

Installation Instructions

IGBT Module Replacement for E1h–E4h Drives

Description

E1h–E4h drives have 6 IGBT modules. If the brake option is present, the drive also includes 2 brake IGBT modules. This IGBT module replacement kit contains all components required to install 1 replacement IGBT module or 1 brake IGBT module.

NOTICE

SPARE PARTS COMPATIBILITY

Danfoss recommends replacement of all 6 IGBT modules or both brake IGBT modules, when 1 or more modules fail. For best results, replace modules with parts from the same lot number.

Kit Part Numbers

This installation instruction describes replacement procedures for the following spare part kits.

| Kit number | Kit description |
|------------|--|
| 176F6641 | 600 A IGBT module for 380–500 V (T4/T5) drives |
| 176F6642 | 900 A IGBT module for 380–500 V (T4/T5) drives |
| 176F6643 | 600 A IGBT module for 525–690 V (T7) drives |
| 176F6644 | 650 A IGBT module for 525–690 V (T7) drives |
| 176F6646 | 450 A brake IGBT module for E2h/E4h drives |
| 176F6711 | 450 A brake IGBT module for E1h/E3h drives |

Table 1.1 Part Numbers for IGBT Module Replacement Kits

Items Supplied

This IGBT module replacement kit for E1h–E4h enclosure sizes contains the following:

- 1 IGBT module
- Fasteners
- 3 cc syringe of thermal grease

Safety Instructions

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 manual*.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

VLT® series drives 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 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 codes.

⚠ WARNING

DISCHARGE TIME

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 LED 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 back-ups, UPS, and DC-link connections to other drives.
- Disconnect or lock PM motor.
- Wait 40 minutes for 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.

NOTICE

ELECTROSTATIC DISCHARGE

Follow proper ESD precautions to prevent damage to sensitive components.

NOTICE

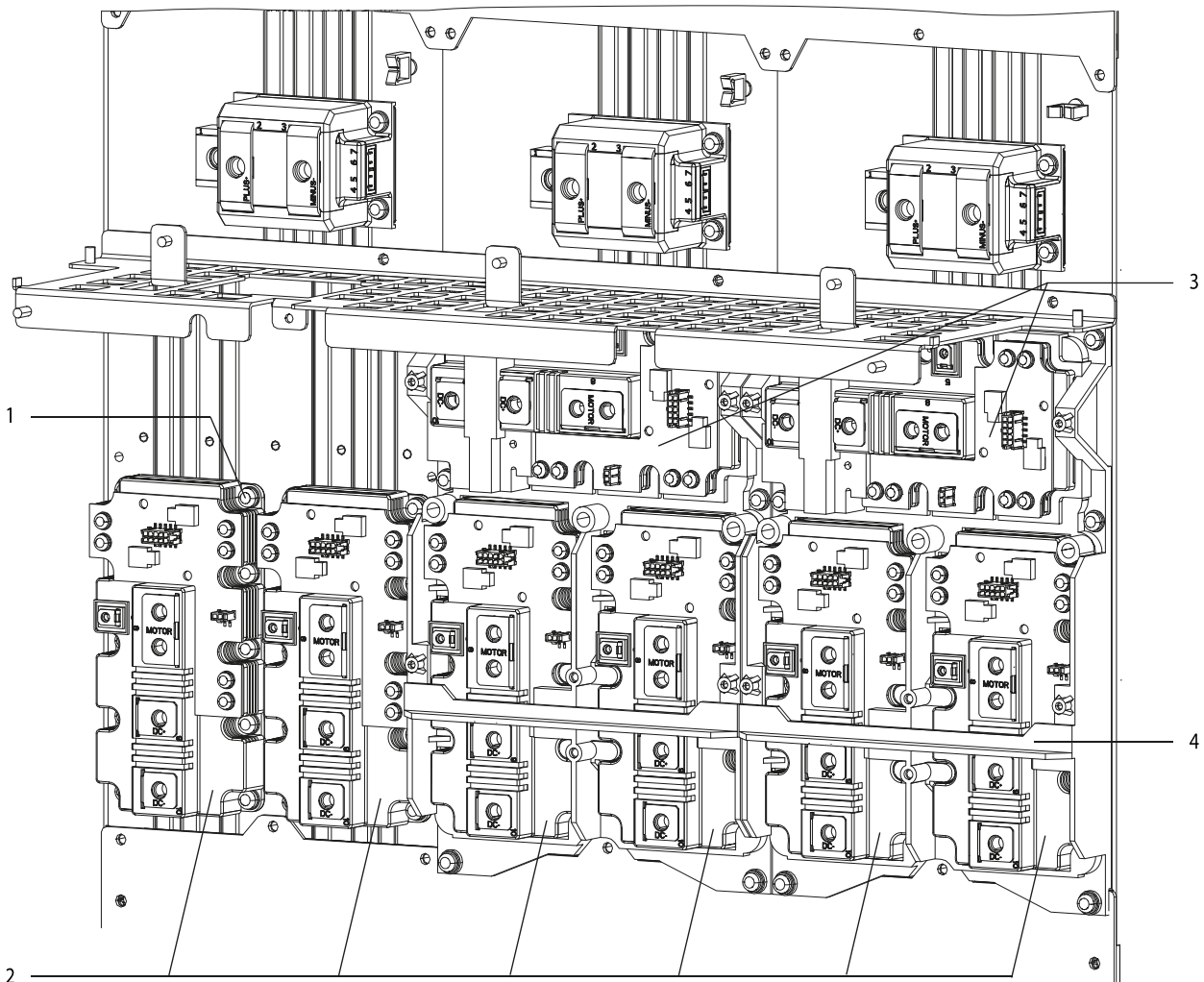
THERMAL INTERFACE

- A proper thermal interface is required between the IGBT module and heat sink. Failure to follow these instructions results in a poor thermal bond and causes premature IGBT failure.
- Ensure that the environment is free of airborne dust and contaminants while applying the thermal grease.

