

# In-back/Out-back Cooling Kit for FK09c/FB09c and FK10c/FB10c

## iC7 Series Frequency Converters

### 1 Overview

#### 1.1 Description

The in-back/out-back cooling kit fits iC7 Series FK09c/FB09c and FK10c/FB10c Frequency Converters. When the kit is installed, airflows into the lower back duct and out through the upper back duct. See [Illustration 1](#).

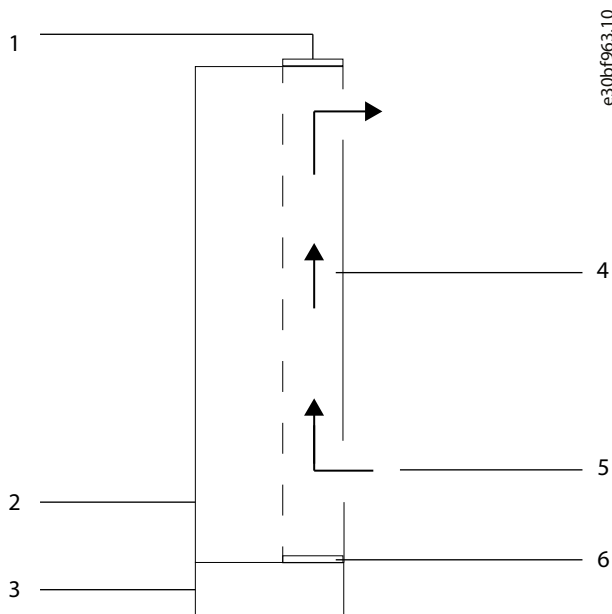


Illustration 1: Direction of Airflow with Kit Installed

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

#### 1.2 Kit Numbers

Use these instructions with the following kits.

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

Number	Kit description
176F4190	FK09c/FB09c in-back/out-back cooling kit
176F4191	FK10c/FB10c in-back/out-back cooling kit

#### 1.3 Items Supplied

[Table 2](#) provides a list of items included in the kit. Refer also to [2.2 Installation Overview](#).

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

Item	Quantity
Top flange spacer	1
Top cover	1
Top cover gasket	1
Drive slot gasket	1
Bottom bracket	1
Base plate gasket	1
Base plate	1
Front spacer	1
Bottom cover gasket	1
Bottom cover	1
M5x12 screw	11–12
M5x16 countersunk screw	4
M5x18 screw	8
Back vent spacer	2
Back vent gasket	4

## 2 Installation

### 2.1 Safety Information

#### NOTICE

##### QUALIFIED PERSONNEL

Only qualified 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 corresponding service guide.
- Use the standard fastener torque values from the service guide, unless the torque value is specified in these instructions.

#### ⚠ WARNING ⚠

##### ELECTRICAL SHOCK HAZARD

The frequency converter contains dangerous voltages when connected to mains voltage. Improper installation, and installing or servicing with power connected, can cause death, serious injury, or equipment failure.

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

#### ⚠ WARNING ⚠

##### DISCHARGE TIME (20 MINUTES)

The frequency converter contains DC-link capacitors, which can remain charged even when the frequency converter is not powered. 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 can result in death or serious injury.

- Stop the motor.
- Disconnect AC mains, permanent magnet type motors, and remote DC-link supplies, including battery backups, 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.
- To verify full discharge, measure the voltage level.

#### NOTICE

##### ELECTROSTATIC DISCHARGE

Electrostatic discharge can damage components.

- Ensure discharge before touching internal frequency converter components, for example by touching a grounded, conductive surface or by wearing a grounded armband.

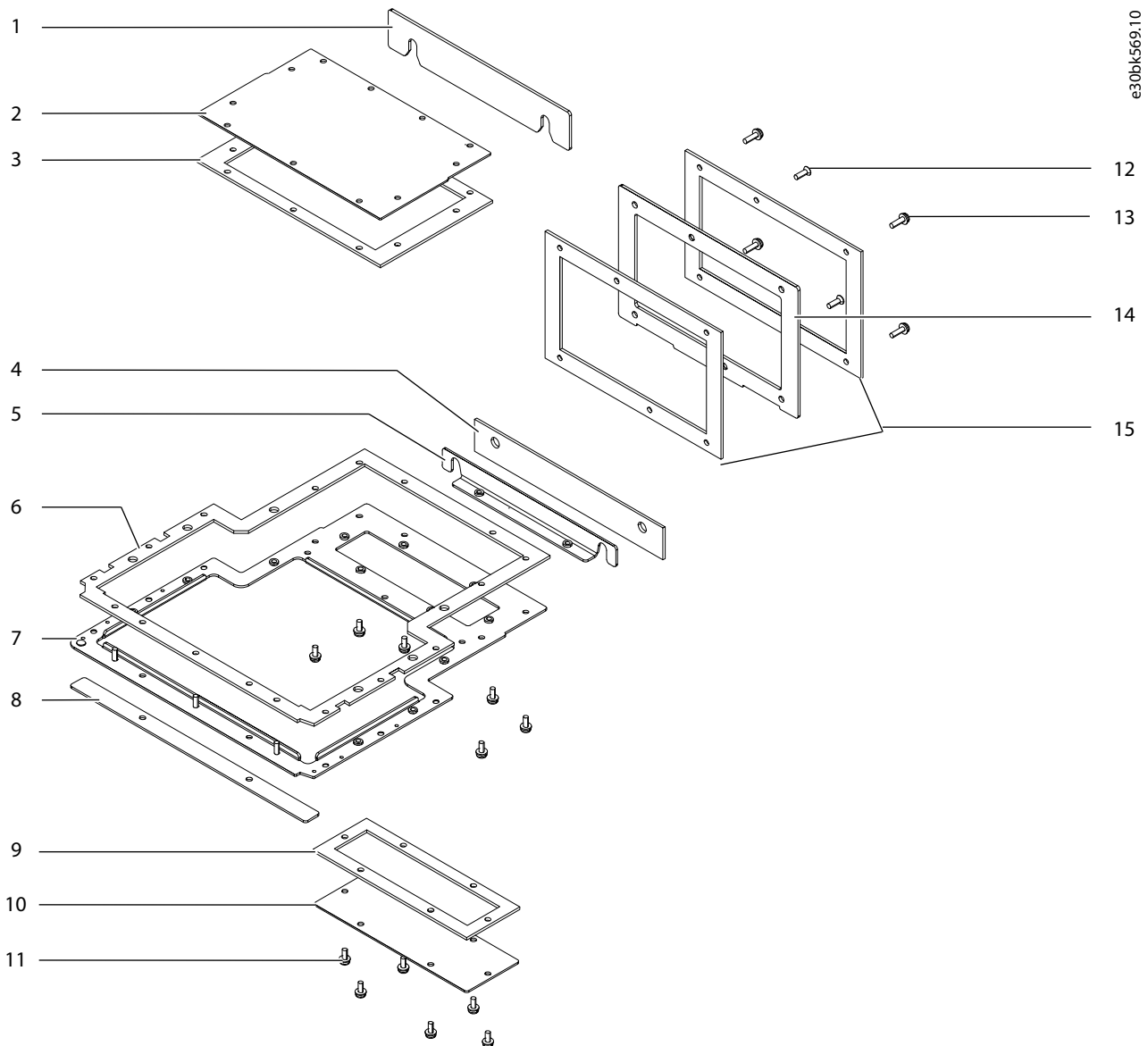
### 2.2 Installation Overview

#### 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.



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

1	Top flange spacer	9	Bottom cover gasket
2	Top cover	10	Bottom cover
3	Top cover gasket	11	M5x12 screw (11–12)
4	Bottom bracket	12	M5x16 countersunk screw (4)
5	Drive slot gasket	13	M5 x 18 screw (8)
6	Base plate gasket	14	Back vent spacer (2)
7	Base plate	15	Back vent spacer gasket (4)
8	Front spacer		

### 2.3 Installing the Back Vent Spacers

To install the back vent spacers, use the following steps. See [Illustration 3](#).

