

N-Series

CIRCUIT BREAKER

Carling Technologies' high-performance N-Series hydraulic-magnetic circuit breaker is ideally suited for the rigors and confined spaces of telecom and datacom power distribution units and rack systems. Its innovative, low profile design features easily accessible load and line terminals and sliding barriers for effortless installation.

With the integration of an optional current transformer, the N-Series is capable of sensing current down to a level of 1%. This optional capability provides precise current monitoring and reporting required for back billing of the actual power consumed by datacenter storage and routing devices. This feature also facilitates load adjustments and maximizes efficiency. A patent pending, flush-rocker actuator and push-to-reset guard offer additional protection against accidental switching.

1-2 poles; ratings: 1-30 amps up to 240 VAC, 277 VAC, 120/240 VAC; 22,000 Amps Max Interrupting Capacity; UL 489 Compliant Sliding Terminal Barriers; EN60947-2 Certified



Resources:

[Configure a Complete Part](#)

[Download CAD & Sales Drawing >](#)

[Watch Product Video](#)



Product Highlights:

- 240 VAC, 277 VAC, 120/240 VAC
- UL 489 Compliant Sliding Terminal Barriers
- 22,000 Amps Max Interrupting Capacity
- 1 – 30 Amps Current Rating
- Optional Current Transformer
- EN60947-2 Certified

Typical Applications:

- Telecom/Datacom
 - PDU's
 - Data Servers
 - Data Storage



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N-Series

DESIGN FEATURES

CURRENT TRANSFORMER

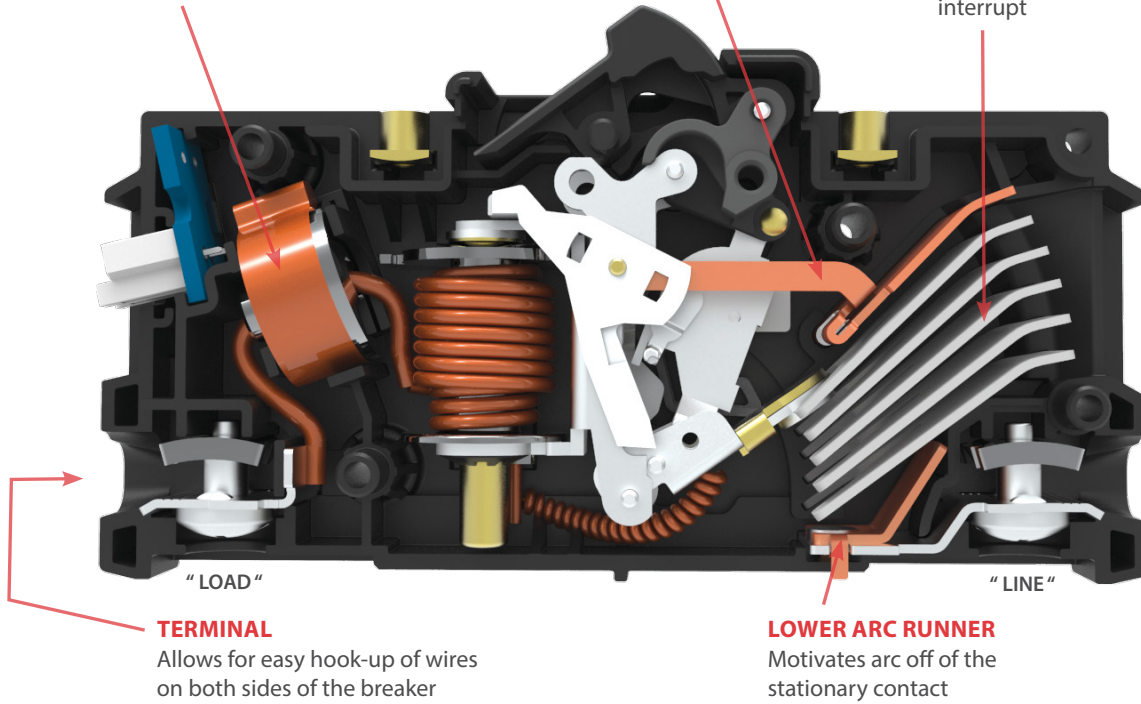
Remote current sensing via molex connector

