

# Molded Case Circuit Breakers

**Power Defense Molded Case Circuit Breakers**



**Series G Circuit Breakers**



<b>2.1</b>	<b>Introduction</b>	
	Product Overview .....	V4-T2-2
<b>2.2</b>	<b>Power Defense Molded Case Circuit Breakers</b>	
	Power Defense Introduction .....	V4-T2-4
	Power Defense Technical Data .....	V4-T2-12
	Frame Size 1 (15–125 A) .....	V4-T2-22
	Frame Size 2 (15–225 A) .....	V4-T2-30
	Frame Size 3 (45–600 A) .....	V4-T2-43
	Frame Size 4 (300–800 A) .....	V4-T2-58
	Frame Size 5 (320–1200 A) .....	V4-T2-71
	Frame Size 6 (700–2500 A) .....	V4-T2-80
	Motor Circuit Protectors (3–600 A) .....	V4-T2-88
	Motor Protection Circuit Breakers (15–600 A) .....	V4-T2-99
	30 mA Ground Fault (Earth Leakage) Modules .....	V4-T2-105
	High Instantaneous Power Defense Circuit Breakers for Selective Coordination .....	V4-T2-108
	Power Defense Direct Current Circuit Breakers .....	V4-T2-111
	Power Defense Mechanical Current-Limiting Circuit Breaker Module .....	V4-T2-116
	Terminals, Lugs, Connectors and Enclosures .....	V4-T2-120
	Communications and Software .....	V4-T2-144
	Special Applications .....	V4-T2-146
	Special Modification Ordering and Pricing .....	V4-T2-150
<b>2.3</b>	<b>Series G Molded Case Circuit Breakers</b>	
	Product Overview .....	V4-T2-151
	EG-Frame (15–125 Amperes) .....	V4-T2-162
	NG-Frame (320–1200 Amperes) .....	V4-T2-176
	RG-Frame (800–2500 Amperes) .....	V4-T2-185
	Motor Circuit Protectors (MCP) .....	V4-T2-194
	Motor Protector Circuit Breakers (MPCB) .....	V4-T2-198
	30 mA Ground Fault (Earth Leakage) Module .....	V4-T2-201
	Current-Limiting Circuit Breaker Module .....	V4-T2-203
	High Instantaneous Circuit Breaker for Selective Coordination .....	V4-T2-208
	Special Features and Accessories .....	V4-T2-211
	Motor Operators .....	V4-T2-219
	Plug-In Blocks .....	V4-T2-221
	Drawout Cassette .....	V4-T2-222
<b>2.4</b>	<b>Series C Molded Case Circuit Breakers</b>	
	Product Overview .....	V4-T2-223
	G-Frame (15–100 Amperes) .....	V4-T2-228
	F-Frame (10–225 Amperes) .....	V4-T2-242
	J-Frame (70–250 Amperes) .....	V4-T2-260
	K-Frame (70–400 Amperes) .....	V4-T2-268
	L-Frame (125–600 Amperes) .....	V4-T2-281
	M-Frame (300–800 Amperes) .....	V4-T2-293
	Motor Circuit Protectors (MCP) .....	V4-T2-304
	Type ELC Current Limiter Attachment (Size 0–4) .....	V4-T2-315
	Current-Limiting Circuit Breaker Module .....	V4-T2-316
	Internal Accessories .....	V4-T2-319
	External Accessories .....	V4-T2-352
<b>2.5</b>	<b>Specialty Breakers</b>	
	Engine Generator Circuit Breakers .....	V4-T2-379
	Direct Current Circuit Breakers .....	V4-T2-385
	PVGard Solar Circuit Breakers .....	V4-T2-397
	E2 Mining Service Breakers .....	V4-T2-407
<b>2.6</b>	<b>Handle Mechanisms</b>	
	Handle Mechanisms—Series G .....	V4-T2-433
	Handle Mechanisms—Series C .....	V4-T2-445

# 2.1

## Molded Case Circuit Breakers

### Introduction

2

Molded Case Circuit Breakers



### Contents

#### Description

	<i>Page</i>
Introduction	
Power Defense .....	<b>V4-T2-4</b>
Series G .....	<b>V4-T2-151</b>
Series C .....	<b>V4-T2-223</b>
Specialty Breakers .....	<b>V4-T2-379</b>



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Online



Drawings  
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### Product Overview

Eaton offers the widest variety of molded case circuit breakers available today. Designed for electrical and machinery OEMs serving a range of industries and applications, these proven designs incorporate the latest in innovation with the high reliability that has been our hallmark since the advent of the circuit breaker in the 1920s.

The Power Defense™ family is Eaton's premier MCCB globally rated line, incorporating Power Xpert® Release electronic trip units with best-in-class safety and protection features. It includes ratings from 15 to 2500 amperes, thermal-magnetic and electronic breakers, and modular field-installable accessories. Power Defense breakers meet the requirements of UL®, CSA®, CE and CCC.

The Series G® line features an average 35% size reduction, common field-installable internal accessories and advanced trip unit functionality that eliminates the need for rating plugs. These breakers meet the requirements of UL, CSA, IEC, CCC and CE, allowing the OEM to standardize on a design that meets the needs of their global customer base.

The Series C® family ranges from 15 to 2500 amperes and includes thermal-magnetic breakers, electronic trip breakers, molded case switches, motor circuit protectors and specially designed breakers for engine generator, DC and mining applications.

### Application Description

Eaton molded case circuit breakers cover the widest range of applications in the industry:

- Electrical OEMs
- Machinery OEMs
- Navy breakers:
  - UL 489 Supplement SB
  - MIL-C-17588
  - MIL-C-17361
  - ABS/NVR
- Mining breakers up to 1100 Vac
- Earth leakage
- DC breakers 125–750 Vdc
- Engine generator breakers 15–1200 amperes
- Current-limiting breakers

## Typical Applications

### **Machine Tool Control Panels and Motor Control Centers**

Designed for these equipment requirements, including new world-class accessories.

### **Panelboards**

As both main and branch circuit protection devices.

### **Feeder Pillars**

In distribution systems to provide main and branch circuit protection.

### **Switchgear**

In distribution systems to provide main and branch circuit protection up to 2500 A (RG-Frame).

### **Busbar Trunking Tap-Offs**

In busbar trunking tap-offs to provide circuit protection.

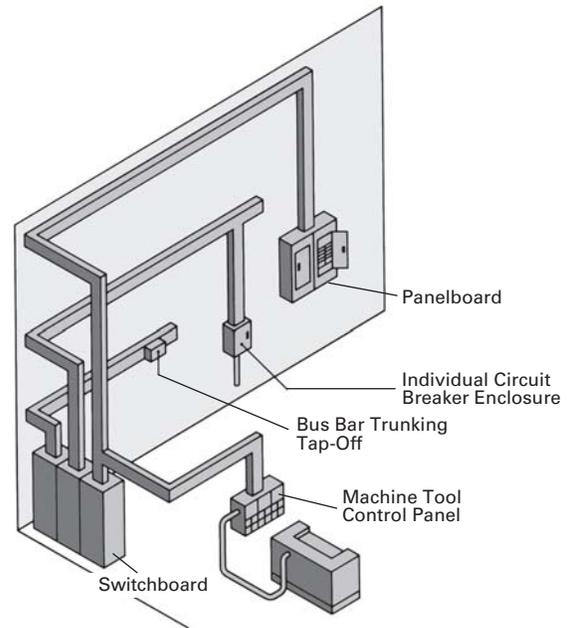
### **Individual Enclosures**

Completely assembled in enclosures to meet specific customer requirements.

### **Additional Applications**

Special versions of each Eaton frame are available to provide safe equipment control and protection in mining and other applications. Contact your Eaton agent or distributor for additional information.

## Typical Eaton Applications



#### Power Defense Molded Case Circuit Breakers

2



### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Product Description

Eaton’s globally accepted Power Defense molded case circuit breaker (MCCB) can:

- Connect to your network or the cloud with built-in communication capability
- Generate the data to help optimize your facility’s performance
- Mitigate arc flash to keep your employees, customers and end users safe

The Power Defense MCCB portfolio is globally adaptive to your footprint no matter the application or project requirement. All frames have the availability of global certifications including IEC, CCC, UL and CSA. Eaton’s best-in-class support enables you to order readily available product for on-time delivery, across the globe.

### Application Description

#### Power Xpert Release Electronic Trip Units

**Simpler communications. Better protection. Easier energy metering**

Embedded in the Power Defense portfolio, Power Xpert Release (PXR) electronic trip units for global low-voltage commercial and industrial applications are Eaton’s latest innovation in circuit protection technology. They are designed to help you simplify your communications, enhance your protection and support your energy metering.

- Unique Eaton trip unit platform enables you to easily change set points, test and configure circuit breakers, and meter energy and power information
- Enhanced, easy-to-use interface allows you to view and adjust the trip unit settings
- Intuitive interface provides simple scroll-through visibility for critical performance metrics such as metering, battery life, zone selective interlock settings and circuit breaker health

### Features and Benefits

#### Trip Unit Configurations

##### Thermal-Magnetic

- Available with adjustable magnetic settings, and for IEC markets, adjustable thermal settings. For NEMA markets, fixed magnetic and fixed thermal settings are options. Four-pole options with 0%, 60% and 100% protection are available

##### PXR 10

- All of the advantages of an electronic trip unit in a simpler interface, which leads to easy setup. This trip unit is available with LSI protection and includes programmable settings so that it can be tailored for the specific application

##### PXR 20

- A fully adjustable trip unit with LSI and LSIG protection capabilities. This trip unit offers more advanced features than ever before at this level, including current metering, programmable relays, and optional embedded communications to enable seamless integration into control and communication systems
- The PXR 20 also offers cutting-edge safety features like the Arcflash Reduction Maintenance System™ and zone selective interlocking with new testing and status indication features, and cause of trip indication

**PXR 25**

- Offers more functionality than ever before in a molded case circuit breaker trip unit. 1% accuracy for energy readings, coupled with the option for multiple communication protocols and embedded programmable relays, making this the ultimate example of an intelligent node in a power distribution system
- Leverage the capabilities of this product to eliminate meters and other components from the system, making the power distribution system cost-effective and smaller, with increased intelligence and connectivity

Each breaker frame section indicates the full range of trip units available for the frame. The wide range of trip unit options, coupled with field-replaceable trip units, enables compatibility with global requirements and allows upgrade from the most basic protective device to a high-end, intelligent node in a power system.

**Trip Unit Features****Breaker Health Feature and Programmable Alarms***Less Costly Downtime*

By enabling you to perform predictive and preventive maintenance on your power distribution system prior to component failure, the breaker health feature and programmable alarms will help you avoid costly downtime.

- Communicates circuit breaker status at customer determined levels to prompt for breaker maintenance or inspection
- Provides real-time evaluation of breaker condition by tracking and analyzing diagnostic details including breaker operations, short-circuit fault levels, operational time, internal temperature and overloads

**Zone Selective Interlocking***Reduction in Arc Flash Energy*

The zone selective interlocking (ZSI) feature communicates when a phase or ground fault is present.

- The breaker closest to the fault will override any customer-defined delay setting and open instantaneously to clear the fault, allowing line-side breakers to remain closed and online
- The PXR trip unit displays when the ZSI system is engaged, communicating, and helping to keep you and your employees safe—so you no longer have to just trust that the ZSI is operational, unlike with other MCCB offerings
- ZSI is also a proven solution for reducing arc flash incident energy when a fault is present

**Arcflash Reduction Maintenance System***Better Safety and Productivity*

For added protection, the Power Defense portfolio offers Eaton's patented Arcflash Reduction Maintenance System to reduce arc flash incident energy. This innovative safety feature can help you:

- Decrease personal protection equipment (PPE) requirements to enhance productivity
- Enhance the safety of your personnel

**Enhanced Ground Fault Protection and Coordination***Easier Phase or Ground Fault Detection and Warning*

Expanded protection of ground fault increases coordination capabilities and provides ability to turn protection off.

- ON/OFF feature simplifies system testing
- Ground fault trip units combine trip, alarm, and OFF in every unit, with programmable relays for alarm or pre-alarm functionality
- Expanded time profile selections include I<sup>2</sup>t and flat response profiles for more coordination options

**Industry Standard Communication**

Energy monitoring and system status with onboard serial and industrial network communications available through CAM modules in the PXR 20 and 25 will offer a greater view and control into the machine or power distribution system.

Available features can offer:

- Easy connection to PLC building management systems, SCADA and cloud-based systems
- Remote monitoring and option control of breaker
- Metering and health data

**Power Xpert Protection Manager***Simpler Operation, Reduced Maintenance*

Once installed, your Power Xpert Release trip unit continues to provide cost savings and advanced functionality through the Power Xpert Protection Manager (PXPM) interface. This intuitive user interface allows for simple trip unit set up and programming, real-time reporting of power and energy metering, as well as the ability to check critical performance metrics, to meet your application needs while decreasing maintenance and in-field testing time. The testing features and functionality, which can be run through a personal computer, offers savings through labor hour reduction and avoiding the need for expensive proprietary testing kits.

- Ultimate control and data are at your fingertips:
  - Set point Configuration: Allows direct-to-trip unit or offline set up, including duplication of settings between units
  - Control Mode: Capture waveforms, reset TU or set the date/time
  - Test Mode: Run secondary injection and create test reports
  - Real-Time Data: Provides information regarding all status and metered data direction from the trip unit
  - Event Summaries: Stores up to 200 events, detailed information on the most recent (10) trip and (10) alarm events, and time adjustments to the real-time clock
  - Reports: Allows for the formatting and printing of real time data and of performed secondary injection tests

## Breaker Frame Overview

Power Defense molded case circuit breakers include six frames, PD-1 through PD-6, providing flexibility to meet protection needs up to 2500 A.

**PD-1**—Compact frame covering range of 15 A through 125 A with fixed thermal-magnetic trip unit, and with current-limiting options. Additionally, motor circuit protectors covering a range from 3 A through 100 A with adjustable magnetic settings of 3x to 11x.

**PD-2**—Standard frame covering a range of 15 A through 225 A with trip unit options, from a fixed thermal-magnetic to the most advanced Power Xpert Release (PXR) electronic units. PD-2 also has current-limiting options available. Additionally, motor protection circuit breakers ranging from 15 A through 200 A with PXR electronic trip units, as well as motor circuit protectors ranging from 3 A through 150 A with adjustable magnetic settings from 3x to 10x.

**PD-3**—Covers a range of 45 A through 600 A with field-installable trip units, including fixed thermal/adjustable magnetic and all PXR electronic trip unit options in two frame options: 400 A and 600 A. PD-3 also has 100% UL ratings and current-limiting options. Additionally, motor protection circuit breakers ranging from 45 A through 600 A with PXR electronic trip units, as well as motor circuit protectors ranging from 70 A through 600 A with adjustable magnetic settings from 5x to 10x.

**PD-4**—Covers a range of 300 A through 800 A with field-installable trip units, including fixed thermal/adjustable magnetic, and all PXR electronic trip unit options (PXR 10, PXR 20 and PXR 25), and 100% UL rating options.

**PD-5**—Covers a range of 320 A through 1200 A with field-installable PXR electronic trip units, PXR 20 and PXR 25, as well as 100% UL rating options.

**PD-6**—Covers a range of 700 A through 2500 A with field-installable PXR electronic trip units, PXR 20 and PXR 25, as well as 100% UL rating options.

## Interrupting Ratings

The Power Defense molded case circuit breaker line is a global product, with interrupting ratings across a broad range of voltages. These interrupting ratings are optimized for power distribution and meet the broadest range of application needs. See each frame for the specific interrupting levels.

## Modular Accessories

The Power Defense molded case circuit breakers feature new, modular accessories that are designed to make customization of the breaker for the unique requirements of the application easier than ever before. A common line of auxiliary switch and bell alarms allow for interchangeability between the different Power Defense breaker frames, enabling the final configuration of the breaker at the point of use and minimizing the amount of inventory required. Compact, modular shunt trips and under voltage releases have been designed to be easily installed and removed as the project or application dictates.

Some of the most common accessories and their function are described below.

### Internal Accessories

**Auxiliary Switches**—Provide circuit breaker primary contact status information. The auxiliary switch is used for remote indication and interlock system verification. These switches mount internal to the breaker in the right side accessory cavity.

**Alarm Switches**—Used for remote indication of automatic trip operation. The switch automatically resets when the circuit breaker is reset. These switches mount internal to the breaker in the right side accessory cavity.

**Shunt Trip**—Provides capability to trip the breaker by remote control. Shunt trips are designed to be applied at specific AC or DC voltages. These devices are installed internal to the breaker in the left side accessory cavity.

### Undervoltage Release

**(UVR)**—Monitors a voltage, typically of a line voltage, and trips the circuit breaker when the voltage falls below 70% of the nominal voltage designated for the UVR. These devices are installed internal to the breaker in the left side accessory cavity.

**External Accessories**

**Terminals**—Multiple cable terminal options are available for each frame, providing alternatives to connect primary power and loads to the circuit breaker.

Additionally, control wire terminals provide a means to tap off control power. Multi-wire terminals on the load side of the breaker can also be used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

**Terminal Shields**—Provide protection against accidental contact with live terminations, as well as clearance between circuit breaker poles or adjacent circuit breakers, and are required for some terminal applications.

**Interphase Barriers**—Offer additional electrical clearance between circuit breaker poles for special termination applications.

**Operating Mechanisms**—Manually operated mechanisms designed to open, close and reset circuit breakers. These are available in three basic configurations—flange mounted, through-the-door and direct (close-coupled)—to provide a variety of options for different applications.

**Remote/Electrical Operators**—A motor driven, stored energy operator that enables a user to locally or remotely switch the breaker between the OFF, ON and TRIP positions, including reset switching. These operators mount on the front cover of the circuit breaker, within the trim line of the circuit breaker, and are designed to be applied at specific AC or DC voltages.

**Locking Devices**—Offer the capability to lock the breaker handle in the OFF or ON position (trip-free operation allows the breaker to trip when locked in the ON position). Power Defense offers three primary types, including handle blocks, padlockable hasps, and provisions for Kirk trapped key locks (Kirk lock must be purchased separately).

**Walking Beam Interlock**

Provides a mechanical interlock between two adjacent circuit breakers of the same frame size and pole configuration, preventing both breakers from being switched ON at the same time. To install a walking beam interlock, the circuit breakers must be ordered with the factory modification to accept the interlock.

**Plug-In Adapters**—Provide a rear connection and mounting base to simplify installation and front removal of circuit breakers. Plug-in adapters are available for frames PD-1, PD-2 and PD-3.

**Drawout Configurations**—Provide a robust system to remove or exchange breakers and is typically used in critical power operations. It provides a rear connection and cell, and provides indication of the circuit breaker position. Drawout configurations are available for frames PD-3, PD-4 and PD-5.

**Standards and Certifications**

Power Defense circuit breakers meet applicable:

- UL 489
- CSA, C22.2 No. 5-02
- IEC 60947-2
- GB 14048.2-2008

**A2L Certification**

Power Defense circuit breakers Frames 1 through 4 are A2L certified (UL 60335-2-40 and CSA C22.2). A2L is a non-toxic, flammable refrigerant used in HVAC systems.

## Catalog Numbering System Overview

### Breakers

Power Defense breakers are configured using a 20-digit catalog number that can be divided into two sections:

- Base breaker catalog number = digits 1–14
- Factory modifications = digits 15–20

Product may be ordered using the base breaker catalog number (*14 digits*) only. However, if factory modifications are required, including installation of accessories, the full breaker catalog number plus factory modifications (*20 digits*) for a configured breaker must be used.

Note that most of the accessories for Power Defense molded case circuit breakers are field installable. When field installing accessories, the best practice to follow is to order a base breaker with the 14-digit catalog number, and order the accessories separate for field installation.

A configured breaker (*20 digits*) catalog number should only be used when it is necessary to have a factory modification of the circuit breaker.

### Base Breaker Catalog Number (14 digits)

The catalog number has fixed positions for each breaker characteristic. The fixed format allows a customer to determine the performance characteristics of the product by parsing the catalog number. The format of the Power Defense breaker catalog number is as follows:

Catalog Number Digits	PD (1, 2)	G (3)	3 (4)	3 (5)	F (6)	0400 (7–10)	TFA (11–13)	J (14)
Meaning	Power Defense	Certifications and standards	Frame size	Poles	Interrupting rating	Continuous current rating	Trip unit type	Terminals

### Certifications and Standards (Digit 3)

The certifications and standards selection (*digit 3*) denotes the global standards and certifications met by the product, and, as such, indicates the respective markings found on the product. Defined values and their meaning are as follows:

Value	Meaning	Marks on Product
G	Global ratings	UL, CSA, CE, CCC
F	Global ratings with 100% UL rating	UL, CSA, CE, CCC
D	Rated to 240 V	UL, CSA
J	UL and CSA	UL, CSA
C	IEC and GB	CE, CCC
E	IEC only	CE

### Poles (Digit 5)

The poles selection (*digit 5*) is mostly self-explanatory, with the exception of four-pole breakers, which may use the values 4 (100% protected neutral pole), 0 (no protection on neutral pole), or 6 (60% protected neutral pole).

Other selections are self-explanatory, and further defined in each frame-specific section relative to the specific frame or product type.

### Configured Breaker Catalog Number (20 digits)

For breakers with factory modifications, product must be ordered using the complete 20-digit configured breaker catalog number. This 20-digit number includes the base breaker catalog number plus an additional 6 digits to denote the factory modifications.

Factory modifications on Power Defense catalog numbers are also based on fixed positions within digits 15–20 of the catalog number. Digits 15–16 are always used for indicating accessories, 17–18 for tripping accessories and 19–20 for other accessories or modifications. When not used, the modification code digits default to the letter **N**.

### Example

An example of a full catalog number with modification codes would be as follows:

Catalog Number Digits	PDG33F0400TFAJ (1–14)	CC (15, 16)	SP (17, 18)	WB (19, 20)
Meaning	Base breaker catalog number	Indicating accessories (auxiliary and/or alarm switches)	Tripping accessories (shunt trip or UVR)	Other accessories or modifications

**Indicating Accessories (Digits 15, 16)**

The two digits used for indicating accessories (*digits 15, 16*) denote the type of accessory(-ies) installed, the type of termination of those accessories, and the configuration.

Digit 15 specifically designates the accessory type and termination, as shown below (note that not all frames offer all the options shown).

Type	Accessory Terminations	Digit 15 Selection
Auxiliary switch only	Pigtail (30-inch)	<b>A</b>
	Pigtail (3-meter)	<b>D</b>
	Screw terminal	<b>X</b>
	Spring cage clamp	<b>U</b>
Alarm switch only	Pigtail (30-inch)	<b>B</b>
	Pigtail (3-meter)	<b>E</b>
	Screw terminal	<b>Y</b>
	Spring cage clamp	<b>V</b>
Auxiliary and alarm	Pigtail (30-inch)	<b>C</b>
	Pigtail (3-meter)	<b>F</b>
	Screw terminal	<b>Z</b>
	Spring cage clamp	<b>W</b>

**Tripping Accessories (Digits 17, 18)**

The two digits used for tripping accessories (*digits 17, 18*) denote the type of accessory installed, the type of termination, and the nominal voltage rating of the accessory. Digit 17 specifically designates the type of accessory and type of termination, as shown below.

Type	Accessory Terminations	Digit 17 Selection
Shunt trip	Pigtail (30-inch)	<b>S</b>
	Pigtail (3-meter)	<b>R</b>
	Screw terminal	<b>T</b>
Under voltage release	Pigtail (30-inch)	<b>U</b>
	Pigtail (3-meter)	<b>W</b>
	Screw terminal	<b>V</b>

Digit 16 determines the configuration of the switches, such as Form A (normally open or NO), Form B (normally closed or NC), or Form C (change-over or CO, or NO/NC).

Digit 18 designates the nominal voltage rating of the shunt trip or UVR, for which options available vary by frame and are detailed in each frame section of the catalog.

**Other Accessories (Digits 19, 20)**

Other factory-installed accessories and factory modifications available (*digits 19, 20*) are detailed on a frame-by-frame basis in the respective section of the catalog.

**Trip Units and Accessories for Field Installation or Replacement**

Power Defense circuit breakers are designed to have field-installable accessories, and for frame sizes 3, 4, 5 and 6, field installable and replaceable trip units. As such, breaker frames, trip units and accessories may be purchased separately for field configuration. Trip units and accessories also have designated catalog numbers for identification and ordering purposes.

Breaker frames are configured using the base breaker catalog number (*14 digits*), as detailed in each section.

In general, when ordering accessory or trip unit field installation kits, the format of the catalog number begins with a description of the frame or frames for which it is applicable (e.g., PDG3), followed by a separator digit (X), and ending with a descriptive section, as follows:

**Trip Units and Accessories**

Catalog Number Example	PDG3	X	Descriptive Section
<b>Meaning</b>	Power Defense Global Standards Frame 3	Separator digit	May include voltage, functionality or other description of accessory or trip unit.

**Trip Units**

Trip units may be ordered installed as part of a base or configured breaker, with (*digits 11–13*) denoting the functionality and features included. Additionally, trip units may be ordered separately, using the trip unit designated catalog numbers. Below, it is explained how separate trip unit catalog numbers are set up, as well as their relationship with their designation in digits 11–13 of the breaker catalog number for the same trip unit.

**Thermal-Magnetic Trip Units (TMTU)**

Power Defense TMTUs are available in frame sizes 1 through 4, covering a continuous current range of 15 A through 800 A.

**Thermal (overload) settings**—Functionality and configurations are available based on the standard to which the breaker is certified, with all trip units carrying UL and CSA certifications (PDG, PDF, etc.) having a fixed thermal setting.

**Magnetic (short circuit) settings**—For frame sizes 1 and 2 that include UL and CSA certifications, magnetic settings are fixed. For frame sizes 3 and 4, the trip unit includes an adjustment for the short circuit protection setting of the trip unit, with the range dependent on the frame.

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

2

When ordered individually, thermal-magnetic trip unit catalog numbers include a Descriptive Section to denote the tripping characteristics of the unit, the pole configuration and continuous current rating.

The information in the description, TFA30400, is also used in the base breaker catalog number.

#### Example

An individual TMTU catalog number takes the form of:

<b>Catalog Number</b>	<b>PDG3</b>	<b>X</b>	<b>TFA</b>	<b>3</b>	<b>0400</b>
<b>Description</b>	Power Defense Frame Size	Separator digit	Trip unit tripping characteristics	Poles	Continuous current rating

Specific to TMTUs, the trip unit characteristics used in the base breaker catalog number denote the thermal and magnetic tripping characteristics of the unit.

Thermal-magnetic trip units (or breakers) may also be ordered calibrated to 50 °C ambient temperature by using a V in the trip unit type designator. Breakers with 50 °C calibrated trip units do not carry a UL Listing.

TM trip unit tripping characteristics options:

Configured Breaker Digit	Separate TM Trip Unit Digit	Designator	Option	Meaning
11	6	Trip unit type	<b>T</b>	Thermal-magnetic trip unit
			<b>V</b>	50 °C thermal-magnetic trip unit
12	7	Thermal type	<b>F</b>	Fixed
			<b>A</b>	Adjustable
13	8	Magnetic type	<b>F</b>	Fixed
			<b>A</b>	Adjustable

**Note:** IEC rated circuit thermal-magnetic trip units that are included with PDC or PDE breakers are typically fully adjustable (thermal and magnetic). Please consult with the product line for additional details.

#### Power Xpert Release (PXR) Electronic Trip Units (ETUs)

PXR ETUs are available in frame sizes 2 through 6, covering a continuous current range of 15 A through 2500 A.

When ordered individually, PXR trip unit catalog numbers also include a Descriptive Section denoting the functionality and configuration of the trip unit.

Sections of the PXR ETU catalog number are also used in the Base Breaker that is outfitted with the same trip unit.

#### Power Xpert Release (PXR) Electronic Trip Units (ETUs)

<b>Catalog Number</b>	<b>PDG3</b>	<b>X</b>	<b>PXR</b>	<b>3</b>	<b>0400</b>	<b>P2M</b>
<b>Description</b>	Power Defense Frame Size	Separator digit	PXR ETU	Poles	Maximum continuous current rating	Trip unit functionality

The three digit code at the end of the trip unit catalog number, or digits 11–13 for a base catalog number, denote the trip unit type, protection features and options included with the trip unit.

**Example**

Trip unit features and options:

Configured Breaker Digit	Separate PXR Trip Unit Digit	Designator	Option	Meaning
11	14	Trip unit type	<b>B</b>	PXR 10 Basic ETU
			<b>E</b>	PXR 20
			<b>P</b>	PXR 25
12	15	Protection type	<b>2</b>	LSI
			<b>3</b>	LSIG
			<b>4</b>	LSI with Arcflash Reduction Maintenance System™ (ALSI)
			<b>5</b>	LSIG with Arcflash Reduction Maintenance System (ALSIG)
			<b>8</b>	LSI Motor (MLSI)
			<b>9</b>	LSIG Motor (MLSIG)
13	16	Options included	<b>N</b>	None
			<b>R</b>	Programmable relays
			<b>M</b>	Modbus and relays
			<b>Z</b>	ZSI and relays
			<b>C</b>	CAM Link and relays
			<b>W</b>	Modbus, ZSI, and relays
			<b>X</b>	CAM Link, ZSI, and relays
			<b>D</b>	Modbus, CAM Link, and relays
	<b>Y</b>	Modbus, CAM Link, ZSI and relays		

Each frame section provides details on which options are available for the frame and includes a table similar to the one below, denoting the options that may be combined by following horizontal lines and selecting one item per section, such as E2Z or P3W below.

**Power Xpert Release (PXR) Trip Unit Options**

Trip Unit Type (Character 11)		Protection Type (Character 12)				Available Configured Options (Character 13)											
PXR	ETU	LSI	LSIG	LSI ①	LSIG ①	Relays		Relays		Relays		Relays		Relays		Relays	
						Modbus	Modbus	ZSI	ZSI	Modbus	Modbus	ZSI	ZSI	Modbus	Modbus	ZSI	ZSI
PXR 10	<b>B</b>	<b>2</b>	—	—	—	<b>N</b>	—	—	—	—	—	—	—	—	—	—	—
PXR 20	<b>E</b>	<b>2</b>	—	—	—	<b>N</b>	<b>R</b>	<b>M</b>	<b>Z</b>	<b>C</b>	<b>W</b>	<b>X</b>	—	—	—	—	—
		—	<b>3</b>	<b>4</b>	<b>5</b>	—	<b>R</b>	<b>M</b>	<b>Z</b>	<b>C</b>	<b>W</b>	<b>X</b>	—	—	—	—	—
PXR 25	<b>P</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	—	—	<b>M</b>	—	—	<b>W</b>	—	—	<b>D</b>	—	<b>Y</b>	—

**Accessories**

Power Defense accessory catalog numbers also follow a format with a frame description, separator digit (X) and descriptive section, similar to trip units.

Accessory catalog numbering format:

Catalog Number Example	PDG3	X	ST130ACDCS
<b>Meaning</b>	Power Defense Global Standards Frame 3	Separator digit	Descriptive section. May include voltage, functionality, or other description of accessory.

In cases where an accessory is used on multiple frames, multiple frames may be listed in the Frame Description, such as “PDG34” for some rotary handles. Accessory catalog numbers are listed with descriptions in each frame section.

**Note**

① With Arcflash Reduction Maintenance System.

#### Technical Data

#### Technical Data—Frame Sizes 1 and 2

2



**Frame Size 1—125 A,  
1-, 2-, 3- and 4-Pole**



**Frame Size 2—225 A,  
1-, 2-, 3- and 4-Pole**

Description	Unit	Frame Size 1—125 A, 1-, 2-, 3- and 4-Pole								Frame Size 2—225 A, 1-, 2-, 3- and 4-Pole						
		C	F	G	K	M	N <sup>①</sup>	P <sup>①</sup>	F	G	K	M	N	P		
Interrupting rating / breaking capacity	50–60 Hz	kA														
NEMA UL/CSA	240 Vac		25	35	65	85	100	150	200	35	65	85	100	150	200	
	480 Vac (277 Vac for 1-pole)		18	25	35	50	65	85	100	25	35	50	65	85	100	
	600 Vac (347 Vac for 1-pole) <sup>②③</sup>		10	14	18	22	25	25	25	14	18	22	25	30/25	35/25	
	125 Vdc <sup>④</sup>		10	22	22	35	42	42	42	10	10	10	10	10	10	
	250 Vdc <sup>④</sup>		10	22	22	35	42	42	42	10	10	10	22	22	22	
IEC 60947-2	220–240 Vac	$I_{cu}$	25	35	55	85	100	150	200	35	55	85	100	150	200	
		$I_{cs}$	25	35	55	85	100	100	150	35	55	85	100	100	150	
	380–415 Vac	$I_{cu}$	20	25	36	50	70	70	100	25	36	50	70	70	100	
		$I_{cs}$	20	25	36	50	50	70	100	25	36	50	53	70	70	
	440 Vac	$I_{cu}$	—	—	—	—	—	—	—	25	30	35	50	70	100	
		$I_{cs}$	—	—	—	—	—	—	—	20	22.5	35	40	50	65	
	480 Vac	$I_{cu}$	—	—	—	—	—	—	—	20	25	35	50	65	65	
		$I_{cs}$	—	—	—	—	—	—	—	20	20	22.5	30	40	40	
	525 Vac <sup>②</sup>	$I_{cu}$	—	—	—	—	—	—	—	18	20	30/25	30/25	30/25	35/25	
		$I_{cs}$	—	—	—	—	—	—	—	15/13	15/13	15/13	15/13	15/13	18/13	
	660–690 Vac	$I_{cu}$	—	—	—	—	—	—	—	—	8	10	10	10	10	
		$I_{cs}$	—	—	—	—	—	—	—	—	4	5	5	5	5	
	125 Vdc <sup>④</sup>	$I_{cu}$	10	22	22	35	42	42	42	10	10	10	10	10	10	
		$I_{cs}$	10	22	22	35	42	42	42	10	10	10	10	10	10	
	250 Vdc <sup>④</sup>	$I_{cu}$	10	22	22	35	42	42	42	10	10	10	22	22	22	
		$I_{cs}$	10	22	22	35	42	42	42	10	10	10	22	22	22	
Rated short circuit making capacity (I <sub>cm</sub> )	220–240 Vac		52.5	73.5	121	187	220	330	440	73.5	121	187	220	330	440	
	380–415 Vac		42	53	76	105	154	154	220	52.5	75.6	105	154	154	220	
	440 Vac		—	—	—	—	—	—	—	52.5	63	73.5	105	154	220	
	480 Vac		—	—	—	—	—	—	—	42	52.5	73.5	105	143	143	
	525 Vac		—	—	—	—	—	—	—	37.8	42	63/52.5	63/52.5	73.5	73.5	
	660–690 Vac		—	—	—	—	—	—	—	—	16.8	21	21	21	21	
Withstand/threshold of the frame	$I_{cw}$	kA	—								1.8					
Trip unit																
Interchangeable			No								No					
Thermal-magnetic (T)			Fixed-Fixed								Fixed-Fixed					
Motor circuit protector (M)			Adjustable Mag Only (3 pole)								Adjustable Mag Only (3 pole)					
Electronics																
Basic—PXR 10 (B)											LSI, MLSI					
Standard—PXR 20 (E)											LSI, LSIG					
Energy / programmable—PXR 25 (P)											LSI, LSIG, MLSI, MLSIG					

#### Notes

- ① N and P ratings not available for single-pole breakers.
- ② First listed interrupting rating applies to thermal-magnetic breakers; the second rating applies to electronic breakers.
- ③ PDG1 breakers are rated for use in 600Y/347 Vac systems.
- ④ 125 Vdc ratings are for single-pole breakers. 250 Vdc require two poles in series.

## Technical Data—Frame Sizes 1 and 2, continued



**Frame Size 1—125 A,  
1-, 2-, 3- and 4-Pole**



**Frame Size 2—225 A,  
1-, 2-, 3- and 4-Pole**

Description		Unit	Frame Size 1—125 A, 1-, 2-, 3- and 4-Pole	Frame Size 2—225 A, 1-, 2-, 3- and 4-Pole
UL File Number			E7819	E7819
UL 100% rated breaker			—	—
Amperage range	Thermal-magnetic	A	15–125	15–225 (1-pole: 15–150; 15–30 for 1-pole N and P ratings)
	Electronics		—	15–225
Selectivity category			A	A
Reference standard			UL/CSA/IEC/CCC	UL/CSA/IEC/CCC
Rated insulation voltage $U_i$ , according to IEC 60947–2	Main conducting paths	V	500	800 (TMTU) 690 (ETU)
	Auxiliary circuits	V	500	690
Rated impulse withstand voltage $U_{imp}$	Main conducting paths	kV	6	8 (TMTU) 6 (ETU)
	Auxiliary circuits		4	4
Rated operational voltage $U_e$ (AC)	IEC/CCC	Vac	415	690
	UL/CSA	Vac	600/347	600
Rated operational voltage $U_e$ (DC)	IEC/CCC	Vdc	250	250
	UL/CSA	Vdc	250	250
Suitable for use on single-phase AC applications up to 480 V?			No	3-pole and 4-pole
Permissible ambient temperature range (for storage and operation)		°C	–20 to +70	–20 to +70
Product complies with IEC 60068	Shock		Yes	Yes
Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker				
Thermal-magnetic breakers		40 °C	100%	100%
		45 °C	98%	100%
		50 °C	96%	100%
		55 °C	93%	98%
		60 °C	91%	95%
		70 °C	86%	90%
PXR Electronic Breakers (including motor protection circuit breakers)		40 °C	—	100%
		45 °C	—	100%
		50 °C	—	100%
		55 °C	—	98%
		60 °C	—	92%
	70 °C	—	80%	
Altitude derating factor			See Special Applications Section	See Special Applications Section
400 Hz derating factor			—	See Special Applications Section
Endurance (operating cycles) no-load (mechanical endurance)			10,000	20,000
Endurance (operating cycles) with load (electrical endurance) at 415 V			125 A: 4000; 100 A: 6000	8,000
Maximum switching frequency (per minute)			125 A: 5; 100 A: 6	2

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

#### Technical Data—Frame Sizes 1 and 2, continued

2

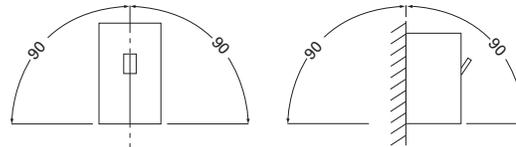


**Frame Size 1—125 A,  
1-, 2-, 3- and 4-Pole**



**Frame Size 2—225 A,  
1-, 2-, 3- and 4-Pole**

Description		Unit	Frame Size 1—125 A, 1-, 2-, 3- and 4-Pole	Frame Size 2—225 A, 1-, 2-, 3- and 4-Pole
Dimensions (H x W x D)	1-pole	inch (mm)	5.5 x 1.0 x 3.0 (139.7 x 25.4 x 76.2)	6.0 x 1.4 x 3.5 (152.4 x 35.1 x 88.9)
	2-pole		5.5 x 2.0 x 3.0 (139.7 x 50.8 x 76.2)	6.0 x 2.8 x 3.5 (152.4 x 71.1 x 88.9)
	3-pole		5.5 x 3.0 x 3.0 (139.7 x 76.2 x 76.2)	6.0 x 4.1 x 3.5 (152.4 x 104.6 x 88.9)
	4-pole		5.5 x 4.0 x 3.0 (139.7 x 101.6 x 76.2)	6.0 x 5.5 x 3.5 (152.4 x 139.5 x 88.9)
Pole to pole distance		inch (mm)	1.000 (24.40)	1.375 (34.93)
Approximate weight		lb (kg)		
Breaker	3-pole / 4-pole		2.29 (1.04) / 2.84 (1.29)	4.21 (1.82) / 5.69 (2.46)
Breaker with Plug-in	3-pole / 4-pole		—	6.00 (2.72) / 8.09 (3.67)
Power loss per circuit breaker at maximum rated current in fixed breaker (3P)—for plant protection	W		31	48 (TMTU); 38 (ETU)
Suitable for reverse-feed applications			Yes (except MCP)	Yes (except MCP)
Blow out dimension		Inch (mm)	3.75 (95.3)	1.00 (25.4)
Required spacing between circuit breakers		Inch (mm)	0	0
Installation methods	Fixed		Yes	Yes
	Plug-in		Yes	Yes
	Drawout		—	—
	DIN rail		Yes	Yes ①
IP Protection	With accessories		IP30	IP2X with finger protection
Pollution degree			III	III
Overtoltage category			III	III
Annex H IT capability	at 415 V		Yes	Yes
Permissible mounting positions				



**Note**

① Consult with product line for availability.

### Technical Data—Frame Sizes 3 and 4



**Frame Size 3—400 A,  
2-, 3- and 4-Pole**



**Frame Size 3—600 A,  
2-, 3- and 4-Pole**



**Frame Size 4—800 A,  
2-, 3- and 4-Pole**

Description	Unit	Frame Size 3—400 A, 2-, 3- and 4-Pole						Frame Size 3—600 A, 2-, 3- and 4-Pole						Frame Size 4—800 A, 2-, 3- and 4-Pole			
		F	G	K	M	N	P	F	G	K	M	N	P	G	K	M	
Interrupting rating / breaking capacity	50–60 Hz	kA															
NEMA UL/CSA	240 Vac	35	65	85	100	150	200	35	65	85	100	150	200	65	85	100	
	480 Vac	25	35	50	65	85	100	25	35	50	65	85	100	35	50	65	
	600 Vac	14	18	25	35	50	65	14	18	25	35	50	65	18	25	35	
	125 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	250 Vdc <sup>①</sup>	10	10	10	22	22	22	22	22	22	42	42	42	22	22	25	
IEC 60947-2	220–240 Vac	$I_{cu}$	35	55	85	100	150	200	35	55	85	100	150	200	55	85	100
		$I_{cs}$	35	55	85	100	100	150	35	55	85	100	100	150	55	85	100
	380–415 Vac	$I_{cu}$	25	36	50	70	70	100	25	36	50	70	70	100	36	50	70
		$I_{cs}$	25	36	50	53	70	70	25	36	50	53	70	70	36	50	53
	440 Vac	$I_{cu}$	25	30	35	50	70	100	25	30	35	50	70	100	30	35	50
		$I_{cs}$	20	22.5	35	40	50	50	20	22.5	35	40	50	50	22.5	35	40
	480 Vac	$I_{cu}$	20	25	35	50	65	85	20	25	35	50	65	85	25	35	50
		$I_{cs}$	20	20	22.5	30	40	40	20	20	22.5	30	40	40	20	22.5	30
	525 Vac	$I_{cu}$	18	20	25	30	35	40	18	20	25	30	35	40	20	25	30
		$I_{cs}$	5	7.5	10	15	25	25	5	7.5	10	15	25	25	16.5	20	25
	660–690 Vac	$I_{cu}$	—	8	10	15	20	20	—	8	10	15	20	20	8	10	15
		$I_{cs}$	—	4	5	7.5	10	10	—	4	5	7.5	10	10	4	5	7.5
	125 Vdc	$I_{cu}$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		$I_{cs}$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	250 Vdc <sup>①</sup>	$I_{cu}$	10	10	10	22	22	22	22	22	22	42	42	42	22	22	25
		$I_{cs}$	10	10	10	22	22	22	22	22	22	42	42	42	22	22	25
Rated short circuit making capacity (I <sub>cm</sub> )	220–240 Vac	73.5	121	187	220	330	440	73.5	121	187	220	330	440	121	187	220	
	380–415 Vac	52.5	75.6	105	154	154	220	52.5	75.6	105	154	154	220	75.6	105	154	
	440 Vac	52.5	63	73.5	105	154	220	52.5	63	73.5	105	154	220	63	73.5	105	
	480 Vac	42	52.5	73.5	105	143	187	42	52.5	73.5	105	143	187	52.5	73.5	105	
	525 Vac	37.8	42	52.5	63	73.5	84	37.8	42	52.5	63	73.5	84	42	52.5	63	
	660–690 Vac	—	16.8	21	31.5	42	42	—	16.8	21	31.5	42	42	16.8	21	31.5	
Withstand/threshold of the frame	$I_{cw}$	kA															
Trip unit																	
Interchangeable		Yes						Yes						Yes			
Thermal-magnetic (T)		Fixed-Adjustable						Fixed-Adjustable						Fixed-Adjustable			
Motor circuit protector (M)		Adjustable Mag Only (3 pole)						Adjustable Mag Only (3 pole)						—			
Adjustable Magnetic only (3-pole)—PXR 10 (B)		LSI, MLSI						LSI, MLSI						LSI			
Standard—PXR 20 (E)		LSI, LSIG, ALSI, ALSIG						LSI, LSIG, ALSI, ALSIG						LSI, LSIG, ALSI, ALSIG			
Energy / programmable—PXR 25 (P)		LSI, LSIG, ALSI, ALSIG, MLSI, MLSIG						LSI, LSIG, ALSI, ALSIG, MLSI, MLSIG						LSI, LSIG, ALSI, ALSIG			

**Note**

<sup>①</sup> 2P in series.

#### Technical Data—Frame Sizes 3 and 4, continued



**Frame Size 3—400 A,  
2-, 3- and 4-Pole**



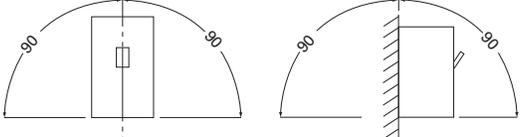
**Frame Size 3—600 A,  
2-, 3- and 4-Pole**



**Frame Size 4—800 A,  
2-, 3- and 4-Pole**

Description		Unit	Frame Size 3—400 A, 2-, 3- and 4-Pole	Frame Size 3—600 A, 2-, 3- and 4-Pole	Frame Size 4—800 A, 2-, 3- and 4-Pole
UL File Number			E7819	E7819	E7819
UL 100% rated breaker			Yes (ETU)	Yes (TMTU and ETU)	Yes (ETU)
Amperage range	Thermal-magnetic	A	100–400	250–600	300–800
	Electronics		45–400	90–600	320–800
Selectivity category			A	A	A
Reference standard			UL/CSA/IEC/CCC	UL/CSA/IEC/CCC	UL/CSA/IEC/CCC
Rated insulation voltage $U_i$ , according to IEC 60947–2	Main conducting paths	V	800	800 (TMTU); 690 (ETU)	800 (TMTU); 690 (ETU)
	Auxiliary circuits	V	690	690	690
Rated impulse withstand voltage $U_{imp}$	Main conducting paths	kV	8 (TMTU); 6 (ETU)	8 (TMTU); 6 (ETU)	8 (TMTU); 6 (ETU)
	Auxiliary circuits		4	4	4
Rated operational voltage $U_e$ (AC)	IEC/CCC	Vac	690	690	690
	UL/CSA	Vac	600	600	600
Rated operational voltage $U_e$ (DC)	IEC/CCC	Vdc	250	250	250
	UL/CSA	Vdc	250	250	250
Suitable for use on single-phase AC applications up to 480 V?			3-pole and 4-pole	3-pole and 4-pole	3-pole and 4-pole
Permissible ambient temperature range (for storage and operation)		°C	–20 to +70	–20 to +70	–20 to +70
Product complies with IEC 60068	Shock		Yes	Yes	Yes
Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker					
Thermal-magnetic breakers		40 °C	100%	100%	100%
		45 °C	95.5%	95.5%	97%
		50 °C	91%	91%	94%
		55 °C	86%	86%	91%
		60 °C	82%	82%	88%
		70 °C	70%	70%	80%
PXR electronic breakers (including motor protection circuit breakers)		40 °C	100%	100%	100%
		45 °C	100%	100%	100%
		50 °C	100%	100%	100%
		55 °C	86%	86%	91%
		60 °C	82%	82%	88%
		70 °C	70%	70%	80%
Altitude derating factor			See Special Applications Section	See Special Applications Section	See Special Applications Section
400 Hz derating factor			See Special Applications Section	See Special Applications Section	See Special Applications Section
Endurance (operating cycles) no-load (mechanical endurance)			15,000	15,000	10,000
Endurance (operating cycles) with load (electrical endurance) at 415 V			5000	5000	3000
Maximum switching frequency (per minute)			1	1	1

### Technical Data—Frame Sizes 3 and 4, continued

Description	Unit	 <b>Frame Size 3—400 A, 2-, 3- and 4-Pole</b>		 <b>Frame Size 3—600 A, 2-, 3- and 4-Pole</b>		 <b>Frame Size 4—800 A, 2-, 3- and 4-Pole</b>	
		Dimensions (H x W x D)					
	1-pole	inch (mm)	—	—	—	—	—
	2-pole		10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1)	10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1)	10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1)	16.0 x 8.3 x 4.4 (406.4 x 209.6 x 111.2)	16.0 x 8.3 x 4.4 (406.4 x 209.6 x 111.2)
	3-pole		10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1)	10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1)	10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1)	16.0 x 8.3 x 4.4 (406.4 x 209.6 x 111.2)	16.0 x 8.3 x 4.4 (406.4 x 209.6 x 111.2)
	4-pole		10.1 x 7.2 x 4.3 (257.1 x 182.9 x 109.1)	10.1 x 7.2 x 4.3 (257.1 x 182.9 x 109.1)	10.1 x 7.2 x 4.3 (257.1 x 182.9 x 109.1)	16.0 x 11.0 x 4.4 (406.4 x 279.4 x 111.2)	16.0 x 11.0 x 4.4 (406.4 x 279.4 x 111.2)
Pole to pole distance		inch (mm)	1.719 (43.66)	1.719 (43.66)	1.719 (43.66)	2.750 (69.85)	2.750 (69.85)
Approximate weight		lb (kg)					
Breaker	3-pole / 4-pole		11.02 (5.00) 13.77 (6.25)	12.79 (5.80) 17.42 (7.90)	12.79 (5.80) 17.42 (7.90)	30.00 (13.60) 39.90 (18.08)	30.00 (13.60) 39.90 (18.08)
Breaker with Plug-in	3-pole / 4-pole		18.07 (8.20) 20.82 (9.44)	19.84 (9.01) 26.87 (12.19)	19.84 (9.01) 26.87 (12.19)	—	—
Power loss per circuit breaker at maximum rated current $I_n$ fixed breaker (3P)—for plant protection		W	70 (TMTU); 64 (ETU)	130 (TMTU); 110 (ETU)	130 (TMTU); 110 (ETU)	291 (TMTU); 270 (ETU)	291 (TMTU); 270 (ETU)
Suitable for reverse-feed applications			Yes	Yes	Yes	Yes	Yes
Blow out dimension		Inch (mm)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	2.36 (60.0)	2.36 (60.0)
Required spacing between circuit breakers		Inch (mm)	0	0	0	0	0
Installation methods	Fixed		Yes	Yes	Yes	Yes	Yes
	Plug-in		Yes	Yes	Yes	—	—
	Drawout		Yes <sup>①</sup>	Yes <sup>①</sup>	Yes <sup>①</sup>	Yes <sup>①</sup>	Yes <sup>①</sup>
	DIN rail		—	—	—	—	—
IP Protection	With accessories		IP2X with Finger Protection	IP2X with Finger Protection	IP2X with Finger Protection	IP2X Protection	IP2X Protection
Pollution degree			III	III	III	III	III
Overtoltage category			III	III	III	III	III
Annex H IT capability	at 415 V		Yes	Yes	Yes	Yes	Yes
Permissible mounting positions							

**Note**

<sup>①</sup> Consult with product line for availability.

#### Technical Data—Frame Sizes 5 and 6

2



**Frame Size 5—800, 1200, 1600 (IEC)  
2-, 3- and 4-Pole**



**Frame Size 6—1600, 2000, 2500  
2-, 3- and 4-Pole**

Description	Unit	Frame Size 5—800, 1200, 1600 (IEC) 2-, 3- and 4-Pole					Frame Size 6—1600, 2000, 2500 2-, 3- and 4-Pole			
		K	M	N	P	T <sup>①</sup>	M	N	P	
Interrupting rating / breaking capacity	50–60 Hz	kA								
NEMA UL/CSA	240 Vac		85	100	150	200	200	125	150	200
	480 Vac (277 Vac for 1-pole)		50	65	85	100	125	65	85	100
	600 Vac (347 Vac for 1-pole)		25	35	50	65	85	35	50	65
	125 Vdc		—	—	—	—	—	—	—	—
	250 Vdc		—	—	—	—	—	—	—	—
IEC 60947-2	220–240 Vac	$I_{cu}$	85	100	150	200	—	135	150	200
		$I_{cs}$	85	100	100	150	—	100	100	100
	380–415 Vac	$I_{cu}$	50	70	70	100	—	70	70	100
		$I_{cs}$	50	53	50	50	—	50	50	50
	440 Vac	$I_{cu}$	35	50	70	100	—	50	70	100
		$I_{cs}$	35	40	50	50	—	40	50	50
	480 Vac	$I_{cu}$	35	50	65	85	—	50	65	85
		$I_{cs}$	22.5	30	40	40	—	30	40	40
	525 Vac	$I_{cu}$	25	30	35	40	—	30	35	40
		$I_{cs}$	20	25	25	25	—	25	25	25
	660–690 Vac	$I_{cu}$	10	15	20	35	—	15	20	35
		$I_{cs}$	5	7.5	10	18	—	7.5	13	18
	125 Vdc	$I_{cu}$	—	—	—	—	—	—	—	—
		$I_{cs}$	—	—	—	—	—	—	—	—
	250 Vdc	$I_{cu}$	—	—	—	—	—	—	—	—
		$I_{cs}$	—	—	—	—	—	—	—	—
Rated short circuit making capacity (I <sub>cm</sub> )	220–240 Vac		187	220	330	440	—	297	330	440
	380–415 Vac		105	154	154	220	—	154	154	220
	440 Vac		73.5	105	154	220	—	105	154	220
	480 Vac		73.5	105	143	187	—	105	143	187
	525 Vac		52.5	63	73.5	84	—	63	73.5	84
	660–690 Vac		21	31.5	42	73.5	—	31.5	42	73.5
Withstand/threshold of the frame	$I_{cw}$	kA	14					20		
Trip unit										
Interchangeable			Yes					Yes		
Thermal-magnetic ( <b>T</b> )			—					—		
Motor circuit protector ( <b>M</b> )			—					—		
Electronics										
Basic—PXR 10 ( <b>B</b> )			—					—		
Standard—PXR 20 ( <b>E</b> )			LSI, LSIG, ALSI, ALSIG					LSI, LSIG, ALSI, ALSIG		
Energy / programmable—PXR 25 ( <b>P</b> )			LSI, LSIG, ALSI, ALSIG					LSI, LSIG, ALSI, ALSIG		

**Note**

① PDJ (UL/CSA only), three-pole only; 800 A.

## Technical Data—Frame Sizes 5 and 6, continued


**Frame Size 5—800, 1200, 1600 (IEC)  
2-, 3- and 4-Pole**

**Frame Size 6—1600, 2000, 2500  
2-, 3- and 4-Pole**

Description	Unit		
UL File Number		E7819	E7819
UL 100% rated breaker		Yes	Yes (up to 2000 A)
Amperage range	Thermal-magnetic A	—	—
	Electronics	320–1200 (1600 IEC)	700–2500
Selectivity category		A	A
Reference standard		UL/CSA/IEC/CCC	UL/CSA/IEC/CCC
Rated insulation voltage U <sub>i</sub> , according to IEC 60947–2	Main conducting paths V	690 (ETU)	690 (ETU)
	Auxiliary circuits V	690	690
Rated impulse withstand voltage U <sub>imp</sub>	Main conducting paths kV	6 (ETU)	6 (ETU)
	Auxiliary circuits	4	4
Rated operational voltage U <sub>e</sub> (AC)	IEC/CCC Vac	690	690
	UL/CSA Vac	600	600
Rated operational voltage U <sub>e</sub> (DC)	IEC/CCC Vdc	—	—
	UL/CSA Vdc	—	—
Suitable for use on single-phase AC circuits?		Yes	No
Permissible ambient temperature range (for storage and operation)	°C	–20 to +70	–20 to +70
Product complies with IEC 60068	Shock	Yes	Yes
Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker			
Thermal-magnetic breakers	40 °C	—	—
	45 °C	—	—
	50 °C	—	—
	55 °C	—	—
	60 °C	—	—
	70 °C	—	—
PXR electronic breakers (including motor protection circuit breakers)	40 °C	100%	100%
	45 °C	95.5%	95.5%
	50 °C	91%	91%
	55 °C	85%	85%
	60 °C	81%	81%
	70 °C	70%	70%
Altitude derating factor		See Special Applications Section	See Special Applications Section
400 Hz derating factor		See Special Applications Section	See Special Applications Section
Endurance (operating cycles) no-load (mechanical endurance)		3000	3000
Endurance (operating cycles) with load (electrical endurance) at 415 V		500	500
Maximum switching frequency (per minute)		1	1

#### Technical Data—Frame Sizes 5 and 6, continued

2

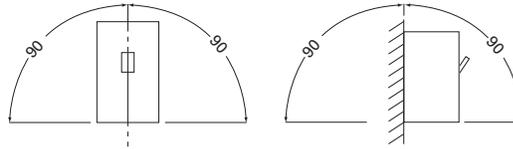


**Frame Size 5—800, 1200, 1600 (IEC)  
2-, 3- and 4-Pole**



**Frame Size 6—1600, 2000, 2500  
2-, 3- and 4-Pole**

Description		Unit	Frame Size 5—800, 1200, 1600 (IEC) 2-, 3- and 4-Pole	Frame Size 6—1600, 2000, 2500 2-, 3- and 4-Pole
Dimensions (H x W x D)	1-pole	inch (mm)	—	—
	2-pole		16.0 x 8.3 x 5.5 (406.4 x 209.5 x 139.7)	16.0 x 15.5 x 9.8 (406.4 x 393.7 x 247.65)
	3-pole		16.0 x 8.3 x 5.5 (406.4 x 209.5 x 139.7)	16.0 x 15.5 x 9.8 (406.4 x 393.7 x 247.65)
	4-pole		16.0 x 11.1 x 5.5 (406.4 x 282.7 x 139.7)	16.0 x 20.0 x 9.8 (406.4 x 508 x 247.65)
Pole to pole distance		inch (mm)	2.750 (69.85)	4.500 (114.30)
Approximate weight		lb (kg)		
Breaker	3-pole / 4-pole		46.80 (21.30) / 58.00 (26.31)	135.00 (61.23) / 182.00 (82.55)
Breaker with Plug-in	3-pole / 4-pole		—	—
Power loss per circuit breaker at maximum rated current in fixed breaker (3P)—for plant protection		W	87 (800 A) 195 (1200 A and 1600 A)	220 (1600 A); 270 (2000 A); 400 (2500 A)
Suitable for reverse-feed applications			Yes	Yes
Blow out dimension		Inch (mm)	13.125 (333.38)	2.625 (66.68)
Required spacing between circuit breakers		Inch (mm)	0	0
Installation methods	Fixed		Yes	Yes
	Plug-in		—	—
	Drawout		Yes <sup>①</sup>	—
	DIN rail		—	—
IP Protection	With accessories		IP2X Protection	IP2X Protection
Pollution degree			III	III
Overvoltage category			III	III
Annex H IT capability	at 415 V		Yes	Yes



**Note**

<sup>①</sup> Consult with product line for availability.

## Power Defense Accessories

	PDG1	PDG2	PDG3	PDG4	PDG5	PDG6
<b>Auxiliary switches</b>						
Rated thermal current $I_{th}$	5 A	4 A	4 A	4 A	6 A	6 A
Rated operational voltage (AC)	125 V / 250 V / 600 V	230 V / 500 V / 600 V	230 V / 500 V / 600 V	230 V / 500 V / 600 V	600 V	600 V
Rated operational current (AC)	5 A / 5 A / 2 A	4 A / 1 A / 0.6 A	4 A / 1 A / 0.6 A	4 A / 1 A / 0.6 A	6 A	6 A
Rated operational voltage (DC)	125 V	220 V	220 V	220 V	125 V / 250 V	125 V / 250 V
Rated operational current (DC)	1 A	0.3 A	0.3 A	0.3 A	0.5 A / 0.25 A	0.5 A / 0.25 A
Backup fuse <sup>①</sup>	4 A	4 A	4 A	4 A	4 A	4 A
<b>Undervoltage releases</b>						
Response voltage						
Drop (breaker tripped) $U_s$	0.35-0.70	0.35-0.70	0.35-0.70	0.35-0.70	0.35-0.70	0.35-0.70
Pickup (breaker may be switched on) $U_s$	0.85-1.1	0.85-1.1	0.85-1.1	0.85-1.1	0.85-1.1	0.85-1.1
Power consumption in continuous operation:						
50/60 Hz 24 Vac	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 11 W	≤ 9.6 W
50/60 Hz 110-130 Vac	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 11 W	≤ 9.6 W
50/60 Hz 208-240 Vac	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 11 W	≤ 9.6 W
50/60 Hz 380-440 Vac	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 11 W	≤ 9.6 W
50/60 Hz 480-525 Vac	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 11 W	≤ 9.6 W
50/60 Hz 600 Vac	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 6.25 W	≤ 7.5 W
12 Vdc	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 6.25 W	≤ 7.5 W
24 Vdc	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 6.25 W	≤ 7.5 W
48 Vdc	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 6.25 W	≤ 7.5 W
60 Vdc	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 6.25 W	≤ 7.5 W
125 Vdc	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 6.25 W	≤ 7.5 W
250 Vdc	≤ 4.3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 6.25 W	≤ 7.5 W
Maximum opening time (ms)	≤ 50	≤ 20	≤ 20	≤ 20	≤ 46	≤ 77
<b>Shunt trips</b>						
Shunt trips ("f" releases) response voltage						
Pickup (breaker tripped) $U_s$	0.7-1.1	0.7-1.1	0.7-1.1	0.7-1.1	0.7-1.1	0.7-1.1
Power consumption in (short time) at:						
50/60 Hz 24 Vac / 24 Vdc	41 VA / 120 VA	≤ 3 W	≤ 3 W	≤ 3 W	475 VA / 610 VA	612 VA / 396 VA
50/60 Hz 110-130 Vac / 125 Vdc	572 VA / 121 VA	≤ 3 W	≤ 3 W	≤ 3 W	100 VA / 150 VA	1896 VA / 475 VA
50/60 Hz 208-240 Vac / 250 Vdc	2280 VA / N/A	≤ 3 W	≤ 3 W	≤ 3 W	432 VA / 55 VA	1896 VA / 475 VA
50/60 Hz 380-440 Vac	572 VA	≤ 3 W	≤ 3 W	≤ 3 W	110 VA	2156 VA
50/60 Hz 480-525 Vac	840 VA	≤ 3 W	≤ 3 W	≤ 3 W	32 VA	289 VA
50/60 Hz 600 Vac	1080 VA	≤ 3 W	≤ 3 W	≤ 3 W	42 VA	384 VA
12 Vdc	201 VA	≤ 3 W	≤ 3 W	≤ 3 W	145 VA	—
48 Vdc	475 VA	≤ 3 W	≤ 3 W	≤ 3 W	67 VA	403 VA
60 Vdc	720 VA	≤ 3 W	≤ 3 W	≤ 3 W	102 VA	666 VA
Maximum load duration						
Maximum opening time (ms)	≤ 50	<20	<20	<20	<30	<62

**Note**

① Proper system design should size the backup fuse to the rated current going through the auxiliary switch.

Power Defense Molded Case Circuit Breakers—Frame Size 1

2



### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A)	
Catalog Number / Product Selection . . . . .	<b>V4-T2-23</b>
Accessories . . . . .	<b>V4-T2-27</b>
Dimensions and Weights . . . . .	<b>V4-T2-29</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Power Defense Molded Case Circuit Breakers—Frame Size 1

#### Product Description

Frame Size 1 covers a range of 15 A through 125 A with fixed-fixed thermal-magnetic trip units. PD-1 is available in single-, two-, three- and four-pole configurations, with the four-pole configuration available with no protection on the neutral pole, or fully protected.

#### Application Description

Frame Size 1 can be used to meet a wide range of circuit protection and power distribution needs, including current-limiting applications. PD-1 is a cable-in / cable-out MCCB.

#### Features and Benefits

Frame Size 1 breakers are available in multiple ratings from 15 A through 125 A. They are of a modular design with field installable accessories and terminals, which may also be factory installed.

#### Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



**Catalog Number / Product Selection****Power Defense—Frame Size 1 (15–125 A)**

Frame Size 1 covers a range of 15 A through 125 A using thermal-magnetic trip units. It is available in configurations of single-, two-, three- and four-pole.

**Interrupting Ratings (Two-, Three- and Four-Pole)**

Catalog Designator	C		F		G		K		M <sup>①</sup>		N <sup>①②</sup>		P <sup>①②</sup>	
UL/CSA	kA rms		kA rms		kA rms		kA rms		kA rms		kA rms		kA rms	
240 Vac	25		35		65		85		100		150		200	
480 Vac	18		25		35		50		65		85		100	
600Y/347 Vac	10		14		18		22		25		25		25	
250 Vdc <sup>③</sup>	10		22		22		35		42		42		42	
IEC	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$
240 Vac	25	25	35	35	55	55	85	85	100	100	150	150	200	200
380–415 Vac	20	20	25	25	36	36	50	50	70	50	70	70	100	100
250 Vdc <sup>③</sup>	10	10	22	22	22	22	35	35	42	42	42	42	42	42

**Interrupting Ratings (Single-Pole)**

Catalog Designator	C		F		G		K		M	
UL/CSA	kA rms									
120 Vac	35		—		100		—		200	
240 Vac	25		35		65		85		100	
277 Vac	18		25		35		50		65	
347 Vac	10		14		18		22		25	
125 Vdc	10		22		22		35		42	
IEC	$I_{cu}$	$I_{cs}$								
240 Vac	25	25	35	35	55	55	85	85	100	100
125 Vdc	10	10	22	22	22	22	35	35	35	35

**Notes**

- ① UL current limiting.
- ② Available in three- and four-pole configurations only.
- ③ Must use 2 poles in series for 250 Vdc.

# 2.2

## Molded Case Circuit Breakers

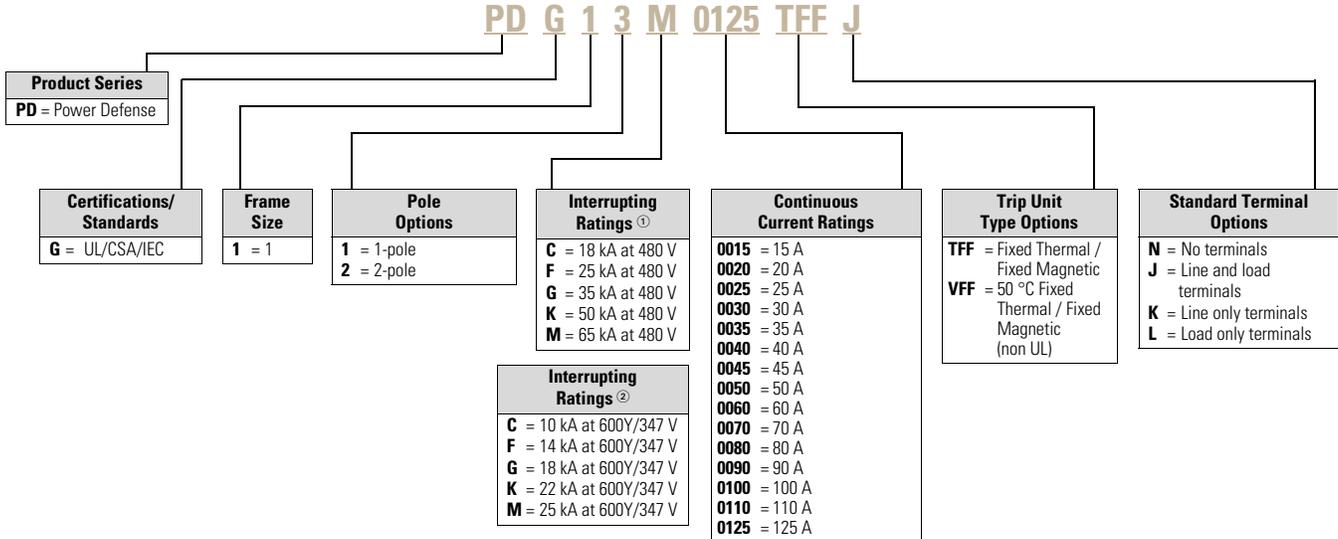
### Power Defense Molded Case Circuit Breakers

2

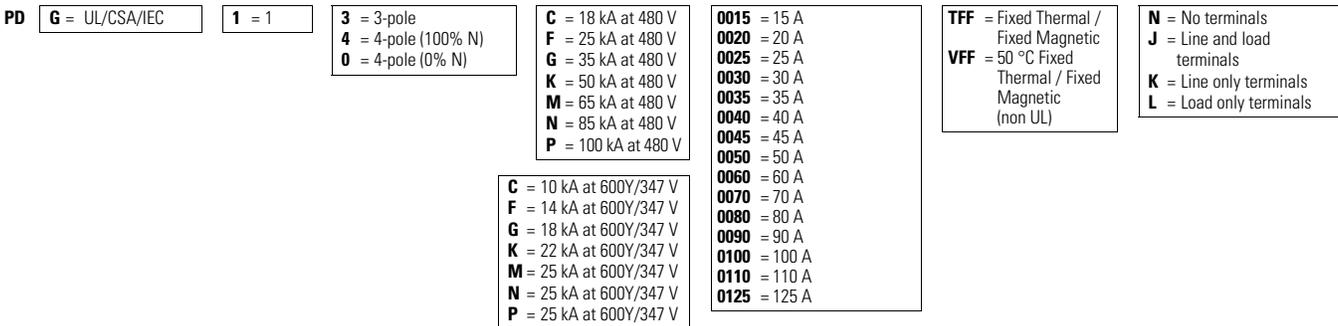
#### Power Defense—Frame Size 1 (15–125 A)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

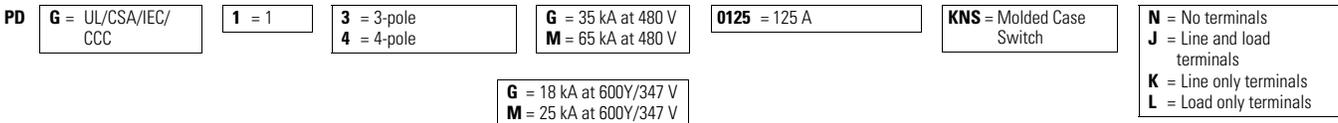
#### Molded Case Circuit Breakers (Single- and Two-Pole) with Thermal-Magnetic Trip Units—Globally Rated



#### Molded Case Circuit Breakers (Three- and Four-Pole) with Thermal-Magnetic Trip Units—Globally Rated



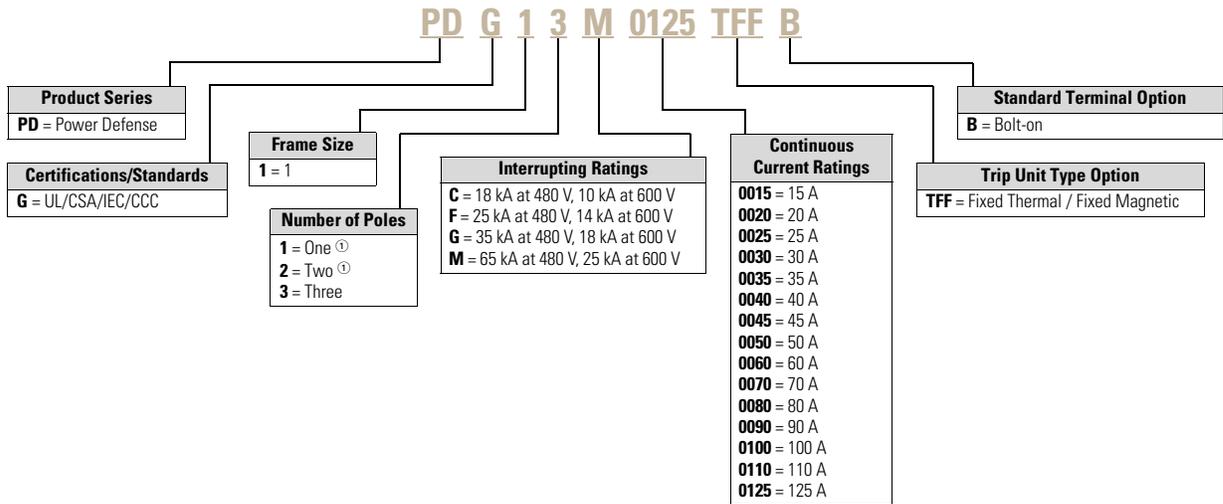
#### Molded Case Switches—Globally Rated<sup>③</sup>



#### Notes

- ① Ratings at 277 Vac for single-pole.
- ② Ratings at 347 Vac for single-pole.
- ③ Molded case switch may open above 1250 A.

### Bolt-on



**Note**

① PD1 1-pole and 2-pole breakers are not CCC certified.

# 2.2

## Molded Case Circuit Breakers

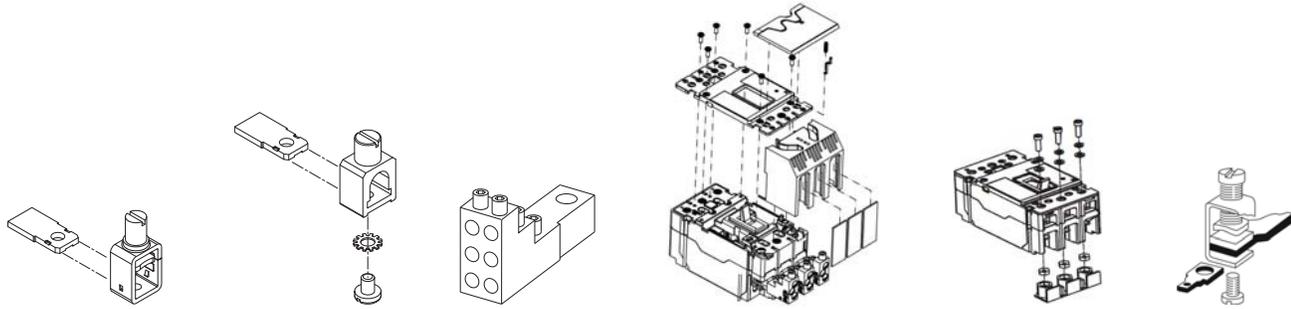
### Power Defense Molded Case Circuit Breakers

#### Terminals—Frame Size 1

Catalog numbers shown are for a single side of a three-pole breaker. For two- and four-pole options, replace the **X3** with **X2** or **X4**, respectively. Example: PDG1**X3**T125 becomes PDG1**X2**T125 for two-pole.

2

#### Terminal Types



PDG1X3T125 PDG1X3TA125 PDG1X3TA1256W PDG1X3TA1253W PDG1X3TS125 GCWTK

Note: Pictures are for reference only.

#### Terminals

Maximum Breaker Amperes	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	3-Pole Catalog Number	Included Accessories	Digit 14 Designation			Standard on Amperes
									Line and Load	Line Only	Load Only	
<b>Standard Terminals</b>												
125	Steel	Al or Cu	B, C	1	14-3/0	2.08-85	PDG1X3T125	—	J	K	L	15-125
<b>Alternate Terminals</b>												
125	Aluminum	Cu/Al	B, C	1	14-1/0	2.08-53.5	PDG1X3TA125	—	T	U	V	15-125
<b>Multi-wire Terminals</b>												
125	Aluminum	Cu/Al	B, C	6	14-6	2.08-13.3	PDG1X3TA1256W	Terminal shield	—	—	G	15-125
125	Aluminum	Cu/Al	B, C	3	14-2	2.08-33.6	PDG1X3TA1253W	Terminal shield	—	—	H	15-125
<b>End Cap Kit/Screw Terminals</b>												
—	—	—	—	—	—	—	PDG1X3TS125	—	S	D	E	15-125

Note: Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.

#### Control Wire Tabs

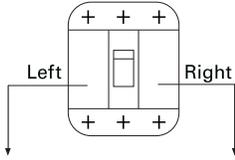
Use	Package Quantity	Catalog Number
15-125 A	12	GCWTK

Note: Control wire tabs can be installed with terminals listed above.

**Accessories**

**Internal Accessory Configurations—Frame Size 1<sup>①</sup>**

**3- and 4-Pole Circuit Breakers**



**Tripping Accessory Options**

None



Qty: 1



Qty: 1

**Indicating Accessory Options**

None

- 1 Make/1 Break Alarm Switch
- 2 Make/2 Break Alarm Switch
- 1A/1B Auxiliary Switch
- 2A/2B Auxiliary Switch
- 1A/1B Alarm, 1A/1B Auxiliary Combination

**Alarm and Auxiliary Switches**

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of field installation in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables:

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types
- Digit 16 denotes number of switches installed
- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number

**Alarm and Auxiliary Switch—Field Installation Kits<sup>②</sup>**

	Auxiliary Switch	Catalog Number		
	Three-Pole	None	1NO/1NC (1 Form C)	2NO/2NC (2 Form C)
Alarm Switch	None	—	AUX1A1BPK	AUX2A2BPK
	1NO/1NC (1 Form C)	ALM1M1BEPK	AUXALRMEPK	—
	2NO/2NC (2 Form C)	ALM2M2BEPK	—	—

**Alarm and Auxiliary Switch Factory Installation (Digits 15–16)<sup>②</sup>**

	Auxiliary Switch	Breaker Catalog Number (Digit 15–16 Suffix)		
	Three-Pole	None	1NO/1NC (1 Form C)	2NO/2NC (2 Form C)
Alarm Switch	None	NN	AC	A1
	1NO/1NC (1 Form C)	BC	CC	—
	2NO/2NC (2 Form C)	B1	—	—

**Notes**

- ① Two-pole PD-1 breakers have an accessory pocket compatible with indicating accessory options only.
- ② All options come with pigtail terminations.

#### Tripping Accessories—Frame Size 1

##### Shunt Trips

Pigtail (29 in / 0.75 m) Voltage	Breaker Catalog Number Digit 17-18 Suffix	Catalog Number
12 Vdc	SH	SNT012CPK
24 Vac/Vdc	SN	SNT024CPK
48–60 Vdc	—	SNT4860CPK
110–125 Vdc	—	SNT125DPK
250 Vdc	—	SNT250DPK
48–60 Vac	—	SNT4860CPK
110–240 Vac	—	SNT120CPK
380–600 Vac	—	SNT480CPK

#### Handle Mechanisms—Frame Size 1

##### Universal Direct Rotary Handle Mechanism

Description	NEMA 1/12 Black Handle Catalog Number	NEMA 1/12 Red Handle Catalog Number
With interlock	EHMCCBI	EHMCCRI
Without interlock	EHMCCB	EHMCCR

##### Flex Shaft Handle Mechanism

Cable Length (ft)	Metal Handle, NEMA 1/3R/12 Catalog Number	High Performance Handle, NEMA 1/3R/12 Catalog Number	Metal Handle, NEMA 4/4X Catalog Number	High Performance Handle, NEMA 4/4X Catalog Number
2	PDG1XFS02	PDG1XFS02HP	PDG1XFS02X	PDG1XFS02HPX
3	PDG1XFS03	PDG1XFS03HP	PDG1XFS03X	PDG1XFS03HPX
4	PDG1XFS04	PDG1XFS04HP	PDG1XFS04X	PDG1XFS04HPX
5	PDG1XFS05	PDG1XFS05HP	PDG1XFS05X	PDG1XFS05HPX
6	PDG1XFS06	PDG1XFS06HP	PDG1XFS06X	PDG1XFS06HPX
7	PDG1XFS07	PDG1XFS07HP	PDG1XFS07X	PDG1XFS07HPX
8	PDG1XFS08	PDG1XFS08HP	PDG1XFS08X	PDG1XFS08HPX
9	PDG1XFS09	PDG1XFS09HP	PDG1XFS09X	PDG1XFS09HPX
10	PDG1XFS10	PDG1XFS10HP	PDG1XFS10X	PDG1XFS10HPX

##### Flex Shaft Handle Auxiliary Switch

Description	Catalog Number
1A/1B, Early Break	AUX1EBFSEG

**Note**

① Handle mechanism shaft sold separately.

#### Undervoltage Releases

Pigtail (29 in / 0.75 m) Voltage	Breaker Catalog Number Digit 17-18 Suffix	Catalog Number
24 Vdc	UG	UVR024DPK
48 Vdc	UJ	UVR048DPK
60 Vdc	UK	UVR048DPK
125 Vdc	—	UVR125DPK
250 Vdc	UM	UVR250DPK
24 Vac	UF	UVR024APK
48 Vac	—	UVR048APK
60 Vac	—	UVR048APK
125 Vac	—	UVR120APK
240 Vac	UB	UVR240APK
480 Vac	—	UVR480APK
525 Vac	UD	UVR600APK
600 Vac	UE	UVR600APK

##### Variable Depth Rotary Handle Mechanism

Description	Catalog Number
<b>PDG1XHMDS</b> Standard lockable handle with mechanism (black and gray) NEMA 1/3R/12/4/4X ①	<b>PDG1XHMDS</b>
Emergency lockable handle with mechanism (red and yellow) NEMA 1/3R/12/4/4X ①	<b>PDG1XHMDE</b>
Mechanism only	<b>EHMVDB</b>
12-in (307 mm) handle mechanism shaft	<b>PDG12XHMS307</b>
20-in (507 mm) handle mechanism shaft	<b>PDG12XHMS507</b>
Standard NFPA79-compliant shaft handle (black and gray)	<b>PDG12XHM79S</b>
Emergency NFPA79-compliant shaft handle (red and yellow)	<b>PDG12XHM79E</b>



**Accessories—Frame Size 1****External Accessories**

Description	Fit Type	Catalog Number
Padlockable handle lock, Snap-on	Center	<b>PDG1XPLKSNAP</b>
Padlockable handle lock hasp	Top	<b>PDG1XPLKT</b>
Padlockable handle lock hasp, OFF only	Top	<b>PDG1XPLKTOFF</b> ①
	Right	<b>PDG1XPLKROFF</b>
Padlockable handle block	On handle	<b>PDG1XPHB</b>
Padlockable handle block, OFF only	On handle	<b>PDG1XPHBOFF</b>
Walking beam interlock ②③	Three-pole	<b>PDG1XWBI3P</b>
	Four-pole	<b>PDG1XWBI4P</b>
Slide bar interlock	Field	<b>EFSBI</b>
Electrical operator	110–240 Vac/Vdc	<b>MOPEG240C</b>
	24/48 Vdc	<b>MOPEG48D</b>
Wohner busbar adapter	Field top	<b>EG-BUS-T</b>
	Field bottom	<b>EG-BUS-B</b>
Terminal covers	Three-pole	<b>PDG1XTC3P</b>
	Four-pole	<b>PDG1XTC4P</b>
Interphase barriers	2 barriers	<b>PDG1XIB3P</b>
Plug-in adapters	Three-pole	<b>PAD3E</b>
	Four-pole	<b>PAD4E</b>

**DIN Rail Mounting**

Description	Catalog Number
DIN rail adapter; single-pole	<b>PDG1XDIN1P</b>
Din rail adapter; two-, three- or four-pole	<b>PDG1XDIN234P</b>
DIN rail adapter; three- or four-pole	<b>PDG1XDIN34P</b>
Metal DIN rail adapter, three-pole	<b>PDG1XDINM3P</b>

**Base Mounting Hardware**

Description	Catalog Number
Single-pole metric	<b>8703C80G11</b>
Two-, three-, four-pole metric	<b>8703C80G08</b>
Single-pole English	<b>8703C80G12</b>
Two-, three-, four-pole English	<b>BMHE</b>

**Note:** Base mounting hardware is included with a circuit breaker or molded case switch.

**Dimensions and Weights—Frame Size 1****Approximate Dimensions in Inches (mm)**

Number of Poles	Width	Height	Depth
1	1.0 (25.4)	5.5 (139.7)	2.99 (76.0)
2	2.0 (50.8)	5.5 (139.7)	2.99 (76.0)
3	3.0 (76.2)	5.5 (139.7)	2.99 (76.0)
4	4.0 (101.6)	5.5 (139.7)	2.99 (76.0)

**Approximate Shipping Weight in lb (kg)**

Breaker Type	1-Pole	2-Pole	3-Pole	4-Pole
PDG1 125 A	0.85 (0.39)	1.57 (0.71)	2.3 (1.04)	2.84 (1.29)

**Notes**

- ① Cannot be used with single- or two-pole breaker.
- ② Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix WB).
- ③ Requires two breakers.

Power Defense Molded Case Circuit Breakers—Frame Size 2

2



### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A)	
Catalog Number / Product Selection . . . . .	<b>V4-T2-31</b>
Accessories . . . . .	<b>V4-T2-36</b>
Dimensions and Weights . . . . .	<b>V4-T2-42</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Power Defense Molded Case Circuit Breakers—Frame Size 2

#### Product Description

Frame Size 2 covers a range of 15 A through 225 A with a complete offering of trip units, including PXR electronic trip units and fixed-fixed thermal-magnetic trip units.

#### Application Description

Frame Size 2 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection and current-limiting options. PXR trip units in PD-2 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication, and zone selective interlocking with visual indication.

#### Features and Benefits

Frame Size 2 breakers are available in multiple ratings from 15 A through 225 A. They are configured with a trip unit from the factory. Accessories are modular in design to allow for field installation or factory configuration. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

#### Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



## Catalog Number / Product Selection

### Power Defense—Frame Size 2 (15–225 A)

Frame Size 2 covers a range of 15 A through 225 A using electronic trip units or thermal-magnetic trip units. It is available in configurations of single-, two-, three- and four-pole.

### Interrupting Ratings (Two-, Three- and Four-Pole)

Catalog Designator	F		G		K <sup>①</sup>		M <sup>①</sup>		N <sup>①</sup>		P <sup>①</sup>	
UL/CSA	kA rms		kA rms		kA rms		kA rms		kA rms		kA rms	
240 Vac	35		65		85		100		150		200	
480 Vac	25		35		50		65		85		100	
600 Vac	14		18		22		25		30 / 25 <sup>③</sup>		35 / 25 <sup>③</sup>	
250 Vdc <sup>②</sup>	10		10		10		22		22		22	
IEC	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>
240 Vac	35	35	55	55	85	85	100	100	150	100	200	150
380–415 Vac	25	25	36	36	50	50	70	53	70	70	100	70
440 Vac	25	20	30	22.5	35	35	50	40	70	50	100	65
480 Vac	20	20	25	20	35	22.5	50	30	65	40	65	40
525 Vac	18	15 / 13 <sup>③</sup>	20	15 / 13 <sup>③</sup>	30 / 25 <sup>③</sup>	15 / 13 <sup>③</sup>	30 / 25 <sup>③</sup>	15 / 13 <sup>③</sup>	30 / 25 <sup>③</sup>	15 / 13 <sup>③</sup>	35 / 25 <sup>③</sup>	18 / 13 <sup>③</sup>
660–690 Vac	—	—	8	4	10	5	10	5	10	5	10	5
250 Vdc <sup>②</sup>	10	10	10	10	10	10	22	22	22	22	22	22

### Interrupting Ratings (Single-Pole)

Catalog Designator	F		G		K		M		N		P	
UL/CSA	kA rms											
277 Vac	25		35		50		65		85		100	
347 Vac	14		18		22		25		30		35	
125 Vdc	10		10		10		22		22		22	
IEC	I <sub>cu</sub>	I <sub>cs</sub>										
240 Vac	25	25	36	36	50	50	70	70	85	70	100	70
125 Vdc	10	10	10	10	10	10	22	22	22	22	22	22

#### Notes

- ① UL current limiting for three- and four-pole breakers.
- ② DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using two poles in series.
- ③ First rating listed is for thermal-magnetic breakers, second rating is for breakers with PXR electronic trip units.

# 2.2

## Molded Case Circuit Breakers

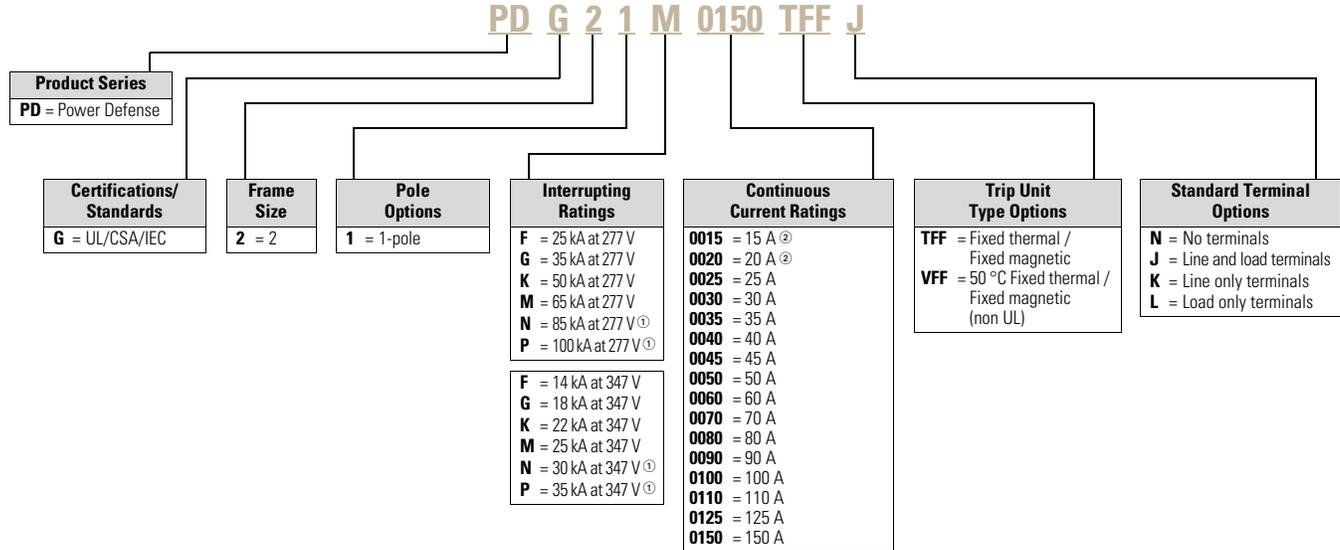
### Power Defense Molded Case Circuit Breakers

#### Power Defense—Frame Size 2 (15–225 A)

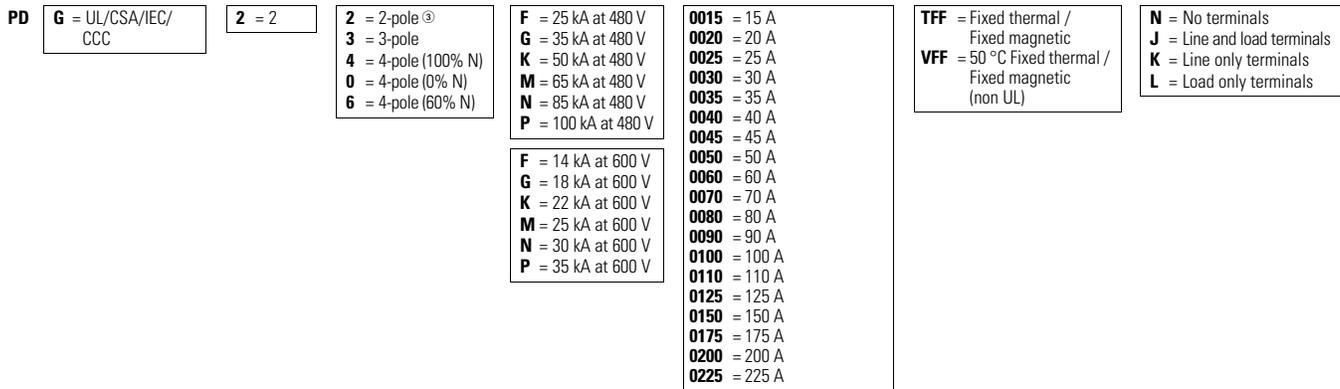
This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

2

#### Molded Case Circuit Breakers (Single-Pole) with Thermal-Magnetic Trip Units (TMTU)—Globally Rated



#### Molded Case Circuit Breakers (Two-, Three- and Four-Pole) with Thermal-Magnetic Trip Units—Globally Rated



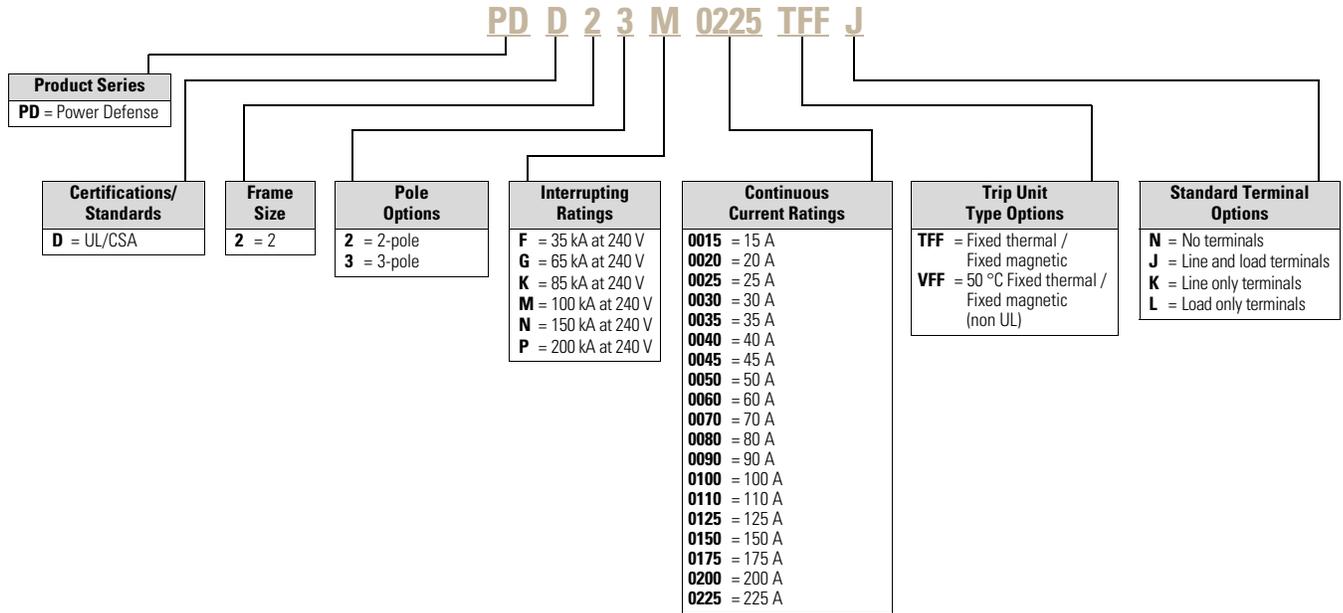
#### Notes

- ① N and P ratings available for 15–30 A on single-pole breakers.
- ② UL listed for SWD applications, see NEC Article 240.83(d).
- ③ PD2 2-pole breakers are not CCC certified.

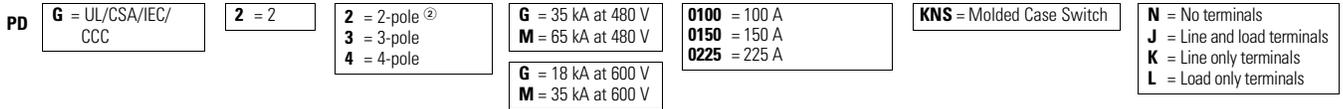
### Power Defense—Frame Size 2 (15–225 A)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

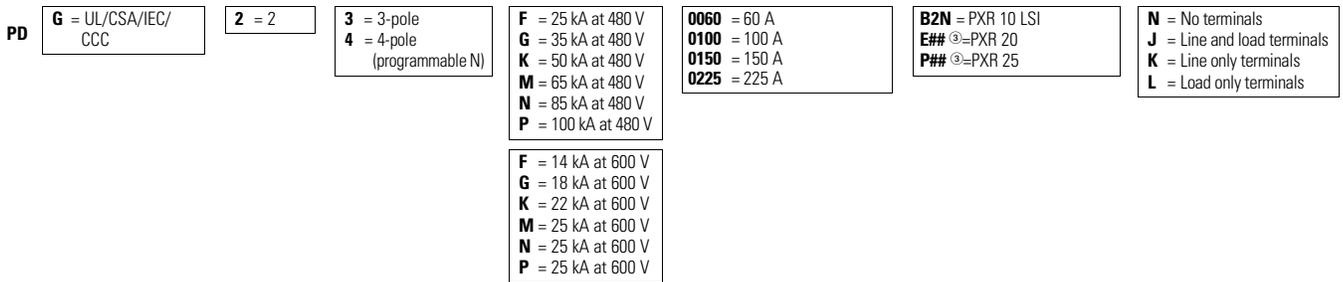
### Molded Case Circuit Breakers with TMTU—UL/CSA Rated to 240 Vac



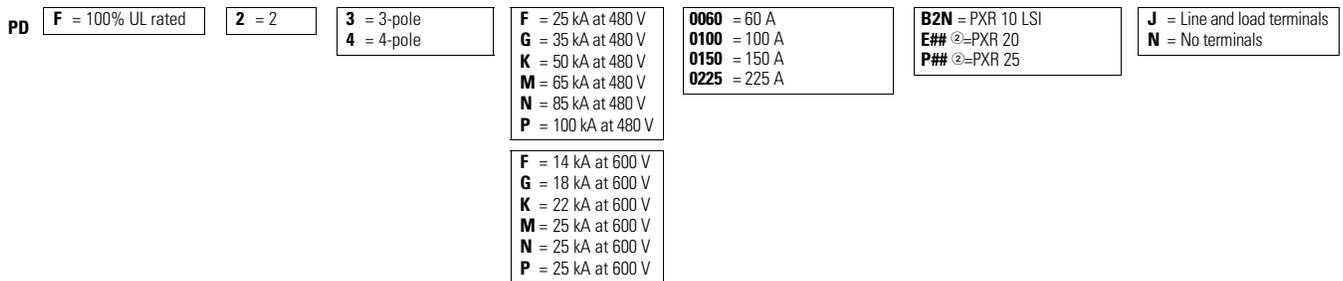
### Molded Case Switches—Globally Rated ①



### Molded Case Circuit Breakers with Power Xpert Release Electronic Trip Units (ETU)—Globally Rated



### Molded Case Circuit Breakers with Power Xpert Release Electronic Trip Units (ETU)—100% UL Rated



#### Notes

- ① Molded case switch may open above 1800 A.
- ② PD2 2-pole breakers are not CCC certified.
- ③ See tables and descriptions on **Page V4-T2-34** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

#### Power Xpert Release (PXR) Trip Unit Options—Frame Size 2

#### Power Xpert Release (PXR) Trip Unit Options

PXR	ETU	#(1)—Protection Type		#(2)—Available Configured Options								
		LSI	LSIG ①	Relays	Relays Modbus	Relays ZSI	Relays CAM	Relays Modbus ZSI	Relays Modbus CAM	Relays Modbus ZSI CAM		
PXR 10	B	2	—	N	—	—	—	—	—	—	—	—
PXR 20	E	2	—	N	R	M	Z	C	W	X	—	—
		—	3	—	R	M	Z	C	W	X	—	—
PXR 25	P	2	3	—	—	M	—	—	W	—	D	Y

**Note:** Shunt trip can only be used with B2N or E2N PXR configuration for PD2 breakers.

#### Description of PXR Configured Options

**Relays** ②—Form A contacts (rated for 240 Vac, 1 A)

- 2 available if Modbus RTU is not used; 1 available when used in conjunction with Modbus RTU
- Interface: 3 wires (RLY1, RLY2, RLYC Common)
- Programmable to indicate breaker conditions
- Available as field-installable option if not pre-configured (catalog number **PDG2XRELAYS**) ③

**Modbus** ②—Modbus RTU directly from breaker

- Interface: 3 wires (RTU\_D(+), RTU\_D(-), RTU\_GND)
- Interface: 2 wires (RLY1, RLYC Common)
- No additional modules required
- Available as field-installable option if not pre-configured (catalog number **PDG2XMODRTUREL**) ③

**ZSI**—Zone Selective Interlocking

- Includes ability to turn ON and OFF
- Interface: 3 wires (Zin, Zout, Zcomm)
- No additional modules required

**CAM**—CAM Link Connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

#### Auxiliary Power

- Connection included with all PXR 20 and 25 trip units
- Note:** For PXR 20 units, wire harness connections for auxiliary power not included on E2N styles.
- Required for communications, relays and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux +24 V, Aux 0 V)

#### Available Continuous Current (I<sub>n</sub>) Settings on PXR Electronic Trip Units

Option	Setting	Catalog Number Selection and Maximum Setting (I <sub>n</sub> )			
		0060 60 A	0100 100 A	0150 150 A	0225 225 A
PXR 10, PXR 20	1	15 A	32 A	50 A	80 A
	2	16 A	35 A	60 A	90 A
	3	20 A	40 A	63 A	100 A
	4	25 A	50 A	70 A	110 A
	5	30 A	60 A	80 A	125 A
	6	35 A	63 A	90 A	150 A
	7	40 A	70 A	100 A	160 A
	8	45 A	80 A	110 A	175 A
	9	50 A	90 A	125 A	200 A
	10 = I <sub>n</sub>	60 A	100 A	150 A	225 A
PXR 25	Programmable from minimum to maximum values in 1 A increments.				

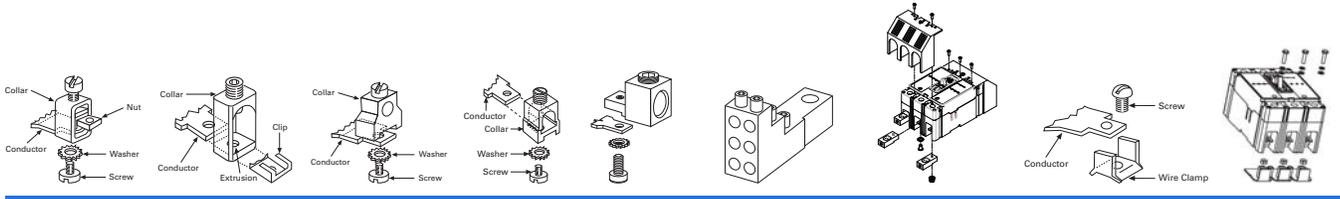
#### Notes

- ① All neutral current sensors required for LSIG protection are sold separately.
- ② Relays and/or Modbus RTU in PD-2 uses accessory pocket, therefore UVR and shunt trip use is not possible.
- ③ PD-2 can only be equipped with one field-installable communication option (PDG2XMODRTUREL or PDG2XRELAYS).

### Terminals—Frame Size 2

Catalog numbers shown are for a single side of a three-pole breaker.  
 For two- and four-pole options, replace the **X3** with **X2** or **X4**, respectively.  
 Example: PDG**2X3**T100 becomes PDG**2X2**T100 for two-pole

### Terminal Types



PDG2X3T100 PDG2X3T150	PDG2X3TA225 PDG2X3TA150 PDG2X3T225	PDG2X3TA50	PDG2X3TA100	PDG2X3TA225K	PDG2X3TA256W PDG2X3TA2253W	PDG2X3TA150RF PDG2X3TA225RF	PDG2X3T20	PDG2X3TS225
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**Note:** Pictures are for reference only.

### Terminals

Maximum Breaker Amperes	Breaker Frame ①	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG/kcmil Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	3-Pole Catalog Number	Included Accessories	Digit 14 Designation			Standard on Amperes
										Line and Load	Line Only	Load Only	
<b>Standard Terminals</b>													
100	15–100	Steel	Cu/Al	B, C	1	14–1/0	2.08–53.5	PDG2X3T100 ②		J	K	L	15–100
225	60–225	Aluminum	Cu/Al	B, C	1	4–4/0	21.2–107	PDG2X3TA225 ③		J	K	L	110–225
<b>Alternate Terminals</b>													
50	15–50	Aluminum	Cu/Al	B, C	1	14–4	2.08–21.2	PDG2X3TA50		T	U	V	15–50
100	60–100	Aluminum	Cu/Al	B, C	1	14–1/0	2.08–53.5	PDG2X3TA100		T	U	V	60–100
150	60–150	Aluminum	Cu/Al	B, C	1	14–4/0	2.08–107	PDG2X3TA150		T	U	V	110–150
225	175–225	Aluminum	Cu/Al	B, C	1	6–300	13.3–152	PDG2X3TA225K ④	Terminal shield	T	U	V	175–225
<b>Non-standard Terminals</b>													
100	15–100	Steel	Cu/Al	B, C	1	14–1/0	2.08–53.5	PDG2X3T100 ②		W	Y	Z	15–100
150	60–150	Stainless Steel	Cu	B, C	1	4–4/0	21.2–107	PDG2X3T150		W	Y	Z	110–150
225	60–225	Copper	Cu	B, C	1	4–4/0	21.2–107	PDG2X3T225		W	Y	Z	175–225
<b>Multi-wire Terminals</b>													
225	150–225	Aluminum	Cu/Al	B, C	6	14–6	2.08–13.3	PDG2X3TA2256W		—	—	G	15–225
225	150–225	Aluminum	Cu/Al	B, C	3	14–2	2.08–33.6	PDG2X3TA2253W		—	—	H	15–225
<b>Rear Fed Terminals ④</b>													
150	60–150	Aluminum	Cu/Al	B, C	1	14–4/0	2.08–107	PDG2X3TA150RF	Terminal shield	—	—	—	15–150
225	60–225	Aluminum	Cu/Al	B, C	1	6–300	13.3–152	PDG2X3TA225RF	Terminal shield	—	—	—	175–225
<b>Box Terminal</b>													
20	15–20	Steel	Cu/Al	B, C	1	14–10	2.08–5.26	PDG2X3T20		—	—	—	15–20
<b>Rear Connectors ④</b>													
225	—	—	—	—	—	—	—	PDG2X3T225RC		R	—	—	15–225
<b>End Cap Kits/Screw Terminals</b>													
225	—	—	—	—	—	—	—	PDG2X3TS225		S	D	E	15–225

### Notes

Wire capacity is based on standard imperial wire sizes; metric sizes provided in the table are direct conversion to demonstrate maximum capacity, not to denote metric wire sizes. For connector kit options for Eaton’s panelboards, see document RP01400001E.

- ① The “Breaker Frame” column provides information on the ampere ratings for which the terminal may be used (field installation); in some cases the range is limited by proper fit of the terminal onto the breaker conductor. The column “Standard on Amperes” provides information on what terminal is used during factory configuration per Digit 14 of the breaker catalog number. The two may not match.
- ② Factory standard terminals and non-aluminum terminals for 100 A and below are the same terminals.
- ③ PDF2 225 A breakers with Digit 14 designation of “J” are equipped with PDG2X3TA225K terminals. PDF2 150 A breakers with Digit 14 designation of “J” are equipped with PDG2X3TA225 terminals.
- ④ Breaker loses UL when fitted with rear-fed terminals or rear connectors.

### Control Wire Tabs

Compatible Terminals	Package Qty.	Catalog Number
PDG2X3T100 PDG2X3T150	12	FCWTK
PDG2X3TA225	12	FCWTK225

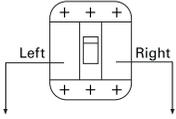
#### Accessories

2

#### Internal Accessory Configurations—Frame Size 2

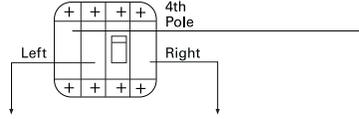
#### Thermal-Magnetic Circuit Breakers <sup>①②</sup>

##### 3-Pole Circuit Breakers



Tripping Accessory Options	Alarm (2 Spaces) Options	Aux (2 Spaces) Options
None	None	None
Shunt Trip	1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)	1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)
	2NO (2 spaces)	2NO (2 spaces)
UVR	2NC (2 spaces)	2NC (2 spaces)
		

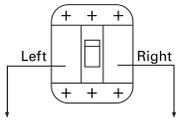
##### 4-Pole Circuit Breakers



Tripping Accessory Options	Alarm (2 Spaces) Options	Aux (4 Spaces) Options
None	None	None
Shunt Trip	1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)	1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)
	2NO (2 spaces)	2NO (2 spaces)
UVR	2NC (2 spaces)	2NC (2 spaces)
		2CO (4 spaces) 4NO (4 spaces) 4NC (4 spaces)

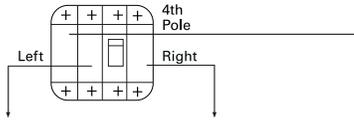
#### Electronic Circuit Breakers

##### 3-Pole Circuit Breakers



Tripping Accessory Options	Alarm Options	Aux Options
None	None	1NO/1NC <sup>③</sup>
Shunt Trip		
		
UVR		
		
Bell alarm (1NO/1NC—Form C)		
Qty: 1 Programmable relay with Modbus RTU		
Qty: 2 Programmable relays		

##### 4-Pole Circuit Breakers



Tripping Accessory Options	Alarm Options	Aux (2 Spaces) Options
None	None	1NO/1NC <sup>③</sup>
Shunt Trip		1NO/1NC <sup>③</sup> + 1NO (1 space) 1NO/1NC <sup>③</sup> + 1NC (1 space) 1NO/1NC <sup>③</sup> + 1NO/1NC (2 spaces) 1NO/1NC <sup>③</sup> + 2NO (2 spaces)
		
UVR		1NO/1NC <sup>③</sup> + 2NC (2 spaces)
		
Bell alarm (1NO/1NC—Form C)		
Qty: 1 Programmable relay with Modbus RTU		
Qty: 2 Programmable relays		

#### Notes

- ① Two-pole PD-2 breakers have an accessory pocket compatible with indicating accessory options only.
- ② Single-pole PD-2 breakers may be equipped with a Form C bell alarm as a factory installation only. Use “BC” as a suffix code in digits 15–16.
- ③ Qty: 1 1NO/1NC (Form C) auxiliary contact is automatically factory installed for all Frame 2 Power Defense breakers with electronic trip units.

**Alarm and Auxiliary Contact Blocks—Frame Size 2**

Power Defense breakers have designated positions for alarm and auxiliary switches in the right-pole accessory cavity. For Frame 2, the two left-most positions are used for alarm switches, and the two right-most locations are used for auxiliary switches.

Power Defense breakers have secondary covers for ease of field installation of accessories, including alarm and auxiliary switches.

Power Defense alarm and auxiliary switches are available in contact blocks, in Form A (NO), Form B (NC) and Form C (NO-NC) types. Form A and Form B contacts take one position in the breaker accessory cavity, and Form C contacts take two positions in the cavity. Identical contact blocks are used for the alarm and auxiliary switch functions.

Frame 2 breakers with electronic trip units are automatically configured with a factory-installed Form C auxiliary contact block because the right-pole accessory cavity is not available for field modification. Trip position can also be communicated via communications and the PXR programmable relays.

**Pigtail (29 in / 0.75 m) Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXAA	PDGXAB	PDGXAC
Type	Form A / NO	Form B / NC	Form C / NO-NC

**Screw Terminal Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXXA	PDGXXB	PDGXXA + PDGXXB
Type	Form A / NO	Form B / NC	For NO-NC, use two separate contact blocks

**Push-In Clamp Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXUA	PDGXUB	PDGXUC
Type	Form A / NO	Form B / NC	Form C / NO-NC

**Pigtail (118 in / 3.0 m) Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXDA	PDGXDB	PDGXDC
Type	Form A / NO	Form B / NC	Form C / NO-NC

**Contact Blocks for Alarm and Auxiliary Switch Functionality—Bulk Packs**

Catalog Number	Type	Termination	Bulk Pack Quantity <sup>①</sup>
PDGXAA-BP20	Form A / NO	Screw Terminal	20
PDGXAB-BP20	Form B / NC	Screw Terminal	20
PDGXUA-BP20	Form A / NO	Push-in Clamp	20
PDGXUB-BP20	Form B / NC	Push-in Clamp	20
PDGXUC-BP10	Form C / NO-NC	Push-in Clamp	10

**Alarm Switch for Use with PXR Electronic Trip Units <sup>②</sup>**

Catalog Number	PDG2XALMBC	PDG2XALMEC
Type	Form C / NO-NC	Form C / NO-NC
Termination	0.75 m pigtail	3.0 m pigtail

**Notes**

- <sup>①</sup> Order in multiples of quantity listed to receive bulk pack. (ex. Order qty 20 PDGXAA-BP20 to receive 1 bulk pack).
- <sup>②</sup> Frame 2 breakers with electronic trip units do not allow access to the right accessory pocket but are automatically configured with a factory installed Form C / NO-NC auxiliary switch. These alarm switches can be field or factory installed in the left accessory pocket in place of a shunt trip or UVR.

#### Factory Installation of Alarm and Auxiliary Switches—Frame Size 2

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers installation service in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables.

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types

- Switches may be requested for alarm only, auxiliary only or a combination of the two
- Digit 16 denotes the number and type (NO, NC) of switches installed
- For Eaton factory installation, the same type of terminals (i.e. all pigtail 0.75 m, all screw, etc.) and same style of contact block (i.e., all 1NO/1NC, all 2NC, etc.) must be used in a factory configuration
- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number
- Frame 2 breakers with electronic trip units do not allow access to the right accessory pocket but are automatically configured with a factory installed 1NO/1NC auxiliary switch. A bell alarm accessory is available for separate installation in the left accessory pocket.

**Note:** Though factory configuration options are limited, combinations of auxiliary switches and alarms using differing terminals and contact block styles are still available through field installation. Please see full auxiliary switch and alarm catalog numbers to order.

#### Pigtails—29 in / 0.75 m (A, B, C)

		Auxiliary Switch						Four-Pole		
		Three-Pole						2NO/2NC		
		None	1NO	1NC	1NO/1NC	2NO	2NC	A1	A2	A3
Alarm Switch	None	NN	AA	AB	AC	AD	AE	A1	A2	A3
	1NO	BA	CA	—	—	—	—	—	—	—
	1NC	BB	—	CB	—	—	—	—	—	—
	1NO/1NC <sup>①</sup>	BC	—	—	CC	—	—	C1	—	—
	2NO	BD	—	—	—	CD	—	—	C2	—
	2NC	BE	—	—	—	—	CE	—	—	C3

#### Screw Terminals (X, Y, Z)

		Auxiliary Switch						Four-Pole		
		Three-Pole						2NO/2NC		
		None	1NO	1NC	1NO/1NC	2NO	2NC	X1	X2	X3
Alarm Switch	None	NN	XA	XB	XC	XD	XE	X1	X2	X3
	1NO	YA	ZA	—	—	—	—	—	—	—
	1NC	YB	—	ZB	—	—	—	—	—	—
	1NO/1NC	YC	—	—	ZC	—	—	Z1	—	—
	2NO	YD	—	—	—	ZD	—	—	Z2	—
	2NC	YE	—	—	—	—	ZE	—	—	Z3

#### Push-In Clamps (U, V, W)

		Auxiliary Switch						Four-Pole		
		Three-Pole						2NO/2NC		
		None	1NO	1NC	1NO/1NC	2NO	2NC	U1	U2	U3
Alarm Switch	None	NN	UA	UB	UC	UD	UE	U1	U2	U3
	1NO	VA	WA	—	—	—	—	—	—	—
	1NC	VB	—	WB	—	—	—	—	—	—
	1NO/1NC	VC	—	—	WC	—	—	W1	—	—
	2NO	VD	—	—	—	WD	—	—	W2	—
	2NC	VE	—	—	—	—	WE	—	—	W3

**Note**

<sup>①</sup> Single-pole breakers can be equipped with a 1NO/1NC alarm switch that must be factory installed; use suffix **BC** in digits 15–16. No other internal accessories are available for single-pole breakers.

**Pigtails— 118 in / 3.0 m (D, E, F)**

	Auxiliary Switch Three-Pole							Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC
<b>Alarm Switch</b>	<b>None</b>	NN	DA	DB	DC	DD	DE	D1	D2	D3
	<b>1NO</b>	EA	FA	—	—	—	—	—	—	—
	<b>1NC</b>	EB	—	FB	—	—	—	—	—	—
	<b>1NO/1NC</b>	EC	—	—	FC	—	—	F1	—	—
	<b>2NO</b>	ED	—	—	—	FD	—	—	F2	—
	<b>2NC</b>	EE	—	—	—	—	FE	—	—	F3

**Factory Installation of Alarm Switch for Use with PXR Electronic Trip Units**

**Pigtails— 29 in / 0.75 m**

Auxiliary switch		Auxiliary Switch Three-Pole	
		None	1NO/1NC
	None	NN <sup>①</sup>	AC <sup>①</sup>
	1NO/1NC	—	CC

**Pigtails— 118 in / 3.0 m**

Alarm switch		Auxiliary Switch Three-Pole	
		None	1NO/1NC
	None	NN <sup>①</sup>	DC
	1NO/1NC	—	FC

**Tripping Accessories—Frame Size 2**

Power Defense breakers have designated positions for shunt trips and undervoltage releases (UVRs) in the left pole accessory cavity. Each breaker has space for one tripping accessory only.

Power Defense breaker have secondary covers for ease of field installation of tripping accessories.

**Shunt Trips**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	PDG2XST12DCT	PDG2XST12DCS	PDG2XST12DCR
48 Vdc	PDG2XST48DCT	PDG2XST48DCS	PDG2XST48DCR
60 Vdc	PDG2XST60DCT	PDG2XST60DCS	PDG2XST60DCR
24 Vac/Vdc	PDG2XST24ACDCT	PDG2XST24ACDCS	PDG2XST24ACDCR
110-130 Vac/125 Vdc	PDG2XST130ACDCT	PDG2XST130ACDCS	PDG2XST130ACDCR
200-240 Vac/250 Vdc	PDG2XST250ACDCT	PDG2XST250ACDCS	PDG2XST250ACDCR
380-440 Vac	PDG2XST440ACT	PDG2XST440ACS	PDG2XST440ACR
480-525 Vac	PDG2XST525ACT	PDG2XST525ACS	PDG2XST525ACR
600 Vac	PDG2XST600ACT	PDG2XST600ACS	PDG2XST600ACR

**Undervoltage Releases (UVRs)**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	PDG2XUV12DCV	PDG2XUV12DCU	PDG2XUV12DCW
24 Vdc	PDG2XUV24DCV	PDG2XUV24DCU	PDG2XUV24DCW
48 Vdc	PDG2XUV48DCV	PDG2XUV48DCU	PDG2XUV48DCW
60 Vdc	PDG2XUV60DCV	PDG2XUV60DCU	PDG2XUV60DCW
125 Vdc	PDG2XUV125DCV	PDG2XUV125DCU	PDG2XUV125DCW
250 Vdc	PDG2XUV250DCV	PDG2XUV250DCU	PDG2XUV250DCW
24 Vac	PDG2XUV24ACV	PDG2XUV24ACU	PDG2XUV24ACW
130 Vac	PDG2XUV130ACV	PDG2XUV130ACU	PDG2XUV130ACW
240 Vac	PDG2XUV240ACV	PDG2XUV240ACU	PDG2XUV240ACW
440 Vac	PDG2XUV440ACV	PDG2XUV440ACU	PDG2XUV440ACW
525 Vac	PDG2XUV525ACV	PDG2XUV525ACU	PDG2XUV525ACW
600 Vac	PDG2XUV600ACV	PDG2XUV600ACU	PDG2XUV600ACW

**Note**

<sup>①</sup> 1NO/1NC (AC) is always included in breakers with PXR trip units; no selection or selection of **NN** in Digits 15–16 will result in AC.

**Factory Installed Tripping Accessories—Frame Size 2**

Shunt trips and under voltage releases (UVRs) are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of installation in our factories.

Breaker catalog numbers with shunt trips or UVRs require a complete 20-digit catalog number, adding the tripping accessory functionality in digits 17 and 18 and adhering to the following conditions and tables.

- Digit 17 denotes the type of accessory installed and the terminal type
- Digit 18 denotes the voltage of the accessory
- If no accessories are selected, use NNNN for the final 4 digits of the catalog number
- Each breaker has space for one shunt trip or UVR tripping accessory only

**Shunt Trips**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	TH	SH	RH
48 Vdc	TJ	SJ	RJ
60 Vdc	TK	SK	RK
24 Vac/Vdc	TN	SN	RN
110–130 Vac/125 Vdc	TP	SP	RP
200–240 Vac/250 Vdc	TR	SR	RR
380–440 Vac	TC	SC	RC
480–525 Vac	TD	SD	RD
600 Vac	TE	SE	RE

**Undervoltage Releases (UVRs)**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	VH	UH	WH
24 Vdc	VG	UG	WG
48 Vdc	VJ	UJ	WJ
60 Vdc	VK	UK	WK
125 Vdc	VL	UL	WL
250 Vdc	VM	UM	WM
24 Vac	VF	UF	WF
130 Vac	VA	UA	WA
240 Vac	VB	UB	WB
440 Vac	VC	UC	WC
525 Vac	VD	UD	WD
600 Vac	VE	UE	WE

**Note:** Use suffix **US** for 18 Vdc when using Time Delay UVR.

## Handle Mechanisms—Frame Size 2

Direct Rotary Handle Mechanism <sup>①</sup>

Description	NEMA 1/12 Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism	PDG2XHMCS	HA
Standard lockable handle and mechanism with door interlock	PDG2XHMCSN	HB
Standard lockable handle and mechanism with mechanical padlock	PDG2XHMCSNP	HC
Standard lockable handle and mechanism with door interlock and mechanical padlock	PDG2XHMCSNP	HE
Emergency lockable handle and mechanism	PDG2XHMCE	H1
Emergency lockable handle and mechanism with door interlock	PDG2XHMCE	H2
Emergency lockable handle and mechanism with mechanical padlock	PDG2XHMCEP	H3
Emergency lockable handle and mechanism with door interlock and mechanical padlock	PDG2XHMCEP	H5

Variable Depth Rotary Handle Mechanism <sup>①</sup>

## PDG2XHMDS



Description	NEMA 1/3R/12/4/4X Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism <sup>②</sup>	PDG2XHMDS	DA
Standard lockable handle and mechanism with mechanical padlock <sup>②</sup>	PDG2XHMDS	DC
Standard lockable mechanism only with mechanical padlock	PDG2XMECH	—
Emergency lockable handle and mechanism <sup>②</sup>	PDG2XHMDE	D1
Emergency lockable handle and mechanism with mechanical padlock <sup>②</sup>	PDG2XHMDEP	D3
12 in (307 mm) handle mechanism shaft	PDG12XHMS307	—
20 in (507 mm) handle mechanism shaft	PDG12XHMS507	—
Standard NFPA79-compliant shaft handle	PDG12XHM79S	—
Emergency NFPA79-compliant shaft handle	PDG12XHM79E	—

Metal Variable Depth Rotary Handle Mechanism <sup>①</sup>

Description	NEMA 1/3R/12/4/4X Catalog Number
Metal standard lockable handle, mechanism, and 6-inch shaft	PDG2XHMDS06MH
Metal standard lockable handle, mechanism, and 12-inch shaft	PDG2XHMDS12MH
Metal standard lockable handle, mechanism, and 24-inch shaft	PDG2XHMDS24MH
Metal emergency lockable handle, mechanism, and 6-inch shaft	PDG2XHMDE06MH
Metal emergency lockable handle, mechanism, and 12-inch shaft	PDG2XHMDE12MH
Metal emergency lockable handle, mechanism, and 24-inch shaft	PDG2XHMDE24MH

## Flex Shaft Handle Mechanism

Cable Length (ft)	Metal Handle, NEMA 1/3R/12 Catalog Number <sup>③</sup>	High Performance Handle, NEMA 1/3R/12 Catalog Number <sup>③</sup>	Metal Handle, NEMA 4/4X Catalog Number <sup>④</sup>	High Performance Handle, NEMA 4/4X Catalog Number <sup>④</sup>
2	PDG2XFS02	PDG2XFS02HP	PDG2XFS02X	PDG2XFS02HPX
3	PDG2XFS03	PDG2XFS03HP	PDG2XFS03X	PDG2XFS03HPX
4	PDG2XFS04	PDG2XFS04HP	PDG2XFS04X	PDG2XFS04HPX
5	PDG2XFS05	PDG2XFS05HP	PDG2XFS05X	PDG2XFS05HPX
6	PDG2XFS06	PDG2XFS06HP	PDG2XFS06X	PDG2XFS06HPX
7	PDG2XFS07	PDG2XFS07HP	PDG2XFS07X	PDG2XFS07HPX
8	PDG2XFS08	PDG2XFS08HP	PDG2XFS08X	PDG2XFS08HPX
9	PDG2XFS09	PDG2XFS09HP	PDG2XFS09X	PDG2XFS09HPX
10	PDG2XFS10	PDG2XFS10HP	PDG2XFS10X	PDG2XFS10HPX

## Notes

<sup>①</sup> Standard handles are black and gray; Emergency handles are red and yellow.

<sup>②</sup> Handle mechanism shaft sold separately.

<sup>③</sup> For dual flex shaft option, add D at the end for NEMA 1/3R/12.

<sup>④</sup> For NEMA 4/4X, add D before the X (ex., PDG2XFS02HPDX).

## Accessories—Frame Size 2

## External Accessories

Description	Fit Type	Catalog Number	Factory Installed Digits 19–20
Padlockable hasp	Top	<b>PDG2XPLKT</b> ①	L4
	Left side	<b>PDG2XPLKL</b> ①	L5
	Right side	<b>PDG2XPLKR</b>	L6
	Snap on	<b>PDG2XPLKSNAP</b>	L0
Padlockable hasp OFF only	Top	<b>PDG2XPLKTOFF</b> ①	L1
	Left side	<b>PDG2XPLKLOFF</b> ①	L2
	Right side	<b>PDG2XPLKROFF</b>	L3
Padlockable handle block	On handle	<b>PDG2XPHB</b>	—
Kirk lock provision ②	Top	<b>PDG2XKLPKPTFF</b>	L7
Walking beam interlock ③④	Two-, three-, and four-pole	<b>PDG2XWB1234P</b>	—
Plug-in breaker base only	Three-pole	<b>PDG2XPIBB3P225A</b>	—
	Four-pole	<b>PDG2XPIBB4P225A</b>	—
Plug-in breaker parts kit	Three-pole	<b>PDG2XPIBK3P225A</b>	—
	Four-pole	<b>PDG2XPIBK4P225A</b>	—
Terminal covers	Two-pole	<b>PDG2XTC2P</b>	—
	Three-pole	<b>PDG2XTC3P</b>	—
	Four-pole	<b>PDG2XTC4P</b>	—
Interphase barriers	Single-pole	<b>PDG2XIB</b>	—
	Three-pole	<b>PDG2XIB3P</b>	—
	Four-pole	<b>PDG2XIB4P</b>	—
Finger protection	Three-pole	<b>PDG2XFP3P</b>	—
	Four-pole	<b>PDG2XFP4P</b>	—
60–100 A residual current neutral sensor	Cable type	<b>PDG2XNCTD0100</b>	—
150–225 A residual current neutral sensor	Cable type	<b>PDG2XNCTD0225</b>	—
60–100 A residual current neutral sensor	Busbar type	<b>PDG2XNCTB0100</b>	—
150–225 A residual current neutral sensor	Busbar type	<b>PDG2XNCTB0225</b>	—
Service entrance barrier kit	Three-pole	<b>PRLSEBPD2</b>	—
Electrical operator thermal-magnetic trip unit	24 Vdc	<b>PDG2XROPT24DC</b>	—
	48–60 Vdc	<b>PDG2XROPT60DC</b>	—
	125 Vdc	<b>PDG2XROPT125DC</b>	—
	250 Vdc	<b>PDG2XROPT250DC</b>	—
	110–130 Vac	<b>PDG2XROPT130AC</b>	—
	200–240 Vac	<b>PDG2XROPT240AC</b>	—
Electrical operator electronic trip unit	24 Vdc	<b>PDG2XROP24DC</b>	—
	48–60 Vdc	<b>PDG2XROP60DC</b>	—
	125 Vdc	<b>PDG2XROP125DC</b>	—
	250 Vdc	<b>PDG2XROP250DC</b>	—
	110–130 Vac	<b>PDG2XROP130AC</b>	—
	200–240 Vac	<b>PDG2XROP240AC</b>	—
380–440 Vac	<b>PDG2XROP440AC</b>	—	
PD2 accessory pocket barrier kit		<b>PDG2XIPPB</b>	—

## Base Mounting Hardware

Description	Catalog Number
Single-pole metric	<b>4218B80G09</b>
Two-pole metric	<b>4218B80G11</b>
Three-, four-pole metric	<b>BMH1M</b>
Single-pole English	<b>624B375G01</b>
Two-pole English	<b>4218B80G01</b>
Three-, four-pole English	<b>BMH1</b>

**Note:** Base mounting hardware is included with a circuit breaker or molded case switch.

## Aftermarket Products

Description	Catalog Number
PD2 clear trip unit cover for PXR 10 left and right	<b>PDG2XPXRCC10-BP5</b>
PD2 clear trip unit cover for PXR 20 right	<b>PDG2XPXRCC20R-BP5</b>
PD2 clear trip unit cover for PXR 20/PXR 25 left	<b>PDG2XPXRCC20L-BP5</b>
PD2 clear trip unit cover for PXR 25 right	<b>PDG2XPXRCC25R-BP5</b>
Neutral voltage sensing module for PD 2, 3, 4, 5 and 6	<b>PDGXPXR25NVT</b>
Eaton Power Defense, trip unit tamper protection wire seal	<b>5108A03H02</b>

## Dimensions and Weights—Frame Size 2

## Approximate Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
1	1.38 (35.1)	6.00 (152.4)	3.50 (88.9)
2	2.75 (69.9)	6.00 (152.4)	3.50 (88.9)
3	4.12 (104.6)	6.00 (152.4)	3.50 (88.9)
4	5.49 (139.5)	6.00 (152.4)	3.50 (88.9)

## Approximate Shipping Weight in lb (kg)

Breaker Type	1-Pole	2-Pole	3-Pole	4-Pole
PDG2 225 A	2.00 (0.91)	3.00 (1.36)	4.21 (1.82)	5.69 (2.46)

## Notes

- ① Cannot be used with single- or two-pole breaker.
- ② Provision only. For use with Type FF Kirk keylock (sold separately). Bolt projection in withdrawn position is 0 in (0 mm).
- ③ Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix **WB**).
- ④ Requires two breakers.

## Power Defense Molded Case Circuit Breakers—Frame Size 3



## Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A)	
Catalog Number / Product Selection . . . . .	<b>V4-T2-44</b>
Accessories . . . . .	<b>V4-T2-52</b>
Dimensions and Weights . . . . .	<b>V4-T2-57</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

## Power Defense Molded Case Circuit Breakers—Frame Size 3

## Product Description

Frame Size 3 covers a range of 45 A through 600 A with a complete offering of trip units, including PXR electronic trip units and fixed-adjustable thermal-magnetic trip units. PD-3 is available in two versions, with 400 A and 600 A constructions to optimize performance in multiple applications.

## Application Description

Frame Size 3 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection, current-limiting, 100% UL ratings, and high instantaneous settings for selective coordination. PXR trip units in PD-3 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication, and arc flash reduction options.

## Features and Benefits

Frame Size 3 breakers are modular and available as complete breakers from the factory, or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

## Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



## Catalog Number / Product Selection

2

**Power Defense—Frame Size 3 (45–600 A)**

Frame Size 3 covers a range of 45 A through 600 A using electronic trip units, and 100 A through 600 A using thermal-magnetic trip units. It is available in configurations of two-, three- and four-pole, with the two-pole being in the same physical size of a three-pole variant. Frame 3 has two unique constructions: one for 400 A and a second one for 600 A. The 600 A construction provides a unique capability to be used at 400 A and below in critical coordination applications where a high level fixed instantaneous is required. This is accomplished by using a letter **H** in the 7th digit of the catalog number, as shown below.

## Interrupting Ratings

Catalog Designator	F		G		K		M <sup>①</sup>		N <sup>①</sup>		P <sup>①</sup>	
UL/CSA	kA rms											
240 Vac	35		65		85		100		150		200	
480 Vac	25		35		50		65		85		100	
600 Vac	14		18		25		35		50		65	
250 Vdc <sup>②③</sup>	10 / 22		10 / 22		10 / 22		22 / 42		22 / 42		22 / 42	
IEC	I <sub>cu</sub>	I <sub>cs</sub>										
240 Vac	35	35	55	55	85	85	100	100	150	100	200	150
380–415 Vac	25	25	36	36	50	50	70	53	70	70	100	70
440 Vac	25	20	30	22.5	35	35	50	40	70	50	100	50
480 Vac	20	20	25	20	35	22.5	50	30	65	40	85	40
525 Vac	18	5	20	7.5	25	10	30	15	35	25	40	25
660–690 Vac	—	—	8	4	10	5	15	7.5	20	10	20	10
250 Vdc <sup>②③</sup>	10 / 22	10 / 22	10 / 22	10 / 22	10 / 22	10 / 22	22 / 42	22 / 42	22 / 42	22 / 42	22 / 42	22 / 42

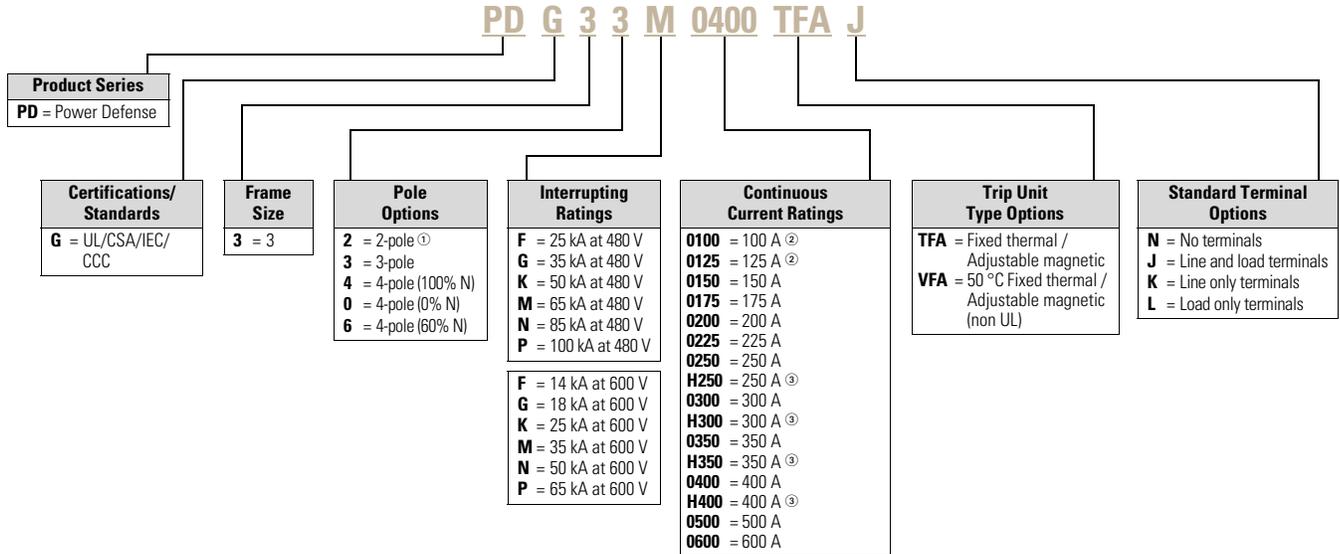
**Notes**

- ① UL current-limiting. M interrupting rating only current limiting for the 400 A construction breakers.  
 ② DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using two poles in series.  
 ③ First rating listed is for 400 A frame, second rating is for 600 A frame.

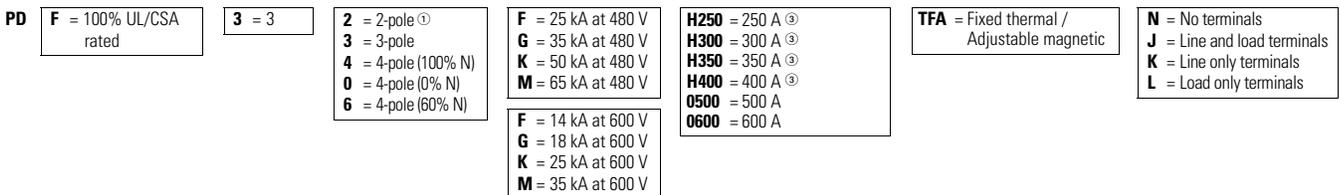
### Molded Case Circuit Breaker

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

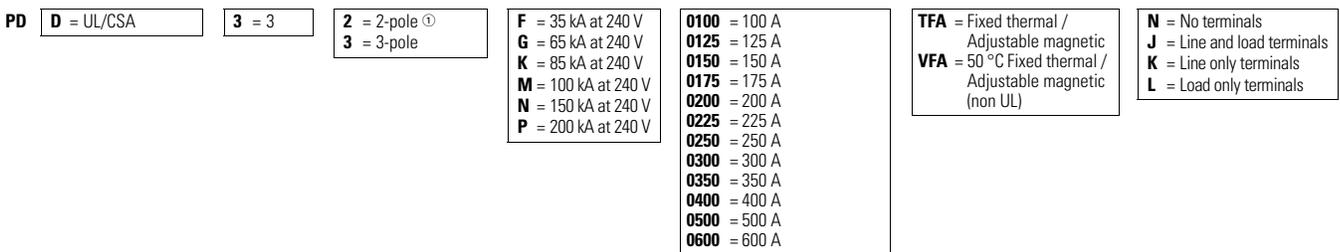
### Molded Case Circuit Breaker with Thermal-Magnetic Trip Units (TMTU)—Globally Rated



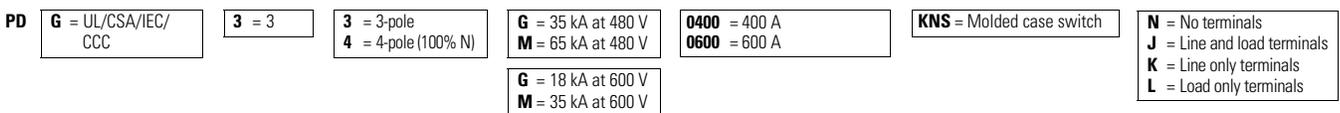
### Molded Case Circuit Breakers with TMTU—Globally Rated (100% UL Rated)



### Molded Case Circuit Breakers with TMTU—UL/CSA Rated to 240 Vac



### Molded Case Switches<sup>④</sup>—Globally Rated



#### Notes

- ① All PD-3 two-pole breakers are physically the same size as a three-pole frame with the outer poles used for electrical connections.
- ② Not available in four-pole 60% neutral protection.
- ③ High override (600 A frame).
- ④ Molded case switches may open above 4000 A for the 400 A frame, and above 6300 A for the 600 A frame.

# 2.2

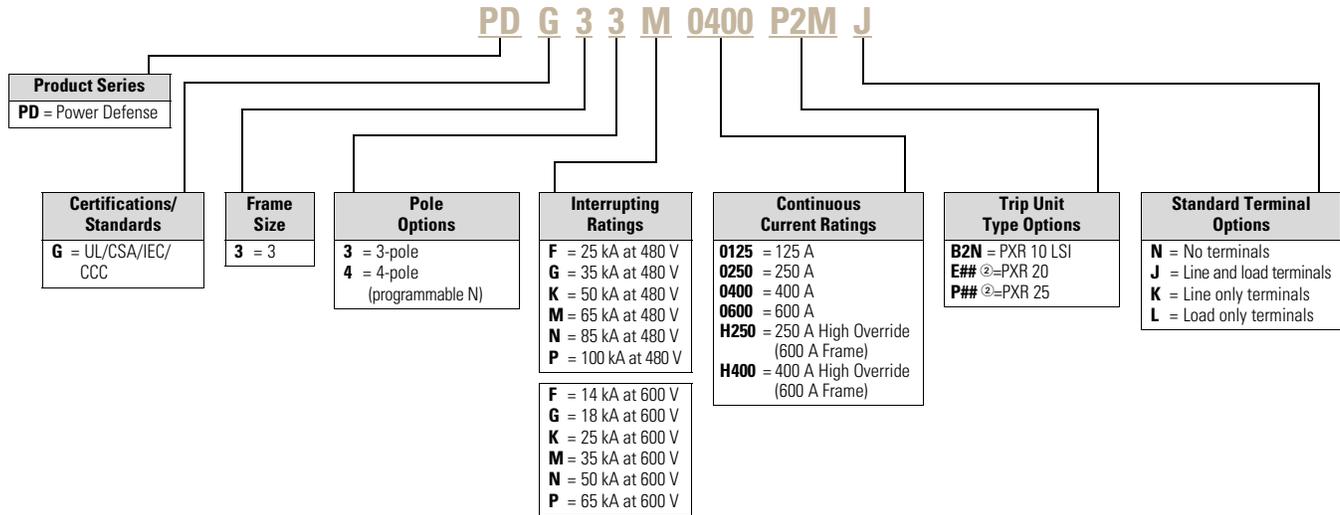
## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

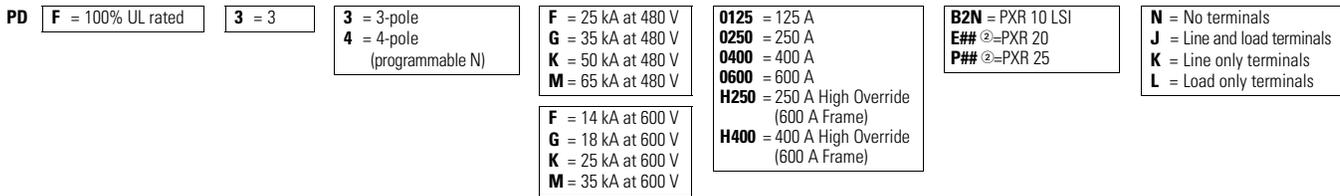
#### Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### 2 Molded Case Circuit Breakers with PXR ETU—Globally Rated



#### Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)



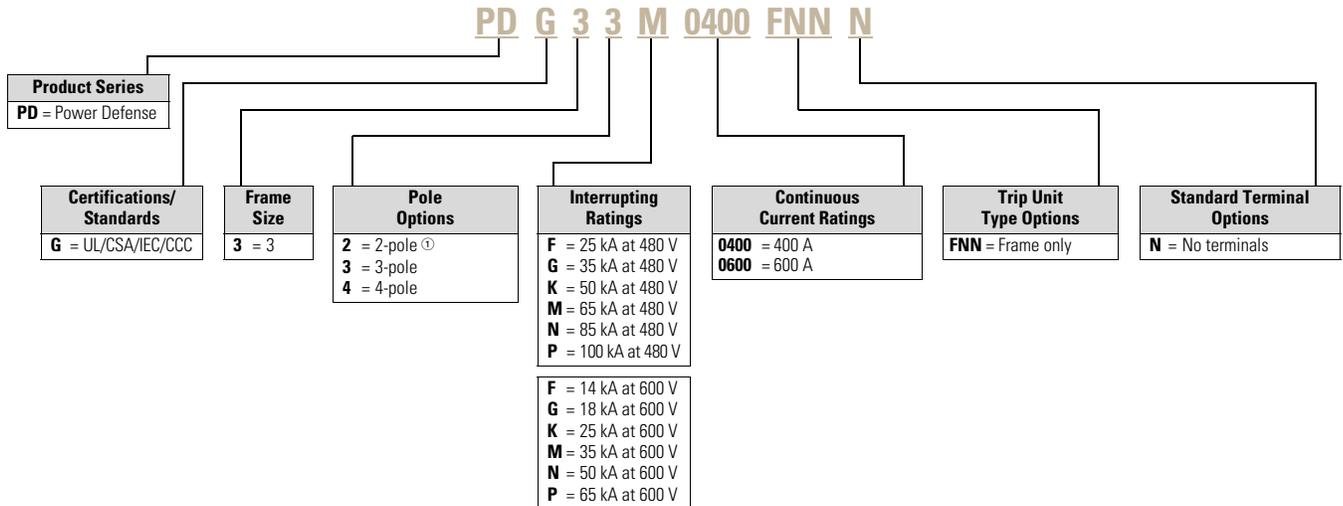
#### Notes

① See PXR Trip Unit Options table on Page V4-T2-49 for protection type (#1) and available configured options (#2).

