

Circuit Breakers & Supplementary Protectors

Contents

<i>Description</i>	<i>Page</i>
Series C® vs. Series G®	
Typical Applications	45-2
Series G — Globally Accepted Breaker	
Product Line Overview	45-3
Electrical Characteristics	45-5
15 – 125 Amperes (EG Frame)	45-14
63 – 250 Amperes (JG Frame)	45-21
250 – 630 Amperes (LG Frame)	45-30
400 – 1200 Amperes (NG Frame)	45-39
800 – 2500 Amperes (RG Frame)	45-46
Motor Circuit Protectors	45-53
Motor Protector Circuit Breaker	45-54
Earth Leakage Modules	45-55
Special Features and Accessories	45-56
Plug-in Blocks and Drawout Cassettes	45-59
Handle Mechanisms	45-60
Dimensions	45-63
Series C — North American Standards and Special Application Breakers	
Product Line Overview	45-66
Quick Reference	45-67
15 – 100 Amperes (GD Frame)	45-70
10 – 225 Amperes (FD Frame)	45-78
70 – 250 Amperes (JD Frame)	45-86
70 – 400 Amperes (KD Frame)	45-92
125 – 600 Amperes (LD Frame)	45-108
300 – 800 Amperes (MD Frame)	45-127
400 – 1200 Amperes (ND Frame)	45-135
800 – 2500 Amperes (RD Frame)	45-157
Earth Leakage Circuit Breakers	45-176
Add-on Ground Fault Protection	45-179
Internal Accessories	45-182
External Accessories	45-208
Dimensions	45-235
Motor Circuit Protectors	45-241
Supplementary Protectors	
Current Limiting Circuit Breakers	45-252
Hydraulic-Magnetic	45-269



Series C



Series G

Product Line Overview

Typical Applications

Machine Tool Control Panels and Motor Control Centers

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

Panelboards

As both main and branch circuit protection devices.

Feeder Pillars

In distribution systems to provide main and branch circuit protection.

Switchgear

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

Bus Bar Trunking Tap-Offs

In bus bar trunking tap-offs to provide circuit protection.

Individual Enclosures

Completely assembled in enclosures to meet specific customer requirements.

Additional Applications

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

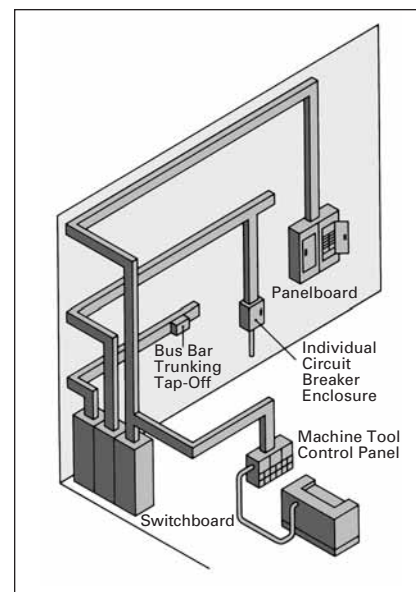


Figure 45-1. Typical Cutler-Hammer Applications

Table 45-1. Cutler-Hammer Molded Case Circuit Breakers in Eaton Assemblies

Frame	Ampere Range	Panelboards					Switchboards		Motor Control Centers		Enclosed Control	Bus Plugs	Enclosed Breaker
		1A	2A	3A	4	5P	PRL-C	IFS	Freedom	IT			
Series G													
EG	15 – 160 ^①									●	●	●	
JG	20 – 250												
LG	100 – 630 ^②				●			●	●				●
NG	400 – 1600 ^③									●	●		●
RG	800 – 2500									●	●		
Series C													
FD/ED	15 – 225	●	●	●	●	●	●	●	●	●	●	●	●
JD	70 – 250	●	●	●	●	●	●	●	●	●	●	●	●
KD	70 – 400	●	●	●	●	●	●	●	●	●	●	●	●
LD	400 – 600				●	●	●	●	●	●	●	●	●
MDL	300 – 800				●	●	●	●	●		●	●	●
ND	400 – 1200				●	●	●	●	●	●	●	●	●
RD	800 – 2500					●	●	●	●	●	●		●

^① 125 amperes is the maximum UL® and CSA® rating for EG.

^② 600 amperes is the maximum UL and CSA rating for LG.

^③ 1200 amperes is the maximum UL and CSA rating for NG.

Cutler-Hammer Molded Case Circuit Breakers cover the widest range of applications in the industry:

- Electrical OEMs.
- Machinery OEMs.
- Navy Breakers:
 - UL Supplement SA and SB
 - MIL-C-17588
 - MIL-C-17361
- Mining Breakers up to 1100 Vac.
- Earth Leakage.
- DC Breakers 125 – 750 Vdc.
- Engine Generator Breakers 15 – 1200 amperes.
- Current Limiting Breakers.

General Information

Cutler-Hammer® Series G Molded Case Circuit Breakers provide increased performance in considerably less space than standard circuit breakers or comparable fusible devices.

The “G” signifies global applications: Series G circuit breakers are marked with UL, CSA, CE, IEC and KEMA KEUR listings. Other advantages include:

- Field-fit accessories.
- Common accessories through 630 amperes.
- Electronic trip units from 20 to 2500 amperes.
- UL-listed and IEC-rated, 30 mA ground fault/earth leakage modules.
- Built-in ground fault protection down to 20 amperes.

The EG, JG and LG frames are designed around space-saving footprints. The NG and RG use the proven Cutler-Hammer Series C® ND and RD designs but use metric threading on their line and load conductors.

Cutler-Hammer Series G Circuit Breakers meet applicable UL 489 and IEC 60947-2 standards.

The Cutler-Hammer Series G family includes five frame sizes in ratings from 15 to 2500 amperes. Series G offers a choice of several interrupting capacities up to 200 kA at 480 volts ac (200 kA at 240 volts ac).

Standard calibration is 40°C. For applications in high ambient temperature conditions, 50°C factory calibration is available on thermal magnetic breakers (not UL).

The Most Logically Designed Contact Assembly

The flexibility and outstanding performance characteristics of Cutler-Hammer Circuit Breakers are made possible by the best contact designs in circuit breaker history. Our patented technology creates a high-speed “blow-open” action using the electromechanical forces produced by high-level fault currents.

Cutler-Hammer Circuit Breakers are operated by a toggle-type mechanism that is mechanically trip-free from the handle so that the contacts cannot be held closed against short circuit currents. Tripping due to overload or short circuits is clearly indicated by the position on the handle. This remarkably fast and dependable contact action is designed to enhance safety.

Thorough In-Plant Testing

The quality, dependability and reliability of every Cutler-Hammer Circuit Breaker is ensured by a thorough program of in-plant testing. Two calibration tests are conducted on every pole of every circuit breaker to verify the trip mechanism, operating mechanism, continuity and accuracy.

ISO Certification

Cutler-Hammer Circuit Breakers are manufactured in ISO® certified facilities.

Current Limiting Characteristics

Circuit breakers are current limiting because of their high repulsion contact arrangement and use of state-of-the-art arc extinguishing technology.

Eaton offers one of the most complete lines of current limiting breakers in the industry. The industrial breakers are available in current limiting versions with interrupting capacities up to 200 kA at 480 V without fuses in the same physical size as standard and high interrupting capacity breakers.

Operating Mechanisms

Cutler-Hammer Circuit Breakers have a toggle handle operating mechanism, which also serves as a switching position indicator. The indicator shows the positions of: ON, OFF and TRIPPED.

The toggle handle snaps into the TRIPPED position if the breaker is tripped by one of its overcurrent, short circuit, shunt or undervoltage releases. Before the circuit breaker can be reclosed following a trip-out, the toggle handle must be brought beyond the OFF position (RESET). The circuit breaker can then be reclosed.

As an additional switching position indicator for EG- to RG-Frame circuit breakers, there are two windows on the right and on the left of the toggle handle, in which the switching state is indicated by means of the colors red, green and white corresponding to the ON, OFF and TRIPPED positions respectively.

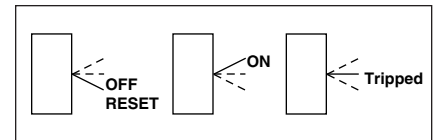



Figure 45-2. Positions of the Toggle Handle Drive

Product Line Overview

Standards and Certifications

Cutler-Hammer Molded Case Circuit Breakers from Eaton are designed to conform with the following international standards:

- Australian Standard AS 2184 and AS 3947-2 Molded Case Circuit Breakers.
- British Standards Institution Standard EN60947.2.
- International Electrotechnical Commission Recommendations IEC 60947.2 Circuit Breakers. 
- Japanese T-Mark Standard Molded Case Circuit Breakers.
- National Electrical Manufacturers Association Standards Publication No. AB1-1993 Molded Case Circuit Breakers.
- South African Bureau of Standards, Standard SANS 156, Standard Specification for Molded Case Circuit Breakers.
- Swiss Electro-Technical Association Standard SEV 947.2, Safety Regulations for Circuit Breakers.
- Union Technique de l'Electricite Standard NF C 63-120, Low Voltage Switchgear and Control Gear Circuit Breaker Requirements.
- Verband Deutscher Elektrotechnike (Association of German Electrical Engineers) Standard VDE 0660, Low Voltage Switchgear and Control Gear, Circuit Breakers.

Global Third-Party Certification

Certification marks ensure product compliance with the total standard via the third party witnessing of tests by globally recognized independent certification organizations.

KEMA is a highly recognized, independent international organization that offers certification and inspection facilities for equipment in many industries. The KEMA-KEUR mark is the highest certification an electrical product can receive from KEMA. Our IEC 60947-2 Molded Case Circuit Breakers are KEMA tested and certified. These breakers are also listed in accordance with UL® 489, as well as CSA C22.2 No. 5-02.

KEMA, UL and CSA provide ongoing follow-up testing and inspections to ensure that Cutler-Hammer Molded Case Circuit Breakers continue to meet their exacting standards.

General Information




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

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

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

Electrical Characteristics

Table 45-2. Electrical Characteristics

Maximum Rated Current (Amperes)	EG									JG						LG						
																						
	125, 160 ①									250						400, 630 ②						
Breaker Type	B	E		S		H		C		E	S	H	C	U	X	E	S	H	C	U	X	
Number of Poles	1	2, 3, 4	2, 3, 4		1		2, 3, 4		1		2, 3, 4		3, 4		3, 4	3, 4		3, 4		3, 4		
Breaker Capacity (kA rms) ac 50 – 60 Hz																						
NEMA®, UL, CSA	240 Vac	25	25	35	85	85	100	100	200	65	85	100	200	200	200	65	85	100	200	200	200	
	480 Vac	—	18	25	—	35	—	65	100	25	35	65	100	150	200	35	50	65	100	150	200	
	600 Vac ③	—	—	18	—	22	—	25	35	18	18	25	35	50	50	18	25	35	50	65	65	
	125/250 Vdc ④	10 ⑥	10	10	35 ⑥	35	42 ⑥	42	42	10	22	22	42	50	50	22	22	42	42	50	50	
IEC 60947-2	220 – 240 Vac	<i>I_{CU}</i>	25	25	35	85	85	100	100	200	65	85	100	200	200	65	85	100	200	200	200	
		<i>I_{CS}</i>	25	25	35	43	43	50	50	200	65	85	100	200	200	65	85	100	200	200	200	
	380 – 415 Vac	<i>I_{CU}</i>	—	18	25	—	40	—	70	100	25	40	70	100	150	200	35	50	70	100	150	200
		<i>I_{CS}</i>	—	18	25	—	30	—	35	100	25	40	70	100	150	200	35	50	70	100	150	200
	660 – 690 Vac	<i>I_{CU}</i>	—	—	—	—	—	—	—	—	12	12	14	16	18	18	12	20	25	30	35	35
		<i>I_{CS}</i>	—	—	—	—	—	—	—	—	6	6	7	12	14	14	6	10	13	15	18	18
	125/250 Vdc ④	<i>I_{CU}</i>	10 ⑥	10	10	35 ⑥	35	42 ⑥	42	42	10	22	22	42	50	50	22	22	42	42	50	50
		<i>I_{CS}</i>	10 ⑥	10	10	35 ⑥	35	42 ⑥	42	42	10	22	22	42	50	50	22	22	42	42	50	50
Ampere Range	15 – 160 A ①									20 – 250 A						100 – 630 A ②						
Trip Units F = Fixed A = Adjustable T = Thermal M = Magnetic	FT-FM AT-FM									FT-AM AT-AM Electronic (Digitrip RMS 310)						FT-AM AT-AM Electronic (Digitrip RMS 310)						
Thermal Magnetic	Interchangeable	—									■						■					
	Built-in	■									■						■					
Thermal Magnetic	Fixed Thermal	■									■						■					
	Adjustable Thermal	■									■						■					
Magnetic	Fixed									Adjustable						Adjustable						
Electronic rms ⑤	LS	—									■						■ ④					
	LSI	—									■						■ ④					
	LSG	—									■						■ ④					
	LSIG	—									■						■ ④					
Dimensions Inches (mm)	1-Pole	H		W		D		H		W		D		H		W		D		D		
	2-Pole	5.50 (139.7)		1.00 (25.4)		2.99 (76.0)		—		—		—		—		—		—		—		
	3-Pole	—		2.00 (50.8)		—		7.00 (177.8)		4.13 (105.0)		3.57 (87.4)		10.13 (258.0)		5.48 (140.0)		4.09 (104.0)		—		
	4-Pole	—		3.00 (76.2)		—		—		5.34 (135.6)		—		—		7.22 (183.0)		—		—		
Weight (approximate) lbs. (kg)	1-Pole	0.85 (0.39)	1.57 (0.71)	2.28 (1.04)	2.85 (1.29)	11.3 (5.13)	5.06 (2.30) T/M 5.31 (2.41) ETU	6.76 (3.07) T/M 7.12 (3.23) ETU	12.36 (5.61) T/M 13.04 (5.92) ETU	16.27 (7.39) T/M 16.92 (7.68) ETU												
	Utilization Category	A									A						A					

① 125 amperes is the maximum UL and CSA rating for the EG.
 ② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
 ③ EG breaker rated 600/347 Vac.
 ④ Two poles in series.
 ⑤ Not suitable for dc application. 4-pole ground fault not available.
 ⑥ 125 Vdc only for 1-pole breakers.

Frame Sizes NG and RG

Table 45-2. Electrical Characteristics (Continued)

Maximum Rated Current (Amperes)		NG ^①					RG ^①		
		800, 1200		1600 ^②	800	1600, 2000, 2500			
Breaker Type		S	H	C ^③	S	U	H	C ^③	
Number of Poles		2, 3, 4			3	3	3, 4		
Breaker Capacity (kA rms) ac 50 – 60 Hz									
NEMA, UL, CSA	240 Vac	85	100	200	—	200	125	200	
	480 Vac	50	65	100	—	150	65	100	
	600 Vac	25	35	65	—	65	50	65	
IEC 60947-2	220 – 240 Vac	<i>I_{cu}</i>	85	100	200	85	—	135	200
		<i>I_{cs}</i>	85	100	100	85	—	100	100
	380 – 415 Vac	<i>I_{cu}</i>	50	70	100	50	—	70	100
		<i>I_{cs}</i>	50	50	50	50	—	50	50
	660 – 690 Vac	<i>I_{cu}</i>	20 ^④	25 ^④	35	20 ^④	—	25 ^④	35 ^④
		<i>I_{cs}</i>	10	13	18	10	—	13	18
250 Vdc	<i>I_{cu}</i>	—	—	—	—	—	—	—	
	<i>I_{cs}</i>	—	—	—	—	—	—	—	
Ampere Range		400 – 1200 A			1600 A	800 A	800 – 2500 A		
Trip Units		Electronic					Electronic (Digitrip RMS 310, 610 and 910)		
Interchangeable		—					—		
Built-in		■					■		
Electronic ^⑤	LI	—					■ ^⑥		
	LS	■					■		
	LSI	■					■		
	LIG	—					■ ^⑥		
	LSG	■					■		
	LSIG	■					■		
Dimensions Inches (mm)	1-Pole	H	W	D	H	W	D		
	2-Pole	—	—	—	—	—	—		
	3-Pole	16.00 (406.0)	8.25 (210.0)	5.50 (140.0)	16.00 (406.0)	15.50 (394.0)	9.75 (229.0)		
	4-Pole		11.13 (280.0)			20.00 (508.0)			
Weight (approximate) lbs. (kg)	3-Pole	46.8 (21.3)			62.0 (28.3)		103.0 (47.0)		118.4 (54.0)
	4-Pole								
Utilization Category		A					A		

^① The NG and RG MCCBs use metric threading in their line and load terminals. If English (Imperial) threading is needed, use Series C ND and RD MCCBs. Contact Eaton for more information.

^② NG 1600 ampere frame is not UL or CSA listed.

^③ Not KEMA-KEUR listed.

^④ IEC 60947-2 H.5 Annex H is not KEMA-KEUR tested.

^⑤ Not suitable for dc application. 4-pole ground fault not available.

^⑥ Available only on Digitrip 610 and 910 trip units.

Frame Sizes EG through RG

Table 45-3. EG through RG Electrical Characteristics

Technical Data	EG		JG		LG		NG		RG
Maximum Rated Current I_n Depending on the Version	160 A ^①		250 A		400, 630 A ^②		800, 1200, 1600 A ^③		1600, 2000, 2500 A
Rated Insulation Voltage U, According to IEC 60947-2 Main Conducting Paths Auxiliary Circuits	500 Vac 500 Vac		750 Vac 690 Vac		750 Vac 690 Vac		750 Vac 690 Vac		750 Vac 690 Vac
Rated Impulse Withstand Voltage U_{imp} Main Conducting Paths Auxiliary Circuits	6 kV 4 kV		8 kV 4 kV		8 kV 4 kV		8 kV 4 kV		8 kV 4 kV
Rated Operational Voltage U_e IEC NEMA	690 Vac 600 Y/347 Vac		690 Vac 600 Vac		690 Vac 600 Vac		690 Vac 600 Vac		690 Vac 600 Vac
UL and CSA Listed	Yes ^④		Yes ^④		Yes ^④		Yes ^④		Yes ^④
Permissible Ambient Temperature	-20 to +70°C		-20 to +70°C		-20 to +70°C		-5 to +60°C		-5 to +60°C
Permissible Load for Various Ambient Temperatures Close to the Circuit Breaker, Related to the Rated Current of the Circuit Breaker <ul style="list-style-type: none"> ■ Circuit Breakers for Plant Protection <ul style="list-style-type: none"> - At 40°C - At 50°C - At 55°C - At 60°C - At 70°C ■ Circuit Breakers for Motor Protection <ul style="list-style-type: none"> - At 40°C - At 50°C - At 55°C - At 60°C - At 70°C ■ Circuit Breakers for Starter Combinations and Isolating Circuit Breakers <ul style="list-style-type: none"> - At 40°C - At 50°C - At 55°C - At 60°C - At 70°C 	⑤	⑥	⑤	⑥	⑤	⑥	—	—	
	100%	100%	100%	100%	100%	100%	100%	100%	100%
	96%	92%	96%	94%	96%	91%	91%	91%	91%
	93%	87%	94%	90%	93%	86%	85%	85%	85%
91%	83%	92%	87%	90%	82%	81%	81%	81%	
86%	73%	88%	80%	84%	70%	—	—	—	
—	—	100%	100%	100%	100%	—	—	—	
—	—	100%	100%	100%	100%	—	—	—	
—	—	100%	100%	100%	100%	—	—	—	
—	—	100%	100%	100%	100%	—	—	—	
—	—	90%	90%	90%	90%	—	—	—	
100%	100%	100%	100%	100%	100%	100%	100%	100%	
100%	100%	100%	100%	100%	91%	91%	91%	91%	
96%	96%	96%	95%	95%	85%	85%	85%	85%	
91%	82%	82%	90%	82%	81%	81%	81%	81%	
86%	88%	88%	84%	84%	—	—	—	—	
Rated Short Circuit Breaking Capacity (dc) Not for Circuit Breakers for Motor Protection (Time Constant $\tau = 10$ rms) 2 Conducting Paths in Series For EG to LG up to 250 Vdc NEMA (Time Constant $\tau = 8$ rms) 2 Conducting Paths in Series 250 Vdc	42 kA Max.		42 kA Max.		42 kA Max.		⑦		⑦
	42 kA Max.		42 kA Max.		42 kA Max.		⑦		⑦
	42 kA Max.		42 kA Max.		42 kA Max.		⑦		⑦
Main Switch Characteristics According to IEC 60947-2 in Combination with Lockable Rotary Drives	Yes		Yes		Yes		Yes		Yes
Rated Short Circuit Breaking Capacity According to IEC 60947-2 (at ac 50/60 Hz)	Rated Short Circuit Breaking Capacity See Table 45-2 on Page 45-5								
Endurance (Operating Cycles)	10,000		10,000		8,000		3,000		3,000
Maximum Switching Frequency	300 1/h		240 1/h		240 1/h		60 1/h		20 1/h

① 125 amperes is the maximum UL and CSA rating for the EG.
 ② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
 ③ 1200 amperes is the maximum UL and CSA rating for the NG.
 ④ See footnotes for exceptions.
 ⑤ Thermal overload release set to the lower value.
 ⑥ Thermal overload release set to the upper value.
 ⑦ Not suitable for dc switching.


Frame Sizes EG through RG

Table 45-3. EG through RG Electrical Characteristics (Continued)

Technical Data	EG	JG	LG		NG	RG
Conductor Cross Sections and Terminal Types for Main Conductors <ul style="list-style-type: none"> ■ Solid or Stranded ■ Finely Stranded with End Sleeve ■ Bus Bar Tightening Torque for Box Terminals Tightening Torque for Bus Bar Connection Pieces	Box Terminals 2.5 to 95 mm ² 2.5 to 50/70 mm ² —	Box Terminals 50 to 150 mm ² 35 to 120 mm ² —	Box Terminals 95 to 240 mm ² 70 to 150 mm ² —	Flat Bar Terminals — — 600 A 31 Nm 6 Nm	Flat Bar Terminals — — Optional 31 Nm 50 Nm	Flat Bar Terminals — — Optional — 20 Nm
Conductor Cross Sections for Auxiliary Circuits with Terminal Connection or Terminal Strip <ul style="list-style-type: none"> ■ Solid ■ Finely Stranded with End Sleeve ■ With Brought-out Cable Ends ■ Tightening Torque for Fitting Screws 	0.75 to 2.5 mm ² 0.75 to 2.5 mm ²	0.75 to 2.5 mm ² 0.75 to 2.5 mm ² 0.82 (AWG 18) mm ² 0.8 to 1.4 Nm	0.75 to 2.5 mm ² 0.75 to 2.5 mm ² 0.82 (AWG 18) mm ² 0.8 to 1.4 Nm		Up to 2x4 mm ² Up to 2x2.5 mm ² 0.82 (AWG 18) mm ² 0.8 to 1.4 Nm	Up to 2x4 mm ² Up to 2x2.5 mm ² 0.82 (AWG 18) mm ² 0.8 to 1.4 Nm
Power Loss per Circuit Breaker at Maximum Rated Current I_n (The Power Losses of the Undervoltage Releases ("r" Releases) Must Be Observed if Necessary) at Three-Phase Symmetrical Load) <ul style="list-style-type: none"> ■ For Plant Protection ■ As Isolating Circuit Breaker ■ For Starter Combinations ■ For Motor Protection 	40 W 40 W 40 W —	45 W 45 W 45 W 45 W	400 A: 65 W 65 W 65 W 65 W	600 A: 120 W 120 W 120 W 120 W	87/210 W 87/210 W — —	220/270/400 W 220/270/400 W — —
Permissible Mounting Position						
Arc Spacing — Suitable for Reverse-Feed Applications	Yes (Except HMCPE)	Yes	Yes		Yes	Yes

Frame Sizes EG through RG

Table 45-3. EG through RG Electrical Characteristics (Continued)

Technical Data	EG	JG	LG	NG	RG
Auxiliary Switches					
Rated Thermal Current I_{th} Rated Making Capacity	6 A 20 A	6 A 20 A	6 A 20 A	6 A 20 A	6 A 20 A
ac (ac-15) ■ Rated Operational Voltage ■ Rated Operational Current	230/400/600 V 6/3/0.25 A	230/400/600 V 6/3/0.25 A	230/400/600 V 6/3/0.25 A	600 V 6 A	600 V 6 A
dc (dc-13) ■ Rated Operational Voltage ■ Rated Operational Current	125/250 V 0.5/0.25 A	125/250 V 0.5/0.15 A	125/250 V 0.5/0.15 A	125/250 V 0.5/0.25 A	125/250 V 0.5/0.25 A
Backup Fuse Miniature Circuit Breaker	6/4/4 A 6/4 A	4 6/4/4 A 6/4 A	4 6/4/4 A 6/4 A	4 6/4/4 A 6/4 A	4 6/4/4 A 6/4 A
Releases					
Undervoltage Releases ("r" Releases) Response Voltage: ■ Drop (Breaker Tripped) U_S ■ Pickup (Breaker May Be Switched on) U_S	35 – 70% 85 – 110%	35 – 70% 85 – 110%	35 – 70% 85 – 110%	35 – 70% 85 – 110%	35 – 70% 85 – 110%
Power Consumption in Continuous Operation at: ■ 50/60 Hz 12 Vac ■ 50/60 Hz 24 Vac ■ 50/60 Hz 48 – 60 Vac ■ 50/60 Hz 110 – 127 Vac ■ 50/60 Hz 208 – 240 Vac ■ 50/60 Hz 380 – 500 Vac ■ 50/60 Hz 525 – 600 Vac ■ 12 Vdc ■ 24 Vdc ■ 48 – 60 Vdc ■ 110 – 125 Vdc ■ 220 – 250 Vdc Maximum Opening Time	0.95 VA 0.72 VA 1.15 – 1.78 VA 0.96 – 1.25 VA 1.28 – 1.68 VA 2.2 – 3.9 VA 3.4 – 4.3 VA 0.88 W 0.70 W 1.12 – 1.76 W 0.94 – 1.21 W 1.45 – 1.86 W 50 ms	1.9 VA 3.9 VA 2.5 – 3.8 VA 1.8 – 2.4 VA 2.7 – 3.8 VA 3.4 – 5.8 VA 3.4 – 4.3 VA 1.6 W 3.1 W 2.0 – 3.1 W 1.6 – 2.2 W 3.1 – 4 W 50 ms	1.9 VA 3.9 VA 2.5 – 3.8 VA 1.8 – 2.4 VA 2.7 – 3.8 VA 3.4 – 5.8 VA 3.4 – 4.3 VA 1.6 W 3.1 W 2.0 – 3.1 W 1.6 – 2.2 W 3.1 – 4 W 50 ms	1.9 VA 2.4 VA 2.3 – 4.1 VA 3.4 – 4.2 VA 4.8 – 6.5 VA 6.8 – 12.0 VA — 2.6 W 3.6 W 3.5 – 5.5 W 2.9 – 3.6 W 4.8 – 6.3 W 62 ms	2.9 VA 3.1 VA 3.4 – 6.0 VA 3.3 – 3.8 VA 4.2 – 7.2 VA 3.8 – 10.0 VA — 3.4 W 4.3 W 4.8 – 7.2 W 3.3 – 3.8 W 6.6 – 7.5 W 62 ms
Shunt Trips					
Shunt Trips ("f" Releases) Response Voltage: ■ Pickup (Breaker Tripped) U_S	70 – 110%	70 – 110%	70 – 110%	70 – 110%	70 – 110%
Power Consumption in (Short Time) at: ■ 50/60 Hz 24 Vac ■ 50/60 Hz 48 – 60 Vac ■ 50/60 Hz 48 – 127 Vac ■ 50/60 Hz 110 – 240 Vac ■ 50/60 Hz 380 – 440 Vac ■ 50/60 Hz 380 – 600 Vac ■ 50/60 Hz 480 – 600 Vac ■ 12 – 24 Vdc ■ 48 – 60 Vdc ■ 110 – 125 Vdc ■ 220 – 250 Vdc	10 – 41 VA 139 – 210 VA — 83 – 360 VA — 418 – 1080 VA — 29 – 120 W 475 – 720 W 99 – 121 W —	87 – 405 VA 710 – 1105 VA — 66 – 432 VA 127 – 188 VA — 34 – 60 VA 164 – 631 W 830 – 1580 W 112 – 150 W 40 – 58 W	87 – 405 VA 710 – 1105 VA — 66 – 432 VA 127 – 188 VA — 34 – 60 VA 164 – 631 W 830 – 1580 W 112 – 150 W 40 – 58 W	98 – 475 VA 24 – 50 VA — 67 – 432 VA 76 – 110 VA — 19 – 42 VA 145 – 610 W 67 – 102 W 121 – 150 W 46 – 55 W	612 VA 403 – 666 VA — 396 – 1896 VA 1596 – 2156 VA — 230 – 384 VA 396 W 341 – 528 W 264 – 350 W 374 – 475 W
Maximum Load Duration	Interrupts Automatically				
Maximum Opening Time	50 ms	50 ms	50 ms	62 ms	62 ms
Molded Case Switch (with High Magnetic Trip)					
Unfused kAIC at 480 Vac (415 Vac) Self-Protected, Will Trip Above: 	65 (70) 1250 for EG125; 1600 for EG160	65 (70) 2500	65 (70) 4000/6300	65 (70) 12,500	65 (70) 20,000

Frame Sizes EG through LG

DC Switching Duty

The EG- to LG-Frame circuit breakers are also suitable for switching dc currents.

The NG- and RG-Frame circuit breakers are not suitable for dc currents due to the solid-state overcurrent release system.

For switching dc currents, however, the maximum permissible dc voltage per conducting path has to be considered.

For voltages higher than 250 volts, the series connection of two or three conducting paths is required.

As the current has to flow through all conducting paths so as to maintain the thermal tripping characteristics, the following circuit arrangements are recommended. With dc, the trip values of the instantaneous short circuit release ("n" release) are increased by 30 to 40%.

Table 45-4. For 3- and 4-Pole Circuit Breakers

Proposed Circuit	Maximum Permissible Vdc U _e	Remarks
<p>NSI-5178a</p>	250 Vdc	Double-pole switching. If there is no risk of an earth fault, or if any earth fault which occurs is immediately eliminated (earth fault monitoring), the maximum permissible dc voltage can be 600 volts.
<p>NSI-5179a</p>	440 Vdc	Double-pole switching (earth system). The earthed pole must always be assigned to the individual conducting path, so that two paths are always in series in the event of an earth fault.
<p>NSI-5180</p>	600 Vdc	Single-pole switching (earthed system). Three conducting paths in series. The earthed pole must be assigned to the nonswitched conducting path.
<p>NSI-5181</p>	750 Vdc	Single-pole switching (earthed system). Four conducting paths in series. The earthed pole must be assigned to the nonswitched conducting path.

Series G Electronic Trip Units

Multi-Function Electronic
Trip Units for All Applications

Digitrip RMS Trip Units

True rms Sensing

Digitrip RMS Trip Units utilize our patented microprocessor-based intelligence to provide true rms sensing, permitting increased accuracy and reliable system protection. True rms sensing is not susceptible to nuisance tripping when waveforms containing high harmonic currents are present.

Digitrip RMS 310+

Digitrip RMS 310+ Electronic Trip Units are available with Cutler-Hammer Circuit Breakers JG and LG. They are selectable long time delay (t_{LD}) and pickup settings (I_p). A rating plug is not required. The Digitrip 310+ offers true rms sensing, is front adjustable and has an optional local display of current and cause of trip.

Rating Plugs

If rating plugs are needed for N- and R-Frame, they are marked for 50/60 Hz applications. Both fixed and adjustable rating plugs are available, providing further flexibility when applied to selectively coordinated systems.

Curve Shaping

When selectively coordinated systems are called for, Digitrip RMS 310+ will provide a cost-effective solution for a variety of applications.

The standard Digitrip RMS 310+ includes an adjustable short time pickup setting encompassing an I^2t ramp function which provides the basic LS curve shaping function. JG- and LG-Frames have an adjustable long time delay.

JG- and LG-Frames have selectable long time delay (t_{LD}) and pickup settings (I_p). A rating plug is not required.

The optional Digitrip RMS 310+ provides additional flat response short time delay adjustments on an instantaneous setting to provide LSI curve shaping capability.

Digitrip RMS 310+ Trip Units are available with ground fault pickup and flat response ground fault delay which provides the trip unit with full function LSG and LSIG curve shaping flexibility.

Note: Contact factory for availability of ground fault for LG-Frame trip unit.

Digitrip RMS 310+ Trip Units can effectively coordinate with both sophisticated upstream power breakers as well as downstream thermal magnetic breakers...making Digitrip RMS 310+ Trip Units the cost-effective reliable choice for selectively coordinated systems.

Thermal Memory

All Digitrip RMS Trip Units incorporate a long delay. Thermal memory prevents the system from cumulative overheating due to repeated overcurrent events that may occur in quick succession.

Field Testing

A field test kit is available for Digitrip RMS 310+ trip units.

Digitrip RMS 610 and 910



RMS 610

RMS 910

Digitrip RMS 610 and 910 Trip Units are available with Cutler-Hammer R-Frame Circuit Breakers 800 through 2500 amperes. Digitrip 610 and 910 Trip Units provide unparalleled system protection with the added convenience of a local display.

Curve Shaping

Digitrip RMS 610 and 910 Trip Units are available with up to nine curve shaping choices achieved by adjusting up to seven switches on the front of the unit for optimum system coordination. Maximum curve shaping flexibility is provided by dependent long and short delay adjustments that are long delay pickup (I_p) based, depicted on the front of the unit by the blue portion of the time-current curve.

Additional coordination capability can be provided by utilizing the short delay and ground fault zone selective interlocking features available on these trip units.

Series G Electronic Trip Units

System Diagnostics

Digitrip RMS 610 and 910 models of trip units provide long delay, short delay, instantaneous, and ground fault cause of trip LEDs on the front of the unit. Their display shows a magnitude of trip information, as well as remote signal contacts, for improved system alarming.

System Monitoring

Digitrip 610 and 910 Trip Units have the capability to monitor phase currents, as well as neutral or ground currents. This information is displayed on a large digital display mounted on the unit.

Digitrip RMS 910 Trip Units can also provide the user with power and energy monitoring capability. Peak power demand, present power demand, and total energy, as well as forward and reverse energy can be monitored with this unit.

Digitrip RMS 910 Trip Units have the additional capability of monitoring line-to-line voltage, as well as system power factor. Both parameters are displayed in the digital display window and are supported by LEDs to indicate which parameter is being displayed.

Harmonics Monitoring

Digitrip RMS 910 Trip Units are capable of displaying values of current harmonics in the digital display window. Percentage of harmonic content can be monitored for each phase, up to the 27th harmonic. Additionally, a total harmonic distortion value can be calculated and displayed.

Communications

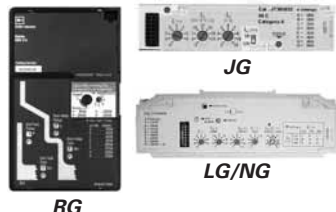


Digitrip RMS 910 units have built-in communications options to allow all protection, monitoring, and control information to be transmitted back to a central location via the Cutler-Hammer PowerNet™ system.

Field Testing

Integral field testing capability is provided on all 610 and 910 Trip Units. No additional test set is needed to perform both trip and no trip field testing.

Digitrip RMS Electronic Trip Unit Selection Guide

Table 45-5. Digitrip RMS Electronic Trip Unit Selection Guide

Digitrip	RMS 310	RMS 610	RMS 910
			

Breaker Type

Breaker Type	RMS 310	RMS 610	RMS 910
Cutler-Hammer Frame(s)	JG-, LG-, NG- and RG-Frames	RG-Frame	RG-Frame
Ampere Rating	20 – 2500 A	800 – 2500 A	800 – 2500 A
Interrupting Rating at 415 V	35, 70, 100 kA	70, 100 kA	70, 100 kA

Trip Unit Sensing

rms Sensing	RMS 310	RMS 610	RMS 910
rms Sensing	Yes	Yes	Yes

Protection and Coordination

Protection	Ordering Options	LS, LSG	LSI, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG
Protection	Fixed Rating Plug (I_N) ^①	Yes	Yes	Yes	Yes
	Overtemperature Trip	Yes	Yes	Yes	Yes
	Adjustable Rating Plug (I_N) ^①	Yes	Yes	No	No
Long Delay	Long Delay Setting	0.5 – 1.0 (I_N) ^②	0.5 – 1.0 (I_N) ^②	0.5 – 1.0 x (I_N)	0.5 – 1.0 x (I_N)
	Long Delay Time I^2t at 6x	10 Seconds ^②	10 Seconds ^②	2 – 24 Seconds	2 – 24 Seconds
	Long Delay Thermal Memory	Yes	Yes	Yes	Yes
	High Load Alarm	No	No	0.85 x I_r	0.85 x I_r
Short Delay	Short Delay Setting	Var/Frame ^③	Var/Frame ^③	200 – 600% S1 & S2 x (I_r)	200 – 600% S1 & S2 x (I_r)
	Short Delay Time I^2t	100 ms	No	100, 300, 500 ms	100, 300, 500 ms
	Short Delay Time Flat	No	1 – 300 ms	100 – 500 ms	100 – 500 ms
	Short Delay Time ZSI	No	No	Yes	Yes
Instantaneous	Instantaneous Setting	No	200 – 800% x (I_N) ^④	200 – 600% M1 & M2 x (I_N)	200 – 600% M1 & M2 x (I_N)
	Discriminator	No	No	Yes ^⑤	Yes ^⑤
	Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault	Ground Fault Setting	Var/Frame ^⑥	Var/Frame ^⑥	25 – 100% x (I_N) ^⑥	25 – 100% x (I_N) ^⑥
	Ground Fault Delay I^2t at .62x	No	No	100, 300, 500 ms	100, 300, 500 ms
	Ground Fault Delay Flat	1 – 500 ms ^⑦	1 – 500 ms ^⑦	100 – 500 ms	100 – 500 ms
	Ground Fault ZSI	No	No	Yes	Yes
Ground Fault Thermal Memory	No	No	Yes	Yes	

System Diagnostics

System Diagnostics	RMS 310	RMS 610	RMS 910
Cause of Trip LEDs	No	No	Yes
Magnitude of Trip Information	No	No	Yes
Remote Signal Contacts	No	No	Yes

System Monitoring

System Monitoring	RMS 310	RMS 610	RMS 910
Digital Display	No	No	Yes
Current	No	No	Yes
Voltage	No	No	No
Power and Energy	No	No	No
Power Quality — Harmonics	No	No	No
Power Factor	No	No	No

System Communications

System Communications	RMS 310	RMS 610	RMS 910
PowerNet	No	No	No

Field Testing

Field Testing	RMS 310	RMS 610	RMS 910
Testing Method	Test Set	Test Set	Integral

① JG- and LG-Frames have selectable settings instead of a rating plug.
 ② JG-, LG- and NG-Frames have adjustable long delay times of 2 – 24 seconds.
 ③ JG/LG: 2X – 14X (I_N); NG: 2X – 8X (I_N);
 RG: 2X – 8X (I_N); 2500 ampere RG-Frame
 200 – 600% x (I_N).

④ JG-Frame also has a 14X setting.
 ⑤ LS, LSG only.
 ⑥ Not to exceed 1200 amperes.

⑦ JG- and LG-Frames are Instantaneous, 120 ms.
 NG- and RG-Frames are Instantaneous, 100,
 300 and 500 ms.

Note: I_N = Rating plug rating.
 I_r = Long delay setting.

EG-Frame



Eaton's Cutler-Hammer EG

Product Description

- EG breaker is HACR rated.

Technical Data and Specifications

Table 45-6. UL 489/IEC 60947-2 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (Symmetrical Amperes) (kA)															
		Volts ac (50/60 Hz)								Volts dc ^①							
		120	220 – 240		277	347	380 – 415		480	600Y/347	690 ^②		125		250 ^{③④}		
	I _{cu}	I _{cs}			I _{cu}	I _{cs}			I _{cu}	I _{cs}	I _{cu}	I _{cs}	I _{cu}	I _{cs}			
EGB125	1	35	25	25	18	—	—	—	—	—	—	—	—	10	10	—	—
	2, 3, 4	—	25	25	—	—	18	18	18	—	—	—	—	—	—	10	10
EGE125	2, 3, 4	—	35	35	—	—	25	25	25	18	—	—	—	—	—	10	10
	1	100	85	43	35	22	—	—	—	—	—	—	—	35	35	—	—
EGS125	2, 3, 4	—	85	43	—	—	40	30	35	22	—	—	—	—	—	35	35
	1	200	100	50	65	30	—	—	—	—	—	—	—	42	42	—	—
EGH125	2, 3, 4	—	100	50	—	—	70	35	65	25	—	—	—	—	—	42	42
	3, 4	—	200	200	—	—	100	100	100	35	—	—	—	—	—	42	42

① dc ratings apply to substantially non-inductive circuits.

② IEC only.

③ 2-pole circuit breaker, or two poles of 3-pole circuit breaker.

④ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 42 kA.

Dimensions/Weights

Table 45-7. Dimensions in Inches (mm)

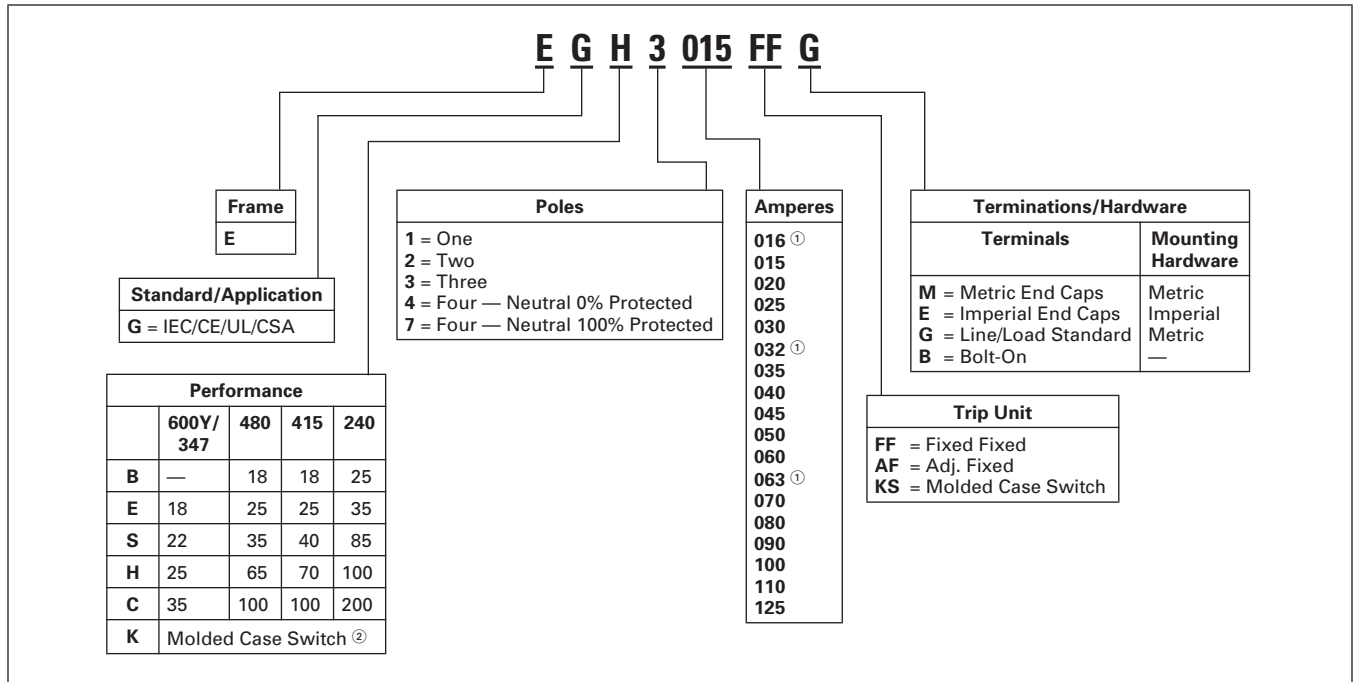
Number of Poles	Width	Height	Depth
1	1.00 (25.4)	5.50 (139.7)	2.99 (75.9)
2	2.00 (50.8)	5.50 (139.7)	2.99 (75.9)
3	3.00 (76.2)	5.50 (139.7)	2.99 (75.9)
4	4.00 (101.6)	5.50 (139.7)	2.99 (75.9)

Table 45-8. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Number of Poles			
	1	2	3	4
EGB125, EGE125, EGS125, EGH125, EGC125	1.5 (.68)	2.0 (.91)	3.0 (1.36)	4.9 (1.82)

Product Selection

Table 45-9. Main Catalog Numbering System



① Cannot be UL rated.

② Available only as 125 and 160 A sizes.

EG-Frame

Product Selection

Table 45-10. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) — IC Rating at 415/480 Volts

Max. Cont. Amps at 40°C ①	1-Pole		2-Pole		3-Pole			4-Pole 0% Protected Neutral ③				
	Fixed Thermal Fixed Magnetic	Price U.S. \$	Fixed Thermal Fixed Magnetic	Price U.S. \$	Fixed Thermal Fixed Magnetic	Price U.S. \$	Adjustable ② Thermal Fixed Magnetic	Price U.S. \$	Fixed Thermal Fixed Magnetic	Price U.S. \$	Adjustable Thermal Fixed Magnetic	Price U.S. \$
18/18												
15	EGB1015FFG		EGB2015FFG		EGB3015FFG		—		EGB4015FFG		—	
16	EGB1016FFG		EGB2016FFG		EGB3016FFG		—		EGB4016FFG		—	
20	EGB1020FFG		EGB2020FFG		EGB3020FFG		—		EGB4020FFG		EGB4020AFG	
25	EGB1025FFG		EGB2025FFG		EGB3025FFG		EGB3025AFG		EGB4025FFG		EGB4025AFG	
30	EGB1030FFG		EGB2030FFG		EGB3030FFG		—		EGB4030FFG		—	
32	EGB1032FFG		EGB2032FFG		EGB3032FFG		EGB3032AFG		EGB4032FFG		EGB4032AFG	
35	EGB1035FFG		EGB2035FFG		EGB3035FFG		—		EGB4035FFG		—	
40	EGB1040FFG		EGB2040FFG		EGB3040FFG		EGB3040AFG		EGB4040FFG		EGB4040AFG	
45	EGB1045FFG		EGB2045FFG		EGB3045FFG		—		EGB4045FFG		—	
50	EGB1050FFG		EGB2050FFG		EGB3050FFG		EGB3050AFG		EGB4050FFG		EGB4050AFG	
60	EGB1060FFG		EGB2060FFG		EGB3060FFG		—		EGB4060FFG		—	
63	EGB1063FFG		EGB2063FFG		EGB3063FFG		EGB3063AFG		EGB4063FFG		EGB4063AFG	
70	EGB1070FFG		EGB2070FFG		EGB3070FFG		—		EGB4070FFG		—	
80	EGB1080FFG		EGB2080FFG		EGB3080FFG		EGB3080AFG		EGB4080FFG		EGB4080AFG	
90	EGB1090FFG		EGB2090FFG		EGB3090FFG		—		EGB4090FFG		—	
100	EGB1100FFG		EGB2100FFG		EGB3100FFG		EGB3100AFG		EGB4100FFG		EGB4100AFG	
125	EGB1125FFG		EGB2125FFG		EGB3125FFG		EGB3125AFG		EGB4125FFG		EGB4125AFG	
25/25												
15	—		EGE2015FFG		EGE3015FFG		—		EGE4015FFG		—	
16	—		EGE2016FFG		EGE3016FFG		—		EGE4016FFG		—	
20	—		EGE2020FFG		EGE3020FFG		—		EGE4020FFG		EGB4020AFG	
25	—		EGE2025FFG		EGE3025FFG		EGB3025AFG		EGE4025FFG		EGE4025AFG	
30	—		EGE2030FFG		EGE3030FFG		—		EGE4030FFG		—	
32	—		EGE2032FFG		EGE3032FFG		EGB3032AFG		EGE4032FFG		EGB4032AFG	
35	—		EGE2035FFG		EGE3035FFG		—		EGE4035FFG		—	
40	—		EGE2040FFG		EGE3040FFG		EGB3040AFG		EGE4040FFG		EGB4040AFG	
45	—		EGE2045FFG		EGE3045FFG		EGB3050AFG		EGE4045FFG		—	
50	—		EGE2050FFG		EGE3050FFG		—		EGE4050FFG		EGB4050AFG	
60	—		EGE2060FFG		EGE3060FFG		—		EGE4060FFG		—	
63	—		EGE2063FFG		EGE3063FFG		EGB3063AFG		EGE4063FFG		EGB4063AFG	
70	—		EGE2070FFG		EGE3070FFG		—		EGE4070FFG		—	
80	—		EGE2080FFG		EGE3080FFG		EGB3080AFG		EGE4080FFG		EGB4080AFG	
90	—		EGE2090FFG		EGE3090FFG		—		EGE4090FFG		—	
100	—		EGE2100FFG		EGE3100FFG		EGB3100AFG		EGE4100FFG		EGB4100AFG	
125	—		EGE2125FFG		EGE3125FFG		EGB3125AFG		EGE4125FFG		EGB4125AFG	
40/35												
15	EGS1015FFG		EGS2015FFG		EGS3015FFG		—		EGS4015FFG		—	
16	EGS1016FFG		EGS2016FFG		EGS3016FFG		—		EGS4016FFG		—	
20	EGS1020FFG		EGS2020FFG		EGS3020FFG		—		EGS4020FFG		EGS4020AFG	
25	EGS1025FFG		EGS2025FFG		EGS3025FFG		EGB3025AFG		EGS4025FFG		EGS4025AFG	
30	EGS1030FFG		EGS2030FFG		EGS3030FFG		—		EGS4030FFG		—	
32	EGS1032FFG		EGS2032FFG		EGS3032FFG		EGB3032AFG		EGS4032FFG		EGS4032AFG	
35	EGS1035FFG		EGS2035FFG		EGS3035FFG		—		EGS4035FFG		—	
40	EGS1040FFG		EGS2040FFG		EGS3040FFG		EGB3040AFG		EGS4040FFG		EGS4040AFG	
45	EGS1045FFG		EGS2045FFG		EGS3045FFG		—		EGS4045FFG		—	
50	EGS1050FFG		EGS2050FFG		EGS3050FFG		EGB3050AFG		EGS7050FFG		EGS4050AFG	
60	EGS1060FFG		EGS2060FFG		EGS3060FFG		—		EGS7060FFG		—	
63	EGS1063FFG		EGS2063FFG		EGS3063FFG		EGB3063AFG		EGS7063FFG		EGS4063AFG	
70	EGS1070FFG		EGS2070FFG		EGS3070FFG		—		EGS7070FFG		—	
80	EGS1080FFG		EGS2080FFG		EGS3080FFG		EGB3080AFG		EGS7080FFG		EGS4080AFG	
90	EGS1090FFG		EGS2090FFG		EGS3090FFG		—		EGS7090FFG		—	
100	EGS1100FFG		EGS2100FFG		EGS3100FFG		EGB3100AFG		EGS7100FFG		EGS4100AFG	
125	EGS1125FFG		EGS2125FFG		EGS3125FFG		EGB3125AFG		EGS7125FFG		EGS4125AFG	

① 16, 32, 63 A are not UL listed ratings.
 ② Adjustable thermal are not UL listed.
 ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

Table 45-10. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) — IC Rating at 415/480 Volts (Continued)

Max. Cont. Amps at 40°C ①	1-Pole		2-Pole		3-Pole			4-Pole 0% Protected Neutral ③				
	Fixed Thermal Fixed Magnetic	Price U.S. \$	Fixed Thermal Fixed Magnetic	Price U.S. \$	Fixed Thermal Fixed Magnetic	Price U.S. \$	Adjustable ② Thermal Fixed Magnetic	Price U.S. \$	Fixed Thermal Fixed Magnetic	Price U.S. \$	Adjustable Thermal Fixed Magnetic	Price U.S. \$
70/65												
15	EGH1015FFG		EGH2015FFG		EGH3015FFG		—		EGH4015FFG		—	
16	EGH1016FFG		EGH2016FFG		EGH3016FFG		—		EGH4016FFG		—	
20	EGH1020FFG		EGH2020FFG		EGH3020FFG		EGH3020AFG		EGH4020FFG		EGH4020AFG	
25	EGH1025FFG		EGH2025FFG		EGH3025FFG		EGH3025AFG		EGH4025FFG		EGH4025AFG	
30	EGH1030FFG		EGH2030FFG		EGH3030FFG		—		EGH4030FFG		—	
32	EGH1032FFG		EGH2032FFG		EGH3032FFG		EGH3032AFG		EGH4032FFG		EGH4032AFG	
35	EGH1035FFG		EGH2035FFG		EGH3035FFG		—		EGH4035FFG		—	
40	EGH1040FFG		EGH2040FFG		EGH3040FFG		EGH3040AFG		EGH4040FFG		EGH4040AFG	
45	EGH1045FFG		EGH2045FFG		EGH3045FFG		—		EGH4045FFG		—	
50	EGH1050FFG		EGH2050FFG		EGH3050FFG		EGH3050AFG		EGH4050FFG		—	
60	EGH1060FFG		EGH2060FFG		EGH3060FFG		—		EGH4060FFG		—	
63	EGH1063FFG		EGH2063FFG		EGH3063FFG		EGH3063AFG		EGH4063FFG		EGH4063AFG	
70	EGH1070FFG		EGH2070FFG		EGH3070FFG		—		EGH4070FFG		—	
80	EGH1080FFG		EGH2080FFG		EGH3080FFG		EGH3080AFG		EGH4080FFG		EGH4080AFG	
90	EGH1090FFG		EGH2090FFG		EGH3090FFG		—		EGH4090FFG		—	
100	EGH1100FFG		EGH2100FFG		EGH3100FFG		EGH3100AFG		EGH4100FFG		EGH4100AFG	
125	EGH1125FFG		EGH2125FFG		EGH3125FFG		EGH3125AFG		EGH4125FFG		EGH4125AFG	
100/100												
15	—		—		EGC3015FFG		—		EGC7015FFG		—	
16	—		—		EGC3016FFG		—		EGC7016FFG		—	
20	—		—		EGC3020FFG		EGC3020AFG		EGC7020FFG		EGC7020AFG	
25	—		—		EGC3025FFG		EGC3025AFG		EGC7025FFG		EGC7025AFG	
30	—		—		EGC3030FFG		—		EGC7030FFG		—	
32	—		—		EGC3032FFG		EGC3032AFG		EGC7032FFG		EGC7032AFG	
35	—		—		EGC3035FFG		—		EGC7035FFG		—	
40	—		—		EGC3040FFG		EGC3040AFG		EGC7040FFG		EGC7040AFG	
45	—		—		EGC3045FFG		—		EGC7045FFG		—	
50	—		—		EGC3050FFG		EGC3050AFG		EGC7050FFG		EGC7050AFG	
60	—		—		EGC3060FFG		—		EGC7060FFG		—	
63	—		—		EGC3063FFG		EGC3063AFG		EGC7063FFG		EGC7063AFG	
70	—		—		EGC3070FFG		—		EGC7070FFG		—	
80	—		—		EGC3080FFG		EGC3080AFG		EGC7080FFG		EGC7080AFG	
90	—		—		EGC3090FFG		—		EGC7090FFG		—	
100	—		—		EGC3100FFG		EGC3100AFG		EGC7100FFG		EGC7100AFG	
125	—		—		EGC3125FFG		EGC3125AFG		EGC7125FFG		EGC7125AFG	

① 16, 32, 63 A are not UL listed ratings.
 ② Adjustable thermal is not UL listed.
 ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on LH side.

Table 45-11. Molded Case Switches

Catalog Number	Price U.S. \$
EGK2125KSG	
EGK3125KSG	
EGK4125KSG	

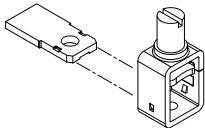
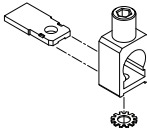
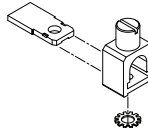
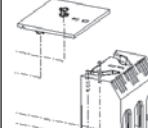
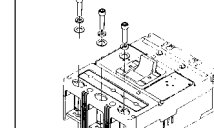

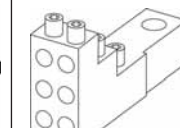
Note: Molded case switches may open above 1250 A.

EG-Frame

Table 45-12. EG Bolt-On Complete Breaker (Includes Frame, Trip Unit and Mounting Hardware)

Max. Cont. Amps	1-Pole		3-Pole	
	Fixed Thermal Fixed Magnetic	Price U.S. \$	Fixed Thermal Fixed Magnetic	Price U.S. \$
18 kAIC at 480 Vac				
15	EGB1015FFB		EGB3015FFB	
20	EGB1020FFB		EGB3020FFB	
25	EGB1025FFB		EGB3025FFB	
30	EGB1030FFB		EGB3030FFB	
35	EGB1035FFB		EGB3035FFB	
40	EGB1040FFB		EGB3040FFB	
45	EGB1045FFB		EGB3045FFB	
50	EGB1050FFB		EGB3050FFB	
60	EGB1060FFB		EGB3060FFB	
63	EGB1070FFB		EGB3070FFB	
70	EGB1080FFB		EGB3080FFB	
80	EGB1090FFB		EGB3090FFB	
90	EGB1100FFB		EGB3100FFB	
100	EGB1110FFB		EGB3110FFB	
125	EGB1125FFB		EGB3125FFB	
35 kAIC at 480 Vac				
15	EGS1015FFB		EGS3015FFB	
20	EGS1020FFB		EGS3020FFB	
25	EGS1025FFB		EGS3025FFB	
30	EGS1030FFB		EGS3030FFB	
35	EGS1035FFB		EGS3035FFB	
40	EGS1040FFB		EGS3040FFB	
45	EGS1045FFB		EGS3045FFB	
50	EGS1050FFB		EGS3050FFB	
60	EGS1060FFB		EGS3060FFB	
63	EGS1070FFB		EGS3070FFB	
70	EGS1080FFB		EGS3080FFB	
80	EGS1090FFB		EGS3090FFB	
90	EGS1100FFB		EGS3100FFB	
100	EGS1110FFB		EGS3110FFB	
125	EGS1125FFB		EGS3125FFB	
65 kAIC at 480 Vac				
15	EGH1015FFB		EGH3015FFB	
20	EGH1020FFB		EGH3020FFB	
25	EGH1025FFB		EGH3025FFB	
30	EGH1030FFB		EGH3030FFB	
35	EGH1035FFB		EGH3035FFB	
40	EGH1040FFB		EGH3040FFB	
45	EGH1045FFB		EGH3045FFB	
50	EGH1050FFB		EGH3050FFB	
60	EGH1060FFB		EGH3060FFB	
63	EGH1070FFB		EGH3070FFB	
70	EGH1080FFB		EGH3080FFB	
80	EGH1090FFB		EGH3090FFB	
90	EGH1100FFB		EGH3100FFB	
100	EGH1110FFB		EGH3110FFB	
125	EGH1125FFB		EGH3125FFB	

Selection Guide and Ordering Information

						
3T125EF	3TA125EF	3TA150EF	3TA160EFK	EF3RTWK, 3-Pole – Metric EF4RTWK, 4-Pole – Metric EF3RTDK, 3-Pole – Imperial EF4RTDK, 4-Pole – Imperial	Control Wire Terminal Kit GCWTK	Multiwire Connectors

Line and Load Terminals

EG-Frame circuit breakers and molded case switches have line and load terminals as standard equipment.

Table 45-13. Line and Load Terminals

Max. Breaker Amps	Terminal Body Material	Wire Type	Metric Wire Range mm ²	AWG Wire Range	Catalog Number Package of 3 Terminals	Price U.S. \$
Standard Cu/Al Pressure Type Terminals						
125	Steel	Cu	2.5-95	#14-3/0	3T125EF ①	
125	Aluminum	Cu/Al	2.5-50	#14-1/0	3TA125EF	
125/160	Aluminum	Cu/Al	16-95	#6-3/0	3TA150EF	
160	Aluminum	Cu/Al	35-120	#3-250	3TA160EFK	
160	Aluminum	Cu/Al	35-120	#3-250	4TA160EFK	

① Standard line and load terminals.

Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer.

Caution: Collar must surround conductor.

Insert collar enclosing conductor and center on extrusion. Tighten securely with screw and washer. Endcap kits are used on the E-Frame breaker line side to connect bus bar or similar electrical connections. Includes hardware.

Control Wire Terminal Kit

For use with steel or stainless steel standard line and load terminals only.

Table 45-14. Control Wire Terminal Kit

Package of 12 — Priced Individually	Catalog Number	Price U.S. \$
Control Wire Terminal Kit	5652B38G01	

Interphase Barriers

The interphase barrier is available for extended insulation between circuit breaker poles. Specify quantity when ordering.

Table 45-15. Interphase Barriers

Package of 2 — Priced Individually	Catalog Number	Price U.S. \$
Interphase Barriers	EIPBK	

Base Mounting Hardware

Metric base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.)

Note: English mounting hardware kit can be supplied separate. Catalog number is **BMHE #6** – 32 x 3 inches.

Table 45-16. DIN Rail Mounting

DIN Rail Adapter	Catalog Number	Price U.S. \$
3- or 4-Pole	EF34DIN	

Multiwire Connectors

Field-installed multiwire connectors for the load side (OFF) end terminals. They are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include mounting hardware, terminal shield insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed for copper only as used on the load side (OFF) end.

Table 45-17. EG-Frame Multiwire Connectors Ordering Information (Package of 3)

Max. Amps	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number	Price U.S. \$
125	3	14 – 2	3TA125E3K	
125	6	14 – 6	3TA125E6K	

Terminal Shields

The terminal shield is available for line terminal areas in 3- and 4-pole circuit breakers. Special terminal shields are also available for use when an electrical (solenoid) operator is mounted on the circuit breaker. The standard style number by pole for each terminal shield is for a package of 10 and is priced per each package. Special terminal shields are packaged individually.

Table 45-18. Terminal Shields

Number of Poles	IP30 Protection	Price U.S. \$
	Catalog Numbers	
3	EFTS3K	
4	EFTS4K	

Terminal End Covers (Gas Barrier)

The terminal end cover is available for 3-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

Table 45-19. Terminal End Covers

Conductor Opening Diameter – Inches (mm)	Catalog Number	Price U.S. \$
6.35 (0.25)	EEC3K	
10.41 (0.41)	EEC4K	

Discount Symbol **CB-2**

EG-Frame

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.

Table 45-20. Accessories

Description	Reference Page	1-Pole			2-Pole			3-Pole			4-Pole			
		Center	Left	Right	Left	Right	Center	Left	Center	Right	Left	Center	Right	Neutral
Internal Accessories (Only one internal accessory per pole)														
Alarm Lockout (Make/Break)	45-58			■				■					■	
Alarm Lockout (2Make/2Break)	45-58			■				■					■	
Auxiliary Switch (1A, 1B)	45-58			■				■					■	
Auxiliary Switch (2A, 2B)	45-58			■				■					■	
Auxiliary Switch and Alarm Switch Combination	45-58			■				■					■	
Shunt Trip — Standard	45-58						■				■			
Undervoltage Release Mechanism	45-58						■				■			
External Accessories														
End Cap Kit	45-19			●				●					●	
Control Wire Terminal Kit	45-19	●		●				●					●	
Multiwire Connectors	45-19	●		●				●					●	
Base Mounting Hardware	45-19	●		●				●					●	
Terminal Shields	45-19	●		●				●					●	
Terminal End Covers	45-19							●						
Interphase Barriers	45-19			●				●					●	
Non-Padlockable Handle Block	45-57	■		■				■					■	
Snap-On Padlockable Handle Lock Hasp	45-57	■		■				■					■	
Padlockable Handle Lock Hasp	45-57			■		□				□	□			□
Walking Beam Interlock — Requires Two Breakers	45-57							●					●	
Plug-in Adapters	45-59			●				●					●	
Electrical Operator	45-57							●						
Handle Mechanisms	45-60							●						
Modifications (Refer to Eaton)														
Moisture Fungus Treatment	—		●	●				●					●	
Freeze-Tested Circuit Breakers	—		●	●				●					●	
Marine Application	—		●	●				●					●	

■ Applicable in indicated pole position

□ May be mounted on left or right pole — not both

● Accessory available/Modification available

JG-Frame



Eaton's Cutler-Hammer J250

Product Description

- JG breaker is HACR rated.

Technical Data and Specifications

Table 45-21. UL 489/IEC 60947-2 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)								Volts dc ^①
		Volts ac (50/60 Hz)								
		220 – 240		380 – 415		480	600	690		
		I _{cu}	I _{cs}	I _{cu}	I _{cs}			I _{cu}	I _{cs}	
JGE250	2, 3, 4	65	65	25	25	25	18	12	6	10
JGS250	2, 3, 4	85	85	40	40	35	18	12	6	22
JGH250	2, 3, 4	100	100	70	70	65	25	14	7	22
JGC250	3, 4	200	200	100	100	100	35	16	12	42
JGU250	3, 4	200	200	150	150	150	50	18	14	50
JGX250	3, 4	200	200	200	200	200	50	18	14	50

- ① dc ratings apply to substantially non-inductive circuits.
- ② 2-pole circuit breaker, or two poles of 3-pole circuit breaker.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

Dimensions/Weights

Table 45-22. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2/3	4.13 (104.9)	7.00 (177.8)	3.57 (90.7)
4	5.34 (135.6)	7.00 (177.8)	3.57 (90.7)

Table 45-23. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Number of Poles	
	2/3	4
JGE, JGS, JGH, JGC, JGU, JGX	6 (2.7)	8 (3.6)

Product Selection

Table 45-24. Main Catalog Numbering System

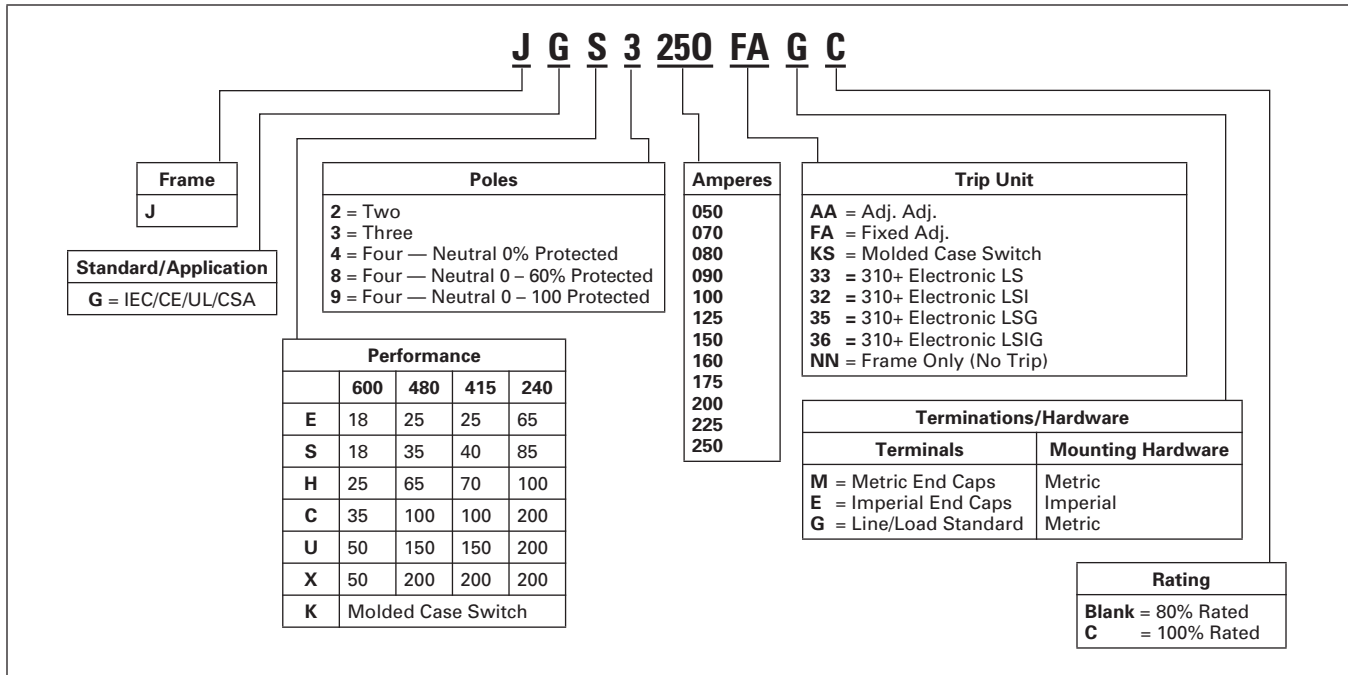
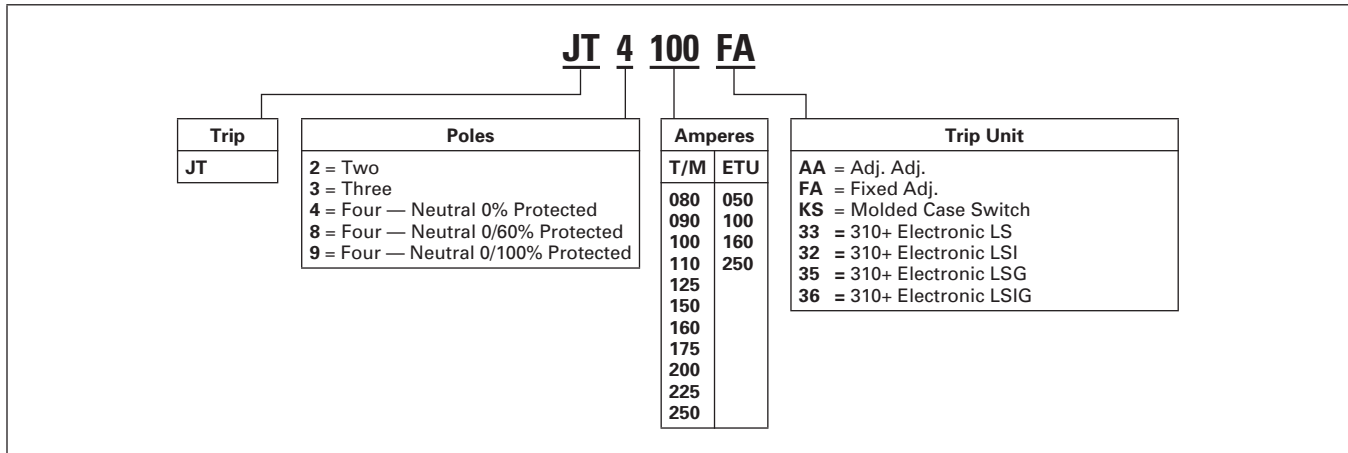


Table 45-25. Trip Unit Catalog Numbering System



Product Selection

Table 45-26. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) — IC Rating at 415/480 Volts

Maximum Continuous Amperes	Magnetic Range	2-Pole		3-Pole				4-Pole 0% ①			
		Fixed Thermal Adjustable Magnetic		Fixed Thermal Adjustable Magnetic		Adjustable Thermal Adjustable Magnetic ②		Fixed Thermal Adjustable Magnetic		Adjustable Thermal Adjustable Magnetic ②	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
IEC/CE/UL/CSA 25/25											
70	350 – 700	JGE2070FAG		JGE3070FAG		—		JGE4070FAG		—	
90	450 – 900	JGE2090FAG		JGE3090FAG		—		JGE4090FAG		—	
100	500 – 1000	JGE2100FAG		JGE3100FAG		JGE3100AAG		JGE4100FAG		JGE4100AAG	
125	625 – 1250	JGE2125FAG		JGE3125FAG		JGE3125AAG		JGE4125FAG		JGE4125AAG	
150	750 – 1550	JGE2150FAG		JGE3150FAG		—		JGE4150FAG		—	
160	800 – 1600	—		—		JGE3160AAG		—		JGE4160AAG	
175	875 – 1750	JGE2175FAG		JGE3175FAG		—		JGE4175FAG		—	
200	1000 – 2000	JGE2200FAG		JGE3200FAG		JGE3200AAG		JGE4200FAG		JGE4200AAG	
225	1125 – 2250	JGE2225FAG		JGE3225FAG		—		JGE4225FAG		—	
250	1250 – 2500	JGE2250FAG		JGE3250FAG		JGE3250AAG		JGE4250FAG		JGE4250AAG	
IEC/CE/UL/CSA 40/35											
70	350 – 700	JGS2070FAG		JGS3070FAG		—		JGS4070FAG		—	
90	450 – 900	JGS2090FAG		JGS3090FAG		—		JGS4090FAG		—	
100	500 – 1000	JGS2100FAG		JGS3100FAG		JGS3100AAG		JGS4100FAG		JGS4100AAG	
125	625 – 1250	JGS2125FAG		JGS3125FAG		JGS3125AAG		JGS4125FAG		JGS4125AAG	
150	750 – 1550	JGS2150FAG		JGS3150FAG		—		JGS4150FAG		—	
160	800 – 1600	—		—		JGS3160AAG		—		JGS4160AAG	
175	875 – 1750	JGS2175FAG		JGS3175FAG		—		JGS4175FAG		—	
200	1000 – 2000	JGS2200FAG		JGS3200FAG		JGS3200AAG		JGS4200FAG		JGS4200AAG	
225	1125 – 2250	JGS2225FAG		JGS3225FAG		—		JGS4225FAG		—	
250	1250 – 2500	JGS2250FAG		JGS3250FAG		JGS3250AAG		JGS4250FAG		JGS4250AAG	
IEC/CE/UL/CSA 70/65											
70	350 – 700	JGH2070FAG		JGH3070FAG		—		JGH4070FAG		—	
90	450 – 900	JGH2090FAG		JGH3090FAG		—		JGH4090FAG		—	
100	500 – 1000	JGH2100FAG		JGH3100FAG		JGH3100AAG		JGH4100FAG		JGH4100AAG	
125	625 – 1250	JGH2125FAG		JGH3125FAG		JGH3125AAG		JGH4125FAG		JGH4125AAG	
150	750 – 1550	JGH2150FAG		JGH3150FAG		—		JGH4150FAG		—	
160	800 – 1600	—		—		JGH3160AAG		—		JGH4160AAG	
175	875 – 1750	JGH2175FAG		JGH3175FAG		—		JGH4175FAG		—	
200	1000 – 2000	JGH2200FAG		JGH3200FAG		JGH3200AAG		JGH4200FAG		JGH4200AAG	
225	1125 – 2250	JGH2225FAG		JGH3225FAG		—		JGH4225FAG		—	
250	1250 – 2500	JGH2250FAG		JGH3250FAG		JGH3250AAG		JGH4250FAG		JGH4250AAG	
IEC/CE/UL/CSA 100/100											
70	350 – 700	—		JGC3070FAG		—		JGC4070FAG		—	
80	400 – 800	—		—		JGC3080AAG		—		JGC4080AAG	
90	450 – 900	—		JGC3090FAG		—		JGC4090FAG		—	
100	500 – 1000	—		JGC3100FAG		JGC3100AAG		JGC4100FAG		JGC4100AAG	
125	625 – 1250	—		JGC3125FAG		JGC3125AAG		JGC4125FAG		JGC4125AAG	
150	750 – 1550	—		JGC3150FAG		—		JGC4150FAG		—	
160	800 – 1600	—		—		JGC3160AAG		—		JGC4160AAG	
175	875 – 1750	—		JGC3175FAG		—		JGC4175FAG		—	
200	1000 – 2000	—		JGC3200FAG		JGC3200AAG		JGC4200FAG		JGC4200AAG	
225	1125 – 2250	—		JGC3225FAG		—		JGC4225FAG		—	
250	1250 – 2500	—		JGC3250FAG		JGC3250AAG		JGC4250FAG		JGC4250AAG	
IEC/CE/UL/CSA 150/150											
70	350 – 700	—		JGU3070FAG		—		JGU4070FAG		—	
80	400 – 800	—		—		JGU3080AAG		—		JGU4080AAG	
90	450 – 900	—		JGU3090FAG		—		JGU4090FAG		—	
100	500 – 1000	—		JGU3100FAG		JGU3100AAG		JGU4100FAG		JGU4100AAG	
125	625 – 1250	—		JGU3125FAG		JGU3125AAG		JGU4125FAG		JGU4125AAG	
150	750 – 1550	—		JGU3150FAG		—		JGU4150FAG		—	
160	800 – 1600	—		—		JGU3160AAG		—		JGU4160AAG	
175	875 – 1750	—		JGU3175FAG		—		JGU4175FAG		—	
200	1000 – 2000	—		JGU3200FAG		JGU3200AAG		JGU4200FAG		JGU4200AAG	
225	1125 – 2250	—		JGU3225FAG		—		JGU4225FAG		—	
250	1250 – 2500	—		JGU3250FAG		JGU3250AAG		JGU4250FAG		JGU4250AAG	
IEC/CE/UL/CSA 200/200											
70	350 – 700	—		JGX3070FAG		—		JGX4070FAG		—	
80	400 – 800	—		—		JGX3080AAG		—		JGX4080AAG	
90	450 – 900	—		JGX3090FAG		—		JGX4090FAG		—	
100	500 – 1000	—		JGX3100FAG		JGX3100AAG		JGX4100FAG		JGX4100AAG	
125	625 – 1250	—		JGX3125FAG		JGX3125AAG		JGX4125FAG		JGX4125AAG	
150	750 – 1550	—		JGX3150FAG		—		JGX4150FAG		—	
160	800 – 1600	—		—		JGX3160AAG		—		JGX4160AAG	
175	875 – 1750	—		JGX3175FAG		—		JGX4175FAG		—	
200	1000 – 2000	—		JGX3200FAG		JGX3200AAG		JGX4200FAG		JGX4200AAG	
225	1125 – 2250	—		JGX3225FAG		—		JGX4225FAG		—	
250	1250 – 2500	—		JGX3250FAG		JGX3250AAG		JGX4250FAG		JGX4250AAG	

① Change the fourth digit to 8 for adjustable 0 – 60% neutral protection, 9 for 0 – 100% neutral protection. Neutral is on LH side.

② IEC-EN 60947-2 only. Adjustment is .8 and 1.0.

Product Selection

Table 45-27. Thermal-Magnetic Trip Unit

Ampere Rating	Range	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Range	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
70	350 – 700	JT2070FA		JT3070FA		—		—	JT4070FA		—	
80	400 – 800	—		—		JT3080AA ①		64 – 100	—		JT4080AA ①	
90	450 – 900	JT2090FA		JT3090FA		—		—	JT4090FA		—	
100	500 – 1000	JT2100FA		JT3100FA		JT3100AA ①		80 – 100	JT4100FA		JT4100AA ①	
125	625 – 1250	JT2125FA		JT3125FA		JT3125AA ①		100 – 125	JT4125FA		JT4125AA ①	
150	750 – 1500	JT2150FA		JT3150FA		—		—	JT4150FA		—	
160	800 – 1600	JT2160FA ①		—		JT3160AA ①		128 – 160	—		JT4160AA ①	
175	875 – 1750	JT2175FA		JT3175FA		—		—	JT4175FA		—	
200	1000 – 2000	JT2200FA		JT3200FA		JT3200AA ①		160 – 200	JT4200FA		JT4200AA ①	
225	1125 – 2250	JT2225FA		JT3225FA		—		—	JT4225FA		—	
250	1250 – 2500	JT2250FA		JT3250FA		JT3250AA ①		200 – 250	JT4250FA		JT4250AA ①	

① Adjustable thermal trip units are typically used in IEC markets and are not UL or CSA listed.

Table 45-28. Molded Case Switches

Catalog Number	Price U.S. \$
JGK2250KSK JGK3250KSG JGK7250KSG	

Note: Molded case switches will trip above 2500 amperes.

Table 45-29. Components — Line and Load Terminal

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range No. Conductors	Metric Wire Range mm ²	Catalog Number	Price U.S. \$
Standard Cu/Al Pressure Terminals						
250	Aluminum	Cu/Al	4 – 350 kcmil	25 – 185	TA250FJ	
250	Stainless Steel	Cu	4 – 350 kcmil	25 – 185	T250FJ ②	

② Standard line and load terminals.

Product Selection

Table 45-30. Components — Frame — IC Rating at 415/480 Volts

Maximum Amperes	2-Pole		3-Pole		4-Pole 0%	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
25/25						
250	JGE2250NN		JGE3250NN		JGE4250NN	
40/35						
250	JGS2250NN		JGS3250NN		JGS4250NN	
70/65						
250	JGH2250NN		JGH3250NN		JGH4250NN	
100/100						
250	—		JGC3250NN		JGC4250NN	
150/150						
250	—		JGU3250NN		JGU4250NN	
200/200						
250	—		JGX3250NN		JGX4250NN	
25/25 ①						
250	—		JGE3250NNWC		—	
40/35 ①						
250	—		JGS3250NNWC		—	
70/65 ①						
250	—		JGH3250NNWC		JGH4250NNWC	

① Components — 100% rated frame. To be used with electronic trip units only.

Table 45-31. Plug-in Test Kit

Voltage Rating	Catalog Number	Price U.S. \$
120 Vac	MTST120V	
230 Vac	MTST230V	

Table 45-32. Breaker Mount Ammeter

Description	Catalog Number	Price U.S. \$
Breaker Mount Ammeter	DIGIVIEW	

Note: Use on electronic trip only.

Table 45-33. JG Electronic Trip Units

Ampere Rating	LS	Price U.S. \$	LSI	Price U.S. \$	LSG	Price U.S. \$	LSIG	Price U.S. \$	Neutral CT for LSG & LSIG ②	Price U.S. \$
3-Pole										
50	JT305033		JT305032		JT305035		JT305036		JGFCT050	
100	JT310033		JT310032		JT310035		JT310036		JGFCT100	
160	JT316033		JT160323		JT316035		JT316036		JGFCT160	
250	JT325033		JT325032		JT325035		JT325036		JGFCT250	
4-Pole ③										
50	JT405033		JT405032		JT405035		JT405036		JGFCT050	
100	JT410033		JT410032		JT410035		JT410036		JGFCT100	
160	JT416033		JT416032		JT416035		JT416036		JGFCT160	
250	JT425033		JT425032		JT425035		JT425036		JGFCT250	

② Required for 4-wire systems if neutral protection is desired.

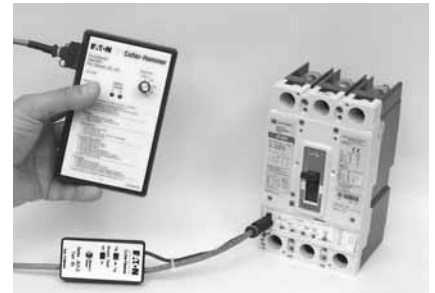
③ Neutral protection 4 = 0%, 6 = 60%, 7 = 100% electronic trip unit neutral protection is not adjustable.

Note: Long time pickup — no rating plug.
 250 Ampere Settings — 250, 225, 200, 175, 160, 150, 125, 100.
 160 Ampere Settings — 160, 150, 125, 110, 100, 90, 80, 63.
 100 Ampere Settings — 100, 90, 80, 70, 63, 50, 45, 40.
 50 Ampere Settings — 50, 45, 40, 32, 30, 25, 20.

Note: Adjustable long time delay — 2 – 24 seconds at 6 x Ir.
 Adjustable short time delay — Inst., 120, 300 ms



Digitrip 310+ Test Kit



Digitrip 310+ Test Kit Shown with JG MCCB



JG Digitrip 310+ Electronic Trip Unit



Ammeter

JG-Frame

Table 45-34. Complete Breaker with Electronic Trip Units

Ampere Rating	LS	Price U.S. \$	LSI	Price U.S. \$	LSG	Price U.S. \$	LSIG	Price U.S. \$	Neutral CT for LSG & LSIG ①	Price U.S. \$
IEC/UL/CSA 25/25 — 3-Pole										
50	JGE305033G		JGE305032G		JGE305035G		JGE305036G		JGFCT050	
100	JGE310033G		JGE310032G		JGE310035G		JGE310036G		JGFCT100	
160	JGE316033G		JGE316032G		JGE316035G		JGE316036G		JGFCT160	
250	JGE325033G		JGE325032G		JGE325035G		JGE325036G		JGFCT250	
IEC/UL/CSA 25/25 — 4-Pole ②										
50	JGE405033G		JGE405032G		JGE405035G		JGE405036G		JGFCT050	
100	JGE410033G		JGE410032G		JGE410035G		JGE410036G		JGFCT100	
160	JGE416033G		JGE416032G		JGE416035G		JGE416036G		JGFCT160	
250	JGE425033G		JGE425032G		JGE425035G		JGE425036G		JGFCT250	
IEC/UL/CSA 40/35 — 3-Pole										
50	JGS305033G		JGS305032G		JGS305035G		JGS305036G		JGFCT050	
100	JGS310033G		JGS310032G		JGS310035G		JGS310036G		JGFCT100	
160	JGS316033G		JGS316032G		JGS316035G		JGS316036G		JGFCT160	
250	JGS325033G		JGS325032G		JGS325035G		JGS325036G		JGFCT250	
IEC/UL/CSA 40/35 — 4-Pole ②										
50	JGS405033G		JGS405032G		JGS405035G		JGS405036G		JGFCT050	
100	JGS410033G		JGS410032G		JGS410035G		JGS410036G		JGFCT100	
160	JGS416033G		JGS416032G		JGS416035G		JGS416036G		JGFCT160	
250	JGS425033G		JGS425032G		JGS425035G		JGS425036G		JGFCT250	
IEC/UL/CSA 70/65 — 3-Pole										
50	JGH305033G		JGH305032G		JGH305035G		JGH305036G		JGFCT050	
100	JGH310033G		JGH310032G		JGH310035G		JGH310036G		JGFCT100	
160	JGH316033G		JGH316032G		JGH316035G		JGH316036G		JGFCT160	
250	JGH325033G		JGH325032G		JGH325035G		JGH325036G		JGFCT250	
IEC/UL/CSA 70/65 — 4-Pole ②										
50	JGH405033G		JGH405032G		JGH405035G		JGH405036G		JGFCT050	
100	JGH410033G		JGH410032G		JGH410035G		JGH410036G		JGFCT100	
160	JGH416033G		JGH416032G		JGH416035G		JGH416036G		JGFCT160	
250	JGH425033G		JGH425032G		JGH425035G		JGH425036G		JGFCT250	
IEC/UL/CSA 100/100 — 3-Pole										
50	JGC305033G		JGC305032G		JGC305035G		JGC305036G		JGFCT050	
100	JGC310033G		JGC310032G		JGC310035G		JGC310036G		JGFCT100	
160	JGC316033G		JGC316032G		JGC316035G		JGC316036G		JGFCT160	
250	JGC325033G		JGC325032G		JGC325035G		JGC325036G		JGFCT250	
IEC/UL/CSA 100/100 — 4-Pole ②										
50	JGC405033G		JGC405032G		JGC405035G		JGC405036G		JGFCT050	
100	JGC410033G		JGC410032G		JGC410035G		JGC410036G		JGFCT100	
160	JGC416033G		JGC416032G		JGC416035G		JGC416036G		JGFCT160	
250	JGC425033G		JGC425032G		JGC425035G		JGC425036G		JGFCT250	
IEC/UL/CSA 150/150 — 3-Pole										
50	JGU305033G		JGU305032G		JGU305035G		JGU305036G		JGFCT050	
100	JGU310033G		JGU310032G		JGU310035G		JGU310036G		JGFCT100	
160	JGU316033G		JGU316032G		JGU316035G		JGU316036G		JGFCT160	
250	JGU325033G		JGU325032G		JGU325035G		JGU325036G		JGFCT250	
IEC/UL/CSA 150/150 — 4-Pole ②										
50	JGU405033G		JGU405032G		JGU405035G		JGU405036G		JGFCT050	
100	JGU410033G		JGU410032G		JGU410035G		JGU410036G		JGFCT100	
160	JGU416033G		JGU416032G		JGU416035G		JGU416036G		JGFCT160	
250	JGU425033G		JGU425032G		JGU425035G		JGU425036G		JGFCT250	
IEC/UL/CSA 200/200 — 3-Pole										
50	JGX305033G		JGX305032G		JGX305035G		JGX305036G		JGFCT050	
100	JGX310033G		JGX310032G		JGX310035G		JGX310036G		JGFCT100	
160	JGX316033G		JGX316032G		JGX316035G		JGX316036G		JGFCT160	
250	JGX325033G		JGX325032G		JGX325035G		JGX325036G		JGFCT250	
IEC/UL/CSA 200/200 — 4-Pole ②										
50	JGX405033G		JGX405032G		JGX405035G		JGX405036G		JGFCT050	
100	JGX410033G		JGX410032G		JGX410035G		JGX410036G		JGFCT100	
160	JGX416033G		JGX416032G		JGX416035G		JGX416036G		JGFCT160	
250	JGX425033G		JGX425032G		JGX425035G		JGX425036G		JGFCT250	

① Required for 4-wire systems if neutral protection is required.

② Neutral protection 4 = 0%, 6 = 60%, 7 = 100% electronic trip unit neutral protection is not adjustable.

JG-Frame

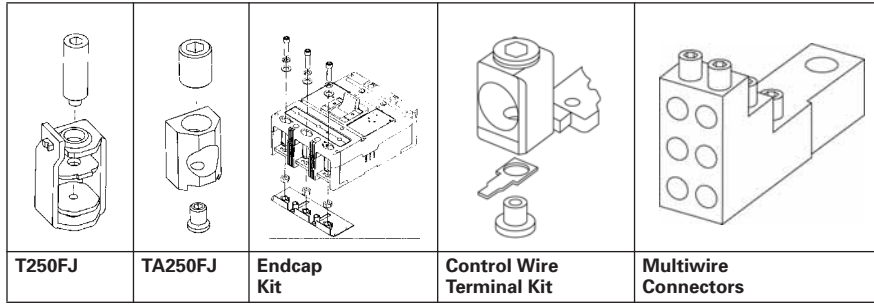
Table 45-34. Complete Breaker with Electronic Trip Units (Continued)

Ampere Rating	LS		LSI		LSG		LSIG		Neutral CT for LSG & LSIG ①	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
IEC/UL/CSA 25/25										
50	JGE305033GC		JGE305032GC		JGE305035GC		JGE305036GC		JGFCT050	
100	JGE310033GC		JGE310032GC		JGE310035GC		JGE310036GC		JGFCT100	
160	JGE316033GC		JGE316032GC		JGE316035GC		JGE316036GC		JGFCT160	
250	JGE325033GC		JGE325032GC		JGE325035GC		JGE325036GC		JGFCT250	
IEC/UL/CSA 40/35										
50	JGS305033GC		JGS305032GC		JGS305035GC		JGS305036GC		JGFCT050	
100	JGS310033GC		JGS310032GC		JGS310035GC		JGS310036GC		JGFCT100	
160	JGS316033GC		JGS316032GC		JGS316035GC		JGS316036GC		JGFCT160	
250	JGS325033GC		JGS325032GC		JGS325035GC		JGS325036GC		JGFCT250	
IEC/UL/CSA 70/65										
50	JGH305033GC		JGH305032GC		JGH305035GC		JGH305036GC		JGFCT050	
100	JGH310033GC		JGH310032GC		JGH310035GC		JGH310036GC		JGFCT100	
160	JGH316033GC		JGH316032GC		JGH316035GC		JGH316036GC		JGFCT160	
250	JGH325033GC		JGH325032GC		JGH325035GC		JGH325036GC		JGFCT250	

① Required for 4-wire systems if neutral protection is required.

JG-Frame

Selection Guide and Ordering Information



Line and Load Terminals

JG-Frame circuit breakers include Cu/Al terminals T250FJ as standard. When optional copper only terminals are required, order by catalog number.

Table 45-35. Line and Load Terminals

Maximum Breaker Amps	Terminal Body Material	Wire Type	Metric Wire Range mm ²	AWG Wire Range/ Number of Conductors	Catalog Number	Price U.S. \$
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Standard Pressure Type Terminals

250	Stainless Steel	Cu	25 – 185	#4 – 350 (1)	T250FJ ①②	
250	Aluminum	Cu/Al	25 – 185	#4 – 350 (1)	TA250FJ ①	

Optional Copper and Cu/Al Pressure Type Terminals

250	Copper	Cu/Al	25 – 185	#4 – 350 (1)	TC250FJ ③	
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- ① Individually packed.
- ② Standard line and load.
- ③ Contact factory for availability.

Endcap Kits

Endcap kits are used on J250-Frame breaker line side to connect bus bar or similar electrical connections. Includes hardware.

Table 45-36. Kit Catalog Number

Number of Poles	Catalog Number		Price U.S. \$
	Metric	Imperial	
3	FJ3RTWK	FJ3RTDK	
4	FJ4RTWK	FJ4RTDK	

Control Wire Terminal Kit

For use with aluminum or copper terminals only.

Table 45-37. Control Wire Terminal Kit

Control Wire Terminal Kit	Catalog Number	Price U.S. \$
Package of 14 — Priced Individually	FJCWTK	

Multiwire Connectors

Field-installed multiwire connectors for the load side (OFF) end terminals. They are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include terminal shield, mounting hardware, insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed for copper only as used on the load side (OFF) end.

Table 45-38. JG-Frame Multiwire Connectors Ordering Information (Package of 3)

Max. Amps	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number	Price U.S. \$
250	3	14 – 2	3TA250FJ3	
250	6	14 – 6	3TA250FJ6	

Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.)

Table 45-39. Terminal Shields IP30

Location	Number of Poles	Catalog Number	Price U.S. \$
Line or Load	2, 3, 4	FJTS3K FJTS4K	

Table 45-40. Interphase Barriers

Package of 2	Catalog Number		Price U.S. \$
	Number of Poles	Catalog Number	
3		FJIPBK	
4		FJIPBK4	

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.

Table 45-41. Accessories

Description	Reference Page	2-, 3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	45-58			■			■	
Auxiliary Switch (1A, 1B)	45-58			■			■	
Auxiliary Switch (2A, 2B)	45-58			■			■	
Auxiliary Switch and Alarm Switch Combination	45-58			■			■	
Shunt Trip — Standard	45-58	■			■			
Undervoltage Release Mechanism	45-58	■			■			
External Accessories								
End Cap Kit	45-28		●				●	
Control Wire Terminal Kit	45-28		●				●	
Multiwire Connectors	45-28		●				●	
Base Mounting Hardware	45-28		●				●	
Interphase Barriers	45-28		●				●	
Padlockable Handle Block	45-57		■			■		
Padlockable Handle Lock Hasp	45-57	□			□			□
Key Interlock Kit	45-57	□			□			□
Sliding Bar Interlock — Requires Two Breakers	45-57		●					
Electrical Operator	45-57		●				●	
Plug-in Adapters	45-59		●				●	
Handle Mechanisms	45-60		●				●	
Earth Leakage/Ground Fault Protector	45-55		●				●	
Drawout Cassette	45-59		●				●	
Digitrip 310+ Test Kit	45-25		●				●	
Ammeter/Cause of Trip Display	45-25		●				●	
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	—		●				●	
Freeze-Tested Circuit Breakers	—		●				●	
Marine/Naval Application, UL Supplement SA and SB	①		●				●	

■ Applicable in indicated pole position □ May be mounted on left or right pole — not both ● Accessory available/Modification available

① Contact Eaton

LG-Frame

LG-Frame



Typical LG-Frame Circuit Breaker

Product Description

- LG breaker is HACR rated.

Interrupting Capacity Ratings

Table 45-42. UL 489/IEC 60947-2 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA rms Symmetrical Amperes) (kA)										
		Volts ac (50/60 Hz)									Volts dc ^①	
		240 – 240		380 – 415		480	600	690		250 ^{②③}		600 ^④
		Icu	Ics	Icu	Ics			Icu	Ics	Icu	Ics	
LGE630	3, 4	65	65	35	35	35	18	12	6	22	22	10
LGS630	3, 4	85	85	50	50	50	25	20	10	22	22	22
LGH630	3, 4	100	100	70	70	65	35	25	13	42	42	35
LGC630	3, 4	200	200	100	100	100	50	30	15	42	42	42
LGU630	3, 4	200	200	150	150	150	65	35	18	50	50	42
LGX630	3, 4	200 ^⑤	200	200	200	200	65	35	18	50	50	50

^① dc rating apply to substantially non-inductive circuits.

^② 2-pole circuit breaker, or two poles of 3-pole circuits.

^③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at – kA.

^④ 3-poles in series. 750 Vdc ratings available (4-poles in series, not UL listed). Contact Eaton.

^⑤ IEC rating is 300 kA @ 240 Vac.

Product Selection

Table 45-43. Main Catalog Numbering System

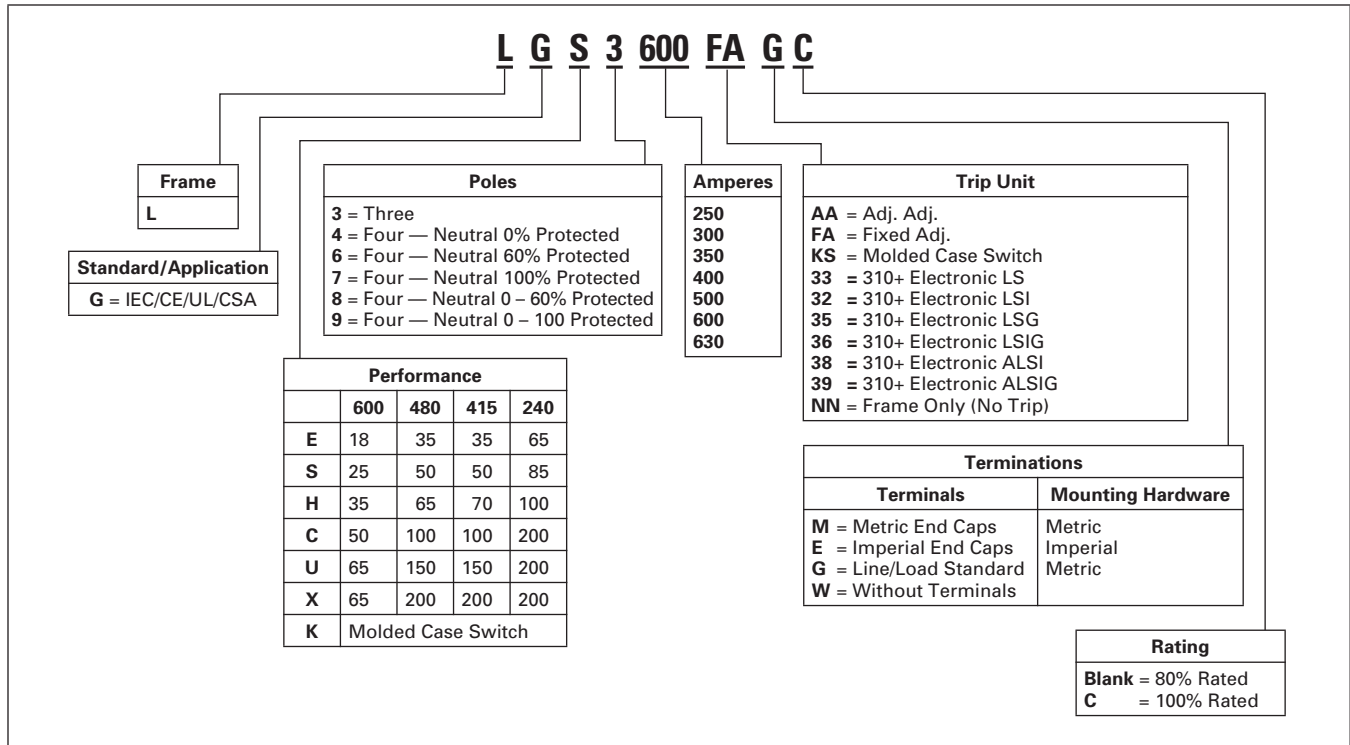
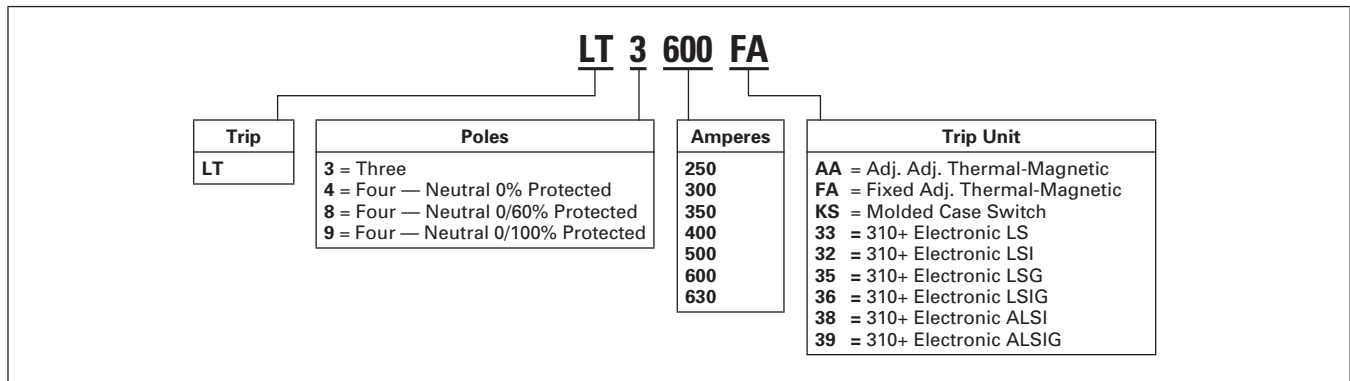


Table 45-44. Trip Unit Catalog Numbering System



LG-Frame, 630 Amperes

Table 45-45. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) ①

Ampere Rating	3-Pole ②		4-Pole (0%) ③		3-Pole ②		4-Pole (0%) ③		
	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ④⑤	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ④⑤	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ④⑤	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ④⑤	
IC Rating: 35 kAIC at 415 and 480 Vac					IC Rating: 50 kAIC at 415 and 480 Vac				
250	LGE3250FAG	LGE3250AAG	LGE4250FAG	LGE4250AAG	LGS3250FAG	LGS3250AAG	LGS4250FAG	LGS4250AAG	
300	LGE3300FAG	—	LGE4300FAG	—	LGS3300FAG	—	LGS4350FAG	—	
320	—	LGE3320AAG	—	LGE4320AAG	—	LGS3320AAG	—	LGS4320AAG	
350	LGE3350FAG	—	LGE4350FAG	—	LGS3350FAG	—	LGS4350FAG	—	
400	LGE3400FAG	LGE3400AAG	LGE4400FAG	LGE4400AAG	LGS3400FAG	LGS3400AAG	LGS4400FAG	LGS4400AAG	
500	LGE3500FAG	LGE3500AAG	LGE4500FAG	LGE4500AAG	LGS3500FAG	LGS3500AAG	LGS4500FAG	LGS4500AAG	
600	LGE3600FAG	—	LGE4600FAG	—	LGS3600FAG	—	LGS4600FAG	—	
630 ④	—	LGE3630AAG	—	LGE4630AAG	—	LGS3630AAG	—	LGS4630AAG	
IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac					IC Rating: 100 kAIC at 415 and 480 Vac				
250	LGH3250FAG	LGH3250AAG	LGH4250FAG	LGH4250AAG	LGC3250FAG	LGC3250AAG	LGC4250FAG	LGC4250AAG	
300	LGH3300FAG	—	LGH4300FAG	—	LGC3300FAG	—	LGC4300FAG	—	
320	—	LGH3320AAG	—	LGH4320AAG	—	LGC3320AAG	—	LGC4320AAG	
350	LGH3350FAG	—	LGH4350FAG	—	LGC3350FAG	—	LGC4350FAG	—	
400	LGH3400FAG	LGH3400AAG	LGH4400FAG	LGH4400AAG	LGC3400FAG	LGC3400AAG	LGC4400FAG	LGC4400AAG	
500	LGH3500FAG	LGH3500AAG	LGH4500FAG	LGH4500AAG	LGC3500FAG	LGC3500AAG	LGC4500FAG	LGC4500AAG	
600	LGH3600FAG	—	LGH4600FAG	—	LGC3600FAG	—	LGC4600FAG	—	
630 ④	—	LGH3630AAG	—	LGH4630AAG	—	LGC3630AAG	—	LGC4630AAG	
IC Rating: 150 kAIC at 415 and 480 Vac					IC Rating: 200 kAIC at 415 and 480 Vac				
250	LGU3250FAG	LGU3250AAG	LGU4250FAG	LGU4250AAG	LGX3250FAG	LGX3250AAG	LGX4250FAG	LGX4250AAG	
300	LGU3300FAG	—	LGU4300FAG	—	LGX3300FAG	—	LGX4300FAG	—	
320	—	LGU3320AAG	—	LGU4320AAG	—	LGX3320AAG	—	LGX4320AAG	
350	LGU3350FAG	—	LGU4350FAG	—	LGX3350FAG	—	LGX4350FAG	—	
400	LGU3400FAG	LGU3400AAG	LGU4400FAG	LGU4400AAG	LGX3400FAG	LGX3400AAG	LGX4400FAG	LGX4400AAG	
500	LGU3500FAG	LGU3500AAG	LGU4500FAG	LGU4500AAG	LGX3500FAG	LGX3500AAG	LGX4500FAG	LGX4500AAG	
600	LGU3600FAG	—	LGU4600FAG	—	LGX3600FAG	—	LGX4600FAG	—	
630 ④	—	LGU3630AAG	—	LGU4630AAG	—	LGX3630AAG	—	LGX4630AAG	

- ① Replace suffix "G" with "W" for no line and load terminals.
- ② For 2-pole applications, use two outer poles.
- ③ Neutral protection is indicated by the fourth character: 4 = 0%, 7 = 100%, 8 = adjustable 0 – 60% and 9 = 0 – 100%. Neutral is on LH side.
- ④ 320/630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
- ⑤ Adjustable thermal units are typically used in IEC markets and are not UL or CSA listed.

