

**FAZ Circuit Breakers**

*Optimum and Efficient Protection for Every Application*

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**FAZ Circuit Breakers****Product Overview**

Optimum product quality, tested reliability and safety stand for best protection of personnel, installations and plant. Eaton's FAZ DIN rail mountable circuit breaker is designed for use in control panel applications.

**Powerful offering for machine and system builders**

The FAZ is available with B, C, D, K, S, and Z characteristics in accordance with UL 1077, CSA C22.2 No.235 and IEC 60947-2. These devices are CE marked.

**Application Description**

- Supplementary protection
- Control circuits
- Lighting
- Business equipment
- Appliances

**Features**

- Complete range of UL 1077 recognized DIN rail mounted miniature circuit breakers up to 63A current rating
- Standard ratings of 10 kAIC up to 277/480 Vac
- Current limiting design provides fast short-circuit interruption that reduces the let-through energy, which can damage the circuit
- Suitable for supplementary protection
- Thermal-magnetic overcurrent protection
  - Six levels of short-circuit protection, categorized by B, C, D, K, S, and Z curves
- Trip-free design—breaker can not be defeated by holding the handle in the ON position
- Captive screws cannot be lost
- Fulfill UL 1077, CSA C22.2 No.235 and also IEC 60947-2 Standard
- Field-installable shunt trip and auxiliary switch subsequent mounting
- Module width of only 17.7 mm (per pole)
- Contact position indicator (red/green)
- Easy installation on DIN rail
- Possibility for sealing the toggle in ON or OFF position

### Discover These Advanced Features

Breakers install on standard DIN rail

Available in one-, two-, three-, four-pole, 1+N and 3+N models

Color-coded indicator provides breaker status for easy troubleshooting



Captive Posidrive terminal screws with finger and back-of-hand protection (IP20)

Trip-free design; breaker cannot be defeated by holding the handle in the ON position

Breaker information printed on the front of the device for quick identification

### Standards and Certifications

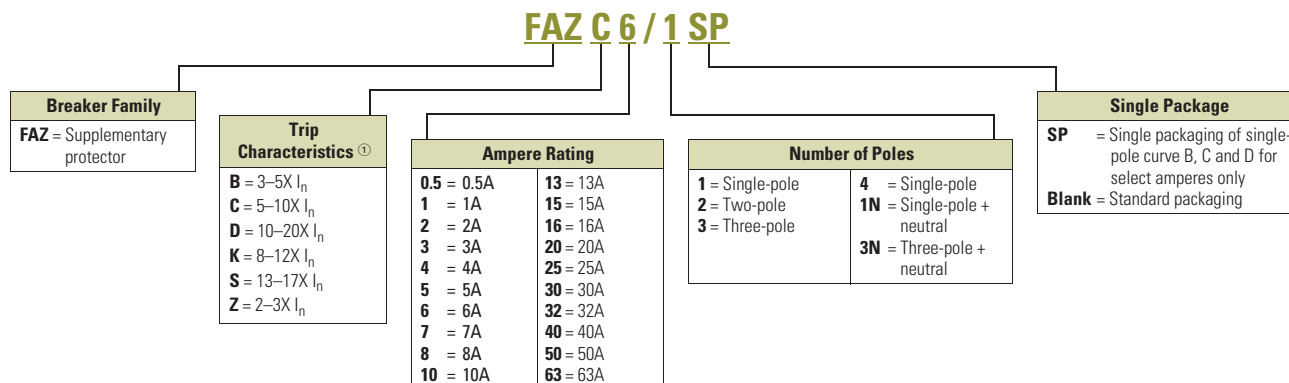
FAZ complies with the latest national and international standards.

- UL 1077, CSA C22.2 No. 235
- Apply to supplementary protectors intended for use as overcurrent, or overvoltage or undervoltage protection within an appliance or other electrical equipment where branch circuit protection is already provided, or is not required

- RoHS compliant
- VDE compliant
  - Devices with B, C, and D curves are VDE compliant
- CCC
  - Devices with B, C, and D curves are CCC compliant
- ABS compliant



### Catalog Number Selection



#### Note

<sup>①</sup>  $I_n$  = Rated current for instantaneous trip characteristics.

