

# Common-mode Filter Kit for E1h-E2h Drives

VLT® Series FC 102, FC 103, FC 202, FC 302

## 1 Overview

### 1.1 Description

The common-mode filter kit is an option used to prevent excessive noise from being conducted between electronic equipment and the AC line. The kit is designed to fit VLT® FC Series E1h-E2h Drives.

### 1.2 Kit Numbers

Use these instructions with the following kits.

Table 1: Numbers for Common-mode Filter Kits

| Number   | Kit description           |
|----------|---------------------------|
| 176F4251 | Common-mode core kit, E1h |
| 176F4259 | Common-mode core kit, E2h |

### 1.3 Items Supplied

Table 2: Contents of Common-mode Filter Kit

| Item                      | Quantity |
|---------------------------|----------|
| Common-mode filter        | 1        |
| M10 nut                   | 3        |
| Installation instructions | 1        |

## 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 drive must be done in accordance with the corresponding service guide.

#### ⚠ 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.

#### ⚠ 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.

#### 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 Removing the Cable Clamps and Cable Brackets

Before installing the common-mode filter, use the following steps to remove the cable clamps and cable brackets.

### Procedure

1. Unfasten 6–10 screws (T25) and open the enclosure door.

Number of screws varies based on enclosure size.

2. If the mains shield option is present, unfasten 6–10 screws (T20) and remove the option.

Number of screws varies based on enclosure size.

3. Remove the customer wiring from the mains and motor terminals.

4. Remove the cable clamps that sit below the mains and motor terminal blocks.

No tools are required to remove the clamps. Tip the clamps downward at a 45° angle to unhook them from the cable clamp brackets. See [Figure 1](#).

