

# Miniature Circuit Breakers

## Understanding UL489 & UL1077 Devices

The key to understanding UL 1077 supplementary protection and UL 489 branch protection requirements is to first understand how to identify the products, the applications they can be used for and importance of selecting the correct device in compliance with UL standards and NEC Codes.

- A UL 489 device can be used as branch circuit protection or supplementary protection.
- UL 1077 devices are only acceptable for providing supplementary protection where there is branch circuit protection ahead of it.

### UL 489 Circuit Breakers and Branch Circuit Overcurrent Devices

National Electric Code (NEC) defines a branch circuit as the circuit conductors between the final overcurrent device protecting the circuit and the outlets. UL489 opens automatically on overload and short circuit. It also protects wire and cable against overload and short circuit. UL489 circuit breaker used for branch circuit protection.

#### UL489 Applications:

- Receptacles and branch lighting
- Control Panels
- Load circuits leaving the equipment (external)
- Uninterruptible power supply (UPS)
- Relays
- Heating, ventilation, air conditioning and refrigeration equipment (HVAC/R)
- Variable frequency drives (VFD)

#### Features:

- DIN rail mountable
- Stand alone Branch Circuit Protection
- External handle mechanisms available
- Field mounted accessories
- Various levels of protection (curves)



UL 489 products have larger dimensions to provide the necessary phase to phase voltage air gap.

### UL1077 Supplementary Protectors & Overcurrent Devices

UL1077 Supplementary Protector is a manually re-settable device designed to open the circuit automatically on a predetermined value of time versus current or voltage within an appliance or other electrical equipment. A supplementary protective device is intended to provide limited overcurrent protection for specific applications and utilization equipment such as cabinet lighting and appliances.

Example: only use UL 1077 to protect circuits inside the equipment that do not feed circuits that exit the equipment.

#### UL1077 Applications:

- Cabinet Lighting
- Appliances
- Control Power Transformers
- Relays
- Control Circuits

#### Features:

- DIN rail mountable
- Field mounted accessories
- Various levels of protection (curves)



## Miniature Circuit Breakers

### UL 489 Product Overview

### Features

The B1 UL489 miniature circuit breakers are available in a complete range of amperages from 0.5A to 63A. Standard ratings of 10 kA at 480Y/277 Vac and 10 kA at 125 Vdc. These are suitable for branch circuit protection.

- Breakers mount on standard 35 mm DIN rail
- Can be used in UL 1077 or CSA C22.2 No.235 applications
- Field installable shunt trip and auxiliary switch
- Available with provisions for ring tongue terminals
- Module width of only 0.71 in (18 mm) per pole
- Contact position indicator (red/green)
- Possibility for locking the toggle in ON or OFF position



### Typical Applications

- Branch Circuit Protection
- Receptacle and lighting circuits
- Motor control circuits
- Load circuits leaving the equipment (external)
- Heating, ventilation, air conditioning, refrigeration equipment
- Power supplies
- Control instrumentation
- Relays
- Uninterruptible power supply (UPS)
- Power conditioners

### Certifications

#### UL 489 File Number E355392 / CSA C22.2 No. 5-16 / IEC 60947-2

- Certified for Canada according to Canadian Standards Association CSA C22.2 No. 5-16 standard for branch circuit protection.
- UL 489 file number E355392 standard for connection terminals which allows the user to apply field wiring directly to the breaker.
- UL 486 standard for connection terminals which allows the user to apply field wiring directly to the breaker.
- IEC 60947-2 standard for industrial applications of circuit protection.
- CCC China Compulsory Certification



