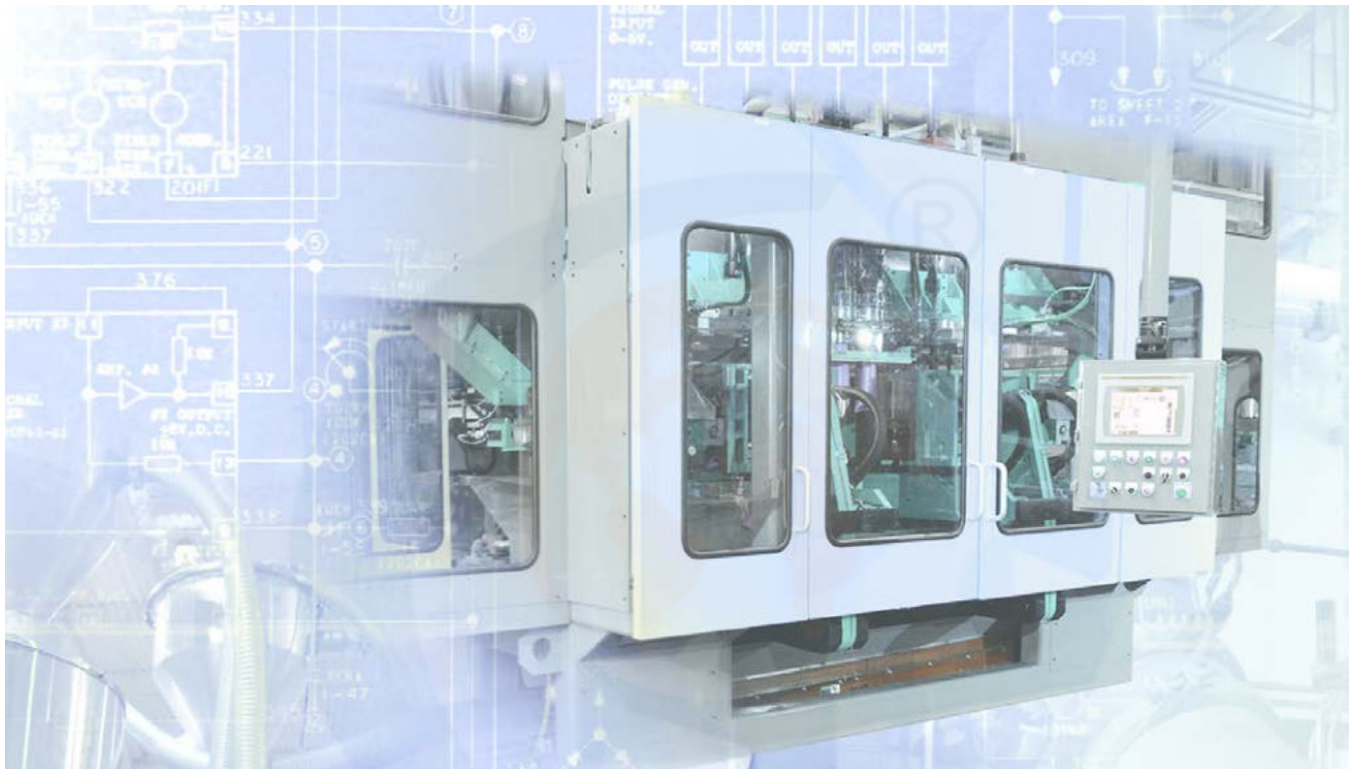


Molded Case Circuit Breakers

Bulletin Numbers 140G, 140MG



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What's Inside

Topic	Page
Overview	3
Product Selection	19
Molded Case Circuit Breakers Product Selection	19
Current-limiting Molded Case Circuit Breakers Product Selection	55
Motor Circuit Protectors Product Selection	67
Motor Protection Circuit Breakers Product Selection	73
Molded Case Switches	76
Mounting System Adapters Product Selection	77
Accessories	79
Replacement Parts	99
Specifications	103
Trip and Let-through Current Curves	129
Approximate Dimensions	189

Summary of Changes

This publication reflects additions and corrections of product information throughout. It incorporates content from previous technical data publications (140G-TD100 and 140G-TD047), and contains new information for current-limiting molded case circuit breakers.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Circuit Breaker Protection for Automation Systems, publication 140G-BR001	Overview of full line of Allen-Bradley circuit breaker offerings.
Circuit Breaker Selectivity Guide, publication 140G-TD050	Aids in selecting circuit breaker pairs for line and load side protection.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.rockwellautomation.com/global/certification/overview.page	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/global/literature-library/overview.page>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

What is a Circuit Breaker?

What is a circuit breaker? This is the first question to answer in understanding Molded Case Circuit Breakers. The definition of a circuit breaker varies between the standards organizations, but the most commonly used definitions are:

The National Electrical Manufacturers Association (NEMA) defines circuit breakers as “devices designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overcurrent without injury to itself when properly applied within its rating.”

The International Electrotechnical Commission (IEC) Standard IEC 60947-2 defines a circuit breaker as “a mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified time and breaking currents under specified abnormal circuit conditions such as those of short-circuit.”

There are also similar definitions, that further identify circuit breakers by type of construction and functionality. Within the IEC specification for circuit breakers, there are several distinctions of types of circuit breakers by classification:

Utilization Category

Interrupting medium

- Air break
- Vacuum break
- Gas break

Design

- Open case
- Moulded (molded) case

Method of controlling the operating mechanism

- Dependent manual operation
- Independent manual operation
- Dependent power operation
- Independent power operation
- Stored energy operation

Type of overcurrent release

- Instantaneous
- Definite time delay
- Inverse time delay

In reviewing the attributes just listed, it is understandable that many people are confused about which type of circuit breaker to use, where to use it, and how to select it properly. In this section, we will focus on the definition, application and selection of Molded Case Circuit Breakers (MCCBs) with an inverse time delay as applied to industrial control panels.

This publication focuses on the application and selection of MCCBs, Motor Protection Circuit Breakers (MPCBs) and Motor Circuit Protectors (MCPs). The primary focus will be on products that are packaged in a molded case design, but much of the information can be applied to other circuit breakers that are commonly found in control panels.

Definitions

Each of the product categories we mentioned earlier is packaged in a molded case and confusion develops because of the physical similarity of the products.

The Molded Case Circuit Breaker is a specific type of circuit breaker. NEMA defines circuit breakers as devices designed to open or close a circuit by nonautomatic means, and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating. The term “molded case” simply refers to the construction of the circuit breaker and refers to the fact that the circuit breaker is an assembled unit in a supporting housing of an insulating material.

Within the realm of MCCBs, three distinct product variations exist, each with specific protection properties and uses within the industrial control panel. The main categories are:

Molded Case Circuit Breakers or Feeder Breakers

MCCBs are intended to provide overcurrent protection for conductors and equipment by opening automatically before the current reaches a value and duration that will cause an excessive or dangerous temperature in conductors or conductor insulation. Additionally, these devices can serve as the main disconnecting means for a control panel. This protection pertains to low level overcurrent, and short-circuit current. Traditionally these types of circuit breakers are generically described as thermal magnetic devices, though an increasing number of these devices are also electronic circuit breakers which provide the same type of protection, with the exception that the electronics allow the protection curves to be customized to the specific application. In the United States, the National Electrical Code (NEC) defines how