Installation Instructions

Options Input Plate for D- and E-size Enclosures VLT® 4000-VLT® 8000, and VLT® FC Series

1.1 Description

The options input plate kit allows a D1–D4 enclosure or an E1–E2 enclosure to be retrofitted with fuses, RFI, and a disconnect.

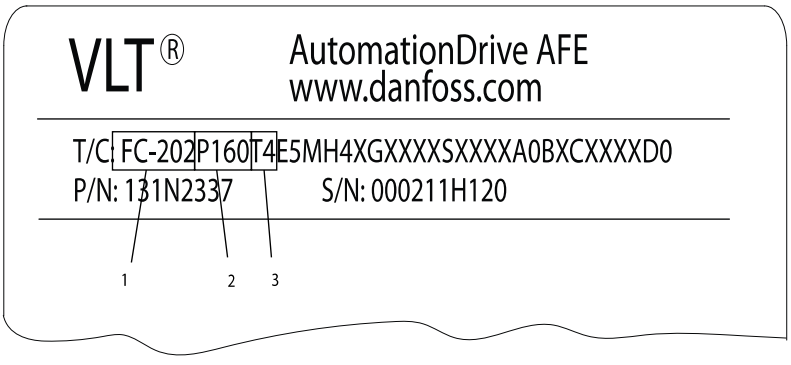
The kit contains the following parts:

- Assembled options input plate
- Modification label
- Template (disconnect option)
- Handle (disconnect option)
- On/off label (disconnect option)

1.2 Identifying a VLT® FC Series Enclosure Size

Use the following steps to find the frequency converter enclosure size.

1. Obtain the following information from the nameplate, which is located on the frequency converter. Refer to *Illustration 1.1*.
    - Product group and drive series (characters 1–6)
    - Power rating (characters 7–10)
    - Voltage rating (phases and mains) (characters 11–12)
2. Find the matching information in *Table 1.1 – Table 1.2*. For an example, see *Illustration 1.2*.



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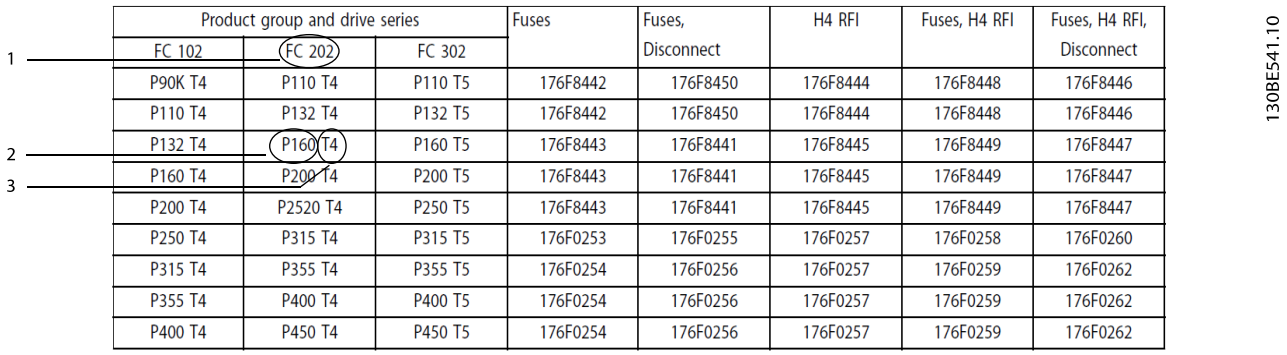
1	Product group and drive series	3	Voltage rating (phases and mains)
2	Power rating		

