

### Molded Case Circuit Breaker Product Family



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### 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 price adder.) (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

E- to R-Framed circuit breakers can be supplied to meet the following marine specifications:

- U.S. Coast Guard CFR 46; ABS—American Bureau of Shipping; IEEE 45; DNV; Lloyds; and ABS/NVR

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 NF C 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.



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## Molded Case Circuit Breakers

### Series C

#### Quick Reference

#### Industrial Circuit Breakers

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#### G-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					
GHB	15–100	1	120	125	N.I.T.U.	11a	65	—	—	—	—	—	—	14	—	V4-T2-126
GHB	15–100	2, 3	240	125/250	N.I.T.U.	11a10b, 11b	—	—	65	—	—	—	—	14	—	V4-T2-126
GHB	15–100	1	277	125	N.I.T.U.	12b, 14b	—	—	—	14	—	—	14	—	—	V4-T2-126
GHB	15–100	2, 3	480Y/277	125/250	N.I.T.U.	15b	—	—	—	14	14	—	—	14	—	V4-T2-126
HGHB	15–30	1	277	125	N.I.T.U.	12c, 13a, 13b	65	—	—	25	—	—	14	—	—	V4-T2-126
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-T2-124
GDB	15–100	3	480	250	N.I.T.U.	—	—	—	—	—	14	—	—	10	—	V4-T2-124
GD	15–50	2	480	125/250	N.I.T.U.	13b	—	—	65	—	14	—	—	10	—	V4-T2-123
GD	15–100	3	480	250	N.I.T.U.	13b	—	—	65	—	22	—	—	10	—	V4-T2-123
GHC	15–100	1	120	125	N.I.T.U.	12c, 13a	65	—	—	—	—	—	14	—	—	V4-T2-131
GHC	15–100	2, 3	240	125/250	N.I.T.U.	13b	—	—	65	—	—	—	—	1	—	V4-T2-131
GHC	15–100	1	277	125	N.I.T.U.	12c, 13a	—	—	—	14	—	—	14	—	—	V4-T2-131
GHC	15–100	2, 3	480Y/277	125/250	N.I.T.U.	13b	—	—	—	14	14	—	—	14	—	V4-T2-131
HGHC	15–30	1	277	125	N.I.T.U.	—	65	—	—	25	—	—	14	—	—	V4-T2-131

#### 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.

## 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>					
							120	120/240	240	277	480	600	125	250		
EDB	100–225	2, 3	240	125	N.I.T.U.	—	—	—	—	22	—	—	—	10	—	V4-T2-135
EDS	100–225	2, 3	240	125	N.I.T.U.	—	—	—	—	42	—	—	—	10	—	V4-T2-135
ED	15–225	2, 3	240	125	N.I.T.U.	12b	—	—	—	65	—	—	—	10	—	V4-T2-135
EDH	100–225	2, 3	240	125	N.I.T.U.	14b	—	—	—	100	—	—	—	10	—	V4-T2-135
EDC	100–225	2, 3	240	125	N.I.T.U.	1	—	—	—	200	—	—	—	10	—	V4-T2-135
EHD	15–100	1	277	125	N.I.T.U.	13a	—	—	—	14	—	—	—	10	—	V4-T2-135
EHD	15–100	2, 3	480	250	N.I.T.U.	13b	—	—	—	18	—	14	—	—	10	V4-T2-135
FDB	15–150	2, 3	600	250	N.I.T.U.	18a	—	—	—	18	—	14	14	—	10	V4-T2-135
FDB	15–150	4	600	250	N.I.T.U.	③	—	—	—	18	—	14	14	—	10	V4-T2-135
FD	15–150	1	277	125	N.I.T.U.	13a	—	—	—	35	—	—	—	10	—	V4-T2-135
FD	15–225	2, 3	600	250	N.I.T.U.	22a	—	—	—	65	—	35	18	—	10	V4-T2-135
FD	15–225	4	600	250	N.I.T.U.	③	—	—	—	65	—	35	18	—	10	V4-T2-135
FDE	15–225	3	600	—	N.I.T.U.	—	—	—	—	65	—	35	18	—	—	V4-T2-135
HFD	15–150	1	277	125	N.I.T.U.	13a	—	—	—	65	—	—	—	10	—	V4-T2-135
HFD	15–225	2,3	600	250	N.I.T.U.	22a	—	—	—	100	—	65	25	—	22	V4-T2-135
HFD	15–225	4	600	250	N.I.T.U.	③	—	—	—	100	—	65	25	—	22	V4-T2-135
HFDE	15–225	3	600	—	N.I.T.U.	—	—	—	—	100	—	65	25	—	—	V4-T2-135
FDC <sup>④</sup>	15–225	2, 3	600	250	N.I.T.U.	24a	—	—	—	200	—	100	35	—	22	V4-T2-135
FDC <sup>④</sup>	15–225	4	600	250	N.I.T.U.	③	—	—	—	200	—	100	35	—	22	V4-T2-135
FDCE <sup>④⑤</sup>	15–225	3	600	—	N.I.T.U.	—	—	—	—	200	—	100	25	—	—	V4-T2-135

**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.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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-T2-156
JD	70–250	2, 3, 4	600	250	I.T.U.	22a	—	—	65	—	35	18	—	10	V4-T2-155
HJD	70–250	2, 3, 4	600	250	I.T.U.	22a	—	—	100	—	65	25	—	22	V4-T2-155
JDC ③	70–250	2, 3, 4	600	250	I.T.U.	22a	—	—	200	—	100	35	—	22	V4-T2-155

#### 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-T2-167
KDB	100–400	2, 3	600	250	N.I.T.U.	23a	—	—	65	—	35	25	—	10	V4-T2-167
KD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	10	V4-T2-164, V4-T2-165, V4-T2-169, V4-T2-172
CKD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	V4-T2-166, V4-T2-175, V4-T2-177
HKD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	22	V4-T2-164, V4-T2-165, V4-T2-169, V4-T2-172
CHKD	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	V4-T2-166, V4-T2-175, V4-T2-177
KDC ③	100–400	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	65	—	22	V4-T2-164, V4-T2-165, V4-T2-169, V4-T2-172

#### 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-T2-190
LD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	22	V4-T2-188, V4-T2-189, V4-T2-194
CLD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	V4-T2-190, V4-T2-200
HLD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	V4-T2-188, V4-T2-189, V4-T2-194
CHLD	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	V4-T2-190, V4-T2-200
LDC ③	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	V4-T2-188, V4-T2-189, V4-T2-196
CLDC ③	300–600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	V4-T2-190, V4-T2-202

#### 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-T2-213, V4-T2-215
CMDL	300–800	2, 3	600	250	I.T.U.	23a	—	—	65	—	50	25	—	—	V4-T2-215
HMDL	300–800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	V4-T2-213, V4-T2-215
CHMDL	300–800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	V4-T2-215

#### 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**



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External Accessories . . . . .	V4-T2-304

**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

# 2.3

## Molded Case Circuit Breakers

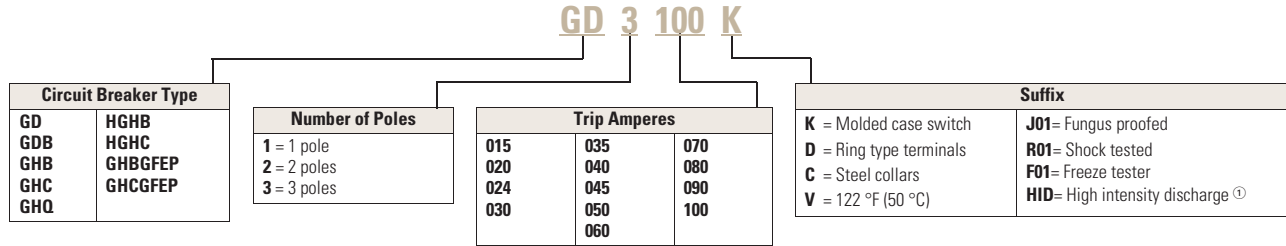
### Series C

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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.

#### 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	250 ②③
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> ) ④
<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 Only</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 Time constant is 8 milliseconds minimum.
- ③ Two poles of three-pole circuit breaker.
- ④ Not UL listed sizes.

Typical G-Frame Circuit Breaker



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**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 Three-Pole Catalog Number
	14 kAIC at 480 Vac Includes Line and Load Terminals Two-Pole Catalog Number	22 kAIC at 480 Vac 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.

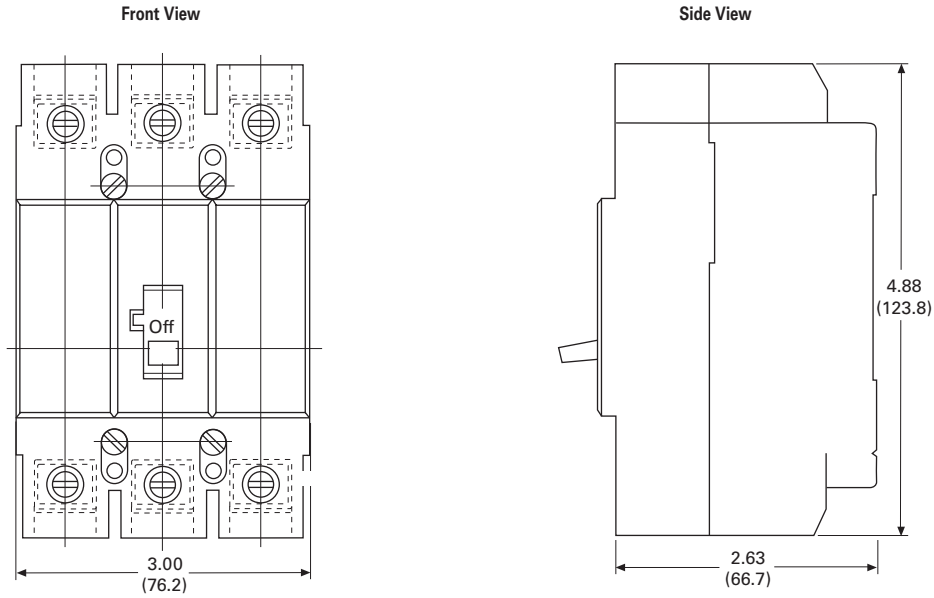
<sup>②</sup> Includes binding head screws and clamps 10–32 x 0.312.

Molded case switches may open above 1300 amperes.

## Dimensions

Approximate Dimensions in Inches (mm)

### GD-Frame, Three-Pole



Typical GHB



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K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-161</b>
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### 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/277V:
  - Single-pole: Classes 12c, 13a
  - Two-, three-pole: Class 13b
  - Type HGHB 277V
  - Type GHQ 277V



Product Selection

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	Single-Pole Catalog Number	Two-Pole Catalog Number	Single-Pole Catalog Number	Two-Pole Catalog Number
15	GHB1015 <sup>④⑤</sup>	GHB2015 <sup>④</sup>	GHB1015 <sup>④⑤</sup>	GHB2015 <sup>④</sup>	GHB3015 <sup>④</sup>	GHB3015 <sup>④</sup>
20	GHB1020 <sup>④⑤</sup>	GHB2020 <sup>④</sup>	GHB1020 <sup>④⑤</sup>	GHB2020 <sup>④</sup>	GHB3020 <sup>④</sup>	GHB3020 <sup>④</sup>
25	GHB1025	GHB2025	GHB1025	GHB2025	GHB3025	GHB3025
30	GHB1030	GHB2030	GHB1030	GHB2030	GHB3030	GHB3030
35	GHB1035	GHB2035	GHB1035	GHB2035	GHB3035	GHB3035
40	GHB1040	GHB2040	GHB1040	GHB2040	GHB3040	GHB3040
45	GHB1045	GHB2045	GHB1045	GHB2045	GHB3045	GHB3045
50	GHB1050	GHB2050	GHB1050	GHB2050	GHB3050	GHB3050
60	GHB1060	GHB2060	GHB1060	GHB2060	GHB3060	GHB3060
70	GHB1070	GHB2070	GHB1070	GHB2070	GHB3070	GHB3070
80	GHB1080	GHB2080	GHB1080	GHB2080	GHB3080	GHB3080
90	GHB1090	GHB2090	GHB1090	GHB2090	GHB3090	GHB3090
100	GHB1100	GHB2100	GHB1100	GHB2100	GHB3100	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	Two-Pole Catalog Number
15	HGHB1015 <sup>⑥</sup>	HGHB2015 <sup>⑥</sup>
20	HGHB1020 <sup>⑥</sup>	HGHB2020 <sup>⑥</sup>
25	HGHB1025	HGHB2025
30	HGHB1030	HGHB2030

**Notes**

- ① 480Y/277 V, circuit breakers (Type GHB) not suitable for three-phase delta (480 V).
- ② 15 through 70 ampere circuit breakers only.
- 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.

# 2.3

## Molded Case Circuit Breakers

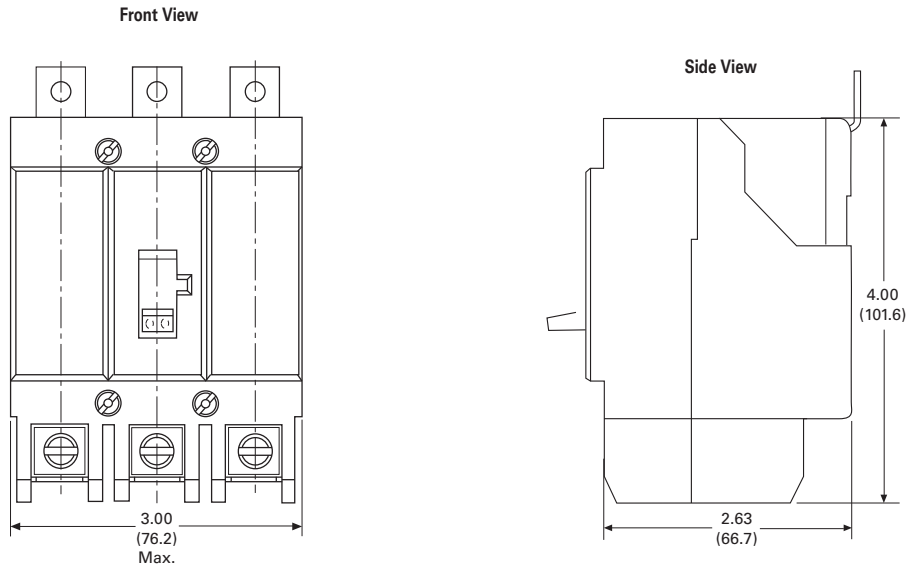
### Series C

#### Dimensions

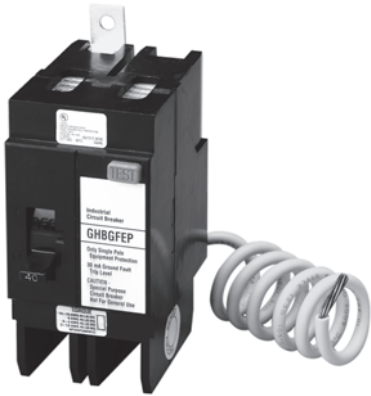
Approximate Dimensions in Inches (mm)

2

#### GDB-Frame, Three-Pole



Single-Phase (requires two poles)



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**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

# 2.3

## Molded Case Circuit Breakers

### Series C

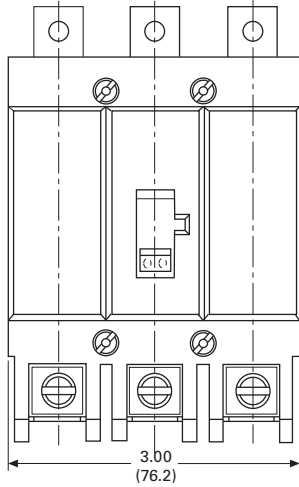
#### Dimensions

Approximate Dimensions in Inches (mm)

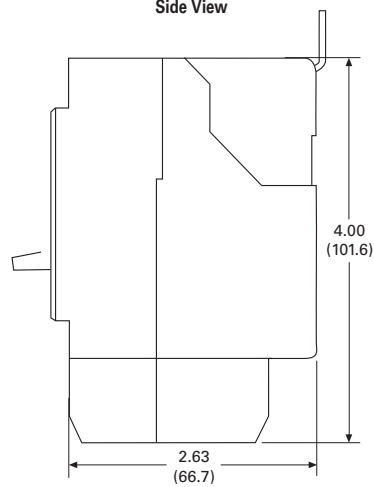
2

#### GHB-Frame, Three-Pole

Front View



Side View



Typical GHC



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**Types GHC and HGHC Circuit Breakers (15–100 Amperes)**

**Product Description**

- 15–100 amperes
- 120, 240, 277, 480Y/277V, 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/277V:
  - Single-pole: Classes 12c, 13a
  - Two-, three-pole: Class 13b
  - UL/CSA





## Product Selection

## 2

## 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
15	GHC1015 ③④	GHC2015 ③	GHC3015 ③
20	GHC1020 ③④	GHC2020 ③	GHC3020 ③
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	HGHC1015 ⑤
20	HGHC1020 ⑤
25	HGHC1025
30	HGHC1030

**Notes**

- ① 15 through 70 ampere circuit breakers only.
- ② Use two outside poles.
- 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)



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**Type GHCGFEP 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 GHCGFEP 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units**

Continuous Ampere Rating at 40 °C	Single-Phase (Requires Two Poles) 277V, 30 mA	
		Catalog Number
15		GHCGFEP1015
20		GHCGFEP1020
30		GHCGFEP1030
40		GHCGFEP1040
50		GHCGFEP1050
60		GHCGFEP1060

**Technical Data and Specifications**

**Interrupting Capacity Ratings**

Circuit Breaker Type	Number of Poles	Interrupting Capacity (Symmetrical Amperes)	
			277 Vac (50/60 Hz)
GHCGFEP	1		14,000

#### Special Purpose Circuit Breakers

2



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### 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

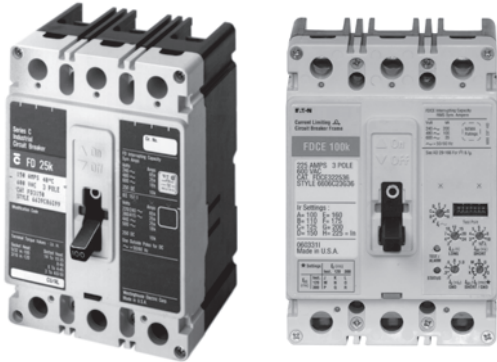
Continuous Ampere Rating at 40 °C	277 Vac Maximum, 125 Vdc Maximum	480Y/277 Vac Maximum, 125/250 Vdc Maximum	480Y/277 Vac Maximum, 125/250 Vdc Maximum <sup>①</sup>
	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
25	GHC1025D	GHC2025D	GHC3025D
30	GHC1030D	GHC2030D	GHC3030D
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

**Note**  
<sup>①</sup> Use two outside poles.

**Typical F-Frame Breaker**  
**F-Frame Breaker with Electronic Trip Unit**



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**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

# 2.3

## Molded Case Circuit Breakers

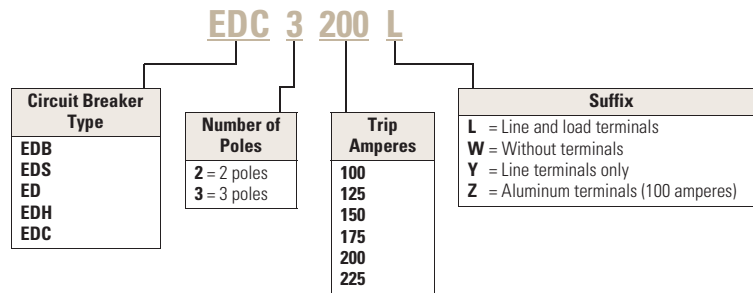
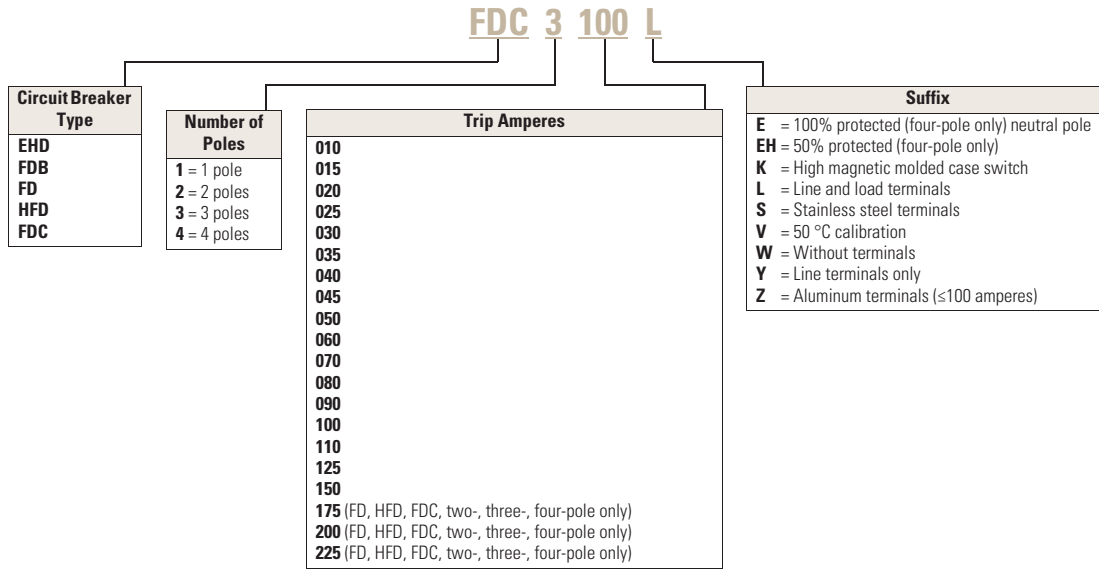
Series C

### 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.

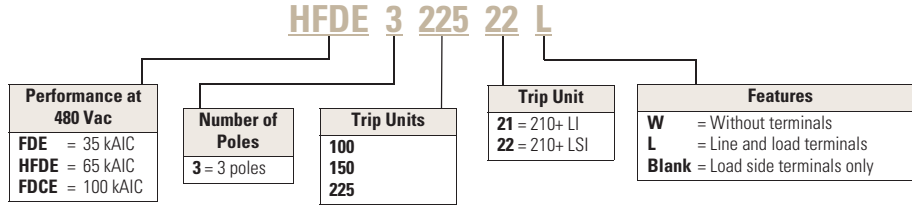
2

### FD-Frame Circuit Breakers with Thermal-Magnetic Trip Unit Technology

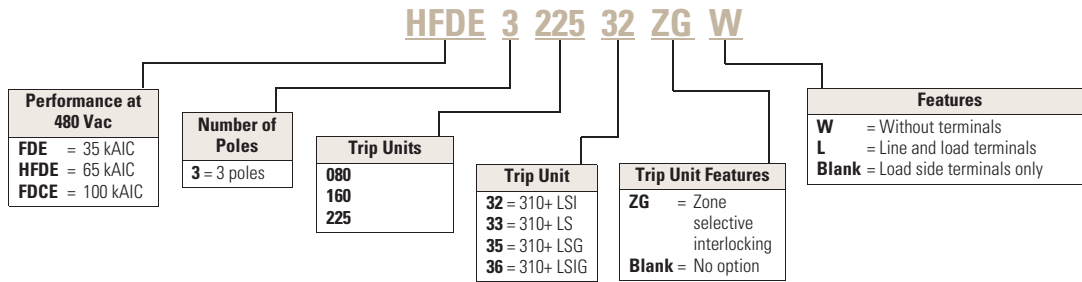


This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

### FD-Frame Circuit Breakers with 210+ Electronic Trip Unit Technology



### FD-Frame Circuit Breakers with 310+ Electronic Trip Unit Technology



## Product Selection

## 2

## 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 <sup>①</sup>	EHD1010	EHD2010	EHD3010
15	EHD1015 <sup>②</sup>	EHD2015	EHD3015
20	EHD1020 <sup>②</sup>	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

<sup>①</sup> Not UL listed. 5 kAIC interrupting rating.

<sup>②</sup> 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)**

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

**Notes**

① Not UL listed. 5 kAIC interrupting rating.

② UL listed for SWD applications, see NEC Article 240.83(d).

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## Molded Case Circuit Breakers

### Series C

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#### 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 Single-Pole	600 Vac Maximum, 250 Vdc 35 kAIC at 480 Vac		
	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).

**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 Single-Pole	600 Vac Maximum, 250 Vdc 65 kAIC at 480 Vac		
	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).

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## Molded Case Circuit Breakers

### Series C

#### Type FDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units (Includes Terminals on Load End Only)

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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

**Types FDE, HFDE and FDCE 310+ Electronic Circuit Breakers with Non-Interchangeable Trip Units**

See 310+ adjustability specifications on **Page V4-T2-151**.

Maximum Ampere Rating	Digitrip RMS 310+ Trip Unit Only		LSG Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	LSIG Independently Adjustable Short Time Pickup and Ground Fault Protection	Neutral CT for LSG and LSIG Catalog Number
	Standard LS Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp Catalog Number	Optional LSI Independently Adjustable Short Time Pickup and Delay Catalog Number			
<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 Adjustable Instantaneous Catalog Number	Optional LSI 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
<b>100 kAIC at 480 Vac / 25 kAIC at 600 Vac ②</b>		
100	FDCE310021	FDCE310022
150	FDCE315021	①
225	FDCE322521	FDCE322522

**210+ Trip Electronic Trip Units Amperage Settings**

Circuit Breaker Type	Frame	Ratings
FDE, HFDE, FDCE	225	100, 110, 125, 150, 175, 200, 225
FDE, HFDE, FDCE	150	70, 80, 90, 100, 110, 125, 150
FDE, HFDE, FDCE	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

**Notes**

- ① For 210+ trip unit, 150 A not available with LSI trip unit; entire range is covered by 100 A and 225 A frames.
- ② Contact the product line for availability.

# 2.3

## Molded Case Circuit Breakers

### Series C

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#### 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

### 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> ②
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> ②
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>3TA225FDK</b> ③

#### Notes

- ① Use on FDE, HFDE and FDCE electronic trip only.
- ② Not for use with ED, EDH, EDC breakers.
- ③ Includes terminal shield kit. Adds approximately 3 inches (76.2) to breaker height. Available for use on three-pole breaker only.



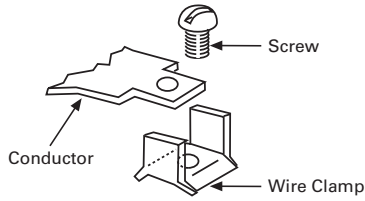
# 2.3

## Molded Case Circuit Breakers

### Series C

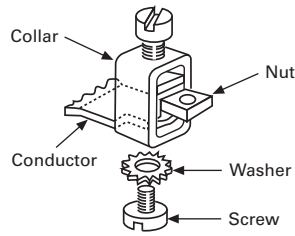
#### Line and Load Terminals

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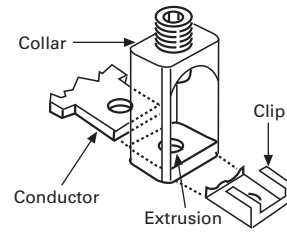
**3T20FB**

Assemble wire clamp to bottom of conductor as shown.



