

C-Series Circuit Breaker

The C-Series hydraulic/magnetic circuit breakers are ideal for applications that require higher amperage and voltage handling capability in a smaller package. They are available in 1-6 poles, 0.02-100amps, UL Recognized up to 480VAC or 150VDC, UL489 Listed up to 240VAC or 125VDC, with choice of time delays, terminal options, actuator styles and colors.

Product Highlights:

- ♦ The UL489 C-Series employs a unique arc chute design which allows for higher interrupting capacities of up to 10,000 amps. New thermoset glass filled polyester half shell construction provides for increased mechanical and electrical strength. The wiping contacts, mechanical linkage with two step actuation, clean contacts providing high, positive contact pressure and longer contact life
- ♦ Available with American Standard or Metric Threaded Stud terminals, or Saddle Clamp screw terminals. Optional mid-trip handle style actuator allows visual indication of electrical overload with or without alarm feature
- ♦ Available with new solid color rocker actuators and unique two-color Visi-rocker® actuators, which can be specified to indicate either the ON or TRIPPED/OFF mode
- ♦ Exclusive Rockerguard and Push-To-Reset bezel help prevent inadvertent actuation



HANDLE ACTUATOR



METAL TOGGLE ACTUATOR



PARALLEL POLE ACTUATOR

Agency Certifications:

UL Recognized
UL Standard 1077 | UL Standard 508
UL Standard 1500
UL Listed
UL Standard 489 | UL Standard 489A
CSA Accepted | CSA Certified
TUV Certified | VDE Certified

* For full Agency Certifications, please see pg. 6



Carling Technologies®

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Electrical Tables

Table A: Lists UL Recognized & CSA Accepted configurations and performance capabilities as a Component Supplementary Protector

C-SERIES TABLE A: COMPONENT SUPPLEMENTARY PROTECTORS										
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING		SHORT CIRCUIT CAPACITY (AMPS)		APPLICATION CODES		NOTES
	MAX. RATING	FREQUENCY	PHASE	FULL LOAD AMPS	GENERAL PURPOSE AMPS	WITH BACKUP FUSE ¹	WITHOUT BACKUP FUSE	UL	CSA	
SERIES	32	DC	—	0.02 - 100	—	—	5000	TC1, OL1, U2	TC1, OL1, U2	
	48	DC	—	110 - 150	—	—	5000	TC1, OL1, U2	TC1, OL1, U2	Must Have Agency Code "L"
	65	DC	—	0.02 - 70	—	—	5000	TC1,2, OL1,U1	TC1,2, OL1,U1	
				—	71 - 100	—	5000	TC1,2, OL0,U1	TC1,2, OL0,U1	
	80	DC	—	0.02 - 70	—	—	7500	TC1,2, OL1,U1	TC1,2, OL1,U1	
				—	71 - 100	—	7500	TC1,2, OL0,U1	TC1,2, OL0,U1	
	80	DC	—	0.02 - 70	—	—	10,000	TC1,2, OL1,U1	TC1,2, OL1,U1	Must Have Agency Code "L"
				—	71 - 100	—	10,000	TC1,2, OL0,U1	TC1,2, OL0,U1	Must Have Agency Code "L"
	125	DC	—	0.02 - 50	—	—	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	Must Have Agency Code "L"
	125 / 250	DC	—	0.02 - 50	—	—	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	Must Have Agency Code "L"
	250	DC	—	0.02 - 50	—	—	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	Must Have Agency Code "L", 2 Pole Break Required for 250 Volts
	125	50 / 60	1	0.02 - 100	—	—	3000	TC1, OL1, U2	TC1, OL1, U2	Per Pole Rating
				0.02 - 100	—	—	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	Must Have Agency Code "L"
	150	DC	—	—	80-100	—	5000	TC1, OLO, U3	—	Agency Code "L"
	150	DC	—	—	101-175	—	5000	TC, OLO, U3	—	Agency Code "L" Parallel Pole
	125 / 250	50 / 60	1	0.02 - 100	—	—	3500	TC1, OL1, U2	TC1, OL1, U2	
				0.02 - 50	—	—	3000	TC1,2,OL1,U1	TC1,2,OL1,U1	2 or 3 poles breaking single phase
				51 - 100	—	—	1000	TC1,2,OL1,U1	TC1,2,OL1,U1	2 or 3 poles breaking single phase
				0.02 - 100	—	—	5000	TC1,1,OL1,U2	TC1,1,OL1,U2	2 or 3 poles breaking single phase, "L" Agency Code
	250	50 / 60	1	0.02 - 50	—	—	3500	TC1, OL1, U2	TC1, OL1, U2	Per Pole Rating
				0.02 - 100	—	—	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	Must Have Agency Code "L"
				51 - 70	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	
				0.02 - 100	—	—	3000	TC1, OL0, U2	TC1, OL0, U2	
			3	0.02 - 70	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	3 poles breaking 3 phase
				0.02 - 90	—	—	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	Must Have Agency Code "L"
	277	50 / 60	1	0.02 - 50	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	
	480 / 277	50 / 60	3	0.02 - 30	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	3 poles breaking 3 phase
				—	31 - 50	5000	—	TC1,2,OL0,C1	TC1,2,OL0,C1	
	480	50 / 60	1	0.02 - 30	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	2 poles breaking 1 phase
				—	31 - 50	5000	—	TC1,2,OL0,C1	TC1,2,OL0,C1	
DUAL COIL	80	DC	—	0.02 - 50	—	—	7500	TC1,2, OL1,U1	TC1,2, OL1,U1	
	125	50 / 60	1	0.02 - 50	—	—	3000	TC1, OL1, U2	TC1, OL1, U2	Per Pole Rating
	125 / 250	50 / 60	1	0.02 - 50	—	—	3500	TC1, OL1, U2	TC1, OL1, U2	2 or 3 poles breaking single phase
				0.02 - 50	—	—	3000	TC1,2,OL1,U1	TC1,2,OL1,U1	2 or 3 poles breaking single phase
	250	50 / 60	1	0.02 - 50	—	—	3500	TC1, OL1, U2	TC1, OL1, U2	Per Pole Rating
				0.02 - 50	—	—	3000	TC1, OL0, U2	TC1, OL0, U2	3 poles breaking 3 phase
SHUNT	277	50 / 60	3	0.02 - 50	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	3 poles breaking 3 phase
	80	DC	—	0.02 - 50	—	—	7500	TC1,2, OL1,U1	TC1,2, OL1,U1	
	277	50 / 60	1	0.02 - 50	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	
	250	50 / 60	3	0.02 - 50	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	3 poles breaking 3 phase
	480 / 277	50 / 60	3	0.02 - 30	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	3 poles breaking 3 phase
				—	31 - 50	5000	—	TC1,2,OL0,C1	TC1,2,OL0,C1	
	480	50 / 60	1	0.02 - 30	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	2 poles breaking 1 phase
				—	31 - 50	5000	—	TC1,2,OL0,C1	TC1,2,OL0,C1	
	80	DC	—	0.02 - 50	—	—	7500	TC1,2, OL1,U1	TC1,2, OL1,U1	
	277	50 / 60	1	0.02 - 50	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	
	250	50 / 60	3	0.02 - 50	—	5000	—	TC1,2,OL1,C1	TC1,2,OL1,C1	3 poles breaking 3 phase
				0.02 - 70	—	—	—	—	—	
SWITCH ONLY	65	DC	—	—	71 - 100	—	—	—	—	
	80	DC	—	0.02 - 70	—	—	—	—	—	
				—	71 - 100	—	—	—	—	
	125	50 / 60	1	0.02 - 100	—	—	—	—	—	
	125 / 250	50 / 60	1	0.02 - 100	—	—	—	—	—	2 or 3 poles breaking single phase
	250	50 / 60	1	0.02 - 100	—	—	—	—	—	
			3	0.02 - 70	—	—	—	—	—	
	277	50 / 60	1	0.02 - 50	—	—	—	—	—	
	480 / 277	50 / 60	3	0.02 - 30	—	—	—	—	—	3 poles breaking 3 phase
				—	31 - 50	—	—	—	—	

Notes for Table A:

- ¹ Requires branch circuit backup with a UL LISTED Type K5 or RK5 fuse rated 15A minimum and no more than 4 times full load amps not to exceed 125A for 50 Amp or less rating and not to exceed 175 for 51 through 100 Amp rating

*Manufacturer reserves the right to change product specification without prior notice.

Electrical Tables

Table B: Lists UL Recognized and CSA Accepted configurations and performance capabilities as a Manual Motor Controller.

C-SERIES TABLE B: MANUAL MOTOR CONTROLLERS					
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING	HORSEPOWER RATINGS
	MAX. RATING	FREQUENCY	PHASE	FULL LOAD AMPS	MAX HP
SERIES, SHUNT & RELAY SWITCH ONLY	120 ¹	50 / 60	1	0.02 - 50	7 1/2
	250 ¹	50 / 60	1	0.02 - 20	3
			3	0.02 - 20	5
	277 ¹	50 / 60	1	0.02 - 20	3
	480 ²	50 / 60	3	0.02 - 20	5

Notes for Table B:

1 UL recognized and CSA Accepted at 480V refers to 3 & 4 pole versions used in a 3Ø, wye connected circuit or 2-pole version connected with 2 poles breaking. 1Ø and backed up with series fusing as stated above in note 1.

* Series, Shunt and Relay Trip - Voltage Coil Construction not current coils

Table C: Lists UL Recognized, CSA Accepted, VDE and TUV Certified configurations and performance capabilities as a Component Supplementary Protector.