**Procedure**

1. Affix 4 back vent gaskets to the 2 back vent spacers.

Place 1 gasket on the inner side and 1 gasket on the outer side of each spacer.

2. Attach the back vent spacers around the upper and lower openings in the back of the frequency converter:
  - a. Secure 8 M5x18 screws, 4 in the corners of each back vent spacer.
  - b. Fasten 4 M5x16 countersunk screws, 2 in each back vent spacer along the upper and lower edges.

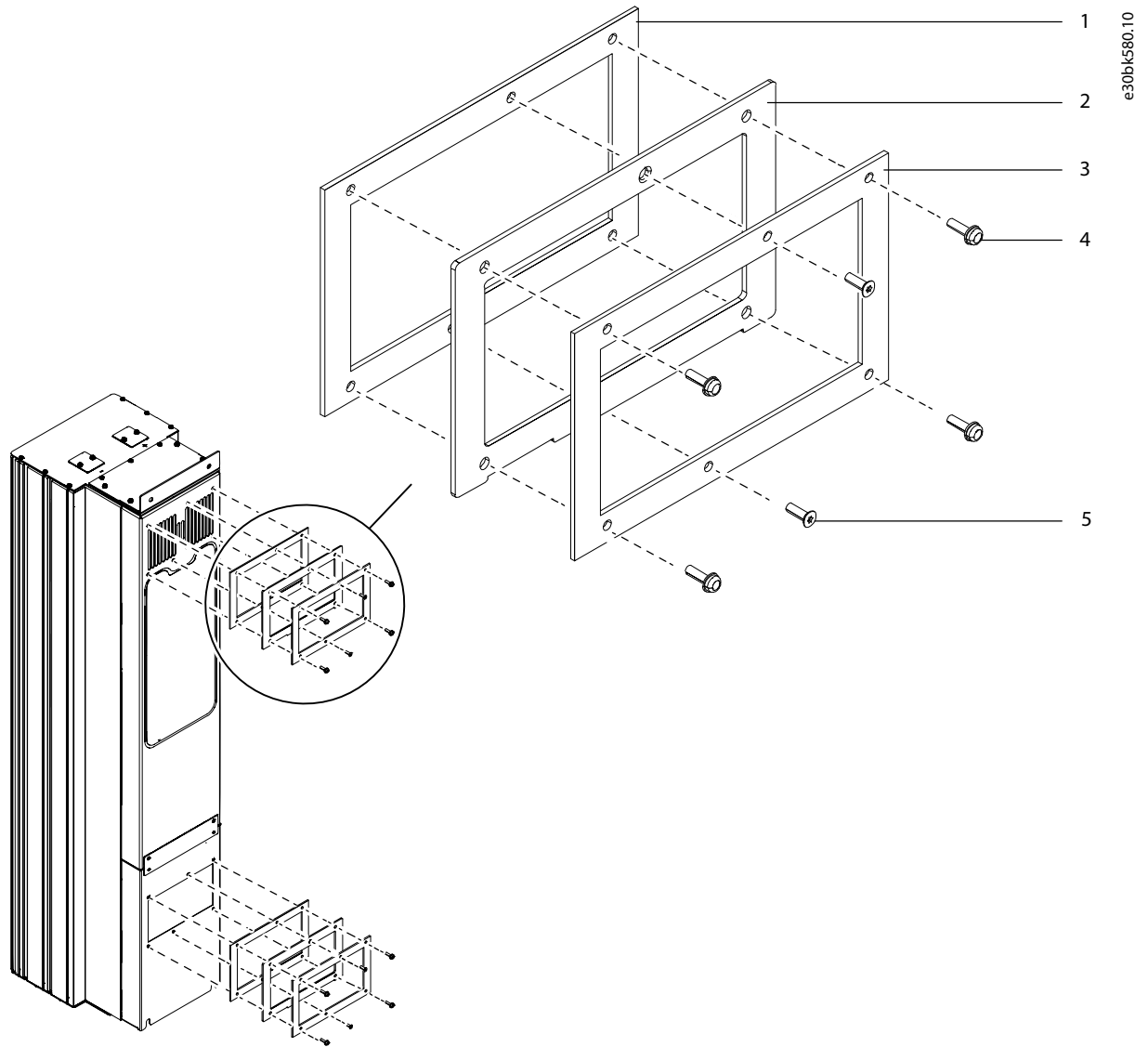


Illustration 3: Installation of Back Vent Spacers (Upper and Lower)

1	Back vent spacer gasket (inner)	4	M6x12 screw
2	Back vent spacer	5	M5x18 countersunk screw
3	Back vent spacer gasket (outer)		

## 2.4 Installing the Base Plate

Use the following steps to install the base plate. See [Illustration 4](#).

### Procedure

1. Unfasten 9 M5x12 screws (T25) from the cable access plate (gland plate), and remove the plate from the bottom of the frequency converter.

Keep the cable access plate and screws for reinstallation.

2. Adhere the base plate gasket to the underside of the base plate.
3. Fasten the bottom bracket to the upper side of the base plate using 2 M5x12 screws (T25) from the kit.
4. Position the base plate at the bottom of the frequency converter.
5. Secure the base plate using 6 M5x12 screws (T25) from the kit.

