

Freedom™ arc-resistant Motor Control Center



Arc flash – the threat is real



Eaton's Freedom arc-resistant
Motor Control Center

An arc flash is a dangerous condition associated with the explosive release of energy caused by an electrical arc due to either a phase-to-ground or a phase-to-phase fault. This fault can result from many factors, including dropped tools, accidental contact with electrical systems, buildup of conductive dust, corrosion and improper work procedure. An arc-flash event releases a tremendous amount of energy in the form of thermal heat, toxic fumes, pressure waves, blinding light, sound waves and explosions that can result in serious injury, including critical burns, collapsed lungs, loss of vision, ruptured eardrums, puncture wounds and even death. Temperatures can reach 35,000°F, which is three times hotter than the temperature of the sun!

These excessive temperatures cause the air and metal in the path of the arc to expand and explode, creating an arc blast. Throughout the world, arc flash threatens personnel safety, and companies face lost man-hours, lawsuits, fines, equipment damage, facility downtime and lost production.

Eaton's Freedom arc-resistant Motor Control Center

In continuation with the legacy of Eaton's leadership in arc flash safety products, the Freedom arc-resistant Motor Control Center (MCC) is designed to provide personnel with increased protection from the dangers of arc flash hazards. This enhanced version of Eaton's flagship Freedom MCC includes additional features specifically designed to contain the arc blast energy should an arc flash event be triggered within the assembly. The Freedom arc-resistant MCC has a Type 2 accessibility rating, meaning that arc-resistant designs or features are present on the front, back, and sides of the assembly.

This Type 2 rating translates to enhanced safety around the entire perimeter of the MCC should an arc flash event occur.

Applicable standards and guidelines

Eaton's Freedom arc-resistant MCC has been tested and verified per the criteria found in the Institute of Electrical and Electronics Engineers (IEEE) guideline C37.20.7 titled "IEEE Guide for Testing Metal-Enclosed Switchgear Rated Up to 38 kV for Internal Arcing Faults." The MCC also meets the criteria found in Canadian Standards Association (CSA) standard C22.2 No. 0.22-11, titled "Evaluation Methods for Arc Resistance Ratings of Enclosed Electrical Equipment." This standard was originally published in 2012 and is currently the only official North American standard or guideline that contains low voltage MCCs within the scope of coverage. CSA C22.2 No. 0.22-11 was based in large part on the guidelines and testing criteria found in IEEE C37.20.7.

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Features and benefits

No exhaust plenums or roof flaps required

Eaton's arc-resistant Freedom MCC requires no exhaust plenums or roof flaps. This aids in the ease of installation, as additional clearance or venting ductwork is not required above the assembly.

12 gauge steel doors, side sheets, and back sheets

Usage of 12 gauge steel on all MCC doors, side sheets, and back sheets serve to increase the structural integrity of the MCC and aid in the containment of arc blast energy, further enhancing personnel safety should an arc flash event occur.

4 inch sections

A four-inch section is added to the first and last structures of the MCC lineup, regardless of the number of structures. These sections increase the structural integrity of the MCC lineup, further ensuring it can withstand the arc blast energy.

Enhanced door hinges and latches

Hinges and door latches play a vital role in the containment of arc blast energy during an arc flash event. The design and implementation of enhanced door hinges and latches on the Freedom arc-resistant MCC serves to keep doors closed and latched securely during an arc flash event, further preventing the propagation of arc blast energy towards personnel. As an additional measure, the quantity of door hinges and latches applied to the MCC unit doors has also been increased.

Insulated horizontal and vertical buses

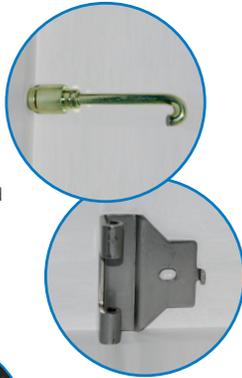
Insulation of the horizontal and vertical buses aids in the prevention of arc flash incidents. When an arc flash incident does occur, the insulation serves to prevent further propagation of the arc fault throughout the entire MCC. Automatic vertical bus shutters are included.

Isolation barriers between adjacent structures

Isolation barriers placed between adjacent structures serve to isolate the arc blast energy to a single area within the MCC.



Front view of structure



Rear view of structure with back and side sheets removed

Specifications

Item	Description
Freedom arc-resistant MCC	
Applicable guidelines and standards	Tested and verified per IEEE guideline C37.20.7 and CSA standard 22.2 No. 0.22-11
Agency approvals	UL and cUL per UL845
Voltage rating	600V maximum
Interrupting rating	Maximum 65kA @ 480V and 600V
Arc duration rating	100ms @ 480V / 50ms @ 600V
Accessibility type ⁴	Type 2 (contains arc-resistant protection designs or features on the front, sides, and rear of the equipment)
Main incoming breaker (required)	2500A frame (1200A-2500A trip range), 80% rated 1200A frame (400A-1200A trip range), 80% rated
Structure environmental ratings	NEMA 1 and 2 available
Structure depth	21 inches
Horizontal bus	Minimum 800A, maximum 2500A ¹
Vertical bus	Maximum 1200A
Bus insulation	Horizontal and vertical buses both insulated

Available units, assemblies and options

Interrupting devices ²	Thermal magnetic circuit breakers and motor circuit protectors
Main breakers ³	2500A frame (800A - 2500A range) 1200A frame (320A - 1200A range)
Starters	NEMA size 1-5 full voltage non-reversing (FVNR), full voltage reversing (FVR), and multi-speed All overload options available, including bimetallic and solid state
Feeders	Maximum 600A, 80% rated
Variable frequency drives (VFDs ⁴)	Maximum 150hp
Soft starters	Maximum 450hp
Other units and assemblies available	Main lugs Relay panels Relay structures Meters Transformers Panelboards Surge protective devices Power factor correction capacitors Active harmonic correction units
Communications	Communications on all major fieldbus protocols, including Modbus, Modbus TCP, Ethernet/IP, DeviceNet, and Profibus

¹ 2500A maximum with 65°C temperature rise bus, 2000A maximum with 50°C temperature rise bus

² Fused switches and air circuit breakers not available

³ An incoming main breaker is required to be configured in the lineup.

Incoming main lugs, fused switches, and air circuit breakers not available as main devices.

⁴ Bypass and isolation not available for FR8 150HPVT

For more information, please visit:
Eaton.com/mcc

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