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

iC7 Series Frequency Converters

1 Overview

1.1 Description

The in-back/out-top 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 back duct and out through the top duct. See Figure 1.

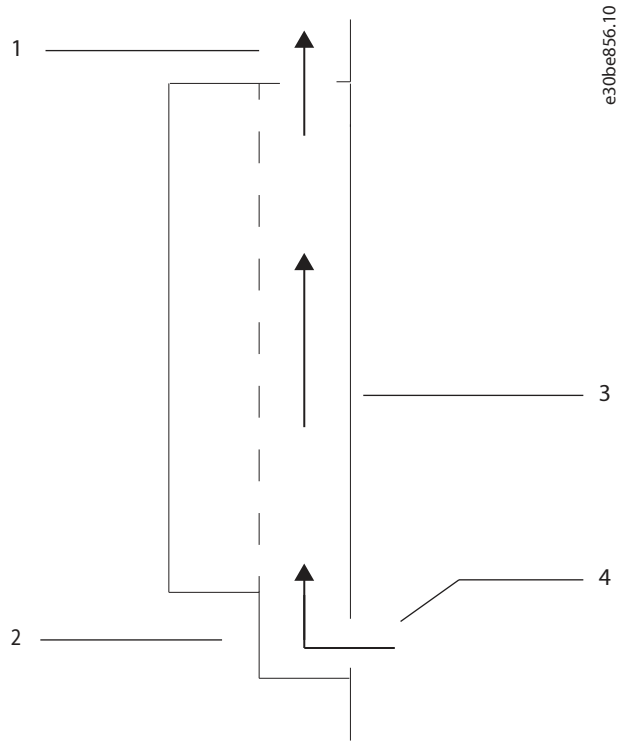

Figure 1: Direction of Airflow with Kit Installed

1	Top duct (exhaust)	**2**	Cooling back channel
3	Airflow direction	**4**	Bottom duct (intake)

1.2 Kit Numbers

Use these instructions with the following kits.

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

Number	Kit description
176F4061	In-back/out-top cooling kit for FA11 frequency converters
176F4062	In-back/out-top cooling kit for FA12 frequency converters

1.3 Items Supplied

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

Item	Quantity
Bottom cover	1
Bottom gasket	1
Telescopic top duct assembly	1
Ribbed EPDM rubber seal	1
Back duct	1
6-hole back gasket	2
8-hole back gasket	2
Clip-on nut	8
M6x12 screw	6
M5x18 screw	8
M5x14 screw	8–10
M5 hex nut	6

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 and that no holes are covered.

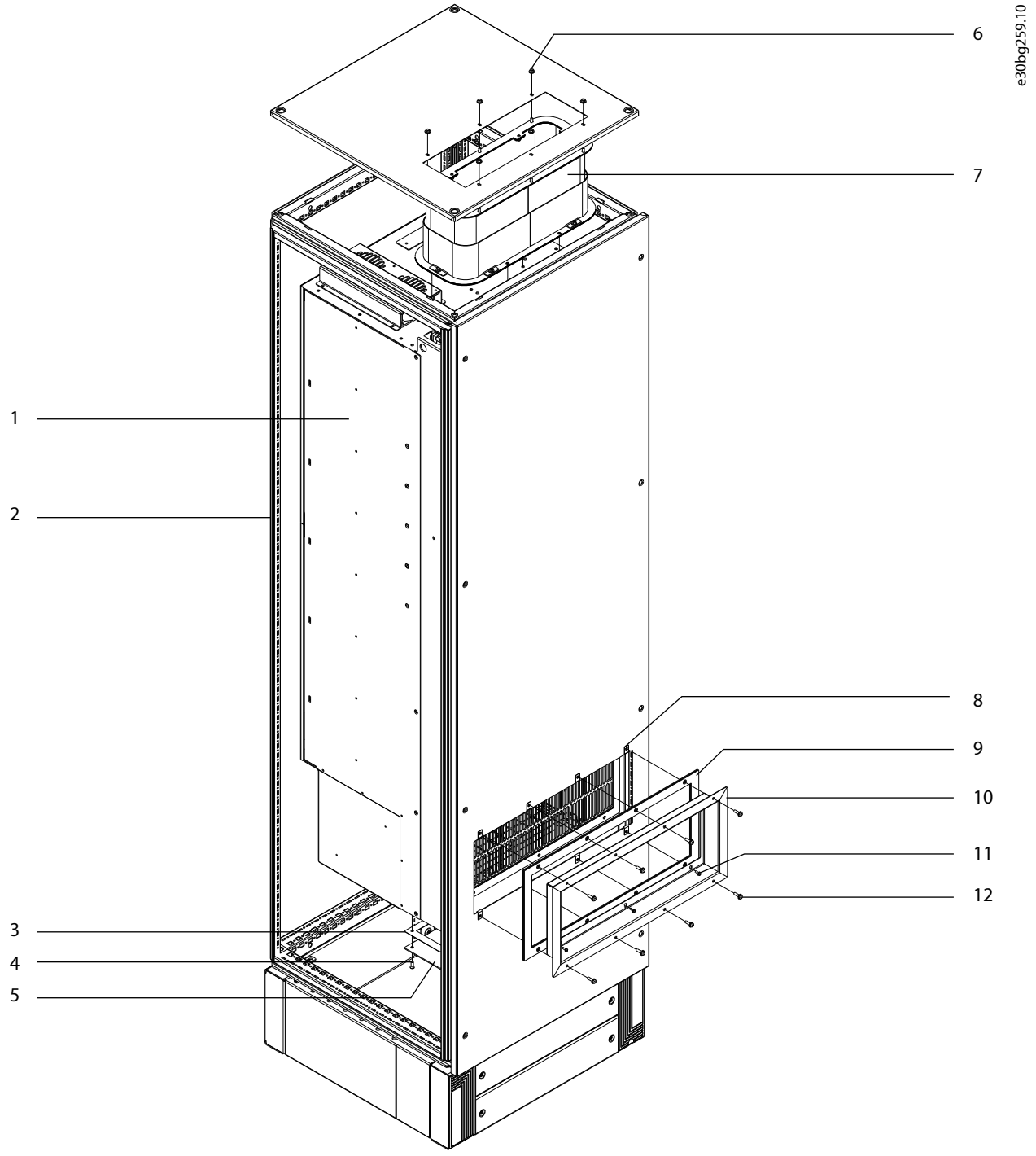

Figure 2: Overview of In-back/Out-top Cooling Kit

1	Frequency converter	**2**	Rittal cabinet
3	Bottom gasket	**4**	M5x14 screw
5	Bottom cover	**6**	M5 hex nut
7	Top duct assembly	**8**	Clip-on nut
9	Back gasket	**10**	Back duct
11	M6x12 screw	**12**	M5x18 screw

2.3 Creating a Vent Opening in the Mounting Plate

To create mounting holes and a back vent opening in the mounting plate, use the following steps. Use the dimensions in Figure 3 for 600 mm (24 in) cabinets, or 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 vent opening in the mounting plate using the dimensions in the template.

