

# Control Circuit and Load Protection

## Product Overview

Bulletin	1489-A		1489-D		1492-FB			140F		
Type	480Y/ 277V AC	240V AC	1 Pole: 125V DC	2 Pole: 250V DC	For Class CC Fuse	For Class J Fuse		For Midget Fuse	For Class CC Fuse or Midget Fuse	For IEC 10 x 38 mm Fuse
Features	<ul style="list-style-type: none"> <li>• True IP2X finger-safe design (front)</li> <li>• 10 000 A interrupt</li> <li>• A positively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)</li> <li>• Superior shock and vibration resistance capabilities</li> <li>• Mounts on DIN Rail</li> <li>• IEC 60947-2 - 0.5...40 A @ 240, 415V AC</li> <li>• - 15 000 A interrupting</li> <li>• Field-mountable options</li> <li>• Optional terminal for ring lugs</li> </ul>	<ul style="list-style-type: none"> <li>• True IP2X finger-safe design (front)</li> <li>• A positively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)</li> <li>• Superior shock and vibration resistance capabilities</li> <li>• Mounts on DIN Rail</li> <li>• IEC 60947-2</li> <li>• Field-mountable options</li> <li>• Optional terminal for ring lugs</li> </ul>	<ul style="list-style-type: none"> <li>• EN/IEC 60529 Front Finger Protection — Dead front construction</li> <li>• Handle isolates the fuse from line power when it is opened for fuse insertion or removal</li> <li>• Compact size requiring less panel space than open style fuse folders</li> <li>• Optional blown fuse indicators - allow for easy troubleshooting of electrical circuits</li> <li>• Type M holder - accepts 0...30 A midget fuses (1-1/2 in. x 13/32 in.)</li> <li>• Type C holder - accepts 0...30 A Class CC fuses</li> <li>• Type J 30 &amp; 60 A holders - accepts Class J fuses</li> <li>• Silver-plated fuse clips</li> <li>• Mounts on DIN Rail, marker-ready and increased heat dissipation</li> </ul>		<ul style="list-style-type: none"> <li>• Lockable in the open position</li> <li>• Compatible with Bulletin 140M accessories</li> <li>• Compact busbar and connectors for Bulletin 100-C and 100-K contactors</li> <li>• 1 N.O./1 N.C auxiliary contact— late make N.O., early break N.C.</li> </ul>					
Certifications	UL 489 Listed (CSA C22.2 No. 5), UL File Number E197878 VDE (IEC 60 947-2)				UL 512, CSA C22.2 No. 39, CE, EN/IEC 60947-3			UR, CSA	UL 512, CSA C22.2 No. 39, CE, EN/IEC 60947-3	
Maximum Voltage Rating	480Y/277V AC		480Y/ 277V AC	UL 250V DC IEC 500V DC	600V AC/DC Type M, IEC - 690V AC			600V AC	690V AC	
Shock	25 G half sine wave for 11 ms (three axes)									
Tripping Characteristic Reference Temperature	UL/CSA: 104 ° F (40 °C) IEC: 86 ° F (30 °C)				NA			NA		
Tripping Characteristic	C Curve: 5...10 D Curve: 10...20		C Curve: 5...10 In		NA			NA		
Vibration	100...500 Hz for 1 hour Amplitude — 10...57 Hz; 0.030 inches peak to peak; 57...500 Hz; 5 G peak				5 G peak or 0.030 in. peak-to-peak displacement for 2 hours in each perpendicular direction. Vibration sweep 10 to 2000 to 10 Hz (15 minutes long)			—		
Operating Temperature	-13...+140 °F (-25...+55 °C), non-condensing				-4...+130 °F (-20...+55 °C)			-4...+130 °F (-20...+55 °C)		
Housing Material	Nylon				Nylon			—		
Working Voltage	—		—		110...600V AC/DC or 12...72V AC/DC	110...600V AC/DC		110...600V AC/DC or 12...72V AC/DC	—	
Leakage Current with Indicator LED	—		—		2.0 mA			—		
Wire Size	0.8...13 mm <sup>2</sup> /#18...6 AWG Cu				#16...4 AWG Cu	#14...1 AWG Cu	#10...1 AWG Cu	#16...4 AWG Cu	#16...10 AWG Cu (1...4 mm <sup>2</sup> )	
Interrupt Rating	UL/CSA: up to 14 kA IEC: up to 15 kA		10 kA		200 kA			50 kA	200 kA - Class CC 100 kA - Midget	
Product Selection	Page 7-15		Page 7-31		Page 7-39			Page 7-41		

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Bulletin	1492-MC	1492-MCGA, -MCEA	1492-SP
Type	<b>Branch Circuit Breaker</b>	<b>Ground Fault Detection</b>	<b>Miniature Circuit Breaker Supplementary Protector</b>
Features	<ul style="list-style-type: none"> <li>• 120/240V, 240V &amp; 480Y/277V rating</li> <li>• 1/2 in. per pole wide 10...60 A @ 120/240V AC &amp; 15...30 A @ 240V AC</li> <li>• IP2X finger-safe, built-in with 1/2 in. wide, add protectors for 1 in. wide</li> <li>• Ratings to 480Y/277V AC, 10 000 A interrupt ratings</li> <li>• Mounts on DIN Rail</li> </ul>	<ul style="list-style-type: none"> <li>• 10 000 A interrupt</li> <li>• UL 489 Circuit breaker with ground fault circuit interrupter and ground fault equipment protector</li> <li>• Mounts on DIN Rail or panel mount</li> </ul>	<ul style="list-style-type: none"> <li>• True IP2X finger-safe design (front)</li> <li>• Field mountable options for selective applications</li> <li>• AC and DC voltage ratings in one convenient device</li> <li>• Superior shock and vibration resistance capabilities</li> <li>• Mounts on DIN Rail</li> </ul>
Number of Poles	1-, 2-, 3-pole	1- and 2-pole with Neutral	1-, 2-, 3-pole 1-pole + neutral, 3-pole + neutral
Maximum Voltage	120/240V AC 240V AC	120/240V AC 60 Hz	480Y/277V AC 1-pole — 48V DC 2-pole — 96V DC
Tripping Characteristic Reference Temperature	104 °F (40 °C)	104 °F (40 °C)	86 °F (30 °C)
Tripping Characteristic	UL 489 Standard (CSA 22.2 No. 5.1)	UL/CSA Standard	B Curve 3...5 In C Curve 5...10 In D Curve 10...20 In
Certifications	UL 489 Listed Circuit Breaker (CSA 22.2 No. 5.1) UL File Number E197878	UL 489, 943 and 1053 CSA 22.2 No. 5.1	UL 1077 CSA 22.2 No. 235 VDE (IEC 60898) GL (60 947-2)
Dielectric Strength	1960V AC	1960V AC	1960V AC
Shock	25 G half sine wave for 11 ms (3 axes)		
Vibration	100...500 Hz for 1 hour	100...500 Hz for 1 hour	100...500 Hz for 1 hour
Wire Size	#14...1/0 AWG	#14...4 AWG 75°C (Cu only)	#18...4 AWG (1.0...25 mm <sup>2</sup> )
Electromechanical Life	UL 489 specifications	UL 489 specifications	≥6000 operations
Interrupt Rating	10 kA @ 240V AC	10 kA @ 120/240V AC	IEC 60898 10 kA @ 415V AC IEC 60947-2 15 kA @ 415V AC UL/CSA 10 kA U2
Operating Temperature (non-condensing)	32...140 °F (0...+60 °C)	32...140 °F (0...+60 °C)	-22...+158 °F (-30...+70 °C)
Product Selection	<b>Page 7-6</b>	<b>Page 7-11</b>	<b>Page 7-46</b>



# Control Circuit and Load Protection

## General Information

### General Information

Allen-Bradley offers two lines of Miniature Circuit Breakers with UL 489 (CSA 22.2 No. 5) certification, four different lines of Supplementary Protectors (Miniature Circuit Breakers), and a line of fuse holders for branch circuit fuses and supplementary fuses.

### Product Selection

#### Bulletin 1492-FB Fuse Holders

- EN/IEC 60529 finger protection — dead front construction
- Compact size requiring less panel space than open-style fuse holders
- Optional blown fuse indicator
- Branch circuit protection with Class CC and J fuses
- UL Listed, CSA Certified
- DIN Rail (35 mm), mounted

#### Bulletin 1492 Circuit Breakers

Potential applications include protection of:

- Solenoids
- Transformers
- Computers
- Power Supplies
- Relay/contactor coils
- PLCs
- Medical Equipment
- PLC I/O Points

**UL1077, CSA C22.2 No. 235** — In North America, miniature circuit breakers are recognized as supplementary protectors and are intended for use as overcurrent protection within an appliance or other electrical equipment where branch circuit protection is already provided or not required. Internationally, these products are rated to IEC standards as miniature circuit breakers or circuit breakers for equipment.

**UL508, CSA 22.2 No.14** — In North America, some miniature circuit breakers, meeting specific requirements, may be used as Manual Motor Controllers for direct control of motors connected across-the-line equipment where branch circuit protection is already provided or not required. Internationally, these products are rated to IEC standards as miniature circuit breakers and applied for motor controller applications within those standards.

**UL489, CSA 22.2 No. 5.1** — In North America, some miniature circuit breakers, meeting specific requirements, may be used as Branch Circuit Protection devices for the protection of electric wiring as well as load protection.

Type	1492-GH	1492-GS	1492-SP	1492-MC	1489	
Certifications	UL	1077	1077	1077	489	
	CSA	22.2 No. 235	22.2 No. 235	22.2 No. 235	22.2 No. 5	
	EN/IEC	IEC 60934	IEC 60934	IEC 60898 IEC 60947-2	—	IEC 60947-2
	CE Marked	Yes	Yes	Yes	No	Yes
No. of Poles	1	1, 2, 3	1, 2, 3 – 1+N, 3+N	1, 2, 3	1, 2, 3	
Volts AC	250 V	480Y/277 V	480Y/277 V	120/240V AC 240V AC	480Y/277 V	
Volts DC	65 V	65 V	1p 48V 2p (series) 125V	—	up to 500V DC	
Current Range	0.2...15A	0.2...25A	0.5...63A	15...100 A	0.5...40 A	
Trip Characteristics (In)	G 6...12	G 6...10	B 3...5 C 5...10 D 10...20	UL 489 Standard (CSA 22.2 No. 5.1)	B 3...5 C, 5...10 D 10...20	
Energy Limiting	No	No	Yes	No	Yes	
No. of Pole/foot	24	24	17	Varies	17	
Mounting Method	DIN Rail & A-B Rail	DIN Rail & A-B Rail	DIN Rail	DIN Rail	DIN Rail	
IEC 529 and 60947 Finger Protection	Yes	Yes	Yes	Varies	Yes	
Optional	Auxiliary Contacts	No	Yes	Yes	No	Yes
	Shunt Trip	No	No	Yes	No	Yes
	Undervoltage Trip	No	No	Yes	No	Yes



**Technical Information: The Benefits of Limiting Let-Through Energy****Energy Limiting Circuit Breakers Versus Conventional Breakers**

The Bulletin 1492-SP line features the unique ability to achieve short circuit interruptions far more effectively than conventional circuit breakers. In *conventional circuit breakers*, the short circuit interruption time required is approximately one or two half cycles of an AC sine wave. When the contacts are open, the resulting arc continues to burn until the current level passes through zero. The arc may re-ignite because of the insufficient width of the contact gap. The current that flows until the arc is extinguished produces a heating effect proportional to the  $I^2t$  value (let-through-energy) of the fault current.

