

# N-Series

Hydraulic-Magnetic Circuit Breaker

**PRODUCT WEBPAGE**

*request sample, configure part, watch video*



## Low Profile Datacom/Telecom Applications

The N-Series is a full-featured hydraulic-magnetic circuit breaker packaged in an innovative low profile design to meet the smaller size requirements of datacom/telecom power distribution units and rack systems. Its features include easy access line and load terminals with UL 489 compliant sliding terminal barriers, an optional current transformer capable of sensing current down to a level of 1%, and a patented flush rocker actuator with push-to-reset guard to protect against inadvertent actuation. The N-Series is available as a one or two pole configuration with ratings from 1 to 30 amps, up to 277VAC for one pole or 120/240VAC for two poles with a max IC of 22,000 amps.

<b>1-2</b>	<b>1-30</b>	<b>120/240</b>	<b>22,000 Amps</b>
Poles	Amps	VAC	Max Interrupting Capacity

## Typical Applications

- Power Distribution Units
- Data Servers
- Data Storage

# Design Features

## CURRENT TRANSFORMER

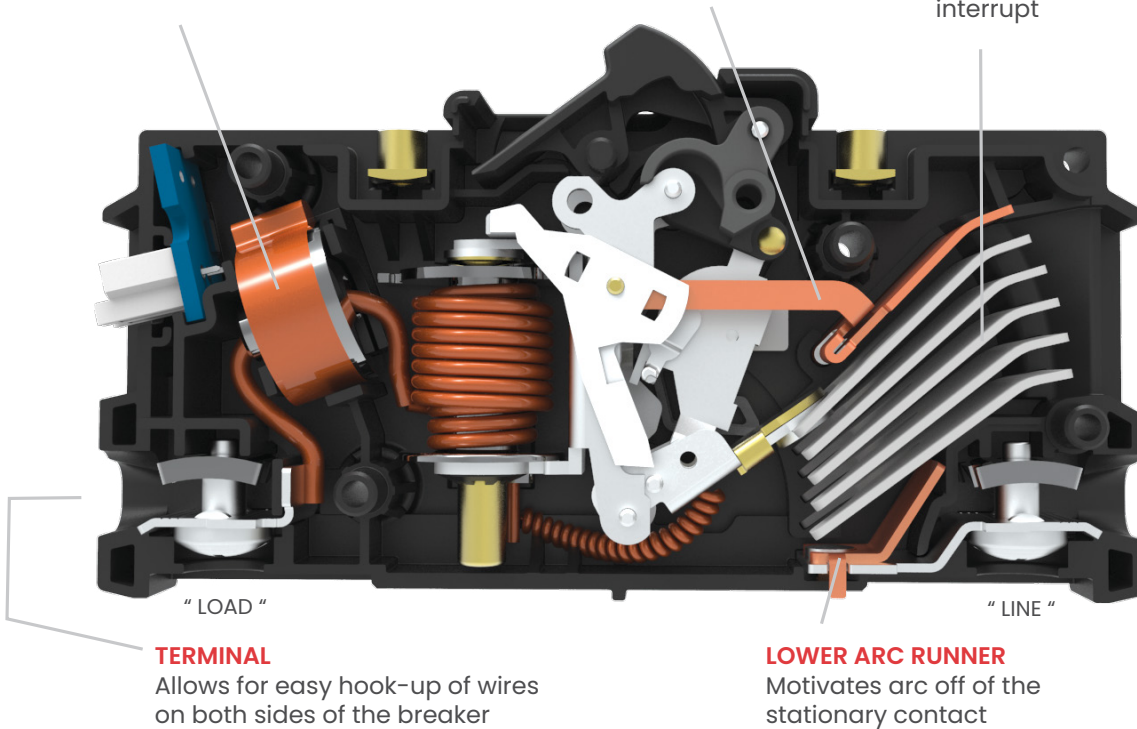
Remote current sensing via Molex® connector