# Miniature Circuit Breakers

## B1NQ UL 489 120/240 Vac 10 kA - Box Lugs



Green Highlight = Most Popular

Rated Amperage (A)	C Curve (5-10 In) Standard		D Curve (10-20 In) Inductive	
	1 Pole - 120 / 240 Vac	2 Pole - 120 / 240 Vac	1 Pole - 120 / 240 Vac	2 Pole - 120 / 240 Vac
	Catalog Number	Catalog Number	Catalog Number	Catalog Number
1	B1NQ1C1	B1NQ2C1	B1NQ1D1	B1NQ2D1
1.6	B1NQ1C1.6	B1NQ2C1.6	B1NQ1D1.6	B1NQ2D1.6
2	B1NQ1C2	B1NQ2C2	B1NQ1D2	B1NQ2D2
3	B1NQ1C3	B1NQ2C3	B1NQ1D3	B1NQ2D3
4	B1NQ1C4	B1NQ2C4	B1NQ1D4	B1NQ2D4
5	B1NQ1C5	B1NQ2C5	B1NQ1D5	B1NQ2D5
6	B1NQ1C6	B1NQ2C6	B1NQ1D6	B1NQ2D6
8	B1NQ1C8	B1NQ2C8	B1NQ1D8	B1NQ2D8
10	B1NQ1C10	B1NQ2C10	B1NQ1D10	B1NQ2D10
13	B1NQ1C13	B1NQ2C13	B1NQ1D13	B1NQ2D13
15	B1NQ1C15	B1NQ2C15	B1NQ1D15	B1NQ2D15
16	B1NQ1C16	B1NQ2C16	B1NQ1D16	B1NQ2D16
20	B1NQ1C20	B1NQ2C20	B1NQ1D20	B1NQ2D20
25	B1NQ1C25	B1NQ2C25	B1NQ1D25	B1NQ2D25
30	B1NQ1C30	B1NQ2C30	B1NQ1D30	B1NQ2D30
32	B1NQ1C32	B1NQ2C32	B1NQ1D32	B1NQ2D32
35	B1NQ1C35	B1NQ2C35	B1NQ1D35	B1NQ2D35
40	B1NQ1C40	B1NQ2C40	B1NQ1D40	B1NQ2D40
45	B1NQ1C45	B1NQ2C45	B1NQ1D45	B1NQ2D45
50	B1NQ1C50	B1NQ2C50	B1NQ1D50	B1NQ2D50
60	B1NQ1C60	B1NQ2C60	B1NQ1D60	B1NQ2D60
63	B1NQ1C63	B1NQ2C63	B1NQ1D63	B1NQ2D63

\*For B Curve see B1N miniature circuit breakers on page A23-A24

Additional products, accessories and higher ratings available. Contact your NOARK representative or visit [na.noark-electric.com](http://na.noark-electric.com) for additional information.

## Miniature Circuit Breakers

### B1N UL 489 240 Vac; 60/125 Vdc 10 kA - Box Lugs



Green Highlight = Most Popular

Rated Amperage (A)	C Curve (5-10 In) Standard		D Curve (10-20 In) Inductive		B Curve (3-5 In) Electronic	
	1 Pole - 240 Vac / 60 Vdc	2 Poles - 240 Vac / 125 Vdc	1 Pole - 240 Vac / 60 Vdc	2 Poles - 240 Vac / 125 Vdc	1 Pole - 240 Vac / 60 Vdc	2 Poles - 240 Vac / 125 Vdc
	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
0.5	B1N1C0.5	B1N2C0.5	B1N1D0.5	B1N2D0.5	B1N1B0.5	B1N2B0.5
1	B1N1C1	B1N2C1	B1N1D1	B1N2D1	B1N1B1	B1N2B1
1.6	B1N1C1.6	B1N2C1.6	B1N1D1.6	B1N2D1.6	B1N1B1.6	B1N2B1.6
2	B1N1C2	B1N2C2	B1N1D2	B1N2D2	B1N1B2	B1N2B2
3	B1N1C3	B1N2C3	B1N1D3	B1N2D3	B1N1B3	B1N2B3
4	B1N1C4	B1N2C4	B1N1D4	B1N2D4	B1N1B4	B1N2B4
5	B1N1C5	B1N2C5	B1N1D5	B1N2D5	B1N1B5	B1N2B5
6	B1N1C6	B1N2C6	B1N1D6	B1N2D6	B1N1B6	B1N2B6
7	B1N1C7	B1N2C7	B1N1D7	B1N2D7	B1N1B7	B1N2B7
8	B1N1C8	B1N2C8	B1N1D8	B1N2D8	B1N1B8	B1N2B8
10	B1N1C10	B1N2C10	B1N1D10	B1N2D10	B1N1B10	B1N2B10
13	B1N1C13	B1N2C13	B1N1D13	B1N2D13	B1N1B13	B1N2B13
15	B1N1C15	B1N2C15	B1N1D15	B1N2D15	B1N1B15	B1N2B15
16	B1N1C16	B1N2C16	B1N1D16	B1N2D16	B1N1B16	B1N2B16
20	B1N1C20	B1N2C20	B1N1D20	B1N2D20	B1N1B20	B1N2B20
25	B1N1C25	B1N2C25	B1N1D25	B1N2D25	B1N1B25	B1N2B25
30	B1N1C30	B1N2C30	B1N1D30	B1N2D30	B1N1B30	B1N2B30
32	B1N1C32	B1N2C32	B1N1D32	B1N2D32	B1N1B32	B1N2B32
35	B1N1C35	B1N2C35	B1N1D35	B1N2D35	B1N1B35	B1N2B35
40	B1N1C40	B1N2C40	B1N1D40	B1N2D40	B1N1B40	B1N2B40
50	B1N1C50	B1N2C50	B1N1D50	B1N2D50	B1N1B50	B1N2B50
60	B1N1C60	B1N2C60	B1N1D60	B1N2D60	B1N1B60	B1N2B60
63	B1N1C63	B1N2C63	B1N1D63	B1N2D63	B1N1B63	B1N2B63