C-SERIES TABLE C: COMPONENT SUPPLEMENTARY PROTECTORS														
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING		SHORT CIRCUIT CAPACITY (AMPS)						APPLICATION CODES		CONSTRUCTION NOTES
	MAX. RATING	FREQUENCY	PHASE	FULL LOAD AMPS	GENERAL PURPOSE AMPS ¹	UL/CSA		VDE		TUV		UL	CSA	
						WITH BACKUP FUSE	WITHOUT BACKUP FUSE	(I _{nc}) WITH BACKUP FUSE	(I _{cn}) WITHOUT BACKUP FUSE	(I _{nc}) WITH BACKUP FUSE	(I _{cn}) WITHOUT BACKUP FUSE			
SERIES	80	DC	---	0.10 - 70	---	---	7500	---	5000	5000	1500	TC1,2, OL1,U1	TC1,2, OL1,U1	Agency Code F, H, J or R Only
			---	71 - 100	71 -100	---	10,000	---	5000	---	5000	TC1,2, OL0,U1	TC1,2, OL0,U1	
	125	DC	---	1 - 50	---	---	5000	---	---	---	5000	TC1,2, OL1,U1	TC1,2, OL1,U1	Agency Code J or R Only
			---	0.10 - 50	---	---	5000	---	---	---	5000	TC1,2, OL1,U1	TC1,2, OL1,U1	Agency Code J or R Only, 2P
		50 / 60	1	0.10 - 70	---	---	5000	3000	1500	3000	1500	TC1,2, OL1,U1	TC1,2, OL1,U1	Agency Code J or R Only
			3	0.10 -100	---	---	5000	---	---	5000	5000	TC1,2, OL1,U1	TC1,2, OL1,U1	
	415	50 / 60	3	0.10 - 30	---	5000	---	3000	1500	3000	1500	TC1,2, OL1,C1	TC1,2, OL1,C1	Rocker
						5000	---	5000	2500	3000	1500	TC1,2, OL1,C1	TC1,2, OL1,C1	Handle/ Agency F, H, J, or R
DUAL COIL	80	DC	---	0.10 - 30	---	---	7500	---	1500	5000	1500	TC1,2, OL1,U1	TC1,2, OL1,U1	
	250	50 / 60	1 & 3	0.10 - 30	---	---	5000	3000	1500	3000	1500	TC1,2, OL1,U1	TC1,2, OL1,U1	
SHUNT	80	DC	---	0.10 - 70	---	---	7500	---	5000	5000	1500	TC1,2, OL1,U1	TC1,2, OL1,U1	
	250	50 / 60	1 & 3	0.10 - 70	---	---	5000	3000	1500	3000	1500	TC1,2, OL1,U1	TC1,2, OL1,U1	
	415	50 / 60	3	0.10 - 30	---	5000	---	3000	1500	3000	1500	TC1,2, OL1,C1	TC1,2, OL1,C1	Rocker
						5000	---	5000	2500	3000	1500	TC1,2, OL1,C1	TC1,2, OL1,C1	Handle/ Agency F, H, J, or R

Notes for Table C:

1 General Purpose ratings for UL/CSA only.

2 Requires branch circuit backup with a UL LISTED Type K5 or RK5 fuse rated 15A minimum and no more than 4 times full load amps not to exceed 125A for 50 Amp or less rating and not to exceed 175 for 51 through 100 Amp rating.

Electrical Tables

Table D: Lists UL Listed (489), CSA Certified (C22.2 No. 5.1-M) configuration and performance capabilities as a Molded Case Circuit Breaker.

C SERIES TABLE D : UL489 LISTED BRANCH CIRCUIT BREAKERS						
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING	INTERRUPTING CAPACITY (AMPS)	CONSTRUCTION NOTES
	MAX. RATING	FREQUENCY	PHASE	FULL LOAD AMPS	WITHOUT BACKUP FUSE	
SERIES	80	DC	---	0.10 - 100	50,000 ¹	Limited to 2 Poles Max from 71 - 100 Amps.
					10,000	Limited to 2 Poles Max from 71 - 100 Amps.
	125	DC	---	0.10 - 100	5,000	1 - 3 Poles
	125 / 250	DC	---	0.10 - 50	5,000	1 or 2 Poles (2 Poles Required for 250 Volts)
				0.10 - 50	10,000	1 - 3 Poles
	120	50 / 60	1	51 - 70	5,000	1 - 3 Poles
				0.10 - 50	5,000	2 or 3 Poles. 1 Pole of a 3 Pole Unit is Neutral
	120 / 240	50 / 60	1	0.10 - 50	10000 ¹	2 or 3 Poles. 1 Pole of a 3 Pole Unit is Neutral
				0.10 - 50	5,000	1 Pole
	240	50 / 60	1	0.10 - 30	5,000	2 Pole
DUAL COIL	277	50 / 60	1	0.10 - 20	10,000	1 Pole
	120	50 / 60	1	0.10 - 30	10,000	---

Notes from Table D:

¹ Special catalog number required. Consult factory.

Table E: Lists UL Recognized, CSA Accepted configurations and performance capabilities as Protectors, Supplementary for Marine Electrical and Fuel Systems (Guide PEQZ2, File E75596). Ignition Protected per UL 1500. UL Classified Small Craft Electrical Devices, Marine in accordance with ISO 8846 (Guide UZMK, File MQ1515) as Marine Supplementary Protectors.

C-SERIES TABLE E: UL1500 (Marine Ignition Protected)								
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING	INTERRUPTING CAPACITY (AMPS)	APPLICATION CODES		CONSTRUCTION NOTES
	MAX. RATING	FREQUENCY	PHASE	FULL LOAD AMPS	WITHOUT BACKUP FUSE	UL	CSA	
SERIES	48	DC	---	0.02 - 100	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	---
				101 - 150	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	---
	65	DC	---	0.02 - 100	1500	TC1,2,OL0,U1	TC1,2,OL0,U1	---
	80	DC	---	0.02 - 70	1500	TC1,2,OL1,U1	TC1,2,OL1,U1	---
				0.02 - 70	5000	TC1,2,OL1,U1	TC1,2,OL1,U1	---
	125	50 / 60	1	71 - 100	1500	TC1,2,OL1,U1	TC1,2,OL1,U1	---
				0.02 - 70	1500	TC1,2,OL1,U1	TC1,2,OL1,U1	---
	250	50 / 60	1	71 - 100	1500	TC1,2,OL1,U1	TC1,2,OL1,U1	2 Poles Breaking Single Phase
				0.02 - 70	1500	TC1,2,OL1,U1	TC1,2,OL1,U1	---
				71 - 100	1500	TC1,2,OL1,U1	TC1,2,OL1,U1	---

Table F: Lists UL Listed configurations and performance capabilities as Circuit Breakers for use in Communications Equipment (Guide DITT, File E189195), under UL489A.

C-SERIES TABLE F : PARALLEL POLE CONSTRUCTION UL489A LISTED FOR COMMUNICATIONS EQUIPMENT				
CIRCUIT CONFIGURATION	VOLTAGE		CURRENT RATING	INTERRUPTING CAPACITY (AMPS)
	MAX. RATING	FREQUENCY	GENERAL PURPOSE AMPS	WITHOUT BACKUP FUSE
SERIES	80	DC	110 - 250	10,000

Electrical

Maximum Voltage

AC, 480 WYE/277 VAC, 50/60 Hz
(see Table A.)

Current Rating

UL489: AC, 240 VAC. (Table D),
50/60 Hz, 125 VDC, UL 1077,
150 VDC, 277 VAC

Standard Voltage Coils

Standard current coils: 0.100,
0.250, 0.500, 0.750, 1.00, 2.50,
5.00, 7.50, 10.0, 15.0, 25.0, 30.0,
35.0, 40.0, 50.0, 60.0, 70.0, 80.0,
90.0 and 100 amps. Other ratings
available, see Ordering Scheme.

Auxiliary Switch Rating

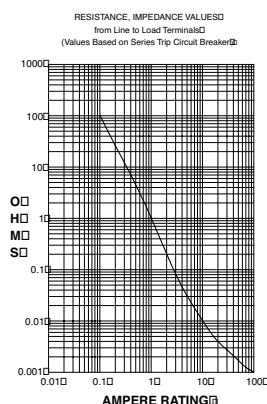
SPDT; 10.1 amps-250VAC, DC
Aux. Switch 1.0A, 65 VDC. 0.5A,
80VDC, 1/4 HP, 125VAC, VDE & TUV
1.0 125 VAC.

Insulation Resistance Dielectric Strength

Minimum of 100 Megohms at 500 VDC.
UL, CSA: 1960 V 50/60 Hz for one
minute between all electrically
isolated terminals. C-Series
Circuit Breakers comply with the
8mm spacing and 3750V 50/60
Hz dielectric requirements from
hazardous voltage to operator
accessible surfaces, between
adjacent poles and from main
circuits to auxiliary circuits per
Publications EN 60950 and VDE
0805.

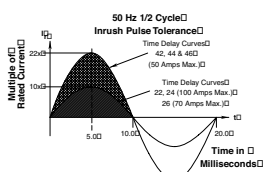
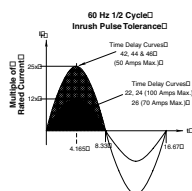
Resistance, Impedance

Values from Line to Load Terminal
based on Series Trip Circuit
Breaker.



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 5.0	± 15%
5.1 - 20.0	± 25%
20.1 - 100.0	± 35%

Pulse Tolerance Curves



Mechanical

Endurance

10,000 ON-OFF operations @ 6 per
minute; with rated current & voltage
All C-Series circuit breakers will trip
on overload, even when actuator is
forcibly held in the ON position.

Trip Free

Trip Indication

The operating actuator moves
positively to the OFF position when
an overload causes the breaker to
trip. With mid-trip, handle moves to
the mid position on electrical trip
of the circuit breaker. With mid trip
handle with alarm switch, handle
moves to the mid position and
the alarm switch actuates when
the circuit breaker is electrically
tripped.

Physical

Number of Poles

1-6 poles ≤ 50A; 1-4 poles @ 51-
70A; 1-2 poles 71-100A. UL489
Handle: 1 pole ≤ 100A, 2 pole ≤
50A; Rocker: 1 pole ≤ 100A.