UPPER ARC RUNNER

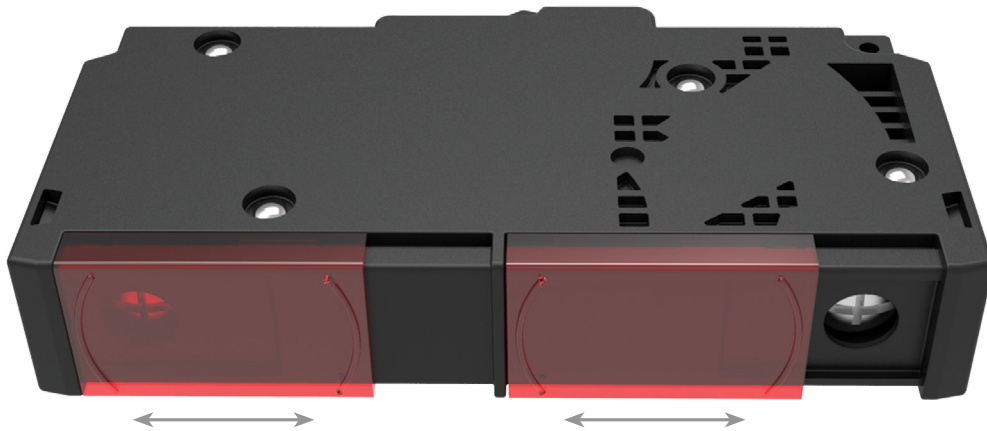
Optional, for 277 VAC rated breakers

GRIDS (5x)

Arc deionizing splitter plates that increase arc voltage for quick interrupt



SLIDING TERMINAL BARRIERS



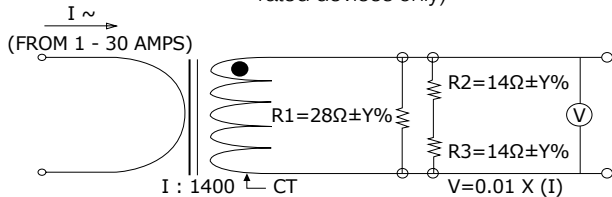
Electrical

Current Metering

Integrated current transformer.
 Measurement range: 1-30 Amps.
 Voltage output: 10mV per Amp according to the formula below:
 $2(\text{Amp}) \leq I \leq 30(\text{Amp})$
 $V = 0.01 \times I \pm 2\%$
 (with current metering codes 1 or 2)
 $V = 0.01 \times I \pm 1\%$
 (with current metering codes 3 or 4)

$$\left| \frac{\frac{V}{I} - \frac{V_{10}}{I_{10}}}{\frac{V_{10}}{I_{10}}} \right| \leq 0.85\%$$

Where V=CT output in volts
 V_{10} =CT output in volts with $I=I_{10}=10$ (A); I =primary current in amperage (50/60 Hz). Phase shift between primary current and CT output is $0.25 \pm 0.25^\circ$. Maximum crest factor of primary current is 1.73. R1 shall be integrated in the breaker. R2 and R3 are provided by end user and external to the breaker.
 Connection: below Load Terminal.
 2-pin connector, Molex 35362-0250.
 Mating Connector housing – Molex PN35507-0200.
 (Current metering is available on AC rated devices only)



Note: When current metering code is 1 or 2; Y to equal 1.0
 When current metering code is 3 or 4; Y to equal 0.1

Dielectric Strength

UL, CSA-1960V 50/60 Hz for one minute between all electrically isolated terminals. Comply with the 8mm spacing and 3750V 50/60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces and between main circuits of adjacent poles per Publications EN 60950 and VDE 0805

Impedance

See next page

Insulation Resistance

Minimum of 100 Megohms @ 500VDC

Overload

50 operations @ 600% of rated current for AC rated devices

Interrupt Capacity

See table A

Mechanical

Endurance

10,000 “On-Off” operations @ 6 per minute; with rated current & voltage

Trip Free

Trips on overload even when actuator is forcibly held in the “On” position

Trip Indication

The operating actuator moves positively to the “Off” position when an overload causes the breaker to trip