   The opening must match the frequency converter vent opening.
4. Drill 6 screw holes around the vent opening using the dimensions in the template.

   The holes must match the holes in the inner flange of the back duct.

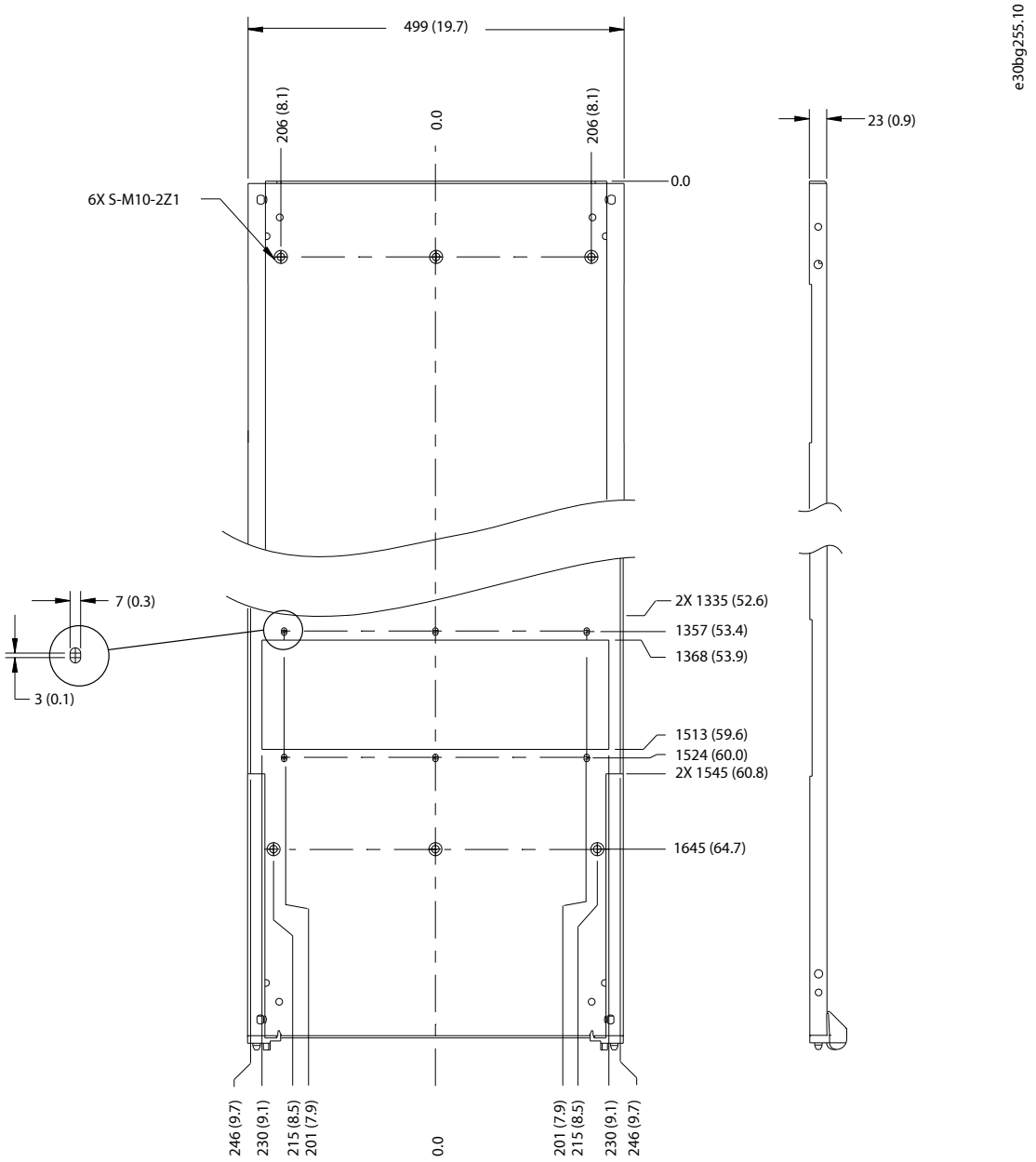

Figure 3: Vent Dimensions for Mounting Plate in 600 mm (24 in) Cabinet

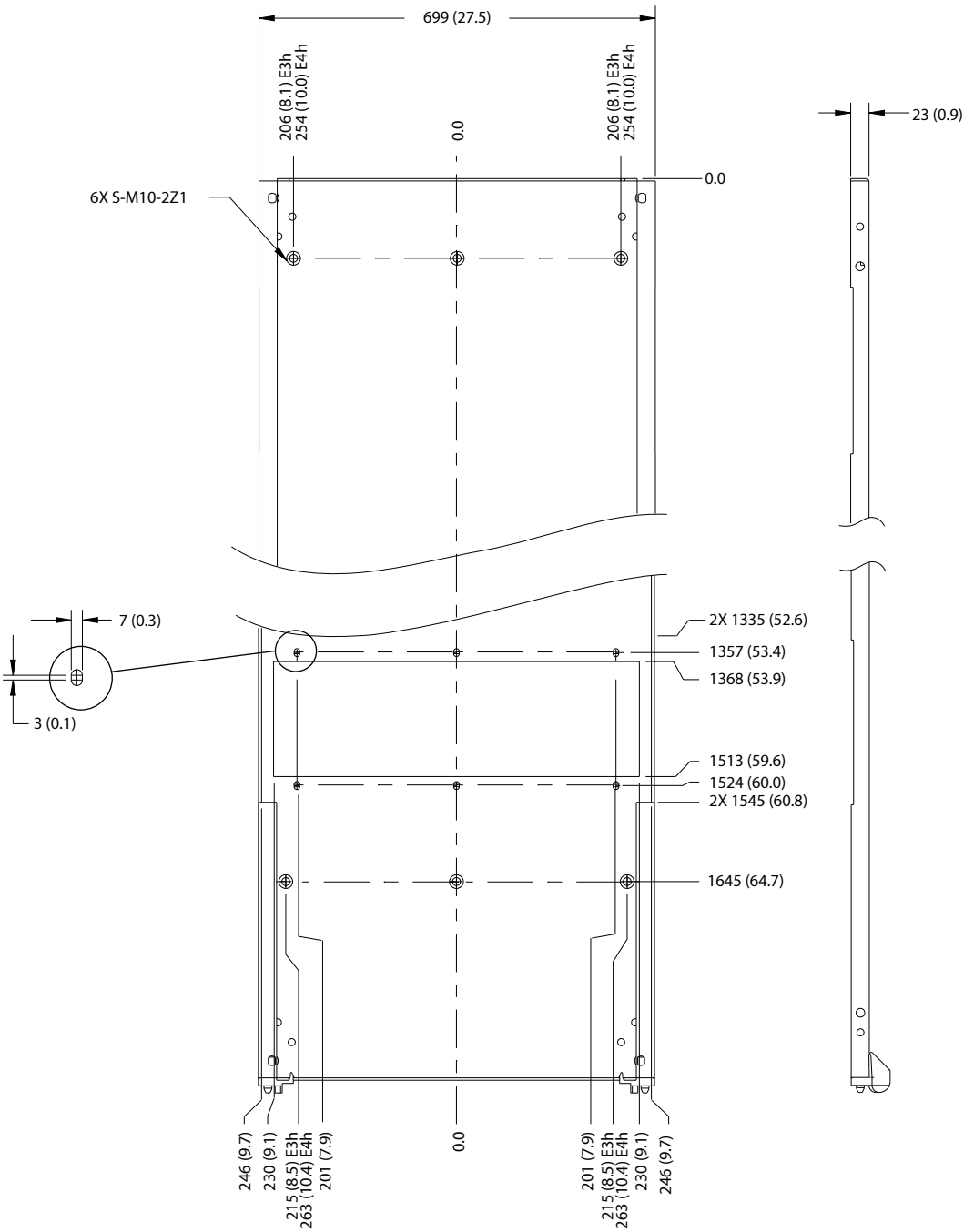

Figure 4: Vent Dimensions for Mounting Plate in 800 mm (32 in) Cabinet

2.4 Creating a Vent Opening in the Backplate

To create a vent opening in the cabinet backplate to match the mounting plate and frequency converter vent, use the following steps. Use the dimensions in Figure 5 for 600 mm (24 in) cabinets, or Figure 6 for 800 mm (32 in) cabinets.

Procedure

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

   The opening must match the frequency converter vent opening.

