materials, and
- the temperature of the room the resistor is located in does not exceed the allowed maximum.

Supply the resistor with cooling air or coolant according to the resistor manufacturer's instructions.



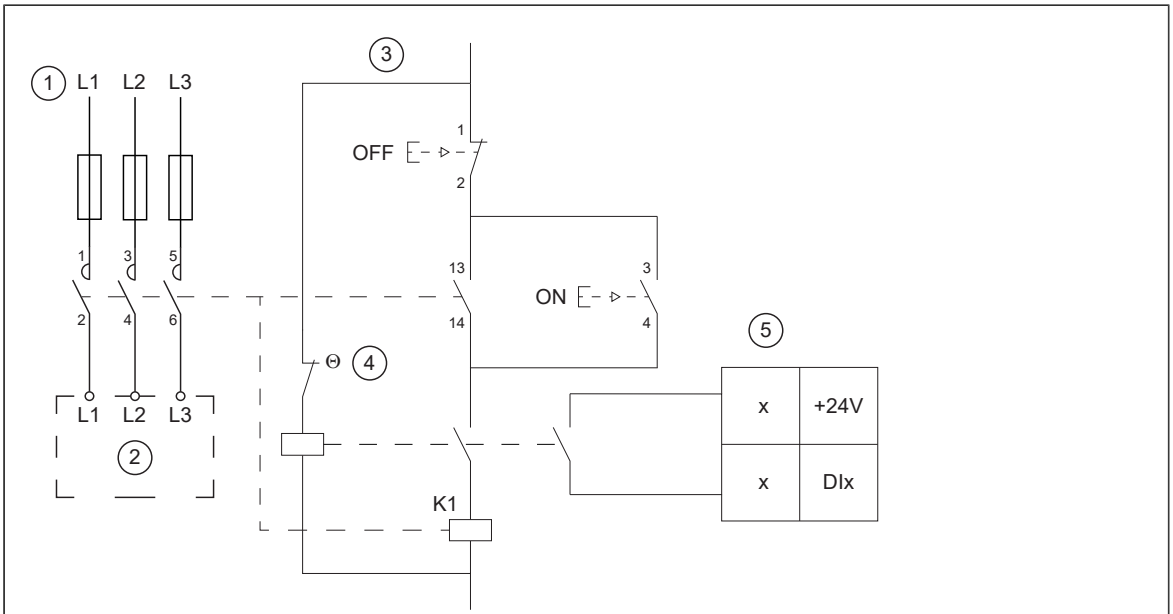
WARNING!
The materials near the brake resistor must be non-flammable. The surface temperature of the resistor is high. Air flowing from the resistor is of hundreds of degrees Celsius. If the exhaust vents are connected to a ventilation system, make sure that the material withstands high temperatures. Protect the resistor against contact.

Protecting the system against thermal overload

The inverter module protects itself and the resistor cable against thermal overload when the cable is correctly dimensioned. The inverter control program includes a resistor and resistor cable thermal protection function which can be tuned by the user. See the firmware manual.

Equipping the drive system with a main contactor or breaker is highly recommended for safety reasons. Wire the contactor or breaker so that it opens in case the resistor overheats. This is essential for safety since the inverter module may not be able to break the current if the chopper remains conductive in a fault situation. An example wiring diagram is shown below. ABB resistors are equipped with a thermal switch (1) inside the resistor assembly as standard. The switch indicates overtemperature and overload.

We recommend that you also wire the thermal switch to a digital input of the inverter module.



1.	Thermal switch
2.	Drive system
3.	ACS880-104

Protecting the resistor cable against short circuit

The DC fuses of the inverter module will also protect the resistor cable if the cable is identical with the inverter input cable.

Mechanical installation

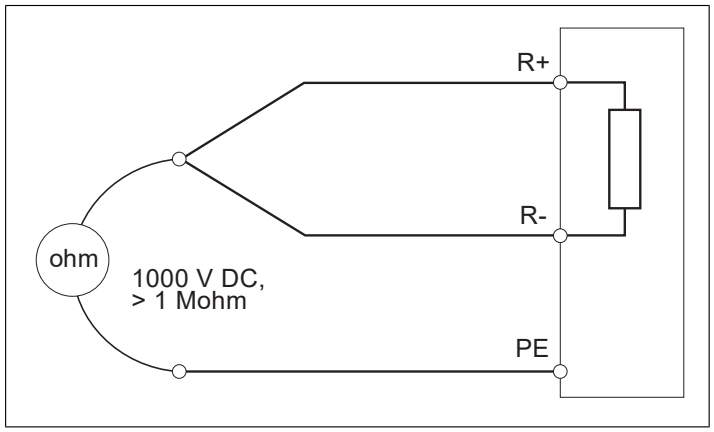
All brake resistors must be installed outside the drive. Follow the resistor manufacturer’s instructions.

Electrical installation

Checking the insulation of the brake resistor assembly

Check the insulation of each brake resistor assembly as follows:

1. Check that the resistor cable is connected to the resistor, and disconnected from the inverter module terminals R+ and R-.
2. At the inverter end, connect the R+ and R- conductors of the resistor cable together. Measure the insulation resistance between the combined conductors and the Protective Earth (PE) conductor by using a measuring voltage of 1000 V DC. The insulation resistance must be higher than 1 Mohm.



Connection procedure

1. Connect the resistor cable to the R+ and R- terminals in the same way as the other power cables. Use the same cable type as with the DC input cable. If a shielded threeconductor cable is used, cut the third conductor, insulate it, and ground the twisted shield of the cable (protective earth conductor of the resistor assembly) at both ends.
2. Connect the thermal switch of the brake resistor as described above under *Protecting the system against thermal overload*.

Start-up

Note: New brake resistors may be coated with storage grease. As the brake chopper operates for the first time, the grease burns off and may produce some smoke. Make sure there is proper ventilation.

Set the following inverter control program parameters (ACS880 primary control program) in each braking inverter:

- Disable the overvoltage control (parameter *30.30*).
- Set parameter *31.01* to point to the digital input to which the thermal switch of the brake resistor is wired.
- Set parameter *31.02* so that the event generates a fault.
- Enable the brake chopper by parameter *43.06 Brake chopper enable*. If you select *Enabled with thermal model*, also set the brake resistor overload protection parameters *43.08* and *43.09* according to the application.
- Check the value of parameter *43.10 Brake resistance*.
- Adjust other brake-related settings as necessary in parameter group 43.
  Match the brake chopper operating limits of all braking inverters. You will need to enter a service-level pass code into parameter *96.02* to access the limit parameters. To obtain the pass code, contact your local ABB representative.
  - Stop all inverters of the drive system (even those not used for braking) if any are running.
  - Monitor the DC voltage (parameter *01.11*) on each braking inverter for a period of time. Calculate the average of the readings separately for each inverter.
  - Select one braking inverter as reference. On this inverter, enter the nominal AC supply voltage into parameter *95.37*. Multiply this value by the number shown in the table below to get the value of *95.36*.

Supply voltage range [V AC] (see parameter *95.01*)				
	208…240	**380…415**	**440…480**	**500**
[95.36] = [95.37] ×	0.867	0.916	0.917	1.000

  For example, with a 380…415 V inverter, the value of *95.36* should be 0.916 times the value of *95.37*.
  - For each of the remaining braking inverters, divide the average DC voltage value of the inverter by that of the reference inverter. Multiply the result with the nominal supply voltage, and enter the result into parameter *95.37*. Further multiply the value of *95.37* by the factor shown in the above table to get the value of *95.36*.
  - On all braking inverters, enable custom supply voltage limits using parameter *95.35*.

With these parameter settings, a resistor overtemperature situation will trip the inverter which will then coast to a stop.



WARNING!
Connect the brake resistor to the inverter module before enabling the brake chopper. On the other hand, if the chopper is disabled, the resistor must be disconnected.

For settings with other control programs, see the appropriate firmware manual.

Technical data

Ratings

Inverter unit type ACS880-104-…	Output ratings			Brake resistor example			
	P_{brcont}	P_{brmax}	R_{min}	Type	R	P_n	E_R
	kW	kW	ohm		ohm	W	kJ
U_N = 400 V							
004A8-3	1.8	3.3	120	JBR-01 (Danotherm CAR 155 D T 414 120R)	120	105	22
006A0-3	1.9	3.3	120				
008A0-3	1.9	3.3	120				
0011A-3	2.8	50	80	JBR-03 (Danotherm CAR 200 D T 415 80R)	80	135	40
0014A-3	5.7	10.0	40	JBR-04 (Danotherm CBR-V 210 D T 415 40R)	40	360	73
0018A-3	5.7	10.00	40				
0025A-3	11.4	20.0	20	JBR-05 (Danotherm CBR-V 330 D T 415 20R)	20	570	77
0035A-3	11.4	20.0	20				
0044A-3	17.5	30.8	13	JBR-06 (Danotherm CBR-V 460 D HT 415 13R)	13	790	132
0050A-3	17.5	30.8	13				
0061A-3	17.5	30.8	13				
0078A-3	17.5	30.8	13				
0094A-3	17.5	30.8	13				
0100A-3	17.5	30.8	13				
U_N = 500 V							
003A6-5	1.3	5.5	120	JBR-01 (Danotherm CAR 155 D T 414 120R)	120	105	22
004A8-5	1.8	5.5	120				
006A0-5	1.9	5.5	120				
008A0-5	1.9	5.5	120				
0011A-5	2.8	7.9	80	JBR-03 (Danotherm CAR 200 D T 415 80R)	80	135	40
0014A-5	5.7	14.6	40	JBR-04 (Danotherm CBR-V 210 D T 415 40R)	40	360	73
0018A-5	5.7	14.6	40				
0025A-5	11.4	30.7	20	JBR-05 (Danotherm CBR-V 330 D T 415 20R)	20	570	77
0030A-5	11.4	30.7	20				
0035A-5	11.4	30.7	20				
0050A-5	17.5	43.9	13	JBR-06 (Danotherm CBR-V 460 D HT 415 13R)	13	790	132
0061A-5	17.5	43.9	13				
0078A-5	17.5	43.9	13				
0094A-5	17.5	43.9	13				

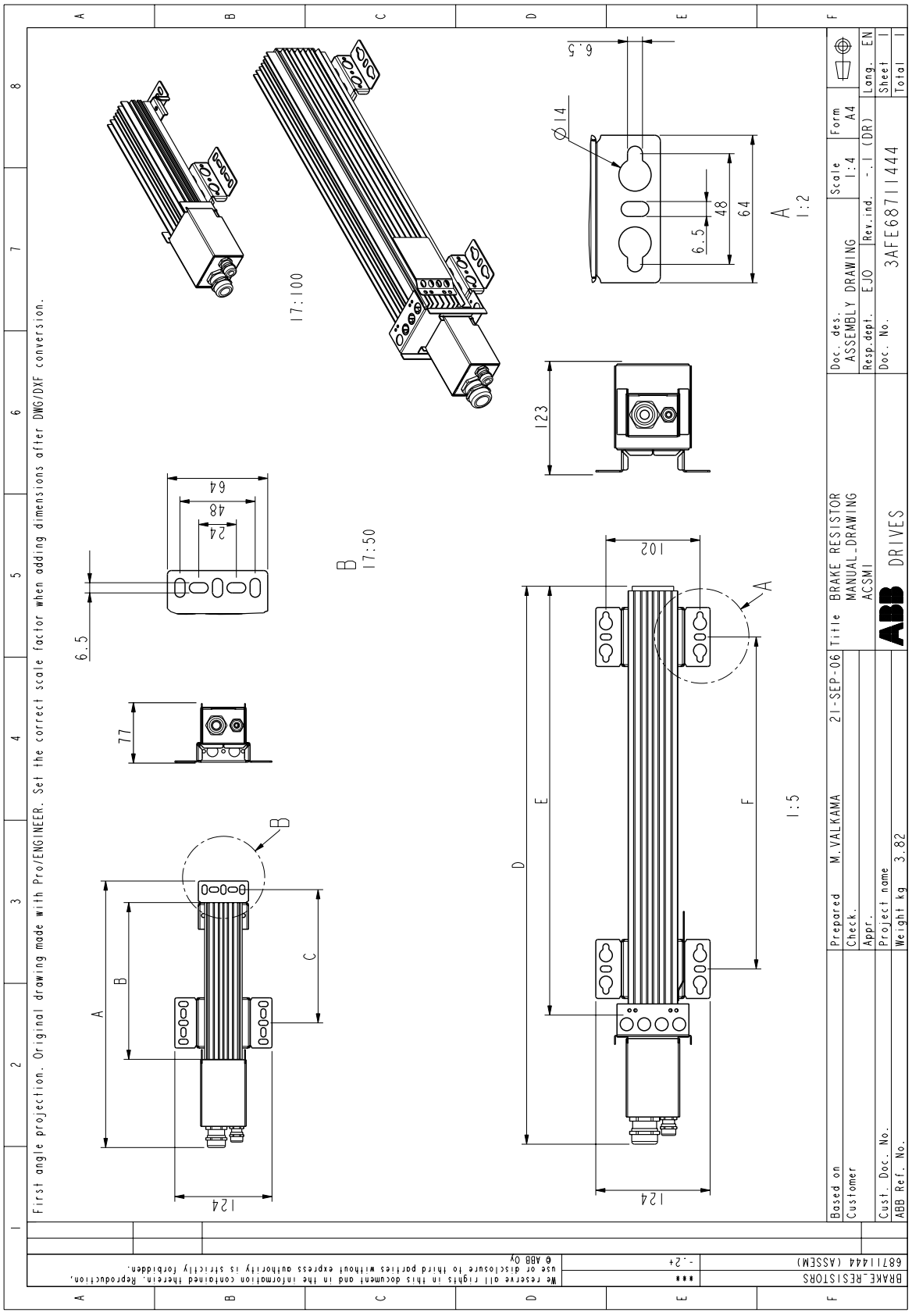
Definitions

P_{brcont}	Maximum continuous braking power. The braking is considered continuous if the braking time exceeds 30 seconds.
P_{brmax}	Maximum braking power of the inverter module and its internal brake chopper. The inverter and chopper will withstand this braking power for 1 second within every 10 seconds. **Note:** The listed resistors will withstand this braking power for 1 second within every 120 seconds.
R_{min}	Minimum allowed resistance of the brake resistor.
R	Resistance of the listed resistor.
P_n	Continuous power (heat) dissipation of the listed resistor when placed correctly.
E_R	Short energy pulse that the listed resistor will withstand every 400 seconds.

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

The listed brake resistors are protected to IP20. Refer to *Resistor dimensions (page 379)* for dimensions, wire sizes and tightening torques for the resistors.

Resistor dimensions



Parameter	Resistor type				
	JBR-01	**JBR-03**	**JBR-04**	**JBR-05**	**JBR-06**
Dim. **A** mm (in.)	295 (11.61)	340 (13.39)	–	–	–
Dim. **B** mm (in.)	155 (6.10)	200 (7.87)	–	–	–
Dim. **C** mm (in.)	125 (4.92)	170 (6.69)	–	–	–
Dim. **D** mm (in.)	–	–	345 (13.58)	465 (18.31)	595 (23.43)
Dim. **E** mm (in.)	–	–	210 (8.27)	330 (12.99)	460 (18.11)
Dim. **F** mm (in.)	–	–	110 (4.33)	230 (9.06)	360 (14.17)
Weight kg (lbs)	0.75 (1.7)	0.8 (1.8)	1.8 (4.0)	3.0 (6.6)	3.9 (8.6)
Max. wire size – Main terminals	10 mm^2 (AWG6)				
Tightening torque – Main terminals	1.5 … 1.8 N·m (13 … 16 lbf·in)				
Max. wire size – Thermal switch terminals	4 mm^2 (AWG12)				
Tightening torque – Thermal switch terminals	0.6 … 0.8 N·m (5.3 … 7.1 lbf·in)				

Resistor connectors on inverter modules

R+ and R- terminals

Frame R1i

U2, V2, W2: 0.25…4 mm^2, 0.5 … 0.6 N·m (4.4 …5.3 lbf·in)

Ground: 1.5 N·m (13 lbf·in)

Frame R2i

U2, V2, W2: 0.5 … 6 mm^2, 1.2 … 1.5 N·m (10.6 … 13.3 lbf·in)

Ground: 1.5 N·m (13 lbf·in)

Frames R3i and R4i

U2, V2, W2: 6…70 mm^2. Allen screw torque 15 N·m (11 lbf·ft), connection post torque 4 N·m (30 lbf·in). Other conductor sizes can be used by replacing the original lug with a suitable crimp ring terminal.

Ground: Screw size M5, torque 3 N·m (25 lbf·in)

Connector cover screws: Torque 3 N·m (25 lbf·in)

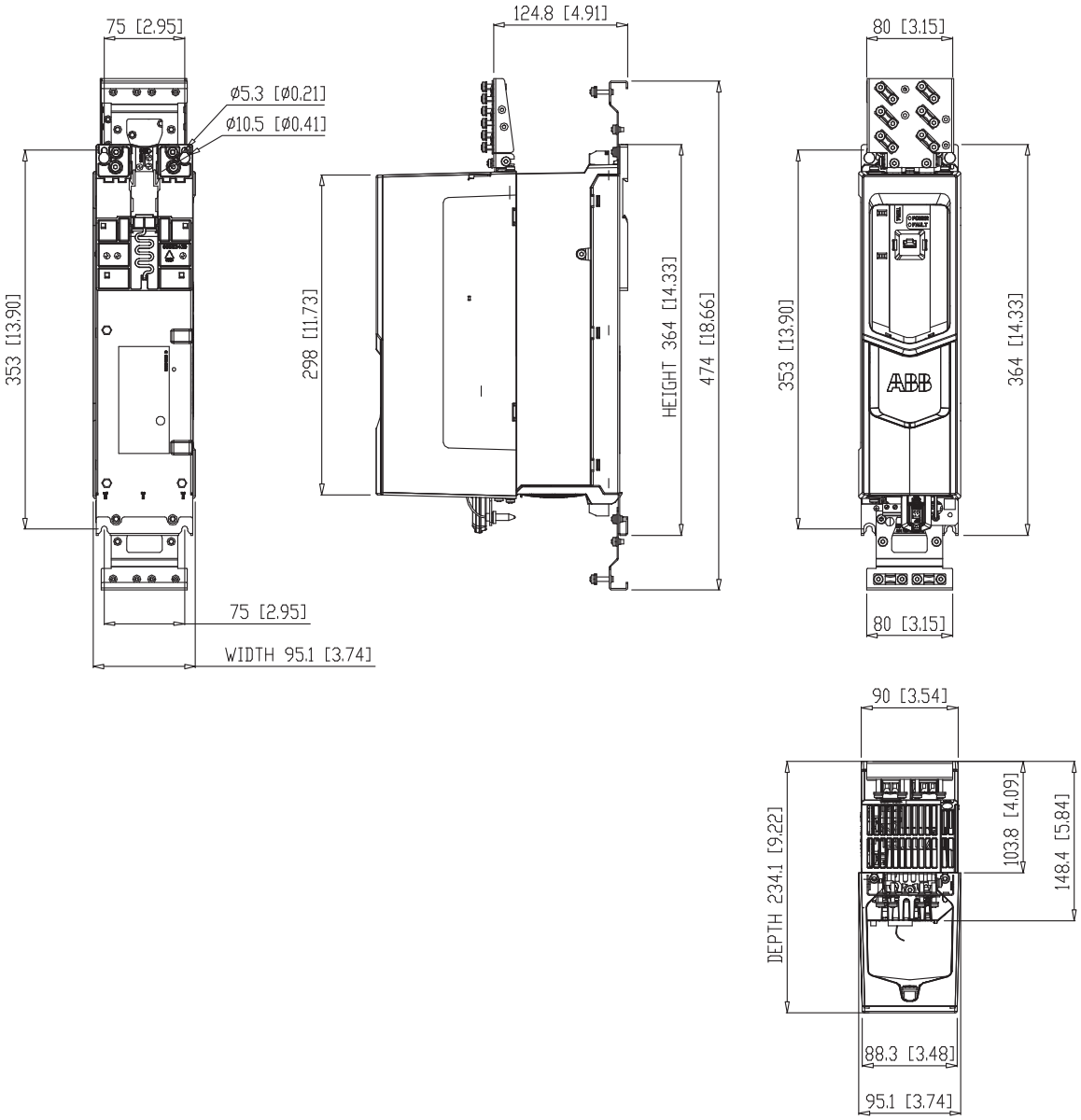
14

Dimension drawings

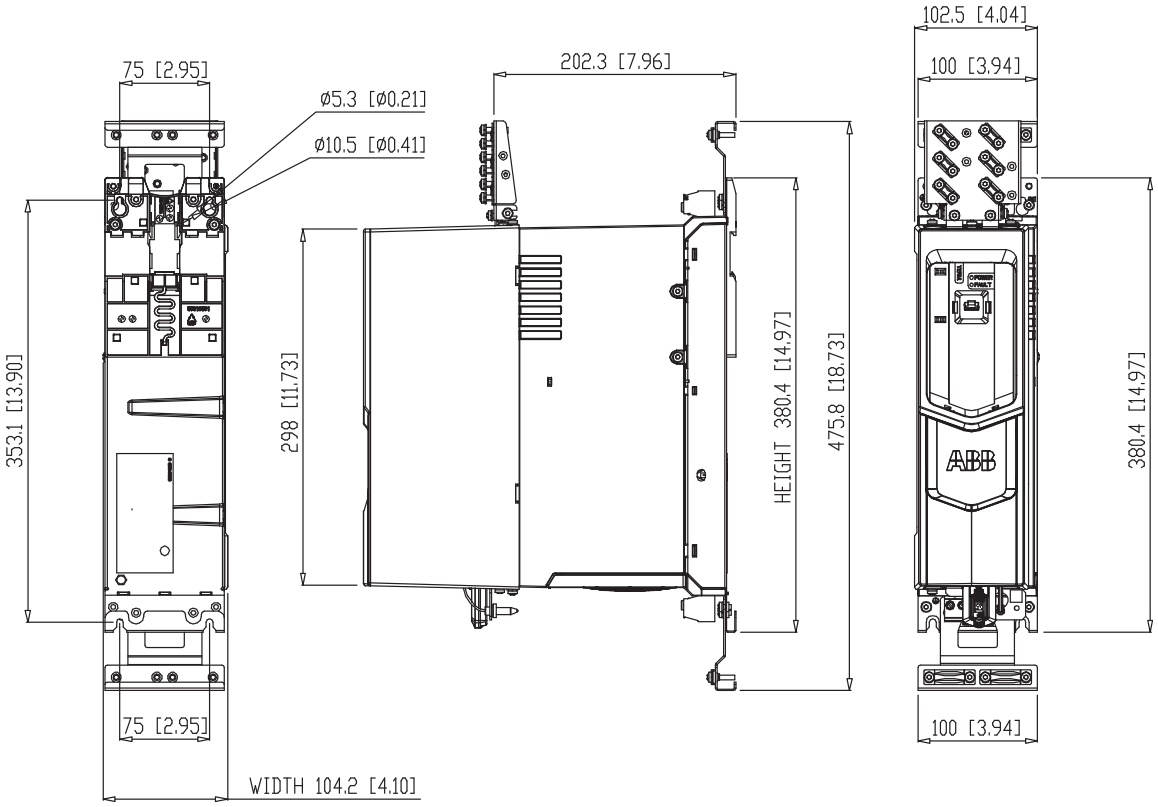
Contents of this chapter

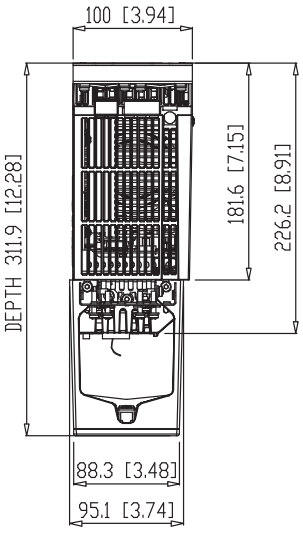
This chapter contains dimension drawings of the ACS880-104 inverter modules as well as auxiliary components. Dimensional drawings of most installation accessories are available from ABB on request.

Frame R1i

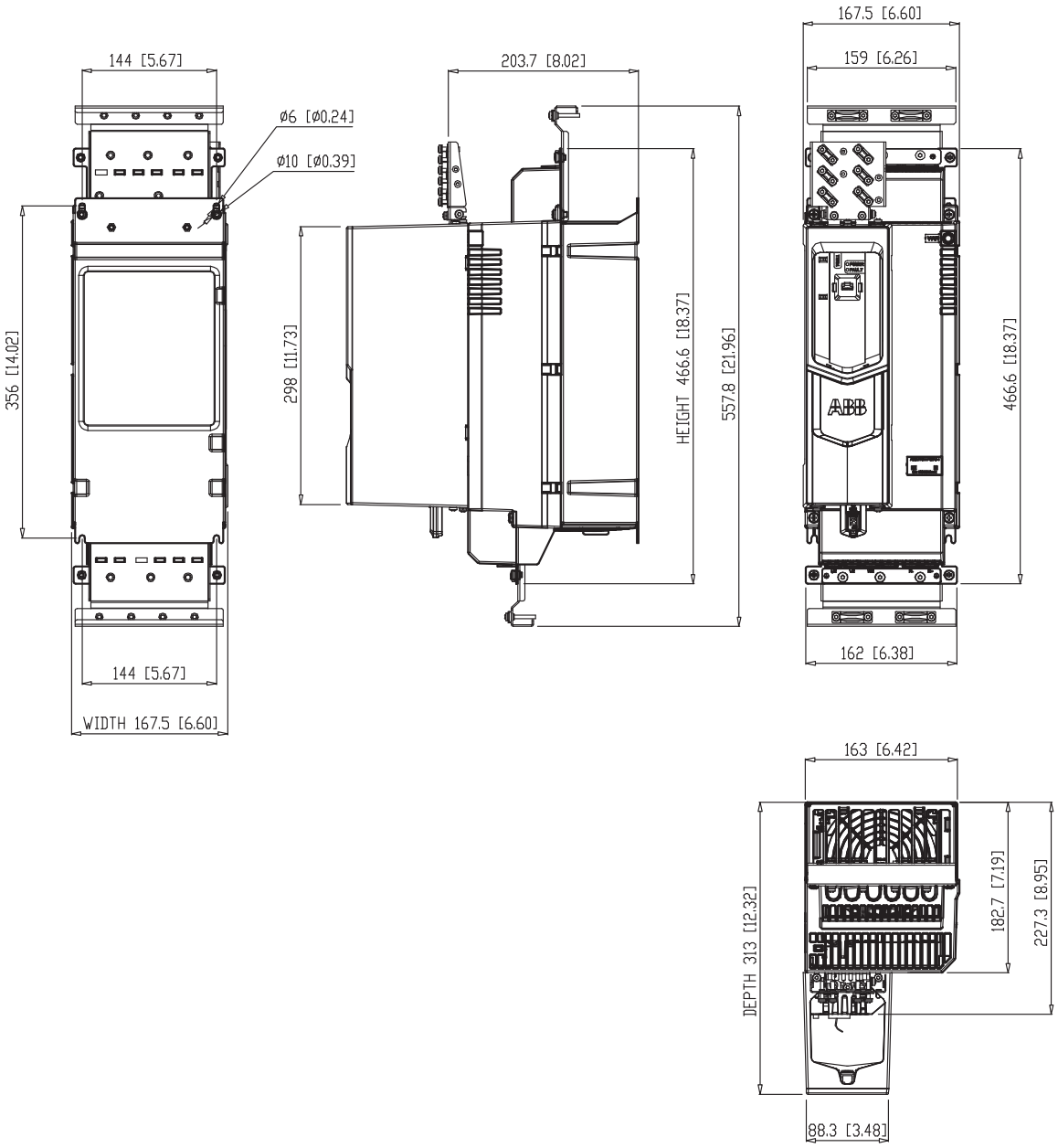

75 [2.95]
Ø5.3 [Ø0.21]
Ø10.5 [Ø0.41]
353 [13.90]
75 [2.95]
WIDTH 95.1 [3.74]
124.8 [4.91]
298 [11.73]
HEIGHT 364 [14.33]
474 [18.66]
80 [3.15]
353 [13.90]
364 [14.33]
ABB
80 [3.15]
90 [3.54]
DEPTH 234.1 [9.22]
103.8 [4.09]
148.4 [5.84]
88.3 [3.48]
95.1 [3.74]

Frame R2i

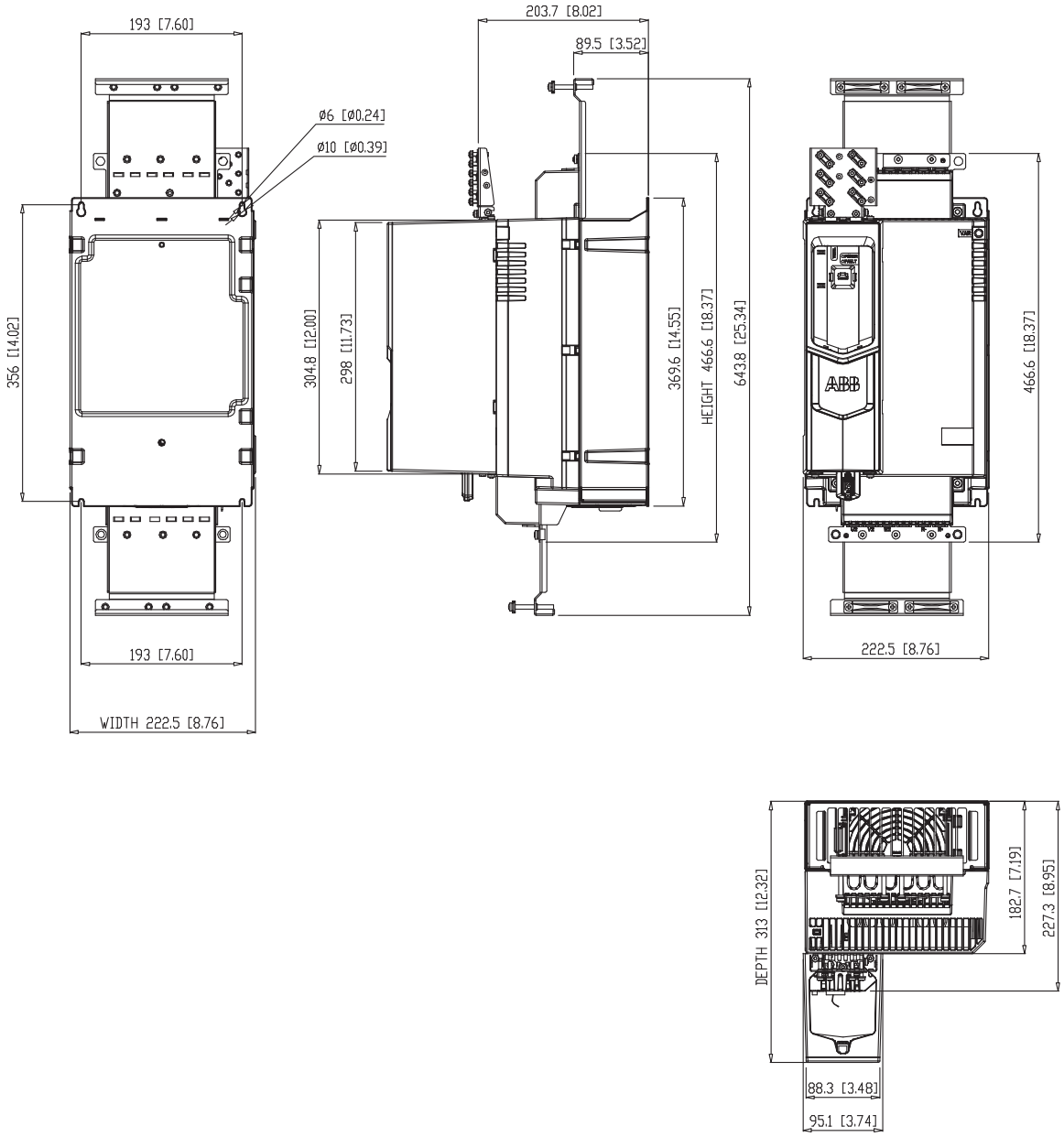

75 [2.95]
Ø5.3 [Ø0.21]
Ø10.5 [Ø0.41]
202.3 [7.96]
102.5 [4.04]
100 [3.94]
353.1 [13.90]
298 [11.73]
HEIGHT 380.4 [14.97]
475.8 [18.73]
380.4 [14.97]
ABB
75 [2.95]
100 [3.94]
WIDTH 104.2 [4.10]


