Control Circuit and Load Protection Devices

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**
	0.5…25 A	**0.5…40 A**	**2...40 A**		**30 A**	**30 A**	**60 A**	**30 A**	**30 A**	**32 A**
Features	• True IP2X finger-safe design (front) • 10 000 A interrupt • A postively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position) • Superior shock and vibration resistance capabilties • Mounts on DIN Rail • IEC 60947-2 - 0.5...40 A @ 240, 415V AC - 15 000 A interrupting • Field-mountable options • Optional terminal for ring lugs		• True IP2X finger-safe design (front) • A postively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position) • Superior shock and vibration resistance capabilties • Mounts on DIN Rail • IEC 60947-2 • Field-mountable options • Optional terminal for ring lugs		• EN/IEC 60529 Front Finger Protection — Dead front construction • Handle isolates the fuse from line power when it is opened for fuse insertion or removal • Compact size requiring less panel space than open style fuse folders • Optional blown fuse indicators - allow for easy troubleshooting of electrical circuits • Type M holder - accepts 0…30 A midget fuses (1-1/2 in. x 13/32 in.) • Type C holder - accepts 0…30 A Class CC fuses • Type J 30 & 60 A holders - accepts Class J fuses • Silver-plated fuse clips • Mounts on DIN Rail, marker-ready and increased heat dissipation				• Lockable in the open position • Compatible with Bulletin 140M accessories • Compact busbar and connectors for Bulletin 100-C and 100-K contactors • 1 N.O./1 N.C auxiliary contact— late make N.O., early break N.C.	
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 mm²/#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 mm²)	
Interrupt Rating	UL/CSA: up to 14 kA		10 kA		200 kA			50 kA	200 kA - Class CC 100 kA - Midget	
	IEC: up to 15 kA				Fuse dependent				Fuse dependent	
Product Selection	**Page 7-15**		**Page 7-31**		**Page 7-39**				**Page 7-41**	

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Publication A117-CA001A-EN-P

			
Bulletin	**1492-MC**	**1492-MCGA, -MCEA**	**1492-SP**
Type	**Branch Circuit Breaker**	**Ground Fault Detection**	**Miniature Circuit Breaker Supplementary Protector**
Features	• 120/240V, 240V & 480Y/277V rating • 1/2 in. per pole wide 10...60 A @ 120/240V AC & 15...30 A @ 240V AC • IP2X finger-safe, built-in with 1/2 in. wide, add protectors for 1 in. wide • Ratings to 480Y/277V AC, 10 000 A interrupt ratings • Mounts on DIN Rail	• 10 000 A interrupt • UL 489 Circuit breaker with ground fault circuit interrupter and ground fault equipment protector • Mounts on DIN Rail or panel mount	• True IP2X finger-safe design (front) • Field mountable options for selective applications • AC and DC voltage ratings in one convenient device • Superior shock and vibration resistance capabilities • Mounts on DIN Rail
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 Cruve 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^2)
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	**Page 7-6**	**Page 7-11**	**Page 7-46**

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	489
	CSA	22.2 No. 235	22.2 No. 235	22.2 No. 235	22.2 No. 5	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.

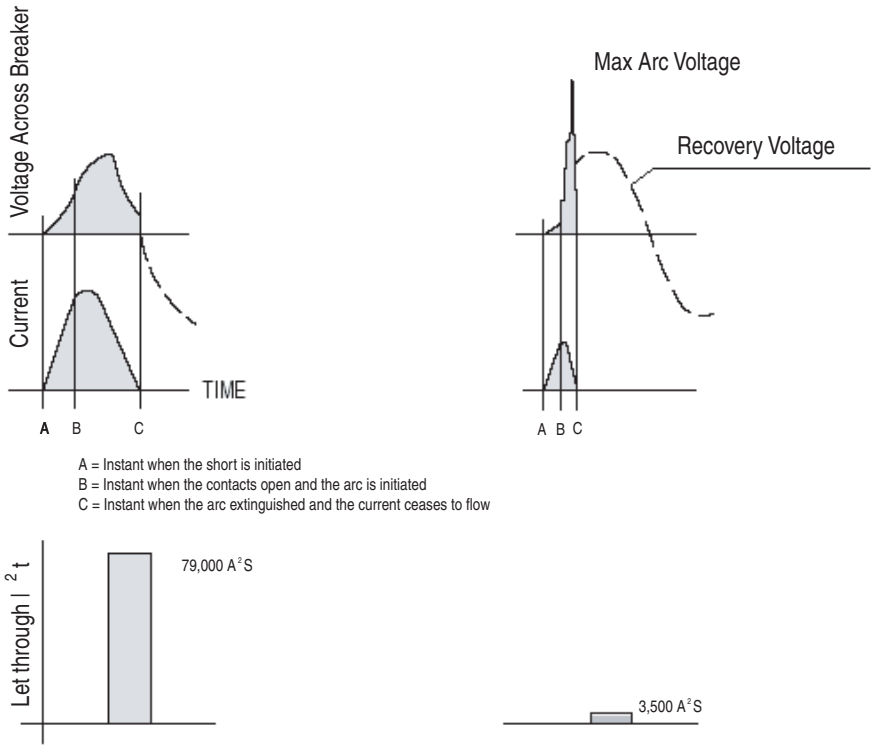
These devices are designed to substantially reduce the amount of *let-through-current* and the resulting let-through-energy that can damage protected components. They have the ability to interrupt short circuit current within the first half cycle of the fault. Limiting let-through-energy will protect 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 subtantially 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



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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

Table of Contents

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 flourescent 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) AC Rating	Interrupting Ratings (rms Symmetrical Amperes) DC Rating ∗	Cat. No.
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
120/240				1492-MCEA2xx
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 breakders 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.

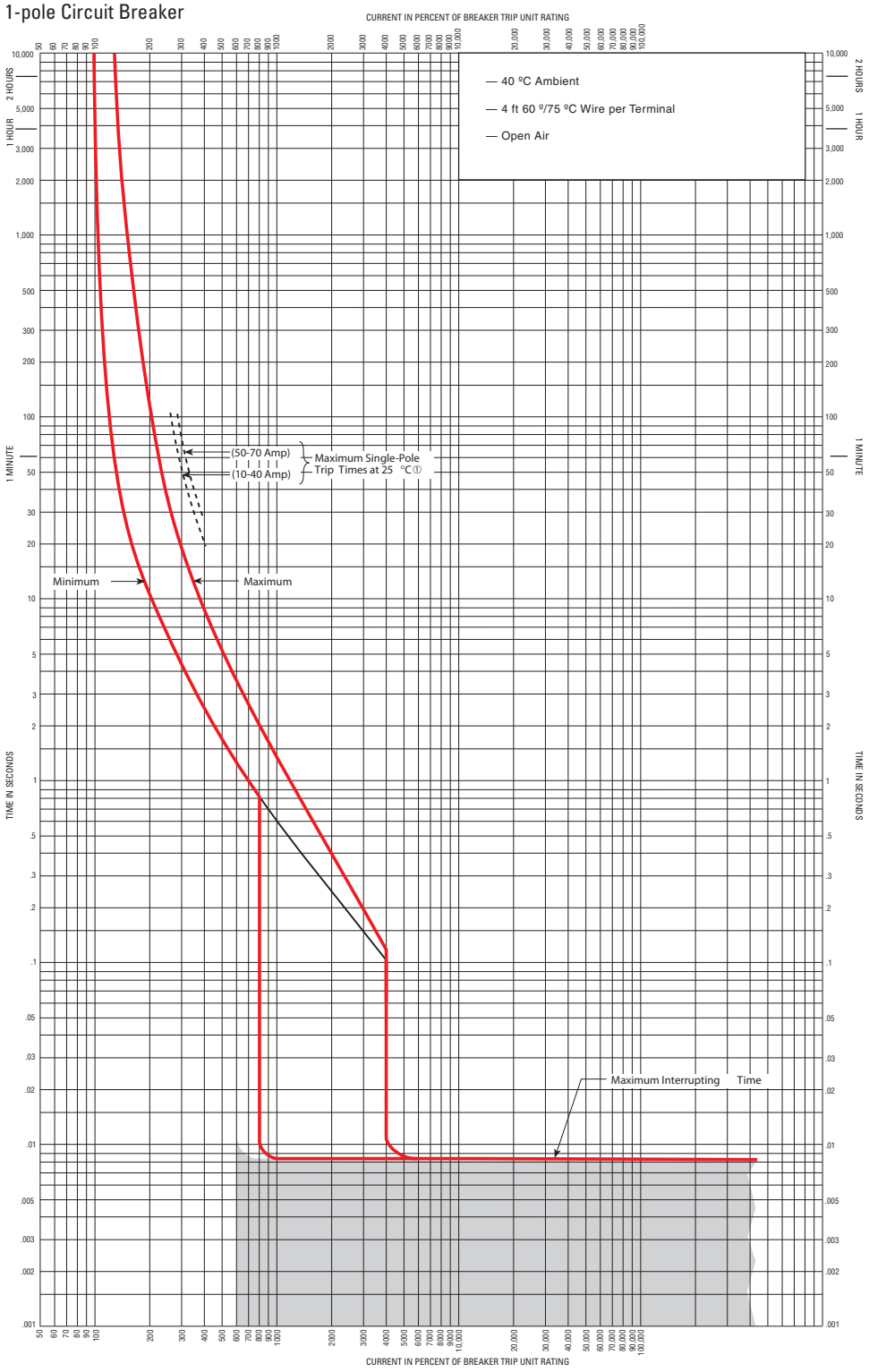
References: NEC 240.12. Also see CEC.

Time Current Curve – 1-Pole Circuit Breaker

Time Current Curve

1492-MCAA1NN 1492-MCEA1NN
1492-MCBA1NN 1492-MCGA1NN

1-pole Circuit Breaker

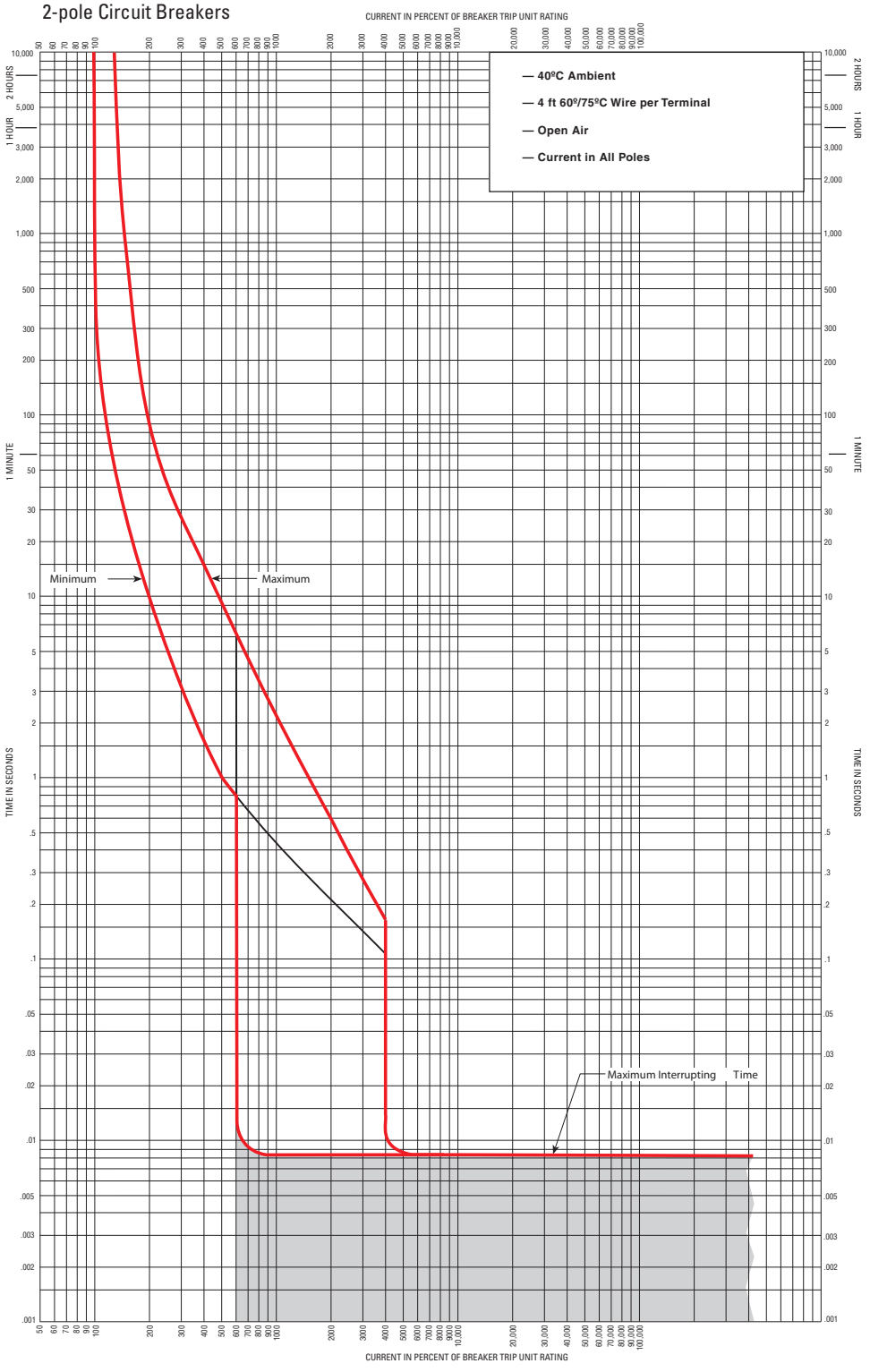


Time Current Curve – 2-Pole Circuit Breakers

Time Current Curve

1492-MCAA2$_{NN}$ 1492-MCAA2H$_{NN}$ 1492-MCEA2$_{NN}$
1492-MCBA2$_{NN}$ 1492-MCBA2H$_{NN}$ 1492-MCGA2$_{NN}$

2-pole Circuit Breakers

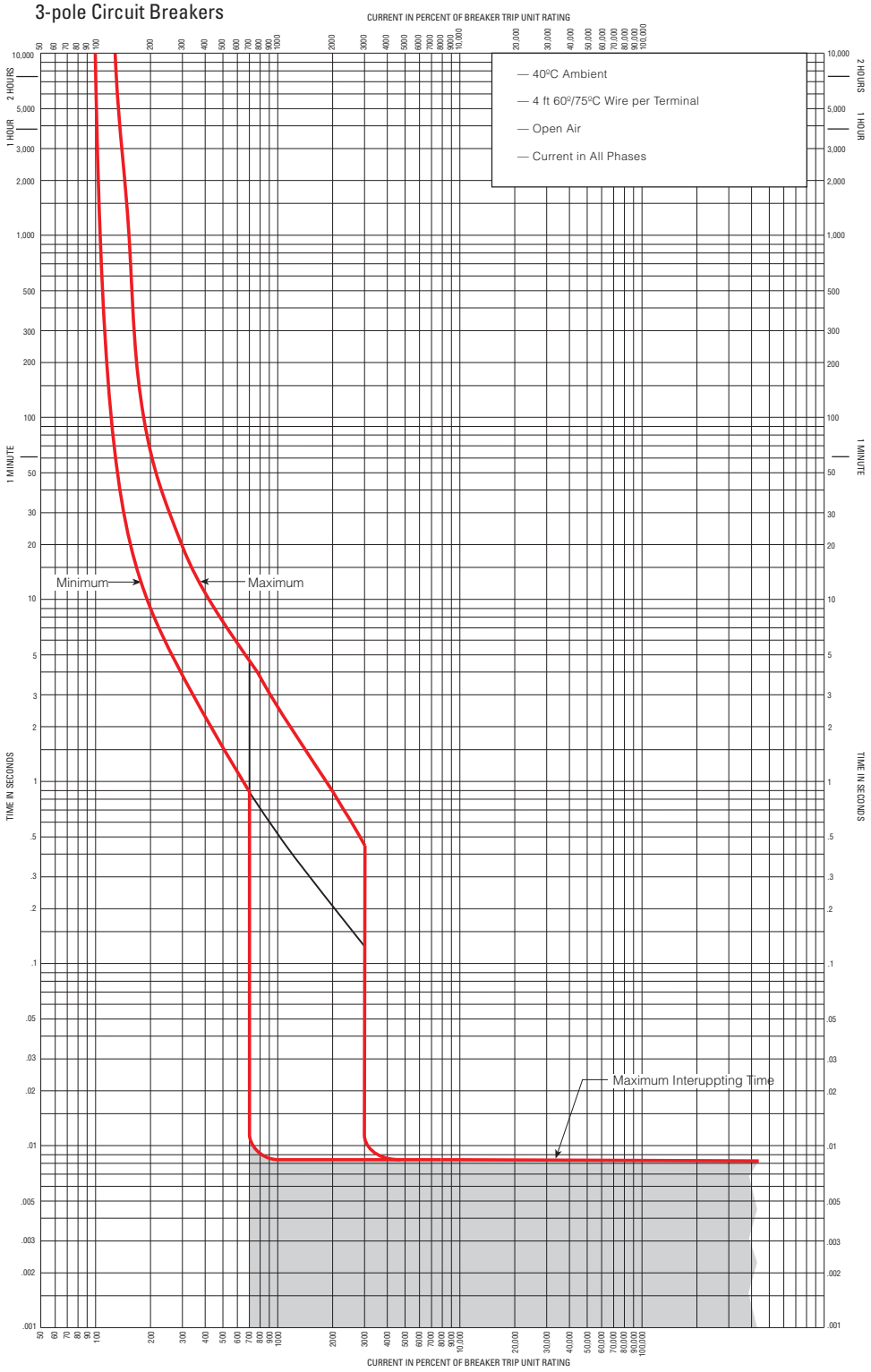


Time Current Curve – 3-Pole Circuit Breakers

Time Current Curve

1492-MCAA3NN
1492-MCBA3NN

3-pole Circuit Breakers



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)

b

Interrupt Rating	
Code	Description
A	10 kA AIC

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		

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. 120/240V AC		Width per pole [in.]	Cat. No. 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 know 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-AMCALM**
	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**	

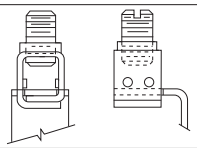
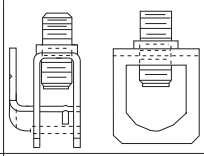
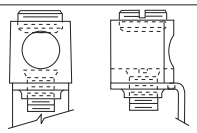
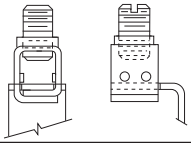
Bul. 1492-MC Ground Sensing Product Selection

Continuous Ampere Rating @ 40 °C (104 °F) [A]	Cat. No. 120V AC 1-pole	Cat. No. 120/240V AC 2-pole
GFCI (5 mA Sensitivity)		
15	**1492-MCGA115**	**1492-MCGA215**
20	**1492-MCGA120**	**1492-MCGA220**
25	1492-MCGA125	**1492-MCGA225**
30	1492-MCGA130	1492-MCGA230
40	1492-MCGA140	1492-MCGA240
50	—	1492-MCGA250
GFEP (30 mA Sensitivity)		
15	**1492-MCEA115**	**1492-MCEA215**
20	**1492-MCEA120**	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	