Note: Please contact Eaton for pricing.

Table 45-46. Thermal-Magnetic Trip Unit

Ampere Rating	3-Pole ⑥			4-Pole (0%) ⑦				
	Fixed Thermal/ Adj. Magnetic	Price U.S. \$	Adj. Thermal/ Adj. Magnetic ⑧	Price U.S. \$	Fixed Thermal/ Adj. Magnetic	Price U.S. \$	Adj. Thermal/ Adj. Magnetic ⑧	Price U.S. \$
250	LT3250FA		LT3250AA		LT4250FA		LT4250AA	
300	LT3300FA		—		LT4300FA		—	
320	—		LT3320AA		—		LT4320AA	
350	LT3350FA		—		LT4350FA		—	
400	LT3400FA		LT3400AA		LT4400FA		LT4400AA	
500	LT3500FA		LT3500AA		LT4500FA		LT4500AA	
600	LT3600FA		—		LT4600FA		—	
630	—		LT3630AA		—		LT4630AA	

- ⑥ For 2-pole applications, use two outer poles.
- ⑦ Neutral protection is indicated by the third character: 4 = 0%, 7 = 100%, 8 = adjustable 0 – 60% and 9 = 0 – 100%
- ⑧ Adjustable thermal, adjustable magnetic trip units are typically used in IEC markets and are not UL or CSA listed.

Table 45-47. Molded Case Switches

Ampere Rating	Number of Poles	Catalog Number	Price U.S. \$
400	3 ① 4	LGK3400KSG LGK4400KSG	
630 ②	3 ① 4	LGK3630KSG LGK4630KSG	

① For 2-pole applications, use two outer poles.

② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.

Note: Molded case switches will trip above 6300 amperes.

Table 45-48. Breaker Frame Only

Ampere Rating ③	IC Rating at 415/480 V	3-Pole ④		4-Pole (0%)	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
630	35/35	LGE3630NN		LGE4630NN	
630 ⑤	35/35	LGE3630NNWC		—	
630	50/50	LGS3630NN		LGS4630NN	
630 ⑤	50/50	LGS3630NNWC		—	
630	70/65	LGH3630NN		LGH4630NN	
630 ⑤	70/65	LGH3630NNWC		—	
630	100/100	LGC3630NN		LGC4630NN	
630	150/150	LGU3630NN		LGU4630NN	
630	200/200	LGX3630NN		LGX4630NN	

③ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.

④ For 2-pole applications, use two outer poles.

⑤ 100% rated frame. For use with electronic trip units only.

Table 45-49. Electronic Trip Units — Digitrip 310+

Ampere Rating	LS		LSI		LSG		LSIG		Neutral CT for LSG & LSIG ⑥	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

3-Pole

250	LT325033		LT325032		LT325035		LT325036		LGFACT250	
400	LT340033		LT340032		LT340035		LT340036		LGFACT400	
600	LT360033		LT360032		LT360035		LT360036		LGFACT600	
630 ⑦	LT363033		LT363032		LT363035		LT363036		LGFACT600	

4-Pole ⑧

250	LT425033		LT425032		LT425035		LT425036		LGFACT250	
400	LT440033		LT440032		LT440035		LT440036		LGFACT400	
600	LT460033		LT460032		LT460035		LT460036		LGFACT600	
630 ⑦	LT463033		LT463032		LT463035		LT463036		LGFACT600	

⑧ Required for 4-wire systems if neutral protection is desired.

⑦ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.

⑧ Neutral protection: 4= 0%, 6 = 60%, 7 = 100%. Electronic trip unit neutral protection is not adjustable.

Note: Long time pickup — no rating plug needed.

630 Ampere Settings — 630, 600, 500, 400, 350, 315, 300, 250 (315, 630 are IEC ratings only).

600 Ampere Settings — 600, 500, 450, 400, 350, 315, 300, 250 (315 is IEC rating only).

400 Ampere Settings — 400, 350, 315, 300, 250, 225, 200, 160 (315 is IEC rating only).

250 Ampere Settings — 250, 225, 200, 175, 160, 150, 125, 100 (160 is IEC rating only).

Note: Adjustable long time delay — 2 – 24 seconds at $6 \times I_r$.

Adjustable short time delay — Inst., 120, 300 ms.

Table 45-50. Plug-in Test Kit

Voltage Rating	Catalog Number	Price U.S. \$
120 Vac 230 Vac	MTST120V MTST230V	

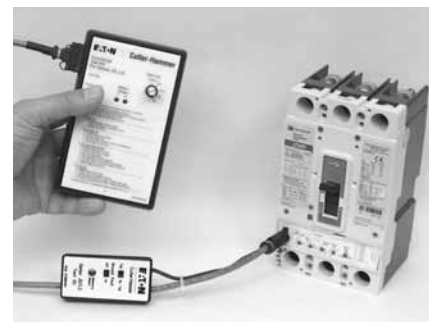
Table 45-51. Breaker Mount Ammeter

Description	Catalog Number	Price U.S. \$
Breaker Mount Ammeter	DIGIVIEW	

Note: Use on electronic trip only.



Digitrip 310+ Test Kit



Digitrip 310+ Test Kit Shown with JG MCCB

45



LG Digitrip 310+ Electronic Trip Unit



Ammeter

Frame Size LG, 630 Amperes (600 Amperes UL, CSA)

Table 45-52. IC Rating at 415/480 V — Complete LG Breakers with Electronic Trip Unit (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) ①

Ampere Rating	LS	Price U.S. \$	LSI	Price U.S. \$	LSG	Price U.S. \$	LSIG	Price U.S. \$	Neutral CT for LSG & LSIG ②	Price U.S. \$
3-Pole ③ — IC Rating: 35 kAIC at 415 and 480 Vac										
250	LGE325033G		LGE325032G		LGE325035G		LGE325036G		LGFACT250	
400	LGE340033G		LGE340032G		LGE340035G		LGE340036G		LGFACT400	
600	LGE360033G		LGE360032G		LGE360035G		LGE360036G		LGFACT600	
630 ④	LGE363033G		LGE363032G		LGE363035G		LGE363036G		LGFACT600	
4-Pole ⑤ — IC Rating: 35 kAIC at 415 and 480 Vac										
250	LGE425033G		LGE425032G		LGE425035G		LGE425036G		LGFACT250	
400	LGE440033G		LGE440032G		LGE440035G		LGE440036G		LGFACT400	
600	LGE460033G		LGE460032G		LGE460035G		LGE460036G		LGFACT600	
630 ④	LGE463033G		LGE463032G		LGE463035G		LGE463036G		LGFACT600	
3-Pole ③ — IC Rating: 50 kAIC at 415 and 480 Vac										
250	LGS325033G		LGS325032G		LGS325035G		LGS325036G		LGFACT250	
400	LGS340033G		LGS340032G		LGS340035G		LGS340036G		LGFACT400	
600	LGS360033G		LGS360032G		LGS360035G		LGS360036G		LGFACT600	
630 ④	LGS363033G		LGS363032G		LGS363035G		LGS363036G		LGFACT600	
4-Pole ⑤ — IC Rating: 50 kAIC at 415 and 480 Vac										
250	LGS425033G		LGS425032G		LGS425035G		LGS425036G		LGFACT250	
400	LGS440033G		LGS440032G		LGS440035G		LGS440036G		LGFACT400	
600	LGS460033G		LGS460032G		LGS460035G		LGS460036G		LGFACT600	
630 ④	LGS463033G		LGS463032G		LGS463035G		LGS463036G		LGFACT600	
3-Pole ③ — IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac										
250	LGH325033G		LGH325032G		LGH325035G		LGH325036G		LGFACT250	
400	LGH340033G		LGH340032G		LGH340035G		LGH340036G		LGFACT400	
600	LGH360033G		LGH360032G		LGH360035G		LGH360036G		LGFACT600	
630 ④	LGH363033G		LGH363032G		LGH363035G		LGH363036G		LGFACT600	
4-Pole ⑤ — IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac										
250	LGH425033G		LGH425032G		LGH425035G		LGH425036G		LGFACT250	
400	LGH440033G		LGH440032G		LGH440035G		LGH440036G		LGFACT400	
600	LGH460033G		LGH460032G		LGH460035G		LGH460036G		LGFACT600	
630 ④	LGH463033G		LGH463032G		LGH463035G		LGH463036G		LGFACT600	
3-Pole ③ — IC Rating: 100 kAIC at 415 Vac and 480 Vac										
250	LGC325033G		LGC325032G		LGC325035G		LGC325036G		LGFACT250	
400	LGC340033G		LGC340032G		LGC340035G		LGC340036G		LGFACT400	
600	LGC360033G		LGC360032G		LGC360035G		LGC360036G		LGFACT600	
630 ④	LGC363033G		LGC363032G		LGC363035G		LGC363036G		LGFACT600	
4-Pole ⑤ — IC Rating: 100 kAIC at 415 Vac and 480 Vac										
250	LGC425033G		LGC425032G		LGC425035G		LGC425036G		LGFACT250	
400	LGC440033G		LGC440032G		LGC440035G		LGC440036G		LGFACT400	
600	LGC460033G		LGC460032G		LGC460035G		LGC460036G		LGFACT600	
630 ④	LGC463033G		LGC463032G		LGC463035G		LGC463036G		LGFACT600	
3-Pole ③ — IC Rating: 150 kAIC at 415 Vac and 480 Vac										
250	LGU325033G		LGU325032G		LGU325035G		LGU325036G		LGFACT250	
400	LGU340033G		LGU340032G		LGU340035G		LGU340036G		LGFACT400	
600	LGU360033G		LGU360032G		LGU360035G		LGU360036G		LGFACT600	
630 ④	LGU363033G		LGU363032G		LGU363035G		LGU363036G		LGFACT600	
4-Pole ⑤ — IC Rating: 150 kAIC at 415 Vac and 480 Vac										
250	LGU425033G		LGU425032G		LGU425035G		LGU425036G		LGFACT250	
400	LGU440033G		LGU440032G		LGU440035G		LGU440036G		LGFACT400	
600	LGU460033G		LGU460032G		LGU460035G		LGU460036G		LGFACT600	
630 ④	LGU463033G		LGU463032G		LGU463035G		LGU463036G		LGFACT600	
3-Pole ③ — IC Rating: 200 kAIC at 415 Vac and 480 Vac										
250	LGX325033G		LGX325032G		LGX325035G		LGX325036G		LGFACT250	
400	LGX340033G		LGX340032G		LGX340035G		LGX340036G		LGFACT400	
600	LGX360033G		LGX360032G		LGX360035G		LGX360036G		LGFACT600	
630 ④	LGX363033G		LGX363032G		LGX363035G		LGX363036G		LGFACT600	
4-Pole ⑤ — IC Rating: 200 kAIC at 415 Vac and 480 Vac										
250	LGX425033G		LGX425032G		LGX425035G		LGX425036G		LGFACT250	
400	LGX440033G		LGX440032G		LGX440035G		LGX440036G		LGFACT400	
600	LGX460033G		LGX460032G		LGX460035G		LGX460036G		LGFACT600	
630 ④	LGX463033G		LGX463032G		LGX463035G		LGX463036G		LGFACT600	

① Replace suffix "G" with "W" for no line and load terminals.
 ② Required for 4-wire systems if neutral protection is desired.
 ③ For 2-pole applications, use two outer poles.
 ④ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
 ⑤ Neutral protection: 4= 0%, 6 = 60%, 7 = 100%. Electronic trip unit neutral protection is not adjustable.

Table 45-53. LG 100% Rated Electronic Breaker

Ampere Rating	LS		LSI		LSG		LSIG		Neutral CT for LSG & LSIG ②	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
IEC/UL/CSA 35 kAIC at 415 and 480 Vac										
250	LGE325033GC		LGE325032GC		LGE325035GC		LGE325036GC		LGFACT250	
400	LGE340033GC		LGE340032GC		LGE340035GC		LGE340036GC		LGFACT400	
600	LGE360033GC		LGE360032GC		LGE360035GC		LGE360036GC		LGFACT600	
630 ①	LGE363033GC		LGE363032GC		LGE363035GC		LGE363036GC		LGFACT630	
IEC/UL/CSA 50 kAIC at 415 and 480 Vac										
250	LGS325033GC		LGS325032GC		LGS325035GC		LGS325036GC		LGFACT250	
400	LGS340033GC		LGS340032GC		LGS340035GC		LGS340036GC		LGFACT400	
600	LGS360033GC		LGS360032GC		LGS360035GC		LGS360036GC		LGFACT600	
630 ①	LGS363033GC		LGS363032GC		LGS363035GC		LGS363036GC		LGFACT630	
IEC/UL/CSA 70 kAIC at 415 and 480 Vac										
250	LGH325033GC		LGH325032GC		LGH325035GC		LGH325036GC		LGFACT250	
400	LGH340033GC		LGH340032GC		LGH340035GC		LGH340036GC		LGFACT400	
600	LGH360033GC		LGH360032GC		LGH360035GC		LGH360036GC		LGFACT600	
630 ①	LGH363033GC		LGH363032GC		LGH363035GC		LGH363036GC		LGFACT630	

① 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.

② Required for 4-wire systems if neutral protection is required.

LG Electronic Breaker with Arcflash Reduction Maintenance System™



LG with Arcflash Reduction Maintenance System

Series G LG circuit breakers are available with the Arcflash Reduction Maintenance System integrated into the electronic trip units helping to improve safety by providing a simple and reliable method to reduce fault clearing time. The Arcflash Reduction Maintenance System unit utilizes a separate analog trip circuit that provides faster interruption times than the standard (digital) “instantaneous” protection. Work locations downstream of a circuit breaker with an Arcflash Reduction Maintenance System unit can have a significantly lower incident energy level, reducing arc flash potential to the system.

Table 45-54. LG Electronic Breaker with Arcflash Reduction Maintenance System

Ampere Rating	Catalog Number					
	ALSI	Price U.S. \$	ALSIG	Price U.S. \$	Neutral CT for LSG & LSIG ③	Price U.S. \$
IEC/UL/CSA 35 kAIC at 415 and 480 Vac						
250	LGE325038G		LGE365039G		LGFACT250	
400	LGE340038G		LGE340039G		LGFACT400	
600	LGE360038G		LGE360039G		LGFACT600	
630	LGE363038G		LGE363039G		LGFACT630	
IEC/UL/CSA 50 kAIC at 415 and 480 Vac						
250	LGS325038G		LGS365039G		LGFACT250	
400	LGS340038G		LGS340039G		LGFACT400	
600	LGS360038G		LGS360039G		LGFACT600	
630	LGS363038G		LGS363039G		LGFACT630	
IEC/UL/CSA 70 kAIC at 415 and 480 Vac						
250	LGH325038G		LGH365039G		LGFACT250	
400	LGH340038G		LGH340039G		LGFACT400	
600	LGH360038G		LGH360039G		LGFACT600	
630	LGH363038G		LGH363039G		LGFACT630	
IEC/UL/CSA 100 kAIC at 415 and 480 Vac						
250	LGC325038G		LGC365039G		LGFACT250	
400	LGC340038G		LGC340039G		LGFACT400	
600	LGC360038G		LGC360039G		LGFACT600	
630	LGC363038G		LGC363039G		LGFACT630	
IEC/UL/CSA 150 kAIC at 415 and 480 Vac						
250	LGU325038G		LGU365039G		LGFACT250	
400	LGU340038G		LGU340039G		LGFACT400	
600	LGU360038G		LGU360039G		LGFACT600	
630	LGU363038G		LGU363039G		LGFACT630	
IEC/UL/CSA 200 kAIC at 415 and 480 Vac						
250	LGX325038G		LGX365039G		LGFACT250	
400	LGX340038G		LGX340039G		LGFACT400	
600	LGX360038G		LGX360039G		LGFACT600	
630	LGX363038G		LGX363039G		LGFACT630	

③ Required for 4-wire systems if neutral protection is required.

Table 45-55. LG Electronic Trip Units with Arcflash Reduction Maintenance System

Ampere Rating	Catalog Number					
	ALSI	Price U.S. \$	ALSIG	Price U.S. \$	Neutral CT for LSG & LSIG ④	Price U.S. \$
250	LT325038		LT325039		LGFACT250	
400	LT340038		LT340039		LGFACT400	
600	LT360038		LT360039		LGFACT600	
630	LT363038		LT363039		LGFACT630	

④ Required for 4-wire systems if neutral protection is required.

Line and Load Terminals

Table 45-56. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/ Number of Conductors	Metric Wire Range (mm ²)	Number of Terminals Included	Catalog Number	Price U.S. \$
400	Aluminum	Cu/Al	500 – 750 (1)	240 – 380 (1)	3	3TA631LK ①	
400	Aluminum	Cu/Al	500 – 750 (1)	240 – 380 (1)	4	4TA631LK ①	
400	Copper	Cu	500 – 750 (1)	240 – 380 (1)	3	3T631LK ①	
400	Copper	Cu	500 – 750 (1)	240 – 380 (1)	4	4T631LK ①	
630	Aluminum	Cu/Al	2 – 500 (2)	35 – 240 (2)	3	3TA632LK ①②	
630	Aluminum	Cu/Al	2 – 500 (2)	35 – 240 (2)	4	4TA632LK ①②	
630	Copper	Cu	2 – 500 (2)	35 – 240 (2)	3	3T632LK ①	
630	Copper	Cu	2 – 500 (2)	35 – 240 (2)	4	4T632LK ①	
400	Aluminum	Cu/Al	2 – 500 (1)	35 – 240 (1)	1	TA350LK ②	
400	Copper	Cu	2 – 500 (1)	35 – 240 (1)	1	T350LK	

① Includes LTS3K (3-pole) or LTS4K (4-pole) terminal covers.

② Standard terminal included with complete breaker.

Table 45-57. Terminal Covers

Description	Catalog Number	Price U.S. \$
3-Pole Terminal Cover ③	LTS3K	
4-Pole Terminal Cover ③	LTS4K	

③ Included in TA631L, T631L, TA632L kits listed above.

Table 45-58. End Cap Kits (MIO Metric Nuts)

Number of Poles	Catalog Number	Price U.S. \$
3	L3RTWK	
4	L4RTWK	

Table 45-59. Control Wire Terminal Kit

Description	Terminal Body Type	Catalog Number	Price U.S. \$
3-Pole Kit	Aluminum	3TA632LKW	
4-Pole Kit	Aluminum	4TA632LKW	
3-Pole Kit	Copper	3T632LKW	
4-Pole Kit	Copper	4T632LKW	

Table 45-60. Terminal Extensions

Number of Poles	Catalog Number	Price U.S. \$
3	LGTEW3	
4	LGTEW4	

Table 45-61. Terminal Spreaders

Number of Poles	Catalog Number	Price U.S. \$
3	LGTES3	
4	LGTES4	

Table 45-62. Handle Extension

Description	Catalog Number	Price U.S. \$
Handle Extension	HEXLG	

Table 45-63. Interphase Barrier

Package of 2	Catalog Number	Price U.S. \$
Interphase Barrier	IPB3	

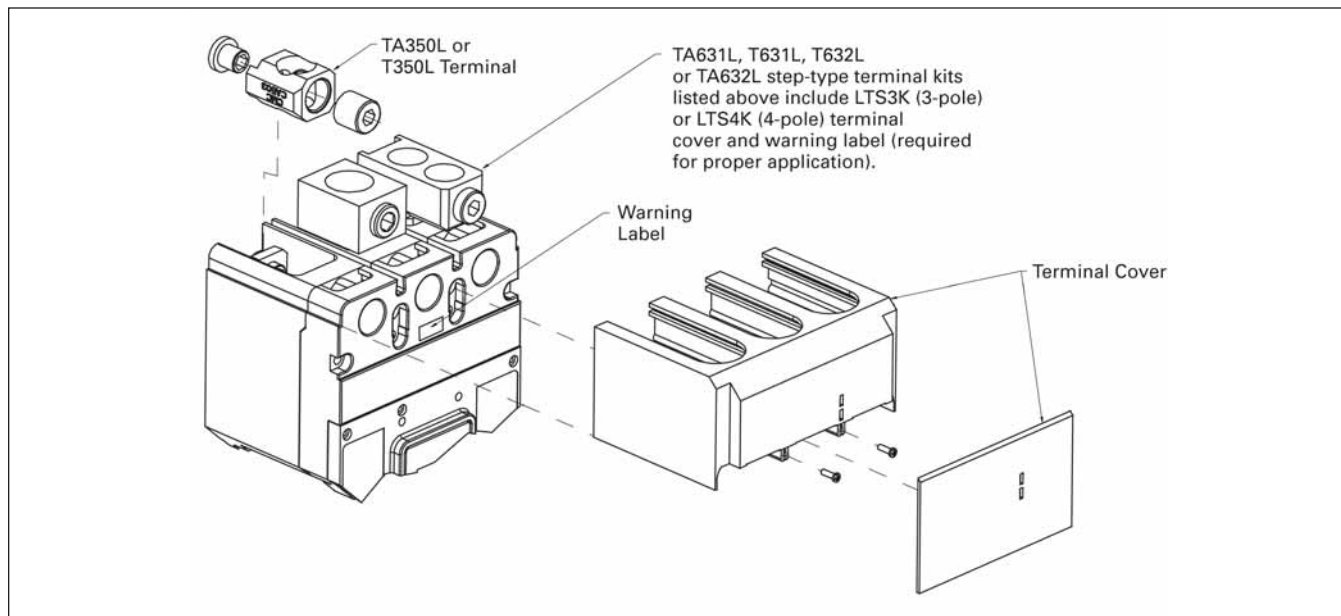


Figure 45-3. Terminals and Terminal Cover for the LG Breaker — Includes LTS3K (3-Pole) or LTS4K (4-Pole) Terminal Covers

Note: Extended terminal covers add 2.13 inches (54.0 mm) to breaker length.

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.

Table 45-64. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	45-58			■			■	
Auxiliary Switch (1A, 1B)	45-58			■			■	
Auxiliary Switch (2A, 2B)	45-58			■			■	
Auxiliary Switch and Alarm Switch Combination	45-58			■			■	
Shunt Trip — Standard	45-58	■			■			
Undervoltage Release Mechanism	45-58	■			■			
External Accessories								
End Cap Kit	45-36		●				●	
Handle Extension	45-36		●				●	
Terminal Cover	45-36		●				●	
Padlockable Handle Block	45-57		■			■		
Padlockable Handle Lock Hasp	45-57	□		□	□		□	
Key Interlock Kit	45-57	□		□	□		□	
Sliding Bar Interlock — Requires Two Breakers	45-57		●					
Electrical Operator	45-57		●				●	
Plug-in Adapters	45-59		●				●	
Rear Connecting Studs	45-57		●				●	
Handle Mechanisms	45-60		●				●	
Earth Leakage/Ground Fault Protector	45-55		●				●	
Drawout Cassette	45-59		●				●	
Digitrip 310+ Test Kit	45-33		●				●	
Ammeter/Cause of Trip Display	45-33		●				●	
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	—		●				●	
Freeze-Tested Circuit Breakers	—		●				●	
Marine/Naval Application, UL Supplement SA and SB	①		●				●	

■ Applicable in indicated pole position □ May be mounted on left or right pole — not both ● Accessory available/Modification available

① Contact Eaton.

NG-Frame

NG-Frame



Typical NG-Frame Circuit Breaker

Technical Data and Specifications

Table 45-65. UL 489/IEC 60947-2 Interrupting Capacity Ratings ^①

Circuit Breaker Type	Number of Poles	240 (UL)	Interrupting Capacity (kA Symmetrical Amperes)							
			Volts ac (50/60 Hz)							
			220 – 240		380 – 415		480	600	690	
			I_{cu}	I_{cs}	I_{cu}	I_{cs}			I_{cu}	I_{cs}
NGS ^①	2, 3, 4	65	85	85	50	50	50	25	20	10
NGH	2, 3, 4	100	100	100	70	50	65	35	25	13
NGC	2, 3, 4	200	200	100	100	50	100	65	35	18

^① 1600 amperes is not a UL or CSA listed rating. 1200 amperes is the maximum UL and CSA rating for NG.

Product Description

- All Cutler-Hammer NG-Frame Circuit Breakers by Eaton Corporation are suitable for reverse feed use.
- All NG-Frame circuit breakers are HACR rated.

NG-Frame
NG-Frame Digitrip Specifications
Table 45-66. Specifications

Trip Unit Type	Digitrip RMS 310		Digitrip OPTIM 550	Digitrip OPTIM 1050
rms Sensing	Yes		Yes	Yes
Breaker Type				
Frame	N		N	N
Ampere Range	400 A – 1200 A		400 A – 1200 A	400 A – 1200 A
Interrupting Rating at 480 Volts	50, 65, 100 (kA)		50, 65, 100 (kA)	50, 65, 100 (kA)
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSIG, LSI(A)	LSI(A), LISG
Fixed Rated Plug (I_N)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_N)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_N) ^①	0.5 – 1.0 (I_N) ^①	0.4 – 1.0 x (I_N)	0.4 – 1.0 x (I_N)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	No	0.5 – 1.0 x I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% x (I_N)	200 – 800% x (I_N)	150 – 800% x (I_r)	150 – 800% x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% x (I_N)	200 – 800% x (I_N)	200 – 800% x (I_N)
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% x (I_G)	20 – 100% x (I_G)
Ground Fault Pickup	1 – 5 x I_g (160 A)	1 – 5 x I_g (160 A)	20 – 100% x (I_G)	20 – 100% x (I_G)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ^②	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ^③	Yes ^③	Yes ^②	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ^④	Yes ^④
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	No ^⑤	Yes
Testing				
Testing Method	Test Set		OPTIMizer, BIM, Cutler-Hammer PowerNet	OPTIMizer, BIM, Cutler-Hammer PowerNet

① Adjust by rating plug.

② Zone interlock kit.

③ With separate ground fault alarm unit (GFAU).

④ By OPTIMizer/BIM.

⑤ Eaton's Cutler-Hammer PowerNet kit.

Legend: BIM = Breaker Interface Module
 (A) = GF Alarm
 I_S = Sensor Rating
 I_N = Rating Plug
 I_r = Long Delay Pickup Setting

NG-Frame

Dimensions/Weights

Table 45-67. Dimensions in Inches (mm)

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)

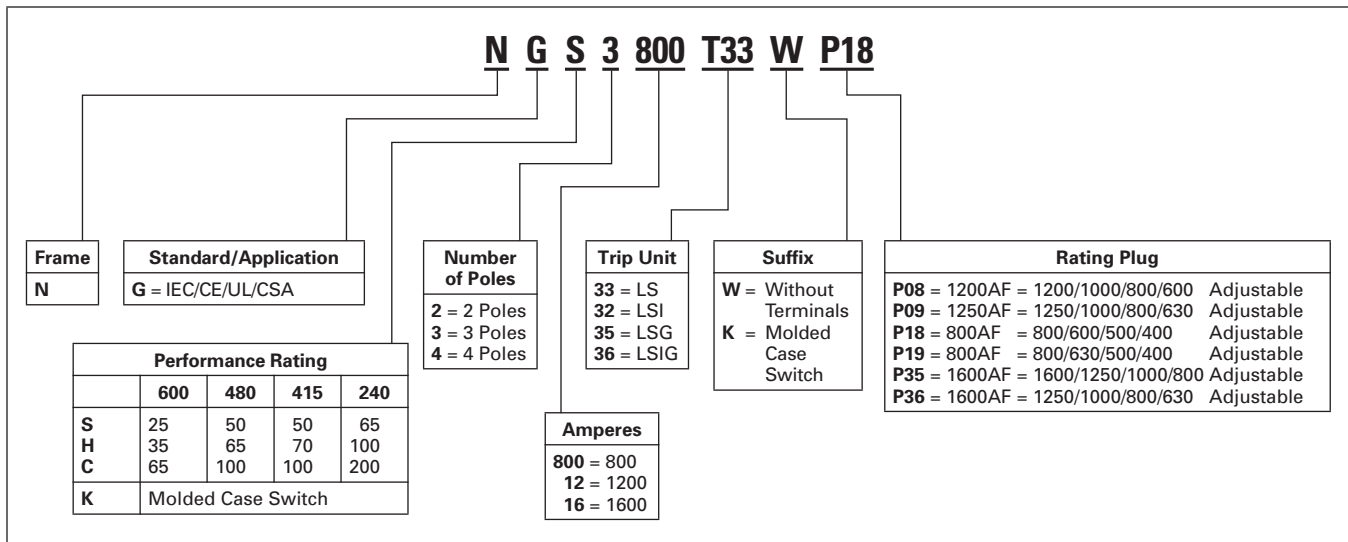
Table 45-68. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker		
	Number of Poles		
	2	3	4
NGS, NGH, NGC	37 (16.8)	45 (20.4)	58 (26.3)

Product 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.

Table 45-69. Circuit Breaker/Frame Catalog Numbering System



NG-Frame, 1200 Amperes — Selection Guide and Ordering Information

Table 45-70. Type NGS Standard Interrupting Capacity — U_e Max. 690 Vac, 50 kA I_{CU} at 480 Vac or 415 Vac

Maximum Continuous Ampere Rating at 40°C ①②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ③				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS	LSI	LSG	LSIG	Fixed Rating Plug	Adj. Rating Plug	
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — —	2 – 8 x I_n 1 – 300 ms —	2 – 8 x I_n — 200 – 1200 A 1 – 500 ms	2 – 8 x I_n 1 – 300 ms 200 – 1200 A 1 – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
800	2-Pole	NGS2800T33WP18	NGS2800T32WP18	NGS2800T35WP18	NGS2800T36WP18	400	8NES400T	400/500/600/800 A8NES800T1
						450	8NES450T	
	500	8NES500T						
	550	8NES550T						
	600	8NES600T						
	630	8NES630T						
700	8NES700T							
800	8NES800T							
1200 ⑤	2-Pole	NGS212T33WP08 ⑤	NGS212T32WP08 ⑤	NGS212T35WP08 ⑤	NGS212T36WP08 ⑤	600	12NES600T	600/800/ 1000/1200 A12NES1200T1
						630	12NES630T	
	700	12NES700T						
	800	12NES800T						
	900	12NES900T						
	1000	12NES1000T						
1200	12NES1200T							
1200 ⑤	3-Pole	NGS312T33WP08 ⑤	NGS312T32WP08 ⑤	NGS312T35WP08 ⑤	NGS312T36WP08 ⑤	600	12NES600T	600/800/ 1000/1200 A12NES1200T1
						630	12NES630T	
	700	12NES700T						
	800	12NES800T						
	900	12NES900T						
	1000	12NES1000T						
1200	12NES1200T							
1200 ⑤	4-Pole ④	NGS412T33WP08 ⑤	NGS412T32WP08 ⑤	—	—	600	12NES600T	600/800/ 1000/1200 A12NES1200T1
						630	12NES630T	
	700	12NES700T						
	800	12NES800T						
	900	12NES900T						
	1000	12NES1000T						
1200	12NES1200T							

① For ac use only.
 ② NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.
 ③ Order terminals separately.
 ④ Unprotected left pole neutral. Insert “E” for 100% neutral or “EH” for 60% neutral between “T33” or “T32” and “W” (e.g., NGS412T32EHWP08). Neutral is on LH side.
 ⑤ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.
Note: NG MCCBs have metric threading on line and load conductors. Use ND MCCBs if imperial threading is required.

Table 45-71. Molded Case Switches ⑥⑦

Ampere Rating	U_e Maximum 690 Vac			
	3-Pole	Catalog Number	4-Pole	Catalog Number
800	MCS Only without Line and Load Terminals	NGK3800KSW	MCS Only without Line and Load Terminals	NGK4800KSW
1200	MCS Only without Line and Load Terminals	NGK312KSW	MCS Only without Line and Load Terminals	NGK412KSW
1250	MCS Only without Line and Load Terminals	NGK3125KSW	MCS Only without Line and Load Terminals	NGK4125KSW

⑥ For ac use only. Molded case switch will trip above 14,000 amperes.
 ⑦ For 2-pole applications, use outer poles of 3-pole molded case switch.

Frame Size NG, 1200 Amperes 65 kA at 480 Vac, 70 kA at 415 Vac

Table 45-72. Type NGH High Interrupting Capacity — U_g Max. 690 Vac, 65 kA I_{CU} at 480 Vac, 70 kA I_{CU} at 415 Vac

Maximum Continuous Ampere Rating at 40°C ①②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ③				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker	
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed Rating Plug	Adjustable Rating Plug		
		LS	LSI	LSG	LSIG				
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay	$2 - 8 \times I_n$ — — —	$2 - 8 \times I_n$ 1 – 300 ms — —	$2 - 8 \times I_n$ — 200 – 1200 A 1 – 500 ms	$2 - 8 \times I_n$ 1 – 300 ms 200 – 1200 A 1 – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number		
800	2-Pole	NGH2800T33WP18	NGH2800T32WP18	NGH2800T35WP18	NGH2800T36WP18	400	8NES400T 8NES450T 8NES500T 8NES550T	400/500/600/800 A8NES800T1	
						450			
						500			
	550								
	600	8NES600T 8NES630T 8NES700T 8NES800T							
	630								
	700								
	800								
	3-Pole	NGH3800T33WP18	NGH3800T32WP18	NGH3800T35WP18	NGH3800T36WP18	400	8NES400T 8NES450T 8NES500T 8NES550T		400/500/600/800 A8NES800T1
450									
500									
550									
600	8NES600T 8NES630T 8NES700T 8NES800T								
630									
700									
800									
4-Pole ④	NGH4800T33WP18	NGH4800T32WP18	—	—	400	8NES400T 8NES450T 8NES500T 8NES550T	400/500/600/800 A8NES800T1		
					450				
					500				
550									
600	8NES600T 8NES630T 8NES700T 8NES800T								
630									
700									
800									
1200 ⑤	2-Pole	NGH212T33WP08 ⑤	NGH212T32WP08 ⑤	NGH212T35WP08 ⑤	NGH212T36WP08 ⑤	600		12NES600T 12NES630T 12NES700T 12NES800T	600/800/ 1000/1200 A12NES1200T1
						630			
						700			
	800								
	900	12NES900T 12NES1000T 12NES1200T							
	1000								
	1200								
	1200								
	3-Pole	NGH312T33WP08 ⑤	NGH312T32WP08 ⑤	NGH312T35WP08 ⑤	NGH312T36WP08 ⑤	600	12NES600T 12NES630T 12NES700T 12NES800T	600/800/ 1000/1200 A12NES1200T1	
						630			
						700			
	800								
900	12NES900T 12NES1000T 12NES1200T								
1000									
1200									
1200									
4-Pole ④	NGH412T33WP08 ⑤	NGH412T32WP08 ⑤	—	—	600	12NES600T 12NES630T 12NES700T 12NES800T	600/800/ 1000/1200 A12NES1200T1		
					630				
					700				
800									
900	12NES900T 12NES1000T 12NES1200T								
1000									
1200									
1200									

① For ac use only.

② NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.

③ Order terminals separately.

④ Unprotected left pole neutral. Insert “E” for 100% neutral or “EH” for 60% neutral between “T33” or “T32” and “W” (e.g., NGH412T32EHWP08). Neutral is on LH side.

⑤ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.

Note: NG MCCBs have metric threading on line and load conductors. Use ND MCCBs if imperial threading is required.

Table 45-73. Type NGC Very High Capacity — U_e Max. 690 Vac, 100 kA I_{cu} at 480 Vac or 415 Vac

Maximum Continuous Ampere Rating at 40°C ①②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ③				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed Rating Plug	Adjustable Rating Plug	
		LS	LSI	LSG	LSIG			Ampere Rating
Short Time Range	$2 - 8 \times I_n$	$2 - 8 \times I_n$	$2 - 8 \times I_n$	$2 - 8 \times I_n$				
Short Time Delay	—	1 – 300 ms	—	1 – 300 ms				
Ground Fault Pickup	—	—	200 – 1200 A	200 – 1200 A				
Ground Fault Delay	—	—	1 – 500 ms	1 – 500 ms				
800	2-Pole	NGC2800T33WP18	NGC2800T32WP18	NGC2800T35WP18	NGC2800T36WP18	400	8NES400T 8NES450T 8NES500T 8NES550T	400/500/600/800 A8NES800T1
						450		
						500		
						550		
	3-Pole	NGC3800T33WP18	NGC3800T32WP18	NGC3800T35WP18	NGC3800T36WP18	400	8NES400T 8NES450T 8NES500T 8NES550T	400/500/600/800 A8NES800T1
						450		
						500		
						550		
	4-Pole ④	NGC4800T33WP18	NGC4800T32WP18	—	—	400	8NES400T 8NES450T 8NES500T 8NES550T	400/500/600/800 A8NES800T1
450								
500								
550								
1200 ⑤	2-Pole	NGC212T33WP08 ⑤	NGC212T32WP08 ⑤	NGC212T35WP08 ⑤	NGC212T36WP08 ⑤	600	12NES600T 12NES630T 12NES700T 12NES800T	600/800/ 1000/1200 A12NES1200T1
						630		
						700		
						800		
	3-Pole	NGC312T33WP08 ⑤	NGC312T32WP08 ⑤	NGC312T35WP08 ⑤	NGC312T36WP08 ⑤	600	12NES600T 12NES630T 12NES700T 12NES800T	600/800/ 1000/1200 A12NES1200T1
						630		
						700		
						800		
	4-Pole ④	NGC412T33WP08 ⑤	NGC412T32WP08 ⑤	—	—	600	12NES600T 12NES630T 12NES700T 12NES800T	600/800/ 1000/1200 A12NES1200T1
						630		
						700		
						800		
						900	12NES900T 12NES1000T 12NES1200T	
						1000		
						1000		
						1200		

① For ac use only.

② NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.

③ Order terminals separately.

④ Unprotected left pole neutral. Insert “E” for 100% neutral or “EH” for 60% neutral between “T33” or “T32” and “W” (e.g., NGC412T32EHWP08). Neutral is on LH side.

⑤ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.

Note: NG MCCBs have metric threading on line and load conductors. Use ND MCCBs if imperial threading is required.

Frame Size NG, 1600 Amperes 50 kA at 415 Vac

Table 45-74. Type NGS Standard Interrupting Capacity — U_e Max. 690 Vac, 50 kA I_{cu} at 415 Vac

Maximum Continuous Ampere Rating at 40°C ①②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit and Rating Plugs								Adjustable Rating Plug
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)								
		LS	Price U.S. \$	LSI	Price U.S. \$	LSG	Price U.S. \$	LSIG	Price U.S. \$	
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay	2 – 8 x I _n — — —	2 – 8 x I _n 1 – 300 ms — —		2 – 8 x I _n 1 – 300 ms — —		2 – 8 x I _n — 200 – 1200 A 1 – 500 ms		2 – 8 x I _n 1 – 300 ms 200 – 1200 A 1 – 500 ms		
1600 ③	3-Pole ④ 4-Pole ④	NGS316T33WP35 NGS416T33WP35		NGS316T32WP35 NGS416T32WP35		NGS316T35WP35 —		NGS316T36WP35 —		800/ 1000/ 1250/ 1600

- ① For ac use only.
- ② NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.
- ③ No UL or CSA label is available for the 1600 ampere frame size.
- ④ Unprotected left pole neutral. Insert "1" for 100% protected neutral or "6" for 60% protected neutral before "WP" suffix (e.g., NGS416T336WP35).

Note: NG 1600 MCCB uses metric threading on line and load conductors. The NG 1600 is not UL or CSA listed.

Line and Load Terminals

N-Frame circuit breakers do not include terminals as standard. When copper or Cu/Al terminals are required, order by catalog number.

Table 45-75. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Metric Wire Range mm ²	AWG Wire Number of Conductors	Catalog Number ⑤	Price U.S. \$
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Optional Copper and Cu/Al Pressure Type Terminals

1250 ⑥	Copper	Copper	95 – 185	3/0 – 400 (4)	T1200NB3M	
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- ⑤ Single terminals individually packed.
- ⑥ Not suitable with 1600 ampere frame version.

Base Mounting Hardware

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

Table 45-76. Base Mounting Hardware ⑦

Number of Poles	Description	Catalog Number	Price U.S. \$
3- and 4-pole	Imperial Hardware: .3125 – 18 x 1.25 Pan-Head Steel Screws and Lock Washers	BMH5	
3- and 4-pole	Metric Hardware: M8 Pan-Head Steel Screws and Lock Washers	BMH5M	

- ⑦ Metric hardware included with breaker.

Terminal Shield

Table 45-77. Terminal Shield

Description	Catalog Number	Price U.S. \$
3-Pole Terminal Shield	NTS3K	

Keeper Nut

Not required on NG-Frame. Terminals are threaded.

Handle Extension

Included with breaker. Additional handle extensions are available.

Table 45-78. Handle Extension

Description	Catalog Number	Price U.S. \$
Single Handle Extension	HEX5	

Interphase Barriers

The interphase barriers provide additional electrical clearance between circuit breaker poles for special termination applications. Barriers are high dielectric insulating plates that are installed in the molded slots between the terminals. (Field installation only.)

Table 45-79. Interphase Barriers

Description	Catalog Number	Price U.S. \$
Interphase Barriers	IPB5	

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.

Table 45-80. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	45-58	●		■	●		■	
Auxiliary Switch (1A, 1B)	45-58	●		■	●		■	
Auxiliary Switch (2A, 2B)	45-58	●		■	●		■	
Auxiliary Switch and Alarm Switch Combination	45-58	●		■	●		■	
Shunt Trip — Standard	45-58	■			■			
Undervoltage Release Mechanism	45-58	■			■			
External Accessories								
Base Mounting Hardware	45-44		●			●		
Interphase Barriers	45-44		●			●		
Non-Padlockable Handle Block	45-57		■			■		
Padlockable Handle Lock Hasp	45-57	□		□	□		□	
Key Interlock Kit	45-57	□		□	□		□	
Sliding Bar Interlock — Requires Two Breakers	45-57		●					
Electrical Operator	45-57		●			●		
Plug-in Adapters	45-59		●			●		
Rear Connecting Studs	45-57		●			●		
Handle Mechanisms	45-60		●			●		
Drawout Cassette	45-59		●			●		
Handle Extension	45-44		●			●		
Digitrip 310 Test Kit	45-233		●			●		
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	—		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application, UL Supplement SA and SB	①		●			●		

- Applicable in indicated pole position
- May be mounted on left or right pole — not both
- Accessory available/Modification available

① Contact Eaton

RG-Frame

RG-Frame



RG-Frame Circuit Breaker

Product Description

- Cutler-Hammer RG-Frame Circuit Breakers by Eaton Corporation are available as frame (which includes trip unit), rating plug and terminals.
- All R-Frame circuit breakers are suitable for reverse feed use.

Technical Data and Specifications

Table 45-81. UL 489/CSA Interrupting Capacity Ratings ^①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts ac (50/60 Hz)			
		240	277	480	600
RGH	3, 4	125	—	65	50
RGC	3, 4	200	—	100	65

^① Utilization Category A circuit breakers.

Note: See Page 45-157 for Trip Unit Specifications.

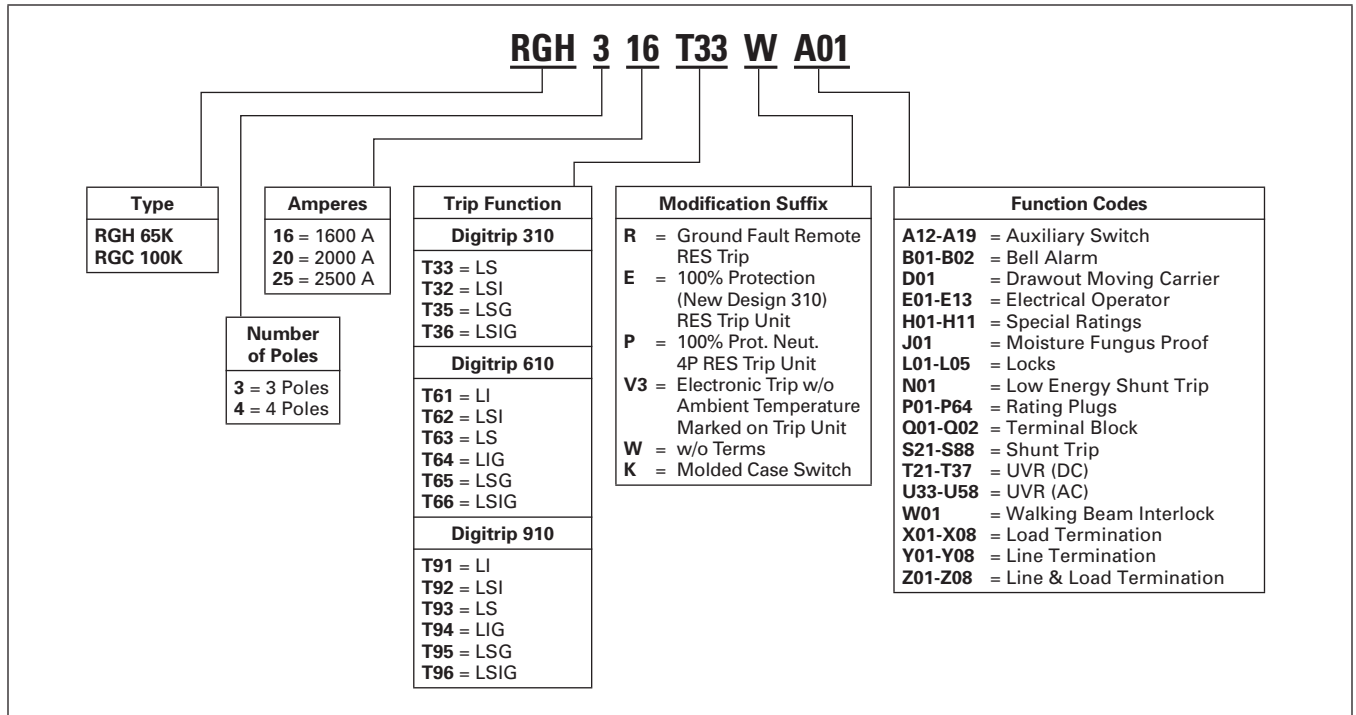
Table 45-82. IEC 947-2 Interrupting Capacity Ratings ^②

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts ac (50/60 Hz)			
		240	415	690	
RGH	3, 4	I_{cu}	135	70	25
		I_{cs}	100	50	13
RGC	3, 4	I_{cu}	200	100	35
		I_{cs}	100	50	18

^② Utilization Category A circuit breakers.

Product Selection

Table 45-83. Circuit Breaker/Frame Catalog Numbering System



Dimensions/Weights

Table 45-84. Dimensions in Inches (mm)

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)

Table 45-85. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker	
	Number of Poles	
	3	4
1600 Amperes		
RGH, RGC	102 (46.3)	135 (61.2)
2000 Amperes		
RGH, RGC	102 (46.3)	135 (61.2)
2500 Amperes		
RGH, RGC	135 (61.2)	182 (82.6)

Frame Size RG, 2500 Amperes 65 kA at 480 Vac, 70 kA at 415 Vac — Digitrip 310 Trip Unit

RG-Frame, 2500 Amperes — Selection Guide and Ordering Information

Table 45-86. Type RGH with Digitrip 310 High Interrupting Capacity — U_e Maximum 690 Vac, 70 kA I_{cu} at 415 Vac

Maximum Continuous Ampere Rating at 40°C ①	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ②				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS	LSI	LSG ③	LSIG ③	Fixed Rating Plug		
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — —	2 – 8 x I_n 1 – 300 ms —	2 – 8 x I_n — 200 – 1200 A 1 – 500 ms	2 – 8 x I_n 1 – 300 ms 200 – 1200 A 1 – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
1600 ①	3-Pole	RGH316T33WP08	RGH316T32WP08	RGH316T35WP08	RGH316T36WP08	800	16RES08T	800/1000/ 1200/1600 A16RES16T1
						1000	16RES10T	
						1200	16RES12T	
1250	16RES125T							
						1400	16RES14T	
						1500	16RES15T	
						1600	16RES16T	
2000	3-Pole	RGH320T33WP16	RGH320T32WP16	RGH320T35WP16	RGH320T36WP16	1000	20RES10T	1000/1200/ 1600/2000 A20RES20T1
						1200	20RES12T	
						1250	A20RES125T	
1400	A20RES14T							
						1600	A20RES16T	
						2000	A20RES20T	
2500	3-Pole	RGH325T33WP39	RGH325T32WP39	RGH325T35WP39	RGH325T36WP39	1200	25RES12T	1200/1600/ 2000/2500 A25RES25T1
						1250	25RES125T	
						1600	A25RES16T	
2000	A25RES20T							
						2500	A25RES25T	
1600 ①	4-Pole ⑤	RGH416T33WP08	RGH416T32WP08	—	—	800	16RES08T	800/1000/ 1200/1600 A16RES16T1
						1000	16RES10T	
						1200	16RES12T	
1250	16RES125T							
						1400	16RES14T	
						1500	16RES15T	
						1600	16RES16T	
2000	4-Pole ⑤	RGH420T33WP16	RGH420T32WP16	—	—	1000	20RES10T	1000/1200/ 1600/2000 A20RES20T1
						1200	20RES12T	
						1250	A20RES125T	
1400	A20RES14T							
						1600	A20RES16T	
						2000	A20RES20T	
2500	4-Pole ⑤	RGH425T33WP39	RGH425T32WP39	—	—	1200	25RES12T	1200/1600/ 2000/2500 A25RES25T1
						1250	25RES125T	
						1600	A25RES16T	
2000	A25RES20T							
						2500	A25RES25T	

① For SCR application, use 2000 ampere frame.

② Order terminals separately. Mounting hardware not included.

③ Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, e.g., "RGH316T35RW."

④ Additional IEC ratings are available on adjustable rating plugs. Contact your Eaton representative.

⑤ Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, e.g., "RGH416T33PW", "RGH416T33EW."

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Table 45-87. Type RGC with Digitrip 310 Very High Interrupting Capacity — U_e Maximum 690 Vac, 100 kA I_{cu} at 415 Vac

Maximum Continuous Ampere Rating at 40°C ①	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ②				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker ②
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed Rating Plug		
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		LS	LSI	LSG ③	LSIG ③	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
1600 ①	3-Pole	RGC316T33WP08	RGC316T32WP08	RGC316T35WP08	RGC316T36WP08	800 1000 1200 1250	16RES08T 16RES10T 16RES12T 16RES125T	800/1000/ 1200/1600 A16RES16T1
						1400 1500 1600	16RES14T 16RES15T 16RES16T	
2000		RGC320T33WP16	RGC320T32WP16	RGC320T35WP16	RGC320T36WP16	1000 1200 1250	20RES10T 20RES12T A20RES125T	1000/1200/ 1600/2000 A20RES20T1
					1400 1600 2000	A20RES14T A20RES16T A20RES20T		
2500		RGC325T33WP40	RGC325T32WP40	RGC325T35WP40	RGC325T36WP40	1200 1250 1600	25RES12T 25RES125T A25RES16T	1200/1600/ 2000/2500 A25RES25T1
						2000 2500	A25RES20T A25RES25T	
1600 ①	4-Pole ⑤	RGC416T33WP08	RGC416T32WP08	—	—	800 1000 1200 1250	16RES08T 16RES10T 16RES12T 16RES125T	800/1000/ 1200/1600 A16RES16T1
						1400 1500 1600	16RES14T 16RES15T 16RES16T	
2000		RGC420T33WP16	RGC420T32WP16	—	—	1000 1200 1250	20RES10T 20RES12T A20RES125T	1000/1200/ 1600/2000 A20RES20T1
					1400 1600 2000	A20RES14T A20RES16T A20RES20T		
2500		RGC425T33WP40	RGC425T32WP40	—	—	1200 1250 1600	25RES12T 25RES125T A25RES16T	1200/1600/ 2000/2500 A25RES25T1
						2000 2500	A25RES20T A25RES25T	

① For SCR application, use 2000 ampere frame.

② Order terminals separately. Mounting hardware not included.

③ Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, e.g., "RGH316T35RW."

④ Additional IEC ratings are available on adjustable rating plugs. Contact your Eaton representative.

⑤ Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, e.g., "RGH416T33PW", "RGH416T33EW."

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Table 45-88. Molded Case Switches ⑥

Ampere Rating	Number of Poles	Catalog Number	Price U.S. \$
1600 2000	3-Pole	RGK316WK RGK320WK	
1600 2000	4-Pole	RGK416WK RGK420WK	

⑥ Molded case switch will trip above 17,500 amperes.

Frame Size RG, 1250 Amperes — Digitrip 610 & 910 Trip Units

Table 45-89. Type RG with Digitrip 610 and 910

Maximum Continuous Ampere Rating at 40°C	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 610 and 910 Electronic Trip Unit with Rating Plugs Order as Individual Component — Catalog Number ①						Digitrip RMS Interchangeable Rating Plug (Order as Individual Component)		
		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)						Fixed Rating Plug	Ampere Rating	Catalog Number
		LI	LS	LSI	LIG	LSG	LSIG			
Long Delay Pickup Long Delay Time Short Time Range Short Time Delay Instantaneous Ground Fault Pickup Ground Fault Delay		0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_L — 2 – 6 x M1 & M2 — —	0.5 – 1.0 I_n 2 – 24 Seconds 2 – 6 x I_L 100 – 500 ms — — —	0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_L 100 – 500 ms 2 – 6 x M1 & M2 — —	0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_L — 2 – 6 x M1 & M2 0.25 – 1.0 x I_n ② 100 – 500 ms	0.5 – 1.0 x I_n 2 – 24 Sec. 2 – 6 x I_L 100 – 500 ms — — 0.25 – 1.0 x I_n ② 100 – 500 ms	0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_L 100 – 500 ms 2 – 6 x M1 & M2 0.25 – 1.0 x I_n ② 100 – 500 ms	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160	

Type RGH with Digitrip 610 High Interrupting Capacity — U_e Max. 690 Vac, 70 kA I_{CU} at 415 Vac

1600	3-Pole	RGH316T61WP44	RGH316T63WP44	RGH316T62WP44	RGH316T64WP44	RGH316T65WP44	RGH316T66WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGH320T61WP49	RGH320T63WP49	RGH320T62WP49	RGH320T64WP49	RGH320T65WP49	RGH320T66WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGH325T61WP53	RGH325T63WP53	RGH325T62WP53	RGH325T64WP53	RGH325T65WP53	RGH325T66WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
		Includes 2500 A Rating Plug							

Type RGC with Digitrip 610 Very High Interrupting Capacity — U_e Max. 690 Vac, 100 kA I_{CU} at 415 Vac

1600	3-Pole	RGC316T61WP44	RGC316T63WP44	RGC316T62WP44	RGC316T64WP44	RGC316T65WP44	RGC316T66WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGC320T61WP49	RGC320T63WP49	RGC320T62WP49	RGC320T64WP49	RGC320T65WP49	RGC320T66WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGC325T61WP53	RGC325T63WP53	RGC325T62WP53	RGC325T64WP53	RGC325T65WP53	RGC325T66WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
		Includes 2500 A Rating Plug							

Type RGH with Digitrip 910 High Interrupting Capacity — U_e Max. 690 Vac, 70 kA I_{CU} at 415 Vac

1600	3-Pole	RGH316T91WP44	RGH316T93WP44	RGH316T92WP44	RGH316T94WP44	RGH316T95WP44	RGH316T96WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGH320T91WP49	RGH320T93WP49	RGH320T92WP49	RGH320T94WP49	RGH320T95WP49	RGH320T96WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGH325T91WP53	RGH325T93WP53	RGH325T92WP53	RGH325T94WP53	RGH325T95WP53	RGH325T96WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
		Includes 2500 A Rating Plug							

Type RGC with Digitrip 910 Very High Interrupting Capacity — U_e Max. 690 Vac, 100 kA I_{CU} at 415 Vac

1600	3-Pole	RGC316T91WP44	RGC316T93WP44	RGC316T92WP44	RGC316T94WP44	RGC316T95WP44	RGC316T96WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGC320T91WP49	RGC320T93WP49	RGC320T92WP49	RGC320T94WP49	RGC320T95WP49	RGC320T96WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGC325T91WP53	RGC325T93WP53	RGC325T92WP53	RGC325T94WP53	RGC325T95WP53	RGC325T96WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
		Includes 2500 A Rating Plug							

① Order terminals separately. Mounting hardware not included.

② Not to exceed 1200 ampere ground fault pickup.

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Line and Load Terminals

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

Table 45-90. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Hardware	AWG/kcmil Wire Range/ Number of Conductors	Metric Wire Range mm ²	Catalog Number	Price U.S. \$
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Wire Terminals

1600	Aluminum	Cu/Al	Metric	500 – 1000 (4)	300 – 500	TA1600RDM ①	
1600	Copper	Cu	Metric	1 – 600 (4)	50 – 300	T1600RDM ①	
2000	Aluminum	Cu/Al	Metric	2 – 600 (6)	35 – 300	TA2000RDM ②	

Rear Connectors

2000	Copper	—	Metric	—	—	B2016RDM ①	
2000	Copper	—	Metric	—	—	B2016RDLM ①	
2500	Copper	—	Metric	—	—	B2500RDM ①	

① Order one per pole — single terminals individually packed.

② Order one TA2000RD kit per 3-poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of 3-pole breaker.

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

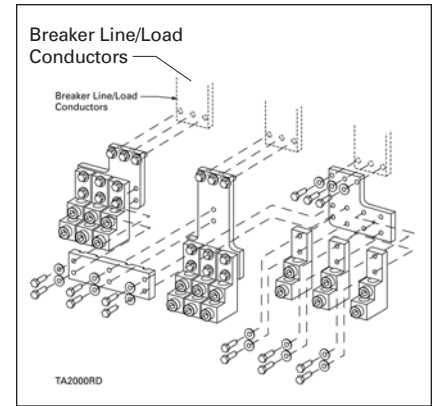


Figure 45-5. TA2000RD Wire Terminal

Note: Order one TA2000RDM kit per 3-poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of 3-pole breaker.

Base Mounting Hardware

Supplied by customer.

Handle Extension

Included with breaker. Additional handle extensions are available.

Table 45-91. Handle Extension

Description	Catalog Number	Price U.S. \$
Single Handle Extension	HEX6	

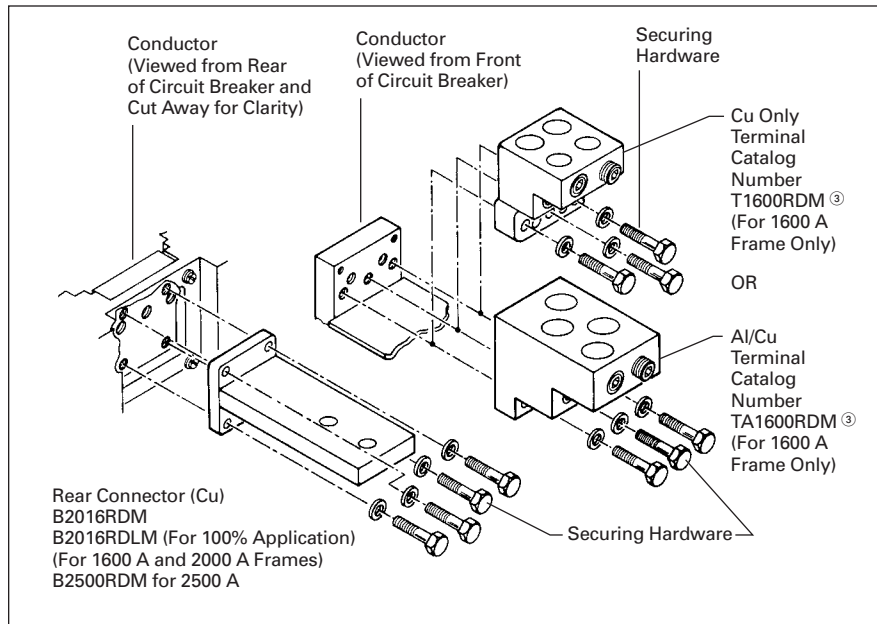


Figure 45-4. RD Rear Connector Exploded View

③ Order one per pole (or two per pole if line and load terminals are required) — single terminals individually packed.

RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

RG-Frame

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.

Table 45-92. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	45-58			■			■	
Auxiliary Switch (1A, 1B)	45-58			■			■	
Auxiliary Switch (2A, 2B)	45-58			■			■	
Auxiliary Switch and Alarm Switch Combination	45-58			■			■	
Shunt Trip — Standard	45-58			●			●	
Undervoltage Release Mechanism	45-58			●			●	
External Accessories								
Base Mounting Hardware	45-51		●			●		
Padlockable Handle Lock Hasp	45-57	□		□	□		□	
Key Interlock Kit	45-57	□		□	□		□	
Electrical Operator	45-57		●			●		
Handle Mechanisms	45-60		●			●		
Drawout Cassette	45-59		●			●		
Handle Extension	45-51		●			●		
Digitrip 310 Test Kit	45-233		●			●		
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	—		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application, UL Supplement SA and SB	①		●			●		

■ Applicable in indicated pole position

□ May be mounted on left or right pole — not both

● Accessory available/Modification available

① Contact Eaton

Motor Circuit 480 Vac, Protectors — Selection Guide and Ordering Information

Table 45-93. EG-Frame — 480 Vac, 600Y/347 Vac Maximum ①

Continuous Amperes	Cam Setting	Motor Full Load Current Amperes ②	MCP Trip Setting ③	MCP Catalog Number	Price U.S. \$
3	A	.69 – .91	9	HMCPE003A0C	
	B	1.1 – 1.3	15		
	C	1.6 – 1.7	21		
	D	2.0 – 2.2	27		
	E	2.3 – 2.5	30		
	F	2.6 – 2.8	33		
7	A	1.5 – 2.0	21	HMCPE007C0C	
	B	2.6 – 3.1	35		
	C	3.7 – 3.9	49		
	D	4.8 – 5.2	63		
	E	5.3 – 5.7	70		
	F	5.8 – 6.1	77		
15	A	3.4 – 4.5	45	HMCPE015E0C	
	B	5.7 – 6.8	75		
	C	8.0 – 9.1	105		
	D	10.4 – 11.4	135		
	E	11.5 – 12.6	150		
	F	12.7 – 13.0	165		
30	A	3.9 – 9.1	90	HMCPE030H1C	
	B	11.5 – 13.7	150		
	C	16.1 – 18.3	210		
	D	20.7 – 22.9	270		
	E	23.0 – 25.2	300		
	F	25.3 – 26.1	330		
50	A	11.5 – 15.2	150	HMCPE050K2C	
	B	19.2 – 22.9	250		
	C	26.9 – 30.6	350		
	D	34.6 – 38.3	450		
	E	38.4 – 42.1	500		
	F	42.2 – 43.5	550		
70	A	16.1 – 30.6	210	HMCPE070M2C	
	B	26.9 – 32.2	350		
	C	37.6 – 42.9	490		
	D	48.4 – 53.7	630		
	E	53.8 – 59.1	700		
	F	59.2 – 60.9	770		
100	A	23.0 – 30.6	300	HMCPE100R3C	
	B	38.4 – 46.0	500		
	C	53.8 – 61.4	700		
	D	69.2 – 76.8	900		
	E	76.9 – 84.5	1000		
	F	84.6 – 87.0	1100		
100	A	38.4 – 46.0	500	HMCPE100T3C	
	B	57.6 – 65.2	750		
	C	76.9 – 84.5	1000		
	D	④	1250		
	E	④	1375		
	F	④	1500		

- ① UL listed for use with Cutler-Hammer Motor Starters.
- ② Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ③ For dc applications, actual trip levels are approximately 40% higher than values shown.
- ④ Settings above 10 x I_n are for special applications. Where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

Table 45-94. JG-Frame — 600 Vac Maximum, 250 Vdc Maximum ⑥

Continuous Amperes	MCP Trip Range (Amperes)	MCP Catalog Number	Price U.S. \$
250	500 – 1000 625 – 1250 750 – 1500	HMCJP250D5L HMCJP250F5L HMCJP250G5L	
	875 – 1750 1000 – 2000 1125 – 2250 1250 – 2500	HMCJP250J5L HMCJP250K5L HMCJP250L5L HMCJP250W5L	

⑥ UL listed for use with Cutler-Hammer Motor Starters.

Table 45-95. LG-Frame — 600 Vac Maximum, 250 Vdc Maximum ⑦

Continuous Amperes	MCP Trip Range (Amperes)	MCP Catalog Number	Price U.S. \$
600	1250 – 2500 1500 – 3000 1750 – 3500	HMCPL600L6G HMCPL600N6G HMCPL600R6G	
	2000 – 4000 2250 – 4500 2500 – 5000 3000 – 6000	HMCPL600X6G HMCPL600Y6G HMCPL600P6G HMCPL600M6G	

⑦ Equipped with an electromechanical trip device.

⑦ UL listed for use with Cutler-Hammer Motor Starters.

Note: 800 and 1200 ampere, 600 Vac maximum motor circuit protectors are available as Series C HMCPL product.

Motor Protector Circuit Breaker

Series G Motor Protector Circuit Breaker (MPCB)



Product Description

- Eliminates need for separate overload relay.

Features

- IEC 60947-2.
- UL 489 rating.
- CSA C22.2
- Phase unbalance protection.
- Phase loss protection.
- Hot trip/cold trip.
- High load alarm.
- Pre-detection trip relay option.
- Class 10, 15, 20, 30 protection.

Applications

- Can be used with contactor to eliminate need for overload relay and still create manual motor control.
- Meets requirement for motor branch protection, including:
 - Disconnecting means
 - Branch circuit short circuit protection
 - Overload protection

Table 45-96. JGMPS and JGMPH Rating and Ampere Range

Maximum Rated Current (Amperes)			250	
Breaker Type			JGMPS	JGMPH
Breaker Capacity (kA rms) ac 50 – 60 Hz				
IEC 60947-2	220 – 240 Vac	I _{cu} I _{cs}	85 85	100 100
	380 – 415 Vac	I _{cu} I _{cs}	40 40	70 70
	660 – 690 Vac	I _{cu} I _{cs}	12 6	14 7
NEMA UL 489	240 Vac		85	100
	480 Vac		35	65
	600 Vac		25	35
Number of Poles			3	3
Ampere Range			50 – 250	50 – 250

Table 45-97. LGMPS and LGMPH Rating and Ampere Range

Maximum Rated Current (Amperes)			630 ^②	
Breaker Type			LGMPH	LGMPH
Breaker Capacity (kA rms) ac 50 – 60 Hz				
IEC 60947-2	220 – 240 Vac	I _{cu} I _{cs}	85 85	100 100
	380 – 415 Vac	I _{cu} I _{cs}	50 50	70 70
	660 – 690 Vac	I _{cu} I _{cs}	20 10	25 13
NEMA UL 489	240 Vac		85	100
	480 Vac		50	65
	600 Vac		25	35
Number of Poles			3	3
Ampere Range			250 – 630 ^①	250 – 630 ^①

^① 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

Table 45-98. JGMP Catalog Numbers

Continuous Amperes	35 kAIC		65 kAIC	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
50	JGMPS050G		JGMPH050G	
100	JGMPS100G		JGMPH100G	
160	JGMPS160G		JGMPH160G	
250	JGMPS250G		JGMPH250G	

Table 45-99. LGMP Catalog Numbers

Continuous Amperes	50 kAIC		65 kAIC	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
250	LGMPH250G		LGMPH250G	
400	LGMPH400G		LGMPH400G	
600	LGMPH600G		LGMPH600G	
630 ^②	LGMPH630G		LGMPH630G	

^② 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

Note: For pre-trip alarm option, order Style Number 5721B31G02.

30 mA Ground Fault (Earth Leakage) Modules

**30 mA Ground Fault
(Earth Leakage) Modules**



Clockwise from Left: JG, LG MCCBs Shown with Ground Fault (Earth Leakage) Modules

Product Description

Eaton offers a 3- and 4-pole 30 mA ground fault (earth leakage) protection module for JG and LG breakers. The module does not restrict the use of other breaker accessories. UL-listed modules are available for JG and LG MCCBs. The JG and LG modules are both bottom mounted for circuits up to 160 and 250 amperes (JG), or 400 and 630 amperes for the LG.

The module is completely self-contained since the current sensor, relay and power supply are located inside the product. Current pickup settings are selectable from 0.03 – 10 amperes for all IEC-rated modules and JG UL-listed module, and 0.03 – 30 amperes for the LG UL-listed modules. Time delays are also selectable from Instantaneous – 1.0 seconds for 0.10 ampere settings and above. A current pickup setting of 0.03 amperes defaults to an Instantaneous time setting regardless of the time dial's position. Two alarm contacts come as standard: a 50% pre-trip and a 100% after trip, both based only on earth leakage current levels.

Product Selection

Table 45-100. JG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120 – 480 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
150	3	ELJBN3150W	
150	4	ELJBN4150W	
250	3	ELJBN3250W	
250	4	ELJBN4250W	

Table 45-101. JG-Frame Earth Leakage Modules, IEC (Bottom Mounted, 230 – 415 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
160	3	ELJBE3160W	
160	4	ELJBE4160W	
250	3	ELJBE3250W	
250	4	ELJBE4250W	

Table 45-102. LG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120 – 480 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
400	3	ELLBN3400W	
400	4	ELLBN4400W	
600	3	ELLBN3600W	
600	4	ELLBN4600W	

Table 45-103. LG-Frame Earth Leakage Modules, IEC (Bottom Mounted, 230 – 415 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. \$
400	3	ELLBE3400W	
400	4	ELLBE4400W	
630	3	ELLBE3630W	
630	4	ELLBE4630W	

Table 45-104. Dimensions for Assembled Breaker and Earth Leakage Module in Inches (mm)

Frame	Height	Width	Depth
3-Pole			
JG	11.25 (285.8)	4.13 (104.9)	3.57 (90.7)
LG	15.38 (390.7)	5.48 (139.2)	4.06 (103.1)
4-Pole			
JG	11.25 (285.8)	5.50 (139.7)	3.57 (90.7)
LG	15.38 (390.7)	7.23 (183.6)	4.06 (103.1)

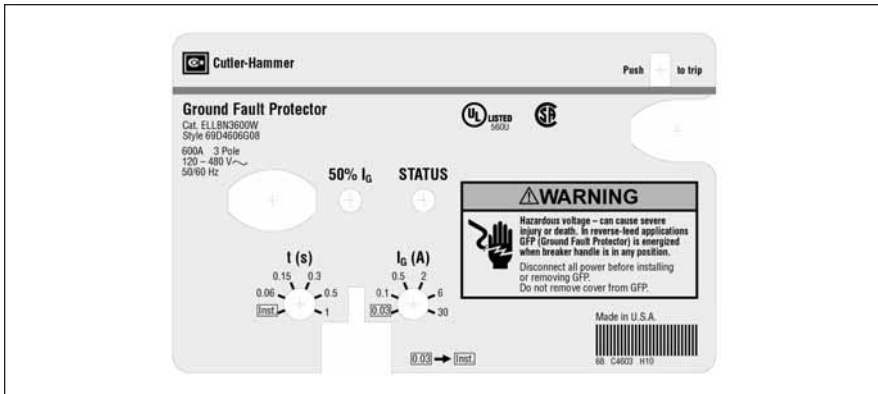


Figure 45-6. UL-Rated LG-Frame Earth Leakage Module Faceplate

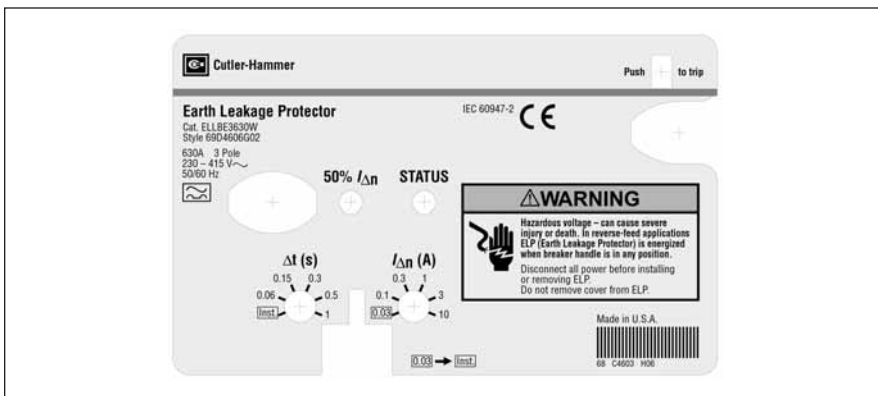


Figure 45-7. IEC-Rated LG-Frame Earth Leakage Module Faceplate

Special Features and Accessories

Internal Accessories

Alarm Lockout

The alarm switches operate when the circuit breaker is tripped by a short circuit or overcurrent, but also when it is tripped by a shunt trip or undervoltage release.

Auxiliary Switches

Auxiliary switches are used for signaling and control purposes. The various functions of the auxiliary switches (changeover) are shown in **Figure 45-9**.

Shunt Trips

The shunt trip is used for remote tripping.

The coil of the shunt trip is rated only for short-time operation.

It is not permissible with the circuit breaker open to apply a continuous opening command to the shunt trip in order to prevent the breaker from closing. This means that interlocking circuits with continuous commands may not be set up with shunt trips.

Undervoltage Releases

The circuit breaker cannot be closed until the undervoltage release is energized. If the release is not energized, the circuit breaker can only perform an idle switching operation.

Frequent idle switching actions should be avoided as they shorten the endurance of the circuit breaker.

Accessory Configurations for EG – RG Circuit Breakers

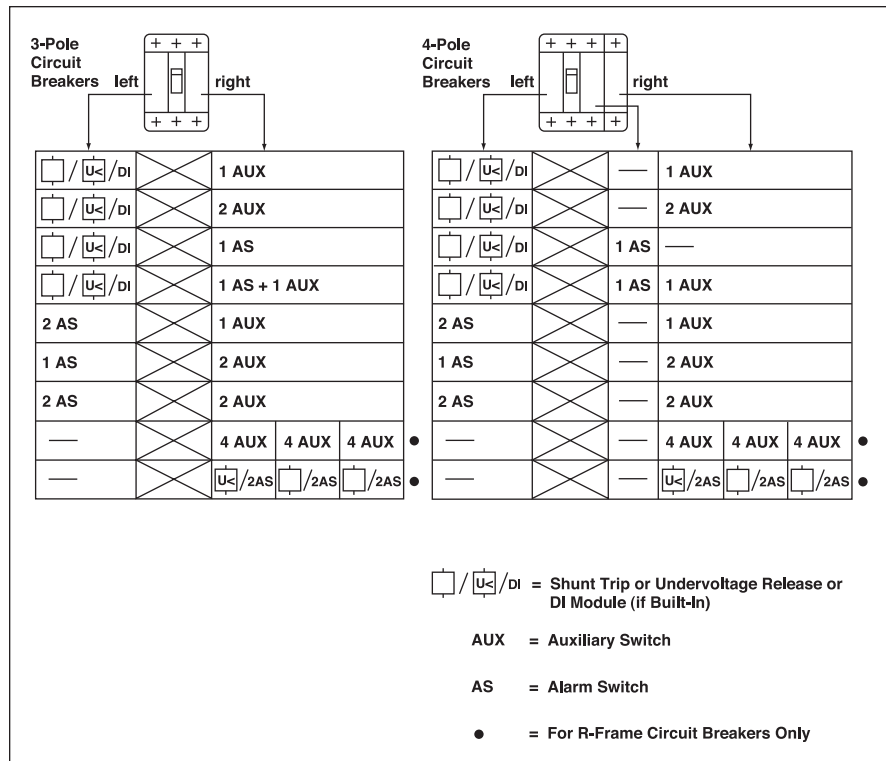


Figure 45-8. Internal Accessory Configurations

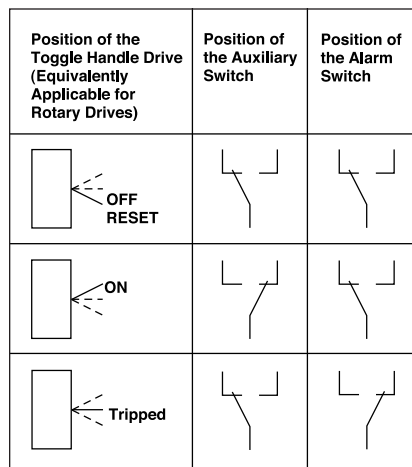


Figure 45-9. Contact Making by the Auxiliary and Alarm Switches as a Function of the Switching Position of the Circuit Breaker

Special Features and Accessories

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

Note: Breakers equipped with electronic trip units can operate reliably in ambient temperatures of 50°C. Add suffix "V3" to NG MCCBs to remove standard 40°C labeling.

Add suffix "V" to catalog number for complete thermal magnetic breaker when ordering listed ampere ratings for breakers to be used in 50°C ambients. 50°C ambient MCCBs are not UL listed.

Contact Eaton for availability.

Moisture-Fungus Treatment

All Cutler-Hammer 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.

Order by description.

Table 45-105. Calibrations and Treatment

Description	Frame									
	EG	Price U.S. \$	JG	Price U.S. \$	LG	Price U.S. \$	NG	Price U.S. \$	RG	Price U.S. \$
Special Calibration	✓		✓		✓		✓		✓	
Moisture-Fungus Treatment	✓		✓		✓		✓		✓	

Table 45-106. External Accessories and Test Kit

Description	Fit Type	Frame									
		EG	Price U.S. \$	JG	Price U.S. \$	LG	Price U.S. \$	NG	Price U.S. \$	RG	Price U.S. \$

External Accessories

Non-Padlockable Handle Block	Field	EFHB		—		—		LKD4		—	
Padlockable Handle Block	Field	EFPHB		—		—		—		—	
Padlockable Handle Block Off-Only	Field	EFPHBOFF		FJPHBOFF		LBHPOFF		—		—	
Padlockable Handle Lock Hasp	Field	EFPHL		FJPHL		LPHL		PLK5		HLK6	
Padlockable Handle Lock Hasp Off-Only	Field	EFPHLOFF		FJPHLOFF		LPHLOFF		PLK5LOFF		HLK6LOFF	
Kirk Key Interlock Kit ①②	Field	—		KYKJG		KYKLG		KYK4		KYK6	
Castell Key Interlock Kit ②③	Field	—		CTKJG		CTKLG		CYK4		CYK6	
Slide Bar Interlock ④	Field	EFSBI		FJSBI		LGSBI		SBK5		—	
Walking Beam Interlock ④	3-Pole	EG3WBI		JG3WBI		LG3WBI		WBL5		WBL6	
	4-Pole	EG4WBI		JG4WBI		LG4WBI		WBL5		—	
Electrical Operator ⑤	120 Vac	MOPEG240C		EOPFJ240C		EOPLG240C		EOP5T07		EOP6T08	
	240 Vac	MOPEG240C		EOPFJ240C		EOPLG240C		EOP5T11		EOP6T11K	
	24 Vdc	MOPEG48D		EOPFJ24D		EOPLG24D		EOP5T21		EOP6T19K	
	48 Vdc	MOPEG48D		EOPFJ48D		EOPLG48D		EOP5T22		EOP6T21K	
Plug-In Adapters	3-Pole	PAD3E		PAD3J		PAD3L		PAD53		—	
	4-Pole	PAD4E		PAD4J		PAD4L		PAD54		—	
Rear Connecting Studs	Field	EFRCSDL EFRCSDS EFRCSWL EFRCSWS		FJRCSDL FJRCSDS FJRCSWL FJRCSWS		3P-LRCS3WK 4P-LRCS4WK — —		⑥		— — — —	

Test Kit

Electronic Portable Test Kit	120 V 230 V	N/A N/A		MTST120V MTST230V		MTST120V MTST230V		STK2 —		STK2 —	
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- ① Provision only.
- ② See **Page 45-218** for bolt projection dimensions.
- ③ Castell bolt mounting hole must be 10 mm.
- ④ Requires two breakers.
- ⑤ Contact Eaton for availability of operators for EG- and NG-Frames before December 2004.
- ⑥ Contact Eaton for catalog numbers.

Accessories

Table 45-107. Accessories

Description	Pole Location	Frame					
		EG, JG & LG	Price U.S. \$	NG	Price U.S. \$	RG ①	Price U.S. \$
Field Fit Kit Catalog Numbers							
Alarm Lockout 	Make/Break	Left	—		A1L5LPK	—	
		Right	ALM1M1BEPK ②		A1L5RPK	—	A1L6RPK
	2 Make/2 Break	Left	—		A2L5LPK	—	
		Right	ALM2M2BEPK ③		A2L5RPK	—	A2L6RPK
Auxiliary Switch 	1A, 1B	Left	—		A1X5PK	—	
		Right	AUX1A1BPK		A1X5PK	—	
	2A, 2B	Left	—		A2X5PK	—	
		Right	AUX2A2BPK		A2X5PK	—	A2X6RPK
	3A, 3B	Left	—		A3X5LPK	—	
		Right	—		A3X5RPK	—	
	4A, 4B	Left	—		—	—	
		Right	—		—	—	A4X6RPK
Auxiliary Switch / Alarm Lockout	Left	—		AA115LPK	—		
	Right	AUXALRMEPK ④		AA115RPK	—		
Shunt Trip — Standard 	120 Vac	Left	SNT120CPK ⑤		SNT5LP11K	—	
		Right	—		—	—	SNT6P11K
	240 Vac	Left	SNT120CPK ⑤		SNT5LP11K	—	
		Right	—		—	—	SNT6P11K
	12 Vdc	Left	SNT012CPK		—	—	
		Right	—		—	—	
	24 Vdc	Left	SNT060CPK		SNT5LP03K	—	
		Right	—		—	—	SNT6P03K
	48 Vdc	Left	SNT060CPK		SNT5LP23K	—	
		Right	—		—	—	SNT6P23K
	380 – 600 Vac	Left	SNT480CPK ⑥		—	—	
		Right	—		—	—	
220 – 250 Vdc or 380 – 440 Vac	—			SNT5LP14K	—	SNT6P14K	
480 – 600 Vac	—			SNT5LP18K	—	SNT6P18K	
Shunt Trip — Low Energy	Left	—		LST5LPK	—		
	Right	—		—	—	LST6RPK	
Undervoltage Release Mechanism 	110 – 127 Vac	Left	UVR120APK		UVH5LP08K	—	
		Right	—		—	—	UVH6RP08K
	208 – 240 Vac	Left	UVR240APK		UVH5LP11K	—	
		Right	—		—	—	UVH6RP11K
	24 Vdc, Vac	Left	UVR024CPK		UVH5LP21K ⑦	—	
		Right	—		—	—	UVH6RP21K ⑦
	48 – 60 Vdc	Left	UVR048DPK		UVH5LP23K	—	
		Right	—		—	—	UVH6RP23K
	12 Vdc, Vac	Left	UVR012CPK		—	—	
		Right	—		—	—	
	48 – 60 Vac	Left	UVR048APK		UVHLP05K	—	
		Right	—		—	—	UVHRP05K
	120 Vdc	Left	UVR125DPK		UVHLP26K	—	
		Right	—		—	—	UVHRP26K
	220 – 250 Vdc	Left	UVR250DPK		UVHLP28K	—	
		Right	—		—	—	UVHRP28K
	380 – 500 Vac	Left	UVR480APK		UVHLP29K	—	
		Right	—		—	—	UVHRP29K
	525 – 600 Vac	Left	UVR600APK		—	—	
		Right	—		—	—	
12 Vdc	Left	—		UVHLP20K	—		
	Right	—		—	—	UVH6RP20K	
12 Vac	Left	—		UVHLP02K	—		
	Right	—		—	—	UVH6RP02K	

① All accessories mount in the RH cavity which will accept one each of shunt trip, UVR, auxiliary switch and alarm switch.
 ② Part number for JG and LG is ALM1M1BJPK.
 ③ Part number for JG and LG is ALM2M2BJPK.

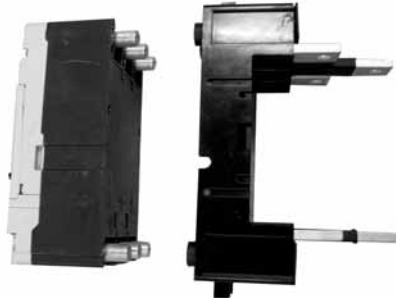
④ Part number for JG and LG is AUXALRMJPK.
 ⑤ 110 – 125 Vdc, 50/60 Hz.
 ⑥ 380 – 600 Vdc, 50/60 Hz.
 ⑦ 24 Vdc only use UVH5LP03K (NG) UVH6RP03K (RG) for 24 Vac.

Discount Symbol **CB-2**

Plug-in Blocks and Drawout Cassettes

Plug-in Blocks

Plug-in adapters simplify installation and front removal of circuit breakers. Plug-ins are available for rear connection applications on 3- and 4-pole circuit breakers. Trip on drawout interlock kits are included. Stabs for EG, JG and LG plug-ins rotate 90° for flexible installation. Use terminal shields for IP30 protection.



LG Breaker with Plug-in Block

Product Selection

Table 45-108. Plug-in Blocks

Breaker Frame	Poles	Catalog Number	Price U.S. \$
---------------	-------	----------------	---------------

EG-, JG- and LG-Frame Plug-in Blocks

EG	3	PAD3E	
EG	4	PAD4E	
JG	3	PAD3J	
JG	4	PAD4J	
LG	3	PAD3L	
LG	4	PAD4L	

Trip-on Drawout Interlock Kit ①

EG	3, 4	PIILEG	
JG	3, 4	PIILJG	
LG	3, 4	PIILLG	

Terminal Shields IP30

EG	3	EFTS3K	
EG	4	EFTS4K	
JG	3	FJTS3K	
JG	4	FJTS4K	
LG	3	LTS3K	
LG	4	LTS4K	

Position Switch

EG	3, 4	PADILE	
JG	3, 4	PADILJ	
LG	3, 4	PADILL	

① Included with plug-in block. Trips the breaker when breaker is removed from plug-in block.

The drawout mechanism has three primary positions:

- **Connected** — The breaker is fully connected to the primary stabs and secondary contacts.
- **Disconnected** — Both the primary stabs and the secondary contacts are disconnected.
- **Withdraw** — The breaker can be

Drawout Cassette



Drawout Cassette



JG and LG Drawout Cassettes

The Drawout Cassette is available for use with JG, LG and NG, 3- and 4-pole breakers. Also available are drawout cassettes for use with the standard 3-pole 65 and 100 kA/480 Vac, 1600 ampere and 2000 ampere RG circuit breakers. The cassettes consist of two separate components: the movable mechanism, which attaches to the breaker, and the stationary mechanism, which houses in the cassette. The stationary mechanism is shipped separately for the RG frame breakers. For the JG, LG and NG drawout cassettes, all necessary parts for installation are included in the one catalog number.

Features of the drawout cassettes for the JG, LG and NG include:

- **Trip on drawout** — Breaker will trip if it is in the ON position when withdrawn from the cassette.
- **Secondary Terminal Block** — The drawout cassettes include a secondary terminal block for easier access when wiring low voltage accessories, including shunts and undervoltage releases.

removed from the cassette.

Table 45-109. RG Drawout Cassette

Description	Catalog Number	Price U.S. \$
-------------	----------------	---------------

65 kA/480 Vac Version

Movable Mechanism	RD20DOM ②	
Stationary Mechanism	RD20DOS ③ RD20DOSS ④	

Description	Catalog Number	Price U.S. \$
-------------	----------------	---------------

65 kA/480 Vac Version

100 kA/480 Vac Version

Movable Mechanism	RDC20DOM ②	
Stationary Mechanism	RDC20DOS ③ RDC20DOSS ④	

② List price included in price of the stationary mechanism.

③ Without shutters.

④ With shutters.

Movable mechanism must be ordered with RG circuit breaker and is shipped mounted to circuit breaker frame. Stationary mechanism is ordered separately.

Table 45-110. JG, LG and NG Drawout Cassettes

Breaker Frame	Poles	Catalog Number	Price U.S. \$
---------------	-------	----------------	---------------

JG	3	JG3DOM	
	4	JG4DOM	
LG	3	LG3DOM	
	4	LG4DOM	
NG	3	NG3DOM	
	4	NG4DOM	

Handle Mechanisms

Handle Mechanisms Overview

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations — Flange Mounted, Through-the-Door and Direct (Close-Coupled) — providing safe, dependable operation and ease of installation.

Flange Mounted

- Flex Shaft

Through-the-Door

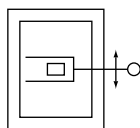
- Universal Rotary

Direct (Close Coupled)

- Universal Direct
- Euro IEC

Handle mechanisms are typically used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton Electrical has a handle mechanism for virtually any need.

Flange Mounted Handle Mechanisms



The Flex Shaft™

Flange Mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9 m) through 10 feet (3 m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8 inch (9.5 mm). Can be used with NEMA 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with NEMA 4 environments.

Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes — a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

Flex Shaft is UL listed under File E64893 and meets CSA requirements.

Note: NEMA 4X handle mechanisms are available. Add Suffix X to the complete Catalog Number.

Note: When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) is maintained to operate properly.

The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

Flex Shaft Ordering Information

Table 45-111. Flex Shaft Ordering Information

Breaker Frame	Flexible Shaft Length in Feet (m)									
	2 (0.61)		3 (.9)		4 (1.2)		5 (1.3)		6 (1.8)	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
EG	EHMFS02		EHMFS03		EHMFS04		EHMFS05		EHMFS06	
JG	N/A		JHMFS03		JHMFS04		JHMFS05		JHMFS06	
LG	N/A		—		LHMFS04		—		—	
NG	N/A		N/A		F5S04CI		F5S05CI		F5S06CI	
RG	N/A		N/A		F6S04		F6S05		F6S06	

Breaker Frame	Flexible Shaft Length in Feet (m)							
	7 (2.1)		8 (2.4)		9 (2.7)		10 (3.1)	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
EG	EHMFS07		EHMFS08		EHMFS09		EHMFS10	
JG	JHMFS07		JHMFS08		JHMFS09		JHMFS10	
LG	LHMFS07		—		—		LHMFS10	
NG	N/A		N/A		N/A		F5S10CI	
RG	N/A		N/A		N/A		N/A	

Note: Add Suffix L to the complete Catalog Number for 6-inch (152.4 mm) handle.

Note: 3-Pole only for EG, 3 and 4 Pole for JG and LG.

Note: EG and LG can be left or right-hand mounted.

Flex Shaft Accessories (E- through R-Frame)

Table 45-112. NEMA 12 Safety Door Hardware for Flex Shaft ①

Handle Length in Inches (mm)	Catalog Number ②	Price U.S. \$
4.00 (101.6)	C361KJ4	
6.00 (152.4)	C361KJ6	
Roller Latch ③	C361KR	

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.

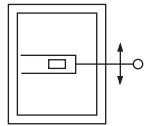
③ Third roller latch for use with 4- or 6-inch (101.6 or 152.4 mm) handle when 3 point latching is required.

Table 45-113. NEMA — IP Crossover

NEMA Type	IP Type
1	IP20
3R	IP55
12	IP54
4/4X	IP66

Handle Mechanisms

Through-the-Door Handle Mechanisms



Universal Rotary

The Cutler-Hammer Universal Rotary is suitable for use with NEMA 12 enclosure types. An optional NEMA 4/4X handle mechanism is also available. All rotary handle mechanisms include a handle "Lock Off," to prevent turning the breaker ON while in the OFF position. All Rotary handles indicate ON/OFF/Tripped/Reset positions, however, Universal Rotary has the added feature of international markings for ON (I) and OFF (O). The Universal Rotary is made of molded material. Inside handle is lockable.

The Universal Rotary mechanisms for EG, JG and LG MCCBs can be operated by hand with the door open or "locked off" to prevent operation with the door open.

For the NG-Frame MCCBs, a Cutler-Hammer Rotary with a metal handle (Table 45-115) is also available.

4/4X Handle Mechanism



EG-Frame



**JG & LG-Frames
(JG Shown)**

Table 45-114. Universal Rotary Ordering Information

Shaft Length in Inches (mm)	Handle Color	NEMA Rating	Complete Catalog Number ①		Price U.S. \$
EG-Frame					
6.00 (152.4)	Black	1, 12	EHMVD06B		
12.00 (304.8)	Black	1, 12	EHMVD12B		
24.00 (609.6)	Black	1, 12	EHMVD24B		
6.00 (152.4)	Red	1, 12	EHMVD06R		
12.00 (304.8)	Red	1, 12	EHMVD12R		
24.00 (609.6)	Red	1, 12	EHMVD24R		
6.00 (152.4)	Black	4, 4X, 3R	EHMVD06BX		
12.00 (304.8)	Black	4, 4X, 3R	EHMVD12BX		
24.00 (609.6)	Black	4, 4X, 3R	EHMVD24BX		
6.00 (152.4)	Red	4, 4X, 3R	EHMVD06RX		
12.00 (304.8)	Red	4, 4X, 3R	EHMVD12RX		
24.00 (609.6)	Red	4, 4X, 3R	EHMVD24RX		
JG-Frame					
6.00 (152.4)	Black	1, 12	FJHMVD06B		
12.00 (304.8)	Black	1, 12	FJHMVD12B		
24.00 (609.6)	Black	1, 12	FJHMVD24B		
6.00 (152.4)	Red	1, 12	FJHMVD06R		
12.00 (304.8)	Red	1, 12	FJHMVD12R		
24.00 (609.6)	Red	1, 12	FJHMVD24R		
6.00 (152.4)	Black	4, 4X, 3R	FJHMVD06BX		
12.00 (304.8)	Black	4, 4X, 3R	FJHMVD12BX		
24.00 (609.6)	Black	4, 4X, 3R	FJHMVD24BX		
6.00 (152.4)	Red	4, 4X, 3R	FJHMVD06RX		
12.00 (304.8)	Red	4, 4X, 3R	FJHMVD12RX		
24.00 (609.6)	Red	4, 4X, 3R	FJHMVD24RX		
LG-Frame					
6.00 (152.4)	Black	1, 12	KLHMVD06B		
12.00 (304.8)	Black	1, 12	KLHMVD12B		
24.00 (609.6)	Black	1, 12	KLHMVD24B		
6.00 (152.4)	Red	1, 12	KLHMVD06R		
12.00 (304.8)	Red	1, 12	KLHMVD12R		
24.00 (609.6)	Red	1, 12	KLHMVD24R		
6.00 (152.4)	Black	4, 4X, 3R	KLHMVD06BX		
12.00 (304.8)	Black	4, 4X, 3R	KLHMVD12BX		
24.00 (609.6)	Black	4, 4X, 3R	KLHMVD24BX		
6.00 (152.4)	Red	4, 4X, 3R	KLHMVD06RX		
12.00 (304.8)	Red	4, 4X, 3R	KLHMVD12RX		
24.00 (609.6)	Red	4, 4X, 3R	KLHMVD24RX		
NG-Frame					
6.00 (152.4)	Black	1	HMVD5B		
6.00 (152.4)	Black	1	HMVD5BT ②		
6.00 (152.4)	Black	4, 4X, 3R	WHM5R06X		
12.00 (304.8)	Black	4, 4X, 3R	WHM5R12X		
16.00 (406.4)	Black	4, 4X, 3R	WHM5R16X		
24.00 (609.6)	Black	4, 4X, 3R	WHM5R24X		
RG-Frame					
9.00 (235.0)	Black	1	HMVD6B		

① Complete catalog number includes handle, mechanism, shaft and mounting hardware.

② Same as HMVD5B, except uses R-Frame T handle.

Table 45-115. Cutler-Hammer Rotary Ordering Information — NG-Frame

Shaft Length in Inches (mm)	Handle Color	Complete Catalog Number ③			
		NEMA 1, 3R, 12	Price U.S. \$	NEMA 4/4X	Price U.S. \$
6.00 (152.4)	Black	WHM5R06		WHM5R06X	
12.00 (304.8)	Black	WHM5R12		WHM5R12X	
16.00 (406.4)	Black	WHM5R16		WHM5R16X	
24.00 (609.6)	Black	WHM5R24		WHM5R24X	

③ Complete catalog number includes handle, mechanism, shaft and mounting hardware.

Handle Mechanisms

Direct (Close-Coupled) Handle Mechanisms



Universal Direct (EG – LG)

Direct (Close-Coupled) Handle Mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-Door type mechanism is not practical or cannot be used. They are typically for applications where high volume, standardized enclosures are being fabricated.

NEMA Ratings

Rated NEMA 1 and NEMA 12.

The Universal Direct handle mechanism is designed exclusively for the new Cutler-Hammer EG, JG and LG circuit breakers. It is available as standard with a door interlock to prevent opening the enclosure while the circuit breaker is in the ON position. It is also available without a door interlock.

The Universal Direct handle mechanism is UL 489 listed, IEC 60947-1/2 and meets CSA requirements.

The Euro IEC Direct handle mechanism is designed for NG and RG MCCBs. The Euro IEC Direct handle mechanism is 60947-112.