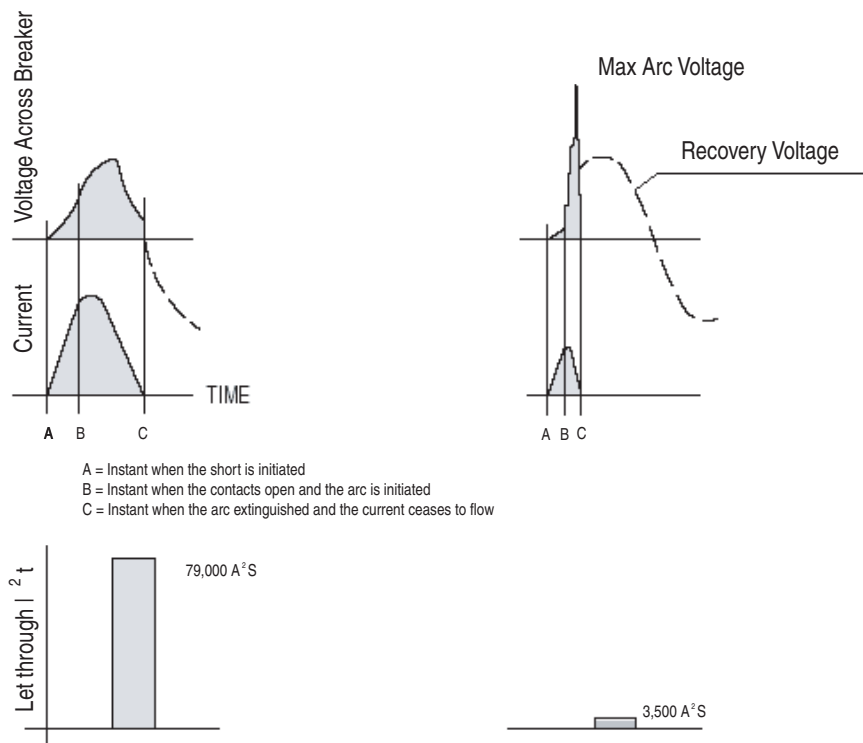
These devices are designed to substantially reduce the amount of *let-through-current* and the resulting let-through-energy that can damage protected components. They have the ability to interrupt short circuit current within the first half cycle of the fault. Limiting let-through-energy will protect against the harmful effects of over-current and is focused primarily on avoiding the following:

- Excessive heat
- Mechanical damage

Both of these factors are proportional to the square of the current. Thermal energy is proportional to the square of the RMS value and magnetic forces are proportional to the square of the peak value. The most effective way to provide protection is to substantially limit *let-through-energy*. This provides the following advantages:

- Far less damage at the location of the short circuit.
- Fast electric separation of a faulty unit from the system, especially power supplies connected in parallel that are switched off when the voltage of the power bus drops below a certain level.
- Far less wear on the miniature circuit breaker itself. This means more safe interruptions.
- Better protection of all components in the short circuit path.
- Far wider range of selective action when used with an upstream protective device. (No nuisance shut downs from feeder line interruptions causing a blackout in all connected branches.)

Short Circuit Interruption 10 kA - 120V AC  
Instant of initiation: 15° after voltage zero





**Bulletin 1492-MC Circuit Breakers**  
**Industrial Circuit Breakers for North American Applications**

The Bulletin 1492-MC line includes:

- 1/2 in. wide circuit breakers
- 1 in. wide circuit breakers
- Ground Fault Circuit Interrupters (GFCIs)
- Ground Fault Equipment Protector (GFEPs)

**Features**

- Designed, manufactured and listed to UL 489 (CSA C22.2, No. 5)
- Thermal-magnetic protection
- All Ratings (10...100 A) are HACR rated
- 10 kAIC (10...100 A)
- Finger-safe design (front) (1/2 in. wide)
- DIN Rail mounting (120/240 & 240V AC)
- Three-position handle (ON, Tripped (Middle), OFF)
- (Line and load) wire connections

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**Certifications**

UL Listed  
 CSA Certified

**Standards Compliance for Bul. 1492-MC**

- UL 489
- CSA C22.2 No. 5
- HACR (10...100 A)
- SWD (15 and 20 A) for Switching Duty for fluorescent lighting applications

**Standards Compliance for GFCI (5 mA trip sensitivity)**

- UL 943
- CSA C22.2 No. 144

**Standards Compliance for GFEP (30 mA trip sensitivity)**

- UL 1053
- CSA C22.2 No. 144

**Bulletin 1492-MC Thermal Magnetic Description**

**Thermal Magnetic Circuit Breakers**

Bulletin 1492-MC Circuit Breakers for Branch Circuit protection are available in one (1)-, two (2)-, and three (3)-pole construction in 120/240 volt rating, 240 volt rating and as one (1)-pole and two (2)-pole devices in 480/277 volt rating. Versions are available as Ground Fault Circuit Interrupters and as Ground Fault Equipment Protectors.

The 1492-MC product line consists of Thermal Magnetic Circuit Breakers and Ground Fault Sensing Breakers that are designed, manufactured, and certified to North American standards, UL 489, UL 943, UL1093, and the equivalent CSA standards, CSA 22.2 No. 5.1, 22.2 No. 144.

Bul. 1492-MC Thermal Magnetic Circuit Breakers are general-purpose devices suitable for the majority of industrial, inverse time circuit breaker applications.

They combine thermal and magnetic trip actions and provide accurate overload and short-circuit protection for conductors and connected equipment.

**Circuit Breaker Application Information**

Selection of a Bul. 1492-MC circuit breaker with appropriate circuit protection includes consideration of:

- Circuit voltage
- Circuit frequency
- Available short circuit current
- Continuous current rating
- Application considerations
- Special operating conditions

The following discussion is based upon National Electric Code and UL requirements. Similar considerations are appropriate for Canadian applications.

**Circuit Voltage**

Bul. 1492-MC circuit breakers are rated by voltage class. Applications should not exceed the listed voltage range (see Table 1).

**Circuit Frequency**

Bul. 1492-MC circuit breakers may be applied to frequencies from DC up to 60 Hz without derating. For applications above 60...400 Hz, contact Rockwell Automation with specific application information for the derating of the circuit breakers.

**Available Short Circuit Current**

Bul. 1492-MC circuit breakers should only be applied in those applications in which the available short-circuit (or fault) current is less than or equal to the interrupting rating shown in the Voltage and Interrupting Ratings table.

**Table 1. Voltage and Interrupting Ratings**

AC Voltage	DC Voltage *	Interrupting Ratings (rms Symmetrical Amperes)		Cat. No.	
		AC Rating	DC Rating *		
120/240	24, 48, 62.5	10,000	3,000	1492-MCAA1xx 1492-MCAA2xx	
240	24, 48, 62.5		3,000	1492-MCAA2Hxx 1492-MCAA3xx	
120/240	*		*	1492-MCBA1xx 1492-MCBA2xx	
240	*		*	1492-MCBA2Hxx 1492-MCBA3xx	
120	*		10,000	*	1492-MCEA1xx 1492-MCEA2xx
120/240					1492-MCGA1xx
120		1492-MCGA1xx			
120/240		1492-MCGA2xx			

\* Rating as supplementary protector.

\* Consult your local Rockwell Automation sales office or Allen-Bradley distributor for specific rating.

### Continuous Current Rating

Bul. 1492-MC circuit breakers are rated in RMS amperes at a 40 °C (104 °F) ambient temperature per UL 489 (CSA 22.2 No. 5.1). This temperature is generally used as the average temperature within an industrial enclosure. If a circuit breaker is applied in a temperature that exceeds the 40 °C (104 °F) ambient, then the circuit breaker should be derated. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for derating information.

The characteristic trip curves are shown on pages 7-8...7-10. The trip bands shown for each breaker represent current tripping limits for a circuit breaker and are within the limits established by UL. For a specific current at 40 °C (104 °F), a circuit breaker will open ("clear the circuit") automatically at some total time that will be within the "Minimum" and "Maximum" time shown as the "Minimum" and "Maximum" curves. For example, page 7-8 shows that a one pole, 15 A, 1492-MC trips in not less than 10 s and not more than 150 s on a 30 A current. Because the UL standard defines this time spread, users should not specify exact tripping time. The lower current portion of the curves (upper left) depict the time to trip due to thermal action and reflect overload protection of the wire and connect load. The higher current portion of the curves (lower right) depicts the trip due to magnetic action of the circuit breaker and reflects protection due to short circuit level currents.

Standard current ratings are, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80, 90, and 100 A.

### Application Considerations

The selection of a specific ampere rating for a specific application is dependent on the type of load and duty cycle and is governed by the National Electric Code (Canadian Electric Code) and UL/CSA. In general the codes require that overcurrent protection is at the current supply and at points where wire sizes are reduced. In addition the codes state that conductors be protected according to their current carrying capacity. There are specific situations that require application consideration, such as motor circuit, and guidelines for the selection for transformer protection.

Bulletin 1492-MC circuit breakers are "non-100% rated" as defined by UL 489 Part 7.1.4.2. As such the circuit breaker's rating should be loaded to no more than 80%, if used with continuous loads.

### Branch Circuits:

Bulletin 1492-MC circuit breakers may be used to protect branch circuits. A branch circuit is the wiring portion of a system extending beyond the final overcurrent device protecting the circuit.

Guidelines established in NEC, CEC, UL, and CSA should be used to determine the specific device. For example:

#### 1) Motor Branch Circuit

Bulletin 1492-MC circuit breakers are not horsepower rated because they are able to safely interrupt currents far in excess of the locked rotor value for a selected motor. This ability is recognized in the codes and standards and is also established by the UL and CSA tests described in UL 489 and CSA C22.2 No. 5.1 standards.

The size of a Bulletin 1492-MC circuit breaker should be determined following the guidelines for an Inverse Time Circuit Breaker.

References: NEC 430.51 and UL 508A. Also see CEC and appropriate Canadian Standards.

