Installation Instructions

In-back/Out-back Cooling Kit for D5h/D6h and D7h/D8h Enclosures VLT® Series FC 102, FC 202, and FC 302

1.1 Description

The back-channel cooling (in-back/out-back) kit is designed for the D5h/D6h and D7h/D8h frequency converters. Instead of airflow entering the bottom of the unit and exiting the top, the kit directs air in from and out of the back of the unit.

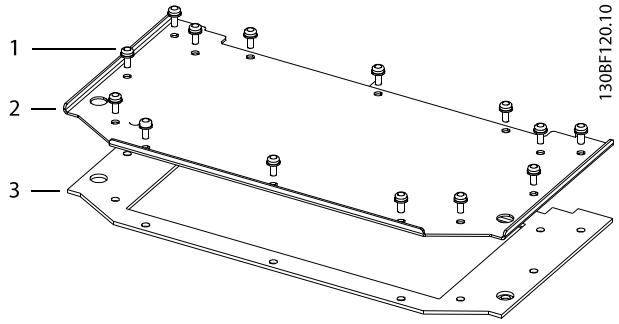
1.2 Kit Part Numbers

Part number	Kit description
176F3530	In-back/out-back cooling kit for the D5h/D6h
176F3531	In-back/out-back cooling kit for the D7h/D8h

Table 1.1 Part Numbers for D5h/D6h and D7h/D8h In-back/ Out-back Cooling Kits

1.3 Items Supplied

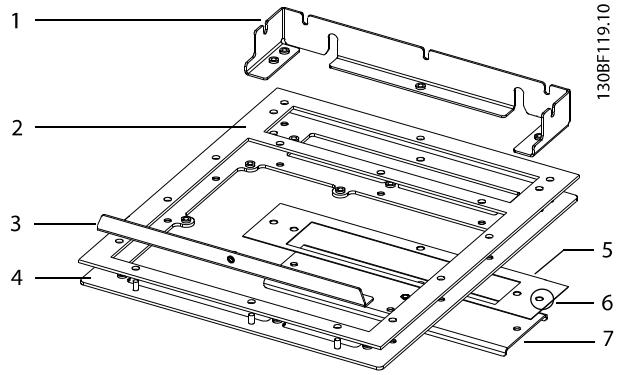
Top plate assembly



1	M5x12 screw/washer (12) D5h/D6h or (18) D7h/D8h
2	Top plate (1)
3	Gasket between top plate and frequency converter (1)

Illustration 1.1 Top Plate Components

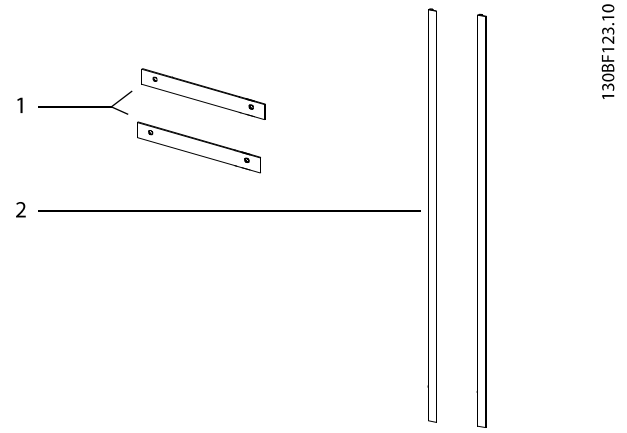
Base plate assembly



1	Bottom bracket (1)
2	Gasket between base plate and frequency converter (1)
3	Front brace (removed from base of frequency converter)
4	Base plate (1)
5	Gasket, bottom cover (1)
6	Outer hole in bottom cover gasket
7	Bottom cover (1)
–	M5 nut (8)
–	M5x16 Torx screw (2)
–	M5x12 screw with washer, (5) D5h/D6h or (7) D7h/D8h