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

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

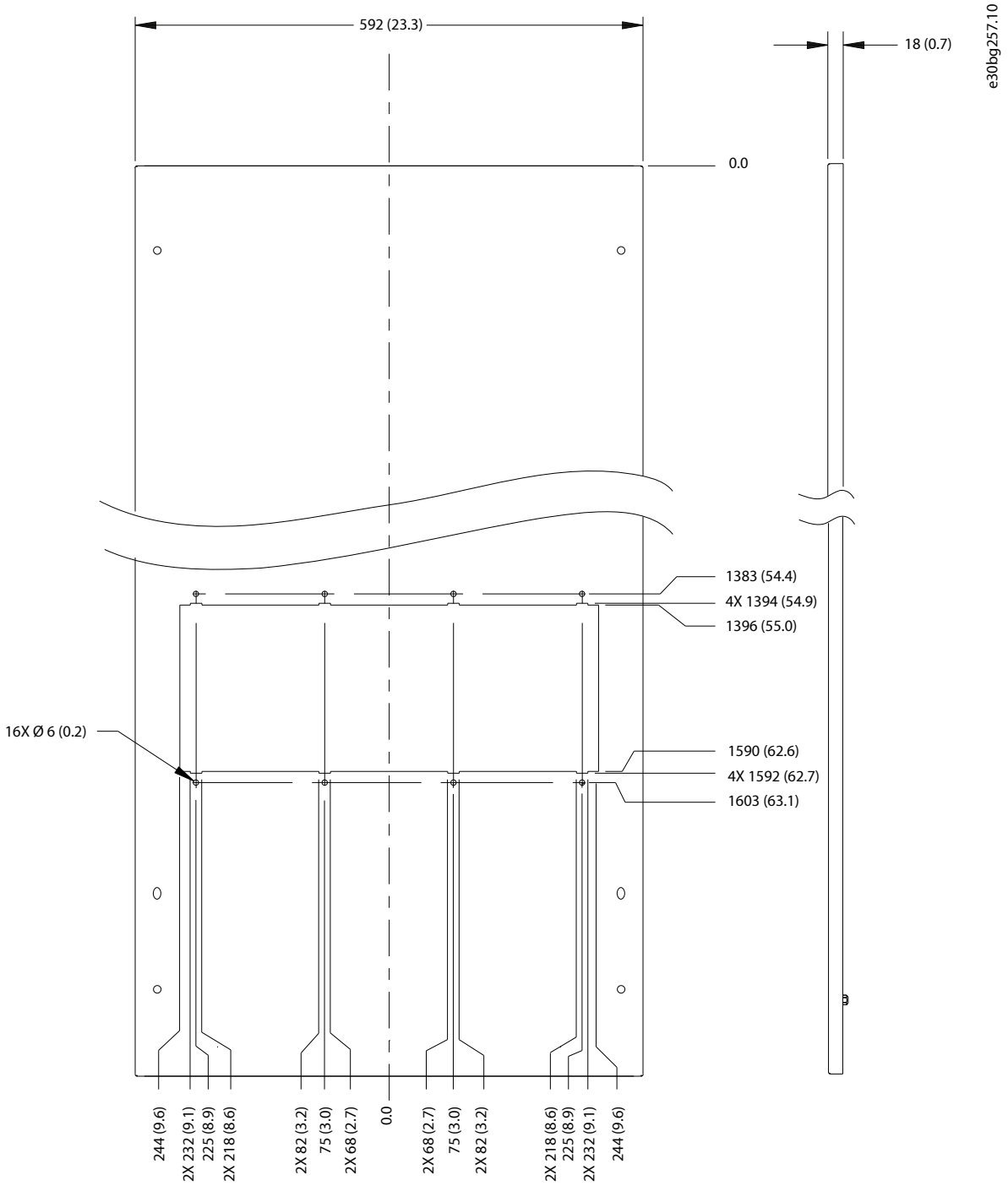

Figure 5: Vent Dimensions for Backplate in 600 mm (24 in) Cabinet

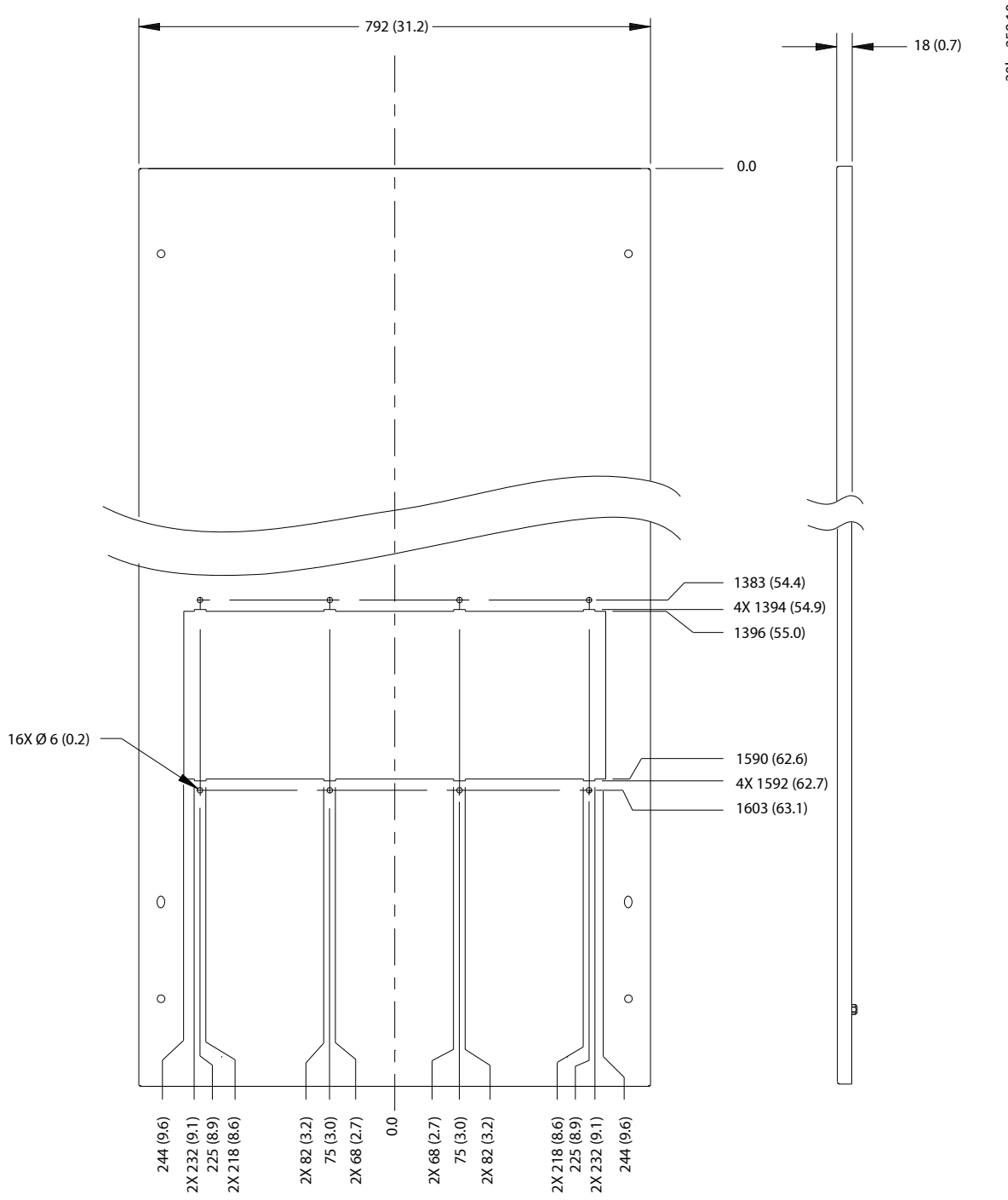

Figure 6: Vent Dimensions for Backplate in 800 mm (32 in) Cabinet

2.5 Creating a Vent Opening in the Top Plate

To create a vent opening in the cabinet top plate, use the following steps.

Procedure

1. Cut out the vent opening in the cabinet top plate using the dimensions in Figure 7 for TS9 cabinets, or Figure 8 for Vx25 cabinets.

   The opening must match the frequency converter vent opening.

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

The holes must match the holes in the upper flange of the top duct.