Table 45-116. Universal Direct Ordering Information

Frame	White Handle Color				Red Handle Color	
	with Interlock	Price U.S. \$	without Interlock	Price U.S. \$	without Interlock	Price U.S. \$
	Catalog Number		Catalog Number		Catalog Number	
EG	EHMCCBI		EHMCCB		EHMCCR	
JG	—		JHMCCB		JHMCCR	
LG	—		LHMCCB		LHMCCR	

Table 45-117. Euro IEC Direct Ordering Information

Frame	Catalog Number	Price U.S. \$
	Black Handle	
NG	HMVD5B	
RG	HMVD6B	

Dimensions

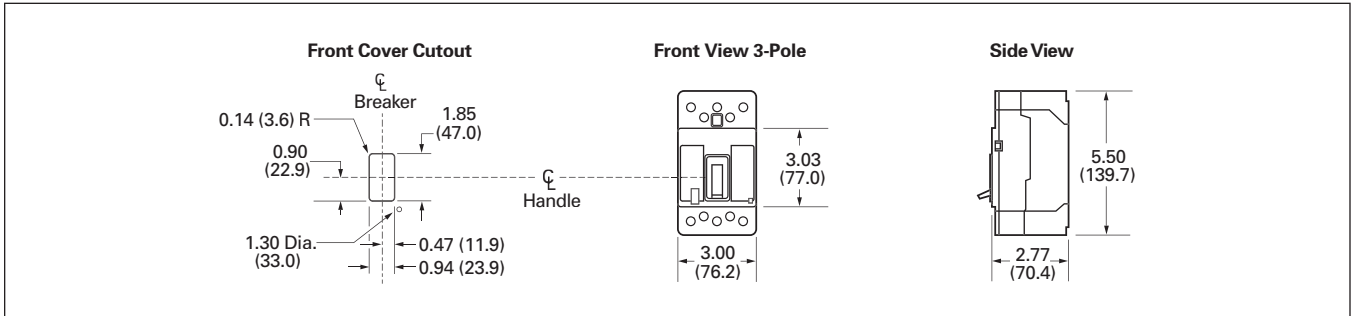


Figure 45-10. EG-Frame — Dimensions in Inches (mm)

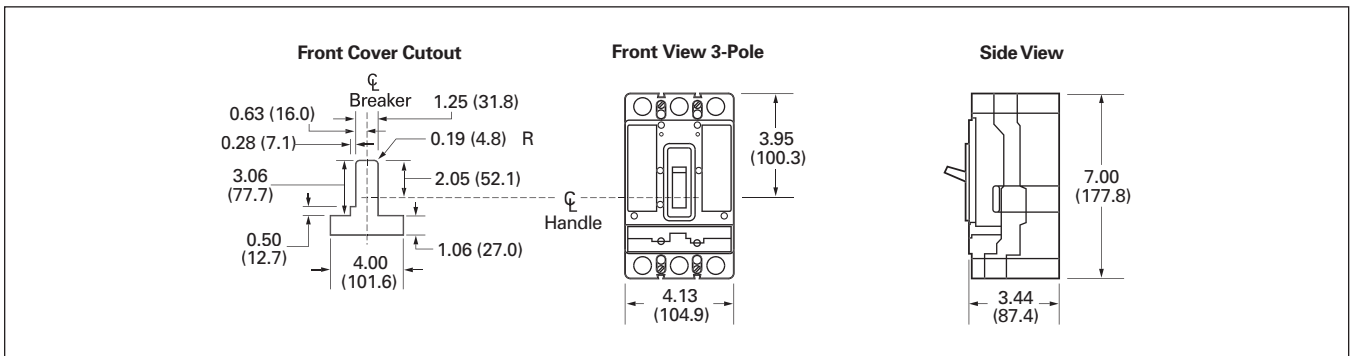


Figure 45-11. JG-Frame — Dimensions in Inches (mm)

Frame Sizes LG through NG

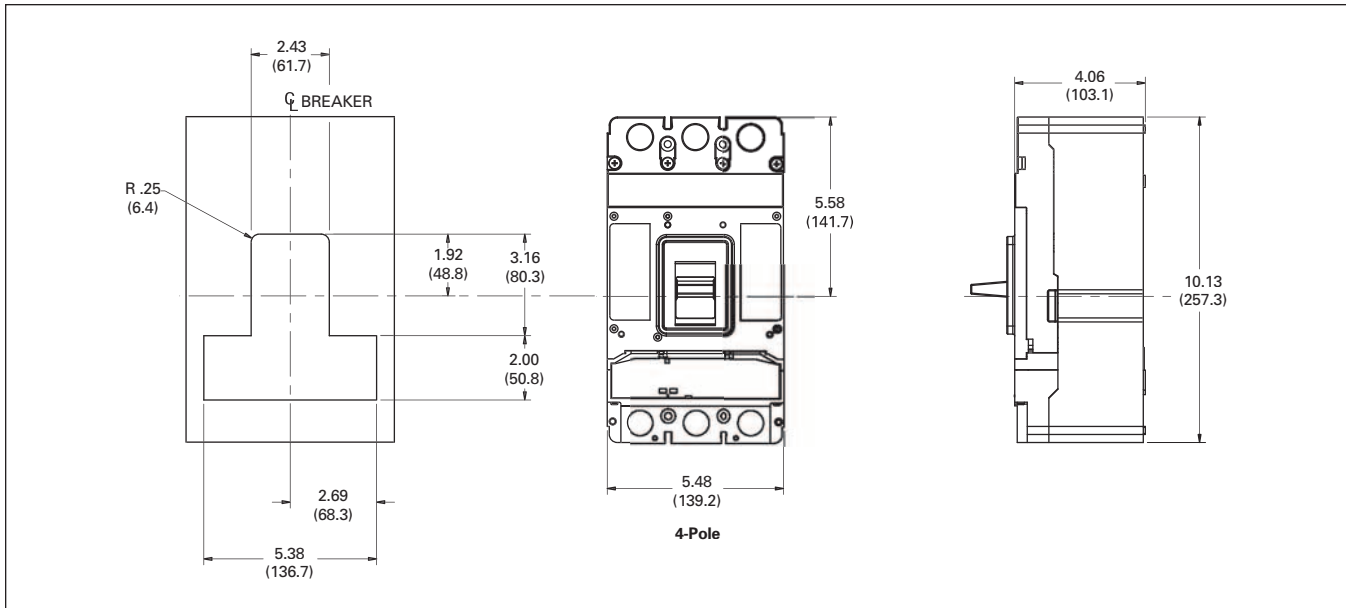


Figure 45-12. LG-Frame — Dimensions in Inches (mm)

Note: TA63IL, T63IL, T632L, TA632L terminals add 1.19 inches (30.2 mm) to line or load side of LG. LTS3K or LTS4K terminal covers add 2.13 inches (54.1 mm) to line or load side of LG.

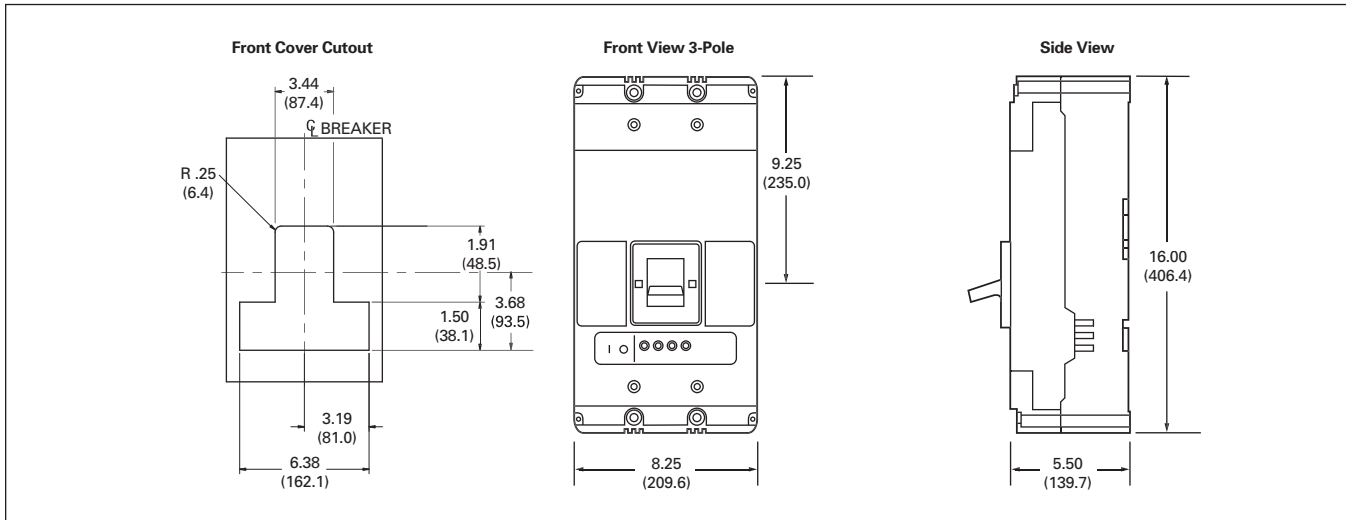


Figure 45-13. NG-Frame — Dimensions in Inches (mm)

Frame Size RG

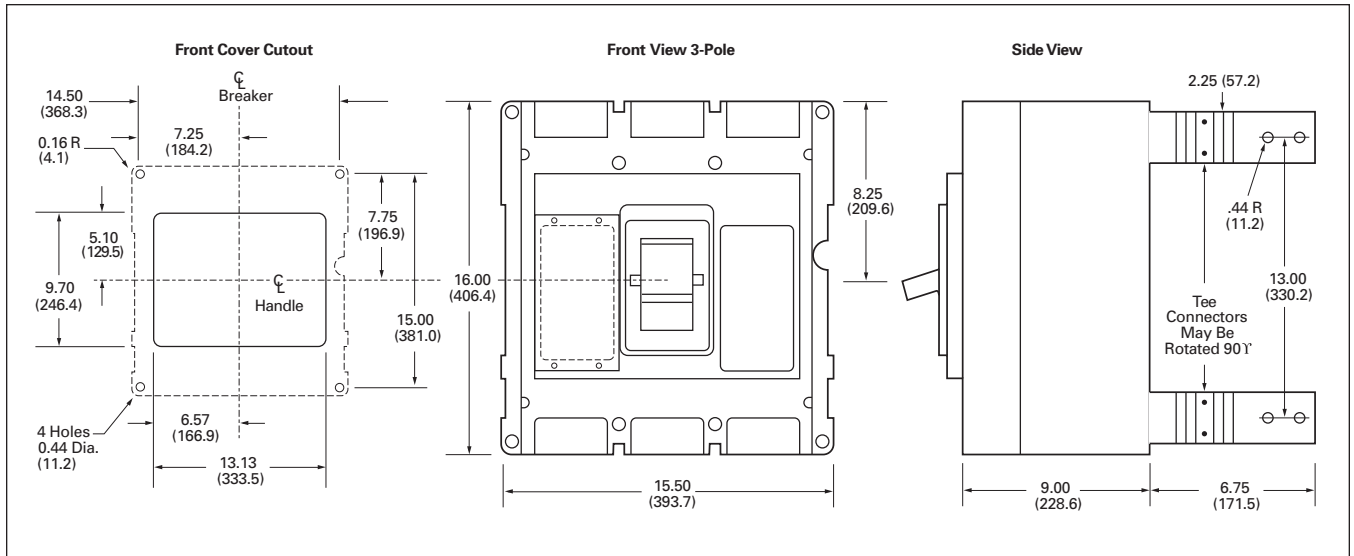


Figure 45-14. RG-Frame — Dimensions in Inches (mm)

Product Line Overview

Product Line Description



Molded Case Circuit Breaker Product Family

Cutler-Hammer Molded Case Circuit Breakers by Eaton Corporation 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, Cutler-Hammer 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

Cutler-Hammer breakers can be ordered with internal accessories installed. These modified breakers will be subject to an addition charge.

Modified Breakers	\$75 List Adder
-------------------	-----------------

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.

Suffix H01 400 Hz	20% Adder
--------------------------	-----------

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.

Suffix J01 Fungus Treated	\$375 + 20% Adder
----------------------------------	-------------------

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.

Suffix F01 Freeze Tested	20% Adder
---------------------------------	-----------

Marine Applications

F- 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.

These specifications generally require molded case circuit breakers to be supplied with special nameplating, and plug-in adapter kits. When plug-in adapter kits are used, no terminals need be supplied.

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 available.)

Suffix H08 "Marine"	10% Adder
----------------------------	-----------

UL 489 Supplement SB requires 50°C ambient calibration, vibration testing, special nameplating and no use of aluminum conductors or terminals. ("Naval" labeled per UL but no "UL" mark due to 50°C label.)

Suffix H09 "Naval"	10% Adder
---------------------------	-----------

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.

Quick Reference

Table 45-118. Industrial Circuit Breakers

Circuit Breaker Type	Continuous Ampere Rating at 40°C	No. Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			ac	dc			ac (kV)						dc (kV) ②		
							120	120/240	240	277	480	600	125	250	
G-Frame															
GHB	15 – 100	1	120	125	N.I.T.U.	11a	65	—	—	—	—	—	14	—	45-73
GHB	15 – 100	2, 3	240	125/250		10b, 11b,	—	—	65	—	—	—	—	14	45-73
GHB	15 – 100	1	277	125		12b, 14b,	—	—	—	14	—	—	14	—	45-73
GHB	15 – 100	2, 3	480Y/277	125/250		15b	—	—	—	14	14	—	—	14	45-73
HGHB	15 – 30	1	277	125		12c, 13a, 13b	65	—	—	25	—	—	14	—	45-73
GHQ	15 – 20	1	277	—			65	—	—	14	—	—	—	—	45-73
GHBS	15 – 30	1, 2	480Y/277	—	—	—	65	65	—	14	—	—	—	—	⑥
GBHS	15 – 20	1, 2	600Y/347	—	N.I.T.U.	—	—	—	—	—	—	10	—	—	⑥
GD	15 – 50	2	480	125/250	N.I.T.U.	13b	—	—	65	—	14	—	—	10	45-72
GD	15 – 100	3	480	250		13b	—	—	65	—	22	—	—	10	45-72
GHC	15 – 100	1	120	125	N.I.T.U.	12c, 13a	65	—	—	—	—	—	14	—	45-75
GHC	15 – 100	2, 3	240	125/250		13b	—	—	65	—	—	—	—	14	45-75
GHC	15 – 100	1	277	125		12c, 13a	—	—	—	14	—	—	14	—	45-75
GHC	15 – 100	2, 3	480Y/277	125/250		13b	—	—	—	14	14	—	—	14	45-75
HGHC	15 – 30	1	277	125			65	—	—	25	—	—	14	—	45-75
F-Frame															
EDB	100 – 225	2, 3	240	125	N.I.T.U.	—	—	—	22	—	—	—	10	—	45-78
EDS	100 – 225	2, 3	240	125		—	—	—	42	—	—	—	10	—	45-78
ED	15 – 225	2, 3	240	125	N.I.T.U.	12b	—	—	65	—	—	—	10	—	45-78
EDH	100 – 225	2, 3	240	125		14b	—	—	100	—	—	—	10	—	45-78
EDC	100 – 225	2, 3	240	125		1	—	—	200	—	—	—	10	—	45-78
EHD	15 – 100	1	277	125	N.I.T.U.	13a	—	—	—	14	—	—	10	—	45-78
EHD	15 – 100	2, 3	480	250		13b	—	—	18	—	14	—	—	10	45-78
FDB	15 – 150	2, 3	600	250	N.I.T.U.	18a	—	—	18	—	14	14	—	10	45-78
FDB	15 – 150	4	600	250		③	—	—	18	—	14	14	—	10	45-78
FD	15 – 150	1	277	125	N.I.T.U.	13a	—	—	—	35	—	—	10	—	45-78
FD	15 – 225	2, 3	600	250		22a	—	—	65	—	35	18	—	10	45-78
FD	15 – 225	4	600	250		③	—	—	65	—	35	18	—	10	45-78
FDE	15 – 225	3	600	—	N.I.T.	—	—	—	65	—	35	18	—	—	45-78
HFD	15 – 150	1	277	125	N.I.T.U.	13a	—	—	—	65	—	—	10	—	45-78
HFD	15 – 225	2,3	600	250		22a	—	—	100	—	65	25	—	22	45-78
HFD	15 – 225	4	600	250		③	—	—	100	—	65	25	—	22	45-78
HFDE	15 – 225	3	600	—	N.I.T.	—	—	—	100	—	65	25	—	—	45-78
FDC ④	15 – 225	2, 3	600	250	N.I.T.U.	24a	—	—	200	—	100	35	—	22	45-78
FDC ④	15 – 225	4	600	250		③	—	—	200	—	100	35	—	22	45-78
FDCE ④⑤	15 – 225	3	600	—	N.I.T.	—	—	—	200	—	100	35	—	—	45-78

① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.
 ② 2-pole circuit breaker, or two poles of 3-pole circuit breaker at 250 Vdc.
 ③ Not defined in W-C-375b.
 ④ Current limiting.
 ⑤ Check with Eaton for availability.
 ⑥ Refer to the Distribution Products Catalog CA08101001E.

Product Line Overview

Table 45-118. Industrial Circuit Breakers (Continued)

Circuit Breaker Type	Continuous Ampere Rating at 40°C	No. Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			ac	dc			ac (kV)						dc (kV) ②		
							120	120/240	240	277	480	600	125	250	
J-Frame															
JDB	70 – 250	2, 3	600	250	N.I.T.U.	22a	—	—	65	—	35	18	—	10	45-89
JD	70 – 250	2, 3, 4	600	250	I.T.U.	22a	—	—	65	—	35	18	—	10	45-88
HJD	70 – 250	2, 3, 4	600	250	I.T.U.	22a	—	—	100	—	65	25	—	22	45-88
JDC ③	70 – 250	2, 3, 4	600	250	I.T.U.	22a	—	—	200	—	100	35	—	22	45-88
K-Frame															
DK	250 – 400	2, 3	240	250	N.I.T.U.	14b	—	—	65	—	—	—	—	10	45-100
KDB	100 – 400	2, 3	600	250	N.I.T.U.	23a	—	—	65	—	35	25	—	10	45-100
KD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	10	45-96, 45-97, 45-102, 45-103
CKD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	45-101, 45-104, 45-105
HKD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	22	45-96, 45-97, 45-102, 45-103
CHKD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	45-101, 45-104, 45-105
KDC ③	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	65	—	22	45-96, 45-97, 45-102, 45-103
L-Frame															
LDB	300 – 600	2, 3	600	250	N.I.T.U.	23a	—	—	65	—	35	25	—	22	45-116
LD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	22	45-112, 45-113, 45-119
CLD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	45-115, 45-123
HLD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	45-112, 45-113, 45-119
CHLD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	45-115, 45-123
LDC ③	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	45-112, 45-113, 45-120
CLDC ③	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	45-115, 45-124
M-Frame															
MDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	65	—	50	25	—	22	45-130, 45-131
CMDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	65	—	50	25	—	—	45-132
HMDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	45-130, 45-131
CHMDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	45-132
N-Frame															
ND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	65	—	50	25	—	—	45-138, 45-151
CND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	65	—	50	25	—	—	45-145, 45-153
HND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	100	—	65	35	—	—	45-140, 45-151
CHND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	100	—	65	35	—	—	45-147, 45-153
NDC	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	200	—	100	65	—	—	45-142, 45-151
CNDC	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	200	—	100	65	—	—	45-149, 45-153
NDU	600 – 1200	3	600	—	N.I.T.	—	—	—	300	—	150	75	—	—	—

① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.

② 2-pole circuit breaker, or two poles of 3-pole circuit breaker at 250 Vdc.

③ Current limiting.

Product Line Overview
Table 45-118. Industrial Circuit Breakers (Continued)

Circuit Breaker Type	Continuous Ampere Rating at 40°C	No. Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			ac	dc			ac (kV)						dc (kV) ②		
							120	120/240	240	277	480	600	125	250	
R-Frame															
RD 1600	800 – 1600	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	45-160
CRD 1600	800 – 1600	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	45-163
RD 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	45-160
RD 2500	1000 – 2500	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	45-160
CRD 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	45-163
RDC 1600	800 – 1600	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	45-162
CRDC 1600	800 – 1600	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	45-163
RDC 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	45-162
RDC 2500	1000 – 2500	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	45-162
CRDC 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	45-163
Current-Limit-R Current Limiting Circuit Breakers — Non-Fused Type															
FCL	15 – 100	2, 3	480	—	N.I.T.U.	—	—	—	200	—	150	—	—	—	45-252
LCL	125 – 400	2, 3	600	—	N.I.T.U.	—	—	—	200	—	200	100	—	—	45-253
TRI-PAC Current Limiting Circuit Breakers — Fused Type															
FB	15 – 100	2, 3	600	250	N.I.T.U.	16a, 16b, 17a, 26a	—	—	200	—	200	200	—	10	45-255
LA	70 – 400	2, 3	600	250	I.T.U.	16a, 16b, 17a, 26a	—	—	200	—	200	200	—	10	45-256
NB	300 – 800	2, 3	600	250	I.T.U.	16b, 17a, 26a	—	—	200	—	200	200	—	10	45-258
PB	600 – 1600	2, 3	600	250	I.T.U.	17a, 26a	—	—	200	—	200	200	—	10	45-260

① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.

② 2-pole circuit breaker, or two poles of 3-pole circuit breaker at 250 Vdc.

G-Frame

Product Description

- All two- and three-pole circuit breakers are of the common trip type. On all 3-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.

Technical Data and Specifications

Interrupting Capacity Ratings

Table 45-119. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)				
		Volts ac (50/60 Hz)				
		120	240	277	480	250 ①②
GD	2	—	65	—	14	10
	3	—	65	—	22	10

① Time constant is 8 milliseconds minimum.

② Two poles of 3-pole circuit breaker.

Table 45-119. UL 489 Interrupting Capacity Ratings (Continued)

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)				Volts dc
		Volts ac (50/60 Hz)				
		120	240	277	480Y/277	
GHQ	—	65	—	14	—	—
GHB	1	65	—	14	—	14 ③
	2, 3	—	65	—	14	14
HGHB	1	65	—	25	—	14
GHC	1	65	—	14	—	14 ③
	2, 3	—	65	—	14	14
HGHC	1	65	—	25	—	14

③ 15 through 70 A breakers only.

Terminal Types

For line and load-side. Terminals are UL listed as suitable for wire type and size given below.

Table 45-120. Terminal Types

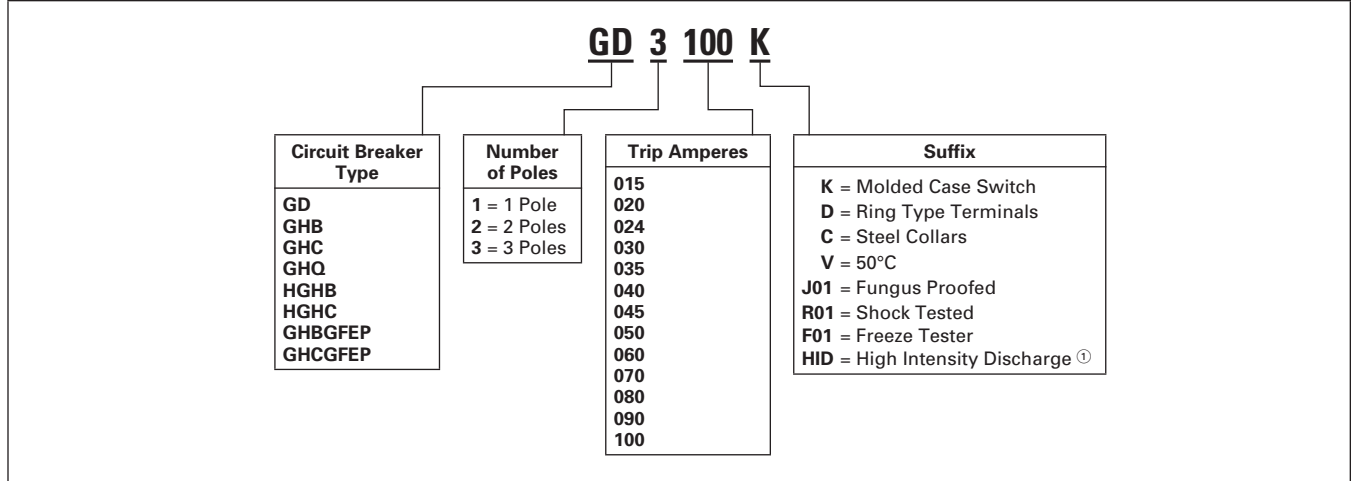
Circuit Breaker Amperes	Terminal Type Material	Screw Head Type	Wire Type	AWG Wire Range	Metric Wire ④ Range (mm ²)
Standard					
15 – 20	Clamp (Plated Steel)	Slotted	Cu/Al	14 – 10	2.5 – 4
25 – 100	Pressure (Aluminum Body)	Slotted	Cu/Al	10 – 1/0	4 – 50
Optional — GD Only					
15 – 100	Pressure (Steel Body)	Slotted	Cu	14 – 3	—

④ Not UL listed sizes.

Product 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.

Table 45-121. Circuit Breaker/Frame Catalog Numbering System



① HID suffix only applies to the GHB and GHC 1 pole, 15 – 20 ampere circuit breakers.

G-Frame

Type GD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units



Typical G-Frame Circuit Breaker

Standards and Certifications

- UL/CSA.

Product Description

- Cable in, cable out.
- Includes mounting hardware and BMHE.

Product Selection

Table 45-122. 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 .312	
	14 kAIC at 480 Vac		22 kAIC at 480 Vac			
	Includes Line and Load Terminals					
	2-Pole		3-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
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 GD Molded Case Switches

Product Selection

Table 45-123. Type GD Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	480 Vac Maximum, 250 Vdc	
	Catalog Number (Includes Line and Load Terminals)	Price U.S. \$
3-Pole		
60	GD3060K	
100	GD3100K	
60	GD3060KC ①	
100	GD3100K ①	

① Includes line and load steel terminals.

Note: Molded Case Switches may open above 1300 amperes.

Types GHB and HGHB Bolt-On Panelboard Circuit Breakers



Typical GHB

Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-375b as follows:

- Type GHB, 120 and 240 V:
 - 1 Pole: Class 11a
 - 2, 3 Poles: Classes 10b, 11b, 12b, 14b, 15b
 - UL/CSA
- Type GHB, 277 and 480Y/277 V:
 - 1 Pole: Classes 12c, 13a
 - 2, 3 Poles: Class 13b
 - Type HGHB 277 V
 - Type GHQ 277 V

Product Selection

Table 45-124. Type GHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units ①

Continuous Ampere Rating at 40°C	277/480 Vac Maximum, 125 Vdc Maximum ②		277/480 Vac Maximum, 125/250 Vdc Maximum		277/480 Vac Maximum, 125/250 Vdc Maximum ③	
	1-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
15	GHB1015 ④⑤		GHB2015 ④		GHB3015 ④	
20	GHB1020 ④⑤		GHB2020 ④		GHB3020 ④	
25	GHB1025		GHB2025		GHB3025	
30	GHB1030		GHB2030		GHB3030	
35	GHB1035		GHB2035		GHB3035	
40	GHB1040		GHB2040		GHB3040	
45	GHB1045		GHB2045		GHB3045	
50	GHB1050		GHB2050		GHB3050	
60	GHB1060		GHB2060		GHB3060	
70	GHB1070		GHB2070		GHB3070	
80	GHB1080		GHB2080		GHB3080	
90	GHB1090		GHB2090		GHB3090	
100	GHB1100		GHB2100		GHB3100	

- ① 480Y/277 V, circuit breakers (Type GHB) not suitable for 3-phase Delta (480 V).
- ② 15 through 70 ampere circuit breakers only.
- ③ Use (2) outside poles.
- ④ Uses .190 (4.83) -32 screw type clamp terminals.
- ⑤ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, 1-pole are SWD rated.

Table 45-125. Type HGHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc Maximum	
	1-Pole	
	Catalog Number	Price U.S. \$
15	HGHB1015 ⑥	
20	HGHB1020 ⑥	
25	HGHB1025	
30	HGHB1030	

- ⑥ 15 and 20 ampere, 1-pole are SWD rated.

Table 45-126. Type GHQ Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum 14 kAIC, No dc Rating (HID & SWD)	
	1-Pole	
	Catalog Number	Price U.S. \$
15	GHQ1015 ⑦	
20	GHQ1020 ⑦	

- ⑦ Includes 4A33462H01 load clip.

G-Frame

Type GHBGFEP Bolt-On Panelboard 30 mA Industrial Ground Fault Circuit Protectors



Single-Phase (Requires 2 Poles)

Technical Data

Table 45-127. Interrupting Capacity Ratings

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

Product Selection

Table 45-128. 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 2 Poles) 277 Vac, 30 mA	
	Catalog Number	Price U.S. \$
15	GHBGFEP1015	
20	GHBGFEP1020	
30	GHBGFEP1030	
40	GHBGFEP1040	
50	GHBGFEP1050	
60	GHBGFEP1060	

Product Description

- 15 – 60 amperes, 277 V, 50/60 Hz.
- Operational voltage 240 V to 305 V.

Standards and Certifications

45

These circuit breakers meet the requirements of UL 489 and UL 1053.

Discount Symbol **CB-2**

**Types GHC and HGHC
Circuit Breakers**



Typical GHC

Product Description

- 15 – 100 amperes.
- 120, 240, 277, 480Y/277 V, 50/60 Hz, 125, 125/250 Vdc.
- 1, 2 and 3 poles.
- Cable in, cable out.
- Does not include mounting hardware.

Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-37b as follows:

- Type GHC, 277 and 480Y/277 V:
 - 1 Pole: Classes 12c, 13a
 - 2, 3 Poles: Class 13b
 - UL/CSA

Product Selection

Table 45-129. 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	
	1-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
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	

- ① 15 through 70 ampere circuit breakers only.
- ② Use (2) outside poles.
- ③ Uses .190-32 screw type clamp terminals.
- ④ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, 1-pole are SWD rated.

Table 45-130. Type HGHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc Maximum	
	1-Pole	
	Catalog Number	Price U.S. \$
15	HGHC1015 ⑤	
20	HGHC1020 ⑤	
25	HGHC1025	
30	HGHC1030	

- ⑤ 15 and 20 ampere, 1-pole are SWD rated.

**Type GHCGFEP Cable-In/
 Cable-Out 30 mA
 Industrial Ground Fault
 Circuit Protectors**



*Single-Phase
 (Requires 2 Pole Spaces)*

Technical Data and Specifications

Table 45-131. Interrupting Capacity Ratings

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

Product Selection

Table 45-132. Type GHCGFEP 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	Single-Phase (Requires 2 Poles) 277 V, 30 mA	
	Catalog Number	Price U.S. \$
15	GHCGFEP1015	
20	GHCGFEP1020	
30	GHCGFEP1030	
40	GHCGFEP1040	
50	GHCGFEP1050	
60	GHCGFEP1060	

Product Description

- 15 – 60 amperes, 277 V, 50/60 Hz.
- Operational voltage 240 V to 305 V.

45

Standards and Certifications

These circuit breakers meet the requirements of UL 489 and UL 1053.

**Special Purpose
GHC Circuit Breakers**

Product Description

Eaton’s Cutler-Hammer Type GHC circuit breakers have binding head screw-type terminals on line and load side. These circuit breakers with screw-type terminals (.190-32) will be marked “Special purpose breaker not for general use.” To order this special breaker, use the Catalog Number from **Tables 45-133 and 45-134.**

Product Selection

Table 45-133. 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 ①	
	1-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
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	

① Use (2) outside poles.

Table 45-134. 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	
		1-Pole	
		Catalog Number	Price U.S. \$
Cable-in	15	GHC1015HID	
	20	GHC1020HID	
Bolt-on	15	GHB1015HID	
	20	GHB1020HID	

F-Frame



Typical F-Frame Breaker



F-Frame Breaker with Electronic Trip Unit

45

Product Description

- All Eaton's Cutler-Hammer F-Frame Circuit Breakers by 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

Technical Data and Specifications

Table 45-135. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts ac (50/60 Hz)				Volts dc ^①	
		240	277	480	600	125	250 ^{②③}
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	—
FDE ^④	2, 3, 4	65	—	35	18	—	10
HFDE,	1	—	65	—	—	10	—
HFDE ^④	2, 3, 4	100	—	65	25	—	22
FDC ^⑤ ,	2, 3, 4	200	—	100	35	—	22
FDCE ^{④⑤⑥}							

^① dc ratings apply to substantially non-inductive circuits.

^② 2-pole circuit breaker, or two poles of 3-pole circuit breaker.

^③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

^④ Electronics available on 3-pole only, no dc rating for FDE, HFDE, FDCE.

^⑤ Current limiting.

^⑥ Check with Eaton for availability.

Table 45-136. IEC 157-1 (P1) Interrupting Capacity Ratings (P1)

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts ac (50/60 Hz)				Volts dc ^⑦	
		220, 240	380, 415	440	500	125	250 ^{⑧⑨}
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

^⑦ dc ratings apply to substantially non-inductive circuits.

^⑧ 2-pole circuit breaker, or two poles of 3-pole circuit breaker.

^⑨ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

Table 45-137. Digitrip Electronic Trip Units

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

F-Frame

Table 45-138. F-Frame Digitrip Specifications

Trip Unit Type	Digitrip RMS 310+	
rms Sensing	Yes	
Breaker Type		
Frame Ampere Range Interrupting Rating at 480 V	FDE 15 – 225 A 35, 65, 100 (kA)	
Protection		
Ordering Options	LS LSG	LSI LSIG
Fixed Rated Plug (I_n) Overtemperature Trip	No Yes	
Long Delay Protection (L)		
Adjustable Rating Plug (I_n) Long Delay Pickup Long Delay Time I^2t	No 40 – 100% Frame 2 – 24 Seconds	
Long Delay Time I^4t Long Delay Thermal Memory High Load Alarm	No Yes Yes	
Short Delay Protection (S)		
Short Delay Pickup	200 – 1000% x (I_r)	
Short Delay Time I^2t Short Delay Time Flat	Yes No	No Inst – 300 ms
Short Delay Time Z.S.I.	Yes ^①	
Instantaneous Protection (I)		
Instantaneous Pickup Discriminator Instantaneous Override	No No Yes	
Ground Fault Protection (G)		
Ground Fault Alarm Ground Fault Pickup Ground Fault Delay I^2t	No 20 – 100% Frame No	
Ground Fault Delay Flat Ground Fault Z.S.I. Ground Fault Thermal Memory	Inst – 300 ms Yes ^① Yes	
System Diagnostics		
Cause of Trip LEDs Magnitude of Trip Information Remote Signal Contacts	No No No	
System Monitoring		
Digital Display Current Voltage	No No No	
Power and Energy Power Quality Harmonics Power Factor	No No No	
Communications		
PowerNet	No	
Testing		
Testing Method	Test Kit	

^① ZSI (Zone Selective Interlocking) is optional. Must order with ZSI. Standard 310+ does not come with ZSI.

Legend: I_n = Rating Plug
 I_r = Long Delay Pickup Setting x I_n

F-Frame

Dimensions/Weights

Table 45-139. Dimensions in Inches (mm)

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)

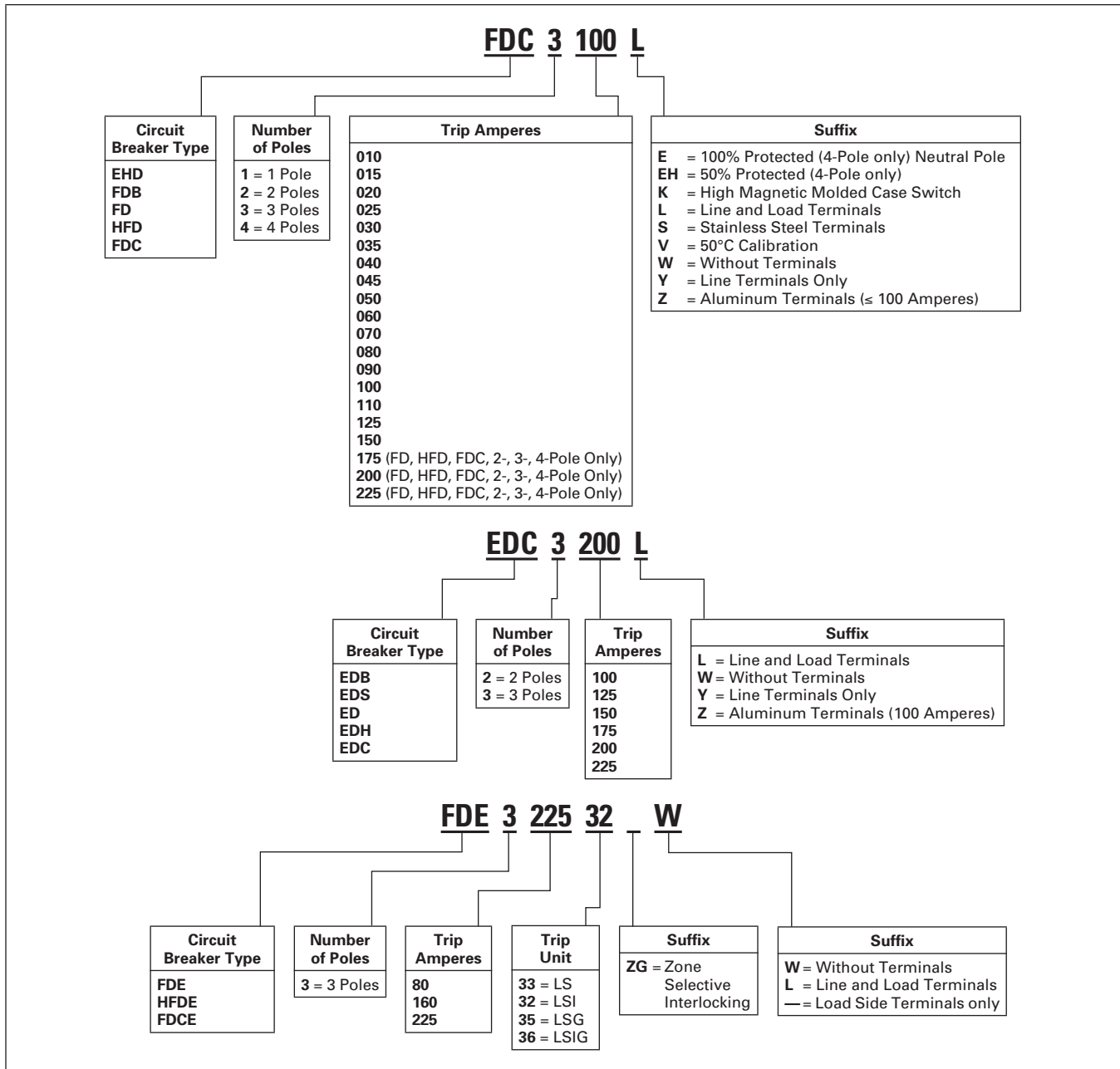
Table 45-140. Approximate Shipping Weight, Lbs. (kg)

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 (.9)	3 (1.4)	4.5 (2.0)	6 (2.7)
FDE, HFDE, FDCE	—	—	4.5 (2.0)	—

Product 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.

Table 45-141. Circuit Breaker Catalog Numbering System



F-Frame

Product Selection

Table 45-142. Types ED, EDH and 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)											
	65 kAIC at 240 Vac				100 kAIC at 240 Vac				200 kAIC at 240 Vac			
	Type ED				Type EDH				Type EDC Current Limiting			
	2-Pole		3-Pole		2-Pole		3-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
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		EDH2100		EDH3100		EDC2100		EDC3100	
125	ED2125		ED3125		EDH2125		EDH3125		EDC2125		EDC3125	
150	ED2150		ED3150		EDH2150		EDH3150		EDC2150		EDC3150	
175	ED2175		ED3175		EDH2175		EDH3175		EDC2175		EDC3175	
200	ED2200		ED3200		EDH2200		EDH3200		EDC2200		EDC3200	
225	ED2225		ED3225		EDH2225		EDH3225		EDC2225		EDC3225	

Table 45-143. Types EDB and 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)							
	22 kAIC at 240 Vac				42 kAIC at 240 Vac			
	Type EDB				Type EDS			
	2-Pole		3-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
100	EDB2100		EDB3100		EDS2100		EDS3100	
110	EDB2110		EDB3110		EDS2110		EDS3110	
125	EDB2125		EDB3125		EDS2125		EDS3125	
150	EDB2150		EDB3150		EDS2150		EDS3150	
175	EDB2175		EDB3175		EDS2175		EDS3175	
200	EDB2200		EDB3200		EDS2200		EDS3200	
225	EDB2225		EDB3225		EDS2225		EDS3225	

Table 45-144. Type EHD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc				480 Vac Maximum, 250 Vdc			
	14 kAIC at 277 Vac		14 kAIC at 480 Vac					
	Type EHD (Includes Terminals on Load End Only)							
	1-Pole		2-Pole		3-Pole			
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
10 ①	EHD1010		EHD2010		EHD3010			
15	EHD1015 ②		EHD2015		EHD3015			
20	EHD1020 ②		EHD2020		EHD3020			
25	EHD1025		EHD2025		EHD3025			
30	EHD1030		EHD2030		EHD3030			
35	EHD1035		EHD2035		EHD3035			
40	EHD1040		EHD2040		EHD3040			
45	EHD1045		EHD2045		EHD3045			
50	EHD1050		EHD2050		EHD3050			
60	EHD1060		EHD2060		EHD3060			
70	EHD1070		EHD2070		EHD3070			
80	EHD1080		EHD2080		EHD3080			
90	EHD1090		EHD2090		EHD3090			
100	EHD1100		EHD2100		EHD3100			

① Not UL listed. 5 kAIC interrupting rating.
 ② UL listed for SWD applications, see NEC® Article 240-83(d).

F-Frame

Table 45-145. Type FD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Max. Cont. Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc						277 Vac Maximum, 125 Vdc		600 Vac Maximum, 250 Vdc					
	14 kAIC at 600 Vac						35 kAIC at 277 Vac		35 kAIC at 480 Vac					
	Type FDB (Includes Terminals on Load End Only)						Type FD (Includes Terminals on Load End Only)							
	2-Pole		3-Pole		4-Pole		1-Pole		2-Pole		3-Pole		4-Pole	
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	
10 ①	FDB2010		FDB3010		FDB4010		FD1010		—		—		—	
15	FDB2015		FDB3015		FDB4015		FD1015 ②		FD2015		FD3015		FD4015	
20	FDB2020		FDB3020		FDB4020		FD1020 ②		FD2020		FD3020		FD4020	
25	FDB2025		FDB3025		FDB4025		FD1025		FD2025		FD3025		FD4025	
30	FDB2030		FDB3030		FDB4030		FD1030		FD2030		FD3030		FD4030	
35	FDB2035		FDB3035		FDB4035		FD1035		FD2035		FD3035		FD4035	
40	FDB2040		FDB3040		FDB4040		FD1040		FD2040		FD3040		FD4040	
45	FDB2045		FDB3045		FDB4045		FD1045		FD2045		FD3045		FD4045	
50	FDB2050		FDB3050		FDB4050		FD1050		FD2050		FD3050		FD4050	
60	FDB2060		FDB3060		FDB4060		FD1060		FD2060		FD3060		FD4060	
70	FDB2070		FDB3070		FDB4070		FD1070		FD2070		FD3070		FD4070	
80	FDB2080		FDB3080		FDB4080		FD1080		FD2080		FD3080		FD4080	
90	FDB2090		FDB3090		FDB4090		FD1090		FD2090		FD3090		FD4090	
100	FDB2100		FDB3100		FDB4100		FD1100		FD2100		FD3100		FD4100	
110	FDB2110		FDB3110		FDB4110		FD1110		FD2110		FD3110		FD4110	
125	FDB2125		FDB3125		FDB4125		FD1125		FD2125		FD3125		FD4125	
150	FDB2150		FDB3150		FDB4150		FD1150		FD2150		FD3150		FD4150	
175	—		—		—		—		FD2175		FD3175		FD4175	
200	—		—		—		—		FD2200		FD3200		FD4200	
225	—		—		—		—		FD2225		FD3225		FD4225	

① Not UL listed. 5 kAIC interrupting rating.

② UL listed for SWD applications, see NEC Article 240-83(d).

Table 45-146. Types HFD and FDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Max. Cont. Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc		600 Vac Maximum, 250 Vdc				600 Vac Maximum, 250 Vdc						
	65 kAIC at 277 Vac		65 kAIC at 480 Vac				100 kAIC at 480 Vac						
	Type HFD (Includes Terminals on Load End Only)						Type FDC Current Limiting (Includes Terminals on Load End Only)						
	1-Pole		2-Pole		3-Pole		4-Pole		2-Pole		3-Pole		4-Pole
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
15	HFD1015 ③		HFD2015		HFD3015		HFD4015		FDC2015		FDC3015		FDC4015
20	HFD1020 ③		HFD2020		HFD3020		HFD4020		FDC2020		FDC3020		FDC4020
25	HFD1025		HFD2025		HFD3025		HFD4025		FDC2025		FDC3025		FDC4025
30	HFD1030		HFD2030		HFD3030		HFD4030		FDC2030		FDC3030		FDC4030
35	HFD1035		HFD2035		HFD3035		HFD4035		FDC2035		FDC3035		FDC4035
40	HFD1040		HFD2040		HFD3040		HFD4040		FDC2040		FDC3040		FDC4040
45	HFD1045		HFD2045		HFD3045		HFD4045		FDC2045		FDC3045		FDC4045
50	HFD1050		HFD2050		HFD3050		HFD4050		FDC2050		FDC3050		FDC4050
60	HFD1060		HFD2060		HFD3060		HFD4060		FDC2060		FDC3060		FDC4060
70	HFD1070		HFD2070		HFD3070		HFD4070		FDC2070		FDC3070		FDC4070
80	HFD1080		HFD2080		HFD3080		HFD4080		FDC2080		FDC3080		FDC4080
90	HFD1090		HFD2090		HFD3090		HFD4090		FDC2090		FDC3090		FDC4090
100	HFD1100		HFD2100		HFD3100		HFD4100		FDC2100		FDC3100		FDC4100
110	HFD1110		HFD2110		HFD3110		HFD4110		FDC2110		FDC3110		FDC4110
125	HFD1125		HFD2125		HFD3125		HFD4125		FDC2125		FDC3125		FDC4125
150	HFD1150		HFD2150		HFD3150		HFD4150		FDC2150		FDC3150		FDC4150
175	—		HFD2175		HFD3175		HFD4175		FDC2175		FDC3175		FDC4175
200	—		HFD2200		HFD3200		HFD4200		FDC2200		FDC3200		FDC4200
225	—		HFD2225		HFD3225		HFD4225		FDC2225		FDC3225		FDC4225

③ UL listed for SWD applications, see NEC Article 240-83(d).

F-Frame

Table 45-147. Types FDE, HFDE and FDCE Electronic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Ampere Rating	Neutral CT for LSG and LSIG	LS		LSI		LSG		LSIG	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
IC Rating 35 kAIC at 480 Vac									
80	CTF080	FDE308033		FDE308032		FDE308035		FDE308036	
160	CTF160	FDE316033		FDE316032		FDE316035		FDE316036	
225	CTF225	FDE322533		FDE322532		FDE322535		FDE322536	
IC Rating 65 kAIC at 480 Vac									
80	CTF080	HFDE308033		HFDE308032		HFDE308035		HFDE308036	
160	CTF160	HFDE316033		HFDE316032		HFDE316035		HFDE316036	
225	CTF225	HFDE322533		HFDE322532		HFDE322535		HFDE322536	
IC Rating 100 kAIC at 480 Vac ①									
80	CTF080	FDCE308033		FDCE308032		FDCE308035		FDCE308036	
160	CTF160	FDCE316033		FDCE316032		FDCE316035		FDCE316036	
225	CTF225	FDCE322533		FDCE322532		FDCE322535		FDCE322536	

① Check with Eaton for availability.

Molded Case Switches

Eaton's Cutler-Hammer 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 Inc., Standard UL 1087.

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 Inc., 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.

Table 45-148. FDE Electronic Breaker with Zone Selective Interlocking

Ampere Rating	Catalog Number			
	LSI w/ZSI		LSIG w/ZSI	
	Price U.S. \$		Price U.S. \$	
35 kAIC at 480 Vac				
80	FDE308032ZG		FDE308036ZG	
160	FDE316032ZG		FDE316036ZG	
225	FDE322532ZG		FDE322536ZG	
65 kAIC at 480 Vac				
80	HFDE308032ZG		HFDE308036ZG	
160	HFDE316032ZG		HFDE316036ZG	
225	HFDE322532ZG		HFDE322536ZG	

Table 45-149. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	Complete Circuit Breaker with Load Side Terminals Only					
	480 Vac Maximum, 250 Vdc			600 Vac Maximum, 250 Vdc		
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole						
100	EHD2100K		FD2100K		HFD2100K	
150	—		FD2150K		HFD2150K	
225	—		FD2225K		HFD2225K	
3-Pole						
100	EHD3100K		FD3100K		HFD3100K	
150	—		FD3150K		HFD3150K	
225	—		FD3225K		HFD3225K	
4-Pole						
100	—		FD4100K		HFD4100K	
150	—		FD4150K		HFD4150K	
225	—		FD4225K		HFD4225K	

Note: Molded Case Switches will open above 1800 amperes.

Table 45-150. Breaker Mount Ammeter

Description	Catalog Number	Price U.S. \$
Breaker Mount Ammeter	DIGIVIEW	

Note: Use on FDE, HFDE and FDCE electronic trip only.



Ammeter

F-Frame

Line and Load Terminals (Continued)

Table 45-151. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range	Metric Wire Range mm ²	Package of 3 Terminals	
					Catalog Number	Price U.S. \$
Standard Pressure Type Terminals						
20 (EHD)	Steel	Cu/Al	14 – 10	2.5 – 4	3T20FB ①	
100	Steel	Cu/Al	14 – 1/0	2.5 – 50	3T100FB	
225	Aluminum	Cu/Al	4 – 4/0	25 – 95	3TA225FD	
Optional Pressure Terminals						
50	Aluminum	Cu/Al	14 – 4	2.5 – 25	3TA50FB ①	
100	Aluminum	Cu/Al	14 – 1/0	2.5 – 50	3TA100FD	
200	Stainless Steel	Cu	4 – 4/0	25 – 95	3T150FB	
225	Aluminum	Cu/Al	6 – 300 kcmil	16 – 150	3TA225FDK ②	

① Not for use with ED, EDH, EDC breakers.

② Includes terminal shield kit. Adds approximately 3 inches (76.2) to breaker height. Available for use on 3-pole breaker only.

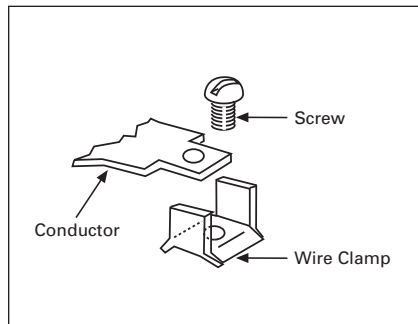


Figure 45-15. 3T20FB
Assemble wire clamp to bottom of conductor as shown.

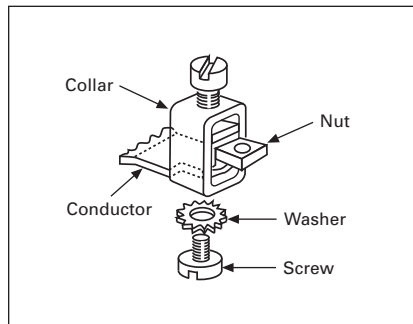


Figure 45-16. 3T100FB, 3T150FB
Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer. **Caution:** Collar must surround conductor.

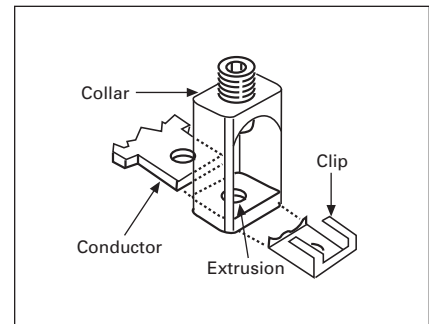


Figure 45-17. 3TA225FD
Insert collar enclosing conductor and center on extrusion on collar. Install clip with legs on top of conductor and snap end around bottom of collar.

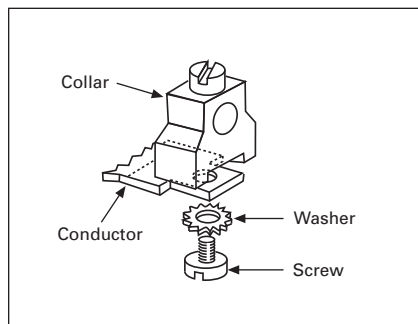


Figure 45-18. 3TA50FB
Assemble collar on top of conductor as shown. Tighten securely with screw and washer.

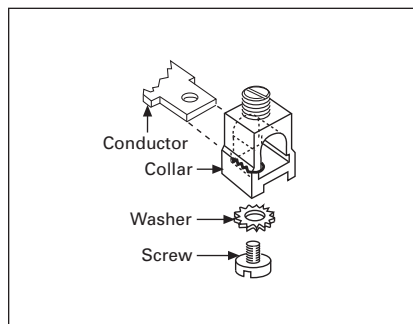


Figure 45-19. 3TA100FD
Collar slides onto conductor and is held in position by a screw and lockwasher.

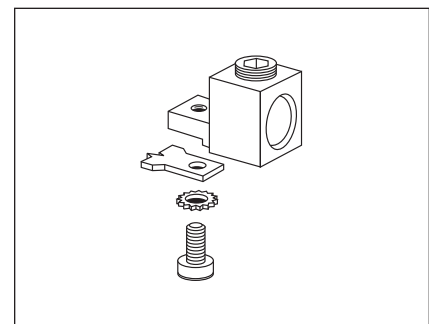


Figure 45-20. 3TA225FDK (Up to 150 mm²)
Assemble collar on top of conductor as shown. Tighten securely with screw and washer. Terminal shield must be used with this collar.

Note: For 185 mm², use 3TA225FDK1.

F-Frame

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.

Table 45-152. Accessories

Description	Reference Page	1-Pole			2-Pole			3-Pole			4-Pole			
		Center	Left	Right	Left	Center	Right	Left	Center	Right	Left	Center	Right	Neutral
Internal Accessories (Only one internal accessory per pole)														
Alarm Lockout Switch (Make Only)	45-182	■												
Alarm Lockout (Make/Break)	45-182			■	□			□	■					
Alarm Lockout (2Make/2Break)	45-182			■	□			□	■					
Auxiliary Switch (1A, 1B)	45-185			■	■			■	■					■
Auxiliary Switch (2A, 2B)	45-185			■	■			■	■					■
Auxiliary Switch and Alarm Switch Combination	45-188			■	□			□	■					
Shunt Trip — Standard	45-191			■	■			■	■					■
Shunt Trip — Low Energy	45-196			■	■			■	■					
Undervoltage Release Mechanism	45-197			■	■			■	■					
External Accessories														
End Cap Kit	45-208			●				●						●
Keeper Nut	45-208	●		●				●						●
Control Wire Terminal Kit	45-209	●		●				●						●
Multewire Connectors	45-210	●		●				●						●
Base Mounting Hardware	45-211	●		●				●						●
Terminal Shields	45-213	●		●				●						●
Terminal End Covers	45-214							●						
Interphase Barriers	45-214			●				●						●
Non-Padlockable Handle Block	45-216	■	■					■				■		
Snap-on Padlockable Handle Lock Hasp	45-216	■	■					■				■		
Padlockable Handle Lock Hasp	45-217			■	□			□		□		□		□
Cylinder Lock	45-217				■									
Key Interlock Kit	45-218			■	□			□		□		□		□
Sliding Bar Interlock — Requires Two Breakers	45-219							●						
Walking Beam Interlock — Requires Two Breakers	45-219							●						●
Electrical (Solenoid and Motor) Operators	45-220							●						●
Plug-in Adapters	45-222			●				●						●
Rear Connecting Studs	45-223	●		●				●						●
Panelboard Connecting Straps	45-226	●		●				●						●
Handle Mechanisms	45-227							●						
LFD Current Limiter	45-233							●						
IQ Energy Sentinel	45-233			●				●						
Modifications (Refer to Eaton)														
Special Calibration	—	●		●				●						●
Moisture Fungus Treatment	—	●		●				●						●
Freeze-Tested Circuit Breakers	—	●		●				●						●
Marine Application	—	●		●				●						●

■ Applicable in indicated pole position □ May be mounted on left or right pole — not both ● Accessory available/Modification available

J-Frame

J-Frame



Typical J-Frame Circuit Breaker

Product Description

- All Eaton's Cutler-Hammer 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

Technical Data and Specifications

Table 45-153. 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 ^{①②}
JDB	2, 3	65	35	18	—	10
JD	2, 3, 4	65	35	18	—	10
HJD	2, 3, 4	100	65	25	—	22
JDC ^③	2, 3, 4	200	100	35	—	22

^① 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.

^② Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

^③ Current limiting.

Table 45-154. 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 ^{④⑤}
JD	2, 3, 4	65	35	35	—	—	10
HJD	2, 3, 4	100	65	65	—	—	22
JDC	2, 3, 4	200	100	100	—	—	22

^④ 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.

^⑤ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

J-Frame

Dimensions/Weights

Table 45-155. Dimensions in Inches (mm)

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)

Table 45-156. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker			Frame Only			Trip Unit		
	Number of Poles								
	2	3	4	2	3	4	2	3	4
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 (.9)	2.00 (.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 (.9)	2.00 (.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 (.9)	2.00 (.9)	2.25 (1.0)

Product 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.

Table 45-157. Circuit Breaker/Frame Catalog Numbering System

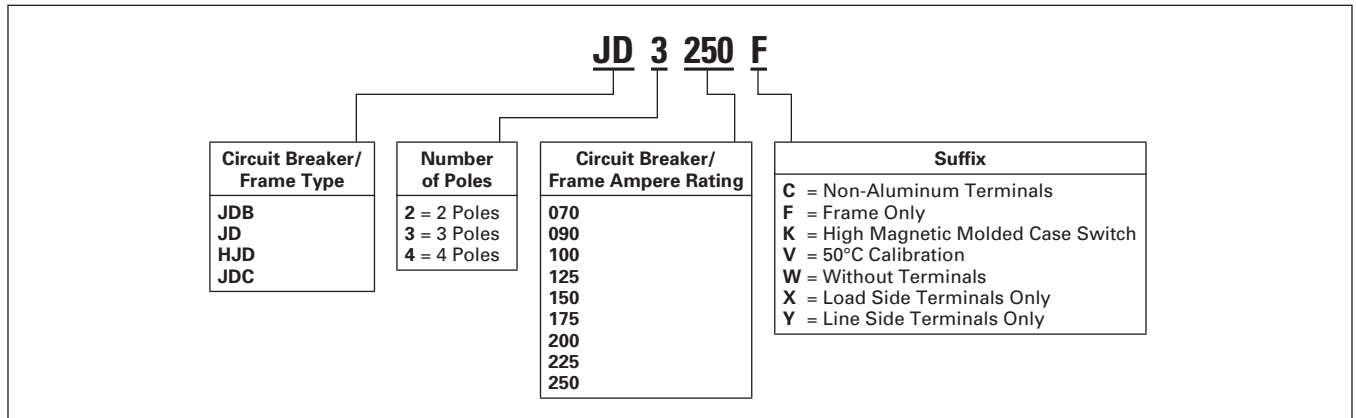
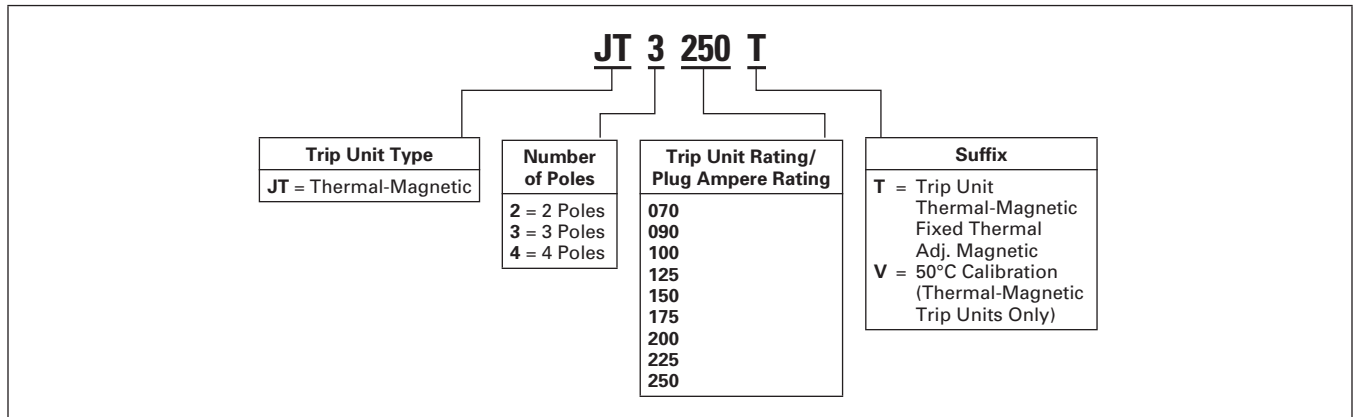


Table 45-158. Trip Unit Catalog Numbering System



J-Frame

Product Selection

Table 45-159. Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Max. Cont. Amp Rating at 40°C	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 ①		Standard Terminals Only	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		For Use with Standard or High or Ultra High Interrupting Frames		See Page 45-90 for Optional Terminals	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole										
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			
3-Pole										
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			
4-Pole ③④										
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			

- 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.

Table 45-160. Types JD, HJD and JDC 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	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole					
JD2250F		HJD2250F		JDC2250F	
3-Pole					
JD3250F		HJD3250F		JDC3250F	
4-Pole					
JD4250F		HJD4250F		JDC4250F	

Discount Symbol CB-2

J-Frame

Table 45-161. 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		With Standard Line and Load Terminals Only	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2-Pole

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	

3-Pole

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 Cutler-Hammer 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 1087.

Table 45-162. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc				Standard Terminals Only	
	Complete Circuit Breaker Only without Line and Load Terminals				See Page 45-90 for Optional Terminals	
	—		Suitable for Reverse Feed Use			
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2-Pole

250	JD2250KW HJD2250KW		JDB2250KW HJDB2250KW		TA250KB ① —	
-----	-----------------------	--	-------------------------	--	----------------	--

3-Pole

250	JD3250KW HJD3250KW		JDB3250KW HJDB3250KW		TA250KB ① —	
-----	-----------------------	--	-------------------------	--	----------------	--

4-Pole

250	JD4250KW HJD4250KW		JDB4250KW HJDB4250KW		TA250KB ① —	
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① Individually packed.

Note: Molded case switches may open above 2500 amperes.

J-Frame

Line and Load Terminals

Eaton’s Cutler-Hammer 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 which 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.

Table 45-163. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/ No. Conductors	Metric Wire Range mm ²	Catalog Number	Price U.S. \$
Standard Cu/Al Pressure Terminals						
250	Aluminum	Cu/Al	4 – 350 kcmil	25 – 185	TA250KB	
Optional Cu Pressure Terminals						
250	Stainless Steel	Cu	4 – 350 kcmil	25 – 185	T250KB	

Note: No dual lugs. See multiwire lugs **Page 45-210**.

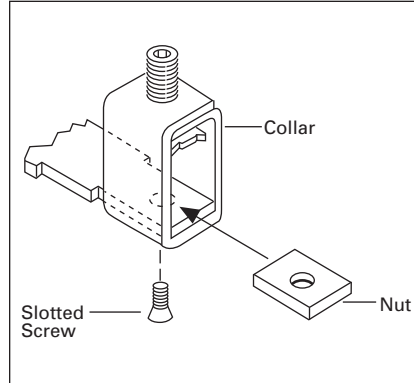


Figure 45-21. T250KB Terminal

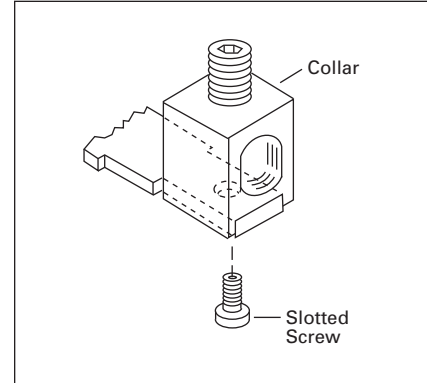


Figure 45-22. TA250KB Terminal (Standard)

J-Frame

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.

Table 45-164. Accessories

Description	Reference Page	2-, 3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	45-182	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	
Auxiliary Switch (1A, 1B)	45-185	■		■	■		■	
Auxiliary Switch (2A, 2B)	45-185	■		■	■		■	
Auxiliary Switch and Alarm Switch Combination	45-188	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	
Shunt Trip — Standard	45-191	■		■	■		■	
Shunt Trip — Low Energy	45-196	■		■	■		■	
Undervoltage Release Mechanism	45-197	■		■	■		■	
External Accessories								
End Cap Kit	45-208		●			●		
Plug Nut	45-209		●			●		
Control Wire Terminal Kit	45-209		●			●		
Multewire Connectors	45-210		●			●		
Base Mounting Hardware	45-211		●			●		
Terminal Shields	45-213		●			●		
Interphase Barriers	45-214		●			●		
Non-Padlockable Handle Block	45-216		■			■		
Padlockable Handle Block	45-216		■			■		
Padlockable Handle Lock Hasp	45-217	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	
Cylinder Lock	45-217	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	
Key Interlock Kit	45-218	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	
Sliding Bar Interlock — Requires Two Breakers	45-219		●			●		
Electrical (Solenoid) Operator	45-220		●			●		
Plug-in Adapters	45-222		●			●		
Rear Connecting Studs	45-223		●			●		
Panelboard Connecting Straps	45-226		●			●		
Handle Mechanisms	45-227		●			●		
Handle Extension	45-232		●			●		
IQ Energy Sentinel	45-233		●			●		
Modifications (Refer to Eaton)								
Special Calibration	—		●			●		
Moisture Fungus Treatment	45-266		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application	—		●			●		

■ Applicable in indicated pole position □ May be mounted on left or right pole — not both ● Accessory available/Modification available

K-Frame

K-Frame



Typical K-Frame Circuit Breaker

Product Description

- All Cutler-Hammer K-Frame Circuit Breakers by Eaton Corporation 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.

Technical Data and Specifications

Table 45-165. NEMA/UL 489/CSA Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					Volts dc
		Volts ac (50/60 Hz)					
		240	277	480	600	250 ^{①②}	
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 ^③	2, 3, 4	200	—	100	65	22	
CKD	3	65	—	35	25	—	
CHKD	3	100	—	65	35	—	

① 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.

② Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

③ Current limiting.

Table 45-166. IEC 157-1 (P1) Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)						Volts dc
		Volts ac (50/60 Hz)						
		240	380	415	440	500	600	
DK	2, 3	65	—	—	—	—	—	10
KDB	2, 3, 4	65	40	40	—	—	—	10
KD	2, 3, 4	65	40	40	—	—	—	10
HKD, HKDB	2, 3, 4	100	65	65	—	—	—	22
KDC	2, 3, 4	200	100	100	—	—	—	22

④ 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.

⑤ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

K-Frame

K-Frame Digitrip Specifications

Table 45-167. Specifications

Trip Unit Type	Digitrip RMS 310	Digitrip OPTIM 550	Digitrip OPTIM 1050	
rms Sensing	Yes	Yes	Yes	
Breaker Type				
Frame	K	K	K	
Ampere Range	125 – 400A	125 – 400A	125 – 400A	
Interrupting Rating at 480 Volts	35, 65, 100 (kA)	35, 65, 100 (kA)	35, 65, 100 (kA)	
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSI(A), LSIG	LSI(A), LSIG
Fixed Rated Plug (I_N)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_N)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_N) ^①	0.5 – 1.0 (I_N) ^①	0.4 – 1.0 x (I_N)	0.4 – 1.0 x (I_N)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	0.5 – 1.0 x I_r	0.5 – 1.0 x I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% x (I_N)	200 – 800% x (I_N)	150 – 800% x (I_r)	150 – 800% x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes ^②	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% x (I_N)	200 – 800% x (I_N)	200 – 800% x (I_N)
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% x (I_S)	20 – 100% x (I_S)
Ground Fault Pickup	Varies by Frame ^⑥	Varies by Frame ^⑥	20 – 100% x (I_S)	20 – 100% x (I_S)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ^②	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ^③	Yes ^③	Yes ^②	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ^④	Yes ^④
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	Yes ^⑤	Yes
Testing				
Testing Method		Test Set	OPTIMizer, BIM, Cutler-Hammer PowerNet	

① Adjust by rating plug.

② Zone interlock kit.

③ With separate ground fault alarm unit (GFAU).

④ By OPTIMizer/BIM.

⑤ Eaton's Cutler-Hammer PowerNet kit.

 ⑥ 400 ampere frame 1 – 5 x I_g (80 A).

 250 ampere frame 1 – 5 x I_g (50 A).

 125 ampere frame 1 – 5 x I_g (25 A).

Legend: BIM = Breaker Interface Module

(A) = GF Alarm

 I_S = Sensor Rating

 I_N = Rating Plug

 I_r = Long Delay Pickup Setting

K-Frame

Dimensions/Weights

Table 45-168. Dimensions in Inches (mm)

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)

Table 45-169. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker		Frame Only		Trip Unit ^①	
	Number of Poles					
	2	3	2	3	2	3
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 (.7)	1.5 (.7)
HKD, HKDB	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (.7)	1.5 (.7)
KDC	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (.7)	1.5 (.7)

^① Weights shown are for thermal-magnetic trip units. 3-pole electronic trip units weigh 2.5 lbs. (1.1 kg).

Product 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.

Table 45-170. Circuit Breaker/Frame Catalog Numbering System

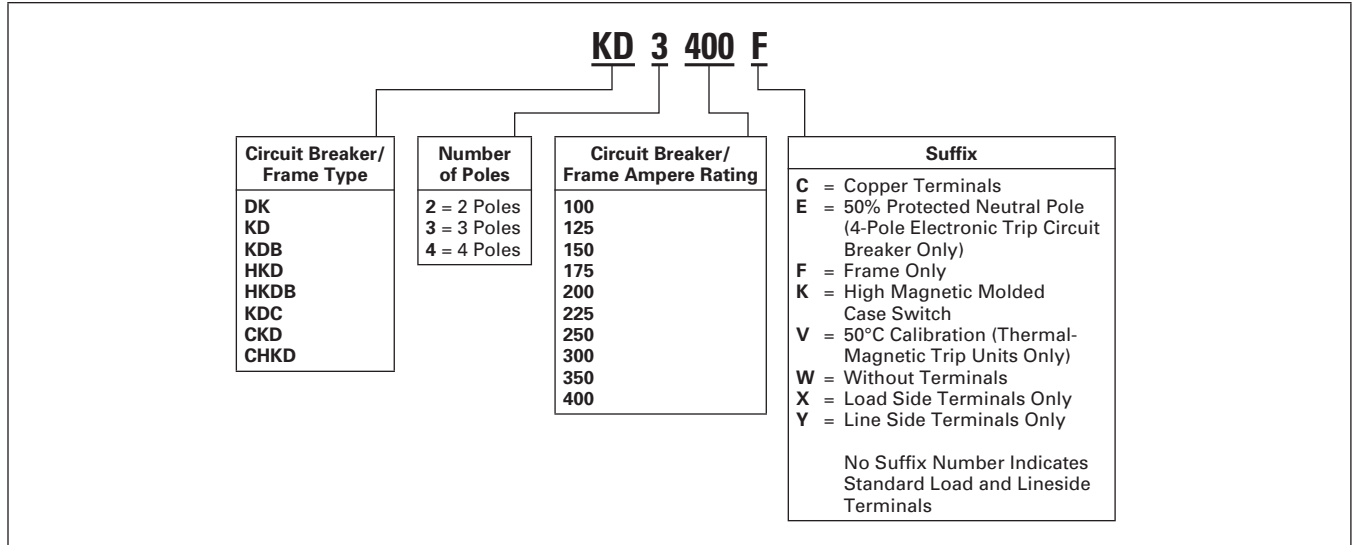
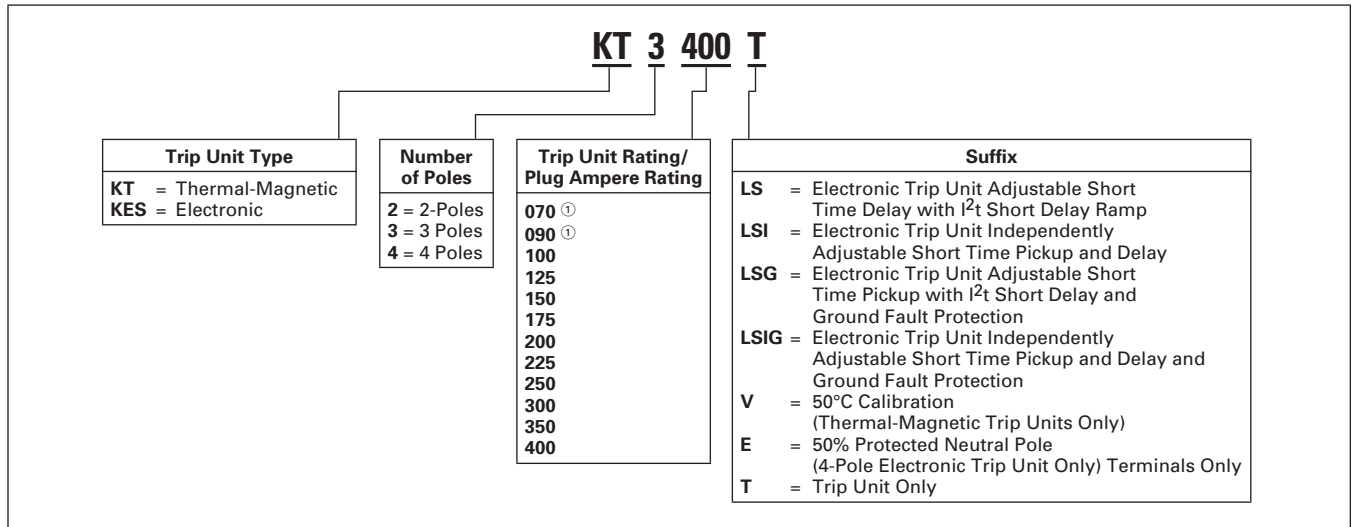
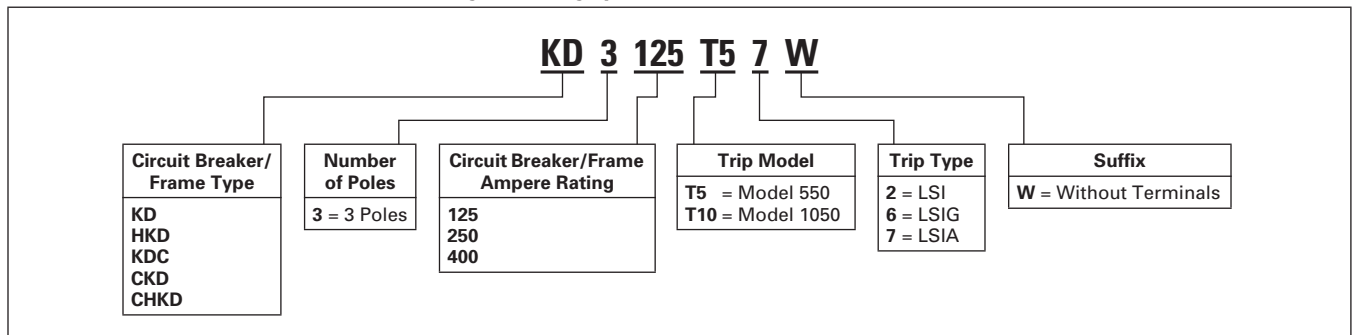


Table 45-171. Trip Unit Catalog Numbering System



① Ampere rating available with electronic trip unit only.

Table 45-172. OPTIM Circuit Breaker/Frame Catalog Numbering System



K-Frame

Product Selection

Table 45-173. 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		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 ①		Standard Terminals Only	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		For Use with Standard or High or Ultra High Interrupting Frames		See Page 45-106 for Optional Terminals	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2-Pole

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	

3-Pole

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	

4-Pole

100	KD4100		HKD4100		KDC4100		KT3100T		TA300K ②	
125	KD4125		HKD4125		KDC4125		KT3125T		TA300K ②	
150	KD4150		HKD4150		KDC4150		KT3150T		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	

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.

Table 45-174. Types KD, HKD and KDC 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	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole					
KD2400F		HKD2400F		KDC2400F	
3-Pole					
KD3400F		HKD3400F		KDC3400F	
4-Pole					
KD4400F		HKD4400F		KDC4400F	

Discount Symbol **CB-2**

Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable Trip Units

Order as individual components: Breaker Frame, Trip Unit, Rating Plug, Terminals.

Table 45-175. Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable Trip Units ①

Max. Cont. Ampere Rating at 40°C ②	Circuit Breaker Frame Only			Digitrip RMS 310 Trip Unit Only ③				Digitrip 310 Rating Plug Only			Standard Terminals Only See Page 45-106 for Optional Terminals
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Standard	Options			Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Ampere Rating	
				Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
Catalog Number								Catalog Number			

3-Pole ④

125	KD3400F	HKD3400F	KDC3400F	KES3125LS	KES3125LSI	KES3125LSG	KES3125LSIG	70	1KES070T	70/90/100/125 A1KES125T1	TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤
								90	1KES090T		
								100	1KES100T		
								110	1KES110T		
								125	1KES125T		
250	KD3400F	HKD3400F	KDC3400F	KES3250LS	KES3250LSI	KES3250LSG	KES3250LSIG	70	2KES070T	125/150/200/250 A2KES250T1	TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA350K ⑤
								100	2KES100T		
								125	2KES125T		
								150	2KES150T		
								160	2KES160T		
								175	2KES175T		
								200	2KES200T		
								225	2KES225T		
250	2KES250T										
400	KD3400F	HKD3400F	KDC3400F	KES3400LS	KES3400LSI	KES3400LSG	KES3400LSIG	200	4KES200T	200/250/300/400 A4KES400T1	TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA350K ⑤ 3TA400K ⑥
								225	4KES225T		
								250	4KES250T		
								300	4KES300T		
								350	4KES350T		
								400	4KES400T		

4-Pole ⑦⑧

125	KD4400F	HKD4400F	KDC4400F	KES4125LS	KES4125LSI	—	—	70	1KES070T	70/90/100/125 A1KES125T1	TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤
								90	1KES090T		
								100	1KES100T		
								110	1KES110T		
								125	1KES125T		
250	KD4400F	HKD4400F	KDC4400F	KES4250LS	KES4250LSI	—	—	70	2KES070T	125/150/200/250 A2KES250T1	TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA300K ⑤ TA350K ⑤
								100	2KES100T		
								125	2KES125T		
								150	2KES150T		
								160	2KES160T		
								175	2KES175T		
								200	2KES200T		
								225	2KES225T		
250	2KES250T										
400	KD4400F	HKD4400F	KDC4400F	KES4400LS	KES4400LSI	—	—	200	4KES200T	200/250/300/400 A4KES400T1	TA300K ⑤ TA300K ⑤ TA350K ⑤ TA350K ⑤ 4TA400K ⑥
								225	4KES225T		
								250	4KES250T		
								300	4KES300T		
								350	4KES350T		
								400	4KES400T		

① See Table 45-176 on Page 45-98 for prices.

② Ampere rating is established by rating plug.

③ For ac use only.

④ 3-pole KES Trip Units are for use in 3-pole frames only.

⑤ Individually packed.

⑥ 3TA400K and 4TA400K terminal kits contain one terminal for each pole and one terminal cover.

⑦ Trip unit includes protected neutral pole. Use corresponding 3-pole trip unit if protected neutral pole is not required.

⑧ Fully rated neutral pole protection is standard. For 50% rated protection on neutral pole, add Suffix E to 4-pole trip unit Catalog Number.

K-Frame

Product Selection

Table 45-176. Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable Trip Unit Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A1KES125T1 A2KES250T1 A4KES400T1 HKD3400F HKD4400F		KES3250LSI KES3250LSIG KES3400LS KES3400LSG KES3400LSI		1KES090T 1KES100T 1KES110T 1KES125T 2KES070T		4KES225T 4KES250T 4KES300T 4KES350T 4KES400T	
KDC3400F KDC4400F KD3400F KD4400F		KES3400LSIG KES4125LS KES4125LSI KES4250LS		2KES100T 2KES125T 2KES150T 2KES160T		4TA400K — — —	
KES3125LS KES3125LSG KES3125LSI KES3125LSIG KES3250LS KES3250LSG		KES4250LSI KES4400LS KES4400LSI TA300K TA350K 1KES070T		2KES175T 2KES200T 2KES225T 2KES250T 3TA400K 4KES200T		— — — — — —	

Table 45-177. Types KDB and HKDB with Non-Interchangeable Trip Unit Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40°C	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit Less Terminals and Rating Plug				Digitrip RMS 310 Rating Plug (Order as Separate Items)	
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Time Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed	Adjustable
		LS	LSI	LSG	LSIG		
Short Time Range	2 – 8 x I _n	2 – 8 x I _n	2 – 8 x I _n	2 – 8 x I _n			
Short Time Delay	—	0 – 300 ms	—	0 – 300 ms			
Ground Fault Pickup	—	—	Varies by Frame	Varies by Frame			
Ground Fault Delay	—	—	0 – 500 ms	0 – 500 ms			
Catalog Number					Catalog Number		

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

125	3	KDB3125FT33W	KDB3125FT32W	KDB3125FT35W	KDB3125FT36W	1KES070T 1KES090T 1KES100T 1KES125T	70/90/100/125 A1KES125T1
250	3	KDB3250FT33W	KDB3250FT32W	KDB3250FT35W	KDB3250FT36W	2KES070T 2KES090T 2KES100T 2KES125T 2KES150T 2KES160T 2KES175T 2KES200T 2KES225T 2KES250T	125/150/200/250 A2KES250T1
400	3	KDB3400FT33W	KDB3400FT32W	KDB3400FT35W	KDB3400FT36W	4KES200T 4KES225T 4KES250T 4KES300T 4KES350T 4KES400T	200/250/300/400 A4KES400T1 200/240/260/280 A4KES200T5 320/340/360/380 A4KES300T5

45

K-Frame

Table 45-177. Types KDB and HKDB with Non-Interchangeable Trip Unit Suitable for Reverse Feed (Continued)

Maximum Continuous Ampere Rating at 40°C	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit Less Terminals and Rating Plug				Digitrip RMS 310 Rating plug (Order as Separate Items)	
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Time Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed	Adjustable
		LS	LSI	LSG	LSIG		
Catalog Number						Catalog Number	
Short Time Range		2 – 8 x I _n	2 – 8 x I _n	2 – 8 x I _n	2 – 8 x I _n		
Short Time Delay		—	0 – 300 ms	—	0 – 300 ms		
Ground Fault Pickup		—	—	Varies by Frame	Varies by Frame		
Ground Fault Delay		—	—	0 – 500 ms	0 – 500 ms		

Type HKDB with Digitrip 310 Non-Interchangeable Trip Unit Suitable for Reverse Feed

125	3	HKDB3125FT33W	HKDB3125FT32W	HKDB3125FT35W	HKDB3125FT36W	1KES070T 1KES090T 1KES100T 1KES125T	70/90/100/125 AKES125T1
250	3	HKDB3250FT33W	HKDB3250FT32W	HKDB3250FT35W	HKDB3250FT36W	2KES070T 2KES090T 2KES100T 2KES125T 2KES150T 2KES160T 2KES175T 2KES200T 2KES225T 2KES250T	125/150/200/250 A2KES250T1
400	3	HKDB3400FT33W	HKDB3400FT32W	HKDB3400FT35W	HKDB3400FT36W	4KES200T 4KES225T 4KES250T 4KES300T 4KES350T 4KES400T	125/150/200/250 A4KES250T1 200/240/260/280 A4KES200T5 320/340/360/380 A4KES300T5

K-Frame

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

Suitable for reverse feed application.

Table 45-178. 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						600 Vac Rated, 250 Vdc			
	Complete Circuit Breaker									
	Without Line and Load Terminals		With Line Terminals Only		With Standard Line and Load Terminals Only		Without Line and Load Terminals		With Standard Line and Load Terminals	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole										
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	—	—
3-Pole										
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	—	—

45

Molded Case Switches

Eaton’s Cutler-Hammer 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 1087.

Table 45-179. 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		Complete Circuit Breaker with Standard Line and Load Terminals		Complete Circuit Breaker with Standard Line and Load Terminals. Suitable for Reverse Feed Use	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole						
400	DK2400K	—	KD2400K	—	KDB2400K	—
	—	—	HKD2400K	—	HKDB2400K	—
3-Pole						
400	DK3400K	—	KD3400K	—	KDB3400K	—
	—	—	HKD3400K	—	HKDB3400K	—
4-Pole						
400	—	—	KD4400K	—	KDB4400K	—
	—	—	HKD4400K	—	HKDB4400K	—

Note: Molded case switches may open above 4000 amperes.

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.

Table 45-180. 100% Rated Types CKD and CHKD Electronic Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only		Digitrip RMS 310 Trip Unit Only				Digitrip 310 Rating Plug Only			Standard Terminals Only See Page 45-106 for Optional Terminals
	Standard Interrupting Capacity 35 kAIC at 480 Vac	High Interrupting Capacity 65 kAIC at 480 Vac	Standard	Options			Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug	
			Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection			Ampere Rating	
Catalog Number							Catalog Number			

3-Pole

125	CKD3400F	CHKD3400F	KES3125LS	KES3125LSI	KES3125LSG	KES3125LSIG	70 90 100 110 125	1KES070T 1KES090T 1KES100T 1KES110T 1KES125T	70/90/100/125 A1KES125T1	TA300K ② TA300K ② TA300K ② TA300K ② TA300K ②
250	CKD3400F	CHKD3400F	KES3250LS	KES3250LSI	KES3250LSG	KES3250LSIG	70 100 125 150 160 175 200 225 250	2KES070T 2KES100T 2KES125T 2KES150T 2KES160T 2KES175T 2KES200T 2KES225T 2KES250T	125/150/200/225 A2KES250T1	TA300K ② TA300K ② TA300K ② TA300K ② TA300K ② TA300K ② TA300K ② TA300K ② TA350K ②
400	CKD3400F	CHKD3400F	KES3400LS	KES3400LSI	KES3400LSG	KES3400LSIG	200 225 250 300 350 400	4KES200T 4KES225T 4KES250T 4KES300T 4KES350T 4KES400T	200/250/300/400 A4KES400T1 220/240/260/280 A4KES200T5 320/340/360/380 A4KES300T5	TA300K ② TA300K ② TA350K ② TA350K ② TA350K ② 3TA400K ③

① See Table 45-181 below for prices.

② Individually packed.

③ 3TA400K terminal kit contains one terminal for each pole and one terminal cover.

Table 45-181. 100% Rated Types CKD and CHKD Electronic Circuit Breakers Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A1KES125T1 A2KES250T1 A4KES400T1 A4KES200T5 A4KES300T5		KES3250LSG KES3250LSI KES3250LSIG KES3400LS KES3400LSG		1KES070T 1KES090T 1KES100T 1KES110T 1KES125T		2KES200T 2KES225T 2KES250T 3TA400K —	
CHKD3400F CKD3400F KES3125LS KES3125LSG KES3125LSI KES3125LSIG KES3250LS		KES3400LSI KES3400LSIG TA300K TA350K — — —		2KES070T 2KES100T 2KES125T 2KES150T 2KES160T 2KES175T —		4KES200T 4KES225T 4KES250T 4KES300T 4KES350T 4KES400T —	

K-Frame

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

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

Table 45-182. Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only	
	L – Adjustable Long Delay Pickup (I _p) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I ² t or Flat Response)						Ampere Rating	Fixed Rating Plug
	OPTIM 550 ②							
	LSI		LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

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

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

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

Rating	LSI Catalog	LSI Price	LSIG Catalog	LSIG Price	LSIA Catalog	LSIA Price	Rating Plug	Rating Plug Price
125	HKD3125T52W		HKD3125T56W		HKD3125T57W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125
250	HKD3250T52W		HKD3250T56W		HKD3250T57W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250
400	HKD3400T52W		HKD3400T56W		HKD3400T57W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400

3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac

Rating	LSI Catalog	LSI Price	LSIG Catalog	LSIG Price	LSIA Catalog	LSIA Price	Rating Plug	Rating Plug Price
125	KDC3125T52W		KDC3125T56W		KDC3125T57W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125
250	KDC3250T52W		KDC3250T56W		KDC3250T57W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250
400	KDC3400T52W		KDC3400T56W		KDC3400T57W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400

① Long delay I⁴t 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 45-207 and take list price Adder x 1.25).

Discount Symbol. **CB-2**

45

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

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

Table 45-183. 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	
	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)				Ampere Rating	Fixed Rating Plug
	OPTIM 1050 ②					
	LSIG		LSIA			
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac						
125	KD3125T106W		KD3125T107W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125
250	KD3250T106W		KD3250T107W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250
400	KD3400T106W		KD3400T107W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac						
125	HKD3125T106W		HKD3125T107W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125
250	HKD3250T106W		HKD3250T107W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250
400	HKD3400T106W		HKD3400T107W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac						
125	KDC3125T106W		KDC3125T107W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125
250	KDC3250T106W		KDC3250T107W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250
400	KDC3400T106W		KDC3400T107W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400

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

K-Frame

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.

Table 45-184. 100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_p) 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)						Ampere Rating	Fixed Rating Plug
	OPTIM 550 ②							
	LSI		LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

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

Rating	LSI	LSIG	LSIA	Ampere Rating	Fixed Rating Plug
125	CKD3125T52W	CKD3125T56W	CKD3125T57W	70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125
250	CKD3250T52W	CKD3250T56W	CKD3250T57W	125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250
400	CKD3400T52W	CKD3400T56W	CKD3400T57W	200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400

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

Rating	LSI	LSIG	LSIA	Ampere Rating	Fixed Rating Plug
125	CHKD3125T52W	CHKD3125T56W	CHKD3125T57W	70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125
250	CHKD3250T52W	CHKD3250T56W	CHKD3250T57W	125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250
400	CHKD3400T52W	CHKD3400T56W	CHKD3400T57W	200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400

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 (refer to **Page 45-207** and take list price Adder x 1.25).

K-Frame

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.

Table 45-185. 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	
	L – Adjustable Long Delay Pickup (I_p) with Adjustable Long Delay Time (I^2t or I^4t Response) ①				Ampere Rating	Fixed Rating Plug
	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						
LSIG			LSIA			
Catalog Number		Price U.S. \$	Catalog Number		Price U.S. \$	
Number			Number		Number	Price U.S. \$

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

Frame Rating	Frame Type	Price U.S. \$	Frame Type	Price U.S. \$	Rating Plug	Price U.S. \$
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
					250	ORPK025A250
400	CKD3400T106W		CKD3400T107W		200	ORPK40A200
					225	ORPK40A225
					250	ORPK40A250
					300	ORPK40A300
					350	ORPK40A350
					400	ORPK40A400

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

Frame Rating	Frame Type	Price U.S. \$	Frame Type	Price U.S. \$	Rating Plug	Price U.S. \$
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

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

② Factory sealed.

K-Frame

Line and Load Terminals

Eaton's Cutler-Hammer 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.

Table 45-186. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Metric Wire Range mm ²	Terminal		Figure	Terminals with Control Wire Termination		Figure
					Catalog Number	Price U.S. \$		Catalog Number	Price U.S. \$	
Standard Cu/Al Pressure Terminals										
225	Aluminum	Cu/Al	3 – 350/(1)	35 – 185	TA300K ①		45-26	—		—
350	Aluminum	Cu/Al	250 – 500/(1)	120 – 240	TA350K ①		45-25	—		—
400	Aluminum	Cu/Al	3/0 – 250/(2)	95 – 120	2TA400K ②③ 3TA400K ②④ 4TA400K ⑤⑥		45-24	2TA400KCW ②③ 3TA400KCW ②④ 4TA400KCW ⑤⑥		45-27 45-27 45-27
Optional Copper and Cu/Al Pressure Type Terminals										
225	Copper	Cu	3 – 350/(1)	35 – 185	T300K ①		45-26	—		—
350	Copper	Cu	250 – 500/(1)	120 – 240	T350K ①		45-25	—		—
400	Copper	Cu	3/0 – 250/(2)	95 – 120	2T400K ③ 3T400K ④ 4T400K ⑤		45-24	2T400KCW ②③ 3T400KCW ②④ 4T400KCW ⑤⑥		45-27 45-27 45-27
400	Aluminum	Cu/Al	2/0 – 250/(2) or 2/0 – 500/(1)	70 – 120 70 – 240 70 – 240	2TA401K ②③ 3TA401K ②④ 4TA401K ⑤⑥		45-23	2TA401KCW ②③ 3TA401KCW ②④ 4TA401KCW ⑤⑥		45-27 45-27 45-27
400	Aluminum	Cu/Al	500 – 750/(1)	300 – 400	2TA402K ②③ 3TA402K ②④ 4TA402K ⑤⑥		45-28	—		—
400	Copper	Cu	500 – 750/(1)	—	2T402K ②③ 3T402K ②④ 4T402K ⑤⑥		45-28	—		—

45

- ① Individually packed.
- ② Terminal kits contain one terminal for each pole and one terminal cover.
- ③ 2-pole kit.
- ④ 3-pole kit.
- ⑤ 4-pole kit.
- ⑥ Terminal kits contain one terminal for each pole and three interphase barriers.

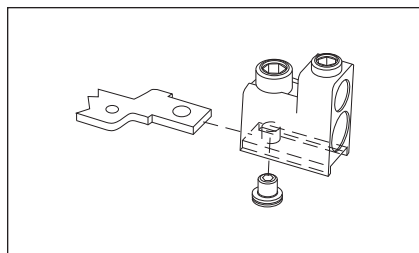


Figure 45-23. TA401K

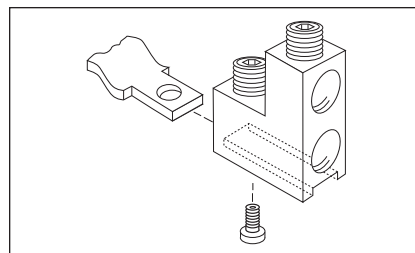


Figure 45-24. TA400K, T400K

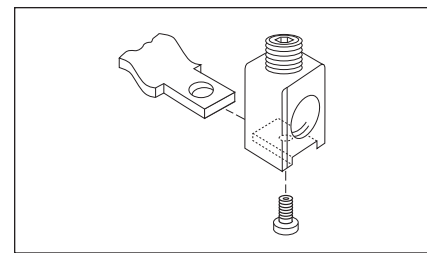


Figure 45-25. TA350K, T350K

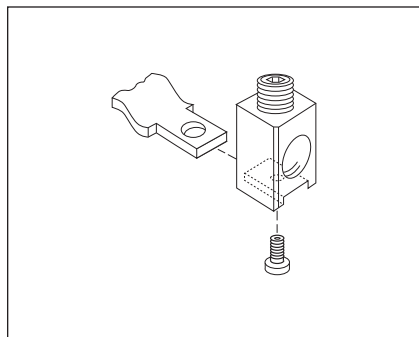


Figure 45-26. TA300K, T300K

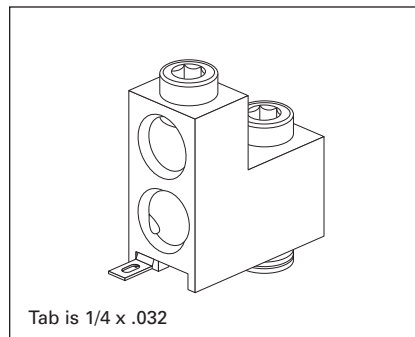


Figure 45-27. T400KCW, TA400KCW, TA401KCW

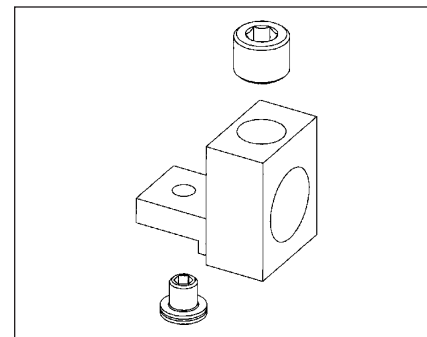


Figure 45-28. TA402K, T402K

Discount Symbol CB-2

K-Frame

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.

Table 45-187. Accessories

Description	Reference Page	2-Pole ^①		3-Pole			4-Pole			
		Left	Right	Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)										
Alarm Lockout (Make/Break)	45-182		■	□		□	■			
Alarm Lockout (2Make/2Break)	45-182			□		□	■			
Auxiliary Switch (1A, 1B)	45-185		■	■		■	■			■
Auxiliary Switch (2A, 2B)	45-185			■		■	■			■
Auxiliary Switch (3A, 3B)	45-185			■		■	■			■
Auxiliary Switch and Alarm Switch Combination	45-188			□		□	□			□
Shunt Trip — Standard ^②	45-191		■	■		■	■			■
Shunt Trip — Low Energy ^②	45-196			■		■	■			
Undervoltage Release Mechanism ^②	45-197		■	■		■	■			
PowerNet or Zone Interlock Kit (OPTIM 550)	45-207					■				
External Accessories										
End Cap Kit	45-208		●			●				●
Keeper Nut	45-208		●			●				●
Control Wire Terminal Kit	45-209		●			●				●
Terminal Adapter	45-209		●			●				●
Multewire Connectors	45-210		●			●				●
Base Mounting Hardware	45-211		●			●				●
Terminal Shields	45-213		●			●				●
Interphase Barriers	45-214		●			●				●
Non-Padlockable Handle Block	45-216	■				■			■	
Padlockable Handle Block	45-216					■				
Padlockable Handle Lock Hasp	45-217		■	□		□	□			□
Cylinder Lock	45-217	□	□	□		□				□
Key Interlock Kit	45-218	■	□	□		□	□			□
Sliding Bar Interlock — Requires Two Breakers	45-219					●				
Walking Beam Interlock — Requires Two Breakers	45-219					●				●
Electrical (Solenoid) Operator	45-220					●				●
Plug-in Adapters	45-222	●				●				●
Rear Connecting Studs	45-223	●				●				●
Panelboard Connecting Straps	45-226	●				●				●
Handle Mechanisms	45-227	●				●				●
Handle Extension	45-232	●				●				●
IQ Energy Sentinel	45-233					●				●
Solid-State (Electronic) Portable Test Kit	45-233	●				●				●
OPTIM System Components 3-Poles										
Breaker Interface Module (BIM)	45-234									
Digitrip OPTIMizer	45-234									
Auxiliary Power Module	45-234									
Modifications (Refer to Eaton)										
Special Calibration	—		●			●				●
Moisture Fungus Treatment	45-266		●			●				●
Freeze-Tested Circuit Breakers	—		●			●				●
Marine Application	—		●			●				●

■ Applicable in indicated pole position. □ May be mounted on left or right pole — not both. ● Accessory available/Modification available.

① 2-pole breaker supplied in 3-pole frame. Current carrying parts omitted from center pole.

② Shunt trip and UVR cannot be mounted in right poles on LES or OPTIM trip units.

L-Frame



Typical L-Frame Circuit Breaker

Product Description

- All Cutler-Hammer L-Frame Circuit Breakers by Eaton Corporation 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.
- CE marked.

Technical Data and Specifications

Table 45-188. UL 489 Interrupting Capacity Ratings ^①

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 ^{②③}
LDB	2, 3	65	—	35	25	—	22
LD	2, 3, 4	65	—	35	25	—	22
CLD	2, 3, 4	65	—	35	25	—	—
HLD, HLDB	2, 3, 4	100	—	65	35	—	25
CHLD ^④	2, 3, 4	100	—	65	35	—	—
LDC, LDCB ^⑤	2, 3, 4	200	—	100	50	—	30
CLDC ^{④⑤}	2, 3, 4	200	—	100	50	—	—

^① Utilization category A circuit breakers.

^② L/R = 8 milliseconds minimum.

^③ 2-pole circuit breaker or two poles of 3-pole circuit breaker. Incorporating Thermal-Magnetic trip unit only.

^④ 100% rated breakers.

^⑤ Current limiting.

Table 45-189. IEC 947-2 Interrupting Capacity Ratings ^⑥

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)							
		Volts ac (50/60 Hz)						Volts dc	
		240		415		690		250 ^{⑦⑧}	
		I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
LDB	2, 3	85	85	45	45	20	10	20	10
LD	2, 3, 4	85	85	45	45	20	10	20	10
CLD ^⑨	2, 3, 4	85	85	45	45	20	10	—	—
HLD, HLDB	2, 3, 4	100	100	70	70	25	13	20	10
CHLD ^⑨	2, 3, 4	100	100	70	70	25	13	—	—
LDC, LDCB	2, 3, 4	200	100	100	75	35	18	20	10
CLDC ^⑨	2, 3, 4	200	100	100	75	35	18	—	—

^⑥ Utilization category A circuit breakers.

^⑦ L/R = 8 milliseconds minimum.

^⑧ 2-pole circuit breaker or two poles of 3-pole circuit breaker. Incorporating Thermal-Magnetic trip unit only.

^⑨ 100% rated breakers.

L-Frame
L-Frame Digitrip Specifications
Table 45-190. Specifications

Trip Unit Type	Digitrip RMS 310	Digitrip OPTIM 550	Digitrip OPTIM 1050	
rms Sensing	Yes	Yes	Yes	
Breaker Type				
Frame	L	L	L	
Ampere Range	300 – 600 A	200 – 600 A	200 – 600 A	
Interrupting Rating at 480 Volts	35, 65, 100 (kA)	35, 65, 100 (kA)	35, 65, 100 (kA)	
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSI(A), LSIG	LSI(A), LSIG
Fixed Rated Plug (I_N)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_N)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_N) ^①	0.5 – 1.0 (I_N) ^①	0.4 – 1.0 (I_N)	0.4 – 1.0 (I_N)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	0.5 – 1.0 I_r	0.5 – 1.0 I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% $x (I_N)$	200 – 800% $x (I_N)$	150 – 800% $x (I_r)$	150 – 800% $x (I_r)$
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes ^④	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% $x (I_N)$	200 – 800% $x (I_N)$	200 – 800% $x (I_N)$
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% $x (I_S)$	20 – 100% $x (I_S)$
Ground Fault Pickup	1 – 5 $x I_G$ (120 A)	1 – 5 $x I_G$ (120 A)	20 – 100% $x (I_S)$	20 – 100% $x (I_S)$
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ^④	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ^⑤	Yes ^⑤	Yes ^④	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ^②	Yes ^②
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	Yes ^③	Yes
Testing				
Testing Method	Test Set	OPTIMizer, BIM, Cutler-Hammer PowerNet		

① Adjust by rating plug.

② By OPTIMizer/BIM.

③ Eaton's Cutler-Hammer PowerNet kit.

④ Zone interlock kit.

⑤ With separate ground fault alarm unit (GFAU).

Legend: BIM = Breaker Interface Module
 (A) = GF Alarm
 I_S = Sensor Rating
 I_N = Rating Plug
 I_r = Long Delay Pickup Setting

L-Frame

Dimensions/Weights
Table 45-191. Dimensions in Inches (mm)

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)

Table 45-192. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker			Frame Only			Trip Unit		
	Number of Poles								
	2	3	4	2	3	4	2	3	4
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)	—	—	—	—	—	—

L-Frame

Product 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.