100 [3.94]
DEPTH 311.9 [12.28]
181.6 [7.15]
226.2 [8.91]
88.3 [3.48]
95.1 [3.74]

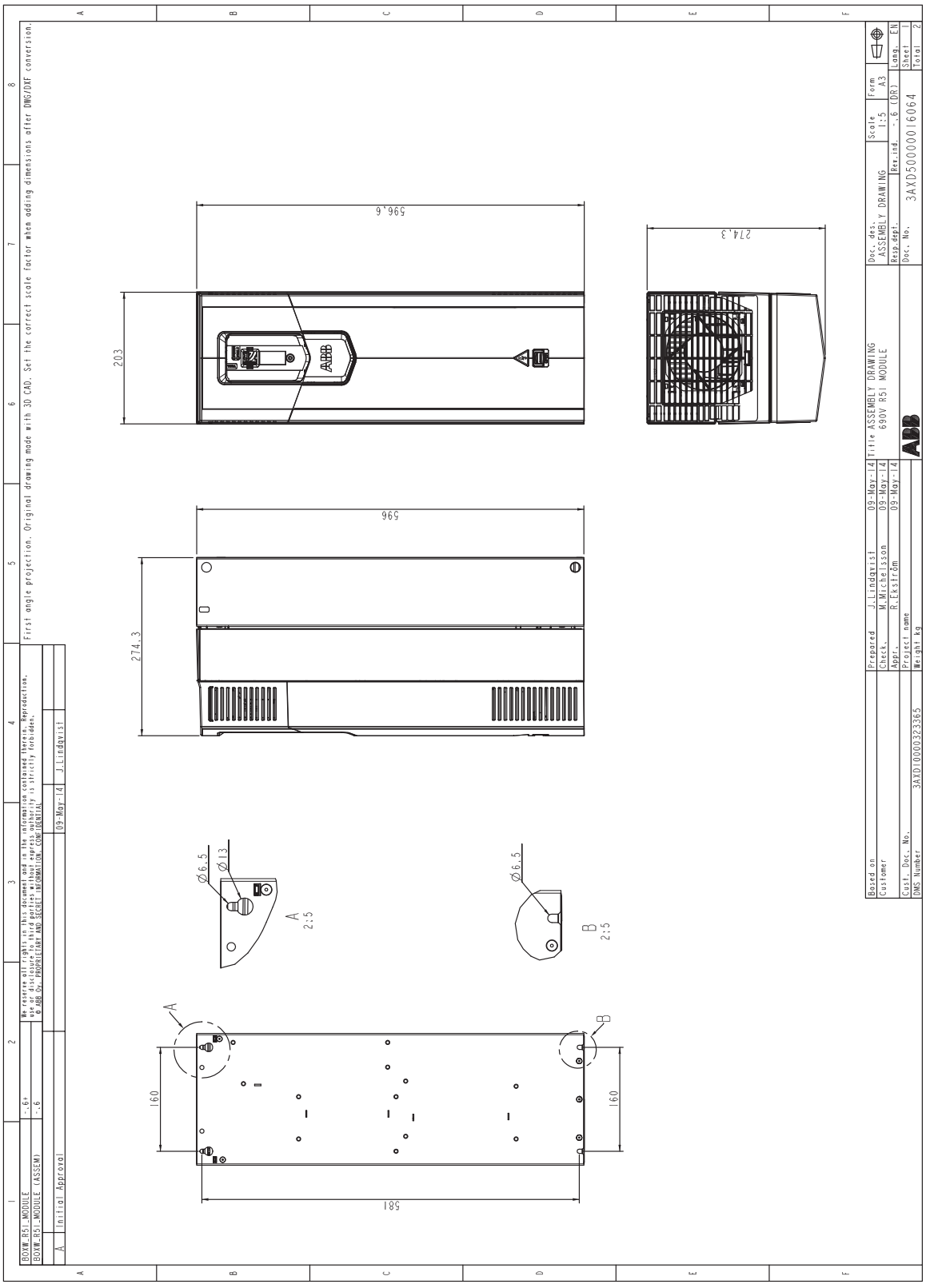
Frame R3i


144 [5.67]
Ø6 [Ø0.24]
Ø10 [Ø0.39]
356 [14.02]
144 [5.67]
WIDTH 167.5 [6.60]
203.7 [8.02]
298 [11.73]
HEIGHT 466.6 [18.37]
557.8 [21.96]
167.5 [6.60]
159 [6.26]
466.6 [18.37]
162 [6.38]
163 [6.42]
DEPTH 313 [12.32]
182.7 [7.19]
227.3 [8.95]
88.3 [3.48]

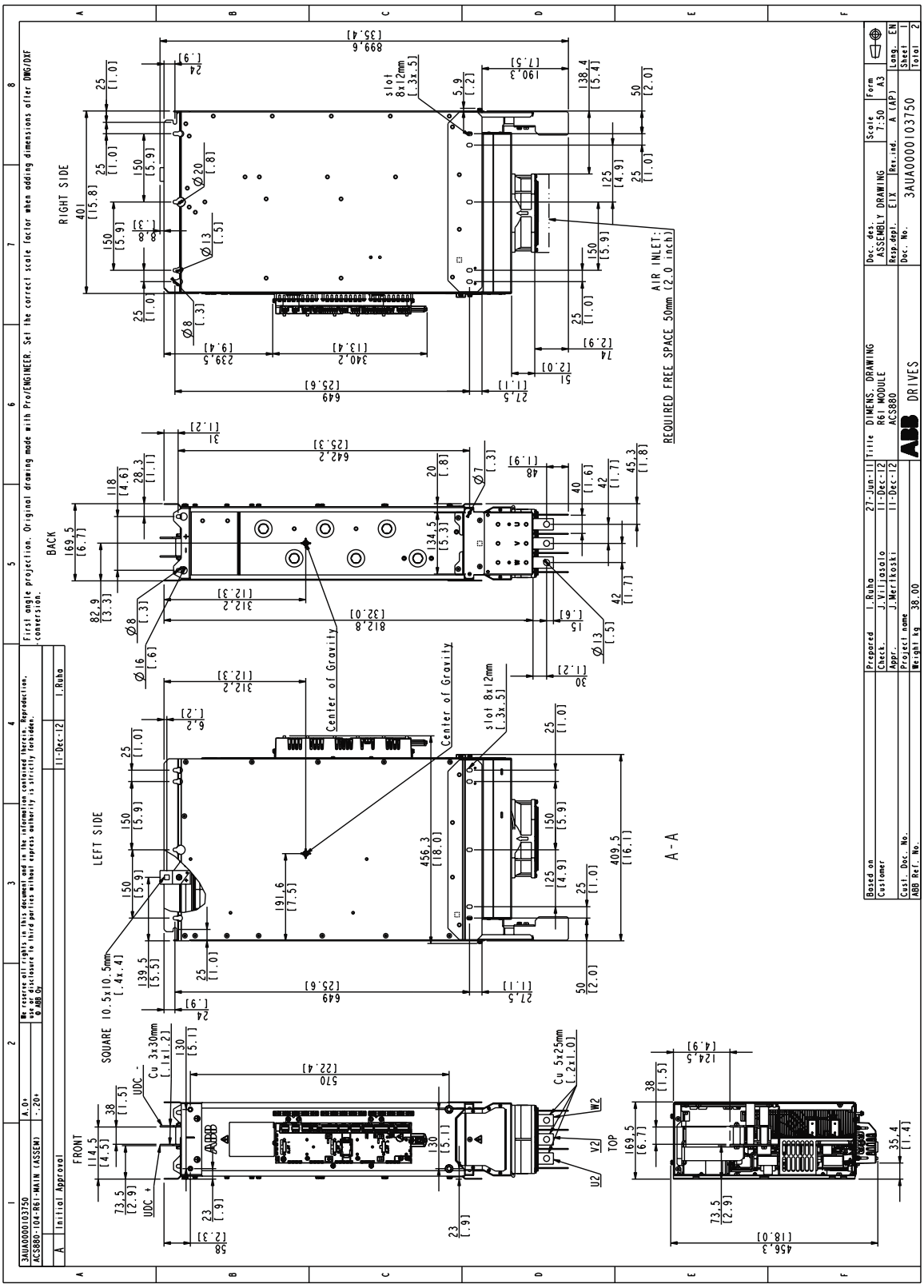
Frame R4i


193 [7.60]
Ø6 [Ø0.24]
Ø10 [Ø0.39]
356 [14.02]
193 [7.60]
WIDTH 222.5 [8.76]
203.7 [8.02]
89.5 [3.52]
304.8 [12.00]
298 [11.73]
369.6 [14.55]
HEIGHT 466.6 [18.37]
643.8 [25.34]
ABB
466.6 [18.37]
222.5 [8.76]
DEPTH 313 [12.32]
182.7 [7.19]
227.3 [8.95]
88.3 [3.48]
95.1 [3.74]

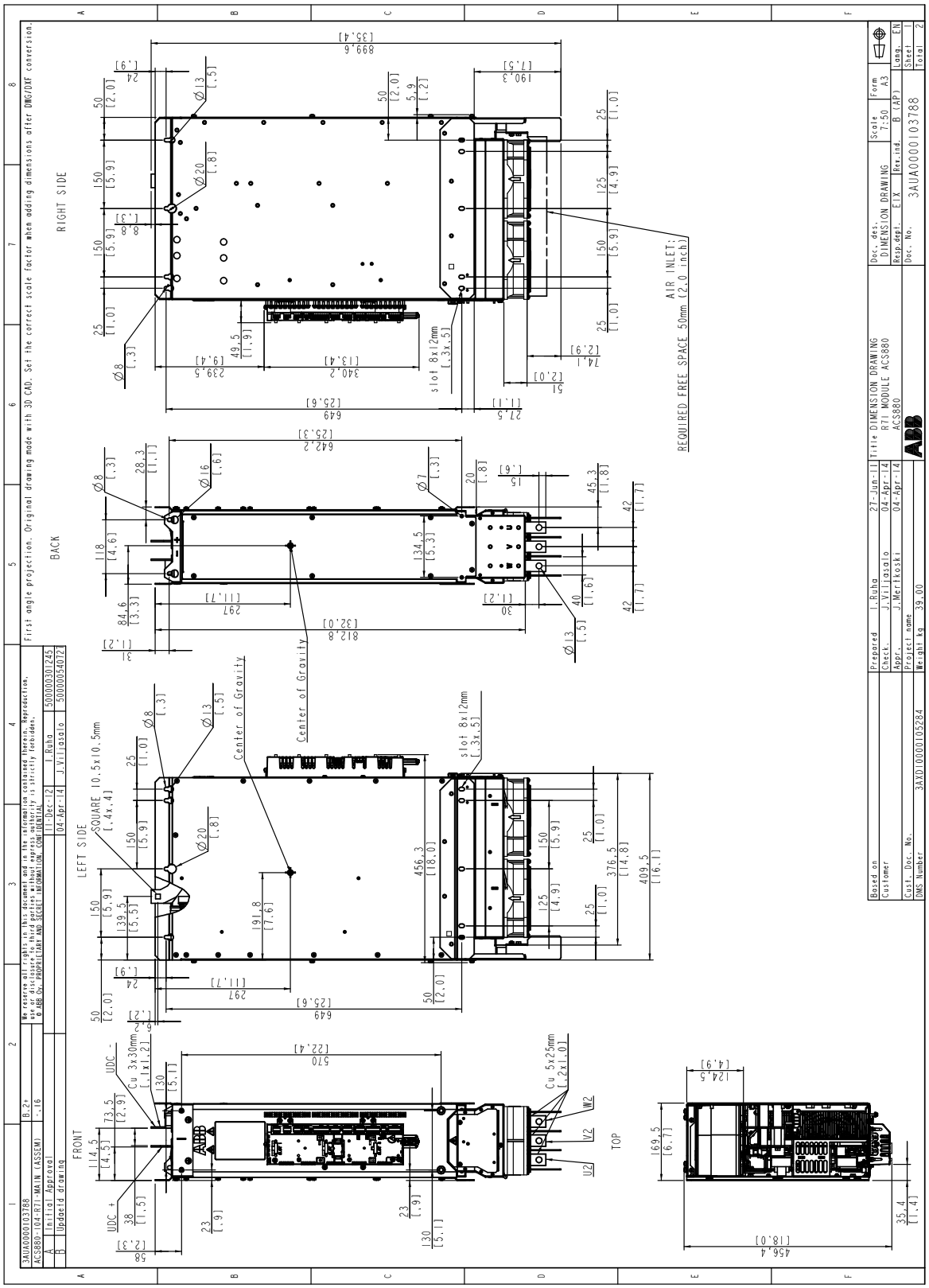
Frame R5i


596.6
274.3
203
596
274.3
Ø6.5
Ø13
A
2:5
Ø6.5
B
2:5
A
B
160
160
581
ABB
Title ASSEMBLY DRAWING
690V R5i MODULE
ASSEMBLY DRAWING
3AXD50000016064
Scale 1:5
Form A3
Lang. EN
Sheet 1
Total 2
Prepared J.Lindqvist 09-May-14
Check. M.Michelsson 09-May-14
Appr. R.Ekström 09-May-14
Project name
Weight kg
3AXD10000323365
BOOM-R5I MODULE
BOOM-R5I_MODULE (ASSEMB)
Initial Approval
09-May-14 J.Lindqvist
First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.

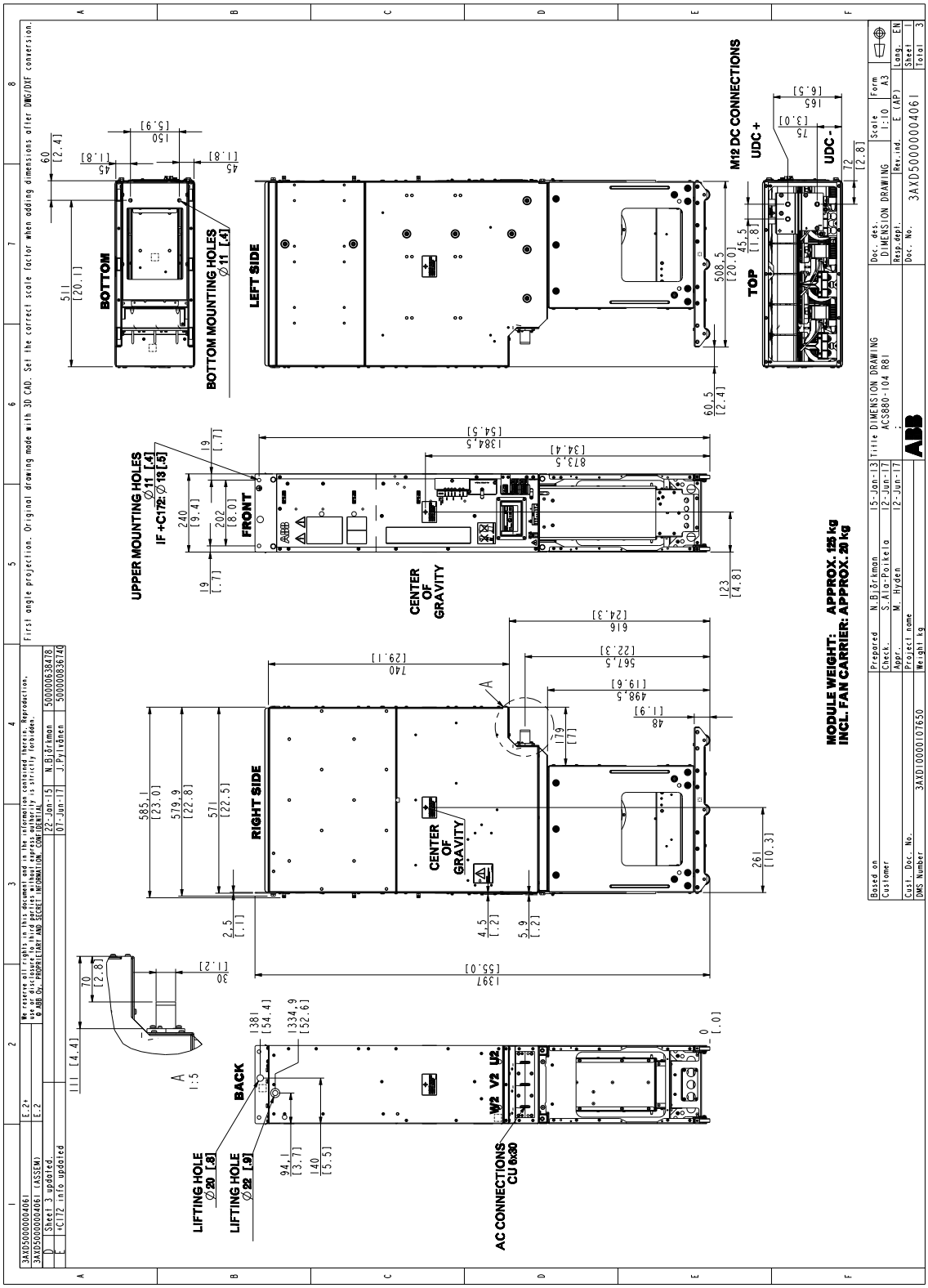
Frame R6i

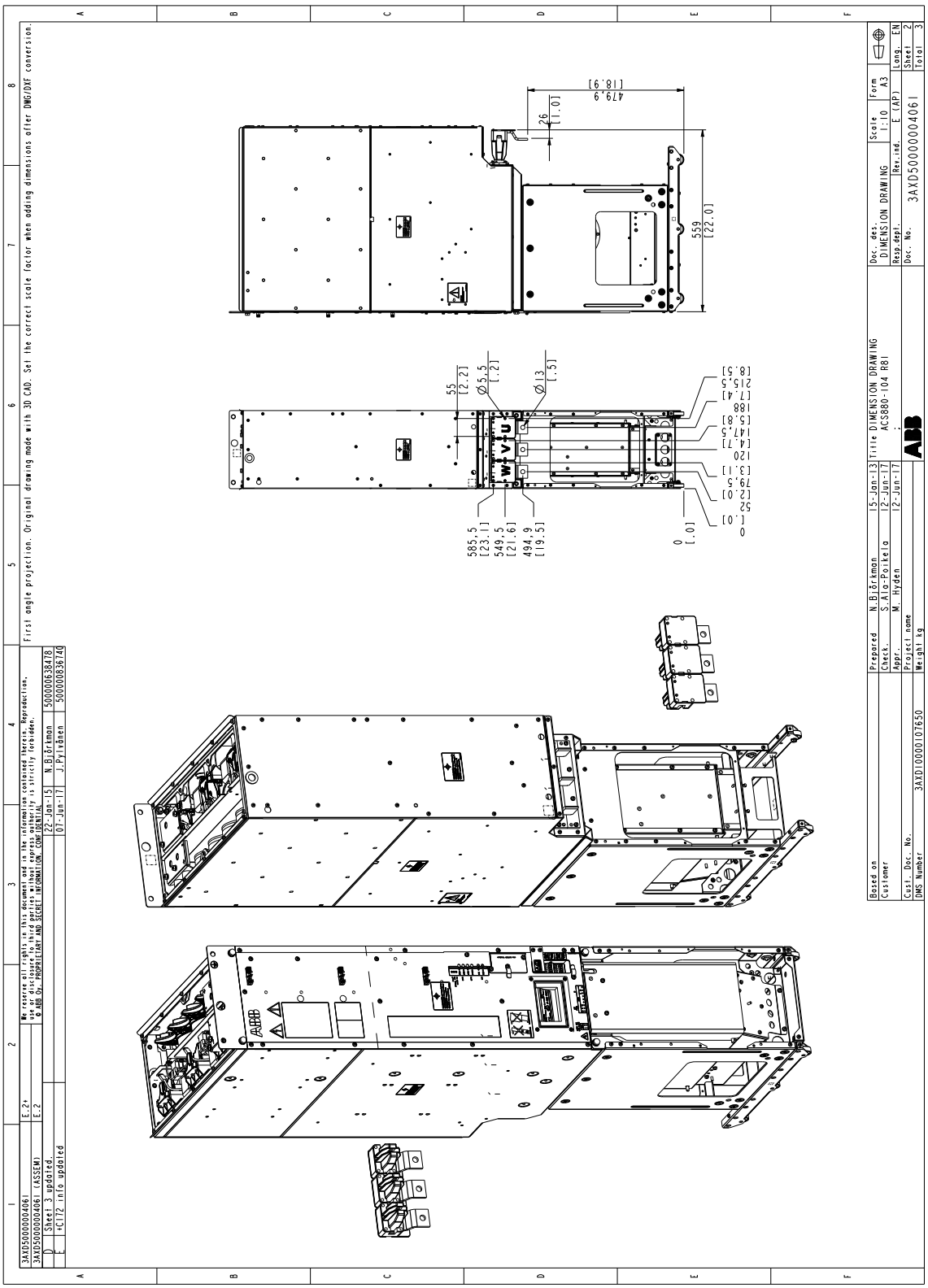

RIGHT SIDE
BACK
LEFT SIDE
FRONT
TOP
A - A
AIR INLET:
REQUIRED FREE SPACE 50mm (2.0 inch)
Center of Gravity
Center of Gravity
SQUARE 10.5x10.5mm
Cu 3x30mm
Cu 5x25mm
UDC -
UDC +
U2
V2
W2
ABB DRIVES
3AUA0000103750
ACS880-104-R6i-MAIN (ASSEM)
Initial Approval
I.Ruha
11-Dec-12
Prepared I.Ruha 27-Jun-11
Check. J.Viljasalo 11-Dec-12
Appr. J.Merikoski 11-Dec-12
Based on
Customer
Title DIMENS. DRAWING
R6i MODULE
ACS880
Doc. des. ASSEMBLY DRAWING
Resp.dept. E1X
Doc. No. 3AUA0000103750
Scale 7:50
Form A3
Rev.ind. A (AP)
Lang. EN
Sheet 1
Total 2
Project name
Weight kg 38.00
ABB Ref. No.

Frame R7i

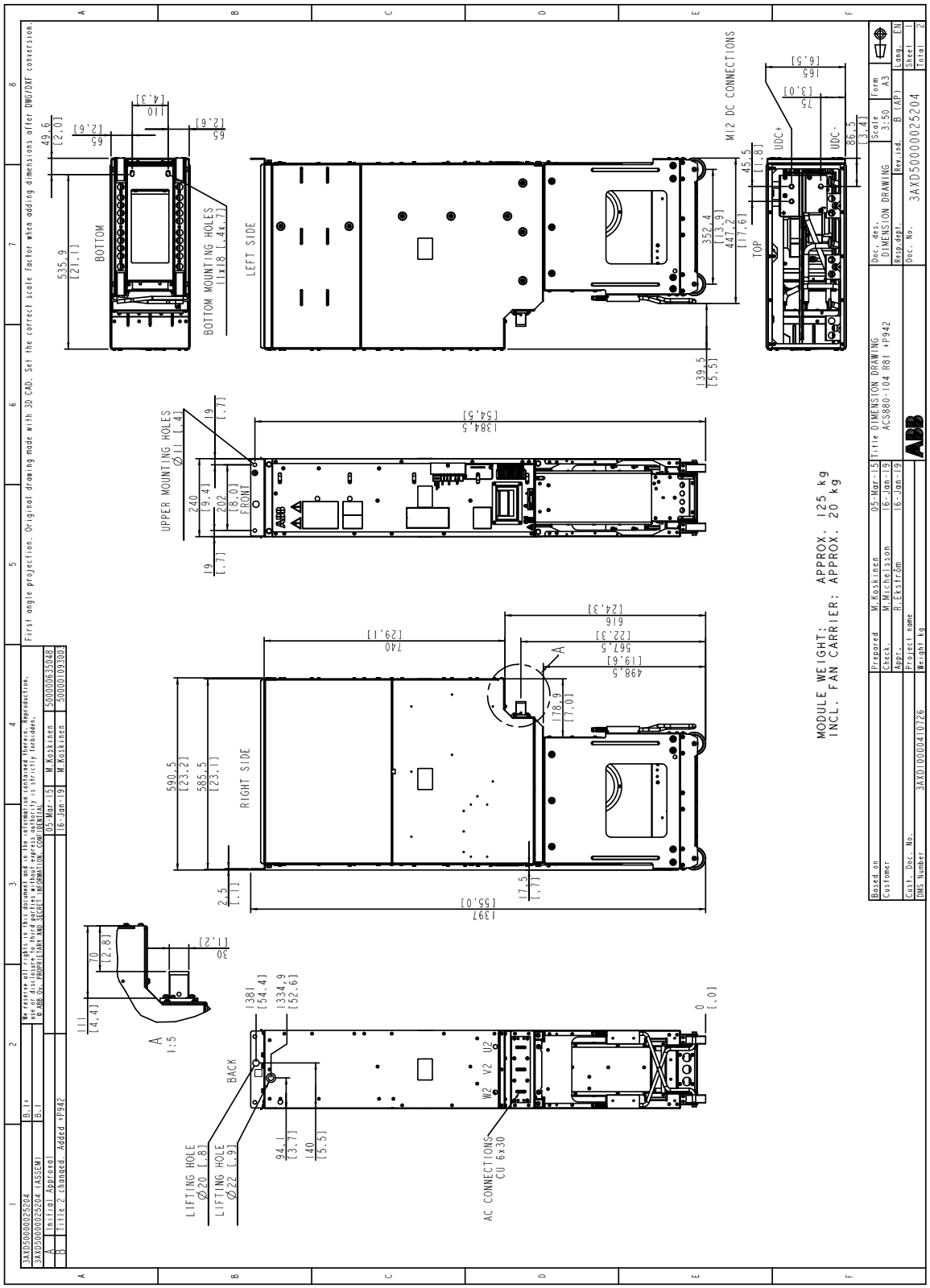

RIGHT SIDE
BACK
LEFT SIDE
FRONT
TOP
AIR INLET:
REQUIRED FREE SPACE 50mm (2.0 inch)
Center of Gravity
slot 8x12mm
SQUARE 10.5x10.5mm
UDC +
UDC -
Cu 3x30mm
Cu 5x25mm
W2
U2
3AUA0000103788
ACS880-104-R7I-MAIN (ASSEM)
Initial Approval
Updated drawing
First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
Prepared I.Ruha 27-Jun-11
Checkd. J.Viljasalo 04-Apr-14
Appr. J.Merikoski 04-Apr-14
Project name
Weight kg 39.00
Title DIMENSION DRAWING
R7i MODULE ACS880
Doc. No. 3AUA0000103788
Scale 1:50
Form A3
Lang. EN
Sheet 1
Total 2

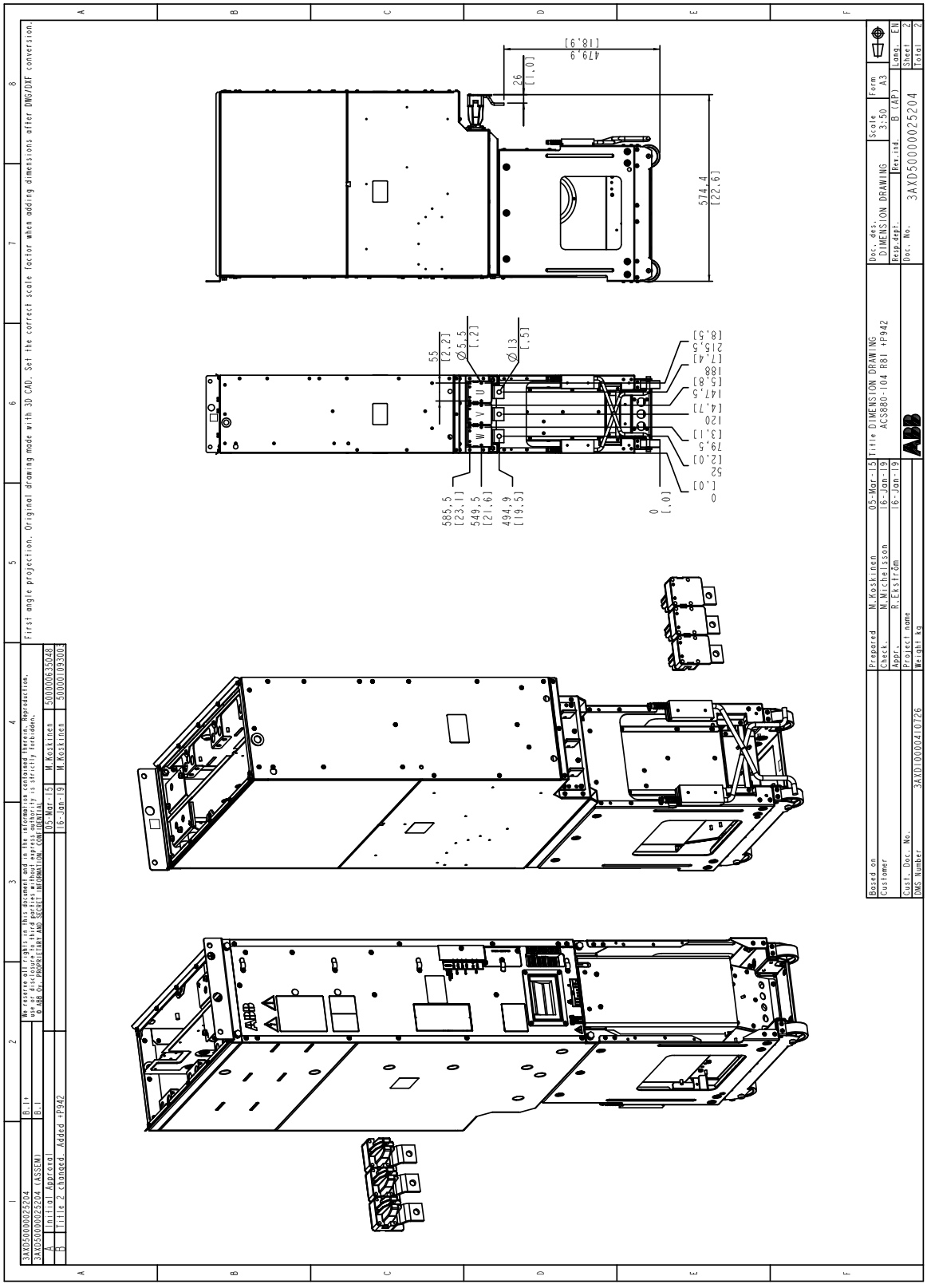
Frame R8i

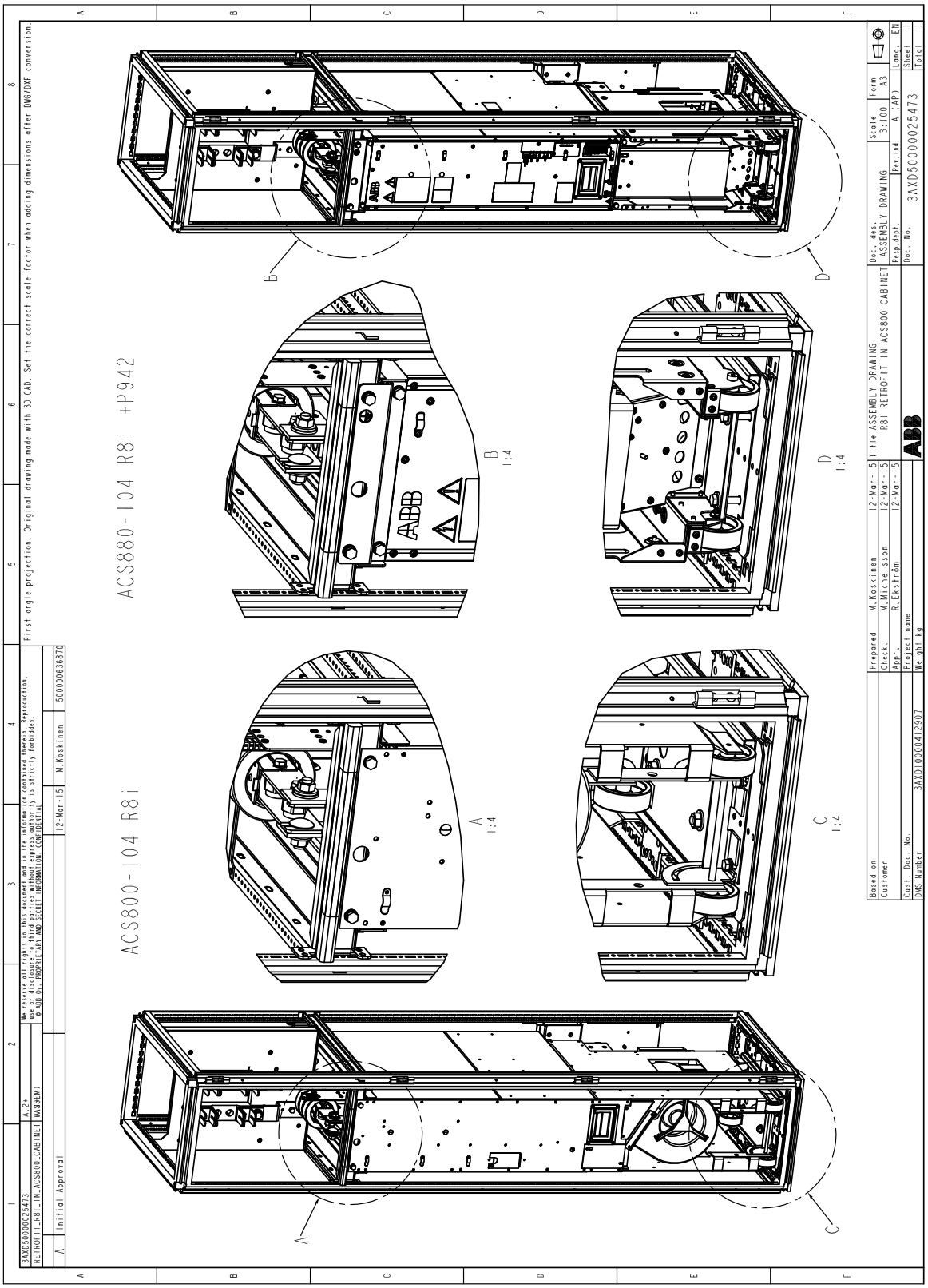

BOTTOM
BOTTOM MOUNTING HOLES Ø11 [.4]
LEFT SIDE
M12 DC CONNECTIONS
UDC +
UDC -
TOP
UPPER MOUNTING HOLES Ø11 [.4] IF +C172: Ø13 [.5]
FRONT
CENTER OF GRAVITY
RIGHT SIDE
CENTER OF GRAVITY
MODULE WEIGHT: APPROX. 125 kg
INCL. FAN CARRIER: APPROX. 29 kg
BACK
W2 V2 U2
LIFTING HOLE Ø20 [.8]
LIFTING HOLE Ø22 [.9]
AC CONNECTIONS CU 6x30
3AXD50000004061
ACS880-104 R8I
DIMENSION DRAWING
3AXD50000004061
3AXD10000107650