#### 2) Transformer Protection

Bulletin 1492-MC circuit breakers may be used for transformer protection following the guidelines established.

References: NEC 450 and UL 508A. Also see CEC and appropriate Canadian Standards.

#### 3) Heater Load, Lighting, and Other Load Protection

Bulletin 1492-MC circuit breakers may be used for protection of heater loads, lighting loads, and other loads following the guidelines established.

References: NEC Article 31 and UL 508A. Also see CEC and appropriate Canadian Standards.

### Coordinated Overcurrent Protection

Where an orderly shutdown is required to minimize the hazards to personnel and equipment, a system of coordination based upon the faulted or overloaded circuit is isolated by selective operation of only the overcurrent protective device closest to the overcurrent condition.

The user should select devices that meet this requirement.

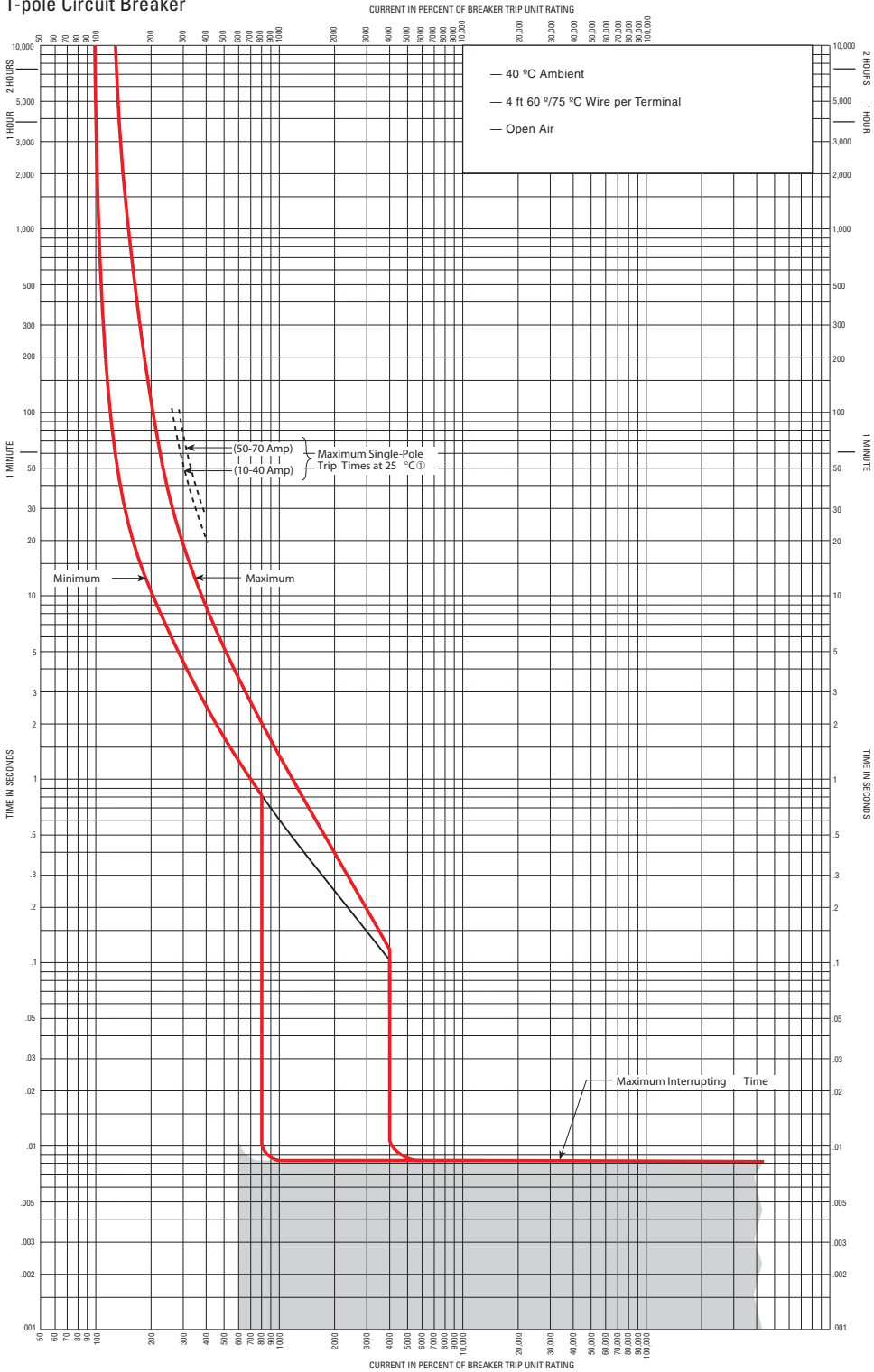
References: NEC 240.12. Also see CEC.

Time Current Curve – 1-Pole Circuit Breaker

**Time Current Curve**

1492-MCAA1<sub>NN</sub>    1492-MCEA1<sub>NN</sub>  
 1492-MCBA1<sub>NN</sub>    1492-MCGA1<sub>NN</sub>

1-pole Circuit Breaker



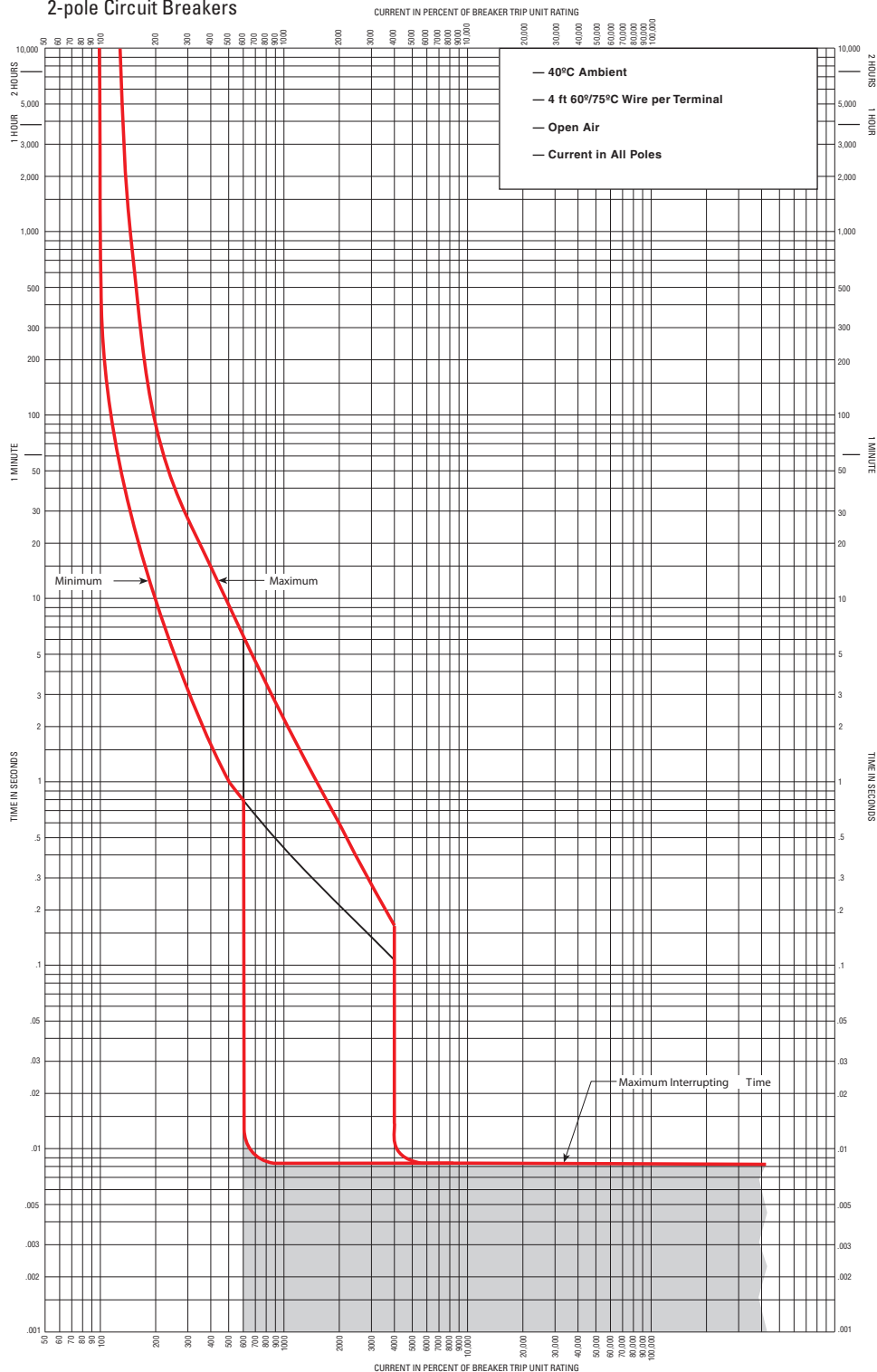
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Time Current Curve – 2-Pole Circuit Breakers

**Time Current Curve**

1492-MCAA2<sub>NN</sub> 1492-MCAA2H<sub>NN</sub> 1492-MCEA2<sub>NN</sub>  
 1492-MCBA2<sub>NN</sub> 1492-MCBA2H<sub>NN</sub> 1492-MCGA2<sub>NN</sub>