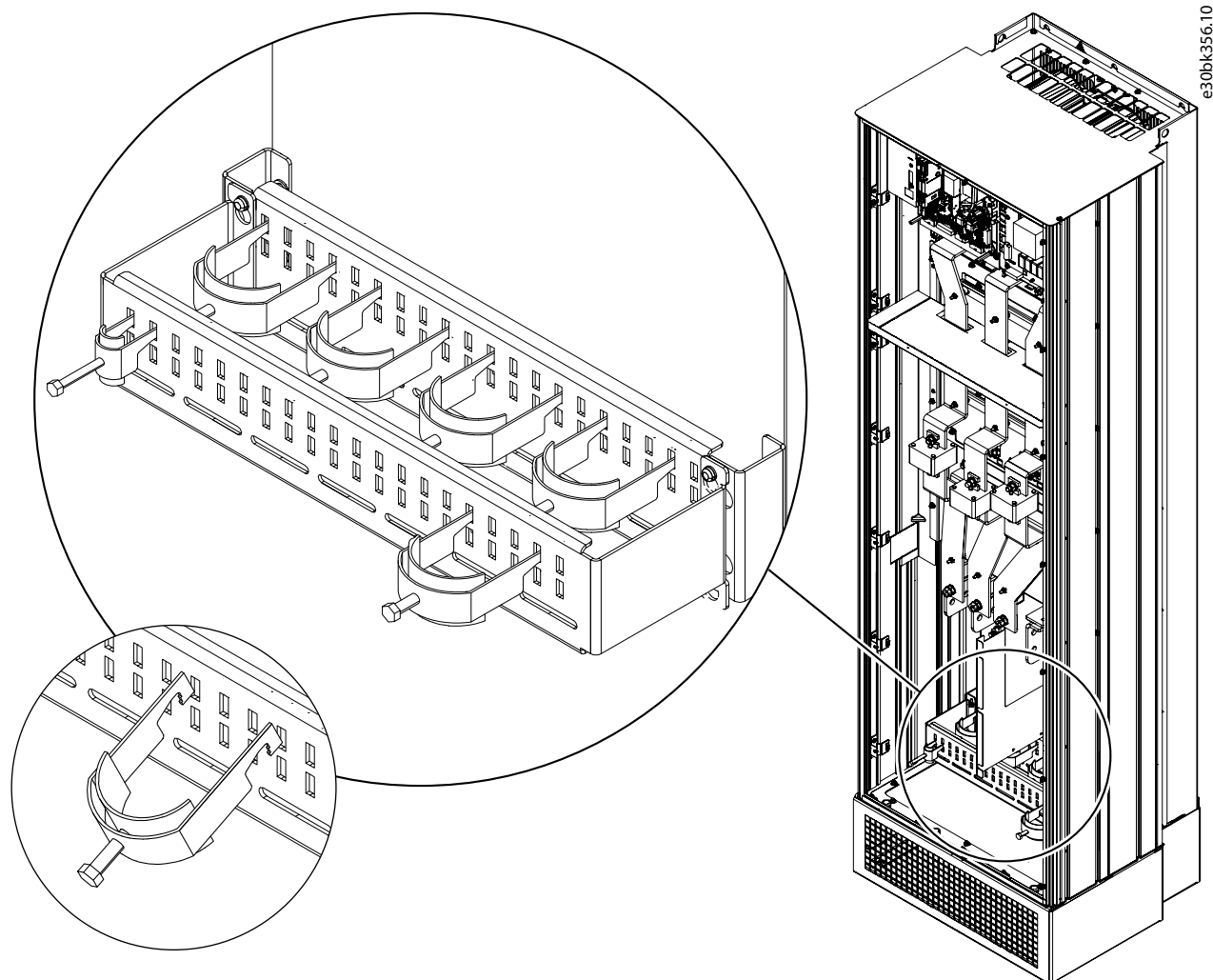


Figure 1: Cable Clamp Removal

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5. Remove the outer cable bracket:
  - a. Loosen 4 screws (T25), 1 at each corner of the outer cable clamp bracket.
  - b. Slide the bracket upward until the screws line up with the largest part of the keyhole opening.
  - c. Pull the bracket forward to remove it. See [Figure 2](#).