Internal Circuit Configuration

Series (with or without auxiliary
switch, mid trip & mid trip with
alarm switch) Shunt & Relay with
current or voltage trip coils, Dual
Coil, Switch Only (with or without
aux. switch). UL489: Series (with or
without auxiliary switch, mid-trip &
mid-trip with alarm switch).

Weight

Approx. 112 grams/pole (3.95 oz).

Standard Colors

Housing: Black

Environmental

Designed and tested in accordance with requirements of
specification MIL-PRF-55629 & MIL-STD-202 as follows:

Shock

Withstands 100 Gs, 6ms sawtooth
while carrying rated current per
Method 213, Test Condition "I".
Instantaneous and ultrashort curves
tested @ 90% of rated current.

Vibration

Withstands 0.060" excursion from
10-55 Hz & 10 Gs 55-500 Hz, @
rated current per Method 204C,
Test Cond. A. Instantaneous &
ultrashort curves tested @ 90% of
rated current.

Moisture Resistance

Method 106D, i.e., ten 24-hour
cycles @ +25°C to +65°C, 80-98%
RH.

Salt Spray

Method 101, Condition A (90-95%
RH @ 5% NaCl Solution, 96 hrs).

Thermal Shock

Method 107D, Condition A (five
cycles @ -55°C to +25°C to +85°C
to +25°C).

Operating Temperature

-40°C to +85°C

Agency Certifications:

UL Recognized

UL Standard 1077 Component Recognition Program
as Protectors, Supplementary
(Guide CCN/QVNU2, File E75596)



UL Standard 508 Motor Controllers, Manual
(Guide CCN/NLRV2, File E135367)



UL Standard 1500 Protectors, Supplementary for
Marine Electrical & Fuel Systems
(Guide PEQZ2, File E75596)
Ignition Protection



UL Listed

UL Standard 489 Circuit Breakers, Molded Case,
(Guide DIVQ, File E129899)



UL Standard 489A Communications Equipment
(Guide CCN/DITT, File E189195)



CSA Accepted



Component Supplementary Protector
under Class 3215 30,
File 047848 0 000
CSA Standard C22.2 No. 235

CSA Certified



Circuit Breaker Model Case
(Class 1432 01, File 093910),
CSA Standard C22.2 No. 5.1 - M

TUV Certified



EN60934, under License No.
R72041016

VDE Certified



EN60934, VDE 0642 under File No.
10537



1 SERIES

C

2 ACTUATOR¹

- A** Handle, one per pole
B Handle, one per multipole unit
S Mid-Trip Handle, one per pole
T Mid-Trip, one per pole & Alarm Switch

3 POLES²

- | | | |
|--------------|----------------|---------------|
| 1 One | 3 Three | 5 Five |
| 2 Two | 4 Four | 6 Six |

4 CIRCUIT³

- | | |
|--|---|
| A³ Switch Only (no coil) | F⁴ Relay Trip (current) |
| B Series Trip (current) | G⁴ Relay Trip (voltage) |
| C Series Trip (voltage) | H^{4,5} Dual Coil with Shunt Trip Voltage Coil |
| D⁴ Shunt Trip (current) | K^{4,5} Dual Coil with Relay Trip Voltage Coil |
| E⁴ Shunt Trip (voltage) | |

5 AUXILIARY/ALARM SWITCH

- | | |
|---|---|
| 0 w/o Aux Switch | 5 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts) |
| 1 S.P.D.T., 0.110 Q.C. Term. | 6 S.P.S.T., 0.139 Solder Lug |
| 3 S.P.D.T., 0.139 Solder Lug | 7 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts) |
| 4 S.P.D.T., 0.110 Q.C. Term. (Gold Contacts) | 8 S.P.S.T., 0.187 Q.C. Term. |
| | 9 S.P.D.T., 0.187 Q.C. Term. |

6 FREQUENCY & DELAY

- | | |
|---|---|
| 03³ DC 50/60Hz, Switch Only | 30 DC 50/60Hz Instantaneous |
| 10⁷ DC Instantaneous | 31 DC 50/60Hz Ultra Short |
| 11 DC Ultra Short | 32 DC 50/60Hz Short |
| 12 DC Short | 34 DC 50/60Hz Medium |
| 14 DC Medium | 36 DC 50/60Hz Long |
| 16 DC Long | 42⁸ 50/60Hz Short, Hi-Inrush |
| 20⁷ 50/60Hz Instantaneous | 44⁸ 50/60Hz Medium, Hi-Inrush |
| 21 50/60Hz Ultra Short | 46⁸ 50/60Hz Long, Hi-Inrush |
| 22 50/60Hz Short | 52⁸ DC Short, Hi-Inrush |
| 24 50/60Hz Medium | 54⁸ DC Medium, Hi-Inrush |
| 26 50/60Hz Long | 56 DC Long, Hi-Inrush |

Notes:

- 1 Actuator Code:
 A: Handle tie pin spacer(s) and retainers provided assembled with multi-pole units.
 B: Handle location as viewed from front of breaker:
 2 pole - left pole 3 pole - center pole 4 pole - two handles at center poles
 5 pole - three handles at center poles 6 pole - four handles at center poles
 S: Handle moves to mid-position only upon electrical trip of the breaker. Available with circuit codes B, C, D, E, F, G, H and K.
 T: Handle moves to mid-position and alarm switch activates only upon electrical trip of the breaker. Available with circuit codes B & C.
 Standard multipole units have all poles identical except when specifying auxiliary switch and/or mixed poles. 4 pole max w/VDE. 5th pole available as Series Trip w/Voltage Coil only.
- 3 Switch Only circuits, rated up to 50 amps and 6 poles, and only available with VDE Certification when tied to a protected pole (Circuit Code B, C, D or H.). For .02 to 30 amps, select Current Code 630. For 35 - 50 amps, select Current Code 650. For 55-70 amps, select Current Code 670. For 75-100 amps, select Current Code 810.
- 4 Circuit Codes D,E,F,G,H & K available with Terminal Codes 1,2,4 & 5 only. Circuit Codes D, F, H & K available up to 50 amps maximum Current Rating.
- 5 Consult factory for available Dual Coil options, as special catalog number is required. Dual Coil Voltage Coils with Shunt Trip Construction trip instantaneously on line voltage. Dual Coil Voltage Coils require 30VA minimum power to trip instantaneously and are rated for intermittent duty only.
- 6 ers, one aux. switch is supplied, mounted in the extreme right pole. Voltage coils not rated for continuous duty. Available only with delay codes 10 and 20.
- 7 Available with Circuit Codes B & D only, and up to 50 amps maximum.
- 8 Current Ratings 60 - 70 are available up to four poles maximum. Ratings 71 - 100 are available up to two poles maximum.
- 9 Terminal Code 1 available to 60 amps maximum.
- 10 Terminal Codes 2,4,5 and C available to 50 amps maximum.
- 11 Terminal Codes 3,6 & 9 available to 100 amps maximum.
- 12 Terminal Code 7 available to 25 amps maximum.
- 13 Terminal Code A available to 100 amps maximum.
- 14 Terminal Codes 7,8,9 & C are not VDE approved.
- 15 No marking available. Consult factory. VDE/TUV Approval requires dual (I-O, ON-OFF) or I-O markings on all handles.
- 16 Single pole only.
- 17 VDE/TUV: 30 amps max.; UL/CSA: 50 amps max.; Available in 2 - 4 poles only and limited to AC Delays. "General Purpose amps" not rated for "full load amps" or to be used in applications with a motor.
- 18

7 CURRENT RATING (AMPERES)

CODE	AMPERES				
020	0.020	235	0.350	430	3.000
025	0.025	240	0.400	435	3.500
030	0.030	245	0.450	440	4.000
035	0.035	250	0.500	445	4.500
040	0.040	255	0.550	450	5.000
045	0.045	260	0.600	455	5.500
050	0.050	265	0.650	460	6.000
055	0.055	270	0.700	465	6.500
060	0.060	275	0.750	470	7.000
065	0.065	280	0.800	475	7.500
070	0.070	285	0.850	480	8.000
075	0.075	290	0.900	485	8.500
080	0.080	295	0.950	490	9.000
085	0.085	410	1.000	495	9.500
090	0.090	512	1.250	610	10.000
095	0.095	415	1.500	710	10.500
210	0.100	517	1.750	611	11.000
215	0.150	420	2.000	711	11.500
220	0.200	522	2.250	612	12.000
225	0.250	425	2.500	712	12.500
230	0.300	527	2.750	613	13.000

VOLTAGE COIL (NOMINAL RATED VOLTAGE)⁷

CODE	RATING				
A06	6DC	A32	32DC	J12	12AC
A12	12DC	A48	48DC	J18	18AC
A18	18DC	A65	65DC	J24	24AC
A24	24DC	J06	6AC	J48	48AC
				J65	65AC
				K20	120AC
				L40	240AC

8 TERMINAL¹⁵

1 ¹⁰	Stud 10-32, threaded	6 ¹²	Screw M6, threaded
2 ¹¹	Screw 10-32	7 ^{13,15}	0.250 Double Click Connect
3 ¹²	Screw 1/4-20, threaded	8 ¹⁵	1/4" Clip Terminal
4 ¹¹	Screw M5 x 0.8, threaded	9 ^{12,15}	7/16" Clip Terminal
5 ¹¹	Screw M5 x 0.8	A ¹⁴	Plug-In Stud
		C ^{11,15}	5/16" Clip Terminal

9 ACTUATOR COLOR & LEGEND¹⁶

Actuator Color	I-O	ON-OFF	Dual	Legend Color
White	A	B	1	Black
Black	C	D	2	White
Red	F	G	3	White
Green	H	J	4	White
Blue	K	L	5	White
Yellow	M	N	6	Black
Gray	P	Q	7	Black
Orange	R	S	8	Black
Black (short handle) ¹⁷	T	U	9	White