Terminals

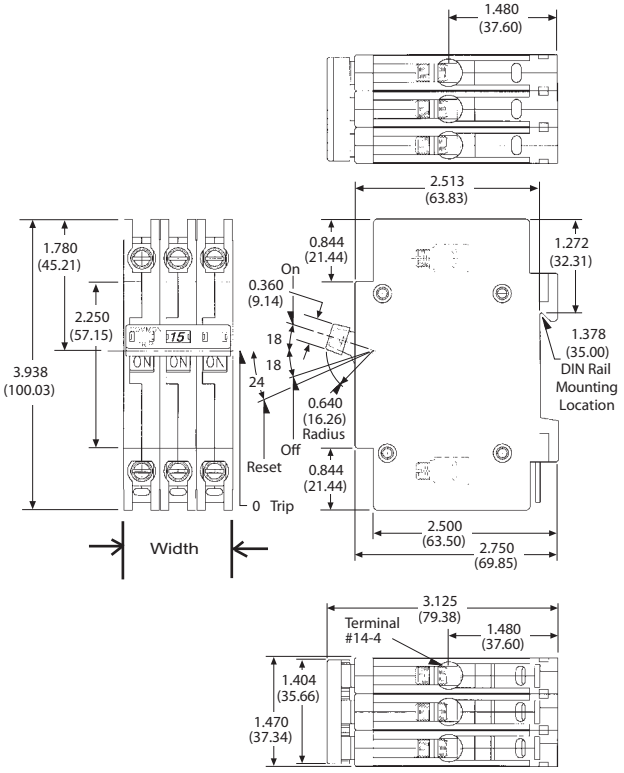
Cat. No.	Continuous Current Rating	Wire Type	Wire Range [AWG]	Terminal Torque	Line Strip Length	Line and Load Terminals
1492-MCAAxxx	10…60 A	Copper (Cu)	14…10	20 lb•in (2.3 N•m)	7/16 in.	
			8	25 lb•in (2.8 N•m)		
			6…4	27 lb•in (3.0 N•m)		
1492-MCBAxxx	35…60 A		14…10	20 lb•in (2.3 N•m)		**1/8 in. Allen Head** 
			8…4	32 lb•in (3.6 N•m)		
	70…100 A		4…1/0	50 lb•in (5.6 N•m)		
1492-MCEAxxx	15…50 A		14…10	20 lb•in (2.3 N•m)	9/16 in.	**Line**
			8	25 lb•in (2.8 N•m)	—	
1492-MCGAxxx			6…4	27 lb•in (3.0 N•m)	—	**Load** 

1492-MC Approximate Dimensions

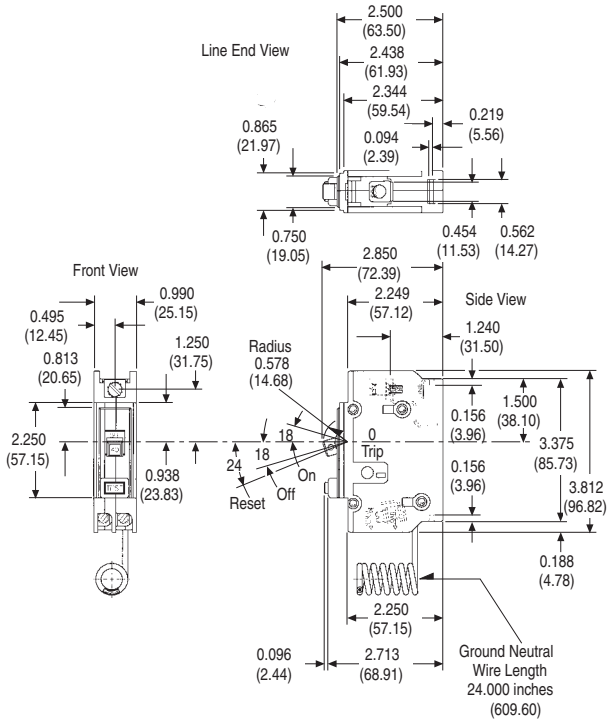
Note: Dimensions are shown in inches (millimeters). Dimensions are not intended for manufacturing purposes.

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-MCAAnxx



1492-MCEA1xx
1492-MCGA1xx



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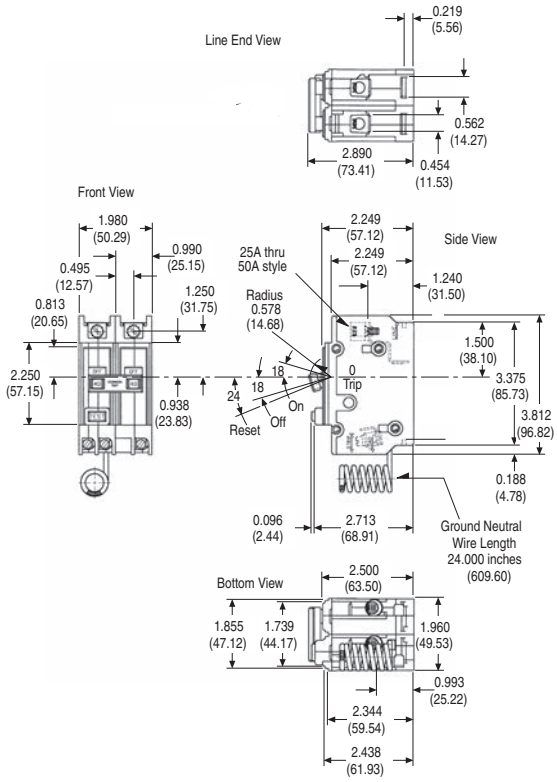
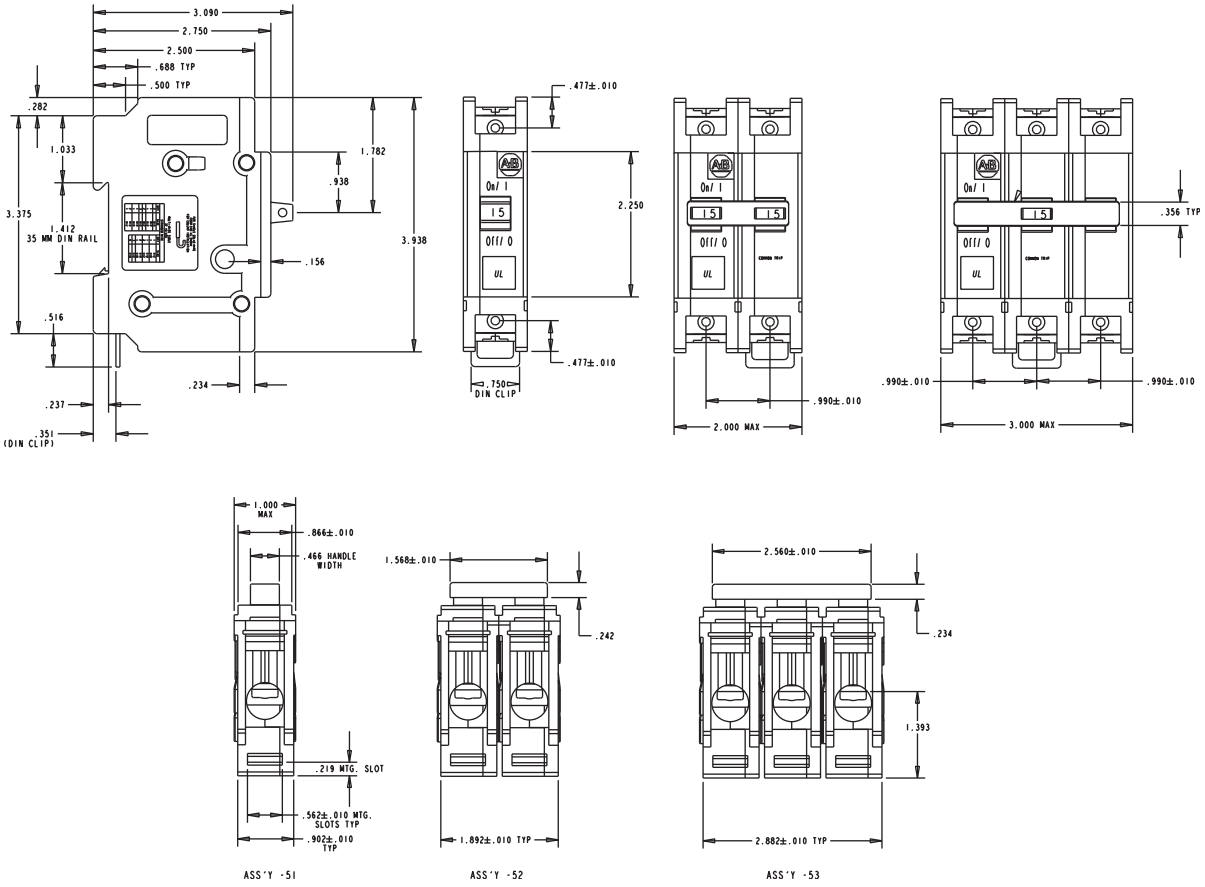
1492-MCEA2xx
1492-MCGA2xx



1492-MCBAxxx



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

Table of Contents

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
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- 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 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 kA1p, 2p, 3p I^2t = 43 kA^2s and I peak = 6.2 kA

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

Current-Limiting at 480Y/277V / 14 kA 1p, 2p, 3p I^2t = 65 kA^2s 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	**0.50**	0.5	0.5	0.5
1.0	1.3	1.2	1.2	1.2	1.1	1.1	1.0	1.0	**1.0**	1.0	1.0	0.9
1.5	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.5	**1.5**	1.5	1.4	1.4
2.0	2.5	2.5	2.4	2.3	2.2	2.2	2.1	2.0	**2.0**	2.0	1.9	1.9
3.0	3.8	3.7	3.6	3.5	3.4	3.2	3.1	3.1	**3.0**	2.9	2.9	2.8
4.0	5.0	5.0	4.8	4.6	4.5	4.3	4.2	4.1	**4.0**	3.9	3.8	3.8
5.0	6.3	6.2	6.0	5.8	5.6	5.4	5.2	5.1	**5.0**	4.9	4.8	4.7
6.0	7.5	7.4	7.2	7.0	6.7	6.5	6.2	6.1	**6.0**	5.9	5.8	5.6
7.0	8.8	8.7	8.4	8.1	7.8	7.6	7.3	7.1	**7.0**	6.9	6.7	6.6
8.0	10.0	9.9	9.6	9.3	9.0	8.6	8.3	8.2	**8.0**	7.8	7.7	7.5
10.0	12.6	12.4	12.0	11.6	11.2	10.8	10.4	10.2	**10**	9.8	9.6	9.4
13.0	16.3	16.1	15.6	15.1	14.6	14.0	13.5	13.3	**13**	12.7	12.5	12.2
15.0	18.8	18.6	18.0	17.4	16.8	16.2	15.6	15.3	**15**	14.7	14.4	14.1
16.0	20.1	19.8	19.2	18.6	17.9	17.3	16.6	16.3	**16**	15.7	15.4	15.0
20.0	25.1	24.8	24.0	23.2	22.4	21.6	20.8	20.4	**20**	19.6	19.2	18.8
25.0	31.4	31.0	30.0	29.0	28.0	27.0	26.0	25.5	**25**	24.5	24.0	23.5
30.0	37.7	37.2	36.0	34.8	33.6	32.4	31.2	30.6	**30**	29.4	28.8	28.2
32.0	40.2	39.7	38.4	37.1	35.8	34.6	33.3	32.6	**32**	31.4	30.7	30.1
40.0	43.9	43.4	42.0	40.6	39.2	37.8	36.4	35.7	**35**	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.

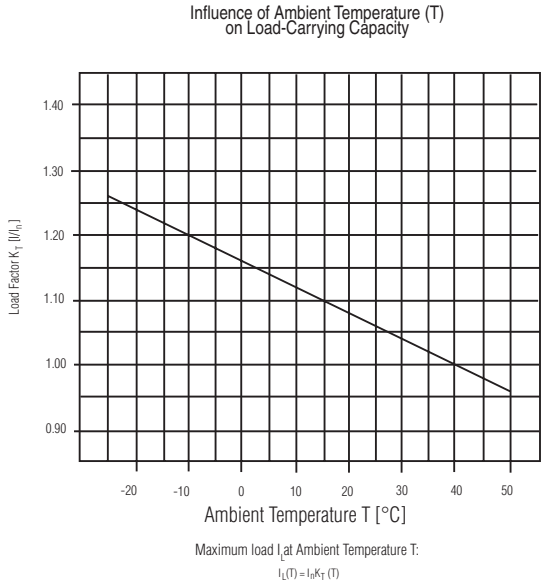
All other specifications for standard Bulletin 1489-A products remain unchanged.

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

7

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 mm²). 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

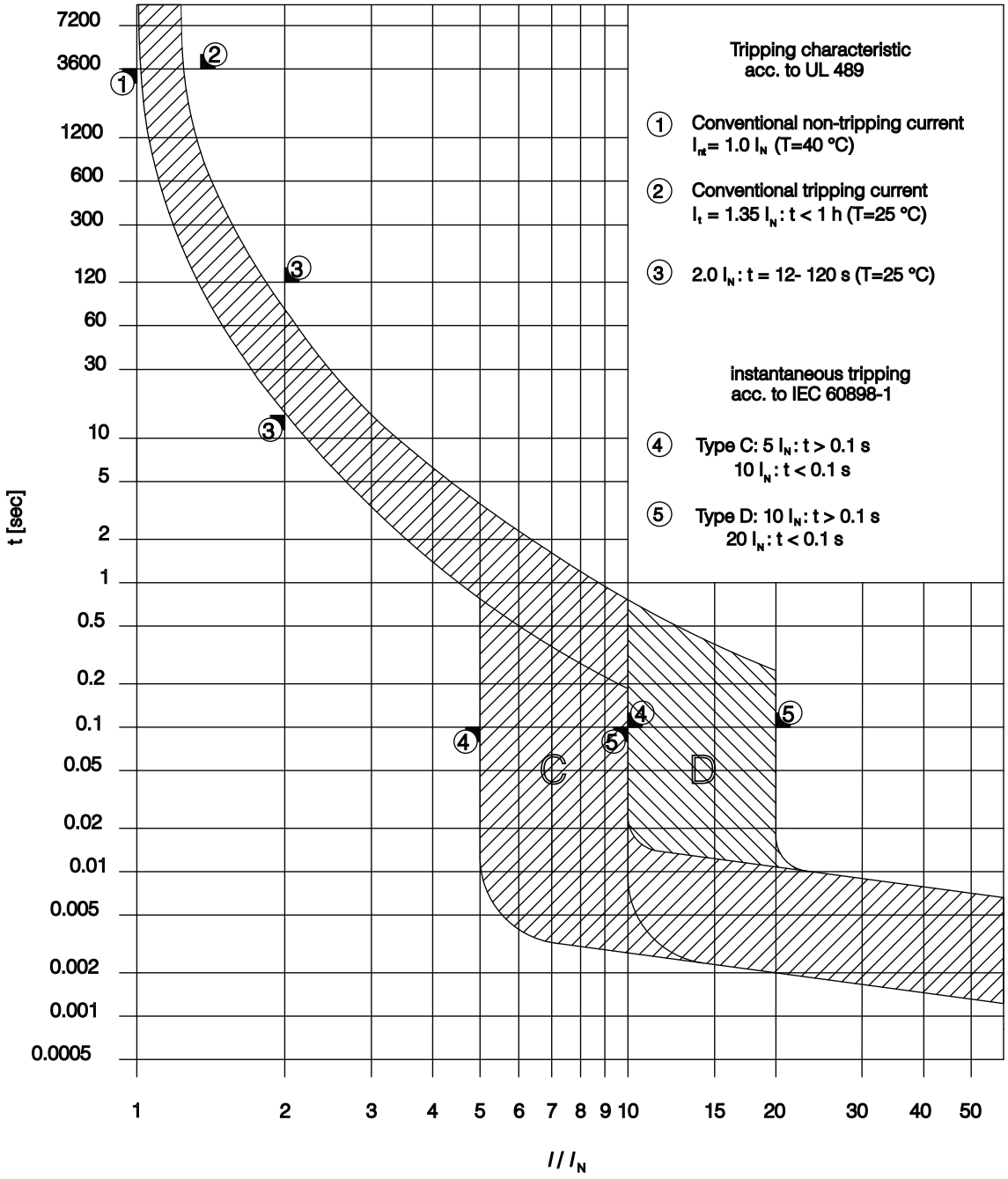
A signal/auxiliary contact module may be added to a circuit breaker to provide auxiliary contact information off and on and signal contact pilot duty contacts. With signal contacts, the contacts change state only when the circuit breaker changes state from On to Off because of an electrical operation. 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 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	**1489-A1C005**	1489-A1C005R
				1	**1489-A1C010**	**1489-A1C010R**
				1.5	**1489-A1C015**	1489-A1C015R
				2	**1489-A1C020**	**1489-A1C020R**
				3	**1489-A1C030**	**1489-A1C030R**
				4	**1489-A1C040**	1489-A1C040R
				5	**1489-A1C050**	**1489-A1C050R**
				6	**1489-A1C060**	**1489-A1C060R**
				7	**1489-A1C070**	1489-A1C070R
				8	**1489-A1C080**	1489-A1C080R
				10	**1489-A1C100**	**1489-A1C100R**
				13	**1489-A1C130**	1489-A1C130R
				15	**1489-A1C150**	**1489-A1C150R**
				16	**1489-A1C160**	1489-A1C160R
				20	**1489-A1C200**	1489-A1C200R
				25	**1489-A1C250**	1489-A1C250R
				30	**1489-A1C300**	1489-A1C300R
				32	**1489-A1C320**	1489-A1C320R
			240V AC, 48V DC	35	**1489-A1C350**	1489-A1C350R
				40	**1489-A1C400**	1489-A1C400R
		D	277V AC, 48V DC	0.5	**1489-A1D005**	1489-A1D005R
				1	**1489-A1D010**	1489-A1D010R
				1.5	**1489-A1D015**	1489-A1D015R
				2	**1489-A1D020**	1489-A1D020R
				3	**1489-A1D030**	1489-A1D030R
				4	**1489-A1D040**	**1489-A1D040R**
				5	**1489-A1D050**	1489-A1D050R
				6	**1489-A1D060**	**1489-A1D060R**
				7	**1489-A1D070**	1489-A1D070R
				8	**1489-A1D080**	1489-A1D080R
				10	**1489-A1D100**	1489-A1D100R
				13	**1489-A1D130**	1489-A1D130R
				15	**1489-A1D150**	1489-A1D150R
				16	**1489-A1D160**	1489-A1D160R
				20	**1489-A1D200**	1489-A1D200R
				25	**1489-A1D250**	1489-A1D250R
				30	**1489-A1D300**	1489-A1D300R
				32	**1489-A1D320**	1489-A1D320R
			240V AC, 48V DC	35	**1489-A1D350**	1489-A1D350R
				40	**1489-A1D400**	1489-A1D400R

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	**1489-A2C005**	**1489-A2C005**
				1	**1489-A2C010**	1489-A2C010R
				1.5	**1489-A2C015**	1489-A2C015R
				2	**1489-A2C020**	1489-A2C020R
				3	**1489-A2C030**	1489-A2C030R
				4	**1489-A2C040**	1489-A2C040R
				5	**1489-A2C050**	1489-A2C050R
				6	**1489-A2C060**	1489-A2C060R
				7	**1489-A2C070**	1489-A2C070R
				8	**1489-A2C080**	1489-A2C080R
				10	**1489-A2C100**	1489-A2C100R
				13	**1489-A2C130**	1489-A2C130R
				15	**1489-A2C150**	1489-A2C150R
				16	**1489-A2C160**	1489-A2C160R
				20	**1489-A2C200**	1489-A2C200R
				25	**1489-A2C250**	1489-A2C250R
				30	**1489-A2C300**	1489-A2C300R
				32	**1489-A2C320**	1489-A2C320R
			240V AC, 96V DC	35	**1489-A2C350**	1489-A2C350R
				40	**1489-A2C400**	1489-A2C400R
		D	480Y/277V AC, 96V DC	0.5	**1489-A2D005**	1489-A2D005R
				1	**1489-A2D010**	1489-A2D010R
				1.5	**1489-A2D015**	1489-A2D015R
				2	**1489-A2D020**	1489-A2D020R
				3	**1489-A2D030**	1489-A2D030R
				4	**1489-A2D040**	1489-A2D040R
				5	**1489-A2D050**	1489-A2D050R
				6	**1489-A2D060**	1489-A2D060R
				7	**1489-A2D070**	1489-A2D070R
				8	**1489-A2D080**	1489-A2D080R
				10	**1489-A2D100**	**1489-A2D100R**
				13	**1489-A2D130**	1489-A2D130R
				15	**1489-A2D150**	1489-A2D150R
				16	**1489-A2D160**	1489-A2D160R
				20	**1489-A2D200**	1489-A2D200R
				25	**1489-A2D250**	1489-A2D250R
				30	**1489-A2D300**	1489-A2D300R
				32	**1489-A2D320**	1489-A2D320R
			240V AC, 96V DC	35	**1489-A2D350**	1489-A2D350R
				40	**1489-A2D400**	1489-A2D400R

