

## Installation Instructions

# Inrush Card Kit for D1h–D8h Drives

## VLT<sup>®</sup> FC Series FC 102, FC 103, FC 202, FC 302

### 1.1 Description

The inrush card kit includes all parts required to install the inrush card in D1h–D8h drives.

#### 1.1.1 Kit Ordering Numbers

Number	Kit description
176F3159	Inrush card NO 110–315 kW 400 V (T5)
176F3417	Inrush card NO 75–400 kW 690 V (T7)
176F3517	Inrush card rugged NO 110–315 kW 400 V (T5)
176F3518	Inrush card rugged NO 75–400 kW 690 V (T7)

Table 1.1 Ordering Numbers for Inrush Card Kits

#### 1.1.2 Items Supplied

The following items are included with the inrush card kits for D1h–D8h drives.

Item	Quantity
Inrush card	1
Standoff (for D1h/D3h/D5h/D6h drives only)	3
Installation instructions	1

Table 1.2 Items Supplied with Inrush Card Kit

### 1.2 Safety Information

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**

##### ELECTRICAL SHOCK HAZARD

VLT<sup>®</sup> 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.

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 the specified time 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 for the capacitors to discharge fully. The minimum waiting time is 20 minutes.
- Before performing any service or repair work, use an appropriate voltage measuring device to make sure that the capacitors are fully discharged.