Illustration 1.2 Base Plate Components

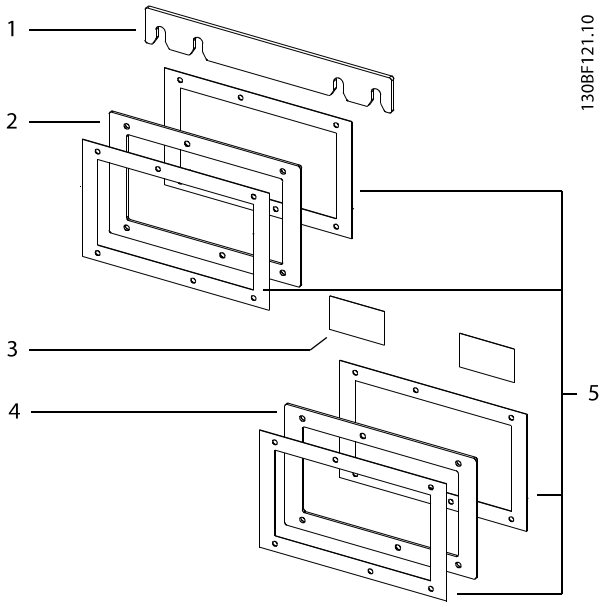
Enclosure gaskets



1	Gasket, slot (1) D5h/D6h or (2) D7h/D8h
2	Gasket, strip (2)

Illustration 1.3 Gasket Set for Enclosure

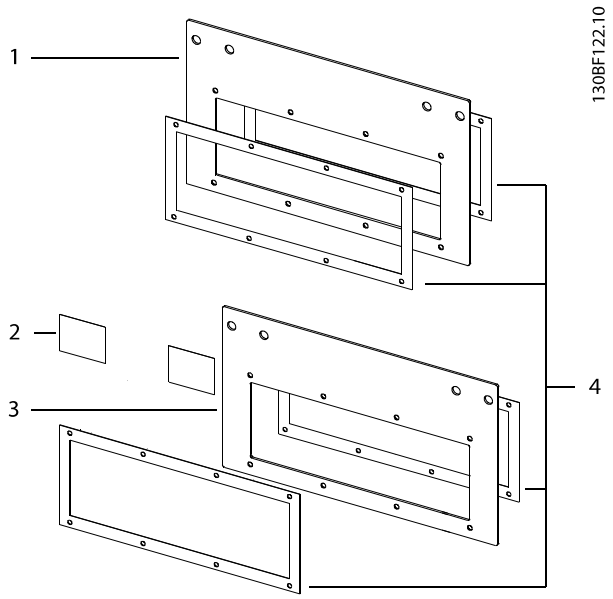
D5h/D6h back panel gasket set



1	Gasket, mounting (Not supplied with kit)
2	Exhaust spacer (1) (Used on pedestal units only)
3	Label (2)
4	Intake spacer (1) (Used on pedestal units only)
5	Vent gaskets (4)
–	M5x18 screw/washer (8)
–	M5x16 Torx screw (4) (Used on pedestal units only)

Illustration 1.4 Gasket Set, D5h/D6h Back Panel

D7h/D8h back panel gasket set



1	Exhaust spacer (1)
2	Intake spacer (1)
3	Label (2)
4	Vent gaskets (4)
–	M5x18 screw/washer (16)

Illustration 1.5 Gasket Set, D7h/D8h Back Panel

1.4 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.
- Measure the voltage level to verify full discharge before performing any service or repair work.

1.5.1 Removing the Frequency Converter from the Enclosure

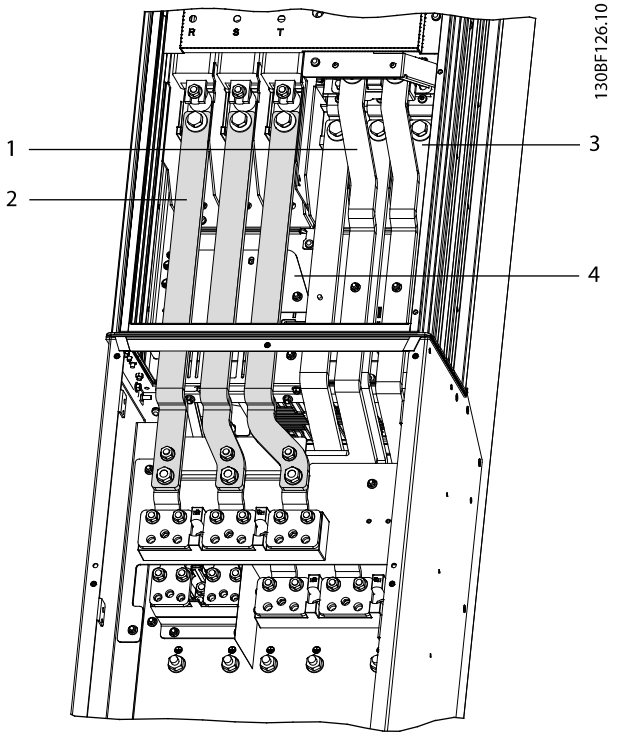
⚠WARNING

LIFTING HAZARD

The D5h/D7h modules weigh 62 kg (135 lb), and the D6h/D8h modules weigh 125 kg (275 lb). The options enclosure adds more weight. Failure to take proper lifting precautions could result in death or serious injury.

