

In-back/Out-back Cooling Kit for FA11-FA12

iC7 Series Frequency Converters

1 Overview

1.1 Description

The in-back/out-back cooling kit fits FA11 and FA12 frequency converters mounted in Rittal TS8 and VX25 cabinets with widths of 600 mm (24 in) or 800 mm (32 in). When the kit is installed, air flows into the lower back duct and out through the upper back duct of the frequency converter. See [Figure 1](#).

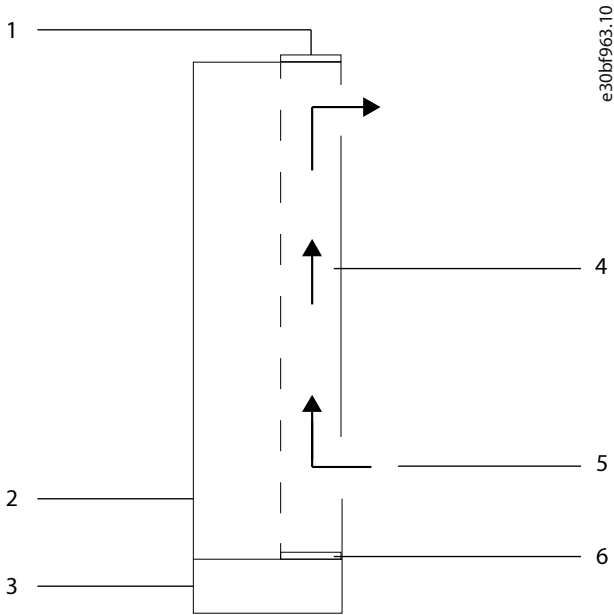


Figure 1: Direction of Airflow with Kit Installed

1	Top cover	2	Cabinet
3	Pedestal	4	Cooling back channel
5	Airflow direction	6	Bottom cover

1.2 Kit Numbers

Use these instructions with the following kits.

Table 1: In-back/Out-back Cooling Kits

Number	Kit description
176F4057	In-back/out-back cooling kit for FA11 frequency converter
176F4058	In-back/out-back cooling kit for FA12 frequency converter

1.3 Items Supplied

Table 2: Items Supplied in In-back/Out-back Cooling Kits

Item	Quantity
Top cover	1
Top gasket	1
Bottom cover	1

Table 2: Items Supplied in In-back/Out-back Cooling Kits (continued)

Item	Quantity
Bottom gasket	1
Back duct	2
6-hole gasket	4
8-hole gasket	4
Clip-on nut	16
M5x14 screw	8–10
M5x18 screw	16
M6x12 screw	12

2 Installation

2.1 Safety Information

NOTICE

QUALIFIED PERSONNEL

Only qualified, Danfoss authorized personnel are allowed to install the parts described in these installation instructions.

- Disassembly and reassembly of the frequency converter must be done in accordance with the service guide.
- Use the standard fastener torque values from the service guide, unless the torque value is specified in these instructions.

WARNING



DISCHARGE TIME (40 MINUTES)

The drive contains DC-link capacitors, which can remain charged even when the drive is not powered. High voltage can be present even when the warning indicator lights are off.

Failure to wait 40 minutes after power has been removed before performing service or repair work can result in death or serious injury.

- Stop the motor.
- Disconnect AC mains and remote DC-link power supplies, including battery backups, UPS, and DC-link connections to other drives.
- Disconnect or lock the permanent magnet motor.
- Wait for the capacitors to discharge fully. The minimum waiting time is 40 minutes.
- Before performing any service or repair work, use an appropriate voltage measuring device to make sure that the capacitors are fully discharged.

WARNING**ELECTRIC SHOCK HAZARD**

AC drives contain dangerous voltages when connected to mains voltage. Installing or servicing the drive with power connected can cause death, serious injury, or equipment failure.

- Only use qualified electricians for the installation.
- Disconnect the drive from all power sources before installation or service.
- Treat the drive as live whenever the mains voltage is connected.
- Follow the guidelines in these instructions and local electrical safety regulations.

NOTICE**ELECTROSTATIC DISCHARGE**

Electrostatic discharge can damage components.

- Follow standard ESD procedures.
- Ensure discharge before touching internal components, for example by touching a grounded, conductive surface or by wearing a grounded armband.

2.2 Installation Overview

NOTICE**APPLYING GASKETS**

This kit contains self-adhesive gaskets to ensure a proper seal between metal parts.

- Before affixing a gasket, check that the part matches the gasket.
- Check that no holes are covered by the gasket.