479,9 [18.9]
26 [1.0]
559 [22.0]
55 [2.2]
Ø5.5 [.2]
Ø13 [.5]
585,5 [23.1]
549,5 [21.6]
494,9 [19.5]
0 [.0]
52 [2.0]
79,5 [3.1]
120 [4.7]
147,5 [5.8]
188 [7.4]
215,5 [8.5]
ABB
DIMENSION DRAWING
ACS880-104 R01
3AXD50000004061
3AXD10000107650

Frame R8i with option +P942



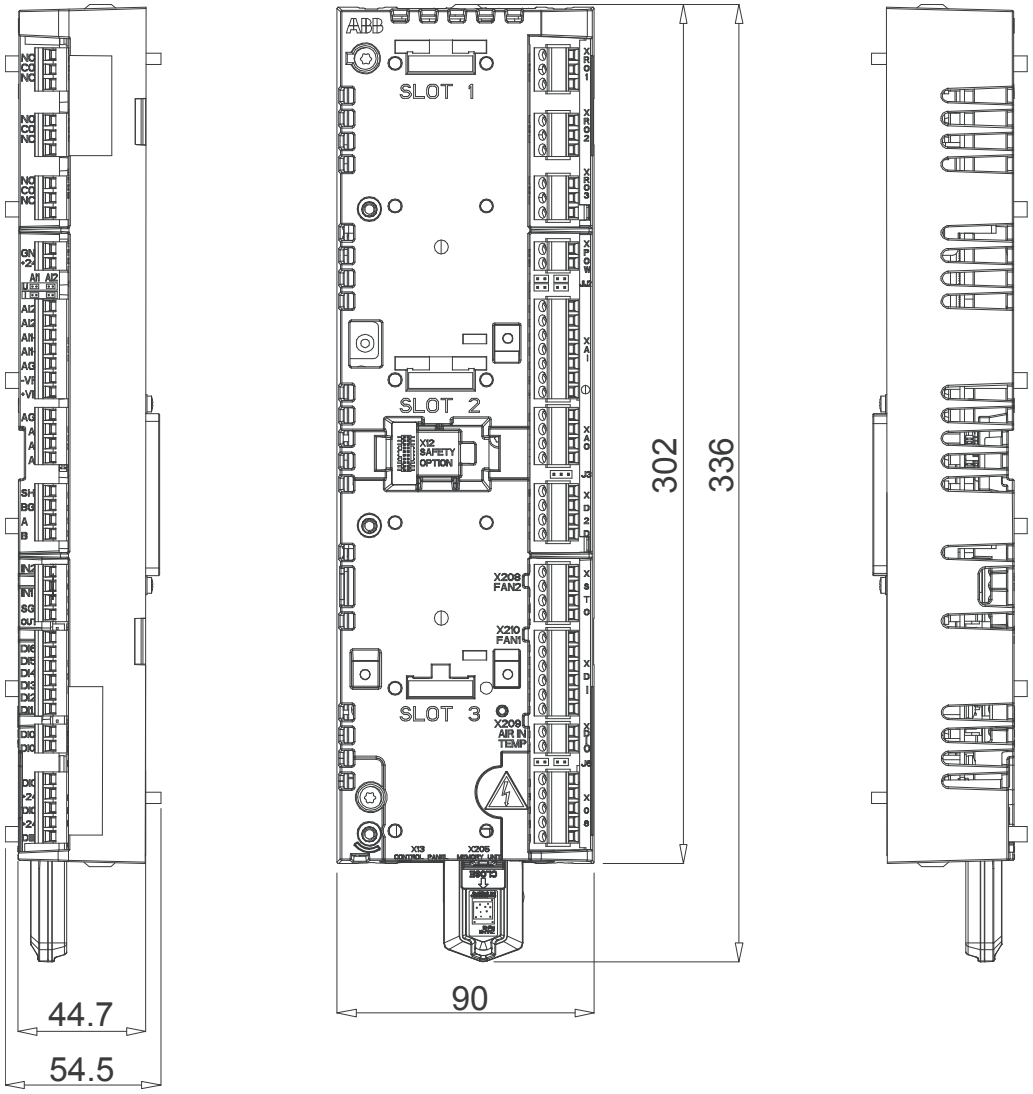

3AXD50000025204
3AXD50000025204 (ASSEM)
A Initial Approval
B Title 2 changed. Added +P942
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First angle projection. Original drawing made with 3D CAD. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
Prepared M.Koskinen 05-Mar-15
Check. M.Michelsson 16-Jan-19
Appr. R.Eksström 16-Jan-19
Project name
Weight kg
Title DIMENSION DRAWING
ACS880-104 R8I +P942
Doc. des. DIMENSION DRAWING
Resp dept.
Doc. No. 3AXD50000025204
Scale 3:50
Rev. ind. B (AP)
Form A3
Lang. EN
Sheet 2
Total 2
Based on
Customer
Cust. Doc. No.
DMS Number 3AXD10000410726
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26 [1,0]
574,4 [22,6]
55 [2,2]
Ø5,5 [,2]
Ø13 [,5]
585,5 [23,1]
549,5 [21,6]
494,9 [19,5]
0 [,0]
52 [2,0]
79,5 [3,1]
120 [4,7]
147,5 [5,8]
188 [7,4]
217,5 [8,5]
ABB


ACS880-104 R8i +P942
ACS800-104 R8i
B
1:4
D
1:4
A
1:4
C
1:4
Title ASSEMBLY DRAWING
R8i RETROFIT IN ACS800 CABINET
ASSEMBLY DRAWING
3AXD50000025473
3AXD10000412907
ABB

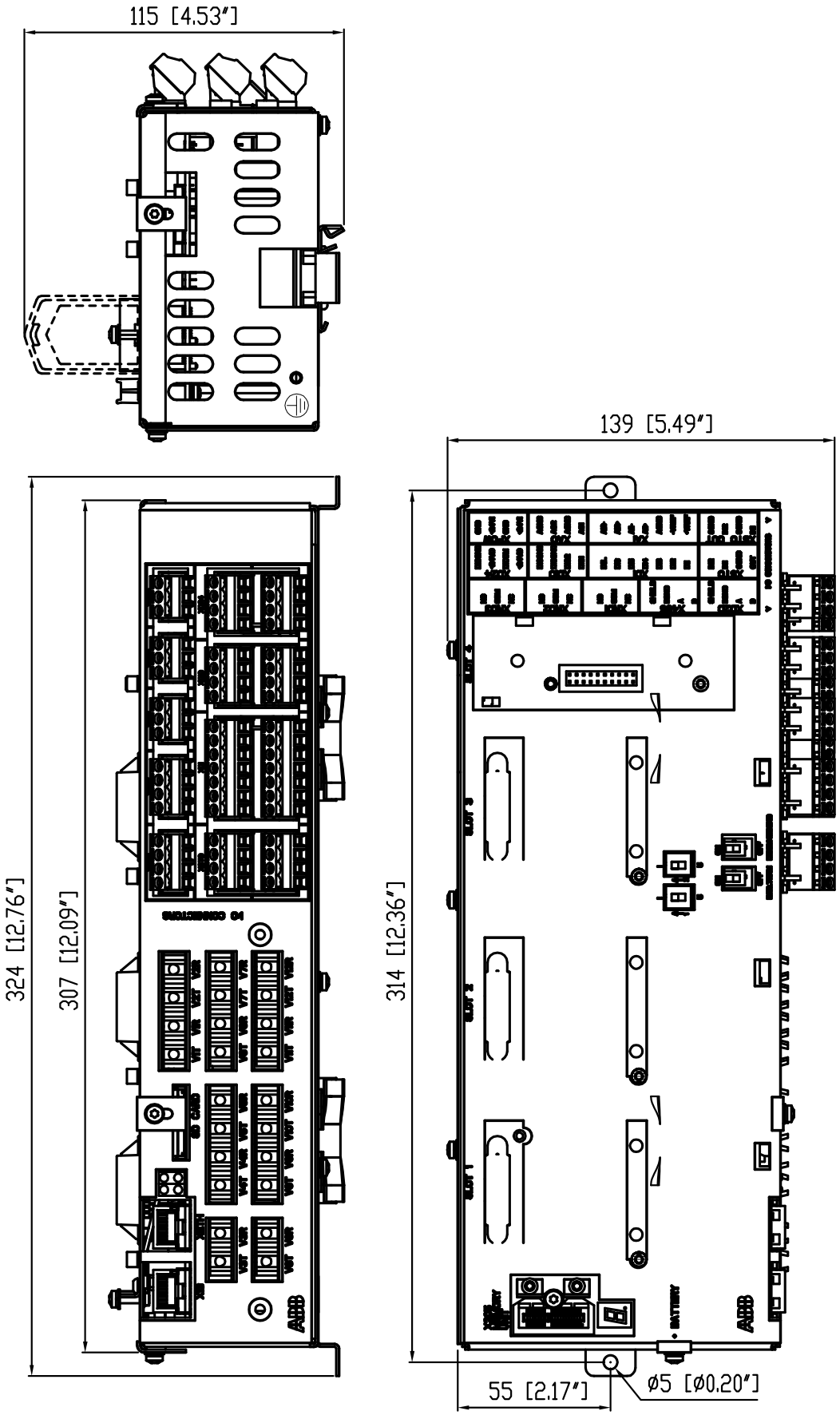
Control electronics

ZCU control unit

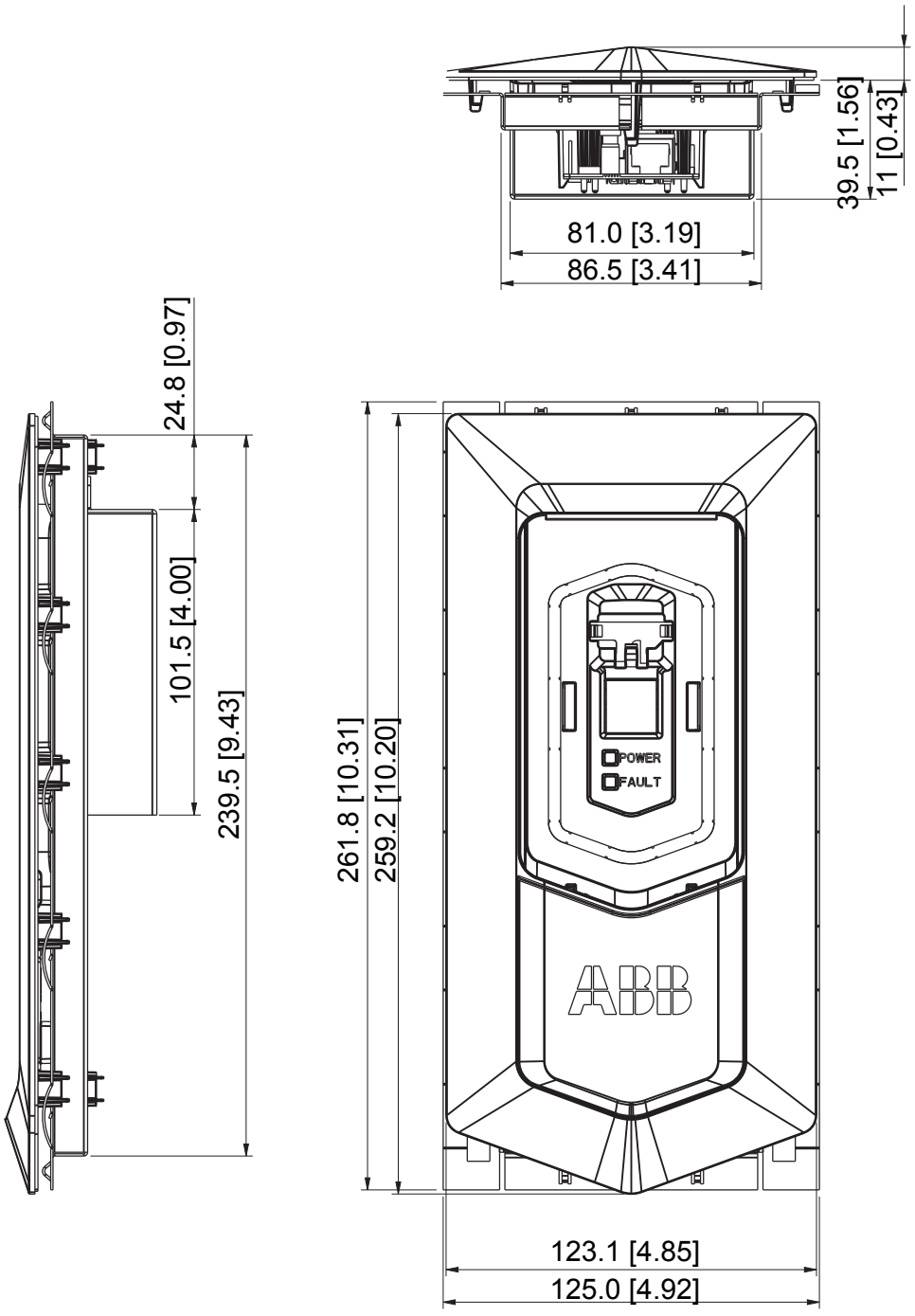
Note: The control cable grounding plate can be attached to either top or bottom edge of the control unit.



BCU control unit



DPMP-01 door mounting kit

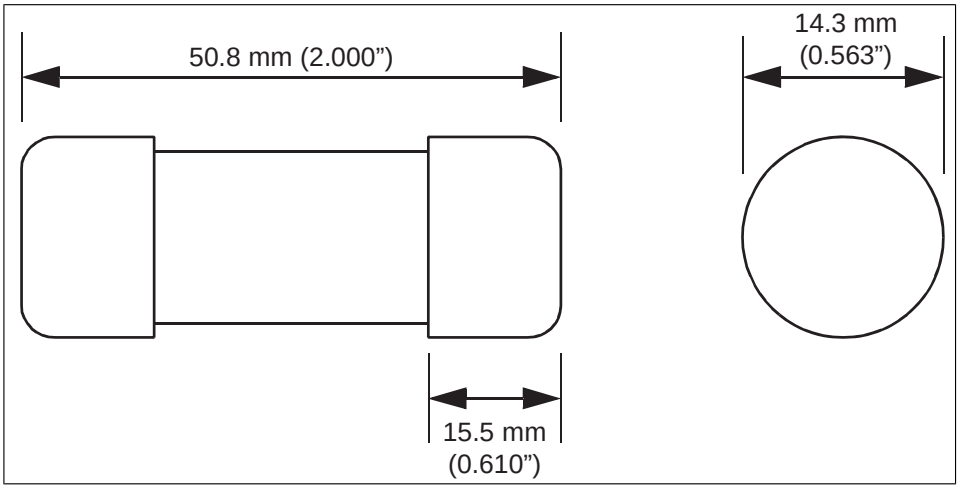


Cutting in the cabinet door: 109 mm × 223 mm (4.29 in. × 8.78 in.)

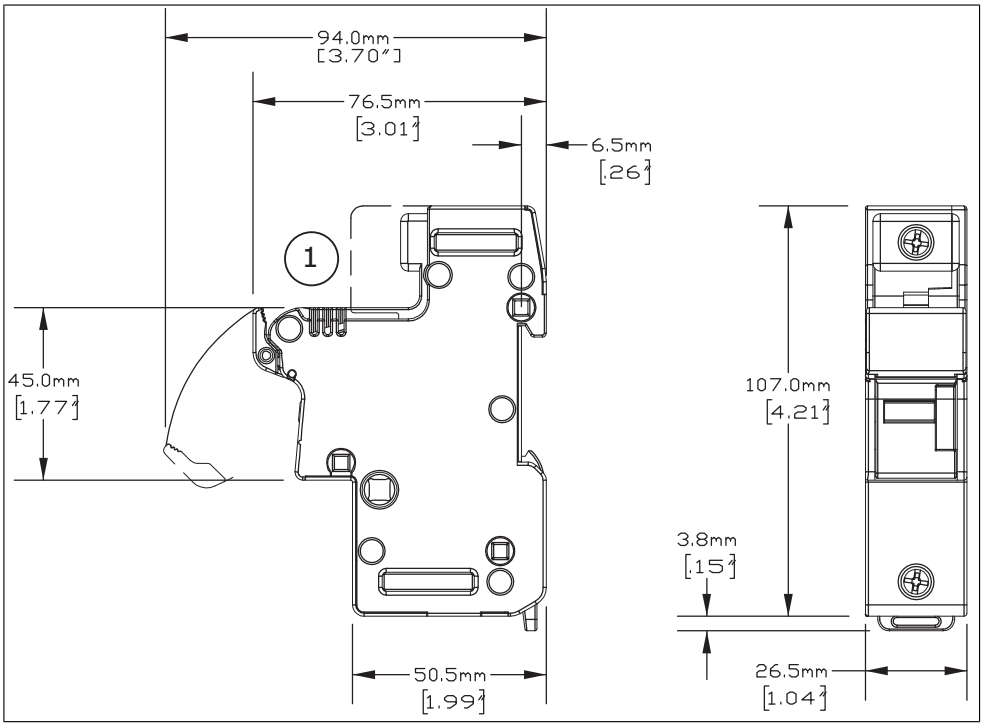
Plate thickness: 1.5 … 2.5 mm (0.06 … 0.10 in.)

DC fuses and fuse bases

Fuse, 14 × 51 mm

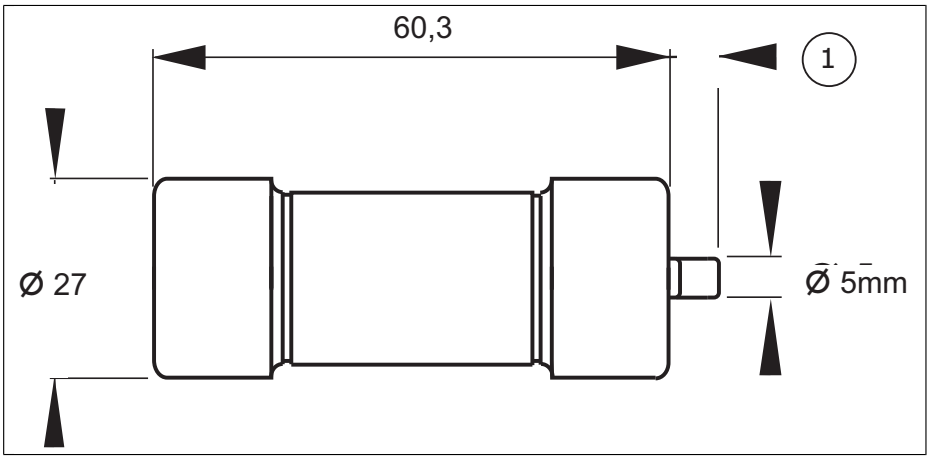


Mersen US141 (Z331153F) fuse disconnector (for 14 × 51 mm fuses)



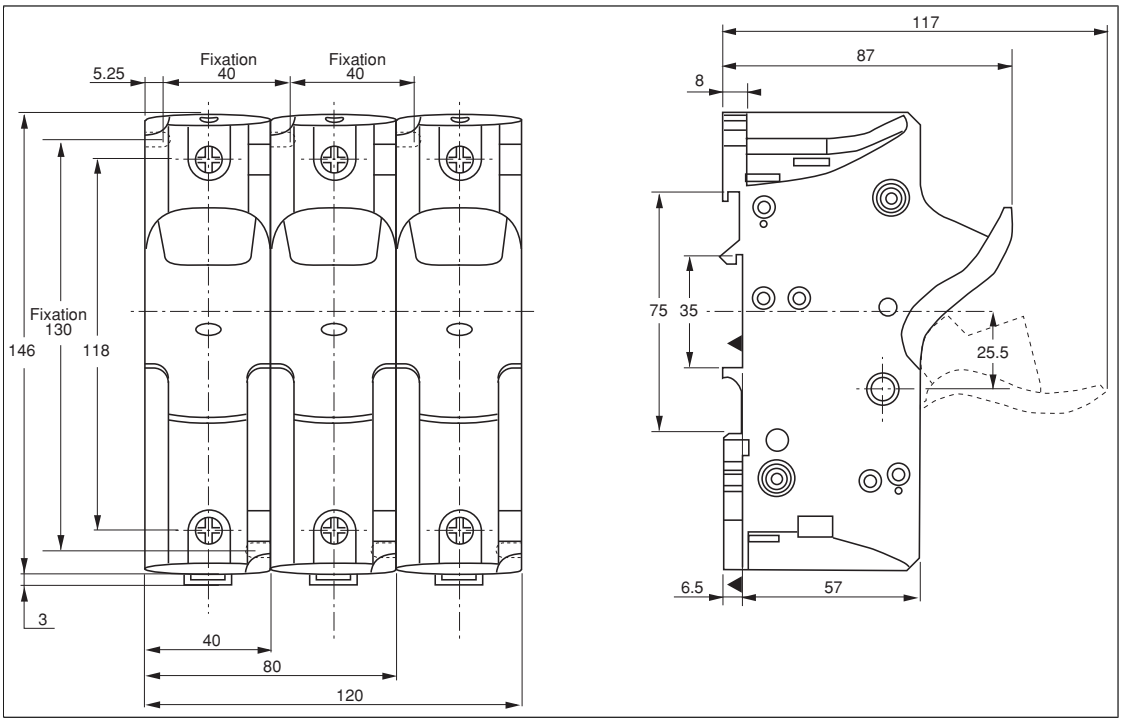
1. **Note:** On microswitch versions only

Fuse, 27 × 60 mm

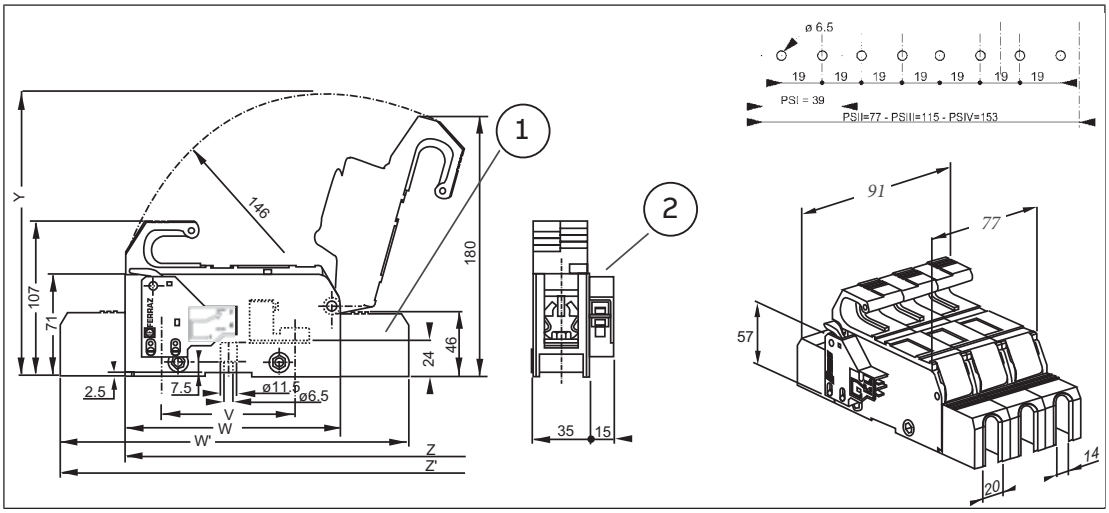


1. 7 mm indicator travel

Mersen US271MI (R227600C) fuse disconnector (for 27 × 60 mm fuses)



■ Mersen PS272PREMCPS (N220076) fuse disconnector (for R5i, 27 × 60 mm fuses)



1. Twin terminal covers
   PS 27
   Part #: A 220087
   Weight: 30 g
   Packaging: 3 twins
2. MC PS

V: 93 Connecting distance between centers

W: 150 Without terminals cover length

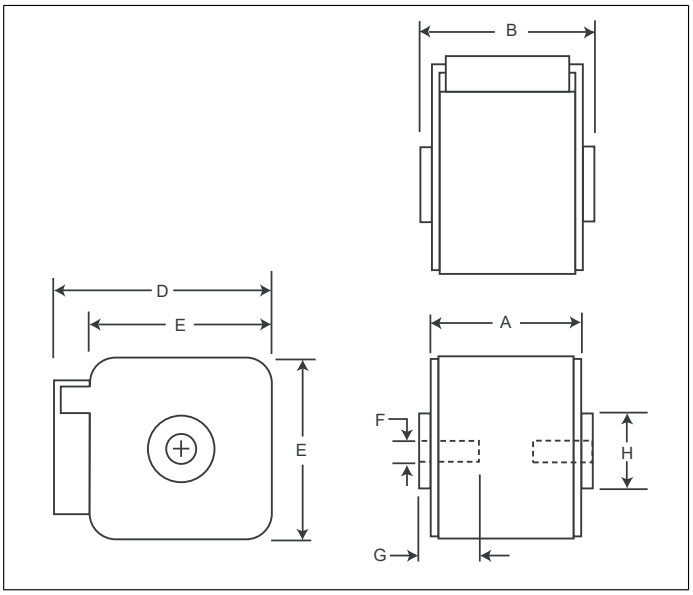
W′: 240 With terminals cover length

Y: 196 Space factor with a 90° fuse carrier position

Z: 284 Without terminal cover, space factor with a 180° fuse carrier position

Z′: 279 With terminal cover, space factor with a 180° fuse carrier position

DC fuse blocks for frames R5i…R8i (Bussmann)



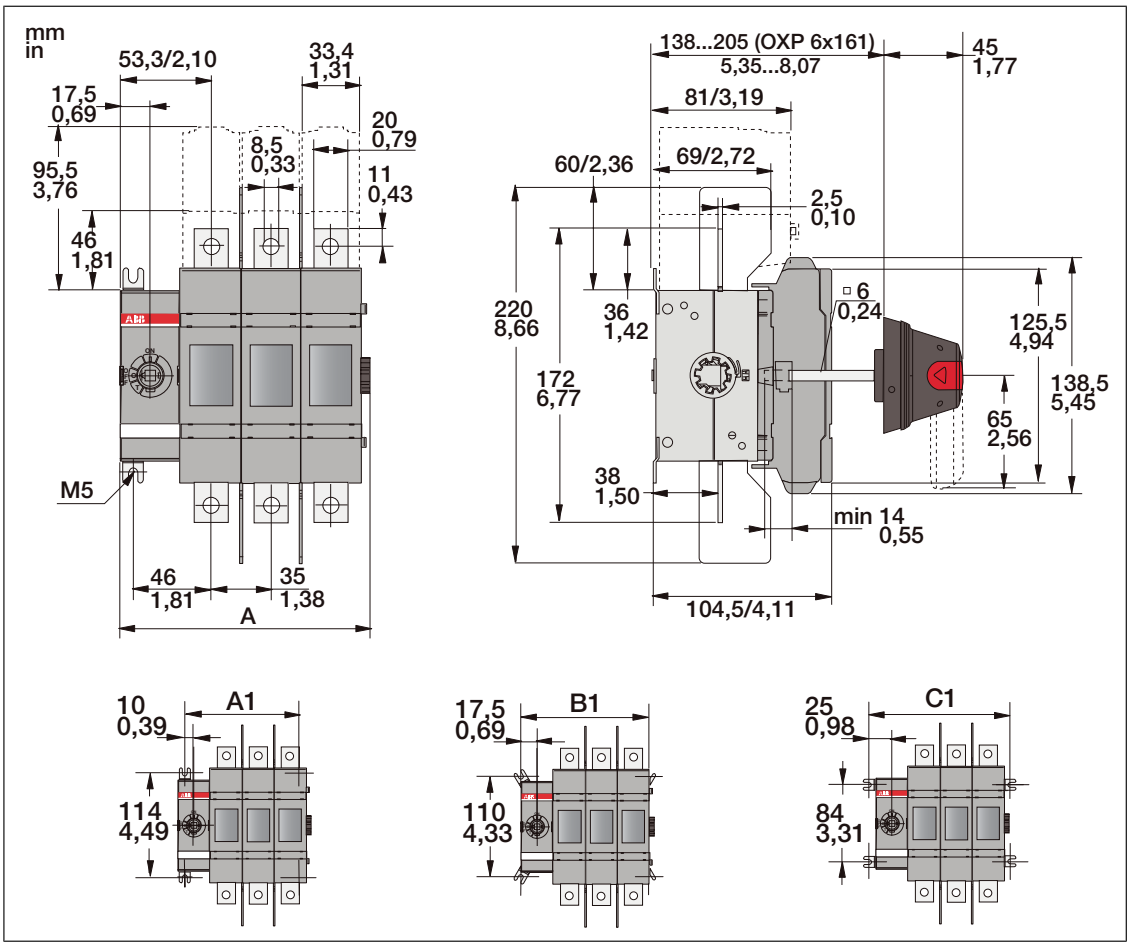
690 V fuses (as used with 400 and 500 V units)							
Size	**A** mm (inch)	**B** mm (inch)	**D** mm (inch)	**E** mm (inch)	**F**	**G** mm (inch)	**H** mm (inch)
1	50 (1.97)	51 (2.01)	69 (2.72)	53 (2.09)	M8	8 (0.31)	20 (0.79)
3	51 (2.01)	53 (2.09)	92 (3.62)	76 (2.99)	M12	10 (0.39)	30 (1.18)
3*	51 (2.01)	65 (2.56)	92 (3.62)	76 (2.99)	M12	10 (0.39)	30 (1.18)

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)