- **Ensure that a hoisting mechanism is used to lift the frequency converter.**

1. Remove the cover from the option enclosure.
2. Remove the front cover from the frequency converter.
3. Set the entire unit on its back.
4. Remove the jumper busbars that connect the frequency converter to the options enclosure. See *Illustration 1.6* for an example of a possible busbar configuration.
   - 4a Motor
   - 4b Mains
   - 4c Brake (if so equipped)

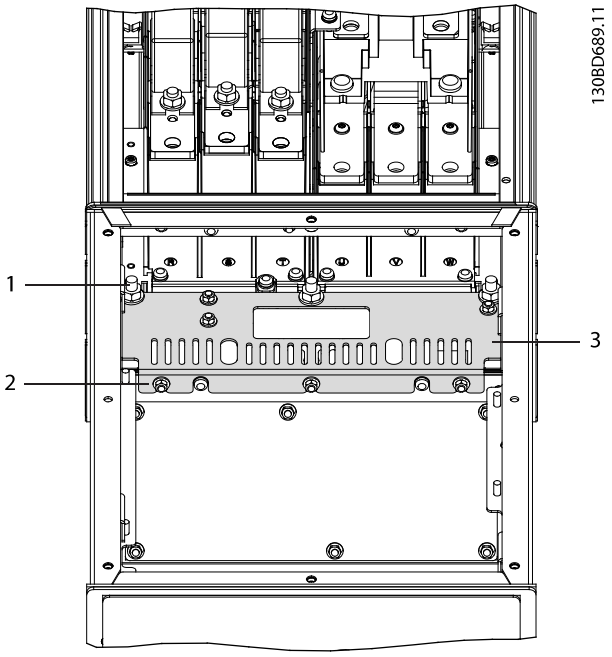


1	Motor busbar
2	Mains busbar
3	Brake busbar (optional)
4	Ground plate

Illustration 1.6 Jumper Busbars Between the Frequency Converter and the Enclosure

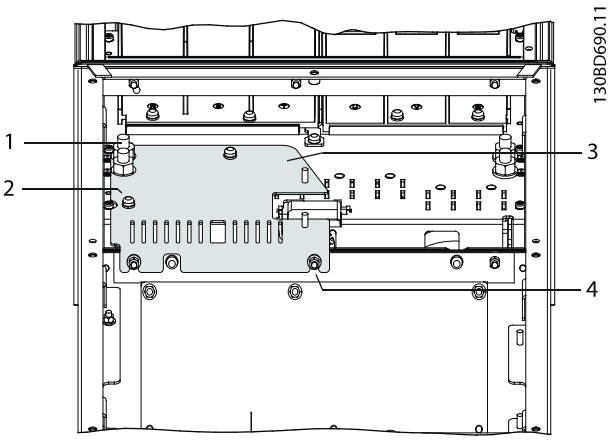
The ground plates come in 2 configurations. The smaller ground plate is used with the D5h and D7h enclosures, and the larger ground plate is used with the D6h and D8h enclosures.

5. Remove the ground plate between the bottom of the frequency converter and the top of the options enclosure.
   - For the smaller configuration, remove three 13 mm nuts and three 8 mm nuts. See *Illustration 1.7*.
   - For the larger configuration, remove two 17 mm nuts, three 8 mm nuts, and one T25 machine screw. See *Illustration 1.8*.