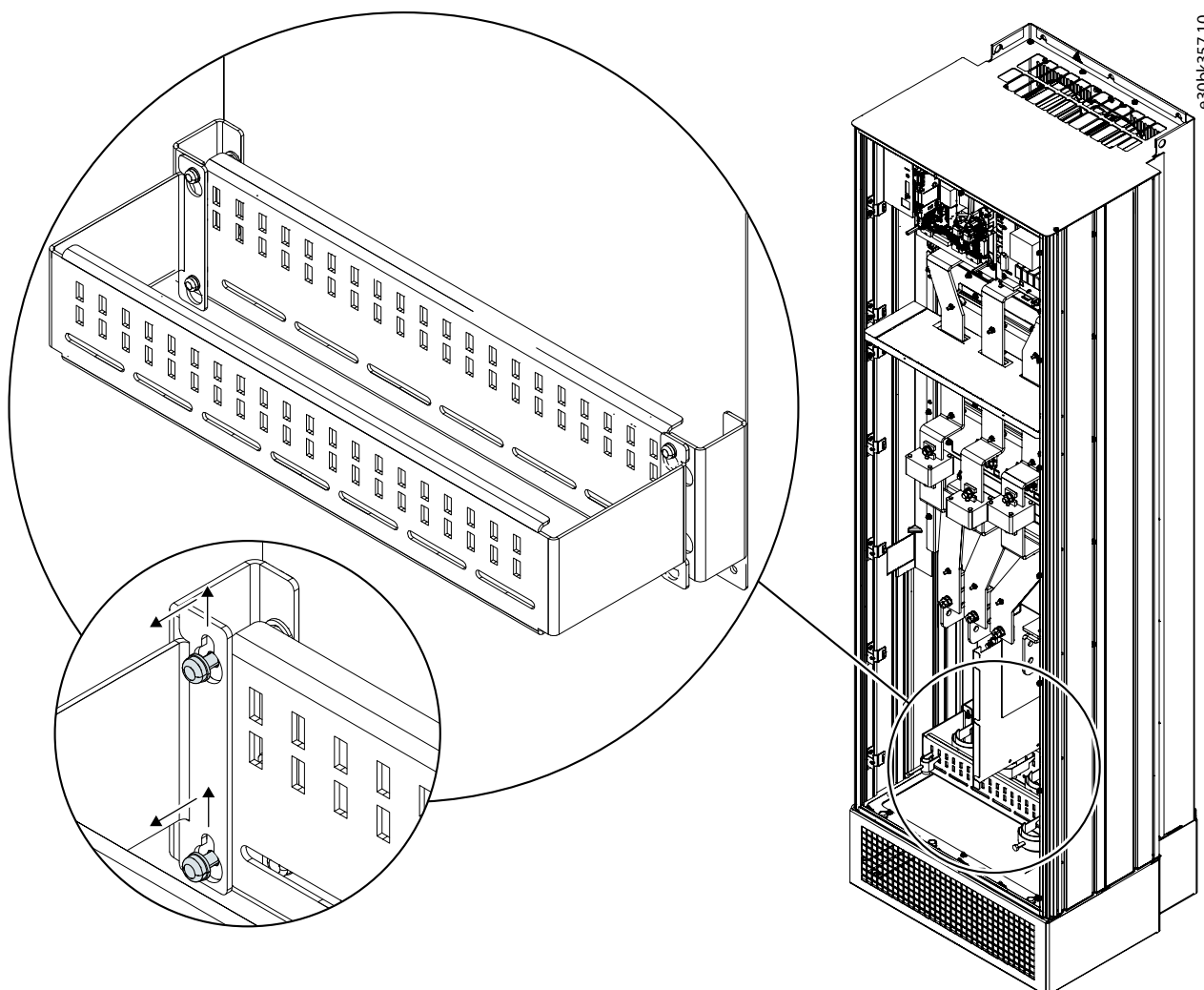


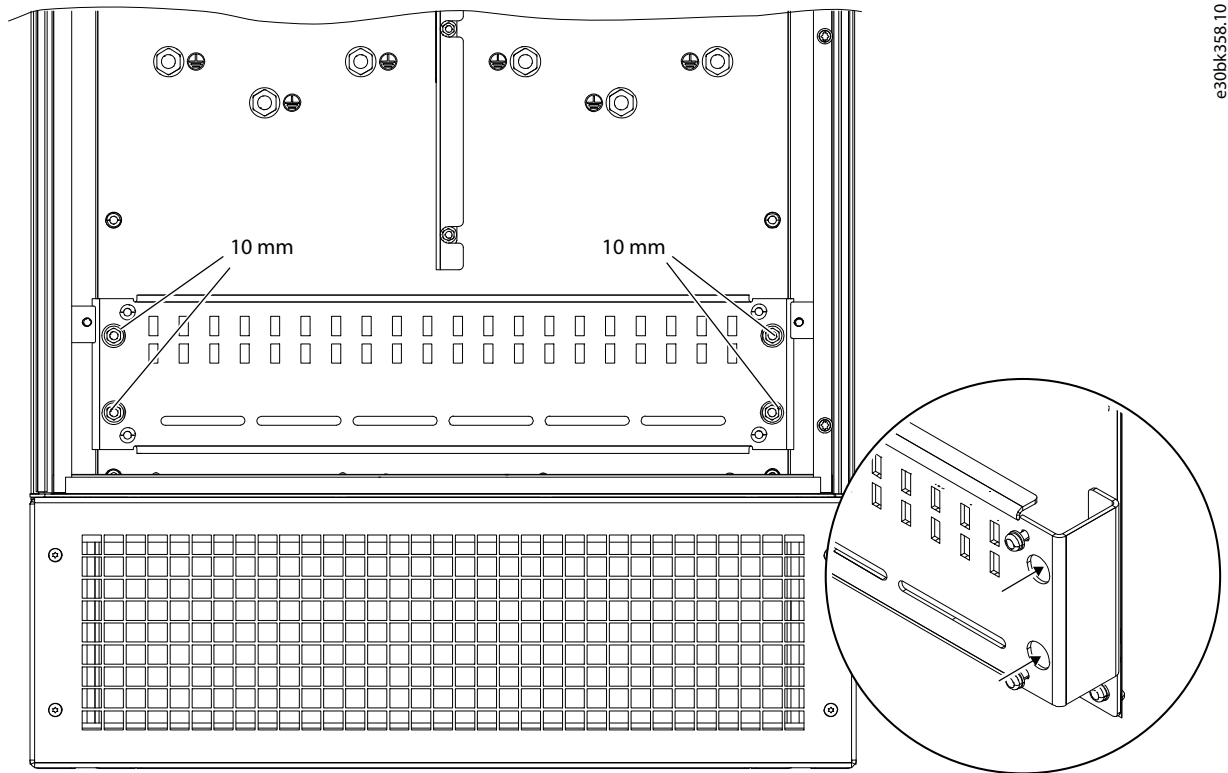
Figure 2: Outer Cable Bracket Removal

6. Remove the inner cable bracket:
  - a. Unfasten 4 M6 nuts (10 mm), 1 from each corner of the bracket.

