

# IGBT Module Replacement for D1h–D8h Drives

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

### 1 Overview

#### 1.1 Description

D1h–D8h drives have 3 IGBT modules. If the brake option is present, the drive also includes a brake IGBT module. This IGBT module replacement kit contains all components required to install 1 replacement IGBT module or 1 brake IGBT module.

#### NOTICE

##### SPARE PARTS COMPATIBILITY

recommends replacement of all IGBT modules or all brake IGBT modules, when 1 or more modules fail.

- For best results, replace modules with parts from the same lot number.

#### 1.2 Kit Numbers

Use these instructions with the following kits.

Table 1: Numbers for IGBT Module Replacement Kits

Kit number	Kit description
176F3362	IGBT dual module 300 A 1200 V T4/T5 drive
176F3363	IGBT dual module 450 A 1200 V T2/T4/T5 drive
176F3364	IGBT dual module 600 A 1200 V T2/T4/T5 drive
176F3365	IGBT dual module 900 A 1200 V T2/T4/T5 drive
176F3366	IGBT brake module 450 A 1700 V
176F3367	IGBT brake module 650 A 1700 V
176F3422	IGBT dual module 300 A 1700 V T7 drive
176F3423	IGBT dual module 450 A 1700 V T7 drive
176F3424	IGBT dual module 450 A 1700 V T7 drive PP2
176F3425	IGBT dual module 650 A 1700 V T7 drive PP2
176F4242	IGBT dual module 450 A 1200 V T4/T5 drive

#### 1.3 Items Supplied

The following parts are contained in the kit.

- 1 IGBT module
- Syringe of thermal grease
- Hardware for busbar mounting
- Fasteners

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

#### ⚠ WARNING ⚠

**ELECTRICAL SHOCK HAZARD**

VLT® FC 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.

- 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 (20 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 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 back-ups, UPS, and DC-link connections to other drives.
- Wait 20 minutes for the capacitors to discharge fully before performing any service or repair work.
- Measure the voltage level to verify full discharge.

#### NOTICE

**ELECTROSTATIC DISCHARGE**

Electrostatic discharge can damage components.

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

## 2.2 Installing the IGBT Module

### 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.

### NOTICE

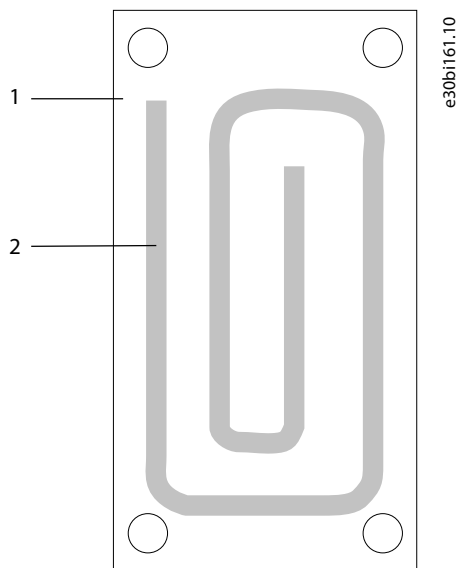
#### HEAT SINK DAMAGE

A damaged heat sink can cause a drive to malfunction. A clean, undamaged mounting surface allows proper thermal dissipation.

- Take care not to scratch or damage the heat sink when cleaning and servicing the drive.

Refer to the service guide for IGBT disassembly procedures. To install replacement IGBT modules, use the following steps.

1. Clean the heat sink using a cloth and solvent or isopropyl alcohol to remove debris and remaining thermal grease.
2. To ensure that the thermal grease is not expired, check the expiration date on the packaging. If expired, order a new syringe of thermal grease (p/n 177G5463).
3. With the syringe, apply a layer of thermal grease to the bottom of the IGBT module in the pattern shown in [Illustration 1](#). It is not required to use the whole syringe, but excess thermal grease is not a problem.



**Illustration 1: IGBT Thermal Grease Pattern**

- |   |                               |
|---|-------------------------------|
| 1 | Bottom surface of IGBT module |
| 2 | Thermal grease                |

4. Place the IGBT module on the heat sink, and twist it back and forth to spread the thermal grease evenly on the IGBT and the heat sink surface.
5. Align the mounting holes in the IGBT module with the holes in the heat sink.
6. Insert the mounting screws and hand tighten them. The IGBT module requires either 4 or 10 screws to fasten it to the heat sink.
7. Using a manual torque wrench to avoid over torquing the screw, follow the fastener tightening sequence shown in [Illustration 2](#). Slowly tighten (maximum 20 RPM) all screws to 50% of the torque values listed in [Table 2](#).
8. Repeat the same tightening sequence and slowly tighten (maximum 5 RPM) all screws to 100% of the torque value.