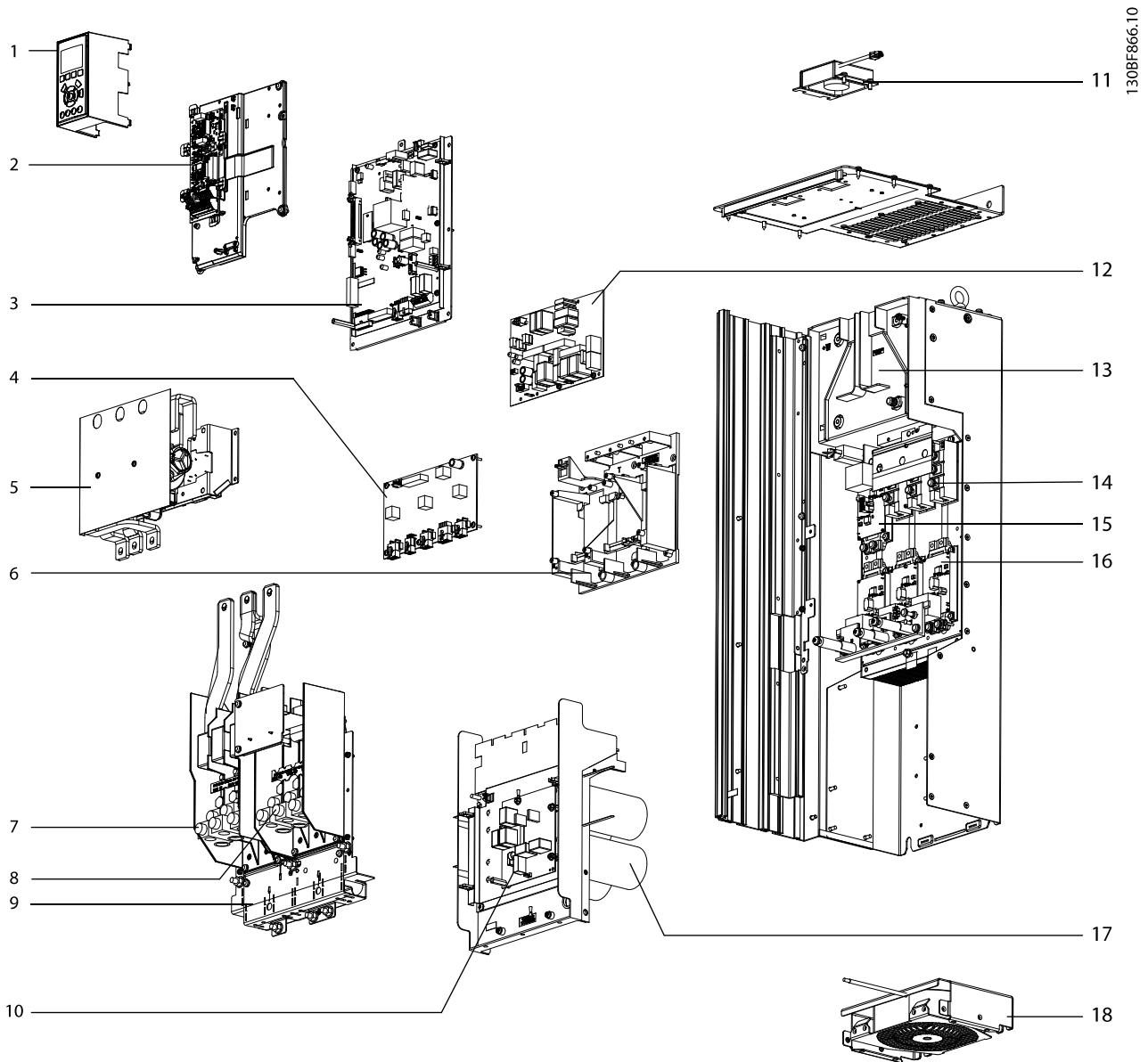
#### **NOTICE**

##### ELECTROSTATIC DISCHARGE

Follow proper ESD precautions to prevent damage to sensitive components.

### 1.3 Installation Instructions for D1h/D3h/D5h/D6h Drives

Illustration 1.1 shows an exploded view of the main components of the D3h drive. The components of the D1h/D5h/D6h drives are similar.



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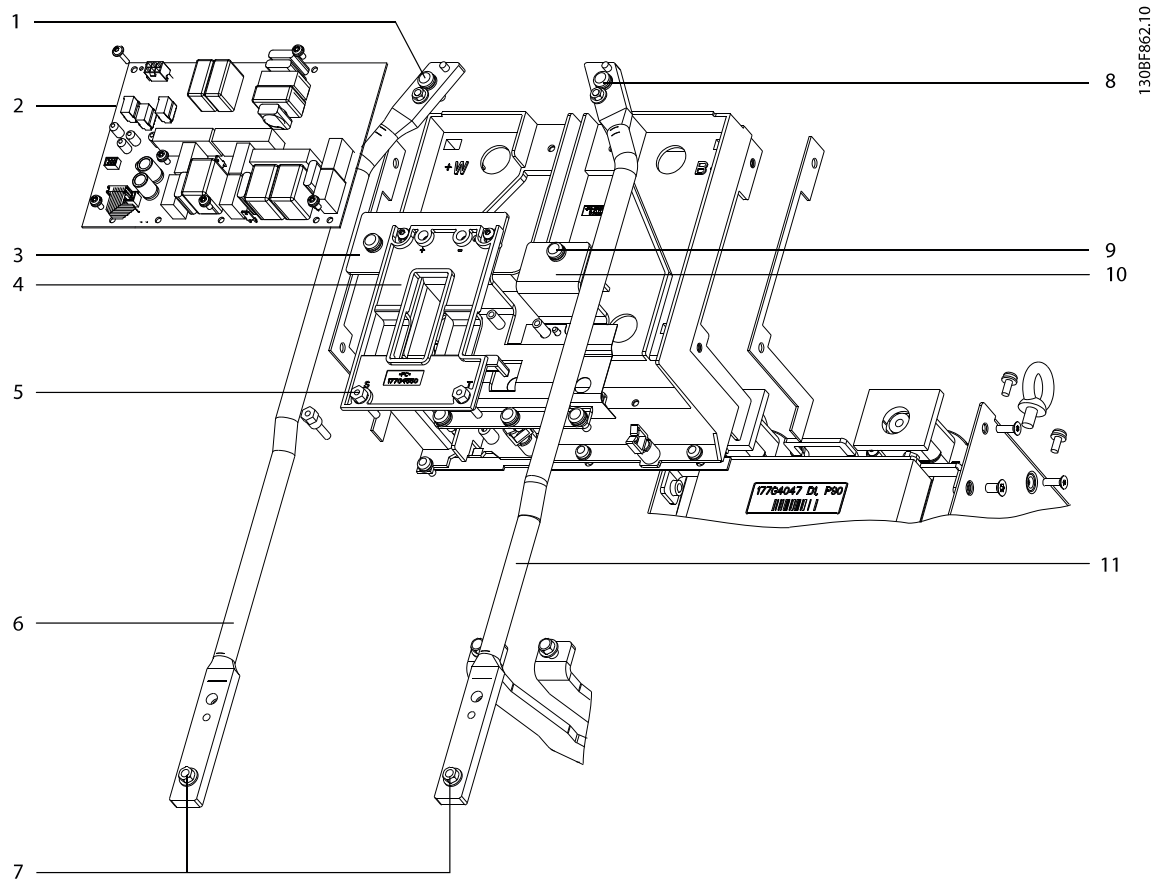
1	Local control panel (LCP) and LCP cradle	10	Balance/high frequency card
2	Control card mounting plate	11	Top fan (IP20 only)
3	Power card mounting plate	12	Inrush card
4	Gatedrive card	13	DC inductor
5	RFI filter (optional)	14	SCR/diode modules
6	Gatedrive card support bracket	15	Brake IGBT module (optional)
7	Mains input terminal block	16	IGBT modules
8	Motor terminal block	17	Capacitor bank
9	Power terminal mounting plate	18	Heat sink fan