10 MOUNTING/BARRIERS

	MOUNTING STYLE	BARRIERS	VOLTAGE
	Threaded Insert		
1	6-32 x 0.195 inches	no	< 300
A	6-32 x 0.195 inches	yes	< 300
C¹⁸	6-32 x 0.195 inches	yes	≥ 300
2	ISO M3 x 5mm	no	< 300
B	ISO M3 x 5mm	yes	< 300
D¹⁸	ISO M3 x 5mm	yes	≥ 300
E¹⁷	Front Panel Snap-In, 1.00" [25.4mm] wide bezel with Handleguard	no	< 300

11 AGENCY APPROVAL

C	UL Recognized, CSA Accepted
D	VDE Certified, UL Recognized, CSA Accepted
E	TUV Certified, UL Recognized, CSA Accepted
H	UL489 Construction: VDE Certified, UL Recognized, CSA Accepted
I	UL Rec. STD 1077, UL Rec. 1500 (ignition protected), CSA Accepted
L	UL489 Construction: UL Recognized, CSA Accepted
R	UL489 Construction: TUV Certified, UL Recognized, CSA Accepted

8 | C-Series Handle Parallel Pole UL489A Listed – Ordering Scheme

C	A	2	—	P	0	—	D4	—	820	—	3	2	1	—	M	T
1 Series	2 Actuator	3 Poles		4 Circuit	5 Aux/Alarm Switch		6 Frequency & Delay		7 Current Rating		8 Terminal	9 Actuator Color	10 Mounting		11 Max. App. Rating	12 Agency Approval

1 SERIES

C

2 ACTUATOR¹

A Handle, one per pole
S Mid-Trip Handle, one per pole
T Mid-Trip, one per pole & Alarm Switch

3 POLES³

2 Two **3** Three

4 CIRCUIT

P Series Trip (parallel pole)

5 AUXILIARY/ALARM SWITCH

0 w/o Aux Switch	5 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
2 S.P.D.T., 0.110 Q.C. Term.	6 S.P.S.T., 0.139 Solder Lug
3 S.P.D.T., 0.139 Solder Lug	7 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
4 S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)	8 S.P.S.T., 0.187 Q.C. Term.
	9 S.P.D.T., 0.187 Q.C. Term.

6 FREQUENCY & DELAY

D1 DC Ultra Short	D4 DC Medium
D2 DC Short	D6 DC Long

7 CURRENT RATING (AMPERES)

CODE	AMPERES			
811	110.000	814	140.000	917 170.000
812	120.000	815	150.000	922³ 225.000
912	125.000	816	160.000	825³ 250.000
813	130.000	817	170.000	820 200.000

8 TERMINAL²

3 1/4-20, threaded
6 M6, threaded
A Plug-In Stud

9 ACTUATOR COLOR

White	LEGEND ON-OFF	Dual	Legend Color
B	1	1	Black
D	2	2	White
G	3	3	White
J	4	4	White
L	5	5	White
N	6	6	Black
Q	7	7	Black
S	8	8	Black

10 MOUNTING/BARRIERS

MOUNTING STYLE
Threaded Insert
1 6-32 x 0.195 inches
2 ISO M3 x 5mm

11 MAXIMUM APPLICATION RATING

M 80 DC

12 AGENCY APPROVAL

T UL489A Listed (up to 250 amps)
K UL489A Listed, VDE Certified (up to 200 amps)
7 UL489A Listed, TUV Certified (up to 250 amps)

Notes:

- Actuator Code:
A: Handle tie pin spacer(s) and retainers provided assembled with multi-pole units.
S: Handle moves to mid-position only upon electrical trip of the breaker.
T: Handle moves to mid-position and alarm switch activates only upon electrical trip of the breaker.
- Terminal Code:
3 & 6: Supplied with bus bars connecting the Line and Load Terminals.
A: Line and Load Terminals must be connected to a copper bus bar having a minimum cross section of 0.078 square inches.
- Above 200 amps, 3 poles are required.

C	A	3	—	B	0	—	14	—	450	—	1	2	1	—	K	G
1 Series	2 Actuator	3 Poles		4 Circuit	5 Aux/Alarm Switch		6 Frequency & Delay		7 Current Rating		8 Terminal	9 Actuator Color	10 Mounting/ Barriers		11 Max. App. Rating	12 Agency Approval

1 SERIES C

2 ACTUATOR¹

- A** Handle, one per pole
B Handle, one per multipole unit
S Mid-Trip Handle, one per pole
T Mid-Trip, one per pole & Alarm Switch

3 POLES²

- 1** One **2** Two **3** Three

4 CIRCUIT

- B** Series Trip (current)

5 AUXILIARY/ALARM SWITCH³

- 0** w/o Aux Switch
2 S.P.D.T., 0.110 Q.C. Term.
3 S.P.D.T., 0.139 Solder Lug
4 S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)
5 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
6 S.P.S.T., 0.139 Solder Lug
7 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
8 S.P.S.T., 0.187 Q.C. Term.
9 S.P.D.T., 0.187 Q.C. Term.

6 FREQUENCY & DELAY

- 11** DC Ultra Short
12 DC Short
14 DC Medium
16 DC Long
21 50/60Hz Ultra Short
22 50/60Hz Short
24 50/60Hz Medium
26 50/60Hz Long
42⁴ 50/60Hz Short, Hi-Inrush
44⁴ 50/60Hz Medium, Hi-Inrush
46⁴ 50/60Hz Long, Hi-Inrush
52⁴ DC Short, Hi-Inrush
54⁴ DC Medium, Hi-Inrush
56⁴ DC Long, Hi-Inrush

Notes:

- 1 Actuator Code:
A: Handle tie pin spacer(s) and retainers provided assembled with multi-pole units.
B: Handle located, as viewed from front of breaker in left pole. 2 pole maximum.
S: Handle moves to mid-position only upon electrical trip of the breaker.
T: Handle moves to mid-position and alarm switch activates only upon electrical trip of the breaker.
2 Standard multipole units have all poles identical except when specifying auxiliary switch and/or mixed poles.
2 & 3 pole circuit breakers required for 120/240 VAC (Maximum application rating code C) applications, have all poles identical except when specifying auxiliary / alarm switch which is normally supplied in extreme right pole per figure B. Terminal barriers are required on all multipole breakers.
Third pole is for 120/240 VAC applications requiring neutral disconnect. The 3rd pole has the same construction as poles 1 & 2.
3 On multi-pole breakers, one auxiliary switch is supplied, mounted in the extreme right pole.
VDE approval on auxiliary switch codes 2, 3 & 4 only.
Auxiliary / Alarm Switch with Independent Circuit ie: separate from breaker circuit, only available with circuit breakers rated 50 amp maximum at 80 VDC, 125 VDC, and 120 VAC. Auxiliary / Alarm Switch with Dependent Circuit ie: same as circuit breaker, is supplied from factory with common terminal of auxiliary / alarm switch connected to line terminal on 120/240 and 240 VAC ratings. Circuit breakers rated 120 VAC 50 amp maximum can be supplied with Auxiliary/Alarm switch common terminal connected to breaker line terminal. Consult factory for special catalog number.
4 Available up to 50 amps maximum.
5 Current ratings 71 - 100 with VDE approvals are available up to two poles maximum.
6 Terminal Codes 8, 9 & C are not VDE approved.
7 Terminal Code 1 available to 60 amps maximum.
8 Terminal Codes 2, 4, 5 & C available to 50 amps maximum.
9 Terminal Codes 3, 6 & 9 available to 100 amps maximum.
10 Terminal Code A available to 100 amps maximum.
11 VDE and TUV approvals require Dual (I-O, ON-OFF) markings on all handles.
12 Barriers supplied on multi-pole units only.

7 CURRENT RATING (AMPERES)⁵

CODE	AMPERES				
210	0.100	295	0.950	470	7.000
215	0.150	410	1.000	475	7.500
220	0.200	512	1.250	480	8.000
225	0.250	415	1.500	485	8.500
230	0.300	517	1.750	490	9.000
235	0.350	420	2.000	495	9.500
240	0.400	522	2.250	610	10.000
245	0.450	425	2.500	710	10.500
250	0.500	527	2.750	611	11.000
255	0.550	430	3.000	711	11.500
260	0.600	435	3.500	612	12.000
265	0.650	440	4.000	712	12.500
270	0.700	445	4.500	613	13.000
275	0.750	450	5.000	614	14.000
280	0.800	455	5.500	615	15.000
285	0.850	460	6.000	616	16.000
290	0.900	465	6.500	617	17.000
				618	18.000
				620	20.000
				622	22.000
				624	24.000
				625	25.000
				630	30.000
				635	35.000
				640	40.000
				660	60.000
				670	70.000
				680	80.000
				685	85.000
				690	90.000
				695	95.000
				810	100.000

8 TERMINAL⁶

- 1⁷** Stud 10-32, threaded
2⁸ Screw 10-32
3⁹ Screw 1/4-20, threaded
4⁸ Screw M5 x 0.8, threaded
5⁸ Screw M5 x 0.8
6⁹ Screw M6, threaded
8 1/4" Clip Terminal
9⁹ 7/16" Clip Terminal
A¹⁰ Plug-In Stud
C 5/16" Clip Terminal

9 ACTUATOR COLOR & LEGEND¹¹

Actuator Color	ON-OFF	Dual	Legend Color
White	B	1	Black
Black	D	2	White
Red	G	3	White
Green	J	4	White
Blue	L	5	White
Yellow	N	6	Black
Gray	Q	7	Black
Orange	S	8	Black

10 MOUNTING/BARRIERS

MOUNTING STYLE	BARRIERS ¹²
Threaded Insert	
1 6-32 x 0.195 inches	yes
2 ISO M3 x 5mm	yes

11 MAXIMUM APPLICATION RATING

- A** 65 DC
B 125 DC
C 120/240 AC²
D 240 AC
K 120 AC
M 80 DC

12 AGENCY APPROVAL¹¹

- A** w/o approvals
F UL489 Listed, VDE Certified, CSA Accepted
G UL489 Listed, CSA Accepted
J UL489 Listed, TUV Certified, CSA Accepted



1 SERIES

C

2 ACTUATOR¹

M Sealed Toggle, one per pole

3 POLES

1 One 2 Two 3 Three

4 CIRCUIT

A² Switch Only (no coil)	F³ Relay Trip (current)
B Series Trip (current)	G³ Relay Trip (voltage)
C Series Trip (voltage)	H^{3,4} Dual Coil with Shunt Trip
D³ Shunt Trip (current)	K^{3,4} Dual Coil with Relay Trip
E³ Shunt Trip (voltage)	V Voltage Coil

5 AUXILIARY/ALARM SWITCH

0 w/o Aux Switch	5 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
2 S.P.D.T., 0.110 Q.C. Term.	6 S.P.S.T., 0.139 Solder Lug
3 S.P.D.T., 0.139 Solder Lug	7 S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
4 S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)	8 S.P.S.T., 0.187 Q.C. Term.
	9 S.P.D.T., 0.187 Q.C. Term.