Additional products, accessories and higher ratings available. Contact your NOARK representative or visit [na.noark-electric.com](http://na.noark-electric.com) for additional information.

# Miniature Circuit Breakers

## B1N UL 489 240 Vac; 10 kA - Box Lugs



Green Highlight = Most Popular

Rated Amperage (A)	C Curve (5-10 In) Standard	D Curve (10-20 In) Inductive	B Curve (3-5 In) Electronic
	3 Poles - 240 Vac	3 Poles - 240 Vac	3 Poles - 240 Vac
	Catalog Number	Catalog Number	Catalog Number
0.5	B1N3C0.5	B1N3D0.5	B1N3B0.5
1	B1N3C1	B1N3D1	B1N3B1
1.6	B1N3C1.6	B1N3D1.6	B1N3B1.6
2	B1N3C2	B1N3D2	B1N3B2
3	B1N3C3	B1N3D3	B1N3B3
4	B1N3C4	B1N3D4	B1N3B4
5	B1N3C5	B1N3D5	B1N3B5
6	B1N3C6	B1N3D6	B1N3B6
7	B1N3C7	B1N3D7	B1N3B7
8	B1N3C8	B1N3D8	B1N3B8
10	B1N3C10	B1N3D10	B1N3B10
13	B1N3C13	B1N3D13	B1N3B13
15	B1N3C15	B1N3D15	B1N3B15
16	B1N3C16	B1N3D16	B1N3B16
20	B1N3C20	B1N3D20	B1N3B20
25	B1N3C25	B1N3D25	B1N3B25
30	B1N3C30	B1N3D30	B1N3B30
32	B1N3C32	B1N3D32	B1N3B32
35	B1N3C35	B1N3D35	B1N3B35
40	B1N3C40	B1N3D40	B1N3B40
50	B1N3C50	B1N3D50	B1N3B50
60	B1N3C60	B1N3D60	B1N3B60
63	B1N3C63	B1N3D63	B1N3B63

Additional products, accessories and higher ratings available. Contact your NOARK representative or visit [na.noark-electric.com](http://na.noark-electric.com) for additional information.