Table 45-193. Circuit Breaker/Frame Catalog Numbering System

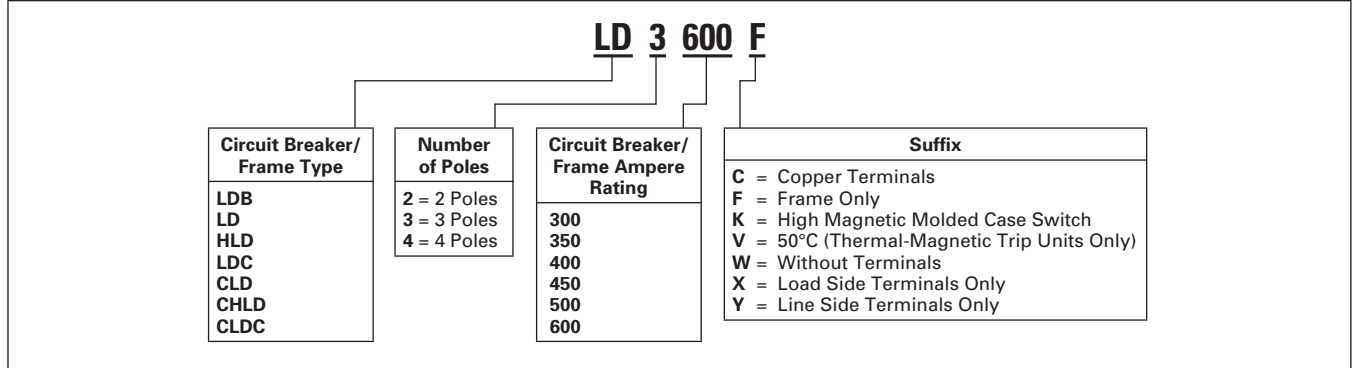


Table 45-194. Thermal-Magnetic Trip Unit Catalog Numbering System

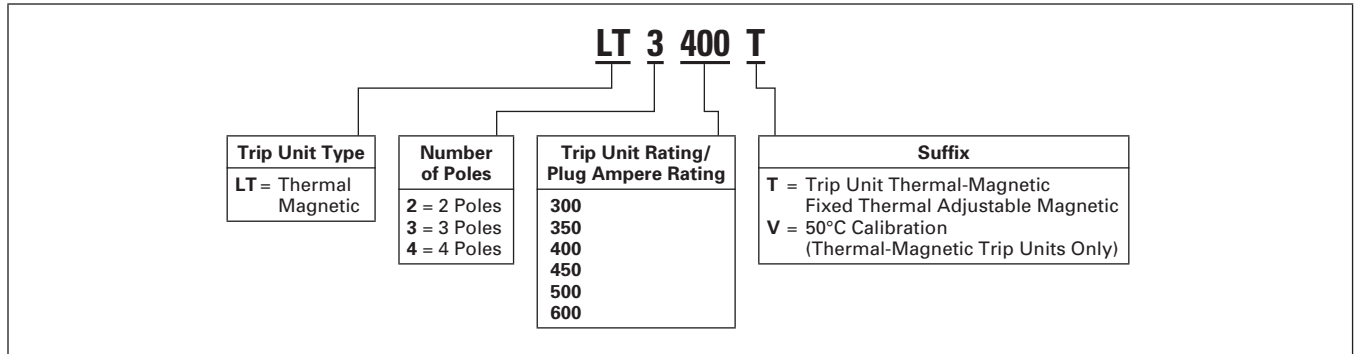


Table 45-195. OPTIM Circuit Breaker/Frame Catalog Numbering System

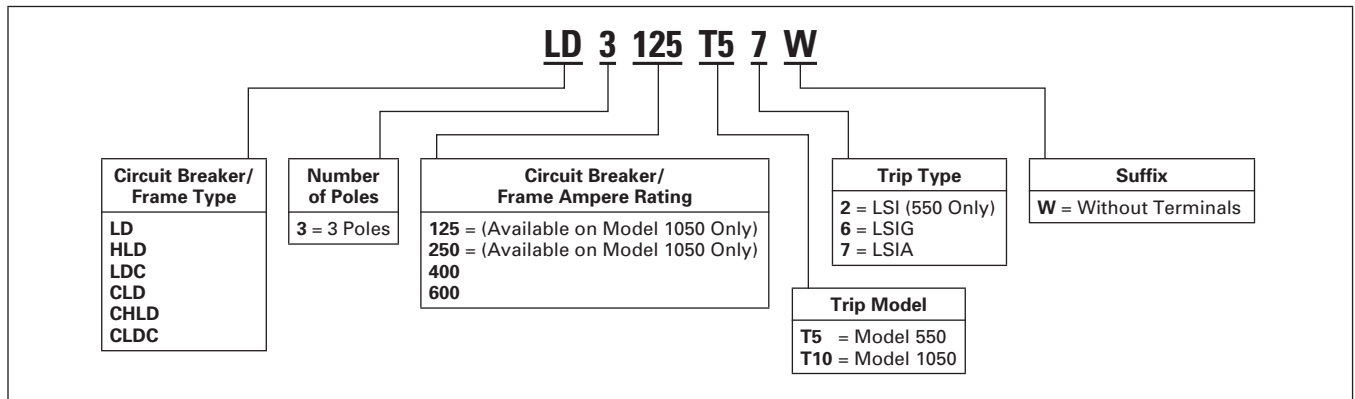
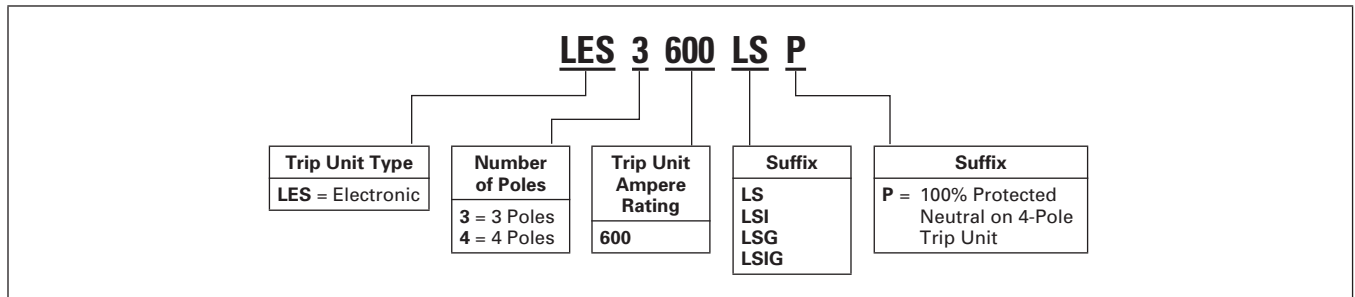


Table 45-196. Digitrip RMS 310 Trip Unit Catalog Numbering System



L-Frame

Product Selection

Table 45-197. 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 For Use with Standard or High or Ultra High Interrupting Frames		Standard Terminals Only See Page 45-125 for Optional Terminals	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals					
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2-Pole

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	

3-Pole

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	

4-Pole ④

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	

45

- 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.

Table 45-198. 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	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2-Pole

LD2600F		HLD2600F		LDC2600F	
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3-Pole

LD3600F		HLD3600F		LDC3600F	
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4-Pole

LD4600F		HLD4600F		LDC4600F	
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L-Frame

Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units

Order as individual components: Breaker Frame, Trip Unit, Rating Plug, Terminals.

Table 45-199. Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C ②	Circuit Breaker Frame Only			Digitrip RMS 310 Trip Unit Only ③				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only See Page 45-125 for Optional Terminals
	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	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug)	S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Delay Time (Flat Response)	I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous	G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)	Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Ampere Rating	
Catalog Number				Catalog Number				Catalog Number			

3-Pole ④

600	LD3600F	HLD3600F	LDC3600F	LES3600LS	LES3600LSI	LES3600LSG	LES3600LSIG	300 350 400 450 500 600	6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T	300/400/ 500/600 A6LES600T1 420/440/ 460/480 A6LES400T5 520/540/ 560/580 A6LES500T5	TA602LD ② TA602LD ② TA602LD ② 3TA603LDK ⑤
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4-Pole ④

600	LD4600F	HLD4600F	LDC4600F	LES4600LS	LES4600LSI	—	—	300 350 400 450 500 600	6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T	300/400/ 500/600 A6LES600T1 420/440/ 460/480 A6LES400T5 520/540/ 560/580 A6LES500T5	TA602LD ③ TA602LD ③ TA602LD ③ TA602LD ③ 4TA603LDK ⑤
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- ① See Table 45-200 below for prices.
- ② Individually packed.
- ③ For ac use only.
- ④ Neutral is in right pole.
- ⑤ Terminal kits contain one terminal for each pole and one terminal cover.

Table 45-200. Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A6LES600T1 HLD3600F HLD4600F LDC3600F LDC4600F —		LD3600F LD4600F LES3600LS LES3600LSG LES3600LSI —		LES3600LSIG LES4600LS LES4600LSI TA602LD 3TA603LDK —		4TA603LDK 6LES300T 6LES350T 6LES400T 6LES450T 6LES500T		6LES600T — — A6LES400T5 A6LES500T5 —	

L-Frame

Table 45-201. Types LDB, HLDB and LDCB Electronic Circuit Breakers with Non-Interchangeable Electronic Trip Units Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40°C ①	Number of Poles	Circuit Breaker Frame Including DigiTrip RMS 310 Electronic Trip Unit Less Terminals and Rating Plug				Digitrip RMS 310 Rating Plug (Order as Separate Items)	
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Time Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed	Adjustable
		Catalog Number					
		LS	LSI	LSG	LSIG	Catalog Number	
Short Time Range		2 – 8 × I _n	2 – 8 × I _n	2 – 8 × I _n	2 – 8 × I _n		
Short Time Delay		—	0 – 300 ms	—	0 – 300 ms		
Ground Fault Pickup		—	—	Varies by Frame	Varies by Frame		
Ground Fault Delay		—	—	0 – 500 ms	0 – 500 ms		
Type LDB, HLDB and LDCB with DigiTrip 310 Non-Interchangeable Trip Unit							
600	3	LDB3600FT33W	LDB3600FT32W	LDB3600FT35W	LDB3600FT35W	6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T	300/400/500/600 A6LES600T1 420/440/460/480 A6LES400T5 520/540/560/580 A6LES500T5
600	3	HLDB3600FT33W	HLDB3600FT32W	HLDB3600FT35W	HLDB3600FT36W	6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T	300/400/500/600 A6LES600T1 420/440/460/480 A6LES400T5 520/540/560/580 A6LES500T5
600	3	LDCB3600FT33W	LDCB3600FT32W	LDCB3600FT35W	LDCB3600FT36W	6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T	300/400/500/600 A6LES600T1 420/440/460/480 A6LES400T5 520/540/560/580 A6LES500T5

① For ac use only.

L-Frame

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, Rating Plug and Terminals.

Table 45-202. 100% Rated Types CLD, CHLD, and CLDC Electronic Circuit Breakers with Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C ②	Circuit Breaker Frame Only			Digitrip RMS 310 Trip Unit Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only See Page 45-125 for Optional Terminals
	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 600 Vac Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Standard	Options			Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug	
				Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay Ground Fault Protection	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection			Ampere Rating	
Catalog Number								Catalog Number			
3-Pole											
600	CLD3600F	CHLD3600F	CLDC3600F	LES3600LS	LES3600LSI	LES3600LSG	LES3600LSIG	300 350 400 450 500 600	6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T	300/400/ 500/600 A6LES600T1 420/440/460/480 A6LES400T5 520/540/560/580 A6LES500T5	TA602LD ③ TA602LD ③ TA602LD ③ 3TA603LDK ④

- ① See Table 45-203 below for prices.
- ② Ampere rating is established by rating plug.
- ③ Individually packed.
- ④ 3TA603LDK terminal kit contains one terminal for each pole and one terminal cover.

Table 45-203. 100% Rated Types CLD, CHLD and CLDC Electronic Circuit Breakers with Interchangeable Trip Units Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A6LES600T1		LES3600LSG		6LES300T	
CHLD3600F		LES3600LSI		6LES350T	
CLDC3600F		LES3600LSIG		6LES400T	
CLD3600F		TA602LD		6LES450T	
LES3600LS		3TA603LDK		6LES500T	
—		—		6LES600T	

L-Frame

Table 45-204. Type LDB Thermal-Magnetic Circuit Breakers with Non-interchangeable Trip Units ①

Maximum Continuous Ampere Rating	600 Vac Rated, 250 Vdc			
	Complete Circuit Breaker			
	Without Line and Load Terminals		With Standard Line and Load Terminals Only	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2-Pole

300	LDB2300W		LDB2300	
350	LDB2350W		LDB2350	
400	LDB2400W		LDB2400	
450	LDB2450W		LDB2450	
500	LDB2500W		LDB2500	
600	LDB2600W		LDB2600	

3-Pole

300	LDB3300W		LDB3300	
350	LDB3350W		LDB3350	
400	LDB3400W		LDB3400	
450	LDB3450W		LDB3450	
500	LDB3500W		LDB3500	
600	LDB3600W		LDB3600	

① Factory sealed — suitable for reverse feed application.

Molded Case Switches

Eaton's Cutler-Hammer 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.

Table 45-205. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc		Standard Terminals Only	
	Circuit Breaker Only without Line and Load Terminals		See Page 45-125 for Optional Terminals	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2-Pole

600	LD2600WK		2TA603LDK	
600	LDB2600WK ②		2TA603LDK	
600	HLD2600WK		2TA603LDK	

3-Pole

600	LD3600WK		3TA603LDK	
600	LDB3600WK ②		3TA603LDK	
600	HLD3600WK		3TA603LDK	

4-Pole

600	LD4600WK		4TA603LDK	
600	LDB4600WK ②		4TA603LDK	
600	HLD4600WK		4TA603LDK	

② Factory sealed — suitable for reverse feed application.

Note: 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.

Table 45-206. Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug 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)						Ampere Rating	Fixed Rating Plug
	OPTIM 550 ②							
	LSI		LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

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

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

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

Rating	HLD3125T52W	HLD3125T56W	HLD3125T57W	Rating	Price	Rating	Price
125	HLD3125T52W	HLD3125T56W	HLD3125T57W	70 90 100 110 125	—	ORPL125A070 ORPL125A090 ORPL125A100 ORPL125A110 ORPL125A125	—
250	HLD3250T52W	HLD3250T56W	HLD3250T57W	125 150 175 200 225 250	—	ORPL025A125 ORPL025A150 ORPL025A175 ORPL025A200 ORPL025A225 ORPL025A250	—
400	HLD3400T52W	HLD3400T56W	HLD3400T57W	200 225 250 300 350 400	—	ORPL40A200 ORPL40A225 ORPL40A250 ORPL40A300 ORPL40A350 ORPL40A400	—
600	HLD3600T52W	HLD3600T56W	HLD3600T57W	300 350 400 500 600	—	ORPL60A300 ORPL60A350 ORPL60A400 ORPL60A500 ORPL60A600	—

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 (refer to **Page 45-207** and take list price Adder x 1.25).

L-Frame

Table 45-206. 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	
	L – Adjustable Long Delay Pickup (I_p) with Adjustable Long Delay Time (I^2t or I^4t Response) 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)						Ampere Rating	Fixed Rating Plug
	OPTIM 550 ②							
	LSI		LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac								
125	LDC3125T52W		LDC3125T56W		LDC3125T57W		— — — — —	ORPL125A070 ORPL125A090 ORPL125A100 ORPL125A110 ORPL125A125
250	LDC3250T52W		LDC3250T56W		LDC3250T57W		— — — — —	ORPL025A125 ORPL025A150 ORPL025A175 ORPL025A200 ORPL025A225 ORPL025A250
400	LDC3400T52W		LDC3400T56W		LDC3400T57W		200 225 250 300 350 400	ORPL40A200 ORPL40A225 ORPL40A250 ORPL40A300 ORPL40A350 ORPL40A400
600	LDC3600T52W		LDC3600T56W		LDC3600T57W		300 350 400 500 600	ORPL60A300 ORPL60A350 ORPL60A400 ORPL60A500 ORPL60A600

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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 (refer to **Page 45-207** and take list price Adder x 1.25).

L-Frame

Digitrip OPTIM Electronic Circuit Breaker with Interchangeable Rating Plug

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

Table 45-207. Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug 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)				Ampere Rating	Fixed Rating Plug
	OPTIM 1050 ②③					
	LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

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

Frame Size	Frame Catalog Number	Price U.S. \$	Frame Catalog Number	Price U.S. \$	Rating Plug Ampere Rating	Rating Plug Catalog Number	Price U.S. \$
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	
400	LD3400T106W		LD3400T107W		200	ORPL40A200	
					225	ORPL40A225	
					250	ORPL40A250	
					300	ORPL40A300	
					350	ORPL40A350	
600	LD3600T106W		LD3600T107W		300	ORPL60A300	
					350	ORPL60A350	
					400	ORPL60A400	
					500	ORPL60A500	
					600	ORPL60A600	

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

Frame Size	Frame Catalog Number	Price U.S. \$	Frame Catalog Number	Price U.S. \$	Rating Plug Ampere Rating	Rating Plug Catalog Number	Price U.S. \$
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	
400	HLD3400T106W		HLD3400T107W		200	ORPL40A200	
					225	ORPL40A225	
					250	ORPL40A250	
					300	ORPL40A300	
					350	ORPL40A350	
600	HLD3600T106W		HLD3600T107W		300	ORPL60A300	
					350	ORPL60A350	
					400	ORPL60A400	
					500	ORPL60A500	
					600	ORPL60A600	

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.

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L-Frame

Table 45-207. 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	
	L – Adjustable Long Delay Pickup (I_p) 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)				Ampere Rating	Fixed Rating Plug
	OPTIM 1050 ②③					
	LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac

Frame Size	Frame Only Catalog #	Frame Only Price	Rating Plug Only Catalog #	Rating Plug Only Price	Rating Plug Only Options
125	LDC3125T106W		LDC3125T107W		70 90 100 110 125 ORPL125A070 ORPL125A090 ORPL125A100 ORPL125A110 ORPL125A125
250	LDC3250T106W		LDC3250T107W		125 150 175 200 225 250 ORPL025A125 ORPL025A150 ORPL025A175 ORPL025A200 ORPL025A225 ORPL025A250
400	LDC3400T106W		LDC3400T107W		200 225 250 300 350 400 ORPL40A200 ORPL40A225 ORPL40A250 ORPL40A300 ORPL40A350 ORPL40A400
600	LDC3600T106W		LDC3600T107W		300 350 400 500 600 ORPL60A300 ORPL60A350 ORPL60A400 ORPL60A500 ORPL60A600

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- 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.

Discount Symbol **CB-2**

L-Frame

100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plug

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

Table 45-208. 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	
	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)						Ampere Rating	Fixed Rating Plug
	OPTIM 550 ②							
	LSI		LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

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

Rating	LSI	LSIG	LSIA	Rating Plug
125	CLD3125T52W	CLD3125T56W	CLD3125T57W	70 90 100 110 125 ORPL125A070 ORPL125A090 ORPL125A100 ORPL125A110 ORPL125A125
250	CLD3250T52W	CLD3250T56W	CLD3250T57W	125 150 175 200 225 250 ORPL025A125 ORPL025A150 ORPL025A175 ORPL025A200 ORPL025A225 ORPL025A250
400	CLD3400T52W	CLD3400T56W	CLD3400T57W	200 225 250 300 350 400 ORPL40A200 ORPL40A225 ORPL40A250 ORPL40A300 ORPL40A350 ORPL40A400
600	CLD3600T52W	CLD3600T56W	CLD3600T57W	300 350 400 500 600 ORPL60A300 ORPL60A350 ORPL60A400 ORPL60A500 ORPL60A600

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

Rating	CHLD	CHLD	CHLD	Rating Plug
125	CHLD3125T52W	CHLD3125T56W	CHLD3125T57W	70 90 100 110 125 ORPL125A070 ORPL125A090 ORPL125A100 ORPL125A110 ORPL125A125
250	CHLD3250T52W	CHLD3250T56W	CHLD3250T57W	125 150 175 200 225 250 ORPL025A125 ORPL025A150 ORPL025A175 ORPL025A200 ORPL025A225 ORPL025A250
400	CHLD3400T52W	CHLD3400T56W	CHLD3400T57W	200 225 250 300 350 400 ORPL40A200 ORPL40A225 ORPL40A250 ORPL40A300 ORPL40A350 ORPL40A400
600	CHLD3600T52W	CHLD3600T56W	CHLD3600T57W	300 350 400 500 600 ORPL60A300 ORPL60A350 ORPL60A400 ORPL60A500 ORPL60A600

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 (refer to **Page 45-207** and take list price Adder x 1.25).

L-Frame

Table 45-208. 100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug (Continued)

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug 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)						Ampere Rating	Fixed Rating Plug
	OPTIM 550 ②							
	LSI		LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac								
125	CLDC3125T52W		CLDC3125T56W		CLDC3125T57W		70 90 100 110 125	ORPL125A070 ORPL125A090 ORPL125A100 ORPL125A110 ORPL125A125
250	CLDC3250T52W		CLDC3250T56W		CLDC3250T57W		125 150 175 200 225 250	ORPL025A125 ORPL025A150 ORPL025A175 ORPL025A200 ORPL025A225 ORPL025A250
400	CLDC3400T52W		CLDC3400T56W		CLDC3400T57W		200 225 250 300 350 400	ORPL40A200 ORPL40A225 ORPL40A250 ORPL40A300 ORPL40A350 ORPL40A400
600	CLDC3600T52W		CLDC3600T56W		CLDC3600T57W		300 350 400 500 600	ORPL60A300 ORPL60A350 ORPL60A400 ORPL60A500 ORPL60A600

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 (refer to **Page 45-207** and take list price Adder x 1.25).

Table 45-209. 100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug 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)				Ampere Rating	Fixed Rating Plug
	OPTIM 1050 ②③					
	LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

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

Rating	Frame	Price	Frame	Price	Rating	Plug	Price
125	CLD3125T106W		CLD3125T107W		70	ORPL125A07	
					90	ORPL125A09	
					100	ORPL125A10	
					110	ORPL125A11	
					125	ORPL125A125	
250	CLD3250T106W		CLD3250T107W		125	ORPL025A12	
					150	ORPL025A15	
					175	ORPL025A17	
					200	ORPL025A20	
					225	ORPL025A22	
					250	ORPL025A250	
400	CLD3400T106W		CLD3400T107W		200	ORPL40A200	
					225	ORPL40A225	
					250	ORPL40A250	
					300	ORPL40A300	
					350	ORPL40A350	
					400	ORPL40A400	
600	CLD3600T106W		CLD3600T107W		300	ORPL60A300	
					350	ORPL60A350	
					400	ORPL60A400	
					500	ORPL60A500	
					500	ORPL60A500	
					600	ORPL60A600	

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

Rating	Frame	Price	Frame	Price	Rating	Plug	Price
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	
					500	ORPL60A500	
					600	ORPL60A600	

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

L-Frame

Table 45-209. 100% Rated 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	
	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)				Ampere Rating	Fixed Rating Plug
	OPTIM 1050 ②③					
	LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac

Frame Size	CLDC Frame	CLDC Frame	ORPL Rating Plug
125	CLDC3125T106W	CLDC3125T107W	70 90 100 110 125 ORPL125A070 ORPL125A090 ORPL125A100 ORPL125A110 ORPL125A125
250	CLDC3250T106W	CLDC3250T107W	125 150 175 200 225 250 ORPL025A125 ORPL025A150 ORPL025A175 ORPL025A200 ORPL025A225 ORPL025A250
400	CLDC3400T106W	CLDC3400T107W	200 225 250 300 350 400 ORPL40A200 ORPL40A225 ORPL40A250 ORPL40A300 ORPL40A350 ORPL40A400
600	CLDC3600T106W	CLDC3600T107W	300 350 400 500 600 ORPL60A300 ORPL60A350 ORPL60A400 ORPL60A500 ORPL60A600

45

- 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.

L-Frame

Line and Load Terminals

Eaton's Cutler-Hammer 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 which 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 which 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.

Table 45-210. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/Number of Conductors	Metric Wire Range mm ²	Terminal			Terminals with Control Wire Termination	
					Poles	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Standard Cu/Al Pressure Terminals									
400	Aluminum	Cu/Al	4/0 – 600 (1)	120 – 300	2-Pole Kit ① 3-Pole Kit ① 4-Pole Kit ①	2TA401LDK 3TA401LDK 4TA401LDK		— — —	
450	Aluminum	Cu/Al	4 – 4/0 (2)	25 – 95	②	TA450LD		—	
500	Aluminum	Cu/Al	3/0 – 350 (2)	95 – 150	②	TA602LD		TA602LDCW	
600	Aluminum	Cu/Al	400 – 500 (2)	185 – 240	2-Pole Kit ① 3-Pole Kit ① 4-Pole Kit ①	2TA603LDK 3TA603LDK 4TA603LDK		2TA603LDKCW 3TA603LDKCW 4TA603LDKCW	
Optional Copper and Cu/Al Pressure Type Terminals									
600	Copper	Cu	250 – 350 (2)	120 – 250	②	T602LD		T602LDCW	

- ① Terminal kits contain one terminal for each pole and one terminal cover.
- ② Individually packed.

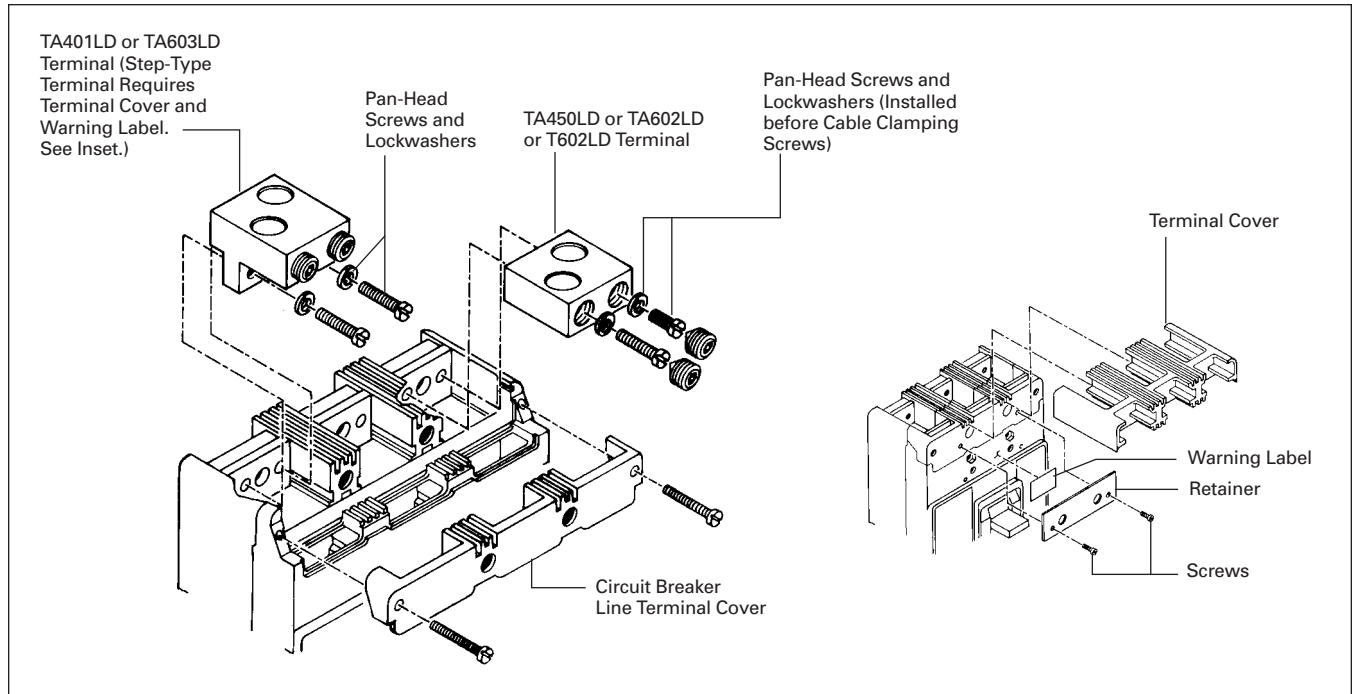


Figure 45-29. Terminals

L-Frame

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.

Table 45-211. Accessories

Description	Reference Page	2-Pole ^① , 3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu. ^②
Internal Accessories (Only One Internal Accessory Per Pole) ^③								
Alarm Lockout (Make/Break)	45-182	■		■	■		■	
Alarm Lockout (2Make/2Break)	45-182	■		■	■		■	
Auxiliary Switch (1A, 1B)	45-185	■		■	■		■	
Auxiliary Switch (2A, 2B)	45-185	■		■	■		■	
Auxiliary Switch (3A, 3B)	45-185	■		■	■		■	
Auxiliary Switch (1A, 1B) and Alarm Switch Combination	45-188	■		■	■		■	
Auxiliary Switch (2A, 2B) and Alarm Switch Combination	45-188	■		■	■		■	
Shunt Trip — Standard ^④	45-191	■		■	■		■	
Shunt Trip — Low Energy ^④	45-196	■		■	■		■	
Undervoltage Release Mechanism ^④	45-197	■		■	■		■	
Cutler-Hammer PowerNet Communications Kit (OPTIM 550)	45-207			■				
External Accessories								
End Cap Kit	45-208		●				●	
Control Wire Terminal Kit	45-209		●				●	
Base Mounting Hardware	45-211		●				●	
Terminal Shields	45-213		●				●	
Interphase Barriers	45-214		●				●	
Non-Padlockable Handle Block	45-216		■			■		
Padlockable Handle Lock Hasp	45-217	□		□	□		□	
Key Interlock Kit	45-218	□		□	□		□	
Sliding Bar Interlock — Requires Two Breakers	45-219		●					
Walking Beam Interlock — Requires Two Breakers	45-219		●				●	
Electrical (Motor) Operator	45-220		●				●	
Plug-in Adapters	45-222		●				●	
Rear Connecting Studs	45-223		●				●	
Panelboard Connecting Straps	45-226		●				●	
Handle Mechanisms	45-227		●				●	
Handle Extension	45-232		●				●	
Solid-State (Electronic) Portable Test Kit	45-233		●				●	
OPTIM System Components 3-Poles								
Ground Fault Alarm Unit	45-233							
Potential Transformer Module	45-233							
Breaker Interface Module (BIM)	45-234							
Digitrip OPTIMizer	45-234							
Auxiliary Power Module	45-234							
Modifications (Refer to Eaton)								
Special Calibration	—		●				●	
Moisture Fungus Treatment	45-266		●				●	
Freeze-Tested Circuit Breakers	—		●				●	
Marine Application	—		●				●	

■ Applicable in indicated pole position

□ May be mounted on left or right pole — not both

● Accessory available/Modification available

^① 2-pole breaker supplied in 3-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.

M-Frame



Typical M-Frame Circuit Breaker

Product Description

- All Cutler-Hammer M-Frame Circuit Breakers by Eaton Corporation 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.
- CE marked.

Technical Data and Specifications

Table 45-212. UL 489/CSA Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts ac (50/60 Hz)			Volts dc ②③
		240	480	600	
MDL, MDLB CMDL	2, 3 2, 3	65 65	50 50	25 25	22 —
HMDL, HMDLB CHMDL	2, 3 2, 3	100 100	65 65	35 35	25 —

- ① Utilization category A circuit breakers.
- ② 2-pole or two poles of 3-pole circuit breaker. Thermal-magnetic trip units only, MDL, HMDL breakers with electronic trip unit are not dc rated.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds at 22 kA.

Table 45-213. IEC 947-2 Interrupting Capacity Ratings ④

Circuit Breaker Type	Number of Poles	Interrupting Capacity rms (kA Symmetrical Amperes) $I_{CU} \neq I_{CS}$			
		Volts ac (50/60 Hz)			Volts dc ⑤⑥
		240	415	690	
MDL, MDLB CMDL	2, 3 2, 3	65/65 65/65	50/50 50/50	20/10 20/10	20/10 —
HMDL, HMDLB CHMDL	2, 3 2, 3	100/100 100/100	70/50 70/50	25/13 25/13	20/10 —

- ④ Utilization category A circuit breakers.
- ⑤ 2-pole or two poles of 3-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 20 kA.

M-Frame

MDL-Frame Digitrip Specifications

Table 45-214. Specifications

Trip Unit Type	Digitrip RMS 310	
rms Sensing	Yes	
Breaker Type		
Frame	MDL, MDLB, CMDL, HMDL, HMDLB, CHMDL	
Ampere Range	400 – 800 A	
Interrupting Rating at 480 Volts	50, 65 (kA)	
Protection		
Ordering Options	LS, LSG	LSI, LSIG
Fixed Rated Plug (I_n)	Yes	Yes
Overtemperature Trip	Yes	Yes
Long Delay Protection (L)		
Adjustable Rating Plug (I_n)	Yes	Yes
Long Delay Pickup	0.5 – 1.0 (I_n) ^①	0.5 – 1.0 (I_n) ^①
Long Delay Time I^2t	12 Seconds	12 Seconds
Long Delay Time I^4t	No	No
Long Delay Thermal Memory	Yes	Yes
High Load Alarm	No	No
Short Delay Protection (S)		
Short Delay Pickup	200 – 800% x (I_n)	200 – 800% x (I_n)
Short Delay Time I^2t	100 ms	No
Short Delay Time Flat	No	Inst – 300 ms
Short Delay Time Zone Selective Interlocking	No	No
Instantaneous Protection (I)		
Instantaneous Pickup	No	200 – 800% x (I_n)
Discriminator	No	No
Instantaneous Override	Yes	Yes
Ground Fault Protection (G)		
Ground Fault Alarm	No	No
Ground Fault Pickup	1 – 5 x I_g (160 A)	1 – 5 x I_g (160 A)
Ground Fault Delay I^2t	No	No
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms
Ground Fault Zone Selective Interlocking	No	No
Ground Fault Thermal Memory	Yes	Yes
System Diagnostics		
Status LEDs	Yes	Yes
Cause of Trip LEDs	No	No
Magnitude of Trip Information	No	No
Remote Signal Contacts — Ground Alarm	Yes ^②	Yes ^②
System Monitoring		
Digital Display	No	No
Current	No	No
Power and Energy	No	No
Power Quality — Harmonics	No	No
Power Factor	No	No
Communications		
Eaton's Cutler-Hammer PowerNet	No	No
Testing		
Testing Method	Test Set	

① Adjust by rating plug.

② With separate ground fault alarm unit (GFAU).

Legend: I_n = Rating Plug

M-Frame

Dimensions/Weights

Table 45-215. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	16.00 (406.4)	4.06 (103.1)

Table 45-216. Approximate Shipping Weight in Lbs. (kg)

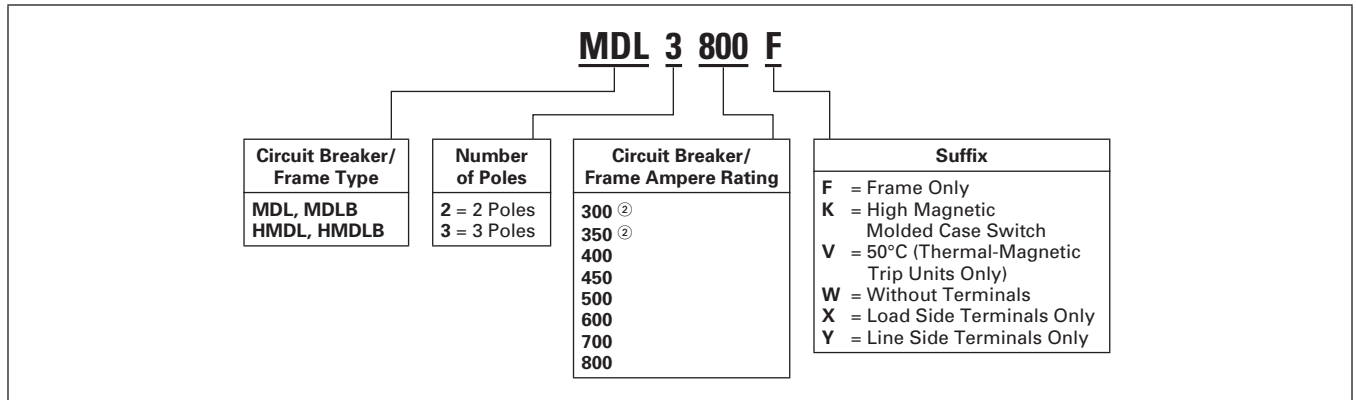
Breaker Type	Complete Breaker		Frame Only		Trip Unit ①	
	Number of Poles					
	2	3	2	3	2	3
MDL, HMDL (T/M T.U.)	26.5 (12.0)	29.0 (13.2)	24.5 (11.1)	26.0 (11.8)	2.5 (1.1)	3.0 (1.4)
MDL, HMDL (Elec. T.U.)	—	30.0 (13.6)	—	26.0 (11.8)	—	4.0 (1.8)

① Thermal-magnetic only.

Product Selection

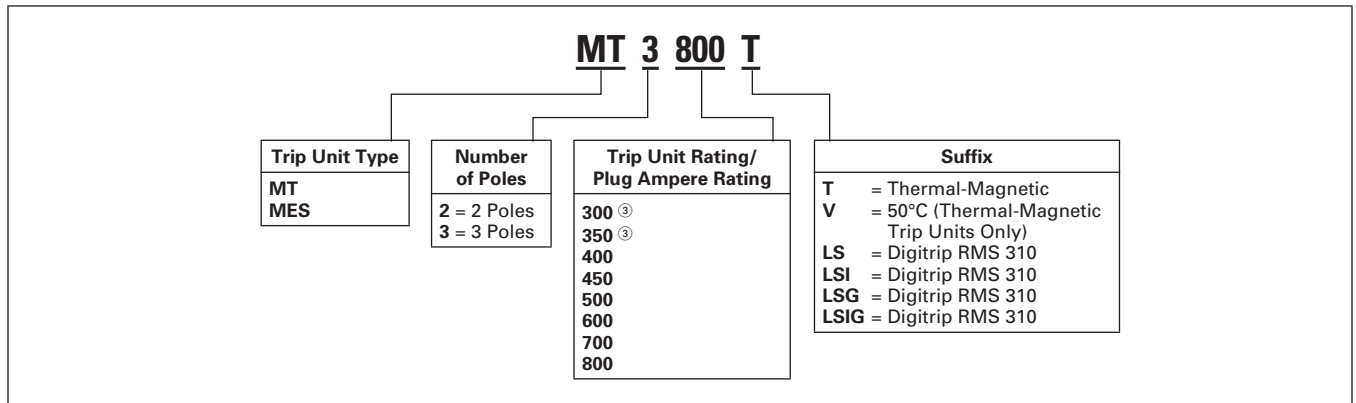
This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 45-217. Circuit Breaker/Frame Catalog Numbering System



② Thermal-magnetic only.

Table 45-218. Thermal-Magnetic Trip Unit Catalog Numbering System



③ Thermal-magnetic only.

M-Frame

Product Selection

Table 45-219. Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

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 ^①	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Frame Only		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Frame Only		For Use with Standard or High or Ultra High Interrupting Frames		See Page 45-133 for Optional Terminals	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole												
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	
3-Pole												
300	MDL3300		MDL3800F		HMDL3300		HMDL3800F		MT3300T		TA700MA1	
350	MDL3350				HMDL3350				MT3350T		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	

① Two terminals are required per pole.

Table 45-220. Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units ^②

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 ^③	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		See Page 45-133 for Optional Terminals	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2-Pole						
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	
3-Pole						
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	

② Factory sealed for reverse feed application.

③ Two terminals are required per pole.

M-Frame

Types MDL and HMDL Electronic Circuit Breakers with Interchangeable Trip Units

Order as Individual Components: Breaker Frame, Trip Unit, Rating Plug, Terminals.

Table 45-221. Types MDL and HMDL Electronic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C ①	Circuit Breaker Frame Only				Digitrip RMS 310 Trip Unit Only ②		Digitrip RMS 310 Rating Plug Only				Terminals
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		L – Adjustable Long Delay Pickup (by Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)	Ampere Rating	Fixed Rating Plug	Adjustable Rating Plugs			
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$				Ampere Rating	Catalog Number	Price U.S. \$	
3-Pole											
800	MDL3800F		HMDL3800F		MES3800LS MES3800LSI MES3800LSG MES3800LSIG —		400 500 600 700 800	8MES400T 8MES500T 8MES600T 8MES700T 8MES800T		400/500/600/800 A8MES800T 620/640/660/680 A8MES600T5 720/740/760/780 A8MES700T5	See Page 45-133 for Standard and Optional Terminals

① Ampere rating is established by rating plug.

② For ac use only.

M-Frame

Table 45-222. Types MDLB and HMDLB Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C ②	Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit							
	LS		LSI		LSG		LSIG	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac								
800	MDLB3800T33W		MDLB3800T32W		MDLB3800T35W		MDLB3800T36W	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
800	HMDLB3800T33W		HMDLB3800T32W		HMDLB3800T35W		HMDLB3800T36W	

① Factory sealed, suitable for reverse feed application. CMDLB and CHMDLB are also available.

② Ampere rating is established by rating plug.

100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Non-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, rating plug and terminals.

Table 45-223. 100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable Trip Units ③

Maximum Continuous Ampere Rating at 40°C ④	Circuit Breaker Frame Only		Digitrip RMS 310 Trip Unit Only ⑤				Digitrip RMS 310 Trip Unit Only			Terminals
	Standard Interrupting Capacity 50 kAIC at 480 Vac	High Interrupting Capacity 65 kAIC at 480 Vac	Standard	Options		Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug		
				Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay Ground Fault Protection				Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	
3-Pole										
800	CMDL3800F	CHMDL3800F	MES3800LS	MES3800LSI	MES3800LSG	MES3800LSIG	400 500 600 700 800	8MES400T 8MES500T 8MES600T 8MES700T 8MES800T	400/500/ 600/800 A8MES800T 620/640/ 660/680 A8MES600T5 720/740/ 760/780 A8MES700T5	See Page 45-133 for Standard and Optional Terminals

③ See Table 45-224 below for prices.

④ Ampere rating is established by rating plug.

⑤ For ac use only.

Table 45-224. 100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Non-Interchangeable Trip Units Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A8MES800T CHMDL3800F CMDL3800F MES3800LS MES3800LSG		MES3800LSI MES3800LSIG 8MES400T 8MES500T 8MES600T		8MES700T 8MES800T — — —	

M-Frame

Molded Case Switches

Eaton’s Cutler-Hammer 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.

Table 45-225. 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	Price U.S. \$

2-Pole

800	MDL2800WK MDLB2800WK ① HMDL2800WK	
-----	---	--

3-Pole

800	MDL3800WK MDLB3800WK ① HMDL3800WK	
-----	---	--

① MDLB and HMDLB are suitable for reverse-feed applications.

Note: Molded case switch may trip above 6000 amperes.

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.

Table 45-226. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Terminal		Terminals with Control Wire Termination	
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

Standard Cu/Al Pressure Terminals

600	Aluminum	Cu/Al	(2) 1 – 500 kcmil	TA700MA1		TA700MA1CWT	
800 std.	Aluminum	Cu/Al	(3) 3/0 – 400 kcmil	TA800MA2		TA800MA2CWT	
800	Aluminum	Cu/Al	(2) 500 – 750 kcmil	TA801MA		TA801MACWT	

Optional Copper and Cu/Al Pressure Type Terminals

600	Copper	Cu	(2) 2/0 – 500 kcmil	T600MA1		—	
800	Copper	Cu	(3) 3/0 – 300 kcmil	T800MA1		—	

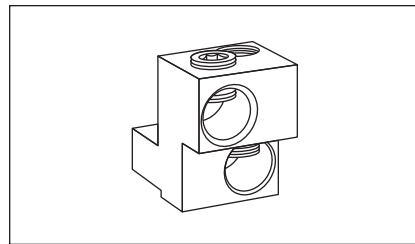


Figure 45-30. TA700MA1

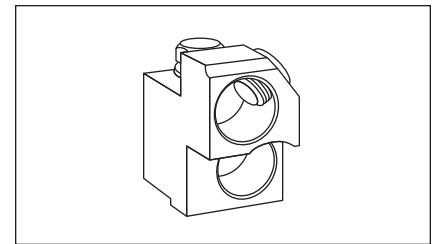


Figure 45-32. TA801MA

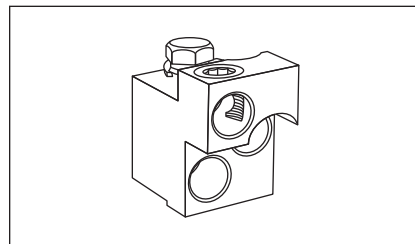


Figure 45-31. TA800MA2

Discount Symbol **CB-2**

M-Frame

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.

Table 45-227. Accessories

Description	Reference Page	2-Pole ^①		3-Pole		
		Left	Right	Left	Center	Right
Internal Accessories (Only One Internal Accessory Per Pole)						
Alarm Lockout (Make/Break)	45-182	■		■		■
Alarm Lockout (2Make/2Break)	45-182	■		■		■
Auxiliary Switch (1A, 1B)	45-185	■		■		■
Auxiliary Switch (2A, 2B)	45-185	■		■		■
Auxiliary Switch (3A, 3B)	45-185	■		■		■
Auxiliary Switch (1A, 1B) and Alarm Switch Combination	45-188	■		■		■
Auxiliary Switch (2A, 2B) and Alarm Switch Combination	45-188	■		■		■
Shunt Trip — Standard ^②	45-191	■		■		■
Shunt Trip — Low Energy ^②	45-196	■		■		■
Undervoltage Release Mechanism ^②	45-197	■		■		■
External Accessories						
Base Mounting Hardware	45-211				●	
Terminal Shields	45-213				●	
Interphase Barriers	45-214				●	
Non-Padlockable Handle Block	45-216				■	
Padlockable Handle Lock Hasp	45-217		□		□	□
Key Interlock Kit	45-218		□		□	□
Sliding Bar Interlock — Requires Two Breakers	45-219		●		●	
Walking Beam Interlock — Requires Two Breakers	45-219		●		●	
Electrical (Motor) Operator	45-220		●		●	
Plug-in Adapters	45-222		●		●	
Rear Connecting Studs	45-223		●		●	
Panelboard Connecting Straps	45-226		●		●	
Handle Mechanisms	45-227		●		●	
Handle Extension	45-232				●	
Solid-State (Electronic) Portable Test Kit	45-233		●		●	
Modifications (Refer to Eaton)						
Special Calibration	—		●		●	
Moisture Fungus Treatment	45-266		●		●	
Freeze-Tested Circuit Breakers	—		●		●	
Marine Application	—		●		●	

■ Applicable in indicated pole position

□ May be mounted on left or right pole — not both

● Accessory available/Modification available

^① 2-pole breaker supplied in 3-pole frame. Current carrying parts omitted from center pole.

^② Shunt trip and UVR cannot be mounted in right poles on MES trip units.

N-Frame

N-Frame



Typical N-Frame Circuit Breaker

Product Description

- All Cutler-Hammer N-Frame Circuit Breakers by Eaton Corporation are suitable for reverse feed use.
- All N-Frame circuit breakers are HACR rated.

Technical Data and Specifications

Table 45-228. UL 489 Interrupting Capacity Ratings ①

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 ②	2, 3, 4	65	—	50	25
HND	2, 3, 4	100	—	65	35
CHND ②	2, 3, 4	100	—	65	35
NDC	2, 3, 4	200	—	100	65
CNDC ②	2, 3, 4	200	—	100	65
NDU ③	3	300 ④	—	150	75 ⑤

- 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.

Table 45-229. IEC 947-2 Interrupting Capacity Ratings ⑥

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)		
		Volts ac (50/60 Hz)		
		240	415	690
ND I_{cu} I_{cs}	2, 3, 4	85 85	50 50	20 10
CND ⑦ I_{cu} I_{cs}	2, 3, 4	85 85	50 50	20 10
HND I_{cu} I_{cs}	2, 3, 4	100 100	70 50	25 13
CHND ⑦ I_{cu} I_{cs}	2, 3, 4	100 100	70 50	25 13
NDC I_{cu} I_{cs}	2, 3, 4	200 100	100 50	35 18
CNDC ⑦ I_{cu} I_{cs}	2, 3, 4	200 100	100 50	35 18

- ⑥ Utilization Category A circuit breakers.
- ⑦ 100% rated breakers.

N-Frame

N-Frame Digitrip Specifications

Table 45-230. Specifications

Trip Unit Type	Digitrip RMS 310	Digitrip OPTIM 550	Digitrip OPTIM 1050	
rms Sensing	Yes	Yes	Yes	
Breaker Type				
Frame	N	N	N	
Ampere Range	400 A – 1200 A	400 A – 1200 A	400 A – 1200 A	
Interrupting Rating at 480 Volts	50, 65, 100 (kA)	50, 65, 100 (kA)	50, 65, 100 (kA)	
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSIG, LSI(A)	LSI(A), LISG
Fixed Rated Plug (I_N)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_N)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_N) ^①	0.5 – 1.0 (I_N) ^①	0.4 – 1.0 x (I_N)	0.4 – 1.0 x (I_N)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	No	0.5 – 1.0 x I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% x (I_N)	200 – 800% x (I_N)	150 – 800% x (I_r)	150 – 800% x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% x (I_N)	200 – 800% x (I_N)	200 – 800% x (I_N)
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% x (I_G)	20 – 100% x (I_G)
Ground Fault Pickup	Varies by Frame ^②	Varies by Frame ^②	20 – 100% x (I_G)	20 – 100% x (I_G)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ^③	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ^④	Yes ^④	Yes ^③	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ^②	Yes ^②
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	No ^⑤	Yes
Testing				
Testing Method	Test Set	OPTIMizer, BIM, Cutler-Hammer PowerNet	OPTIMizer, BIM, Cutler-Hammer PowerNet	

① Adjust by rating plug.

② By OPTIMizer/BIM.

③ Zone interlock kit.

④ With separate ground fault alarm unit (GFAU).

⑤ Eaton's Cutler-Hammer PowerNet kit.

Legend: BIM = Breaker Interface Module

(A) = GF Alarm

 I_s = Sensor Rating I_N = Rating Plug I_r = Long Delay Pickup Setting

N-Frame

Dimensions/Weights

Table 45-231. Dimensions in Inches (mm)

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)

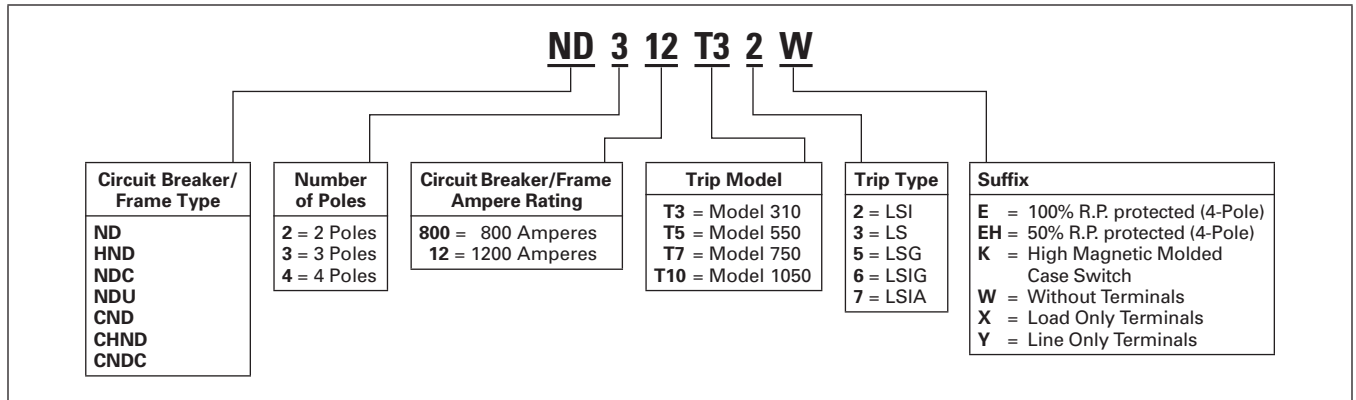
Table 45-232. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker		
	Number of Poles		
	2	3	4
ND, HND, NDC, NDU	37 (16.8)	45 (20.4)	58 (26.3)

Product 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.

Table 45-233. Circuit Breaker/Frame Catalog Numbering System



N-Frame

Product Selection

Type ND Electronic Circuit Breakers with Non-Interchangeable Trip Units

Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 45-234. Type ND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 45-155 for Optional Terminals	
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac								
	Standard		Options		Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug		
	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection					Adjustable Ampere Ratings
Catalog Number				Catalog Number					
2-Pole									
800	ND2800T33W	ND2800T32W	ND2800T35W	ND2800T36W	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1	
					450	8NES450T			
					500	8NES500T			
					600	8NES600T			
					700	8NES700T			
					800	8NES800T			
3-Pole									
800	ND3800T33W or ND4800T33EW (100% Neutral)	ND3800T32W	ND3800T35W	ND3800T36W	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1	
					450	8NES450T			
					500	8NES500T			
					600	8NES600T			
					700	8NES700T			
					800	8NES800T			
4-Pole ③									
800	ND4800T33W	ND4800T32W	—	—	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1	
					450	8NES450T			
					500	8NES500T			
					600	8NES600T			
					700	8NES700T			
					800	8NES800T			
2-Pole									
1200	ND212T33W	ND212T32W	ND212T35W	ND212T36W	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1	
					700	12NES700T			
					800	12NES800T			
					900	12NES900T			
					1000	12NES1000T			
					1200	12NES1200T			
3-Pole									
1200	ND312T33W	ND312T32W	ND312T35W	ND312T36W	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1	
					700	12NES700T			
					800	12NES800T			
					900	12NES900T			
					1000	12NES1000T			
					1200	12NES1200T			
4-Pole ③									
1200	ND412T33W	ND412T32W	—	—	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1	
					700	12NES700T			
					800	12NES800T			
					900	12NES900T			
					1000	12NES1000T			
					1200	12NES1200T			

① See Table 45-235 on Page 45-139 for prices.

② Two terminals are required per pole.

③ Neutral is in right pole.

May 2008

N-Frame

Table 45-235. Type ND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A12NES1200T1 A8NES800T1 ND212T32W ND212T33W ND212T35W		ND312T32W ND312T33W ND312T35W ND312T36W ND3800T32W		ND4800T32W ND4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
ND212T36W ND2800T32W ND2800T33W ND2800T35W ND2800T36W		ND3800T33W ND3800T35W ND3800T36W ND412T32W ND412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

Discount Symbol **CB-2**

N-Frame

Type HND Electronic Circuit Breakers with Non-Interchangeable Trip Units

Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 45-236. Type HND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 45-155 for Optional Terminals
	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug Adjustable Ampere Ratings	
	Standard	Options						
	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number				Catalog Number			
2-Pole								
800	HND2800T33W	HND2800T32W	HND2800T35W	HND2800T36W	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
3-Pole								
800	HND3800T33W	HND3800T32W	HND3800T35W	HND3800T36W	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
4-Pole ③								
800	HND4800T33W	HND4800T32W	—	—	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
2-Pole								
1200	HND212T33W	HND212T32W	HND212T35W	HND212T36W	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
3-Pole								
1200	HND312T33W	HND312T32W	HND312T35W	HND312T36W	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
4-Pole ③								
1200	HND412T33W	HND412T32W	—	—	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1

① See Table 45-237 on Page 45-141 for prices.

② Two terminals are required per pole.

③ Neutral is in right pole.

May 2008

N-Frame

Table 45-237. Type HND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A12NES1200T1 A8NES800T1 HND212T32W HND212T33W HND212T35W		HND312T32W HND312T33W HND312T35W HND312T36W HND3800T32W		HND4800T32W HND4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
HND212T36W HND2800T32W HND2800T33W HND2800T35W HND2800T36W		HND3800T33W HND3800T35W HND3800T36W HND412T32W HND412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

Discount Symbol **CB-2**

N-Frame

Type NDC Electronic Circuit Breakers with Non-Interchangeable Trip Units

Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 45-238. Type NDC Electronic Circuit Breakers with Non-Interchangeable Trip Units ^①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ^② See Page 45-155 for Optional Terminals
	Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard		Options				Adjustable Ampere Ratings	
	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
Catalog Number				Catalog Number				
2-Pole								
800	NDC2800T33W	NDC2800T32W	NDC2800T35W	NDC2800T36W	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
3-Pole								
800	NDC3800T33W	NDC3800T32W	NDC3800T35W	NDC3800T36W	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
4-Pole ^③								
800	NDC4800T33W	NDC4800T32W	—	—	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
2-Pole								
1200	NDC212T33W	NDC212T32W	NDC212T35W	NDC212T36W	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
3-Pole								
1200	NDC312T33W	NDC312T32W	NDC312T35W	NDC312T36W	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
4-Pole ^③								
1200	NDC412T33W	NDC412T32W	—	—	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1

^① See Table 45-239 on Page 45-143 for prices.^② Two terminals are required per pole.^③ Neutral is in right pole.

May 2008

N-Frame

Table 45-239. Type NDC Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A12NES1200T1 A8NES800T1 NDC212T32W NDC212T33W NDC212T35W		NDC312T32W NDC312T33W NDC312T35W NDC312T36W NDC3800T32W		NDC4800T32W NDC4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
NDC212T36W NDC2800T32W NDC2800T33W NDC2800T35W NDC2800T36W		NDC3800T33W NDC3800T35W NDC3800T36W NDC412T32W NDC412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

Discount Symbol **CB-2**

N-Frame

Type ND, 1200 Amperes 150 kA at 480 Vac

Table 45-240. Type NDU Ultra High Capacity — U_e Max. 600 Vac, 150 kA I_{cu} at 480 Vac

Maximum Continuous Ampere Rating at 40°C ①②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ③				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS	LSI	LSG	LSIG	Fixed Rating Plug	Adjustable Rating Plug	
Short Time Range	2 – 8 × I_n	2 – 8 × I_n	2 – 8 × I_n	2 – 8 × I_n	400	8NES400T	400/500/600/800 A8NES800T1	
Short Time Delay	—	1 – 300 ms	—	1 – 300 ms	450	8NES450T		
Ground Fault Pickup	—	—	200 – 1200 A	200 – 1200 A	500	8NES500T		
Ground Fault Delay	—	—	1 – 500 ms	1 – 500 ms	550	8NES550T		
					600	8NES600T		
					630	8NES630T		
					700	8NES700T		
					800	8NES800T		
	4-Pole ④	NDU4800T33W	NDU4800T32W	—	—	400	8NES400T	400/500/600/800 A8NES800T1
						450	8NES450T	
						500	8NES500T	
						550	8NES550T	
						600	8NES600T	
						630	8NES630T	
						700	8NES700T	
						800	8NES800T	

① For ac use only.

② ND MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.

③ Order terminals separately.

④ Unprotected left pole neutral. Insert “E” for 100% neutral or “EH” for 60% neutral between “W” and “P” (e.g., **NDS412T32EHP08**). Neutral is on LH side.**Note:** Non-UL listed ND 1250 with 1250 ampere trip unit is also available.

100% Rated Type CND Electronic Circuit Breakers with Non-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. Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 45-241. 100% Rated Type CND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 45-155 for Optional Terminals
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options						
	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection			Adjustable Ampere Ratings	
	Catalog Number				Catalog Number			
2-Pole								
800	CND2800T33W	CND2800T32W	CND2800T35W	CND2800T36W	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
3-Pole								
800	CND3800T33W	CND3800T32W	CND3800T35W	CND3800T36W	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
4-Pole ③								
800	CND4800T33W	CND4800T32W	—	—	400 450 500 600 700 800	8NES400T 8NES450T 8NES500T 8NES600T 8NES700T 8NES800T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
2-Pole ④								
1200	CND212T33W	CND212T32W	CND212T35W	CND212T36W	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
3-Pole ④								
1200	CND312T33W	CND312T32W	CND312T35W	CND312T36W	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
4-Pole ③④								
1200	CND412T33W	CND412T32W	—	—	600 700 800 900 1000 1200	12NES600T 12NES700T 12NES800T 12NES900T 12NES1000T 12NES1200T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1

① See Table 45-242 on Page 45-146 for prices.

② Two terminals are required per pole.

③ Neutral is in right pole.

④ Includes conductor extension kit which increase breaker length 3.75 on each end. Terminal ordered separate.

N-Frame

Table 45-242. 100% Rated Type CND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A12NES1200T1 A8NES800T1 CND212T32W CND212T33W CND212T35W		CND312T32W CND312T33W CND312T35W CND312T36W CND3800T32W		CND4800T32W CND4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
CND212T36W CND2800T32W CND2800T33W CND2800T35W CND2800T36W		CND2800T33W CND2800T35W CND2800T36W CND412T32W CND412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

Discount Symbol **CB-2**

100% Rated Type CHND Electronic Circuit Breakers with Non-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. Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 45-243. 100% Rated Type CHND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 45-155 for Optional Terminals
	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options						
	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
Catalog Number				Catalog Number				
2-Pole								
800	CHND2800T33W	CHND2800T32W	CHND2800T35W	CHND2800T36W	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
					450	8NES450T		
					500	8NES500T		
					600	8NES600T		
					700	8NES700T		
					800	8NES800T		
3-Pole								
800	CHND3800T33W	CHND3800T32W	CHND3800T35W	CHND3800T36W	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
					450	8NES450T		
					500	8NES500T		
					600	8NES600T		
					700	8NES700T		
					800	8NES800T		
4-Pole ③								
800	CHND4800T33W	CHND4800T32W	—	—	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
					450	8NES450T		
					500	8NES500T		
					600	8NES600T		
					700	8NES700T		
					800	8NES800T		
2-Pole ④								
1200	CHND212T33W	CHND212T32W	CHND212T35W	CHND212T36W	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
					700	12NES700T		
					800	12NES800T		
					900	12NES900T		
					1000	12NES1000T		
					1200	12NES1200T		
3-Pole ④								
1200	CHND312T33W	CHND312T32W	CHND312T35W	CHND312T36W	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
					700	12NES700T		
					800	12NES800T		
					900	12NES900T		
					1000	12NES1000T		
					1200	12NES1200T		
4-Pole ③④								
1200	CHND412T33W	CHND412T32W	—	—	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
					700	12NES700T		
					800	12NES800T		
					900	12NES900T		
					1000	12NES1000T		
					1200	12NES1200T		

① See Table 45-244 on Page 45-148 for prices.

② Two terminals are required per pole.

③ Neutral is in right pole.

④ Includes conductor extension kit which increase breaker length 3.75 on each end. Terminal ordered separate.

N-Frame

Table 45-244. 100% Rated Type CHND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A12NES1200T1 A8NES800T1 CHND212T32W CHND212T33W CHND212T35W		CHND312T32W CHND312T33W CHND312T35W CHND312T36W CHND3800T32W		CHND4800T32W CHND4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
CHND212T36W CHND2800T32W CHND2800T33W CHND2800T35W CHND2800T36W		CHND3800T33W CHND3800T35W CHND3800T36W CHND412T32W CHND412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

100% Rated Type CNDC Electronic Circuit Breakers with Non-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. Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 45-245. 100% Rated Type CNDC Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 45-155 for Optional Terminals
	Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard		Options					
	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
Catalog Number				Catalog Number				
2-Pole								
800	CNDC2800T33W	CNDC2800T32W	CNDC2800T35W	CNDC2800T36W	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
					450	8NES450T		
					500	8NES500T		
					600	8NES600T		
					700	8NES700T		
					800	8NES800T		
3-Pole								
800	CNDC3800T33W	CNDC3800T32W	CNDC3800T35W	CNDC3800T36W	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
					450	8NES450T		
					500	8NES500T		
					600	8NES600T		
					700	8NES700T		
					800	8NES800T		
4-Pole ③								
800	CNDC4800T33W	CNDC4800T32W	—	—	400	8NES400T	Adjustable Settings are: 400, 500, 600, 800 A8NES800T1	TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA700NB1 TA1000NB1
					450	8NES450T		
					500	8NES500T		
					600	8NES600T		
					700	8NES700T		
					800	8NES800T		
2-Pole ④								
1200	CNDC212T33W	CNDC212T32W	CNDC212T35W	CNDC212T36W	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
					700	12NES700T		
					800	12NES800T		
					900	12NES900T		
					1000	12NES1000T		
					1200	12NES1200T		
3-Pole ④								
1200	CNDC312T33W	CNDC312T32W	CNDC312T35W	CNDC312T36W	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
					700	12NES700T		
					800	12NES800T		
					900	12NES900T		
					1000	12NES1000T		
					1200	12NES1200T		
4-Pole ③④								
1200	CNDC412T33W	CNDC412T32W	—	—	600	12NES600T	Adjustable Settings are: 600, 800, 1000, 1200 A12NES1200T1	TA700NB1 TA700NB1 TA1000NB1 TA1000NB1 TA1000NB1 TA1200NB1
					700	12NES700T		
					800	12NES800T		
					900	12NES900T		
					1000	12NES1000T		
					1200	12NES1200T		

① See Table 45-246 on Page 45-150 for prices.

② Two terminals are required per pole.

③ Neutral is in right pole.

④ Includes conductor extension kit which increases breaker length 3.75 on each end. Terminal ordered separate.

N-Frame

Table 45-246. 100% Rated Type CNDC Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A12NES1200T1 A8NES800T1 CNDC212T32W CNDC212T33W CNDC212T35W		CNDC312T32W CNDC312T33W CNDC312T35W CNDC312T36W CNDC3800T32W		CNDC4800T32W CNDC4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
CNDC212T36W CNDC2800T32W CNDC2800T33W CNDC2800T35W CNDC2800T36W		CNDC3800T33W CNDC3800T35W CNDC3800T36W CNDC412T32W CNDC412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

N-Frame

Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-247. Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug 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 Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ^②								
	LSI		LSIG		LSIA				
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$		
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac									
800	ND3800T52W		ND3800T56W		ND3800T57W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	ND312T52W		ND312T56W		ND312T57W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac									
800	HND3800T52W		HND3800T56W		HND3800T57W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	HND312T52W		HND312T56W		HND312T57W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	
3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac									
800	NDC3800T52W		NDC3800T56W		NDC3800T57W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	NDC312T52W		NDC312T56W		NDC312T57W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	

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 (refer to **Page 45-207** and take list price Adder x 1.25).

N-Frame

Table 45-248. Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug 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 Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug
	OPTIM 1050 ②③					
	LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac

800	ND3800T106W		ND3800T107W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	ND312T106W		ND312T107W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	

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

800	HND3800T106W		HND3800T107W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	HND312T106W		HND312T107W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	

3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

800	NDC3800T106W		NDC3800T107W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	NDC312T106W		NDC312T107W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	

- 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 (trip) alarm switch supplied with breaker as standard.
- ③ Factory sealed.

45

100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-249. 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	
	L – Adjustable Long Delay Pickup (I_p) 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)						Ampere Rating	Fixed Rating Plug
	OPTIM 550 ^②							
	LSI		LSIG		LSIA			
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac

Rating	LSI	Price U.S. \$	LSIG	Price U.S. \$	LSIA	Price U.S. \$	Rating Plug
800	CND3800T52W		CND3800T56W		CND3800T57W		400 ORPN80A400 450 ORPN80A450 500 ORPN80A500 550 ORPN80A550 600 ORPN80A600 700 ORPN80A700 800 ORPN80A800
1200 ^③	CND312T52W		CND312T56W		CND312T57W		600 ORPN12A600 700 ORPN12A700 800 ORPN12A800 1000 ORPN12A100 1200 ORPN12A120

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

Rating	LSI	Price U.S. \$	LSIG	Price U.S. \$	LSIA	Price U.S. \$	Rating Plug
800	CHND3800T52W		CHND3800T56W		CHND3800T57W		400 ORPN80A400 450 ORPN80A450 500 ORPN80A500 550 ORPN80A550 600 ORPN80A600 700 ORPN80A700 800 ORPN80A800
1200 ^③	CHND312T52W		CHND312T56W		CHND312T57W		600 ORPN12A600 700 ORPN12A700 800 ORPN12A800 1000 ORPN12A100 1200 ORPN12A120

3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LSI	Price U.S. \$	LSIG	Price U.S. \$	LSIA	Price U.S. \$	Rating Plug
800	CNDC3800T52W		CNDC3800T56W		CNDC3800T57W		400 ORPN80A400 450 ORPN80A450 500 ORPN80A500 550 ORPN80A550 600 ORPN80A600 700 ORPN80A700 800 ORPN80A800
1200 ^③	CNDC312T52W		CNDC312T56W		CNDC312T57W		600 ORPN12A600 700 ORPN12A700 800 ORPN12A800 1000 ORPN12A100 1200 ORPN12A120

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 (refer to **Page 45-207** and take list price Adder x 1.25).

③ Includes conductor extension kit which increases breaker length 3.75 on each end. Terminal ordered separate.

N-Frame

Table 45-250. 100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug 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)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②③						
	LSIG		LSIA				
Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$		
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac							
800	CND3800T106W		CND3800T107W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	CND312T106W		CND312T107W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
800	CHND3800T106W		CHND3800T107W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	CHND312T106W		CHND312T107W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	
3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
800	CNDC3800T106W		CNDC3800T107W		400 450 500 550 600 700 800	ORPN80A400 ORPN80A450 ORPN80A500 ORPN80A550 ORPN80A600 ORPN80A700 ORPN80A800	
1200	CNDC312T106W ④		CNDC312T107W		600 700 800 1000 1200	ORPN12A600 ORPN12A700 ORPN12A800 ORPN12A100 ORPN12A120	

① Long delay I^4t 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.

45

N-Frame

Type ND Molded Case Switches

Table 45-251. Type ND Molded Case Switches

Continuous Ampere Rating at 40°C	3-Pole		4-Pole ①	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Type ND – High Instantaneous (K)				
800	ND3800WK HND3800WK		ND4800WK HND4800WK	
Type ND – High Instantaneous (K)				
1200	ND312WK HND312WK		ND412WK HND412WK	

① Neutral is in right pole.

Note: Molded case switch will trip above 14,000 amperes.

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

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.

Table 45-252. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/ No. Conductors	Metric Wire Range mm ²	Catalog Number	Price U.S. \$
Standard Cu/Al Pressure Terminals						
700	Aluminum	Cu/Al	(2) 1 – 500 kcmil	50 – 240	TA700NB1	
1000	Aluminum	Cu/Al	(3) 3/0 – 400 kcmil	95 – 185	TA1000NB1 ②	
1200	Aluminum	Cu/Al	(4) 4/0 – 500 kcmil	120 – 240	TA1200NB1 ②	
1200	Aluminum	Cu/Al	(3) 500 – 750 kcmil	300 – 400	TA1201NB1 ③	
Optional Copper and Cu/Al Pressure Type Terminals						
700	Copper	Cu	(2) 2/0 – 500 kcmil	70 – 240	T700NB1	
1000	Copper	Cu	(3) 3/0 – 500 kcmil	95 – 240	T1000NB1	
1200	Copper	Cu	(4) 3/0 – 400 kcmil	95 – 185	T1200NB3	

② Terminal rating is AL9CU.

③ Terminal rating is AL7CU.

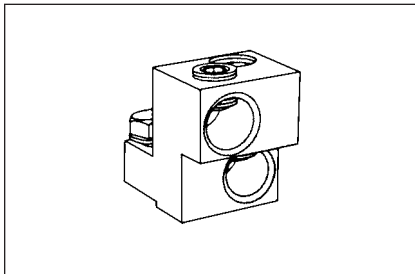


Figure 45-33. TA700NB1

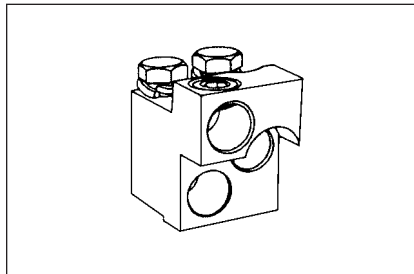


Figure 45-34. TA1000NB1

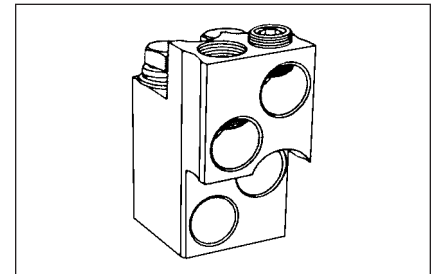


Figure 45-35. TA1200NB1

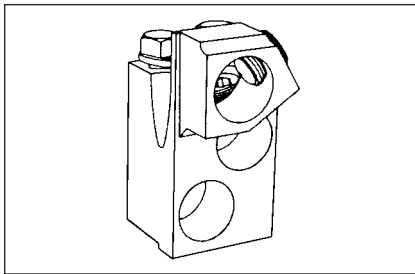


Figure 45-36. TA1201NB1

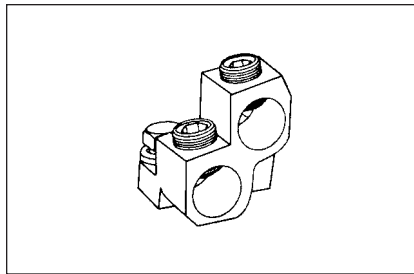


Figure 45-37. T700NB1

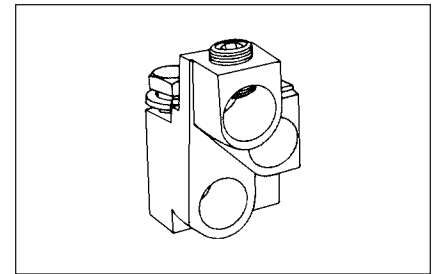


Figure 45-38. T1000NB1

N-Frame

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.

Table 45-253. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole) ①								
Alarm Lockout (Make/Break)	45-182	■		■	■		■	
Alarm Lockout (2Make/2Break)	45-182	■		■	■		■	
Auxiliary Switch (1A, 1B)	45-185	■		■	■		■	
Auxiliary Switch (2A, 2B)	45-185	■		■	■		■	
Auxiliary Switch (3A, 3B)	45-185	■		■	■		■	
Auxiliary Switch (1A, 1B) and Alarm Switch Combination	45-188	■		■	■		■	
Auxiliary Switch (2A, 2B) and Alarm Switch Combination	45-188	■		■	■		■	
Shunt Trip — Standard	45-191	■			■			
Shunt Trip — Low Energy	45-196	■			■			
Undervoltage Release Mechanism	45-197	■			■			
Cutler-Hammer PowerNet Communications Kit (OPTIM 550)	45-207			■				
External Accessories								
Base Mounting Hardware	45-211		●				●	
Interphase Barriers	45-214		●				●	
Non-Padlockable Handle Block	45-216		■			■		
Padlockable Handle Lock Hasp	45-217	□		□	□		□	
Key Interlock Kit	45-218	□		□	□		□	
Sliding Bar Interlock — Requires Two Breakers	45-219		●					
Walking Beam Interlock — Requires Two Breakers	45-219		●				●	
Electrical (Motor) Operator	45-220		●				●	
Plug-in Adapters	45-222		●				●	
Rear Connecting Studs	45-223		●				●	
Panelboard Connecting Straps	45-226		●				●	
Handle Mechanisms	45-227		●				●	
Handle Extension	45-232		●				●	
Solid-State (Electronic) Portable Test Kit	45-233		●				●	
OPTIM System Components 3-Poles								
Ground Fault Alarm Unit	45-233							
Potential Transformer Module	45-233							
Breaker Interface Module (BIM)	45-234							
Digitrip OPTIMizer	45-234							
Auxiliary Power Module	45-234							
Modifications (Refer to Eaton)								
Special Calibration	—		●				●	
Moisture Fungus Treatment	45-266		●				●	
Freeze-Tested Circuit Breakers	—		●				●	
Marine Application	—		●				●	

■ Applicable in indicated pole position

□ May be mounted on left or right pole — not both

● Accessory available/Modification available

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

R-Frame



Typical R-Frame Circuit Breaker

Product Description

- Cutler-Hammer R-Frame Circuit Breakers by Eaton Corporation are available as frame (which includes trip unit), rating plug and terminals.
- All R-Frame circuit breakers are suitable for reverse feed use.

Technical Data and Specifications

Table 45-254. UL 489/CSA Interrupting Capacity Ratings ①

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 ②	3, 4	125	—	65	50
RDC	3, 4	200	—	100	65
CRDC ②	3, 4	200	—	100	65

① Utilization Category A circuit breakers.

② 100% rated breakers.

Note: See Page 45-158 for Trip Unit Specifications.

Table 45-255. IEC 947-2 Interrupting Capacity Ratings ③

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)		
		Volts ac (50/60 Hz)		
		240	415	690
RD	3, 4	135	70	25
I_{cu}		100	50	13
I_{cs}				
RDC	3, 4	200	100	35
I_{cu}		100	50	18
I_{cs}				

③ Utilization Category A circuit breakers.

R-Frame

R-Frame Digitrip Specifications

Table 45-256. Specifications

Trip Unit Type	Digitrip RMS 310	Digitrip RMS 510	Digitrip RMS 610	Digitrip RMS 810	Digitrip RMS 910	Digitrip OPTIM 1050
rms Sensing	Yes	Yes	Yes	Yes	Yes	Yes
Breaker Type						
Frame	R	R	R	R	R	R
Ampere Range	800 A – 2500 A	800 A – 2500 A	800 A – 2500 A	800 A – 2500 A	800 A – 2500 A	800 A – 2500 A
Interrupting Rating at 480 Volts	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)
Protection						
Ordering Options	LS, LSG	LSI, 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	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes	Yes	Yes
Long Delay Protection (L)						
Adjustable Rating Plug (I_n)	Yes	Yes	No	No	No	No
Long Delay Pickup	0.5 – 1.0 (I_n) ^①	0.5 – 1.0 (I_n) ^①	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)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	No	No	No	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes	Yes	Yes
High Load Alarm	No	No	No	0.85 x I_r	0.85 x I_r	0.85 x I_r
Short Delay Protection (S)						
Short Delay Pickup	200 – 800% x (I_n) ^②	200 – 800% x (I_n) ^②	200 – 600% S1&S2 x (I_r)	200 – 600% S1&S2 x (I_r)	200 – 600% S1&S2 x (I_r)	200 – 600% S1&S2 x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes	Yes	Yes	Yes
Instantaneous Protection (I)						
Instantaneous Pickup	No	200 – 800% x (I_n)	200 – 600% M1&M2 x (I_n)	200 – 600% M1&M2 x (I_n)	200 – 600% M1&M2 x (I_n)	200 – 600% M1&M2 x (I_n)
Discriminator	No	No	Yes ^④	Yes ^④	Yes ^④	Yes ^④
Instantaneous Override	Yes	Yes	Yes	Yes	Yes	Yes
Ground Fault Protection (G)						
Ground Fault Alarm ^⑤	No	No	No	No	No	No
Ground Fault Pickup ^⑤	200 – 1200 A	200 – 1200 A	25 – 100% x (I_s)	25 – 100% x (I_s)	25 – 100% x (I_s)	25 – 100% x (I_s)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes	Yes	Yes	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes	Yes	Yes
System Diagnostics						
Status LEDs	Yes	Yes	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes	Yes	Yes
Magnitude of Trip Information	No	No	No	Yes	Yes	Yes
Remote Signal Contacts	Yes ^⑦	Yes ^⑦	No	Yes	Yes	Yes
System Monitoring						
Digital Display	No	No	No	Yes	Yes	Yes ^⑥
Current	No	No	No	Yes	Yes	Yes
Voltage	No	No	No	No	No	No
Power and Energy	No	No	No	No	Yes	Yes
Power Quality — Harmonics	No	No	No	No	No	Yes
Power Factor	No	No	No	No	Yes (Over Cutler-Hammer PowerNet Only)	Yes
Communications						
Cutler-Hammer PowerNet	No	No	No	No	Yes	Yes
Testing						
Testing Method	Test Set	Integral	Integral	Integral	Integral	OPTIMizer, BIM, Cutler-Hammer PowerNet

① Adjust by rating plug.

② Except 2500 ampere frame is 200 – 600%.

③ Varies by frame.

④ LS/LSG only.

⑤ Not to exceed 1200 amperes.

⑥ By OPTIMizer/BIM.

⑦ Optional. Add suffix "R" to Catalog Number.

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

R-Frame

Dimensions/Weights

Table 45-257. Dimensions in Inches (mm)

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)

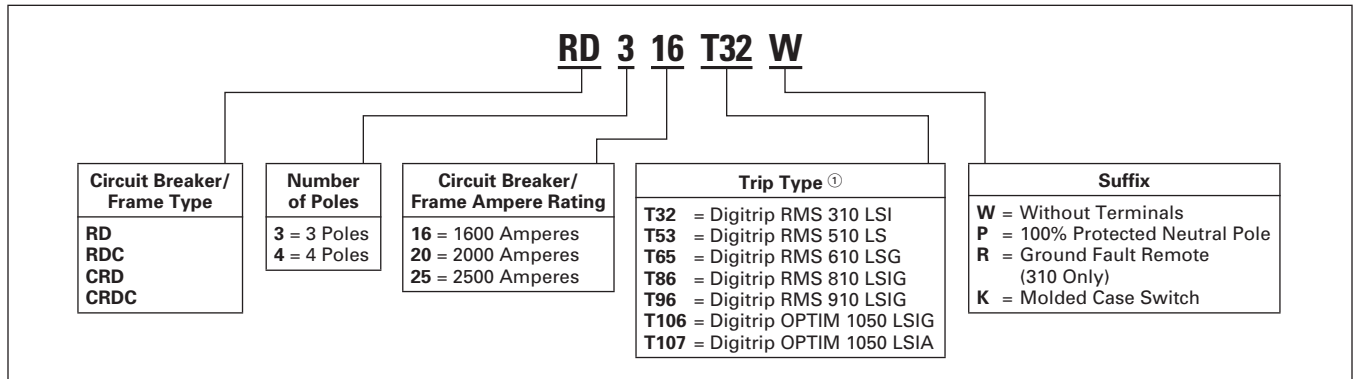
Table 45-258. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker	
	Number of Poles	
	3	4
1600 Amperes		
RD, CRD, RDC, CRDC	102 (46.3)	135 (61.2)
2000 Amperes		
RD, RDC	102 (46.3)	135 (61.2)
CRD, CRDC	130 (59.0)	175 (79.4)
2500 Amperes		
RD, RDC	135 (61.2)	182 (82.6)

Product 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.

Table 45-259. Circuit Breaker/Frame Catalog Numbering System



① For complete list of available trip types refer to **Pages 45-160 – 45-173.**

Product Selection

Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-260. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only		
	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (Flat Response)				Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug
	LS LSI LSG ② LSIG ②						Adjustable Ampere Ratings
	Catalog Number				Catalog Number		

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Maximum Continuous Ampere Rating at 40°C	RD316T33W	RD316T32W	RD316T35W	RD316T36W	Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug
1600 ③					800 1000 1200 1250 1400 1500 1600	16RES08T 16RES10T 16RES12T 16RES125T 16RES14T 16RES15T 16RES16T	Adjustable Settings are: 800, 1000, 1200, 1600 A16RES16T1
2000					1000 1200 1250 1400 1600 2000	20RES10T 20RES12T 20RES125T 20RES14T 20RES16T 20RES20T	Adjustable Settings are: 1000, 1200, 1600, 2000 A20RES20T1
2500					1200 1250 1600 2000 2500	25RES12T 25RES125T 25RES16T 25RES20T 25RES25T	Adjustable Settings are: 1200, 1600, 2000, 2500 A25RES25T1

4-Pole ④ Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Maximum Continuous Ampere Rating at 40°C	RD416T33W	RD416T32W	—	—	Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug
1600 ③					800 1000 1200 1250 1400 1500 1600	16RES08T 16RES10T 16RES12T 16RES125T 16RES14T 16RES15T 16RES16T	Adjustable Settings are: 800, 1000, 1200, 1600 A16RES16T1
2000					1000 1200 1250 1400 1600 2000	20RES10T 20RES12T 20RES125T 20RES14T 20RES16T 20RES20T	Adjustable Settings are: 1000, 1200, 1600, 2000 A20RES20T1
2500					1200 1250 1600 2000 2500	25RES12T 25RES125T 25RES16T 25RES20T 25RES25T	Adjustable Settings are: 1200, 1600, 2000, 2500 A25RES25T1

① See Table 45-261 on Page 45-161 for prices.

② Add **R** to Catalog Number for ground fault remote indication compatibility, i.e., RD316T35RW.

③ For SCR application use 2000 ampere frame.

④ Unprotected right pole neutral. Add **P** to Catalog Number for 100% protected right pole neutral, i.e., RD416T33PW.

R-Frame

Table 45-261. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A16RES16T1 A20RES20T1 A25RES25T1 RD316T32W RD316T33W		RD320T36W RD325T32W RD325T33W RD325T35W RD325T36W		RD425T33W 16RES08T 16RES10T 16RES12T 16RES125T		20RES125T 20RES14T 20RES16T 20RES19T 20RES20T	
RD316T35W RD316T36W RD320T32W RD320T33W RD320T35W		RD416T32W RD416T33W RD420T32W RD420T33W RD425T32W		16RES14T 16RES15T 16RES16T 20RES10T 20RES12T		25RES12T 25RES125T 25RES16T 25RES20T 25RES25T	

Discount Symbol **CB-2**

R-Frame

Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-262. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only		
	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (Flat Response)				Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug
							Adjustable Ampere Ratings
	LS	LSI	LSG ②	LSIG ②	Catalog Number		
Catalog Number				Catalog Number			

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LS	LSI	LSG	LSIG	Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug
1600 ③	RDC316T33W	RDC316T32W	RDC316T35W	RDC316T36W	800 1000 1200 1250 1400 1500 1600	16RES08T 16RES10T 16RES12T 16RES125T 16RES14T 16RES15T 16RES16T	Adjustable Settings are: 800, 1000, 1200, 1600 A16RES16T1
2000	RDC320T33W	RDC320T32W	RDC320T35W	RDC320T36W	1000 1200 1250 1400 1600 2000	20RES10T 20RES12T 20RES125T 20RES14T 20RES16T 20RES20T	Adjustable Settings are: 1000, 1200, 1600, 2000 A20RES20T1
2500	RDC325T33W	RDC325T32W	RDC325T35W	RDC325T36W	1200 1250 1600 2000 2500	25RES12T 25RES125T 25RES16T 25RES20T 25RES25T	Adjustable Settings are: 1200, 1600, 2000, 2500 A25RES25T1

4-Pole ④ High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LS	LSI	LSG	LSIG	Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug
1600 ③	RDC416T33W	RDC416T32W	—	—	800 1000 1200 1250 1400 1500 1600	16RES08T 16RES10T 16RES12T 16RES125T 16RES14T 16RES15T 16RES16T	Adjustable Settings are: 800, 1000, 1200, 1600 A16RES16T1
2000	RDC420T33W	RDC420T32W	—	—	1000 1200 1250 1400 1600 2000	20RES10T 20RES12T 20RES125T 20RES14T 20RES16T 20RES20T	Adjustable Settings are: 1000, 1200, 1600, 2000 A20RES20T1
2500	RDC425T33W	RDC425T32W	—	—	1200 1250 1600 2000 2500	25RES12T 25RES125T 25RES16T 25RES20T 25RES25T	Adjustable Settings are: 1200, 1600, 2000, 2500 A25RES25T1

① See Table 45-263 below for prices.

② Add R to Catalog Number for ground fault remote indication compatibility, i.e., RDC316T35RW.

③ For SCR application use 2000 ampere frame.

④ Unprotected right pole neutral. Add P to Catalog Number for 100% protected right pole neutral, i.e., RDC416T33PW.

Table 45-263. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A16RES16T1 A20RES20T1 A25RES25T1 RDC316T32W RDC316T33W		RDC320T36W RDC325T32W RDC325T33W RDC325T35W RDC325T36W		RDC425T33W 16RES08T 16RES10T 16RES12T 16RES125T		20RES125T 20RES14T 20RES16T 20RES20T 25RES12T	
RDC316T35W RDC316T36W RDC320T32W RDC320T33W RDC320T35W		RDC416T32W RDC416T33W RDC420T32W RDC420T33W RDC425T32W		16RES14T 16RES15T 16RES16T 20RES10T 20RES12T		25RES125T 25RES16T 25RES20T 25RES25T —	

Discount Symbol CB-2

45

100% Rated Digitrip RMS 310 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 75°C ampacity. Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 45-264. 100% Rated Digitrip RMS 310 Electronic Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only		
	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I ² t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (Flat Response)				Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug
							Adjustable Ampere Ratings
	LS	LSI	LSG ②	LSIG ②	Catalog Number	Catalog Number	
Catalog Number							

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	CRD316T33W	CRD316T32W	CRD316T35W	CRD316T36W	Ampere Rating	Rating Plug	Adjustable Settings
1600 ③					800 1000 1200 1250 1400 1500 1600	16RES08T 16RES10T 16RES12T 16RES125T 16RES14T 16RES15T 16RES16T	Adjustable Settings are: 800, 1000, 1200, 1600 A16RES16T1
2000 ④					1000 1200 1250 1400 1600 2000	20RES10T 20RES12T 20RES125T 20RES14T 20RES16T 20RES20T	Adjustable Settings are: 1000, 1200, 1600, 2000 A20RES20T1

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	CRDC316T33W	CRDC316T32W	CRDC316T35W	CRDC316T36W	Ampere Rating	Rating Plug	Adjustable Settings
1600 ③					800 1000 1200 1250 1400 1500 1600	16RES08T 16RES10T 16RES12T 16RES125T 16RES14T 16RES15T 16RES16T	Adjustable Settings are: 800, 1000, 1200, 1600 A16RES16T1
2000 ④					1000 1200 1250 1400 1600 2000	20RES10T 20RES12T 20RES125T 20RES14T 20RES16T 20RES20T	Adjustable Settings are: 1000, 1200, 1600, 2000 A20RES20T1

- ① See Table 45-265 below for prices.
- ② Add **R** to Catalog Number for ground fault remote indication compatibility, i.e., CRD316T35**R**W.
- ③ For SCR application use 2000 ampere frame.
- ④ Includes B2016RDL rear connectors.

Table 45-265. 100% Rated Digitrip RMS 310 Electronic Circuit Breakers Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
A16RES16T1 A20RES20T1 CRDC316T32W CRDC316T33W CRDC316T35W		CRD316T32W CRD316T33W CRD316T35W CRD316T36W CRD320T32W		16RES12T 16RES125T 16RES14T 16RES15T 16RES16T		20RES20T — — — —	
CRDC316T36W CRDC320T32W CRDC320T33W CRDC320T35W CRDC320T36W		CRD320T33W CRD320T35W CRD320T36W 16RES08T 16RES10T		20RES10T 20RES12T 20RES125T 20RES14T 20RES16T		— — — — —	

R-Frame

Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-266. Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_t) with Adjustable Long Delay Time						Rated Current (I_n)	Fixed Rating Plug
	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)						Catalog Number		
	LI	LS	LSI	LIG	LSG	LSIG		

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	RD316T51W	RD316T53W	RD316T52W	RD316T54W	RD316T55W	RD316T56W	Rated Current (I_n)	Fixed Rating Plug
1600							800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T51W	RD320T53W	RD320T52W	RD320T54W	RD320T55W	RD320T56W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T51W	RD325T53W	RD325T52W	RD325T54W	RD325T55W	RD325T56W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	RDC316T51W	RDC316T53W	RDC316T52W	RDC316T54W	RDC316T55W	RDC316T56W	Rated Current (I_n)	Fixed Rating Plug
1600							800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T51W	RDC320T53W	RDC320T52W	RDC320T54W	RDC320T55W	RDC320T56W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T51W	RDC325T53W	RDC325T52W	RDC325T54W	RDC325T55W	RDC325T56W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See Table 45-267 below for prices.

Table 45-267. Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
RDC316T51W		RDC320T55W		RD316T53W		RD325T51W		RP6R20A100	
RDC316T52W		RDC320T56W		RD316T54W		RD325T52W		RP6R20A120	
RDC316T53W		RDC325T51W		RD316T55W		RD325T53W		RP6R20A160	
RDC316T54W		RDC325T52W		RD316T56W		RD325T54W		RP6R20A200	
RDC316T55W		RDC325T53W		RD320T51W		RD325T55W		RP6R25A160	
RDC316T56W		RDC325T54W		RD320T52W		RD325T56W		RP6R25A200	
RDC320T51W		RDC325T55W		RD320T53W		RP6R16A080		RP6R25A250	
RDC320T52W		RDC325T56W		RD320T54W		RP6R16A100		—	
RDC320T53W		RD316T51W		RD320T55W		RP6R16A120		—	
RDC320T54W		RD316T52W		RD320T56W		RP6R16A160		—	

Discount Symbol CB-2

R-Frame

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.

Table 45-268. 100% Rated Digitrip RMS 510 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I _p) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response)						Rated Current (I _n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	CRD316T51W	CRD316T53W	CRD316T52W	CRD316T54W	CRD316T55W	CRD316T56W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T51W	CRD320T53W	CRD320T52W	CRD320T54W	CRD320T55W	CRD320T56W	1000 1200 1600 2000	— — — —

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	—	CRDC316T53W	CRDC316T52W	CRDC316T54W	CRDC316T55W	CRDC316T56W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T51W	CRDC320T53W	CRDC320T52W	CRDC320T54W	CRDC320T55W	CRDC320T56W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See Table 45-269 below for prices.

② Includes B2016RDL rear connectors.

Table 45-269. 100% Rated Digitrip RMS 510 Circuit Breakers Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
CRDC316T52W		CRDC320T56W		CRD320T54W		RP6R20A200	
CRDC316T53W		CRD316T51W		CRD320T55W		—	
CRDC316T54W		CRD316T52W		CRD320T56W		—	
CRDC316T55W		CRD316T53W		RP6R16A080		—	
CRDC316T56W		CRD316T54W		RP6R16A100		—	
CRDC320T51W		CRD316T55W		RP6R16A120		—	
CRDC320T52W		CRD316T56W		RP6R16A160		—	
CRDC320T53W		CRD320T51W		RP6R20A100		—	
CRDC320T54W		CRD320T52W		RP6R20A120		—	
CRDC320T55W		CRD320T53W		RP6R20A160		—	

R-Frame

Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-270. Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_p) 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
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I_n)	Fixed Rating Plug
1600	RD316T61W	RD316T63W	RD316T62W	RD316T64W	RD316T65W	RD316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T61W	RD320T63W	RD320T62W	RD320T64W	RD320T65W	RD320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T61W	RD325T63W	RD325T62W	RD325T64W	RD325T65W	RD325T66W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I_n)	Fixed Rating Plug
1600	RDC316T61W	RDC316T63W	RDC316T62W	RDC316T64W	RDC316T65W	RDC316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T61W	RDC320T63W	RDC320T62W	RDC320T64W	RDC320T65W	RDC320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T61W	RDC325T63W	RDC325T62W	RDC325T64W	RDC325T65W	RDC325T66W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See Table 45-271 below for prices.

Table 45-271. Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plug Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
RDC316T61W		RDC320T65W		RD316T63W		RD325T61W		RP6R20A100	
RDC316T62W		RDC320T66W		RD316T64W		RD325T62W		RP6R20A120	
RDC316T63W		RDC325T61W		RD316T65W		RD325T63W		RP6R20A160	
RDC316T64W		RDC325T62W		RD316T66W		RD325T64W		RP6R20A200	
RDC316T65W		RDC325T63W		RD320T61W		RD325T64W		RP6R25A160	
RDC316T66W		RDC325T64W		RD320T62W		RD325T66W		RP6R25A200	
RDC320T61W		RDC325T65W		RD320T63W		RP6R16A080		RP6R25A250	
RDC320T62W		RDC325T66W		RD320T64W		RP6R16A100		—	
RDC320T63W		RD316T61W		RD320T65W		RP6R16A120		—	
RDC320T64W		RD316T62W		RD320T65W		RP6R16A160		—	

R-Frame

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.

Table 45-272. 100% Rated Digitrip RMS 610 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I _p) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response)						Rated Current (I _n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	CRD316T61W	CRD316T63W	CRD316T62W	CRD316T64W	CRD316T65W	CRD316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T61W	CRD320T63W	CRD320T62W	CRD320T64W	CRD320T65W	CRD320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	CRDC316T61W	CRDC316T63W	CRDC316T62W	CRDC316T64W	CRDC316T65W	CRDC316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T61W	CRDC320T63W	CRDC320T62W	CRDC320T64W	CRDC320T65W	CRDC320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See Table 45-273 below for prices.

② Includes B2016RDRL rear connectors.

Table 45-273. 100% Rated Digitrip RMS 610 Circuit Breaker Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
CRDC316T61W		CRDC320T65W		CRD320T63W		RP6R20A160	
CRDC316T62W		CRDC320T66W		CRD320T64W		RP6R20A200	
CRDC316T63W		CRD316T61W		CRD320T65W		—	
CRDC316T64W		CRD316T62W		CRD320T66W		—	
CRDC316T65W		CRD316T63W		RP6R16A080		—	
CRDC316T66W		CRD316T64W		RP6R16A100		—	
CRDC320T61W		CRD316T65W		RP6R16A120		—	
CRDC320T62W		CRD316T66W		RP6R16A160		—	
CRDC320T63W		CRD320T61W		RP6R20A100		—	
CRDC320T64W		CRD320T62W		RP6R20A120		—	

R-Frame

Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-274. Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_p) with Adjustable Long Delay Time						Rated Current (I_n)	Fixed Rating Plug
	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)						Catalog Number		
LI	LS	LSI	LIG	LSG	LSIG			
Catalog Number								

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I_n)	Fixed Rating Plug
1600	RD316T81W	RD316T83W	RD316T82W	RD316T84W	RD316T85W	RD316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T81W	RD320T83W	RD320T82W	RD320T84W	RD320T85W	RD320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T81W	RD325T83W	RD325T82W	RD325T84W	RD325T85W	RD325T86W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I_n)	Fixed Rating Plug
1600	RDC316T81W	RDC316T83W	RDC316T82W	RDC316T84W	RDC316T85W	RDC316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T81W	RDC320T83W	RDC320T82W	RDC320T84W	RDC320T85W	RDC320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T81W	RDC325T83W	RDC325T82W	RDC325T84W	RDC325T85W	RDC325T86W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See Table 45-275 below for prices.

Table 45-275. Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plug Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
RDC316T81W		RDC320T85W		RD316T83W		RD325T81W		RP6R20A100	
RDC316T82W		RDC320T86W		RD316T84W		RD325T82W		RP6R20A120	
RDC316T83W		RDC325T81W		RD316T85W		RD325T83W		RP6R20A160	
RDC316T84W		RDC325T82W		RD316T86W		RD325T84W		RP6R20A200	
RDC316T85W		RDC325T83W		RD320T81W		RD325T85W		RP6R25A160	
RDC316T86W		RDC325T84W		RD320T82W		RD325T86W		RP6R25A200	
RDC320T81W		RDC325T85W		RD320T83W		RP6R16A080		RP6R25A250	
RDC320T82W		RDC325T86W		RD320T84W		RP6R16A100		—	
RDC320T83W		RD316T81W		RD320T85W		RP6R16A120		—	
RDC320T84W		RD316T82W		RD320T86W		RP6R16A160		—	

Discount Symbol CB-2

R-Frame

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.

Table 45-276. 100% Rated Digitrip RMS 810 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I _p) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response)						Rated Current (I _n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number						Catalog Number	

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Frame Size	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	CRD316T81W	CRD316T83W	CRD316T82W	CRD316T84W	CRD316T85W	CRD316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T81W	CRD320T83W	CRD320T82W	CRD320T84W	CRD320T85W	CRD320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Frame Size	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	CRDC316T81W	CRDC316T83W	CRDC316T82W	CRDC316T84W	CRDC316T85W	CRDC316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T81W	CRDC320T83W	CRDC320T82W	CRDC320T84W	CRDC320T85W	CRDC320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See Table 45-277 below for prices.

② Includes B2016RDL rear connectors.

Table 45-277. 100% Rated Digitrip RMS 810 Circuit Breaker Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
CRDC316T81W		CRDC320T85W		CRD320T83W		RP6R20A160	
CRDC316T82W		CRDC320T86W		CRD320T84W		RP6R20A200	
CRDC316T83W		CRD316T81W		CRD320T85W		—	
CRDC316T84W		CRD316T82W		CRD320T86W		—	
CRDC316T85W		CRD316T83W		RP6R16A080		—	
CRDC316T86W		CRD316T84W		RP6R16A100		—	
CRDC320T81W		CRD316T85W		RP6R16A120		—	
CRDC320T82W		CRD316T86W		RP6R16A160		—	
CRDC320T83W		CRD320T81W		RP6R20A100		—	
CRDC320T84W		CRD320T82W		RP6R20A120		—	

R-Frame

Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-278. Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_T) 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
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I_n)	Fixed Rating Plug
1600	RD316T91W	RD316T93W	RD316T92W	RD316T94W	RD316T95W	RD316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T91W	RD320T93W	RD320T92W	RD320T94W	RD320T95W	RD320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T91W	RD325T93W	RD325T92W	RD325T94W	RD325T95W	RD325T96W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I_n)	Fixed Rating Plug
1600	RDC316T91W	RDC316T93W	RDC316T92W	RDC316T94W	RDC316T95W	RDC316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T91W	RDC320T93W	RDC320T92W	RDC320T94W	RDC320T95W	RDC320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T91W	RDC325T93W	RDC325T92W	RDC325T94W	RDC325T95W	RDC325T96W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See Table 45-279 below for prices.

Table 45-279. Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plug Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
RDC316T91W		RDC320T95W		RD316T93W		RD325T91W		RP6R20A100	
RDC316T92W		RDC320T96W		RD316T94W		RD325T92W		RP6R20A120	
RDC316T93W		RDC325T91W		RD316T95W		RD325T93W		RP6R20A160	
RDC316T94W		RDC325T92W		RD316T96W		RD325T94W		RP6R20A200	
RDC316T95W		RDC325T93W		RD320T91W		RD325T95W		RP6R25A160	
RDC316T96W		RDC325T94W		RD320T92W		RD325T96W		RP6R25A200	
RDC320T91W		RDC325T95W		RD320T93W		RP6R16A080		RP6R25A250	
RDC320T92W		RDC325T96W		RD320T94W		RP6R16A100		—	
RDC320T93W		RD316T91W		RD320T95W		RP6R16A120		—	
RDC320T94W		RD316T92W		RD320T96W		RP6R16A160		—	

Discount Symbol CB-2

R-Frame

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.

Table 45-280. 100% Rated Digitrip RMS 910 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I _r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response)						Rated Current (I _n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	CRD316T91W	CRD316T93W	CRD316T92W	CRD316T94W	CRD316T95W	CRD316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T91W	CRD320T93W	CRD320T92W	CRD320T94W	CRD320T95W	CRD320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Rating	LI	LS	LSI	LIG	LSG	LSIG	Rated Current (I _n)	Fixed Rating Plug
1600	CRDC316T91W	CRDC316T93W	CRDC316T92W	CRDC316T94W	CRDC316T95W	CRDC316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T91W	CRDC320T93W	CRDC320T92W	CRDC320T94W	CRDC320T95W	CRDC320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See Table 45-281 below for prices.

② Includes B2016RDRL rear connectors.

Table 45-281. 100% Rated Digitrip RMS 910 Circuit Breaker Prices

Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
CRDC316T91W		CRDC320T95W		CRD320T93W		RP6R20A160	
CRDC316T92W		CRDC320T96W		CRD320T94W		RP6R20A200	
CRDC316T93W		CRD316T91W		CRD320T95W		—	
CRDC316T94W		CRD316T92W		CRD320T96W		—	
CRDC316T95W		CRD316T93W		RP6R16A080		—	
CRDC316T96W		CRD316T94W		RP6R16A100		—	
CRDC320T91W		CRD316T95W		RP6R16A120		—	
CRDC320T92W		CRD316T96W		RP6R16A160		—	
CRDC320T93W		CRD320T91W		RP6R20A100		—	
CRDC320T94W		CRD320T92W		RP6R20A120		—	

R-Frame

Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

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

Table 45-282. 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		
	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) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	LSIA 1050		LSIG 1050			Catalog Number	Price U.S. \$
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$			
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
1600	RD316T107W		RD316T106W		800 1000 1200 1600	ORPR16A080 ORPR16A100 ORPR16A120 ORPR16A160	
2000	RD320T107W		RD320T106W		1000 1200 1600 2000	ORPR20A100 ORPR20A120 ORPR20A160 ORPR20A200	
2500	RD325T107W		RD325T106W		1600 2000 2500	ORPR25A160 ORPR25A200 ORPR25A250	
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
1600	RDC316T107W		RDC316T106W		800 1000 1200 1600	ORPR16A080 ORPR16A100 ORPR16A120 ORPR16A160	
2000	RDC320T107W		RDC320T106W		1000 1200 1600 2000	ORPR20A100 ORPR20A120 ORPR20A160 ORPR20A200	
2500	RDC325T107W		RDC325T106W		1600 2000 2500	ORPR25A160 ORPR25A200 ORPR25A250	

R-Frame

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.