Illustration 1.1 Nameplate Information



Product group and drive series			Fuses	Fuses, Disconnect	H4 RFI	Fuses, H4 RFI	Fuses, H4 RFI, Disconnect
FC 102	FC 202	FC 302					
P90K T4	P110 T4	P110 T5	176F8442	176F8450	176F8444	176F8448	176F8446
P110 T4	P132 T4	P132 T5	176F8442	176F8450	176F8444	176F8448	176F8446
P132 T4	P160 T4	P160 T5	176F8443	176F8441	176F8445	176F8449	176F8447
P160 T4	P200 T4	P200 T5	176F8443	176F8441	176F8445	176F8449	176F8447
P200 T4	P2520 T4	P250 T5	176F8443	176F8441	176F8445	176F8449	176F8447
P250 T4	P315 T4	P315 T5	176F0253	176F0255	176F0257	176F0258	176F0260
P315 T4	P355 T4	P355 T5	176F0254	176F0256	176F0257	176F0259	176F0262
P355 T4	P400 T4	P400 T5	176F0254	176F0256	176F0257	176F0259	176F0262
P400 T4	P450 T4	P450 T5	176F0254	176F0256	176F0257	176F0259	176F0262

1	Product group and drive series	3	Voltage rating (phases and mains)
2	Power rating		

Illustration 1.2 Finding the Enclosure Size Based on the Nameplate Data

1.3 Kit Part Numbers for VLT® FC Series

Product group and drive series			Fuses	Fuses, Disconnect	H4 RFI	Fuses, H4 RFI	Fuses, H4 RFI, Disconnect
FC 102	FC 202	FC 302					
P90K T4	P110 T4	P110 T5	176F8442	176F8450	176F8444	176F8448	176F8446
P110 T4	P132 T4	P132 T5	176F8442	176F8450	176F8444	176F8448	176F8446
P132 T4	P160 T4	P160 T5	176F8443	176F8441	176F8445	176F8449	176F8447
P160 T4	P200 T4	P200 T5	176F8443	176F8441	176F8445	176F8449	176F8447
P200 T4	P2520 T4	P250 T5	176F8443	176F8441	176F8445	176F8449	176F8447
P250 T4	P315 T4	P315 T5	176F0253	176F0255	176F0257	176F0258	176F0260
P315 T4	P355 T4	P355 T5	176F0254	176F0256	176F0257	176F0259	176F0262
P355 T4	P400 T4	P400 T5	176F0254	176F0256	176F0257	176F0259	176F0262
P400 T4	P450 T4	P450 T5	176F0254	176F0256	176F0257	176F0259	176F0262

Table 1.1 Input Plate Options for VLT® FC Series Frequency Converters, 380–500 V

Product group and drive series			**Fuses**	**Fuses, Disconnect**	**H4 RFI**	**Fuses, H4 RFI**	**Fuses, H4 RFI, Disconnect**
FC 102	**FC 202**	**FC 302**					
P37K T7	–	P45K T7	175L8829	175L8828	175L8824	–	–
P45K T7	–	P55K T7	175L8829	175L8828	175L8824	–	–
P55K T7	–	P75K T7	175L8829	175L8828	175L8824	–	–
P75K T7	P75K T6	P90K T7	175L8829	175L8828	175L8824	–	–
P90K T7	P90K T6	P110 T7	176F8442	176F8450	176L8824	–	–
P110 T7	P110 T6	P132 T7	176F8442	176F8450	175L8824	–	–
P132 T7	P132 T6	P160 T7	176F8422	176F8450	175L8824	–	–
P160 T7	P160 T6	P200 T7	175L8827	175L8826	175L8825	–	–
P200 T7	P200 T6	P250 T7	175L8827	175L8826	175L8825	–	–
P250 T7	P250 T6	P315 T7	175L8827	175L8826	175L8825	–	–
P315 T7	P315 T6	P400 T7	175L8827	175L8826	175L8825	–	–
P355 T7	P355 T6	P450 T7	176F0253	176F0255	–	–	–
P400 T7	P400 T6	P500 T7	176F0253	176F0255	–	–	–
P500 T7	P450 T6	P560 T7	176F0254	176F0258	–	–	–
P560 T7	P500 T6	P630 T7	176F0254	176F0258	–	–	–