1	Nut, 13 mm
2	Nut, 8 mm
3	Ground plate

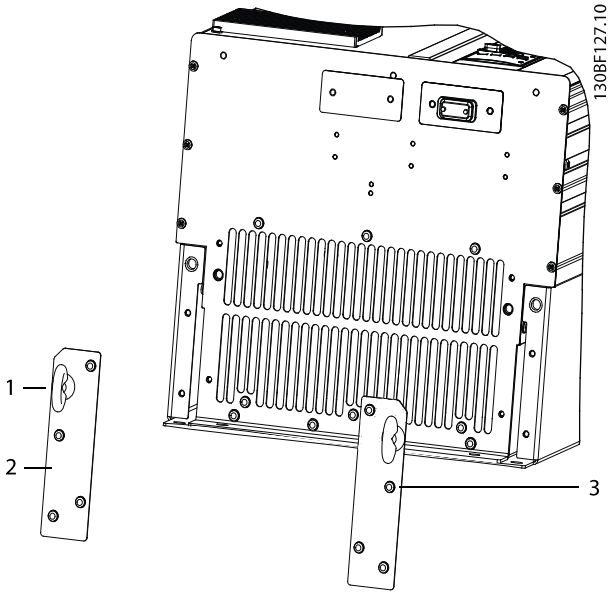
Illustration 1.7 Removing the Ground Plate (Smaller Configuration)



1	Nut, 13 mm
2	Screw, M5x12
3	Ground plate
4	Nut, 8 mm

Illustration 1.8 Removing the Ground Plate (Larger Configuration)

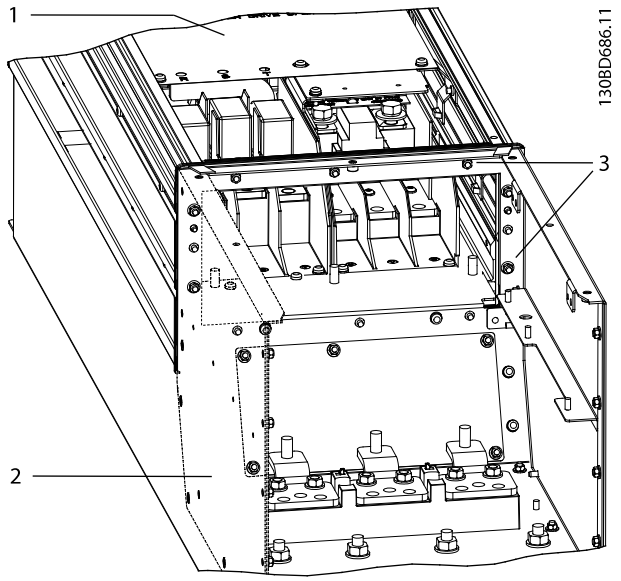
6. Unfasten the top of the frequency converter from the top of the options enclosure. See *Illustration 1.9*.
   - 6a Unscrew the 2 M10 eyebolts.
   - 6b Remove 4 M5x12 screws from each top connector plate.
   - 6c Remove the top connector plates.



1	M10 eyebolt on top of frequency converter
2	Top connector plate
3	Screw, M5x12 on connector plate

Illustration 1.9 Removing the Top Connection Plates

7. Unfasten the base of the frequency converter from the options enclosure.
   - 7a Make sure the unit is on its back.
   - 7b Remove five 8 mm nuts (D5h and D7h) or six 8 mm nuts (D6h and D8h). See *Illustration 1.9*.
   - 7c Lift and slide the frequency converter from the open channel of the options enclosure.



1	Frequency converter
2	Option enclosure
3	Nut, 8 mm

Illustration 1.10 Removing the Frequency Converter Base from the Options Enclosure

1.5.2 Assembling the Top Plate

1. Install the top plate gasket onto the top plate. Refer to *Illustration 1.1*.
2. Install the 2 M10 eyebolts onto the top plate.

1.5.3 Assembling and Installing the Base Plate

See *Illustration 1.2* for the following steps.