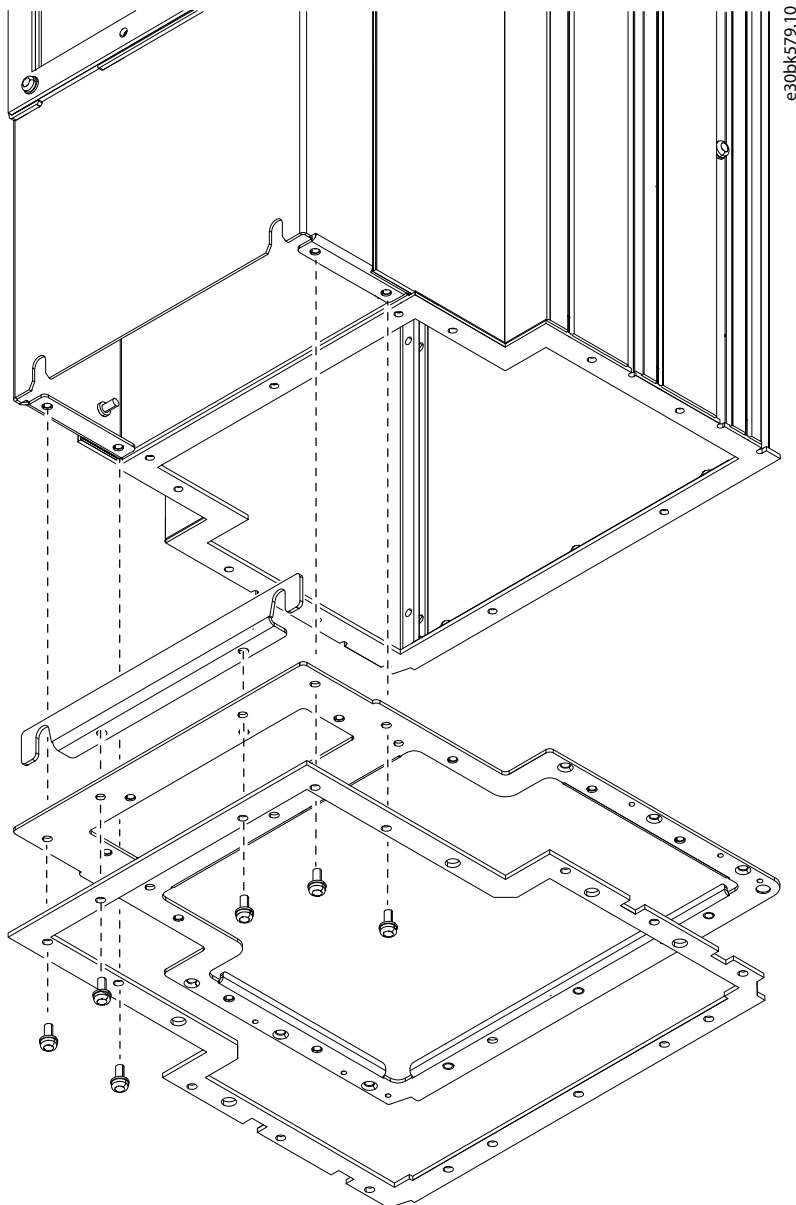


Illustration 4: Installation of Bottom Bracket and Base Plate

## 2.5 Installing the Bottom Cover

Use the following steps to install the bottom cover . See [Illustration 4](#).

### Procedure

1. Adhere the bottom cover gasket to the upper surface of the bottom cover.

If mounting the frequency converter on a pedestal, install the bottom cover after the pedestal is attached.

2. Position the bottom cover over the opening in the base plate at the lower end of the cooling channel.
3. Secure the bottom cover using 6 M5x16 screws (T25) from the kit.

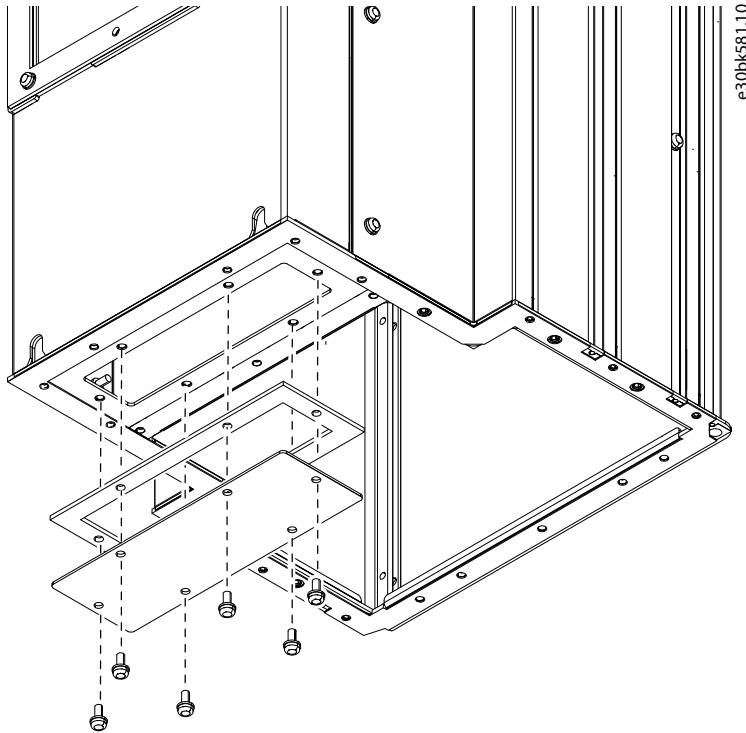


Illustration 5: Bottom Cover Installation

## 2.6 Installing the Cable Entry Plate

The cable entry plate provides cable entry and cable termination points. The plate is installed to maintain the IP21/Type 1 or IP54/Type 12 protection rating.

To install the cable entry plate, use the following steps. See [Illustration 6](#).

### Procedure

1. Create cable entry holes in the plate using a sheet metal punch.

Reuse the cable entry plate that was removed during base plate installation.

2. Position the cable access plate at the bottom of the frequency converter.

3. Fasten 9 M5x12 screws (T25), attaching the cable access plate to the opening in the base plate adapter.

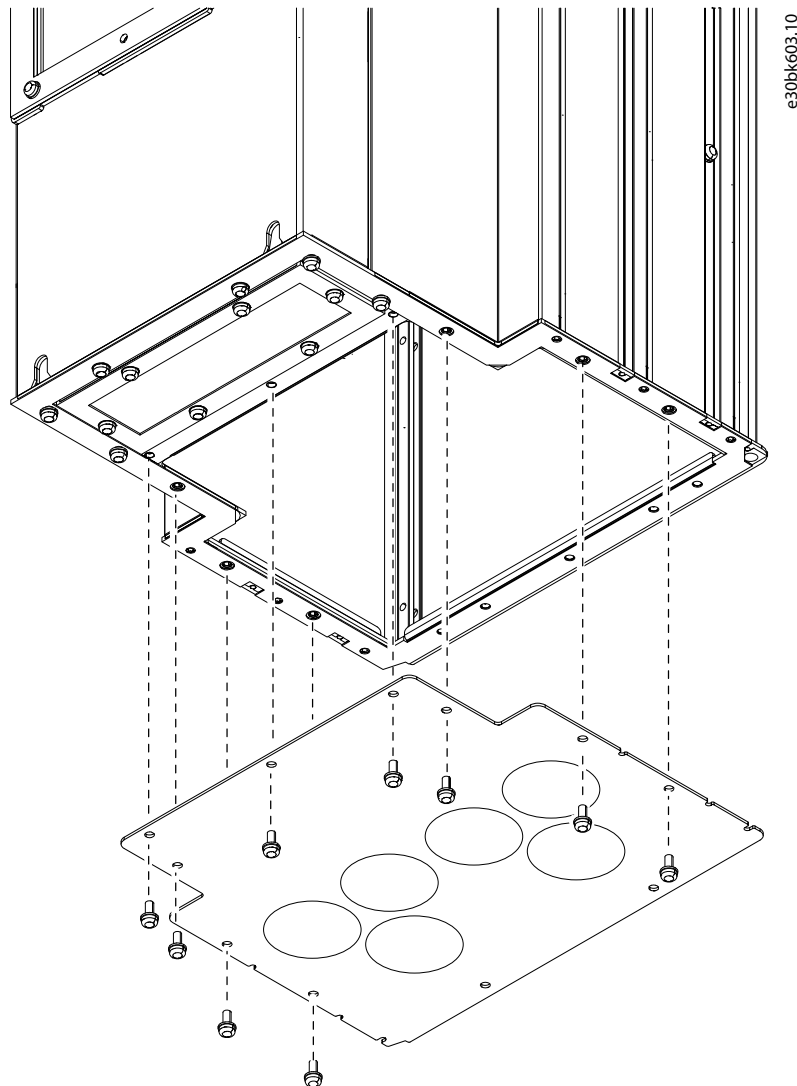


Illustration 6: Installation of Cable Access Plate

## 2.7 Lifting the Frequency Converter

### ⚠ WARNING ⚠

#### LIFTING PRECAUTIONS

The frequency converter is heavy. Failure to follow local safety regulations for lifting heavy weights can cause death, personal injury, or property damage.