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	**1489-A3C005**	1489-A3C005R
				1	**1489-A3C010**	1489-A3C010R
				1.5	**1489-A3C015**	1489-A3C015R
				2	**1489-A3C020**	1489-A3C020R
				3	**1489-A3C030**	1489-A3C030R
				4	**1489-A3C040**	1489-A3C040R
				5	**1489-A3C050**	1489-A3C050R
				6	**1489-A3C060**	1489-A3C060R
				7	**1489-A3C070**	1489-A3C070R
				8	**1489-A3C080**	1489-A3C080R
				10	**1489-A3C100**	1489-A3C100R
				13	**1489-A3C130**	1489-A3C130R
				15	**1489-A3C150**	1489-A3C150R
				16	**1489-A3C160**	1489-A3C160R
				20	**1489-A3C200**	1489-A3C200R
				25	**1489-A3C250**	1489-A3C250R
				30	**1489-A3C300**	1489-A3C300R
				32	**1489-A3C320**	1489-A3C320R
			240V AC	35	**1489-A3C350**	1489-A3C350R
				40	**1489-A3C400**	1489-A3C400R
		D	480Y/277V AC	0.5	**1489-A3D005**	1489-A3D005R
				1	**1489-A3D010**	1489-A3D010R
				1.5	**1489-A3D015**	1489-A3D015R
				2	**1489-A3D020**	1489-A3D020R
				3	**1489-A3D030**	1489-A3D030R
				4	**1489-A3D040**	1489-A3D040R
				5	**1489-A3D050**	1489-A3D050R
				6	**1489-A3D060**	1489-A3D060R
				7	**1489-A3D070**	1489-A3D070R
				8	**1489-A3D080**	1489-A3D080R
				10	**1489-A3D100**	1489-A3D100R
				13	**1489-A3D130**	1489-A3D130R
				15	**1489-A3D150**	1489-A3D150R
				16	**1489-A3D160**	1489-A3D160R
				20	**1489-A3D200**	1489-A3D200R
				25	**1489-A3D250**	1489-A3D250R
				30	**1489-A3D300**	1489-A3D300R
				32	**1489-A3D320**	1489-A3D320R
			240V AC	35	**1489-A3D350**	1489-A3D350R
				40	**1489-A3D400**	1489-A3D400R

Miniature Circuit Breaker Accessories

Description	CSA/UL Certifications	IEC 60947-2 Compliance	CE	EN/IEC Max. Volt.	UL/CSA Max. Volt.	Connection	Cat. No.
Lockout Attachment	Yes	Yes	—	—	—	—	**1489-AALOA**
Auxiliary Contact, 2 sets, each are Form C, 1 N.O. & 1 N.C.	Yes	Yes	—	3 A, 250V AC (AC13) 0.5 A, 110V DC	2 A, 240V AC 0.5 A, 110V DC	Cable	✶ **1489-AAHH3**
Auxiliary/Signal Contact, each are Form C, 1 N.O. & 1 N.C	Yes	Yes	—	3 A, 250V AC (AC13) 0.5 A, 110V DC	2 A, 240V AC 0.5 A, 110V DC	Cable	✶ **1489-AAHS3**
Auxiliary Contact, Feed Through, 1 N.O. & 1 N.C.	Yes	Yes	—	3 A, 250V AC (AC13) 0.5 A, 110V DC	2 A, 230V AC 0.5 A, 110V DC	Cable	❄ **1489-ABH12**
Shunt Trip Module	Yes	Yes	—	110...415V AC 110…230V DC	110...415V AC 110…230V DC	Cable	**1489-AASTA1**
Shunt Trip Module	Yes	Yes	—	12...110V AC 12…60V DC	12...110V AC 12…60V DC	Cable	**1489-AASTA2**

✶ Use of auxiliary or signal contact limits the 1489-A circuit breaker to a maximum voltage of 240V AC for UL/CSA applications.
❄ Use of this auxiliary contact allows application of the 1489-A circuit breaker to full rating of 480Y/ 277V AC for UL/CSA applications.

Bulletin 1489-A Bus Bar

Description	No. of Poles	No. of Phases	Pkg Qty.	Number of Circuit Breakers	Cat. No.
Bus Bar‡	6	1	10	6	**1489-AACL106**
	12			12	**1489-AACL112**
	18			18	**1489-AACL118**
	6	2		3	**1489-AACL206**
	12			6	**1489-AACL212**
	18			9	**1489-AACL218**
	6	3		2	**1489-AACL306**
	12			4	**1489-AACL312**
	18			6	**1489-AACL318**

‡ UL Recognized (E300325), CE Marked

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Bulletin 1489 Bus Bar Accessories

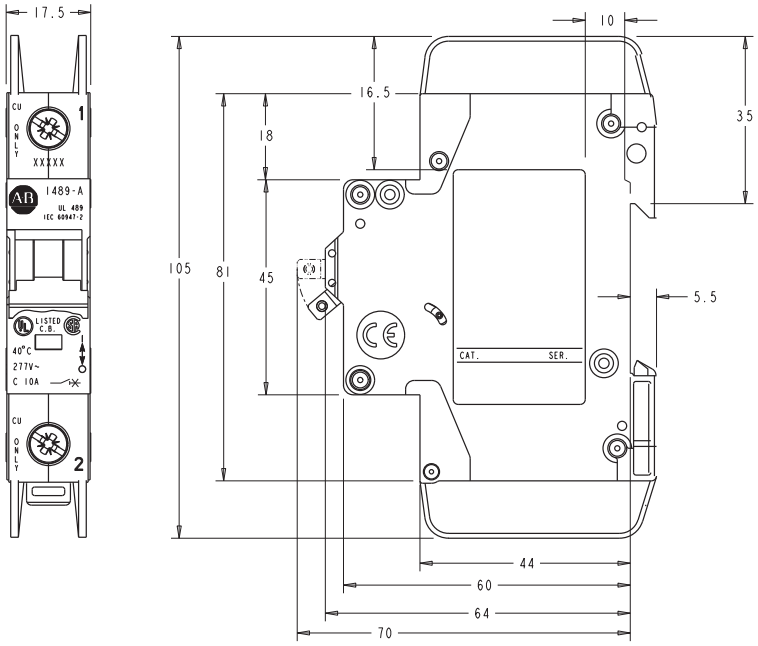
Description	No. of Poles	Pkg Qty.	Wire Range	Cat. No.
Terminal Lug	1-pole for circuit breaker termination	10	#14 … 2 AWG 2.5 … 35 mm²	**1489-AACLT35**
Protective Cover for Unused Termination	3-pole set (may be separated)	10	—	**1489-AACLPS**

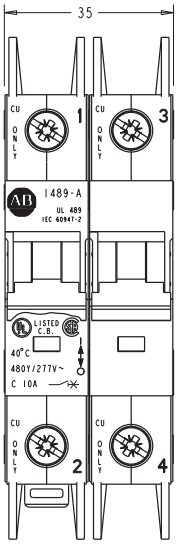
Bulletin 1489-A Specifications

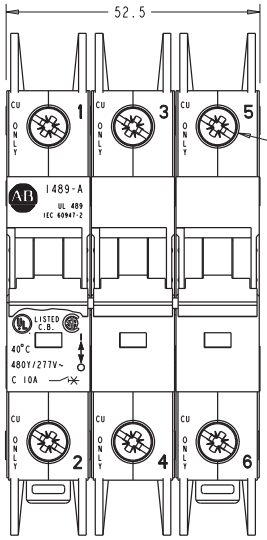
Number of Poles	1, 2, and 3		
Standards	UL 489 CSA C22.2 No. 5 EN/IEC 60947-2		
Certifications	UL Listed Circuit Breaker (File Number E197878) CSA Certified, VDE Certified, MCB, CE Marked		
HACR Rating (USA/Canada)	Yes		
SWD Rating (USA/Canada)	Yes (0.5...20 A)		
Calibration Temperature	UL/CSA: 40 °C EN/IEC: 30 °C		
Rated Interrupting Capacity	EN/IEC - *I*cu: 15 000 A		
	UL/CSA (See Below)		
	Trip Curve	Rated Current (In)	Interrupt Rating (UL/CSA)
	C Curve	0.5...13 A	10,000 A
		15...25 A	14,000 A
		30...40 A	10,000 A
	D Curve	0.5...10 A	10,000 A
		13...20 A	14,000 A
		25...40 A	10,000 A
Rated Tripping Current	UL/CSA: 0.5...32 A, 480Y/277V AC 0.5...40 A, 240V AC 0.5…40 A 48V DC 1-pole 0.5…40 A 96V DC 2-pole EN/IEC: 0.5...40 A, 415V AC 48V DC		
Degree of Protection	Finger-safe from front: -IP20 per IEC 529 from front -IP00 at wire terminals		
Dielectric Strength	1960V AC		
Shock	25 G Half sine wave for 11 ms (3 axes)		
Vibration	Frequency range: 10…200 Hz Max. amplitude (p-p) = 0.030 in. Max. acceleration = 5 G 2 hours each of 3 axes		
Normal Operating Environment	-30…+60 °C (-22... 140 °F) (non-condensing)		
Trip Curves	C curve (Inductive) 5...10 I_N D curve (Highly Inductive) 10...20 I_N		
Shipment and Short-Term Storage Limits	-40...+85 °C (-40...+185 °F)		
Wire Size	1 wire: #18...6 AWG 2 wires: #18...10 AWG		
Terminal Torque	#18...12 AWG: 21 lb•in #10...8 AWG: 25 lb•in #6 AWG: 36 lb•in #2 PoziDriv		
Recommended Wire Strip Length	0.5 in.		

Bulletin 1489-A Circuit Breaker Approximate Dimensions

Note: All units are in millimeters unless indicated. Dimensions are not intended for manufacturing purposes.



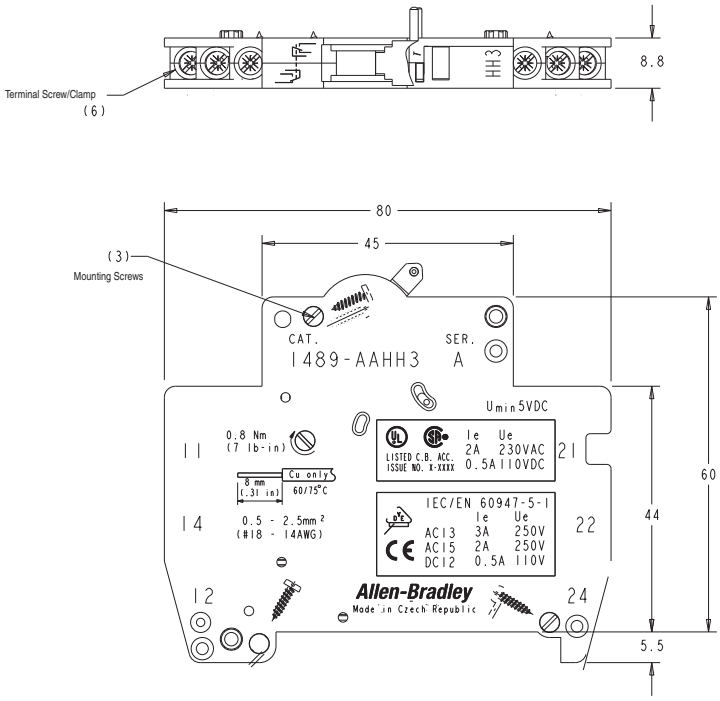




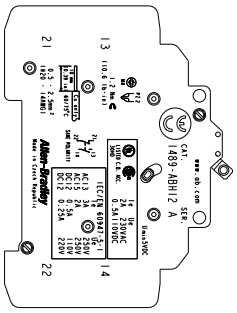
Catalog Number	Line/Load Terminal Style	Access Hole Dia. in Housing (mm)	Terminal Screw Head Diam (mm)	Comment: Terminal Screw	Type
Without "R" Suffix	Cable	8.2	10	Non-Removable	#2 PoziDrive
With "R" Suffix	Ring Lug	8.2	8	Removable	

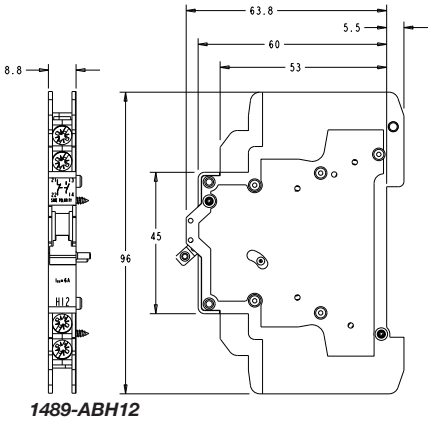
Note: Dimensions are in millimeters (mm).

Note: All units are in millimeters unless indicated. Dimensions are not intended for manufacturing purposes.



1489-AAHH3 & 1489-AAHS3





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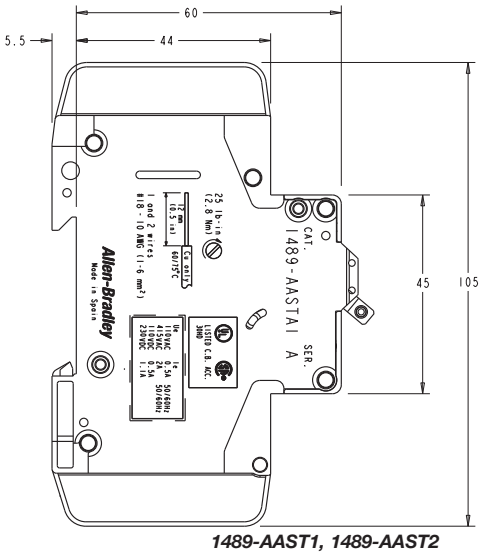
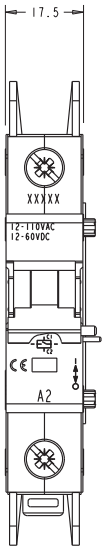
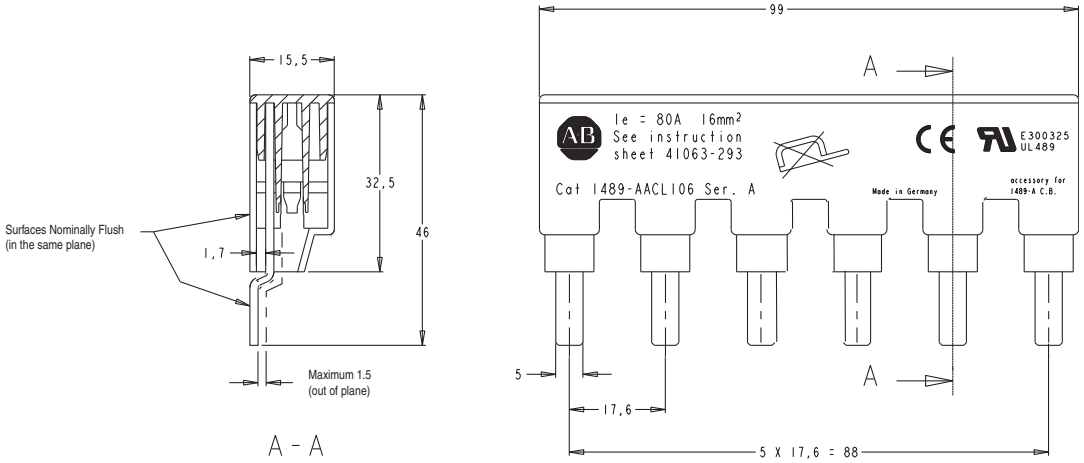




1489-AAST1, 1489-AAST2

Note: All units are in millimeters unless indicated. Dimensions are not intended for manufacturing purposes.



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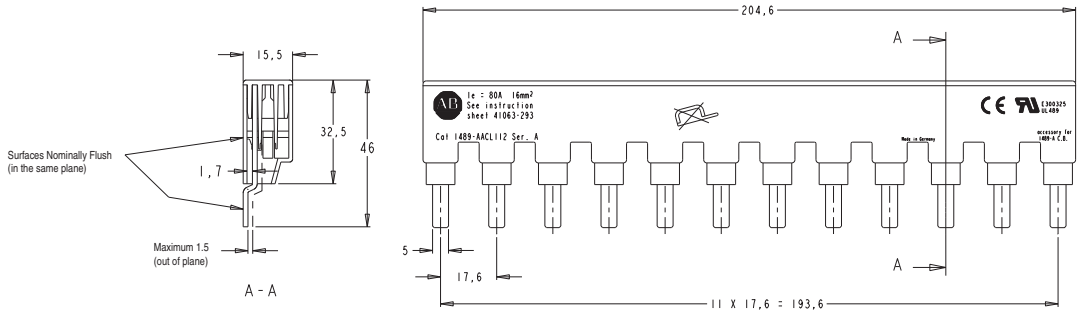

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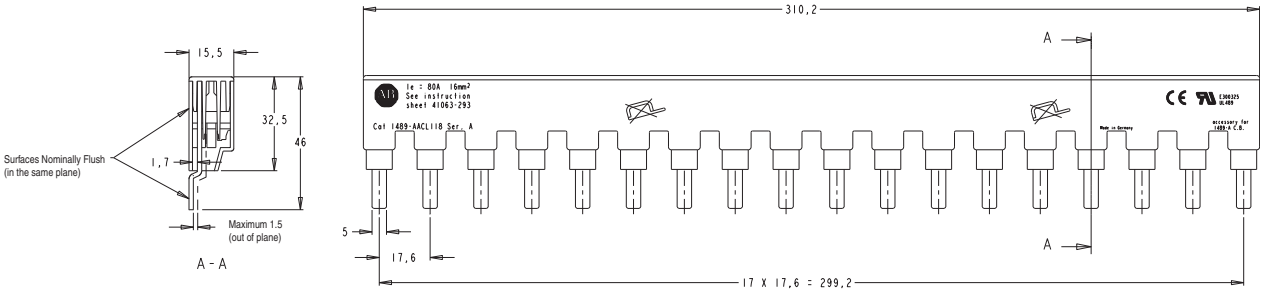