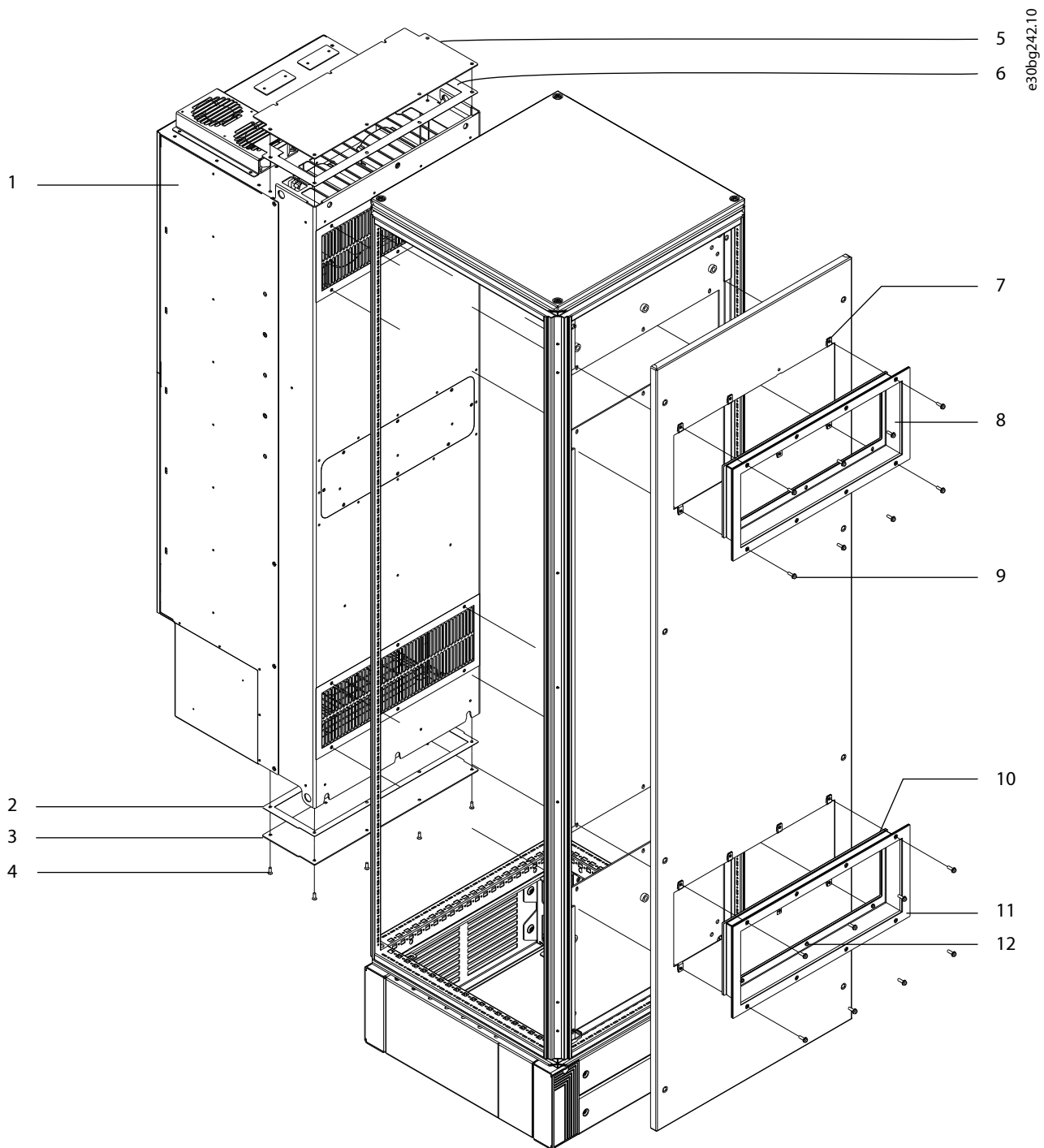


Figure 2: Overview of In-back/Out-back Cooling Kit

1	Cabinet	2	Bottom gasket
3	Bottom cover	4	M5x14 screw
5	Top cover	6	Top gasket
7	Clip-on nut	8	Back duct
9	M5x18 screw	10	6-hole gasket
11	8-hole gasket	12	M6x12 screw

2.3 Creating Vent Openings in the Mounting Plate

To create upper and lower vent openings in the mounting plate, use the following steps. Use the dimensions in [Figure 3](#) for 600 mm (24 in) cabinets, and [Figure 4](#) for 800 mm (32 in) cabinets.

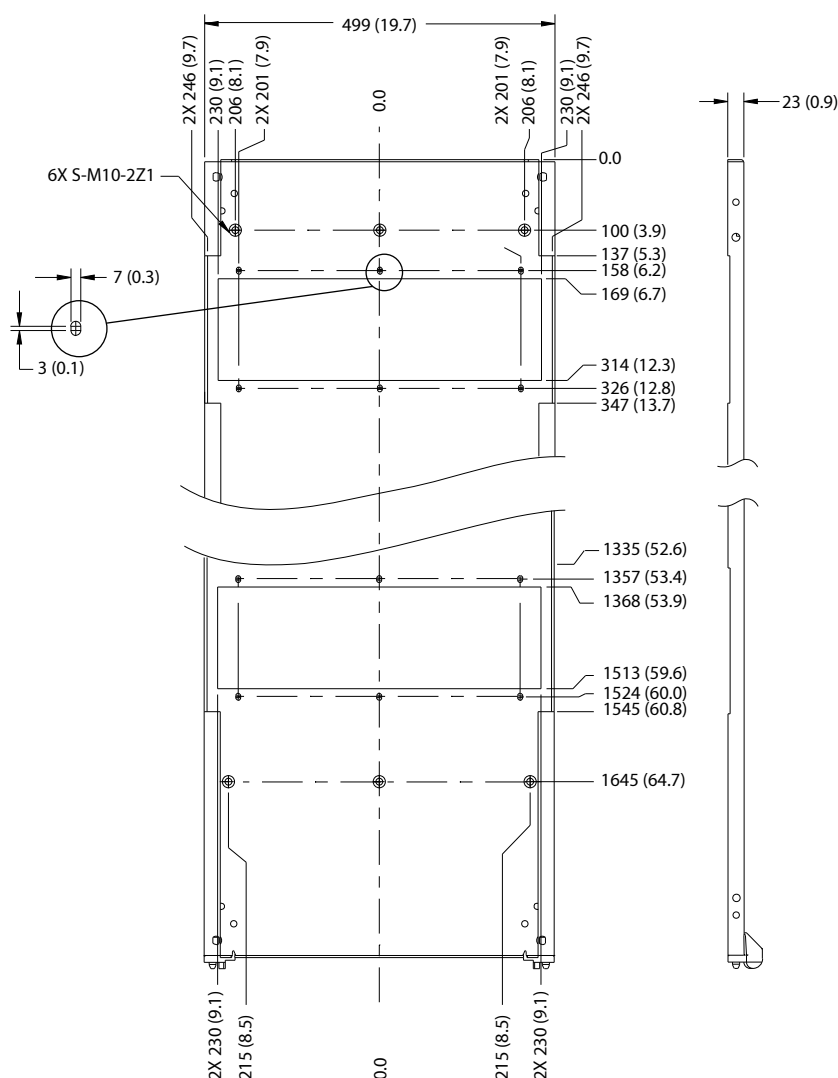
Procedure

1. Drill 6 mounting holes in the back of the frequency converter using the dimensions in the template.
2. Insert 6 M10 pem self-clinching nuts (not supplied) in the mounting holes.
3. Cut out the upper and lower vent openings in the mounting plate using the dimensions in the template.