Table 1.2 Input Plate Options for VLT® FC Series Frequency Converters, 525–690 V

1.4 Kit Part Numbers for VLT® 4000, VLT® 5000, VLT® 6000, and VLT® 8000

VLT models				Fuses	Fuses, Disconnect	RFI	Fuses, RFI	Fuses, RFI, Disconnect,
5122	4152	6152	8152	176F8442	176F8450	176F8444	176F8448	176F8446
5152	4202	6172	8202	176F8442	176F8450	176F8444	176F8448	176F8446
5202	4252	6222	8252	176F8443	176F8441	176F8445	176F8449	176F8447
5252	4302	6272	8302	176F8443	176F8441	176F8445	176F8449	176F8447
5302	4352	6352	8352	176F8443	176F8441	176F8445	176F8449	176F8447
5352	4452	6402	8452	176F0253	176F0255	176F0257	176F0258	176F0260
5452	4502	6502	8502	176F0254	176F0256	176F0257	176F0259	176F0262
5502	4602	6552	8602	176F0254	176F0256	176F0257	176F0259	176F0262
5552	4652	6602	8652	176F0254	176F0256	176F0257	176F0259	176F0262

Table 1.3 Input Plate Options for VLT® 4000, VLT® 5000, VLT® 6000, and VLT® 8000 Frequency Converters, 380–500 V

VLT models				Fuses	Fuses, Disconnect	RFI	Fuses, RFI	Fuses, RFI, Disconnect
5042	–	–	8052	175L8829	175L8828	175L8824	–	–
5052	–	–	8062	175L8829	175L8828	175L8824	–	–
5062	–	–	8072	175L8829	175L8828	175L8824	–	–
5072	4102	6102	8102	175L8829	175L8828	175L8824	–	–
5102	4122	6122	8122	176F8442	176F8450	175L8824	–	–
5122	4152	6152	8152	176F8442	176F8450	175L8824	–	–
5152	4202	6172	8202	176F8442	176F8450	175L8824	–	–
5202	4252	6222	8252	175L8827	175L8826	175L8825	–	–
5252	4302	6272	8302	175L8827	175L8826	175L8825	–	–
5302	4352	6352	8352	175L8827	175L8826	175L8825	–	–
5352	4402	6402	8402	175L8827	175L8826	175L8825	–	–
5402	4502	6502	8502	176F0253	176F0255	–	–	–
5502	4602	6602	8602	176F0254	176F0258	–	–	–
5602	4652	6652	8652	176F0254	176F0258	–	–	–

Table 1.4 Input Plate Options for VLT® 4000, VLT® 5000, VLT® 6000, and VLT® 8000 Frequency Converters, 525–690 V

1.5 Safety Instructions

Only qualified personnel who are authorized by Danfoss are allowed to install the parts described in these installation instructions. Read and save these instructions. Disassembly and reassembly of the frequency converter must be done in accordance with the corresponding service manual.

⚠WARNING

ELECTRICAL SHOCK HAZARD

VLT® frequency converters contain dangerous voltages when connected to mains voltage. Improper installation, and installing or servicing with power connected, can cause death, serious injury, or equipment failure.
To avoid 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 (including when the frequency converter is tripped or waiting for a command).**
- **Follow the guidelines in these instructions and local electrical safety codes.**

⚠WARNING

DISCHARGE TIME

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 for 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 supplies, including battery back-ups, UPS, and DC-link connections to other frequency converters.**
- **Disconnect or lock PM motor.**
- **Wait 40 minutes for the capacitors to discharge fully.**
- **Before performing any service or repair work, use an appropriate voltage measuring device to make sure that the capacitors are fully discharged.**

1.6 Installation

NOTICE

CONTROL WIRE DAMAGE

Move slowly and avoid damaging control wires when removing and installing the input plate.

1.6.1 Installing the Options Input Plate

1. Disconnect power and verify incoming power to the frequency converter is off. Allow capacitors to discharge fully.
2. Disconnect the incoming power cables from the input terminals. Although the cables have been removed in *Illustration 1.3* to show detail, it is not necessary to remove them.