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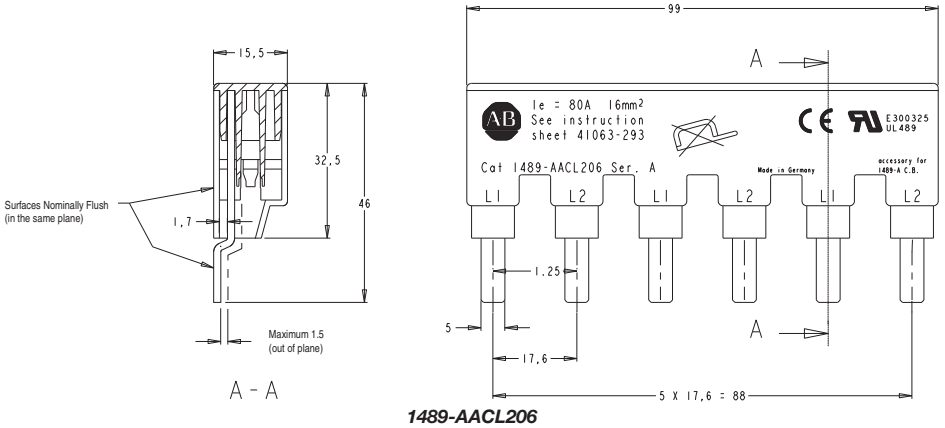
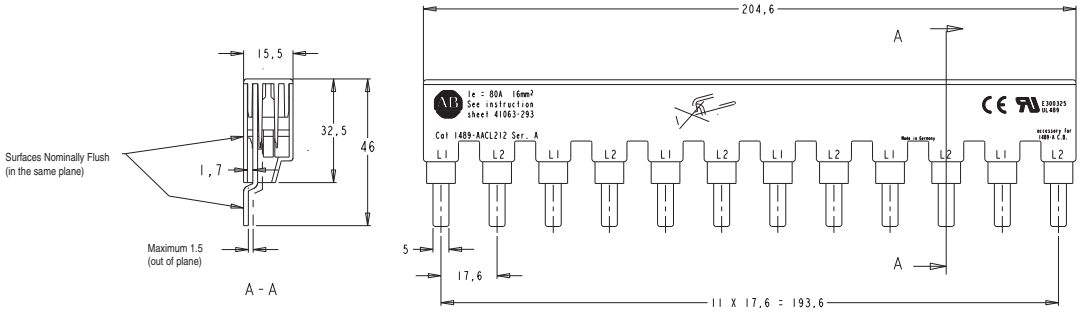
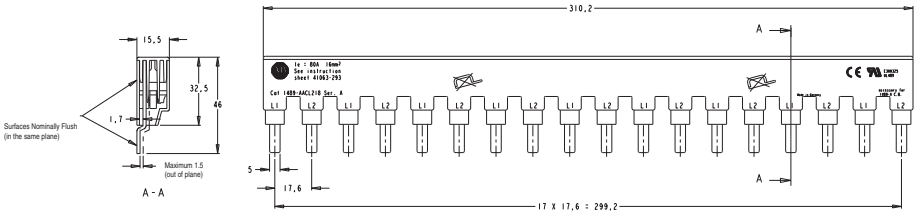


1489-AACL206

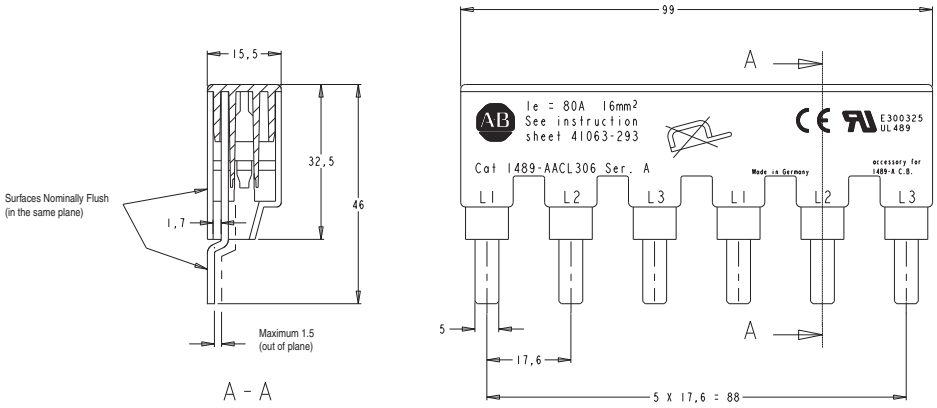
Note: All units are in millimeters unless indicated. Dimensions are not intended for manufacturing purposes.



1489-AACL212



1489-AACL218



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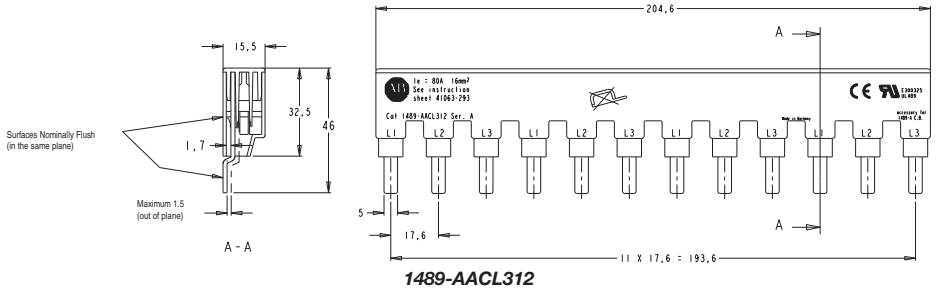
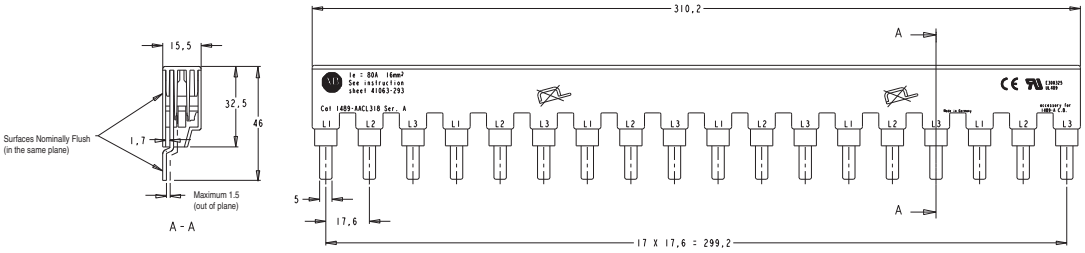
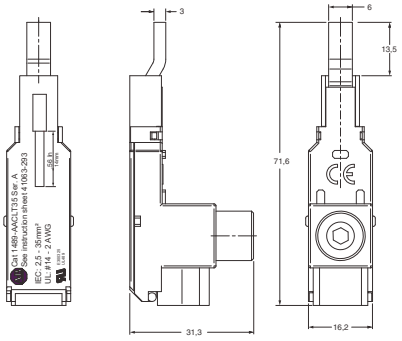


1489-AACL312

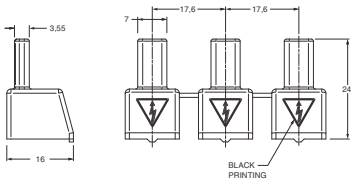
Note: All units are in millimeters unless indicated. Dimensions are not intended for manufacturing purposes.



1489-AACL318



1489-AACLT35



1489-AACLPS

Bulletin 1489-D Circuit Breakers

- Specially designed for higher voltage DC circuits with a permanent magnet to direct the arc into the arc splitters.
- Field-mountable options for selective applications
- IP2x Finger-Protection (Front)
- North America certifications: UL 489, CSA C22.2 No. 5
- International standards: CE Marked for IEC 60947-2 standards for worldwide acceptance
- 10 kA interrupt rating
- UL/CSA — 1 pole: max. 125V DC, 2 pole: max. 250V DC
  IEC — 1 pole: max. 250V DC, 2 pole: max. 500V DC
- A positively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)
- Trip curves: C
- Superior shock and vibration resistance capabilities — helps to prevent nuisance tripping
- Mounts on DIN Rail
- Wire connect, follow polarity requirements

Table of Contents

Industrial Circuit Breakers for North American Applications

- Field mountable options for selective applications
- IP2x Finger-Protection (Front)
- North America certifications: UL 489, CSA 22.2 No. 5
- International standards: CE Marked for IEC 60947-2 standards for worldwide acceptance
- 10 kA interrupt rating
- UL/CSA — 1 pole: max. 125V DC, 2 pole: max. 250V DC
  IEC — 1 pole: max. 250V DC, 2 pole: max. 500V DC
- A positively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)
- Trip curves: C
- Superior shock and vibration resistance capabilities — helps to prevent nuisance tripping
- Mounts on DIN Rail
- Wire connect, line and load (reversible)
- Follow polarity requirements.

The Bulletin 1489-D line includes:

- UL 489, CSA C22.2 No. 5
- 1 pole, 125V DC, 2...40 A
  2 pole, 250V DC, 2...40 A
- Miniature Circuit Breaker for EN/IEC Applications
  EN/IEC 60947-2
  1 pole, 250V DC, 2...40 A
  2 pole, 500V DC, 2...40 A

Miniature Circuit Breaker for IEC Applications:
1 pole, 250V DC, 2...40 A
2 pole, 500V DC, 2...40 A

Standards Compliance

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

Certifications

UL Listed
CSA Certified
CE Marked

Features

- Designed manufactured and listed to UL 489 (CSA 22.2 No. 5)
- Thermal-magnetic protection
- up to 10 kA Interrupting rating
- Finger–safe design (front)
- DIN Rail mounting
- Line and load wire connections
- Follow polarity requirements

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Description

Bulletin 1489-D Circuit Breakers for Branch Circuit protection are available in 1- and 2-pole construction and are rated 2...40 A at 125V DC and 2...40 A at 250V DC for North American applications (UL 489 and CSA C22.2 No. 5). . For EN\IEC applications the products are rated 1-pole: 2...40 A, 250V DC, and 2-pole: 2...40 A, 500V DC.

Thermal Magnetic Circuit Breakers

The Bulletin 1489-D 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-D circuit breaker with appropriate circuit protection includes consideration of:

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

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

Circuit Voltage

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

Available Short Circuit Current

The Bulletin 1489-D 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.

Table 1. Voltage and Current Ranges

Region		Max. Voltage	Current Range [A]
EN/IEC Regions	1-pole	250V DC	2...40
	2-pole	500V DC	2...40
North America (UL 489 & CSA C22.2 No. 5)	1-pole	125V DC	2...40
	2-pole	250V DC	2...40

Continuous Current Rating

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

The Bulletin 1489-D circuit breakers are rated in 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 curve is shown on page 7-34. 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 7-33 shows that a one-pole, 15 A, Bulletin 1489 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-D 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.

Polarity

Positive and negative connection many **not** be reversed.

Branch Circuits

Bulletin 1489 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.

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.

Determining Ratings

The tripping characteristic for Bulletin 1489-D is Type C. Type C has a magnetic trip activated at 7…15 times the rated current of the circuit breaker. The reference temperature for the thermal tripping characteristics is 40 °C (104 °F). The Type C characteristic will suit most applications.

Use the following table and graph to determine the current rating for the breaker if the ambient is significantly different than 40 °C (104 °F).

Bulletin 1489-D Ambient Temperature Derating Calibration Temperature 40º C (UL) Application below 0º C is for non-condensing atmosphere❄

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

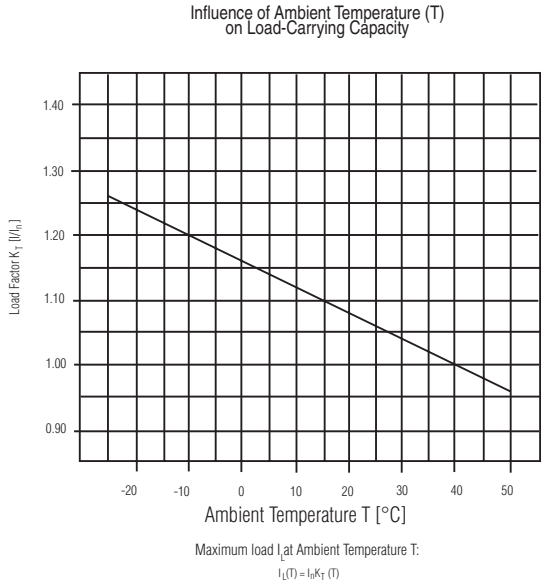
❄ Care should be taken for application below 0 °C (32 °F). These devices are not certified to operate correctly in the presence of ice.

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-D 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 is with terminals suitable for connection of stranded copper wire of the wire size #18…8 AWG (1.0 … 10 mm²). Strip length for the termination is 0.5 in. (12 mm). Terminals are shipped in the open position for ease of installation.

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

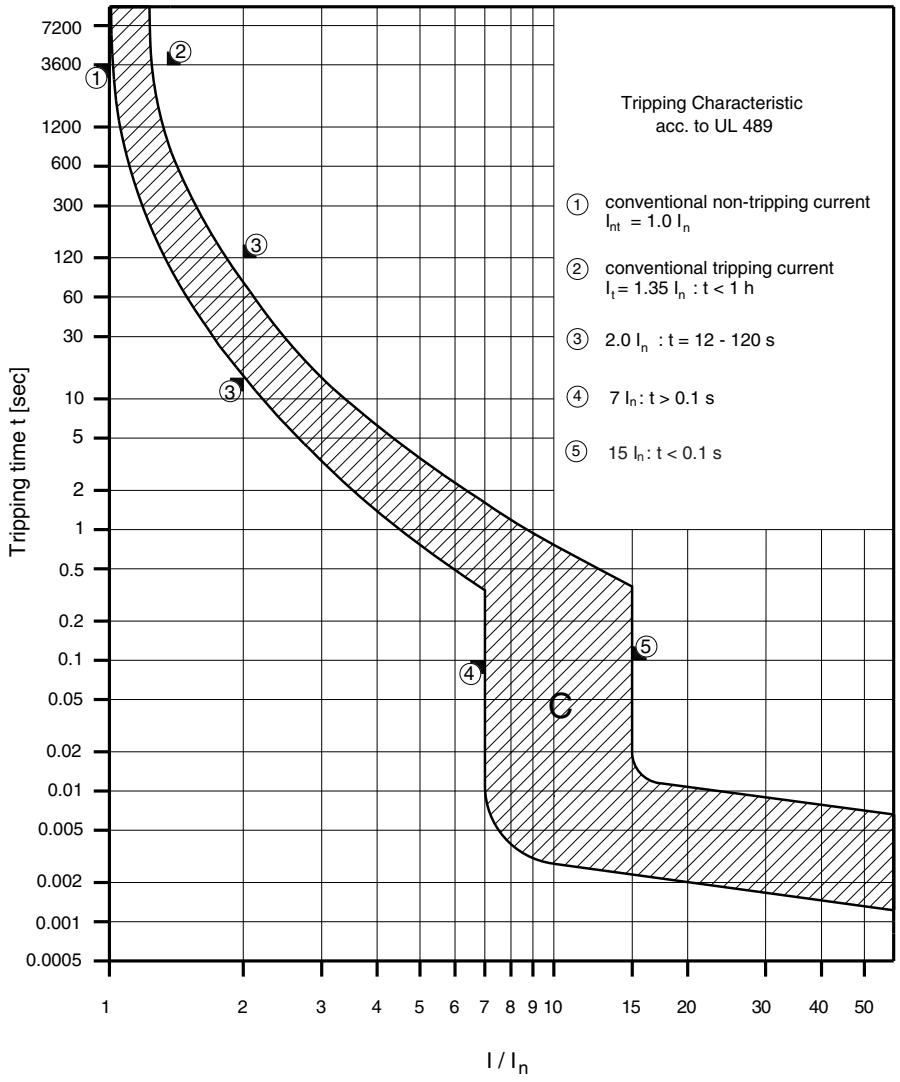
An auxiliary contact module may be added to a circuit breaker to provide pilot duty contacts to indicate the position of circuit breaker, off or on. This contact changes state when the circuit breaker is operated either manually or electrically.

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- and 2-Pole Circuit Breaker

Time-Current Characteristic UL



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	-	D	1	C	020	
		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

c

Trip Curve	
Code	Trip Curve
C	Trip curve C

d

Rated Current (I_n)	
Code	Current [A]
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 (available on 1489-A only)

Product Selection

Bulletin 1489 DC Miniature Circuit Breakers

Bulletin 1489-D, 1-Pole DC Miniature Circuit Breakers

No. of Poles	EN/IEC Maximum Voltage	Trip Curve	UL/CSA Max. Volt.	Rated Current [A]	Standard Wire Configuration Cat. No.
1	250	C	125 V DC	2	**1489-D1C020**
				3	**1489-D1C030**
				4	**1489-D1C040**
				5	**1489-D1C050**
				6	**1489-D1C060**
				7	**1489-D1C070**
				8	**1489-D1C080**
				10	**1489-D1C100**
				13	**1489-D1C130**
				15	**1489-D1C150**
				16	**1489-D1C160**
				20	**1489-D1C200**
				25	**1489-D1C250**
				30	**1489-D1C300**
				32	**1489-D1C320**
				35	**1489-D1C350**
				40	**1489-D1C400**

Bulletin 1489-D, 2-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.
2	500V DC	C	250V DC	2	**1489-D2C020**
				3	**1489-D2C030**
				4	1489-D2C040
				5	1489-D2C050
				6	**1489-D2C060**
				7	**1489-D2C070**
				8	**1489-D2C080**
				10	**1489-D2C100**
				13	**1489-D2C130**
				15	**1489-D2C150**
				16	1489-D2C160
				20	**1489-D2C200**
				25	1489-D2C250
				30	**1489-D2C300**
				32	**1489-D2C320**
				35	**1489-D2C350**
				40	**1489-D2C400**

Miniature Circuit Breaker Accessories

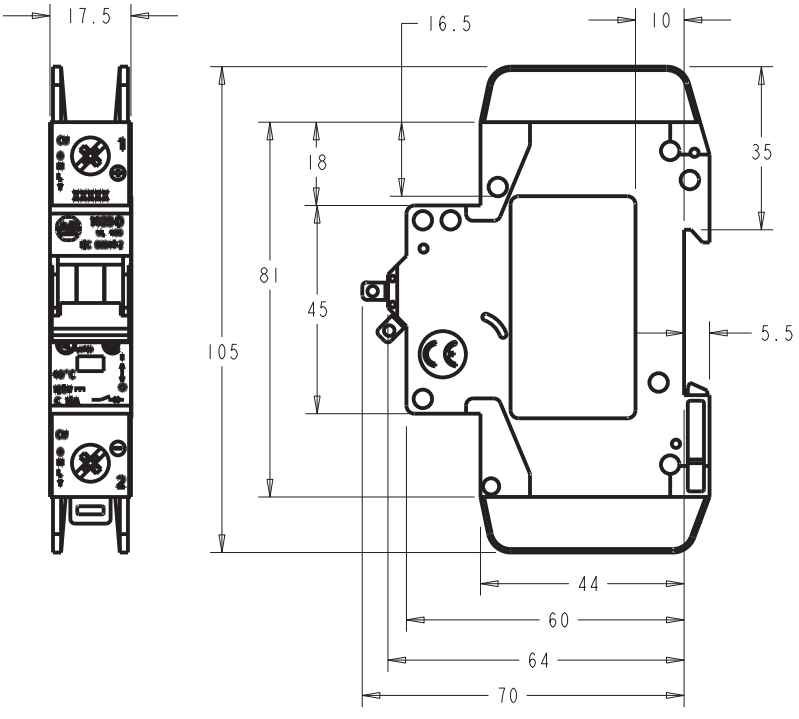
Description	CSA/UL Certifications	IEC 60947-2 Compliance	CE	EN/IEC Max. Volt.	UL/CSA Max. Volt.	Connection	Cat. No.
Lockout Attachment	Yes	Yes	—	—	—	—	**1489-AALOA**
Auxiliary Contact, 2 sets, each are Form C, 1 N.O. & 1 N.C.	Yes	Yes	—	3 A, 250V AC (AC13) 0.5 A, 110V DC	2 A, 240V AC 0.5 A, 110V DC	Cable	**1489-AAHH3**
Auxiliary/Signal Contact, each are Form C, 1 N.O. & 1 N.C	Yes	Yes	—	3 A, 250V AC (AC13) 0.5 A, 110V DC	2 A, 240V AC 0.5 A, 110V DC	Cable	**1489-AAHS3**
Auxiliary Contact, Feed Through, 1 N.O. & 1 N.C.	Yes	Yes	—	3 A, 250V AC (AC13) 0.5 A, 110V DC	2 A, 230V AC 0.5 A, 110V DC	Cable	**1489-ABH12**
Shunt Trip Module	Yes	Yes	—	110...415V AC 110…230V DC	110...415V AC 110…230V DC	Cable	**1489-AASTA1**
Shunt Trip Module	Yes	Yes	—	12...110V AC 12…60V DC	12...110V AC 12…60V DC	Cable	**1489-AASTA2**

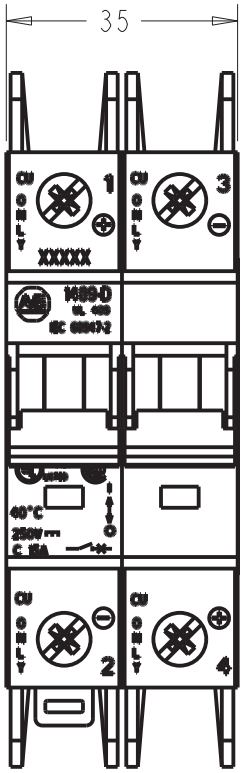
Bulletin 1489-D Specifications

Number of Poles	1 and 2
Standards	UL 489 CSA C22.2 No. 5 EN/IEC 60947-2
Certifications	UL Listed Circuit Breaker (File Number E197878) CSA Certified, VDE Certified, MCB, CE Marked
SWD Rating (USA/Canada)	Yes (2...20 A)
Calibration Temperature	UL/CSA: 40 °C EN/IEC: 30 °C
Rated Interrupting Capacity	EN/IEC - *I*cu: 10 000 A
	UL/CSA 10kA
Rated Tripping Current	UL/CSA: 2...40 A, 1-pole 125 VAC 2...40 A, 2-pole 250 VAC EN/IEC: 2...40 A, 1-pole 250 VAC 2...40 A, 2-pole 500 VAC
Degree of Protection	Finger-safe from front: -IP20 per IEC 529 from front -IP00 at wire terminals
Dielectric Strength	1960V AC
Shock	25 G Half sine wave for 11 ms (3 axes)
Vibration	Frequency range: 10…200 Hz Max. Amplitude (p-p) = 0.030 in. Max. Acceleration = 5 G 2 hours each of 3 axes
Normal Operating Environment	-30…+60 °C (-22...+140 °F) (non-condensing)
Trip Curves	C curve (Inductive) 7...185 I_N
Shipment and Short-Term Storage Limits	-40...+85 °C (-40...+185 °F)
Wire Size	1 wire: #18...6 AWG 2 wires: #18...10 AWG
Terminal Torque	#18...12 AWG: 21 lb•in #10...8 AWG: 25 lb•in #6 AWG: 36 lb•in #2 PoziDriv
Recommended Wire Strip Length	0.5 in.