## UPPER ARC RUNNER

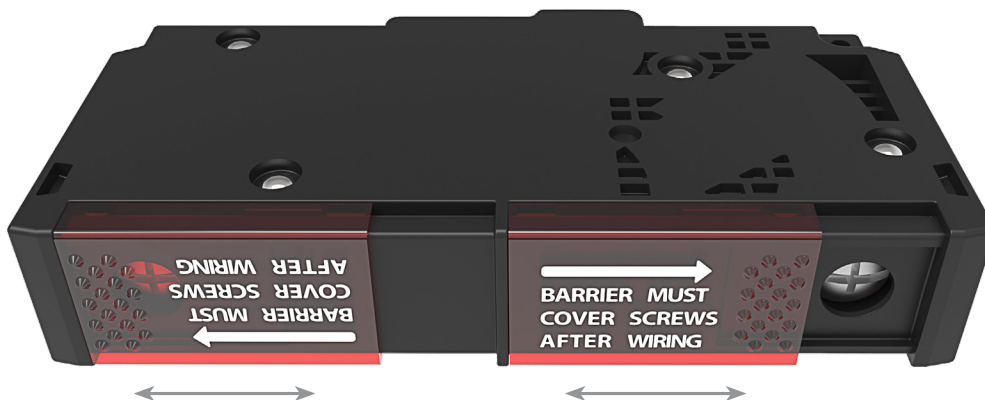
Optional, for 277 VAC rated breakers

## GRIDS (5x)

Arc deionizing splitter plates that increase arc voltage for quick interrupt



## SLIDING TERMINAL BARRIERS

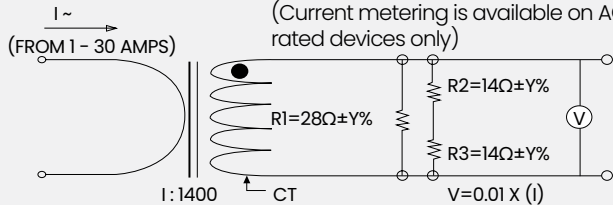


# Tech Specs

## Electrical

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
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Current Ratings	<p>Integrated current transformer. Measurement range: 1-30 Amps. Voltage output: 10mV per Amp according to the formula below:  <math>2(\text{Amp}) \leq I \leq 30(\text{Amp})</math>  <math>V = 0.01 \times I \pm 2\%</math>                      (with current metering codes 1 or 2)  <math>V = 0.01 \times I \pm 1\%</math>                      (with current metering codes 3 or 4)</p> $\left  \frac{\frac{V}{I} - \frac{V_{10}}{I_{10}}}{\frac{V_{10}}{I_{10}}} \right  \leq 0.85\%$ <p>Where V=CT output in volts  <math>V_{10}</math>=CT output in volts with <math>I=I_{10}=10</math> (A); <math>I</math>=primary current in amperage (50/60 Hz). Phase shift between primary current and CT output is <math>0.25 \pm 0.25^\circ</math>. 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)</p>
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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

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

Current Ratings	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	MIL-PRF-55629 and MIL-STD-202G
Operating Temp.	-40°C to +85°C
Vibration	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	MWithstands 50 Gs, 6 ms saw tooth while carrying rated current per MIL-PRF-55629 and MIL-STD-202G, Method 213B, test condition "I". 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
Salt Spray	Method 101, Condition A (90-95% RH @ 5% NaCl Solution, 96hrs)

## Physical

Number of Poles	1 - 2 poles
Termination	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	15-20 in-lbs (Line & Load terminals)
Termination Barrier	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	7-9 in-lbs
Actuator	Rocker, with or without guard (See figures 1, 2, and 4)
Internal Circuit Config.	Series Trip
Materials	Housing – Glass Filled Polyester Rocker – Nylon Line/Load Terminals – Copper Alloy; Bright Acid Tin Plated
Weights	~107 grams (~3.76 ounces) per pole
Standard Color	Housing – Black Rocker – Several (See ordering scheme for colors)