Table 45-283. 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		
	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) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	LSIA 1050		LSIG 1050			Catalog Number	Price U.S. \$
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$			

3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac

Frame	LSIA 1050	Price U.S. \$	LSIG 1050	Price U.S. \$	Ampere Rating	Fixed Rating Plug
1600	CRD316T107W		CRD316T106W		800 1000 1200 1600	ORPR16A080 ORPR16A100 ORPR16A120 ORPR16A160
2000 ①	CRD320T107W		CRD320T106W		1000 1200 1600 2000	ORPR20A100 ORPR20A120 ORPR20A160 ORPR20A200

3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac

Frame	CRDC316T107W	Price U.S. \$	CRDC316T106W	Price U.S. \$	Ampere Rating	Fixed Rating Plug
1600	CRDC316T107W		CRDC316T106W		800 1000 1200 1600	ORPR16A080 ORPR16A100 ORPR16A120 ORPR16A160
2000 ①	CRDC320T107W		CRDC320T106W		1000 1200 1600 2000	ORPR20A100 ORPR20A120 ORPR20A160 ORPR20A200

① Includes B2016RDL rear connectors.

R-Frame

Molded Case Switches

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

Table 45-284. Molded Case Switches

Cont. Amp Rating at 40°C	Complete without Terminals			
	3-Pole		4-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1600	RD316WK		RD416WK	
2000	RD320WK		RD420WK	

Type RD — High Instantaneous (K)

1600	RD316WK		RD416WK
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Type RD — High Instantaneous (K)

2000	RD320WK		RD420WK
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Note: Molded case switch may trip above 17,500 amperes.

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.

45

Table 45-285. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Hardware	AWG/kcmil Wire Range/ No. Conductors	Metric Wire Range mm ²	Catalog Number	Price U.S. \$
1600	Aluminum	Cu/Al	English	500 – 1000 (4)	300 – 500	TA1600RD	
1600	Copper	Cu	English	1 – 600 (4)	50 – 300	T1600RD	①
2000	Aluminum	Cu/Al	English	2 – 600 (6)	35 – 300	TA2000RD	①

Wire Terminals

1600	Aluminum	Cu/Al	English	500 – 1000 (4)	300 – 500	TA1600RD	
1600	Copper	Cu	English	1 – 600 (4)	50 – 300	T1600RD	①
2000	Aluminum	Cu/Al	English	2 – 600 (6)	35 – 300	TA2000RD	①

Rear Connectors

2000	Copper	—	English	—	—	B2016RD	
2000	Copper	—	English	—	—	B2016RDL	②
2500	Copper	—	English	—	—	B2500RD	③

① Catalog Number includes bus connection, terminals and hardware for either line side or load side of 3-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.

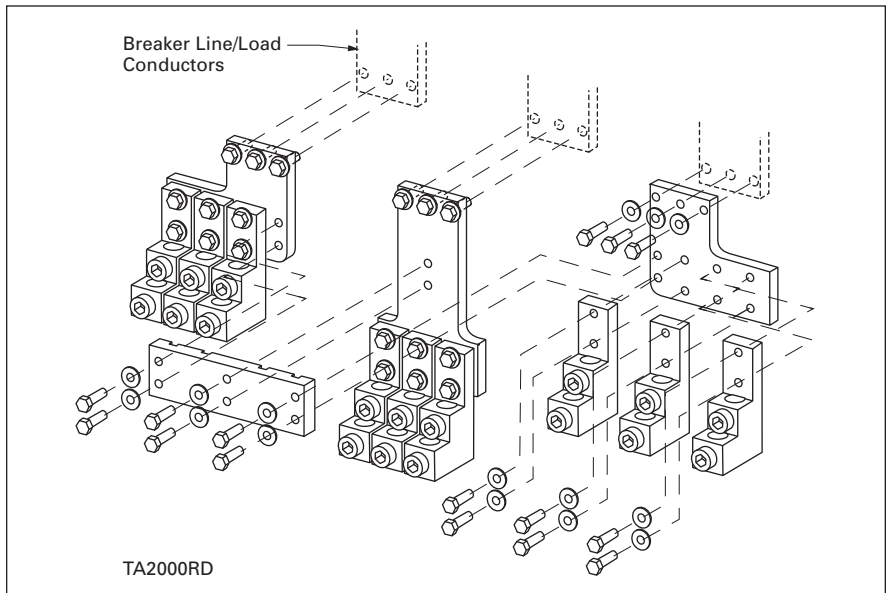


Figure 45-39. Mounting Hardware

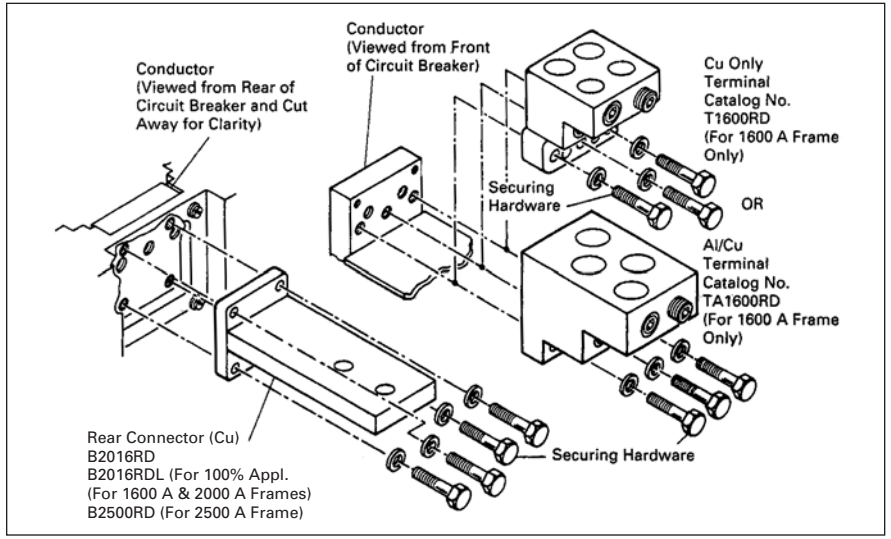


Figure 45-40. Mounting Hardware

Discount Symbol CB-2

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 45-286. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories ①								
Alarm Lockout (Make/Break)	45-184			■			■	
Alarm Lockout (2Make/2Break)	45-184			■			■	
Auxiliary Switch (2A, 2B)	45-187			■			■	
Auxiliary Switch (4A, 4B)	45-187			■			■	
Shunt Trip — Standard	45-191			■			■	
Shunt Trip — Low Energy	45-196			■			■	
Undervoltage Release Mechanism	45-197			■			■	
Accessory Terminal Block ②	45-206			■				■
External Accessories								
Base Mounting Hardware	45-211							
Padlockable Handle Lock Hasp	45-217		●			●		
Key Interlock Kit	45-218		■			■		
Walking Beam Interlock	45-219							
Electrical (Motor) Operator	45-220		■			■		
Drawout Cassette	45-59		●					
Handle Mechanisms	45-227		■			■		
Handle Extension ③	45-232		■			■		
Solid-State (Electronic) Portable Test Kit (310 Only)	45-233		●			●		
OPTIM System Components								
Breaker Interface Module (BIM)	45-234		●					
Digitrip OPTIMizer	45-234		●					
Auxiliary Power Module	45-234		●					
Modifications (Refer to Eaton)								
Special Calibration	—		●				●	
Moisture Fungus Treatment	45-266		●				●	
Freeze-Tested Circuit Breakers	—		●				●	
Marine Application	—		●				●	

① All accessories mount in the RH cavity which will accept one each shunt trip, UVR, auxiliary switch and alarm switch. ■ Applicable in indicated pole position ● Accessory available/Modification available

② Mounts outside breaker.

③ Included with breaker.

Product Description

Earth Leakage Circuit Breaker



Typical Earth Leakage Circuit Breaker

Product Description

Eaton's Cutler-Hammer Series C earth leakage breakers offer superior Class 1 ground fault protection and improved ground fault coordination capability.

Earth leakage ground fault protection differs from other types of systems in its level of sensitivity. The sensitivity of traditional devices is limited by the cumulative error of the residual current sensors and the placement of the phase and neutral conductors inside the current sensor.

Leakage breakers are zero sequence sensing devices. They are factory supplied with a single sensor and ground fault relay built-in. This technique allows for protection sensitivities down to the 30 milliampere level.

Leakage breakers are provided with a full complement of easy adjustments. The ground fault pickup setting is adjustable from 0.03 to 30 amperes in eight steps, and the ground fault time delay setting is adjustable from instantaneous to 2.0 seconds in six steps. When the pickup is set to 30 mA, the time delay setting defaults internally to instantaneous only. Increased selectivity provides for improved coordination with upstream and downstream ground fault devices as well as the flexibility to adjust for transient currents.

Application Description

Three-Phase, Four-Wire Loads

For 3-phase applications with line-to-neutral loads, select 4-pole earth leakage breakers and wire the neutral through the fourth (right) pole.

Three-Phase, Three-Wire Loads

For applications with only 3-phase, 3-wire, line-to-line connected loads, select 3-pole earth leakage breakers.

Single-Phase Loads

For single-phase, 3-wire applications, use a 3-pole earth leakage breaker and connect all conductors through the breaker. For single-phase load, 2-wire, wire to L1 – L2 or L2 – L3.

General

Do not reverse feed. Do not apply on 400 Hz systems. Voltage range: 110 – 480 Vac.

Options and Accessories

Optional Factory-Installed Internal Accessories

Earth leakage breakers use the same internal accessories as standard F-, J- and K-Frame Series C Breakers. Internal accessories fit in the right-hand pole space and are available as factory modifications only.

Bell alarm is included as standard.

Optional External Accessories

Series C Earth Leakage Breakers use the same external accessories as the standard F-, J- and K-Frame circuit breakers. R.H. only. It comes standard with a flux shunt and ground fault alarm switch in the LH pole. Leads for the alarm switch exit the rear of the breaker.

Product Selection

Table 45-287. Standard Line and Load Terminals — Included with Breaker

Frame	Amperes	Wire Type	(Number) Range of Conductors	Terminal Material
F-Frame	35 – 100	Cu/Al	(1) 14 – 1/0 AWG	Steel
F-Frame	110 – 150	Cu/Al	(1) 4 – 4/0 AWG	Stainless Steel
J-Frame	100 – 250	Cu/Al	(1) 4 AWG – 250 kcmil	Aluminum
K-Frame	200 – 350	Cu/Al	(1) 250 – 500 kcmil	Aluminum
K-Frame	400	Cu/Al	(2) 3/0 – 250 kcmil	Aluminum

Table 45-288. F-Frame Earth Leakage Ground Fault Breakers UL 489 and UL 1053

Amperes	25 kA at 480 Vac				65 kA at 480 Vac				100 kA at 480 Vac			
	3-Pole		4-Pole ①		3-Pole		4-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
15	ELFD3015L		N/A		ELHFD3015L		N/A		ELFDC3015L		N/A	
20	ELFD3020L		N/A		ELHFD3020L		N/A		ELFDC3020L		N/A	
25	ELFD3025L		N/A		ELHFD3025L		N/A		ELFDC3025L		N/A	
30	ELFD3030L		N/A		ELHFD3030L		N/A		ELFDC3030L		N/A	
35	ELFD3035L		ELFD4035L		ELHFD3035L		ELHFD4035L		ELFDC3035L		ELFDC4035L	
40	ELFD3040L		ELFD4040L		ELHFD3040L		ELHFD4040L		ELFDC3040L		ELFDC4040L	
45	ELFD3045L		ELFD4045L		ELHFD3045L		ELHFD4045L		ELFDC3045L		ELFDC4045L	
50	ELFD3050L		ELFD4050L		ELHFD3050L		ELHFD4050L		ELFDC3050L		ELFDC4050L	
60	ELFD3060L		ELFD4060L		ELHFD3060L		ELHFD4060L		ELFDC3060L		ELFDC4060L	
70	ELFD3070L		ELFD4070L		ELHFD3070L		ELHFD4070L		ELFDC3070L		ELFDC4070L	
80	ELFD3080L		ELFD4080L		ELHFD3080L		ELHFD4080L		ELFDC3080L		ELFDC4080L	
90	ELFD3090L		ELFD4090L		ELHFD3090L		ELHFD4090L		ELFDC3090L		ELFDC4090L	
100	ELFD3100L		ELFD4100L		ELHFD3100L		ELHFD4100L		ELFDC3100L		ELFDC4100L	
110	ELFD3110L		ELFD4110L		ELHFD3110L		ELHFD4110L		ELFDC3110L		ELFDC4110L	
125	ELFD3125L		ELFD4125L		ELHFD3125L		ELHFD4125L		ELFDC3125L		ELFDC4125L	
150	ELFD3150L		ELFD4150L		ELHFD3150L		ELHFD4150L		ELFDC3150L		ELFDC4150L	

N/A = Not Available

① Also see EL4FD — 3-pole breaker with 4-pole earth leakage module.

Table 45-289. J-Frame Earth Leakage Ground Fault Breakers UL 489 and UL 1053

Amperes	35 kA at 480 Vac				65 kA at 480 Vac				100 kA at 480 Vac			
	3-Pole		4-Pole		3-Pole		4-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
100	ELJD3100		ELJD4100		ELHJD3100		ELHJD4100		ELJDC3100		ELJDC4100	
125	ELJD3125		ELJD4125		ELHJD3125		ELHJD4125		ELJDC3125		ELJDC4125	
150	ELJD3150		ELJD4150		ELHJD3150		ELHJD4150		ELJDC3150		ELJDC4150	
175	ELJD3175		ELJD4175		ELHJD3175		ELHJD4175		ELJDC3175		ELJDC4175	
200	ELJD3200		ELJD4200		ELHJD3200		ELHJD4200		ELJDC3200		ELJDC4200	
225	ELJD3225		ELJD4225		ELHJD3225		ELHJD4225		ELJDC3225		ELJDC4225	
250	ELJD3250		ELJD4250		ELHJD3250		ELHJD4250		ELJDC3250		ELJDC4250	

Product Selection

Table 45-290. K-Frame Earth Leakage Ground Fault Breakers UL 489 and UL 1053

Amperes	3-Pole		4-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
35 kA at 480 Vac				
200	ELKD3200		ELKD4200	
225	ELKD3225		ELKD4225	
250	ELKD3250		ELKD4250	
300	ELKD3300		ELKD4300	
350	ELKD3350		ELKD4350	
400	ELKD3400		ELKD4400	
65 kA at 480 Vac				
200	ELHKD3200		ELHKD4200	
225	ELHKD3225		ELHKD4225	
250	ELHKD3250		ELHKD4250	
300	ELHKD3300		ELHKD4300	
350	ELHKD3350		ELHKD4350	
400	ELHKD3400		ELHKD4400	
100 kA at 480 Vac				
200	ELKDC3200		ELKDC4200	
225	ELKDC3225		ELKDC4225	
250	ELKDC3250		ELKDC4250	
300	ELKDC3300		ELKDC4300	
350	ELKDC3350		ELKDC4350	
400	ELKDC3400		ELKDC4400	

Table 45-291. Optional K-Frame Line and Load Terminals — Order Separately

Wire Type	(Number) Range of Conductors	Terminal Material	Catalog Number	Price U.S. \$
Cu/Al	(2) 250 kcmil	Aluminum	3TA401K ①	
Cu/Al	(1) 500 kcmil	Aluminum		
Cu/Al	(2) 250 kcmil	Aluminum	4TA401K ②	
Cu/Al	(1) 500 kcmil	Aluminum		
Cu	(1) 3 – 350 kcmil	Copper	T300K	
Cu	(1) 3 – 350 kcmil	Copper		
Cu	(1) 250 – 500 kcmil	Copper		
Cu	(1) 250 – 500 kcmil	Copper	T350K	
Cu	(1) 3/0 – 250 kcmil	Copper		
Cu	(1) 3/0 – 250 kcmil	Copper		

① Package of 3 terminals.

② Package of 4 terminals.

Leakage Ground Fault — 480 Volts

Continuous Amperes	3-Pole Catalog Number	Price U.S. \$
3	ELHMCP003A0C	
7	ELHMCP007C0C	
15	ELHMCP015E0C	
25	ELHMCP025X0C	
30	ELHMCP030H1C	
50	ELHMCP050K2C	
70	ELHMCP070M2C	
100	ELHMCP100R3C	
150	ELHMCP150T4C	
150	ELHMCP150U4C	
3	ELHMCP003A0LC ③	
7	ELHMCP007C0LC ③	
15	ELHMCP015E0LC ③	
25	ELHMCP025D0C	
30	ELHMCP030H1LC ③	
70	ELHMCP070J2C	
100	ELHMCP100L3C	
50	ELHMCP050G2C	
70	ELHMCP070J2C	
100	ELHMCP100K3C	

HMCPs for Application with Motor Starters Equipped with Electronic Overload Relays

3	ELHMCP003A0C	
7	ELHMCP007C0C	
15	ELHMCP015E0C	
30	ELHMCP030H1C	
50	ELHMCP050K2C	
100	ELHMCP100R3C	
150	ELHMCP150T4C	
150	ELHMCP150U4C	

③ Special low mag suffix "L."

Table 45-293. J and K-Frame HMCP with Earth Leakage Ground Fault — 480 Volts

Continuous Amperes	3-Pole Catalog Number	Price U.S. \$
250	ELHMCP250A5 ELHMCP250C5 ELHMCP250D5 ELHMCP250F5 ELHMCP250G5 ELHMCP250J5 ELHMCP250K5 ELHMCP250L5 ELHMCP250W5	
400	ELHMCP400D5 ELHMCP400F5 ELHMCP400G5 ELHMCP400J5 ELHMCP400K5	

Table 45-292. F-Frame HMCP with Earth

Discount Symbol CB-2

Type GFR



GFR Relay

Product Description

Eaton's Cutler-Hammer GFR ground fault relays, current sensors, test panels and accessory devices are UL listed by Underwriters Laboratories in accordance with their standard for Ground Fault Sensing and Relaying Equipment, UL 1053, under File E48381.

Note: Suitable for either surface or semi-flush mounting.

A Type GFR ground fault protection system, when properly installed on a grounded electrical system, will sense phase-to-ground fault currents. When the level of fault current is in excess of the pre-selected current pickup and time delay settings, the GFR relay will initiate a trip action of a disconnect device, which will open the faulted circuit and clear the fault.

The GFR devices are UL Class I devices designed to protect electrical equipment against extensive damage from arcing ground faults.

A basic Type GFR ground fault protection system consists of a ground fault relay, a ground fault current sensor and a disconnect device equipped with a shunt trip device. This disconnect device can be a molded case circuit breaker, a power circuit breaker, a bolted pressure switch or other fusible disconnect device, suitable for application with UL Class I Ground Fault Sensing and Relaying equipment.

Note: Relays are also listed with CSA under their file number 43357.



Typical Current Sensor

Sensor

- 600 volt, 50/60 Hz maximum system voltage.

Electrical Ratings

GFR Relay

- Ground fault detection ranges:
 - 1 to 12, 5 to 60 or 100 to 1200 amperes
- Output contacts:
 - 240 volt, 50/60 Hz: 3.0 amperes
 - 120 volt, 50/60 Hz: 6.0 amperes
 - 28 Vdc: 3.0 amperes
 - 125 Vdc: .5 amperes
- Control power requirements:
 - 120 volt, 50/60 Hz or 125 Vdc (optional)

Accessories

Options and Accessories

Options

Additional optional equipment can be added to the protection system to meet the requirements of the specifying engineer, including:

- Ground fault test panel.
- Ground fault warning indicator relay.
- Ground fault indicating ammeter.

GFR relays are available with zone selective interlocking circuitry to interlock several relays within the same system. This allows the relay which detects a ground fault to instantly clear the fault by tripping the disconnect device. The relay simultaneously sends a signal to relay units "upstream" from the fault to time delay or to block their operation completely. Current sensors in various designs provide a range of "window" sizes to accommodate standard bus and cable arrangements.

Shunt trip attachments may be ordered for field mounting in Eaton's Cutler-Hammer molded case circuit breakers, or may be ordered factory installed in the breaker.

Accessories

Test Panel (120 Vac)

Used to test the ground fault system, to give an indication the relay has tripped the breaker, and to reset the relay after tripping. These functions may be separately mounted pilot devices.

Note: When a mechanically reset relay is used with a test panel, both the relay and test panel must be reset following either a simulated ground fault test or actual ground fault. Not UL listed.

Table 45-294. Optional Test Panel

Control	Test	Catalog Number	Price U.S. \$
120 Volt 50/60 Hz	120 Volt 50/60 Hz	GFRTF	
125 Vdc	120 Volt 50/60 Hz	GFRTPD	

Ground Fault Warning Indicator

This is an accessory item for use with GFR relays with interlocking circuitry. At approximately 30 – 50% of the relay pickup setting, the indicator switches separate 120 Vac control power to a lamp or relay, (not included) to give an indication of a ground fault. The indicator is rated 110/120 Vac 50/60 Hz for a maximum indicator load of .5 amperes.

Table 45-295. Ground Fault Warning Indicator

Description	Catalog Number	Price U.S. \$
Manual Reset	1234C67G01	
Self-Resetting	1234C67G02	

Indicating Ammeter

The optional indicating ammeter connects to the sensor terminals through a momentary contact push-button, and will indicate (in amperes) any ground fault current flowing through the sensor. Kit includes the ammeter and pushbutton.

Note: Not UL listed.

Table 45-296. Ammeter Kit

GFR System Used with	Kit Catalog Number	Price U.S. \$
1 – 12 Ampere	752B820G01	
5 – 60 Ampere	752B820G02	
100 – 1200 Ampere	752B820G03	

Shunt Trip Attachments

Use 120 Vac shunt trips.

Faceplate

Recommended when these relays are semi-flush mounted, to close the door cutout opening.

Table 45-297. Faceplate

Description	Catalog Number	Price U.S. \$
Faceplate	752B410G01	

Product Selection

Each installation requires:

- One relay unit (select trip ampere as required).
- One current sensor (select configuration required).
- One circuit breaker or disconnect device with shunt trip, or a shunt trip attachment for mounting in existing breaker.
- Test panel (optional).

Table 45-298. GFR Relay

GFR Relay Types	Ground Fault Pickup Amperes					
	1 – 12		5 – 60		100 – 1200	
	Catalog Number ①	Price U.S. \$	Catalog Number ①	Price U.S. \$	Catalog Number ①	Price U.S. \$
For 120 Volt 50/60 Hz Control						
Electrical Reset with Zone Interlocking	GFR12EI		GFR60EI		GFR1200EI	
Electrical Reset without Zone Interlocking	GFR12E		GFR60E		GFR1200E	
Mechanical Reset with Zone Interlocking	GFR12MI		GFR60MI		GFR1200MI	
Mechanical Reset without Zone Interlocking	GFR12M		GFR60M		GFR1200M	
For 120 Vdc Control						
Electrical Reset with Zone Interlocking	—		—		GFR1200EID	
Electrical Reset without Zone Interlocking	—		—		GFR1200ED	
Mechanical Reset with Zone Interlocking	—		—		GFR1200MID	
Mechanical Reset without Zone Interlocking	—		—		GFR1200MD	

① Suitable for either surface or semi-flush mounting.

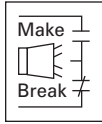
Table 45-299. Current Sensor

Window Size in Inches (mm)	Catalog Number	Price U.S. \$
Used with Relays Rated 1 – 12 Amperes		
5.50 (139.7) I.D.	1283C45G01	
Used with Relays Rated 5 – 60 Amperes		
2.50 (63.5) I.D.	179C768G01	
5.50 (139.7) I.D.	1256C13G01	
7.81 x 11.00 (198.4 x 279.4) Rect. ②	1257C88G04	
3.31 x 24.94 (84.1 x 760.5) Rect. ②	1257C92G03	
Used with Relays Rated 100 – 1200 Amperes		
2.50 (63.5) I.D.	179C768G02	
5.50 (139.7) I.D.	1256C13G02	
8.25 (209.6) I.D.	179C767G02	
7.81 x 11.00 (198.4 x 279.4) Rect. ②	1257C88G03	
9.94 x 16.94 (252.5 x 430.3) Rect. ②	1257C90G02	
9.94 x 23.94 (252.5 x 608.1) Rect. ②	1257C91G02	
15.94 x 19.94 (404.9 x 506.4) Rect. ②	1257C89G02	
3.31 x 24.94 (84.1 x 633.5) Rect. ②	1257C92G04	
6.75 x 29.64 (171.5 x 752.9) Rect. ②	1255C39G03	

② One end removable for installation.

Alarm Switch

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 under-voltage 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.

Table 45-300. F-Frame Electrical Rating Data ①②

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
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Multi-Pole Circuit Breakers

600	50/60 Hz	6	2500
125	dc	0.50 ③	
250	dc	0.25 ③	

Single-Pole Circuit Breakers

125/250	50/60 Hz	6 ③	2000
28	dc	3 ③	
28	dc	5 ④	

- ① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.
- ② Endurance: 6,000 electrical operations plus 2,000 mechanical operations.
- ③ Non-inductive load.
- ④ Inductive (L/R = 0.026).

Table 45-301. J-Frame Electrical Rating Data ⑤⑥

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
-----------------	-----------	-------------------------	------------------------------

600	50/60 Hz	6	2500
125	dc	0.50 ⑦	
250	dc	0.25 ⑦	

- ⑤ Endurance: 6,000 electrical operations plus 2,000 mechanical operations.
- ⑥ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑦ Non-inductive load.

Table 45-302. K-Frame Electrical Rating Data ⑧⑨

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
-----------------	-----------	-------------------------	------------------------------

600	50/60 Hz	6	2500
125	dc	0.50 ⑩	
250	dc	0.25 ⑩	

- ⑧ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑨ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
- ⑩ Non-inductive load.

Table 45-306. G-Frame Alarm Switch (RH Only) ⑪

Electrical Ratings			Contact Arrangement	Factory Suffix	Adder U.S. \$	Catalog Number ⑫⑬	Price U.S. \$
Volts	Frequency	Amperes					

Alarm Switch

240	50/60 Hz	6	1 Make/1 Break	B3		1288C75G03	
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Alarm Switch Auxiliary Switches Combination

240	50/60 Hz	6	1 Make/1 Break and 1A/1B	B13		1288C76G09	
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- ⑪ 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.
- ⑫ Includes 24-inch (609.6 mm) external pigtail leads, 18 AWG (16-.010).
- ⑬ A maximum of two internal accessories may be mounted in a 3-pole circuit breaker.
- ⑭ Suitable for mounting in right pole only of 2- or 3-pole breaker.

Table 45-303. L- and M-Frames Electrical Rating Data ⑮⑯

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
-----------------	-----------	-------------------------	------------------------------

600	50/60 Hz	6	2500
125	dc	0.50 ⑰	
250	dc	0.25 ⑰	

- ⑮ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑯ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
- ⑰ Non-inductive load.

Table 45-304. N-Frame Electrical Rating Data ⑱

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
-----------------	-----------	-------------------------	------------------------------

600	50/60 Hz	6	2500
125	dc	0.50 ⑲	
250	dc	0.25 ⑲	

- ⑱ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.
- ⑲ Non-inductive load.

Table 45-305. R-Frame Electrical Rating Data ⑳㉑

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
-----------------	-----------	-------------------------	------------------------------

600	50/60 Hz	6	2500
125	dc	0.50 ㉑	
250	dc	0.25 ㉑	

- ⑳ Endurance: 500 electrical operations plus 2,500 mechanical operations.
- ㉑ Pigtail wire size: 18 AWG (0.82 mm²). Leads are red, black and blue.
- ㉒ Non-inductive load.

Alarm Switch

Table 45-307. F-Frame Alarm Switch ①

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ②			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side			Rear ③		Opposite Side		Same Side				
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left ④ Right	B01 B05		B02 B06		B03 B07		B04 B08		A1L1LPK A1L1RPK		A1L1LTK A1L1RTK	
2	Left ④ Right	B09 B12		B10 B13		— —		B11 B14		A2L1LPK A2L1RPK		A2L1LTK A2L1RTK	
1 (Make Only)	Single-Pole	B15 ⑤		—		—		—		—		—	

- ① F-Frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.
- ② Not listed with Underwriters Laboratories, for field installation.
- ③ Standard pigtail lead exit location.
- ④ Standard mounting location.
- ⑤ Factory installation only. Leads exit load end of circuit breaker.

Table 45-308. F-Frame HMCP Alarm Switch ⑥

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑦			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side			Rear ⑧		Opposite Side		Same Side				
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left ⑨ Right	B01 B05		B02 B06		B03 B07		B04 B08		MA1L1LPK MA1L1RPK		MA1L1LTK MA1L1RTK	
2	Left ⑨ Right	B09 B12		B10 B13		— —		B11 B14		MA2L1LPK MA2L1RPK		MA2L1LTK MA2L1RTK	

- ⑥ 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.
- ⑦ Not listed with Underwriters Laboratories, for field installation.
- ⑧ Standard pigtail lead exit location.
- ⑨ Standard mounting location.

Table 45-309. J-Frame and HMCP (J) Alarm Switch

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑩			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side			Rear ⑪		Opposite Side		Same Side				
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left ⑫ Right	B01 B05		B02 B06		B03 B07		B04 B08		A1L2LPK A1L2RPK		A1L2LTK A1L2RTK ⑬	

- ⑩ Listed with Underwriters Laboratories, for field installation on interchangeable trip unit breakers under E64983.
- ⑪ Standard mounting location.
- ⑫ Standard mounting location — leads exit rear of breaker.
- ⑬ Standard pigtail lead exit location.

Alarm Switch

Table 45-310. K-Frame and HMCP (K) Alarm Switch

Number of Sets of Contacts (1M and 1B)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ①			
		18-Inch (457.2 mm) Pigtail Leads								Terminal Block			
		Same Side				Rear ②		Opposite Side		Same Side		Pigtail Leads	
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left ③ Right ④	B01 B05		B02 B06		B03 B07		B04 B08		A1L3LPK A1L3RPK		A1L3LTK A1L3RTK	
2	Left ③ Right ④	B09 B12		B10 B13		— —		B11 B14		A2L3LPK A2L3RPK		A2L3LTK A2L3RTK	

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.

Table 45-311. L-, HMCP (L) and (M) Frames and Alarm Switch

Number of Sets of Contacts (1M and 1B)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑤			
		18-Inch (457.2 mm) Pigtail Leads								Terminal Block			
		Same Side				Rear ⑥		Opposite Side		Same Side		Pigtail Leads	
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left ⑦ Right	B01 B05		B02 B06		B03 B07		B04 B08		A1L4LPK A1L4RPK		A1L4LTK A1L4RTK	
2	Left ⑦ Right	B09 B12		B10 B13		— —		B11 B14		A2L4LPK A2L4RPK		A2L4LTK A2L4RTK	

⑤ Listed with Underwriters Laboratories, for field installation on interchangeable trip unit breakers under E64983.

⑥ Standard mounting location.

⑦ Standard mounting location — leads exit rear of breaker.

Table 45-312. N-Frame and HMCP (N) Alarm Switch

Number of Sets of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑧			
		18-Inch (457.2 mm) Pigtail Leads								Terminal Block			
		Same Side				Rear ⑨		Opposite Side		Same Side		Pigtail Leads	
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left Right ⑩	B01 B05		B02 B06		B03 B07		B04 B08		A1L5LPK A1L5RPK		A1L5LTK A1L5RTK	
2	Left Right ⑩	B09 B12		B10 B13		— —		B11 B14		A2L5LPK A2L5RPK		A2L5LTK A2L5RTK	

⑧ Listed with Underwriters Laboratories for field installation under E64983.

⑨ Standard mounting location.

⑩ Standard mounting location — leads exit rear of breaker.

Table 45-313. R-Frame Alarm Switch (RH only)

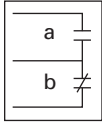
Number of Contacts (Make and Break)	Factory Mounted				Field Mounted			
	Connection Type and Location				Field Installation Kits ⑪			
	18-Inch (457.2 mm) Pigtail Leads				Pigtail Leads			
	Suffix Number ⑫	Adder U.S. \$			Catalog Number ⑫	Price U.S. \$		
1			B05		A1L6RPK			
2			B12		A2L6RPK			

⑪ Listed with Underwriters Laboratories for field installation under E64983.

⑫ A maximum of three ASL plug-in modules may be installed in a circuit breaker.

Auxiliary Switch

Auxiliary Switch



The Auxiliary Switch provides circuit breaker contact status information by monitoring the position of the molded cross bar which 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.

Table 45-314. F-Frame Electrical Rating Data ①②

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
125 ③	50/60 Hz	1	2500
600	50/60 Hz	6	
125	dc	0.50 ④	
250	dc	0.25 ④	

- ① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.
- ② Pigtail wire size: 18 AWG (0.82 mm²).
- ③ For use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
- ④ Non-inductive load.

Table 45-315. J-Frame Electrical Rating Data ⑤⑥

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑦	
250	dc	0.25 ⑦	

- ⑤ Endurance: 6,000 electrical operations plus 4,000 mechanical operations.
- ⑥ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑦ Non-inductive load.

Table 45-320. G-Frame Auxiliary Switch (RH only)

Electrical Ratings			Contact Arrangement	Factory Suffix	Adder U.S. \$	Catalog Number ⑧⑨	Price U.S. \$
Volts	Frequency	Amperes					
240	50/60 Hz	6	1a/1b	A3		1288C74G03	
240	50/60 Hz	6	2a/2b	A6		1288C73G03	

- ⑧ Includes 24-inch external pigtail leads, 18 AWG (16-.010).
- ⑨ A maximum of two internal accessories may be mounted in a 3-pole circuit breaker. Suitable for mounting in right pole only of 2- or 3-pole breaker.

Table 45-316. K-Frame Electrical Rating Data ⑩⑪

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑫	
250	dc	0.25 ⑫	

- ⑩ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
- ⑪ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑫ Non-inductive load.

Table 45-317. L- and M-Frames Electrical Rating Data ⑬

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑭	
250	dc	0.25 ⑭	

- ⑬ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑭ Non-inductive load.

Table 45-318. N-Frame Electrical Rating Data ⑮⑯

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑰	
250	dc	0.25 ⑰	

- ⑮ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.
- ⑯ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑰ Non-inductive load.

Table 45-319. R-Frame Electrical Rating Data ⑱⑲

Maximum Voltage	Frequency	Maximum Current Amperes
600	50/60 Hz	6
125	dc	0.50 ⑳
250	dc	0.25 ⑳

- ⑱ Endurance: 500 electrical operations plus 2,500 mechanical operations.
- ⑲ Pigtail wire size: 18 AWG (0.82 mm²). Leads are red, black and blue.
- ⑳ Non-inductive load.

Auxiliary Switch

Table 45-321. F-Frame and HMCP (F) Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ②			
		18-Inch (457.2 mm) Pigtail Leads								Terminal Block			
		Same Side				Rear ①		Opposite Side		Same Side		Pigtail Leads	
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left ③ Right or Neutral ④	A01 A15 ⑤ A05 A18 ⑤		A02 A16 ⑤ A06 A19 ⑤		A03 A17 ⑤ A07 A20 ⑤		A04 — A08 —		A1X1PK E1X1PK A1X1PK —		A1X1LTK — A1X1RTK ⑥ —	
2	Left ③ Right or Neutral ④	A09 A21 ⑤ A12 A23 ⑤		A10 A22 ⑤ A13 A24 ⑤		— — — —		A11 — A14 —		A2X1LPK E2X1LPK A2X1RPK E2X1RPK		A2X1LTK — A2X1RTK ⑥ —	

① Standard pigtail lead exit location.
 ② Not listed with Underwriters Laboratories, for field installation.
 ③ Pigtail wire size: 18 AWG (0.82 mm²).
 ④ Not for use on F-Frame with electronic trip unit.
 ⑤ 125 volts (Max.), 50/60 Hz switch for use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
 ⑥ Not for use on 4-pole circuit breakers.

Table 45-322. F-Frame with Electronic Trip Unit Auxiliary Switch ⑦

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑧			
		18-Inch (457.2 mm) Pigtail Leads								Terminal Block			
		Same Side				Rear		Opposite Side		Same Side		Pigtail Leads	
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Right	A30		A31		A32		—		A1X1RPKFDE		—	

⑦ Only for use on 3-pole F-Frame breakers with electronic trip unit.
 ⑧ Not listed with Underwriters Laboratories, for field installation.

45

Table 45-323. J-Frame and HMCP (J) Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑨			
		18-Inch (457.2 mm) Pigtail Leads								Terminal Block			
		Same Side				Rear ⑩		Opposite Side		Same Side		Pigtail Leads	
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left Right ▽	A01 A05		A02 A06		A03 A07		A04 A08		A1X2PK A1X2PK		A1X2LTK A1X2RTK ⑪	
2	Left Right ▽	A09 A12		A10 A13		— —		A11 A14		A2X2PK A2X2PK		A2X2LTK A2X2RTK ⑪	

⑨ Listed with Underwriters Laboratories for field installation or interchangeable trip unit breakers under E64983.
 ⑩ Standard mounting location — leads exit rear of breaker.
 ⑪ Not for use on 4-pole circuit breakers.

Table 45-324. K-Frame and HMCP (K) Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑫			
		18-Inch (457.2 mm) Pigtail Leads								Terminal Block			
		Same Side				Rear ⑬		Opposite Side		Same Side		Pigtail Leads	
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1	Left Right ⑭	A01 A05		A02 A06		A03 A07		A04 A08		A1X3PK A1X3PK		A1X3LTK A1X3RTK ⑮	
2	Left Right ⑭	A09 A12		A10 A13		— —		A11 A14		A2X3PK A2X3PK		A2X3LTK A2X3RTK ⑮	
3	Left Right ⑭	A18 A17		— —		— —		A15 A16		A3X3LPK A3X3RPK		A3X3LTK A3X3RTK ⑮	

⑫ Listed with Underwriters Laboratories for field installation under E64983.
 ⑬ Standard mounting location — leads exit rear of breaker.
 ⑭ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
 ⑮ Not for use on 4-pole circuit breaker.

Discount Symbol **CB-2**

Auxiliary Switch

Table 45-325. L-, HMCP (L) and (M) Frames and Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ①			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ②		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$						
1	Left Right ②	A01 A05		A02 A06		A03 A07		A04 A08		A1X4PK A1X4PK		A1X4LTK A1X4RTK ③	
2	Left Right ②	A09 A12		A10 A13		— —		A11 A14		A2X4PK A2X4PK		A2X4LTK A2X4RTK ③	
3	Left Right ②	A18 A17		— —		— —		A15 A16		A3X4PK A3X4PK		A3X4LTK A3X4RTK ③	

① Listed with Underwriters Laboratories for field installation under E64983.

② Standard mounting location — leads exit rear of breaker.

③ Not for use on 4-pole circuit breaker.

Table 45-326. N-Frame and HMCP (N) Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ④			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑤		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$						
1	Left Right ⑤	A01 A05		A02 A06		A03 A07		A04 A08		A1X5PK A1X5PK		A1X5LTK A1X5RTK ⑥	
2	Left Right ⑤	A09 A12		A10 A13		— —		A11 A14		A2X5PK A2X5PK		A2X5LTK A2X5RTK ⑥	
3	Left Right ⑤	A18 A17		— —		— —		A15 A16		A3X5LPK A3X5RPK		A3X5LTK A3X5RTK ⑥	

④ Listed with Underwriters Laboratories for field installation under E64983.

⑤ Standard mounting location — leads exit rear of breaker.

⑥ Not for use on 4-pole circuit breaker.

Table 45-327. R-Frame Auxiliary Switch (RH only)

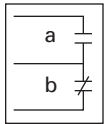
Number of Contacts A and B	Factory Mounted		Field Mounted	
	Connection Type and Location		Field Installation Kits ⑦	
	18-Inch (457.2 mm) Pigtail Leads		Pigtail Leads	
	Suffix Number ⑧	Adder U.S. \$	Catalog Number ⑧	Price U.S.
2	A12		A2X6RPK	
4	A19		A4X6RPK	

⑦ Listed with Underwriters Laboratories for field installation under E64983.

⑧ A maximum of two auxiliary switches (any combination of 2a/2b or 4a/4b plug-in modules may be installed in a circuit breaker.

Auxiliary Switch and Alarm Switch Combination

Auxiliary Switch and Alarm Switch Combination



Each Catalog Number listed in Tables 45-326 – 45-336 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.

Table 45-328. F-Frame Electrical Rating Data ^{①②}

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ^③	2200
250	dc	0.25 ^③	2200

^① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.

^② Pigtail wire size: 18 AWG (0.82 mm²).

^③ Non-inductive load.

Table 45-329. J-Frame Electrical Rating Data ^{④⑤}

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ^⑥	
250	dc	0.25 ^⑥	

^④ Endurance: 6,000 electrical operations plus 2,000 mechanical operations.

^⑤ Pigtail wire size: 18 AWG (0.82 mm²).

^⑥ Non-inductive load.

Table 45-330. K-Frame Electrical Rating Data ^{⑦⑧}

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ^⑨	
250	dc	0.25 ^⑨	

^⑦ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.

^⑧ Pigtail wire size: 18 AWG (0.82 mm²).

^⑨ Non-inductive load.

Table 45-331. L- and M-Frames Electrical Rating Data ^{⑩⑪}

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ^⑫	
250	dc	0.25 ^⑫	

^⑩ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.

^⑪ Pigtail wire size: 18 AWG (0.82 mm²).

^⑫ Non-inductive load.

Table 45-332. N-Frame Electrical Rating Data ^{⑬⑭}

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ^⑮	
250	dc	0.25 ^⑮	

^⑬ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.

^⑭ Pigtail wire size: 18 AWG (0.82 mm²).

^⑮ Non-inductive load.

Auxiliary Switch and Alarm Switch Combination

Table 45-333. F-Frame Auxiliary Switch and Alarm Switch Combination

Mounting Location (Pole)	Factory Mounted						Field Mounted			
	Connection Type and Location						Field Installation Kits ①			
	18-Inch (457 mm) Pigtail Leads				Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Same Side					
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	
Left ②	C01		C02		C03		AAL1LPK		AAL1LTK	
Right	C04		C05		C06		AAL1RPK		AAL1RTK ③	

- ① Not listed with Underwriters Laboratories for field installation.
- ② Standard mounting location.
- ③ Not for use on 4-pole circuit breakers

Table 45-334. F-Frame HMCP Auxiliary Switch and Alarm Switch Combination

Mounting Location (Pole)	Factory Mounted						Field Mounted			
	Connection Type and Location						Field Installation Kits ④			
	18-Inch (457 mm) Pigtail Leads				Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ⑤		Same Side					
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	
Left ⑥	C01		C02		C03		MAAL1LPK		MAAL1LTK	
Right	C04		C05		C06		MAAL1RPK		MAAL1RPK	

- ④ Not listed with Underwriters Laboratories for field installation.
- ⑤ Standard mounting location.
- ⑥ Not for use on 4-pole circuit breakers

Table 45-335. 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						Field Mounted					
		Connection Type and Location						Field Installation Kits ⑦					
		18-Inch (457 mm) Pigtail Leads				Terminal Block		Pigtail Leads		Terminal Block			
		Same Side		Rear ⑧		Opposite Side		Same Side					
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$		
1	Left Right ⑨	C01 C04		C02 C05		— —		C03 C06		AAL2LPK AAL2RPK		AAL2LTK AAL2RTK ⑩	

- ⑦ Listed with Underwriters Laboratories for field installation of interchangeable trip unit breakers under E64983.
- ⑧ Standard mounting location — leads exit rear of breaker.
- ⑨ Not for use on 4-pole circuit breakers.

Table 45-336. 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						Field Mounted					
		Connection Type and Location						Field Installation Kits ⑪					
		18-Inch (457 mm) Pigtail Leads				Terminal Block		Pigtail Leads		Terminal Block			
		Same Side		Rear ⑫		Opposite Side		Same Side					
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$		
1	Left Right ⑬⑭	C01 C04		C02 C05		— —		C03 C06		AAL3LPK AAL3RPK ⑮		AAL3LTK AAL3RTK	

- ⑪ Listed with Underwriters Laboratories for field installation of interchangeable trip unit breakers under E64983.
- ⑫ Standard mounting location — leads exit rear of breaker.
- ⑬ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
- ⑭ Will not install on OPTIM Trip (RH).

Auxiliary Switch and Alarm Switch Combination

Table 45-337. L-, HMCP (L) and (M) Frames and Auxiliary Switch and Alarm Switch Combination

Number of Sets of Contacts	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ①			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ②		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$						
1A, 1B and 1 Make/1 Break	Left	C01		C02		—		C03		AA114LPK AA114RPK		AA114LTK AA114RTK ③	
	Right ②	C04		C05		—		C06					
2A, 2B and 1 Make/1 Break	Left	C07		C08		—		C12		AA214LPK AA214RPK		AA214LTK AA214RTK ③	
	Right ②	C10		C11		—		C13					
3A, 3B and 1 Make/1 Break	Left	C14		—		—		—		AA314LPK AA314RPK		—	
	Right ②	C15		—		—		—					

① Listed with Underwriters Laboratories for field installation under E64983.

② Standard mounting location — leads exit rear of breaker.

③ Not for use on 4-pole circuit breaker.

Table 45-338. N-Frame and HMCP (N) Auxiliary Switch and Alarm Switch Combination

Number of Sets of Contacts	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ④			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑤		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$						
1A, 1B and 1 Make/1 Break	Left	C01		C02		—		C03		AA115LPK AA115RPK		AA115LTK AA115RTK ⑥	
	Right ⑤	C04		C05		—		C06					
2A, 2B and 1 Make/1 Break	Left	C07		C08		—		C12		AA215LPK AA215RPK		AA215LTK AA215RTK ⑥	
	Right ⑤	C10		C11		—		C13					

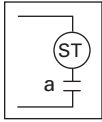
④ Listed with Underwriters Laboratories for field installation under E64983.

⑤ Standard mounting location — leads exit rear of breaker.

⑥ Not for use on 4-pole circuit breaker.

Shunt Trip

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.

Table 45-339. F-Frame Electrical Rating Data ①②③

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

- ① Average unlatching time: 6 milliseconds.
- ② Average circuit breaker contact total opening time: 18 milliseconds.
- ③ Endurance: 6,000 electrical operations plus 4,000 mechanical operations.

Table 45-340. J-Frame Electrical Rating Data ④⑤⑥

50/60 Hz			dc		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
12 24	9	31 173	12 24	8.4	50 247
48 60	36	686 1014	48 60	33.6	1094 1698
110 ⑦ 120 ⑦ 127 ⑦ 208 ⑦ 220 ⑦ 240 ⑦	60.5	66 84 102 354 396 432	110 120 125	77	112 138 150
380 400 415 440	285	180 200 240 610	110 120 125 127	154	40 58
480 525 550 600	360	34 42 50 60	— — — —	— — — —	— — — —

- ④ Average unlatching time: 6 milliseconds.
- ⑤ Average circuit breaker contact total opening time: 18 milliseconds.
- ⑥ Endurance: 6,000 electrical operations plus 2,000 mechanical operations.
- ⑦ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 45-341. K-Frame Electrical Rating Data ⑧⑨⑩

50/60 Hz			dc		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
12 24	9	45 200	12 24	8.4	35 170
48 60	—	830 1280	48 60	—	710 1105
110 ⑪ 120 ⑪ 127 ⑪ 208 ⑪ 220 ⑪ 240 ⑪	60	100 120 140 420 470 550	110 120 125	77	110 130 140
380 400 415 440	285	95 108 120 136	220 250	154	41 54
480 525 550 600	360	40 50 50 70	— — — —	— — — —	— — — —

- ⑧ Approximate unlatching time: 6 milliseconds.
- ⑨ Approximate total circuit breaker contact opening time: 8 milliseconds.
- ⑩ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
- ⑪ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 45-342. L- and M-Frame Electrical Rating Data ⑫⑬⑭

50/60 Hz			dc		
Supply Voltage	Minimum Operating Voltage	VA	Supply Voltage	Minimum Operating Voltage	VA
12 24	9	45 200	12 24	9	35 170
48 60	34	830 1280	48 60	34	710 1105
110 ⑮ 120 ⑮ 127 ⑮ 208 ⑮ 220 ⑮ 240 ⑮	60	100 120 140 420 470 550	110 120 125	77	110 130 140
380 400 415 440	266	95 108 120 136	220 250	154	41 54
480 525 550 600	336	40 50 50 70	— — — —	— — — —	— — — —

- ⑫ Approximate unlatching time: 6 milliseconds.
- ⑬ Approximate total circuit breaker contact opening time: 18 milliseconds.
- ⑭ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
- ⑮ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Shunt Trip

Table 45-343. N-Frame Electrical Rating Data ①②③

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		1280	60		1150
110 ④	60	100	110	77	110
120 ④		120	120		130
127 ④		140	125		140
208 ④		420	—		—
220 ④		470	—		—
240 ④		550	—		—
380	266	95	220	154	41
400		108	250		54
415		120	—		—
440		136	—		—
480	336	40	—	—	—
525		50	—		—
550		50	—		—
600		70	—		—

① Approximate unlatching time: 6 milliseconds.

② Approximate total circuit breaker contact opening time: 18 milliseconds.

③ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.

④ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 45-344. R-Frame Electrical Rating Data ⑤⑥⑦⑧⑨⑩

Suffix Number	Application Ratings		Electrical Operating Ratings						
	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I _p (A)	I _{rms} at 0.250s (A)	I _{rms} at 0.033s (A)	VA	One Minute Dielectric Withstand Voltage (V)
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
			60		17.2		12.2		
11/11K ⑦	110 – 240	50/60	110	60.5	4.2	—	3.0	330	1480
			120		4.5		3.2	390	
			127		4.6		3.3	430	
			208		7.9		5.6	1170	
			220		8.5		6.0	1370	
			240		8.7		6.1	1470	
14/14K	380 – 440	50/60	380	266.0	4.5	—	3.2	1220	1880
			415		5.0		3.6	1500	
			440		5.3		3.7	1640	
	220 – 250	dc	220	154.0	—	2.4	—	530	1500
250	2.7	—	680						
18/18K	480 – 600	50/60	480	336.0	0.6	—	0.4	200	2200
			525		0.7		0.5	270	
			550		0.7		0.5	280	
			600		0.8		0.6	360	
			—		—		—	—	
23/23K	48 – 60	dc	48	34.0	—	9.8	—	470	1120
			60		11.6	—	700		
26/26K	110 – 125	dc	110	77.0	—	3.3	—	370	1250
			120		3.6	—	440		
			125		3.8	—	480		

⑤ Approximate unlatching time of 6 milliseconds.

⑥ Average circuit breaker contact total opening time approximately 62 milliseconds, at rated voltage.

⑦ Endurance: 500 electrical operations and 2,500 mechanical operations.

⑧ Shunt trip can be operated up to a maximum of six times per minute.

⑨ Maximum operating voltage — 110% of maximum voltage range rating.

⑩ Pigtail wire size: 18 AWG (0.82 mm²). Leads are yellow and white.

Shunt Trip

Table 45-345. G-Frame Shunt Trip (LH 3-Pole only)

Electrical Ratings			Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$
Volts	Frequency	Amperes				
120	50/60 Hz	1.1	S1		1373D62G01	
240	50/60 Hz	2.1	S2		1373D62G02	
12	dc	2.8	S3		1373D62G15	
24	dc	5.7	S4		1373D62G16	
24	60 Hz	—	S7		1373D62G20	

Note: G-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory.

Note: Internal accessories are UL listed for factory installation under E7819.

Note: 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.

Table 45-346. F-Frame and HMCP (F) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ^①			
	18-Inch (457.2 mm) Pigtail Leads ^②						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ^③		Opposite Side		Same Side					
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

Left-Pole Mounting ac/dc Ratings

12 – 24 Vac or dc	S01		S02		S03		S04		SNT1LP03K		SNT1LT03K	
48 – 127 Vac or 48 – 60 Vdc ^④	S05		S06		S07		S08		SNT1LP08K		SNT1LT08K	
208 – 380 Vac or 110 – 127 Vdc	S09		S10		S11		S12		SNT1LP12K		SNT1LT12K	
415 – 600 Vac or 220 – 250 Vdc	S13		S14		S15		S16		SNT1LP18K		SNT1LT18K	

Right- or Neutral-Pole Mounting ac/dc Ratings ^⑤

12 – 24 Vac or dc	S17		S18		S19		S20		SNT1RP03K		SNT1RT03K ^⑥	
48 – 127 Vac or 48 – 60 Vdc ^④	S21		S22		S23		S24		SNT1RP08K		SNT1RT08K ^⑥	
208 – 380 Vac or 110 – 127 Vdc	S25		S26		S27		S28		SNT1RP12K		SNT1RT12K ^⑥	
415 – 600 Vac or 220 – 250 Vdc	S29		S30		S31		S32		SNT1RP18K		SNT1RT18K ^⑥	

^① Not listed with Underwriters Laboratories, for field installation.

^② Pigtail wire size: 18 AWG (0.82 mm²).

^③ Standard pigtail lead exit location.

^④ 120 Vac marked suitable for ground fault protection devices.

^⑤ Standard mounting location.

^⑥ Not for use on 4-pole circuit breakers

Shunt Trip

Table 45-347. J-Frame and HMCP (J) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Opposite Side		Same Side					
	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

Left-Pole Mounting ac/dc Ratings ②

12 – 24 Vac or dc	S41		S42		S43		S44		SNT2P04K		SNT2T04K	
48 – 60 Vac or dc	S49		S50		S51		S52		SNT2P06K		SNT2T06K	
110 – 240 Vac or 110 – 125 Vdc ③	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	

Right- or Neutral-Pole Mounting ac/dc Ratings

12 – 24 Vac or dc	S45		S46		S47		S48		SNT2P04K		SNT2T04K ④	
48 – 60 Vac or dc	S53		S54		S55		S56		SNT2P06K		SNT2T06K ④	
110 – 240 Vac or 110 – 125 Vdc ③	S29		S30		S31		S32		SNT2P11K		SNT2T11K ④	
380 – 440 Vac or 220 – 250 Vdc	S33		S34		S35		S36		SNT2P14K		SNT2T14K ④	
480 – 600 Vac	S37		S38		S39		S40		SNT2P18K		SNT2T18K ④	

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 4-pole circuit breakers.

Table 45-348. K-Frame and HMCP (K) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ⑤			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ⑥		Opposite Side		Same Side					
	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

Left-Pole Mounting ac/dc Ratings ⑥

12 – 24 Vac or dc	S41		S42		S43		S44		SNT3P04K		SNT3T04K	
48 – 60 Vac or dc	S49		S50		S51		S52		SNT3P06K		SNT3T06K	
110 – 240 Vac or 110 – 125 Vdc ⑦	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	

Right- or Neutral-Pole Mounting ac/dc Ratings ⑧⑨

12 – 24 Vac or dc	S45		S46		S47		S48		SNT3P04K		SNT3T04K ⑩	
48 – 60 Vac or dc	S53		S54		S55		S56		SNT3P06K		SNT3T06K ⑩	
110 – 240 Vac or 110 – 125 Vdc ⑦	S29		S30		S31		S32		SNT3P11K		SNT3T11K ⑩	
380 – 440 Vac or 220 – 250 Vdc	S33		S34		S35		S36		SNT3P14K		SNT3T14K ⑩	
480 – 600 Vac	S37		S38		S39		S40		SNT3P18K		SNT3T18K ⑩	

⑤ Listed with Underwriters Laboratories, for field installation under E64983.

⑥ Standard mounting location — leads exit rear of breaker.

⑦ Suitable for use with Class 1 ground fault sensing element.

⑧ For use with KT (thermal-magnetic) trip units only.

⑨ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

⑩ Not for use on 4-pole circuit breaker.

Shunt Trip

Table 45-349. L-, HMCP (L) and (M) Frames and Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ^①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ^②		Opposite Side		Same Side					
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

Left-Pole Mounting ac/dc Ratings ^②

12 – 24 Vac or dc	S01		S02		S03		S04		SNT4LP03K		SNT4LT03K	
48 – 60 Vdc	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	

Right-Pole Mounting ac/dc Ratings ^③

12 – 24 Vac or dc	S21		S22		S23		S24		SNT4RP03K		SNT4RT03K	
48 – 60 Vdc	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	

^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) 3-pole trip units only.

Table 45-350. N-Frame and HMCP (N) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ^④			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ^⑤		Opposite Side		Same Side					
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	

Left-Pole Mounting ac/dc Ratings ^⑤

9 – 24 Vac or dc	S01		S02		S03		S04		SNT5LP03K		SNT5LT03K	
48 – 60 Vac	S05		S06		S07		S08		SNT5LP05K		SNT5LT05K	
110 – 240 Vac ^⑥	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	

^④ Listed with Underwriters Laboratories for field installation under E64983.

^⑤ Standard mounting location — leads exit rear of breaker.

^⑥ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 45-351. R-Frame Shunt Trip (RH Only)

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted		Field Mounted	
	Connection Type and Location		Field Installation Kits ^⑦	
	18-Inch (457.2 mm) Pigtail Leads		Pigtail Leads	
Suffix Number ^⑧	Adder U.S. \$	Catalog Number ^⑧	Price U.S. \$	

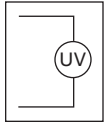
24 Vac or dc	S21		SNT6P03K	
48 – 60 Vac	S25		SNT6P05K	
110 – 240 Vac	S29		SNT6P11K	
380 – 440 Vac or 220 – 250 Vdc	S33		SNT6P14K	
480 – 600 Vac	S37		SNT6P18K	
48 – 60 Vdc	S88		SNT6P23K	
110 – 125 Vdc	S45		SNT6P26K	

^⑦ Listed with Underwriters Laboratories for field installation under E64983.

^⑧ A maximum of two shunt trip plug-in modules may be installed in a circuit breaker.

Low Energy Shunt Trip

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.

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.

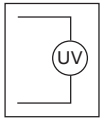
Table 45-352. F-, J-, K-, L-, M-, N- and R-Frames and HMCPs Low Energy Shunt Trip ①

Mounting Positions (Pole)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ②			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ③		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$					
F-Frame												
Left	NO1		NO2		NO3		NO4		LST1LPK ④		LST1LTK ④	
Right ③	NO5		NO6		NO7		NO8		LST1RPK ④		LST1RTK ④	
J-Frame												
Left	NO1		NO2		NO3		—		LST2LPK		—	
Right ③	NO5		NO6		NO7		—		LST2RPK		—	
K-Frame												
Left ③	NO1		NO2		NO3		—		LST3LPK		—	
Right ⑤⑥	NO5		NO6		NO7		—		LST3RPK		—	
L- and M-Frames												
Left	NO1		NO2		NO3		—		LST4LPK		—	
Right	NO5		NO6		NO7		—		LST4RPK		—	
N-Frame												
Left ③	NO1		NO2		NO3		—		LST5LPK		—	
R-Frame												
Right	NO1		—		—		—		LST6RPK		—	

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.
 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

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.

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.

Table 45-353. F-Frame Electrical Rating Data ①

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 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 60	21.0	33.6	40.8	1.2 1.9	48 60	21.0	33.6	40.8	1.3 2.0
110 120 127	44.5	77.0	93.5	1.3 1.5 1.7	110 120 125	44.5	77.0	93.5	1.5 1.7 1.9
208 220 240	84.0	145.6	176.8	2.2 2.4 2.9	220 250	87.5	154.0	187.0	2.6 3.4 —
380 415 440 480	168.0	266.0	323.0	2.9 3.5 3.9 4.6	—	—	—	—	—
525 550 600	210.0	367.0	446.0	4.3 4.8 5.8	—	—	—	—	—

① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.

Table 45-354. J-Frame Electrical Rating Data ②③

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 60	21.0	33.6	40.8	2.5 3.8	48 60	21.0	33.6	40.8	2.0 3.1
110 120 127	44.5	77.0	93.5	1.8 2.1 2.4	110 120 125	44.5	77.0	93.5	1.6 1.9 2.2
208 220 240	84.0	145.6	176.8	2.7 3.1 3.8	220 250	87.5	154.0	187.0	3.1 4.0 —
380 415 440 480	168.0	266.0	323.0	3.4 4.0 4.6 5.4	—	—	—	—	—

② Endurance: 6,000 electrical operations plus 2,000 mechanical operations.

③ For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.

Undervoltage Release Mechanism

Table 45-355. K-Frame Electrical Rating Data ①

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				3.8	60				3.1	
110	44.5	77.0	93.5	1.8	110	44.5	77.0	93.5	1.6	
120				2.1	120				1.9	
127				2.4	125				2.2	
208	84.0	145.6	176.8	2.7	220	87.5	154.0	187.0	3.1	
220				3.1	250				4.0	
240				3.8	—				—	—
380	168.0	266.0	323.0	3.4	—	—	—	—	—	
415				4.0	—	—	—	—	—	
440				4.6	—	—	—	—	—	—
480				5.4	—	—	—	—	—	—

① Endurance: 5,000 electrical operations plus 1,000 mechanical operations.

Table 45-356. L- and M-Frames Electrical Rating Data ②

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				3.8	60				3.1	
110	44.5	77.0	93.5	1.8	110	44.5	77.0	93.5	1.6	
120				2.1	120				1.9	
127				2.4	125				2.2	
208	84.0	145.6	176.8	2.7	220	87.5	154.0	187.0	3.1	
220				3.1	250				4.0	
240				3.8	—				—	—
380	168.0	266.0	323.0	3.4	—	—	—	—	—	
415				4.0	—	—	—	—	—	
440				4.6	—	—	—	—	—	—
480				5.4	—	—	—	—	—	—

② Endurance: 5,000 electrical operations plus 1,000 mechanical operations.

Table 45-357. N-Frame Electrical Rating Data ③

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				3.8	60				3.1	
110	44.5	77.0	93.5	1.8	110	44.5	77.0	93.5	1.6	
120				2.1	120				1.9	
127				2.4	125				2.2	
208	84.0	145.6	176.8	2.7	220	87.5	154.0	187.0	3.1	
220				3.1	250				—	
240				3.8	—				—	4.0
380	175.0	266.0	323.0	3.4	—	—	—	—	—	
415				4.0	—	—	—	—	—	
480				4.6	—	—	—	—	—	—
500				5.4	—	—	—	—	—	—

③ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.

Undervoltage Release Mechanism

Table 45-358. R-Frame ac Undervoltage Release Mechanism (Handle Reset) Ratings ①②

Catalog Suffix	Application Ratings	Electrical Operating Ratings				Approximate Operating Time (ms)					
		Voltage (V)	Supply Voltage (V)	Dropout Voltage (V)		Pickup Voltage (V) Max.	VA	Minimum UVR Response ③	Initiation Circuit Breaker Contact Separation ④	Maximum Circuit Breaker Contact Opening	Dielectric Withstand Voltage (V) ⑤
				Minimum	Maximum						
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 60	21.0	33.5	40.8	3.4 6.0	5	46	77	1120	
08/08K	110 – 127	110 120 127	44.5	77.0	93.5	3.3 3.6 3.8	5	46	77	1254	
11/11K	208 – 240	208 220 240	84.0	145.6	176.8	4.2 6.6 7.2	5	46	77	1480	
29/29K	380 – 500	380 415 440 480 500	168.0	266.0	323.0	3.8 8.3 8.8 9.6 10.0	5	46	77	2000	

- ① Endurance: 500 electrical operations plus 2500 mechanical operations.
- ② Pigtail wire size: 18 AWG (0.82 mm²). 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.

Table 45-359. R-Frame dc Undervoltage Release Mechanism (Handle Reset) Ratings ⑥⑦

Catalog Suffix	Application Ratings	Electrical Operating Ratings				Approximate Operating Time (ms)					
		Voltage (V)	Supply Voltage (V)	Dropout Voltage (V)		Pickup Voltage (V) Max.	VA	Minimum UVR Response ⑧	Initiation Circuit Breaker Contact Separation ⑨	Maximum Circuit Breaker Contact Opening	Dielectric Withstand Voltage (V) ⑩
				Minimum	Maximum						
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 60	21.0	33.5	40.8	4.8 7.2	5	46	77	1120	
26/26K	110 – 127	110 120 125	43.8	77.0	93.5	3.3 3.6 3.8	5	46	77	1250	
28/28K	220 – 250	220 250	87.5	154.0	187.0	6.6 7.5	5	46	77	1500	

- ⑥ Endurance: 500 electrical operations plus 2500 mechanical operations.
- ⑦ Pigtail wire size: 18 AWG (0.82 mm²). Leads are orange and brown.
- ⑧ UVR will override a momentary voltage dip up to the response time shown.
- ⑨ Unlatching occurs 1 millisecond before circuit breaker contacts begin to separate.
- ⑩ For 1 minute.

Table 45-360. G-Frame Undervoltage Release Mechanism (LH 3-Pole Only)

Electrical Ratings			Style Numbers ⑪⑫⑬	Price U.S. \$	Factory Suffix	Adder U.S. \$
Volts (ac Only)	Frequency	Amperes				
120	50/60 Hz	0.05	1373D62G03		T1	
24	50/60 Hz	0.22	1373D62G04		T2	
48	50/60 Hz	0.11	1373D62G05		T3	
60	50/60 Hz	0.10	1373D62G06		T4	
110	50 Hz	0.049	1373D62G07		T5	
208	60 Hz	0.026	1373D62G08		T6	
220	50 Hz	0.025	1373D62G09		T7	
240	50/60 Hz	0.024	1373D62G10		T8	
380	50 Hz	0.015	1373D62G11		T9	
415	50 Hz	0.013	1373D62G12		T10	
440	50 Hz	0.012	1373D62G13		T11	
480	60 Hz	0.01	1373D62G14		T12	

- ⑪ Includes 24-inch (609.6 mm) external pigtail leads, 18 AWG (16-.010).
- ⑫ A maximum of two internal accessories may be mounted in a 3-pole circuit breaker.
- ⑬ Suitable for mounting in left pole only of 3-pole breaker.

Note: G-frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory.

Note: Internal accessories are UL listed for factory installation under E7819.

Note: 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.

Undervoltage Release Mechanism

Table 45-361. 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		Rear ①		Opposite Side		Same Side	
	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$
Left-Pole Mounting ac Ratings								
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	
Right-Pole Mounting ac Ratings ②③								
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	
Left-Pole Mounting dc Ratings								
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	
Right-Pole Mounting dc Ratings ②③								
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	

① Standard pigtail lead exit location.

② Standard mounting location.

③ Not for use on right pole of 4-pole circuit breaker.

Note: F-frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory.

Note: Internal accessories are UL listed for factory installation under E7819.

Note: 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.

Undervoltage Release Mechanism

Table 45-362. F-Frame Field Mounted Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	F-Frame Breaker				F-Frame Breaker HMCP			
	Field Installation Kits ^①							
	Pigtail Leads		Terminal Block		Pigtail Leads		Terminal Block	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Left-Pole Mounting ac Ratings								
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	
Right-Pole Mounting ac Ratings ^{②③}								
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	
Left-Pole Mounting dc Ratings								
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	
Right-Pole Mounting dc Ratings ^{②③}								
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	

① Not listed with Underwriters Laboratories, for field installation.
 ② Standard mounting location.
 ③ Not for use on right pole of 4-pole circuit breaker.

Undervoltage Release Mechanism

Table 45-363. J-Frame and HMCP (J) Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ^②			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block ^①		Pigtail Leads		Terminal Block ^③	
	Same Side		Rear ^②		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$					

Left-Pole Mounting ac Ratings ^④

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	

Right-Pole Mounting ac Ratings ^③

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	

Left-Pole Mounting dc Ratings ^④

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	

Right-Pole Mounting dc Ratings ^③

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	

① For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.

② Listed with Underwriters Laboratories for field installation under E64983.

③ Not for use on right pole of 4-pole circuit breakers.

④ Standard mounting location — leads exit rear of breaker.

Undervoltage Release Mechanism

Table 45-364. K-Frame and HMCP (K) Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ^①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ^②		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$					

Left-Pole Mounting ac Ratings ^②

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	

Right-Pole Mounting ac Ratings ^{③④⑤}

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	

Left-Pole Mounting dc Ratings ^②

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	

Right-Pole Mounting dc Ratings ^{③④⑤}

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	

- 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 4-pole circuit breaker.
- ⑤ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

Undervoltage Release Mechanism

Table 45-365. L-, HMCP (L) and (M)-Frames and Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$					

Left-Pole Mounting ac Ratings ②

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	

Right-Pole Mounting ac Ratings ③④

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	

Left-Pole Mounting dc Ratings ②

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	

Right-Pole Mounting dc Ratings ③④

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	

- 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 4-pole circuit breaker.

Table 45-366. N-Frame and HMCP (N) Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ⑤			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ⑥		Opposite Side		Same Side		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$	Suffix Number	Adder U.S. \$					

Left-Pole Mounting ac Ratings ⑥

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	

Left-Pole Mounting dc Ratings ⑥

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	

- ⑤ Listed with Underwriters Laboratories for field installation under E64983.
- ⑥ Standard mounting location — leads exit rear of breaker.

Undervoltage Release Mechanism

Table 45-367. R-Frame Undervoltage Release Mechanism (RH only)

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted		Field Mounted	
	Connection Type and Location		Field Installation Kits ^①	
	18-Inch (457.2 mm) Pigtail Leads		Pigtail Leads	
	Suffix Number ^②	Adder U.S. \$	Catalog Number ^②	Price U.S. \$
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	

^① Endurance: 500 electrical operations plus 2500 mechanical operations.

^② Pigtail wire size: 18 AWG (0.82 mm²). Leads are orange and brown.

Accessory Terminal Block

**Accessory Terminal Block
(R-Frame)**

(For Fixed Mounted Configuration)



Accessory Terminal Block

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 **Table 45-368**.

Table 45-368. 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

Table 45-369. R-Frame Accessory Terminal Block ①

Factory Installed		Field Mounted	
Suffix Number	Adder U.S. \$	Catalog Number	Price U.S. \$
Q01		TBRDK	

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).

PowerNet and Zone Interlock Kits

**Eaton's Cutler-Hammer
PowerNet and Zone Interlock
Kits (OPTIM 550 only)
K-, L- and N-Frames**

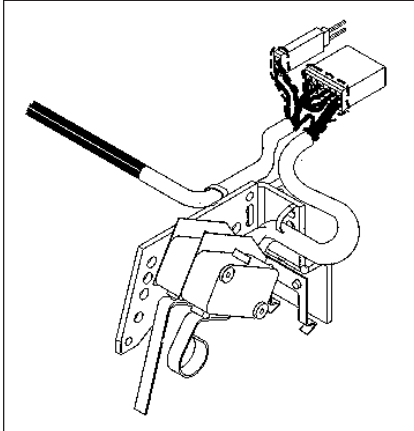


Figure 45-41. PowerNet Communication Kit

Eaton's Cutler-Hammer 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.

Table 45-370. PowerNet and Zone Interlock Kits ①

Circuit Breaker	PowerNet			Zone Interlocking/ Ground ②			PowerNet & Zone Interlocking/Ground ②		
	Factory Install Suffix	Catalog Number	Price U.S. \$	Factory Install Suffix	Catalog Number	Price U.S. \$	Factory Install Suffix	Catalog Number	Price U.S. \$
K-Frame	PN	ICK550K		ZG	ZGK550K		ZGP	ZGPK550K	
L-Frame	PN	ICK550L		ZG	ZGK550L		ZGP	ZGPK550L	
N-Frame	PN	ICK550N		ZG	ZGK550N		ZGP	ZGPK550N	

① Installation of these kits restrict any other attachments from being installed in the RH pole.

② Includes a ground fault alarm signal which can drive the Ground Fault Alarm unit (Catalog Number GFAU).

Termination Hardware

End Cap Kit

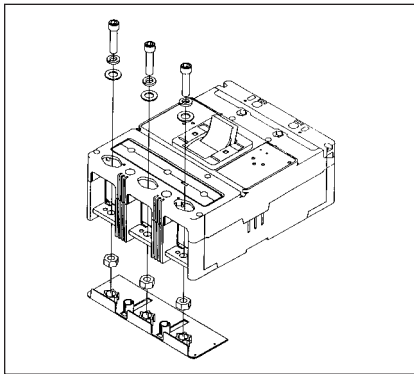


Figure 45-42. End Cap Kit

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.

Table 45-371. End Cap Kit

Thread Type	Thread Size	Catalog Number	Price U.S. \$
2-Pole F-Frame (225 A)			
Imperial	10-32	KPEK12	
Metric	M-5	KPEKM12	
3-Pole F-Frame (225 A)			
Imperial	10-32	KPEK1	
Metric	M-5	KPEKM1	
4-Pole F-Frame (225 A)			
Imperial	10-32	KPEK14	
Metric	M-5	KPEKM14	
3-Pole J-Frame			
Imperial	.312-18	KPEK2	
Metric	M-8	KPEKM2	
4-Pole J-Frame			
Imperial	.312-18	KPEK24	
Metric	M-8	KPEKM24	
3-Pole K-Frame			
Imperial	.312-18	KPEK3	
Metric	M-8	KPEKM3	
4-Pole K-Frame			
Imperial	.312-18	KPEK34	
Metric	M-8	KPEKM34	
3-Pole L-Frame			
Imperial	.312-18	KPEK4	
Metric	M-8	KPEKM4	
4-Pole L-Frame			
Imperial	.312-18	KPEK44	
Metric	M-8	KPEKM44	

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.

Table 45-372. F-Frame Keeper Nut

Thread Type	Thread Size	Catalog Number	Price U.S. \$
		Package of 12 (Priced Individually)	
Imperial	10-32	KPR1A	
Metric	M-5	KPR1AM	

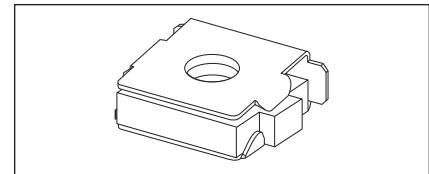


Figure 45-43. F-Frame Keeper Nut

Table 45-373. K-Frame Keeper

Thread Type	Thread Size	Line/Load End	Catalog Number	Price U.S. \$
			Package of 3	
Imperial	.375-16	Line Load	KPR3A	
			KPR3B	
Metric	M-8	Line Load	KPR3AM	
			KPR3BM	

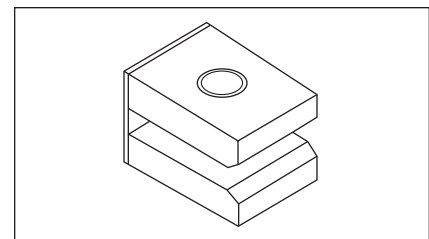


Figure 45-44. K-Frame Keeper Nut

L-, M-, N-Frames

Not required. Terminals are threaded.

Termination Hardware

Plug Nut

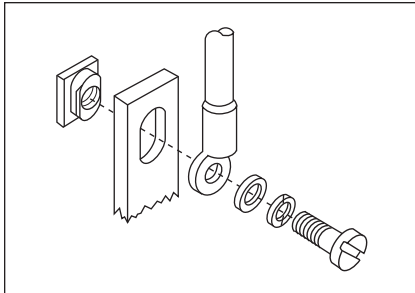


Figure 45-45. J-Frame Plug Nut

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.

Table 45-374. J-Frame Plug Nut

Thread Type	Thread Size	Catalog Number Package of 6	Price U.S. \$
Imperial	.250-20	PLN2'	
Metric	M-6	PLN2M	

Terminal Adapter

Table 45-375. K-Frame Terminal Adapter ①

Line/Load End	Catalog Number	Price U.S. \$
Line & Load	TAD3	

① K-Frame terminal adapter for use in replacing LB/DA breakers.

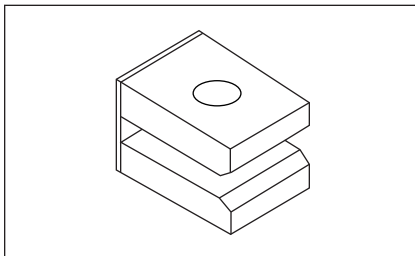


Figure 45-46. K-Frame Terminal Adapter

Control Wire Terminal Kit

Table 45-376. G-Frame Control Wire Terminal

Description	Catalog Number	Catalog Number	Price U.S. \$
Control Wire Terminal (Kit of 12)	5652B38G01	GCWTK	

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.

F-Frame Ordering Information

Package of 12 control wire terminal tangs. Terminals must be ordered separately. Priced individually.

Table 45-377. F-Frame Control Wire Terminal Kit

Maximum Amperes	Catalog Number	Price U.S. \$
150	FCWTK	
225	FCWTK225	

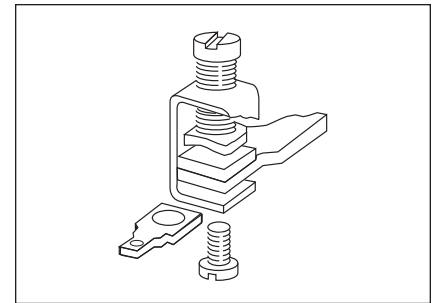


Figure 45-47. F-Frame Kit

Not for use with T250KB terminals.

J- and K-Frame Ordering Information

Package of 12 control wire terminal tangs. Terminals must be ordered separately. Priced individually.

Table 45-378. J- and K-Frame Control Wire Terminal Kit Ordering Information

Catalog Number	Price U.S. \$
KCWTK	

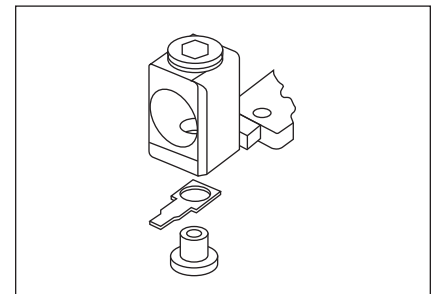


Figure 45-48. J- and K-Frame Kit

Table 45-379. L-Frame Control Wire Terminal Kit

AWG Wire Range/Number Conductors	Metric Wire Range mm ²	Catalog Number	Price U.S. \$
Al/Cu (2) 250 – 350 kcmil	120 – 150	TA602LDCW ②	
Cu (2) 3/0 – 350 kcmil	120 – 150	T602LDCW ②	
Al/Cu (2) 400 – 500 kcmil	185 – 240	2TA603LDCW ③ 2-Pole Kit	
Al/Cu (2) 400 – 500 kcmil	185 – 240	3TA603LDCW ③ 3-Pole Kit	
Al/Cu (2) 400 – 500 kcmil	185 – 240	4TA603LDCW ③ 4-Pole Kit	

② Individually packed.

③ Terminal kits contain one terminal for each pole and one terminal cover.

Multiwire Connectors

Multiwire Connectors

Eaton's Cutler-Hammer 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 for copper only as used on the load side (OFF) end.

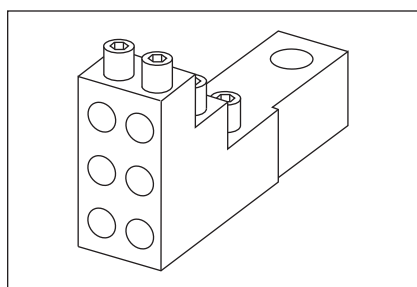


Figure 45-49. Multiwire Connectors

Table 45-380. Multiwire Connectors Ordering Information (Package of 3)

Maximum Amperes	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number	Price U.S. \$
G-Frame ①				
100	3	14 - 2	3TA100G3K	
100	6	14 - 6	3TA100G6K	
F-Frame				
225	3	14 - 2	3TA150F3K	
225	6	14 - 6	3TA150F6K	
J-Frame				
250	3	14 - 2	3TA250J3K	
250	6	14 - 6	3TA250J6K	
K-Frame				
400	3	14 - 2/0	3TA400K3K	
400	6	14 - 3	3TA400K6K	

① GD breakers require special tapping for multiwire lugs, as described in the IL. Special terminals are required as well.

Base Mounting Hardware

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.

Table 45-381. Mounting Hardware

Screw Length in Inches (mm)	Catalog Number	Price U.S. \$
-----------------------------	----------------	---------------

G-Frame

.138-32 x 2.63 (3.5 x 66.7 mm) Std.	624B375G23	
.138-32 x 3.00 (3.5 x 76.2 mm)	8703C80G05	

Table 45-382. Imperial Thread Mounting Hardware

Number of Poles	Description	Type of Mounting	Catalog Number	Price U.S. \$
F-Frame				
1	.164-32 x 3.188-inch Pan-Head Steel Screws, Lockwashers, and Clamps	Individual Group ①	624B375G01 624B375G02	
2	.164-32 x 1.5-inch Pan-Head Steel Screws and Lockwashers	Individual	4218B80G01	
3, 4	.164-32 x 1.5-inch Pan-Head Steel Screws and Lockwashers	Individual	BMH1	
J-Frame				
2, 3, 4	.250-20 x 2.75 inch Pan-Head Steel Screws and Lockwashers	Individual	BMH2	
K-Frame				
2, 3, 4	.250-20 x 1.5 inch Pan-Head Steel Screws and Lockwashers	Individual	BMH3	
L-Frame				
2, 3, 4	.250-20 x 1.5 inch Filister-Head Steel Screws and Lockwashers and Flat Washers	Individual	BMH4	
M-Frame				
2, 3	.3125-18 x 1.25 inch Filister-Head Steel Screws and Lockwashers and Flat Washers	Individual	BMH5	
N-Frame				
2, 3, 4	.3125-18 x 1.25 inch Pan-Head Steel Screws and Lockwashers	Individual	BMH5	
R-Frame				
Supplied by customer				

① One set of hardware for two circuit breakers.

Table 45-383. Metric Thread Mounting Hardware

Number of Poles	Description	Type of Mounting	Catalog Number	Price U.S. \$
F-Frame				
1	M4 – 0.7 x 80 mm Pan-Head Steel Screws, Lockwashers, and Clamps	Individual Group (one set of hardware for two circuit breakers)	4218B80G09 4218B80G10	
2	M4 – 0.7 x 38 mm Pan-Head Steel Screws and Lockwashers	Individual	4218B80G11	
3, 4	M4 – 0.7 x 38 mm Pan-Head Steel Screws and Lockwashers	Individual	BMH1M	
J-Frame				
2, 3, 4	M6 – 0.7 x 70 mm Pan-Head Steel Screws and Lockwashers	Individual	BMH2M	
K-Frame				
2, 3, 4	M6 – 0.7 x 38 mm Pan-Head Steel Screws and Lockwashers	Individual	BMH3M	
L-Frame				
2, 3	—	Individual	BMH4M	
M-Frame				
2, 3	—	Individual	BMH5M	
N-Frame				
2, 3	—	Individual	BMH5M	
R-Frame				
Supplied by customer				

Drawout Cassette

Drawout Cassette



R-Frame with Moveable Mechanism

Product Description

The Drawout Cassette is currently for use with the standard 3-pole 65 kA/480 Vac, 1600 and 2000 ampere RD circuit breakers only. It consists of two separate components: the movable mechanism which is factory mounted to the circuit breaker frame and the stationary mechanism which is housed in the cassette and shipped separately.

The drawout mechanism has four positions.

- **Connected:** The breaker is fully connected to the primary stabs and secondary contacts.
- **Test:** The breaker is not connected to the primary stab but is connected to the secondary contacts.
- **Disconnected:** Both the primary stabs and the secondary contacts are disconnected.
- **Withdraw:** The breaker can be removed from the cassette.

Product Selection

Table 45-384. RD Drawout Cassette

Description	Catalog Number	Price U.S. \$
-------------	----------------	---------------

65 kA/480 Vac Version

Movable Mechanism	RD20DOM ①	
Stationary Mechanism	RD20DOS ② RD20DOSS ③	

100 kA/480 Vac Version

Movable Mechanism	RDC20DOM ①	
Stationary Mechanism	RDC20DOS (without shutters) RDC20DOSS (with shutters)	

① List price included in price of the stationary mechanism.

② Without shutters.

③ With shutters.

Movable mechanism must be ordered with RD or RDC circuit breaker and is shipped mounted to circuit breaker frame. Stationary mechanism is ordered separately.

All internal accessories must be factory installed for use with drawout.

Terminal Shields and End Covers

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.)



F-Frame

Table 45-385. G-Frame Terminal Shield

Number Units in Package	Catalog Number	Price U.S. \$
10	GTSK3	

Table 45-386. 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	Price U.S. \$	Catalog Number	Price U.S. \$
1	Line	625B229G06		—	
2		625B229G07		—	
3		625B229G08		4210B95G01	
4		625B229G09		4210B95G02	



J-Frame

Table 45-387. J-Frame Terminal Shield

Number of Poles	Location	Catalog Number (Package of 10)	Price U.S. \$
2,3 4	Line End	1266C07G01 6631C01G01	
2,3 4	Load End	6641C16G01 6641C16G02	



L-Frame

Table 45-389. L-Frame Terminal Shield

Catalog Number (Package of 1)	Price U.S. \$
314C420G05	



K-Frame

Table 45-388. K-Frame Terminal Shield

Number of Poles	Location	Catalog Number (Package of 10)	Price U.S. \$
2, 3	Line	TS33LN	
4	Line	TS34LN	
3	Load	TS33LD	



M-Frame

Table 45-390. M-Frame Terminal Shield

Catalog Number (Package of 1)	Price U.S. \$
208B966G01	

Table 45-391. N-Frame Terminal Shield

Catalog Number (Package of 1)	Price U.S. \$
NTS3K	

Discount Symbol **CB-2**

Terminal Shields and End Covers

Terminal End Covers



F-Frame

Product Description

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.)

Ordering Information

The terminal end cover is available for 3-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

Table 45-392. F-Frame Terminal End Covers

Conductor Opening Diameter in Inches (mm)	Catalog Number	Price U.S. \$
0.25 (6.35 mm)	TEC1	
0.41 (10.41 mm)	TEC2	

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.



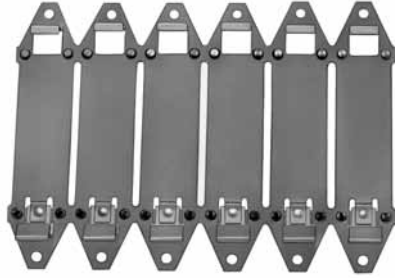
Interphase Barrier

Table 45-393. Interphase Barriers

Frame	Catalog Number	Price U.S. \$
F	IPB1	
J, K	IPB3	
L	IPB4	
M	IPB4	
N	IPB5	

Base Mounting Adapters

Base Mounting Plate



Base Mounting Plate

Suitable for mounting (6) single-pole circuit breakers.

**Table 45-394. Base Mounting Plate
G-Frame GD/GHC**

Number Units in Package	Catalog Number	Price U.S. \$
1	207B513G01	

DIN Rail Adapter



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 2- and 3-pole circuit breakers. Adapters for 1-pole circuit breakers (pictured above) clip into the base molding.

**Table 45-395. DIN Rail Adapter
G-Frame GD/GHC**

Poles	Number Units in Package	Catalog Number	Price U.S. \$
1, 2-Pole	10	1225C79G01	
3-Pole	10	1225C79G02 ①	

① For use on 3-pole breakers only.

Key Operated Attachment

**Table 45-396. Key Operated Attachment
G-Frame GD/GHC**

Number Units in Package	Catalog Number	Price U.S. \$
10	GK0A	

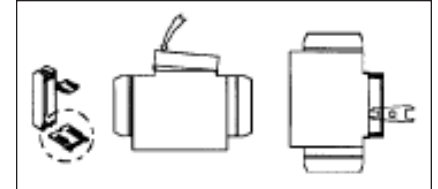


Figure 45-50. Key Operated Attachment

Handle Locking and Blocking Devices

Lock Dog (Non-Padlockable)

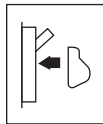


Lock Dog (Non-Padlockable)

**Table 45-397. Lock Dog (Non-Padlockable)
G-Frame GD/GHC/GHB/GMCP**

Number Units in Package	Catalog Number	Price U.S. \$
1	1294C01H01	

Non-Padlockable Handle Block



Non-Padlockable Handle Block

Product Description

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.)

Table 45-398. Non-Padlockable Handle Block

Frame	Catalog Number	Price U.S. \$
F J, K L, M, N	LKD1 LKD3 LKD4	

Padlockable Handle



Padlockable Handle

**Table 45-399. Padlockable G-Frame
GD/GHC/GHB**

Number Units in Package	Catalog Number ①	Price U.S. \$
10	1223C77G03	
10	1223C77G05 ②	
100	1223C77G06 ②	

- ① Accepts .285 Lock Shank.
- ② Padlockable in the OFF position only.

Padlockable Handle Lock



Padlockable Handle Lock

The device is positioned in the cover opening to prevent handle movement. Will accommodate one 5/16-inch (8 mm) padlock.

Table 45-400. Padlockable Handle Lock

Frame	Catalog Number	Price U.S. \$
G J, K	GPHBOFF PHB3	

Snap-on Padlockable Handle Lock Hasp



Snap-on Padlockable Handle Lock Hasp

Product Description

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 1-pole circuit breaker, but may be used on 1-, 2-, 3- and 4-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.)

Table 45-401. Snap-on Padlockable Handle Lock Hasp

Frame	Catalog Number	Price U.S. \$
F	PHL1	

Handle Locking and Blocking Devices

Padlockable Handle Lock Hasp



Padlockable Handle Lock Hasp

Product Description

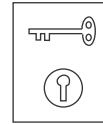
The Padlockable Handle Lock Hasp allows the handle to be locked in the ON or OFF position. (Trip-free operation allows the circuit breaker to trip when the handle lock holds the circuit breaker handle in the ON position.) The hasp mounts on the circuit breaker cover within the trimline. The cover is 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.)

Table 45-402. Padlockable Handle Lock Hasp

Description	Catalog Number	Price U.S. \$
F-Frame		
1-Pole Breakers	PHL1	
2-, 3-, 4-Pole Breakers	PLK1	
For Left Side Mounting	PLK1LOFF	
For Right Side Mounting	PLK1ROFF	
J, K-Frames		
2-, 3-, 4-Pole Breakers	PLK3	
For Left Side Mounting	PLK3LOFF ①	
For Right Side Mounting	PLK3ROFF ①	
L-Frame (Side Mounted)		
Side Mounted		
Lock ON or OFF	HLK4	
Lock OFF Only (Left-Hand Mount)	HLK4LOFF ①	
L-Frame (Top Mounted)		
Lock ON or OFF	HLK4S	
Lock OFF Only	HLK4SOFF ①	
M-Frame		
Lock ON or OFF	HLK4	
Lock OFF Only (Left-Hand Mount)	HLK4LOFF ①	
M-Frame (Vertical Mounting)		
Lock ON/OFF	HLK4S	
Lock OFF Only	HLK4SOFF	
N-Frame		
Side Mounted	PLK5	
Top Mounted (ON/OFF)	PLK5S	
Top Mounted (OFF Only)	PLK5SOFF ①	
R-Frame		
Lock ON/OFF	HLK6	
Lock OFF Only	HLK6OFF ①	

① For padlockable handle lock hasp to padlock handle in OFF position only order either catalog number.

Cylinder Lock



Cylinder Lock

Product Description

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.)

Table 45-403. Cylinder Lock

Frame	Catalog Number	Price U.S. \$
F, J, K	Order by Description	

Mechanical Interlocking Devices

Key Interlock Kit
(Lock Not Included)

Key Interlock Kit

Product Description

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.

Ordering Information

Key interlock mounting kits are for field installation only. Select mounting kit catalog numbers to match type of lock used. Key interlocks are supplied by customer.

Table 45-404. Key Interlock Kit

Lock Manufacturer	Lock Type	Bolt Projection in Withdrawn Position in Inches (mm)	Kit Catalog Number	Price U.S. \$
F-Frame				
Superior Kirk® Square D®	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	KYK1	
Castell ①	K or QK	.38 (9.5)	CTK1	
J, K-Frames				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	KYK3	
Castell ①	K or QK	.38 (9.5)	CTK3	
L-, M-, N-Frames				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	KYK4	
Castell ①	K or QK	.38 (9.5)	CTK4	
R-Frame				
Superior Kirk Square D	B-4003-1 F SF	1.0 (25.4) 1.0 (25.4) 1.0 (25.4)	KYK6	
Castell ①	K or QK	1.0 (25.4)	CTK6	
JG-Frame				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	KYKJG	
Castell ①	K or QK	.38 (9.5)	CTKJG	
LG-Frame				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	KYKLG	
Castell ①	K or QK	.38 (9.5)	CTKLG	

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



Sliding Bar Interlock

Product Description

The Sliding Bar Interlock provides mechanical interlocking between two adjacent 3-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.)

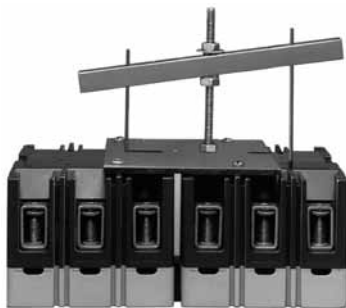
Ordering Information

The sliding bar interlock is available for mounting between two adjacent 3-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.)

Table 45-405. Sliding Bar Interlock

Frame	Centerline Spacing in Inches (mm)	Catalog Number	Price U.S. \$
F	4.19 (106.4)	SBK1	
J	4.38 (111.3)	SBK2	
K	5.75 (146.0)	SBK3	
L, M	8.50 (215.9)	SBK4	
N	8.50 (215.9)	SBK5	

Walking Beam Interlock



Walking Beam Interlock

Product Description

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 E3816.

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 2-, 3- or 4-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.

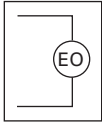
Table 45-406. Walking Beam Interlock

Frame	Catalog Number	Price U.S. \$
F	WBL1	
K	WBL3	
L, M	WBL4A	
N	WBL5	
R ①	WBL6	

① 3-pole only.

Electrical Operator

Electrical Operator



Electrical Operator

Product Description

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.

Table 45-407. F-Frame Electrical (Solenoid) Operator Rating Data ①②

Voltage ③	Frequency	Inrush Current Amperes	Maximum Operating Time	Fuse ④ Amperes
120	50/60 Hz ac	10	5 cycles (80 ms)	3
240		5		2

- ① UL listed under UL File E64983.
- ② The electrical operator design is endurance tested for 8,000 electrical operations.
- ③ Tolerance: +10%, -15% of nominal voltage.
- ④ Use current-limiting type fuse where required.

Table 45-408. F-Frame Electrical (Solenoid) Operator

Voltage	Frequency	Terminal Block		18-Inch (457.2 mm) Pigtail Lead	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
120	ac	EOP1T07		EOP1P07	
240		EOP1T11		EOP1P11	

Table 45-409. F-Frame Electrical (Motor) Operator Rating Data ⑤⑥⑦⑧

Voltage ⑨	Frequency	Inrush Current Amperes
120	ac	2
24	dc	5
48		3
125		2

- ⑤ UL listed under UL File E64124.
- ⑥ Frequency: 50/60 Hz.
- ⑦ The electrical operator design has been endurance tested for 8,000 electrical operations.
- ⑧ 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.
- ⑨ Tolerance: +10%, -15% of nominal voltage.

Table 45-410. F-Frame Electrical (Motor) Operator

Voltage	Frequency	18-Inch (457.2 mm) Pigtail Lead	
		Catalog Number	Price U.S. \$
120	50/60 Hz ac	MOP1P07	
24	dc	MOP1P03DC	
48		MOP1P05DC	
125		MOP1P07DC	

Table 45-411. J-Frame Electrical (Solenoid) Operator Rating Data ⑩⑪⑫⑬

Voltage ⑭	Inrush Current Amperes	Fuse Amperes
120	30	6
240	16	4

- ⑩ UL listed under UL File E64983.
- ⑪ The electrical operator design has been endurance tested for 6,000 electrical operations.
- ⑫ Frequency: 50/60 Hz.
- ⑬ Maximum operating time: 5 cycles (80 mS).
- ⑭ Tolerance: +10%, -15% of nominal voltage.

Table 45-412. J-Frame Electrical (Solenoid) Operator

Operating Voltage	Frequency	Terminal Block	
		Catalog Number	Price U.S. \$
120	50/60 Hz ac	EOP2T07	
240		EOP2T11	

Electrical Operator

Table 45-413. K-Frame Electrical (Solenoid) Operator Rating Data ①②③④

Operating Voltage ⑤	Inrush Current Amperes	Fuse Amperes
120	30	6
240	16	4

- ① UL listed under UL File E64983.
- ② The electrical operator design has been endurance tested for 6,000 electrical operations.
- ③ Frequency: 50/60 Hz.
- ④ Maximum operating time: 5 cycles (80 mS).
- ⑤ Tolerance: +10%, -15% of nominal voltage.

Table 45-414. K-Frame Electrical (Solenoid) Operator

Operating Voltage	Frequency	Terminal Block	
		Catalog Number	Price U.S. \$
120	50/60 Hz ac	EOP3MT07	
240		EOP3MT11	

Table 45-415. K-Frame Electrical (Solenoid) Operator Base Mounting Kit

Frame	Catalog Number	Price U.S. \$
K	BBMK3	

Table 45-416. L- and M-Frame Electrical (Motor) Operator Rating Data ⑥⑦⑧⑨

Operating Voltage ⑩	Inrush Current Amperes
120 ac	31
208	13
240	12
125 dc	21
24	50

- ⑥ UL listed under UL File E64983.
- ⑦ The electrical operator design has been endurance tested for 6,000 electrical operations.
- ⑧ Frequency: 50/60 Hz.
- ⑨ Maximum operating time: 12 cycles.
- ⑩ Tolerance: +10%, -15% of nominal voltage.

Table 45-417. L- and M-Frame Electrical (Motor) Operator 310 and OPTIM

Operating Voltage	Frequency	Terminal Block	
		Catalog Number	Price U.S. \$
120	50/60 Hz	EOP4MT07	
208		EOP4MT11	
240		EOP4MT11A	
480		EOP4MT15	
125	dc	EOP4MT26	
24		EOP4MT21	

Table 45-418. N-Frame Electrical (Motor) Operator Rating Data ⑪⑫⑬⑭

Operating Voltage ⑮	Frequency	Inrush Current Amperes	Fuse Amperes
120	50/60 Hz	31	6
208		21	—
240		19	4
480		—	—
24	dc	50	—
48		80	—
125		21	—

- ⑪ UL listed under UL File E64983.
- ⑫ Frequency: 50/60 Hz.
- ⑬ The electrical operator design has been endurance tested for 2,500 electrical operations.
- ⑭ 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.
- ⑮ Tolerance: +10%, -15% of nominal voltage.

Table 45-419. N-Frame Electrical (Motor) Operator

Operating Voltage	Frequency	Pigtail Leads	
		Catalog Number	Price U.S. \$
120	50/60 Hz	EOP5T07	
208		EOP5T09	
240		EOP5T11	
480		EOP5T15	
24	dc	EOP5T21	
48		EOP5T22	
125		EOP5T26	

Note: For OPTIM trip, OPEOPCK kit required.

Table 45-420. R-Frame Electrical (Motor) Operator Rating Data ⑯⑰⑱⑲

Operating Voltage ⑳	Frequency	Motor Inrush Current Amperes
120	50/60 Hz	40
240	50/60 Hz	27
48	dc	53
24		58

- ⑯ Operator is an intermittent duty service. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
- ⑰ Electric Operating time at rated voltage; (a) To turn breaker ON – 1/2 second max. (b) To turn breaker OFF – 1/2 second max.
- ⑱ Motor operating temperature; Class “A” temperature limits apply.
- ⑲ A minimum 1 kVA power source is recommended for motor operation.
- ⑳ Applied voltage should be no less than 85% or no more than 110% of rated voltage.

Table 45-421. R-Frame Electrical (Motor) Operator

Operating Voltage	Frequency	Factory-Installed Terminal Block	
		Catalog Number	Price U.S. \$
120	50/60 Hz	EOP6T08K	
240	50/60 Hz	EOP6T11K	
48	dc	EOP6T21K	
24		EOP6T19K	

Plug-in Adapters

Plug-in Adapters



Plug-in Adapter

Product Description

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 2-, 3- and 4-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.

Table 45-422. F-Frame Ordering Information (Flat Bar Type)

Continuous Current Rating (Amperes)	2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
100 – 225	1480D13G01		1480D13G02		1480D13G07 ^①	
Mounting Plate	176C511H01		507C047H01		—	

^① 100 ampere maximum.

Table 45-423. J-Frame Ordering Information (Flat Bar Type)

Continuous Current Rating (Amperes)	Terminal End	2-Pole		3-Pole		4-Pole	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
250	Line Load 1 Line and 1 Load	1260C86G05 1260C86G07 506C144G27		1260C86G06 1260C86G08 506C144G28		1231C67G01 1231C67G02 —	
Mounting Plate	—	②		PMP23		—	

^② Use 3-pole mounting plate for 2-pole circuit breaker.

Table 45-424. K-Frame Ordering Information (Flat Bar Type) — 600 Vac Maximum

Continuous Current Rating (Amperes)	2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
400	PAD32		PAD33		—	
Mounting Plate	③		PMP33		—	

^③ Use 3-pole mounting plate for 2-pole circuit breaker.

Table 45-425. L-Frame Ordering Information (Threaded Stud Type)

Continuous Current Rating (Amperes)	2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
600 (Threaded Stud Type)	506C059G03		506C059G04		PAD44	
600 (Flat Bar Type)	1288C19G01		1288C19G02		6636C55H01	
Mounting Plate	504C824H01		504C824H01		—	

Table 45-426. M-Frame Ordering Information (Flat Bar Type) — 600 Vac Maximum

Continuous Current Rating (Amperes)	2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
800	2614D53G05		2614D53G06	
Mounting Plate	1290C73H01		1290C73H01	

Table 45-427. N-Frame Ordering Information (Flat Bar Type)

Continuous Current Rating (Amperes)	2-Pole		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1200	2614D53G03		2614D53G04	
Mounting Plate	1290C73H01		1290C73H01	

Table 45-428. Plug-in Adapters

Frame	Poles	Standard Certification	Catalog Number	Price U.S. \$
FD	3	IEC	PAD3F	
FD	4	IEC	PAD4F	
JD	3	IEC	PAD3JD	
KD	3	IEC	PAD3K	
LD	3	IEC	PAD3LD	
LD	4	IEC	PAD4LD	

Discount Symbol CB-2

Rear Connecting Studs

Rear Connecting Studs



Product Description

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.