Switchgear and charging components

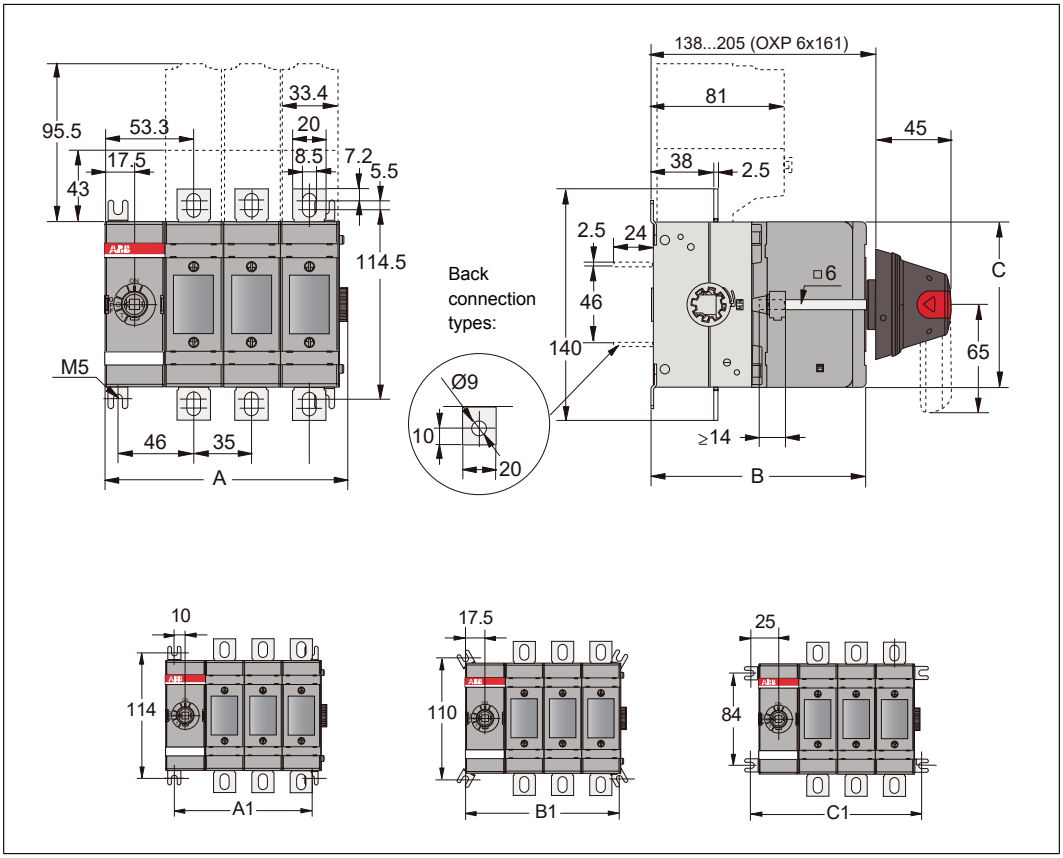
OS_ switch fuses

OS100GJ04FP



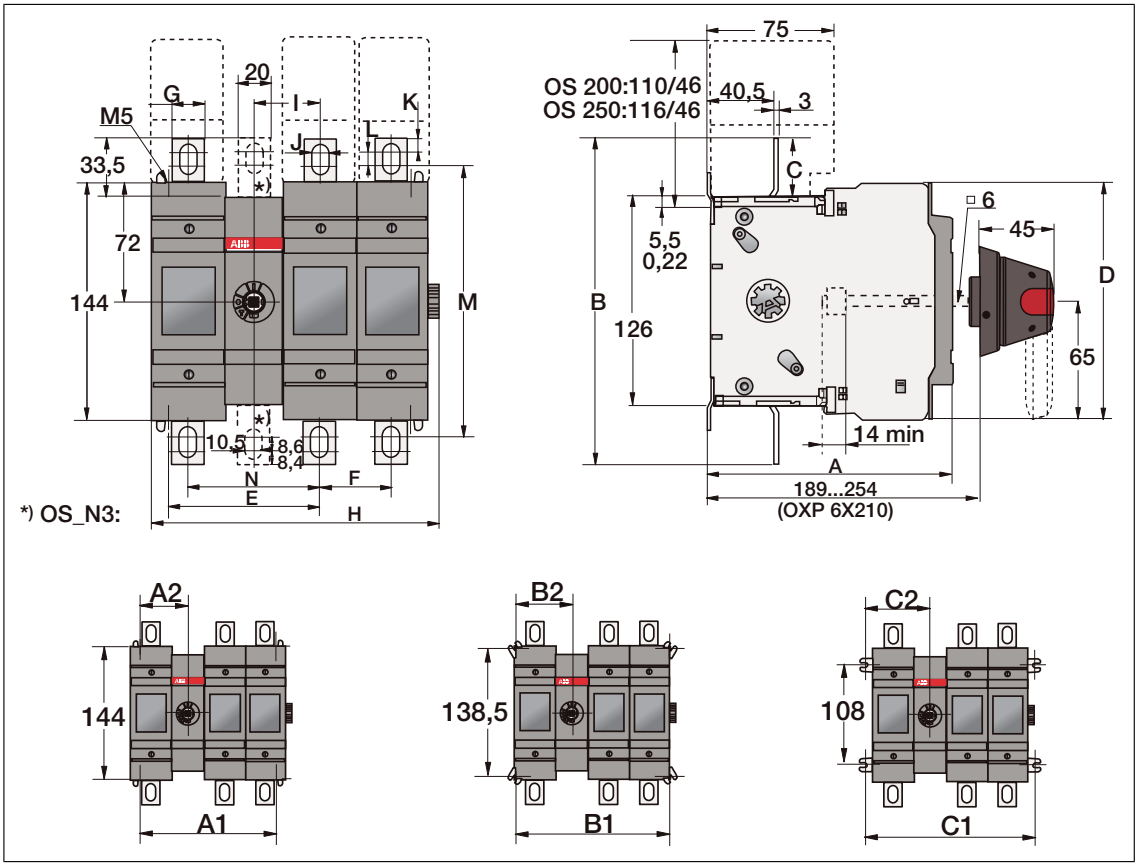
	mm (in)
A	181.5 (7.15)
A1	160 (6.30)
B1	175 (6.89)
C1	190 (7.48)

OS160GD04F



	mm (in)
A	181.5 (7.15)
B	130 (5.12)
C	100 (3.94)
A1	160 (6.30)
B1	175 (6.89)
C1	190 (7.48)

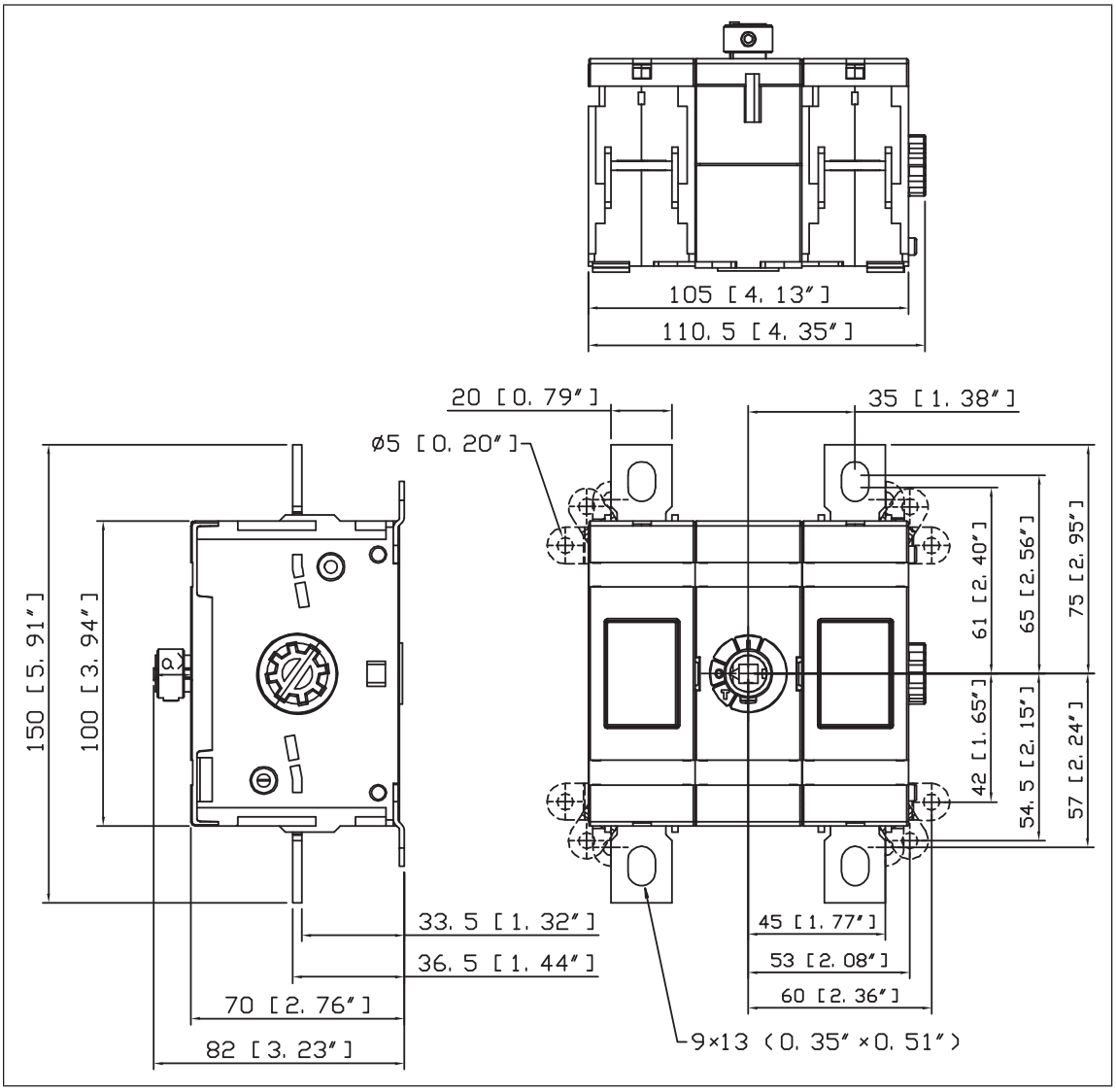
OS200DZ22F



OS200			
D22	**mm (inch)**	**D22**	**mm (inch)**
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)

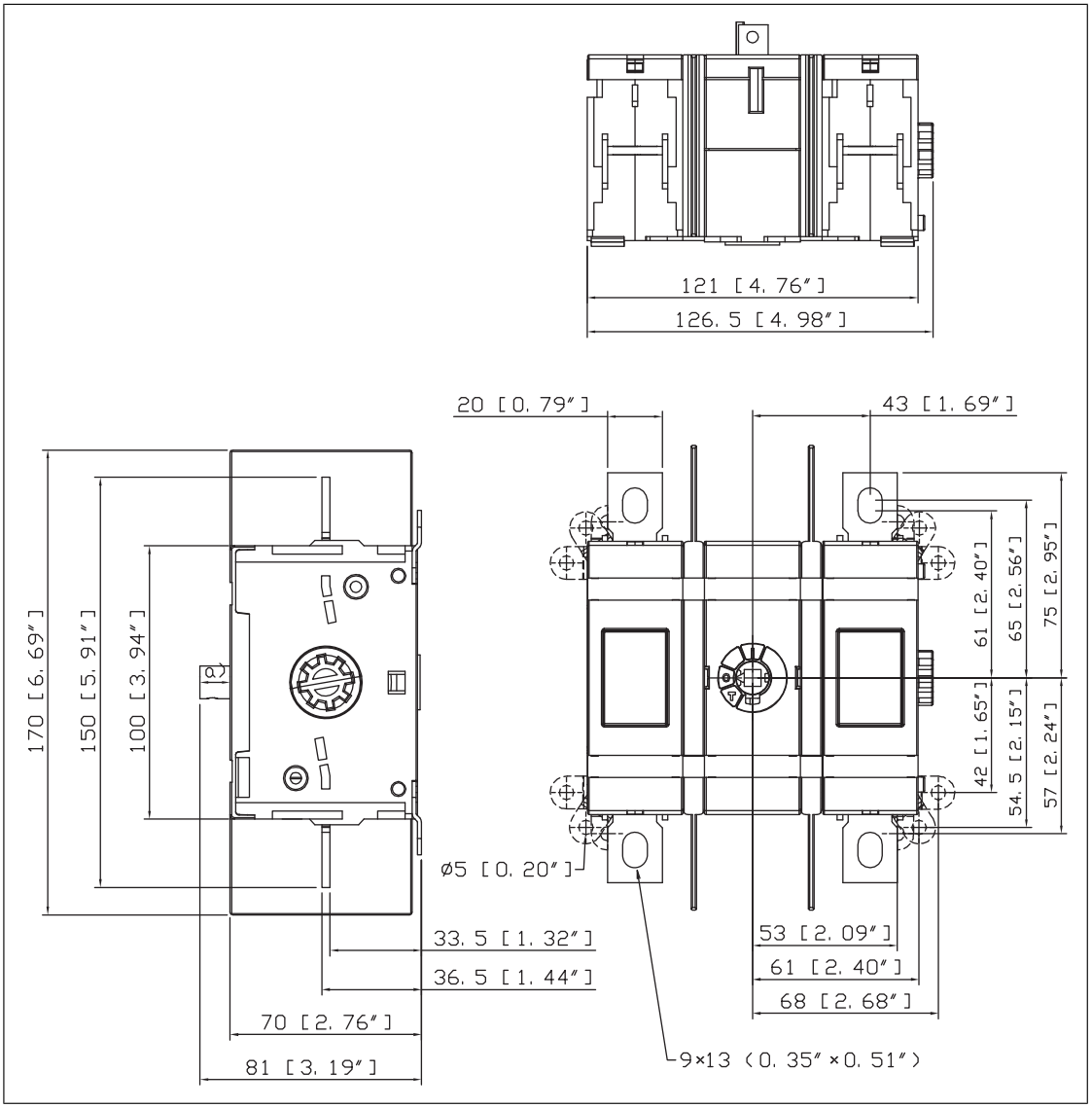
OT_ switch/disconnectors

OT200E11



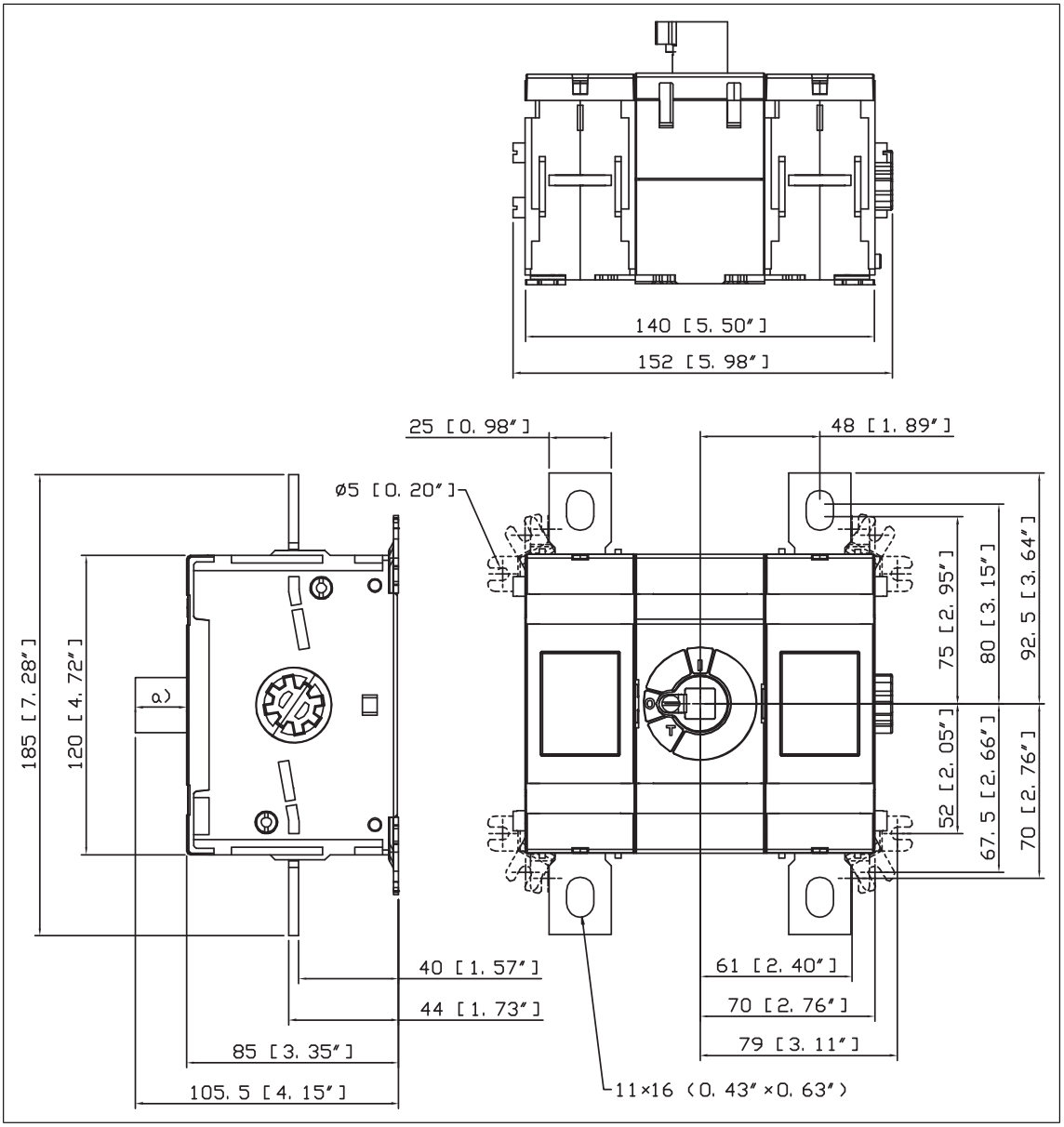
a) The shaft must extend into switch at least 14 mm (0.55″).

OT200U11



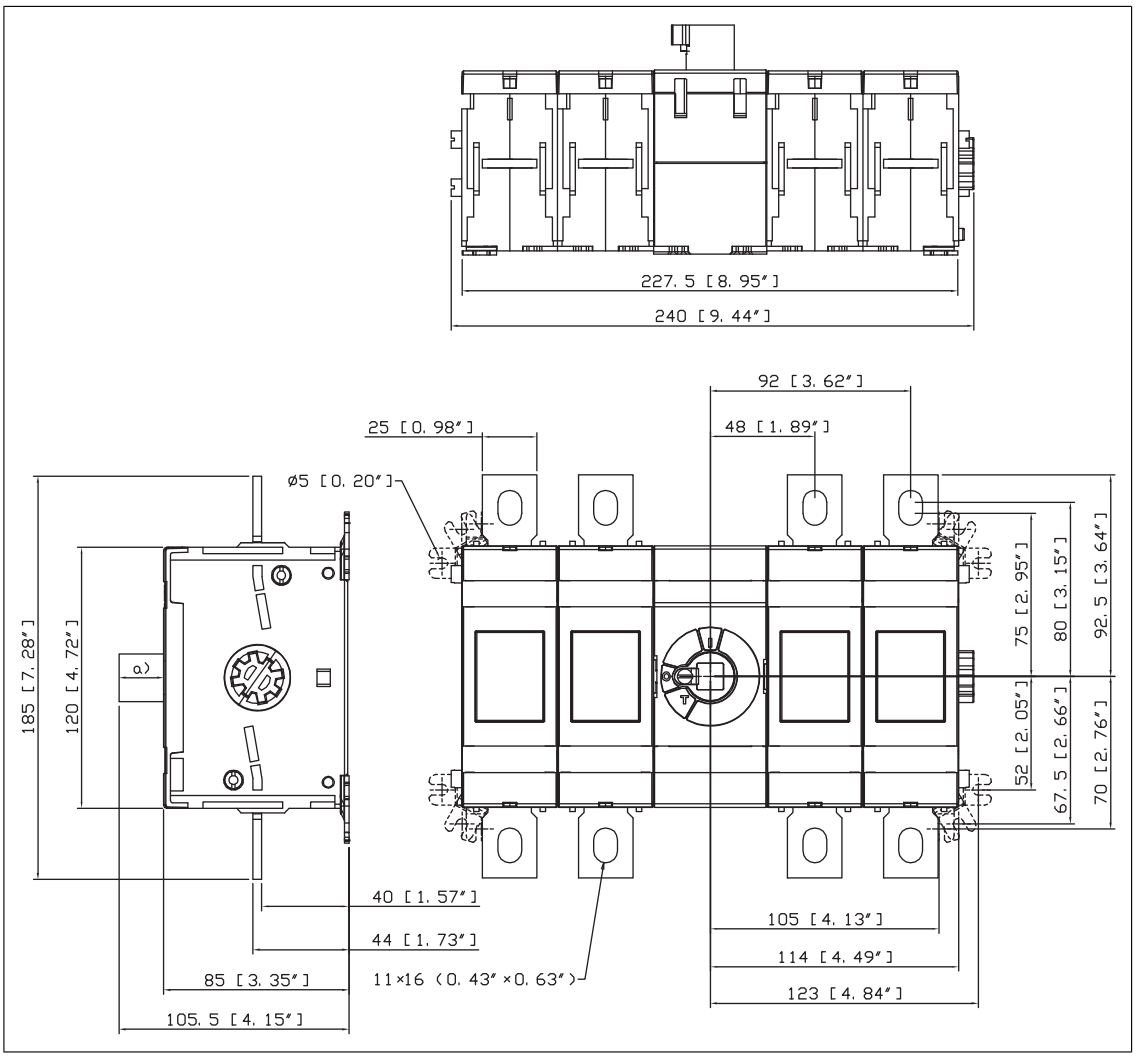
a) The shaft must extend into switch at least 14 mm (0.55″).

OT400E11



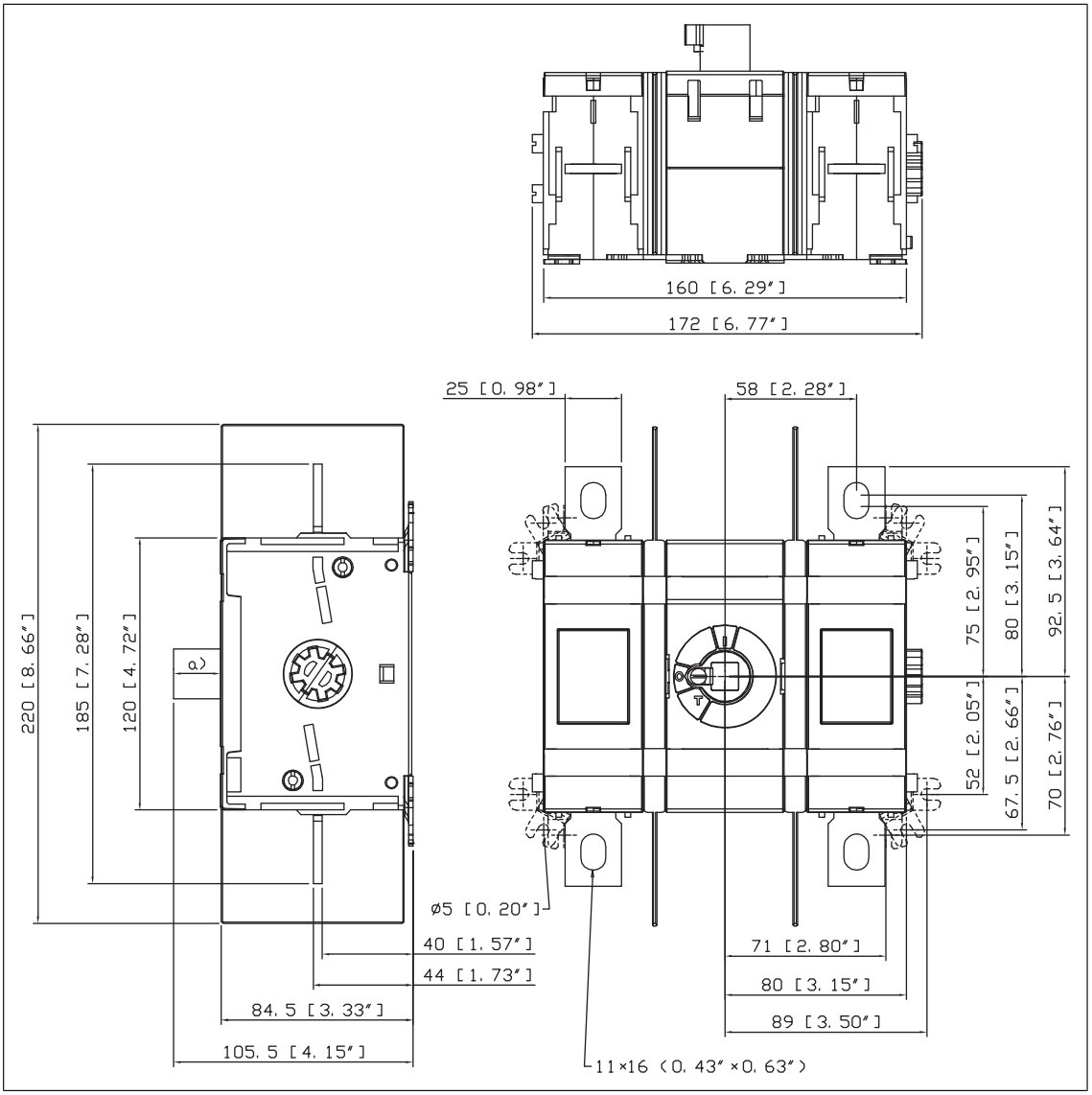
a) The shaft must extend into the switch at least 20 mm (0.79″).

OT400E22



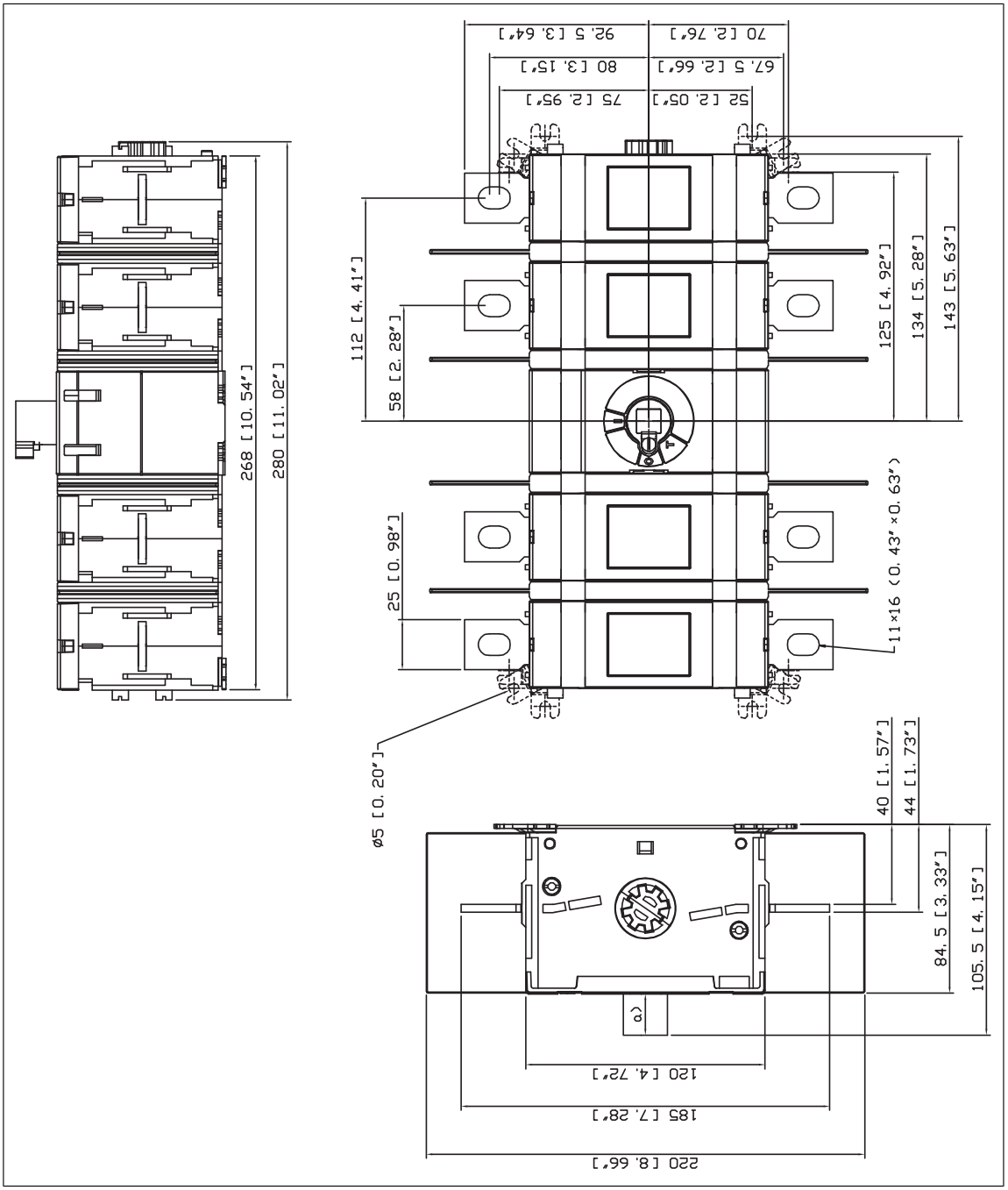
a) The shaft must extend into the switch at least 20 mm (0.79″).

OT400U11



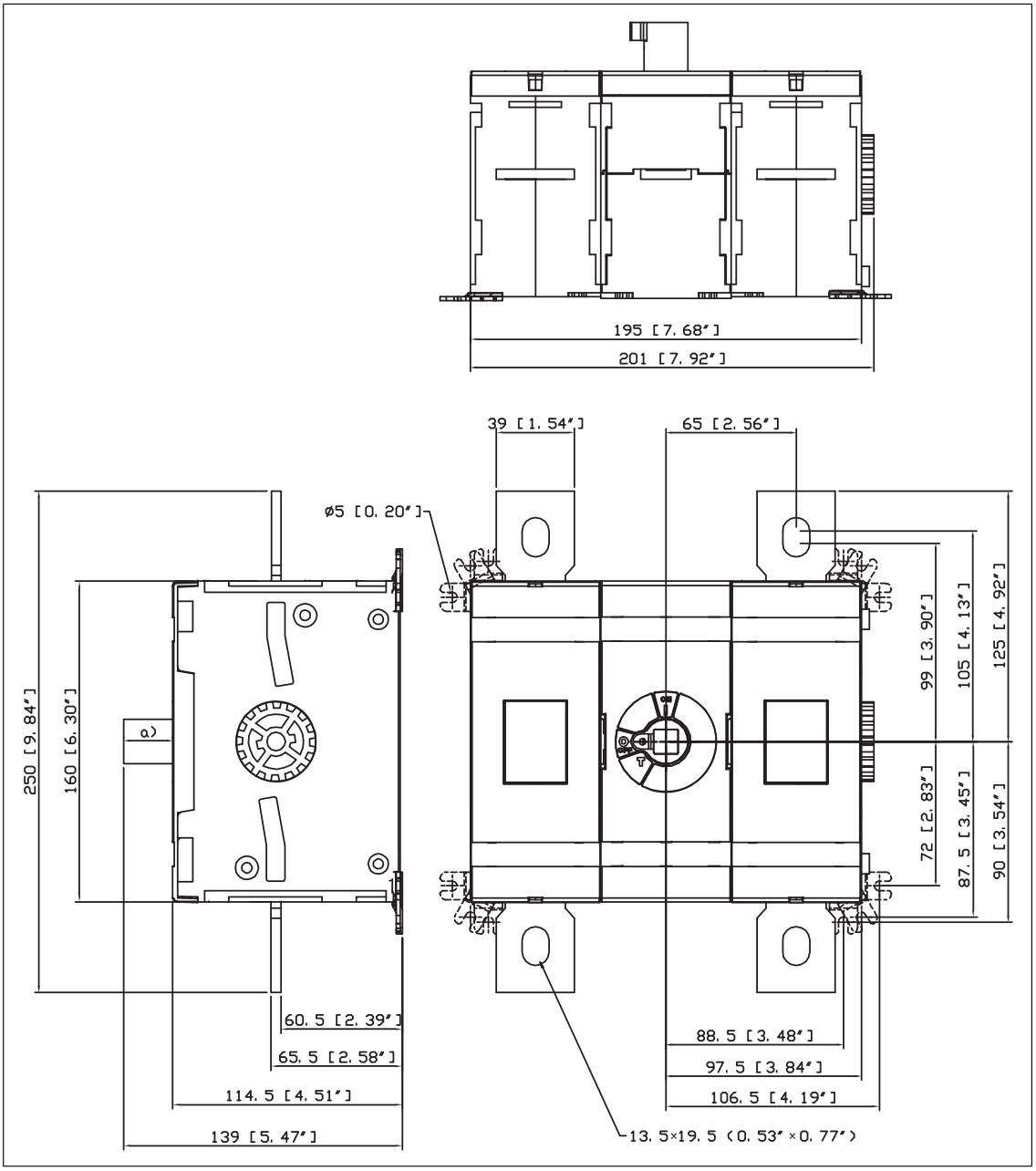
a) The shaft must extend into the switch at least 20 mm (0.79″).