NOTICE

MULTI-CONDUCTOR APPLICATIONS

Loosen or remove cable clamps to allow the cables to be removed from the terminals.

3. Loosen the 2 retaining nuts (10 mm) that secure the EMC screen. Refer to *Illustration 1.3*.
4. Remove the EMC screen from the input plate.

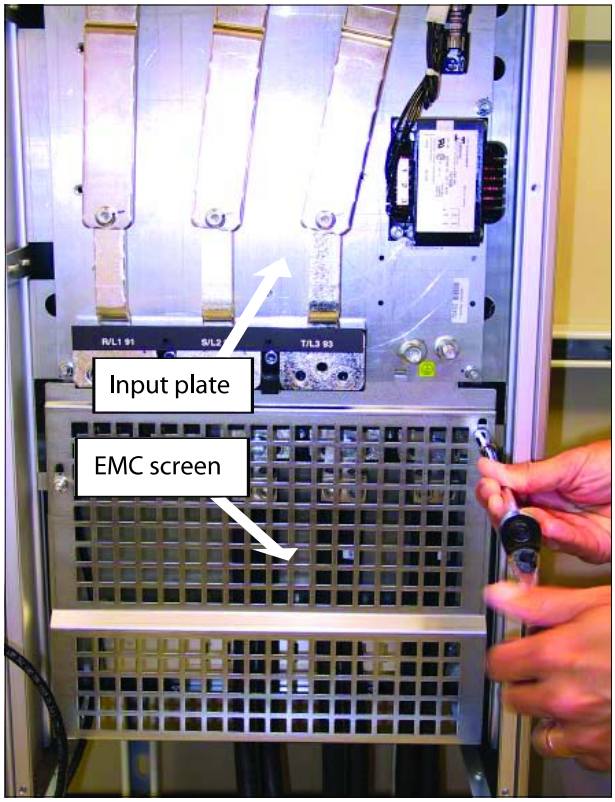


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Illustration 1.3 Location of the Input Plate and EMC Screen

5. Remove the 3 retaining nuts (13 mm) that connect the input plate to the input bus bars. Refer to *Illustration 1.4*.

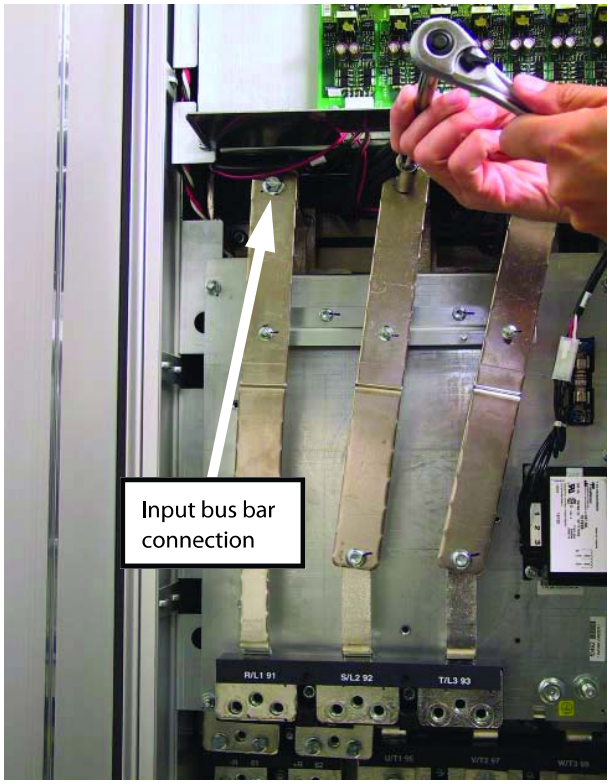

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Illustration 1.4 Removing Retaining Nut from the Input Bus Bar