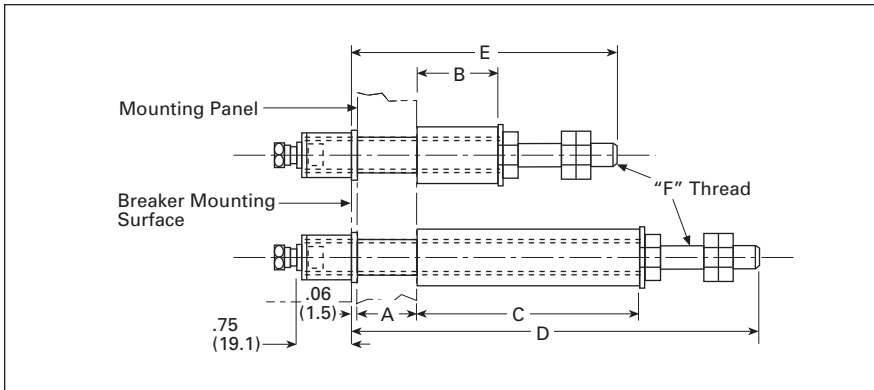


Figure 45-51. F-Frame

Table 45-429. F-Frame Ordering Information — Dimensions in Inches (mm) ①

Stud Ampere Rating	Stud Catalog Number	Price U.S. \$	Panel Thickness		Tube Length		Tube Catalog Number	Price U.S. \$	Dimensions		
			A		B	C			D	E	F
For 15 to 100 Ampere Circuit Breakers											
100 A Short	451D874G01		1.00 (25.4)		1.06 (26.9)	—	32B9446H20		—	3.63 (92.1)	.31
100 A Short	451D874G01		.69 – .94 (17.5 to 23.8)		1.38 (34.9)	—	32B9446H21		—	—	.31 (7.9) – 18
100 A Short	451D874G01		.38 – .63 (9.5 to 15.9)		1.69 (42.9)	—	32B9446H22		—		
100 A Short	451D874G01		.25 – .31 (6.4 to 7.9)		2.00 (50.8)	—	32B9446H23		—		
100 A Long	451D874G02		1.00 (25.4)		—	3.44 (87.3)	32B9446H24		6.13 (155.6)	—	—
100 A Long	451D874G02		.69 – .94 (17.5 to 23.8)		—	3.75 (95.2)	32B9446H25		—	—	—
100 A Long	451D874G02		.38 – .63 (9.5 to 15.9)		—	4.06 (103.1)	32B9446H26		—	—	—
100 A Long	451D874G02		.25 – .31 (6.4 to 7.9)		—	4.38 (111.3)	32B9446H27		—	—	—
For 110 to 225 Amperes Circuit Breakers											
225 A Short	374D883G01		1.00 (25.4)		1.06 (26.9)	—	374D883H06		—	4.25 (108.0)	.44
225 A Short	374D883G01		.69 – .94 (17.5 to 23.8)		1.38 (34.9)	—	374D883H07		—	—	.44 (11.1) – 14
225 A Short	374D883G01		.38 – .63 (9.5 to 15.9)		1.69 (42.9)	—	374D883H08		—		
225 A Short	374D883G01		.25 – .31 (6.4 to 7.9)		2.00 (50.8)	—	374D883H09		—		
225 A Long	374D883G02		1.00 (25.4)		—	3.44 (87.3)	374D883H10		7.50 (190.5)	—	—
225 A Long	374D883G02		.69 – .94 (17.5 to 23.8)		—	3.75 (95.2)	374D883H11		—	—	—
225 A Long	374D883G02		.38 – .63 (9.5 to 15.9)		—	4.06 (103.1)	374D883H12		—	—	—
225 A Long	374D883G02		.25 – .31 (6.4 to 7.9)		—	4.38 (111.3)	374D883H13		—	—	—

① Not UL listed.

Rear Connecting Studs

Table 45-430. J-Frame Ordering Information — Dimensions in Inches (mm) ①

Stud Ampere Rating	Stud Catalog Number	Price U.S. \$	Panel Thickness			Tube Length			Tube Catalog Number	Price U.S. \$
			A	B	C	B	C			
250 A Short	5010D23G01		.75 - 1.00 (19.1 - 25.4)	.84 (21.4)	—	—	—	456D983H05		
250 A Short	5010D23G01		.50 - .75 (12.7 - 19.1)	1.09 (27.7)	—	—	—	456D983H06		
250 A Short	5010D23G01		.25 - .50 (6.4 - 12.7)	1.03 (26.2)	—	—	—	456D983H07		
250 A Long	5010D23G02		.75 - 1.00 (19.1 - 25.4)	—	3.88 (98.6)	—	—	5010D23H05		
250 A Long	5010D23G02		.50 - .75 (12.7 - 19.1)	—	4.13 (104.9)	—	—	5010D23H06		
250 A Long	5010D23G02		.25 - .50 (6.4 - 12.7)	—	4.38 (111.3)	—	—	5010D23H07		

① Not UL listed.

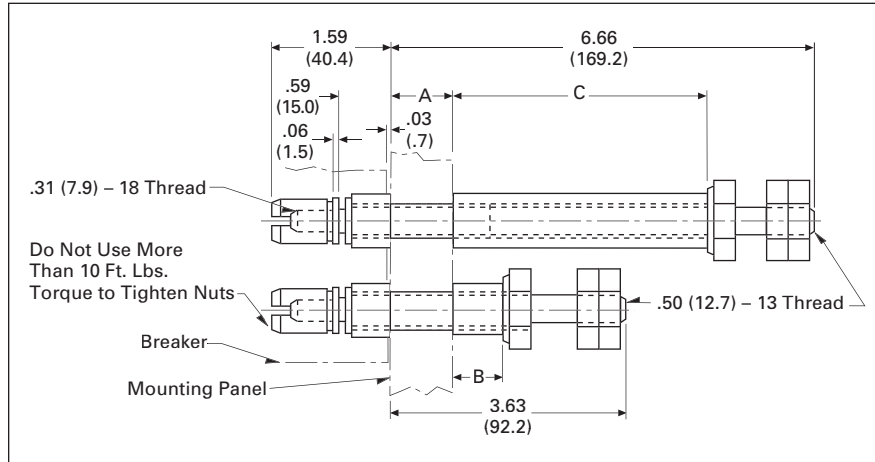


Figure 45-52. J-Frame

Table 45-431. K-Frame Ordering Information — Dimensions in Inches (mm) ②

Stud Ampere Rating	Stud Catalog Number	Price U.S. \$	Panel Thickness			Tube Length			Standard Tube Catalog Number	Price U.S. \$	Dimensions		
			A	B	C	B	C	D			E	F	
400 A Short	6642C14G02		.75 - 1 (19.1 - 25.4)	.84 (21.3)	—	3.13 (79.3)	—	313C909H17		—	3.66 (93.0)	.75 - 16 (19.1 - 406.4)	
400 A Short	6642C14G04		.50 - .75 (12.7 - 18.4)	1.09 (27.69)	—	3.13 (79.3)	—	313C909H18		—	—	—	
400 A Short	6642C14G06		.25 - .5 (6.35 - 12.7)	1.03 (26.16)	—	3.13 (79.3)	—	313C909H19		—	—	—	
400 A Long	6642C14G03		.75 - 1 (19.1 - 25.4)	—	3.78 (96.0)	—	—	313C909H20		—	—	—	
400 A Long	6642C14G05		.50 - .75 (12.7 - 18.4)	—	4.03 (102.4)	—	—	313C909H21		6.58 (167.1)	—	—	
400 A Long	6642C14G07		.25 - .5 (6.35 - 12.7)	—	4.28 (108.7)	—	—	313C909H22		—	—	—	

② Not UL listed.

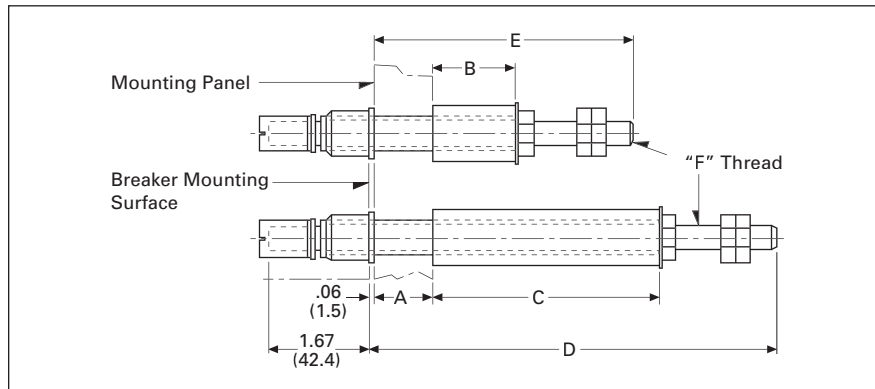


Figure 45-53. K-Frame

Discount Symbol CB-2

Rear Connecting Studs

Table 45-432. L-Frame Ordering Information — Dimensions in Inches (mm)

Stud Length (A)	Stud Catalog Number	Price U.S. \$
5.47 (138.9)	314C960G07	
7.97 (202.4)	314C960G08	
10.47 (265.9)	314C960G09	

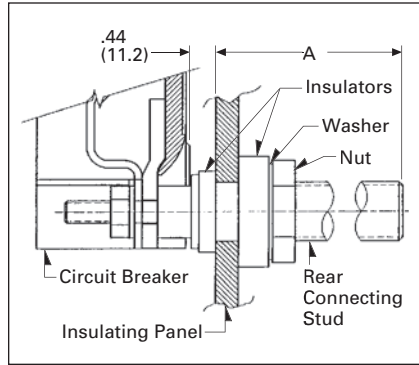


Figure 45-54. L-Frame

Table 45-433. M-Frame Ordering Information — Dimensions in Inches (mm) ①

Stud Ampere Rating	Diameter and Thread	Extension Back of Breaker	Stud Catalog Number	Price U.S. \$
225	.50 (12.7) – 13	3.66 (93.0)	314C960G01	
400	.75 (19.1) – 16	5.91 (150.1)	314C960G04	
400	.75 (19.1) – 16	8.41 (213.6)	314C960G05	
400	.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	

① Not UL listed.

Table 45-434. N-Frame Ordering Information — Dimensions in Inches (mm) ②

Stud Ampere Rating	Diameter and Thread	Extension Back of Breaker	Stud Catalog Number	Price U.S. \$
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	

② Not UL listed.

Panelboard Connecting Straps

Panelboard Connecting Straps



Panelboard Connecting Straps

Product Description

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.

Table 45-435. F-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type			
		Center		Outside	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
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	

Table 45-436. F-Frame Mounting Bracket

Number of Poles	Catalog Number	Price U.S. \$
2	624B600H02	
3	624B600H01	

Table 45-437. J-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type			
		Center		Outside	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
3.50 (88.9)	250	2600D26G01		2600D26G02	

Table 45-438. J-Frame Mounting Bracket

Number of Poles	Catalog Number	Price U.S. \$
2, 3	1576707	

Table 45-439. K-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type			
		Center		Outside	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
3.50 (88.9)	400	4212B78G02		4212B77G01	

Table 45-440. K-Frame Mounting Bracket

Number of Poles	Catalog Number	Price U.S. \$
2, 3	208B264H01	

Table 45-441. L-Frame Panelboard Connecting Straps

Continuous Current Rating (Amperes)	Pole Connector Type			
	Center		Outside	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
600	624B609G01		506C052G01	

Table 45-442. L-Frame Mounting Bracket

Number of Poles	Catalog Number	Price U.S. \$
2, 3	208B297H01	

Table 45-443. M-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Connector Type	Pole Connector Type	
			Catalog Number	Price U.S. \$
3.50 (88.9)	800	Short Medium Long	314C996G01 314C996G02 314C996G03	

Table 45-444. M-Frame Mounting Bracket

Catalog Number	Price U.S. \$
315C270H01	

Table 45-445. N-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Connector Type	Pole Connector Type	
			Catalog Number	Price U.S. \$
3.50 (88.9)	1200	Short Medium Long	505C606G04 505C606G05 505C606G06	

Table 45-446. N-Frame Mounting Bracket (Four [4] Required)

Catalog Number	Price U.S. \$
315C270H01	

Handle Mechanisms

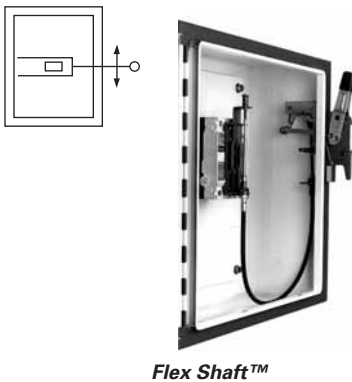
**Handle Mechanisms
Overview**

Handle Mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations — Flange Mounted, Through-the-Door and Direct (Close-Coupled) — providing safe, dependable operation and ease of installation.

- Flange Mounted:
 - Flex Shaft
 - C371
- Through-the-Door:
 - Series C Rotary
 - Universal Rotary
- Direct (Close-Coupled):
 - Universal Direct
 - Euro IEC
 - G Direct

Handle mechanisms are typically used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton has a handle mechanism for virtually any need.

Flange Mounted Handle Mechanisms



Product Description

Flange Mounted Handle Mechanisms mount on the flange of an enclosure door. The Flex Shaft™ is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (.9 m) through 10 feet (3 m) for use with various size enclosures.

The Flex Shaft Handle will accept up to three padlock shackles, each with a maximum diameter of 3/8-inch (9.5 mm). Can be used with NEMA 1, 3R and 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with NEMA 4 and 4X environments. Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes — a significant time savings compared to installation of other types of flange handle mechanisms. The

Flex Shaft mechanism also takes up less interior enclosure space than competitive designs and the handle fits standard flange cutouts. Flex Shaft Handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

Flex Shaft is UL listed under File E64983 and meets CSA requirements.

The Type C371 Circuit Breaker Operating Mechanisms are designed for installation in control enclosures where main or branch circuit protective devices are required. All circuit breaker mechanisms are suitable for right-hand mounting.

Auxiliary contacts are not available for mounting on operating mechanisms. Where required, have them installed in circuit breaker.

Type C371 is UL listed under File E62635.

Table 45-447. Flex Shaft Ordering Information

Breaker Frame	Flexible Shaft Length in Feet (m)							
	3 (.9)		4 (1.2)		5 (1.5)		6 (1.8)	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
G	F0S03C		F0S04C		F0S05C		F0S06C	
F	F1S03C		F1S04C		F1S05C		F1S06C	
F (Dual)	F1S03CD		F1S04CD		F1S05CD		F1S06CD	
J	F2S03C		F2S04C		F2S05C		F2S06C	
K	F3S03C		F3S04C		F3S05C		F3S06C	
L and MDL	N/A		F4S04C		F4S05C		F4S06C	
N	N/A		F5S04C		F5S05C		F5S06C	
R	N/A		F6S04		F6S05		F6S06	
MD, MDS (Old)	N/A		F7S04		F7S05		F7S06	

Table 45-447. Flex Shaft Ordering Information (Continued)

Breaker Frame	Flexible Shaft Length in Feet (m)							
	7 (2.1)		8 (2.4)		9 (2.7)		10 (3.0)	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
G	N/A		N/A		N/A		N/A	
F	F1S07C		F1S08C		F1S09C		F1S10C	
F (Dual)	F1S07CD		F1S08CD		F1S09CD		F1S10CD	
J	F2S07C		F2S08C		F2S09C		F2S10C	
K	F3S07C		F3S08C		F3S09C		F3S10C	
L and MDL	N/A		N/A		N/A		F4S10C	
N	N/A		N/A		N/A		F5S10C	
R	N/A		N/A		N/A		N/A	
MD	N/A		N/A		N/A		F7S10C	
LG	LHMFS07		LHMFS08		LHMFS08		LHMFS10	

Note: Type 4/4X handle mechanisms are available. Add Suffix X to complete catalog number. Add Suffix I to complete catalog number for IEC handle. Original narrow handle design (No C Suffix) is available. Remove C from catalog number.

Note: When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) (5 inches, 12.7 mm for L, N, R Frames) is maintained to operate properly. The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

Note: Dual breakers operator available on F-Frame only. Only the F, J & K can mount LH & RH all other RH only.

Handle Mechanisms

Table 45-448. Type C371 Ordering Information — Dimensions in Inches (mm)

Circuit Breaker or Motor Circuit Protector	Frame Size	Variable Depth Mounting Range Min/Max ①②	Operating Mechanism Only ③		Operating Mechanism w/ 4-inch Handle			
			Catalog Number	Price U.S. \$	For NEMA 1-12 Enclosure		For NEMA 4/4X Enclosure	
					Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
HMCP & Series C EHD, FDB, FD, FDC, HFD, ED	150	6.5 – 16 (165.1 – 406.4)	C371E		C371E1		C371E2	
HMCP & Series C HJD, JD, JDB, JDC	250	6.5 – 16.63 (165.1 – 422.4)	C371F		C371F5		C371F6	
HMCP & Series C DK, HKD, KD, KDB	400	6.5 – 16.63 (165.1 – 422.4)	C371F		C371F5		C371F6	
Series C HLD, LD, LDC	600	8.5 – 22 (215.9 – 558.8)	C371G		C371G5		C371G6	
Series C MD, MDS (No MDL)	800	8.75 – 22 (222.3 – 558.8)	C371K		C371K5		C371K6	
Series C HND, ND, NDC	1200	9.75 – 22 (247.7 – 558.8)	C371K		C371K5		C371K6	

① For increased maximum allowable depth, see connecting rods right.

② Dimensions shown are from panel flange surface.

③ Does not include handle.

Table 45-449. Handle Only — Dimensions in Inches (mm)

Circuit Breaker Frame Size (Amperes)	NEMA Enclosure Type	Operating Handle Length	Catalog Number	Price U.S. \$
150	1-3R-3-12 4/4X	4 (101.6)	C371H1 C371H2	
	1-3R-3-12 4/4X	6 (152.4)	C371H3 C371H4	
250 – 1200	1-3R-3-12 4/4X	4 (101.6)	C371H5 C371H6	
	1-3R-3-12 4/4X	6 (152.4)	C371H7 C371H8	

Table 45-450. Channel Support Kit (Rod Not Supplied)

For use to prevent bending of the operating handle mounting surface. This is especially useful when the operating handle is mounted on a channel in a multi-door enclosure. Included in 600 – 1200 A.

Catalog Number	Price U.S. \$
C371CS6	

Table 45-451. Connecting Rods ④

Application	Catalog Number	Price U.S. \$
Disconnect Switches (30, 60, 100, 200 A Sizes)	C371CS1	
Circuit Breakers (150, 250, 400 A Sizes)	C371CS1	
Circuit Breakers (600, 800, 1200 A Sizes)	C371CS2	

④ Increase maximum allowable depth by 5 inches (127 mm).

Flex Shaft Accessories
(F- through R-Frame)

Table 45-452. NEMA 12 Safety Door Hardware for Flex Shaft and C371 ⑤

Handle Length in Inches (mm)	Catalog Number ⑥	Price U.S. \$
4 (101.6)	C361KJ4	
6 (152.4)	C361KJ6	
Roller Latch ⑦	C361KR	

⑤ Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.

⑥ 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.

⑦ Third roller latch for use with 4- or 6-inch (101.6 or 152.4 mm) handle when 3 point latching is required.

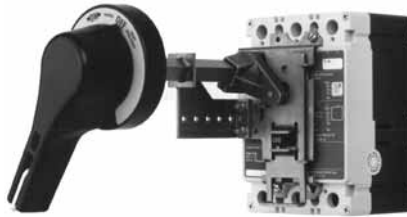
Handle Mechanisms

**Through-the-Door
Handle Mechanisms**

Eaton's Cutler-Hammer through-the-door handle mechanisms mount on the front of an enclosure or cabinet door and externally operate the circuit breaker via a variable depth shaft or a linear operator (Type MC). Each rotary type handle mechanism includes a handle, base operating mechanism and shaft that can be cut to various lengths.

Series C Rotary and Universal Rotary handle mechanisms are for use with Molded Case Circuit Breakers (G, F, J, K, L, MDL), Molded Case Switches and Motor Circuit Protectors.

Series C Rotary and Universal Rotary, are UL listed and meet CSA requirements. Universal Rotary also meets IEC947-1/2 for international compliance. Rotary UL File Number is E64983.



Series C Rotary

Type 4/4X handles are similar to standard handles except they include an internal neoprene gasket. Type 4/4X handle style number is 6648C22G03. Due to gasketing effect between the handle and the housing, the handle may not indicate a tripped position.

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.

Table 45-453. Series C Auxiliary Switch

Catalog Number	Price U.S. \$
5108A61G01	

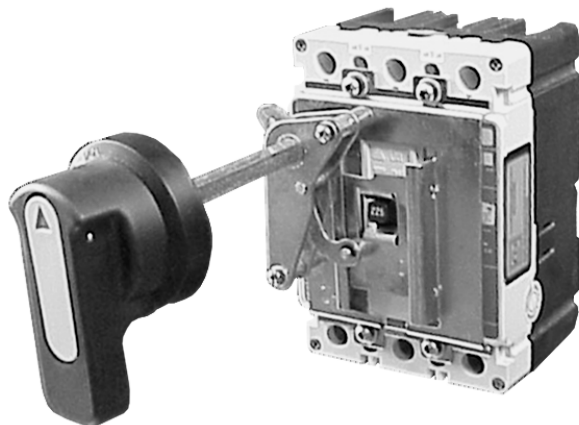
Table 45-454. Series C Rotary Ordering Information

Shaft Length Inches (mm)	Complete Catalog Number ①	Price U.S. \$	Separate Catalog Number				Catalog Number				
			Standard Handle ②	Price U.S. \$	Breaker Mechanism ③	Price U.S. \$	Shaft ④	Price U.S. \$	IEC IP65 ⑤⑥	Price U.S. \$	IEC IP66 ⑤⑥
F-Frame											
6 (152.4)	HM1R06		6648C22G01		6648C23G11		4217B37G04		WHM1R06		WHM1R06X
12 (304.8)	HM1R12		6648C22G01		6648C23G11		4217B37G01		WHM1R12		WHM1R12X
16 (406.4)	HM1R16		6648C22G01		6648C23G11		4217B37G02		WHM1R16		WHM1R16X
24 (609.6)	HM1R24		6648C22G01		6648C23G11		4217B37G03		WHM1R24		WHM1R24X
J-Frame											
6 (152.4)	HM2R06		6648C22G01		6648C23G21		4217B37G04		WHM2R06		WHM2R06X
12 (304.8)	HM2R12		6648C22G01		6648C23G21		4217B37G01		WHM2R12		WHM2R12X
16 (406.4)	HM2R16		6648C22G01		6648C23G21		4217B37G02		WHM2R16		WHM2R16X
24 (609.6)	HM2R24		6648C22G01		6648C23G21		4217B37G03		WHM2R24		WHM2R24X
K-Frame											
6 (152.4)	HM3R06		6648C22G01		6648C23G25		4217B37G04		WHM3R06		WHM3R06X
12 (304.8)	HM3R12		6648C22G01		6648C23G25		4217B37G01		WHM3R12		WHM3R12X
16 (406.4)	HM3R16		6648C22G01		6648C23G25		4217B37G02		WHM3R16		WHM3R16X
24 (609.6)	HM3R24		6648C22G01		6648C23G25		4217B37G03		WHM3R24		WHM3R24X
L- and MDL-Frame											
6 (152.4)	HM4R06		6648C22G11		6648C23G19		4217B37G04		WHM4R06		WHM4R06X
12 (304.8)	HM4R12		6648C22G11		6648C23G19		4217B37G01		WHM4R12		WHM4R12X
16 (406.4)	HM4R16		6648C22G11		6648C23G19		4217B37G02		WHM4R16		WHM4R16X
24 (609.6)	HM4R24		6648C22G11		6648C23G19		4217B37G03		WHM4R24		WHM4R24X
MD/MDS											
6 (152.4)	HM7R06		6648C22G21		6648C23G17		4217B37G04		—		—
12 (304.8)	HM7R12		6648C22G21		6648C23G17		4217B37G01		—		—
16 (406.4)	HM7R16		6648C22G21		6648C23G17		4217B37G02		—		—
24 (609.6)	HM7R24		6648C22G21		6648C23G17		4217B37G03		—		—
N-Frame											
6 (152.4)	HM5R06		6648C22G21		6648C23G08		4217B37G04		WHM5R06		WHM5R06X
12 (304.8)	HM5R12		6648C22G21		6648C23G08		4217B37G01		WHM5R12		WHM5R12X
16 (406.4)	HM5R16		6648C22G21		6648C23G08		4217B37G02		WHM5R16		WHM5R16X
24 (609.6)	HM5R24		6648C22G21		6648C23G08		4217B37G03		WHM5R24		WHM5R24X

- ① Complete catalog number includes the standard handle, mechanism, shaft and support brace/bracket.
- ② Handle is designed suitable for NEMA Types 1, 3R and 12 enclosures. Use style number **6648C22G03** for Type 4/4X handle or add **X** Suffix to complete catalog number. Handle is cast aluminum.
- ③ Breaker mechanism includes a shaft support bracket and its parts. Shaft is .50-inch (12.7 mm).
- ④ Longer shafts, 16-inch (406.4 mm) and 24-inch (609.6 mm), include an adjustable support extension.
- ⑤ IEC Handle Mechanism supplied with Metric thread mounting hardware.
- ⑥ Complete catalog number includes a handle, mechanism and shaft.

Discount Symbol **CB-2**

Handle Mechanisms



Universal Rotary F-Frame

Table 45-455. Series C Universal Rotary Ordering Information ①

Shaft Length in Inches (mm)	Handle Color	Complete Catalog Number	Price U.S. \$
F-Frame			
6 (152.4)	Black	FHMVD06B	
12 (304.8)	Black	FHMVD12B	
6 (152.4)	Red	FHMVD06R	
12 (304.8)	Red	FHMVD12R	
G-Frame			
6 (152.4)	Black	GHMVD06B	
12 (304.8)	Black	GHMVD12B	
6 (152.4)	Red	GHMVD06R	
12 (304.8)	Red	GHMVD12R	
J-Frame			
6 (152.4)	Black	JHMVD06B	
12 (304.8)	Black	JHMVD12B	
6 (152.4)	Red	JHMVD06R	
12 (304.8)	Red	JHMVD12R	
K-Frame			
6 (152.4)	Black	KHMVD06B	
12 (304.8)	Black	KHMVD12B	
6 (152.4)	Red	KHMVD06R	
12 (304.8)	Red	KHMVD12R	
L-Frame			
6 (152.4)	Black	LHMVD06B	
12 (304.8)	Black	LHMVD12B	
6 (152.4)	Red	LHMVD06R	
12 (304.8)	Red	LHMVD12R	
MDL-Frame			
6 (152.4)	Black	MHMVD06B	
12 (304.8)	Black	MHMVD12B	
6 (152.4)	Red	MHMVD06R	
12 (304.8)	Red	MHMVD12R	

① Only available as complete handle mechanism. Parts not sold separately.

Table 45-456. Series C G-Frame Vari-Depth Handle Mechanism (Not Shown)

For Use With:		Handle Color	Complete Catalog Number	Price U.S. \$
Enclosure	Breaker	Black		
NEMA 1 NEMA 1 NEMA 3R/12/4X NEMA 3R/12/4X	GC/GHC/GD GC/GHC/GD GC/GHC/GD GC/GHC/GD	Yellow Black Yellow Black	HRGCV11L HRGCV31L HRGCV14L HRGCV34L	
NEMA 1 NEMA 1 NEMA 3R/12/4X NEMA 3R/12/4X	GMCP GMCP GMCP GMCP	Yellow Black Yellow Black	HRGMV11L HRGMV31L HRGMV14L HRGMV34L	

Table 45-457. Features Comparison of Series C Rotary and Universal Rotary Handle Mechanism

Rotary	Number of Poles	NEMA Enclosure Type				Handle Lock-Off ③	Handle Indication: ON/OFF TRIPPED/RESET	International Markings ON (I) OFF (O)	Handle Material	Available Handle Colors	Handle Rotation ④	Shaft Lengths (Inches)
		1	3R	12	4/4X ②							
Series C Rotary		X	X	X	X	X	X	X	Metal	Black	45 deg.	6, 12, 16, 24
Universal Rotary		X	—	X	—	X	X	X	Molded Plastic	Yellow/Red	90 deg.	6, 12

② Type 4/4X application requires special handle. See "Ordering Information."

③ All rotary handle mechanisms include a handle "Lock Off" to prevent turning the breaker ON while in the OFF position.

④ Series C Rotary handle was ergonomically designed with extra clearance for a "gloved hand" to operate. Handle has a 45-degree rotation. Universal Rotary has a 90-degree rotation ("pipe valve" operation) where ON is vertical and OFF is horizontal. Shafts include a support brace to ensure proper alignment.

Handle Mechanisms

**Direct (Close-Coupled)
Handle Mechanisms**

Product Description

Direct (Close-Coupled) Handle Mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-Door type mechanism is not practical or cannot be used. They are typically for applications where high volume, standardized enclosures are being fabricated.

The Euro IEC Direct handle mechanism can be used on F- through R-Frames.

The G Direct is available with a black or the yellow handle, and with or without a shroud. It is suitable for use with NEMA 1 enclosures. It is for use only with the G-Frame (GD, GC, GHC, GMCP).

An escutcheon ring and interlock clip are provided as standard. The standard design includes a lock-off feature.

The Universal Direct handle mechanism is UL 489 listed, IEC947-1/2 and meets CSA requirements. The Euro IEC Direct handle mechanism is IEC-240-1. G Direct is UL listed and meets CSA requirements.

Table 45-458. Euro IEC Direct Ordering Information

Frame	Black Handle		Red Handle	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
F J K	HMCC1B HMCC2B HMCC3B		HMCC1R HMCC2R HMCC3R	
L and M N R	HMCC4B HMVD5B HMVD6B		HMCC4R — —	



G Direct

Table 45-459. G Direct Ordering Information ①

Frame	Black Handle				Yellow Handle			
	with Shroud		without Shroud		with Shroud		without Shroud	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
GD/ GHC	HRGCC1S		HRGCC10		HRGCC3S		HRGCC30	
GMCP	HRGMC1S		HRGMC10		HRGMC3S		HRGMC30	

① Suitable for use on 2- or 3-Pole G-Frame.

Handle Mechanisms

Handle Extension



Handle Extension

Handle Extension is not included with J, K, L, M and N-Frame breakers. It must be purchased separately.

Table 45-460. Handle Extension

Frame	Style Number	Price U.S. \$
J, K L, M	HEX3 HEX4	

Handle Extension is included with breaker with R-Frame breakers.

Table 45-461. Handle Extension

Frame	Style Number	Price U.S. \$
N R	HEX5 HEX6	

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 circuit breakers are listed with Underwriters Laboratories under File E47239.

Table 45-462. Type LFD Current Limiter

Circuit Breaker Rating Amperes	Catalog Number	Price U.S. \$
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.

Table 45-463. GF Alarm Unit

Description	Catalog Number	Price U.S. \$
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 3-phase, 4-wire systems, or single-phase, 3-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.

Table 45-464. Potential Transformer Module

Description	Catalog Number	Price U.S. \$
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.

Table 45-465. Portable Test Kit

Description	Catalog Number	Price U.S. \$
Solid-State (Electronic) Portable Test Kit	STK2	

OPTIM System Components

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 Cutler-Hammer 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.

Table 45-466. Breaker Interface Module (BIM)

Catalog Number	Price U.S. \$
BIMII	

Digitrip OPTIMizer



The Digitrip OPTIMizer is a hand-held programmer that is used to access, configure, test and display information from OPTIM trip units. The OPTIMizer plugs into the front of an OPTIM trip unit via an eight-pin telephone jack and is powered by a nine-volt battery or the auxiliary power module. One highlighted feature is the "Copy" and "Download" commands. Setting up multiple OPTIM trips can be finished in minutes and with no errors. An Auxiliary Power Module connection provides a trip test when control power is not present at the breaker. The OPTIMizer is supplied as a standard package to include the programmer, the eight-pin connection cord, battery and carrying case. The Auxiliary Power Module is optional.

Table 45-467. Digitrip OPTIMizer

Catalog Number	Price U.S. \$
OPTIMizer — Standard Package	

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's Cutler-Hammer 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.

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 stand-alone non-communicating OPTIM breaker that ordinarily would not have control power.

Note: The OPTIMizer can work off of 32 Vdc control power, although 24 Vdc is the standard on OPTIM breakers.

Table 45-468. Auxiliary Power Module

Catalog Number	Price U.S. \$
PRTAAPM	

45

Dimensions

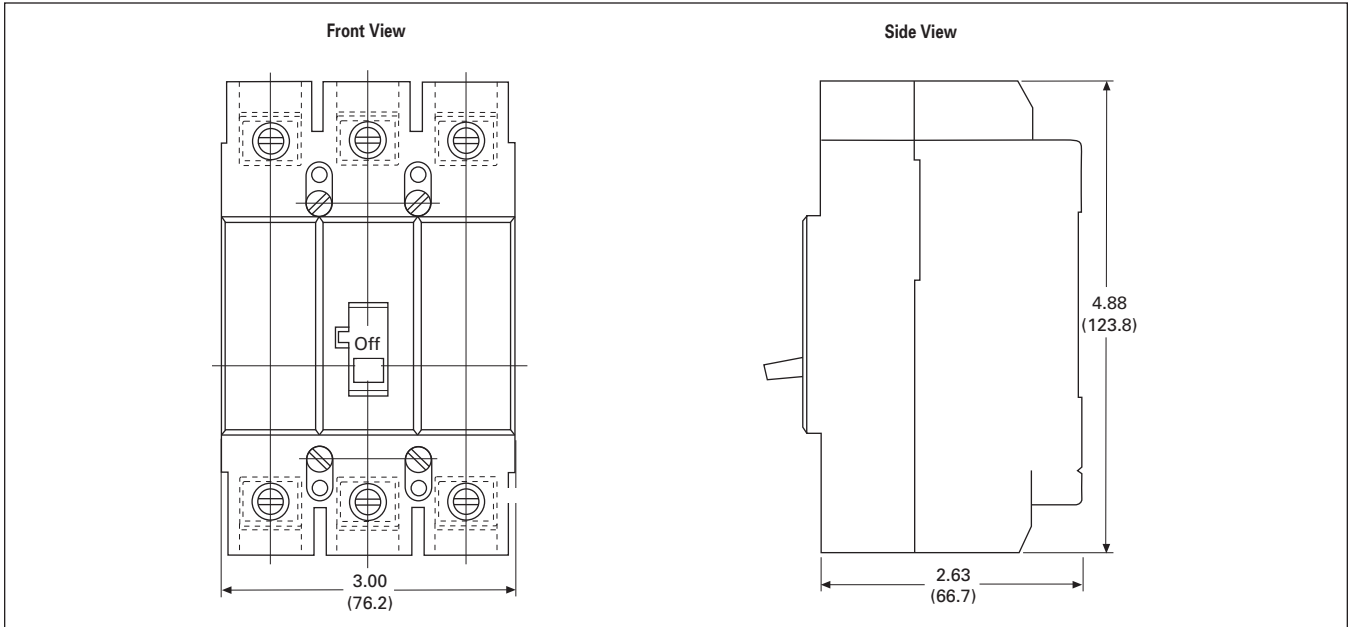


Figure 45-55. GD-Frame, 3-Pole — Dimensions in Inches (mm)

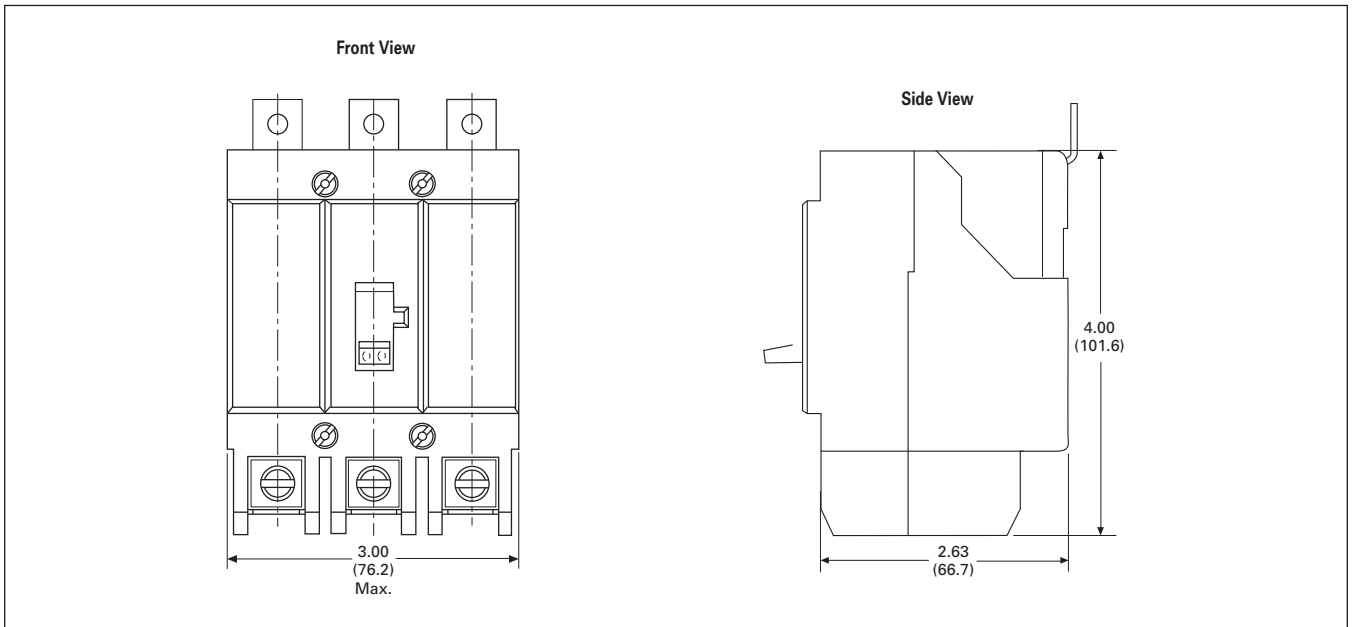


Figure 45-56. GDB-Frame, 3-Pole — Dimensions in Inches (mm)

Frame Size GC and GHB

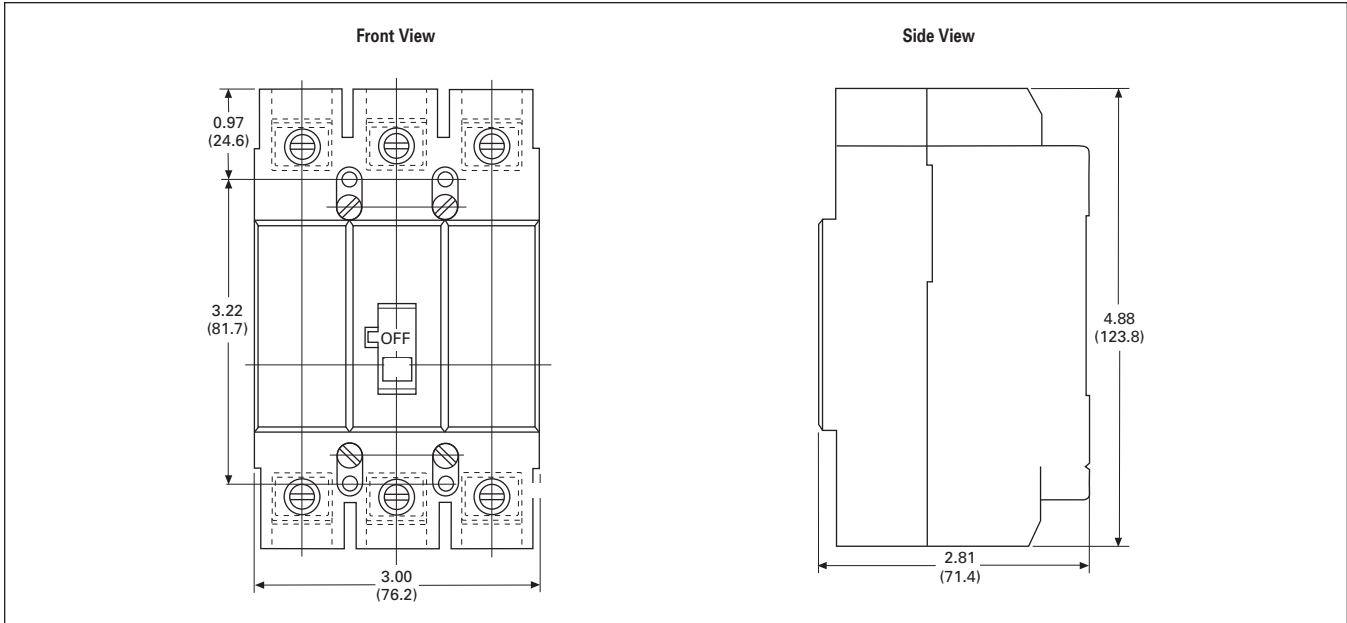


Figure 45-57. GC-Frame, 3-Pole — Dimensions in Inches (mm)

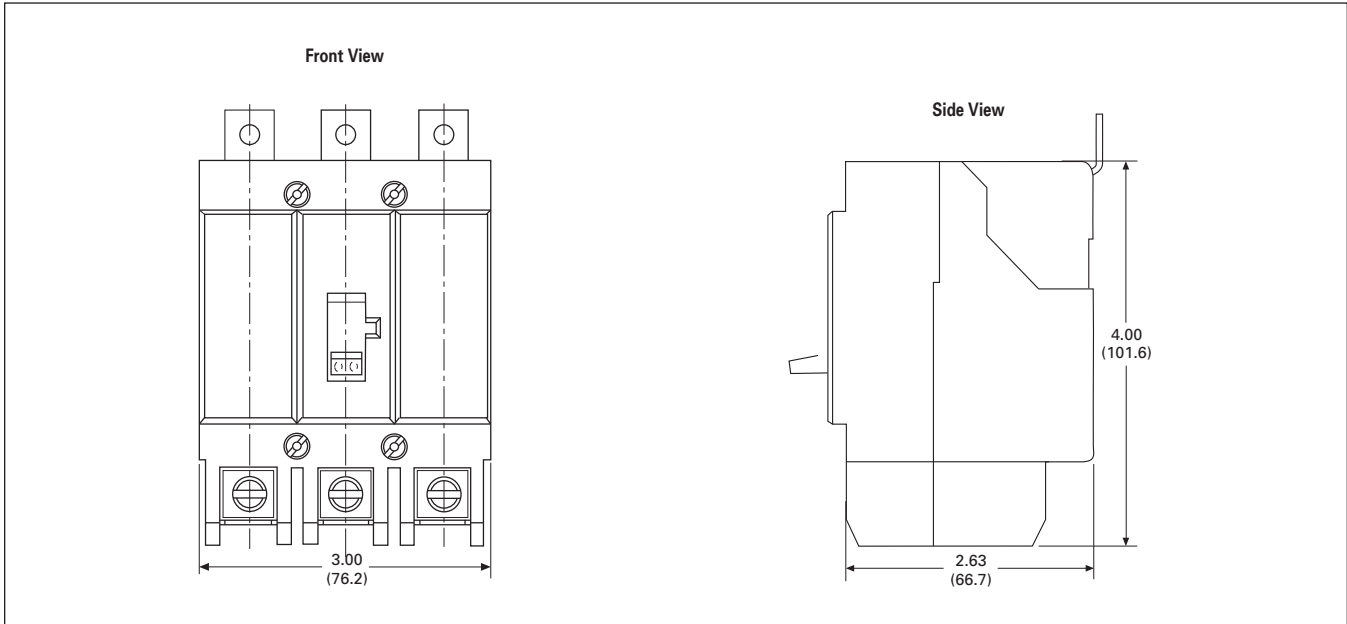


Figure 45-58. GHB-Frame, 3-Pole — Dimensions in Inches (mm)

Frame Size FD and JD

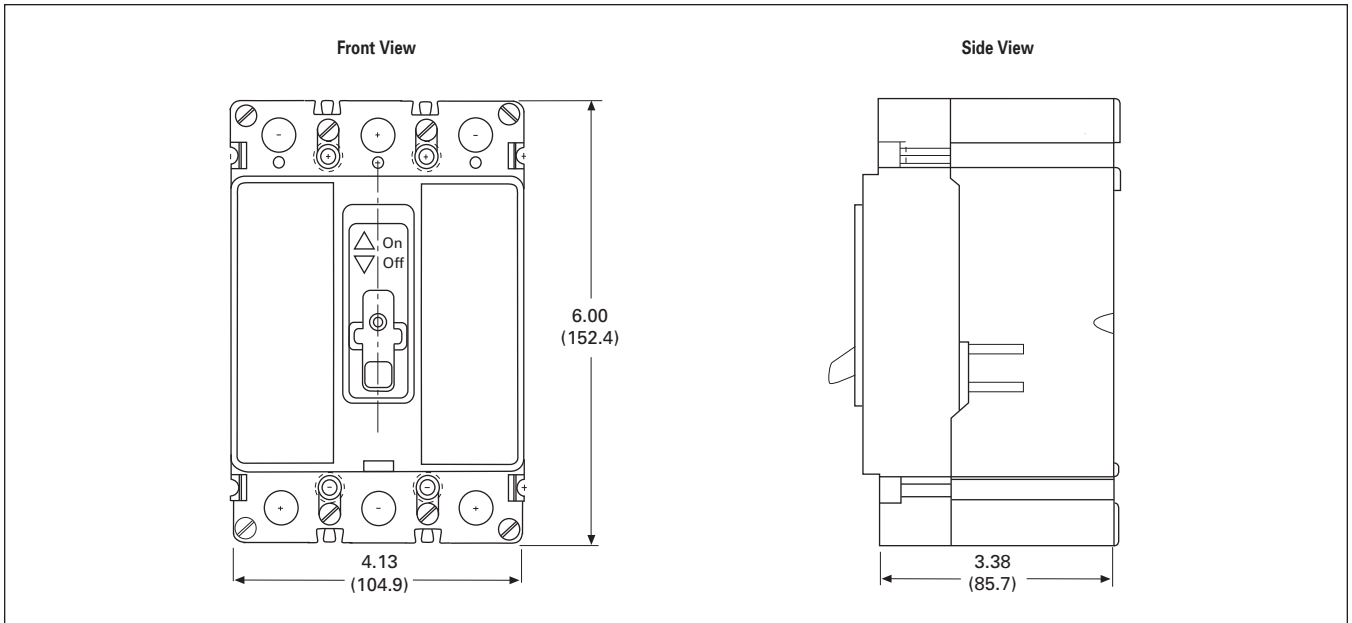


Figure 45-59. FD-Frame, 3-Pole — Dimensions in Inches (mm)

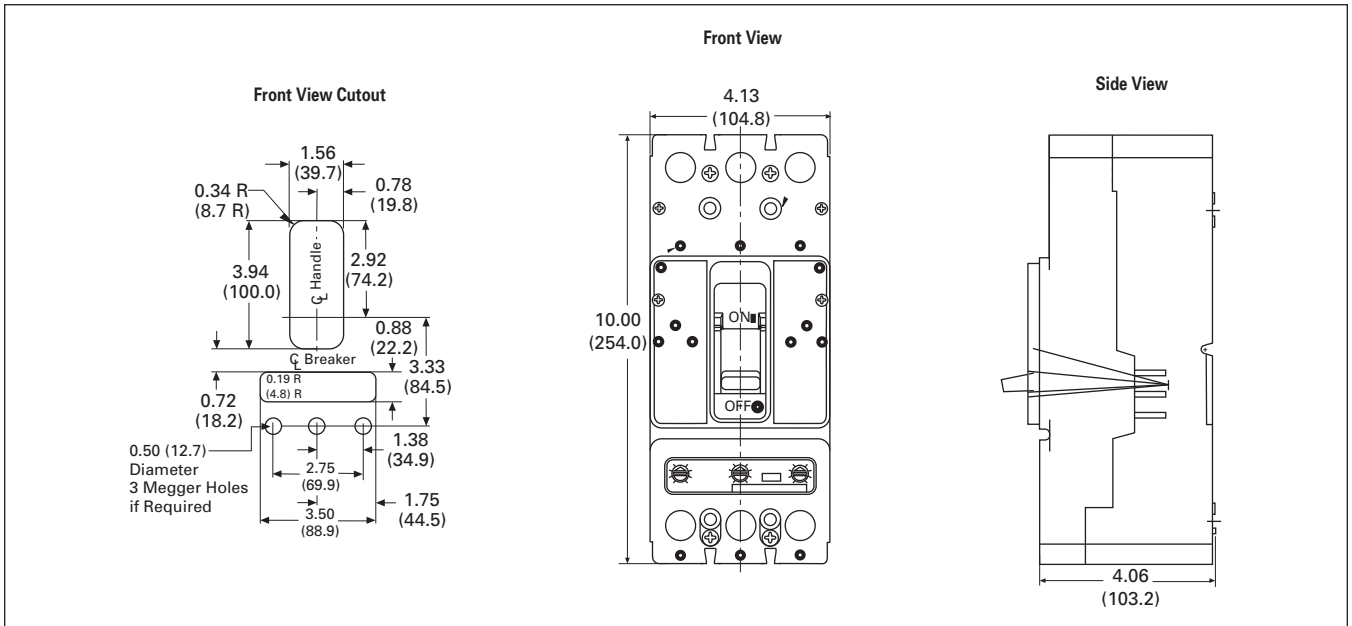


Figure 45-60. JD-Frame, 3-Pole — Dimensions in Inches (mm)

Frame Size KD and LD

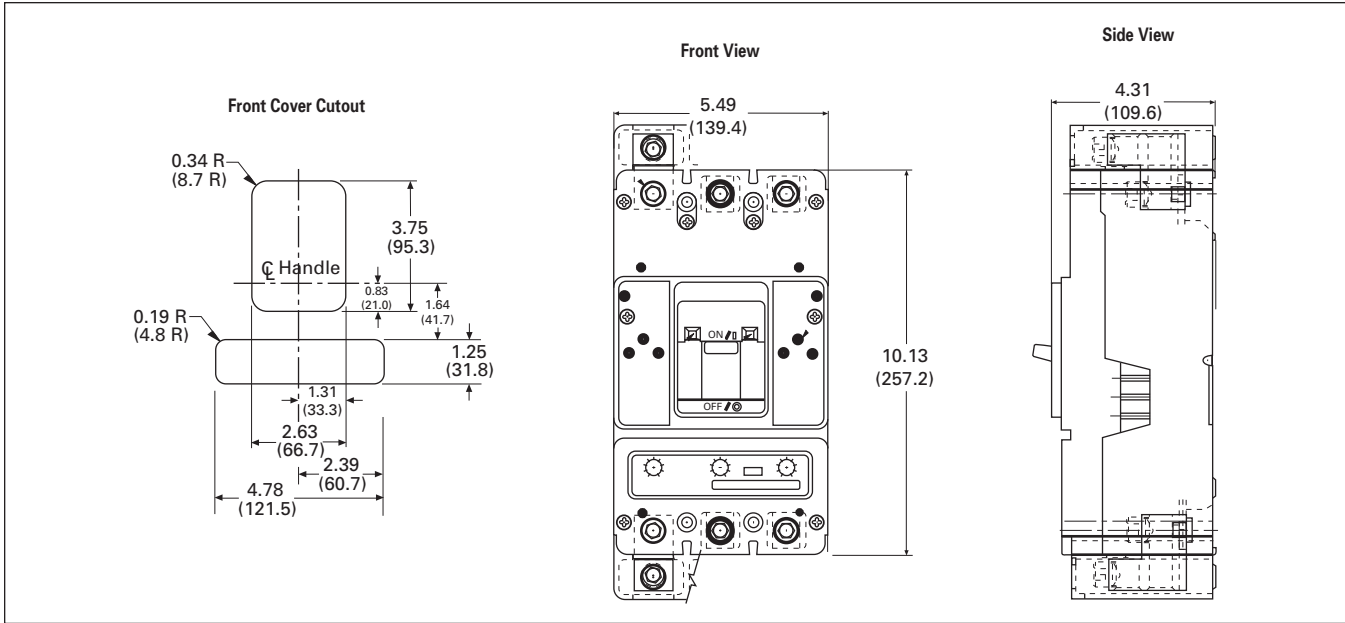


Figure 45-61. KD-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

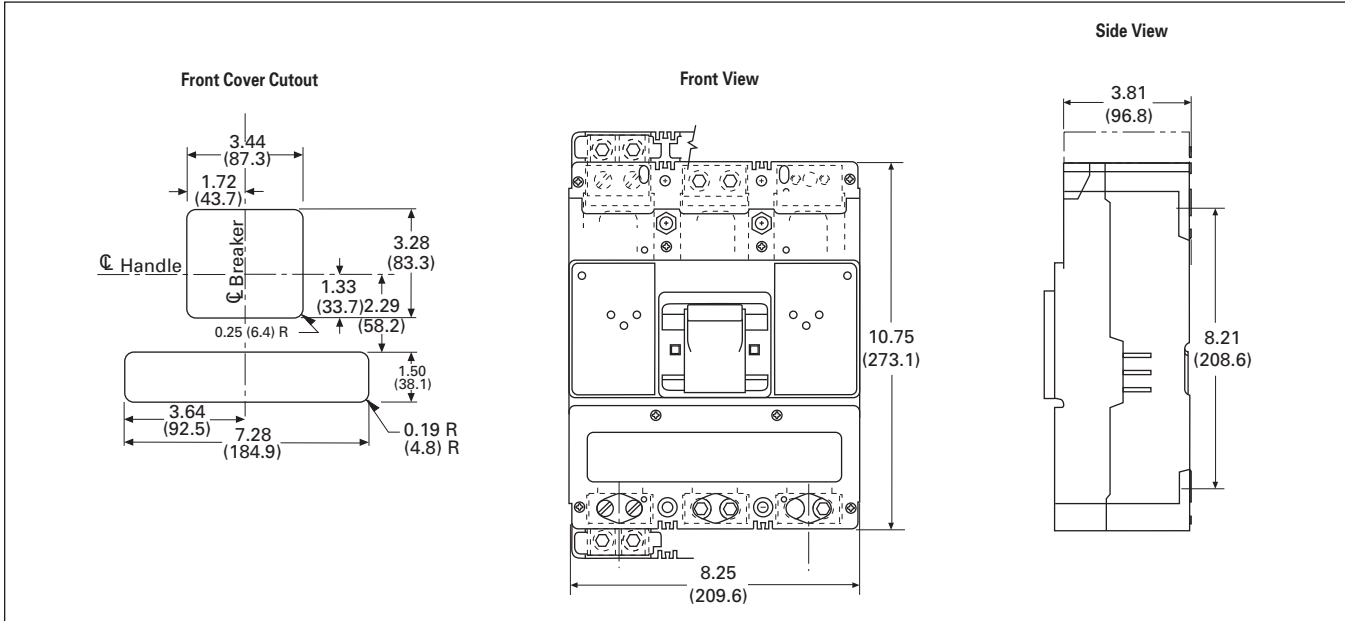


Figure 45-62. LD-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

Frame Size MDL and ND

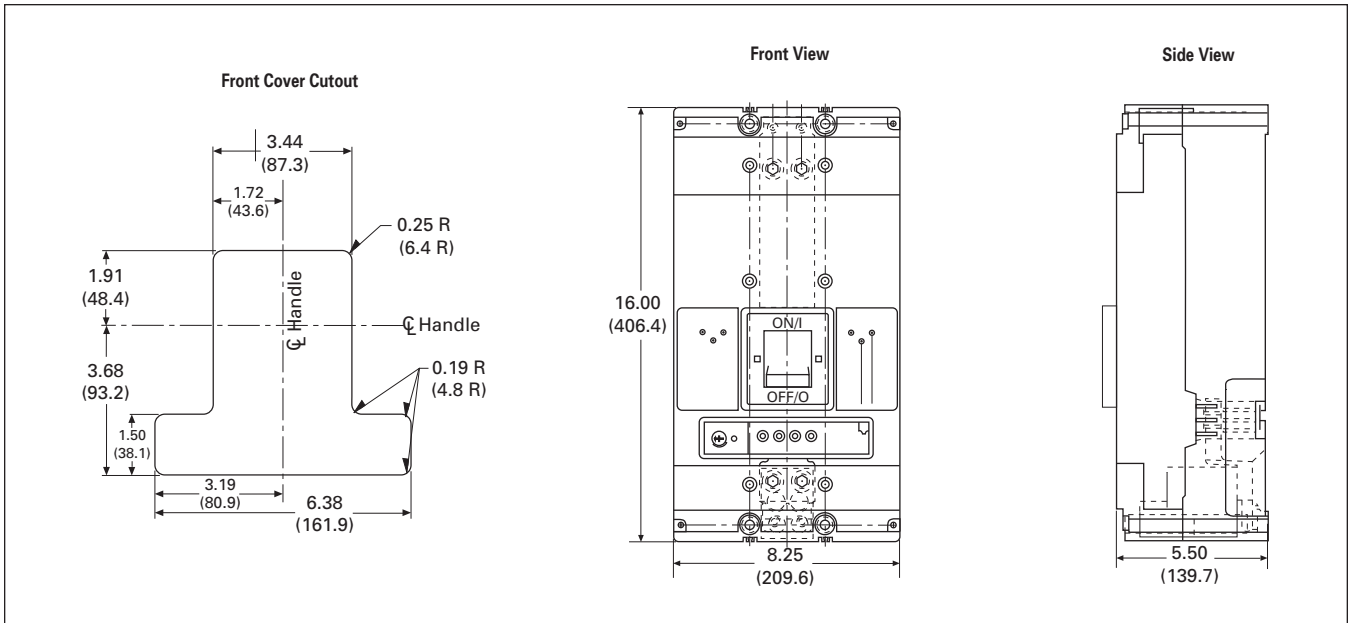


Figure 45-63. ND-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

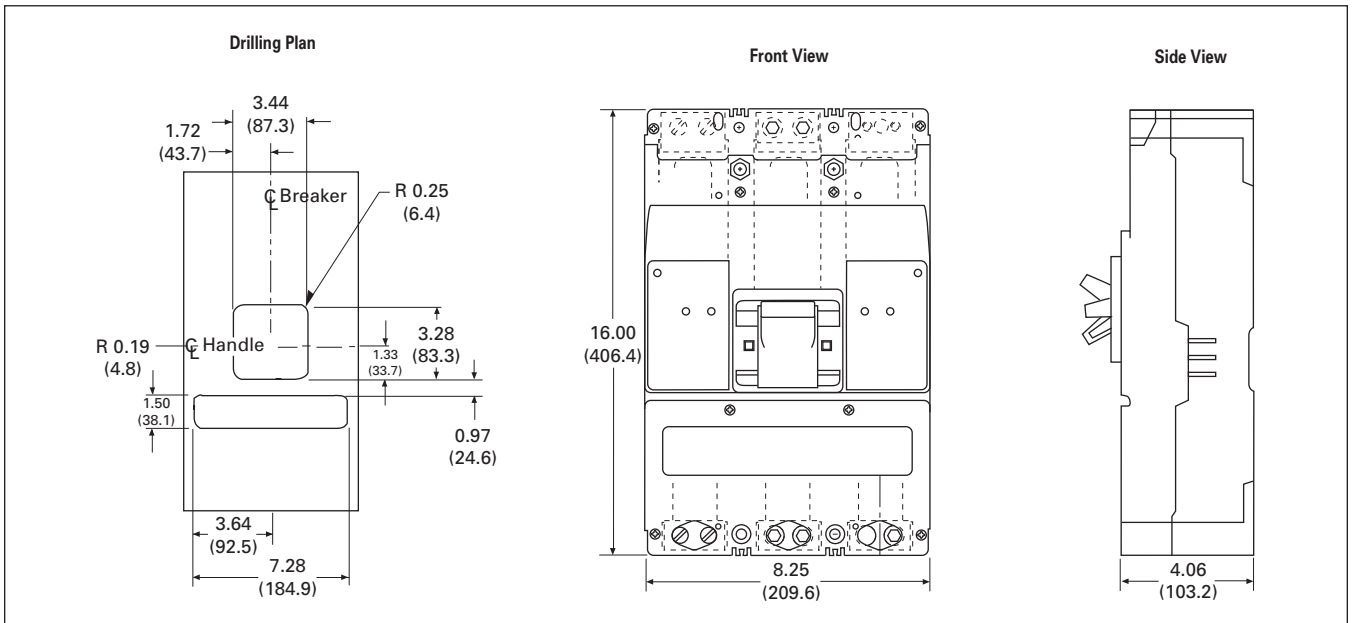


Figure 45-64. MDL-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

Frame Size RD

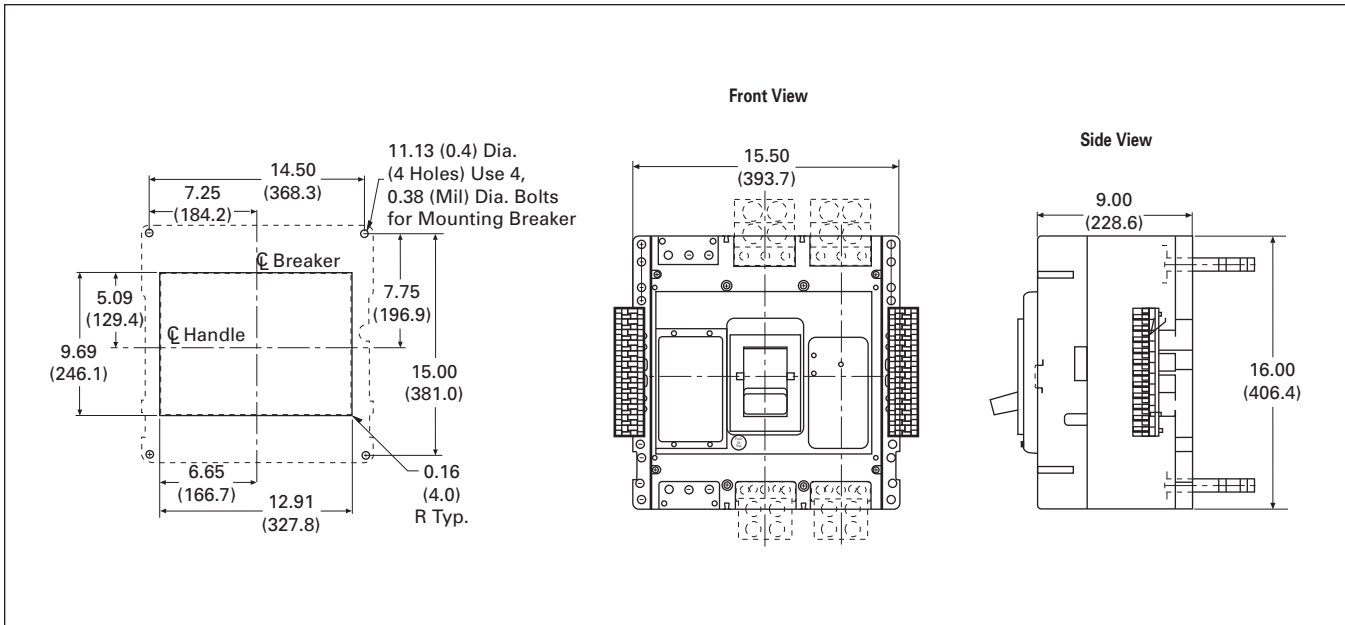


Figure 45-65. RD-Frame, 3-Pole, 1600 and 2000 Amperes — Dimensions in Inches (mm)

Motor Circuit Protectors



Motor Circuit Protectors

Product Description

Designated as Eaton's Cutler-Hammer 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. 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.

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.

The MCP is a recognized component (UL File E7819) and complies with the applicable requirements of Underwriters Laboratories Standard UL 489. It is also designed to comply with the applicable requirements of Canadian Standards Association Standard C22.2 No. 5.1, International Electrotechnical Commission Recommendations IEC 157-1, and nameplates bear the CE marking.

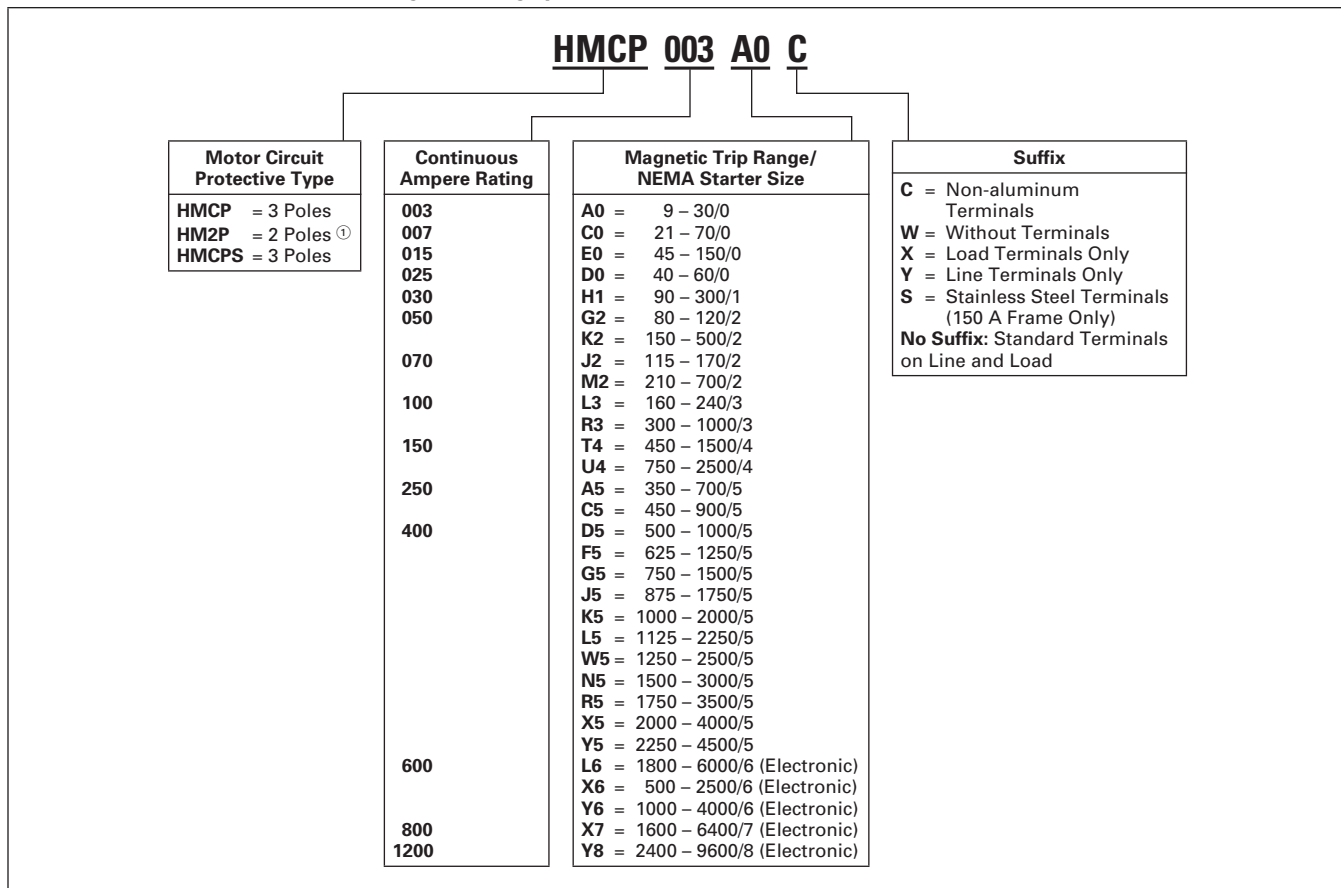
Note: Interrupting ratings are dependent on starter it is used with.

Product Selection

Product Selection

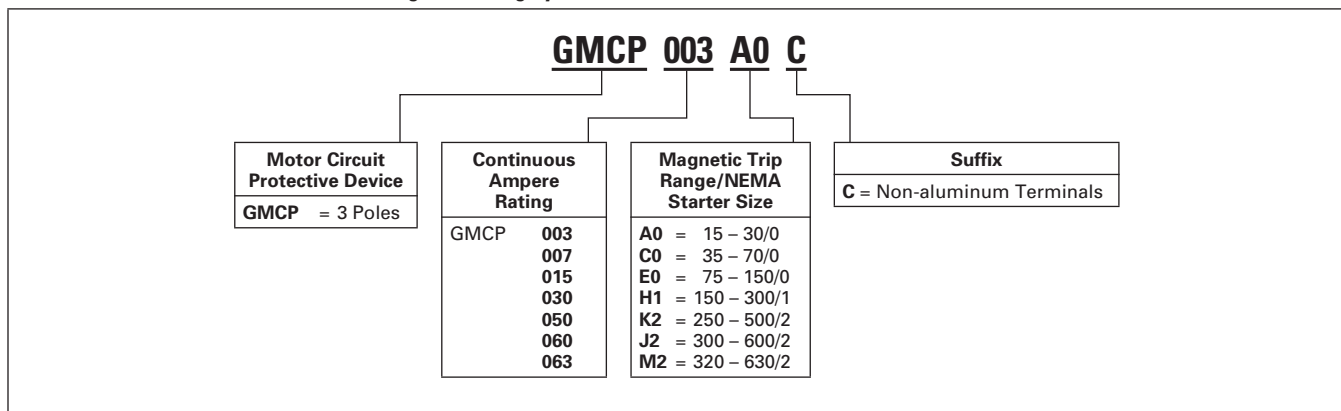
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

Table 45-469. Motor Circuit Protector Catalog Numbering System



① On J- and K-Frame HMCPs only.

Table 45-470. Motor Circuit Protector Catalog Numbering System



Product Selection

G-Frame

Table 45-471. 480 Vac Maximum, 600Y/347 Vac

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting	MCP Catalog Number	Price U.S. \$
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		
		C	33.9 – 39.4	440		
		D	38.8 – 46.4	500		
		E	43.6 – 48.9	570		
		F	48.5 – 53.7	630		

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.

Note: All GMCP 3 – 63 A come with line and load steel body terminals for Cu only wire. Refer to **Table 45-120** on **Page 45-70** under Optional Terminal Types.

Note: UL recognized and CSA approved.

Accessories

Modifications for GMCP

Internal accessories must be factory installed.

Table 45-472. Internal Accessories ①

Type Accessory	Electrical Ratings			Contact Arrangement	Factory Suffix	Style Number	Adder U.S. \$
	Volts	Frequency	Amperes				
Shunt Trip ②	120	50/60 Hz	1.1	—	S5	1373D62G18	
Shunt Trip ②	240	50/60 Hz	2.1	—	S6	1373D62G19	
Auxiliary Switch ③	240	50/60 Hz	6.0	1A/1B	A3	1288C74G03	
Auxiliary Switch ③	240	50/60 Hz	6.0	2A/2B	A6	1288C73G03	
Alarm Switch ③	240	50/60 Hz	6.0	Make/Break	B3	1288C75G03	
Auxiliary Switch/Alarm Switch Combination ③	240	50/60 Hz	6.0	1A/1B Make/Break	B13	1288C76G09	

① Only one accessory may be installed in GMCP.

② LH only.

③ RH only.

Note: No UVR available on GMCP.**Table 45-473. External Mounted Accessories**

Description	Number Units in Package	Style Number	Price U.S. \$
Lock Dog (Non-padlockable)	1	1294C01H01	
Mounting Hardware	1	624B375G23	
DIN Rail Adapter ④	10	1225C79G02	

④ For use with standard 35 mm DIN rail such as, 35 x 7.5 or 15 mm per DIN EN50022.

Table 45-474. Vari-Depth Handle Mechanism ⑤

Description	Catalog Number	Price U.S. \$
For Type 1 use	HRGMV11L	
For Type 3R, 4X, 12 use	HRGMV14L	
Close Coupled Black with Gray Handle	HRGMC10	
Close Coupled Red with Yellow Handle	HRGMC30	

⑤ For use with GMCP only.

Modifications for HMCPSee Internal Accessories starting on **Page 45-182**.

F-Frame

F-Frame

Table 45-475. 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	Price U.S. \$
0	3	A	.69 – .91	9	HMCP003A0C	
		B	.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	HMCP007C0C	
		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	HMCP015E0C	
		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	HMCP030H1C	
		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	HMCP050K2C	
		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		

Table 45-475. 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	Price U.S. \$
2	70	A	16.1 – 21.4	210	HMCP070M2C	
		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	HMCP100R3C	
		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	HMCP150T4C	
		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	HMCP150U4C	
		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		

- 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.

Note: HMCP 3 – 100 A come with line and load steel body terminals, 3T100FB. HMCP 150 A come with line and load steel body terminals, 3T150FB.

Low Magnetic Protection — F-Frame

Special Low Magnetic Protection Application MCP

Table 45-476. 600 Vac Maximum, 250 Vdc Maximum

Cont. Amps	Cam Setting	MCP Trip Setting ①	MCP Catalog Number	Price U.S. \$
25	A	40	HMCP025D0C	
	B	43		
	C	46		
	D	49		
	E	52		
	F	55		
	G	58		
	H	60		
50	A	80	HMCP050G2C	
	B	87		
	C	93		
	D	98		
	E	103		
	F	109		
	G	115		
	H	120		
70	A	115	HMCP070J2C	
	B	122		
	C	130		
	D	139		
	E	145		
	F	153		
	G	160		
	H	170		
100	A	160	HMCP100L3C	
	B	174		
	C	185		
	D	196		
	E	207		
	F	218		
	G	229		
	H	240		

① For dc applications, actual trip levels are approximately 40% higher than values shown.

Note: HMCP 25 – 100 A come with line and load steel body terminals, 3T100FB.

MCPs for Application with Motor Starters Equipped with Electronic Overload Relays

Table 45-477. 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting ③	MCP Catalog Number	Price U.S. \$
0	3	A	.69 – .91	9	HMCP003A0C	
		B	.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	HMCP007C0C	
		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		

Table 45-477. 600 Vac Maximum, 250 Vdc Maximum (Continued)

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting ③	MCP Catalog Number	Price U.S. \$
0	15	A	3.4 – 4.5	45	HMCP015E0C	
		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	HMCP030H1C	
		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	HMCP050K2C	
		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		
3	100	A	23.0 – 30.6	300	HMCP100R3C	
		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	HMCP150T4C	
		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	HMCP150U4C	
		B	76.0 – 95.0	1000		
		C	96.0 – 114.0	1250		
		D	115.0 – 130.7	1500		
		E	④	1750		
		F	④	2000		
		G	④	2250		
		H	④	2500		

② 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.

③ For dc applications, actual trip levels are approximately 40% higher than values shown.

④ 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.

Note: HMCP 3 – 100 A come with line and load steel body terminals, 3T100FB. HMCP 150 A come with line and load steel body terminals, 3T150FB.

Product Description

Type ELC Current Limiter Attachment (Size 0 – 4)



Type ELC Current Limiter Attachment

Product Description

Eaton’s Cutler-Hammer 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 45-478.**)

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.

Table 45-478. Type ELC Current Limiter Terminal Wire Sizes ①

Type ELC Current Limiter Maximum Amperes	Wire Range AWG	Metric (mm ²)
Standard Aluminum Terminals		
50	14 – 2	2.5 – 35
100	1 – 4/0	50 – 95
150	1 – 4/0	50 – 95
Non-standard Terminals (Steel)		
50	14 – 2 ②	2.5 – 35
100	—	—
150	—	—

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.

Table 45-479. ELC Current Limiter Attachment

MCP Rating (Amperes)	Catalog Number	Price U.S. \$
3	ELC3003R	
7	ELC3007R	
15	ELC3015R	
30	ELC3030R	
50	ELC3050R	
100	ELC3100R	
150	ELC3150R	

J-Frame

J-Frame

Table 45-480. 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③	Price U.S. \$
4	250	A	27.0 – 30.7	350	HMCP250A5C	
4		B	30.8 – 33.8	400		
4		C	33.9 – 36.9	440		
5		D	37.0 – 40.3	480		
5		E	40.4 – 43.8	525		
5		F	43.9 – 46.9	570		
5		G	47.0 – 50.7	610		
5		H	50.8 – 53.8	660		
5		I	53.9 – 57.2	700		
5	250	A	34.7 – 38.8	450	HMCP250C5C	
5		B	38.9 – 43.4	505		
5		C	43.5 – 47.6	565		
5		D	47.7 – 52.2	620		
5		E	52.3 – 56.5	680		
5		F	56.6 – 60.7	735		
5		G	60.8 – 64.9	790		
5		H	65.0 – 69.2	845		
5		I	69.3 – 73.5	900		
5	250	A	38.5 – 43.4	500	HMCP250D5C	
5		B	43.5 – 48.0	565		
5		C	48.1 – 53.0	625		
5		D	53.1 – 57.6	690		
5		E	57.7 – 62.3	750		
5		F	62.4 – 67.3	810		
5		G	67.4 – 71.9	875		
5		H	72.0 – 76.9	935		
5		I	77.0 – 81.6	1000		
5	250	A	48.1 – 53.8	625	HMCP250F5C	
5		B	53.9 – 59.9	700		
5		C	60.0 – 66.1	780		
5		D	66.2 – 72.3	860		
5		E	72.4 – 78.4	940		
5		F	78.5 – 83.8	1020		
5		G	83.9 – 89.9	1090		
5		H	90.0 – 96.1	1170		
5		I	96.2 – 102.0	1250		
5	250	A	57.7 – 64.6	750	HMCP250G5C	
5		B	64.7 – 71.9	840		
5		C	72.0 – 79.2	935		
5		D	79.3 – 86.5	1030		
5		E	86.6 – 93.8	1125		
5		F	93.9 – 101.1	1220		
5		G	101.2 – 108.4	1315		
5		H	108.5 – 115.3	1410		
5		I	115.4 – 122.4	1500		

Table 45-480. 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	Price U.S. \$
5	250	A	67.4 – 75.3	875	HMCP250J5C	
5		B	75.4 – 83.8	980		
5		C	83.9 – 92.3	1090		
5		D	92.4 – 100.7	1200		
5		E	100.8 – 109.2	1310		
5		F	109.3 – 117.6	1420		
5		G	117.7 – 126.1	1530		
5		H	126.2 – 134.6	1640		
5		I	134.7 – 142.8	1750		
5	250	A	77.0 – 86.6	1000	HMCP250K5C	
5		B	86.6 – 96.1	1125		
5		C	96.2 – 105.7	1250		
5		D	105.8 – 115.3	1375		
5		E	115.4 – 124.9	1500		
5		F	125.0 – 134.6	1625		
5		G	134.7 – 144.2	1750		
5		H	144.3 – 153.8	1875		
5		I	153.9 – 163.3	2000		
5	250	A	86.6 – 97.3	1125	HMCP250L5C	
5		B	97.4 – 108.4	1265		
5		C	108.5 – 118.8	1410		
5		D	118.9 – 129.9	1545		
5		E	130.0 – 140.7	1690		
5		F	140.8 – 151.5	1830		
5		G	151.6 – 162.3	1970		
5		H	162.4 – 173.0	2110		
5		I	173.1 – 183.6	2250		
5	250	A	96.2 – 108.0	1250	HMCP250W5C	
5		B	108.1 – 119.9	1405		
5		C	120.0 – 132.3	1560		
5		D	132.4 – 144.2	1720		
5		E	144.3 – 156.1	1875		
5		F	156.2 – 168.0	2030		
5		G	168.1 – 179.9	2185		
5		H	180.0 – 192.3	2340		
5		I	192.4 – 204.0	2500		

45

- 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.

Note: All HMCP and HM2P 250 A come with line and load steel body terminals, T250KB. (With suffix "C", without "C" comes with TA250KB.)

K-Frame

K-Frame

Table 45-481. 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③	Price U.S. \$
4	400	A	27.0 – 30.7	350	HMCP400A5C	
4		B	30.8 – 33.8	400		
4		C	33.9 – 36.9	440		
5		D	37.0 – 40.3	480		
5		E	40.4 – 43.8	525		
5		F	43.9 – 46.9	570		
5		G	47.0 – 50.7	610		
5		H	50.8 – 53.8	660		
5		I	53.9 – 57.2	700		
5	400	A	38.5 – 43.4	500	HMCP400D5C	
5		B	43.5 – 48.0	565		
5		C	48.1 – 53.0	626		
5		D	53.1 – 57.6	690		
5		E	57.7 – 62.3	750		
5		F	62.4 – 67.3	810		
5		G	67.4 – 71.9	875		
5		H	72.0 – 76.9	935		
5		I	77.0 – 81.6	1000		
5	400	A	48.1 – 53.8	625	HMCP400F5C	
5		B	53.9 – 59.9	700		
5		C	60.0 – 66.1	780		
5		D	66.2 – 72.3	860		
5		E	72.4 – 78.4	940		
5		F	78.5 – 83.8	1020		
5		G	83.9 – 89.9	1090		
5		H	90.0 – 96.1	1170		
5		I	96.2 – 102.0	1250		
5	400	A	57.7 – 64.6	750	HMCP400G5C	
5		B	64.7 – 71.9	840		
5		C	72.0 – 79.2	935		
5		D	79.3 – 86.5	1030		
5		E	86.6 – 93.8	1125		
5		F	93.9 – 101.1	1220		
5		G	101.2 – 108.4	1315		
5		H	108.5 – 115.3	1410		
5		I	115.4 – 122.4	1500		
5	400	A	67.4 – 75.3	875	HMCP400J5C	
5		B	75.4 – 83.8	980		
5		C	83.9 – 92.3	1090		
5		D	92.4 – 100.7	1200		
5		E	100.8 – 109.2	1310		
5		F	109.3 – 117.6	1420		
5		G	117.7 – 126.1	1530		
5		H	126.2 – 134.6	1640		
5		I	134.7 – 142.8	1750		
5	400	A	77.0 – 86.5	1000	HMCP400K5C	
5		B	86.6 – 96.1	1125		
5		C	96.2 – 105.7	1250		
5		D	105.8 – 115.3	1375		
5		E	115.4 – 124.9	1500		
5		F	125.0 – 134.6	1625		
5		G	134.7 – 144.2	1750		
5		H	144.3 – 153.8	1875		
5		I	153.9 – 163.3	2000		
5	400	A	86.6 – 97.3	1125	HMCP400L5C	
5		B	97.4 – 108.4	1265		
5		C	108.5 – 118.8	1410		
5		D	118.9 – 129.9	1545		
5		E	130.0 – 140.7	1690		
5		F	140.8 – 151.5	1830		
5		G	151.6 – 162.3	1970		
5		H	162.4 – 173.0	2110		
5		I	173.1 – 183.6	2250		

Table 45-481. 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	Price U.S. \$
5	400	A	96.2 – 108.0	1250	HMCP400W5C	
5		B	108.1 – 119.9	1405		
5		C	120.0 – 132.3	1560		
5		D	132.4 – 144.2	1720		
5		E	144.3 – 156.1	1875		
5		F	156.2 – 168.0	2030		
5		G	168.1 – 179.9	2185		
5		H	180.0 – 192.3	2340		
5		I	192.4 – 204.0	2500		
5	400	A	115.4 – 129.9	1500	HMCP400N5C	
5		B	130.0 – 144.2	1690		
5		C	144.3 – 158.4	1875		
5		D	158.5 – 173.0	2060		
5		E	173.1 – 187.6	2250		
5		F	187.7 – 201.9	2440		
5		G	202.0 – 216.1	2625		
5		H	216.2 – 230.7	2810		
5		I	230.8 – 244.9	3000		
5	400	A	134.7 – 151.5	1750	HMCP400R5C	
5		B	151.6 – 168.4	1970		
5		C	168.5 – 185.3	2190		
5		D	185.4 – 201.9	2410		
5		E	202.0 – 218.8	2625		
5		F	218.9 – 235.7	2845		
5		G	235.8 – 252.6	3065		
5		H	252.7 – 269.2	3285		
5		I	269.3 – 285.7	3500		
5	400	A	153.9 – 173.0	2000	HMCP400X5C	
5		B	173.1 – 192.3	2250		
5		C	192.4 – 211.5	2500		
5		D	211.6 – 230.7	2750		
5		E	230.8 – 249.9	3000		
5		F	250.0 – 269.2	3250		
5		G	269.3 – 288.4	3500		
5		H	288.5 – 307.6	3750		
5		I	307.7 – 326.9	4000		
5	400	A	173.1 – 194.5	2250	HMCP400Y5C	
5		B	194.6 – 216.1	2530		
5		C	216.2 – 237.6	2810		
5		D	237.7 – 259.5	3090		
5		E	259.6 – 281.1	3375		
5		F	281.2 – 302.6	3655		
5		G	302.7 – 324.1	3935		
5		H	324.2 – 346.1	4215		
5		I	346.2 – 368.1	4500		

- 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**.

Note: All HMCP and HM2P 400A come with aluminum body terminals, 3TA400K. Catalog numbers with suffix "C" as shown above come with copper body terminals 3T400K.

L-Frame

L-Frame

Table 45-482. 600 Vac Maximum ①

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting	MCP Catalog Number	Price U.S. \$
6	600	A	138.5 – 184.5	1800	HMCP600L6W	
6		B	184.6 – 230.7	2400		
6		C	230.8 – 276.8	3000		
6		D	276.9 – 323.0	3600		
6		E	323.1 – 369.1	4200		
6		F	369.2 – 415.3	4800		
6		G	415.4 – 461.4	5400		
6		H	461.5 – 507.7	6000		
6	600	A	38.5 – 46.1	500	HMCP600X6W	
6		B	46.2 – 61.4	600		
6		C	61.5 – 76.8	800		
6		D	76.9 – 96.1	1000		
6		E	96.2 – 115.3	1250		
6		F	115.4 – 153.7	1500		
6		G	153.8 – 192.2	2000		
6		H	192.3 – 230.7	2500		
6	600	A	76.9 – 96.1	1000	HMCP600Y6W	
6		B	96.2 – 115.3	1250		
6		C	115.4 – 153.7	1500		
6		D	153.8 – 192.2	2000		
6		E	192.3 – 230.7	2500		
6		F	230.8 – 269.1	3000		
6		G	269.2 – 307.6	3500		
6		H	307.7 – 346.1	4000		

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.

Note: All HMCP 600 A come without terminals. For Terminals, see **Table 45-226** on **Page 45-133**.

N-Frame

N-Frame

Table 45-483. 600 Vac Maximum ①

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting	MCP Catalog Number	Price U.S. \$
7	800	A	123.1 – 184.5	1600	HMCP800X7W	
7		B	184.6 – 246.1	2400		
7		C	246.2 – 307.6	3200		
7		D	307.7 – 369.1	4000		
7		E	369.2 – 430.7	4800		
7		F	430.8 – 492.2	5600		
7		G	492.3 – 553.7	6400		
8	1200	A	184.6 – 276.8	2400	HMCP12Y8W	
8		B	276.9 – 369.1	3600		
8		C	369.2 – 461.4	4800		
8		D	461.5 – 553.7	6000		
8		E	553.8 – 646.1	7200		
8		F	646.2 – 738.4	8400		
8		G	738.5 – 830.7	9600		

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.

Note: All HMCP 800 A and 1200 A come without terminals. For Terminals, see **Table 45-475** on **Page 45-245**.

Table 45-484. F-Frame HMCP with Earth Leakage Ground Fault — 480 Volts

Continuous Amperes	3-Pole Catalog Number	Price U.S. \$
3	ELHMCP003A0C	
7	ELHMCP007C0C	
15	ELHMCP015E0C	
25	ELHMCP025X0C	
30	ELHMCP030H1C	
50	ELHMCP050K2C	
70	ELHMCP070M2C	
100	ELHMCP100R3C	
150	ELHMCP150T4C	
150	ELHMCP150U4C	
3	ELHMCP003A0LC	
7	ELHMCP007C0LC	
15	ELHMCP015E0LC	
25	ELHMCP025D0C	
30	ELHMCP030H1LC	
70	ELHMCP070J2C	
100	ELHMCP100L3C	
50	ELHMCP050G2C	
70	ELHMCP070J2C	
100	ELHMCP100K3C	

Table 45-485. J and K-Frame HMCP with Earth Leakage Ground Fault — 480 Volts

Continuous Amperes	3-Pole Catalog Number	Price U.S. \$
250	ELHMCP250A5	
	ELHMCP250C5	
	ELHMCP250D5	
	ELHMCP250F5	
	ELHMCP250G5	
	ELHMCP250J5	
	ELHMCP250K5	
400	ELHMCP250L5	
	ELHMCP250W5	
	ELHMCP400D5	
	ELHMCP400F5	
	ELHMCP400G5	
	ELHMCP400J5	
	ELHMCP400K5	

HMCPs for Application with Motor Starters Equipped with Electronic Overload Relays

Continuous Amperes	3-Pole Catalog Number	Price U.S. \$
3	ELHMCP003A0C	
7	ELHMCP007C0C	
15	ELHMCP015E0C	
30	ELHMCP030H1C	
50	ELHMCP050K2C	
100	ELHMCP100R3C	
150	ELHMCP150T4C	
150	ELHMCP150U4C	

Non-Fused

**Type FCL Current-Limit-R
Thermal-Magnetic Circuit
Breakers — Non-Fused**



Type FCL Breaker

Product Description

- 15 to 100 amperes, 480 Vac.
- Non-interchangeable trip, line and load terminals included.

Standards and Certifications

- Listed with Underwriters Laboratories except as noted.
- Type FCL breakers are not defined in Federal Specification W-C-375-b.

**Technical Data
and Specifications**

Table 45-486. Interrupting Capacity Ratings

Circuit Breaker Type	Volts ac (50/60 Hz)	Interrupting Capacity (Symmetrical Amperes) (kA)
FCL	240 480	200 150

On all 3-phase Delta, Grounded B phase applications, refer to Eaton's Customer Support Center.

Line and Load Terminals

Breakers listed include line and load terminals. Terminals are Underwriters Laboratories listed for wire sizes and types listed below. When used with aluminum cable, use joint compound. To order optional aluminum terminals, add Suffix Z to breaker catalog number listed.

Table 45-487. Line and Load Terminals

Maximum Breaker Amperes	Wire Type	AWG Wire Range
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Standard Pressure Terminals

100	Al/Cu	14 – 1/0
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Optional Al/Cu Pressure Terminals

50	Al/Cu	14 – 4
100	Al/Cu	4 – 4/0

Dimensions/Weights

Table 45-488. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2 – 3	4.13 (104.8)	8.8 (222.3)	3.4 (85.7)

Table 45-489. Approximate Shipping Weight

Number of Poles	Lbs. (kg)
2 – 3	9 (4.1)

Product Selection

Table 45-490. Type FCL Circuit Breakers

Max. Cont. Amp Rating at 40°C	2-Pole ①		3-Pole	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
15	FCL2015L		FCL3015L	
20	FCL2020L		FCL3020L	
25	FCL2025L		FCL3025L	
30	FCL2030L		FCL3030L	
35	FCL2035L		FCL3035L	
40	FCL2040L		FCL3040L	
45	FCL2045L		FCL3045L	
50	FCL2050L		FCL3050L	
60	FCL2060L		FCL3060L	
70	FCL2070L		FCL3070L	
80	FCL2080L		FCL3080L	
90	FCL2090L		FCL3090L	
100	FCL2100L		FCL3100L	

① 2-pole breakers are supplied in 3-pole frames with current carrying parts omitted from the center pole.

Non-Fused

**Type LCL Current-Limit-R
Electronic Circuit Breakers
— Non-Fused**



Type LCL Breaker

Product Description

- 125 to 400 amperes, 600 Vac with solid-state trip units.

Standards and Certifications

- Listed with Underwriters Laboratories except as noted.
- Type LCL breakers are not defined in Federal Specification W-C-375-b.

**Technical Data
and Specifications**

Table 45-491. Interrupting Capacity Ratings

Circuit Breaker Type	Volts ac (50/60 Hz)	Interrupting Capacity (Symmetrical Amperes) (kA)
LCL	240	200
	480	200
	600	100

On all 3-phase Delta, Grounded B phase applications, refer to Eaton's Customer Support Center.

Dimensions/Weights

Table 45-492. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2 – 3	16 (406.4)	8.25 (209.56)	4.06 (103.2)

Table 45-493. Approximate Shipping Weight

Number of Poles	Lbs. (kg)
Standard	
2 – 3	32 (14.5)
With Ground Fault	
3	36 (16.3)

Product Selection

Standard Breakers 600 Vac, 50/60 Hz

Complete breaker requires frame, rating plug and terminals.

Table 45-494. Standard Breakers 600 Vac, 50/60 Hz

Frame Only						
Poles ①	Standard (Long Delay, Short Time Trip and Current Limiting)		Short Time Only ② and Current Limiting		Long Delay, Short Time Trip and Adjustable Short Delay Time (.08-.28 seconds) and Current Limiting	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

Types LCL and LCLA 250 Ampere Frame (125 – 250 Amperes)

2	LCL2250F		LCL2250FM		LCLA2250F	
3	LCL3250F		LCL3250FM		LCLA3250F	

Type LCL and LCLA 400 Ampere Frame (200 – 400 Amperes)

2	LCL2400F		LCL2400FM		LCLA2400F	
3	LCL3400F		LCL3400FM		LCLA3400F	

- ① 2-pole breakers are supplied in 3-pole frames with current carrying parts omitted from the center pole.
- ② UL listed recognized component.

Breakers with Built-in Ground Fault Protection

Complete breaker requires frame, rating plug and terminals — extra current transformer included for neutral.

Table 45-495. Breakers with Built-in Ground Fault Protection

Frame Only					
Poles ③	Standard (Long Delay, Short Time Trip, Current Limiting and Ground Fault Trip)			Long Delay, Short Time Trip and Adjustable Short Delay Time (.06-.22 seconds), Ground Fault Trip and Current Limiting	
	Catalog Number	Price U.S. \$		Catalog Number	Price U.S. \$

Types LCLG and LCLGA 250 Ampere Frame (125 – 250 Amperes)

3	LCLG3250F			LCLGA3250F	
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Types LCLG and LCLGA 400 Ampere Frame (200 – 400 Amperes)

3	LCLG3400F			LCLGA3400F	
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- ③ 2-pole breakers are supplied in 3-pole frames with current carrying parts omitted from the center pole.

Non-Fused

Terminals (Order Separately)

Two terminals are required per pole. Terminals are Underwriters Laboratories listed for wire type and range listed below. When used with aluminum cable, use joint compound.

Table 45-496. Terminals

Maximum Breaker Amperes	Wire Range, Type, Number of Cables	Terminal Catalog Number	Price U.S. \$
Standard Copper Pressure Terminals			
225	(1) 6 AWG – 350 kcmil Cu	T225LA	
400	(1) 4 AWG – 250 kcmil Cu, plus		
	(1) 3/0 – 600 kcmil Cu		
Optional Al/Cu Pressure Terminals			
225	(1) 6 AWG – 350 kcmil Cu, or (1) 4 AWG – 350 kcmil Al	TA225LA1	
400	(1) 4 AWG – 250 kcmil Al/Cu, plus (1) 3/0 – 600 kcmil Al/Cu	TA400LA1	

Note: Terminals shipped separately from breaker.

Rating Plug Selection Data

Rating plugs listed below are for both standard breakers and breakers with built-in ground fault protection.

Table 45-497. Rating Plugs Only (For 2- or 3-Pole Frames)

Cont. Ampere Rating	Magnetic Trip Setting, Amps		Fixed Rating Plugs		Adjustable Rating Plugs ^①	
	Low	High	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

Types LCL and LCLA 250 Ampere Frames

125	375	1125	2LCL125		—	
150	450	1350	2LCL150		—	
175	525	1575	2LCL175		A2LCL175 ^②	
200	600	1800	2LCL200		A2LCL200	
225	675	2025	2LCL225		A2LCL225	
250	750	2250	2LCL250		A2LCL250 ^③	

Types LCL and LCLA 400 Ampere Frames

200	400	1600	4LCL200		—	
225	450	1800	4LCL225		—	
250	500	2000	4LCL250		—	
275	550	2200	4LCL275		—	
300	600	2400	4LCL300		A4LCL300 ^②	
350	700	2800	4LCL350		A4LCL350	
400	800	3200	4LCL400		A4LCL400 ^③	

^① Adjustable 70 to 100% except as noted.

^② Adjustable 75 to 100%.

^③ Adjustable 50 to 100%.

Fused

**Type FB TRI-PAC
Thermal-Magnetic Circuit
Breakers — Fused**



Type TRI-PAC FB Breaker

Product Description

- 15 to 100 amperes, 600 Vac, 250 Vdc, replaceable current limiters.

Standards and Certifications

- Listed with Underwriters Laboratories except as noted.
- TRI-PAC FB breakers meet the requirements for Class 16a, 16b, 17a and 26a circuit breakers as defined in Federal Specification W-C-375b.

**Technical Data
and Specifications**

Interrupting Capacity Ratings

- UL listed.
- 600 Vac maximum: 200,000 amperes symmetrical.
- 250 Vdc: 10,000 amperes.

Based on NEMA Test Procedures

- On all 3-phase Delta, Ground B phase applications, refer to Eaton's Customer Support Center.

Line and Load Terminals

Breakers listed include line and load terminals. Terminals are UL listed for wire sizes and types listed below. When used with aluminum cable, use joint compound. To order optional aluminum terminals, add Suffix **Z** to breaker catalog number listed.

Table 45-498. Line and Load Terminals

Maximum Breaker Amps	Wire Type	AWG Wire Range
Standard Pressure Terminals		
100	Al/Cu	14 – 1/0
Optional Al/Cu Pressure Terminals		
50	Al/Cu	14 – 4
100	Al/Cu	4 – 4/0

Dimensions/Weights

Table 45-499. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2 – 3	4.13 (104.8)	8.75 (222.3)	3.50 (88.9)

Table 45-500. Approximate Shipping Weight in Lbs. (kg)

Breaker	Complete Breaker	
	2-Pole	3-Pole
TRI-PAC FB	10.5 (4.8)	11.5 (5.2)

Product Selection

Table 45-501. Type FB Circuit Breakers

Maximum Continuous Ampere Rating at 40°C	2-Pole ①		3-Pole	
	Catalog Number (Current Limiters Included)	Price U.S. \$	Catalog Number (Current Limiters Included)	Price U.S. \$
15	FB2015PL		FB3015PL	
20	FB2020PL		FB3020PL	
30	FB2030PL		FB3030PL	
40	FB2040PL		FB3040PL	
50	FB2050PL		FB3050PL	
60	FB2060PL		FB3060PL	
70	FB2070PL		FB3070PL	
90	FB2090PL		FB3090PL	
100	FB2100PL		FB3100PL	

① 2-pole breakers are supplied in 3-pole frames with current carrying parts omitted from the center pole.

Replacement Current Limiters and Housing Assembly

Current Limiters: One required per pole.

Table 45-502. Replacement Current Limiters and Housing Assembly

Application	Catalog Number	Price U.S. \$
Supplied as Standard in Type FB TRI-PAC breakers rated 15 – 100 amperes. Replaces 200FBP03 formerly supplied on 15 – 40 ampere ratings, and 500FBP07 formerly supplied on 50 – 100 ampere ratings.	100FBP06	

Note: Refer to CAT.71.01.T.E for complete application information.

Table 45-503. Current Limiter Housing Assembly Complete with Current Limiter

Ampere Rating	Poles	Catalog Number	Price U.S. \$
15 – 100	2	176C593G09	
15 – 100	3	176C593G10	

Fused

Type LA TRI-PAC Thermal-Magnetic Circuit Breakers — Fused



Type TRI-PAC LA Breaker

Product Description

- 70 to 400 amperes, 600 Vac, 250 Vdc.
- 2-, 3-pole, interchangeable trip, replaceable current limiters.

Standards and Certifications

- Listed with Underwriters Laboratories, except as noted.
- TRI-PAC LA breakers meet the requirements for Class 16a, 16b, 17a and 26a circuit breakers as defined in Federal Specification W-C-375b.

Technical Data and Specifications

Interrupting Capacity Ratings

- UL listed.
- 600 Vac maximum: 200,000 amperes symmetrical.
- 250 Vdc: 10,000 amperes.

Based on NEMA Test Procedures

- On all 3-phase Delta, Ground B phase applications, refer to Eaton's Customer Support Center.

Dimensions/Weights

Table 45-504. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2 - 3	8.25 (209.6)	16.00 (406.4)	4.75 (120.7)

Table 45-505. Approximate Shipping Weight in Lbs. (kg)

Breaker	Complete Breaker		Frame Only		Trip Unit	
	2-Pole	3-Pole	2-Pole	3-Pole	2-Pole	3-Pole
TRI-PAC LA	29.75 (13.5)	34 (15.4)	23.5 (10.7)	25 (11.4)	2.25 (1.0)	3 (1.4)

Product Selection

Table 45-506. Type LA Circuit Breakers

Cont. Amp Rating at 40°C	Magnetic Trip Setting Amps ①		Complete Breaker		Shipped as Frame, Trip Units, Limiters and Terminals ②					
			Includes Pressure Type Copper Terminals ②		Frame Only		Trip Unit Only		Current Limiter 1 Required per Pole	
	Low	High	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2 Poles, 600 Vac, 250 Vdc ③

70	350	700	LA2070PR		LA2400PRF		LA2070PT		200LAP08	
90	450	900	LA2090PR		LA2400PRF		LA2090PT		200LAP08	
100	500	1000	LA2100PR		LA2400PRF		LA2100PT		200LAP08	
125	625	1250	LA2125PR		LA2400PRF		LA2125PT		200LAP08	
150	750	1500	LA2150PR		LA2400PRF		LA2150PT		200LAP08	
175	875	1750	LA2175PR		LA2400PRF		LA2175PT		200LAP08	
200	1000	2000	LA2200PR		LA2400PRF		LA2200PT		200LAP08	
225	1125	2250	LA2225PR		LA2400PRF		LA2225PT		400LAP10	
250	1250	2500	LA2250PR		LA2400PRF		LA2250PT		400LAP10	
300	1500	3000	LA2300PR		LA2400PRF		LA2300PT		400LAP10	
350	1750	3500	LA2350PR		LA2400PRF		LA2350PT		400LAP10	
400	2000	4000	LA2400PR		LA2400PRF		LA2400PT		400LAP10	

3 Poles, 600 Vac, 250 Vdc

70	350	700	LA3070PR		LA3400PRF		LA3070PT		200LAP08	
90	450	900	LA3090PR		LA3400PRF		LA3090PT		200LAP08	
100	500	1000	LA3100PR		LA3400PRF		LA3100PT		200LAP08	
125	625	1250	LA3125PR		LA3400PRF		LA3125PT		200LAP08	
150	750	1500	LA3150PR		LA3400PRF		LA3150PT		200LAP08	
175	875	1750	LA3175PR		LA3400PRF		LA3175PT		200LAP08	
200	1000	2000	LA3200PR		LA3400PRF		LA3200PT		200LAP08	
225	1125	2250	LA3225PR		LA3400PRF		LA3225PT		400LAP10	
250	1250	2500	LA3250PR		LA3400PRF		LA3250PT		400LAP10	
300	1500	3000	LA3300PR		LA3400PRF		LA3300PT		400LAP10	
350	1750	3500	LA3350PR		LA3400PRF		LA3350PT		400LAP10	
400	2000	4000	LA3400PR		LA3400PRF		LA3400PT		400LAP10	

① Set on high side, adjustable to lower limits.