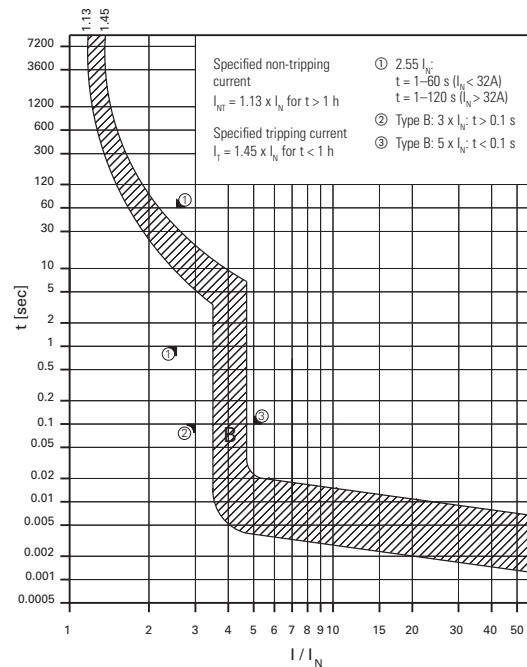
## 1

## Product Selection

**FAZ B curve (3–5X  $I_n$  current rating)**

- Designed for resistive or slightly inductive loads
- Response time of instantaneous trip: 3–5X  $I_n$  current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where protection against low-level short-circuit faults in control wiring is desired. Instantaneous trip is 3–5X continuous rating of device ( $I_n$ ). Applications include PLC wiring, business equipment, lighting, appliances and some motors. Low magnetic trip point.



## Single-Pole



## Two-Pole



## Three-Pole

**B Curve (3–5X  $I_n$  Current Rating) — Designed for Resistive or Slightly Inductive Loads ①**

| Amperes | Single-Pole ②<br>Catalog Number | Two-Pole<br>Catalog Number | Three-Pole<br>Catalog Number |
|---------|---------------------------------|----------------------------|------------------------------|
| 1       | FAZ-B1/1-SP                     | FAZ-B1/2                   | FAZ-B1/3                     |
| 2       | FAZ-B2/1-SP                     | FAZ-B2/2                   | FAZ-B2/3                     |
| 3       | FAZ-B3/1-SP                     | FAZ-B3/2                   | FAZ-B3/3                     |
| 4       | FAZ-B4/1-SP                     | FAZ-B4/2                   | FAZ-B4/3                     |
| 5       | FAZ-B5/1-SP                     | FAZ-B5/2                   | FAZ-B5/3                     |
| 6       | FAZ-B6/1-SP                     | FAZ-B6/2                   | FAZ-B6/3                     |
| 7       | FAZ-B7/1-SP                     | FAZ-B7/2                   | FAZ-B7/3                     |
| 8       | FAZ-B8/1-SP                     | FAZ-B8/2                   | FAZ-B8/3                     |
| 10      | FAZ-B10/1-SP                    | FAZ-B10/2                  | FAZ-B10/3                    |
| 12      | FAZ-B12/1-SP                    | FAZ-B12/2                  | FAZ-B12/3                    |
| 13      | FAZ-B13/1-SP                    | FAZ-B13/2                  | FAZ-B13/3                    |
| 15      | FAZ-B15/1-SP                    | FAZ-B15/2                  | FAZ-B15/3                    |
| 16      | FAZ-B16/1-SP                    | FAZ-B16/2                  | FAZ-B16/3                    |
| 20      | FAZ-B20/1-SP                    | FAZ-B20/2                  | FAZ-B20/3                    |
| 25      | FAZ-B25/1-SP                    | FAZ-B25/2                  | FAZ-B25/3                    |
| 30      | FAZ-B30/1-SP                    | FAZ-B30/2                  | FAZ-B30/3                    |
| 32      | FAZ-B32/1-SP                    | FAZ-B32/2                  | FAZ-B32/3                    |
| 40      | FAZ-B40/1-SP                    | FAZ-B40/2                  | FAZ-B40/3                    |
| 50      | FAZ-B50/1-SP                    | FAZ-B50/2                  | FAZ-B50/3                    |
| 63      | FAZ-B63/1-SP                    | FAZ-B63/2                  | FAZ-B63/3                    |

**Notes**

① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.

② Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.

## Four-Pole



## Single-Pole + Neutral



## Three-Pole + Neutral

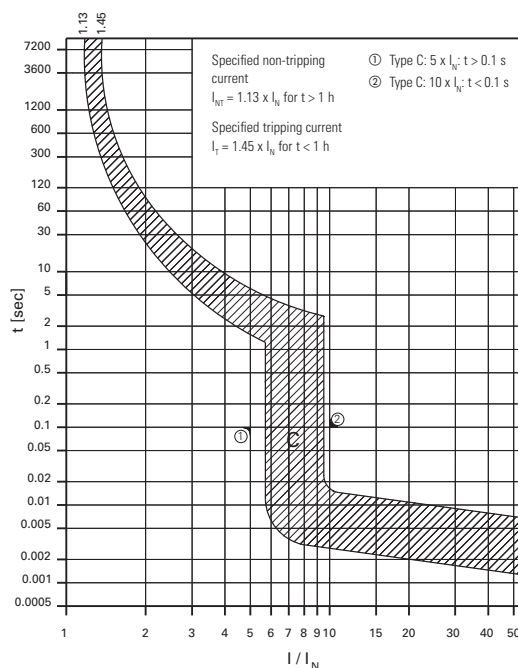
**B Curve (3–5X  $I_n$  Current Rating) — Designed for Resistive or Slightly Inductive Loads, continued ①**