## Miniature Circuit Breakers

### B1H UL 489 480Y/277 Vac 10 kA - Box Lugs

**Certifications**  
IEC/EN 60947-2

CE cUL US LISTED

CCC



Green Highlight = Most Popular

Rated Amperage (A)	C Curve (5-10 In) Standard		D Curve (10-20 In) Inductive		B Curve (3-5 In) Electronic	
	1 Pole 277 Vac	2 Poles 480Y/277 Vac	1 Pole 277 Vac	2 Poles 480Y/277 Vac	1 Pole 277 Vac	2 Poles 480Y/277 Vac
	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
0.5	B1H1C0.5	B1H2C0.5	B1H1D0.5	B1H2D0.5	B1H1B0.5	B1H2B0.5
1	B1H1C1	B1H2C1	B1H1D1	B1H2D1	B1H1B1	B1H2B1
1.6	B1H1C1.6	B1H2C1.6	B1H1D1.6	B1H2D1.6	B1H1B1.6	B1H2B1.6
2	B1H1C2	B1H2C2	B1H1D2	B1H2D2	B1H1B2	B1H2B2
3	B1H1C3	B1H2C3	B1H1D3	B1H2D3	B1H1B3	B1H2B3
4	B1H1C4	B1H2C4	B1H1D4	B1H2D4	B1H1B4	B1H2B4
5	B1H1C5	B1H2C5	B1H1D5	B1H2D5	B1H1B5	B1H2B5
6	B1H1C6	B1H2C6	B1H1D6	B1H2D6	B1H1B6	B1H2B6
7	B1H1C7	B1H2C7	B1H1D7	B1H2D7	B1H1B7	B1H2B7
8	B1H1C8	B1H2C8	B1H1D8	B1H2D8	B1H1B8	B1H2B8
10	B1H1C10	B1H2C10	B1H1D10	B1H2D10	B1H1B10	B1H2B10
13	B1H1C13	B1H2C13	B1H1D13	B1H2D13	B1H1B13	B1H2B13
15	B1H1C15	B1H2C15	B1H1D15	B1H2D15	B1H1B15	B1H2B15
16	B1H1C16	B1H2C16	B1H1D16	B1H2D16	B1H1B16	B1H2B16
20	B1H1C20	B1H2C20	B1H1D20	B1H2D20	B1H1B20	B1H2B20
25	B1H1C25	B1H2C25	B1H1D25	B1H2D25	B1H1B25	B1H2B25
30	B1H1C30	B1H2C30	B1H1D30	B1H2D30	B1H1B30	B1H2B30
32	B1H1C32	B1H2C32	B1H1D32	B1H2D32	B1H1B32	B1H2B32

Additional products, accessories and higher ratings available. Contact your NOARK representative or visit [na.noark-electric.com](http://na.noark-electric.com) for additional information.

# Miniature Circuit Breakers

## B1H UL 489 480Y/277 Vac 10 kA - Box Lugs



Green Highlight = Most Popular

Rated Amperage (A)	C Curve (5-10 In) Standard	D Curve (10-20 In) Inductive	B Curve (3-5 In) Electronic
	3 Poles 480Y/277 Vac	3 Poles 480Y/277 Vac	3 Poles 480Y/277 Vac
	Catalog Number	Catalog Number	Catalog Number
0.5	B1H3C0.5	B1H3D0.5	B1H3B0.5
1	B1H3C1	B1H3D1	B1H3B1
1.6	B1H3C1.6	B1H3D1.6	B1H3B1.6
2	B1H3C2	B1H3D2	B1H3B2
3	B1H3C3	B1H3D3	B1H3B3
4	B1H3C4	B1H3D4	B1H3B4
5	B1H3C5	B1H3D5	B1H3B5
6	B1H3C6	B1H3D6	B1H3B6
7	B1H3C7	B1H3D7	B1H3B7
8	B1H3C8	B1H3D8	B1H3B8
10	B1H3C10	B1H3D10	B1H3B10
13	B1H3C13	B1H3D13	B1H3B13
15	B1H3C15	B1H3D15	B1H3B15
16	B1H3C16	B1H3D16	B1H3B16
20	B1H3C20	B1H3D20	B1H3B20
25	B1H3C25	B1H3D25	B1H3B25
30	B1H3C30	B1H3D30	B1H3B30
32	B1H3C32	B1H3D32	B1H3B32

D

Additional products, accessories and higher ratings available. Contact your NOARK representative or visit [na.noark-electric.com](http://na.noark-electric.com) for additional information.

