

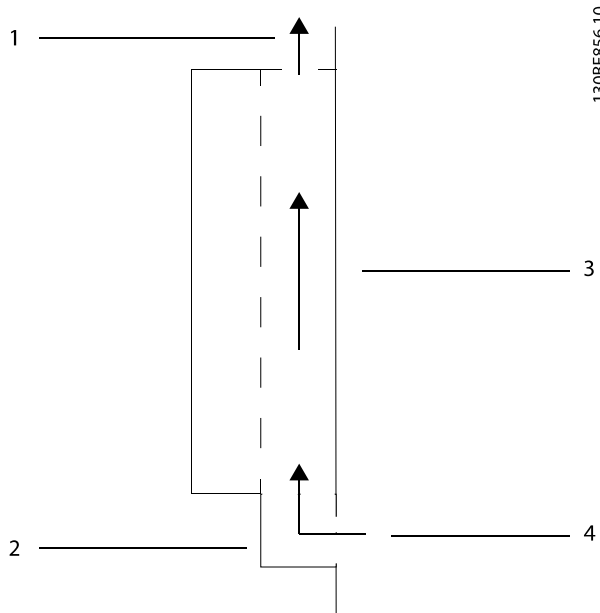
Installation Instructions

In-back/Out-top Cooling Kit for VLT[®] Parallel Drive Modules

VLT[®] Series FC 102, FC 202, and FC 302

Description

The in-back/out-top cooling kit is designed for the specific VLT[®] HVAC Drive FC 102, VLT[®] AQUA Drive FC 202, and VLT[®] AutomationDrive FC 302 D4h-size VLT[®] Parallel Drive Modules mounted in a Rittal TS8 enclosure. The kit directs air in from the back of unit and out through the top of the unit. See *Illustration 1.1*.



1	Back-channel airflow (exhaust)
2	Base duct assembly
3	Mounting backplate
4	Back-channel airflow (intake)

Illustration 1.1 Direction of Airflow with the Kit Installed

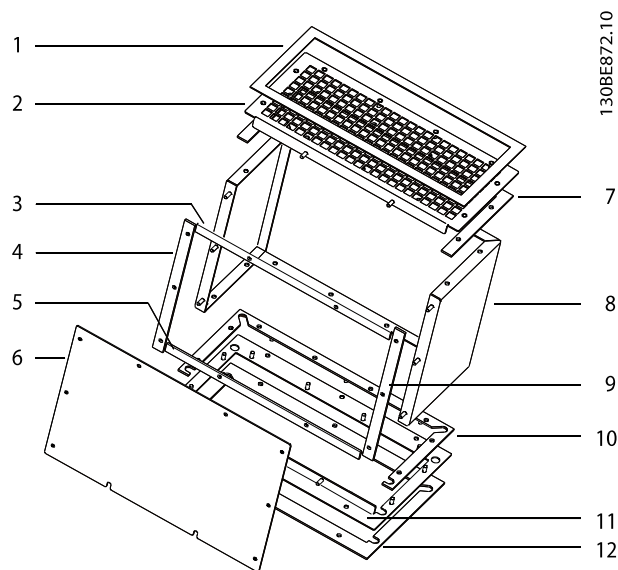
Kit Part Number

Part number	Kit description
176F6494	In-back/Out-top Cooling Kit for the VLT [®] Parallel Drive Modules (2-drive system)

Table 1.1 Part Number for the VLT[®] Parallel Drive Modules In-back/Out-top Cooling Kit

Items Supplied

Upper duct assembly



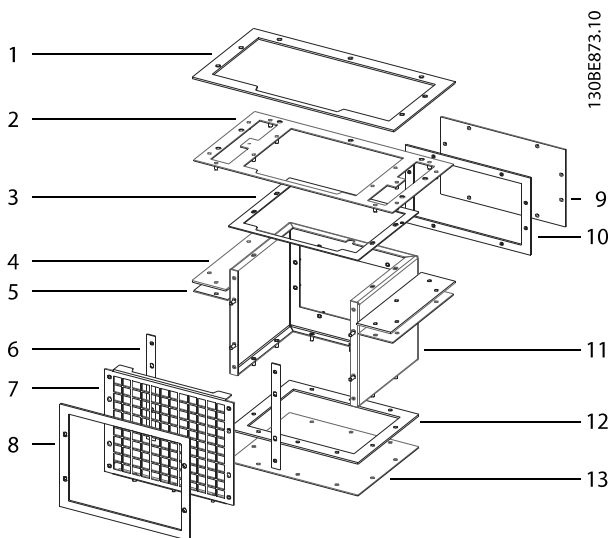
1	Gasket between grill and cabinet (1)
2	Grill (1)
3	Gasket, top front cover (1)
4	Gasket, left front cover (1)
5	Gasket, bottom front cover (1)
6	Front cover plate (1)
7	Gasket between duct enclosure and grill (1)
8	Duct enclosure (1)
9	Gasket, right front cover (1)
10	Gasket between duct enclosure and base plate (1)
11	Base plate (1)
12	Gasket between base plate and module (1)
-	Nuts, M5 (26)
-	Screws, M5x12 (6)