- Ensure that the lifting equipment is in proper working condition.
- Check the weight of the frequency converter and verify that the lifting equipment can safely lift the weight.
- Always lift the frequency converter using the eye bolts at the top of the frequency converter.
- Ensure that the angle from the top of the frequency converter to the lifting cable is 65° or greater.
- Test lift the frequency converter approximately 610 mm (24 in) to verify the proper center of gravity lift point. Reposition the lifting point if the frequency converter is not level.
- Never walk under suspended loads.

Always lift the frequency converter using the recommended lifting method and safety precautions.



## Example

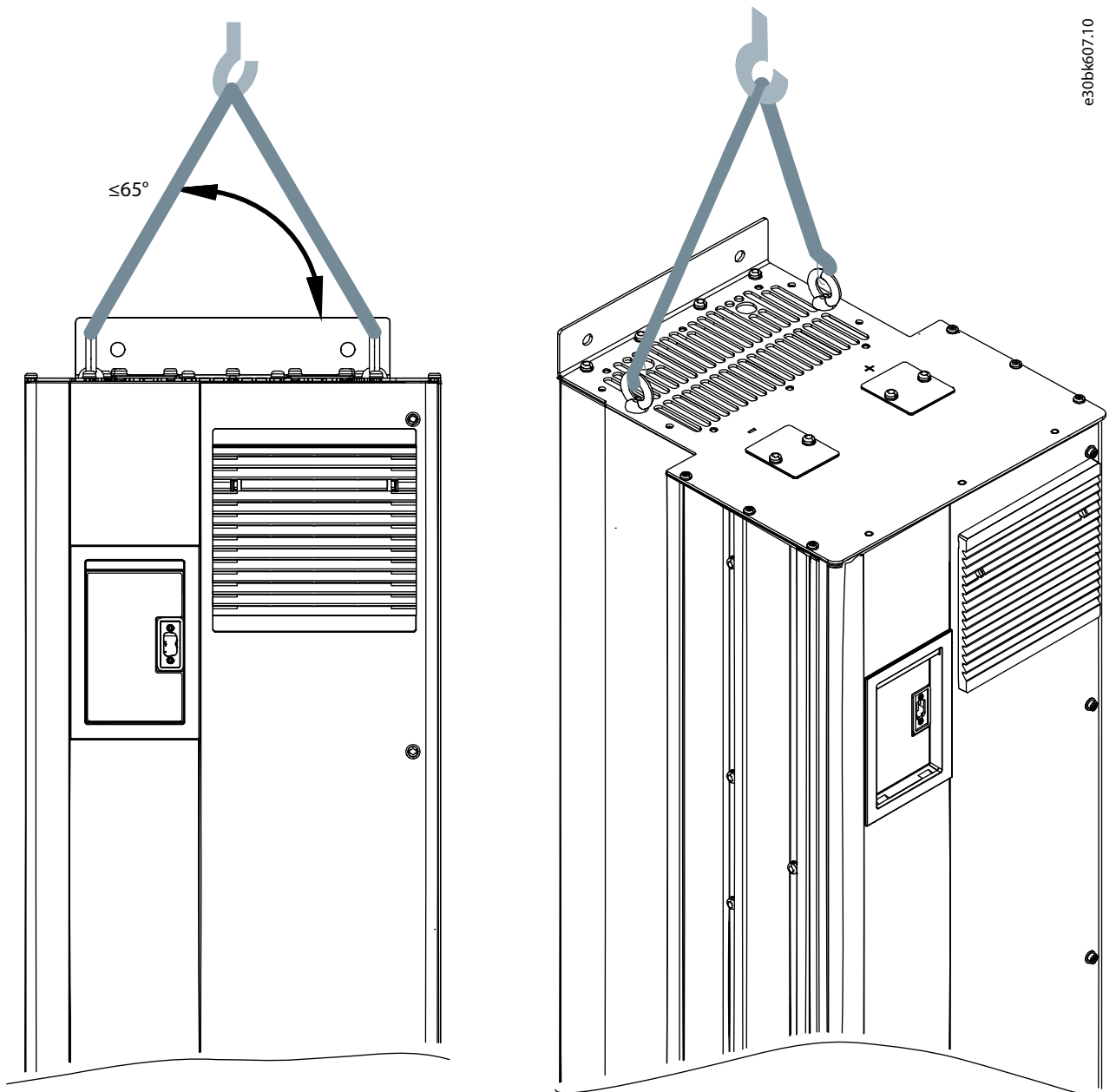


Illustration 7: Recommended Lifting Method, Fx09 and Fx10

## 2.8 Wall-mounting the Frequency Converter

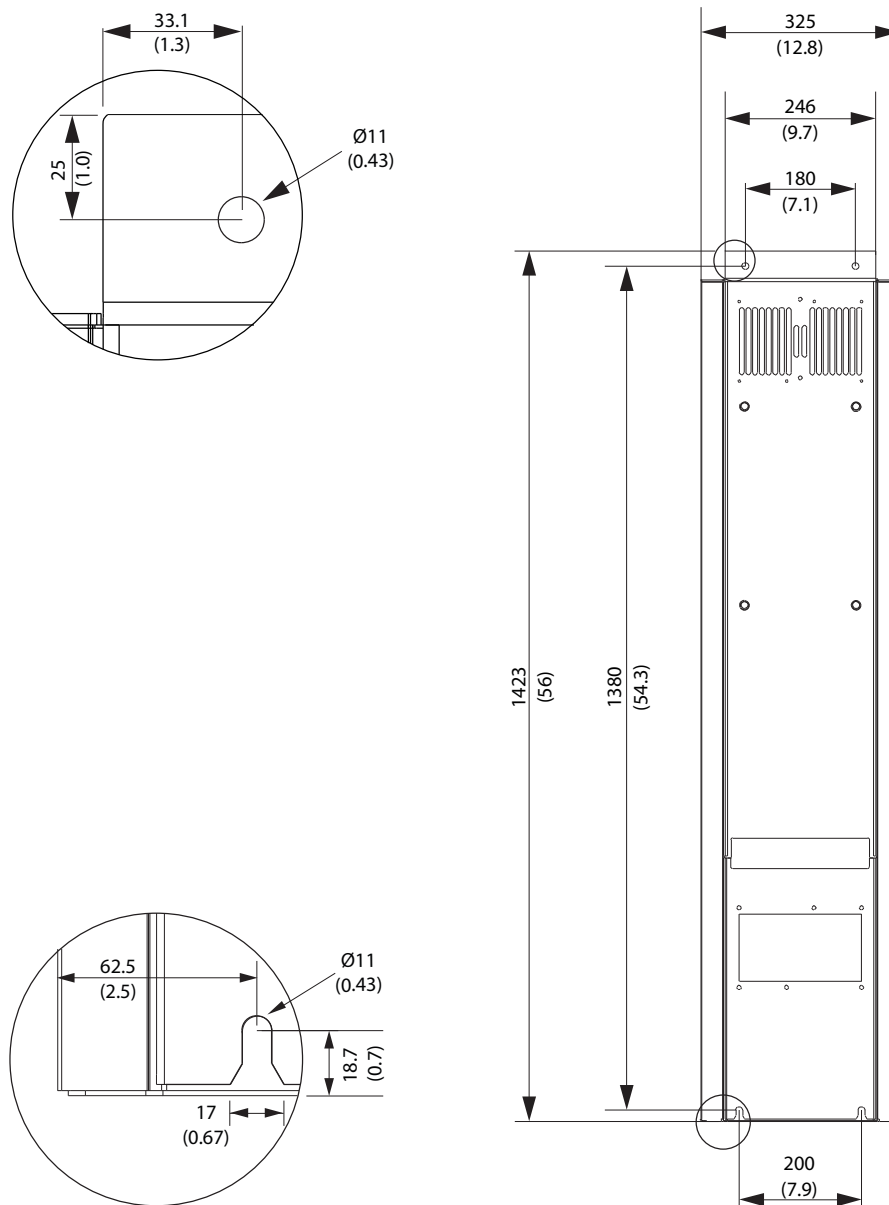
FK09c frequency converters can be wall-mounted or pedestal-mounted. To mount the FK09c frequency converter on a wall or mounting panel, use the following steps. See [Illustration 8](#), [Illustration 9](#), and [Illustration 10](#).