1. Remove the existing base plate from the frequency converter. Put aside the fasteners and the front brace (3) for later.
2. Place the new base plate (4) on a level surface, studs facing up.
3. Install gasket (2) onto the base plate.
4. Install front brace onto the 3 front studs and secure with 3 M5 nuts. Torque to 5.1 Nm (45 in-lb).
5. Install the bottom bracket (1) to the enclosure and secure with 5 M5 nuts. Torque to 5.1 Nm (45 in-lb). Refer to step 1 in *Illustration 1.11*.
6. Install the new base plate assembly onto the bottom of the enclosure. Torque all fasteners in this step to 5.1 Nm (45 in-lb). Refer to step 2 in *Illustration 1.11*.
   - 6a Secure the front of half of the new base plate with the 9 M5x16 Torx screws taken from the old base plate.
   - 6b At the back of the base plate assembly, secure both corners with the 2 M5x16 Torx screws included in the kit.
7. Install the bottom gasket (5) onto the base plate assembly. Secure it with 2 M5x12 screws placed in the outer holes (6). Refer to step 3 in *Illustration 1.11*.
8. Install the bottom cover (7) onto the bottom gasket. Refer to step 4 in *Illustration 1.11*. Secure with M5x12 screws, 4 (D5h/D6h) or 6 (D7h/D8h). Torque to 5.1 Nm (45 in-lb).
9. Install 1 M5x12 screw into the drain plug, which is found in the center of the bottom cover. Torque to 5.1 Nm (45 in-lb).

1.5.4 Reinstalling the Frequency Converter into the Enclosure

NOTICE

PREVENTING GASKET DAMAGE

Use a hoist to lift the D-frame unit into the enclosure. Sliding the unit into the enclosure with the weight of the unit on the side gaskets can damage the gaskets.

1. Attach the side gaskets to both sides of the frequency converter. Refer to step 5 in *Illustration 1.11*.
2. Stand up the enclosure and the D-frame unit side by side.
3. Attach 2 M8 eyebolts (not included) to the top of the D-frame unit.
4. Using a hoisting mechanism to support the D-frame unit, lower the unit into the enclosure being careful not to tear the side gaskets. Refer to step 6 in *Illustration 1.11*.
5. Remove the eyebolts from the D-frame unit.
6. Install the top plate assembly. Refer to step 7 in *Illustration 1.11*.
   - 6a With the gasket facing the enclosure, secure the top plate to the enclosure using M5x18 screws, 14 (D5h/D6h) or 18 (D7h/D8h).
   - 6b Torque to 5.1 Nm (45 in-lb).
7. Secure the unit to the options enclosure.
8. Reconnect the unit to the mains and motor.
9. Securely fasten the front door of the unit and the front panel on the options enclosure.