| Amperes | Four-Pole<br>Catalog Number | Single-Pole + Neutral<br>Catalog Number | Three-Pole + Neutral<br>Catalog Number |
|---------|-----------------------------|-----------------------------------------|----------------------------------------|
| 1       | FAZ-B1/4                    | FAZ-B1/1N                               | FAZ-B1/3N                              |
| 2       | FAZ-B2/4                    | FAZ-B2/1N                               | FAZ-B2/3N                              |
| 3       | FAZ-B3/4                    | FAZ-B3/1N                               | FAZ-B3/3N                              |
| 4       | FAZ-B4/4                    | FAZ-B4/1N                               | FAZ-B4/3N                              |
| 5       | FAZ-B5/4                    | FAZ-B5/1N                               | FAZ-B5/3N                              |
| 6       | FAZ-B6/4                    | FAZ-B6/1N                               | FAZ-B6/3N                              |
| 7       | FAZ-B7/4                    | FAZ-B7/1N                               | FAZ-B7/3N                              |
| 8       | FAZ-B8/4                    | FAZ-B8/1N                               | FAZ-B8/3N                              |
| 10      | FAZ-B10/4                   | FAZ-B10/1N                              | FAZ-B10/3N                             |
| 12      | FAZ-B12/4                   | FAZ-B12/1N                              | FAZ-B12/3N                             |
| 13      | FAZ-B13/4                   | FAZ-B13/1N                              | FAZ-B13/3N                             |
| 15      | FAZ-B15/4                   | FAZ-B15/1N                              | FAZ-B15/3N                             |
| 16      | FAZ-B16/4                   | FAZ-B16/1N                              | FAZ-B16/3N                             |
| 20      | FAZ-B20/4                   | FAZ-B20/1N                              | FAZ-B20/3N                             |
| 25      | FAZ-B25/4                   | FAZ-B25/1N                              | FAZ-B25/3N                             |
| 30      | FAZ-B30/4                   | FAZ-B30/1N                              | FAZ-B30/3N                             |
| 32      | FAZ-B32/4                   | FAZ-B32/1N                              | FAZ-B32/3N                             |
| 40      | FAZ-B40/4                   | FAZ-B40/1N                              | FAZ-B40/3N                             |
| 50      | FAZ-B50/4                   | FAZ-B50/1N                              | FAZ-B50/3N                             |
| 63      | FAZ-B63/4                   | FAZ-B63/1N                              | FAZ-B63/3N                             |

### FAZ C curve (5–10X $I_n$ current rating)

- Designed for inductive loads
- Response time of instantaneous trip: 5–10X  $I_n$  current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where medium levels of inrush current are expected. Instantaneous trip is 5–10X rating of device ( $I_n$ ). Applications include small transformers, lighting, pilot devices, control circuits and coils. Medium magnetic trip point.