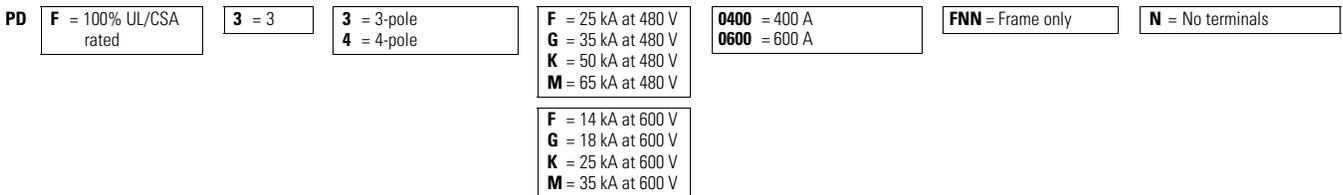
### Globally Rated Frame Only

PD-3 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

### Frame Only—Globally Rated



### Frame Only—Globally Rated (100% UL Rated)



**Note**

<sup>①</sup> All PD-3 two-pole breakers are physically the same size as a three-pole frame with the outer poles used for electrical connections.

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

2

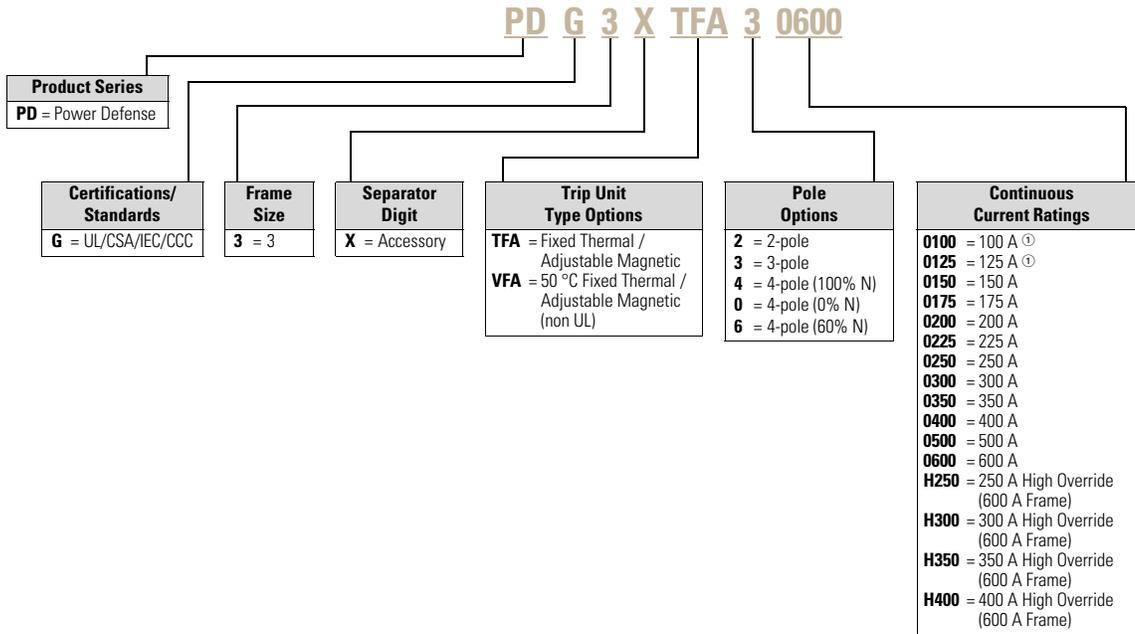
#### Trip Units

PD-3 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by **H**, such as *H250*. Additionally, for two-pole breakers using electronic trip units, three-pole trip units are used. PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

#### Trip Units Only

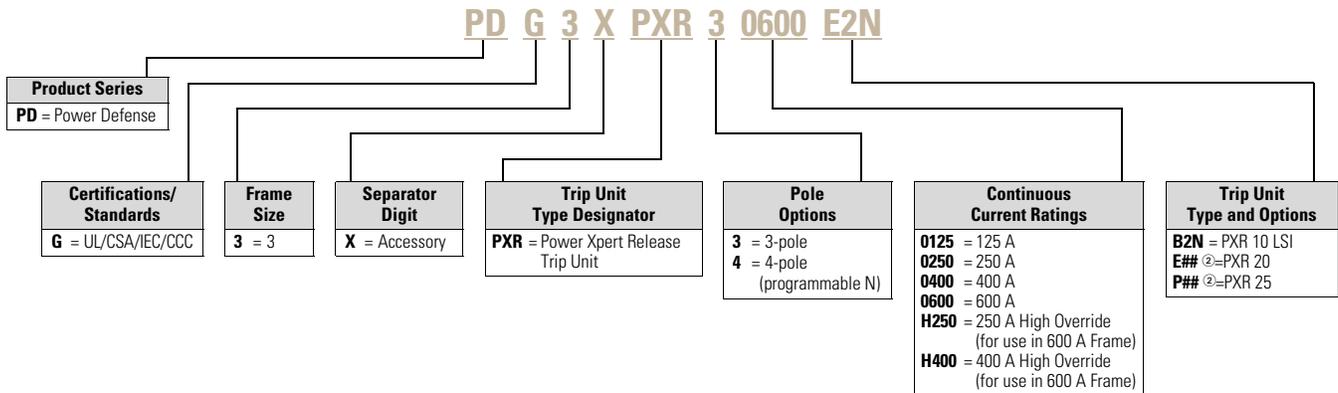
This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Thermal-Magnetic Trip Units



#### Power Xpert Release (PXR) Electronic Trip Units

#### Power Xpert Release (PXR) Electronic Trip Units



#### Notes

- ① Not available in four-pole 60% neutral protection.
- ② See tables and descriptions on **Page V4-T2-49** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

**Power Xpert Release (PXR) Trip Unit Options—Frame Size 3**

**Power Xpert Release (PXR) Trip Unit Options**

PXR	ETU	#(1)—Protection Type				#(2)—Available Configured Options							
		LSI	LSIG ①	LSI with Arcflash Reduction Maintenance System	LSIG with Arcflash Reduction Maintenance System	Relays	Relays Modbus	Relays ZSI	Relays CAM	Relays Modbus ZSI	Relays Modbus CAM	Relays Modbus ZSI CAM	
PXR 10	B	2	—	—	—	N	—	—	—	—	—	—	—
PXR 20	E	2	—	—	—	N	R	M	Z	C	W	X	—
		—	3	4	5	—	R	M	Z	C	W	X	—
PXR 25	P	2	3	4	5	—	—	M	—	—	W	—	D Y

**Descriptions of PXR Configured Options**

**Relays**—2 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions

**Modbus**—Modbus RTU directly from breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required

**ZSI**—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

**CAM**—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

**Arcflash Reduction Maintenance System, or Maintenance Mode**

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit (self-powered) and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of Arcflash Reduction Maintenance System

**Auxiliary Power**

- Connection included with all PXR 20 and 25 trip units

**Note:** For PXR 20 units, wire harness connections for auxiliary power not included on E2N styles.

- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires Aux +24 V, Aux 0 V)

**Available Continuous Current (I<sub>r</sub>) Settings on PXR Electronic Trip Units**

Option	Setting	Catalog Number Selection and Maximum Setting (I <sub>n</sub> )			
		0125 125 A	0250/H250 250 A	0400/H400 400 A	0600 600 A
PXR 10, PXR 20	1	45 A	90 A	160 A	250 A
	2	50 A	100 A	175 A	275 A
	3	60 A	110 A	200 A	300 A
	4	63 A	125 A	225 A	320 A
	5	70 A	150 A	250 A	350 A
	6	80 A	160 A	275 A	400 A
	7	90 A	175 A	300 A	450 A
	8	100 A	200 A	320 A	500 A
	9	110 A	225 A	350 A	550 A
	10 = I <sub>n</sub>	125 A	250 A	400 A	600 A
PXR 25	Programmable from minimum to maximum values in 1 A increments.				

**Note**

① All neutral current sensors required for LSIG protection are sold separately.

# 2.2

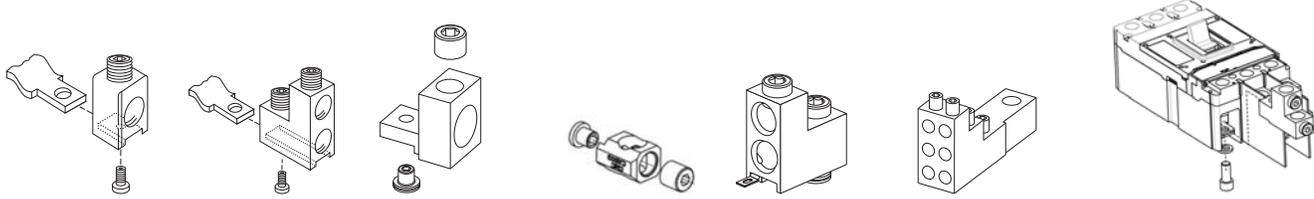
## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

#### Terminals—Frame Size 3

Catalog numbers shown are for a single side of a three-pole breaker. For two- and four-pole options, replace the **X3** with **X2** or **X4**, respectively. Example: PDG3**X3**TA300 becomes PDG3**X2**TA300 for two-pole.

#### Terminal Types



PDG3X3TA300 PDG3X3TA350 PDG3X3T300 PDG3X3T350 PDG3X3TA350SW	PDG3X3TA400 PDG3X3TA400SW PDG3X3T400 PDG3X3TA400CW PDG3X3T400CW PDG3X3TA401CW PDG3X3TA401	PDG3X3TA402 PDG3X3T402 PDG3X3TA401H PDG3X3T401H PDG3X3TA401HCW PDG3X3T401HCW	PDG3X3TA400H PDG3X3T400H	PDG3X3TA630 PDG3X3T630 PDG3X3TA630SW PDG3X3TA630CW PDG3X3T630CW	PDG3X3TA4003W PDG3X3TA4006W PDG3X3TA6006W PDG3X3TA6006WSW	PDG3X3TA400RF PDG3X3TA400HRF PDG3X3TA630RF
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**Note:** Pictures are for reference only.

#### Terminals

Maximum Breaker Amperes	Breaker Frame	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG / kcmil Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	3-Pole Catalog Number	Included Accessories	Digit 14 Designation			Factory Config. Ampere Range
										Line and Load	Line Only	Load Only	
<b>Standard Terminals</b>													
300	400	Aluminum	Cu/Al	B, C	1	3–350	26.7–177	<b>PDG3X3TA300</b>	—	J	K	L	100–225
350	400	Aluminum	Cu/Al	B, C	1	250–500	127–253	<b>PDG3X3TA350</b>	—	J	K	L	250–350
400	400	Aluminum	Cu/Al	B, C	2	3/0–250	85–127	<b>PDG3X3TA400</b>	Terminal shield	J	K	L	400
400	600	Aluminum	Cu/Al	B, C	1	500–750	253–380	<b>PDG3X3TA401H</b>	Terminal shield	J	K	L	H250–H400
630	600	Aluminum	Cu/Al	B, C	2	2–500	33.6–253	<b>PDG3X3TA630</b>	Terminal shield	J	K	L	450–600
<b>Optional Aluminum Terminals</b>													
400	400	Aluminum	Cu/Al	B, C	1	500–750	253–380	<b>PDG3X3TA402</b>	Terminal shield	T	U	V	100–400
400	400	Aluminum	Cu/Al	B, C	2	2/0–250 (2) or 2/0–500 (1)	67.4–127 (2) or 67.4–253 (1)	<b>PDG3X3TA401</b>	Terminal shield	I	O	F	100–400
400	600	Aluminum	Cu/Al	B, C	1	3–500	26.7–253	<b>PDG3X3TA400H</b>	—	T	U	V	H250–H400
<b>Optional Copper Terminals</b>													
300	400	Copper	Cu	B, C	1	3–350	26.7–177	<b>PDG3X3T300</b>	—	W	Y	Z	100–225
350	400	Copper	Cu	B, C	1	250–500	127–253	<b>PDG3X3T350</b>	—	W	Y	Z	250–350
400	400	Copper	Cu	B, C	2	3/0–250	85–127	<b>PDG3X3T400</b>	Terminal shield	W	Y	Z	400
400	400	Copper	Cu/Al	B, C	1	Al: 500–750 Cu: 500 Only	—	<b>PDG3X3T402</b>	Terminal shield	—	—	—	—
400	600	Copper	Cu	B, C	1	3–500	26.7–253	<b>PDG3X3T400H</b>	—	—	—	—	—
400	600	Copper	Cu	B, C	1	500–750	253–380	<b>PDG3X3T401H</b>	Terminal shield	W	Y	Z	H250–H400
630	600	Copper	Cu	B, C	2	2–500	33.6–253	<b>PDG3X3T630</b>	Terminal shield	W	Y	Z	450–600
<b>Strandable Terminals</b>													
400	400	Aluminum	Cu/Al	B, C	2	3/0–250	85–127	<b>PDG3X3TA400SW</b>	Terminal shield	A	B	C	100–400
				D, G, H, I, K, M		3/0–4/0	85–107						
350	400	Aluminum	Cu/Al	B, C	1	250–500	127–253	<b>PDG3X3TA350SW</b>	—	—	—	—	—
				D, G, H, I, K, M		250–350	127–177						
630	600	Aluminum	Cu/Al	B, C	2	2–500	33.6–253	<b>PDG3X3TA630SW</b>	Terminal shield	A	B	C	H250–600
				D, G, H, I, K, M		2–350	33.6–177						

**Terminals—Frame Size 3****Terminals, continued**

Maximum Breaker Amperes	Breaker Frame	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG / kcmil Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	3-Pole Catalog Number	Included Accessories	Digit 14 Designation			Factory Config. Ampere Range
										Line and Load	Line Only	Load Only	
<b>Control Wire Aluminum Terminals</b>													
400	400	Aluminum	Cu/Al	B, C	2	3/0–250	85–127	PDG3X3TA400CW	Terminal shield	1	2	3	100–400
400	400	Aluminum	Cu/Al	B, C	2	2/0–250 (2) or 2/0–500 (1)	67.4–127 (2) or 67.4–253 (1)	PDG3X3TA401CW	Terminal shield	4	5	6	100–400
400	600	Aluminum	Cu/Al	B, C	1	500–750	253–380	PDG3X3TA401HCW	Terminal shield	1	2	3	H250–H400
630	600	Aluminum	Cu/Al	B, C	2	2–500	33.6–253	PDG3X3TA630CW	Terminal shield	1	2	3	450–600
<b>Control Wire Copper Terminals</b>													
400	400	Copper	Cu	B, C	2	3/0–250	85–127	PDG3X3T400CW	Terminal shield	7	8	9	100–400
400	600	Copper	Cu	B, C	1	500–750	253–380	PDG3X3T401HCW	Terminal shield	7	8	9	H250–H400
630	600	Copper	Cu	B, C	2	2–500	33.6–253	PDG3X3T630CW	Terminal shield	7	8	9	450–600
<b>Multi-wire Terminals</b>													
400	400	Aluminum	Cu/Al	B, C	3	12–2/0	3.31–67.4	PDG3X3TA4003W	Terminal shield	—	—	H	100–400
400	400	Aluminum	Cu/Al	B, C	6	14–3	2.08–26.7	PDG3X3TA4006W	Terminal shield	—	—	G	100–400
600	600	Aluminum	Cu/Al	B, C	6	14–1/0	2.08–53.5	PDG3X3TA6006W	Terminal shield	—	—	G	H250–600
<b>StrandAble Multi-wire Terminals</b>													
600	600	Aluminum	Cu/Al	B, C D, G, H, I, K, M	6	12–2/0 8–1/0	—	PDG3X3TA6006WSW	Terminal shield	—	—	—	—
<b>Rear-fed Terminals</b> <sup>①</sup>													
400	400	Aluminum	Cu/Al	B, C	1	250–500	127–253	PDG3X3TA400RF	Interphase barriers	—	—	—	—
400	600	Aluminum	Cu/Al	B, C	1	2–500	33.6–253	PDG3X3TA400HRF	Interphase barriers	—	—	—	—
630	600	Aluminum	Cu/Al	B, C	2	2–500	33.6–253	PDG3X3TA630RF	Interphase barriers	—	—	—	—
<b>Rear Connectors</b> <sup>①</sup>													
400	—	Aluminum	—	—	—	—	—	PDG3X3T400RC	—	R	—	—	100–400
630	—	—	—	—	—	—	—	PDG3X3T600RC	—	R	—	—	250–600
<b>End Cap Kits/Screw Terminals</b>													
400	—	—	—	—	—	—	—	PDG3X3TS400	—	S	D	E	100–400
600	—	—	—	—	—	—	—	PDG3X3TS600	—	S	D	E	250–600

**Note:** Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes. For connector kit options for Eaton's panelboards, see document RP01400001E.

**Control Wire Tabs**

Use	Package Qty.	Catalog Number
100–400 A	12	KCWTK

**Note**

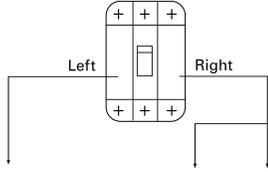
<sup>①</sup> Breaker loses UL rating when fitted with rear-fed terminals or rear connectors.

#### Accessories

2

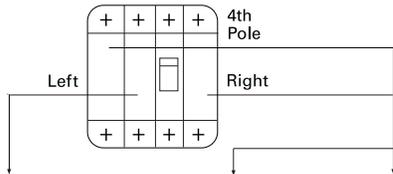
#### Internal Accessory Configurations—Frame Size 3

##### Three-Pole Circuit Breakers



Tripping Accessory Options	Alarm Options (2 Spaces) ①	Aux Options (2 Spaces)
Shunt Trip 	None 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)	None 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)
UVR 	2NO (2 spaces) 2NC (2 spaces)	2NO (2 spaces) 2NC (2 spaces)

##### Four-Pole Circuit Breakers



Tripping Accessory Options	Alarm Options (2 Spaces) ①	Aux Options (4 Spaces) ②
Shunt Trip 	None 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)	None 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces)
UVR 	2NO (2 spaces) 2NC (2 spaces)	2NO (2 spaces) 2NC (2 spaces) 2NO/2NC (4 spaces) 4NO (4 spaces) 4NC (4 spaces)

#### Notes

- ① Frame 3 Power Defense breakers with electronic trip units AND communication only have access to one alarm space. Breakers with thermal-magnetic trip units or electronic trip units without communication have access to two alarm spaces.
- ② Neutral pole includes two additional auxiliary spaces.
- ③ Order in multiples of quantity listed to receive bulk pack. (ex. Order qty 20 PDGXXA-BP20 to receive 1 bulk pack).

#### Alarm and Auxiliary Contact Blocks—Frame Size 3

Power Defense breakers have designated positions for alarm and auxiliary switches in the right pole accessory cavity. For Frame 3, the two left-most positions are used for alarm switches, and the two right-most locations are used for auxiliary switches.

Power Defense breakers have secondary covers for ease of field installation of accessories, including alarm and auxiliary switches.

Power Defense alarm and auxiliary switches are available in contact blocks, in Form A (NO), Form B (NC), and Form C (NO-NC) types. Form A and Form B contacts take one position in the breaker accessory cavity, and Form C contacts take two positions in the cavity. Identical contact blocks are used for the alarm and auxiliary switch functions.

Electronic breakers with communications options (Modbus RTU or CAM Link) lose one alarm switch position, but are also able to provide trip position via communications and the PXR programmable relays.

#### Contact Blocks

##### Pigtail (29 in / 0.75 m) Contact Blocks for Alarm and Auxiliary Switch Functionality

Catalog Number	PDGXAA	PDGXAB	PDGXAC
Type	Form A / NO	Form B / NC	Form C / NO-NC

##### Screw Terminal Contact Blocks for Alarm and Auxiliary Switch Functionality

Catalog Number	PDGXXA	PDGXXB	PDGXXA + PDGXXB
Type	Form A / NO	Form B / NC	For NO-NC, use two separate contact blocks

##### Push-In Clamp Contact Blocks for Alarm and Auxiliary Switch Functionality

Catalog Number	PDGXUA	PDGXUB	PDGXUC
Type	Form A / NO	Form B / NC	Form C / NO-NC

##### Pigtail (118 in / 3.0 m) Contact Blocks for Alarm and Auxiliary Switch Functionality

Catalog Number	PDGXDA	PDGXDB	PDGXDC
Type	Form A / NO	Form B / NC	Form C / NO-NC

##### Contact Blocks for Alarm and Auxiliary Switch Functionality—Bulk Packs

Catalog Number	Type	Termination	Bulk Pack Quantity ③
PDGXXA-BP20	Form A / NO	Screw Terminal	20
PDGXXB-BP20	Form B / NC	Screw Terminal	20
PDGXUA-BP20	Form A / NO	Push-in Clamp	20
PDGXUB-BP20	Form B / NC	Push-in Clamp	20
PDGXUC-BP10	Form C / NO-NC	Push-in Clamp	10

**Factory Installation of Alarm and Auxiliary Switches—Frame Size 3**

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers installation service in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and

auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables.

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types
- Switches may be requested for alarm only, auxiliary only or a combination of the two

- For Eaton factory installation, the same type of terminals (i.e., all pigtail 0.75 m, all screw, etc.) must be used. If a combination of alarm and auxiliary switches is selected, they must be the same type (i.e., all 1NC, all 1NO/1NC, etc.)
- Digit 16 denotes number and type (NO, NC) of switches installed

- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number
- Electronic breakers with communications lose one alarm switch position in order to provide trip status via communications. They do not lose an auxiliary position for this purpose.

**Pigtails—29 in / 0.75 m (A, B, C)**

		Auxiliary Switch Three-Pole						Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC
Alarm Switch	None	NN	AA	AB	AC	AD	AE	A1	A2	A3
	1NO	BA	CA	—	—	—	—	—	—	—
	1NC	BB	—	CB	—	—	—	—	—	—
	1NO/1NC	BC	—	—	CC	—	—	C1	—	—
	2NO	BD	—	—	—	CD	—	—	C2	—
	2NC	BE	—	—	—	—	CE	—	—	C3

**Screw Terminals (X, Y, Z)**

		Auxiliary Switch Three-Pole						Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC
Alarm Switch	None	NN	XA	XB	XC	XD	XE	X1	X2	X3
	1NO	YA	ZA	—	—	—	—	—	—	—
	1NC	YB	—	ZB	—	—	—	—	—	—
	1NO/1NC	YC	—	—	ZC	—	—	Z1	—	—
	2NO	YD	—	—	—	ZD	—	—	Z2	—
	2NC	YE	—	—	—	—	ZE	—	—	Z3

**Push-In Clamps (U, V, W)**

		Auxiliary Switch Three-Pole						Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC
Alarm Switch	None	NN	UA	UB	UC	UD	UE	U1	U2	U3
	1NO	VA	WA	—	—	—	—	—	—	—
	1NC	VB	—	WB	—	—	—	—	—	—
	1NO/1NC	VC	—	—	WC	—	—	W1	—	—
	2NO	VD	—	—	—	WD	—	—	W2	—
	2NC	VE	—	—	—	—	WE	—	—	W3

#### Factory Installation of Alarm and Auxiliary Switches—Frame Size 3

##### Pigtails—118 in / 3.0 m (D, E, F)

Alarm Switch		Auxiliary Switch Three-Pole						Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC
Alarm Switch	None	NN	DA	DB	DC	DD	DE	D1	D2	D3
	1NO	EA	FA	—	—	—	—	—	—	—
	1NC	EB	—	FB	—	—	—	—	—	—
	1NO/1NC	EC	—	—	FC	—	—	F1	—	—
	2NO	ED	—	—	—	FD	—	—	F2	—
	2NC	EE	—	—	—	—	FE	—	—	F3

##### For PXR Trip Units with Communication <sup>Ⓞ</sup>

Alarm Switch		Auxiliary Switch Three-Pole						Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC
Alarm Switch	None	NN	AA	AB	AC	AD	AE	A1	A2	A3
	1NO	BA	CA	—	CF	CG	—	CP	CQ	—
	1NC	BB	—	CB	CH	—	CI	CR	—	CS

#### Tripping Accessories—Frame Size 3

Power Defense breakers have designated positions for shunt trips and undervoltage releases (UVRs) in the left pole accessory cavity. Each breaker has space for one tripping accessory only.

Power Defense breakers have secondary covers for ease of field installation of tripping accessories.

#### Shunt Trips

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	PDG3XST12DCT	PDG3XST12DCS	PDG3XST12DCR
48 Vdc	PDG3XST48DCT	PDG3XST48DCS	PDG3XST48DCR
60 Vdc	PDG3XST60DCT	PDG3XST60DCS	PDG3XST60DCR
24 Vac/Vdc	PDG3XST24ACDCT	PDG3XST24ACDCS	PDG3XST24ACDCR
110–130 Vac/125 Vdc	PDG3XST130ACDCT	PDG3XST130ACDCS	PDG3XST130ACDCR
200–240 Vac/250 Vdc	PDG3XST250ACDCT	PDG3XST250ACDCS	PDG3XST250ACDCR
380–440 Vac	PDG3XST440ACT	PDG3XST440ACS	PDG3XST440ACR
480–525 Vac	PDG3XST525ACT	PDG3XST525ACS	PDG3XST525ACR
600 Vac	PDG3XST600ACT	PDG3XST600ACS	PDG3XST600ACR

#### Undervoltage Releases (UVRs)

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	PDG3XUV12DCV	PDG3XUV12DCU	PDG3XUV12DCW
24 Vdc	PDG3XUV24DCV	PDG3XUV24DCU	PDG3XUV24DCW
48 Vdc	PDG3XUV48DCV	PDG3XUV48DCU	PDG3XUV48DCW
60 Vdc	PDG3XUV60DCV	PDG3XUV60DCU	PDG3XUV60DCW
125 Vdc	PDG3XUV125DCV	PDG3XUV125DCU	PDG3XUV125DCW
250 Vdc	PDG3XUV250DCV	PDG3XUV250DCU	PDG3XUV250DCW
24 Vac	PDG3XUV24ACV	PDG3XUV24ACU	PDG3XUV24ACW
130 Vac	PDG3XUV130ACV	PDG3XUV130ACU	PDG3XUV130ACW
240 Vac	PDG3XUV240ACV	PDG3XUV240ACU	PDG3XUV240ACW
440 Vac	PDG3XUV440ACV	PDG3XUV440ACU	PDG3XUV440ACW
525 Vac	PDG3XUV525ACV	PDG3XUV525ACU	PDG3XUV525ACW
600 Vac	PDG3XUV600ACV	PDG3XUV600ACU	PDG3XUV600ACW

**Note:** Use PDG3XUV18DCW when using Time Delay UVR.

#### Note

<sup>Ⓞ</sup> All options shown have 29 in/0.75 m pigtail termination. For alternate termination options, contact the product line.

**Factory Installed Tripping Accessories—Frame Size 3**

Shunt trips and undervoltage releases (UVRs) are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of installation in our factories.

Breaker catalog numbers with shunt trips or UVRs require a complete 20-digit catalog number, adding the tripping accessory functionality in digits 17 and 18 and adhering to the following conditions and tables.

- Digit 17 denotes the type of accessory installed and the terminal type
- Digit 18 denotes the voltage of the accessory
- If no additional accessories are selected, use NN for digits 15-16 and 19-20 of the catalog number
- Each breaker has space for one shunt trip or UVR tripping accessory only

**Shunt Trips**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	TH	SH	RH
48 Vdc	TJ	SJ	RJ
60 Vdc	TK	SK	RK
24 Vac/Vdc	TN	SN	RN
110–130 Vac/125 Vdc	TP	SP	RP
200–240 Vac/250 Vdc	TR	SR	RR
380–440 Vac	TC	SC	RC
480–525 Vac	TD	SD	RD
600 Vac	TE	SE	RE

**Undervoltage Releases (UVRs)**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	VH	UH	WH
24 Vdc	VG	UG	WG
48 Vdc	VJ	UJ	WJ
60 Vdc	VK	UK	WK
125 Vdc	VL	UL	WL
250 Vdc	VM	UM	WM
24 Vac	VF	UF	WF
130 Vac	VA	UA	WA
240 Vac	VB	UB	WB
440 Vac	VC	UC	WC
525 Vac	VD	UD	WD
600 Vac	VE	UE	WE

**Note:** Use suffix **US** for 18 Vdc when using Time Delay UVR.

## Handle Mechanisms—Frame Size 3

2

## Direct Rotary Handle Mechanism ①

Description	NEMA 1/12 Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism	PDG3XHMCS	HA
Standard lockable handle and mechanism with door interlock	PDG3XHMCSN	HB
Standard lockable handle and mechanism with mechanical padlock	PDG3XHMCS P	HC
Standard lockable handle and mechanism with door interlock and mechanical padlock	PDG3XHMCSNP	HE
Emergency lockable handle and mechanism	PDG3XHMCE	H1
Emergency lockable handle and mechanism with door interlock	PDG3XHMCE N	H2
Emergency lockable handle and mechanism with mechanical padlock	PDG3XHMCE P	H3
Emergency lockable handle and mechanism with door interlock and mechanical padlock	PDG3XHMCE NP	H5

## Variable Depth Rotary Handle Mechanism ①

## PDG3XHMD S



Description	NEMA 1/3R/12/4/4X Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism ②	PDG3XHMD S	DA
Standard lockable handle and mechanism with mechanical padlock ②	PDG3XHMD S P	DC
Standard lockable mechanism only with mechanical padlock	PDG3XMECH	—
Emergency lockable handle and mechanism ②	PDG3XHMD E	D1
Emergency lockable handle and mechanism with mechanical padlock ②	PDG3XHMD E P	D3
9 in (245 mm) handle mechanism shaft	PDG34XHMS245	—
17 in (445 mm) handle mechanism shaft	PDG34XHMS445	—
Standard NFPA79-compliant shaft handle	PDG34XHM79S	—
Emergency NFPA79-compliant shaft handle	PDG34XHM79E	—

## Metal Variable Depth Rotary Handle Mechanism ①

Description	NEMA 1/3R/12/4/4X Catalog Number
Metal standard lockable handle, mechanism, and 6-inch shaft	PDG3XHMD S06MH
Metal standard lockable handle, mechanism, and 12-inch shaft	PDG3XHMD S12MH
Metal standard lockable handle, mechanism, and 24-inch shaft	PDG3XHMD S24MH
Metal emergency lockable handle, mechanism, and 6-inch shaft	PDG3XHMD E06MH
Metal emergency lockable handle, mechanism, and 12-inch shaft	PDG3XHMD E12MH
Metal emergency lockable handle, mechanism, and 24-inch shaft	PDG3XHMD E24MH

## Flex Shaft Handle Mechanism

Cable Length (ft)	Metal Handle, NEMA 1/3R/12 Catalog Number	High Performance Handle, NEMA 1/3R/12 Catalog Number	Metal Handle, NEMA 4/4X Catalog Number	High Performance Handle, NEMA 4/4X Catalog Number
2	PDG3XFS02	PDG3XFS02HP	PDG3XFS02X	PDG3XFS02HPX
3	PDG3XFS03	PDG3XFS03HP	PDG3XFS03X	PDG3XFS03HPX
4	PDG3XFS04	PDG3XFS04HP	PDG3XFS04X	PDG3XFS04HPX
5	PDG3XFS05	PDG3XFS05HP	PDG3XFS05X	PDG3XFS05HPX
6	PDG3XFS06	PDG3XFS06HP	PDG3XFS06X	PDG3XFS06HPX
7	PDG3XFS07	PDG3XFS07HP	PDG3XFS07X	PDG3XFS07HPX
8	PDG3XFS08	PDG3XFS08HP	PDG3XFS08X	PDG3XFS08HPX
9	PDG3XFS09	PDG3XFS09HP	PDG3XFS09X	PDG3XFS09HPX
10	PDG3XFS10	PDG3XFS10HP	PDG3XFS10X	PDG3XFS10HPX

## Notes

① Standard handles are black and gray; Emergency handles are red and yellow.

② Handle mechanism shaft sold separately.

**Accessories—Frame Size 3****External Accessories**

Description	Fit Type	Catalog Number	Factory Installed Digits 19–20
Padlockable hasp	Top	PDG3XPLKT	L4
Padlockable hasp, OFF only	Top	PDG3XPLKTOFF	L1
Padlockable handle block	On handle	PDG3XPHB	—
Kirk lock provision—left side, Type F ①	Left side	PDG3XKLKPSF	L8
Kirk lock provision—right side, Type F ①	Right side		L9
Kirk lock provision—left/right side, Type FF ②	Left/right side	PDG3XKLKPSFF	—
Walking beam interlock ②③	400 A frame, two-, three- and four-pole	PDG3XWBI234P	—
	600 A frame, two- and three-pole	PDG3XWBI23P	—
	600 A frame, four-pole	PDG3XWBI4P	—
Electrical operator	24 Vdc	PDG3XROP24DC	—
	48–60 Vdc	PDG3XROP60DC	—
	125 Vdc	PDG3XROP125DC	—
	250 Vdc	PDG3XROP250DC	—
	110–130 Vac	PDG3XROP130AC	—
	200–240 Vac	PDG3XROP240AC	—
Plug-in breaker base only	Three-pole	PDG3XPBB3P600A	—
	Four-pole	PDG3XPBB4P600A	—
Plug-in breaker parts kit ④	Three-pole, 400 A	PDG3XPBK3P400A	—
	Three-pole, 600 A	PDG3XPBK3P600A	—
	Four-pole, 400 A	PDG3XPBK4P400A	—
	Four-pole, 600 A	PDG3XPBK4P600A	—
Terminal covers	Three-pole (400 A frame)	PDG3XTC3P400A	—
	Three-pole	PDG3XTC3P	—
	Four-pole	PDG3XTC4P	—
Interphase barriers	Single-pole	PDG3XIB	—
	Three-pole	PDG3XIB3P	—
	Four-pole	PDG3XIB4P	—
Finger protection	Three-pole	PDG3XFP3P	—
	Four-pole	PDG3XFP4P	—
Neutral CTs for ground fault (PXR)	Busbar type	PDG3XNCTB0600	—
Service entrance barrier kit	Three-pole	PRLSEBPD3	—
Withdrawable cassettes	Three-pole, 400 A	PDG3XWDR3P400A	—
	Four-pole, 400 A	PDG3XWDR4P400A	—
	Three-pole, 600 A	PDG3XWDR3P630A	—
	Four-pole, 600 A	PDG3XWDR4P630A	—

**Base Mounting Hardware**

Description	Catalog Number
Two-, three-, four-pole metric	66A4560G03

**Note:** Base mounting hardware is included with a circuit breaker or molded case switch.

**Aftermarket Products**

Description	Catalog Number
PD3 clear trip unit cover for thermal-magnetic trip unit	PDG3XTMTUCC-BP5
PD3 clear trip unit cover for PXR 10	PDG3XPXRCC10-BP5
PD3 clear trip unit cover for PXR 20	PDG3XPXRCC20-BP5
PD3 clear trip unit cover for PXR 25	PDG3XPXRCC25-BP5
Neutral voltage sensing module for PD 2, 3, 4, 5 and 6	PDG3XPXR25NVT
Eaton Power Defense trip unit tamper protection wire seal	5108A03H02

**Dimensions and Weights—Frame Size 3****Approximate Dimensions in Inches (mm)**

Number of Poles	Width	Height	Depth
2	5.47 (138.9)	10.13 (257.1)	4.30 (109.1)
3	5.47 (138.9)	10.13 (257.1)	4.30 (109.1)
4	7.22 (182.9)	10.13 (257.1)	4.30 (109.1)

**Approximate Shipping Weight in lb (kg)**

Breaker Type	2-Pole	3-Pole	4-Pole
PDG3 400 A	8.05 (3.65)	11.02 (5.0)	13.77 (6.25)
PDG3 600 A	10.43 (4.73)	12.36 (5.61)	16.27 (7.39)

**Notes**

- ① Provision only. Kirk keylock sold separately. Bolt projection in withdrawn position is 0.375 in (9.525 mm) for F-lock and 0 in (0 mm) for FF-lock.
- ② Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix **WB** in digits 19-20).
- ③ Requires two breakers.
- ④ Ensure plug-in parts kit matches breaker frame (400 A kit for 400 A frame, 600 A kit for 600 A frame).

Power Defense Molded Case Circuit Breakers—Frame Size 4



### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A)	
Catalog Number / Product Selection . . . . .	<b>V4-T2-59</b>
Accessories . . . . .	<b>V4-T2-64</b>
Dimensions and Weights . . . . .	<b>V4-T2-70</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Power Defense Molded Case Circuit Breakers—Frame Size 4

#### Product Description

Frame Size 4 covers a range of 300 A through 800 A with a complete offering of trip units, including PXR electronic trip units and fixed-adjustable thermal-magnetic trip units. PD-4 is available in a single 800 A frame.

#### Application Description

Frame Size 4 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection and 100% UL ratings. PXR trip units in PD-4 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication and arc flash reduction options.

#### Features and Benefits

Frame Size 4 breakers are modular and available as complete breakers from the factory or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

#### Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



### Catalog Number / Product Selection

#### Power Defense—Frame Size 4 (300–800 A)

Frame Size 4 covers a range of 320 A through 800 A using electronic trip units, and 300 A through 800 A using thermal-magnetic trip units. It is available in configurations of two-, three- and four-pole, with the two-pole being in the same physical size of a three-pole variant.

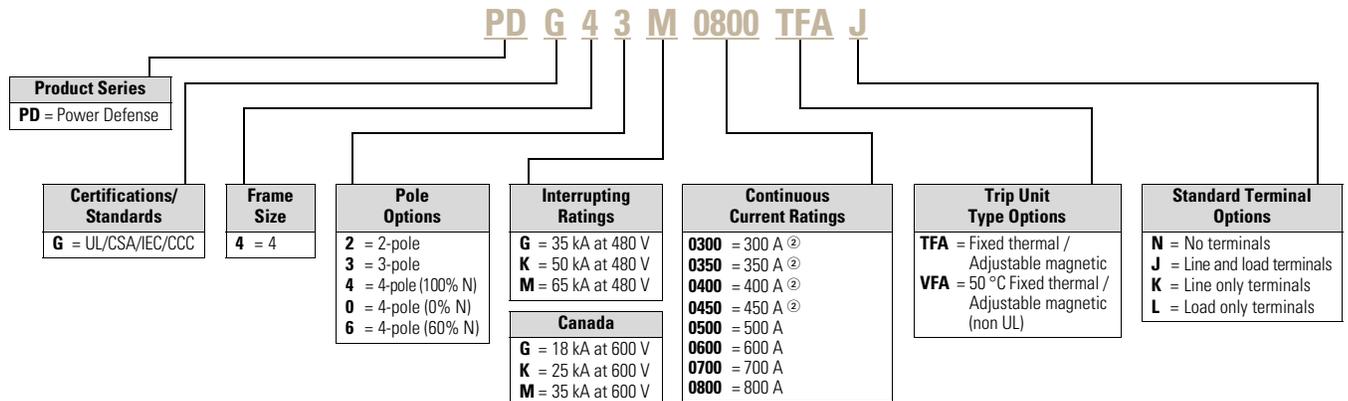
#### Interrupting Ratings

	G		K		M	
UL/CSA	kA rms		kA rms		kA rms	
240 Vac	65		85		100	
480 Vac	35		50		65	
600 Vac	18		25		35	
250 Vdc ①	22		22		25	
IEC	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>
240 Vac	55	55	85	85	100	100
380–415 Vac	36	36	50	50	70	53
440 Vac	30	22.5	35	35	50	40
480 Vac	25	20	35	22.5	50	30
525 Vac	20	16.5	25	20	30	25
660–690 Vac	8	4	10	5	15	7.5
250 Vdc ①	22	22	22	22	25	25

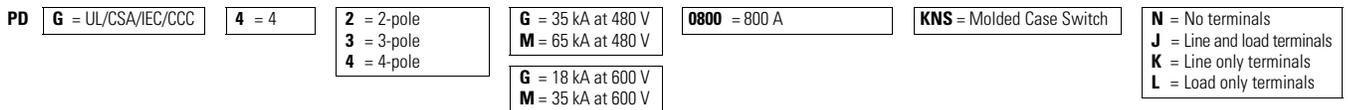
#### Power Defense—Frame Size 4 (300–800 A)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Molded Case Circuit Breakers with Thermal-Magnetic Trip Units (TMTU)—Globally Rated



#### Molded Case Switches—Globally Rated ③



#### Notes

- ① DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using 2 poles in series.
- ② Not available in four-pole 60% neutral protection.
- ③ Molded case switch may open above 6000 A.

# 2.2

## Molded Case Circuit Breakers

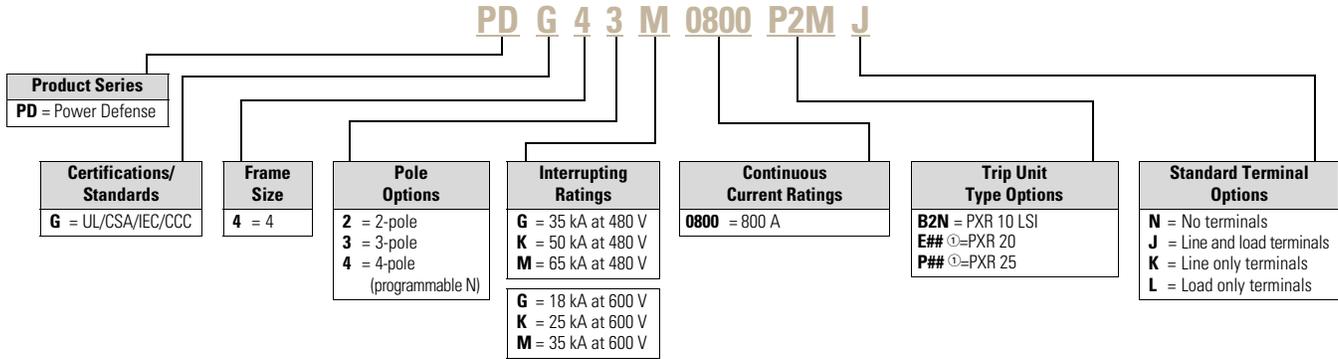
### Power Defense Molded Case Circuit Breakers

2

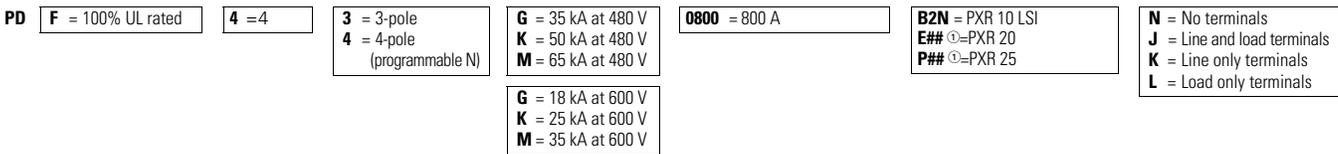
#### Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Molded Case Circuit Breakers with PXR ETU—Globally Rated



#### Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)

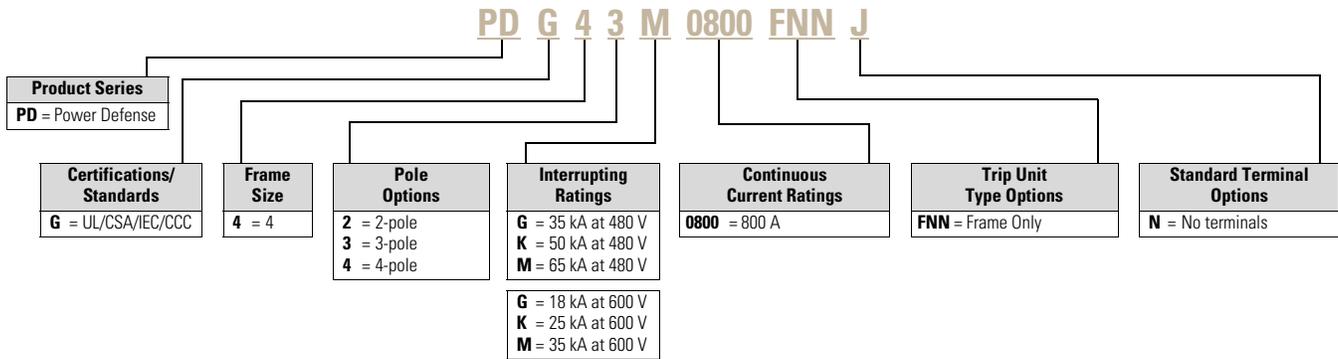


#### Globally Rated Frame Only

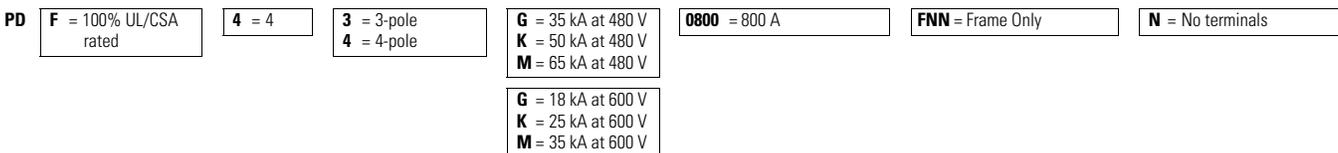
PD-4 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Frame Only—Globally Rated



#### Frame Only—Globally Rated (100% UL Rated)



#### Note

⊕ See tables and descriptions on **Page V4-T2-62** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

### Trip Units

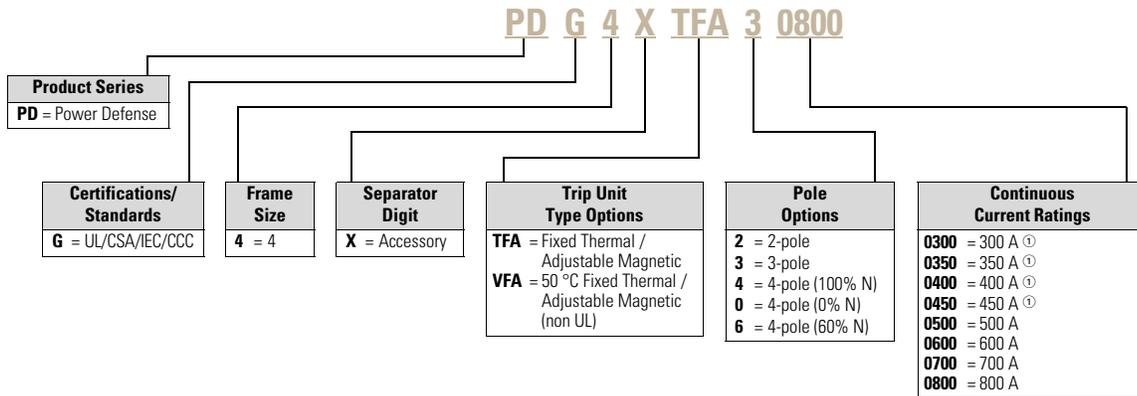
PD-4 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. For two-pole breakers using electronic trip units, three-pole trip units are used.

PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

### Trip Units Only

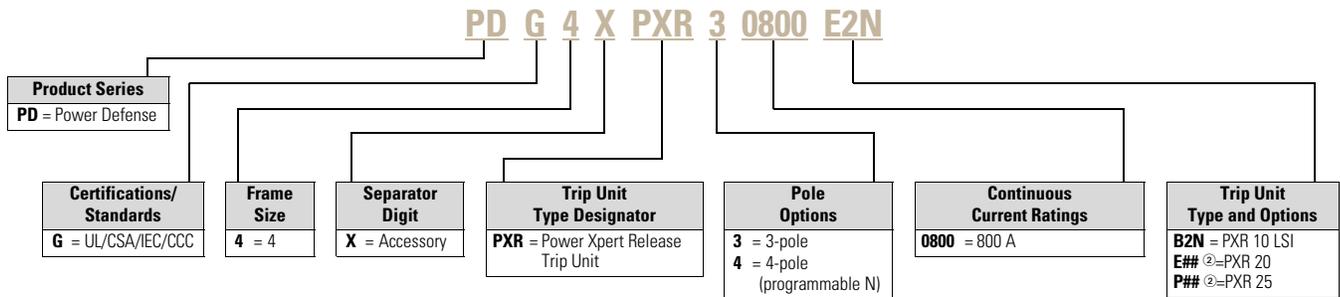
This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

### Thermal-Magnetic Trip Units



### Power Xpert Release (PXR) Electronic Trip Units

### Power Xpert Release (PXR) Electronic Trip Units



### Notes

- ① Not available in four-pole 60% neutral protection.
- ② See tables and descriptions on **Page V4-T2-62** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

#### Power Xpert Release (PXR) Trip Unit Options—Frame Size 4

2

#### Power Xpert Release (PXR) Trip Unit Options

PXR	ETU	#(1)—Protection Type				#(2)—Available Configured Options								
		LSI	LSIG ①	LSI with Arcflash Reduction Maintenance System	LSIG with Arcflash Reduction Maintenance System	—	Relays	Relays Modbus	Relays ZSI	Relays CAM	Relays Modbus ZSI	Relays CAM	Relays Modbus ZSI	Relays Modbus CAM
PXR 10	B	2	—	—	—	N	—	—	—	—	—	—	—	—
PXR 20	E	2	—	—	—	N	R	M	Z	C	W	X	—	—
		—	3	4	5	—	R	M	Z	C	W	X	—	—
PXR 25	P	2	3	4	5	—	—	M	—	—	W	—	D	Y

#### Descriptions of PXR Configured Options

**Relays**—2 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions

**Modbus**—Modbus RTU directly from breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required

**ZSI**—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

**CAM**—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

#### Arcflash Reduction Maintenance System, or Maintenance Mode

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of Arcflash Reduction Maintenance System

#### Auxiliary Power

- Connection included with all PXR 20 and 25 trip units

**Note:** For PXR20 units, wire harness connections for auxiliary power not included on E2N styles.

- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux +24 V, Aux 0 V)

#### Available Continuous Current (I<sub>r</sub>) Settings on PXR Electronic Trip Units

Option	Setting	Catalog Number Selection and Maximum Setting (I <sub>n</sub> ) 800 A
PXR 10, PXR 20	1	320 A
	2	350 A
	3	400 A
	4	450 A
	5	500 A
	6	550 A
	7	600 A
	8	630 A
	9	700 A
	10 = I <sub>n</sub>	800 A
PXR 25	Programmable from minimum to maximum values in 10 A increments.	

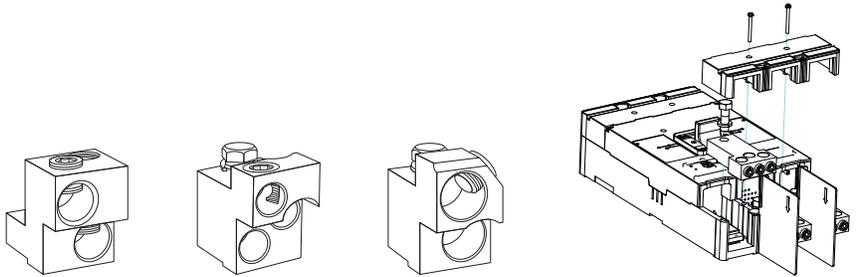
#### Note

- ① All neutral current sensors required for LSIG protection are sold separately.

**Terminals—Frame Size 4**

Catalog numbers shown are for a single side of a three-pole breaker. For Frame Size 4, terminals are also available in single-pole kits; these are not available in two-pole or four-pole configurations, unless otherwise noted. For single terminals, replace **X3** with **X1** on the catalog number.

*Example:* PDG4**X3**TA800 becomes PDG4**X1**TA800 for a single unit.

**Terminal Types**

PDG4X3TA700 PDG4X1T600 PDG4X1TA700CW	PDG4X3TA800 PDG4X1TA800SW PDG4X1TA800CW	PDG4X3TA801 PDG4X1T800 PDG4X1TA801CW	PDG4X3TA800RF
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**Note:** Pictures are for reference only.

**Terminals**

Maximum Breaker Amperes	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG / kcmil Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	3-Pole Catalog Number	Included Accessories	Digit 14 Designation			Factory Config. Ampere Range
									Line and Load	Line Only	Load Only	
<b>Standard Terminals</b>												
700	Aluminum	Cu/Al	B, C	2	1–500	42.4–253	PDG4X3TA700	—	J	K	L	300–700
800	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	PDG4X3TA800	—	J	K	L	800
<b>Alternate Terminals</b>												
800	Aluminum	Cu/Al	B, C	2	500–750	253–380	PDG4X3TA801	—	T	U	V	300–800
<b>Non-Aluminum Terminals</b>												
600	Copper	Cu	B, C	2	2/0–500	67.4–238	PDG4X1T600	—	W	Y	Z	300–600
800	Copper	Cu	B, C	3	3/0–300	85–152	PDG4X1T800	—	W	Y	Z	700–800
<b>Strandable Terminals</b>												
800	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	PDG4X1TA800SW	—	A	B	C	300–800
			D, G, H, I, K, M		3/0–300	85–152						
<b>Control Wire Terminals</b>												
700	Aluminum	Cu/Al	B, C	2	1–500	42.4–253	PDG4X1TA700CW	—	1	2	3	300–700
800	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	PDG4X1TA800CW	—	1	2	3	800
800	Aluminum	Cu/Al	B, C	2	500–750	253–380	PDG4X1TA801CW	—	4	5	6	300–800
<b>Rear Fed Terminals</b> <sup>②</sup>												
800	Aluminum	Cu/Al	B, C	3	3/0–300	85–152	PDG4X3TA800RF	Interphase barriers	—	—	—	300–800
<b>Rear Connectors</b> <sup>②</sup>												
800	—	—	—	—	—	—	PDG4X3T800RC	—	R	—	—	300–800
<b>End Cap Kits/Screw Terminals</b>												
800	—	—	—	—	—	—	PDG4X3TS800	—	S	D	E	300–800

**Notes**

Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes. For connector kit options for Eaton's panelboards, see document RP01400001E.

<sup>①</sup> End cap kits are available in three-pole and four-pole configurations only.

For four-pole, use catalog number **PDG4X4TS800**.

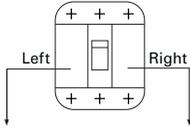
<sup>②</sup> Breaker loses UL rating when fitted with rear-fed terminals or rear connectors.

#### Accessories

2

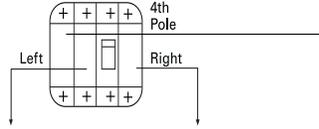
#### Internal Accessory Configurations—Frame Size 4

##### Three-Pole Circuit Breakers



Tripping Accessory Options	Alarm Options (1–2 spaces) <sup>①</sup>	Aux Options (4 spaces)
None	None	None
Shunt Trip	1NO (1 space)	1NO (1 space)
	1NC (1 space)	1NC (1 space)
	1NO/1NC (2 spaces)	1NO/1NC (2 spaces)
	2NO (2 spaces)	2NO (2 spaces)
UVR	2NC (2 spaces)	2NC (2 spaces)
		2CO (4 spaces)
		4NO (4 spaces)
		4NC (4 spaces)

##### Four-Pole Circuit Breakers



Tripping Accessory Options	Alarm Options (1–2 spaces) <sup>①</sup>	Aux Options (6 spaces)
None	None	None
Shunt Trip	1NO (1 space)	1NO (1 space)
	1NC (1 space)	1NC (1 space)
	1NO/1NC (2 spaces)	1NO/1NC (2 spaces)
	2NO (2 spaces)	2NO (2 spaces)
UVR	2NC (2 spaces)	2NC (2 spaces)
		2CO (4 spaces)
		4NO (4 spaces)
		4NC (4 spaces)
		3CO (6 spaces)
		6NO (6 spaces)
		6NC (6 spaces)

**Note**

<sup>①</sup> Frame 4 Power Defense breakers with electronic trip units and communication only have access to one alarm space. Breakers with thermal-magnetic trip units or electronic trip units without communication, have access to two alarm spaces.

**Alarm and Auxiliary Contact Blocks—Frame Size 4**

Power Defense breakers have designated positions for alarm and auxiliary switches in the right pole accessory cavity. For Frame 4, the two left-most positions are used for alarm switches, and the two right-most locations are used for auxiliary switches.

Power Defense breakers have secondary covers for ease of field installation of accessories, including alarm and auxiliary switches.

Power Defense alarm and auxiliary switches are available in contact blocks, in Form A (NO), Form B (NC), and Form C (NO-NC) types. Form A and Form B contacts take one position in the breaker accessory cavity, and Form C contacts take two positions in the cavity. Identical contact blocks are used for the alarm and auxiliary switch functions.

Electronic breakers with communications options (Modbus RTU or CAM Link) lose one alarm switch position, but are also able to provide trip position via communications and the PXR programmable relays.

**Contact Blocks****Pigtail (29 in / 0.75 m) Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXA	PDGXB	PDGXC
Type	Form A / NO	Form B / NC	Form C / NO-NC

**Screw Terminal Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXA	PDGXB	PDGXA + PDGXB
Type	Form A / NO	Form B / NC	For NO-NC, use two separate contact blocks

**Push-In Clamp Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXUA	PDGXUB	PDGXUC
Type	Form A / NO	Form B / NC	Form C / NO-NC

**Pigtail (118 in / 3.0 m) Contact Blocks for Alarm and Auxiliary Switch Functionality**

Catalog Number	PDGXDA	PDGXDB	PDGXDC
Type	Form A / NO	Form B / NC	Form C / NO-NC

**Contact Blocks for Alarm and Auxiliary Switch Functionality—Bulk Packs**

Catalog Number	Type	Termination	Bulk Pack Quantity <sup>①</sup>
PDGXA-BP20	Form A / NO	Screw Terminal	20
PDGXB-BP20	Form B / NC	Screw Terminal	20
PDGXUA-BP20	Form A / NO	Push-in Clamp	20
PDGXUB-BP20	Form B / NC	Push-in Clamp	20
PDGXUC-BP10	Form C / NO-NC	Push-in Clamp	10

**Note**

<sup>①</sup> Order in multiples of quantity listed to receive bulk pack. (ex. Order qty 20 PDGXA-BP20 to receive 1 bulk pack).

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

2

#### Factory Installation of Alarm and Auxiliary Switches—Frame Size 4

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers installation service in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and

auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables.

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types
- Switches may be requested for alarm only, auxiliary only or a combination of the two

- For Eaton factory installation, the same type of terminals (i.e., all pigtail 0.75 m, all screw, etc.) must be used. If a combination of alarm and auxiliary switches is selected, they must be the same type (i.e., all 1NC, all 1NO/1NC, etc.)
- Digit 16 denotes number and type (NO, NC) of switches installed

- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number
- Electronic breakers with communications lose one alarm switch position in order to provide trip status via communications. They do not lose an auxiliary position for this purpose

#### Pigtails—29 in / 0.75 m (A, B, C)

Alarm Switch	Auxiliary Switch Three-Pole	None									Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC	3NO/3NC	6NO	6NC
Alarm Switch	None	NN	AA	AB	AC	AD	AE	A1	A2	A3	A4	A5	A6
	1NO	BA	CA	—	—	—	—	—	—	—	—	—	—
	1NC	BB	—	CB	—	—	—	—	—	—	—	—	—
	1NO/1NC	BC	—	—	CC	—	—	C1	—	—	C4	—	—
	2NO	BD	—	—	—	CD	—	—	C2	—	—	C5	—
	2NC	BE	—	—	—	—	CE	—	—	C3	—	—	C6

#### Screw Terminals (X, Y, Z)

Alarm Switch	Auxiliary Switch Three-Pole	None									Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC	3NO/3NC	6NO	6NC
Alarm Switch	None	NN	XA	XB	XC	XD	XE	X1	X2	X3	X4	X5	X6
	1NO	YA	ZA	—	—	—	—	—	—	—	—	—	—
	1NC	YB	—	ZB	—	—	—	—	—	—	—	—	—
	1NO/1NC	YC	—	—	ZC	—	—	Z1	—	—	Z4	—	—
	2NO	YD	—	—	—	ZD	—	—	Z2	—	—	Z5	—
	2NC	YE	—	—	—	—	ZE	—	—	Z3	—	—	Z6

#### Push-In Clamps (U, V, W)

Alarm Switch	Auxiliary Switch Three-Pole	None									Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC	3NO/3NC	6NO	6NC
Alarm Switch	None	NN	DA	DB	DC	DD	DE	D1	D2	D3	D4	D5	D6
	1NO	EA	FA	—	—	—	—	—	—	—	—	—	—
	1NC	EB	—	FB	—	—	—	—	—	—	—	—	—
	1NO/1NC	EC	—	—	FC	—	—	F1	—	—	F4	—	—
	2NO	ED	—	—	—	FD	—	—	F2	—	—	F5	—
	2NC	EE	—	—	—	—	FE	—	—	F3	—	—	F6

**Factory Installation of Alarm and Auxiliary Switches—Frame Size 4****Pigtails—118 in / 3.0 m (D, E, F)**

Alarm Switch		Auxiliary Switch Three-Pole									Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC	3NO/3NC	6NO	6NC
Alarm Switch	None	NN	UA	UB	UC	UD	UE	U1	U2	U3	U4	U5	U6
	1NO	VA	WA	—	—	—	—	—	—	—	—	—	—
	1NC	VB	—	WB	—	—	—	—	—	—	—	—	—
	1NO/1NC	VC	—	—	WC	—	—	W1	—	—	W4	—	—
	2NO	VD	—	—	—	WD	—	—	W2	—	—	W5	—
	2NC	VE	—	—	—	—	—	WE	—	—	W3	—	W6

**Pigtails—29 in / 0.75 m (A, B, C)**

Alarm Switch		Auxiliary Switch Three-Pole									Four-Pole		
		None	1NO	1NC	1NO/1NC	2NO	2NC	2NO/2NC	4NO	4NC	3NO/3NC	6NO	6NC
Alarm Switch	None	NN	AA	AB	AC	AD	AE	A1	A2	A3	A4	A5	A6
	1NO	BA	CA	—	CF	CG	—	CP	CQ	—	CT	CU	—
	1NC	BB	—	CB	CH	—	CJ	CR	—	CS	CV	—	CW

**Tripping Accessories—Frame Size 4**

Power Defense breakers have designated positions for shunt trips and undervoltage releases (UVRs) in the left pole accessory cavity. Each breaker has space for one tripping accessory only.

Power Defense breakers have secondary covers for ease of field installation of tripping accessories.

**Shunt Trips**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	PDG4XST12DCT	PDG4XST12DCS	PDG4XST12DCR
48 Vdc	PDG4XST48DCT	PDG4XST48DCS	PDG4XST48DCR
60 Vdc	PDG4XST60DCT	PDG4XST60DCS	PDG4XST60DCR
24 Vac/Vdc	PDG4XST24ACDCT	PDG4XST24ACDCS	PDG4XST24ACDCR
110–130 Vac/125 Vdc	PDG4XST130ACDCT	PDG4XST130ACDCS	PDG4XST130ACDCR
200–240 Vac/250 Vdc	PDG4XST250ACDCT	PDG4XST250ACDCS	PDG4XST250ACDCR
380–440 Vac	PDG4XST440ACT	PDG4XST440ACS	PDG4XST440ACR
480–525 Vac	PDG4XST525ACT	PDG4XST525ACS	PDG4XST525ACR
600 Vac	PDG4XST600ACT	PDG4XST600ACS	PDG4XST600ACR

**Undervoltage Releases (UVRs)**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	PDG4XUV12DCV	PDG4XUV12DCU	PDG4XUV12DCW
24 Vdc	PDG4XUV24DCV	PDG4XUV24DCU	PDG4XUV24DCW
48 Vdc	PDG4XUV48DCV	PDG4XUV48DCU	PDG4XUV48DCW
60 Vdc	PDG4XUV60DCV	PDG4XUV60DCU	PDG4XUV60DCW
125 Vdc	PDG4XUV125DCV	PDG4XUV125DCU	PDG4XUV125DCW
250 Vdc	PDG4XUV250DCV	PDG4XUV250DCU	PDG4XUV250DCW
24 Vac	PDG4XUV24ACV	PDG4XUV24ACU	PDG4XUV24ACW
130 Vac	PDG4XUV130ACV	PDG4XUV130ACU	PDG4XUV130ACW
240 Vac	PDG4XUV240ACV	PDG4XUV240ACU	PDG4XUV240ACW
440 Vac	PDG4XUV440ACV	PDG4XUV440ACU	PDG4XUV440ACW
525 Vac	PDG4XUV525ACV	PDG4XUV525ACU	PDG4XUV525ACW
600 Vac	PDG4XUV600ACV	PDG4XUV600ACU	PDG4XUV600ACW

**Note:** Use PDG4XUV18DCW when using Time Delay UVR.

**Factory Installed Tripping Accessories—Frame Size 4**

Shunt trips and undervoltage releases (UVRs) are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of installation in our factories.

Breaker catalog numbers with shunt trips or UVRs require a complete 20-digit catalog number, adding the tripping accessory functionality in digits 17 and 18 and adhering to the following conditions and tables.

- Digit 17 denotes the type of accessory installed and the terminal type
- Digit 18 denotes the voltage of the accessory
- If no additional accessories are selected, use NN for digits 15-16 and 19-20 of the catalog number
- Each breaker has space for one shunt trip or UVR tripping accessory only

**Shunt Trips**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	TH	SH	RH
48 Vdc	TJ	SJ	RJ
60 Vdc	TK	SK	RK
24 Vac/Vdc	TN	SN	RN
110–130 Vac/125 Vdc	TP	SP	RP
200–240 Vac/250 Vdc	TR	SR	RR
380–440 Vac	TC	SC	RC
480–525 Vac	TD	SD	RD
600 Vac	TE	SE	RE

**Undervoltage Releases (UVRs)**

Voltage	Screw Terminals	Pigtail (29 in / 0.75 m)	Pigtail (118 in / 3.0 m)
12 Vdc	VH	UH	WH
24 Vdc	VG	UG	WG
48 Vdc	VJ	UJ	WJ
60 Vdc	VK	UK	WK
125 Vdc	VL	UL	WL
250 Vdc	VM	UM	WM
24 Vac	VF	UF	WF
130 Vac	VA	UA	WA
240 Vac	VB	UB	WB
440 Vac	VC	UC	WC
525 Vac	VD	UD	WD
600 Vac	VE	UE	WE

**Note:** Use suffix **US** for 18 Vdc when using Time Delay UVR.

**Handle Mechanisms—Frame Size 4****Direct Rotary Handle Mechanism** ①

Description	NEMA 1/12 Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism	PDG4XHMCS	HA
Standard lockable handle and mechanism with door interlock	PDG4XHMCSN	HB
Standard lockable handle and mechanism with mechanical padlock	PDG4XHMCS P	HC
Standard lockable handle and mechanism with door interlock and mechanical padlock	PDG4XHMCSNP	HE
Emergency lockable handle and mechanism	PDG4XHMCE	H1
Emergency lockable handle and mechanism with door interlock	PDG4XHMCE N	H2
Emergency lockable handle and mechanism with mechanical padlock	PDG4XHMCE P	H3
Emergency lockable handle and mechanism with door interlock and mechanical padlock	PDG4XHMCE NP	H5

**Variable Depth Rotary Handle Mechanism** ①

Description	NEMA 1/3R/12/4/4X Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism ②	PDG4XHMD S	DA
Standard lockable handle and mechanism with mechanical padlock ②	PDG4XHMD SP	DC
Standard lockable mechanism only with mechanical padlock	PDG4XMECH	—
Emergency lockable handle and mechanism ②	PDG4XHMD E	D1
Emergency lockable handle and mechanism with mechanical padlock ②	PDG4XHMD EP	D3
9 in (245 mm) handle mechanism shaft	PDG34XHMS245	—
17 in (445 mm) handle mechanism shaft	PDG34XHMS445	—
Standard NFPA79-compliant shaft handle	PDG34XHM79S	—
Emergency NFPA79-compliant shaft handle	PDG34XHM79E	—

**Metal Variable Depth Rotary Handle Mechanism** ①

Description	NEMA 1/3R/12/4/4X Catalog Number
Metal standard lockable handle, mechanism, and 6-inch shaft	PDG4XHMD S06MH
Metal standard lockable handle, mechanism, and 12-inch shaft	PDG4XHMD S12MH
Metal standard lockable handle, mechanism, and 24-inch shaft	PDG4XHMD S24MH
Metal emergency lockable handle, mechanism, and 6-inch shaft	PDG4XHMD E06MH
Metal emergency lockable handle, mechanism, and 12-inch shaft	PDG4XHMD E12MH
Metal emergency lockable handle, mechanism, and 24-inch shaft	PDG4XHMD E24MH

**Flex Shaft Handle Mechanism**

Cable Length (ft)	Metal Handle, NEMA 1/3R/12 Catalog Number	High Performance Handle, NEMA 1/3R/12 Catalog Number	Metal Handle, NEMA 4/4X Catalog Number	High Performance Handle, NEMA 4/4X Catalog Number
4	PDG4XFS04	PDG4XFS04HP	PDG4XFS04X	PDG4XFS04HPX
5	PDG4XFS05	PDG4XFS05HP	PDG4XFS05X	PDG4XFS05HPX
6	PDG4XFS06	PDG4XFS06HP	PDG4XFS06X	PDG4XFS06HPX
10	PDG4XFS10	PDG4XFS10HP	PDG4XFS10X	PDG4XFS10HPX

**Notes**

① Standard handles are black and gray; Emergency handles are red and yellow.

② Handle mechanism shaft sold separately.

**Accessories—Frame Size 4****External Accessories**

Description	Fit Type	Catalog Number	Factory Installed Digits 19–20
Padlockable hasp	Top	PDG4XPLKT	L4
Padlockable hasp, OFF only	Top	PDG4XPLKTOFF	L1
Padlockable handle block	On handle	PDG4XPHB	—
Kirk lock provision—left side <sup>①</sup>	Left side	PDG4XKLKPSF	L8
Kirk lock provision—right side <sup>①</sup>	Right side		L9
Walking beam interlock <sup>②③</sup>	Two-, three-, and four-pole	PDG4XWBI234P	—
Electrical operator	24 Vdc	PDG4XROP24DC	—
	48–60 Vdc	PDG4XROP60DC	—
	125 Vdc	PDG4XROP125DC	—
	250 Vdc	PDG4XROP250DC	—
	110–130 Vac	PDG4XROP130AC	—
	200–240 Vac	PDG4XROP240AC	—
Interphase barriers	Single-pole	PDG4XIB	—
	Three-pole	PDG4XIB3P	—
	Four-pole	PDG4XIB4P	—
Neutral CTs for ground fault (PXR)	Busbar Type	PDG4XNCTB0800	—
Service entrance barrier kit	Three-pole	PRLSEBPD4	—
Withdrawable cassettes	Three-pole, 800 A	PDG4XWDR3P800A	—
	Four-pole, 800 A	PDG4XWDR4P800A	—

**Base Mounting Hardware**

Description	Catalog Number
Two-, three-, four-pole metric	BMH4M
Two-, three-, four-pole English	BMH4

**Note:** Base mounting hardware is included with a circuit breaker or molded case switch.

**Aftermarket Products**

Description	Catalog Number
PD4 clear trip unit cover for thermal-magnetic trip unit	PDG4XTMTUCC-BP10
PD4 clear trip unit cover for PXR 25	PDG4XPXRCC25-BP10
PD4 clear trip unit cover for PXR 20	PDG4XPXRCC20-BP10
PD4 clear trip unit cover for PXR 10	PDG4XPXRCC10-BP10
Neutral voltage sensing module for PD 2, 3, 4, 5 and 6	PDG4XPXR25NVT
Eaton Power Defense trip unit tamper protection wire seal	5108A03H02

**Dimensions and Weights—Frame Size 4****Approximate Dimensions in Inches (mm)**

Number of Poles	Width	Height	Depth
2	8.25 (209.6)	16 (406.4)	4.38 (111.2)
3	8.25 (209.6)	16 (406.4)	4.38 (111.2)
4	11.0 (279.4)	16 (406.4)	4.38 (111.2)

**Approximate Shipping Weight in lb (kg)**

Breaker Type	2-Pole	3-Pole	4-Pole
PDG4 800 A	30 (13.6)	30 (13.6)	39.9 (18.08)

**Notes**

- ① Provision only. For use with Type F Kirk keylock (sold separately). Bolt projection in withdrawn position is 0.375 in (9.525 mm).
- ② Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix **WB**).
- ③ Requires two breakers.

Power Defense Molded Case Circuit Breakers—Frame Size 5



### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A)	
Catalog Number / Product Selection . . . . .	<b>V4-T2-72</b>
Accessories . . . . .	<b>V4-T2-77</b>
Dimensions and Weights . . . . .	<b>V4-T2-79</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Power Defense Molded Case Circuit Breakers—Frame Size 5

#### Product Description

Frame Size 5 covers a global range of 320 A through 1200 A with a complete offering of advanced PXR electronic trip units. It includes two frame sizes of 800 A and 1200 A. Additionally, PD-5 has a 1600 A IEC (CE) and GB (CCC) frame that covers 800 A through 1600 A.

#### Application Description

Frame Size 5 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection, 100% UL ratings, high interrupting capacity and high instantaneous settings for selective coordination. PXR trip units in PD-5 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication and arc flash reduction options.

#### Features and Benefits

Frame Size 5 breakers are modular and available as complete breakers from the factory or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

#### Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

#### Catalog Number / Product Selection

2

#### Power Defense—Frame Size 5 (320–1200 A) for UL/CSA and 320–1600 A for IEC/CCC)

Frame Size 5 covers a range of 320 A through 1200 A using electronic trip units. It is available in configurations of two-, three- and four-pole, with the two-pole being in the same physical size of a three-pole variant. Additionally, an IEC / CCC option is available for 1600 A, with selectable ratings from 800 A through 1600 A.

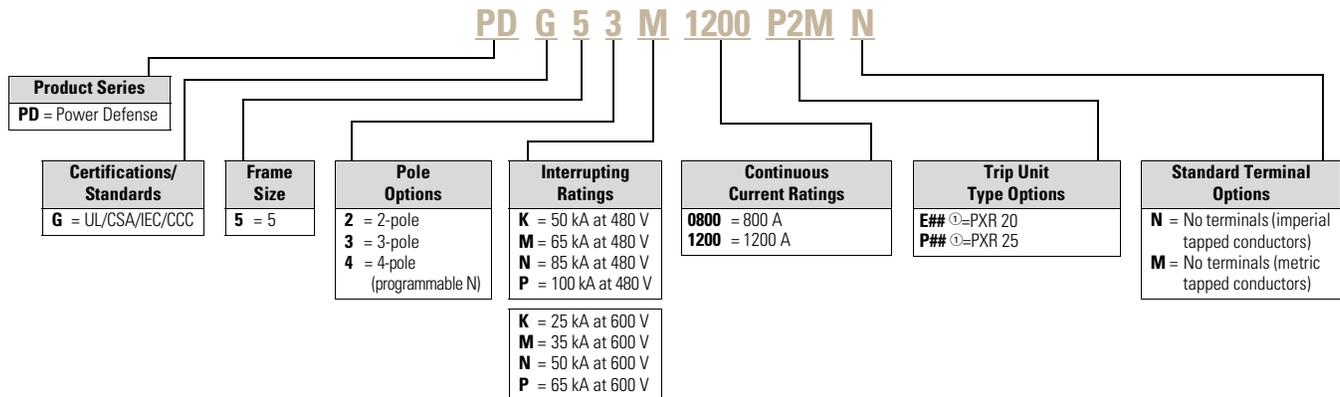
#### Interrupting Ratings

	K		M		N		P		T	
UL/CSA	kA rms									
240 Vac	85		100		150		200		200	
480 Vac	50		65		85		100		125	
600 Vac	25		35		50		65		85	
IEC	I <sub>cu</sub>	I <sub>cs</sub>								
240 Vac	85	85	100	100	150	100	200	150	—	—
380–415 Vac	50	50	70	53	70	50	100	50	—	—
440 Vac	35	35	50	40	70	50	100	50	—	—
480 Vac	35	22.5	50	30	65	40	85	40	—	—
525 Vac	25	20	30	25	35	25	40	25	—	—
660–690 Vac	10	5	15	7.5	20	10	35	18	—	—

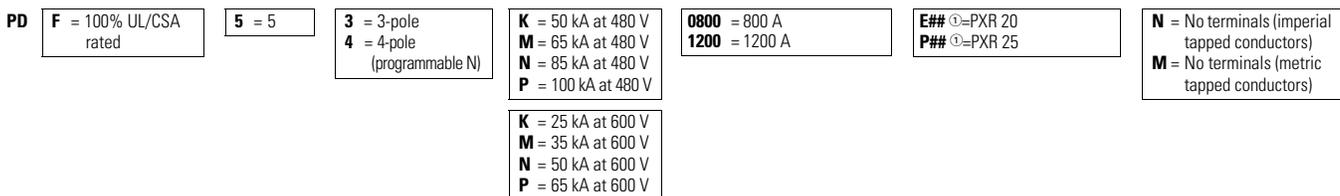
#### Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

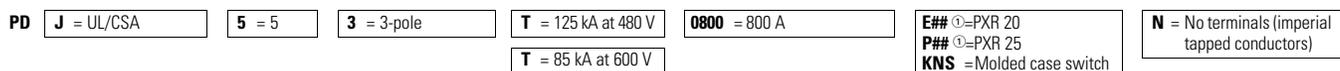
#### Molded Case Circuit Breakers with PXR ETU—Globally Rated



#### Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)



#### Molded Case Circuit Breakers with PXR ETU (125 kA at 480 V / 85 kA at 600 V)—UL/CSA Rated



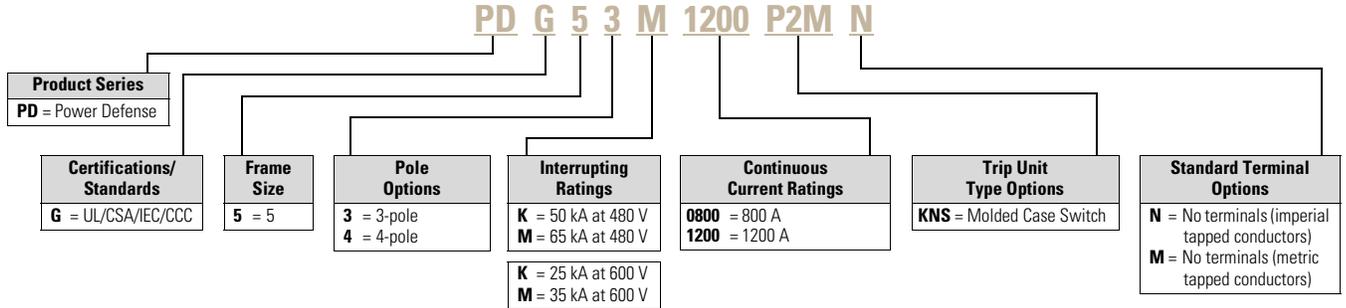
#### Note

See tables and descriptions on Page V4-T2-75 for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

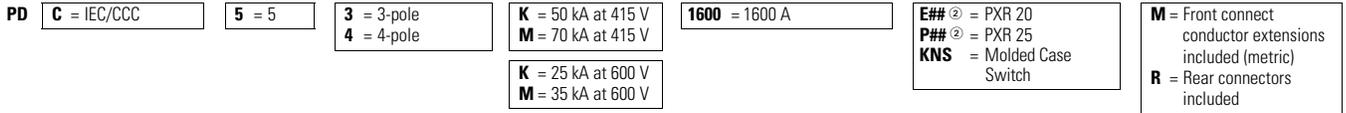
### Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Molded Case Switches—Globally Rated ①



#### Molded Case Circuit Breakers—IEC/CCC Rated (only available as a complete breaker)

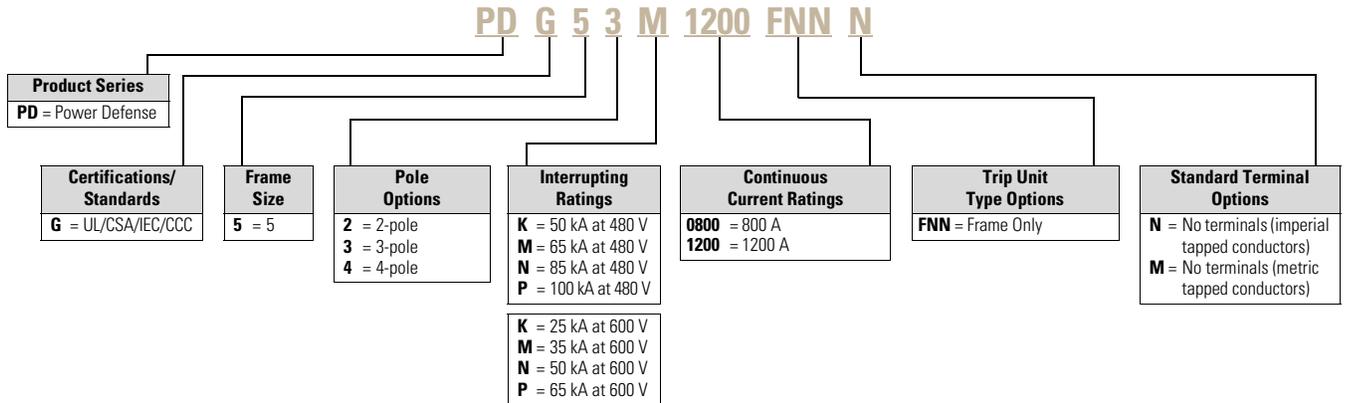


#### Globally Rated Frame Only

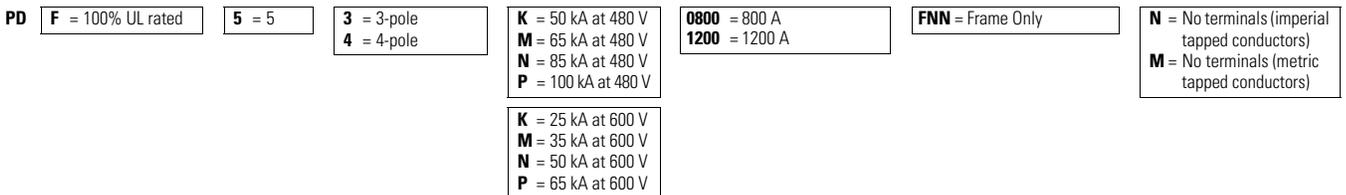
PD-5 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Frame Only—Globally Rated



#### Frame Only—Globally Rated (100% UL Rated)



#### Notes

- ① Molded case switch may open above 14,000 A.
- ② See tables and descriptions on **Page V4-T2-75** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

2

#### Trip Units

PD-5 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each frame rating (800 A, 1200 A, and 1600 A—IEC only) must use trip units of the same rating. Additionally, for two-pole breakers, three-pole trip units are used.

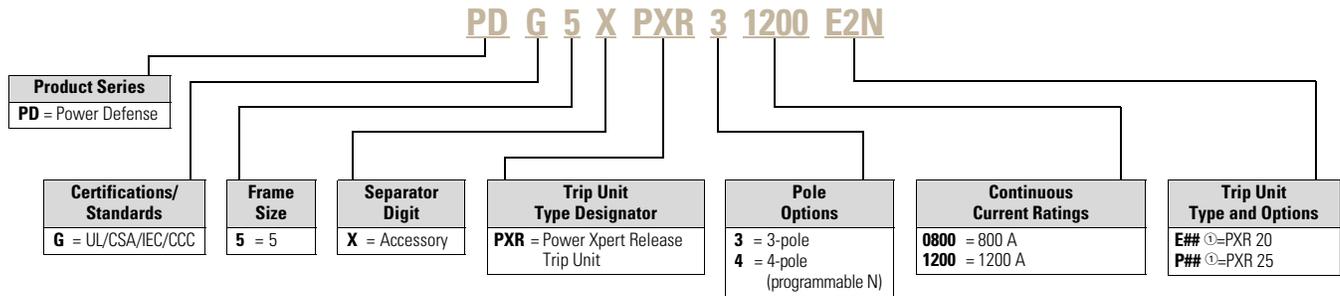
PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

#### Power Xpert Release (PXR) Electronic Trip Units

#### Power Xpert Release (PXR) Electronic Trip Units

#### Trip Units Only

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.



#### Note

① See tables and descriptions on **Page V4-T2-75** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

**Power Xpert Release (PXR) Trip Unit Options—Frame Size 5****Power Xpert Release (PXR) Trip Unit Options**

PXR	ETU	#(1)—Protection Type			#(2)—Available Configured Options		
		LSI	LSIG ①	LSI with Arcflash Reduction Maintenance System	LSIG with Arcflash Reduction Maintenance System	Relays Modbus	Relays Modbus ZSI
PXR 20	E	2	3	4	5	M	W
PXR 25	P	2	3	4	5	M	W

**Descriptions of PXR Configured Options**

**Relays**—3 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 4 wires (RLY1, RLY2, RLY3, RLYC Common)
- Programmable to indicate breaker conditions

**Modbus**—Modbus RTU directly from breaker

- Interface: 3 wires (RTU\_D(+), RTU\_D(-), RTU\_GND)
- No additional modules required

**ZSI**—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

**CAM**—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for ModbusTCP and PROFIBUS

**Arcflash Reduction Maintenance System, or Maintenance Mode**

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of Arcflash Reduction Maintenance System

**Auxiliary Power**

- Connection included with all PXR 20 and 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux + 24 V, Aux 0 V)

**Available Continuous Current ( $I_r$ ) Settings on PXR Electronic Trip Units**Catalog Number Selection and Maximum Setting ( $I_n$ )

Option	Setting	0800	1200	1600
		800 A	1200 A	1600 A (IEC only)
PXR 20	1	320 A	500 A	800 A
	2	350 A	550 A	900 A
	3	400 A	600 A	1000 A
	4	450 A	630 A	1100 A
	5	500 A	700 A	1200 A
	6	550 A	800 A	1250 A
	7	600 A	900 A	1300 A
	8	630 A	1000 A	1400 A
	9	700 A	1100 A	1500 A
	10 = $I_n$	800 A	1200 A	1600 A
PXR 25	Programmable from minimum to maximum values in 10 A increments.			

**Note**

① All neutral current sensors required for LSIG protection are sold separately.

# 2.2

## Molded Case Circuit Breakers

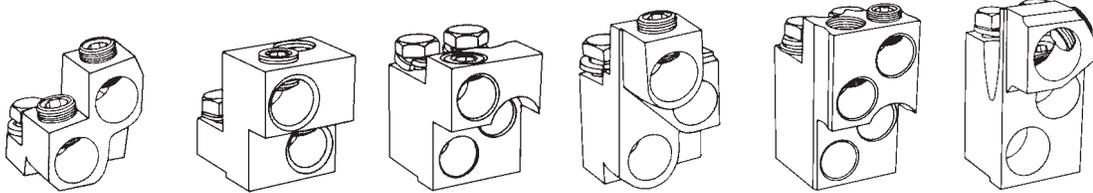
### Power Defense Molded Case Circuit Breakers

2

#### Terminals—Frame Size 5

Terminals for Frame 5 are available as single terminals only, unless otherwise specified. To configure both line and load of a three-pole breaker, order quantity 6 terminals.

#### Terminal Types



PDG5X1T700	PDG5X1TA700 PDG5X1TA700CW	PDG5X1TA1000 PDG5X1TA1000CW	PDG5X1T1000	PDG5X1TA1200 PDG5X1TA1200CW PDG5X1TA1200SW PDG5X1T1200	PDG5X1TA1201 PDG5X1TA1201CW
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**Note:** Pictures are for reference only.

#### Terminals

Maximum Breaker Amperes	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG / kcmil Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	3-Pole Catalog Number <sup>①</sup>	Hardware Included
<b>Aluminum Terminal Options</b>								
700	Aluminum	Cu/Al	B, C	2	1–500	42.4–253	PDG5X1TA700	Imperial
1000	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	PDG5X1TA1000	Imperial
1200	Aluminum	Cu/Al	B, C	4	4/0–500	107–253	PDG5X1TA1200	Imperial
1200	Aluminum	Cu/Al	B, C	3	500–750	253–380	PDG5X1TA1201	Imperial
<b>Copper Terminal Options</b>								
700	Copper	Cu	B, C	2	2/0–500	67.4–253	PDG5X1T700	Imperial
1000	Copper	Cu	B, C	3	3/0–500	85–253	PDG5X1T1000	Imperial
1200	Copper	Cu	B, C	4	3/0–400	85–203	PDG5X1T1200	Imperial
<b>Strandable Terminal Options</b>								
1200	Aluminum	Cu/Al	B, C D, G, H, I, K, M	4	4/0–500 4/0–350	107–253 107–177	PDG5X1TA1200SW	Imperial
<b>Control Wire Terminal Options</b>								
700	Aluminum	Cu/Al	B, C	2	1–500	42.4–253	PDG5X1TA700CW	Imperial
1000	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	PDG5X1TA1000CW	Imperial
1200	Aluminum	Cu/Al	B, C	4	4/0–500	107–253	PDG5X1TA1200CW	Imperial
1200	Aluminum	Cu/Al	B, C	3	500–750	253–380	PDG5X1TA1201CW	Imperial
<b>Conductor Extensions <sup>②③</sup></b>								
1200	—	—	—	—	—	—	5104A24G01	Imperial two-pole
1200	—	—	—	—	—	—	5104A24G02	Imperial three-pole
1200	—	—	—	—	—	—	5104A24G05	Imperial four-pole
1200	—	—	—	—	—	—	5104A24G03	Metric two-pole
1200	—	—	—	—	—	—	5104A24G04	Metric three-pole
1200	—	—	—	—	—	—	5104A24G06	Metric four-pole

#### Notes

Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes. For connector kit options for Eaton's panelboards, see document RP01400001E.

① Add M at end for metric hardware.

② Included with 100% rated breaker.

③ Kits include conductors for both sides of the breaker (e.g., 6 conductors for a three-pole breaker). Order quantity 1 per breaker.

## Accessories

### Internal Accessory Configurations—Frame Size 5

#### Three- and Four-Pole Circuit Breakers

##### Tripping Accessory Options

	Left Pole	Right Pole
None	None	Bell Alarm Options <sup>①</sup>
Shunt Trip	Bell Alarm Options <sup>①</sup>	Auxiliary Switch Options <sup>①</sup>
	Auxiliary Switch Options <sup>①</sup>	Bell and Auxiliary Combination Options <sup>①</sup>
	Alarm and Auxiliary Combination Options <sup>①</sup>	
UVR		
		

### Indicating Accessories—Frame Size 5

#### Alarm and Auxiliary Switches for Breakers with Communicating Trip Units <sup>②③</sup>

		Auxiliary Switch			
		None	None	1 Form C	2 Form C
Alarm Switch	None	Left	—	—	—
		Right	<b>PDG5XRCBSM</b> <sup>④</sup>	<b>PDG5XRC1AC</b>	<b>PDG5XRC2AC</b>
	1 Form C	Left	—	—	—
		Right	<b>PDG5XRC1BC</b>	<b>PDG5XRC1AC1BC</b>	—
	2 Form C	Left	—	—	—
		Right	<b>PDG5XRC2BC</b>	—	—

##### Notes

- <sup>①</sup> See Indicating Accessories tables for options.
- <sup>②</sup> All electronic trip units configured with communication will automatically include a communication indicator (PDG5XRCBSM) in the right pole. Up to two additional Form C contacts are available for external indication in the right pole.
- <sup>③</sup> When installing these components, any existing accessory in the right cavity must be removed.
- <sup>④</sup> PDG5XRCBSM is factory installed in breakers with trip units that require breaker position Open/Close/Trip status. It must be installed in breakers not already equipped with relays or Modbus RTU when adding those features (PDG56XRELAYS or PDG56XMODRTU). Applicable to E2N trip units only.

**Factory Installed Indicating Accessories—Frame Size 5** ①**Alarms and Auxiliary Switches**

Alarm Switch	None	Auxiliary Switch				
		None	None	1 Form C	2 Form C	3 Form C
	None	Left	—	—	—	A4
		Right	NN	AC	A1	—
1 Form C	1 Form C	Left	—	—	—	—
		Right	BC	CC	C1	—
2 Form C	2 Form C	Left	—	—	—	—
		Right	B1	CX	—	—

**Alarm and Auxiliary Switches for Breakers with Communicating Trip Units** ②

Alarm Switch	None	Auxiliary Switch			
		None	None	1 Form C	2 Form C
	None	Left	—	—	—
		Right	NN	AC	A1
1 Form C	1 Form C	Left	—	—	—
		Right	BC	CC	—
2 Form C	2 Form C	Left	—	—	—
		Right	B1	—	—

**Tripping Accessories—Frame Size 5****Shunt Trips**

Voltage	Pigtail (29 in / 0.75 m)	Factory Installed Catalog Number (Digit 17–18)
48–60 Vdc	PDG5XST60DCS	SK
110–125 Vdc	PDG5XST125DCS	SL
220–250 Vdc	PDG5XST250DCS	SM
24 Vac/Vdc	PDG5XST24ACDCS	SN
48–60 Vac	PDG5XST60ACS	ST
110–240 Vac	PDG5XST240ACS	SA or SB
380–440 Vac	PDG5XST440ACS	SC
480–600 Vac	PDG5XST600ACS	SD or SE

**Undervoltage Releases (UVRs)**

Voltage	Pigtail (29 in / 0.75 m)	Factory Installed Catalog Number (Digit 17–18)
12 Vdc	PDG5XUV12DCU	UH
24 Vdc	PDG5XUV24DCU	UG
48–60 Vdc	PDG5XUV60DCU	UJ or UK
125 Vdc	PDG5XUV125DCU	UL
250 Vdc	PDG5XUV250DCU	UM
12 Vac	PDG5XUV12ACU	UU
24 Vac	PDG5XUV24ACU	UF
48–60 Vac	PDG5XUV60ACU	UT
110–127 Vac	PDG5XUV120ACU	UA
208–240 Vac	PDG5XUV240ACU	UB
380–500 Vac	PDG5XUV480ACU	UC or UV

**Note:** Use PDG5XUV18DCU (Suffix US) when using Time Delay UVR.

**Notes**

- ① Factory installation of indicating accessories available for the right pole only. Left pole accessories may be field installed.
- ② All electronic trip units configured with communication will automatically include a Communication Indicator in the right pole. Up to two additional Form C contacts are available for external indication in the right pole.

**Handle Mechanisms—Size 5****Variable Depth Rotary Handle Mechanism**

Description	NEMA 1/3R/12/4/4X Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism ①	PDG5XHMD5	DA
Emergency lockable handle and mechanism ①	PDG5XHMD5E	D1
12 in (305 mm) handle mechanism shaft	PDG56XHMD5305	—

**Metal Variable Depth Rotary Handle Mechanism**

Description	NEMA 1/3R/12/4/4X Catalog Number
Metal standard lockable handle, mechanism, and 6-inch shaft	PDG5XHMD506MH
Metal standard lockable handle, mechanism, and 12-inch shaft	PDG5XHMD512MH
Metal standard lockable handle, mechanism, and 24-inch shaft	PDG5XHMD524MH
Metal emergency lockable handle, mechanism, and 6-inch shaft	PDG5XHMD506MH
Metal emergency lockable handle, mechanism, and 12-inch shaft	PDG5XHMD512MH
Metal emergency lockable handle, mechanism, and 24-inch shaft	PDG5XHMD524MH

**Flex Shaft Handle Mechanism**

Cable Length (ft)	Metal Handle, NEMA 1/3R/12 Catalog Number	High Performance Handle, NEMA 1/3R/12 Catalog Number	Metal Handle, NEMA 4/4X Catalog Number	High Performance Handle, NEMA 4/4X Catalog Number
4	PDG5XFS04	PDG5XFS04HP	PDG5XFS04X	PDG5XFS04HPX
5	PDG5XFS05	PDG5XFS05HP	PDG5XFS05X	PDG5XFS05HPX
6	PDG5XFS06	PDG5XFS06HP	PDG5XFS06X	PDG5XFS06HPX
10	PDG5XFS10	PDG5XFS10HP	PDG5XFS10X	PDG5XFS10HPX

**External Accessories—Frame Size 5****External Accessories**

Description	Fit Type	Catalog Number	Factory Installed Digits 19–20
Padlockable hasp	Left-side	PDG5XPLKS	L5
	Right-side		L6
Padlockable hasp	Top	PDG5XPLKT	L4
Padlockable hasp, OFF only	Top	PDG5XPLKTOFF	L1
Non-padlockable handle block	Field	PDG5XHB	—
Kirk key interlock kit ②	Left-side	PDG5XKLKPSF	L8
	Right-side		L9
Walking beam interlock ③④	Three- or four-pole	PDG5XWBI34P	WB ⑤
Electrical operator	24 Vdc	EOP5T21	—
	48 Vdc	EOP5T22	—
	125 Vdc	EOP5T26	—
	120 Vac	EOP5T07	—
	208 Vac	EOP5T09	—
	240 Vac	EOP5T11	—
Neutral CTs for ground fault (PXR)	Busbar type	PDG5XNCTB1200	—
Interphase barriers	Three-pole	PDG5XIB3P	—
	Four-pole	PDG5XIB4P	—
Terminal covers	Three-pole	PDG5XTC3P	—
Service entrance barrier kit	Three-pole	PRLSEBPD5	—

**PD5 Drawout Cassettes**

Breaker Frame	Number of Poles	Catalog Number
PD5	3	NG3DOM

**Base Mounting Hardware**

Description	Catalog Number
Two-, three-, four-pole metric	BMH5M
Two-, three-, four-pole English	BMH5

**Note:** Base mounting hardware is included with a circuit breaker or molded case switch.

**Aftermarket Products**

Description	Catalog Number
PD5 clear trip unit cover for PXR 20	PDG5XPXRCC20-BP10
PD5 clear trip unit cover for PXR 25	PDG5XPXRCC25-BP10
Neutral voltage sensing module for PD 2, 3, 4, 5 and 6	PDGXPXR25NVT
Eaton Power Defense trip unit tamper protection wire seal	5108A03H02

**Dimensions and Weights—Frame Size 5****Approximate Dimensions in Inches (mm)**

Number of Poles	Width	Height	Depth
2	8.25 (209.5)	16 (406.4)	5.50 (139.7)
3	8.25 (209.5)	16 (406.4)	5.50 (139.7)
4	11.13 (282.7)	16 (406.4)	5.50 (139.7)

**Approximate Shipping Weight in lb (kg)**

Breaker Type	2-Pole	3-Pole	4-Pole
PDG5 800, 1200 and 1600 A	46.8 (21.30)	46.8 (21.30)	58 (26.31)

**Notes**

- ① Handle mechanism shaft sold separately.
- ② Provision only. For use with Type F Kirk keylock (sold separately). Bolt projection in withdrawn position is 0.375 in (9.525 mm).
- ③ Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix "WB").
- ④ Requires two breakers.
- ⑤ Modification code for walking beam denotes modification to the breaker; accessory must be ordered separate.

Power Defense Molded Case Circuit Breakers—Frame Size 6

2



### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A)	
Catalog Number / Product Selection . . . . .	<b>V4-T2-81</b>
Accessories . . . . .	<b>V4-T2-85</b>
Dimensions and Weights . . . . .	<b>V4-T2-87</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
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Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Power Defense Molded Case Circuit Breakers—Frame Size 6

#### Product Description

Frame Size 6 covers a range of 700 A through 2500 A with a complete offering of advanced PXR electronic trip units. It includes three frame sizes of 1600 A, 2000 A and 2500 A.

#### Application Description

Frame Size 6 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection and 100% UL ratings. PXR trip units in PD-6 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication and arc flash reduction options.

#### Features and Benefits

Frame Size 6 breakers are modular and available as complete breakers from the factory or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

#### Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



**Catalog Number / Product Selection**

**Power Defense—Frame Size 6 (700–2500 A)**

Frame Size 6 covers a range of 700 A through 2500 A using electronic trip units. It is available in configurations of two-, three- and four-pole, with the two-pole being in the same physical size of a three-pole variant.

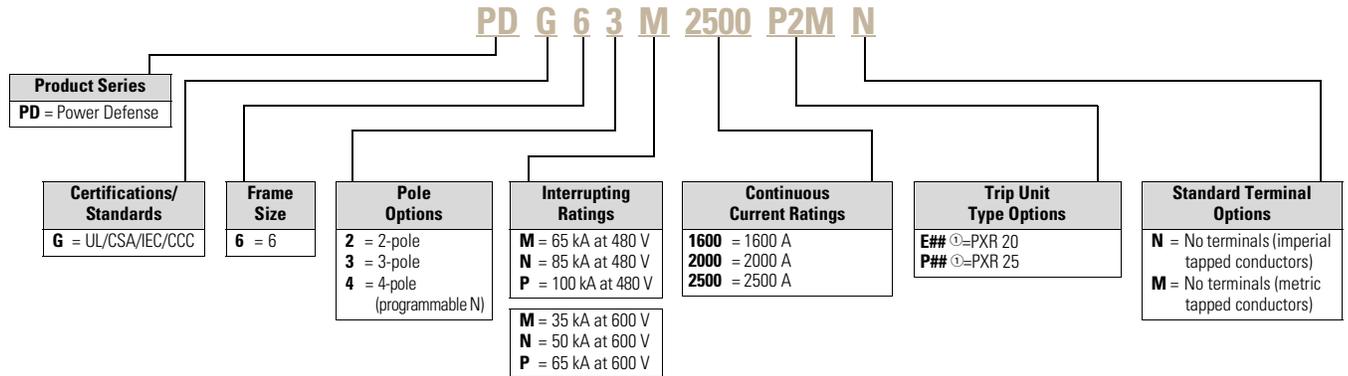
**Interrupting Ratings**

	M		N		P	
UL/CSA	kA rms		kA rms		kA rms	
240 Vac	125		150		200	
480 Vac	65		85		100	
600 Vac	35		50		65	
IEC	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>
240 Vac	135	100	150	100	200	100
380–415 Vac	70	53	70	53	100	53
440 Vac	50	40	70	50	100	50
480 Vac	50	30	65	40	85	40
525 Vac	30	25	35	25	40	25
660–690 Vac	15	7.5	20	13	35	18

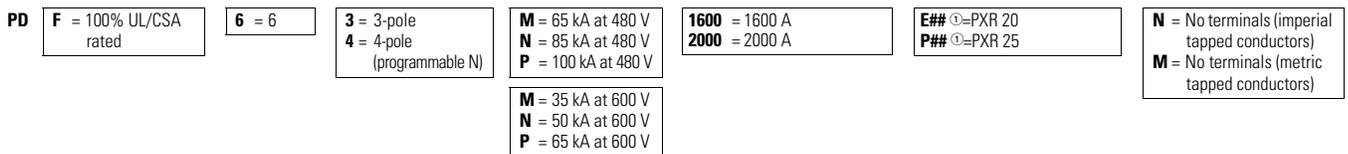
**Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)**

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

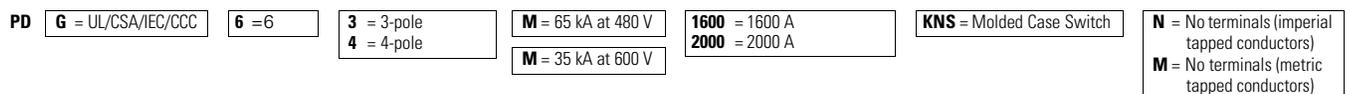
**Molded Case Circuit Breakers with PXR ETU—Globally Rated**



**Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)**



**Molded Case Switches—Globally Rated**



**Notes**

- ① See tables and descriptions on **Page V4-T2-83** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).
- ② Molded case switch may open above 17,500 A.

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

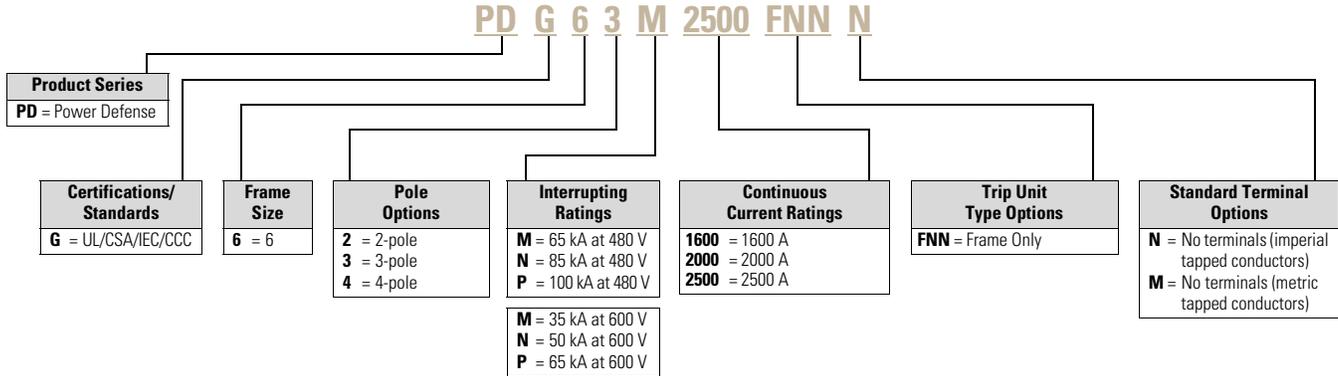
2

#### Globally Rated Frame Only

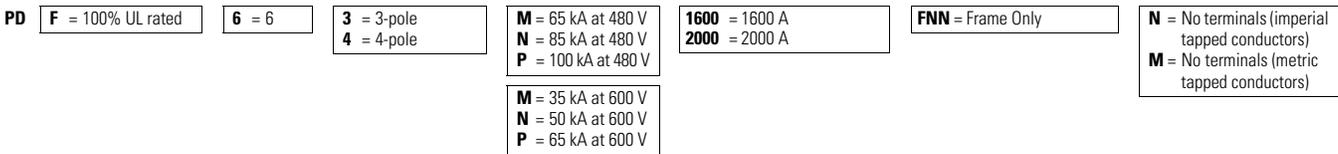
PD-6 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Frame Only—Globally Rated



#### Frame Only—Globally Rated (100% UL Rated)



#### Trip Units

PD-6 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each frame rating (1600 A, 2000 A, and 2500 A) must use trip units of the same rating. Additionally, for two-pole breakers, three-pole trip units are used.

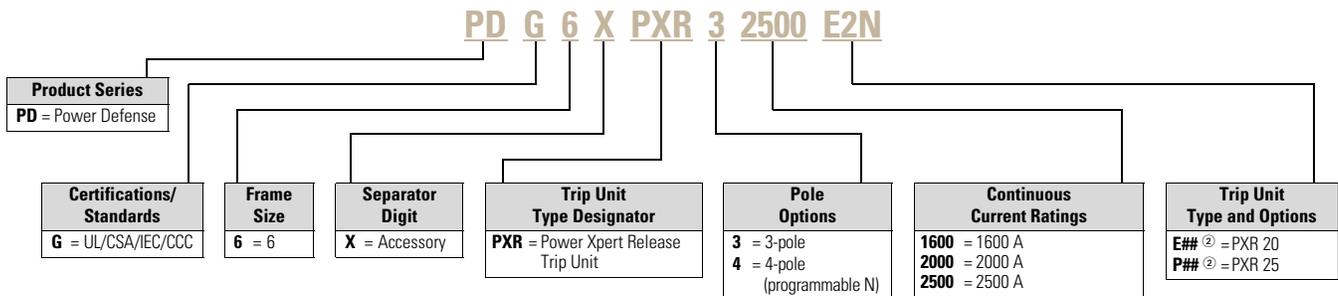
PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

#### Trip Units Only

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Power Xpert Release (PXR) Electronic Trip Units<sup>①</sup>

#### Power Xpert Release (PXR) Electronic Trip Units



#### Note

- ① PD6 trip units may be swapped out for trip units with different functional capabilities (LSI, LSIG, etc.) but continuous current rating is not capable of being changed. Replacement trip units should be ordered with the same continuous current rating that is existing.
- ② See PXR Trip Unit Options table on **Page V4-T2-83** for protection type (#<sub>1</sub>) and available configured options (#<sub>2</sub>).

**Globally Rated Frame Only****Power Xpert Release (PXR) Trip Unit Options**

PXR	ETU	#(1)—Protection Type			#(2)—Available Configured Options		
		LSI	LSIG ①	LSI with Arcflash Reduction Maintenance System	LSIG with Arcflash Reduction Maintenance System	Relays Modbus	Relays Modbus ZSI
PXR 20	E	2	3	4	5	M	W
PXR 25	P	2	3	4	5	M	W

**Descriptions of PXR Configured Options**

**Relays**—3 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 4 wires (RLY1, RLY2, RLY3, RLYC Common)
- Programmable to indicate breaker conditions

**Modbus**—Modbus RTU directly from breaker

- Interface: 3 wires (RTU\_D(+), RTU\_D(-), RTU\_GND)
- No additional modules required

**ZSI**—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

**CAM**—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

**Arcflash Reduction Maintenance System, or Maintenance Mode**

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of Arcflash Reduction Maintenance System

**Auxiliary Power**

- Connection included with all PXR 20 and 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux + 24 V, Aux 0 V)

**Available Continuous Current (I<sub>c</sub>) Settings on PXR Electronic Trip Units**

Option	Setting	Catalog Number Selection and Maximum Setting (I <sub>n</sub> )		
		1600 1600 A	2000 2000 A	2500 2500 A
PXR 20	1	700 A	1000 A	1600 A
	2	800 A	1100 A	1700 A
	3	900 A	1200 A	1800 A
	4	1000 A	1250 A	1900 A
	5	1100 A	1400 A	2000 A
	6	1200 A	1600 A	2100 A
	7	1250 A	1700 A	2200 A
	8	1400 A	1800 A	2300 A
	9	1500 A	1900 A	2400 A
	10 = I <sub>n</sub>	1600 A	2000 A	2500 A
PXR 25	Programmable from minimum to maximum values in 10 A increments.			

**Note**

① All neutral current sensors required for LSIG protection are sold separately.

# 2.2

## Molded Case Circuit Breakers

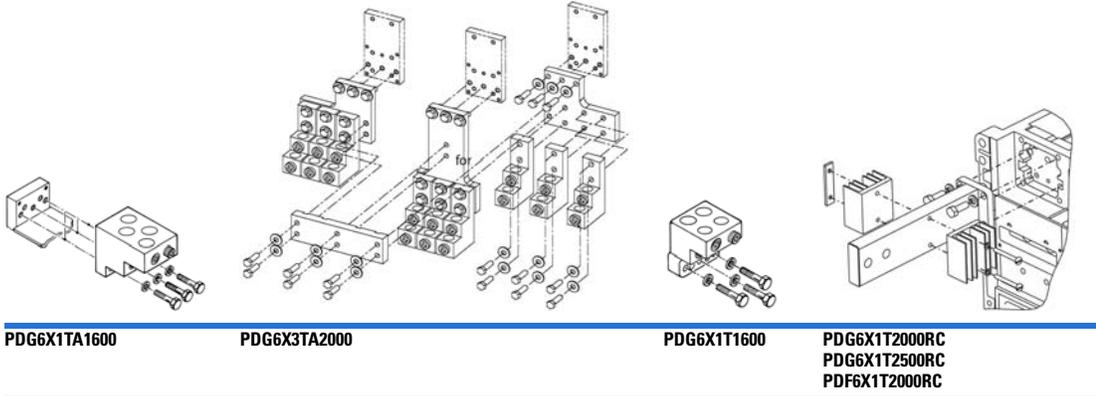
### Power Defense Molded Case Circuit Breakers

2

#### Terminals—Frame Size 6

Terminals for Frame 6 are available as single terminals only, unless otherwise specified. To configure both line and load of a three-pole breaker, order quantity 6 terminals.

#### Terminal Types



**Note:** Pictures are for reference only.

#### Terminals

Maximum Breaker Amperes	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG / kcmil Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	3-Pole Catalog Number <sup>①</sup>	Hardware Included
<b>Aluminum Terminal Options</b>								
1600	Aluminum	Cu/Al	B, C	4	500–1000	253–507	<b>PDG6X1TA1600</b>	Imperial
2000	Aluminum	Cu/Al	B, C	6	2–600	33.6–304	<b>PDG6X3TA2000</b> <sup>②</sup>	Imperial bus connection
<b>Copper Terminal Options</b>								
1600	Copper	Cu	B, C	4	1–600	42.4–304	<b>PDG6X1T1600</b>	Imperial
<b>Rear Connectors</b> <sup>③</sup>								
2000	Copper						<b>PDG6X1T2000RC</b>	Imperial
2000	Copper						<b>PDF6X1T2000RC</b> <sup>④</sup>	Imperial
2500	Copper						<b>PDG6X1T2500RC</b>	Imperial

**Note:** Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.

#### Notes

- ① Add **M** at end for metric hardware.
- ② Only available for three-pole breaker; order quantity 1 per breaker side, or quantity 2 per breaker.
- ③ Kit includes one conductor and hardware; order quantity 6 for both sides of a three-pole breaker.
- ④ Included with 100% rated breaker.



**Tripping Accessories—Frame Size 6****Shunt Trips**

Voltage	Pigtail (29 in / 0.75 m)	Factory Installed Catalog Number (Digit 17–18)
48–60 Vdc	PDG6XST60DCS	SK
110–125 Vdc	PDG6XST125DCS	SL
220–250 Vdc	PDG6XST250DCS	SM
24 Vac/ Vdc	PDG6XST24ACDCS	SN
48–60 Vac	PDG6XST60ACS	ST
110–240 Vac	PDG6XST240ACS	SA or SB
380–440 Vac	PDG6XST440ACS	SC
480–600 Vac	PDG6XST600ACS	SD or SE

**Undervoltage Releases (UVRs)**

Voltage	Pigtail (29 in / 0.75 m)	Factory Installed Catalog Number (Digit 17–18)
12 Vdc	PDG6XUV12DCU	UH
24 Vdc	PDG6XUV24DCU	UG
48–60 Vdc	PDG6XUV60DCU	UJ or UK
125 Vdc	PDG6XUV125DCU	UL
250 Vdc	PDG6XUV250DCU	UM
12 Vac	PDG6XUV12ACU	UU
24 Vac	PDG6XUV24ACU	UF
48–60 Vac	PDG6XUV60ACU	UT
110–127 Vac	PDG6XUV120ACU	UA
208–240 Vac	PDG6XUV240ACU	UB
380–500 Vac	PDG6XUV480ACU	UC or UV

**Accessory Terminal Block—Frame Size 6****Accessory Terminal Block** <sup>①</sup>**Catalog Number****TBRDK****Number of Control Wires for Each Internally Mounted Accessory**

Type of Accessory	Number of Contacts per Single Accessory	Required Number of Wires
Auxiliary switch	2a/2b	6
	4a/4b	12
Alarm signal/lockout switch	1a/1b	6
	2a/2b	12
Shunt trip	—	2
Low energy shunt	—	2
Undervoltage release mechanism	—	2

**Note**

<sup>①</sup> One 24-point terminal block provided with circuit breaker when factory installed or shipped from warehouse as separate item when ordered for field installation. See PXR wiring diagram and instructions (TD012071EN).

**Handle Mechanisms—Size 6****Variable Depth Rotary Handle Mechanism**

Description	NEMA 1/3R/12/4/4X Catalog Number	Factory Installed Digits 19–20
Standard lockable handle and mechanism <sup>①</sup>	PDG6XHMD5	DA
Emergency lockable handle and mechanism <sup>①</sup>	PDG6XHMD6	D1
12 in (305 mm) handle mechanism shaft	PDG56XHMD5305	—

**Flex Shaft Handle Mechanism**

Cable Length (ft)	Metal Handle, NEMA 1/3R/12 Catalog Number	High Performance Handle, NEMA 1/3R/12 Catalog Number	Metal Handle, NEMA 4/4X Catalog Number	High Performance Handle, NEMA 4/4X Catalog Number
4	PDG6XFS04	PDG6XFS04HP	PDG6XFS04X	PDG6XFS04HPX
5	PDG6XFS05	PDG6XFS05HP	PDG6XFS05X	PDG6XFS05HPX
6	PDG6XFS06	PDG6XFS06HP	PDG6XFS06X	PDG6XFS06HPX

**External Accessories—Frame Size 6****External Accessories**

Description	Fit Type	Catalog Number	Factory Installed Digits 19–20
Padlockable hasp	Right	PDG6XPLKR	L6
Padlockable hasp, OFF only	Right	PDG6XPLKROFF	L3
Kirk key interlock kit <sup>②</sup>	Right	PDG6XKLKPRF	L9
Walking beam interlock <sup>③④</sup>	Three-pole	PDG6XWBI3P	WB <sup>⑤</sup>
Electrical operator	48 Vdc	EOP6T21K	—
	120 Vac	EOP6T08K	—
	240 Vac	EOP6T11K	—
Neutral CTs for ground fault (PXR)	Busbar type	PDG6XNCTB2500	—

**Aftermarket Products**

Description	Catalog Number
PD6 clear trip unit cover for PXR 20	PDG6XPXRCC20-BP10
PD6 clear trip unit cover for PXR 25	PDG6XPXRCC25-BP10
Neutral voltage sensing module for PD 2, 3, 4, 5 and 6	PDGXPXR25NVT
Eaton Power Defense trip unit tamper protection wire seal	5108A03H02

**Dimensions and Weights—Frame Size 6****Approximate Dimensions in Inches (mm)**

Number of Poles	Width	Height	Depth
2	15.5 (393.7)	16 (406.4)	9.75 (247.7)
3	15.5 (393.7)	16 (406.4)	9.75 (247.7)
4	20 (508.0)	16 (406.4)	9.75 (247.7)

**Approximate Shipping Weight in lb (kg)**

Breaker Type	2-Pole	3-Pole	4-Pole
PDG6 1600 and 2000 A	102 (46.3)	102 (46.3)	135 (61.2)
PDG6 2500 A	135 (61.2)	135 (61.2)	182 (82.6)

**Notes**

- <sup>①</sup> Handle mechanism shaft sold separately.
- <sup>②</sup> Provision only. For use with Type F Kirk keylock (sold separately). Bolt projection in withdrawn position is 1.00 in (25.4 mm).
- <sup>③</sup> Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix "WB").
- <sup>④</sup> Requires two breakers.
- <sup>⑤</sup> Modification code for Walking Beam denotes modification to the breaker; accessory must be ordered separate.

**Motor Circuit Protectors (3–600 A)****Power Defense Molded Case Circuit Breakers—Motor Circuit Protectors**

2

**Product Description**

Motor circuit protectors (MCPs) are instantaneous-only devices available in ratings from 3 A to 600 A. Power Defense MCPs are available in Frame Sizes 1, 2 and 3, and are designated by the trip unit digits in the catalog number (Digits 11–13), always use M as Digit 11. Digit 12 designates the calibration (S = Standard, H = High, L = Low), and always use A as Digit 13 to indicate an adjustable instantaneous setting.

**Application Description**

MCPs are designed to be used in combination with motor starters. Power Defense MCPs are typically used in combination with motor starters, usually NEMA sizes 0 through 6. Each MCP device is calibrated at a minimum for six trip settings to provide flexibility in its application. Typical motor full load currents and NEMA starter sizes are provided for each device and setting, only as a guide for selecting MCPs; actual motor characteristics and design parameters must be used to determine the adequate device and setting to be used in the application.

**Features and Benefits**

Power Defense MCPs are of a modular design, with field-installable accessories and terminals. Accessories and terminals for MCPs are common with the accessories used for the equivalent frame size molded case circuit breaker. Accessories may be field or factory installed. For factory installation, follow the same catalog numbering guidelines provided for the respective equivalent circuit breaker frame.

**Standards and Certifications**

MCPs are UL Recognized Components (UL File E7819) and comply with the applicable requirements of the UL 489 standard. Eaton MCPs are also UL Listed in combination with Eaton motor starters under various UL file number; reference UL's website for additional information.

MCPs are also designed to comply with CSA Standard C22.2 No. 5, IEC 60947-2 (Annex O), and GB 14048.2. As such, they carry the following markings:

- UL
- CSA
- IEC (CE)
- CB (CCC)



### Frame Size 1 Product Selection

PDG1 MCPs cover a continuous current range of 3 A through 100 A, with trip calibration settings from 9 A through 1100 A. All devices are a three-pole configuration and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous trip circuit breaker.

PDG1 MCPs include six trip settings, corresponding to 3x through 11x of the continuous amperage rating of the device, and each corresponding to 13x the minimum FLA value shown in the table below.

Where a 13x setting is required for an intermediate FLA value, alternate CAM settings and/or MCP ratings should be used.

A High Calibration MCP for the 100 A device is also available for special applications where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating, and includes settings corresponding to 5x to 15x of the continuous ampere rating of the device.

All catalog numbers shown include standard line and load steel terminals (Digit 14 = J). For aluminum terminals, use T in Digit 14 of the catalog number.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

### Ratings

Maximum Application Voltage (UL and CSA)

- 600Y/347 Vac
- 480 Vac
- 250 Vdc

**Note:** For DC applications, actual trip levels are approximately 40% higher than values shown.

### IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)

	I <sub>cu</sub>	I <sub>cs</sub>
240 Vac	5	5
415 Vac	5	5
690 Vac	3	1.5

### PDG1 Motor Circuit Protectors—Standard Calibration

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers	
							Included (Dig 14 = J)	Optional (Dig 14 = T)
PDG13M0003MSAJ	3	A	3x	9	0	0.69–0.91	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	5x	15		1.1–1.3		
		C	7x	21		1.6–1.7		
		D	9x	27		2.0–2.2		
		E	10x	30		2.3–2.5		
		F	11x	33		2.6–2.8		
PDG13M0007MSAJ	7	A	3x	21	0	1.5–2.0	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	5x	35		2.6–3.1		
		C	7x	49		3.7–3.9		
		D	9x	63		4.8–5.2		
		E	10x	70		5.3–5.7		
		F	11x	77		5.8–6.1		
PDG13M0015MSAJ	15	A	3x	45	0	3.4–4.5	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	5x	75		5.7–6.8		
		C	7x	105		8.0–9.1		
		D	9x	135		10.4–11.4		
		E	10x	150		11.5–12.6		
		F	11x	165		12.7–13.0		
PDG13M0030MSAJ	30	A	3x	90	1	3.9–9.1	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	5x	150		11.5–13.7		
		C	7x	210		16.1–18.3		
		D	9x	270		20.7–22.9		
		E	10x	300		23.0–25.2		
		F	11x	330		25.3–26.1		
PDG13M0050MSAJ	50	A	3x	150	2	11.5–15.2	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	5x	250		19.2–22.9		
		C	7x	350		26.9–30.6		
		D	9x	450		34.6–38.3		
		E	10x	500		38.4–42.1		
		F	11x	550		42.2–43.5		

## PDG1 Motor Circuit Protectors—Standard Calibration, continued

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers	
							Included (Dig 14 = J)	Optional (Dig 14 = T)
PDG13M0070MSAJ	70	A	3x	210	2	16.1–30.6	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	5x	350		26.9–32.2		
		C	7x	490		37.6–42.9		
		D	9x	630		48.4–53.7		
		E	10x	700		53.8–59.1		
		F	11x	770		59.2–60.9		
PDG13M0100MSAJ	100	A	3x	300	3	23–30.6	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	5x	500		38.4–46.0		
		C	7x	700		53.8–61.4		
		D	9x	900		69.2–76.8		
		E	10x	1000		76.9–84.5		
		F	11x	1100		84.6–87.0		

## PDG1 Motor Circuit Protectors—High Calibration

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers	
							Included (Dig 14 = J)	Optional (Dig 14 = T)
PDG13M0100MHAJ	100	A	5x	500	3	38.4–46.0	PDG1X3T125 (Steel)	PDG1X3TA125 (Aluminum)
		B	7.5x	750		57.6–65.2		
		C	10x	1000		76.9–84.5		
		D	12.5x	1250		①		
		E	13.75x	1375		①		
		F	15x	1500		①		

**Note**

- ① Settings above 85 A are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating

**Frame Size 2 Product Selection**

PDG2 MCPs cover a continuous current range of 3 A through 150 A, with trip calibration settings from 9 A through 2500 A. All devices are a three-pole configuration and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous circuit breaker.

PDG2 MCPs include eight trip settings, corresponding to 3x through 10x of the continuous amperage rating of the device, and each corresponding to 13x the minimum FLA value shown in the table below.

Where a 13x setting is required for an intermediate FLA value, alternate dial settings and/or MCP ratings should be used.

A High Calibration MCP for the 150 A device is also available for special applications where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

Additionally, four Low Calibration devices are available for low magnetic protection special applications.

All catalog numbers shown include standard line and load terminals (Digit 14 = J). For optional terminals, use T, W or other options in Digit 14 as described in the Frame Size 2 circuit breaker section of the catalog.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

**Ratings**

Maximum Application Voltage (UL and CSA)

- 600 Vac
- 250 Vdc

**Note:** For DC applications, actual trip levels are approximately 40% higher than values shown.

**IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)**

	I <sub>cu</sub>	I <sub>cs</sub>
240 Vac	5	5
415 Vac	5	5
690 Vac	3	1.5

**PDG2 Motor Circuit Protectors—Standard Calibration**

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG23M0003MSAJ	3	A	3.0	9	0	0.69–0.91	PDG2X3T100 (Steel)	PDG2X3TA50 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	4.0	12		0.92–1.0			
		C	5.0	15		1.1–1.2			
		D	6.0	18		1.3–1.5			
		E	7.0	21		1.6–1.7			
		F	8.0	24		1.8–1.9			
		G	9.0	27		2.0–2.2			
		H	10.0	30		2.3–2.5			
PDG23M0007MSAJ	7	A	3.0	21	0	1.50–2	PDG2X3T100 (Steel)	PDG2X3TA50 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	4.0	28		2.10–2.5			
		C	5.0	35		2.6–3.1			
		D	6.0	42		3.2–3.6			
		E	7.0	49		3.7–3.9			
		F	8.0	56		4.3–4.7			
		G	9.0	63		4.8–5.2			
		H	10.0	70		5.3–5.7			
PDG23M0015MSAJ	15	A	3.0	45	0	3.40–4.5	PDG2X3T100 (Steel)	PDG2X3TA50 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	4.0	60		4.60–5.6			
		C	5.0	75		5.7–6.8			
		D	6.0	90		6.9–7.9			
		E	7.0	105		8.0–9.1			
		F	8.0	120		9.2–10.3			
		G	9.0	135		10.4–11.4			
		H	10.0	150		11.5–12.6			
PDG23M0030MSAJ	30	A	3.0	90	1	6.90–9.1	PDG2X3T100 (Steel)	PDG2X3TA50 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	4.0	120		9.20–11.4			
		C	5.0	150		11.5–13.7			
		D	6.0	180		13.8–16.0			
		E	7.0	210		16.1–18.3			
		F	8.0	240		18.4–20.6			
		G	9.0	270		20.7–22.9			
		H	10.0	300		23.0–25.2			

#### PDG2 Motor Circuit Protectors—Standard Calibration, continued

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG23M0050MSAJ	50	A	3.0	150	2	11.50–15.2	PDG2X3T100 (Steel)	PDG2X3TA50 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	4.0	200		15.30–19.1			
		C	5.0	250		19.2–22.9			
		D	6.0	300		23.0–26.8			
		E	7.0	350		26.9–30.6			
		F	8.0	400		30.7–34.5			
		G	9.0	450		34.6–38.3			
		H	10.0	500		38.4–42.1			
PDG23M0100MSAJ	100	A	3.0	300	3	23.00–30.6	PDG2X3T100 (Steel)	PDG2X3TA100 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	4.0	400		30.70–38.3			
		C	5.0	500		38.4–46.0			
		D	6.0	600		46.1–53.7			
		E	7.0	700		53.8–61.4			
		F	8.0	800		61.5–69.1			
		G	9.0	900		69.2–76.8			
		H	10.0	1000		76.9–84.5			
PDG23M0150MSAJ	150	A	3.0	450	4	34.60–46	PDG2X3TA225 (Aluminum)	PDG2X3TA150 (Aluminum)	PDG2X3T150 (St. Steel)
		B	4.0	600		46.10–57.5			
		C	5.0	750		57.6–69.1			
		D	6.0	900		69.2–80.6			
		E	7.0	1050		80.7–92.2			
		F	8.0	1200		92.3–103.7			
		G	9.0	1350		103.8–115.2			
		H	10.0	1500		115.3–126.7			

#### PDG2 Motor Circuit Protectors—High Calibration

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG23M0150MHAI	150	A	5.0	750	4	57.0–75.0	PDG2X3TA225 (Aluminum)	PDG2X3TA150 (Aluminum)	PDG2X3T150 (St. Steel)
		B	6.7	1000		76.0–95.0			
		C	8.3	1250		96.0–114.0			
		D	10.0	1500		115.0–130.7			
		E	11.7	1750		⓪			
		F	13.3	2000		⓪			
		G	15.0	2250		⓪			
		H	16.7	2500		⓪			

**Note**

⓪ Settings above 130 A are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating

## PDG2 Motor Circuit Protectors—Special Low Calibration

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Terminal Kit Catalog Numbers		
					Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG23M0025MLAJ	25	A	1.6	40	PDG2X3T100 (Steel)	PDG2X3TA50 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	1.7	43			
		C	1.8	46			
		D	2.0	49			
		E	2.1	52			
		F	2.2	55			
		G	2.3	58			
		H	2.4	60			
PDG23M0050MLAJ	50	A	1.6	80	PDG2X3T100 (Steel)	PDG2X3TA50 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	1.7	87			
		C	1.9	93			
		D	2.0	98			
		E	2.1	103			
		F	2.2	109			
		G	2.3	115			
		H	2.4	120			
PDG23M0070MLAJ	70	A	1.6	115	PDG2X3T100 (Steel)	PDG2X3TA100 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	1.7	122			
		C	1.9	130			
		D	2.0	139			
		E	2.1	145			
		F	2.2	153			
		G	2.3	160			
		H	2.4	170			
PDG23M0100MLAJ	100	A	1.6	160	PDG2X3T100 (Steel)	PDG2X3TA100 (Aluminum)	PDG2X3T100 (Steel) (Same as J)
		B	1.7	174			
		C	1.9	185			
		D	2.0	196			
		E	2.1	207			
		F	2.2	218			
		G	2.3	229			
		H	2.4	240			

#### 400 A Frame Size 3 Product Selection

PDG3 400 A Frame MCPs cover a continuous current range of 70 A through 400 A, with trip calibration settings from 350 A through 4500 A. All devices are a three-pole configuration in a 400 A frame and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous circuit breaker.

PDG3 MCPs include nine trip settings, corresponding to 5x through 10x of the continuous amperage rating of the device and each corresponding to 13x the minimum FLA value shown in the table below.

Where a 13x setting is required for an intermediate FLA value, alternate dial settings and/or MCP ratings should be used.

A High Calibration MCP for the 400 A frame device is also available for special applications where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

All catalog numbers shown include standard aluminum line and load terminals (Digit 14 = J). For optional terminals, use T (aluminum), W (copper) or other options in Digit 14 as described in the Frame Size 3 circuit breaker section of the catalog.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

#### Ratings

Maximum Application Voltage (UL and CSA)

- 600 Vac
- 250 Vdc

**Note:** For DC applications, actual trip levels are approximately 40% higher than values shown.

#### IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)

	I <sub>cu</sub>	I <sub>cs</sub>
240 Vac	100	100
415 Vac	70	53
690 Vac	15	7.5
250 Vdc	22	22

#### PDG3 400 A Frame Motor Circuit Protectors—Standard Calibration

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG33M0070MSAJ	70	A	5.0	350	4	27.0–30.7	PDG3X3TA300 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T300 (Copper)
		B	5.7	400		30.8–33.8			
		C	6.3	440		33.9–36.9			
		D	6.9	480	5	37.0–40.3			
		E	7.5	525		40.4–43.8			
		F	8.1	570		43.9–46.9			
		G	8.7	610		47.0–50.7			
		H	9.4	660		50.8–53.8			
		I	10.0	700		53.9–57.2			
PDG33M0100MSAJ	100	A	5.0	500	5	38.5–43.4	PDG3X3TA300 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T300 (Copper)
		B	5.7	565		43.5–48.0			
		C	6.3	626		48.1–53.0			
		D	6.9	690		53.1–57.6			
		E	7.5	750		57.7–62.3			
		F	8.1	810		62.4–67.3			
		G	8.8	875		67.4–71.9			
		H	9.4	935		72.0–76.9			
		I	10.0	1000		77.0–81.6			
PDG33M0125MSAJ	125	A	5.0	625	5	48.1–53.8	PDG3X3TA300 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T300 (Copper)
		B	5.6	700		53.9–59.9			
		C	6.2	780		60.0–66.1			
		D	6.9	860		66.2–72.3			
		E	7.5	940		72.4–78.4			
		F	8.2	1020		78.5–83.8			
		G	8.7	1090		83.9–89.9			
		H	9.4	1170		90.0–96.1			
		I	10.0	1250		96.2–102.0			

## PDG3 400 A Frame Motor Circuit Protectors—Standard Calibration, continued

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG33M0150MSAJ	150	A	5.0	750	5	57.7–64.6	PDG3X3TA300 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T300 (Copper)
		B	5.6	840		64.7–71.9			
		C	6.2	935		72.0–79.2			
		D	6.9	1030		79.3–86.5			
		E	7.5	1125		86.6–93.8			
		F	8.1	1220		93.9–101.1			
		G	8.8	1315		101.2–108.4			
		H	9.4	1410		108.5–115.3			
		I	10.0	1500		115.4–122.4			
PDG33M0175MSAJ	175	A	5.0	875	5	67.4–75.3	PDG3X3TA300 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T300 (Copper)
		B	5.6	980		75.4–83.8			
		C	6.2	1090		83.9–92.3			
		D	6.9	1200		92.4–100.7			
		E	7.5	1310		100.8–109.2			
		F	8.1	1420		109.3–117.6			
		G	8.7	1530		117.7–126.1			
		H	9.4	1640		126.2–134.6			
		I	10.0	1750		134.7–142.8			
PDG33M0200MSAJ	200	A	5.0	1000	5	77.0–86.5	PDG3X3TA300 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T300 (Copper)
		B	5.6	1125		86.6–96.1			
		C	6.3	1250		96.2–105.7			
		D	6.9	1375		105.8–115.3			
		E	7.5	1500		115.4–124.9			
		F	8.1	1625		125.0–134.6			
		G	8.8	1750		134.7–144.2			
		H	9.4	1875		144.3–153.8			
		I	10.0	2000		153.9–163.3			
PDG33M0225MSAJ	225	A	5.0	1125	5	86.6–97.3	PDG3X3TA300 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T300 (Copper)
		B	5.6	1265		97.4–108.4			
		C	6.3	1410		108.5–118.8			
		D	6.9	1545		118.9–129.9			
		E	7.5	1690		130.0–140.7			
		F	8.1	1830		140.8–151.5			
		G	8.8	1970		151.6–162.3			
		H	9.4	2110		162.4–173.0			
		I	10.0	2250		173.1–183.6			
PDG33M0250MSAJ	250	A	5.0	1250	5	96.2–108.0	PDG3X3TA350 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T350 (Copper)
		B	5.6	1405		108.1–119.9			
		C	6.2	1560		120.0–132.3			
		D	6.9	1720		132.4–144.2			
		E	7.5	1875		144.3–156.1			
		F	8.1	2030		156.2–168.0			
		G	8.7	2185		168.1–179.9			
		H	9.4	2340		180.0–192.3			
		I	10.0	2500		192.4–204.0			

#### PDG3 400 A Frame Motor Circuit Protectors—Standard Calibration, continued

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG33M0300MSAJ	300	A	5.0	1500	5	115.4–129.9	PDG3X3TA350 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T350 (Copper)
		B	5.6	1690		130.0–144.2			
		C	6.3	1875		144.3–158.4			
		D	6.9	2060		158.5–173.0			
		E	7.5	2250		173.1–187.6			
		F	8.1	2440		187.7–201.9			
		G	8.8	2625		202.0–216.1			
		H	9.4	2810		216.2–230.7			
		I	10.0	3000		230.8–244.9			
PDG33M0350MSAJ	350	A	5.0	1750	5	134.7–151.5	PDG3X3TA350 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T350 (Copper)
		B	5.6	1970		151.6–168.4			
		C	6.3	2190		168.5–185.3			
		D	6.9	2410		185.4–201.9			
		E	7.5	2625		202.0–218.8			
		F	8.1	2845		218.9–235.7			
		G	8.8	3065		235.8–252.6			
		H	9.4	3285		252.7–269.2			
		I	10.0	3500		269.3–285.7			
PDG33M0400MSAJ	400	A	5.0	2000	5	153.9–173.0	PDG3X3TA400 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T400 (Copper)
		B	5.6	2250		173.1–192.3			
		C	6.3	2500		192.4–211.5			
		D	6.9	2750		211.6–230.7			
		E	7.5	3000		230.8–249.9			
		F	8.1	3250		250.0–269.2			
		G	8.8	3500		269.3–288.4			
		H	9.4	3750		288.5–307.6			
		I	10.0	4000		307.7–326.9			

#### PDG3 400 A Frame Motor Circuit Protectors—High Calibration

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG33M0400MHAJ	400	A	5.6	2250	5	173.1–194.5	PDG3X3TA400 (Aluminum)	PDG3X3TA402 (Aluminum)	PDG3X3T400 (Copper)
		B	6.3	2530		194.6–216.1			
		C	7.0	2810		216.2–237.6			
		D	7.7	3090		237.7–259.5			
		E	8.4	3375		259.6–281.1			
		F	9.1	3655		281.2–302.6			
		G	9.8	3935		302.7–324.1			
		H	10.5	4215		324.2–346.1			
		I	11.3	4500		346.2–368.1			

### 600 A Frame Size 3 Product Selection

PDG3 600 A MCPs cover a continuous current range of 250 A through 600 A, with trip calibration settings from 1250 A through 6000 A. All devices are a three-pole configuration in a 600 A frame and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous circuit breaker.

PDG3 MCPs include nine trip settings, corresponding to 5x through 10x of the

continuous amperage rating of the device, and each corresponding to 13x the minimum FLA value shown in the table below. Where a 13x setting is required for an intermediate FLA value alternate dial settings and/or MCP ratings should be used.