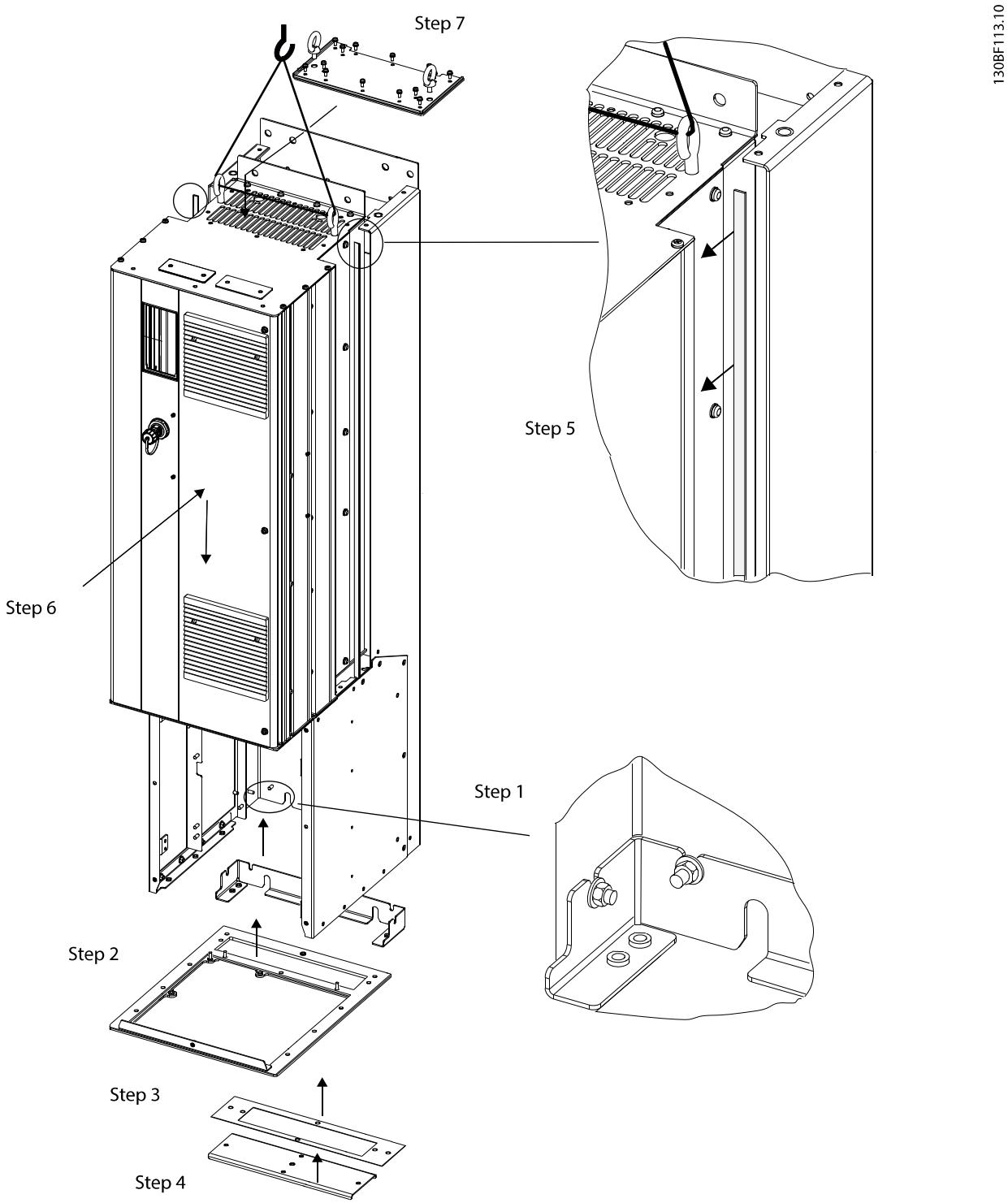


Illustration 1.11 Reinstalling the Frequency Converter into the Enclosure

1.5.5 Installing Gaskets to the Back of a D5h/D6h Enclosure

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.

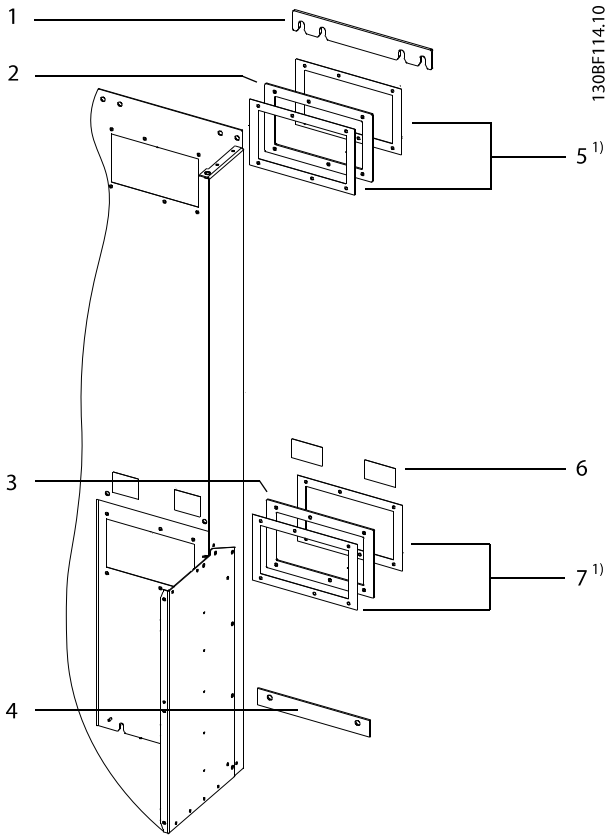
For the following steps, refer to *Illustration 1.12*.

D5h/D6h enclosures with a pedestal

1. Install the mounting gasket (1) to the top of the enclosure.
2. Install 1 of the vent gaskets (5) around the exhaust vent opening on the back of the enclosure.
3. On top of the gasket, install the exhaust spacer (2) to the back of the enclosure panel using 6 M5x18 screws. Torque to 5.1 Nm (45 in-lb).
4. Install 1 of the vent gaskets (5) to the exhaust spacer.
5. Apply the 2 labels (6) over the back-channel form holes.
6. Install 1 of the vent gaskets (7) around the intake vent opening on the back of the enclosure.
7. On top of the gasket, install the intake spacer (3) to the back of the enclosure panel using 6 M5x18 screws. Torque to 5.1 Nm (45 in-lb).
8. Install 1 of the vent gaskets (7) to the intake spacer.
9. Install the slot gasket (4) to cover the mounting holes used to secure the enclosure to the base plate.