#### Single-Pole



#### Two-Pole



#### Three-Pole



### C Curve (5–10X $I_n$ Current Rating)—Designed Inductive Loads ①

| Amperes | Single-Pole ②<br>Catalog<br>Number | Two-Pole<br>Catalog<br>Number | Three-Pole<br>Catalog<br>Number |
|---------|------------------------------------|-------------------------------|---------------------------------|
| 0.5     | FAZ-C0.5/1-SP                      | FAZ-C0.5/2                    | FAZ-C0.5/3                      |
| 1       | FAZ-C1/1-SP                        | FAZ-C1/2                      | FAZ-C1/3                        |
| 1.6     | FAZ-C1.6/1-SP                      | FAZ-C1.6/2                    | FAZ-C1.6/3                      |
| 2       | FAZ-C2/1-SP                        | FAZ-C2/2                      | FAZ-C2/3                        |
| 3       | FAZ-C3/1-SP                        | FAZ-C3/2                      | FAZ-C3/3                        |
| 4       | FAZ-C4/1-SP                        | FAZ-C4/2                      | FAZ-C4/3                        |
| 5       | FAZ-C5/1-SP                        | FAZ-C5/2                      | FAZ-C5/3                        |
| 6       | FAZ-C6/1-SP                        | FAZ-C6/2                      | FAZ-C6/3                        |
| 7       | FAZ-C7/1-SP                        | FAZ-C7/2                      | FAZ-C7/3                        |
| 8       | FAZ-C8/1-SP                        | FAZ-C8/2                      | FAZ-C8/3                        |
| 10      | FAZ-C10/1-SP                       | FAZ-C10/2                     | FAZ-C10/3                       |
| 13      | FAZ-C13/1-SP                       | FAZ-C13/2                     | FAZ-C13/3                       |
| 15      | FAZ-C15/1-SP                       | FAZ-C15/2                     | FAZ-C15/3                       |
| 16      | FAZ-C16/1-SP                       | FAZ-C16/2                     | FAZ-C16/3                       |
| 20      | FAZ-C20/1-SP                       | FAZ-C20/2                     | FAZ-C20/3                       |
| 25      | FAZ-C25/1-SP                       | FAZ-C25/2                     | FAZ-C25/3                       |
| 30      | FAZ-C30/1-SP                       | FAZ-C30/2                     | FAZ-C30/3                       |
| 32      | FAZ-C32/1-SP                       | FAZ-C32/2                     | FAZ-C32/3                       |
| 40      | FAZ-C40/1-SP                       | FAZ-C40/2                     | FAZ-C40/3                       |
| 50      | FAZ-C50/1-SP                       | FAZ-C50/2                     | FAZ-C50/3                       |
| 63      | FAZ-C63/1-SP                       | FAZ-C63/2                     | FAZ-C63/3                       |

#### Four-Pole



#### Single-Pole + Neutral



#### Three-Pole + Neutral



### C Curve (5–10X $I_n$ Current Rating)—Designed Inductive Loads, continued ①

| Amperes | Four-Pole<br>Catalog<br>Number | Single-Pole<br>+ Neutral<br>Catalog<br>Number | Three-Pole<br>+ Neutral<br>Catalog<br>Number |
|---------|--------------------------------|-----------------------------------------------|----------------------------------------------|
| 0.5     | FAZ-C0.5/4                     | FAZ-C0.5/1N                                   | FAZ-C0.5/3N                                  |
| 1       | FAZ-C1/4                       | FAZ-C1/1N                                     | FAZ-C1/3N                                    |
| 1.6     | FAZ-C1.6/4                     | FAZ-C1.6/1N                                   | FAZ-C1.6/3N                                  |
| 2       | FAZ-C2/4                       | FAZ-C2/1N                                     | FAZ-C2/3N                                    |
| 3       | FAZ-C3/4                       | FAZ-C3/1N                                     | FAZ-C3/3N                                    |
| 4       | FAZ-C4/4                       | FAZ-C4/1N                                     | FAZ-C4/3N                                    |
| 5       | FAZ-C5/4                       | FAZ-C5/1N                                     | FAZ-C5/3N                                    |
| 6       | FAZ-C6/4                       | FAZ-C6/1N                                     | FAZ-C6/3N                                    |
| 7       | FAZ-C7/4                       | FAZ-C7/1N                                     | FAZ-C7/3N                                    |
| 8       | FAZ-C8/4                       | FAZ-C8/1N                                     | FAZ-C8/3N                                    |
| 10      | FAZ-C10/4                      | FAZ-C10/1N                                    | FAZ-C10/3N                                   |
| 13      | FAZ-C13/4                      | FAZ-C13/1N                                    | FAZ-C13/3N                                   |
| 15      | FAZ-C15/4                      | FAZ-C15/1N                                    | FAZ-C15/3N                                   |
| 16      | FAZ-C16/4                      | FAZ-C16/1N                                    | FAZ-C16/3N                                   |
| 20      | FAZ-C20/4                      | FAZ-C20/1N                                    | FAZ-C20/3N                                   |
| 25      | FAZ-C25/4                      | FAZ-C25/1N                                    | FAZ-C25/3N                                   |
| 30      | FAZ-C30/4                      | FAZ-C30/1N                                    | FAZ-C30/3N                                   |
| 32      | FAZ-C32/4                      | FAZ-C32/1N                                    | FAZ-C32/3N                                   |
| 40      | FAZ-C40/4                      | FAZ-C40/1N                                    | FAZ-C40/3N                                   |
| 50      | FAZ-C50/4                      | FAZ-C50/1N                                    | FAZ-C50/3N                                   |
| 63      | FAZ-C63/4                      | FAZ-C63/1N                                    | FAZ-C63/3N                                   |

#### Notes

- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.

# 1.3

## Miniature Circuit Breakers and Supplementary Protectors

### UL 1077 DIN Rail Supplementary Protectors

1

#### FAZ D curve (10–20X $I_n$ current rating)

- Designed for highly inductive loads
- Response time of instantaneous trip: 10–20X  $I_n$  current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where high levels of inrush current are expected. Instantaneous trip is 10–20X rating of device ( $I_n$ ). The high magnetic trip point prevents nuisance tripping in high inductive applications such as motors, transformers and power supplies.