2-pole Circuit Breakers



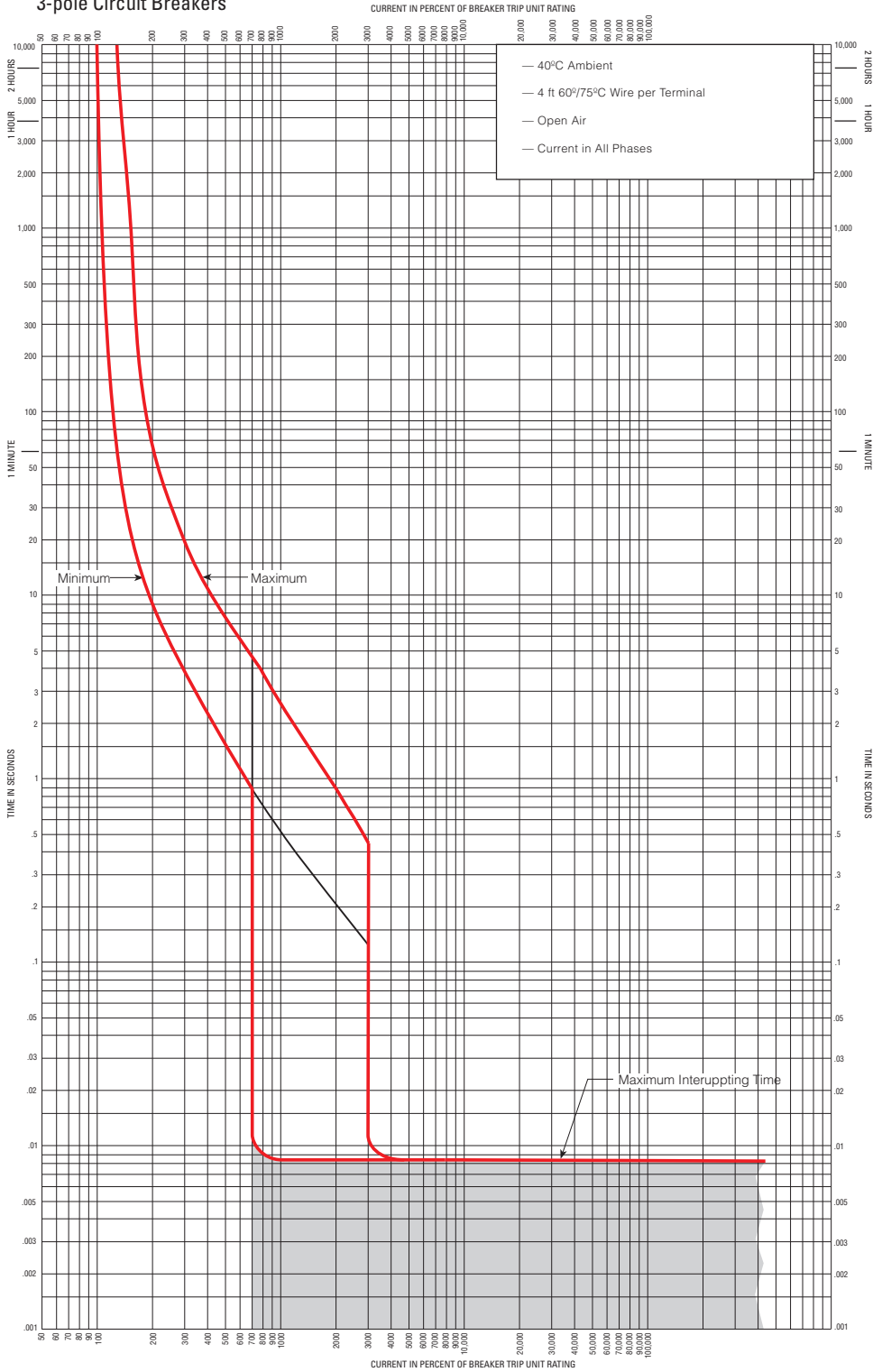


Time Current Curve – 3-Pole Circuit Breakers

**Time Current Curve**

1492-MCAA3<sub>NN</sub>  
 1492-MCBA3<sub>NN</sub>

3-pole Circuit Breakers



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1492-MC Cat. No. Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

1492-MC          A    A    1    15

                  a           b           c           d

a

Body Style	
Code	Description
A	1/2 in. wide/pole (DIN Rail mounting)
B	1 in. wide/pole (DIN Rail mounting)
E	GFEP (30 mA)
G	GFCI (5 mA)

c

Poles	
Code	Description
1	1 pole
2	2 poles
2H	2 poles (240V AC)
3	3 poles

d

Current Rating		Size	
Code	Description	Code	Description
10	10 A	50	50 A
15	15 A	55	55 A
20	20 A	60	60 A
25	25 A	70	70 A
30	30 A	80	80 A
35	35 A	90	90 A
40	40 A	A0	100 A
45	45 A		

b

Interrupt Rating	
Code	Description
A	10 kA AIC

Bul. 1492-MC Thermal Magnetic Product Selection  
120/240 and 240V AC DIN Rail Mounting

120/240 and 240V AC DIN Rail Mounting

Continuous Ampere Rating @ 40°C (104°F)	Width per pole [in.]	Cat. No.		Width per pole [in.]	Cat. No.	
		120/240V AC			240V AC	
		1-pole	2-poles		2-poles	3-poles
10	1/2	1492-MCAA110	1492-MCAA210	—	—	—
15	1/2	1492-MCAA115	1492-MCAA215	1/2	1492-MCAA2H15	1492-MCAA315
20	1/2	1492-MCAA120	1492-MCAA220	1/2	1492-MCAA2H20	1492-MCAA320
25	1/2	1492-MCAA125	1492-MCAA225	1/2	1492-MCAA2H25	1492-MCAA325
30	1/2	1492-MCAA130	1492-MCAA230	1/2	1492-MCAA2H30	1492-MCAA330
35	1/2	1492-MCAA135	1492-MCAA235	1	1492-MCBA2H35	1492-MCBA335
40	1/2	1492-MCAA140	1492-MCAA240	1	1492-MCBA2H40	1492-MCBA340
45	1/2	1492-MCAA145	1492-MCAA245	1	1492-MCBA2H45	1492-MCBA345
50	1/2	1492-MCAA150	1492-MCAA250	1	1492-MCBA2H50	1492-MCBA350
55	1/2	1492-MCAA155	1492-MCAA255	1	1492-MCBA2H55	1492-MCBA355
60	1/2	1492-MCAA160	1492-MCAA260	1	1492-MCBA2H60	1492-MCBA360
70	1	1492-MCBA170	1492-MCBA270	1	1492-MCBA2H70	1492-MCBA370
80	1	1492-MCBA180	1492-MCBA280	1	1492-MCBA2H80	1492-MCBA380
90	1	1492-MCBA190	1492-MCBA290	1	1492-MCBA2H90	1492-MCBA390
100	1	1492-MCBA1A0	1492-MCBA2A0	1	1492-MCBA2HA0	1492-MCBA3A0

1492-MC Ground Fault Sensing

The Bulletin 1492-MC Circuit Breakers with Ground Fault protection for Branch Circuits are available in 1- and 2-pole construction in 120/240V rating. Versions are available as Ground Fault Circuit Interrupters and as Ground Fault Equipment Protectors.

When protection from low-level fault currents for North American standards is required, two versions of protection are available.

- Circuit Breakers with protection for personnel use a threshold of 5 mA sensing to provide protection for people. These are typically known as Ground Fault Circuit Interrupters or GFCIs.
- Circuit Breakers that provide protection for equipment at a sensing threshold of 30 mA are also available. These are typically known as Ground Fault Equipment Protectors or GFEPs.

The following devices are tested and listed to meet the North American standards of UL 489, UL 943 (for GFCI), UL1053 (for GFEP), and CSA 22.2 No.5.1.

It is recommended that the devices be tested monthly by using the TEST button to check for proper operation of the device.


Auxiliary Devices

Device description	1-pole	2- and 3-poles
Locking Attachment for Circuit Breaker	1492-MCAAxxx	1492-AMCAL1
	1492-MCBAxxx	1492-AMCBL1
Finger protection cover for 1 in. wide Cat. No. 1492-MCBxxx, package of 10 (one required for line and one required for load for each pole) (not for GFCI / GFEP)	1492-AMCBFP	
DIN Rail adapter, per pole, DIN Rail mounting for GFCI, GFEP	1492-AMCDIN1	
Panel Mounting Clips for GFCI and GFEP, two required per device	1492-AMCP1	

# Circuit Breaker

## Product Selection/Specifications

### Bul. 1492-MC Ground Sensing Product Selection

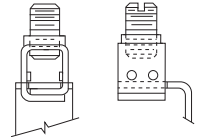
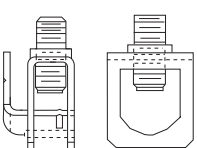
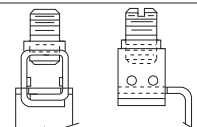
		Cat. No.	Cat. No.	
	Continuous Ampere Rating @ 40 °C (104 °F) [A]	120V AC	120/240V AC	
		1-pole	2-pole	
	<b>GFCI (5 mA Sensitivity)</b>			
	15	<b>1492-MCGA115</b>	<b>1492-MCGA215</b>	
	20	<b>1492-MCGA120</b>	<b>1492-MCGA220</b>	
	25	1492-MCGA125	1492-MCGA225	
	30	1492-MCGA130	1492-MCGA230	
	40	1492-MCGA140	1492-MCGA240	
	50	—	1492-MCGA250	
	<b>GFEP (30 mA Sensitivity)</b>			
	15	<b>1492-MCEA115</b>	<b>1492-MCEA215</b>	
	20	<b>1492-MCEA120</b>	1492-MCEA220	
	25	1492-MCEA125	1492-MCEA225	
	30	1492-MCEA130	1492-MCEA230	
40	1492-MCEA140	1492-MCEA240		
50	—	1492-MCEA250		
For panel mounting use two 1492-AMCP1 per device For DIN Rail mounting use one 1492-AMCDIN1 per pole				

### Specifications

Standards Compliance	UL 489, CSA C22.2 No. 5
Certifications	UL Listed, CSA Certified
Rated Voltage	120/240V AC, 240V AC
Continuous Current rating @ 40°C (104°F)	10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80 90, 100 Amp
Rated short circuit capability	10 kA 120/240V AC and 240V AC 14 kA 480Y/277V AC
Degree of protection	Open Device 1/2 in. wide circuit breakers are finger safe from front per IEC. Terminal Covers available for 1 in. wide circuit breaker at 120/240 and 240V AC.
Mounting	DIN Rail (check product for specific)
Operating Temperature	0...60 °C (32...140 °F) (non-condensing)
Shipment and short term storage limits	-40 °C...+80 °C (-40...176 °F)
Wire Size	See Terminals Table Below
Terminal Torque	
Recommended Wire Strip Length	

7

### Terminals

Cat. No.	Continuous Current Rating	Wire Type	Wire Range [AWG]	Terminal Torque	Line Strip Length	Line and Load Terminals
1492-MCAAxxx	10...60 A	Copper (Cu)	14...10	20 lb•in (2.3 N•m)	7/16 in.	
			8	25 lb•in (2.8 N•m)		
			6...4	27 lb•in (3.0 N•m)		
1492-MCBAxxx	35...60 A		14...10	20 lb•in (2.3 N•m)		
	70...100 A		8...4	32 lb•in (3.6 N•m)		
1492-MCEAxxx	15...50 A		14...10	20 lb•in (2.3 N•m)		9/16 in.
			8	25 lb•in (2.8 N•m)	—	
1492-MCGAxxx			6...4	27 lb•in (3.0 N•m)	—	