6. Disconnect the fan transformer wiring harness. Refer to *Illustration 1.5*.

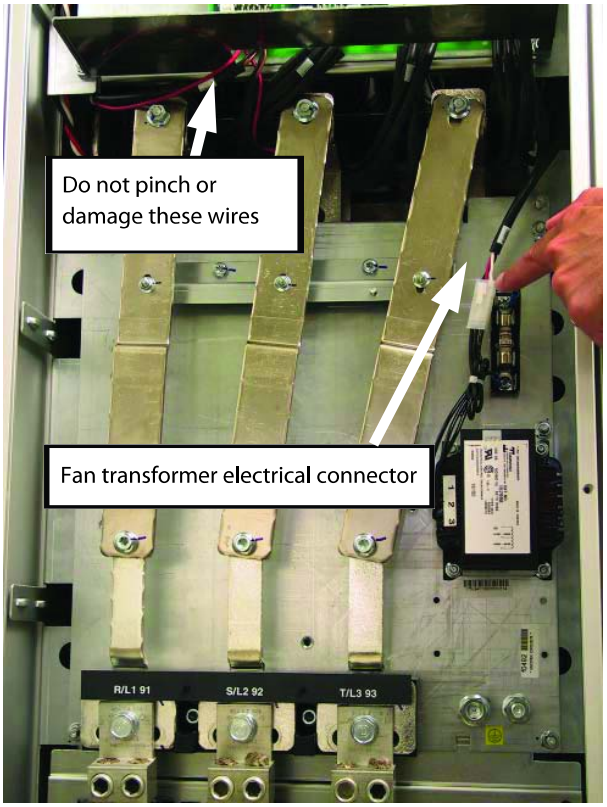

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Illustration 1.5 Disconnecting the Fan Transformer Wiring Harness

7. Remove the 5 retaining nuts (10 mm) and then remove the input plate from the 5 frame studs. Refer to *Illustration 1.6*.

⚠CAUTION

SHARP EDGES

The input plate contains sharp edges. Failure to use hand protection when removing the input plate can result in injury.

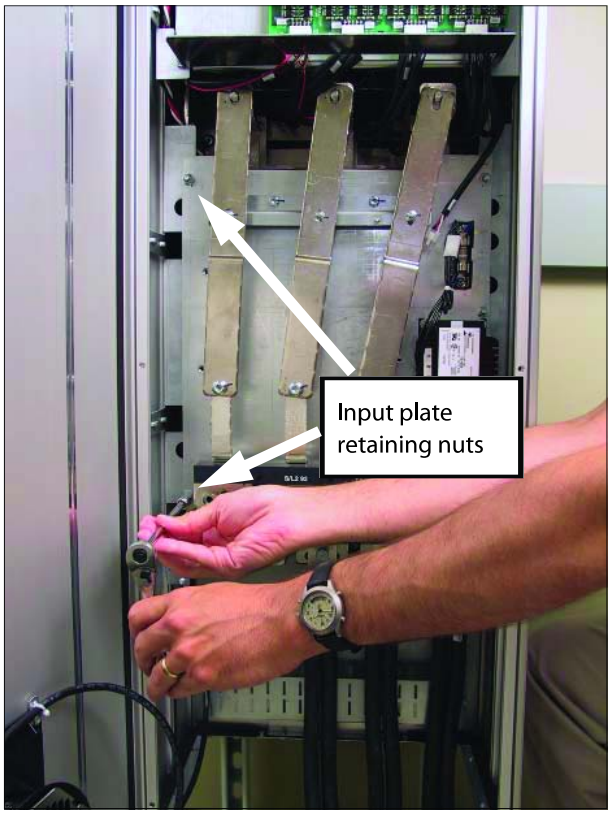

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Illustration 1.6 Removing the Retaining Nuts from the Input Plate

⚠CAUTION

HEAVY WEIGHT

For D-size enclosures, the input plate weighs 6–30 kg (13–66 lbs). For E-size enclosures, the input plate weighs 20–35 kg (44–77 lbs). Failure to use some method of support while installing the input plate can result in injury.