FK10c frequency converters are pedestal-mounted only. Refer to [2.9 Pedestal-mounting the Frequency Converter](#).

### Procedure

1. Using the dimensions in [Illustration 8](#), prepare the mounting surface.

Determine proper placement of the frequency converter, considering the operating environment and cable access requirements. Ensure that the air intake and exhaust vents at the back of the frequency converter are not obstructed.



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Illustration 8: Dimension for Mounting FK09c Frequency Converter

2. Use 4 M10 bolts, 2 in the upper and 2 in the lower mounting holes.
3. Apply the drive slot gasket over the slots at the back lower edge of the frequency converter.

4. Lift the the frequency converter and lean it forward slightly, aligning the 2 holes in the lower edge over the 2 lower M10 bolts.

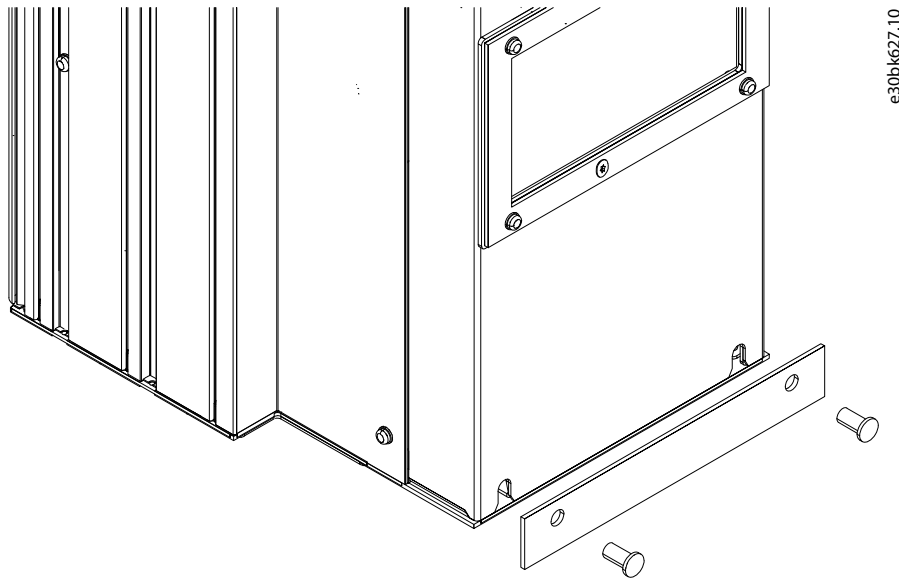


Illustration 9: Drive Slot Gasket Installation

5. Loosely fasten the bolts with 2 M10 nuts.
6. Position the top spacer from the kit behind the mounting flange at the upper edge of the frequency converter.

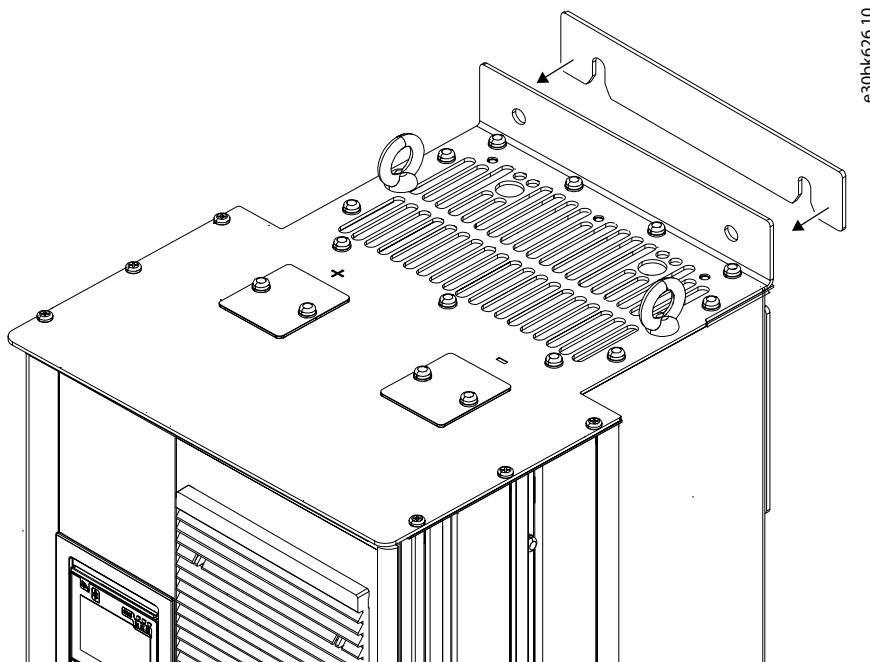


Illustration 10: Top Spacer Installation

7. Slowly push the top of the frequency converter back against the mounting surface until the mounting holes line up with the upper 2 M10 bolts.
8. Secure the top of the frequency converter using 2 M10 bolts.

Torque all fasteners to 19 Nm (170 in-lb).

## 2.9 Pedestal-mounting the Frequency Converter

To mount the FK09c or FK10c frequency converter on a pedestal, use the following steps. See [Illustration 11](#) to [Illustration 16](#).