Illustration 1.2 Upper Duct Assembly for 1 Drive Module

Enclosure mounting assembly

- Base mounting plate, 38 mm (1.5 in.) (4)
- Gasket, base mounting plate (4)
- Duct spacer (2)
- Gasket, between exhaust and backplate (2)
- Gasket, between duct spacer and cabinet panel (2)
- Gasket, between duct spacer and backplate (2)
- Slot gasket, between drive module and backplate (2)
- M5 nuts (20)
- Screws, M5x16 (14)

Lower duct assembly



1	Gasket between drive module and top plate (1)
2	Top plate (1)
3	Gasket between duct enclosure and top plate (1)
4	Gasket, top side (2)
5	Top side, cover (2)
6	Gasket, side of grill (2)
7	Grill (1)
8	Gasket between grill and mounting backplate (1)
9	Front cover plate (1)
10	Gasket between duct enclosure and front cover plate (1)
11	Duct enclosure (1)
12	Gasket between duct enclosure and base cover plate (1)
13	Base cover plate (1)
-	Screws, M5x12 (4)
-	Torx screws, M5x16 (7)
-	Nuts, M5 (36)

Illustration 1.3 Lower Duct Assembly for 1 Drive Module

Safety

⚠ WARNING

DISCHARGE TIME

The frequency converter contains DC-link capacitors, which can remain charged even when the unit is off. High voltage can be present even when the warning indicator lights are off. Failure to wait 20 minutes after power has been removed before performing service or repair work, could result in death or serious injury.

- Stop the motor.
- Disconnect the AC mains, permanent magnet type motors, and remote DC-link supplies, including battery back-ups, UPS, and DC-link connections to other frequency converters.
- Wait 20 minutes for the capacitors to discharge fully, before performing any service or repair work.
- Measure the voltage level to verify full discharge.

Installation

NOTICE

If both a bus bar kit and a back-channel cooling kit are being installed in the cabinet, install the back-channel cooling kit first.

NOTICE

APPROVALS AND CERTIFICATIONS

This VLT® Parallel Drive Modules back-channel cooling kit is UL 508C compliant. These installation instructions describe how to install the back-channel cooling kit which, if followed, meet specific agency approvals and certifications. Seek agency approvals or certifications apart from Danfoss if designing and building other configurations.