② Terminals shipped separately from breakers.

③ 2-pole breakers or trips are supplied in 3-pole frames with current carrying parts omitted from the center pole.

Fused

Current Limiters

Included with breaker, one required per pole.

Table 45-507. Current Limiters

Application	Catalog Number	Price U.S. \$
Supplied as standard on ratings through 200 amperes.	200LAP08	
Supplied as standard on 225 through 400 ampere ratings, optional on lower ratings when a higher "cross-over point" is desired. (Above two limiters replace 800LAP12 formerly supplied as standard on all ratings, 600LAP09 optional on all ratings through 300 amperes, 300LAP05 optional on ratings through 150 amperes, and special rating limiter 1000LAP14.)	400LAP10	
Special rating where a higher "cross-over point" is desired on 200 ampere and higher ratings (Replaces limiter 1500LAP20)	500LAP15 ①②	

① Not UL listed.

② Protection based on 100,000 ampere maximum fault, 480 volts maximum.

Note: New limiters suitable for replacement in existing breakers by using plug-in conductor from old limiter (instructions included with limiter).

Terminals (Order Separately)

Two terminals are required per pole. Terminals are Underwriters Laboratories listed for wire size and type listed below. When used with aluminum conductors, use joint compound. To order optional aluminum terminals, add Suffix **Z** to complete breaker catalog number.

Note: Terminals shipped separately from breakers.

Table 45-508. Terminals

Maximum Breaker Amperes	Wire Range, Type, Number of Cables	Terminal Catalog Number	Price U.S. \$
Standard Copper Pressure Terminals			
225 225 ③ 400	(1) 6 AWG – 350 kcmil Cu (1) 6 AWG – 250 kcmil Cu (1) 4 AWG – 250 kcmil Cu, plus (1) 3/0 – 600 kcmil Cu	T225LA T225LBF T401LA	
Optional Al/Cu Pressure Terminals			
225 400	(1) 6 AWG – 350 kcmil Cu, or (1) 4 AWG – 350 kcmil Cu/Al (1) 4 AWG – 250 kcmil Al/Cu, plus (1) 3/0 – 600 kcmil Al/Cu	TA225LA1 TA400LA1	

③ Optional terminal.

Fused

Type NB TRI-PAC Thermal-Magnetic Circuit Breakers — Fused



Type TRI-PAC NB Breaker

Product Description

- 300 to 800 amperes, 600 Vac, 250 Vdc.

Note: dc rating applies to 350 amperes maximum thermal or to magnetic only breakers.

- 2-, 3-pole, interchangeable trip, replaceable current limiters.

Standards and Certifications

- Listed with Underwriters Laboratories except as noted.
- TRI-PAC NB breakers meet the requirements for Class 16b, 17a and 26a circuit breakers as defined in Federal Specification W-C-375b.

Technical Data and Specifications

Interrupting Capacity Ratings

- UL listed.
- 600 Vac maximum: 200,000 amperes symmetrical.
- 250 Vdc: 10,000 amperes.

Based on NEMA Test Procedures

- On all 3-phase Delta, grounded B phase applications, refer to Eaton's Customer Support Center.

Dimensions/Weights

Table 45-509. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2 - 3	8.25 (209.6)	22.00 (558.8)	5.50 (139.7)

Table 45-510. Approximate Shipping Weight in Lbs. (kg)

Breaker	Complete Breaker		Frame Only		Trip Unit	
	2-Pole	3-Pole	2-Pole	3-Pole	2-Pole	3-Pole
TRI-PAC NB	62 (28.1)	75 (34.1)	58 (26.3)	65 (29.5)	3.5 (1.6)	4 (1.8)

Product Selection

Table 45-511. Type NB Circuit Breakers

Cont. Amp Rating at 40°C	Magnetic Trip Setting Amperes ①		Complete Breaker		Shipped as Frame, Trip Units, Limiters and Terminals					
			Includes Pressure Type Copper Terminals		Frame Only		Trip Unit Only		Current Limiter 1 Required per Pole	
	Low	High	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$

2 Poles, 600 Vac, 250 Vdc ②③

300	1500	3000	NB2300P		NB2800PF		NB2300PT		500NBP12	
350	1750	3500	NB2350P		NB2800PF		NB2350PT		500NBP12	
400 ①	2000	4000	NB2400P		NB2800PF		NB2400PT		500NBP12	
500 ①	2500	5000	NB2500P		NB2800PF		NB2500PT		500NBP12	
600 ①	3000	6000	NB2600P		NB2800PF		NB2600PT		800NBP20	
700 ①	3000	6000	NB2700P		NB2800PF		NB2700PT		800NBP20	
800 ①	3000	6000	NB2800P		NB2800PF		NB2800PT		800NBP20	

3 Poles, 600 Vac Only

300	1500	3000	NB3300P		NB3800PF		NB3300PT		500NBP12	
350	1750	3500	NB3350P		NB3800PF		NB3350PT		500NBP12	
400 ①	2000	4000	NB3400P		NB3800PF		NB3400PT		500NBP12	
500 ①	2500	5000	NB3500P		NB3800PF		NB3500PT		500NBP12	
600 ①	3000	6000	NB3600P		NB3800PF		NB3600PT		800NBP20	
700 ①	3000	6000	NB3700P		NB3800PF		NB3700PT		800NBP20	
800 ①	3000	6000	NB3800P		NB3800PF		NB3800PT		800NBP20	

① 60 Hz ac only.

② dc rating applies to 350 amperes maximum thermal or to magnetic only breakers.

③ 2-pole breakers or trips are supplied in 3-pole frames with current carrying parts omitted from the center pole.

Fused

Current Limiters

Included with breaker, one required per pole.

Table 45-512. Current Limiters

Application	Catalog Number	Price U.S. \$
Supplied as standard on ratings through 500 amperes.	500NBP12	
Supplied as standard on 600 – 800 ampere ratings, optional on lower ratings when a higher “cross-over point” is desired.	800NBP20	
Above two limiters replace 1000NBP14 formerly supplied on ratings up to 600 amperes, 1500NBP20 supplied on 700 amperes, and 2500NBP25 supplied on 800 amperes.		

Terminals (Order Separately)

Two terminals are required per pole. Terminals are Underwriters Laboratories listed for wire size and type listed below. When used with aluminum conductors, use joint compound. To order optional aluminum terminals, add Suffix **Z** to complete breaker catalog number.

Note: Shipped separately from breaker.

Table 45-513. Terminals

Maximum Ampere Rating	Wire Range, Type, Number of Cables	Terminal Catalog Number	Price U.S. \$
Standard Copper Pressure Terminals			
350	(1) 1 AWG – 600 kcmil Cu	T350NB	
700	(2) 2/0 – 500 kcmil Cu	T700NB1	
800	(3) 3/0 – 500 kcmil Cu	T1000NB1	
Optional Al/Cu Pressure Terminals			
700	(2) 1 AWG – 500 kcmil Al/Cu	TA700NB1	
800	(3) 3/0 – 400 kcmil Al/Cu	TA1000NB1	
800	(3) 500 – 750 kcmil Al/Cu	TA1201NB1	

Fused

Type PB TRI-PAC Thermal-Magnetic Circuit Breakers — Fused



Type TRI-PAC PB Breaker

Product Description

- 600 to 1600 amperes, 600 Vac, 60 Hz ac, 250 Vdc.
Note: Higher frequency calibration not available. Minimum of 50 Hz calibration available on special order.
Note: 250 Vdc rating applies only to magnetic only breakers.
- 2-, 3-pole interchangeable trip, replaceable current limiters.

Standards and Certifications

- Listed with Underwriters Laboratories except as noted.
- TRI-PAC PB breakers meet the requirements for Class 17a and 26a circuit breakers as defined in Federal Specification W-C-375b.

Technical Data and Specifications

Interrupting Capacity Ratings

- UL listed.
- 600 Vac maximum: 200,000 amperes symmetrical.
- 250 Vdc: 10,000 amperes.

Based on NEMA Test Procedures

- On all 3-phase Delta, grounded B phase applications, refer to Eaton's Customer Support Center.

Dimensions/Weights

Table 45-515. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2 - 3	12.06 (306.4)	22.13 (562.1)	9.06 (230.2)

Table 45-516. Approximate Shipping Weight in Lbs. (kg)

Breaker	Complete Breaker		Frame Only		Trip Unit	
	2-Pole	3-Pole	2-Pole	3-Pole	2-Pole	3-Pole
TRI-PAC PB	148 (67.2)	179 (81.3)	106 (48.1)	120 (54.5)	18 (8.2)	23 (10.4)

Product Selection

Table 45-514. Type PB Circuit Breakers

Cont. Amp Rating at 40°C	ac Magnetic Trip Setting (Set on High Side, Adjustable to Lower Limits)		Complete Breaker		Shipped as Frame, Trip Unit Current Limiters and Connectors					
			Includes Rear "T" Connectors ①		Frame Only		Trip Unit Only ②		Current Limiter 1 Required per Pole	
	Low	High	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
2 Poles, 600 Vac ①										
600	1500	5000	PB2600PR		PB21600PRF		PB2600PRT		1000PBPR20	
700	1500	5000	PB2700PR		PB21600PRF		PB2700PRT		1000PBPR20	
800	1500	5000	PB2800PR		PB21600PRF		PB2800PRT		1000PBPR20	
900	1500	5000	PB2900PR		PB21600PRF		PB2900PRT		1000PBPR20	
1000	1500	5000	PB21000PR		PB21600PRF		PB21000PRT		1000PBPR20	
1200	2000	6000	PB21200PR		PB21600PRF		PB21200PRT		1600PBPR30	
1400	2500	7000	PB21400PR		PB21600PRF		PB21400PRT		1600PBPR30	
1600	3000	8000	PB21600PR		PB21600PRF		PB21600PRT		1600PBPR30	
3 Poles, 600 Vac Only										
600	1500	5000	PB3600PR		PB31600PRF		PB3600PRT		1000PBPR20	
700	1500	5000	PB3700PR		PB31600PRF		PB3700PRT		1000PBPR20	
800	1500	5000	PB3800PR		PB31600PRF		PB3800PRT		1000PBPR20	
900	1500	5000	PB3900PR		PB31600PRF		PB3900PRT		1000PBPR20	
1000	1500	5000	PB31000PR		PB31600PRF		PB31000PRT		1000PBPR20	
1200	2000	6000	PB31200PR		PB31600PRF		PB31200PRT		1600PBPR30	
1400	2500	7000	PB31400PR		PB31600PRF		PB31400PRT		1600PBPR30	
1600	3000	8000	PB31600PR		PB31600PRF		PB31600PRT		1600PBPR30	

① 2-pole breakers are supplied in 3-pole frames with current carrying parts omitted from center pole.
② Change the third digit to **8** for adjustable 0 - 60% neutral protection, **9** for 0 - 100% neutral protection.

Discount Symbol **CB-2**

Fused

Current Limiters

Included with breaker, one required per pole.

Table 45-517. Current Limiters

Application	Catalog Number	Price U.S. \$
Supplied as standard on ratings through 1000 amperes. (Replaces limiter 1500PBPR30 formerly supplied on 600 and 700 ampere ratings, and 3000 PBPR27 supplied on 800 – 1000 ampere ratings.)	1000PBPR20	
Supplied as standard on 1200 through 1600 ampere ratings. Optional on lower ratings where a higher "cross-over point" is desired. (Replaces limiter 4000PBR30 formerly supplied on 1200 through 1400 ampere ratings, and 5000PBPR42 supplied on 1600 ampere ratings.)	1600PBPR30	

Bus Bar Connectors

"T" Connector for Cu/Al Bus

Two required per pole. For rear bus connection. Accepts up to four bus bolts. May be rotated 90°.



Table 45-518. Bus Bar Connectors

Catalog Number	Price U.S. \$
BA2000PB	

Note: Not UL listed.

Cable Connector (Optional)

For "T" connector. Accepts four 600 kcmil copper cables.



Table 45-519. Cable Connector (Optional)

Catalog Number	Price U.S. \$
505C706G04	

Special Breakers

Magnetic Only Type TRI-PACs available on request.

Note: Not UL listed.

Options and Accessories

Alarm Switch

For light or alarm indication when breaker trips. Does not function with manual operation. Automatically resets when breaker is relatched. Standard leads extend 18 inches (457.2 mm) outside of breaker. Not field mountable and no alarm switch available for FB TRI-PAC.

Table 45-520. Alarm Switch

Breaker Frame	Normal Pole Meeting	Contact Operation (Specific Type Desired)
FCL	Center	Make or Break
LA TRI-PAC	Left	Make or Break
NB TRI-PAC	Left	Make or Break
PB TRI-PAC	Left	Make or Break
LCL	Left ①	Make or Break

① When alarm switch is used in conjunction with auxiliary switch, the auxiliary switch is rated 250 volts max., 5 amperes maximum.

Alarm Switch Contact Rating
(Non Inductive) LA TRI-PAC: 10 amperes, 120 Vac; 5 Amperes, 240 Vac.

Auxiliary Switch

For auxiliary control circuits. Miniature switches mount within breaker. Commonly used for remote indication of open or closed breaker and electrically interlocking component control circuits. "A" contacts are closed when breaker is closed. "B" contacts are open when breaker is closed. Standard leads extend 18 inches (457.2 mm) outside of breaker.



Auxiliary Switch

Note: Left-hand mounting is standard unless otherwise specified.

Table 45-521. Auxiliary Switch Attachment Kits for Field Mounting ②③

Breaker Type	Maximum ac Voltage Rating ④	Maximum Non-Inductive Amperes	1A-1B		2A-2B	
			Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
For Right-Hand Mounting						
FCL	240	5	1369D79G03		—	
NB TRI-PAC	480	10	4980D16G05		4980D16G06	
PB TRI-PAC	480	10	2602D32G14		2602D32G15	
LCL	480	6 (10 at 240)	—		—	
For Left-Hand Mounting						
FCL	240	5	1369D79G03		—	
NB TRI-PAC	480	10	4980D16G12		4980D16G13	
PB TRI-PAC	480	10	2602D32G11		2602D32G12	
LCL	480	6 (10 at 240)	1372D49G03		1372D49G06	

② All switches are multiples of 1A-1B with a common electrical connection (see Figure 45-41).

③ Field mounting voids UL listing of breaker except on NB TRI-PAC and PB TRI-PAC breakers.

④ For dc applications refer to factory.

Factory Mounted Auxiliary Switches

Note: Left-hand mounting is standard unless otherwise specified.

All of the above auxiliary switches can be specified for factory mounting at the same price as listed for the kit. These attachments have the leads out the side of the breaker and are UL listed when factory mounted unless other non-UL-listed modifications are used (except as noted).

Factory mounted switches only can be supplied for the following breakers: FB TRI-PAC, LA TRI-PAC. Order by description.

Note: Right-hand mounting for FB TRI-PAC only.

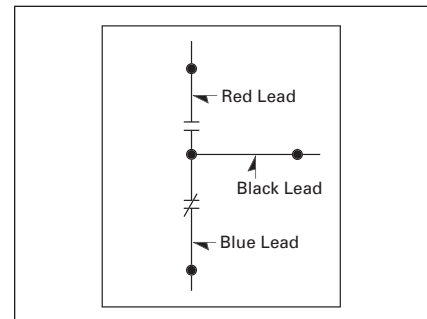
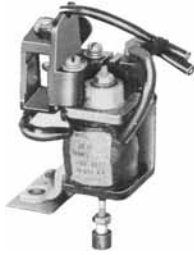


Figure 45-66. Auxiliary Switches

Accessories

Shunt Trip



Shunt Trip

Product Description

For tripping breaker from a remote point. A solenoid device mounts within breaker case. Breaker trips when coil is energized.

Shunt trips should not be used as circuit interlocks using maintained contact pilot devices.

A cutoff switch breaks the circuit to the momentary rated coil when breaker opens. Available for control voltages up to 250 Vdc or 600 Vac. Voltage and frequency must be specified. Standard leads extend 18 inches (457.2 mm) outside of breaker.

Table 45-522. Shunt Trip for Field Mounting ①②③

Voltage/Hz	Breaker Type					
	FCL		NB TRI-PAC		PB TRI-PAC	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Right-Hand Mounting						
600/50 – 60 Hz	1369D80G15		2606D58G15		2606D59G15	
480/50 – 60 Hz	1369D80G16		2606D58G16		2606D59G16	
240/50 – 60 Hz	1369D80G17		2606D58G17		2606D59G17	
208/50 – 60 Hz	1369D80G18		2606D58G18		2606D59G18	
120/50 – 60 Hz	1369D80G19		2606D58G19		2606D59G19	
60/50 – 60 Hz	1369D80G20		2606D58G20		2606D59G20	
48/50 – 60 Hz	1369D80G21		2606D58G21		2606D59G21	
24/50 – 60 Hz	1369D80G22		2606D58G22		2606D59G22	
250 dc	1369D80G23		2606D58G23		2606D59G23	
125 dc	1369D80G24		2606D58G24		2606D59G24	
60 dc	1369D80G25		2606D58G25		2606D59G25	
48 dc	1369D80G26		2606D58G26		2606D59G26	
24 dc	1369D80G27		2606D58G27		2606D59G27	
12 dc	1369D80G28		2606D58G28		2606D59G28	
Left-Hand Mounting						
600/50 – 60 Hz	1369D80G01		2606D58G01		2606D59G01	
480/50 – 60 Hz	1369D80G02		2606D58G02		2606D59G02	
240/50 – 60 Hz	1369D80G03		2606D58G03		2606D59G03	
208/50 – 60 Hz	1369D80G04		2606D58G04		2606D59G04	
120/50 – 60 Hz	1369D80G05		2606D58G05		2606D59G05	
60/50 – 60 Hz	1369D80G06		2606D58G06		2606D59G06	
48/50 – 60 Hz	1369D80G07		2606D58G07		2606D59G07	
24/50 – 60 Hz	1369D80G08		2606D58G08		2606D59G08	
250 dc	1369D80G09		2606D58G09		2606D59G09	
125 dc	1369D80G10		2606D58G10		2606D59G10	
60 dc	1369D80G11		2606D58G11		2606D59G11	
48 dc	1369D80G12		2606D58G12		2606D59G12	
24 dc	1369D80G13		2606D58G13		2606D59G13	
12 dc	1369D80G14		2606D58G14		2606D59G14	

Left-Hand Mounting

600/50 – 60 Hz	1369D80G01		2606D58G01		2606D59G01	
480/50 – 60 Hz	1369D80G02		2606D58G02		2606D59G02	
240/50 – 60 Hz	1369D80G03		2606D58G03		2606D59G03	
208/50 – 60 Hz	1369D80G04		2606D58G04		2606D59G04	
120/50 – 60 Hz	1369D80G05		2606D58G05		2606D59G05	
60/50 – 60 Hz	1369D80G06		2606D58G06		2606D59G06	
48/50 – 60 Hz	1369D80G07		2606D58G07		2606D59G07	
24/50 – 60 Hz	1369D80G08		2606D58G08		2606D59G08	
250 dc	1369D80G09		2606D58G09		2606D59G09	
125 dc	1369D80G10		2606D58G10		2606D59G10	
60 dc	1369D80G11		2606D58G11		2606D59G11	
48 dc	1369D80G12		2606D58G12		2606D59G12	
24 dc	1369D80G13		2606D58G13		2606D59G13	
12 dc	1369D80G14		2606D58G14		2606D59G14	

① 120 Vac ratings suitable for 55% pickup for ground fault applications.

② Not field mountable on non-automatic breakers (MCS).

③ Field mounting voids breakers' UL listing except on NB TRI-PAC and PB TRI-PAC.

Factory-mounted shunt trips only can be supplied for FB TRI-PAC and LA TRI-PAC breakers. Order by description.

Note: Right-hand mounting for FB TRI-PAC only. FB TRI-PAC not UL listed.

Table 45-523. Left-Hand Mounting Kits for Type LCL Current Limiting Breakers

Description	Catalog Number	Price U.S. \$
Provision to trip flux transfer shunt trip from external 32 to 120 volts (dc to 60 Hz) source. ④⑤	1372D49G22	
Provision to trip flux transfer shunt trip from external 240 to 600 volts (50/60 Hz) source. ⑤⑥	1372D49G32	

④ Rated 48 Volts minimum for ground fault applications.

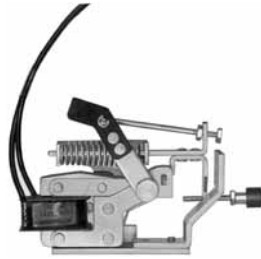
⑤ Also available factory mounted for 24 Vdc. Order by description.

⑥ Not for ground fault.

Table 45-524. Shunt Trip Coil Data for Type LCL Current Limiting Breakers

Shunt Trip Voltage Rating	Coil Inrush	
	Amperes	Volt-Amperes
120 ac	.15	18

Standard Undervoltage Release



Standard Undervoltage Release

Product Description

For undervoltage protection, a solenoid device mounts within breaker case. Coil must be energized before closing breaker. Trips breaker when voltage drops below 40 to 60% of coil rating. Picks up and seals in at 80% of coil rating. For line voltages up to 250 Vdc or 600 Vac. Externally mounted resistors are supplied for certain ratings. Standard leads extend 18 inches (457.2 mm) outside of breaker.

Note: UVR attachments are not designed for, and should not be used as, circuit interlocks. For further information, refer to Eaton.

Factory Mounted Undervoltage Releases

NB TRI-PAC and PB TRI-PAC undervoltage releases can be specified for factory mounting at the same price as the kit. These attachments have the leads out the side and are UL listed when factory mounted unless other non-UL listed modifications are used.

Note: Right-hand mounting considered standard unless specified otherwise.

Factory-mounted undervoltage releases only can be supplied for the following breakers: FB TRI-PAC, LA TRI-PAC and FCL; LCL 120 Vac only. Order by description.

Note: Right-hand mounting for FB TRI-PAC only. UL listing pending for LCL.

Table 45-525. Undervoltage Release Attachment Kits for Field Mounting ①

Attachment Voltage/ Hz	Breaker Type							
	For Right-Hand Mounting				For Left-Hand Mounting			
	NB TRI-PAC		PB TRI-PAC		NB TRI-PAC		PB TRI-PAC	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
24/60	—	—	—	—	—	—	—	—
48/60	—	—	5674D29G16	—	—	—	5674D29G08	—
120/60	373D632G01	—	5674D29G09	—	373D632G05	—	5674D29G01	—
208/60	373D632G19	—	5674D29G10	—	373D632G20	—	5674D29G02	—
240/60	373D632G02	—	5674D29G11	—	373D632G06	—	5674D29G03	—
480/60	373D632G03	—	5674D29G13	—	373D632G07	—	5674D29G05	—
600/60	373D632G04	—	5674D29G14	—	373D632G08	—	5674D29G06	—
12 dc	372D032G01	—	4976D85G01	—	372D032G06	—	4976D85G11	—
24 dc	372D032G02	—	4976D85G02	—	372D032G07	—	4976D85G12	—
48 dc	372D032G03	—	4976D85G03	—	372D032G08	—	4976D85G13	—
60 dc	—	—	4976D85G04	—	—	—	4976D85G14	—
125 dc	372D032G04	—	4976D85G07	—	372D032G09	—	4976D85G17	—
250 dc	372D032G05	—	4976D85G08	—	372D032G10	—	4976D85G18	—

① Field mounting voids UL listing of breaker except on NB TRI-PAC and PB TRI-PAC.

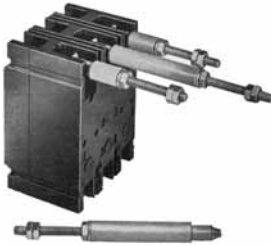
Table 45-526. Undervoltage Release Coil Data

Voltage Rating (ac)	Breaker Type				
	FB TRI-PAC			LCL	
	Coil Amperes	Series Resistance (Ohms)	Total VA	Coil Amperes	Total VA
600	0.020	25,000	12.0	—	—
480	0.016	25,000	7.7	—	—
240	0.021	6,000	5.1	—	—
208	0.019	6,000	4.0	—	—
120	0.023	—	2.8	.05	6
60	0.203	250	12.2	—	—
48	0.245	150	11.8	—	—
24	0.250	50	6.0	—	—
250	0.026	5,000	6.5	—	—
125	0.026	—	3.3	—	—
60	0.248	200	14.9	—	—
48	0.260	150	12.5	—	—
24	0.141	—	3.4	—	—
12	0.286	—	3.5	—	—

Table 45-527. Undervoltage Release Coil Data

Voltage Rating (ac)	Breaker Type					
	LA TRI-PAC, PB TRI-PAC			NB TRI-PAC		
	Coil Amperes	External Series Resistance (Ohms)	Total VA	Coil Amperes	External Series Resistance (Ohms)	Total VA
600	0.029	20,000	17.4	0.016	35,000	9.6
480	0.014	—	6.8	0.013	30,000	6.3
240	0.036	—	8.7	0.013	—	3.2
208	0.036	—	7.5	0.018	—	3.8
120	0.073	—	8.8	0.023	—	2.8
48	0.152	—	7.3	—	—	—
250	0.035	5,000	8.8	0.013	16,500	3.3
125	0.039	1,500	4.9	0.013	6,500	1.7
60	0.034	—	2.1	—	—	—
48	0.040	—	2.0	0.012	600	0.6
24	0.069	—	1.7	0.023	—	0.6
12	0.136	—	1.7	0.048	—	0.6

Rear Connected Studs



Rear Connected Studs

For complete stud assembly, order a stud and appropriate tube based on thickness of customer's mounting panel. A short stud must be assembled adjacent to a long stud to maintain clearances required by Underwriters Laboratories. Two studs are required per pole.

Note: Not UL listed.

Note: Two 400 ampere LA studs of the same length have sufficient clearance; however, customer connections may make it necessary to use a short stud adjacent to a long stud.

Panelboard Connecting Straps



Panelboard Connecting Strap

For connecting line end of breakers to panelboard bus.

Note: Not UL listed.

Table 45-528. Panelboard Connecting Straps

Ampere Rating	Connector Type	Catalog Number	Price U.S. \$
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Power Panelboards (Convertible) for TRI-PAC FB and FCL Breakers Bus Spacing 3.5-Inch (88.9 mm)

50	Center	1253C72G01	
50	Outside	1253C72G02	
100	Center	1253C73G03	
100	Outside	1253C73G04	
150	Center	1253C73G01	
150	Outside	1253C73G02	

3-Pole Mtg. Bracket	624B600H01	
2-Pole Mtg. Bracket	624B600H02	

For LCL Breakers Bus Spacing 3.5-Inch (88.9 mm)

400	Short	1275C85G01	
400	Medium	1275C85G02	
400	Long	1275C85G03	
Mtg. Bracket Kit (1 Required)		751B044G01	

Table 45-529. Studs for FCL and FB TRI-PAC

Mounting Panel Thickness Inches (mm)	Stud			Tube ①		
	Length	Catalog Number	Price U.S. \$	Length Inches (mm)	Catalog Number	Price U.S. \$
1.00 (25.4)	Short	451D874G01		1.06 (26.9)	32B9446H20	
	Long	451D874G02		3.44 (87.3)	32B9446H24	
.68 – .94 (17.5 – 23.8)	Short	451D874G01		1.38 (35.1)	32B9446H21	
	Long	451D874G02		3.75 (95.3)	32B9446H25	
.38 – .63 (9.5 – 15.9)	Short	451D874G01		1.69 (42.9)	32B9446H22	
	Long	451D874G02		4.06 (103.1)	32B9446H26	
.25 – .31 (6.4 – 7.9)	Short	451D874G01		2.00 (50.8)	32B9446H23	
	Long	451D874G02		4.38 (110.7)	32B9446H27	

① Included at no charge when ordered with stud.

Table 45-530. Studs for LCL, LA TRI-PAC and NB TRI-PAC — Dimensions in Inches (mm)

Stud Ampere Rating	Diameter and Thread	Extension Back of Breaker	Stud Catalog Number	Price U.S. \$
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LCL, LA TRI-PAC Breakers

400 ②	.75 (19.1) – 16	5.47 (138.9)	05B7383G15	
400 ②	.75 (19.1) – 16	7.97 (202.4)	05B7383G16	
400 ②	.75 (19.1) – 16	10.47 (265.9)	05B7383G17	

NB TRI-PAC Breakers

450	1.13 (28.7) – 12	5.50 (139.7)	623B222G01	
450	1.13 (28.7) – 12	8.00 (203.2)	623B222G02	
450	1.13 (28.7) – 12	10.50 (266.7)	623B222G03	
800	1.25 (31.7) – 12	5.50 (139.7)	373B375G04	
800	1.25 (31.7) – 12	10.50 (266.7)	373B375G03	

② 150, 250, 300 and 400 ampere frames only.

Plug-in Adapter Kits



Plug-in Adapter Kit

For rear connected applications such as switchboards. Facilitates ease of installation and front removal of breaker. Includes conductor for mounting on breaker, plug-in mounting blocks with matching conductor, rear studs and mounting hardware. Order two mounting block style numbers when line and load are required; order one mounting block style number when either line or load is required.

Table 45-531. FB TRI-PAC and FCL Breakers (Flat Bar Type) ③

Description	Catalog Number	Price U.S. \$
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1 Mounting Block, Line or Load

2-Pole, 100 Ampere	1480D13G06	
2-Pole, 150 Ampere		
3-Pole, 100 Ampere		
3-Pole, 150 Ampere		

③ These plug-in adapter kits are UL listed as recognized components.

Table 45-532. LCL Breakers (Threaded Stud Type)

Description	Catalog Number	Price U.S. \$
-------------	----------------	---------------

2 Mounting Blocks, Line and Load

2-Pole	313C644G25	
3-Pole	313C644G26	

1 Mounting Block, Line and Load

2-Pole	450D010G15	
3-Pole	450D010G16	

Table 45-533. NB TRI-PAC Breakers (Flat Bar Type) ④

Description	Catalog Number	Price U.S. \$
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1 Mounting Block, Line or Load

NB TRI-PAC, 2 Poles	2614D53G03	
NB TRI-PAC, 3 Poles	2614D53G04	

④ Not UL listed.

Table 45-534. TRI-PAC LA Breakers (Threaded Stud Type) ⑤

Description	Catalog Number	Price U.S. \$
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2 Mounting Blocks, Line and Load

2-Pole	313C644G41	
3-Pole	313C644G42	

1 Mounting Block, Line Only

2-Pole	450D010G17	
3-Pole	450D010G19	

1 Mounting Block, Load Only

2-Pole	450D010G18	
3-Pole	450D010G20	

⑤ Not UL listed.

Accessories

Mounting Block for NB TRI-PAC Breakers

Table 45-535. Mounting Block ①

Ampere Rating	Number of Poles	Catalog Number	Price U.S. \$
NB TRI-PAC			
800	2	4990D16G04	
800	3	4990D16G03	

① Not UL listed. Insulated base with front removable bolted connection.

Extended Line Terminal Shields



Extended Line Terminal Shield

For shielding line side terminal connections. One shield required per breaker. Order separately when needed. Sold only in lots of 10, including hardware.

Table 45-536. Extended Line Terminal Shields ②

Breaker Frame	Catalog Number	Price U.S. \$
FB TRI-PAC, FCL	625B229G01	
LA TRI-PAC	314C420G05	
NB TRI-PAC	208B996G02	

② Not UL listed. Insulated base with front removable bolted connection.

Base Mounting Hardware

Order separately when needed.

Table 45-537. Base Mounting Hardware

Breaker Frame	Catalog Number	Price U.S. \$
FB TRI-PAC, FCL	21C6782G18	
LA TRI-PAC	21C6782G05	
NB TRI-PAC	1091716	
PB TRI-PAC	624B375G22	

Moisture-Fungus-Corrosion Treatment

Treatment can be provided to meet customer's specific atmospheric conditions. Moisture-fungus treating material used meets JAN-T-152; treatment meets MIL-V-173a. Requests and orders should specify government specifications or conditions to be met.

Note: Included with frame.

Handle Locks



Handle Lock

Non-Padlockable

For prevention of unintentional operation of breaker. Fits over breaker handle and may be removed.

Padlockable

For prevention of unauthorized operation of breaker. Is non-removable once installed on breaker. Meets Underwriters Laboratories and California Code requirements.

Note: All breakers are trip free and will trip with handle locks attached. Cannot be used when handle extension is used.

Table 45-538. Handle Locks ③

Breaker Frame	Catalog Number	Price U.S. \$
Non-padlockable (No FCL, LCL, NB TRI-PAC)		
FB TRI-PAC	29B2721H01	
LA TRI-PAC	28B4596G01	
NB TRI-PAC	28B4596G01	
Padlockable (No FCL, LCL, NB TRI-PAC)		
FB TRI-PAC	765A754G01	
LA TRI-PAC	373B591G02	

③ Not UL listed. Insulated base with front removable bolted connection.

Handle Extension

Table 45-539. Handle Extension

Breaker Frame	Catalog Number	Price U.S. \$
LA TRI-PAC	372B399G01	
NB TRI-PAC	1251C65G01	
PB TRI-PAC ④	6635C78G02	

④ Included with frame.

Kirk Key Interlock



Availability: FB, LA, NB, PB TRI-PACs.

Permits interlocking of two breakers or one breaker with other devices. Before breaker can be closed, key must be inserted and turned in breaker interlock. Breaker must be opened before key can be removed. It can then be inserted in interlock or other devices to permit their closure. Requests and orders should completely outline interlocking scheme, ultimate user and his address.

Note: Not available for FCL or LCL breakers.



Mechanical Interlocks

For mechanically interlocking a pair of breakers so that only one may be closed

at one time, but both may be open simultaneously.

Note: Included with frame.

Walking Beam Type

Mounts on panel (not included) at rear of breaker. Standard breaker spacing: LA TRI-PAC, NB TRI-PAC: 8-1/2 inches (215.9 mm) center to center; FB TRI-PAC: 4-3/8 inches (111.1 mm) center to center; PB TRI-PAC: 12-1/4 inches (311.2 mm) center to center. Order as a set of two special factory drilled breakers and one walking beam interlock. Specify breaker type, panel thickness and center-to-center dimension of breakers.

Note: Included with frame. Not UL listed. Not available on drawout breakers.



Sliding Bar Type (Field Mountable)

Mounts on panel (not included) fitting over front of breakers. Standard breaker spacing: LA TRI-PAC, NB TRI-PAC: 8-1/2 inches (215.9 mm); FB TRI-PAC: 4-3/16 inches (106.4 mm) center to center.

Note: Included with frame. Not available for FCL or LCL breakers.

Accessories

Motor Operators

Motor operators provide complete remote control by means of a push-button or similar pilot device. Positive switching action is accomplished by use of an operating arm engaging the breaker handle. The unit is energized momentarily to actuate the lever arm moving it to either the ON or OFF position. The control is broken by an internal cutoff switch. Means for emergency manual operation is provided.

Note: The pilot device must be maintained contact type for FB TRI-PAC, FCL mechanisms; momentary contact type for all others.

Motor operators are available with motors rated 120 Vac, 208 Vac and 240 Vac.

Note: ac voltage rated operators are UL listed as recognized components.

The 480 volt operators utilize a 120 Vac motor in conjunction with a 480/240 to 120 volt dual voltage transformer. (On LA and larger operators, the transformer is supplied for separate mounting by the customer.)

Note: The motor operator is intended only for infrequent operation in line with Underwriters Laboratories endurance standard for AB molded case breakers.



For FB TRI-PAC/FCL Breakers



For LA TRI-PAC Breakers



For NB TRI-PAC Breakers



For PB TRI-PAC Breakers

Table 45-540. Motor Operator Selection

Type Breaker	ac Voltage								dc Voltage			
	120		208		240		480		125		24	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
FCL	656D148G15		656D148G10		656D148G17		656D148G17		—		—	
LCL	5664D54G83		5664D54G86		5664D54G84		5664D54G85		5664D54G77		5664D54G88	
FB TRI-PAC	656D148G11		656D148G04		656D148G13		656D148G13		—		—	
LA TRI-PAC	2607D97G22		2607D97G25		2607D97G23		2607D97G24		2607D97G44		—	
NB TRI-PAC	5664D54G65		5664D54G68		5664D54G66		5664D54G67		5664D54G82		—	
PB TRI-PAC	5661D52G01		5661D52G04		5661D52G02		5661D52G03		5661D52G17		—	

Table 45-541. Back Mounting Plates

Type Breaker	120, 208, 240, 480 Vac	
	Catalog Number	Price U.S. \$
FB-P/FCL	1282C01G01	

Table 45-542. Motor Data

Type Breaker	Motor		Inrush Current, Ampere (Peak)			Continuous Current (rms)			Operating Time, Open or Close
	Type	Hp	120 Volts	208 Volts	240 Volts	120 Volts	208 Volts	240 Volts	
FB TRI-PAC	Split Phase	1/75	10	4	5	2.3	1.17	1.65	1.5 Seconds
LA TRI-PAC	Reversing	—	8	5	4	—	—	—	12 Cycles
NB TRI-PAC	Reversing	—	11	7	6	—	—	—	12 Cycles
PB TRI-PAC	Reversing	—	20	12	11	—	—	—	10 Cycles

Drawout Frame



Drawout Frame

Product Description

These drawout frames are for use with standard 3-pole Eaton's Cutler-Hammer molded case circuit breakers. They consist of two separate parts; stationary mounting frame and movable carrier frame. Slide rails are drawer-type, and a screw mechanism is used to engage or withdraw the movable carrier frame.

The drawout frames have three positions: connected, test and disconnected. The frames do not include a safety tripping interlock, or secondary contacts. These are optional items and may be ordered at additional cost.

Breakers mounted in the drawout frames can be equipped with standard breaker accessories including shunt trip, undervoltage release, auxiliary switch, alarm switch and motor operator.

Table 45-543. Selection Data

Breaker Type ①	Stationary Mounting Frame		Movable Carrier Frame	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
NB TRI-PAC	2603D85G09		2608D34G12	

① Drawout for FB and LA TRI-PAC, FCL and LCL Circuit Breakers are not available. PB TRI-PAC movable is available factory-installed only. Order by description.

Secondary Contacts

These are used to disconnect auxiliary circuits when attachments such as shunt trip or motor operator are used. Available in multiples of four contacts with a maximum of 32 contacts for the NB TRI-PAC. They must be factory mounted. Order by description as similar to stationary or moving frame and specify number of contacts required.

Standard Installation

- Order one stationary mounting frame and one movable carrier frame.
- Order breakers without terminals or rear connectors.
- Order any attachments desired (shunt trip, undervoltage release, etc.).
- Order secondary contacts as required:
 - A shunt trip, undervoltage release or alarm switch requires two contacts
 - A 1A-1B auxiliary switch requires three contacts
 - A motor operator requires a maximum of four contacts
 - Others as required

Racking Crank

A special crank to engage or withdraw the moving portion of the drawout. A standard 1/2 inch (12.7 mm) hex socket with extension can be used for this purpose.

Table 45-544. Racking Crank

Catalog Number	Price U.S. \$
765A767G01	

Cell Switches Mounted on Drawout Frames, All Ratings

Up to four switches can be provided. Order by description.

Each switch provides NO and NC contact that transfers before reaching the test position when being withdrawn, and after the test position when being racked in.

Note: Handle mechanisms for current limiting breaker, see *Electrical Aftermarket Products and Services Catalog* CA08105001E.

SPHM — Supplementary Protector



Single-Pole



2-Pole



3-Pole

Product Description

- IEC breaker recognized by UL under UL 1077.
- Used to provide overcurrent protection where branch protection (for example UL 489 MCCB) is already provided or not required.
- Installed as a component within or part of an appliance or a piece of electrical equipment.
- Ideal replacement for fuses that are applied as a supplementary protector i.e., in addition to branch protection (if required).
- 35 mm DIN-rail mountable, utilizing the molded spring clip.
- Light Gray case with Off White handle, that is marked "O" for OFF and "I" for ON.
- UL File Number E69553.

Application Description

Cutler-Hammer Supplementary Protectors by Eaton Corporation are ideal for providing protection in a multitude of applications, including:

- Motor control circuits.
- Control power transformers.
- Relays.
- Contactor coils.
- PLC I/O points.
- Lighting circuits.
- Fluctuating ambients.
- High vibration.
- Shock resistant.

Features, Benefits and Functions

- **Environmental, Vibration and Shock Resistant:** Mil-spec qualification for fungus resistance, humidity, salt spray resistance and shock vibration resistance.
- **Heat Induced Nuisance Tripping Eliminated:** The protector is designed to "hold in" at 100% continuous rated current, regardless of ambient temperatures from -40° to +85°C.
- **Immediate Reset After Trip:** The protector can be reset (closed) immediately after an overcurrent trip without a "cooling off" period.
- **1/2 Cycle High Inrush Tolerance — 8X (standard), 18X and 25X:** The protector is available with different levels of tolerance to 1/2 cycle current spikes — standard tolerance is 8X the continuous current rating; in addition 18X and 25X are also available.
- **Overcurrent Curves, Long, Medium or Short Delay:** Time characteristic curves are available as Short, Medium and Long Delay.
- **Integral Auxiliary Switch (optional selection):** One auxiliary switch (a or b) can be factory installed per pole — a separate pole for auxiliary is NOT required. Contact Eaton for price adder.
- **Precise Overcurrent Calibration:** The protector can be precisely calibrated to a wide variety of current ratings, from 0.1 to 50 continuous amperes.
- **DIN-Rail Mountable:** The protector can be easily mounted, utilizing its quick release spring clip to attach it to a 35 mm DIN-rail.

Standards and Certifications

- UL recognized under UL 1077.
- CSA 22.2 No. 235.
- VDE 0660.
- IEC 60947-2.
- CE marked.

SPHM

Product Specifications

The SPHM Supplementary Protector is a dual rated product for both ac and dc supplies, in accordance with UL 1077, CSA 22.2, VDE 0660 and IEC 60947-2 standards.

It is to be applied in conjunction with a branch protector (if branch protection is required) and can be a replacement

for similarly applied fuses. Its advantages over fuses are that it is resettable and the device's status is easily and clearly identified by the position of the handle. In addition to this, the user is able to select a device that precisely fits the application (of which there are many) due to the availability of a wide range of current ratings, three levels of inrush tolerance (8X, 18X or 25X) and flexible time characteristic curves

(Short, Medium and Long Delay). In addition to this, the SPHM's protection performance is *not* adversely affected and is resistant to abnormal or changing ambient temperatures or even excessive environmental factors. The design allows it to be utilized in environments that can expose it to fungus, shock or out of the ordinary vibration.

Technical Data and Specifications

Table 45-545. Short Circuit Capacity

Standards and Approvals	Ampere Rating	Volts ac 50/60 Hz	Volts dc	Interruption Capacity ($I_{CU} = I_{CS}$)
UL 1077 CSA 22.2	0.1 – 30 35 – 50	277/480 250	— 80	3000 5000
VDE 0660 IEC-60947-2	0.1 – 50 0 – 50	230/400 —	— 80	1500 3000

Approximate Dimensions

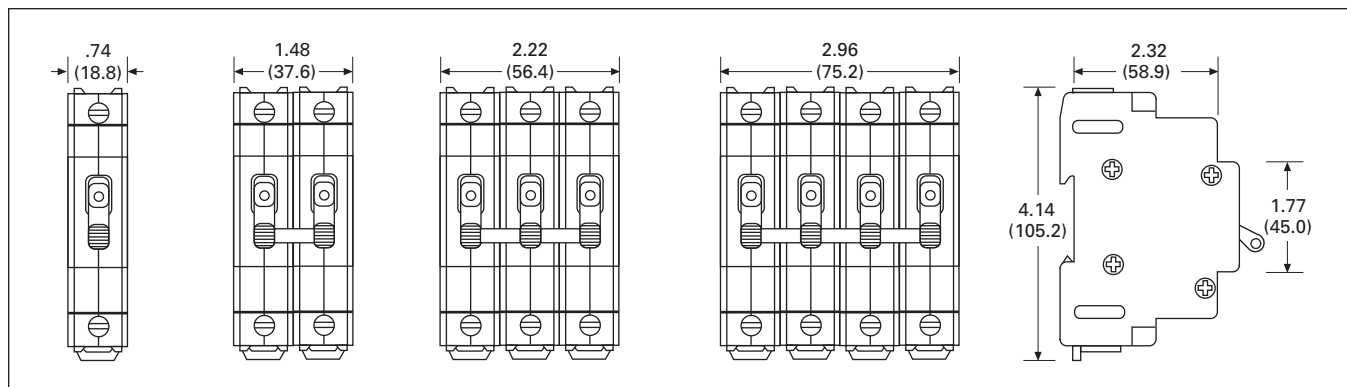


Figure 45-67. Approximate Dimensions in Inches (mm) — Not for Construction Purposes

Table 45-546. SPHM — Shipping Data

Pole Configuration	Pack Quantity	Pack Dimensions in Inches (mm)	Pack Weight Lbs oz. (kg)
1	1	2.05 x 3.94 x 5.12 (52.1 x 100.1 x 130.0)	7 oz. (.20)
2	1	2.05 x 3.94 x 5.12 (52.1 x 100.1 x 130.0)	12 oz. (.34)
3	1	3.54 x 3.94 x 5.12 (89.9 x 100.1 x 130.0)	1 lb. 2 oz. (.51)
4	1	3.54 x 3.94 x 5.12 (89.9 x 100.1 x 130.0)	1 lb. 7 oz. (.65)

Trip Curves

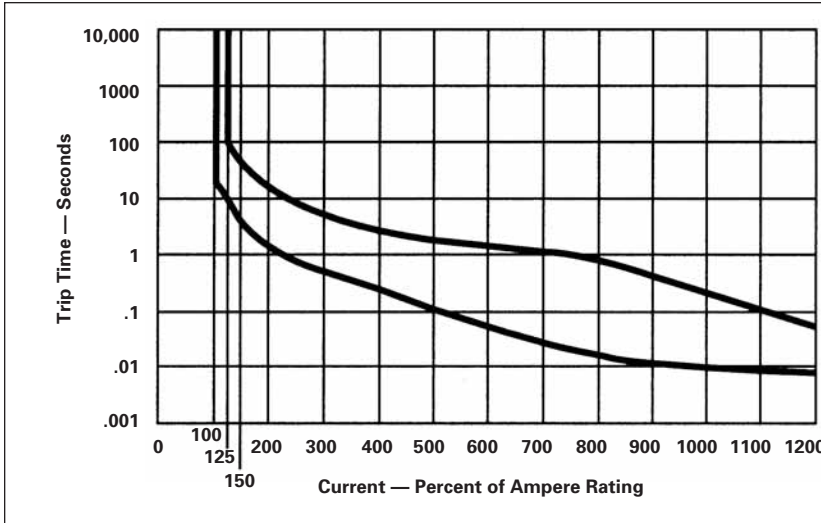


Table 45-547. Percent of Rated Current vs. Trip Delay at 25°C; Breakers Not Preloaded

Percent Overload	Delay Maximum (Seconds)	Delay Minimum (Seconds)
100	No Trip	No Trip
101 – 125	May Trip	May Trip
125	110	10
150	50	4.5
200	18	1.7
300	6	.55
400	2.8	.25
500	1.9	1.1
600	1.5	.05
700	1.2	.025
800	.8	.015
900	.41	.011
1000	.2	.01
1100	.1	.009
1200	.05	.008

Figure 45-68. 8X Continuous Current — Curve 2, Medium Delay, Option M

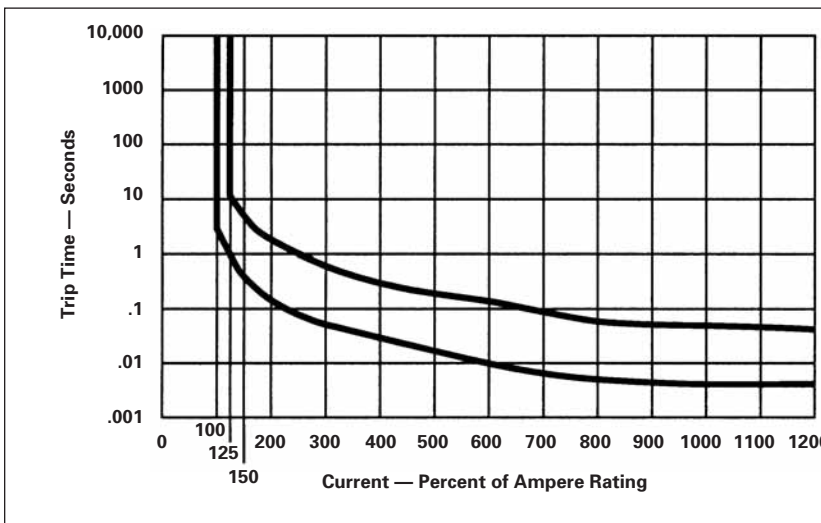


Table 45-548. Percent of Rated Current vs. Trip Delay at 25°C; Breakers Not Preloaded

Percent Overload	Delay Maximum (Seconds)	Delay Minimum (Seconds)
100	No Trip	No Trip
101 – 125	May Trip	May Trip
125	12	1
150	5	.4
200	1.9	.15
300	.64	.054
400	.3	.03
500	.2	.017
600	.14	.01
700	.09	.007
800	.06	.005
900	.052	.0044
1000	.05	.004
1100	.046	.004
1200	.04	.004

Figure 45-69. 8X Continuous Current — Curve 3, Short Delay, Option S

SPHM

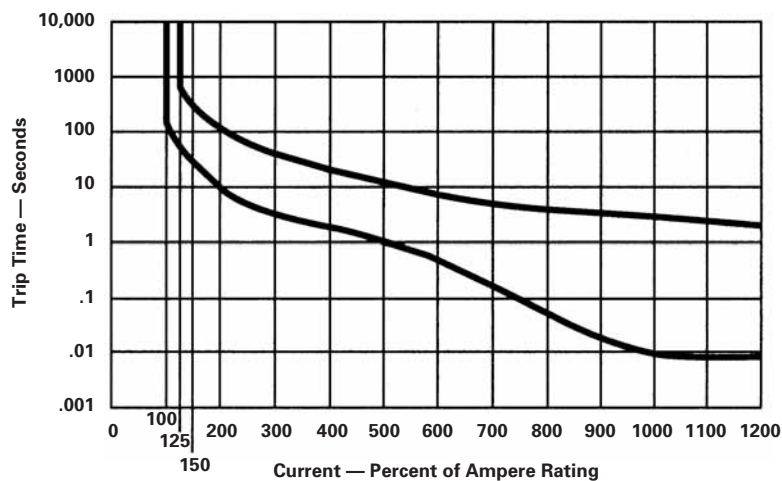


Table 45-549. Percent of Rated Current vs. Trip Delay at 25°C; Breakers Not Preloaded

Percent Overload	Delay Maximum (Seconds)	Delay Minimum (Seconds)
100	No Trip	No Trip
101 - 125	May Trip	May Trip
125	700	60
150	350	30
200	120	10
300	42	3.4
400	22	2
500	12.5	1.1
600	8	.5
700	5.2	.17
800	4	.05
900	3.4	.02
1000	3	.01
1100	2.5	.0084
1200	2	.008

Figure 45-70. 18X Continuous Current — Curve 10, Long Delay, Option L

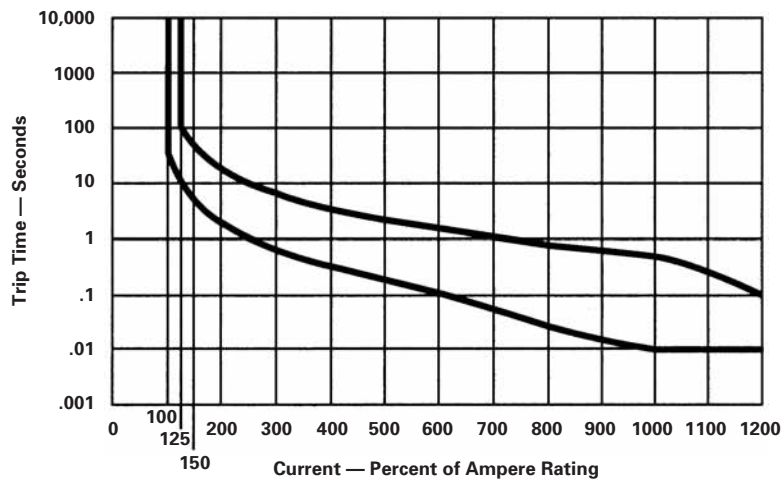


Table 45-550. Percent of Rated Current vs. Trip Delay at 25°C; Breakers Not Preloaded

Percent Overload	Delay Maximum (Seconds)	Delay Minimum (Seconds)
100	No Trip	No Trip
101 - 125	May Trip	May Trip
125	110	10
150	50	4.5
200	18	1.7
300	6.9	.54
400	4	.3
500	2.75	.18
600	2	.1
700	1.4	.04
800	1	.02
900	.75	.013
1000	.5	.01
1100	.25	.01
1200	.1	.01

Figure 45-71. 18X Continuous Current — Curve 20, Medium Delay, Option M

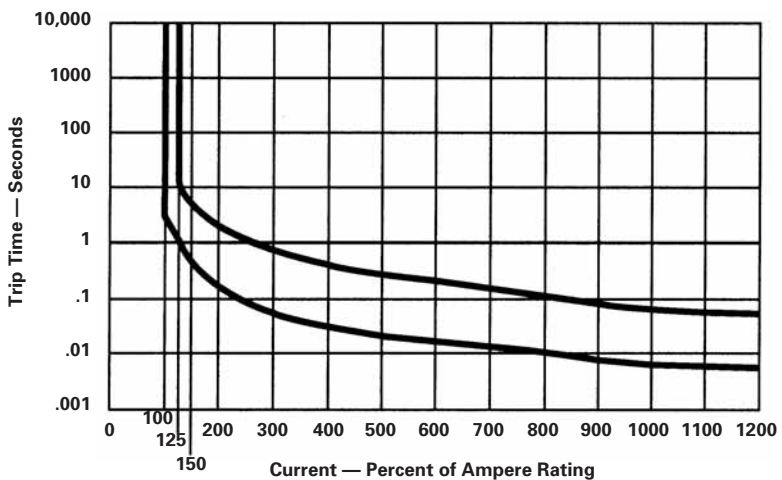


Table 45-551. Percent of Rated Current vs. Trip Delay at 25°C; Breakers Not Preloaded

Percent Overload	Delay Maximum (Seconds)	Delay Minimum (Seconds)
100	No Trip	No Trip
101 - 125	May Trip	May Trip
125	12	1
150	5	.4
200	1.9	.15
300	.73	.052
400	4	.03
500	.27	.02
600	.2	.015
700	.14	.012
800	.1	.01
900	.074	.0076
1000	.06	.006
1100	.053	.0053
1200	.05	.005

Figure 45-72. 18X Continuous Current — Curve 30, Short Delay, Option S

45

SPHM

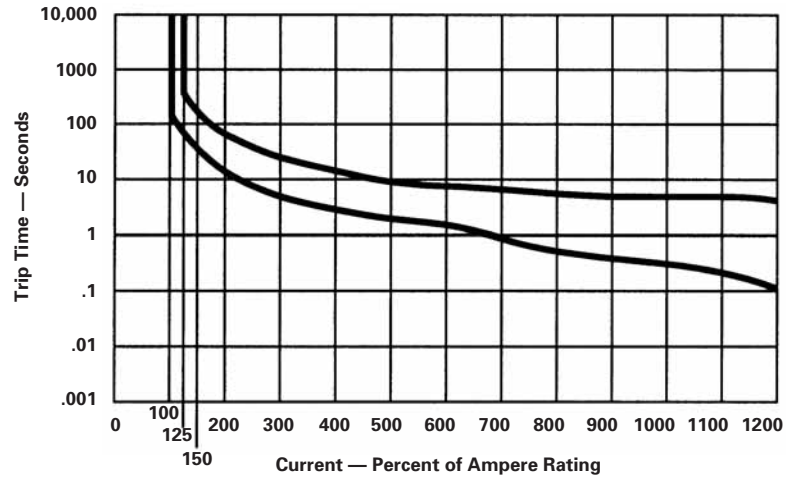


Figure 45-73. 25X Continuous Current — Curve 251, Long Delay, Option L

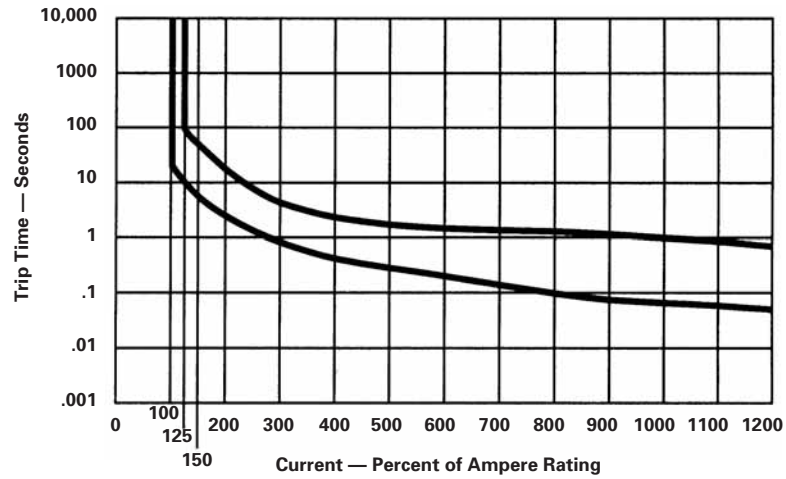


Figure 45-74. 25X Continuous Current — Curve 252, Medium Delay, Option M

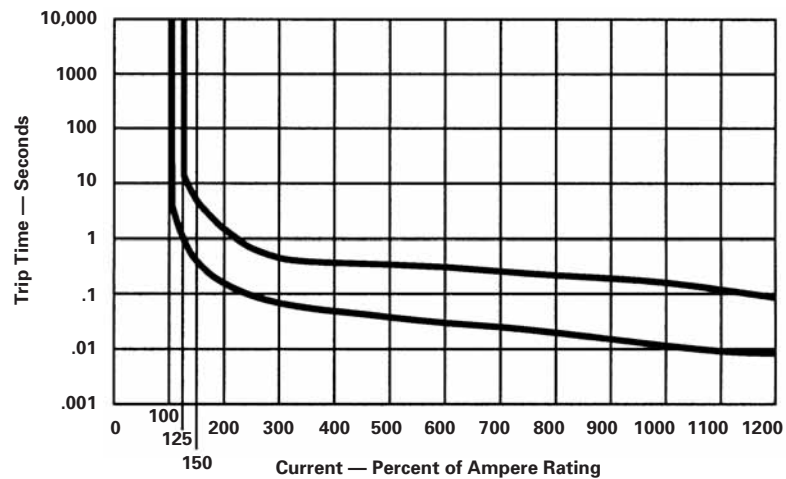
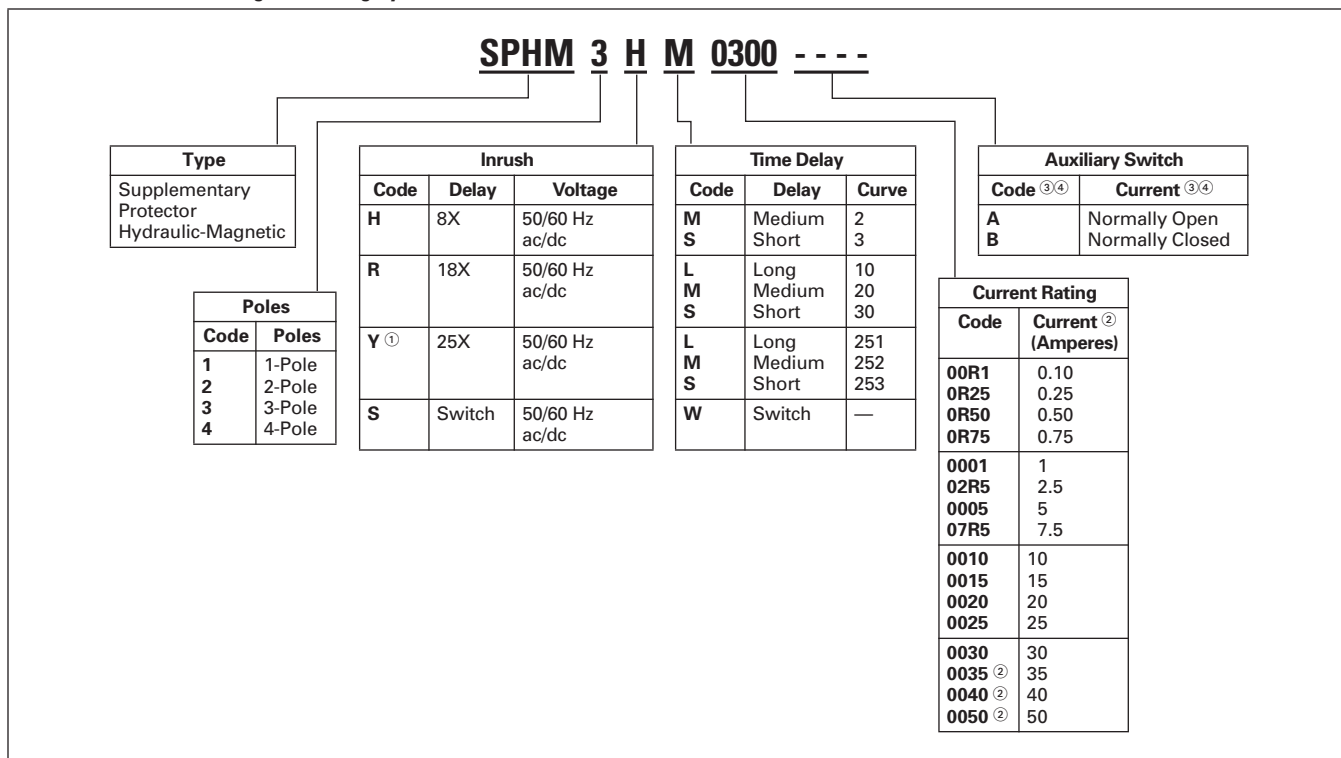


Figure 45-75. 25X Continuous Current — Curve 253, Short Delay, Option S

SPHM

Product Selection

Table 45-552. SPHM Catalog Numbering System



- ① Maximum of 40 amperes available at 25x inrush.
- ② UL recognized to 250 Vac, 5 kA above 30 amperes.
- ③ One A or B contact maximum per pole. Contacts will be arranged left to right (e.g., BAB suffix on 3-pole breaker).
- ④ Contact Eaton for availability and price.

Table 45-553. SPHM Product Selection ⑤

Continuous Current Ampere Rating	18X (Standard Inrush Tolerance) Medium Delay Curve 20							
	1-Pole 277 Vac Catalog Number	Price U.S. \$	2-Pole 277/480 Vac Catalog Number	Price U.S. \$	3-Pole 277/480 Vac Catalog Number	Price U.S. \$	4-Pole 277/480 Vac Catalog Number	Price U.S. \$
0.1	SPHM1RM00R1 ⑥		SPHM2RM00R1 ⑥		SPHM3RM00R1 ⑥		SPHM4RM00R1	
0.25	SPHM1RM0R25 ⑥		SPHM2RM0R25 ⑥		SPHM3RM0R25 ⑥		SPHM4RM0R25	
0.50	SPHM1RM0R50 ⑥		SPHM2RM0R50 ⑥		SPHM3RM0R50 ⑥		SPHM4RM0R50	
0.75	SPHM1RM0R75 ⑥		SPHM2RM0R75 ⑥		SPHM3RM0R75 ⑥		SPHM4RM0R75	
1	SPHM1RM0001 ⑥		SPHM2RM0001 ⑥		SPHM3RM0001 ⑥		SPHM4RM0001	
2.5	SPHM1RM02R5 ⑥		SPHM2RM02R5 ⑥		SPHM3RM02R5 ⑥		SPHM4RM02R5	
5.0	SPHM1RM0005 ⑥		SPHM2RM0005 ⑥		SPHM3RM0005 ⑥		SPHM4RM0005	
7.5	SPHM1RM07R5 ⑥		SPHM2RM07R5 ⑥		SPHM3RM07R5 ⑥		SPHM4RM07R5	
10	SPHM1RM0010 ⑥		SPHM2RM0010 ⑥		SPHM3RM0010 ⑥		SPHM4RM0010	
15	SPHM1RM0015 ⑥		SPHM2RM0015 ⑥		SPHM3RM0015 ⑥		SPHM4RM0015	
20	SPHM1RM0020 ⑥		SPHM2RM0020 ⑥		SPHM3RM0020 ⑥		SPHM4RM0020	
25	SPHM1RM0025 ⑥		SPHM2RM0025 ⑥		SPHM3RM0025 ⑥		SPHM4RM0025	
30	SPHM1RM0030 ⑥		SPHM2RM0030 ⑥		SPHM3RM0030 ⑥		SPHM4RM0030	

Continuous Current Ampere Rating	250 Vac							
	1-Pole 250 Vac Catalog Number	Price U.S. \$	2-Pole 250 Vac Catalog Number	Price U.S. \$	3-Pole 250 Vac Catalog Number	Price U.S. \$	4-Pole 250 Vac Catalog Number	Price U.S. \$
35	SPHM1RM0035 ⑥		SPHM2RM0035 ⑥		SPHM3RM0035 ⑥		SPHM4RM0035	
40	SPHM1RM0040 ⑥		SPHM2RM0040 ⑥		SPHM3RM0040 ⑥		SPHM4RM0040	
50	SPHM1RM0050 ⑥		SPHM2RM0050 ⑥		SPHM3RM0050 ⑥		SPHM4RM0050	

- ⑤ For stocking information: please contact Eaton for current stocking situation.
- ⑥ To identify catalog number for other Inrush and Delay categories, replace underlined letters from Catalog Number Selection above. Contact Eaton for availability and price.

Discount Symbol SP-1

Heinemann® Hydraulic-Magnetic Circuit Breakers

Product Description

Eaton has combined Heinemann and Cutler-Hammer technologies to give customers the best protective solutions available in the world from 12 to 38,000 volts. Heinemann offers product designers the broadest ranges of hydraulic-magnetic circuit breakers from 0.1 to 1200 amperes.

Nuisance Tripping Eliminated

Heinemann hydraulic-magnetic circuit breakers offer three major advantages:

- Elimination of nuisance tripping caused by high ambient temperatures in or near the installation. The breaker responds only to current variations, not to temperature change.
- Continuous operation at 100% current. There is no such assurance with a thermal device, which may fail to carry rated current when subjected to above normal ambient temperatures. A Heinemann breaker rated at 20 amperes, for example, will sustain 20 amperes, even at elevated temperatures. Derating and other forms of temperature compensation are unnecessary.
- Immediate reset. Since there are no thermal elements, heat build-up is not a factor. Therefore, no "cooling off" period is required after a fault.

Guaranteed Power Availability

Using a controlled time delay, Heinemann circuit breakers can eliminate nuisance tripping caused by transient current surges. In any installation where a power supply or compressor motor is on the line, an inrush of current occurs when the equipment is first turned on. The bigger the equipment, the larger the surge. Although inrush surges are, in fact, transient overloads, they usually pose no threat of damage to the line or the equipment. So, it's simply not necessary or even desirable to interrupt the power when they occur.

The hydraulically controlled time-delay mechanism of a Heinemann breaker eliminates nuisance tripping without reducing the overload protection. The delay is inversely proportional to the overload; response is quicker on large overloads where greater potential danger exists, and slower on small overloads. For sensitive electronic equipment, Heinemann breakers can be purchased with an instantaneous trip feature to prevent damage.

Precision Protection

The current rating of the hydraulic-magnetic circuit breaker is determined by the number of wire turns in the load sensing coil. By altering the number of turns and the wire size, Heinemann can provide a breaker of virtually any rating within the unit's overall current carrying range. Regardless of your needs, we can deliver custom equipment protection, even at fractional amperages.

Shock and Vibration

A precision, counterbalanced armature design prevents mechanical tripping due to shock and vibration. This makes the Heinemann family of products perfect anywhere shock and vibration are a concern. Some popular applications include railcars, mobile industrial equipment, generators and marine power distribution.

Global Ready

Heinemann breakers are tested to meet global certifications and standards including UL, CE, VDE, TUV and CSA.

Mission Control

With a variety of control and indicating options, the Heinemann line of circuit breakers allows you to take control of your complex operations. Available with integral remote trip coils and indicating contacts, Heinemann breakers can be integrated into your control logic. We also offer a lighted handle design that can allow operators to see breaker conditions at a distance.

Self-Adjusting

The time delay feature is self-adjusting to ambient temperature conditions. At high ambients where the overload tolerance of most circuits is lowered, the viscosity of the fluid in the breaker's dashpot is lessened, and the time delay is thereby shortened. At low temperatures, the response is correspondingly longer to allow for cold equipment startups.

Features, Benefits and Functions

Hydraulic-Magnetic



Hydraulic-Magnetic

- Precision custom calibration.
- Requires no derating (100% rated).
- Ambient compensating (-40°C to +85°C).
- Immediate reset after fault.
- Broad range of integral internal accessories.
- Provides equipment and wire protection.

Fuse Protection



Fuse Protection

- No-reset capability.
- Fuses degrade over time.
- Protection effected by ambient temperature.
- Requires more panel space.
- No accessories available.
- Provides equipment and wire protection.

Thermal-Magnetic



E125S Thermal-Magnetic Breaker

- Fixed calibration band, wide variation.
- Device must be derated to 80% load.
- Protection effected by ambient temperature.
- Requires "cooling-off" period.
- Accessories in multi-pole devices only.
- Provides basic wire protection.

Heinemann

2. Self-Cleaning Contacts

Sliding pivot point causes a wiping action across the contacts each time a breaker is switched. This cleaning motion helps keep surface resistance low, extending contact life. (Contacts are made of silver alloy for minimal wattage loss.)

3. Efficient Blowout Grid

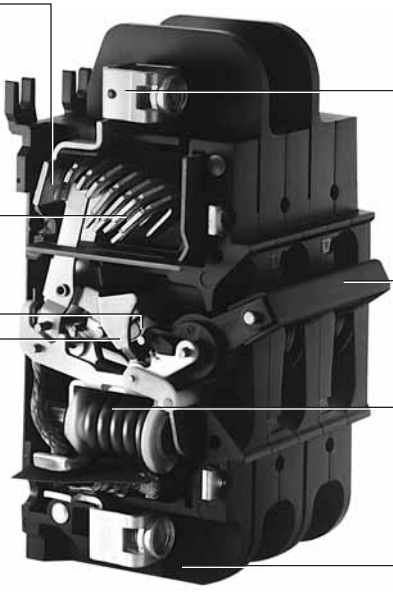
U-shaped grid plates quickly draw out, fragment and extinguish contact arc. Charring and pitting are minimized.

4. Sturdy Toggle and Latch

Strong, durable and highly efficient. Latch is shock-resistant, yet provides very fast operation. Trip-free construction makes it impossible to hold the breaker closed against a fault. (Even when handle is held in ON position, contacts trip free of fault condition.)

5. Balanced Armature

Counterbalanced armature design helps prevent mechanical tripping caused by shock and vibration. Meets MIL-STD-202 requirements.



1. Broad Selection of Terminal Styles

Pressure connector, threaded stud, hook, bus, plug-in and quick-connect terminals (with holes for optional soldering) are available.

6. Two-Position Switching

Two handle positions, ON and OFF (no ambiguous "reset" position). After fault clearance, simply snap the handle back to ON.

7. Load-Sensing Coil

Magnetic unit measures current, not temperature, making it unnecessary to derate for high-ambient service. Coil will carry 100% rated load as specified in the appropriate response curve.

8. Fungus-Resistant Case

Circuit breakers are housed in special plastic casings that significantly reduce fungal growth and contamination.

Inside a Heinemann Hydraulic-Magnetic Circuit Breaker

The Hydraulic Principal

The hydraulic-magnetic technology used in the Heinemann line of circuit breakers delivers precision protection and a controlled response to changes in load current. Utilizing a coil of wire to measure the magnetic flux produced in the circuit, in combination with the dampening effect of an oil-filled tube, Heinemann circuit breakers provide reliable, consistent protection characteristics in all environments.

The Heinemann hydraulic-magnetic circuit breaker operates on load-current produced magnetic flux variation in a solenoid. The coil is wound around a hermetically sealed, non-magnetic tube containing a spring-loaded, moveable iron core and a silicone liquid fill. With the load current either at or below the breaker's nominal rating, the magnetic flux is of insufficient strength to move the core, and it remains at the end of the tube opposite the armature.

On an overload, the magnetic flux force increases, pulling the iron core into the coil toward the armature end of the tube. This core insertion reduces the reluctance of the magnetic circuit and further increases the strength of the magnetic field. The silicone liquid regulates the core's speed of travel, creating a controlled trip delay that is inversely proportional to the magnitude of the overload. If the overload subsides before the core reaches the pole piece, the core returns to its original position, and the breaker does not trip. (For non-delay applications, the breaker is modified to omit the intentional delay.)

When the magnetic flux reaches a predetermined value, the armature is attracted to the pole piece and the breaker trips. (The breaker may trip before the core reaches the pole piece if the critical flux value is achieved first.) On very heavy overloads or short circuits, the flux produced by the coil above, regardless of core position, is sufficient to pull in the armature. This circuit interruption occurs with no intentional delay — a highly desirable response characteristic.



Core at End of Tube Opposite Armature



Overload Subsides Before Core Reaches Pole Piece



Armature Pulled In

Technical Data

**Personalized Protection
To Fit Your Application**

With advanced hydraulic-magnetic technology, we're able to match our breaker performance to meet your exact application requirements. Whether you choose a standard curve, or one of our special application curves, we're sure to have a device that meets your needs. In addition, if you have specific requirements that can't be met with one of our off-the-shelf products, we can custom configure a breaker to protect your equipment.

To find out more about custom breaker solutions, or for application assistance, you can contact our Technical Resource Center at 1-800-356-1243 or via e-mail at trc@eaton.com.

Time Delay Curves and Typical Applications

The curves shown indicate the magnitude and duration of overloads, which will be tolerated before tripping occurs. By selecting the proper curve, breaker response can be closely matched to safe operating limits of the equipment or circuitry. The following are standard curves for typical applications on ac and dc circuits.

Curve 1

Allows the largest and most prolonged overload needed to prevent nuisance tripping on motor circuits.

Curve 2

A medium delay accommodates mixed loads consisting of lights, motors and resistive heating, where the breaker is rated to the wiring instead of to any specific load.

Curve 3

Permits a very brief time delay period before tripping and is used for protection of transformers and electronic circuits.

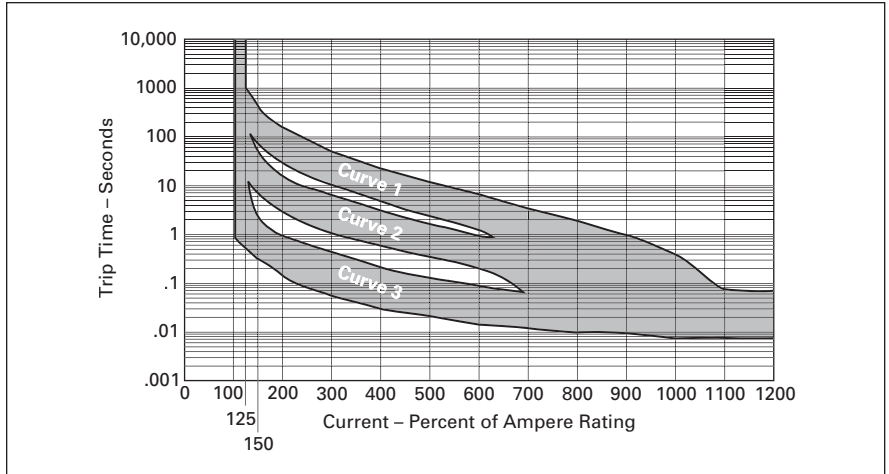


Figure 45-76. Curves 1, 2 and 3, dc

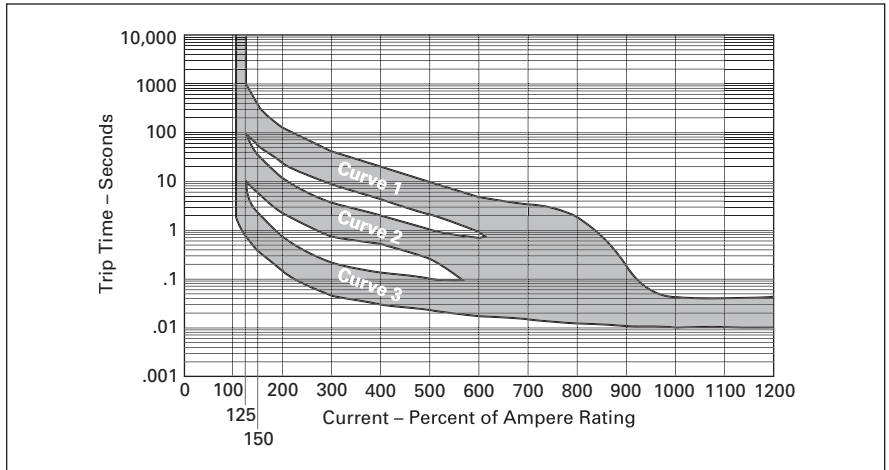


Figure 45-77. Curves 1, 2 and 3, 50/60 Hz

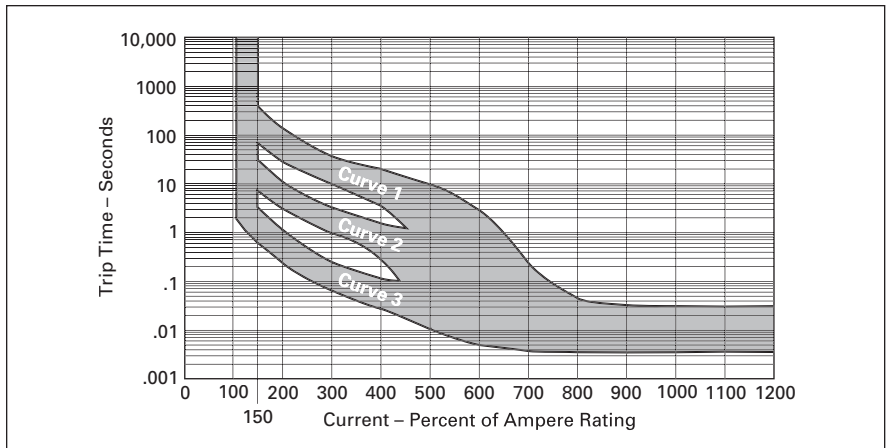


Figure 45-78. Curves 1, 2 and 3, 400 Hz

Time Delay Curves and Typical Applications

Curve P

Non-time-delay breakers have no deliberately imposed delay and will trip instantaneously at any load above 120% of rated current.

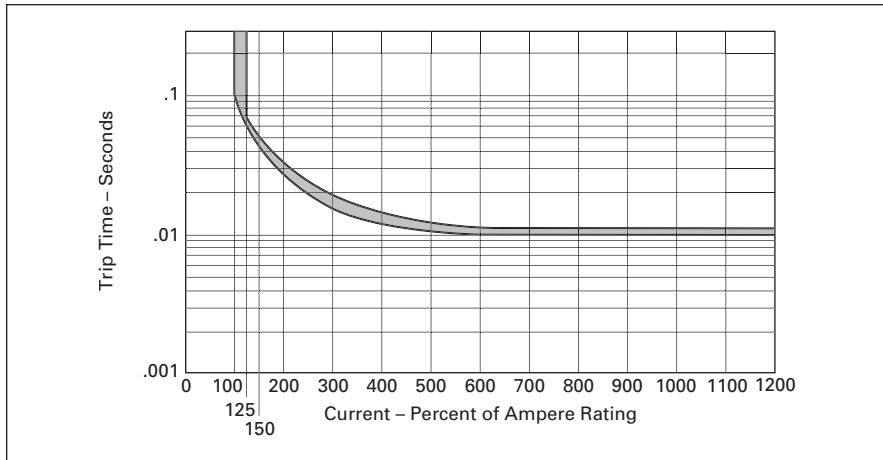


Figure 45-79. Curve P, Non-delay

Curve 10

High Inrush — Time delays similar to Curves 1, 2 and 3 with high-inrush surge capabilities.

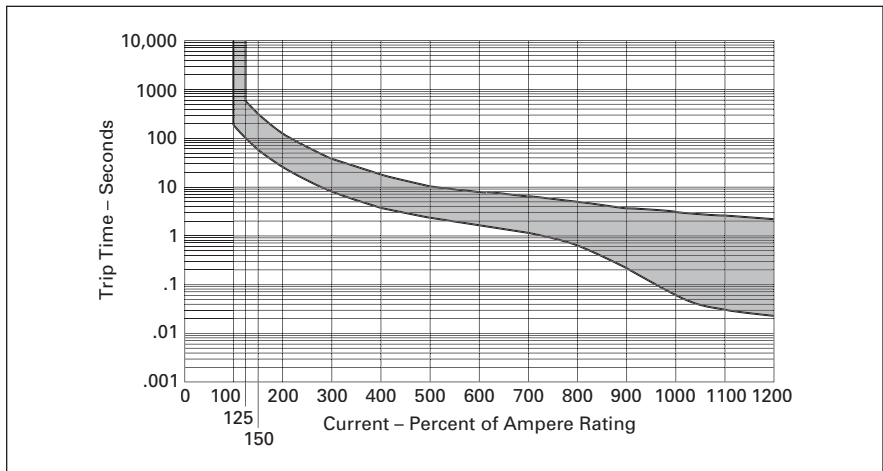


Figure 45-80. Curve 10

Curve 20

High Inrush — Time delays similar to Curves 1, 2 and 3 with high-inrush surge capabilities.

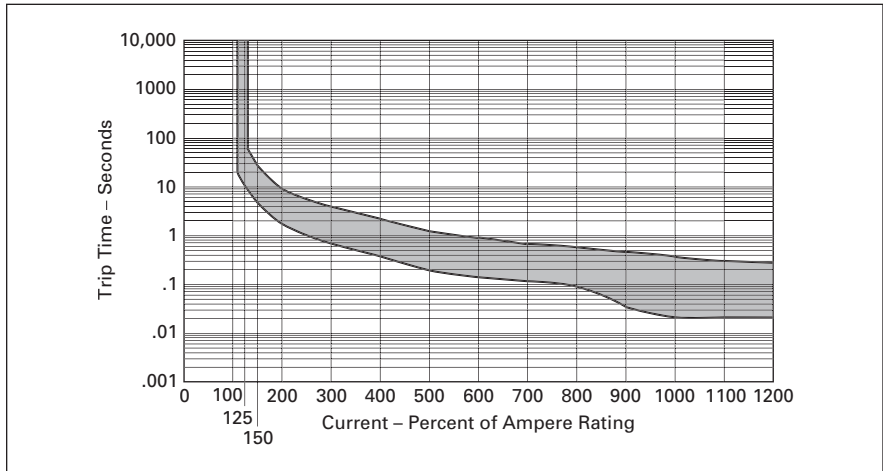


Figure 45-81. Curve 20

Curve 30

High Inrush — Time delays similar to Curves 1, 2 and 3 with high-inrush surge capabilities.

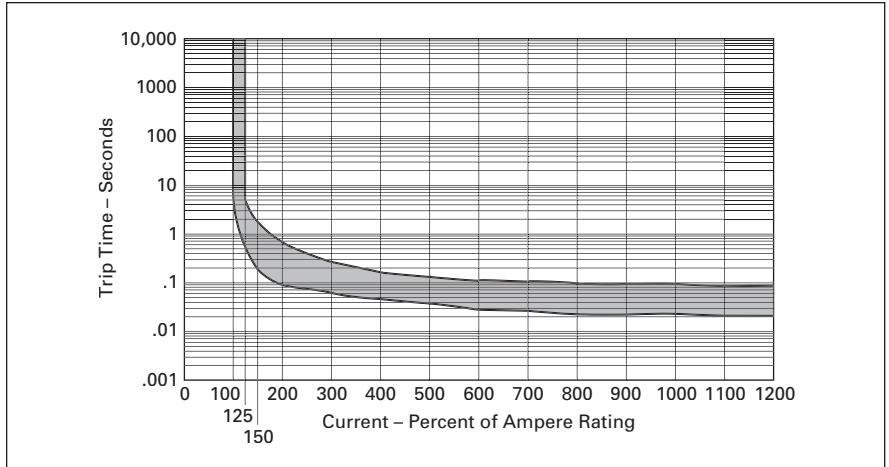


Figure 45-82. Curve 30

Curve 100

High Inrush — For ferroresonant power supplies, distribution transformers, data processing equipment, etc., which may draw starting surges as high as 3000% normal load. To accommodate brief surges of this magnitude for approximately a half cycle of line current, or 8.3 milliseconds (long enough to get the equipment online without tripping), high inrush models are available.

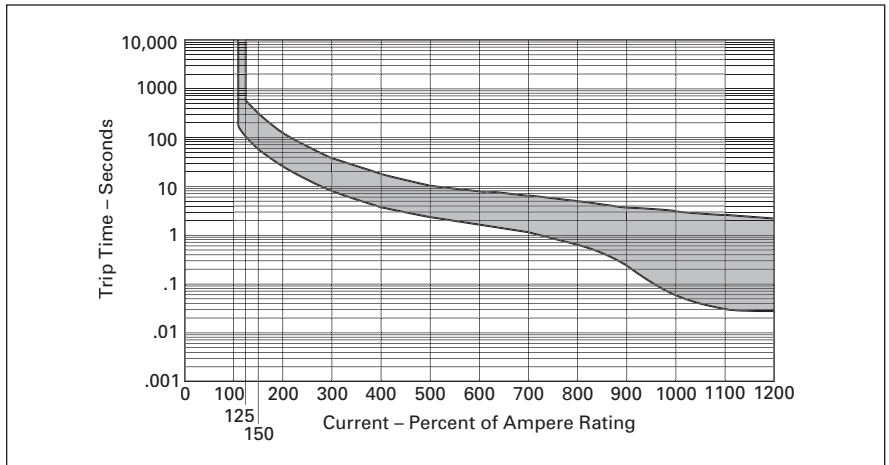


Figure 45-83. Curve 100

Internal Circuits

Product Specifications

All time-delay curves shown are based on the fact that circuit breakers are not preloaded. (Breakers do not carry current prior to application of overload for calibration testing.) Curves are plotted at an ambient temperature of 77°F (25°C), with breakers in the standard wall-mount position.

Heinemann Breakers are 100% Rated

All circuit breakers shall hold 100% rated load continuously. Time-delay circuit breakers may trip between 101% and 125% of rated load; must trip at 125% and above, as shown on the time-delay curve selected. Breakers rated for ac/dc operation may trip between 101% and 135%; must trip at 135% and above.

Non-time-delay circuit breakers may trip instantaneously between 101% and 120% of rated load; must trip instantaneously at 120% and above.

Ambient Compensating

Time delay will decrease as ambient temperature is raised and increase as ambient is lowered.

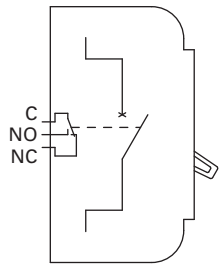
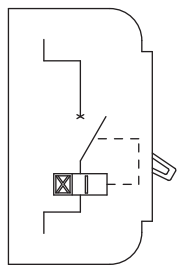
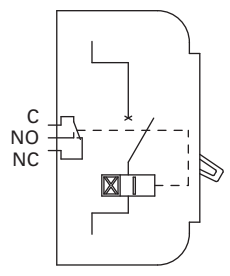
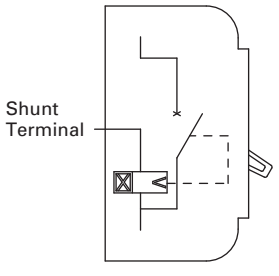
Note: These curves are presented for product selection purposes only. For detailed curve information by frame, please visit www.eaton.com/heinemann.

Heinemann circuit breakers are available in a variety of electrical configurations. When ordering a breaker, you must specify the internal circuit type. Each pole can be configured separately, making the design flexible around your application.

The most common configuration is "Series Trip" which means that the magnetic coil is in series with the main power circuit of the breaker, providing overcurrent protection. By configuring poles separately, you can design equipment that will work in multiple environments.

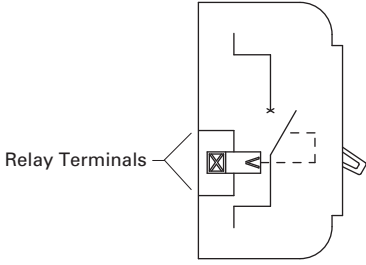
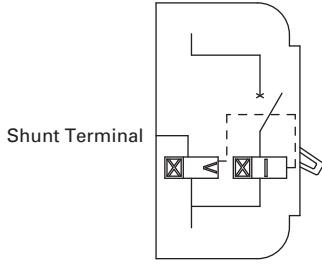
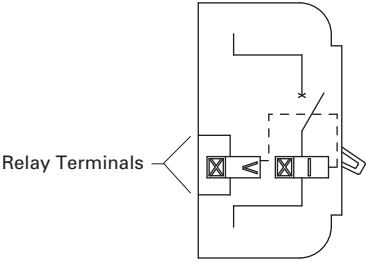
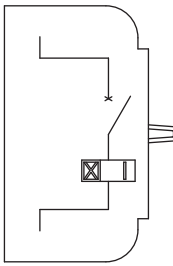
For instance, by configuring individual poles with different amperage ratings, you could design your equipment to work on different voltages. You could also use the relay trip function to shut down the power circuit while leaving the control circuit energized during a system fault.

Table 45-554. Internal Circuits

Circuit	Diagram	Description
Switch	Internal Circuits Represented: 0, 12 	Switch only (without coil) with or without auxiliary contact.
Series Trip	Internal Circuits Represented: 3, 8 	The contacts and the coil are in series. It is often used as the main switch.
Series Trip With Auxiliary Contact	Internal Circuits Represented: 2, 9 	The contacts and the coil are in series. Auxiliary contacts are placed behind the circuit breaker and mechanically connected to the releasing system.
Shunt Tap	Internal Circuit Represented: 5 	Enables two loads to be checked by means of a single circuit breaker. However, it only releases if there is an overload in the main circuit. The sum of the two nominal currents must not exceed the peak current of the contacts. With this execution, it is also possible to adjust the tripping through a potentiometer between the load terminals.

Internal Circuits

Table 45-554. Internal Circuits (Continued)

Circuit	Diagram	Description
Relay Trip	<p>Internal Circuit Represented: 6</p>  <p>Relay Terminals</p>	<p>Relay tripping can be used for releasing the circuit breaker by the intermediary of a monitor or a safety device installed at a distance. The contacts are electrically separated from the coil. Consequently, all the currents and voltages within the permissible limits can be used. Coils are either current or voltage sensitive.</p>
Dual Control (DUCON)	<p>Internal Circuits Represented: 15, 25</p>  <p>Shunt Terminal</p>	<p>The version is used both for the protection of the load finding itself in series with the circuit breaker and for the release via a voltage. The main coil is in series with the contact and the DUCON coil is shunt trip.</p>
Dual Control DUCON (Series + Relay)	<p>Internal Circuits Represented: 16, 26</p>  <p>Relay Terminals</p>	<p>Dual Control DUCON allows separate control of the shunt trip coil when the load is not energized. Similar to a shunt trip coil in a molded case breaker.</p>
Mid-Trip	<p>Internal Circuit Represented: 98</p> 	<p>Series overload, mid-trip handle position.</p>

Circuit Breaker Series

Product Selection

KD Series



KD Series Pushbutton

A low-cost pushbutton supplementary protector for electrical equipment. Designed to fit a standard 5/8" round or "D" shaped panel cutout. With a variety of accessories, the KD Series is a perfect replacement for traditional panel-mounted fuse holders.

Table 45-555. KD Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Thermal	1	250 Vac	0.25 – 20 A	1 kA
		32 Vdc	0.25 – 15 A	0.2 kA
		50 Vdc	0.25 – 10 A	0.2 kA

PROPAK Series



PROPAK Series Circuit Breaker

Miniature single- or 2-pole circuit breaker available with paddle or rocker handle. Available with or without illumination and a variety of internal accessories including auxiliary switches and remote tripping options. Carries UL 1077, CSA and VDE approvals.

Table 45-556. PROPAK Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	250 Vac	0.1 – 20 A	1 kA
		50 Vdc	0.1 – 20 A	1 kA
		72 Vdc	0.1 – 20 A	1 kA

J Series



J Series Circuit Breaker

Small lightweight hydraulic-magnetic circuit breaker perfect for telecom and marine applications. Available in ratings from 0.1 – 50 amperes, the J Series offers a variety of options including snap-in mounting and rocker style handles. The compact size of the J Series makes it well suited for applications where space comes at a premium.

Table 45-557. J Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	125 Vac	0.2 – 50 A	1 kA ①
		250 Vac	0.1 – 50 A	5 kA ①
	3	415 Vac	0.1 – 30 A	1.5 kA ①
		32 Vdc	0.1 – 50 A	5 kA
	4	72 Vdc	0.1 – 30 A	2 kA
		80 Vdc	0.1 – 20 A	1 kA

① With series fuse.

SPHM Series



SPHM Series Circuit Breaker

The SPHM Series Circuit Breaker snaps easily onto a standard 35 mm DIN rail. This saves valuable installation time. Available with a wide range of accessories, the SPHM Series is the perfect alternative to DIN-rail mounted fuse blocks.

Table 45-558. SPHM Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	250 Vac	0.1 – 63 A	5 kA
	2	480/277 Vac	0.1 – 30 A	3 kA
	3	80 Vdc	0.1 – 63 A	5 kA
	4	—	—	—

AMR Series



AMR Series Circuit Breaker

Ultra-high interrupting circuit breaker for single- or multi-pole applications. The AMR Series delivers significant performance advantages in a compact package. Available as a UL 489 listed device, suitable for branch circuit protection, the AMR can be used in a wide variety of applications, including lighting and power distribution equipment. Also carries UL 1077, CSA and TUV approvals.

Table 45-559. AMR Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	120/240 Vac	0.2 – 30 A	10 kA ①
	2	250 Vac	0.1 – 100 A	3 kA ①
	3	277 Vac	0.2 – 20 A	10 kA ②
	4	480 Vac	0.1 – 30 A	3 kA ②
		80 Vdc	0.1 – 100 A	5 kA
		125 Vdc	0.1 – 100 A	5 kA

① 5 kA with series fuse.
② With series fuse.

C Series



C Series Circuit Breaker

High-current circuit breaker for single- or multi-pole applications, the C Series is one of Eaton's most versatile breakers. With a 600 Vac rating and the ability to select from a variety of trip curves, the C Series is an alternative to thermal-magnetic breakers in harsh environments or when precision is essential.

Table 45-560. C Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	240 Vac	1 – 100 A	5 kA
	2	480 Vac	0.1 – 100 A	Up to 10 kA ③
	3	600 Vac	0.1 – 77 A	Up to 10 kA ③
	4	125 Vdc	0.1 – 100 A	5 kA

③ With series fuse.

GH Series



GH Series Circuit Breaker

The GH Series offers all of the advantages of a completely magnetic 3-pole breaker with a 14,000 ampere interrupting capacity. Perfect for applications in extreme environments where thermal-magnetic breakers would have otherwise been selected. The GH breaker is UL listed (489/508) for branch circuit applications.

Table 45-561. GH Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	480 Vac	0.5 – 100 A	14 kA
	2	250 Vdc	0.5 – 100 A	14 kA
	3	—	—	—

AM1P Series



AM1P Series Circuit Breaker

The AM1P breaker is designed for telecommunication sites with high current demands and limited space. With a 250 ampere current carrying capacity and improved interrupting ratings up to 50 kA, the AM1P breaker gives unparalleled performance in site applications. The AM1P series is UL 489A listed.

Table 45-562. AM1P Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	Multiple	80 Vdc	100 – 250 A	up to 50 kA
	—	—	—	—

Circuit Breaker Series

GJ Series



GJ Series Circuit Breakers

High-current circuit breakers in a compact package, the GJ Series offers protection up to 250 amperes. Add the precision of hydraulic-magnetic protection on your critical loads over 100 amperes.

Table 45-563. GJ Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	250 Vac	0.5 – 250 A	10 kA
	2	250 Vdc	0.5 – 250 A	10 kA
	3	—	—	—

GJ1P Series



GJ1P Series Circuit Breaker

Similar to the GJ, the GJ1P Series has increased capacity and is available in current ratings up to 1200 amperes. The GJ1P is a UL 489 listed device delivering superior performance.

Table 45-564. GJ1P Series Ratings

Technology	Poles	Voltage	Current	Int. Capacity
Hydraulic-Magnetic	1	65 Vac	100 – 1200 A	25 kA
	2	160 Vdc	100 – 1200 A	10 kA
	3	—	—	—

KD Series



KD Series Pushbutton Circuit Protector

Product Description

The KD Pushbutton Circuit Protector provides circuit protection similar to a fuse but does not require replacement after a fault. This resettable design allows your customer to stay online and eliminate downtime.

Features, Benefits and Functions

- Easy installation — The KD Series is easily installed in a 5/8" round or D-Shaped panel cutout similar to that used on conventional panel-mounted fuse holders. It can be mounted from either the front or rear and is held in place by special hardware. Its 1/4" quick-connect terminals are solderable.
- Resettable pushbutton circuit protector:
 - Provides basic thermal protection
 - Ratings from 0.25 – 20 amperes
 - UL recognized
- Positive action — The KD Pushbutton Circuit Protector trips without delay on short circuit, and with a controlled delay upon sustained overloads upon tripping, the contacts open with a positive snap action, thereby suppressing the arc.
- Protective covers — For applications where equipment may be exposed to dust or moisture, protective boots are available. Two styles are available, one which protects the breaker from splashing water and another which seals the panel opening.

Standards and Certifications

The KD Series has been tested to meet the requirements of UL 1077, and is recognized as a supplemental protector by UL. We also carry CSA approval for applications in Canada.

Technical Data and Specifications

Dimensions in Inches and (mm)

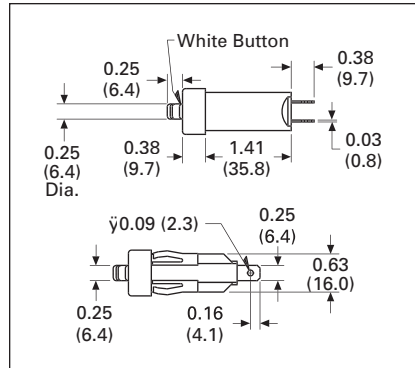


Figure 45-84. Dimensions with Front Mount Clip Installed

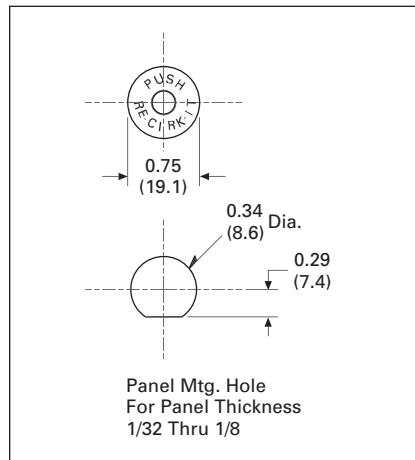


Figure 45-85. Panel Mounting Hole

Accessories

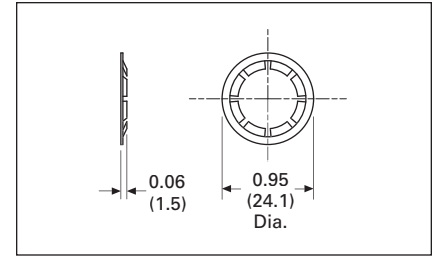


Figure 45-86. #006-10417 Retaining Ring

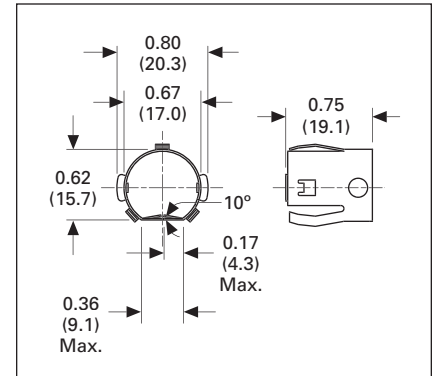


Figure 45-87. #006-10478 Front Mount Clip

Product Selection

Table 45-565. KD Series Standard Product Offering

Current Amperes	Catalog Number	Price U.S. \$
.25	KD1-0R25	
.50	KD1-0R50	
.75	KD1-0R75	
1.00	KD1-1	
1.50	KD1-1R5	
1.75	KD1-1R75	
2.00	KD1-2	
2.50	KD1-2R5	
3.00	KD1-3	
4.00	KD1-4	
5.00	KD1-5	
6.00	KD1-6	
7.00	KD1-7	
8.00	KD1-8	
9.00	KD1-9	
10.00	KD1-10	
15.00	KD1-15	
20.00	KD1-20	

To order the slip-on boot, choose Catalog Number 006-10469 or for a panel sealing version, purchase Catalog Number 006-10528.

PROPAK Series

PROPAK Series



PROPAK Hydraulic-Magnetic Breaker

Product Description

The PROPAK offers the performance of a hydraulic-magnetic breaker in a miniature package. Available in 1- or 2-pole versions, the PROPAK can be used in a variety of applications up to 250 Vac. All breakers ship with mounting hardware included and have quick-connect terminals for fast installation.

Features, Benefits and Functions

45

- Time delay options — Choose from instantaneous or standard time delay curves 2 or 3. A high inrush version is also available.
- Hydraulic-magnetic circuit protector:
 - 1- or 2-poles
 - 0.1 to 20 amperes
 - Auxiliary switch option
 - Meets MIL-STD for shock, vibration, temperature and humidity
- Accessories — Some popular accessories include optional internal auxiliary contacts and screw terminal adapters.