The openings must match the frequency converter vent openings.

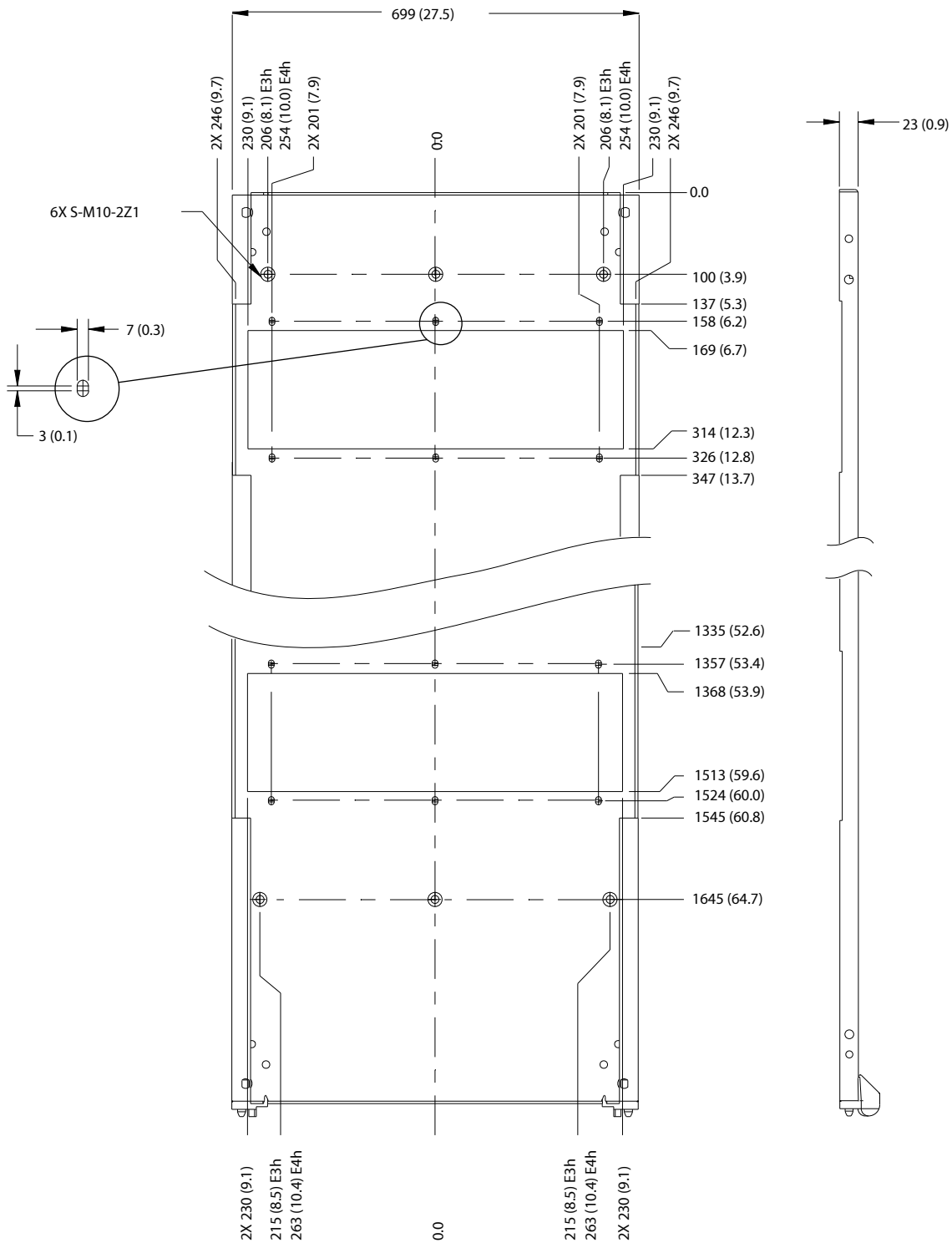
4. Drill 6 screw holes around each vent opening using the dimensions in the template.

The holes must match the holes in the frequency converter and the inner flange of the back ducts.



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Figure 3: Vent Dimensions for Mounting Plate in 600 mm (24 in) Cabinet



e30bg244.10

Figure 4: Vent Dimensions for Mounting Plate in 800 mm (32 in) Cabinet

2.4 Creating Vent Openings in the Backplate

To create upper and lower vent openings in the cabinet backplate, use the following steps. Use the dimensions in [Figure 5](#) for 600 mm (24 in) cabinets, and [Figure 6](#) for 800 mm (32 in) cabinets.