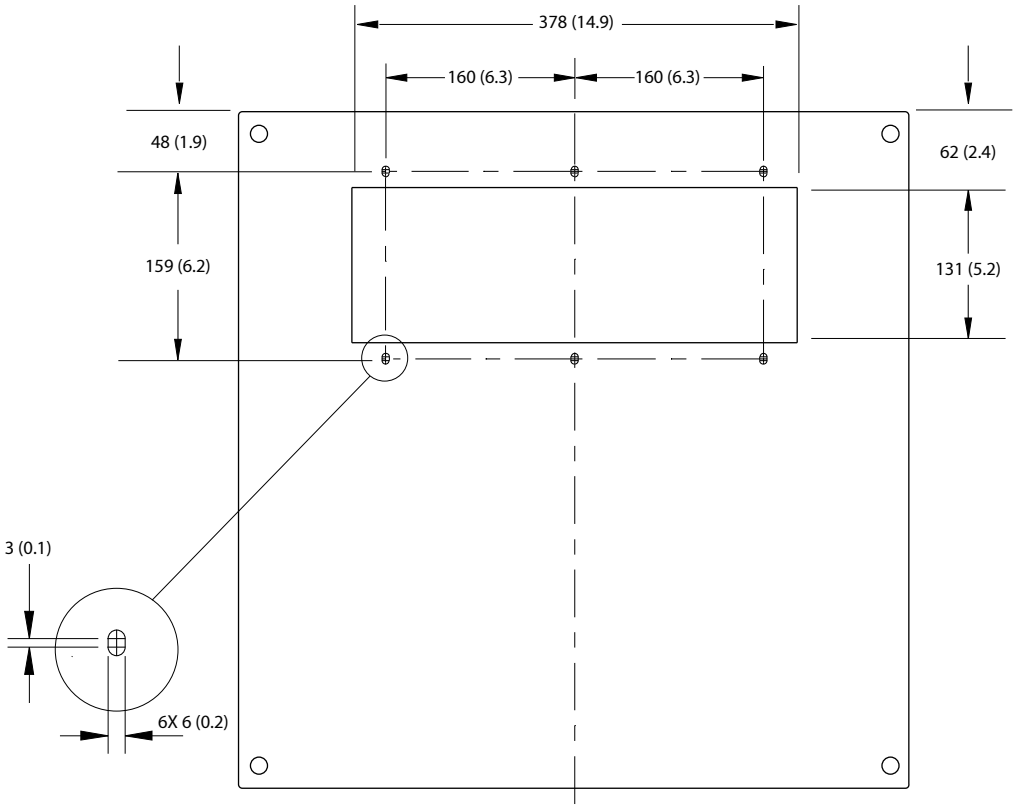

Figure 7: Dimensions of Opening in Top Plate of TS8 Cabinet

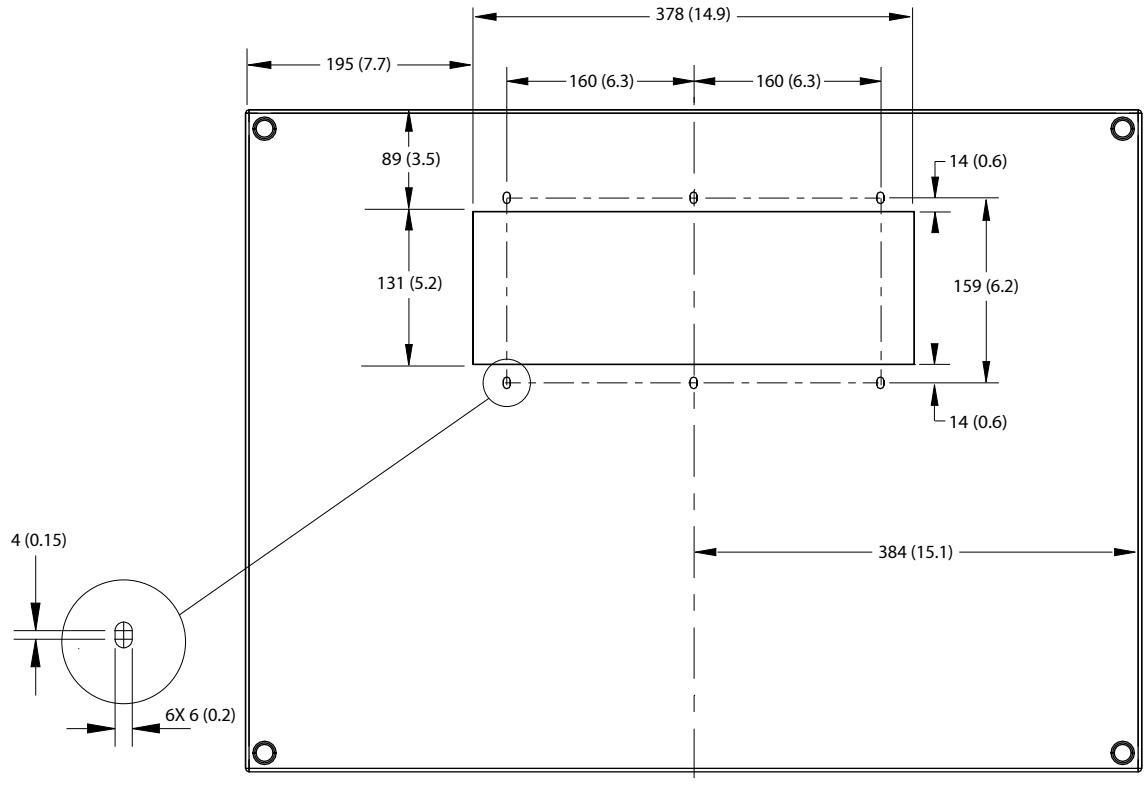

Figure 8: Dimensions of Opening in Top Plate of VX25 Cabinet

2.6 Assembling the Top Duct

The top duct is a telescopic duct that collapses to simplify installation. To assemble the duct before installation, use the following steps. See Figure 9.

Procedure

1. Cut the strip of ribbed EPDM rubber seal into 2 pieces of 1027 mm (40.4 in).