#### Single-Pole



#### Two-Pole



#### Three-Pole



#### D Curve (10–20X $I_n$ Current Rating)—Designed for Inductive Loads ①

| Amperes | Single-Pole ②<br>Catalog Number | Two-Pole<br>Catalog Number | Three-Pole<br>Catalog Number |
|---------|---------------------------------|----------------------------|------------------------------|
| 0.5     | FAZ-D0.5/1-SP                   | FAZ-D0.5/2                 | FAZ-D0.5/3                   |
| 1       | FAZ-D1/1-SP                     | FAZ-D1/2                   | FAZ-D1/3                     |
| 2       | FAZ-D2/1-SP                     | FAZ-D2/2                   | FAZ-D2/3                     |
| 3       | FAZ-D3/1-SP                     | FAZ-D3/2                   | FAZ-D3/3                     |
| 4       | FAZ-D4/1-SP                     | FAZ-D4/2                   | FAZ-D4/3                     |
| 5       | FAZ-D5/1-SP                     | FAZ-D5/2                   | FAZ-D5/3                     |
| 6       | FAZ-D6/1-SP                     | FAZ-D6/2                   | FAZ-D6/3                     |
| 7       | FAZ-D7/1-SP                     | FAZ-D7/2                   | FAZ-D7/3                     |
| 8       | FAZ-D8/1-SP                     | FAZ-D8/2                   | FAZ-D8/3                     |
| 10      | FAZ-D10/1-SP                    | FAZ-D10/2                  | FAZ-D10/3                    |
| 13      | FAZ-D13/1-SP                    | FAZ-D13/2                  | FAZ-D13/3                    |
| 15      | FAZ-D15/1-SP                    | FAZ-D15/2                  | FAZ-D15/3                    |
| 16      | FAZ-D16/1-SP                    | FAZ-D16/2                  | FAZ-D16/3                    |
| 20      | FAZ-D20/1-SP                    | FAZ-D20/2                  | FAZ-D20/3                    |
| 25      | FAZ-D25/1-SP                    | FAZ-D25/2                  | FAZ-D25/3                    |
| 30      | FAZ-D30/1-SP                    | FAZ-D30/2                  | FAZ-D30/3                    |
| 32      | FAZ-D32/1-SP                    | FAZ-D32/2                  | FAZ-D32/3                    |
| 40      | FAZ-D40/1-SP                    | FAZ-D40/2                  | FAZ-D40/3                    |
| 50 ③    | FAZ-D50/1-SP                    | FAZ-D50/2                  | FAZ-D50/3                    |
| 63 ③    | FAZ-D63/1-SP                    | FAZ-D63/2                  | FAZ-D63/3                    |

#### Notes

① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.

② Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.

③ IEC 60947-2 only.

#### Four-Pole



#### Single-Pole + Neutral



#### Three-Pole + Neutral



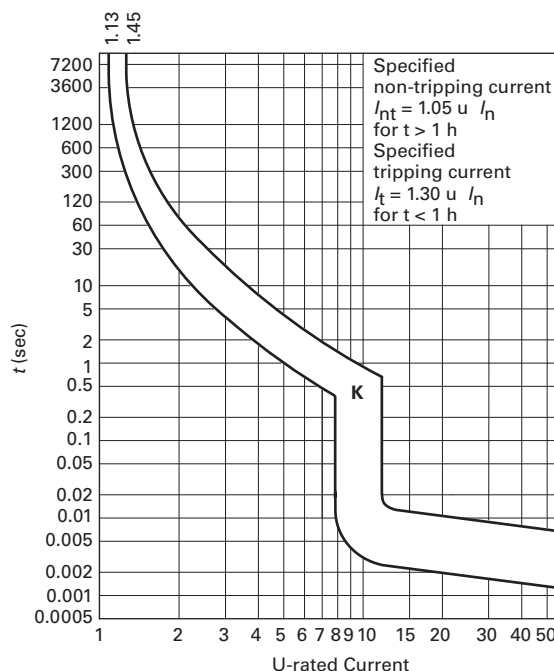
#### D Curve (10–20X $I_n$ Current Rating)—Designed for Inductive Loads, continued ①