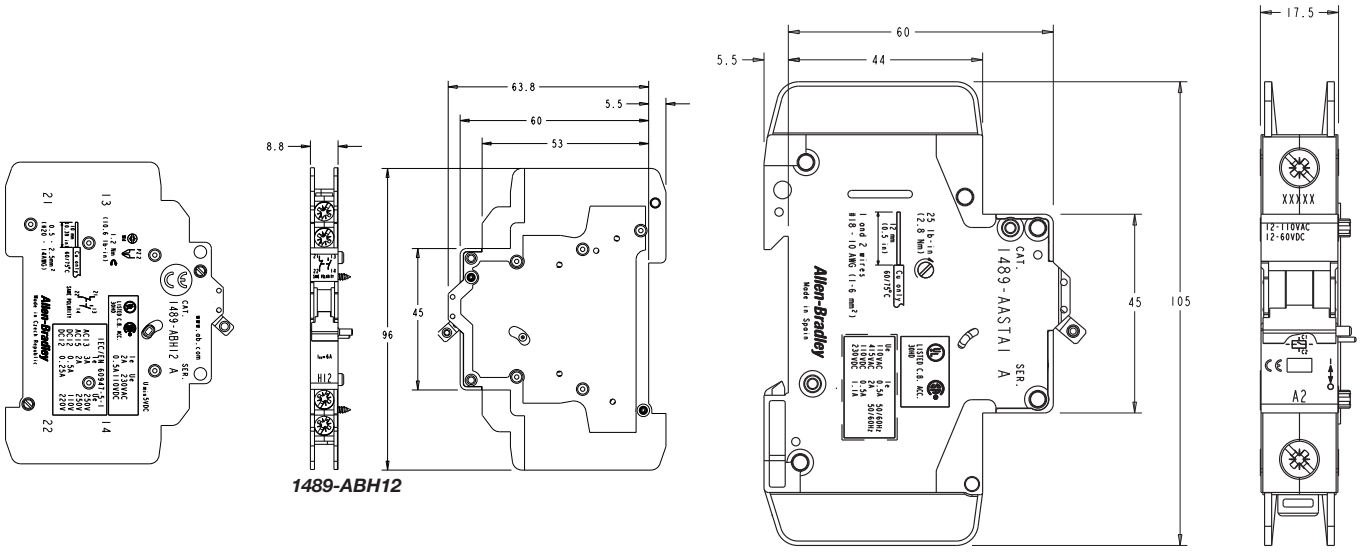
Bulletin 1489-D Circuit Breaker Approximate Dimensions

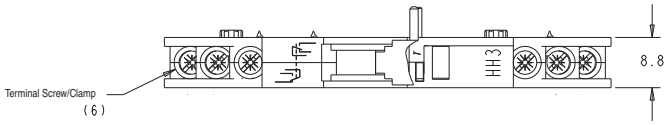
Note: All units are in millimeters unless indicated. Dimensions are not intended for manufacturing purposes.

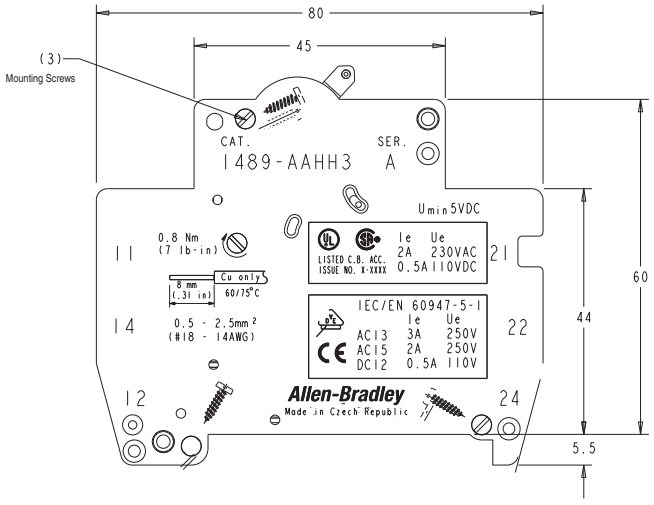




Note: All units are in millimeters unless indicated. Dimensions are not intended for manufacturing purposes.







1489-AAHH3 & 1489-AAHS3

Bulletin 1492-FB — DIN Rail Mounting Fuse Holders

- Compact size requiring less panel space than open-style fuse holders
- Handle isolates the fuse from power when installing or removing fuse
- IP2 — Front-finger protection per IEC/EN 60529
- Optional blown fuse indicators — allow easy troubleshooting of electrical circuits
- Easy insertion/removal of fuses, no special tools required
- Mounts on standard 35 mm DIN Rail
- Marker-ready
- Terminals shipped in open position and are ready for wiring

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Standards Compliance

UL 512
CSA 22.2 No. 39
EN/IEC 60947-3
EN/IEC 60269-2-1

Certifications

UL Listed E34648
UR Recognized Component
CSA Certified
CE Marked

Bulletin 1492-FB fuse holders provide a safe and convenient means for installation of class CC, J, and midget fuses. The class CC fuse holder is designed to reject a midget fuse or international 10 x 38 mm fuse. The class J fuse holder will reject all fuses other than a class J fuse.

The class CC and J holders are UL Listed and CSA Certified for branch circuit protection. Class CC and J fuses are excellent for wire protection, small motor loads, and group protection of small motor loads. The midget holders are UL Recognized and CSA Certified when supplementary (1-1/2 in. x 13/32 in.) fuses are applied. The midget fuse holder is also CE Marked for 10 x 38 mm IEC midget fuses.

The 1492-FB fuse holder family is designed for use in many OEM applications, such as power supplies, equipment protection, primary and secondary control transformers, solenoids, lighting and heater loads, and drives.

Product Selection

		For Class CC Fuse	For Class J Fuse		For Midget Fuse
		30 A*	30 A	60 A	30 A
	Description	Cat. No.	Cat. No.	Cat. No.	Cat. No.
One-Pole	1-Pole Fuse Block	**1492-FB1C30**	**1492-FB1J30**	**1492-FB1J60**	**1492-FB1M30**
	1-Pole Fuse Block with Indication, 110...600V	**1492-FB1C30-L**	**1492-FB1J30-L**	**1492-FB1J60-L**	**1492-FB1M30-L**
	1-Pole Fuse Block with Indication, 12…72V	**1492-FB1C30-D1**	—	—	**1492-FB1M30-D1**
	Pieces per Carton	6			
Two-Pole	2-Pole Fuse Block	**1492-FB2C30**	**1492-FB2J30**	**1492-FB2J60**	**1492-FB2M30**
	2-Pole Fuse Block with Indication	**1492-FB2C30-L**	**1492-FB2J30-L**	**1492-FB2J60-L**	**1492-FB2M30-L**
	Pieces per Carton	3			
Three-Pole	3-Pole Fuse Block	**1492-FB3C30**	**1492-FB3J30**	**1492-FB3J60**	**1492-FB3M30**
	3-Pole Fuse Block with Indication	**1492-FB3C30-L**	**1492-FB3J30-L**	**1492-FB3J60-L**	**1492-FB3M30-L**
	Pieces per Carton	2			

* All major fuse brands and current ranges have been evaluated for this fuse holder. Due to the heat they generate, the following fuses must be derated:
Ferraz Shamut ATQR 1.25 *I* = 0.42 A max.
Ferraz Shamut ATQR 1.40 *I* = 0.47 A max.

Accessories

Description	Pkg. Quantity	Cat. No.
Fuseholder Identification Slide-in Markers❄ The following are blank cards. Squares slip into molded slot.	5	**1492-MC5X5** **1492-MC6X5**

❄ Refer to terminal block marking systems on page 12-90.

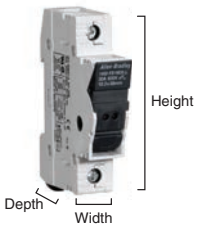
Specifications

	CC	M	J30	J60
Product Type (*n* = number of poles)	1492-FB*n*C30 "B" 1492-FB1C30-D1 "B" 1492-FB*n*C30-L "B"	1492-FB*n*M30 "B" 1492-FB1M30-D1 "B" 1492-FB*n*M30-L "B"	1492-FB*n*J30 "B" 1492-FB*n*J30-L "B"	1492-FB*n*J60 "B" 1492-FB*n*J60-L "B"
For Fuse Type:	Class CC	Midget 13/32" x 1-1/2" (10 x 38 mm)	Class J	
Approvals	UL, CSA, CE	UR, CSA, CE	UL, CSA, CE	
Maximum Voltage	600V	600V 690V(IEC)	600V	
Maximum Current	30 A	30 A 32 A (IEC)	30 A	60 A
Maximum Current Withstand (UL/CSA)	200 kA sym	Fuse dependant 50 kA max UL	200 kA sym	
Operating Temperature Range	-4...+130 °F -20...+55 °C			
Conductor Material	Copper, stranded			
Conductor Strip Length	0.43 in. (11 mm)		0.79 in. (20 mm)	
Conductor Range 1 Wire per Terminal:	#18...4 AWG (0.75...25 mm²)		#18...1 AWG (0.75...50 mm²)	#14...1 AWG (2.5...50 mm²)
Conductor Range 2 Wires∗ per Terminal:	#18...8 AWG (0.75...10 mm²)		#18...6 AWG (0.75...16 mm²)	#14...6 AWG (2.5...16 mm²)
Terminal Tightening Torque	#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25 mm²: 2.5 N•m		35 lb•in (4 N•m)	

∗ Both wires must be same size

Approximate Dimensions

Dimensions are in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.



Dimension		For Class CC Fuse	For Class J Fuse		For Midget Fuse
		30 A	30 A	60 A	30 A
Height		3.19 in. (81 mm)	4.65 in. (118 mm)	4.65 in. (118 mm)	3.19 in. (81 mm)
Depth		2.51 in. (64 mm)	2.76 in. (70 mm)	3.23 in. (82 mm)	2.51 in. (64 mm)
Width	One-Pole	0.71 in. (18 mm)	1.41 in. (36 mm)	1.57 in. (40 mm)	0.71 in. (18 mm)
	Two-Pole	1.41 in. (36 mm)	2.83 in. (72 mm)	3.15 in. (80 mm)	1.41 in. (36 mm)
	Three-Pole	2.13 in. (54 mm)	4.25 in. (108 mm)	4.72 in. (120 mm)	2.13 in. (54 mm)

Bulletin 140F Fuse Holders

- Available for UL Class CC or Midget Fuses and IEC 10 x 38 mm fuses, with or without blown fuse indication
- Lockable in the open position
- Compatible with Bulletin 140M accessories
- Compact busbar and connectors for Bulletin 100-C and 100-K contactors
- 1 N.O./1 N.C. Auxiliary Contact—late make N.O., early break N.C.
  - Provides capability for dropping out contactor before breaking current on fuses
  - Late make N.O. contact provides positive indication that power circuit is open

Table of Contents

Standards Compliance

UL 512

CSA 22.2, No. 39

IEC/EN 60947-3

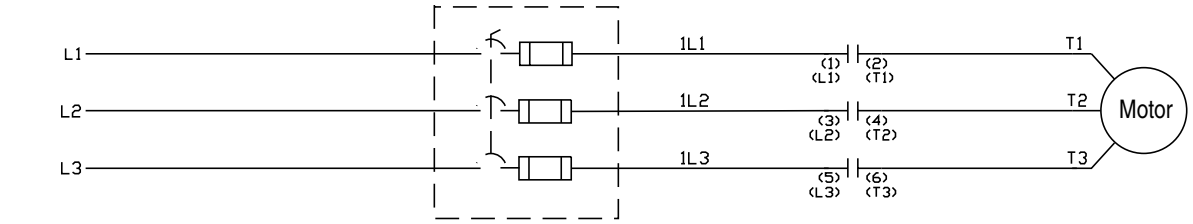
Product Selection

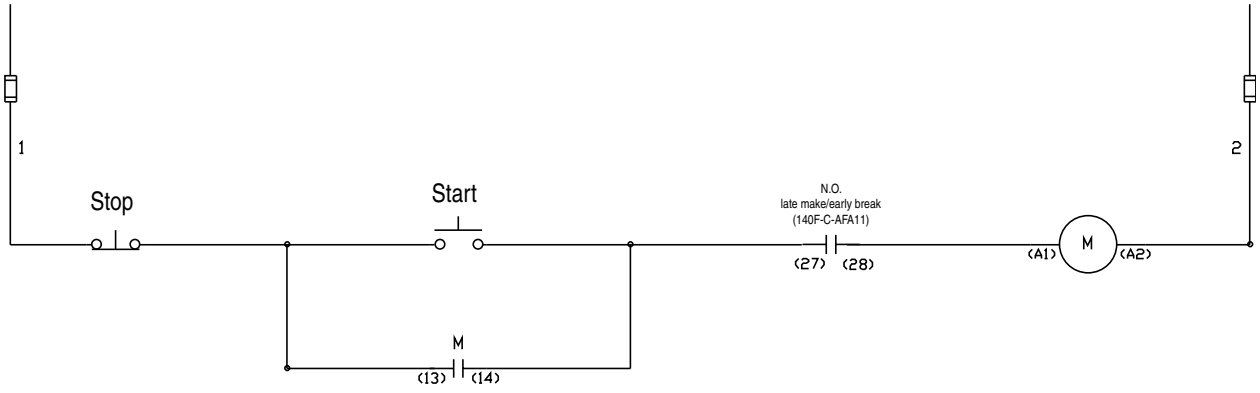
Description	Fuse Withstand, Max. [kA]	Voltage Rating, Max.[V]	Approvals				Cat. No.
			IEC	CE Mark	UL	CSA	
Fuse Holder, UL Class CC — 30 A max.	200	600	Yes	Yes	Yes	Yes	**140F-D3C-C30**
Fuse Holder with Blown Fuse Indication, UL Class CC — 30 A max.			Yes	Yes			**140F-D3C-C30L**
Fuse Holder, UL Midget — 30 A max.	200	600	Yes	Yes			**140F-D3F-C30**
Fuse Holder, IEC 10 x 38 mm — 32 A max.	120	690					
Fuse Holder with Blown Fuse Indication, UL Midget — 30 A max.	200	600	Yes	Yes			**140F-D3F-C30L**
Fuse Holder with Blown Fuse Indication, IEC 10 x 38 mm — 32 A max.	120	690					
Auxiliary Contact for Fuse Holder (1 N.O. Late Make + 1 N.C. Early Break)	—	—	Yes	Yes	Yes	Yes	**140F-C-AFA11**

For additional accessories, refer to Bulletin 100-C/100-K contactors and Bulletin 140M circuit breakers.

Wiring Diagrams

UL/CSA (ANSI)





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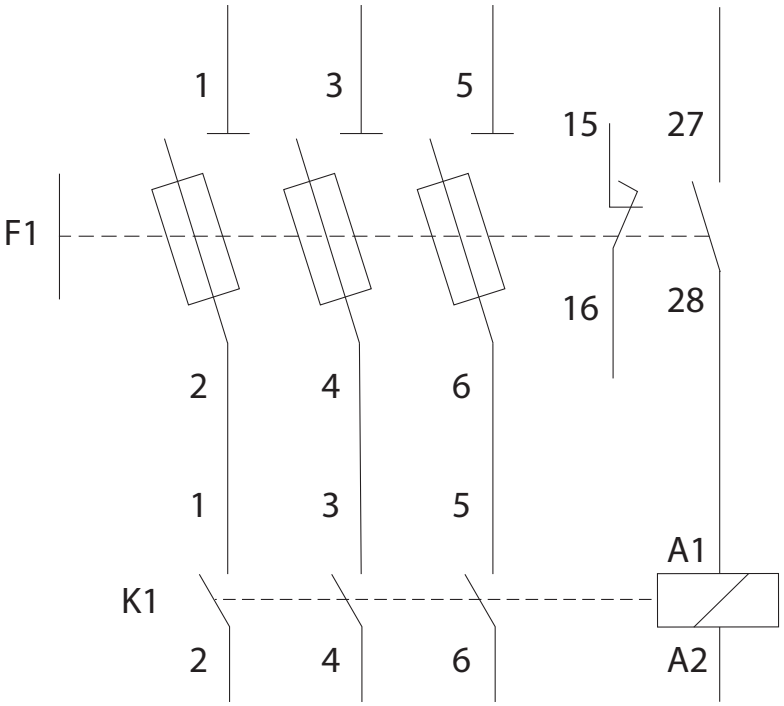
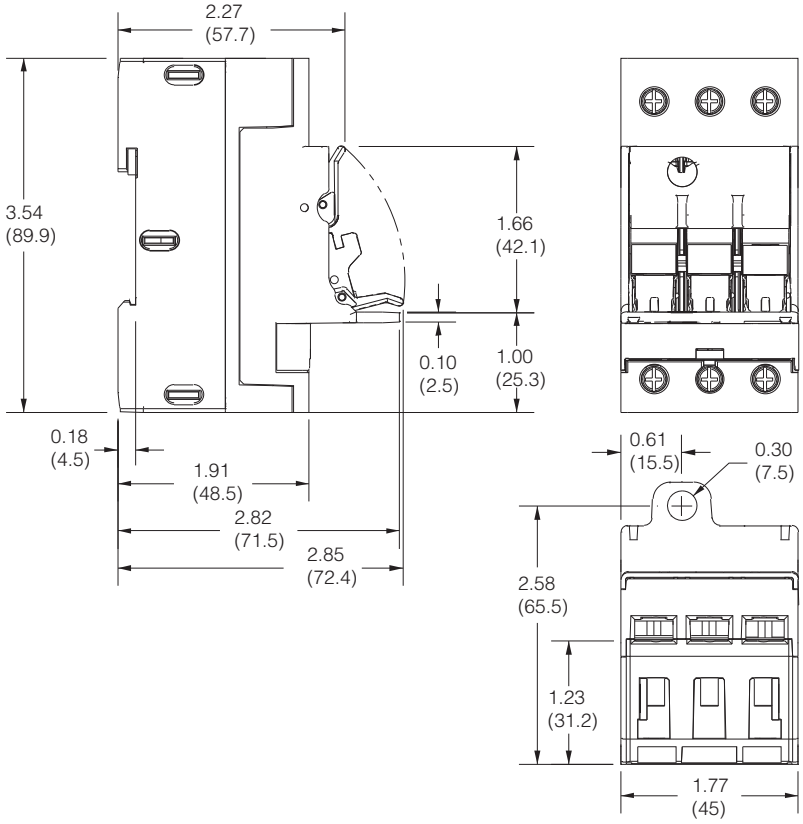
IEC



Approximate Dimensions

Dimensions are in inches (mm). Dimensions are not to be used for manufacturing purposes.