6 FREQUENCY & DELAY

03² DC 50/60Hz, Switch Only	30 DC 50/60Hz Instantaneous
10⁶ DC Instantaneous	31 DC 50/60Hz Ultra Short
11 DC Ultra Short	32 DC 50/60Hz Short
12 DC Short	34 DC 50/60Hz Medium
14 DC Medium	36 DC 50/60Hz Long
16 DC Long	42⁷ 50/60Hz Short, Hi-Inrush
20⁶ 50/60Hz Instantaneous	44⁷ 50/60Hz Medium, Hi-Inrush
21 50/60Hz Ultra Short	46⁷ 50/60Hz Long, Hi-Inrush
22 50/60Hz Short	52⁷ DC Short, Hi-Inrush
24 50/60Hz Medium	54⁷ DC Medium, Hi-Inrush
26 50/60Hz Long	56 DC Long, Hi-Inrush

7 CURRENT RATING (AMPERES)⁹

CODE	AMPERES				
020	0.020	235	0.350	430	3.000
025	0.025	240	0.400	435	3.500
030	0.030	245	0.450	440	4.000
035	0.035	250	0.500	445	4.500
040	0.040	255	0.550	450	5.000
045	0.045	260	0.600	455	5.500
050	0.050	265	0.650	460	6.000
055	0.055	270	0.700	465	6.500
060	0.060	275	0.750	470	7.000
065	0.065	280	0.800	475	7.500
070	0.070	285	0.850	480	8.000
075	0.075	290	0.900	485	8.500
080	0.080	295	0.950	490	9.000
085	0.085	410	1.000	495	9.500
090	0.090	512	1.250	610	10.000
095	0.095	415	1.500	710	10.500
210	0.100	517	1.750	611	11.000
215	0.150	420	2.000	711	11.500
220	0.200	522	2.250	612	12.000
225	0.250	425	2.500	712	12.500
230	0.300	527	2.750	613	13.000

VOLTAGE COIL (NOMINAL RATED VOLTAGE)⁷

CODE	RATING				
A06	6DC	A32	32DC	J12	12AC
A12	12DC	A48	48DC	J18	18AC
A18	18DC	A65	65DC	J24	24AC
A24	24DC	J06	6AC	J48	48AC
				J65	65AC
				K20	120AC
				L40	240AC

8 TERMINAL

1 ⁹	Stud 10-32, threaded	6 ¹¹	Screw M6, threaded
2 ¹⁰	Screw 10-32	7 ¹²	0.250 Double Click Connect
3 ¹¹	Screw 1/4-20, threaded	8	1/4" Clip Terminal
4 ¹⁰	Screw M5 x 0.8, threaded	9 ¹¹	7/16" Clip Terminal
5 ¹⁰	Screw M5 x 0.8	A ¹³	Plug-In Stud
		C ¹⁰	5/16" Clip Terminal

9 LEGEND PLATE

0 No Legend

10 MOUNTING/BARRIERS

	MOUNTING STYLE	BARRIERS
1	Standard Hex Nut	no
A	Standard Hex Nut (multi-pole units only)	yes

11 AGENCY APPROVAL

C	UL Recognized, CSA Accepted
L	UL Recognized, CSA Accepted with listed construction
I	UL Recognized, CSA Accepted, UL1500 ignition protection

Notes:

- Actuator Code M: Handle location as viewed from front of breaker:
2 pole - right pole 3 pole - center pole
- Switch Only circuits, rated up to 50 amps and 3 poles, and only available with VDE. For .02 to 30 amps, select Current Code 630. For 35 - 50 amps, select Current Code 650. For 55-70 amps, select Current Code 670. For 75-100 amps, select Current Code 810.
- Circuit Codes D,E,F,G,H & K available with Terminal Codes 1,2,4 & 5 only.
- Consult factory for available Dual Coil options, as special catalog number is required. Dual Coil Voltage Coils with Shunt Trip Construction trip instantaneously on line voltage. Dual Coil Voltage Coils require 30VA minimum power to trip instantaneously and are rated for intermittent duty only.
- Auxiliary Switch available with Series Trip and Switch Only circuits. On multi-pole breakers, one aux. switch is supplied, mounted in the extreme right pole.
- Voltage coils not rated for continuous duty. Available only with delay codes 10 and 20.
- Available with Circuit Codes B & D only, and up to 50 amps maximum.
- Consult factory for current ratings 71-100, in three pole units, available as special catalog number only.
- Terminal Code 1 available to 60 amps maximum.
- Terminal Codes 2,4,5 and C available to 50 amps maximum.
- Terminal Codes 3,6 & 9 available to 100 amps maximum.
- Terminal Code 7 available to 25 amps maximum.
- Terminal Code A available to 100 amps maximum.



1 SERIES

2 ACTUATOR¹

Two Color Visi-Rocker

- C** Indicate ON, vertical legend
- D** Indicate ON, horizontal legend
- E** Indicate ON, no legend
- F** Indicate OFF, vertical legend
- G** Indicate OFF, horizontal legend
- H** Indicate OFF, no legend

Single color

- J** *Vertical legend*
K Horizontal legend
L No legend

Push-To-Reset, Single color

- | | |
|---|-------------------|
| R | Vertical legend |
| U | Horizontal legend |
| V | No legend |

Push-To-Reset, Visi-Rocker

- | | |
|----------|------------------------------------|
| N | Indicate OFF,
vertical legend |
| O | Indicate OFF,
horizontal legend |
| P | Indicate OFF,
no legend |

ROCKER STYLE DESCRIPTIONS

	INDICATE "ON"	INDICATE "OFF"	SINGLE COLOR
VERTICAL STYLE	LINE CODE "G", "H" INDICATE COLOR LOCATION	LINE CODE "I", "N"	LINE CODE "J", "T"
HORIZONTAL STYLE	CODE "D" LINE	CODE "G", "O" LINE	CODE "K", "U" LINE

3 POLES²

- | | | | | | |
|---|-----|---|-----|---|-------|
| 1 | One | 2 | Two | 3 | Three |
|---|-----|---|-----|---|-------|

4 CIRCUIT

- | | | | |
|----------------------|-----------------------|------------------------|---------------------------|
| A³ | Switch Only (No Coil) | G⁴ | Relay Trip (Voltage) |
| B | Series Trip (Current) | H^{4,5} | Dual Coil with Shunt Trip |
| C | Series Trip (Voltage) | | Voltage Coil |
| D⁴ | Shunt Trip (Current) | K^{4,5} | Dual Coil with Relay Trip |
| E⁴ | Shunt Trip (Voltage) | | Voltage Coil |

5 AUXILIARY/ALARM SWITCH⁶

- | | | | |
|---|----------------------------|---|----------------------------|
| 0 | w/o Aux Switch | | (Gold Contacts) |
| 2 | S.P.D.T., 0.110 Q.C. Term. | 6 | S.P.S.T., 0.139 Solder Lug |
| 3 | S.P.D.T., 0.139 Solder Lug | 7 | S.P.S.T., 0.110 Q.C. Term. |
| 4 | S.P.D.T., 0.110 Q.C. Term. | | (Gold Contacts) |
| | (Gold Contacts) | 8 | S.P.S.T., 0.187 Q.C. Term. |
| | | 9 | S.P.D.T., 0.187 Q.C. Term. |

6 FREQUENCY & DELAY

- | | | | |
|-----------------|-------------------------|-----------------|---------------------------|
| 03 | DC 50/60Hz, Switch Only | 31 | DC 50/60Hz Ultra Short |
| 10 ^a | Instantaneous | 32 | DC 50/60Hz Short |
| 11 | DC Ultra Short | 34 | DC 50/60Hz Medium |
| 12 | DC Short | 36 | DC 50/60Hz Long |
| 14 | DC Medium | 42 ^b | 50/60Hz Short, Hi-Inrush |
| 16 | DC Long | 44 ^b | 50/60Hz Medium, Hi-Inrush |
| 20 ^c | 50/60Hz Instantaneous | 46 ^b | 50/60Hz Long, Hi-Inrush |
| 21 | 50/60Hz Ultra Short | 52 ^b | DC Short, Hi-Inrush |
| 22 | 50/60Hz Short | 54 ^b | DC Medium, Hi-Inrush |
| 24 | 50/60Hz Medium | 56 ^b | DC Long, Hi-Inrush |
| 26 | 50/60Hz Long | | |

