

IEEE Guide for Motor Control Centers Rated up to and including 600 V AC or 1000 V DC with Recommendations Intended to Help Reduce Electrical Hazards

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IEEE Industry Applications Society**

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Abstract: Functional design recommendations and field practices for motor control centers (single- and three-phase 50 Hz and 60 Hz and dc) are provided in this guide. The features and practices described in this guide are intended to help reduce the probability that an incident will occur due to shock or arc flash hazards when qualified persons are performing certain activities. The recommendations within this guide are intended to augment the existing requirements of applicable standards for motor control centers, e.g., NEMA ICS 18 Motor Control Centers, UL 845 Motor Control Centers, NMX-J-353-ANCE, and CSA C22.2 No. 254. This guide also provides recommendations for interface relationships between the specifier, manufacturer, installer, and user for safety-related concerns. It also provides a framework from which specifiers/users can select specific MCC features and system characteristics that are applicable to their specific situation and needs.

The recommendations in this guide complement safety requirements and procedures as stipulated by workplace safety standards and site practices and site procedures, e.g., NFPA 70E Standard for Electrical Safety in the Workplace, CSA Z462 Workplace Electrical Safety Standard, and site practice on Personal Protective Equipment (PPE), etc.

Keywords: arc flash, arc resistant, circuit protection, electrical safety, IEEE 1683™, low voltage, MCC, motor control centers, selectivity, shock, thermal monitoring

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Introduction

This introduction is not part of IEEE Std 1683-2014, IEEE Guide for Motor Control Centers Rated up to and including 600 V AC or 1000 V DC with Recommendations Intended to Help Reduce Electrical Hazards.

Low-voltage motor control centers (MCCs) are the most widely used control and distribution equipment in industrial and commercial establishments. The IEEE working group for this guide consisted of dedicated industry professionals who realize that enhancing the safety of the operating and maintenance personnel interfacing with low-voltage motor controls centers is paramount.

The working group believes that enhancing safety relies on a combination of system design, product selection, product design, procedures, training, and other factors based on operation and maintenance requirements. Every decision in system design, product selection, installation, maintenance activity, upgrade activity, procedures, tools, protective equipment, and training of personnel who use and maintain MCCs can impact the safety of workers who must interface with the equipment for many years after initial installation. The working group has endeavored to create one cohesive document of guidelines to assist users, system designers, manufacturers of MCCs, and maintenance personnel, as well as others, in making decisions that may lead to a greater degree of safety surrounding this important type of electrical control equipment. In many cases, decisions are not clearly incorrect or correct, and readers will need to use engineering judgment to decide the best course of action to take, for their situation and for their facility. However, it is hoped that this guide will assist in making better decisions when such judgments must be made.

The guidelines in this document are strictly voluntary and are not intended to replace mandatory manufacturing, testing or safety standards, codes or regulations that apply in relevant situations.

Readers who find this document useful, or lacking, are encouraged to participate in future revisions of this IEEE guide to improve it for future generations of electrical workers.

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1. Overview

This guide provides functional design recommendations for motor control centers (MCCs) intended to help reduce the likelihood of shock and arc flash injuries. Users are instructed to comply with all safety laws and regulations applicable to their location, systems, equipment, and operations.

1.1 General

It is not the intent of this guide to encourage or endorse work of any kind on energized equipment; working on energized equipment is dangerous and can result in death or serious injury. However, it is recognized by the working group that such work on occasion does transpire for a variety of reasons. Any such work should only be done by a qualified person in a manner that safeguards persons and property, including placing the equipment in an electrically safe work condition whenever possible prior to the start of any work.