

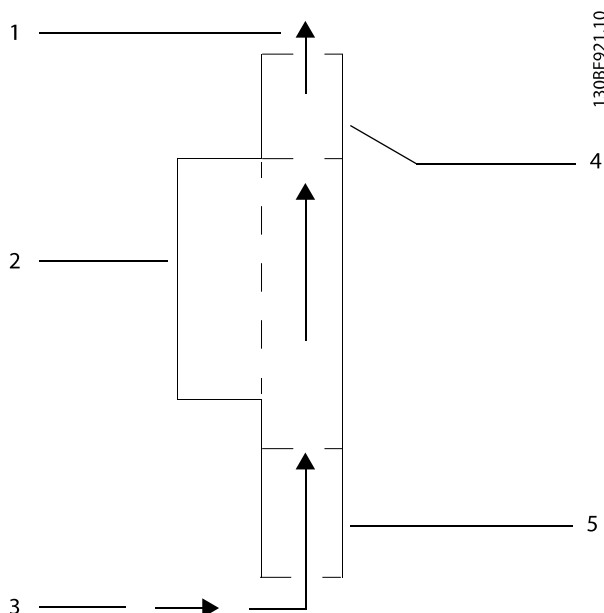
Installation Instructions

In-bottom/Out-top Cooling Kit for VLT® Parallel Drive Modules

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

Description

The in-bottom/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 bottom of the unit and out through the top of the unit. See *Illustration 1.1*.



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1	Back-channel airflow (exhaust)
2	Drive module
3	Back-channel airflow (intake)
4	Upper duct assembly
5	Lower duct assembly

Illustration 1.1 Direction of Airflow with the Kit Installed

Kit Part Number

Part number	Kit description
176F6491	In-bottom/Out-top Cooling Kit for the VLT® Parallel Drive Modules (2-drive system)

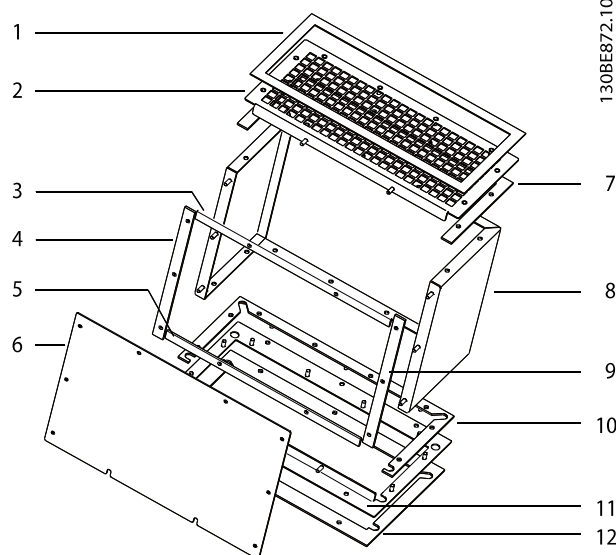
Table 1.1 Part Number for the VLT® Parallel Drive Modules In-bottom/Out-top Cooling Kit