8. Hang the new input plate on the 5 frame studs. If the bus bars are not aligned with the top frame studs, adjust the bus bars by loosening the support nuts (8 mm) and the lower bus bar nuts (13 mm). Refer to *Illustration 1.7*.
9. Align the input plate with the 5 studs and push the entire assembly up against the frame. Secure the input plate with the 5 retaining nuts (10 mm). Torque to 3.9 Nm (35 in-lb).
10. Secure the bus bars by tightening the 3 support nuts to 2.3 Nm (20 in-lb). Then tighten the 3 lower bus bar nuts to 9.6 Nm (85 in-lb).

⚠CAUTION

SHARP EDGES

The input plate contains sharp edges. Failure to use hand protection when installing the input plate can result in injury.

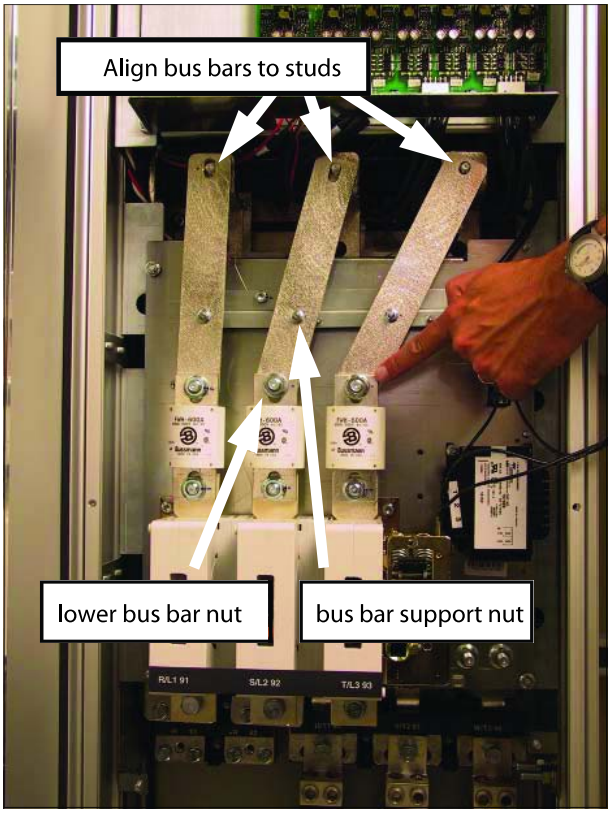

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Illustration 1.7 Aligning Bus Bars on the Input Plate

11. Install the EMC screen by pushing the top of the screen into the 2 notches on the bottom of the input plate. Secure with 2 retaining nuts (10 mm). Torque to 3.9 Nm (35 in-lb).
12. Reconnect the input power wiring. Tighten all connections to the proper torque specifications.
13. On the modification label supplied with the kit, indicate the appropriate modification and install next to the product label.
14. Reconnect the fan transformer wiring harness.
15. If the input plate contains an RFI option, perform the following extra steps:
    - 15a Connect the RFI cable to the gatedrive card. See *Illustration 1.8*.
    - 15b Set the RFI switch on the interface card to the ON position. Refer to *Illustration 1.9*.

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Illustration 1.8 Connecting the RFI Cable to the Gatedrive Card

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Illustration 1.9 RFI Switch on the Control Card

1.6.2 Installing the Disconnect Handle for D-size Enclosures

If the input plate contains a disconnect option, the frequency converter door must be drilled and punched to accommodate the disconnect handle. Although not required, removing the door is recommended.

NOTICE

EQUIPMENT DAMAGE

Prevent metal particles and debris from entering the enclosure during the drilling and hole punching process. Failure to follow this guideline, increases the risk of equipment damage.

1. Locate the center of the handle on the door using the drawing provided with this kit. Alternatively, use marking compound on the handle shaft to mark the center point on the door.
2. Use a hole punch to cut an opening (31 mm) in the door for the handle shaft.
3. Using the template provided with the kit, mark and then drill the 2 mounting holes (5 mm) for the handle. The final result should resemble *Illustration 1.10*.