Environmental

Environmental
 Operating Temperature
 Vibration

MIL-PRF-55629 and MIL-STD-202G
 -40°C to +85°C
 Withstands 0.06” excursion from 10-55 Hz and 10Gs 55-500 Hz at rated current per MIL-PRF-55629 and MIL-STD-202G, Method 204D, Test Condition A. Instantaneous and ultra-short curves tested at 90% of rated current

Shock

Withstands 50 Gs, 6 ms saw tooth while carrying rated current per MIL-PRF-55629 and MIL-STD-202G, Method 213B, test condition “1”. Instantaneous and ultra short curves tested at 90% of rated current

Thermal Shock

MIL-PRF-55629 and MIL-STD-202G, Method 107G, Condition A (5-cycles at -55°C to +25°C to +85°C to +25°C)

Moisture Resistance

MIL-PRF-55629 and MIL-STD-202G, Method 106G, i.e., Ten 24-hour cycles at +25°C to +65°C, 80-98% RH Method 101, Condition A (90-95% RH @ 5% NaCl Solution, 96hrs)

Salt Spray

Physical

Number of Poles
 Termination

1 - 2 poles
 Wire ready and touch proof wire clamp (See Figure 1). Accepts up to (2) #10 AWG wires per terminal. Designed for use with solid, stranded and flexible stranded wires, with or without ferrule or pin terminals. Also accepts straight fork and flanged fork terminals.

Termination Torque
 Termination Barrier

15-20 in-lbs (Line & Load terminals)
 Integral sliding barrier to comply with spacing requirements (See figure 1)

Mounting

Threaded Insert: #6-32 UNC-2B, or M3X0.5-6H B ISO

Insert Termination Torque
 Actuator

7-9 in-lbs
 Rocker, with or without guard (See figures 1, 2, and 4)

Internal Circuit Config.
 Materials

Series Trip
 Housing - Glass Filled Polyester
 Rocker – Nylon
 Line/Load Terminals - Copper Alloy; Bright Acid Tin Plated

Weight
 Standard Color

~107 grams (~3.76 ounces) per pole
 Housing – Black
 Rocker - Several
 (See ordering scheme for colors)

Agency Approvals

UL489, cUL, TUV EN60947-2

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

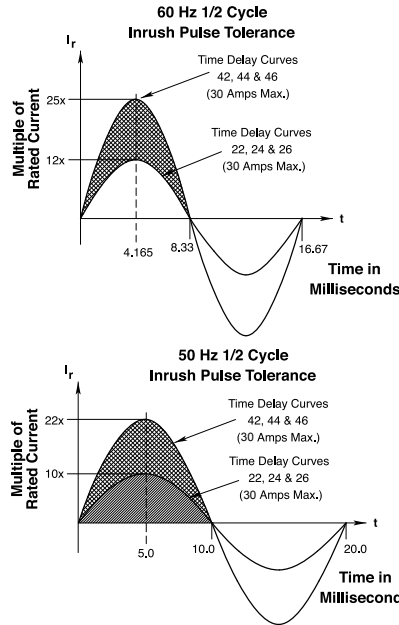
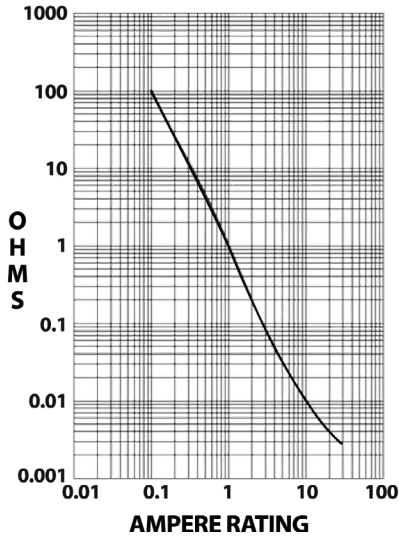
Electrical Tables