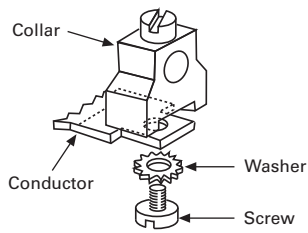
**3T100FB, 3T150FB**

Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer.  
**Caution:** Collar must surround conductor.



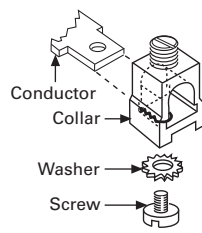
**3TA225FD**

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.



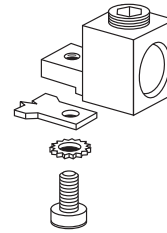
**3TA50FB**

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.



**3TA225FDK (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.

**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		
		Center	Left	Right	Left	Center	Right	Left	Center	Right	Neutral
<b>Internal Accessories (Only one internal accessory per pole)</b>											
Alarm lockout switch (make only)	V4-T2-275	■									
Alarm lockout (Make/Break)	V4-T2-275			■	□		□	■			
Alarm lockout (2Make/2Break)	V4-T2-275			■	□		□	■			
Auxiliary switch (1A, 1B)	V4-T2-277			■	■		■	■			■
Auxiliary switch (2A, 2B)	V4-T2-277			■	■		■	■			■
Auxiliary switch and alarm switch combination	V4-T2-279			■	□		□	■			
Shunt trip—standard	V4-T2-281			■	■		■	■			■
Shunt trip—low energy	V4-T2-285			■	■		■	■			
Undervoltage release mechanism	V4-T2-287			■	■		■	■			
<b>External Accessories</b>											
End cap kit	V4-T2-308		●	●	●	●	●	●	●	●	●
Keeper nut	V4-T2-308	●	●	●	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-309	●	●	●	●	●	●	●	●	●	●
Multewire connectors	V4-T2-310	●	●	●	●	●	●	●	●	●	●
Rear fed terminals	V4-T2-310	●	●	●	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-310	●	●	●	●	●	●	●	●	●	●
Terminal shields	V4-T2-312	●	●	●	●	●	●	●	●	●	●
Terminal end covers	V4-T2-313				●	●	●				
Interphase barriers	V4-T2-313		●	●	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-314	■	■			■		■			
Snap-on padlockable handle lock hasp	V4-T2-314	■	■			■		■			
Padlockable handle lock hasp	V4-T2-315			■	□		□	□		□	
Cylinder lock	V4-T2-315					■					
Key interlock kit	V4-T2-316			■	□		□	□		□	
Sliding bar interlock—requires two breakers	V4-T2-317					●	●	●			
Walking beam interlock—requires two breakers	V4-T2-317					●	●	●	●	●	●
Electrical (solenoid and motor) operators	V4-T2-318					●	●	●	●	●	●
Plug-in adapters	V4-T2-319					●	●	●	●	●	●
Rear connecting studs	V4-T2-321	●	●	●	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-322	●	●	●	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-430					●	●	●			
LFD current limiter	V4-T2-324					●	●	●			
IQ Energy Sentinel	V4-T2-324		●	●	●	●	●	●			
Cause of trip display	V4-T2-325					●		●			
Remote mount cause of trip display	V4-T2-325					●		●			
Cause of trip LED	V4-T2-325					●		●			
<b>Modifications (Refer to Eaton)</b>											
Special calibration	—	●	●	●	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●	●	●	●	●	●
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

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## 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 DC <sup>①</sup>	
		Volts AC (50/60 Hz)						
		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>⑦</sup>		■	CTF080
External neutral sensor (160 A) <sup>⑦</sup>		■	CTF160
External neutral sensor (225 A) <sup>⑦</sup>		■	CTF225
Compact external neutral sensor (80 A) <sup>⑦</sup>		■	CTFD080
Compact external neutral sensor (160 A) <sup>⑦</sup>		■	CTFD160
Compact external neutral sensor (225 A) <sup>⑦</sup>		■	CTFD225
Breaker-mount cause-of-trip indication		■	TRIP-LED
Breaker-mount ammeter module		■	DIGIVIEW
Remote-mount ammeter module		■	DIGIVIEWR06

## 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	2400
① $I_{sd}$ (x $I_r$ ) / $t_{sd}$ = 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
$t_{sd}$ = short delay time $I^2t$ (milliseconds) (LS, LSG)	Fixed	67 at10x	67 at10x	67 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
$t_{gd}$ = ground fault delay time (milliseconds) (LSG, LSIG)	Position 6	80	160	225
	Position 1	Inst	Inst	Inst
	Position 2	120	120	120
Independently Adjustable Instantaneous ( $I_i$ ) setting ①	Position 3	300	300	300
	Maintenance Mode pickup ( $2.5 \times I_n$ ) (amperes) ②			

Notes

- ① Not available for FD. Independently adjustable  $I_i$  setting available in LG, NG and RG ALSI and ALSIG trip units.
- ② Maintenance Mode not available for FD frames. It is available for KD, LD, MDL, LG, NG and RG.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

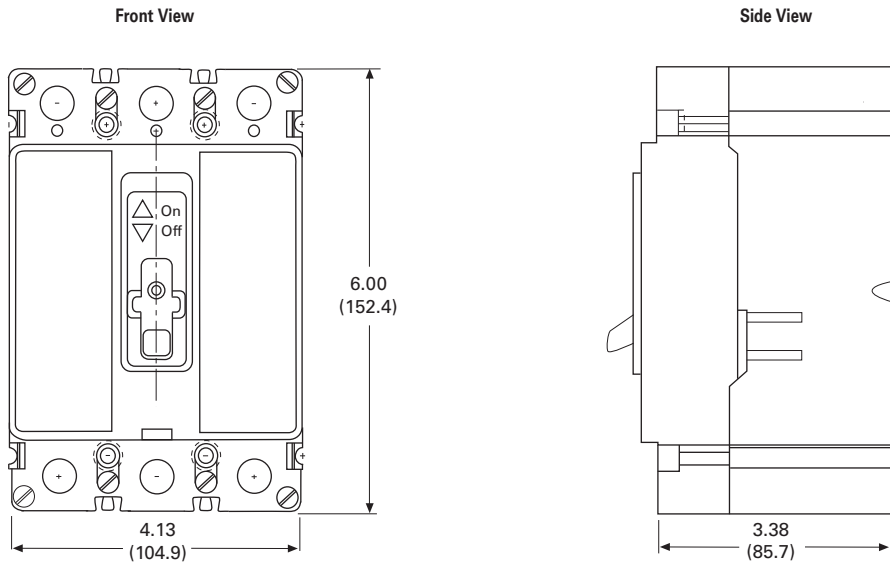
Approximate Dimensions in Inches (mm)

2

#### 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 Lbs (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



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**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

# 2.3

## Molded Case Circuit Breakers

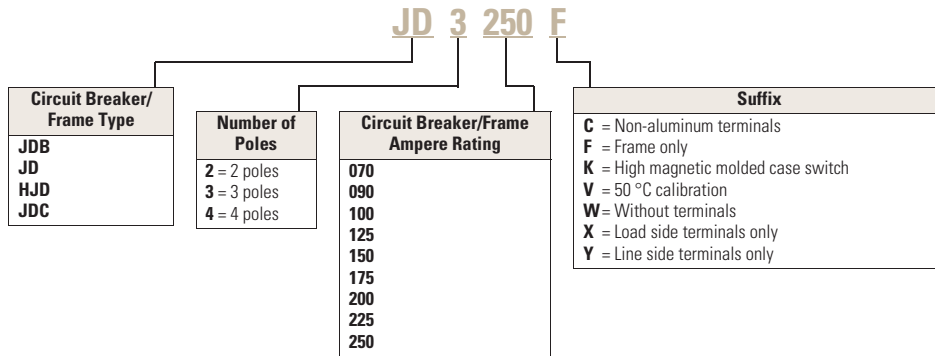
Series C

### Catalog Number Selection

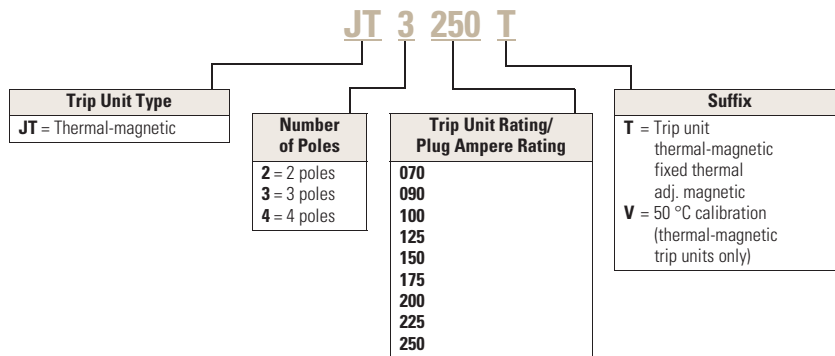
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

#### Circuit Breaker/Frame



#### Trip Unit



## Product Selection

## Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

2

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-T2-157 for Optional Terminals 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	JD4125	HJD4125	JDC4125	JT3125T	TA250KB ②
150	JD4150	HJD4150	JDC4150	JT3150T	
175	JD4175	HJD4175	JDC4175	JT3175T	
200	JD4200	HJD4200	JDC4200	JT3200T	
225	JD4225	HJD4225	JDC4225	JT3225T	
250	JD4250	HJD4250	JDC4250	JT3250T	

**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.



# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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-T2-157 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.

**Accessories Selection Guide and Ordering Information**

**Line and Load Terminals**

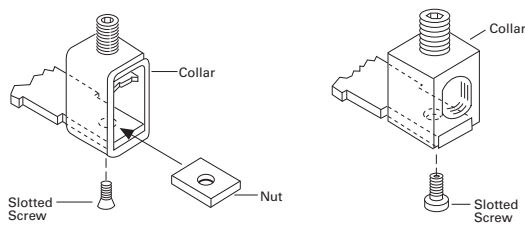
Eaton’s line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65, or Electrical Bulletin 1165.

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.



**T250KB Terminal**

**TA250KB Terminal (Standard)**

**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>

# 2.3

## Molded Case Circuit Breakers

### Series C

#### 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-T2-275	☐		☐	☐		☐	
Auxiliary switch (1A, 1B)	V4-T2-277	■		■	■		■	
Auxiliary switch (2A, 2B)	V4-T2-277	■		■	■		■	
Auxiliary switch and alarm switch combination	V4-T2-279	☐		☐	☐		☐	
Shunt trip—standard	V4-T2-282	■		■	■		■	
Shunt trip—low energy	V4-T2-285	■		■	■		■	
Undervoltage release mechanism	V4-T2-289	■		■	■		■	
<b>External Accessories</b>								
End cap kit	V4-T2-308	●	●	●	●	●	●	●
Plug nut	V4-T2-309	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-309	●	●	●	●	●	●	●
Multewire connectors	V4-T2-310	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-311	●	●	●	●	●	●	●
Terminal shields	V4-T2-312	●	●	●	●	●	●	●
Interphase barriers	V4-T2-313	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-314		■			■		
Padlockable handle block	V4-T2-314		■			■		
Padlockable handle lock hasp	V4-T2-315	☐		☐	☐		☐	
Cylinder lock	V4-T2-315	☐		☐				
Key interlock kit	V4-T2-316	☐		☐	☐		☐	
Sliding bar interlock—requires two breakers	V4-T2-317	●	●	●				
Electrical (solenoid) operator	V4-T2-319	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-319	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-321	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-322	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-430	●	●	●	●	●	●	●
Handle extension	V4-T2-445	●	●	●	●	●	●	●
IQ Energy Sentinel	V4-T2-324	●	●	●				
<b>Modifications (Refer to Eaton)</b>								
Special calibration	—	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●	●	●
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

### 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

#### 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.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

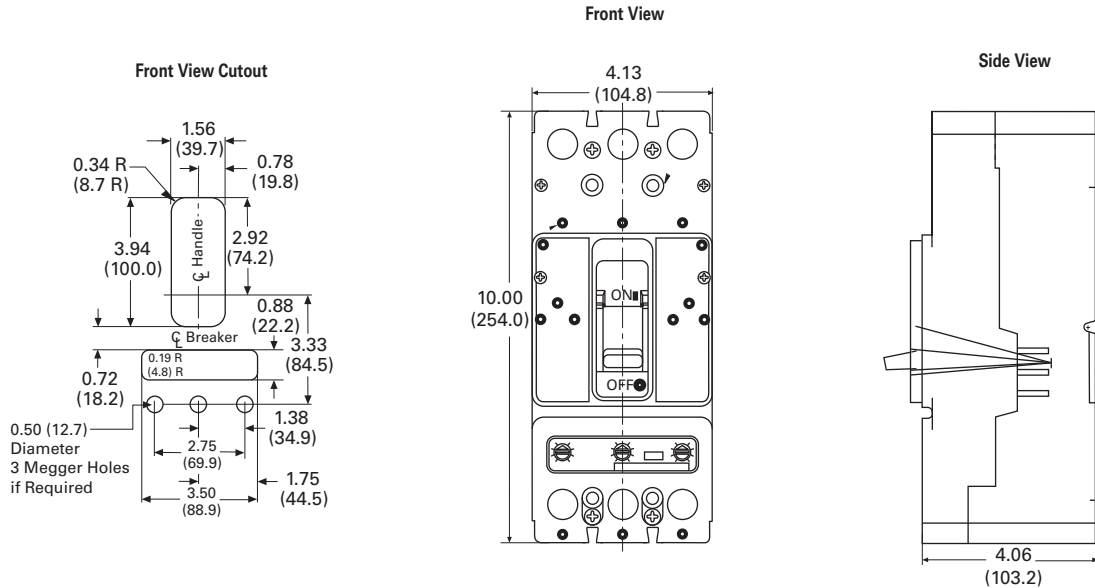
Approximate Dimensions in Inches (mm)

2

#### 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 Lbs (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



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External Accessories . . . . .	<b>V4-T2-304</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

# 2.3

## Molded Case Circuit Breakers

Series C

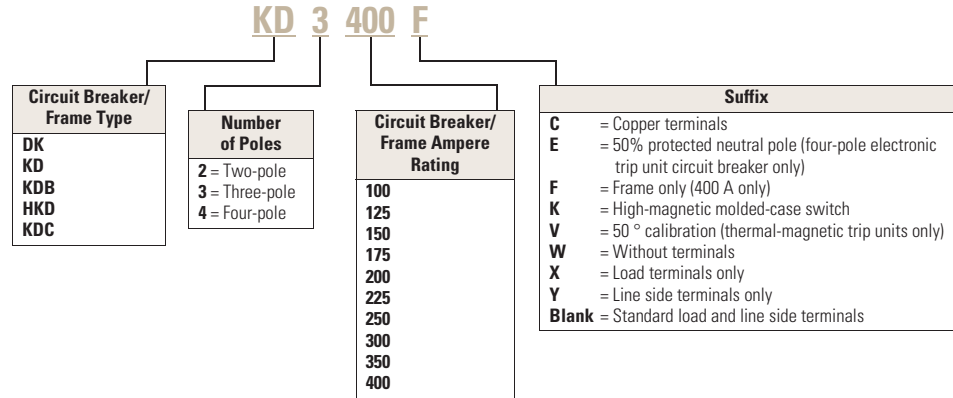
2

### Catalog Number Selection

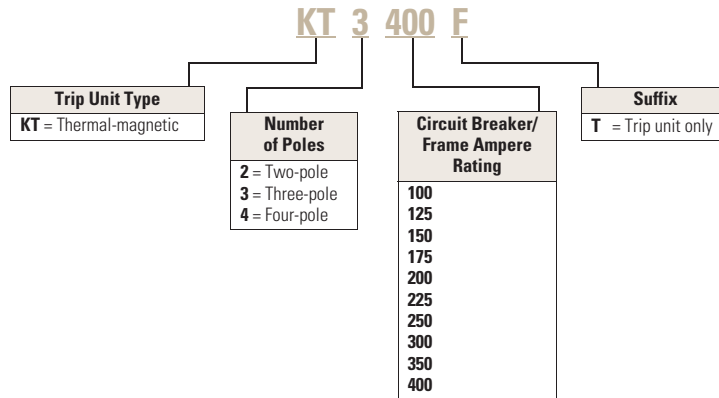
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

#### K-Frame with Thermal-Magnetic Trip Unit Technology

#### Thermal-Magnetic Breakers and Frames ①



#### Thermal-Magnetic Trip Unit ①

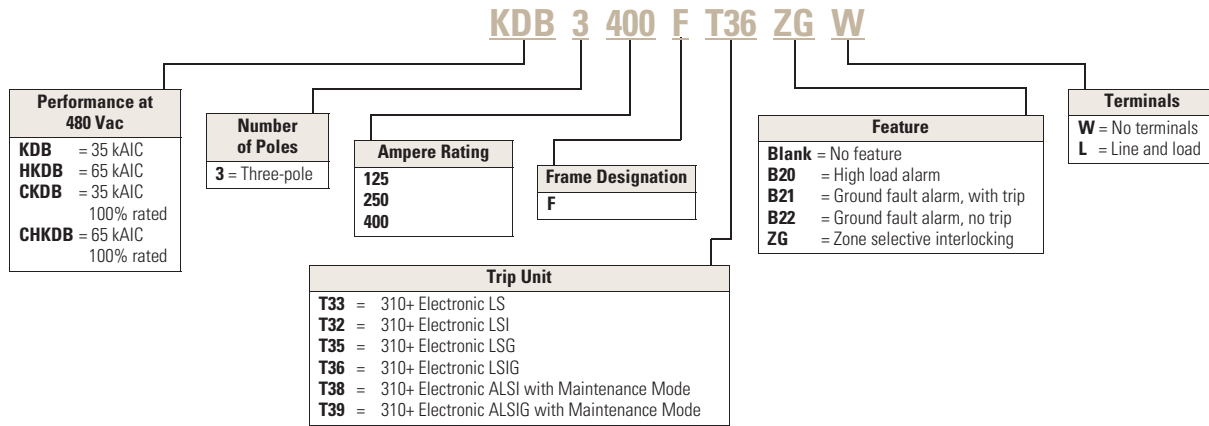


#### Notes

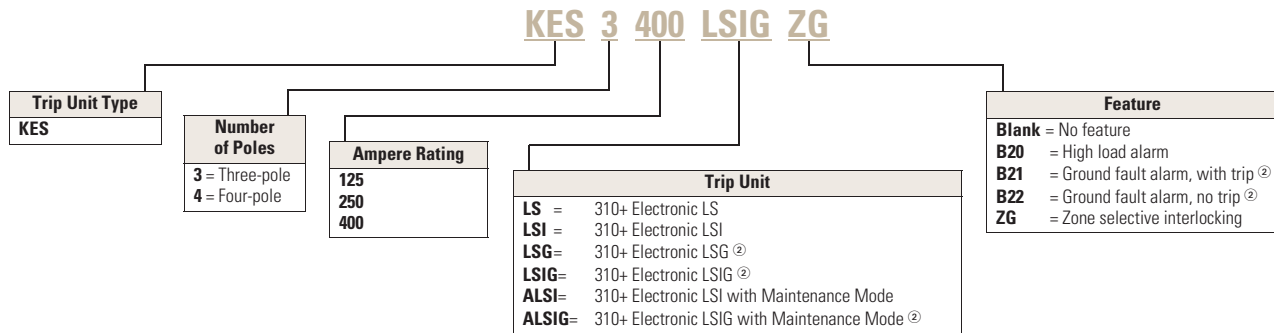
① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **KD3400F** or **HKD3400F**.  
Ampere rating available with electronic trip unit only.

**K-Frame with 310+ Electronic Trip Unit Technology** ①

**310+ Circuit Breakers** ②

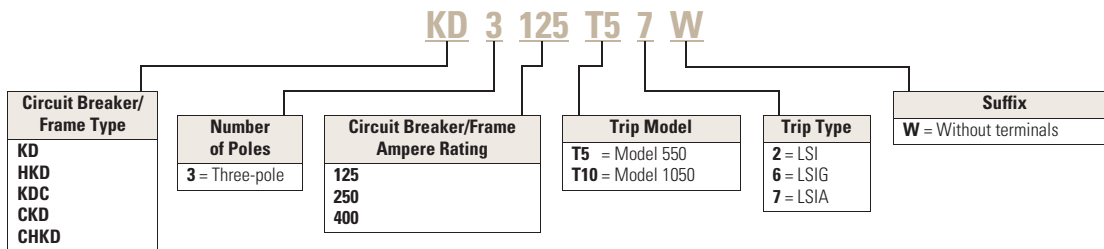


**310+ Electronic Trip Units** ③



**K-Frame with OPTIM Trip Unit Technology**

**OPTIM Circuit Breakers**



**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

## 2

## 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 Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ① Catalog Number	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 Catalog Number	Thermal-Magnetic Trip Unit Only ① For Use with Standard or High or Ultra High Interrupting Frames Catalog Number	Standard Terminals Only See Page V4-T2-179 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.

**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-T2-182**.

**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			Digitrip RMS 310+ Trip Unit Only ①				Neutral CT for LSG and LSIG ②③	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	Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac	Standard LS	Options LSI	LSG Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	LSIG Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection		
125	KD3400F	HKD3400F	KDC3400F	KES3125LS	KES3125LSI	KES3125LSG	KES3125LSIG	LGFACT25	See Page V4-T2-179
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 ④⑤**

Max. Cont. Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip RMS 310+ Trip Unit Only ①				Neutral CT for LSG and LSIG ②③	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	Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac	Standard LS	Options LSI	LSG Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay and Ground Fault Protection	LSIG Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection		
125	KD4400F	HKD4400F	KDC4400F	KES4125LS	KES4125LSI	—	—	—	See Page V4-T2-179
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.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Type KDB with Digitrip 310+ Non-Interchangeable Trip Unit Suitable for Reverse Feed

See 310+ adjustability specifications on [Page V4-T2-182](#).

2

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 <a href="#">Page V4-T2-180</a>
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-T2-182](#).

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 <a href="#">Page V4-T2-180</a>
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-T2-182](#).

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				
125	35 kAIC at 480 Vac CKD3400F	65 kAIC at 480 Vac CHKD3400F	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp KES3125LS	Independently Adjustable Short Time Pickup and Delay KES3125LSI	KES3125LSG	KES3125LSIG	LGFACT125	See <a href="#">Page V4-T2-179</a>
250	35 kAIC at 480 Vac CKD3400F	65 kAIC at 480 Vac CHKD3400F	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp KES3250LS	Independently Adjustable Short Time Pickup and Delay KES3250LSI	KES3250LSG	KES3250LSIG	LGFACT250	
400	35 kAIC at 480 Vac CKD3400F	65 kAIC at 480 Vac CHKD3400F	Adjustable Short Time Pickup with I <sup>2</sup> t Short Delay Ramp KES3400LS	Independently Adjustable Short Time Pickup and Delay 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.

**Types DK and KDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units**

Suitable for reverse feed application.

**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

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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	240 Vac Maximum, 250 Vdc	600 Vac Maximum, 250 Vdc	600 Vac Maximum, 250 Vdc
	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.

**Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug**

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

**Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug**

**Digitrip OPTIM Rating Plug Only**

**Circuit Breaker Frame Only**

- L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time ( $I^2t$  or  $I^4t$  Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$  or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)

**OPTIM 550 ②**

Maximum  
Continuous  
Ampere  
Rating  
at 40 °C

LSI  
Catalog  
Number

LSIG  
Catalog  
Number

LSIA  
Catalog  
Number

Ampere  
Rating

Fixed Rating Plug  
Catalog  
Number

**Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac**

Maximum Continuous Ampere Rating at 40 °C	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
125	KD3125T52W	KD3125T56W	KD3125T57W	70	ORPK125A70
				90	ORPK125A90
				100	ORPK125A100
				110	ORPK125A110
				125	ORPK125A125
250	KD3250T52W	KD3250T56W	KD3250T57W	125	ORPK025A125
				150	ORPK025A150
				175	ORPK025A175
				200	ORPK025A200
				225	ORPK025A225
				250	ORPK025A250
400	KD3400T52W	KD3400T56W	KD3400T57W	200	ORPK40A200
				225	ORPK40A225
				250	ORPK40A250
				300	ORPK40A300
				350	ORPK40A350
				400	ORPK40A400

**Notes**

- ① Long delay  $I^4t$  response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	L – Adjustable Long Delay Pickup (I <sub>1</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) <sup>①</sup> S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response)				
	OPTIM 550 <sup>②</sup>				
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>					
125	HKD3125T52W	HKD3125T56W	HKD3125T57W	70	ORPK125A70
				90	ORPK125A90
				100	ORPK125A100
				110	ORPK125A110
				125	ORPK125A125
250	HKD3250T52W	HKD3250T56W	HKD3250T57W	125	ORPK025A125
				150	ORPK025A150
				175	ORPK025A175
				200	ORPK025A200
				225	ORPK025A225
400	HKD3400T52W	HKD3400T56W	HKD3400T57W	200	ORPK40A200
				225	ORPK40A225
				250	ORPK40A250
				300	ORPK40A300
				350	ORPK40A350
				400	ORPK40A400

**Notes**

① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.

② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	L – Adjustable Long Delay Pickup (I <sub>1</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response)				
	OPTIM 550 ②				
<b>Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac</b>					
125	KDC3125T52W	KDC3125T56W	KDC3125T57W	70	ORPK125A70
				90	ORPK125A90
				100	ORPK125A100
				110	ORPK125A110
				125	ORPK125A125
250	KDC3250T52W	KDC3250T56W	KDC3250T57W	125	ORPK025A125
				150	ORPK025A150
				175	ORPK025A175
				200	ORPK025A200
				225	ORPK025A225
				250	ORPK025A250
400	KDC3400T52W	KDC3400T56W	KDC3400T57W	200	ORPK40A200
				225	ORPK40A225
				250	ORPK40A250
				300	ORPK40A300
				350	ORPK40A350
				400	ORPK40A400

Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.



# 2.3

## Molded Case Circuit Breakers

### Series C

#### Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

2

#### Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

##### Circuit Breaker Frame Only

L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time ( $I^2t$  or  $I^4t$  Response) ①

S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$  or Flat Response)

I – Adjustable Instantaneous Pickup

G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)

A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)

##### OPTIM 1050 ②

Maximum  
Continuous  
Ampere  
Rating  
at 40 °C

LSIG  
Catalog  
Number

LSIA  
Catalog  
Number

##### Digitrip OPTIM Rating Plug Only

Fixed Rating Plug  
Catalog  
Number

Ampere  
Rating

#### Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac

Maximum Continuous Ampere Rating at 40 °C	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
125	KD3125T106W	KD3125T107W	70	ORPK125A70
			90	ORPK125A90
			100	ORPK125A100
			110	ORPK125A110
			125	ORPK125A125
250	KD3250T106W	KD3250T107W	125	ORPK025A125
			150	ORPK025A150
			175	ORPK025A175
			200	ORPK025A200
			225	ORPK025A225
400	KD3400T106W	KD3400T107W	250	ORPK025A250
			200	ORPK40A200
			225	ORPK40A22
			250	ORPK40A250
			300	ORPK40A300
			350	ORPK40A350
			400	ORPK40A400

#### Notes

① Long delay  $I^4t$  response selection limits short delay time to flat response.

② Factory sealed.