## Miniature Circuit Breakers

### UL 489 Technical Data

		B1NQ		B1N			B1H			
Conformed Standard		UL 489								
Number of Poles		1	2	1	2	3	1	2	3	
Rated Operational Voltage (V)		120/240 Vac		240 Vac 60 Vdc	240 Vac 125 Vdc	240 Vac	480Y/277 Vac			
Rated Frequency (Hz)		50/60								
Rated Current (A)		1-63		0.5-63			0.5-32			
Instantaneous Tripping Type		C (5-10 In), D (10-20 In)		B (3-5 In), C (5-10 In), D (10-20 In)						
Interrupting (kA)	120 Vac	10	10	-			10	-		
	240 Vac		10			10				
	277 Vac	-	-			-	10			
	480Y/277 Vac		-				-			
	60 Vdc		10	10	-					
	125 Vdc	-	-	10		-	-			
Inverse Time-Delay Over-Current Release Type		Thermal-Magnetic								
Service Life	Electrical	6,000		10,000						
	Mechanical	10,000		20,000						
Protection Degree		IP 20								
Wire AWG	Single Wire	18-4								
	Two Wires	#18-6 / #14-10								
Operating Temperature Range		-22 °F to 167 °F (-30 °C to +75 °C)								
Insulation Coordination	Rated Insulation Voltage (Vac)	500								
	Rated Impulse Withstand Voltage (kV)	6								
Pollution Degree		Class III								
Over Voltage Category		Class III								
Mounting		35 mm DIN rail / Flush and surface mount available on B1NQ with the use of additional mounting clips								
Altitude ft (m)		Does not exceed 6,561 (2,000)								
Atmospheric Conditions		At 68 °F (+20 ), the relative humidity does not exceed 90% At 104 °F (+40 ), the relative humidity does not exceed 50%								

\* AWG = American Wire Gauge

		Alarm Switch	Auxiliary Contact	Shunt Trip		Under-Voltage Trip	
		AL	AX	SHT	SHT+AX	UVT	UVT+AX
Applicable Standard		UL 489					
Ratings (50/60 Hz)	Vac	480V (3 A), 277V (3 A), 240V (6 A)		110-415V		240V	
	Vdc	250V (0.5 A), 125V (1 A), 48V (2 A), 24V (6 A)		110-130V		-	
	Vac/dc	-		48-60V, 12-24V		48V	
Auxiliary Contact Configuration		-	1NO+1NC	-	1NO+1NC	-	1NO+1NC



# Miniature Circuit Breakers

## UL 489 Accessories



Accessory Description	Catalog Number
Alarm Switch*	AL3111N
Auxiliary Contact*	AX3111N

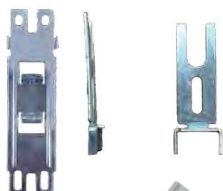
Green Highlight = Most Popular



Accessory Description	Configuration	Catalog Number
Shunt Trip*	12-24 Vac/dc	SHT31NC
	48-60 Vac/dc	SHT31NB
	110-415 Vac/110-130 Vdc	SHT31NA
	12-24 Vac/dc 1NO+1NC	SHT3111NC
	48-60 Vac/dc 1NO+1NC	SHT3111NB
	110-415 Vac/110-130 Vdc 1NO+1NC	SHT3111NA
Under-Voltage Trip*	1NC / 240 Vac	UVT3101NA
	1NC / 48 Vac/dc	UVT3101NB
	1NO / 240 Vac	UVT3110NA
	1NO / 48 Vac/dc	UVT3110NB
	240 Vac	UVT31NA
	48 Vac/dc	UVT31NB



Accessory Description	Catalog Number
Padlock* (Lock Off)	LK31N



Accessory Description	Catalog Number
Surface Mount Clip - 1 Pole*	SMC311N
Surface Mount Clip - 2 Pole*	SMC312N
Flush Mount Clip*	FMC31N



Accessory Description	Catalog Number
35 mm DIN rail	TH35A75

\* Note: These accessories are not compatible with comb bus bar applications. They cannot be used on miniature circuit breakers when utilizing a comb bus bar.

Additional products, accessories and higher ratings available. Contact your NOARK representative or visit [na.noark-electric.com](http://na.noark-electric.com) for additional information.