9. Tighten the busbar connection terminals to the torque value listed in [Table 2](#).

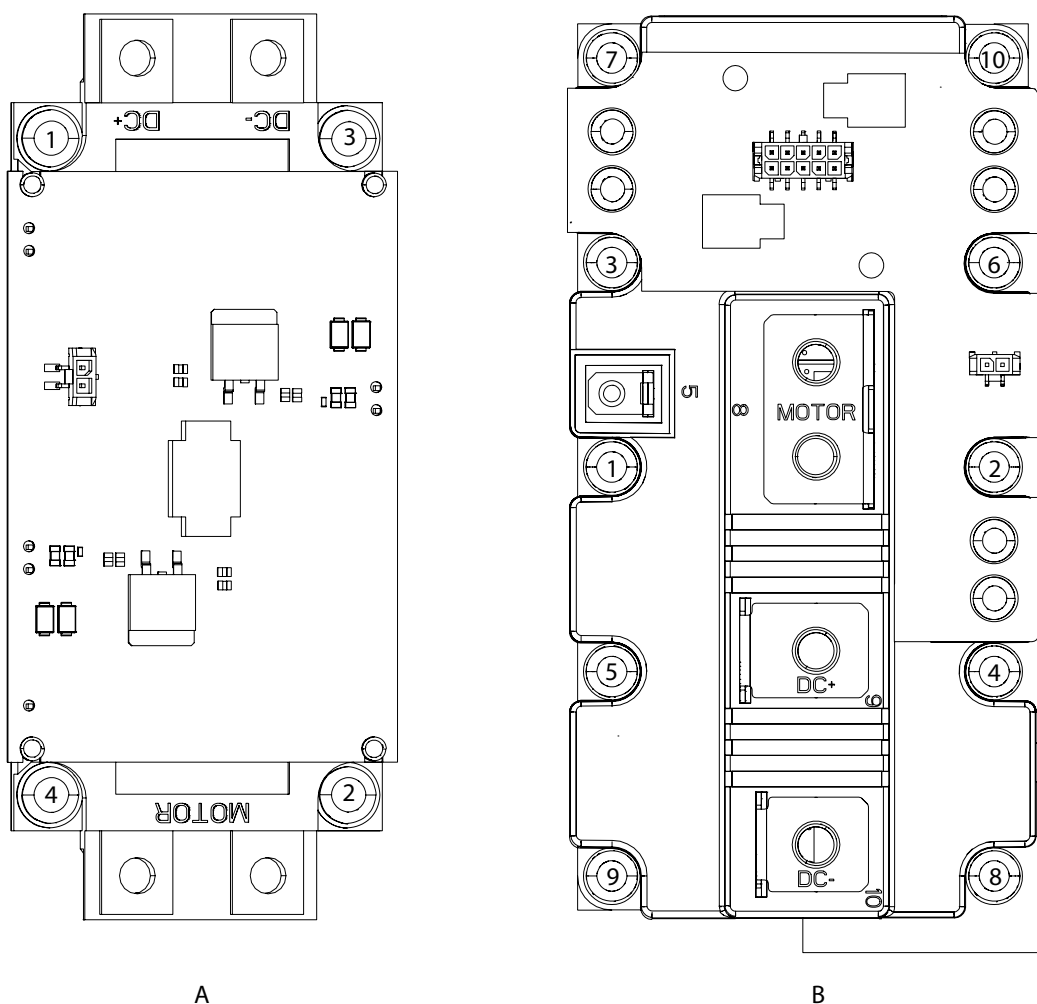


Illustration 2: IGBT Fastener Tightening Sequence

Table 2: Torque Tightening Values and Sequence

Kit number	Mounting torque [Nm (in-lb)]	Busbar connection torque [Nm (in-lb)]	Diagram	Screw tightening order
176F3362	3.3 (29)	4.0 (35)	A	1-2-3-4
176F3363	3.3 (29)	4.0 (35)	A	1-2-3-4
176F3364	3.5 (31)	9.0 (80)	B	1-2-3-4-5-6-7-8-9-10
176F3365	3.5 (31)	9.0 (80)	B	1-2-3-4-5-6-7-8-9-10
176F3366	3.3 (29)	4.0 (35)	A	1-2-3-4
176F3367	3.5 (31)	9.0 (80)	B	1-2-3-4-5-6-7-8-9-10
176F3422	3.3 (29)	4.0 (35)	A	1-2-3-4

Kit number	Mounting torque [Nm (in-lb)]	Busbar connection torque [Nm (in-lb)]	Diagram	Screw tightening order
176F3423	3.3 (29)	4.0 (35)	A	1-2-3-4
176F3424	3.5 (31)	9.0 (80)	B	1-2-3-4-5-6-7-8-9-10
176F3425	3.5 (31)	9.0 (80)	B	1-2-3-4-5-6-7-8-9-10
176F4242	3.3 (29)	4.0 (35)	A	1-2-3-4

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