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
L – Adjustable Long Delay Pickup (I <sub>1</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) OPTIM 1050 ②				
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>				
125	HKD3125T106W	HKD3125T107W	70	ORPK125A70
			90	ORPK125A90
			100	ORPK125A100
			110	ORPK125A110
			125	ORPK125A125
250	HKD3250T106W	HKD3250T107W	125	ORPK025A125
			150	ORPK025A150
			175	ORPK025A175
			200	ORPK025A200
			225	ORPK025A225
			250	ORPK025A250
			400	HKD3400T106W
225	ORPK40A225			
250	ORPK40A250			
300	ORPK40A300			
350	ORPK40A350			
400	ORPK40A400			

Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Factory sealed.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	L – Adjustable Long Delay Pickup (I <sub>1</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response)			
	OPTIM 1050 ②			
<b>Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac</b>				
125	KDC3125T106W	KDC3125T107W	70	ORPK125A70
			90	ORPK125A90
			100	ORPK125A100
			110	ORPK125A110
			125	ORPK125A125
250	KDC3250T106W	KDC3250T107W	125	ORPK025A125
			150	ORPK025A150
			175	ORPK025A175
			200	ORPK025A200
			225	ORPK025A225
			250	ORPK025A250
400	KDC3400T106W	KDC3400T107W	200	ORPK40A200
			225	ORPK40A225
			250	ORPK40A250
			300	ORPK40A300
			350	ORPK40A350
			400	ORPK40A400

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Factory sealed.

**100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug**

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

**100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug**

**Digitrip OPTIM Rating Plug Only**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>OPTIM 550 ②</b>					
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac</b>					
125	CKD3125T52W	CKD3125T56W	CKD3125T57W	70	ORPK125A70
				90	ORPK125A90
				100	ORPK125A100
				110	ORPK125A110
				125	ORPK125A125
250	CKD3250T52W	CKD3250T56W	CKD3250T57W	125	ORPK025A125
				150	ORPK025A150
				175	ORPK025A175
				200	ORPK025A200
				225	ORPK025A225
400	CKD3400T52W	CKD3400T56W	CKD3400T57W	250	ORPK025A250
				200	ORPK40A200
				225	ORPK40A225
				250	ORPK40A250
				300	ORPK40A300
				350	ORPK40A350
				400	ORPK40A400

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number (refer to **Page V4-T2-293**).

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time ( $I^2t$ or $I^4t$ Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$ or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$ or Flat Response) OPTIM 550 ②					
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>					
125	CHKD3125T52W	CHKD3125T56W	CHKD3125T57W	70	ORPK125A70
				90	ORPK125A90
				100	ORPK125A100
				110	ORPK125A110
				125	ORPK125A125
250	CHKD3250T52W	CHKD3250T56W	CHKD3250T57W	125	ORPK025A125
				150	ORPK025A150
				175	ORPK025A175
				200	ORPK025A200
				225	ORPK025A225
				250	ORPK025A250
400	CHKD3400T52W	CHKD3400T56W	CHKD3400T57W	200	ORPK40A200
				225	ORPK40A225
				250	ORPK40A250
				300	ORPK40A300
				350	ORPK40A350
				400	ORPK40A400

**Notes**

① Long delay  $I^4t$  response selection limits short delay time to flat response.

② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

**100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug**

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

**100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac</b>				
125	CKD3125T106W	CKD3125T107W	70	ORPK125A70
			90	ORPK125A90
			100	ORPK125A100
			110	ORPK125A110
			125	ORPK125A125
250	CKD3250T106W	CKD3250T107W	125	ORPK025A125
			150	ORPK025A150
			175	ORPK025A175
			200	ORPK025A200
			225	ORPK025A225
400	CKD3400T106W	CKD3400T107W	250	ORPK025A250
			200	ORPK40A200
			225	ORPK40A225
			250	ORPK40A250
			300	ORPK40A300
			350	ORPK40A350
			400	ORPK40A400

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Factory sealed.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

**Circuit Breaker Frame Only**

- L – Adjustable Long Delay Pickup ( $I_t$ ) with Adjustable Long Delay Time ( $I^2t$  or  $I^4t$  Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$  or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)

**Digitrip OPTIM Rating Plug Only**

Maximum Continuous Ampere Rating at 40 °C	OPTIM 1050 ②		Ampere Rating	Fixed Rating Plug Catalog Number
	LSIG Catalog Number	LSIA Catalog Number		
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>				
125	CHKD3125T106W	CHKD3125T107W	70	ORPK125A70
			90	ORPK125A90
			100	ORPK125A100
			110	ORPK125A110
			125	ORPK125A125
250	CHKD3250T106W	CHKD3250T107W	125	ORPK025A125
			150	ORPK025A150
			175	ORPK025A175
			200	ORPK025A200
			225	ORPK025A225
			250	ORPK025A250
400	CHKD3400T106W	CHKD3400T107W	200	ORPK40A200
			225	ORPK40A225
			250	ORPK40A250
			300	ORPK40A300
			350	ORPK40A350
			400	ORPK40A400

**Notes**

- ① Long delay  $I^4t$  response selection limits short delay time to flat response.
- ② Factory sealed.

**Accessories Selection Guide and Ordering Guide**

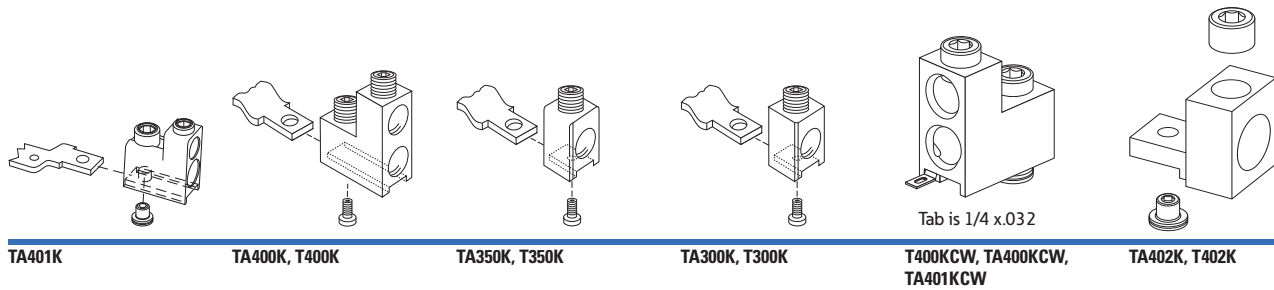
**Line and Load Terminals**

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.



**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 Catalog Number	Terminals with Control Wire Termination 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.



# 2.3

## Molded Case Circuit Breakers

### Series C

#### 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			
		Left	Right	Left	Center	Right	Left	Center	Right	Neutral
<b>Internal Accessories (Only One Internal Accessory Per Pole)</b>										
Alarm lockout (Make/Break)	V4-T2-276		■	□		□		■		
Alarm lockout (2Make/2Break)	V4-T2-276			□		□		■		
Auxiliary switch (1A, 1B)	V4-T2-278		■	■		■		■		■
Auxiliary switch (2A, 2B)	V4-T2-278			■		■		■		■
Auxiliary switch (3A, 3B)	V4-T2-278			■		■		■		■
Auxiliary switch and alarm switch combination	V4-T2-279			□		□		□		□
Shunt trip—standard <sup>②</sup>	V4-T2-282		■	■		■		■		■
Shunt trip—low energy <sup>②</sup>	V4-T2-285			■		■		■		
Undervoltage release mechanism <sup>②</sup>	V4-T2-290		■	■		■		■		
PowerNet or zone interlock kit (OPTIM 550)	V4-T2-293					■				
<b>External Accessories</b>										
End cap kit	V4-T2-308	●	●	●	●	●	●	●	●	●
Keeper nut	V4-T2-308	●	●	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-309	●	●	●	●	●	●	●	●	●
Terminal adapter	V4-T2-309	●	●	●	●	●	●	●	●	●
Multiwire connectors	V4-T2-310	●	●	●	●	●	●	●	●	●
Rear fed terminals	V4-T2-310	●	●	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-311	●	●	●	●	●	●	●	●	●
Terminal shields	V4-T2-313	●	●	●	●	●	●	●	●	●
Interphase barriers	V4-T2-313	●	●	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-314	■			■			■		
Padlockable handle block	V4-T2-314				■					
Padlockable handle lock hasp	V4-T2-315		■	□		□		□		□
Cylinder lock	V4-T2-315	□	□	□		□				
Key Interlock kit	V4-T2-316	■	□	□		□		□		□
Sliding bar interlock—requires two breakers	V4-T2-317			●	●	●				
Walking beam interlock—requires two breakers	V4-T2-317			●	●	●	●	●	●	●
Electrical (solenoid) operator	V4-T2-318			●	●	●	●	●	●	●
Plug-in adapters	V4-T2-319	●	●	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-321	●	●	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-322	●	●	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-430	●	●	●	●	●	●	●	●	●
Handle extension	V4-T2-445	●	●	●	●	●	●	●	●	●
IQ Energy Sentinel	V4-T2-324			●	●	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-324	●	●	●	●	●	●	●	●	●
<b>OPTIM System Components Three Poles</b>										
Breaker interface module (BIM)	V4-T2-325									
Digitrip OPTIMizer	V4-T2-325									
Auxiliary power module	V4-T2-325									

##### 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 or OPTIM trip units. Standard internal accessories cannot be mounted in right pole on any K-Frame OPTIM trip units. Special OPTIM ground fault and zone interlock accessories are available for field installation in the right pole of K-Frame 550 OPTIM trip units. Factory installed 2a/2b and bell/aux are available for factory installation. K-Frame breakers equipped with OPTIM 1050 trip units include aux-bell alarm in the right pole.

**KD Frame Accessories, continued**

Description	Reference Page	Two-Pole <sup>①</sup>		Three-Pole			Four-Pole			Neutral
		Left	Right	Left	Center	Right	Left	Center	Right	
<b>Modifications (Refer to Eaton)</b>										
Special calibration	—	●	●	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●	●	●	●	●
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>②</sup>
Trip unit tamper protection wire seal	5108A03H01
External neutral sensor, 400 A	LGFACT400 <sup>③</sup>
External neutral sensor, 250 A	LGFACT250 <sup>③</sup>
External neutral sensor, 125 A	LGFACT125 <sup>③</sup>
Breaker-mount cause-of-trip indication	TRIP-LED
Breaker-mount ammeter module	DIGIVIEW
Remote-mount ammeter module	DIGIVIEWR06 <sup>④</sup>

**Technical Data and Specifications**

**NEMA/UL 489/CSA Interrupting Capacity Ratings**

Circuit Breaker Type	Number of Poles	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	Interrupting Capacity (kA Symmetrical Amperes)							Volts DC <sup>⑤⑥</sup>
		Volts AC (50/60 Hz)							
		240	380	415	440	500	600	250 <sup>⑤⑥</sup>	
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	

**Notes**

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② MTST230V applies to 100–230 Vac.
- ③ Included with all LD LSG and LSG trip units and breakers.
- ④ Includes 6 ft cable for remote mounting; NEMA 3R rated.
- 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			
	125A	250 A	400 A	
$I_r$ = continuous current or long delay pickup (amperes) (All 310+)	$I_r \backslash I_n$			
	A (=I <sub>r</sub> )	55	100	160
	B (=I <sub>r</sub> )	60	125	200
	C (=I <sub>r</sub> )	70	150	225
	D (=I <sub>r</sub> )	80	160	250
	E (=I <sub>r</sub> )	90	175	300
	F (=I <sub>r</sub> )	100	200	315
	G (=I <sub>r</sub> )	110	225	350
	H (=I <sub>r</sub> =I <sub>n</sub> )	125	250	400
$t_r$ = long delay time (seconds) (All 310+)				
	2	2	2	2
	4	4	4	4
	7	7	7	7
	10	10	10	10
	12	12	12	12
	15	15	15	15
	20	20	20	20
	24	24	24	24
$I_{sd}$ (x I <sub>r</sub> ) = short delay pickup (amperes) (All 310+)				
	Position 1	2	2x	2x
	Position 2	3	3x	3x
	Position 3	4	4x	4x
	Position 4	5	5x	5x
	Position 5	6	6x	6x
	Position 6	7	7x	7x
	Position 7	8	8x	8x
	Position 8	10	10x	10x
	Position 9	12	12x	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	80
	Position 2	37.5	75	120
	Position 3	50	100	160
	Position 4	75	150	240
	Position 5	100	200	320
	Position 6	125	250	400
$t_g$ = 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 LG, NG and RG ALSI and ALSIG trip units.

## Specifications

Trip Unit Type	Digitrip OPTIM 550	Digitrip OPTIM 1050
rms sensing	Yes	Yes
<b>Breaker Type</b>		
Frame	K	K
Ampere range	125–400 A	125–400 A
Interrupting rating at 480 volts	35, 65, 100 (kA)	35, 65, 100 (kA)
<b>Protection</b>		
Ordering options	LSI, LSI(A), LSIG	LSI(A), LSIG
Fixed rated plug ( $I_n$ )	Yes	Yes
Overtemperature trip	Yes	Yes
<b>Long Delay Protection (L)</b>		
Adjustable rating plug ( $I_n$ )	No	No
Long delay pickup	0.4–1.0 x ( $I_n$ )	0.4–1.0 x ( $I_n$ )
Long delay time $I^2t$	2–24 seconds	2–24 seconds
Long delay time $I^4t$	1–5 seconds	1–5 seconds
Long delay thermal memory	Yes	Yes
High load alarm	0.5–1.0 x $I_r$	0.5–1.0 x $I_r$
<b>Short Delay Protection (S)</b>		
Short delay pickup	150–800% x ( $I_r$ )	150–800% x ( $I_r$ )
Short delay time $I^2t$	100–500 ms	100–500 ms
Short delay time flat	100–500 ms	100–500 ms
Short delay time zone selective interlocking	Yes <sup>①</sup>	Yes
<b>Instantaneous Protection (I)</b>		
Instantaneous pickup	200–800% x ( $I_n$ )	200–800% x ( $I_n$ )
Discriminator	Yes	Yes
Instantaneous override	Yes	Yes
<b>Ground Fault Protection (G)</b>		
Ground fault alarm	20–100% x ( $I_s$ )	20–100% x ( $I_s$ )
Ground fault pickup	20–100% x ( $I_s$ )	20–100% x ( $I_s$ )
Ground fault delay $I^2t$	100–500 ms	100–500 ms
Ground fault delay flat	100–500 ms	100–500 ms
Ground fault zone selective interlocking	Yes <sup>①</sup>	Yes
Ground fault thermal memory	Yes	Yes
<b>System Diagnostics</b>		
Status LEDs	Yes	Yes
Cause of trip LEDs	Yes	Yes
Magnitude of trip information	Yes	Yes
Remote signal contact—ground alarm	Yes <sup>①</sup>	Yes
Local auxiliary and bell alarm contact	Optional	Included
<b>System Monitoring</b>		
Digital display	Yes <sup>②</sup>	Yes <sup>②</sup>
Current	Yes	Yes
Power and energy	No	Yes
Power quality—harmonics	No	Yes
Power factor	No	Yes
<b>Communications</b>		
PowerNet	Yes <sup>③</sup>	Yes
<b>Testing</b>		
Testing method	OPTIMizer, BIM, PowerNet	OPTIMizer, BIM, PowerNet

**Legend**

BIM = Breaker Interface Module  
(A) = GF Alarm  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = Long Delay Pickup Setting

**Notes**

- ① Zone interlock kit.  
② By OPTIMizer/BIM.  
③ Eaton's PowerNet kit.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

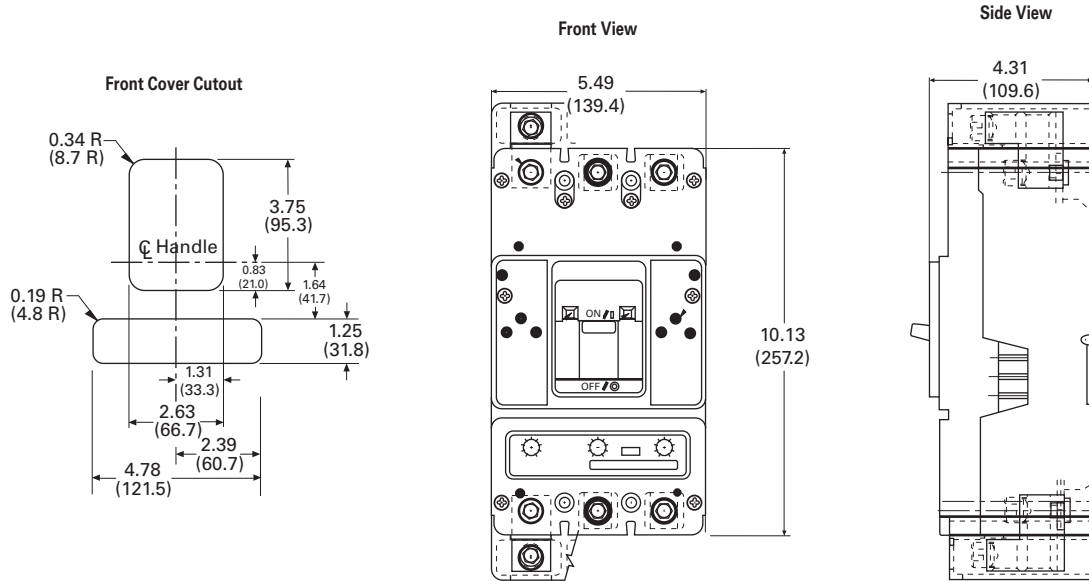
Approximate Dimensions in Inches (mm)

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, Lbs (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 lbs (1.1 kg).

Typical L-Frame Circuit Breaker



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Quick Reference . . . . .	V4-T2-118
G-Frame (15–100 Amperes) . . . . .	V4-T2-121
F-Frame (10–225 Amperes) . . . . .	V4-T2-135
J-Frame (70–250 Amperes) . . . . .	V4-T2-153
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Catalog Number Selection . . . . .	V4-T2-186
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Motor Circuit Protectors (MCP) . . . . .	V4-T2-256
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External Accessories . . . . .	V4-T2-304

**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



# 2.3

## Molded Case Circuit Breakers

### Series C

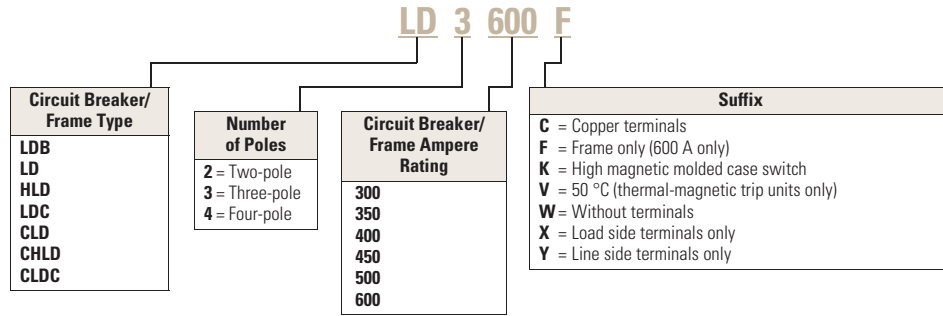
2

#### Catalog Number Selection

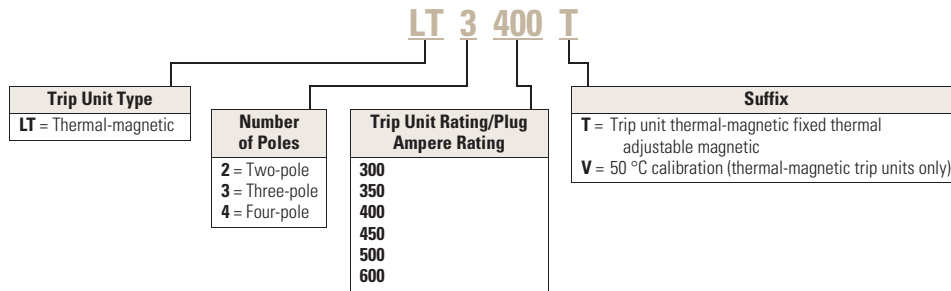
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

#### LD-Frame with Thermal-Magnetic Trip Unit Technology

##### Thermal-Magnetic Breakers and Frame ①



##### Thermal-Magnetic Trip Unit ①

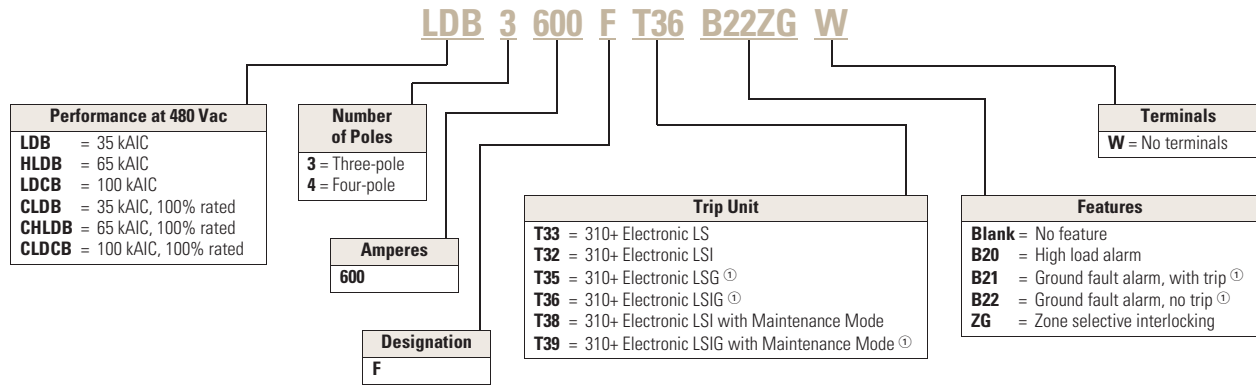


#### Note

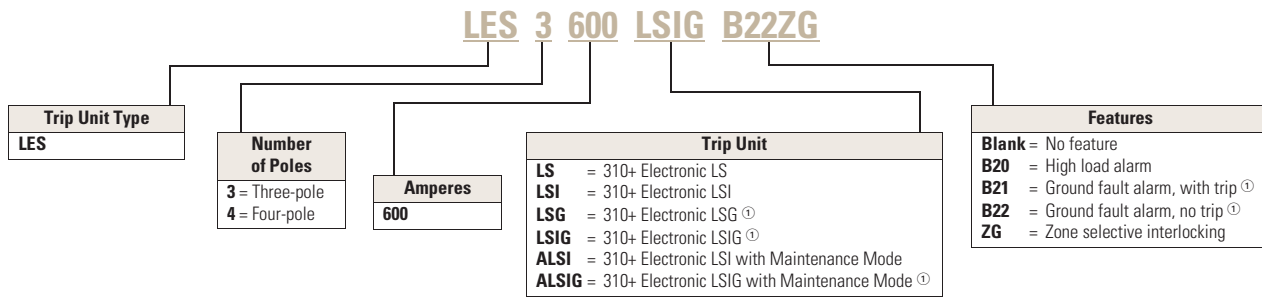
① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., LD3600F, HLD3600F, etc.

**LD-Frame with 310+ Electronic Trip Unit Technology**

**310+ Circuit Breakers**

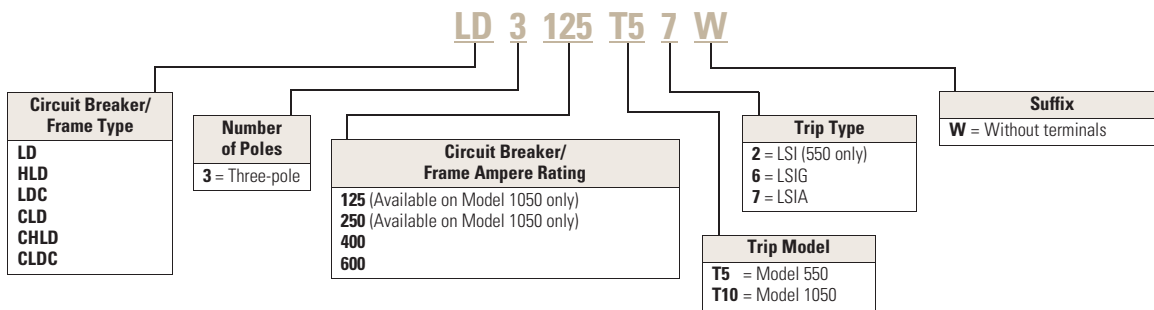


**310+ Electronic Trip Units ②**



**LD-Frame with OPTIM Electronic Trip Unit Technology**

**OPTIM Circuit Breakers**



**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

## 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-T2-203 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	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
Catalog Number	Catalog Number	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-T2-182**.

**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 Catalog Number	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		
<b>Three-Pole</b>									
600	LD3600F	HLD3600F	LDC3600F	LES3600LS	LES3600LSI	LES3600LSG	LES3600LSIG	LGFT600	See Page V4-T2-180
<b>Four-Pole ④</b>									
600	LD4600F	HLD4600F	LDC4600F	LES4600LS	LES4600LSI	—	—	—	See Page V4-T2-180

**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-T2-182**.

**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		
600	3	LDB3600FT33W	LDB3600FT32W	LDB3600FT35W	LDB3600FT36W	LGFT600	See Page V4-T2-180
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-T2-182**.

**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 Catalog Number	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		
<b>Three-Pole</b>									
600	CLD3600F	CHLD3600F	CLDC3600F	LES3600LS	LES3600LSI	LES3600LSG	LES3600LSIG	LGFT600	See Page V4-T2-180

**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.

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## Molded Case Circuit Breakers

### Series C

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#### 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-T2-203 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.

**Digitrip OPTIM Electronic Circuit Breaker with Interchangeable Rating Plug**

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

**Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug**

**Circuit Breaker Frame Only**

- L – Adjustable Long Delay Pickup (I<sub>n</sub>) with Adjustable Long Delay Time (I<sup>2</sup>t or I<sup>4</sup>t Response) <sup>①</sup>
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I<sup>2</sup>t or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)

**Digitrip OPTIM Rating Plug Only**

Maximum  
Continuous  
Ampere  
Rating  
at 40 °C

**OPTIM 550 <sup>②</sup>**

LSI

Catalog  
Number

LSIG

Catalog  
Number

LSIA

Catalog  
Number

Ampere  
Rating

Fixed Rating Plug

Catalog  
Number

**Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac**

Maximum Continuous Ampere Rating at 40 °C	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
125	LD3125T52W	LD3125T56W	LD3125T57W	—	ORPL125A070
				—	ORPL125A090
				—	ORPL125A100
				—	ORPL125A110
				—	ORPL125A125
250	LD3250T52W	LD3250T56W	LD3250T57W	—	ORPL025A125
				—	ORPL025A150
				—	ORPL025A175
				—	ORPL025A200
				—	ORPL025A225
				—	ORPL025A250
400	LD3400T52W	LD3400T56W	LD3400T57W	200	ORPL40A200
				225	ORPL40A225
				250	ORPL40A250
				300	ORPL40A300
				350	ORPL40A350
				400	ORPL40A400
600	LD3600T52W	LD3600T56W	LD3600T57W	300	ORPL60A300
				350	ORPL60A350
				400	ORPL60A400
				500	ORPL60A500
				600	ORPL60A600

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

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## Molded Case Circuit Breakers

### Series C

2

#### Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
L – Adjustable Long Delay Pickup (I <sub>a</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) <sup>①</sup> S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) OPTIM 550 <sup>②</sup>					
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>					
125	HLD3125T52W	HLD3125T56W	HLD3125T57W	70	ORPL125A070
				90	ORPL125A090
				100	ORPL125A100
				110	ORPL125A110
				125	ORPL125A125
250	HLD3250T52W	HLD3250T56W	HLD3250T57W	125	ORPL025A125
				150	ORPL025A150
				175	ORPL025A175
				200	ORPL025A200
				225	ORPL025A225
				250	ORPL025A250
400	HLD3400T52W	HLD3400T56W	HLD3400T57W	200	ORPL40A200
				225	ORPL40A225
				250	ORPL40A250
				300	ORPL40A300
				350	ORPL40A350
				400	ORPL40A400
				600	HLD3600T52W
350	ORPL60A350				
400	ORPL60A400				
500	ORPL60A500				
600	ORPL60A600				

**Notes**

① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.

② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup (I<sub>r</sub>) with Adjustable Long Delay Time (I<sup>2</sup>t or I<sup>4</sup>t Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I<sup>2</sup>t or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)

Digitrip OPTIM Rating Plug Only

Maximum  
Continuous  
Ampere  
Rating  
at 40 °C

OPTIM 550 ②

LSI  
Catalog  
Number

LSIG  
Catalog  
Number

LSIA  
Catalog  
Number

Ampere  
Rating

Fixed Rating Plug  
Catalog  
Number

Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac					
Maximum Continuous Ampere Rating at 40 °C	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
125	LDC3125T52W	LDC3125T56W	LDC3125T57W	—	ORPL125A070
				—	ORPL125A090
				—	ORPL125A100
				—	ORPL125A110
				—	ORPL125A125
250	LDC3250T52W	LDC3250T56W	LDC3250T57W	—	ORPL025A125
				—	ORPL025A150
				—	ORPL025A175
				—	ORPL025A200
				—	ORPL025A225
400	LDC3400T52W	LDC3400T56W	LDC3400T57W	200	ORPL40A200
				225	ORPL40A225
				250	ORPL40A250
				300	ORPL40A300
				350	ORPL40A350
600	LDC3600T52W	LDC3600T56W	LDC3600T57W	400	ORPL40A400
				300	ORPL60A300
				350	ORPL60A350
				400	ORPL60A400
				500	ORPL60A500
600	ORPL60A600				

Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Digitrip OPTIM Electronic Circuit Breaker with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

#### 2 Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug

##### Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup (I<sub>l</sub>) with Adjustable Long Delay Time (I<sup>2</sup>t or I<sup>4</sup>t Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I<sup>2</sup>t or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)

##### Digitrip OPTIM Rating Plug Only

##### OPTIM 1050 ②③

Maximum Continuous Ampere Rating at 40 °C	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac</b>				
125	LD3125T106W	LD3125T107W	70	ORPL125A070
			90	ORPL125A090
			100	ORPL125A100
			110	ORPL125A110
			125	ORPL125A125
250	LD3250T106W	LD3250T107W	125	ORPL025A125
			150	ORPL025A150
			175	ORPL025A175
			200	ORPL025A200
			225	ORPL025A225
			250	ORPL025A250
400	LD3400T106W	LD3400T107W	200	ORPL40A200
			225	ORPL40A225
			250	ORPL40A250
			300	ORPL40A300
			350	ORPL40A350
			400	ORPL40A400
600	LD3600T106W	LD3600T107W	300	ORPL60A300
			350	ORPL60A350
			400	ORPL60A400
			500	ORPL60A500
			600	ORPL60A600

#### Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

**Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug, continued**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	L – Adjustable Long Delay Pickup (I <sub>1</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I <sup>2</sup> t or Flat Response) OPTIM 1050 ②③			
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>				
125	HLD3125T106W	HLD3125T107W	70	ORPL125A070
			90	ORPL125A090
			100	ORPL125A100
			110	ORPL125A110
			125	ORPL125A125
250	HLD3250T106W	HLD3250T107W	125	ORPL025A125
			150	ORPL025A150
			175	ORPL025A175
			200	ORPL025A200
			225	ORPL025A225
			250	ORPL025A250
400	HLD3400T106W	HLD3400T107W	200	ORPL40A200
			225	ORPL40A225
			250	ORPL40A250
			300	ORPL40A300
			350	ORPL40A350
			400	ORPL40A400
600	HLD3600T106W	HLD3600T107W	300	ORPL60A300
			350	ORPL60A350
			400	ORPL60A400
			500	ORPL60A500
			600	ORPL60A600

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.



# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time ( $I^2t$ or $I^4t$ Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$ or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$ or Flat Response) OPTIM 1050 ②③			
<b>Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac</b>				
125	LDC3125T106W	LDC3125T107W	70	ORPL125A070
			90	ORPL125A090
			100	ORPL125A100
			110	ORPL125A110
			125	ORPL125A125
250	LDC3250T106W	LDC3250T107W	125	ORPL025A125
			150	ORPL025A150
			175	ORPL025A175
			200	ORPL025A200
			225	ORPL025A225
			250	ORPL025A250
400	LDC3400T106W	LDC3400T107W	200	ORPL40A200
			225	ORPL40A225
			250	ORPL40A250
			300	ORPL40A300
			350	ORPL40A350
			400	ORPL40A400
600	LDC3600T106W	LDC3600T107W	300	ORPL60A300
			350	ORPL60A350
			400	ORPL60A400
			500	ORPL60A500
			500	ORPL60A500
			600	ORPL60A600

**Notes**

- ① Long delay  $I^4t$  response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

**100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plug**

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

**100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>OPTIM 550 ②</b>					
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac</b>					
125	CLD3125T52W	CLD3125T56W	CLD3125T57W	70	ORPL125A070
				90	ORPL125A090
				100	ORPL125A100
				110	ORPL125A110
				125	ORPL125A125
250	CLD3250T52W	CLD3250T56W	CLD3250T57W	125	ORPL025A125
				150	ORPL025A150
				175	ORPL025A175
				200	ORPL025A200
				225	ORPL025A225
				250	ORPL025A250
400	CLD3400T52W	CLD3400T56W	CLD3400T57W	200	ORPL40A200
				225	ORPL40A225
				250	ORPL40A250
				300	ORPL40A300
				350	ORPL40A350
				400	ORPL40A400
600	CLD3600T52W	CLD3600T56W	CLD3600T57W	300	ORPL60A300
				350	ORPL60A350
				400	ORPL60A400
				500	ORPL60A500
				600	ORPL60A600

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug, continued

**Circuit Breaker Frame Only**

- L – Adjustable Long Delay Pickup ( $I_t$ ) with Adjustable Long Delay Time ( $I^2t$  or  $I^4t$  Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$  or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)

**Digitrip OPTIM Rating Plug Only**

Maximum Continuous Ampere Rating at 40 °C	OPTIM 550 ②			Ampere Rating	Fixed Rating Plug Catalog Number
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number		
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>					
125	CHLD3125T52W	CHLD3125T56W	CHLD3125T57W	70	ORPL125A070
				90	ORPL125A090
				100	ORPL125A100
				110	ORPL125A125
				125	ORPL125A125
250	CHLD3250T52W	CHLD3250T56W	CHLD3250T57W	125	ORPL025A125
				150	ORPL025A150
				175	ORPL025A175
				200	ORPL025A200
				225	ORPL025A225
				250	ORPL025A250
				400	ORPL025A400
400	CHLD3400T52W	CHLD3400T56W	CHLD3400T57W	200	ORPL40A200
				225	ORPL40A225
				250	ORPL40A250
				350	ORPL40A350
				400	ORPL40A400
600	CHLD3600T52W	CHLD3600T56W	CHLD3600T57W	300	ORPL60A300
				350	ORPL60A350
				400	ORPL60A400
				500	ORPL60A500
				600	ORPL60A600

**Notes**

- ① Long delay  $I^4t$  response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug, continued

Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup (I<sub>r</sub>) with Adjustable Long Delay Time (I<sup>2</sup>t or I<sup>4</sup>t Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I<sup>2</sup>t or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)

Digitrip OPTIM Rating Plug Only

Maximum Continuous Ampere Rating at 40 °C	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac</b>					
125	CLDC3125T52W	CLDC3125T56W	CLDC3125T57W	70	ORPL125A070
				90	ORPL125A090
				100	ORPL125A100
				110	ORPL125A110
				125	ORPL125A125
250	CLDC3250T52W	CLDC3250T56W	CLDC3250T57W	125	ORPL025A125
				150	ORPL025A150
				175	ORPL025A175
				200	ORPL025A200
				225	ORPL025A225
				250	ORPL025A250
400	CLDC3400T52W	CLDC3400T56W	CLDC3400T57W	200	ORPL40A200
				225	ORPL40A225
				250	ORPL40A250
				300	ORPL40A300
				350	ORPL40A350
				400	ORPL40A400
600	CLDC3600T52W	CLDC3600T56W	CLDC3600T57W	300	ORPL60A300
				350	ORPL60A350
				400	ORPL60A400
				500	ORPL60A500
				600	ORPL60A600

Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

#### 100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plug

**Circuit Breaker Frame Only**

- L – Adjustable Long Delay Pickup (I<sub>r</sub>) with Adjustable Long Delay Time (I<sup>2</sup>t or I<sup>4</sup>t Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I<sup>2</sup>t or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I<sup>2</sup>t or Flat Response)

**OPTIM 1050 ②③**

**Digitrip OPTIM Rating Plug Only**

Maximum Continuous Ampere Rating at 40 °C	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac</b>				
125	CLD3125T106W	CLD3125T107W	70	ORPL125A070
			90	ORPL125A090
			100	ORPL125A100
			110	ORPL125A110
			125	ORPL125A125
250	CLD3250T106W	CLD3250T107W	125	ORPL025A125
			150	ORPL025A150
			175	ORPL025A175
			200	ORPL025A200
			225	ORPL025A225
			250	ORPL025A250
			400	CLD3400T106W
225	ORPL40A225			
250	ORPL40A250			
300	ORPL40A300			
350	ORPL40A350			
400	ORPL40A400			
600	CLD3600T106W	CLD3600T107W		
			350	ORPL60A350
			400	ORPL60A400
			500	ORPL60A500
			600	ORPL60A600

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plug, continued

Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time ( $I^2t$  or  $I^4t$  Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$  or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)

Digitrip OPTIM Rating Plug Only

Maximum  
Continuous  
Ampere  
Rating  
at 40 °C

OPTIM 1050 ②③

LSIG  
Catalog  
Number

LSIA  
Catalog  
Number

Ampere  
Rating

Fixed Rating Plug  
Catalog  
Number

Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

125	CHLD3125T106W	CHLD3125T107W	70	ORPL125A070
			90	ORPL125A090
			100	ORPL125A100
			110	ORPL125A110
			125	ORPL125A125
250	CHLD3250T106W	CHLD3250T107W	125	ORPL025A125
			150	ORPL025A150
			175	ORPL025A175
			200	ORPL025A200
			225	ORPL025A225
			250	ORPL025A250
400	CHLD3400T106W	CHLD3400T107W	200	ORPL40A200
			225	ORPL40A225
			250	ORPL40A250
			300	ORPL40A300
			350	ORPL40A350
			400	ORPL40A400
600	CHLD3600T106W	CHLD3600T107W	300	ORPL60A300
			350	ORPL60A350
			400	ORPL60A400
			500	ORPL60A500
			600	ORPL60A600

Notes

- ① Long delay  $I^4t$  response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

##### Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time ( $I^2t$  or  $I^4t$  Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$  or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time ( $I^2t$  or Flat Response)

##### Digitrip OPTIM Rating Plug Only

Maximum  
Continuous  
Ampere  
Rating  
at 40 °C

LSIG  
Catalog  
Number

LSIA  
Catalog  
Number

Ampere  
Rating

Fixed Rating Plug  
Catalog  
Number

OPTIM 1050 ②③

Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac				
Maximum Continuous Ampere Rating at 40 °C	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
125	CLDC3125T106W	CLDC3125T107W	70	ORPL125A070
			90	ORPL125A090
			100	ORPL125A100
			110	ORPL125A110
			125	ORPL125A125
250	CLDC3250T106W	CLDC3250T107W	125	ORPL025A125
			150	ORPL025A150
			175	ORPL025A175
			200	ORPL025A200
			225	ORPL025A225
			250	ORPL025A250
400	CLDC3400T106W	CLDC3400T107W	200	ORPL40A200
			225	ORPL40A225
			250	ORPL40A250
			300	ORPL40A300
			350	ORPL40A350
			400	ORPL40A400
600	CLDC3600T106W	CLDC3600T107W	300	ORPL60A300
			350	ORPL60A350
			400	ORPL60A400
			500	ORPL60A500
			600	ORPL60A600

##### Notes

- ① Long delay  $I^4t$  response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

**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

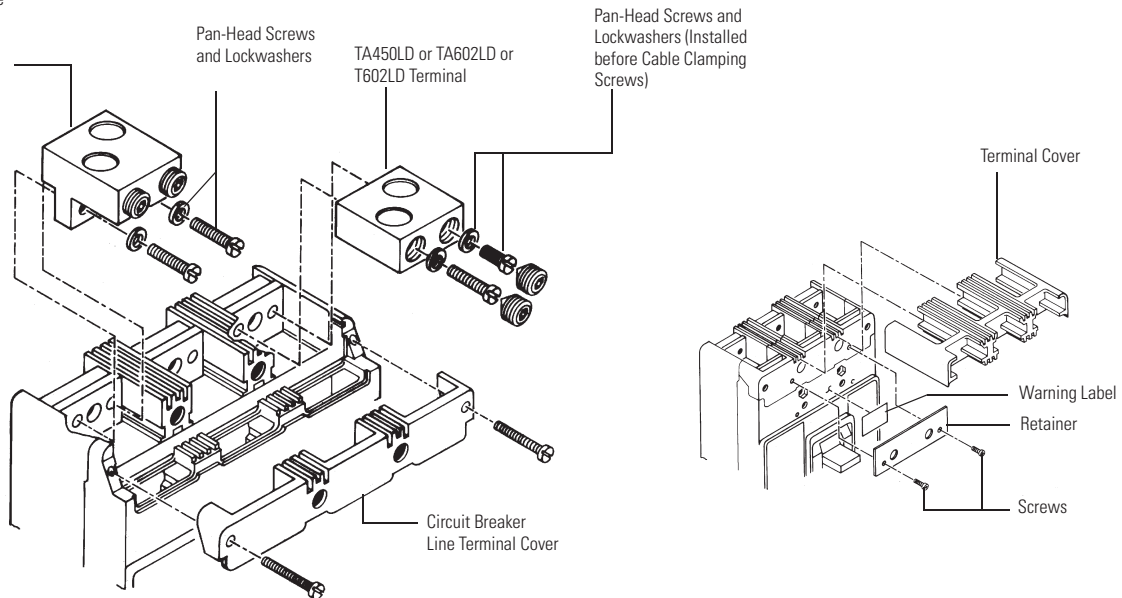
breaker before installation of the conductors. (Applies to all styles.) The circuit breaker line/load terminal conductors are positioned in the conducting holes in the wire connecting terminal and are secured with recessed socket screws that are tightened to the correct torque loading from the front 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>2TA603LDCW</b>
600	Aluminum	Cu/Al	400–500 (2)	185–240	Three-pole kit ①	<b>3TA603LDK</b>	<b>3TA603LDCW</b>
600	Aluminum	Cu/Al	400–500 (2)	185–240	Four-pole kit ①	<b>4TA603LDK</b>	<b>4TA603LDCW</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-T2-276	■		■	■		■	
Alarm lockout (2Make/2Break)	V4-T2-276	■		■	■		■	
Auxiliary switch (1A, 1B)	V4-T2-278	■		■	■		■	
Auxiliary switch (2A, 2B)	V4-T2-278	■		■	■		■	
Auxiliary switch (3A, 3B)	V4-T2-278	■		■	■		■	
Auxiliary switch (1A, 1B) and alarm switch combination	V4-T2-280	■		■	■		■	
Auxiliary switch (2A, 2B) and alarm switch combination	V4-T2-280	■		■	■		■	
Shunt trip—standard <sup>④</sup>	V4-T2-282	■		■	■		■	
Shunt trip—low energy <sup>④</sup>	V4-T2-285	■		■	■		■	
Undervoltage release mechanism <sup>④</sup>	V4-T2-291	■		■	■		■	
Eaton PowerNet communications kit (OPTIM 550)	V4-T2-293			■				
<b>External Accessories</b>								
End cap kit	V4-T2-308	●	●	●	●	●	●	●
Control wire terminal kit	V4-T2-309	●	●	●	●	●	●	●
Base mounting hardware	V4-T2-311	●	●	●	●	●	●	●
Terminal shields	V4-T2-313	●	●	●	●	●	●	●
Interphase barriers	V4-T2-313	●	●	●	●	●	●	●
Non-padlockable handle block	V4-T2-314		■			■		
Padlockable handle lock hasp	V4-T2-315	□		□	□		□	
Key interlock kit	V4-T2-316	□		□	□		□	
Sliding bar interlock—requires two breakers	V4-T2-317	●	●	●				
Walking beam interlock—requires two breakers	V4-T2-317	●	●	●	●	●	●	●
Electrical (motor) operator	V4-T2-318	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-320	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-321	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-322	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-430	●	●	●	●	●	●	●
Handle extension	V4-T2-445	●	●	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-324	●	●	●	●	●	●	●

**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 OPTIM model 1050 is factory sealed and does not have the right pole space available for accessories.
- ④ Shunt trip and UVR cannot be mounted in right poles on LES or OPTIM trip units. Standard non-tripping internal accessories can be mounted in the left or right poles of LES and 550 OPTIM trip units.

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>OPTIM System Components Three Poles</b>								
Ground fault alarm unit	V4-T2-324							
Potential transformer module	V4-T2-324							
Breaker interface module (BIM)	V4-T2-325							
Digitrip OPTIMizer	V4-T2-325							
Auxiliary power module	V4-T2-325							
<b>Modifications (Refer to Eaton)</b>								
Special calibration	—	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●	●	●
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 <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>
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	—	—

**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 DIGVIEW)
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.

## Digitrip OPTIM Specifications

Trip Unit Type	Digitrip OPTIM 550	Digitrip OPTIM 1050
rms sensing	Yes	Yes
<b>Breaker Type</b>		
Frame	L	L
Ampere range	200–600 A	200–600 A
Interrupting rating at 480 volts	35, 65, 100 (kA)	35, 65, 100 (kA)
<b>Protection</b>		
Ordering options	LSI, LSI(A), LSIG	LSI(A), LSIG
Fixed rated plug ( $I_n$ )	Yes	Yes
Overtemperature trip	Yes	Yes
<b>Long Delay Protection (L)</b>		
Adjustable rating plug ( $I_n$ )	No	No
Long delay pickup	$0.4-1.0 \times (I_n)$	$0.4-1.0 \times (I_n)$
Long delay time $I^2t$	2–24 seconds	2–24 seconds
Long delay time $I^4t$	1–5 seconds	1–5 seconds
Long delay thermal memory	Yes	Yes
High load alarm	$0.5-1.0 \times I_r$	$0.5-1.0 \times I_r$
<b>Short Delay Protection (S)</b>		
Short delay pickup	$150-800\% \times (I_r)$	$150-800\% \times (I_r)$
Short delay time $I^2t$	100–500 ms	100–500 ms
Short delay time flat	100–500 ms	100–500 ms
Short delay time zone selective interlocking	Yes <sup>①</sup>	Yes
<b>Instantaneous Protection (I)</b>		
Instantaneous pickup	$200-800\% \times (I_n)$	$200-800\% \times (I_n)$
Discriminator	Yes	Yes
Instantaneous override	Yes	Yes
<b>Ground Fault Protection (G)</b>		
Ground fault alarm	$20-100\% \times (I_s)$	$20-100\% \times (I_s)$
Ground fault pickup	$20-100\% \times (I_s)$	$20-100\% \times (I_s)$
Ground fault delay $I^2t$	100–500 ms	100–500 ms
Ground fault delay flat	100–500 ms	100–500 ms
Ground fault zone selective interlocking	Yes <sup>①</sup>	Yes
Ground fault thermal memory	Yes	Yes

**Legend**

BIM = Breaker Interface Module  
(A) = GF Alarm  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = Long Delay Pickup Setting

**Note**

① Zone interlock kit.

**Digitrip OPTIM Specifications, continued**

<b>Trip Unit Type</b>	<b>Digitrip OPTIM 550</b>	<b>Digitrip OPTIM 1050</b>
<b>System Diagnostics</b>		
Status LEDs	Yes	Yes
Cause of trip LEDs	Yes	Yes
Magnitude of trip information	Yes	Yes
Remote signal contact—ground alarm	Yes <sup>①</sup>	Yes
Local auxiliary and bell alarm contact	Optional	Included
<b>System Monitoring</b>		
Digital display	Yes <sup>②</sup>	Yes <sup>②</sup>
Current	Yes	Yes
Power and energy	No	Yes
Power quality—harmonics	No	Yes
Power factor	No	Yes
<b>Communications</b>		
PowerNet	Yes <sup>③</sup>	Yes
<b>Testing</b>		
Testing method	OPTIMizer, BIM, PowerNet	OPTIMizer, BIM, PowerNet

**Legend**

BIM = Breaker Interface Module  
(A) = GF Alarm  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = Long Delay Pickup Setting

**Notes**

- ① Zone interlock kit.  
② By OPTIMizer/BIM.  
③ Eaton's PowerNet kit.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

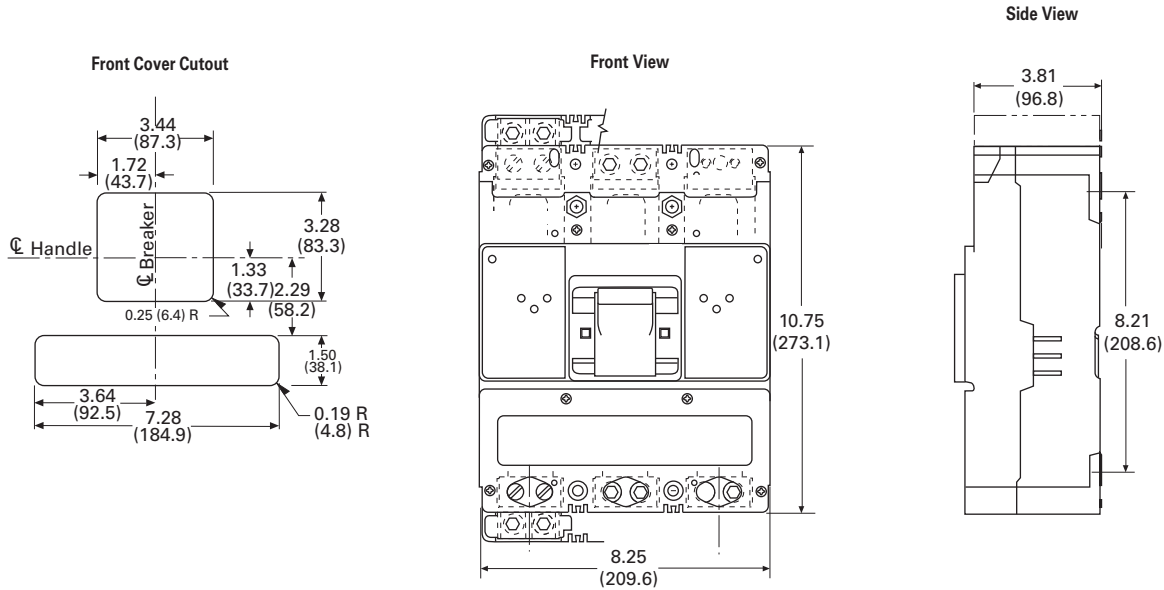
Dimensions in Inches (mm)

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, Lbs (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



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F-Frame (10–225 Amperes) . . . . .	V4-T2-135
J-Frame (70–250 Amperes) . . . . .	V4-T2-153
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**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





# 2.3

## Molded Case Circuit Breakers

Series C

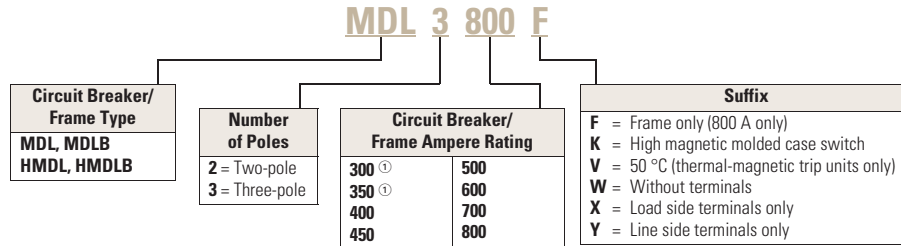
2

### Catalog Number Selection

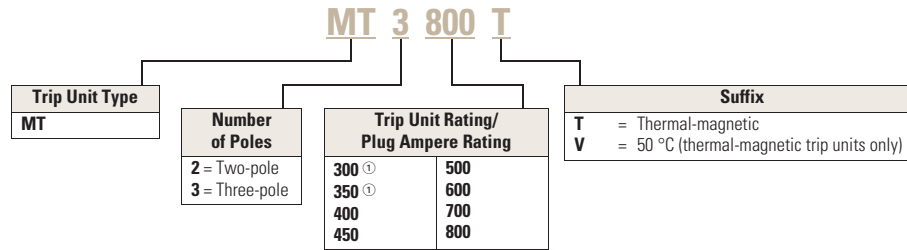
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

#### MDL Frame with Thermal-Magnetic Trip Unit Technology

##### Thermal-Magnetic Breakers and Frame ①

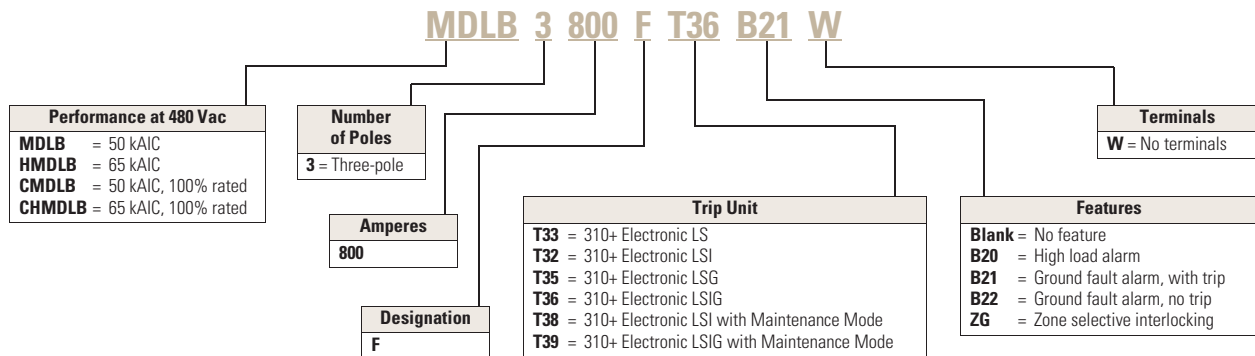


##### Thermal-Magnetic Trip Unit ①

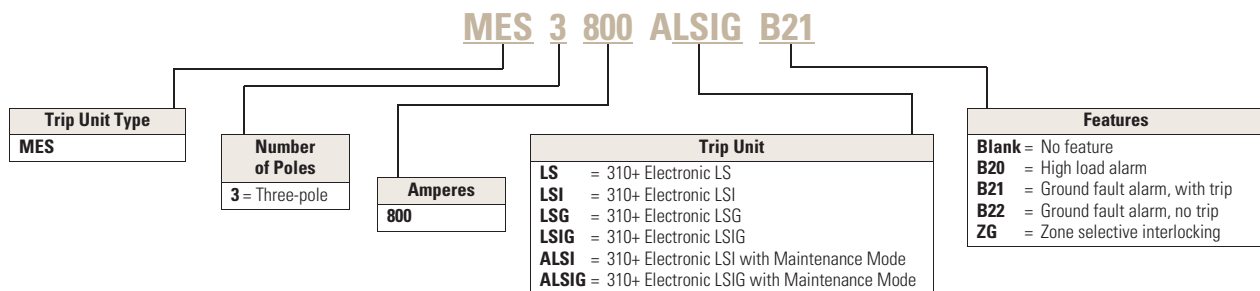


#### MDL Frame with 310+ Electronic Trip Unit Technology

##### 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-T2-217 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	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-T2-217 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	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 600 Vac Rated 50 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Standard Terminals Only <sup>②</sup>
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	See Page V4-T2-217 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 600 Vac Rated 50 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Standard Terminals Only <sup>②</sup>
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	See Page V4-T2-217 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-T2-220**.