To reach the M6 nuts, use the access holes in the corners of the bracket. See [Figure 3](#).

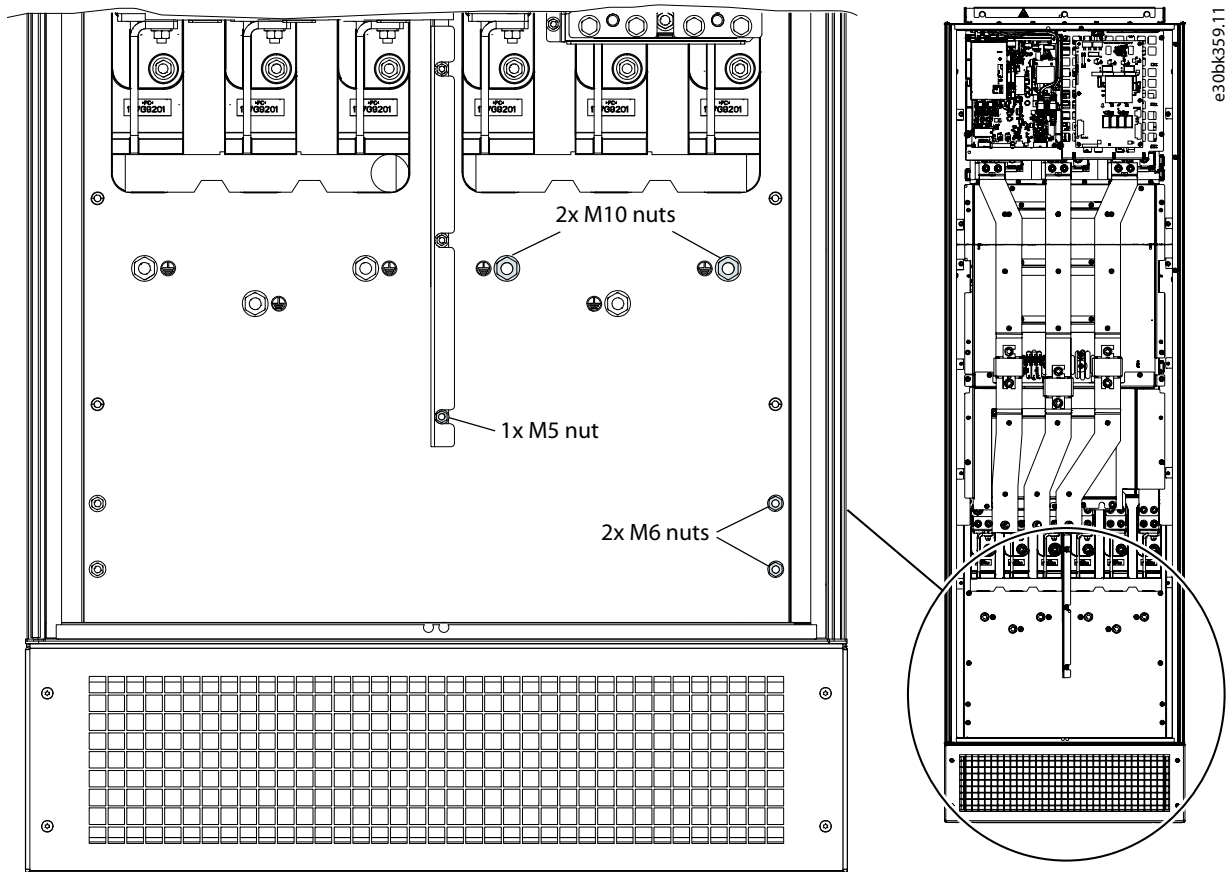
- b. Remove the bracket from the drive.