2. Peel the paper off the self-adhesive seals. Place 1 strip on the outside bottom edge of the inner sleeve of the duct, and 1 strip on the upper inside edge of the outer sleeve of the duct.
3. With the rubber seal in place, carefully slide the inner sleeve of the duct into the outer sleeve.

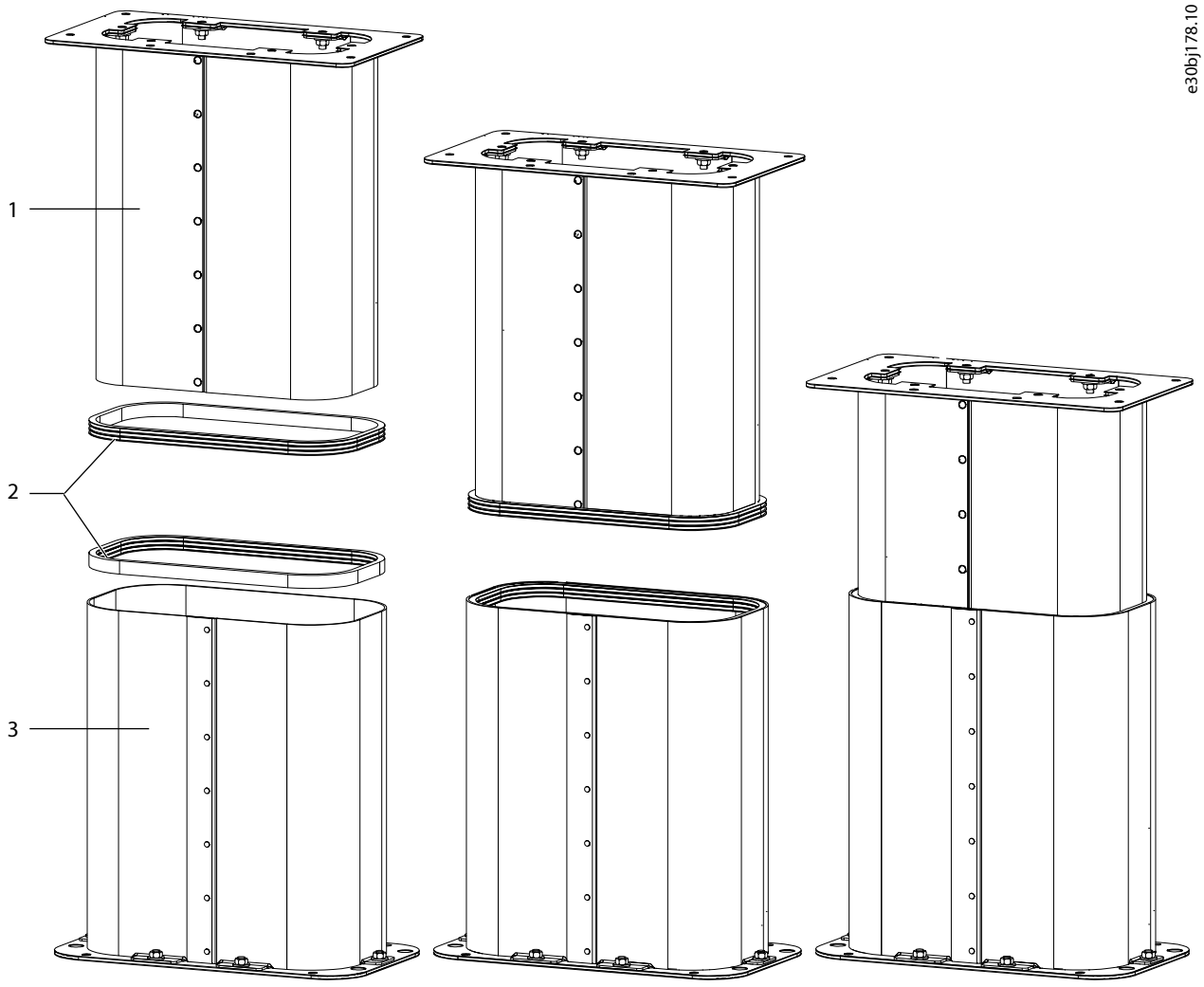

Figure 9: Assembly of Telescopic Duct

1	Inner sleeve of duct	**2**	Ribbed EPDM rubber seal
3	Outer sleeve of duct		

2.7 Installing the Top Duct Over the Top Vent

To attach the top duct over the top vent of the frequency converter, use the following steps. See Figure 10.