Table A: Voltage and Current Ratings

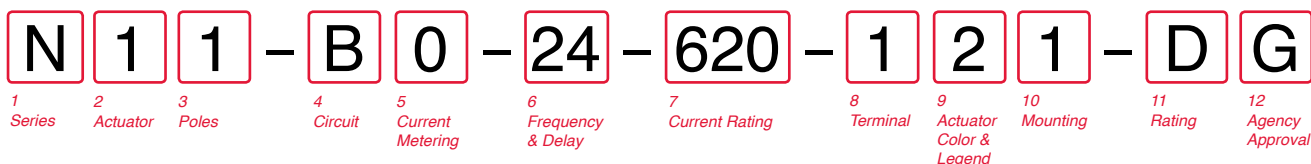
N-SERIES TABLE A: ELECTRICAL RATINGS								
VOLTAGE	CURRENT (AMPS)	NUMBER OF POLES	INTERRUPT CAPACITY (AMPS)					
			UL 489		EN60947-2			
			1-20 A	21-30 A	1-20 A		21-30 A	
					I _{cu}	I _{cs}	I _{cu}	I _{cs}
120/240 VAC	1 - 30	2	22000	5000	10000	5000	10000	5000
240 VAC	1 - 20	1	10000	N/A	10000	5000	5000	5000
277 VAC	1 - 20	1	10000	N/A	N/A		N/A	

Electrical: Impedance / Resistance

RESISTANCE, IMPEDANCE VALUES
Across Line and Load Terminals



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 5.0	+/- 15
5.1 - 30.0	+/- 25



1 SERIES

N N-Series Circuit Breaker

2 ACTUATOR

- 1 Single Color Low Profile Rocker, Vertical Legend
- 2 Single Color Low Profile Rocker, Horizontal Legend
- 3 Single Color Push To Reset Low Profile Rocker, Vertical Legend
- 4 Single Color Push To Reset Low Profile Rocker, Horizontal Legend

3 POLES

- 1 One 2 Two

4 CIRCUIT

B Series Trip (current)

5 CURRENT METERING

- 0 Without Current Transformer
- 1¹ Integrated Current Transformer, +/- 2%, 1 per unit
- 2 Integrated Current Transformer, +/- 2%, 1 per pole
- 3^{2,6} Integrated Current Transformer, +/- 1%, 1 per unit
- 4⁶ Integrated Current Transformer, +/- 1%, 1 per pole

6 FREQUENCY & DELAY

21 50/60 Hz Ultra Short	42 50/60 Hz Short, High-inrush
22 50/60 Hz Short	44 50/60 Hz Medium, High-inrush
24 50/60 Hz Medium	46 50/60 Hz Long, High-inrush
26 50/60 Hz Long	

7 CURRENT RATING (AMPERES)

<small>CODE</small>	<small>AMPERES</small>						
410	1.00	440	4.00	490	9.00	615	15.00
512	1.25	445	4.50	495	9.50	616	16.00
415	1.50	450	5.00	610	10.00	617	17.00
517	1.75	455	5.50	710	10.50	618	18.00
420	2.00	460	6.00	611	11.00	620	20.00
522	2.25	465	6.50	711	11.50	622	22.00
425	2.50	470	7.00	612	12.00	624	24.00
527	2.75	475	7.50	712	12.50	625	25.00
430	3.00	480	8.00	613	13.00	630	30.00
435	3.50	485	8.50	614	14.00		