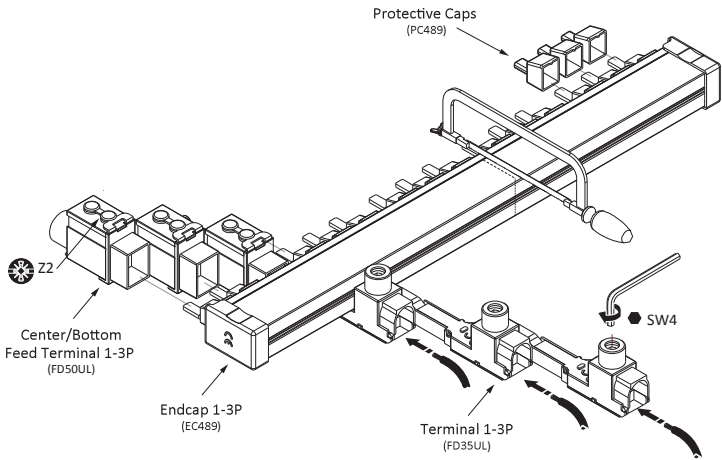
# Miniature Circuit Breakers

## UL 489 Accessories: Comb Bus Bar Specifications

Green Highlight = Most Popular

Description	Sold in Quantity of	Catalog Number
Top Feed Terminal (35mm)	10	FD35UL
Bottom Feed Terminal (50mm)	10	FD50UL
End Cap 1-3p	10	EC489
Protective Cap	10	PC489

\*Example: Order 1 FD35UL = Quantity of 10



	Phase	No. of Pins	No. of Circuit Breakers	Poles	Cross Section	Rating	Catalog Number
UL 489	1	6	6x	1	25mm	100 amp (End Feed) 200 amp (Center Feed)	CBA1P06P25UL
	1	12	12x	1			CBA1P12P25UL
	1	18	18x	1			CBA1P18P25UL
	1	57	57x	1			CBA1P57P25UL
	2	6	3x	2			CBA2P06P25UL
	2	12	6x	2			CBA2P12P25UL
	2	18	9x	2			CBA2P18P25UL
	2	56	28x	2			CBA2P56P25UL
	3	6	2x	3			CBA3P06P25UL
	3	12	4x	3			CBA3P12P25UL
	3	18	6x	3			CBA3P18P25UL
	3	57	19x	3			CBA3P57P25UL

Note: J Fuse Rating 14 kA

Additional products, accessories and higher ratings available. Contact your NOARK representative or visit [na.noark-electric.com](http://na.noark-electric.com) for additional information.

# Miniature Circuit Breakers

## Understanding UL489 & UL1077 Devices

The key to understanding UL 1077 supplementary protection and UL 489 branch protection requirements is to first understand how to identify the products, the applications they can be used for and importance of selecting the correct device in compliance with UL standards and NEC Codes.

- A UL 489 device can be used as branch circuit protection or supplementary protection.
- UL 1077 devices are only acceptable for providing supplementary protection where there is branch circuit protection ahead of it.

### UL 489 Circuit Breakers and Branch Circuit Overcurrent Devices

National Electric Code (NEC) defines a branch circuit as the circuit conductors between the final overcurrent device protecting the circuit and the outlets. UL489 opens automatically on overload and short circuit. It also protects wire and cable against overload and short circuit. UL489 circuit breaker used for branch circuit protection.

#### UL489 Applications:

- Receptacles and branch lighting
- Control Panels
- Load circuits leaving the equipment (external)
- Uninterruptible power supply (UPS)
- Relays
- Heating, ventilation, air conditioning and refrigeration equipment (HVAC/R)
- Variable frequency drives (VFD)

#### Features:

- DIN rail mountable
- Stand alone Branch Circuit Protection
- External handle mechanisms available
- Field mounted accessories
- Various levels of protection (curves)



UL 489 products have larger dimensions to provide the necessary phase to phase voltage air gap.

### UL1077 Supplementary Protectors & Overcurrent Devices

UL1077 Supplementary Protector is a manually re-settable device designed to open the circuit automatically on a predetermined value of time versus current or voltage within an appliance or other electrical equipment. A supplementary protective device is intended to provide limited overcurrent protection for specific applications and utilization equipment such as cabinet lighting and appliances.

Example: only use UL 1077 to protect circuits inside the equipment that do not feed circuits that exit the equipment.

#### UL1077 Applications:

- Cabinet Lighting
- Appliances
- Control Power Transformers
- Relays
- Control Circuits

#### Features:

- DIN rail mountable
- Field mounted accessories
- Various levels of protection (curves)



Disclaimer: Proper Sizing of an overcurrent protection device is the responsibility of the customer and should be determined using the application standards of the NEC\*, CEC\*\*, or other applicable standards.