Items Supplied

Enclosure mounting assembly

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

Upper duct assembly

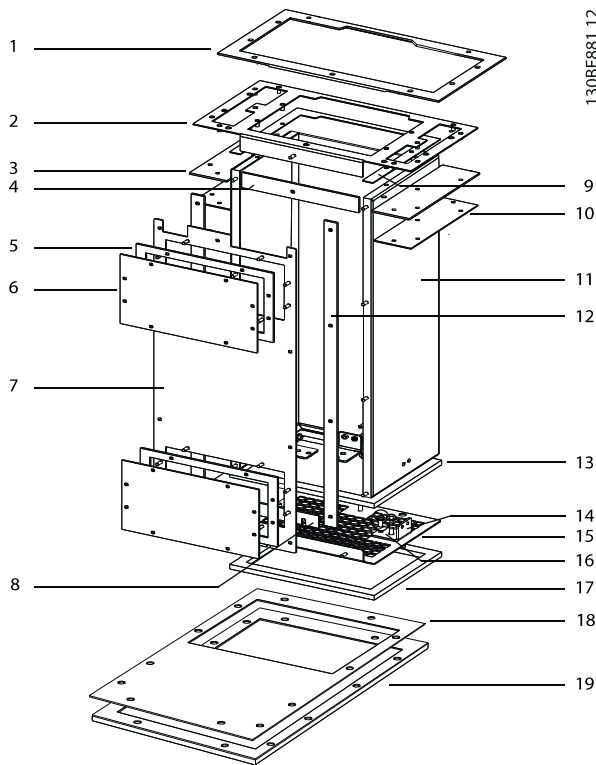


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1	Gasket between grill and top cover panel (1)
2	Grill (1)
3	Gasket, top front cover (1)
4	Gasket, left front cover (1)
5	Gasket, bottom front cover (1)
6	Front cover plate (1)
7	Gasket between duct enclosure and grill (1)
8	Duct enclosure (1)
9	Gasket, 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

Lower duct assembly



1	Gasket between the top plate and the module (1)
2	Top plate between module and lower duct (1)
3	Gasket, top side plate (2)
4	Gasket, upper strip on front side of duct enclosure (1)
5	Gasket between front plate and access plate (2)
6	Access plate (2)
7	Front plate (1)
8	Gasket, lower strip on front side of duct enclosure (1)
9	Gasket between top plate and lower duct enclosure (1)
10	Top side plate (2)
11	Duct enclosure (1)
12	Gasket, side rail on front side of duct (2)
13	Gasket between grill and lower duct enclosure (1)
14	Bracket (3)
15	Grill (1)
16	Screw/washer assembly for bracket (3)
17	Gasket between grill and gland plate (1)
18	Base cover plate (2)
19	Gasket between base cover plate and base plate (2)
-	Nuts, M5 (47) and M6 (3)

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.

Assembling the Lower Duct Enclosure

1. Position the duct enclosure (11) as shown in *Illustration 1.4*.
2. Install the top plate assembly.
 - 2a Place the U-shaped gasket (9) along the top edge of the duct enclosure.
 - 2b Apply the gasket (1) to the top side of the top plate (2). Leave the paper backing on the adhesive until the duct is ready to install on the drive module.
 - 2c Install the top plate, with the studs facing down, onto the top of the duct enclosure. Secure with 4 M5 nuts and torque to 5.1 N · m (45 in-lb).
 - 2d Install the top side plate gaskets (3) to the underside of the top plate (2).
 - 2e Install both top side plates (10) over the top side plate gaskets. Secure each top side plate with 5 M5 nuts and torque to 5.1 N · m (45 in-lb).
 - 2f Apply the upper strip gasket (4) to the top plate flange along the front of the duct enclosure.
3. Install the grill assembly to the base of the duct enclosure.
 - 3a Apply the gasket (13) to the base of the duct enclosure.
 - 3b Apply the gasket (17) to the base of the grill plate.
 - 3c Install the grill (15) with the flange facing upward onto the duct enclosure base.
 - 3d Apply the lower strip gasket (8) to the grill plate flange.
 - 3e Fasten the grill to the duct enclosure using the 3 brackets (14). Each bracket is placed over a stud on the grill and lines up with 2 studs in the duct enclosure.
 - 3f Secure each bracket to the duct enclosure with 2 M5 nuts. Torque to 5.1 N · m (45 in-lb).
 - 3g Secure the grill to each bracket using 1 M6 nut. Torque to 6.0 N · m (53 in-lb).
4. Assemble the backplate.
 - 4a Apply 1 gasket (5) onto the studs along the edge of each opening on the front plate.
 - 4b Install the access plates (6) over the gaskets and openings in the front plate.
 - 4c Secure each access plate with 8 M5 nuts and torque to 5.1 N · m (45 in-lb).
5. Apply gaskets (12) to each side rail on the duct enclosure.
6. Install the front plate (7) and secure with 11 M5 nuts. Torque to 5.1 N · m (45 in-lb).