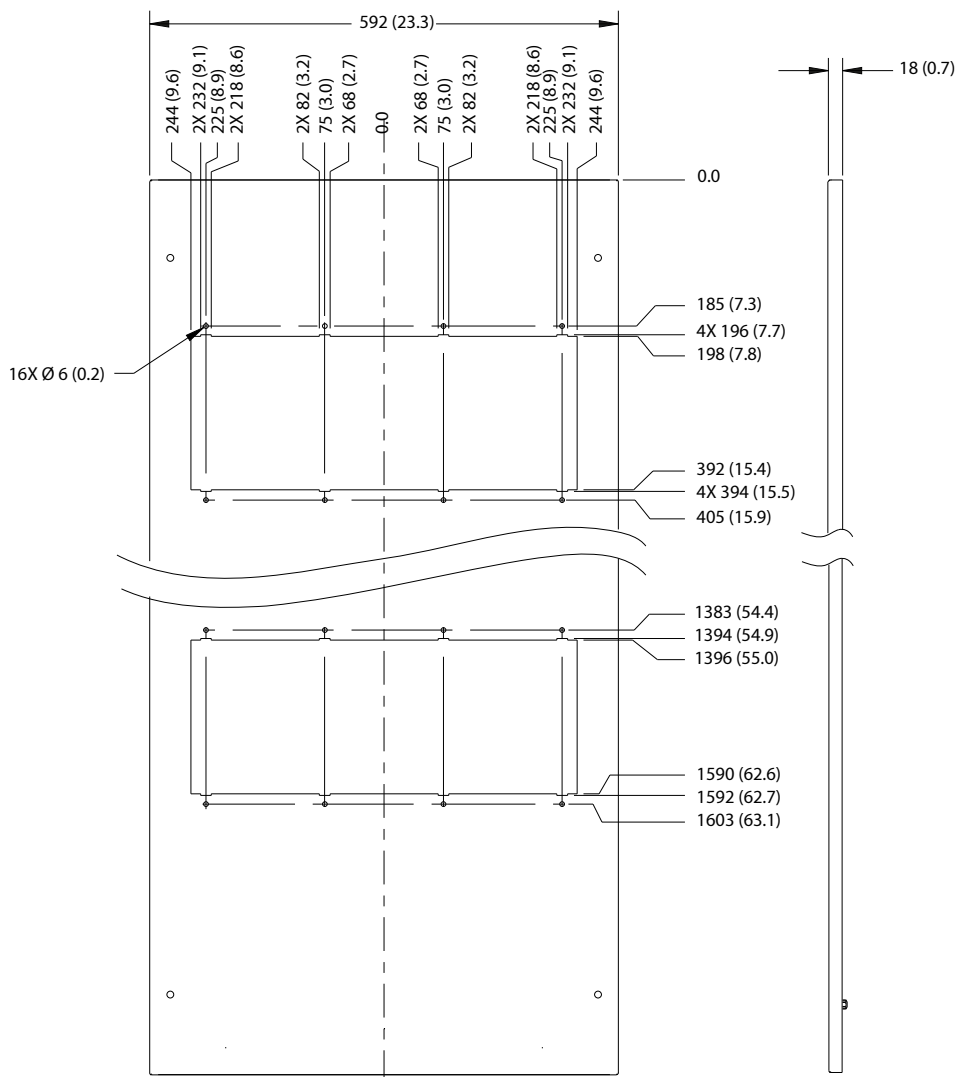
Procedure

1. Cut out the vent openings in the cabinet backplate using the dimensions in the template.

The openings must match the frequency converter and mounting plate vent openings.

2. Drill 8 screw holes (6 mm) around each vent opening using the dimensions in the template.

The holes must match the holes in the frequency converter and in the outer flange of the back duct.



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Figure 5: Vent Dimensions for Backplate in 600 mm (24 in) Cabinet