### ⚠ WARNING ⚠

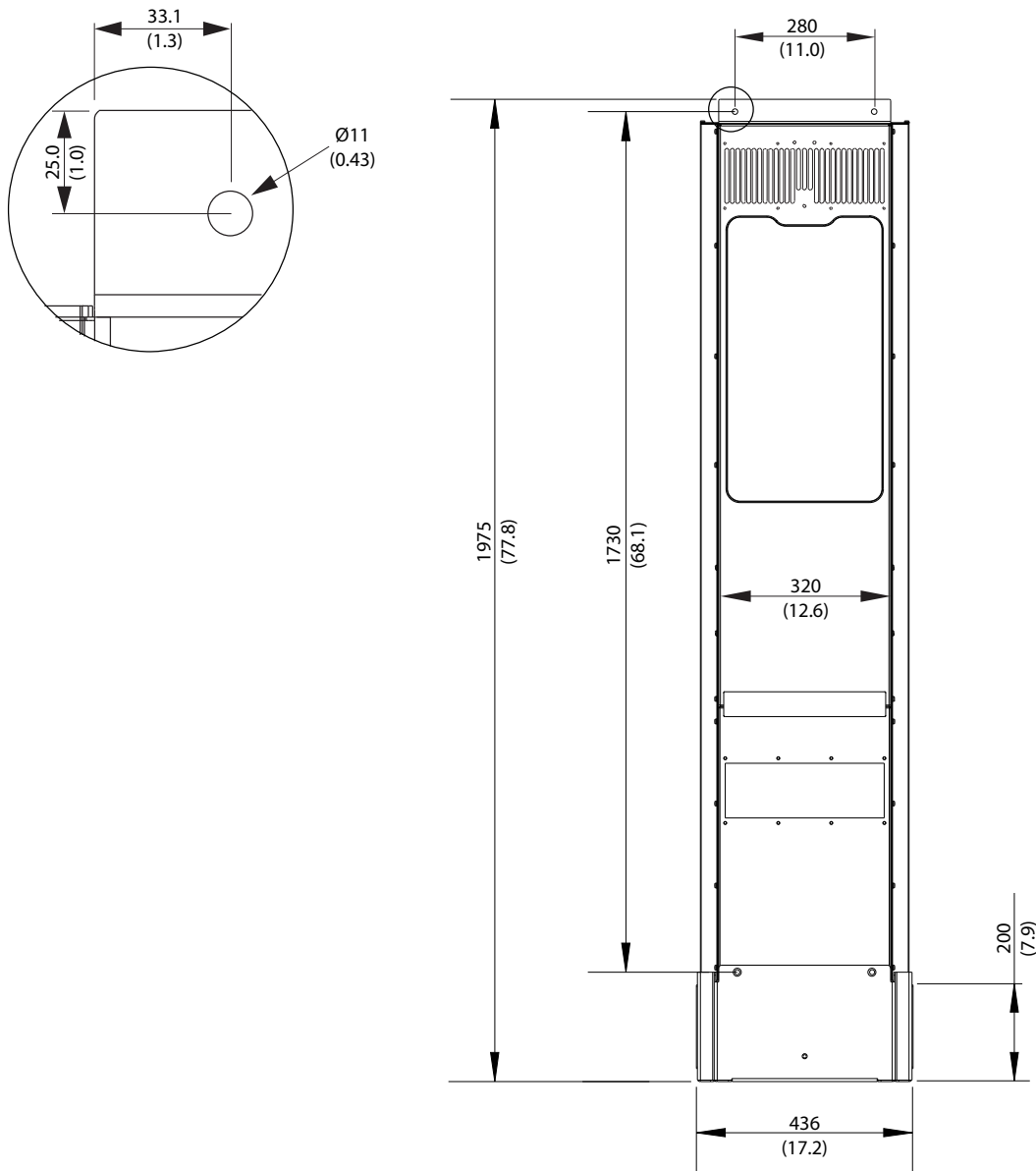
**TIPPING PRECAUTION**

If not properly secured, the frequency converter can tip and cause serious injury.

- After attaching the frequency converter and pedestal to the floor, secure the top of the frequency converter to the wall or mounting panel.

**Procedure**

1. Using the dimensions in [Illustration 8](#) for FK09c or [Illustration 11](#) for FK10c, prepare the mounting surface.



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**Illustration 11: Dimensions for Mounting FK10c Frequency Converter**

- Using the pedestal base, mark the location of the 8 mounting holes on the floor.

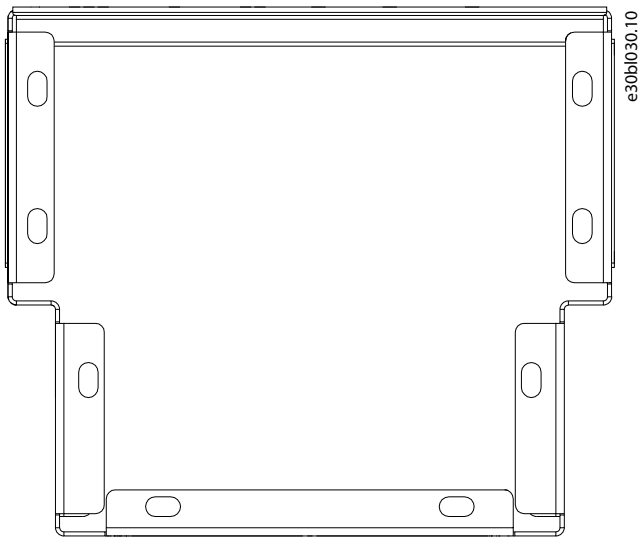


Illustration 12: Pedestal-to-Floor Mounting Holes

- Place the front spacer from the kit at the front edge of the pedestal.
- Affix the drive slot gasket from the kit over the 2 M10 studs at the back of the pedestal.