**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 <sup>①</sup>				Neutral CT for LSG and LSIG <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		
	Catalog Number	Catalog Number	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		
800	MDL3800F	HMDL3800F	MES3800LS	MES3800LSI	MES3800LSG	MES3800LSIG	LGFACT600	See Page V4-T2-218

**Types MDLB and HMDLB Electronic Circuit Breakers with Non-Interchangeable 310+ Trip Units <sup>④</sup>**

Maximum Continuous Ampere Rating at 40 °C	Factory-Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals					Neutral CT for LSG and LSIG <sup>②③</sup>
	LS	LSI	LSG	LSIG		
	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	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-T2-220**.

**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 <sup>①</sup>				Neutral CT for LSG and LSIG <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		
	Catalog Number	Catalog Number	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		
800	CMDL3800F	CHMDL3800F	MES3800LS	MES3800LSI	MES3800LSG	MES3800LSIG	LGFACT600	See Page V4-T2-218

**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 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**

Maximum Continuous Ampere Rating at 40 °C	600 Vac Maximum, 250 Vdc Circuit Breaker Only without Line and Load Terminals Catalog Number
<b>Two-Pole</b>	
800	MDL2800WK
	MDLB2800WK ①
	HMDL2800WK
<b>Three-Pole</b>	
800	MDL3800WK
	MDLB3800WK ①
	HMDL3800WK

**Notes**

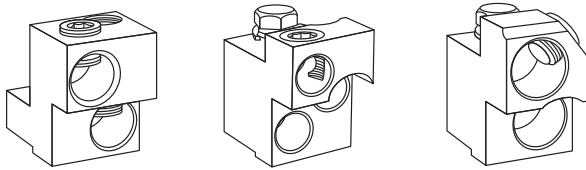
① MDLB and HMDLB are suitable for reverse feed applications.

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)	<b>TA700MA1</b>	<b>TA700MA1CWT</b>
800 std.	Aluminum	Cu/Al	3/0–400 kcmil (3)	<b>TA800MA2</b>	<b>TA800MA2CWT</b>
800	Aluminum	Cu/Al	500–750 kcmil (2)	<b>TA801MA</b>	<b>TA801MACWT</b>
<b>Optional Copper and Cu/Al Pressure Type Terminals</b>					
600	Copper	Cu	2/0–500 kcmil (2)	<b>T600MA1</b>	—
800	Copper	Cu	3/0–300 kcmil (3)	<b>T800MA1</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.

**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-T2-276	■	■	■		■
Alarm lockout (2Make/2Break)	V4-T2-276	■	■	■		■
Auxiliary switch (1A, 1B)	V4-T2-278	■	■	■		■
Auxiliary switch (2A, 2B)	V4-T2-278	■	■	■		■
Auxiliary switch (3A, 3B)	V4-T2-278	■	■	■		■
Auxiliary switch (1A, 1B) and alarm switch combination	V4-T2-280	■	■	■		■
Auxiliary switch (2A, 2B) and alarm switch combination	V4-T2-280	■	■	■		■
Shunt trip—standard <sup>②</sup>	V4-T2-283	■	■	■		■
Shunt trip—low energy <sup>②</sup>	V4-T2-285	■	■	■		■
Undervoltage release mechanism <sup>②</sup>	V4-T2-291	■	■	■		■
<b>External Accessories</b>						
Rear fed terminals	V4-T2-310	●	●	●	●	●
Base mounting hardware	V4-T2-311				●	
Terminal shields	V4-T2-313				●	
Interphase barriers	V4-T2-313				●	
Non-padlockable handle block	V4-T2-314				■	
Padlockable handle lock hasp	V4-T2-315	□		□		□
Key interlock kit	V4-T2-316	□		□		□
Sliding bar interlock—requires two breakers	V4-T2-317	●	●	●	●	●
Walking beam interlock—requires two breakers	V4-T2-317	●	●	●	●	●
Electrical (motor) operator	V4-T2-318	●	●	●	●	●
Plug-in adapters	V4-T2-320	●	●	●	●	●
Rear connecting studs	V4-T2-321	●	●	●	●	●
Panelboard connecting straps	V4-T2-322	●	●	●	●	●
Handle mechanisms	V4-T2-430	●	●	●	●	●
Handle extension	V4-T2-445	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-324	●	●	●	●	●
<b>Modifications (Refer to Eaton)</b>						
Special calibration	—	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●
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 <sup>①</sup>
Trip unit tamper protection wire seal	5108A03H01
External neutral sensor	LGFACT600 <sup>②</sup>
Breaker-mount cause-of-trip indication	TRIP-LED
Breaker-mount ammeter module	DIGIVIEW
Remote-mount ammeter module	DIGIVIEWR06 <sup>③</sup>

**Technical Data and Specifications****UL 489/CSA Interrupting Capacity Ratings <sup>④</sup>**

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts AC (50/60 Hz)			Volts DC <sup>⑤⑥</sup>
		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 <sup>④</sup>**

Circuit Breaker Type	Number of Poles	Interrupting Capacity rms (kA Symmetrical Amperes) $I_{cu} \neq I_{cs}$			
		Volts AC (50/60 Hz)			Volts DC <sup>⑤⑥</sup>
		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.



# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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.

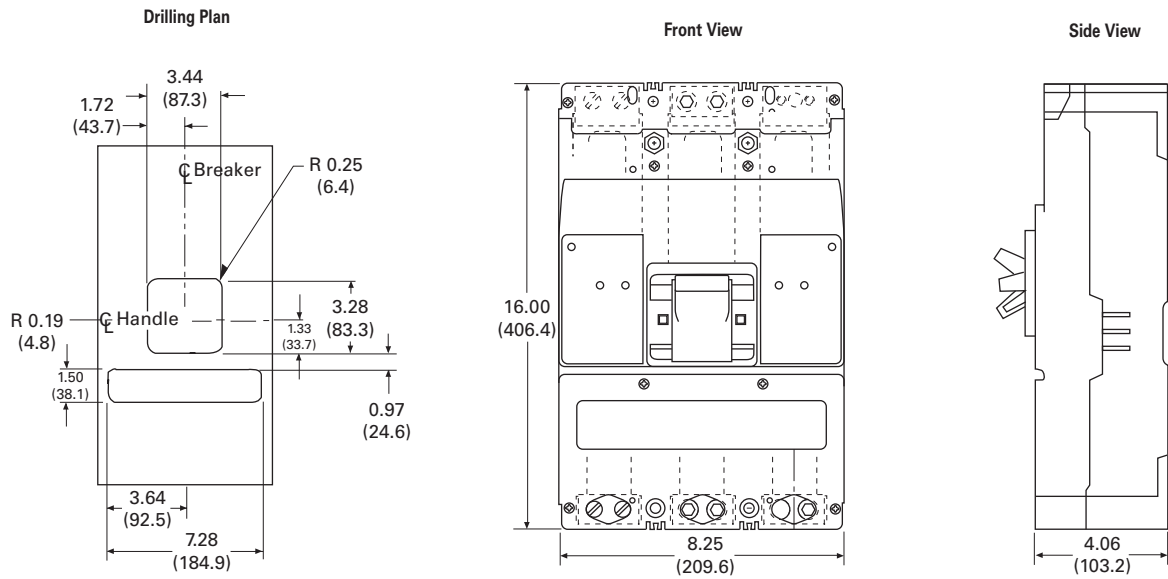
## Dimensions and Weights

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, Lbs (kg)

### MD Frame

Breaker Type	Complete Breaker		Frame Only		Trip Unit <sup>①</sup>	
	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

<sup>①</sup> Thermal-magnetic only.

Typical N-Frame Breaker



## Contents

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	V4-T2-116
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Current Limiting Circuit Breaker Module . . . . .	V4-T2-270
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External Accessories . . . . .	V4-T2-304

## N-Frame (400–1200 Amperes)

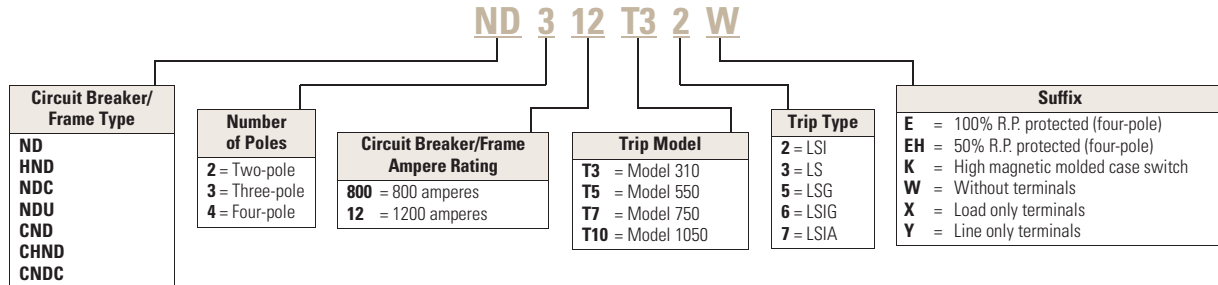
### Product Description

- All Eaton N-Frame circuit breakers are suitable for reverse feed use
- All N-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.

### Circuit Breaker/Frame



# 2.3

## Molded Case Circuit Breakers

### Series C

#### Product Selection

2

#### Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

#### Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plugs

##### Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time ( $I^2t$  or  $I^4t$  Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$  or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay ( $I^2t$  or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay ( $I^2t$  or Flat Response)

##### OPTIM 550 ②

##### Digitrip OPTIM Rating Plug Only

Maximum Continuous Ampere Rating at 40 °C	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac</b>					
800	ND3800T52W	ND3800T56W	ND3800T57W	400	ORPN80A400
				450	ORPN80A450
				500	ORPN80A500
				550	ORPN80A550
				600	ORPN80A600
				700	ORPN80A700
				800	ORPN80A800
1200	ND312T52W	ND312T56W	ND312T57W	600	ORPN12A600
				700	ORPN12A700
				800	ORPN12A800
				1000	ORPN12A100
				1200	ORPN12A120
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>					
800	HND3800T52W	HND3800T56W	HND3800T57W	400	ORPN80A400
				450	ORPN80A450
				500	ORPN80A500
				550	ORPN80A550
				600	ORPN80A600
				700	ORPN80A700
				800	ORPN80A800
1200	HND312T52W	HND312T56W	HND312T57W	600	ORPN12A600
				700	ORPN12A700
				800	ORPN12A800
				1000	ORPN12A100
				1200	ORPN12A120

#### Notes

- ① Long delay  $I^4t$  response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plugs, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	L – Adjustable Long Delay Pickup (I <sub>1</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response) OPTIM 550 ②				
<b>Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>					
800	NDC3800T52W	NDC3800T56W	NDC3800T57W	400	ORPN80A400
				450	ORPN80A450
				500	ORPN80A500
				550	ORPN80A550
				600	ORPN80A600
				700	ORPN80A700
				800	ORPN80A800
1200	NDC312T52W	NDC312T56W	NDC312T57W	600	ORPN12A600
				700	ORPN12A700
				800	ORPN12A800
				1000	ORPN12A100
				1200	ORPN12A120

Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plugs

##### Circuit Breaker Frame Only

- L– Adjustable Long Delay Pickup (L) with Adjustable Long Delay Time (I<sup>2</sup>t or I<sup>4</sup>t Response) <sup>①</sup>
- S– Adjustable Short Delay Pickup with Adjustable Short Delay Time (I<sup>2</sup>t or Flat Response)
- I– Adjustable Instantaneous Pickup
- G– Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I<sup>2</sup>t or Flat Response)
- A– Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I<sup>2</sup>t or Flat Response)

##### OPTIM 1050 <sup>②③</sup>

##### Digitrip OPTIM Rating Plug Only

Maximum Continuous Ampere Rating at 40 °C	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac</b>				
800	ND3800T106W	ND3800T107W	400	ORPN80A400
			450	ORPN80A450
			500	ORPN80A500
			550	ORPN80A550
			600	ORPN80A600
			700	ORPN80A700
			800	ORPN80A800
1200	ND312T106W	ND312T107W	600	ORPN12A600
			700	ORPN12A700
			800	ORPN12A800
			1000	ORPN12A100
			1200	ORPN12A120
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>				
800	HND3800T106W	HND3800T107W	400	ORPN80A400
			450	ORPN80A450
			500	ORPN80A500
			550	ORPN80A550
			600	ORPN80A600
			700	ORPN80A700
			800	ORPN80A800
1200	HND312T106W	HND312T107W	600	ORPN12A600
			700	ORPN12A700
			800	ORPN12A800
			1000	ORPN12A100
			1200	ORPN12A120
<b>Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>				
800	NDC3800T106W	NDC3800T107W	400	ORPN80A400
			450	ORPN80A450
			500	ORPN80A500
			550	ORPN80A550
			600	ORPN80A600
			700	ORPN80A700
			800	ORPN80A800
1200	NDC312T106W	NDC312T107W	600	ORPN12A600
			700	ORPN12A700
			800	ORPN12A800
			1000	ORPN12A100
			1200	ORPN12A120

#### Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell (trip) alarm switch supplied with breaker as standard.
- ③ Factory sealed.

**100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs**

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

**100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plugs**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac</b>					
800	CND3800T52W	CND3800T56W	CND3800T57W	400	ORPN80A400
				450	ORPN80A450
				500	ORPN80A500
				550	ORPN80A550
				600	ORPN80A600
				700	ORPN80A700
				800	ORPN80A800
1200 <sup>③</sup>	CND312T52W	CND312T56W	CND312T57W	600	ORPN12A600
				700	ORPN12A700
				800	ORPN12A800
				1000	ORPN12A100
				1200	ORPN12A120
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>					
800	CHND3800T52W	CHND3800T56W	CHND3800T57W	400	ORPN80A400
				450	ORPN80A450
				500	ORPN80A500
				550	ORPN80A550
				600	ORPN80A600
				700	ORPN80A700
				800	ORPN80A800
1200 <sup>③</sup>	CHND312T52W	CHND312T56W	CHND312T57W	600	ORPN12A600
				700	ORPN12A700
				800	ORPN12A800
				1000	ORPN12A100
				1200	ORPN12A120

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.
- ③ Includes conductor extension kit, which increases breaker length 3.75 on each end. Terminal ordered separate.



# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plugs, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only			Digitrip OPTIM Rating Plug Only	
	LSI Catalog Number	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	L – Adjustable Long Delay Pickup (I <sub>l</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) <sup>①</sup> S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response) OPTIM 550 <sup>②</sup>				
<b>Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>					
800	CNDC3800T52W	CNDC3800T56W	CNDC3800T57W	400	ORPN80A400
				450	ORPN80A450
				500	ORPN80A500
				550	ORPN80A550
				600	ORPN80A600
				700	ORPN80A700
				800	ORPN80A800
1200 <sup>③</sup>	CNDC312T52W	CNDC312T56W	CNDC312T57W	600	ORPN12A600
				700	ORPN12A700
				800	ORPN12A800
				1000	ORPN12A100
				1200	ORPN12A120

**Notes**

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.
- ③ Includes conductor extension kit, which increases breaker length 3.75 on each end. Terminal ordered separate.

100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plugs

Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup (I<sub>1</sub>) with Adjustable Long Delay Time (I<sup>2</sup>t or I<sup>4</sup>t Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I<sup>2</sup>t or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I<sup>2</sup>t or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I<sup>2</sup>t or Flat Response)

Digitrip OPTIM Rating Plug Only

Maximum Continuous Ampere Rating at 40 °C	OPTIM 1050 ②③ LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac</b>				
800	CND3800T106W	CND3800T107W	400	ORPN80A400
			450	ORPN80A450
			500	ORPN80A500
			550	ORPN80A550
			600	ORPN80A600
			700	ORPN80A700
			800	ORPN80A800
1200	CND312T106W	CND312T107W	600	ORPN12A600
			700	ORPN12A700
			800	ORPN12A800
			1000	ORPN12A100
			1200	ORPN12A120
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>				
800	CHND3800T106W	CHND3800T107W	400	ORPN80A400
			450	ORPN80A450
			550	ORPN80A550
			600	ORPN80A600
			700	ORPN80A700
			800	ORPN80A800
			1200	CHND312T106W
700	ORPN12A700			
800	ORPN12A800			
1000	ORPN12A100			
1200	ORPN12A120			

Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch one Form C bell (trip) alarm switch supplied with breaker as standard.
- ③ Factory sealed.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plugs, continued

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIG Catalog Number	LSIA Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
	OPTIM 1050 ②③ L – Adjustable Long Delay Pickup (I <sub>l</sub> ) with Adjustable Long Delay Time (I <sup>2</sup> t or I <sup>4</sup> t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response)			
<b>Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>				
800	CNDC3800T106W	CNDC3800T107W	400	ORPN80A400
			450	ORPN80A450
			500	ORPN80A500
			550	ORPN80A550
			600	ORPN80A600
			700	ORPN80A700
1200	CNDC312T106W ④	CNDC312T107W	600	ORPN12A600
			700	ORPN12A700
			800	ORPN12A800
			1000	ORPN12A100
			1200	ORPN12A120

#### Type ND Molded Case Switches

##### Type ND High Instantaneous (K)

Continuous Ampere Rating at 40 °C	Three-Pole Catalog Number	Four-Pole ⑤ Catalog Number
800	ND3800WK	ND4800WK
	HND3800WK	HND4800WK
1200	ND312WK	ND412WK
	HND312WK	HND412WK

#### Notes

- ① Long delay I<sup>4</sup>t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch one Form C bell (trip) alarm switch supplied with breaker as standard.
- ③ Factory sealed.
- ④ Includes conductor extension kit, which increases breaker length 3.75 on each end. Terminal ordered separate.
- ⑤ Neutral is in right pole.

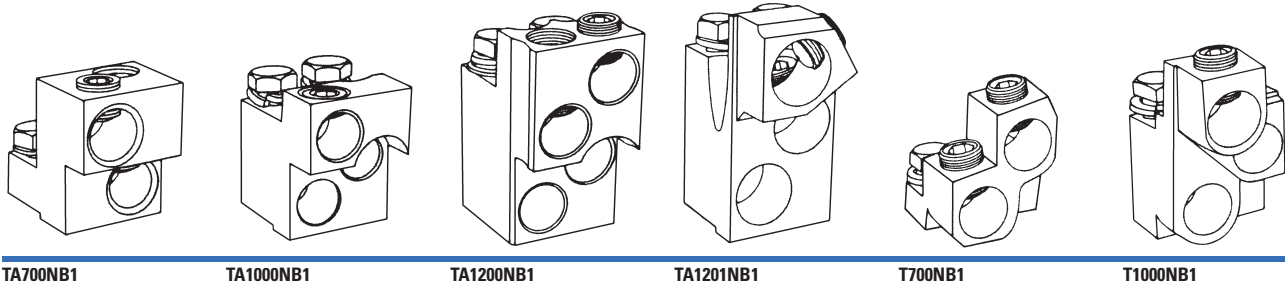
Molded case switch will trip above 14,000 amperes.

For UL listed, series tested molded case switch application data, refer to Eaton.

**Accessories Selection Guide and Ordering Information**

**Line and Load Terminals—Ordering Information**

N-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.



**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>					
700	Aluminum	Cu/Al	1–500 kcmil (2)	50–240	<b>TA700NB1</b>
1000	Aluminum	Cu/Al	3/0–400 kcmil (3)	95–185	<b>TA1000NB1</b> ①
1200	Aluminum	Cu/Al	4/0–500 kcmil (4)	120–240	<b>TA1200NB1</b> ①
1200	Aluminum	Cu/Al	500–750 kcmil (3)	300–400	<b>TA1201NB1</b> ②
<b>Optional Copper and Cu/Al Pressure Type Terminals</b>					
700	Copper	Cu	2/0–500 kcmil (2)	70–240	<b>T700NB1</b>
1000	Copper	Cu	3/0–500 kcmil (3)	95–240	<b>T1000NB1</b>
1200	Copper	Cu	3/0–400 kcmil (4)	95–185	<b>T1200NB3</b>

**Notes**

- ① Terminal rating is AL9CU.
- ② Terminal rating is AL7CU.

## 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.

**ND 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) <sup>①</sup></b>								
Alarm lockout (Make/Break)	V4-T2-276	■		■	■		■	
Alarm lockout (2Make/2Break)	V4-T2-276	■		■	■		■	
Auxiliary switch (1A, 1B)	V4-T2-278	■		■	■		■	
Auxiliary switch (2A, 2B)	V4-T2-278	■		■	■		■	
Auxiliary switch (3A, 3B)	V4-T2-278	■		■	■		■	
Auxiliary switch (1A, 1B) and alarm switch combination	V4-T2-280	■		■	■		■	
Auxiliary switch (2A, 2B) and alarm switch combination	V4-T2-280	■		■	■		■	
Shunt trip—standard	V4-T2-284	■			■			
Shunt trip—low energy	V4-T2-285	■			■			
Undervoltage release mechanism	V4-T2-292	■			■			
Eaton PowerNet communications kit (OPTIM 550)	V4-T2-293			■				
<b>External Accessories</b>								
Base mounting hardware	V4-T2-311	●	●	●	●	●	●	●
Interphase barriers	V4-T2-313	●	●	●	●	●	●	●
Terminal shield	V4-T2-313	■	■	■				
Non-padlockable handle block	V4-T2-314		■			■		
Padlockable handle lock hasp	V4-T2-315	□		□	□		□	
Key interlock kit	V4-T2-316	□		□	□		□	
Sliding bar interlock—requires two breakers	V4-T2-317	●	●	●				
Walking beam interlock—requires two breakers	V4-T2-317	●	●	●	●	●	●	●
Electrical (motor) operator	V4-T2-319	●	●	●	●	●	●	●
Plug-in adapters	V4-T2-320	●	●	●	●	●	●	●
Rear connecting studs	V4-T2-321	●	●	●	●	●	●	●
Panelboard connecting straps	V4-T2-322	●	●	●	●	●	●	●
Handle mechanisms	V4-T2-430	●	●	●	●	●	●	●
Handle extension	V4-T2-445	●	●	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-325	●	●	●	●	●	●	●
<b>OPTIM System Components Three Poles</b>								
Ground fault alarm unit	V4-T2-324							
Potential transformer module	V4-T2-324							
Breaker interface module (BIM)	V4-T2-325							
Digitrip OPTIMizer	V4-T2-325							
Auxiliary power module	V4-T2-325							
<b>Modifications (Refer to Eaton)</b>								
Special calibration	—	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●	●	●
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**

<sup>①</sup> OPTIM 550 and 1050 are factory sealed and do not have the right pole available for accessories.

## Technical Data and Specifications

### UL 489 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
ND	2, 3, 4	65	—	50	25
CND <sup>②</sup>	2, 3, 4	65	—	50	25
HND	2, 3, 4	100	—	65	35
CHND <sup>②</sup>	2, 3, 4	100	—	65	35
NDC	2, 3, 4	200	—	100	65
CNDC <sup>②</sup>	2, 3, 4	200	—	100	65
NDU <sup>③</sup>	3	300 <sup>④</sup>	—	150	75 <sup>⑤</sup>

### 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
<b>ND</b>				
$I_{CU}$	2, 3, 4	85	50	20
$I_{CS}$	2, 3, 4	85	50	10
<b>CND <sup>②</sup></b>				
$I_{CU}$	2, 3, 4	85	50	20
$I_{CS}$	2, 3, 4	85	50	10
<b>HND</b>				
$I_{CU}$	2, 3, 4	100	70	25
$I_{CS}$	2, 3, 4	100	50	13
<b>CHND <sup>②</sup></b>				
$I_{CU}$	2, 3, 4	100	70	25
$I_{CS}$	2, 3, 4	100	50	13
<b>NDC</b>				
$I_{CU}$	2, 3, 4	200	100	35
$I_{CS}$	2, 3, 4	100	50	18
<b>CNDC <sup>②</sup></b>				
$I_{CU}$	2, 3, 4	200	100	35
$I_{CS}$	2, 3, 4	100	50	18

#### Notes

- ① Utilization Category A circuit breakers.
- ② 100% rated breakers.
- ③ 800 amperes maximum rating.
- ④ Successfully tested at 300 kAIC, although UL recognizes maximum of 200 kAIC at 240 Vac.
- ⑤ Successfully tested at 75 kAIC, although UL recognizes maximum of 65 kAIC at 600 Vac.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### N-Frame Digitrip

Trip Unit Type	Digitrip OPTIM 550	Digitrip OPTIM 1050
rms sensing	Yes	Yes
<b>Breaker Type</b>		
Frame	N	N
Ampere range	400–1200 A	400–1200 A
Interrupting rating at 480 volts	50, 65, 100 (kA)	50, 65, 100 (kA)
<b>Protection</b>		
Ordering options	LSI, LSIG, LSI(A)	LSI(A), LISG
Fixed rated plug ( $I_n$ )	Yes	Yes
Overtemperature trip	Yes	Yes
<b>Long Delay Protection (L)</b>		
Adjustable rating plug ( $I_n$ )	No	No
Long delay pickup	0.4–1.0 x ( $I_n$ )	0.4–1.0 x ( $I_n$ )
Long delay time $I^2t$	2–24 seconds	2–24 seconds
Long delay time $I^4t$	1–5 seconds	1–5 seconds
Long delay thermal memory	Yes	Yes
High load alarm	No	0.5–1.0 x $I_r$
<b>Short Delay Protection (S)</b>		
Short delay pickup	150–800% x ( $I_r$ )	150–800% x ( $I_r$ )
Short delay time $I^2t$	100–500 ms	100–500 ms
Short delay time flat	100–500 ms	100–500 ms
Short delay time zone selective interlocking	Yes	Yes
<b>Instantaneous Protection (I)</b>		
Instantaneous pickup	200–800% x ( $I_n$ )	200–800% x ( $I_n$ )
Discriminator	Yes	Yes
Instantaneous override	Yes	Yes
<b>Ground Fault Protection (G)</b>		
Ground fault alarm	20–100% x ( $I_g$ )	20–100% x ( $I_g$ )
Ground fault pickup	20–100% x ( $I_g$ )	20–100% x ( $I_g$ )
Ground fault delay $I^2t$	100–500 ms	100–500 ms
Ground fault delay flat	100–500 ms	100–500 ms
Ground fault zone selective interlocking	Yes ①	Yes
Ground fault thermal memory	Yes	Yes
<b>System Diagnostics</b>		
Status LEDs	Yes	Yes
Cause of trip LEDs	Yes	Yes
Magnitude of trip information	Yes	Yes
Remote signal contact—ground alarm	Yes ①	Yes
Local auxiliary and bell alarm contact	Optional	Included

#### Legend

BIM = Breaker Interface Module  
 (A) = GF Alarm  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = Long Delay Pickup Setting

#### Note

① Zone interlock kit.