8 TERMINAL

1 Screw Terminal

9 ACTUATOR COLOR & LEGEND

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

10 MOUNTING

- 1 6-32 x .195 inches Threaded Inserts
- 2 ISO M3 x 5 mm Threaded Inserts

11 APPLICATION RATING

- C** 120/240 VAC (2 Pole only)
- D**² 240 VAC
- F**³ 277 VAC

12 AGENCY APPROVAL

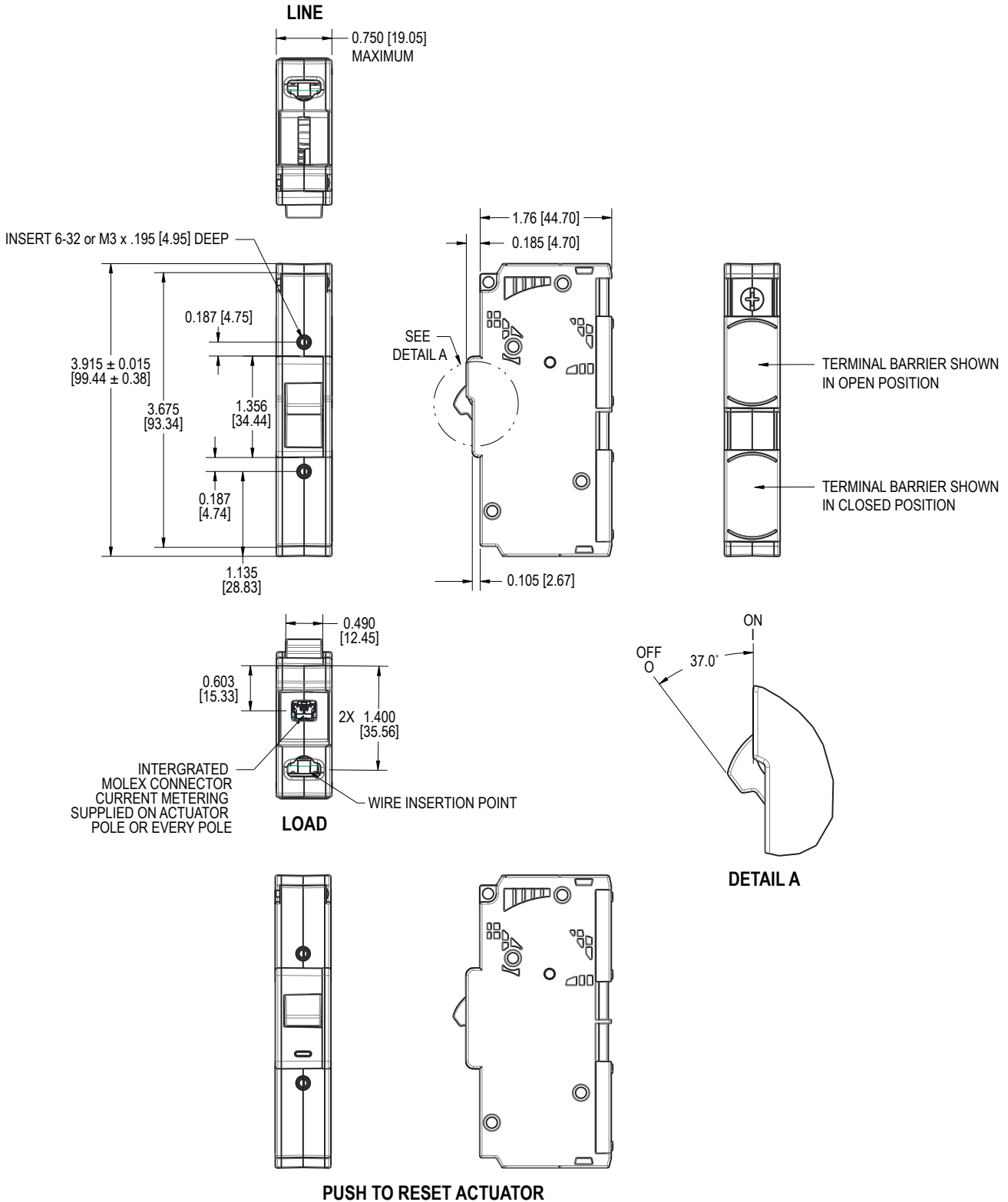
- A** Without Approvals
- G** UL 489 Listed
- U**⁴ TUV Certified, IEC 60947-2
- 3**⁵ UL 489 Listed, TUV Certified

Notes:

- 1 On multi pole units one current transformer is supplied on the actuator pole
- 2 Available up to 20 amps
- 3 Voltage rating F only available as a 1 pole device at 20 amps maximum
- 4 TUV approval requires dual (I-O, ON-OFF) markings
- 5 Approval Code “3” requires Dual (I-O, ON-OFF) markings on rocker.
- 6 +/-1% tolerance only available when used with +/-0.1% tolerance external burden resistor.