D5h/D6h enclosures without a pedestal

1. Install 1 of the vent gaskets (5) around the exhaust vent opening on the back of the enclosure.
2. Apply the 2 labels (6) over the back-channel form holes.
3. Install 1 of the vent gaskets (7) around the intake vent opening on the back of the enclosure.
4. Install the slot gasket (4) to cover the mounting holes used to secure the enclosure to the base plate.



1	Mounting gasket
2	Exhaust spacer (Used on pedestal units only)
3	Intake spacer (Used on pedestal units only)
4	Slot gasket
5	Exhaust vent gaskets
6	Label
7	Intake vent gaskets
1) Gasket between vent spacer and mounting backplate/wall is used only on pedestal-mounted units.	

Illustration 1.12 Installing Sealing Gaskets to Back Panel for the D5h/D6h Frequency Converters

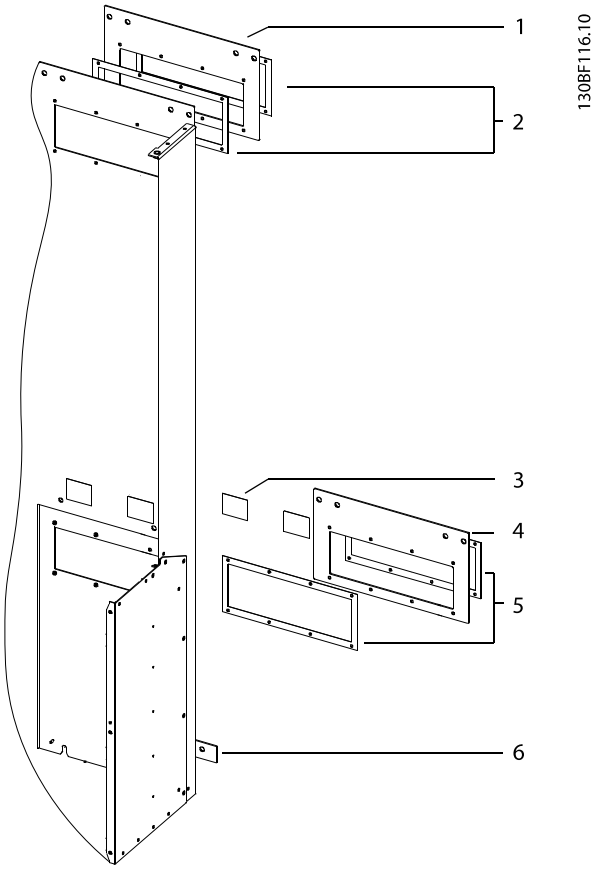
1.5.6 Installing Gaskets to the Back of a D7h/D8h Enclosures

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.

1. Install 1 of the vent gaskets (2) around the exhaust vent opening on the back of the enclosure.
2. On top of the gasket, install the exhaust spacer (1) to the back of the enclosure panel using 8 M5x18 screws. Torque to 5.1 Nm (45 in-lb).
3. Install 1 of the vent gaskets (2) to the exhaust spacer.
4. Apply the 2 labels (3) over the back-channel form holes.
5. Install 1 of the vent gaskets (5) around the intake vent opening on the back of the enclosure.
6. On top of the gasket, install the intake spacer (4) to the back of the enclosure panel using 8 M5x18 screws. Torque to 5.1 Nm (45 in-lb).
7. Install 1 of the vent gaskets (5) to the intake spacer.
8. Install the slot gasket (6) to cover the mounting holes used to secure the enclosure to the base plate.



1	Exhaust spacer
2	Exhaust vent gaskets
3	Slot gasket
4	Intake spacer
5	Intake vent gaskets
6	Slot gasket

Illustration 1.13 Installing Sealing Gaskets to Back Panel for the D7h/D8h Frequency Converters

1.5.7 Creating Vent Openings in the Mounting Backplate

1. Cut out the intake and exhaust openings in the mounting backplate. The openings must match the vent openings in the back panel. See the product-specific dimensions in *Illustration 1.14* and *Illustration 1.15*.
2. For the D5h/D6h enclosures, perform the following steps:
   - 2a Drill 4 mounting holes near the top of the mounting backplate.
   - 2b Drill the 4 screw holes around the exhaust (top) vent openings and insert 4 M5 X 12 pem studs.
   - 2c Drill the 4 screw holes around the intake (bottom) vent openings and insert the 4 M5 X 12 pem studs.
3. For the D7h/D8h enclosures, perform the following steps:
   - 3a Drill 4 mounting holes near the top of the mounting backplate.
   - 3b Drill the 8 screw holes around the exhaust (top) vent openings and insert 8 M5 X 12 pem studs.
   - 3c Drill the 8 screw holes around the intake (bottom) vent openings and insert the 8 M5 X 12 pem studs.