**N-Frame Digitrip, continued**

<b>Trip Unit Type</b>	<b>Digitrip OPTIM 550</b>	<b>Digitrip OPTIM 1050</b>
<b>System Monitoring</b>		
Digital display	Yes <sup>①</sup>	Yes <sup>①</sup>
Current	Yes	Yes
Power and energy	No	Yes
Power quality—harmonics	No	Yes
Power factor	No	Yes
<b>Communications</b>		
Eaton PowerNet	No <sup>②</sup>	Yes
<b>Testing</b>		
Testing method	OPTIMizer, BIM, PowerNet	OPTIMizer, BIM, PowerNet

**Legend**

BIM = Breaker Interface Module  
(A) = GF Alarm  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = Long Delay Pickup Setting

**Notes**

- ① By OPTIMizer/BIM.  
② Eaton's PowerNet kit.



# 2.3

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

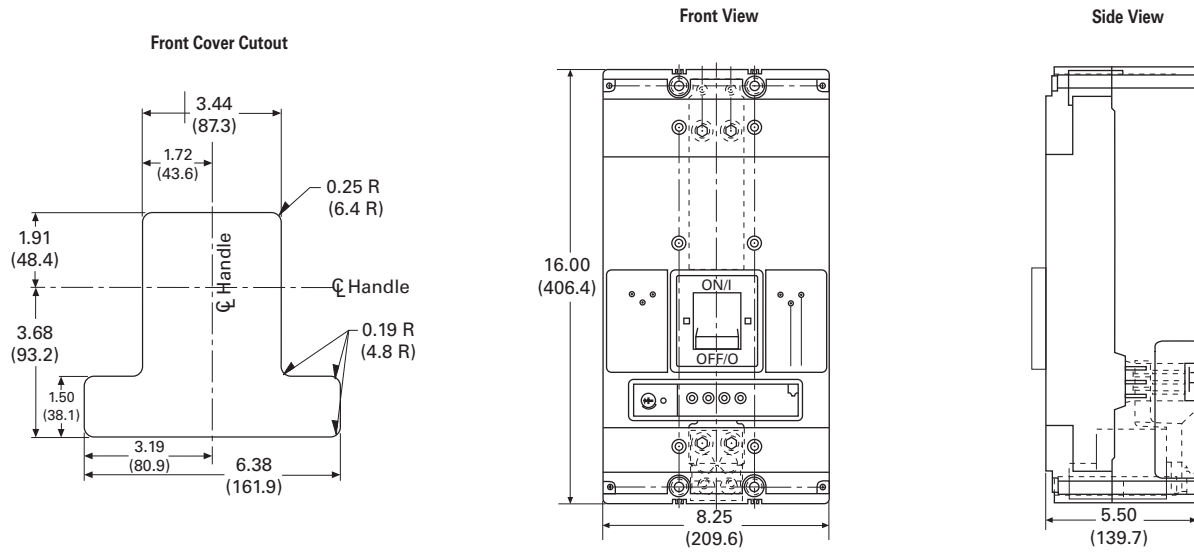
Approximate Dimensions in Inches (mm)

2

#### ND Frame

Number of Poles	Width	Height	Depth
2, 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)

#### ND-Frame, Two- and Three-Pole

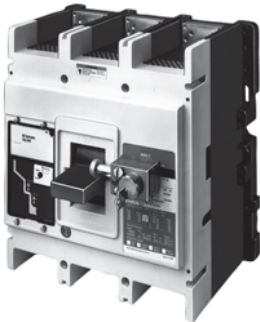


Approximate Shipping Weight in Lbs (kg)

#### ND Frame

Breaker Type	Complete Breaker		
	Two-Pole	Three-Pole	Four-Pole
ND, HND, NDC, NDU	37 (16.8)	45 (20.4)	58 (26.3)

Typical R-Frame Breaker



**Contents**

<i>Description</i>	<i>Page</i>
Product Overview . . . . .	<b>V4-T2-116</b>
Standards and Certifications . . . . .	<b>V4-T2-117</b>
Quick Reference . . . . .	<b>V4-T2-118</b>
G-Frame (15–100 Amperes) . . . . .	<b>V4-T2-121</b>
F-Frame (10–225 Amperes) . . . . .	<b>V4-T2-135</b>
J-Frame (70–250 Amperes) . . . . .	<b>V4-T2-153</b>
K-Frame (70–400 Amperes) . . . . .	<b>V4-T2-161</b>
L-Frame (125–600 Amperes) . . . . .	<b>V4-T2-185</b>
M-Frame (300–800 Amperes) . . . . .	<b>V4-T2-211</b>
N-Frame (400–1200 Amperes) . . . . .	<b>V4-T2-222</b>
R-Frame (800–2500 Amperes)	
Catalog Number Selection . . . . .	<b>V4-T2-238</b>
Product Selection . . . . .	<b>V4-T2-239</b>
Accessories . . . . .	<b>V4-T2-251</b>
Technical Data and Specifications . . . . .	<b>V4-T2-252</b>
Dimensions and Weights . . . . .	<b>V4-T2-255</b>
Motor Circuit Protectors (MCP) . . . . .	<b>V4-T2-256</b>
Motor Protection Circuit Breakers (MPCB) . . . . .	<b>V4-T2-267</b>
Type ELC Current Limiter Attachment (Size 0–4) . . . . .	<b>V4-T2-269</b>
Current Limiting Circuit Breaker Module . . . . .	<b>V4-T2-270</b>
Internal Accessories . . . . .	<b>V4-T2-273</b>
External Accessories . . . . .	<b>V4-T2-304</b>

**R-Frame (800–2500 Amperes)**

**Product Description**

- Eaton R-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

# 2.3

## Molded Case Circuit Breakers

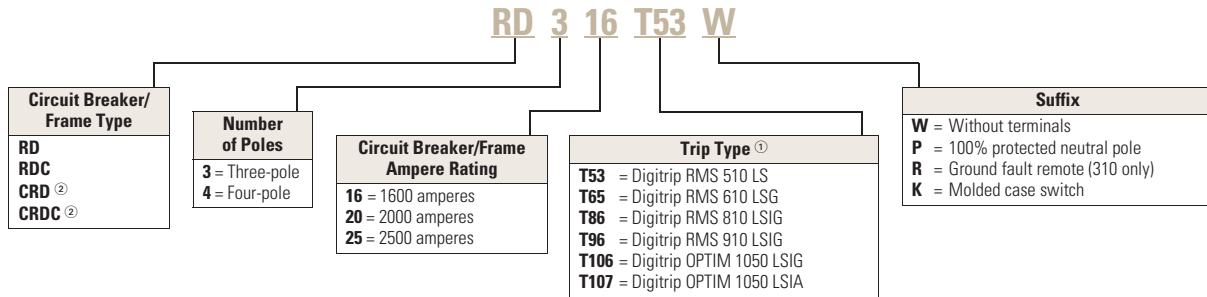
Series C

### 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.

2

#### Circuit Breaker/Frame



#### Notes

- ① For complete list of available trip types, refer to **Pages V4-T2-239 to V4-T2-248**.
- ② No four-pole for CRD and CRDC.

**Product Selection**

**Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Order as individual components: breaker frame (which includes trip unit) and rating plug.

**Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup ( $I_n$ ) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay ( $I^2t$ or Flat Response)						Rated Current ( $I_n$ )	Fixed Rating Plug Catalog Number
	LI	LS	LSI	LIG	LSG	LSIG		
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	RD316T51W	RD316T53W	RD316T52W	RD316T54W	RD316T55W	RD316T56W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RD320T51W	RD320T53W	RD320T52W	RD320T54W	RD320T55W	RD320T56W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RD325T51W	RD325T53W	RD325T52W	RD325T54W	RD325T55W	RD325T56W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	RDC316T51W	RDC316T53W	RDC316T52W	RDC316T54W	RDC316T55W	RDC316T56W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RDC320T51W	RDC320T53W	RDC320T52W	RDC320T54W	RDC320T55W	RDC320T56W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RDC325T51W	RDC325T53W	RDC325T52W	RDC325T54W	RDC325T55W	RDC325T56W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250

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## Molded Case Circuit Breakers

### Series C

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#### 100% Rated Digitrip RMS 510 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 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

#### 100% Rated Digitrip RMS 510 Circuit Breakers

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay ( $I^2t$ or Flat Response)						Rated Current ( $I_n$ )	Fixed Rating Plug Catalog Number
	LI	LS	LSI	LIG	LSG	LSIG		
Catalog Number								
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	CRD316T51W	CRD316T53W	CRD316T52W	CRD316T54W	CRD316T55W	CRD316T56W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000 <sup>①</sup>	CRD320T51W	CRD320T53W	CRD320T52W	CRD320T54W	CRD320T55W	CRD320T56W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	—	CRDC316T53W	CRDC316T52W	CRDC316T54W	CRDC316T55W	CRDC316T56W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000 <sup>①</sup>	CRDC320T51W	CRDC320T53W	CRDC320T52W	CRDC320T54W	CRDC320T55W	CRDC320T56W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200

**Note**

<sup>①</sup> Includes B2016RDL rear connectors.

**Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Order as individual components: breaker frame (which includes trip unit) and rating plug.

**Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I <sub>n</sub> ) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response)						Rated Current (I <sub>n</sub> )	Fixed Rating Plug Catalog Number
	LI	LS	LSI	LIG	LSG	LSIG		
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	RD316T61W	RD316T63W	RD316T62W	RD316T64W	RD316T65W	RD316T66W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RD320T61W	RD320T63W	RD320T62W	RD320T64W	RD320T65W	RD320T66W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RD325T61W	RD325T63W	RD325T62W	RD325T64W	RD325T65W	RD325T66W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	RDC316T61W	RDC316T63W	RDC316T62W	RDC316T64W	RDC316T65W	RDC316T66W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RDC320T61W	RDC320T63W	RDC320T62W	RDC320T64W	RDC320T65W	RDC320T66W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RDC325T61W	RDC325T63W	RDC325T62W	RDC325T64W	RDC325T65W	RDC325T66W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250

# 2.3

## Molded Case Circuit Breakers

### Series C

#### 100% Rated Digitrip RMS 610 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 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

2

#### 100% Rated Digitrip RMS 610 Circuit Breakers

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time						Rated Current ( $I_n$ )	Fixed Rating Plug Catalog Number
	S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response)							
I – Adjustable Instantaneous Pickup						LSIG		
G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay ( $I^2t$ or Flat Response)								
	LI	LS	LSI	LIG	LSG			
	Catalog Number							
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	CRD316T61W	CRD316T63W	CRD316T62W	CRD316T64W	CRD316T65W	CRD316T66W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000 <sup>①</sup>	CRD320T61W	CRD320T63W	CRD320T62W	CRD320T64W	CRD320T65W	CRD320T66W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	CRDC316T61W	CRDC316T63W	CRDC316T62W	CRDC316T64W	CRDC316T65W	CRDC316T66W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000 <sup>①</sup>	CRDC320T61W	CRDC320T63W	CRDC320T62W	CRDC320T64W	CRDC320T65W	CRDC320T66W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200

**Note**

<sup>①</sup> Includes B2016RDL rear connectors.

**Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Order as individual components: breaker frame (which includes trip unit) and rating plug.

**Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay ( $I^2t$ or Flat Response)						Rated Current ( $I_n$ )	Fixed Rating Plug Catalog Number
	LI	LS	LSI	LIG	LSG	LSIG		
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	RD316T81W	RD316T83W	RD316T82W	RD316T84W	RD316T85W	RD316T86W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RD320T81W	RD320T83W	RD320T82W	RD320T84W	RD320T85W	RD320T86W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RD325T81W	RD325T83W	RD325T82W	RD325T84W	RD325T85W	RD325T86W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	RDC316T81W	RDC316T83W	RDC316T82W	RDC316T84W	RDC316T85W	RDC316T86W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RDC320T81W	RDC320T83W	RDC320T82W	RDC320T84W	RDC320T85W	RDC320T86W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RDC325T81W	RDC325T83W	RDC325T82W	RDC325T84W	RDC325T85W	RDC325T86W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250



# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip RMS 810 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 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

#### 100% Rated Digitrip RMS 810 Circuit Breakers

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I <sub>n</sub> ) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I <sup>2</sup> t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I <sup>2</sup> t or Flat Response)						Rated Current (I <sub>n</sub> )	Fixed Rating Plug Catalog Number
	LI	LS	LSI	LIG	LSG	LSIG		
Catalog Number								
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	CRD316T81W	CRD316T83W	CRD316T82W	CRD316T84W	CRD316T85W	CRD316T86W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000 ①	CRD320T81W	CRD320T83W	CRD320T82W	CRD320T84W	CRD320T85W	CRD320T86W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	CRDC316T81W	CRDC316T83W	CRDC316T82W	CRDC316T84W	CRDC316T85W	CRDC316T86W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000 ①	CRDC320T81W	CRDC320T83W	CRDC320T82W	CRDC320T84W	CRDC320T85W	CRDC320T86W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200

**Note**

① Includes B2016RDL rear connectors.

**Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Order as individual components: breaker frame (which includes trip unit) and rating plug.

**Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay ( $I^2t$ or Flat Response)						Rated Current ( $I_n$ )	Fixed Rating Plug Catalog Number
	LI	LS	LSI	LIG	LSG	LSIG		
Catalog Number								
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	RD316T91W	RD316T93W	RD316T92W	RD316T94W	RD316T95W	RD316T96W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RD320T91W	RD320T93W	RD320T92W	RD320T94W	RD320T95W	RD320T96W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RD325T91W	RD325T93W	RD325T92W	RD325T94W	RD325T95W	RD325T96W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	RDC316T91W	RDC316T93W	RDC316T92W	RDC316T94W	RDC316T95W	RDC316T96W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000	RDC320T91W	RDC320T93W	RDC320T92W	RDC320T94W	RDC320T95W	RDC320T96W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
2500	RDC325T91W	RDC325T93W	RDC325T92W	RDC325T94W	RDC325T95W	RDC325T96W	1600	RP6R25A160
							2000	RP6R25A200
							2500	RP6R25A250

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 100% Rated Digitrip RMS 910 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 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

#### 100% Rated Digitrip RMS 910 Circuit Breakers

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup ( $I_L$ ) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time ( $I^2t$ or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay ( $I^2t$ or Flat Response)						Rated Current ( $I_n$ )	Fixed Rating Plug Catalog Number
	LI	LS	LSI	LIG	LSG	LSIG		
Catalog Number								
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>								
1600	CRD316T91W	CRD316T93W	CRD316T92W	CRD316T94W	CRD316T95W	CRD316T96W	800	RP6R16A080
							1000	RP6R16A100
							1200	RP6R16A120
							1600	RP6R16A160
2000 <sup>①</sup>	CRD320T91W	CRD320T93W	CRD320T92W	CRD320T94W	CRD320T95W	CRD320T96W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>								
1600	CRDC316T91W	CRDC316T93W	CRDC316T92W	CRDC316T94W	CRDC316T95W	CRDC316T96W	800	RP6R16A080
							1000	RP6R16A100
							1000	RP6R16A100
							1200	RP6R16A120
2000 <sup>①</sup>	CRDC320T91W	CRDC320T93W	CRDC320T92W	CRDC320T94W	CRDC320T95W	CRDC320T96W	1000	RP6R20A100
							1200	RP6R20A120
							1600	RP6R20A160
							2000	RP6R20A200

**Note**

<sup>①</sup> Includes B2016RDL rear connectors.

**Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs**

Order as individual components: breaker frame (which includes trip unit) and rating plug.

**Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs**

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIA 1050 Catalog Number	LSIG 1050 Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>				
1600	RD316T107W	RD316T106W	800	ORPR16A080
			1000	ORPR16A100
			1200	ORPR16A120
			1600	ORPR16A160
2000	RD320T107W	RD320T106W	1000	ORPR20A100
			1200	ORPR20A120
			1600	ORPR20A160
			2000	ORPR20A200
2500	RD325T107W	RD325T106W	1600	ORPR25A160
			2000	ORPR25A200
			2500	ORPR25A250
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>				
1600	RDC316T107W	RDC316T106W	800	ORPR16A080
			1000	ORPR16A100
			1200	ORPR16A120
			1600	ORPR16A160
2000	RDC320T107W	RDC320T106W	1000	ORPR20A100
			1200	ORPR20A120
			1600	ORPR20A160
			2000	ORPR20A200
2500	RDC325T107W	RDC325T106W	1600	ORPR25A160
			2000	ORPR25A200
			2500	ORPR25A250

# 2.3

## Molded Case Circuit Breakers

### Series C

#### 100% Rated 600 Volts AC Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit) and rating plug.

2

#### 100% Rated 600 Volts AC Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip OPTIM Rating Plug Only	
	LSIA 1050 Catalog Number	LSIG 1050 Catalog Number	Ampere Rating	Fixed Rating Plug Catalog Number
<b>Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac</b>				
1600	CRD316T107W	CRD316T106W	800	ORPR16A080
			1000	ORPR16A100
			1200	ORPR16A120
			1600	ORPR16A160
2000 ①	CRD320T107W	CRD320T106W	1000	ORPR20A100
			1200	ORPR20A120
			1600	ORPR20A160
			2000	ORPR20A200
<b>Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac</b>				
1600	CRDC316T107W	CRDC316T106W	800	ORPR16A080
			1000	ORPR16A100
			1200	ORPR16A120
			1600	ORPR16A160
2000 ①	CRDC320T107W	CRDC320T106W	1000	ORPR20A100
			1200	ORPR20A120
			1600	ORPR20A160
			2000	ORPR20A200

#### Molded Case Switches

Refer to Eaton for UL listed, series tested Molded Case Switch application data.

#### Type RD—High Instantaneous (K)

Continuous Ampere Rating at 40 °C	Complete without Terminals	
	Three-Pole Catalog Number	Four-Pole Catalog Number
1600	RD316WK	RD416WK
2000	RD320WK	RD420WK

#### Notes

① Includes B2016RDL rear connectors.

Molded case switch may trip above 17,500 amperes.

## Accessories Selection Guide and Ordering Information

### Line and Load Terminals

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 C22.2 No. 65M. Unless otherwise specified, R-Frame circuit breaker line load terminals are shipped separately for field installation.

### Ordering Information

R-Frame circuit breakers have Cu/Al terminals as standard and Cu only terminals as an option. Specify if factory installation is required.

### Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Hardware	AWG/kcmil Wire Range/ No. Conductors	Metric Wire Range mm <sup>2</sup>	Catalog Number
<b>Wire Terminals</b>						
1600	Aluminum	Cu/Al	English	500–1000 (4)	300–500	<b>TA1600RD</b>
1600	Copper	Cu	English	1–600 (4)	50–300	<b>T1600RD</b>
2000	Aluminum	Cu/Al	English	2–600 (6)	35–300	<b>TA2000RD</b> <sup>①</sup>
<b>Rear Connectors</b>						
2000	Copper	—	English	—	—	<b>B2016RD</b>
2000	Copper	—	English	—	—	<b>B2016RDL</b> <sup>②</sup>
2500	Copper	—	English	—	—	<b>B2500RD</b> <sup>③</sup>

### Notes

- ① Catalog Number includes bus connection, terminals and hardware for either line side or load side of three-pole breaker.
- ② For use with 100% rated 1600 A and 2000 A frame. Do not order separately unless for replacement purposes. Included in breaker carton when 100% rated device is ordered.
- ③ For use with 2500 A frame. Do not order separately unless for replacement purposes. Included in breaker carton when 2500 A breaker is ordered.

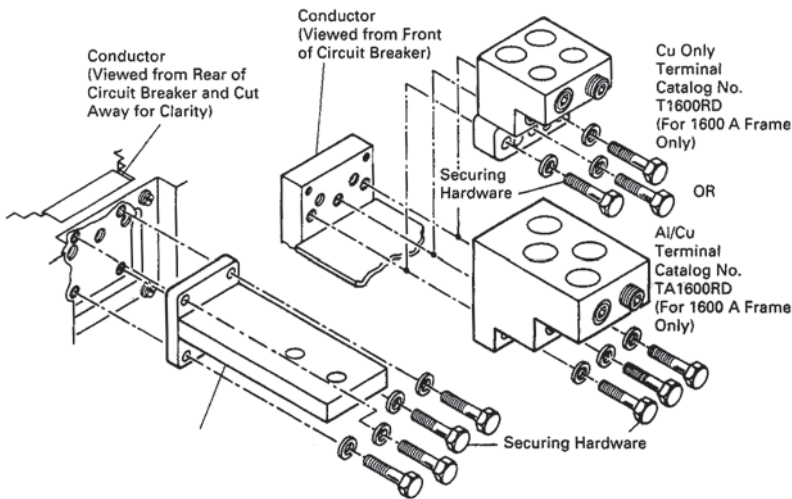
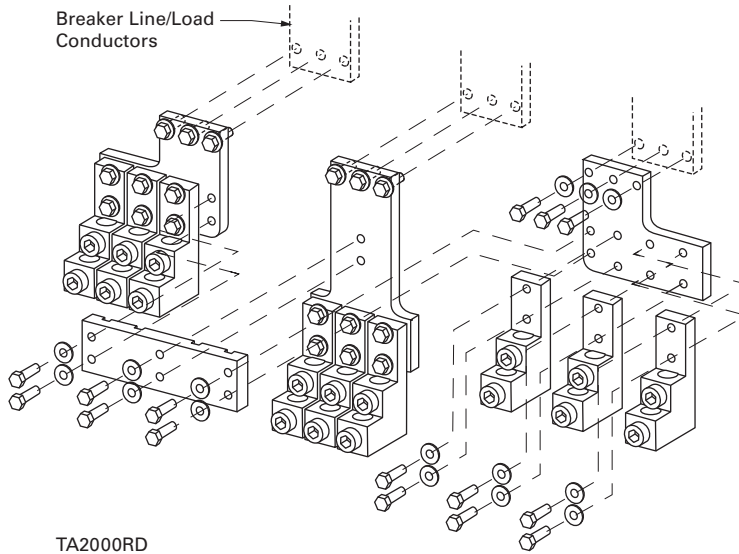
# 2.3

## Molded Case Circuit Breakers

### Series C

#### Mounting Hardware

2



## 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.

### RD Frame Accessories

Description	Reference Page	Three-Pole			Four-Pole			Neu.
		Left	Center	Right	Left	Center	Right	
<b>Internal Accessories</b> <sup>①</sup>								
Alarm lockout (Make/Break)	V4-T2-276			■			■	
Alarm lockout (2Make/2Break)	V4-T2-276			■			■	
Auxiliary switch (2A, 2B)	V4-T2-276			■			■	
Auxiliary switch (4A, 4B)	V4-T2-276			■			■	
Shunt trip—standard	V4-T2-284			■			■	
Shunt trip—low energy	V4-T2-285			■			■	
Undervoltage release mechanism	V4-T2-292			■			■	
Accessory terminal block <sup>②</sup>	V4-T2-293			■				■
<b>External Accessories</b>								
Base mounting hardware	V4-T2-311							
Padlockable handle lock hasp	V4-T2-314		●			●		
Key interlock kit	V4-T2-316	■	■	■		■		
Walking beam interlock	V4-T2-317							
Electrical (motor) operator	V4-T2-319	■	■	■		■		
Handle mechanisms	V4-T2-430	■	■	■		■		
Handle extension <sup>③</sup>	V4-T2-445		■			■		
<b>OPTIM System Components</b>								
Breaker interface module (BIM)	V4-T2-325	●	●	●				
Digitrip OPTIMizer	V4-T2-325	●	●	●				
Auxiliary power module	V4-T2-325	●	●	●				
<b>Modifications (Refer to Eaton)</b>								
Special calibration	—	●	●	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●	●	●
Marine/naval application	—	●	●	●	●	●	●	●

#### Legend

- Applicable in indicated pole position
- Accessory available/modification available

#### Notes

- ① All accessories mount in the RH cavity which will accept one each shunt trip, UVR, auxiliary switch and alarm switch.
- ② Mounts outside breaker.
- ③ Included with breaker.



## Technical Data and Specifications

## 2

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
RD	3, 4	125	—	65	50
CRD <sup>②</sup>	3	125	—	65	50
RDC	3, 4	200	—	100	65
CRDC <sup>②</sup>	3	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
<b>RD</b>				
$I_{cu}$	3, 4	135	70	25
$I_{cs}$	3, 4	100	50	13
<b>RDC</b>				
$I_{cu}$	3, 4	200	100	35
$I_{cs}$	3, 4	100	50	18

**Notes**

<sup>①</sup> Utilization Category A circuit breakers.

<sup>②</sup> 100% rated breakers.

See **Page V4-T2-253** for Trip Unit Specifications.