Procedure

1. Remove 2 M5x14 screws (T25) at the back of the top vent and retain the screws.
2. Remove 3 M5x12 screws (T25) at the front of the top vent and retain the screws.
3. Position the top duct over the vent in the top of the frequency converter.
4. Line up the holes in the lower flange with the screw holes in the frequency converter.
5. Secure the lower flange to the frequency converter with 5 screws (T25) previously removed.

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

6. Collapse the duct until installation of the cabinet top plate.

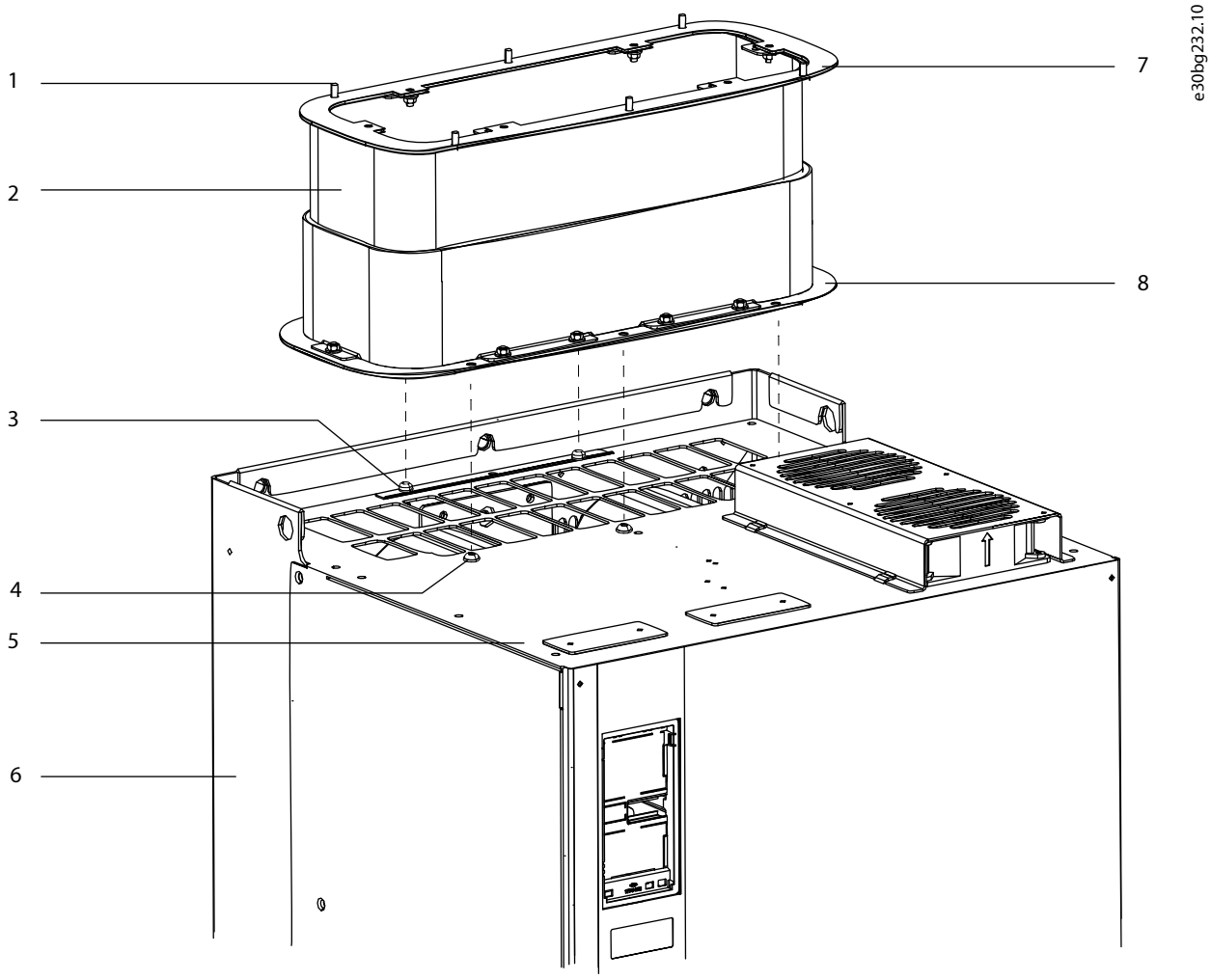

Figure 10: Installation of the Top Duct Over the Top Vent

1	Threaded stud	**2**	Top duct
3	M5x14 screw	**4**	M5x12 screw
5	Top of frequency converter	**6**	Cooling back channel
7	Upper flange of duct	**8**	Lower flange of duct

2.8 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 11.

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.