| Amperes | Four-Pole<br>Catalog Number | Single-Pole + Neutral<br>Catalog Number | Three-Pole + Neutral<br>Catalog Number |
|---------|-----------------------------|-----------------------------------------|----------------------------------------|
| 0.5     | FAZ-D0.5/4                  | FAZ-D0.5/1N                             | FAZ-D0.5/3N                            |
| 1       | FAZ-D1/4                    | FAZ-D1/1N                               | FAZ-D1/3N                              |
| 2       | FAZ-D2/4                    | FAZ-D2/1N                               | FAZ-D2/3N                              |
| 3       | FAZ-D3/4                    | FAZ-D3/1N                               | FAZ-D3/3N                              |
| 4       | FAZ-D4/4                    | FAZ-D4/1N                               | FAZ-D4/3N                              |
| 5       | FAZ-D5/4                    | FAZ-D5/1N                               | FAZ-D5/3N                              |
| 6       | FAZ-D6/4                    | FAZ-D6/1N                               | FAZ-D6/3N                              |
| 7       | FAZ-D7/4                    | FAZ-D7/1N                               | FAZ-D7/3N                              |
| 8       | FAZ-D8/4                    | FAZ-D8/1N                               | FAZ-D8/3N                              |
| 10      | FAZ-D10/4                   | FAZ-D10/1N                              | FAZ-D10/3N                             |
| 13      | FAZ-D13/4                   | FAZ-D13/1N                              | FAZ-D13/3N                             |
| 15      | FAZ-D15/4                   | FAZ-D15/1N                              | FAZ-D15/3N                             |
| 16      | FAZ-D16/4                   | FAZ-D16/1N                              | FAZ-D16/3N                             |
| 20      | FAZ-D20/4                   | FAZ-D20/1N                              | FAZ-D20/3N                             |
| 25      | FAZ-D25/4                   | FAZ-D25/1N                              | FAZ-D25/3N                             |
| 30      | FAZ-D30/4                   | FAZ-D30/1N                              | FAZ-D30/3N                             |
| 32      | FAZ-D32/4                   | FAZ-D32/1N                              | FAZ-D32/3N                             |
| 40      | FAZ-D40/4                   | FAZ-D40/1N                              | FAZ-D40/3N                             |
| 50 ③    | FAZ-D50/4                   | FAZ-D50/1N                              | FAZ-D50/3N                             |
| 63 ③    | FAZ-D63/4                   | FAZ-D63/1N                              | FAZ-D63/3N                             |

### FAZ K curve (8–12X $I_n$ current rating)

- Designed for motors, transformers and upstream electronics
- Response time of instantaneous trip: 8–12X  $I_n$  current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where medium levels of inrush current are expected. Instantaneous trip is 8–12X rating of device ( $I_n$ ). Applications include small transformers, lighting, pilot devices, control circuits and coils. Medium magnetic trip point.



### Single-Pole



### Two-Pole



### Three-Pole



### K Curve (8–12X $I_n$ Current Rating) — Designed for Inductive Loads <sup>①②</sup>

| Amperes | Single-Pole <sup>③</sup><br>Catalog Number | Two-Pole<br>Catalog Number | Three-Pole<br>Catalog Number |
|---------|--------------------------------------------|----------------------------|------------------------------|
| 0.5     | FAZ-K0.5/1                                 | FAZ-K0.5/2                 | FAZ-K0.5/3                   |
| 1       | FAZ-K1/1                                   | FAZ-K1/2                   | FAZ-K1/3                     |
| 1.6     | FAZ-K1.6/1                                 | FAZ-K1.6/2                 | FAZ-K1.6/3                   |
| 2       | FAZ-K2/1                                   | FAZ-K2/2                   | FAZ-K2/3                     |
| 3       | FAZ-K3/1                                   | FAZ-K3/2                   | FAZ-K3/3                     |
| 4       | FAZ-K4/1                                   | FAZ-K4/2                   | FAZ-K4/3                     |
| 6       | FAZ-K6/1                                   | FAZ-K6/2                   | FAZ-K6/3                     |
| 8       | FAZ-K8/1                                   | FAZ-K8/2                   | FAZ-K8/3                     |
| 10      | FAZ-K10/1                                  | FAZ-K10/2                  | FAZ-K10/3                    |
| 13      | FAZ-K13/1                                  | FAZ-K13/2                  | FAZ-K13/3                    |
| 16      | FAZ-K16/1                                  | FAZ-K16/2                  | FAZ-K16/3                    |
| 20      | FAZ-K20/1                                  | FAZ-K20/2                  | FAZ-K20/3                    |
| 25      | FAZ-K25/1                                  | FAZ-K25/2                  | FAZ-K25/3                    |
| 32      | FAZ-K32/1                                  | FAZ-K32/2                  | FAZ-K32/3                    |
| 40      | FAZ-K40/1                                  | FAZ-K40/2                  | FAZ-K40/3                    |
| 50      | FAZ-K50/1                                  | FAZ-K50/2                  | FAZ-K50/3                    |
| 63      | FAZ-K63/1                                  | FAZ-K63/2                  | FAZ-K63/3                    |