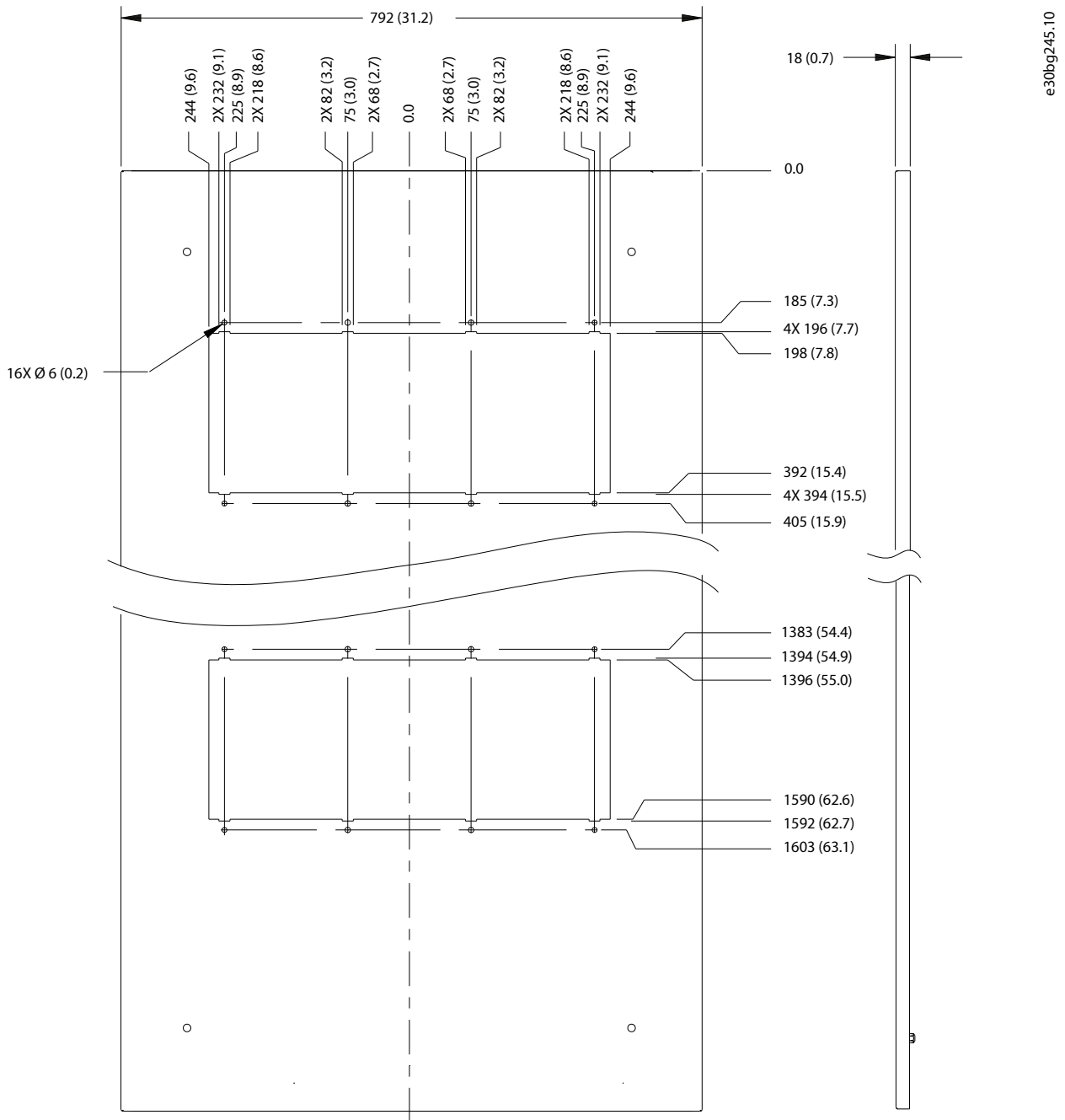


Figure 6: Vent Dimensions for Backplate in 800 mm (32 in) Cabinet

2.5 Installing the Top Cover

To install the top cover, use the following steps. See [Figure 7](#).

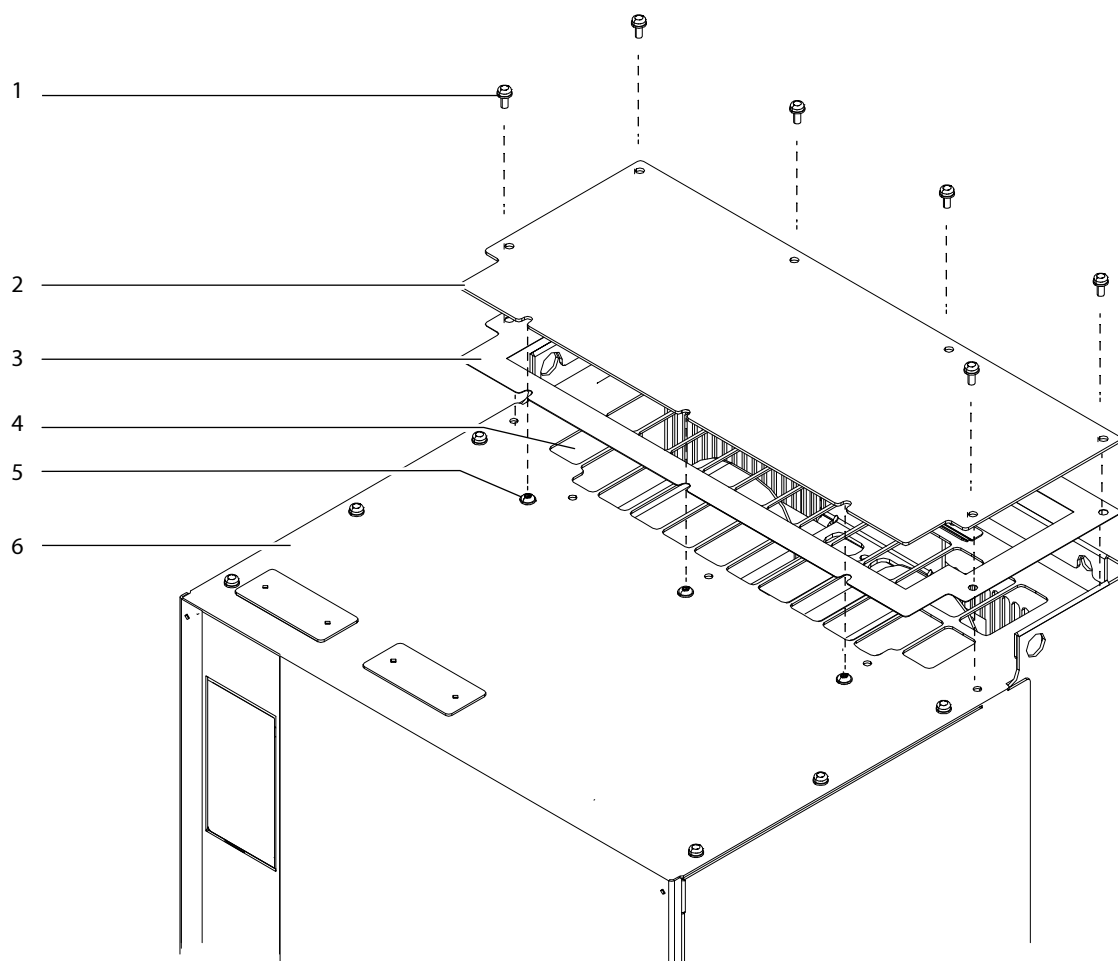
Procedure

1. Remove paper backing from the top gasket to expose the adhesive.
2. Adhere the top gasket to the underside of the top cover.
3. Remove the M5x14 screws (T25) surrounding the sides and back of the vent in the top of the frequency converter.

Retain the screws. Fx11 converters have 6 screws; Fx12 converters have 7 screws.

4. Loosen 3 M5x12 screws (T25) at the front of the vent in the top surface of the frequency converter.
5. Slide the edge of the top cover plate under the 3 loosened screws, positioning the plate over the top vent.
6. Secure the top cover plate with the M5x14 screws (T25) removed previously in step 3.

Torque all screws to 2.3 Nm (20 in-lb).