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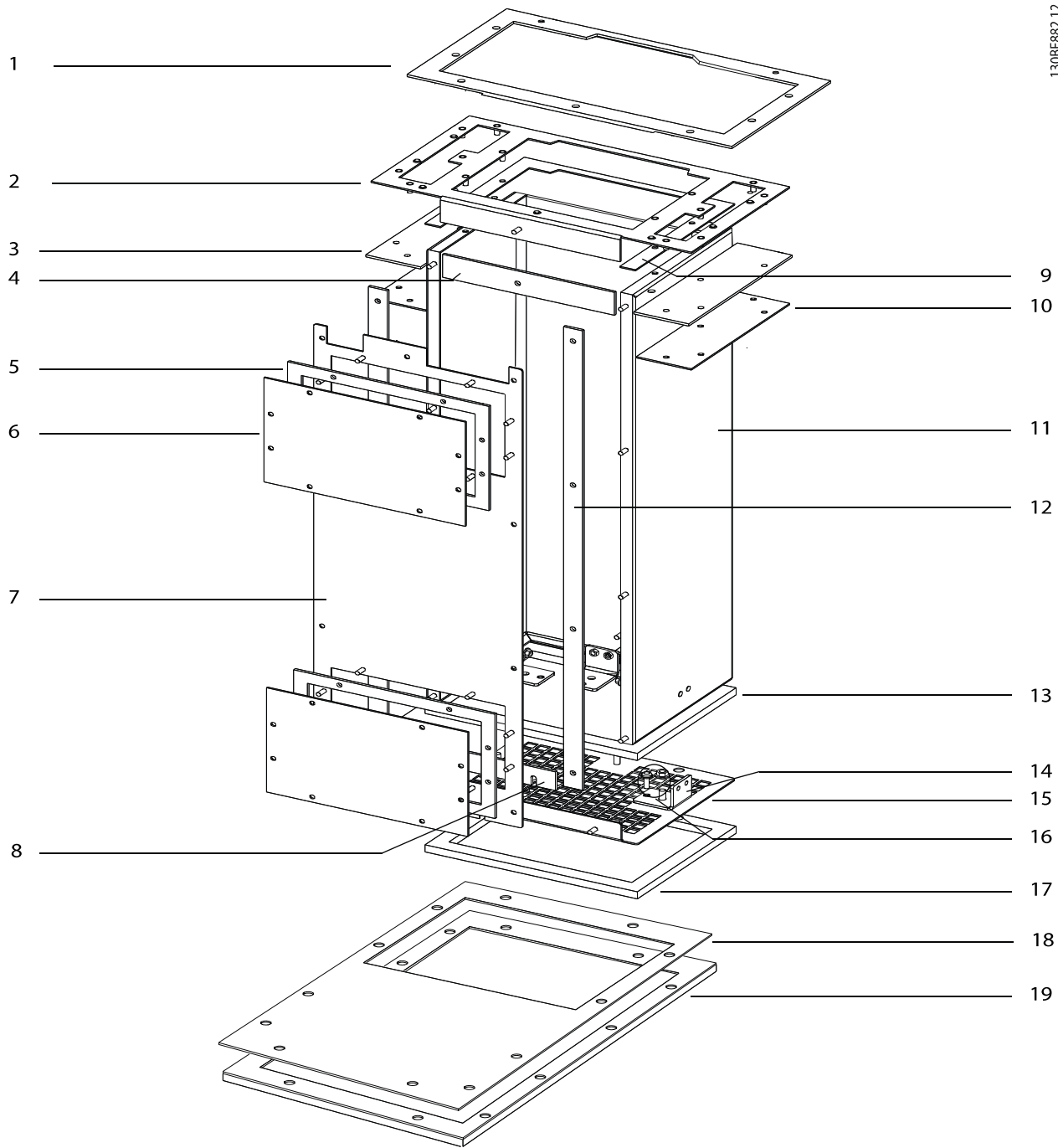
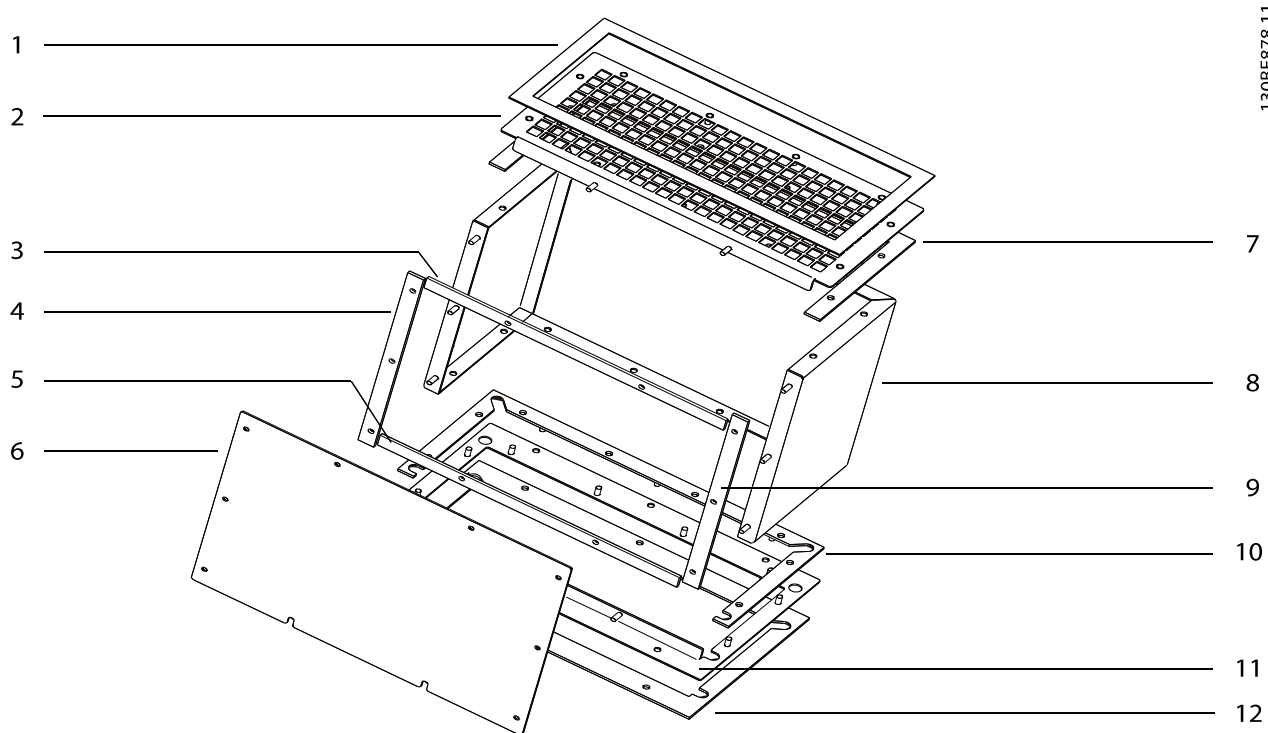