Illustration 1.1 Exploded View of D3h Drive

### 1.3.1 Accessing the Inrush Card in D1h/D3h/Dh5/D6h Drives

To access the inrush card, remove the following components from the drive. Refer to *Illustration 1.1* and *Illustration 1.2*. See the *service guide* for detailed instructions for each component.

1. Remove the control card mounting plate.
2. Remove the power card mounting plate.
3. Remove the AC input busbars and any input options present, such as RFI filter or mains fuses.
4. Remove the mains input terminal block and EMC shield.
5. Remove the brake terminals, if present.
6. Remove the motor terminal block.
7. Remove the power terminal mounting plate.
8. Remove the DC bus rails.



1	Screw (T30)	7	Nut (10 mm)
2	Inrush card	8	Screw (T30)
3	DC(+) busbar	9	Screw (T30)
4	Inrush support bracket	10	DC(+) busbar
5	Standoff (11 mm)	11	DC(-) busbar DC coil to capacitor bank
6	DC coil to capacitor bank DC(-) busbar	–	–

Illustration 1.2 Inrush Card and DC Bus Rails

### 1.3.2 Removing the Inrush Card in D1h/D3h/D5h/D6h Drives

To remove the inrush card, use the following steps. Refer to *Illustration 1.2*.

1. Unplug the cables from the following connectors on the inrush card:
  - MK1800
  - MK1802
2. Remove 5 screws (T20) from the inrush card.
3. Remove the inrush card from the drive, and discard it.

### 1.3.3 Replacing the Standoffs in D1h/D3h/D5h/D6h Drives

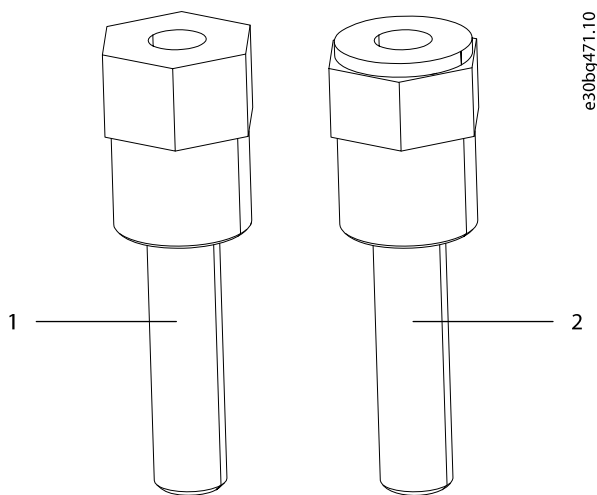
#### **NOTICE**

#### **STANDOFF REPLACEMENT**

Only D1h/D3h/D5h/D6h drives require replacement of the standoffs. For all other drives, use the installed standoffs.