OT400U22



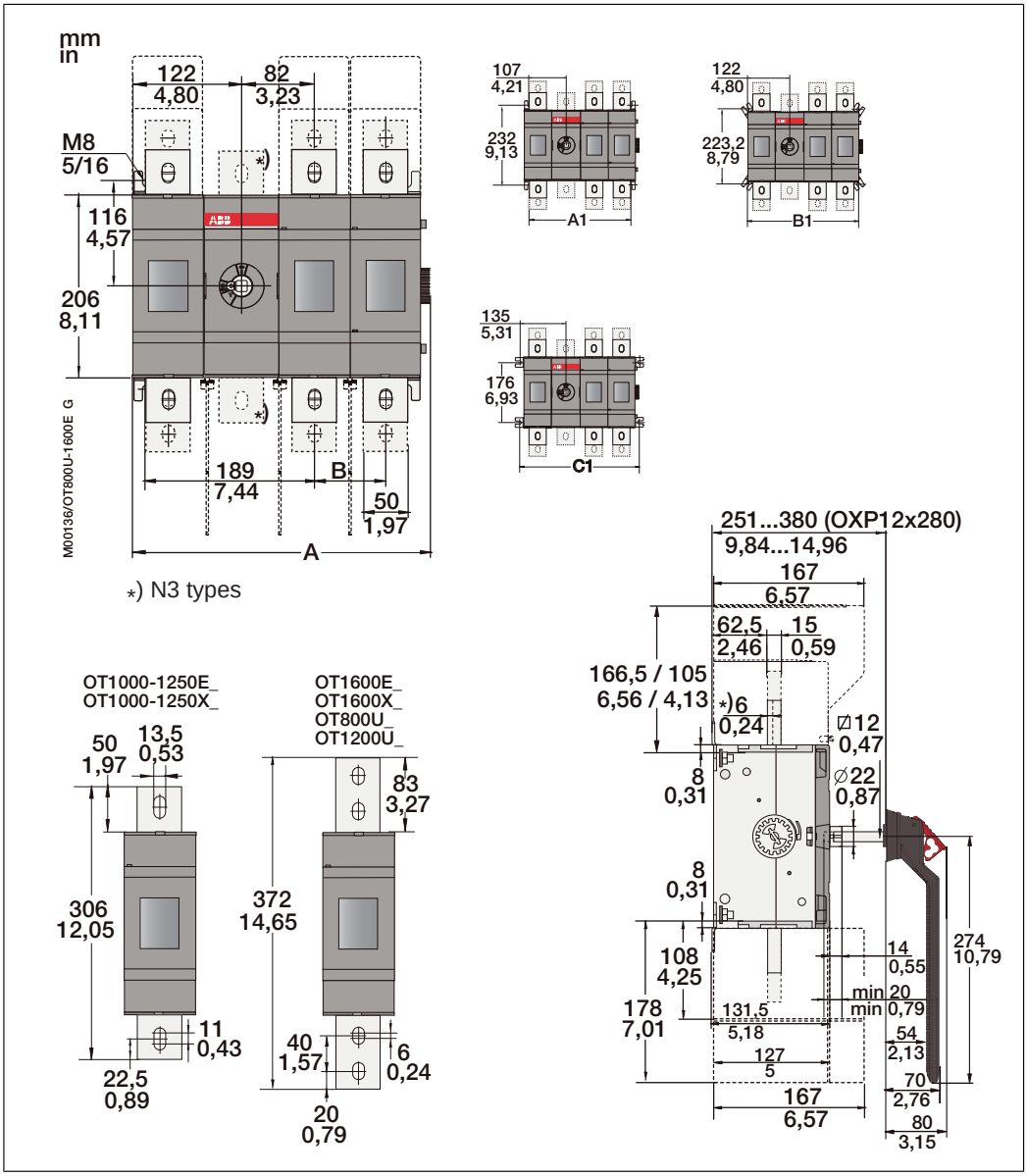
a) The shaft must extend into the switch at least 20 mm (0.79″).

OT600U11, OT630E11



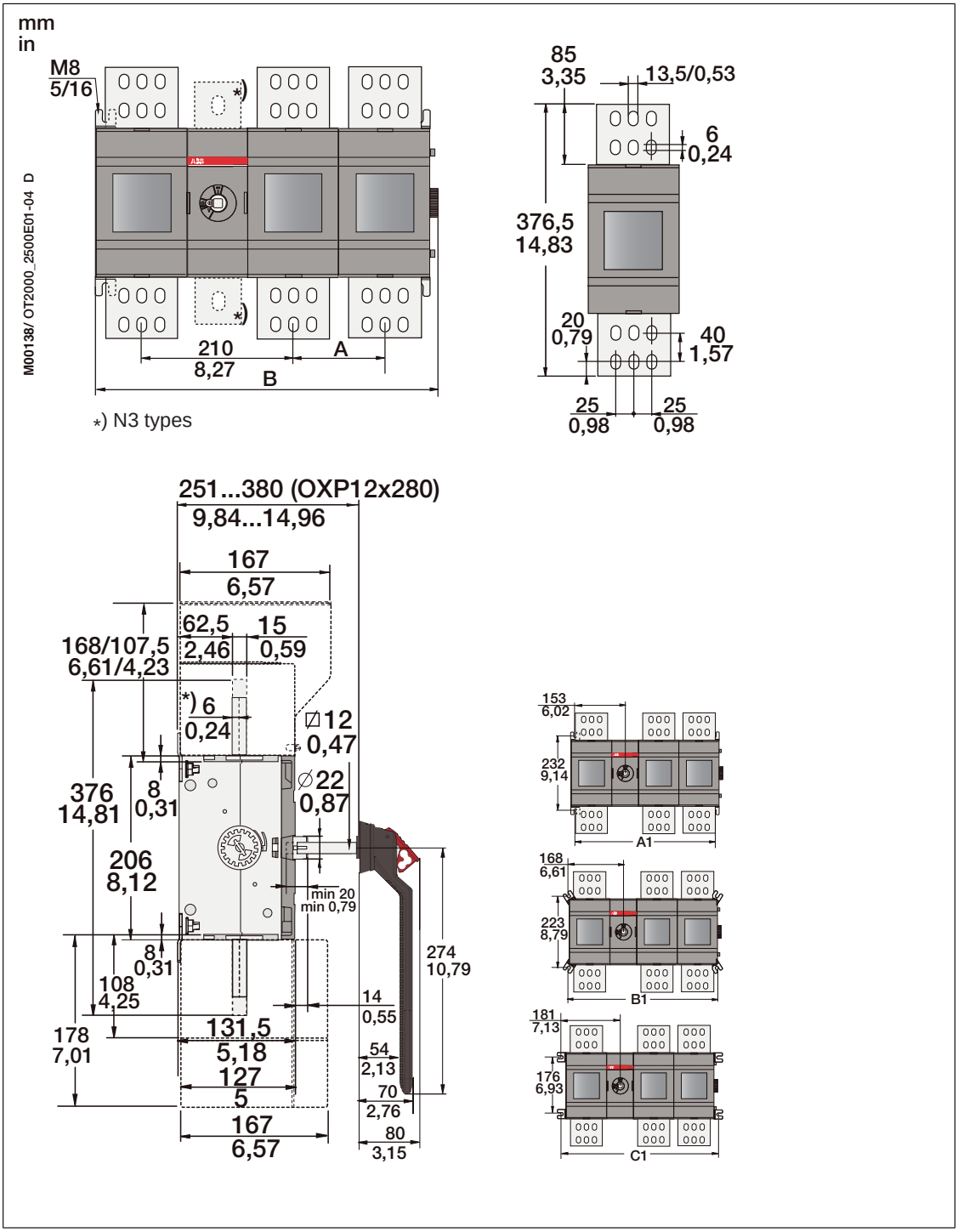
a) The shaft must extend into the switch at least 20 mm (0.79″).

OT1200U__, OT1600E__



	_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

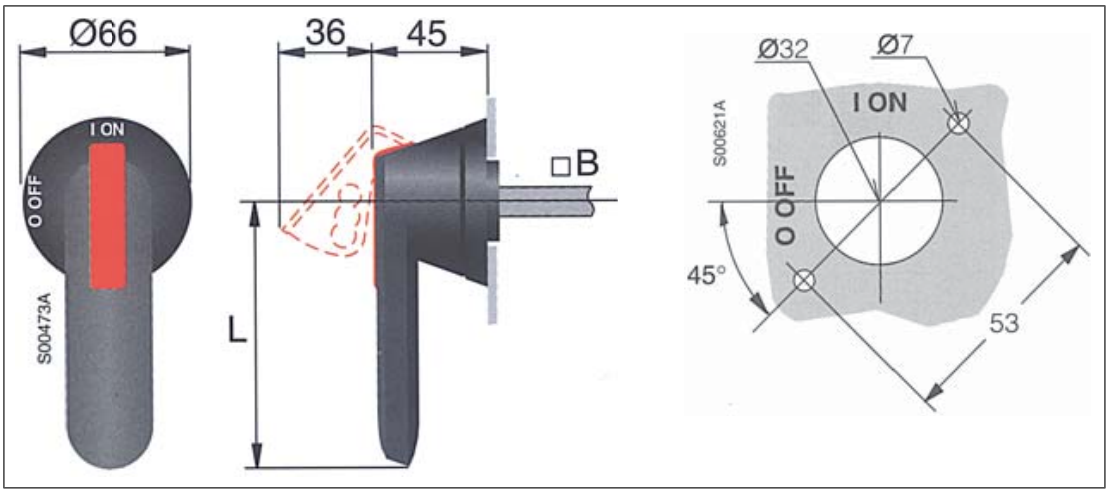


	mm (in)
A	126 (4.96)
B	598.5 (23.56)
A1	558 (21.97)
B1	588 (23.15)
C1	614 (24.17)

OHB_ switch handles

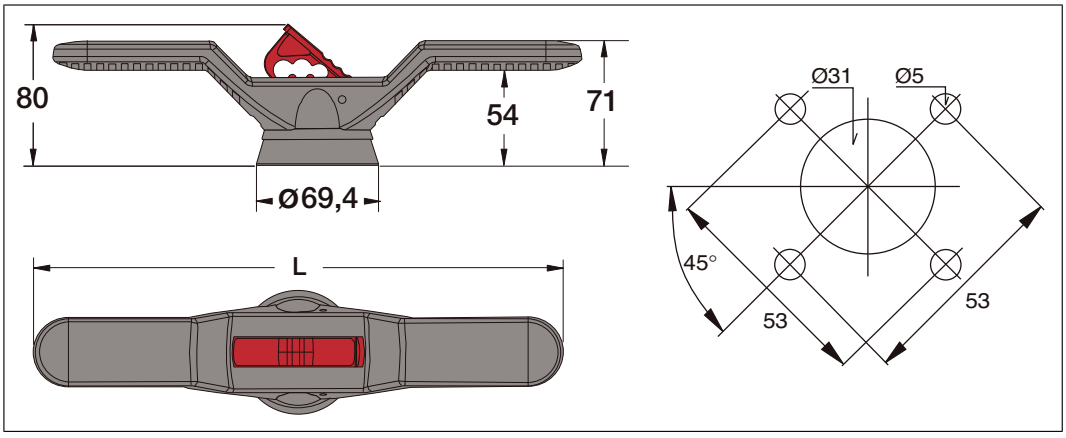
Note: The drawings are not to scale.

OHB65J6, OHB125J12, OHB145J12



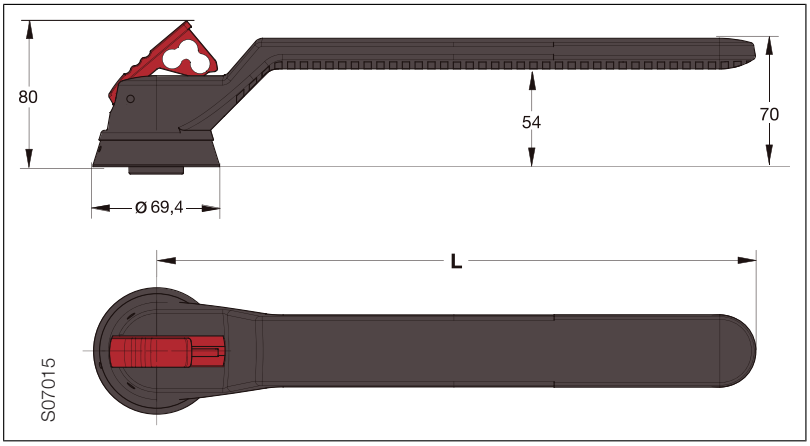
Handle type	L mm (inch)	B mm (inch)	Notes
OHB65J6	65 (2.56)	6 × 6 (0.24 × 0.24)	Used with OS_, OT200_
OHB125J12	125 (4.92)	12 × 12 (0.47 × 0.47)	Used with OT400_
OHB145J12	145 (5.71)	12 × 12 (0.47 × 0.47)	Used with OT600_ and OT630_

OHB150J12P



Handle type	L mm (inch)	Shaft mm (inch)	Notes
OHB150J12P	300 (11.81)	12 × 12 (0.47 × 0.47)	Used with OT1200U11 and OT1600E11

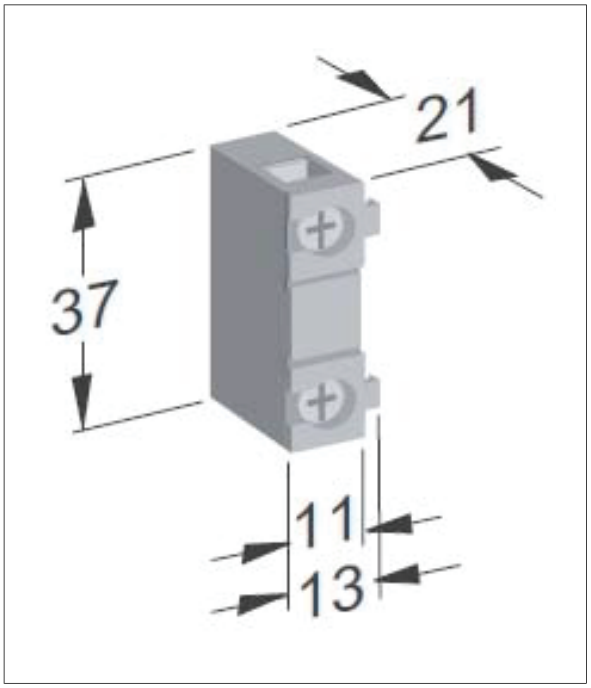
OHB274J12



The drilling pattern is the same as OHB65/125/145.

Handle type	L mm (inch)	Shaft mm (inch)	Note
OHB274J12	274 (10.79)	12 × 12 (0.47 × 0.47)	Used with OT1200U22, OT1600E22 and OT2500E22

OA1G10/OA3G01 auxiliary contact blocks

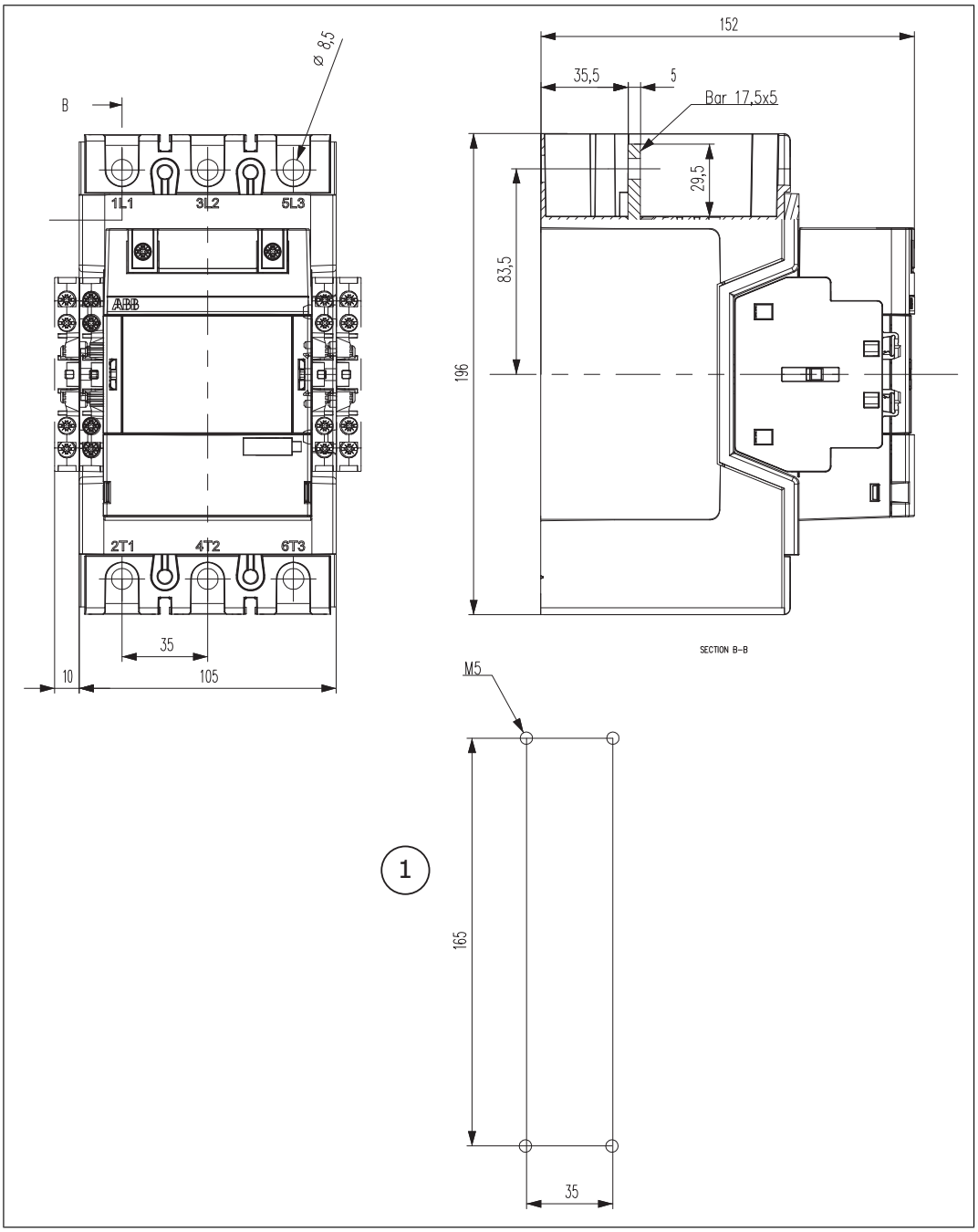


2×0.75…2.5 mm² (2×18…14 AWG)

0.8 N·m (7 lbf·in)

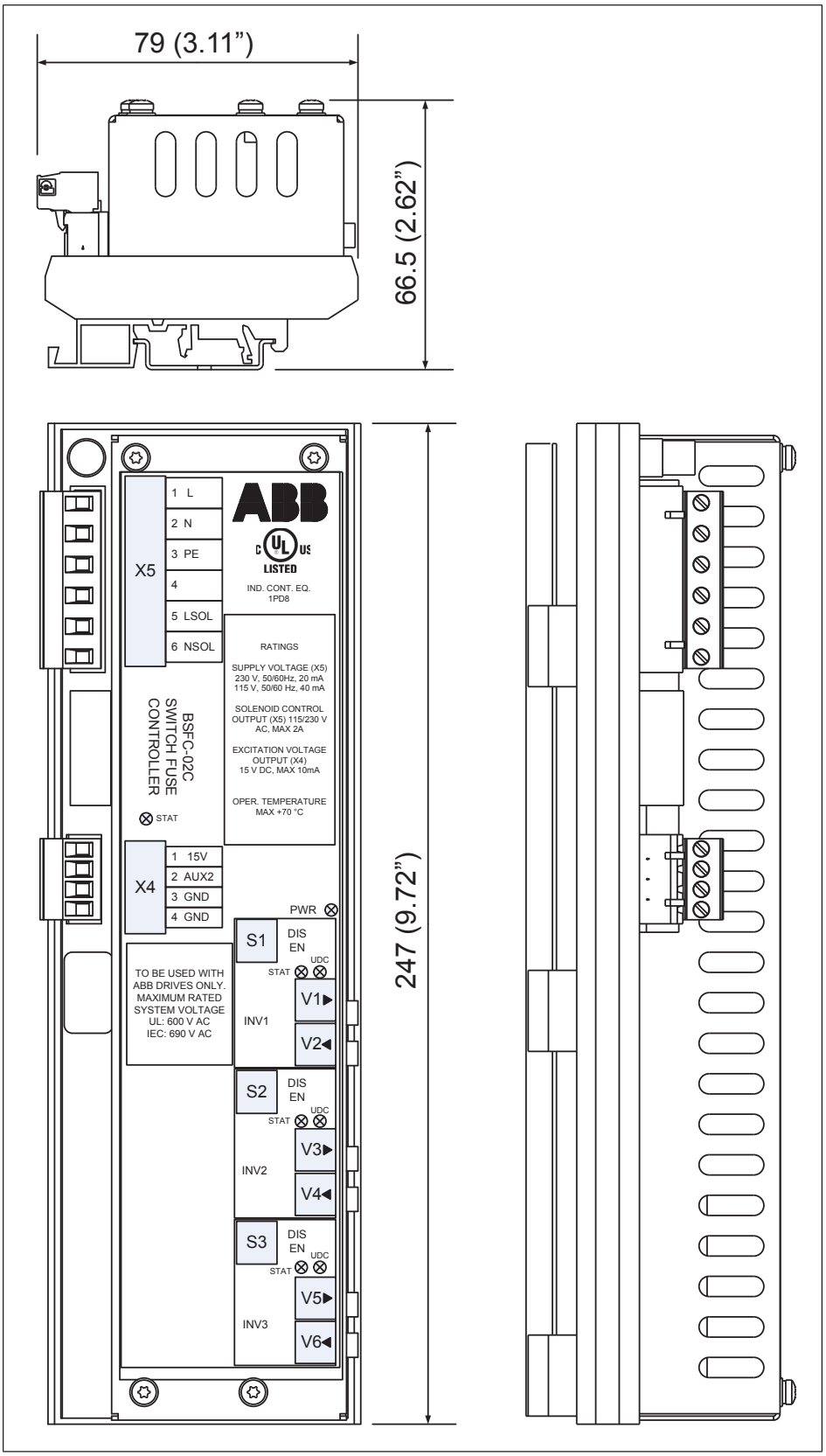
Pozidriv M3.5 Form 2

AF190-30-00-13 contactor

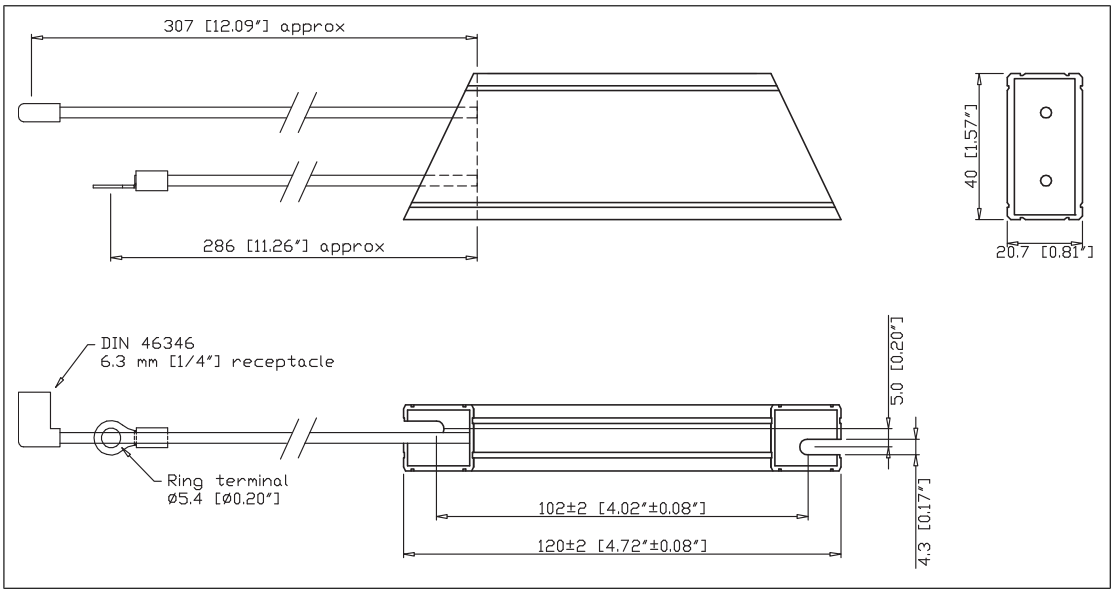


1. Drilling pattern

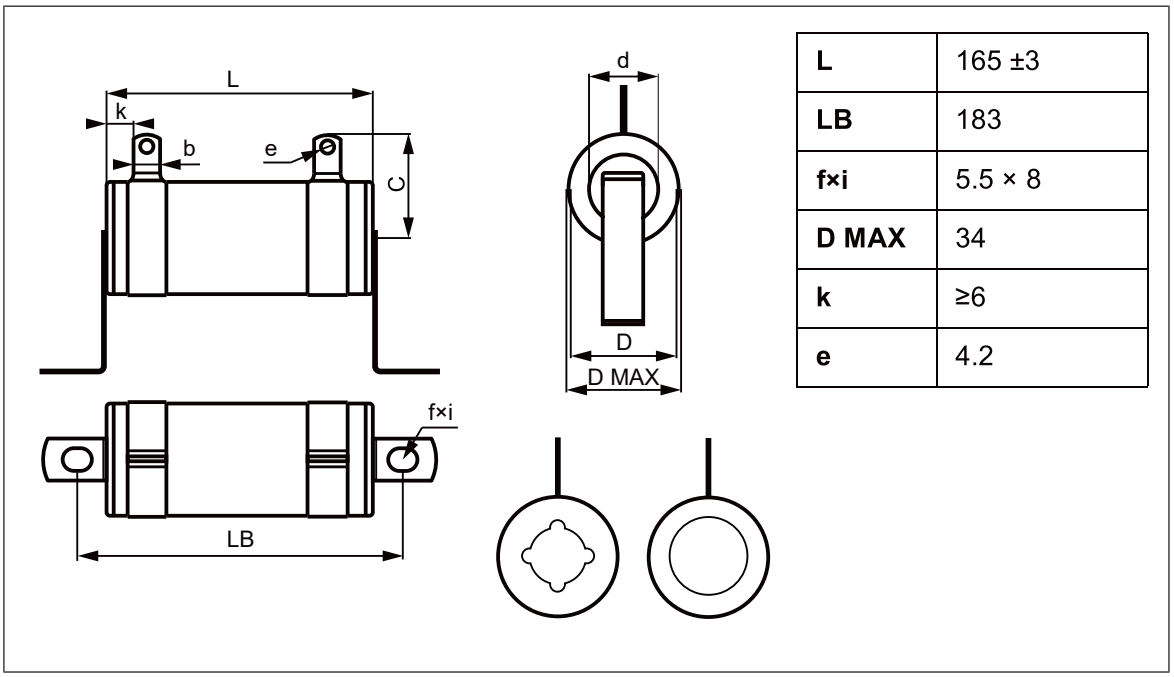
Charging controller



Charging resistor (frame R7i)



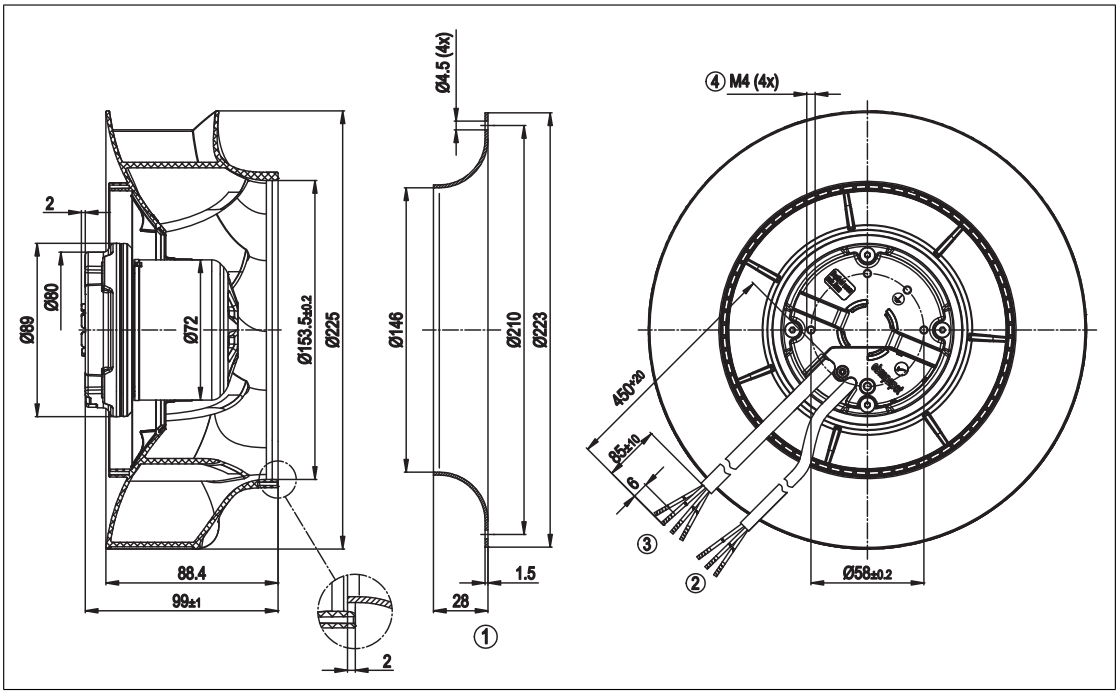
Charging resistor (frame R8i)



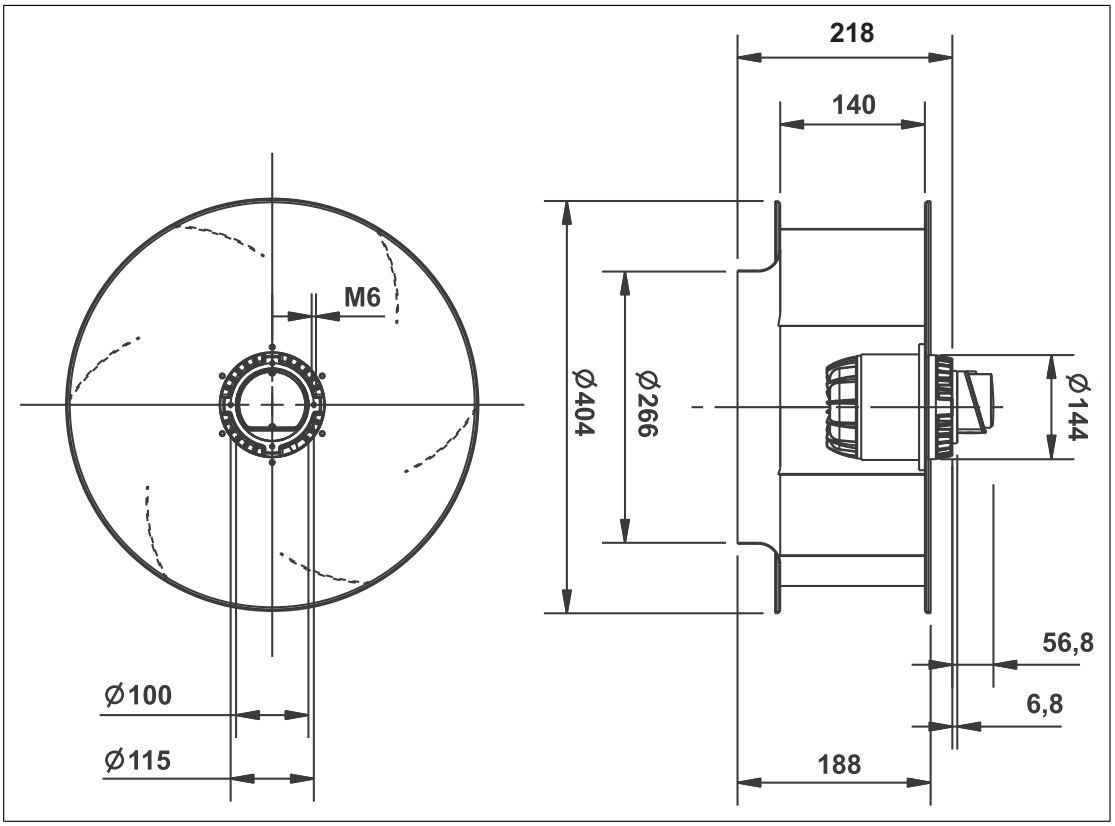
L	165 ±3
LB	183
f×i	5.5 × 8
D MAX	34
k	≥6
e	4.2