All catalog numbers shown include standard line and load terminals (Digit 14 = J). For optional terminals, use T (aluminum) W (copper) or

other options in Digit 14 as described in the Frame Size 3 circuit breaker section of the catalog.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

### Ratings

Maximum Application Voltage (UL and CSA)

- 600 Vac
- 250 Vdc

**Note:** For DC applications, actual trip levels are approximately 40% higher than values shown.

### IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)

	I <sub>cu</sub>	I <sub>cs</sub>
240 Vac	100	100
415 Vac	70	53
690 Vac	25	13
250 Vdc	42	42

### PDG3 600 A Frame Motor Circuit Protectors—Standard Calibration

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		
							Included (Dig 14 = J)	Optional (Dig 14 = T)	Optional (Dig 14 = W)
PDG33MH250MSAJ	250	A	5.0	1250	6	96.2–108.0	PDG3X3TA401H (Aluminum)	PDG3X3TA400H (Aluminum)	PDG3X3T401H (Copper)
		B	5.6	1405		108.1–119.9			
		C	6.2	1560		120.0–132.2			
		D	6.9	1720		132.3–144.1			
		E	7.5	1875		144.2–156.1			
		F	8.1	2030		156.2–168.0			
		G	8.7	2185		168.1–179.9			
		H	9.4	2340		180.0–192.2			
		I	10.0	2500		192.3–204.0			
PDG33MH300MSAJ	300	A	5.0	1500	6	115.4–129.9	PDG3X3TA401H (Aluminum)	PDG3X3TA400H (Aluminum)	PDG3X3T401H (Copper)
		B	5.6	1690		130.0–144.1			
		C	6.3	1875		144.2–158.4			
		D	6.9	2060		158.5–173.0			
		E	7.5	2250		173.1–187.6			
		F	8.1	2440		187.7–201.8			
		G	8.8	2625		201.9–216.1			
		H	9.4	2810		216.2–230.7			
		I	10.0	3000		230.8–244.9			
PDG33MH350MSAJ	350	A	5.0	1750	6	134.6–151.4	PDG3X3TA401H (Aluminum)	PDG3X3TA400H (Aluminum)	PDG3X3T401H (Copper)
		B	5.6	1970		151.5–168.4			
		C	6.3	2190		168.5–185.3			
		D	6.9	2410		185.4–201.8			
		E	7.5	2625		201.9–218.7			
		F	8.1	2845		218.8–235.7			
		G	8.8	3065		235.8–252.6			
		H	9.4	3285		252.7–269.1			
		I	10.0	3500		269.2–285.7			
PDG33MH400MSAJ	400	A	5.0	2000	6	153.8–173.0	PDG3X3TA401H (Aluminum)	PDG3X3TA400H (Aluminum)	PDG3X3T401H (Copper)
		B	5.6	2250		173.1–192.2			
		C	6.3	2500		192.3–211.4			
		D	6.9	2750		211.5–230.7			
		E	7.5	3000		230.8–249.9			
		F	8.1	3250		250.0–269.1			
		G	8.8	3500		269.2–288.4			
		H	9.4	3750		288.5–307.6			
		I	10.0	4000		307.7–326.9			

#### PDG3 600 A Frame Motor Circuit Protectors—Standard Calibration, continued

MCP Catalog Number	Continuous Amperes	CAM Setting	MCP Trip Setting (Mult)	MCP Trip Setting (Amps)	Typical NEMA Starter Size	Typical Motor Full Load Current Amperes	Terminal Kit Catalog Numbers		Optional (Dig 14 = W)
							Included (Dig 14 = J)	Optional (Dig 14 = T)	
PDG33M0450MSAJ	450	A	5.0	2250	6	173.1–194.5	PDG3X3TA630 (Aluminum)	—	PDG3X3T630 (Copper)
		B	5.6	2530		194.6–216.1			
		C	6.2	2810		216.2–237.6			
		D	6.9	3090		237.7–259.5			
		E	7.5	3375		259.6–281.4			
		F	8.1	3660		281.5–303.0			
		G	8.8	3940		303.1–324.5			
		H	9.4	4220		324.6–346.1			
		I	10.0	4500		346.2–368.1			
PDG33M0500MSAJ	500	A	5.0	2500	6	192.3–216.1	PDG3X3TA630 (Aluminum)	—	PDG3X3T630 (Copper)
		B	5.6	2810		216.2–240.3			
		C	6.3	3125		240.4–264.5			
		D	6.9	3440		264.6–288.4			
		E	7.5	3750		288.5–313.7			
		F	8.2	4080		313.8–336.4			
		G	8.8	4375		336.5–359.1			
		H	9.3	4670		359.2–384.5			
		I	10.0	5000		384.6–408.2			
PDG33M0600MSAJ	600	A	5.0	3000	6	230.8–259.5	PDG3X3TA630 (Aluminum)	—	PDG3X3T630 (Copper)
		B	5.6	3375		259.6–289.1			
		C	6.3	3760		289.2–316.8			
		D	6.9	4120		316.9–346.1			
		E	7.5	4500		346.2–375.3			
		F	8.1	4880		375.4–403.7			
		G	8.8	5250		403.8–433.0			
		H	9.4	5630		433.1–461.4			
		I	10.0	6000		461.5–507.7			

**Note:** 800 and 1200 A, 600 Vac maximum motor circuit protectors are available as Series C HMCP product.

#### Additional Information

##### Terminals

Available terminal configuration for MCPs follow the same guidelines as presented for each circuit breaker frame. Additional terminals, including control wire, StrandAble and other options are presented in each Power Defense circuit breaker frame size section.

##### Accessories

MCPs and MCCBs for each frame use a common set of accessories. Available accessories are presented in each corresponding Power Defense circuit breaker frame section (i.e., PDG1 accessories are found in the Frame Size 1 section, PDG2 accessories in the Frame Size 2 section and PDG3 in the Frame Size 3 section).

##### Weights and Dimensions

MCPs have the same dimensions and weight as the three-pole version of the respective circuit breaker, shown in each frame section.

## Motor Protection Circuit Breakers (15–600 A)

### Power Defense Molded Case Circuit Breakers—Motor Protection Circuit Breakers

#### Product Description

Power Defense motor protection circuit breakers (MPCBs) use Power Xpert Release (PXR) electronic trip units to provide branch protection and motor protection in a combined device, eliminating the need for a separate overload relay. Motor protection PXR units build upon the features available in standard PXR trip units and add motor protection application specific functionality and features. MPCBs are available in Power Defense Frame Sizes 2 and 3, and share accessories and catalog numbering convention with the respective molded case circuit breaker frames.

#### Application Description

MPCBs meet requirements for motor branch protection, including disconnecting means, branch circuit short-circuit protection and overload protection. MPCBs can be used with a contactor to eliminate the need for overload relay and still create manual motor control. Typical branch motor starter applications are protected by three components consisting of: breaker, contactor and overload relay, or fuse, contactor and overload relay. The MPCB application-specific protection eliminates the need for motor overload relay and reduces the traditional three-component starter assembly down to two elements—the MPCB and the contactor.

#### Features and Benefits

PXR motor protection electronic trip units provide motor protection basic and advanced functionality in PXR 10 and PXR 25, respectively. Features include phase unbalance protection, phase loss protection, over/under voltage protection, cold/hot start (thermal memory) protection, programmable high load alarms, programmable relays for multiple functions to include pre-detection trip relay, Class 5/10/15/20/30 protection, energy metering, communications, cause-of-trip indication, events logging, breaker health monitoring, harmonics, ground fault alarm and protection, and more.

ZSI allows the MPCB to interface with upstream feeder or branch circuit breakers for coordination and reduction of arc flash for some applications.

#### Standards and Certifications

MPCBs provide:

- UL 489 branch circuit protection
- UL 508 and CSA C22.2 No. 14 motor protection, and meet IEC 60947-2 and 50947-4 requirements

Power Defense MPCBs meet:

- UL 489
- CSA
- C22.2 No. 5-02
- IEC 60947-2
- GB 14048.2-2008



### Power Defense MPCB—Frame Size 2 (15–200 A)

Frame Size 2 covers a range of 15 A through 200 A using PXR 10 and PXR 25 electronic trip units. It is available in three-pole configurations.

#### Interrupting Ratings

Catalog Designator	F		G		K		M		N		P	
UL/CSA	kA rms											
240 Vac	35		65		85		100		150		200	
480 Vac	25		35		50		65		85		100	
600 Vac	14		18		22		25		25		25	
250 Vdc	—		—		—		—		—		—	
IEC	$I_{cu}$	$I_{cs}$										
240 Vac	35	35	55	55	85	85	100	100	150	100	200	150
380–415 Vac	25	25	36	36	50	50	70	53	70	70	100	70
440 Vac	25	20	30	22.5	35	35	50	40	70	50	100	65
480 Vac	20	20	25	20	35	22.5	50	30	65	40	65	40
525 Vac	18	13	20	13	25	13	25	13	25	13	25	13
660–690 Vac	—	—	8	4	10	5	10	5	10	5	10	5
250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

2

#### Power Defense MPCB—Frame Size 3 (45–600 A)

Frame Size 3 covers a range of 45 A through 600 A using PXR 10 and PXR 25 electronic trip units. It is available in three-pole configurations. Frame 3 has two specific constructions, one each for 400 A and 600 A. The 600 A construction provides a unique capability to be used at 400 A and below in applications requiring higher fixed instantaneous levels. This is accomplished by using a letter H in the 7th digit of the catalog number.

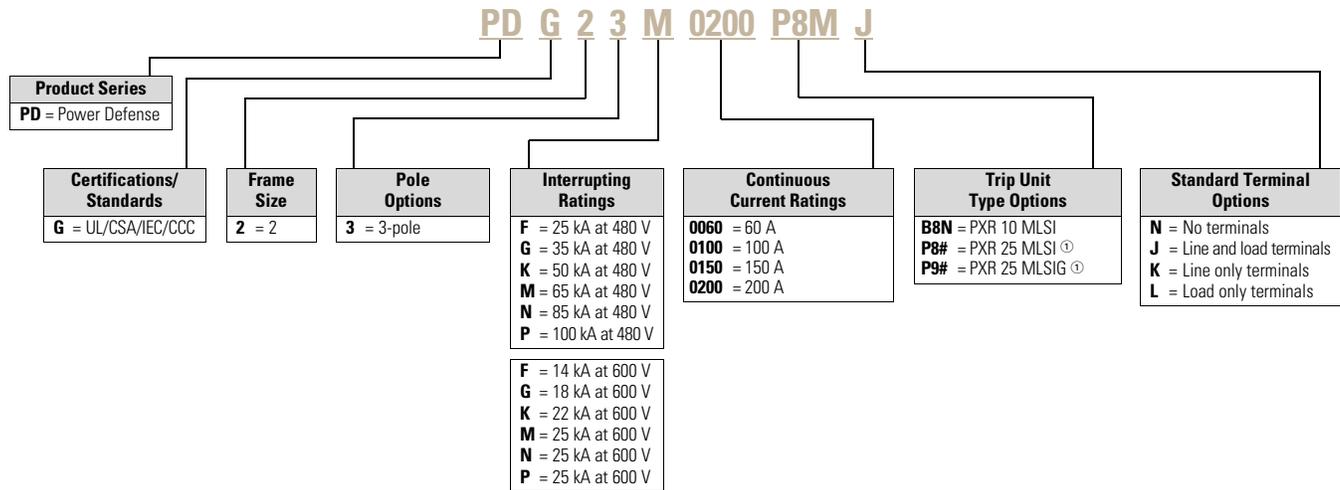
#### Interrupting Ratings

Catalog Designator	F		G		K		M		N		P	
UL/CSA	kA rms											
240 Vac	35		65		85		100		150		200	
480 Vac	25		35		50		65		85		100	
600 Vac	14		18		25		35		50		65	
125/250 Vdc	—		—		—		—		—		—	
IEC	$I_{cu}$	$I_{cs}$										
240 Vac	35	35	55	55	85	85	100	100	150	100	200	150
380–415 Vac	25	25	36	36	50	50	70	53	70	70	100	70
440 Vac	25	20	30	22.5	35	35	50	40	70	50	100	50
480 Vac	20	20	25	20	35	22.5	50	30	65	40	85	40
525 Vac	18	5	20	7.5	25	10	30	15	35	25	40	25
660–690 Vac	—	—	8	4	10	5	15	7.5	20	10	20	10
125/250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—

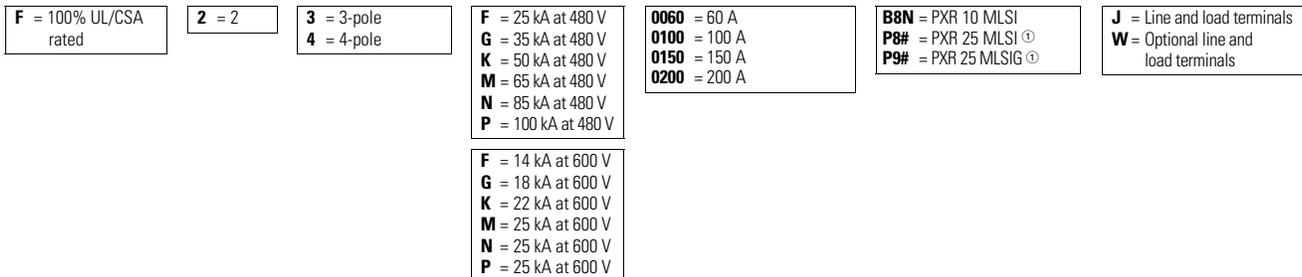
#### MPCB with Power Xpert (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

#### Frame Size 2 MPCB with PXR ETU—Globally Rated



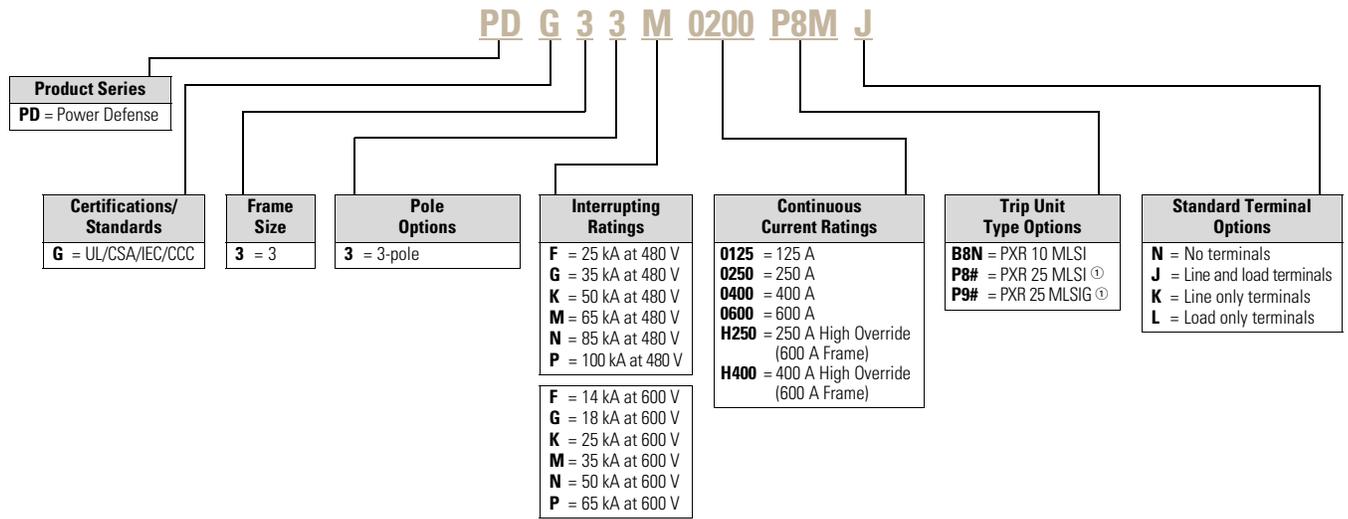
#### Frame Size 2 MPCB with PXR ETU—Globally Rated (100% UL Rated)



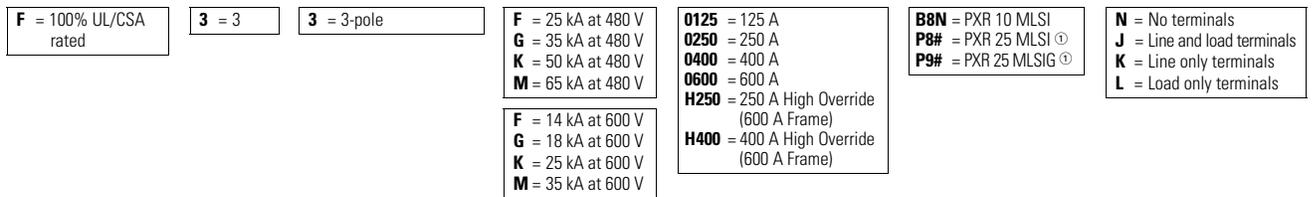
#### Note

① See "Power Xpert Release (PXR) Trip Unit Options" table on Page V4-T2-102 for # (Available Configured Options).

### Frame Size 3 MPCB with PXR ETU—Globally Rated



### Frame Size 3 MPCB with PXR ETU—Globally Rated (100% UL Rated)



**Note**

① See "Power Xpert Release (PXR) Trip Unit Options" table on the next page for # (Available Configured Options).

#### Power Xpert Release (PXR) Trip Unit Options

PXR	ETU	#(1)—Protection Type		#(2)—Available Configured Options				
		LSI	LSIG	Relays Modbus	Relays Modbus ZSI	Relays Modbus CAM	Relays Modbus ZSI CAM	
PXR 10	B	8	—	N	—	—	—	—
PXR 25	P	8	9	—	M	W	D	Y

#### Descriptions of PXR Configured Options

**Relays**—2 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions
- Field installable for PD-2

**Note:** PD-2 includes 1 relay when used in conjunction with Modbus RTU.

**Modbus**—Modbus RTU directly from the breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required
- Field installable for PD-2

**ZSI**—Zone Selective Interlocking output

- Interface: 2 wires (Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

**CAM**—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for ModbusTCP and PROFIBUS

#### Auxiliary Power

- Connection included with all PXR 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux +24 V, Aux 0 V)

#### Available Settings and Features on PXR Motor Protection Electronic Trip Units

Option	Setting	Full Load Amperes (I <sub>e</sub> ) Current Settings PD-2				Full Load Amperes (I <sub>e</sub> ) Current Settings PD-3			
		0060 60 A	0100 100 A	0150 150 A	0200 200 A	0125 125 A	0250/H250 250 A	0400/H400 400 A	0600 600 A
PXR 10	1	15 A	32 A	50 A	70 A	45 A	90 A	160 A	250 A
	2	16 A	35 A	60 A	80 A	50 A	100 A	175 A	275 A
	3	20 A	40 A	63 A	90 A	60 A	110 A	200 A	300 A
	4	25 A	50 A	70 A	100 A	63 A	125 A	225 A	320 A
	5	30 A	60 A	80 A	110 A	70 A	150 A	250 A	350 A
	6	35 A	63 A	90 A	125 A	80 A	160 A	275 A	400 A
	7	40 A	70 A	100 A	150 A	90 A	175 A	300 A	450 A
	8	45 A	80 A	110 A	160 A	100 A	200 A	320 A	500 A
	9	50 A	90 A	125 A	175 A	110 A	225 A	350 A	550 A
	10	60 A	100 A	150 A	200 A	125 A	250 A	400 A	600 A
PXR 25	Programmable from minimum to maximum values in 1 A increments.								

### Trip Profile (Trip Class and Phase Unbalance)

#### PXR 10—Dial 2

Setting	Dial Label	Trip Class	Phase Unbalance
1	A	5	OFF
2	B	10	OFF
3	C	15	OFF
4	D	20	OFF
5	E	30	OFF
6	F	5	ON
7	G	10	ON
8	H	15	ON
9	J	20	ON
10	K	30	ON

#### PXR 10—Phase Unbalance Settings Programmable by PXP

- Pickup Level: 5 to 35% of load
- Trip Time: 1 to 300 seconds
- Action taken: MPCB will trip at selected protection settings

#### PXR 25—Programmable

##### Trip Class

- Trip Class: 5–30 in increments of 0.1

##### Phase Unbalance

- Pickup Level: 5 to 35% of load
- Trip Time: 1 to 300 seconds
- Action taken: MPCB will trip at selected protection settings

##### Phase Loss

- Pickup Level: Fixed at 75% of load
- Trip Time: 1 to 240 seconds
- Action taken: May be set to trip or alarm

### Short Delay/Instantaneous Settings

MPCBs with PXR 10 include a combined Short Delay and Instantaneous trip dial. The short delay time may be programmed to trip instantaneously or with a delay for coordination or to avoid nuisance tripping. Breakers with PXR 25 trip units include independent adjustments for short delay and instantaneous settings.

#### PXR 10—Dial 3 Programmable

Setting	$I_{sd}$ ( $\times I_e$ )	$t_{sd}$ (sec)
1	3	Default to INST; programmable via USB and PXP to INST, 0.150 or 0.300.
2	4	INST / 0.150 / 0.300
3	5	INST / 0.150 / 0.300
4	6	
5	7	
6	8	
7	10	
8	11 <sup>Ⓢ</sup>	
9	12 <sup>Ⓢ</sup>	
10	13 <sup>Ⓢ</sup>	

#### Note

<sup>Ⓢ</sup> If setting value exceeds the fixed magnetic override of the device, the setting defaults to the magnetic override value (please verify these values in the time current curves or PXR user manual).

#### PXR 25—Programmable

##### Short delay pickup— $I_{sd}$ ( $\times I_e$ )

- 3x–13x: Programmable in increments of 0.1x

##### Short delay time— $t_{sd}$ (sec)

- 0.05–0.50: Programmable in increments of 0.01 sec
- Fixed (flat) response

##### Instantaneous pickup— $I_i$ ( $\times I_n$ )

- 3x–Maximum: Programmable in increments of 0.1x
- Maximum is determined by frame fixed magnetic override level

### Ground Fault Protection Settings

MPCBs with PXR 25 include an option to add ground fault protection. Ground fault protection includes the ability to trip and/or alarm on a determined ground fault condition.

#### Phase Unbalance

- Pickup Level: 5 to 35% of load
- Trip Time: 1 to 300 seconds
- Action taken: May be set to trip or alarm

#### Phase Loss

- Pickup Level: Fixed at 75% of load
- Trip Time: 1 to 240 seconds
- Action taken: May be set to trip or alarm

### Metering and Communications Capabilities

PXR 25 motor protection trip units include the same advanced metering functions as the MCCB PXR 25, including:

- Energy metering to 1% accuracy
- Current metering to 0.5% accuracy
- Multiple communications options, including standard Modbus RTU
- Load alarm at two programmable levels between 50% to 120%
- Programmable relays for remote indication

### Advanced Motor Protection Settings

MPCBs with PXR 25 trip units also include additional application specific motor protection features. These features may be set to trip the breaker, alarm (indication via programmable relays), or disabled.

#### Over Voltage

- Pickup Level: 180 to 720 V
- Trip Time: 1 to 300 seconds

#### Under Voltage

- Pickup Level: 60 to 670 V
- Trip Time: 1 to 300 seconds

#### Voltage Unbalance (between phase-to-phase readings)

- Pickup Level: 5% to 25% difference
- Trip Time: 1 to 300 seconds

#### Phase Rotation

- Configuration: ABC or CBA sequence
- Time: Fixed at 200 ms

#### Reverse Power

- Pickup Level: 1–65,500 kW
- Trip Time: 1 to 300 seconds

#### Total Harmonic Distortion

- Line-to-line and line-to-neutral voltage
- Each phase and neutral current
- 1st through 29th at 60 Hz/ 1st through 35th at 50 Hz

**Additional Information****Terminals**

2

Available terminal configuration for MPCBs follow the same guidelines as presented for each circuit breaker frame. Additional terminals, including control wire, StrandAble and other options are presented in each Power Defense circuit breaker frame size section.

**Accessories**

MPCBs and MCCBs for each frame use a common set of accessories. Available accessories are presented in each corresponding Power Defense circuit breaker frame section (i.e., PDG2 accessories are found in the Frame Size 2 section and PDG3 in the Frame Size 3 section). All Frame Size 2 MPCBs are automatically configured with 1 Form C auxiliary switch.

**Weights and Dimensions**

MPCBs have the same dimensions and weight as the three-pole version of the respective circuit breaker, shown in each frame section.

### 30 mA Ground Fault (Earth Leakage) Modules



### 30 mA Ground Fault (Earth Leakage) Modules

#### Product Description

Eaton offers three- and four-pole 30 mA ground fault (earth leakage) protection modules, also known as residual current devices for Power Defense frame 1, 2, and 3 molded case circuit breakers (MCCBs). Separate UL/CSA, IEC, and IEC/CCC listed rated devices are available. The modules are bottom mounted and are available for each frame circuits up to:

- PD1: 125 amperes (UL/CSA or IEC)
- PD2: 225 amperes (UL/CSA)
- PD3: 400, 600 (UL/CSA) or 630 (IEC/CCC) amperes

The module is completely self-contained, including a current sensor, relay and power supply inside the device. Current pickup settings are selectable from 0.03 to 10 amperes for all devices, except for the UL/CSA listed module, for which settings are selectable from 0.03 to 30 amperes. Time delays are also selectable from Instantaneous to 1.0 second for pickup settings of 0.10 amperes and above.

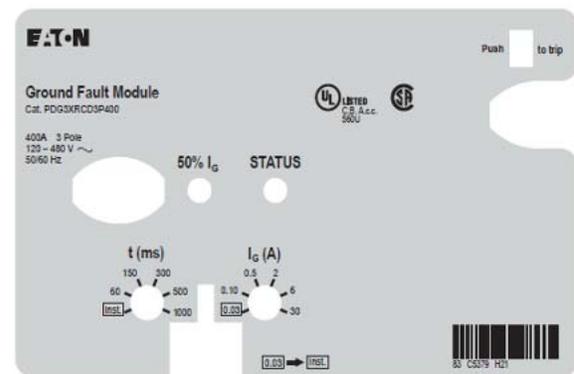
The current pickup setting of 0.03 amperes defaults to an Instantaneous time setting regardless of the time dial's position. Two alarm contacts are included with each device, which can be wired externally for remote indication. Both of these are also indicated by an LED on the front of the device:

- 50% pre-trip: alarms when the earth leakage current reaches 50% of the set pickup setting value
- 100% after trip: alarms when the breaker reaches the set pickup setting value and the breaker trips.

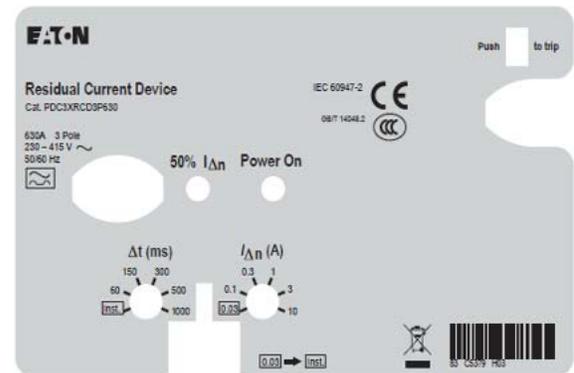
### Contents

Description	Page
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A)	V4-T2-22
Frame Size 2 (15–225 A)	V4-T2-30
Frame Size 3 (45–600 A)	V4-T2-43
Frame Size 4 (300–800 A)	V4-T2-58
Frame Size 5 (320–1200 A)	V4-T2-71
Frame Size 6 (700–2500 A)	
Motor Circuit Protectors (3–600 A)	V4-T2-88
Motor Protection Circuit Breakers (15–600 A)	
30 mA Ground Fault (Earth Leakage) Modules	V4-T2-105
Product Selection	V4-T2-106
Dimensions and Weights	V4-T2-107
Dimensions and Weights	
High Instantaneous Power Defense Circuit Breakers for Selective Coordination	V4-T2-108
Power Defense Direct Current Circuit Breakers	V4-T2-111
Power Defense Mechanical Current-Limiting Circuit Breaker Module	V4-T2-116
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module	V4-T2-118
Terminals, Lugs, Connectors and Enclosures	V4-T2-120
Communications and Software	V4-T2-144
Special Applications	V4-T2-146
Special Modification Ordering and Pricing	V4-T2-150

### UL/CSA—Rated PD3 Frame Ground Fault Module Faceplate



### IEC/CCC—Rated PD3 Frame Residual Current Device Faceplate



#### Product Selection

2

##### PD1-Frame



##### PD1-Frame Ground Fault Modules, UL/CSA-Rated (Bottom Mounted, 120–480 Vac, 50/60 Hz) ①

Ampere Rating	Number of Poles	Catalog Number
125	3	ELEBN3125G
	4	ELEBN4125G

##### PD1-Frame Earth Leakage Modules, IEC-Rated (Bottom Mounted, 230–415 Vac, 50/60 Hz) ①

Ampere Rating	Number of Poles	Catalog Number
125	3	ELEBE3125G
	4	ELEBE4125G

##### PD2-Frame



##### PD2-Frame Ground Fault Modules, UL/CSA-Rated (Bottom Mounted, 120–480 Vac, 50/60 Hz) ②

Ampere Rating	Number of Poles	Catalog Number
225	3	PDG2XRCD3P225
	4	PDG2XRCD4P225

##### PD3-Frame



##### PD3-Frame Ground Fault Modules, UL/CSA-Rated (Bottom Mounted, 120–480 Vac, 50/60 Hz)

Ampere Rating	Number of Poles	Catalog Number
400	3	PDG3XRCD3P400
	4	PDG3XRCD4P400
600	3	PDG3XRCD3P600
	4	PDG3XRCD4P600

##### PD3-Frame Earth Leakage Modules, IEC-Rated (Bottom Mounted, 230–415 Vac, 50/60 Hz)

Ampere Rating	Number of Poles	Catalog Number
630	3	PDE3XRCD3P630
	4	PDE3XRCD4P630

##### PD3-Frame Earth Leakage Modules, IEC/CCC-Rated (Bottom Mounted, 230–415 Vac, 50/60 Hz)

Ampere Rating	Number of Poles	Catalog Number
630	3	PDC3XRCD3P630
	4	PDC3XRCD4P630

##### Notes

- ① Shunt trip and undervoltage release cannot be used in a PD1 breaker connected to an earth leakage module.
- ② Includes shunt trip to reset breaker

**Dimensions and Weights**

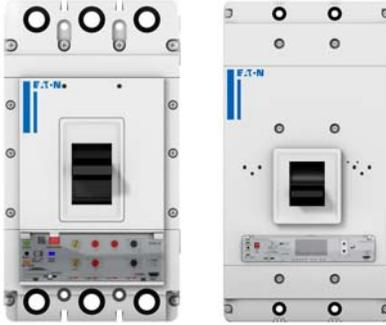
Approximate Dimensions in Inches (mm)

**Assembled Breaker and Earth Leakage Module**

<b>Frame</b>	<b>Height</b>	<b>Width</b>	<b>Depth</b>
<b>Three-Pole</b>			
PD1	10.25 (260.3)	3.00 (76.2)	2.98 (75.8)
PD2	9.75 (247.65)	2.80 (71.1)	3.50 (88.9)
PD3	15.35 (389.89)	5.50 (138.9)	4.30 (109.1)
<b>Four-Pole</b>			
PD1	10.25 (260.3)	4.00 (101.6)	2.98 (75.8)
PD2	9.75 (247.65)	5.50 (139.5)	3.50 (88.9)
PD3	15.35 (389.89)	7.2 (182.9)	4.30 (109.1)

#### Power Defense Molded Case Circuit Breakers

2



### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination	
High Instantaneous Power Defense Frame 3 (H250–H400)	
High Instantaneous Power Defense Frame 5 (400 A) . . . . .	<b>V4-T2-109</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### High Instantaneous Power Defense Circuit Breakers for Selective Coordination

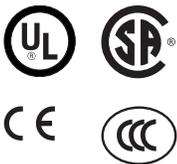
#### High Instantaneous Power Defense Frame 3 (H250–H400)

##### Product Description

Eaton's Power Defense Frame 3 molded case circuit breakers are available with **standard** and **high instantaneous** constructions for the nominal amperages of 250–400. The high instantaneous construction offers a wider range of instantaneous adjustability and can be adjusted up to 7200 A for higher current levels of selective coordination.

##### Standards and Certifications

- UL
- CSA
- IEC (CE)
- CB (CCC)



##### Product Selection

#### PXR Electronic Trip Unit

Power Defense Frame 3 molded case circuit breakers from 250 A to 400 A can be configured with high instantaneous construction with all PXR electronic trip unit options. To configure, use H as the 7th digit in the 14-digit complete catalog number. For additional selection details and product information, **refer to the Power Defense Frame 3 section within this catalog.**

#### Thermal-Magnetic Trip Unit

Power Defense Frame 3 **high-magnetic** molded case circuit breakers from 250 A to 400 A can be configured by purchasing 600 A frame and high-magnetic (250 A–400 A) trip unit separately. For a complete list of available thermal-magnetic trip unit options, **see the selection tables to the right.**

### Product Selection 600 A Frame

#### 600 A Frame Only Catalog Number

Three-Pole	Four-Pole
PDG33F0600FNNN	PDG34F0600FNNN
PDG33G0600FNNN	PDG34G0600FNNN
PDG33K0600FNNN	PDG34K0600FNNN
PDG33M0600FNNN	PDG34M0600FNNN
PDG33N0600FNNN	PDG34N0600FNNN
PDG33P0600FNNN	PDG34P0600FNNN

### Product Selection High-Magnetic TMTU

#### High-Magnetic Trip Unit Catalog Number

Three-Pole	Four-Pole <sup>①</sup>
PDG3XTFA3H250	PDG3XTFA4H250
PDG3XTFA3H300	PDG3XTFA4H300
PDG3XTFA3H350	PDG3XTFA4H350
PDG3XTFA3H400	PDG3XTFA4H400

### Product Selection High-Magnetic Electronic TU

#### High-Magnetic Trip Unit Catalog Number <sup>②</sup>

Three-Pole	Four-Pole
PDG3XPXRH250###	PDG3XPXRH250###
PDG3XPXRH300###	PDG3XPXRH300###
PDG3XPXRH350###	PDG3XPXRH350###
PDG3XPXRH400###	PDG3XPXRH400###

##### Notes

- ① For four-pole trip units, neutral protection is specified using the 9th digit of the catalog number. Available options: 0 = 0%, 4 = 100%, 6 = 60% (example: PDG3XTFAH20 = 0% protected neutral)
- ② The last three digits of the catalog number specify the trip unit type, protection and features. See **PXR Trip Unit Options table on V4-T2-48** for reference.

**Instantaneous Settings PXR Electronic Trip Unit**

	H250	H400
<b>Minimum</b>	2x ( $I_n$ )	2x ( $I_n$ )
<b>Maximum</b>	28x ( $I_n$ )	18x ( $I_n$ )
<b>Instantaneous override—7200 A</b>		

**Magnetic Adjustments Thermal-Magnetic Trip Unit**

	H250–H400
<b>Minimum</b>	5x ( $I_r$ )
<b>Maximum</b>	28x ( $I_r$ )
<b>Magnetic threshold—6000 A</b>	

**High Instantaneous Power Defense Frame 5 (400 A)****Product Description**

Eaton's Power Defense Frame 5 molded case circuit breakers with high-instantaneous withstand are specifically designed for critical operations and selective coordination requirements. The high-instantaneous withstand **PDJ5** frame is available at 400 A and includes Eaton's state-of-the-art PXR electronic trip unit. This design enables the breaker to withstand up to 90 times rated current before opening under short-circuit conditions.

**Application Description**

The PDJ5 circuit breaker incorporates a higher level of instantaneous pickup, thus allowing for higher current levels of selective coordination. Standard molded case circuit breakers typically are furnished with a magnetic pickup or electronic instantaneous adjustment set at ten times (10x) maximum the continuous trip rating. For details on ratings and adjustment capability of the PDJ5 circuit breakers, please consult the ratings table at the end of this catalog section. These higher levels of electronic instantaneous values in turn allow the system designer to obtain selective coordination at fault current levels up to these higher ratings. Greater values of selective coordination are available based on manufacturer tested combinations using the PDJ5 as line-side breaker and standard breakers as load-side devices. Refer to IA01200002E to determine the maximum fault levels that selective coordination achieves.

When the line-side and load-side molded case circuit breaker trip ratings are chosen to coordinate in the overload range, they also can be selectively coordinated in the fault range up to the values listed in the table at the end of this section or IA01200002E. For overcurrents protected by circuit breakers on the load-side of the PDJ5, only the effected load-side circuit breaker will open, while the line-side circuit breaker remains closed, thus providing continuity of power to the other critical loads supplied by the PDJ5 circuit breakers.

**Innovative Technology and Reliable Performance**

The PDJ5 is based on the Power Defense Frame 5 circuit breaker and shares the same footprint and accessories. Complete with PXR electronic trip unit technology, the PDJ5 circuit breaker can be configured with PXR 25 trip units with standard LSI functionality or ALSI to include Eaton's Arcflash Reduction Maintenance System.

**Standards and Certifications**

- UL 489
- CSA, C22.2 No. 5-02



## Product Selection

2

## PDJ5 Molded Case Circuit Breakers

Available Catalog Numbers—400 A Rating

## PXR 25 ETU

PDJ53MH400P2DN

PDJ53MH400P2DN

PDJ53MH400P2WN

PDJ53MH400P2YN

PDJ53MH400P4DN

PDJ53MH400P4MN

PDJ53MH400P4WN

PDJ53MH400P4YN

## Power Xpert Release Trip Unit Options—PDJ5 (Digits 11–13)

## Protection Type

## Available Configured Options

PXR	ETU	LSI	LSI with Arcflash Reduction Maintenance System	Relays Modbus	Relays Modbus ZSI	Relays Modbus CAM	Relays Modbus ZSI CAM
PXR 25	P	2	4	M	W	D	Y

## PDJ5 PXR 25 Protection Settings

Frame Setting	Pickup ( $I_p$ )	Time at 6x ( $I_p$ )	400 A Short Delay Pickup ( $I_{sd}$ )	Short Delay Time ( $t_{sd}$ )	Instantaneous Pickup
Minimum	150 A	0.5 s	1.5x ( $I_p$ )	0.050 s	2x ( $I_n$ )
Maximum	400 A	14.0 s	8.0x ( $I_p$ )	0.500 s	36x ( $I_n$ ) <sup>Ⓢ</sup>
Step	10 A	0.10 s	0.10	0.01 s	0.10
Additional Setting			OFF		

## Short-Circuit Current Ratings (kA rms) AC 50–60 Hz

Description	PDJ5
Maximum rated current (amperes)	400 A
<b>UL/CSA</b>	
240 V	100
480 V	65
600 V	35

**Note**

<sup>Ⓢ</sup> 36x ( $I_n$ ) = Instantaneous Override value of 14,400 A.

## Power Defense Direct Current Circuit Breakers



## Contents

## Description

## Page

Power Defense Direct Current Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers Catalog Number / Product Selection . . . . .	<b>V4-T2-112</b>
Accessories . . . . .	<b>V4-T2-115</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

## Power Defense Direct Current Circuit Breakers

## Product Description

Direct current (DC) systems and applications are becoming commonplace as alternative energy sources have expanded and the number of DC devices and data centers using DC power has swelled. Eaton offers molded case circuit breakers to meet circuit protection and switching requirements for a host of different DC end-user requirements.

## Application Description

Applications include UPS battery supply circuits, solar systems and electric vehicle charging, as well as commercial and industrial distribution.

## Features and Benefits

Current ratings are available from 25 to 3000 A, with a full scale of voltage up to 600 Vdc and interrupting ratings to address needs ranging from standard to the highest performance. Optional internal accessories provide remote tripping and indication of breaker status.

All DC breakers use the same internal and external accessories as their corresponding, standard Power Defense equivalents. The standard Power Defense molded case circuit breakers carry a maximum 250 Vdc ratings for ungrounded systems. Refer to the following page for interrupting ratings.

## Standards and Certifications

The DC breaker family is both CSA and UL 489 listed. Eaton breakers may be applied in both ungrounded and select grounded applications, with poles connected in series to operate at the maximum voltages shown on **Page V4-T2-12** through **V4-T2-20**.

To use DC circuit breakers on 600 V (500 V for Power Defense frame 1) grounded systems, three poles in series must be connected on the ungrounded leg.



# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

2

#### Catalog Number / Product Selection

- Frame size 1 covers a range of 25 A through 100 A, three-pole only option
- Frame size 2 covers a range of 15 A through 150 A for single-pole options and 15 A through 225 A for two- and three-pole options
- Frame size 3 covers a range of 100 A through 600 A, three-pole only option
- Frame size 4 covers a range of 300 A through 800 A, three-pole only option
- Frame size 5 covers a range of 800 A through 1200 A, three-pole only option
- Frame size 6 covers a range of 1600 A through 3000 A, three-pole only option

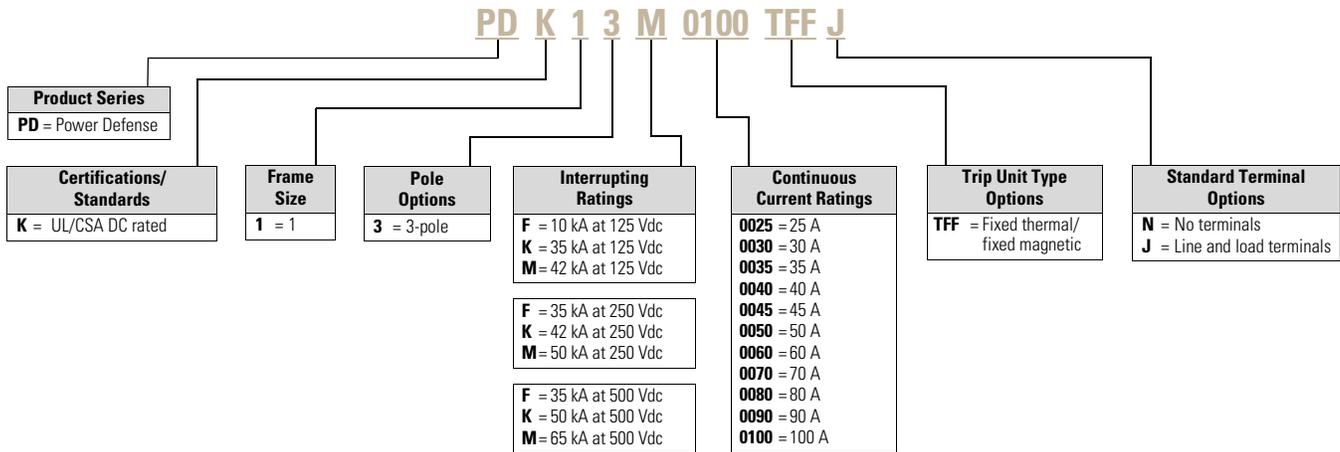
#### Interrupting Ratings (Single- and Two-Pole)

Catalog Designator	F kA rms	K kA rms	M kA rms
125 Vdc <sup>①</sup>	10	35	42
250 Vdc <sup>②</sup>	35	42	50

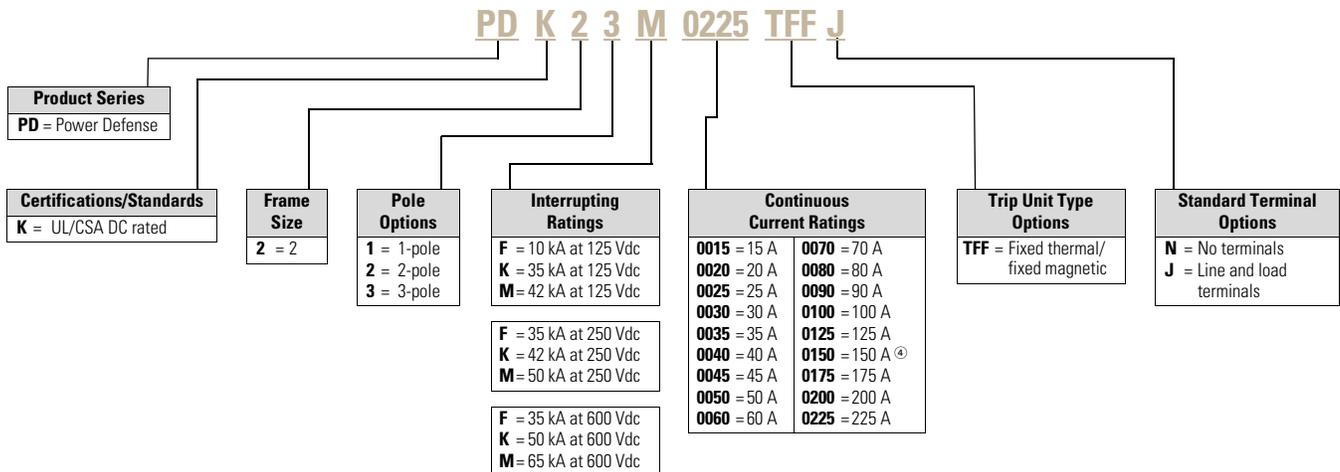
#### Interrupting Ratings (Three-Pole)

Catalog Designator	F kA rms	K kA rms	M kA rms
125 Vdc	10	35	42/50 <sup>③</sup>
250 Vdc	35	42	50
600 Vdc PD1 at 500 Vdc	35	50	65

#### Molded Case Circuit Breakers (Three-Pole) with Thermal-Magnetic Trip Units—Frame Size 1 (25–100 A)



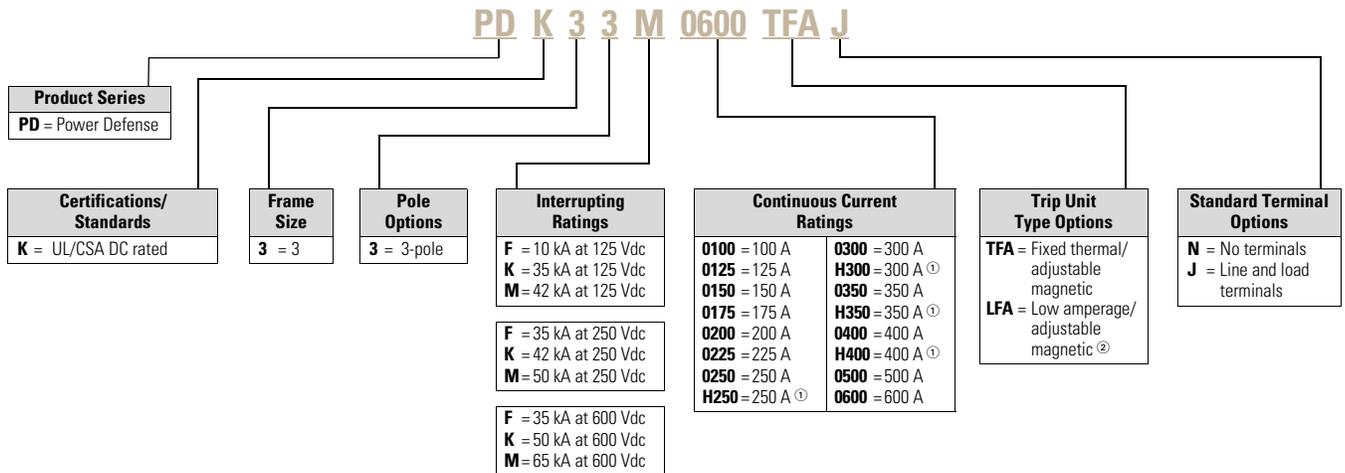
#### Molded Case Circuit Breakers (Single-, Two- and Three-Pole) with Thermal-Magnetic Trip Units—Frame Size 2 (15–225 A)



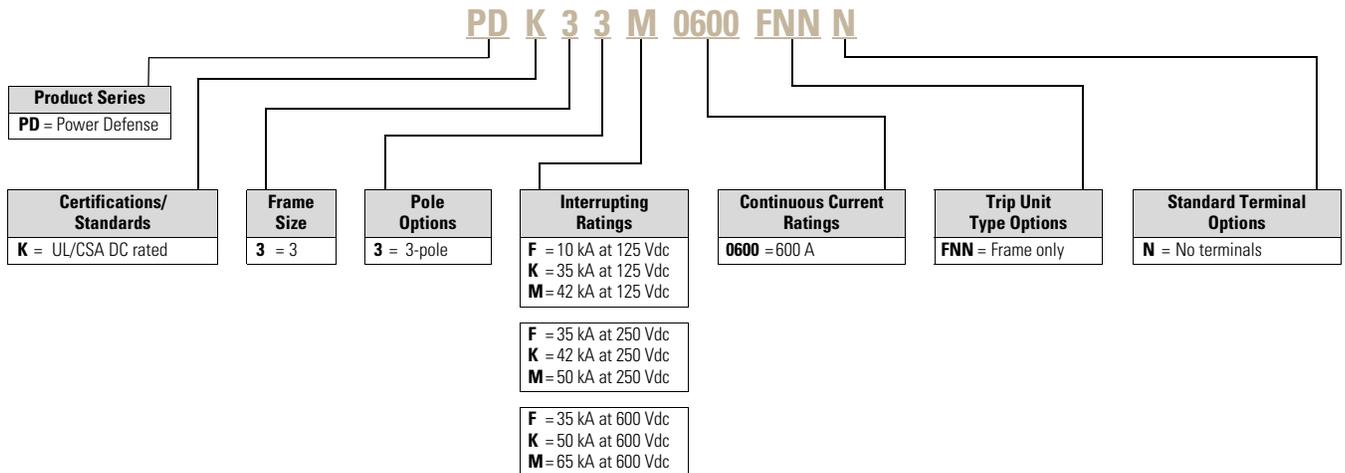
#### Notes

- <sup>①</sup> Single-pole option is rated at 125 Vdc only.
- <sup>②</sup> Two-pole option is rated at 125 Vdc and 250 Vdc.
- <sup>③</sup> First value for frames 1, 2, 3, 4. Second value for frame 6.
- <sup>④</sup> Single-pole option has a maximum current rating of 150 A.

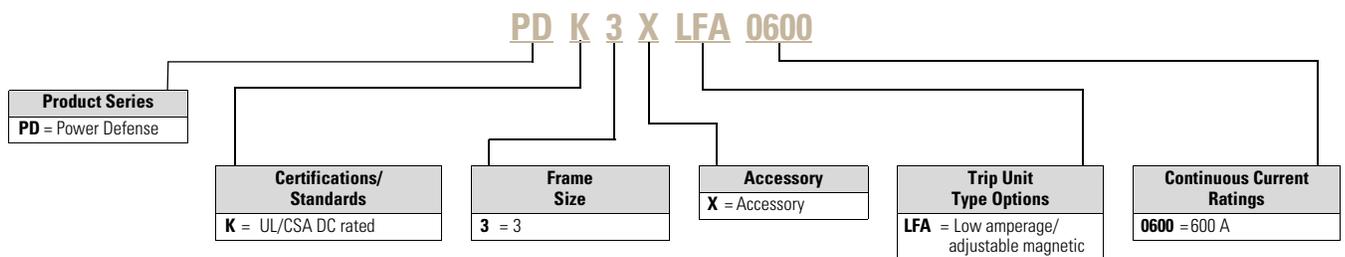
### Molded Case Circuit Breakers (Three-Pole) with Thermal-Magnetic Trip Units—Frame Size 3 (100–600 A)



### Frame 3 PDK DC Frame Only



### Frame 3 LFA Low Magnetic DC Trip Unit



#### Notes

- ① High override (600 A frame). When ordering frame only, select interrupting rating digit and select highest nominal current (400 or 600 A). Frame only option does not come with terminals, ex., PDK33F0400FNN.
- ② Only available in the high override (600 A frame).

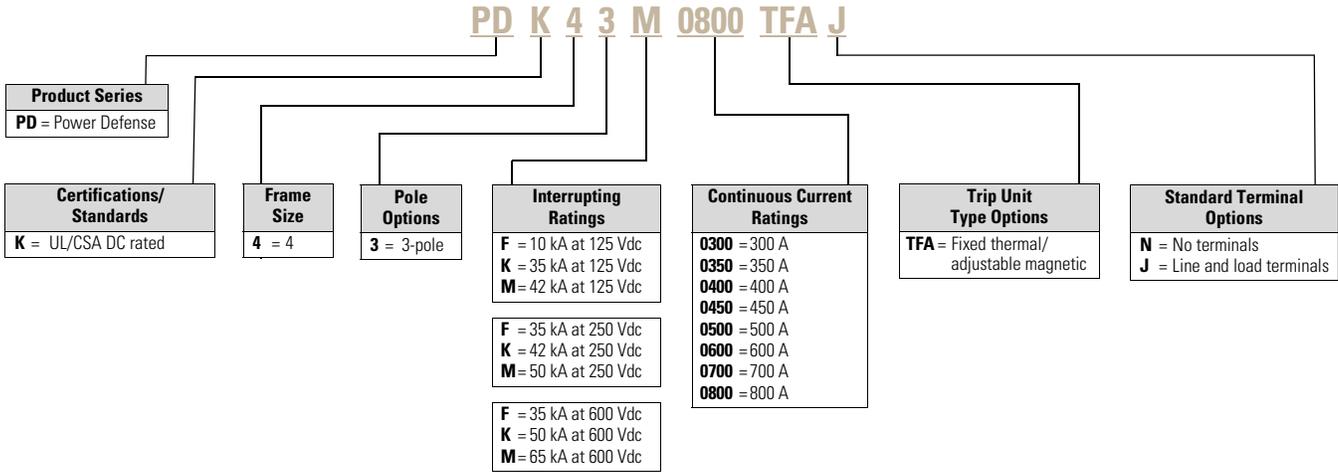
# 2.2

## Molded Case Circuit Breakers

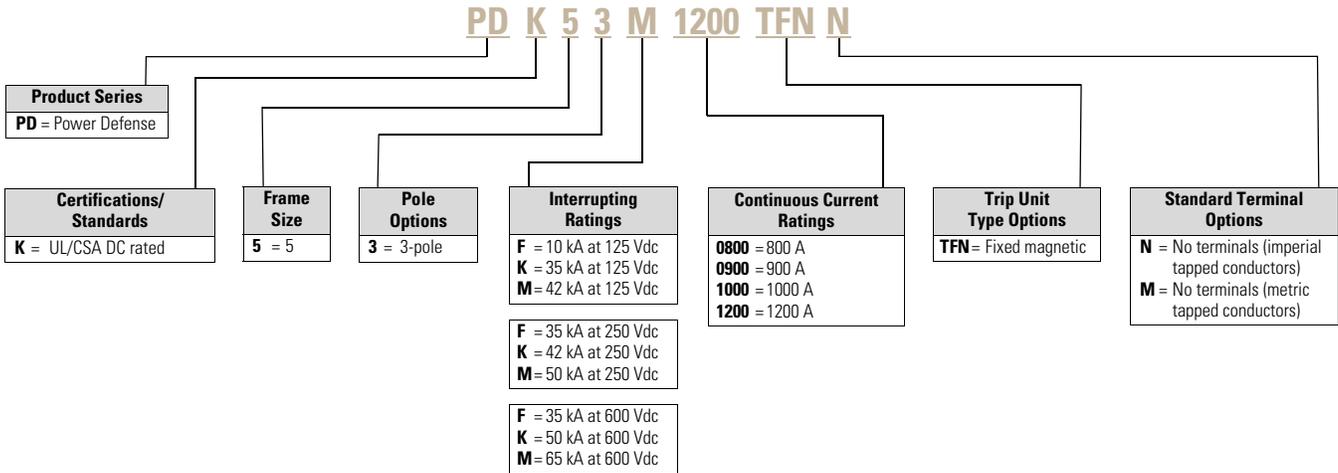
### Power Defense Molded Case Circuit Breakers

2

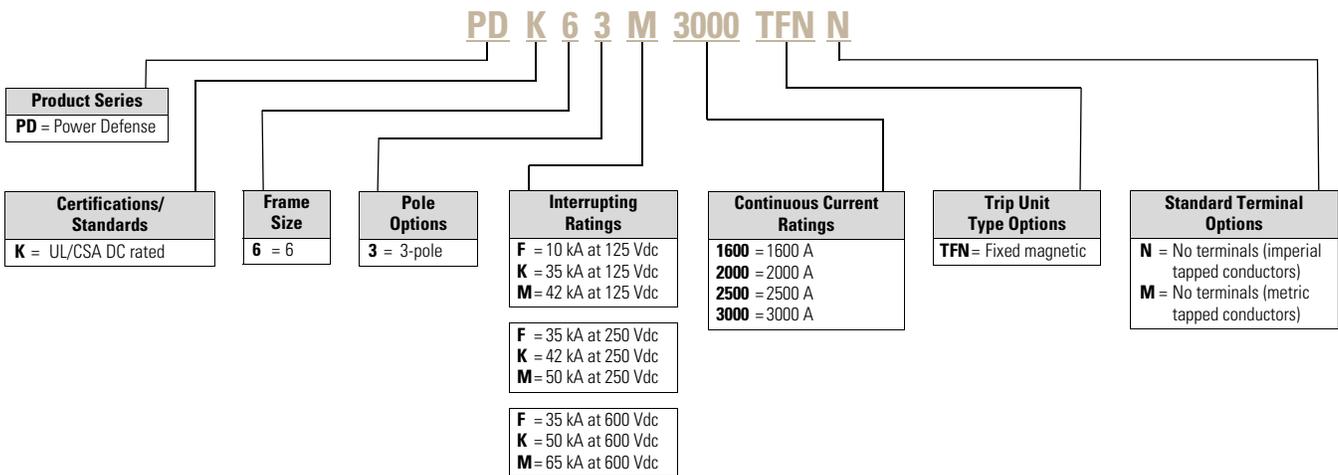
#### Molded Case Circuit Breakers (Three-Pole) with Thermal-Magnetic Trip Unit—Frame Size 4 (300–800 A)



#### Molded Case Circuit Breakers (Three-Pole) with Thermal-Magnetic Trip Unit—Frame Size 5 (800–1200 A)



#### Molded Case Circuit Breakers (Three-Pole) with Thermal-Magnetic Trip Unit—Frame Size 6 (1600–3000 A)



## Terminal Types



**Note:** Pictures are for reference only.

## Terminals

Frame Size	Maximum Breaker Amperes	Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	Catalog Number	Included Accessories	Standard on Amperes
1	125	Steel	Cu/Al	B, C	1	14–3/0	2.08–85	<b>PDG1X3T125</b>		15–125
2	100	Steel	Cu/Al	B, C	1	14–1/0	2.08–53.5	<b>PDG2X3T100</b> <sup>①</sup>		15–100
	225	Aluminum	Cu/Al	B, C	1	4–4/0	21.2–107	<b>PDG2X3TA225</b> <sup>①</sup>		110–225
3	300	Aluminum	Cu/Al	B, C	1	3–350	26.7–177	<b>PDG3X3TA300</b>		100–225
	350	Aluminum	Cu/Al	B, C	1	250–500	127–253	<b>PDG3X3TA350</b>		250–350
	400	Aluminum	Cu/Al	B, C	2	3/0–250	85–127	<b>PDG3X3TA400</b>	Terminal shield	400
	400	Aluminum	Cu/Al	B, C	1	3–5200	26.7–253	<b>PDG3X3TA400H</b>		H250–H400
4	630	Aluminum	Cu/Al	B, C	2	2–500	33.6–253	<b>PDG3X3TA630</b>	Terminal shield	450–600
	700	Aluminum	Cu/Al	B, C	2	1–500	42.4–253	<b>PDG4X3TA700</b>		300–700
	800	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	<b>PDG4X3TA800</b>		800
5	700	Aluminum	Cu/Al	B, C	2	1–500	42.4–253	<b>PDG5X1TA700</b>	Imperial	
	1000	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	<b>PDG5X1TA1000</b>	Imperial	
	1200	Aluminum	Cu/Al	B, C	4	4/0–500	107–253	<b>PDG5X1TA1200</b>	Imperial	
	1200	Aluminum	Cu/Al	B, C	3	500–750	253–380	<b>PDG5X1TA1201</b>	Imperial	
6	1600	Aluminum	Cu/Al	B, C	4	500–1000	253–507	<b>PDG6X1TA1600</b>	Imperial	
	2000	Aluminum	Cu/Al	B, C	6	2–600	33.6–304	<b>PDG6X3TA2000</b> <sup>②</sup>	Imperial bus connection	

**Notes**

<sup>①</sup> Catalog numbers shown are for a single side of a three-pole breaker. For single- and two-pole options, replace the X3 with X1 or X2, respectively.  
Example: PDG2X3T100 becomes PDG2X2T100 for two-pole.

<sup>②</sup> Only available for three-pole breaker; order quantity 1 per breaker side, or quantity 2 per breaker.

**Accessories**

All DC breakers use the same internal and external accessories as their corresponding, standard Power Defense equivalents.

- Frame 1: Refer to **Pages V4-T2-26** through **V4-T2-28**
- Frame 2: Refer to **Pages V4-T2-35** through **V4-T2-41**
- Frame 3: Refer to **Pages V4-T2-51** through **V4-T2-56**
- Frame 4: Refer to **Pages V4-T2-63** through **V4-T2-69**
- Frame 6: Refer to **Pages V4-T2-84** through **V4-T2-86**

#### Power Defense Mechanical Current-Limiting Circuit Breaker Module

2



#### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module	
Catalog Number / Product Selection . . . . .	<b>V4-T2-117</b>
Dimensions and Weights . . . . .	<b>V4-T2-117</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Power Defense Mechanical Current-Limiting Circuit Breaker Module

#### Product Overview

Power demand continues to grow in new and existing facilities. To meet increased demand, larger utility supplies, spot networks and large facility transformers are installed. The increased capacity of the electrical source results in increased fault currents in excess of 100 kA short-circuit protection. Eaton manufactures non-fused current-limiting modules with interrupting capacities up to 200 kA at 600 Vac or 70 kA at 690 Vac. Unlike fused current limiters with a one-time use, a current-limiting module provides an automatic reset of the module after a short-circuit event. Resetting the molded case circuit breaker is the only action required to restore critical power to the system; there is no time wasted with sourcing the correct replacement fuses or module to bring the system back online.

#### Product Description

The current-limiting breaker modules use a unique contact design to enhance the system protection, similar to that of the circuit breaker. When high short-circuit current is flowing through the contacts of these modules, the design results in very high interrupting capacities and improved current-limiting characteristics.

#### Application Description

High-performance breakers are most commonly applied when very high fault levels are available and with applications where the current-limiting capability is used upstream of the final load to limit current. Typical loads include lighting, power distribution and motor control applications.

#### Features and Benefits

Superior system protection:

- **Auto reset** improves system uptime and eliminates the need for finding replacement parts
- **No fuses** to replace, reducing the overall cost of ownership and the waste created by fuses
- **Overloads**, by using inverse time current tripping characteristics of the molded case circuit breaker
- **Low-level short circuits**, by using instantaneous and/or short time delay tripping characteristics of the molded case circuit breaker
- **High-level short circuits**, by using ultra-high-speed, blow-apart contacts of the current-limiting module in series with the circuit breaker contacts
- **Let-through currents**, by improved opening speed of the contacts, the resultant rapid rise of arc voltage introduces impedance into the system

#### Standards and Certifications

- UL 489
- CSA C22.2

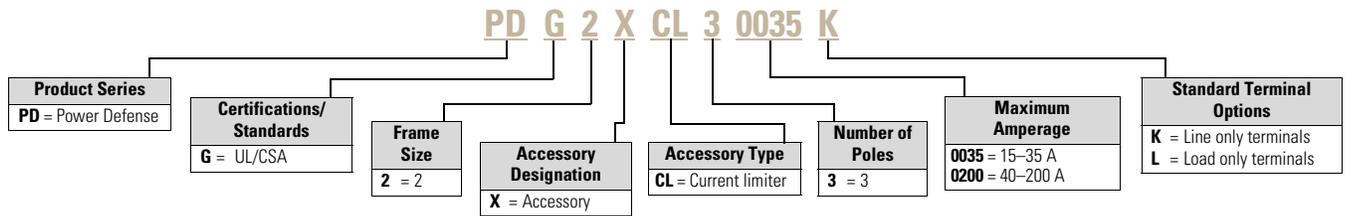


### Catalog Number / Product Selection

#### Interrupting Ratings (Three-Pole)

Type	Product	Amperes	480 Vac		600 Vac		415 Vac (IEC)		690 Vac (IEC)	
			(UL)	(UL)	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>		
PDG23(P) thermal-magnetic	Breaker only	15–225	100	35	100	70	10	5		
	With limiter	15–200	200	200	—	—	—	—		
PDG23(P) PXR electronic	Breaker only	15–225	100	35	100	70	10	5		
	With limiter	15–150	200	200	—	—	—	—		

#### Current-Limiting Module



#### Terminals

Terminal Body Type	Wire Type	Wire Class	Number of Conductors per Phase	AWG/kcmil Range per Conductor	Metric (mm <sup>2</sup> ) Range per Conductor	Three-Pole Catalog Number	Digit 12 Designation	
							Line Only	Load Only
Aluminum	Cu/Al	B, C	1	#8–350	10–185	TA250FJ	K	L

#### Dimensions and Weights

Approximate dimensions in inches (mm)

Height	Width	Depth	Weight in lb (kg)
6.06 (153)	4.13 (104.9)	3.39 (86.1)	8.50 (3.86)

#### Type ELC Current Limiter Attachment

2



### Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module

#### Type ELC Current Limiter Attachment

##### Product Overview

Eaton's type ELC current limiter attachment for the PDG2 motor circuit protector (MCP) is designed to provide increased interrupting capacity. The combination may be used for the application up to 200 kA symmetrical at 600 Vac, making the MCP suitable for use in network distribution systems and other applications where unusually high fault currents are available. The current limiter connects to the load end of the MCP and is provided with terminals suitable for copper or aluminum conductors (see table at the right).

##### Product Description

ELC type current limiters are coordinated with the MCP so that normal fault currents are interrupted automatically by the MCP without any damage to the limiter. Only the rare high fault is opened by the current limiter attachment. Faults that are interrupted by the current limiter also magnetically trip the MCP, opening all three poles, preventing single-phase operation.

Each of the three poles of the ELC current limiter are equipped with an indicator that extends when a fault is interrupted by the current limiter attachment.

### Contents

#### Description

#### Page

Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module	
Type LFD Current Limiter Attachment . . . . .	<b>V4-T2-119</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

#### Product Selection

##### Type ELC Current Limiter Attachment



#### ELC Current Limiter Attachment

MCP Rating (Amperes)	Catalog Number
3	ELC3003R
7	ELC3007R
15	ELC3015R
30	ELC3030R
50	ELC3050R
100	ELC3100R
150	ELC3150R

#### Technical Data and Specifications

##### Type ELC Current Limiter Terminal Wire Sizes <sup>①</sup>

Type ELC Current Limiter Maximum Amperes	Wire Range AWG	Metric (mm <sup>2</sup> )
<b>Standard Aluminum Terminals</b>		
50	14–2	2.5–35
100	1–4/0	50–95
150	1–4/0	50–95
<b>Non-Standard Terminals (Steel)</b>		
50	14–2 <sup>②</sup>	2.5–35
100	—	—
150	—	—

##### Notes

- ① Terminal wire connectors are UL listed for standard stranded wire sizes as defined in UL 486A or UL 486B.
- ② Optional on special order for copper cable only.

All HMCP 800 A and 1200 A come without terminals. For terminals, see **Page V4-T2-299**.

### Type LFD Current Limiter Attachment

#### Product Overview

The LFD current limiter is an accessory that bolts to the load end of a Power Defense Frame 2 thermal-magnetic or PXR electronic circuit breaker, providing 200 kA interrupting capacity at up to 600 Vac. LFD current limiters for thermal-magnetic circuit breakers are UL listed under File E47239.

#### Standards and Certifications

- UL 489
- CSA C22.2



#### Product Selection

Type LFD Current Limiter



#### Type LFD Current Limiter

Circuit Breaker Rating Amperes	Catalog Number
15-70	LFD3070R
80-160	LFD3150R

#### Terminals, Lugs, Connectors and Enclosures

2



#### Contents

<i>Description</i>	<i>Page</i>
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Power Defense Current-Limiting Circuit Breaker—Fused Current-Limiting Module . . . . .	<b>V4-T2-118</b>
Terminals, Lugs, Connectors and Enclosures	
Standards and Certifications . . . . .	<b>V4-T2-121</b>
Cable Sizing/Selection . . . . .	<b>V4-T2-121</b>
Special Application Terminals . . . . .	<b>V4-T2-121</b>
Catalog Numbering System Overview . . . . .	<b>V4-T2-122</b>
Catalog Numbering System Overview . . . . .	<b>V4-T2-124</b>
Communications and Software . . . . .	<b>V4-T2-144</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

#### Terminals, Lugs, Connectors and Enclosures

##### Product Description

###### Standard Terminals

Eaton’s Power Defense molded case circuit breakers (MCCB) can be configured with line and load terminals factory installed or shipped separately for field installation. Each terminal provides wire connecting capabilities for specific ranges of continuous current ratings and wire types. Wire connecting terminals are typically secured to the breaker using slotted or hex head screws and use various hardware types for securing connection to the wire. For proper terminal-breaker or terminal-wire torque requirements, please consult the detailed selection tables in this catalog or the specific markings on the terminal.

##### Application Description

###### Terminal Ratings

###### Cu/Al, Cu, or Al

Each terminal is marked with information specific to the wire material type that it is rated for use with. In most electrical applications, the conductor material is comprised of copper or aluminum busbar or stranded wire. Each is considered effective material for conducting electricity and both have different advantages. Copper has higher conductivity as well as superior tensile strength, which is considered an advantage in the event of a high current fault. Aluminum is a lighter material with greater pliability and is also generally more cost-effective. Each terminal is labeled to indicate which material it is rated for use with as outlined on **Page V4-T2-121**.

###### Terminal Ratings

###### 75 °C vs. 90 °C Terminal Rating

Terminals are marked to indicate the maximum wire temperature rating that is approved for use. In relation to molded case circuit breaker application, the temperature rating is typically 90 °C or 75 °C. Although the terminal is marked with applicable wire temperature rating, it is important to note UL 489, the standard to which MCCBs adhere, only recognizes 60 °C and 75 °C wire for testing purposes and rated use. If 90 °C wire is used to connect to an MCCB, the wire must be applied at its 75 °C rated ampacity.

As an example, 90 °C wire is often required for use in 100% continuous current rated MCCB applications. When this is the case, the 90 °C wire must be applied at its 75 °C rated ampacity, which often results in the wire being selected one size larger than typical. An example of the terminal markings and corresponding designations is on **Page V4-T2-121**.

## Standards and Certifications

All terminals comply with UL Standards 486A and 486B and CSA Standard C22.2 No. 65M.

### Terminal Marking Example <sup>①</sup>



#### Legend

AL — Aluminum conductors

CU — Copper conductors

9 — 90 °C wire

7 — 75 °C wire

Example: AL9CU—Rated for use with aluminum and copper and is 90 °C rated.

#### Note

① If the terminal is not marked to indicate maximum wire temperature rating, it should be assumed that 75 °C is the maximum wire rating.

## Cable Sizing/Selection

When sizing and selecting cable for use with a molded case circuit breaker, the temperature rating of both the breaker terminals and the electrical equipment connectors must be considered to ensure proper size and insulation rating can be chosen. The equipment labeling or installation guidelines must be reviewed to determine the proper cable size and insulation required, regardless of the ratings listed on the terminal. For general selection guidelines, NEC Article 310 (NEC 2017) outlines the use of “Conductors for General Wiring” and can be a resource for determining appropriate cable size based on the temperature rating, wire type and amperage requirement.

## Special Application Terminals

### Multi-Wire Terminals



The use of load-side multi-wire terminals provides an alternative to power distribution blocks by distributing the electrical load directly from the circuit breaker to multiple downstream devices. These terminals can be installed in the field or specified for factory installation. Kits typically include terminal shields, mounting hardware, insulators and tin-plated connectors. Multi-wire terminals connect directly to the circuit breaker and eliminate the need for additional short-circuit combination ratings, as required by separate power distribution blocks. Direct connection to the breaker also saves space in the panel and eliminates wiring. Multi-wire terminals are UL listed for use on the load side of the circuit breaker.

### StrandAble Terminals



Standard molded case circuit breaker terminals are listed for Class B and C rigid wire by default in accordance with UL 489 & 486 standards. Eaton’s StrandAble terminals allow for direct connection to the circuit breaker with nearly any class of rigid or fine strand wire. This eliminates the need for any additional fittings and ensures UL compliance with all components connected to the breaker. Rated for use with the eight most common wire classes, StrandAble terminals offer a breaker integrated solution that can eliminate time and save cost in an electrical assembly.

### Rear Fed Terminals



Rear fed terminals allow the ability to connect cable from the back of the breaker instead of the top or bottom. This allows for easier connection when the breaker is more accessible from the back. A kit of three terminals typically includes terminal shields or interphase barriers.

### End Cap/Screw Terminal Kits



An end cap kit slides onto the line or load side of the circuit breaker and acts as a threaded adapter for the conductor to accept a ring terminal (compression lug) or other bolt-on connector. The kit is designed to meet any requirements for clearance and is capped to provide finger protection once installed. Each kit includes a threaded base and the required hardware for securing the connector.

**Note:** As standard, Power Defense frame sizes 4, 5 and 6 include imperial threaded conductors (optional metric threading). No additional components are required to connect a compression lug or other bolted connection to these frames.

### Control Wire Terminals



Control wire terminals and control wire kits are offered to provide means to tap off control power from the circuit breaker using the male end of a quick disconnect. Varying for each frame size, the tabs can be ordered separately for field installation or factory installed onto the terminal.

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

#### Catalog Numbering System Overview

2

##### Breakers

Power Defense breakers are configured using a 20-digit catalog number that can be divided into two sections:

- Base breaker catalog number = digits 1–14
- Factory modifications = digits 15–20

Product may be ordered using the base breaker catalog number (14 digits) only. However, if factory modifications are required, including installation of accessories, the full breaker catalog number plus factory modifications (20 digits) for a configured breaker must be used.

Note that most of the accessories and terminals for Power Defense molded case circuit breakers are field installable.

When field installing accessories, the best practice to follow is to order a base breaker with the 14-digit catalog number and order the accessories or special terminals separate for field installation.

#### Base Breaker Catalog Number (14 digits with standard terminal configuration)

The catalog number has fixed positions for each breaker characteristic. The fixed format allows a customer to determine the performance characteristics of the product by parsing the catalog number. The format of the Power Defense breaker catalog number is as follows:

Catalog Number Digits	PD (1, 2)	G (3)	3 (4)	3 (5)	F (6)	0400 (7–10)	TFA (11–13)	J (14)
Meaning	Power Defense	Certifications and Standards	Frame Size	Poles	Interrupting rating	Continuous current rating	Trip unit type	Terminals

#### Terminal Catalog Number (if ordered separately)

Each terminal catalog number has consistent nomenclature that can be used for deciphering specific terminal characteristic. The consistent format allows the customer to determine the applicable breaker frame, quantity included in each kit and base terminal type.

Catalog Number Digits	PD (1, 2)	G (3)	3 (4)	X (5)	3 (6)	TA400 (7–end)
Meaning	Power Defense	Certifications and Standards	Frame Size	Denotes accessory	Quantity included in kit	Base terminal (marked on each component)

### Specifying Terminals on a Breaker (Digits 14 / 19–20)

The 14th digit of each base breaker catalog number indicates the terminal configuration. For breakers that require terminals on the line side only, load side only, or use the same terminals for line and load side, the 14th digit can be used to specify the terminal requirement.

For breakers that require special terminal configurations, such as different terminals on line and load side, a configured 20-digit catalog number must be utilized. When different terminals are required on each side, the Power Defense catalog number structure will maintain consistency.

In cases where a 20-digit catalog number is required, digit 14 will always be utilized to specify the line side terminal requirement. Digits 19–20 will be utilized to specify the load side configuration. This can be accomplished by using the letter “Z” in digit 19 and specifying the load terminal using digit 20.

### Example: 20-Digit Catalog Number—Frames 1–4 with Different Line and Load Terminals

PD (1, 2)	G (3)	2 (4)	3 (5)	F (6)	0225 (7–10)	TFF (11–13)	K (14)	NN (15–16)	NN (17–18)	ZG (19–20)
Power Defense	Certifications and Standards	Frame Size	Poles	Interrupting rating	Continuous current rating	Trip unit type	Line side terminals	Indicating accessory	Tripping accessory	Load side terminals

The example above illustrates a Power Defense Frame 2 circuit breaker configured with different terminals on the line and load side. Digit 14 (K) indicates standard terminals, PDG2X3TA225, on the line side. Digits 19–20 (ZG) indicate special multi-wire terminals, PDG2X3TA2256W, on the load side.

### Specifying Terminals on a Breaker (Frames 5 and 6)

Power Defense frames 5 and 6 are most commonly ordered without terminals installed at the factory. These frames include tapped conductors that can be specified for imperial or metric threading. This allows for increased flexibility when making field connections to the breaker conductors.

For frames 5 and 6, standard 14-digit catalog numbers will not include terminals. The 14th digit of the catalog number will indicate imperial or metric threaded conductors.

If factory-installed terminals are required for frames 5 or 6, they can be specified using a complete 20-digit catalog number. In these cases, the 14th digit will indicate the conductor threading and digits 19–20 will specify the terminal type.

### Example: 20-Digit Catalog Number—Frames 5 and 6 with Factory-Installed Terminals

PD (1, 2)	G (3)	5 (4)	3 (5)	M (6)	1200 (7–10)	P5D (11–13)	M (14)	NN (15–16)	NN (17–18)	ZJ (19–20)
Power Defense	Certifications and Standards	Frame Size	Poles	Interrupting rating	Continuous current rating	Trip unit type	Threading type	Indicating accessory	Tripping accessory	Terminals

The example above illustrates a Power Defense frame 5 circuit breaker configured with factory-installed terminals. Digit 14 (M) indicates metric threaded conductors on the line and load side. Digits 19–20 (ZJ) indicate terminal, PDG5X1TA1200, installed on the line and load side.

#### Product Selection

#### Terminals—Frame Size 1 (15–125 A)

2

##### Standard Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG1X2T125 PDG1X3T125 PDG1X4T125	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	J K L/ZL
Breaker Max Amps	<b>125 A</b>	Terminal Body Type	<b>Steel</b>	Wire Torque (in-lb)	<b>See listed chart</b>
Standard Amp Range	<b>15–125 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See listed chart</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Slotted—Imperial</b>
Wire Range AWG	<b>#14–3/0</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	—
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–85</b>	Included Parts	—	Terminal Hardware Type	<b>Slotted—Imperial</b>

##### Alternate Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG1X2TA125 PDG1X3TA125 PDG1X4TA125	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZL
Breaker Max Amps	<b>125 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>See listed chart</b>
Standard Amp Range	<b>15–125 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See listed chart</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Slotted—Imperial</b>
Wire Range AWG	<b>#14–1/0</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	—
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–53.5</b>	Included Parts	—	Terminal Hardware Type	<b>Slotted—Imperial</b>

##### Multi-Wire Terminals



Catalog Number	2-pole 3-pole 4-pole	— PDG1X3TA1253W PDG1X4TA1253W	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	— — H/ZH
Breaker Max Amps	<b>125 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>70</b>
Standard Amp Range	<b>15–125 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>7.9</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (5/32 in) Imperial</b>
Wire Range AWG	<b>#14–2</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–33.6</b>	Included Parts	<b>Terminal Shield</b>	Terminal Hardware Type	<b>Hex (5/32 in) Imperial</b>



Catalog Number	2-pole 3-pole 4-pole	— PDG1X3TA1256W PDG1X4TA1256W	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	— — G/ZG
Breaker Max Amps	<b>125 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>25</b>
Standard Amp Range	<b>15–125 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>2.82</b>
# Conductors per Phase	<b>6</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/32 in) Imperial</b>
Wire Range AWG	<b>#14–6</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–13.3</b>	Included Parts	<b>Terminal Shield</b>	Terminal Hardware Type	<b>Hex (5/32 in) Imperial</b>

**Terminals—Frame Size 1 (15–125 A), continued****End Cap Kit/Screw Terminals**

Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only	S
	3-pole	PDG1X3TS125		Load Only (Digit 14/19–20)	D
	4-pole	PDG1X4TS125			E/ZE
Breaker Max Amps	125 A	Terminal Body Type	—	Wire Torque (in-lb)	34–38
Breaker Frame	15–125 A	Wire Type	—	Wire Torque (Nm)	4–4.4
# Conductors per Phase	—	Wire Temperature Rating	—	Wire Hardware Type	—
Wire Range AWG	—	Wire Classes	—	Terminal Torque (in-lb)	34–38
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	<b>End Cap/Hardware</b>	Terminal Screw Size	<b>Hex Cap (10/32 x 0.875)</b>

**Control Wire Tabs**

Catalog Number	GCWTK	For Use With ...
Breaker Max Amps	125 A	PDG1X3TA125, PDG1X3T125
Breaker Frame	15–125 A	
Quick Connect Tab Size	1/4-in	
Package Qty	12	

**Terminal Shields and Barriers**

Catalog Number	2-pole	—
	3-pole	PDG1XTC3P
	4-pole	PDG1XTC4P
Breaker Max Amps	125 A	—
Breaker Frame	15–125 A	—
Included Parts	<b>Terminal Shield, Terminal Shield Cover, Barriers</b>	—



Catalog Number	PDG1XIB3P
Breaker Max Amps	125 A
Breaker Frame	15–125 A
Included Parts	<b>Qty 2 Barriers</b>

**Frame Size 1 Wire Torque (if chart is referenced)**

For Sizes ...	Torque (in-lb)	For Sizes ...	Torque (Nm)
14–10 AWG	35	2.5–6 mm <sup>2</sup>	3.95 Nm
8 AWG	40	10 mm <sup>2</sup>	4.52 Nm
6–4 AWG	45	16–25 mm <sup>2</sup>	5.08 Nm
3–1/0 AWG	50	25–50 mm <sup>2</sup>	5.65 Nm

#### Terminals—Frame Size 2 (15–225 A)

2



#### Standard Terminals

Catalog Number	2-pole 3-pole 4-pole	PDG2X2T100 PDG2X3T100 PDG2X4T100	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	J K L/ZL
Breaker Max Amps	<b>100 A</b>	Terminal Body Type	<b>Steel</b>	Wire Torque (in-lb)	<b>See listed chart</b>
Standard Amp Range	<b>15–100 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See listed chart</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Slotted—Imperial</b>
Wire Range AWG	<b>#14–1/0</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>20</b>
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–53.5</b>	Included Parts	—	Terminal Hardware Type	<b>Slotted—Imperial</b>



Catalog Number	2-pole 3-pole 4-pole	PDG2X2TA225 PDG2X3TA225 PDG2X4TA225	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	J K L/ZL
Breaker Max Amps	<b>225 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>120</b>
Standard Amp Range	<b>110–225 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>13.55</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Hex (3/16 in) Imperial</b>
Wire Range AWG	<b>#4–4/0</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>N/A</b>
Wire Range Metric (mm <sup>2</sup> )	<b>21.2–107</b>	Included Parts	—	Terminal Hardware Type	<b>Clip-in Mount</b>

#### Alternate Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG2X2TA50 PDG2X3TA50 PDG2X4TA50	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZV
Breaker Max Amps	<b>50 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>See listed chart</b>
Amp Range	<b>15–50 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See listed chart</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Slotted—Imperial</b>
Wire Range AWG	<b>#14–4</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>20</b>
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–21.2</b>	Included Parts	—	Terminal Hardware Type	<b>Slotted—Imperial</b>



Catalog Number	2-pole 3-pole 4-pole	PDG2X2TA100 PDG2X3TA100 PDG2X4TA100	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZV
Breaker Max Amps	<b>100 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>See listed chart</b>
Amp Range	<b>60–100 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See listed chart</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Slotted—Imperial</b>
Wire Range AWG	<b>#14–1/0</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>20</b>
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–53.5</b>	Included Parts	—	Terminal Hardware Type	<b>Slotted—Imperial</b>



Catalog Number	2-pole 3-pole 4-pole	PDG2X2TA150 PDG2X3TA150 PDG2X4TA150	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZV
Breaker Max Amps	<b>150 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>120</b>
Amp Range	<b>60–150 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>13.55</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Hex (3/16 in) Imperial</b>
Wire Range AWG	<b>#14–4/0</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>N/A</b>
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–107</b>	Included Parts	—	Terminal Hardware Type	<b>Clip-in Mount</b>



Catalog Number	2-pole 3-pole 4-pole	PDG2X2TA225K PDG2X3TA225K PDG2X4TA225K	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZV
Breaker Max Amps	<b>225 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>275</b>
Amp Range	<b>60–225 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>31.07</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (5/16 in) Imperial</b>
Wire Range AWG	<b>#6–300 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>100</b>
Wire Range Metric (mm <sup>2</sup> )	<b>13.3–152</b>	Included Parts	<b>Terminal Shield</b>	Terminal Hardware Type	<b>Hex (5/32 in) Imperial</b>

## Terminals—Frame Size 2 (15–225 A), continued

## Non-standard Terminals



Catalog Number	2-pole	PDG2X2T150	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only	W
	3-pole	PDG2X3T150			
	4-pole	PDG2X4T150		Load Only (Digit 14/19–20)	Z/ZZ
Breaker Max Amps	150 A	Terminal Body Type	Stainless Steel	Wire Torque (in-lb)	See listed chart
Amp Range	60–150 A	Wire Type	Cu	Wire Torque (Nm)	See listed chart
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Slotted—Imperial
Wire Range AWG	#4–4/0	Wire Classes	B, C	Terminal Torque (in-lb)	20
Wire Range Metric (mm <sup>2</sup> )	21.2–107	Included Parts	—	Terminal Hardware Type	Slotted—Imperial



Catalog Number	2-pole	PDG2X2T225	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only	W
	3-pole	PDG2X3T225			
	4-pole	PDG2X4T225		Load Only (Digit 14/19–20)	Z/ZZ
Breaker Max Amps	225 A	Terminal Body Type	Copper	Wire Torque (in-lb)	120
Amp Range	60–225 A	Wire Type	Cu	Wire Torque (Nm)	13.55
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (3/16 in) Imperial
Wire Range AWG	#4–4/0	Wire Classes	B, C	Terminal Torque (in-lb)	N/A
Wire Range Metric (mm <sup>2</sup> )	21.2–107	Included Parts	—	Terminal Hardware Type	Clip-in Mount

## Multi-Wire Terminals



Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only	—
	3-pole	PDG2X3TA2256W			
	4-pole	—		Load Only (Digit 14/19–20)	G/ZG
Breaker Max Amps	225 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	25
Amp Range	15–225 A	Wire Type	Cu/Al	Wire Torque (Nm)	2.82
# Conductors per Phase	6	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (3/32 in) Imperial
Wire Range AWG	#14–6	Wire Classes	B, C	Terminal Torque (in-lb)	35
Wire Range Metric (mm <sup>2</sup> )	2.08–13.3	Included Parts	—	Terminal Hardware Type	Hex (5/32 in) Imperial



Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only	—
	3-pole	PDG2X3TA2253W			
	4-pole	—		Load Only (Digit 14/19–20)	H/ZH
Breaker Max Amps	225 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	70
Amp Range	15–225 A	Wire Type	Cu/Al	Wire Torque (Nm)	7.9
# Conductors per Phase	3	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/32 in) Imperial
Wire Range AWG	#14–2	Wire Classes	B, C	Terminal Torque (in-lb)	35
Wire Range Metric (mm <sup>2</sup> )	2.08–33.6	Included Parts	—	Terminal Hardware Type	Hex (5/32 in) Imperial

## Rear Fed Terminals



Catalog Number	2-pole	PDG2X2TA150RF	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only	—
	3-pole	PDG2X3TA150RF			
	4-pole	PDG2X4TA150RF		Load Only (Digit 14/19–20)	—
Breaker Max Amps	225 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	120
Amp Range	15–150 A	Wire Type	Cu/Al	Wire Torque (Nm)	13.55
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (3/16 in) Imperial
Wire Range AWG	#14–4/0	Wire Classes	B, C	Terminal Torque (in-lb)	60
Wire Range Metric (mm <sup>2</sup> )	2.08–107	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/32 in) Imperial



Catalog Number	2-pole	PDG2X2TA225RF	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only	—
	3-pole	PDG2X3TA225RF			
	4-pole	PDG2X4TA225RF		Load Only (Digit 14/19–20)	—
Breaker Max Amps	225 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	275
Amp Range	60–225 A	Wire Type	Cu/Al	Wire Torque (Nm)	31.07
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (3/16 in) Imperial
Wire Range AWG	#6–300 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	60
Wire Range Metric (mm <sup>2</sup> )	13.3–152	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/32 in) Imperial

#### Terminals—Frame Size 2 (15–225 A), continued

2



#### Box Terminals

Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG2X3T20		Line Only	—
	4-pole	—		Load Only (Digit 14/19–20)	—
Breaker Max Amps	<b>20 A</b>	Terminal Body Type	<b>Steel</b>	Wire Torque (in-lb)	<b>20</b>
Amp Range	<b>15–20 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>2.26</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Slotted—Imperial</b>
Wire Range AWG	<b>#14–10</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>20</b>
Wire Range Metric (mm <sup>2</sup> )	<b>2.08–5.26</b>	Included Parts	—	Terminal Hardware Type	<b>Slotted—Imperial</b>



#### End Cap Kit/Screw Terminals

Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load	<b>S</b>
	3-pole	PDG2X3TS225		Line Only	<b>D</b>
	4-pole	PDG2X4TS225		Load Only (Digit 14/19–20)	<b>E/ZE</b>
Breaker Max Amps	<b>225 A</b>	Terminal Body Type	—	Wire Torque (in-lb)	<b>34–38</b>
Breaker Frame	<b>15–225 A</b>	Wire Type	—	Wire Torque (Nm)	<b>4–4.4</b>
# Conductors per Phase	—	Wire Temperature Rating	—	Wire Hardware Type	—
Wire Range AWG	—	Wire Classes	—	Terminal Torque (in-lb)	<b>34–38</b>
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	<b>End Cap/Hardware</b>	—	<b>Hex Cap (10/32 x 0.75)</b>



#### Control Wire Tabs

Catalog Number	FCWTK	For Use With ...
Breaker Max Amps	<b>150 A</b>	PDG2X3T100,
Breaker Frame	<b>15–150 A</b>	PDG2X3T150
Quick Connect Tab Size	<b>1/4-in</b>	
Package Qty	<b>12</b>	



Catalog Number	FCWTK225	For Use With ...
Breaker Max Amps	<b>225 A</b>	PDG2X3T225
Breaker Frame	<b>175–225 A</b>	
Quick Connect Tab Size	<b>1/4-in</b>	
Package Qty	<b>12</b>	



#### Terminal Shields and Barriers

Catalog Number	2-pole	PDG2XTC2P
	3-pole	PDG2XTC3P
	4-pole	PDG2XTC4P
Breaker Max Amps	<b>225 A</b>	—
Breaker Frame	<b>15–225 A</b>	—
Included Parts	<b>Terminal Shield &amp; Hardware</b>	—



Catalog Number	2-pole	PDG2XIB
	3-pole	PDG2XIB3P
	4-pole	PDG2XIB4P
Breaker Max Amps	<b>225 A</b>	—
Breaker Frame	<b>15–225 A</b>	—
Included Parts	<b>Interphase Barriers</b>	—

#### Frame Size 2 Wire Torque (if chart is referenced)

For Sizes ...	Torque (in-lb)	For Sizes ...	Torque (Nm)
14–10 AWG	35	2.5–6 mm <sup>2</sup>	3.95 Nm
8 AWG	40	10 mm <sup>2</sup>	4.52 Nm
6–4 AWG	45	16–25 mm <sup>2</sup>	5.08 Nm
3–1/0 AWG	50	25–50 mm <sup>2</sup>	5.65 Nm

### Terminals—Frame Size 3 (45–600 A)

#### Standard Terminals



Catalog Number	2-pole	PDG3X2TA300	Breaker Catalog Number Digit 14 Designation	Line and Load	J
	3-pole	PDG3X3TA300		Line Only	K
	4-pole	PDG3X4TA300		Load Only (Digit 14/19–20)	L/ZL
Breaker Max Amps	<b>300 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>275</b>
Breaker Frame	<b>400 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>31</b>
Standard Amp Range	<b>100–225 A</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (5/16 in)</b>
# Conductors per Phase	<b>1</b>	—	—	—	—
Wire Range AWG	<b>#3–350 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>6–8</b>
Wire Range Metric (mm <sup>2</sup> )	<b>26.7–177</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (7/32 in) Imperial</b>



Catalog Number	2-pole	PDG3X2TA350	Breaker Catalog Number Digit 14 Designation	Line and Load	J
	3-pole	PDG3X3TA350		Line Only	K
	4-pole	PDG3X4TA350		Load Only (Digit 14/19–20)	L/ZL
Breaker Max Amps	<b>350 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Breaker Frame	<b>400 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
Standard Amp Range	<b>250–350 A</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in)</b>
# Conductors per Phase	<b>1</b>	—	—	—	—
Wire Range AWG	<b>250–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>6–8</b>
Wire Range Metric (mm <sup>2</sup> )	<b>127–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (7/32 in) Imperial</b>



Catalog Number	2-pole	PDG3X2TA400	Breaker Catalog Number Digit 14 Designation	Line and Load	J
	3-pole	PDG3X3TA400		Line Only	K
	4-pole	PDG3X4TA400		Load Only (Digit 14/19–20)	L/ZL
Breaker Max Amps	<b>400 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>275</b>
Breaker Frame	<b>400 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>31</b>
Standard Amp Range	<b>400 A</b>	—	—	—	—
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (5/16 in)</b>
Wire Range AWG	<b>3/0–250 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>6–8</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–127</b>	Included Parts	<b>Terminal Shield</b>	Terminal Hardware Type	<b>Hex (7/32 in) Imperial</b>



Catalog Number	2-pole	PDG3X2TA401H	Breaker Catalog Number Digit 14 Designation	Line and Load	J
	3-pole	PDG3X3TA401H		Line Only	K
	4-pole	PDG3X4TA401H		Load Only (Digit 14/19–20)	L/ZL
Breaker Max Amps	<b>400 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>550</b>
Breaker Frame	<b>600 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>62.14</b>
Standard Amp Range	<b>H250–H400 A</b>	—	—	—	—
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (5/16 in)</b>
Wire Range AWG	<b>500–750 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>200</b>
Wire Range Metric (mm <sup>2</sup> )	<b>253–380</b>	Included Parts	<b>Terminal Shield</b>	Terminal Hardware Type	<b>Hex (5/16 in) Imperial</b>



Catalog Number	2-pole	PDG3X2TA630	Breaker Catalog Number Digit 14 Designation	Line and Load	J
	3-pole	PDG3X3TA630		Line Only	K
	4-pole	PDG3X4TA630		Load Only (Digit 14/19–20)	L/ZL
Breaker Max Amps	<b>600 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Breaker Frame	<b>600 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
Standard Amp Range	<b>450–600 A</b>	—	—	—	—
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (5/16 in)</b>
Wire Range AWG	<b>#2–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>200</b>
Wire Range Metric (mm <sup>2</sup> )	<b>33.6–253</b>	Included Parts	<b>Terminal Shield</b>	Terminal Hardware Type	<b>Hex (7/32 in) Imperial</b>

#### Terminals—Frame Size 3 (45–600 A), continued

2

#### Optional Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG3X2TA402 PDG3X3TA402 PDG3X4TA402	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZV
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	375
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	42.37
# Conductors per Phase	1	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (3/8 in)
Wire Range AWG	500–750 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	253–380	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial



Catalog Number	2-pole 3-pole 4-pole	PDG3X2TA401 PDG3X3TA401 PDG3X4TA401	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	— — —
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	(2) 275 or (1) 375
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	(2) 31.0 or (1) 42.37
# Conductors per Phase	2	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/16 in)
Wire Range AWG	(2) 2/0–250 kcmil; (1) 2/0–500 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	(1) 67.4–127; (1) 67.4–253	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial



Catalog Number	2-pole 3-pole 4-pole	PDG3X2TA400H PDG3X3TA400H PDG3X4TA400H	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZV
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	375
Breaker Frame	600 A	Wire Type	Cu/Al	Wire Torque (Nm)	42.37
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (3/8 in)
Wire Range AWG	#3–500 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	26.7–253	Included Parts	—	Terminal Hardware Type	Hex (5/16 in) Imperial

#### Optional Copper Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG3X2T300 PDG3X3T300 PDG3X4T300	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	W Y Z/ZZ
Breaker Max Amps	300 A	Terminal Body Type	Copper	Wire Torque (in-lb)	275
Breaker Frame	400 A	Wire Type	Cu	Wire Torque (Nm)	31
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	#3–350 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	26.7–177	Included Parts	—	Terminal Hardware Type	Hex (7/32 in) Imperial



Catalog Number	2-pole 3-pole 4-pole	PDG3X2T350 PDG3X3T350 PDG3X4T350	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	W Y Z/ZZ
Breaker Max Amps	350 A	Terminal Body Type	Copper	Wire Torque (in-lb)	375
Breaker Frame	400 A	Wire Type	Cu	Wire Torque (Nm)	42.37
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (3/8 in) Imperial
Wire Range AWG	250–500 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	127–253	Included Parts	—	Terminal Hardware Type	Hex (7/32 in) Imperial

Terminals—Frame Size 3 (45–600 A), *continued*Optional Copper Terminals, *continued*

Catalog Number	2-pole	PDG3X2T400	Breaker Catalog Number Digit 14 Designation	Line and Load	W
	3-pole	PDG3X3T400		Line Only	Y
	4-pole	PDG3X4T400		Load Only (Digit 14/19–20)	Z/ZZ
Breaker Max Amps	400 A	Terminal Body Type	Copper	Wire Torque (in-lb)	275
Breaker Frame	400 A	Wire Type	Cu	Wire Torque (Nm)	31
# Conductors per Phase	2	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	3/0–250 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	85–127	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial



Catalog Number	2-pole	PDG3X2T402	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3T402		Line Only	—
	4-pole	PDG3X4T402		Load Only (Digit 14/19–20)	—
Breaker Max Amps	400 A	Terminal Body Type	Copper	Wire Torque (in-lb)	550
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	62.14
# Conductors per Phase	1	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (3/8 in) Imperial
Wire Range AWG	Al: 500–750 kcmil Cu: 500 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	85–127	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/16 in) Imperial



Catalog Number	2-pole	PDG3X2T400H	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3T400H		Line Only	—
	4-pole	PDG3X4T400H		Load Only (Digit 14/19–20)	—
Breaker Max Amps	400 A	Terminal Body Type	Copper	Wire Torque (in-lb)	550
Breaker Frame	600 A	Wire Type	Cu	Wire Torque (Nm)	62.14
# Conductors per Phase	1	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (3/8 in) Imperial
Wire Range AWG	#3–500 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	26.7–253	Included Parts	—	Terminal Hardware Type	Hex (5/16 in) Imperial



Catalog Number	2-pole	PDG3X2T401H	Breaker Catalog Number Digit 14 Designation	Line and Load	W
	3-pole	PDG3X3T401H		Line Only	Y
	4-pole	PDG3X4T401H		Load Only (Digit 14/19–20)	Z/ZZ
Breaker Max Amps	400 A	Terminal Body Type	Copper	Wire Torque (in-lb)	500
Breaker Frame	600 A	Wire Type	Cu	Wire Torque (Nm)	56.49
# Conductors per Phase	1	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	500–750 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	253–380	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/16 in) Imperial



Catalog Number	2-pole	PDG3X2T630	Breaker Catalog Number Digit 14 Designation	Line and Load	W
	3-pole	PDG3X3T630		Line Only	Y
	4-pole	PDG3X4T630		Load Only (Digit 14/19–20)	Z/ZZ
Breaker Max Amps	630 A	Terminal Body Type	Copper	Wire Torque (in-lb)	375
Breaker Frame	600 A	Wire Type	Cu	Wire Torque (Nm)	42.37
# Conductors per Phase	2	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	#2–500 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	33.6–253	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/16 in) Imperial

#### Terminals—Frame Size 3 (45–600 A), continued

2

#### Strandable Terminals



Catalog Number	2-pole	PDG3X2TA400SW	Breaker Catalog Number Digit 14 Designation	Line and Load	A
	3-pole	PDG3X3TA400SW		Line Only	B
	4-pole	PDG3X4TA400SW		Load Only (Digit 14/19–20)	C/ZC
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	275
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	31
# Conductors per Phase	2	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	3/0–250 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
	3/0–4/0	Wire Classes	D, G, H, I, K, M	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	85–127	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial



Catalog Number	2-pole	PDG3X2TA350SW	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA350SW		Line Only	—
	4-pole	PDG3X4TA350SW		Load Only (Digit 14/19–20)	—
Breaker Max Amps	350 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	375
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	42.37
# Conductors per Phase	1	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	250–500 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
	250–350 kcmil	Wire Classes	D, G, H, I, K, M	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	127–253	Included Parts	—	Terminal Hardware Type	Hex (5/16 in) Imperial



Catalog Number	2-pole	PDG3X2TA630SW	Breaker Catalog Number Digit 14 Designation	Line and Load	A
	3-pole	PDG3X3TA630SW		Line Only	B
	4-pole	PDG3X4TA630SW		Load Only (Digit 14/19–20)	C/ZC
Breaker Max Amps	630 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	375
Breaker Frame	600 A	Wire Type	Cu/Al	Wire Torque (Nm)	42.37
# Conductors per Phase	2	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	#2–500 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
	#2–350 kcmil	Wire Classes	D, G, H, I, K, M	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	127–253	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/16 in) Imperial

#### Terminals with Control Wire



Catalog Number	2-pole	PDG3X2TA400CW	Breaker Catalog Number Digit 14 Designation	Line and Load	1
	3-pole	PDG3X3TA400CW		Line Only	2
	4-pole	PDG3X4TA400CW		Load Only (Digit 14/19–20)	3/Z3
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	275
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	31
# Conductors per Phase	2	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/16 in)
Wire Range AWG	3/0–250 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	85–127	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial



Catalog Number	2-pole	PDG3X2TA401CW	Breaker Catalog Number Digit 14 Designation	Line and Load	4
	3-pole	PDG3X3TA401CW		Line Only	5
	4-pole	PDG3X4TA401CW		Load Only (Digit 14/19–20)	6/Z6
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	(2) 275 or (1) 375
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	(2) 31.0 or (1) 42.37
# Conductors per Phase	2	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/16 in)
Wire Range AWG	(2) 2/0–250 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
	(1) 2/0–500 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	(2) 67.4–127	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial
	(1) 67.4–253	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial

## Terminals—Frame Size 3 (45–600 A), continued

## Aluminum Terminals with Control Wire, continued



Catalog Number	2-pole	PDG3X2TA630CW	Breaker Catalog Number Digit 14 Designation	Line and Load	1
	3-pole	PDG3X3TA630CW		Line Only	2
	4-pole	PDG3X4TA630CW		Load Only (Digit 14/19–20)	3/Z3
Breaker Max Amps	630 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	375
Breaker Frame	600 A	Wire Type	Cu/Al	Wire Torque (Nm)	42.37
# Conductors per Phase	2	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (5/16 in)
Wire Range AWG	#2–500 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	33.6–253	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/16 in) Imperial

## Copper Terminals with Control Wire



Catalog Number	2-pole	PDG3X2T400CW	Breaker Catalog Number Digit 14 Designation	Line and Load	7
	3-pole	PDG3X3T400CW		Line Only	8
	4-pole	PDG3X4T400CW		Load Only (Digit 14/19–20)	9/Z9
Breaker Max Amps	400 A	Terminal Body Type	Copper	Wire Torque (in-lb)	275
Breaker Frame	400 A	Wire Type	Cu	Wire Torque (Nm)	31
# Conductors per Phase	2	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	3/0–250 kcmil	Wire Classes	B, C	Terminal Torque (ft-lb)	6–8
Wire Range Metric (mm <sup>2</sup> )	85–127	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (7/32 in) Imperial



Catalog Number	2-pole	PDG3X2T630CW	Breaker Catalog Number Digit 14 Designation	Line and Load	7
	3-pole	PDG3X3T630CW		Line Only	8
	4-pole	PDG3X4T630CW		Load Only (Digit 14/19–20)	9/Z9
Breaker Max Amps	630 A	Terminal Body Type	Copper	Wire Torque (in-lb)	375
Breaker Frame	600 A	Wire Type	Cu	Wire Torque (Nm)	42.37
# Conductors per Phase	2	Wire Temperature Rating	75 °C	Wire Hardware Type	Hex (5/16 in) Imperial
Wire Range AWG	#2–500 kcmil	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	33.6–253	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/16 in) Imperial

## Multi-Wire Terminals



Catalog Number	2-pole	PDG3X2TA4003W	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA4003W		Line Only	—
	4-pole	PDG3X4TA4003W		Load Only (Digit 14/19–20)	H/ZH
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	120
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	13.55
# Conductors per Phase	3	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (3/16 in) Imperial
Wire Range AWG	#12–2/0	Wire Classes	B, C	Terminal Torque (in-lb)	35
Wire Range Metric (mm <sup>2</sup> )	3.31–67.4	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/32 in) Imperial



Catalog Number	2-pole	PDG3X2TA4006W	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA4006W		Line Only	—
	4-pole	PDG3X4TA4006W		Load Only (Digit 14/19–20)	G/ZG
Breaker Max Amps	400 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	25
Breaker Frame	400 A	Wire Type	Cu/Al	Wire Torque (Nm)	2.82
# Conductors per Phase	6	Wire Temperature Rating	90 °C	Wire Hardware Type	Hex (3/32 in) Imperial
Wire Range AWG	#14–3	Wire Classes	B, C	Terminal Torque (in-lb)	35
Wire Range Metric (mm <sup>2</sup> )	2.08–26.7	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/32 in) Imperial



Catalog Number	2-pole	PDG3X2TA6006W	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA6006W		Line Only	—
	4-pole	PDG3X4TA6006W		Load Only (Digit 14/19–20)	G/ZG
Breaker Max Amps	600 A	Terminal Body Type	Aluminum	Wire Torque (in-lb)	See listed chart
Breaker Frame	600 A	Wire Type	Cu/Al	Wire Torque (Nm)	See listed chart
# Conductors per Phase	6	Wire Temperature Rating	90 °C	Wire Hardware Type	Slotted Imperial
Wire Range AWG	#14–1/0	Wire Classes	B, C	Terminal Torque (in-lb)	200
Wire Range Metric (mm <sup>2</sup> )	2.08–53.5	Included Parts	Terminal Shield	Terminal Hardware Type	Hex (5/16 in) Imperial

#### Terminals—Frame Size 3 (45–600 A), continued

2



#### StrandAble Multi-Wire Terminals

Catalog Number	2-pole	PDG3X2TA6006WSW	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA6006WSW		Line Only	—
	4-pole	PDG3X4TA6006WSW		Load Only (Digit 14/19–20)	—
Breaker Max Amps	<b>600 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>See listed chart</b>
Breaker Frame	<b>600 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See listed chart</b>
# Conductors per Phase	<b>6</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Slotted Imperial</b>
Wire Range AWG	<b>#12–2/0</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>200</b>
	<b>#8–1/0</b>	Wire Classes	<b>D, G, H, I, K, M</b>		
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	<b>Terminal Shield</b>	Terminal Hardware Type	<b>Hex (5/16 in) Imperial</b>

#### Rear-Fed Terminals



Catalog Number	2-pole	PDG3X2TA400RF	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA400RF		Line Only	—
	4-pole	PDG3X4TA400RF		Load Only (Digit 14/19–20)	—
Breaker Max Amps	<b>400 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Breaker Frame	<b>400 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.36</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Hex (3/8 in)</b>
Wire Range AWG	<b>250–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>6–8</b>
Wire Range Metric (mm <sup>2</sup> )	<b>127–253</b>	Included Parts	<b>Interphase Barriers</b>	Terminal Hardware Type	<b>Hex (7/32 in) Imperial</b>



Catalog Number	2-pole	PDG3X2TA400HRF	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA400HRF		Line Only	—
	4-pole	PDG3X4TA400HRF		Load Only (Digit 14/19–20)	—
Breaker Max Amps	<b>400 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Breaker Frame	<b>600 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.36</b>
# Conductors per Phase	<b>1</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Hex (3/8 in)</b>
Wire Range AWG	<b>#2–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>200</b>
Wire Range Metric (mm <sup>2</sup> )	<b>33.6–253</b>	Included Parts	<b>Interphase Barriers</b>	Terminal Hardware Type	<b>Hex (5/16 in) Imperial</b>



Catalog Number	2-pole	PDG3X2TA630RF	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG3X3TA630RF		Line Only	—
	4-pole	PDG3X4TA630RF		Load Only (Digit 14/19–20)	—
Breaker Max Amps	<b>600 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Breaker Frame	<b>600 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.36</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Hex (5/16 in) Imperial</b>
Wire Range AWG	<b>#2–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>200</b>
Wire Range Metric (mm <sup>2</sup> )	<b>33.6–253</b>	Included Parts	<b>Interphase Barriers</b>	Terminal Hardware Type	<b>Hex (1/2 in) Imperial</b>

## Terminals—Frame Size 3 (45–600 A), continued

## End Cap Kit/Screw Terminals



Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	S D E/ZE
	3-pole	PDG3X3TS400			
	4-pole	PDG3X4TS400			
Breaker Max Amps	400 A	Terminal Body Type	—	Wire Torque (in-lb)	120–144
Breaker Frame	400 A	Wire Type	—	Wire Torque (Nm)	14–16
# Conductors per Phase	—	Wire Temperature Rating	—	Wire Hardware Type	—
Wire Range AWG	—	Wire Classes	—	Terminal Torque (in-lb)	120–144
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	End Cap/Hardware	Terminal Screw Size	Hex Cap (M8–1.25 x 25)



Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	S D E/ZE
	3-pole	PDG3X3TS600			
	4-pole	PDG3X4TS600			
Breaker Max Amps	600 A	Terminal Body Type	—	Wire Torque (in-lb)	354
Breaker Frame	600 A	Wire Type	—	Wire Torque (Nm)	40
# Conductors per Phase	—	Wire Temperature Rating	—	Wire Hardware Type	—
Wire Range AWG	—	Wire Classes	—	Terminal Torque (in-lb)	354
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	End Cap/Hardware	Terminal Screw Size	Hex Cap (M12 x 30)

## Control Wire Tabs



Catalog Number	KCWTK	For Use With ...
Breaker Max Amps	400 A	PDG3X3TA300, PDG3X3T300, PDG3X3TA350, PDG3X3T350
Breaker Frame	100–400 A	
Quick Connect Tab Size	1/4-in	
Package Qty	12	

## Terminal Shields and Barriers



Catalog Number	2-pole	—
	3-pole	PDG3XTC3P
	4-pole	PDG3XTC4P
Breaker Max Amps	600 A	—
Breaker Frame	70–600 A	—
Included Parts	Terminal Shield & Hardware	—



Catalog Number	2-pole	PDG3XIB
	3-pole	PDG3XIB3P
	4-pole	PDG3XIB4P
Breaker Max Amps	600 A	—
Breaker Frame	70–600 A	—
Included Parts	Interphase Barriers	—

## Frame Size 3 Wire Torque (if chart is referenced)

For Sizes ...	Torque (in-lb)	For Sizes ...	Torque (Nm)
14–10	35 in-lb	2.5–6	3.95 Nm
8	40 in-lb	10	4.51 Nm
6–4	45 in-lb	16–25	5.08 Nm
2–1/0	50 in-lb	35–50	5.65 Nm

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

#### Terminals—Frame Size 4 (300–800 A)

2

##### Standard Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG4X1TA700 PDG4X3TA700 —	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	J K L/ZL
Breaker Max Amps	<b>700 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Standard Amp Range	<b>300–700 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>1–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>42.4–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



Catalog Number	2-pole 3-pole 4-pole	PDG4X1TA800 PDG4X3TA800 —	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	J K L/ZL
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Standard Amp Range	<b>800 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>3/0–400 kcmil</b>	Wire Classes	<b>B,C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–203</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

##### Alternate Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG4X1TA801 PDG4X3TA801 —	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	T U V/ZV
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>500</b>
Amp Range	<b>300–800 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>56.49</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>500–750 kcmil</b>	Wire Classes	<b>B,C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>253–380</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

##### Alternate Copper Terminals



Catalog Number	2-pole 3-pole 4-pole	PDG4X1T600 PDG4X3T600 —	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	W Y Z/ZZ
Breaker Max Amps	<b>600 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>300</b>
Amp Range	<b>300–600 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>33.9</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>2/0–500 kcmil</b>	Wire Classes	<b>B,C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>67.4–238</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



Catalog Number	2-pole 3-pole 4-pole	PDG4X1T800 PDG4X3T800 —	Breaker Catalog Number Digit 14 Designation	Line and Load Line Only Load Only (Digit 14/19–20)	W Y Z/ZZ
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>275</b>
Amp Range	<b>700–800 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>31.07</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>3/0–300 kcmil</b>	Wire Classes	<b>B,C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–152</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

### Terminals—Frame Size 4 (300–800 A), continued

#### Strandable Terminals



Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load	A
	3-pole	PDG4X3TA800SW		Line Only	B
	4-pole	—		Load Only (Digit 14/19–20)	C/ZC
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	—
Amp Range	<b>300–800 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	—
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (5/16 in) Imperial</b>
Wire Range AWG	<b>3/0–400 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	—
	<b>3/0–300 kcmil</b>	Wire Classes	<b>D, G, H, I, K, M</b>	—	—
Wire Range Metric (mm <sup>2</sup> )	<b>85–203</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

#### Control Wire Terminals



Catalog Number	2-pole	PDG4X1TA700CW	Breaker Catalog Number Digit 14 Designation	Line and Load	1
	3-pole	PDG4X3TA700CW		Line Only	2
	4-pole	—		Load Only (Digit 14/19–20)	3/Z3
Breaker Max Amps	<b>700 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>300–700 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>#1–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>42.4–253</b>	Control Tab Size	<b>1/4-in</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



Catalog Number	2-pole	PDG4X1TA800CW	Breaker Catalog Number Digit 14 Designation	Line and Load	1
	3-pole	PDG4X3TA800CW		Line Only	2
	4-pole	—		Load Only (Digit 14/19–20)	3/Z3
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>300–800 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>3/0–400 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–203</b>	Control Tab Size	<b>1/4-in</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



Catalog Number	2-pole	PDG4X1TA801CW	Breaker Catalog Number Digit 14 Designation	Line and Load	4
	3-pole	PDG4X3TA801CW		Line Only	5
	4-pole	—		Load Only (Digit 14/19–20)	6/Z6
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>500</b>
Amp Range	<b>300–800 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>56.49</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>500–750 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>253–380</b>	Control Tab Size	<b>1/4-in</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

#### Terminals—Frame Size 4 (300–800 A), continued

2



#### Rear Fed Terminals

Catalog Number	2-pole	PDG4X1TA800RF	Breaker Catalog Number Digit 14 Designation	Line and Load	—
	3-pole	PDG4X3TA800RF		Line Only	—
	4-pole	—		Load Only (Digit 14/19–20)	—
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>275</b>
Amp Range	<b>300–800 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>31.07</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (5/16 in) Imperial</b>
Wire Range AWG	<b>3/0–300 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–152</b>	Included Parts	<b>Interphase Barriers</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

#### End Cap Kit/Screw Terminals



Catalog Number	2-pole	—	Breaker Catalog Number Digit 14 Designation	Line and Load	<b>S</b>
	3-pole	PDG4X3TS800		Line Only	<b>D</b>
	4-pole	PDG4X4TS800		Load Only (Digit 14/19–20)	<b>E/ZE</b>
Breaker Max Amps	<b>800 A</b>	Terminal Body Type	—	Wire Torque (ft-lb)	<b>35</b>
Breaker Frame	<b>300–800 A</b>	Wire Type	—	Wire Torque (Nm)	<b>47.45</b>
# Conductors per Phase	—	Wire Temperature Rating	—	Wire Hardware Type	—
Wire Range AWG	—	Wire Classes	—	Terminal Torque (ft-lb)	<b>35</b>
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	<b>End Cap/Hardware</b>	Terminal Screw Size	<b>Hex Cap (1/2–13 x 1.25 in)</b>

## Terminals—Frame Size 5 (320–1200 A)

## Terminal Options



	1-pole	PDG5X1TA700	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZJ ZK ZL
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>700 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>320–700 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>1–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>42.4–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



	1-pole	PDG5X1TA1000	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZJ ZK ZL
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1000 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>320–1000 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>3/0–400 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–203</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



	1-pole	PDG5X1TA1200	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZJ ZK ZL
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>4</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>4/0–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>107–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



	1-pole	PDG5X1TA1201	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZT ZU ZV
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>450</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>50.84</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>500–750 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>107–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

#### Terminals—Frame Size 5 (320–1200 A), continued

2



#### Copper Terminal Options

	1-pole	PDG5X1T700	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZW ZY ZZ
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>700 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>300</b>
Amp Range	<b>320–700 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>33.9</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>2/0–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>67.4–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



	1-pole	PDG5X1T1000	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZW ZY ZZ
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1000 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>300</b>
Amp Range	<b>320–1000 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>33.9</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>3/0–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



	1-pole	PDG5X1T1200	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZW ZY ZZ
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>275</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>31.07</b>
# Conductors per Phase	<b>4</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>4/0–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>107–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

#### Strandable Terminals



	1-pole	PDG5X1TA1200SW	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZA ZB ZC
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>4</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>4/0–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
	<b>4/0–350 kcmil</b>	Wire Classes	<b>D, G, H, I, K, M</b>		
Wire Range Metric (mm <sup>2</sup> )	<b>107–253</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

#### Control Wire Terminals



	1-pole	PDG5X1TA700CW	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	Z1 Z2 Z3
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>700 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>320–700 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>2</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>1–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>42.4–253</b>	Control Tab Size	<b>1/4-in</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



	1-pole	PDG5X1TA1000CW	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	Z1 Z2 Z3
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1000 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>320–1000 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>3/0–400 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>85–203</b>	Control Tab Size	<b>1/4-in</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

### Terminals—Frame Size 5 (320–1200 A), continued

#### Control Wire Terminals, continued



	1-pole	PDG5X1TA1200CW	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	Z1 Z2 Z3
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>4</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>4/0–500 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>107–253</b>	Control Tab Size	<b>1/4-in</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>



	1-pole	PDG5X1TA1201CW	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	Z4 Z5 Z6
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>450</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>50.84</b>
# Conductors per Phase	<b>3</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>500–750 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	<b>107–253</b>	Control Tab Size	<b>1/4-in</b>	Terminal Hardware Type	<b>Hex (3/4 in) Imperial</b>

#### Conductor Extensions



	2-pole 3-pole 4-pole	5104A24G01 5104A24G02 5104A24G05	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	— — —
<b>Catalog Number (Imperial)</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>See terminal/conductor</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See terminal/conductor</b>
# Conductors per Phase	—	Wire Temperature Rating	—	Wire Hardware Type	<b>See terminal/conductor</b>
Wire Range AWG	—	Wire Classes	—	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	<b>Interphase Barriers</b>	Terminal Hardware Type	<b>Hex (1/2 in) Imperial</b>



	2-pole 3-pole 4-pole	5104A24G03 5104A24G04 5104A24G06	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	— — —
<b>Catalog Number (Metric)</b>	—	—	—	—	—
Breaker Max Amps	<b>1200 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>See terminal/conductor</b>
Amp Range	<b>320–1200 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>See terminal/conductor</b>
# Conductors per Phase	—	Wire Temperature Rating	—	Wire Hardware Type	<b>See terminal/conductor</b>
Wire Range AWG	—	Wire Classes	—	Terminal Torque (ft-lb)	<b>30–35</b>
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	<b>Interphase Barriers</b>	Terminal Hardware Type	<b>Hex (M12) Metric</b>

#### Terminals—Frame Size 6 (700–2500 A)

2

#### Terminal Options



	1-pole	PDG6X1TA1600	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZJ ZK ZL
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1600 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>550</b>
Amp Range	<b>700–1600 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>62.14</b>
# Conductors per Phase	<b>4</b>	Wire Temperature Rating	<b>75 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>500–1000 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>20</b>
Wire Range Metric (mm <sup>2</sup> )	<b>253–507</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (9/16 in) Imperial</b>



	3-pole	PDG6X3TA2000	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZJ ZK ZL
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>2000 A</b>	Terminal Body Type	<b>Aluminum</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>700–2000 A</b>	Wire Type	<b>Cu/Al</b>	Wire Torque (Nm)	<b>62.14</b>
# Conductors per Phase	<b>6</b>	Wire Temperature Rating	<b>90 °C</b>	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>#2–600</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>25</b>
Wire Range Metric (mm <sup>2</sup> )	<b>33.6–304</b>	Included Parts	<b>Extended Connectors</b>	Terminal Hardware Type	<b>Hex (9/16 in) Imperial</b>

#### Copper Terminal Options



	1-pole	PDG6X1T1600	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	ZW ZY ZZ
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>1600 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>375</b>
Amp Range	<b>700–1600 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>42.37</b>
# Conductors per Phase	<b>4</b>	Wire Temperature Rating	—	Wire Hardware Type	<b>Hex (3/8 in) Imperial</b>
Wire Range AWG	<b>#1–600 kcmil</b>	Wire Classes	<b>B, C</b>	Terminal Torque (ft-lb)	<b>20</b>
Wire Range Metric (mm <sup>2</sup> )	<b>42.4–304</b>	Included Parts	—	Terminal Hardware Type	<b>Hex (9/16 in) Imperial</b>

#### Rear Connectors



	1-pole	PDG6X1T2000RC	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	— — —
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>2000 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>See terminal/conductor</b>
Amp Range	<b>700–2000 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>See terminal/conductor</b>
# Conductors per Phase	—	Wire Temperature Rating	—	Connector Tap Size	<b>2 x 0.45-in Opening</b>
Wire Range AWG	—	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>120</b>
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	—	Terminal Hardware Type	<b>Hex (5/16-in) Imperial</b>



	1-pole	PDF6X1T2000RC	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	— — —
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>2000 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>See terminal/conductor</b>
Amp Range	<b>700–2000 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>See terminal/conductor</b>
# Conductors per Phase	—	Wire Temperature Rating	—	Connector Tap Size	<b>2 x 0.45-in Opening</b>
Wire Range AWG	—	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>120</b>
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	—	Terminal Hardware Type	<b>Hex (5/16 in) Imperial</b>



	1-pole	PDG6X1T2500RC	Breaker Catalog Number Digit 19/20 Designation	Line and Load Line Only Load Only	— — —
<b>Catalog Number</b>	—	—	—	—	—
Breaker Max Amps	<b>2000 A</b>	Terminal Body Type	<b>Copper</b>	Wire Torque (in-lb)	<b>See terminal/conductor</b>
Amp Range	<b>700–2000 A</b>	Wire Type	<b>Cu</b>	Wire Torque (Nm)	<b>See terminal/conductor</b>
# Conductors per Phase	—	Wire Temperature Rating	—	Connector Tap Size	<b>2 x 0.45-in Opening</b>
Wire Range AWG	—	Wire Classes	<b>B, C</b>	Terminal Torque (in-lb)	<b>120</b>
Wire Range Metric (mm <sup>2</sup> )	—	Included Parts	—	Terminal Hardware Type	<b>Hex (5/16-in) Imperial</b>

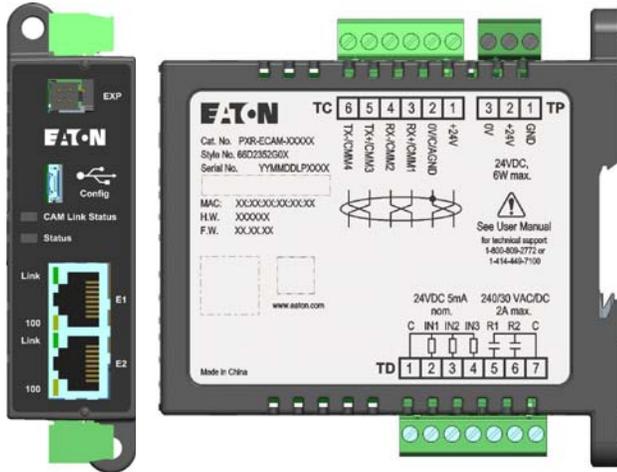
## Power Defense Breaker Enclosures

Breaker Frame	Maximum Breaker Amperes	Number of Poles	NEMA Rating	Catalog Number
PD1	125	2P/3P	NEMA 1	<b>SPD1K0125</b>
			NEMA 1 Flush	<b>FPD1K0125</b>
			NEMA 3R	<b>RPD1K0125</b>
			NEMA 12	<b>DPD1K0125</b>
			NEMA 4X	<b>WPD1K0125</b>
PD2	225	2P	NEMA 1	<b>SPD2J0225</b>
			NEMA 1 Flush	<b>FPD2J0225</b>
		3P	NEMA 1	<b>SPD2K0225</b>
			NEMA 1 Flush	<b>FPD2K0225</b>
		2P/3P	NEMA 3R	<b>RPD2K0225</b>
			NEMA 12	<b>DPD2K0225</b>
			NEMA 4X	<b>WPD2K0225</b>
PD3 (400 A)	400	2P/3P	NEMA 1	<b>SPD3K0400</b>
			NEMA 1 Flush	<b>FPD3K0400</b>
			NEMA 3R	<b>RPD3K0400</b>
			NEMA 12	<b>DPD3K0400</b>
			NEMA 4X	<b>WPD3K0400</b>
PD3 (600 A)	600	2P/3P	NEMA 1	<b>SPD3K0600</b>
			NEMA 3R	<b>RPD3K0600</b>
			NEMA 12	<b>DPD3K0600</b>
			NEMA 4X	<b>WPD3K0600</b>
PD4	800	2P/3P	NEMA 1	<b>SPD4K0800</b>
			NEMA 3R	<b>RPD4K0800</b>
			NEMA 12	<b>DPD4K0800</b>
			NEMA 4X	<b>WPD4K0800</b>
PD5	1200	2P/3P	NEMA 1	<b>SPD5K1200</b>
			NEMA 3R	<b>RPD5K1200</b>
			NEMA 12	<b>DPD5K1200</b>
			NEMA 4X	<b>WPD5K1200</b>

**Note:** These enclosures are approved for use with Power Defense breakers equipped with thermal-magnetic PXR 10 or PXR 20 trip units. For enclosed breakers using PXR 25 trip units, please contact the enclosed circuit breaker product line. For more detail on MCCB enclosures, neutral kits or raintight hubs, reference CA8100003E.

Power Defense Molded Case Circuit Breakers—Communications and Software

2



### Contents

Description	Page
Power Defense Molded Case Circuit Breakers	
Frame Size 1 (15–125 A) . . . . .	<b>V4-T2-22</b>
Frame Size 2 (15–225 A) . . . . .	<b>V4-T2-30</b>
Frame Size 3 (45–600 A) . . . . .	<b>V4-T2-43</b>
Frame Size 4 (300–800 A) . . . . .	<b>V4-T2-58</b>
Frame Size 5 (320–1200 A) . . . . .	<b>V4-T2-71</b>
Frame Size 6 (700–2500 A) . . . . .	<b>V4-T2-80</b>
Motor Circuit Protectors (3–600 A) . . . . .	<b>V4-T2-88</b>
Motor Protection Circuit Breakers (15–600 A) . . . . .	<b>V4-T2-99</b>
30 mA Ground Fault (Earth Leakage) Modules . . . . .	<b>V4-T2-105</b>
High Instantaneous Power Defense Circuit Breakers for Selective Coordination . . . . .	<b>V4-T2-108</b>
Power Defense Direct Current Circuit Breakers . . . . .	<b>V4-T2-111</b>
Power Defense Mechanical Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-116</b>
Terminals, Lugs, Connectors and Enclosures . . . . .	<b>V4-T2-120</b>
Communications and Software	
Communication Adapter Modules	
Modbus RTU RS-485 . . . . .	<b>V4-T2-145</b>
Power Xpert Protection Manager . . . . .	<b>V4-T2-145</b>
Special Applications . . . . .	<b>V4-T2-146</b>
Special Modification Ordering and Pricing . . . . .	<b>V4-T2-150</b>

### Communications and Software

#### Communication Adapter Modules

##### Product Description

Designed for Power Defense circuit breakers, the Power Xpert Release (PXR) communications adapter module (CAM) expands the communication capabilities of the PXR 20 and PXR 25 electronic trip units. When used in conjunction with an IoT-based system, the PXR-CAMs allow for greater visibility into the facility, process or machine, thus adhering to the design principles of Industry 4.0.

##### Application Description

- Improve safety with remote breaker control via programmable discrete I/O
- Perform at-a-glance troubleshooting with front-facing LEDs that communicate status and alarms
- Simplify configuration and monitoring with intuitive HTML5 web interface (ECAM only)

##### Features and Benefits

- Compact, DIN rail mounted design with removable terminal blocks offers space savings, fast installation and accessibility for maintenance
- Dimensions:  
4.30 in (110 mm) H  
1.20 in (30 mm) W  
4.30 in (110 mm) D

##### Supported Protocols

- Modbus TCP/IP CAM for PXR 20, 25  
Catalog number: **PXR-ECAM-MTCP**
- PROFIBUS DP CAM for PXR 20, 25  
Catalog number: **PXR-PCAM**

## Modbus RTU RS-485

### Product Description

Power Xpert Release (PXR) trip units have optional integral Modbus RTU communication on the PXR 20. Modbus RTU comes standard on the PXR 25.

### Application Description

With this industry standard protocol, the PXR trip units can supply real-time data such as voltage, current, power, health and status to any Modbus RTU client without any additional external device.

### Field Installation

Field-installable options are available on the PXR 20 for Power Defense frames 2, 5 and 6. See catalog numbers below:

- Field installable Modbus RTU with Relay for PD-2: **PDG2XMODRTUREL**
- Field installable Modbus RTU for PD-5 and 6: **PDG56XMODRTU**

## Power Xpert Protection Manager

### Product Description

Eaton's Power Xpert Protection Manager (PXPM) software provides a clean, intuitive user interface enabling unmatched control, testing and troubleshooting.

The software is free to download and can run all standard features on any PC. Licenses can be purchased to unlock premium features: secondary injection testing and trip/alarm waveform.

Communication between PXPM and PXR trip units is made via USB or through connected networks.

### Features and Benefits

- *Set point configuration:* allows direct-to-trip unit or offline setup, including duplication of settings between units
- *Control mode:* capture waveforms, reset trip unit or set the date/time
- *Real-time data:* provides information regarding all status and metered data direction from the trip unit
- *Event summaries:* stores up to 200 events, detailed information on the most recent (10 trip and 10 alarm) events, and time adjustments to the real-time clock
- *Reports:* allows for the formatting and printing of real-time data of performed secondary injection tests

### Secondary Injection Testing

The secondary injection testing function utilizes a separate circuit that injects a signal in parallel with and representative of the output of the current sensor. All the built-in protection circuitry and routines respond per the settings in the breaker. The PXPM software can initiate testing of long delay trip, short delay trip, instantaneous trip, maintenance mode and ground (earth) fault trip via the USB communication.

The current sensor test utilizes a separate circuit to create a signal that is directed through the Rogowski coil. This signal will verify continuity and functionality of the Rogowski coil.

### Trip/Alarm Waveform

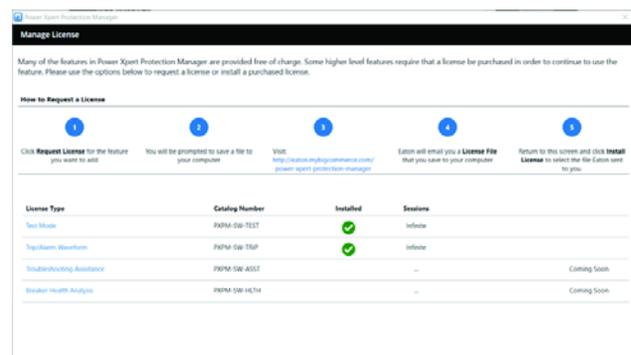
PXPM's trip/alarm waveform feature allows PXR trip units to capture and display the breaker state leading up to the last trip or alarm event, provided that auxiliary power is connected.

Available waveform data includes minimum and maximum phase current, voltage and frequency. Using this information increases uptime by identifying issues causing an event and minimized breaker wear by identifying potential tripping issues faster, without the need for expensive standalone testing equipment.

## Advanced Feature Licenses

Description	Part Number
PXPM Advanced Testing License 10 Sessions	PXPM-SW-TEST-10
PXPM Advanced Testing License 30 Sessions	PXPM-SW-TEST-30
PXPM Advanced Testing License 120 Sessions	PXPM-SW-TEST-120
PXPM Advanced Testing License Infinite Sessions	PXPM-SW-TEST
PXPM Trip/Alarm Waveform License 10 Sessions	PXPM-SW-WAVE-10
PXPM Trip/Alarm Waveform License 30 Sessions	PXPM-SW-WAVE-30
PXPM Trip/Alarm Waveform License 120 Sessions	PXPM-SW-WAVE-120
PXPM Trip/Alarm Waveform License Infinite Sessions	PXPM-SW-WAVE

Licenses are also available online at [www.Eaton.com/BuyPXPM](http://www.Eaton.com/BuyPXPM).



## Special Applications

### Extreme Temperature Applications

The Technical Data section of this catalog (**Pages V4-T2-12–V4-T2-20**) presents permissible loads for each breaker type at ambient temperatures ranging from 40 °C through 70 °C. The tables are presented as an aid in selecting breakers appropriate for the application.

Per industry standards, breakers are calibrated to perform at an ambient temperature of 40 °C. Thermal-magnetic breakers are temperature sensitive, and at temperatures above 40 °C will carry less current than their continuous current rating. This high temperature condition promotes nuisance tripping and can create unacceptable temperature conditions inside the breaker and at the terminals. To prevent these issues, the ambient temperature load derating values presented in the technical data section must be followed. Additionally, special 50 °C calibrated breakers are available—note that these do not carry a UL Listing.

Electronic breakers are insensitive to ambient temperature within a certain range and are not likely to nuisance trip. However, if the ambient temperature significantly exceeds 40 °C the electronic circuitry or other internal components could become damaged. Power Defense electronic breakers are designed with circuitry to initiate a tripping operation to provide self-protection to the electronic components in the event the internal temperature reaches to an unsafe level.

In addition to ambient temperature, other factors must be taken into account in the application of circuit breakers in system designs. These include altitude, power factor, cable size and type, load types, and others. Additional details on these can be found in Eaton's *Consulting Application Guide*.

### 100% Rated Breakers

Molded case circuit breakers are designed to carry rated current in open air at the calibrated temperature for an indefinite period of time without tripping. Molded case circuit breakers are typically applied in an enclosure, therefore the National Electrical Code (Article 220.10b) requires that all overcurrent protection devices be loaded to a maximum of 80% of their continuous current rating, unless specifically listed for 100% applications. Breakers listed for 100% applications specifically outline, on the nameplates, a minimum size enclosure, the minimum ventilation (if needed), and the minimum conductor size for application at 100% rating.

Power Defense circuit breakers are available in 100% rated configurations, as presented in each section of the catalog. Power Defense breakers rated for 100% use the designator PDF in Digits 1–3 of the catalog number.

It is important to understand that using 100% rated breakers is not always the best choice for every system design. Consideration should be given to any present or future factors that could affect the overall system design, and an understanding of NEC Article 210.20a in application of these products.

### 50 °C Calibrated Breakers

Special non-UL listed calibrations are available for 50 °C ambient temperatures for breakers equipped with thermal-magnetic trip units, and for separate thermal-magnetic trip units. Breakers equipped with electronic trip units can operate reliably in ambient temperatures of 50 °C, and do not require specific calibration.

For this application on thermal-magnetic breakers, the trip unit digits (11–13) of the Power Defense circuit breaker catalog number are changed, from TFF and TFA to VFF and VFA, respectively. Details for these are provided within each frame section.

### Freeze-Tested Circuit Breakers

Power Defense circuit breakers may be ordered with freeze testing for applications in extreme cold conditions. This option uses special lubrication and mechanical operation is verified at –40 °C.

For this application, add suffix **J2** to digits 19–20 on a Power Defense catalog number to order.

### Fungus/Moisture Treated Breakers

Molded case circuit breakers are suited for operation in 0% to 95% noncondensing humidity environments. As is the case with all electrical equipment, application in a condition or environment above this humidity level should be avoided. Breakers applied in these environments should be protected by the proper NEMA rated enclosure (or of appropriate IP rating), and maintained dry. If such operating conditions cannot be met, special treatment of the circuit breaker should be considered to minimize the possibility of operational problems.

All Eaton circuit breaker cases are molded from a glass-polyester material, which does not support the growth of fungus. Any parts that are susceptible to the growth of fungus will require special treatment for application in these types of conditions.

For this application, add suffix **J1** to digits 19–20 on a Power Defense catalog number to order.

### High Altitude Applications

Low-voltage circuit breakers must be progressively derated for voltage and current carrying capacity at altitudes above approximately 6000 ft. The thinner air at higher altitudes reduces cooling and dielectric characteristics compared to denser air found at lower altitudes.

Derate voltage, interruption and current-carrying capacity for every increase of 1000 ft over 6000 ft.

Voltage and interruption capacity: 2.5% derate every 1000 ft over. For example, a 480 V at 65 kA circuit breaker applied at 7000 ft elevation would be derated to 468 V at 63 kA.

Current-carrying capacity: apply 3 °C ambient temperature rise every 1000 ft over.

Frame/trip unit specific temperature derating tables can be found in the technical data section.

### Reverse Fed Applications

All Power Defense molded case circuit breakers shipped complete from Eaton's factory are capable of being reverse fed, with the power source feeding the lower side (typically considered the load side) of the circuit breaker. UL specifies parameters for circuit breakers to be applied in reverse-feed applications, which are met by Power Defense circuit breakers. This typically includes a factory seal and no "Line" or "Load" markings. All Frame Sizes 1 and 2 (PDG1 and PDG2) circuit breakers are always shipped in this configuration.

Breakers that ship as frames only (available in Frame Sizes 3–6), for field installation of trip units, are marked for standard application, with the line side marked at the top and the load side at the bottom, and meet UL requirement for standard applications.

An Eaton facility authorized to modify MCCBs under UL File E7819 may convert a standard circuit breaker of this type to a reverse-feed capable device per UL parameters following specific procedures.

Frame Sizes 1 and 2 always ship complete from the factory and are always reverse-feed capable. Frame Sizes 3, 4, 5 and 6 may ship as complete circuit breakers, or as separate frames and trip units if ordered separately.

Motor Circuit Protector devices are not capable of being reverse fed.

### Application of Power Defense Molded Case Circuit Breakers in 400–415 Hz Systems

Some specialty equipment requires 400–415 Hz power systems. Due to the increased resistance in these systems, circuit breakers typically require derating. Additionally, cable and bus sizes used at 400–415 Hz are not based on standard National Electrical Code tables for 60 Hz applications, and larger cross sections are necessary.

Eaton's Power Defense molded case circuit breakers can be applied for overcurrent protection on 400–415 Hz systems. Commonly used to power computer installations, 400–415 Hz systems are also employed in conjunction with certain aircraft, military and other specialty equipment.

The following application tables contain derating guidelines for applying Eaton molded case circuit breakers on 400–415 Hz systems.

The Continuous Current table on the next page lists the maximum continuous current carrying capacity at 400 Hz.

The Interrupting Capacities table on **V4-T2-149** lists the estimated interrupting capacities at 400–415 Hz.

Due to the increased resistance of the copper sections resulting from the skin effect produced by eddy currents at 400–415 Hz, circuit breakers in many cases require derating.

The thermal derating on these devices is based upon 100%, three-phase application in open air in a maximum of 40 °C (104 °F) with 4 feet (1.2 m) of the specified cable 75 °C (167 °F) of bus at the line and load side.

Additional derating of not less than 20% will be required if the circuit breaker is to be used in an enclosure.

Further derating may be required if the enclosure contains other heat generating devices or if the ambient temperatures exceed 40 °C (104 °F).

#### Cable and Bus Sizing

The cable and bus sizes to be used at 400–415 Hz are not based on standard National Electrical Code tables for 60 Hz application. Larger cross sections are necessary at 400–415 Hz to avoid exceeding component temperature limits. All busbars specified are based upon mounting the bars in the vertical plane to allow maximum air flow. All busbars are spaced at a minimum of 1/4-inch (6.35 mm) apart. Mounting of busbars in the horizontal plane will necessitate additional drafting. Edgewise orientation of the bus may change the maximum ratings indicated.

#### Application Recommendations

It is recommended that thermal indicating devices such as "tempplates" be placed on the line and load terminals or T-connectors of the center pole. These are usually the hottest terminals with a balanced load. A maximum temperature of 90 °C (50 °C over a maximum ambient of 40 °C) would verify the maximum rating for the application. Temperature profiles taken on these breakers can be correlated to ensure that the hottest points within the breaker are within the required temperature limits. A thermal cutoff switch can also be used to actuate a shunt trip to open the breaker if the thermal limits are exceeded. Consult the Eaton Technical Resource Center for further information on special applications.