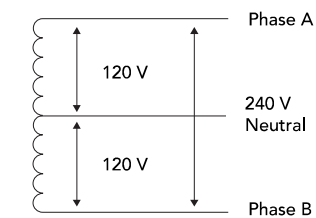
\*NEC-National Electric Code

\*\* CEC-Canadian Electrical Code

## Miniature Circuit Breakers

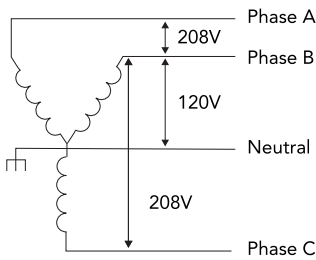
### Applying UL 489 Breakers Based on Common System Voltages

#### Voltage 120/240V 1 Phase



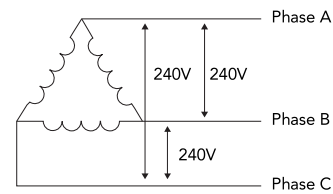
Connection		Style	Rating
Poles	Voltage		
One	120V	B1NQ	120/240
Two	240V	B1NQ	120/240

#### Voltage 208/120 3 Phase



Connection		Style	Rating
Poles	Voltage		
One	120V	B1NQ	120/240
Two	208V	B1NQ	120/240
Three	208V	B1N	240

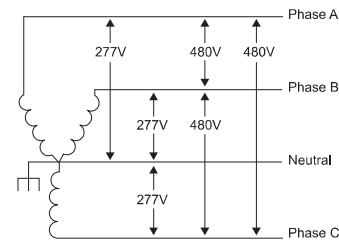
#### Voltage 240V Delta Ungrounded



Connection		Style	Rating
Poles	Voltage		
Two	240V	B1N	240
Three	240V	B1N	240

Note: For high-leg delta or 480V delta systems, please call your Noark representative.

#### Voltage 3 Phase 480/277V



Connection		Style	Rating
Poles	Voltage		
One	277V	B1H	480/277
Two	480V	B1H	480/277
Three	480/277V	B1H	480/277

Note: One can always use a higher rated breaker. (ie. B1NQ<B1N<B1H)

Disclaimer: Proper Sizing of an overcurrent protection device is the responsibility of the customer and should be determined using the application standards of the NEC\*, CEC\*\*, or other applicable standards.

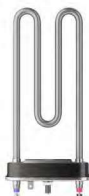
# Miniature Circuit Breakers

## Curves

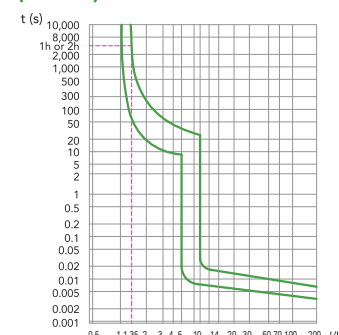
Miniature circuit breakers have different protection curves to accommodate different applications.

### C Curve

In Type C curve applications the magnetic trip is set between 5-10 times the full load current. This is the most common protection used for cables, lighting, resistive loads, general purpose applications and when properly sized, for motors.



### C Curve (5-10 In)

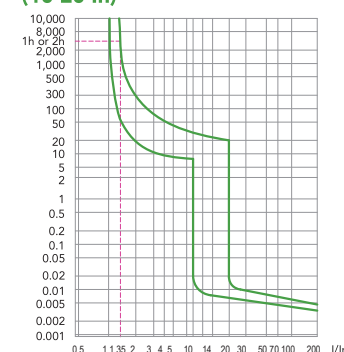


### D Curve

Type D curve applications have a higher setting of 7-15 times the full load current. Due to the inrush current of motor loads and the magnetizing current on the primary of a transformer or solenoid. Application for this curve include motor loads, transformer primary and solenoids due to the inrush or magnetizing currents.



### D Curve (10-20 In)

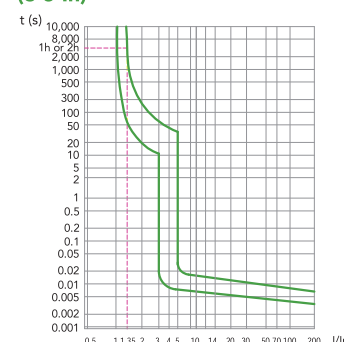


### B Curve

Type B curves provide a magnetic trip setting of 3-5 times the full load current. Applications: electronic circuits.