Miscellaneous components

Cooling fan 3AXD5000000592

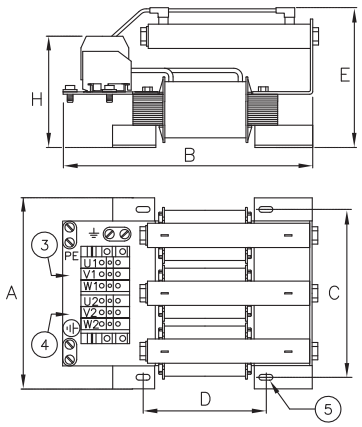
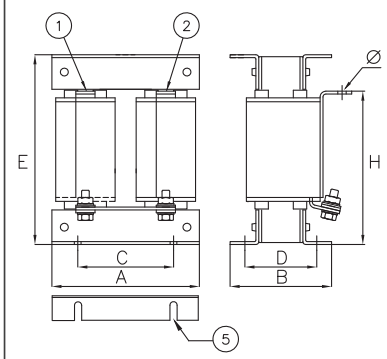
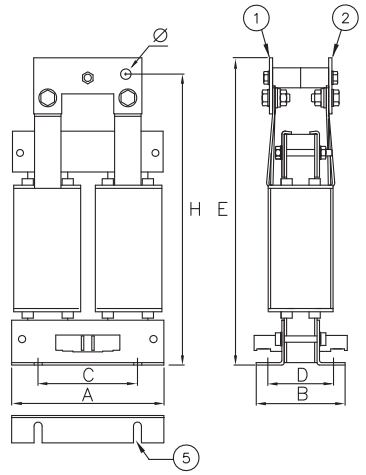


Cooling fan 3AXD50000006111

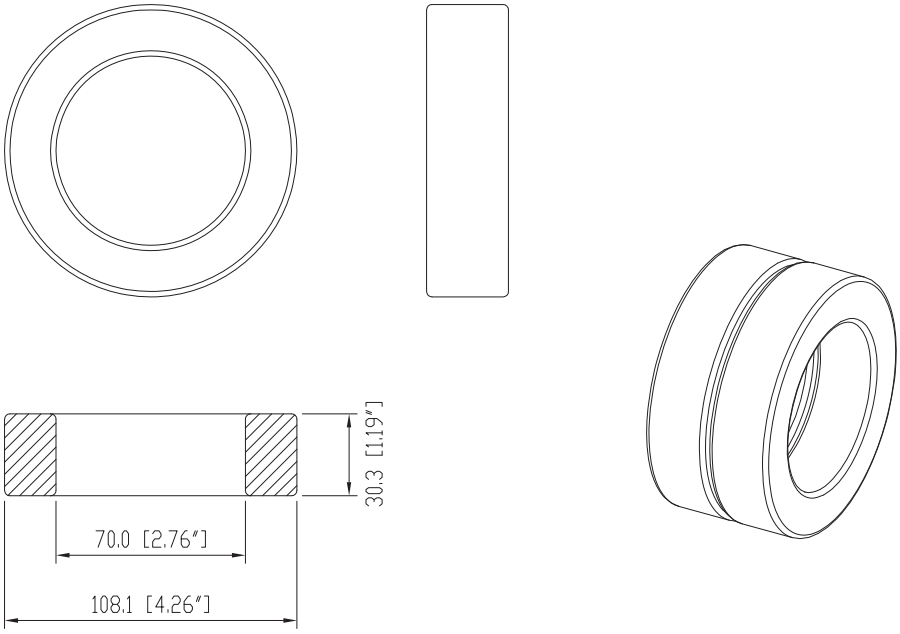


Output (du/dt) filters for frames R1i…R5i

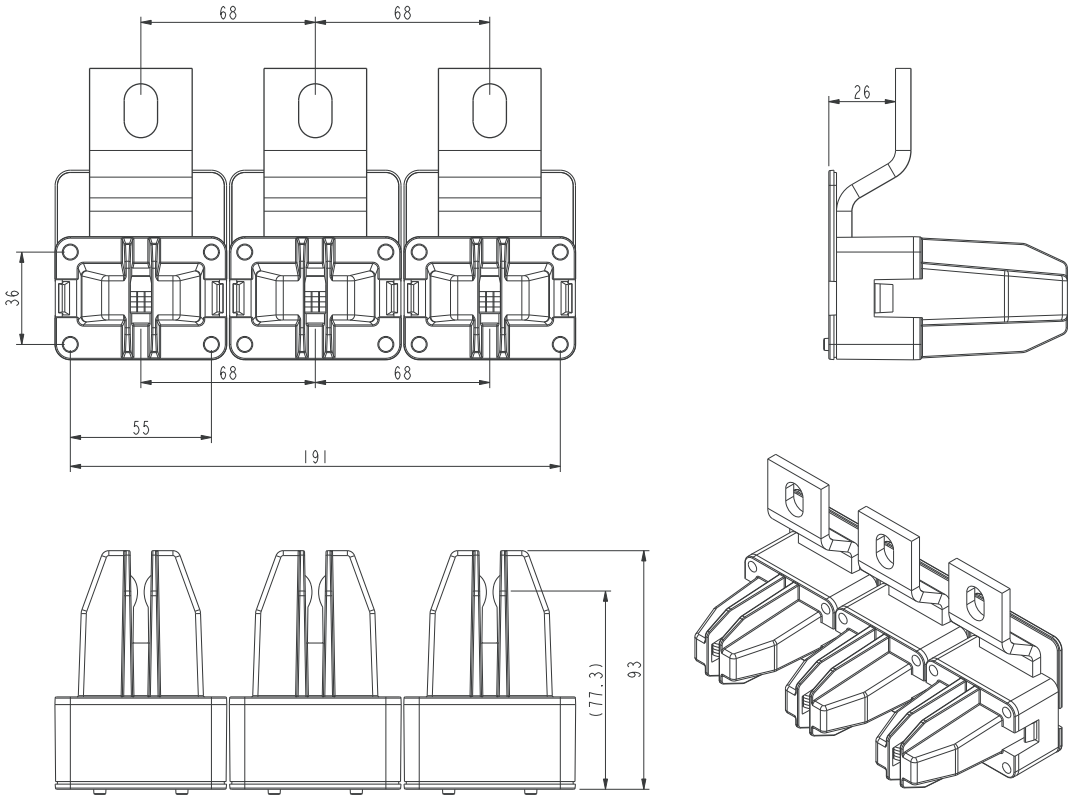
L2	mm (inch)						① ② ⌀	kg /1	5	1 2 Nm	3 4	Nm
	A	B	C	D	E	H	mm (inch)	kg (lb)		N·m (lbf·in)	mm^2	N·m (lbf·in)
NOCH0016-60	140 (5.51)	195 (7.68)	120 (4.72)	85 (3.35)	115 (4.53)	83 (3.279	–	2.4 (5.29)	M5	4 (35.40)	0.2…10	1.5 (13.28)
NOCH0030-60	165 (6.50)	215 (8.46)	145 (5.71)	108 (4.25)	130 (5.12)	95 (3.74)	–	4.7 (10.36)	M5	4 (35.40)	0.5…16	1.5 (13.28)
NOCH0070-60	180 (7.09)	261 (1028)	170 (6.69)	125 (4.92)	150 (5.91)	120 (4.72)	–	9.5 (20.94)	M6	6 (53.10)	10…35	2.5 (22.13)
NOCH0120-60	154 (6.06)	106 (4.17)	100 (3.94)	75 (2.95)	200 (7.87)	160 (6.30)	9 (0.35)	7 (15.43)	M8	20 (177.02)	–	–
NOCH0260-60	185 (7.28)	111 (4.37)	124 (4.88)	82 (3.23)	383 (1508)	368 (1449)	13 (0.51)	12 (26.46)	M10	30 (265.52)	–	–
NOCH0400-60	185 (7.28)	126 (4.96)	124 (4.88)	97 (3.82)	383 (1508)	368 (1449)	13 (0.51)	17 (37.48)	M10	30 (265.52)	–	–

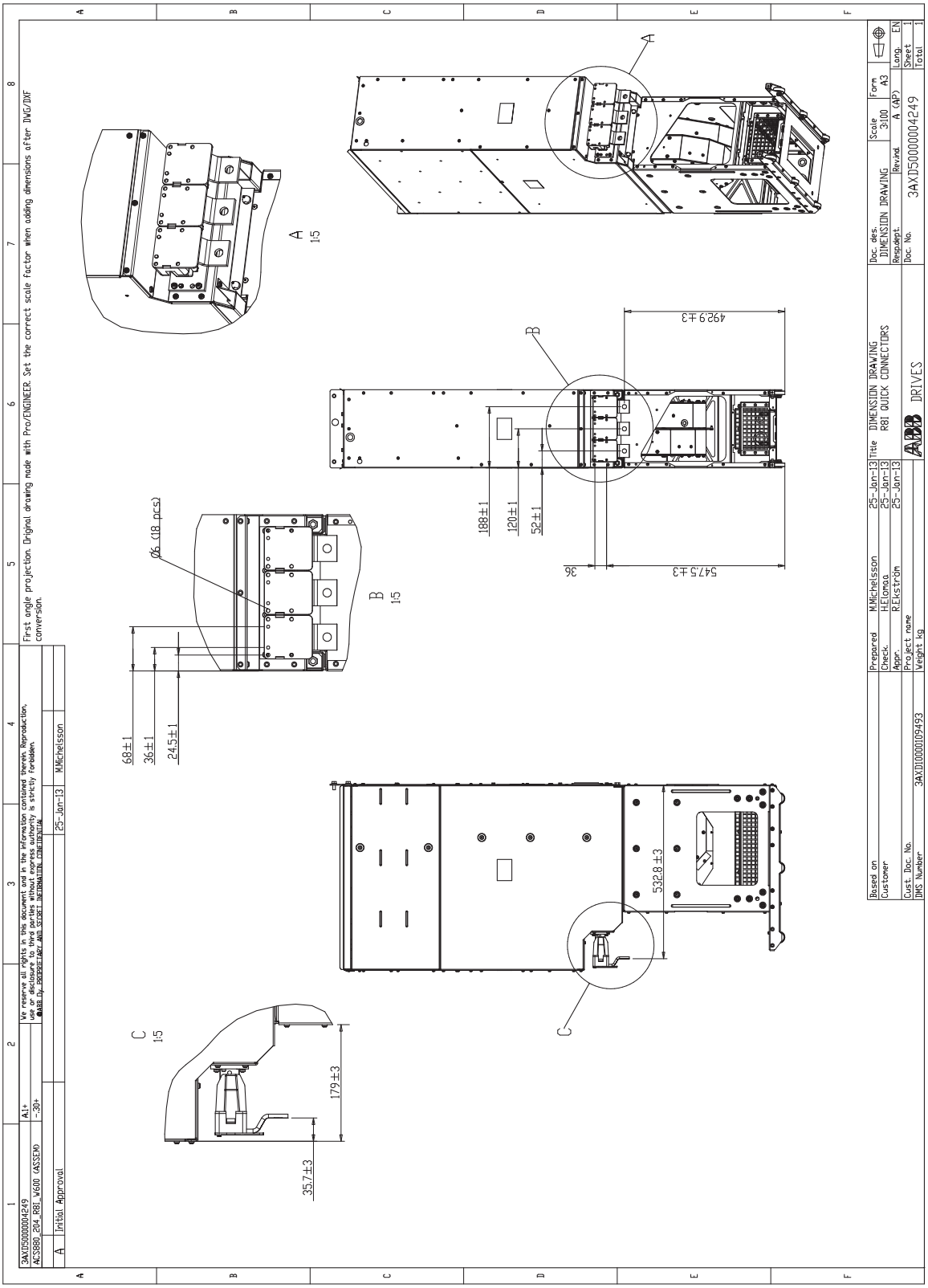
3. U1, V1, W1 4. U2, V2, W2	NOCH0016-60 NOCH0030-60 NOCH0050-60 NOCH0070-60	1. U1, V1, W1 2. U2, V2, W2	NOCH0120-60	1. U1, V1,W1 2. U2, V2, W2	NOCH0260-60 NOCH0400-60
					

Common mode filters

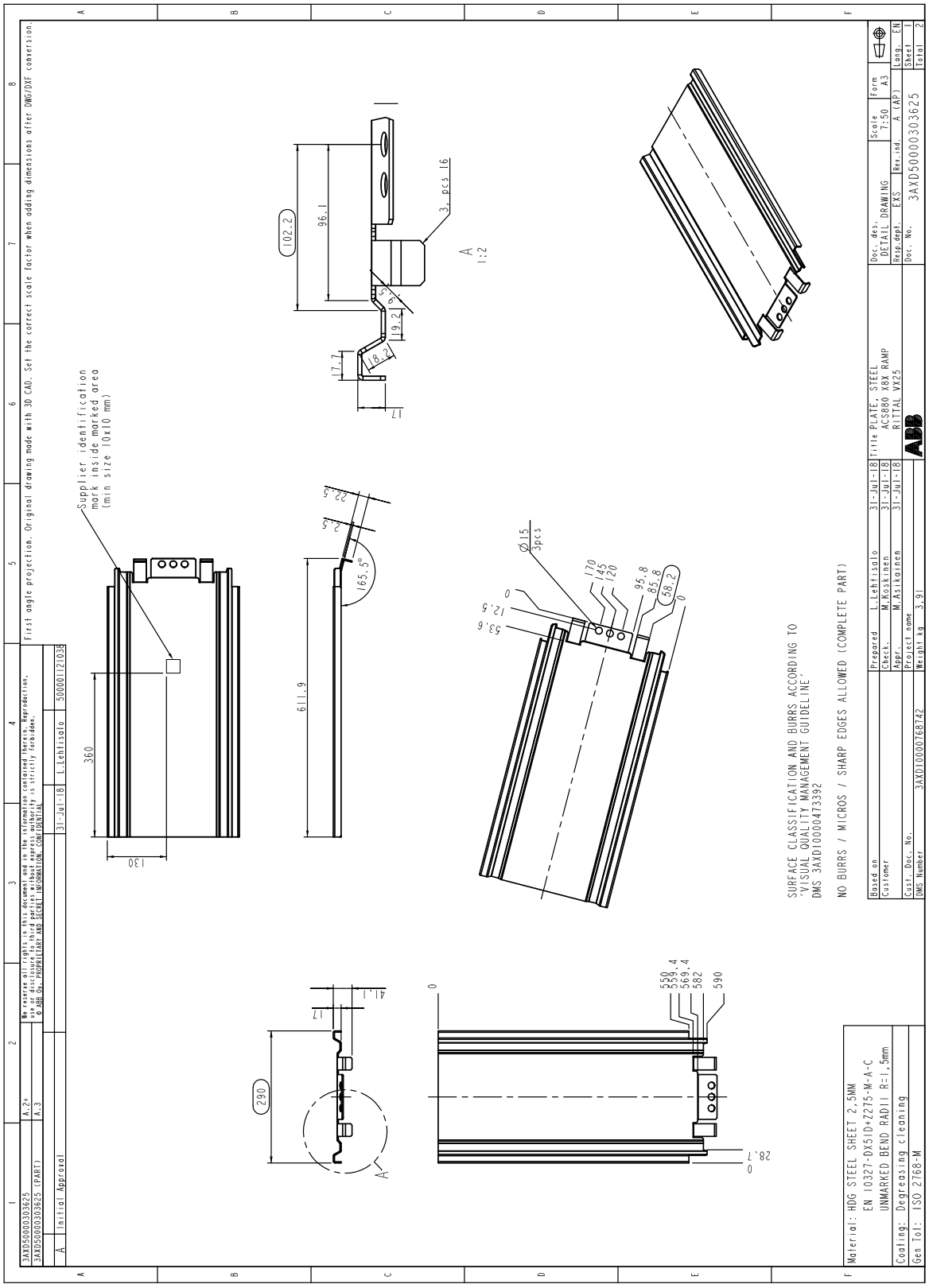


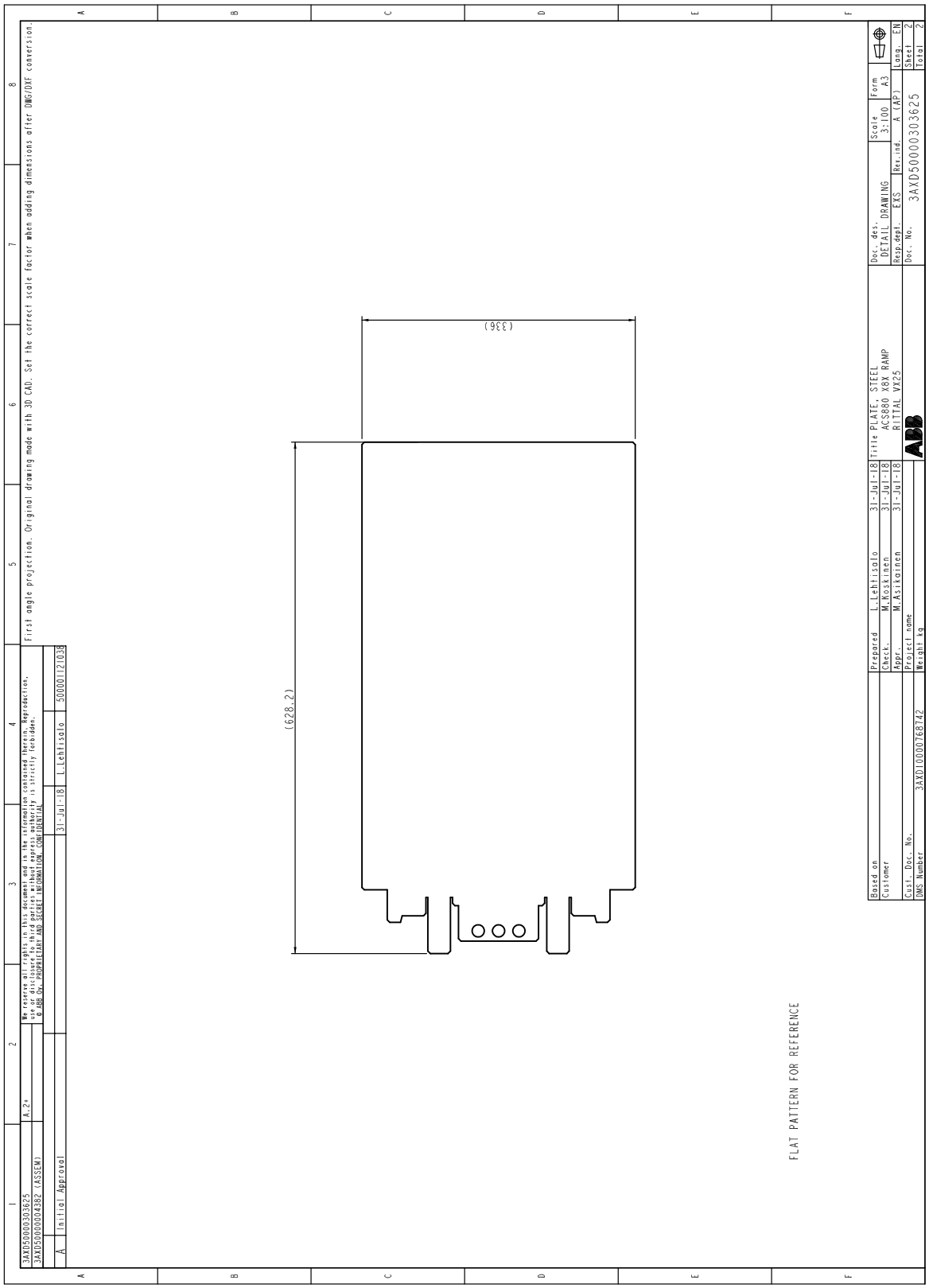
Quick connector for frame R8i




3AXD50000004249
ACS880_204_R8I_W600 (ASSEM)
A Initial Approval
25-Jan-13
M.Michelsson
First angle projection. Original drawing made with Pro/ENGINEER. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
Doc. des. DIMENSION DRAWING
Doc. No. 3AXD50000004249
Scale 3:100
Form A3
Lang. EN
Sheet 1
Total 1
Prepared M.Michelsson 25-Jan-13
Check. H.Elomaa 25-Jan-13
Appr. R.Ekström 25-Jan-13
Title DIMENSION DRAWING R8I QUICK CONNECTORS
ABB DRIVES
A 1:5
B 1:5
C 1:5
Ø6 (18 pcs)
68±1
36±1
24.5±1
188±1
120±1
52±1
36
547.5±3
492.9±3
532.8±3
179±3
35.7±3

Insertion/extraction ramp for frame R8i modules




(336)
(628.2)
FLAT PATTERN FOR REFERENCE
3AXD50000303625
3AXD50000004382 (ASSEM)
A
Initial Approval
A.2+
L.Lehtisalo
31-Jul-18
5000011210 38
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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.
Based on
Customer
Prepared L.Lehtisalo 31-Jul-18
Check. M.Koskinen 31-Jul-18
Appr. M.Asikainen 31-Jul-18
Cust. Doc. No.
Project name
DMS Number 3AXD10000768742
Weight kg
Title PLATE, STEEL
ACS880 V8X RAMP
RITTAL VX25
ABB
Doc. des. DETAIL DRAWING
Resp.dept. EKS
Doc. No. 3AXD50000303625
Scale 3:100
Rev.ind. A (AP)
Form A3
Lang. EN
Sheet 2
Total 2

15. 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 (page 353)*.

Component designations used in the diagrams

Frames R1i…R5i

Designation	Component
A41.x	ZCU control unit
A47	FDPI diagnostics and control panel interface. For constructing a panel bus between inverter modules without front cover, see *Panel bus (Control of several units from one control panel) (page 183)*.
A48	DPMP-01 panel mounting platform kit (to be ordered separately)
A49	ACS-AP-W control panel
F10.x	Main DC fuses
F11.x	Module-specific DC fuses
G26.x	Roof fan
K26	Roof fan control relay
Q11	Main DC switch/disconnector
R12	du/dt filter
T11	Inverter module
T22	24 V DC power supply

Frame R6i

Designation	Component
A41	ZCU control unit
A47	FDPI diagnostics and control panel interface. For constructing a panel bus between inverter modules without front cover, see *Panel bus (Control of several units from one control panel) (page 183)*.
A48	DPMP-01 panel mounting platform kit (to be ordered separately)
A49	ACS-AP-W control panel
F11.x	DC fuses
Q11	Main DC switch/disconnector
R12	Output (du/dt) filter
T11	Inverter module
T22	24 V DC power supply
Z1.x	Common mode filters

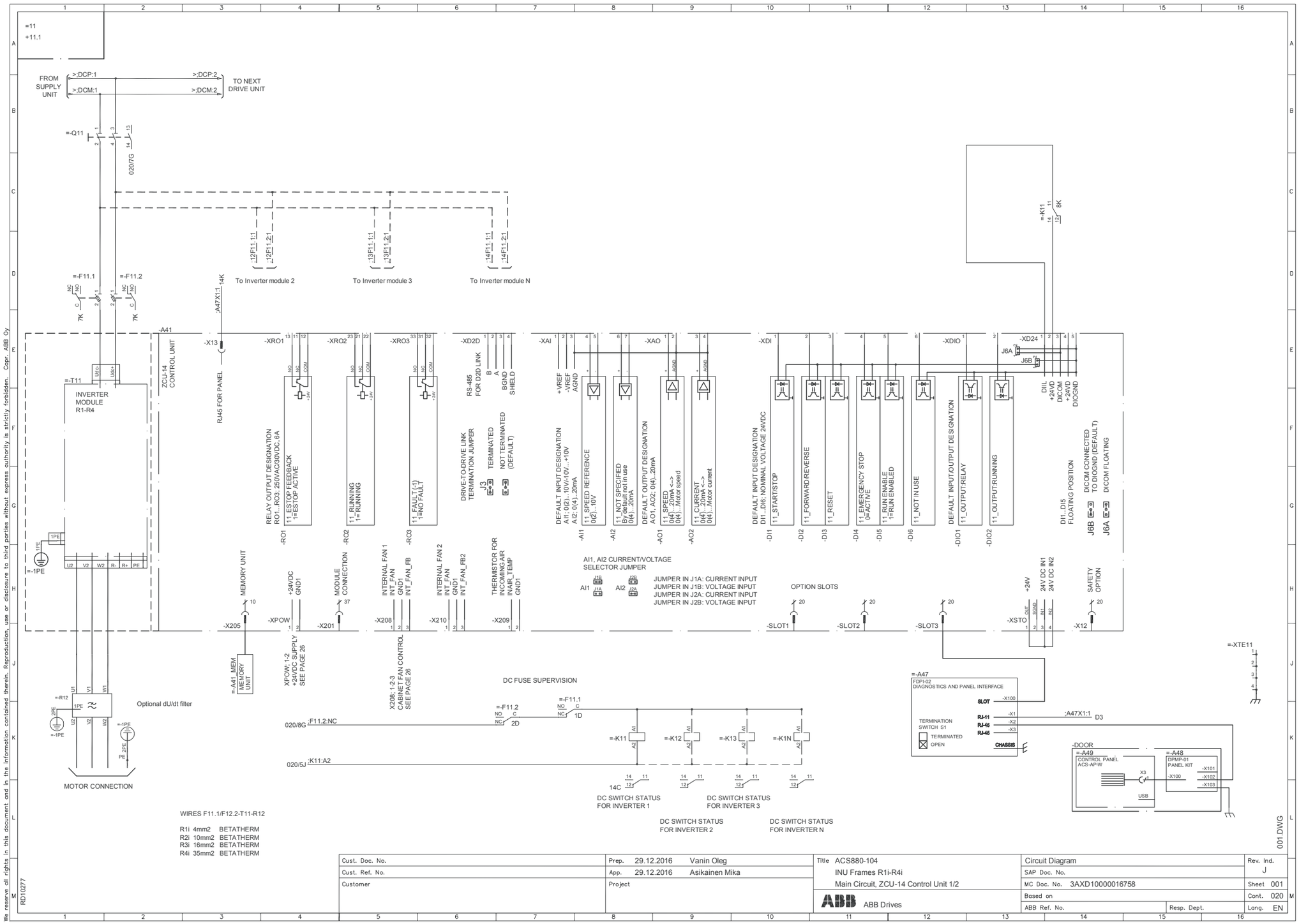
Frame R7i

Designation	Component
A47	FDPI diagnostics and control panel interface. For constructing a panel bus between inverter modules without front cover, see *Panel bus (Control of several units from one control panel) (page 183)*.
A48	DPMP-01 panel mounting platform kit (to be ordered separately)
A49	ACS-AP-W control panel
A51	ZCU control unit
F11.x	DC fuses
Q11	Main DC switch/disconnector
Q14	Charging contactor
R14.x	Charging resistors
T11	Inverter module
T22	24 V DC power supply
Z1.x	Common mode filters

Frame R8i and multiples

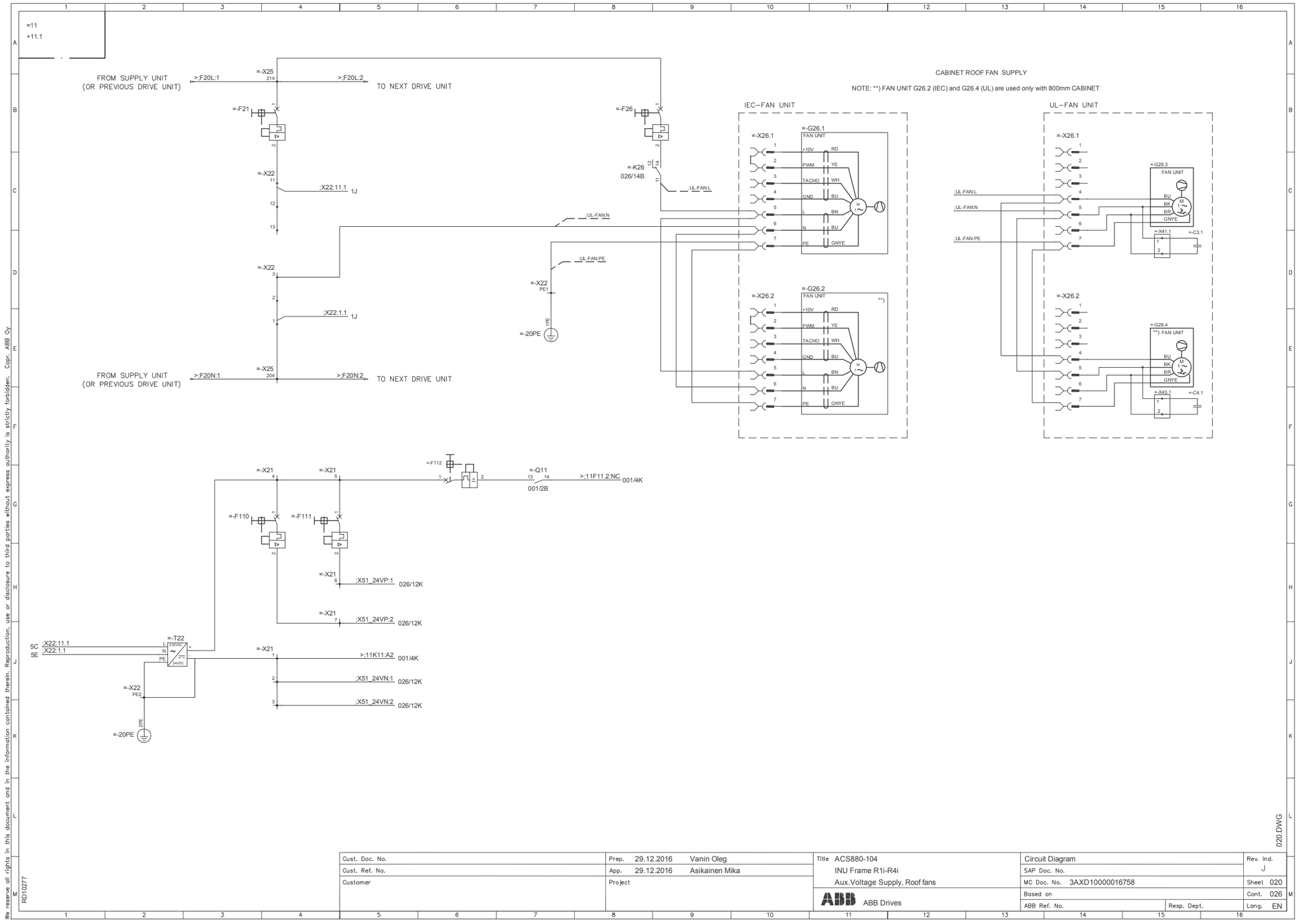
Designation	Component
A11.x	Charging controller
A41	BCU control unit
A47	FDPI diagnostics and control panel interface. For constructing a panel bus between inverter modules without front cover, see *Panel bus (Control of several units from one control panel) (page 183)*.
A48	DPMP-01 panel mounting platform kit (to be ordered separately)
A49	ACS-AP-W control panel
F11.xx	DC fuses
Q10.x	Charging switch
Q11.x	Main DC switch/disconnector
R10.x	Charging resistors
R11.xx	Common mode filters
T11.x	Inverter module
T22	External 24 V DC power supply

Frames R1i…R4i – Sheet 001 (Main circuit, control unit)



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Frames R1i…R4i – Sheet 020 (Auxiliary voltage distribution)