**Specifications****R-Frame Digitrip**

Trip Unit Type	Digitrip RMS 510	Digitrip RMS 610	Digitrip RMS 810	Digitrip RMS 910	Digitrip OPTIM 1050
rms sensing	Yes	Yes	Yes	Yes	Yes
<b>Breaker Type</b>					
Frame	R	R	R	R	R
Ampere range	800–2500 A	800–2500 A	800–2500 A	800–2500 A	800–2500 A
Interrupting rating at 480 volts	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)
<b>Protection</b>					
Ordering options	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LSI(A), LISG
Fixed rated plug ( $I_n$ )	Yes	Yes	Yes	Yes	Yes
Overtemperature trip	Yes	Yes	Yes	Yes	Yes
<b>Long Delay Protection (L)</b>					
Adjustable rating plug ( $I_n$ )	No	No	No	No	No
Long delay pickup	0.5–1.0 x ( $I_n$ )	0.5–1.0 x ( $I_n$ )	0.5–1.0 x ( $I_n$ )	0.5–1.0 x ( $I_n$ )	0.4–1.0 x ( $I_n$ )
Long delay time $I^2t$	2–24 seconds	2–24 seconds	2–24 seconds	2–24 seconds	2–24 seconds
Long delay time $I^4t$	No	No	No	No	1–5 Seconds
Long delay thermal memory	Yes	Yes	Yes	Yes	Yes
High load alarm	No	0.85 x $I_r$	0.85 x $I_r$	0.85 x $I_r$	0.5–1.0 x $I_r$
<b>Short Delay Protection (S)</b>					
Short delay pickup	200–600% S1 and S2 x ( $I_r$ )	200–600% S1 and S2 x ( $I_r$ )	200–600% S1 and S2 x ( $I_r$ )	200–600% S1 and S2 x ( $I_r$ )	150–800% x ( $I_r$ ) <sup>①②</sup>
Short delay time $I^2t$	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Short delay time flat	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Short delay time zone selective interlocking	Yes	Yes	Yes	Yes	Yes
<b>Instantaneous Protection (I)</b>					
Instantaneous pickup	200–600% M1 and M2 x ( $I_n$ )	200–600% M1 and M2 x ( $I_n$ )	200–600% M1 and M2 x ( $I_n$ )	200–600% M1 and M2 x ( $I_n$ )	200–800% x ( $I_n$ ) <sup>②</sup>
Discriminator	Yes <sup>③</sup>	Yes <sup>③</sup>	Yes <sup>③</sup>	Yes <sup>③</sup>	Yes
Instantaneous override	Yes	Yes	Yes	Yes	Yes
<b>Ground Fault Protection (G)</b>					
Ground fault alarm <sup>④</sup>	No	No	No	No	25–100% x ( $I_n$ )
Ground fault pickup <sup>④</sup>	25–100% x ( $I_s$ )	25–100% x ( $I_s$ )	25–100% x ( $I_s$ )	25–100% x ( $I_s$ )	25–100% x ( $I_n$ )
Ground fault delay $I^2t$	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Ground fault delay flat	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Ground fault zone selective interlocking	Yes	Yes	Yes	Yes	Yes
Ground fault thermal memory	Yes	Yes	Yes	Yes	Yes

**Legend**

BIM = Breaker Interface Module  
(A) = GF Alarm  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = Long Delay Pickup Setting x  $I_n$

**Notes**

- ① Except 2500 ampere frame is 200–600%.  
② Varies by frame.  
③ LS/LSG only.  
④ Not to exceed 1200 amperes.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### R-Frame Digitrip, continued

Trip Unit Type	Digitrip RMS 510	Digitrip RMS 610	Digitrip RMS 810	Digitrip RMS 910	Digitrip OPTIM 1050
<b>System Diagnostics</b>					
Status LEDs	Yes	Yes	Yes	Yes	Yes
Cause of trip LEDs	Yes	Yes	Yes	Yes	Yes
Magnitude of trip information	No	Yes	Yes	Yes	Yes
Remote signal contacts	No	Yes	Yes	Yes	Yes
<b>System Monitoring</b>					
Digital display	No	Yes	Yes	Yes	Yes <sup>①</sup>
Current	No	Yes	Yes	Yes	Yes
Voltage	No	No	No	Yes	No
Power and energy	No	No	Yes	Yes	Yes
Power quality—harmonics	No	No	No	Yes	Yes
Power factor	No	No	Yes (over Eaton PowerNet only)	Yes	Yes
<b>Communications</b>					
Eaton PowerNet	No	No	Yes	Yes	Yes
<b>Testing</b>					
Testing method	Integral	Integral	Integral	Integral	OPTIMizer, BIM, PowerNet

#### Legend

BIM = Breaker Interface Module  
 (A) = GF Alarm  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = Long Delay Pickup Setting x  $I_n$

#### Note

<sup>①</sup> By OPTIMizer/BIM.

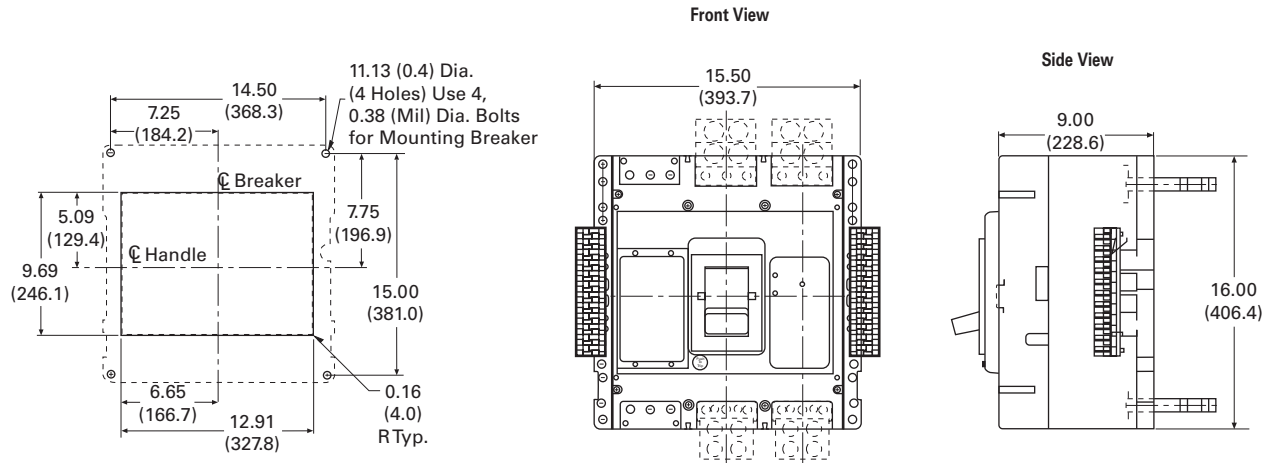
**Dimensions and Weights**

Dimensions in Inches (mm)

**RD 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)

**RD-Frame, Three-Pole, 1600 and 2000 Amperes**



Approximate Shipping Weight in Lbs (kg)

**RD Frame**

Breaker Type	Complete Breaker	
	Three-Pole	Four-Pole
<b>1600 Amperes</b>		
RD, CRD ①, RDC, CRDC ①	102 (46.3)	135 (61.2)
<b>2000 Amperes</b>		
RD, RDC	102 (46.3)	135 (61.2)
CRD, CRDC	130 (59.0)	175 (79.4)
<b>2500 Amperes</b>		
RD, RDC	135 (61.2)	182 (82.6)

**Note**

① No four-pole for CRD and CRDC.

**Motor Circuit Protectors**



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**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.

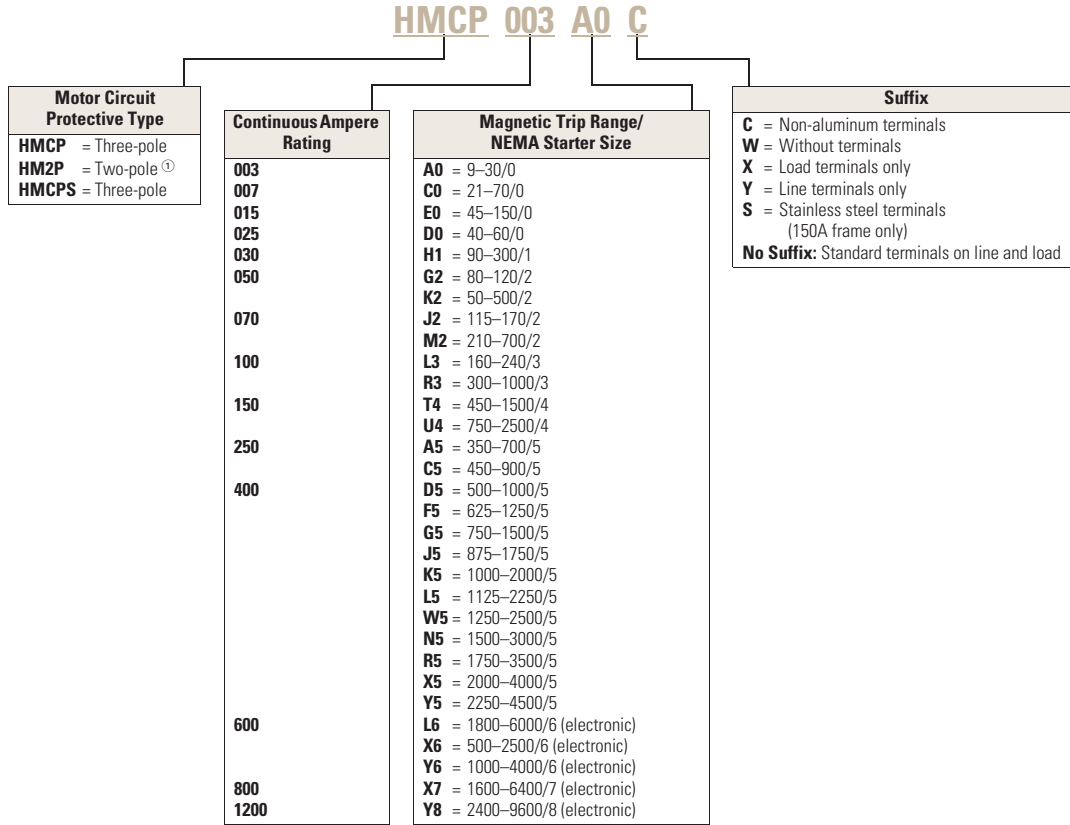


**Note:** Interrupting ratings are dependent on starter it is used with.

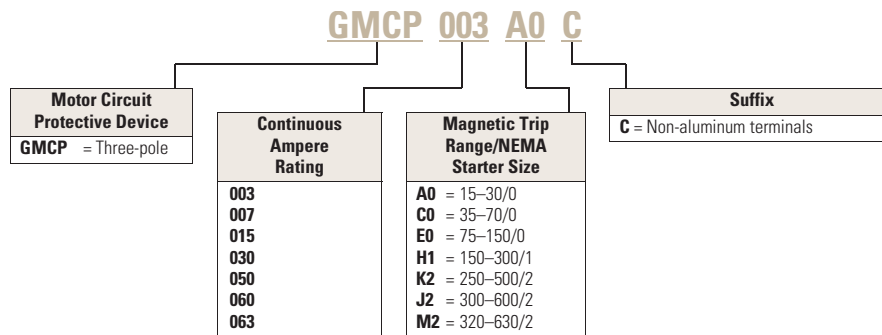
### Catalog Number Selection

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.

### Motor Circuit Protector



### Motor Circuit Protector



**Note**

<sup>①</sup> On J- and K-Frame HMCPs only.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Product Selection

##### G-Frame

2

##### 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-T2-122** 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-T2-273**.

### 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.



# 2.3

## 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) ①	MCP Trip Setting ②	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) ①	MCP Trip Setting ②	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	
		E	69.2–80.6	900	
		F	80.7–92.2	1050	
		G	92.3–103.7	1200	
		H	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 amperes 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 150A come with line and load steel body terminals, 3T150FB.

**Special Low Magnetic Protection Application MCP****600 Vac Maximum, 250 Vdc Maximum**

Cont. Amps	Cam Setting	MCP Trip Setting <sup>①</sup>	MCP Catalog Number
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.

# 2.3

## 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 130A 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 150A 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) <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number <sup>③</sup>
4	250	A	27.0–30.7	350	HMCP250A5C
		B	30.8–33.8	400	
		C	33.9–36.9	440	
5	250	D	37.0–40.3	480	HMCP250C5C
		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	34.7–38.8	450	HMCP250C5C
		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	HMCP250D5C
		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	HMCP250F5C
		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	HMCP250G5C
		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) <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number <sup>③</sup>
5	250	A	67.4–75.3	875	HMCP250J5C
		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	HMCP250K5C
		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	HMCP250L5C
		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	HMCP250W5C
		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 250A come with line and load steel body terminals, T250KB. (With suffix "C," without "C" comes with TA250KB.)

# 2.3

## Molded Case Circuit Breakers

### Series C

#### K-Frame

#### 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 <sup>③</sup>
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) <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number <sup>③</sup>	
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>HMCP400M5C</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	400	A	96.2–108.0	1250	<b>HMCP400W5C</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		
5	400	A	115.4–129.9	1500	<b>HMCP400N5C</b>	
		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		
		G	202.0–216.1	2625		
		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) <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number <sup>③</sup>
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 <sup>④</sup>

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) <sup>①</sup>	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**

- <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.
- <sup>②</sup> For DC applications, actual trip levels are approximately 40% higher than values shown.
- <sup>③</sup> Three-pole catalog numbers shown. Two-pole catalog numbers begin with **HM2P** in place of **HMCP**.
- <sup>④</sup> 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-T2-217**.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### N-Frame

2

#### 600 Vac Maximum <sup>①</sup>

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) <sup>②</sup>	MCP Trip Setting	MCP Catalog Number
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

- ① Equipped with electronic trip device.
- ② 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.

**Motor Protection Circuit Breakers**



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**Motor Protection Circuit Breakers (MPCB)**

**Product Description**

Motor protection circuit breakers (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. Typical branch motor loads are protected by three-component starters, 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 found in the traditional three-component starter assembly. The branch motor load protection is simplified to an MPCB and contactor, reducing both space requirements and heat generation in customer panels. Protection is provided by application-specific electronic trip units.

The electronic trip unit provides typical motor overload relay functionality and short-circuit protection against potential phase-to-phase or phase-to-ground faults.

- Disconnecting means
- Branch circuit short-circuit protection
- Overload protection
  - Class 5, 10, 15 and 20
- Phase unbalance protection
  - FDMP breaker trips when there is a 40% difference between any phase compared to the calculated three-phase average

- Phase loss protection
  - Active when the maximum phase current is greater than 50% of FLA setting
  - Breaker will trip when minimum phase current is 25% or less than the maximum phase current
  - Time delay of 1 or 2 seconds before breaker trips
- Thermal memory to prevent immediate restart after overload trip to allow motor to cool down

The MPCB is based on the Series C F-Frame. Accessories for standard Series C breakers apply to the MPCB. Unlike Motor Circuit Protectors (MCPs), MPCBs are UL 489 listed with 35 kA and 65 kA interruption ratings.



## Product Selection

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## FDMP and HFDMP

Continuous Amperes	35 kA Without Phase Unbalance, Class 10 Motor Protection Only	35 kA With Phase Unbalance and Adjustable Motor Class Protection	65 kA Without Phase Unbalance, Class 10 Motor Protection Only	65 kA With Phase Unbalance and Adjustable Motor Class Protection
80	FDMP3080L	FDMP3080JL	HFDMP3080L	HFDMP3080JL
100	FDMP3100L	FDMP3100JL	HFDMP3100L	HFDMP3100JL
160	FDMP3160L	FDMP3160JL	HFDMP3160L	HFDMP3160JL
205	FDMP3205L	FDMP3205JL	HFDMP3205L	HFDMP3205JL

## FLA Ie Dial Setting

Continuous Amperes	A	B	C	D	E	F	G	H
80	40	50	60	70	80	—	—	—
100	80	—	90	—	100	—	—	—
160	100	115	130	145	160	—	—	—
205	160	170	180	195	205	—	—	—

## Technical Data and Specifications

## Specifications

Feature	FDMP	HFDMP
Interruption rating at 240 V	65 kA	100 kA
Interruption rating at 480 V	35 kA	65 kA
Interruption rating at 600 V	18 kA	25 kA
Icu/Ics at 240 V	65 kA/33 kA ①	100 kA/50 kA ①
Icu/Ics at 415 V	35 kA/18 kA ①	65 kA/33 kA ①
100% rated	No	No
FLA range (A)	40–205	40–205
Motor class protection	5, 10, 15, 20	5, 10, 15, 20
Phase unbalance protection (current)—active for phase current >0.5 FLA setting	≥40% delta (single-phase): (three-phase avg.) for 5 seconds	≥40% delta (single-phase): (three-phase avg.) for 5 seconds
Phase loss protection (current)—active for phase current >0.5 FLA setting	Min. phase ≤0.25 max. phase for 1 second	Min. phase ≤0.25 max. phase for 1 second
Thermal memory protection	Yes	Yes
High load indicator	—	—
Pre-detection relays	—	—
Internal accessories	Factory installed Aux. alarm, shunt trip, UVR	Factory installed Aux. alarm, shunt trip, UVR

## Notes

① IEC ratings available only on FWMP and HFWMP.

For additional breaker solutions, see **Page V4-T2-89**.

**Type ELC Current Limiter Attachment**



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**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.

**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-T2-217**.

#### Current Limiting Circuit Breaker Module

2



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### 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.

#### 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

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## 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>

Amperes 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	FDC3040Q02
45	FDC3045Q01	FDC3045Q02
50	FDC3050Q01	FDC3050Q02
60	FDC3060Q01	FDC3060Q02
70	FDC3070Q01	FDC3070Q02
80	FDC3080Q01	FDC3080Q02
90	FDC3090Q01	FDC3090Q02
100	FDC3100Q01	FDC3100Q02
110	FDC3110Q01	FDC3110Q02
125	FDC3125Q01	FDC3125Q02
150	FDC3150Q01	FDC3150Q02
175	FDC3175Q01	FDC3175Q02
200	FDC3200Q01	FDC3200Q02

## 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

- ① Line and load terminal included.
- ② Two interphase barriers provided, mounted on line end of limiter, catalog number **FJ1PBK**.
- ③ Four interphase barriers provided, (2) line end of breaker, (2) load end of limiter.
- ④ Load side breaker terminations included for units configured with line mounted limiters.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Dimensions and Weights

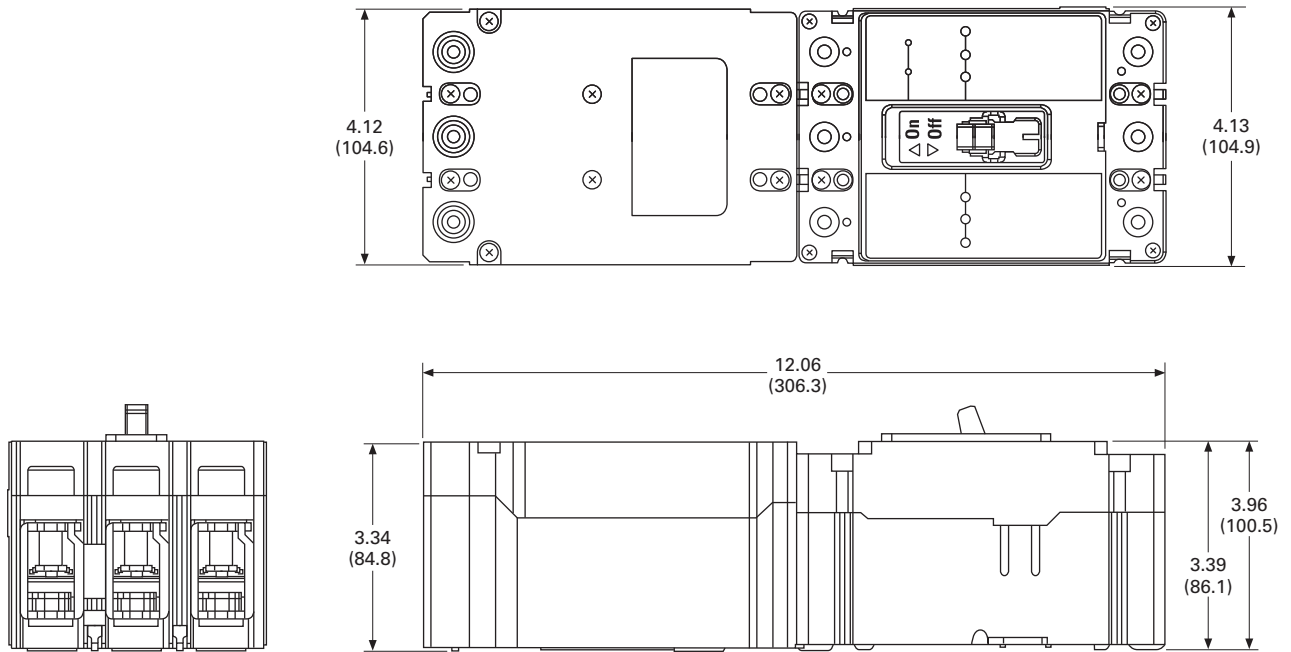
Approximate Dimensions in Inches (mm)

2

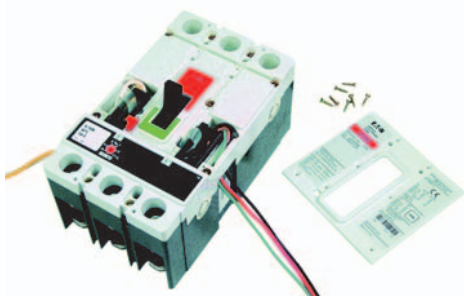
#### Assembled Breaker and Current Limiting Module

Frame	Height	Width	Depth	Weight in lbs (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



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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-T2-278** and **V4-T2-279** 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-T2-274**.

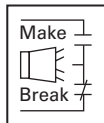
**PowerNet and Zone Interlock Kits (OPTIM 550 only) K-, L- and N-Frames**

Eaton's PowerNet Communications Kit can be ordered to add PowerNet communications to an existing OPTIM 550 breaker in the field. An 18-inch (457.2 mm) wiring pigtail is routed to the rear of the breaker: two wires for PowerNet and two wires for 24 Vdc (45 mA load). It is recommended that the power supply be an "isolated high quality" unit.

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	B3	1288C75G03
<b>Alarm Switch Auxiliary Switches Combination</b>					
240	50/60 Hz	6	1 Make/1 Break and 1A/1B	B13	1288C76G09

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	B01	B02	B03	B04	A1L1LPK	A1L1LTK
	Right	B05	B06	B07	B08	A1L1RPK	A1L1RTK
2	Left ⑦	B09	B10	—	B11	A2L1LPK	A2L1LTK
	Right	B12	B13	—	B14	A2L1RPK	A2L1RTK
1 (Make only)	Single-pole	B15 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	B01	B02	B03	B04	MA1L1LPK	MA1L1LTK
	Right	B05	B06	B07	B08	MA1L1RPK	MA1L1RTK
2	Left ⑦	B09	B10	—	B11	MA2L1LPK	MA2L1LTK
	Right	B12	B13	—	B14	MA2L1RPK	MA2L1RTK

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 ⑤		
		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	B01	B02	B03	B04	A1L2LPK	A1L2LTK
	Right	B05	B06	B07	B08	A1L2RPK	A1L2RTK 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 <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
		1	Left <sup>③</sup>	B01		B02	B03
	Right <sup>④</sup>	B05	B06	B07	B08	A1L3RPK	A1L3RTK
2	Left <sup>③</sup>	B09	B10	—	B11	A2L3LPK	A2L3LTK
	Right <sup>④</sup>	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 <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
		1	Left <sup>③</sup>	B01		B02	B03
	Right	B05	B06	B07	B08	A1L4RPK	A1L4RTK
2	Left <sup>③</sup>	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 <sup>⑤</sup>	
		Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
		1	Left	B01		B02	B03
	Right <sup>③</sup>	B05	B06	B07	B08	A1L5RPK	A1L5RTK
2	Left	B09	B10	—	B11	A2L5LPK	A2L5LTK
	Right <sup>③</sup>	B12	B13	—	B14	A2L5RPK	A2L5RTK

## R-Frame Alarm Switch (RH Only)

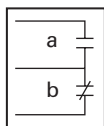
Number of Contacts (Make and Break)	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads	Field Mounted Field Installation Kits <sup>⑤</sup>
	Suffix Number <sup>⑥</sup>	Pigtail Leads Catalog Number <sup>⑥</sup>
1	B05	A1L6RPK
2	B12	A2L6RPK

## 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			Factory Installation Kit <sup>④</sup>		
		18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number	Catalog Number	Catalog Number
1	Left <sup>⑤</sup>	A01	A02	A03	A04	A1X1PK	A1X1LTK
	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			Factory Installation Kit <sup>④</sup>		
		18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side Suffix Number	Rear Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number	Catalog Number	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			Field Mounted Factory Installation Kit <sup>⑩</sup>		
		18-Inch (457.2 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side Suffix Number	Rear <sup>③</sup> Suffix Number	Opposite Side Suffix Number	Same Side Suffix Number	Catalog Number	Catalog Number
1	Left	A01	A02	A03	A04	A1X2PK	A1X2LTK
	Right <sup>⑧</sup>	A05	A06	A07	A08	A1X2PK	A1X2RTK <sup>⑧</sup>
2	Left	A09	A10	—	A11	A2X2PK	A2X2LTK
	Right <sup>⑧</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				Field Mounted Factory Installation Kit ①	
		Same Side		Opposite Side	Terminal Block		Terminal Block
		Suffix Number	Rear ② Suffix Number		Same Side Suffix Number	Pigtail Leads	
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				Field Mounted Factory Installation Kit ①	
		Same Side		Opposite Side	Terminal Block		Terminal Block
		Suffix Number	Rear ② Suffix Number		Same Side Suffix Number	Pigtail Leads	
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				Field Mounted Factory Installation Kit ①	
		Same Side		Opposite Side	Terminal Block		Terminal Block
		Suffix Number	Rear ② Suffix Number		Same Side Suffix Number	Pigtail Leads	
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)

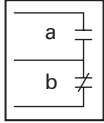
Number of Contacts A and B	Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads	Field Mounted Field Installation Kits ①
	Suffix Number ⑤	Pigtail Leads Catalog Number ⑤
2	A12	A2X6RPK
4	A19	A4X6RPK

#### 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 Available on the OPTIM 550 only. 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 ①**

Mounting Location (Pole)	Factory Mounted Connection Type and Location			Factory Installation Kit ②	
	18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads
	Same Side	Rear ③	Terminal Block	Same Side	Terminal Block
	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
Left ④	C01	C02	C03	AAL1LPK	AAL1LTK
Right	C04	C05	C06	AAL1RPK	AAL1RTK ④

**F-Frame HMCP Auxiliary Switch and Alarm Switch Combination**

Mounting Location (Pole)	Factory Mounted Connection Type and Location			Factory Installation Kit ②	
	18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads
	Same Side	Rear ③	Terminal Block	Same Side	Terminal Block
	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
Left ④	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			Field Mounted Field Installation Kits ⑤		
		18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side	Rear ⑥	Opposite Side	Same Side	Terminal Block	Pigtail Leads
		Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
1	Left	C01	C02	—	C03	AAL2LPK	AAL2LTK
	Right ④	C04	C05	—	C06	AAL2RPK	AAL2RTK ④

**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			Field Mounted Field Installation Kits ⑤		
		18-Inch (457 mm) Pigtail Leads			Terminal Block	Pigtail Leads	Terminal Block
		Same Side	Rear ⑥	Opposite Side	Same Side	Terminal Block	Pigtail Leads
		Suffix Number	Suffix Number	Suffix Number	Suffix Number	Catalog Number	Catalog Number
1	Left	C01	C02	—	C03	AAL3LPK	AAL3LTK
	Right ⑥⑦	C04	C05	—	C06	AAL3RPK ⑧	AAL3RTK
	Right	C07	C08	—	—	1482D28G09 ⑨⑩	—

**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 Available on the OPTIM 550 only. 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

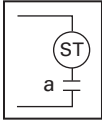
Number of Sets of Contacts	Mounting Location (Pole)	Factory Mounted Connection Type and Location 18-Inch (457 mm) Pigtail Leads			Terminal Block Same Side Suffix Number	Field Mounted Field Installation Kits <sup>①</sup>	
		Same Side Suffix Number	Rear <sup>②</sup> Suffix Number	Opposite Side Suffix Number		Pigtail Leads Catalog Number	Terminal Block Catalog Number
1A, 1B and 1 Make/1 Break	Left	C01	C02	—	C03	AA114LPK	AA114LTK
	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	—	C03	AA115LPK	AA115LTK
	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**

<sup>①</sup> Not listed with Underwriters Laboratories, for field installation.

<sup>②</sup> Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>).

<sup>③</sup> Standard pigtail lead exit location.

<sup>④</sup> 120 Vac marked suitable for ground fault protection devices.

<sup>⑤</sup> Standard mounting location.

<sup>⑥</sup> 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.

# 2.3

## 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	Terminal Block
					Catalog Number	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	Terminal Block
					Catalog Number	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	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**

- 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) three-pole trip units only.



# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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 ①		
	Same Side		Opposite Side	Terminal Block		Terminal Block Catalog Number
	Suffix Number	Rear ② Suffix Number	Suffix Number	Same Side Suffix Number	Pigtail Leads Catalog Number	
<b>Left-Pole Mounting AC/DC Ratings ②</b>						
9–24 Vac or Vdc	S01	S02	S03	S04	SNT5LP03K	SNT5LT03K
48–60 Vac	S05	S06	S07	S08	SNT5LP05K	SNT5LT05K
110–240 Vac ③	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 ①
	Suffix Number ④	Pigtail Leads Catalog Number ④
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

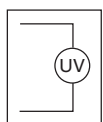
#### Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
- ② Standard mounting location—leads exit rear of breaker.
- ③ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.
- ④ 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	—

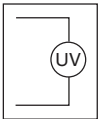
**Notes**

- ① Cutoff provisions required in control circuit.
- ② Listed with Underwriters Laboratories for field installation under E64983.
- ③ Standard mounting location—leads exit rear of breaker.
- ④ 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.
- ⑤ For use with thermal-magnetic trip units only.
- ⑥ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

### Undervoltage Release Mechanism Ordering Information

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

Volts (AC Only)	Frequency (Hz)	Amperes	Style Numbers <sup>①②③</sup>	Factory Suffix
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 ① 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 ②③</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 ②③</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 Catalog Number	Terminal Block Catalog Number	Pigtail Leads Catalog Number	Terminal Block 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.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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 <sup>①</sup>	
	18-Inch (457.2 mm) Pigtail Leads				Terminal Block	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	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 <sup>③④⑤</sup></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 <sup>②</sup></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 <sup>③④⑤</sup></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			
<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 <sup>①</sup>	
	Same Side		Opposite Side		Pigtail Leads	Terminal Block
	Suffix Number	Rear <sup>②</sup> Suffix Number	Suffix Number	Suffix Number	Terminal Block Catalog Number	Terminal Block Catalog Number
<b>Left-Pole Mounting AC Ratings <sup>②</sup></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 <sup>②</sup></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 <sup>③</sup>
	Suffix Number <sup>④</sup>	Pigtail Leads Catalog Number <sup>④</sup>
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

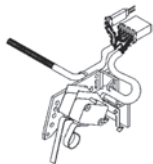
Factory Installed Suffix Number	Field Mounted Catalog Number
Q01	TBRDK

**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 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

**PowerNet and Zone Interlock Kits (OPTIM 550 Only)  
K-, L- and N-Frames**

**PowerNet and Zone  
Interlock Kits**



**PowerNet Interlock Kit** ②

Circuit Breaker	Factory Install Suffix	Catalog Number
K-Frame	PN	ICK550K
L-Frame	PN	ICK550L
N-Frame	PN	ICK550N

**Zone Interlock/Ground Kit** ②③

Circuit Breaker	Factory Install Suffix	Catalog Number
K-Frame	ZG	ZGK550K
L-Frame	ZG	ZGK550L
N-Frame	ZG	ZGK550N

**PowerNet and Zone Interlock/Ground Kit** ②③

Circuit Breaker	Factory Install Suffix	Catalog Number
K-Frame	ZGP	ZGPK550K
L-Frame	ZGP	ZGPK550L
N-Frame	ZGP	ZGPK550N

**Notes**

- 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).
- ② Installation of these kits restrict any other attachments from being installed in the RH pole.
- ③ Includes a ground fault alarm signal that can drive the ground fault alarm unit (catalog number GFAU).

## Technical Data and Specifications

## Alarm Switch

2

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>⑧⑩</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 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****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 Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>).
- ③ For use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
- ④ Non-inductive load.
- ⑤ Endurance: 5000 electrical operations plus 1000 mechanical operations.
- ⑥ Endurance: 3000 electrical operations plus 1000 mechanical operations.
- ⑦ Endurance: 500 electrical operations plus 2500 mechanical operations.
- ⑧ Pigtail wire size: 18 AWG (0.82 mm<sup>2</sup>). Leads are red, black and blue.

**Auxiliary Switch and Alarm Switch Combination**

2

**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>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

**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: 6000 electrical operations plus 2000 mechanical operations.
- ⑤ Endurance: 5000 electrical operations plus 1000 mechanical operations.
- ⑥ Endurance: 3000 electrical operations plus 1000 mechanical operations.

**Shunt Trip****F-Frame Electrical Rating Data** <sup>①②③</sup>

50/60 Hz			DC		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
12	6.75	75	12	9	100
24	6.75	300	24	9	400
48	36	92	48	36	100
60	36	140	60	36	160
110	156	480	110	77	55
120	156	570	120	77	66
127	156	640	125	77	71
208	156	180	—	—	—
220	156	200	—	—	—
240	156	240	—	—	—
380	300	610	127	—	72
415	300	130	220	—	110
440	300	330	250	—	140
480	300	380	—	—	—
525	300	450	—	—	—
550	300	530	—	—	—
600	300	590	—	—	—

**J-Frame Electrical Rating Data** <sup>①②④</sup>

50/60 Hz			DC		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
12	9	31	12	8.4	50
24	9	173	24	8.4	247
48	36	686	48	33.6	1094
60	36	1014	60	33.6	1698
110 <sup>⑤</sup>	60.5	66	110	77	112
120 <sup>⑤</sup>	60.5	84	120	77	138
127 <sup>⑤</sup>	60.5	102	125	77	150
208 <sup>⑤</sup>	60.5	354	—	77	—
220 <sup>⑤</sup>	60.5	396	—	—	—
240 <sup>⑤</sup>	60.5	432	—	—	—
380	285	180	110	154	40
400	285	200	120	154	58
415	285	240	125	154	—
440	285	610	127	154	—
480	360	34	—	—	—
525	360	42	—	—	—
550	360	50	—	—	—
600	360	60	—	—	—

**K-Frame Electrical Rating Data** <sup>⑥⑦⑧</sup>

50/60 Hz			DC		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
12	9	45	12	8.4	35
24	9	200	24	8.4	170
48	—	830	48	—	710
60	—	1280	60	—	1105
110 <sup>⑤</sup>	60	100	110	77	110
120 <sup>⑤</sup>	60	120	120	77	130
127 <sup>⑤</sup>	60	140	125	77	140
208 <sup>⑤</sup>	60	420	—	—	—
220 <sup>⑤</sup>	60	470	—	—	—
240 <sup>⑤</sup>	60	550	—	—	—
380	285	95	220	154	41
400	285	108	250	154	54
415	285	120	—	154	—
440	285	136	—	154	—
480	360	40	—	—	—
525	360	50	—	—	—
550	360	50	—	—	—
600	360	70	—	—	—

**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.
- ④ Endurance: 6000 electrical operations plus 2000 mechanical operations.
- ⑤ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.
- ⑥ Approximate unlatching time: 6 milliseconds.
- ⑦ Approximate total circuit breaker contact opening time: 8 milliseconds.
- ⑧ Endurance: 5000 electrical operations plus 1000 mechanical operations.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### L- and M-Frame Electrical Rating Data <sup>①②③</sup>

50/60 Hz			DC		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
12	9	45	12	9	35
24	9	200	24	9	170
48	34	830	48	34	710
60	34	1280	60	34	1105
110 <sup>④</sup>	60	100	110	77	110
120 <sup>④</sup>	60	120	120	77	130
127 <sup>④</sup>	60	140	125	77	140
208 <sup>④</sup>	60	420	—	77	—
220 <sup>④</sup>	60	470	—	—	—
240 <sup>④</sup>	60	550	—	—	—
380	266	95	220	154	41
400	266	108	250	—	54
415	266	120	—	—	—
440	266	136	—	—	—
480	336	40	—	—	—
525	336	50	—	—	—
550	336	50	—	—	—
600	336	70	—	—	—

#### N-Frame Electrical Rating Data <sup>①②⑤</sup>

50/60 Hz			DC		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
24	16.8	200	24	16.8	170
48	33.6	830	48	33.6	710
60	33.6	1280	60	33.6	1150
110 <sup>④</sup>	60	100	110	77	110
120 <sup>④</sup>	60	120	120	77	130
127 <sup>④</sup>	60	140	125	77	140
208 <sup>④</sup>	60	420	—	—	—
220 <sup>④</sup>	60	470	—	—	—
240 <sup>④</sup>	60	550	—	—	—
380	266	95	220	154	41
400	266	108	250	—	54
415	266	120	—	—	—
440	266	136	—	—	—
480	336	40	—	—	—
525	336	50	—	—	—
550	336	50	—	—	—
600	336	70	—	—	—

#### 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.
- ④ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.
- ⑤ Endurance: 3000 electrical operations plus 1000 mechanical operations.

## R-Frame Electrical Rating Data ①②③④⑤⑥

Suffix Number	Application Ratings		Electrical Operating Ratings					VA	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 0.250s (A)	I <sub>rms</sub> at 0.033s (A)		
03/03K	24	50/60	24	16.8	36.1	—	25.5	612	1050
	24	DC	24	16.8	36.1	16.5	—	396	1050
05/05K	48–60	50/60	48	34.0	13.1	—	9.2	450	1120
	48–60	50/60	60	34.0	17.2	—	12.2	740	1120
11/11K ③	110–240	50/60	110	60.5	4.2	—	3.0	330	1480
	110–240	50/60	120	60.5	4.5	—	3.2	390	1480
	110–240	50/60	127	60.5	4.6	—	3.3	430	1480
	110–240	50/60	208	60.5	7.9	—	5.6	1170	1480
	110–240	50/60	220	60.5	8.5	—	6.0	1370	1480
	110–240	50/60	240	60.5	8.7	—	6.1	1470	1480
14/14K	380–440	50/60	380	266.0	4.5	—	3.2	1220	1880
	380–440	50/60	415	266.0	5.0	—	3.6	1500	1880
	380–440	50/60	440	266.0	5.3	—	3.7	1640	1880
	220–250	DC	220	154.0	—	2.4	—	530	1500
	220–250	DC	250	154.0	—	2.7	—	680	1500
18/18K	480–600	50/60	480	336.0	0.6	—	0.4	200	2200
	480–600	50/60	525	336.0	0.7	—	0.5	270	2200
	480–600	50/60	550	336.0	0.7	—	0.5	280	2200
	480–600	50/60	600	336.0	0.8	—	0.6	360	2200
23/23K	48–60	DC	48	34.0	—	9.8	—	470	1120
	48–60	DC	60	34.0	—	11.6	—	700	1120
26/26K	110–125	DC	110	77.0	—	3.3	—	370	1250
	110–125	DC	120	77.0	—	3.6	—	440	1250
	110–125	DC	125	77.0	—	3.8	—	480	1250

**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.



# 2.3

## Molded Case Circuit Breakers

### Series C

#### 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.

# 2.3

## 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**

<sup>①</sup> 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



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## 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.

**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.

#### **Potential Transformer Module**

The potential transformer module is required for the Digitrip OPTIM 1050 to provide a voltage input to allow the trip unit to monitor power and energy as well as power factor. The potential transformer module is a 6 VA transformer with a primary voltage input of up to 600 volt line to line. Three 0.1 ampere fuses are provided on the primary of the transformer and can be used for isolation purposes during dielectric testing. The device is normally panel mounted and can feed up to 16 OPTIM trip units.

#### **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 OPTIM trip units and 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 OPTIM trip units, 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, 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 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.

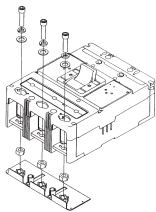


## Product Selection

## Termination Hardware—End Cap Kit

2

## End Cap Kit

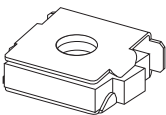


## End Cap Kit

Thread Type	Thread Size	Catalog Number
<b>Two-Pole F-Frame (225A)</b>		
Imperial	10–32	KPEK12
Metric	M–5	KPEKM12
<b>Three-Pole F-Frame (225A)</b>		
Imperial	10–32	KPEK1
Metric	M–5	KPEKM1
<b>Four-Pole F-Frame (225A)</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

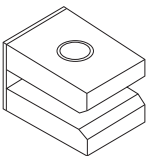
## F-Frame Keeper Nut



## 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

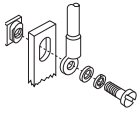
Thread Type	Thread Size	Line/Load End	Catalog Number Package of 3
Imperial	0.375–16	Line	KPR3A
		Load	KPR3B
Metric	M–8	Line	KPR3AM
		Load	KPR3BM

**Note**

L-, M-, N-Frames not required. Terminals are threaded.

**Termination Hardware**

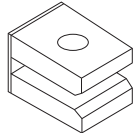
**J-Frame Plug Nut**



**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**



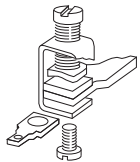
**K-Frame Terminal Adapter** ①

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**



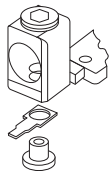
**F-Frame Control Wire Terminal Kit** ②

Description	Maximum Amperes	Catalog Number
Package of 12 control wire terminal tangs.	150	<b>FCWTK</b>
	225	<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**

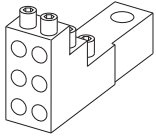
AWG Wire Range/Number Conductors	Metric Wire Range mm <sup>2</sup>	Catalog Number
Al/Cu 3/0–350 kcmil (2)	95–150	<b>TA602LDCW</b> ③
Cu 250–350 kcmil (2)	120–250	<b>T602LDCW</b> ③
Al/Cu 400–500 kcmil (2)	185–240	<b>2TA603LDKCW</b> ④⑤
Al/Cu 400–500 kcmil (2)	185–240	<b>3TA603LDKCW</b> ④⑥
Al/Cu 400–500 kcmil (2)	185–240	<b>4TA603LDKCW</b> ④⑦

**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****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>BMH5M</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**

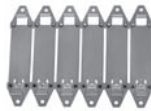


**Interphase Barriers**

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**

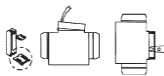
Number of Poles	Number of Units in Package	Catalog Number
1, 2	10	1225C79G01
3	10	1225C79G02 ①

**All Metal DIN Rail Adapter G-Frame GD/GHC**

Number of Poles	Number of Units in Package	Catalog Number
3	1	EGGDDIN

**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.

# 2.3

## 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 Tie G-Frame—GHB/GHC

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 <sup>①</sup>
For right side mounting	PLK3ROFF <sup>①</sup>
<b>L-Frame (Side Mounted)</b>	
Lock ON or OFF	HLK4
Lock OFF only (left-hand mount)	HLK4LOFF <sup>①</sup>
<b>L-Frame (Top Mounted)</b>	
Lock ON or OFF	HLK4S
Lock OFF only	HLK4SOFF <sup>①</sup>
<b>M-Frame</b>	
Lock ON or OFF	HLK4
Lock OFF only (left-hand mount)	HLK4LOFF <sup>①</sup>
<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 <sup>①</sup>
<b>R-Frame</b>	
Lock ON/OFF	HLK6
Lock OFF only	HLK6OFF <sup>①</sup>

**Cylinder Lock****Cylinder Lock****Cylinder Lock**

Frame	Catalog Number
F, J, K	Order by description

**Note**

- <sup>①</sup> 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>
<b>JG-Frame</b>			
Superior	B-4003-1	0.38 (9.5)	<b>KYKJG</b>
Kirk	F	0.38 (9.5)	<b>KYKJG</b>
Castell ①	K or QK	0.38 (9.5)	<b>CTKJG</b>
<b>LG-Frame</b>			
Superior	B-4003-1	0.38 (9.5)	<b>KYKLG</b>
Kirk	F	0.38 (9.5)	<b>KYKLG</b>
Castell ①	K or QK	0.38 (9.5)	<b>CTKLG</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 and OPTIM)**

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	EOP5T07
208	50/60 Hz	EOP5T09
240	50/60 Hz	EOP5T11
480	50/60 Hz	EOP5T15
24	DC	EOP5T21
48	DC	EOP5T22
125	DC	EOP5T26

**R-Frame Electrical (Motor) Operator**

Operating Voltage	Frequency	Factory-Installed Terminal Block Catalog Number
120	50/60 Hz	EOP6T08K
240	50/60 Hz	EOP6T11K
48	DC	EOP6T21K

**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	1480D13G01	1480D13G02	1480D13G07 <sup>①</sup>
Mounting plate	176C511H01	507C047H01	—

**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	1260C86G05	1260C86G06	1231C67G01
	Load	1260C86G07	1260C86G08	1231C67G02
	One line and one load	506C144G27	506C144G28	—
Mounting plate	—	<sup>②</sup>	PMP23	—

**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	PAD32	PAD33	—
Mounting plate	<sup>②</sup>	PMP33	—

**Notes**

<sup>①</sup> 100 ampere maximum.

<sup>②</sup> Use three-pole mounting plate for two-pole circuit breaker.

# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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 Ampere Circuit Breakers</b>		
100 A short	451D874G01	32B9446H20
100 A short	451D874G01	32B9446H21
100 A short	451D874G01	32B9446H22
100 A short	451D874G01	32B9446H23
100 A long	451D874G02	32B9446H24
100 A long	451D874G02	32B9446H25
100 A long	451D874G02	32B9446H26
100 A long	451D874G02	32B9446H27
<b>For 110 to 225 Ampere Circuit Breakers</b>		
225A short	374D883G01	374D883H06
225A short	374D883G01	374D883H07
225A short	374D883G01	374D883H08
225A short	374D883G01	374D883H09
225A long	374D883G02	374D883H10
225A long	374D883G02	374D883H11
225A long	374D883G02	374D883H12
225A long	374D883G02	374D883H13

**J-Frame** <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number	Tube Catalog Number
250A short	5010D23G01	456D983H05
250A short	5010D23G01	456D983H06
250A short	5010D23G01	456D983H07
250A long	5010D23G02	5010D23H05
250A long	5010D23G02	5010D23H06
250A long	5010D23G02	5010D23H07

**K-Frame** <sup>①</sup>

Stud Ampere Rating	Stud Catalog Number	Standard Tube Catalog Number
400 A short	6642C14G02	313C909H17
400 A short	6642C14G04	313C909H18
400 A short	6642C14G06	313C909H19
400 A long	6642C14G03	313C909H20
400 A long	6642C14G05	313C909H21
400 A 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.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### 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



# 2.3

## Molded Case Circuit Breakers

### Series C

2

#### 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

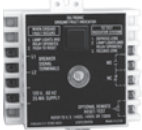
Circuit Breaker Rating Amperes	Catalog Number
15–70	LFD3070R
80–160	LFD3150R

#### 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.

#### Potential Transformer Module

The potential transformer module is required for the Digitrip OPTIM 1050 to provide a voltage input to allow the trip unit to monitor power and energy as well as power factor. The potential transformer module is a 6 VA transformer with a primary voltage input of up to 600 volt

line to line. Three 0.1 ampere fuses are provided on the primary of the transformer and can be used for isolation purposes during dielectric testing. The device is normally panel mounted and can feed up to 16 OPTIM trip units.

#### Potential Transformer Module



#### Potential Transformer Module

Description	Catalog Number
Potential transformer module	DOPTMLN

#### 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 OPTIM trip units and 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 OPTIM trip units, 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.

**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.

**Breaker Interface Module (BIM)**



**Breaker Interface Module (BIM)**

Catalog Number

BIM11

**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**



**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, 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 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>②⑤⑥⑦</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>①⑧⑩⑪</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>①⑥⑩⑫</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>③⑩⑫⑬</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.

For OPTIM trip, OPEOPCK kit required.

# 2.3

## Molded Case Circuit Breakers

### Series C

#### Dimensions

Approximate Dimensions in Inches (mm)

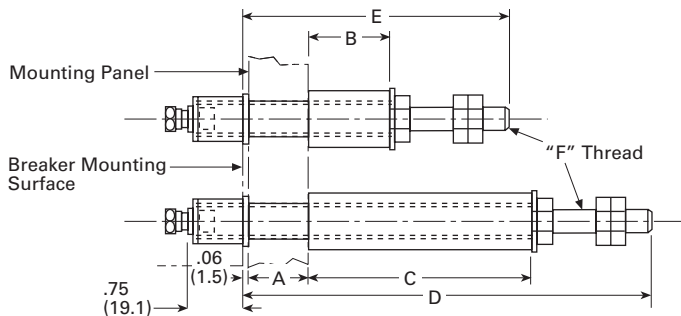
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#### Rear Connecting Studs

#### 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 Ampere Circuit Breakers</b>									
100 A short	451D874G01	1.00 (25.4)		1.06 (26.9)		32B9446H20	—	3.63 (92.1)	0.31 (7.9)–18
100 A short	451D874G01	0.69–0.94 (17.5 to 23.8)		1.38 (34.9)		32B9446H21	—	3.63 (92.1)	0.31 (7.9)–18
100 A short	451D874G01	0.38–0.63 (9.5 to 15.9)		1.69 (42.9)		32B9446H22	—	3.63 (92.1)	0.31 (7.9)–18
100 A short	451D874G01	0.25–0.31 (6.4 to 7.9)		2.00 (50.8)		32B9446H23	—	3.63 (92.1)	0.31 (7.9)–18
100 A long	451D874G02	1.00 (25.4)		—		32B9446H24	6.13 (155.6)	—	0.31 (7.9)–18
100 A long	451D874G02	0.69–0.94 (17.5 to 23.8)		—		32B9446H25	6.13 (155.6)	—	0.31 (7.9)–18
100 A long	451D874G02	0.38–0.63 (9.5 to 15.9)		—		32B9446H26	6.13 (155.6)	—	0.31 (7.9)–18
100 A long	451D874G02	0.25–0.31 (6.4 to 7.9)		—		32B9446H27	6.13 (155.6)	—	0.31 (7.9)–18
<b>For 110 to 225 Ampere Circuit Breakers</b>									
225A short	374D883G01	1.00 (25.4)		1.06 (26.9)		374D883H06	—	4.25 (108.0)	0.44 (11.1)–14
225A short	374D883G01	0.69–0.94 (17.5 to 23.8)		1.38 (34.9)		374D883H07	—	4.25 (108.0)	0.44 (11.1)–14
225A short	374D883G01	0.38–0.63 (9.5 to 15.9)		1.69 (42.9)		374D883H08	—	4.25 (108.0)	0.44 (11.1)–14
225A short	374D883G01	0.25–0.31 (6.4 to 7.9)		2.00 (50.8)		374D883H09	—	4.25 (108.0)	0.44 (11.1)–14
225A long	374D883G02	1.00 (25.4)		—		374D883H10	7.50 (190.5)	—	0.44 (11.1)–14
225A long	374D883G02	0.69–0.94 (17.5 to 23.8)		—		374D883H11	7.50 (190.5)	—	0.44 (11.1)–14
225A long	374D883G02	0.38–0.63 (9.5 to 15.9)		—		374D883H12	7.50 (190.5)	—	0.44 (11.1)–14
225A long	374D883G02	0.25–0.31 (6.4 to 7.9)		—		374D883H13	7.50 (190.5)	—	0.44 (11.1)–14

#### F-Frame



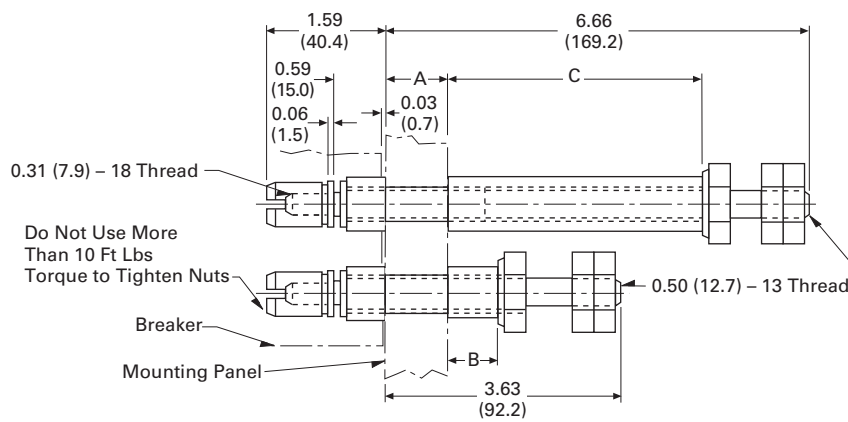
#### Note

① Not UL listed.

Approximate Dimensions in Inches (mm)

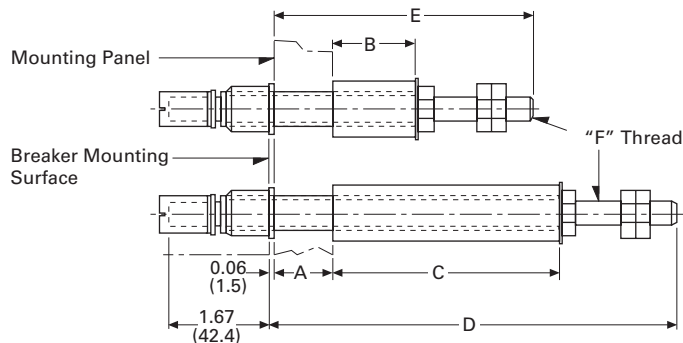
### J-Frame

Stud Ampere Rating	Stud Catalog Number	Panel Thickness			Tube Length		Tube Catalog Number
		A	B	C	B	C	
250A short	5010D23G01	0.75–1.00 (19.1–25.4)	0.84 (21.4)	—	0.84 (21.4)	—	456D983H05
250A short	5010D23G01	0.50–0.75 (12.7–19.1)	1.09 (27.7)	—	1.09 (27.7)	—	456D983H06
250A short	5010D23G01	0.25–0.50 (6.4–12.7)	1.03 (26.2)	—	1.03 (26.2)	—	456D983H07
250A long	5010D23G02	0.75–1.00 (19.1–25.4)	—	3.88 (98.6)	—	3.88 (98.6)	5010D23H05
250A long	5010D23G02	0.50–0.75 (12.7–19.1)	—	4.13 (104.9)	—	4.13 (104.9)	5010D23H06
250A long	5010D23G02	0.25–0.50 (6.4–12.7)	—	4.38 (111.3)	—	4.38 (111.3)	5010D23H07



### K-Frame ①

Stud Ampere Rating	Stud Catalog Number	Panel Thickness			Tube Length		Standard Tube Catalog Number	Dimensions		
		A	B	C	B	C		D	E	F
400 A short	6642C14G02	0.75–1 (19.1–25.4)	0.84 (21.3)	—	0.84 (21.3)	—	313C909H17	—	3.66 (93.0)	0.75–16 (19.1–406.4)
400 A short	6642C14G04	0.50–0.75 (12.7–18.4)	1.09 (27.69)	—	1.09 (27.69)	—	313C909H18	—	—	—
400 A short	6642C14G06	0.25–0.5 (6.35–12.7)	1.03 (26.16)	—	1.03 (26.16)	—	313C909H19	—	—	—
400 A long	6642C14G03	0.75–1 (19.1–25.4)	—	3.78 (96.0)	—	3.78 (96.0)	313C909H20	—	—	—
400 A long	6642C14G05	0.50–0.75 (12.7–18.4)	—	4.03 (102.4)	—	4.03 (102.4)	313C909H21	6.58 (167.1)	—	—
400 A long	6642C14G07	0.25–0.5 (6.35–12.7)	—	4.28 (108.7)	—	4.28 (108.7)	313C909H22	—	—	—



### Note

① Not UL listed.

# 2.3

## Molded Case Circuit Breakers

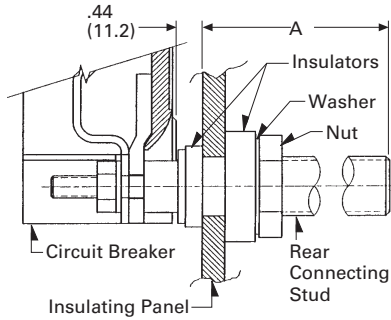
### Series C

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

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