7 CURRENT RATING (AMPERES)

CODE	AMPERES						
020	0.020	235	0.350	430	3.000	614	14.000
025	0.025	240	0.400	435	3.500	615	15.000
030	0.030	245	0.450	440	4.000	616	16.000
035	0.035	250	0.500	445	4.500	617	17.000
040	0.040	255	0.550	450	5.000	618	18.000
045	0.045	260	0.600	455	5.500	620	20.000
050	0.050	265	0.650	460	6.000	622	22.000
055	0.055	270	0.700	465	6.500	624	24.000
060	0.060	275	0.750	470	7.000	625	25.000
065	0.065	280	0.800	475	7.500	630	30.000
070	0.070	285	0.850	480	8.000	635	35.000
075	0.075	290	0.900	485	8.500	640	40.000
080	0.080	295	0.950	490	9.000	650	50.000
085	0.085	410	1.000	495	9.500	660 ^a	60.000
090	0.090	512	1.250	610	10.000	670 ^a	70.000
095	0.095	415	1.500	710	10.500	680 ^a	80.000
210	0.100	517	1.750	611	11.000	685 ^a	85.000
215	0.150	420	2.000	711	11.500	690 ^a	90.000
220	0.200	522	2.250	612	12.000	695 ^a	95.000
225	0.250	425	2.500	712	12.500	810 ^a	100.000
230	0.300	527	2.750	613	13.000		

VOLTAGE COIL (NORMINAL RATED VOLTAGE)⁷

CODE	RATING						
A06	6DC	A32	32DC	J12	12AC	J65	65AC
A12	12DC	A48	48DC	J18	18AC	K20	120AC
A18	18DC	A65	65DC	J24	24AC	L40	240AC
A24	24DC	J06	6AC	J48	48AC		

8 TERMINAL

- | | | | |
|-----------------|-------------------------|-----------------|----------------------------|
| 1 ¹⁰ | Stud 10-32, threaded | 7 ¹³ | 0.250 Double Quick Connect |
| 2 ¹¹ | Screw 10-32 | 8 | 1/4" Clip Terminal |
| 3 ¹² | Stud 1/4-20, threaded | 9 | 7/16" Clip Terminal |
| 4 ¹¹ | Stud M5 x 0.8, threaded | A ¹⁴ | Plug-In Stud |
| 5 ¹¹ | Screw M5 x 0.8 | C | 5/16" Clip Terminal |
| 6 ¹² | Stud M6, threaded | | |

9 ACTUATOR COLOR & LEGEND^{16,17,18}

Actuator or Visi-Color			Marking:	Marking Color:		
Color:	I-O	ON-OFF	Dual/None	Single Color Rocker/Handle	Visi-Rocker	
White	A	B	1	Black	White	
Black	C	D	2	White	n/a	
Red	F	G	3	White	Red	
Green	H	J	4	White	Green	
Blue	K	L	5	White	Blue	
Yellow	M	N	6	Black	Yellow	
Gray	P	Q	7	Black	Gray	
Orange	R	S	8	Black	Orange	

10 MOUNTING/BARRIERS¹

	Standard Rocker Bezel	BARRIERS
1	6-32 x 0.195 inches	no
2	6-32 x 0.195 inches	yes
3 ¹⁹	6-32 x 0.195 inches	yes
4	ISO M3 x 5mm	no
5	ISO M3 x 5mm	yes
6 ¹⁹	ISO M3 x 5mm	yes
	Rockerguard Bezel	
A	6-32 x 0.195 inches	no
C	6-32 x 0.195 inches	yes
E ¹⁹	6-32 x 0.195 inches	yes
G	ISO M3 x 5mm	no
J	ISO M3 x 5mm	yes
L ¹⁹	ISO M3 x 5mm	yes
	Push-To-Reset Bezel	
B	6-32 x 0.195 inches	no
D	6-32 x 0.195 inches	yes
F ¹⁹	6-32 x 0.195 inches	yes
H	ISO M3 x 5mm	no
J	ISO M3 x 5mm	yes
M ¹⁹	ISO M3 x 5mm	yes

11 AGENCY APPROVAL

- | | |
|--------------------------------------|---|
| C
O
N
T
E
N
T
S | UL Recognized, CSA Accepted |
| | VDE Certified, UL Recognized, CSA Accepted |
| | TUV Certified, UL Recognized, CSA Accepted |
| | UL489 Construction: VDE Certified, UL Recognized, CSA Accepted |
| | UL Rec. STD 1077, UL Rec. 1500 (ignition protected), CSA Accepted |
| | UL489 Construction: UL Recognized, CSA Accepted |
| | UL489 Construction: TUV Certified, UL Recognized, CSA Accepted |

Notes:

1 Push-To-Reset actuators have OFF portion of rocker shrouded.

2 Multi-pole breakers have all poles identical except when specifying Aux. switch and/or mixed poles, and have one
rocker per breaker. Rocker location as viewed from front panel: 2 pole – left pole; 3 pole – center pole.

3 Switch Only circuits, rated to 50 amps and 3 poles, and only available with VDE Certification when tied to a
protected pole (Circuit Code B, C, D or H). For .02 to 30 amps, select Current Code 630. For 35 - 50 amps, select
Current Code 650. For 55-70 amps, select Current Code 670. For 75-100 amps, select Current Code 810.

4 Circuit Codes D,E,F,G,H & K available with Terminal Codes 1,2,4 & 5 only. Circuit Codes D,F,H & K available up
to 50 amps maximum Current Rating.

5 Consult factory for available Dual Coil options, as special catalog number is required. Dual Coil Voltage Coils
with Shunt Trip Construction trip instantaneously on line voltage. Dual Coil Voltage Coils require 30VA minimum
power to trip instantaneously and are rated for intermittent duty only.

6 Auxiliary Switch available with Series Trip and Switch Only circuits. On multi-pole breakers, one aux. switch is
supplied, mounted in the extreme right pole. Auxiliary switch codes 2,3 & 4 are VDE approved.

7 Voltage coils not rated for continuous duty. Available only with delay codes 10 and 20.

8 Available with Circuit Codes B & D only, and up to 50 amps maximum.

9 Current Ratings 60-70 are available up to four poles maximum. Ratings 71-100 are available up to two poles maximum.

10 Terminal Code 1 available to 60 amps maximum.

11 Terminal Codes 2,4,5 & C available to 50 amps maximum.

12 Terminal Codes 3,6 & 9 available to 100 amps maximum.

13 Terminal Code 7 available to 25 amps maximum.

14 Terminal Code A available to 100 amps maximum.

15 Terminal Codes 7,8,9 & C are not VDE approved.

16 Color shown is visi and legend with remainder of rocker black

17 Legend on Push-to-reset bezel/shroud is white when single color rocker is ordered. Dual = ON-OFF/I-O legend
with actuator Codes C - G, and J, K, N, O, R, & U. None = no legend with actuator codes H, L, P, V. Rocker-
guard available with actuator codes C - L. Push-to-reset available with actuator codes N, O, P, R, U, V.

18 VDE/TUV approval requires Dual (I-O, ON-OFF) or I-O markings on rocker.

19 VDE/TUV: 30 amps max.; UL/CSA: 50 amps max.; Available in 2 - 4 poles only and limited to AC Delays.

“General Purpose” trips not rated for “full load amps” or to be used in applications with a motor.

ROCKER STYLE DESCRIPTIONS

	INDICATE "ON"	INDICATE "OFF"	SINGLE COLOR
VERTICAL STYLE	LINE INDICATE COLOR LOCATION CODE "C"	LINE CODE "F"	LINE CODE "J"
HORIZONTAL STYLE	LINE CODE "D"	LINE CODE "G"	LINE CODE "K"

1	One	2	Two	3	Three
---	-----	---	-----	---	-------

B Series Trip (current)

0	w/o Aux Switch	5	S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)
2	S.P.D.T., 0.110 Q.C. Term.	6	S.P.S.T., 0.139 Solder Lug
3	S.P.D.T., 0.139 Solder Lug	7	S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
4	S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)	8	S.P.S.T., 0.187 Q.C. Term.
		9	S.P.D.T., 0.187 Q.C. Term.

11	DC Ultra Short	42 ⁸	50/60Hz Short, Hi-Inrush
12	DC Short	44 ⁸	50/60Hz Medium, Hi-Inrush
14	DC Medium	46 ⁸	50/60Hz Long, Hi-Inrush
16	DC Long	52 ⁸	DC Short, Hi-Inrush
21	50/60Hz Ultra Short	54 ⁸	DC Medium, Hi-Inrush
22	50/60Hz Short	56	DC Long, Hi-Inrush
24	50/60Hz Medium		

CODE	AMPERES						
210	0.100	295	0.950	470	7.000	618	18.000
215	0.150	410	1.000	475	7.500	620	20.000
220	0.200	512	1.250	480	8.000	622	22.000
225	0.250	415	1.500	485	8.500	624	24.000
230	0.300	517	1.750	490	9.000	625	25.000
235	0.350	420	2.000	495	9.500	630	30.000
240	0.400	522	2.250	610	10.000	635	35.000
245	0.450	425	2.500	710	10.500	640	40.000
250	0.500	527	2.750	611	11.000	650	50.000
255	0.550	430	3.000	711	11.500	660	60.000
260	0.600	435	3.500	612	12.000	670	70.000
265	0.650	440	4.000	712	12.500	680	80.000
270	0.700	445	4.500	613	13.000	685	85.000
275	0.750	450	5.000	614	14.000	690	90.000
280	0.800	455	5.500	615	15.000	695	95.000
285	0.850	460	6.000	616	16.000	100	100.000
290	0.900	465	6.500	617	17.000		

1 ⁵	Stud 10-32, threaded	6 ⁷	Stud M6, threaded
2 ⁶	Screw 8-32 w/saddle & washer clamps	8 ⁸	1/4" Clip Terminal
3 ⁷	Stud 1/4-20, threaded	9 ^{7,8}	7/16" Clip Terminal
4 ⁶	Stud M5 x 0.8, threaded	A ^{7,8}	Plug-In Stud
5 ⁶	Screw M5 x 0.8 w/saddle & washer clamps	C ^{6,8}	5/16" Clip Terminal

ACTUATOR COLOR & LEGEND				
Actuator or Visi-Color 9		Marking:		Marking Color:
Color:	ON-OFF	Dual¹⁰	Single Color Rocker/Handle	Visi-Rocker
White	B	1	Black	White
Black	D	2	White	n/a
Red	G	3	White	Red
Green	J	4	White	Green
Blue	L	5	White	Blue
Yellow	N	6	Black	Yellow
Gray	Q	7	Black	Gray
Orange	S	8	Black	Orange