NOTICE

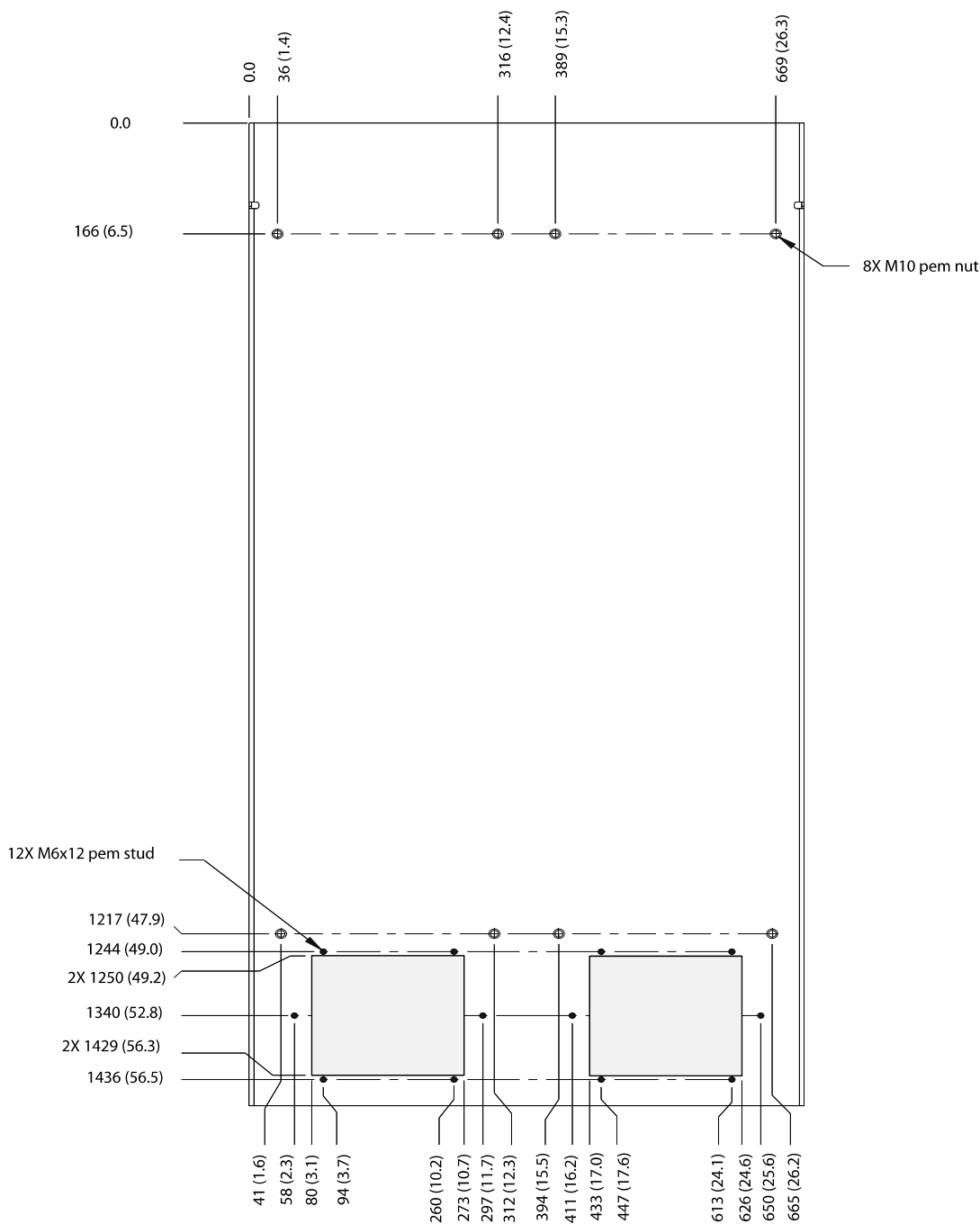
APPLYING GASKETS

This kit contains gaskets to ensure a proper seal between metal parts. Before adhering a gasket to a part, check that the part matches the gasket and that no holes are covered. Remove paper backing and place the sticky side on the part.

Creating Vent Openings in the Mounting Backplate

Refer to *Illustration 1.4* for the following steps.

1. Cut out the intake openings in the mounting backplate. The openings must match to the intake vent openings of the drive module.
2. Drill the 12 screw holes around the vent openings and insert the 12 M6 X 12 pem studs, with the studs facing toward the back of the mounting backplate.
3. Drill the 8 screw holes to mount the drive modules and install 8 M10 pem nuts on the back side of the mounting backplate.



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Illustration 1.4 Vent Dimensions for Mounting Backplate

Assembling the Lower Duct Enclosure

The front cover gasket (10) and front cover plate (9) are not installed during the lower duct assembly. They are installed once the duct is attached to the mounting backplate.

1. Install the left and right side gaskets (6) against the back side of the duct enclosure (11).
2. Place the grill (7) on top of the gaskets. Secure the grill to the enclosure using 4 M5 nuts. Torque to 5.1 Nm (45 in-lb).
3. Install the gasket (8) on top of the grill.
4. On the base of the enclosure, install the gasket (12) and then the base cover plate (13) on the enclosure. Secure with 10 M5 nuts and torque to 5.1 Nm (45 in-lb).
5. On the top of the enclosure, install the gasket (3) and then the top plate (13) on the enclosure. Secure the top plate to the enclosure with 4 M5 nuts. Torque to 5.1 Nm (45 in-lb).
6. Install the gasket (1) on the top plate. Leave the paper backing on the adhesive until ready to install on the drive module.
7. Turn the duct enclosure over so the base of the enclosure is facing up. Install the top side gaskets (4) on the sides of the top plate (2).
8. Place a top side cover (5) on each gasket (4). Secure each cover with 5 M5 nuts and torque to 5.1 Nm (45 in-lb).