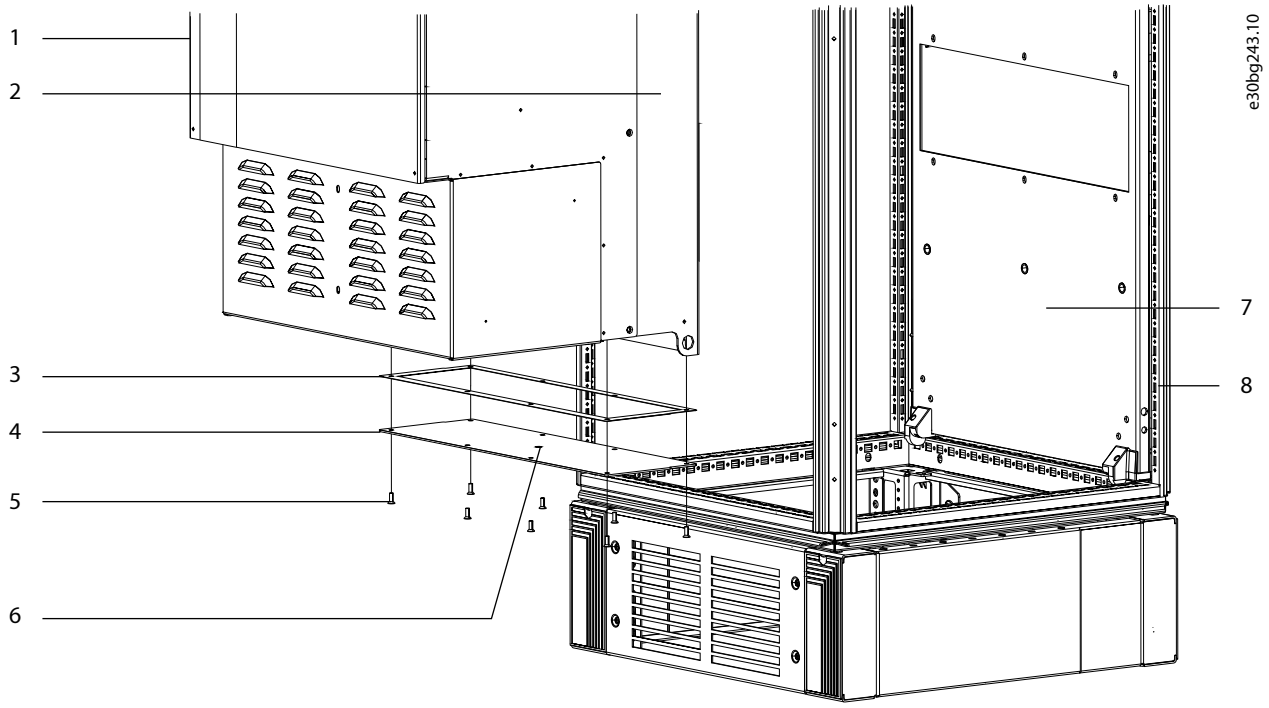

Figure 11: Installation of the Bottom Cover

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

2.9 Mounting the Frequency Converter

To install the mounting plate and frequency converter in the cabinet, use the following steps.

Procedure

1. Remove the paper backing from both 6-hole gaskets, exposing the adhesive.
2. Adhere 1 gasket around the vent opening on each side of the mounting plate.
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 12.

   For TS8 cabinets, see step 1 in Figure 13.

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 12.

   For TS8 cabinets, see step 2 in Figure 13.

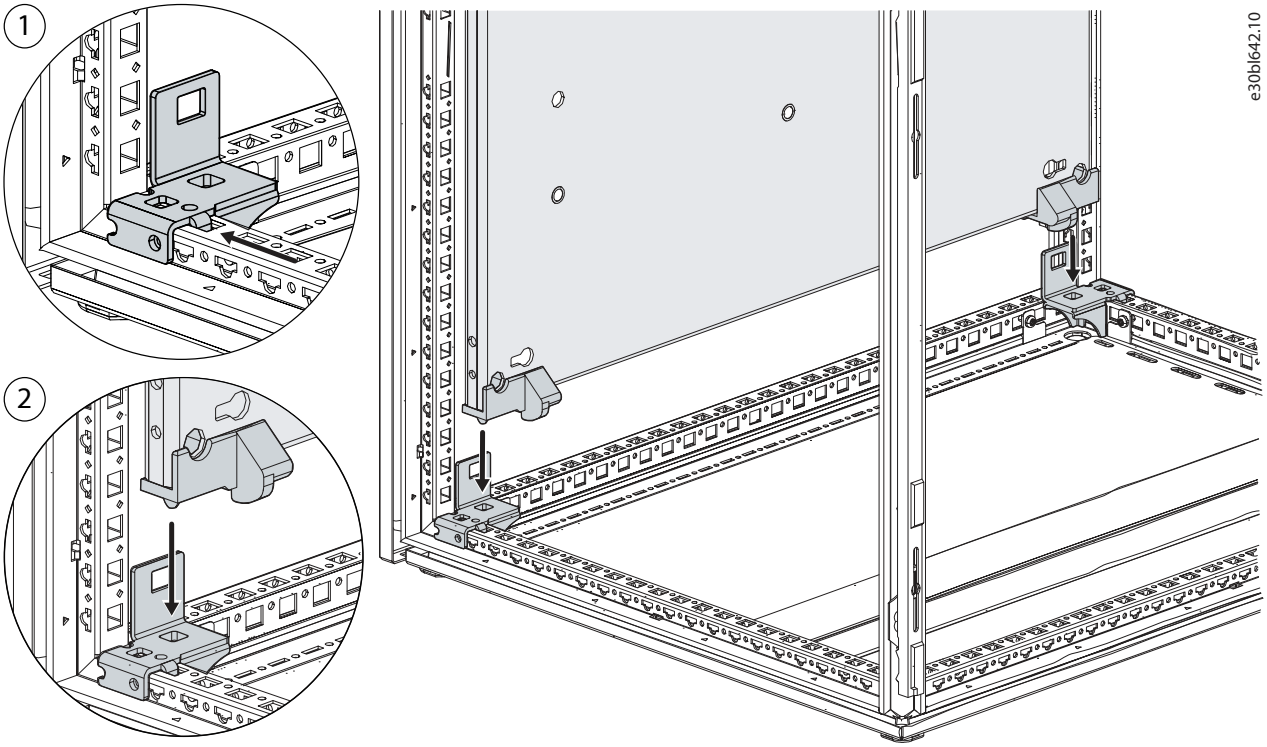

Figure 12: Rittal VX25 Cabinet - Installation of Mounting Brackets and Mounting Plate