Bulletin 1492-GH and 1492-GS — Supplementary Protectors (Miniature Circuit Breakers)

- High density design allows 24 one-pole breakers per foot
- Wide range of currents for precise circuit requirements
- International approvals — meet UL, CSA, and EN/IEC standards for worldwide acceptance
- CE Marked
- AC and DC voltage ratings — in one convenient device
- A positively trip free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)
- Superior shock and vibration resistance capabilities — helps prevent nuisance tripping
- Universal mounting foot for a variety of mounting channels, including Cat. No. 1492-N1 and various 35 mm DIN (e.g., Cat. No. 199-DR1)

Table of Contents

Standards Compliance

UL 1077
CSA C22.2 No 235
EN/IEC 60934

Certifications

UL Recognized Component
CSA Recognized Component
CE Marked

Bulletin 1492 high density miniature circuit breakers are thermal magnetic type supplementary overcurrent protective devices. Bulletin 1492-GH miniature circuit breakers are available in one-pole units. Bulletin 1492-GS are available in one-, two-, and three-pole. These breakers are often used when panel space (width) is a premium. These products include a high density design. Up to 24 one-pole breakers can be mounted per foot. The Bulletin 1492-GS breaker can be ordered with auxiliary contacts that do not add any additional space. Wire termination is achieved by a clamping style, self-lifting box lug.

One-Pole Style Bulletin 1492-GH

This single-pole, high-density miniature circuit breaker incorporates a thermal portion and a magnetic trip function for the combined advantages of two sensing systems. The Bulletin 1492-GH breaker style uses a push-to-set mechanism for circuit actuation and comes with a manual trip button for manually opening the circuit. Voltage range is 250V AC, and this breaker has a 65V DC rating.

One-, Two-, and Three-Pole Style Bulletin 1492-GS

These high-density miniature circuit breakers incorporate a thermal portion and a magnetic trip function for the combined advantages of two sensing systems. The Bulletin 1492-GS style of breakers uses a toggle style handle mechanism for circuit actuation. Voltage range is 277V AC for the one-pole and 480Y/277V AC for the multiple pole. These breakers have a 65V DC rating.

Applications

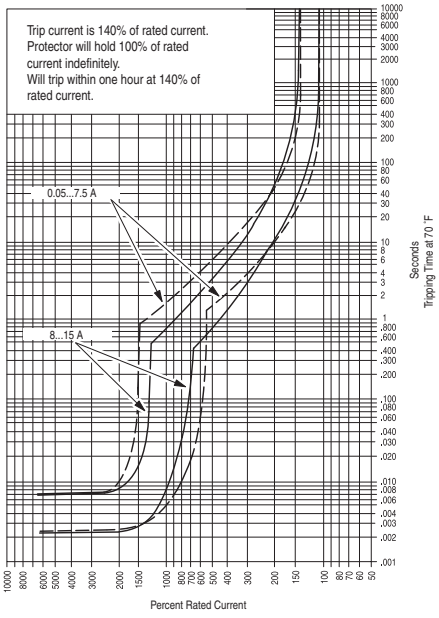
The high-density miniature circuit breaker appliations include, but not limited to, the protection of test equipment, control instrumentation, solenoids, and power supplies. The wide range of current values and the use of a thermal magnetic trip system allows for a variety of applications where a very accurate and compact breaker is required.

UL1077, CSA C22.2 #235

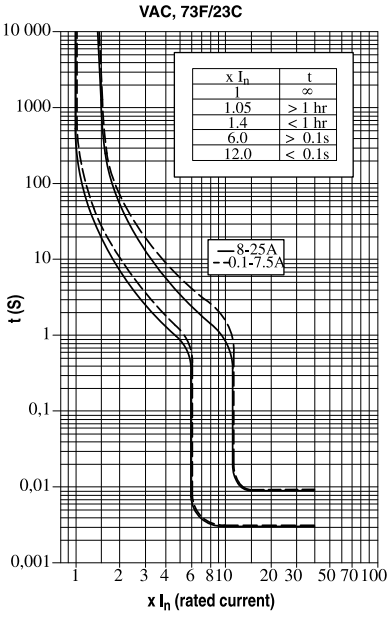
In North America, miniature circuit breakers are recognized as supplementary protectors and are intended for use as overcurrent protection within an appliance or other electrical equipment where branch circuit protection is already provided or not required. Internationally, these products are rated to IEC standards as circuit breakers for equipment (CBE).

Product Selection

1492-GH



1492-GS



High Density Supplementary Protectors

Product Selection

Using selection table on this page select Bulletin 1492-GH/GS that allows full load current nearest without exceeding application current. Also, check that inrush current is less than trip range of 6…10 *I*n.

1492-GH/GS

To select a miniature circuit breaker, use the following procedure:
1. Determine the inrush correction factor from the following table.

Inrush Ratio Correction Table

Inrush Ratio	1:1 to 1:4	1:5	1:6	1:7	1:8
Factor	1.3	1.4	1.5	1.6	1.7

Note: For resistive loads use inrush correction factor of 1.0.

2. Determine the temperature correction factor from the following table.

Ambient Temperature Correction Table

Ambient Temperature	70 °F (21.1 °C)	100 °F (37.8 °C)	120 °F (48.9 °C)	140 °F (60 °C)	160 °F (71.1 °C)	180 °F (82.2 °C)	200 °F (93.3 °C)
Factor	1.0	1.1	1.2	1.3	1.4	1.5	1.6

3. Determine the sealed current of the load being protected.

4. Multiply the sealed current by the two correction factors and select the closest higher ampere rating.

Example — For a solenoid with sealed current of 0.5 A, an inrush ratio of 1:8, and an ambient temperature of +110 °F (43.7 °C), (0.5 x 1.7 x 1.15 = 0.9775), select the 1.0 A miniature circuit breaker. Tripping time of the miniature circuit breaker is determined from the table below. Divide the miniature circuit breaker value by the temperature correction factor from the Ambient Temperature Correction Table above to determine the actual rated current referenced in the table below.

Tripping Times in Seconds at 70 °F (21.1 °C)

Percent Rated Current	100%	200%	300%	400%	500%	600%	1000%	2000% Greater
Tripping Times (Seconds)	No Trip	10…40	3…18	1.5…9	0.8…6	0.003…4	0.009…2	Max. 0.02

Note: When several breakers are rail mounted adjacent to each other, the no-trip current will be 80% of rated current at 70 °F (21.1 °C).

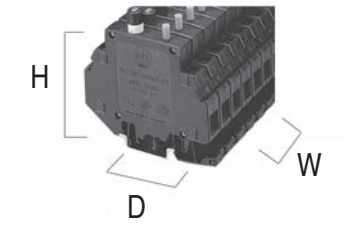
	1492-GH	1492-GS		
	1-Pole	1-Pole	2-Pole	3-Pole
Amperage [A]	Cat. No.	Cat. No.	Cat. No.	Cat. No.
0.2	**1492-GH002**	1492-GS1G002	1492-GS2G002	1492-GS3G002
0.5	**1492-GH005**	**1492-GS1G005**	1492-GS2G005	1492-GS3G005
0.8	**1492-GH008**	1492-GS1G008	1492-GS2G008	1492-GS3G008
1.0	**1492-GH010**	**1492-GS1G010**	**1492-GS2G010**	1492-GS3G010
1.2	**1492-GH012**	1492-GS1G012	1492-GS2G012	1492-GS3G012
1.5	**1492-GH015**	1492-GS1G015	1492-GS2G015	1492-GS3G015
2.0	**1492-GH020**	**1492-GS1G020**	**1492-GS2G020**	1492-GS3G020
2.5	**1492-GH025**	1492-GS1G025	1492-GS2G025	1492-GS3G025
3.0	**1492-GH030**	**1492-GS1G030**	**1492-GS2G030**	1492-GS3G030
4.0	**1492-GH040**	**1492-GS1G040**	**1492-GS2G040**	1492-GS3G040
5.0	**1492-GH050**	**1492-GS1G050**	**1492-GS2G050**	1492-GS3G050
6.0	—	1492-GS1G060	1492-GS2G060	1492-GS3G060
7.0	**1492-GH070**	1492-GS1G070	1492-GS2G070	1492-GS3G070
8.0	—	**1492-GS1G080**	1492-GS2G080	1492-GS3G080
10.0	**1492-GH100**	**1492-GS1G100**	**1492-GS2G100**	1492-GS3G100
12.0	—	1492-GS1G120	1492-GS2G120	1492-GS3G120
15.0	**1492-GH150**	**1492-GS1G150**	**1492-GS2G150**	1492-GS3G150
16.0	—	**1492-GS1G160**	1492-GS2G160	1492-GS3G160
20.0	—	**1492-GS1G200**	**1492-GS2G200**	1492-GS3G200
25.0	—	**1492-GS1G250**	1492-GS2G250	1492-GS3G250
Adding Auxiliary Contact	—	Add suffix — H1 for N.O. aux. One aux. may be installed in all devices.		
Pieces Per Carton	1			

Specifications

	1492-GH	1492-GS		
	1-Pole	1-Pole	2-Pole	3-Pole
UL/CSA	200 A (Not to exceed 100 x rated A)	0.2…16 A	5 kA C1 (2 kA C1 for 65V DC — 1-pole)	
		18…25 A	2 kA C1	
EN/IEC 60934 (CBE)		0.2…5 A	400 A	
		6…25 A	800 A	
Maximum Voltage Ratings	250V AC 50/60 Hz 65V DC	480Y/277V AC 50/60 Hz 65V DC		
Temperature Range	–40…+149 °F (–40…+65 °C) non-condensing			
Operating Life	6000 operations @ rated current			
Housing Material	Glass-filled Polyamide 6.6			
Shock	25 G, 11 ms duration			
Vibration	5 G (10…500 Hz)			
Dielectric Strength	1500V AC	1600V AC		
Insulation Resistance	100 M Ω @ 500V DC			
Terminal Type	Tubular Screw with self-lifting box lug			
Wire Size	#22…10 AWG			
Recommended Wire Strip Length	0.44 in. (11.2 mm)	Main Term — 0.51 in. (13 mm) Aux Term — 0.41 in. (10.4 mm)		
Terminal Torque	1.3…1.4 N•m (10…12 lb•in)	0.656 N•m (5 lb•in)		
Auxiliary Contact rating (N.O. or N.C.)		1.0 A AC or DC (Resistive Load)		

Approximate Dimensions

Dimensions are in inches (millimeters). Dimensions are not intended for manufacturing purposes.



	1492-GH	1492-GS		
	1-Pole	1-Pole	2-Pole	3-Pole
Height	3.15 in. (80 mm)	3.15 in. (80 mm)		
Depth	2.89 in. (73.4 mm)	3.48 in. (88.5 mm)		
Width	0.49 in. (12.4 mm)	0.49 in. (12.5 mm)	0.98 in. (25 mm)	1.47 in. (37.5 mm)

Supplementary Protector/Miniature Circuit Breaker

Product Overview

Bulletin 1492-SP — Supplementary Protector/Miniature Circuit Breaker

- Energy limiting design — protects downstream components better than conventional breakers during short circuits
- Field-mountable options for selective applications
- True IP2X finger-safe design (front)
- International approvals — CE Marked, and meets UL, CSA, and IEC (VDE, GL) standards for worldwide acceptance
- Ratings to 480Y/277V AC @ 240/415V AC — 10 000 A interrupt rating
- AC and DC voltage ratings — in one convenient device
- A positively trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)
- 3 trip curves: B, C, and D
- Time delay (D characteristic) for high inrush currents during inductive start-ups such as transformers and power supplies
- Superior shock and vibration resistance capabilities — helps to prevent nuisance tripping

Table of Contents

Standards Compliance

UL 1077
CSA C22.2 No. 235
IEC/EN 60898, 60947-2
UL File Number E65138
CCC GB10963

Certifications

UL Recognized
CSA Certified
CE Marked
Germanischer Lloyd (Marine)
CCC

Bulletin 1492-SP series C devices are energy limiting, thermal magnetic type overcurrent protectors meeting UL 1077/CSA C22.2 No. 235, IEC/EN 60898. These devices are designed for the protection of a wide variety of products including:

- Solenoids
- Test equipment
- Controller I/O points
- Relay and contractor coils
- Computers
- Transformers
- Automotive systems
- Power supplies
- Medical equipment
- Control instrumentation

The Bulletin 1492-SP supplementary protectors/miniature circuit breakers are available in one-, one-pole plus neutral, two-, three-, and three-pole plus neutral units. One- and two-pole AC units also have limited DC ratings. Two- and three pole units are connected at the handle for simultaneous operation. Screw termination is standard on all Bulletin 1492-SP units. Both line and load side terminals accept #18...4 AWG (1.0.. 25 mm²) copper wire.

Ordering Information

To order the proper device, you need to know the:

- Maximum rated current of equipment to be protected
- Sytem phase of 1-, 2-, or 3
- Maximum startup (inrush) current
- Accessories that are required

Use the product selection tables on the following pages to determine the catalog number.

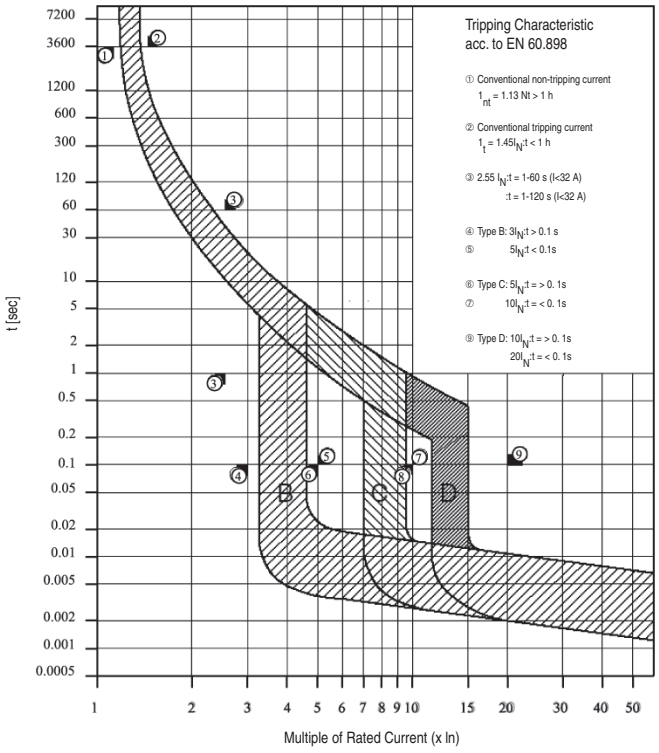
1. Select a 1-, 2-, or 3-pole device.

2. If needed, select the Switched Neutral Module. The Switched Neutral Module is mounted on the right side of the breaker. This module must be mounted at the factory. It cannot be installed in the field.

3. If applicable, consider the derating factors listed in the Determining Ratings section of Publication 1492-TD010*

4. Order accessory contacts or modules as separate items. Accessory modules are always mounted on the left side of the supplemental protector/miniature circuit breaker. A maximum of two accessory modules can be mounted on a single device.

Refer to the Accessories table on page 7-49 for possible combinations.



Tripping Characteristics Bul 1492-SP at 30 °C

Product Selection

Tripping Characteristics		Trip Curve B Resistive or Slightly Inductive	Trip Curve C Inductive	Trip Curve D Highly Inductive
		3…5 I_n	5…10 I_n	10…20 I_n
Number of Poles	Continuous Current Rating (I_n) [A]	Cat. No.	Cat. No.	Cat. No.
1-Pole	0.5	—	**1492-SP1C005**	**1492-SP1D005**
	1	**1492-SP1B010**	**1492-SP1C010**	**1492-SP1D010**
	2	**1492-SP1B020**	**1492-SP1C020**	**1492-SP1D020**
	3	**1492-SP1B030**	**1492-SP1C030**	**1492-SP1D030**
	4	**1492-SP1B040**	**1492-SP1C040**	**1492-SP1D040**
	5	**1492-SP1B050**	**1492-SP1C050**	**1492-SP1D050**
	6	**1492-SP1B060**	**1492-SP1C060**	**1492-SP1D060**
	7	**1492-SP1B070**	**1492-SP1C070**	**1492-SP1D070**
	8	**1492-SP1B080**	**1492-SP1C080**	**1492-SP1D080**
	10	**1492-SP1B100**	**1492-SP1C100**	**1492-SP1D100**
	13	**1492-SP1B130**	**1492-SP1C130**	**1492-SP1D130**
	15	**1492-SP1B150**	**1492-SP1C150**	**1492-SP1D150**
	16	**1492-SP1B160**	**1492-SP1C160**	**1492-SP1D160**
	20	**1492-SP1B200**	**1492-SP1C200**	**1492-SP1D200**
	25	**1492-SP1B250**	**1492-SP1C250**	**1492-SP1D250**
	30	**1492-SP1B300**	**1492-SP1C300**	**1492-SP1D300**
	32	**1492-SP1B320**	**1492-SP1C320**	1492-SP1D320
	40	**1492-SP1B400**	**1492-SP1C400**	**1492-SP1D400**
	50	**1492-SP1B500**	**1492-SP1C500**	∗ **1492-SP1D500**
	63	**1492-SP1B630**	**1492-SP1C630**	∗ **1492-SP1D630**

IEC 240/415V AC
UL/CSA 277V AC 48V DC

Note: Bulletin 1492-SP 1- and 3-pole circuit breakers are also available with neutral. Add a suffix of -N to the cat. no.
∗ IEC only, does not have CCC, UR, or CSA certifications

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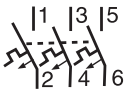
Supplementary Protector/Miniature Circuit Breaker