Standards and Certifications

The PROPAK series is UL recognized under UL 1077 and carries CSA approval. Each unit carries an interrupting capacity of 1 kA at maximum voltage of 250 Vac or 72 Vdc.

Technical Data and Specifications

Dimensions in Inches and (mm)

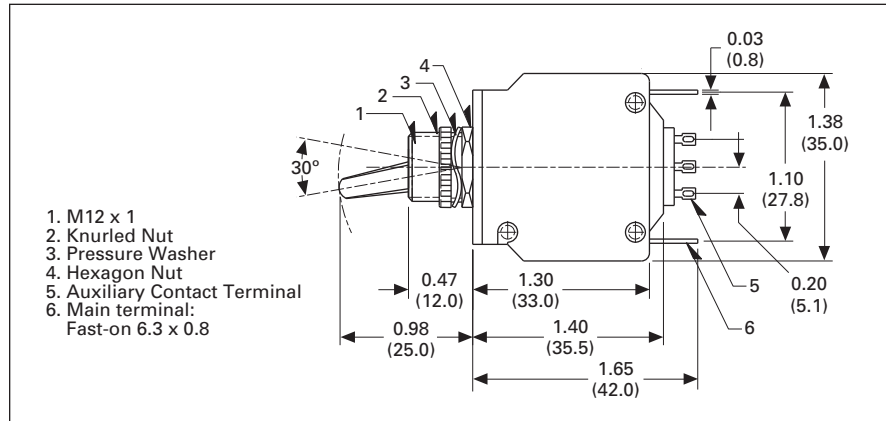


Figure 45-88. Type PBB 1-Pole

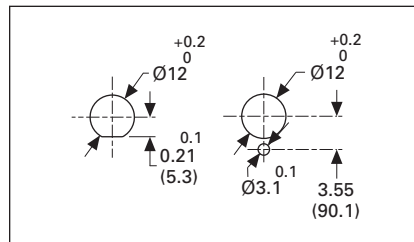


Figure 45-89. Panel Cut-out

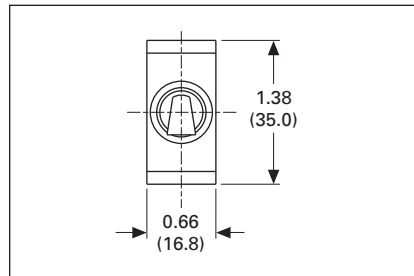


Figure 45-90. Type PBB 1-Pole

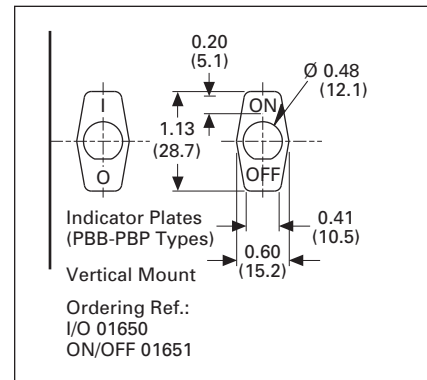
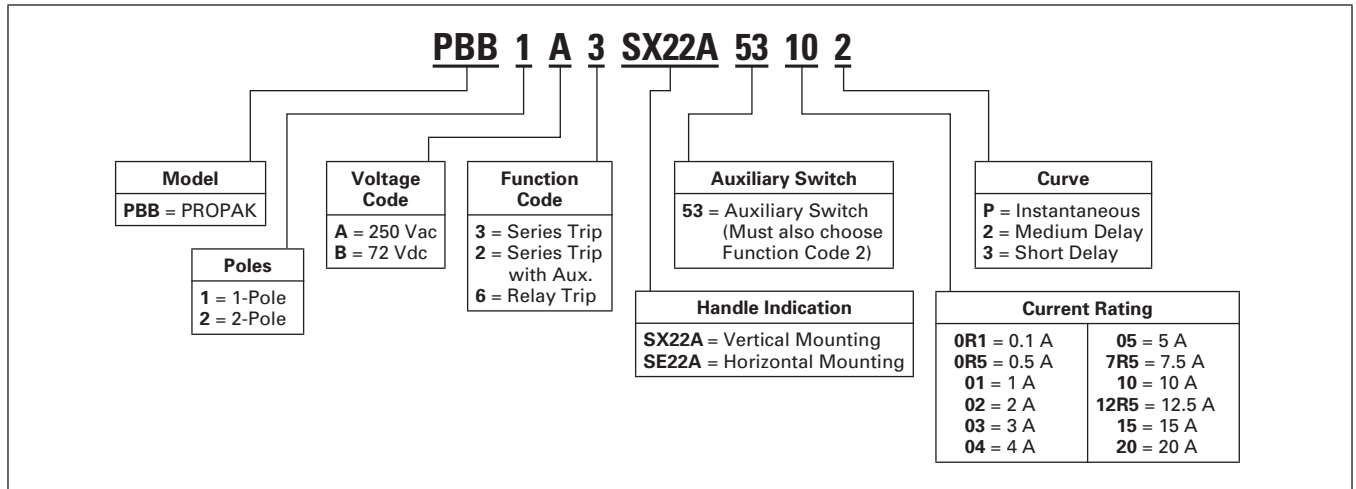


Figure 45-91. Indicator Plates

Product Selection

Table 45-566. PROPAK Series Catalog Numbering System



J Series

J Series



Standard Style JA Snap-in Mounting JB



Rocker Style JC



Sealed Toggle JE

Product Description

Eaton's J Series is one of the most versatile breakers offered in the Heine-mann product line. The J Series can be used in a wide variety of applications including tele-com, rail, marine and mobile equipment. Multiple mounting and handle configurations allow you to customize your equipment. These include rocker handles, snap-in mounting, sealed toggle actuators and color-coded handles.

Features, Benefits and Functions

- Compact size — The J Series breakers are small and lightweight, saving valuable space in crowded control panels or weight in portable equipment. Since the J Series is magnetically actuated, the breaker generates minimal heat, and breakers can be mounted in densely packed panels with no effect on performance.
- Easy installation — The J Series is designed for fast, easy panel mounting. Its round bezel eliminates square cuts during panel fabrication, and shortens panel production time. Cutout preparation is as simple as punching or drilling three common-center holes per breaker.

- Terminals — The J Series is ready to accept either standard push-on or screw terminal connections.
- Accessories — Available with integral auxiliary switches, shunt and relay trip options, as well as a variety of external accessories including protective shields and adapter plates.
- Harsh environments — In areas where the breaker may be subjected to water spray or splashing, the J Series is available in a sealed mounting version. Utilizing a molded silicone rubber seal, the exposed handle is protected from the elements when used in conjunction with a sealed panel. For areas requiring a completely sealed breaker, the J Series is also available in a UL 1500 Ignition-Protected Construction. Please refer to the Special Application section of this brochure.

Standards and Certifications

The J Series is ready for your global applications. In addition to UL 1077, the breaker also carries CSA and IEC 380 approvals.

Technical Data and Specifications

Dimensions in Inches and (mm)

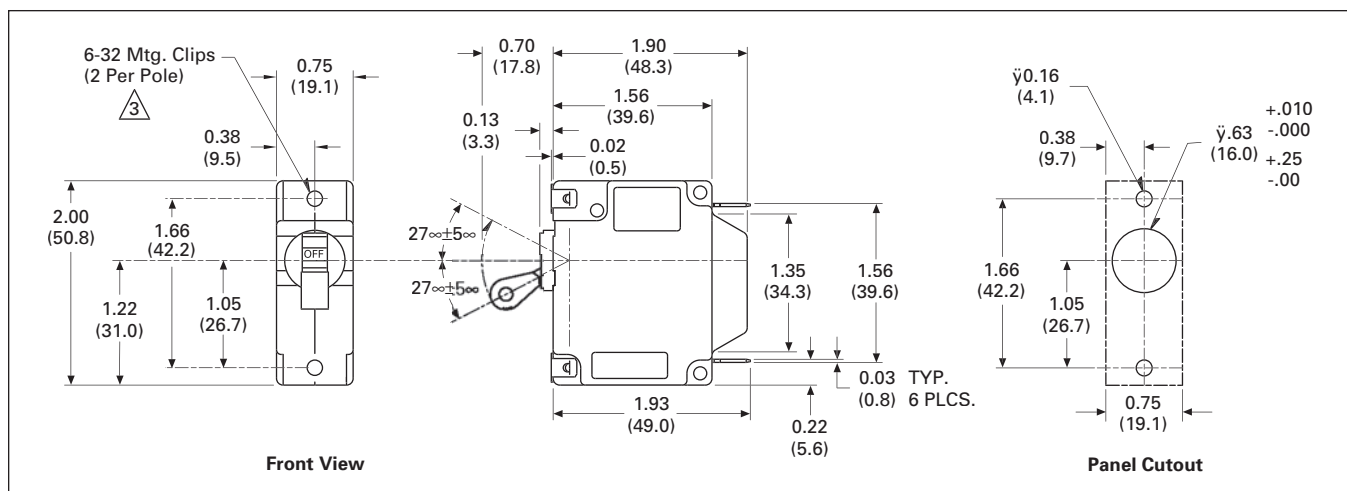


Figure 45-92. J Series Basic Dimensions

J Series

Product Selection

Stock Availability

Standard breaker configurations are available from our regional distribution centers or from one of our 2,300 distributor locations worldwide.

Standard Breaker Configurations

The J Series can be ordered in a number of standard configurations utilizing the table to the right. Once you create your catalog number, you can contact our Technical Resource Center for verification and quotations.

Custom Applications

The J Series is also available in a number of custom configurations to meet your specific application needs. To order a special application breaker, you can visit our Web site at www.eaton.com/heinemann for a list of custom modifications and information on how to obtain a proprietary catalog number. You may also contact the Technical Resource Center for application information and breaker selection assistance.

**Table 45-567. Standard Product Offering
250 Vac/65 Vdc Push-on Terminals**

Poles	Current (Amperes)	Curve	Catalog Number	Price U.S. \$
1	1	2	JA1SD3A000102E	
1	1	3	JA1SD3A000103E	
1	2.5	2	JA1SD3A02R502E	
1	2.5	3	JA1SD3A02R503E	
1	5	2	JA1SD3A000502E	
1	5	3	JA1SD3A000503E	
1	7.5	2	JA1SD3A07R502E	
1	7.5	3	JA1SD3A07R503E	
1	10	2	JA1SD3A001002E	
1	10	3	JA1SD3A001003E	
1	15	2	JA1SD3A001502E	
1	15	3	JA1SD3A001503E	
1	20	2	JA1SD3A002002E	
1	20	3	JA1SD3A002003E	
1	25	2	JA1SD3A002502E	
1	25	3	JA1SD3A002503E	
1	30	2	JA1SD3A003002E	
1	30	3	JA1SD3A003003E	
2	1	2	JA2SD3A000102E	
2	1	3	JA2SD3A000103E	
2	2.5	2	JA2SD3A02R502E	
2	2.5	3	JA2SD3A02R503E	
2	5	2	JA2SD3A000502E	
2	5	3	JA2SD3A000503E	
2	7.5	2	JA2SD3A07R502E	
2	7.5	3	JA2SD3A07R503E	
2	10	2	JA2SD3A001002E	
2	10	3	JA2SD3A001003E	
2	15	2	JA2SD3A001502E	
2	15	3	JA2SD3A001503E	
2	20	2	JA2SD3A002002E	
2	20	3	JA2SD3A002003E	
2	25	2	JA2SD3A002502E	
2	25	3	JA2SD3A002503E	
2	30	2	JA2SD3A003002E	
2	30	3	JA2SD3A003003E	
3	1	2	JA3SD3A000102E	
3	1	3	JA3SD3A000103E	
3	2.5	2	JA3SD3A02R502E	
3	2.5	3	JA3SD3A02R503E	
3	5	2	JA3SD3A000502E	
3	5	3	JA3SD3A000503E	
3	7.5	2	JA3SD3A07R502E	
3	7.5	3	JA3SD3A07R503E	
3	10	2	JA3SD3A001002E	
3	10	3	JA3SD3A001003E	
3	15	2	JA3SD3A001502E	
3	15	3	JA3SD3A001503E	
3	20	2	JA3SD3A002002E	
3	20	3	JA3SD3A002003E	
3	25	2	JA3SD3A002502E	
3	25	3	JA3SD3A002503E	
3	30	2	JA3SD3A003002E	
3	30	3	JA3SD3A003003E	

Table 45-568. J Series Catalog Numbering System

JA1S A 3 A 0015 01 E

Style ①	Number of Poles	Description	Handle Color	Mounting
JA_S	1 to 4	Toggle Handle	White ON/OFF	6-32
JB_S	1 to 4	Snap-in Mount	White ON/OFF	N/A
JC_S	1 to 4	Rocker Handle	White ON/OFF	6-32
JE_S	1 to 3	Sealed Toggle	N/A	3/8-32

Code	Frequency	Terminal Location	Maximum Voltage
A	50/60 Hz	Push-on	277 ac
T	50/60 Hz	8-32 Screw	277 ac
K	50/60 Hz	10-32 Screw	277 ac
B	dc	Push-on	65 dc
V	dc	8-32 Screw	65 dc
L	dc	10-32 Screw	65 dc
D	60 Hz/dc	Push-on	250 ac/65 dc
E	60 Hz/dc	8-32 Screw	250 ac/65 dc
R	60 Hz/dc	10-32 Screw	250 ac/65 dc
C	400 Hz	Push-on	250 ac
W	400 Hz	8-32 Screw	250 ac
N	400 Hz	10-32 Screw	250 ac

Approval Code				
A	Up to 250 Vac UL 1077			
L	Up to 65 Vdc UL 1077			

Internal Circuit Type and Inrush Catalog Code				
N/A	STD	18X	25X	Internal Circuit
0	—	—	—	Switch Only
—	3	8	38	Series Trip
—	2	9	39	Series Trip w/Aux.
—	5	—	—	Shunt/Tap
—	6	—	—	Relay Trip

Current Rating ②	
Code	Current (Amperes)
0R02	0.02
0R10	0.10
0R25	0.25
0R50	0.50
0R75	0.75
0001	1
02R5	2.5
0005	5
07R5	7.5
0010	10
0015	15
0020	20
0025	25
0030	30
0040	40
0050	50

Voltage Rating	
E	0 – 250 Vac
F	251 – 277 Vac
G	415 Vac ③
N	0 – 65 Vdc

Time Delay Curve	
0P	Instant
01	Long Delay Std. Inrush
02	Medium
03	Short
10	Long Delay 18X Inrush
20	Medium Delay 18X Inrush
251	Long Delay 25X Inrush
252	Medium Delay 25X Inrush
253	Short Delay 25X Inrush

① Choose style and select from 1 to 4 poles, and enter the number in position 3 of the catalog number. For example, a JA1S would identify a 1-pole JA Series breaker.
 ② Enter the four digit current rating. For example, use code "0015" for a 15 ampere current rating. For fractional amperages, use an "R" to designate the decimal point. For 0.10 ampere, enter the code "0R10."
 ③ Non-standard. Consult technical support 1-800-356-1243.

SPHM Series

SPHM Series



SPHM Series Circuit Breaker

Product Description

The SPHM Series Circuit Breaker line is designed to provide supplementary protection on ac circuits up to 250 volts or stand-alone overcurrent and short-circuit protection on dc circuits up to 80 volts. Recognized by UL and CSA, the SPHM Series has the features required by panel builders and meets the requirements of UL 508A when utilized in control circuits.

Application Description

SPHM Series Circuit Breakers are DIN-rail mountable for quick installation,

and are perfect for a wide range of applications including:

- Motor control circuits.
- Control power transformers.
- Relays.
- Contactor coils.
- PLC I/O points.

With proven hydraulic-magnetic protection, the SPHM Series Circuit Breaker can be used to provide precision protection regardless of ambient temperature.

Features, Benefits and Functions

- Environmental, vibration and shock resistant — Mil-spec qualification for fungus resistance, humidity, salt spray resistance and shock vibration resistance.
- Heat-induced nuisance tripping eliminated — The protector is designed to “hold in” at 100% continuous rated current, regardless of ambient temperatures from -40°C to +85°C.
- Immediate reset after trip — The protector can be reset (closed) immediately after an overcurrent trip without a “cooling off” period.

- 1/2 cycle high inrush tolerance — 8X (Standard), 18X and 25X — The protector is available with different levels of tolerance to 1/2 cycle current spikes. Standard tolerance is 8X the continuous current rating; in addition 18X and 25X are also available.
- Overcurrent curves, long, medium or short delay — Time characteristic curves are available as Short, Medium and Long Delay.
- Integral auxiliary switch (optional selection) — One auxiliary switch (a or b) can be factory installed per pole — a separate pole for auxiliary is NOT required. Contact Eaton for price adder.
- Precise overcurrent calibration — The protector can be precisely calibrated to a wide variety of current ratings, from 0.1 to 50 continuous amperes.
- DIN-rail mountable — The protector can be easily mounted, utilizing its quick release spring clip to attach it to a 35 mm DIN rail.

Standards and Certifications

UL recognized under UL 1077, CSA 22.2, VDE 0660, IEC 60947-2.

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Technical Data

Dimensions in Inches and (mm)

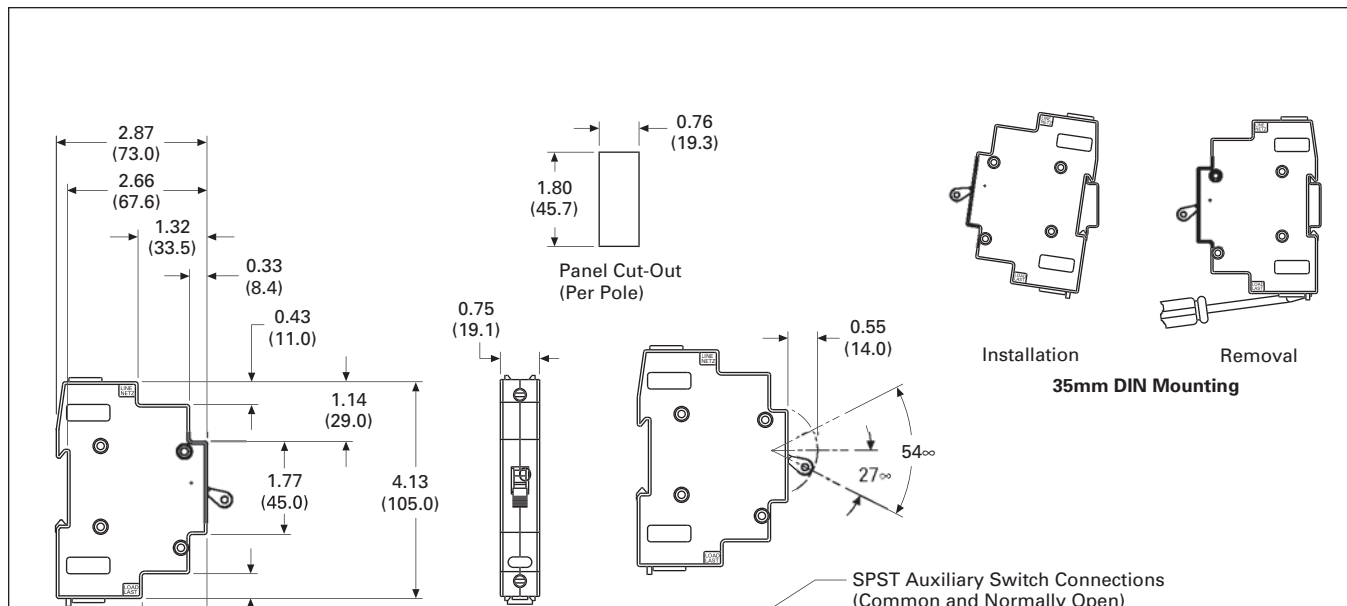


Figure 45-93. SPHM Basic Dimensions

SPHM Series

Product Selection

Standard Breaker Configurations

The SPHM Series can be ordered in a number of standard configurations utilizing the table to the right. Once you create your catalog number, you can contact our Technical Resource Center for verification and quotations.

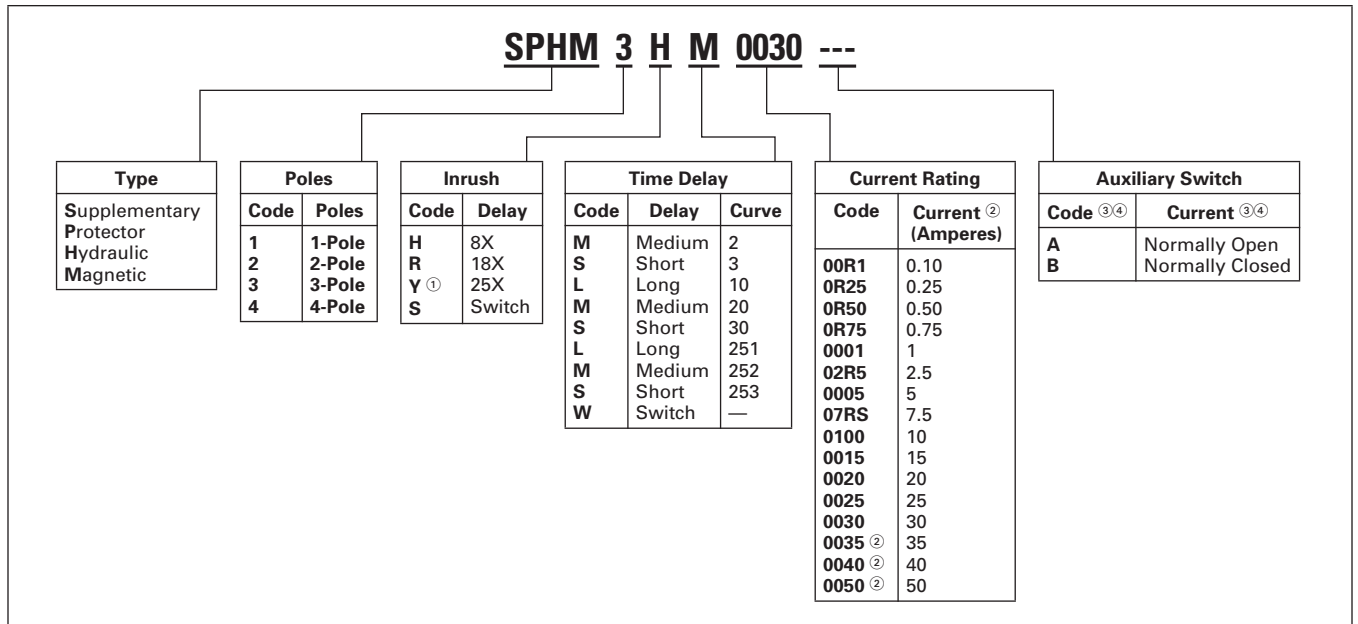
Custom Applications

The SPHM Series is also available in a number of custom configurations to meet your specific application needs. To order a special application breaker, you can visit our Web site at www.eaton.com/heinemann for a list of custom modifications and information on how to obtain a proprietary catalog number. You may also contact the Technical Resource Center for application information and breaker selection assistance.

Table 45-569. SPHM Standard Product Offering

Poles	Current (Amperes)	Curve	Catalog Number	Price U.S. \$
1	0.10	2	SPHM1RM00R1	
1	0.25	2	SPHM1RM0R25	
1	0.50	2	SPHM1RM0R50	
1	0.75	2	SPHM1RM0R75	
1	1.00	2	SPHM1RM0001	
1	2.50	2	SPHM1RM02R5	
1	5.00	2	SPHM1RM0005	
1	7.50	2	SPHM1RM07R5	
1	10.0	2	SPHM1RM0010	
1	15.0	2	SPHM1RM0015	
1	20.0	2	SPHM1RM0020	
1	25.0	2	SPHM1RM0025	
1	30.0	2	SPHM1RM0030	
1	35.0	2	SPHM1RM0035	
1	40.0	2	SPHM1RM0040	
1	50.0	2	SPHM1RM0050	
2	0.10	2	SPHM2RM00R1	
2	0.25	2	SPHM2RM0R25	
2	0.50	2	SPHM2RM0R50	
2	0.75	2	SPHM2RM0R75	
2	1.00	2	SPHM2RM0001	
2	2.50	2	SPHM2RM02R5	
2	5.00	2	SPHM2RM0005	
2	7.50	2	SPHM2RM07R5	
2	10.0	2	SPHM2RM0010	
2	15.0	2	SPHM2RM0015	
2	20.0	2	SPHM2RM0020	
2	25.0	2	SPHM2RM0025	
2	30.0	2	SPHM2RM0030	
2	35.0	2	SPHM2RM0035	
2	40.0	2	SPHM2RM0040	
2	50.0	2	SPHM2RM0050	
3	0.10	2	SPHM3RM00R1	
3	0.25	2	SPHM3RM0R25	
3	0.50	2	SPHM3RM0R50	
3	0.75	2	SPHM3RM0R75	
3	1.00	2	SPHM3RM0001	
3	2.50	2	SPHM3RM02R5	
3	5.00	2	SPHM3RM0005	
3	7.50	2	SPHM3RM07R5	
3	10.0	2	SPHM3RM0010	
3	15.0	2	SPHM3RM0015	
3	20.0	2	SPHM3RM0020	
3	25.0	2	SPHM3RM0025	
3	30.0	2	SPHM3RM0030	
3	35.0	2	SPHM3RM0035	
3	40.0	2	SPHM3RM0040	
3	50.0	2	SPHM3RM0050	

Table 45-570. SPHM Series Catalog Numbering System



① Maximum of 40 amperes available at 25X inrush.
 ② UL recognized to 250 Vac, 5 kA above 30 amperes.
 ③ One A or B contact maximum per pole. Contacts will be arranged left to right (e.g. BAB suffix on 3-pole breaker).
 ④ Contact Eaton for availability and price at 1-800-356-1243.

AMR Series

AMR Series



Standard Style (AMR)



Illuminated Style (AML)



Rocker Style (ACR)

45

Product Description

The Heinemann AMR Series is the logical choice for applications requiring greater interrupting performance coupled with the sensitivity of hydraulic-magnetic protection. The precisely tailored time delays and ability to interrupt high currents make them ideal for critical applications.

Application Description

The AMR Series is designed for global applications, meeting a variety of international standards. It combines the proven high quality and reliability of the former AM Series with the spacing, dielectric and interrupt requirements of the IEC Standard 60947-2. The AMR Series carries the CE Mark, VDE and TUV approvals, and is available with metric hardware for OEMs exporting their equipment overseas.

Features, Benefits and Functions

- Current range up to 100 A 50/60 Hz ac/125 Vdc, 60 A 400 Hz ac.
- 100% rated.
- Plug-in, screw or stud terminals.
- Handles knurled for positive grip.
- Operating temperature -40°C to +85°C.
- Available with internal auxiliary or alarm switch, relay trip function and shunt tap.
- Shock-tested for shock in accordance with MIL-STD-202.
- Vibration-tested in accordance with MIL-STD-202.
- Dielectric strength tested in accordance with MIL-STD-202.
- Insulation resistance of 100 megaohms minimum at 500 Vdc, per MIL-STD-202.
- Flammability specifications of UL 94-VO case, UL 94-HB handle.
- Available with UL 1500 Ignition Protected for Marine Applications. Refer to the special applications section for more information.
- Direct replacement for discontinued AM and NAM/S models.

Handle Configurations

Standard Black Toggle

For industrial and commercial applications, where economical design and construction is a concern. Order Prefix "AMR."

Illuminated Toggle

Provides indication of breaker status via the integral multicolored LED. Can be custom configured for indication of ON, OFF, Tripped or Ready status. Order Prefix "AML."

Rocker Style

Used where style and performance is required. The rocker style handle delivers the performance of the AMR Series with European styling. Order Prefix "ACR."

Standards and Certifications

The AMR Series is UL 489 Listed and CSA certified for branch circuit applications. It is also UL 1077 recognized for use in panels where branch circuit protection is already provided. Available in a wide variety of configurations, the AMR Series is rated as high as 100 amperes at 240 Vac or 80 Vdc. It is the solution for demanding applications requiring up to 50,000 amperes interrupting capacity. The 50,000 amperes interrupting capacity is at 65 Vdc UL 489A, telecom applications.

All UL 489 listed configurations are suitable for normal and reverse feed connection, for easy installation.

Table 45-571. UL 489 Ratings

Poles	Current (Amperes)	Voltage	KA
1	0.02 – 100	65 Vdc	50
1, 2	0.02 – 50	120/240 Vac	10
3	0.02 – 30	240 Vac	10
1	0.02 – 20	277 Vac	10

Approvals

- UL 1077 recognized.
- UL 489 listed.
- UL 489A listed for telecom applications.
- IEC 60947-2.
- VDE.
- TUV.

Technical Data

Dimensions in Inches and (mm)

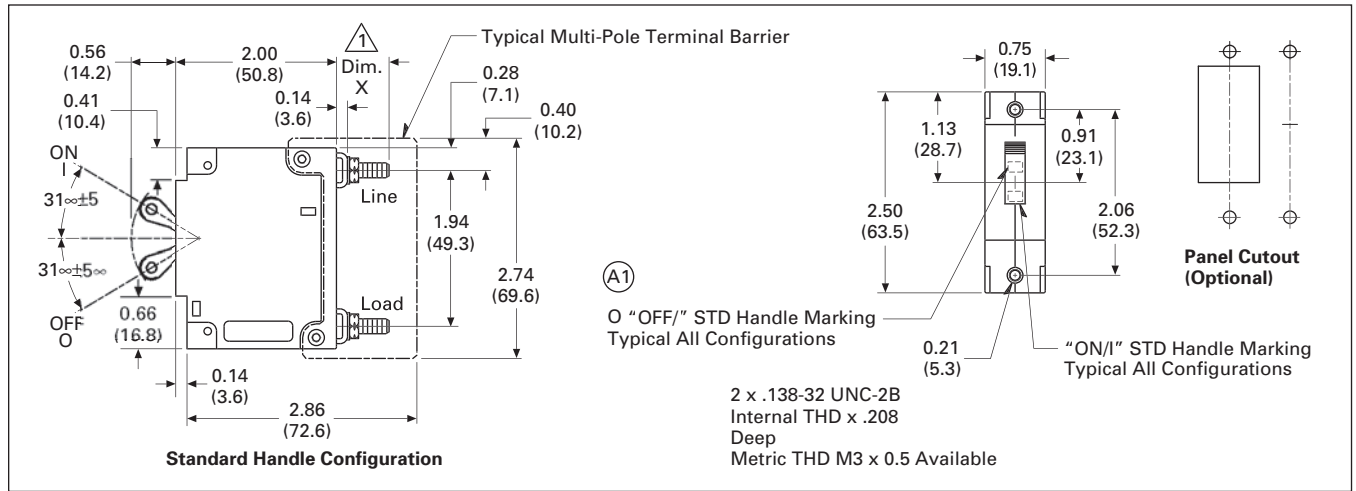


Figure 45-94. AMR Handle Configuration and Typical Dimensions

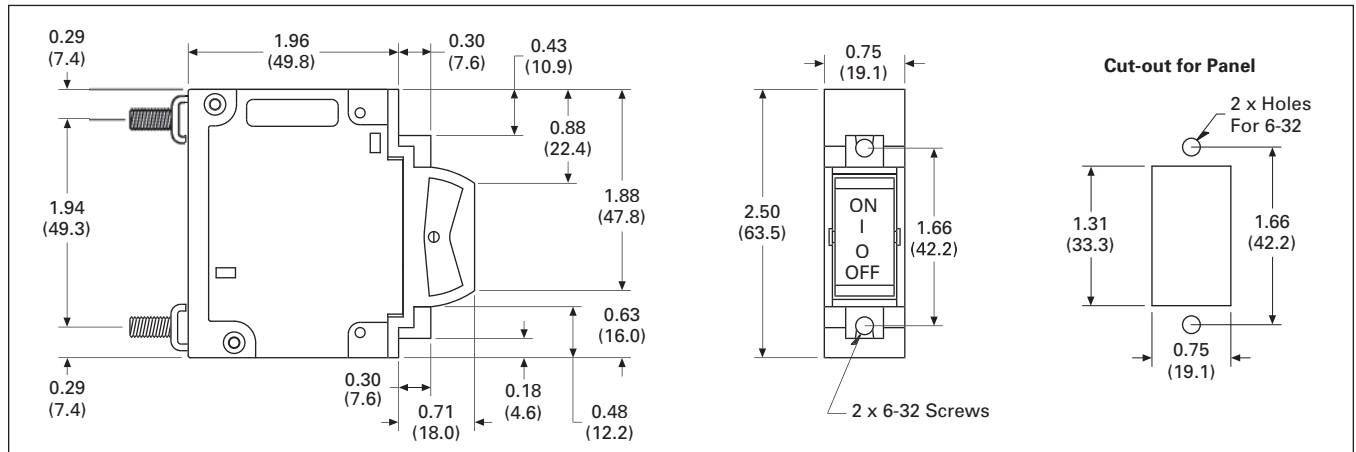


Figure 45-95. ACR Typical Dimensions

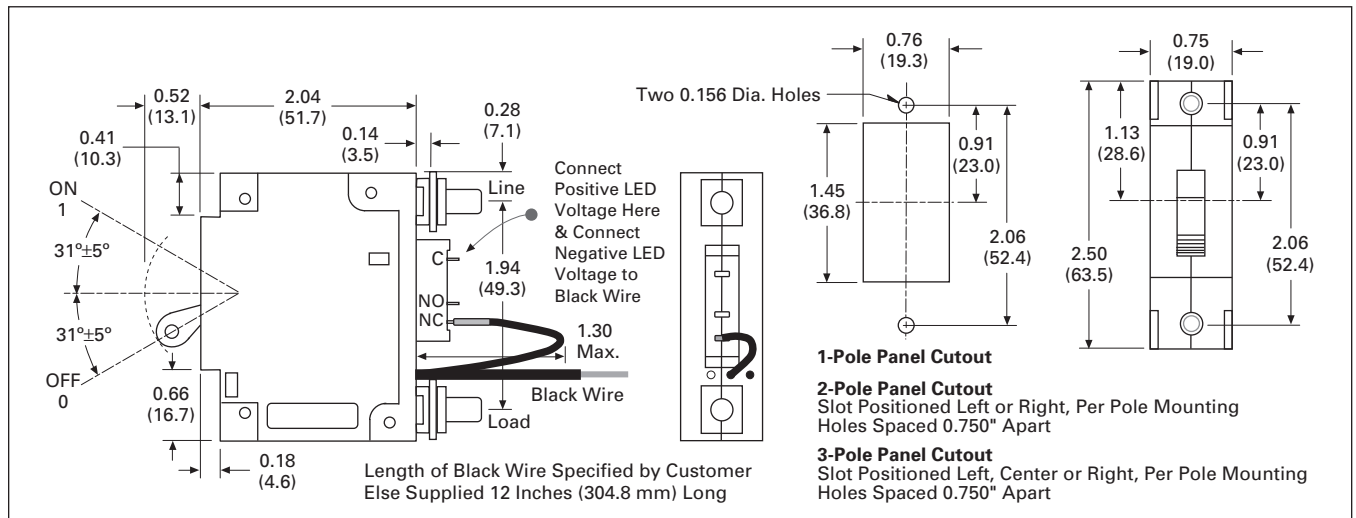


Figure 45-96. AML Typical Dimensions

AMR Series

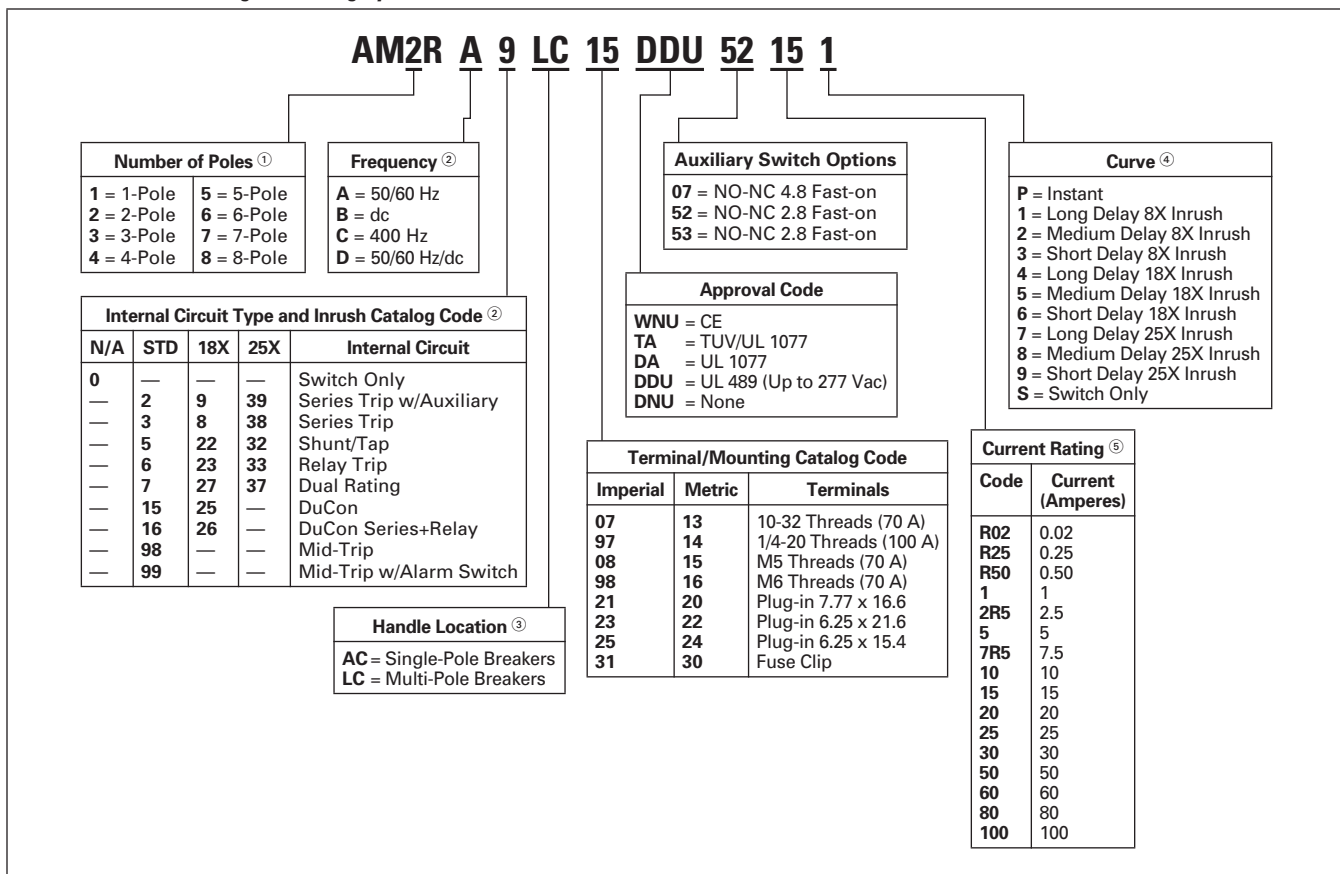
Product Selection

The following catalog numbers can be ordered from stock.

Table 45-572. AMR Standard Black Toggle Current

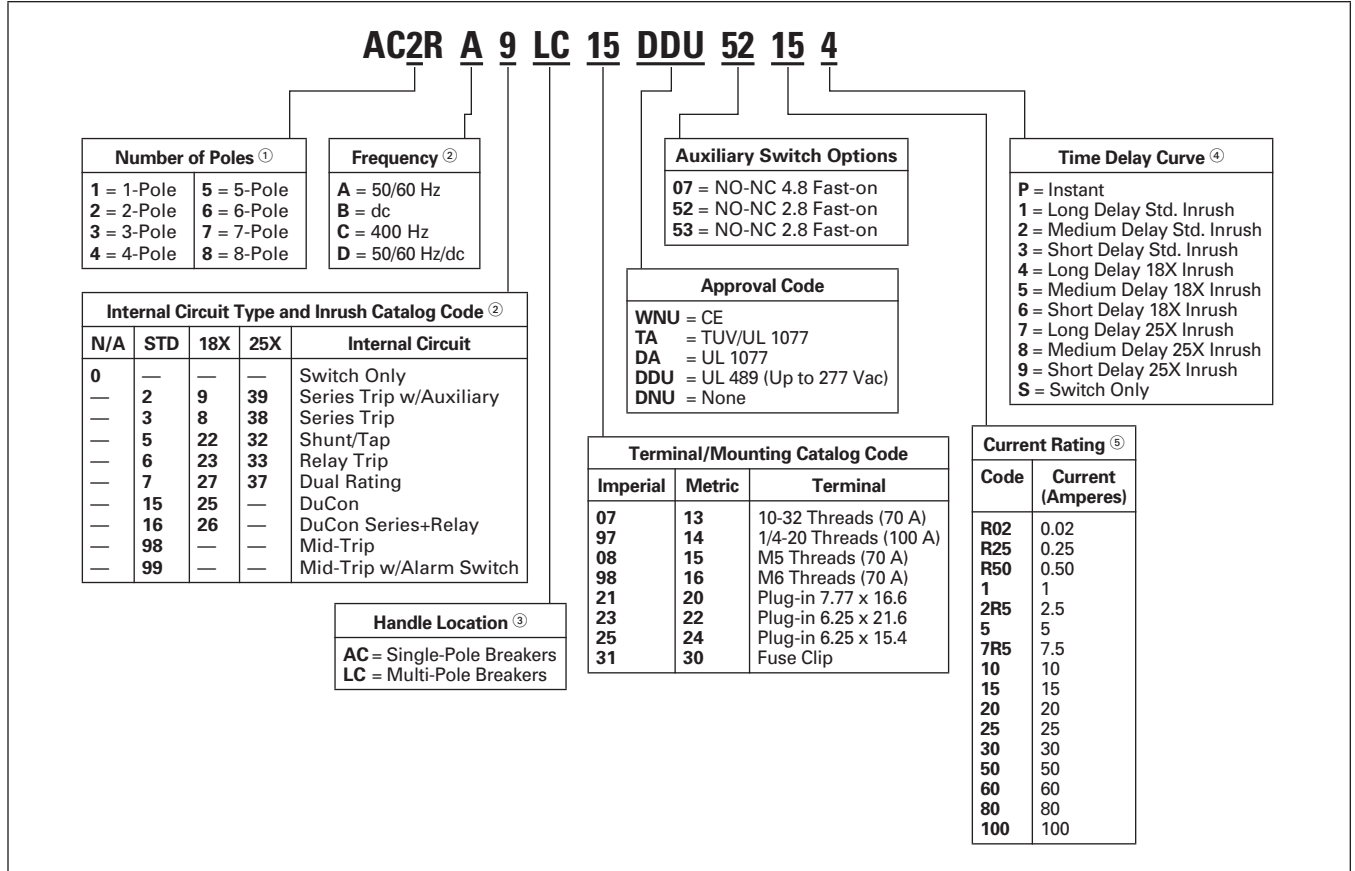
Current (Amperes)	Curve	1-Pole	Price U.S. \$	2-pole	Price U.S. \$	3-pole	Price U.S. \$
		Catalog Number		Catalog Number		Catalog Number	
1.00	2	AM1RA3AC07DA12		AM2RA3AC07DA12		AM3RA3AC07DA12	
2.50	2	AM1RA3AC07DA2R52		AM2RA3AC07DA2R52		AM3RA3AC07DA2R52	
5.00	2	AM1RA3AC07DA52		AM2RA3AC07DA52		AM3RA3AC07DA52	
7.50	2	AM1RA3AC07DA7R52		AM2RA3AC07DA7R52		AM3RA3AC07DA7R52	
10.0	2	AM1RA3AC07DA102		AM2RA3AC07DA102		AM3RA3AC07DA102	
15.0	2	AM1RA3AC07DA152		AM2RA3AC07DA152		AM3RA3AC07DA152	
20.0	2	AM1RA3AC07DA202		AM2RA3AC07DA202		AM3RA3AC07DA202	
30.0	2	AM1RA3AC07DA302		AM2RA3AC07DA302		AM3RA3AC07DA302	
50.0	2	AM1RA3AC07DA502		AM2RA3AC07DA502		AM3RA3AC07DA502	
80.0	2	AM1RA3AC97DA802		AM2RA3AC97DA802		AM3RA3AC97DA802	

Table 45-573. AMR Catalog Numbering System



- ① Select from 1 to 8 poles, and enter the number in position 3 of the catalog number. For example, an AM3L would identify a 3-pole AML breaker.
- ② On multi-pole breakers, Steps 2 and 3 can be repeated if subsequent poles are different than the first. Identification starts from left-hand side when viewing the front of the breaker.
- ③ These will provide standard handle locations. For additional options, contact the Technical Resource Center.
- ④ Specific data on trip curves can be found on the Web at www.eaton.com/heinemann.
- ⑤ Enter the whole number current rating. For example, use code "15" for a 15 A current rating. For fractional amperages, use an "R" to designate the decimal point. For 0.10 A, enter the code "R10." Current range up to 100 amperes 50/60 Hz, 60 amperes 400 Hz, 100 Adc.

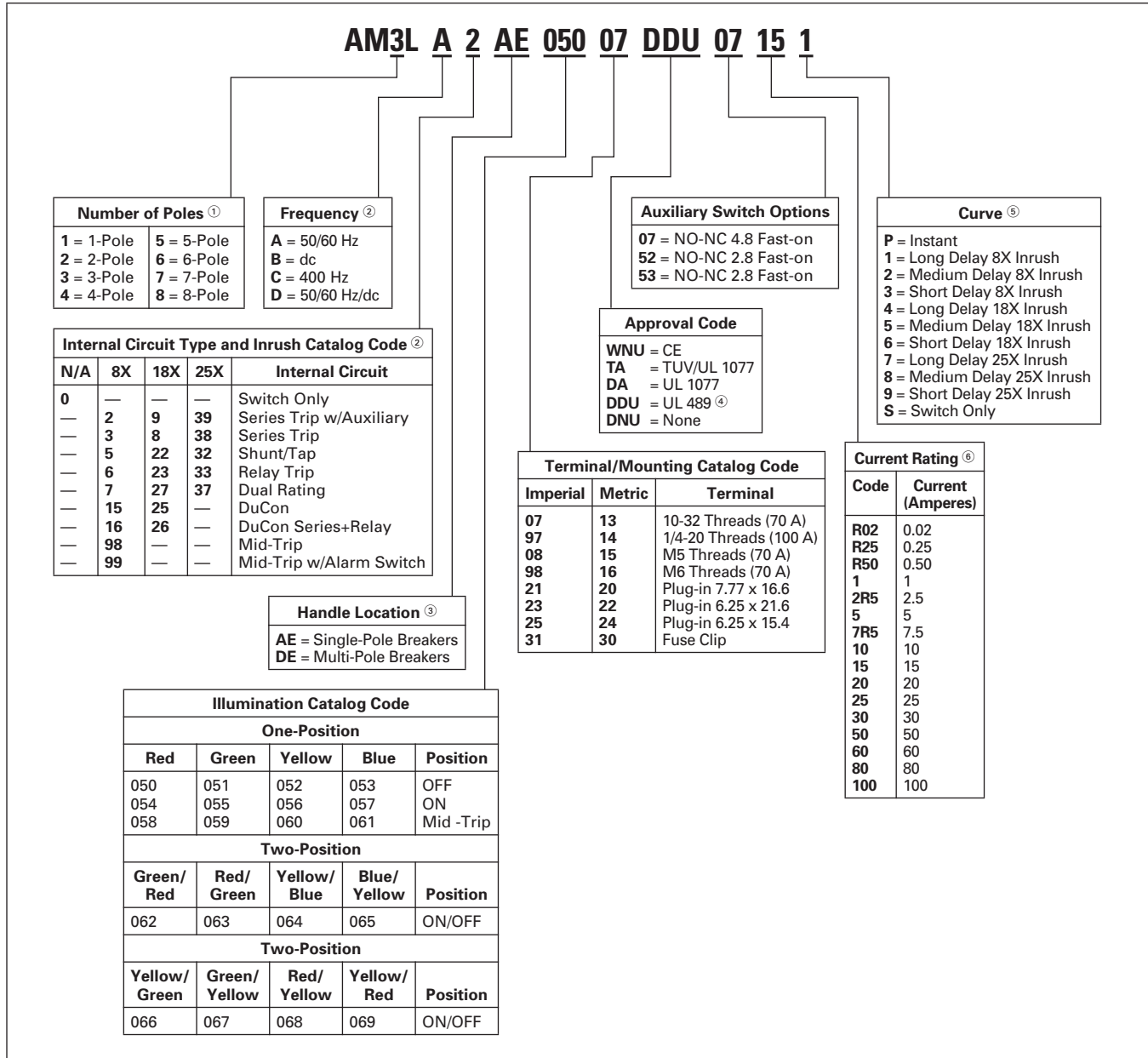
Table 45-574. ACR Catalog Numbering System



- ① Select from 1 to 8 poles, and enter the number in position 3 of the catalog number. For example, an AM3L would identify a 3-pole AML breaker.
- ② On multi-pole breakers, Steps 2 and 3 can be repeated if subsequent poles are different than the first. Identification starts from left-hand side when viewing the front of the breaker.
- ③ These will provide standard handle locations. For additional options, contact the Technical Resource Center.
- ④ Specific data on trip curves can be found on the Web at www.eaton.com/heinemann.
- ⑤ Enter the whole number current rating. For example, use code "15" for a 15 A current rating. For fractional amperages, use an "R" to designate the decimal point. For 0.10 A, enter the code "R10." Current range up to 100 amperes 50/60 Hz, 60 amperes 400 Hz, 100 Adc.

AMR Series

Table 45-575. AML Catalog Numbering System



- ① Select from 1 to 8 poles, and enter the number in position 3 of the catalog number. For example, an AM3L would identify a 3-pole AML breaker.
- ② On multi-pole breakers, Steps 2 and 3 can be repeated if subsequent poles are different than the first. Identification starts from left-hand side when viewing the front of the breaker.
- ③ These will provide standard handle locations. For additional options, contact the Technical Resource Center.
- ④ Up to 277 Vac.
- ⑤ Specific data on trip curves can be found on the Web at www.eaton.com/heinemann.
- ⑥ Enter the whole number current rating. For example, use code "15" for a 15 A current rating. For fractional amperages, use an "R" to designate the decimal point. For 0.10 A, enter the code "R10."

C Series

C Series



CD Rear Connection Front Mounting



CF Front Connected Back Panel Mounting

Product Description

Eaton's Heinemann C Series breakers incorporate the benefits of hydraulic-magnetic technology in a familiar molded case design. The C Series is popular in outdoor locations, in either high temperature or low temperature environments where nuisance tripping might have been a problem in the past.

Application Description

The C Series is built for a wide range of applications, and is one of the most versatile designs. From heating and air conditioning to modern railcars, the C Series breaker is built for the most demanding industrial applications.

With the precision overcurrent protection provided by the C Series, many manufacturers have been able to extend their warranties and deliver more reliability to their customers. Popular in the HVAC market, the C Series delivers true equipment protection, ensuring OEMs that their equipment will be safe in any environment.

Available in a wide range of mounting options, the C Series breaker can be ordered as either a front or back connected device.

Features, Benefits and Functions

- Environmental, vibration and shock resistant — Mil-spec qualification for fungus resistance, humidity, salt spray resistance and shock vibration resistance.
- Heat-induced nuisance tripping eliminated — The protector is designed to “hold in” at 100% continuous rated current, regardless of ambient temperatures from -40°C to +85°C.

- Immediate reset after trip — The protector can be reset (closed) immediately after an overcurrent trip without a “cooling off” period.
- 1/2 cycle high inrush tolerance – 8X (Standard) and 25X — The protector is available with different levels of tolerance to 1/2 cycle current spikes. Standard tolerance is 8X the continuous current rating; in addition, 25X is also available.
- Overcurrent curves, long, medium or short delay — Time characteristic curves are available as Short, Medium and Long Delay.
- Integral auxiliary switch (optional selection) — One auxiliary switch (a or b) can be factory installed per pole. A separate pole for auxiliary is NOT required. Contact Eaton for price adder.
- Precise overcurrent calibration — The protector can be precisely calibrated to a wide variety of current ratings, from 0.1 to 100 continuous amperes.

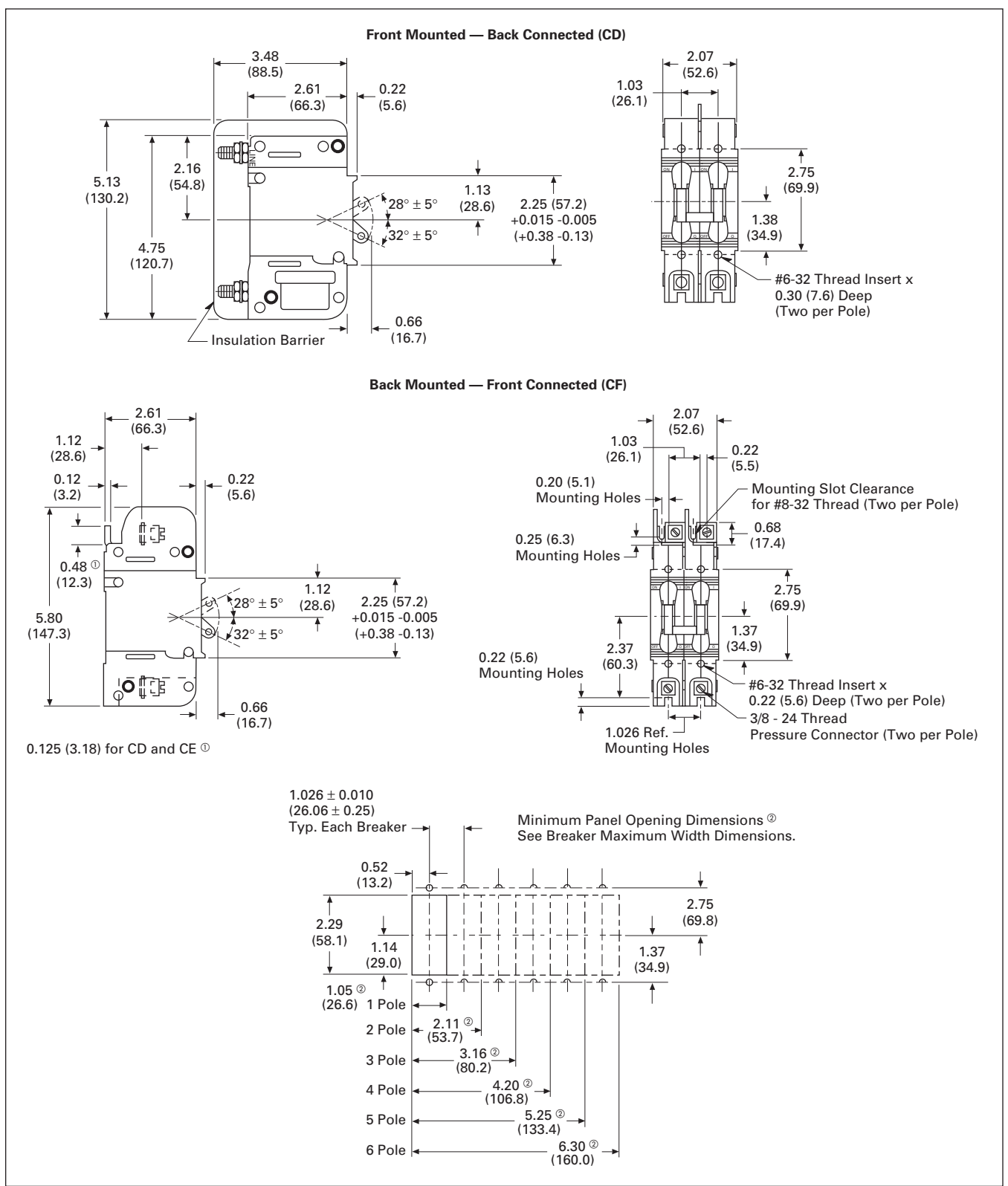
Standards and Certifications

- UL 1077/UL 489 and CSA 22.2.
- Due to its rugged construction, the C Series is UL listed through 240 Vac or 125 Vdc. The breaker also carries ratings up to 600 Vac as a UL Recognized Device under UL 508.

C Series

Technical Data

Dimensions in Inches and (mm)



45

Figure 45-97. C Series Typical Dimensions

C Series

Product Selection

Standard Catalog Numbers

Standard C Series breakers are UL listed for applications at 240 volts or less, and are built with mechanical lugs for cable connection. All breakers are panel mount, cable in/out design.

Standard Breaker Configurations

The C Series can be ordered in a number of standard configurations utilizing the tables to the right. Once you create your catalog number, you can contact our Technical Resource Center for verification and quotations.

Custom Applications

The C Series is also available in a number of custom configurations to meet your specific application needs. To order a special application breaker, you can visit our Web site at www.eaton.com/heinemann for a list of custom modifications and information on how to obtain a proprietary catalog number. You may also contact the Technical Resource Center for application information and breaker selection assistance.

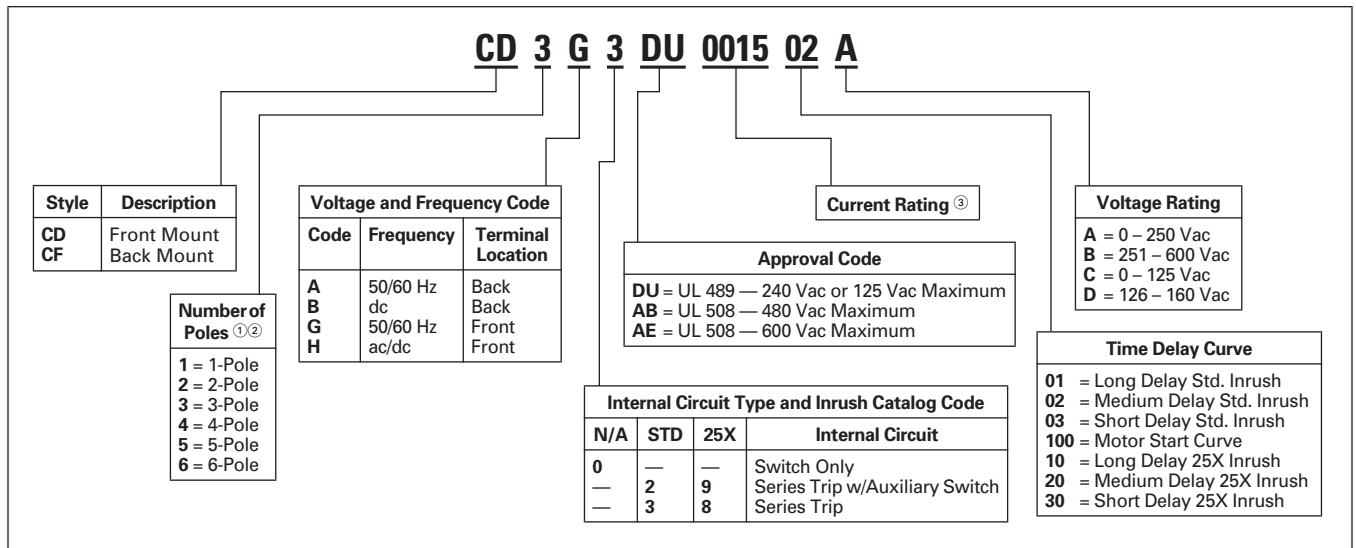
Table 45-576. Standard Product Offering

CF Standard Breakers are configured for ac circuits, back panel mounting, and cable in/cable out. Standard breakers are configured for ac circuits, rear connection.

Poles	Current (Amperes)	Curve	Catalog Number	Price U.S. \$
1	15	2	CD1A3U001502A	
1	15	3	CD1A3U001503A	
1	20	2	CD1A3U002002A	
1	20	3	CD1A3U002003A	
1	30	2	CD1A3U003002A	
1	30	3	CD1A3U003003A	
2	15	2	CD2A3U001502A	
2	15	3	CD2A3U001503A	
2	20	2	CD2A3U002002A	
2	20	3	CD2A3U002003A	
2	30	2	CD2A3U003002A	
2	30	3	CD2A3U003003A	
3	15	2	CD3A3U001502A	
3	15	3	CD3A3U001503A	
3	20	2	CD3A3U002002A	
3	20	3	CD3A3U002003A	
3	30	2	CD3A3U003002A	
3	30	3	CD3A3U003003A	
3	50	3	CD3A3U005002A	
3	50	2	CD3A3U005003A	
3	60	3	CD3A3U006002A	
3	60	2	CD3A3U006003A	
3	100	3	CD3A3U010002A	
3	100	2	CD3A3U010003A	

Poles	Current (Amperes)	Curve	Catalog Number	Price U.S. \$
1	15	2	CF1G3U001502A	
1	15	3	CF1G3U001503A	
1	20	2	CF1G3U002002A	
1	20	3	CF1G3U002003A	
1	30	2	CF1G3U003002A	
1	30	3	CF1G3U003003A	
2	15	2	CF2G3U001502A	
2	15	3	CF2G3U001503A	
2	20	2	CF2G3U002002A	
2	20	3	CF2G3U002003A	
2	30	2	CF2G3U003002A	
2	30	3	CF2G3U003003A	
3	15	2	CF3G3U001502A	
3	15	3	CF3G3U001503A	
3	20	2	CF3G3U002002A	
3	20	3	CF3G3U002003A	
3	30	2	CF3G3U003002A	
3	30	3	CF3G3U003003A	
3	50	3	CF3G3U005002A	
3	50	2	CF3G3U005003A	
3	60	3	CF3G3U006002A	
3	60	2	CF3G3U006003A	
3	100	3	CF3G3U010002A	
3	100	2	CF3G3U010003A	

Table 45-577. C Series Catalog Numbering System



① Select from 1 to 6 poles, and enter the number in position 3 of the catalog number. For example, a CD3 would identify a 3-pole C Series breaker.
 ② Style includes Toggle Handle with Black ON/OFF handle color.
 ③ Enter the four digit current rating. For example, use code "0015" for a 15 ampere current rating. For fractional amperages use an "R" to designate the decimal point. For 0.10 ampere, enter the code "0R10." Available from 0.10 – 50 amperes.

GH Series

GH Series



GH Series breaker

Product Description

Eaton's GH Series breaker offers the benefits of hydraulic-magnetic protection in a compact, economical design. Heinemann brand breakers have proven their ability by performing in harsh environment installations, indoor and outdoor, requiring a compact, environmentally stable breaker rated to 100 amperes at 480 Vac.

Technical Data

Dimensions in Inches and (mm)

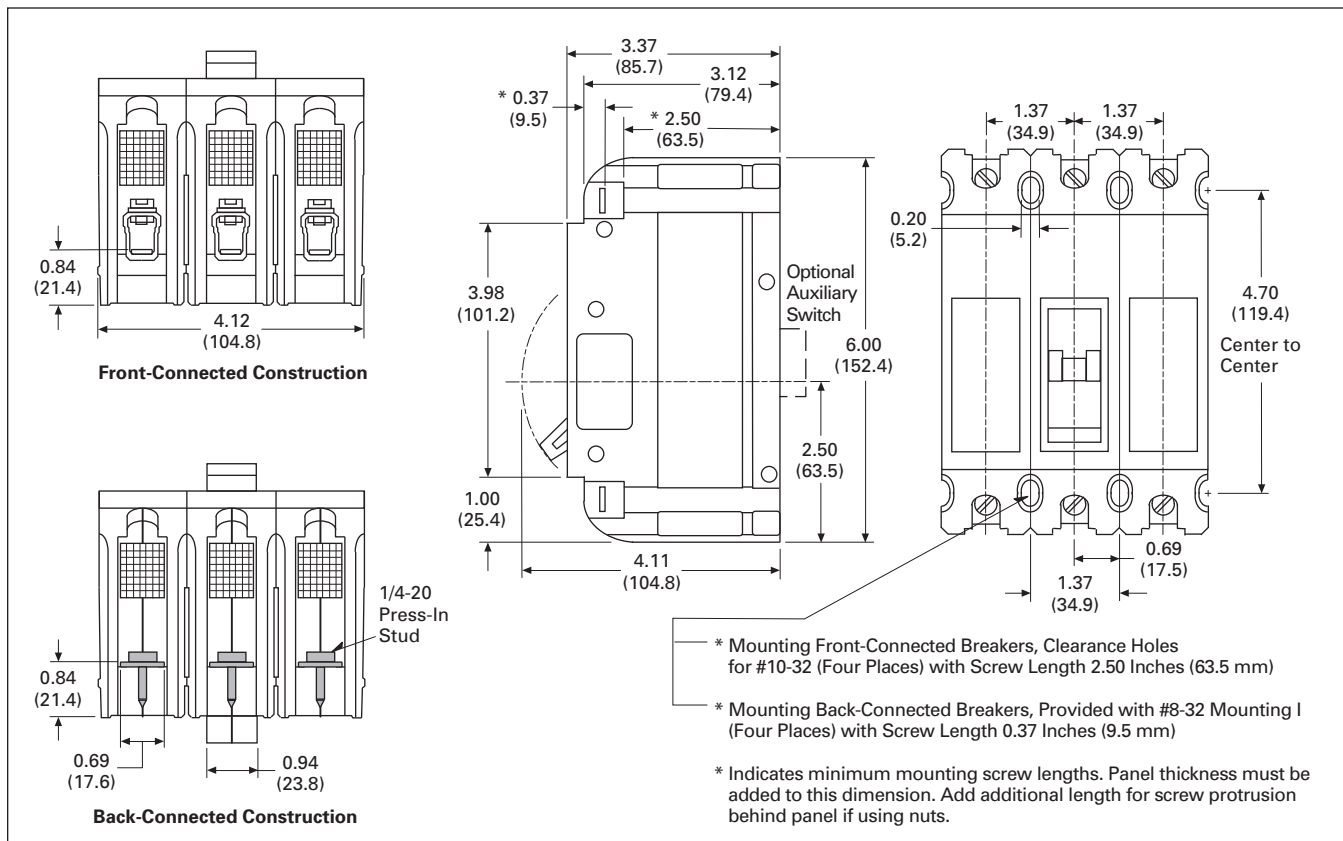


Figure 45-98. GH Basic Dimensions

Application Description

Because of their ability to furnish both close-rated locked rotor protection and running overcurrent protection without derating in extreme and highly variable ambient conditions, the Series GH breakers are popular in a variety of industries — air conditioning, electric heating, computer main frame and central processing, transportation and many others. In addition, since the GH Series utilizes hydraulic-magnetic technology, you can specify a breaker to match your particular application.

Features, Benefits and Functions

- Fungus and humidity resistance — Provided in accordance with MIL-STD-202 by treating all ferrous parts with a special moisture-resistant finish and by using special springs and fungus-resistant cases, covers and handles.

- Shock — Tested in accordance with MIL-STD-202, Method 213, Test Condition I (100G's at 6 milliseconds).
- Vibration — Tested in accordance with MIL-STD-202, Method 204, 10 to 500 Hz, 0.06-inch total excursion on three mutually perpendicular planes. Shock and vibration tests apply to time delay breakers only and are performed with units carrying full rated current.
- Life — 10,000 cycles.
- Approximate weights GH3 — 3.3 lbs. (14.96 kg)
- Dielectric strength — 1960 Vac.
- Insulation resistance (internal resistance) — Impedance or internal resistance across breaker at full rated load.

GH Series

Product Selection

Standard Breaker Configurations

The GH Series can be ordered in a number of standard configurations utilizing the table to the right. Once you create your catalog number, you can contact our Technical Resource Center for verification and quotations.

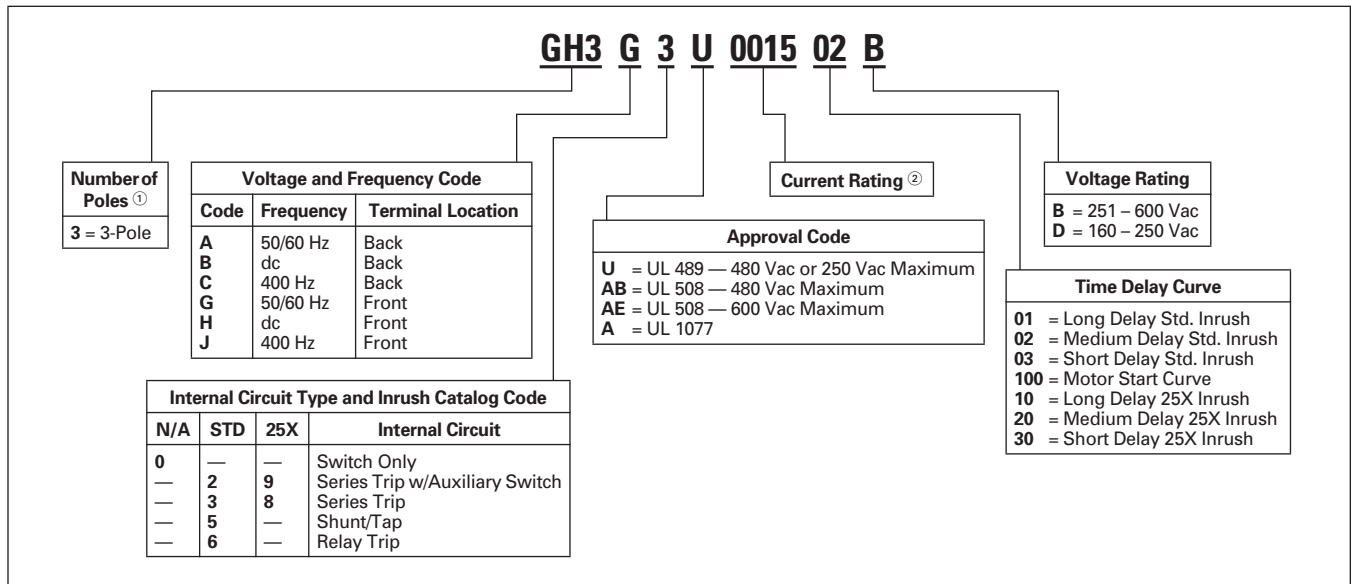
Custom Applications

The GH Series is also available in a number of custom configurations to meet your specific application needs. To order a special application breaker, you can visit our Web site at www.eaton.com/heinemann for a list of custom modifications and information on how to obtain a proprietary catalog number. You may also contact the Technical Resource Center for application information and breaker selection assistance.

Table 45-578. Standard Product Offering

Poles	Current (Amperes)	Curve	Catalog Number	Price U.S. \$
3	15	2	GH3A3U001502B	
3	15	3	GH3A3U001503B	
3	20	2	GH3A3U002002B	
3	20	3	GH3A3U002003B	
3	30	2	GH3A3U003002B	
3	30	3	GH3A3U003003B	
3	50	3	GH3A3U005002B	
3	50	2	GH3A3U005003B	
3	60	3	GH3A3U006002B	
3	60	2	GH3A3U006003B	
3	100	3	GH3A3U010002B	
3	100	2	GH3A3U010003B	

Table 45-579. GH Catalog Numbering System



① Style includes Toggle Handle with Black ON/OFF handle color.

② Enter the four digit current rating. For example, use code "0015" for a 15 ampere current rating. GH Series breakers are available from 15 – 100 amperes.

AM1P Series

AM1P Series



AM1P Series Circuit Breaker

Product Description

Increased performance and compact packaging make the AM1P perfect for demanding dc applications. The AM1P delivers maximum performance in the smallest package size available in the industry.

Application Description

With a 250 ampere current rating and 50,000 ampere interrupting capacity at 80 Vdc, the AM1P is ideal for telecommunications sites with space constraints or high current applications.

Using a parallel wiring configuration, the AM1P delivers 200 amperes in a 2-pole design and 250 amperes in a 3-pole design. In addition, the AM1P employs a proprietary technology known as PCE or Precision Current Equalization. This technology ensures that current flows evenly through all poles and nuisance tripping is eliminated.

Features, Benefits and Functions

- Maximum current rating up to 250 amperes.
- Plug-in, screw and stud terminals.
- Operating temperature -40°C to +85°C.
- Shock-tested for shock in accordance with MIL-STD-202, Method 213, Test Condition I.
- Vibration-tested in accordance with MIL-STD-202, Method 204, while carrying full-rated current.

- Minimum life of 10,000 on/off operations, with 6,000 at rated current and voltage, and 4,000 at no load.
- Dielectric strength tested in accordance with MIL-STD-202, Method 1500 volts at 50/60 Hz, 1100 Vdc (or twice rating plus 1000 volts).
- Insulation resistance of 100 Megaohms minimum at 500 Vdc, per MIL-STD-202, Method 302.
- Flammability specifications of UL 94-VO Case, UL 94-HB Handle.

Standards and Certifications

The AM1P Series is UL 489A listed.

Technical Data

Dimensions in Inches and (mm)

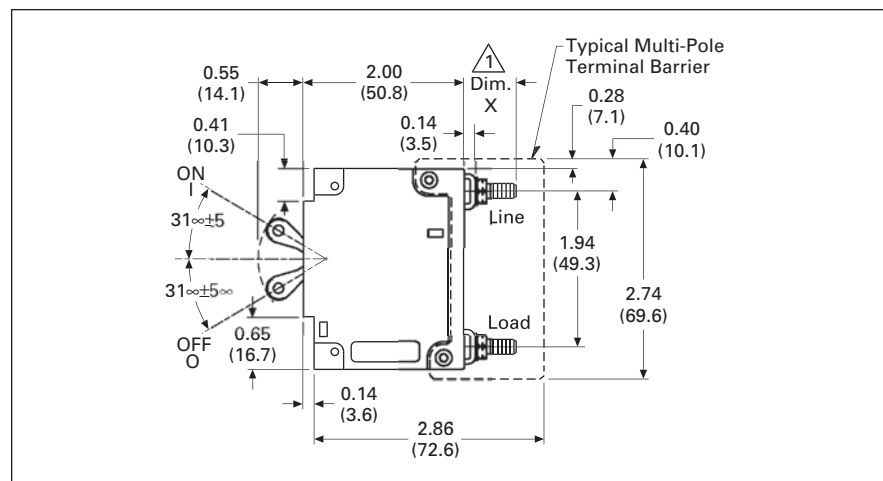


Figure 45-99. Standard Handle Configuration

AM1P Series

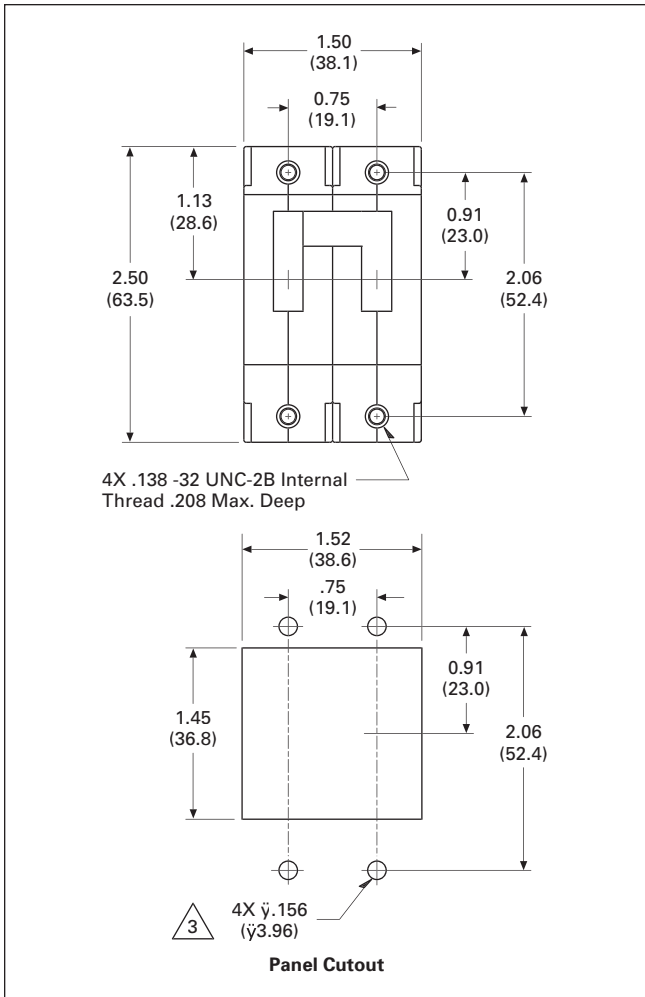


Figure 45-100. 2-Pole Configuration (101 – 200 Ampere)

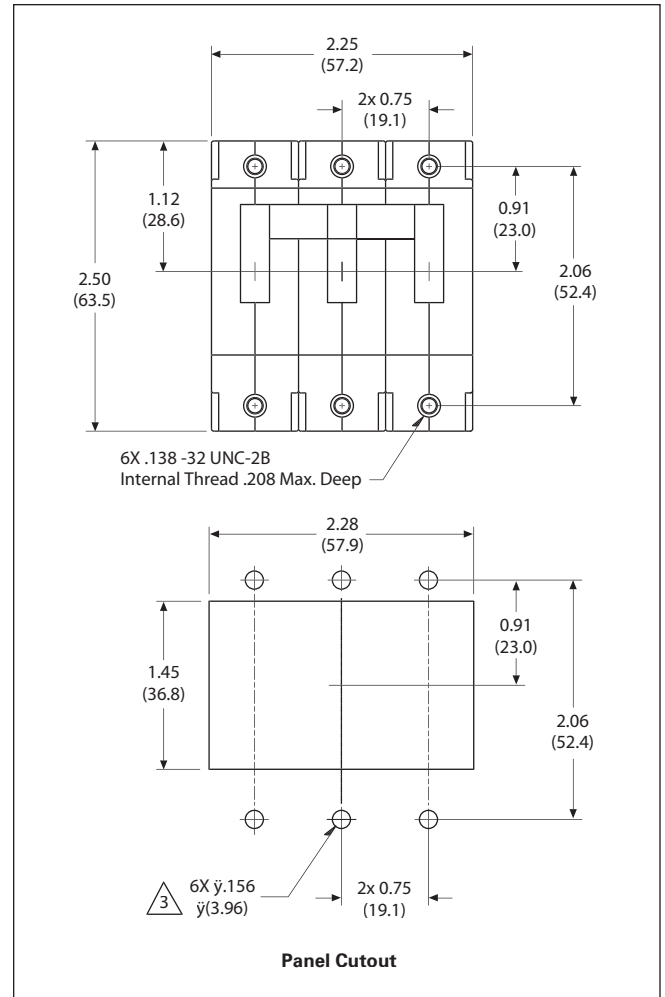
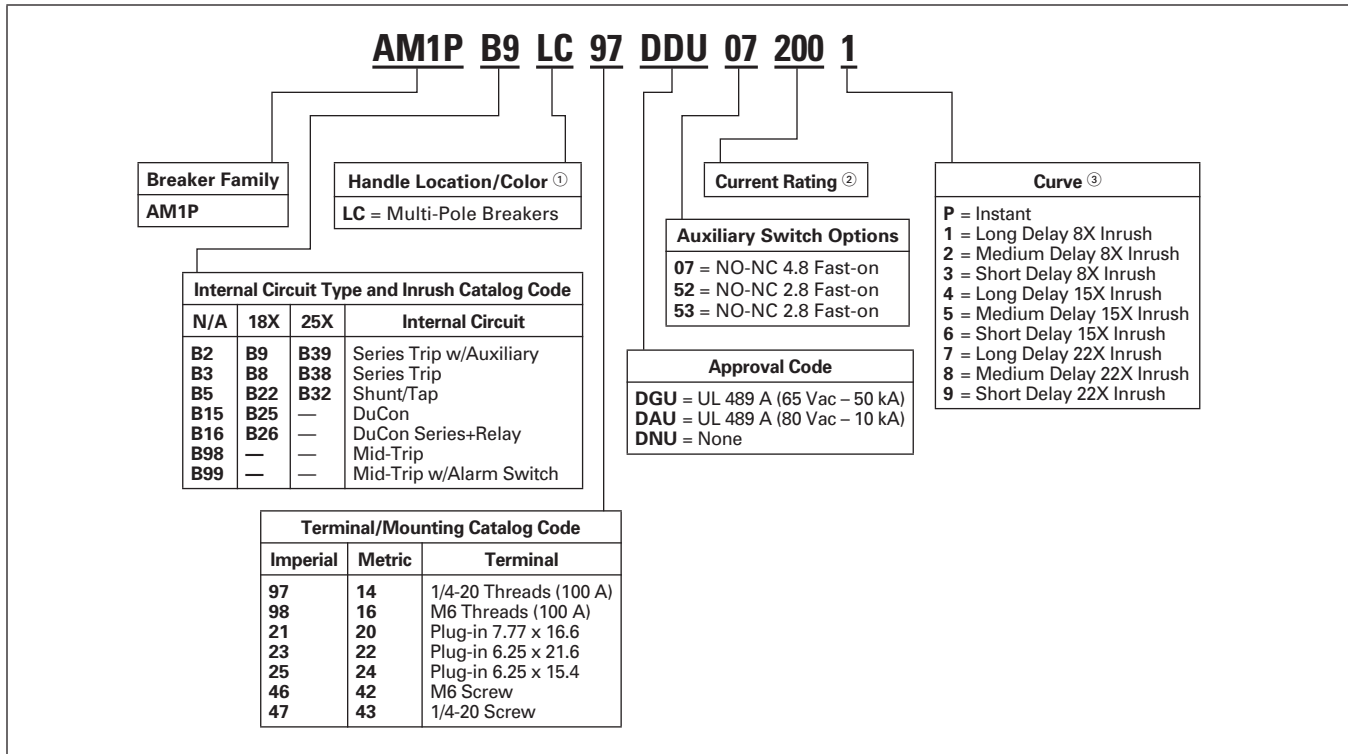


Figure 45-101. 3-Pole Configuration (201 – 250 Amperes)

AM1P Series

Product Selection

Table 45-580. AM1 Catalog Numbering System



① Specify LC for multi-pole breakers with common trip handle as standard.
 ② Enter the three digit current rating from 101 – 250 amperes. 101 – 200 amperes is configured as 2-poles in parallel, 201 – 250 as 3-poles in parallel.
 ③ Specific data on trip curves can be found on the Web at www.eaton.com/heinemann.

GJ Series

GJ Series



GJ Series Circuit Breakers

Product Description

Heinemann Series GJ Circuit Breakers are the logical choice for high-current service entrance and panelboard installations, as well as control and protection of commercial and industrial lighting, transformers, motors and power supplies. The precisely tailored time delays and ability to interrupt high currents make them ideal for critical applications with inductive or other loads of up to 280 amperes.

Application Description

The hydraulic-magnetic load-sensing and time delay mechanism of the Series GJ is insensitive to changes in ambient or enclosure temperature, adapting it to service conditions encountered in electric vehicles, roof-mounted air conditioners and other outdoor or "heat-loaded" equipment. Unlike thermal breakers, the GJ breaker can be loaded to rated capacity without causing nuisance tripping when ambient temperature rises. It is also well suited for protecting line-sensitive loads, such as critical data processing equipment and computers.

Features, Benefits and Functions

- Standard maximum voltages:
 - GJ1, GJ2 and GJ3: 240 Vac, 50/60/400 Hz
 - GJ1: 125 Vdc
 - GJ2: 125/250 Vdc

Breakers will be labeled with standard maximum (UL) voltage unless otherwise specified.

- Maximum current rating: Up to 280 amperes per pole.
- Interrupting capacities:
 - GJ1: 10 kA at 240 Vac
160 Vdc, 25 kA at 65 Vdc
 - GJ2/3: 18 kA at 240 Vac
10 kA at 125/250 Vdc

Terminal Types

Standard: front-connected, pressure-wire terminals accepting copper or aluminum wire sizes from 78 to 37 mm² (6 to 300 kcmil). Back-connected and many special terminals are available. Consult Customer Service Center.

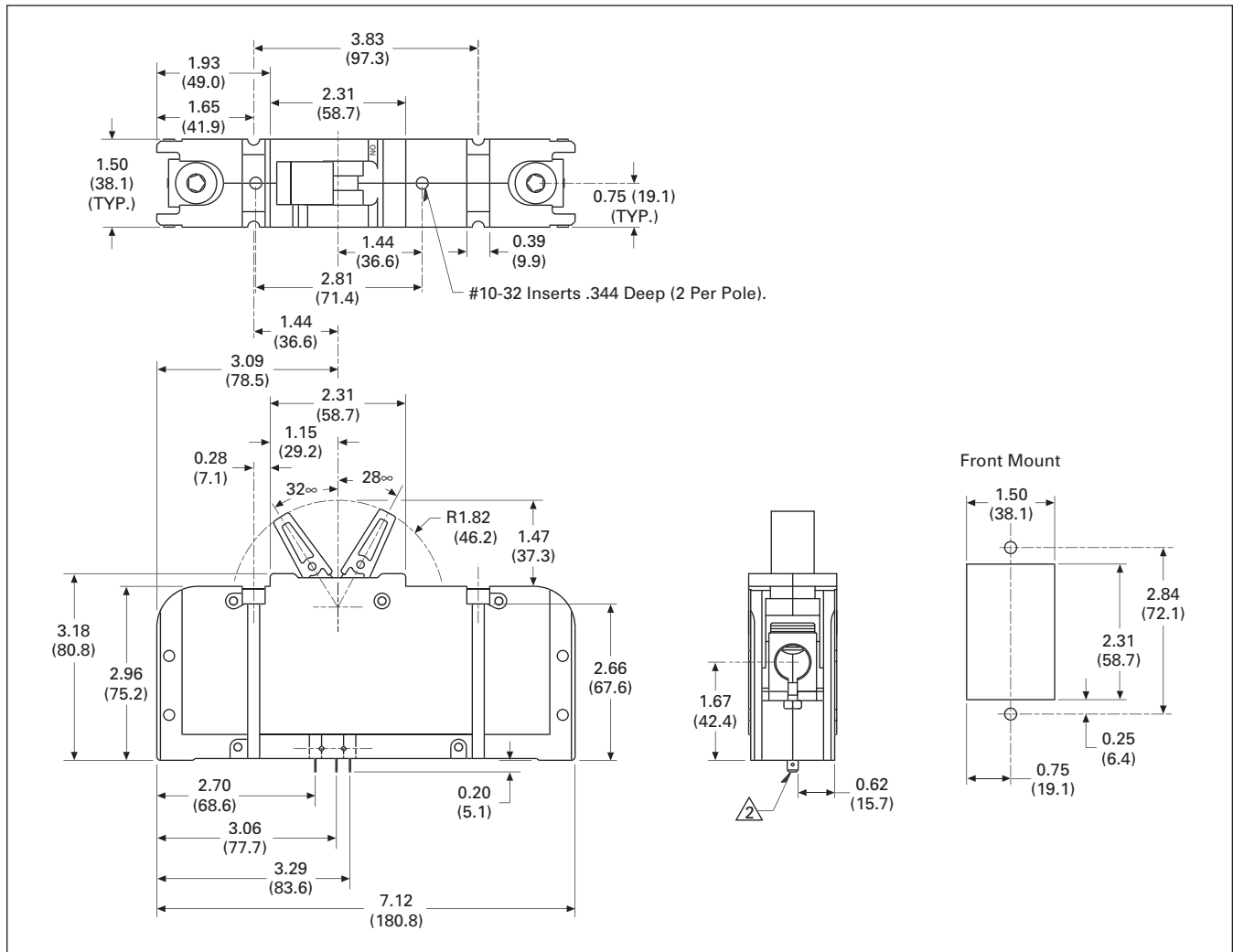
- Operating temperature range: 40°C to +85°C.
- Fungus and humidity resistance — MIL-STD-202, Ferrous parts incorporate special moisture-resistant finish. Springs, cases and handles are made from fungus-resistant materials.
- Shock — MIL-STD-202, Method 213.
- Test condition — 100g's for 6 milliseconds (Time delay breakers only).
- Vibration — MIL-STD-202, Method 24, 10 to 500 Hz, 0.06-inch total excursion on three mutually perpendicular planes (time delay breakers only). Testing completed at full rated current 50/60 Hz.

Optional Features

- 1-, 2- or 3-pole models.
- Fast, medium or slow response times to accurately match load conditions.
- Auxiliary switch for signaling.
- Back connected series trip, relay or shunt configurations.
- A mounting kit assembly is available for the GJ breakers (Cat. No. 009-18155).

Technical Data

Dimensions in Inches and (mm)



45

Figure 45-102. GJ Typical Dimensions

GJ Series

Product Selection

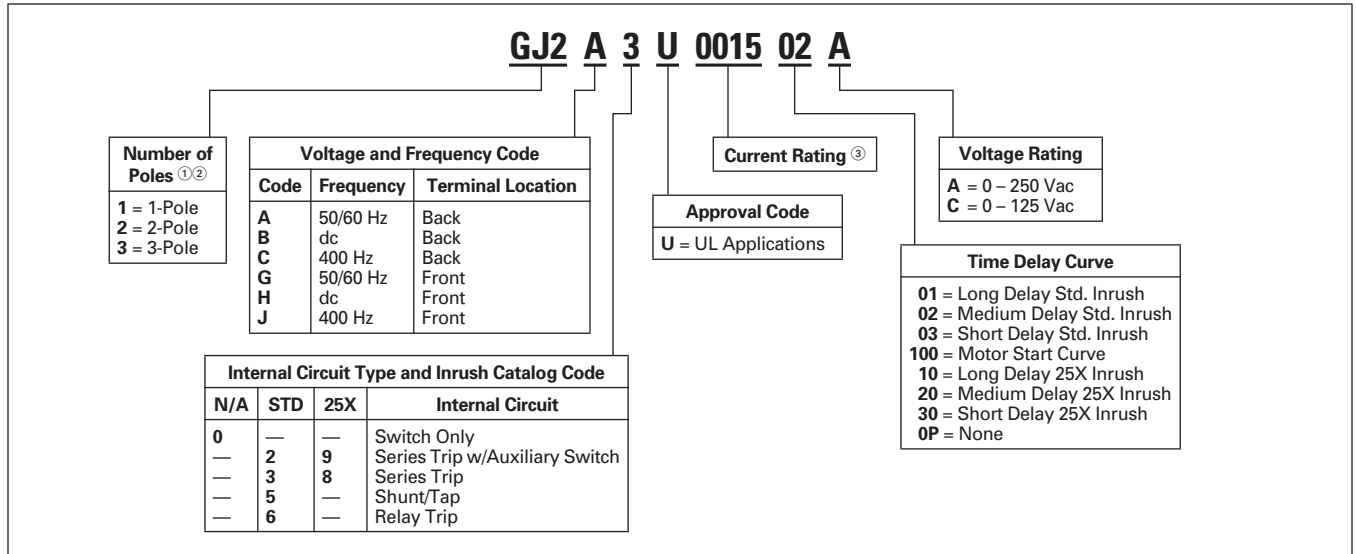
Standard Breaker Configurations

The GJ Series can be ordered in a number of standard configurations utilizing the GJ Catalog Numbering System. Once you create your catalog number, you can contact our Technical Resource Center for verification and quotations.

Custom Applications

The GJ Series is also available in a number of custom configurations to meet your specific application needs. To order a special application breaker, you can visit our Web site at www.eaton.com/heinemann for a list of custom modifications and information on how to obtain a proprietary catalog number. You may also contact the Technical Resource Center for application information and breaker selection assistance.

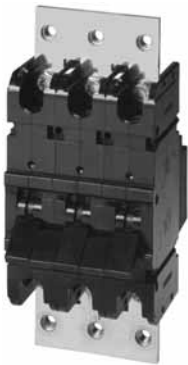
Table 45-581. GJ Catalog Numbering System



① Select from 1 to 3 poles, and enter the number in position 3 of the catalog number. For example, a GJ2 would identify a 2-pole GJ Series breaker.
 ② Style includes Toggle Handle with Black ON/OFF handle color.
 ③ Enter the four digit current rating. For example, use code "0015" for a 15 ampere current rating. Breakers are available from 100 – 280 amperes.

GJ1P Series

GJ1P Series



GJ1P Series Breaker

Product Description

Eaton Corporation's Heinemann GJ1P breakers offer high-quality circuit protection for dc applications from 100 to 1200 amperes.

Application Description

Their precisely tailored time delays and ability to interrupt high currents makes them ideally suited for critical applications. On overloads exceeding 1000 – 1400% of rating, there is no intentional time delay and the breaker interrupts currents of as much as 100,000 amperes at 65 Vdc up to 1200 amperes.

Features, Benefits and Functions

An optional shunt (25 or 50 millivolt full scale) permits metering of current. Since the shunt output is low voltage, light-gauge wiring can be used from shunt to meter. Indication may be displayed in percent, watts, safe/danger or other dial calibrations. In addition, the bus bar is available in two versions, Standard Size and Reduced Size. Contact your Eaton sales representative for more information.

Precision Current Equalization (PCE) Circuit Breakers

GJ1P breakers rated 250 to 1200 amperes are built in parallel construction. Conventional parallel pole breakers can experience uneven current distribution because of variations in internal resistances. This condition can result in nuisance tripping since the higher current in one parallel branch has the same effect as an overload on the sensing element in that branch. Proprietary Precision Current Equalization (PCE) circuit breakers, on the other hand, allow for differences in internal resistances by automatically distributing the current equally through the parallel current sensing elements, minimizing the danger of nuisance tripping.

The UL listed series GJ1P (UL 489) models are available in a choice of fast, medium or slow response times to accurately match load conditions.

They can be ordered in "series trip," "mid-trip" and "switch only" constructions and are available front- or back-mounted, front- or back-connected, with optional auxiliary switches for signaling.

Technical Data

Dimensions in Inches and (mm)

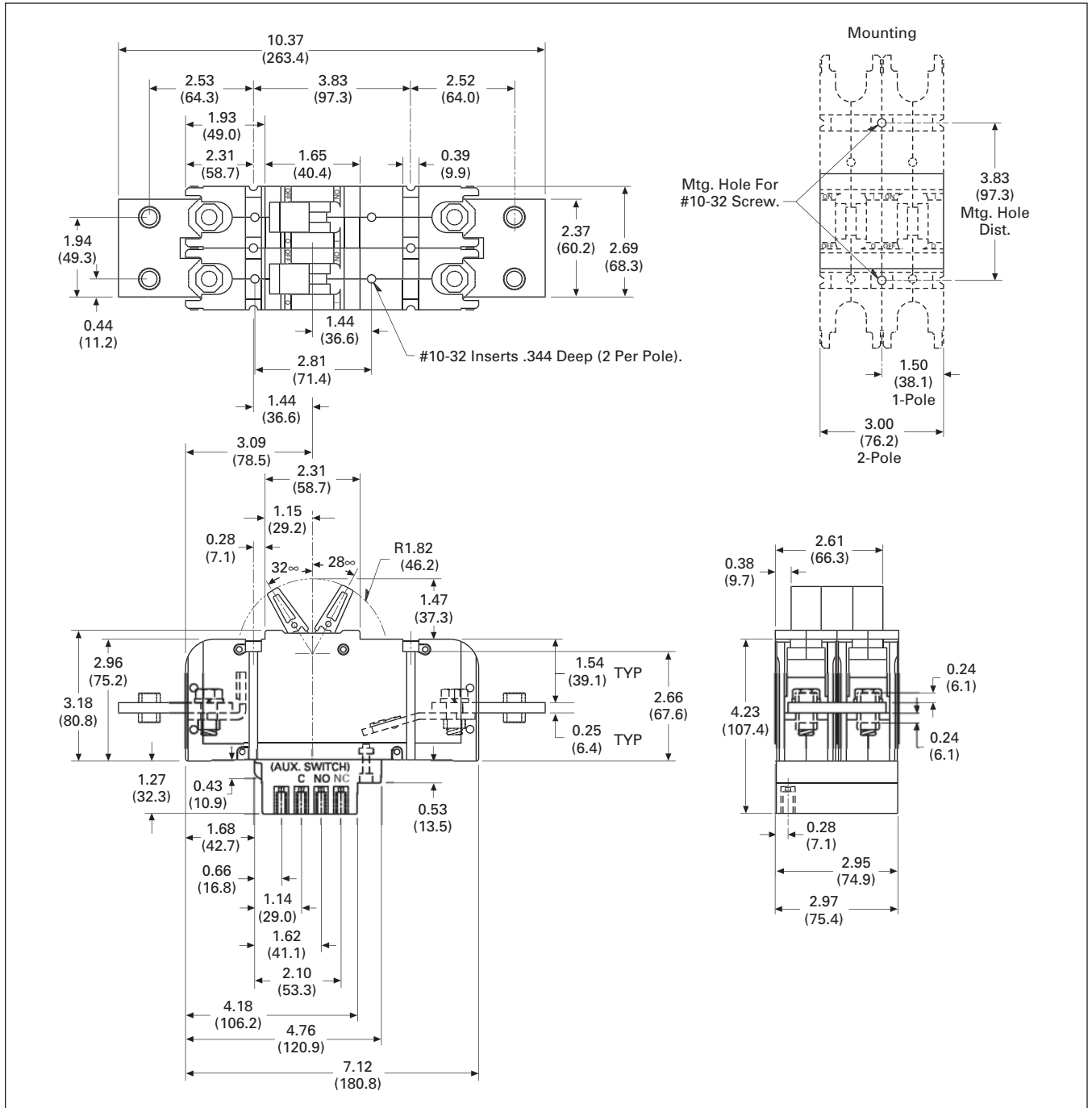
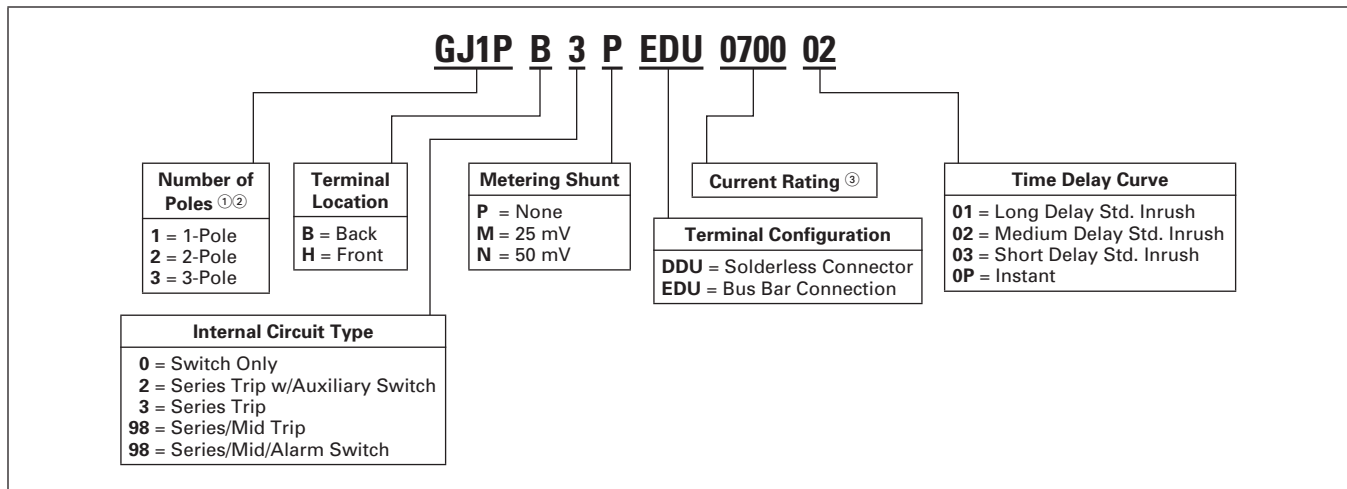


Figure 45-103. GJ1P Typical Dimensions

GJ1P Series

Product Selection

Table 45-582. GJ1P Catalog Numbering System



① Select from 1 to 3 poles, and enter the number in position 3 of the catalog number. For example, a GJ1P would identify a 1-pole GJ Series breaker.

② Style includes Toggle Handle with Black ON/OFF handle color and 6-32 mounting.

③ Enter the four digit current rating. For example, use code "0015" for a 15 ampere current rating. Breakers are available from 100 – 280 amperes.

Industrial Solutions

Marine Industry



Eaton Heinemann Breakers for Marine Craft

Where there is a need for small, lightweight, low-cost reliable circuit breakers, boat designers have found Eaton Heinemann an excellent choice. Long a standard in the industry, Heinemann breakers meet a wide variety of demanding needs in marine craft.

From a single-pole breaker for ON/OFF switching and overcurrent protection on smaller boats to multi-pole breakers with auxiliary functions on larger vessels, you can expect to find a Heinemann breaker that will meet your requirements.

The JA/S, JE/S and AMR circuit breakers are perfect for basic marine applications exposed to temperature variations and vibration. The JE/S adds a watertight seal and is suitable for locations where water spray and splash might occur.

Eaton Heinemann's marine circuit breakers (MAS, MES and MMR) are UL listed under UL 1500 for Marine Applications and meet all U.S. Coast Guard requirements. The marine line is ignition protected and designed for use aboard gasoline-powered craft in engine compartments and closed areas where gasoline vapors may be present.

In addition, Eaton Heinemann offers services and options for OEMs focused on finding ways to reduce costs without sacrificing quality. Eaton can provide fully wired custom panel solutions eliminating the need to deal with multiple vendors and additional procurement costs.



2-Pole AMR Series



Sealed Toggle JE Series



DC Distribution Panel

Telecommunications



Powering Wireless Telecommunications

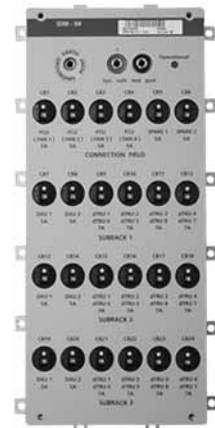
Eaton Heinemann circuit breakers power nearly half of all wireless telecommunications equipment in the world. Chosen for their precision protection and high reliability in outdoor environments, Eaton Heinemann circuit breakers deliver reliable power eliminating costs for some of the largest wireless carriers in the U.S. and abroad.

If you are an OEM building Radio Base Station Equipment, or looking for ways to distribute dc power more efficiently, Eaton has a solution ready for your application.

Our facilities in Switzerland have designed both integrated distribution modules (IDM) and bus bar solutions to distribute power to your equipment, requiring less labor during fabrication. In addition, we have developed several custom products to improve the reliability of communications equipment in both civilian and military applications.

Eaton Heinemann is also one of the manufacturers of electrical equipment that can combine the benefits of hydraulic-magnetic protection and ac site power protection in conjunction with Eaton Cutler-Hammer Products.

At Eaton Heinemann, we know the telecommunications business, and we can help shorten your product delivery cycle. From design services, to logistics, to contract manufacturing, Eaton can help you keep your customers communicating.



Internal Distribution Module



0U Bus and Cable System

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