# 2.2

## Molded Case Circuit Breakers

### Power Defense Molded Case Circuit Breakers

#### Continuous Current of 400 Hz Breakers

2

Breaker Frame	Maximum Continuous Current (Amps at 60 Hz)	400–415 Hz Application		Terminals (Fixed Front) Catalog Number
		Maximum Continuous (Amps)	Cable/Busbar (per phase)	
PDG1	15	15	1-#12 Cu	PDG1X3T125
	20	20	1-#12 Cu	PDG1X3T125
	25	25	1-#12 Cu	PDG1X3T125
	30	30	1-#10 Cu	PDG1X3T125
	35	35	1-#10 Cu	PDG1X3T125
	40	40	1-#8 Cu	PDG1X3T125
	45	45	1-#8 Cu	PDG1X3T125
	50	50	1-#6 Cu	PDG1X3T125
	60	60	1-#6 Cu	PDG1X3T125
	80	70	1-#4 Cu	PDG1X3T125
	90	80	1-#2 Cu	PDG1X3T125
	100	90	1-#1 Cu	PDG1X3T125
	110	100	1-1/0 Cu	PDG1X3T125
125	110	1-1/0 Cu	PDG1X3T125	
PDG2 <sup>①</sup>	15	15	1-#12 Cu	PDG2X3T100
	20	20	1-#12 Cu	PDG2X3T100
	25	25	1-#12 Cu	PDG2X3T100
	30	30	1-#10 Cu	PDG2X3T100
	35	35	1-#10 Cu	PDG2X3T100
	40	40	1-#8 Cu	PDG2X3T100
	50	45	1-#6 Cu	PDG2X3T100
	70	65	1-#4 Cu	PDG2X3T100
	90	85	1-#2 Cu	PDG2X3T100
	100	95	1-#1 Cu	PDG2X3TA150
	125	115	1-1/0 Cu	PDG2X3TA150
	150	135	1-1/0 Cu	PDG2X3TA150
	PDG3 (400 A Frame) <sup>①</sup>	125	100	1-1/0 Cu
150		125	1-1/0 Cu	PDG3X3T300
170		150	1-2/0 Cu	PDG3X3T300
200		160	1-3/0 Cu	PDG3X3T300
225		180	1-4/0 Cu	PDG3X3T300
250		200	1-250 kcmil Cu	PDG3X3T300
300		225	1-350 kcmil Cu	PDG3X3T300
350		275	1-500 kcmil Cu	PDG3X3T350
400		300	2-3/0 Cu	PDG3X3T400
PDG3 (600 A Frame) <sup>①</sup>		250	200	1-250 kcmil Cu
	300	250	1-350 kcmil Cu	PDG3X3TA400H
	350	275	1-500 kcmil Cu	PDG3X3TA400H
	400	300	1-500 kcmil Cu	PDG3X3TA400H
	500	400	2-500 kcmil Cu	PDG3X3TA630
	600	400	2-500 kcmil Cu	PDG3X3TA630
PDG4 <sup>①</sup>	400	340	2-3/0 Cu	PDG4X3T600
	500	405	2-300 kcmil Cu	PDG4X3T600
	600	470	2-350 kcmil Cu	PDG4X3T600
	700	355	2-4/0 Cu	PDG4X3T800
	800	400	2-300 kcmil Cu	PDG4X3T800
PDG5 <sup>①</sup>	1200	700	3-300 kcmil Cu	PDG5X1T1000
		750	3-350 kcmil Cu	PDG5X1T1000
		850	4-350 kcmil Cu	PDG5X1T1200
PDG6 <sup>①</sup>	2000	1500	4-1/2 x 4 Cu	<sup>②</sup>

#### Notes

<sup>①</sup> PXR metering accuracy is ±5% in 400 Hz application.

<sup>②</sup> Rear connected Cu T-Bar.

### Interrupting Capacities of 400 Hz Breakers

Estimated 400–415 Hz Interrupting Capacities <sup>①②</sup> (rms Symmetrical Amperes)

Breaker Frame	240 V	480 V	600 V
PDG1_C	5,000	3,600	—
PDG1_F	7,000	5,000	3,600
PDG1_G	17,000	7,000	4,400
PDG1_H	20,000	13,000	5,000
PDG1_P	40,000	20,000	7,000
PDG2_F	3,600	2,800	2,800
PDG2_G, PDG2_M	13,000	5,000	3,600
PDG3_F, PDG3_G, PDG3_M (400 A Frame)	21,000	11,000	8,000
PDG3_G (600 A Frame)	13,000	7,000	3,600
PDG3_K (600 A Frame)	17,000	10,000	5,000
PDG3_M (600 A Frame)	20,000	13,000	7,000
PDG3_P (600 A Frame)	40,000	20,000	10,000
PDG4_K	14,000	10,000	7,000
PDG4_M	21,000	11,000	8,000
PDG5	21,000	16,000	8,000
PDG6	40,000	33,000	33,000

#### Notes

- ① The above interrupting ratings are estimates based on the design parameters and operating characteristics of each breaker as well as on the limited amount of test data thus far available for circuit breakers applied to 400-415 Hz systems.
- ② Not UL Listed.

### Special Modification Ordering and Pricing

The pricing schedule below outlines the available Power Defense modifications, ordering instructions and associated fees. The fees only cover the cost of the installation or modification. Any additional hardware required such as shunt trips, auxiliary switches, terminals, and so forth are in addition to the fees listed below.

#### Installation of Internal Accessories ①

Internal accessories included are alarm switches, auxiliary switches, shunt trips and undervoltage releases.

**Fee:** \$200 list price addition per breaker.

**Ordering:** Reference frame catalog section for modification suffixes.

**Note:** Single fee per breaker regardless of number of internal accessories installed.

#### Installation of External Accessories ①

External accessories included are lock offs, locking provisions (Kirk Key™), handle mechanisms, plug-in blocks and motor operators.

**Fee:** \$200 list price additional per accessory.

**Ordering:** Reference frame catalog section for modification suffixes

#### Installation of Terminals ①

There is no fee for the installation of standard or non-standard terminals on any frames except PD5 and PD6.

**Fee:** \$300 list price addition per PD5/PD6 breaker.

**Ordering:** Reference terminals, lugs and connectors section for modification suffixes.

#### Walking Beam Modification

Modify rear of breaker for walking beam installation.

**Fee:** \$325 list price addition per breaker. Requires two breakers.

**Ordering:** Add suffix WB to digits 19–20 on a Power Defense catalog string.

#### Freeze Tested

This option uses special lubrication and mechanical operation is verified at –40 °C. Additional information can be found in the special applications section of the catalog.

**Fee:** 20% addition to total breaker list price.

**Ordering:** Add suffix J2 to digits 19–20 on a Power Defense catalog string.

**Note:** Modification removes UL listing per UL 489.

#### Fungus/Moisture Treated

This option provides additional protection against fungus growth in application above 95% noncondensing humidity.

**Fee:** 20% addition to total breaker list price.

**Ordering:** Add suffix J1 to digits 19–20 on a Power Defense catalog string.

**Note:** Modification removes UL listing per UL 489.

#### Special Calibrations

Ambient temperature calibrations other than 40 °C and 50 °C or special magnetic calibrations where applicable.

**Fee:** 20% addition to total breaker list price.

**Ordering:** Contact Eaton's Technical Resource Center.

**Note:** Modification removes UL listing per UL 489.

#### Certified Test Report

Available on demand via Eaton Asset Manager mobile phone application.

**Fee:** Varies.

#### Certificate of Compliance or Origin

Available from Eaton's Technical Resource Center.

**Fee:** No charge.

#### Marine Certification

Power Defense frames 1–5 are available with marine certification. This includes ABS, Lloyd's and UL 489SA certifications.②

**Fee:** 10% additional to total breaker list price.

**Ordering:** Add suffix M1 to digits 19–20 on the Power Defense catalog string.

#### Naval Certification

Power Defense frames 1–5 are also available with the naval certification. UL 489 Supplement SB requires 50 °C calibration, vibration testing, shock testing, special nameplating and no use of aluminum conductors or terminals. "Naval" labeled per UL but no "UL" mark due to 50 °C label.

**Fee:** 25% additional to total breaker list price.

**Ordering:** Add suffix M2 to digits 19–20 on the Power Defense catalog string.

#### Notes

- ① May also be field installed for reduced cost and leadtime.
- ② UL 489 Supplement SA requires 40 °C calibration, vibration testing, shock testing, special labeling, and no use of aluminum conductors or terminals.

## Series G, 15–2500 Amperes for UL, CSA and IEC Applications



## Contents

## Description

	Page
Series G	
Standards and Certifications . . . . .	V4-T2-152
Product Selection Overview . . . . .	V4-T2-153
Product Selection Guide . . . . .	V4-T2-154
Technical Data and Specifications . . . . .	V4-T2-156
Dimensions and Weights . . . . .	V4-T2-161
EG-Frame (15–125 Amperes) . . . . .	V4-T2-162
NG-Frame (320–1200 Amperes) . . . . .	V4-T2-176
RG-Frame (800–2500 Amperes) . . . . .	V4-T2-185
Motor Circuit Protectors (MCP) . . . . .	V4-T2-194
Motor Protector Circuit Breakers (MPCB) . . . . .	V4-T2-198
30 mA Ground Fault (Earth Leakage) Module . . . . .	V4-T2-201
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-203
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	V4-T2-208
Special Features and Accessories . . . . .	V4-T2-211
Motor Operators . . . . .	V4-T2-219
Plug-In Blocks . . . . .	V4-T2-221
Drawout Cassette . . . . .	V4-T2-222



## Product Overview

**Series G, 15–2500 Amperes for UL, CSA and IEC Applications**

Eaton Series G molded case circuit breakers provide increased performance in considerably less space than standard circuit breakers or comparable fusible devices.

The “G” signifies global applications: Series G circuit breakers are marked with UL, CSA, CE, IEC and KEMA KEUR listings. Other advantages include:

- Field-fit accessories
- Common accessories through 630 amperes
- Electronic trip units from 20 to 2500 amperes
- UL-listed and IEC-rated, 30 mA ground fault/earth leakage modules
- Built-in ground fault protection down to 20 amperes

The EG frames are designed around space-saving footprints. The NG and RG use the proven Eaton Series C ND and RD designs.

The Series G family includes five frame sizes in ratings from 15 to 2500 amperes. Series G offers a choice of several interrupting capacities up to 200 kA at 480 volts AC (200 kA at 240 volts AC).

Series G molded case circuit breakers are also available in direct current options. Please see Specialty Breakers **Section 2.6** for more details.

Standard calibration is 40 °C. For applications in high ambient temperature conditions, 50 °C factory calibration is available on thermal-magnetic breakers (not UL).

**The Most Logically Designed Contact Assembly**

The flexibility and outstanding performance characteristics of Eaton circuit breakers are made possible by the best contact designs in circuit breaker history. Our technology creates a high-speed “blow-open” action using the electromechanical forces produced by high-level fault currents.

Eaton circuit breakers are operated by a toggle-type mechanism that is mechanically trip-free from the handle so that the contacts cannot be held closed against short circuit currents. Tripping due to overload or short circuits is clearly indicated by the position on the handle. This remarkably fast and dependable contact action is designed to enhance safety.

**Thorough In-Plant Testing**

The quality, dependability and reliability of every Eaton Circuit Breaker is ensured by a thorough program of in-plant testing. Two calibration tests are conducted on every pole of every circuit breaker to verify the trip mechanism, operating mechanism, continuity and accuracy.

**Current-Limiting Characteristics**

Circuit breakers are current-limiting because of their high repulsion contact arrangement and use of state-of-the-art arc extinguishing technology.

Eaton offers one of the most complete lines of current-limiting breakers in the industry. The industrial breakers are available in current-limiting versions with interrupting capacities up to 200 kA at 480 V without fuses in the same physical size as standard and high interrupting capacity breakers.

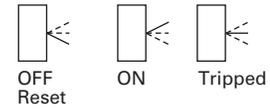
### Operating Mechanisms

Eaton circuit breakers have a toggle handle operating mechanism, which also serves as a switching position indicator. The indicator shows the positions of: ON, OFF and TRIPPED.

The toggle handle snaps into the TRIPPED position if the breaker is tripped by one of its overcurrent, short circuit, shunt or undervoltage releases. Before the circuit breaker can be reclosed following a trip-out, the toggle handle must be brought beyond the OFF position (RESET). The circuit breaker can then be reclosed.

As an additional switching position indicator for EG- to RG-Frame circuit breakers, there are two windows on the right and on the left of the toggle handle, in which the switching state is indicated by means of the colors red, green and white corresponding to the ON, OFF and TRIPPED positions respectively.

### Positions of the Toggle Handle Drive



### Standards and Certifications

Eaton Series G circuit breakers meet applicable UL 489 and IEC 60947-2 standards.

Molded case circuit breakers from Eaton are designed to conform with the following international standards:

- Australian Standard AS 2184 and AS 3947-2 molded case circuit breakers
- British Standards Institution Standard EN60947.2
- International Electromechanical Commission Recommendations IEC 60947.2 circuit breakers
- Japanese T-Mark standard molded case circuit breakers
- National Electrical Manufacturers Association Standards Publication No. AB1-1993 molded case circuit breakers
- South African Bureau of Standards, Standard SANS 156, Standard Specification for molded case circuit breakers
- Swiss Electro-Technical Association Standard SEV 947.2, Safety Regulations for circuit breakers
- Union Technique de l'Electricite Standard NF C 63-120, low-voltage switchgear and control gear circuit breaker requirements
- Verband Deutscher Elektrotechnike (Association of German Electrical Engineers) Standard VDE 0660, low-voltage switchgear and control gear, circuit breakers



### Global Third-Party Certification

Certification marks ensure product compliance with the total standard via the third party witnessing of tests by globally recognized independent certification organizations.

KEMA is a highly recognized, independent international organization that offers certification and inspection facilities for equipment in many industries. The KEMA-KEUR mark is the highest certification an electrical product can receive from KEMA. Our IEC 60947-2 molded case circuit breakers are KEMA tested and certified. These breakers are also listed in accordance with UL 489, as well as CSA C22.2 No. 5-02.

KEMA, UL and CSA provide ongoing follow-up testing and inspections to ensure that Eaton molded case circuit breakers continue to meet their exacting standards.

### ISO Certification

Eaton circuit breakers are manufactured in ISO® certified facilities.

## Product Selection Overview

### Electronic Trip Units (Digitrip RMS Trip Units)—Multi-Function Electronic Trip Units for All Applications

#### True rms Sensing

Digitrip RMS trip units use Eaton's microprocessor-based intelligence to provide true rms sensing, permitting increased accuracy and reliable system protection. True rms sensing is not susceptible to nuisance tripping when waveforms containing high harmonic currents are present.

#### Digitrip RMS 310+

Digitrip RMS 310+ electronic trip units are available with Eaton Series G circuit breakers NG and RG, as well as Series C FD, KD, LD and MDL circuit breakers.

Digitrip 310+ trip units are equipped with an integrated  $I_r$  switch that allows users to modify the continuous current rating of the breaker without having to replace a rating plug. This provides further flexibility for coordination in systems. The trip units may be used in 50 Hz or 60 Hz applications. The Digitrip 310+ offers true rms sensing, is front adjustable and has an optional local display of current and cause of trip.

#### Curve Shaping

When selectively coordinated systems are called for, Digitrip RMS 310+ will provide a cost-effective solution for a variety of applications.

The standard Digitrip RMS 310+ includes an adjustable short time pickup setting encompassing an  $I^2t$  ramp function that provides the basic LS curve shaping function.

Digitrip 310+ trip units also include selectable long time delay ( $t_{LD}$ ) and pickup settings ( $I_p$ ). A rating plug is not required.

The optional Digitrip RMS 310+ LSI and LSIg provide additional flat response short time delay adjustments and an instantaneous setting to provide LSI curve shaping capability.

Digitrip RMS 310+ LSG and LSIg units are available with ground fault pickup and flat response ground fault delay. Ground fault alarm options are available with trip and no trip functionality as a means to notify users of a ground fault condition with the option to maintain the breaker online.

Digitrip RMS 310+ trip units can effectively coordinate with both sophisticated upstream power breakers as well as downstream thermal-magnetic breakers, making Digitrip RMS 310+ trip units the cost-effective reliable choice for selectively coordinated systems.

#### Thermal Memory

All Digitrip RMS trip units incorporate a long delay. Thermal memory prevents the system from cumulative overheating due to repeated overcurrent events that may occur in quick succession.

#### Field Testing

A field test kit is available for Digitrip RMS 310+ trip units.

#### Arcflash Reduction Maintenance System

Arcflash Reduction Maintenance System is an available feature on KD, LD, MDL, NG and RG frames with 310+ electronic trip units. This feature increases worker safety by providing an accelerated instantaneous trip unit to reduce arc flash. Additionally, NG and RG frames with the Arcflash Reduction Maintenance System feature include a fully adjustable instantaneous setting.

#### Digitrip RMS 610 and 910

Digitrip RMS 610 and 910 trip units are available with Eaton R-Frame circuit breakers 800 through 2500 amperes. Digitrip 610 and 910 trip units provide unparalleled system protection with the added convenience of a local display.

#### Curve Shaping

Digitrip RMS 610 and 910 trip units are available with up to nine curve shaping choices achieved by adjusting up to seven switches on the front of the unit for optimum system coordination. Maximum curve shaping flexibility is provided by dependent long and short delay adjustments that are long delay pickup ( $I_p$ ) based, depicted on the front of the unit by the blue portion of the time-current curve.

Additional coordination capability can be provided by utilizing the short delay and ground fault zone selective interlocking features available on these trip units.

#### System Diagnostics

Digitrip RMS 610 and 910 models of trip units provide long delay, short delay, instantaneous, and ground fault cause of trip LEDs on the front of the unit. Their display shows a magnitude of trip information, as well as remote signal contacts, for improved system alarming.

#### System Monitoring

Digitrip 610 and 910 trip units have the capability to monitor phase currents, as well as neutral or ground currents. This information is displayed on a large digital display mounted on the unit.

Digitrip RMS 910 trip units can also provide the user with power and energy monitoring capability. Peak power demand, present power demand, and total energy, as well as forward and reverse energy can be monitored with this unit.

Digitrip RMS 910 trip units have the additional capability of monitoring line-to-line voltage, as well as system power factor. Both parameters are displayed in the digital display window and are supported by LEDs to indicate which parameter is being displayed.

#### Harmonics Monitoring

Digitrip RMS 910 trip units are capable of displaying values of current harmonics in the digital display window. Percentage of harmonic content can be monitored for each phase, up to the 27th harmonic. Additionally, a total harmonic distortion value can be calculated and displayed.

#### Communications

Digitrip RMS 910 units have built-in communications options to allow all protection, monitoring, and control information to be transmitted back to a central location via the Eaton PowerNet™ system.

#### Field Testing

Integral field testing capability is provided on all 610 and 910 trip units. No additional test set is needed to perform both trip and no trip field testing.

### Product Selection Guide

#### Electronic Trip Units

2

#### Digitrip—RMS 310+, 610 and 910

RMS 310+



RG



NG

RMS 610



RMS 910



Breaker Type		NG- and RG-Frames	RG-Frame	RG-Frame
Series G frame(s)		NG- and RG-Frames	RG-Frame	RG-Frame
Ampere rating		20–2500 A	800–2500 A	800–2500 A
Interrupting rating at 415 V		35, 70, 100 kA	70, 100 kA	70, 100 kA
Trip Unit Sensing		Yes	Yes	Yes
Protection and Coordination <sup>①</sup>				
Protection	Ordering options	LS, LSG	LSI, LSIG	LI, LS, LSI, LIG, LSG, LSIG
	Fixed rating plug ( $I_n$ ) <sup>②</sup>	Yes	Yes	Yes
	Overtemperature trip	Yes	Yes	Yes
Long delay	Adjustable $I_r$ switch	Yes	Yes	No
	Long delay setting	Var/frame	Var/frame	0.5–1.0 x ( $I_n$ )
	Long delay time $I^2t$ at 6x	10 seconds <sup>③</sup>	10 seconds <sup>③</sup>	2–24 seconds
	Long delay thermal memory	Yes	Yes	Yes
	High load alarm	1.05 $I_r$	1.05 $I_r$	0.85 x $I_r$
Short delay	Short delay setting	Var/frame <sup>④</sup>	Var/frame <sup>④</sup>	200–600% S1 and S2 x ( $I_r$ )
	Short delay time $I^2t$	100 ms	No	100, 300, 500 ms
	Short delay time flat	No	1–300 ms	100–500 ms
	Short delay time ZSI	No	Yes	Yes
Instantaneous	Independent adjustable Inst. setting	No	Yes <sup>⑤</sup>	Yes
	Instantaneous setting	No	Var/frame	200–600% M1 and M2 x ( $I_n$ )
	Discriminator	No	No	Yes <sup>⑥</sup>
	Instantaneous override	Yes	Yes	Yes
Ground fault	Ground fault setting	Var/frame <sup>⑦</sup>	Var/frame <sup>⑦</sup>	25–100% x ( $I_n$ ) <sup>⑦</sup>
	Ground fault delay $I^2t$ at 0.62x	No	No	100, 300, 500 ms
	Ground fault delay flat	1–300 ms	1–300 ms	100–500 ms
	Ground fault ZSI	No	Yes	Yes
	Ground fault thermal memory	No	No	Yes

#### Notes

$I_n$  = Rating plug rating.

$I_r$  = Long delay setting.

① 310+ details are included by frame in **Pages V4-T2-183** (NG), and **V4-T2-192** (RG).

② 310+ trip units have selectable settings instead of a rating plug.

③ 310+ trip units have adjustable long delay times of 2–24 seconds, except NG 310+ for 800 A frame, for which it is 2–14 seconds.

④ NG: 2X–8X ( $I_n$ ); RG: 2X–9X ( $I_n$ ); 2500 ampere RG-Frame 2X–6X% x ( $I_n$ ).

⑤ NG and RG ALSI and ALSIG 310+ trip units include an independently adjustable Instantaneous ( $I_r$ ) setting.

⑥ LS, LSG only.

⑦ Not to exceed 1200 amperes.

Digitrip—RMS 310+, 610 and 910, continued

RMS 310+



RG



NG

RMS 610



RMS 910



	LS, LSG	LSI, LSIG	LSI, LSIG, LSIG (A)	LSI (A), LSIG
<b>System Diagnostics</b>				
Cause of trip LEDs	Yes <sup>① ②</sup>	Yes <sup>① ②</sup>	Yes	Yes
Magnitude of trip information	No	No	Yes	Yes
Remote signal contacts	No	No	Yes	Yes
<b>System Monitoring</b>				
Digital display	Yes <sup>③</sup>	Yes <sup>③</sup>	Yes	Yes
Current	Yes <sup>③</sup>	Yes <sup>③</sup>	Yes	Yes
Voltage	No	No	No	Yes
Power and energy	No	No	No	Yes
Power quality—harmonics	No	No	No	Yes
Power factor	No	No	No	Yes
<b>System Communications</b>				
PowerNet	No	No	No	Yes
<b>Field Testing</b>				
Testing method	Test set <sup>④</sup>	Test set <sup>④</sup>	Integral	Integral

**Notes**

- ① Using cause of trip module (catalog number **TRIP-LED**).
- ② RG 310+ trip units include integrated cause of trip LEDs.
- ③ Using ammeter or remote ammeter/cause of trip display (catalog number **DIGIVIEW** and **DIGIVIEWR06**).
- ④ Test kit available for field testing 310+ trip units (catalog number **MTST230V**).

## Technical Data and Specifications

### Ratings

#### Frame EG

EG



Maximum rated current (amperes)	125, 160 <sup>①</sup>									
Breaker type <sup>②</sup>	B	B	E	S	S	H	H	C		
Number of poles	1	2, 3, 4	2, 3, 4	1	2, 3, 4	1	2, 3, 4	3, 4		
<b>Breaker Capacity (kA rms) Vac 50–60 Hz</b>										
NEMA <sup>®</sup> , UL, CSA	240 Vac	25	25	35	85	85	100	100	200	
	480 Vac	—	18	25	—	35	—	65	100	
	600 Vac <sup>③</sup>	—	—	18	—	22	—	25	35	
	125/250 Vdc <sup>④</sup>	10 <sup>⑤</sup>	10	10	35 <sup>⑤</sup>	35	42 <sup>⑤</sup>	42	42	
IEC 60947-2	220–240 Vac	$I_{cu}$	25	25	35	85	85	100	100	200
		$I_{cs}$	25	25	35	43	43	50	50	200
	380–415 Vac	$I_{cu}$	—	18	25	—	40	—	70	100
		$I_{cs}$	—	18	25	—	30	—	35	100
	660–690 Vac	$I_{cu}$	—	—	—	—	—	—	—	—
		$I_{cs}$	—	—	—	—	—	—	—	—
	125/250 Vdc <sup>④</sup>	$I_{cu}$	10 <sup>⑤</sup>	10	10	35 <sup>⑤</sup>	35	42 <sup>⑤</sup>	42	42
		$I_{cs}$	10 <sup>⑤</sup>	10	10	35 <sup>⑤</sup>	35	42 <sup>⑤</sup>	42	42
Ampere range	15–160 A <sup>①</sup>									
Trip Units	FT-FM									
F = Fixed	AT-FM									
A = Adjustable										
T = Thermal										
M = Magnetic										
	Interchangeable	—	—	—	—	—	—	—	—	
	Built-in	■	■	■	■	■	■	■	■	
Thermal-magnetic	Fixed thermal	■	■	■	■	■	■	■	■	
	Adjustable thermal	■	■	■	■	■	■	■	■	
	Magnetic	Fixed								
Electronic RMS <sup>⑥</sup>	LS	—	—	—	—	—	—	—	—	
	LSI	—	—	—	—	—	—	—	—	
	LSG	—	—	—	—	—	—	—	—	
	LSIG	—	—	—	—	—	—	—	—	
	ALSI	—	—	—	—	—	—	—	—	
	ALSIG	—	—	—	—	—	—	—	—	
Utilization category	A A A A A A A A A									

#### Notes

- ① 125 amperes is the maximum UL and CSA rating for the EG.
- ② Breaker type C, U and X are current limiting per UL 489.
- ③ EG breaker rated 600/347 Vac.
- ④ Two poles in series.
- ⑤ 125 Vdc only for single-pole breakers.
- ⑥ Not suitable for DC application. Four-pole ground fault not available.

## Frames NG and RG

NG



RG



Maximum rated current (amperes)		800, 1200	800, 1200	800, 1200	1600 <sup>①</sup>	800	1600, 2000, 2500	1600, 2000, 2500	
Breaker type		S	H	C <sup>②</sup>	S	U	H	C <sup>②</sup>	
Number of poles		2, 3, 4	2, 3, 4	2, 3, 4	3	3	3, 4	3, 4	
<b>Breaker Capacity (kA rms) AC 50–60 Hz</b>									
NEMA, UL, CSA	240 Vac	85	100	200	—	200	125	200	
	480 Vac	50	65	100	—	150	65	100	
	600 Vac	25	35	65	—	65	50	65	
IEC 60947-2	220–240 Vac	$I_{cu}$	85	100	200	85	—	135	200
		$I_{cs}$	85	100	100	85	—	100	100
	380–415 Vac	$I_{cu}$	50	70	100	50	—	70	100
		$I_{cs}$	50	50	50	50	—	50	50
	660–690 Vac	$I_{cu}$	20 <sup>③</sup>	25 <sup>③</sup>	35	20 <sup>③</sup>	—	25 <sup>③</sup>	35 <sup>③</sup>
		$I_{cs}$	10	13	18	10	—	13	18
250 Vdc	$I_{cu}$	—	—	—	—	—	—	—	
	$I_{cs}$	—	—	—	—	—	—	—	
Ampere range		400–1200 A	400–1200 A	400–1200 A	1600 A	800 A	800–2500 A	800–2500 A	
Trip units		Electronic (Digitrip RMS 310+)				Electronic (Digitrip RMS 310+ and 910)			
	Interchangeable	—	—	—	—	—	■ <sup>⑤</sup>	■ <sup>⑤</sup>	
	Built-in	■	■	■	■	■	■	■	
Electronic <sup>④</sup>	LI	—	—	—	—	—	■ <sup>⑥</sup>	■ <sup>⑥</sup>	
	LS	■	■	■	■	■	■	■	
	LSI	■	■	■	■	■	■	■	
	LIG	—	—	—	—	—	■ <sup>⑥</sup>	■ <sup>⑥</sup>	
	LSG	■	■	■	■	■	■	■	
	LSIG	■	■	■	■	■	■	■	
	ALSI	■	■	■	■	—	■	■	
	ALSIG	■	■	■	■	—	■	■	
Utilization category		A	A	A	A	A	A	A	

**Notes**

- ① NG 1600 ampere frame is not UL or CSA listed.  
 ② Not KEMA-KEUR listed.  
 ③ IEC 60947-2 H.5 Annex H is not KEMA-KEUR tested.  
 ④ Not suitable for DC application. Four-pole ground fault not available.  
 ⑤ RG 310+ are interchangeable with the exception of: FROM not ground fault equipped TO ground fault equipped  
 ⑥ Available only on Digitrip 910 trip units.

## General Specifications

## All Series G Frames

2

	EG	NG	RG
Maximum rated current $I_n$ depending on the version	160 A <sup>①</sup>	800, 1200, 1600 A <sup>②</sup>	1600, 2000, 2500 A
Rated insulation voltage U, according to IEC 60947-2			
Main conducting paths	500 Vac	750 Vac	750 Vac
Auxiliary circuits	500 Vac	690 Vac	690 Vac
Rated impulse withstand voltage $U_{imp}$			
Main conducting paths	6 kV	8 kV	8 kV
Auxiliary circuits	4 kV	4 kV	4 kV
Rated operational voltage $U_e$			
IEC	415 Vac	690 Vac	690 Vac
NEMA	600Y/347 Vac	600 Vac	600 Vac
UL and CSA listed	Yes <sup>①</sup>	Yes <sup>②</sup>	Yes
Permissible ambient temperature	−20 ° to 70 °C	−20 ° to 70 °C	−20 ° to 70 °C
Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker	③	④	—
Circuit breakers for plant protection			
At 40 °C	100%	100%	100%
At 50 °C	96%	92%	91%
At 55 °C	93%	87%	85%
At 60 °C	91%	83%	81%
At 70 °C	86%	73%	70%
Circuit breakers for motor protection			
At 40 °C	—	—	—
At 50 °C	—	—	—
At 55 °C	—	—	—
At 60 °C	—	—	—
At 70 °C	—	—	—
Circuit breakers for starter combinations and isolating circuit breakers			
At 40 °C	100%	100%	100%
At 50 °C	100%	91%	91%
At 55 °C	96%	85%	85%
At 60 °C	91%	81%	81%
At 70 °C	86%	—	—
Rated short-circuit breaking capacity (DC) Not for circuit breakers for motor protection (Time constant $t = 10$ rms)			
Two conducting paths in series For EG up to 250 Vdc	42 kA max.	⑤	⑤
NEMA (time constant $t = 8$ rms) Two conducting paths in series 250 Vdc	42 kA max.	⑤	⑤

## Notes

- ① 125 amperes is the maximum UL and CSA rating for the EG.
- ② 1200 amperes is the maximum UL and CSA rating for the NG.
- ③ Thermal overload release set to the lower value.
- ④ Thermal overload release set to the upper value.
- ⑤ Not suitable for DC switching.

## All Series G Frames, continued

	EG	NG	RG
Main switch characteristics according to IEC 60947-2 in combination with lockable rotary drives	Yes	Yes	Yes
Rated short circuit breaking capacity according to IEC 60947-2 (at AC 50/60 Hz)	For rated short circuit breaking capacity, see <b>Page V4-T2-156</b> .		
Endurance (operating cycles)	10,000	3,000	3,000
Maximum switching frequency	300 1/h	60 1/h	60 1/h
Conductor cross sections and terminal types for main conductors	Box terminals		Flat bar terminals
Solid or stranded	2.5 to 95 mm <sup>2</sup>		—
Finely stranded with end sleeve	2.5 to 50/70 mm <sup>2</sup>		—
Busbar	—	Optional	Optional
Tightening torque for box terminals	5.6 Nm	31 Nm	—
Tightening torque for busbar connection pieces	5.6 Nm	50 Nm	20 Nm
Conductor cross sections for auxiliary circuits with terminal connection or terminal strip			
Solid	0.75 to 2.5 mm <sup>2</sup>		Up to 2x4 mm <sup>2</sup>
Finely stranded with end sleeve	0.75 to 2.5 mm <sup>2</sup>		Up to 2x2.5 mm <sup>2</sup>
With brought-out cable ends	—	0.82 (AWG 18) mm <sup>2</sup>	0.82 (AWG 18) mm <sup>2</sup>
Tightening torque for fitting screws	—	0.8 to 1.4 Nm	0.8 to 1.4 Nm
Power loss per circuit breaker at maximum rated current $I_n$ (the power losses of the undervoltage releases ("r" releases) must be observed if necessary) at three-phase symmetrical load)			
For plant protection	40 W	87/210 W	220/270/400 W
As isolating circuit breaker	40 W	87/210 W	220/270/400 W
For starter combinations	40 W	—	—
For motor protection	—	—	—
Permissible mounting position			
Arc spacing— suitable for reverse-feed applications	Yes (except HMCPE)		Yes
<b>Auxiliary Switches</b>			
Rated thermal current $I_{th}$	6 A	6 A	6 A
Rated making capacity	20 A	20 A	20 A
	<b>AC-14</b>	<b>AC-15</b>	<b>AC-15</b>
Rated operational voltage	230/400/600 V		600 V
Rated operational current	6/3/0.25 A	6A	6A
		<b>DC-13</b>	<b>DC-13</b>
Rated operational voltage	125/250 V	125/250 V	125/250 V
Rated operational current	0.5/0.15 A	0.5/0.25 A	0.5/0.25 A
Backup fuse	6/4/4 A	(4) 6/4/4 A	(4) 6/4/4 A
Miniature circuit breaker	6/4 A	6/4 A	6/4 A

## All Series G Frames, continued

2

	EG	NG	RG
<b>Releases</b>			
Undervoltage releases ("r" releases)			
Response voltage:			
Drop (breaker tripped) $U_s$	35–70%	35–70%	35–70%
Pickup (breaker may be switched on) $U_s$	85–110%	85–110%	85–110%
Power consumption in continuous operation at:			
50/60 Hz 12 Vac	—	1.9 VA	2.9 VA
50/60 Hz 24 Vac	0.72 VA	2.4 VA	3.1 VA
50/60 Hz 48–60 Vac	1.15–1.78 VA	2.3–4.1 VA	3.4–6.0 VA
50/60 Hz 110–127 Vac	0.96–1.25 VA	3.4–4.2 VA	3.3–3.8 VA
50/60 Hz 208–240 Vac	1.28–1.68 VA	4.8–6.5 VA	4.2–7.2 VA
50/60 Hz 380–500 Vac	2.2–3.9 VA	6.8–12.0 VA	3.8–10.0 VA
50/60 Hz 525–600 Vac	3.4–4.3 VA	—	—
12 Vdc	—	2.6W	3.4W
24 Vdc	0.70 W	3.6W	4.3W
48–60 Vdc	1.12–1.76W	3.5–5.5W	4.8–7.2W
110–125 Vdc	0.94–1.21W	2.9–3.6W	3.3–3.8W
220–250 Vdc	1.45–1.86W	4.8–6.3W	6.6–7.5W
Maximum opening time	50 ms	62 ms	62 ms
<b>Shunt Trips</b>			
Shunt trips ("f" releases)			
Response voltage:			
Pickup (breaker tripped) $U_s$	70–110%	70–110%	70–110%
Power consumption in (short time) at:			
50/60 Hz 24 Vac	10–41 VA	98–475 VA	612 VA
50/60 Hz 48–60 Vac	139–210 VA	24–50 VA	403–666 VA
50/60 Hz 48–127 Vac	—	—	—
50/60 Hz 110–240 Vac	83–360 VA	67–432 VA	396–1896 VA
50/60 Hz 380–440 Vac	—	76–110 VA	1596–2156 VA
50/60 Hz 380–600 Vac	418–1080 VA	—	—
50/60 Hz 480–600 Vac	—	19–42 VA	230–384 VA
12–24 Vdc	29–120 W	145–610 W	396 W
48–60 Vdc	475–720 W	67–102 W	341–528 W
110–125 Vdc	99–121 W	121–150 W	264–350 W
220–250 Vdc	—	46–55 W	374–475 W
Maximum load duration	Interrupts automatically	Interrupts automatically	Interrupts automatically
Maximum opening time	50 ms	62 ms	62 ms
<b>Molded Case Switch (with High Magnetic Trip)</b>			
Unfused kAIC at 480 Vac (415 Vac)	65 (70)	65 (70)	65 (70)
Self-protected, will trip above	1250 for EG125; 1600 for EG160	12,500	20,000



## Dimensions and Weights

Approximate Dimensions in Inches (mm)

### Series G—Frame EG

	EG		
	H	W	D
<b>Single-pole</b>	5.50 (139.7)	1.00 (25.4)	2.99 (76.0)
<b>Two-pole</b>	5.50 (139.7)	2.00 (50.8)	2.99 (76.0)
<b>Three-pole</b>	5.50 (139.7)	3.00 (76.2)	2.99 (76.0)
<b>Four-pole</b>	5.50 (139.7)	4.00 (101.6)	2.99 (76.0)

### Series G—Frame NG and RG

	NG			RG		
	H	W	D	H	W	D
<b>Single-pole</b>	—	—	—	—	—	—
<b>Two-pole</b>	—	—	—	—	—	—
<b>Three-pole</b>	16.00 (406.0)	8.25 (210.0)	5.50 (140.0)	16.00 (406.0)	15.50 (394.0)	9.75 (229.0)
<b>Four-pole</b>	16.00 (406.0)	11.13 (280.0)	5.50 (140.0)	16.00 (406.0)	20.00 (508.0)	9.75 (229.0)

Approximate Shipping Weight in Lb (kg)

### Series G—Frame EG

	EG	NG	RG
<b>Single-pole</b>	0.85 (0.39)	—	—
<b>Two-pole</b>	1.57 (0.71)	—	—
<b>Three-pole</b>	2.28 (1.04)	46.8 (21.3)	103.0 (47.0)
<b>Four-pole</b>	2.85 (1.29)	62.0 (28.3)	118.4 (54.0)

EG-Frame (15–125 Amperes)

2



### Contents

<i><b>Description</b></i>	<i><b>Page</b></i>
EG-Frame (15–125 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-163</b>
Product Selection . . . . .	<b>V4-T2-164</b>
Accessories . . . . .	<b>V4-T2-173</b>
Technical Data and Specifications . . . . .	<b>V4-T2-174</b>
Dimensions and Weights. . . . .	<b>V4-T2-174</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB) . . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module. . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators. . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette. . . . .	<b>V4-T2-222</b>

### EG-Frame (15–125 Amperes)

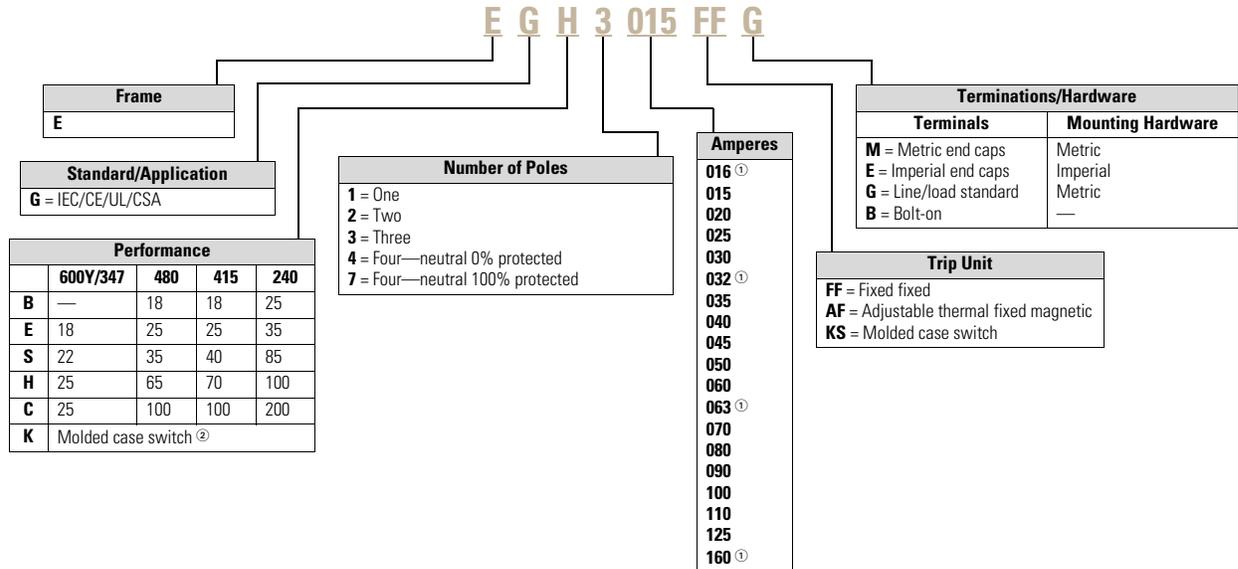
#### Product Description

EG breaker is HACR rated.

**Catalog Number Selection**

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

**Series G—EG-Frame (15–125 Amperes)**



Frame
E

Standard/Application
G = IEC/CE/UL/CSA

Performance				
	600V/347	480	415	240
B	—	18	18	25
E	18	25	25	35
S	22	35	40	85
H	25	65	70	100
C	25	100	100	200
K	Molded case switch ②			

Number of Poles
1 = One
2 = Two
3 = Three
4 = Four—neutral 0% protected
7 = Four—neutral 100% protected

Amperes
016 ①
015
020
025
030
032 ①
035
040
045
050
060
063 ①
070
080
090
100
110
125
160 ①

Terminations/Hardware	
Terminals	Mounting Hardware
M = Metric end caps	Metric
E = Imperial end caps	Imperial
G = Line/load standard	Metric
B = Bolt-on	—

Trip Unit
FF = Fixed fixed
AF = Adjustable thermal fixed magnetic
KS = Molded case switch

**Notes**

- ① Cannot be UL rated.
- ② Available only as 125 and 160 A sizes.

#### Product Selection

**Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) IC Rating at 415/480 Volts**

2

EG-Frame

EG-Frame—18/18



Maximum Continuous Amps at 40 °C ①	Single-Pole	Two-Pole	Three-Pole	Adjustable ② Thermal, Fixed Magnetic Catalog Number	Four-Pole ③	Adjustable ② Thermal, Fixed Magnetic Catalog Number
	Fixed Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number			
15	EGB1015FFG	EGB2015FFG	EGB3015FFG	—	EGB4015FFG	—
16	EGB1016FFG	EGB2016FFG	EGB3016FFG	—	EGB4016FFG	—
20	EGB1020FFG	EGB2020FFG	EGB3020FFG	—	EGB4020FFG	EGB4020AFG
25	EGB1025FFG	EGB2025FFG	EGB3025FFG	EGB3025AFG	EGB4025FFG	EGB4025AFG
30	EGB1030FFG	EGB2030FFG	EGB3030FFG	—	EGB4030FFG	—
32	EGB1032FFG	EGB2032FFG	EGB3032FFG	EGB3032AFG	EGB4032FFG	EGB4032AFG
35	EGB1035FFG	EGB2035FFG	EGB3035FFG	—	EGB4035FFG	—
40	EGB1040FFG	EGB2040FFG	EGB3040FFG	EGB3040AFG	EGB4040FFG	EGB4040AFG
45	EGB1045FFG	EGB2045FFG	EGB3045FFG	—	EGB4045FFG	—
50	EGB1050FFG	EGB2050FFG	EGB3050FFG	EGB3050AFG	EGB4050FFG	EGB4050AFG
60	EGB1060FFG	EGB2060FFG	EGB3060FFG	—	EGB4060FFG	—
63	EGB1063FFG	EGB2063FFG	EGB3063FFG	EGB3063AFG	EGB4063FFG	EGB4063AFG
70	EGB1070FFG	EGB2070FFG	EGB3070FFG	—	EGB4070FFG	—
80	EGB1080FFG	EGB2080FFG	EGB3080FFG	EGB3080AFG	EGB4080FFG	EGB4080AFG
90	EGB1090FFG	EGB2090FFG	EGB3090FFG	—	EGB4090FFG	—
100	EGB1100FFG	EGB2100FFG	EGB3100FFG	EGB3100AFG	EGB4100FFG	EGB4100AFG
110	EGB1110FFG	EGB2110FFG	EGB3110FFG	—	EGB4110FFG	—
125	EGB1125FFG	EGB2125FFG	EGB3125FFG	EGB3125AFG	EGB4125FFG	EGB4125AFG
160	—	—	EGB3160FFG	EGB3160AFG	EGB4160FFG	EGB4160AFG

**Notes**

- ① 16, 32, 63 and 160 A are not UL listed ratings.
- ② Adjustable thermal are not UL listed.
- ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

EG-Frame—25/25 Single-Pole Unavailable

## EG-Frame



## EG-Frame—25/25

Maximum Continuous Amps at 40 °C <sup>①</sup>	Two-Pole	Three-Pole	Adjustable <sup>②</sup> Thermal, Fixed Magnetic	Four-Pole <sup>③</sup>	Adjustable <sup>②</sup> Thermal, Fixed Magnetic
	Fixed Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number	Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number	Catalog Number
15	EGE2015FFG	EGE3015FFG	—	EGE4015FFG	—
16	EGE2016FFG	EGE3016FFG	—	EGE4016FFG	—
20	EGE2020FFG	EGE3020FFG	—	EGE4020FFG	EGE4020AFG
25	EGE2025FFG	EGE3025FFG	EGE3025AFG	EGE4025FFG	EGE4025AFG
30	EGE2030FFG	EGE3030FFG	—	EGE4030FFG	—
32	EGE2032FFG	EGE3032FFG	EGE3032AFG	EGE4032FFG	EGE4032AFG
35	EGE2035FFG	EGE3035FFG	—	EGE4035FFG	—
40	EGE2040FFG	EGE3040FFG	EGE3040AFG	EGE4040FFG	EGE4040AFG
45	EGE2045FFG	EGE3045FFG	EGE3050AFG	EGE4045FFG	—
50	EGE2050FFG	EGE3050FFG	—	EGE4050FFG	EGE4050AFG
60	EGE2060FFG	EGE3060FFG	—	EGE4060FFG	—
63	EGE2063FFG	EGE3063FFG	EGE3063AFG	EGE4063FFG	EGE4063AFG
70	EGE2070FFG	EGE3070FFG	—	EGE4070FFG	—
80	EGE2080FFG	EGE3080FFG	EGE3080AFG	EGE4080FFG	EGE4080AFG
90	EGE2090FFG	EGE3090FFG	—	EGE4090FFG	—
100	EGE2100FFG	EGE3100FFG	EGE3100AFG	EGE4100FFG	EGE4100AFG
125	EGE2125FFG	EGE3125FFG	EGE3125AFG	EGE4125FFG	EGE4125AFG
160	—	EGE3160FFG	EGE3160AFG	EGE4160FFG	EGE4160AFG

**Notes**

- ① 16, 32, 63 and 160 A are not UL listed ratings.  
 ② Adjustable thermal are not UL listed.  
 ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

# 2.3

## Molded Case Circuit Breakers

### Series G

2

EG-Frame



#### EG-Frame—40/35

Maximum Continuous Amps at 40 °C <sup>①</sup>	Single-Pole	Two-Pole	Three-Pole	Adjustable Thermal, Fixed Magnetic <sup>②</sup> Catalog Number	Four-Pole <sup>③</sup>	Adjustable <sup>②</sup> Thermal, Fixed Magnetic Catalog Number
	Fixed Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number		Fixed Thermal, Fixed Magnetic Catalog Number	
15	EGS1015FFG	EGS2015FFG	EGS3015FFG	—	EGS4015FFG	—
16	EGS1016FFG	EGS2016FFG	EGS3016FFG	—	EGS4016FFG	—
20	EGS1020FFG	EGS2020FFG	EGS3020FFG	—	EGS4020FFG	EGS4020AFG
25	EGS1025FFG	EGS2025FFG	EGS3025FFG	EGS3025AFG	EGS4025FFG	EGS4025AFG
30	EGS1030FFG	EGS2030FFG	EGS3030FFG	—	EGS4030FFG	—
32	EGS1032FFG	EGS2032FFG	EGS3032FFG	EGS3032AFG	EGS4032FFG	EGS4032AFG
35	EGS1035FFG	EGS2035FFG	EGS3035FFG	—	EGS4035FFG	—
40	EGS1040FFG	EGS2040FFG	EGS3040FFG	EGS3040AFG	EGS4040FFG	EGS4040AFG
45	EGS1045FFG	EGS2045FFG	EGS3045FFG	—	EGS4045FFG	—
50	EGS1050FFG	EGS2050FFG	EGS3050FFG	EGS3050AFG	EGS4050FFG	EGS4050AFG
60	EGS1060FFG	EGS2060FFG	EGS3060FFG	—	EGS4060FFG	—
63	EGS1063FFG	EGS2063FFG	EGS3063FFG	EGS3063AFG	EGS4063FFG	EGS4063AFG
70	EGS1070FFG	EGS2070FFG	EGS3070FFG	—	EGS4070FFG	—
80	EGS1080FFG	EGS2080FFG	EGS3080FFG	EGS3080AFG	EGS4080FFG	EGS4080AFG
90	EGS1090FFG	EGS2090FFG	EGS3090FFG	—	EGS4090FFG	—
100	EGS1100FFG	EGS2100FFG	EGS3100FFG	EGS3100AFG	EGS4100FFG	EGS4100AFG
125	EGS1125FFG	EGS2125FFG	EGS3125FFG	EGS3125AFG	EGS4125FFG	EGS4125AFG
160	—	—	EGS3160FFG	EGS3160AFG	EGS4160FFG	EGS4160AFG

**Notes**

- ① 16, 32, 63 and 160 A are not UL listed ratings.
- ② Adjustable thermal are not UL listed.
- ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

## EG-Frame



## EG-Frame—70/65

Maximum Continuous Amps at 40 °C <sup>①</sup>	Single-Pole	Two-Pole	Three-Pole	Adjustable Thermal, Fixed Magnetic <sup>②</sup> Catalog Number	Four-Pole <sup>③</sup>	Adjustable <sup>②</sup> Thermal, Fixed Magnetic Catalog Number
	Fixed Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number		Fixed Thermal, Fixed Magnetic Catalog Number	
15	EGH1015FFG	EGH2015FFG	EGH3015FFG	—	EGH4015FFG	—
16	EGH1016FFG	EGH2016FFG	EGH3016FFG	—	EGH4016FFG	—
20	EGH1020FFG	EGH2020FFG	EGH3020FFG	EGH3020AFG	EGH4020FFG	EGH4020AFG
25	EGH1025FFG	EGH2025FFG	EGH3025FFG	EGH3025AFG	EGH4025FFG	EGH4025AFG
30	EGH1030FFG	EGH2030FFG	EGH3030FFG	—	EGH4030FFG	—
32	EGH1032FFG	EGH2032FFG	EGH3032FFG	EGH3032AFG	EGH4032FFG	EGH4032AFG
35	EGH1035FFG	EGH2035FFG	EGH3035FFG	—	EGH4035FFG	—
40	EGH1040FFG	EGH2040FFG	EGH3040FFG	EGH3040AFG	EGH4040FFG	EGH4040AFG
45	EGH1045FFG	EGH2045FFG	EGH3045FFG	—	EGH4045FFG	EGH4050AFG
50	EGH1050FFG	EGH2050FFG	EGH3050FFG	EGH3050AFG	EGH4050FFG	—
60	EGH1060FFG	EGH2060FFG	EGH3060FFG	—	EGH4060FFG	—
63	EGH1063FFG	EGH2063FFG	EGH3063FFG	EGH3063AFG	EGH4063FFG	EGH4063AFG
70	EGH1070FFG	EGH2070FFG	EGH3070FFG	—	EGH4070FFG	—
80	EGH1080FFG	EGH2080FFG	EGH3080FFG	EGH3080AFG	EGH4080FFG	EGH4080AFG
90	EGH1090FFG	EGH2090FFG	EGH3090FFG	—	EGH4090FFG	—
100	EGH1100FFG	EGH2100FFG	EGH3100FFG	EGH3100AFG	EGH4100FFG	EGH4100AFG
125	EGH1125FFG	EGH2125FFG	EGH3125FFG	EGH3125AFG	EGH4125FFG	EGH4125AFG

**Notes**

- ① 16, 32, 63 A are not UL listed ratings.  
 ② Adjustable thermal are not UL listed.  
 ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

# 2.3

## Molded Case Circuit Breakers

### Series G

EG-Frame—100/100 Current Limiting (Single-Pole and Two-Pole Unavailable)

2

EG-Frame

#### EG-Frame—100/100



Maximum Continuous Amps at 40 °C <sup>①</sup>	Three-Pole Fixed Thermal, Fixed Magnetic		Four-Pole 0% Protected Neutral <sup>③</sup>	
	Catalog Number	Adjustable <sup>②</sup> Thermal, Fixed Magnetic Catalog Number	Fixed Thermal, Fixed Magnetic Catalog Number	Adjustable <sup>②</sup> Thermal, Fixed Magnetic Catalog Number
15	EGC3015FFG	—	EGC7015FFG	—
16	EGC3016FFG	—	EGC7016FFG	—
20	EGC3020FFG	EGC3020AFG	EGC7020FFG	EGC7020AFG
25	EGC3025FFG	EGC3025AFG	EGC7025FFG	EGC7025AFG
30	EGC3030FFG	—	EGC7030FFG	—
32	EGC3032FFG	EGC3032AFG	EGC7032FFG	EGC7032AFG
35	EGC3035FFG	—	EGC7035FFG	—
40	EGC3040FFG	EGC3040AFG	EGC7040FFG	EGC7040AFG
45	EGC3045FFG	—	EGC7045FFG	—
50	EGC3050FFG	EGC3050AFG	EGC7050FFG	EGC7050AFG
60	EGC3060FFG	—	EGC7060FFG	—
63	EGC3063FFG	EGC3063AFG	EGC7063FFG	EGC7063AFG
70	EGC3070FFG	—	EGC7070FFG	—
80	EGC3080FFG	EGC3080AFG	EGC7080FFG	EGC7080AFG
90	EGC3090FFG	—	EGC7090FFG	—
100	EGC3100FFG	EGC3100AFG	EGC7100FFG	EGC7100AFG
125	EGC3125FFG	EGC3125AFG	EGC7125FFG	EGC7125AFG

#### Molded Case Switches <sup>④</sup>

Catalog Number

EGK3125KSG

EGK7125KSG

EGK3160KSG

EGK7160KSG

#### Notes

- ① 16, 32, 63 A are not UL listed ratings.
- ② Adjustable thermal is not UL listed.
- ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on LH side.
- ④ Molded case switches may open above 1250 A.

**EG Bolt-On Complete Breaker (Includes Frame, Trip Unit and Mounting Hardware)****EG-Frame****EG-Frame—18 kAIC at 480 Vac**

Maximum Continuous Amps at 40 °C	Single-Pole	Two-Pole	Three-Pole
	Fixed Thermal, Fixed Magnetic Catalog Number <sup>①</sup>	Fixed Thermal, Fixed Magnetic Catalog Number <sup>②</sup>	Fixed Thermal, Fixed Magnetic Catalog Number <sup>③</sup>
15	EGB1015FFB	EGB2015FFB	EGB3015FFB
20	EGB1020FFB	EGB2020FFB	EGB3020FFB
25	EGB1025FFB	EGB2025FFB	EGB3025FFB
30	EGB1030FFB	EGB2030FFB	EGB3030FFB
35	EGB1035FFB	EGB2035FFB	EGB3035FFB
40	EGB1040FFB	EGB2040FFB	EGB3040FFB
45	EGB1045FFB	EGB2045FFB	EGB3045FFB
50	EGB1050FFB	EGB2050FFB	EGB3050FFB
60	EGB1060FFB	EGB2060FFB	EGB3060FFB
70	EGB1070FFB	EGB2070FFB	EGB3070FFB
80	EGB1080FFB	EGB2080FFB	EGB3080FFB
90	EGB1090FFB	EGB2090FFB	EGB3090FFB
100	EGB1100FFB	EGB2100FFB	EGB3100FFB
110	EGB1110FFB	EGB2110FFB	EGB3110FFB
125	EGB1125FFB	EGB2125FFB	EGB3125FFB

**EG-Frame****EG-Frame—35 kAIC at 480 Vac**

Maximum Continuous Amps at 40 °C	Single-Pole	Two-Pole	Three-Pole
	Fixed Thermal, Fixed Magnetic Catalog Number <sup>①</sup>	Fixed Thermal, Fixed Magnetic Catalog Number <sup>②</sup>	Fixed Thermal, Fixed Magnetic Catalog Number <sup>③</sup>
15	EGS1015FFB	EGS2015FFB	EGS3015FFB
20	EGS1020FFB	EGS2020FFB	EGS3020FFB
25	EGS1025FFB	EGS2025FFB	EGS3025FFB
30	EGS1030FFB	EGS2030FFB	EGS3030FFB
35	EGS1035FFB	EGS2035FFB	EGS3035FFB
40	EGS1040FFB	EGS2040FFB	EGS3040FFB
45	EGS1045FFB	EGS2045FFB	EGS3045FFB
50	EGS1050FFB	EGS2050FFB	EGS3050FFB
60	EGS1060FFB	EGS2060FFB	EGS3060FFB
70	EGS1070FFB	EGS2070FFB	EGS3070FFB
80	EGS1080FFB	EGS2080FFB	EGS3080FFB
90	EGS1090FFB	EGS2090FFB	EGS3090FFB
100	EGS1100FFB	EGS2100FFB	EGS3100FFB
110	EGS1110FFB	EGS2110FFB	EGS3110FFB
125	EGS1125FFB	EGS2125FFB	EGS3125FFB

**Notes**

- ① For bulk pack 24, add suffix BP24 and order quantities of 24.
- ② For bulk pack 12, add suffix BP12 and order quantities of 12.
- ③ For bulk pack 8, add suffix BP8 and order quantities of 8.

EG-Frame



## EG-Frame—65 kAIC at 480 Vac

Maximum Continuous Amps at 40 °C	Single-Pole Fixed Thermal, Fixed Magnetic Catalog Number <sup>①</sup>	Two-Pole Fixed Thermal, Fixed Magnetic Catalog Number <sup>②</sup>	Three-Pole Fixed Thermal, Fixed Magnetic Catalog Number <sup>③</sup>
15	EGH1015FFB	EGH2015FFB	EGH3015FFB
20	EGH1020FFB	EGH2020FFB	EGH3020FFB
25	EGH1025FFB	EGH2025FFB	EGH3025FFB
30	EGH1030FFB	EGH2030FFB	EGH3030FFB
35	EGH1035FFB	EGH2035FFB	EGH3035FFB
40	EGH1040FFB	EGH2040FFB	EGH3040FFB
45	EGH1045FFB	EGH2045FFB	EGH3045FFB
50	EGH1050FFB	EGH2050FFB	EGH3050FFB
60	EGH1060FFB	EGH2060FFB	EGH3060FFB
70	EGH1070FFB	EGH2070FFB	EGH3070FFB
80	EGH1080FFB	EGH2080FFB	EGH3080FFB
90	EGH1090FFB	EGH2090FFB	EGH3090FFB
100	EGH1100FFB	EGH2100FFB	EGH3100FFB
110	EGH1110FFB	EGH2110FFB	EGH3110FFB
125	EGH1125FFB	EGH2125FFB	EGH3125FFB

## Load Terminals

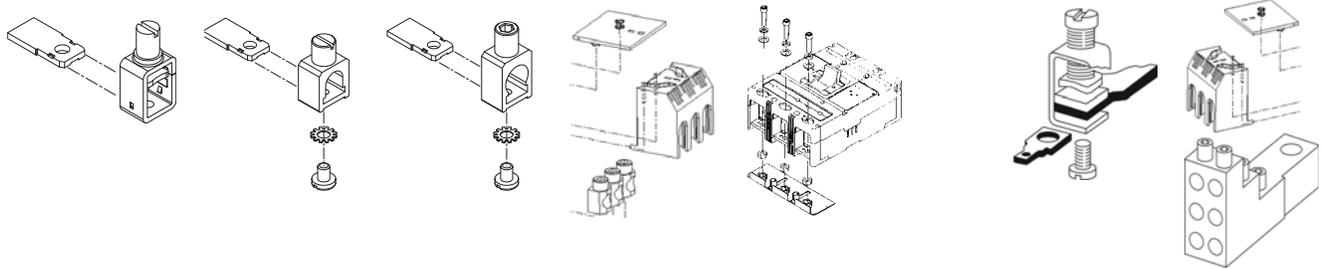
Maximum Breaker Amps	Terminal, Body Material	Wire Type	Metric Wire Range mm <sup>2</sup>	AWG Wire Range	(Package of Three Terminals) Catalog Number
<b>Standard Cu/Al Pressure Type Terminals</b>					
15–50	Aluminum	Cu/Al	2.5–50	#14–1/0	3TA125EF
60–125	Aluminum	Cu/Al	16–70	#6–3/0	3TA150EF

**Notes**

- ① For bulk pack 24, add suffix BP24 and order quantities of 24.
- ② For bulk pack 12, add suffix BP12 and order quantities of 12.
- ③ For bulk pack 8, add suffix BP8 and order quantities of 8.

Accessories Selection Guide and Ordering Information

EG-Frame



3T125EF	3TA125EF	3TA150EF	3TA160EFK	EF2RTWK, Two-Pole–Metric EF3RTWK, Three-Pole–Metric EF4RTWK, Four-Pole–Metric EF2RTDK, Two-Pole–Imperial EF3RTDK, Three-Pole–Imperial EF4RTDK, Four-Pole–Imperial	Control Wire Terminal Kit GCWTK	Multiwire Connectors
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Line and Load Terminals

Maximum Breaker Amps	Terminal Body Material	Wire Type	Metric Wire Range mm <sup>2</sup>	AWG Wire Range	(Package of Three Terminals) Catalog Number
<b>Standard Cu/Al Pressure Type Terminals</b>					
125	Steel	Al	4–6	#14-3/0	3T125EF ①
125	Steel	Cu	2.5–95	#14-3/0	3T125EF ①
125	Aluminum	Cu/Al	2.5–50	#14-1/0	3TA125EF
160	Aluminum	Cu/Al	16–70	#6-3/0	3TA150EF
160	Aluminum	Cu/Al	35–120	#3-250	3TA160EFK
160	Aluminum	Cu/Al	35–120	#3-250	4TA160EFK ②

EG-Frame circuit breakers and molded case switches have line and load terminals as standard equipment.

Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer.

**Caution:** Collar must surround conductor.

Insert collar enclosing conductor and center on extrusion. Tighten securely with screw and washer. Endcap kits are used on the E-Frame breaker line side to connect busbar or similar electrical connections. Includes hardware.

Notes

- ① Standard line and load terminals.
- ② Four-pole kit with four terminals.

**Control Wire Terminal Kit**

	Catalog Number
Control wire terminal kit	5652B38G01
Package of 12—priced individually	

For use with steel or stainless steel standard line and load terminals only.

**Interphase Barriers**

	Catalog Number
Interphase barriers	EIPBK
Package includes 2 barriers	

The interphase barrier is available for extended insulation between circuit breaker poles. Specify quantity when ordering.

**Base Mounting Hardware—DIN Rail Mounting**

	Catalog Number
DIN rail adapter—single-pole	EF1DIN
DIN rail adapter—two-pole	EGDIN
DIN rail adapter—three- or four-pole	EF34DIN
Metal DIN rail adapter—three-pole	EGGDIN

Metric base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.) If required separately, order S/N 8703C80G08.

**Note:** English mounting hardware kit can be supplied separate. Catalog number is **BMHE #6–32** x 3 inches for two-, three- and four-pole. Single-pole mounting hardware metric order **8703C80G11**. English hardware **8703C80G12**. Both sold in quantities of 100.

**Terminal Shields**

The terminal shield is available for line terminal areas in three- and four-pole circuit breakers. Special terminal shields are also available for use when an electrical (solenoid) operator is mounted on the circuit breaker. The standard style number by pole for each terminal shield is for a package of 10 and is priced per each package. Special terminal shields are packaged individually.

**Terminal Shields—IP30 Protection**

Number of Poles	Catalog Number
3	EFTS3K
4	EFTS4K

**Terminal End Covers (Gas Barrier)**

The terminal end cover is available for three-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

**Terminal End Covers**

Conductor Opening Diameter Inches (mm)	Catalog Number
6.35 (0.25)	EEC3K
10.41 (0.41)	EEC4K

**Multiwire Connectors**

Field-installed multiwire connectors for the load side (OFF) end terminals. They are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include mounting hardware, terminal shield insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

**EG-Frame Multiwire Connectors Ordering Information (Package of 3) <sup>①</sup>**

Maximum Amperes	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number
125	3	14–2	3TA125E3K
125	6	14–6	3TA125E6K

**Note**

<sup>①</sup> For four-pole kit, change “3” at beginning of catalog number to “4.”

## Accessories

### Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

### EG-Frame Accessories

Description	Reference Page	Single-Pole	Two-Pole		Three-Pole			Four-Pole			Neutral
		Center	Left	Right	Left	Center	Right	Left	Center	Right	
<b>Internal Accessories</b> (Only one internal accessory per pole)											
Alarm lockout (Make/Break)	V4-T2-216	—	—	■	—	—	■	—	—	■	—
Alarm lockout (2Make/2Break)	V4-T2-216	—	—	■	—	—	■	—	—	■	—
Auxiliary switch (1A, 1B)	V4-T2-216	—	—	■	—	—	■	—	—	■	—
Auxiliary switch (2A, 2B)	V4-T2-216	—	—	■	—	—	■	—	—	■	—
Auxiliary switch and alarm switch combination	V4-T2-216	—	—	■	—	—	■	—	—	■	—
Shunt trip—standard	V4-T2-216	—	—	—	■	—	—	■	—	—	—
Undervoltage release mechanism	V4-T2-217	—	—	—	■	—	—	■	—	—	—
<b>External Accessories</b>											
End cap kit	V4-T2-172	—	●	●	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-172	●	●	●	●	●	●	●	●	●	●
Multiwire connectors	V4-T2-172	●	●	●	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-172	●	●	●	●	●	●	●	●	●	●
Terminal shields	V4-T2-172	●	●	●	●	●	●	●	●	●	●
Terminal end covers	V4-T2-172	—	—	—	●	●	●	—	—	—	—
Interphase barriers	V4-T2-172	—	●	●	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-214	■	■	—	—	■	—	—	■	—	—
Snap-on padlockable handle lock hasp	V4-T2-214	■	■	—	—	■	—	—	■	—	—
Padlockable handle lock hasp	V4-T2-214	—	—	■	□	—	□	□	—	□	—
Walking beam interlock—requires two breakers	V4-T2-214	—	—	—	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-214	—	●	●	●	●	●	●	●	●	●
Electrical operator	V4-T2-214	—	—	—	●	●	●	—	—	—	—
Handle mechanisms	V4-T2-433	—	—	—	●	●	●	—	—	—	—
<b>Modifications (Refer to Eaton)</b>											
Moisture fungus treatment	V4-T2-212	●	●	●	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●	●	●	●
Marine/naval application, UL 489 Supplement SA and SB	—	●	●	●	●	●	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

### Technical Data and Specifications

#### UL 489/IEC 60947-2 Interrupting Capacity (Symmetrical Amperes) (kA) Ratings

Circuit Breaker Type	Number of Poles	Volts AC (50/60 Hz)										Volts DC <sup>①</sup>					
		220–240					380–415					690 <sup>②</sup>		125		250 <sup>③④</sup>	
		120	I <sub>CU</sub>	I <sub>CS</sub>	277	347	I <sub>CU</sub>	I <sub>CS</sub>	480	600Y/347	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	
EGB125	1	35	25	25	18	—	—	—	—	—	—	—	10	10	—	—	
	2, 3, 4	—	25	25	—	—	18	18	18	—	—	—	—	—	10	10	
EGE125	2, 3, 4	—	35	35	—	—	25	25	25	18	—	—	—	—	10	10	
	1	100	85	43	35	22	—	—	—	—	—	—	35	35	—	—	
EGS125	2, 3, 4	—	85	43	—	—	40	30	35	22	—	—	—	—	35	35	
	1	200	100	50	65	25	—	—	—	—	—	—	42	42	—	—	
EGH125	2, 3, 4	—	100	50	—	—	70	35	65	25	—	—	—	—	42	42	
	3, 4	—	200	200	—	—	100	100	100	25	—	—	—	—	42	42	
EGC125 <sup>⑤</sup>	3, 4	—	25	25	—	—	18	18	18	—	—	—	—	—	10	10	
EGE160 <sup>②</sup>	3, 4	—	35	35	—	—	25	25	25	18	—	—	—	—	10	10	
EGS160 <sup>②</sup>	3, 4	—	85	43	—	—	40	30	35	22	—	—	—	—	35	35	

#### UL 489 Current-Limiting Data

Frame	Circuit	I <sub>p</sub> (kA)	I <sup>2</sup> T (10 <sup>6</sup> A <sup>2</sup> S)
EGC	240 V/200 kA	24.5	0.6310
EGC	480 V/100 kA	24.5	0.6310
EGC	600 Y/35 kA	20.0	1.392

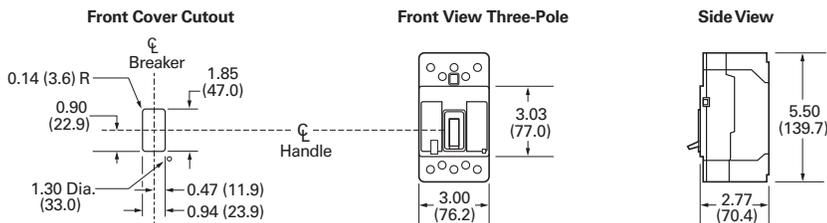
### Dimensions and Weights

Approximate Dimensions in Inches (mm)

#### EG-Frame

Number of Poles	Width	Height	Depth
1	1.00 (25.4)	5.50 (139.7)	2.99 (75.9)
2	2.00 (50.8)	5.50 (139.7)	2.99 (75.9)
3	3.00 (76.2)	5.50 (139.7)	2.99 (75.9)
4	4.00 (101.6)	5.50 (139.7)	2.99 (75.9)

#### EG-Frame



Approximate Shipping Weight in Lb (kg)

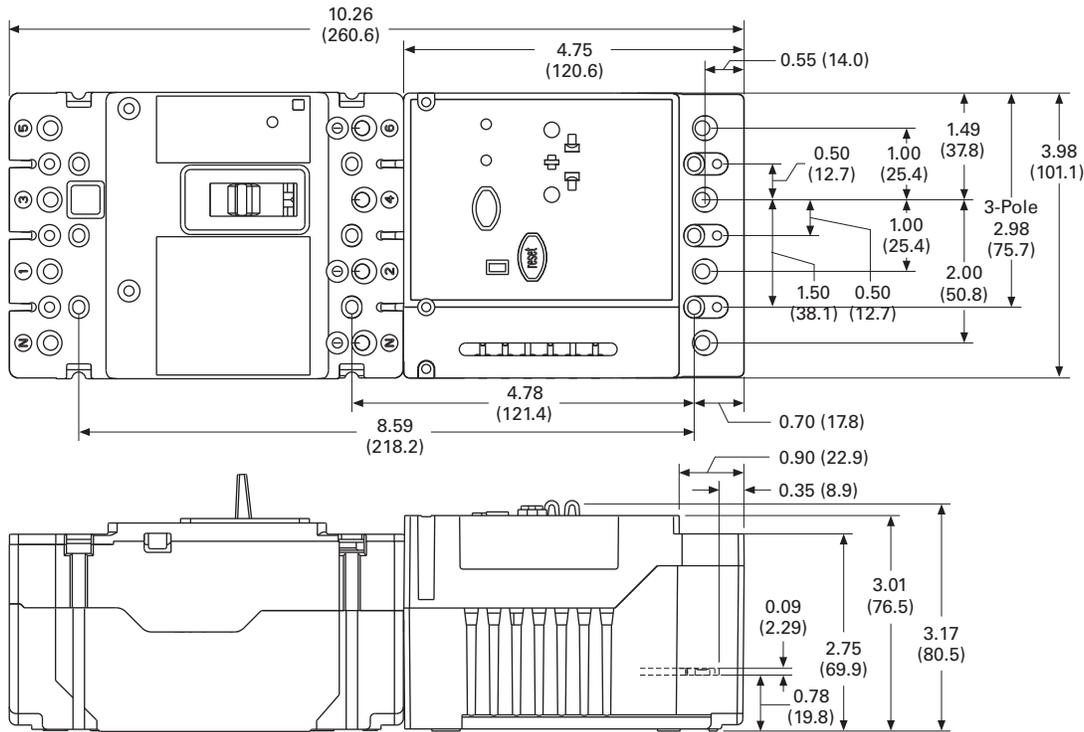
#### EG-Frame

EG Breaker Type	Number of Poles			
	1	2	3	4
EGB125	1.5 (0.68)	2.0 (0.91)	3.0 (1.36)	4.9 (1.82)

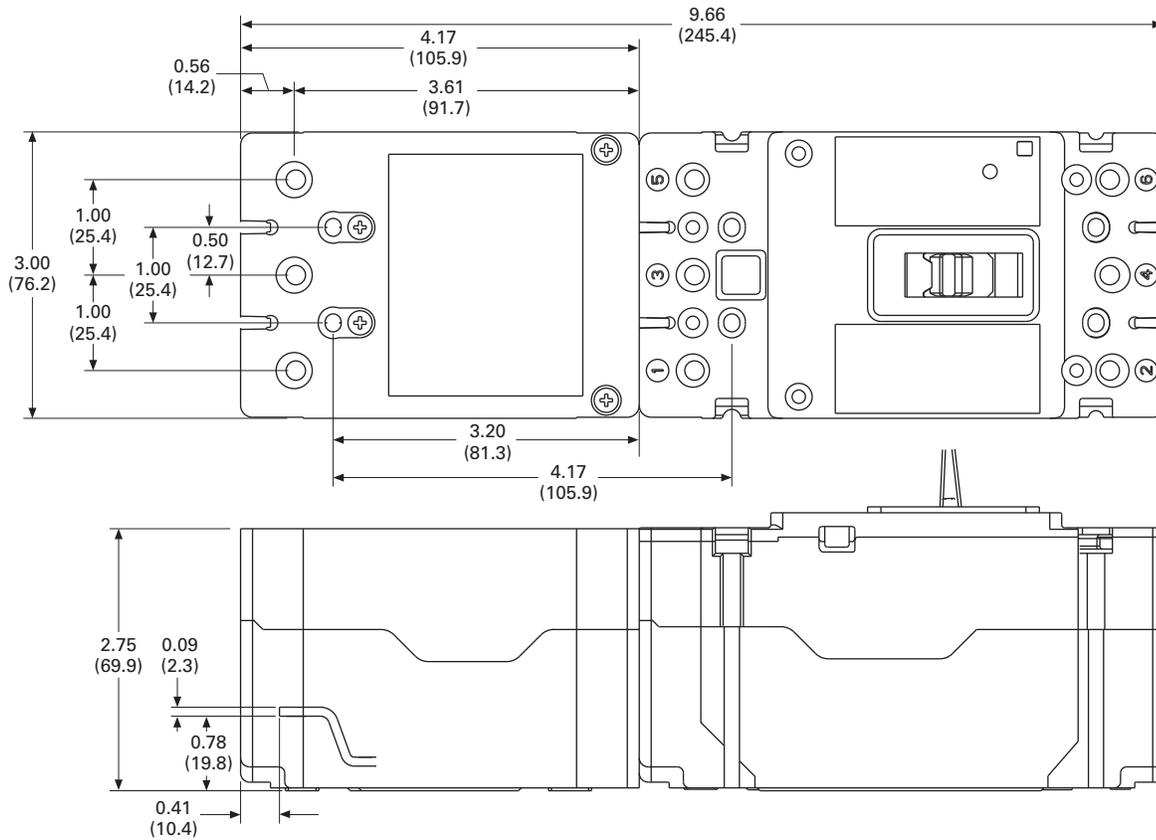
#### Notes

- ① DC ratings apply to substantially non-inductive circuits.
- ② IEC only.
- ③ Two-pole circuit breaker, or two poles of three-pole circuit breaker.
- ④ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 42 kA.
- ⑤ Current limiting per UL 489.

EG-Frame With Earth Leakage Module



EG-Frame With Current Limiter Module



#### NG-Frame (1200 Ampere)

2



#### Contents

<i><b>Description</b></i>	<i><b>Page</b></i>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-177</b>
Product Selection Guide and Ordering Information . . . . .	<b>V4-T2-178</b>
Accessories . . . . .	<b>V4-T2-181</b>
Technical Data and Specifications . . . . .	<b>V4-T2-182</b>
Dimensions and Weights . . . . .	<b>V4-T2-184</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB) . . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

#### NG-Frame (320–1200 Amperes)

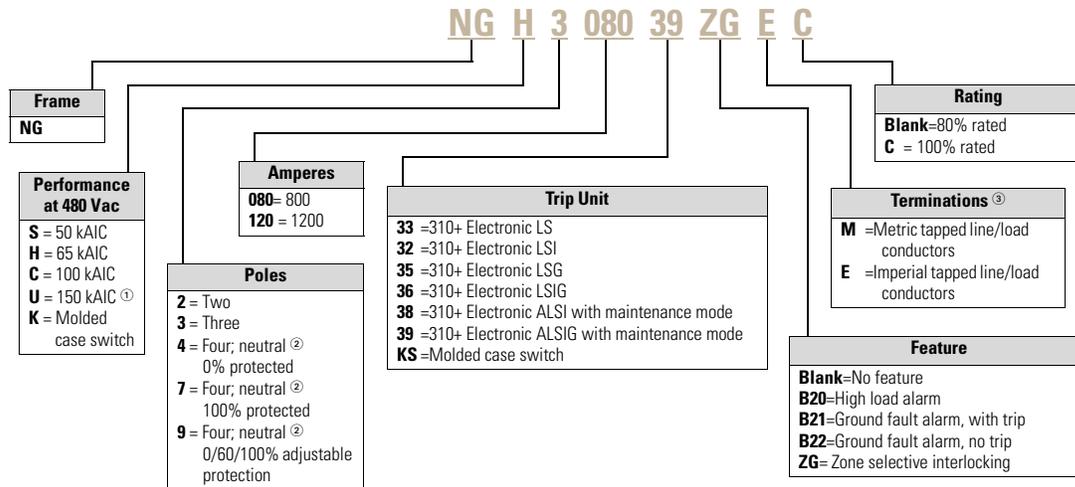
##### Product Description

- All Eaton NG-Frame circuit breakers are suitable for reverse feed use
- All NG-Frame circuit breakers are HACR rated

### Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

#### NG Circuit Breaker with 310+ Electronic Trip Unit



#### Notes

- <sup>①</sup> 800 A only.
  - <sup>②</sup> Neutral inn left pole on GN; right pole on NG.
  - <sup>③</sup> Breakers do not ship with lugs.
- Trip units are factory installable only.

## Product Selection Guide and Ordering Information

2

Type NGS Standard Interrupting Capacity— $U_g$  Max. 690 Vac, 50 kA  $I_{cu}$  at 480 Vac or 415 Vac

See 310+ adjustability specifications on Page V4-T2-183.

Maximum Continuous Ampere Rating at 40 °C <sup>①②</sup>	Number of Poles	Circuit Breaker Frame Including Digitrip Electronic Trip Unit with Imperial Tapped Conductors						Neutral CT for LSG and LSIG <sup>③</sup>
		LS	LSI	LSG	LSIG	ALSI	ALSIG	
800	2	NGS208033E	NGS208032E	NGS208035E	NGS208036E	—	—	—
	3	NGS308033E	NGS308032E	NGS308035E	NGS308036E	NGS308038E	NGS308039E	NGFCT120
	4	NGS408033E	NGS408032E	NGS408035E <sup>④</sup>	NGS408036E <sup>④</sup>	NGS408038E	NGS408039E <sup>④</sup>	—
	4 <sup>⑤</sup>	NGS708033E	NGS708032E	—	—	NGS708038E	—	—
	4 <sup>⑥</sup>	NGS908033E	NGS908032E	—	—	NGS908038E	—	—
1200 <sup>⑥</sup>	2	NGS212033E	NGS212032E	NGS212035E	NGS212036E	—	—	—
	3	NGS312033E	NGS312032E	NGS312035E	NGS312036E	NGS312038E	NGS312039E	NGFCT120
	4	NGS412033E	NGS412032E	NGS412035E <sup>④</sup>	NGS412036E <sup>④</sup>	—	NGS412039E <sup>④</sup>	—
	4 <sup>⑤</sup>	NGS712033E	NGS712032E	—	—	NGS712038E	—	—
	4 <sup>⑥</sup>	NGS912033E	NGS912032E	—	—	NGS912038E	—	—

Molded Case Switches <sup>⑦⑧⑨⑩</sup>

Amperage Rating	$U_g$ Maximum 690 Vac		Catalog Number	Four-Pole	Catalog Number
	Three-Pole				
800	MCS with Imperial tapped line and load conductors		NGK3080KSE	MCS with Imperial line and load terminals	NGK4080KSE
1200	MCS with Imperial tapped line and load conductors		NGK3120KSE	MCS with Imperial line and load terminals	NGK4120KSE
1250	MCS with Imperial tapped line and load conductors		NGK3125KSE	MCS with Imperial line and load terminals	NGK43125KSE

## Notes

- ① For AC use only.
- ② NG MCCBs are suitable for 40 °C or 50 °C applications. Order suffix V3 to eliminate standard 40 °C labeling.
- ③ Required for four-wire systems if neutral protection is desired. Sold separately.
- ④ Neutral 0% protected. NG, neutral in right pole; GN, neutral in left pole.
- ⑤ Neutral 100% protected (denoted by 7 in digit four); no neutral protection available with LSG or LSIG trip units.
- ⑥ Neutral 0%/60%/100% adjustable protection (denoted by 9 in digit four).
- ⑦ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.
- ⑧ For AC use only. Molded case switch will trip above 14,000 amperes.
- ⑨ For two-pole applications, use outer poles of three-pole molded case switch.
- ⑩ Add "M" to above catalog numbers for metric tapped line/load conductors.

**Type NGH High Interrupting Capacity— $U_e$  Max. 690 Vac, 65 kA  $I_{cu}$  at 480 Vac or 415 Vac**See 310+ adjustability specifications on **Page V4-T2-183**.

Maximum Continuous Ampere Rating at 40 °C <sup>①②</sup>	Number of Poles	Circuit Breaker Frame Including Digitrip Electronic Trip Unit						Neutral CT for LSG and LSIG <sup>③</sup>
		LS	LSI	LSG	LSIG	ALSI	ALSIG	
800	2	NGH208033E	NGH208032E	NGH208035E	NGH208036E	—	—	—
	3	NGH308033E	NGH308032E	NGH308035E	NGH308036E	NGH308038E	NGH308039E	NGFCT120
	4	NGH408033E	NGH408032E	NGH408035E <sup>④</sup>	NGH408036E <sup>④</sup>	NGH408038E	NGH408039E <sup>④</sup>	—
	4 <sup>⑤</sup>	NGH708033E	NGH708032E	—	—	NGH708038E	—	—
	4 <sup>⑥</sup>	NGH908033E	NGH908032E	—	—	NGH908038E	—	—
1200	2	NGH212033E	NGH212032E	NGH212035E	NGH212036E	—	—	—
	3	NGH312033E	NGH312032E	NGH312035E	NGH312036E	NGH312038E	NGH312039E	NGFCT120
	4	NGH412033E	NGH412032E	NGH412035E <sup>④</sup>	NGH412036E <sup>④</sup>	—	NGH412039E <sup>④</sup>	—
	4 <sup>⑤</sup>	NGH712033E	NGH712032E	—	—	NGH712038E	—	—
	4 <sup>⑥</sup>	NGH912033E	NGH912032E	—	—	NGH912038E	—	—

**Type NGC Very High Capacity— $U_e$  Max. 690 Vac, 100 kA  $I_{cu}$  at 480 Vac or 415 Vac**See 310+ adjustability specifications on **Page V4-T2-183**.

Maximum Continuous Ampere Rating at 40 °C <sup>①②</sup>	Number of Poles	Circuit Breaker Frame Including Digitrip Electronic Trip Unit						Neutral CT for LSG and LSIG <sup>③</sup>
		LS	LSI	LSG	LSIG	ALSI	ALSIG	
800	2	NGC208033E	NGC208032E	NGC208035E	NGC208036E	—	—	—
	3	NGC308033E	NGC308032E	NGC308035E	NGC308036E	NGC308038E	NGC308039E	NGFCT120
	4	NGC408033E	NGC408032E	NGC408035E <sup>④</sup>	NGC408036E <sup>④</sup>	NGC408038E	NGC408039E <sup>④</sup>	—
	4 <sup>⑤</sup>	NGC708033E	NGC708032E	—	—	NGC708038E	—	—
	4 <sup>⑥</sup>	NGC908033E	NGC908032E	—	—	NGC908038E	—	—
1200	2	NGC212033E	NGC212032E	NGC212035E	NGC212036E	—	—	—
	3	NGC312033E	NGC312032E	NGC312035E	NGC312036E	NGC312038E	NGC312039E	NGFCT120
	4	NGC412033E	NGC412032E	NGC412035E <sup>④</sup>	NGC412036E <sup>④</sup>	—	NGC412039E <sup>④</sup>	—
	4 <sup>⑤</sup>	NGC712033E	NGC712032E	—	—	NGC712038E	—	—
	4 <sup>⑥</sup>	NGC912033E	NGC912032E	—	—	NGC912038E	—	—

**Type NGU Ultra High Capacity— $U_e$  Max. 600 Vac, 150 kA at 480 Vac**See 310+ adjustability specifications on **Page V4-T2-183**.

Maximum Continuous Ampere Rating at 40 °C <sup>①②</sup>	Number of Poles	Circuit Breaker Frame Including Digitrip Electronic Trip Unit						Neutral CT for LSG and LSIG <sup>③</sup>
		LS	LSI	LSG	LSIG	ALSI	ALSIG	
800	3	NGU308033E	NGU308032E	NGU308035E	NGU308036E	NGU308038E	NGU308039E	NGFCT120

**Notes**

- ① For AC use only.
- ② NG MCCBs are suitable for 40 °C or 50 °C applications. Order suffix V3 to eliminate standard 40 °C labeling.
- ③ Required for four-wire systems if neutral protection is desired. Sold separately.
- ④ Neutral 0% protected. NG, neutral in right pole; GN, neutral in left pole.
- ⑤ Neutral 100% protected (denoted by 7 in digit four); no neutral protection available with LSG or LSIG trip units.
- ⑥ Neutral 0%/60%/100% adjustable protection (denoted by 9 in digit four).

## Accessories Selection Guide and Ordering Information

2

### Line and Load Terminals

N-Frame circuit breakers do not include terminals as standard. When copper or Cu/Al terminals are required, order by catalog number.

### Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire (Number of Conductors)	AWG Wire Catalog Number <sup>①</sup>	Metric Wire Range mm <sup>2</sup>	Metric Catalog Number <sup>①</sup>
<b>Standard Cu/Al Pressure Terminals</b>						
700	Aluminum	Cu/Al	1–500 (2)	<b>TA700NB1</b>	50–240	<b>TA700NB1M</b>
1000	Aluminum	Cu/Al	3/0–400 (3)	<b>TA1000NB1</b>	95–185	<b>TA1000NB1M</b>
1200	Aluminum	Cu/Al	4/0–500 (4)	<b>TA1200NB1</b>	120–240	<b>TA1200NB1M</b>
1200	Aluminum	Cu/Al	500–750 (3)	<b>TA1201NB1</b>	300–400	<b>TA1201NB1M</b>
<b>Optional Copper and Cu/Al Pressure Type Terminals</b>						
700	Copper	Cu	2/0–500 (2)	<b>T700NB1</b>	70–240	<b>T700NB1M</b>
1000	Copper	Cu	3/0–500 (3)	<b>T1000NB1</b>	95–240	<b>T1000NB1M</b>
1200	Copper	Cu	3/0–400 (4)	<b>T1200NB3</b>	95–185	<b>T1200NB3M</b>

### 310+ Electronic Trip Unit Accessories

Description	Catalog Number
Electronic portable test kit	<b>MTST230V</b>
Trip unit tamper protection wire seal	<b>5108A03H01</b>
External neutral sensor (1200 A) <sup>②</sup>	<b>NGFCT120</b>
External neutral sensor (800 A) <sup>②</sup>	<b>NGFCT080</b>
Breaker-mount cause-of-trip indication	<b>TRIP-LED</b>
Breaker-mount ammeter module	<b>DIGIVIEW</b>
Remote-mount ammeter module	<b>DIGIEWR06</b>

### Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch.

### Base Mounting Hardware <sup>③</sup>

Number of Poles	Description	Catalog Number
Three- and four-pole	Imperial hardware: 0.3125–18 x 1.25 pan-head steel screws and lock washers	<b>BMH5</b>
Three- and four-pole	Metric hardware: M8 pan-head steel screws and lock washers	<b>BMH5M</b>

### Terminal Shield

### Terminal Shield

Description	Catalog Number
Three-pole terminal shield	<b>NTS3K</b>

### Conductor Extension Kit

### Conductor Extension Kit <sup>④</sup>

Description	Catalog Number
Three-pole both ends Metric	<b>5104A24G04</b>
Three-pole both ends English	<b>5104A24G02</b>

### Keeper Nut

Not required on NG-Frame. Terminals are threaded.

### Handle Extension

Included with breaker. Additional handle extensions are available.

### Handle Extension

Description	Catalog Number
Single handle extension	<b>HEX5</b>

### Interphase Barriers

The interphase barriers provide additional electrical clearance between circuit breaker poles for special termination applications. Barriers are high dielectric insulating plates that are installed in the molded slots between the terminals. (Field installation only.)

### Interphase Barriers

Description	Catalog Number
Interphase barriers <sup>④</sup>	<b>IPB5</b>

### Notes

- <sup>①</sup> Single terminals individually packed.
- <sup>②</sup> Required for four-wire systems if neutral protection is desired. Sold separately.
- <sup>③</sup> Metric hardware included with breaker.
- <sup>④</sup> Included as standard on 100% rated 1200 A breakers only.

## Accessories

### Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

### NG-Frame Accessories

Description	Reference Page	Three-Pole			Four-Pole			Neu.
		Left	Center	Right	Left	Center	Right	
<b>Internal Accessories (Only One Internal Accessory Per Pole)</b>								
Alarm lockout (Make/Break)	V4-T2-216	●	—	■	●	—	■	—
Auxiliary switch (1A, 1B)	V4-T2-216	●	—	■	●	—	■	—
Auxiliary switch (2A, 2B)	V4-T2-216	●	—	■	●	—	■	—
Auxiliary switch and alarm switch combination	V4-T2-216	●	—	■	●	—	■	—
Shunt trip—standard	V4-T2-216	■	—	—	■	—	—	—
Undervoltage release mechanism	V4-T2-217	■	—	—	■	—	—	—
<b>External Accessories</b>								
Base mounting hardware	V4-T2-180	●	●	●	●	●	●	●
Interphase barriers	V4-T2-180	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-214	—	■	—	—	■	—	—
Padlockable handle lock hasp	V4-T2-214	□	—	□	□	—	□	—
Key interlock kit	V4-T2-214	□	—	□	□	—	□	—
Sliding bar interlock—requires two breakers	V4-T2-214	●	●	●	—	—	—	—
Electrical operator	V4-T2-214	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-221	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-214	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-433	●	●	●	●	●	●	●
Drawout cassette	V4-T2-222	●	●	●	●	●	●	●
Handle extension	V4-T2-180	●	●	●	●	●	●	●
Ammeter/cause of trip display	V4-T2-213	●	●	●	●	●	●	●
Cause of trip LED module	V4-T2-213	●	●	●	●	●	●	●
Digitrip 310+ test kit	V4-T2-213	●	●	●	●	●	●	●
<b>Modifications (Refer to Eaton)</b>								
Moisture fungus treatment	V4-T2-212	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●
Marine/Naval application, UL 489 Supplement SA and SB	①	●	●	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

#### Note

- ① Contact Eaton.

## Technical Data and Specifications

## 2

### Interrupting Capacity Ratings

#### UL 489/IEC 60947-2 Interrupting Capacity Ratings <sup>①</sup>

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)									
		Volts AC (50/60 Hz)									
		240 (UL)	220–240		380–415		480	600	690		
		I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>		
NGS <sup>①</sup>	2, 3, 4	65	85	85	50	50	50	25	20	10	
NGH	2, 3, 4	100	100	100	70	50	65	35	25	13	
NGC	2, 3, 4	200	200	100	100	50	100	65	35	18	
NGU	3, 4	200	—	—	—	—	150	65	—	—	

### NG-Frame Digitrip Specifications

#### NG 310+ Specifications

Description	Specification
Trip Unit Type	Digitrip RMS 310+
<b>Breaker Type</b>	
Frame designation	NG
Frames available	800 A, 1200 A
Continuous current range (A)	320–1200 A
Ground fault pickup (A)	160–1200 A
Interrupting capacities at 480 Vac (kAIC)	35, 65, 100, 150
100% rated	Yes
<b>Protection</b>	
Ordering options	LS, LSI, LSG, LSIG, ALSI, ALSIG
Arcflash reduction maintenance system (or maintenance mode)	Yes
Interchangeable trip unit	No
High load alarm (suffix B20) <sup>②</sup>	Yes
Ground fault alarm with trip (suffix B21) <sup>②</sup>	Yes
Ground fault alarm, no trip (suffix B22) <sup>②</sup>	Yes
Zone selective interlocking (suffix ZG)	LSI, LSIG, ALSI, ALSIG
Cause of trip indication	Yes
Thru-cover accessories	No

#### Notes

<sup>①</sup> 1600 amperes is not a UL or CSA listed rating. 1200 amperes is the maximum UL and CSA rating for NG.

<sup>②</sup> B2x suffixes cannot be combined with B2x suffixes.

## NG 310+ Adjustability Specifications

310+ Settings	NG Frame		
	800 A	1200 A	
$I_r$ = continuous current or long delay pickup (amperes) (All 310+)	$I_r$		
	A	320	500
	B	400	600
	C	450	630
	D	500	700
	E	600	800
	F	630	900
	G	700	1000
	H (= $I_n$ )	800	1200
$t_r$ = long delay time (seconds) (All 310+)	Position 1	2	2
	Position 2	4	4
	Position 3	6	7
	Position 4	8	10
	Position 5	10	12
	Position 6	12	15
	Position 7	14	20
	Position 8	14	24
	$I_{sd}$ (x $I_r$ ) = short delay pickup (All 310+)	Position 1	2x
Position 2		3x	3x
Position 3		4x	4x
Position 4		5x	5x
Position 5		6x	6x
Position 6		7x	7x
Position 7		8x	8x
Position 8		9x	9x
Position 9		9x	9x
$t_{sd}$ = short delay time $I^2t$ (milliseconds) (LS, LSG)	Fixed	67 at10x	67 at10x
$t_{sd}$ = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG) ①	Position 1	Inst	Inst
	Position 2	120	120
	Position 3	300	300
$I_g$ = ground fault pickup (amperes) (LSG, LSIG, ALSIG)	Position 1	160	240
	Position 2	240	360
	Position 3	320	480
	Position 4	480	720
	Position 5	640	960
	Position 6	800	1200
$t_g$ = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG)	Position 1	Inst	Inst
	Position 2	120	120
	Position 3	300	300
Independently Adjustable Instantaneous ( $I_i$ ) setting (ALSI, ALSIG)	Yes	2.5x, 4x, 6x, 7x, 8x, 10x, 18x	2.5x, 4x, 6x, 7x, 8x, 10x, 12x
Maintenance Mode (remote) pickup (2.5 x $I_n$ ) (ALSI, ALSIG) ②	Fixed	2.5x	2.5x

**Notes**

- ① 50 ms for ALSI and ALSIG trip units.  
 ② Maintenance Mode is enabled remotely using a 24 Vdc circuit.

# 2.3

## Molded Case Circuit Breakers

### Series G

#### Dimensions and Weights

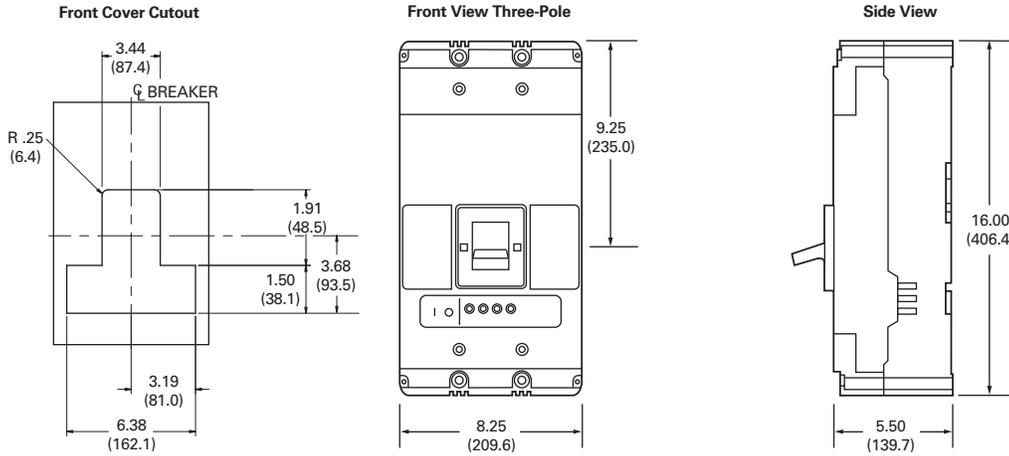
Approximate Dimensions in Inches (mm)

2

#### NG-Frame

Number of Poles	Width	Height	Depth
3	8.25 (209.6)	16.00 (406.4)	5.50 (139.7)
4	11.13 (282.6)	16.00 (406.4)	5.50 (139.7)

#### NG-Frame



Approximate Shipping Weight in Lb (kg)

#### NG-Frame

Breaker Type	Complete Breaker	
	Three-Pole	Four-Pole
NGS, NGH, NGC	45 (20.4)	58 (26.3)

**RG-Frame (800–2500 Amperes)****RG-Frame (800–2500 Amperes)****Product Description**

- Eaton's RG-Frame circuit breakers are available as frame (which includes trip unit), rating plug and terminals
- All R-Frame circuit breakers are suitable for reverse feed use

**Contents****Description**

	<b>Page</b>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-186</b>
Product Selection . . . . .	<b>V4-T2-187</b>
Accessories . . . . .	<b>V4-T2-190</b>
Technical Data and Specifications . . . . .	<b>V4-T2-191</b>
Dimensions and Weights . . . . .	<b>V4-T2-193</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB) . . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for	
Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

# 2.3

## Molded Case Circuit Breakers

### Series G

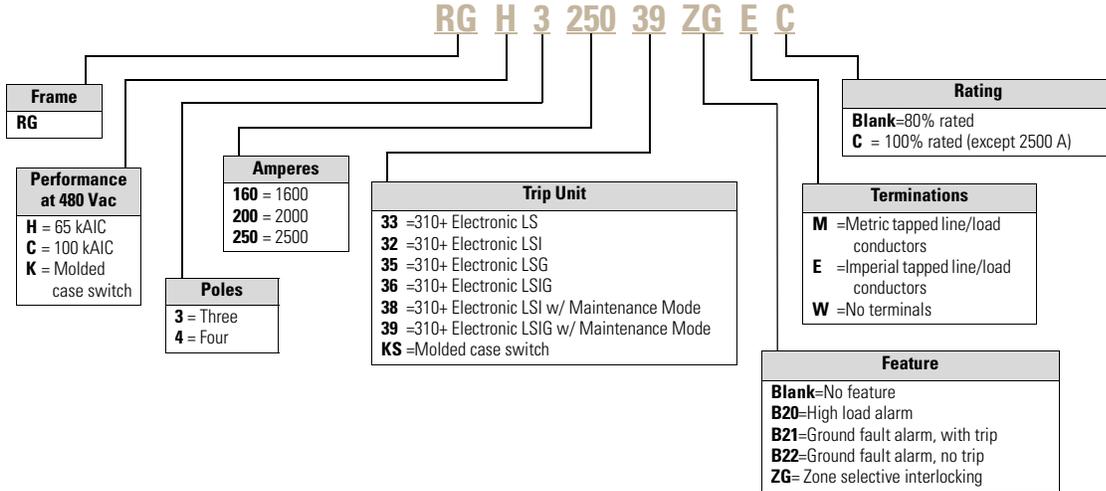
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#### Catalog Number Selection

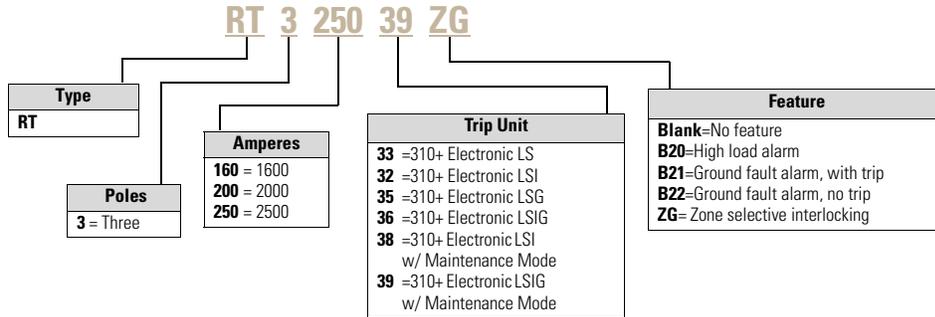
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

70 kA at 415 Vac and 65 kA at 480 Vac

#### RG Circuit Breaker With 310+ Electronic Trip Unit



#### RG 310+ Electronic Trip Unit



**Product Selection****70 kA at 415 Vac and 65 kA at 480 Vac****Type RGH with Digitrip 310+ High Interrupting Capacity— $U_e$  Maximum 690 Vac, 70 kA  $I_{cu}$  at 415 Vac**See 310+ adjustability specifications on **Page V4-T2-192**.

Maximum Continuous Ampere Rating at 40 °C <sup>①</sup>	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number <sup>②</sup>						Neutral CT for LSG and LSIG <sup>④</sup>
		LS	LSI	LSG <sup>③</sup>	LSIG <sup>③</sup>	ALSI	ALSIG	
1600 <sup>①</sup>	3	RGH316033E	RGH316032E	RGH316035E	RGH316036E	RGH316038E	RGH316039E	RGFCT160A
2000	3	RGH320033E	RGH320032E	RGH320035E	RGH320036E	RGH320038E	RGH320039E	RGFCT200A
2500	3	RGH325033E	RGH325032E	RGH325035E	RGH325036E	RGH325038E	RGH325039E	RGFCT250A

**100 kA at Both 415 Vac and 480 Vac****Type RGH with Digitrip 310+ High Interrupting Capacity— $U_e$  Maximum 690 Vac, 70 kA  $I_{cu}$  at 415 Vac**See 310+ adjustability specifications on **Page V4-T2-192**.

Maximum Continuous Ampere Rating at 40 °C <sup>①</sup>	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number <sup>②</sup>					
		LS	LSI	LSG <sup>③⑤</sup>	LSIG <sup>③⑤</sup>	ALSI	ALSIG <sup>③⑤</sup>
1600 <sup>①</sup>	4 <sup>⑥</sup>	RGH416033E	RGH416032E	—	—	RGH416038E	—
2000	4 <sup>⑥</sup>	RGH420033E	RGH420032E	—	—	RGH420038E	—
2500	4 <sup>⑥</sup>	RGH425033E	RGH425032E	—	—	RGH425038E	—

**Notes**<sup>①</sup> For SCR application, use 2000 ampere frame.<sup>②</sup> Order terminals separately. Mounting hardware not included.<sup>③</sup> Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, for example, "RGH316035RW."<sup>④</sup> Required for four-wire systems if neutral protection is desired. Sold separately.<sup>⑤</sup> No neutral protection available on four-pole breakers with LSG or LSIG trip units.<sup>⑥</sup> Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, for example, "RGH416033PW," "RGH416033EW."

RG MCCBs have English threading on line and load conductors. Use suffix "M" for metric threading.

# 2.3

## Molded Case Circuit Breakers

### Series G

#### 100 kA at Both 415 Vac and 480 Vac

2

#### Type RGC with Digitrip 310+ Very High Interrupting Capacity— $U_e$ Maximum 690 Vac, 100 kA $I_{cu}$ at 415 Vac

See 310+ adjustability specifications on [Page V4-T2-192](#).

Maximum Continuous Ampere Rating at 40 °C ①	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number ②						Neutral CT for LSG and LSIG ④
		LS	LSI	LSG ③	LSIG ③	ALSI	ALSIG	
1600 ①	3	RGC316033E	RGC316032E	RGC316035E	RGC316036E	RGC316038E	RGC316039E	RGFCT160A
2000	3	RGC320033E	RGC320032E	RGC320035E	RGC320036E	RGC320038E	RGC320039E	RGFCT200A
2500	3	RGC325033E	RGC325032E	RGC325035E	RGC325036E	RGC325038E	RGC325039E	RGFCT250A

#### Type RGC with Digitrip 310+ Very High Interrupting Capacity— $U_e$ Maximum 690 Vac, 100 kA $I_{cu}$ at 415 Vac, continued

See 310+ adjustability specifications on [Page V4-T2-192](#).

Maximum Continuous Ampere Rating at 40 °C ①	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number ②					
		LS	LSI	LSG ③⑤	LSIG ③⑤	ALSI	ALSIG ③⑤
1600 ①	4 ⑥	RGC416033E	RGC416032E	—	—	RGC416038E	—
2000	4 ⑥	RGC420033E	RGC420032E	—	—	RGC420038E	—
2500	4 ⑥	RGC425033E	RGC425032E	—	—	RGC425038E	—

#### Molded Case Switches ⑦

Ampere Rating	Number of Poles	Catalog Number
1600	3	RGK3160KSE
2000	3	RGK3200KSE
1600	4	RGK4160KSE
2000	4	RGK4200KSE

#### Notes

- ① For SCR application, use 2000 ampere frame.
- ② Order terminals separately. Mounting hardware not included.
- ③ Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, for example, "RGH316035RW."
- ④ Required for four-wire systems if neutral protection is desired. Sold separately.
- ⑤ No neutral protection available on four-pole breakers with LSG or LSIG trip units.
- ⑥ Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, for example, "RGH416033PW," "RGH416033EW."
- ⑦ Molded case switch will trip above 17,500 amperes.

RG MCCBs have English threading on line and load conductors. Use suffix "M" for metric threading.

**Accessories Selection Guide and Ordering Information**

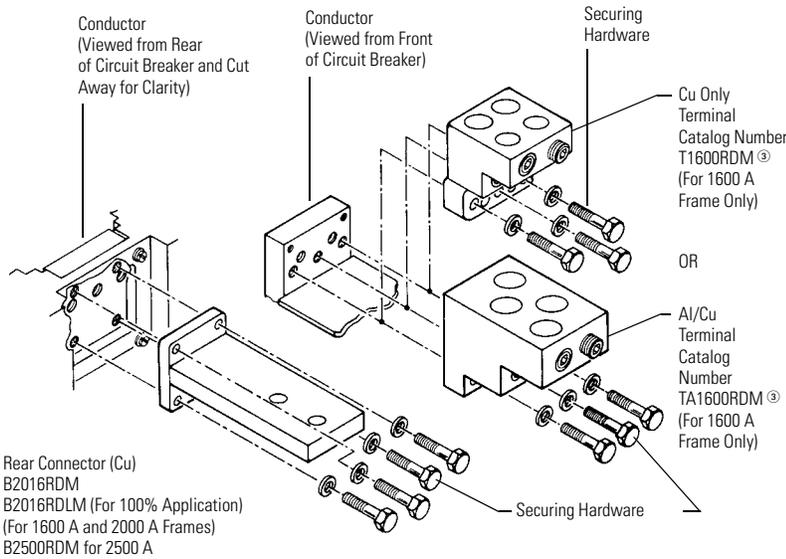
**Line and Load Terminals**

R-Frame circuit breakers use Cu/Al terminals as standard and copper only terminals as an option. Specify if factory installation is required. Must have terminals for 100% rated and or freeze testing requirements.

**Line and Load Terminals**

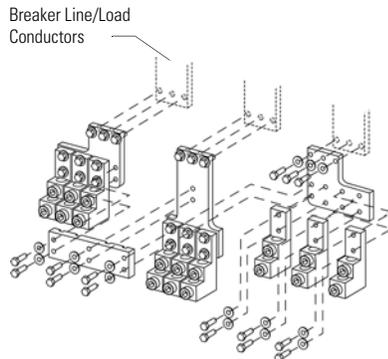
Maximum Breaker Amperes	Terminal Body Material	Wire Type	Hardware	AWG/kcmil Wire Range/ Number of Conductors	Metric Wire Range mm <sup>2</sup>	Catalog Number
<b>Wire Terminals</b>						
1600	Aluminum	Cu/Al	Metric	500–1000 (4)	300–500	TA1600RDM ①
1600	Copper	Cu	Metric	1–600 (4)	50–300	T1600RDM ①
2000	Aluminum	Cu/Al	Metric	2–600 (6)	35–300	TA2000RDM ②
<b>Rear Connectors</b>						
2000	Copper	—	Metric	—	—	B2016RDM ①
2000	Copper	—	Metric	—	—	B2016RDLM ①
2500	Copper	—	Metric	—	—	B2500RDM ①

**RG Rear Connector Exploded View**



**TA2000RD Wire Terminal**

**Note:** Order one TA2000RDM kit per three poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of three-pole breaker.



**Base Mounting Hardware**

Supplied by customer.

**Handle Extension**

Included with breaker. Additional handle extensions are available.

**Handle Extension**

Description	Catalog Number
Single handle extension	HEX6

**Wire Seal**

The wire seal can be used to secure the cover on the trip unit to prevent adjustments after settings are confirmed.

**Wire Seal**

Description	Catalog Number
Wire seal	5108A03H01

**Notes**

- ① Order one per pole—single terminals individually packed.
- ② Order one TA2000RD kit per three poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of three-pole breaker.
- ③ For use with 2500 A Frame. Do not order separately unless for replacement purposes. Included in breaker carton when 2500 A frame is ordered.

RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

## Accessories

2

### Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

### RG-Frame Accessories

Description	Reference Page	Three-Pole			Four-Pole			Neutral
		Left	Center	Right	Left	Center	Right	
<b>Internal Accessories (Only One Internal Accessory Per Pole)</b>								
Alarm lockout (Make/Break)	V4-T2-216	—	—	■	—	—	■	—
Auxiliary switch (1A, 1B)	V4-T2-216	—	—	■	—	—	■	—
Auxiliary switch (2A, 2B)	V4-T2-216	—	—	■	—	—	■	—
Auxiliary switch and alarm switch combination	V4-T2-216	—	—	■	—	—	■	—
Shunt trip—standard	V4-T2-216	—	—	●	—	—	●	—
Undervoltage release mechanism	V4-T2-217	—	—	●	—	—	●	—
<b>External Accessories</b>								
Base mounting hardware	V4-T2-189	●	●	●	●	●	●	●
Padlockable handle lock hasp	V4-T2-214	□	—	□	□	—	□	—
Key interlock kit	V4-T2-214	□	—	□	□	—	□	—
Electrical operator	V4-T2-214	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-433	●	●	●	●	●	●	●
Handle extension	V4-T2-189	●	●	●	●	●	●	●
Digitrip 310+ test kit	V4-T2-213	●	●	●	●	●	●	●
<b>Modifications (Refer to Eaton)</b>								
Moisture fungus treatment	V4-T2-212	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●
Marine/naval application, UL 489 Supplement SA and SB	①	●	●	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

### 310+ Electronic Trip Unit Accessories

Description	Catalog Number
Electronic portable test kit	MTST230V
Trip unit tamper protection wire seal	5108A03H01
External neutral sensor (2500 A) ②	RGFCT250A
External neutral sensor (2000 A) ②	RGFCT200A
External neutral sensor (1600 A) ②	RGFCT160A
Breaker-mount cause-of-trip indication ③	—
Breaker-mount ammeter module	DIGIVIEW
Remote-mount ammeter module	DIGIVIEWR06

#### Notes

- ① Contact Eaton.
- ② Required for four-wire systems if neutral protection is desired. Sold separately.
- ③ Cause-of-trip indication LEDs integrated in RG 310+ trip units.

## Technical Data and Specifications

### UL 489/CSA Interrupting Capacity Ratings <sup>①</sup>

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts AC (50/60 Hz)			
		240	277	480	600
RGH	3, 4	125	—	65	50
RGC	3, 4	200	—	100	65

### IEC 947-2 Interrupting Capacity Ratings <sup>①</sup>

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)		
		Volts AC (50/60 Hz)		
		240	415	690
RGH	3, 4			
$I_{cu}$		135	70	25
$I_{cs}$		100	50	13
RGC	3, 4			
$I_{cu}$		200	100	35
$I_{cs}$		100	50	18

### RG 310+ Specifications

Description	Specification
Trip Unit Type	Digitrip RMS 310+
<b>Breaker Type</b>	
Frame designation	RG
Frames available	1600 A, 2000 A, 2500 A
Continuous current range (A)	800–2500 A
Ground fault pickup (A)	200–1200 A
Interrupting capacities at 480 Vac (kAIC)	65, 100
100% rated	Yes
<b>Protection</b>	
Ordering options	LS, LSI, LSG, LSIG, ALSI, ALSIG
Arcflash reduction maintenance system (or maintenance mode)	Yes
Interchangeable trip unit	Yes
High load alarm (suffix B20) <sup>②</sup>	Yes
Ground fault alarm with trip (suffix B21) <sup>②</sup>	Yes
Ground fault alarm, no trip (suffix B22) <sup>②</sup>	Yes
Zone selective interlocking (suffix ZG)	LSI, LSIG, ALSI, ALSIG
Cause of trip indication	Yes
Thru-cover accessories	No

#### Notes

<sup>①</sup> Utilization Category A circuit breakers.

<sup>②</sup> B2x suffixes cannot be combined with B2x suffixes.

See **Page V4-T2-185** for trip unit specifications.

# 2.3

## Molded Case Circuit Breakers

### Series G

#### RG 310+ Adjustability Specifications

2

310+ Settings		RG Frame		
		1600 A	2000 A	2500 A
$I_r$ = continuous current or long delay pickup (amperes) (All 310+)	$I_r$			
	A	800	1000	1600
	B	900	1200	1700
	C	1000	1400	1800
	D	1100	1600	2000
	E	1200	1700	2100
	F	1400	1800	2200
	G	1500	1900	2400
	H (= $I_n$ )	1600	2000	2500
$t_r$ = long delay time (seconds) (All 310+)	Position 1	2	2	2
	Position 2	4	4	4
	Position 3	7	7	7
	Position 4	10	10	10
	Position 5	12	12	12
	Position 6	15	15	15
	Position 7	20	20	20
	Position 8	24	24	24
$I_{sd}$ (x $I_r$ ) = short delay pickup (All 310+)	Position 1	2x	2x	2x
	Position 2	3x	3x	2x
	Position 3	4x	4x	2x
	Position 4	5x	5x	3x
	Position 5	6x	6x	4x
	Position 6	7x	7x	5x
	Position 7	8x	8x	6x
	Position 8	8x	8x	6x
	Position 9	9x	9x	6x
$t_{sd}$ = short delay time $I^2t$ (milliseconds) (LS, LSG)	Fixed	67 at 10x	67 at 10x	67 at 10x
$t_{sd}$ = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG) ①	Position 1	Inst	Inst	Inst
	Position 2	120	120	120
	Position 3	300	300	300
$I_g$ = ground fault pickup (amperes) (LSG, LSIG, ALSIG)	Position 1	200	200	200
	Position 2	400	400	400
	Position 3	600	600	600
	Position 4	800	800	800
	Position 5	1000	1000	1000
	Position 6	1200	1200	1200
$t_g$ = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG)	Position 1	Inst	Inst	Inst
	Position 2	120	120	120
	Position 3	300	300	300
Independently Adjustable Instantaneous ( $I_i$ ) setting (ALSI, ALSIG)	Yes	2.5x, 4x, 6x, 7x, 8x, 11x	2.5x, 4x, 6x, 7x, 8x, 9x	2.5x, 4x, 6x, 7x
Maintenance Mode (remote) pickup ( $2.5 \times I_n$ ) (ALSI, ALSIG) ②	Fixed	2.5x	2.5x	2.5x

#### Notes

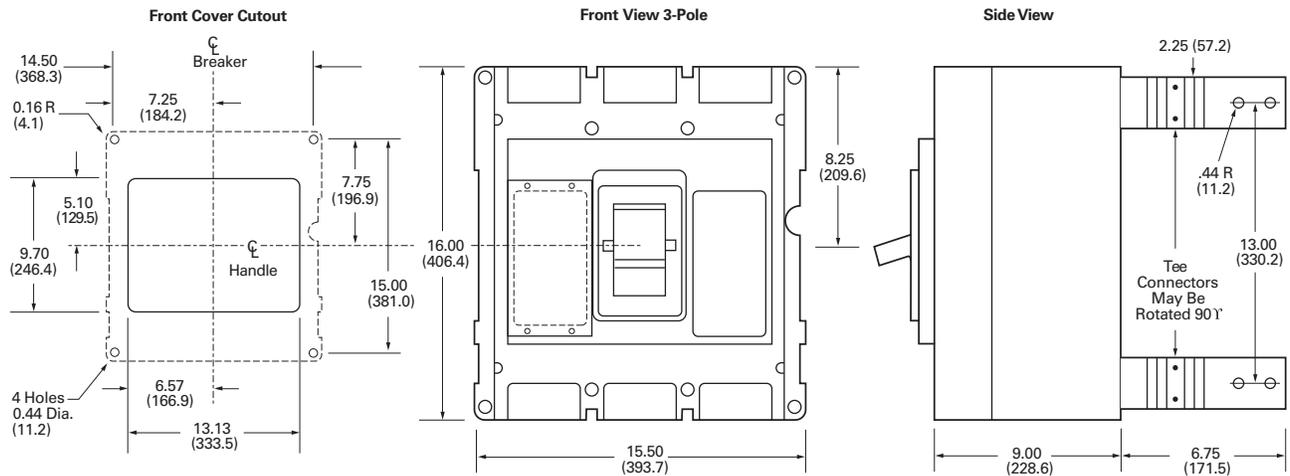
- ① 50 ms for ALSI and ALSIG trip units.
- ② Maintenance Mode is enabled remotely using a 24 Vdc circuit.

**Dimensions and Weights**

Approximate Dimensions in Inches (mm)

**RG-Frame**

Number of Poles	Width	Height	Depth
3	15.50 (393.7)	16.00 (406.4)	9.75 (247.7)
4	20.00 (508.0)	16.00 (406.4)	9.75 (247.7)



Approximate Shipping Weight in Lb (kg)

**RG-Frame**

Breaker Type	Complete Breaker Number of Poles	
	Three-Pole	Four-Pole
<b>1600 Amperes</b>		
RGH, RGC	102 (46.3)	135 (61.2)
<b>2000 Amperes</b>		
RGH, RGC	102 (46.3)	135 (61.2)
<b>2500 Amperes</b>		
RGH, RGC	135 (61.2)	182 (82.6)

Motor Circuit 480 Vac, Protectors

2



### Contents

<i>Description</i>	<i>Page</i>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) Product Selection Guide and Ordering Information . . . . .	<b>V4-T2-195</b>
Motor Protector Circuit Breakers (MPCB) . . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

### Motor Circuit Protectors (MCP)

## Product Selection Guide and Ordering Information

EG-Frame—480 Vac, 600Y/347 Vac Maximum <sup>①</sup>

Continuous Amperes	Cam Setting	Motor Full Load Current Amperes <sup>②</sup>	MCP Trip Setting <sup>③</sup>	MCP Catalog Number
3	A	0.69–0.91	9	HMCPE003A0C
	B	1.1–1.3	15	
	C	1.6–1.7	21	
	D	2.0–2.2	27	
	E	2.3–2.5	30	
	F	2.6–2.8	33	
7	A	1.5–2.0	21	HMCPE007C0C
	B	2.6–3.1	35	
	C	3.7–3.9	49	
	D	4.8–5.2	63	
	E	5.3–5.7	70	
	F	5.8–6.1	77	
15	A	3.4–4.5	45	HMCPE015E0C
	B	5.7–6.8	75	
	C	8.0–9.1	105	
	D	10.4–11.4	135	
	E	11.5–12.6	150	
	F	12.7–13.0	165	
30	A	3.9–9.1	90	HMCPE030H1C
	B	11.5–13.7	150	
	C	16.1–18.3	210	
	D	20.7–22.9	270	
	E	23.0–25.2	300	
	F	25.3–26.1	330	

**Notes**

- <sup>①</sup> UL listed for use with Eaton Motor Starters.
- <sup>②</sup> Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- <sup>③</sup> For DC applications, actual trip levels are approximately 40% higher than values shown.

EG-Frame—480 Vac, 600Y/347 Vac Maximum, continued <sup>①</sup>

Continuous Amperes	Cam Setting	Motor Full Load Current Amperes <sup>②</sup>	MCP Trip Setting <sup>③</sup>	MCP Catalog Number
50	A	11.5–15.2	150	HMCPE050K2C
	B	19.2–22.9	250	
	C	26.9–30.6	350	
	D	34.6–38.3	450	
	E	38.4–42.1	500	
	F	42.2–43.5	550	
70	A	16.1–30.6	210	HMCPE070M2C
	B	26.9–32.2	350	
	C	37.6–42.9	490	
	D	48.4–53.7	630	
	E	53.8–59.1	700	
	F	59.2–60.9	770	
100	A	23.0–30.6	300	HMCPE100R3C
	B	38.4–46.0	500	
	C	53.8–61.4	700	
	D	69.2–76.8	900	
	E	76.9–84.5	1000	
	F	84.6–87.0	1100	
100	A	38.4–46.0	500	HMCPE100T3C
	B	57.6–65.2	750	
	C	76.9–84.5	1000	
	D	④	1250	
	E	④	1375	
	F	④	1500	

JG-Frame—600 Vac Maximum, 250 Vdc Maximum <sup>①</sup>

Continuous Amperes	MCP Trip Range (Amperes)	MCP Catalog Number
250	500–1000	HMCPJ250D5L
	625–1250	HMCPJ250F5L
	750–1500	HMCPJ250G5L
	875–1750	HMCPJ250J5L
	1000–2000	HMCPJ250K5L
	1125–2250	HMCPJ250L5L
	1250–2500	HMCPJ250W5L

**Notes**

- ① UL listed for use with Eaton Motor Starters.
- ② Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ③ For DC applications, actual trip levels are approximately 40% higher than values shown.
- ④ Settings above  $10 \times I_n$  are for special applications. Where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

**LG-Frame—600 Vac Maximum, 250 Vdc Maximum** <sup>①</sup>

Continuous Amperes	MCP Trip Range (Amperes)	MCP Catalog Number
600	1250–2500	<b>HMCPL600L6G</b>
	1500–3000	<b>HMCPL600N6G</b>
	1750–3500	<b>HMCPL600R6G</b>
	2000–4000	<b>HMCPL600X6G</b>
	2250–4500	<b>HMCPL600Y6G</b>
	2500–5000	<b>HMCPL600P6G</b>
	3000–6000	<b>HMCPL600M6G</b>

**Notes**

<sup>①</sup> UL listed for use with Eaton Motor Starters.

800 and 1200 ampere, 600 Vac maximum motor circuit protectors are available as Series C HMCP product.

## Series G Motor Protector Circuit Breakers (MPCB)

2



## Contents

<b>Description</b>	<b>Page</b>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB)	
Product Selection . . . . .	<b>V4-T2-199</b>
Technical Data and Specifications . . . . .	<b>V4-T2-200</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

## Motor Protector Circuit Breakers (MPCB)

## Product Description

- Eliminates need for separate overload relay

## Application Description

- Can be used with contactor to eliminate need for overload relay and still create manual motor control
- Meets requirement for motor branch protection, including:
  - Disconnecting means
  - Branch circuit short circuit protection
  - Overload protection

## Features and Benefits

- Phase unbalance protection
- Phase loss protection
- Hot trip/cold trip
- High load alarm
- Pre-detection trip relay option
- Class 10, 15, 20, 30 protection

## Standards and Certifications

- IEC 60947-2
- UL 489 100% rated
- UL 508
- CSA C22.2



**Product Selection****JGMP Catalog Numbers**

Continuous Amperes	35 kAIC Catalog Number	65 kAIC Catalog Number
50	JGMPS050G	JGMPH050G
100	JGMPS100G	JGMPH100G
160	JGMPS160G	JGMPH160G
250	JGMPS250G	JGMPH250G

**JGMP FLA Ie Dial Setting**

Continuous Amperes	A	B	C	D	E	F	G	H
50	20	20	25	30	32	40	45	50
100	40	45	50	63	70	80	90	100
160	63	80	90	100	110	125	150	160
250	100	125	150	160	175	200	225	250

**LGMP Catalog Numbers**

Continuous Amperes	50 kAIC Catalog Number	65 kAIC Catalog Number
250	LGMP250G	LGMPH250G
400	LGMP400G	LGMPH400G
600	LGMP600G	LGMPH600G
630 ①	LGMP630G	LGMPH630G

**LGMP FLA Ie Dial Setting**

Continuous Amperes	A	B	C	D	E	F	G	H
250	100	125	150	160	175	200	225	250
400	160	200	225	250	300	315	350	400
600	250	300	315	350	400	450	500	600
630 ①	250	300	315	350	400	500	600	630

**Notes**

① 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

For pre-trip alarm option, order Style Number 5721B31G02.

## Technical Data and Specifications

## 2

### JGMPS and JGMPH Rating and Ampere Range

Breaker Capacity (kA rms) AC 50–60 Hz			Maximum Rated Current—250 A	
			Breaker Type	
			JGMPS	JGMPH
IEC 60947-2	220–240 Vac	I <sub>cu</sub>	85	100
		I <sub>cs</sub>	85	100
	380–415 Vac	I <sub>cu</sub>	40	70
		I <sub>cs</sub>	40	70
	660–690 Vac	I <sub>cu</sub>	12	14
		I <sub>cs</sub>	6	7
NEMA UL 489	240 Vac		85	100
	480 Vac		35	65
	600 Vac		25	35
Number of poles			3	3
Ampere range			50–250	50–250

### LGMP5 and LGMPH Rating and Ampere Range

Breaker Capacity (kA rms) AC 50–60 Hz			Maximum Rated Current—630 A <sup>①</sup>	
			Breaker Type	
			LGMP5	LGMPH
IEC 60947-2	220–240 Vac	I <sub>cu</sub>	85	100
		I <sub>cs</sub>	85	100
	380–415 Vac	I <sub>cu</sub>	50	70
		I <sub>cs</sub>	50	53
	660–690 Vac	I <sub>cu</sub>	20	25
		I <sub>cs</sub>	10	13
NEMA UL 489	240 Vac		85	100
	480 Vac		50	65
	600 Vac		25	35
Number of poles			3	3
Ampere range			250–630 <sup>①</sup>	250–630 <sup>①</sup>

#### Notes

<sup>①</sup> 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

For pre-trip alarm option, order Style Number 5721B31G02.

### 30 mA Ground Fault (Earth Leakage) Modules



**EG MCCB Shown with Ground Fault (Earth Leakage) Module**

### 30 mA Ground Fault (Earth Leakage) Module

#### Product Description

Eaton offers three- and four-pole 30 mA ground fault (earth leakage) protection modules for Series G E-frame molded case circuit breakers (MCCBs). Separate UL listed and IEC rated devices are available.

The modules are bottom mounted and are available for EG frame circuits up to 125 A.

The module is completely self contained, including a current sensor, relay and power supply inside the device. Current pickup settings are selectable from 0.03 to 10 amperes for all devices, except for the UL listed module, for which settings are selectable from 0.03 to 30 amperes. Time delays are also selectable from Instantaneous to 1.0 second for pickup settings of 0.10 amperes and above. The current pickup setting of 0.03 amperes defaults to an Instantaneous time setting regardless of the time dial's position.

Two alarm contacts are included with each device, which can be wired externally for remote indication. Both of these are also indicated by an LED on the front of the device:

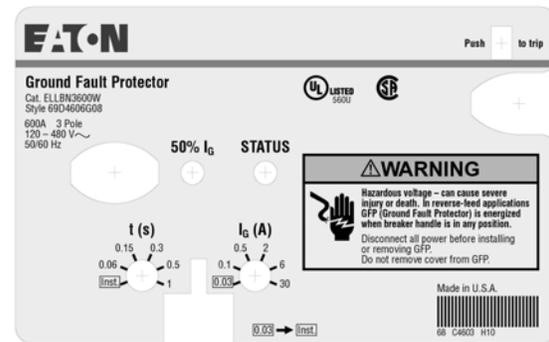
1. 50% pre-trip: alarms when the earth leakage current reaches 50% of the set pickup setting value.
2. 100% after trip: alarms when the breaker reaches the set pickup setting value and the breaker trips.

### Contents

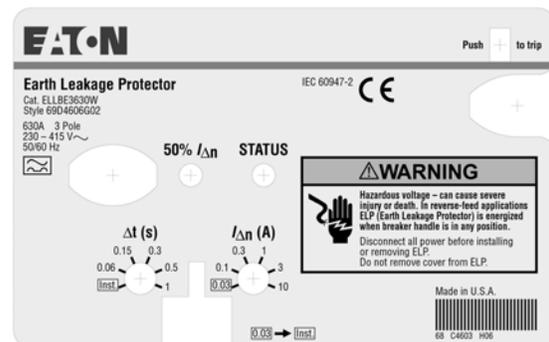
#### Description

	<i>Page</i>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB). . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module	
Product Selection. . . . .	<b>V4-T2-202</b>
Dimensions . . . . .	<b>V4-T2-202</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for	
Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories. . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette. . . . .	<b>V4-T2-222</b>

#### UL-Rated Ground Fault Module Faceplate



#### IEC-Rated Earth Leakage Module Faceplate



# 2.3

## Molded Case Circuit Breakers

### Series G

#### Product Selection

2

#### EG-Frame

#### EG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120–480 Vac, 50/60 Hz) ①



Ampere Rating	Number of Poles	Catalog Number
125	3	ELEBN3125G
125	4	ELEBN4125G

#### EG-Frame Earth Leakage Modules, IEC-Rated (Bottom Mounted, 230–415 Vac, 50/60 Hz) ①

Ampere Rating	Number of Poles	Catalog Number
125	3	ELEBE3125G
125	4	ELEBE4125G

**Note**

① Shunt trip and undervoltage release cannot be used in an EG breaker connected to an earth leakage module.

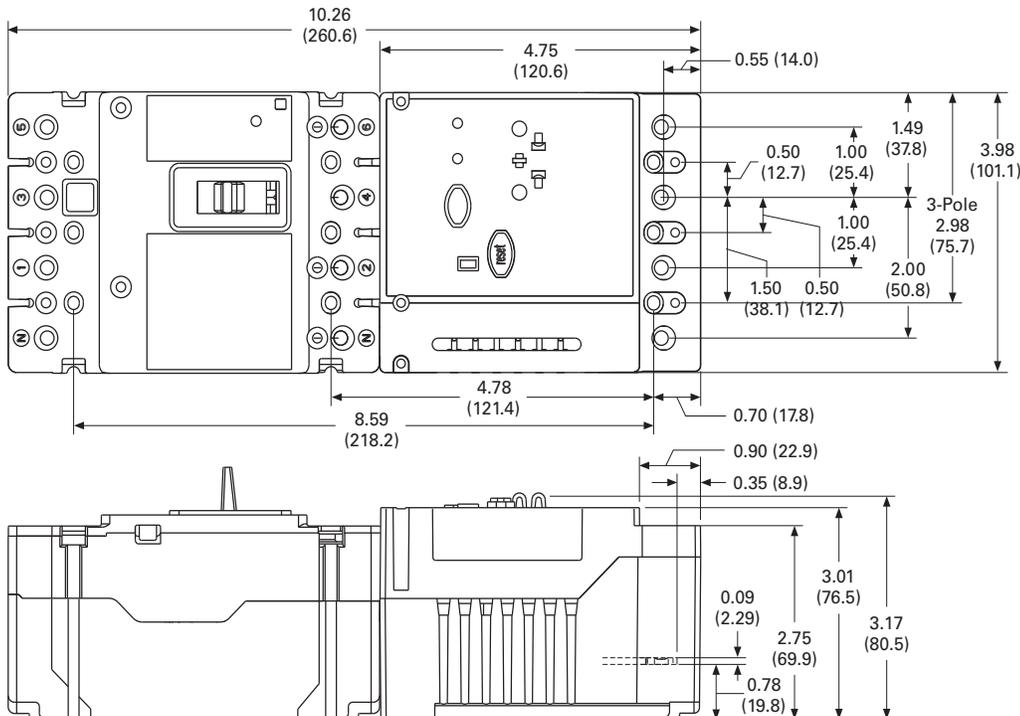
#### Dimensions

Approximate Dimensions in Inches (mm)

#### Assembled Breaker and Earth Leakage Module

Frame	Height	Width	Depth
<b>Three-Pole</b>			
EG	10.25 (260.3)	3.00 (76.2)	2.98 (75.8)
<b>Four-Pole</b>			
EG	10.25 (260.3)	4.00 (101.6)	2.98 (75.8)

#### EG-Frame With Earth Leakage Module



**Current-Limiting Circuit Breaker Modules****Contents****Description**

	<b>Page</b>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB) . . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module	
Product Selection . . . . .	<b>V4-T2-204</b>
Technical Data and Specifications . . . . .	<b>V4-T2-205</b>
Dimensions and Weights . . . . .	<b>V4-T2-205</b>
High Instantaneous Circuit Breaker for	
Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

**Current-Limiting Circuit Breaker Module****Product Overview**

Power demand continues to grow in new and existing facilities. To meet increased demand, larger utility supplies, spot networks and large facility transformers are installed. The increased capacity of the electrical source results in increased fault currents in excess of 100 kA short-circuit protection. Eaton manufactures non-fused current-limiting modules with interrupting capacities up to 200 kA at 600 Vac or 70 kA at 690 Vac. Unlike fused current limiters with a one-time use, a current limiter module provides an automatic reset of the module after a short-circuit event. Resetting the molded-case circuit breaker is the only action required to restore critical power to the system; there is no time wasted with sourcing the correct replacement fuses or module to bring system back online.

**Product Description**

The current-limiting breaker modules use a unique contact design to enhance the system protection similar to that of the circuit breaker. When high short-circuit current is flowing through the contacts of these modules, the design results in very high interrupting capacities and improved current-limiting characteristics.

**Application Description**

High-performance breakers are most commonly applied when very high fault levels are available and with applications where the current-limiting capability is used upstream of the final load to limit current. Typical loads include lighting, power distribution, and motor control applications.

**Features and Benefits**

Superior system protection:

- Auto reset improves system uptime and eliminates the need for finding replacement parts
- No fuses to replace, reducing the overall cost of ownership and the waste created by fuses
- Overloads, by using inverse time current tripping characteristics of the molded-case circuit breaker
- Low-level short circuits, by using instantaneous and/or short-time delay tripping characteristics of the molded-case circuit breaker
- High-level short circuits, by using ultra-high-speed, blow-apart contacts of the current-limiting module in series with the circuit breaker contacts
- Let-through currents, by improved opening speed of the contacts, the resultant rapid rise of arc voltage introduces impedance into the system

**Standards and Certifications**

- IEC 60947-2
- UL 489
- CSA C22.2



## Product Selection

2

## Series G High Performance Family Offering

Type	Product	Amperes	480 Vac (UL)		415 Vac (IEC)		690 Vac (IEC)	
			I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>
EGC 3P thermal-magnetic	Breaker only	15–125	100	25 <sup>①</sup>	100	100	—	—
	With limiter	15–100	150	100 <sup>①</sup>	150	150	—	—

## EG-Frame



## EG IC Rating—150 kAIC at 415 and 480 Vac

UL Listed (NEMA/IEC Rated) Base Molded Case Circuit Breaker	Breaker with Line Side Mounted Current Limiter	Breaker with Load Side Mounted Current Limiter	Line and Load Terminations Included <sup>②</sup>	Interphase Barrier Included for Limiter
EGC3015FFG	EGC3015FFGQ01	EGC3015FFGQ02	T125EF	EIPBSK
EGC3016FFG	EGC3016FFGQ01	EGC3016FFGQ02	T125EF	EIPBSK
EGC3020FFG	EGC3020FFGQ01	EGC3020FFGQ02	T125EF	EIPBSK
EGC3025FFG	EGC3025FFGQ01	EGC3025FFGQ02	T125EF	EIPBSK
EGC3030FFG	EGC3030FFGQ01	EGC3030FFGQ02	T125EF	EIPBSK
EGC3032FFG	EGC3032FFGQ01	EGC3032FFGQ02	T125EF	EIPBSK
EGC3035FFG	EGC3035FFGQ01	EGC3035FFGQ02	T125EF	EIPBSK
EGC3040FFG	EGC3040FFGQ01	EGC3040FFGQ02	T125EF	EIPBSK
EGC3045FFG	EGC3045FFGQ01	EGC3045FFGQ02	T125EF	EIPBSK
EGC3050FFG	EGC3050FFGQ01	EGC3050FFGQ02	T125EF	EIPBSK
EGC3060FFG	EGC3060FFGQ01	EGC3060FFGQ02	T125EF	EIPBSK
EGC3063FFG	EGC3063FFGQ01	EGC3063FFGQ02	T125EF	EIPBSK
EGC3070FFG	EGC3070FFGQ01	EGC3070FFGQ02	T125EF	EIPBSK
EGC3080FFG	EGC3080FFGQ01	EGC3080FFGQ02	T125EF	EIPBSK
EGC3090FFG	EGC3090FFGQ01	EGC3090FFGQ02	T125EF	EIPBSK
EGC3100FFG	EGC3100FFGQ01	EGC3100FFGQ02	T125EF	EIPBSK

## Notes

<sup>①</sup> 600Y/347 V.

<sup>②</sup> Two interphase barriers included on line end mounted limiter; (2) line end of limiter. Four interphase barriers included on load end mounted limiter; (2) line end of breaker (2) load end of limiter.

**Technical Data and Specifications**

**UL 489 Current-Limiting Data**

Frame	Circuit	I <sub>p</sub> (kA)	I <sup>2</sup> T (10 <sup>6</sup> A <sup>2</sup> S)
EGC...Q	240 V/150 kA	21.80	0.277
EGC...Q	480 V/150 kA	21.80	0.277
EGC...Q	600 V/100 kA	22.60	0.387

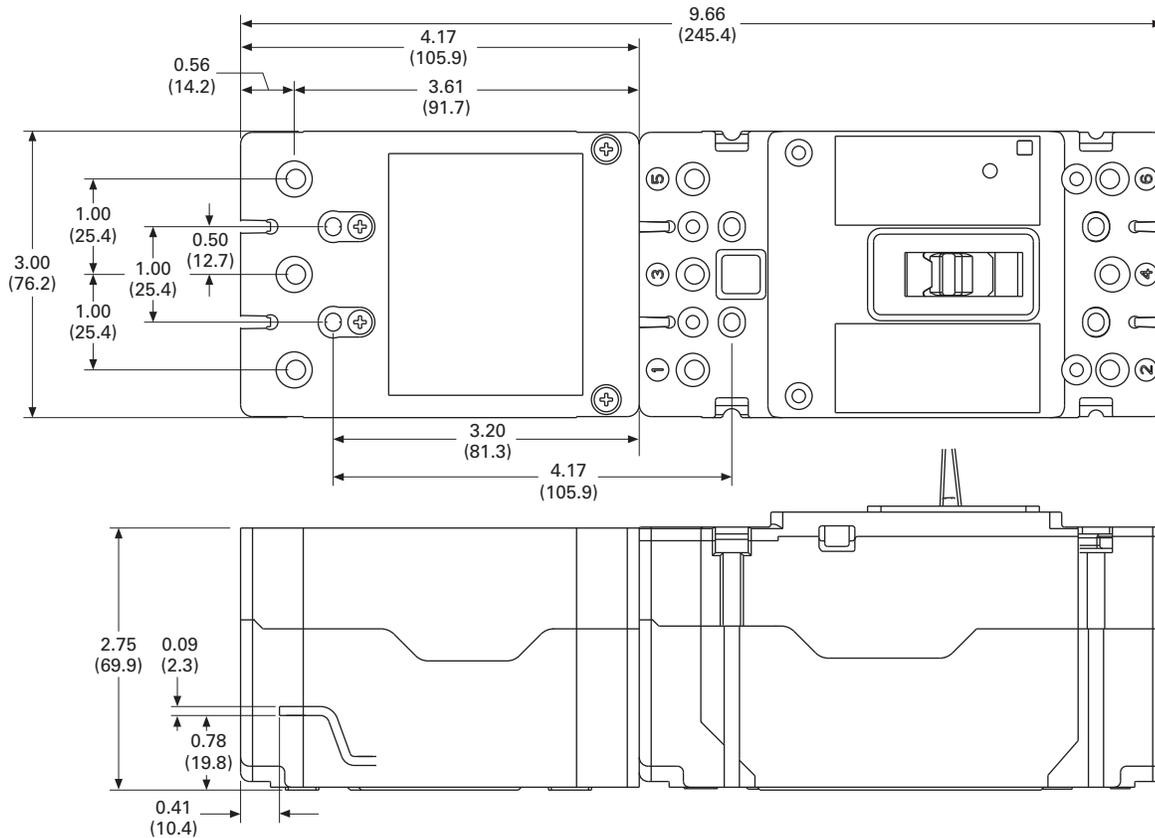
**Dimensions and Weights**

Approximate Dimensions in Inches (mm)

**Assembled Breaker and Current-Limiting Module**

Frame	Height	Width	Depth	Weight in lb (kg)
EG	9.66 (245.7)	3.00 (76.2)	2.98 (75.8)	2.91 (1.32)
HMCP	9.66 (245.7)	3.00 (76.2)	2.98 (75.8)	4.18 (1.90)

**EG-Frame With Current Limiter Module**



JG Frame



2

#### JG IC Rating—200 kAIC at 600 Vac and 70 kAIC at 690 Vac

Ampere Rating	Magnetic Range	UL Listed, IEC Rated Breaker With Line Side Mounted Current Limiter <sup>①</sup>	UL Listed, IEC Rated Breaker With Load Side Mounted Current Limiter <sup>②</sup>	IEC Rated Breaker With Line Side Mounted Current Limiter <sup>①</sup>	IEC Rated Breaker With Load Side Mounted Current Limiter <sup>②</sup>
		<b>Fixed Thermal, Adjustable Magnetic</b>		<b>Adjustable Thermal, Adjustable Magnetic</b>	
70	350–700	JGH3070FAGQ01	JGH3070FAGQ02	—	—
90	450–900	JGH3090FAGQ01	JGH3090FAGQ02	—	—
100	500–1000	JGH3100FAGQ01	JGH3100FAGQ02	JGH3100AAGQ01	JGH3100AAGQ02
125	625–1250	JGH3125FAGQ01	JGH3125FAGQ02	JGH3125AAGQ01	JGH3125AAGQ02
150	750–1550	JGH3150FAGQ01	JGH3150FAGQ02	—	—
160	800–1600	—	—	JGH3160AAGQ01	JGH3160AAGQ02
175	875–1750	JGH3175FAGQ01	JGH3175FAGQ02	—	—
200	1000–2000	JGH3200FAGQ01	JGH3200FAGQ02	JGH3200AAGQ01	JGH3200AAGQ02
225	1125–2250	JGH3225FAGQ01	JGH3225FAGQ02	—	—
		<b>Electronic Trip LS</b>			
250	—	JGH325033GQ01	JGH325033GQ02	—	—
		<b>Electronic Trip LSI</b>			
250	—	JGH325032GQ01	JGH325032GQ02	—	—
		<b>Electronic Trip LSG</b>			
250	—	JGH325035GQ01	JGH325035GQ02	—	—
		<b>Electronic Trip LSIG</b>			
250	—	JGH325036GQ01	JGH325036GQ02	—	—

#### Series G HMCP

Ampere Rating	Motor Circuit Protector with Line Side Mounted Current Limiter	Breaker with Load Side Mounted Current Limiter
250	HMCPJ250D5LQ01	HMCPJ250D5LQ02
250	HMCPJ250F5LQ01	HMCPJ250F5LQ02
250	HMCPJ250G5LQ01	HMCPJ250G5LQ02
250	HMCPJ250J5LQ01	HMCPJ250J5LQ02
250	HMCPJ250K5LQ01	HMCPJ250K5LQ02
250	HMCPJ250L5LQ01	HMCPJ250L5LQ02

#### Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Metric Wire Range mm <sup>2</sup>	AWG Wire Range/ Number of Conductors	Catalog Number
<b>Standard Pressure Type Terminals</b>					
250	Aluminum	Cu/Al	10–185	#8–350 (1)	TA250FJ <sup>③</sup>

#### Notes

- ① Two interphase barriers provided, mounted on line end of limiter, catalog number FJIPBK.
- ② Four interphase barriers provided, (2) line end of breaker, (2) load end of limiter.
- ③ Line and load terminals included with products listed above.