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Figure 7: Installation of Top Cover

1	M5x14 screw	2	Top cover
3	Top gasket	4	Top vent
5	M5x12 screw (loosened, not removed)	6	Top of frequency converter

2.6 Installing the Bottom Cover

NOTICE

DRAIN OPENING

The bottom cover features a drain opening in the middle of the plate.

- To drain moisture in wet or humid environments, attach nylon tubing with an interior diameter of 8 mm (0.3 in).
- To seal the drain in dry environments, fasten a screw in the drain hole.

To install the bottom cover at the lower end of the cooling back channel, use the following steps. See [Figure 8](#).

Procedure

1. Remove the paper backing from the bottom gasket.
2. Adhere the gasket to the upper side of the bottom cover.
3. Position the bottom cover and gasket over the opening at the lower end of the cooling channel.
4. Secure the bottom cover using the M5x14 screws (T25).

Torque screws to 2.3 Nm (20 in-lb). FA11 frequency converters require 8 screws, and FA12 frequency converters require 10 screws.

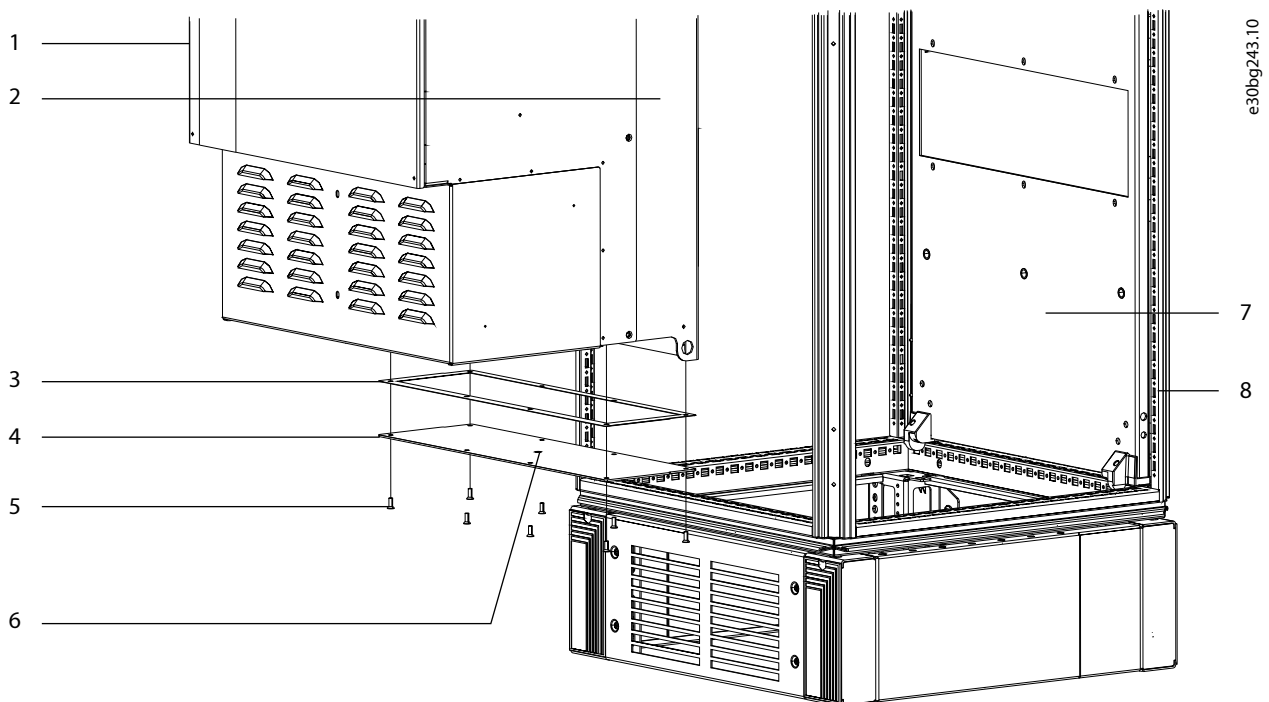


Figure 8: Installation of the Bottom Cover

1	Frequency converter	2	Cooling back channel
3	Bottom gasket	4	Bottom cover
5	M5x14 screws	6	Drain hole
7	Mounting plate	8	Cabinet rails

2.7 Mounting the Frequency Converter

To install the mounting plate and frequency converter in the cabinet, use the following steps. See [Figure 9](#) and [Figure 10](#).

Procedure

1. Remove the paper backing from two 6-hole gaskets, exposing the adhesive.
2. Adhere 1 gasket around the top vent opening on each side of the mounting plate.

Repeat steps 1 and 2 for the bottom vent opening.

3. Install the Rittal mounting plate brackets in the furthest back position on the rails at the base of the cabinet.

For VX25 cabinets, see step 1 in [Figure 9](#).

For TS8 cabinets, see step 1 in [Figure 10](#).

4. Insert the plastic brackets on the mounting plate into the brackets installed on the cabinet rails in the previous step.

For VX25 cabinets, see step 2 in [Figure 9](#).

For TS8 cabinets, see step 2 in [Figure 10](#).