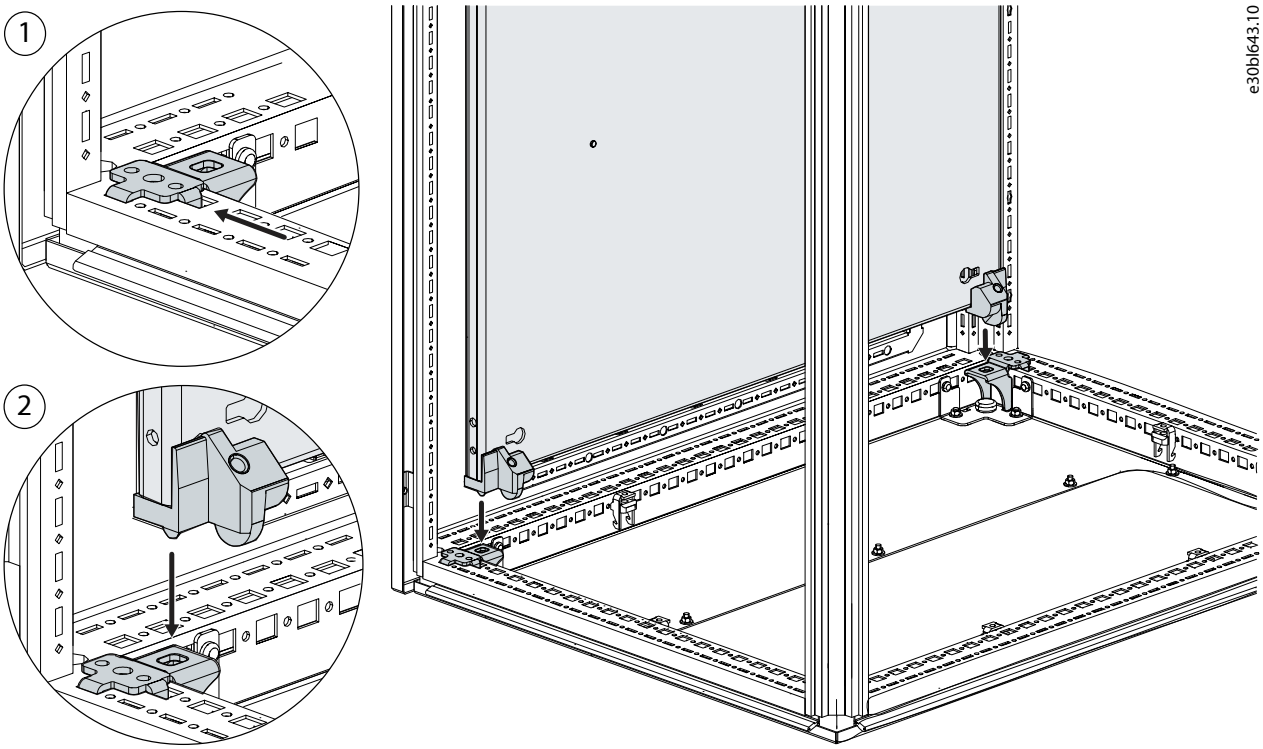

Figure 13: Rittal TS8 Cabinet - Installation of Mounting Brackets and Mounting Plate

5. Align the highest 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).

2.10 Attaching the Top Duct to the Top Plate

After the frequency converter is installed on the mounting plate, attach the top duct to the cabinet top plate using the following steps.

Procedure

1. Extend the top duct upward until the upper flange of the duct is positioned against the underside of the cabinet top plate.
2. Secure the duct to the top plate with 6 M5 hex nuts (T25).

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

2.11 Installing the Backplate and Back Duct

To attach the cabinet backplate and the back duct, use the following steps. See Figure 14.

Procedure

1. Position the backplate on the back 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 around the duct opening in the backplate.
4. Remove the paper backing from both 8-hole gaskets, exposing the adhesive.
5. Adhere 1 gasket to the back and 1 gasket to the front of the back duct outer flange.
6. Position the back duct in the hole created for it in the mounting plate and backplate.
7. Fasten the inner flange of the back duct with 6 M6x12 screws (T30).

   Torque to 3.9 Nm (35 in-lb).
8. Fasten the outer flange of the duct with 8 M5x18 screws (T25).

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

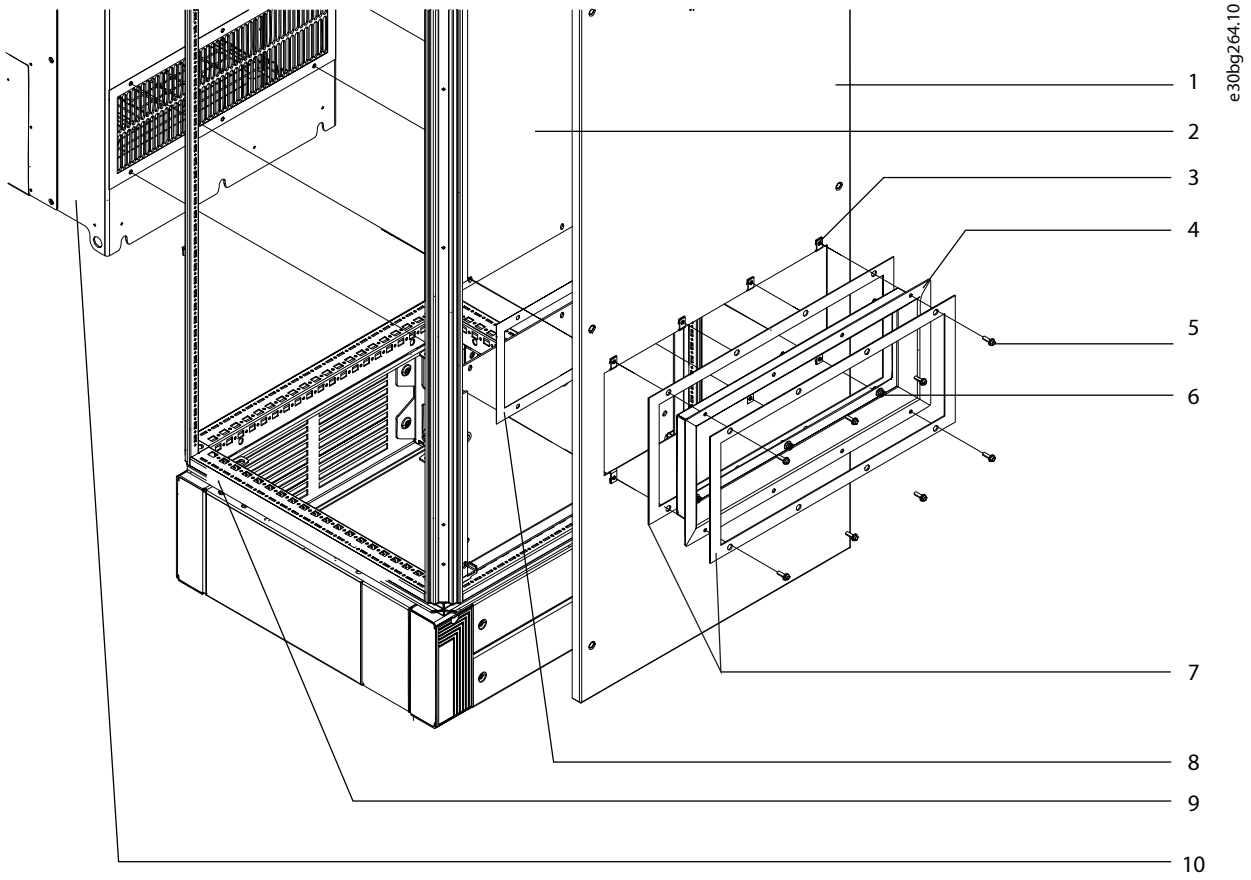

Figure 14: Installation of the Backplate and Back Duct

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

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