Illustration 1.4 Assembling the Lower Duct Enclosure

1	Gasket between the top plate and the module	11	Duct enclosure
2	Top plate between module and lower duct	12	Gasket, side rail on back side of duct
3	Gasket, top side plate	13	Gasket between grill and duct enclosure
4	Gasket, upper strip on back side of duct	14	Bracket
5	Gasket between front plate and access plate	15	Grill
6	Access plate	16	Screw/washer assembly for bracket
7	Front plate	17	Gasket between grill and gland plate
8	Gasket, lower strip on back side of duct	18	Base cover plate
9	U-shaped gasket	19	Gasket between base cover plate and base plate
10	Top side plate	-	-

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.

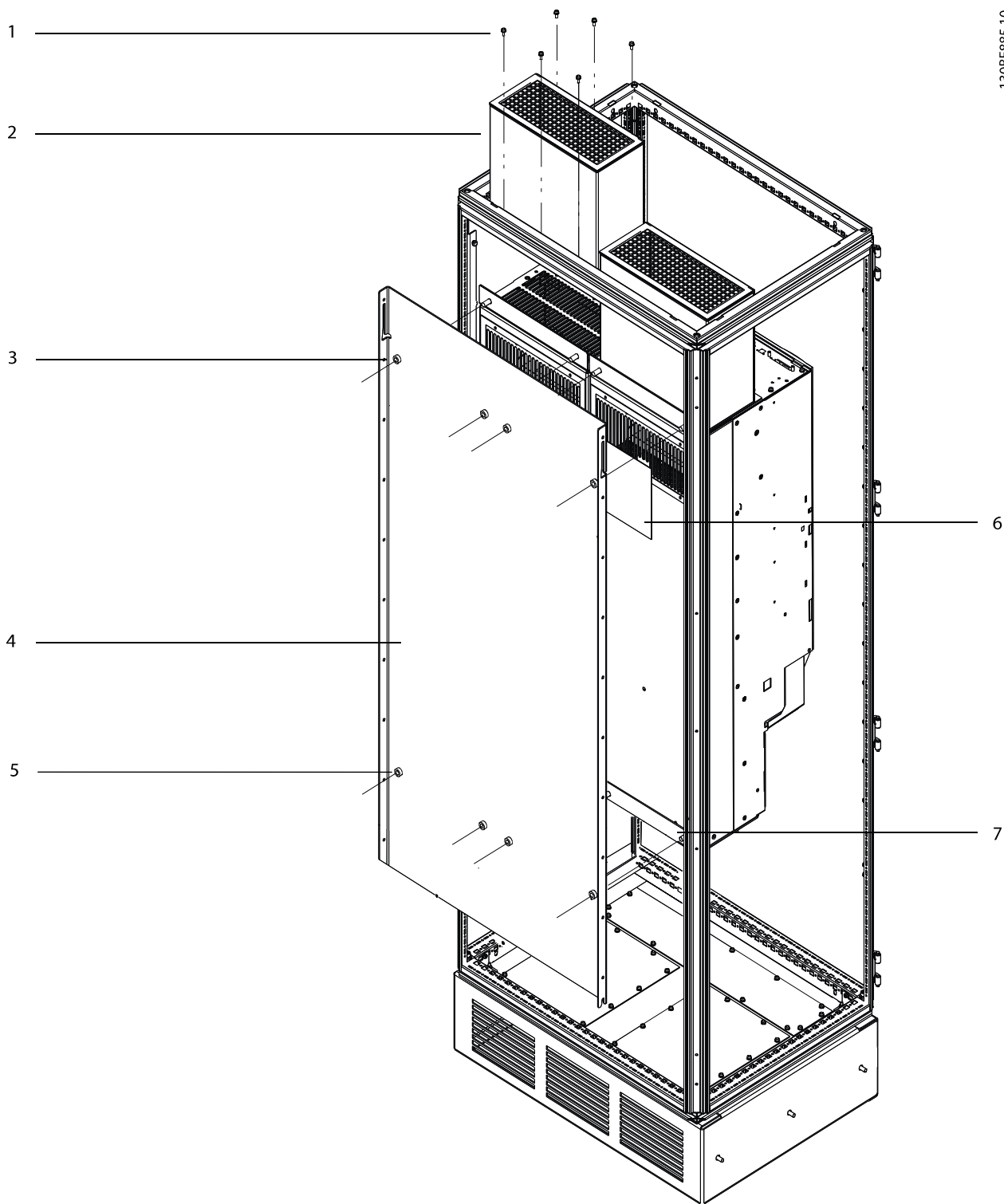


1	Gasket between grill and the top panel cover	7	Gasket between duct enclosure and grill
2	Grill	8	Duct enclosure
3	Gasket, top front cover	9	Gasket, right front cover
4	Gasket, left front cover	10	Gasket between duct enclosure and base plate
5	Gasket, bottom front cover	11	Base plate
6	Front cover plate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