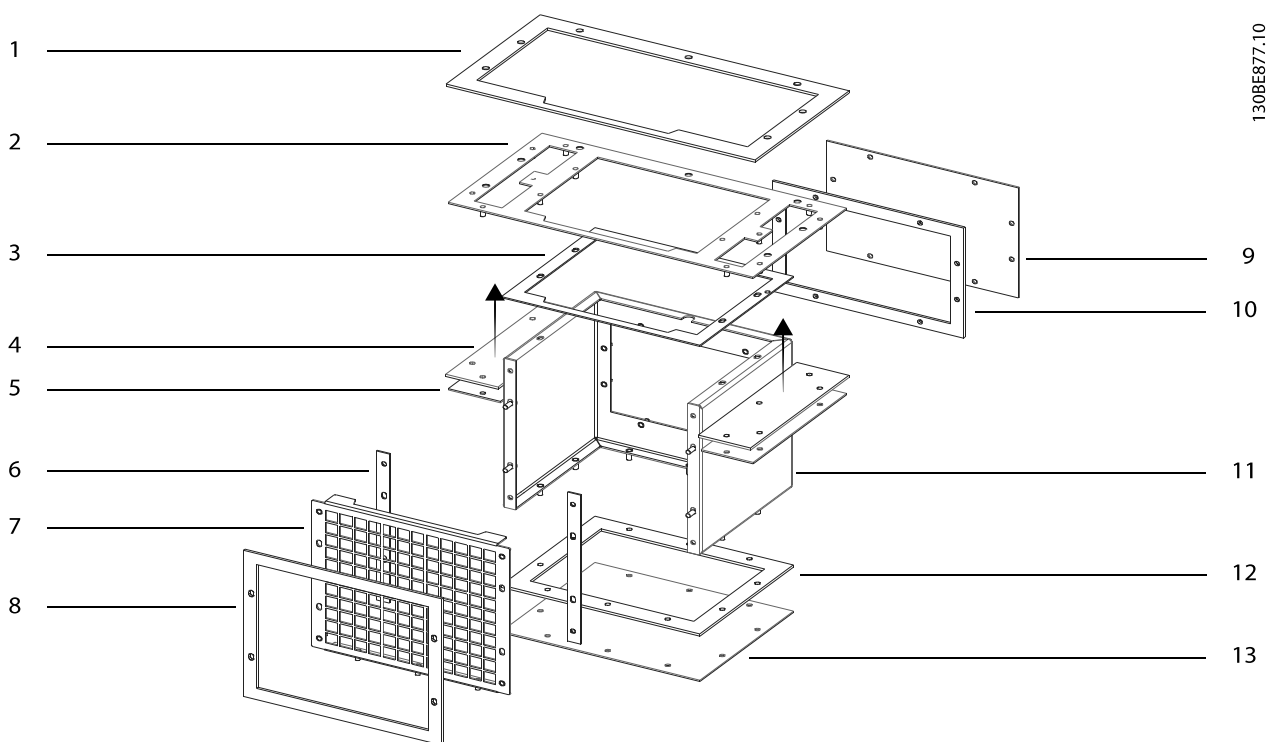
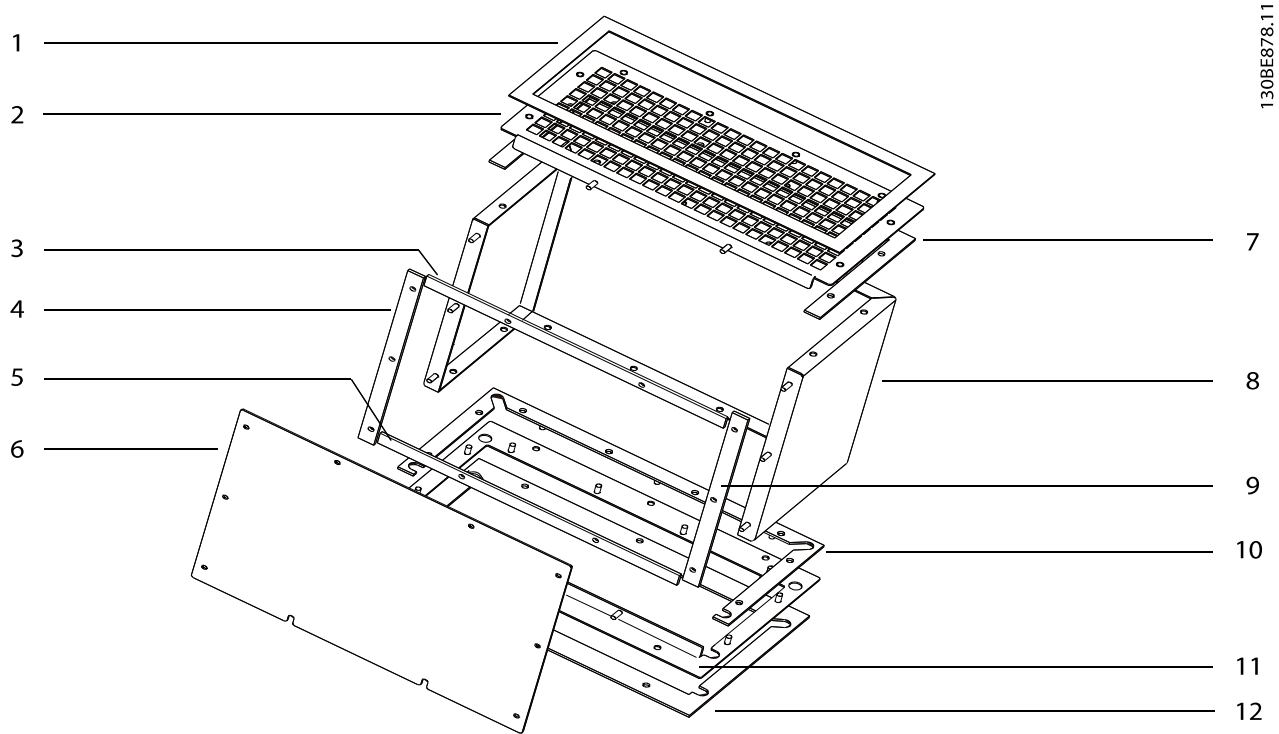