After removing the inrush card, compare the standoffs installed in the drive to the standoffs in *Illustration 1.3*. If the drive contains old standoffs, replace them with the new standoffs included in the kit. To replace the standoffs, use the following steps. Refer to *Illustration 1.2* and *Illustration 1.3*.

1. Remove 3 standoffs (11 mm), 1 from each SCR input busbar.
2. Fasten 3 new standoffs (11 mm), 1 in each SCR busbar. Torque to 2.3 Nm (20 in-lb).



1	Old standoff
2	New standoff (included in kit)

**Illustration 1.3 Standoff Replacement**

### 1.3.4 Installing the Inrush Card in D1h/D3h/Dh5/D6h Drives

To install the new inrush card, use the following steps. Refer to *Illustration 1.2*.

1. Place the new inrush card in the drive.
2. Fasten 5 screws (T20) in the inrush card.
3. Plug the cables to the following connectors on the inrush card:
  - MK1800
  - MK1802

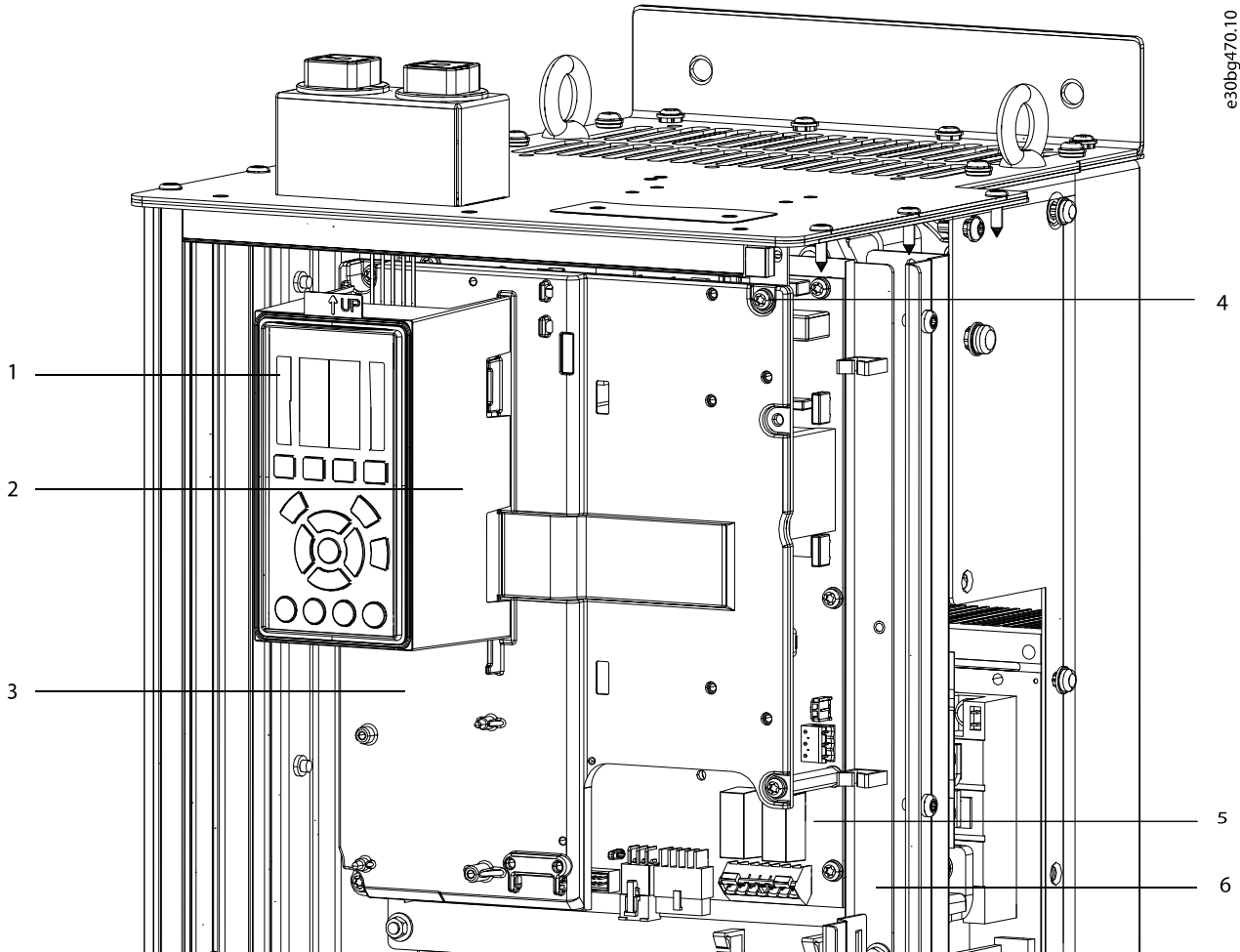
### 1.3.5 Reassembling D1h/D3h/D5h/D6h Drives