Illustration 1.5 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 1.6*.
 - 2a Install gasket (6) over the vent opening.
 - 2b Align the slot gasket (7) 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 1.7*.
 - 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 N · m (170 in-lb).
6. Torque the M10 screws securing the base of the module to 19 N · m (170 in-lb).
7. Remove the DC fuses from the top of the drive module.
8. Install the upper duct assembly. Refer to *Illustration 1.6*.
 - 8a Remove the paper backing from the top gasket.
 - 8b Place the upper duct assembly on top of the drive module, making up sure the mounting holes line.
 - 8c Secure the duct assembly to the drive module with 6 M5x12 screws. Torque to 5.1 N · m (45 in-lb).
9. Reinstall the DC fuses on top of the drive module.
10. Install the next drive module to the mounting backplate.



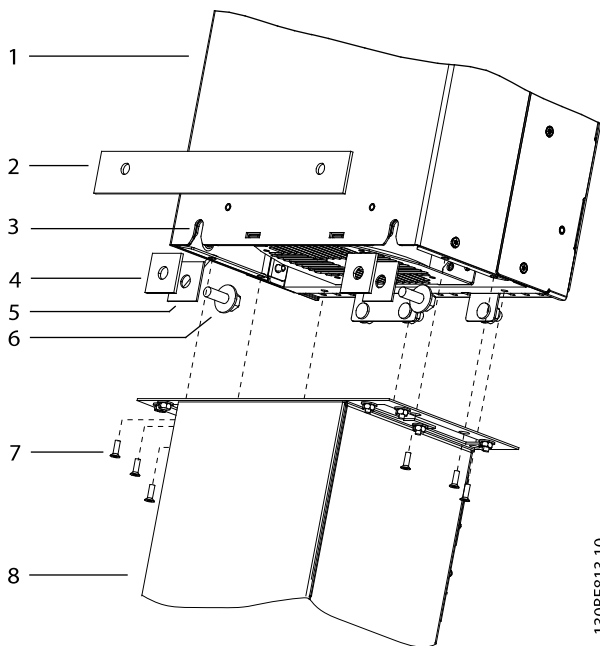
1	M5x12 screws	5	Lower mounting point for drive module (M10 pem nut)
2	Upper duct assembly	6	Gasket between back exhaust and mounting backplate
3	Upper mounting point for drive module (M10 pem nut)	7	Slot gasket
4	Mounting backplate	-	-

Illustration 1.6 Installing the Drive Modules onto the Mounting Backplate

Installing the Lower Duct Assembly

Refer to *Illustration 1.7* 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 that the mounting holes align.
3. Secure the lower duct assembly to the base of the drive module using 7 M5x16 screws. Torque to 5.1 N · m (45 in-lb).
4. Install the lower duct assembly on the next drive module.



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

Illustration 1.7 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 the exhaust vent

openings on the upper duct assembly. Refer to *Illustration 1.8*.