Keep the M6 nuts. The common-mode filter requires 2 M6 nuts for installation. See [Figure 4](#) for all existing fasteners to remove and reuse during the filter installation.



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Figure 3: Inner Cable Bracket Removal



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Figure 4: Existing Fasteners to Use for Filter Installation

### 2.3 Installing the Common-mode Filter

To install the common-mode filter, use the following steps.

#### Procedure

1. Position the common-mode filter below the motor terminal block and to the right of the EMC shield.

The common-mode filter fits over the studs where existing fasteners were removed. See [Figure 5](#).

2. Using the existing fasteners, install the common-mode filter:
  - a. Secure the top of the common-mode filter with 2 M10 nuts (17 mm).
  - b. Secure the left side of the filter to the EMC shield with 1 M5 nut (8 mm).
  - c. Secure the right side of the filter with 2 M6 nuts (10 mm).

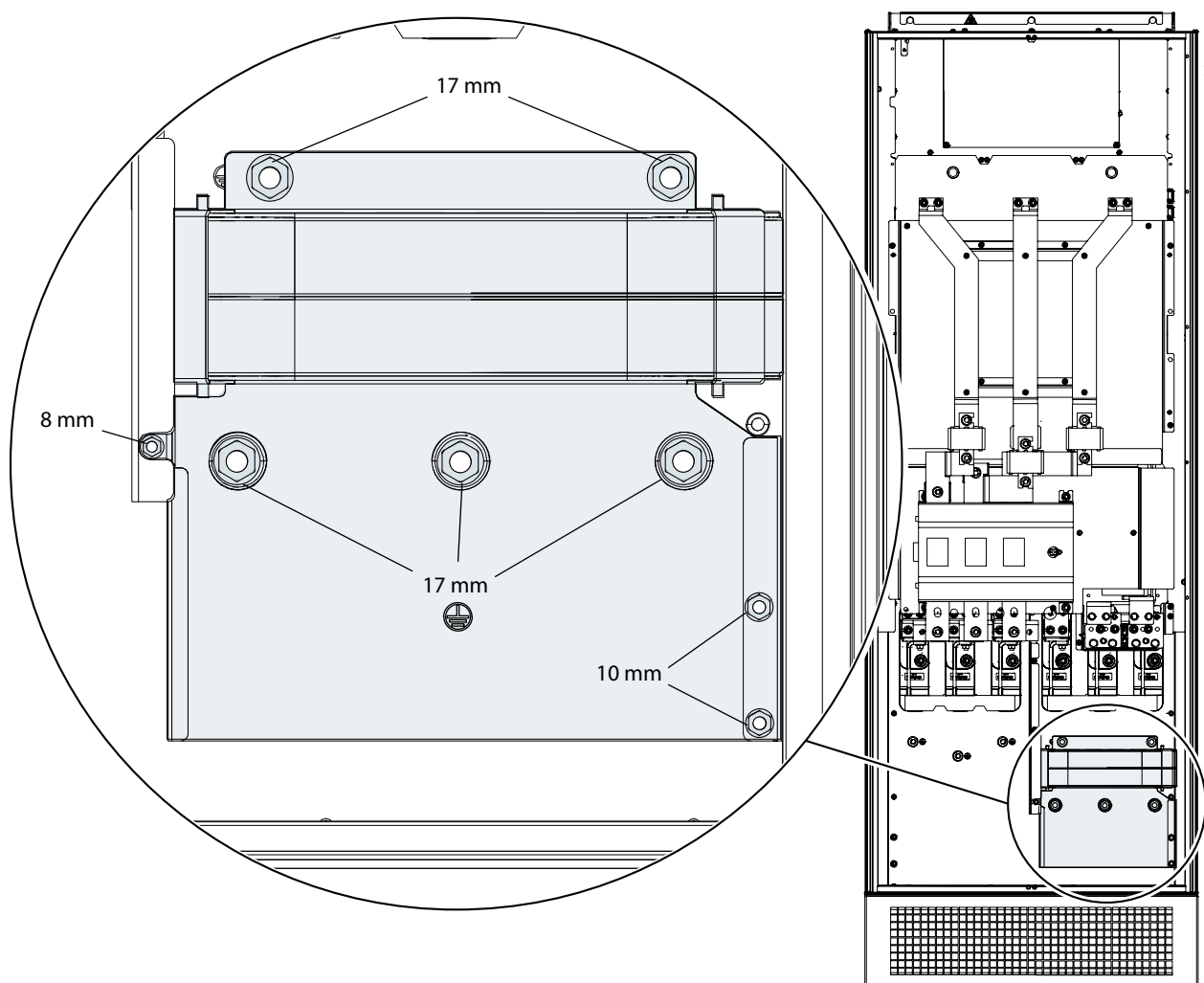


Figure 5: Common-mode Filter Installation

3. Use the 3 M10 nuts (17 mm) from the kit to provide ground connections to the 3 screws below the filter core.

The original ground points are used to attach the filter and cannot be used for grounding.

4. Reconnect the customer wiring to the mains and motor terminals.

Use EMC metal cable glands to ground the EMC shields of the cables. Danfoss recommends SKINTOP® or similar EMC metal cable glands for passing cables through the cable entry plate and for grounding the cable shield. (Cable glands not provided.) See [Figure 6](#).

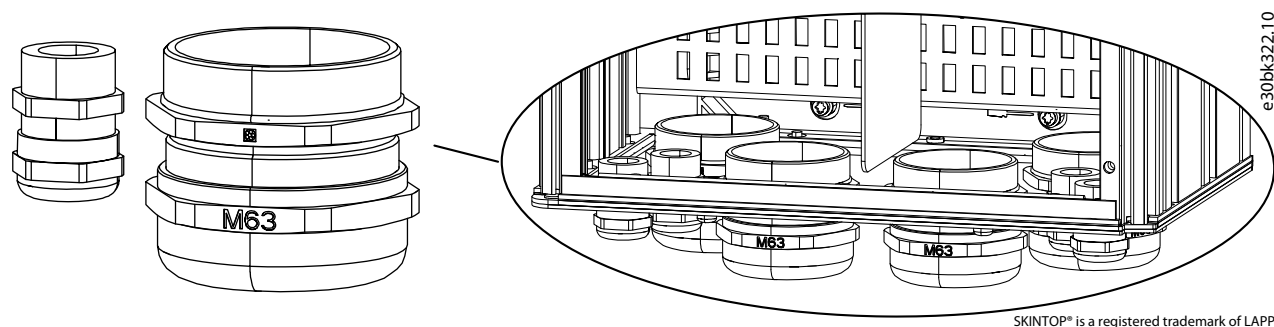


Figure 6: Cable Entry Plate with SKINTOP® Cable Glands

5. If present, install the mains shield option and fasten 6–10 screws (T25).

Number of screws varies based on enclosure size.

6. Close the door and tighten 6–10 screws (T25).

Number of screws varies based on enclosure size.

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