**Technical Data and Specifications**

**UL 489 Current-Limiting Data**

Frame	Circuit	I <sub>p</sub> (kA)	I <sup>2</sup> T (10 <sup>6</sup> A <sup>2</sup> S)
JGH...Q	240 V/200 kA	48.60	2.47
JGH...Q	480 V/200 kA	48.60	2.47
JGH...Q	600 V/200 kA	48.60	2.47

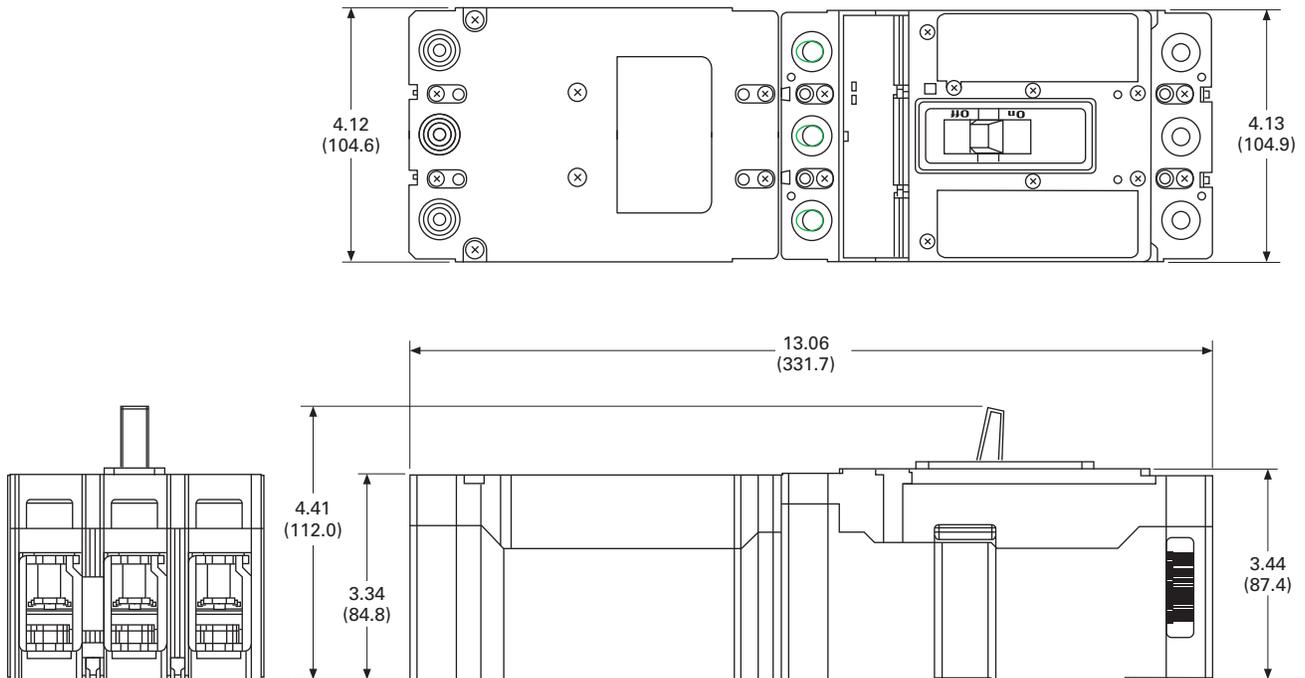
**Dimensions and Weights**

Approximate Dimensions in Inches (mm)

**Assembled Breaker and Current-Limiting Module**

Frame	Height	Width	Depth	Weight in lb (kg)
JG + limiter	13.06 (331.7)	4.13 (104.9)	3.44 (87.4)	9.87 (4.48)
HMCP	13.06 (331.7)	4.13 (104.9)	3.44 (87.4)	9.87 (4.48)

**JG-Frame With Current Limiter Module**



**High Instantaneous Circuit Breaker for Selective Coordination**



**Contents**

<i>Description</i>	<i>Page</i>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB) . . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination	
Product Selection . . . . .	<b>V4-T2-209</b>
Technical Data and Specifications . . . . .	<b>V4-T2-210</b>
Dimensions . . . . .	<b>V4-T2-210</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

**High Instantaneous Circuit Breaker for Selective Coordination**

**Product Description**

Eaton offers high-magnetic withstand molded case circuit breakers, specifically designed for critical operations and selective coordination requirements. The high-magnetic withstand LHH and NHH frames continue the legacy of circuit breaker innovation for which Eaton is recognized throughout the world. The LHH and NHH breakers are equipped with 125 to 400 ampere trip units with high-magnetic capability. This design enables the breakers to withstand up to 90 times rated current before opening under short-circuit conditions.

The LHH and NHH circuit breakers incorporate a higher level of instantaneous pickup, thus allowing for higher current levels of selective coordination. Standard molded case circuit breakers typically are furnished with a magnetic pickup or electronic instantaneous adjustment or instantaneous override set at 10 times (10x) the continuous trip rating.

**Features, Benefits and Functions**

Eaton’s new LHH and NHH molded case circuit breakers are furnished with a higher level of magnetic pickup or electronic instantaneous settings as indicated in table on **Page V4-T2-210**. These higher levels of magnetic pickup and electronic instantaneous values in turn allow the system designer to obtain selective coordination at fault current levels up to these higher ratings. Greater values of selective coordination are available based on manufacturer tested combinations using the LHH and NHH as line-side breakers and standard breakers as load-side devices. Refer to IA01200002E to determine the maximum fault values that selective coordination achieves. When the line-side and load-side molded case circuit breaker trip ratings are chosen to coordinate in the overload range, they also can be selectively coordinated in the fault range up to the values listed in the table on **Page V4-T2-210** or IA01200002E.

For overcurrents protected by circuit breakers on the load-side of the LHH or NHH, only the effected load-side circuit breaker will open, while the line-side LHH and/or NHH circuit breakers remain closed, thus providing continuity of power to the other critical loads supplied by the LHH or NHH circuit breakers.

All other overcurrent protective devices within these systems shall remain closed. Similarly, backup power system designs of a critical nature that are not code mandated may also require overcurrent protective devices to be selectively coordinated as much as practicable to provide a higher level of uptime.

**Benefits of Using the LHH and NHH Molded Case Circuit Breakers**

Customer expectations and codes are driving product development to protect customers’ critical operations. NEC® 2005 and 2008 requires circuits with elevators, emergency systems, legally required standby systems, health care essential systems and critical operation power systems to be selectively coordinated. Simply stated, only the closest protective device directly protecting the circuit having an overcurrent (overload or fault) condition should open.

## Product Selection

### Proven Technology and Performance

The LHH is based on the Series G L-Frame circuit breaker, sharing the same small footprint and field-fit accessories as the L-Frame breaker. The NHH is based on the Series G N-Frame circuit breaker and shares the same footprint and accessories as the N-Frame breaker. NHH accessories must be factory installed.

The LHH incorporates a thermal-magnetic trip unit with fixed thermal and fixed magnetic settings. The NHH has an electronic trip unit with LSI adjustment capabilities. The instantaneous setting is adjustable from 1000–4000 A or may be turned off to default to the frame override of 14,000 A. A hand-held OPTIMizer must be used with the NHH to adjust short-time delay and instantaneous, however, the long delay pickup is fixed and cannot be adjusted (catalog number: OPTIMizer).

The LHH and NHH breakers are available in Eaton's panelboards and switchboards.

### Standards and Certifications

- UL
- CSA



Listed

LHH



### LHH and NHH Catalog Numbers

Ampere Rating	Thermal-Magnetic Trip Unit		LSI Electronic Trip Unit
	LHH Frame	NHH Frame	
125	LHH3125FFG	—	
150	LHH3150FFG	NHH3150T52X15	
175	LHH3175FFG	NHH3175T52X15	
200	LHH3200FFG	NHH3200T52X15	
225	LHH3225FFG	NHH3225T52X15	
250	LHH3250FFG	NHH3250T52X15	
300	LHH3300FFG	NHH3300T52X15	
350	LHH3350FFG	NHH3350T52X15	
400	LHH3400FFG	—	

### Technical Data and Specifications

- Three-pole
- 65 kAIC at 480 Vac
- 125–400 ampere LHH
- 150–350 ampere NHH
- Trip units:
- LHH—thermal-magnetic
- NHH—LSI electronic trip unit
- No rating plugs required
- Factory-sealed breakers
- LHH uses same internal and external accessories as standard Series G L-Frame circuit breaker
- NHH uses same internal and external accessories as standard Series G N-Frame circuit breaker

### LHH and NHH Electrical Characteristics

#### Short-Circuit Current Ratings (kA rms) AC 50–60 Hz

Description	Breaker Type	
	LHH	NHH
Max. rated current (amperes)	400	350
NEMA UL 489		
240 Vac	100	100
480 Vac	65	65
600 Vac	35	35
250 Vac	42	—
IEC 60947-2		
220 Vac	100	100
415 Vac	70	70
690 Vac	25	25
125/250 Vdc	22	—
Number of poles	3	3
Ampere range	125–400 A	150–350 A

#### Continuous Current Ratings

Continuous Current Rating (I <sub>c</sub> )	Magnetic Trip Point	Continuous Current Multiplier	Instantaneous Trip Point	Continuous Current Multiplier	Short Delay Pickup
125 A	2500 A	20x	—	—	—
150 A	2500 A	16x	14,000 A	93x	225–1200 A
175 A	4000 A	22x	14,000 A	80x	260–1400 A
200 A	4000 A	20x	14,000 A	70x	300–1600 A
225 A	6000 A	26x	14,000 A	62x	338–1800 A
250 A	6000 A	24x	14,000 A	56x	375–2000 A
300 A	6000 A	20x	14,000 A	47x	450–2400 A
350 A	6000 A	17x	14,000 A	40x	525–2800 A
400 A	6000 A	15x	—	—	—

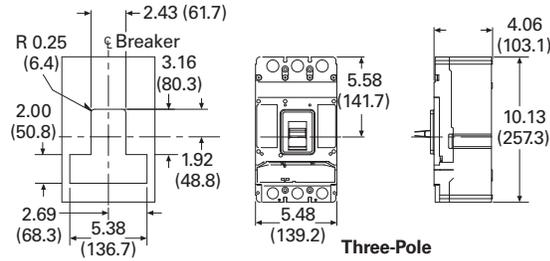
### Dimensions

Approximate Dimensions in Inches (mm)

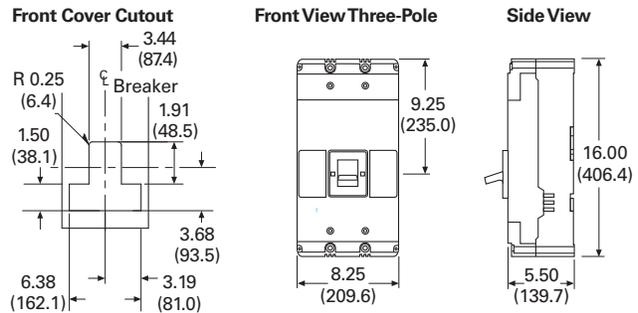
#### Dimensions

Description	Height	Width	Depth	Weight in Lb (kg)
LHH	10.13 (257.3)	5.48 (139.2)	4.09 (103.9)	12.36 (5.6)
NHH	16.00 (406.4)	8.25 (209.5)	5.50 (139.7)	46.80 (21.2)

#### L-Frame



#### N-Frame



**Contents**

<i>Description</i>	<i>Page</i>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB). . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories	
Internal Accessories . . . . .	<b>V4-T2-213</b>
External Accessories and Test Kit . . . . .	<b>V4-T2-214</b>
Accessories . . . . .	<b>V4-T2-216</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

**Special Features and Accessories**

Eaton’s molded case circuit breakers are designed to provide circuit protection for low-voltage distribution systems. They are described by NEMA as, “... a device for closing and interrupting a circuit between separable contacts under both normal and abnormal conditions,” and furthermore as, “... a breaker assembled as an integral unit in a supporting and enclosing housing of insulating material.” The National Electrical Code (NEC) describes them as, “A device designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating.”

So designed, Eaton circuit breakers protect conductors against overloads and conductors and connected apparatus, such as motors and motor starters, against short circuits.

In low-voltage distribution systems, there are many varied applications of molded case circuit breakers. Eaton offers the most comprehensive family of molded case circuit breakers in the industry.

This section of circuit breakers includes:

- Thermal-magnetic trip breakers
- Electronic rms trip breakers
- Molded case switches
- Motor circuit protectors
- Current-limiting breakers
- Special application breakers

**Modified Breakers**

Eaton breakers can be ordered with internal accessories installed. These modified breakers will be subject to an addition charge.

**Special Calibration**

Special non-UL listed calibrations are available for certain ambient temperatures other than 40 °C and for frequencies other than 50/60 Hz or DC. Reduced interrupting ratings will apply for 400 Hz applications.

- Add suffix H01 to breaker catalog number for 400 Hz rating

**50 °C Calibration**

**Note:** Breakers equipped with electronic trip units can operate reliably in ambient temperatures of 50 °C. Add suffix “V3” to NG MCCBs to remove standard 40 °C labeling.

Add suffix “V” to catalog number for complete thermal-magnetic breaker when ordering listed ampere ratings for breakers to be used in 50 °C ambients. 50 °C ambient MCCBs are not UL listed.

Contact Eaton for availability.

**Calibrations and Treatment**

Description	Frame		
	EG	NG	RG
Special calibration	■	■	■
Moisture-fungus treatment	■	■	■

**Moisture-Fungus Treatment**

All Eaton circuit breaker cases are molded from glass-polyester, which does not support the growth of fungus. Any parts that are susceptible to the growth of fungus will require special treatment.

Order by description.

- Add suffix J01 to breaker catalog number

**Freeze-Tested Circuit Breakers**

The circuit breakers may be ordered with freeze testing. This option uses special lubrication and mechanical operation is verified at  $-40^{\circ}\text{C}$ .

- Add suffix F01 to catalog number  $-57^{\circ}\text{F}$ , F02  $-30^{\circ}\text{F}$

**Marine Applications**

These specifications generally require molded case circuit breakers to be supplied with  $50^{\circ}\text{C}$  ambient, and plug-in adapter kits. When plug-in adapter kits are used, no terminals need be supplied (switchboard applications).

Circuit breakers can also be supplied to meet UL 489 Supplement SA (Marine use) and UL 489 Supplement SB (Naval Use).

UL 489 Supplement SA applies to vessels over 65 feet (19.8m) in length.

Requirements include  $40^{\circ}\text{C}$  ambient calibration, special labeling, and no use of aluminum conductors or terminals. (No  $50^{\circ}\text{C}$ .)

- Add suffix H08

Or you can choose to add  $50^{\circ}\text{C}$  ambient but then there is no "UL" mark.

- Add suffix VH08

UL 489 Supplement SB requires partial  $50^{\circ}\text{C}$  ambient calibration, vibration testing, special nameplating and no use of aluminum conductors or terminals. Eaton chooses to always fully calibrate to  $50^{\circ}\text{C}$  ambient. ("Naval" labeled per UL but no "UL" mark due to  $50^{\circ}\text{C}$  label.)

- Add suffix VH09

**Certified Test Reports**

Eaton breakers can be ordered with certified test reports at the time of order entry. Test report documents the thermal and magnetic or electronic tripping characteristics of the individual breaker. Breaker and test report must be ordered together. Add suffix 12 to breaker catalog number and enter separate line item on order for certified test report.

**Standards and Certifications**

Molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Inc., Standard UL 489, molded case circuit breakers and circuit breaker enclosures
- National Electrical Manufacturers Association (NEMA) Standards Publication No. AB1-1993, molded case circuit breakers
- Australian Standard AS 2184, molded case circuit breakers
- British Standards Institution Standard BS 4752: Part 1, switchgear and control gear Part 1: circuit breakers
- Canadian Standards Association (CSA) Standard C22.2 No. 5, service entrance and branch circuit breakers
- International Electrotechnical Commission Recommendations IEC 60947-2, circuit breakers
- Japanese T-Mark Standard molded case circuit breakers
- South African Bureau of Standards, Standard SABS 156, Standard Specification for molded case circuit breakers
- Swiss Electro-Technical Association Standard SEV 157-1, safety regulations for circuit breakers
- Union Technique de l'Electricite Standard NFC 63-120, low-voltage switchgear and control gear circuit breaker requirements
- Verband Deutscher Elektrotechniker (Association of German Electrical Engineers) Standard VDE 0660, low-voltage switchgear and control gear, circuit breakers

Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

Molded case circuit breakers equal or exceed Federal Specification Classification W-C-375b requirements for the particular class associated with the circuit breaker frame being considered.

Open breakers do not have service entrance ratings. Service entrance rating is part of the enclosure.



## Internal Accessories

### Alarm Lockout

The alarm switches operate when the circuit breaker is tripped by a short circuit or overcurrent, but also when it is tripped by a shunt trip or undervoltage release.

### Auxiliary Switches

Auxiliary switches are used for signaling and control purposes. The various functions of the auxiliary switches (changeover) are shown on **Page V4-T2-215**.

### Shunt Trips

The shunt trip is used for remote tripping.

The coil of the shunt trip is rated only for short-time operation.

It is not permissible with the circuit breaker open to apply a continuous opening command to the shunt trip in order to prevent the breaker from closing. This means that interlocking circuits with continuous commands may not be set up with shunt trips.

### Undervoltage Releases

The circuit breaker cannot be closed until the undervoltage release is energized. If the release is not energized, the circuit breaker can only perform an idle switching operation.

Frequent idle switching actions should be avoided as they shorten the endurance of the circuit breaker.

## Digitrip 310+ Electronic Trip Unit Accessories

### Cause of Trip Display/Remote Mount Cause of Trip Display

The Cause of Trip Display can be field-installed on any Digitrip RMS 310+ trip unit. The device provides breaker information through an LCD screen, such as cause of trip, phase current, ground current and low loads. The display is ideal for troubleshooting common trips such as ground fault, long delay, and instantaneous/short delay. The DIGIVIEW version will provide a local display at the breaker without additional wiring by connecting directly onto the trip unit. The DIGIVIEWR06 version has a 6 foot cable that allows users to mount the display on the outside of an enclosure door and connect to the trip unit that is contained inside the enclosure.

The DIGIVIEWR06 is NEMA 3R rated.

### Cause of Trip Display/Remote Mount Cause of Trip Display

Catalog Number

DIGIVIEW

DIGIVIEWR06

### Cause of Trip LED Module

The Cause of Trip LED Module can be field-installed on any Digitrip RMS 310+ trip unit. The device provides a cause of trip indication via LED. The Cause of Trip LED Module connects directly onto the trip unit. When the breaker trips, the module indicates the cause of trip (long delay, short delay, instantaneous and ground) via LED indication. The module is reset after the breaker is reset.

### Cause of Trip LED Module

Catalog Number

TRIP-LED

### Electronic Portable Test Kit

The electronic portable test kit provides a means to complete field tests using secondary injection on all 310+ trip units. The same test kit is also capable of secondary injection testing on Magnum and Series NRX low-voltage power circuit breakers' 520 and 1150 trip units.

### Electronic Portable Test Kit

Catalog Number

MTST230V

### Wire Seal

The wire seal can be used to secure the cover of the trip unit to prevent adjustments after settings are confirmed.

### Wire Seal

Catalog Number

5108A03H01

## External Accessories and Test Kit

2

## External Accessories

Description	Fit Type	Frame		
		EG	NG	RG
Non-padlockable handle block	Field	<b>EFHB</b>	<b>LKD4</b>	—
Padlockable handle block	Field	<b>EFPHB</b>	—	—
Padlockable handle block off-only	Field	<b>EFPHBOFF</b>	—	—
Padlockable handle lock hasp	Field	<b>EFPLK</b>	<b>PLK5</b>	<b>HLK6</b>
Padlockable handle lock hasp off-only	Field	<b>EFPHLOFF</b>	<b>PLK5SOFF</b>	<b>HLK6OFF</b>
Kirk key interlock kit <sup>①②</sup>	Field	—	<b>KYK4</b>	<b>KYK6</b>
Castell key interlock kit <sup>②③</sup>	Field	—	<b>CTK4</b>	<b>CTK6</b>
Slide bar interlock <sup>④</sup>	Field	<b>EFSBI</b>	<b>SBK5</b>	—
Walking beam interlock <sup>④</sup>	Three-pole	<b>EG3WBI</b>	<b>WBL5</b>	<b>WBL6</b>
	Four-pole	<b>EG4WBI</b>	<b>WBL5</b>	—
Electrical operator <sup>⑤</sup>	120 Vac	<b>MOPEG240C</b>	<b>EOP5T07</b>	<b>EOP6T08K</b>
	240 Vac	<b>MOPEG240C</b>	<b>EOP5T11</b>	<b>EOP6T11K</b>
	24 Vdc	<b>MOPEG48D</b>	<b>EOP5T21</b>	—
	48 Vdc	<b>MOPEG48D</b>	<b>EOP5T22</b>	<b>EOP6T21K</b>
	125 Vdc	<b>MOPEG120C</b>	<b>EOP5T26</b>	—
	220 Vdc	—	—	—
	250 Vdc	—	—	—
Plug-in adapters	Three-pole	<b>PAD3E</b>	<b>PAD53</b>	—
	Four-pole	<b>PAD4E</b>	—	—
Wohner busbar adapter	Field top	<b>EG-BUS-T</b>	—	—
	Field bottom	<b>EG-BUS-B</b>	—	—

**Series G MCCB Frame EG to mount to the SASY 60 mm Wohner Classic System**

- UL file # E197132
- Compact design
- UL508 tested and certified using Wohner system with Eaton breakers
- No line side wiring required
- Up to 630 A MCCB
- Reverse feed possible

**Wohner Busbar Adapter****Wohner Busbar Adapters**

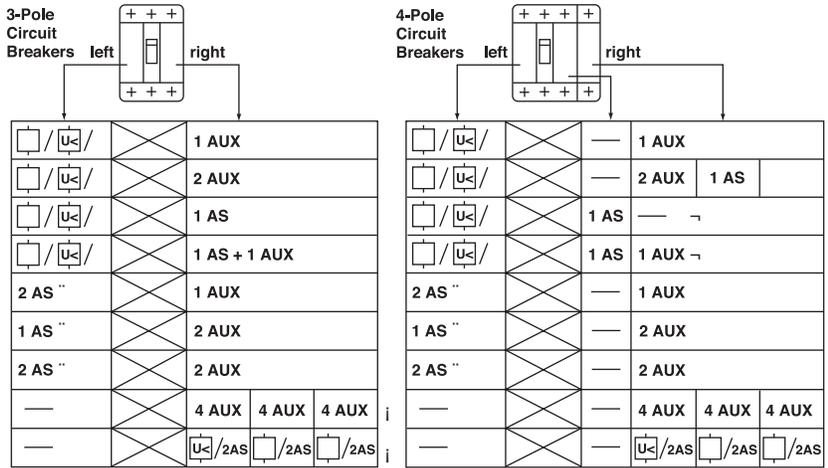
Breaker Frame	Busbar Adapter	Connection Point
EG	<b>EG-BUS-T</b>	Top
EG	<b>EG-BUS-B</b>	Bottom

**Notes**

- ① Provision only.
- ② See **Page V4-T2-364** for bolt projection dimensions.
- ③ Castell bolt mounting hole must be 10 mm.
- ④ Requires two breakers.
- ⑤ Contact Eaton for availability of operators for EG- and NG-Frames before December 2004.

**Accessory Configurations for EG–RG Circuit Breakers**

**Internal Accessory Configurations**



= Shunt Trip or Undervoltage Release

AUX = Auxiliary Switch

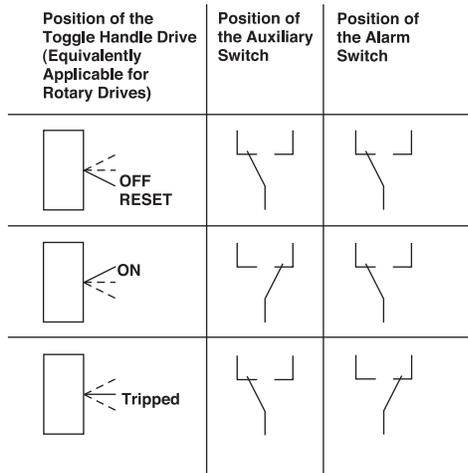
AS = Alarm Switch

“ = For N-Frame Circuit Breakers Only

≠ = For R-Frame Circuit Breakers Only

↔ = For N and R-Frame Circuit Breakers Only

**Contact Making by the Auxiliary and Alarm Switches as a Function of the Switching Position of the Circuit Breaker**



## Accessories

## Field Fit Kit Catalog Numbers

2

## Alarm Lockout

Description	Pole Location	Frame		
		EG	NG	RG ①
Make/Break	Left	—	A1L5LPK	—
	Right	ALM1M1BEPK	A1L5RPK	A1L6RPK
2 Make/2 Break	Left	—	A2L5LPK	—
	Right	ALM2M2BEPK	A2L5RPK	A2L6RPK

Description	Pole Location	For Use in Frame	Contact Type	Catalog Number
Make/Break	Right	EG	Silver	ALM1M1BEPK
2 Make/ 2 Break	Right	EG	Silver	ALM2M2BEPK
Make/Break	Right	EG	Gold	ALM1M1BEEPK
2 Make/ 2 Break	Right	EG	Gold	ALM2M2BEEPK

## Auxiliary Switch

Description	Pole Location	Frame		
		EG	NG	RG ①
1A, 1B	Left	—	A1X5PK	—
	Right	AUX1A1BPK	A1X5PK	—
2A, 2B	Left	—	A2X5PK	—
	Right	AUX2A2BPK	A2X5PK	A2X6RPK
3A, 3B	Left	—	A3X5LPK	—
	Right	—	A3X5RPK	—
4A, 4B	Left	—	—	—
	Right	—	—	A4X6RPK

Description	Pole Location	For Use in Frame	Contact Type	Catalog Number
1A, 1B	Right	EG	Silver	AUX1A1BPK
2A, 2B	Right	EG	Silver	AUX2A2BPK
1A, 1B	Right	EG	Gold	AUX1E1BPK
2A, 2B	Right	EG	Gold	AUX2E2BPK

## Auxiliary Switch/Alarm Lockout

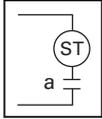
Description	Pole Location	Frame		
		EG	NG	RG ①
—	Left	—	AA115LPK	—
	Right	AUXALRMEPK	AA115RPK	—

Description	Pole Location	For Use in Frame	Contact Type	Catalog Number
1A/1B & 1M/1B	Right	EG	Silver	AUXALRMEPK
1A/1B & 1M/1B	Right	EG	Gold	AUXALRMEEPK

## Note

① All accessories mount in the RH cavity which will accept one each of shunt trip, UVR, auxiliary switch and alarm switch.

## Shunt Trip—Standard



## Shunt Trip—Standard

Description	Pole Location	Frame		
		EG <sup>①</sup>	NG	RG <sup>②</sup>
48–60 Vac	Left	SNT4860CPK	SNT5LP05K	—
	Right	—	—	SNT6P05K
110–240 Vac	Left	SNT120CPK	SNT5LP11K	—
	Right	—	—	SNT6P11K
380–600 Vac	Left	SNT480CPK <sup>③</sup>	—	—
	Right	—	—	—
220–250 Vdc or 380–440 Vac	—	—	SNT5LP14K	SNT6P14K
480–600 Vac	—	—	SNT5LP18K	SNT6P18K
12 Vdc	Left	SNT012CPK	—	—
	Right	—	—	—
24 Vac/dc	Left	SNT024CPK	SNT5LP03K	—
	Right	—	—	SNT6P03K
48–60 Vdc	Left	SNT4860CPK	SNT5LP23K	—
	Right	—	—	SNT6P23K
110–125 Vdc	Left	SNT125DPK	SNT5LP26K	—
	Right	—	—	SNT6P26K
250 Vdc	Left	SNT250DPK	—	—
	Right	—	—	—

## Shunt Trip—Low Energy

Description	Pole Location	Frame		
		EG	NG	RG <sup>②</sup>
—	Left	—	LST5LPK	—
	Right	—	—	LST6RPK

## Undervoltage Release Mechanism

Description	Pole Location	Frame		
		EG <sup>①</sup>	NG	RG <sup>②</sup>
110–127 Vac	Left	UVR120APK	UVH5LP08K	—
	Right	—	—	UVH6RP08K
208–240 Vac	Left	UVR240APK	UVH5LP11K	—
	Right	—	—	UVH6RP11K
24 Vdc	Left	UVR024DPK	UVH5LP21K <sup>④</sup>	—
	Right	—	—	UVH6RP21K <sup>④</sup>
24 Vac	Left	UVR024APK	UVH5LP21K <sup>④</sup>	—
	Right	—	—	UVH6RP21K <sup>④</sup>
48–60 Vdc	Left	UVR048DPK	UVH5LP23K	—
	Right	—	—	UVH6RP23K
48–60 Vac	Left	UVR048APK	UVH5LP05K	—
	Right	—	—	UVH6RP05K
120 Vdc	Left	UVR125DPK	UVH5LP26K	—
	Right	—	—	UVH6RP26K
220–250 Vdc	Left	UVR250DPK	UVH5LP28K	—
	Right	—	—	UVH6RP28K
380–500 Vac	Left	UVR480APK	UVH5LP29K	—
	Right	—	—	UVH6RP29K
525–600 Vac	Left	UVR600APK	—	—
	Right	—	—	—
12 Vdc	Left	—	UVH5LP20K	—
	Right	—	—	UVH6RP20K
12 Vac	Left	—	UVH5LP02K	—
	Right	—	—	UVH6RP02K

## Notes

- <sup>①</sup> LH cavity not available for EG frame with earth leakage module.  
<sup>②</sup> All accessories mount in the RH cavity which will accept one each of shunt trip, UVR, auxiliary switch and alarm switch.  
<sup>③</sup> 380–600 Vdc, 50/60 Hz.  
<sup>④</sup> 24 Vdc only use UVH5LP03K (NG) UVH6RP03K (RG) for 24 Vac.

**Technical Data and Specifications**

**Note:** Gold-plated contacts are well suited for switching low voltages and currents. Lead wires on accessories containing gold-plated contacts are marked with a yellow stripe.

**Series G Gold Contact Accessory Switch Electrical Ratings**

Max. Voltage (U <sub>e</sub> )	Frequency	Max. Current (I <sub>n</sub> )	Dielectric Withstand Voltage (U <sub>i</sub> )
125 V	50/60 Hz	0.1 A	2200 V
30 V	DC	0.25 A	2200 V
5 V	DC	5 mA	2200 V

**Series G Silver Contact Accessory Switch Electrical Ratings**

Max. Voltage (U <sub>e</sub> )	Frequency	Max. Current (I <sub>n</sub> )	Dielectric Withstand Voltage (U <sub>i</sub> )
600 V	50/60 Hz	2 A	2200 V
125/250 V	50/60 Hz	5 A	2200 V
125 V	DC	1 A	2200 V

**Series GJ Frame: Terminal Extension Kits**

	Extension Orientation			
	Edgewise	Right Angle	Spreader	Straight
Three-pole	FJTEE3	FJTER3	FJTEW3	FJTES3
Four-pole	FJTEE4	FJTER4	FJTEW4	FJTES4

**Series G Motor Operators****Motor Operators****Product Description**

Eaton's motor operator mechanism enables local and remote ON, OFF and reset switching of a circuit breaker. The motor operator is mounted on the circuit breaker cover within the dimensions of the circuit breaker.

The robust motor operators offer various voltages to maximize customer flexibility. Standard load transfer switching can be accomplished through the use of two circuit breakers fitted with motor operators and a mechanical interlock.

**Contents**

<b>Description</b>	<b>Page</b>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB). . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators	
Features, Benefits and Functions . . . . .	<b>V4-T2-220</b>
Standards and Certifications . . . . .	<b>V4-T2-220</b>
Product Selection. . . . .	<b>V4-T2-220</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette . . . . .	<b>V4-T2-222</b>

### Features, Benefits and Functions

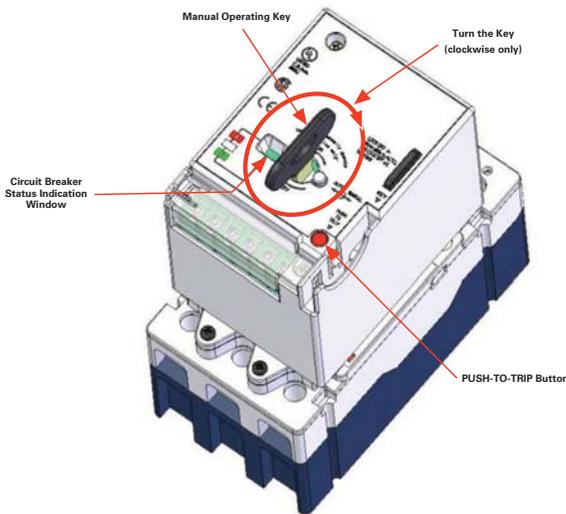
The motor operator provides special features for ease of customer use and status indication.

- The motor operator allows the circuit breaker to be opened, closed or reset remotely
- The motor operator contains a motor connected to a cam drive mechanism. The cam drives a slide mechanism to operate the circuit breaker handle
- Internal limit switches and relays are used to control motor operation to prevent overdriving the circuit breaker handle and motor overload conditions
- A key is provided to manually operate the circuit breaker
- A special pull-out locking mechanism provides a method for padlocking the circuit breaker handle in the OFF position
- The locking device will accept three padlock shackles with a maximum diameter of 1/4-inch (6.4 mm) each
- The cover provides visual status of the circuit breaker: ON, OFF or TRIPPED. A PUSH-TO-TRIP button allows the user to manually trip the breaker

### Product Selection

#### Motor Operators

Frame	Voltage	Frequency	Inrush Current	Catalog Number
Series G E-Frame	100–240 Vac	50/60 Hz	1 A	<b>MOPEG240C</b>
	100–220 Vdc	DC	1 A	<b>MOPEG240C</b>
	24/48 Vdc	DC	3 A	<b>MOPEG48D</b>
Series C F-Frame	208–240 Vac	50/60 Hz	1 A	<b>MOPFD240C</b>
	110–127 Vac	50/60 Hz	1 A	<b>MOPFD120C</b>
	220–250 Vdc	DC	1 A	<b>MOPFD240C</b>
	110–125 Vdc	DC	1 A	<b>MOPFD120C</b>
	24 Vdc	DC	3 A	<b>MOPFD24D</b>

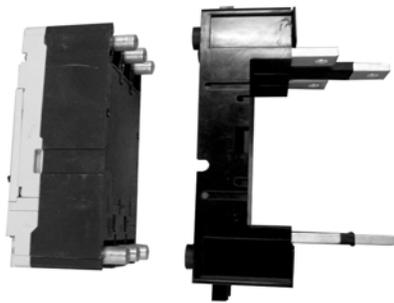


### Standards and Certifications

The motor operators are UL and CSA listed, and CE marked.



EG Breaker with Plug-In Block



**Contents**

<i>Description</i>	<i>Page</i>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-194</b>
Motor Protector Circuit Breakers (MPCB). . . . .	<b>V4-T2-198</b>
30 mA Ground Fault (Earth Leakage) Module . . . . .	<b>V4-T2-201</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-203</b>
High Instantaneous Circuit Breaker for Selective Coordination . . . . .	<b>V4-T2-208</b>
Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks	
Drawout Cassette . . . . .	<b>V4-T2-222</b>

**Plug-In Blocks**

**Product Description**

Plug-in adapters simplify installation and front removal of circuit breakers. Plug-ins are available for rear connection applications on three- and four-pole circuit breakers. Trip on drawout interlock kits are included. Stabs for EG plug-ins rotate 90 ° for flexible installation. Use terminal shields for IP30 protection.

**Product Selection**

**Plug-In Blocks**

Breaker Frame	Number of Poles	Catalog Number
<b>EG-Frame Plug-In Blocks</b>		
EG	3	<b>PAD3E</b>
EG	4	<b>PAD4E</b>
<b>Trip-On Drawout Interlock Kit ①</b>		
EG	3, 4	<b>PIILEG</b>
<b>Terminal Shields IP30</b>		
EG	3	<b>EFTS3K</b>
EG	4	<b>EFTS4K</b>

**Note**

① Included with plug-in block. Trips the breaker when breaker is removed from plug-in block.

#### Drawout Cassettes

2



### Drawout Cassette

#### Product Description

The drawout cassette is available for use with NG three- and four-pole breakers. The cassettes consist of two separate components: the movable mechanism, which attaches to the breaker, and the stationary mechanism, which houses in the cassette. For the NG drawout cassettes, all necessary parts for installation are included in the one catalog number.

#### Features

Features of the drawout cassettes for the NG include:

- Trip on drawout—breaker will trip if it is in the ON position when withdrawn from the cassette
- Secondary terminal block—the drawout cassettes include a secondary terminal block for easier access when wiring low-voltage accessories, including shunts and undervoltage releases

The drawout mechanism has three primary positions:

- Connected—the breaker is fully connected to the primary stabs and secondary contacts
- Disconnected—both the primary stabs and the secondary contacts are disconnected
- Withdraw—the breaker can be removed from the cassette

### Contents

<i>Description</i>	<i>Page</i>
EG-Frame (15–125 Amperes) . . . . .	<b>V4-T2-162</b>
NG-Frame (320–1200 Amperes) . . . . .	<b>V4-T2-176</b>
RG-Frame (800–2500 Amperes) . . . . .	<b>V4-T2-185</b>
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Special Features and Accessories . . . . .	<b>V4-T2-211</b>
Motor Operators . . . . .	<b>V4-T2-219</b>
Plug-In Blocks . . . . .	<b>V4-T2-221</b>
Drawout Cassette	

### Product Selection

#### NG Drawout Cassettes

Breaker Frame	Number of Poles	Catalog Number
NG	3	<b>NG3DOM</b>

## Molded Case Circuit Breaker Product Family



## Contents

<i>Description</i>	<i>Page</i>
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	V4-T2-352



## Product Overview

Eaton's molded case circuit breakers are designed to provide circuit protection for low-voltage distribution systems. They are described by NEMA as, "... a device for closing and interrupting a circuit between separable contacts under both normal and abnormal conditions," and furthermore as, "... a breaker assembled as an integral unit in a supporting and enclosing housing of insulating material." The National Electrical Code (NEC) describes them as, "A device designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating."

So designed, Eaton circuit breakers protect conductors against overloads and conductors and connected apparatus, such as motors and motor starters, against short circuits.

In low-voltage distribution systems, there are many varied applications of molded case circuit breakers.

Eaton offers the most comprehensive family of molded case circuit breakers in the industry.

This section of circuit breakers includes:

- Thermal-magnetic trip breakers
- Electronic rms trip breakers
- Molded case switches
- Motor circuit protectors
- Current-limiting breakers
- Special application breakers

**Modified Breakers**

Eaton breakers can be ordered with internal accessories installed. These modified breakers will be subject to an addition charge.

**Special Calibration**

Special non-UL-listed calibrations are available for certain ambient temperatures other than 40 °C and for frequencies other than 50/60 Hz or DC. Reduced interrupting ratings will apply for 400 Hz applications.

**50 °C Calibration**

Add suffix **V** to catalog Number for complete breaker, listed above, when ordering listed ampere ratings for breakers to be used in 50 °C ambients. (No UL label.)

**Moisture-Fungus Treatment**

All circuit breaker cases are molded from glass-polyester which does not support the growth of fungus. Any parts which are susceptible to the growth of fungus will require special treatment.

**Freeze-Tested Circuit Breakers**

The circuit breakers may be ordered with freeze testing. This option uses special lubrication and mechanical operation is verified at –40 °C.

**Marine Applications**

These specifications generally require molded case circuit breakers to be supplied with 50 °C ambient, and plug-in adapter kits. When plug-in adapter kits are used, no terminals need be supplied (switchboard applications).

Circuit breakers can also be supplied to meet UL 489 Supplement SA (Marine use) and UL 489 Supplement SB (Naval Use).

UL 489 Supplement SA applies to vessels over 65 feet (19.8 m) in length. Requirements include 40 °C ambient calibration, special labeling, and no use of aluminum conductors or terminals. (No 50 °C.)

- Suffix H08

Or you can choose to add 50 °C ambient but then there is no "UL" mark.

- Suffix VH08

UL 489 Supplement SB requires partial 50 °C ambient calibration, vibration testing, special nameplating and no use of aluminum conductors or terminals. Eaton chooses to always fully calibrate to 50 °C ambient. ("Naval" labeled per UL, and UL now allows 50 °C label here.)

- Suffix VH09

### Certified Test Reports

Eaton breakers can be ordered with certified test reports at the time of order entry. Test report documents the thermal and magnetic or electronic tripping characteristics of the individual breaker. Breaker and test report must be ordered together. Add suffix 12 to breaker catalog number and enter separate line item on order for certified test report.

### Standards and Certifications

Molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Inc., Standard UL 489, molded case circuit breakers and circuit breaker enclosures
- National Electrical Manufacturers Association (NEMA) Standards Publication No. AB1-1993, molded case circuit breakers
- Australian Standard AS 2184, molded case circuit breakers
- British Standards Institution Standard BS 4752: Part 1, switchgear and control gear Part 1: circuit breakers
- Canadian Standards Association (CSA) Standard C22.2 No. 5, service entrance and branch circuit breakers
- International Electrotechnical Commission Recommendations IEC 60947-2, circuit breakers
- Japanese T-Mark Standard molded case circuit breakers
- South African Bureau of Standards, Standard SABS 156, Standard Specification for molded case circuit breakers
- Swiss Electro-Technical Association Standard SEV 157-1, safety regulations for circuit breakers
- Union Technique de l'Electricite Standard NFC 63-120, low-voltage switchgear and control gear circuit breaker requirements
- Verband Deutscher Elektrotechniker (Association of German Electrical Engineers) Standard VDE 0660, low-voltage switchgear and control gear, circuit breakers

Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

Molded case circuit breakers equal or exceed Federal Specification Classification W-C-375b requirements for the particular class associated with the circuit breaker frame being considered.

Open breakers do not have service entrance ratings. Service entrance rating is part of the enclosure.



## Quick Reference

## Industrial Circuit Breakers

## G-Frame

Circuit Breaker Type	Continuous Ampere Rating at 40 °C	No. of Poles	Volts		Type of Trip <sup>①</sup>	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number	
			AC	DC			AC (kA)				DC (kA) <sup>②</sup>					
							120	120/240	240	277	480	600	125 <sup>③</sup>	250		
GHB	15–100	1	120	125	N.I.T.U.	11a	65	—	—	—	—	—	—	14	—	V4-T2-233
GHB	15–100	2, 3	240	125/250	N.I.T.U.	11a10b, 11b	—	—	65	—	—	—	—	14	—	V4-T2-233
GHB	15–100	1	277	125	N.I.T.U.	12b, 14b	—	—	—	14	—	—	14	—	—	V4-T2-233
GHB	15–100	2, 3	480Y/277	125/250	N.I.T.U.	15b	—	—	—	14	14	—	—	14	—	V4-T2-233
HGHB	15–30	1	277	125	N.I.T.U.	12c, 13a, 13b	65	—	—	25	—	—	14	—	—	V4-T2-233
GHBS	15–30	1, 2	480Y/277	—	—	—	65	65	—	14	—	—	—	—	—	V4-T1-34
GBHS	15–20	1, 2	600Y/347	—	N.I.T.U.	—	—	—	—	—	—	10	—	—	—	V4-T1-34
GDB	15–50	2	480	125/250	N.I.T.U.	—	—	—	—	—	14	—	—	10	—	V4-T2-231
GDB	15–100	3	480	250	N.I.T.U.	—	—	—	—	—	14	—	—	10	—	V4-T2-231
GD	15–50	2	480	125/250	N.I.T.U.	13b	—	—	65	—	14	—	—	10	—	V4-T2-230
GD	15–100	3	480	250	N.I.T.U.	13b	—	—	65	—	22	—	—	10	—	V4-T2-230
GHC	15–100	1	120	125	N.I.T.U.	12c, 13a	65	—	—	—	—	—	14	—	—	V4-T2-238
GHC	15–100	2, 3	240	125/250	N.I.T.U.	13b	—	—	65	—	—	—	—	1	—	V4-T2-238
GHC	15–100	1	277	125	N.I.T.U.	12c, 13a	—	—	—	14	—	—	14	—	—	V4-T2-238
GHC	15–100	2, 3	480Y/277	125/250	N.I.T.U.	13b	—	—	—	14	14	—	—	14	—	V4-T2-238
HGHC	15–30	1	277	125	N.I.T.U.	—	65	—	—	25	—	—	14	—	—	V4-T2-238

## Notes

- ① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.  
 ② Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.  
 ③ Single-pole breakers can be applied in DC systems up to 70 A.

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### F-Frame

Circuit Breaker Type	Continuous Ampere Rating at 40 °C	No. of Poles	Volts		Type of Trip <sup>①</sup>	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			AC	DC			AC (kA)				DC (kA) <sup>②</sup>				
EDB	100–225	2, 3	240	125	N.I.T.U.	—	—	—	22	—	—	—	10	—	V4-T2-242
EDS	100–225	2, 3	240	125	N.I.T.U.	—	—	—	42	—	—	—	10	—	V4-T2-242
ED	15–225	2, 3	240	125	N.I.T.U.	12b	—	—	65	—	—	—	10	—	V4-T2-242
EDH	100–225	2, 3	240	125	N.I.T.U.	14b	—	—	100	—	—	—	10	—	V4-T2-242
EDC	100–225	2, 3	240	125	N.I.T.U.	1	—	—	200	—	—	—	10	—	V4-T2-242
EHD	15–100	1	277	125	N.I.T.U.	13a	—	—	—	14	—	—	10	—	V4-T2-242
EHD	15–100	2, 3	480	250	N.I.T.U.	13b	—	—	18	—	14	—	10	—	V4-T2-242
FDB	15–150	2, 3	600	250	N.I.T.U.	18a	—	—	18	—	14	14	—	10	V4-T2-242
FDB	15–150	4	600	250	N.I.T.U.	③	—	—	18	—	14	14	—	10	V4-T2-242
FD	15–150	1	277	125	N.I.T.U.	13a	—	—	—	35	—	—	10	—	V4-T2-242
FD	15–225	2, 3	600	250	N.I.T.U.	22a	—	—	65	—	35	18	—	10	V4-T2-242
FD	15–225	4	600	250	N.I.T.U.	③	—	—	65	—	35	18	—	10	V4-T2-242
FDE	15–225	3	600	—	N.I.T.U.	—	—	—	65	—	35	18	—	—	V4-T2-242
HFD	15–150	1	277	125	N.I.T.U.	13a	—	—	—	65	—	—	10	—	V4-T2-242
HFD	15–225	2,3	600	250	N.I.T.U.	22a	—	—	100	—	65	25	—	22	V4-T2-242
HFD	15–225	4	600	250	N.I.T.U.	③	—	—	100	—	65	25	—	22	V4-T2-242
HFDE	15–225	3	600	—	N.I.T.U.	—	—	—	100	—	65	25	—	—	V4-T2-242
FDC <sup>④</sup>	15–225	2, 3	600	250	N.I.T.U.	24a	—	—	200	—	100	35	—	22	V4-T2-242
FDC <sup>④</sup>	15–225	4	600	250	N.I.T.U.	③	—	—	200	—	100	35	—	22	V4-T2-242
FDCE <sup>④⑤</sup>	15–225	3	600	—	N.I.T.U.	—	—	—	200	—	100	25	—	—	V4-T2-242

#### Notes

- ① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.
- ② Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.
- ③ Not defined in W-C-375b.
- ④ Current limiting.
- ⑤ Check with Eaton for availability.

## J-Frame

Circuit Breaker Type	Continuous Ampere Rating at 40 °C	No. of Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			AC	DC			AC (kA)				DC (kA) ②				
							120	120/240	240	277	480	600	125	250	
JDB	70–250	2, 3	600	250	N.I.T.U.	22a	—	—	65	—	35	18	—	10	V4-T2-263
JD	70–250	2, 3, 4	600	250	I.T.U.	22a	—	—	65	—	35	18	—	10	V4-T2-262
HJD	70–250	2, 3, 4	600	250	I.T.U.	22a	—	—	100	—	65	25	—	22	V4-T2-262
JDC ③	70–250	2, 3, 4	600	250	I.T.U.	22a	—	—	200	—	100	35	—	22	V4-T2-262

## K-Frame

Circuit Breaker Type	Continuous Ampere Rating at 40 °C	No. of Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			AC	DC			AC (kA)				DC (kA) ②				
							120	120/240	240	277	480	600	125	250	
DK	250–400	2, 3	240	250	N.I.T.U.	14b	—	—	65	—	—	—	—	10	V4-T2-274
KDB	100–400	2, 3	600	250	N.I.T.U.	23a	—	—	65	—	35	25	—	10	V4-T2-274
KD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	10	V4-T2-271, V4-T2-272
CKD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	V4-T2-273
HKD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	22	V4-T2-271, V4-T2-272
CHKD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	V4-T2-273
KDC ③	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	65	—	22	V4-T2-271, V4-T2-272

## L-Frame

Circuit Breaker Type	Continuous Ampere Rating at 40 °C	No. of Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			AC	DC			AC (kA)				DC (kA) ②				
							120	120/240	240	277	480	600	125	250	
LDB	300–600	2, 3	600	250	N.I.T.U.	23a	—	—	65	—	35	25	—	22	V4-T2-286
LD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	22	V4-T2-284, V4-T2-285
CLD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	V4-T2-286
HLD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	V4-T2-284, V4-T2-285
CHLD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	V4-T2-286
LDC ③	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	V4-T2-284, V4-T2-285,
CLDC ③	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	V4-T2-286

## M-Frame

Circuit Breaker Type	Continuous Ampere Rating at 40 °C	No. of Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			AC	DC			AC (kA)				DC (kA) ②				
							120	120/240	240	277	480	600	125	250	
MDL	300–800	2, 3	600	250	I.T.U.	23a	—	—	65	—	50	25	—	22	V4-T2-295, V4-T2-297
CMDL	300–800	2, 3	600	250	I.T.U.	23a	—	—	65	—	50	25	—	—	V4-T2-297
HMDL	300–800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	V4-T2-295, V4-T2-297
CHMDL	300–800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	V4-T2-297

## Notes

- ① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.  
 ② Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.  
 ③ Current limiting.

## Molded Case Circuit Breaker Product Family

2



## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-229</b>
Technical Data and Specifications . . . . .	<b>V4-T2-229</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

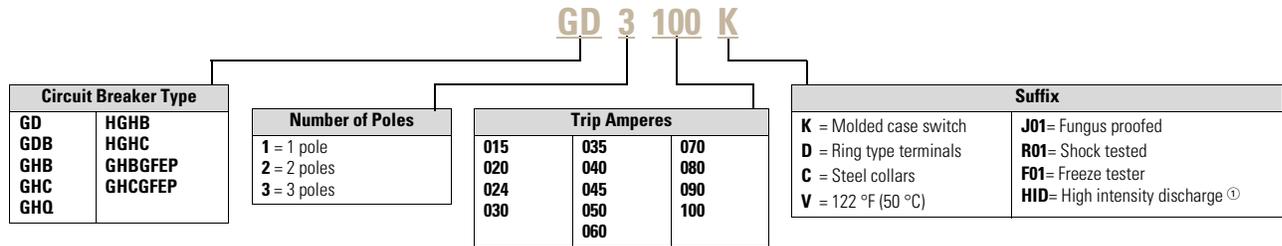
**G-Frame (15–100 Amperes)****Product Description**

- All two- and three-pole circuit breakers are of the common trip type. On all three-phase delta (240 V) Grounded B phase applications, refer to Eaton
- Single-pole circuit breakers, 15 and 20 amperes. Switching duty rated (SWD) for fluorescent lighting applications
- All G-Frame circuit breakers are suitable for reverse feed use
- HACR rated

## Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

### Circuit Breaker/Frame



## Technical Data and Specifications

### UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)						
		Volts AC (50/60 Hz)					Volts DC	
		120	240	277	480	480Y/277	125 ②	250 ③④
GDB	2, 3	—	—	—	14	—	—	10
GD	2	—	65	—	14	—	—	10
GD	3	—	65	—	22	—	—	10
GHQ	—	65	—	14	—	—	—	—
GHB	1	65	—	14	—	—	14	—
GHB	2, 3	—	65	—	—	14	14	—
HGHB	1	65	—	25	—	—	14	—
GHC	1	65	—	14	—	—	14	—
GHC	2, 3	—	65	—	—	14	14	—
HGHC	1	65	—	25	—	—	14	—

### Terminal Types

For line and load-side. Terminals are UL listed as suitable for wire type and size given below.

### Terminal Types

Circuit Breaker Amperes	Terminal Type Material	Screw Head Type	Wire Type	AWG Wire Range	Metric Wire Range (mm <sup>2</sup> ) ⑤
<b>Standard</b>					
15–20	Clamp (plated steel)	Slotted	Cu/Al	14–10	2.5–4
25–100	Pressure (aluminum body)	Slotted	Cu/Al	10–1/0	4–50
<b>Optional—GD, GHB, GHC</b>					
15–100	Pressure (steel body)	Slotted	Cu	14–3	—

### Notes

- ① HID suffix only applies to the GHB and GHC single-pole, 15–20 A circuit breakers.
- ② Single-pole breakers can be applied in DC systems up to 70 A.
- ③ Time constant is 8 milliseconds minimum.
- ④ Two poles of three-pole circuit breaker.
- ⑤ Not UL listed sizes.

#### Typical G-Frame Circuit Breaker

2



### Contents

Description	Page
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	V4-T2-352

### Type GD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units (15–100 Amperes)

#### Product Description

- Cable in, cable out
- Includes mounting hardware and BMHE

#### Standards and Certifications

- UL/CSA



#### Product Selection

#### Type GD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40 °C	480 Vac Maximum, 250 Vdc		Includes Binding Head Screws and Clamps 10–32 x 0.312
	14 kAIC at 480 Vac	22 kAIC at 480 Vac	
	Includes Line and Load Terminals		
	Two-Pole Catalog Number	Three-Pole Catalog Number	Three-Pole Catalog Number
15	GD2015	GD3015	GD3015D
20	GD2020	GD3020	GD3020D
25	GD2025	GD3025	GD3025D
30	GD2030	GD3030	GD3030D
35	GD2035	GD3035	GD3035D
40	GD2040	GD3040	GD3040D
45	GD2045	GD3045	GD3045D
50	GD2050	GD3050	GD3050D
60	—	GD3060	GD3060D
70	—	GD3070	GD3070D
80	—	GD3080	GD3080D
90	—	GD3090	GD3090D
100	—	GD3100	GD3100D

**Type GDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units**

Maximum Continuous Ampere Rating at 40 °C	480 Vac Maximum, 250 Vdc 14 kAIC at 480 Vac Includes Line and Load Terminals	
	Two-Pole Catalog Number	Three-Pole Catalog Number
15	GDB2015	GDB3015
20	GDB2020	GDB3020
25	GDB2025	GDB3025
30	GDB2030	GDB3030
35	GDB2035	GDB3035
40	GDB2040	GDB3040
45	GDB2045	GDB3045
50	GDB2050	GDB3050
60	—	GDB3060
70	—	GDB3070
80	—	GDB3080
90	—	GDB3090
100	—	GDB3100

**Type GD Molded Case Switches****Type GD Molded Case Switches—Three-Pole**

Maximum Continuous Ampere Rating at 40 °C	480 Vac Maximum, 250 Vdc Catalog Number (Includes Line and Load Terminals)
	60
60	GD3060KC <sup>①</sup>
100	GD3100K
100	GD3100KD <sup>②</sup>

**Notes**

<sup>①</sup> Includes line and load steel terminals.

<sup>②</sup> Includes binding head screws and clamps 10–32 x 0.312.

Molded case switches may open above 1300 amperes.

# 2.4

## Molded Case Circuit Breakers

### Series C

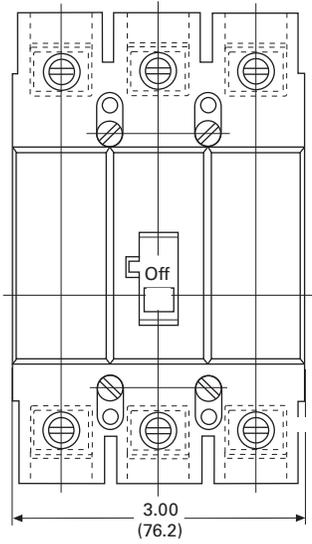
#### Dimensions

Approximate Dimensions in Inches (mm)

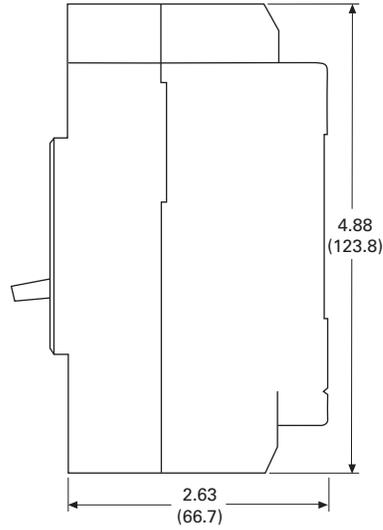
2

#### GD-Frame, Three-Pole

Front View



Side View



Typical GHB



## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	V4-T2-352

## Types GHB and HGHB Bolt-On Panelboard Circuit Breakers (15–100 Amperes)

### Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-375b as follows:

- Type GHB, 120 and 240 V:
  - Single-pole: Class 11a
  - Two-, three-pole: Classes 10b, 11b, 12b, 14b, 15b
  - UL/CSA
- Type GHB, 277 and 480Y/277 V:
  - Single-pole: Classes 12c, 13a
  - Two-, three-pole: Class 13b
- Type HGHB 277 V
- Type GHQ 277 V



## Product Selection

2

## Typical GHB

Type GHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units <sup>①</sup>

Continuous Ampere Rating at 40 °C	277/480 Vac Maximum, 125 Vdc Maximum <sup>②</sup>	277/480 Vac Maximum, 125/250 Vdc Maximum	277/480 Vac Maximum, 125/250 Vdc Maximum <sup>③</sup>
	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
15	GHB1015 <sup>④⑤</sup>	GHB2015 <sup>④</sup>	GHB3015 <sup>④</sup>
20	GHB1020 <sup>④⑤</sup>	GHB2020 <sup>④</sup>	GHB3020 <sup>④</sup>
25	GHB1025	GHB2025	GHB3025
30	GHB1030	GHB2030	GHB3030
35	GHB1035	GHB2035	GHB3035
40	GHB1040	GHB2040	GHB3040
45	GHB1045	GHB2045	GHB3045
50	GHB1050	GHB2050	GHB3050
60	GHB1060	GHB2060	GHB3060
70	GHB1070	GHB2070	GHB3070
80	GHB1080	GHB2080	GHB3080
90	GHB1090	GHB2090	GHB3090
100	GHB1100	GHB2100	GHB3100

## Type HGHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc Maximum Single-Pole Catalog Number
	15
20	HGHB1020 <sup>⑥</sup>
25	HGHB1025
30	HGHB1030

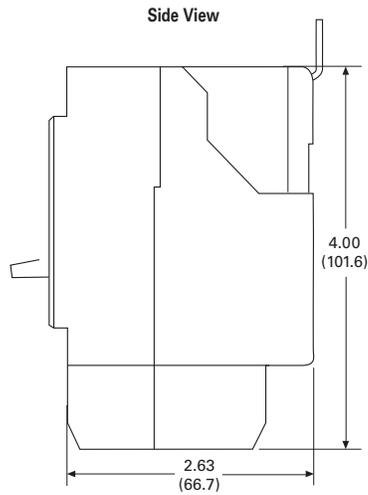
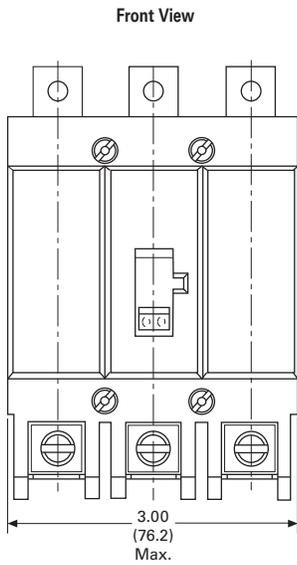
**Notes**

- ① 480Y/277 V, circuit breakers (Type GHB) not suitable for three-phase delta (480 V).
- ② Single-pole breakers can be applied in DC systems from 15 through 70 amperes; 80 through 100 amperes devices are not suitable for DC application.
- ③ Use two outside poles.
- ④ Uses 0.190 (4.83) –32 screw type clamp terminals.
- ⑤ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, single-pole are SWD rated.
- ⑥ 15 and 20 ampere, single-pole are SWD rated.

**Dimensions**

Approximate Dimensions in Inches (mm)

**GDB-Frame, Three-Pole**



Single-Phase (requires two poles)



### Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	V4-T2-352

### Type GHBGFEP Bolt-On Panelboard 30 mA Industrial Ground Fault Circuit Protectors (15–100 Amperes)

#### Product Description

- 15–60 amperes, 277 V, 50/60 Hz
- Operational voltage 240 V to 305 V

#### Standards and Certifications

These circuit breakers meet the requirements of UL 489 and UL 1053.



#### Product Selection

#### Type GHBGFEP Bolt-On Panelboard 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40 °C	Single-Phase (Requires Two Poles) 277 Vac, 30 mA Catalog Number
15	GHBGFEP1015
20	GHBGFEP1020
30	GHBGFEP1030
40	GHBGFEP1040
50	GHBGFEP1050
60	GHBGFEP1060

#### Technical Data and Specifications

#### Interrupting Capacity Ratings

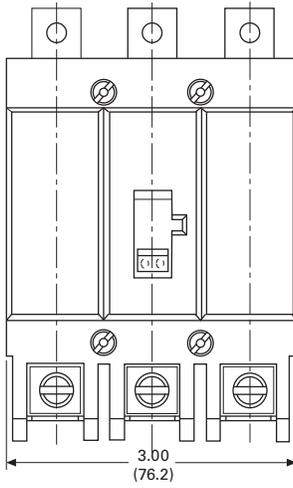
Circuit Breaker Type	Number of Poles	Interrupting Capacity (Symmetrical Amperes) 277 Vac (50/60 Hz)
GHBGFEP	1	14,000

**Dimensions**

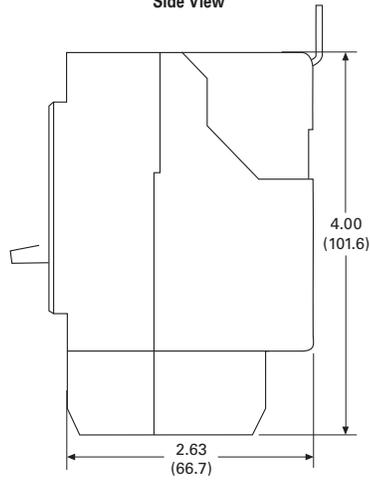
Approximate Dimensions in Inches (mm)

**GHB-Frame, Three-Pole**

Front View



Side View



Typical GHC

2



### Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

### Types GHC and HGHC Circuit Breakers (15–100 Amperes)

#### Product Description

- 15–100 amperes
- 120, 240, 277, 480Y/277 V, 50/60 Hz, 125, 125/250 Vdc
- Single-, two- and three-pole
- Cable in, cable out
- Does not include mounting hardware

#### Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-37b as follows:

- Type GHC, 277 and 480Y/277 V:
  - Single-pole: Classes 12c, 13a
  - Two-, three-pole: Class 13b
- UL/CSA



## Product Selection

### Type GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc Maximum <sup>①</sup>	480Y/277 Vac Maximum, 125/250 Vdc Maximum	480Y/277 Vac Maximum, 125/250 Vdc Maximum <sup>②</sup>
	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
15	GHC1015 <sup>③④</sup>	GHC2015 <sup>③</sup>	GHC3015 <sup>③</sup>
20	GHC1020 <sup>③④</sup>	GHC2020 <sup>③</sup>	GHC3020 <sup>③</sup>
25	GHC1025	GHC2025	GHC3025
30	GHC1030	GHC2030	GHC3030
35	GHC1035	GHC2035	GHC3035
40	GHC1040	GHC2040	GHC3040
45	GHC1045	GHC2045	GHC3045
50	GHC1050	GHC2050	GHC3050
60	GHC1060	GHC2060	GHC3060
70	GHC1070	GHC2070	GHC3070
80	GHC1080	GHC2080	GHC3080
90	GHC1090	GHC2090	GHC3090
100	GHC1100	GHC2100	GHC3100

### Type HGHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc Maximum Single-Pole Catalog Number
	15
20	HGHC1020 <sup>⑤</sup>
25	HGHC1025
30	HGHC1030

#### Notes

- ① 15 through 70 ampere circuit breakers only.
- ② Single-pole breakers can be applied in DC systems from 15 through 70 ampere; 80 through 100 ampere devices are not suitable for DC application.
- ③ Uses 0.190–32 screw type clamp terminals.
- ④ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, single-pole are SWD rated.
- ⑤ 15 and 20 ampere, single-pole are SWD rated.

Single-Phase (requires two-pole spaces)



### Contents

#### Description

	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

### Type GHC GFEP Cable-In/Cable-Out 30 mA Industrial Ground Fault Circuit Protectors (15–100 Amperes)

#### Product Description

- 15–60 amperes, 277 V, 50/60 Hz
- Operational voltage 240–305 V

#### Standards and Certifications

These circuit breakers meet the requirements of UL 489 and UL 1053.



#### Product Selection

#### Type GHC GFEP 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40 °C	Single-Phase (Requires Two Poles) 277 V, 30 mA	
		Catalog Number
15		GHC GFEP1015
20		GHC GFEP1020
30		GHC GFEP1030
40		GHC GFEP1040
50		GHC GFEP1050
60		GHC GFEP1060

#### Technical Data and Specifications

#### Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (Symmetrical Amperes)
		277 Vac (50/60 Hz)
GHC GFEP	1	14,000

Special Purpose Circuit Breakers



Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	V4-T2-352

Special Purpose GHC Circuit Breakers (15–100 Amperes)

Product Description

Eaton’s Type GHC circuit breakers have binding head screw-type terminals on line and load side. These circuit breakers with screw-type terminals (0.190–32) will be marked “Special purpose breaker not for general use.” To order this special breaker, use the catalog number from the tables on this page.

Product Selection

Type GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc Maximum ①	480Y/277 Vac Maximum, 125/250 Vdc Maximum	480Y/277 Vac Maximum, 125/250 Vdc Maximum ②
	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
25	GHC1025D	GHC2025D	GHC3025D
30	GHC1030D	GHC2030D	GHC3030D
35	GHC1035D	GHC2035D	GHC3035D
40	GHC1040D	GHC2040D	GHC3040D
45	GHC1045D	GHC2045D	GHC3045D
50	GHC1050D	GHC2050D	GHC3050D
60	GHC1060D	GHC2060D	GHC3060D
70	GHC1070D	GHC2070D	GHC3070D
80	GHC1080D	GHC2080D	GHC3080D
90	GHC1090D	GHC2090D	GHC3090D
100	GHC1100D	GHC2100D	GHC3100D

Type GHB and GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units for HID Lighting Applications

Type	Continuous Ampere Rating at 40 °C	277 Vac Maximum Single-Pole Catalog Number
Cable-in	15	GHC1015HID
	20	GHC1020HID
Bolt-on	15	GHB1015HID
	20	GHB1020HID

Notes

- ① Single-pole breakers can be applied in DC systems from 15 through 70 amperes; 80 through 100 amperes devices are not suitable for DC application.
- ② Use two outside poles.

**Typical F-Frame Breaker**  
**F-Frame Breaker with Electronic Trip Unit**



### Contents

<i><b>Description</b></i>	<i><b>Page</b></i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-243</b>
Product Selection . . . . .	<b>V4-T2-245</b>
Accessories . . . . .	<b>V4-T2-256</b>
Technical Data and Specifications . . . . .	<b>V4-T2-257</b>
Dimensions and Weights . . . . .	<b>V4-T2-259</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

### F-Frame (10–225 Amperes)

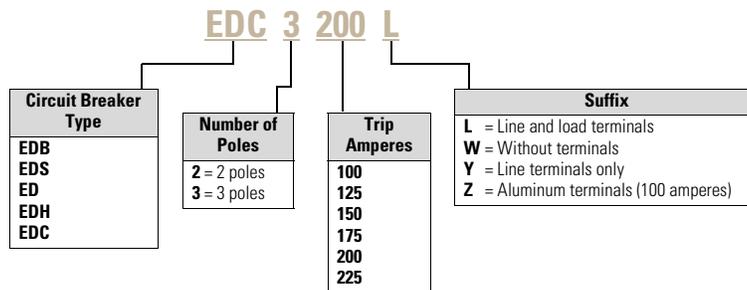
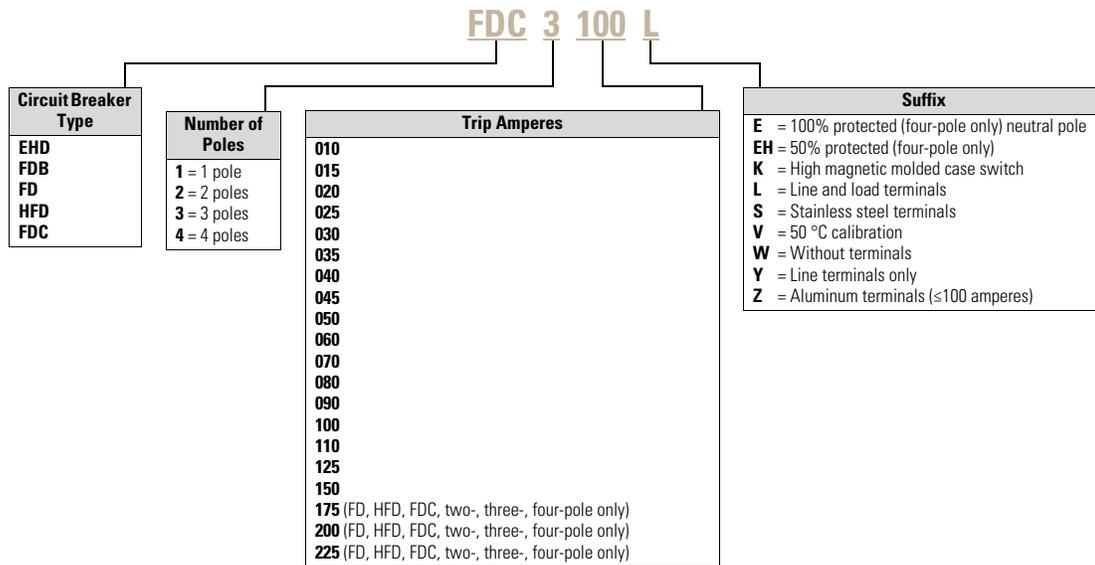
#### Product Description

- All Eaton’s F-Frame circuit breakers are HACR rated
- All circuit breakers 10 through 30 amperes are suitable for HID (high intensity discharge) use
- All F-Frame circuit breakers are suitable for reverse feed use

**Catalog Number Selection**

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

**FD-Frame Circuit Breakers with Thermal-Magnetic Trip Unit Technology**



# 2.4

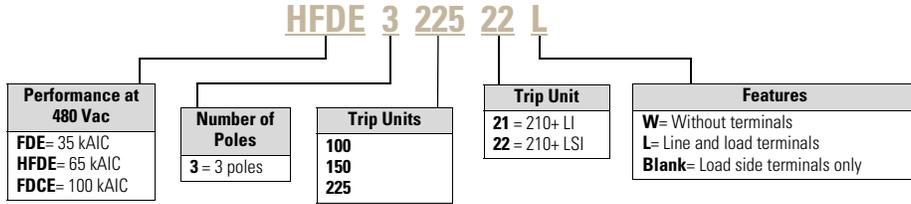
## Molded Case Circuit Breakers

### Series C

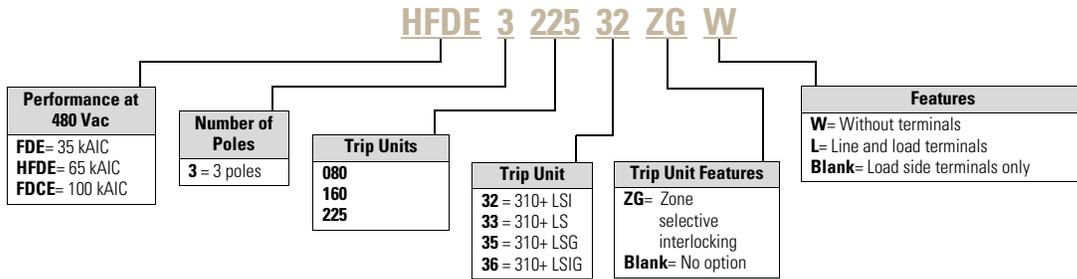
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

#### FD-Frame Circuit Breakers with 210+ Electronic Trip Unit Technology



#### FD-Frame Circuit Breakers with 310+ Electronic Trip Unit Technology



## Product Selection

### Type ED Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40 °C	240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 65 kAIC at 240 Vac	
	Two-Pole Catalog Number	Three-Pole Catalog Number
15	ED2015	ED3015
20	ED2020	ED3020
25	ED2025	ED3025
30	ED2030	ED3030
35	ED2035	ED3035
40	ED2040	ED3040
50	ED2050	ED3050
60	ED2060	ED3060
100	ED2100	ED3100
125	ED2125	ED3125
150	ED2150	ED3150
175	ED2175	ED3175
200	ED2200	ED3200
225	ED2225	ED3225

### Type EDH Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40 °C	240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 100 kAIC at 240 Vac	
	Two-Pole Catalog Number	Three-Pole Catalog Number
15	—	—
20	—	—
25	—	—
30	—	—
35	—	—
40	—	—
50	—	—
60	—	—
100	EDH2100	EDH3100
125	EDH2125	EDH3125
150	EDH2150	EDH3150
175	EDH2175	EDH3175
200	EDH2200	EDH3200
225	EDH2225	EDH3225

### Type EDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40 °C	240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 200 kAIC at 240 Vac	
	Two-Pole Catalog Number	Three-Pole Catalog Number
15	—	—
20	—	—
25	—	—
30	—	—
35	—	—
40	—	—
50	—	—
60	—	—
100	EDC2100	EDC3100
125	EDC2125	EDC3125
150	EDC2150	EDC3150
175	EDC2175	EDC3175
200	EDC2200	EDC3200
225	EDC2225	EDC3225

### Type EDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40 °C	240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 22 kAIC at 240 Vac	
	Two-Pole Catalog Number	Three-Pole Catalog Number
100	EDB2100	EDB3100
110	EDB2110	EDB3110
125	EDB2125	EDB3125
150	EDB2150	EDB3150
175	EDB2175	EDB3175
200	EDB2200	EDB3200
225	EDB2225	EDB3225

### Type EDS Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40 °C	240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 42 kAIC at 240 Vac	
	Two-Pole Catalog Number	Three-Pole Catalog Number
100	EDS2100	EDS3100
110	EDS2110	EDS3110
125	EDS2125	EDS3125
150	EDS2150	EDS3150
175	EDS2175	EDS3175
200	EDS2200	EDS3200
225	EDS2225	EDS3225

### Type EHD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units (Includes Terminals on Load End Only)

Maximum Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc 14 kAIC at 277 Vac Single-Pole	480 Vac Maximum, 250 Vdc 14 kAIC at 480 Vac Two-Pole	Three-Pole
	Catalog Number	Catalog Number	Catalog Number
10 ①	EHD1010	EHD2010	EHD3010
15	EHD1015 ②	EHD2015	EHD3015
20	EHD1020 ②	EHD2020	EHD3020
25	EHD1025	EHD2025	EHD3025
30	EHD1030	EHD2030	EHD3030
35	EHD1035	EHD2035	EHD3035
40	EHD1040	EHD2040	EHD3040
45	EHD1045	EHD2045	EHD3045
50	EHD1050	EHD2050	EHD3050
60	EHD1060	EHD2060	EHD3060
70	EHD1070	EHD2070	EHD3070
80	EHD1080	EHD2080	EHD3080
90	EHD1090	EHD2090	EHD3090
100	EHD1100	EHD2100	EHD3100

#### Notes

- ① Not UL listed. 5 kAIC interrupting rating.
- ② UL listed for SWD applications, see NEC Article 240.83(d).

**Type FDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units  
(Includes Terminals on Load End Only)**

2

Maximum Continuous Ampere Rating at 40 °C	600 Vac Maximum, 250 Vdc 14 kAIC at 600 Vac		
	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
10 ①	FDB2010	FDB3010	FDB4010
15	FDB2015	FDB3015	FDB4015
20	FDB2020	FDB3020	FDB4020
25	FDB2025	FDB3025	FDB4025
30	FDB2030	FDB3030	FDB4030
35	FDB2035	FDB3035	FDB4035
40	FDB2040	FDB3040	FDB4040
45	FDB2045	FDB3045	FDB4045
50	FDB2050	FDB3050	FDB4050
60	FDB2060	FDB3060	FDB4060
70	FDB2070	FDB3070	FDB4070
80	FDB2080	FDB3080	FDB4080
90	FDB2090	FDB3090	FDB4090
100	FDB2100	FDB3100	FDB4100
110	FDB2110	FDB3110	FDB4110
125	FDB2125	FDB3125	FDB4125
150	FDB2150	FDB3150	FDB4150

**Note**

① Not UL listed. 5 kAIC interrupting rating.

**Type FD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units  
(Includes Terminals on Load End Only)**

Maximum Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc 35 kAIC at 277 Vac	600 Vac Maximum, 250 Vdc 35 kAIC at 480 Vac		
	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
10 ①	FD1010	—	—	—
15	FD1015 ②	FD2015	FD3015	FD4015
20	FD1020 ②	FD2020	FD3020	FD4020
25	FD1025	FD2025	FD3025	FD4025
30	FD1030	FD2030	FD3030	FD4030
35	FD1035	FD2035	FD3035	FD4035
40	FD1040	FD2040	FD3040	FD4040
45	FD1045	FD2045	FD3045	FD4045
50	FD1050	FD2050	FD3050	FD4050
60	FD1060	FD2060	FD3060	FD4060
70	FD1070	FD2070	FD3070	FD4070
80	FD1080	FD2080	FD3080	FD4080
90	FD1090	FD2090	FD3090	FD4090
100	FD1100	FD2100	FD3100	FD4100
110	FD1110	FD2110	FD3110	FD4110
125	FD1125	FD2125	FD3125	FD4125
150	FD1150	FD2150	FD3150	FD4150
175	—	FD2175	FD3175	FD4175
200	—	FD2200	FD3200	FD4200
225	—	FD2225	FD3225	FD4225

**Notes**

- ① Not UL listed. 5 kAIC interrupting rating.  
 ② UL listed for SWD applications, see NEC Article 240.83(d).

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### Type HFD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units (Includes Terminals on Load End Only)

Maximum Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc 65 kAIC at 277 Vac	600 Vac Maximum, 250 Vdc 65 kAIC at 480 Vac		
	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
15	HFD1015 ①	HFD2015	HFD3015	HFD4015
20	HFD1020 ①	HFD2020	HFD3020	HFD4020
25	HFD1025	HFD2025	HFD3025	HFD4025
30	HFD1030	HFD2030	HFD3030	HFD4030
35	HFD1035	HFD2035	HFD3035	HFD4035
40	HFD1040	HFD2040	HFD3040	HFD4040
45	HFD1045	HFD2045	HFD3045	HFD4045
50	HFD1050	HFD2050	HFD3050	HFD4050
60	HFD1060	HFD2060	HFD3060	HFD4060
70	HFD1070	HFD2070	HFD3070	HFD4070
80	HFD1080	HFD2080	HFD3080	HFD4080
90	HFD1090	HFD2090	HFD3090	HFD4090
100	HFD1100	HFD2100	HFD3100	HFD4100
110	HFD1110	HFD2110	HFD3110	HFD4110
125	HFD1125	HFD2125	HFD3125	HFD4125
150	HFD1150	HFD2150	HFD3150	HFD4150
175	—	HFD2175	HFD3175	HFD4175
200	—	HFD2200	HFD3200	HFD4200
225	—	HFD2225	HFD3225	HFD4225

**Note**

① UL listed for SWD applications, see NEC Article 240.83(d).

**Type FDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units  
(Includes Terminals on Load End Only)**

Maximum Continuous Ampere Rating at 40 °C	600 Vac Maximum, 250 Vdc 100 kAIC at 480 Vac		
	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
15	FDC2015	FDC3015	FDC4015
20	FDC2020	FDC3020	FDC4020
25	FDC2025	FDC3025	FDC4025
30	FDC2030	FDC3030	FDC4030
35	FDC2035	FDC3035	FDC4035
40	FDC2040	FDC3040	FDC4040
45	FDC2045	FDC3045	FDC4045
50	FDC2050	FDC3050	FDC4050
60	FDC2060	FDC3060	FDC4060
70	FDC2070	FDC3070	FDC4070
80	FDC2080	FDC3080	FDC4080
90	FDC2090	FDC3090	FDC4090
100	FDC2100	FDC3100	FDC4100
110	FDC2110	FDC3110	FDC4110
125	FDC2125	FDC3125	FDC4125
150	FDC215	FDC3150	FDC4150
175	FDC2175	FDC3175	FDC4175
200	FDC2200	FDC3200	FDC4200
225	FDC2225	FDC3225	FDC4225

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### Types FDE, HFDE and FDCE 310+ Electronic Circuit Breakers with Non-Interchangeable Trip Units

See 310+ adjustability specifications on [Page V4-T2-258](#).

Maximum Ampere Rating	Digitrip RMS 310+ Trip Unit Only		LSG	LSIG	Neutral CT for LSG and LSIG Catalog Number
	Standard LS	Optional LSI			
	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp Catalog Number	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection	
<b>35 kAIC at 480 Vac / 18 kAIC at 600 Vac</b>					
80	FDE308033	FDE308032	FDE308035	FDE308036	CTF080
160	FDE316033	FDE316032	FDE316035	FDE316036	CTF160
225	FDE322533	FDE322532	FDE322535	FDE322536	CTF225
<b>65 kAIC at 480 Vac / 25 kAIC at 600 Vac</b>					
80	HFDE308033	HFDE308032	HFDE308035	HFDE308036	CTF080
160	HFDE316033	HFDE316032	HFDE316035	HFDE316036	CTF160
225	HFDE322533	HFDE322532	HFDE322535	HFDE322536	CTF225
<b>100 kAIC at 480 Vac / 25 kAIC at 600 Vac</b>					
80	FDCE308033	FDCE308032	FDCE308035	FDCE308036	CTF080
160	FDCE316033	FDCE316032	FDCE316035	FDCE316036	CTF160
225	FDCE322533	FDCE322532	FDCE322535	FDCE322536	CTF225

#### Types FDE, HFDE, and FDCE 210+ Electronic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Ampere Rating	Digitrip RMS 210+ Trip Unit Only	
	Standard LI	Optional LSI
	Adjustable Instantaneous Catalog Number	Adjustable Short Time Pickup and Delay Catalog Number
<b>35 kAIC at 480 Vac / 18 kAIC at 600 Vac</b>		
100	FDE310021	FDE310022
150	FDE315021	①
225	FDE322521	FDE322522
<b>65 kAIC at 480 Vac / 25 kAIC at 600 Vac</b>		
100	HFDE310021	HFDE310022
150	HFDE315021	①
225	HFDE322521	HFDE322522

#### 210+ Trip Electronic Trip Units Amperage Settings

Circuit Breaker Type	Frame	Ratings
FDE, HFDE	225	100, 110, 125, 150, 175, 200, 225
FDE, HFDE	150	70, 80, 90, 100, 110, 125, 150
FDE, HFDE	100	40, 50, 60, 70, 80, 90, 100

#### FDE 310+ Electronic Breaker with Zone Selective Interlocking

Ampere Rating	LSI w/ZSI Catalog Number	LSIG w/ZSI Catalog Number
<b>35 kAIC at 480 Vac / 18 kAIC at 600 Vac</b>		
80	FDE308032ZG	FDE308036ZG
160	FDE316032ZG	FDE316036ZG
225	FDE322532ZG	FDE322536ZG
<b>65 kAIC at 480 Vac / 25 kAIC at 600 Vac</b>		
80	HFDE308032ZG	HFDE308036ZG
160	HFDE316032ZG	HFDE316036ZG
225	HFDE322532ZG	HFDE322536ZG
<b>100 kAIC at 480 Vac / 25 kAIC at 600 Vac</b>		
80	FDCE308032ZG	FDCE308036ZG
160	FDCE316032ZG	FDCE316036ZG
225	FDCE322532ZG	FDCE322536ZG

#### Digitrip 310+ Electronic Trip Units Amperage Settings

Circuit Breaker Type	Frame	Ratings
FDE, HFDE, FDCE	225	100, 110, 125, 150, 160, 175, 200, 225
FDE, HFDE, FDCE	160	60, 70, 80, 90, 100, 125, 150, 160
FDE, HFDE, FDCE	80	15, 20, 30, 40, 50, 60, 70, 80

#### Note

① For 210+ trip unit, 150 A not available with LSI trip unit; entire range is covered by 100 A and 225 A frames.

**Molded Case Switches**

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

**Molded Case Switches**

Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker with Load Side Terminals Only		
	480 Vac Maximum, 250 Vdc Catalog Number	600 Vac Maximum, 250 Vdc Catalog Number	
<b>Two-Pole</b>			
100	EHD2100K	FD2100K	HFD2100K
150	—	FD2150K	HFD2150K
225	—	FD2225K	HFD2225K
<b>Three-Pole</b>			
100	EHD3100K	FD3100K	HFD3100K
150	—	FD3150K	HFD3150K
225	—	FD3225K	HFD3225K
<b>Four-Pole</b>			
100	—	FD4100K	HFD4100K
150	—	FD4150K	HFD4150K
225	—	FD4225K	HFD4225K

**Note**

Molded case switches will open above 1800 amperes.

## Accessories Selection Guide and Ordering Information

2

### Line and Load Terminals

Line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. Except as noted, terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B. Unless otherwise specified, F-Frame circuit breakers are factory equipped with load terminals only.

### Ordering Information

F-Frame circuit breakers and molded case switches have load terminals only as standard equipment. When standard line-end terminals (same as standard load-end terminals) are required, add Suffix **L** to the circuit breaker catalog number. When non-standard or optional line and/or load terminals are required, order by style number. Specify if factory installation is required.

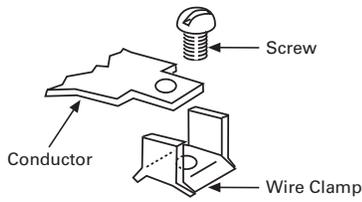
### Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range	Metric Wire Range mm <sup>2</sup>	Package of Three Terminals Catalog Number
<b>Standard Pressure Type Terminals</b>					
20 (EHD)	Steel	Cu/Al	14–10	2.5–4	<b>3T20FB</b> ①
100	Steel	Cu/Al	14–1/0	2.5–50	<b>3T100FB</b>
225	Aluminum	Cu/Al	4–4/0	25–95	<b>3TA225FD</b>
<b>Optional Pressure Terminals</b>					
50	Aluminum	Cu/Al	14–4	2.5–25	<b>3TA50FB</b> ①
100	Aluminum	Cu/Al	14–1/0	2.5–50	<b>3TA100FD</b>
200	Stainless steel	Cu	4–4/0	25–95	<b>3T150FB</b>
225	Copper	Cu	4–4/0	25–95	<b>3T225FD</b>
225	Aluminum	Cu/Al	6–300 kcmil	16–150	<b>3TA225FDK3</b> ②
225	Aluminum	Cu/Al	6–300 kcmil	16–150	<b>3TA225FDK</b> ② ③

#### Notes

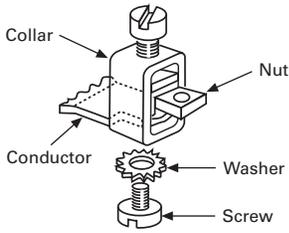
- ① Not for use with ED, EDH, EDC breakers.
- ② Includes terminal shield kit. Adds approximately 3 inches (76.2) to breaker height. Available for use on three-pole breaker only.
- ③ Replacement use only.

### Line and Load Terminals



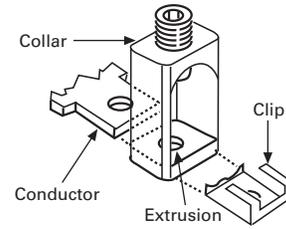
**3T20FB**

Assemble wire clamp to bottom of conductor as shown.



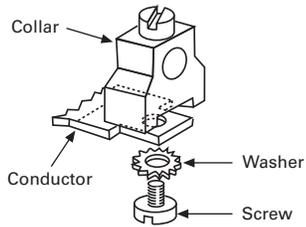
**3T100FB, 3T150FB**

Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer.  
**Caution:** Collar must surround conductor.



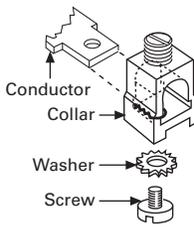
**3TA225FD**

Insert collar enclosing conductor and center on extrusion on collar. Install clip with legs on top of conductor and snap end around bottom of collar.



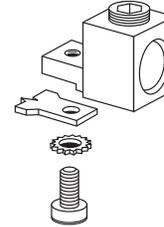
**3TA50FB**

Assemble collar on top of conductor as shown. Tighten securely with screw and washer.



**3TA100FD**

Collar slides onto conductor and is held in position by a screw and lockwasher.



**3TA225FDK3 (Up to 150 mm<sup>2</sup>)**

Assemble collar on top of conductor as shown. Tighten securely with screw and washer. Terminal shield must be used with this collar.  
**Note:** For 185 mm<sup>2</sup>, use 3TA225FDK1. Same illustration for 3TA225FDK

### Accessories

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

#### Allowable Accessory Combinations

##### FD Frame Accessories

Description	Reference Page	Single-Pole		Two-Pole		Three-Pole ①			Four-Pole			Neutral
		Center		Left	Right	Left	Center	Right	Left	Center	Right	
<b>Internal Accessories (Only one internal accessory per pole)</b>												
Alarm lockout switch (make only)	V4-T2-321	■	—	—	—	—	—	—	—	—	—	—
Alarm lockout (Make/Break)	V4-T2-321	—	—	■	□	—	□	■	—	—	—	—
Alarm lockout (2Make/2Break)	V4-T2-321	—	—	■	□	—	□	■	—	—	—	—
Auxiliary switch (1A, 1B)	V4-T2-323	—	—	■	■	—	■	■	—	—	—	■
Auxiliary switch (2A, 2B)	V4-T2-323	—	—	■	■	—	■	■	—	—	—	■
Auxiliary switch and alarm switch combination	V4-T2-325	—	—	■	□	—	□	■	—	—	—	—
Shunt trip—standard	V4-T2-327	—	—	■	■	—	■	■	—	—	—	■
Shunt trip—low energy	V4-T2-331	—	—	■	■	—	■	■	—	—	—	—
Undervoltage release mechanism	V4-T2-333	—	—	■	■	—	■	■	—	—	—	—
<b>External Accessories</b>												
End cap kit	V4-T2-356	—	●	●	●	●	●	●	●	●	●	●
Keeper nut	V4-T2-356	●	●	●	●	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-357	●	●	●	●	●	●	●	●	●	●	●
Multiwire connectors	V4-T2-358	●	●	●	●	●	●	●	●	●	●	●
Rear fed terminals	V4-T2-358	●	●	●	●	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-358	●	●	●	●	●	●	●	●	●	●	●
Terminal shields	V4-T2-360	●	●	●	●	●	●	●	●	●	●	●
Terminal end covers	V4-T2-361	—	—	—	●	●	●	—	—	—	—	—
Interphase barriers	V4-T2-361	—	●	●	●	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-362	■	■	—	—	■	—	—	■	—	—	—
Snap-on padlockable handle lock hasp	V4-T2-362	■	■	—	—	■	—	—	■	—	—	—
Padlockable handle lock hasp	V4-T2-363	—	—	■	□	—	□	□	—	□	—	—
Cylinder lock	V4-T2-363	—	—	—	■	—	—	—	—	—	—	—
Key interlock kit	V4-T2-364	—	—	■	□	—	□	□	—	□	—	—
Sliding bar interlock—requires two breakers	V4-T2-365	—	—	—	●	●	●	—	—	—	—	—
Walking beam interlock—requires two breakers	V4-T2-365	—	—	—	●	●	●	●	●	●	●	●
Electrical (solenoid and motor) operators	V4-T2-366	—	—	—	●	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-367	—	●	●	●	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-369	●	●	●	●	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-370	●	●	●	●	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-445	—	—	—	●	●	●	—	—	—	—	—
LFD current limiter	V4-T2-372	—	—	—	●	●	●	—	—	—	—	—
IQ Energy Sentinel	V4-T2-372	—	●	●	●	●	●	—	—	—	—	—
Cause of trip display	V4-T2-373	—	—	—	●	—	—	●	—	—	—	—
Remote mount cause of trip display	V4-T2-373	—	—	—	●	—	—	●	—	—	—	—
Cause of trip LED	V4-T2-373	—	—	—	●	—	—	●	—	—	—	—
<b>Modifications (Refer to Eaton)</b>												
Special calibration	—	●	●	●	●	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-223	●	●	●	●	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●	●	●	●	●
Marine/naval application	—	●	●	●	●	●	●	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

#### Note

① Internal accessories are listed with Underwriters Laboratories (UL) for factory installation. They are not listed with UL for field installation.

## Technical Data and Specifications

### UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts AC (50/60 Hz)				Volts DC <sup>①</sup>	
		240	277	480	600	125	250 <sup>②③</sup>
EDB	2, 3	22	—	—	—	10	—
EDS	2, 3	42	—	—	—	10	—
ED	2, 3	65	—	—	—	10	—
EDH	2, 3	100	—	—	—	10	—
EDC	2, 3	200	—	—	—	10	—
EHD	1	—	4	—	—	10	—
	2, 3	18	—	14	—	—	10
FDB	2, 3, 4	18	—	14	14	—	10
FD	1	—	35	—	—	10	—
	2, 3, 4	65	—	35	18	—	10
FDE <sup>④</sup>	3	65	—	35	18	—	—
HFD	1	—	65	—	—	10	—
	2, 3, 4	100	—	65	25	—	22
HFDE <sup>④</sup>	3	100	—	65	25	—	—
FDC <sup>⑤</sup>	2, 3, 4	200	—	100	35	—	22
FDCE <sup>④⑤⑥</sup>	3	200	—	100	25	—	—

### IEC 157-1 (P1) Interrupting Capacity Ratings (P1)

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts AC (50/60 Hz)				Volts DC <sup>①</sup>	
		220, 240	380, 415	440	500	125	250 <sup>②③</sup>
EDB	2, 3	22	—	—	—	10	—
EDS	2, 3	42	—	—	—	10	—
ED	2, 3	65	—	—	—	10	—
EDH	2, 3	100	—	—	—	10	—
EDC	2, 3	200	—	—	—	10	—
EHD	1	—	14	—	—	10	—
	2, 3	18	—	14	—	—	10
FDB	2, 3, 4	18	14	14	14	—	10
FD	1	35	—	—	—	10	—
	2, 3, 4	65	35	35	18	—	10
HFD	1	65	—	—	—	10	—
	2, 3, 4	100	65	65	25	—	22
FDC	2, 3, 4	200	100	100	35	—	22

### 210+ and 310+ Electronic Trip Unit Accessories

Description	210+	310+	Catalog number
Electronic portable test kit	■	■	MTST230V
Trip unit tamper protection wire seal	■	■	5108A03H01
External neutral sensor (80 A) <sup>②</sup>		■	CTF080
External neutral sensor (160 A) <sup>②</sup>		■	CTF160
External neutral sensor (225 A) <sup>②</sup>		■	CTF225
Compact external neutral sensor (80 A) <sup>②</sup>		■	CTFD080
Compact external neutral sensor (160 A) <sup>②</sup>		■	CTFD160
Compact external neutral sensor (225 A) <sup>②</sup>		■	CTFD225
Breaker-mount cause-of-trip indication		■	TRIP-LED
Breaker-mount ammeter module		■	DIGIVIEW
Remote-mount ammeter module		■	DIGIVIEWR06

### UL 489 Current-Limiting Data

Frame	Circuit	I <sub>p</sub> (kA)	I <sup>2</sup> T (10 <sup>6</sup> A <sup>2</sup> S)
FDC	240 V/200 kA	41.4	1.41
FDC	480 V/100 kA	38.9	2.50
FDC	600 V/35 kA	29.0	3.00

#### Notes

- ① DC ratings apply to substantially non-inductive circuits.
- ② Two-pole circuit breaker, or two poles of three-pole circuit breaker.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ④ Electronics available on three-pole only, no DC rating for FDE, HFDE, FDCE.
- ⑤ Current limiting.
- ⑥ Check with Eaton for availability.
- ⑦ Neutral sensor required for four-wire systems if neutral protection is desired; sold separately.

### FDE 210+ and 310+ Specifications

Description	Digitrip RMS 210+	Digitrip RMS 310+
<b>Breaker type</b>		
Frame designation	FD	FD
Frames available	100 A, 150 A, 225 A	80 A, 160 A, 225 A
Continuous current range (A)	40–225 A	15–225 A
Ground fault pickup (A)	N/A	16–225 A
Interrupting capacities at 480 Vac (kAIC)	35, 65, 100	35, 65, 100
<b>Protection</b>		
Ordering options	LI, LSI	LS, LSI, LSG, LSIG
Arcflash Reduction Maintenance System™ (or Maintenance Mode)	No	No
Interchangeable trip unit	No	No
High load alarm (suffix B20)	No	No
Ground fault alarm with trip (suffix B21)	No	No
Ground fault alarm, no trip (suffix B22)	No	No
Zone selective interlocking (suffix ZG)	No	LSI, LSIG
Cause of trip indication	No	Yes
Thru-cover accessories	No	No
Test kit available	Yes	Yes

### FDE 210+ Adjustability Specifications

210+ settings		FD Frame		
		100 A	150 A	225 A
$I_r$ = continuous current or long delay pickup (amperes) (all 210+)	$I_r$			
	A	40	70	100
	B	50	80	110
	C	60	90	125
	D	70	100	150
	E	80	110	175
	F	90	125	200
	G (= $I_n$ )	100	150	225
	$I_i$ (x $I_n$ )= Instantaneous pickup (210+ LI version)	$I_i$	100	150
J–2x		200	300	450
K–2.5x		250	375	565
L–3x		300	450	675
M–3.5x		350	525	790
N–4x		400	600	900
O–5x		500	750	1125
P–6x		600	900	1350
Q–8x		800	1200	1800
R–10x		1000	1500	2250
S–12x ①		1200	1800	2400
Fixed instantaneous override (all 210+)			2400	2400
"Isd (x $I_r$ ) / tsd = SD profile ② (210+ LSI version)	$I_{sd} / t_{sd}$	100	150	225
	J	2x / 150	N/A	2x / 150
	K	2x / 300	N/A	2x / 300
	L	2x / $I^2t$	N/A	2x / $I^2t$
	M	4x / Inst	N/A	4x / Inst
	N	4x / 150	N/A	4x / 150
	O	4x / $I^2t$	N/A	4x / $I^2t$
	P	6x / Inst	N/A	6x / Inst
	Q	6x / 300	N/A	6x / 300
	R	10x / 150	N/A	10x / 150
	S	10x / 300	N/A	10x / 300

### FDE 310+ Adjustability Specifications

310+ Settings		FD Frame		
		80 A	160 A	225 A
$I_r$ = continuous current or long delay pickup (amperes) (All 310+)	$I_r$			
	A	15	60	100
	B	20	70	110
	C	30	80	125
	D	40	90	150
	E	50	100	160
	F	60	125	175
	G	70	150	200
	H (= $I_n$ )	80	160	225
$t_r$ = long delay time (seconds) (All 310+)	Position 1	2	2	2
	Position 2	4	4	4
	Position 3	7	7	7
	Position 4	10	10	10
	Position 5	12	12	12
	Position 6	15	15	15
	Position 7	20	20	20
	Position 8	24	24	24
	$I_{sd}$ (x $I_r$ ) = short delay pickup (All 310+)	Position 1	2x	2x
Position 2		3x	3x	3x
Position 3		4x	4x	4x
Position 4		5x	5x	5x
Position 5		6x	6x	6x
Position 6		7x	7x	7x
Position 7		8x	8x	8x
Position 8		10x	10x	10x
Position 9		12x	12x	12x
$t_{sd}^2$ = short delay time $I^2t$ (milliseconds) (LS, LSG)	Fixed	67	67	67
		at10x	at10x	at10x
	Position 1	Inst	Inst	Inst
	Position 2	120	120	120
$t_{sd}$ = short delay time flat (milliseconds) (LSI, LSIG)	Position 3	300	300	300
	Position 1	16	32	45
	Position 2	24	48	67
$I_g$ = ground fault pickup (amperes) (LSG, LSIG)	Position 3	32	64	90
	Position 4	48	96	135
	Position 5	64	128	180
	Position 6	80	160	225
	Position 1	Inst	Inst	Inst
	Position 2	120	120	120
$t_g$ = ground fault delay time (milliseconds) (LSG, LSIG)	Position 3	300	300	300
	Independently Adjustable Instantaneous ( $I_i$ ) setting ①			
Maintenance Mode pickup (2.5 x $I_n$ ) (amperes) ②				

#### Notes

- ① Not available for FD. Independently adjustable  $I_i$  setting available in NG and RG ALSI and ALSIG trip units.
- ② Maintenance Mode not available for FD frames. It is available for KD, LD, MDL, NG and RG.

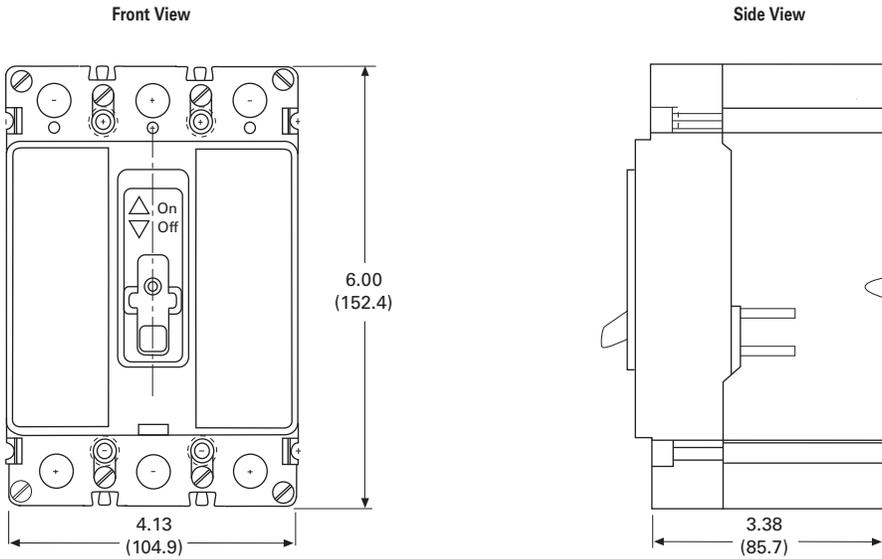
**Dimensions and Weights**

Approximate Dimensions in Inches (mm)

**FD Frame**

Number of Poles	Width	Height	Depth
1	1.38 (35.1)	6.00 (152.4)	3.38 (86.0)
2	2.75 (70.0)	6.00 (152.4)	3.38 (86.0)
3	4.13 (105.0)	6.00 (152.4)	3.38 (86.0)
4	5.50 (139.7)	6.00 (152.4)	3.38 (86.0)

**FD Frame, Three-Pole**



Approximate Shipping Weight Lb (kg)

**FD Frame**

Breaker Type	Number of Poles			
	1	2	3	4
ED, EDB, EDS, EDH, EDC	—	3 (1.4)	4.5 (2.0)	—
EHD, FDB, FD, HFD, FDC	2 (0.9)	3 (1.4)	4.5 (2.0)	6 (2.7)
FDE, HFDE, FDCE	—	—	4.5 (2.0)	—

Typical J-Frame Breaker

2



## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-261</b>
Product Selection . . . . .	<b>V4-T2-262</b>
Accessories . . . . .	<b>V4-T2-265</b>
Technical Data and Specifications . . . . .	<b>V4-T2-266</b>
Dimensions and Weights . . . . .	<b>V4-T2-267</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

## J-Frame (70–250 Amperes)

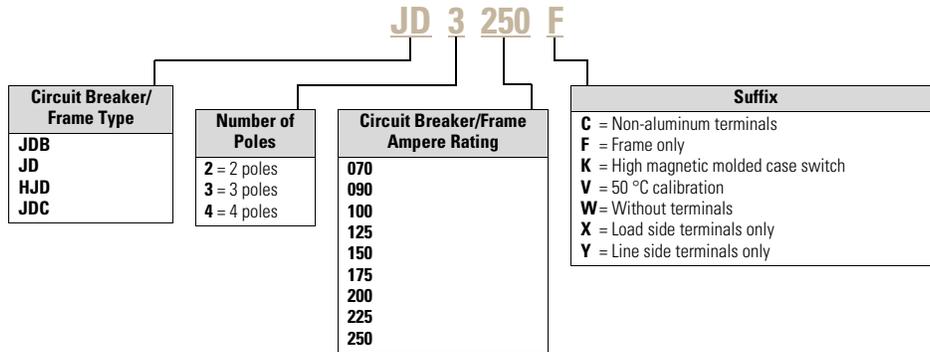
### Product Description

- All Eaton's J-Frame circuit breakers are HACR rated
- J-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- J-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

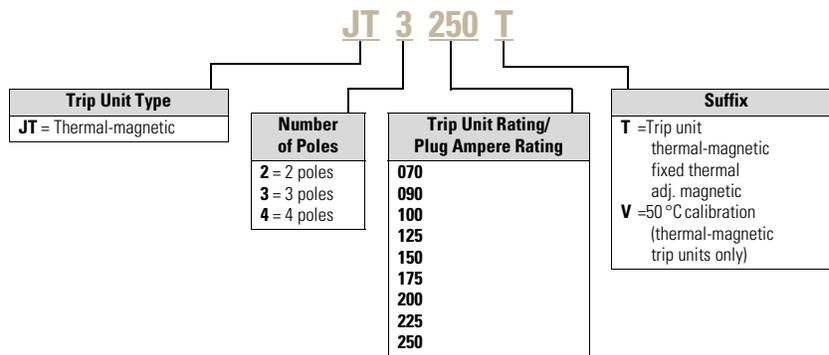
**Catalog Number Selection**

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

**Circuit Breaker/Frame**



**Trip Unit**



## Product Selection

## 2

## Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①	Thermal-Magnetic Trip Unit Only ①	Standard Terminals Only
	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
<b>Two-Pole</b>					
70	JD2070	HJD2070	JDC2070	JT2070T	TA250KB ②
90	JD2090	HJD2090	JDC2090	JT2090T	
100	JD2100	HJD2100	JDC2100	JT2100T	
125	JD2125	HJD2125	JDC2125	JT2125T	
150	JD2150	HJD2150	JDC2150	JT2150T	
175	JD2175	HJD2175	JDC2175	JT2175T	
200	JD2200	HJD2200	JDC2200	JT2200T	
225	JD2225	HJD2225	JDC2225	JT2225T	
250	JD2250	HJD2250	JDC2250	JT2250T	
<b>Three-Pole</b>					
70	JD3070	HJD3070	JDC3070	JT3070T	TA250KB ②
90	JD3090	HJD3090	JDC3090	JT3090T	
100	JD3100	HJD3100	JDC3100	JT3100T	
125	JD3125	HJD3125	JDC3125	JT3125T	
150	JD3150	HJD3150	JDC3150	JT3150T	
175	JD3175	HJD3175	JDC3175	JT3175T	
200	JD3200	HJD3200	JDC3200	JT3200T	
225	JD3225	HJD3225	JDC3225	JT3225T	
250	JD3250	HJD3250	JDC3250	JT3250T	
<b>Four-Pole ③④</b>					
125	—	HJD4125	—	JT4125T	TA250KB ②
150	—	—	—	—	
175	—	—	—	—	
200	JD4200	—	—	JT4200T	
225	—	—	—	—	
250	JD4250	HJD4250	—	JT4250T	

**Notes**

- ① Magnetic trip adjustable 5–10 times continuous ampere rating.
- ② Individually packed.
- ③ Fully rated neutral pole with no protection.
- ④ Neutral is in right pole.

### Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers – Frame Only

Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Catalog Number
<b>Two-Pole</b>		
JD2250F	HJD2250F	JDC2250F
<b>Three-Pole</b>		
JD3250F	HJD3250F	JDC3250F
<b>Four-Pole</b>		
JD4250F	HJD4250F	JDC4250F

### Type JDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Thermal-Magnetic Trip Units Suitable for Reverse Feed Application

Maximum Continuous Ampere Rating at 40 °C	600 Vac Rated, 250 Vdc Complete Circuit Breaker	
	Without Line and Load Terminals Catalog Number	With Standard Line and Load Terminals Only Catalog Number
<b>Two-Pole</b>		
70	JDB2070W	JDB2070
90	JDB2090W	JDB2090
100	JDB2100W	JDB2100
125	JDB2125W	JDB2125
150	JDB2150W	JDB2150
175	JDB2175W	JDB2175
200	JDB2200W	JDB2200
225	JDB2225W	JDB2225
250	JDB2250W	JDB2250
<b>Three-Pole</b>		
70	JDB3070W	JDB3070
90	JDB3090W	JDB3090
100	JDB3100W	JDB3100
125	JDB3125W	JDB3125
150	JDB3150W	JDB3150
175	JDB3175W	JDB3175
200	JDB3200W	JDB3200
225	JDB3225W	JDB3225
250	JDB3250W	JDB3250

### Molded Case Switches

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

### Molded Case Switches

Maximum Continuous Ampere Rating at 40 °C	600 Vac Maximum, 250 Vdc Complete Circuit Breaker Only Without Line and Load Terminals		Standard Terminals Only
	Catalog Number	Suitable for Reverse Feed Use Catalog Number	See Page V4-T2-264 for Optional Terminals Catalog Number
<b>Two-Pole</b>			
250	JD2250KW	JDB2250KW	TA250KB ①
	HJD2250KW	HJDB2250KW	—
<b>Three-Pole</b>			
250	JD3250KW	JDB3250KW	TA250KB ①
	HJD3250KW	HJDB3250KW	—
<b>Four-Pole</b>			
250	JD4250KW	JDB4250KW	TA250KB ①
	HJD4250KW	HJDB4250KW	—

#### Notes

① Individually packed.

Molded case switches may open above 2500 amperes.

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### Accessories Selection Guide and Ordering Information

##### Line and Load Terminals

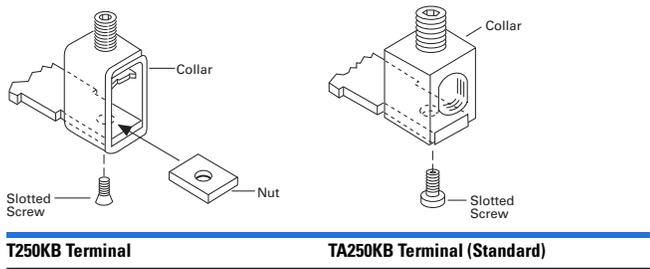
Eaton's line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65, or Electrical Bulletin 1165.

Unless otherwise specified, J-Frame circuit breaker line and load terminals are shipped separately for field installation.

The bottom of the standard TA250KB terminal contains a recess that is positioned over the J-Frame circuit breaker terminal conductor.

##### Ordering Information

J-Frame circuit breakers use Cu/Al terminals as standard. When optional copper-only terminals are required, order by catalog number. Specify if factory installation is required.



#### Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/ No. Conductors	Metric Wire Range mm <sup>2</sup>	Catalog Number
<b>Standard Cu/Al Pressure Terminals</b>					
250	Aluminum	Cu/Al	4–350 kcmil	25–185	<b>TA250KB</b>
<b>Optional Cu Pressure Terminals</b>					
250	Stainless Steel	Cu	4–350 kcmil	25–185	<b>T250KB</b>

## Accessories

### Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

### JD Frame Accessories

Description	Reference Page	Two-, Three-Pole			Four-Pole			Neutral
		Left	Center	Right	Left	Center	Right	
<b>Internal Accessories (Only One Internal Accessory Per Pole)</b>								
Alarm lockout (Make/Break)	V4-T2-321	☐	—	☐	☐	—	☐	—
Auxiliary switch (1A, 1B)	V4-T2-323	■	—	■	■	—	■	—
Auxiliary switch (2A, 2B)	V4-T2-323	■	—	■	■	—	■	—
Auxiliary switch and alarm switch combination	V4-T2-325	☐	—	☐	☐	—	☐	—
Shunt trip—standard	V4-T2-328	■	—	■	■	—	■	—
Shunt trip—low energy	V4-T2-331	■	—	■	■	—	■	—
Undervoltage release mechanism	V4-T2-335	■	—	■	■	—	■	—
<b>External Accessories</b>								
End cap kit	V4-T2-356	●	●	●	●	●	●	●
Plug nut	V4-T2-357	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-357	●	●	●	●	●	●	●
Multiwire connectors	V4-T2-358	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-359	●	●	●	●	●	●	●
Terminal shields	V4-T2-360	●	●	●	●	●	●	●
Interphase barriers	V4-T2-361	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-362	—	■	—	—	■	—	—
Padlockable handle block	V4-T2-362	—	■	—	—	■	—	—
Padlockable handle lock hasp	V4-T2-363	☐	—	☐	☐	—	☐	—
Cylinder lock	V4-T2-363	☐	—	☐	—	—	—	—
Key interlock kit	V4-T2-364	☐	—	☐	☐	—	☐	—
Sliding bar interlock—requires two breakers	V4-T2-365	●	●	●	—	—	—	—
Electrical (solenoid) operator	V4-T2-367	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-367	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-369	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-370	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-445	●	●	●	●	●	●	●
Handle extension	V4-T2-457	●	●	●	●	●	●	●
IQ Energy Sentinel	V4-T2-372	●	●	●	—	—	—	—
<b>Modifications (Refer to Eaton)</b>								
Special calibration	—	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-223	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●
Marine/naval application	—	●	●	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- ☐ May be mounted on left or right pole—not both
- Accessory available/modification available

## Technical Data and Specifications

2

### UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)				
		Volts AC (50/60 Hz)			Volts DC	
		240	480	600	125	250 <sup>①②</sup>
JDB	2, 3	65	35	18	—	10
JD	2, 3, 4	65	35	18	—	10
HJD	2, 3, 4	100	65	25	—	22
JDC <sup>③</sup>	2, 3, 4	200	100	35	—	22

### IEC 157-1 (P1) Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts AC (50/60 Hz)				Volts DC	
		240	380	415	600	125	250 <sup>①②</sup>
JD	2, 3, 4	65	35	35	—	—	10
HJD	2, 3, 4	100	65	65	—	—	22
JDC	2, 3, 4	200	100	100	—	—	22

### UL 489 Current-Limiting Data

Frame	Circuit	I <sub>p</sub> (kA)	I <sup>2</sup> T (10 <sup>6</sup> A <sup>2</sup> S)
JDC	240 V/200 kA	42.6	1.36
JDC	480 V/100 kA	40.0	3.00
JDC	600 V/35 kA	31.9	3.10

#### Notes

- ① Two-pole circuit breaker or two outside poles of three-pole circuit breaker.
- ② Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ③ Current limiting.

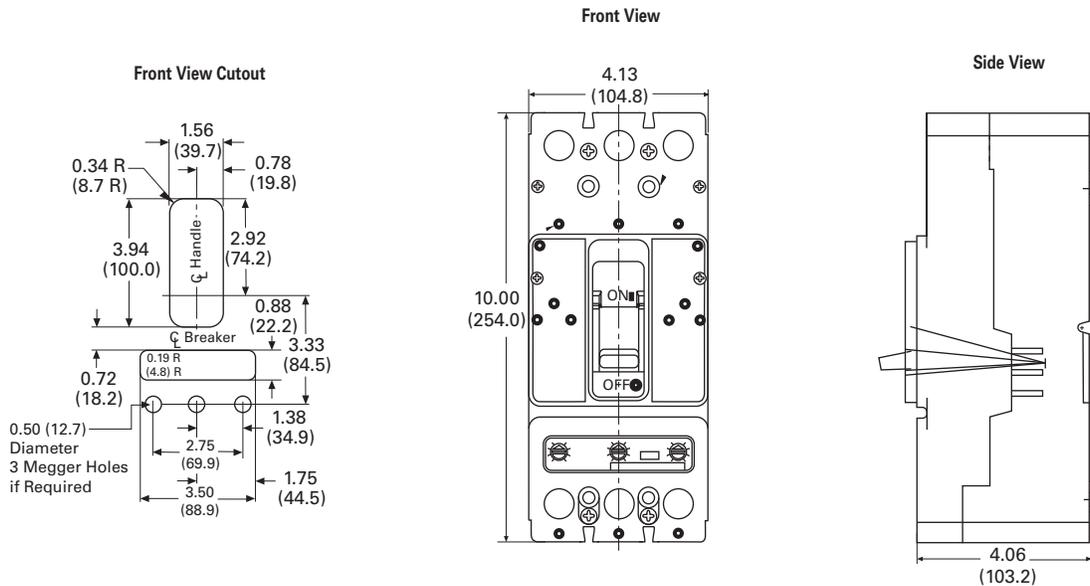
**Dimensions and Weights**

Approximate Dimensions in Inches (mm)

**JD Frame**

Number of Poles	Width	Height	Depth
2, 3	4.13 (105.0)	10.00 (254.0)	4.06 (104.1)
4	5.50 (139.7)	10.00 (254.0)	4.06 (104.1)

**JD-Frame, Three-Pole**



Approximate Shipping Weight in Lb (kg)

**JD Frame**

Breaker Type	Complete Breaker			Frame Only			Trip Unit		
	Two-Pole	Three-Pole	Four-Pole	Two-Pole	Three-Pole	Four-Pole	Two-Pole	Three-Pole	Four-Pole
JDB	11.25 (5.1)	12.50 (5.7)	—	—	—	—	—	—	—
JD	11.25 (5.1)	12.50 (5.7)	13.25 (6.0)	9.00 (4.1)	10.00 (4.5)	10.50 (4.8)	2.00 (0.9)	2.00 (0.9)	2.25 (1.0)
HJD	11.25 (5.1)	12.50 (5.7)	13.25 (6.0)	9.00 (4.1)	10.00 (4.5)	10.50 (4.8)	2.00 (0.9)	2.00 (0.9)	2.25 (1.0)
JDC	12.25 (5.6)	13.50 (6.1)	14.25 (6.5)	10.00 (4.5)	11.00 (5.0)	11.50 (5.2)	2.00 (0.9)	2.00 (0.9)	2.25 (1.0)

Typical K-Frame Circuit Breaker

2



### Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-269</b>
Product Selection . . . . .	<b>V4-T2-271</b>
Accessories . . . . .	<b>V4-T2-277</b>
Technical Data and Specifications . . . . .	<b>V4-T2-278</b>
Dimensions and Weights . . . . .	<b>V4-T2-280</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

### K-Frame (70–400 Amperes)

#### Product Description

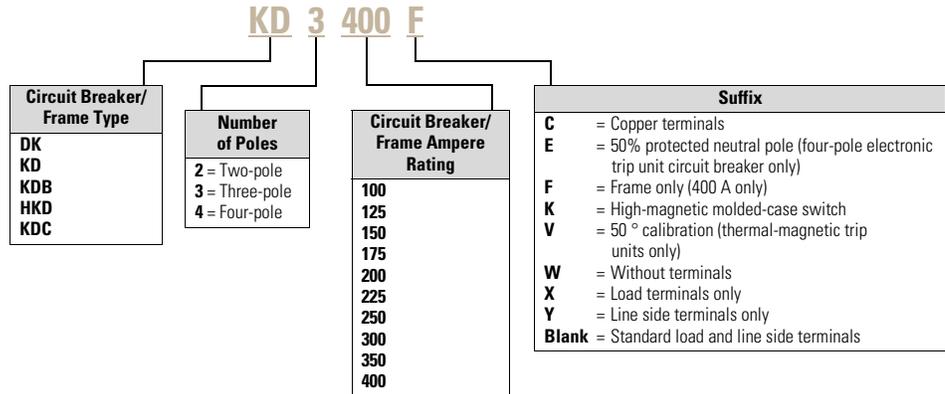
- All Eaton K-Frame circuit breakers are HACR rated
- K-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- K-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

**Catalog Number Selection**

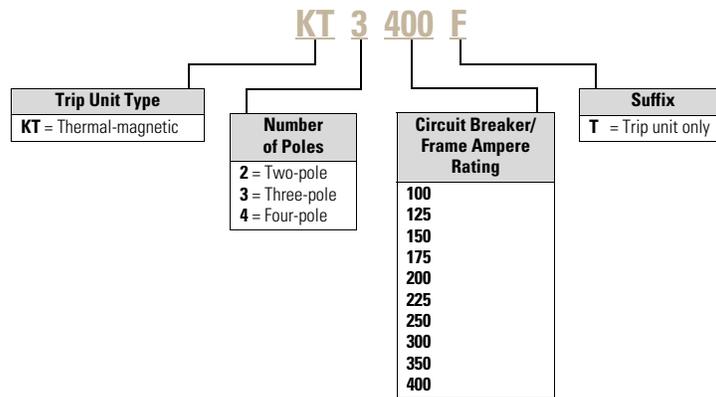
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

**K-Frame with Thermal-Magnetic Trip Unit Technology**

**Thermal-Magnetic Breakers and Frames ①**



**Thermal-Magnetic Trip Unit ①**



**Notes**

① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **KD3400F** or **HKD3400F**.

Ampere rating available with electronic trip unit only.

# 2.4

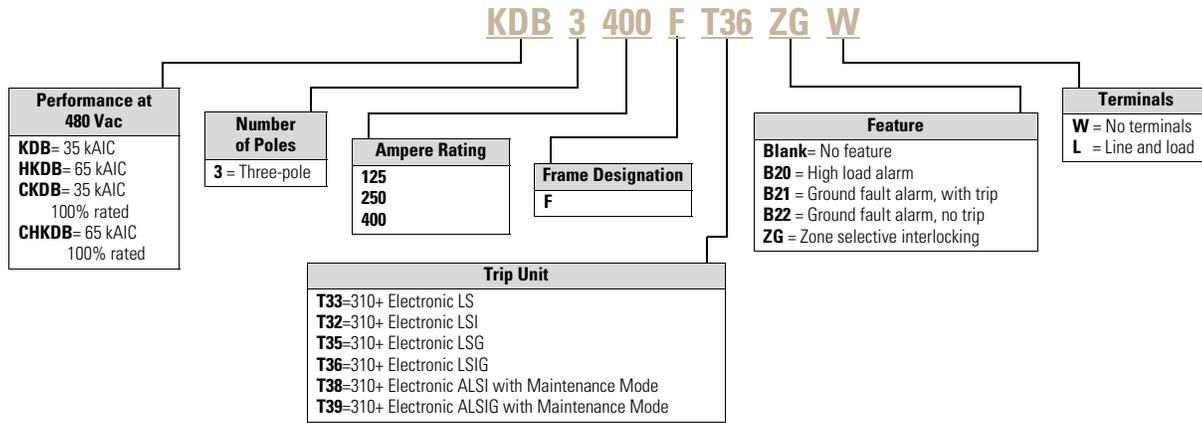
## Molded Case Circuit Breakers

### Series C

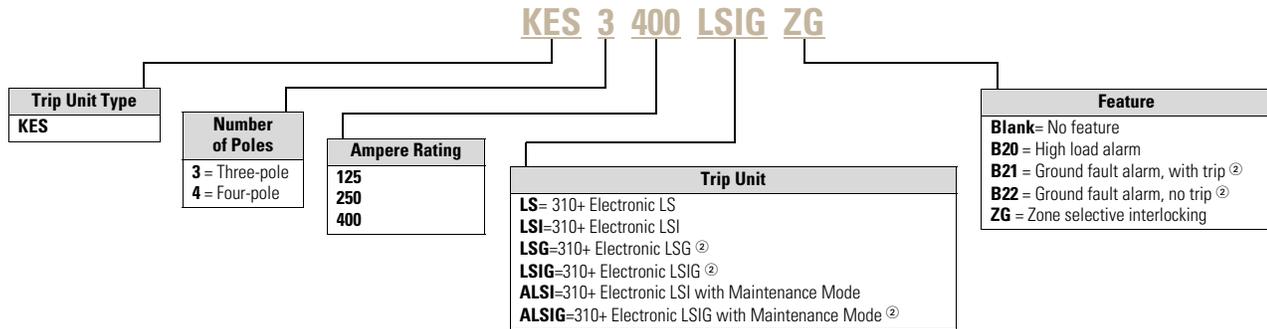
#### K-Frame with 310+ Electronic Trip Unit Technology<sup>①</sup>

2

#### 310+ Circuit Breakers<sup>②</sup>



#### 310+ Electronic Trip Units<sup>③</sup>



#### Notes

- ① Cannot combine 'B2X' suffixes with 'B2X' suffixes.
- ② Not available in four-pole configurations.
- ③ Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **KD3400F**, **HKD3400F**, etc.

## Product Selection

## Types KD, HKD and KDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①	Thermal-Magnetic Trip Unit Only ①	Standard Terminals Only
	Catalog Number	Catalog Number	Catalog Number	For Use with Standard or High or Ultra High Interrupting Frames Catalog Number	See Page V4-T2-276 for Optional Terminals Catalog Number
<b>Two-Pole</b>					
100	KD2100	HKD2100	KDC2100	KT2100T	TA300K ②
125	KD2125	HKD2125	KDC2125	KT2125T	TA300K ②
150	KD2150	HKD2150	KDC2150	KT2150T	TA300K ②
175	KD2175	HKD2175	KDC2175	KT2175T	TA300K ②
200	KD2200	HKD2200	KDC2200	KT2200T	TA300K ②
225	KD2225	HKD2225	KDC2225	KT2225T	TA300K ②
250	KD2250	HKD2250	KDC2250	KT2250T	TA350K ②
300	KD2300	HKD2300	KDC2300	KT2300T	TA350K ②
350	KD2350	HKD2350	KDC2350	KT2350T	TA350K ②
400	KD2400	HKD2400	KDC2400	KT2400T	2TA400K ③
<b>Three-Pole</b>					
100	KD3100	HKD3100	KDC3100	KT3100T	TA300K ②
125	KD3125	HKD3125	KDC3125	KT3125T	TA300K ②
150	KD3150	HKD3150	KDC3150	KT3150T	TA300K ②
175	KD3175	HKD3175	KDC3175	KT3175T	TA300K ②
200	KD3200	HKD3200	KDC3200	KT3200T	TA300K ②
225	KD3225	HKD3225	KDC3225	KT3225T	TA300K ②
250	KD3250	HKD3250	KDC3250	KT3250T	TA350K ②
300	KD3300	HKD3300	KDC3300	KT3300T	TA350K ②
350	KD3350	HKD3350	KDC3350	KT3350T	TA350K ②
400	KD3400	HKD3400	KDC3400	KT3400T	3TA400K ③
<b>Four-Pole</b>					
100	KD4100	HKD4100	KDC4100	KT3100T	TA300K ②
125	KD4125	HKD4125	KDC4125	KT3125T	TA300K ②
175	KD4175	HKD4175	KDC4175	KT3175T	TA300K ②
200	KD4200	HKD4200	KDC4200	KT3200T	TA300K ②
225	KD4225	HKD4225	KDC4225	KT3225T	TA300K ②
250	KD4250	HKD4250	KDC4250	KT3250T	TA350K ②
300	KD4300	HKD4300	KDC4300	KT3300T	TA350K ②
350	KD4350	HKD4350	KDC4350	KT3350T	TA350K ②
400	KD4400	HKD4400	KDC4400	KT3400T	4TA400K ③

## Notes

- ① Magnetic trip adjustable 5–10 times continuous ampere rating.
- ② Individually packed.
- ③ 2TA400K, 3TA400K and 4TA400K terminal kits contain one terminal for each pole and one terminal cover.

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### Types KD, HKD and KDC Thermal-Magnetic Circuit Breakers—Frame Only

Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Catalog Number
<b>Two-Pole</b>		
KD2400F	HKD2400F	KDC2400F
<b>Three-Pole</b>		
KD3400F	HKD3400F	KDC3400F
<b>Four-Pole</b>		
KD4400F	HKD4400F	KDC4400F

#### Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units

Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on [Page V4-T2-279](#).

#### Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole

Max. Cont. Ampere Rating at 40 °C	Circuit Breaker Frame Only		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Digitrip RMS 310+ Trip Unit Only <sup>①</sup>				Neutral CT for LSG and LSIG <sup>②③</sup> Catalog Number	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Standard LS	Options LSI	LSG	LSIG		
125	KD3400F	HKD3400F	KDC3400F	KES3125LS	KES3125LSI	KES3125LSG	KES3125LSIG	LGFACT125	See Page V4-T2-276
250	KD3400F	HKD3400F	KDC3400F	KES3250LS	KES3250LSI	KES3250LSG	KES3250LSIG	LGFACT250	
400	KD3400F	HKD3400F	KDC3400F	KES3400LS	KES3400LSI	KES3400LSG	KES3400LSIG	LGFACT400	

#### Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Four-Pole <sup>④⑤</sup>

Max. Cont. Ampere Rating at 40 °C	Circuit Breaker Frame Only		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Digitrip RMS 310+ Trip Unit Only <sup>①</sup>				Neutral CT for LSG and LSIG <sup>②③</sup> Catalog Number	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Standard LS	Options LSI	LSG	LSIG		
125	KD4400F	HKD4400F	KDC4400F	KES4125LS	KES4125LSI	—	—	—	See Page V4-T2-276
250	KD4400F	HKD4400F	KDC4400F	KES4250LS	KES4250LSI	—	—	—	
400	KD4400F	HKD4400F	KDC4400F	KES4400LS	KES4400LSI	—	—	—	

#### Notes

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSIG trip units.
- ④ Trip unit includes protected neutral pole. Use corresponding three-pole trip unit if protected neutral pole is not required.
- ⑤ Fully rated neutral pole protection is standard. For 50% rated protection on neutral pole, add Suffix **E** to four-pole trip unit catalog number.

**Type KDB with Digitrip 310+ Non-Interchangeable Trip Unit Suitable for Reverse Feed**See 310+ adjustability specifications on **Page V4-T2-279**.

Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals <sup>①</sup>							
Maximum Continuous Ampere Rating at 40 °C	Number of Poles	Standard LS	Optional LSI	LSG	LSIG	Neutral CT for LSG and LSIG <sup>②③</sup>	Terminal Information
		Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp Catalog Number	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection		
125	3	KDB3125FT33W	KDB3125FT32W	KDB3125FT35W	KDB3125FT36W	LGFACT125	See Page V4-T2-277
250	3	KDB3250FT33W	KDB3250FT32W	KDB3250FT35W	KDB3250FT36W	LGFACT250	
400	3	KDB3400FT33W	KDB3400FT32W	KDB3400FT35W	KDB3400FT36W	LGFACT400	

**Type HKDB with Digitrip 310+ Non-Interchangeable Trip Unit Suitable for Reverse Feed**See 310+ adjustability specifications on **Page V4-T2-279**.

Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals <sup>①</sup>							
Maximum Continuous Ampere Rating at 40 °C	Number of Poles	Standard LS	Optional LSI	LSG	LSIG	Neutral CT for LSG and LSIG <sup>②③</sup>	Terminal Information
		Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp Catalog Number	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection		
125	3	HKDB3125FT33W	HKDB3125FT32W	HKDB3125FT35W	HKDB3125FT36W	LGFACT125	See Page V4-T2-277
250	3	HKDB3250FT33W	HKDB3250FT32W	HKDB3250FT35W	HKDB3250FT36W	LGFACT250	
400	3	HKDB3400FT33W	HKDB3400FT32W	HKDB3400FT35W	HKDB3400FT36W	LGFACT400	

**100% Rated Types CKD and CHKD Electronic Circuit Breakers**

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at the 75 °C ampacity. All 100% rated circuit breakers have electronic trip units.

**100% Rated Types CKD and CHKD Electronic Circuit Breakers—Three-Pole**See 310+ adjustability specifications on **Page V4-T2-279**.

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip RMS 310+ Trip Unit Only		Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection	Neutral CT for LSG and LSIG <sup>②③</sup>	Terminal Information
	Standard Interrupting Capacity	High Interrupting Capacity	Standard	Options				
	35 kAIC at 480 Vac Catalog Number	65 kAIC at 480 Vac	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay				
125	CKD3400F	CHKD3400F	KES3125LS	KES3125LSI	KES3125LSG	KES3125LSIG	LGFACT125	See Page V4-T2-276
250	CKD3400F	CHKD3400F	KES3250LS	KES3250LSI	KES3250LSG	KES3250LSIG	LGFACT250	
400	CKD3400F	CHKD3400F	KES3400LS	KES3400LSI	KES3400LSG	KES3400LSIG	LGFACT400	

**Notes**

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSIG trip units.

# 2.4

## Molded Case Circuit Breakers

### Series C

#### Types DK and KDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Suitable for reverse feed application.

2

#### Types DK and KDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40 °C	240 Vac Rated, 250 Vdc Complete Circuit Breaker			600 Vac Rated, 250 Vdc Complete Circuit Breaker	
	Without Line and Load Terminals Catalog Number	With Line Terminals Only Catalog Number	With Standard Line and Load Terminals Only Catalog Number	Without Line and Load Terminals Catalog Number	With Standard Line and Load Terminals Catalog Number
<b>Two-Pole</b>					
100	—	—	—	KDB2100W	KDB2100
125	—	—	—	KDB2125W	KDB2125
150	—	—	—	KDB2150W	KDB2150
175	—	—	—	KDB2175W	KDB2175
200	—	—	—	KDB2200W	KDB2200
225	—	—	—	KDB2225W	KDB2225
250	DK2250W	DK2250Y	DK2250	KDB2250W	KDB2250
300	DK2300W	DK2300Y	DK2300	KDB2300W	KDB2300
350	DK2350W	DK2350Y	DK2350	KDB2350W	KDB2350
400	DK2400W	DK2400Y	DK2400	KDB2400W	KDB2400
<b>Three-Pole</b>					
100	—	—	—	KDB3100W	KDB3100
125	—	—	—	KDB3125W	KDB3125
150	—	—	—	KDB3150W	KDB3150
175	—	—	—	KDB3175W	KDB3175
200	—	—	—	KDB3200W	KDB3200
225	—	—	—	KDB3225W	KDB3225
250	DK3250W	DK3250Y	DK3250	KDB3250W	KDB3250
300	DK3300W	DK3300Y	DK3300	KDB3300W	KDB3300
350	DK3350W	DK3350Y	DK3350	KDB3350W	KDB3350
400	DK3400W	DK3400Y	DK3400	KDB3400W	KDB3400

**Molded Case Switches**

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

**Molded Case Switches**

	240 Vac Maximum, 250 Vdc	600 Vac Maximum, 250 Vdc	600 Vac Maximum, 250 Vdc
Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker with Standard Line and Load Terminals Catalog Number	Complete Circuit Breaker with Standard Line and Load Terminals Catalog Number	Complete Circuit Breaker with Standard Line and Load Terminals. Suitable for Reverse Feed Use Catalog Number
<b>Two-Pole</b>			
400	DK2400K	KD2400K	KDB2400K
	—	HKD2400K	HKDB2400K
<b>Three-Pole</b>			
400	DK3400K	KD3400K	KDB3400K
	—	HKD3400K	HKDB3400K
<b>Four-Pole</b>			
400	—	KD4400K	KDB4400K
	—	HKD4400K	HKDB4400K

**Note**

Molded case switches may open above 4000 amperes.

#### Accessories Selection Guide and Ordering Guide

2

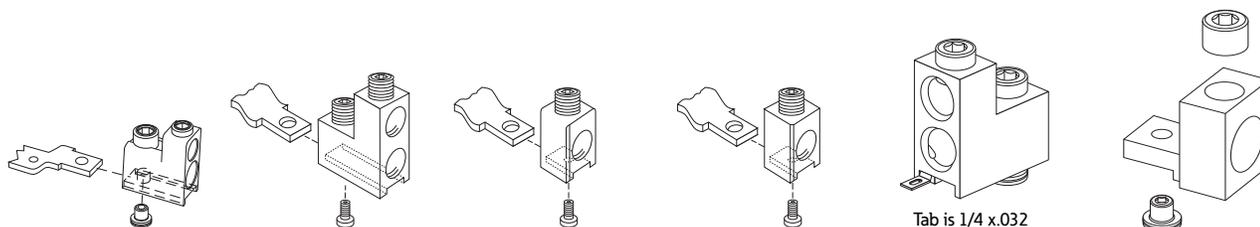
##### Line and Load Terminals

Eaton's line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards

UL 486A and UL 486B and CSA Standard C22.2 No. 65, or Electrical Bulletin 1165. Unless otherwise specified, K-Frame circuit breaker line and load terminals are shipped separately for field installation.

##### Ordering Information

K-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by catalog number. Specify if factory installation is required.