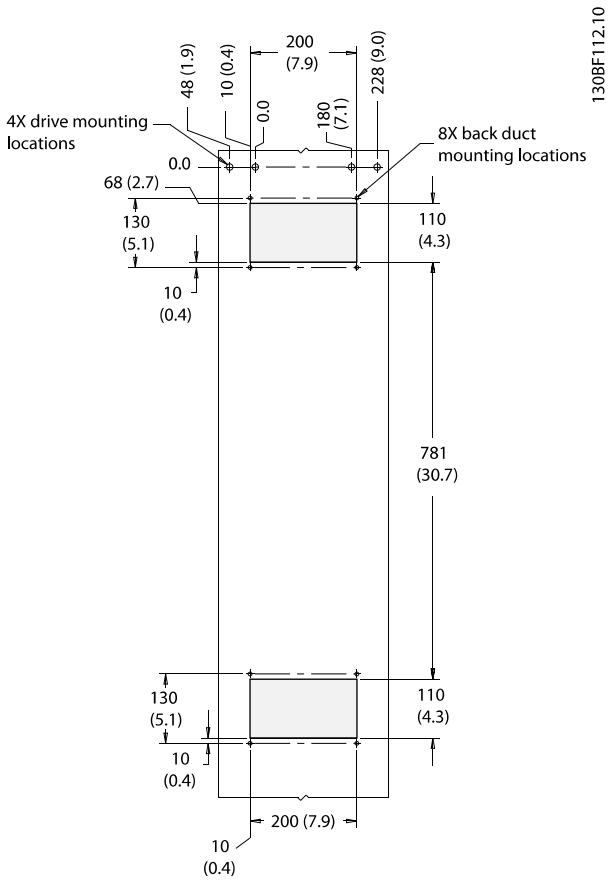


Illustration 1.14 Vent Opening Dimensions for the Mounting Backplate, D5h/D6h

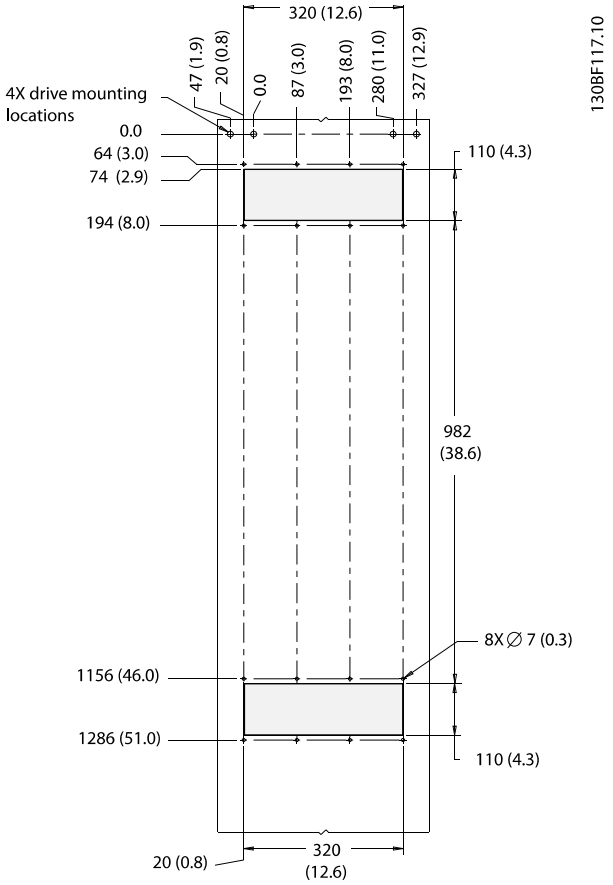


Illustration 1.15 Vent Opening Dimensions for the Mounting Backplate, D7h/D8h

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