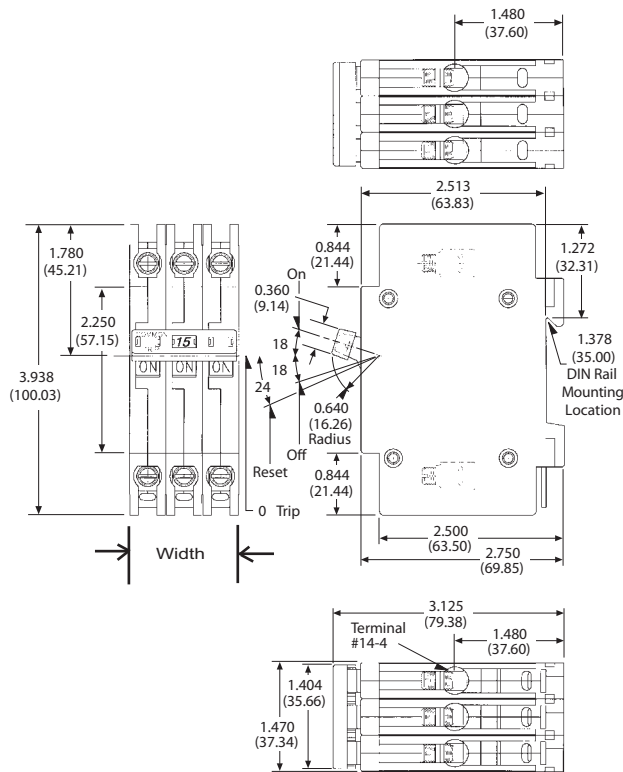


**1492-MC Approximate Dimensions**

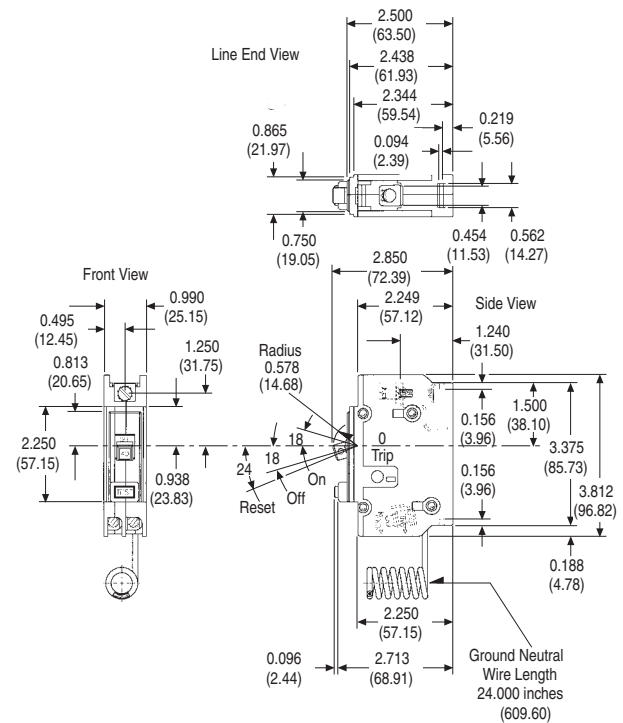
**Note:** Dimensions are shown in inches (millimeters). Dimensions are not intended for manufacturing purposes.

Catalog Type	No. of Poles	Continuous Current Rating [A]	Width [in.]
1492-MCAA1xx	1	10...60	0.490
1492-MCAA2xx	2	10...60	0.980
1492-MCAA2Hxx	2	15...30	0.980
1492-MCAA3xx	3	15...30	1.470
1492-MCBA1xx	1	70...100	1.000
1492-MCBA2xx	2	70...100	2.000
1492-MCBA2Hxx	2	35...100	2.000
1492-MCBA3xx	3	35...100	3.000
1492-MCEA1xx	1	15...50	0.990
1492-MCEA2xx	2	15...50	1.980
1492-MCGA1xx	1	15...50	0.990
1492-MCGA2xx	2	15...50	1.980

**1492-MCAAxx**

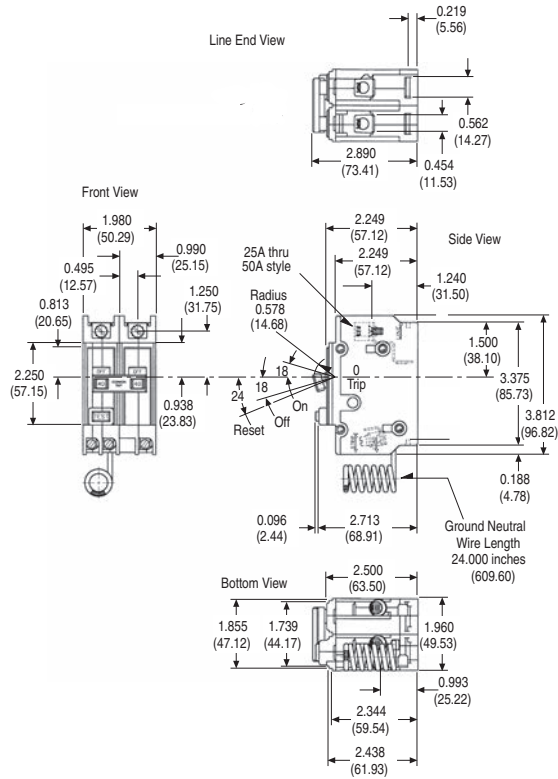


**1492-MCEA1xx  
 1492-MCGA1xx**

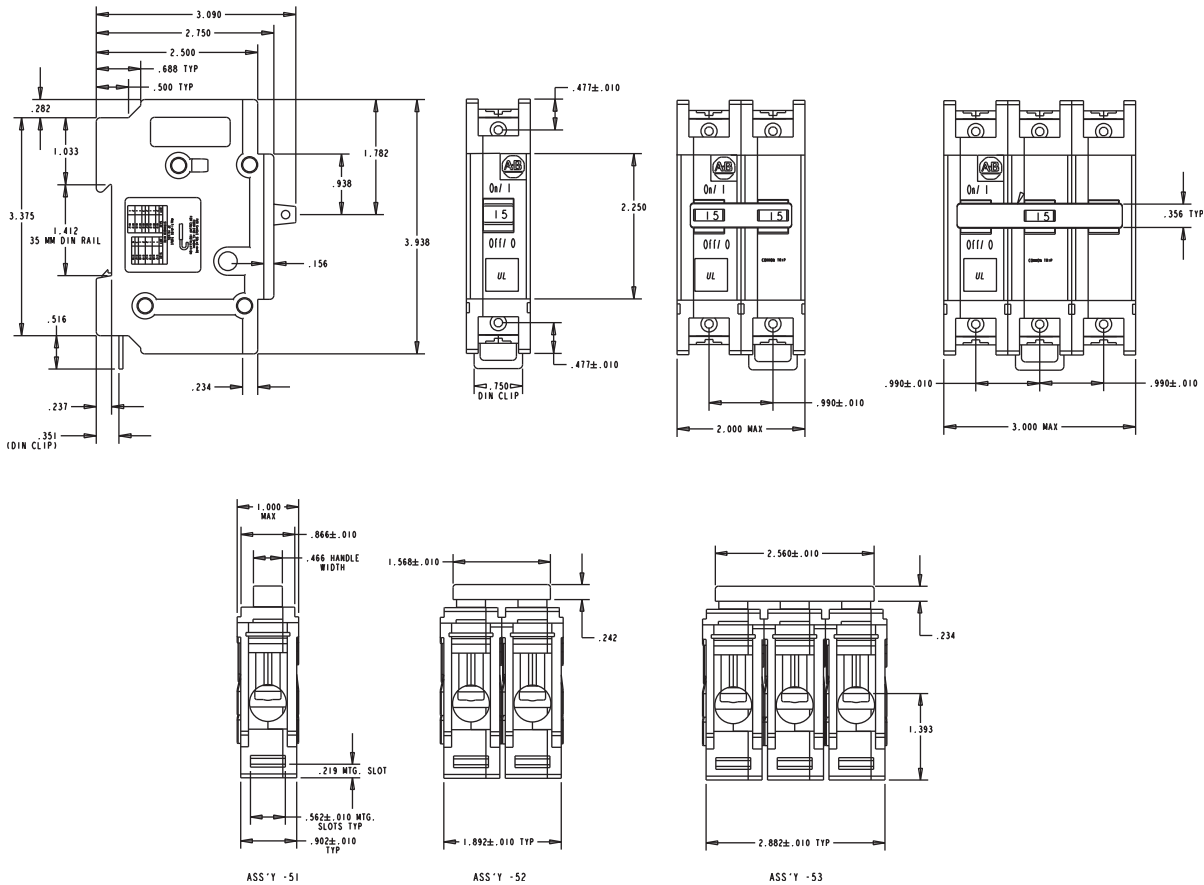


Bulletin 1492-MC  
**Circuit Breaker**  
 Approximate Dimensions

1492-MCEA2xx  
 1492-MCGA2xx



1492-MCBAxxx



7



### Bulletin 1489-A Circuit Breakers

- Energy-limiting design — protects downstream components better than conventional breakers during short circuits
- Field-mountable options for selective applications
- IP2x Finger-Protection (Front)
- North America certifications: UL 489, CSA C22.2 No. 5
- International standards: CE Marked, and IEC (VDE) standards for worldwide acceptance
- Ratings: UL/CSA — max. 480Y/277V AC – up to 14 kA interrupt rating; IEC — max. 240/415V AC – 15 000 A interrupt rating
- 48V DC rating, 96V DC — 2-pole series
- A positively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)
- Trip curves: C and D
- Time delay (D Characteristic) for high inrush currents during inductive start-ups such as motors, transformers and power supplies
- Superior shock and vibration resistance capabilities — helps to prevent nuisance tripping
- Mounts on DIN Rail
- Wire connect, line and load (reversible)
- Optional terminals for ring lug terminals

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 Approximate  
 Dimensions ..... 7-26

### Industrial Circuit Breakers for North American Applications

- Energy limiting design - protects downstream components better than conventional breakers during short circuits
- Field mountable options for selective applications
- IP2x Finger-Protection (Front)
- North America certifications: UL 489, CSA 22.2 No. 5
- International standards: CE Marked, and IEC (VDE) standards for worldwide acceptance
- Ratings: UL/CSA — max. 480Y/277V AC – up to 14 kA interrupt rating; IEC — max. 240/415V AC – 15 000 A interrupt rating
- 48V DC rating, 96V DC — 2-pole series
- A positively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)
- Trip curves: C and D
- Time delay (D Characteristic) for high inrush currents during inductive start-ups such as motors, transformers and power supplies
- Superior shock and vibration resistance capabilities — helps to prevent nuisance tripping
- Mounts on DIN Rail
- Wire connect, line and load (reversible)
- Optional terminals for ring lug terminals.