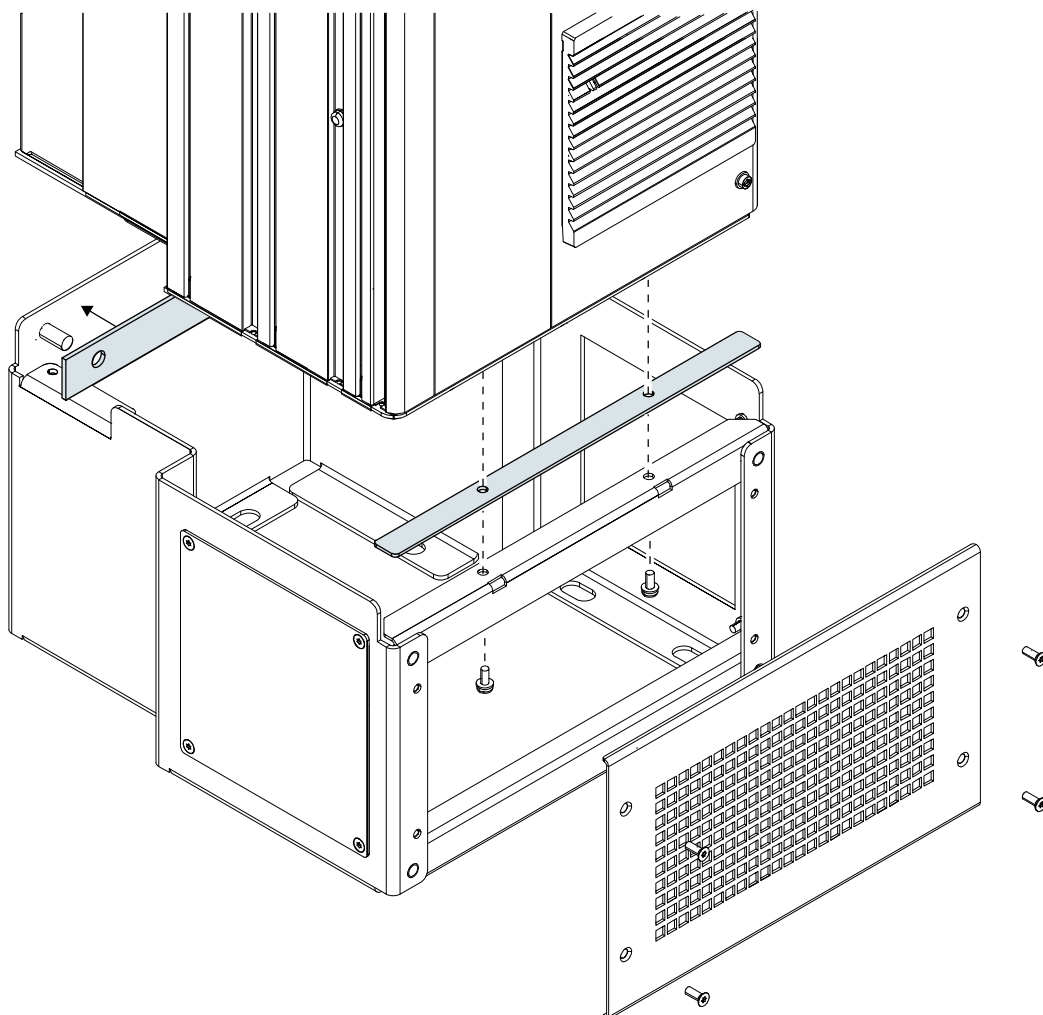
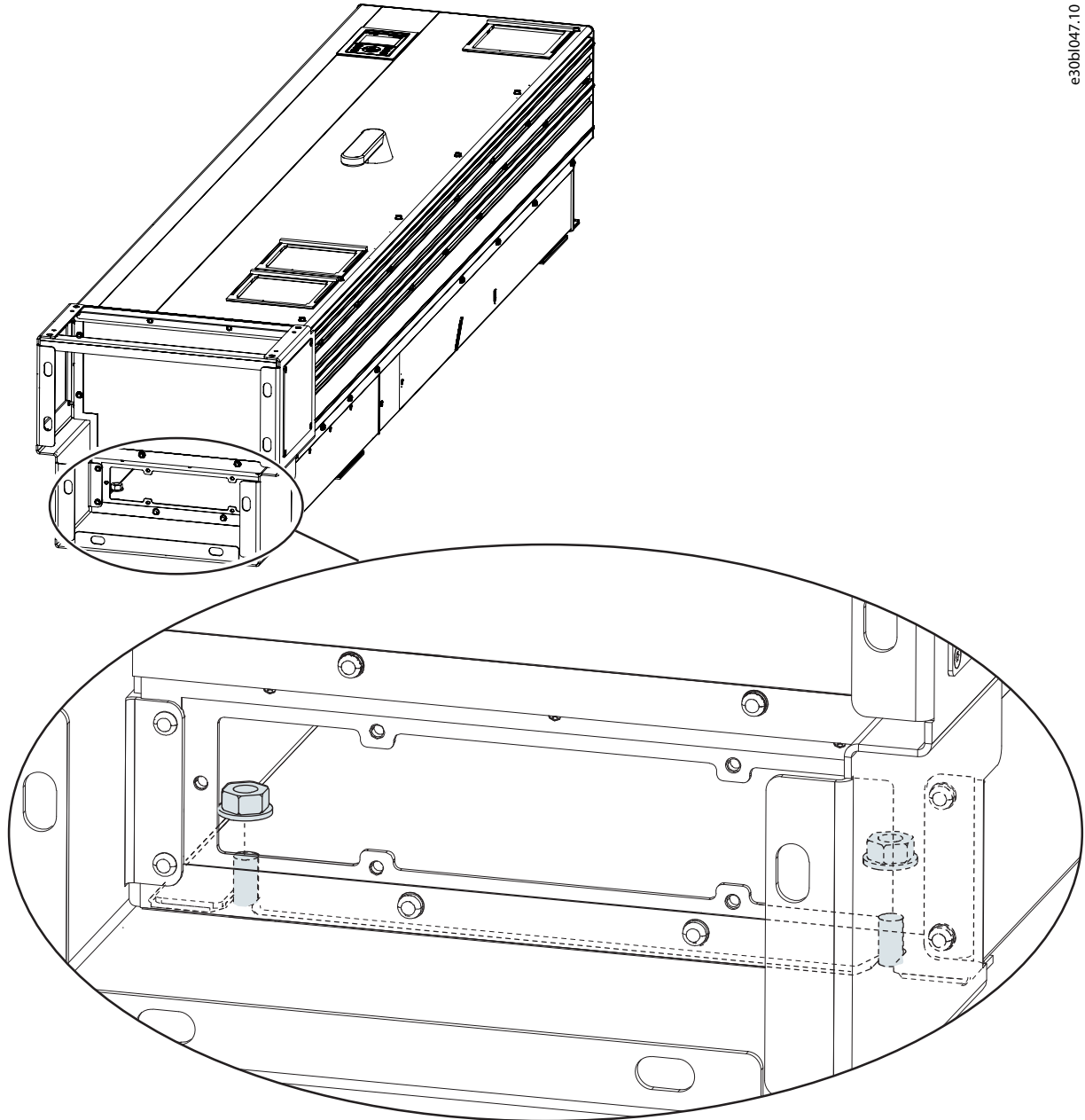


Illustration 13: Front Spacer and Drive Slot Gasket Installation

5. Position the pedestal at the lower end of the frequency converter.
6. Slide the 2 M10 studs at the back of the pedestal through the slots in the back lower edge of the frequency converter.
7. Fasten 2 M5x18 screws (T25) through the pedestal and front spacer and into the cable access plate.
8. Fasten 2 M10 nuts (17 mm) to the 2 M10 studs, attaching the pedestal to the frequency converter.



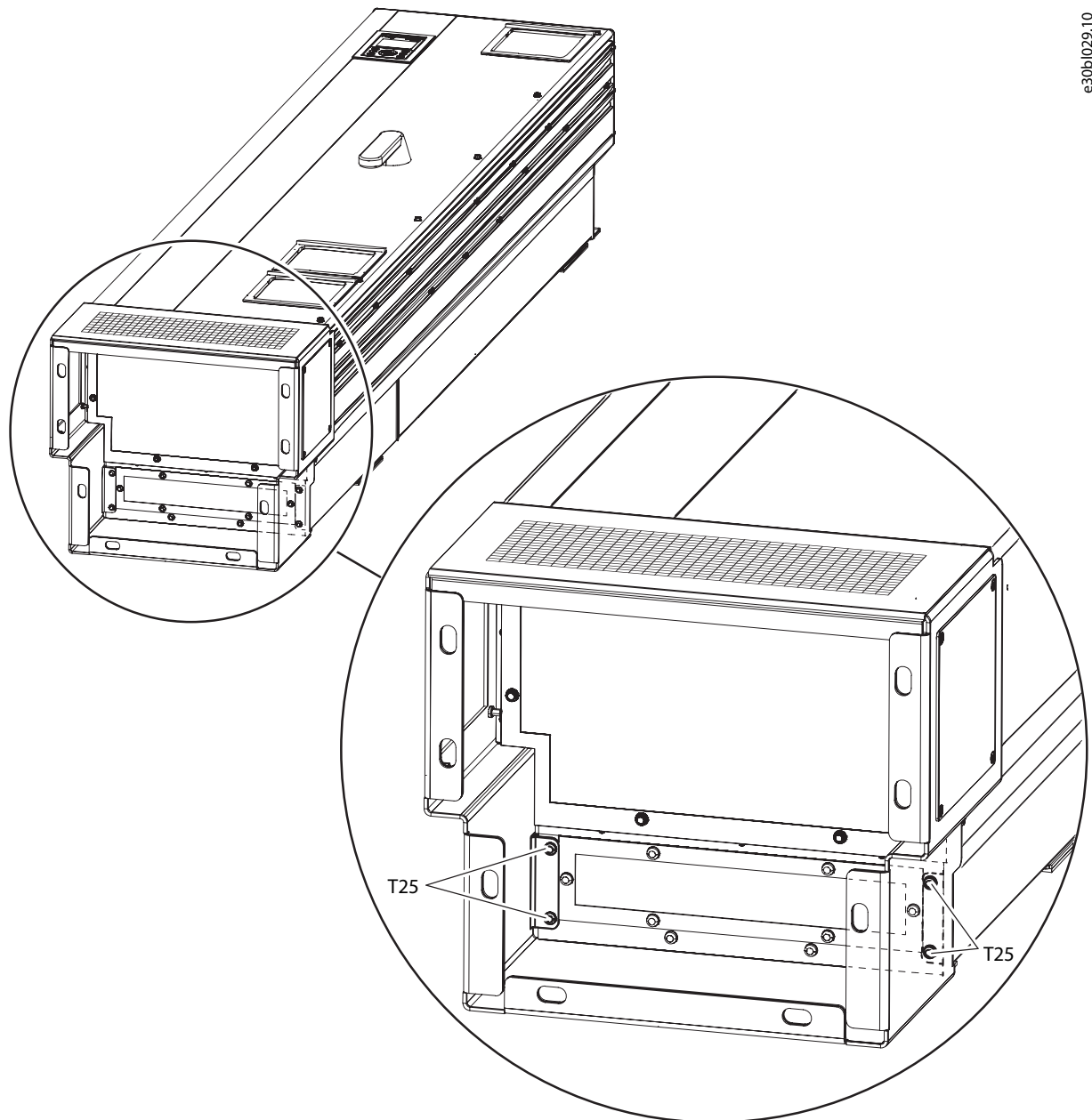
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**Illustration 14: Installation of M10 Nuts Attaching Pedestal**

9. Install the bottom cover to seal the lower end of the back channel.

Refer to [2.5 Installing the Bottom Cover](#).