	Standard Rocker Bezel	BARRIERS ¹³
	<i>Threaded Insert, 2 per pole</i>	
A	6-32 x 0.195 inches	yes
C	ISO M3 x 5mm	yes
	Rockerguard Bezel	
	<i>Threaded Insert, 2 per pole</i>	
B	6-32 x 0.195 inches	yes
D	ISO M3 x 5mm	yes

A	65 DC
B	125 DC
C	120/240 AC ¹⁴
D	240 AC
K	120 AC
M	80 DC

A	without approvals
F	UL 489 Listed, CSA Certified, & VDE Certified
G	UL 489 Listed & CSA Certified
J	UL489 Listed, CSA Certified & TUV Certified

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Email: sales@carlingtech.com • www.carlingtech.com

C

Two Color Visi-Rocker

Single color

- Push-To-Reset, Visi-Rocker**

5 Indicate OFF, vertical le

- 6 Indicate OFF, horizontal legend

Push-To-Reset, Single color

- 7 Vertical legend
- 8 Horizontal lege

ROCKER STYLE DESCRIPTIONS		
	INDICATE "OFF"	SINGLE COLOR
VERTICAL STYLE	CODE "1", "5" INDICATE COLOR LOCATION	CODE "3", "7" LINE
HORIZONTAL STYLE	CODE "2", "6" LINE	CODE "4", "8" LINE

1 One

- | | | | | | |
|---|-----|---|-----|---|-------|
| 1 | One | 2 | Two | 3 | Three |
|---|-----|---|-----|---|-------|

B Series Trip (current)

0	w/o Aux Switch	5	S.P.D.T., 0.187 Q.C. Term. (Gold Contacts)
2	S.P.D.T., 0.110 Q.C. Term.	6	S.P.S.T., 0.139 Solder Lug
3	S.P.D.T., 0.139 Solder Lug	7	S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)
4	S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)	8	S.P.S.T., 0.187 Q.C. Term.
		9	S.P.D.T., 0.187 Q.C. Term.

11	DC Ultra Short	26	50/60Hz Long
12	DC Short	42 ^a	50/60Hz Short, Hi-Inrush
14	DC Medium	44 ^a	50/60Hz Medium, Hi-Inrush
16	DC Long	46 ^a	50/60Hz Long, Hi-Inrush
21	50/60Hz Ultra Short	52 ^a	DC Short, Hi-Inrush
22	50/60Hz Short	54 ^a	DC Medium, Hi-Inrush
24	50/60Hz Medium	56 ^a	DC Long, Hi-Inrush

CODE	AMPERES
------	---------

CODE	AMPERES						
210	0.100	295	0.950	470	7.000	618	18.000
215	0.150	410	1.000	475	7.500	620	20.000
220	0.200	512	1.250	480	8.000	622	22.000
225	0.250	415	1.500	485	8.500	624	24.000
230	0.300	517	1.750	490	9.000	625	25.000
235	0.350	420	2.000	495	9.500	630	30.000
240	0.400	522	2.250	610	10.000	635	35.000
245	0.450	425	2.500	710	10.500	640	40.000
250	0.500	527	2.750	611	11.000	650	50.000
255	0.550	430	3.000	711	11.500	660	60.000
260	0.600	435	3.500	612	12.000	670	70.000
265	0.650	440	4.000	712	12.500	680	80.000
270	0.700	445	4.500	613	13.000	685	85.000
275	0.750	450	5.000	614	14.000	690	90.000
280	0.800	455	5.500	615	15.000	695	95.000
285	0.850	460	6.000	616	16.000	100	100.000
290	0.900	465	6.500	617	17.000		

1⁶	Stud 10-32, threaded .625 long	6⁸	Stud M6, threaded 17mm long
2⁷	Screw 8-32 w/saddle & washer clamps	8⁹	1/4" Clip Terminal
3⁸	Stud 1/4-20, threaded .625 long	9^{8,9}	7/16" Clip Terminal
4⁷	Stud M5 x 0.8, threaded .625 long	A^{8,9}	Plug-In Stud
5⁷	Screw M5 x 0.8 w/saddle & washer clamps	C^{7,9}	5/16" Clip Terminal

ACTUATOR COLOR & LEGEND				
Actuator or Visi-Color 9		Marking:		Marking Color:
Color:	ON-OFF	Dual¹¹	Single Color Rocker/Handle	Visi-Rocker
White	B	1	Black	White
Black	D	2	White	n/a
Red	G	3	White	Red
Green	J	4	White	Green
Blue	L	5	White	Blue
Yellow	N	6	Black	Yellow
Gray	Q	7	Black	Gray
Orange	S	8	Black	Orange

	Standard Rocker Bezel <i>Threaded Insert, 2 per pole</i>	BARRIERS ¹⁵
A	6-32 x 0.195 inches	yes
C	ISO M3 x 5mm	yes
	Recessed Off Rocker¹⁴ <i>Threaded Insert, 2 per pole</i>	
E	6-32 x 0.195 inches	yes
F	ISO M3 x 5mm	yes
	Push-To-Reset Bezel <i>Threaded Insert, 2 per pole</i>	
B	6-32 x 0.195 inches	yes
D	ISO M3 x 5mm	yes

A	65 DC
B	125 DC
C	120/240 AC ¹⁶
D	240 AC
K	120 AC
M	80 DC

A	without approvals
G	UL 489 Listed & CSA Certified
J	UL489 Listed, CSA Certified & TUV Certified

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TERMINAL			RATING (AMPS)			
DESCRIPTION	CODE	DIMENSIONAL DETAIL	25	50	100	
					80	
#10-32 STUD	1					
M5 STUD	4					
#1/4-20 STUD	3					
M6 STUD	6					
#1/4-20 STUD	3					
M6 STUD	6					
#10-32 SCREW	2					
M-5 SCREW	5					

NOTES: TOLERANCE ON STUD LENGTHS IS ± 0.031 [$\pm .79$] UNLESS OTHERWISE SPECIFIED.

TERMINAL			RATING (AMPS)		
DESCRIPTION	CODE	DIMENSIONAL DETAIL	25	50	100
.250 DOUBLE Q.C.	7				
7/16" CLIP TERMINALS	9				
PUSH-IN STUD	A				

AUXILIARY / ALARM SWITCH TERMINAL DETAIL³

TAB (Q.C.) .187

TAB (Q.C.) .110

SOLDER TYPE

TIGHTENING TORQUE SPECIFICATIONS	
THREAD SIZE	TORQUE
#6-32 [M3] MOUNTING INSERTS	7-9 IN-LBS [0.8-1.0 NM]
#10-32 & M5 THD STUDS	15-20 IN-LBS [1.7-2.3 NM]
#10-32 THD SCREW	15-20 IN-LBS [1.7-2.3 NM]
#1/4-20 & M6 THD STUDS	30-35 IN-LBS [3.4-4.0 NM]

TERMINAL HARDWARE				
TERMINAL DESCRIPTION	CODE	AGENCY APPROVAL	AMPERE RATING	HARDWARE SUPPLIED
#10-32 STUD	1	ALL	.02 - 50	LOCK WASHER - FLAT WASHER - NUT
M5 STUD	4	ALL	.02 - 50	LOCK WASHER - FLAT WASHER - NUT
#14-20 STUD	3	ALL	.02 - 80	LOCK WASHER - FLAT WASHER - NUT
			81 - 100	LOCK WASHER - NUT - (2)FLAT WASHER - NUT
M6 STUD	6	ALL	.02 - 80	LOCK WASHER - FLAT WASHER - NUT
			81 - 100	LOCK WASHER - NUT - (2)FLAT WASHER - NUT
#10-32 SCREW	2 & 5	UL RECOGNIZED	.02 - 50	* SADDLE CLAMP - FLAT WASHER - SCREW
		UL-489 LISTED	.02 - 50	LOCK WASHER - FLAT WASHER - SCREW
		TUV & VDE CERTIFIED	.02 - 16	* SADDLE CLAMP - FLAT WASHER - SCREW
		TUV & VDE CERTIFIED	16.1 - 50	LOCK WASHER - FLAT WASHER - SCREW

* THE SADDLE CLAMP IS FOR DIRECT WIRE CONNECTION USE.
DISCARD SADDLE CLAMP IF WIRE TERMINAL LUG IS USED

Notes:

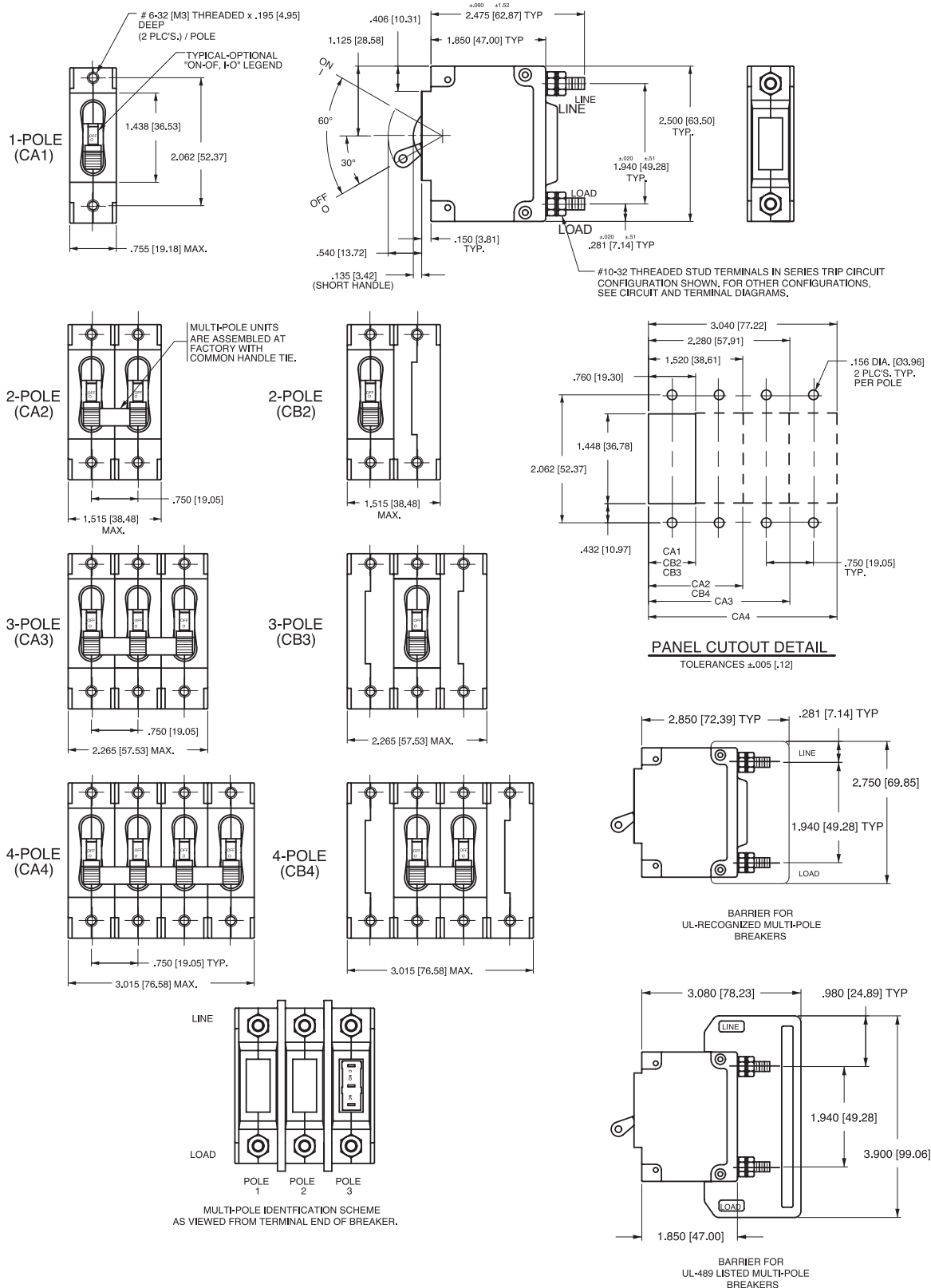
- 1 All dimensions are in inches [millimeters].
2 Tolerance ± 0.020 [.51] unless otherwise specified.
3 Available on Series Trip and Switch Only Circuits when called for on multi-pole units.
Only one aux. switch is normally supplied, as viewed in multi-pole identification scheme.

	CIRCUIT SCHEMATIC		CIRCUIT CODE	AUX SWITCH CODE	CIRCUIT SCHEMATIC		CIRCUIT CODE	AUX SWITCH CODE
	ANSI	IEC			ANSI	IEC		
			LINE	O			B	O
			LOAD	2 3 4			B	2 3 4
				0			H	0
				0			K	0

HANDLE POSITION VS. AUX/ALARM SWITCH MODE					
CIRCUIT BREAKER MODE	STANDARD C/B		MID TRIP C/B		
	HANDLE POSITION	AUX. SWITCH MODE	HANDLE POSITION	STANDARD ALARM SWITCH MODE	REVERSE ALARM SWITCH MODE ⁴
OFF					
ON					
ELECTRICAL TRIP					

Notes:

- All dimensions are in inches [millimeters].
- Tolerance $\pm .020$ [.51] unless otherwise specified.
- Schematic shown represents current trip circuits.
- Available only as special catalog number.



Notes:

- 1 All dimensions are in inches [millimeters].
- 2 Tolerance ±.020 [.51] unless otherwise specified.



*Handleguard available as special catalog number only



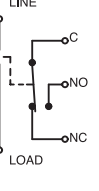
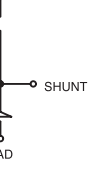
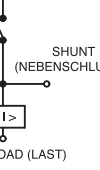
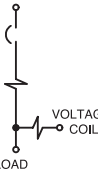
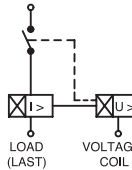
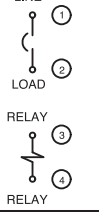
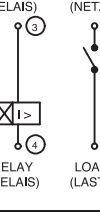
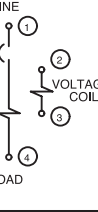
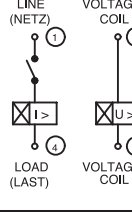
Notes:

- 1 All dimensions are in inches [millimeters].
- 2 Tolerance ± 0.020 [.51] unless otherwise specified.



Notes:

- 1 All dimensions are in inches [millimeters].
- 2 Tolerance ±.020 [.51] unless otherwise specified.

CIRCUIT BREAKER PROFILE	CIRCUIT SCHEMATIC		CIRCUIT CODE	AUX. SWITCH CODE	CIRCUIT SCHEMATIC		CIRCUIT CODE	AUX. SWITCH CODE
	ANSI	IEC			ANSI	IEC		
 2.160 [54.86] TYP LINE MAIN TERM'S. (SEE TABLE A) LOAD SERIES TRIP (2 TERM'S.) ±.031 [.79] TYP .625 [15.88] TYP	SWITCH ONLY (NO COIL)		A	0	SWITCH TRIP		BC	0
	 LINE LOAD	 LINE (NETZ) LOAD (LAST)			 LINE LOAD	 LINE (NETZ) (3) LOAD (LAST)		
 .675 [17.15] TYP .970 [24.64] C NO NC 1.265 [32.13] AUX. SWITCH TERM'S. (3 PLCS.) SERIES TRIP W/AUX. SWITCH (5 TERM'S.)	SWITCH ONLY (NO COIL) WITH AUXILIARY SWITCH		A	2 3 4	SERIES TRIP WITH AUXILIARY SWITCH		BC	2 3 4
	 LINE LOAD	 LINE (NETZ) LOAD (LAST)			 LINE LOAD	 LINE (NETZ) (3) LOAD (LAST)		
 SHUNT TRIP (3 TERM'S.)	SHUNT TRIP		DE	0	DUAL COIL; SERIES TRIP CURRENT COIL, SHUNT TRIP VOLTAGE COIL		H	0
	 LINE LOAD	 LINE (NETZ) (3) SHUNT (NEBENSCHLUSS) LOAD (LAST)			 LINE LOAD	 LINE (NETZ) LOAD (LAST) VOLTAGE COIL		
 1 2 3 4 .646 [16.41] ±.031 [.79] TYP .812 [20.62] TYP .646 [16.41] TYP SHUNT TRIP (4 TERM'S.)	RELAY TRIP		FG	0	DUAL COIL; SERIES TRIP CURRENT COIL, RELAY TRIP VOLTAGE COIL		K	0
	 LINE LOAD RELAY	 RELAY (RELAIS) LOAD (LAST)			 LINE LOAD	 LINE (NETZ) LOAD (LAST) VOLTAGE COIL		



BARRIER FOR
UL-RECOGNIZED MULTI-POLE
BREAKERS



BARRIER FOR
UL-489 LISTED MULTI-POLE
BREAKERS

Notes:

- All dimensions are in inches [millimeters].
- Tolerance $\pm .020$ [.51] unless otherwise specified.
- Schematic shown represents current trip circuit.

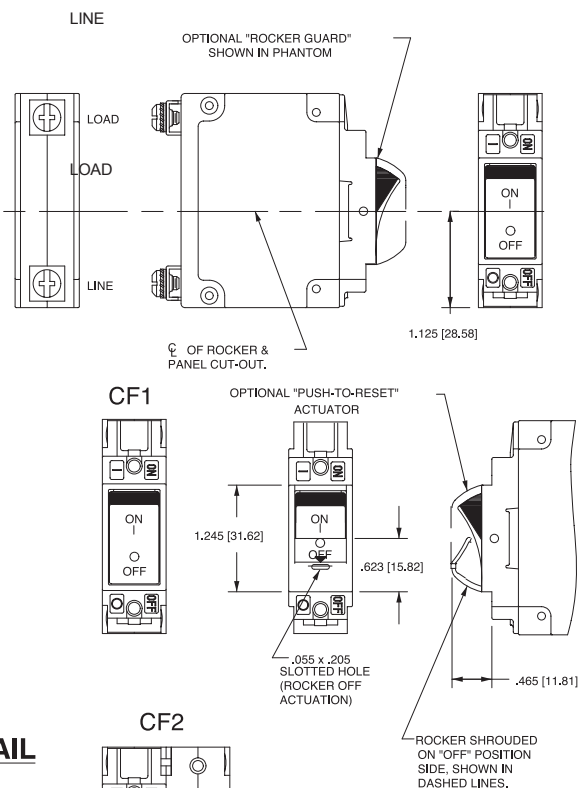
INDICATE "ON"

SCREW TYPE TERMINALS IN SERIES TRIP CIRCUIT CONFIGURATION SHOWN. FOR OTHER CONFIGURATIONS SEE CIRCUIT AND TERMINAL DIAGRAMS.



INDICATE "OFF" & SINGLE COLOR

(INDICATE "OFF" SHOWN)



PANEL CUT-OUT DETAIL



CC3



REAR VIEW OF INDICATE "ON"
SERIES TRIP W/ AUX SWITCH
CIRCUIT CONFIGURATION.

CF3



REAR VIEW OF INDICATE "OFF"
SERIES TRIP W/ AUX SWITCH
CIRCUIT CONFIGURATION.

Notes:

- 1 Dimensions apply to all variations shown. Notice that circuit breaker line and load terminal orientation on indicate OFF is opposite of indicate ON.
2 For pole orientation with horizontal legend, rotate front view clockwise 90°.
3 All dimensions are in inches [millimeters].
4 Tolerance $\pm .020$ [.51] unless otherwise specified.



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