The Bulletin 1489-A line includes:

- UL 489, CSA C22.2 No. 5
- 240V AC 0.5...40 A
- 480V/277V AC 0.5...32 A
- Miniature Circuit Breaker for EN/IEC Applications EN/IEC 60947-2 415V AC 0.5...40 A
- SWD (0.5...20 A) Switching Duty for fluorescent lighting applications
- HACR
- 1-pole 48V DC 0.5...40 A
- 2-pole (series) 96V DC 0.5...40 A
- 48V DC 0.5...40 A

### Miniature Circuit Breaker for IEC Applications: 415V AC 0.5...40 A Standards Compliance

UL 489  
 CSA C22.2 No. 5  
 EN/IEC 60947-2

#### Certifications

UL Listed  
 CSA Certified  
 CE Marked  
 VDE Certified

#### Features

- Designed manufactured and listed to UL 489 (CSA 22.2 No. 5)
- Thermal-magnetic protection
- All ratings are HACR rated
- up to 14 kA Interrupting rating
- Finger-safe design (front)
- DIN Rail mounting
- Line and load wire connections
- Optional ring terminal connections (convertible)

#### Description

Bulletin 1489-A Circuit Breakers for Branch Circuit protection are available in 1-, 2-, and 3-pole construction and are rated 0.5...40 A at 240V AC and 0.5...32 A at 480Y/277V AC for North American applications (UL 489 and CSA C22.2 No. 5). The circuit breakers also have a 1-pole 48V DC, 2-pole (series) 96V DC rating. For EN/IEC applications the products are rated 415V AC, 48V AC 0.5...40 A.

#### Thermal Magnetic Circuit Breakers

The Bulletin 1489-A Thermal Magnetic Circuit Breakers are general-purpose devices suitable for the majority of industrial, inverse time circuit breaker applications.

They combine thermal and magnetic trip actions and provide accurate overload and short-circuit protection for conductors and connected equipment.



**Circuit Breaker Application Information**

Selection of a Bulletin 1489 circuit breaker with appropriate circuit protection includes consideration of:

- Circuit voltage
- Circuit frequency
- Available short circuit current
- Continuous current rating
- Application considerations
- Special operating conditions

The following discussion is based upon National Electric Code and UL requirements. Similar considerations are appropriate for Canadian applications.

**Circuit Voltage**

The Bulletin 1489-A circuit breakers are rated by voltage class. Applications should not exceed the listed voltage and current range (see Table 1).

**Circuit Frequency**

The Bulletin 1489-A circuit breakers may be applied to frequencies of 50 Hz and 60 Hz without derating. For applications above 60 Hz, contact Rockwell Automation with specific application information for the derating of the circuit breakers.

**Available Short Circuit Current**

The Bulletin 1489-A circuit breakers should only be applied in those applications in which the available short-circuit (or fault) current is less than or equal to 10 kA...14 kA (US/Canada) and 15 kA (IEC).

**Table 1. Voltage and Current Ranges**

Region	Max. Voltage	Current Range [A]
EN/IEC Regions	415V AC	0.5...40
	48V DC	0.5...40
North America (UL 489 & CSA C22.2 No. 5)	240V AC	0.5...40
	480Y/277V AC	0.5...32
	1-pole 48V DC	0.5...40
	2-pole 96V DC	0.5...40

**Continuous Current Rating**

Standard current ratings are: 0.5, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 10, 15, 16, 20, 25, 30, 32, 35, and 40 A.

The Bulletin 1489-A circuit breakers are rated in RMS amperes at a 40 °C (104 °F) ambient temperature per the UL 489 (CSA 22.2 No. 5) standard. This temperature is generally used as the average temperature within an industrial enclosure. If a circuit breaker is applied in a temperature that exceeds the 40 °C (104 °F) ambient, then the circuit breaker should be derated. For IEC 60 947-2 standard, the products carry an ambient rating of 30 °C. Follow standard IEC application considerations for temperature rating in different ambient temperatures.

The characteristic trip curves are shown on page 7-19. The trip bands shown for each breaker represent current tripping limits for a circuit breaker and are within the limits established by UL. For a specific current at 40 °C (104 °F), a circuit breaker will open ("clear the circuit") automatically at some total time that will be within the "Minimum" and "Maximum" time shown on the curves. For example, page 7-19 shows that a one-pole, 15 A, Bulletin 1489-A circuit breaker trips in not less than 10 s and not more than 120 s on a 30 A current. Because the UL standard defines this time spread, users should not specify exact tripping time. The lower current portion of the curves (upper left) depict the time to trip due to thermal action and reflect overload protection of the wire and connect load. The higher current portion of the curves (lower right) depicts the trip due to magnetic action of the circuit breaker and reflects protection due to short circuit level currents.

**Application Considerations**

*The following is a discussion of application considerations related to North American applications. When applying product to IEC regional requirements, follow IEC practices and guidelines.*

The selection of a specific ampere rating for a specific application is dependent on the type of load and duty cycle and is governed by the National Electric Code (Canadian Electric Code) and UL/CSA. In general, the codes require that overcurrent protection is at the current supply and at points where wire sizes are reduced. In addition, the codes state that conductors be protected according to their current carrying capacity. There are specific situations that require application consideration, such as motor circuit, and guidelines for the selection for transformer protection.

The Bulletin 1489-A circuit breakers are "non 100 percent rated" as defined by UL 489, para 7.1.4.2. As such, the circuit breaker's rating should be loaded to no more than 80% if used with continuous loads.

Line and load may be reversed. The Bulletin 1489 circuit breaker may be bottom fed.

**Branch Circuits:**

Bulletin 1489-A circuit breakers may be used to protect branch circuits. A branch circuit is the wiring portion of a system extending beyond the final overcurrent device protecting the circuit.

Guidelines established in NEC, CEC, UL, and CSA should be used to determine the specific device. For example:

1) Motor Branch Circuit

Bulletin 1489-A circuit breakers are not horsepower rated because they are able to safely interrupt currents far in excess of the locked rotor value for a selected motor. This ability is recognized in the codes and standards and is also established by the UL and CSA tests described in UL 489 and CSA C22.2 No. 5 standards.

The size of a Bulletin 1489 circuit breaker should be determined following the guidelines for an Inverse Time Circuit Breaker.

References: NEC 430.51 and UL 489. Also see CEC and appropriate Canadian Standards.

2) Transformer Protection

Bulletin 1489-A circuit breakers may be used for transformer protection following the guidelines established.

References: NEC 450 and UL 489. Also see CEC and appropriate Canadian Standards.

3) Heater Load, Lighting, and Other Load Protection

Bulletin 1489-A circuit breakers may be used for protection of heater loads, lighting loads, and other loads following the guidelines established.

References: NEC Article 31 and UL 508A. Also see CEC and appropriate Canadian Standards.

**Coordinated Overcurrent Protection**

Where an orderly shutdown is required to minimize the hazards to personnel and equipment, a system of coordination based upon the faulted or overloaded circuit is isolated by selective operation of only the overcurrent protective device closest to the overcurrent condition. The user should select devices that meet this requirement.

References: NEC 240.12. Also see CEC.



### HACR Rating

Bulletin 1489-A Circuit Breakers are rated as Heating, Air Conditioning and Refrigeration circuit breakers as defined by UL 489, paragraph 6.7 and may be used in this type of application.

### SWD Rating

The Bulletin 1489 breakers (0.5 ... 20 A) are rated as SWD and as such may be applied to switch fluorescent lighting loads up to their current and voltage maximum.

### Current Limiting

Bulletin 1489-A Circuit Breakers are rated as current limiting circuit breakers as defined by UL 489, paragraph 8.6.

The Bulletin 1489-A line features the ability to achieve short circuit interruptions far more effectively than conventional breakers. In conventional circuit breakers, the short circuit interruption time required is approximately one or two half cycles of an AC sine wave. When the contacts open, the resulting arc continues to burn until the current level passes through zero. The arc may re-ignite because of the insufficient width of the contact gap. The current that flows until the arc is extinguished produces a heating effect proportional to the  $I^2t$  value (let-through-energy) of the fault current.

The Bulletin 1489-A device is designed to substantially reduce the amount of let-through-current and the resulting let-through-energy that can damage protected components. The Bulletin 1489 has the ability to interrupt short circuit current within the first half cycle of the fault. Limiting let-through current and energy will protect against the harmful effects of overcurrent and is focused primarily on avoiding the following:

- Excessive Heat
- Mechanical Damage

Both of these factors are proportional to the square of the current. Thermal energy is proportional to the square of the RMS value and magnetic forces are proportional to the square of the peak value. The most effective way to provide protection is to substantially limit let-through-energy. This provides the following advantages

- Far less damage at the location of the short circuit.
- Fast electric separation of a faulty unit from the system, especially power supplies connected in parallel that are switched off when the voltage of the power bus drops below a certain level.
- Far less wear on the miniature circuit breaker itself. This means more safe interruptions.
- Better protection of all components in the short circuit path.
- Far wider range of selective action when used with an upstream protective device. (No nuisance shut downs from feeder line interruptions, causing a blackout in all connected branches.)

The following values are applicable to the whole product range with frequency of 50/60 Hz.

The values were derived from worst case V AC testing of:

D trip 40 A, 240V AC @ 10 kA

D trip 32 A, 480Y/277V AC @ 10 kA

D trip 20 A, 480Y/277V AC @ 14 kA

Current-Limiting at 240V / 10 kA 1p, 2p, 3p  $I^2t$  = 43 kA<sup>2</sup>s and  $I$  peak = 6.2 kA

Current-Limiting at 480Y/277V / 10 kA 1p, 2p, 3p  $I^2t$  = 60 kA<sup>2</sup>s and  $I$  peak = 6.2 kA

Current-Limiting at 480Y/277V / 14 kA 1p, 2p, 3p  $I^2t$  = 65 kA<sup>2</sup>s and  $I$  peak = 7.5 kA

### Bulletin 1489-A Ambient Temperature Derating

The standard tripping characteristic for Bulletin 1489-A is Type C. Type C has a magnetic trip activated at 5...10 times the rated current of the circuit breaker. The reference temperature for the thermal tripping characteristics is 40 °C. The Type C characteristic will suit most applications.

In rare occurrences when the Type C characteristic does not fully meet the application, the following additional magnetic trip characteristic is available:

Type D allows for transients approximately twice as high as the standard Type C.

Use the following table and graph to determine the current rating for the breaker if the ambient is significantly different than 40 °C.

