PowerFlex® 7000 AC Drive with Direct-to-Drive Technology
Re-installing a Common Mode Choke

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Important User Information

Read this document and the documents listed in the Additional Resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

![WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.](image-url)

![ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.](image-url)

![IMPORTANT Identifies information that is critical for successful application and understanding of the product.](image-url)

Labels may also be on or inside the equipment to provide specific precautions.

![SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.](image-url)

![BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.](image-url)

![ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).](image-url)
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Installation Instructions for
Re-installing a Separately Shipped Common Mode Choke (CMC)

Safety

ATTENTION
Ensure lifting provisions have a load rating that exceeds the equipment weight being lifted.

Only lift the CMC as high as needed to clear barriers, etc.

ATTENTION
Never walk under or place any part of your body under the equipment being lifted.

Restrict access to the work area during the lifting and handling of the CMC.

ATTENTION
The VFD enclosure is NOT suitable for lifting with the CMC installed. It still can be rolled or slid into its final position with the CMC installed.

Background

For the largest air-cooled Direct-to-Drive VFDs, the Common Mode Chokes (CMCs) are relatively heavy (5000 lbs./2267 kg.+). In order to ease handling of the VFD Enclosure, the CMCs are shipped separately and the contractor and/or customer must reinstall the CMC into the VFD Enclosure on site. The CMC is completely installed and tested at the factory before shipment, then removed for shipment.

Definitions

VFD Enclosure – the entire VFD metal cabinet assembly. This consists of a number of cabinet sections, each with its own front access door.

Common Mode Choke (CMC) – the DC Link Inductor that is electrically connected between VFD rectifier and inverter to provide the DC source to the inverter and address Common Mode Voltage.

CMC Cabinet Section – Part of the overall VFD Enclosure. This cabinet section houses the CMC. It is located at the far right of the overall VFD enclosure (looking from the front).
Definitions (cont.)

**Dimension Drawings** – These are part of the project-specific drawing set supplied for each individual factory order. They show the VFD Enclosure front elevation, roof and floor plans, as well as general information.

**CMC Lifting Provisions** – Two series of in-line metal rungs (one series for each fork of the forklift) welded to the top of the CMC frame.

**CMC Isolation Mounting Strips** – These reduce the noise that could be caused by the operation of the CMC, by isolating the base of the CMC from the VFD Enclosure floor. These black rubber strips are placed between the CMC and the floor of the CMC Cabinet.

**Air Baffles** – These help to direct the airflow (induced by the cooling fan) through the core of the CMC. These are two clear rigid corrugated plastic sheets trimmed to fit around the CMC. One is placed in front and one is placed behind the CMC.

Siting

Move the VFD Enclosure and the CMC close to the area where the VFD will be installed.

**IMPORTANT** Please note that the CMC should be installed through the rear of VFD Enclosure and a forklift is typically required to install the CMC. Therefore adequate space is required above and behind the VFD enclosure for the forklift. Usually where the VFD is finally installed, adequate rear or overhead clearance is restricted. Therefore the installation of the CMC typically must be performed before final placement of the VFD Enclosure.

The CMC could be removed from the front of the enclosure but this requires additional disassembly of interior barriers in the structure.
Removing CMC Cabinet Access Plates

Refer to the Dimensional Drawings supplied with the VFD. The cabinet section that houses the CMC is designated on the drawing as “LINK” (right-hand side of the overall VFD Enclosure – looking from the front). A typical example is shown in Figure 1.

![Figure 1 – Typical Dimension Drawing excerpt](image)

The rear of the CMC Cabinet Section has three cover plates (top to bottom). Remove the tapkite screws that secure the center plate first; then also remove the top and bottom plates. Please note that there are small seams on the top and bottom horizontal outer edges of these plates that are sealed with silicone. A small tube of silicone is included in a cardboard box typically located behind the black low voltage compartment door. This can be used to reseal these seams after the CMC is reinstalled and the cover plates replaced.

Open the front door of the CMC Cabinet Section by turning the three hex key door latches counter-clockwise (located along the right vertical edge of the door). Behind the door is a large interior white metal barrier plate (see Figure 2). Remove the bolts (the nuts behind are held captive) around the periphery of this plate that secure this barrier, to gain access to the front of the CMC compartment located behind the barrier.

Ensure reinstallation of this barrier after the CMC is installed.
Preparing the CMC

Remove the four mounting bolts that secure the CMC to the wooden shipping skid (these bolts mount through the same mounting holes that are used to secure the CMC to the floor of the CMC Cabinet Section). Insert the forks of the fork lift into the CMC Lifting Provisions welded to the top of the CMC (see Figure 3). Lift the CMC slightly off the wooden skid, remove the skid, and then lower to the ground.