TA401K      TA400K, T400K      TA350K, T350K      TA300K, T300K      T400KCW, TA400KCW, TA401KCW      TA402K, T402K

#### Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Metric Wire Range mm <sup>2</sup>	Terminal	Terminals with Control Wire Termination
					Catalog Number	Catalog Number
<b>Standard Cu/Al Pressure Terminals</b>						
225	Aluminum	Cu/Al	3–350 (1)	35–185	TA300K <sup>①</sup>	—
400	Aluminum	Cu/Al	250–500 (1)	120–240	TA350K <sup>①</sup>	—
400	Aluminum	Cu/Al	3/0–250 (2)	95–120	2TA400K <sup>②③</sup>	2TA400KCW <sup>②③</sup>
400	Aluminum	Cu/Al	3/0–250 (2)	95–120	3TA400K <sup>②④</sup>	3TA400KCW <sup>②④</sup>
400	Aluminum	Cu/Al	3/0–250 (2)	95–120	4TA400K <sup>⑤⑥</sup>	4TA400KCW <sup>⑤⑥</sup>
<b>Optional Copper and Cu/Al Pressure Type Terminals</b>						
225	Copper	Cu	3–350 (1)	35–185	T300K <sup>①</sup>	—
400	Copper	Cu	250–500 (1)	120–240	T350K <sup>①</sup>	—
400	Copper	Cu	3/0–250 (2)	95–120	2T400K <sup>③</sup>	2T400KCW <sup>②③</sup>
					3T400K <sup>④</sup>	3T400KCW <sup>②④</sup>
					4T400K <sup>⑤</sup>	4T400KCW <sup>⑤⑥</sup>
400	Aluminum	Cu/Al	2/0–250 (2) or 2/0–500 (1)	70–120	2TA401K <sup>②③</sup>	2TA401KCW <sup>②③</sup>
				70–240	3TA401K <sup>②④</sup>	3TA401KCW <sup>②④</sup>
				70–240	4TA401K <sup>⑤⑥</sup>	4TA401KCW <sup>⑤⑥</sup>
400	Aluminum	Cu/Al	500–750 (1)	300–400	2TA402K <sup>②③</sup>	—
					3TA402K <sup>②④</sup>	—
					4TA402K <sup>⑤⑥</sup>	—
400	Copper	Cu	500–750 (1)	—	2T402K <sup>②③</sup>	—
					3T402K <sup>②④</sup>	—
					4T402K <sup>⑤⑥</sup>	—

##### Notes

- ① Individually packed.
- ② Terminal kits contain one terminal for each pole and one terminal cover.
- ③ Two-pole kit.
- ④ Three-pole kit.
- ⑤ Four-pole kit.
- ⑥ Terminal kits contain one terminal for each pole and three interphase barriers.

**Accessories**

**Allowable Accessory Combinations**

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

**KD Frame Accessories**

Description	Reference Page	Two-Pole <sup>①</sup>		Three-Pole			Four-Pole			Neutral
		Left	Right	Left	Center	Right	Left	Center	Right	
<b>Internal Accessories (Only One Internal Accessory Per Pole)</b>										
Alarm lockout (Make/Break)	V4-T2-322	—	■	□	—	□	■	—	—	—
Alarm lockout (2Make/2Break)	V4-T2-322	—	—	□	—	□	■	—	—	—
Auxiliary switch (1A, 1B)	V4-T2-324	—	■	■	—	■	■	—	■	—
Auxiliary switch (2A, 2B)	V4-T2-324	—	—	■	—	■	■	—	■	—
Auxiliary switch (3A, 3B)	V4-T2-324	—	—	■	—	■	■	—	■	—
Auxiliary switch and alarm switch combination	V4-T2-325	—	—	□	—	□	□	—	□	—
Shunt trip—standard <sup>②</sup>	V4-T2-328	—	■	■	—	■	■	—	■	—
Shunt trip—low energy <sup>②</sup>	V4-T2-331	—	—	■	—	■	■	—	—	—
Undervoltage release mechanism <sup>②</sup>	V4-T2-336	—	■	■	—	■	■	—	—	—
<b>External Accessories</b>										
End cap kit	V4-T2-356	●	●	●	●	●	●	●	●	●
Keeper nut	V4-T2-356	●	●	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-357	●	●	●	●	●	●	●	●	●
Terminal adapter	V4-T2-357	●	●	●	●	●	●	●	●	●
Multewire connectors	V4-T2-358	●	●	●	●	●	●	●	●	●
Rear fed terminals	V4-T2-358	●	●	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-359	●	●	●	●	●	●	●	●	●
Terminal shields	V4-T2-361	●	●	●	●	●	●	●	●	●
Interphase barriers	V4-T2-361	●	●	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-362	■	—	—	■	—	—	■	—	—
Padlockable handle block	V4-T2-362	—	—	—	■	—	—	—	—	—
Padlockable handle lock hasp	V4-T2-363	—	■	□	—	□	□	—	□	—
Cylinder lock	V4-T2-363	□	□	□	—	□	—	—	—	—
Key Interlock kit	V4-T2-364	■	□	□	—	□	□	—	□	—
Sliding bar interlock—requires two breakers	V4-T2-365	—	—	●	●	●	—	—	—	—
Walking beam interlock—requires two breakers	V4-T2-365	—	—	●	●	●	●	●	●	●
Electrical (solenoid) operator	V4-T2-366	—	—	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-367	●	●	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-369	●	●	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-370	●	●	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-445	●	●	●	●	●	●	●	●	●
Handle extension	V4-T2-457	●	●	●	●	●	●	●	●	●
IQ Energy Sentinel	V4-T2-372	—	—	●	●	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-372	●	●	●	●	●	●	●	●	●
<b>System Components Three Poles</b>										
Breaker interface module (BIM)	V4-T2-372	—	—	—	—	—	—	—	—	—
Auxiliary power module	V4-T2-373	—	—	—	—	—	—	—	—	—
<b>Modifications (Refer to Eaton)</b>										
Special calibration	—	●	●	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-223	●	●	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●	●	●
Marine/naval application	—	●	●	●	●	●	●	●	●	●

**Legend**

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

**Notes**

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Shunt trip and UVR cannot be mounted in right poles on KES. Standard internal accessories cannot be mounted in right pole on any K-Frame. Special ground fault and zone interlock accessories are available for field installation in the right pole of K-Frame. Factory installed 2a/2b and bell/aux are available for factory installation.

## 310+ Electronic Trip Unit Accessories

Description	Catalog Number
Electronic portable test kit	MTST230V <sup>①</sup>
Trip unit tamper protection wire seal	5108A03H01
External neutral sensor, 400 A	LGFACT400 <sup>②</sup>
External neutral sensor, 250 A	LGFACT250 <sup>②</sup>
External neutral sensor, 125 A	LGFACT125 <sup>②</sup>
Breaker-mount cause-of-trip indication	TRIP-LED
Breaker-mount ammeter module	DIGVIEW
Remote-mount ammeter module	DIGVIEWR06 <sup>③</sup>

## Technical Data and Specifications

## NEMA/UL 489/CSA Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles <sup>④</sup>	Interrupting Capacity (kA Symmetrical Amperes)					Volts DC <sup>⑤⑥</sup>
		Volts AC (50/60 Hz)					
		240	277	480	600	250 <sup>⑤⑥</sup>	
DK	2, 3	65	—	—	—	10	
KDB	2, 3, 4	65	—	35	25	10	
KD	2, 3, 4	65	—	35	25	10	
HKD, HKDB	2, 3, 4	100	—	65	35	22	
KDC <sup>⑦</sup>	2, 3, 4	200	—	100	65	22	
CKD	3	65	—	35	25	—	
CHKD	3	100	—	65	35	—	

## IEC 157-1 (P1) Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles <sup>④</sup>	Interrupting Capacity (kA Symmetrical Amperes)						Volts DC <sup>⑤⑥</sup>
		Volts AC (50/60 Hz)						
		240	380	415	440	500	600	
DK	2, 3	65	—	—	—	—	10	
KDB	2, 3, 4	65	40	40	—	—	10	
KD	2, 3, 4	65	40	40	—	—	10	
HKD, HKDB	2, 3, 4	100	65	65	—	—	22	
KDC	2, 3, 4	200	100	100	—	—	22	

## UL 489 Current-Limiting Data

Frame	Circuit	I <sub>p</sub> (kA)	I <sup>2</sup> T (10 <sup>6</sup> A <sup>2</sup> S)
KDC	240 V/200 kA	56.00	2.30
KDC	480 V/100 kA	53.30	5.60
KDC	600 V/50 kA	43.40	5.40

## Notes

- ① MTST230V applies to 100–230 Vac.
- ② Included with all LD LSG and LSIG trip units and breakers.
- ③ Includes 6 ft cable for remote mounting; NEMA 3R rated.
- ④ Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ⑤ Two-pole circuit breaker or two outside poles of three-pole circuit breaker.
- ⑥ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ⑦ Current limiting.

## 310+ Specifications

Trip Unit Type	Digitrip RMS 310+
<b>Breaker Type</b>	
Frame	K
Frames available	125 A, 250 A, 400 A
Continuous current range (A)	55–400 A
Ground fault pickup (A)	50–400 A
Interrupting capacities at 480 Vac (kAIC)	35, 65, 100
100% rated	Yes
<b>Protection</b>	
Ordering options	LS, LSI, LSG, LSIG, ALSI, ALSIG
Arcflash Reduction Maintenance System	Remote enabled on ALSI, ALSIG
Interchangeable trip unit	Yes
High load alarm, trip (suffix B20) ①	Yes
Ground fault alarm with trip (suffix B21) ①	LSG, LSIG, ALSIG
Ground fault alarm, no trip (suffix B22)	LSG, LSIG, ALSIG
Zone selective interlock (suffix ZG) ①	LSI, LSIG, ALSI, ALSIG
Cause of trip indication	Yes (via TRIP-LED or DIGVIEW)
Thru-cover accessories	No

## 310+ Adjustability Specifications

310+ Settings	K-Frame		
	125 A	250 A	400 A
$I_r$ = continuous current or long delay pickup (amperes) (All 310+)	$I_r \setminus I_n$		
	A (=I <sub>r</sub> )	55	100
	B (=I <sub>r</sub> )	60	125
	C (=I <sub>r</sub> )	70	150
	D (=I <sub>r</sub> )	80	160
	E (=I <sub>r</sub> )	90	175
	F (=I <sub>r</sub> )	100	200
	G (=I <sub>r</sub> )	110	225
	H (=I <sub>r</sub> =I <sub>n</sub> )	125	250
$t_r$ = long delay time (seconds) (All 310+)	2	2	2
	4	4	4
	7	7	7
	10	10	10
	12	12	12
	15	15	15
	20	20	20
	24	24	24
$I_{sd}$ (x I <sub>r</sub> ) = short delay pickup (amperes) (All 310+)	Position 1	2	2x
	Position 2	3	3x
	Position 3	4	4x
	Position 4	5	5x
	Position 5	6	6x
	Position 6	7	7x
	Position 7	8	8x
	Position 8	10	10x
	Position 9	12	12x
$t_{sd}$ = short delay time I <sup>2</sup> t (milliseconds) (LS and LSG)	Fixed	67 @10x	
$t_{sd}$ = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG)	Position 1	Inst	
	Position 2	120	
	Position 3	300	
$I_g$ (x I <sub>n</sub> ) = ground fault pickup (amperes) (LSG, LSIG, ALSIG)	Position 1	25	50
	Position 2	37.5	75
	Position 3	50	100
	Position 4	75	150
	Position 5	100	200
	Position 6	125	250
$t_g$ = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG)	Position 1	Inst	
	Position 2	120	
	Position 3	300	
Independently adjustable Instantaneous (Ii) setting ②			
Maintenance Mode pickup (2.5 x I <sub>n</sub> ) (amperes) (310+ with Maintenance Mode—ALSI and ALSIG)	Fixed	312	625
		1000	

**Notes**

① B2x suffixes cannot be combined with B2x suffixes.

② Not available for KD. Independently adjustable I<sub>i</sub> setting available in NG and RG ALSI and ALSIG trip units.

# 2.4

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

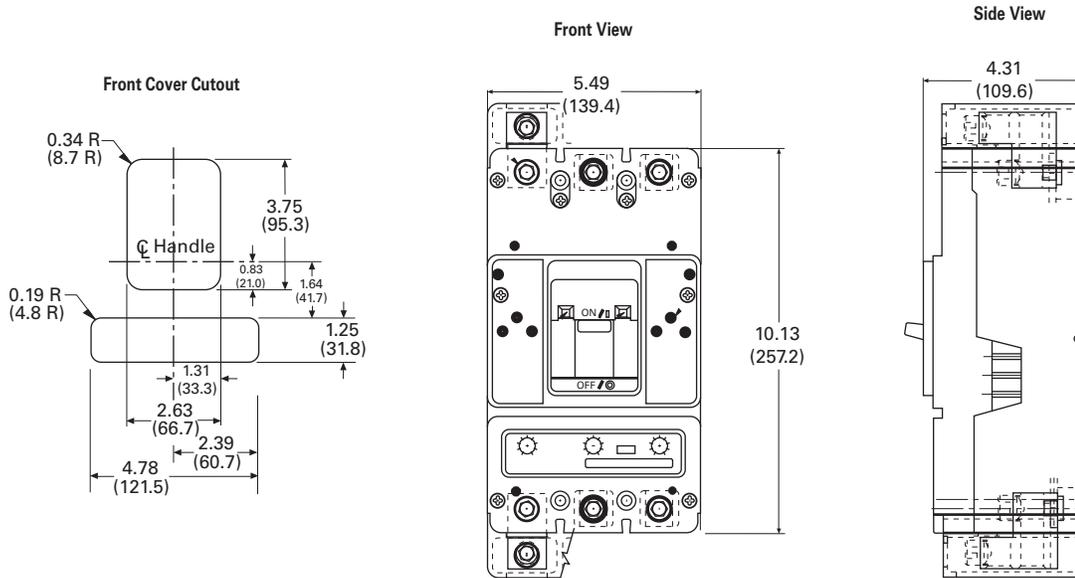
Approximate Dimensions in Inches (mm)

2

#### KD Frame

Number of Poles	Width	Height	Depth
2, 3	5.50 (149.7)	10.13 (257.3)	4.10 (104.1)
4	7.22 (183.4)	10.13 (257.3)	4.10 (104.1)

#### KD-Frame, Two- and Three-Pole



Approximate Shipping Weight, Lb (kg)

#### KD Frame

Breaker Type	Complete Breaker		Frame Only		Trip Unit ①	
	Two-Pole	Three-Pole	Two-Pole	Three-Pole	Two-Pole	Three-Pole
DK	10.0 (4.5)	11.5 (5.2)	—	—	—	—
KDB	10.0 (4.5)	11.5 (5.2)	—	—	—	—
KD	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (0.7)	1.5 (0.7)
HKD, HKDB	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (0.7)	1.5 (0.7)
KDC	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (0.7)	1.5 (0.7)

#### Note

① Weights shown are for thermal-magnetic trip units. Three-pole electronic trip units weigh 2.5 lb (1.1 kg).

Typical L-Frame Circuit Breaker



## Contents

### Description

	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-282</b>
Product Selection . . . . .	<b>V4-T2-284</b>
Accessories . . . . .	<b>V4-T2-288</b>
Technical Data and Specifications . . . . .	<b>V4-T2-290</b>
Dimensions and Weights . . . . .	<b>V4-T2-292</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

## L-Frame (125–600 Amperes)

### Product Description

- All Eaton L-Frame circuit breakers are HACR rated
- L-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- L-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

### Standards and Certifications

- CE marked



# 2.4

## Molded Case Circuit Breakers

### Series C

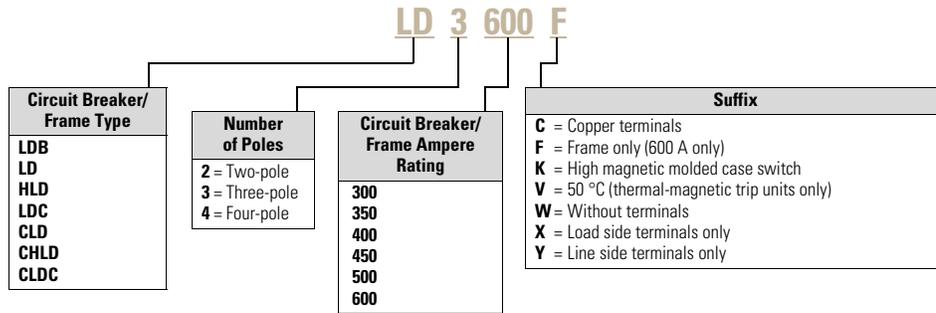
2

#### Catalog Number Selection

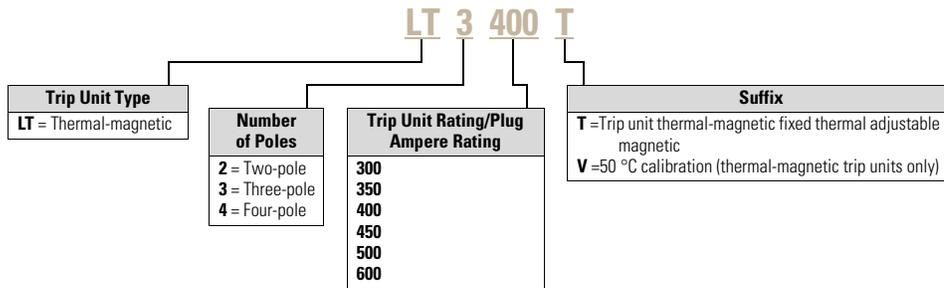
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

#### LD-Frame with Thermal-Magnetic Trip Unit Technology

##### Thermal-Magnetic Breakers and Frame ①



##### Thermal-Magnetic Trip Unit ①

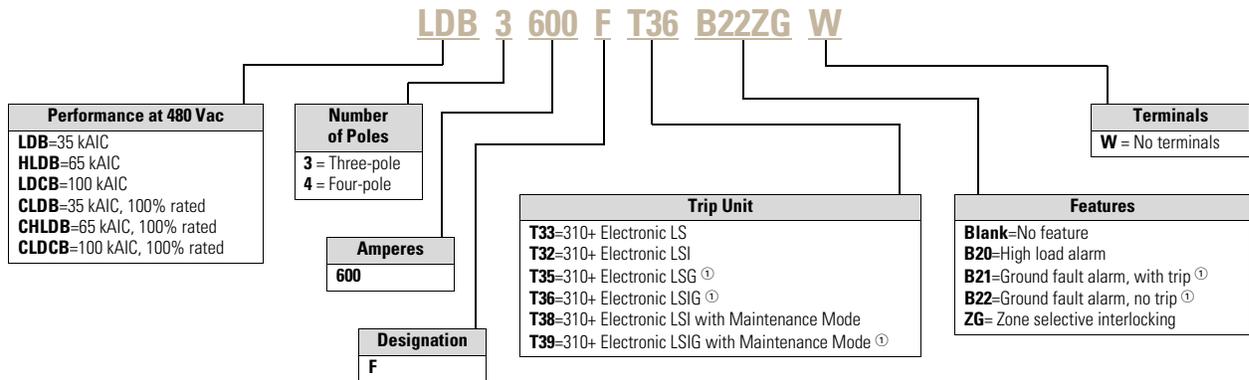


#### Note

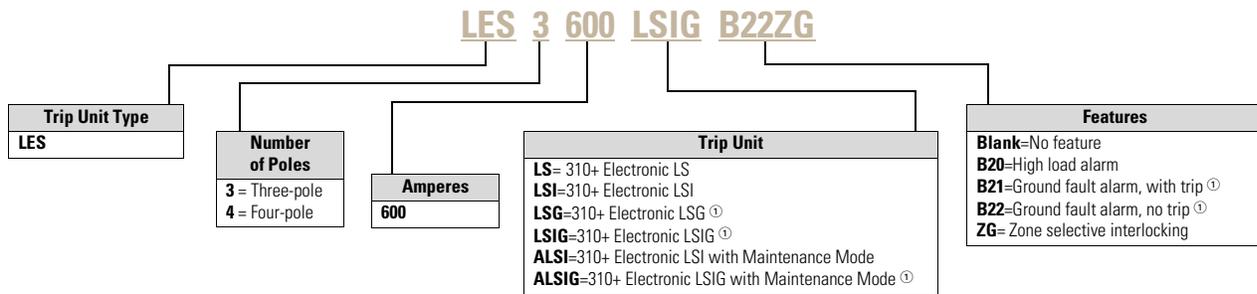
① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **LD3600F**, **HLD3600F**, etc.

**LD-Frame with 310+ Electronic Trip Unit Technology**

**310+ Circuit Breakers**



**310+ Electronic Trip Units ②**



**Notes**

① Not available in four-pole configurations.

② Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **LD3600F**, **HLD3600F**, etc.

## Product Selection

2

## Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40 °C ①	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Thermal-Magnetic Trip Unit Only	Standard Terminals Only
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	For Use with Standard or High or Ultra High Interrupting Frames Catalog Number	See Page V4-T2-287 for Optional Terminals Catalog Number
<b>Two-Pole</b>					
300	LD2300	HLD2300	LDC2300	LT2300T	TA602LD ②
350	LD2350	HLD2350	LDC2350	LT2350T	TA602LD ②
400	LD2400	HLD2400	LDC2400	LT2400T	TA602LD ②
450	LD2450	HLD2450	LDC2450	LT2450T	TA602LD ②
500	LD2500	HLD2500	LDC2500	LT2500T	TA602LD ②
600	LD2600	HLD2600	LDC2600	LT2600T	2TA603LDK ③
<b>Three-Pole</b>					
300	LD3300	HLD3300	LDC3300	LT3300T	TA602LD ②
350	LD3350	HLD3350	LDC3350	LT3350T	TA602LD ②
400	LD3400	HLD3400	LDC3400	LT3400T	TA602LD ②
450	LD3450	HLD3450	LDC3450	LT3450T	TA602LD ②
500	LD3500	HLD3500	LDC3500	LT3500T	TA602LD ②
600	LD3600	HLD3600	LDC3600	LT3600T	3TA603LDK ③
<b>Four-Pole ④</b>					
300	LD4300	HLD4300	LDC4300	LT4300T	TA602LD ②
350	LD4350	HLD4350	LDC4350	LT4350T	TA602LD ②
400	LD4400	HLD4400	LDC4400	LT4400T	TA602LD ②
450	LD4450	HLD4450	LDC4450	LT4450T	TA602LD ②
500	LD4500	HLD4500	LDC4500	LT4500T	TA602LD ②
600	LD4600	HLD4600	LDC4600	LT4600T	4TA603LDK ③

## Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers—Frame Only

Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Catalog Number
<b>Two-Pole</b>		
LD2600F	HLD2600F	LDC2600F
<b>Three-Pole</b>		
LD3600F	HLD3600F	LDC3600F
<b>Four-Pole</b>		
LD4600F	HLD4600F	LDC4600F

**Notes**

- ① Magnetic trip range 5–10 times continuous ampere rating.
- ② Individually packed.
- ③ Terminal kits contain one terminal for each pole and one terminal cover.
- ④ Neutral is in right pole.

**Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units**

Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on **Page V4-T2-279**.

**Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip RMS 310+ Trip Unit Only ①				Neutral CT for LSG and LSI ②③	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Standard LS	Optional LSI	LSG	LSIG		
	Catalog Number			Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection		
<b>Three-Pole</b>									
600	LD3600F	HLD3600F	LDC3600F	LES3600LS	LES3600LSI	LES3600LSG	LES3600LSIG	LGFACT600	See Page V4-T2-277
<b>Four-Pole ④</b>									
600	LD4600F	HLD4600F	LDC4600F	LES4600LS	LES4600LSI	—	—	—	See Page V4-T2-277

**Types LDB, HLDB and LDCB Electronic Circuit Breakers with Non-Interchangeable 310+ Electronic Trip Units Suitable for Reverse Feed**

See 310+ adjustability specifications on **Page V4-T2-279**.

**Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit Less Terminals**  
**Types LDB, HLDB and LDCB with Digitrip 310+ Non-Interchangeable Trip Units**

Maximum Continuous Ampere Rating at 40 °C	Number of Poles	Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals ①				Neutral CT for LSG and LSI ②③	Terminal Information
		Standard LS	Optional LSI	LSG	LSIG		
		Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection		
		Catalog Number					
600	3	LDB3600FT33W	LDB3600FT32W	LDB3600FT35W	LDB3600FT36W	LGFACT600	See Page V4-T2-277
600	3	HLDB3600FT33W	HLDB3600FT32W	HLDB3600FT35W	HLDB3600FT36W		
600	3	LDCB3600FT33W	LDCB3600FT32W	LDCB3600FT35W	LDCB3600FT36W		

**100% Rated Types CLD, CHLD and CLDC Electronic Circuit Breakers with Interchangeable Trip Units**

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at the 75 °C ampacity. All 100% rated circuit breakers have electronic trip units. Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on **Page V4-T2-279**.

**100% Rated Types CLD, CHLD and CLDC Electronic Circuit Breakers with 310+ Interchangeable Trip Units**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip RMS 310+ Trip Unit Only				Neutral CT for LSG and LSI ②③	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Standard LS	Optional LSI	LSG	LSIG		
	Catalog Number			Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection		
<b>Three-Pole</b>									
600	CLD3600F	CHLD3600F	CLDC3600F	LES3600LS	LES3600LSI	LES3600LSG	LES3600LSIG	LGFACT600	See Page V4-T2-277

**Notes**

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSI trip units.
- ④ Neutral is in right pole.

### Type LDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units <sup>①</sup>

Maximum Continuous Ampere Rating	600 Vac Rated, 250 Vdc Complete Circuit Breaker	
	Without Line and Load Terminals Catalog Number	With Standard Line and Load Terminals Only Catalog Number
<b>Two-Pole</b>		
300	LDB2300W	LDB2300
350	LDB2350W	LDB2350
400	LDB2400W	LDB2400
450	LDB2450W	LDB2450
500	LDB2500W	LDB2500
600	LDB2600W	LDB2600
<b>Three-Pole</b>		
300	LDB3300W	LDB3300
350	LDB3350W	LDB3350
400	LDB3400W	LDB3400
450	LDB3450W	LDB3450
500	LDB3500W	LDB3500
600	LDB3600W	LDB3600

### Molded Case Switches

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

### Molded Case Switches

Maximum Continuous Ampere Rating at 40 °C	600 Vac Maximum, 250 Vdc Circuit Breaker Only without Line and Load Terminals	
	Catalog Number	Standard Terminals Only See Page V4-T2-287 for Optional Terminals Catalog Number
<b>Two-Pole</b>		
600	LD2600WK	2TA603LDK
600	LDB2600WK <sup>①</sup>	2TA603LDK
600	HLD2600WK	2TA603LDK
<b>Three-Pole</b>		
600	LD3600WK	3TA603LDK
600	LDB3600WK <sup>①</sup>	3TA603LDK
600	HLD3600WK	3TA603LDK
<b>Four-Pole</b>		
600	LD4600WK	4TA603LDK
600	LDB4600WK <sup>①</sup>	4TA603LDK
600	HLD4600WK	4TA603LDK

#### Notes

<sup>①</sup> Factory sealed—suitable for reverse feed application.

Molded case switch will trip above 6000 amperes.

**Accessories Selection Guide and Ordering Information**

**Line and Load Terminals**

Eaton’s line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65M. Unless otherwise specified,

L-Frame circuit breaker line and load terminals are shipped separately for field installation.

The wire connecting terminal is secured with two pan-head, slotted screws and lockwashers that can be checked for the correct torque loading or retightened from the front of the circuit

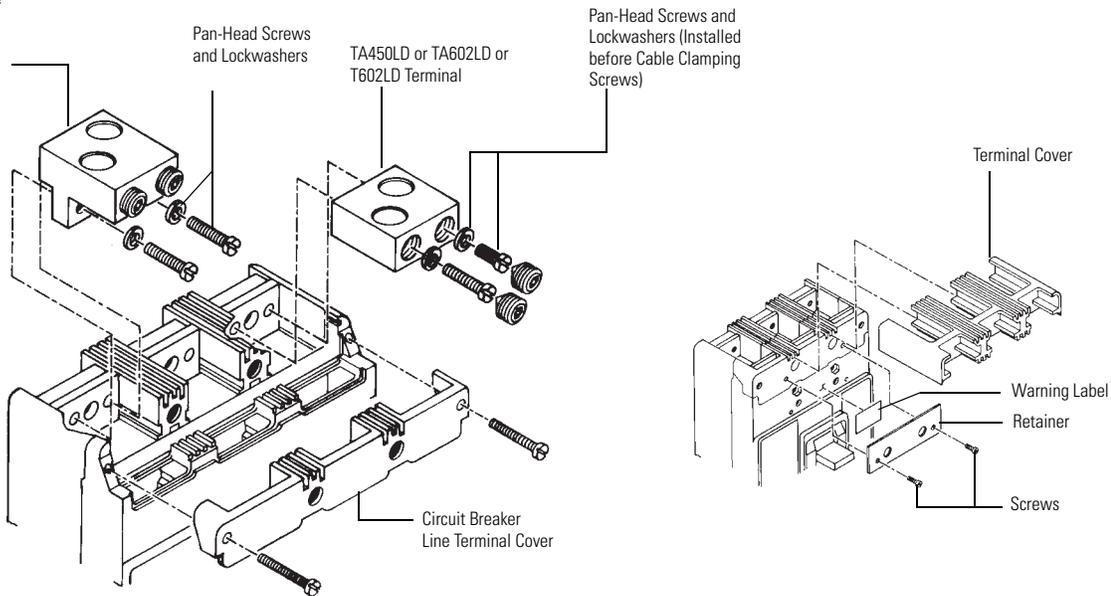
breaker before installation of the conductors. (Applies to all styles.) The circuit breaker line/load terminal conductors are positioned in the conducting holes in the wire connecting terminal and are secured with recessed socket screws that are tightened to the correct torque loading from the front of the circuit breaker.

**Ordering Information**

L-Frame circuit breakers use Cu/Al terminals as standard. When optional copper terminals are required, order by catalog Number. Specify if factory installation is required.

**Terminals**

TA401LD or TA603LD Terminal (Step-Type Terminal Requires Terminal Cover and Warning Label. See Inset.)



**Line and Load Terminals**

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/Number of Conductors	Metric Wire Range mm <sup>2</sup>	Terminal Poles	Catalog Number	Terminals with Control Wire Termination Catalog Number
<b>Standard Cu/Al Pressure Terminals</b>							
400	Aluminum	Cu/Al	4/0–600 (1)	120–300	Two-pole kit ①	<b>2TA401LDK</b>	—
400	Aluminum	Cu/Al	4/0–600 (1)	120–300	Three-pole kit ①	<b>3TA401LDK</b>	—
400	Aluminum	Cu/Al	4/0–600 (1)	120–300	Four-pole kit ①	<b>4TA401LDK</b>	—
450	Aluminum	Cu/Al	4–4/0 (2)	25–95	②	<b>TA450LD</b>	—
500	Aluminum	Cu/Al	3/0–350 (2)	95–150	②	<b>TA602LD</b>	<b>TA602LDCW</b>
600	Aluminum	Cu/Al	400–500 (2)	185–240	Two-pole kit ①	<b>2TA603LDK</b>	<b>2TA603LDKCW</b>
600	Aluminum	Cu/Al	400–500 (2)	185–240	Three-pole kit ①	<b>3TA603LDK</b>	<b>3TA603LDKCW</b>
600	Aluminum	Cu/Al	400–500 (2)	185–240	Four-pole kit ①	<b>4TA603LDK</b>	<b>4TA603LDKCW</b>
<b>Optional Copper and Cu/Al Pressure Type Terminals</b>							
600	Copper	Cu	250–350 (2)	120–250	②	<b>T602LD</b>	<b>T602LDCW</b>

**Notes**

- ① Terminal kits contain one terminal for each pole and one terminal cover.
- ② Individually packed.

### Accessories

#### Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

#### LD Frame Accessories

Description	Reference Page	Two-Pole <sup>①</sup> , Three-Pole			Four-Pole			Neutral <sup>②</sup>
		Left	Center	Right	Left	Center	Right	
<b>Internal Accessories (Only One Internal Accessory Per Pole) <sup>③</sup></b>								
Alarm lockout (Make/Break)	V4-T2-322	■	—	■	■	—	■	—
Alarm lockout (2Make/2Break)	V4-T2-322	■	—	■	■	—	■	—
Auxiliary switch (1A, 1B)	V4-T2-324	■	—	■	■	—	■	—
Auxiliary switch (2A, 2B)	V4-T2-324	■	—	■	■	—	■	—
Auxiliary switch (3A, 3B)	V4-T2-324	■	—	■	■	—	■	—
Auxiliary switch (1A, 1B) and alarm switch combination	V4-T2-326	■	—	■	■	—	■	—
Auxiliary switch (2A, 2B) and alarm switch combination	V4-T2-326	■	—	■	■	—	■	—
Shunt trip—standard <sup>③</sup>	V4-T2-328	■	—	■	■	—	■	—
Shunt trip—low energy <sup>③</sup>	V4-T2-331	■	—	■	■	—	■	—
Undervoltage release mechanism <sup>③</sup>	V4-T2-337	■	—	■	■	—	■	—
<b>External Accessories</b>								
End cap kit	V4-T2-356	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-357	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-359	●	●	●	●	●	●	●
Terminal shields	V4-T2-361	●	●	●	●	●	●	●
Interphase barriers	V4-T2-361	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-362	—	■	—	—	■	—	—
Padlockable handle lock hasp	V4-T2-363	□	—	□	□	—	□	—
Key interlock kit	V4-T2-364	□	—	□	□	—	□	—
Sliding bar interlock—requires two breakers	V4-T2-365	●	●	●	—	—	—	—
Walking beam interlock—requires two breakers	V4-T2-365	●	●	●	●	●	●	●
Electrical (motor) operator	V4-T2-366	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-368	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-369	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-370	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-433	●	●	●	●	●	●	●
Handle extension	V4-T2-457	●	●	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-372	●	●	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

#### Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Refer to Eaton for appropriate neutral pole accessory combinations.
- ③ Shunt trip and UVR cannot be mounted in right poles on LES. Standard non-tripping internal accessories can be mounted in the left or right poles of LES.

## LD Frame Accessories, continued

Description	Reference Page	Two-Pole <sup>①</sup> , Three-Pole			Four-Pole			Neutral <sup>②</sup>
		Left	Center	Right	Left	Center	Right	
<b>Modifications (Refer to Eaton)</b>								
Special calibration	—	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-223	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●
Marine/naval application	—	●	●	●	●	●	●	●

**Legend**

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

## 310+ Electronic Trip Unit Accessories

Description	Catalog Number
Electronic portable test kit	MTST230V <sup>③</sup>
Trip unit tamper protection wire seal	5108A03H01
External neutral sensor	LGFACT600 <sup>④</sup>
Breaker-mount cause-of-trip indication	TRIP-LED
Breaker-mount ammeter module	DIGIVIEW
Remote-mount ammeter module	DIGIVIEWR06 <sup>⑤</sup>

**Notes**

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Refer to Eaton for appropriate neutral pole accessory combinations.
- ③ MTST230V applies to 100–230 Vac.
- ④ Included with all LD LSG and LSIG trip units and breakers.
- ⑤ Includes 6 ft cable for remote mounting; NEMA 3R rated.

## Technical Data and Specifications

2

UL 489 Interrupting Capacity Ratings <sup>①</sup>

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA rms Symmetrical Amperes)					
		Volts AC (50/60 Hz)				Volts DC	
		240	277	480	600	125	250 <sup>②③</sup>
LDB	2, 3	65	—	35	25	—	22
LD	2, 3, 4	65	—	35	25	—	22
CLD <sup>④</sup>	2, 3, 4	65	—	35	25	—	—
HLD, HLDB	2, 3, 4	100	—	65	35	—	25
CHLD <sup>④</sup>	2, 3, 4	100	—	65	35	—	—
LDC, LDCB <sup>⑤</sup>	2, 3, 4	200	—	100	50	—	30
CLDC <sup>④⑤</sup>	2, 3, 4	200	—	100	50	—	—

IEC 947-2 Interrupting Capacity Ratings <sup>①</sup>

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)							
		Volts AC (50/60 Hz)				Volts DC			
		240		415		690		250 <sup>②③</sup>	
		$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$	$I_{cu}$	$I_{cs}$
LDB	2, 3	85	85	45	45	20	10	20	10
LD	2, 3, 4	85	85	45	45	20	10	20	10
CLD <sup>④</sup>	2, 3, 4	85	85	45	45	20	10	—	—
HLD, HLDB	2, 3, 4	100	100	70	70	25	13	20	10
CHLD <sup>④</sup>	2, 3, 4	100	100	70	70	25	13	—	—
LDC, LDCB	2, 3, 4	200	100	100	75	35	18	20	10
CLDC <sup>④</sup>	2, 3, 4	200	100	100	75	35	18	—	—

## UL 489 Current-Limiting Data

Frame	Circuit	$I_p$ (kA)	$I^2T$ ( $10^6 A^2S$ )
LDC	240 V/200 kA	64.80	6.80
LDC	480 V/100 kA	66.90	9.33
LDC	600 V/50 kA	54.30	8.92

## Notes

- ① Utilization Category A circuit breakers.
- ② L/R = 8 milliseconds minimum.
- ③ Two-pole circuit breaker or two poles of three-pole circuit breaker. Incorporating thermal-magnetic trip unit only.
- ④ 100% rated breakers.
- ⑤ Current limiting.

## 310+ Specifications

Description	Specification
Trip Unit Type	Digitrip RMS 310+
<b>Breaker Type</b>	
Frame designation	LD
Frames available	600 A
Continuous current range (A)	250–600 A
Ground fault pickup (A)	120–600 A
Interrupting capacities at 480 Vac (kAIC)	35, 65, 100
100% rated	Yes
<b>Protection</b>	
Ordering options	LS, LSI, LSG, LSIG, ALSI, ALSIG
Arcflash Reduction Maintenance System (or Maintenance Mode)	Remote enabled on ALSI, ALSIG
Interchangeable trip unit	Yes
High load alarm (suffix B20) ①	Yes
Ground fault alarm with trip (suffix B21) ①	LSG, LSIG, ALSIG
Ground fault alarm, no trip (suffix B22) ①	LSG, LSIG, ALSIG
Zone selective interlocking (suffix ZG)	LSI, LSIG, ALSI, ALSIG
Cause of trip indication	Yes (via TRIP-LED or DIGIVIEW)
Thru-cover accessories	No

## 310+ Adjustability Specifications

Description	LD Frame Specification	
310+ settings	600 A	
$I_r$ = continuous current or long delay pickup (amperes) (All 310+)	$I_r$	
	A	250
	B	300
	C	315
	D	350
	E	400
	F	450
	G	500
	H (= $I_n$ )	600
$t_r$ = long delay time (seconds) (All 310+)	2	2
	4	4
	7	7
	10	10
	12	12
	15	15
	20	20
	24	24
$I_{sd}$ (x $I_r$ ) = short delay pickup (All 310+)	Position 1	2x
	Position 2	3x
	Position 3	4x
	Position 4	5x
	Position 5	6x
	Position 6	7x
	Position 7	8x
	Position 8	8x
	Position 9	8x
$t_{sd}$ = short delay time $I^2t$ (milliseconds) (LS and LSG)	Fixed	67 @10x
$t_{sd}$ = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG)	Position 1	Inst
	Position 2	120
	Position 3	300
$I_g$ (x $I_n$ ) = ground fault pickup (amperes) (LSG, LSIG, ALSIG)	Position 1	120
	Position 2	180
	Position 3	240
	Position 4	360
	Position 5	480
	Position 6	600
$t_g$ = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG)	Position 1	Inst
	Position 2	120
	Position 3	300
Independently adjustable Instantaneous (Ii) setting	②	
Maintenance Mode pickup (2.5 x $I_n$ ) (amperes) (310+ with Maintenance Mode—ALSI and ALSIG)	Fixed	1500

## Notes

- ① B2x suffixes cannot be combined with B2x suffixes.
- ② Not available for LD. Independently adjustable Ii setting available in LG, NG, and RG ALSI and ALSIG trip units.

# 2.4

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

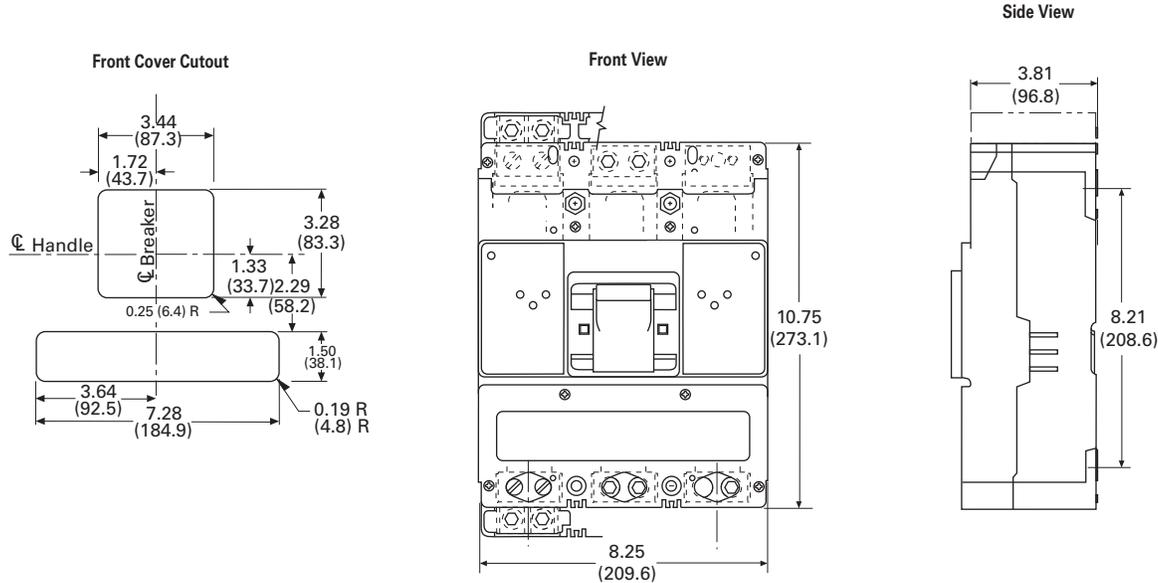
Dimensions in Inches (mm)

2

#### LD Frame

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	10.75 (273.1)	4.06 (103.1)
4	11.00 (279.4)	10.75 (273.1)	4.06 (103.1)

#### LD-Frame, Two- and Three-Pole



Approximate Shipping Weight, Lb (kg)

#### LD Frame

Breaker Type	Complete Breaker			Frame Only			Trip Unit		
	Two-Pole	Three-Pole	Four-Pole	Two-Pole	Three-Pole	Four-Pole	Two-Pole	Three-Pole	Four-Pole
LD, HLD, LDC	18 (8.2)	20 (9.1)	25 (11.3)	14 (6.4)	15 (6.8)	20 (9.1)	3 (1.4)	4 (1.8)	5 (2.3)
LDB	18 (8.2)	20 (9.1)	25 (11.3)	—	—	—	—	—	—

Typical M-Frame Circuit Breaker



## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-294</b>
Product Selection . . . . .	<b>V4-T2-295</b>
Accessories . . . . .	<b>V4-T2-300</b>
Technical Data and Specifications . . . . .	<b>V4-T2-301</b>
Dimensions and Weights . . . . .	<b>V4-T2-303</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-304</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

## M-Frame (300–800 Amperes)

### Product Description

- All Eaton M-Frame circuit breakers are HACR rated
- MDL-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- MDLB, HMDLB-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

### Standards and Certifications

- CE marked



# 2.4

## Molded Case Circuit Breakers

### Series C

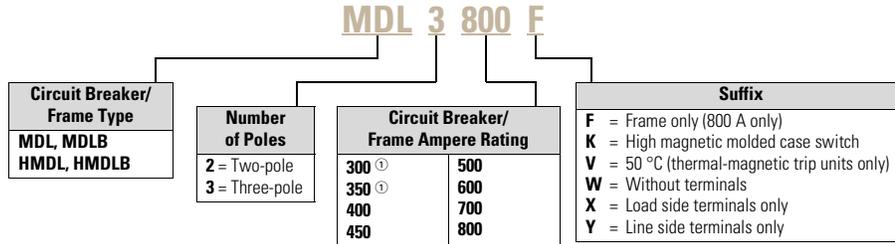
2

#### Catalog Number Selection

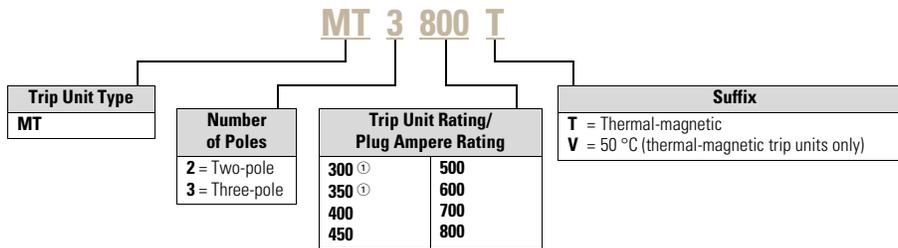
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

#### MDL Frame with Thermal-Magnetic Trip Unit Technology

##### Thermal-Magnetic Breakers and Frame ①

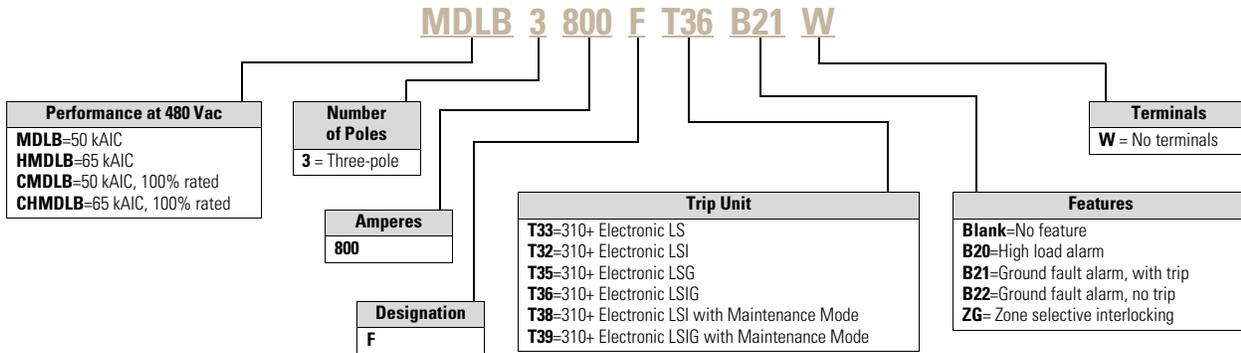


##### Thermal-Magnetic Trip Unit ①

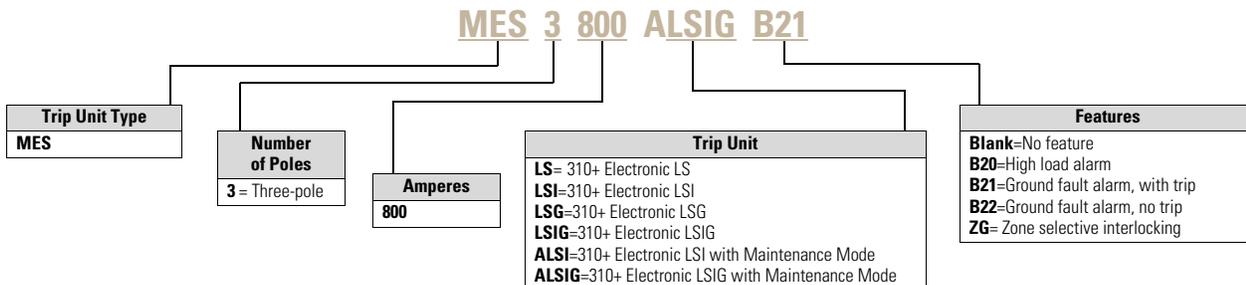


#### MDL Frame with 310+ Electronic Trip Unit Technology

##### 310+ Circuit Breaker



##### 310+ Electronic Trip Unit ①



**Note**

① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., MDL3800F, HMDL3800F, etc.

## Product Selection

## Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units—Two-Pole

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Thermal-Magnetic Trip Unit Only	Standard Terminals Only <sup>①</sup>  See Page V4-T2-299 for Optional Terminals Catalog Number
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		For Use with Standard or High or Ultra High Interrupting Frames  Magnetic Trip Range is 5–10 Up Through 600 A; 4–8 on 700 and 800 A x Continuous Ampere Rating Catalog Number	
	Catalog Number	Frame Only Catalog Number	Catalog Number	Frame Only Catalog Number		
300	MDL2300	MDL2800F	HMDL2300	HMDL2800F	MT2300T	TA700MA1
350	MDL2350		HMDL2350		MT2350T	TA700MA1
400	MDL2400		HMDL2400		MT2400T	TA700MA1
450	MDL2450		HMDL2450		MT2450T	TA700MA1
500	MDL2500		HMDL2500		MT2500T	TA700MA1
600	MDL2600		HMDL2600		MT2600T	TA700MA1
700	MDL2700		HMDL2700		MT2700T	TA700MA1
800	MDL2800		HMDL2800		MT2800T	TA800MA2

## Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units—Three-Pole

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Thermal-Magnetic Trip Unit Only	Standard Terminals Only <sup>①</sup>  See Page V4-T2-299 for Optional Terminals Catalog Number
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		For Use with Standard or High or Ultra High Interrupting Frames  Magnetic Trip Range is 5–10 Up Through 600 A; 4–8 on 700 and 800 A x Continuous Ampere Rating Catalog Number	
	Catalog Number	Frame Only Catalog Number	Catalog Number	Frame Only Catalog Number		
300	MDL3300	MDL3800F	HMDL3300	HMDL3800F	MT3300T	TA700MA1
350	MDL3350		HMDL3350		MT3400T	TA700MA1
400	MDL3400		HMDL3400		MT3400T	TA700MA1
450	MDL3450		HMDL3450		MT3450T	TA700MA1
500	MDL3500		HMDL3500		MT3500T	TA700MA1
600	MDL3600		HMDL3600		MT3600T	TA700MA1
700	MDL3700		HMDL3700		MT3700T	TA700MA1
800	MDL3800		HMDL3800		MT3800T	TA800MA2

**Note**

<sup>①</sup> Two terminals are required per pole.

Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units—Two-Pole <sup>①</sup>

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity	High Interrupting Capacity	Standard Terminals Only <sup>②</sup>
	600 Vac Rated 50 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	See Page V4-T2-299 for Optional Terminals Catalog Number
300	MDLB2300	HMDLB2300	TA700MA1
350	MDLB2350	HMDLB2350	TA700MA1
400	MDLB2400	HMDLB2400	TA700MA1
450	MDLB2450	HMDLB2450	TA700MA1
500	MDLB2500	HMDLB2500	TA700MA1
600	MDLB2600	HMDLB2600	TA700MA1
700	MDLB2700	HMDLB2700	TA700MA1
800	MDLB2800	HMDLB2800	TA800MA2

Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units—Three-Pole <sup>①</sup>

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity	High Interrupting Capacity	Standard Terminals Only <sup>②</sup>
	600 Vac Rated 50 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	See Page V4-T2-299 for Optional Terminals Catalog Number
300	MDLB3300	HMDLB3300	TA700MA1
350	MDLB3350	HMDLB3350	TA700MA1
400	MDLB3400	HMDLB3400	TA700MA1
450	MDLB3450	HMDLB3450	TA700MA1
500	MDLB3500	HMDLB3500	TA700MA1
600	MDLB3600	HMDLB3600	TA700MA1
700	MDLB3700	HMDLB3700	TA700MA1
800	MDLB3800	HMDLB3800	TA800MA2

**Notes**

① Factory sealed for reverse feed application.

② Two terminals are required per pole.

**Types MDL and HMDL Electronic Circuit Breakers with Interchangeable Trip Units**

Order as Individual Components: breaker frame, trip unit and terminals.  
See 310+ adjustability specifications on **Page V4-T2-302**.

**Types MDL and HMDL Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip RMS 310+ Trip Unit Only ①				Neutral CT for LSG and LSI <sup>②③</sup>	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Standard LS	Optional LSI	LSG	LSIG		
			Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection		
Catalog Number	Catalog Number	Catalog Number	Catalog Number			Catalog Number		
800	MDL3800F	HMDL3800F	MES3800LS	MES3800LSI	MES3800LSG	MES3800LSIG	LGFACT600	See Page V4-T2-300

**Types MDLB and HMDLB Electronic Circuit Breakers with Non-Interchangeable 310+ Trip Units ④**

Maximum Continuous Ampere Rating at 40 °C	Factory-Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals					Neutral CT for LSG and LSI <sup>②③</sup>
	LS	LSI	LSG	LSIG		
	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection	Catalog Number	
Catalog Number					Catalog Number	
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac</b>						
800	MDLB3800FT33W	MDLB3800FT32W	MDLB3800FT35W	MDLB3800FT36W		LGFACT600
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>						
800	HMDLB3800FT33W	HMDLB3800FT32W	HMDLB3800FT35W	HMDLB3800FT36W		LGFACT600

**100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable Trip Units**

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at the 75 °C ampacity. All 100% rated circuit breakers have electronic trip units. Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on **Page V4-T2-302**.

**100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip RMS 310+ Trip Unit Only ①				Neutral CT for LSG and LSI <sup>②③</sup>	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Standard LS	Options LSI	LSG	LSIG		
			Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection		
Catalog Number	Catalog Number	Catalog Number	Catalog Number			Catalog Number		
800	CMDL3800F	CHMDL3800F	MES3800LS	MES3800LSI	MES3800LSG	MES3800LSIG	LGFACT600	See Page V4-T2-300

**Notes**

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSI trip units or breakers.
- ④ Factory sealed, suitable for reverse feed application. CMDLB and CHMDLB are also available.

**Molded Case Switches**

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

**Molded Case Switches**

<b>Maximum Continuous Ampere Rating at 40 °C</b>	<b>600 Vac Maximum, 250 Vdc Circuit Breaker Only without Line and Load Terminals Catalog Number</b>
<b>Two-Pole</b>	
800	<b>MDL2800WK</b>
	<b>MDLB2800WK</b> ①
	<b>HMDL2800WK</b>
<b>Three-Pole</b>	
800	<b>MDL3800WK</b>
	<b>MDLB3800WK</b> ①
	<b>HMDL3800WK</b>

**Notes**

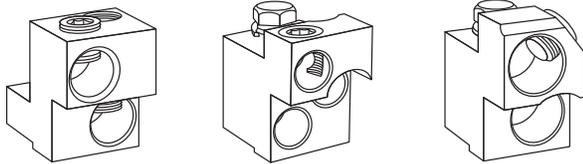
① MDLB and HMDLB are suitable for reverse feed applications.

Molded case switch may trip above 6000 amperes.

## Accessories Selection Guide and Ordering Information

### Line and Load Terminals

M-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by catalog number. Specify if factory installation is required.



TA700MA1

TA800MA2

TA801MA

### Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Terminal Catalog Number	Terminals with Control Wire Termination Catalog Number
<b>Standard Cu/Al Pressure Terminals</b>					
700	Aluminum	Cu/Al	1–500 kcmil (2)	TA700MA1	TA700MA1CWT
800 std.	Aluminum	Cu/Al	3/0–400 kcmil (3)	TA800MA2	TA800MA2CWT
800	Aluminum	Cu/Al	500–750 kcmil (2)	TA801MA	TA801MACWT
<b>Optional Copper and Cu/Al Pressure Type Terminals</b>					
600	Copper	Cu	2/0–500 kcmil (2)	T600MA1	—
800	Copper	Cu	3/0–300 kcmil (3)	T800MA1	—

## Accessories

### Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

### MD Frame Accessories

Description	Reference Page	Two-Pole <sup>①</sup>		Three-Pole		
		Left	Right	Left	Center	Right
<b>Internal Accessories (Only One Internal Accessory Per Pole)</b>						
Alarm lockout (Make/Break)	V4-T2-322	■	■	■	—	■
Alarm lockout (2Make/2Break)	V4-T2-322	■	■	■	—	■
Auxiliary switch (1A, 1B)	V4-T2-324	■	■	■	—	■
Auxiliary switch (2A, 2B)	V4-T2-324	■	■	■	—	■
Auxiliary switch (3A, 3B)	V4-T2-324	■	■	■	—	■
Auxiliary switch (1A, 1B) and alarm switch combination	V4-T2-326	■	■	■	—	■
Auxiliary switch (2A, 2B) and alarm switch combination	V4-T2-326	■	■	■	—	■
Shunt trip—standard <sup>②</sup>	V4-T2-329	■	■	■	—	■
Shunt trip—low energy <sup>②</sup>	V4-T2-331	■	■	■	—	■
Undervoltage release mechanism <sup>②</sup>	V4-T2-337	■	■	■	—	■
<b>External Accessories</b>						
Rear fed terminals	V4-T2-358	—	—	●	●	●
Base mounting hardware	V4-T2-359	—	—	—	●	—
Terminal shields	V4-T2-361	—	—	—	●	—
Interphase barriers	V4-T2-361	—	—	—	●	—
Non-padlockable handle block	V4-T2-362	—	—	—	■	—
Padlockable handle lock hasp	V4-T2-363	□	—	□	—	□
Key interlock kit	V4-T2-364	□	—	□	—	□
Sliding bar interlock—requires two breakers	V4-T2-365	●	●	●	●	●
Walking beam interlock—requires two breakers	V4-T2-365	●	●	●	●	●
Electrical (motor) operator	V4-T2-366	●	●	●	●	●
Plug-in adapters	V4-T2-368	●	●	●	●	●
Rear connecting studs	V4-T2-369	●	●	●	●	●
Panelboard connecting straps	V4-T2-370	●	●	●	●	●
Handle mechanisms	V4-T2-433	●	●	●	●	●
Handle extension	V4-T2-457	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-372	●	●	●	●	●
<b>Modifications (Refer to Eaton)</b>						
Special calibration	—	●	●	●	●	●
Moisture fungus treatment	V4-T2-223	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●
Marine/naval application	—	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

#### Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Shunt trip and UVR cannot be mounted in right poles on MES trip units.

## 310+ Electronic Trip Unit Accessories

Description	Catalog Number
Electronic portable test kit	MTST230V ①
Trip unit tamper protection wire seal	5108A03H01
External neutral sensor	LGFACT600 ②
Breaker-mount cause-of-trip indication	TRIP-LED
Breaker-mount ammeter module	DIGIVIEW
Remote-mount ammeter module	DIGIVIEWR06 ③

## Technical Data and Specifications

## UL 489/CSA Interrupting Capacity Ratings ④

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			Volts DC ⑤⑥
		Volts AC (50/60 Hz)			
		240	480	600	250
MDL, MDLB	2, 3	65	50	25	22
CMDL	2, 3	65	50	25	—
HMDL, HMDLB	2, 3	100	65	35	25
CHMDL	2, 3	100	65	35	—

## IEC 947-2 Interrupting Capacity Ratings ④

Circuit Breaker Type	Number of Poles	Interrupting Capacity rms (kA Symmetrical Amperes) $I_{cu} \neq I_{cs}$			Volts DC ⑤⑥
		Volts AC (50/60 Hz)			
		240	415	690	250
MDL, MDLB	2, 3	65/65	50/50	20/10	20/10
CMDL	2, 3	65/65	50/50	20/10	—
HMDL, HMDLB	2, 3	100/100	70/50	25/13	20/10
CHMDL	2, 3	100/100	70/50	25/13	—

## Notes

- ① MTST230V applies to 100–230 Vac.
- ② Included with all LD LSG and LSIG trip units and breakers.
- ③ Includes 6 ft cable for remote mounting; NEMA 3R rated.
- ④ Utilization Category A circuit breakers.
- ⑤ Two-pole or two poles of three-pole circuit breaker. Thermal-magnetic trip units only, MDL, HMDL breakers with electronic trip unit are not DC rated.
- ⑥ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds at 22 kA.

#### 310+ Specifications

Description	Specification
Trip Unit Type	Digitrip RMS 310+
<b>Breaker Type</b>	
Frame designation	MDL
Frames available	800 A
Continuous current range (A)	320–800 A
Ground fault pickup (A)	160–800 A
Interrupting capacities at 480 Vac (kAIC)	50, 65
100% rated	Yes
<b>Protection</b>	
Ordering options	LS, LSI, LSG, LSIG, ALSI, ALSIG
Arcflash Reduction Maintenance System (or Maintenance Mode)	Remote enabled on ALSI, ALSIG
Interchangeable trip unit	Yes
High load alarm (suffix B20) ①	Yes
Ground fault alarm with trip (suffix B21) ①	LSG, LSIG, ALSIG
Ground fault alarm, no trip (suffix B22) ①	LSG, LSIG, ALSIG
Zone selective interlocking (suffix ZG)	LSI, LSIG, ALSI, ALSIG
Cause of trip indication	Yes (via TRIP-LED or DIGIVIEW)
Thru-cover accessories	No

#### 310+ Adjustability Specifications

Description	MDL Frame Specification	
310+ settings	800 A	
$I_r$ = continuous current or long delay pickup (amperes) (All 310+)	$I_r$	
	A	320
	B	400
	C	450
	D	500
	E	600
	F	630
	G	700
	H (= $I_n$ )	800
$t_r$ = long delay time (seconds) (All 310+)	2	2
	4	4
	7	7
	10	10
	12	12
	15	15
	20	20
	24	24
$I_{sd}$ (x $I_r$ ) = short delay pickup (All 310+)	Position 1	2x
	Position 2	3x
	Position 3	4x
	Position 4	5x
	Position 5	6x
	Position 6	7x
	Position 7	8x
	Position 8	8x
	Position 9	8x
$t_{sd}$ = short delay time $I^2t$ (milliseconds) (LS and LSG)	Fixed	67 @10x
$t_{sd}$ = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG)	Position 1	Inst
	Position 2	120
	Position 3	300
$I_g$ (x $I_n$ ) = ground fault pickup (amperes) (310+ w/ ground fault)	Position 1	160
	Position 2	240
	Position 3	320
	Position 4	480
	Position 5	640
	Position 6	800
$t_g$ = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG)	Position 1	Inst
	Position 2	120
	Position 3	300
Independently adjustable Instantaneous (Ii) setting	②	
Maintenance Mode pickup (2.5 x $I_n$ ) (amperes) (310+ with Maintenance Mode—ALSI and ALSIG)	Fixed	2000

#### Notes

- ① B2x suffixes cannot be combined with B2x suffixes.
- ② Not available for MDL. Independently adjustable Ii setting available in LG, NG, and RG ALSI and ALSIG trip units.

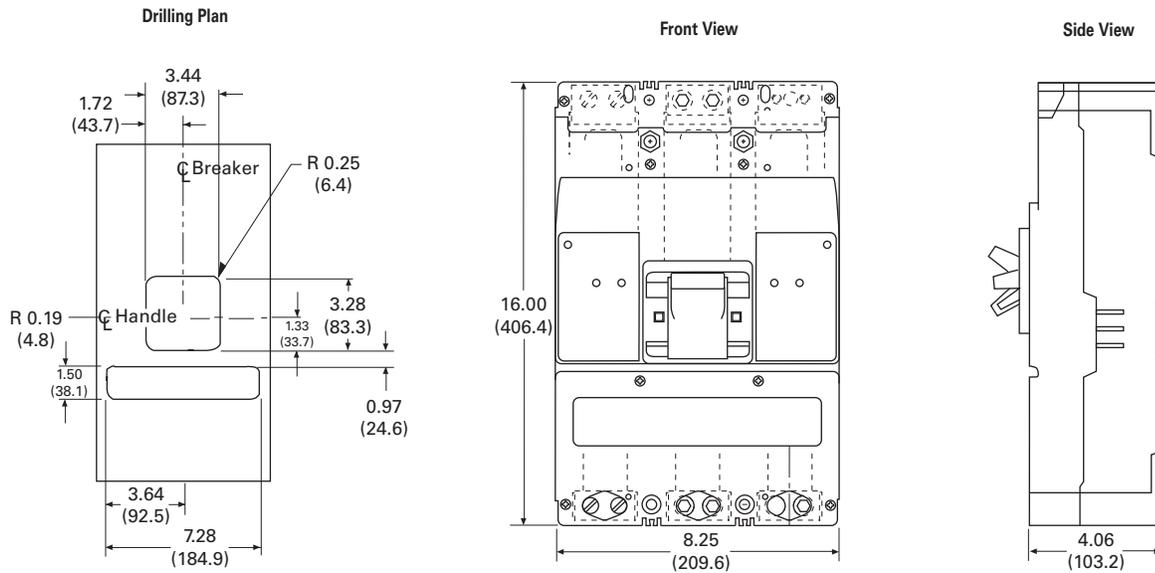
**Dimensions and Weights**

Dimensions in Inches (mm)

**MD Frame**

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	16.00 (406.4)	4.06 (103.1)

**MDL-Frame, Two- and Three-Pole**



Approximate Shipping Weight, Lb (kg)

**MD Frame**

Breaker Type	Complete Breaker		Frame Only		Trip Unit ①	
	Two-Pole	Three-Pole	Two-Pole	Three-Pole	Two-Pole	Three-Pole
MDL, HMDL (T/M T.U.)	26.5 (12.0)	29.0 (13.2)	24.5 (11.1)	26.0 (11.8)	2.5 (1.1)	3.0 (1.4)
MDL, HMDL (Elec. T.U.)	—	30.0 (13.6)	—	26.0 (11.8)	—	4.0 (1.8)

**Note**

① Thermal-magnetic only.

#### Motor Circuit Protectors



#### Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-223</b>
Standards and Certifications . . . . .	<b>V4-T2-224</b>
Quick Reference . . . . .	<b>V4-T2-225</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-228</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-242</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-260</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-268</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-281</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-293</b>
Motor Circuit Protectors (MCP)	
Catalog Number Selection . . . . .	<b>V4-T2-305</b>
Product Selection . . . . .	<b>V4-T2-306</b>
Accessories . . . . .	<b>V4-T2-307</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-315</b>
Current-Limiting Circuit Breaker Module . . . . .	<b>V4-T2-316</b>
Internal Accessories . . . . .	<b>V4-T2-319</b>
External Accessories . . . . .	<b>V4-T2-352</b>

### Motor Circuit Protectors (MCP)

#### Product Description

Designated as Eaton’s Types GMCP and HMCP, the instantaneous-only motor circuit protector (MCP) is available in ratings from 3 A to 1200 A for motor starter sizes 0 through 8.

An innovative design of internal components allows higher MCP-starter combination interrupting ratings. The MCP is marked to permit proper electrical application within the assigned equipment ratings.

#### Standards and Certifications

The MCP is designed to comply with the applicable requirements of Underwriters Laboratories Standard UL 489, Canadian Standards Association Standard C22.2 No. 5.1, and International Electrotechnical Commission Recommendations IEC 157-1.

The MCP is a recognized component (UL File E7819) and complies with the applicable requirements of Underwriters Laboratories Standard UL 489. It is also designed to comply with the applicable requirements of Canadian Standards Association Standard C22.2 No. 5.1, International Electrotechnical Commission Recommendations IEC 157-1, and nameplates bear the CE marking.



**Note:** Interrupting ratings are dependent on starter it is used with.



## Product Selection

## G-Frame

## 480 Vac Maximum, 600Y/347 Vac

NEMA Starter Size	Continuous Amperes	Cam Setting	Motor Full Load Current Amperes (FLA) <sup>①</sup>	MCP Trip Setting	MCP Catalog Number
0	3	A	1.1–1.2	15	GMCP003A0C
		B	1.3–1.5	18	
		C	1.6–1.7	21	
		D	1.8–1.9	24	
		E	2.0–2.2	27	
		F	2.3–2.5	30	
0	7	A	2.6–3.1	35	GMCP007C0C
		B	3.2–3.6	42	
		C	3.7–3.9	49	
		D	4.3–4.7	56	
		E	4.8–5.2	63	
		F	5.3–5.7	70	
0	15	A	5.7–6.8	75	GMCP015E0C
		B	6.9–7.9	90	
		C	8.0–9.1	105	
		D	9.2–10.3	120	
		E	10.4–11.4	135	
		F	11.5–12.6	150	
1	30	A	11.5–13.7	150	GMCP030H1C
		B	13.8–16.0	180	
		C	16.1–18.3	210	
		D	18.4–20.6	240	
		E	20.7–22.9	270	
		F	23.0–25.2	300	
2	50	A	19.3–22.9	250	GMCP050K2C
		B	23.0–26.8	300	
		C	26.9–30.6	350	
		D	30.7–34.5	400	
		E	34.6–38.3	450	
		F	38.4–42.1	500	
3	60	A	23.1–27.5	300	GMCP060J2C
		B	27.7–32.2	360	
		C	32.3–36.7	420	
		D	36.9–41.4	480	
		E	41.5–46.0	540	
		F	46.2–50.5	600	
3	63	A	24.2–32.1	320	GMCP063M2C
		B	29.1–34.8	380	
		D	38.8–46.4	500	
		E	43.6–48.9	570	
		F	48.5–53.7	630	

**Notes**

<sup>①</sup> Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate Cam settings and/or MCP ratings should be used.

All GMCP 3–63A come with line and load steel body terminals for Cu only wire. Refer to **Page V4-T2-229** under Optional Terminal Types.

UL recognized and CSA approved.

## Accessories

### Modifications for GMCP

Internal accessories must be factory installed.

### Internal Accessories <sup>①</sup>

Type Accessory	Electrical Ratings			Contact Arrangement	Factory Suffix	Style Number
	Volts	Frequency	Amperes			
Shunt trip <sup>②</sup>	120	50/60 Hz	1.1	—	S5	1373D62G18
Shunt trip <sup>②</sup>	240	50/60 Hz	2.1	—	S6	1373D62G19
Auxiliary switch <sup>③</sup>	240	50/60 Hz	6.0	1A/1B	A3	1288C74G03
Auxiliary switch <sup>③</sup>	240	50/60 Hz	6.0	2A/2B	A6	1288C73G03
Alarm switch <sup>③</sup>	240	50/60 Hz	6.0	Make/Break	B3	1288C75G03
Auxiliary switch/alarm switch combination <sup>③</sup>	240	50/60 Hz	6.0	1A/1B Make/Break	B13	1288C76G09

### External Mounted Accessories

Description	Number Units in Package	Style Number
Lock dog (non-padlockable)	1	1294C01H01
Mounting hardware	1	624B375G23
DIN rail adapter <sup>④</sup>	10	1225C79G02

### Modifications for HMCP

See Internal Accessories starting on **Page V4-T2-319**.

### Handle Mechanisms for Series C Frames

#### Kits Only (Kit Includes Shaft, Mechanism and Handle)—GMCP-Frame

Description	Rating Type		GMCP-Frame Catalog Number
	NEMA	IP	
 S01 Blue Handle S01 blue handle, 12-inch shaft	1/3R/12	54	GMHMVD12B / 68C6039G05
	4/4X	65	GMHMVD12BX / 68C6039G07
 S01 Red Handle S01 red handle, 12-inch shaft	1/3R/12	54	GMHMVD12R / 68C6039G06
	4/4X	65	GMHMVD12RX / 68C6039G08

### Direct (Close-Coupled) Handle Mechanisms

#### G Direct <sup>⑤</sup>

Frame	Black Handle		Yellow Handle	
	With Shroud	Without Shroud	With Shroud	Without Shroud
	Catalog Number	Catalog Number	Catalog Number	Catalog Number
GMCP	HRGMC1S	HRGMC10	HRGMC3S	HRGMC30

#### Notes

- ① Only one accessory may be installed in GMCP.
- ② LH only.
- ③ RH only.
- ④ For use with standard 35 mm DIN rail such as, 35 x 7.5 or 15 mm per DIN EN50022.
- ⑤ Suitable for use on two- or three-pole G-Frame.

No UVR available on GMCP.

# 2.4

## Molded Case Circuit Breakers

### Series C

#### F-Frame

2

#### 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number
0	3	A	0.69–0.91	9	<b>HMCP003A0C</b>
		B	0.92–1.0	12	
		C	1.1–1.2	15	
		D	1.3–1.5	18	
		E	1.6–1.7	21	
		F	1.8–1.9	24	
		G	2.0–2.2	27	
		H	2.3–2.5	30	
0	7	A	1.5–2.0	21	<b>HMCP007C0C</b>
		B	2.1–2.5	28	
		C	2.6–3.1	35	
		D	3.2–3.6	42	
		E	3.7–3.9	49	
		F	4.3–4.7	56	
		G	4.8–5.2	63	
		H	5.3–5.7	70	
0	15	A	3.4–4.5	45	<b>HMCP015E0C</b>
		B	4.6–5.6	60	
		C	5.7–6.8	75	
		D	6.9–7.9	90	
		E	8.0–9.1	105	
		F	9.2–10.3	120	
		G	10.4–11.4	135	
		H	11.5–12.6	150	
1	30	A	6.9–9.1	90	<b>HMCP030H1C</b>
		B	9.2–11.4	120	
		C	11.5–13.7	150	
		D	13.8–16.0	180	
		E	16.1–18.3	210	
		F	18.4–20.6	240	
		G	20.7–22.9	270	
		H	23.0–25.2	300	
2	50	A	11.5–15.2	150	<b>HMCP050K2C</b>
		B	15.3–19.1	200	
		C	19.2–22.9	250	
		D	23.0–26.8	300	
		E	26.9–30.6	350	
		F	30.7–4.5	400	
		G	34.6–38.3	450	
		H	38.4–42.1	500	

#### 600 Vac Maximum, 250 Vdc Maximum, continued

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number
2	70	A	16.1–21.4	210	<b>HMCP070M2C</b>
		B	21.5–26.8	280	
		C	26.9–32.2	350	
		D	32.3–37.5	420	
		E	37.6–42.9	490	
		F	43.0–48.3	560	
		G	48.4–53.7	630	
		H	53.8–59.1	700	
3	100	A	23.0–30.6	300	<b>HMCP100R3C</b>
		B	30.7–38.3	400	
		C	38.4–46.0	500	
		D	46.1–53.7	600	
		E	53.8–61.4	700	
		F	61.5–69.1	800	
		G	69.2–76.8	900	
		H	76.9–84.5	1000	
4	150	A	34.6–46.0	450	<b>HMCP150T4C</b>
		B	46.1–57.5	600	
		C	57.6–69.1	750	
		D	69.2–80.6	900	
		D	69.2–80.6	900	
		E	80.7–92.2	1050	
		F	92.3–103.7	1200	
		G	103.8–115.2	1350	
4	150	A	57.0–75.0	750	<b>HMCP150U4C</b>
		B	76.0–95.0	1000	
		C	96.0–114.0	1250	
		D	115.0–130.7	1500	
		E	③	1750	
		F	③	2000	
		G	③	2250	
		H	③	2500	

#### Notes

- ① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate Cam settings and/or MCP ratings should be used.
- ② For DC applications, actual trip levels are approximately 40% higher than values shown.
- ③ Settings above 130 A are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating.

HMCP 3–100 A come with line and load steel body terminals, 3T100FB. HMCP 150 A come with line and load steel body terminals, 3T150FB.

**Special Low Magnetic Protection Application MCP****600 Vac Maximum, 250 Vdc Maximum**

<b>Cont. Amps</b>	<b>Cam Setting</b>	<b>MCP Trip Setting <sup>①</sup></b>	<b>MCP Catalog Number</b>
25	A	40	<b>HMCP025D0C</b>
	B	43	
	D	49	
	E	52	
	F	55	
	G	58	
	H	60	
	50	A	
B		87	
C		93	
D		98	
E		103	
F		109	
G		115	
H		120	
70	A	115	<b>HMCP070J2C</b>
	B	122	
	C	130	
	D	139	
	E	145	
	F	153	
	G	160	
	H	170	
100	A	160	<b>HMCP100L3C</b>
	B	174	
	C	185	
	D	196	
	E	207	
	F	218	
	G	229	
	H	240	

**Notes**

<sup>①</sup> For DC applications, actual trip levels are approximately 40% higher than values shown.

HMCP 25–100 A come with line and load steel body terminals, 3T100FB.

# 2.4

## Molded Case Circuit Breakers

### Series C

#### MCPs for Application with Motor Starters Equipped with Electronic Overload Relays

2

#### 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number
0	3	A	0.69–0.91	9	<b>HMCP5003A0C</b>
		B	0.92–1.0	12	
		C	1.1–1.2	15	
		D	1.3–1.5	18	
		E	1.6–1.7	21	
		F	1.8–1.9	24	
		G	2.0–2.2	27	
		H	2.3–2.5	30	
0	7	A	1.5–2.0	21	<b>HMCP5007C0C</b>
		B	2.1–2.5	28	
		C	2.6–3.1	35	
		D	3.2–3.6	42	
		E	3.7–3.9	49	
		F	4.3–4.7	56	
		G	4.8–5.2	63	
		H	5.3–5.7	70	
0	15	A	3.4–4.5	45	<b>HMCP5015E0C</b>
		B	4.6–5.6	60	
		C	5.7–6.8	75	
		D	6.9–7.9	90	
		E	8.0–9.1	105	
		F	9.2–10.3	120	
		G	10.4–11.4	135	
		H	11.5–12.6	150	
1	30	A	6.9–9.1	90	<b>HMCP5030H1C</b>
		B	9.2–11.4	120	
		C	11.5–13.7	150	
		D	13.8–16.0	180	
		E	16.1–18.3	210	
		F	18.4–20.6	240	
		G	20.7–22.9	270	
		H	23.0–25.2	300	
2	50	A	11.5–15.2	150	<b>HMCP5050K2C</b>
		B	15.3–19.1	200	
		C	19.2–22.9	250	
		D	23.0–26.8	300	
		E	26.9–30.6	350	
		F	30.7–34.5	400	
		G	34.6–38.3	450	
		H	38.4–42.1	500	

#### 600 Vac Maximum, 250 Vdc Maximum, continued

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number
3	100	A	23.0–30.6	300	<b>HMCP5100R3C</b>
		B	30.7–38.3	400	
		C	38.4–46.0	500	
		D	46.1–53.7	600	
		E	53.8–61.4	700	
		F	61.5–69.1	800	
		G	69.2–76.8	900	
		H	76.9–84.5	1000	
4	150	A	34.6–46.0	450	<b>HMCP5150T4C</b>
		B	46.1–57.5	600	
		C	57.6–69.1	750	
		D	69.2–80.6	900	
		E	80.7–92.2	1050	
		F	92.3–103.7	1200	
		G	103.8–115.2	1350	
		H	115.3–126.7	1500	
4	150	A	57.0–75.0	750	<b>HMCP5150U4C</b>
		B	76.0–95.0	1000	
		C	96.0–114.0	1250	
		D	115.0–130.7	1500	
		E	③	1750	
		F	③	2000	
		G	③	2250	
		H	③	2500	

#### Notes

- ① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ② For DC applications, actual trip levels are approximately 40% higher than values shown.
- ③ Settings above 130 A are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating.

HMCP 25–100 A come with line and load steel body terminals, 3T100FB.

HMCP 3–100 A come with line and load steel body terminals, 3T100FB. HMCP 150 A come with line and load steel body terminals, 3T150FB.

**J-Frame****600 Vac Maximum, 250 Vdc Maximum**

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③
4	250	A	27.0–30.7	350	<b>HMCP250A5C</b>
		B	30.8–33.8	400	
		C	33.9–36.9	440	
5	250	D	37.0–40.3	480	<b>HMCP250D5C</b>
		E	40.4–43.8	525	
		F	43.9–46.9	570	
		G	47.0–50.7	610	
		H	47.0–50.7	660	
		I	47.0–50.7	700	
		5	250	A	
B	38.9–43.4			505	
C	43.5–47.6			565	
D	47.7–52.2			620	
E	52.3–56.5			680	
F	56.6–60.7			735	
G	60.8–64.9			790	
H	65.0–69.2			845	
I	69.3–73.5			900	
5	250	A	38.5–43.4	500	<b>HMCP250D5C</b>
		B	43.5–48.0	565	
		C	48.1–53.0	625	
		D	53.1–57.6	690	
		E	57.7–62.3	750	
		F	62.4–67.3	810	
		G	67.4–71.9	875	
		H	72.0–76.9	935	
		I	77.0–81.6	1000	
5	250	A	48.1–53.8	625	<b>HMCP250F5C</b>
		B	53.9–59.9	700	
		C	60.0–66.1	780	
		D	66.2–72.3	860	
		E	72.4–78.4	940	
		F	78.5–83.8	1020	
		G	83.9–89.9	1090	
		H	90.0–96.1	1170	
		I	96.2–102.0	1250	
5	250	A	57.7–64.6	750	<b>HMCP250G5C</b>
		B	64.7–71.9	840	
		C	72.0–79.2	935	
		D	79.3–86.5	1030	
		E	86.6–93.8	1125	
		F	93.9–101.1	1220	
		G	101.2–108.4	1315	
		H	108.5–115.3	1410	
		I	115.4–122.4	1500	

**600 Vac Maximum, 250 Vdc Maximum, continued**

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③
5	250	A	67.4–75.3	875	<b>HMCP250J5C</b>
		B	75.4–83.8	980	
		C	83.9–92.3	1090	
		D	92.4–100.7	1200	
		E	100.8–109.2	1310	
		F	109.3–117.6	1420	
		G	117.7–126.1	1530	
		H	126.2–134.6	1640	
		I	134.7–142.8	1750	
5	250	A	77.0–86.6	1000	<b>HMCP250K5C</b>
		B	86.6–96.1	1125	
		C	96.2–105.7	1250	
		D	105.8–115.3	1375	
		E	115.4–124.9	1500	
		F	125.0–134.6	1625	
		G	134.7–144.2	1750	
		H	144.3–153.8	1875	
		I	153.9–163.3	2000	
5	250	A	86.6–97.3	1125	<b>HMCP250L5C</b>
		B	97.4–108.4	1265	
		C	108.5–118.8	1410	
		D	118.9–129.9	1545	
		E	130.0–140.7	1690	
		F	140.8–151.5	1830	
		G	151.6–162.3	1970	
		H	162.4–173.0	2110	
		I	173.1–183.6	2250	
5	250	A	96.2–108.0	1250	<b>HMCP250W5C</b>
		B	108.1–119.9	1405	
		C	120.0–132.3	1560	
		D	132.4–144.2	1720	
		E	144.3–156.1	1875	
		F	156.2–168.0	2030	
		G	168.1–179.9	2185	
		H	180.0–192.3	2340	
		I	192.4–204.0	2500	

**Notes**

① Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

② For DC applications, actual trip levels are approximately 40% higher than values shown.

③ Three-pole catalog numbers shown. Two-pole catalog numbers begin with **HM2P** in place of **HMCP**.

All HMCP and HM2P 250 A come with line and load steel body terminals, T250KB. (With suffix "C," without "C" comes with TA250KB.)

## K-Frame

2

## 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③
4	400	A	27.0–30.7	350	<b>HMCP400A5C</b>
		B	30.8–33.8	400	
		C	33.9–36.9	440	
5	400	D	37.0–40.3	480	<b>HMCP400A5C</b>
		E	40.4–43.8	525	
		F	43.9–46.9	570	
		G	47.0–50.7	610	
		H	50.8–53.8	660	
		I	53.9–57.2	700	
5	400	A	38.5–43.4	500	<b>HMCP400D5C</b>
		B	43.5–48.0	565	
		C	48.1–53.0	626	
		D	53.1–57.6	690	
		E	57.7–62.3	750	
		F	62.4–67.3	810	
		G	67.4–71.9	875	
		H	72.0–76.9	935	
		I	77.0–81.6	1000	
5	400	A	48.1–53.8	625	<b>HMCP400F5C</b>
		B	53.9–59.9	700	
		C	60.0–66.1	780	
		D	66.2–72.3	860	
		E	72.4–78.4	940	
		F	78.5–83.8	1020	
		G	83.9–89.9	1090	
		H	90.0–96.1	1170	
		I	96.2–102.0	1250	
5	400	A	57.7–64.6	750	<b>HMCP400G5C</b>
		B	64.7–71.9	840	
		C	72.0–79.2	935	
		D	79.3–86.5	1030	
		E	86.6–93.8	1125	
		F	93.9–101.1	1220	
		G	101.2–108.4	1315	
		H	108.5–115.3	1410	
		I	115.4–122.4	1500	
5	400	A	67.4–75.3	875	<b>HMCP400J5C</b>
		B	75.4–83.8	980	
		C	83.9–92.3	1090	
		D	92.4–100.7	1200	
		E	100.8–109.2	1310	
		F	109.3–117.6	1420	
		G	117.7–126.1	1530	
		H	126.2–134.6	1640	
		I	134.7–142.8	1750	

## 600 Vac Maximum, 250 Vdc Maximum, continued

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③
5	400	A	77.0–86.5	1000	<b>HMCP400K5C</b>
		B	86.6–96.1	1125	
		C	96.2–105.7	1250	
		D	105.8–115.3	1375	
		E	115.4–124.9	1500	
		F	125.0–134.6	1625	
5	400	G	134.7–144.2	1750	<b>HMCP400L5C</b>
		H	144.3–153.8	1875	
		I	153.9–163.3	2000	
		A	86.6–97.3	1125	
		B	97.4–108.4	1265	
		C	108.5–118.8	1410	
		D	118.9–129.9	1545	
		E	130.0–140.7	1690	
		F	140.8–151.5	1830	
5	400	G	151.6–162.3	1970	<b>HMCP400W5C</b>
		H	162.4–173.0	2110	
		I	173.1–183.6	2250	
		A	96.2–108.0	1250	
		B	108.1–119.9	1405	
		C	120.0–132.3	1560	
		D	132.4–144.2	1720	
		E	144.3–156.1	1875	
		F	156.2–168.0	2030	
5	400	G	168.1–179.9	2185	<b>HMCP400N5C</b>
		H	180.0–192.3	2340	
		I	192.4–204.0	2500	
		A	115.4–129.9	1500	
		B	130.0–144.2	1690	
		C	144.3–158.4	1875	
		D	158.5–173.0	2060	
		E	173.1–187.6	2250	
		F	187.7–201.9	2440	
5	400	G	202.0–216.1	2625	<b>HMCP400O5C</b>
		H	216.2–230.7	2810	
		I	230.8–244.9	3000	

## Notes

- ① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ② For DC applications, actual trip levels are approximately 40% higher than values shown.
- ③ Three-pole catalog numbers shown. Two-pole catalog numbers begin with **HM2P** in place of **HMCP**.

All HMCP and HM2P 400 A come with aluminum body terminals, 3TA400K. Catalog numbers with suffix "C" as shown above come with copper body terminals 3T400K.

## 600 Vac Maximum, 250 Vdc Maximum, continued

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③
5	400	A	134.7–151.5	1750	<b>HMCP400R5C</b>
		B	151.6–168.4	1970	
		C	168.5–185.3	2190	
		D	185.4–201.9	2410	
		E	202.0–218.8	2625	
		F	218.9–235.7	2845	
		G	235.8–252.6	3065	
		H	252.7–269.2	3285	
		I	269.3–285.7	3500	
5	400	A	153.9–173.0	2000	<b>HMCP400X5C</b>
		B	173.1–192.3	2250	
		C	192.4–211.5	2500	
		D	211.6–230.7	2750	
		E	230.8–249.9	3000	
		F	250.0–269.2	3250	
		G	269.3–288.4	3500	
		H	288.5–307.6	3750	
		I	307.7–326.9	4000	
5	400	A	173.1–194.5	2250	<b>HMCP400Y5C</b>
		B	194.6–216.1	2530	
		C	216.2–237.6	2810	
		D	237.7–259.5	3090	
		E	259.6–281.1	3375	
		F	281.2–302.6	3655	
		G	302.7–324.1	3935	
		H	324.2–346.1	4215	
		I	346.2–368.1	4500	

## L-Frame

## 600 Vac Maximum ④

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting	MCP Catalog Number
6	600	A	138.5–184.5	1800	<b>HMCP600L6W</b>
		B	184.6–230.7	2400	
		C	230.8–276.8	3000	
		D	276.9–323.0	3600	
		E	323.1–369.1	4200	
		F	369.2–415.3	4800	
		G	415.4–461.4	5400	
		H	461.5–507.7	6000	
6	600	A	38.5–46.1	500	<b>HMCP600X6W</b>
		B	46.2–61.4	600	
		C	61.5–76.8	800	
		D	76.9–96.1	1000	
		E	96.2–115.3	1250	
		F	115.4–153.7	1500	
		G	153.8–192.2	2000	
		H	192.3–230.7	2500	
6	600	A	76.9–96.1	1000	<b>HMCP600Y6W</b>
		B	96.2–115.3	1250	
		C	115.4–153.7	1500	
		D	153.8–192.2	2000	
		E	192.3–230.7	2500	
		F	230.8–269.1	3000	
		G	269.2–307.6	3500	
		H	307.7–346.1	4000	

**Notes**

① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

② For DC applications, actual trip levels are approximately 40% higher than values shown.

③ Three-pole catalog numbers shown. Two-pole catalog numbers begin with **HM2P** in place of **HMCP**.

④ Equipped with electronic trip device.

All HMCP and HM2P 400 A come with aluminum body terminals, 3TA400K. Catalog numbers with suffix "C" as shown above come with copper body terminals 3T400K.

All HMCP 600 A come without terminals. For terminals, see **Page V4-T2-287**.

**N-Frame**

2

**600 Vac Maximum** <sup>①</sup>

<b>NEMA Starter Size</b>	<b>Cont. Amps</b>	<b>Cam Setting</b>	<b>Motor Full Load Current Amperes (FLA)</b> <sup>②</sup>	<b>MCP Trip Setting</b>	<b>MCP Catalog Number</b>
7	800	A	123.1–184.5	1600	<b>HMCP800X7W</b>
		B	184.6–246.1	2400	
		C	246.2–307.6	3200	
		D	307.7–369.1	4000	
		E	369.2–430.7	4800	
		F	430.8–492.2	5600	
		G	492.3–553.7	6400	
8	1200	A	184.6–276.8	2400	<b>HMCP12Y8W</b>
		B	276.9–369.1	3600	
		C	369.2–461.4	4800	
		D	461.5–553.7	6000	
		E	553.8–646.1	7200	
		F	646.2–738.4	8400	
		G	738.5–830.7	9600	

**Notes**

- <sup>①</sup> Equipped with electronic trip device.
- <sup>②</sup> Motor FLA ranges are typical. The corresponding trip setting is at 13X the minimum FLA value shown. Where a 13X setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

## Type ELC Current Limiter Attachment



## Type ELC Current Limiter Attachment (Size 0–4)

## Product Description

Eaton's Type ELC current limiter attachment for the MCP is designed to provide increased interrupting capacity. The combination may be used for the application up to 200,000 A symmetrical at 600 Vac, making the MCP suitable for use in network distribution systems or other applications where unusually high fault currents are available. The current limiter connects to the load end of the MCP and is provided with terminals suitable for copper or aluminum conductors. (See table at right.)

Limiters are coordinated with the MCP so that normal fault currents are interrupted automatically by the MCP without any damage to the limiter. Only the rare very high fault is opened by the limiter. Faults that are interrupted by the limiter also magnetically trip the MCP, opening all three poles, preventing single-phase operation.

Each of the three poles of the Type ELC limiter is equipped with an indicator that extends when a fault is interrupted by the limiter.

## Contents

## Description

	<i>Page</i>
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	V4-T2-352

## Product Selection

## Type ELC Current Limiter Attachment



## ELC Current Limiter Attachment

MCP Rating (Amperes)	Catalog Number
3	ELC3003R
7	ELC3007R
15	ELC3015R
30	ELC3030R
50	ELC3050R
100	ELC3100R
150	ELC3150R

## Technical Data and Specifications

Type ELC Current Limiter Terminal Wire Sizes <sup>①</sup>

Type ELC Current Limiter Maximum Amperes	Wire Range AWG	Metric (mm <sup>2</sup> )
<b>Standard Aluminum Terminals</b>		
50	14–2	2.5–35
100	1–4/0	50–95
150	1–4/0	50–95
<b>Non-Standard Terminals (Steel)</b>		
50	14–2 <sup>②</sup>	2.5–35
100	—	—
150	—	—

## Notes

<sup>①</sup> Terminal wire connectors are UL listed for standard stranded wire sizes as defined in UL 486A or UL 486B.

<sup>②</sup> Optional on special order for copper cable only.

All HMCP 800 A and 1200 A come without terminals. For terminals, see Page V4-T2-299.

## Current-Limiting Circuit Breaker Module

2



## Current-Limiting Circuit Breaker Module

## Product Overview

Power demand continues to grow in new and existing facilities. To meet increased demand, larger utility supplies, spot networks and large facility transformers are installed. The increased capacity of the electrical source results in increased fault currents in excess of 100 kA short-circuit protection. Eaton manufactures non-fused current-limiting modules with interrupting capacities up to 200 kA at 600 Vac. Unlike fused current limiters with a one-time use, a current limiter module provides an automatic reset of the module after a short-circuit event. Resetting the molded-case circuit breaker is the only action required to restore critical power to the system; there is no time wasted with sourcing the correct replacement fuses or module to bring the system back online.

## Product Description

The current-limiting breaker modules use a unique contact design to enhance the system protection similar to that of the circuit breaker. When high short-circuit current is flowing through the contacts of these modules, the design results in very high interrupting capacities and improved current-limiting characteristics.

## Application Description

High-performance breakers are most commonly applied when very high fault levels are available and with applications where the current-limiting capability is used upstream of the final load to limit current. Typical loads include lighting, power distribution, and motor control applications.

## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module	
Product Selection . . . . .	V4-T2-317
Technical Data and Specifications . . . . .	V4-T2-318
Dimensions and Weights . . . . .	V4-T2-318
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	V4-T2-352

## Features and Benefits

Superior system protection:

- Auto reset improves system uptime and eliminates the need for finding replacement parts
- No fuses to replace, reducing the overall cost of ownership and the waste created by fuses
- Overloads, by using inverse time current tripping characteristics of the molded-case circuit breaker
- Low-level short circuits, by using instantaneous and/or short-time delay tripping characteristics of the molded-case circuit breaker
- High-level short circuits, by using ultra-high-speed, blow-apart contacts of the current-limiting module in series with the circuit breaker contacts
- Let-through currents, by improved opening speed of the contacts, the resultant rapid rise of arc voltage introduces impedance into the system

## Standards and Certifications

- UL 489
- CSA C22.2



## Product Selection

## Series C High Performance Ratings

Type	Product	Amperes	480 Vac (UL)	600 Vac (UL)
FDC 3P thermal-magnetic	Breaker only	15–225	100	35
	With limiter	40–200	200	200

## FD Frame

FD IC Rating—200 kAIC at 600 Vac <sup>①</sup>

Ampere Rating	Breaker with Line Side Mounted Current Limiter <sup>②</sup>	Breaker with Load Side Mounted Current Limiter <sup>③</sup>
<b>Thermal-Magnetic</b>		
40	FDC3040Q01	FDC3040YQ02
45	FDC3045Q01	FDC3045YQ02
50	FDC3050Q01	FDC3050YQ02
60	FDC3060Q01	FDC3060YQ02
70	FDC3070Q01	FDC3070YQ02
80	FDC3080Q01	FDC3080YQ02
90	FDC3090Q01	FDC3090YQ02
100	FDC3100Q01	FDC3100YQ02
110	FDC3110Q01	FDC3110YQ02
125	FDC3125Q01	FDC3125YQ02
150	FDC3150Q01	FDC3150YQ02
175	FDC3175Q01	FDC3175YQ02
200	FDC3200Q01	FDC3200YQ02

## Limiter Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Metric Wire Range mm <sup>2</sup>	AWG Wire Range/ Number of Conductors	Catalog Number
<b>Standard Pressure Type Terminals</b>					
250	Aluminum	Cu/Al	10–185	#8–350 (1)	TA250FJ <sup>④</sup>

## Breaker Load Terminals (For Line Mounted Limiters Only)

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range	Metric Wire Range mm <sup>2</sup>	Package of Three Terminals Catalog Number
<b>Standard Pressure Type Terminals</b>					
100	Steel	Cu/Al	14–1/0	2.5–50	3T100FB
225	Aluminum	Cu/Al	4–4/0	25–95	3TA225FD

## Notes

- <sup>①</sup> Line and load terminal included.  
<sup>②</sup> Two interphase barriers provided, mounted on line end of limiter, catalog number **FJ1PBK**.  
<sup>③</sup> Four interphase barriers provided, (2) line end of breaker, (2) load end of limiter.  
<sup>④</sup> Load side breaker terminations included for units configured with line mounted limiters.

### Technical Data and Specifications

2

#### UL 489 Current-Limiting Data

Frame	Circuit	I <sub>p</sub> (kA)	I <sup>2</sup> T (10 <sup>6</sup> A <sup>2</sup> S)
FDC	240 V/200 kA	64.80	6.80
FDC	480 V/100 kA	66.90	9.33
FDC	600 V/50 kA	54.30	8.92

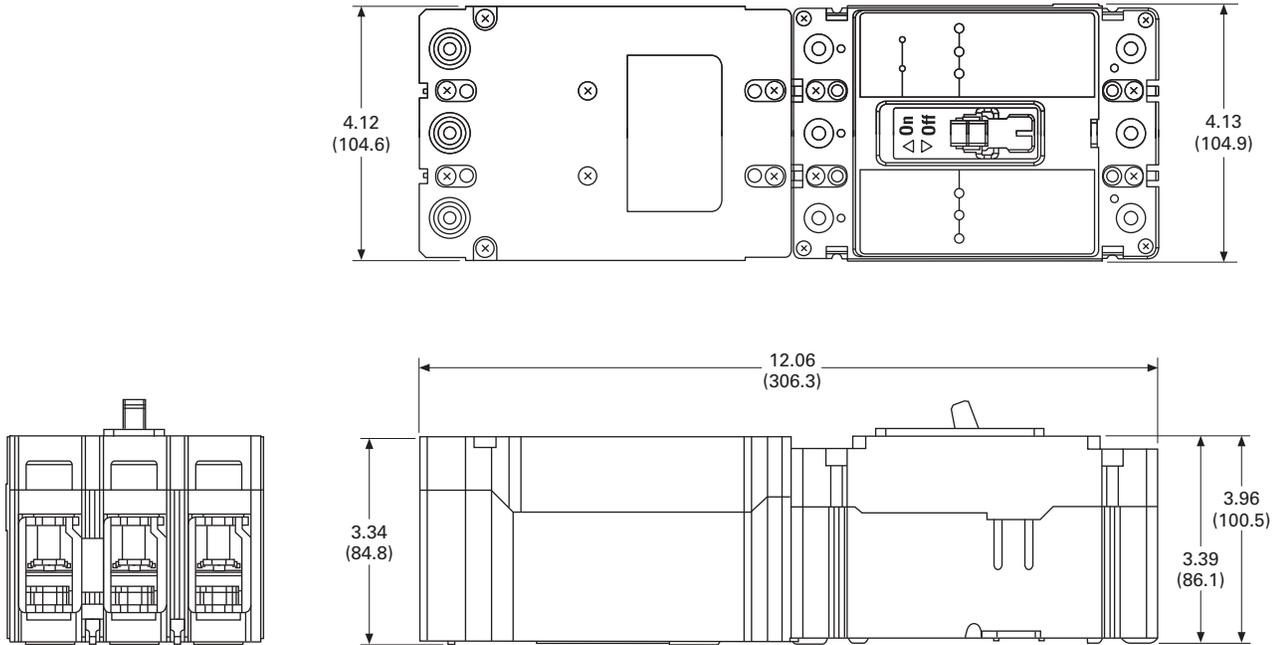
### Dimensions and Weights

Approximate Dimensions in Inches (mm)

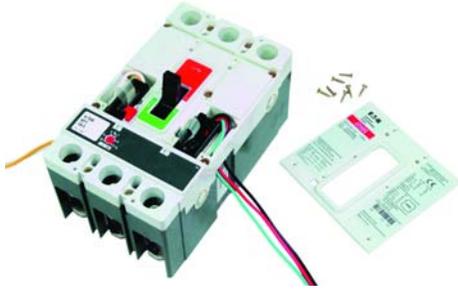
#### Assembled Breaker and Current-Limiting Module

Frame	Height	Width	Depth	Weight in lb (kg)
FD + limiter	12.06 (306.3)	4.13 (104.9)	3.39 (86.1)	8.50 (3.86)

#### FD-Frame With Current Limiter Module



## Series C Internal Accessories



## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories	
Product Selection . . . . .	V4-T2-321
Technical Data and Specifications . . . . .	V4-T2-340
External Accessories . . . . .	V4-T2-352

## Internal Accessories

## Product Overview

**Alarm Switch**

For remote indication of automatic trip operation. Does not function with manual switching; however, it will operate when either a shunt trip or undervoltage release is operated. A “make” contact closes and a “break” contact opens when the alarm/lockout switch operates. The switch automatically resets when the circuit breaker is reset.

**Auxiliary Switch**

The auxiliary switch provides circuit breaker contact status information by monitoring the position of the molded cross bar that contains the moving contact arms. The auxiliary switch is used for remote indication and interlock system verification, and consists of one or two SPDT switches housed in a plug-in module. Each SPDT switch has one “a” and one “b” contact. When the circuit breaker contacts are open, the “a” contact is open and the “b” contact is closed.

**Auxiliary Switch and Alarm Switch Combination**

Each catalog number listed in tables on **Pages V4-T2-324** and **V4-T2-325** includes one auxiliary switch and one alarm switch. In an auxiliary switch ASL switch combination, the auxiliary switch is always mounted on the side of the plug-in module next to the center pole of the circuit breaker.

**Shunt Trip**

The shunt trip provides remote controlled tripping of the circuit breaker. The shunt trip consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch assembled to a plug-in module. When required for ground fault protection applications, certain AC rated shunt trips, as noted in the electrical rating table, are suitable for operation at 55 percent of rated voltage.

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific AC or DC voltages within the voltage range shown. Electrical ratings are also shown on applicable circuit breaker accessory nameplates.

**Low Energy Shunt Trip**

Low energy shunt trip devices are designed to operate from low energy output signals from dedicated current sensors typically applied in ground fault protection schemes. However, with a proper control voltage source, they may be applied in place of conventional trip devices for special applications. Flux paths surrounding permanent magnets used in the shunt trip assembly hold a charged spring poised in readiness to operate the circuit breaker trip mechanism.

When a 100 microfarad capacitor charged to 28 Vdc is discharged through the shunt trip coil, the resultant flux opposes the permanent magnet flux field, which releases the stored energy in the spring to trip the circuit breaker. As the circuit breaker resets, the shunt trip reset arm is actuated by the circuit breaker handle, resetting the shunt trip. The plug-in module is mounted in retaining slots in the top of the trip unit. Coil is intermittent-rated only. Cutoff provisions required in control circuit.

**Undervoltage Release Mechanism**

The undervoltage release mechanism monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating.

The undervoltage release mechanism consists of a continuous rated solenoid with a plunger and tripping lever mounted in a plug-in module. The tab on the tripping lever resets the undervoltage release mechanism when normal voltage has been restored and the circuit breaker handle is moved to the reset (or OFF) position. With less than pickup voltage applied to the undervoltage release mechanism, the circuit breaker contacts will not touch when a closing operation is attempted.

**Note:** Undervoltage release mechanism accessories are not designed for, and should not be used as, circuit interlocks.

**Accessory Terminal Block (R-Frame)**

(For fixed-mounted configuration.)

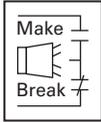
Internal accessory wiring leads are normally supplied with pigtail leads (18 AWG) that exit from the right side of the circuit breaker. Where specified, fixed-mounted accessory terminal blocks are available. A maximum of one 24-point terminal block can be installed on the right side of the circuit breaker for the internal accessories.

For convenience in determining the appropriate number of terminal block points required, refer to **Page V4-T2-320**.

## Product Selection

## Alarm Switch

## Alarm Switch



## G-Frame Alarm Switch (RH Only) ①

Electrical Ratings			Contact Arrangement	Factory Suffix	Catalog Number ②③④
Volts	Frequency	Amperes			
<b>Alarm Switch</b>					
240	50/60 Hz	6	1 Make/1 Break	<b>B3</b>	<b>1288C75G03</b>
<b>Alarm Switch Auxiliary Switches Combination</b>					
240	50/60 Hz	6	1 Make/1 Break and 1A/1B	<b>B13</b>	<b>1288C76G09</b>

## F-Frame Alarm Switch ①

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted Connection Type and Location			Factory Installation Kit ⑤		
		18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side Suffix Number	Rear ⑥ Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number	Catalog Number	Catalog Number
1	Left ⑦	<b>B01</b>	<b>B02</b>	<b>B03</b>	<b>B04</b>	<b>A1L1LPK</b>	<b>A1L1LTK</b>
	Right	<b>B05</b>	<b>B06</b>	<b>B07</b>	<b>B08</b>	<b>A1L1RPK</b>	<b>A1L1RTK</b>
2	Left ⑦	<b>B09</b>	<b>B10</b>	—	<b>B11</b>	<b>A2L1LPK</b>	<b>A2L1LTK</b>
	Right	<b>B12</b>	<b>B13</b>	—	<b>B14</b>	<b>A2L1RPK</b>	<b>A2L1RTK</b>
1	Single-pole	<b>B15</b> ⑧	—	—	—	—	—

## F-Frame HMCP Alarm Switch ①

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted Connection Type and Location			Factory Installation Kit ⑤		
		18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side Suffix Number	Rear ⑥ Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number	Catalog Number	Catalog Number
1	Left ⑦	<b>B01</b>	<b>B02</b>	<b>B03</b>	<b>B04</b>	<b>MA1L1LPK</b>	<b>MA1L1LTK</b>
	Right	<b>B05</b>	<b>B06</b>	<b>B07</b>	<b>B08</b>	<b>MA1L1RPK</b>	<b>MA1L1RTK</b>
2	Left ⑦	<b>B09</b>	<b>B10</b>	—	<b>B11</b>	<b>MA2L1LPK</b>	<b>MA2L1LTK</b>
	Right	<b>B12</b>	<b>B13</b>	—	<b>B14</b>	<b>MA2L1RPK</b>	<b>MA2L1RTK</b>

## J-Frame and HMCP (J) Alarm Switch

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted Connection Type and Location			Field Mounted Field Installation Kits ⑥		
		18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side Suffix Number	Rear ⑦ Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number	Catalog Number	Catalog Number
1	Left ⑧	<b>B01</b>	<b>B02</b>	<b>B03</b>	<b>B04</b>	<b>A1L2LPK</b>	<b>A1L2LTK</b>
	Right	<b>B05</b>	<b>B06</b>	<b>B07</b>	<b>B08</b>	<b>A1L2RPK</b>	<b>A1L2RTK</b> ⑨

## Notes

- ① F-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed; however, this is not recommended for FDE breakers. Accessory installation should be done before the circuit breaker is mounted and connected.
- ② Includes 24-inch (609.6 mm) external pigtail leads, 18 AWG (16–0.010).
- ③ A maximum of two internal accessories may be mounted in a three-pole circuit breaker.
- ④ Suitable for mounting in right pole only of two- or three-pole breaker.
- ⑤ Not listed with Underwriters Laboratories; for field installation.
- ⑥ Standard pigtail lead exit location.
- ⑦ Standard mounting location.
- ⑧ Factory installation only. Leads exit load end of circuit breaker.
- ⑨ Listed with Underwriters Laboratories; for field installation on interchangeable trip unit breakers under E64983.
- ⑩ Standard mounting location—leads exit rear of breaker.

#### K-Frame and HMCP (K) Alarm Switch

Number of Sets of Contacts (1M and 1B)	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits ①	
		Same Side Suffix Number	Rear ② Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left ③	B01		B02	B03
	Right ④	B05	B06	B07	B08	A1L3RPK	A1L3RTK
2	Left ③	B09	B10	—	B11	A2L3LPK	A2L3LTK
	Right ④	B12	B13	—	B14	A2L3RPK	A2L3RTK

#### L-, HMCP (L) and (M) Frames and Alarm Switch

Number of Sets of Contacts (1M and 1B)	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits ①	
		Same Side Suffix Number	Rear ② Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left ③	B01		B02	B03
	Right	B05	B06	B07	B08	A1L4RPK	A1L4RTK
2	Left ③	B09	B10	—	B11	A2L4LPK	A2L4LTK
	Right	B12	B13	—	B14	A2L4RPK	A2L4RTK

#### N-Frame and HMCP (N) Alarm Switch

Number of Sets of Contacts (1M and 1B)	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits ⑤	
		Same Side Suffix Number	Rear ② Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left	B01		B02	B03
	Right ③	B05	B06	B07	B08	A1L5RPK	A1L5RTK
2	Left	B09	B10	—	B11	A2L5LPK	A2L5LTK
	Right ③	B12	B13	—	B14	A2L5RPK	A2L5RTK

#### R-Frame Alarm Switch (RH Only)

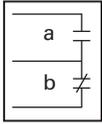
Number of Contacts (Make and Break)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads Suffix Number ⑥	Field Mounted Field Installation Kits ⑤ Pigtail Leads Catalog Number ⑥
	1	B05
2	B12	A2L6RPK

#### Notes

- ① Listed with Underwriters Laboratories; for field installation on interchangeable trip unit breakers under E64983.
- ② Standard mounting location.
- ③ Standard mounting location—leads exit rear of breaker.
- ④ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
- ⑤ Listed with Underwriters Laboratories for field installation under E64983.
- ⑥ A maximum of three ASL plug-in modules may be installed in a circuit breaker.

## Auxiliary Switch

## Auxiliary Switch



## G-Frame Auxiliary Switch (RH Only)

Electrical Ratings			Contact Arrangement	Factory Suffix	Catalog Number <sup>①②</sup>
Volts	Frequency	Amperes			
240	50/60 Hz	6	1a/1b	A3	1288C74G03
240	50/60 Hz	6	2a/2b	A6	1288C73G03

## F-Frame and HMCP (F) Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads				Factory Installation Kit <sup>④</sup>	
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Terminal Block Same Side Suffix Number	Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left <sup>⑤</sup>	A01	A02	A03	A04
	Left <sup>⑤</sup>	A15 <sup>⑦</sup>	A16 <sup>⑦</sup>	A17 <sup>⑦</sup>	—	E1X1PK	—
	Right or Neutral <sup>⑥</sup>	A05	A06	A07	A08	A1X1PK	A1X1RTK <sup>⑧</sup>
	Right or Neutral <sup>⑥</sup>	A18 <sup>⑦</sup>	A19 <sup>⑦</sup>	A20 <sup>⑦</sup>	—	—	—
2	Left <sup>⑤</sup>	A09	A10	—	A11	A2X1LPK	A2X1LTK
	Left <sup>⑤</sup>	A21 <sup>⑦</sup>	A22 <sup>⑦</sup>	—	—	E2X1LPK	—
	Right or Neutral <sup>⑥</sup>	A12	A13	—	A14	A2X1RPK	A2X1RTK <sup>⑧</sup>
	Right or Neutral <sup>⑥</sup>	A23 <sup>⑦</sup>	A24 <sup>⑦</sup>	—	—	E2X1RPK	—

F-Frame with Electronic Trip Unit Auxiliary Switch <sup>⑨</sup>

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads				Factory Installation Kit <sup>④</sup>	
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Terminal Block Same Side Suffix Number	Pigtail Leads Catalog Number	Terminal Block Catalog Number
		<b>Trip Unit Type 310+</b>					
1	Right	A30	A31	A32	—	—	—
<b>Trip Unit Type 210+</b>							
1	Right	A33	A34	A35	—	—	—

## J-Frame and HMCP (J) Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads				Field Mounted Factory Installation Kit <sup>⑩</sup>	
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Terminal Block Same Side Suffix Number	Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left	A01	A02	A03	A04
	Right <sup>⑩</sup>	A05	A06	A07	A08	A1X2PK	A1X2RTK <sup>⑧</sup>
2	Left	A09	A10	—	A11	A2X2PK	A2X2LTK
	Right <sup>⑩</sup>	A12	A13	—	A14	A2X2PK	A2X2RTK <sup>⑧</sup>

## Notes

- ① Includes 24-inch external pigtail leads, 18 AWG (16–0.010).
- ② A maximum of two internal accessories may be mounted in a three-pole circuit breaker. Suitable for mounting in right pole only of two- or three-pole breaker.
- ③ Standard pigtail lead exit location.
- ④ Not listed with Underwriters Laboratories; for field installation.
- ⑤ Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>).
- ⑥ Not for use on F-Frame with electronic trip unit.
- ⑦ 125 volts (max.), 50/60 Hz switch for use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
- ⑧ Not for use on four-pole circuit breakers.
- ⑨ Only for use on three-pole F-Frame breakers with electronic trip unit. Installation auxiliary switch for FD electronic breakers on right pole must be performed at breaker factory.
- ⑩ Listed with Underwriters Laboratories for field installation or interchangeable trip unit breakers under E64983.
- ⑪ Standard mounting location—leads exit rear of breaker.

#### K-Frame and HMCP (K) Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Field Mounted Factory Installation Kit ①		
		Same Side Suffix Number	Rear ② Suffix Number	Opposite Side Suffix Number		Same Side Suffix Number	Pigtail Leads	Terminal Block
							Catalog Number	Catalog Number
1	Left	A01	A02	A03	A04	A1X3PK	A1X3LTK	
	Right ②③	A05	A06	A07	A08	A1X3PK	A1X3RTK ④	
2	Left	A09	A10	—	A11	A2X3PK	A2X3LTK	
	Right ②③	A12	A13	—	A14	A2X3PK	A2X3RTK ④	
	Right	A21	A22	—	—	1482D28G10 ⑥⑦	—	
3	Left	A18	—	—	A15	A3X3LPK	A3X3LTK	
	Right ③	A17	—	—	A16	A3X3RPK	A3X3RTK ④	

#### L-, HMCP (L) and (M) Frames and Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Field Mounted Factory Installation Kit ①		
		Same Side Suffix Number	Rear ② Suffix Number	Opposite Side Suffix Number		Same Side Suffix Number	Pigtail Leads	Terminal Block
							Catalog Number	Catalog Number
1	Left	A01	A02	A03	A04	A1X4PK	A1X4LTK	
	Right ②	A05	A06	A07	A08	A1X4PK	A1X4RTK ④	
2	Left	A09	A10	—	A11	A2X4PK	A2X4LTK	
	Right ②	A12	A13	—	A14	A2X4PK	A2X4RTK ④	
3	Left	A18	—	—	A15	A3X4PK	A3X4LTK	
	Right ②	A17	—	—	A16	A3X4PK	A3X4RTK ④	

#### N-Frame and HMCP (N) Auxiliary Switch

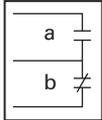
Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Field Mounted Factory Installation Kit ①		
		Same Side Suffix Number	Rear ② Suffix Number	Opposite Side Suffix Number		Same Side Suffix Number	Pigtail Leads	Terminal Block
							Catalog Number	Catalog Number
1	Left	A01	A02	A03	A04	A1X5PK	A1X5LTK	
	Right ②	A05	A06	A07	A08	A1X5PK	A1X5RTK ④	
2	Left	A09	A10	—	A11	A2X5PK	A2X5LTK	
	Right ②	A12	A13	—	A14	A2X5PK	A2X5RTK ④	
3	Left	A18	—	—	A15	A3X5LPK	A3X5LTK	
	Right ②	A17	—	—	A16	A3X5RPK	A3X5RTK ④	

#### R-Frame Auxiliary Switch (RH Only)

Number of Contacts A and B	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads Suffix Number ⑤	Field Mounted Field Installation Kits ① Pigtail Leads Catalog Number ⑤
	2	A12
4	A19	A4X6RPK

#### Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
- ② Standard mounting location—leads exit rear of breaker.
- ③ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
- ④ Not for use on four-pole circuit breakers.
- ⑤ A maximum of two auxiliary switches (any combination of 2a/2b or 4a/4b plug-in modules may be installed in a circuit breaker).
- ⑥ This option is not field installable.
- ⑦ Communications are not available with this option.

**Auxiliary Switch and Alarm Switch Combination****Auxiliary Switch and Alarm Switch Combination****F-Frame Auxiliary Switch and Alarm Switch Combination** <sup>①</sup>

Mounting Location (Pole)	Factory Mounted Connection Type and Location			Factory Installation Kit <sup>②</sup>	
	18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads
	Same Side	Rear <sup>③</sup>	Terminal Block	Same Side	Terminal Block
	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
Left <sup>③</sup>	C01	C02	C03	AAL1LPK	AAL1LTK
Right	C04	C05	C06	AAL1RPK	AAL1RTK <sup>④</sup>

**F-Frame HMCP Auxiliary Switch and Alarm Switch Combination**

Mounting Location (Pole)	Factory Mounted Connection Type and Location			Factory Installation Kit <sup>②</sup>	
	18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads
	Same Side	Rear <sup>③</sup>	Terminal Block	Same Side	Terminal Block
	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
Left <sup>④</sup>	C01	C02	C03	MAAL1LPK	MAAL1LTK
Right	C04	C05	C06	MAAL1RPK	MAAL1RPK

**J-Frame and HMCP (J) Auxiliary Switch and Alarm Switch Combination**

Number of Sets of Contacts (1A and 1B) (1M–1B)	Mounting Location (Pole)	Factory Mounted Connection Type and Location			Terminal Block	Field Mounted Field Installation Kits <sup>⑤</sup>	
		18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side	Rear <sup>⑥</sup>	Opposite Side	Same Side	Same Side	Terminal Block
		Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
1	Left	C01	C02	—	C03	AAL2LPK	AAL2LTK
	Right <sup>④</sup>	C04	C05	—	C06	AAL2RPK	AAL2RTK <sup>④</sup>

**K-Frame and HMCP (K) Auxiliary Switch and Alarm Switch Combination**

Number of Sets of Contacts (1A and 1B) (1M–1B)	Mounting Location (Pole)	Factory Mounted Connection Type and Location			Terminal Block	Field Mounted Field Installation Kits <sup>⑤</sup>	
		18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side	Rear <sup>⑥</sup>	Opposite Side	Same Side	Same Side	Terminal Block
		Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
1	Left	C01	C02	—	C03	AAL3LPK	AAL3LTK
	Right <sup>⑥⑦</sup>	C04	C05	—	C06	AAL3RPK <sup>⑧</sup>	AAL3RTK
	Right	C07	C08	—	—	1482D28G09 <sup>⑧⑨</sup>	—

**Notes**

- ① Auxiliary switch and alarm switch combination options (Cxx) are not available on FDE 310+ with LSG or LSIG trip units due to exit wire limitations. To obtain both features, order a left mounting alarm switch (B01-B04 or B09-B11), and right mounting auxiliary switch (A30-A32).
- ② Not listed with Underwriters Laboratories for field installation.
- ③ Standard mounting location.
- ④ Not for use on four-pole circuit breakers.
- ⑤ Listed with Underwriters Laboratories for field installation of interchangeable trip unit breakers under E64983.
- ⑥ Standard mounting location—leads exit rear of breaker.
- ⑦ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
- ⑧ Will not install on OPTIM Trip (RH).
- ⑨ Communications are not available with this option.
- ⑩ This option is not field installable.

## L-, HMCP (L) and (M) Frames and Auxiliary Switch and Alarm Switch Combination

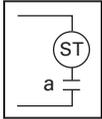
Number of Sets of Contacts	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits <sup>①</sup>	
		Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1A, 1B and 1 Make/1 Break	Left	C01		C02	—
	Right <sup>②</sup>	C04	C05	—	C06	AA114RPK	AA114RTK <sup>③</sup>
2A, 2B and 1 Make/1 Break	Left	C07	C08	—	C12	AA214LPK	AA214LTK
	Right <sup>②</sup>	C10	C11	—	C13	AA214RPK	AA214RTK <sup>③</sup>
3A, 3B and 1 Make/1 Break	Left	C14	—	—	—	AA314LPK	—
	Right <sup>②</sup>	C15	—	—	—	AA314RPK	—

## N-Frame and HMCP (N) Auxiliary Switch and Alarm Switch Combination

Number of Sets of Contacts	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits <sup>①</sup>	
		Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1A, 1B and 1 Make/1 Break	Left	C01		C02	—
	Right <sup>②</sup>	C04	C05	—	C06	AA115RPK	AA115RTK <sup>③</sup>
2A, 2B and 1 Make/1 Break	Left	C07	C08	—	C12	AA215LPK	AA215LTK
	Right <sup>②</sup>	C10	C11	—	C13	AA215RPK	AA215RTK <sup>③</sup>

**Notes**

- ① Listed with Underwriters Laboratories for field installation under E64983.
- ② Standard mounting location—leads exit rear of breaker.
- ③ Not for use on four-pole circuit breaker.

**Shunt Trip****Shunt Trip****G-Frame Shunt Trip (LH Three-Pole Only)**

Electrical Ratings				
Volts	Frequency	Amperes	Suffix Number	Catalog Number
120	50/60 Hz	1.1	<b>S1</b>	<b>1373D62G01</b>
240	50/60 Hz	2.1	<b>S2</b>	<b>1373D62G02</b>
12	DC	2.8	<b>S3</b>	<b>1373D62G15</b>
24	DC	5.7	<b>S4</b>	<b>1373D62G16</b>
24	60 Hz	—	<b>S7</b>	<b>1373D62G20</b>

**F-Frame and HMCP (F) Shunt Trip**

Voltage Rating (AC Frequency = 50/60 Hz)	Factory Mounted Connection Type and Location			Factory Installation Kit <sup>①</sup>		
	18-Inch (457.2 mm) Pigtail Leads <sup>②</sup>			Terminal Block	Pigtail Leads	Terminal Block
	Same Side	Rear <sup>③</sup>	Opposite Side	Same Side		
	Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
<b>Left-Pole Mounting AC/DC Ratings</b>						
12–24 Vac or Vdc	<b>S01</b>	<b>S02</b>	<b>S03</b>	<b>S04</b>	<b>SNT1LP03K</b>	<b>SNT1LT03K</b>
48–127 Vac or 48–60 Vdc <sup>④</sup>	<b>S05</b>	<b>S06</b>	<b>S07</b>	<b>S08</b>	<b>SNT1LP08K</b>	<b>SNT1LT08K</b>
208–380 Vac or 110–127 Vdc	<b>S09</b>	<b>S10</b>	<b>S11</b>	<b>S12</b>	<b>SNT1LP12K</b>	<b>SNT1LT12K</b>
415–600 Vac or 220–250 Vdc	<b>S13</b>	<b>S14</b>	<b>S15</b>	<b>S16</b>	<b>SNT1LP18K</b>	<b>SNT1LT18K</b>
<b>Right- or Neutral-Pole Mounting AC/DC Ratings <sup>⑤</sup></b>						
12–24 Vac or Vdc	<b>S17</b>	<b>S18</b>	<b>S19</b>	<b>S20</b>	<b>SNT1RP03K</b>	<b>SNT1RT03K <sup>⑥</sup></b>
48–127 Vac or 48–60 Vdc <sup>④</sup>	<b>S21</b>	<b>S22</b>	<b>S23</b>	<b>S24</b>	<b>SNT1RP08K</b>	<b>SNT1RT08K <sup>⑥</sup></b>
208–380 Vac or 110–127 Vdc	<b>S25</b>	<b>S26</b>	<b>S27</b>	<b>S28</b>	<b>SNT1RP12K</b>	<b>SNT1RT12K <sup>⑥</sup></b>
415–600 Vac or 220–250 Vdc	<b>S29</b>	<b>S30</b>	<b>S31</b>	<b>S32</b>	<b>SNT1RP18K</b>	<b>SNT1RT18K <sup>⑥</sup></b>

**Notes**

- ① Not listed with Underwriters Laboratories, for field installation.
- ② Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>).
- ③ Standard pigtail lead exit location.
- ④ 120 Vac marked suitable for ground fault protection devices.
- ⑤ Standard mounting location.
- ⑥ Not for use on four-pole circuit breakers.

G-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819.

Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### J-Frame and HMCP (J) Shunt Trip

Voltage Rating (AC Frequency = 50/60 Hz)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits <sup>①</sup>	
	Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
	<b>Left-Pole Mounting AC/DC Ratings <sup>②</sup></b>					
12–24 Vac or Vdc	S41	S42	S43	S44	SNT2P04K	SNT2T04K
48–60 Vac or Vdc	S49	S50	S51	S52	SNT2P06K	SNT2T06K
110–240 Vac or 110–125 Vdc <sup>③</sup>	S09	S10	S11	S12	SNT2P11K	SNT2T11K
380–440 Vac or 220–250 Vdc	S13	S14	S15	S16	SNT2P14K	SNT2T14K
480–600 Vac	S17	S18	S19	S20	SNT2P18K	SNT2T18K
<b>Right- or Neutral-Pole Mounting AC/DC Ratings</b>						
12–24 Vac or Vdc	S45	S46	S47	S48	SNT2P04K	SNT2T04K <sup>④</sup>
48–60 Vac or Vdc	S53	S54	S55	S56	SNT2P06K	SNT2T06K <sup>④</sup>
110–240 Vac or 110–125 Vdc <sup>③</sup>	S29	S30	S31	S32	SNT2P11K	SNT2T11K <sup>④</sup>
380–440 Vac or 220–250 Vdc	S33	S34	S35	S36	SNT2P14K	SNT2T14K <sup>④</sup>
480–600 Vac	S37	S38	S39	S40	SNT2P18K	SNT2T18K <sup>④</sup>

#### K-Frame and HMCP (K) Shunt Trip

Voltage Rating (AC Frequency = 50/60 Hz)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits <sup>①</sup>	
	Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
	<b>Left-Pole Mounting AC/DC Ratings <sup>②</sup></b>					
12–24 Vac or Vdc	S41	S42	S43	S44	SNT3P04K	SNT3T04K
48–60 Vac or Vdc	S49	S50	S51	S52	SNT3P06K	SNT3T06K
110–240 Vac or 110–125 Vdc <sup>③</sup>	S09	S10	S11	S12	SNT3P11K	SNT3T11K
380–440 Vac or 220–250 Vdc	S13	S14	S15	S16	SNT3P14K	SNT3T14K
480–600 Vac	S17	S18	S19	S20	SNT3P18K	SNT3T18K
<b>Right- or Neutral-Pole Mounting AC/DC Ratings <sup>⑤⑥</sup></b>						
12–24 Vac or Vdc	S45	S46	S47	S48	SNT3P04K	SNT3T04K <sup>④</sup>
48–60 Vac or Vdc	S53	S54	S55	S56	SNT3P06K	SNT3T06K <sup>④</sup>
110–240 Vac or 110–125 Vdc <sup>③</sup>	S29	S30	S31	S32	SNT3P11K	SNT3T11K <sup>④</sup>
380–440 Vac or 220–250 Vdc	S33	S34	S35	S36	SNT3P14K	SNT3T14K <sup>④</sup>
480–600 Vac	S37	S38	S39	S40	SNT3P18K	SNT3T18K <sup>④</sup>

#### Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
- ② Standard mounting location—leads exit rear of breaker.
- ③ Suitable for use with Class 1 ground fault sensing element.
- ④ Not for use on four-pole circuit breakers.
- ⑤ For use with KT (thermal-magnetic) trip units only.
- ⑥ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

## L-, HMCP (L) and (M) Frames and Shunt Trip

Voltage Rating (AC Frequency = 50/60 Hz)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads				Field Mounted Field Installation Kits <sup>①</sup>	
	Same Side		Rear <sup>②</sup>	Opposite Side	Terminal Block	
	Suffix Number	Suffix Number	Suffix Number	Same Side Suffix Number	Pigtail Leads Catalog Number	Terminal Block Catalog Number
<b>Left-Pole Mounting AC/DC Ratings <sup>②</sup></b>						
12–24 Vac or Vdc	S01	S02	S03	S04	SNT4LP03K	SNT4LT03K
48–60 Vac	S05	S06	S07	S08	SNT4LP05K	SNT4LT05K
48–60 Vdc	S85	S86	S87	—	SNT4LP23K	SNT4LT23K
110–240 Vac	S09	S10	S11	S12	SNT4LP11K	SNT4LT11K
110–125 Vdc	S41	S42	S43	S44	SNT4LP26K	SNT4LT26K
380–440 Vac or 220–250 Vdc	S13	S14	S15	S16	SNT4LP14K	SNT4LT14K
480–600 Vac	S17	S18	S19	S20	SNT4LP18K	SNT4LT18K
<b>Right-Pole Mounting AC/DC Ratings <sup>③</sup></b>						
12–24 Vac or Vdc	S21	S22	S23	S24	SNT4RP03K	SNT4RT03K
48–60 Vac	S25	S26	S27	S28	SNT4RP05K	SNT4RT05K
48–60 Vdc	S88	S89	S90	—	SNT4RP23K	SNT4RT23K
110–240 Vac	S29	S30	S31	S32	SNT4RP11K	SNT4RT11K
110–125 Vdc	S45	S46	S47	S48	SNT4RP26K	SNT4RT26K
380–440 Vac or 220–250 Vdc	S33	S34	S35	S36	SNT4RP14K	SNT4RT14K
480–600 Vac	S37	S38	S39	S40	SNT4RP18K	SNT4RT18K

**Notes**

- <sup>①</sup> Listed with Underwriters Laboratories, for field installation under E64983.  
<sup>②</sup> Standard mounting location—leads exit rear of breaker.  
<sup>③</sup> For use with LT (thermal-magnetic) three-pole trip units only.

## N-Frame and HMCP (N) Shunt Trip

Voltage Rating (AC Frequency = 50/60 Hz)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Field Mounted Field Installation Kits <sup>①</sup>		
	Same Side	Rear <sup>②</sup>	Opposite Side	Terminal Block Same Side	Pigtail Leads	Terminal Block
	Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
<b>Left-Pole Mounting AC/DC Ratings <sup>②</sup></b>						
9–24 Vac or Vdc	S01	S02	S03	S04	SNT5LP03K	SNT5LT03K
48–60 Vac	S05	S06	S07	S08	SNT5LP05K	SNT5LT05K
110–240 Vac <sup>③</sup>	S09	S10	S11	S12	SNT5LP11K	SNT5LT11K
110–125 Vdc	S41	S42	S43	S44	SNT5LP26K	SNT5LT26K
380–440 Vac or 220–250 Vdc	S13	S14	S15	S16	SNT5LP14K	SNT5LT14K
480–600 Vac	S17	S18	S19	S20	SNT5LP18K	SNT5LT18K
48–60 Vdc	S21	S22	S23	S24	SNT5LP23K	SNT5LT23K

## R-Frame Shunt Trip (RH Only)

Voltage Rating (AC Frequency = 50/60 Hz)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads	Field Mounted Field Installation Kits <sup>①</sup>
	Suffix Number <sup>④</sup>	Pigtail Leads Catalog Number <sup>④</sup>
24 Vac or Vdc	S21	SNT6P03K
48–60 Vac	S25	SNT6P05K
110–240 Vac	S29	SNT6P11K
380–440 Vac or 220–250 Vdc	S33	SNT6P14K
480–600 Vac	S37	SNT6P18K
48–60 Vdc	S88	SNT6P23K
110–125 Vdc	S45	SNT6P26K

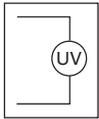
**Notes**

- <sup>①</sup> Listed with Underwriters Laboratories for field installation under E64983.
- <sup>②</sup> Standard mounting location—leads exit rear of breaker.
- <sup>③</sup> Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.
- <sup>④</sup> A maximum of two shunt trip plug-in modules may be installed in a circuit breaker.

### Low Energy Shunt Trip Ordering Information

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific AC or DC voltages within the voltage range shown. Electrical ratings are also shown on applicable circuit breaker accessory nameplates.

#### Low Energy Shunt Trip



#### F-, J-, K-, L-, M-, N- and R-Frames and HMCPs Low Energy Shunt Trip <sup>①</sup>

Mounting Positions (Pole)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Field Mounted Field Installation Kits <sup>②</sup> Terminal Block		
	Same Side	Rear <sup>③</sup>	Opposite Side	Same Side	Pigtail Leads	Terminal Block
	Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
<b>F-Frame</b>						
Left	N01	N02	N03	N04	LST1LPK <sup>④</sup>	LST1LTK <sup>④</sup>
Right <sup>③</sup>	N05	N06	N07	N08	LST1RPK <sup>④</sup>	LST1RTK <sup>④</sup>
<b>J-Frame</b>						
Left	N01	N02	N03	—	LST2LPK	—
Right <sup>③</sup>	N05	N06	N07	—	LST2RPK	—
<b>K-Frame</b>						
Left <sup>③</sup>	N01	N02	N03	—	LST3LPK	—
Right <sup>⑤⑥</sup>	N05	N06	N07	—	LST3RPK	—
<b>L- and M-Frames</b>						
Left	N01	N02	N03	—	LST4LPK	—
Right	N05	N06	N07	—	LST4RPK	—
<b>N-Frame</b>						
Left <sup>③</sup>	N01	N02	N03	—	LST5LPK	—
<b>R-Frame</b>						
Right	N01	—	—	—	LST6RPK	—

#### Notes

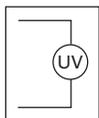
- <sup>①</sup> Cutoff provisions required in control circuit.
- <sup>②</sup> Listed with Underwriters Laboratories for field installation under E64983.
- <sup>③</sup> Standard mounting location—leads exit rear of breaker.
- <sup>④</sup> For F-Frame HMCP, add an "M" to beginning of catalog number. Field Installation Kit referenced for factory use only, not UL listed for field installation.
- <sup>⑤</sup> For use with thermal-magnetic trip units only.
- <sup>⑥</sup> Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

### Undervoltage Release Mechanism Ordering Information

2

Select handle reset undervoltage release mechanism catalog number for the voltage within the indicated voltage range. Undervoltage release mechanism coils are designed to be applied at specific AC or DC voltages within the voltage range shown on applicable circuit breaker accessory nameplates.

#### Undervoltage Release Mechanism



#### G-Frame Undervoltage Release Mechanism (LH Three-Pole Only)

Electrical Ratings				Style Numbers <sup>①②③</sup>	Factory Suffix
Volts (AC Only)	Frequency (Hz)	Amperes			
120	50/60	0.05	<b>1373D62G03</b>	<b>T1</b>	
24	50/60	0.22	<b>1373D62G04</b>	<b>T2</b>	
48	50/60	0.11	<b>1373D62G05</b>	<b>T3</b>	
60	50/60	0.10	<b>1373D62G06</b>	<b>T4</b>	
110	50	0.049	<b>1373D62G07</b>	<b>T5</b>	
208	60	0.026	<b>1373D62G08</b>	<b>T6</b>	
220	50	0.025	<b>1373D62G09</b>	<b>T7</b>	
240	50/60	0.024	<b>1373D62G10</b>	<b>T8</b>	
380	50	0.015	<b>1373D62G11</b>	<b>T9</b>	
415	50	0.013	<b>1373D62G12</b>	<b>T10</b>	
440	50	0.012	<b>1373D62G13</b>	<b>T11</b>	
480	60	0.01	<b>1373D62G14</b>	<b>T12</b>	

#### Notes

- ① Includes 24-inch (609.6 mm) external pigtail leads, 18 AWG (16–0.010).
- ② A maximum of two internal accessories may be mounted in a three-pole circuit breaker.
- ③ Suitable for mounting in left pole only of three-pole breaker.

G-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory.

Internal accessories are UL listed for factory installation under E7819.

Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

### F-Frame Factory Mounted (For F-Frame Breaker and F-Frame HMCP) Undervoltage Release Mechanism

Voltage Rating (AC Freq. = 50/60 Hz)	Connection Type and Location 18-Inch Pigtail Leads			Terminal Block Same Side Suffix Number
	Same Side Suffix Number	Rear <sup>①</sup> Suffix Number	Opposite Side Suffix Number	
<b>Left-Pole Mounting AC Ratings</b>				
12 Vac	U01	U02	U03	U04
24 Vac	U05	U06	U07	U08
48 Vac	U37	U38	U39	U40
60 Vac	U97	U98	U99	U100
110–127 Vac	U13	U14	U15	U16
208–240 Vac	U17	U18	U19	U20
380–480 Vac	U21	U22	U23	U24
525–600 Vac	U25	U26	U27	U28
<b>Right-Pole Mounting AC Ratings <sup>②③</sup></b>				
12 Vac	U49	U50	U51	U52
24 Vac	U53	U54	U55	U56
48 Vac	U85	U86	U87	U88
60 Vac	U101	U102	U103	U104
110–127 Vac	U61	U62	U63	U64
208–240 Vac	U65	U66	U67	U68
380–480 Vac	U69	U70	U71	U72
525–600 Vac	U73	U74	U75	U76
<b>Left-Pole Mounting DC Ratings</b>				
12 Vdc	U29	U30	U31	U32
24 Vdc	U33	U34	U35	U36
48 Vdc	U37	U38	U39	U40
60 Vdc	U97	U98	U99	U100
110–127 Vdc	U41	U42	U43	U44
220–250 Vdc	U45	U46	U47	U48
<b>Right-Pole Mounting DC Ratings <sup>②③</sup></b>				
12 Vdc	U77	U78	U79	U80
24 Vdc	U81	U82	U83	U84
48 Vdc	U85	U86	U87	U88
60 Vdc	U101	U102	U103	U104
110–127 Vdc	U89	U90	U91	U92
220–250 Vdc	U93	U94	U95	U96

#### Notes

- ① Standard pigtail lead exit location.
- ② Standard mounting location.
- ③ Not for use on right pole of four-pole circuit breaker.

F-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory.

Internal accessories are UL listed for factory installation under E7819.

Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

## F-Frame Field Mounted Undervoltage Release Mechanism

Voltage Rating (AC Freq. = 50/60 Hz)	F-Frame Breaker Factory Installation Kits <sup>①</sup>		F-Frame Breaker HMCP	
	Pigtail Leads	Terminal Block	Pigtail Leads	Terminal Block
	Catalog Number	Catalog Number	Catalog Number	Catalog Number
<b>Left-Pole Mounting AC Ratings</b>				
12 Vac	UVH1LP02K	UVH1LT02K	MUVH1LP02K	MUVH1LT02K
24 Vac	UVH1LP03K	UVH1LT03K	MUVH1LP03K	MUVH1LT03K
48 Vac	UVH1LP22K	UVH1LT22K	MUVH1LP22K	MUVH1LT22K
60 Vac	UVH1LP24K	UVH1LT24K	MUVH1LP24K	MUVH1LT24K
110–127 Vac	UVH1LP08K	UVH1LT08K	MUVH1LP08K	MUVH1LT08K
208–240 Vac	UVH1LP11K	UVH1LT11K	MUVH1LP11K	MUVH1LT11K
380–480 Vac	UVH1LP15K	UVH1LT15K	MUVH1LP15K	MUVH1LT15K
525–600 Vac	UVH1LP18K	UVH1LT18K	MUVH1LP18K	MUVH1LT18K
<b>Right-Pole Mounting AC Ratings <sup>②③</sup></b>				
12 Vac	UVH1RP02K	UVH1RT02K	MUVH1RP02K	MUVH1RT02K
24 Vac	UVH1RP03K	UVH1RT03K	MUVH1RP03K	MUVH1RT03K
48 Vac	UVH1RP22K	UVH1RT22K	MUVH1RP22K	MUVH1RT22K
60 Vac	UVH1RP24K	UVH1RT24K	MUVH1RP24K	MUVH1RT24K
110–127 Vac	UVH1RP08K	UVH1RT08K	MUVH1RP08K	MUVH1RT08K
208–240 Vac	UVH1RP11K	UVH1RT11K	MUVH1RP11K	MUVH1RT11K
380–480 Vac	UVH1RP15K	UVH1RT15K	MUVH1RP15K	MUVH1RT15K
525–600 Vac	UVH1RP18K	UVH1RT18K	MUVH1RP18K	MUVH1RT18K
<b>Left-Pole Mounting DC Ratings</b>				
12 Vdc	UVH1LP20K	UVH1LT20K	MUVH1LP20K	MUVH1LT20K
24 Vdc	UVH1LP21K	UVH1LT21K	MUVH1LP21K	MUVH1LT21K
48 Vdc	UVH1LP22K	UVH1LT22K	MUVH1LP22K	MUVH1LT22K
60 Vdc	UVH1LP24K	UVH1LT24K	MUVH1LP24K	MUVH1LT24K
110–127 Vdc	UVH1LP26K	UVH1LT26K	MUVH1LP26K	MUVH1LT26K
220–250 Vdc	UVH1LP28K	UVH1LT28K	MUVH1LP28K	MUVH1LT28K
<b>Right-Pole Mounting DC Ratings <sup>②③</sup></b>				
12 Vdc	UVH1RP20K	UVH1RT20K	MUVH1RP20K	MUVH1RT20K
24 Vdc	UVH1RP21K	UVH1RT21K	MUVH1RP21K	MUVH1RT21K
48 Vdc	UVH1RP22K	UVH1RT22K	MUVH1RP22K	MUVH1RT22K
60 Vdc	UVH1RP22K	UVH1RT22K	MUVH1RP22K	MUVH1RT22K
110–127 Vdc	UVH1RP26K	UVH1RT26K	MUVH1RP26K	MUVH1RT26K
220–250 Vdc	UVH1RP28K	UVH1RT28K	MUVH1RP28K	MUVH1RT28K

**Notes**

- ① Not listed with Underwriters Laboratories, for field installation.
- ② Standard mounting location.
- ③ Not for use on right pole of four-pole circuit breaker.