### Bulletin 1489-A Ambient Temperature Derating Calibration Temperature 40° C (UL) Application below 0° C is for non-condensing atmosphere\*

Device Marked Current Rating [A] @ 40 °C	Ambient Temperature (°C)											
	-25	-20	-10	0	10	20	30	35	40	45	50	55
0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	<b>0.50</b>	0.5	0.5	0.5
1.0	1.3	1.2	1.2	1.2	1.1	1.1	1.0	1.0	<b>1.0</b>	1.0	1.0	0.9
1.5	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.5	<b>1.5</b>	1.5	1.4	1.4
2.0	2.5	2.5	2.4	2.3	2.2	2.2	2.1	2.0	<b>2.0</b>	2.0	1.9	1.9
3.0	3.8	3.7	3.6	3.5	3.4	3.2	3.1	3.1	<b>3.0</b>	2.9	2.9	2.8
4.0	5.0	5.0	4.8	4.6	4.5	4.3	4.2	4.1	<b>4.0</b>	3.9	3.8	3.8
5.0	6.3	6.2	6.0	5.8	5.6	5.4	5.2	5.1	<b>5.0</b>	4.9	4.8	4.7
6.0	7.5	7.4	7.2	7.0	6.7	6.5	6.2	6.1	<b>6.0</b>	5.9	5.8	5.6
7.0	8.8	8.7	8.4	8.1	7.8	7.6	7.3	7.1	<b>7.0</b>	6.9	6.7	6.6
8.0	10.0	9.9	9.6	9.3	9.0	8.6	8.3	8.2	<b>8.0</b>	7.8	7.7	7.5
10.0	12.6	12.4	12.0	11.6	11.2	10.8	10.4	10.2	<b>10</b>	9.8	9.6	9.4
13.0	16.3	16.1	15.6	15.1	14.6	14.0	13.5	13.3	<b>13</b>	12.7	12.5	12.2
15.0	18.8	18.6	18.0	17.4	16.8	16.2	15.6	15.3	<b>15</b>	14.7	14.4	14.1
16.0	20.1	19.8	19.2	18.6	17.9	17.3	16.6	16.3	<b>16</b>	15.7	15.4	15.0
20.0	25.1	24.8	24.0	23.2	22.4	21.6	20.8	20.4	<b>20</b>	19.6	19.2	18.8
25.0	31.4	31.0	30.0	29.0	28.0	27.0	26.0	25.5	<b>25</b>	24.5	24.0	23.5
30.0	37.7	37.2	36.0	34.8	33.6	32.4	31.2	30.6	<b>30</b>	29.4	28.8	28.2
32.0	40.2	39.7	38.4	37.1	35.8	34.6	33.3	32.6	<b>32</b>	31.4	30.7	30.1
40.0	43.9	43.4	42.0	40.6	39.2	37.8	36.4	35.7	<b>35</b>	34.3	33.6	32.9

\* Care should be taken for application below 0 °C. These devices are not certified to operate correctly in the presence of ice.

All other specifications for standard Bulletin 1489-A products remain unchanged.

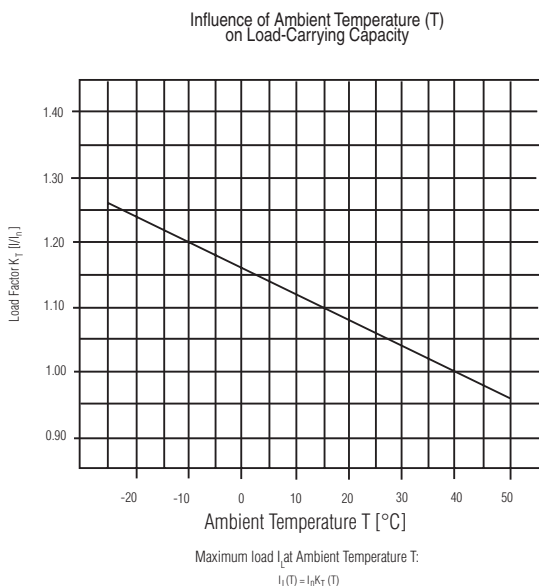
The ambient temperature derating applies to applications of the device as an IEC Miniature Circuit Breaker (MCB), following 60 947-2 and as Circuit Breaker to UL489/CSA 22.2 No 5..

Ambient temperature refers to the free air temperature in contact with the 1489 device





**Ambient Temperature Graph**



**The 1489-A circuit breaker can function over a wide temperature range (-30°...+60 °C). Operation in ambient temperatures below 0 °C is based on a non condensing atmosphere (no ice). Use the graph above or contact your local Rockwell Automation sales office or Allen-Bradley distributor to determine the correction factor based upon ambient temperature.**

**Terminals**

Standard wire (cable) connection

The standard configuration of the Bulletin 1489-A is with terminals suitable for connection of stranded copper wire of the wire size #18... 8 AWG (1.0 ... 10 mm<sup>2</sup>). Strip length for the termination is 0.5 in. (12 mm). Terminals are shipped in the open position for ease of installation.

**Optional Ring Termination**

For the Bulletin 1489-A circuit breakers, an optional terminal configuration (suffix R) is available for use with a ring terminal. This configuration is shipped so that the terminal screw may be unscrewed and withdrawn for the insertion of the ring terminal at proper connection point. The screw is then retightened to provide proper wire termination.

This unique terminal may be field converted to open the wire termination to allow standard wire termination of the converted terminal.

**Bus Bars**

For the Bulletin 1489-A circuit breakers, UL Recognized bus bars and UL Listed feeder terminals are available for group connection of circuit breakers. They are available in 1-, 2-, and 3- pole configurations for connection of multiple circuit breakers.

**Lock-out Attachment**

A sturdy lock-out attachment may be added to a circuit breaker. This lock-out may be padlocked so that the circuit breaker is locked in the off position.

**Shunt Trip**

A shunt trip may be added to a circuit breaker to allow the device to be tripped from a remote source. One version is for tripping voltages of 12...110V AC (12...60V DC) and another for tripping voltages of 110...415V AC (110...230V DC).

**Auxiliary Contacts**

An auxiliary contact module may be added to a circuit breaker to provide pilot duty contacts to indicate the position of circuit breaker, off or on. This contact changes state when the circuit breaker is operated either manually or electrically.

**Signal Contacts**

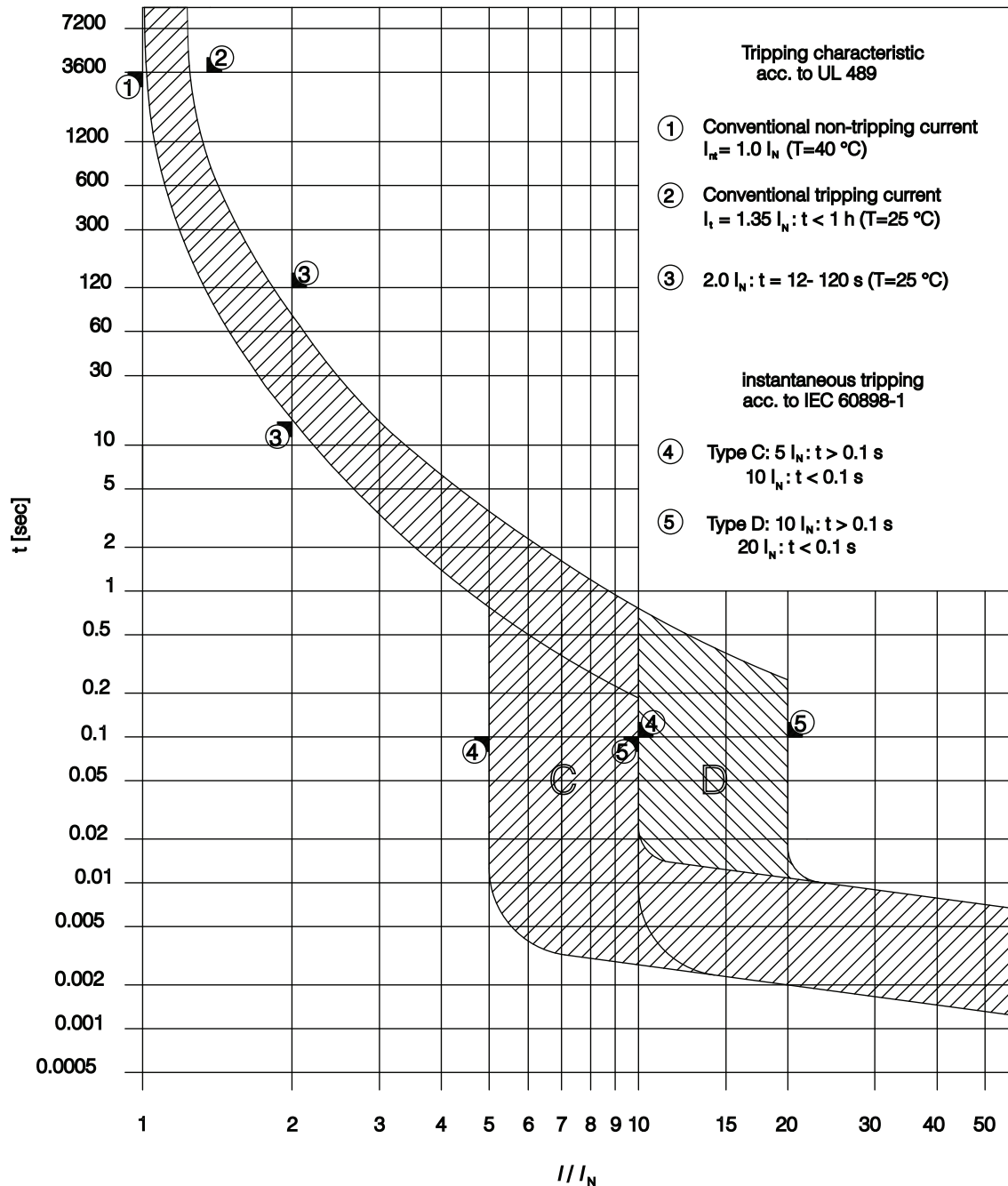
A signal/auxiliary contact module may be added to a circuit breaker to provide auxiliary contact information off and on and signal contact pilot duty contacts. With signal contacts, the contacts change state only when the circuit breaker changes state from On to Off because of an electrical operation. The module contains one signal contact, form C contact (N.O. and N.C contact with common) and one auxiliary contact (N.O. and N.C contact with common).