### Four-Pole



### Single-Pole + Neutral



### Three-Pole + Neutral



### K Curve (8–12X $I_n$ Current Rating) — Designed for Inductive Loads, continued <sup>①②</sup>

| Amperes | Four-Pole <sup>③</sup><br>Catalog Number | Single-Pole + Neutral<br>Catalog Number | Three-Pole + Neutral<br>Catalog Number |
|---------|------------------------------------------|-----------------------------------------|----------------------------------------|
| 0.5     | FAZ-K0.5/4                               | FAZ-K0.5/1N                             | FAZ-K0.5/3N                            |
| 1       | FAZ-K1/4                                 | FAZ-K1/1N                               | FAZ-K1/3N                              |
| 1.6     | FAZ-K1.6/4                               | FAZ-K1.6/1N                             | FAZ-K1.6/3N                            |
| 2       | FAZ-K2/4                                 | FAZ-K2/1N                               | FAZ-K2/3N                              |
| 3       | FAZ-K3/4                                 | FAZ-K3/1N                               | FAZ-K3/3N                              |
| 4       | FAZ-K4/4                                 | FAZ-K4/1N                               | FAZ-K4/3N                              |
| 6       | FAZ-K6/4                                 | FAZ-K6/1N                               | FAZ-K6/3N                              |
| 8       | FAZ-K8/4                                 | FAZ-K8/1N                               | FAZ-K8/3N                              |
| 10      | FAZ-K10/4                                | FAZ-K10/1N                              | FAZ-K10/3N                             |
| 13      | FAZ-K13/4                                | FAZ-K13/1N                              | FAZ-K13/3N                             |
| 16      | FAZ-K16/4                                | FAZ-K16/1N                              | FAZ-K16/3N                             |
| 20      | FAZ-K20/4                                | FAZ-K20/1N                              | FAZ-K20/3N                             |
| 25      | FAZ-K25/4                                | FAZ-K25/1N                              | FAZ-K25/3N                             |
| 32      | FAZ-K32/4                                | FAZ-K32/1N                              | FAZ-K32/3N                             |
| 40      | FAZ-K40/4                                | FAZ-K40/1N                              | FAZ-K40/3N                             |
| 50      | FAZ-K50/4                                | FAZ-K50/1N                              | FAZ-K50/3N                             |
| 63      | FAZ-K63/4                                | FAZ-K63/1N                              | FAZ-K63/3N                             |

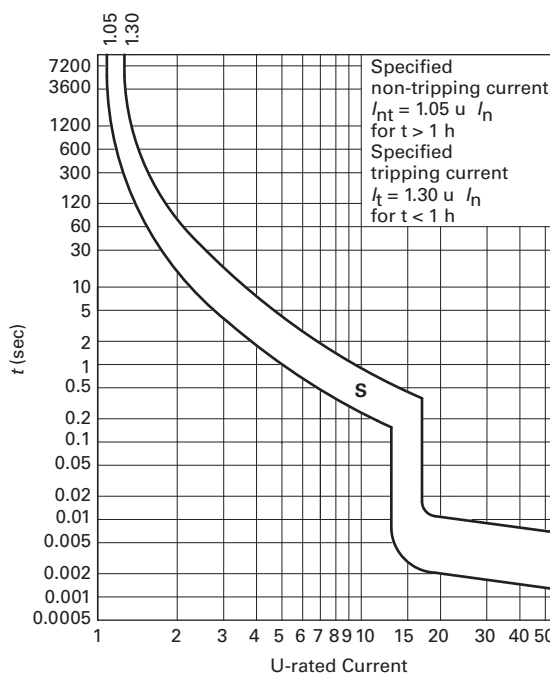
### Notes

- In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- These breakers are available by special order and may result in additional delivery time.
- Two-piece box order, quantities of 2.

**FAZ S curve (13–17X  $I_n$  current rating)**

- Designed for control circuits with high inrush
- Response time of instantaneous trip: 13–17X  $I_n$  current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where high levels of inrush current are expected. Instantaneous trip is 13–17X rating of device ( $I_n$ ). The high magnetic trip point prevents nuisance tripping in high inductive applications such as motors, transformers and power supplies.