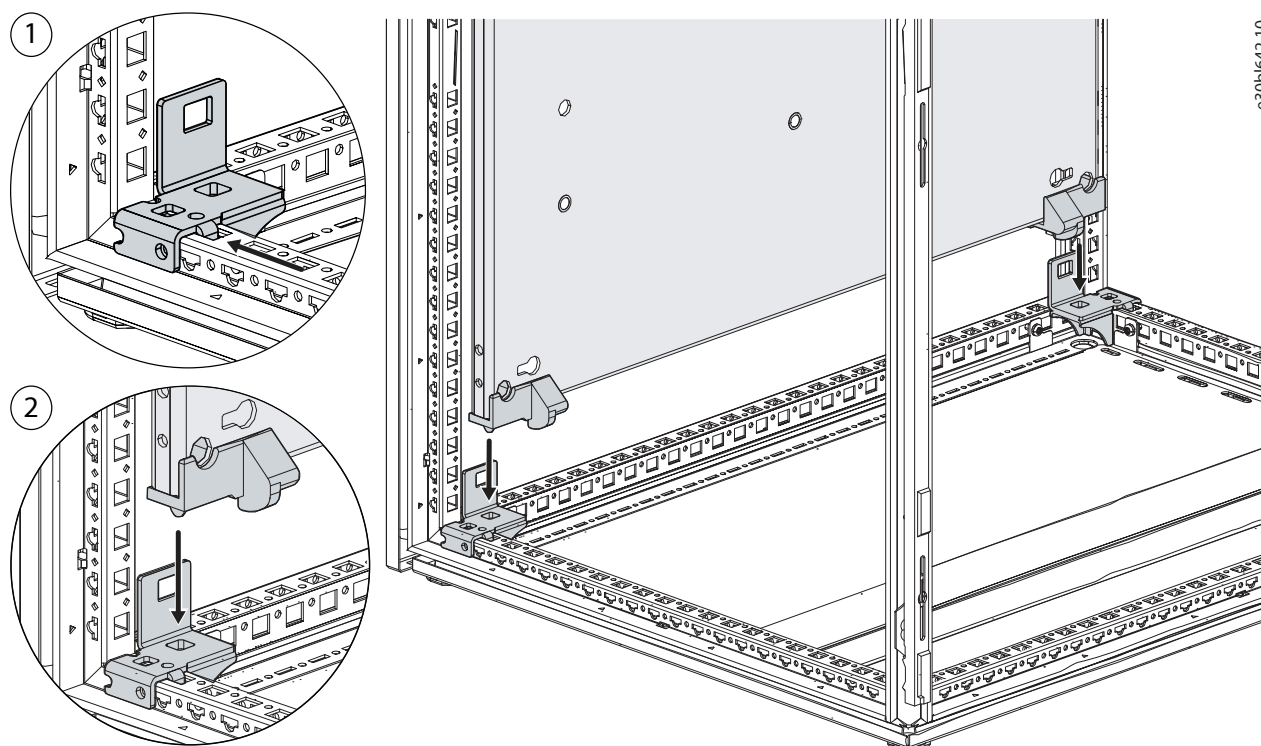


Figure 9: Rittal VX25 Cabinet - Installation of Mounting Brackets and Mounting Plate

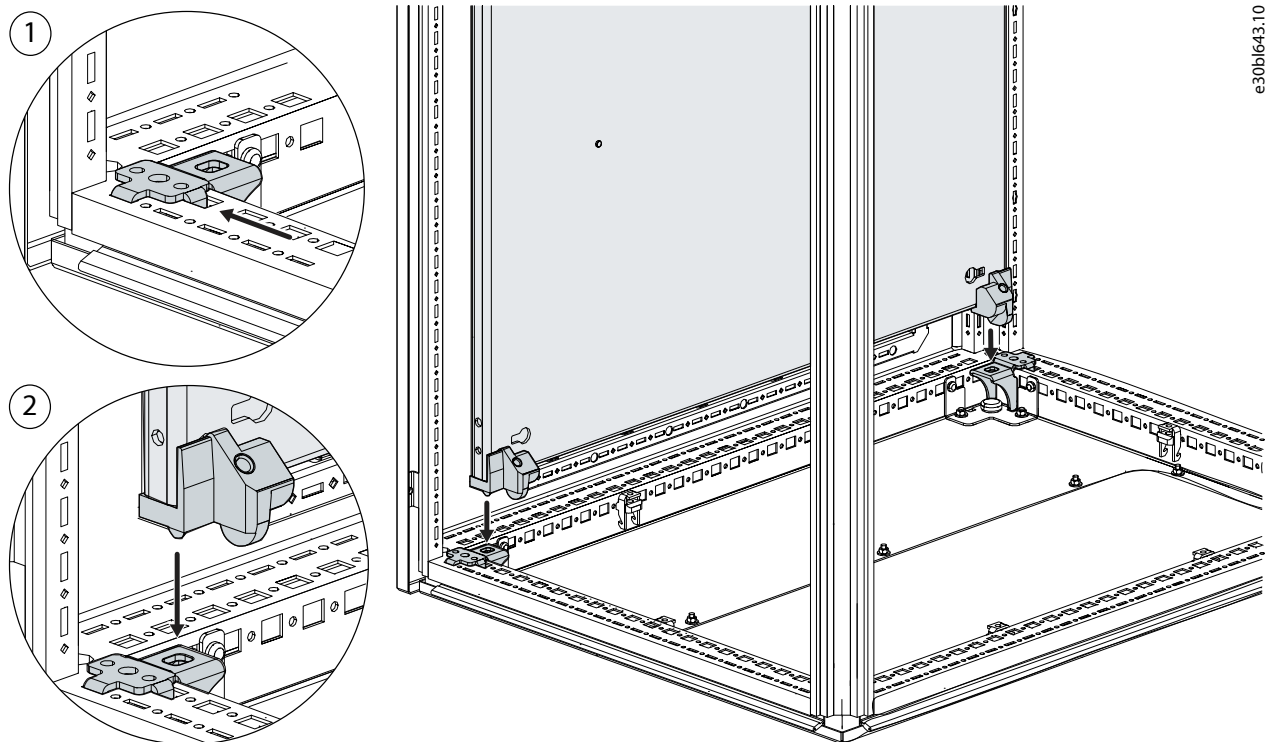


Figure 10: Rittal TS8 Cabinet - Installation of Mounting Brackets and Mounting Plate

5. Position the mounting plate in the Rittal cabinet, aligning the top mounting plate hole with the 5th hole from the top of the cabinet rails.