2. Secure the top panel cover to the frame.

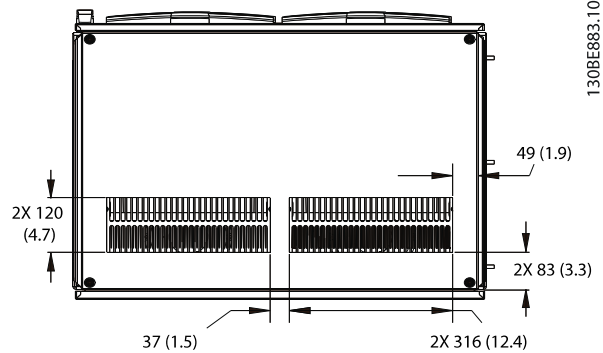


Illustration 1.8 Vent Dimensions for the Top Panel Cover

Installing the Base Cover Plate and Back Panel Cover

1. Cut out 2 vent openings in the base plate. Refer to the shaded area dimensions in *Illustration 1.9*.
2. Create openings for the cables. Refer to the area marked with diagonal lines. Seal the cable entry once the cables are connected.
3. Drill 24 screw holes around the vent openings and install 24 M5 pem nuts. Refer to *Illustration 1.10*.
4. Secure the base plate to the enclosure, pem nuts facing the floor.
5. Install a gasket (19) around each of the vent openings on the base cover plate. When installed, this gasket faces the base plate. Refer to *Illustration 1.4*.
6. For each lower duct assembly, slip the base cover plate (18) between the duct assembly and the base plate. Align the opening on the base cover plate with the gasket (17) on the lower duct assembly.
7. Secure each lower duct assembly to the base cover plate.
 - 7a Install 1 screw/washer assembly (16) per bracket (14). Loosely fasten the screw/washer assembly.
 - 7b Loosen, but do not remove, the M6 nut on the bracket.
 - 7c Torque the screw/washer assembly to 5.1 N · m (45 in-lb).
 - 7d Torque the M6 nut to 3.0 N · m (27 in-lb).
8. Secure each base cover plate to the base plate using 12 M5 screws. Torque to 5.1 N · m (45 in-lb).
9. Secure the back panel cover to the frame.

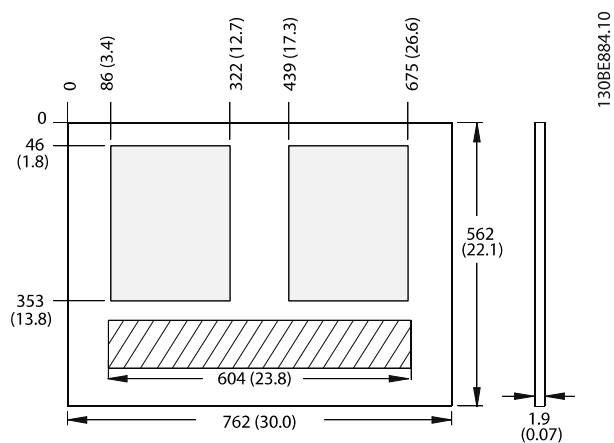
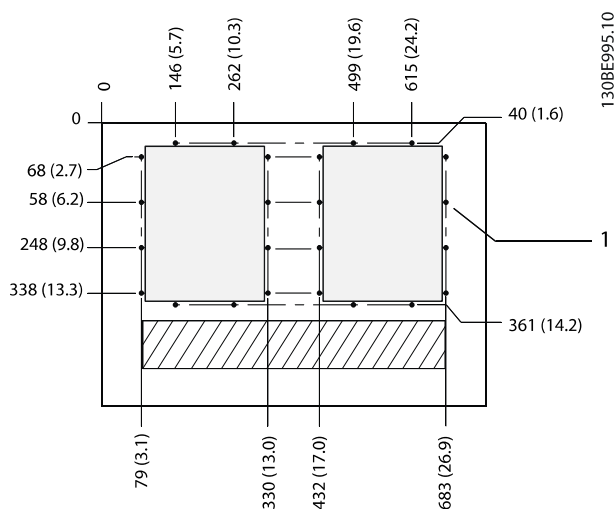


Illustration 1.9 Vent Opening Dimensions for the Base Plate



1	M5 pem nut (24 total on base plate)
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Illustration 1.10 M5 Pem Nut Dimensions on the Base Plate

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