Illustration 1.5 Assembling the Lower Duct Enclosure

1	Gasket between drive module and top plate	8	Gasket between grill and cabinet
2	Top plate	9	Front cover plate
3	Gasket between duct enclosure and top plate	10	Gasket between duct enclosure and front cover plate
4	Gasket, top side	11	Duct enclosure
5	Top side, cover	12	Gasket between duct enclosure and base cover plate
6	Gasket, side of grill	13	Base cover plate
7	Grill	-	-

Assembling the Upper Duct Assembly

1. On the top side of the enclosure, install the gasket (7) and then the grill (2). Secure the grill with 8 M5 nuts and torque to 5.1 N · m (45 in-lb).
2. Install the gasket (1) on top of the grill. Leave the paper backing on the adhesive until ready to install on the drive module.
3. Turn the duct enclosure over so the base of the enclosure is facing up. Install the gasket (10) on the base of the enclosure.
4. Place the base plate (11) on the gasket (10). Secure with 8 M5 nuts and torque to 5.1 N · m (45 in-lb).
5. On the front side of the enclosure (8), install the 4 gaskets (3, 4, 5, 9).
6. Place the front cover plate (6) on top of the gaskets. Secure the front cover plate to the enclosure using 8 M5 nuts. Torque to 5.1 N · m (45 in-lb).
7. Install the gasket (12) on top of the base plate.