After installing the new inrush card and standoffs, replace the following components in the drive. Refer to *Illustration 1.1*. See the *service guide* for detailed instructions for each step.

1. Replace the DC bus rails.
2. Replace the power terminal mounting plate.
3. Replace the motor terminal block.
4. Replace the optional brake terminals, if present.
5. Replace the mains input terminal block and EMC shield.
6. Replace the AC input busbars and any power options, such as RFI filter or mains fuses.
7. Replace the power card mounting plate.
8. Replace the control card mounting plate.

### 1.4 Installation Instructions for D2h/D4h/D7h/D8h Drives

Illustration 1.4 shows the control card mounting plate and power card mounting plate in a D-sized drive. The location of these components is similar in D2h/D4h/D7h/D8h drives.



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1	LCP (Local control panel)	4	Screw (T20)
2	LCP cradle	5	Power card
3	Control card mounting plate	6	Power card mounting plate

Illustration 1.4 Control Card Mounting Plate and Power Card Mounting Plate

#### 1.4.1 Accessing the Inrush Card in D2h/D4h/Dh7/D8h Drives

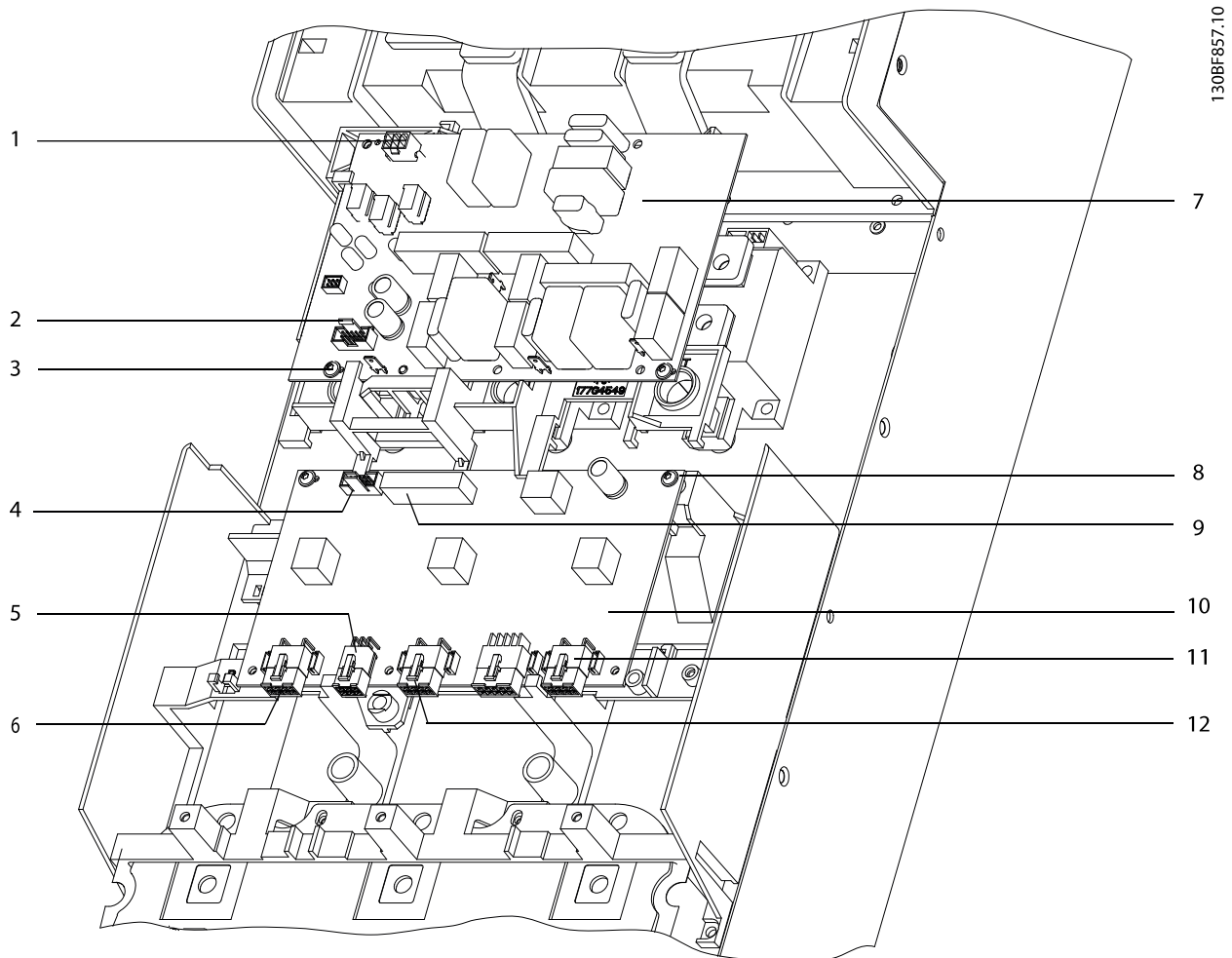
To access the inrush card, remove the following components from the drive. Refer to *Illustration 1.4*. See the *service guide* for detailed instructions for each component.

1. Remove the control card mounting plate.
2. Remove the power card mounting plate.

### 1.4.2 Removing the Inrush Card in D2h/D4h/D7h/D8h Drives

To remove the inrush card, use the following steps. Refer to *Illustration 1.5*.

1. Unplug the cable from the inrush card connector MK1802.
2. Remove 2 thread-forming screws (T20).
3. Remove 5 screws (T20) from the inrush card.
4. Remove the inrush card from the drive, and discard it.



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1	MK1802	7	Inrush card
2	MK1800	8	Screw (T20)
3	Screw (T20)	9	MK101
4	MK102	10	Gatedrive card
5	MK100	11	MK701
6	MK501	12	MK601

Illustration 1.5 Inrush Card and Gatedrive Card

### 1.4.3 Installing the Inrush Card in D2h/D4h/D7h/D8h Drives

To install the new inrush card, use the following steps. Refer to *Illustration 1.5*.

1. Position the inrush card in the drive.
2. Secure 5 screws (T20) in the inrush card.
3. Secure 2 thread-forming screws (T20).
4. Connect the cable to the inrush card connector MK1802.

### 1.4.4 Reassembling D2h/D4h/D7h/D8h Drives

After installing the new inrush card, replace the following components in the drive. Refer to *Illustration 1.4*. See the *service guide* for detailed instructions for each component.

1. Replace the power card mounting plate.
2. Replace the control card mounting plate.

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