10. Fasten 4 screws (T25) through the back flange of the pedestal base into the bottom bracket of the frequency converter.



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**Illustration 15: Installation of Screws in Pedestal Back Flange**

11. Secure 8 bolts (fasteners not provided) into the floor mounting holes.

- Position the top spacer from the kit behind the mounting flange at the upper edge of the frequency converter.

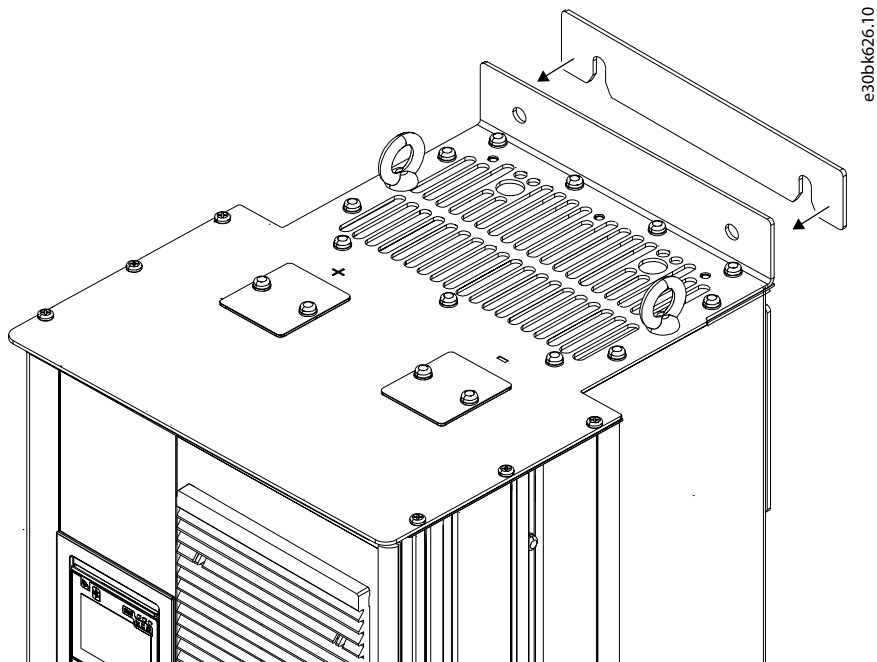


Illustration 16: Top Spacer Installation

- Fasten 2 bolts (not supplied) in the upper mounting holes, securing the top of the frequency converter to the wall.

For FK09c/FB09c frames, use M10 bolts. For FK10c/FB10c frames, use M12 bolts.

- Attach the pedestal front grill with 4 countersunk screws (T20).

## 2.10 Installing the Top Cover

To install the top cover of the cooling kit, use the following steps. See [Illustration 17](#).

### Procedure

- Remove the 2 eyebolts from the top of the frequency converter.

Keep the eyebolts for use when lifting the frequency converter.

- Remove 8 M5x14 screws (T25) surrounding the sides and back of the vent in the top of the frequency converter.
- Remove 3 M5x12 screws (T25) at the front of the vent in the top of the frequency converter.

Retain the screws from steps 2 and 3 for cover installation.

- Adhere the top cover gasket to the underside of the top cover.
- Position the top cover over the vent opening in the top of the frequency converter.
- Secure the top cover to the frequency converter with the screws removed in steps 2 and 3.

Torque to 2.3 Nm (20 in-lb).



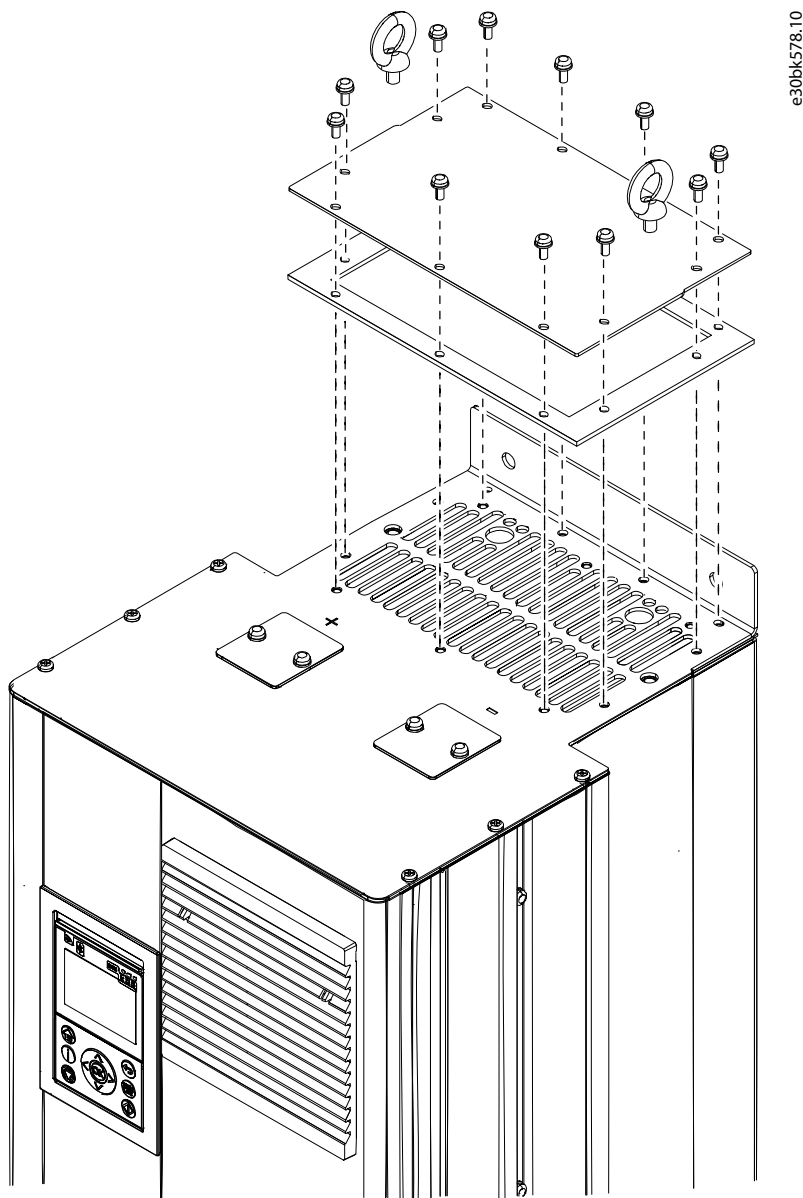


Illustration 17: Top Cover Installation

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