## J-Frame and HMCP (J) Undervoltage Release Mechanism

Voltage Rating (AC Freq. = 50/60 Hz)	Factory Mounted Connection Type and Location			Field Mounted Field Installation Kits <sup>②</sup>		
	18-Inch (457.2 mm) Pigtail Leads			Terminal Block <sup>①</sup>	Pigtail Leads Catalog Number	Terminal Block <sup>③</sup> Catalog Number
	Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number		
<b>Left-Pole Mounting AC Ratings <sup>④</sup></b>						
12 Vac	U05	U06	U07	U08	UVH2LP02K	UVH2LT02K
24 Vac	U09	U10	U11	U12	UVH2LP03K	UVH2LT03K
48–60 Vac	U13	U14	U15	U16	UVH2LP05K	UVH2LT05K
110–127 Vac	U17	U18	U19	U20	UVH2LP08K	UVH2LT08K
208–240 Vac	U21	U22	U23	U24	UVH2LP11K	UVH2LT11K
380–480 Vac	U25	U26	U27	U28	UVH2LP15K	UVH2LT15K
<b>Right-Pole Mounting AC Ratings <sup>③</sup></b>						
12 Vac	U37	U38	U39	U40	UVH2RP02K	UVH2RT02K
24 Vac	U41	U42	U43	U44	UVH2RP03K	UVH2RT03K
48–60 Vac	U45	U46	U47	U48	UVH2RP05K	UVH2RT05K
110–127 Vac	U49	U50	U51	U52	UVH2RP08K	UVH2RT08K
208–240 Vac	U53	U54	U55	U56	UVH2RP11K	UVH2RT11K
380–480 Vac	U57	U58	U59	U60	UVH2RP15K	UVH2RT15K
<b>Left-Pole Mounting DC Ratings <sup>④</sup></b>						
12 Vdc	T01	T02	T03	T04	UVH2LP20K	UVH2LT20K
24 Vdc	T05	T06	T07	T08	UVH2LP21K	UVH2LT21K
48–60 Vdc	T09	T10	T11	T12	UVH2LP23K	UVH2LT23K
110–127 Vdc	T13	T14	T15	T16	UVH2LP26K	UVH2LT26K
220–250 Vdc	T17	T18	T19	T20	UVH2LP28K	UVH2LT28K
<b>Right-Pole Mounting DC Ratings <sup>③</sup></b>						
12 Vdc	T21	T22	T23	T24	UVH2RP20K	UVH2RT20K
24 Vdc	T25	T26	T27	T28	UVH2RP21K	UVH2RT21K
48–60 Vdc	T29	T30	T31	T32	UVH2RP23K	UVH2RT23K
110–127 Vdc	T33	T34	T35	T36	UVH2RP26K	UVH2RT26K
220–250 Vdc	T37	T38	T39	T40	UVH2RP28K	UVH2RT28K

**Notes**

- <sup>①</sup> For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.  
<sup>②</sup> Listed with Underwriters Laboratories for field installation under E64983.  
<sup>③</sup> Not for use on right pole of four-pole circuit breakers.  
<sup>④</sup> Standard mounting location—leads exit rear of breaker.

## K-Frame and HMCP (K) Undervoltage Release Mechanism

Voltage Rating (AC Freq. = 50/60 Hz)	Factory Mounted Connection Type and Location				Field Mounted Field Installation Kits ①	
	18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads Catalog Number	Terminal Block Catalog Number
	Same Side Suffix Number	Rear ② Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number		
<b>Left-Pole Mounting AC Ratings ②</b>						
12 Vac	U05	U06	U07	U08	UVH3LP02K	UVH3LT02K
24 Vac	U09	U10	U11	U12	UVH3LP03K	UVH3LT03K
48–60 Vac	U13	U14	U15	U16	UVH3LP05K	UVH3LT05K
110–127 Vac	U17	U18	U19	U20	UVH3LP08K	UVH3LT08K
208–240 Vac	U21	U22	U23	U24	UVH3LP11K	UVH3LT11K
380–480 Vac	U25	U26	U27	U28	UVH3LP15K	UVH3LT15K
<b>Right-Pole Mounting AC Ratings ③④⑤</b>						
12 Vac	U37	U38	U39	U40	UVH3RP02K	UVH3RT02K
24 Vac	U41	U42	U43	U44	UVH3RP03K	UVH3RT03K
48–60 Vac	U45	U46	U47	U48	UVH3RP05K	UVH3RT05K
110–127 Vac	U49	U50	U51	U52	UVH3RP08K	UVH3RT08K
208–240 Vac	U53	U54	U55	U56	UVH3RP11K	UVH3RT11K
380–480 Vac	U57	U58	U59	U60	UVH3RP15K	UVH3RT15K
<b>Left-Pole Mounting DC Ratings ②</b>						
12 Vdc	T01	T02	T03	T04	UVH3LP20K	UVH3LT20K
24 Vdc	T05	T06	T07	T08	UVH3LP21K	UVH3LT21K
48–60 Vdc	T09	T10	T11	T12	UVH3LP23K	UVH3LT23K
110–127 Vdc	T13	T14	T15	T16	UVH3LP26K	UVH3LT26K
220–250 Vdc	T17	T18	T19	T20	UVH3LP28K	UVH3LT28K
<b>Right-Pole Mounting DC Ratings ③④⑥</b>						
12 Vdc	T21	T22	T23	T24	UVH3RP20K	UVH3RT20K
24 Vdc	T25	T26	T27	T28	UVH3RP21K	UVH3RT21K
48–60 Vdc	T29	T30	T31	T32	UVH3RP23K	UVH3RT23K
110–127 Vdc	T33	T34	T35	T36	UVH3RP26K	UVH3RT26K
220–250 Vdc	T37	T38	T39	T40	UVH3RP28K	UVH3RT28K

**Notes**

- ① Listed with Underwriters Laboratories, for field installation under E64983.
- ② Standard mounting location—leads exit rear of breaker.
- ③ For use with KT (thermal-magnetic) trip units only.
- ④ Not for use on right pole of four-pole circuit breaker.
- ⑤ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

## L-, HMCP (L) and (M)-Frames and Undervoltage Release Mechanism

Voltage Rating (AC Freq. = 50/60 Hz)	Factory Mounted Connection Type and Location				Field Mounted Field Installation Kits <sup>①</sup>	
	18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads Catalog Number	Terminal Block Catalog Number
	Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number		
<b>Left-Pole Mounting AC Ratings <sup>②</sup></b>						
12 Vac	U05	U06	U07	U08	UVH4LP02K	UVH4LT02K
24 Vac	U09	U10	U11	U12	UVH4LP03K	UVH4LT03K
48–60 Vac	U13	U14	U15	U16	UVH4LP05K	UVH4LT05K
110–127 Vac	U17	U18	U19	U20	UVH4LP08K	UVH4LT08K
208–240 Vac	U21	U22	U23	U24	UVH4LP11K	UVH4LT11K
380–480 Vac	U25	U26	U27	U28	UVH4LP15K	UVH4LT15K
<b>Right-Pole Mounting AC Ratings <sup>③④</sup></b>						
12 Vac	U37	U38	U39	U40	UVH4RP02K	UVH4RT02K
24 Vac	U41	U42	U43	U44	UVH4RP03K	UVH4RT03K
48–60 Vac	U45	U46	U47	U48	UVH4RP05K	UVH4RT05K
110–127 Vac	U49	U50	U51	U52	UVH4RP08K	UVH4RT08K
208–240 Vac	U53	U54	U55	U56	UVH4RP11K	UVH4RT11K
380–480 Vac	U57	U58	U59	U60	UVH4RP15K	UVH4RT15K
<b>Left-Pole Mounting DC Ratings <sup>②</sup></b>						
12 Vdc	T01	T02	T03	T04	UVH4LP20K	UVH4LT20K
24 Vdc	T05	T06	T07	T08	UVH4LP21K	UVH4LT21K
48–60 Vdc	T09	T10	T11	T12	UVH4LP23K	UVH4LT23K
110–127 Vdc	T13	T14	T15	T16	UVH4LP26K	UVH4LT26K
220–250 Vdc	T17	T18	T19	T20	UVH4LP28K	UVH4LT28K
<b>Right-Pole Mounting DC Ratings <sup>③④</sup></b>						
12 Vdc	T21	T22	T23	T24	UVH4RP20K	UVH4RT20K
24 Vdc	T25	T26	T27	T28	UVH4RP21K	UVH4RT21K
48–60 Vdc	T29	T30	T31	T32	UVH4RP23K	UVH4RT23K
110–127 Vdc	T33	T34	T35	T36	UVH4RP26K	UVH4RT26K
220–250 Vdc	T37	T38	T39	T40	UVH4RP28K	UVH4RT28K

**Notes**

- ① Listed with Underwriters Laboratories for field installation under E64983.  
 ② Standard mounting location—leads exit rear of breaker.  
 ③ For use with LT (thermal-magnetic) trip units only.  
 ④ Not for use on right pole of four-pole circuit breaker.

## N-Frame and HMCP (N) Undervoltage Release Mechanism

Voltage Rating (AC Freq. = 50/60 Hz)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads			Field Mounted Field Installation Kits ①		
	Terminal Block			Terminal Block		
	Same Side	Rear ②	Opposite Side	Same Side	Pigtail Leads	Terminal Block
	Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
<b>Left-Pole Mounting AC Ratings ②</b>						
12 Vac	U05	U06	U07	U08	UVH5LP02K	UVH5LT02K
24 Vac	U09	U10	U11	U12	UVH5LP03K	UVH5LT03K
48–60 Vac	U13	U14	U15	U16	UVH5LP05K	UVH5LT05K
110–127 Vac	U17	U18	U19	U20	UVH5LP08K	UVH5LT08K
208–240 Vac	U21	U22	U23	U24	UVH5LP11K	UVH5LT11K
380–480 Vac	U25	U26	U27	U28	UVH5LP29K	UVH5LT29K
<b>Left-Pole Mounting DC Ratings ②</b>						
12 Vdc	T01	T02	T03	T04	UVH5LP20K	UVH5LT20K
24 Vdc	T05	T06	T07	T08	UVH5LP21K	UVH5LT21K
48–60 Vdc	T09	T10	T11	T12	UVH5LP23K	UVH5LT23K
110–127 Vdc	T13	T14	T15	T16	UVH5LP26K	UVH5LT26K
220–250 Vdc	T17	T18	T19	T20	UVH5LP28K	UVH5LT28K

## R-Frame Undervoltage Release Mechanism (RH only)

Voltage Rating (AC Frequency = 50/60 Hz)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads		Field Mounted Field Installation Kits ③	
	Terminal Block		Pigtail Leads	
	Suffix Number ④		Catalog Number ④	
12 Vac	U37		UVH6RP02K	
24 Vac	U41		UVH6RP03K	
48–60 Vac	U45		UVH6RP05K	
110–127 Vac	U49		UVH6RP08K	
208–240 Vac	U53		UVH6RP11K	
380–500 Vac	U57		UVH6RP29K	
12 Vdc	T21		UVH6RP20K	
24 Vdc	T25		UVH6RP21K	
48–60 Vdc	T29		UVH6RP23K	
110–125 Vdc	T33		UVH6RP26K	
220–250 Vdc	T37		UVH6RP28K	

**Notes**

- ① Listed with Underwriters Laboratories for field installation under E64983.  
 ② Standard mounting location—leads exit rear of breaker.  
 ③ Endurance: 500 electrical operations plus 2500 mechanical operations.  
 ④ Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>). Leads are orange and brown.

**Accessory Terminal Block (R-Frame)****Accessory Terminal Block (R-Frame)****R-Frame Accessory Terminal Block** ①

Factory Installed Suffix Number	Field Mounted Catalog Number
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Q01	TBRDK
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**Number of Control Wires for Each Internally Mounted Accessory**

Type of Accessory	Number of Contacts per Single Accessory	Required Number of Wires
Auxiliary switch	2a/2b 4a/4b	6 12
Alarm (Signal)/ Lockout switch	1m/1b 2m/2b	6 12
Shunt trip	N/A	2
Low energy shunt	N/A	2
Undervoltage release mechanism	N/A	2

**Note**

- ① One 24-point accessory terminal block provided with circuit breaker when ordered factory installed or shipped from warehouse as separate item when ordered for field installation. See Digitrip RMS master connection diagram (IL 29C714).

## Technical Data and Specifications

2

### Alarm Switch

#### F-Frame Electrical Rating Data <sup>①②</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
<b>Multi-Pole Circuit Breakers</b>			
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500
<b>Single-Pole Circuit Breakers</b>			
125/250	50/60 Hz	6 <sup>③</sup>	2000
28	DC	3 <sup>③</sup>	2000
28	DC	5 <sup>④</sup>	2000

#### J-Frame Electrical Rating Data <sup>⑤⑥</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

#### K-Frame Electrical Rating Data <sup>⑥⑦</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

#### L- and M-Frames Electrical Rating Data <sup>⑥⑦</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

#### N-Frame Electrical Rating Data <sup>⑧</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

#### R-Frame Electrical Rating Data <sup>⑨⑩</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

### Auxiliary Switch

#### F-Frame Electrical Rating Data <sup>①②</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
125 <sup>③</sup>	50/60 Hz	1	2500
600	50/60 Hz	6	2500
125	DC	0.50 <sup>④</sup>	2500
250	DC	0.25 <sup>④</sup>	2500

#### J-Frame Electrical Rating Data <sup>①②</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>④</sup>	2500
250	DC	0.25 <sup>④</sup>	2500

#### K-Frame Electrical Rating Data <sup>②⑤</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>④</sup>	2500
250	DC	0.25 <sup>④</sup>	2500

#### L- and M-Frames Electrical Rating Data <sup>②</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>④</sup>	2500
250	DC	0.25 <sup>④</sup>	2500

#### N-Frame Electrical Rating Data <sup>②⑥</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>④</sup>	2500
250	DC	0.25 <sup>④</sup>	2500

#### R-Frame Electrical Rating Data <sup>⑦⑧</sup>

Maximum Voltage	Frequency	Maximum Current Amperes
600	50/60 Hz	6
125	DC	0.50 <sup>④</sup>
250	DC	0.25 <sup>④</sup>

#### Notes

- ① Endurance: 6000 electrical operations plus 4000 mechanical operations.
- ② Endurance: 6000 electrical operations plus 2000 mechanical operations.
- ③ Non-inductive load.
- ④ Inductive (L/R = 0.026).
- ⑤ Endurance: 6000 electrical operations plus 2000 mechanical operations.
- ⑥ Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>).
- ⑦ Endurance: 5000 electrical operations plus 1000 mechanical operations.
- ⑧ Endurance: 3000 electrical operations plus 1000 mechanical operations.
- ⑨ Endurance: 500 electrical operations plus 2500 mechanical operations.
- ⑩ Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>). Leads are red, black and blue.

**Auxiliary Switch and Alarm Switch Combination****F-Frame Electrical Rating Data** <sup>①②</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2200
250	DC	0.25 <sup>③</sup>	2200

**J-Frame Electrical Rating Data** <sup>②④</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

**K-Frame Electrical Rating Data** <sup>②④</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

**L- and M-Frames Electrical Rating Data** <sup>②⑤</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

**N-Frame Electrical Rating Data** <sup>②⑥</sup>

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	DC	0.50 <sup>③</sup>	2500
250	DC	0.25 <sup>③</sup>	2500

**Notes**

- ① Endurance: 6000 electrical operations plus 4000 mechanical operations.
- ② Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>).
- ③ Non-inductive load.
- ④ Endurance: 4000 electrical operations plus 4000 mechanical operations.
- ⑤ Endurance: 1000 electrical operations plus 5000 mechanical operations.
- ⑥ Endurance: 500 electrical operations plus 2000 mechanical operations.

**Shunt Trip****F-Frame and HMCP Shunt Trip Electrical Rating Data** ①②③

2

Catalog Number	Application Ratings		Electrical Operating Ratings					One Minute Dielectric Withstand Voltage (V)		
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I <sub>p</sub> (A)	I <sub>rms</sub> at 0.25 (A)	I <sub>rms</sub> at 0.33s (A)		VA	
SNT1LP03K or SNT1LT03K	12–24	50/60	9	6.3	6.1	4.3	40	1048		
			12		8.5				6	75
			24		17				12	300
	12–24	DC	12	9	8	100				
			24				16		400	
			24				16		400	
SNT1LP08K or SNT1LT08K	48–127	50/60	48	33.6	2.7	1.9	92	1254		
			60		3.4				2.4	140
			110		6.2				4.4	480
			120		6.8				4.8	570
			127		7.2				5.1	640
	48–60	DC	48	33.6	2.1	100				
			60				2.6		160	
			60				2.6		160	
			60				2.6		160	
SNT1LP12K or SNT1LT12K	208–380	50/60	208	146	1.2	0.25	180	1760		
			220		1.3				0.27	200
			240		1.4				0.29	240
			380		2.3				0.31	610
	110–125	DC	110	77	0.5	55				
			120				0.55		66	
			120				0.55		66	
			125				0.57		71	
			125				0.57		71	
SNT1LP18K or SNT1LT18K	415–600	50/60	400	280	1.1	0.77	310	2200		
			415		1.1				0.8	330
			440		1.2				0.85	380
			480		1.3				0.93	450
			525		1.4				1.02	530
			550		1.5				1.06	590
	220–250	DC	220	154	0.48	110				
			250				0.55		140	
			250				0.55		140	
			250				0.55		140	

**Notes**

- ① Average unlatching time: 6 milliseconds.
- ② Average circuit breaker contact total opening time: 18 milliseconds.
- ③ Endurance: 6000 electrical operations plus 4000 mechanical operations.

J-Frame and HMCP (J) Shunt Trip Electrical Rating Data <sup>①②③</sup>

Catalog Number	Application Ratings		Electrical Operating Ratings						One Minute Dielectric Withstand Voltage (V)	
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I <sub>p</sub> (A)	I <sub>rms</sub> at 0.25 (A)	I <sub>rms</sub> at 0.33s (A)	VA		
SNT2P04K or SNT2T04K	12–24	50/60	12	9	17.7	12.6	164	1048		
			24		38.3				27.4	631
	12–24	DC	12	9	7.3	87	405			
			24		16.9					
SNT2P06K or SNT2T06K	48–60	50/60	48	36	24.4	17.3	830	1120		
			60		30.1				21.3	1280
	48–60	DC	48	36	14.8	710	1105			
			60		18.4					
SNT2P11K or SNT2T11K	110–240	50/60	110	60	0.9	0.6	66	1480		
			120		1				0.7	84
			127		1.1				0.8	102
			208		2.4				1.7	354
			220		2.6				1.8	396
			240		2.6				1.8	432
	110–125	DC	110	60	1	112	138	150		
			120		1.1					
			125		1.2					
SNT2P14K or SNT2T14K	380–440	50/60	380	285	0.34	0.25	127	1880		
			400		0.38				0.27	150
			415		0.4				0.29	163
			440		0.44				0.31	188
	220–250	DC	220	165	0.19	40	58			
			250		0.22					
SNT2P18K or SNT2T18K	480–600	50/60	480	360	0.13	0.07	34	2200		
			525		0.13				0.08	42
			550		0.13				0.09	50
			600		0.14				0.1	60

**Notes**

- ① Average unlatching time: 6 milliseconds.  
 ② Average circuit breaker contact total opening time: 18 milliseconds.  
 ③ Endurance: 6000 electrical operations plus 2000 mechanical operations.

K-Frame and HMCP (K) Shunt Trip Electrical Rating Data <sup>①②③</sup>

Catalog Number	Application Ratings		Electrical Operating Ratings					One Minute Dielectric Withstand Voltage (V)			
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I <sub>p</sub> (A)	I <sub>rms</sub> at 0.25 (A)	I <sub>rms</sub> at 0.33s (A)		VA		
SNT3P04K or SNT3T04K	12–24	50/60	12	9	17.7	12.6	164	1048			
			24		38.3				27.4	631	
	12–24	DC	12	9			7.3		87		
			24							16.9	405
SNT3P06K or SNT3T06K	48–60	50/60	48	36	24.4	17.3	830	1120			
			60		30.1				21.3	1280	
	48–60	DC	48	36			14.8		710		
			60							18.4	1105
SNT3P11K or SNT3T11K	110–240	50/60	110	60	1.3	0.9	100	1480			
			120		1.4				1	120	
			127		1.5				1.1	140	
			208		2.8				2	420	
			220		3				2.1	470	
			240		3.2				2.3	550	
	110–125	DC	110	82			1		110		
			120							1.1	130
			125							1.2	140
SNT3P14K or SNT3T14K	380–440	50/60	380	285	0.37	0.25	95	1880			
			400		0.39				0.27	108	
			415		0.42				0.29	120	
			440		0.44				0.31	136	
	220–250	DC	220	165			0.19		41		
			250							0.22	54
SNT3P18K or SNT3T18K	480–600	50/60	480	360	0.11	0.08	40	2200			
			525		0.13				0.09	50	
			550		0.13				0.09	50	
			600		0.16				0.12	70	

**Notes**

- ① Approximate unlatching time: 6 milliseconds.  
 ② Approximate total circuit breaker contact opening time: 8 milliseconds.  
 ③ Endurance: 5000 electrical operations plus 1000 mechanical operations.

L-Frame and HMCP (L) and M-Frame Shunt Trip Electrical Rating Data <sup>①②③</sup>

Catalog Number	Application Ratings		Electrical Operating Ratings						One Minute Dielectric Withstand Voltage (V)	
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I <sub>p</sub> (A)	I <sub>rms</sub> at 0.25 (A)	I <sub>rms</sub> at 0.33s (A)	VA		
SNT4P03K or SNT4T03K	12–24	50/60	9	6.3	7.2	5.1	46	1048		
			12		11.6				8.2	98
			24		28.6				20.2	485
	12–24	DC	9	6.3	8.5	75	103	418		
			12		8.6				103	
			24		17.4				418	
SNT4P05K SNT4T05K	48–60	50/60	48	34	0.72	0.51	82	1120		
			60		1.2				0.84	126
SNT4P11K or SNT4T11K	110–240	50/60	110	77	0.89	0.63	69	1480		
			120		1.03				0.73	88
			127		1.1				0.8	102
			208		2.3				1.6	333
			220		2.4				1.7	374
			240		2.6				1.8	432
SNT4P14K or SNT4T14K	380–440	50/60	380	266	0.3	0.21	80	1880		
			400		0.34				0.24	96
			415		0.35				0.25	104
			440		0.38				0.27	119
	220–250	DC	220	154	0.34	75	85			
			250		0.34				85	
SNT4P18K or SNT4T18K	480–600	50/60	480	336	0.07	0.05	24	2200		
			525		0.08				0.06	32
			550		0.09				0.07	39
			600		0.11				0.08	48
SNT4P23K SNT4T23K	48–60	DC	48	34	0.76	36	1120			
			60		0.95			57		
SNT4P26K or SNT4T26K	110–125	DC	110	77	0.42	46	1250			
			120		0.43			52		
			125		0.44			55		

**Notes**

- ① Approximate unlatching time: 6 milliseconds.  
 ② Approximate total circuit breaker contact opening time: 18 milliseconds.  
 ③ Endurance: 5000 electrical operations plus 1000 mechanical operations.

N-Frame and HMCP (N) Shunt Trip Electrical Rating Data <sup>①②③</sup>

Catalog Number	Application Ratings		Electrical Operating Ratings					One Minute Dielectric Withstand Voltage (V)		
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I <sub>p</sub> (A)	I <sub>rms</sub> at 0.25 (A)	I <sub>rms</sub> at 0.33s (A)		VA	
SNT5LP03K or SNT5LT03K	9–24	50/60	9	6.3	7.2	5.1	46	1048		
			12		11.6				8.2	98
			24		28				19.8	475
	9–24	DC	9	7.2		8.8	79			
			12			12.1	145			
			24			25.4	610			
SNT5LP05K SNT5LT05K	48–60	50/60	48	34	2.4	1.7	82	1120		
			60		3		2.1		126	
SNT5LP11K or SNT5LT11K	110–240	50/60	110	77	0.86	0.61	67	1480		
			120		0.98		0.69		83	
			127		1.1		0.75		95	
			208		2.3		1.6		333	
			220		2.4		1.7		374	
			240		2.6		1.8		432	
SNT5LP14K or SNT5LT14K	380–440	50/60	380	266	0.28	0.2	76	1880		
			400		0.31		0.22		88	
			415		0.33		0.23		95	
			440		0.35		0.25		110	
	220–250	DC	220	154		0.21	46			
			250			0.22	55			
SNT5LP18K or SNT5LT18K	480–600	50/60	480	336	0.06	0.04	19	2200		
			525		0.08		0.06		32	
			550		0.08		0.06		33	
			600		0.1		0.07		42	
SNT5LP23K SNT5LT23K	48–60	DC	48	34		1.4	67	1120		
			60			1.7	102			
SNT5LP26K or SNT5LT26K	110–125	DC	110	77		1.1	121	1250		
			120			1.2	144			
			125			1.2	150			

**Notes**

- ① Approximate unlatching time: 6 milliseconds.
- ② Approximate total circuit breaker contact opening time: 18 milliseconds.
- ③ Endurance: 3000 electrical operations plus 1000 mechanical operations.

## R-Frame Shunt Trip Electrical Rating Data ①②③④⑤⑥

Catalog Number	Application Ratings		Electrical Operating Ratings						One Minute Dielectric Withstand Voltage (V)
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I <sub>p</sub> (A)	I <sub>rms</sub> at 0.25 (A)	I <sub>rms</sub> at 0.33s (A)	VA	
SNT6P03K	24	50/60	24	16.8	36.1		25.5	612	1050
	24	DC	24	16.8					
SNT6P05K	48–60	50/60	48	34	11.9		8.4	403	1120
			60		15.7		11.1	666	
SNT6P11K	110–240	50/60	110	60	5.09		3.6	396	1480
			120		5.66		4	480	
			127		5.94		4.2	533	
			208		10.2		7.2	1498	
			220		10.5		7.4	1628	
			240		11.2		7.9	1896	
SNT6P14K	380–440	50/60	380	266	5.94		4.2	1596	2200
			400		6.23		4.4	1760	
			415		6.51		4.6	1909	
			440		6.93		4.9	2156	
	220–250	DC	220	154		1.7		374	1500
			250			1.9		475	
SNT6P18K	480–600	50/60	480	336	0.68		0.48	230	2200
			525		0.78		0.55	289	
			550		0.79		0.56	308	
			600		0.91		0.64	384	
SNT6P23K	48–60	DC	48	34		7.1		341	1120
			60			8.8		258	
SNT6P26K	110–125	DC	110	77		2.4		264	1250
			120			2.6		312	
			125			2.8		350	

**Notes**

- ① Approximate unlatching time of 6 milliseconds.
- ② Average circuit breaker contact total opening time approximately 62 milliseconds, at rated voltage.
- ③ Endurance: 500 electrical operations and 2500 mechanical operations.
- ④ Shunt trip can be operated up to a maximum of six times per minute.
- ⑤ Maximum operating voltage—110% of maximum voltage range rating.
- ⑥ Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>). Leads are yellow and white.

**Undervoltage Release Mechanism**

2

**F-Frame Electrical Rating Data** <sup>①</sup>

50/60 Hz					DC				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	6.3	7.6	1.3	12	4.2	8.4	10.2	2.8
12	4.2	6.3	7.6	2.5	12	4.2	8.4	10.2	2.8
24	8.4	16.8	20.4	1.4	24	8.4	16.8	20.4	1.6
48	21.0	33.6	40.8	1.2	48	21.0	33.6	40.8	1.3
60	21.0	33.6	40.8	1.9	60	21.0	33.6	40.8	2.0
110	44.5	77.0	93.5	1.3	110	44.5	77.0	93.5	1.5
120	44.5	77.0	93.5	1.5	120	44.5	77.0	93.5	1.7
127	44.5	77.0	93.5	1.7	125	44.5	77.0	93.5	1.9
208	84.0	145.6	176.8	2.2	220	87.5	154.0	187.0	2.6
220	84.0	145.6	176.8	2.4	250	87.5	154.0	187.0	3.4
240	84.0	145.6	176.8	2.9	—	—	—	—	—
380	168.0	266.0	323.0	2.9	—	—	—	—	—
415	168.0	266.0	323.0	3.5	—	—	—	—	—
440	168.0	266.0	323.0	3.9	—	—	—	—	—
480	168.0	266.0	323.0	4.6	—	—	—	—	—
525	210.0	367.0	446.0	4.3	—	—	—	—	—
550	210.0	367.0	446.0	4.8	—	—	—	—	—
600	210.0	367.0	446.0	5.8	—	—	—	—	—

**J-Frame Electrical Rating Data** <sup>②③</sup>

50/60 Hz					DC				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48	21.0	33.6	40.8	2.5	48	21.0	33.6	40.8	2.0
60	21.0	33.6	40.8	3.8	60	21.0	33.6	40.8	3.1
110	44.5	77.0	93.5	1.8	110	44.5	77.0	93.5	1.6
120	44.5	77.0	93.5	2.1	120	44.5	77.0	93.5	1.9
127	44.5	77.0	93.5	2.4	125	44.5	77.0	93.5	2.2
208	84.0	145.6	176.8	2.7	220	87.5	154.0	187.0	3.1
220	84.0	145.6	176.8	3.1	250	87.5	154.0	187.0	4.0
240	84.0	145.6	176.8	3.8	—	—	—	—	—
380	168.0	266.0	323.0	3.4	—	—	—	—	—
415	168.0	266.0	323.0	4.0	—	—	—	—	—
440	168.0	266.0	323.0	4.6	—	—	—	—	—
480	168.0	266.0	323.0	5.4	—	—	—	—	—

**Notes**

- ① Endurance: 6000 electrical operations plus 4000 mechanical operations.  
 ② Endurance: 6000 electrical operations plus 2000 mechanical operations.  
 ③ For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.

**K-Frame Electrical Rating Data** <sup>①</sup>

50/60 Hz					DC				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48	21.0	33.6	40.8	2.5	48	21.0	33.6	40.8	2.0
60	21.0	33.6	40.8	3.8	60	21.0	33.6	40.8	3.1
110	44.5	77.0	93.5	1.8	110	44.5	77.0	93.5	1.6
120	44.5	77.0	93.5	2.1	120	44.5	77.0	93.5	1.9
127	44.5	77.0	93.5	2.4	125	44.5	77.0	93.5	2.2
208	84.0	145.6	176.8	2.7	220	87.5	154.0	187.0	3.1
220	84.0	145.6	176.8	3.1	250	87.5	154.0	187.0	4.0
240	84.0	145.6	176.8	3.8	—	—	—	—	—
380	168.0	266.0	323.0	3.4	—	—	—	—	—
415	168.0	266.0	323.0	4.0	—	—	—	—	—
440	168.0	266.0	323.0	4.6	—	—	—	—	—
480	168.0	266.0	323.0	5.4	—	—	—	—	—

**L- and M-Frames Electrical Rating Data** <sup>①</sup>

50/60 Hz					DC				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48	21.0	33.6	40.8	2.5	48	21.0	33.6	40.8	2.0
60	21.0	33.6	40.8	3.8	60	21.0	33.6	40.8	3.1
110	44.5	77.0	93.5	1.8	110	44.5	77.0	93.5	1.6
120	44.5	77.0	93.5	2.1	120	44.5	77.0	93.5	1.9
127	44.5	77.0	93.5	2.4	125	44.5	77.0	93.5	2.2
208	84.0	145.6	176.8	2.7	220	87.5	154.0	187.0	3.1
220	84.0	145.6	176.8	3.1	250	87.5	154.0	187.0	4.0
240	84.0	145.6	176.8	3.8	—	—	—	—	—
380	168.0	266.0	323.0	3.4	—	—	—	—	—
415	168.0	266.0	323.0	4.0	—	—	—	—	—
440	168.0	266.0	323.0	4.6	—	—	—	—	—
480	168.0	266.0	323.0	5.4	—	—	—	—	—

**Note**

<sup>①</sup> Endurance: 5000 electrical operations plus 1000 mechanical operations.

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### N-Frame Electrical Rating Data <sup>①</sup>

50/60 Hz					DC				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48	21.0	33.6	40.8	2.5	48	21.0	33.6	40.8	2.0
60	21.0	33.6	40.8	3.8	60	21.0	33.6	40.8	3.1
110	44.5	77.0	93.5	1.8	110	44.5	77.0	93.5	1.6
120	44.5	77.0	93.5	2.1	120	44.5	77.0	93.5	1.9
127	44.5	77.0	93.5	2.4	125	44.5	77.0	93.5	2.2
208	84.0	145.6	176.8	2.7	220	87.5	154.0	187.0	3.1
220	84.0	145.6	176.8	3.1	220	87.5	154.0	187.0	—
240	84.0	145.6	176.8	3.8	250	—	—	—	4.0
380	175.0	266.0	323.0	3.4	—	—	—	—	—
415	175.0	266.0	323.0	4.0	—	—	—	—	—
480	175.0	266.0	323.0	4.6	—	—	—	—	—
500	175.0	266.0	323.0	5.4	—	—	—	—	—

**Note**

① Endurance: 3000 electrical operations plus 1000 mechanical operations.

R-Frame AC Undervoltage Release Mechanism (Handle Reset) Ratings <sup>①②</sup>

Catalog Suffix	Application Ratings Voltage (V)	Electrical Operating Ratings			Approximate Operating Time (ms)				Maximum Circuit Breaker Contact Opening	Dielectric Withstand Voltage (V) <sup>⑤</sup>
		Supply Voltage (V)	Dropout Voltage (V)		Pickup Voltage (V) Max.	VA	Minimum UVR Response <sup>③</sup>	Initiation Circuit Breaker Contact Separation <sup>④</sup>		
02/02K	12	12	4.2	8.4	10.2	2.3	5	46	77	1024
03/03K	24	24	8.4	16.8	20.4	3.1	5	46	77	1048
05/05K	48–60	48	21.0	33.5	40.8	3.4	5	46	77	1120
		60	21.0	33.5	40.8	6.0	5	46	77	1120
08/08K	110–127	110	44.5	77.0	93.5	3.3	5	46	77	1254
		120	44.5	77.0	93.5	3.6	5	46	77	1254
		127	44.5	77.0	93.5	3.8	5	46	77	1254
11/11K	208–240	208	84.0	145.6	176.8	4.2	5	46	77	1480
		220	84.0	145.6	176.8	6.6	5	46	77	1480
		240	84.0	145.6	176.8	7.2	5	46	77	1480
29/29K	380–500	380	168.0	266.0	323.0	3.8	5	46	77	2000
		415	168.0	266.0	323.0	8.3	5	46	77	2000
		440	168.0	266.0	323.0	8.8	5	46	77	2000
		480	168.0	266.0	323.0	9.6	5	46	77	2000
		500	168.0	266.0	323.0	10.0	5	46	77	2000

R-Frame DC Undervoltage Release Mechanism (Handle Reset) Ratings <sup>①②</sup>

Catalog Suffix	Application Ratings Voltage (V)	Electrical Operating Ratings			Approximate Operating Time (ms)				Maximum Circuit Breaker Contact Opening	Dielectric Withstand Voltage (V) <sup>⑤</sup>
		Supply Voltage (V)	Dropout Voltage (V)		Pickup Voltage (V) Max.	VA	Minimum UVR Response <sup>③</sup>	Initiation Circuit Breaker Contact Separation <sup>④</sup>		
20/20K	12	12	4.2	8.4	10.2	3.4	5	46	77	1024
21/21K	24	24	8.4	16.8	20.4	4.3	5	46	77	1048
23/23K	48–60	48	21.0	33.5	40.8	4.8	5	46	77	1120
		60	21.0	33.5	40.8	7.2	5	46	77	1120
26/26K	110–127	110	43.8	77.0	93.5	3.3	5	46	77	1250
		120	43.8	77.0	93.5	3.6	5	46	77	1250
		125	43.8	77.0	93.5	3.8	5	46	77	1250
28/28K	220–250	220	87.5	154.0	187.0	6.6	5	46	77	1500
		250	87.5	154.0	187.0	7.5	5	46	77	1500

**Notes**

- ① Endurance: 500 electrical operations plus 2500 mechanical operations.  
 ② Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>). Leads are orange and brown.  
 ③ UVR will override a momentary voltage dip up to the response time shown.  
 ④ Unlatching occurs 1 millisecond before circuit breaker contacts begin to separate.  
 ⑤ For 1 minute.

## Series C External Accessories

2



## External Accessories

## Product Overview

**End Cap Kit**

The end cap kit slides onto the line or load conductor of the circuit breaker and acts as a threaded adapter for the conductor to accept a ring terminal or other bolt-on connector. The end cap kit is available with English and metric thread sizes. (Field installation only.) Listed per UL File E7819.

**Keeper Nut**

The keeper nut slides onto the line or load conductor of the circuit breaker and acts as a threaded adapter for the conductor to accept a ring terminal or other bolt-on connector. The keeper nut is available with English and metric thread sizes. Screws and washers are supplied by customer. (Field installation only.) Listed per UL File E7819.

**L-, M-, N-Frames**

Not required. Terminals are threaded.

**J-Frame Plug Nut**

The plug nut is used in applications where screw-connected ring-type terminals are preferred to connect cables to circuit breaker conductors. The plug nut is press-fit into the opening in the circuit breaker terminal conductor. Screws and washers are supplied by customer.

**Terminal Adapter****Control Wire Terminal Kit**

The control wire terminal kit provides a means to tap off control power from a main disconnect, using the provided male end of a quick disconnect.

For use with steel or stainless steel terminals only.

**Note:** Terminal Kits contain one terminal for each pole and one terminal cover.

## Contents

**Description**

<b>Description</b>	<b>Page</b>
Product Overview . . . . .	V4-T2-223
Standards and Certifications . . . . .	V4-T2-224
Quick Reference . . . . .	V4-T2-225
G-Frame (15–100 Amperes) . . . . .	V4-T2-228
F-Frame (10–225 Amperes) . . . . .	V4-T2-242
J-Frame (70–250 Amperes) . . . . .	V4-T2-260
K-Frame (70–400 Amperes) . . . . .	V4-T2-268
L-Frame (125–600 Amperes) . . . . .	V4-T2-281
M-Frame (300–800 Amperes) . . . . .	V4-T2-293
Motor Circuit Protectors (MCP) . . . . .	V4-T2-304
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	V4-T2-315
Current-Limiting Circuit Breaker Module . . . . .	V4-T2-316
Internal Accessories . . . . .	V4-T2-319
External Accessories . . . . .	
Product Selection . . . . .	V4-T2-356
Accessories . . . . .	V4-T2-374
Technical Data and Specifications . . . . .	V4-T2-375
Dimensions . . . . .	V4-T2-376

**Multiwire Connectors**

Eaton's field-installed multiwire connectors for the load side (OFF) end terminals are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include mounting hardware, insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

**Terminal Shields**

Terminal shields provide protection against accidental contact with live line side terminations. Terminal shields are fabricated from high dielectric insulating material and fasten over the front terminal access openings. Small openings in the shields provide limited access to the terminals for tightening connectors. (Field installation only.)

**Rear Fed Terminals.**

Rear fed terminals allow the cable to connect to the breaker from the back instead of the top. Terminal shields or interphase barriers are included with each rear fed terminal kit (depending on frame size). When catalog number starts with a 3, it indicates a kit with three terminals in each kit. Catalog number beginning with a TA indicates one terminal.

**Terminal End Covers**

The terminal end covers are designed for use in motor control center applications where, because of confined spaces, line side conductors are normally custom fitted. The molded end covers are made of high dielectric glass-polyester and slide over the line ends of the circuit breaker. Close fitting conductor openings are molded into the end covers. The end cover and circuit breaker case fit together to form terminal compartments that isolate discharged ionizing gases during circuit breaker tripping. Terminal end covers are available with two conductor opening diameters, 0.25-inch (6.4 mm) and 0.41-inch (10.4 mm), and are listed per UL File E7819. (Field installation only.)

**Interphase Barriers**

The interphase barriers provide additional electrical clearance between circuit breaker poles for special termination applications. The barriers are high dielectric insulating plates that are installed in the molded slots between the terminals. (Field installation only.) Two per package.

**Base Mounting Plate**

Suitable for mounting six single-pole circuit breakers.

**DIN Rail Adapter**

For use with standard 35 mm DIN rail such as, 35 x 7.5 or 35 x 15 mm per DIN EN50022.

Adapter mounting screws included are for use with two- and three-pole circuit breakers. Adapters for single-pole circuit breakers clip into the base molding.

**Key Operated Attachment****Lock Dog (Non-Padlockable)****Non-Padlockable Handle Block**

The non-padlockable handle block secures the circuit breaker handle in either the ON or OFF position. (Trip-free operation allows the circuit breaker to trip when the

handle block holds the circuit breaker handle in the ON position.) The device is positioned over the circuit breaker handle and secured by a setscrew to deter accidental operation of the circuit breaker handle. Listed per UL File E7819. (Field installation only.)

**Padlockable Handle****Padlockable Handle Lock**

The device is positioned in the cover opening to prevent handle movement. Will accommodate one 5/16-inch (8 mm) padlock.

**Snap-on Padlockable Handle Lock Hasp**

The snap-on padlockable handle lock allows the handle to be locked in the OFF or ON position. (Trip-free operation allows the circuit breaker to trip when the handle lock holds the circuit breaker handle in the ON position.) This device was designed for use on the single-pole circuit breaker, but may be used on one-, two-, three- and four-pole styles. The handle lock snaps onto the escutcheon area of the handle with an optional retaining screw for added secureness. The handle lock will accommodate one padlock with a 1/4-inch (6.4 mm) shackle. Listed per UL File E7819. (Field installation only.)

**Padlockable Handle Lock Hasp**

The padlockable handle lock hasp allows the handle to be locked in the ON or OFF position. (Trip-free operation allows the circuit breaker to trip when the handle lock holds the circuit breaker handle in the ON position.) The hasp mounts on the circuit breaker cover within the trimline. The cover is predrilled on both sides of the operating handle so that the hasp can be mounted on either side of the handle. The hasp will accommodate up to three padlocks with 1/4-inch (6.4 mm) shackles, one per circuit breaker. Listed per UL File E7819. (Field installation only.)

**Cylinder Lock**

The cylinder lock internally blocks the trip bar in the tripped position to prevent the circuit breaker from being switched to ON. The cylinder lock is factory installed in the left pole only of the circuit breaker cover. Other internally mounted accessories cannot be installed in the same pole as the cylinder lock. (Factory installation only.)

**Key Interlock Kit (Lock Not Included)**

The key interlock is used to externally lock the circuit breaker handle in the OFF position. When the key interlock is locked, an extended deadbolt blocks movement of the circuit breaker handle. Uniquely coded keys are removable only with the deadbolt extended. Each coded key controls a group of circuit breakers for a given specific customer installation.

The key interlock assembly is Underwriters Laboratories listed for field installation under UL File E7819 and consists of a mounting kit and a purchaser supplied deadbolt lock. The mounting kit comprises a mounting plate, which is secured to the circuit breaker cover in either the left- or right-pole position, key interlock mounting screws, and a wire seal. Specific mounting kits are required for individual key interlock types.

**Sliding Bar Interlock**

The sliding bar interlock provides mechanical interlocking between two adjacent three-pole circuit breakers. It is installed on the enclosure cover between the circuit breakers. When the sliding bar interlock handle is moved from one side to the other, a bar extends to alternately block movement of the circuit breaker handles and prevents both circuit breakers from being switched to ON at the same time. Sliding bar interlocks are not UL listed. (Field installation only.)

**Walking Beam Interlock**

The walking beam Interlock provides mechanical interlocking between two adjacent circuit breakers of the same pole configuration. The walking beam interlock mounts on a bracket behind and between the circuit breakers. A plunger on each end of the beam is inserted through an access hole in the back plate and base of each circuit breaker. The walking beam interlock prevents both circuit breakers from being switched ON at the same time. If a walking beam interlock is installed, the wiring troughs in the back of the circuit breaker case are blocked by the plungers and cannot be used for cross wiring. Factory modified circuit breakers are required for this application. UL File E38116.

**Electrical Operator**

The electrical (solenoid) operator is a single solenoid mechanism that enables local and remote circuit breaker ON, OFF, and reset switching. The electrical operator is mounted on the circuit breaker cover within the trimline of the circuit breaker. The electrical operator uses a unique bi-stable latch that allows the device to operate using one solenoid. The accessory provides high-speed switching with a maximum operating time of 5 cycles (80 mS), making it suitable for generator synchronizing applications.

Means are provided for remote electrical operation and for local manual operation. A special slide includes provisions for padlocking the circuit breaker handle in the OFF position. The slide will accept three padlock shackles with a maximum diameter of 1/4-inch (6.4 mm) each. An interlock electrically disconnects the solenoid when the electrical operator cover is removed. The rating data tables provide electrical rating data for the electrical (solenoid) operator.

The electrical (motor) operator allows the circuit's breaker to be opened, closed or reset remotely. It also has a lock-off capability and provisions for manual operation.

The electrical (motor) operator contains a reversible motor connected to a ball screw. The ball screw drives the circuit breaker handle. Limit switches and relays are used to control the motor.

#### **Plug-In Adapters**

Plug-in adapters simplify installation and front removal of circuit breakers. Individual line and load plug-in adapters are available for rear connection applications on two-, three-, and four-pole circuit breakers. Common mounting plates for line- and load-end adapters are available.

One plug-in adapter kit is required for line-end and one for load-end.

Plug-in adapters are UL approved unless otherwise noted.

#### **Rear Connecting Studs**

Rear connecting studs are available in several sizes to accommodate specific fixed-mounted circuit breaker applications.

Each rear connecting stud assembly consists of one stud and one tube. To maintain proper clearances between poles, select alternate long and short stud assemblies for circuit breakers with more than one pole. One assembly is required for line-end and one for load-end of each pole. Tubes must be ordered separately. Connecting studs are available only with English thread sizes.

**Note:** Not UL listed.

#### **Panelboard Connecting Straps**

Panelboard connecting straps are used to connect the circuit breaker terminals to the panelboard bus. The panelboard connecting straps are available with various ratings for outside and center poles. (Field installation only.)

Panelboard connecting straps are available to meet the needs of most standard panelboard applications. Style numbers for mounting brackets for CDP panelboard installations are also included.

**Note:** Not UL listed. Refer to panelboard manufacturer for compatibility.

#### **Type LFD Current Limiter**

The LFD current limiter is an accessory that bolts to the load end of a standard FDB or FD thermal-magnetic circuit breaker, providing 200,000 A interrupting capacity at up to 600 Vac. LFD current limiters for thermal-magnetic and electronic circuit breakers are listed with Underwriters Laboratories under File E47239.

#### **Ground Fault Alarm Unit**

The ground fault alarm unit is a remotely mounted device with a combination indicating light/test button that will light when the breaker trips or alarms on ground fault. The ground fault alarm unit requires a separate 120 Vac power source to power the light and the internal relay, which has 1NO and 1NC contacts for remote indication. The ground fault alarm unit can be panel mounted for ordering with an optional face mounting bracket. For use on Digitrip 310 only, K- through N-Frame.

#### **IQ Energy Sentinel**

The IQ Energy Sentinel is a highly accurate, microprocessor-based, breaker-mounted device designed to monitor power and energy readings. It represents an alternative to watt meters, watt-hour meters, and watt demand meters. Key advantages include savings in space, lower installation costs, and remote monitoring capability.

The IQ Energy Sentinel mounts on the load side of a Series C F-Frame (150 ampere) circuit breaker. It can be applied on three-phase, four-wire systems, or single-phase, three-wire systems with voltage connected through Phases A and C.

For more information, see Descriptive Bulletin 8178.

#### **Solid-State (Electronic) Portable Test Kit**

The solid-state (electronic) portable test kit provides verification of performance of all ratings of Digitrip 310 electronic trip units installed in circuit breakers while in service under varying load and/or phase imbalance. The test kit operates on 120-volt, 50/60 Hz power; it includes complete instructions and test times for testing long time, short time/instantaneous operation and optional ground fault operation of the circuit breaker.

**Breaker Interface Module (BIM)**

The Breaker Interface Module (BIM) is a panel mounted user interface device that is mounted on the front of an electrical assembly or at a remote location. The BIM is used to access, configure, test and display information for other devices. The BIM consists of four display windows, eight function buttons, 18 LEDs, and a graphical time/current curve to provide breaker status, operational information, protection status and energy monitoring. A 24 Vdc power supply is required to provide power to the BIM. This is supplied by the switchboard builder to Eaton's specifications. The BIM is a member of Eaton's PowerNet family of communicating devices that connects Digitrip RMS 810/910 trip units and energy sentinels as a subnetwork system. The BIM can also be connected to a main network via a PONI module to PowerNet software.

**Digitrip OPTIMizer**

The Digitrip OPTIMizer is a hand-held programmer that is used to access, configure, test and display information from OPTIM trip units. The OPTIMizer plugs into the front of an OPTIM trip unit via an eight-pin telephone jack and is powered by a nine-volt battery or the auxiliary power module. One highlighted feature is the "Copy" and "Download" commands.

Setting up multiple OPTIM trips can be finished in minutes and with no errors. An Auxiliary Power Module connection provides a trip test when control power is not present at the breaker. The OPTIMizer is supplied as a standard package to include the programmer, the eight-pin connection cord, battery and carrying case. The auxiliary power module is optional.

**Auxiliary Power Module**

The auxiliary power module is a power supply requiring 120 Vac input at 50 or 60 Hz that provides a 32 Vdc output. The auxiliary power module provides control power for testing an OPTIM trip unit when other means of control power is not available or for continuous OPTIMizer operation versus temporary with a battery. The auxiliary power module connects into the top of the Digitrip OPTIMizer via a keyed receptacle. The main application for the auxiliary power module would be for the testing of a standalone non-communicating OPTIM breaker that ordinarily would not have control power.

**Cause of Trip Display/Remote Mount Cause of Trip Display**

The Cause of Trip Display can be field-installed on any Digitrip RMS 310+ trip unit. The device provides breaker information through an LCD screen, such as cause of trip, phrase current, ground current and low loads. The display is ideal for troubleshooting common trips such as ground fault, long delay, and instantaneous/short delay. The DIGIVIEW version will provide a local display at the breaker without additional wiring by connecting directly onto the trip unit. The DIGIVIEWR06 version has a 6 foot cable that allows users to mount the display on the outside of an enclosure door and connect to the trip unit that is contained inside the enclosure.

**Cause of Trip LED Module**

The Cause of Trip LED Module can be field-installed on any Digitrip RMS 310+ trip unit. The device provides a cause of trip indication via LED. The Cause of Trip LED Module connects directly onto the trip unit. When the breaker trips, the module indicates the cause of trip (long delay, short delay, instantaneous and ground) via LED indication. The module is reset after the breaker is reset.

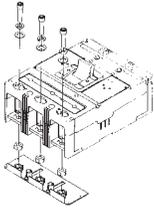
**Note:** The OPTIMizer can work off of 32 Vdc control power, although 24 Vdc is the standard on OPTIM breakers.

### Product Selection

2

#### Termination Hardware—End Cap Kit

##### End Cap Kit

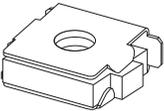


##### End Cap Kit

Thread Type	Thread Size	Catalog Number
<b>Two-Pole F-Frame (225 A)</b>		
Imperial	10–32	KPEK12
Metric	M–5	KPEKM12
<b>Three-Pole F-Frame (225 A)</b>		
Imperial	10–32	KPEK1
Metric	M–5	KPEKM1
<b>Four-Pole F-Frame (225 A)</b>		
Imperial	10–32	KPEK14
Metric	M–5	KPEKM14
<b>Three-Pole J-Frame</b>		
Imperial	0.312–18	KPEK2
Metric	M–8	KPEKM2
<b>Four-Pole J-Frame</b>		
Imperial	0.312–18	KPEK24
Metric	M–8	KPEKM24
<b>Three-Pole K-Frame</b>		
Imperial	0.312–18	KPEK3
Metric	M–8	KPEKM3
<b>Four-Pole K-Frame</b>		
Imperial	0.312–18	KPEK34
Metric	M–8	KPEKM34
<b>Three-Pole L-Frame</b>		
Imperial	0.312–18	KPEK4
Metric	M–8	KPEKM4
<b>Four-Pole L-Frame</b>		
Imperial	0.312–18	KPEK44
Metric	M–8	KPEKM44

#### Termination Hardware—Keeper Nut

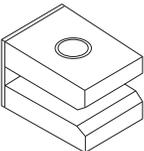
##### F-Frame Keeper Nut



##### F-Frame Keeper Nut

Thread Type	Thread Size	Catalog Number Package of 12 (Priced Individually)
Imperial	10–32	KPR1A
Metric	M–5	KPR1AM

##### K-Frame Keeper Nut

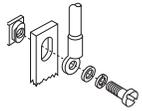


##### K-Frame Keeper Nut

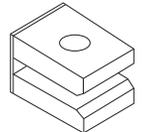
Thread Type	Thread Size	Line/Load End	Catalog Number Package of 3
Imperial	0.375–16	Line	KPR3A
		Load	KPR3B
Metric	M–8	Line	KPR3AM
		Load	KPR3BM

**Note**

L-, M-, N-Frames not required. Terminals are threaded.

**Termination Hardware****J-Frame Plug Nut****J-Frame Plug Nut**

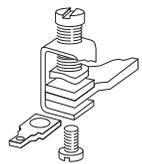
Thread Type	Thread Size	Catalog Number Package of 6
Imperial	0.250–20	<b>PLN2</b>
Metric	M–6	<b>PLN2M</b>

**K-Frame Terminal Adapter****K-Frame Terminal Adapter** <sup>①</sup>

Line/Load End	Catalog Number
Line and load	<b>TAD3</b>

**F-Frame Ordering Information**

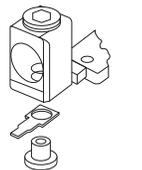
Terminals must be ordered separately. Priced individually.

**F-Frame Kit****F-Frame Control Wire Terminal Kit** <sup>②</sup>

Description	Maximum Amperes	Compatible Terminals	Catalog Number
Package of 12 control wire terminal tangs.	150	3T100FB, 3T150FB	<b>FCWTK</b>
	225	3TA225FD, 3TA225FDM	<b>FCWTK225</b>

**J- and K-Frame Ordering Information**

Terminals must be ordered separately. Priced individually.

**J- and K-Frame Kit****J- and K-Frame Control Wire Terminal Kit**

Description	Catalog Number
Package of 12 control wire terminal tangs.	<b>KCWTK</b>

**L-Frame Control Wire Terminal Kit**

AWG Wire Range/Number Conductors	Metric Wire Range mm <sup>2</sup>	Catalog Number
Al/Cu 3/0–350 kcmil (2)	95–150	<b>TA602LDCW</b> <sup>③</sup>
Cu 250–350 kcmil (2)	120–250	<b>T602LDCW</b> <sup>③</sup>
Al/Cu 400–500 kcmil (2)	185–240	<b>2TA603LDKCW</b> <sup>④⑤</sup>
Al/Cu 400–500 kcmil (2)	185–240	<b>3TA603LDKCW</b> <sup>④⑥</sup>
Al/Cu 400–500 kcmil (2)	185–240	<b>4TA603LDKCW</b> <sup>④⑦</sup>

**Notes**

- ① K-Frame terminal adapter for use in replacing LB/DA breakers.
- ② Not for use with T250KB terminals.
- ③ Individually packed.
- ④ Terminal kits contain one terminal for each pole and one terminal cover.
- ⑤ Two-pole kit.
- ⑥ Three-pole kit.
- ⑦ Four-pole kit.

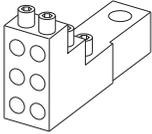
## Termination Hardware

2

## G-Frame Control Wire Terminal

Description	Catalog Number	Catalog Number
Control wire terminal (kit of 12)	5652B38G01	GCWTK

## Multiwire Connectors



## Multiwire Connectors Ordering Information (Package of 3)

Maximum Amperes	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number <sup>①</sup>
<b>G-Frame <sup>②</sup></b>			
100	3	14–2	3TA100G3K
	6	14–6	3TA100G6K
<b>F-Frame</b>			
225	3	14–2	3TA150F3K
	6	14–6	3TA150F6K
<b>J-Frame</b>			
250	3	14–2	3TA250J3K
	6	14–6	3TA250J6K
<b>K-Frame</b>			
400	3	14–2/0	3TA400K3K
	6	14–3	3TA400K6K

## Rear Fed Terminals

Frame	Maximum Amperes	Wire Size Range AWG Cu	Catalog Number <sup>①</sup>
FD	150	14–4/0	TA150FDRF
	150	14–4/0	3TA150FDRF
	225	6–300 kcmil	TA225FDRF
	225	6–300 kcmil	3TA225FDRF
KD	400	250–500 kcmil	TA350KRF
	400	250–500 kcmil	3TA350KRF
MDL	800	3/0 MAX (3)	TA800MDLRF
	800	3/0 MAX (3)	3TA800MDLRF

## Base Mounting Hardware

## Ordering Information

Hardware for surface mounting of circuit breakers is supplied only on request. Hardware consists of mounting screws and lockwashers. Order hardware for circuit breaker pole configurations as required.

## Mounting Hardware

Screw Length in Inches (mm)	Catalog Number
<b>G-Frame</b>	
0.138–32 x 2.63 (3.5 x 66.7 mm) Std.	624B375G23
0.138–32 x 3.00 (3.5 x 76.2 mm)	8703C80G05

## Notes

- ① When catalog number starts with a 3, it indicates a kit with three terminals in each kit. Catalog number beginning with a TA indicates one terminal.
- ② GD breakers require special tapping for multiwire lugs, as described in the IL or use with standard aluminum collars.

## Imperial Thread Mounting Hardware

Number of Poles	Description	Type of Mounting	Catalog Number
<b>F-Frame</b>			
1	0.164-32 x 3.188-inch pan-head steel screws, lockwashers and clamps	Individual	<b>624B375G01</b>
		Group ①	<b>624B375G02</b>
2	0.164-32 x 1.5-inch pan-head steel screws and lockwashers	Individual	<b>4218B80G01</b>
3, 4	0.164-32 x 1.5-inch pan-head steel screws and lockwashers	Individual	<b>BMH1</b>
<b>J-Frame</b>			
2, 3, 4	0.250-20 x 2.75 inch pan-head steel screws and lockwashers	Individual	<b>BMH2</b>
<b>K-Frame</b>			
2, 3, 4	0.250-20 x 1.5 inch pan-head steel screws and lockwashers	Individual	<b>BMH3</b>
<b>L-Frame</b>			
2, 3, 4	0.250-20 x 1.5 inch filister-head steel screws and lockwashers and flat washers	Individual	<b>BMH4</b>
<b>M-Frame</b>			
2, 3	0.3125-18 x 1.25 inch filister-head steel screws and lockwashers and flat washers	Individual	<b>BMH5</b>
<b>N-Frame</b>			
2, 3, 4	0.3125-18 x 1.25 inch pan-head steel screws and lockwashers	Individual	<b>BMH5</b>
<b>R-Frame</b>			
Supplied by customer			

## Metric Thread Mounting Hardware

Number of Poles	Description	Type of Mounting	Catalog Number
<b>F-Frame</b>			
1	M4-0.7 x 80 mm pan-head steel screws, lockwashers, and clamps	Individual	<b>4218B80G09</b>
		Group ①	<b>4218B80G10</b>
2	M4-0.7 x 38 mm pan-head steel screws and lockwashers	Individual	<b>4218B80G11</b>
3, 4	M4-0.7 x 38 mm pan-head steel screws and lockwashers	Individual	<b>BMH1M</b>
<b>J-Frame</b>			
2, 3, 4	M6-0.7 x 70 mm pan-head steel screws and lockwashers	Individual	<b>BMH2M</b>
<b>K-Frame</b>			
2, 3, 4	M6-0.7 x 38 mm pan-head steel screws and lockwashers	Individual	<b>BMH3M</b>
<b>L-Frame</b>			
2, 3	—	Individual	<b>BMH4M</b>
<b>M-Frame</b>			
2, 3	—	Individual	<b>BMH4M</b>
<b>N-Frame</b>			
2, 3	—	Individual	<b>BMH5M</b>
<b>R-Frame</b>			
Supplied by customer			

**Note**

① One set of hardware for two circuit breakers.

#### Terminal Shields

2

#### G-Frame Terminal Shield

Number Units in Package	Catalog Number
10	GTSK3

#### F-Frame



#### F-Frame Terminal Shield

Number of Poles	Location	Standard (Package of 10) (Priced Individually)	Special—For Use When Electrical Operator is Mounted on Circuit Breaker
		Catalog Number	Catalog Number
1	Line	625B229G06	—
2	Line	625B229G07	—
3	Line	625B229G08	4210B95G01
4	Line	625B229G09	4210B95G02

#### J-Frame



#### J-Frame Terminal Shield

Number of Poles	Location	Catalog Number (Package of 10)
2, 3	Line End	1266C07G01
4	Line End	6631C01G01
2, 3	Load End	6641C16G01
4	Load End	6641C16G02

**K-Frame**



**K-Frame Terminal Shield**

Number of Poles	Location	Catalog Number (Package of 10)
2, 3	Line	TS33LN
4	Line	TS34LN
3	Load	TS33LD

**L-Frame Terminal Shield**

Catalog Number (Package of 1)
314C420G05

**M-Frame Terminal Shield**

Catalog Number (Package of 1)
208B966G01

**N-Frame Terminal Shield**

Catalog Number (Package of 1)
NTS3K

**Terminal End Covers**

**Ordering Information**

The terminal end cover is available for three-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

**F-Frame**



**F-Frame Terminal End Covers**

Conductor Opening Diameter in Inches (mm)	Catalog Number
0.25 (6.35 mm)	TEC1
0.41 (10.41 mm)	TEC2

**Interphase Barriers**

**Ordering Information**

Two per package.

**Interphase Barrier**



**Interphase Barriers**

Frame	Catalog Number
F	IPB1
J, K	IPB3
L	IPB4
M	IPB4
N	IPB5

**Base Mounting Plate**

**Base Mounting Plate**



**Base Mounting Plate G-Frame GD/GHC**

Number of Units in Package	Catalog Number
1	207B513G01

**DIN Rail Adapter**

**DIN Rail Adapter**



**DIN Rail Adapter G-Frame GD/GHC**

Number of Poles	Number of Units in Package	Catalog Number
1, 2	10	1225C79G01
3	10	1225C79G02 ①

**All Metal DIN Rail Adapter G-Frame GD/GHC**

Number of Poles	Number of Units in Package	Catalog Number
3	1	EGGDIN

**Key Operated Attachment**

**Key Operated Attachment**



**Key Operated Attachment G-Frame GD/GHC**

Number of Units in Package	Catalog Number
10	GKOA

**Note**

① For use on three-pole breakers only.

# 2.4

## Molded Case Circuit Breakers

### Series C

2

#### Lock Dog (Non-Padlockable)

##### Lock Dog (Non-Padlockable)



##### Lock Dog (Non-Padlockable) G-Frame GD/GHC/GHB/GMCP

Number of Units in Package	Catalog Number
1	1294C01H01

#### Handle Ties

##### Handle Tie—Series C, F-Frame

Number of Poles	Number of Units in Package	Catalog Number
2	10	HTBFD2P
3	10	HTBFD3P

##### Handle Tie—Series C, G-Frame

Number of Poles	Number of Units in Package	Catalog Number
2	10	HTBGD2P
3	10	HTBGD3P

#### Non-Padlockable Handle Block

##### Non-Padlockable Handle Block



##### Non-Padlockable Handle Block

Frame	Catalog Number
F	LKD1
J, K	LKD3
L, M, N	LKD4

#### Padlockable Handle

##### Padlockable Handle



##### Padlockable G-Frame GD/GHC/GHB

Number of Units in Package	Catalog Number <sup>①</sup>
10	1223C77G03
10	1223C77G05 <sup>②</sup>
10	1223C77G06 <sup>②</sup>

#### Padlockable Handle Lock

##### Padlockable Handle Lock



##### Padlockable Handle Lock

Frame	Catalog Number
G	GPHBOFF
J, K	PHB3

#### Snap-On Padlockable Handle Lock Hasp

##### Snap-On Padlockable Handle Lock Hasp



##### Snap-On Padlockable Handle Lock Hasp

Frame	Catalog Number
F	PHL1

#### Notes

- ① Accepts 0.285 Lock Shank.
- ② Padlockable in the OFF position only.

**Padlockable Handle Lock Hasp****Padlockable Handle Lock Hasp****Padlockable Handle Lock Hasp**

Description	Catalog Number
<b>F-Frame</b>	
Single-pole breakers	PHL1
Two-, three- and four-pole breakers	PLK1
For left side mounting	PLK1LOFF
For right side mounting	PLK1ROFF
<b>J, K-Frames</b>	
Two-, three- and four-pole breakers	PLK3
For left side mounting	PLK3LOFF ①
For right side mounting	PLK3ROFF ①
<b>L-Frame (Side Mounted)</b>	
Lock ON or OFF	HLK4
Lock OFF only (left-hand mount)	HLK4LOFF ①
<b>L-Frame (Top Mounted)</b>	
Lock ON or OFF	HLK4S
Lock OFF only	HLK4SOFF ①
<b>M-Frame</b>	
Lock ON or OFF	HLK4
Lock OFF only (left-hand mount)	HLK4LOFF ①
<b>M-Frame (Vertical Mounting)</b>	
Lock ON/OFF	HLK4S
Lock OFF only	HLK4SOFF
<b>N-Frame</b>	
Side mounted	PLK5
Top mounted (ON/OFF)	PLK5S
Top mounted (OFF only)	PLK5SOFF ①
<b>R-Frame</b>	
Lock ON/OFF	HLK6
Lock OFF only	HLK6OFF ①

**Cylinder Lock****Cylinder Lock****Cylinder Lock**

Frame	Catalog Number
F, J, K	Order by description

**Note**

- ① For padlockable handle lock hasp to padlock handle in OFF position only, order either catalog number.

**Key Interlock Kit****Ordering Information**

Key interlock kits contain the necessary interface and hardware to install a trapped key interlock from one of the listed manufacturers. Key interlocks are not installed or supplied as part of the breaker, and must be obtained separately from the lock manufacturer or through the manufacturer of the equipment on which the breaker will be installed. Select the mounting kit catalog number to match the type of lock used.

**Key Interlock Kit****Key Interlock Kit (Trapped Key Interlock)**

Lock Manufacturer	Lock Type	Bolt Projection in Withdrawn Position in Inches (mm)	Kit Catalog Number
<b>F-Frame</b>			
Superior	B-4003-1	0.38 (9.5)	<b>KYK1</b>
Kirk®	F	0.38 (9.5)	<b>KYK1</b>
Castell ①	K or QK	0.38 (9.5)	<b>CTK1</b>
<b>J, K-Frames</b>			
Superior	B-4003-1	0.38 (9.5)	<b>KYK3</b>
Kirk	F	0.38 (9.5)	<b>KYK3</b>
Castell ①	K or QK	0.38 (9.5)	<b>CTK3</b>
<b>L-, M-, N-Frames</b>			
Superior	B-4003-1	0.38 (9.5)	<b>KYK4</b>
Kirk	F	0.38 (9.5)	<b>KYK4</b>
Castell ①	K or QK	0.38 (9.5)	<b>CTK4</b>
<b>R-Frame</b>			
Superior	B-4003-1	1.0 (25.4)	<b>KYK6</b>
Kirk	F	1.0 (25.4)	<b>KYK6</b>
Castell ①	K or QK	1.0 (25.4)	<b>CTK6</b>

**Note**

① When ordering Castell Interlock, it is necessary for customer to specify that the mounting bolt holes must be 10 mm in diameter

**Sliding Bar Interlock****Ordering Information**

The sliding bar interlock is available for mounting between two adjacent three-pole circuit breakers with circuit breakers centerline spacing as indicated in table and enclosure front panel thickness of 1/8 or 3/16 inch (3.2 or 4.8 mm). (For field installation only.)

**Sliding Bar Interlock****Sliding Bar Interlock**

Frame	Centerline Spacing in Inches (mm)	Catalog Number
F	4.19 (106.4)	<b>SBK1</b>
J	4.38 (111.3)	<b>SBK2</b>
K	5.75 (146.0)	<b>SBK3</b>
L, M	8.50 (215.9)	<b>SBK4</b>
N	8.50 (215.9)	<b>SBK5</b>

**Walking Beam Interlock****Ordering Information**

The walking beam interlock is available for mounting between two adjacent circuit breakers spaced 1/4-inch (6.4 mm) apart and having the same pole configuration. The two circuit breakers must be factory modified to accept the walking beam interlock assembly (suitable for use with either two-, three- or four-pole circuit breakers).

With properly modified circuit breakers, the walking beam interlock is suitable for field installation. Order circuit breakers specifying modification for walking beam (20% price adder) and select walking beam interlock from table below. Circuit breakers and walking beam interlock are boxed and shipped separately.

**Walking Beam Interlock****Walking Beam Interlock**

Frame	Catalog Number
F	<b>WBL1</b>
K	<b>WBL3</b>
L, M	<b>WBL4A</b>
N	<b>WBL5</b>
R ①	<b>WBL6</b>

**Note**

① Three-pole only.

**Electrical Operator**

2

**F-Frame Electrical (Solenoid) Operator**

Voltage	Frequency	Terminal Block	18-Inch (457.2 mm) Pigtail Lead
		Catalog Number	Catalog Number
120	AC	EOP1T07	EOP1P07
240	AC	EOP1T11	EOP1P11

**F-Frame Electrical (Motor) Operator** <sup>①</sup>

Voltage	Frequency	18-Inch (457.2 mm) Pigtail Lead
		Catalog Number
120	50/60 Hz AC	MOPFD120C
24	DC	MOPFD24D
125	DC	MOPFD120C
208–240	50/60 Hz	MOPFD240C
220–250	DC	MOPFD240C

**J-Frame Electrical (Solenoid) Operator**

Operating Voltage	Frequency	Terminal Block
		Catalog Number
120	50/60 Hz AC	EOP2T07
240	50/60 Hz AC	EOP2T11

**K-Frame Electrical (Solenoid) Operator**

Operating Voltage	Frequency	Terminal Block
		Catalog Number
120	50/60 Hz AC	EOP3MT07
240	50/60 Hz AC	EOP3MT11

**K-Frame Electrical (Solenoid) Operator Base Mounting Kit**

Frame	Catalog Number
K	BBMK3

**L- and M-Frame Electrical (Motor) Operator (310)**

Operating Voltage	Frequency	Terminal Block
		Catalog Number
120	50/60 Hz	EOP4MT07
208	50/60 Hz	EOP4MT11
240	50/60 Hz	EOP4MT11A
480	50/60 Hz	EOP4MT15
125	DC	EOP4MT26
24	DC	EOP4MT21

**Note**

<sup>①</sup> Motor operators MOP1P07, MOP1P03DC, MOP1P05DC and MOP1P07DC are replaced by MOPFD motor operators listed in table.

**N-Frame Electrical (Motor) Operator**

Operating Voltage	Frequency	Pigtail Leads
		Catalog Number
120	50/60 Hz	<b>EOP5T07</b>
208	50/60 Hz	<b>EOP5T09</b>
240	50/60 Hz	<b>EOP5T11</b>
480	50/60 Hz	<b>EOP5T15</b>
24	DC	<b>EOP5T21</b>
48	DC	<b>EOP5T22</b>
125	DC	<b>EOP5T26</b>

**R-Frame Electrical (Motor) Operator**

Operating Voltage	Frequency	Factory-Installed Terminal Block
		Catalog Number
120	50/60 Hz	<b>EOP6T08K</b>
240	50/60 Hz	<b>EOP6T11K</b>
48	DC	<b>EOP6T21K</b>

**Plug-In Adapters****F-Frame Ordering Information (Flat Bar Type)**

Continuous Current Rating (Amperes)	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
100–225	<b>1480D13G01</b>	<b>1480D13G02</b>	<b>1480D13G07</b> <sup>①</sup>
Mounting plate	<b>176C511H01</b>	<b>507C047H01</b>	—

**J-Frame Ordering Information (Flat Bar Type)**

Continuous Current Rating (Amperes)	Terminal End	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
250	Line	<b>1260C86G05</b>	<b>1260C86G06</b>	<b>1231C67G01</b>
	Load	<b>1260C86G07</b>	<b>1260C86G08</b>	<b>1231C67G02</b>
	One line and one load	<b>506C144G27</b>	<b>506C144G28</b>	—
Mounting plate	—	<sup>②</sup>	<b>PMP23</b>	—

**K-Frame Ordering Information (Flat Bar Type)—600 Vac Maximum**

Continuous Current Rating (Amperes)	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
400	<b>PAD32</b>	<b>PAD33</b>	—
Mounting plate	<sup>②</sup>	<b>PMP33</b>	—

**Notes**

<sup>①</sup> 100 ampere maximum.

<sup>②</sup> Use three-pole mounting plate for two-pole circuit breaker.

**L-Frame (Threaded Stud Type)**

Continuous Current Rating (Amperes)	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
600 (threaded stud type)	506C059G03	506C059G04	PAD44
600 (flat bar type)	1288C19G01	1288C19G02	6636C55H01
Mounting plate	504C824H01	504C824H01	—

**M-Frame (Flat Bar Type) — 600 Vac Maximum**

Continuous Current Rating (Amperes)	Two-Pole Catalog Number	Three-Pole Catalog Number
800	2614D53G05	2614D53G06
Mounting plate	1290C73H01	1290C73H01

**N-Frame (Flat Bar Type)**

Continuous Current Rating (Amperes)	Two-Pole Catalog Number	Three-Pole Catalog Number
1200	2614D53G03	2614D53G04
Mounting plate	1290C73H01	1290C73H01

**Plug-In Adapters**

Frame	Number of Poles	Standard Certification	Catalog Number
FD	3	IEC	PAD3F
FD	4	IEC	PAD4F
JD	3	IEC	PAD3JD
KD	3	IEC	PAD3K
LD	3	IEC	PAD3LD
LD	4	IEC	PAD4LD

**Rear Connecting Studs****F-Frame** <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number	Tube Catalog Number
<b>For 15 to 100 A Circuit Breakers</b>		
100 short	451D874G01	32B9446H20
100 short	451D874G01	32B9446H21
100 short	451D874G01	32B9446H22
100 short	451D874G01	32B9446H23
100 long	451D874G02	32B9446H24
100 long	451D874G02	32B9446H25
100 long	451D874G02	32B9446H26
100 long	451D874G02	32B9446H27
<b>For 110 to 225 A Circuit Breakers</b>		
225 short	374D883G01	374D883H06
225 short	374D883G01	374D883H07
225 short	374D883G01	374D883H08
225 short	374D883G01	374D883H09
225 long	374D883G02	374D883H10
225 long	374D883G02	374D883H11
225 long	374D883G02	374D883H12
225 long	374D883G02	374D883H13

**J-Frame** <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number	Tube Catalog Number
250 short	5010D23G01	456D983H05
250 short	5010D23G01	456D983H06
250 short	5010D23G01	456D983H07
250 long	5010D23G02	5010D23H05
250 long	5010D23G02	5010D23H06
250 long	5010D23G02	5010D23H07

**K-Frame** <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number	Standard Tube Catalog Number
400 short	6642C14G02	313C909H17
400 short	6642C14G04	313C909H18
400 short	6642C14G06	313C909H19
400 long	6642C14G03	313C909H20
400 long	6642C14G05	313C909H21
400 long	6642C14G07	313C909H22

**L-Frame Ordering Information**

Stud Catalog Number
314C960G07
314C960G08
314C960G09

**M-Frame Ordering Information** <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number
225	314C960G01
400	314C960G04
400	314C960G05
400	314C960G06
600	314C960G07
600	314C960G08
600	314C960G09
800	314C960G10
800	314C960G11
800	314C960G12

**N-Frame Ordering Information** <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number
800	623B222G01
800	623B222G02
800	623B222G03
1200	373B375G04
1200	373B375G03

**Note**

<sup>①</sup> Not UL listed.

**Panelboard Connecting Straps**

2

**F-Frame Panelboard Connecting Straps**

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type	
		Center Catalog Number	Outside Catalog Number
2.75 (69.9)	50	673B142G02	673B142G09
2.75 (69.9)	100	673B142G02	673B142G10
2.75 (69.9)	150	673B142G04	673B142G03
3.50 (88.9)	50	1253C72G01	1253C72G03
3.50 (88.9)	100	1253C73G03	1253C73G06
3.50 (88.9)	150	1253C73G01	1253C73G05

**F-Frame Mounting Bracket**

Number of Poles	Catalog Number
2	624B600H02
3	624B600H01

**J-Frame Panelboard Connecting Straps**

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type	
		Center Catalog Number	Outside Catalog Number
3.50 (88.9)	250	2600D26G01	2600D26G02

**K-Frame Panelboard Connecting Straps**

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type	
		Center Catalog Number	Outside Catalog Number
3.50 (88.9)	400	4212B78G02	4212B77G01

**K-Frame Mounting Bracket**

Number of Poles	Catalog Number
2, 3	208B264H01

**L-Frame Panelboard Connecting Straps**

Continuous Current Rating (Amperes)	Pole Connector Type	
	Center Catalog Number	Outside Catalog Number
600	624B609G01	506C052G01

**L-Frame Mounting Bracket**

Number of Poles	Catalog Number
2, 3	208B297H01

**M-Frame Panelboard Connecting Straps**

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type	
		Connector Type	Catalog Number
3.50 (88.9)	800	Short	314C996G01
		Medium	314C996G02
		Long	314C996G03

**M-Frame Mounting Bracket**

Catalog Number
315C270H01

**N-Frame Panelboard Connecting Straps**

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type	
		Connector Type	Catalog Number
3.50 (88.9)	1200	Short	505C606G04
		Medium	505C606G05
		Long	505C606G06

**N-Frame Mounting Bracket (Four Required)**

Catalog Number
315C270H01

#### Type LFD Current Limiter

The LFD current limiter is an accessory that bolts to the load end of a standard FDB or FD thermal-magnetic and electronic circuit breaker, providing 200,000 A interrupting capacity at up to 600 Vac. LFD current limiters for thermal-magnetic circuit breakers are listed with Underwriters Laboratories under File E47239.

Type LFD Current Limiter



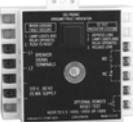
#### Type LFD Current Limiter

Circuit Breaker Rating Amperes	Catalog Number
15–70	LFD3070R
80–160	LFD3150R

#### Ground Fault Alarm Unit

The ground fault alarm unit is a remotely mounted device with a combination indicating light/test button that will light when the breaker trips or alarms on ground fault. The ground fault alarm unit requires a separate 120 Vac power source to power the light and the internal relay, which has 1NO and 1NC contacts for remote indication. The ground fault alarm unit can be panel mounted for ordering with an optional face mounting bracket. For use on Digitrip 310 only, K- through N-Frame.

Ground Fault Alarm Unit



#### GF Alarm Unit

Description	Catalog Number
Ground fault alarm unit	GFAU
Face mounting bracket	1264C67G01

#### IQ Energy Sentinel

The IQ Energy Sentinel is a highly accurate, microprocessor-based, breaker-mounted device designed to monitor power and energy readings. It represents an alternative to watt meters, watt-hour meters, and watt demand meters. Key advantages include savings in space, lower installation costs, and remote monitoring capability.

The IQ Energy Sentinel mounts on the load side of a Series C F-Frame (150 ampere) circuit breaker. It can be applied on three-phase, four-wire systems, or single-phase, three-wire systems with voltage connected through Phases A and C.

For more information, see Descriptive Bulletin 8178.

#### Solid-State (Electronic) Portable Test Kit

The solid-state (electronic) portable test kit provides verification of performance of all ratings of Digitrip 310 electronic trip units installed in circuit breakers while in service under varying load and/or phase imbalance. The test kit operates on 120-volt, 50/60 Hz power; it includes complete instructions and test times for testing long time, short time/instantaneous operation and optional ground fault operation of the circuit breaker.

#### Portable Test Kit

Description	Catalog Number
Solid-state (electronic) portable test kit	STK2

#### Breaker Interface Module (BIM)

The Breaker Interface Module (BIM) is a panel mounted user interface device that is mounted on the front of an electrical assembly or at a remote location. The BIM is used to access, configure, test and display information for other devices. The BIM consists of four display windows, eight function buttons, 18 LEDs, and a graphical time/current curve to provide breaker status, operational information, protection status and energy monitoring. A 24 Vdc power supply is required to provide power to the BIM. This is supplied by the switchboard builder to Eaton's specifications. The BIM is a member of Eaton's PowerNet family of communicating devices that connects Digitrip RMS 810/910 trip units and energy sentinels as a subnetwork system. The BIM can also be connected to a main network via a PONI module to PowerNet software.

Breaker Interface Module (BIM)



#### Breaker Interface Module (BIM)

Catalog Number
BIMII

**Digitrip OPTIMizer**

The Digitrip OPTIMizer is a hand-held programmer that is used to access, configure, test and display information from OPTIM trip units. The OPTIMizer plugs into the front of an OPTIM trip unit via an eight-pin telephone jack and is powered by a nine-volt battery or the auxiliary power module. One highlighted feature is the “Copy” and “Download” commands.

Setting up multiple OPTIM trips can be finished in minutes and with no errors. An Auxiliary Power Module connection provides a trip test when control power is not present at the breaker. The OPTIMizer is supplied as a standard package to include the programmer, the eight-pin connection cord, battery and carrying case. The auxiliary power module is optional.

**Note: 24 Vdc Power Supply**

A 24 Vdc power supply is required for all Digitrip OPTIM trip units that are required to communicate either on the main Eaton PowerNet network or as a subnetwork to a BIM. The breaker’s load is 45 mA of current. Typically one power supply is required per switchboard and can provide control power to a BIM and the OPTIM trip units. The 24 Vdc power supply should be an “isolated high quality” power supply with a “CE” label, and is normally provided by the switchboard manufacturer to Eaton’s recommendations.

**Digitrip OPTIMizer****Digitrip OPTIMizer**

**Catalog  
Number**

**OPTIMizer—standard package**

**Auxiliary Power Module**

The auxiliary power module is a power supply requiring 120 Vac input at 50 or 60 Hz that provides a 32 Vdc output. The auxiliary power module provides control power for testing an OPTIM trip unit when other means of control power is not available or for continuous OPTIMizer operation versus temporary with a battery.

The auxiliary power module connects into the top of the Digitrip OPTIMizer via a keyed receptacle. The main application for the auxiliary power module would be for the testing of a standalone non-communicating OPTIM breaker that ordinarily would not have control power.

**Auxiliary Power  
Module****Auxiliary Power Module**

**Catalog  
Number**

**PRTBAPMDV**

**Cause of Trip Display/Remote Mount Cause of Trip Display**

The Cause of Trip Display can be field-installed on any Digitrip RMS 310+ trip unit. The device provides breaker information through an LCD screen, such as cause of trip, phase current, ground current and low loads. The display is ideal for troubleshooting common trips such as ground fault, long delay, and instantaneous/short delay. The DIGIVIEW version will provide a local display at the breaker without additional wiring by connecting directly onto the trip unit. The DIGIVIEWR06 version has a 6 foot cable that allows users to mount the display on the outside of an enclosure door and connect to the trip unit that is contained inside the enclosure.

**Cause of Trip Display/Remote Mount  
Cause of Trip Display**

**Catalog  
Number**

**DIGIVIEW**

**DIGIVIEWR06**

**Cause of Trip LED Module**

The Cause of Trip LED Module can be field-installed on any Digitrip RMS 310+ trip unit. The device provides a cause of trip indication via LED. The Cause of Trip LED Module connects directly onto the trip unit.

When the breaker trips, the module indicates the cause of trip (long delay, short delay, instantaneous and ground) via LED indication. The module is reset after the breaker is reset.

**Cause of Trip LED Module**

**Catalog  
Number**

**TRIP-LED**

## Accessories

## 2

**Flex Shaft Accessories (F- through R-Frame)****NEMA 12 Safety Door Hardware for Flex Shaft and C371** <sup>①</sup>

Handle Length in Inches (mm)	Catalog Number <sup>②</sup>
4 (101.6)	C361KJ4
6 (152.4)	C361KJ6
Roller Latch <sup>③</sup>	C361KR

**Series C Rotary Accessories**

As an option, an auxiliary switch is offered so that the control panel builder may electrically indicate the status of the breaker.

This accessory would be mounted on the mechanism and comes with 24-inch (609.6 mm) pigtail leads.

**Series C Auxiliary Switch**

Catalog Number
5108A61G01

**Wire Seal**

The wire seal can be used to secure the cover on the trip unit to prevent adjustments after settings are confirmed.

**Wire Seal**

Description	Catalog Number
Wire seal	5108A03H01

**Notes**

- ① Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.
- ② The 1/4-inch x 1/2-inch (6.35 x 12.7 mm) standard mill rectangular locking bar is not supplied with these kits.
- ③ Third roller latch for use with 4- or 6-inch (101.6 or 152.4 mm) handle when 3 point latching is required.

## Technical Data and Specifications

### Electrical Operator

#### F-Frame Electrical (Solenoid) Operator Rating Data <sup>①②</sup>

Voltage <sup>③</sup>	Frequency	Inrush Current Amperes	Maximum Operating Time	Fuse Amperes <sup>④</sup>
120	50/60 Hz AC	10	5 cycles (80 ms)	3
240	50/60 Hz AC	5	5 cycles (80 ms)	2

#### F-Frame Electrical (Motor) Operator Rating Data <sup>②③⑥⑦</sup>

Voltage <sup>③</sup>	Frequency	Inrush Current Amperes
120	AC	2
24	DC	5
48	DC	3
125	DC	2

#### J-Frame Electrical (Solenoid) Operator Rating Data <sup>①⑥⑧⑨</sup>

Voltage <sup>③</sup>	Inrush Current Amperes	Fuse Amperes
120	30	6
240	16	4

#### K-Frame Electrical (Solenoid) Operator Rating Data <sup>①⑥⑧⑨</sup>

Operating Voltage <sup>③</sup>	Inrush Current Amperes	Fuse Amperes
120	30	6
240	16	4

#### L- and M-Frame Electrical (Motor) Operator Rating Data

<sup>①⑥⑧⑩</sup>

Operating Voltage <sup>③</sup>	Inrush Current Amperes
120 AC	31
208 AC	13
240 AC	12
125 DC	21
24 DC	50

#### N-Frame Electrical (Motor) Operator Rating Data <sup>①⑥⑩⑫</sup>

Operating Voltage <sup>③</sup>	Frequency	Inrush Current Amperes	Fuse Amperes
120	50/60 Hz	31	6
208	50/60 Hz	21	—
240	50/60 Hz	19	4
480	50/60 Hz	—	—
24	DC	50	—
48	DC	80	—
125	DC	21	—

#### R-Frame Electrical (Motor) Operator Rating Data <sup>③④⑫⑬</sup>

Operating Voltage <sup>⑦</sup>	Frequency	Motor Inrush Current Amperes
120	50/60 Hz	40
240	50/60 Hz	27
48	DC	53
24	DC	58

#### Notes

- ① UL listed under UL File E64983.
- ② The electrical operator design is endurance tested for 8000 electrical operations.
- ③ Tolerance: +10%, -15% of nominal voltage.
- ④ Use current-limiting type fuse where required.
- ⑤ UL listed under UL File E64124.
- ⑥ Frequency: 50/60 Hz.
- ⑦ Maximum operating time: 3 seconds max. Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
- ⑧ The electrical operator design has been endurance tested for 6000 electrical operations.
- ⑨ Maximum operating time: 5 cycles (80 ms).
- ⑩ Maximum operating time: 12 cycles.
- ⑪ The electrical operator design has been endurance tested for 2,500 electrical operations.
- ⑫ Maximum operating time: 12 cycles max. Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
- ⑬ Operator is an intermittent duty service. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
- ⑭ Electric Operating time at rated voltage; (a) To turn breaker ON—1/2 second max. (b) To turn breaker OFF—1/2 second max.
- ⑮ Motor operating temperature; Class "A" temperature limits apply.
- ⑯ A minimum 1 kVA power source is recommended for motor operation.
- ⑰ Applied voltage should be no less than 85% or no more than 110% of rated voltage.

### Dimensions

Approximate Dimensions in Inches (mm)

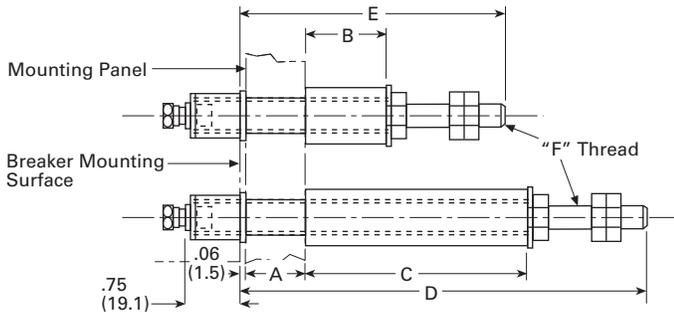
2

#### Rear Connecting Studs

#### F-Frame <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number	Panel Thickness		Tube Length		Tube Catalog Number	Dimensions		
		A		B	C		D	E	F
<b>For 15 to 100 A Circuit Breakers</b>									
100 short	<b>451D874G01</b>	1.00 (25.4)		1.06 (26.9)	—	<b>32B9446H20</b>	—	3.63 (92.1)	0.31 (7.9)–18
100 short	<b>451D874G01</b>	0.69–0.94 (17.5 to 23.8)		1.38 (34.9)	—	<b>32B9446H21</b>	—	3.63 (92.1)	0.31 (7.9)–18
100 short	<b>451D874G01</b>	0.38–0.63 (9.5 to 15.9)		1.69 (42.9)	—	<b>32B9446H22</b>	—	3.63 (92.1)	0.31 (7.9)–18
100 short	<b>451D874G01</b>	0.25–0.31 (6.4 to 7.9)		2.00 (50.8)	—	<b>32B9446H23</b>	—	3.63 (92.1)	0.31 (7.9)–18
100 long	<b>451D874G02</b>	1.00 (25.4)		—	3.44 (87.3)	<b>32B9446H24</b>	6.13 (155.6)	—	0.31 (7.9)–18
100 long	<b>451D874G02</b>	0.69–0.94 (17.5 to 23.8)		—	3.75 (95.2)	<b>32B9446H25</b>	6.13 (155.6)	—	0.31 (7.9)–18
100 long	<b>451D874G02</b>	0.38–0.63 (9.5 to 15.9)		—	4.06 (103.1)	<b>32B9446H26</b>	6.13 (155.6)	—	0.31 (7.9)–18
100 long	<b>451D874G02</b>	0.25–0.31 (6.4 to 7.9)		—	4.38 (111.3)	<b>32B9446H27</b>	6.13 (155.6)	—	0.31 (7.9)–18
<b>For 110 to 225 A Circuit Breakers</b>									
225 short	<b>374D883G01</b>	1.00 (25.4)		1.06 (26.9)	—	<b>374D883H06</b>	—	4.25 (108.0)	0.44 (11.1)–14
225 short	<b>374D883G01</b>	0.69–0.94 (17.5 to 23.8)		1.38 (34.9)	—	<b>374D883H07</b>	—	4.25 (108.0)	0.44 (11.1)–14
225 short	<b>374D883G01</b>	0.38–0.63 (9.5 to 15.9)		1.69 (42.9)	—	<b>374D883H08</b>	—	4.25 (108.0)	0.44 (11.1)–14
225 short	<b>374D883G01</b>	0.25–0.31 (6.4 to 7.9)		2.00 (50.8)	—	<b>374D883H09</b>	—	4.25 (108.0)	0.44 (11.1)–14
225 long	<b>374D883G02</b>	1.00 (25.4)		—	3.44 (87.3)	<b>374D883H10</b>	7.50 (190.5)	—	0.44 (11.1)–14
225 long	<b>374D883G02</b>	0.69–0.94 (17.5 to 23.8)		—	3.75 (95.2)	<b>374D883H11</b>	7.50 (190.5)	—	0.44 (11.1)–14
225 long	<b>374D883G02</b>	0.38–0.63 (9.5 to 15.9)		—	4.06 (103.1)	<b>374D883H12</b>	7.50 (190.5)	—	0.44 (11.1)–14
225 long	<b>374D883G02</b>	0.25–0.31 (6.4 to 7.9)		—	4.38 (111.3)	<b>374D883H13</b>	7.50 (190.5)	—	0.44 (11.1)–14

#### F-Frame



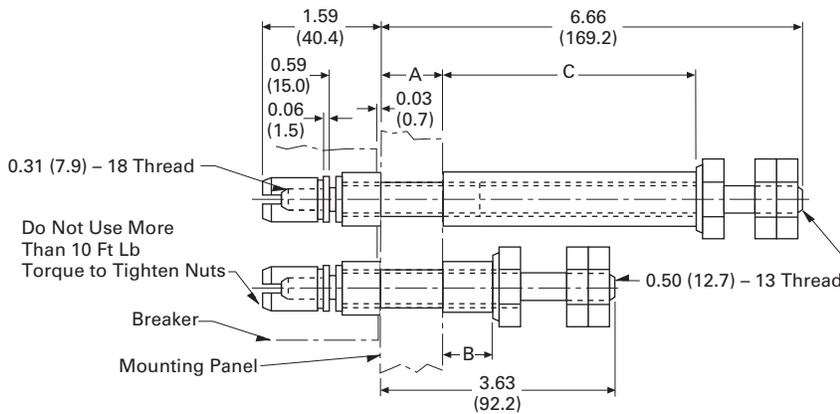
#### Note

<sup>①</sup> Not UL listed.

Approximate Dimensions in Inches (mm)

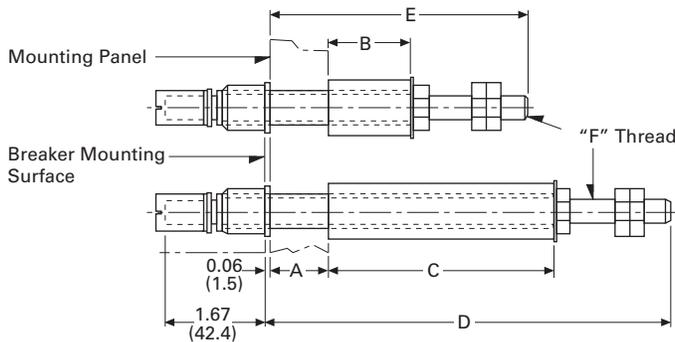
**J-Frame**

Stud Ampere Rating	Stud Catalog Number	Panel Thickness		Tube Length		Tube Catalog Number
		A		B	C	
250 short	5010D23G01	0.75–1.00 (19.1–25.4)		0.84 (21.4)	—	456D983H05
250 short	5010D23G01	0.50–0.75 (12.7–19.1)		1.09 (27.7)	—	456D983H06
250 short	5010D23G01	0.25–0.50 (6.4–12.7)		1.03 (26.2)	—	456D983H07
250 long	5010D23G02	0.75–1.00 (19.1–25.4)		—	3.88 (98.6)	5010D23H05
250 long	5010D23G02	0.50–0.75 (12.7–19.1)		—	4.13 (104.9)	5010D23H06
250 long	5010D23G02	0.25–0.50 (6.4–12.7)		—	4.38 (111.3)	5010D23H07



**K-Frame** <sup>Ⓢ</sup>

Stud Ampere Rating	Stud Catalog Number	Panel Thickness		Tube Length		Standard Tube Catalog Number	Dimensions		
		A		B	C		D	E	F
400 short	6642C14G02	0.75–1 (19.1–25.4)		0.84 (21.3)	—	313C909H17	—	3.66 (93.0)	0.75–16 (19.1–406.4)
400 short	6642C14G04	0.50–0.75 (12.7–18.4)		1.09 (27.69)	—	313C909H18	—	—	—
400 short	6642C14G06	0.25–0.5 (6.35–12.7)		1.03 (26.16)	—	313C909H19	—	—	—
400 long	6642C14G03	0.75–1 (19.1–25.4)		—	3.78 (96.0)	313C909H20	—	—	—
400 long	6642C14G05	0.50–0.75 (12.7–18.4)		—	4.03 (102.4)	313C909H21	6.58 (167.1)	—	—
400 long	6642C14G07	0.25–0.5 (6.35–12.7)		—	4.28 (108.7)	313C909H22	—	—	—



**Note**

<sup>Ⓢ</sup> Not UL listed.

# 2.4

## Molded Case Circuit Breakers

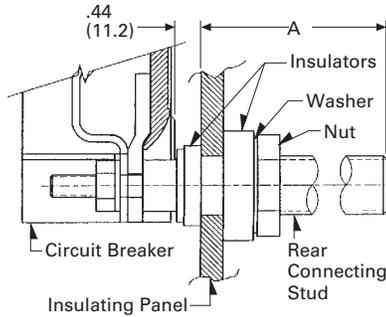
### Series C

Approximate Dimensions in Inches (mm)

2

#### L-Frame

Stud Length (A)	Stud Catalog Number
5.47 (138.9)	314C960G07
7.97 (202.4)	314C960G08
10.47 (265.9)	314C960G09



#### M-Frame

Stud Ampere Rating	Diameter and Thread	Extension Back of Breaker	Stud Catalog Number
225	0.50 (12.7)–13	3.66 (93.0)	314C960G01
400	0.75 (19.1)–16	5.91 (150.1)	314C960G04
400	0.75 (19.1)–16	8.41 (213.6)	314C960G05
400	0.75 (19.1)–16	10.91 (277.0)	314C960G06
600	1.00 (25.4)–12	5.91 (150.1)	314C960G07
600	1.00 (25.4)–12	8.41 (213.6)	314C960G08
600	1.00 (25.4)–12	10.91 (277.0)	314C960G09
800	1.13 (28.7)–12	5.91 (150.1)	314C960G10
800	1.13 (28.7)–12	8.41 (213.6)	314C960G11
800	1.13 (28.7)–12	10.91 (277.0)	314C960G12

#### N-Frame

Stud Ampere Rating	Diameter and Thread	Extension Back of Breaker	Stud Catalog Number
800	1.13 (28.7)–12	5.5 (139.7)	623B222G01
800	1.13 (28.7)–12	8.0 (203.2)	623B222G02
800	1.13 (28.7)–12	10.5 (266.7)	623B222G03
1200	1.25 (31.8)–12	5.5 (139.7)	373B375G04
1200	1.25 (31.8)–12	10.5 (266.7)	373B375G03

## Engine Generator Circuit Breakers



## Contents

<b>Description</b>	<b>Page</b>
Engine Generator Circuit Breakers	
Catalog Number Selection . . . . .	<b>V4-T2-380</b>
Product Selection . . . . .	<b>V4-T2-381</b>
Accessories Selection Guide and Ordering Information . . . . .	<b>V4-T2-383</b>
Options and Accessories . . . . .	<b>V4-T2-383</b>
Technical Data and Specifications . . . . .	<b>V4-T2-384</b>
Dimensions and Weights . . . . .	<b>V4-T2-384</b>
Direct Current Circuit Breakers . . . . .	<b>V4-T2-385</b>
PVGard Solar Circuit Breakers— 1000 Vdc Poles-in-Series . . . . .	<b>V4-T2-397</b>
E <sup>2</sup> Mining Service Circuit Breakers . . . . .	<b>V4-T2-407</b>



## Engine Generator Circuit Breakers

## Product Description

Eaton's engine generator molded case circuit breakers are designed specifically for application on diesel engine powered standby generators where high interrupting circuit breakers are not required. The JG through NG breakers are equipped with a special trip unit, that includes standard thermal (overload) protection and special low magnetic pickup range (FG includes a fixed thermal-magnetic pickup). The standard thermal trip unit provides overload protection for conductors per the National Electrical Code®. The low magnetic pickup range is approximately two to five times the continuous rating and provides closer low-level short-circuit protection when applied on generators that have very low short-circuit capacity. This combination allows the user to customize the breaker to the generator output.

## Application Description

Engine generator circuit breakers are suitable for reverse feed application.

## Standards and Certifications

Engine generator molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Standard UL 489, Molded Case Circuit Breakers and Circuit Breaker Enclosures File E7819
- Canadian Standards Association Standard C22.2 No. 5, Service Entrance and Branch Circuit Breakers
- International Electrotechnical Commission Recommendations IEC 947-2, Circuit Breakers



Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

2

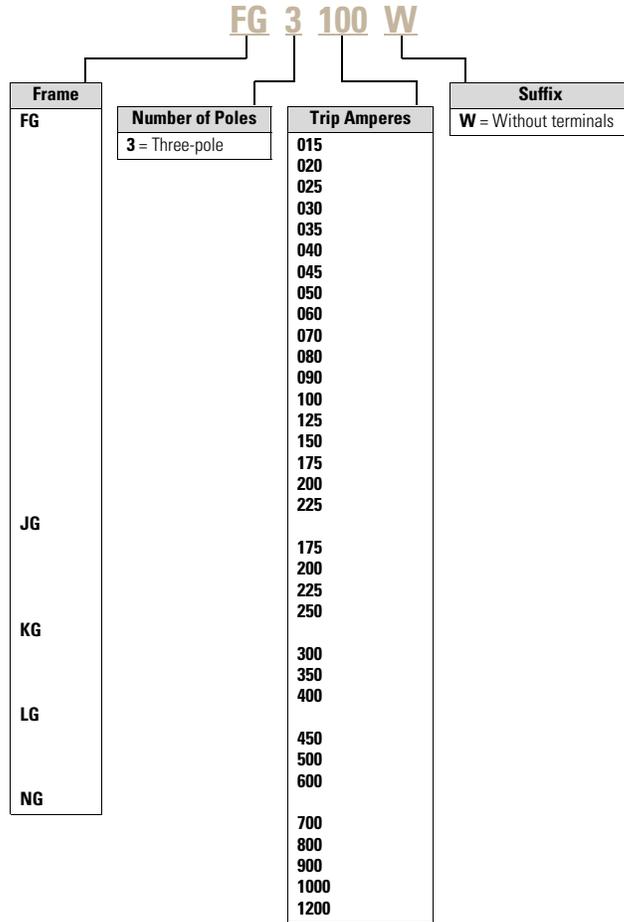
#### Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers.

- FG breakers include both line and load side terminals

- JG, KG, LG and NG breakers with **W** catalog number suffix do not include any terminals
- JG, KG, LG and NG breakers without **W** catalog number suffix include both line and load terminals
- Contact Eaton for additional ratings and internal/external accessories
- Reverse feed

#### Circuit Breakers FG, JG, KG, LG and NG



### Product Selection

The following table lists FG through NG engine generator breakers with the maximum generator kVA and kW rating. Engine generator breakers are applied at 115% of the

generator full load current rating (FLA). The maximum kW rating is based on three-phase generators at 80% power factor.

### Thermal-Magnetic

Magnetic Pickup Range	Maximum Generator Rating 60 Hz				Engine Generator Breaker <sup>③</sup>		
	240 Vac kVA <sup>①</sup>	kW <sup>②</sup>	480 Vac kVA <sup>①</sup>	kW <sup>②</sup>	600 Vac kVA <sup>①</sup>	kW <sup>②</sup>	Catalog Number
Fixed	5	4	11	9	14	11	FG3015 <sup>④</sup>
Fixed	7	6	14	12	18	14	FG3020 <sup>④</sup>
Fixed	9	7	18	14	23	18	FG3025 <sup>④</sup>
Fixed	11	9	22	17	27	22	FG3030 <sup>④</sup>
Fixed	13	10	25	20	32	25	FG3035 <sup>④</sup>
Fixed	14	12	29	23	36	29	FG3040 <sup>④</sup>
Fixed	16	13	32	26	41	32	FG3045 <sup>④</sup>
Fixed	18	14	36	29	45	36	FG3050 <sup>④</sup>
Fixed	22	17	43	35	54	43	FG3060 <sup>④</sup>
Fixed	25	20	51	40	63	51	FG3070 <sup>④</sup>
Fixed	29	23	58	46	72	58	FG3080 <sup>④</sup>
Fixed	32	26	65	52	81	65	FG3090 <sup>④</sup>
Fixed	36	29	72	58	90	72	FG3100 <sup>④</sup>
Fixed	40	32	79	64	99	79	FG3110 <sup>④</sup>
Fixed	45	36	90	72	113	90	FG3125 <sup>④</sup>
Fixed	54	43	108	87	135	108	FG3150 <sup>④</sup>
Fixed	63	51	126	101	158	126	FG3175 <sup>④</sup>
Fixed	72	58	144	116	181	144	FG3200 <sup>④</sup>
Fixed	81	65	162	130	203	162	FG3225 <sup>④</sup>
350–700	63	51	126	101	158	126	JG3175W <sup>⑤</sup>
350–700	63	51	126	101	158	126	JG3175 <sup>④</sup>
350–700	72	58	144	116	181	144	JG3200W <sup>⑤</sup>
350–700	72	58	144	116	181	144	JG3200 <sup>④</sup>
350–700	81	65	162	130	203	162	JG3225W <sup>⑤</sup>
350–700	81	65	162	130	203	162	JG3225 <sup>④</sup>
350–700	90	72	181	144	226	181	JG3250W <sup>⑤</sup>
350–700	90	72	181	144	226	181	JG3250 <sup>④</sup>
500–1000	108	87	217	173	271	217	KG3300W <sup>⑤</sup>
500–1000	108	87	217	173	271	217	KG3300 <sup>④</sup>
500–1000	126	101	253	202	316	253	KG3350W <sup>⑤</sup>
500–1000	126	101	253	202	316	253	KG3350 <sup>④</sup>
1000–2000	144	116	289	231	361	289	KG3400 <sup>④</sup>

#### Notes

- ① Breaker continuous current is based on 115% of the generator full load ampere rating.
- ② Based on three-phase generators at 80% power factor.
- ③ FG, JG, KG include thermal-magnetic trip units, LG and NG include electronic trip units.
- ④ Breaker includes line and load terminals.
- ⑤ Without terminals.

The following catalog numbers have center tap studs for dual voltage applications: JG3070CT, JG3100CT, JG3125CT, KG3175CT, LG3300CTW.

## Electronic

2

Magnetic Pickup Range	Maximum Generator Rating 60 Hz				Engine Generator Breaker <sup>③</sup>		
	240 Vac kVA <sup>①</sup>	kW <sup>②</sup>	480 Vac kVA <sup>①</sup>	kW <sup>②</sup>	600 Vac kVA <sup>①</sup>	kW <sup>②</sup>	Catalog Number
500–2500	162	130	325	260	406	325	LG3450 <sup>④</sup>
500–2500	181	144	361	289	451	361	LG3500 <sup>④</sup>
500–2500	217	173	433	347	542	433	LG3600 <sup>④</sup>
500–2500	253	202	505	404	632	505	NG3700 <sup>④</sup>
500–2500	289	231	578	462	722	578	NG3800 <sup>④</sup>
1250–5000	325	260	650	520	812	650	NG3900 <sup>④</sup>
1250–5000	361	289	722	578	903	722	NG31000 <sup>④</sup>
1250–5000	433	347	867	693	1083	867	NG31200 <sup>④</sup>

**Notes**

- ① Breaker continuous current is based on 115% of the generator full load ampere rating.
- ② Based on three-phase generators at 80% power factor.
- ③ FG, JG, KG include thermal-magnetic trip units, LG and NG include electronic trip units.
- ④ Breaker includes line and load terminals.

The following catalog numbers have center tap studs for dual voltage applications: JG3070CT, JG3100CT, JG3125CT, KG3175CT, LG3300CTW.

## Accessories Selection Guide and Ordering Information

### Enclosures

#### Type 1 General Purpose

- Surface or flush mounting
- 15–1200 ampere range
- 600 Vac, 500 Vdc

Type 1 enclosed breakers are designed for use in commercial buildings, apartment buildings and other areas where a general purpose enclosure is applicable. The breaker is front operable and is capable of being padlocked in either the ON or OFF position. Ratings through 1200 amperes are listed with Underwriters Laboratories as approved for service entrance application. Both surface and flush mounted enclosures are available.

#### Type 3R Rainproof Surface Mounting

- Interchangeable hubs (through 400 amperes)
- 15–1200 ampere range
- 600 Vac, 500 Vdc

This general purpose outdoor service center employs a circuit breaker inside a weatherproof sheet steel breaker enclosure to serve

as a main disconnect and protective device for feeder circuits. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

#### Type 12 Dustproof Surface Mounting

- No knockouts or other openings
- 15–1200 ampere range
- 600 Vac, 500 Vdc

The Type 12 enclosure is designed in line with specifications for special industry applications where unusually severe conditions involving oil, coolant, dust and other foreign materials exist in the operating atmosphere. The handle padlocks in the OFF position and the cover is interlocked with the handle mechanism to prevent opening the cover with the circuit breaker in the ON position. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

### Enclosure Selection Data

Breaker Frame Amperes	Enclosure Type Class	Catalog Number
FG 15–225	Type 1	SFDN225
	Type 3R	RFDN225
	Type 12	JFDN225
KG 300–400	Type 1	SKDN400
	Type 3R	RKDN400
	Type 12	JKDN400
NG 700–1200	Type 1	SNDN1200
	Type 3R	RNDN1200
	Type 12	JNDN1200

## Options and Accessories

### Standard Terminals

Breaker Frame	Max. Amp Rating	AWG Wire Range	Metric Wire Range mm <sup>2</sup>	Catalog Number
FG	100	14–1/0	2.5–50	3T100FB ①
FG	150	4–4/0	25–95	3TA225FD ①
KG	350	250–500 kcmil	120–240	TA350K
KG	400	3/0–250 kcmil (2)	95–120	3TA400K ①
NG	700	1–500 kcmil (2)	50–300	TA700NB1
NG	1000	3/0–400 kcmil (3)	95–185	TA1000NB1
NG	1200	4/0–500 kcmil (4)	120–300	TA1200NB1

### Neutral Kits, Insulated and Groundable

Max. Enclosure Rating (Amperes)	Main Lug Number Size Cu/Al	Ground Lug Size Cu/Al	Catalog Number
100	(1) 14–1/0	(1) 14–1/0	INK100
250	(1) 6–350 kcmil	(1) 4–300 kcmil	INK250
400	(1) 4–750 kcmil or (2) 1/0–250 kcmil	(1) 4–300 kcmil	INK400
600	(2) 250–500 kcmil	(1) 4–300 kcmil	INK600
1200	(3) 1/0 to 750 kcmil or (4) 1/0 to 750 kcmil	(1) 6–250 kcmil	INK1200

### Internal Accessories

#### Auxiliary Switch ②

Breaker Frame	Factory Mounted	1A-1B		2A-2B	
		Field Kit Catalog Number	Factory Mounted	Field Kit Catalog Number	Factory Mounted
FG ③	A06	A1X1PK	A13	A2X1RPK	
KG	A06	A1X3PK	A13	A2X3PK	
NG	A06	A1X5PK	A13	A2X5PK	

#### Shunt Trip ②

Breaker Frame	Rating	Factory Mounted	Field Kit Catalog Number
FG ③	12–24 Vdc	S02	SNT1LP03K
KG	12–24 Vdc	S42	SNT3P04K
NG	12–24 Vdc	S02	SNT5LP03K

#### Notes

- ① Package of three terminals.
- ② Other accessories are available. Same as standard frame breakers.
- ③ Field installation on the FG Frame is not UL listed.

#### Technical Data and Specifications

2

#### UL 489 Interrupting Capacity Ratings

Volts AC (50/60 Hz)	Interrupting Capacity (Symmetrical Amperes)
240	18,000
480	14,000
600	10,000

#### IEC 947-2 Interrupting Capacity Ratings

Volts AC (50/60 Hz)	Interrupting Capacity (Symmetrical Amperes)
220, 240	18,000/9,000
380, 415	14,000/7,000
660, 690	18,000/9,000 14,000/7,000 10,000/5,000

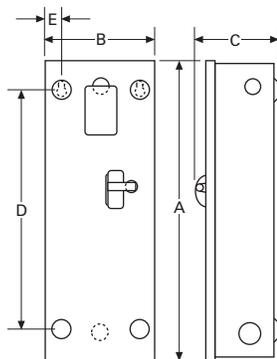
#### Dimensions and Weights

Approximate Dimensions in Inches (mm)

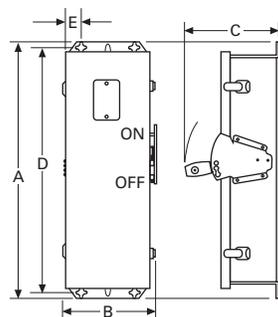
#### Enclosure Selection Data

Breaker Frame Amperes	Enclosure Type Class	A	B	C	D	E	Approx. Weight Lb (kg)	Conduit Sizes, Inches	Catalog Number
FG 15–225	Type 1	23.25 (590.6)	8.41 (213.6)	6.28 (159.5)	18.75 (476.3)	1.20 (30.5)	15 (7)	0.25, 0.50, 0.75, 1, 1.25, 1.50, 2, 2.50	SFDN225
	Type 3R	25.66 (651.8)	8.84 (224.7)	9.31 (236.5)	24.28 (616.7)	1.70 (43.2)	19 (9)	0.25, 0.50, 0.75, 1, 1.25, 1.50, 2, 2.50	RFDN225
	Type 12	25.66 (651.8)	8.84 (224.7)	9.31 (236.5)	24.28 (616.7)	1.70 (43.2)	18 (8)	—	JFDN225
KG 300–400	Type 1	38.81 (985.8)	11.06 (280.9)	10.94 (277.9)	34.00 (863.6)	2.28 (57.9)	53 (24)	0.25, 0.50, 0.75, 1.50, 2, 2.50, 3, 3.50	SKDN400
	Type 3R	41.69 (1058.9)	11.75 (298.5)	14.06 (357.1)	39.90 (1013.5)	1.97 (50.0)	60 (27)	0.25, 0.50, 0.75, 2.50, 3, 3.50	RKDN400
	Type 12	41.69 (1058.9)	11.75 (298.5)	14.06 (357.1)	39.90 (1013.5)	1.97 (50.0)	53 (24)	—	JKDN400
NG 700–1200	Type 1	61.22 (1555.0)	21.44 (544.6)	15.41 (391.4)	61.84 (1570.7)	1.97 (50.0)	178 (81)	—	SNDN1200
	Type 3R	63.59 (1615.2)	22.00 (558.8)	17.63 (447.8)	61.84 (1570.7)	1.97 (50.0)	175 (79)	—	RNDN1200
	Type 12	63.59 (1615.2)	22.00 (558.8)	17.63 (447.8)	61.84 (1570.7)	1.97 (50.0)	170 (77)	—	JNDN1200

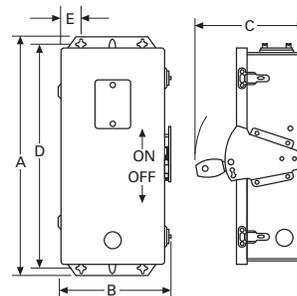
#### Type 1 Surface Mounted



#### Type 3R Rainproof



#### Type 12, 12K Dustproof



## Direct Current Circuit Breakers



## Direct Current Circuit Breakers

## Product Description

DC (direct current) systems and applications are becoming commonplace as alternative energy sources have expanded and the number of DC devices and data centers using DC power has swelled.

Eaton offers molded case circuit breakers and switches to meet circuit protection and switching requirements for a host of different DC end user requirements. Applications include UPS battery supply circuits, solar systems and electric vehicle charging, as well as commercial and industrial distribution.

Current ratings are available from 15 to 3000 A, with a full scale of voltage and interrupting ratings to address needs ranging from standard to the highest performance. Optional internal accessories provide remote tripping and indication of breaker status.

The DC breaker family is UL 489 listed and exceeds the requirements in UL 489 Supplement SC for UPS applications. Eaton breakers may be applied in both ungrounded and select grounded applications, with poles connected in series to operate at the maximum voltages shown on **Page V4-T2-386**. To use DC circuit breakers on 600 V grounded systems, three poles in series must be connected on the ungrounded leg.

## Contents

## Description

	<i>Page</i>
Engine Generator Circuit Breakers . . . . .	<b>V4-T2-379</b>
Direct Current Circuit Breakers	
Catalog Number Selection . . . . .	<b>V4-T2-387</b>
Product Selection . . . . .	<b>V4-T2-388</b>
Accessories . . . . .	<b>V4-T2-393</b>
Wiring Diagrams . . . . .	<b>V4-T2-395</b>
Dimensions . . . . .	<b>V4-T2-396</b>
PVGard Solar Circuit Breakers—	
1000 Vdc Poles-in-Series . . . . .	<b>V4-T2-397</b>
E <sup>2</sup> Mining Service Circuit Breakers . . . . .	<b>V4-T2-407</b>

All DC breakers use the same internal and external accessories as their corresponding Series C and Series G AC frame equivalents, except for the NBDC breaker, which uses the same internal and external accessories as the standard NB frame.

The HFDDC through HMDLDC and EG to RG DC breakers use the same internal and external accessories as their corresponding Series C and Series G AC Frame equivalents. NBDC uses the same internal and external accessories as standard NB breakers.

Many of the Eaton AC molded case circuit breakers carry 250 Vdc ratings for ungrounded systems. Refer to **Pages V4-T2-156** and **V4-T2-225** for these interrupting tables.

## Quick Reference Direct Current Circuit Breakers

## UL 489 Interrupting Capacity Ratings

Interrupting Capacity (kA)  
Volts DC <sup>①</sup>

Circuit Breaker Type	Maximum Amperes	Interrupting Capacity (kA)								
		125	Poles in Series	250 <sup>②</sup>	Poles in Series	500	600	Poles in Series	750 <sup>②</sup>	Poles in Series
EGEDC	100	10	1	35	2	35	—	3	—	—
EGSDC	100	35	1	42	2	50	—	3	—	—
EGHDC	100	42	1	50	2	65	—	3	—	—
HFDDC	225	42	1	50	2	—	42	3	42	4
HJDDC	250	42	1	50	2	—	42	3	—	—
HKDDC	400	42	1	50	2	—	42	3	—	—
HLDDC	600	42	1	50	2	—	35	3	—	—
HLDDC <sup>③</sup>	1200	42	1	50	2	—	—	—	—	—
HMDLDC	800	42	1	50	2	—	35	3	—	—
NBDC	1200	42	1	50	2	—	50	3	—	—
RGHDC	3000	42	1	50	2	—	65	3	—	—

## IEC 60947-2 Interrupting Capacity Ratings

Circuit Breaker Type	Maximum Amperes	125 Volts DC		Poles in Series	250 Volts DC		Poles in Series	600 Volts DC		Poles in Series
		Icu	Ics		Icu	Ics		Icu	Ics	
EGEDC	100	10	10	1	10	10	2	—	—	—
EGSDC	100	35	35	1	35	35	2	—	—	—
EGHDC	100	42	42	1	42	42	2	—	—	—
HJDDC	250	—	—	—	—	—	—	20	10	3
HLDDC	600	—	—	—	—	—	—	20	10	3
HMDLDC	800	—	—	—	—	—	—	20	10	3

**Notes**

<sup>①</sup> DC ratings apply to substantially non-inductive circuits. Time constants per UL 489.

<sup>②</sup> EGEDC through HMDLDC have been tested up to 300 Vdc to allow for battery charging voltages. 750 Vdc is common in transportation applications.

HFDDC, four-pole 750 Vdc is available up to 150 A maximum. 300 Vdc and 750 Vdc are not UL 489 listed voltage ratings.

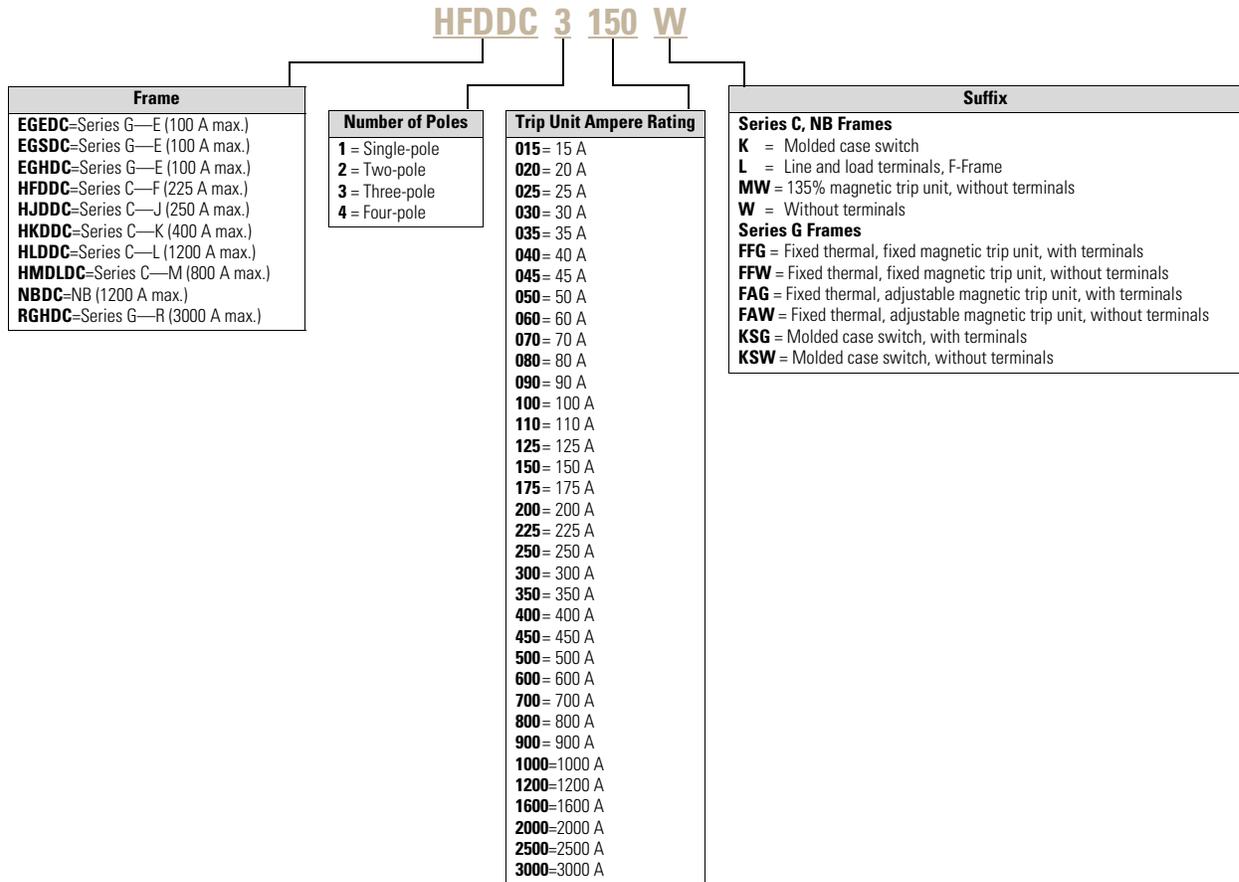
<sup>③</sup> Four-pole frame with two-poles connected in parallel.

See **Page V4-T2-395** for series connection diagrams. Use NEC rated cable to connect/short poles in series as shown.

### Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

#### DC Circuit Breaker



## Product Selection

2

**Type EGEDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 35 kAIC at 500 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker with Terminals Catalog Number	Complete Circuit Breaker without Terminals Catalog Number
25	EGEDC3025FFG	EGEDC3025FFW
30	EGEDC3030FFG	EGEDC3030FFW
35	EGEDC3035FFG	EGEDC3035FFW
40	EGEDC3040FFG	EGEDC3040FFW
45	EGEDC3045FFG	EGEDC3045FFW
50	EGEDC3050FFG	EGEDC3050FFW
60	EGEDC3060FFG	EGEDC3060FFW
70	EGEDC3070FFG	EGEDC3070FFW
80	EGEDC3080FFG	EGEDC3080FFW
90	EGEDC3090FFG	EGEDC3090FFW
100	EGEDC3100FFG	EGEDC3100FFW

**Type EGHDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 65 kAIC at 500 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker with Terminals Catalog Number	Complete Circuit Breaker without Terminals Catalog Number
25	EGHDC3025FFG	EGHDC3025FFW
30	EGHDC3030FFG	EGHDC3030FFW
35	EGHDC3035FFG	EGHDC3035FFW
40	EGHDC3040FFG	EGHDC3040FFW
45	EGHDC3045FFG	EGHDC3045FFW
50	EGHDC3050FFG	EGHDC3050FFW
60	EGHDC3060FFG	EGHDC3060FFW
70	EGHDC3070FFG	EGHDC3070FFW
80	EGHDC3080FFG	EGHDC3080FFW
90	EGHDC3090FFG	EGHDC3090FFW
100	EGHDC3100FFG	EGHDC3100FFW

**Type EGSDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 50 kAIC at 500 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker with Terminals Catalog Number	Complete Circuit Breaker without Terminals Catalog Number
25	EGSDC3025FFG	EGSDC3025FFW
30	EGSDC3030FFG	EGSDC3030FFW
35	EGSDC3035FFG	EGSDC3035FFW
40	EGSDC3040FFG	EGSDC3040FFW
45	EGSDC3045FFG	EGSDC3045FFW
50	EGSDC3050FFG	EGSDC3050FFW
60	EGSDC3060FFG	EGSDC3060FFW
70	EGSDC3070FFG	EGSDC3070FFW
80	EGSDC3080FFG	EGSDC3080FFW
90	EGSDC3090FFG	EGSDC3090FFW
100	EGSDC3100FFG	EGSDC3100FFW

## HFDDC


**Type HFDDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 42 kAIC at 600 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker with Line and Load Terminals <sup>①</sup>			
	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number	Four-Pole Catalog Number
15	HFDDC1015L	HFDDC2015L	HFDDC3015L	HFDDC4015L
20	HFDDC1020L	HFDDC2020L	HFDDC3020L	HFDDC4020L
25	HFDDC1025L	HFDDC2025L	HFDDC3025L	HFDDC4025L
30	HFDDC1030L	HFDDC2030L	HFDDC3030L	HFDDC4030L
35	HFDDC1035L	HFDDC2035L	HFDDC3035L	HFDDC4035L
40	HFDDC1040L	HFDDC2040L	HFDDC3040L	HFDDC4040L
45	HFDDC1045L	HFDDC2045L	HFDDC3045L	HFDDC4045L
50	HFDDC1050L	HFDDC2050L	HFDDC3050L	HFDDC4050L
60	HFDDC1060L	HFDDC2060L	HFDDC3060L	HFDDC4060L
70	HFDDC1070L	HFDDC2070L	HFDDC3070L	HFDDC4070L
80	HFDDC1080L	HFDDC2080L	HFDDC3080L	HFDDC4080L
90	HFDDC1090L	HFDDC2090L	HFDDC3090L	HFDDC4090L
100	HFDDC1100L	HFDDC2100L	HFDDC3100L	HFDDC4100L
110	HFDDC1110L	HFDDC2110L	HFDDC3110L	HFDDC4110L
125	HFDDC1125L	HFDDC2125L	HFDDC3125L	HFDDC4125L
150	HFDDC1150L	HFDDC2150L	HFDDC3150L	HFDDC4150L
175	—	HFDDC2175L	HFDDC3175L	—
200	—	HFDDC2200L	HFDDC3200L	—
225	—	HFDDC2225L	HFDDC3225L	—

## HJDDC3250


**Type HJDDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 42 kAIC at 600 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only <sup>②</sup> Catalog Number	Thermal-Magnetic Trip Unit Catalog Number	Standard Terminals Catalog Number
70	HJDDC3250F	JT3070T	TA250KB
90	HJDDC3250F	JT3090T	TA250KB
100	HJDDC3250F	JT3100T	TA250KB
125	HJDDC3250F	JT3125T	TA250KB
150	HJDDC3250F	JT3150T	TA250KB
175	HJDDC3250F	JT3175T	TA250KB
200	HJDDC3250F	JT3200T	TA250KB
225	HJDDC3250F	JT3225T	TA250KB
250	HJDDC3250F	JT3250T	TA250KB

**Notes**

① For breaker without terminals, replace "L" with "W" at end of catalog number.

② For complete breaker, order individual frame, trip unit and terminals for field installation.

HKDCC3400



**Type HKDCC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 42 kAIC at 600 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only ① Catalog Number	Thermal-Magnetic Trip Unit Catalog Number	Standard Terminals Catalog Number
100	HKDCC3400F	KT3100T	TA300K
125	HKDCC3400F	KT3125T	TA300K
150	HKDCC3400F	KT3150T	TA300K
175	HKDCC3400F	KT3175T	TA300K
200	HKDCC3400F	KT3200T	TA300K
225	HKDCC3400F	KT3225T	TA300K
250	HKDCC3400F	KT3250T	TA350K
300	HKDCC3400F	KT3300T	TA350K
350	HKDCC3400F	KT3350T	TA350K
400	HKDCC3400F	KT3400T	3TA400K ②

HLDDC



**Type HLDDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 35 kAIC at 600 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only ① Catalog Number	Thermal-Magnetic Trip Unit Catalog Number	Standard Terminals Catalog Number
300	HLDDC3600F	LT3300T	TA602LD
350	HLDDC3600F	LT3350T	TA602LD
400	HLDDC3600F	LT3400T	TA602LD
450	HLDDC3600F	LT3450T	TA602LD
500	HLDDC3600F	LT3500T	TA602LD
600	HLDDC3600F	LT3600T	3TA603LDK ②

**Type HLDDC DC Circuit Breakers—  
Two-Pole High Interrupting Capacity 50 kAIC at 250 Vdc ③④**

Maximum Continuous Ampere Rating at 40 °C	Complete Breaker Catalog Number
600	HLDDC20600
700	HLDDC20700
800	HLDDC20800
900	HLDDC20900
1000	HLDDC21000
1200	HLDDC21200

**Notes**

- ① For complete breaker, order individual frame, trip unit and terminals for field installation.
- ② Three-pole kit.
- ③ Includes breaker frame, trip unit and terminals.
- ④ Four-pole breaker with two poles wired in parallel.

## HMDLDC3800F


**Type HMDLDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 35 kAIC at 600 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only Catalog Number	Thermal-Magnetic Trip Unit Catalog Number	Standard Terminals Catalog Number
300	HMDLDC3800F	MT3300T	TA700MA1
350	HMDLDC3800F	MT3350T	TA700MA1
400	HMDLDC3800F	MT3400T	TA700MA1
450	HMDLDC3800F	MT3450T	TA700MA1
500	HMDLDC3800F	MT3500T	TA700MA1
600	HMDLDC3800F	MT3600T	TA700MA1
700	HMDLDC3800F	MT3700T	TA700MA1
800	HMDLDC3800F	MT3800T	TA800MA2

**Type NBDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 50 kAIC at 600 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker Factory Assembled without Terminals Catalog Number	Includes Magnetic Trip Unit Calibrated at 135%	Standard Terminals Catalog Number
700	NBDC3700MW	Included	TA1000NB1
800	NBDC3800MW	Included	TA1000NB1
900	NBDC3900MW	Included	TA1000NB1
1000	NBDC31000MW	Included	TA1000NB1
1200	NBDC31200MW	Included	TA1200NB1

## RGHDC3300FFWM


**Type RGHDC DC Circuit Breakers—  
Three-Pole High Interrupting Capacity 65 kAIC at 600 Vdc**

Maximum Continuous Ampere Rating at 40 °C	Complete Circuit Breaker Factory Assembled <sup>①</sup>		Includes Magnetic Trip Unit Calibrated at 135%
	Imperial Termination Threading Catalog Number	Metric Termination Threading Catalog Number	
1600	RGHDC3160FFWE	RGHDC3160FFWM	Included
2000	RGHDC3200FFWE	RGHDC3200FFWM	Included
2500	RGHDC3250FFWE	RGHDC3250FFWM	Included
3000	RGHDC3300FFWE	RGHDC3300FFWM	Included

**Note**

① Six rear connectors included as standard that match terminal threading.

## DC Breaker Terminal Wire Ranges

Breaker Frame	Maximum Breaker Ampacity	Terminal Body Material	Wire Type	AWG Wire Range/ Number of Conductors	Metric Wire Range mm <sup>2</sup>	Number of Terminals Included	Standard Terminal Catalog Number
EGEDC, EGSDC, EGHDC	100	Aluminum	Cu/Al	14–1/0	2.5–50	3	3TA125EF
HFDDC	20	Steel	Cu/Al	14–10 (1)	2.5–4 (1)	3	3T20FB
	100	Steel	Cu/Al	14–1/0 (1)	2.5–50 (1)	3	3T100FB
	225	Aluminum	Cu/Al	4–4/0 (1)	25–95 (1)	3	3TA225FD
HJDDC	250	Aluminum	Cu/Al	4–350 kcmil (1)	25–185 (1)	1	TA250KB
HKDDC	225	Aluminum	Cu/Al	3–350 kcmil (1)	35–185 (1)	1	TA300K
	350	Aluminum	Cu/Al	250–500 kcmil (1)	120–240 (1)	1	TA350K
	400	Aluminum	Cu/Al	3/0–250 kcmil (2)	95–120 (1)	3	3TA400K
HLDDC	500	Aluminum	Cu/Al	3/0–350 kcmil (2)	95–150 (2)	1	TA602LD
	600	Aluminum	Cu/Al	400–500 kcmil (2)	185–240 (2)	3	3TA603LDK
HMDLDC	600	Aluminum	Cu/Al	1–500 kcmil (2)	—	1	TA700MA1
	800	Aluminum	Cu/Al	3/0–400 kcmil (3)	—	1	TA800MA2
NBDC	700	Aluminum	Cu/Al	3/0–400 kcmil (3)	95–185 (3)	1	TA1000NB1
	800	Aluminum	Cu/Al	3/0–400 kcmil (3)	95–185 (3)	1	TA1000NB1
	900	Aluminum	Cu/Al	3/0–400 kcmil (3)	95–185 (3)	1	TA1000NB1
	1000	Aluminum	Cu/Al	3/0–400 kcmil (3)	95–185 (3)	1	TA1000NB1
	1200	Aluminum	Cu/Al	4/0–500 kcmil (4)	120–240 (4)	1	TA1200NB1

**Note:** RGHDC breakers include six rear connectors as standard.

## Molded Case Switches

Eaton's DC molded case switches are used in applications requiring a compact, high-capacity disconnect. They are UL 489 listed and have automatic high instantaneous current protection. These devices do not provide overload protection.

## Molded Case Switches

Maximum Continuous Ampere Rating at 40 °C	Interrupting Capacity (Volts DC)	Poles in Series	With Line and Load Terminals	Without Line and Load Terminals
			Catalog Number	Catalog Number
<b>600 Vdc Maximum</b>				
100	42	3	HFDDC3100KL	HFDDC3100KW
150	42	3	HFDDC3150KL	HFDDC3150KW
225	42	3	HFDDC3225KL	HFDDC3225KW
250	42	3	HJDDC3250K	HJDDC3250KW
400	35	3	HKDDC3400K	HKDDC3400KW
600	35	3	HLDDC3600K	HLDDC3600WK
800	35	3	HMDLDC3800K	HMDLDC3800WK
<b>500 Vdc Maximum</b>				
100	65	3	EGK3100KSG	EGK3100KSW
<b>250 Vdc Maximum</b>				
100	50	2	HFDDC2100KL	HFDDC2100KW
150	50	2	HFDDC2150KL	HFDDC2150KW
225	50	2	HFDDC2225KL	HFDDC2225KW
1200	50	①	HLDDC21200K ①	HLDDC21200WK ①

## Note

① Four-pole frame with two-pole connected in parallel.

## Accessories

## Internal Accessories

Description	Factory Installation (HFDDC)	Field Installation Kits							
		HFDDC ①	EGEDC, EGSDC, EGHDC	HJDDC	HKDDC	HLDDC	HMDLDC	NBDC	RGHDC
<b>Right-Pole Mounting</b>									
Auxiliary switch									
1A-1B	A06	A1X1PK	AUX1A1BPK	A1X2PK	A1X3PK	A1X4PK	A1X4PK	4980D16G05	—
2A-2B	A13	A2X1RPK	AUX2A2BPK	A2X2PK	A2X3PK	A2X4PK	A2X4PK	4980D16G06	A2X6RPK
Alarm switch									
1 make/1 break	B06	A1L1RPK	ALM1M1BEPK	A1L2RPK	A1L3RPK	A1L4RPK	A1L4RPK	—	A1L6RPK
Auxiliary and alarm combo									
1A-1B, 1 make/1 break	C05	AAL1RPK	AUXALRMEPK	AAL2RPK	AAL3RPK	AA114RPK	AA114RPK	—	—
<b>Left-Pole Mounting</b>									
Shunt trip									
12 Vdc	S02	SNT1LP03K	SNT012CPK	SNT2P04K	SNT3P04K	SNT4LP03K	SNT4LP03K	2606D58G14	—
24 Vdc	S02	SNT1LP03K	SNT024CPK	SNT2P04K	SNT3P04K	SNT4LP03K	SNT4LP03K	2606D58G13	SNT6P03K ②
48 Vdc	S06	SNT1LP08K	SNT4860CPK	SNT2P06K	SNT3P06K	SNT4LP23K	SNT4LP23K	2606D58G12	SNT6P23K ②
60 Vdc	S06	SNT1LP08K	SNT4860CPK	SNT2P06K	SNT3P06K	SNT4LP23K	SNT4LP23K	2606D58G11	SNT6P23K ②
125 Vdc	S10	SNT1LP12K	SNT120CPK	SNT2P11K	SNT3P11K	SNT4LP26K	SNT4LP26K	2606D58G10	SNT6P23K ②
250 Vdc	S14	SNT1LP18K	—	SNT2P14K	SNT3P14K	SNT4LP14K	SNT4LP14K	2606D58G09	SNT6P14K
120 Vac	S06	SNT1LP12K	SNT120CPK	SNT2P11K	SNT3P11K	SNT4LP11K	SNT4LP11K	2060D58G05	SNT6P11K ②
Undervoltage release									
12 Vdc	U30	UVH1LP20K	UVR012DPK	UVH2LP20K	UVH3LP20K	UVH4LP20K	UVH4LP20K	372D032G06	UVH6RP20K ②
24 Vdc	U34	UVH1LP21K	UVR024DPK	UVH2LP21K	UVH3LP21K	UVH4LP21K	UVH4LP21K	372D032G07	UVH6RP21K ②
48 Vdc	U38	UVH1LP22K	UVR048DPK	UVH2LP22K	UVH3LP22K	UVH4LP22K	UVH4LP22K	372D032G08	UVH6RP23K ②
125 Vdc	U42	UVH1LP26K	UVR125DPK	UVH2LP26K	UVH3LP26K	UVH4LP26K	UVH4LP26K	372D032G09	UVH6RP26K ②
250 Vdc	U46	UVH1LP28K	UVR250DPK	UVH2LP28K	UVH3LP28K	UVH4LP28K	UVH4LP28K	372D032G10	UVH6RP28K ②
120 Vac	U14	UVH1LP08K	UVR120APK	UVH2LP08K	UVH3LP08K	UVH4LP08K	UVH4LP08K	373D632G05	UVH6RP08K ②

**Notes**

- ① F-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.
- ② Right-pole mounted.

One accessory can be mounted per pole, per breaker. Factory installation of accessories is available. Contact Eaton for assistance with part number configuration.

**Jumpers**

Jumpers must be ordered separately. Priced individually.

2

**HFDDC Frame**

Description	Maximum Amperes	Catalog Number
Single copper jumper	60	DC1F060 <sup>①</sup>
	100	DC1F100 <sup>①</sup>
	125	DC1F125 <sup>①</sup>
	225	DC1F225 <sup>①</sup>
Package of 2 aluminum jumpers	100	DC2FD100A
Package of 3 aluminum jumpers	100	DC3FD100A

**HKDDC Frame**

Description	Maximum Amperes	Catalog Number
Single copper jumper	400	DC1K400 <sup>①</sup>
Package of 2 aluminum jumpers	400	DC2KD400A <sup>①</sup>
Package of 3 aluminum jumpers	400	DC3KD400A <sup>①</sup>

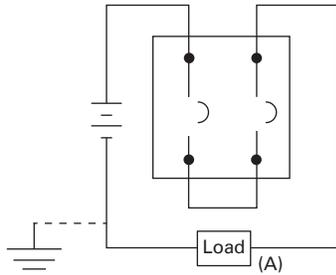
**Note**

<sup>①</sup> Not UL Listed; Non UL listed jumpers used in a UL application may need to be qualified by the OEM in their assembly. This may take place with UL or another certified testing agency.

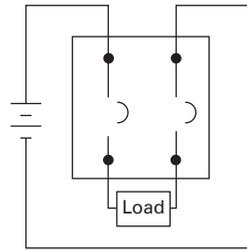
**Wiring Diagrams**

**Series Connection Diagrams for DC Application ①②**

**250 Vdc Maximum—Two Poles in Series**

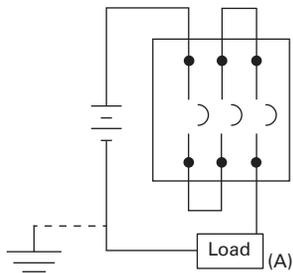


Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.

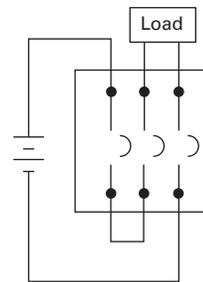


Suitable for use on ungrounded systems only.

**500 Vdc or 600 Vdc Maximum—Three Poles in Series**

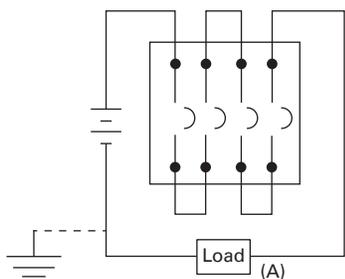


Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.

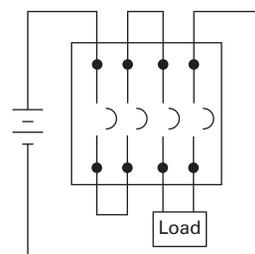


Suitable for use on ungrounded systems only.

**750 Vdc Maximum—Four Poles in Series**



Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.



Suitable for use on ungrounded systems only.

**Notes**

- ① Poles in series connection is customer supplied. Use rated cable per NEC.
- ② For grounded systems, all poles in series must be connected on non-grounded terminal, with load connected to grounded terminal.