Product Selection

Tripping Characteristics		Trip Curve B Resistive or Slightly Inductive	Trip Curve C Inductive	Trip Curve D Highly Inductive
		3...5 I_n	5...10 I_n	10...20 I_n
Number of Poles	Continuous Current Rating (I_n) [A]	Cat. No.	Cat. No.	Cat. No.
2-Pole	0.5	—	**1492-SP2C005**	**1492-SP2D005**
	1	**1492-SP2B010**	**1492-SP2C010**	**1492-SP2D010**
	2	**1492-SP2B020**	**1492-SP2C020**	**1492-SP2D020**
	3	**1492-SP2B030**	**1492-SP2C030**	**1492-SP2D030**
	4	**1492-SP2B040**	**1492-SP2C040**	**1492-SP2D040**
	5	**1492-SP2B050**	**1492-SP2C050**	**1492-SP2D050**
	6	**1492-SP2B060**	**1492-SP2C060**	**1492-SP2D060**
	7	1492-SP2B070	**1492-SP2C070**	**1492-SP2D070**
	8	1492-SP2B080	**1492-SP2C080**	**1492-SP2D080**
	10	**1492-SP2B100**	**1492-SP2C100**	**1492-SP2D100**
	13	1492-SP2B130	**1492-SP2C130**	**1492-SP2D130**
	15	**1492-SP2B150**	**1492-SP2C150**	**1492-SP2D150**
	16	**1492-SP2B160**	**1492-SP2C160**	**1492-SP2D160**
	20	**1492-SP2B200**	**1492-SP2C200**	**1492-SP2D200**
	25	**1492-SP2B250**	**1492-SP2C250**	**1492-SP2D250**
	30	**1492-SP2B300**	**1492-SP2C300**	**1492-SP2D300**
	32	1492-SP2B320	**1492-SP2C320**	**1492-SP2D320**
	40	1492-SP2B400	**1492-SP2C400**	**1492-SP2D400**
	50	1492-SP2B500	**1492-SP2C500**	∗ **1492-SP2D500**
	63	**1492-SP2B630**	**1492-SP2C630**	∗ **1492-SP2D630**
3-Pole	0.5	—	1492-SP3C005	1492-SP3D005
	1	1492-SP3B010	**1492-SP3C010**	**1492-SP3D010**
	2	**1492-SP3B020**	**1492-SP3C020**	**1492-SP3D020**
	3	1492-SP3B030	**1492-SP3C030**	**1492-SP3D030**
	4	**1492-SP3B040**	**1492-SP3C040**	**1492-SP3D040**
	5	**1492-SP3B050**	**1492-SP3C050**	**1492-SP3D050**
	6	**1492-SP3B060**	**1492-SP3C060**	**1492-SP3D060**
	7	1492-SP3B070	**1492-SP3C070**	**1492-SP3D070**
	8	1492-SP3B080	1492-SP3C080	1492-SP3D080
	10	**1492-SP3B100**	**1492-SP3C100**	**1492-SP3D100**
	13	1492-SP3B130	**1492-SP3C130**	**1492-SP3D130**
	15	**1492-SP3B150**	**1492-SP3C150**	**1492-SP3D150**
	16	1492-SP3B160	**1492-SP3C160**	**1492-SP3D160**
	20	**1492-SP3B200**	**1492-SP3C200**	**1492-SP3D200**
	25	1492-SP3B250	**1492-SP3C250**	**1492-SP3D250**
	30	**1492-SP3B300**	**1492-SP3C300**	**1492-SP3D300**
	32	1492-SP3B320	**1492-SP3C320**	**1492-SP3D320**
	40	**1492-SP3B400**	**1492-SP3C400**	**1492-SP3D400**
	50	**1492-SP3B500**	**1492-SP3C500**	∗ **1492-SP3D500**
	63	**1492-SP3B630**	**1492-SP3C630**	∗ **1492-SP3D630**

IEC
415V AC
UL/CSA
480Y/277V AC
96V DC

IEC
415V AC
UL/CSA
480Y/277V AC

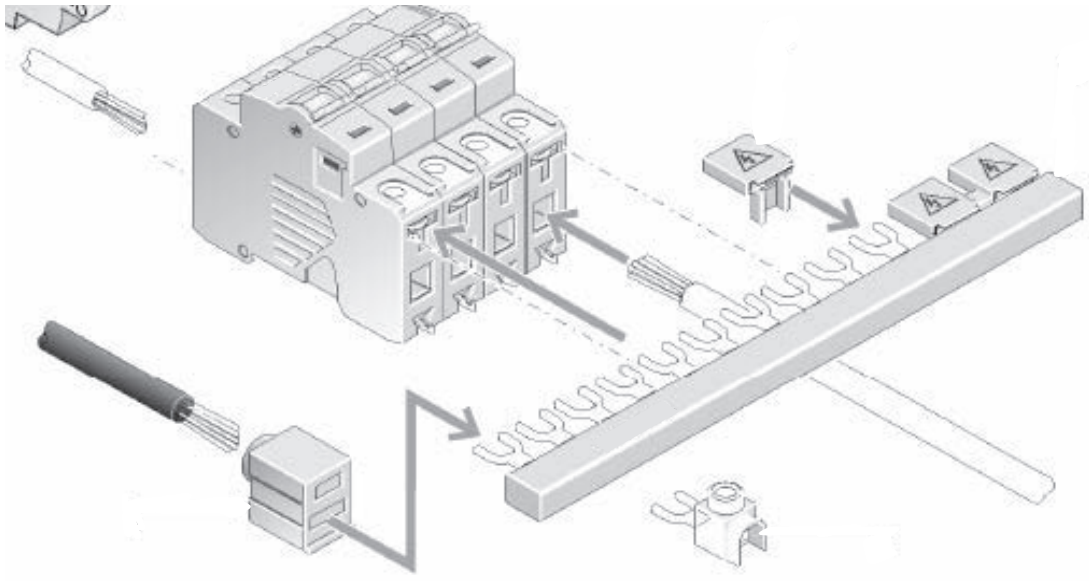


Note: 1492-SP 1- and 3-pole circuit breakers are also available with neutral. Add a suffix of -N to the cat. no.
∗ IEC only, does not have CCC, UR, or CSA certifications

Accessories

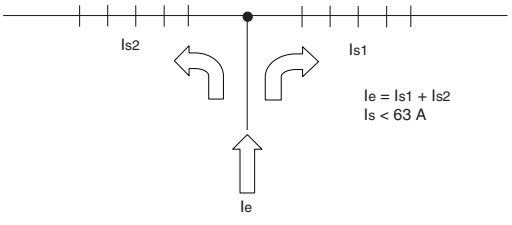
The following bus bars (commoning links have CE certification only)

Description		Cat. No.
Auxiliary Contacts	**Auxiliary contact module** Switches when protective device is operated manually or tripped electrically 1 N.O. – 1 N.C. Form C Contact	**1492-ASPH3**
	Dual auxiliary contact module Switches when protective device is operated manually or tripped electrically 2 N.O. – 2 N.C. 2 Form C Contact	**1492-ASPHH3**
	Auxiliary/signal alarm contact module 1 Auxiliary Contact switches when protective device is operated manually or tripped electrically 1 N.O. – 1 N.C. Form C Contact 1 Signal Contact switches when protective device is tripped electrically 1 N.O. – 1 N.C. Form C Contact	**1492-ASPHS3**
Undervoltage release module Use the undervoltage release module to trip the adjacent breaker poles when the applied voltage is less than the nominal voltage. Undervoltage trip is often used when loss of power and eventual restoration of power creates an unsafe or unknown set of condition.	50…115V AC 110…240V AC	1492-ASPU115 1492-ASPU230
Shunt trip module Use the shunt trip module to trip the adjacent breaker poles from a remote location. The module is actuated by applying a voltage (pickup voltage) to the trip terminals. Shunt trip modules are often used in emergency shutdown circuits where multiple power circuits must be switched off from a single location.	110…415V AC (110…230V DC) 12…110V AC (12…60V DC)	**1492-ASPA1** **1492-ASPA2**
Mounting Rail	Pkg Qty: 10	**199-DR1**
End Anchor	—	1492-EAH35
Lockout Attachment	Pkg Qty: 5	**1492-ASPLOA**



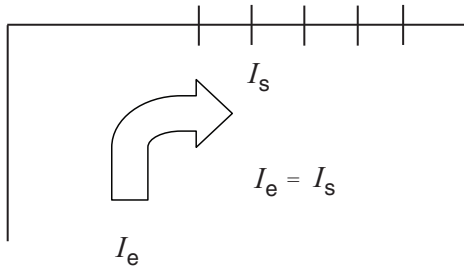
The following bus bars (commoning links have CE approval only for IEC applications).

Type	No. of 1492-SP	Rated Operational I_e End Feed per phase	Rated Operational I_e Center Feed per phase (I_s < 63 A)	Pieces Per Package	Cat. No.
Fork Style Commoning Links (may be cut to length, not for use with accessories)					
1 pole	1 m (56 devices/m)	63	100	1	**1492-ASPCL1**
3 poles	1 m (19 devices/m)	63	100	1	**1492-ASPCL3**
End cap for 3-pole	—	—	—	10	**1492-ASPEC1**
Fork Style Commoning Links (may NOT be cut to length, not for use with accessories)					
1 pole	2	63	100	—	1492-ASPCL102
1 pole	6	63	100	20	1492-ASPCL106
1 pole	12	63	100	20	**1492-ASPCL112**
2 poles (1p + N)	2	63	100	10	1492-ASPCL204
2 poles (1p + N)	3	63	100	10	1492-ASPCL206
2 poles (1p + N)	6	63	100	10	1492-ASPCL212
3 poles	2	63	100	10	1492-ASPCL306
3 poles	4	63	100	10	1492-ASPCL312
4 poles	2	63	100	5	1492-ASPCL408
4 poles	3	63	100	5	1492-ASPCL412
Fork Style Commoning Links (for use with accessories)					
1 pole	2	63	100	20	1492-ASPCL1A02
1 pole	6	63	100	20	1492-ASPCL1A06
1 pole	9	63	100	20	1492-ASPCL1A09
2 poles (1p + N)	2	63	100	10	1492-ASPCL2A04
2 poles (1p + N)	3	63	100	10	1492-ASPCL2A06
2 poles (1p + N)	5	63	100	10	1492-ASPCL2A10
3 poles	2	63	100	10	1492-ASPCL3A06
3 poles	4	63	100	10	1492-ASPCL3A12
Three-Phase Bus for Multiple Single-Pole (each with 1 auxiliary contact)					
—	2x3 (1p)	63	100	10	1492-ASPCL3AP06
—	2x3 (1p)+2 (1p)	63	100	10	1492-ASPCL3AP08
—	3x3 (1p)	63	100	10	1492-ASPCL3AP09
Incoming Terminals for Fork Style (not for use in North America)					
For max 25 mm² wire	—	—	100	50	1492-ASPCLT25
For max 35 mm² wire	—	—	100	10	**1492-ASPCLT35**
Protective Covers for Unused Forks					
—	—	—	100	10 sets (5/set)	1492-ASPCLPS



Note: Ie - for center feed above 63 A use Cat. No. 1492-ASPCLT35 terminal

Center Feed

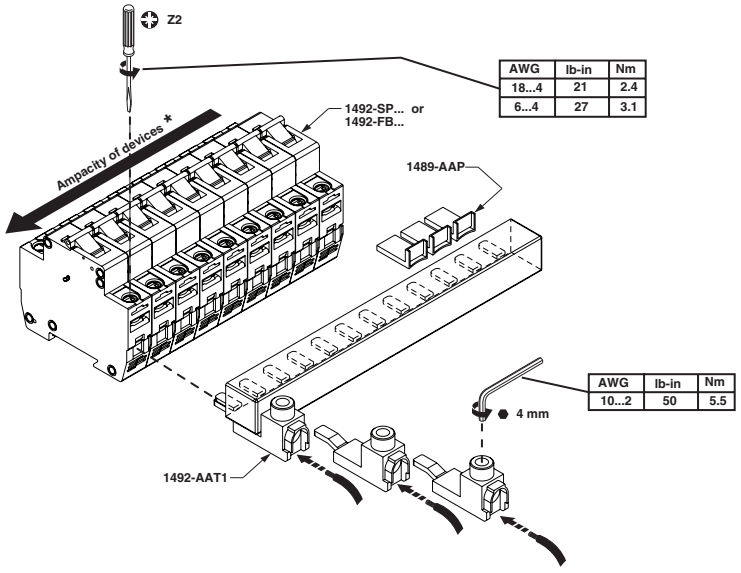


End Feed

Bulletin 1492 Cuttable Bus Bar (cULus and CE)

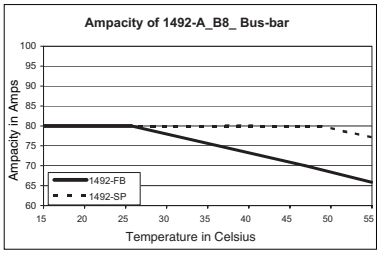
- Cuttable, copper bus bar
- May be cut to to length, provided in 1 meter lengths
- For use with Bulletin 1492-SP and 1492-FB circuit breakers
- 80 A and 100 A versions
- Multiphase options— single, two and three phase
- Accessories: end caps, protective shroud and terminal lug
- Standards Compliance: UL 508, UL E56639 - Category NMTR and NMTR7
- Certifications: cULus Listed, CE Marked

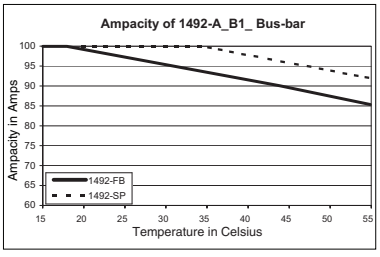
Description	Devices per Meter	Amperage	Pkg. Qty.	Cat. No.
Single Phase Bus Bar	57	80	1 - 1 M Length	**1492-A1B8**
		100		**1492-A1B1**
	36 (with aux. module)	80		**1492-A1B8H**
		100		**1492-A1B1H**
Two Phase Bus Bar	29	80		**1492-A2B8**
		100		**1492-A2B1**
	22 (with aux. module)	80		1492-A2B8H
		100		**1492-A2B1H**
Three Phase Bus Bar	19	80		**1492-A3B8**
		100		**1492-A3B1**
	16 (with aux. module)	80		1492-A3B8H
		100		**1492-A3B1H**
Accessories				
End Caps for use with Single Phase Bus Bar	—	—	10	**1492-A1E**
End Caps for use with Two and Three Phase Bus Bar	—	—	10	**1492-AME**
Protective Shroud	—	—	10	**1492-AAP**
Terminal Lug	—	80/100	10	**1492-AAT1**



* **NOTICE** Position high current drawing devices nearer to the Feed Terminal, 1492-AAT1.

Temperature-Current Characteristic for Bulletin 1492-A_ _ _





Specifications

1492-SP Series C				
Description		**B Curve**	**C Curve**	**D Curve**
Tripping Characteristics		Resistive or Slightly-Inductive Loads	Inductive Loads	Highly-Inductive Loads
		3…5 I_n	5…10 I_n	10…20 I_n
Current Range		1…63 A	0.5…63 A	0.5…40 A
Poles (18 mm width per pole)		1, 2, 3, 1 +N, 3 + N		
Dielectric Strength		1960V AC		
Shock		25 G Half Sine Wave for 11 ms (3 axes)		
Vibration		Frequency Range: 10…2000 Hz Max. Amplitude (p-p) = 0.030 in. Max. Acceleration = 5 G 2 hours each of 3 axes		
Operating Temperature Range		23…104 °F (-5…+40 °C) non-condensing		
Shipment and Short-Term Temperature Limits		-22…+158 °F (-30…+70 °C)		
Housing Material		Nylon		
Wire Size		#18…8 AWG (1.0…10 mm²) Tightening Torque — 2.4 N•m (21 lb•in)		
		#6…4 AWG (16…25 mm²) Tightening Torque — 3.1 N•m (27 lb•in)		
Recommended Wire Strip Length		0.51 in. (13 mm)		
Electromechanical Life		6000 operations (1 operation = 2 switching events) ON/OFF		
Switched Neutral Rating		277V AC		
Supplementary Protector				
Certifications		UL 1077 - Recognized Component QVNU2 - E65138 CSA C22.2 No. 235 Certified Component		
Use Group (UG)		UG A - General Industrial		
Terminals (FW)		FW 3 Line and Load evaluated for field wiring		
Overload Rating (OL)		OL 0 (general use)		
1-Pole, 1-Pole + N				
Maximum Volts		277V AC		48V DC
Tripping Current (TC)		TC 1, 40 °C		TC 1, 40 °C
Short-Circuit Current Rating (SC)		SC U2		SC U1
	< 35 A	10 kA @ 277V AC; B and C Curve 5 kA @ 277V AC; D Curve		10 kA @ 48V DC; B, C, and D Curve
	40, 50, 63 A	5 kA @ 277V AC; B, C, and D Curve		
2-Pole, 3-Pole, 3-Pole + N				
Maximum Volts		480Y/277V AC		96V DC (2-pole - series)
Tripping Current		TC 2, 40 °C		TC 2, 40 °C
Short-Circuit Current Rating (SC)		SC U2		SC U1
	< 35 A	10 kA @ 480Y/277V AC; B and C Curve 5 kA @ 480Y/277V AC; D Curve		10 kA @ 96V DC; B, C, and D Curve
	40, 50, 63 A	5 kA @ 480Y/277V AC; B, C, and D Curve		
Miniature Circuit Breaker				
Certifications		IEC/EN 60898 (VDE) IEC/EN 60947-2 (GL) (not including D50 and D63) CQC (GB-10963) (not including D50 and D63)		
Rated Voltage Un		240/415VAC 48V DC (CE 60747-2)		
Rated Insulation Voltage Ui		440 VAC		
Rated Impulse Withstand Voltage Uimp		4 kV (1.2/50) µsec		
Conventional Non-Tripping Current		int = 1.13 In		
Conventional Tripping Current		it = 1/45 In		
Reference Temperature		30 °C		
Temperature Factor		0.5% /K		
Maximum Back-Up Fuse		125 A gL/gG		
Selectivity Class		3		
Rated Short-Circuit Capacity		Icn (IEC 60 898) = 10 kA Icu (IEC 60 947-2) = 15 kA		
Service Short-Circuit Capacity		Ics = 7.5 kA		
Climatic Conditions		Acc to IEC 68-2 (25...55 °C/ 90...95% RH)		

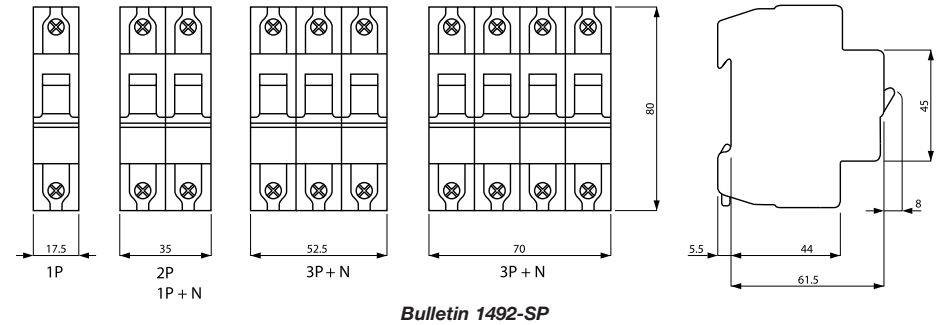
Auxiliary Specifications

		Auxiliary Contact Module Dual Auxiliary Contact Module Auxiliary/Signal Alarm Module Cat. Nos. 1492-ASPH3, 1492-ASPHH3, 1492-ASPHS3	Undervoltage Release Module Cat. Nos. 1492-ASPU115 1492-ASPU230	Shunt Trip Module Cat. Nos. 1492-ASPA1 1492-ASPA2
Degree of Protection		IP20 (IP00)		
Dimensions		See below		
Weight		0.045 kg	0.155 kg	0.155 kg
Mechanical Lifespan		6000 operations	10 000 operations	4000 operations
Minimum Impulse Duration		—	—	> 15 ms
Operating Voltage		—	1492-ASPU115: U_n-115V AC, U_{min}-50V AC	1492-ASPA1: 110…415V AC, 110…230V AC
		—	1492-ASPU230: U_n-230/240V AC, U_{min}-110V AC	1492-ASPA2: 12…110V AC, 12…60V AC
Inrush Current		—	3.6/44 mA (AC/DC)	25/12 mA (AC) 15/2 mA (DC)
Dropout		—	0.7…0.35 x U_s	—
Voltage Range		—	—	0.7…1.1 x U_s
EN/IEC	Max. Operating Current	AC 13 @ 250V AC 3 A AC 15 @ 250V AC 0.5 A DC 12 @ 110V DC 0.5 A U_{min}-5V AC	—	—
	Terminal Capacity IEC Rigid, CU	0.5…2.5 mm² 2 x 0.5…2 x 2.5 mm²	0.5…4.0 mm² 2 x 0.5…2 x 2.5 mm²	1.0…25 mm² 2 x 1.0…2 x 4.0 mm²
	Tightening Torque	0.8 N•m	1.1 N•m	2.4 N•m
UL 1077 CSA C22.2 No. 235	Max. Operating Current	@ 230V AC 2 A @ 110V DC 0.5 A U_{min}-5V CDC	—	—
	Terminal Capacity CU	#18…14 AWG 2 x #18…2 x #14 AWG	#18…14 AWG 2 x #18…2 x #14 AWG	#18…8 AWG 2 x 18…2 x #12 AWG
	Tightening Torque	7 lb•in	10 lb•in	21 lb•in

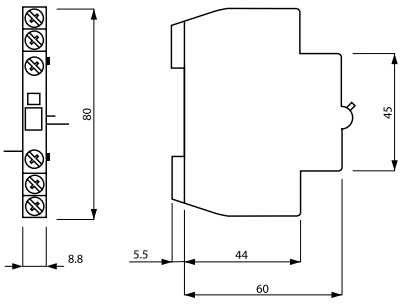
Approximate Dimensions

Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.