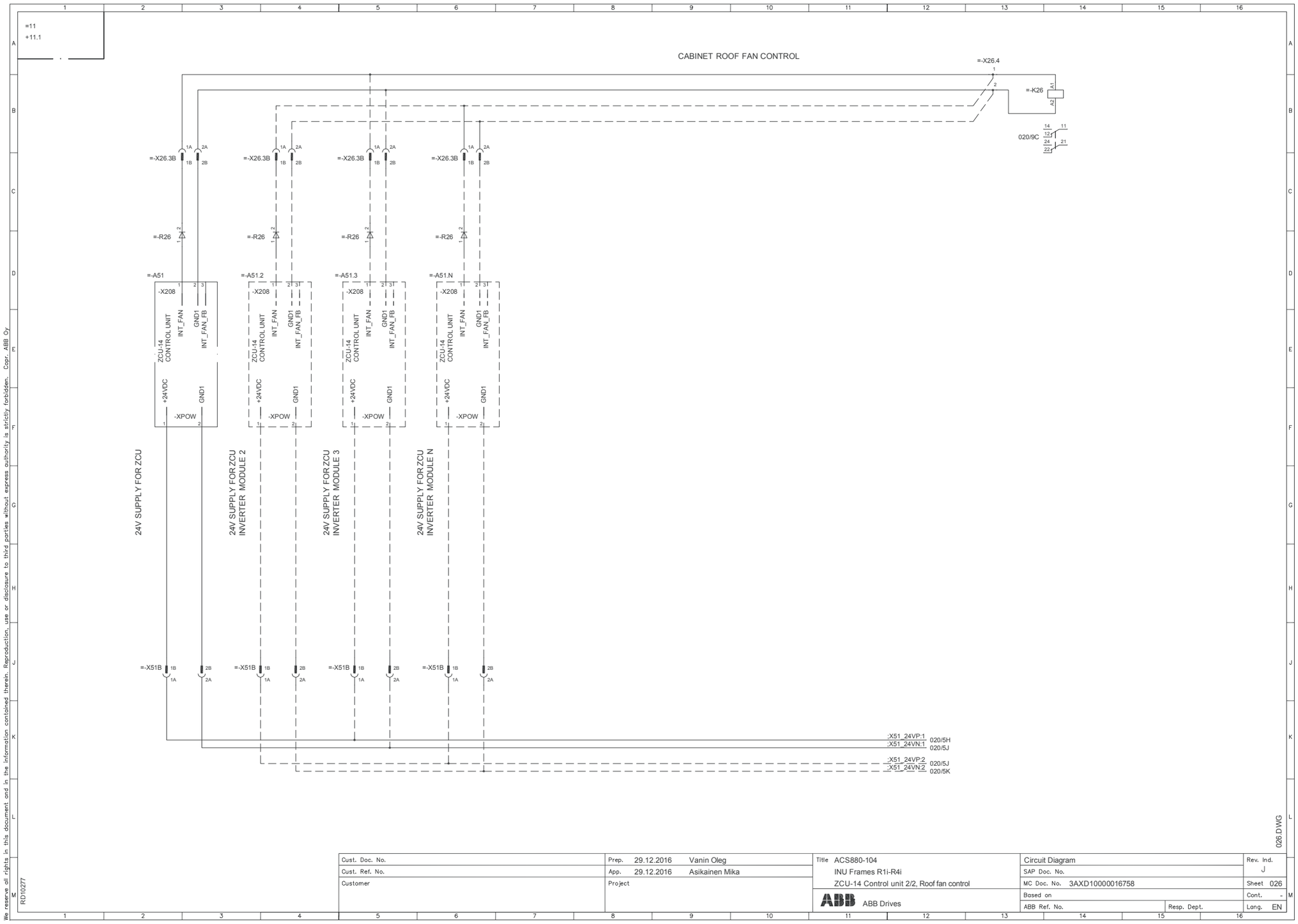
Cust. Doc. No.	Prep. 29.12.2016 Vanin Oleg	Title ACS880-104	Circuit Diagram		Rev. Ind. J
Cust. Ref. No.	App. 29.12.2016 Asikainen Mika	INU Frame R1i-R4i	SAP Doc. No.		
Customer	Project	Aux.Voltage Supply, Roof fans	MC Doc. No. 3AXD10000016758		Sheet 020
		ABB Drives	Based on		Cont. 026
			ABB Ref. No.	Resp. Dept.	Lang. EN

RD10277

020.DWG

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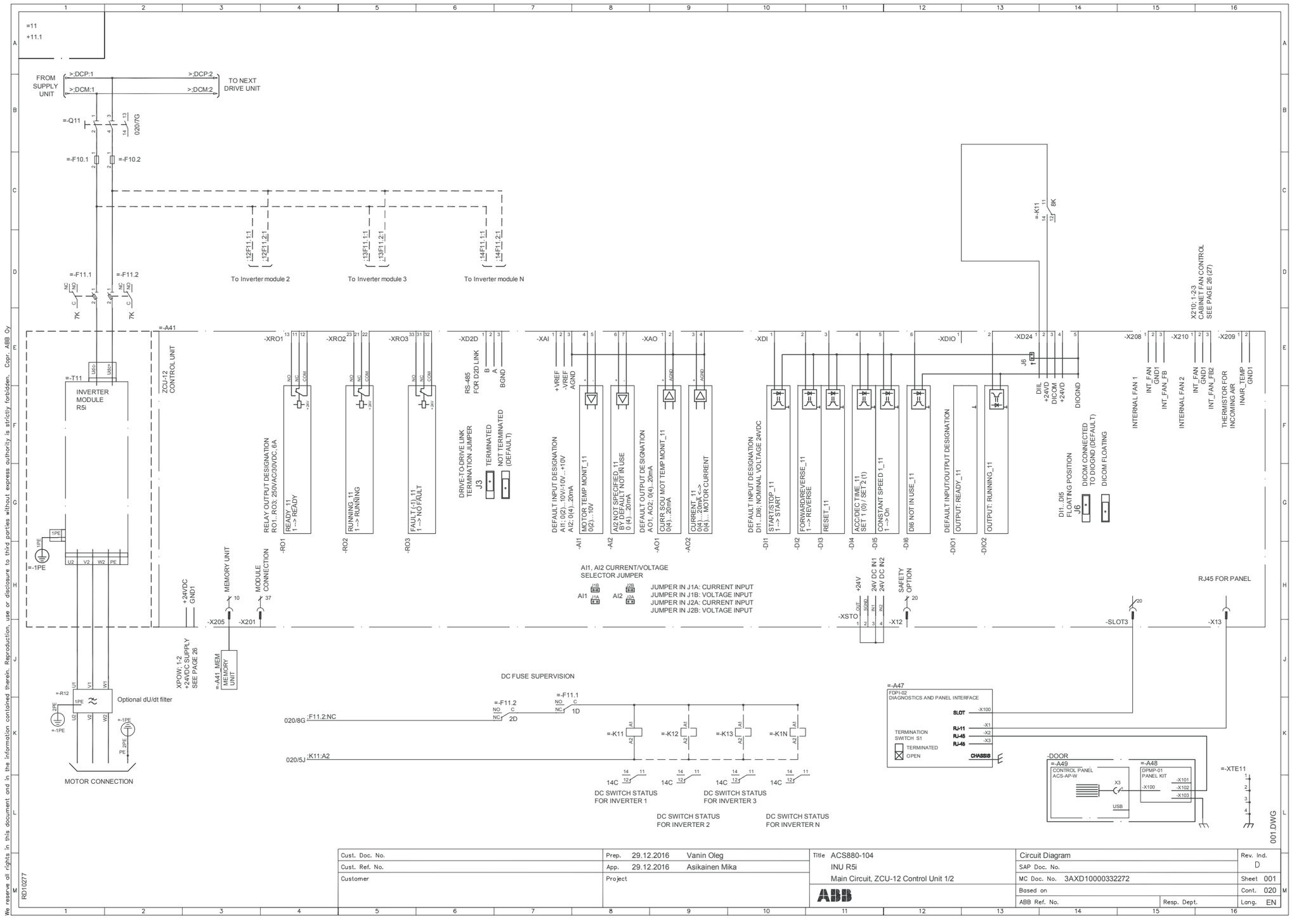
Frames R1i…R4i – Sheet 026 (Cabinet cooling fan control)



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Cust. Doc. No.	Prep. 29.12.2016 Vanin Oleg	Title ACS880-104 INU Frames R1i-R4i ZCU-14 Control unit 2/2, Roof fan control	Circuit Diagram / Rev. Ind. J
Cust. Ref. No.	App. 29.12.2016 Asikainen Mika		SAP Doc. No.
Customer	Project	ABB Drives	MC Doc. No. 3AXD10000016758 / Sheet 026
RD10277			Based on / Cont. -
			ABB Ref. No. / Resp. Dept. / Lang. EN

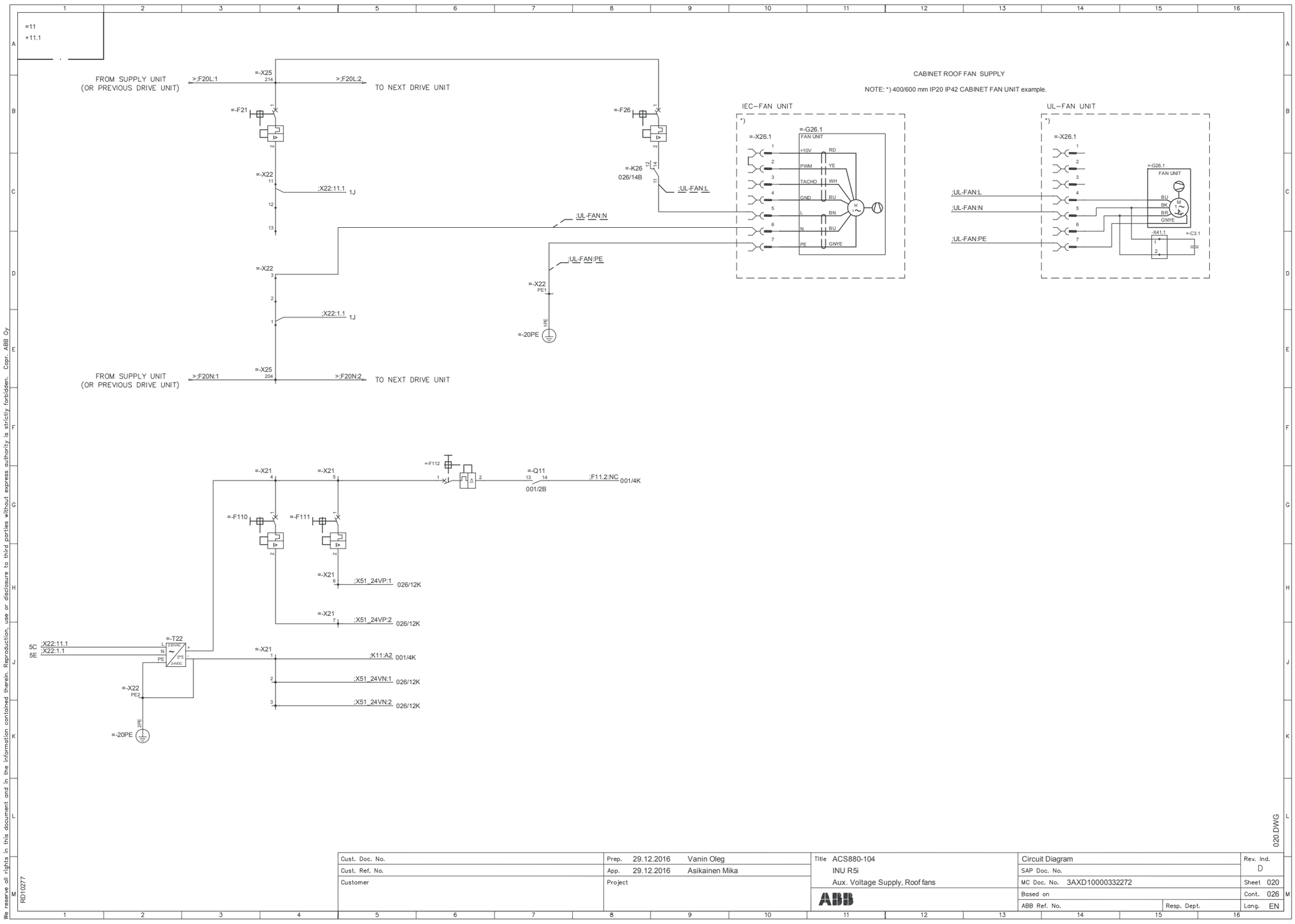
Frame R5i – Sheet 001 (Main circuit, control unit)



Cust. Doc. No.	Prep. 29.12.2016 Vanin Oleg	Title ACS880-104 INU R5i Main Circuit, ZCU-12 Control Unit 1/2	Circuit Diagram / Rev. Ind. D
Cust. Ref. No.	App. 29.12.2016 Asikainen Mika		SAP Doc. No.
Customer	Project		MC Doc. No. 3AXD10000332272 / Sheet 001
		ABB	Based on / Cont. 020
RD10277			ABB Ref. No. / Resp. Dept. / Lang. EN

001.DWG

Frame R5i – Sheet 020 (Auxiliary voltage distribution)

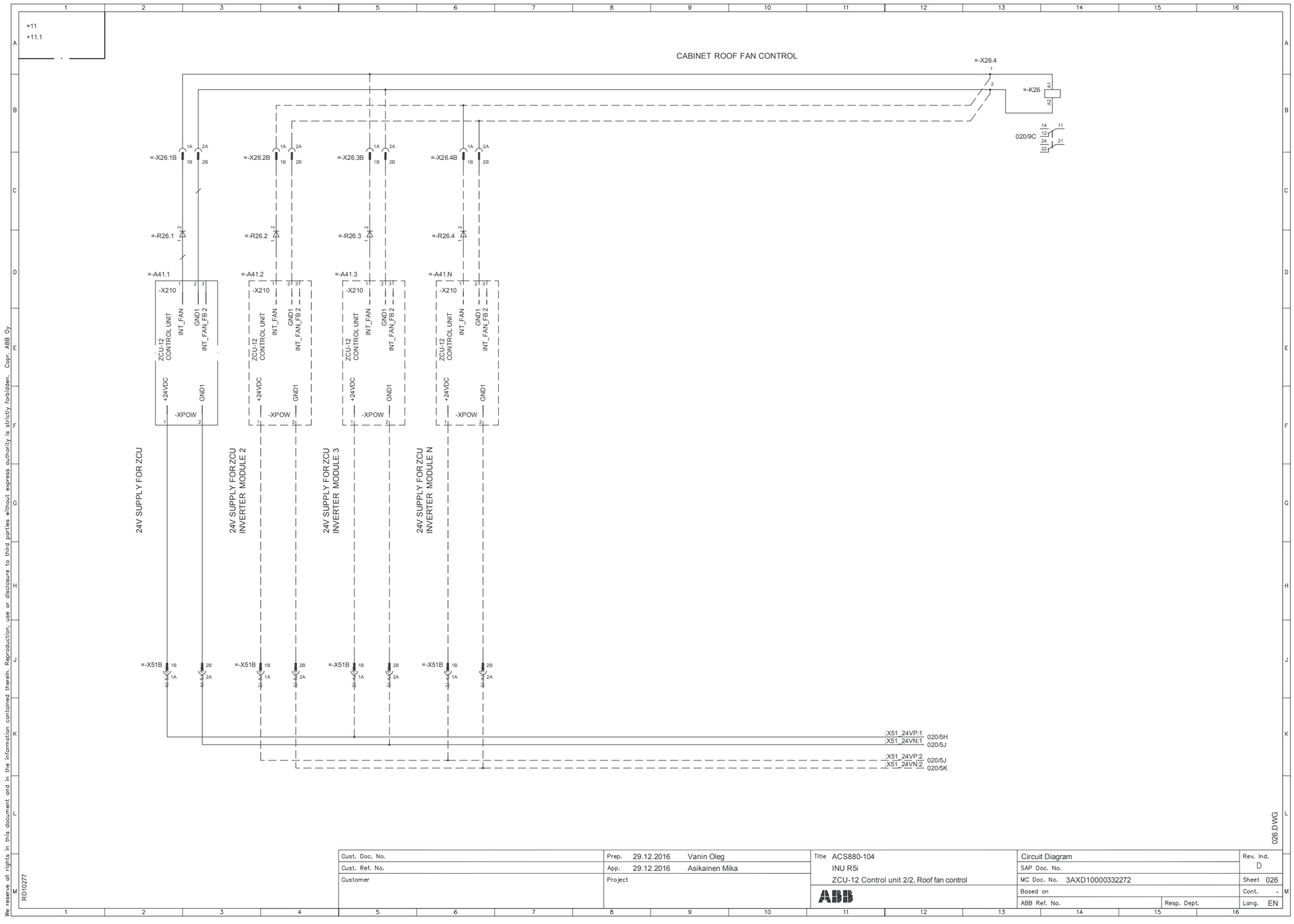


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Cust. Doc. No.	Prep. 29.12.2016 Vanin Oleg	Title ACS880-104	Circuit Diagram	Rev. Ind. D
Cust. Ref. No.	App. 29.12.2016 Asikainen Mika	INU R5i	SAP Doc. No.	
Customer	Project	Aux. Voltage Supply, Roof fans	MC Doc. No. 3AXD10000332272	Sheet 020
RD10277		ABB	Based on	Cont. 026
			ABB Ref. No. / Resp. Dept.	Lang. EN

020.DWG

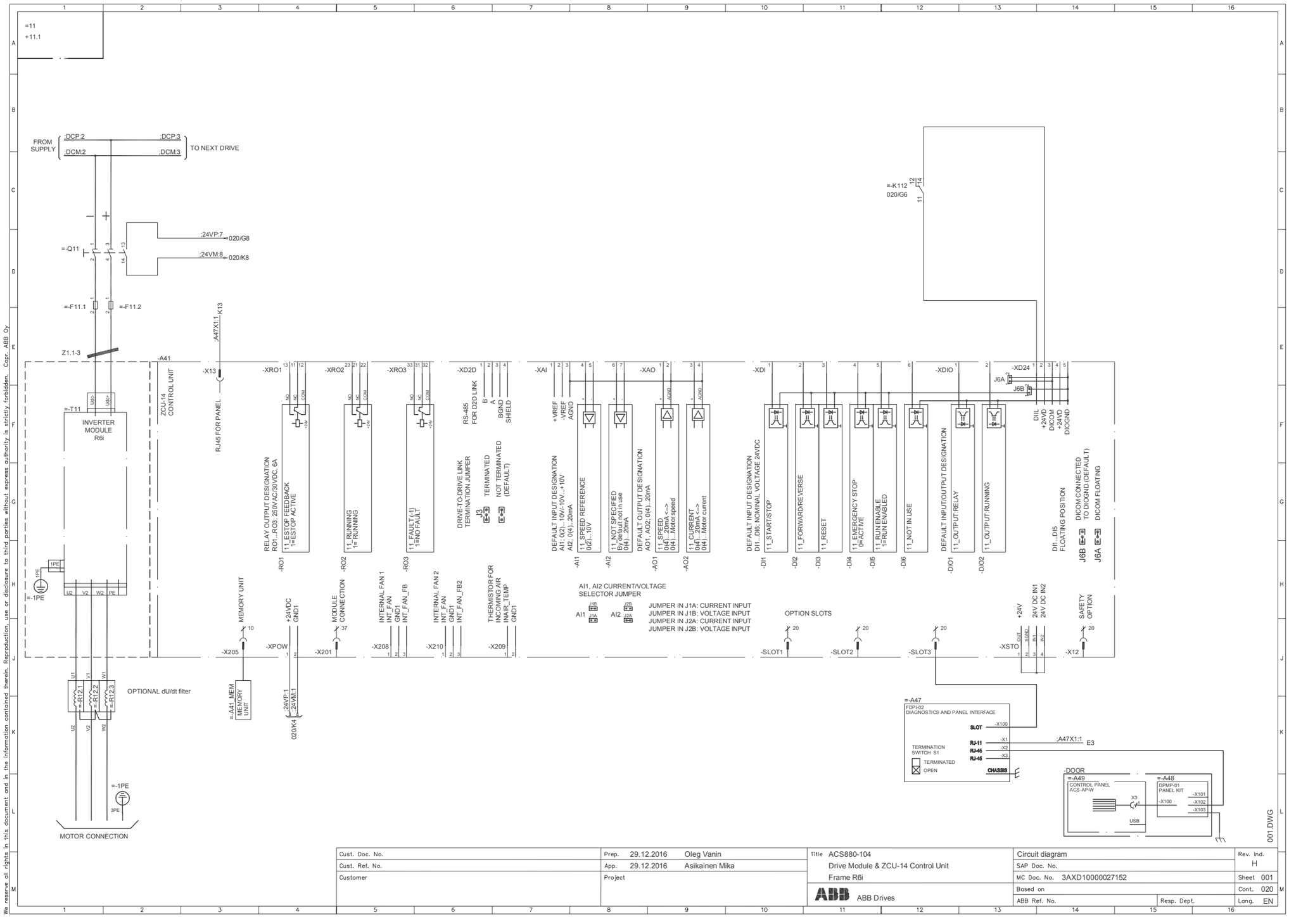
Frame R5i – Sheet 026 (Cabinet cooling fan control)



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Cust. Doc. No.	Prep. 29.12.2016 Vanin Oleg	Title ACS880-104 INU R5i ZCU-12 Control unit 2/2, Roof fan control	Circuit Diagram / Rev. Ind. D
Cust. Ref. No.	App. 29.12.2016 Asikainen Mika		SAP Doc. No.
Customer	Project	ABB	MC Doc. No. 3AXD10000332272 / Sheet 026
RD10277			Based on / Cont. -
			ABB Ref. No. / Resp. Dept. / Lang. EN

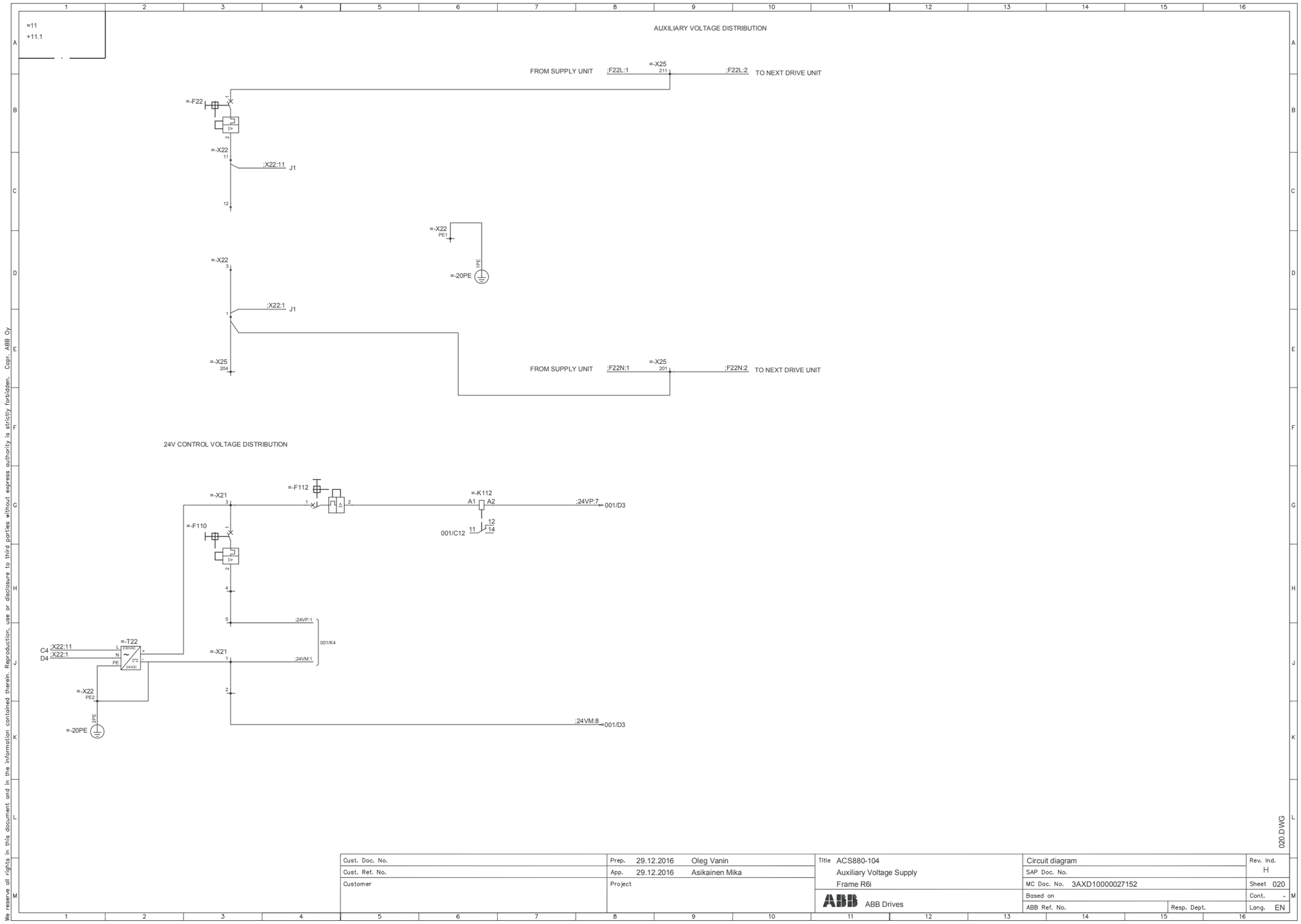
Frame R6i – Sheet 001 (Main circuit, control unit)



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Cust. Doc. No.	Prep. 29.12.2016 Oleg Vanin	Title ACS880-104 Drive Module & ZCU-14 Control Unit Frame R6i	Circuit diagram / Rev. Ind. H
Cust. Ref. No.	App. 29.12.2016 Asikainen Mika		SAP Doc. No. / Sheet 001
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			Based on / Lang. EN
			ABB Ref. No. / Resp. Dept.

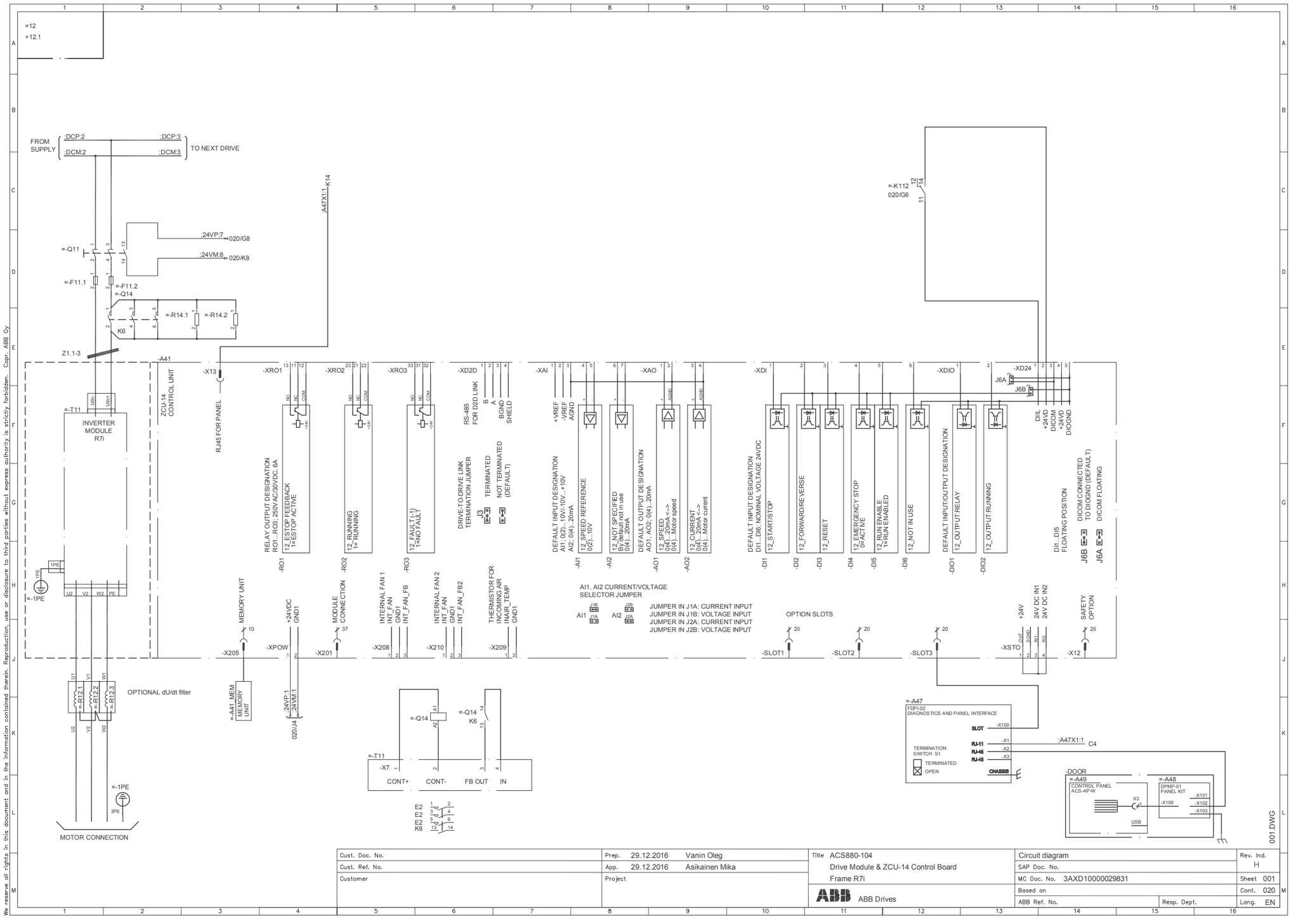
Frame R6i – Sheet 020 (Auxiliary voltage distribution)



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Cust. Ref. No.	App. 29.12.2016 Asikainen Mika		SAP Doc. No.
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			Based on / Cont. -
			ABB Ref. No. / Resp. Dept. / Lang. EN

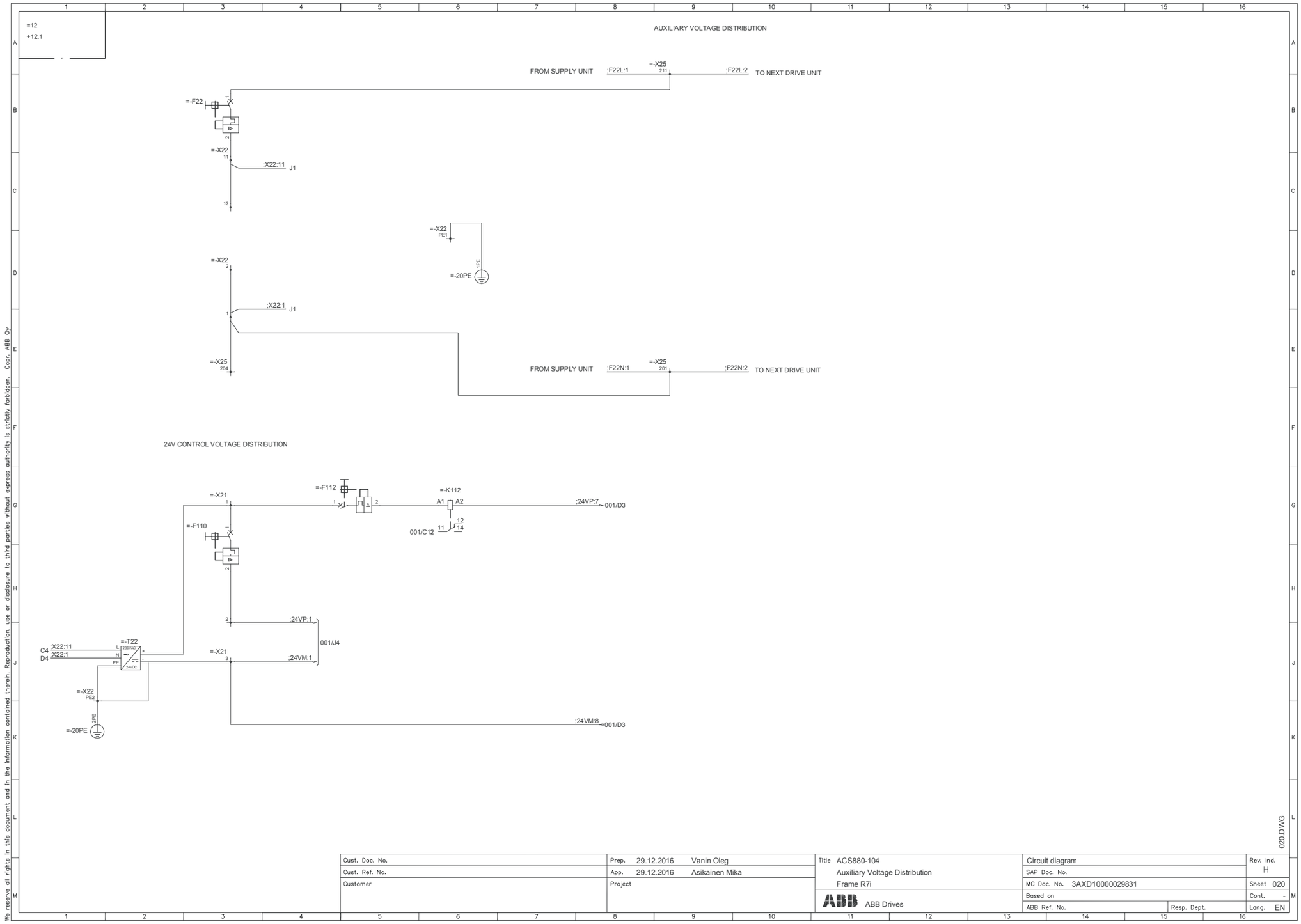
Frame R7i – Sheet 001 (Main circuit, control unit)



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Cust. Ref. No.	App. 29.12.2016 Asikainen Mika		SAP Doc. No. / Sheet 001
Customer	Project	ABB Drives	MC Doc. No. 3AXD10000029831 / Cont. 020
			Based on / Lang. EN
			ABB Ref. No. / Resp. Dept.