# Tech Specs

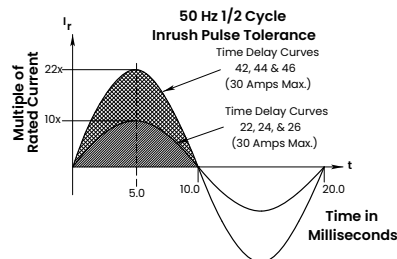
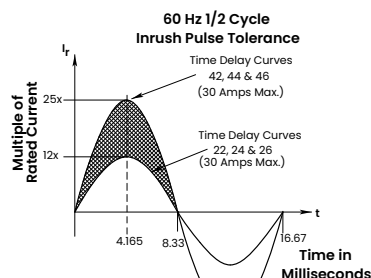
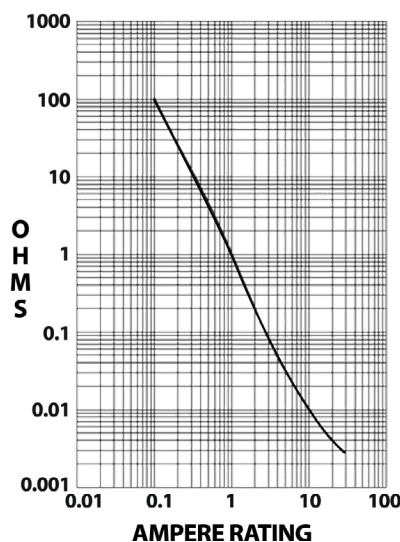
## Electrical Tables

**Table A:** Voltage and Current Ratings

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	
					Icu	Ics	Icu	Ics
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

## Agency Approvals

UL489, cUL, TUV EN60947-2

## Time Delay Specs

To view all hydraulic-magnetic circuit breaker time delay values, please visit [www.carlingtech.com/sites/default/files/documents/Carling-HM-CB-Time-Delays.pdf](http://www.carlingtech.com/sites/default/files/documents/Carling-HM-CB-Time-Delays.pdf)

# Ordering Scheme

Sample Part Number **N 1 1 - B 0 - 24-620 - 1 2 1 - D G**

Selection 1 2 3 4 5 6 7 8 9 10 11 12

## 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
- 1<sup>1</sup>** Integrated Current Transformer, + / - 2%, 1 per unit
- 2** Integrated Current Transformer, + / - 2%, 1 per pole
- 3<sup>2,6</sup>** Integrated Current Transformer, + / - 1%, 1 per unit
- 4<sup>6</sup>** Integrated Current Transformer, + / - 1%, 1 per pole

## 6. FREQUENCY & TIME DELAY

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

## 7. CURRENT RATING (AMPERES)

CODE	AMPERES			
<b>410</b>	1.00	<b>440</b>	4.00	<b>490</b> 9.00
<b>512</b>	1.25	<b>445</b>	4.50	<b>495</b> 9.50
<b>415</b>	1.50	<b>450</b>	5.00	<b>610</b> 10.00
<b>517</b>	1.75	<b>455</b>	5.50	<b>710</b> 10.50
<b>420</b>	2.00	<b>460</b>	6.00	<b>611</b> 11.00
<b>522</b>	2.25	<b>465</b>	6.50	<b>711</b> 11.50
<b>425</b>	2.50	<b>470</b>	7.00	<b>612</b> 12.00
<b>527</b>	2.75	<b>475</b>	7.50	<b>712</b> 12.50
<b>430</b>	3.00	<b>480</b>	8.00	<b>613</b> 13.00
<b>435</b>	3.50	<b>485</b>	8.50	<b>614</b> 14.00

## 8. TERMINAL

- 1** Screw Terminal

## 9. ACTUATOR COLOR & LEGEND

Actuator Color	I-O	ON-OFF	Dual	Legend Color
White	<b>A</b>	<b>B</b>	<b>1</b>	Black
Black	<b>C</b>	<b>D</b>	<b>2</b>	White
Red	<b>F</b>	<b>G</b>	<b>3</b>	White
Green	<b>H</b>	<b>J</b>	<b>4</b>	White
Blue	<b>K</b>	<b>L</b>	<b>5</b>	White
Yellow	<b>M</b>	<b>N</b>	<b>6</b>	Black
Gray	<b>P</b>	<b>Q</b>	<b>7</b>	Black
Orange	<b>R</b>	<b>S</b>	<b>8</b>	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<sup>2</sup>** 240 VAC
- F<sup>3</sup>** 277 VAC

## 12. AGENCY APPROVAL

- A** Without Approvals
- G** UL 489 Listed
- U<sup>4</sup>** TUV Certified, IEC 60947-2
- 3<sup>5</sup>** 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.