Time Current Curve – 1-, 2-, and 3-Pole Circuit Breaker

# Time-Current Characteristic Bulletin 1489

## Type C and D

Ambient Temperature 40 °C



Bulletin 1489-A  
**Circuit Breaker**  
 Cat. No. Explanation

**Bulletin 1489 Cat. No. Explanation**

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

**1489 - A 1 C 005 R**  

*a*
*b*
*c*
*d*
*e*

*a*

Body Style	
Code	Description
A	Standard configuration, AC Device
D	Standard configuration, DC Device

*b*

Poles	
Code	Description
1	1-Pole
2	2-Pole
3	3-Pole

*c*

Trip Curve	
Code	Trip Curve
B	Trip Curve B
C	Trip Curve C
D	Trip Curve D

*d*

Rated Current ( $I_n$ )	
Code	Current [A]
005	0.5
010	1
015	1.5
020	2
030	3
040	4
050	5
060	6
070	7
080	8
100	10
130	13
150	15
160	16
200	20
250	25
300	30
320	32
350	35
400	40

*e*

Factory Modifications	
Code	Description
blank	Standard Terminal
R	Ring Terminal



Product Selection

Bulletin 1489-A AC Miniature Circuit Breakers

Bulletin 1489 1-Pole AC Miniature Circuit Breakers

No. of Poles	EN/IEC Maximum Voltage	Trip Curve	UL/CSA Max. Volt.	Rated Current [A]	Standard Wire Configuration Cat. No.	Ring Terminal Configuration Cat. No.
1	415V AC, 48V DC	C	277V AC, 48V DC	0.5	<b>1489-A1C005</b>	1489-A1C005R
				1	<b>1489-A1C010</b>	<b>1489-A1C010R</b>
				1.5	<b>1489-A1C015</b>	1489-A1C015R
				2	<b>1489-A1C020</b>	<b>1489-A1C020R</b>
				3	<b>1489-A1C030</b>	<b>1489-A1C030R</b>
				4	<b>1489-A1C040</b>	1489-A1C040R
				5	<b>1489-A1C050</b>	<b>1489-A1C050R</b>
				6	<b>1489-A1C060</b>	<b>1489-A1C060R</b>
				7	<b>1489-A1C070</b>	1489-A1C070R
				8	<b>1489-A1C080</b>	1489-A1C080R
				10	<b>1489-A1C100</b>	<b>1489-A1C100R</b>
				13	<b>1489-A1C130</b>	1489-A1C130R
				15	<b>1489-A1C150</b>	<b>1489-A1C150R</b>
				16	<b>1489-A1C160</b>	1489-A1C160R
				20	<b>1489-A1C200</b>	1489-A1C200R
				25	<b>1489-A1C250</b>	1489-A1C250R
				30	<b>1489-A1C300</b>	1489-A1C300R
				32	<b>1489-A1C320</b>	1489-A1C320R
				35	<b>1489-A1C350</b>	1489-A1C350R
				40	<b>1489-A1C400</b>	1489-A1C400R
		0.5	<b>1489-A1D005</b>	1489-A1D005R		
		1	<b>1489-A1D010</b>	1489-A1D010R		
		1.5	<b>1489-A1D015</b>	1489-A1D015R		
		2	<b>1489-A1D020</b>	1489-A1D020R		
		3	<b>1489-A1D030</b>	1489-A1D030R		
		4	<b>1489-A1D040</b>	<b>1489-A1D040R</b>		
		5	<b>1489-A1D050</b>	1489-A1D050R		
		6	<b>1489-A1D060</b>	<b>1489-A1D060R</b>		
		7	<b>1489-A1D070</b>	1489-A1D070R		
		8	<b>1489-A1D080</b>	1489-A1D080R		
		10	<b>1489-A1D100</b>	1489-A1D100R		
		13	<b>1489-A1D130</b>	1489-A1D130R		
		15	<b>1489-A1D150</b>	1489-A1D150R		
		16	<b>1489-A1D160</b>	1489-A1D160R		
		20	<b>1489-A1D200</b>	1489-A1D200R		
		25	<b>1489-A1D250</b>	1489-A1D250R		
		30	<b>1489-A1D300</b>	1489-A1D300R		
		32	<b>1489-A1D320</b>	1489-A1D320R		
		35	<b>1489-A1D350</b>	1489-A1D350R		
		40	<b>1489-A1D400</b>	1489-A1D400R		
		D	277V AC, 48V DC			
			240V AC, 48V DC			



Bulletin 1489-A  
**Circuit Breaker**  
 Product Selection

**Bulletin 1489-A 2-Pole AC Miniature Circuit Breakers**

No. of Poles	EN/IEC Maximum Voltage	Trip Curve	UL/CSA Max. Volt.	Rated Current [A]	Standard Wire Terminal Cat. No.	Ring Terminal Configuration Cat. No.
2	415V AC	C	480Y/277V AC, 96V DC	0.5	<b>1489-A2C005</b>	<b>1489-A2C005</b>
				1	<b>1489-A2C010</b>	1489-A2C010R
				1.5	<b>1489-A2C015</b>	1489-A2C015R
				2	<b>1489-A2C020</b>	1489-A2C020R
				3	<b>1489-A2C030</b>	1489-A2C030R
				4	<b>1489-A2C040</b>	1489-A2C040R
				5	<b>1489-A2C050</b>	1489-A2C050R
				6	<b>1489-A2C060</b>	1489-A2C060R
				7	<b>1489-A2C070</b>	1489-A2C070R
				8	<b>1489-A2C080</b>	1489-A2C080R
				10	<b>1489-A2C100</b>	1489-A2C100R
				13	<b>1489-A2C130</b>	1489-A2C130R
				15	<b>1489-A2C150</b>	1489-A2C150R
				16	<b>1489-A2C160</b>	1489-A2C160R
				20	<b>1489-A2C200</b>	1489-A2C200R
				25	<b>1489-A2C250</b>	1489-A2C250R
				30	<b>1489-A2C300</b>	1489-A2C300R
				32	<b>1489-A2C320</b>	1489-A2C320R
				35	<b>1489-A2C350</b>	1489-A2C350R
				40	<b>1489-A2C400</b>	1489-A2C400R
		0.5	<b>1489-A2D005</b>	1489-A2D005R		
		1	<b>1489-A2D010</b>	1489-A2D010R		
		1.5	<b>1489-A2D015</b>	1489-A2D015R		
		2	<b>1489-A2D020</b>	1489-A2D020R		
		3	<b>1489-A2D030</b>	1489-A2D030R		
		4	<b>1489-A2D040</b>	1489-A2D040R		
		5	<b>1489-A2D050</b>	1489-A2D050R		
		6	<b>1489-A2D060</b>	1489-A2D060R		
		7	<b>1489-A2D070</b>	1489-A2D070R		
		8	<b>1489-A2D080</b>	1489-A2D080R		
		10	<b>1489-A2D100</b>	<b>1489-A2D100R</b>		
		13	<b>1489-A2D130</b>	1489-A2D130R		
		15	<b>1489-A2D150</b>	1489-A2D150R		
		16	<b>1489-A2D160</b>	1489-A2D160R		
		20	<b>1489-A2D200</b>	1489-A2D200R		
		25	<b>1489-A2D250</b>	1489-A2D250R		
		30	<b>1489-A2D300</b>	1489-A2D300R		
		32	<b>1489-A2D320</b>	1489-A2D320R		
		35	<b>1489-A2D350</b>	1489-A2D350R		
		40	<b>1489-A2D400</b>	1489-A2D400R		
		D	480Y/277V AC, 96V DC	0.5	<b>1489-A2D005</b>	1489-A2D005R
				1	<b>1489-A2D010</b>	1489-A2D010R
				1.5	<b>1489-A2D015</b>	1489-A2D015R
				2	<b>1489-A2D020</b>	1489-A2D020R
				3	<b>1489-A2D030</b>	1489-A2D030R
				4	<b>1489-A2D040</b>	1489-A2D040R
				5	<b>1489-A2D050</b>	1489-A2D050R
				6	<b>1489-A2D060</b>	1489-A2D060R
				7	<b>1489-A2D070</b>	1489-A2D070R
				8	<b>1489-A2D080</b>	1489-A2D080R
				10	<b>1489-A2D100</b>	<b>1489-A2D100R</b>
				13	<b>1489-A2D130</b>	1489-A2D130R
				15	<b>1489-A2D150</b>	1489-A2D150R
				16	<b>1489-A2D160</b>	1489-A2D160R
				20	<b>1489-A2D200</b>	1489-A2D200R
				25	<b>1489-A2D250</b>	1489-A2D250R
				30	<b>1489-A2D300</b>	1489-A2D300R
				32	<b>1489-A2D320</b>	1489-A2D320R
				35	<b>1489-A2D350</b>	1489-A2D350R
				40	<b>1489-A2D400</b>	1489-A2D400R
			240V AC, 96V DC	35	<b>1489-A2C350</b>	1489-A2C350R
			240V AC, 96V DC	40	<b>1489-A2C400</b>	1489-A2C400R



**Bulletin 1489-A 3-Pole AC Miniature Circuit Breakers**

No. of Poles	EN/IEC Maximum Voltage	Trip Curve	UL/CSA Max. Volt.	Rated Current [A]	Standard Wire Terminal Cat. No.	Ring Terminal Configurations Cat. No.
3	415V AC	C	480Y/277V AC	0.5	<b>1489-A3C005</b>	1489-A3C005R
				1	<b>1489-A3C010</b>	1489-A3C010R
				1.5	<b>1489-A3C015</b>	1489-A3C015R
				2	<b>1489-A3C020</b>	1489-A3C020R
				3	<b>1489-A3C030</b>	1489-A3C030R
				4	<b>1489-A3C040</b>	1489-A3C040R
				5	<b>1489-A3C050</b>	1489-A3C050R
				6	<b>1489-A3C060</b>	1489-A3C060R
				7	<b>1489-A3C070</b>	1489-A3C070R
				8	<b>1489-A3C080</b>	1489-A3C080R
				10	<b>1489-A3C100</b>	1489-A3C100R
				13	<b>1489-A3C130</b>	1489-A3C130R
				15	<b>1489-A3C150</b>	1489-A3C150R
				16	<b>1489-A3C160</b>	1489-A3C160R
				20	<b>1489-A3C200</b>	1489-A3C200R
				25	<b>1489-A3C250</b>	1489-A3C250R
				30	<b>1489-A3C300</b>	1489-A3C300R
				32	<b>1489-A3C320</b>	1489-A3C320R
			35	<b>1489-A3C350</b>	1489-A3C350R	
			40	<b>1489-A3C400</b>	1489-A3C400R	
		35	<b>1489-A3D005</b>	1489-A3D005R		
		40	<b>1489-A3D010</b>	1489-A3D010R		
		45	<b>1489-A3D015</b>	1489-A3D015R		
		50	<b>1489-A3D020</b>	1489-A3D020R		
		60	<b>1489-A3D030</b>	1489-A3D030R		
		75	<b>1489-A3D040</b>	1489-A3D040R		
		100	<b>1489-A3D050</b>	1489-A3D050R		
		125	<b>1489-A3D060</b>	1489-A3D060R		
		150	<b>1489-A3D070</b>	1489-A3D070R		
		200	<b>1489-A3D080</b>	1489-A3D080R		
		250	<b>1489-A3D100</b>	1489-A3D100R		
		300	<b>1489-A3D130</b>	1489-A3D130R		
		350	<b>1489-A3D150</b>	1489-A3D150R		
		400	<b>1489-A3D160</b>	1489-A3D160R		
		500	<b>1489-A3D200</b>	1489-A3D200R		
		600	<b>1489-A3D250</b>	1489-A3D250R		
		750	<b>1489-A3D300</b>	1489-A3D300R		
		900	<b>1489-A3D320</b>	1489-A3D320R		
		1100	<b>1489-A3D350</b>	1489-A3D350R		
		1400	<b>1489-A3D400</b>	1489-A3D400R		