Dimensional Specifications: in. [mm]

Figure 1. N-Series 1-Pole Construction



Notes:

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

Dimensional Specifications: in. [mm]

Figure 2. N-Series 2-Pole Construction

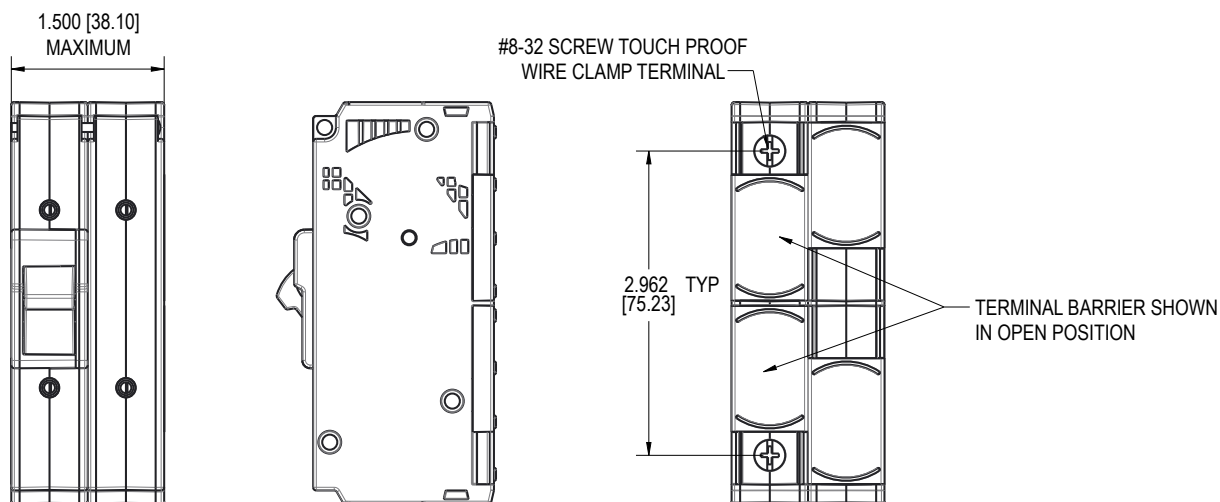
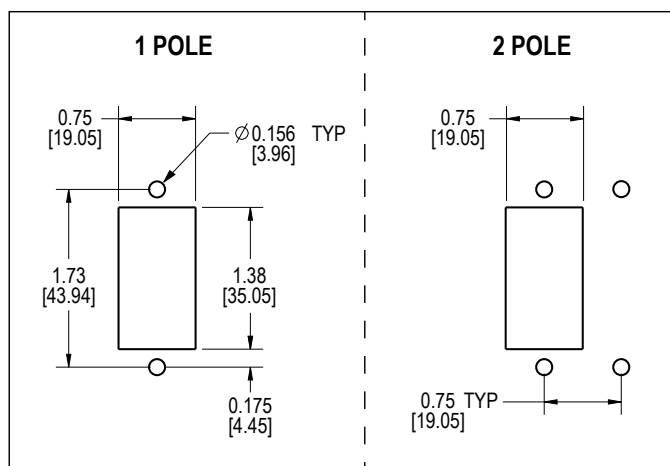


Figure 3. Panel Cutout Details



Notes:

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

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About Carling

Founded in 1920, Carling Technologies is a leading manufacturer of electrical and electronic switches and assemblies, circuit breakers, electronic controls, power distribution units, and multiplexed power distribution systems. With four ISO registered manufacturing facilities and technical sales offices worldwide, Carling Technologies Sales, Service and Engineering teams do much more than manufacture electrical components, they engineer powerful solutions! To learn more about Carling please visit www.carlingtech.com/company-profile.

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