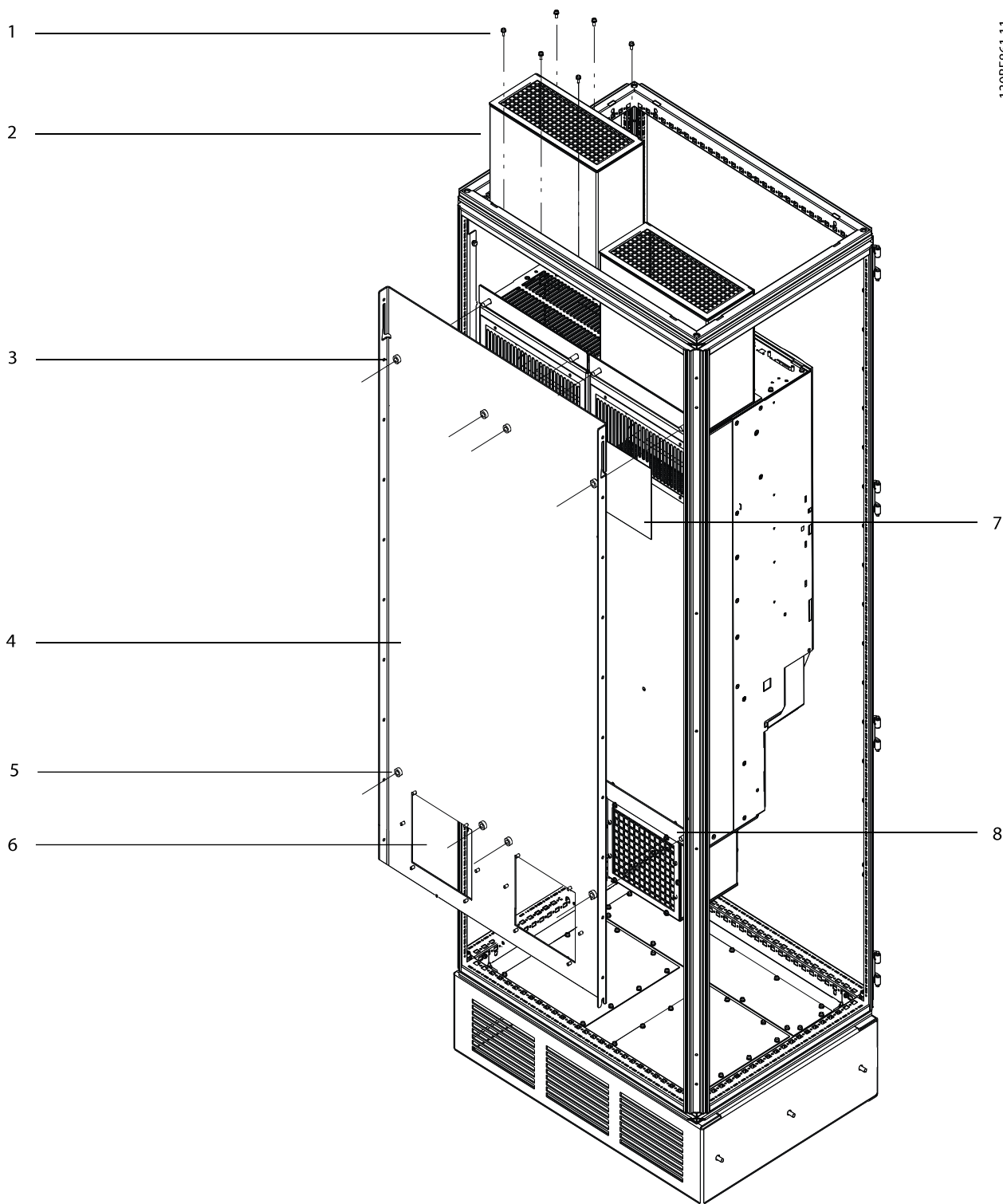


1	Gasket between grill and the top panel cover	7	Gasket between duct enclosure and grill
2	Grill	8	Duct enclosure
3	Gasket, top front cover	9	Gasket, right front cover
4	Gasket, left front cover	10	Gasket between duct enclosure and base plate
5	Gasket, bottom front cover	11	Base plate
6	Front cover plate	12	Gasket between base plate and module

Illustration 1.6 Assembling the Upper Duct Assembly

Mounting the Drive Modules

1. Install the mounting backplate to the cabinet rails, making sure that the pem studs/nuts are facing toward the back of the enclosure.
2. Install gaskets to the back side of the drive module. Refer to *Illustration 1.7*.
 - 2a Install gasket (9) over the vent opening.
 - 2b Align the slot gasket (10) with the lower mounting holes in the drive module and install the gasket onto the drive module.
3. Install the base mounting plates. Refer to *Illustration 1.8*.
 - 3a Assemble the 2 base mounting plates by attaching the gasket (4) onto the base mounting plate (5).
 - 3b Insert an M10 screw (6) through the mounting plate/gasket assembly and loosely fasten into the mounting backplate. Perform this step again for the other mounting plate/gasket assembly. Make sure that the screws are secure since the base of the drive module rests on these screws.
4. Slightly lean the top of the drive module forward and set the cutouts in the base of the module onto the lower 2 M10 screws in the mounting backplate.
5. Slowly push the top of the drive module back against the mounting backplate until the top 2 holes on the module line up with the 2 mounting holes in the mounting backplate. Secure the top of the drive module using 2 M10 screws and torque to 19 Nm (170 in-lb).
6. Torque the M10 screws securing the base of the module to 19 Nm (170 in-lb).
7. Remove the DC fuses from the top of the drive module.
8. Install the upper duct assembly. Refer to *Illustration 1.7*.
 - 8a Remove the paper backing from the top gasket.
 - 8b Place the upper duct assembly on top of the drive module, making sure the mounting holes line up.
 - 8c Secure the duct assembly to the drive module with 6 M5x12 screws. Torque to 5.1 Nm (45 in-lb).
9. Reinstall the DC fuses on top of the drive module.
10. Install the next drive module to the mounting backplate.