Figure 2 – Front CMC barrier plate

Figure 3 – Provisions for Fork Lift Forks
Preparing the CMC Cabinet

The CMC mounts to the floor of the CMC Cabinet Section by four bolts near each corner of the CMC (see Figure 4). The bolts and hardware are preinstalled in the CMC Cabinet Section. The CMC Isolation Mounting Strips are also secured by these bolts for shipping (see Figure 14). Make sure to remove the washers, nuts, and mounting strips first (leave the 4 bolts in place). The front and rear pair of bolts are mounted in horizontal slots across the front and across the rear of the cabinet to allow for slight left-to-right movement. This makes it easier to mate the bolts to the holes in the base of the CMC assembly.

The six (6) supplied black rubber CMC Isolation Mounting Strips (approx. 3” wide x ¼” thick) must be placed between the CMC Cabinet floor and the CMC to reduce noise due to vibration. Two layers are placed between the front pair and rear pair of mounting bolts (over the horizontal slots), and single layers are placed under each of the two weld straps (parallel to the pair of mounting bolt strips) towards the center of the CMC. Measure the position of the weld straps and pre-position these strips (see Figures 5 and 6) on the floor of the CMC Cabinet before the installation of the CMC.

Figure 4 – Mounting detail of CMC to cabinet floor

Figure 5 – Positioning of CMC Isolation Mounting Strips
Preventing the CMC Cabinet
(cont.)

![Figure 6 – CMC Isolation Mounting Strip positions under installed CMC](image)

Installing the CMC

Ensure that the CMC is oriented correctly so the four side-mounted electrical termination lug pads (designated M+, M-, L+, and L-) on the CMC (see Figure 7) are facing towards the four power cables in the CMC Cabinet (with the same designations). These electrical connections will be made after the CMC is installed in the CMC Cabinet.

![Fig. 7 – Position of the cable termination lug pads on CMC](image)

Ensure to leave a minimum of a 3-inch clearance between the right hand side sheet and the right side of the CMC (referenced from the front). Use the Air Baffles as a template to ensure proper orientation of the CMC in the CMC Cabinet.
Lift the CMC with the fork lift (remember the proper orientation). Just lift the CMC high enough to clear the front level of the CMC Cabinet floor plate (see Figure 8). Slowly move the fork lift /CMC into the CMC Cabinet until the upwards-facing four mounting bolts in the CMC Cabinet align with the four mounting holes on the base of the CMC. Then slowly lower the CMC until it is firmly resting on the rubber mounting strips on the floor of the CMC Cabinet (see Figure 9).

Use the Air Baffles as a template to verify that the CMC is oriented in the proper position in the CMC Cabinet. Reposition the CMC until the Air Baffles fit between the side walls of the CMC Cabinet and the CMC. DO NOT MODIFY THE AIR BAFFLES TO FIT. The Air Baffles are sized to ensure optimal placement of the CMC in the CMC Cabinet Section.

Lower the forks until they are clear of the CMC Lifting Provisions and back the fork lift forks slowly out of the CMC Cabinet. Secure the mounting hardware (see Figures 4, 6 and 15).
Installing the CMC (cont.)

Connect the four power cables (designated M+, M-, L+, and L-) in the CMC Cabinet to the identically designated cable termination lug pads on the CMC (see Figures 10 and 15).

![Figure 10 – CMC power cable orientation](image)

Connect the green ground cable lug to the ground connection bolt on the base of the CMC (see Figure 11).

![Figure 11 – Ground Cable Termination](image)
Connect the thermistor cable to the connection terminal assembly (see Figure 12).

Two clear plastic Air Baffles (to optimize airflow through the CMC) will be supplied. These mount horizontally and are placed on top of four (4) white metal baffle supports that attach around the perimeter of the CMC Cabinet (see Figure 13). They are secured when the retaining brackets are placed on top of the baffles and affixed with taptite screws.

NOTE: The rear baffle support must be removed before installing the CMC.
Installing the CMC (cont.)

Figure 13 – Air Baffles and mounting assembly (rear view)

Figure 14 – Front View of CMC Cabinet as shipped
(Front barrier plate removed for photograph)
Common Mode Choke
(Front View)

Figure 15 – Front View of Common Mode Choke
(with detailed Hardware Connection Diagrams)
Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support, you can find technical manuals, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools. You can also visit our Knowledgebase at http://www.rockwellautomation.com/knowledgebase for FAQs, technical information, support chat and forums, software updates, and to sign up for product notification updates.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnectSM support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/support/.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

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New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

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