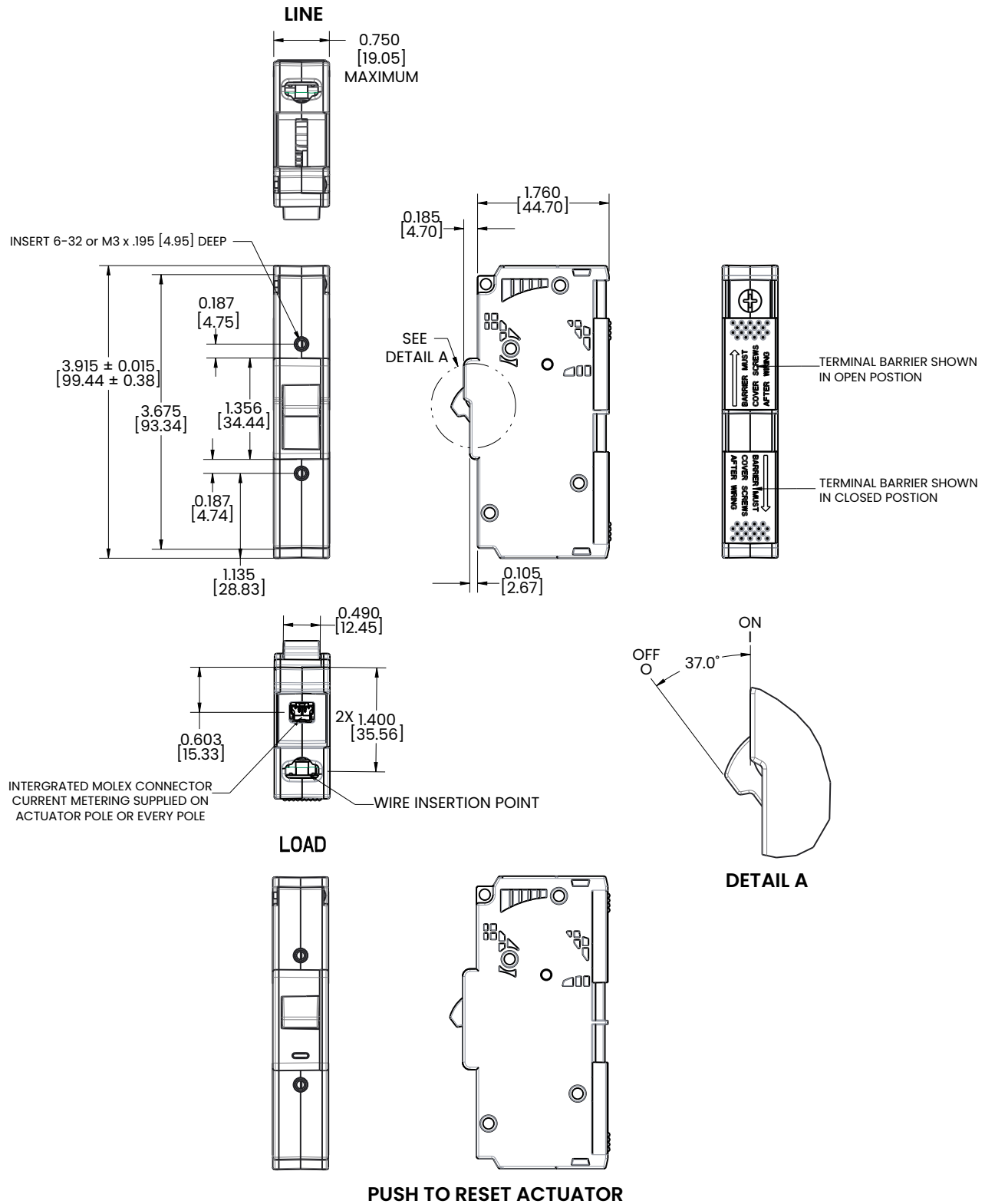
 [Configure Complete Part Number >](#)