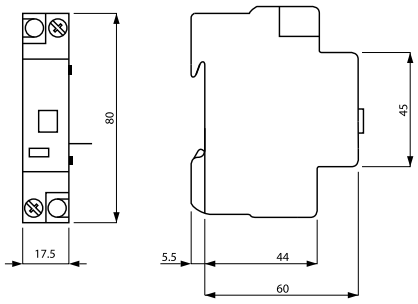
Bulletin 1492-SP Series C



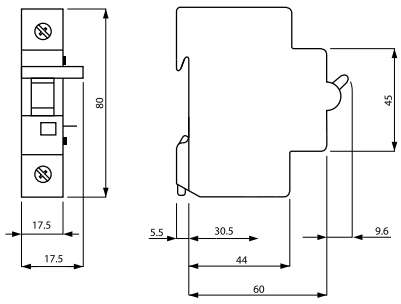
Bulletin 1492-SP



Cat. No.
1492-ASPHH3
1492-ASPHS3
1492-ASPH3



Cat. No. 1492-ASPU_ _ _

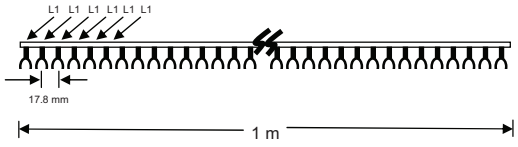


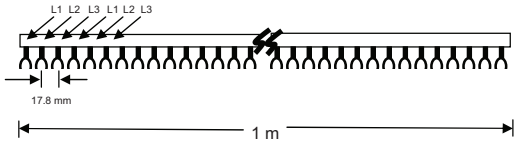
*Cat. No. 1492-ASPA_*

Supplementary Protector/Miniature Circuit Breaker

Approximate Dimensions

Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.



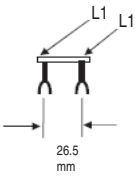


(Use 1492-ASPEC1 (end cap) to cover cut end)

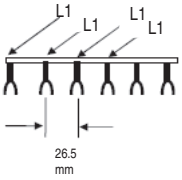
Revised Bus Bar Rating
1492-SP
IEC ratings

The following Bus Bars (Commoning Links) May NOT be cut:

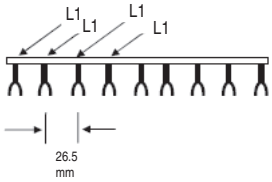
1492-ASPCL1A02



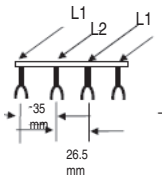
1492-ASPCL1A06



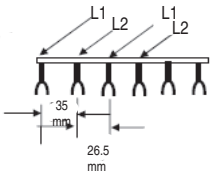
1492-ASPCL1A09



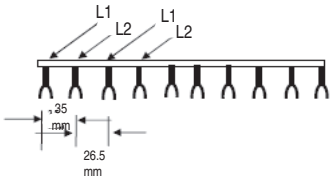
1492-ASPCL2A04



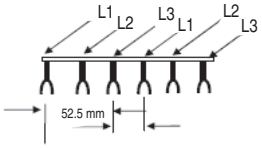
1492-ASPCL2A06



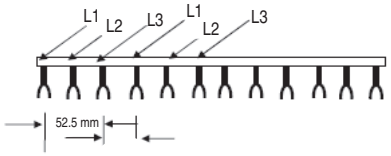
1492-ASPCL2A10



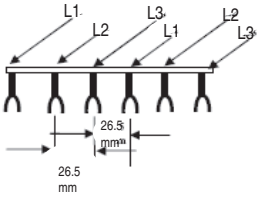
1492-ASPCL3A04



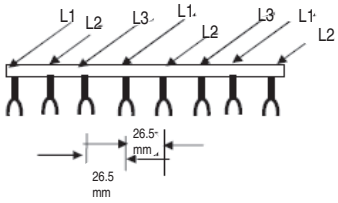
1492-ASPCL3A12



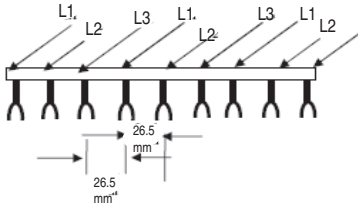
1492-ASPCL3AP04



1492-ASPCL3AP08



1492-ASPCL3AP09

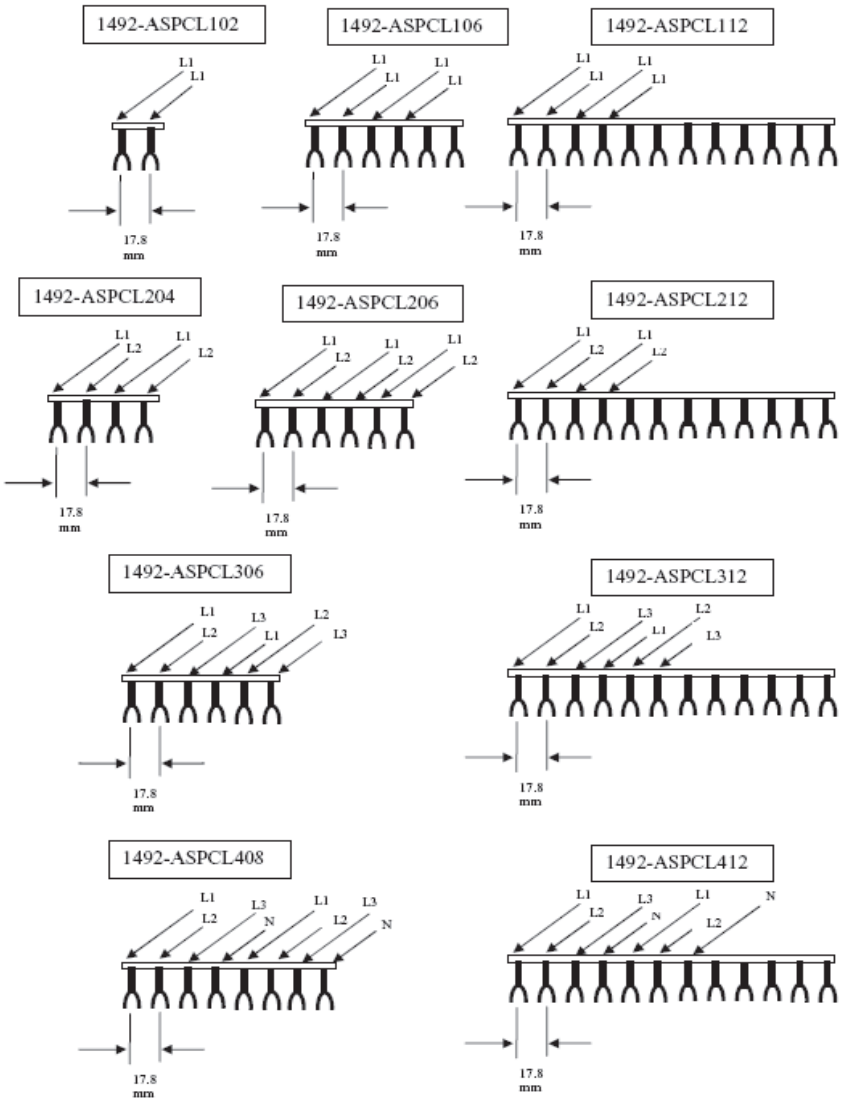


7

Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.

Revised Bus Bar Rating
1492-SP
IEC ratings

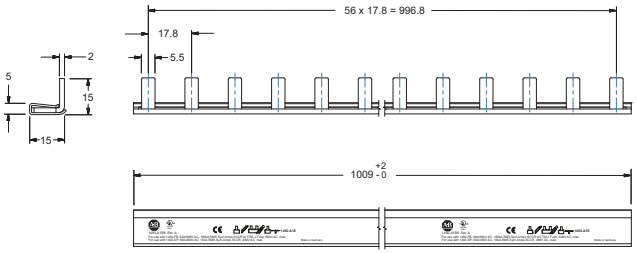
The following Bus Bars (Commoning Links) May **NOT** be cut:



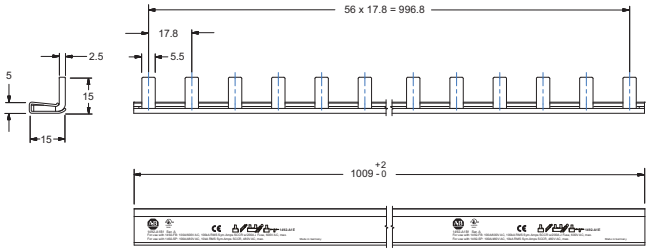
Supplementary Protector/Miniature Circuit Breaker

Approximate Dimensions

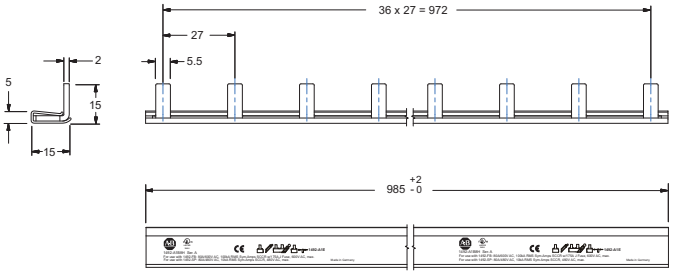
Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.



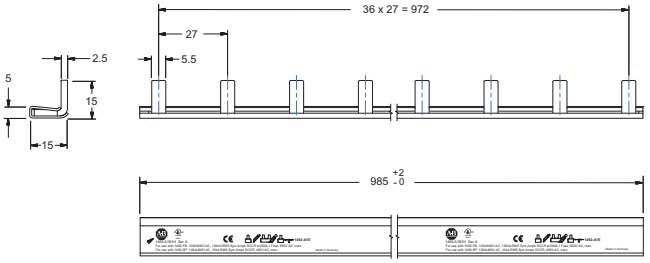
Bulletin 1492-A1B8



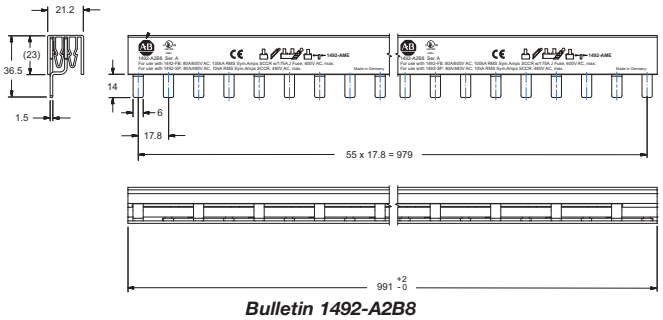
Bulletin 1492-A1B1



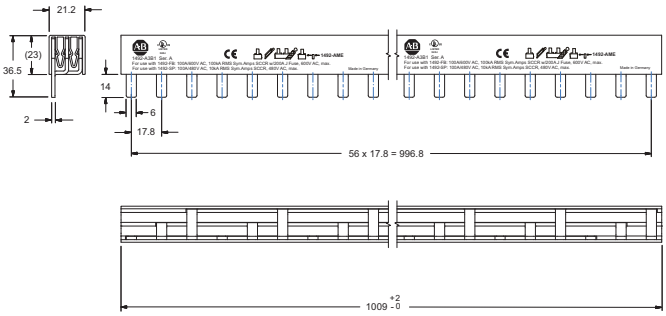
Bulletin 1492-A1B8H



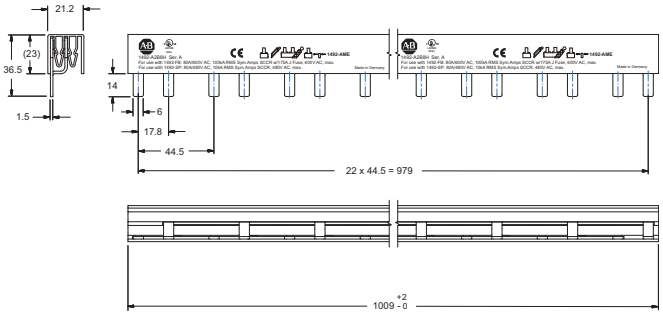
Bulletin 1492-A1B1H



Bulletin 1492-A2B8



Bulletin 1492-A2B1



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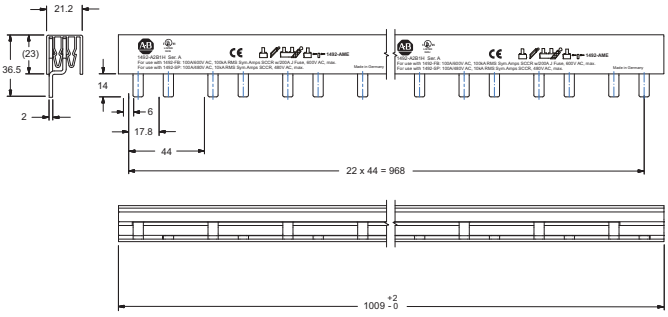
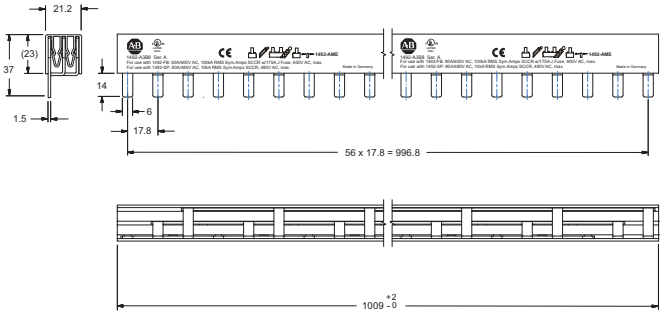
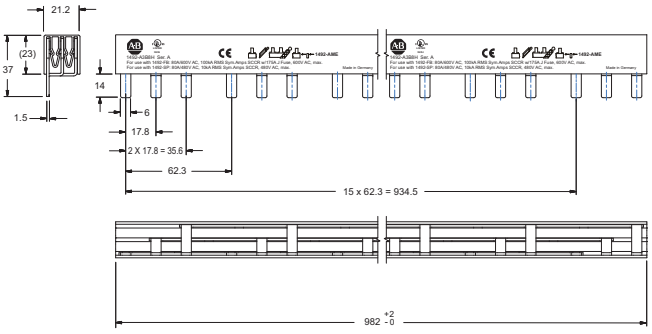


Bulletin 1492-A2B1H

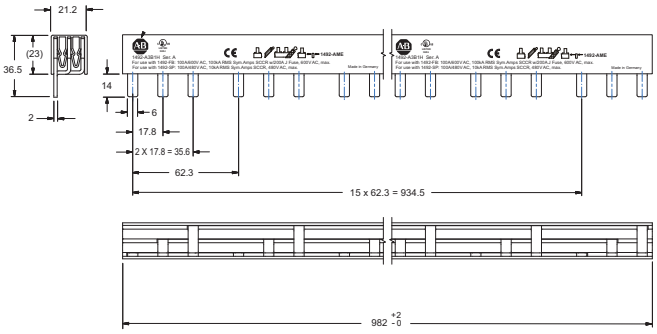


Bulletin 1492-A3B8

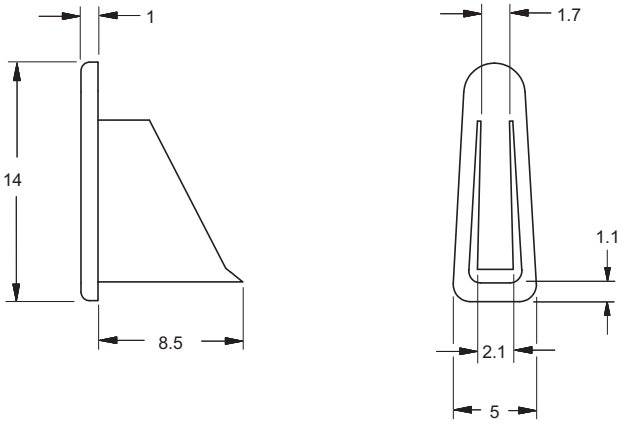
Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.



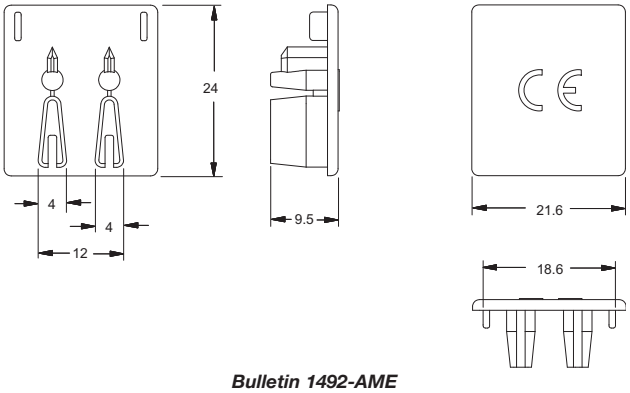
Bulletin 1492-A3B8H



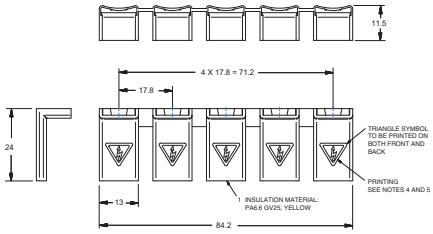
Bulletin 1492-A3B1H



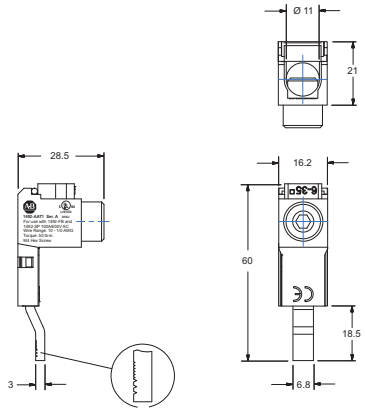
Bulletin 1492-A1E



Bulletin 1492-AME



Bulletin 1492-AAP



Bulletin 1492-AAT1