### B Curve (3-5 In)



Disclaimer: Proper Sizing of an overcurrent protection device is the responsibility of the customer and should be determined using the application standards of the NEC\*, CEC\*\*, or other applicable standards.

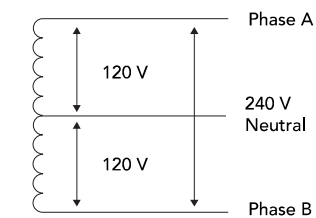
\*NEC-National Electric Code

\*\* CEC-Canadian Electrical Code

## Miniature Circuit Breakers

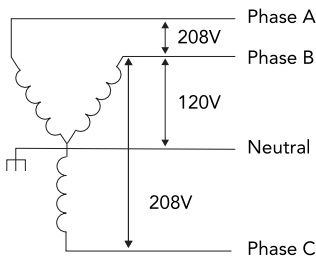
### Applying UL 489 Breakers Based on Common System Voltages

#### Voltage 120/240V 1 Phase



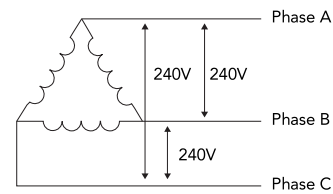
Connection		Style	Rating
Poles	Voltage		
One	120V	B1NQ	120/240
Two	240V	B1NQ	120/240

#### Voltage 208/120 3 Phase



Connection		Style	Rating
Poles	Voltage		
One	120V	B1NQ	120/240
Two	208V	B1NQ	120/240
Three	208V	B1N	240

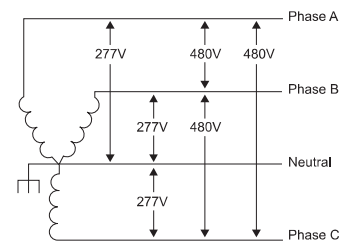
#### Voltage 240V Delta Ungrounded



Connection		Style	Rating
Poles	Voltage		
Two	240V	B1N	240
Three	240V	B1N	240

Note: For high-leg delta or 480V delta systems, please call your Noark representative.

#### Voltage 3 Phase 480/277V



Connection		Style	Rating
Poles	Voltage		
One	277V	B1H	480/277
Two	480V	B1H	480/277
Three	480/277V	B1H	480/277

Note: One can always use a higher rated breaker. (ie. B1NQ<B1N<B1H)

Disclaimer: Proper Sizing of an overcurrent protection device is the responsibility of the customer and should be determined using the application standards of the NEC\*, CEC\*\*, or other applicable standards.

# Miniature Circuit Breakers

## Curves

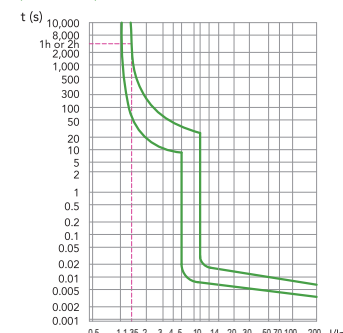
Miniature circuit breakers have different protection curves to accommodate different applications.

### C Curve

In Type C curve applications the magnetic trip is set between 5-10 times the full load current. This is the most common protection used for cables, lighting, resistive loads, general purpose applications and when properly sized, for motors.



### C Curve (5-10 In)

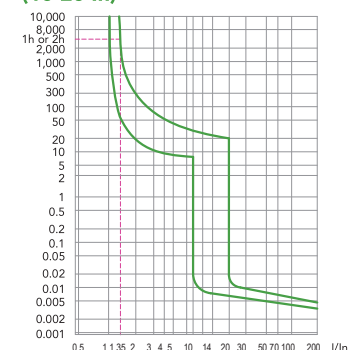


### D Curve

Type D curve applications have a higher setting of 7-15 times the full load current. Due to the inrush current of motor loads and the magnetizing current on the primary of a transformer or solenoid. Application for this curve include motor loads, transformer primary and solenoids due to the inrush or magnetizing currents.



### D Curve (10-20 In)



### B Curve

Type B curves provide a magnetic trip setting of 3-5 times the full load current. Applications: electronic circuits.



### B Curve (3-5 In)