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# Dimensional Specs

inches [millimeters]

**Figure 1. N-Series 1-Pole Construction**



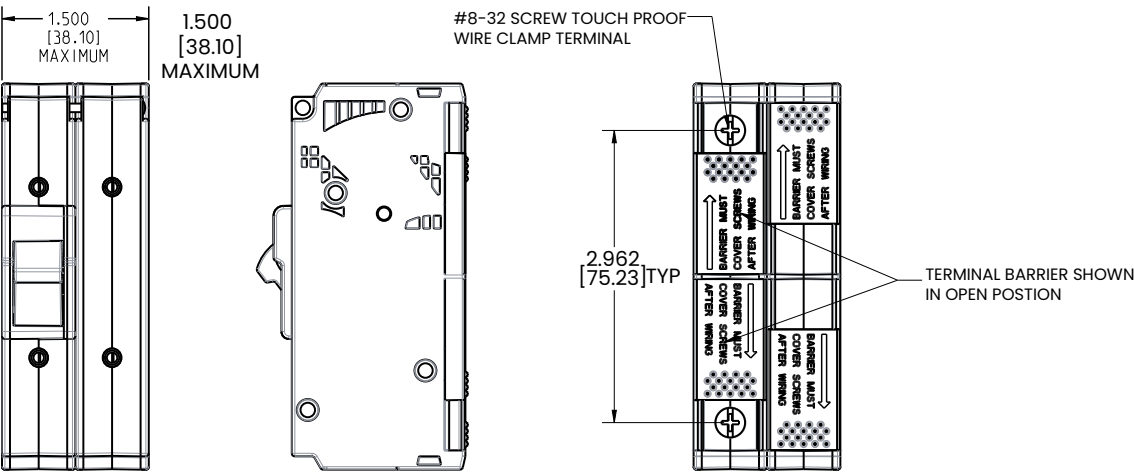
Notes:

1 Tolerance ±.020 [.51] unless otherwise specified.

# Dimensional Specs

inches [millimeters]

Figure 2. N-Series 2-Pole Construction



N-Series 3-Pole Construction

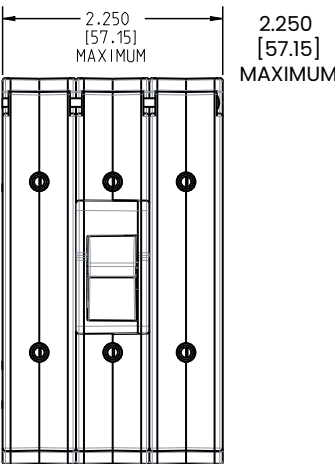
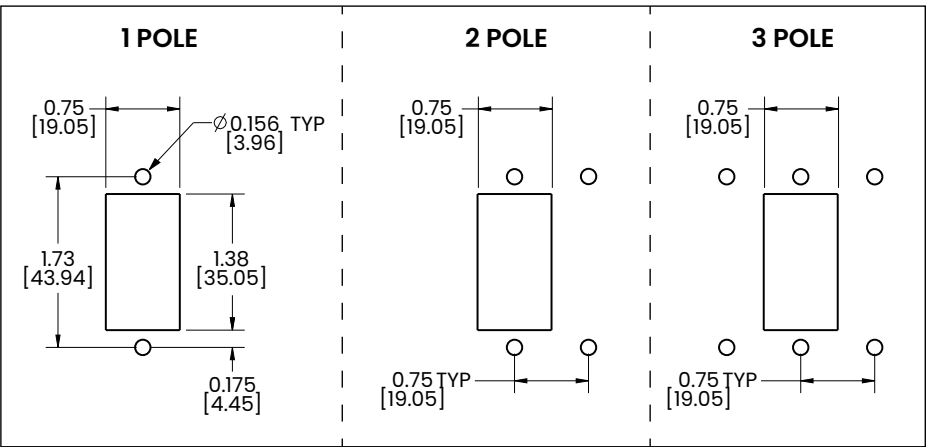


Figure 3. Panel Cutout Details



Notes:  
1 Tolerance  $\pm 0.020$  [51] unless otherwise specified.

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