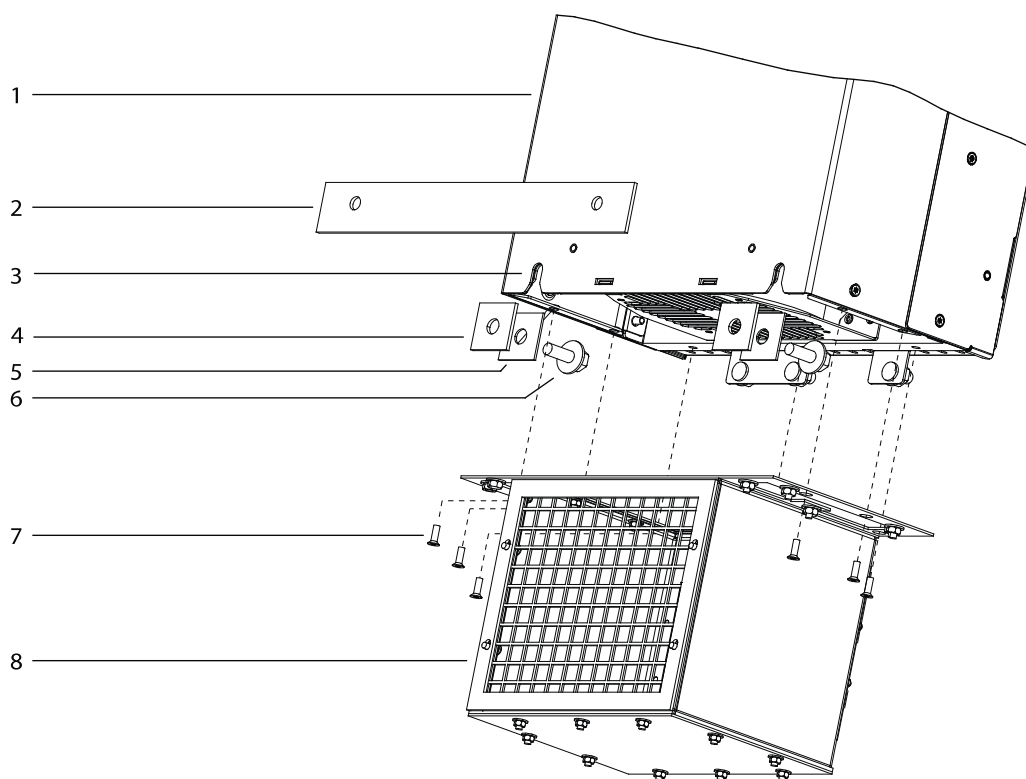
1	M5x12 screws	5	Lower mounting point for drive module (M10 pem nut)
2	Upper duct assembly	6	Intake vent opening
3	Upper mounting point for drive module (M10 pem nut)	7	Gasket, between back exhaust and mounting backplate
4	Mounting backplate	8	Slot gasket

Illustration 1.7 Installing the Drive Modules onto the Mounting Backplate

Installing the Lower Duct Assembly to the Mounting Backplate

Refer to *Illustration 1.8* for the following steps.

1. Remove the paper backing from the top plate gasket.
2. Place the lower duct assembly up against the drive module base, making sure the mounting holes line up.
3. Secure the lower duct assembly to the base of the drive module using 7 M5x16 screws. Torque to 5.1 Nm (45 in-lb).
4. Secure the grill on the lower duct assembly to the mounting backplate using 4 M5x12 screws. Torque to 5.1 Nm (45 in-lb).
5. On the front side of the lower duct, install the front cover gasket (10) and then the front cover plate (9). Refer to *Illustration 1.5*. Secure with 8 M5 nuts and torque to 5.1 Nm (45 in-lb).
6. Install the lower duct assembly for the next drive module.



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1	Drive module	5	Base mounting plate, 38 mm (1.5 in)
2	Gasket, slot	6	M10 screw
3	Cutout in drive module base that rests on the M10 screw	7	M5x16 screw
4	Gasket, base mounting plate, 38 mm (1.5 in)	8	Lower duct assembly

Illustration 1.8 Installing the Lower Duct Assembly

Installing the Top Panel Cover

1. Cut out the 2 exhaust vent openings in the top panel cover. The openings must match to the exhaust vent openings on the upper duct assembly. Refer to *Illustration 1.9*.
2. Secure the top panel cover to the frame.