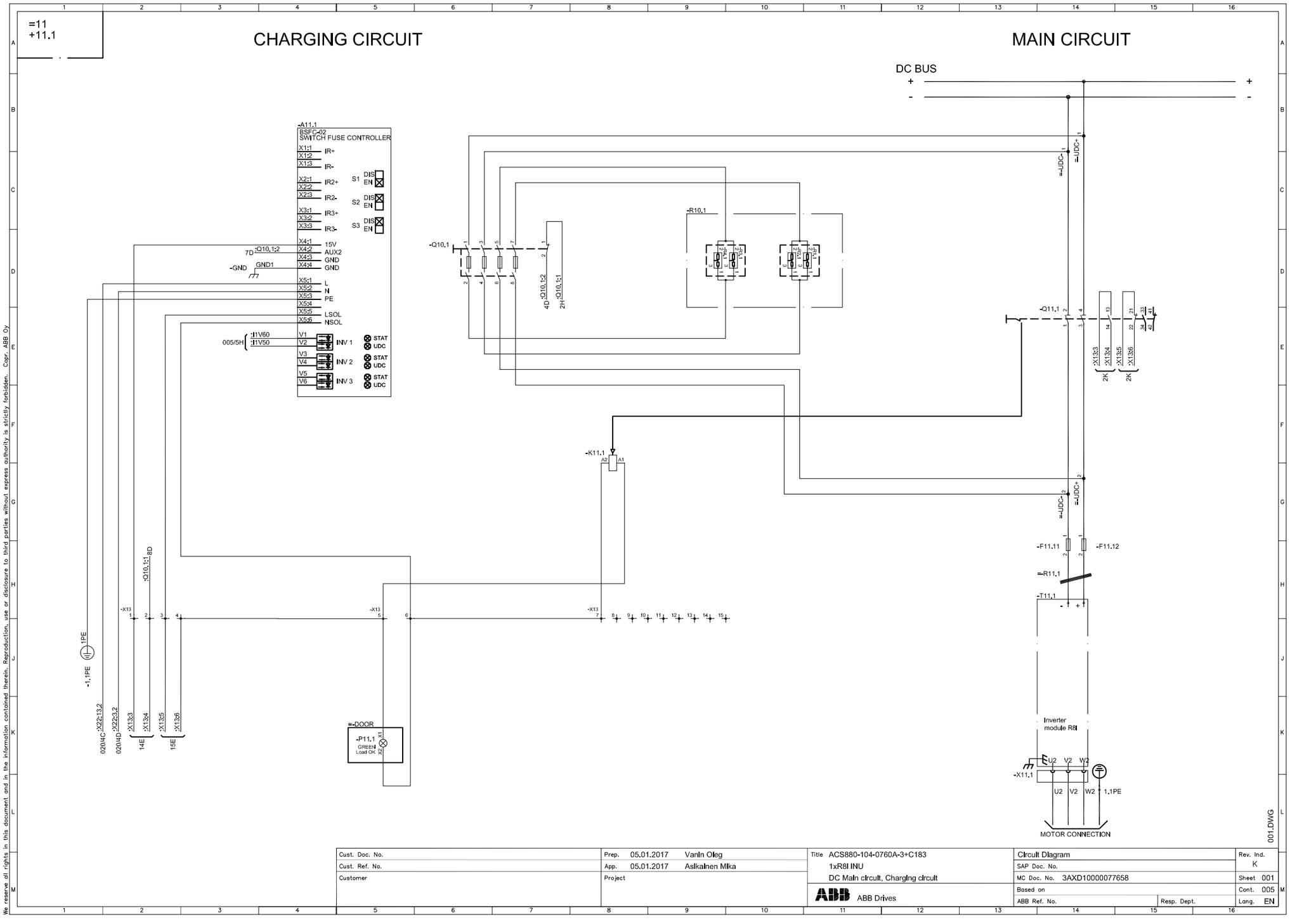
Frame R7i – Sheet 020 (Auxiliary voltage distribution)



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Cust. Doc. No.	Prep. 29.12.2016 Vanin Oleg	Title ACS880-104 Auxiliary Voltage Distribution Frame R7i	Circuit diagram / Rev. Ind. H
Cust. Ref. No.	App. 29.12.2016 Asikainen Mika		SAP Doc. No.
Customer	Project	ABB Drives	MC Doc. No. 3AXD10000029831 / Sheet 020
			Based on / Cont. -
			ABB Ref. No. / Resp. Dept. / Lang. EN

Frame R8i (with DC switch/disconnector) – Sheet 001 (DC circuit)



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Cust. Doc. No.	Prep. 05.01.2017 Vanin Oleg	Title ACS880-104-0760A-3+C183	Circuit Diagram / Rev. Ind. K
Cust. Ref. No.	App. 05.01.2017 Aslkalnen Mika	1xR8I INU	SAP Doc. No.
Customer	Project	DC Main circuit, Charging circuit	MC Doc. No. 3AXD10000077658 / Sheet 001
		ABB Drives	Based on / Cont. 005
			ABB Ref. No. / Resp. Dept. / Lang. EN

Frame R8i (with DC switch/disconnector) – Sheet 005 (Inverter module)

=11
+11.1

INVERTER MODULE 1xR8I

=-T11.1

=-X50.1
1 FAN U
2 FAN V
3 FAN W
4 BDPS L
5 BDPS N
6
7 HEAT L
8 HEAT N
9

020/4C :X22:13.1
020/4D :X22:3.1
020/14G :HEAT.1:L
:HEAT.1:N

=-X53.1
1 GND BCON
2 24VDC BCON
3 GND
4 24 VDC
5 FE

040/4K :A41:V1R
:A41:V1T

V10
V20
V30
V40
V60 :1V60
V50 :1V50 001/4E

DC FAN X54
AC FAN X55
FAN BOX
DC FAN HEATER

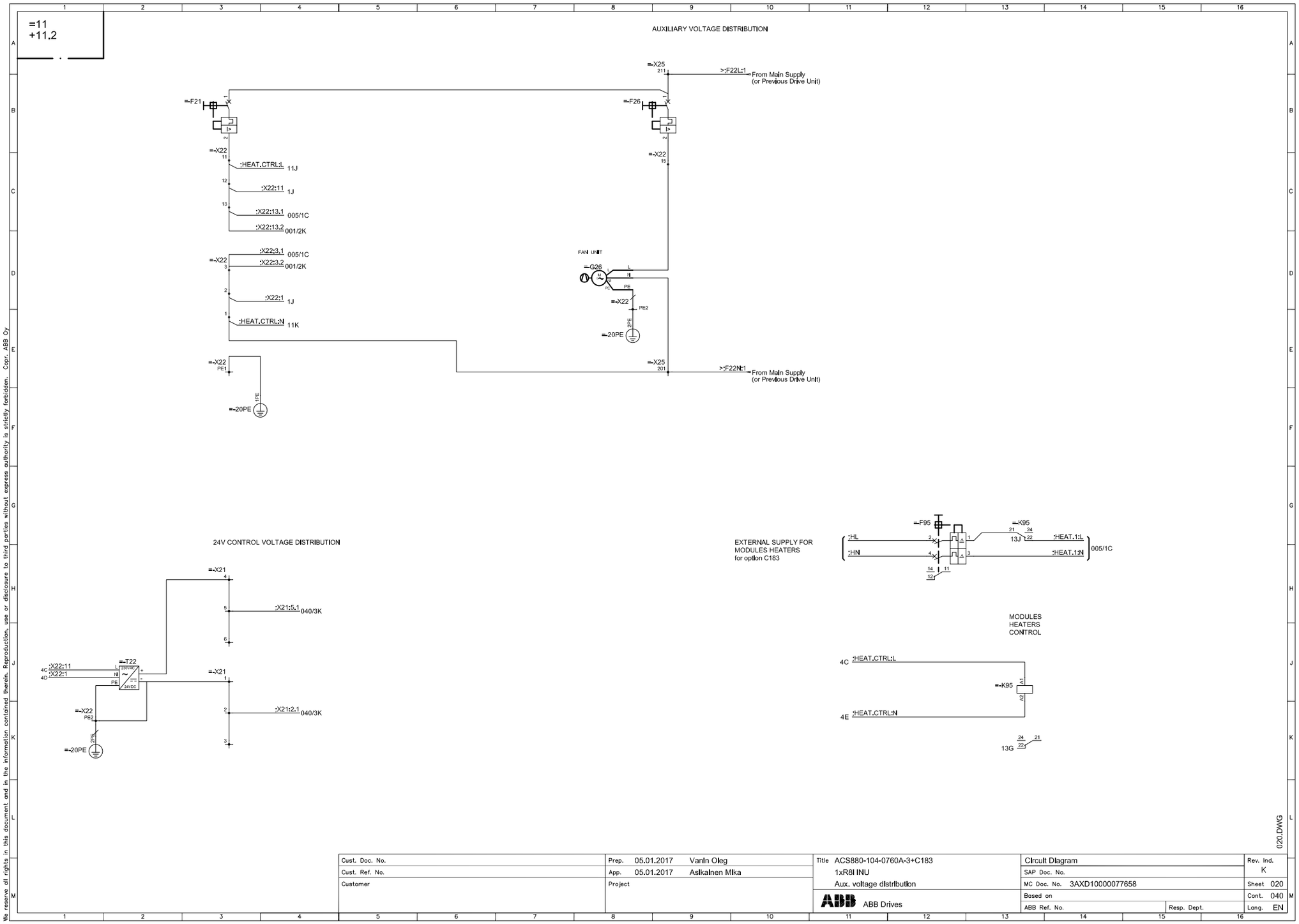
V1
V2

005.DWG

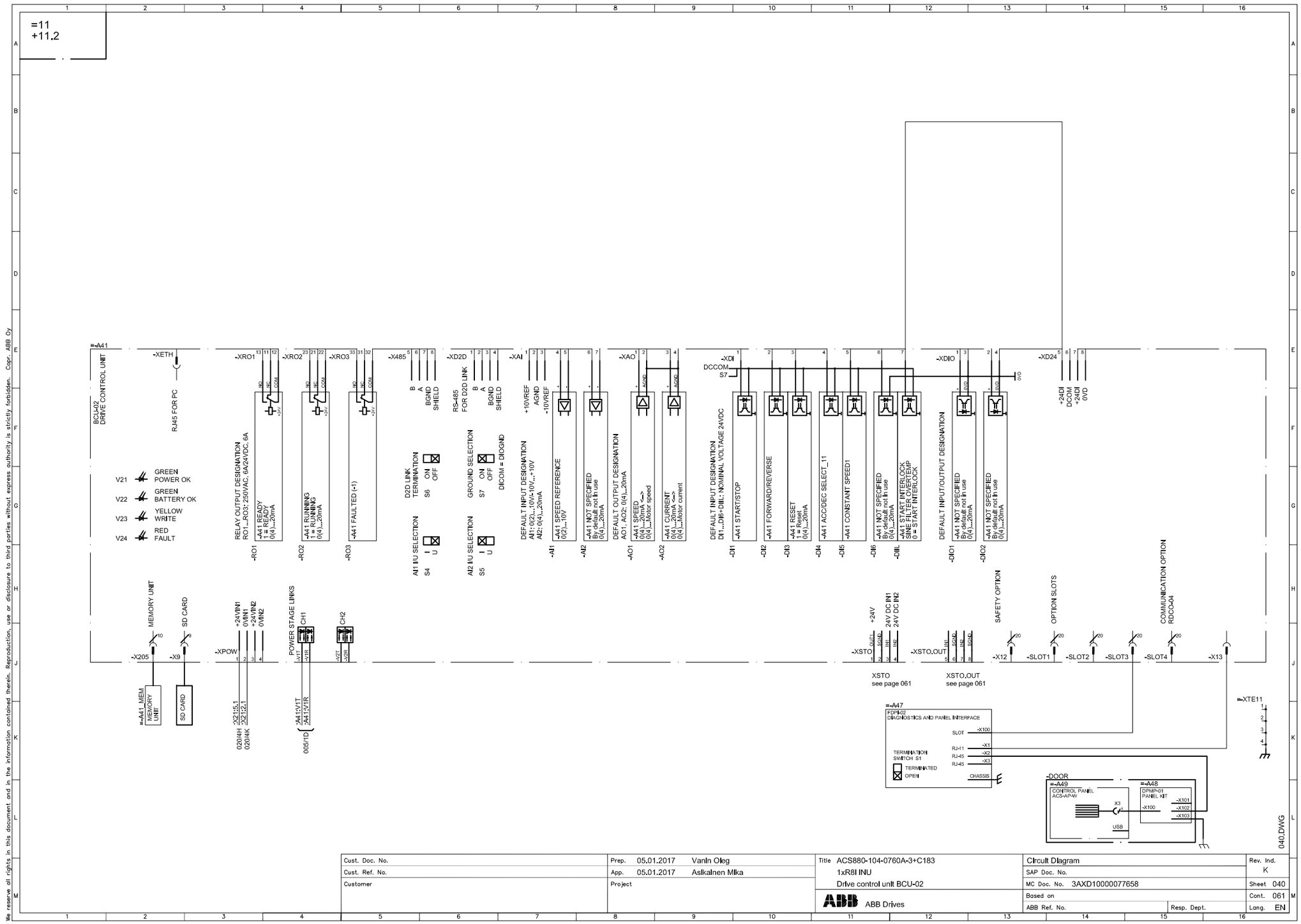
Cust. Doc. No.	Prep. 05.01.2017 Vanln Oleg	Title ACS880-104-0760A-3+C183	Circuit Diagram / Rev. Ind. K
Cust. Ref. No.	App. 05.01.2017 Aslkalnen Mka	1xR8I INU	SAP Doc. No.
Customer	Project	Module connections	MC Doc. No. 3AXD10000077658 / Sheet 005
		ABB Drives	Based on / Cont. 020
			ABB Ref. No. / Resp. Dept. / Lang. EN

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Frame R8i (with DC switch/disconnector) – Sheet 020 (Auxiliary voltage distribution)



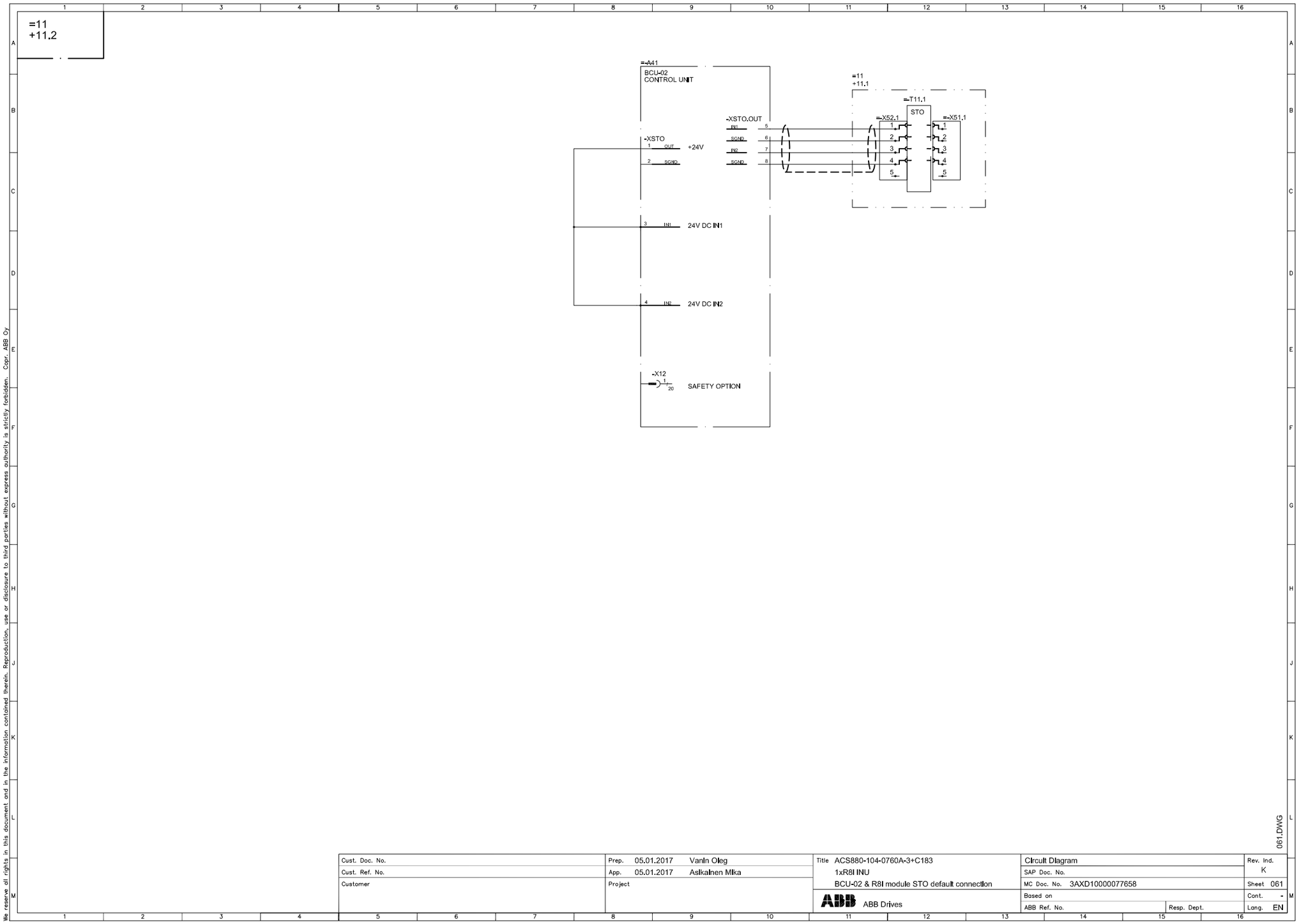
Frame R8i (with DC switch/disconnector) – Sheet 040 (Control unit)



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Cust. Doc. No.	Prep. 05.01.2017 Vanln Oleg	Title ACS880-104-0760A-3+C183	Circuit Diagram / Rev. Ind.
Cust. Ref. No.	App. 05.01.2017 Aslkalnen Mlka	1xR8I INU	SAP Doc. No. / K
Customer	Project	Drive control unlt BCU-02	MC Doc. No. 3AXD10000077658 / Sheet 040
		ABB Drives	Based on / Cont. 061
			ABB Ref. No. / Resp. Dept. / Lang. EN

Frame R8i (with DC switch/disconnector) – Sheet 061 (STO)



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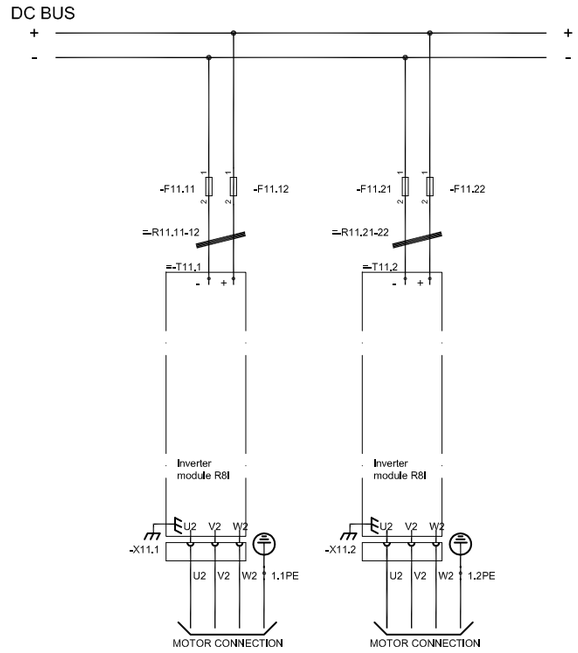
Cust. Doc. No.	Prep. 05.01.2017 Vanln Oleg	Title ACS880-104-0760A-3+C183	Circuit Diagram
Cust. Ref. No.	App. 05.01.2017 Aslkalnen Mlka	1xR8I INU	SAP Doc. No.
Customer	Project	BCU-02 & R8I module STO default connection	MC Doc. No. 3AXD10000077658
		ABB Drives	Based on
			ABB Ref. No. / Resp. Dept.

Rev. Ind. K | Sheet 061 | Cont. - | Lang. EN

Frame 2×R8i – Sheet 001 (DC circuit)

=11
+11.1

DC MAIN CIRCUIT

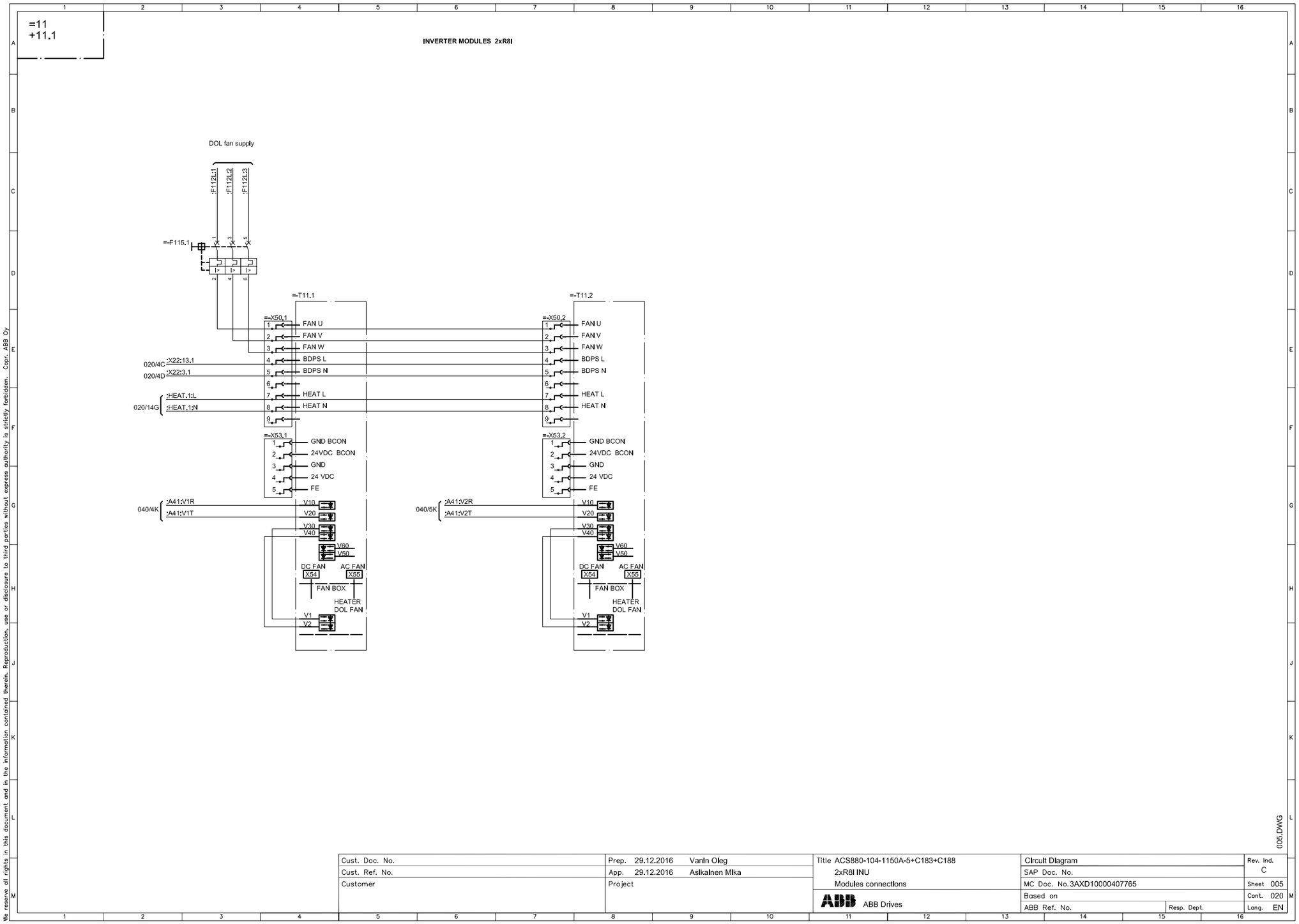


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001.DWG

Cust. Doc. No.	Prep. 29.12.2016 Vanin Oleg	Title ACS880-104-1150A-5+C183+C188	Circuit Diagram		Rev. Ind. C
Cust. Ref. No.	App. 29.12.2016 Aslkalnen Mika	2xR8I INU	SAP Doc. No.		
Customer	Project	DC Main circuit	MC Doc. No. 3AXD10000407765		Sheet 001
		ABB Drives	Based on		Cont. 005
			ABB Ref. No.	Resp. Dept.	Lang. EN

Frame 2×R8i – Sheet 005 (Inverter modules)



Frame 2×R8i – Sheet 020 (Auxiliary voltage distribution)

=11
+11.2

AUXILIARY VOLTAGE DISTRIBUTION

=X25 211 >:F22L:1 From Main Supply (or Previous Drive Unit)

=F21 =F26

=X22 11 :HEAT.CTRL:L 11J
12 :X22:11 1J
13 :X22:13.1 005/1C

=X22 3 :X22:3.1 005/1C
2 :X22:1 1J
1 :HEAT.CTRL:N 11K

FAN UNIT
=G26 L N PE
=X22 PE2
=20PE YPE

=X22 PE1
=-20PE YPE

=X25 201 >:F22N:1 From Main Supply (or Previous Drive Unit)

24V CONTROL VOLTAGE DISTRIBUTION

=T22 230VAC 24VDC
4C :X22:11
4D :X22:1
=X22 PE2
=20PE 2PE

=X21 4 5 :X21:5.1 040/3K 6
=X21 1 2 :X21:2.1 040/3K 3

EXTERNAL SUPPLY FOR MODULES HEATERS for option C183

=F95 2 4 14 12
:HL
:HN
=-K95 21 24 13J 22 1 3 :HEAT.1:L :HEAT.1:N 005/1C

MODULES HEATERS CONTROL

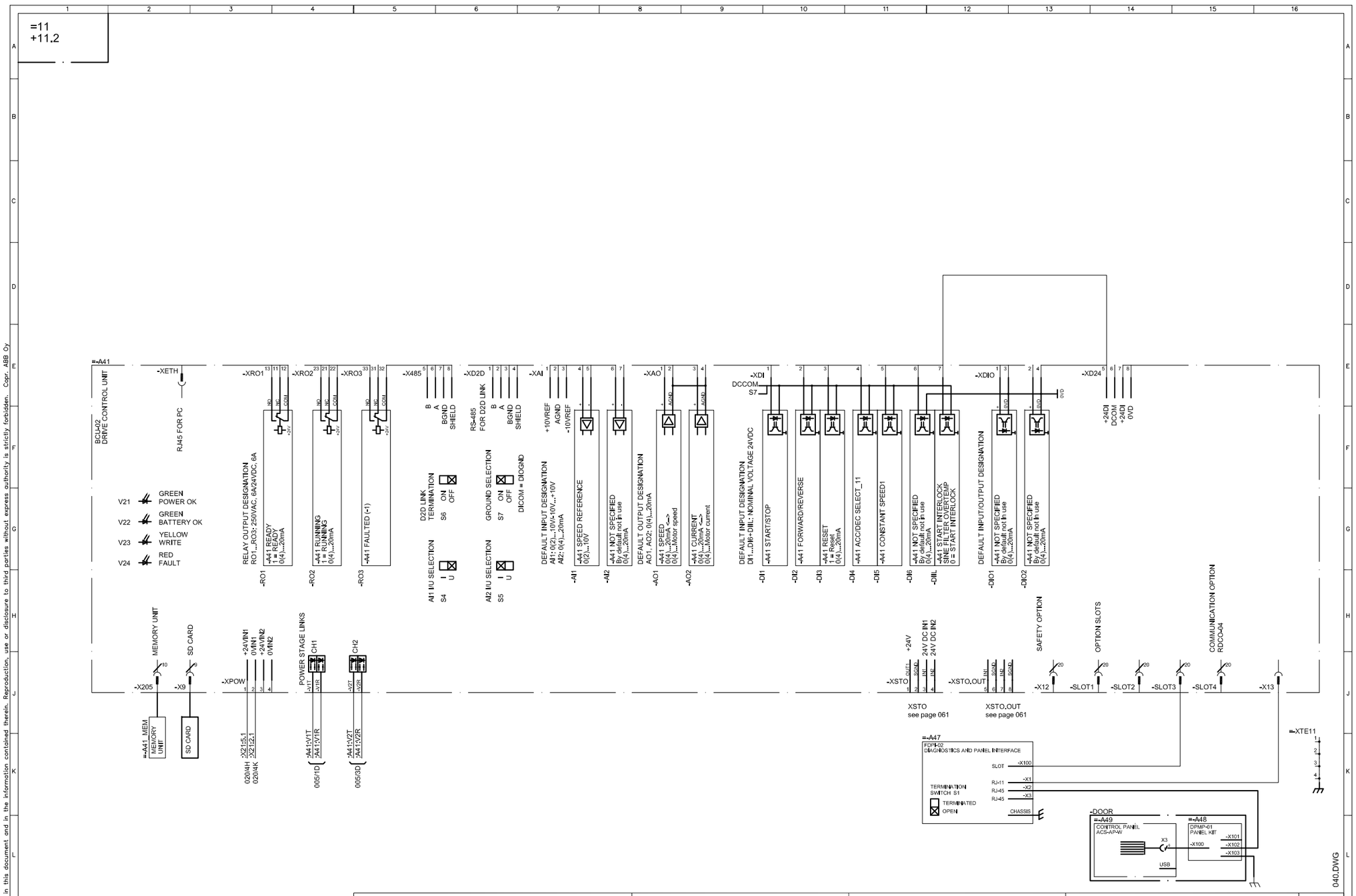
4C :HEAT.CTRL:L
=K95 A1 A2
4E :HEAT.CTRL:N
13G 24 21 22

020.DWG

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Cust. Ref. No.	App. 29.12.2016 Aslkalnen Mka	2xR8I INU	SAP Doc. No.
Customer	Project	Aux.voltage dlstrlbutlon	MC Doc. No. 3AXD10000407765 / Sheet 020
		ABB Drives	Based on / Cont. 040
			ABB Ref. No. / Resp. Dept. / Lang. EN

Frame 2×R8i – Sheet 040 (Control unit)



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Cust. Doc. No.	Prep. 29.12.2016 Vanln Oleg	Title ACS880-104-1150A-5+C183+C188	Circuit Diagram / Rev. Ind. C
Cust. Ref. No.	App. 29.12.2016 Aslkalnen Mika	2xR8i INU	SAP Doc. No.
Customer	Project	Drive control unlt BCU-02	MC Doc. No. 3AXD10000407765 / Sheet 040
		ABB Drives	Based on / Cont. 061
			ABB Ref. No. / Resp. Dept. / Lang. EN

Frame 2×R8i – Sheet 061 (STO)

=11
+11.2

=-A41
BCU-02
CONTROL UNIT

-XSTO
1 OUT +24V
2 SGND

-XSTO.OUT
IN1 5
SGND 6
IN2 7
SGND 8

3 IN1 24V DC IN1

4 IN2 24V DC IN2

-X12
1
20
SAFETY OPTION

=11
+11.1

=-T11.1
STO
=-X52.1 1 2 3 4 5
=-X51.1 1 2 3 4 5

=-T11.2
STO
=-X52.2 1 2 3 4 5
=-X51.2 1 2 3 4 5

061.DWG

Cust. Doc. No.	Prep. 29.12.2016 Vanln Oleg	Title ACS880-104-1150A-5+C183+C188	Circuit Diagram / Rev. Ind.
Cust. Ref. No.	App. 29.12.2016 Aslkalnen Mlka	2xR8I INU	SAP Doc. No. / C
Customer	Project	BCU-02 & R8I modules STO default connection	MC Doc. No. 3AXD10000407765 / Sheet 061
		ABB Drives	Based on / Cont. -
			ABB Ref. No. / Resp. Dept. / Lang. EN

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Further information

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3AUA0000104271 Rev J (EN) 2022-04-05