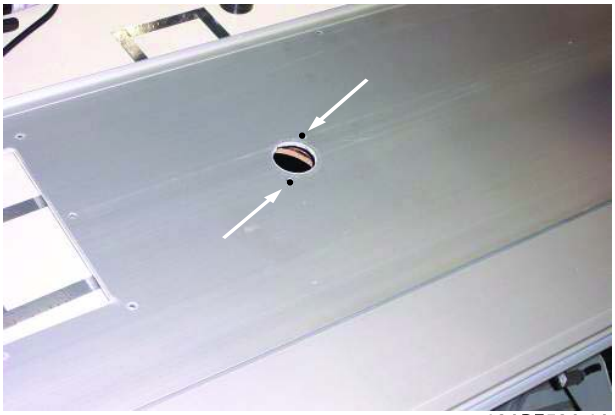

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Illustration 1.10 Shaft Hole with 2 Handle Mounting Holes

4. Test fit the door handle. The depth of the handle shaft is adjustable. Turn the depth collar to adjust the shaft depth as needed.
5. Make sure that the handle is positioned to the right and secure it to the door with 2 screws (M4x8). Torque to 1.5 Nm (13.3 in-lb). Refer to *Illustration 1.11*.

⚠WARNING

IMPROPER HANDLE ORIENTATION

If the handle is mounted improperly, the disconnect function may not operate as designed. An improperly functioning disconnect can result in death or serious injury.

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Illustration 1.11 Proper Disconnect Handle Orientation on a D-sized Enclosure (Handle in Off Position)

1.6.3 Installing the Disconnect Handle for E-size Enclosures

If the input plate contains a disconnect option, the frequency converter door must be drilled and punched to accommodate the disconnect handle. Although not required, removing the door is recommended.

NOTICE

EQUIPMENT DAMAGE

Prevent metal particles and debris from entering the enclosure during the drilling and hole punching process. Failure to follow this guideline, increases the risk of equipment damage.

1. Use the drawing provided with this kit to locate the center of the handle. Alternatively, use marking compound on the handle shaft to mark the center point on the door.
2. Use a hole punch to cut an opening (31 mm) in the door for the handle shaft.
3. Using the template provided with the kit, mark and then drill the 4 mounting holes (5 mm) for the handle. The final result should resemble *Illustration 1.12*.

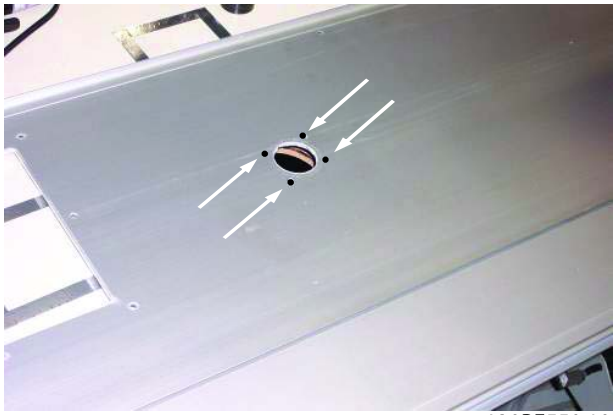

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Illustration 1.12 Shaft Hole with 4 Handle Mounting Holes

4. Test fit the door handle. The depth of the handle shaft is adjustable. Turn the depth collar to adjust the shaft depth as needed.
5. Make sure the handle is positioned to the left and secure it to the door with 4 screws (M4x8). Torque to 1.5 Nm (13.3 in-lb). Refer to *Illustration 1.13*.

⚠WARNING

IMPROPER HANDLE ORIENTATION

If the handle is mounted improperly, the disconnect function may not operate as designed. An improperly functioning disconnect can result in death or serious injury.

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Illustration 1.13 Proper Disconnect Handle Orientation on an E-sized Enclosure (Handle in Off Position)

6. Apply the On/off label to the door around the disconnect handle. Make sure that the ON position is at top center. Refer to *Illustration 1.13*.

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