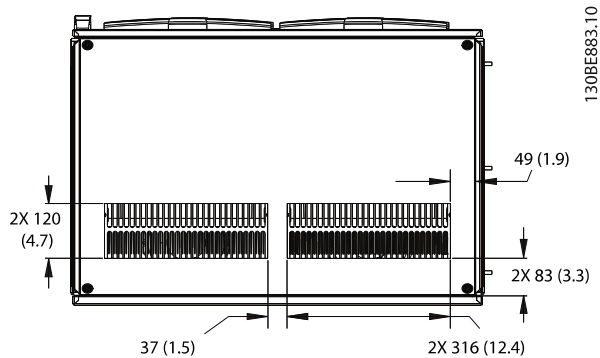
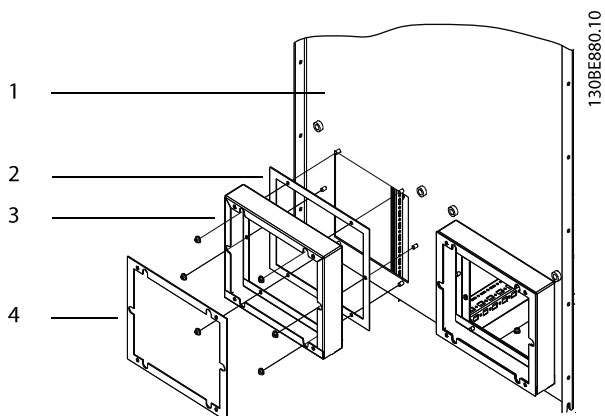


Illustration 1.9 Vent Dimensions for the Top Panel Cover

Installing the Back Cover Panel

1. Install a gasket (2) around each vent opening on the back side of the mounting backplate (1). Refer to *Illustration 1.10*.
2. Install a duct spacer (3) onto each of the gaskets. Secure each duct spacer with 6 M5 nuts. Torque to 5.1 Nm (45 in-lb).
3. Place a gasket (4) onto each duct spacer.



1	Mounting backplate
2	Gasket between the mounting backplate and duct spacer
3	Duct spacer
4	Gasket between the duct spacer and back cover panel

Illustration 1.10 Installing the Duct Spacers

4. Prepare the back cover panel. Refer to *Illustration 1.11*.
 - 4a Cut out the 2 intake vent openings in the back cover panel. The openings must match to the intake vent openings on the intake duct spacer.
 - 4b Drill the 8 screw holes around the vent openings.
5. Secure the back cover cabinet panel to the frame.
6. Secure the back cover panel to the duct spacers with 8 M5x16 screws. Torque to 5.1 Nm (45 in-lb).

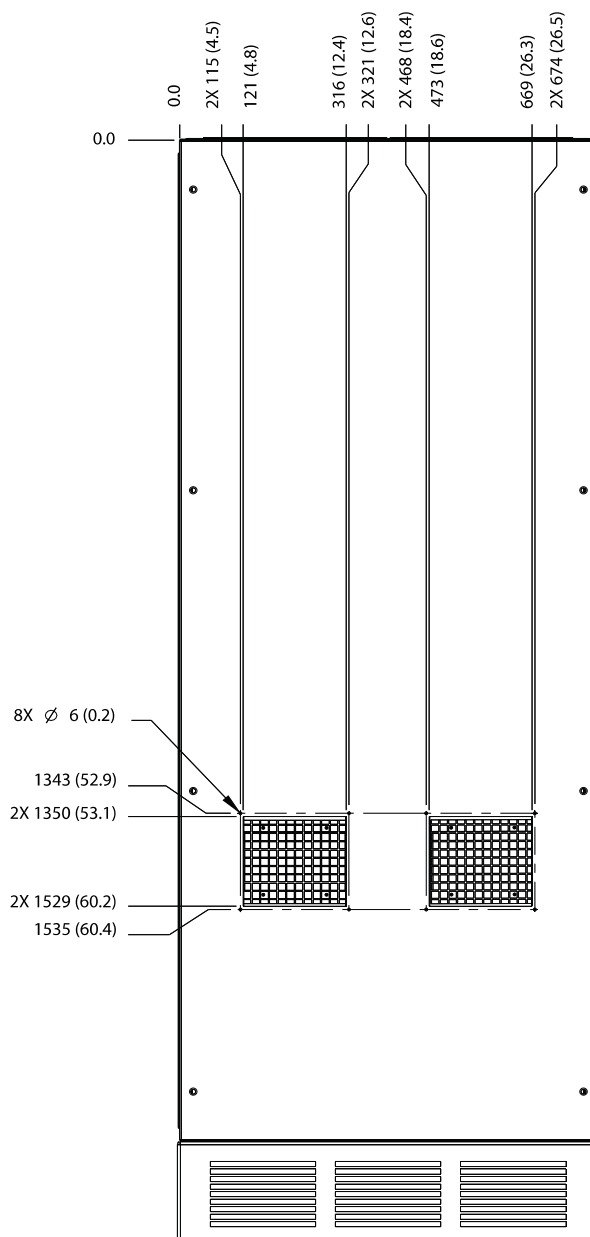


Illustration 1.11 Vent Dimensions for the Back Cover Panel

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