1. Clean the heat sink using a cloth and solvent or alcohol solution to remove debris and remaining thermal grease.
2. With the syringe, apply a layer of thermal grease to the bottom of the IGBT module. Once the module is mounted, thermal grease seeps out to coat the area between the module and heat sink. Excess grease is not a problem.
3. Position the IGBT module on the heat sink by aligning the mounting holes in the module to those in the heat sink. Refer to *Illustration 1.1*.

Installation Instructions

Refer to the product *service manual* for IGBT module disassembly procedures. To install the replacement IGBT module or brake IGBT module, use the following steps.

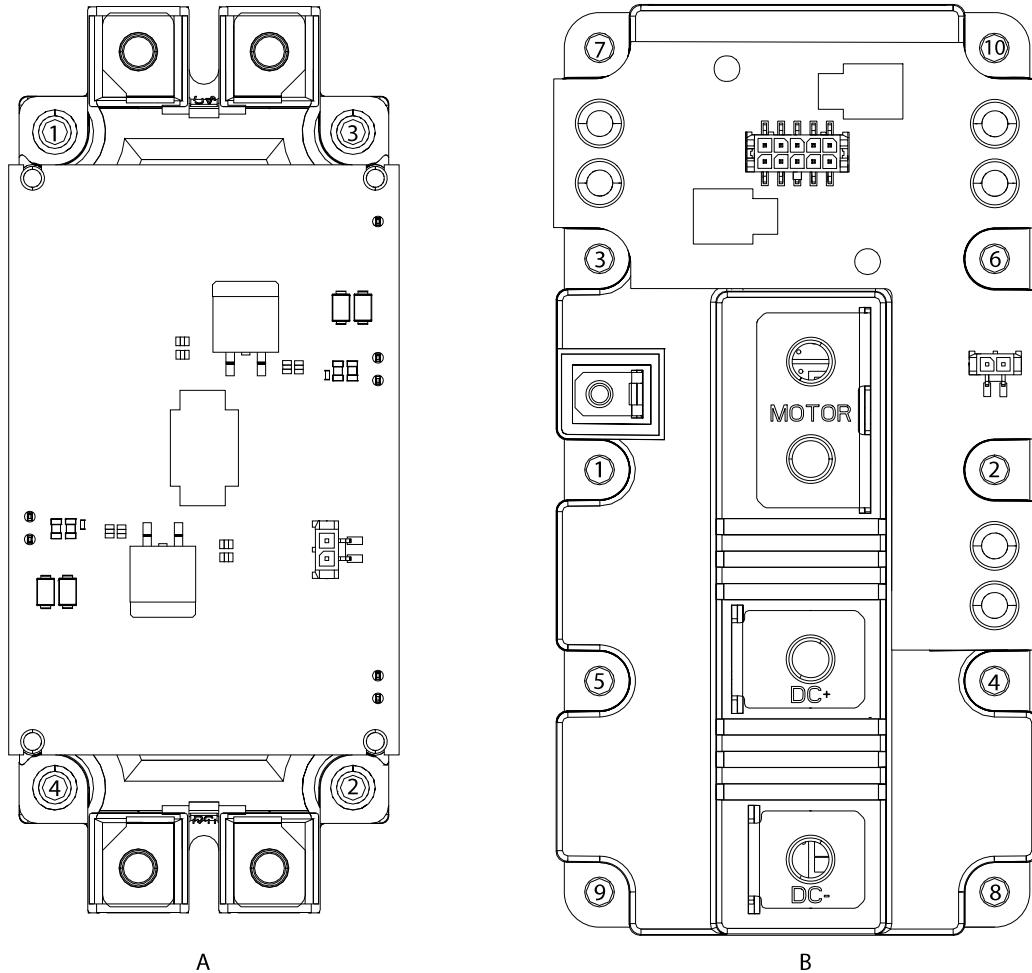


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| | | | |
|---|----------------------|---|-----------------------------|
| 1 | IGBT module fastener | 3 | Brake IGBT modules |
| 2 | IGBT modules | 4 | Plastic IGBT mounting frame |

Illustration 1.1 Mounting the IGBT Module on the Heat Sink

4. Insert the mounting screws and hand tighten them. The IGBT module requires either 4 or 10 screws to fasten it to the heat sink.
5. Following the torque tightening sequence shown in *Illustration 1.2*, slowly tighten (maximum 20 RPM) all screws to 50% of the listed torque values.
6. Repeat the same tightening sequence and slowly tighten (maximum 5 RPM) all screws to 100% of the torque value.
7. Tighten the busbar connection terminals to the torque value listed in *Illustration 1.2*.



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| Part number | Mounting torque [Nm (in-lb)] | Busbar connection torque [Nm (in-lb)] | Screw tightening order | Diagram |
|-------------|------------------------------|---------------------------------------|------------------------|---------|
| 176F6641 | 3.3 (29) | 4.0 (35) | 1-2-3-4 | A |
| 176F6642 | 4.5 (40) | 9.0 (80) | 1-2-3-4-5-6-7-8-9-10 | B |
| 176F6643 | 3.3 (29) | 4.0 (35) | 1-2-3-4 | A |
| 176F6644 | 4.5 (40) | 9.0 (80) | 1-2-3-4-5-6-7-8-9-10 | B |
| 176F6646 | 4.5 (40) | 9.0 (80) | 1-2-3-4-5-6-7-8-9-10 | B |
| 176F6711 | 3.3 (29) | 4.0 (35) | 1-2-3-4 | A |

Illustration 1.2 Torque Tightening Sequence

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