**Dimensions**

Approximate Dimensions in Inches (mm)

## 2

**DC Breaker Dimensions**

Frame	Number of Poles	Width	Height	Depth
EGEDC, EGSDC, EGHDC	3	3.00 (76.2)	5.50 (139.7)	2.99 (75.9)
HFDDC	1	1.38 (35.1)	6.00 (152.4)	3.38 (86.0)
	2	2.75 (70.0)	6.00 (152.4)	3.38 (86.0)
	3	4.13 (105.0)	6.00 (152.4)	3.38 (86.0)
	4	5.50 (139.7)	6.00 (152.4)	3.38 (86.0)
HJDDC	2, 3	4.13 (105.0)	10.00 (254.0)	4.06 (103.1)
HKDDC	2, 3	5.50 (139.7)	10.13 (257.3)	4.10 (104.1)
600 A Max. HLDDC	2, 3	8.25 (209.6)	10.75 (273.1)	4.06 (103.1)
1200 A Max. HLDDC	4	11.00 (279.4)	10.75 (273.1)	4.06 (103.1)
HMDLDC	2, 3	8.25 (209.6)	16.00 (406.4)	4.06 (103.1)
NBDC	3	8.25 (209.6)	16.00 (406.4)	5.50 (139.7)
RGHDC	3	15.50 (393.7)	16.00 (406.4)	9.75 (247.7)

## PVGard Solar Photovoltaic Circuit Breakers



1000 Vdc Poles-in-Series

## Contents

**Description**

	<b>Page</b>
Engine Generator Circuit Breakers . . . . .	<b>V4-T2-379</b>
Direct Current Circuit Breakers . . . . .	<b>V4-T2-385</b>
PVGard Solar Circuit Breakers— 1000 Vdc Poles-in-Series	
Application Description . . . . .	<b>V4-T2-398</b>
Features . . . . .	<b>V4-T2-398</b>
Standards and Certifications . . . . .	<b>V4-T2-398</b>
Product Selection . . . . .	<b>V4-T2-399</b>
Accessories . . . . .	<b>V4-T2-400</b>
Technical Data and Specifications . . . . .	<b>V4-T2-404</b>
Dimensions . . . . .	<b>V4-T2-406</b>
Wiring Diagrams . . . . .	<b>V4-T2-406</b>
E <sup>2</sup> Mining Service Circuit Breakers . . . . .	<b>V4-T2-407</b>

**PVGard Solar Circuit Breaker—1000 Vdc Poles-in-Series****Product Overview**

- Two PVGard™ lineups
  - 600 Vdc per-pole breaker and switch. Each pole rated 600 Vdc
  - 1000 Vdc poles-in-series breaker and switch. Requires poles in series connection
- UL 489B listed for solar photovoltaic circuit protection
- 50 °C calibration
- Offers both 100% and 80% rated breakers
- Handle bi-directional current flow

**Product Description**

Photovoltaic (PV) systems convert the energy of the sun into electrical power that is fed directly into the electric grid. Within the balance of system (BOS), direct current (DC) circuit breakers protect the wiring connected from the PV modules to the combiner or the inverter, while also behaving as a disconnect.

Eaton is a global leader in circuit protection and brings this expertise to bear in the photovoltaic market. PVGard solar circuit breakers are part of a product family that combines a disconnect with circuit protection in a single, compact, resettable device to protect and isolate DC circuits as needed in photovoltaic systems. PVGard breakers can replace fuses, fuse holders and disconnects in combiner box and inverter applications—saving space, streamlining design, purchasing and receiving, and reducing spare parts requirements.

**PVGard 1000 Vdc Poles-in-Series Lineup**

This 1000 Vdc poles-in-series lineup provides reliable and safe disconnect means and overcurrent protection in a single, compact device for commercial and utility scale PV systems. This solution does not require jumpers with the breaker/switch to be a UL 489B listed device, providing reliability and flexibility in design without limitation on implementation of the breaker/switch. If needed, cost-effective Eaton jumpers can be included.

**Application Description**

Photovoltaic (PV) systems convert the energy of the sun into electrical power that is fed directly into the electric grid. PVGuard circuit breakers are used to protect the wiring from the modules to the combiner box or inverter from overcurrents, and to provide an isolation mechanism.

**Features**

PVGard breakers are uniquely designed with these features:

- Meets the higher voltage and lower fault current levels of solar systems
- Tested to extreme ambient conditions from  $-40\text{ }^{\circ}\text{C}$  to  $+90\text{ }^{\circ}\text{C}$
- Full complement of accessories for status, signaling, and on/off operation remotely
- Can handle bi-directional flow of current
- Can be applied in grounded, ungrounded or bi-polar systems
- Meets and exceeds the standards of UL 489B for photovoltaic molded case circuit breakers and molded case switches
- Available both standard (80%-rated) and 100%-rated breakers
- $50\text{ }^{\circ}\text{C}$  calibration
- Ability to open on signal from DC arc or ground fault detector
- Wide range of current ratings increases options for matching incoming strings
- Eliminates fuse stocking costs and matching issues

Designed specifically for high- and low-temperature demands of PV installations, PVGuard circuit breakers undergo extreme ambient cycling tests, and carry a robust operating temperature range. Trip units calibrate at 100% and 80% of nameplate current in a  $50\text{ }^{\circ}\text{C}$  ambient, ensuring continuous operation in higher temperature environments typical to solar.

Rigorous third-party testing includes limited and standard fault current tests, electrical and mechanical endurance, dielectric voltage withstand and temperature tests. Eaton's PVGuard products are stand-alone devices without requiring jumpers to be UL 489B listed devices.

PVGard breakers are available with a full complement of accessories to provide string status, enable remote trip, on/off operation, and can be customized to site requirements.

**Standards and Certifications**

- Designed to meet UL 489B for solar photovoltaic circuit protection
- UL File E350638, Category Control Number DIUR



**Product Selection**

Catalog number includes breaker frame and trip unit. Order terminals separately. See **Page V4-T2-402**.

**FD PV Frame****FD PV Frame, 100 A Maximum, 1000 Vdc, 3 kA** ①

Current Rating Amperes	Poles in Series	Trip Unit	80% Rated Catalog Number	100% Rated Catalog Number
30	4	Fixed thermal, fixed magnetic	FDPV4030W	CFDPV4030W
40	4	Fixed thermal, fixed magnetic	FDPV4040W	CFDPV4040W
50	4	Fixed thermal, fixed magnetic	FDPV4050W	CFDPV4050W
60	4	Fixed thermal, fixed magnetic	FDPV4060W	CFDPV4060W
70	4	Fixed thermal, fixed magnetic	FDPV4070W	CFDPV4070W
80	4	Fixed thermal, fixed magnetic	FDPV4080W	CFDPV4080W
90	4	Fixed thermal, fixed magnetic	FDPV4090W	CFDPV4090W
100	4	Fixed thermal, fixed magnetic	FDPV4100W	CFDPV4100W

**KD PV Frame****KD PV Frame, 350 A Maximum, 1000 Vdc, 5 kA** ①

Current Rating Amperes	Poles in Series	Trip Unit	80% Rated Catalog Number	100% Rated Catalog Number
125	4	Fixed thermal, fixed magnetic	KDPV4125W	CKDPV4125W
150	4	Fixed thermal, fixed magnetic	KDPV4150W	CKDPV4150W
175	4	Fixed thermal, fixed magnetic	KDPV4175W	CKDPV4175W
200	4	Fixed thermal, fixed magnetic	KDPV4200W	CKDPV4200W
225	4	Fixed thermal, fixed magnetic	KDPV4225W	CKDPV4225W
250	4	Fixed thermal, fixed magnetic	KDPV4250W	CKDPV4250W
300	4	Fixed thermal, fixed magnetic	KDPV4300W	CKDPV4300W
350	4	Fixed thermal, fixed magnetic	KDPV4350W	CKDPV4350W

**LG PV Frame****LG PV Frame, 400 A Maximum, 1000 Vdc, 5 kA** ①

Current Rating Amperes	Poles in Series	Trip Unit	80% Rated Catalog Number	100% Rated Catalog Number
250	4	Fixed thermal, fixed magnetic	LGPV4250W	CLGPV4250W
300	4	Fixed thermal, fixed magnetic	LGPV4300W	CLGPV4300W
350	4	Fixed thermal, fixed magnetic	LGPV4350W	CLGPV4350W
400	4	Fixed thermal, fixed magnetic	LGPV4400W	CLGPV4400W

**MDL PV Frame****MDL PV Frame, 600 A Maximum, 1000 Vdc, 7.5 kA** ①

Current Rating Amperes	Poles in Series	Trip Unit	80% Rated Catalog Number	100% Rated Catalog Number
300	3	Fixed thermal, fixed magnetic	MDLPV3300W	CMDLPV3300W
350	3	Fixed thermal, fixed magnetic	MDLPV3350W	CMDLPV3350W
400	3	Fixed thermal, fixed magnetic	MDLPV3400W	CMDLPV3400W
450	3	Fixed thermal, fixed magnetic	MDLPV3450W	CMDLPV3450W
500	3	Fixed thermal, fixed magnetic	MDLPV3500W	CMDLPV3500W
600	3	Fixed thermal, fixed magnetic	MDLPV3600W	CMDLPV3600W

**Note**

① Terminals not included with frames.

## Accessories

## 2

## Available Accessories

- Auxiliary switch
- Shunt trip
- Electrical operator
- Alarm lockout
- Undervoltage release
- Terminals
- Lock-off devices
- End cap kits
- Rotary handle mechanisms
- Flexible shaft handle mechanisms

## Optional modifications

- Freeze testing

For complete internal and external accessories, see the accessory section of each frame.

## External Accessories

Description	Frame	Catalog Number
<b>Imperial Base Mounting Hardware</b>		
0.164-32 x 1.5-inch pan-head steel screws and lockwashers	FD PV	<b>BMH1</b>
0.250-20 x 1.5 inch pan-head steel screws and lockwashers	KD PV	<b>BMH3</b>
—	LG PV	N/A
0.3125-18 x 1.25 inch filister-head steel screws and lockwashers and flat washers	MDL PV	<b>BMH5</b>
<b>Metric Base Mounting Hardware</b>		
M4-0.7 x 38 mm pan-head steel screws and lockwashers	FD PV	<b>BMH1M</b>
M6-0.7 x 38 mm pan-head steel screws and lockwashers	KD PV	<b>BMH3M</b>
—	LG PV	Included <sup>①</sup>
M8-1.25 x 35 mm pan-head steel screws and lockwashers	MDL PV	<b>BMH5M</b>
<b>Interphase Barriers</b>		
	FD PV	<b>IPB1</b>
	KD PV	<b>IPB3</b>
	LG PV	<b>IPB3</b>
	MDL PV	<b>IPB4</b>
<b>Non-Padlockable Handle Block</b>		
	FD PV	<b>LKD1</b>
	KD PV	<b>LKD3</b>
	LG PV	N/A
	MDL PV	<b>LKD4</b>
<b>Padlockable Handle Lock Hasp <sup>②</sup></b>		
	FD PV	<b>PLK1</b>
	KD PV	<b>PLK3</b>
	LG PV	<b>LPHL</b>
	MDL PV	<b>HLK4</b>

Factory Modifications—Freeze Testing to -40 °C <sup>③</sup>

Frame	Modification Code
FD PV	F01
KD PV	F01
LG PV	F01
MDL PV	F01
Special calibration—contact Eaton for availability	

## Molded Case Switches

Eaton's DC molded case switches (MCS) are used in applications requiring a compact, high capacity disconnect. PVGard 1000 Vdc MCS are UL 489B listed and have automatic instantaneous current protection. These devices do not provide overload protection.

## Molded Case Switches

Maximum Continuous Ampere Rating at 50 °C	Interrupting Capacity Vdc	Poles in Series	Catalog Number
<b>1000 Vdc Maximum</b>			
100	3000	4	<b>FDPV4100KW</b>
200	5000	4	<b>KDPV4200KW</b>
250	5000	4	<b>KDPV4250KW</b>
350	5000	4	<b>KDPV4350KW</b>
400	5000	4	<b>LGPV4400KSW</b>
600	7500	3	<b>MDLPV3600KSW</b>

## Notes

- <sup>①</sup> Base mounting hardware is included with a circuit breaker or a molded case switch (included with breaker). If required separately, order 66A2546G02.
- <sup>②</sup> Locks in ON and OFF position.
- <sup>③</sup> Add 20% to list price.

## Internal Accessories—Right Pole Mounting

	FD PV <sup>①</sup>		KD PV		LG PV		MDL PV	
	Factory Modification Code	Field Kit Catalog Number	Factory Modification Code	Field Kit Catalog Number	Factory Modification Code	Field Kit Catalog Number	Factory Modification Code	Field Kit Catalog Number
<b>Auxiliary Switch</b>								
1A-1B	A06	A1X1PK	A06	A1X3PK	A1	AUX1A1BPK	A06	A1X4PK
2A-2B	A13	A2X1RPK	A13	A2X3PK	A2	AUX2A2BPK	A13	A2X4PK
<b>Alarm Switch</b>								
1 make/1 break	B06	A1L1RPK	B06	A1L3RPK	B1	ALM1M1BJPK	B06	A1L4RPK
<b>Auxiliary and Alarm Combo</b>								
1A-1B, 1 make/1 break	C05	AAL1RPK	C05	AAL3RPK	B2	AUXALRMJPK	C05	AA114RPK

## Internal Accessories—Left Pole Mounting

	FD PV <sup>①</sup>		KD PV		LG PV		MDL PV	
	Factory Modification Code	Field Kit Catalog Number	Factory Modification Code	Field Kit Catalog Number	Factory Modification Code	Field Kit Catalog Number	Factory Modification Code	Field Kit Catalog Number
<b>Shunt Trip</b>								
12 Vdc	S02	SNT1LP03K	S42	SNT3P04K	S4	SNT012CPK	S02	SNT4LP03K
24 Vdc	S02	SNT1LP03K	S42	SNT3P04K	S6	SNT024CPK	S02	SNT4LP03K
48 Vdc	S06	SNT1LP08K	S50	SNT3P06K	S7	SNT4860CPK	S86	SNT4LP23K
60 Vdc	S06	SNT1LP08K	S50	SNT3P06K	S7	SNT4860CPK	S86	SNT4LP23K
125 Vdc	S10	SNT1LP12K	S10	SNT3P11K	S2	SNT120CPK	S42	SNT4LP26K
250 Vdc	S14	SNT1LP18K	S14	SNT3P14K	—	—	S14	SNT4LP14K
120 Vac	S10	SNT1LP12K	S10	SNT3P11K	S2	SNT120CPK	S10	SNT4LP11K
<b>Undervoltage Release</b>								
12 Vdc	U30	UVH1LP20K	T02	UVH3LP20K	U1	UVR012DPK	T02	UVH4LP20K
24 Vdc	U34	UVH1LP21K	T02	UVH3LP21K	U2	UVR024DPK	T06	UVH4LP21K
48 Vdc	U38	UVH1LP22K	T10	UVH3LP22K	U4	UVR048DPK	T10	UVH4LP22K
60 Vdc	—	—	—	—	—	—	—	—
125 Vdc	U42	UVH1LP26K	T14	UVH3LP26K	U6	UVR125DPK	T14	UVH4LP26K
250 Vdc	U46	UVH1LP28K	T18	UVH3LP28K	U8	UVR250DPK	T18	UVH4LP28K
120 Vac	U14	UVH1LP08K	U18	UVH3LP08K	U5	UVR120APK	U18	UVH4LP08K

**Notes**

<sup>①</sup> Underwriters Laboratories requires that internal accessories for the FD PV be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

One accessory can be mounted per pole, per breaker.

## PV Gard Solar Circuit Breaker Terminal Offering

2

Breaker Frame	Maximum Breaker Ampacity	Terminal Body Material	Wire Type	AWG Wire Range/ Number of Conductors	Metric Wire Range mm <sup>2</sup>	Number of Terminals Included	Standard Terminal Catalog Number	Comments
FD PV	50	Steel	Cu/Al	14–4 (1)	2.5–25 (1)	3	3TA50FB	
	100	Aluminum	Cu/Al	6–300 kcmil (1)	16–150 (1)	3	3TA225FDK3	Includes 3P terminal cover
	100	Aluminum	Cu/Al	6–300 kcmil (1)	16–150 (1)	3	3TA225FDK	Includes 3P terminal cover Replacement use only
	100	Copper	Cu	4–4/0 (1)	25–95 (1)	3	3T225FD	
KD PV	225	Aluminum	Cu/Al	3–350 kcmil (1)	35–185 (1)	1	TA300K	
	250	Aluminum	Cu/Al	250–500 kcmil (1)	120–240 (1)	1	TA350K	
	250	Aluminum	Cu/Al	3/0–250 kcmil (2)	95–120 (1)	4	4TA400K	Contains interphase barriers
	250	Aluminum	Cu/Al	2/0–250 kcmil (2) or 2/0–500 kcmil (1)	70–240 (2)	4	4TA401K	
	300	Aluminum	Cu/Al	3/0–250 kcmil (2)	95–120 (2)	4	4TA401K	Contains interphase barriers
	350	Aluminum	Cu/Al	3/0–250 kcmil (2)	95–120 (2)	4	4TA401K	Contains interphase barriers
	225	Copper	Cu	3–350 kcmil (1)	35–185 (1)	1	T300K	
	250	Copper	Cu	250–500 kcmil (1)	120–240 (1)	1	T350K	
	250	Copper	Cu	3/0–250 kcmil (2)	95–120 (1)	4	4TA400K	Contains interphase barriers
	300	Copper	Cu	3/0–250 kcmil (2)	95–120 (2)	4	4TA401K	Contains interphase barriers
	350	Copper	Cu	3/0–250 kcmil (2)	95–120 (2)	4	4TA401K	Contains interphase barriers
LG PV	400	Aluminum	Cu/Al	2–500 kcmil (2)	35–240 (2)	4	4TA632LK	Includes 4P terminal cover
	250	Copper	Cu	2–500 kcmil (1)	35–240 (1)	1	T350LK	
	400	Copper	Cu	2–500 kcmil (2)	35–240 (2)	4	4T632LK	Includes 4P terminal cover
MDL PV	300	Aluminum	Cu/Al	1–500 kcmil (2)	—	1	TA700MA1	
	600	Aluminum	Cu/Al	3/0–400 kcmil (3)	—	1	TA800MA2	

## Endcap Kits

Breaker Frame	Number of Poles	Thread Type	Thread Size	Catalog Number
FD PV	4	Imperial	10–32	KPEK14
	4	Metric	M–5	KPEKM14
KD PV	4	Imperial	0.312–18	KPEK34
	4	Metric	M–8	KPEKM34
LG PV	4	Imperial	—	N/A
	4	Metric	M–10	L4RTWK
MDL PV	3	Imperial	—	—
	3	Metric	—	—

**Jumpers**

Jumpers must be ordered separately. Priced individually.

**FD PV Frame**

Description	Maximum Amperes	Catalog Number
Single copper jumper	60	DC1F060
	100	DC1F100
	125	DC1F125
	225	DC1F225

**KD PV Frame**

Description	Maximum Amperes	Catalog Number
Single copper jumper	400	DC1K400

**LG PV Frame**

Description	Maximum Amperes	Catalog Number
Package of 2 aluminum jumpers	400	DC2LG400A
Package of 3 aluminum jumpers	400	DC3LG400A
Package of 30 aluminum jumpers	400	DC30LG400A

**Technical Data and Specifications**

- Thermal-magnetic circuit breakers
- Designed to meet UL 489B for solar photovoltaic circuit protection
- 100% rated of the continuous current rating
- 50 °C calibrated
- Can be applied in grounded, ungrounded or bi-polar systems
- Ability to open on signal from DC arc or ground fault detector
- UL File EE350638, Category Control Number DIUR
- 1000 Vdc poles-in-series breaker and switch
  - Requires poles in series connection

**Quick Reference PVGard Solar Circuit Breakers  
1000 Vdc Poles-in-Series****PVGard 1000 Vdc Current Ratings by Frame  
UL 489B Interrupting Capacity (kA) 1000 Vdc**

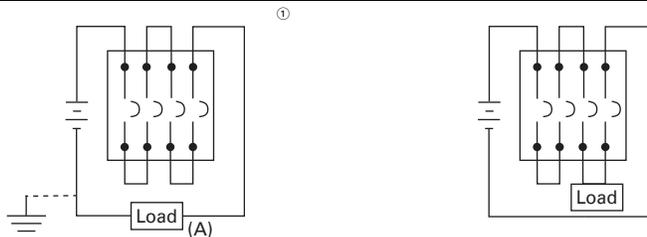
<b>Circuit Breaker Type</b>	<b>Minimum Amperes</b>	<b>Maximum Amperes</b>	<b>kA Rating</b>	<b>Poles in Series</b>
FD PV	30	100	3	4
KD PV	125	350	5	4
LG PV	250	400	5	4
MDL PV	300	600	7.5	3

### PVGard 1000 Vdc Solar PV Circuit Breakers (100% and 80% Rated Frames)

	FD PV	KD PV	LG PV	MDL PV
Number of poles	4	4	4	3
Maximum voltage rating	1000 Vdc	1000 Vdc	1000 Vdc	1000 Vdc
Maximum current rating	100 A	350 A	400 A	600 A
Interrupting capacity at 1000 Vdc	3 kA	5 kA	5 kA	7.5 kA
Time constant	1 ms	1 ms	1 ms	1 ms
Ampere range	15–100 A	125–350 A	250–400 A	300–600 A
Trip unit type	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Rated impulse withstand voltage				
Main conducting paths	8 kV	8 kV	8 kV	8 kV
Auxiliary circuits	4 kV	4 kV	4 kV	4 kV
Endurance				
Mechanical operations	10,000	10,000	8000	8000
Electrical operations	1000	400	400	400
Maximum switching frequency	300 per hour	240 per hour	240 per hour	240 per hour
Third-party certification	UL 489B	UL 489B	UL 489B	UL 489B
Environment				
Design ambient temperature	50 °C	50 °C	50 °C	50 °C
Maximum current at 60 °C, as % of rated current	91%	91%	93%	93%
Maximum current at 70 °C, as % of rated current	88%	88%	88%	88%
Operating temperature range	–20 °C to +50 °C			
Storage temperature range	–20 °C to +70 °C			
Suitable for freeze temperatures to –40 °C	Option	Option	Option	Option
Relative humidity	0 to 95% noncondensing			
Suitable for reverse-feed applications	Yes	Yes	Yes	Yes
Mounting—permissible mounting position				



Connection diagrams



#### Terminations

Al/Cu wire	#6–300 kcmil	(2) 3/0–250 kcmil	(2) #2–500 kcmil	(3) 3/0–400 kcmil
Cu wire	#4–4/0	(2) 3/0–250 kcmil	(2) #2–500 kcmil	(3) 3/0–300 kcmil
Dimensions in inches (mm)				
Height	6.00 (152.4)	10.13 (257.3)	10.13 (257.3)	16.00 (406.4)
Width	5.50 (139.7)	7.22 (183.4)	7.22 (183.4)	8.25 (209.5)
Depth	3.38 (85.9)	4.09 (103.9)	4.09 (103.9)	4.06 (103.1)
Weight in lb	6	20	20	29

#### Notes

- ① Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.
- ② Suitable for use on ungrounded systems only.

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

#### Dimensions

Approximate Dimensions in Inches (mm)

2

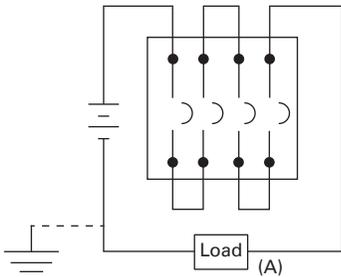
#### PVGard Solar Circuit Breakers—1000 Vdc Poles-in-Series

Frame	Number of Poles	Width	Height	Depth
FD PV	4	5.50 (139.7)	6.00 (152.4)	3.38 (86.0)
KD PV	4	7.22 (183.4)	10.13 (257.3)	4.09 (103.9)
LG PV	4	7.22 (183.4)	10.13 (257.3)	4.09 (103.9)
MDL PV	3	8.25 (209.6)	16.00 (406.4)	4.06 (103.1)

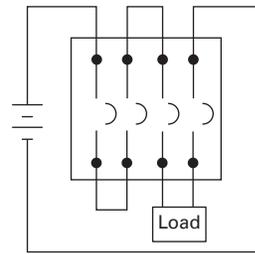
#### Wiring Diagrams

##### Series Connection Diagrams for DC Application ①②

##### FD PV, KD PV, LG PV—1000 Vdc Maximum—Four Poles-in-Series

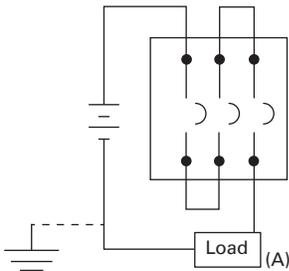


Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.

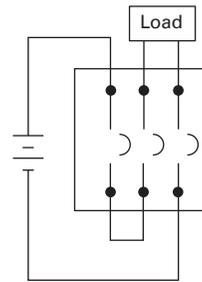


Suitable for use on ungrounded systems only.

##### MDL PV—1000 Vdc Maximum—Three Poles in Series



Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.



Suitable for use on ungrounded systems only.

#### Notes

- ① Poles in series connection is customer supplied. Use rated cable per NEC.
- ② For grounded systems, all poles in series must be connected on non-grounded terminal, with load connected to grounded terminal.

**E<sup>2</sup> Mining Service Breakers****E<sup>2</sup> Mining Service Breakers****Product Overview**

State-of-the-art E<sup>2</sup> mining service breakers incorporate the rigid specifications and testing procedures developed by a focus group led by engineers from several large coal companies and Eaton design engineers. Additionally, the performance of these breakers was proven and verified during hundreds of hours of field testing in harsh mine environments.

E<sup>2</sup> mining breakers are available in 600 Vac, I000Y/577 Vac and 1200 Vac. Interchangeable trip units can be used on either 600 or 1000 Vac frames.

The E<sup>2</sup> mining breaker family is designed especially for trailing cable application per MSHA 30 CFR 75. Field interchangeable electronic rms sensing trip units are available from 150 to 2000 amperes with instantaneous pickup settings conforming to the code of Federal Regulations 30 CFR 75.601-2. Electromechanical trip units are also available with a wide range of magnetic pickup ranges.

E<sup>2</sup> electronic trip units are the first to provide the mining industry with true rms sensing, made possible by the custom ASIC microprocessor in each electronic trip unit.

E<sup>2</sup> breakers are designed to be physically and electrically interchangeable with Classic Mining Service Breakers and supersede Series C<sup>®</sup> Mining Service Breakers. The table to the right outlines direct replacements.

**Contents****Description**

Description	Page
Engine Generator Circuit Breakers . . . . .	<b>V4-T2-379</b>
Direct Current Circuit Breakers . . . . .	<b>V4-T2-385</b>
PVGard Solar Circuit Breakers— 1000 Vdc Poles-in-Series . . . . .	<b>V4-T2-397</b>
E <sup>2</sup> Mining Service Breakers	
Catalog Number Selection . . . . .	<b>V4-T2-409</b>
Product Selection . . . . .	<b>V4-T2-413</b>
Accessories . . . . .	<b>V4-T2-424</b>
Dimensions . . . . .	<b>V4-T2-427</b>

**600 Vac Mining Breaker Replacement Chart**

Classic	Series C	E <sup>2</sup>
FBM	FDBM	E <sup>2</sup> F
HFBM	FDM	E <sup>2</sup> F
	HFDM (mag. only)	E <sup>2</sup> F
—	JDM	E <sup>2</sup> J
KAM	KDM	E <sup>2</sup> K
KAMH	KDM	E <sup>2</sup> K
LAM	LDM	E <sup>2</sup> L
LAMH	LDM	E <sup>2</sup> L
LCM	LDM	E <sup>2</sup> L
LCMH	LDM	E <sup>2</sup> L
MAM	—	E <sup>2</sup> M
MAMH	—	E <sup>2</sup> M
MCM	—	E <sup>2</sup> M
MCMH	—	E <sup>2</sup> M
NBM	—	E <sup>2</sup> N
NBMH	—	E <sup>2</sup> N
NCM	—	E <sup>2</sup> N
NCMH	—	E <sup>2</sup> N

**1000 Vac Mining Breaker Replacement Chart**

Classic	Series C	E <sup>2</sup> M
HFM	—	E <sup>2</sup> FM
—	JDCM	E <sup>2</sup> JM
HKAM	KDCM	E <sup>2</sup> KM
HLAM	LDCM	E <sup>2</sup> LM
HLCM	LDCM	E <sup>2</sup> LM
HMAM	—	E <sup>2</sup> MM
HMCM	—	E <sup>2</sup> MM
HNBM	—	E <sup>2</sup> NM
HNBMH	—	E <sup>2</sup> NM
HNCM	—	E <sup>2</sup> NM
HLCLM	—	E <sup>2</sup> NM
HPBM	—	E <sup>2</sup> RM ①

**Additional Information on Mining Breakers**

Source	Description
TD01217001E	E <sup>2</sup> Mining Circuit Breaker Dimensional Data
BR01217001E	E <sup>2</sup> Mining Circuit Breaker Brochure
TC01217001E	E <sup>2</sup> Mining Circuit Breaker Time Current Curves
<a href="http://www.eaton.com/mining">www.eaton.com/mining</a>	Mining and Metals

**Note**

① E<sup>2</sup>R/E<sup>2</sup>RM is a new frame physically different than the HPBM. See DS29-170MS.

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

2

Eaton's mining service circuit breakers provide short-circuit protection as specified in the code of Federal Regulations 30 CFR 75.601-2.

E<sup>2</sup> 225/400 A K frame and 400/600 A L frame electronic trip units feature specifically designed instantaneous pickup settings to conform exactly with the code of Federal Regulations 30 CFR 75.601-2. Electromechanical trip units are also available with a wide range of magnetic pickup ranges.

#### Interrupting Capacity Rating

Circuit Breaker Type	Interrupting Capacity (Symmetrical kA)					Vdc <sup>①</sup>
	Vac (50/60 Hz)					
	240	480	600	1000Y/577	1200	
E <sup>2</sup> F	65	35	18	—	—	10
E <sup>2</sup> J	65	35	18	—	—	10
E <sup>2</sup> K	65	35	25	—	—	10
E <sup>2</sup> LME	100	65	35	—	—	42
E <sup>2</sup> L	65	35	25	—	—	22
E <sup>2</sup> M	65	35	25	—	—	22
E <sup>2</sup> N	65	50	25	—	—	—
E <sup>2</sup> R	125	65	50	—	—	—
E <sup>2</sup> FM	65	25	18	10	—	10
E <sup>2</sup> JM	65	35	18	10	—	22
E <sup>2</sup> KM	65	35	25	14	—	10
E <sup>2</sup> LMZ	100	65	35	10	—	42
E <sup>2</sup> LM	—	35	25	18	—	22
E <sup>2</sup> MM	—	35	25	18	—	22
E <sup>2</sup> NM <sup>②</sup>	—	50	25	25	—	—
E <sup>2</sup> RM	—	65	50	25	—	—
E <sup>2</sup> KW	—	—	—	10	10	—
E <sup>2</sup> LW	—	—	—	10	10	—
E <sup>2</sup> MW	—	—	—	12	12	—

The tables below list the conductor size maximum allowable circuit breaker instantaneous setting and the E<sup>2</sup> breaker that meets that setting.

#### Trailing Cable Setting Per 30 CFR 75

Conductor Size	Maximum Breaker Instantaneous Setting	Maximum Ampere 75 °C Insulated Conductor	E <sup>2</sup> /E <sup>2</sup> M/E <sup>2</sup> W Instantaneous Only	Setting
14	50	15	E <sup>2</sup> K 150 A	A
12	75	20	E <sup>2</sup> K 150 A	B
10	150	30	E <sup>2</sup> K 150 A	C
8	200	50	E <sup>2</sup> K 225 A	A
6	300	65	E <sup>2</sup> K 225 A	B
4	500	85	E <sup>2</sup> K 225 A / E2L 400 A	C/A
3	600	100	E <sup>2</sup> K 225 A / E2L 400 A	D/B
2	800	115	E <sup>2</sup> K 225 A / E2L 400 A	E/C
1	1000	130	E <sup>2</sup> K 225 A / E2L 400 A	F/D
1/0	1250	150	E <sup>2</sup> K 225 A / E2L 400 A	G/E
2/0	1500	175	E <sup>2</sup> K 225 A / E2L 400 A	H/F
3/0	2000	200	E <sup>2</sup> L 400 A	G
4/0	2500	230	E <sup>2</sup> L 400 A	H
250	2500	255	E <sup>2</sup> L 400 A	H
300	2500	285	E <sup>2</sup> L 400 A	H
350	2500	310	E <sup>2</sup> L 400 A	H
400	2500	335	E <sup>2</sup> L 400 A	H
500	2500	380	E <sup>2</sup> L 400 A	H

#### Auxiliary Switch Electrical Rating Data

Maximum Voltage	Frequency	Maximum Current Amperes
600	50/60 Hz	6.0
125	DC	0.5 (non-inductive load)
250	DC	0.25 (non-inductive load)

#### Alarm (Signal/Lockout Switch) Electrical Rating Data

Maximum Voltage	Frequency	Maximum Current Amperes
600	50/60 Hz	6.0
125	DC	0.5 (non-inductive load)
250	DC	0.25 (non-inductive load)

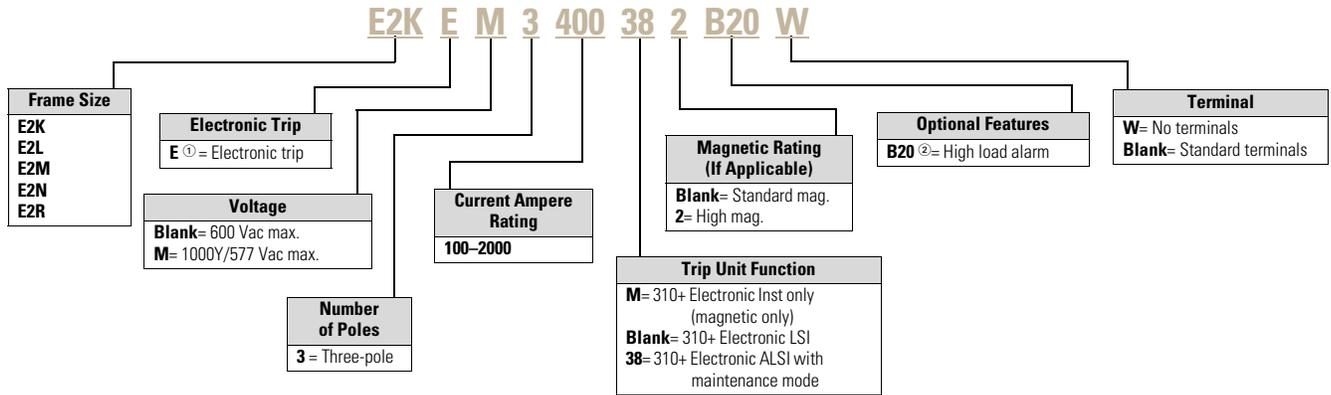
#### Notes

- ① Two poles in series. DC rating applies to breakers with thermal-magnetic trip unit. Breakers with electronic trip units are not DC rated.
- ② Series rated for application with Eaton's E<sup>2</sup>KM and E<sup>2</sup>LM breakers.

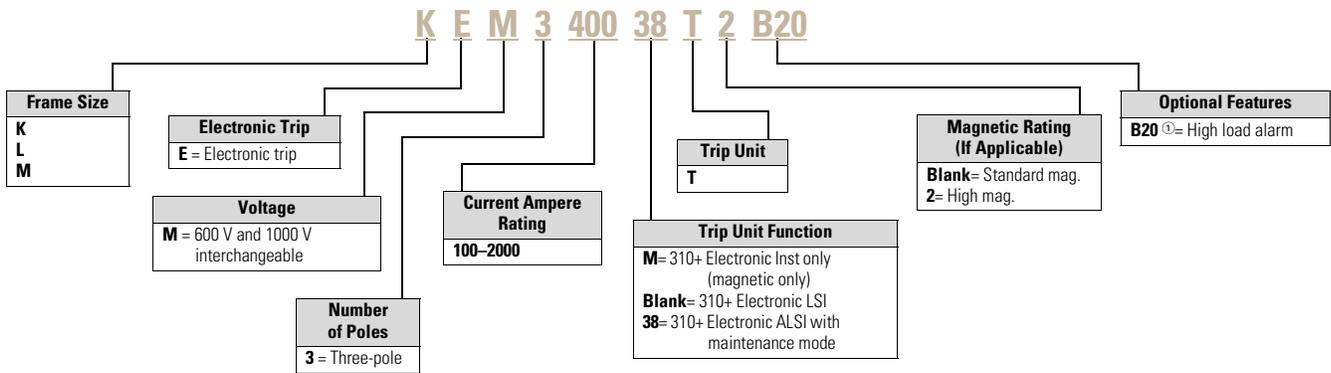
**Catalog Number Selection**

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

**E<sup>2</sup> Mining Service Breaker with 310+ Electronic Trip Unit Technology**



**E<sup>2</sup> Mining Service 310+ Electronic Trip Unit**



**Notes**

- ① All N- and R-Frame breakers equipped with 310+ Electronic Trip Unit. No "E" suffix required.
- ② Not available with instantaneous only.

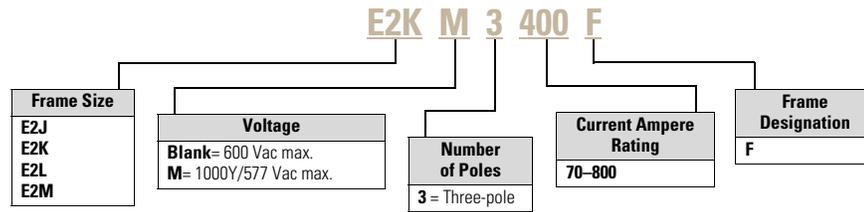
# 2.5

## Molded Case Circuit Breakers

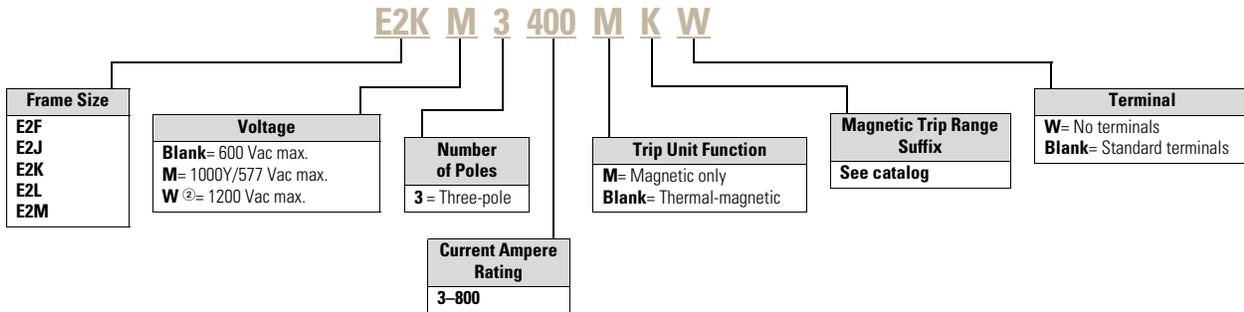
### Specialty Breakers

2

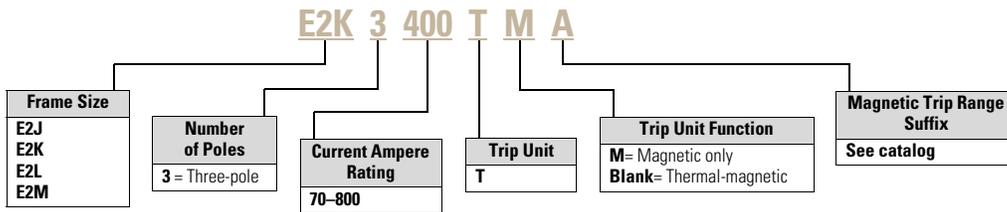
#### E<sup>2</sup> Mining Service Breaker Frame Only <sup>①</sup>



#### E<sup>2</sup> Mining Service Breaker with Thermal-Magnetic Trip Unit <sup>①</sup>



#### E<sup>2</sup> Mining Service Thermal-Magnetic Trip Unit <sup>①</sup>



#### Notes

- ① Does not apply to E2LME/LMZ.
- ② Only available in K-, L- and M-Frames.

## Undervoltage Release Mechanism Electrical Rating Data

Breaker Type	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
		Minimum	Maximum	Maximum	
E <sup>2</sup> F/E <sup>2</sup> FM	110 Vac	44.5	77	93.5	1.3
	120 Vac				1.5
	127 Vac				1.7
	110 Vdc				1.5
	120 Vdc				1.7
	125 Vdc				1.9
E <sup>2</sup> J/E <sup>2</sup> JM	110 Vac	44.5	77	93.5	1.8
	120 Vac				2.1
	127 Vac				2.4
	110 Vdc				1.6
	120 Vdc				1.9
	125 Vdc				2.2
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	110 Vac	44.5	77	93.5	1.8
	120 Vac				2.1
	127 Vac				2.4
	110 Vdc				1.6
	120 Vdc				1.9
	125 Vdc				2.2
E <sup>2</sup> LME/E <sup>2</sup> LMZ	110 Vac	44.5	77	93.5	0.96
	120 Vac				1.13
	127 Vac				1.25
	110 Vdc	43.8	77	93.5	0.94
	120 Vdc				1.12
	125 Vdc				1.21
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	110 Vac	44.5	77	93.5	1.8
	120 Vac				2.1
	127 Vac				2.4
	110 Vdc				1.6
	120 Vdc				1.9
	125 Vdc				2.2
E <sup>2</sup> N/E <sup>2</sup> NM	110 Vac	44.5	77	93.5	1.8
	120 Vac				2.1
	127 Vac				2.4
	110 Vdc				1.6
	120 Vdc				1.9
	125 Vdc				2.2
E <sup>2</sup> R/E <sup>2</sup> RM	110 Vac	44.5	77	93.5	3.3
	120 Vac				3.6
	127 Vac				3.8
	110 Vdc	43.8	77	93.5	3.3
	120 Vdc				3.6
	125 Vdc				3.8

#### Shunt Trip Electrical Rating Data

2

Breaker Type	Supply Voltage	Operating Voltage		
		Minimum	VA	
E <sup>2</sup> F/E <sup>2</sup> FM	48 Vac	33.6	92	
	60 Vac		140	
	110 Vac		480	
	120 Vac		570	
	127 Vac		640	
	208 Vac	146	180	
	220 Vac		200	
	230 Vac		240	
	48 Vdc		33.6	100
	60 Vdc			160
	110 Vdc	77		55
	120 Vdc			66
	125 Vdc			71
	E <sup>2</sup> J/E <sup>2</sup> JM	110 Vac	60.5	66
		120 Vac		84
127 Vac		102		
110 Vdc		77	112	
120 Vdc			138	
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	110 Vac	60	100	
	120 Vac		120	
	127 Vac		140	
	110 Vdc		77	110
	120 Vdc			130
	125 Vdc	140		
	24 Vac	41		
	48 Vac	18		139
	60 Vac		210	
	E <sup>2</sup> LME/E <sup>2</sup> LMZ	110 Vac	60	83
120 Vac		92		
127 Vac		117		
24 Vdc		18	120	
48 Vdc			475	
60 Vdc			720	
110 Vdc			82	99
120 Vdc				120
125 Vdc				121

Breaker Type	Supply Voltage	Operating Voltage		
		Minimum	VA	
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	48 Vac	34	830	
	60 Vac		1280	
	110 Vac		60	
	120 Vac		120	
	127 Vac		140	
	48 Vdc	34	710	
	60 Vdc		1105	
	110 Vdc		77	110
	120 Vdc			130
	125 Vdc			140
E <sup>2</sup> N/E <sup>2</sup> NM	110 Vac	60	100	
	120 Vac		120	
	127 Vac		140	
	110 Vdc		77	
E <sup>2</sup> R/E <sup>2</sup> RM	110 Vac	60.5	330	
	120 Vac		390	
	127 Vac		430	
	110 Vdc		77	
120 Vdc	440			
125 Vdc	480			

## Product Selection

3 A–150 A

E<sup>2</sup>F/E<sup>2</sup>FME<sup>2</sup>F/E<sup>2</sup>FMSealed Breakers with Non-Interchangeable Trip Unit—Include Line/Load Terminals, Non-Electronic Trip Units <sup>①</sup>

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole	1000Y/ 577 Vac Maximum 250 Vdc 10 kA at 1000 Vac Three-Pole
			Complete Breaker Catalog Number	Complete Breaker Catalog Number
<b>Thermal-Magnetic</b>				
15	—	—	E2F3015	—
20	—	—	E2F3020	E2FM3020
25	—	—	E2F3025	E2FM3025
30	—	—	E2F3030	—
35	—	—	E2F3035	—
40	—	—	E2F3040	E2FM3040
45	—	—	E2F3045	—
50	—	—	E2F3050	E2FM3050
60	—	—	E2F3060	E2FM3060
70	—	—	E2F3070	E2FM3070
80	—	—	E2F3080	E2FM3080
90	—	—	E2F3090	E2FM3090
100	—	—	E2F3100	E2FM3100
125	—	—	E2F3125	E2FM3125
150	—	—	E2F3150	E2FM3150
<b>Magnetic Only</b>				
3	9–30	—	E2F003AM	—
7	21–70	—	E2F007CM	—
15	45–150	—	E2F015EM	—
30	90–300	—	E2F030HM	—
	50–150	—	E2F030EM	—
50	150–500	—	E2F050KM	E2FM050KM
	66–190	—	E2F050YM	E2FM050YM
70	210–700	—	E2F070MM	E2FM070MM
100	150–500	—	E2F100KM	E2FM100KM
	300–1000	—	E2F100RM	E2FM100RM
150	450–1500	—	E2F150TM	E2FM150TM
	750–2500	—	E2F150UM	E2FM150UM

**Note**<sup>①</sup> For two-pole application, use outer poles.

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

70 A–250 A

E<sup>2</sup>J/E<sup>2</sup>JM

2

E<sup>2</sup>J/E<sup>2</sup>JM



#### Circuit Breakers with Interchangeable Non-Electronic Trip Units

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ①	1000V/ 577 Vac Maximum 250 Vdc 10 kA at 1000 Vac Three-Pole ②
			Complete Breaker Catalog Number	Complete Breaker Catalog Number
<b>Thermal-Magnetic</b>				
70	300–650	E2J3070T	E2J3070W	E2JM3070W
90	450–900	E2J3090T	E2J3090W	E2JM3090W
100	500–1000	E2J3100T	E2J3100W	E2JM3100W
125	625–1250	E2J3125T	E2J3125W	E2JM3125W
150	750–1500	E2J3150T	E2J3150W	E2JM3150W
175	875–1750	E2J3175T	E2J3175W	E2JM3175W
200	1000–2000	E2J3200T	E2J3200W	E2JM3200W
225	300–650	E2J3225TA	E2J3225AW	E2JM3225AW
	500–1000	E2J3225TD	E2J3225DW	E2JM3225DW
	1125–2250	E2J3225T	E2J3225W	E2JM3225W
250	1250–2500	E2J3250T	E2J3250W	E2JM3250W
<b>Magnetic Only</b>				
250	300–650	E2J3250TMA	E2J3250MAW	E2JM3250MAW
	450–900	E2J3250TMC	E2J3250MCW	E2JM250MCW
	500–1000	E2J3250TMD	E2J3250MDW	E2JM3250MDW
	625–1250	E2J3250TMF	E2J3250MFW	E2JM3250MFW
	750–1500	E2J3250TMG	E2J3250MGW	E2JM3250MGW
	875–1750	E2J3250TMJ	E2J3250MJW	E2JM3250MJW
	1000–2000	E2J3250TMK	E2J3250MKW	E2JM3250MKW
	1125–2250	E2J3250TML	E2J3250MLW	E2JM3250MLW
	1250–2500	E2J3250TM	E2J3250MW	E2JM3250MW

**Notes**

- ① Frame only: **E2J3250F**.
- ② Frame only: **E2JM3250F**.

100 A–400 A

E<sup>2</sup>K/E<sup>2</sup>KM/E<sup>2</sup>KWE<sup>2</sup>K/E<sup>2</sup>KM

## Circuit Breakers with Interchangeable Non-Electronic Trip Units

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ①	1000V/ 577 Vac Maximum 250 Vdc 14 kA at 1000 Vac Three-Pole ②	1200 Vac Maximum 10 kA at 1200 Vac Three-Pole ③④
			Complete Breaker Catalog Number	Complete Breaker Catalog Number	Complete Breaker Catalog Number
<b>Thermal-Magnetic</b>					
100	500–1000	E2K3100T	E2K3100W	E2KM3100W	E2KW3100W
125	625–1250	E2K3125T	E2K3125W	E2KM3125W	E2KW3125W
150	750–1500	E2K3150T	E2K3150W	E2KM3150W	E2KW3150W
175	875–1750	E2K3175T	E2K3175W	E2KM3175W	E2KW3175W
200	1000–2000	E2K3200T	E2K3200W	E2KM3200W	E2KW3200W
225	300–650	E2K3225TA	E2K3225AW	E2KM3225AW	E2KW3225AW
	500–1000	E2K3225TD	E2K3225DW	E2KM3225DW	E2KW3225DW
	1125–2250	E2K3225T	E2K3225W	E2KM3225W	E2KW3225W
250	1250–2500	E2K3250T	E2K3250W	E2KM3250W	E2KW3250W
300	1500–3000	E2K3300T	E2K3300W	E2KM3300W	E2KW3300W
320	1600–3200	—	—	—	E2KW3320W
350	1750–3500	E2K3350T	E2K3350W	E2KM3350W	E2KW3350W
400	2000–4000	E2K3400T	E2K3400W	E2KM3400W	—
<b>Magnetic Only</b>					
400	300–650	E2K3400TMA	E2K3400MAW	E2KM3250MAW	E2KW3250MAW
	500–1000	E2K3400TMD	E2K3400MDW	E2KM3400MDW	E2KW3350MDW
	625–1250	E2K3400TMF	E2K3400MFW	E2KM3400MFW	E2KW3350MFW
	750–1500	E2K3400TMG	E2K3400MGW	E2KM3400MGW	E2KW3350MGW
	875–1750	E2K3400TMJ	E2K3400MJW	E2KM3400MJW	E2KW3350MJW
	1000–2000	E2K3400TMK	E2K3400MKW	E2KM3400MKW	E2KW3350MKW
	1125–2250	E2K3400TML	E2K3400MLW	E2KM3400MLW	E2KW3350MLW
	1250–2500	E2K3400TMW	E2K3400MWW	E2KM3400MWW	E2KW3350MWW
	1500–3000	E2K3400TMN	E2K3400MNW	E2KM3400MNW	E2KW3350MNW
	1600–3200	—	—	—	E2KW3350MVW
	1750–3500	E2K3400TMR	E2K3400MRW	E2KM3400MRW	E2KW3350MRW
	2000–4000	E2K3400TM	E2K3400MW	E2KM3400MW	—

**Notes**

- ① Frame only: **E2K3400F**.  
 ② Frame only: **E2KM3400F**.  
 ③ 1200 V breakers are sold as “complete breakers” only.  
 ④ Maximum continuous ampere rating at 50 °C.

Please see TD01217001E for detailed dimensions.

100 A–400 A

E<sup>2</sup>KE/E<sup>2</sup>KEM

2

E<sup>2</sup>KM

## Circuit Breakers with Interchangeable Electronic Trip Units

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ①	1000Y/ 577 Vac Maximum 250 Vdc 14 kA at 1000 Vac Three-Pole ②
			Complete Breaker Catalog Number	Complete Breaker Catalog Number
<b>310+ Electronic Instantaneous Only</b>				
150	50–800	KEM3150TM	E2KE3150MW	E2KEM3150MW
225	200–1500	KEM3225TM	E2KE3225MW	E2KEM3225MW
	500–2500	KEM3225TM2	E2KE3225M2W	E2KEM3225M2W
400	200–1500	KEM3400TM	E2KE3400MW	E2KEM3400MW
	500–2500	KEM3400TM2	E2KE3400M2W	E2KEM3400M2W
<b>310+ Electronic LSI ③</b>				
100	50–800	KEM3100T	E2KE3100W	E2KEM3100W
125	50–800	KEM3125T	E2KE3125W	E2KEM3125W
150	50–800	KEM3150T	E2KE3150W	E2KEM3150W
200	200–1500	KEM3200T	E2KE3200W	E2KEM3200W
225	200–1500	KEM3225T	E2KE3225W	E2KEM3225
	500–2500	KEM3225T2	E2KE32252W	E2KEM32252W
400	200–1500	KEM3400T	E2KE3400W	E2KEM3400W
	500–2500	KEM3400T2	E2KE34002W	E2KEM34002W
<b>310+ Electronic ALSI with Maintenance Mode ③</b>				
100	50–800	KEM310038T	E2KE310038W	E2KEM310038W
125	50–800	KEM312538T	E2KE312538W	E2KEM312538W
150	50–800	KEM315038T	E2KE315038W	E2KEM315038W
200	200–1500	KEM320038T	E2KE320038W	E2KEM320038W
225	200–1500	KEM322538T	E2KE322538W	E2KEM322538
	500–2500	KEM322538T2	E2KE3225238W	E2KEM3225238W
400	200–1500	KEM340038T	E2KE340038W	E2KEM340038W
	500–2500	KEM340038T2	E2KE3400238W	E2KEM3400238W

**Notes**① Frame only: **E2K3400F**.② Frame only: **E2KM3400F**.③ For High Load Alarm option (B20): **E2KE340038B20W, KEM3400TB20**.

Please see TD01217001E for detailed dimensions.

## 160 A–400 A

*E<sup>2</sup>LME/E<sup>2</sup>LMZ (Series G)*

## Circuit Breakers

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ①	1000V/ 577 Vac Maximum 250 Vdc 14 kA at 1000 Vac Three-Pole ②
			Complete Breaker Catalog Number	Complete Breaker Catalog Number
<b>Magnetic Only</b>				
400	3600–4400	LT3400KM	E2LME3400KMW	E2LMZ3400KMW
<b>Interchangeable Electronic Trip Unit</b>				
160	320–1920	LT340031M	E2LME340031W	E2LMZ340031W
200	400–2400	LT340031M	E2LME340031W	E2LMZ340031W
225	450–2700	LT340031M	E2LME340031W	E2LMZ340031W
250	500–3000	LT340031M	E2LME340031W	E2LMZ340031W
300	600–3600	LT340031M	E2LME340031W	E2LMZ340031W
315	630–3780	LT340031M	E2LME340031W	E2LMZ340031W
350	700–4200	LT340031M	E2LME340031W	E2LMZ340031W
400	800–4800	LT340031M	E2LME340031W	E2LMZ340031W

**Notes**① Frame only: **E2LME3400NN**.② Frame only: **E2LMZ3400NN**.

Please see TD01217001E for detailed dimensions.

#### 300 A–600 A

E<sup>2</sup>L/E<sup>2</sup>LM/E<sup>2</sup>LW

2

#### Circuit Breakers with Interchangeable Non-Electronic Trip Units

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole <sup>①</sup> Complete Breaker Catalog Number	1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole <sup>②</sup> Complete Breaker Catalog Number	1200 Vac Maximum 10 kA at 1200 Vac Three-Pole <sup>③</sup> Complete Breaker Catalog Number
<b>Thermal-Magnetic</b>					
300	1500–3000	E2L3300T	E2L3300W	E2LM3300W	E2LW3300W
320	2250–4500	—	—	—	E2LW3320W
350	1600–3200	E2L3350T	E2L3350W	E2LM3350W	E2LW3350W
400	1750–3500	E2L3400T	E2L3400W	E2LM3400W	E2LW3400W
450	2000–4000	E2L3450T	E2L3450W	E2LM3450W	E2LW3450W
500	2500–5000	E2L3500T	E2L3500W	E2LM3500W	—
600	3000–6000	E2L3600T	E2L3600W	E2LM3600W	—
	1125–2250	E2L3600TL <sup>④</sup>	—	—	—
<b>Magnetic Only</b>					
450	1600–3200	—	—	—	E2LW3450MVW
	1125–2250	—	—	—	E2LW3450MLW
	1500–3000	—	—	—	E2LW3450MNW
	1750–3500	—	—	—	E2LW3450MRW
	2000–4000	—	—	—	E2LW3450MXW
	2250–4500	—	—	—	E2LW3450MYW
600	1125–2250	E2L3600TML	E2L3600MLW	E2LM3600MLW	—
	1500–3000	E2L3600TMN	E2L3600MNW	E2LM3600MNW	—
	1750–3500	E2L3600TMR	E2L3600MRW	E2LM3600MRW	—
	2000–4000	E2L3600TMX	E2L3600MXW	E2LM3600MXW	—
	2250–4500	E2L3600TMY	E2L3600MYW	E2LM3600MYW	—
	2500–5000	E2L3600TMP	E2L3600MPW	E2LM3600MPW	—
	3000–6000	E2L3600TM	E2L3600MW	E2LM3600MW	—

#### Notes

- ① Frame only: **E2L3600F**.
- ② Frame only: **E2LM3600F**.
- ③ Maximum continuous ampere rating at 50 °C.
- ④ 600 A thermal 1125–2250 T.A.

Please see TD01217001E for detailed dimensions.

300 A–600 A

E<sup>2</sup>LE/E<sup>2</sup>LEME<sup>2</sup>LM

## Circuit Breakers with Interchangeable Electronic Trip Units

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole <sup>①</sup> Complete Breaker Catalog Number	1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole <sup>②</sup> Complete Breaker Catalog Number
<b>310+ Electronic Instantaneous Only</b>				
400	500–2500	LEM3400TM	E2LE3400MW	E2LEM3400MW
	1000–4000	LEM3400TM2	E2LE3400M2W	E2LEM3400M2W
600	500–2500	LEM3600TM	E2LE3600MW	E2LEM3600MW
	2500–5000	LEM3600TM2	E2LE3600M2W	E2LEM3600M2W
<b>310+ Electronic LSI <sup>③</sup></b>				
300	500–2500	LEM3300T	E2LE3300W	E2LEM3300W
350	500–2500	LEM3350T	E2LE3350W	E2LEM3350W
400	500–2500	LEM3400T	E2LE3400W	E2LEM3400W
	1000–4000	LEM3400T2	E2LE34002W	E2LEM34002W
600	500–2500	LEM3600T	E2LE3600W	E2LEM3600W
	2500–5000	LEM3600T2	E2LE36002W	E2LEM36002W
<b>310+ Electronic ALSI with Maintenance Mode <sup>③</sup></b>				
300	500–2500	LEM330038T	E2LE330038W	E2LEM330038W
350	500–2500	LEM335038T	E2LE335038W	E2LEM335038W
400	500–2500	LEM340038T	E2LE340038W	E2LEM340038W
	1000–4000	LEM340038T2	E2LE3400238W	E2LEM3400238W
600	500–2500	LEM360038T	E2LE360038W	E2LEM360038W
	2500–5000	LEM360038T2	E2LE3600238W	E2LEM3600238W

**Notes**<sup>①</sup> Frame only: **E2L3600F**.<sup>②</sup> Frame only: **E2LM3600F**.<sup>③</sup> For High Load Alarm option (B20): **E2LE360038B20W, LEM3600TB20**.

Please see TD01217001E for detailed dimensions.

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

300 A— 800 A

E<sup>2</sup>M/E<sup>2</sup>MM/E<sup>2</sup>MW

2

E<sup>2</sup>M/E<sup>2</sup>MM/E<sup>2</sup>MW

#### Circuit Breakers with Interchangeable Non-Electronic Trip Units



Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole <sup>①</sup> Complete Breaker Catalog Number	1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole <sup>②</sup> Complete Breaker Catalog Number	1200 Vac Maximum 12 kA at 1200 Vac Three-Pole <sup>③④</sup> Complete Breaker Catalog Number
<b>Thermal-Magnetic</b>					
400	1000–2000	—	—	—	E2MW3400W
500	1250–2500	—	—	—	E2MW3500W
600	1500–3000	E2M3600TN	E2M3600W	E2MM3600W	E2MW3600W
630	1600–3200	—	—	—	E2MW3630W
800	2000–4000	E2M3800TX	E2M3800W	E2MM3800W	E2MW3800W
<b>Magnetic Only</b>					
800	1500–3000	E2M3800TMN	E2M3800MNW	E2MM3800MNW	E2MW3800MNW
	1600–3200	—	—	—	E2MW3800MVW
	2000–4000	E2M3800TMX	E2M3800MXW	E2MM3800MXW	E2MW3800MXW
	2500–5000	E2M3800TMP	E2M3800MPW	E2MM3800MPW	—
	3000–6000	E2M3800TMW	E2M3800MWW	E2MM3800MWW	—

**Notes**

- ① Frame only: **E2M3800F**.
- ② Frame only: **E2MM3800F**.
- ③ 1200 V breakers are sold as “complete breakers” only.
- ④ Maximum continuous ampere rating at 50 °C.

Please see TD01217001E for detailed dimensions.

800 A

**E<sup>2</sup>ME/E<sup>2</sup>MEM**E<sup>2</sup>MN

## Circuit Breakers with Interchangeable Electronic Trip Units

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole <sup>①</sup> Complete Breaker Catalog Number	1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole <sup>②</sup> Complete Breaker Catalog Number
<b>310+ Electronic Instantaneous Only</b>				
800	500–2500	MEM3800TM	E2ME3800MW	E2MEM3800MW
	1000–4000	MEM3800TM2	E2ME3800M2W	E2MEM3800M2W
<b>310+ Electronic LSI <sup>③</sup></b>				
800	500–2500	MEM3800T	E2ME3800W	E2MEM3800W
	1000–4000	MEM3800T2	E2ME38002W	E2MEM38002W
<b>310+ Electronic ALSI with Maintenance Mode <sup>③</sup></b>				
800	500–2500	MEM380038T	E2ME380038W	E2MEM380038W
	1000–4000	MEM380038T2	E2ME3800382W	E2MEM3800382W

**Notes**① Frame only: **E2M3800F**.② Frame only: **E2MM3800F**.③ For High Load Alarm option (B20): **E2ME380038B20W, MEM3800TB20**.

Please see TD01217001E for detailed dimensions.

400 A–1200 A

E<sup>2</sup>N/E<sup>2</sup>NM

2

E<sup>2</sup>NM

## Circuit Breakers with Non-Interchangeable Electronic Trip Units

Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole Complete Breaker Catalog Number	1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole Complete Breaker Catalog Number
<b>310+ Electronic Instantaneous Only</b>				
800	500–2500	—	E2N3800MW	E2NM3800MW
1200	1250–5000	—	E2N312MW	E2NM312MW
<b>310+ Electronic LSI <sup>①</sup></b>				
400	500–2500	—	E2N3400W	E2NM3400W
500	500–2500	—	E2N3500W	E2NM3500W
600	500–2500	—	E2N3600W	E2NM3600W
700	500–2500	—	E2N3700W	E2NM3700W
800	500–2500	—	E2N3800W	E2NM3800W
900	1250–5000	—	E2N3900W	E2NM3900W
1000	1250–5000	—	E2N310W	E2NM310W
1200	1250–5000	—	E2N312W	E2NM312W
<b>310+ Electronic ALSI with Maintenance Mode <sup>①</sup></b>				
400	500–2500	—	E2N340038W	E2NM340038W
500	500–2500	—	E2N350038W	E2NM350038W
600	500–2500	—	E2N360038W	E2NM360038W
700	500–2500	—	E2N370038W	E2NM370038W
800	500–2500	—	E2N380038W	E2NM380038W
900	1250–5000	—	E2N390038W	E2NM390038W
1000	1250–5000	—	E2N31038W	E2NM31038W
1200	1250–5000	—	E2N31238W	E2NM31238W

**Notes**

<sup>①</sup> For High Load Alarm option (B20): **E2N380038B20W**.

Please see TD01217001E for detailed dimensions.

1600 A–2000 A

*E<sup>2</sup>R/E<sup>2</sup>RM**E<sup>2</sup>RM*

## Circuit Breakers with Electronic Trip Units



Maximum Continuous Ampere Rating at 40 °C	Magnetic Trip Range	Trip Unit Only Catalog Number	600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole Complete Breaker Catalog Number	1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole Complete Breaker Catalog Number
<b>310+ Electronic LSI</b> <sup>①</sup>				
1600	2–8 x I <sub>n</sub>	—	<b>E2R316W</b>	<b>E2RM316W</b>
2000	2–8 x I <sub>n</sub>	—	<b>E2R320W</b>	<b>E2RM320W</b>
<b>310+ Electronic ALSI with Maintenance Mode</b> <sup>①</sup>				
1600	2–8 x I <sub>n</sub>	—	<b>E2R31638W</b>	<b>E2RM31638W</b>
2000	2–8 x I <sub>n</sub>	—	<b>E2R32038W</b>	<b>E2RM32038W</b>

**Notes**

<sup>①</sup> For High Load Alarm option (B20): **E2R1638B20W**.

Please see TD01217001E for detailed dimensions.

## Accessories

## 2

## Line and Load Terminals

Breaker Type	Maximum Breaker Amperes	Wire Type	AWG Wire Range (No. Conductors)	Catalog Number
E <sup>2</sup> F/E <sup>2</sup> FM	100	Cu/Al	#14–1/0 (1)	<b>3T100FB</b> (package of three)
	150	Cu	#4–4/0 (1)	<b>3T150FB</b> (package of three)
E <sup>2</sup> J/E <sup>2</sup> JM	250	Cu	#4–350 (1)	<b>T250KB</b>
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	225	Cu	#3–350 (1)	<b>T300K</b>
	350	Cu	250–500 (1)	<b>T350K</b>
	400	Cu	2/0–250 (2)	<b>3T400K</b> (three-pole kit)
E <sup>2</sup> LME/E <sup>2</sup> LMZ	400	Cu/Al	500–750 (1)	<b>3TA631LK</b>
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW	400	Cu/Al	4/0–600 (1)	<b>3TA401LDK</b> (three-pole kit)
	600	Cu	250–350 (2)	<b>T602LD</b>
E <sup>2</sup> M/E <sup>2</sup> MM/E <sup>2</sup> MW	600	Cu	(2) 2/0–500 kcmil	<b>T600MA1</b>
	600	Cu/Al	(2) 1–500 kcmil	<b>TA700MA1</b>
	800 std.	Cu/Al	(3) 3/0–400 kcmil	<b>TA800MA2</b>
	800	Cu/Al	(2) 500–750 kcmil	<b>TA801MA</b>
	800	Cu	(3) 3/0–300 kcmil	<b>T800MA1</b>
E <sup>2</sup> N/E <sup>2</sup> NM	700	Cu	2/0–500 (2)	<b>T700NB1</b>
	1000	Cu	3/0–500 (3)	<b>T1000NB1</b>
	1200	Cu	3/0–400 (4)	<b>T1200NB3</b>
	1600	Cu/Al	500–1000 (4)	<b>TA1600RD</b>
	2000	Cu/Al	2–600 (6)	<b>TA2000RD</b>

## End Cap Terminals—For Use with Ring Type Terminals

Breaker Type	Maximum Breaker Amperes	Catalog Number	Metric Catalog Number	Imperial
E <sup>2</sup> F/E <sup>2</sup> FM	150	<b>KPEK1</b>	<b>KPEMK1</b>	—
E <sup>2</sup> J/E <sup>2</sup> JM	250	<b>KPEK2</b>	<b>KPEMK2</b>	—
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	400	<b>KPEK3</b>	<b>KPEMK3</b>	—
E <sup>2</sup> LME/E <sup>2</sup> LMZ	400	—	<b>L3RTWK</b>	—
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW	600	<b>KPEK4</b>	<b>KPEMK4</b>	—

## External Accessories

## Padlockable Handle Lock Hasp

Breaker Type	Catalog Number
E <sup>2</sup> F/E <sup>2</sup> FM	<b>PLK1</b>
E <sup>2</sup> J/E <sup>2</sup> JM	<b>PLK3</b>
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	<b>PLK3</b>
E <sup>2</sup> LME/E <sup>2</sup> LMZ	<b>LPHL</b>
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW	<b>HLK4</b>
E <sup>2</sup> M/E <sup>2</sup> MM/E <sup>2</sup> MW	<b>HLK4</b>
E <sup>2</sup> N/E <sup>2</sup> NM	<b>PLK5</b>
E <sup>2</sup> R/E <sup>2</sup> RM	<b>HLK6</b>

## Internal Accessories

## Undervoltage Release ①

Breaker Type	UVR Type	Voltage Rating	Mounting Location	Catalog Number	Factory Modification Code
E <sup>2</sup> F/E <sup>2</sup> FM	Handle reset	208–240 Vac	Left pole	UVH1LP11K (thermal/magnetic only) ②	U18
	Handle reset	110–127 Vdc	Left pole	UVH1LP26K (thermal/magnetic only) ②	U42
E <sup>2</sup> J/E <sup>2</sup> JM	Handle reset	110–127 Vac	Left pole	UVH2LP08K ②	U18
	Handle reset	208–240 Vac	Left pole	UVH2LP11K ②	U22
	Handle reset	110–125 Vdc	Left pole	UVH2LP26K ②	T14
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	120 volt handle reset with LED	120 Vac	Left pole	UVM3LP08K ②③	U66
	120 volt handle reset with LED	120 Vac	Left pole	UVM3LP08KT ②④	U68
	Handle reset	110–127 Vac	Left pole	UVH3LP08K ②	U18
	Handle reset	208–240 Vac	Left pole	UVH3LP11K ②	U22
	Handle reset	110–125 Vdc	Left pole	UVH3LP26K ②	T14
E <sup>2</sup> LME/E <sup>2</sup> LMZ	Handle reset	110–127 Vac	Left pole	UVR120APK	U5
	Handle reset	110–125 Vdc	Left pole	UVR125DPK	U6
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/E <sup>2</sup> MM/ E <sup>2</sup> MW	120 volt handle reset with LED	120 Vac	Left pole	UVM4LP08K ②③	U66
	120 volt handle reset with LED	120 Vac	Left pole	UVM4LP08KT ②④	U68
	Handle reset	110–127 Vac	Left pole	UVH4LP08K ②	U18
	Handle reset	208–240 Vac	Left pole	UVH4LP11K ②	U22
	Handle reset	110–125 Vdc	Left pole	UVH4LP26K ②	T14
E <sup>2</sup> N/E <sup>2</sup> NM	120 volt handle reset with LED	120 Vac	Left pole	UVM5LP08K ③	U66
	120 volt handle reset with LED	120 Vac	Left pole	UVM5LT08K ④	U68
	Handle reset	110–127 Vac	Left pole	UVH5LP08K ②	U18
	Handle reset	208–240 Vac	Left pole	UVH5LP11K ②	U22
	Handle reset	110–125 Vdc	Left pole	UVH5LP26K ②	T14
E <sup>2</sup> R/E <sup>2</sup> RM	120 volt handle reset with LED	120 Vac	Right pole	UVM6RP08K ③⑤	U58
	Handle reset	110–127 Vac	Right pole	UVH6RP08K ⑤	U49
	Handle reset	208–240 Vac	Right pole	UVH6RP11K ⑤	U53
	Handle reset	110–125 Vdc	Right pole	UVH6RP26K ⑤	T33

## Notes

- ① Contact Eaton for internal accessory voltage ratings not listed.
- ② LH (RH also available).
- ③ Pigtail leads.
- ④ Terminal blocks.
- ⑤ RH only.

## Shunt Trip ①

Breaker Type	Voltage Rating	Mounting Location	Catalog Number	Factory Modification Code
E <sup>2</sup> F/E <sup>2</sup> FM	48–127 Vac or 48–60 Vdc	Left pole	<b>SNT1LP08K</b> ②	S06
	208–230 Vac or 110–127 Vdc	Left pole	<b>SNT1LP12K</b> ②	S10
E <sup>2</sup> J/E <sup>2</sup> JM	110–240 Vac or 110–125 Vdc	Left pole	<b>SNT2P11K</b> ③	S10
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	110–240 Vac or 110–125 Vdc	Left pole	<b>SNT3P11K</b> ③	S10
E2LME/E2LMZ	24 Vac/Vdc	Left pole	<b>SNT024CPK</b>	S6
	48–60 Vac/Vdc	Left pole	<b>SNT4860CPK</b>	S7
	110–240 Vac/Vdc	Left pole	<b>SNT120CPK</b>	S2
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	48–60 Vac	Left pole	<b>SNT4LP05K</b> ②	S06
	48–60 Vdc	Left pole	<b>SNT4LP23K</b> ②	S86
	110–240 Vac	Left pole	<b>SNT4LP11K</b> ②	S10
	110–125 Vdc	Left pole	<b>SNT4LP26K</b> ②	S42
E <sup>2</sup> N/E <sup>2</sup> NM	110–240 Vac	Left pole	<b>SNT5LP11K</b> ②	S10
	110–125 Vdc	Left pole	<b>SNT5LP26K</b> ②	S42
E <sup>2</sup> R/E <sup>2</sup> RM	110–240 Vac	Right pole	<b>SNT6P11K</b> ④	S29
	110–125 Vdc	Right pole	<b>SNT6P26K</b> ④	S45

## Auxiliary Switch

Breaker Type	Number of Sets of Contacts (1A and 1B)	Mounting Location	Catalog Number	Factory Modification Code
E <sup>2</sup> F/E <sup>2</sup> FM	1	Right	<b>A1X1PK</b>	A06
	2	Right	<b>A2X1RPK</b>	A13
E <sup>2</sup> J/E <sup>2</sup> JM	1	Right	<b>A1X2PK</b>	A06
	2	Right	<b>A2X2PK</b>	A13
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	1	Right	<b>A1X3PK</b>	A06
	2	Right	<b>A2X3PK</b>	A13
E <sup>2</sup> LME/E <sup>2</sup> LMZ	1	Right	<b>AUX1A1BPK</b>	A1
	2	Right	<b>AUX2A2BPK</b>	A2
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	1	Right	<b>A1X4PK</b>	A06
	2	Right	<b>A2X4PK</b>	A13
E <sup>2</sup> N/E <sup>2</sup> NM	1	Right	<b>A1X5PK</b>	A06
	2	Right	<b>A2X5PK</b>	A13
E <sup>2</sup> R/E <sup>2</sup> RM	2	Right	<b>A2X6RPK</b>	A12
	4	Right	<b>A4X6RPK</b>	A19

## Alarm (Signal/Lockout Switch)

Breaker Type	Number of Sets of Contacts (Make and Break)	Mounting Location	Catalog Number	Factory Modification Code
E <sup>2</sup> F/E <sup>2</sup> FM	1	Right	<b>A1L1LPK/A1L1RPK</b>	B06
	2	Right	<b>A2L1LPK/A2L1RPK</b>	B13
E <sup>2</sup> J/E <sup>2</sup> JM	1	Right	<b>A1L2LPK/A1L2RPK</b>	B06
E <sup>2</sup> K/E <sup>2</sup> KM/E <sup>2</sup> KW	1	Right	<b>A1L3LPK/A1L3RPK</b>	B06
	2	Right	<b>A2L3LPK/A2L3RPK</b>	B13
E <sup>2</sup> LME/E <sup>2</sup> LMZ	1	Right	<b>ALM1M1BJPK</b>	B1
	2	Right	<b>ALM2M2BJPK</b>	B3
E <sup>2</sup> L/E <sup>2</sup> LM/E <sup>2</sup> LW/E <sup>2</sup> M/ E <sup>2</sup> MM/E <sup>2</sup> MW	1	Right	<b>A1L4LPK/A1L4RPK</b>	B06
	2	Right	<b>A2L4LPK/A2L4RPK</b>	B13
E <sup>2</sup> N/E <sup>2</sup> NM	1	Right	<b>A1L5LPK/A1L5RPK</b>	B06
	2	Right	<b>A2L5LPK/A2L5RPK</b>	B13
E <sup>2</sup> R/E <sup>2</sup> RM	1	Right	<b>A1L6RPK</b>	B05
	2	Right	<b>A2L6RPK</b>	B12

## Notes

- ① Contact Eaton for internal accessory voltage ratings not listed.
- ② LH (RH also available).
- ③ LH or RH.
- ④ RH only.

**Dimensions**

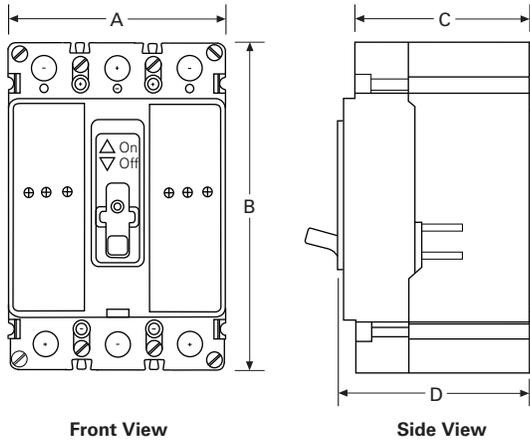
Approximate Dimensions in Inches (mm)

Please see TD01217001E for detailed dimensions.

**3 A–150 A**

**E<sup>2</sup>F/E<sup>2</sup>FM**

Sealed Breakers with Non-Interchangeable Trip Unit—  
Include Line/Load Terminals Non-Electronic Trip Units

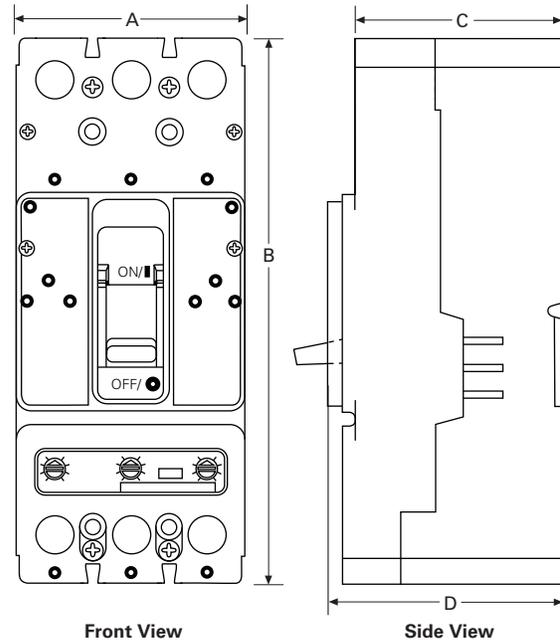


Description	Dimensions in Inches (mm)
A	4.13 (104.9)
B	6.00 (152.4)
C	3.38 (85.9)
D	3.50 (88.9)

**70 A–250 A**

**E<sup>2</sup>J/E<sup>2</sup>JM**

Circuit Breakers with Interchangeable Non-Electronic  
Trip Units



Description	Dimensions in Inches (mm)
A	4.13 (104.9)
B	10.00 (254.0)
C	4.06 (103.1)
D	4.31 (109.5)

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

Approximate Dimensions in Inches (mm)

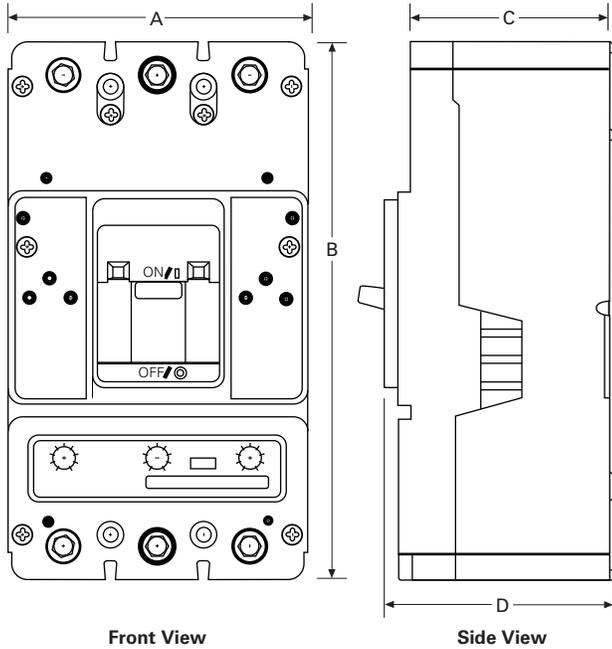
Please see TD01217001E for detailed dimensions.

2

#### 100 A–400 A

##### E<sup>2</sup>K/E<sup>2</sup>KM/E<sup>2</sup>KW

Circuit Breakers with Interchangeable Non-Electronic Trip Units

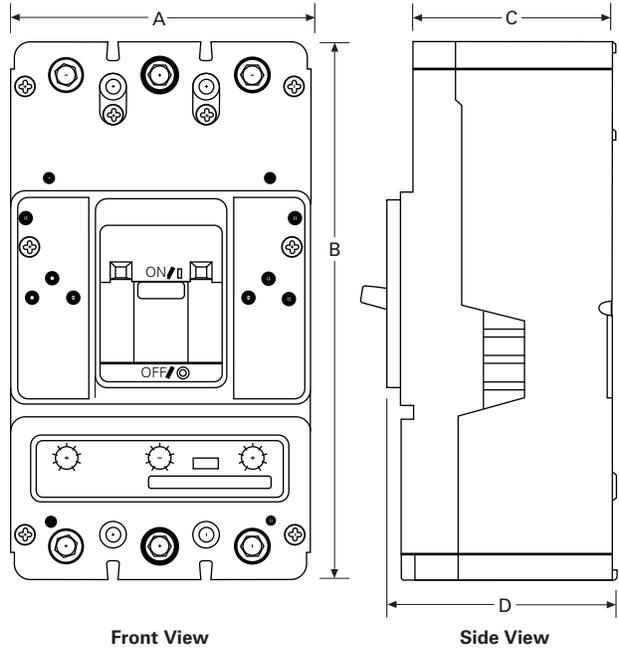


Description	Dimensions in Inches (mm)
A	5.49 (139.4)
B	10.13 (257.3)
C	4.06 (103.1)
D	4.31 (109.5)

#### 100 A–400 A

##### E<sup>2</sup>KE/E<sup>2</sup>KEM

Circuit Breakers with Interchangeable Electronic Trip Units



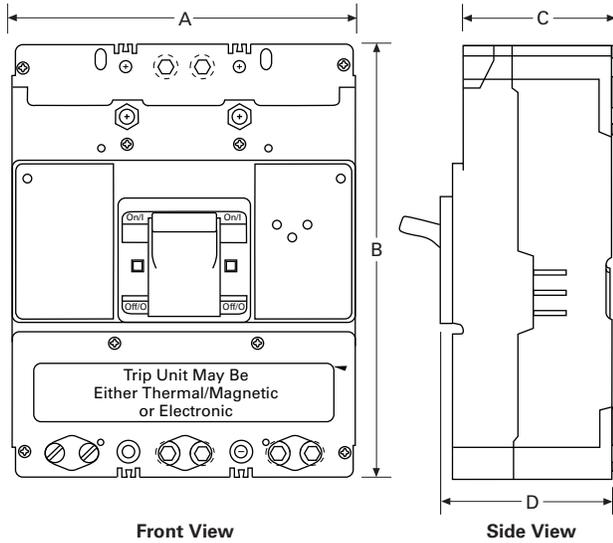
Description	Dimensions in Inches (mm)
A	5.49 (139.4)
B	10.13 (257.3)
C	4.06 (103.1)
D	4.31 (109.5)

Approximate Dimensions in Inches (mm)

Please see TD01217001E for detailed dimensions.

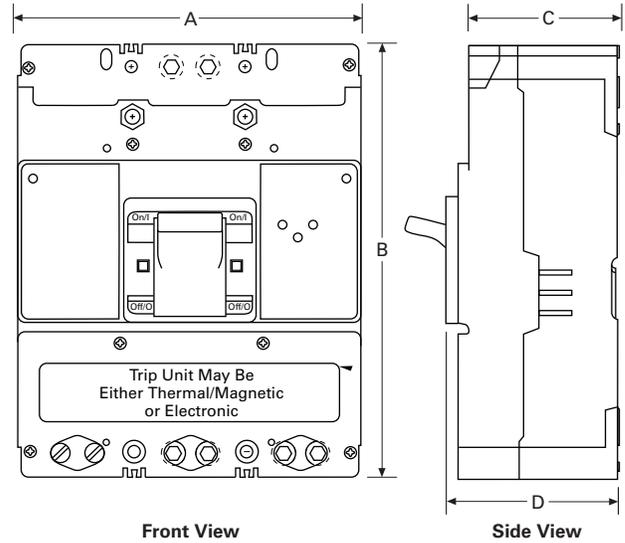
### 160 A–400 A

#### E<sup>2</sup>LME/E<sup>2</sup>LMZ Circuit Breakers



### 300 A–600 A

#### E<sup>2</sup>L/E<sup>2</sup>LM/E<sup>2</sup>LW Circuit Breakers with Interchangeable Electronic Trip Units



Description	Dimensions in Inches (mm)
A	5.48 (139.2)
B	10.13 (257.3)
C	4.00 (101.6)
D	4.22 (107.1)

Description	Dimensions in Inches (mm)
A	8.25 (209.6)
B	10.75 (273.1)
C	4.06 (103.1)
D	4.38 (111.3)

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

Approximate Dimensions in Inches (mm)

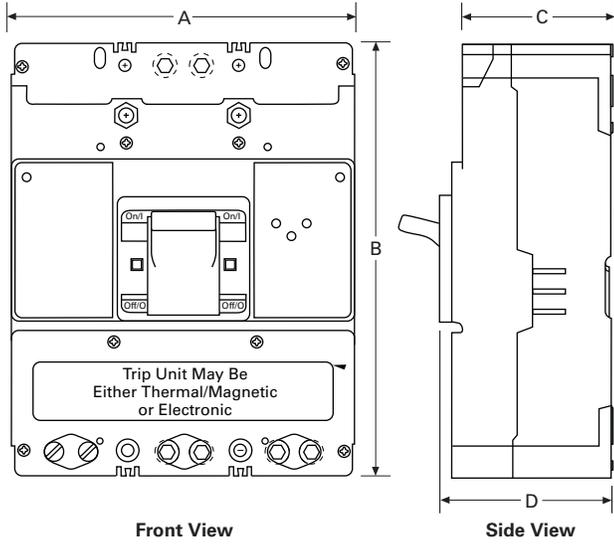
Please see TD01217001E for detailed dimensions.

2

#### 300 A–600 A

##### E<sup>2</sup>LE/E<sup>2</sup>LEM

##### Circuit Breakers with Interchangeable Electronic Trip Units

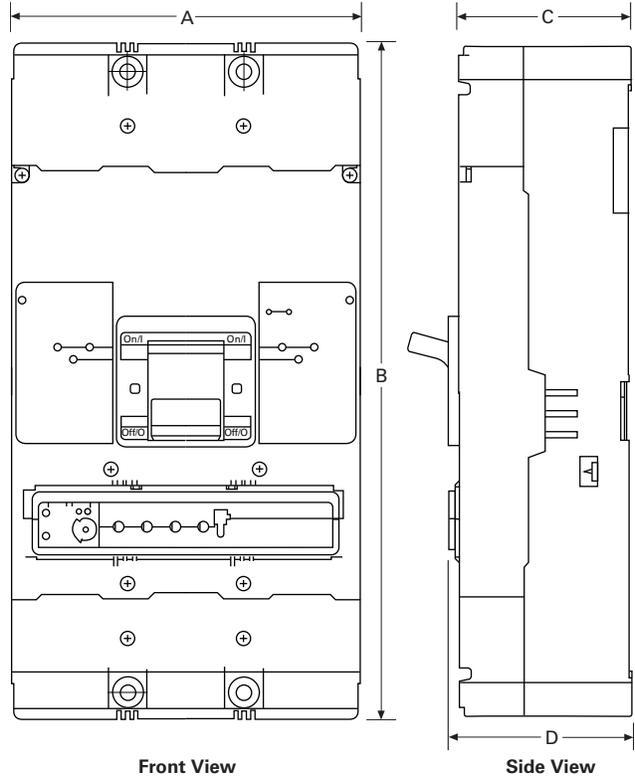


Description	Dimensions in Inches (mm)
A	8.25 (209.6)
B	10.75 (273.1)
C	4.06 (103.1)
D	4.38 (111.3)

#### 300 A–800 A

##### E<sup>2</sup>M/E<sup>2</sup>MM/E<sup>2</sup>MW

##### Circuit Breakers with Interchangeable Non-Electronic Trip Units



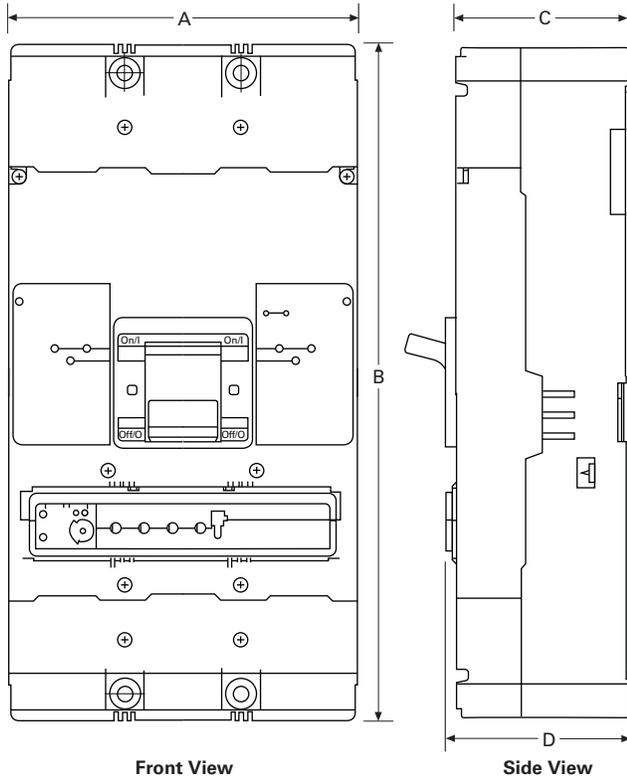
Description	Dimensions in Inches (mm)
A	8.25 (209.6)
B	16.00 (406.4)
C	4.06 (103.1)
D	4.38 (111.3)

Approximate Dimensions in Inches (mm)

Please see TD01217001E for detailed dimensions.

**800 A**

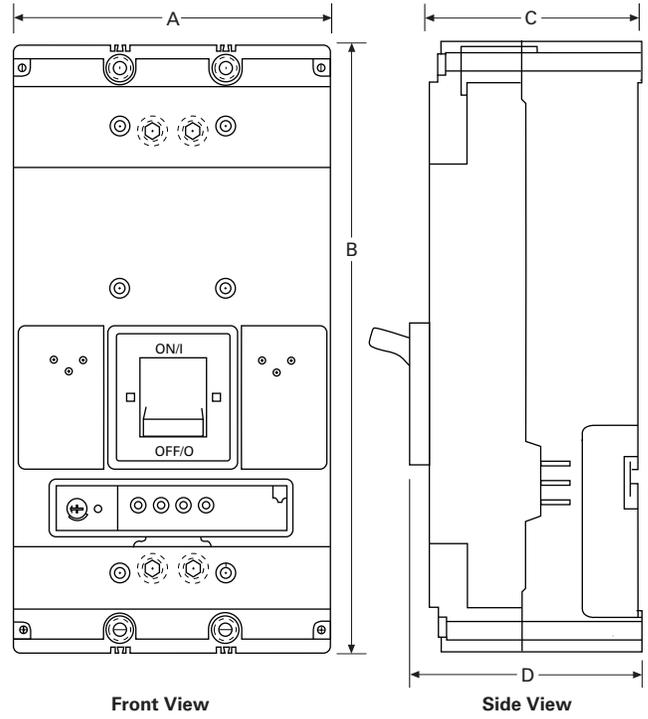
**E<sup>2</sup>ME/E<sup>2</sup>MEM**  
Circuit Breakers with Interchangeable Electronic Trip Units



Description	Dimensions in Inches (mm)
A	8.25 (209.6)
B	16.00 (406.4)
C	4.06 (103.1)
D	4.38 (111.3)

**400 A–1200 A**

**E<sup>2</sup>N/E<sup>2</sup>NM**  
Circuit Breakers with Interchangeable Electronic Trip Units



Description	Dimensions in Inches (mm)
A	8.25 (209.6)
B	16.00 (406.4)
C	5.50 (139.7)
D	6.00 (152.4)

# 2.5

## Molded Case Circuit Breakers

### Specialty Breakers

Approximate Dimensions in Inches (mm)

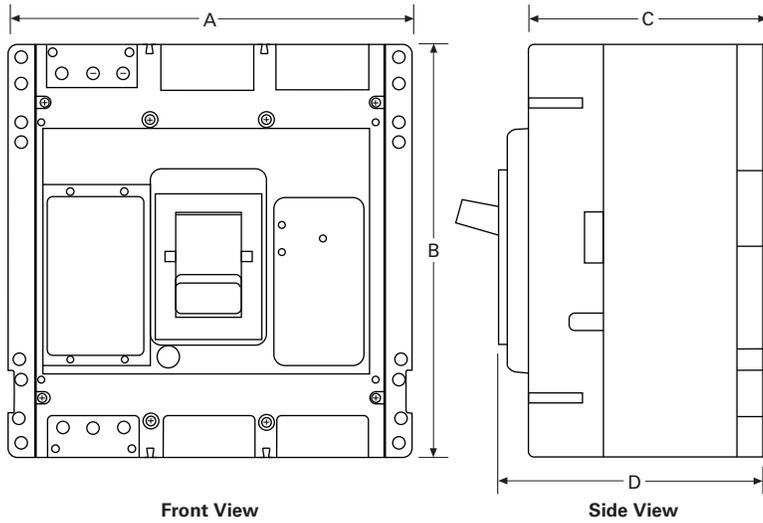
Please see TD01217001E for detailed dimensions.

2

#### 1600 A–2000 A

#### E<sup>2</sup>R/ E<sup>2</sup>RM

#### Circuit Breakers with Electronic Trip Units



Description	Dimensions in Inches (mm)
A	15.50 (393.7)
B	16.00 (406.4)
C	9.00 (228.6)
D	10.00 (254.0)

## Handle Mechanisms



## Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G	
High-Performance Rotary Handle Mechanisms . . .	<b>V4-T2-434</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . .	<b>V4-T2-441</b>
Flex Shaft. . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C	
High-Performance Rotary Handle Mechanisms . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . .	<b>V4-T2-453</b>
Flex Shaft. . . . .	<b>V4-T2-454</b>
Handle Extension. . . . .	<b>V4-T2-457</b>

## Handle Mechanisms—Series G

## Product Overview

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations—Flange Mounted, Through-the-Door and Direct (Close-Coupled)—providing safe, dependable operation and ease of installation.

**Through-the-Door**

- High-Performance Rotary
- Universal Rotary

**Direct (Close-Coupled)**

- Universal Direct

**Flange Mounted**

- Flex Shaft™

Handle mechanisms are used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton has a handle mechanism for virtually any need.

## Handle Mechanisms

2



## High-Performance Rotary Handle Mechanisms

## Product Description

The high-performance rotary handle mechanism uses a simple, yet robust design to make installation and operation easy. The external handle's key functional components are all metallic, ensuring reliability. The metal-on-metal interface between the handle and shaft prevents contaminant buildup that could impede operation, while UV and chemical agent resistant materials protect the handle from heat and fading in direct sunlight, as well as chemicals that may be introduced in harsh environments.

In addition to its robust design features, the handle mechanism has stand-off support that allows for easy operation with a gloved hand. With a shallow profile, the handle can easily be used in applications where an internal or double door is required.

The high-performance external handle can accept padlocks or multi-hasps locks. The door is interlocked when padlocked and cannot be bypassed.

## Contents

## Description

	<i>Page</i>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms	
Product Selection . . . . .	<b>V4-T2-435</b>
Dimensions . . . . .	<b>V4-T2-438</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft . . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft . . . . .	<b>V4-T2-454</b>
Handle Extension . . . . .	<b>V4-T2-457</b>

## Features

- NEMA Type 1/3R/12 (IP54) and NEMA Type 4/4X (IP65) ratings
- Black/Blue or Red/Yellow external handle colors
- Three shaft lengths—6, 12 and 24 inches, which can be cut to size to match enclosure depth
- Conveniently packaged as kit containing handle, shaft and mechanism
- Replacement parts are available separately
- Metallic functional components ensure reliability
- Metal-on-metal interface between handle and shaft
- UV and chemical agent-resistant materials protect the handle
- Shallow profile
- Compatible with both Series C and Series G molded case circuit breakers and molded case switch platforms
- Same handle can be used on multiple frame sizes, reducing the number of parts needed
- Red and yellow handles to designate emergency disconnecting means
- All handle mechanisms can accept padlocks or multi-hasps locks for added flexibility
- Fast, easy installation (see video on website for step-by-step instructions)

## Standards and Certifications

The mechanisms for EG breakers have an internal handle that can be operated independent of door position, and locked-out to meet one of the key NFPA requirements (NFPA® 79) and UL 508A disconnect requirements.

- NEMA 1/3R/12, IP54
- NEMA 4/4X, IP65



## Product Selection

## Handle Mechanisms for Series G Frames

## Kits Only (Kit Includes Shaft, Mechanism and Handle)—EG-Frame

	Description	Rating Type		EG-Frame Catalog Number
		NEMA	IP	
<b>S01 Blue Handle</b>	S01 blue handle, 6-inch shaft	1/3R/12	54	EGHMVD06B0 / 68C6040G25
		4/4X	65	EGHMVD06BX0 / 68C6040G28
	S01 blue handle, 12-inch shaft	1/3R/12	54	EGHMVD12B0 / 68C6040G26
	S01 blue handle, 12-inch shaft	4/4X	65	EGHMVD12BX0 / 68C6040G29
		S01 blue handle, 24-inch shaft ①	1/3R/12	54
		4/4X	65	EGHMVD24BX0 / 68C6040G30
<b>S01 Red Handle</b>	S01 red handle, 6-inch shaft	1/3R/12	54	EGHMVD06R0 / 68C6040G31
		4/4X	65	EGHMVD06RX0 / 68C6040G34
	S01 red handle, 12-inch shaft	1/3R/12	54	EGHMVD12R0 / 68C6040G32
	S01 red handle, 12-inch shaft	4/4X	65	EGHMVD12RX0 / 68C6040G35
		S01 red handle, 24-inch shaft ①	1/3R/12	54
		4/4X	65	EGHMVD24RX0 / 68C6040G36
<b>S2 Blue Handle</b>	S2 blue handle, 6-inch shaft	1/3R/12	54	EGHMVD06B / 68C6040G13
		4/4X	65	EGHMVD06BX / 68C6040G16
	S2 blue handle, 12-inch shaft	1/3R/12	54	EGHMVD12B / 68C6040G14
	S2 blue handle, 12-inch shaft	4/4X	65	EGHMVD12BX / 68C6040G17
		S2 blue handle, 24-inch shaft ①	1/3R/12	54
		4/4X	65	EGHMVD24BX / 68C6040G18
<b>S2 Red Handle</b>	S2 red handle, 6-inch shaft	1/3R/12	54	EGHMVD06R / 68C6040G19
		4/4X	65	EGHMVD06RX / 68C6040G22
	S2 red handle, 12-inch shaft	1/3R/12	54	EGHMVD12R / 68C6040G20
	S2 red handle, 12-inch shaft	4/4X	65	EGHMVD12RX / 68C6040G23
		S2 red handle, 24-inch shaft ①	1/3R/12	54
		4/4X	65	EGHMVD24RX / 68C6040G24

**Notes**

① 24-inch handle comes with support bracket.

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

# 2.6

## Molded Case Circuit Breakers

### Handle Mechanisms

#### Handle Mechanisms for Series G Frames

2

#### Kits Only (Kit Includes Shaft, Mechanism and Handle)—NG- and RG-Frame

Description	Rating Type		IP	NG-Frame	RG-Frame
	NEMA			Catalog Number	Catalog Number
<b>S3 Blue Handle</b> 	S3 blue handle, 10-inch shaft	1/3R/12	54	<b>NGHMVD08B / 68C6043G01</b>	—
		4/4X	65	<b>NGHMVD08BX / 68C6043G03</b>	—
<b>S3 Red Handle</b> 	S3 red handle, 10-inch shaft	1/3R/12	54	<b>NGHMVD08R / 68C6043G02</b>	—
		4/4X	65	<b>NGHMVD08RX / 68C6043G04</b>	—
<b>S4 Blue Handle</b> 	S4 blue handle, 10-inch shaft	1/3R/12	54	<b>NGHMVD08BT / 68C6043G05</b>	<b>RGHMVD08B / 68C6044G01</b>
		4/4X	65	<b>NGHMVD08BTX / 68C6043G07</b>	<b>RGHMVD08BX / 68C6044G03</b>
<b>S4 Red Handle</b> 	S4 red handle, 10-inch shaft	1/3R/12	54	<b>NGHMVD08RT / 68C6043G06</b>	<b>RGHMVD08R / 68C6044G02</b>
		4/4X	65	<b>NGHMVD08RTX / 68C6043G08</b>	<b>RGHMVD08RX / 68C6044G04</b>

**Note**

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

**Separate Components for Series G Frames****Series G Components—Shafts and Mechanisms**

Frame	Shaft Width	Shaft Length				Mechanism Only
		6-Inch	10-Inch	12-Inch	24-Inch <sup>①</sup>	
EG	8 mm	66A6010G95	—	66A6010G96	66A6010G97	1498D66G17
NG	12 mm	—	66A6013H01	—	—	69D9101G30
RG	12 mm	—	66A6013H01	—	—	69D9101G31

**Series G Components—Handles Only**

Frame	Rating Type		Handles Only							
	NEMA	IP	S01 Blue/Black	S01 Red/Yellow	S2 Blue/Black	S2 Red/Yellow	S3 Blue/Black	S3 Red/Yellow	S4 Blue/Black	S4 Red/Yellow
EG	1/3R/12	54	68C6048G41	68C6048G42	68C6048G01	68C6048G02	—	—	—	—
	4/4X	65	68C6048G43	68C6048G44	68C6048G03	68C6048G04	—	—	—	—
NG	1/3R/12	54	—	—	—	—	68C6048G05	68C6048G06	68C6048G09	68C6048G10
	4/4X	65	—	—	—	—	68C6048G07	68C6048G08	68C6048G11	68C6048G12
RG	1/3R/12	54	—	—	—	—	—	—	68C6048G09	68C6048G10
	4/4X	65	—	—	—	—	—	—	68C6048G11	68C6048G12

**Series G Components—Optional Caps**

As an alternative to blue or red, a black, replaceable cap is available.

			Catalog Number
S01	66A6032H01	Black handle cap	HPHC0DGX
S2	66A6032H02	Black handle cap	HPHC2DGX
S3	66A6032H03	Black handle cap	HPHC3DGX

**Series G Replacement Hardware**

This kit provides replacement parts for Series G high performance handle only.

	Catalog Number
High-performance handle replacement parts kit	66A6029G01

**Notes**

① 24-inch handle comes with support bracket.

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

# 2.6

## Molded Case Circuit Breakers

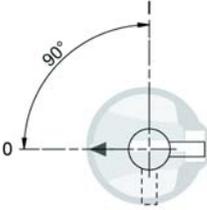
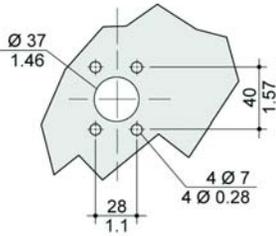
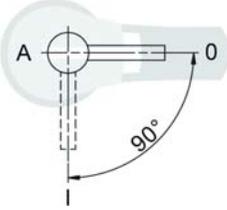
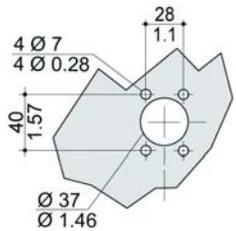
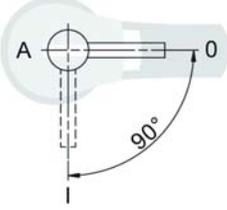
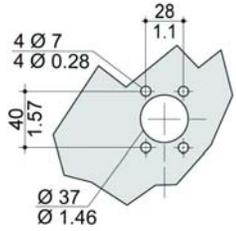
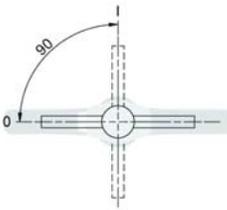
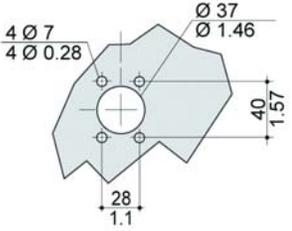
### Handle Mechanisms

#### Dimensions

Approximate Dimensions in mm (Inches)

2

#### High-Performance Rotary Handle Mechanisms

Handle Type	Front Operation Direction of Operation	Door Drilling
<b>Type S01</b>		
<b>Type S2</b>		
<b>Type S3</b>		
<b>Type S4</b>		

Handle Mechanisms



Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary	
Product Selection . . . . .	<b>V4-T2-440</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft . . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft . . . . .	<b>V4-T2-454</b>
Handle Extension . . . . .	<b>V4-T2-457</b>

Universal Rotary

Product Description

Eaton’s Universal Rotary is suitable for use with Type 1 or 12 enclosure types. All rotary handle mechanisms include a handle “lock off” to prevent turning the breaker ON while in the OFF position, and indicate ON/OFF/Tripped/Reset positions. The Universal Rotary has the added feature of international markings for ON (I) and OFF (O). The Universal Rotary is made of molded material.

The Universal Rotary mechanisms for EG-Frame MCCBs can be operated by hand with the door open or “locked off” to prevent operation with the door open.

Standards and Certifications

Universal Rotary is UL listed and meets CSA requirements. Universal Rotary also meets IEC 60947-1 and IEC 60947-2 for international compliance. Rotary UL File Number is E64983.



Features

Features Comparison of Series C Rotary and Universal Rotary Handle Mechanism

Rotary	Number of Poles	NEMA Enclosure Type				Handle Lock-Off ②	Handle Indication: ON/OFF TRIPPED/RESET	International Markings ON (I) OFF (O)	Handle Material	Available Handle Colors	Handle Rotation	Shaft Lengths (Inches)
		1	3R	12	4/4X ①							
Series C rotary	—	■	■	■	■	■	■	■	Metal	Black	45 deg.	6, 12, 16, 24
Universal rotary	—	■	—	■	■	■	■	■	Molded plastic	Yellow/Red/Black	90 deg.	6, 12, 24

Notes

- ① Type 4/4X application requires special handle. See “Ordering Information.”
- ② All rotary handle mechanisms include a handle “Lock Off” to prevent turning the breaker ON while in the OFF position.

## Product Selection

2

## Universal Rotary



## Universal Rotary Through-the-Door Handle Mechanisms

Handle Color	UL Rating	Shaft Length in Inches (mm)	Complete Catalog Number <sup>①</sup>
<b>EG-Frame</b>			
Black	1, 12	6.00 (152.4)	<b>EHMVD06B</b>
		12.00 (304.8)	<b>EHMVD12B</b>
		24.00 (609.6)	<b>EHMVD24B</b>
Red	1, 12	6.00 (152.4)	<b>EHMVD06R</b>
		12.00 (304.8)	<b>EHMVD12R</b>
		24.00 (609.6)	<b>EHMVD24R</b>
<b>NG-Frame</b>			
Black	1	6.00 (152.4)	<b>HMVD5B</b>

## Series G Rotary



## Series G Rotary Ordering Information

Shaft Length Inches (mm)	Complete Catalog Number <sup>②</sup>	Separate Catalog Number		Shaft <sup>⑤</sup>	Catalog Number	
		Standard Handle <sup>③</sup>	Breaker Mechanism <sup>④</sup>		IEC IP65 <sup>⑥⑦</sup>	IEC IP66 <sup>⑥⑦</sup>
<b>N-Frame (ND and NG)</b>						
6.00 (152.4)	<b>HM5R06</b>	<b>6648C22G21</b>	<b>6648C23G08</b>	<b>4217B37G08</b>	<b>WHM5R06</b>	<b>WHM5R06X</b>
12.00 (304.8)	<b>HM5R12</b>	<b>6648C22G21</b>	<b>6648C23G08</b>	<b>4217B37G05</b>	<b>WHM5R12</b>	<b>WHM5R12X</b>
16.00 (406.4)	<b>HM5R16</b>	<b>6648C22G21</b>	<b>6648C23G08</b>	<b>4217B37G06</b>	<b>WHM5R16</b>	<b>WHM5R16X</b>
24.00 (609.6)	<b>HM5R24</b>	<b>6648C22G21</b>	<b>6648C23G08</b>	<b>4217B37G07</b>	<b>WHM5R24</b>	<b>WHM5R24X</b>

**Notes**

- ① Complete catalog number includes handle, mechanism, shaft and mounting hardware.
- ② Complete catalog number includes the standard handle, mechanism, shaft and support brace/bracket.
- ③ Handle is designed suitable for NEMA Types 1, 3R and 12 enclosures. Use style number **6648C22G03** for Type 4/4X handle or add **X** Suffix to complete catalog number. Handle is cast aluminum.
- ④ Breaker mechanism includes a shaft support bracket and its parts. Shaft is .50-inch (12.7 mm).
- ⑤ Longer shafts, 16-inch (406.4 mm) and 24-inch (609.6 mm), include an adjustable support extension.
- ⑥ IEC handle mechanism supplied with metric thread mounting hardware.
- ⑦ Complete catalog number includes a handle, mechanism and shaft.

Handle Mechanisms



Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms	<b>V4-T2-434</b>
Universal Rotary	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms	
Flex Shaft	<b>V4-T2-442</b>
Handle Mechanisms—Series C	
High-Performance Rotary Handle Mechanisms	<b>V4-T2-447</b>
Series C Rotary	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms	<b>V4-T2-453</b>
Flex Shaft	<b>V4-T2-454</b>
Handle Extension	<b>V4-T2-457</b>

**Direct (Close-Coupled) Handle Mechanisms**

**Product Description**

Direct (close-coupled) handle mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-door type mechanism is not practical or cannot be used.

The Universal Direct handle mechanisms are rated Type 1 and Type 12.

The Universal Direct handle mechanism is available as standard with a door interlock to prevent opening the enclosure while the circuit breaker is in the ON position. It is also available without a door interlock.

**Application Description**

Direct (close-coupled) handle mechanisms are typically used for applications where high volume, standardized enclosures are being fabricated.

**Standards and Certifications**

The Universal Direct handle mechanism is UL listed, IEC 60947-1 and IEC 60947-2 compliant, and meets CSA requirements.



**Product Selection**

Universal Direct (EG)



**Universal Direct Handle Mechanisms**

Frame	Black Handle Color		Red Handle Color	
	With Interlock Catalog Number	Without Interlock Catalog Number	With Interlock Catalog Number	Without Interlock Catalog Number
EG	EHMCCBI	EHMCCB	EHMCCRI	EHMCCR

## Handle Mechanisms

2



## Flex Shaft

## Product Description

**Flange-Mounted Handle Mechanisms**

Flange-mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9m) through 10 feet (3m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8 inches (9.5 mm). It can be used with Type 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with Type 4 environments.

Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes—a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs, and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

## Contents

**Description****Page**

Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft . . . . .	
Product Selection . . . . .	<b>V4-T2-443</b>
Accessories . . . . .	<b>V4-T2-444</b>
Dimensions . . . . .	<b>V4-T2-444</b>
Handle Mechanisms—Series C . . . . .	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft . . . . .	<b>V4-T2-454</b>
Handle Extension . . . . .	<b>V4-T2-457</b>

## Standards and Certifications

Flex Shaft is UL listed under File E64983 and meets CSA requirements.



**Product Selection**

**Note:** Type 4X handle mechanisms are available. Add Suffix X to the complete Catalog Number.

**Note:** When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) is maintained to operate properly.

**Note:** The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

**Flex Shaft****Flex Shaft Flange-Mounted Handle Mechanisms** ①②

Breaker Frame	Flexible Shaft Length in Feet (m)				
	2 (0.6) Catalog Number	3 (0.9) Catalog Number	4 (1.2) Catalog Number	5 (1.3) Catalog Number	6 (1.8) Catalog Number
EG	EHMFS02	EHMFS03	EHMFS04	EHMFS05	EHMFS06
NG	N/A	N/A	F5S04C	F5S05C	F5S06C
RG	N/A	N/A	F6S04	F6S05	F6S06

Breaker Frame	Flexible Shaft Length in Feet (m)			
	7 (2.1) Catalog Number	8 (2.4) Catalog Number	9 (2.7) Catalog Number	10 (3.1) Catalog Number
EG	EHMFS07	EHMFS08	EHMFS09	EHMFS10
NG	N/A	N/A	N/A	F5S10C
RG	N/A	N/A	N/A	N/A

**High-Performance Flex Shaft****High-Performance Flex Shaft Flange Mounted Handle Mechanism** ①②

Breaker Frame	Flexible Shaft Length in Feet (m)				
	2 (0.6) Catalog Number	3 (0.9) Catalog Number	4 (1.2) Catalog Number	5 (1.3) Catalog Number	6 (1.8) Catalog Number
EG	EGFS02HP	EGFS03HP	EGFS04HP	EGFS05HP	EGFS06HP
NG	N/A	N/A	F5S04HP	F5S05HP	F5S06HP
RG	N/A	N/A	F6S04HP	F6S05HP	F6S06HP

Breaker Frame	Flexible Shaft Length in Feet (m)			
	7 (2.1) Catalog Number	8 (2.4) Catalog Number	9 (2.7) Catalog Number	10 (3.1) Catalog Number
EG	EGFS07HP	EGFS08HP	EGFS09HP	EGFS10HP
NG	N/A	N/A	N/A	F5S10HP
RG	N/A	N/A	N/A	N/A

**Notes**

- ① Three-pole only for EG-Frame.
- ② EG-Frame can be left- or right-hand mounted.

# 2.6

## Molded Case Circuit Breakers

### Handle Mechanisms

#### Accessories

2

#### Handle Auxiliary Switch—Early Break Design, 1A–1B Contact for Flex Shaft

Breaker Frame	Catalog Number
EG	AUX1EBFSEG

Auxiliary contact changes state prior to parting of breaker contacts to allow for shutdown of equipment. Contacts mounted on breaker mechanism customer supplied wiring.

#### Type 12 Safety Door Hardware for Flex Shaft (E- through R-Frame) <sup>①</sup>

Catalog Number <sup>②</sup>
C361KJ4
C361KJ6
C361KR

#### Dimensions

#### Type 12 Safety Door Hardware for Flex Shaft (E- through R-Frame) <sup>①</sup>

Catalog Number <sup>②</sup>	Handle Length in Inches (mm)
C361KJ4	4.00 (101.6)
C361KJ6	6.00 (152.4)
C361KR	Roller latch <sup>③</sup>

#### Notes

- <sup>①</sup> Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.
- <sup>②</sup> The 1/4-inch x 1/2-inch (6.35 x 12.7 mm) standard mill rectangular locking bar is not supplied with these kits.
- <sup>③</sup> Third roller latch for use with 4.00- or 6.00-inch (101.6 or 152.4 mm) handle when three-point latching is required.

## Handle Mechanisms



## Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft. . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C . . . . .	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft. . . . .	<b>V4-T2-454</b>
Handle Extension. . . . .	<b>V4-T2-457</b>

## Handle Mechanisms—Series C

## Product Overview

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations—Flange Mounted, Through-the-Door and Direct (Close-Coupled)—providing safe, dependable operation and ease of installation.

**Through-the-Door**

- High-Performance Rotary
- Series C Rotary

**Direct (Close-Coupled)**

- Universal Direct
- Euro IEC
- G Direct

**Flange Mounted**

- Flex Shaft
- C371

Handle mechanisms are used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton has a handle mechanism for virtually any need.

**Through-the-Door Handle Mechanisms**

Eaton's through-the-door handle mechanisms mount on the front of an enclosure or cabinet door and externally operate the circuit breaker via a variable depth shaft or a linear operator (Type MC). Each rotary type handle mechanism includes a handle, base operating mechanism and shaft that can be cut to various lengths.

Series C Rotary and Universal Rotary handle mechanisms are for use with molded case circuit breakers (G, F, J, K, L, MDL), molded case switches and motor circuit protectors.

Type 4/4X handles are similar to standard handles except they include an internal neoprene gasket. Type 4/4X handle style number is 6648C22G03. Due to gasketing effect between the handle and the housing, the handle may not indicate a tripped position.

**Direct (Close-Coupled) Handle Mechanisms**

Direct (close-coupled) handle mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-door type mechanism is not practical or cannot be used. They are typically for applications where high volume, standardized enclosures are being fabricated.

The Euro IEC Direct handle mechanism can be used on F- through R-Frames.

The G Direct is available with a black or the yellow handle, and with or without a shroud. It is suitable for use with NEMA 1 enclosures. It is for use only with the G-Frame (GD, GC, GHC, GMCP).

An escutcheon ring and interlock clip are provided as standard. The standard design includes a lock-off feature.

**Flange-Mounted Handle Mechanisms**

Flange-mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9m) through 10 feet (3m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8-inch (9.5 mm). Can be used with NEMA 1, 3R and 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with NEMA 4 and 4X environments. Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes—a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

The Type C371 circuit breaker operating mechanisms are designed for installation in control enclosures where main or branch circuit protective devices are required. All circuit breaker mechanisms are suitable for right-hand mounting.

Auxiliary contacts are not available for mounting on operating mechanisms. Where required, have them installed in circuit breaker.

**Handle Extension**

Handle extension is not included with J, K, L, M and N-Frame breakers. It must be purchased separately.

**Standards and Certifications**

Type C371 is UL Listed under File E62635.

Flex Shaft is UL Listed under File E64983 and meets CSA requirements.

Series C Rotary and Universal Rotary, are UL Listed and meet CSA requirements. Universal Rotary also meets IEC 60947-1 and IEC 60947-2 for international compliance. Rotary UL File Number is E64983.

The Universal Direct handle mechanism is UL 489 Listed, IEC 60947-1 and IEC 60947-2, and meets CSA requirements. The Euro IEC Direct handle mechanism is IEC-240-1. G Direct is UL Listed and meets CSA requirements.



## Handle Mechanisms



## Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft. . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C	
High-Performance Rotary Handle Mechanisms	
Product Selection . . . . .	<b>V4-T2-448</b>
Dimensions . . . . .	<b>V4-T2-450</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft. . . . .	<b>V4-T2-454</b>
Handle Extension. . . . .	<b>V4-T2-457</b>

## High-Performance Rotary Handle Mechanisms

## Product Description

The high-performance rotary handle mechanism uses a simple, yet robust design to make installation and operation easy. The external handle's key functional components are all metallic, ensuring reliability. The metal-on-metal interface between the handle and shaft prevents contaminant buildup that could impede operation, while UV and chemical agent resistant materials protect the handle from heat and fading in direct sunlight, as well as chemicals that may be introduced in harsh environments.

In addition to its robust design features, the handle mechanism has stand-off support that allows for easy operation with a gloved hand. With a shallow profile, the handle can easily be used in applications where an internal or double door is required.

The high-performance external handle can accept padlocks or multi-hasps locks. The door is interlocked when padlocked and cannot be bypassed.

## Features

- NEMA Type 1/3R/12 (IP54) and NEMA Type 4/4X (IP65) ratings
- Black/Blue or Red/Yellow external handle colors
- Three shaft lengths—6, 12 and 24 inches, which can be cut to size to match enclosure depth
- Conveniently packaged as kit containing handle, shaft and mechanism
- Replacement parts are available separately
- Metallic functional components ensure reliability
- Metal-on-metal interface between handle and shaft
- UV and chemical agent-resistant materials protect the handle
- Shallow profile
- Compatible with both Series C and Series G molded case circuit breakers and molded case switch platforms
- Same handle can be used on multiple frames sizes reducing the number of parts needed
- Red and yellow handles to designate emergency disconnecting means
- All handle mechanisms can accept padlocks or multi-hasps locks for added flexibility
- Fast, easy installation (see video on website for step-by-step instructions)

## Standards and Certifications

The mechanisms for EG breakers have an internal handle that can be operated independent of door position, and locked-out to meet one of the key NFPA requirements (NFPA® 79) and UL 508A disconnect requirements.

- NEMA 1/3R/12, IP54
- NEMA 4/4X, IP65



## Product Selection

2

## Handle Mechanisms for Series C Frames

## Kits Only (Kit Includes Shaft, Mechanism and Handle)—GC/GD- and GMCP-Frame

	Description	Rating Type		GC/GD-Frame	GMCP-Frame
		NEMA	IP	Catalog Number	Catalog Number
<b>S01 Blue Handle</b> 	S01 blue handle, 12-inch shaft	1/3R/12	54	<b>GCHMVD12B / 68C6039G01</b>	<b>GMHMVD12B / 68C6039G05</b>
		4/4X	65	<b>GCHMVD12BX / 68C6039G03</b>	<b>GMHMVD12BX / 68C6039G07</b>
<b>S01 Red Handle</b> 	S01 red handle, 12-inch shaft	1/3R/12	54	<b>GCHMVD12R / 68C6039G02</b>	<b>GMHMVD12R / 68C6039G06</b>
		4/4X	65	<b>GCHMVD12RX / 68C6039G04</b>	<b>GMHMVD12RX / 68C6039G08</b>

## Separate Components for Series C Frames

## Series C Components—Shaft and Mechanism

Frame	Shaft Width	Shaft Length			Mechanism Only
		6-Inch	10-Inch	12-Inch	
GC/GD	6 mm	—	—	<b>66A6013H02</b>	<b>GCHMVD / 2A92095G15</b>
GMCP	6 mm	—	—	<b>66A6013H02</b>	<b>GMHMVD / 2A92095G16</b>
GD	8 mm	<b>66A6010G95</b>	—	<b>66A6010G96</b>	<b>1498D34G90</b>
FD	8 mm	<b>66A6010G95</b>	—	<b>66A6010G96</b>	<b>1498D34G91</b>
JD	10 mm	<b>66A6012G15</b>	—	<b>66A6012G16</b>	<b>1498D34G92</b>
KD	10 mm	<b>66A6012G15</b>	—	<b>66A6012G16</b>	<b>1498D34G93</b>
LD	10 mm	<b>66A6012G15</b>	—	<b>66A6012G16</b>	<b>1498D34G94</b>
MDL	10 mm	<b>66A6012G15</b>	—	<b>66A6012G16</b>	<b>1498D34G95</b>
ND	12 mm	—	<b>66A6013H01</b>	—	<b>69D9101G30</b>
RD	12 mm	—	<b>66A6013H01</b>	—	<b>69D9101G31</b>

**Note**

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

## Series C Components—Handles Only

Frame	Rating Type		Handles Only							
	NEMA	IP	S01 Blue/Black	S01 Red/Yellow	S2 Blue/Black	S2 Red/Yellow	S3 Blue/Black	S3 Red/Yellow	S4 Blue/Black	S4 Red/Yellow
GC/GD	1/3R/12	54	68C6048G41	68C6048G42	—	—	—	—	—	—
	4/4X	65	68C6048G43	68C6048G44	—	—	—	—	—	—
GMCP	1/3R/12	54	68C6048G41	68C6048G42	—	—	—	—	—	—
	4/4X	65	68C6048G43	68C6048G44	—	—	—	—	—	—
GD	1/3R/12	54	68C6048G41	68C6048G42	68C6048G01	68C6048G02	—	—	—	—
	4/4X	65	68C6048G43	68C6048G44	68C6048G03	68C6048G04	—	—	—	—
FD	1/3R/12	54	68C6048G41	68C6048G42	68C6048G01	68C6048G02	—	—	—	—
	4/4X	65	68C6048G43	68C6048G44	68C6048G03	68C6048G04	—	—	—	—
JD	1/3R/12	54	—	—	68C6048G01	68C6048G02	—	—	—	—
	4/4X	65	—	—	68C6048G03	68C6048G04	—	—	—	—
KD	1/3R/12	54	—	—	68C6048G01	68C6048G02	—	—	—	—
	4/4X	65	—	—	68C6048G03	68C6048G04	—	—	—	—
LD	1/3R/12	54	—	—	68C6048G01	68C6048G02	68C6048G05	68C6048G06	—	—
	4/4X	65	—	—	68C6048G03	68C6048G04	68C6048G07	68C6048G08	—	—
MDL	1/3R/12	54	—	—	68C6048G01	68C6048G02	68C6048G05	68C6048G06	—	—
	4/4X	65	—	—	68C6048G03	68C6048G04	68C6048G07	68C6048G08	—	—
ND	1/3R/12	54	—	—	—	—	68C6048G05	68C6048G06	68C6048G09	68C6048G10
	4/4X	65	—	—	—	—	68C6048G07	68C6048G08	68C6048G11	68C6048G12
RD	1/3R/12	54	—	—	—	—	—	—	68C6048G09	68C6048G10
	4/4X	65	—	—	—	—	—	—	68C6048G11	68C6048G12

**Note**

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

# 2.6

## Molded Case Circuit Breakers

### Handle Mechanisms

#### Dimensions

Approximate Dimensions in mm (Inches)

2

#### High-Performance Rotary Handle Mechanisms

Handle Type	Front Operation Direction of Operation	Door Drilling
<b>Type S01</b>		
<b>Type S2</b>		
<b>Type S3</b>		
<b>Type S4</b>		

Handle Mechanisms



Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary	
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft . . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Product Selection . . . . .	<b>V4-T2-452</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft . . . . .	<b>V4-T2-454</b>
Handle Extension . . . . .	<b>V4-T2-457</b>

**Series C Rotary**

**Product Description**

Eaton’s through-the-door handle mechanisms mount on the front of an enclosure or a cabinet door and externally operate the circuit breaker via a variable depth shaft or a linear operator (Type MC). Each rotary type handle mechanism includes a handle, a base operating mechanism and a shaft that can be cut to various lengths.

Series C Rotary handle mechanisms are used with molded case circuit breakers (F, J, K, L, MDL), molded case switches and motor circuit protectors.

These rotary handles are robust and durable, made entirely of metal parts. It also has a lock-out tag-out level at the tip of the handle for padlocking.

NEMA Type 4/4X handles are similar to standard handles except they include an internal neoprene gasket. NEMA Type 4/4X handle style number is 6648C22G03. Due to gasketing effect between the handle and the housing, the handle may not indicate a tripped position.

**Standards and Certifications**

Series C Rotary is UL listed and meets CSA requirements.



**Features**

**Features of Series C Rotary Handle Mechanism**

Rotary	Number of Poles	NEMA Enclosure Type				Handle Lock-Off ②	Handle Indication: ON/OFF TRIPPED/RESET	International Markings ON (I) OFF (O)	Handle Material	Available Handle Colors	Handle Rotation	Shaft Lengths (Inches)
		1	3R	12	4/4X ①							
Series C rotary	—	■	■	■	■	■	■	■	Metal	Black	45 deg.	6, 12, 16, 24

**Notes**

- ① Type 4/4X application requires special handle. See “Ordering Information.”
- ② All rotary handle mechanisms include a handle “Lock Off” to prevent turning the breaker ON while in the OFF position.

## Product Selection

2

## Through-the-Door Handle Mechanisms

## Series C Rotary



## Series C Rotary Ordering Information

Shaft Length Inches (mm)	Complete Catalog Number ①	Separate Catalog Number		Shaft ④	Catalog Number	
		Standard Handle ②	Breaker Mechanism ③		IEC IP65 ⑤⑥	IEC IP66 ⑤⑥
<b>F-Frame</b>						
6.00 (152.4)	HM1R06	6648C22G25	6648C23G11	4217B37G08	WHM1R06	WHM1R06X
12.00 (304.8)	HM1R12	6648C22G25	6648C23G11	4217B37G05	WHM1R12	WHM1R12X
16.00 (406.4)	HM1R16	6648C22G25	6648C23G11	4217B37G06	WHM1R16	WHM1R16X
24.00 (609.6)	HM1R24	6648C22G25	6648C23G11	4217B37G07	WHM1R24	WHM1R24X
<b>J-Frame</b>						
6.00 (152.4)	HM2R06	6648C22G01	6648C23G21	4217B37G08	WHM2R06	WHM2R06X
12.00 (304.8)	HM2R12	6648C22G01	6648C23G21	4217B37G05	WHM2R12	WHM2R12X
16.00 (406.4)	HM2R16	6648C22G01	6648C23G21	4217B37G06	WHM2R16	WHM2R16X
24.00 (609.6)	HM2R24	6648C22G01	6648C23G21	4217B37G07	WHM2R24	WHM2R24X
<b>K-Frame</b>						
6.00 (152.4)	HM3R06	6648C22G01	6648C23G25	4217B37G08	WHM3R06	WHM3R06X
12.00 (304.8)	HM3R12	6648C22G01	6648C23G25	4217B37G05	WHM3R12	WHM3R12X
16.00 (406.4)	HM3R16	6648C22G01	6648C23G25	4217B37G06	WHM3R16	WHM3R16X
24.00 (609.6)	HM3R24	6648C22G01	6648C23G25	4217B37G07	WHM3R24	WHM3R24X
<b>L- and MDL-Frame</b>						
6.00 (152.4)	HM4R06	6648C22G11	6648C23G19	4217B37G08	WHM4R06	WHM4R06X
12.00 (304.8)	HM4R12	6648C22G11	6648C23G19	4217B37G05	WHM4R12	WHM4R12X
16.00 (406.4)	HM4R16	6648C22G11	6648C23G19	4217B37G06	WHM4R16	WHM4R16X
24.00 (609.6)	HM4R24	6648C22G11	6648C23G19	4217B37G07	WHM4R24	WHM4R24X
<b>MD/MDS</b>						
6.00 (152.4)	HM7R06	6648C22G21	6648C23G17	4217B37G08	—	—
12.00 (304.8)	HM7R12	6648C22G21	6648C23G17	4217B37G05	—	—
16.00 (406.4)	HM7R16	6648C22G21	6648C23G17	4217B37G06	—	—
24.00 (609.6)	HM7R24	6648C22G21	6648C23G17	4217B37G07	—	—
<b>N-Frame (ND and NG)</b>						
6.00 (152.4)	HM5R06	6648C22G21	6648C23G08	4217B37G08	WHM5R06	WHM5R06X
12.00 (304.8)	HM5R12	6648C22G21	6648C23G08	4217B37G05	WHM5R12	WHM5R12X
16.00 (406.4)	HM5R16	6648C22G21	6648C23G08	4217B37G06	WHM5R16	WHM5R16X
24.00 (609.6)	HM5R24	6648C22G21	6648C23G08	4217B37G07	WHM5R24	WHM5R24X

**Notes**

- ① Complete catalog number includes the standard handle, mechanism, shaft and support brace/bracket.
- ② Handle is designed suitable for NEMA Types 1, 3R and 12 enclosures. Use style number **6648C22G03** for Type 4/4X handle or add **X** Suffix to complete catalog number. Handle is cast aluminum.
- ③ Breaker mechanism includes a shaft support bracket and its parts. Shaft is .50-inch (12.7 mm).
- ④ Longer shafts, 16-inch (406.4 mm) and 24-inch (609.6 mm), include an adjustable support extension.
- ⑤ IEC handle mechanism supplied with metric thread mounting hardware.
- ⑥ Complete catalog number includes a handle, mechanism and shaft.

Handle Mechanisms



Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft. . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C . . . . .	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Product Selection . . . . .	<b>V4-T2-453</b>
Flex Shaft. . . . .	<b>V4-T2-454</b>
Handle Extension. . . . .	<b>V4-T2-457</b>

**Direct (Close-Coupled) Handle Mechanisms**

**Product Description**

Direct (close-coupled) handle mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-door type mechanism is not practical or cannot be used.

The Universal Direct handle mechanisms are rated Type 1 and Type 12.

The Universal Direct handle mechanism is available as standard with a door interlock to prevent opening the enclosure while the circuit breaker is in the ON position. It is also available without a door interlock.

**Application Description**

Direct (close-coupled) handle mechanisms are typically used for applications where high volume, standardized enclosures are being fabricated.

**Standards and Certifications**

The Universal Direct handle mechanism is IEC 60947-1 and IEC 60947-2 compliant.

**Product Selection**

**Direct (Close-Coupled) Handle Mechanisms**

**Euro IEC Direct**

Frame	Black Handle
	Catalog Number
F	<b>HMCC1B</b>
J	<b>HMCC2B</b>
K	<b>HMCC3B</b>
L and M	<b>HMCC4B</b>
N	<b>HMVD5B</b>
R	<b>HMVD6B</b>

**G Direct** ①

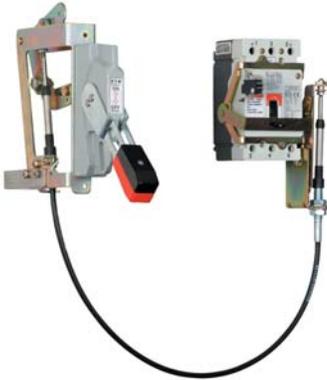
Frame	Black Handle		Yellow Handle	
	With Shroud Catalog Number	Without Shroud Catalog Number	With Shroud Catalog Number	Without Shroud Catalog Number
GD/GHC	<b>HRGCC1S</b>	<b>HRGCC10</b>	<b>HRGCC3S</b>	<b>HRGCC30</b>
GMCP	<b>HRGMC1S</b>	<b>HRGMC10</b>	<b>HRGMC3S</b>	<b>HRGMC30</b>

**Note**

① Suitable for use on two- or three-pole G-Frame.

#### Handle Mechanisms

2



### Flex Shaft

#### Product Description

##### **Flange-Mounted Handle Mechanisms**

Flange-mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9m) through 10 feet (3m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8 inches (9.5 mm). It can be used with Type 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with Type 4 environments.

Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes—a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs, and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

### Contents

#### **Description**

	<b>Page</b>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft . . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C . . . . .	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft . . . . .	
Product Selection . . . . .	
Handle Extension . . . . .	<b>V4-T2-457</b>

#### **Standards and Certifications**

Flex Shaft is UL listed under File E64983 and meets CSA requirements.



## Product Selection

### Handle Mechanisms

#### Flex Shaft <sup>①②</sup>

Breaker Frame	Flexible Shaft Length in Feet (m)							
	3 (0.9) Catalog Number	4 (1.2) Catalog Number	5 (1.5) Catalog Number	6 (1.8) Catalog Number	7 (2.1) Catalog Number	8 (2.4) Catalog Number	9 (2.7) Catalog Number	10 (3.0) Catalog Number
G <sup>①</sup>	F0S03C	F0S04C	F0S05C	F0S06C	—	—	—	—
F	F1S03C	F1S04C	F1S05C	F1S06C	F1S07C	F1S08C	F1S09C	F1S10C
F (dual)	F1S03CD	F1S04CD	F1S05CD	F1S06CD	F1S07CD	F1S08CD	F1S09CD	F1S10CD
J	F2S03C	F2S04C	F2S05C	F2S06C	F2S07C	F2S08C	F2S09C	F2S10C
K	F3S03C	F3S04C	F3S05C	F3S06C	F3S07C	F3S08C	F3S09C	F3S10C
L and MDL	—	F4S04C	F4S05C	F4S06C	—	—	—	F4S10C
N	—	F5S04C	F5S05C	F5S06C	—	—	—	F5S10C
R	—	F6S04	F6S05	F6S06	—	—	—	—
MD, MDS (old)	—	F7S04	F7S05	F7S06	—	—	—	F7S10C

#### High Performance Flex Shaft <sup>①②</sup>

Breaker Frame	Flexible Shaft Length in Feet (m)							
	3 (0.9) Catalog Number	4 (1.2) Catalog Number	5 (1.3) Catalog Number	6 (1.8) Catalog Number	7 (2.1) Catalog Number	8 (2.4) Catalog Number	9 (2.7) Catalog Number	10 (3.1) Catalog Number
G	F0S03HP	F0S04HP	F0S05HP	F0S06HP	N/A	N/A	N/A	N/A
F	F1S03HP	F1S04HP	F1S05HP	F1S06HP	F1S07HP	F1S08HP	F1S09HP	F1S10HP
F (dual)	F1S03HPD	F1S04HPD	F1S05HPD	F1S06HPD	F1S07HPD	F1S08HPD	F1S09HPD	F1S10HPD
J	F2S03HP	F2S04HP	F2S05HP	F2S06HP	F2S07HP	F2S08HP	F2S09HP	F2S10HP
K	F3S03HP	F3S04HP	F3S05HP	F3S06HP	F3S07HP	F3S08HP	F3S09HP	F3S10HP
L and MDL	N/A	F4S04HP	F4S05HP	F4S06HP	N/A	N/A	N/A	F4S10HP
N	N/A	F5S04HP	F5S05HP	F5S06HP	N/A	N/A	N/A	F5S10HP
R	N/A	F6S04HP	F6S05HP	F6S06HP	N/A	N/A	N/A	N/A

### Flange-Mounted Handle Mechanisms

#### Type C371

Circuit Breaker or Motor Circuit Protector	Frame Size	Variable Depth Mounting Range Min./Max. <sup>②③</sup>	Operating Mechanism Only <sup>④</sup>	Operating Mechanism w/ 4-Inch Handle	
			Catalog Number	For NEMA 1–12 Enclosure Catalog Number	For NEMA 4/4X Enclosure Catalog Number
HMCP and Series C—EHD, FDB, FD, FDC, HFD, ED	150	6.50–16 (165.1–406.4)	C371E	C371E1	C371E2
HMCP and Series C—HJD, JD, JDB, JDC	250	6.50–16.63 (165.1–422.4)	C371F	C371F5	C371F6
HMCP and Series C—DK, HKD, KD, KDB	400	6.50–16.63 (165.1–422.4)	C371F	C371F5	C371F6
Series C—HLD, LD, LDC	600	8.50–22 (215.9–558.8)	C371G	C371G5	C371G6
Series C MD, MDS—(No MDL)	800	8.75–22 (222.3–558.8)	C371K	C371K5	C371K6
Series C—HND, ND, NDC	1200	9.75–22 (247.7–558.8)	C371K	C371K5	C371K6

#### Notes

- ① Suitable for GC/GD MCCB; not suitable for GMCP.
- ② For increased maximum allowable depth, see connecting rods on **Page V4-T2-456**.
- ③ Dimensions shown are from panel flange surface.
- ④ Does not include handle.

Type 4/4X handle mechanisms are available. Add Suffix **X** to complete catalog number. Add Suffix **I** to complete catalog number for IEC handle. Original narrow handle design (No C Suffix) is available. Remove C from catalog number.

When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) (5 inches, 12.7 mm for L-, N- and R-Frames) is maintained to operate properly. The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

Dual breakers operator available on F-Frame only. Only the F, J and K can mount LH and RH all other RH only.

# 2.6

## Molded Case Circuit Breakers

### Handle Mechanisms

Approximate Dimensions in Inches (mm)

2

#### Handle Only

Circuit Breaker Frame Size (Amperes)	NEMA Enclosure Type	Operating Handle Length	Catalog Number
150	1/3R/3/12	4.00 (101.6)	<b>C371H1</b>
	4/4X	4.00 (101.6)	<b>C371H2</b>
	1/3R/3/12	6.00 (152.4)	<b>C371H3</b>
	4/4X	6.00 (152.4)	<b>C371H4</b>
250–1200	1/3R/3/12	4.00 (101.6)	<b>C371H5</b>
	4/4X	4.00 (101.6)	<b>C371H6</b>
	1/3R/3/12	6.00 (152.4)	<b>C371H7</b>
	4/4X	6.00 (152.4)	<b>C371H8</b>

#### Channel Support Kit (Rod Not Supplied)

For use to prevent bending of the operating handle mounting surface. This is especially useful when the operating handle is mounted on a channel in a multi-door enclosure.

Amperes	Catalog Number
600–1200	<b>C371CS6</b>

#### Connecting Rods <sup>①</sup>

Application	Catalog Number
Disconnect switches (30, 60, 100, 200 A sizes)	<b>C371CS1</b>
Circuit breakers (150, 250, 400 A sizes)	<b>C371CS1</b>
Circuit breakers (600, 800, 1200 A sizes)	<b>C371CS2</b>

#### Note

<sup>①</sup> Increase maximum allowable depth by 5 inches (127 mm).

Handle Extension



Contents

<i>Description</i>	<i>Page</i>
Handle Mechanisms—Series G . . . . .	<b>V4-T2-433</b>
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-434</b>
Universal Rotary . . . . .	<b>V4-T2-439</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-441</b>
Flex Shaft. . . . .	<b>V4-T2-442</b>
Handle Mechanisms—Series C . . . . .	
High-Performance Rotary Handle Mechanisms . . . . .	<b>V4-T2-447</b>
Series C Rotary . . . . .	<b>V4-T2-451</b>
Direct (Close-Coupled) Handle Mechanisms . . . . .	<b>V4-T2-453</b>
Flex Shaft. . . . .	<b>V4-T2-454</b>
Product Selection . . . . .	<b>V4-T2-455</b>

Handle Extension

Product Description

- Suitable for use on two- or three-pole G-Frame
- Not included with J, K, L, M and N-Frame breakers; it must be purchased separately
- Included with R-Frame breakers

Product Selection

Handle Extension



Handle Extension ①②

Frame	Style Number
J, K	HEX3
L, M	HEX4
N	HEX5
R	HEX6

Notes

- ① Handle extension is not included with J, K, L, M and N-Frame breakers. It must be purchased separately.
- ② Handle extension is included with breaker with R-Frame breakers.