Check that the pem nuts face the back of the cabinet.

6. Fasten the mounting plate to the cabinet rails with 14 M5x10 thread-forming screws.
7. Loosely fasten 3 M10 screws (not supplied) into the pem nuts at the lower end of the mounting plate.

Check that the screws are secure. The base of the frequency converter rests on the screws.

8. Slightly lean the top of the frequency converter forward and set the cutouts in the base onto the 3 screws.
9. Slowly push the top of the frequency converter back against the mounting plate until the top 3 pem nuts line up with the holes in the frequency converter.
10. Secure the top of the frequency converter using 3 M10 screws.

Torque the 6 M10 screws to 19 Nm (170 in-lb).

2.8 Installing the Backplate and Back Ducts

To attach the cabinet backplate and the upper and lower back ducts, use the following steps.

Procedure

1. Position the cabinet backplate on the rear rails of the cabinet behind the mounting plate.
2. Secure the backplate to the rails using the existing fasteners.
3. Slide 8 M5 clip-on nuts over the screw holes surrounding the upper duct opening in the backplate.

See [Figure 11](#). Repeat for the lower duct opening.

4. Remove the paper backing from 1 pair of 8-hole gaskets, exposing the adhesive.
5. Adhere 1 gasket to the back and 1 to the front of the upper back duct outer flange.

Repeat for the lower duct.

6. Position each back duct in the hole created for it in the mounting plate and cabinet backplate.
7. Fasten the inner flanges of the back ducts with 12 M6x12 screws (T30), 6 screws in each duct.

Torque screws to 3.9 Nm (35 in-lb).

8. Fasten the outer flanges of the back ducts with 16 M5x18 screws (T25), 8 screws in each duct.

Torque screws to 2.3 Nm (20 in-lb).

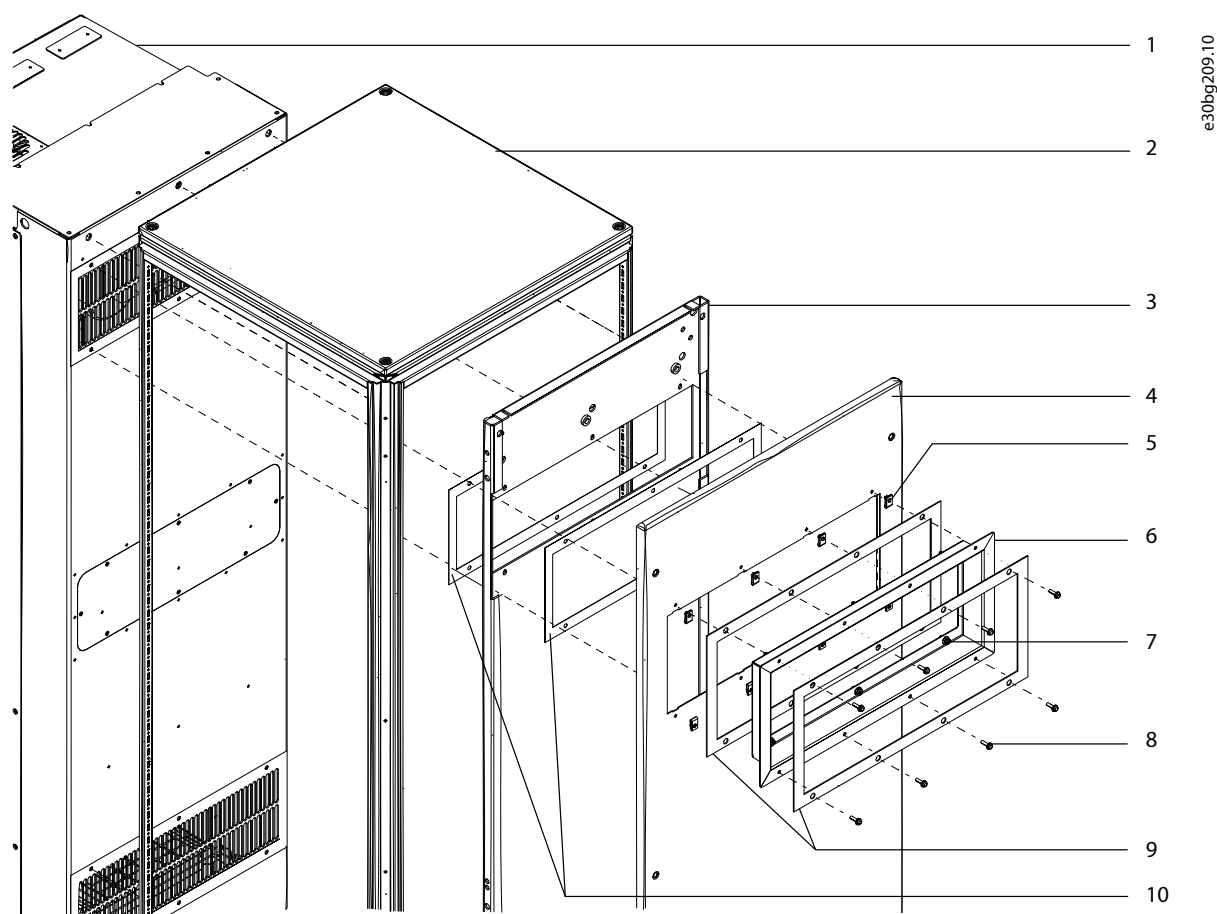


Figure 11: Installation of Backplate and Back Ducts

1	Frequency converter	2	Rittal cabinet
3	Mounting plate	4	Backplate
5	M5 clip-on nut	6	Back duct
7	M6x12 screw	8	M5x18 screw
9	8-hole gaskets	10	6-hole gaskets

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