**Single-Pole****Two-Pole****S Curve (13–17X  $I_n$  Current Rating)—  
Designed for Inductive Loads <sup>①②</sup>**

| Amperes | Single-Pole <sup>③</sup><br>Catalog<br>Number | Two-Pole<br>Catalog<br>Number |
|---------|-----------------------------------------------|-------------------------------|
| 1       | FAZ-S1/1                                      | FAZ-S1/2                      |
| 2       | FAZ-S2/1                                      | FAZ-S2/2                      |
| 3       | FAZ-S3/1                                      | FAZ-S3/2                      |
| 4       | FAZ-S4/1                                      | FAZ-S4/2                      |
| 6       | FAZ-S6/1                                      | FAZ-S6/2                      |
| 10      | FAZ-S10/1                                     | FAZ-S10/2                     |
| 16      | FAZ-S16/1                                     | FAZ-S16/2                     |
| 20      | FAZ-S20/1                                     | FAZ-S20/2                     |
| 25      | FAZ-S25/1                                     | FAZ-S25/2                     |
| 32      | FAZ-S32/1                                     | FAZ-S32/2                     |
| 40      | FAZ-S40/1                                     | FAZ-S40/2                     |

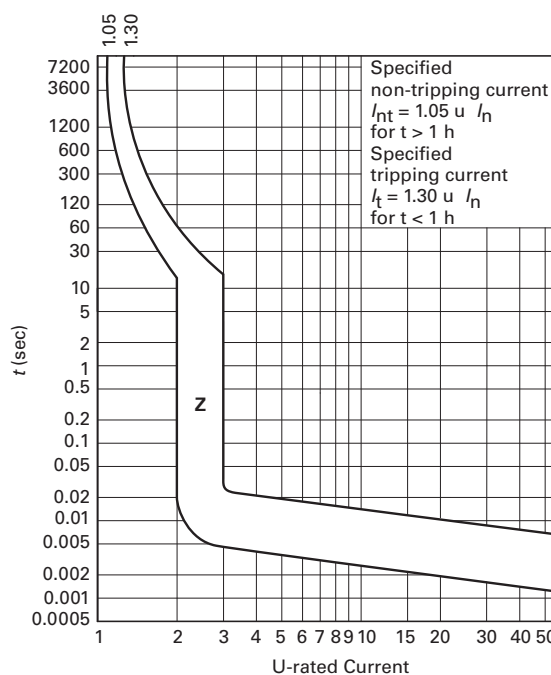
**Notes**

- <sup>①</sup> In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- <sup>②</sup> These breakers are available by special order and may result in additional delivery time.
- <sup>③</sup> Two-piece box order, quantities of 2.

### FAZ Z curve (2–3X $I_n$ current rating)

- Designed for protection of electronic devices
- Response time of instantaneous trip: 2–3X  $I_n$  current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)

Suitable for applications where low levels of inrush current are expected. Instantaneous trip is 2–3X rating of device ( $I_n$ ). Applications include small transformers, lighting, pilot devices, control circuits and coils. Medium magnetic trip point.



### Single-Pole



### Two-Pole



### Z Curve (2–3X $I_n$ Current Rating)—Designed for Inductive Loads <sup>①②</sup>

| Amperes | Single-Pole <sup>③</sup><br>Catalog Number | Two-Pole<br>Catalog Number |
|---------|--------------------------------------------|----------------------------|
| 0.5     | FAZ-Z0.5/1                                 | FAZ-Z0.5/2                 |
| 1       | FAZ-Z1/1                                   | FAZ-Z1/2                   |
| 1.6     | FAZ-Z1.6/1                                 | FAZ-Z1.6/2                 |
| 2       | FAZ-Z2/1                                   | FAZ-Z2/2                   |
| 3       | FAZ-Z3/1                                   | FAZ-Z3/2                   |
| 4       | FAZ-Z4/1                                   | FAZ-Z4/2                   |
| 6       | FAZ-Z6/1                                   | FAZ-Z6/2                   |
| 8       | FAZ-Z8/1                                   | FAZ-Z8/2                   |
| 10      | FAZ-Z10/1                                  | FAZ-Z10/2                  |
| 13      | FAZ-Z13/1                                  | FAZ-Z13/2                  |
| 16      | FAZ-Z16/1                                  | FAZ-Z16/2                  |
| 20      | FAZ-Z20/1                                  | FAZ-Z20/2                  |
| 25      | FAZ-Z25/1                                  | FAZ-Z25/2                  |
| 32      | FAZ-Z32/1                                  | FAZ-Z32/2                  |
| 40      | FAZ-Z40/1                                  | FAZ-Z40/2                  |
| 50      | FAZ-Z50/1                                  | FAZ-Z50/2                  |
| 63      | FAZ-Z63/1                                  | FAZ-Z63/2                  |

### Three-Pole



### Four-Pole



### Z Curve (2–3X $I_n$ Current Rating)—Designed for Inductive Loads, continued <sup>①②</sup>

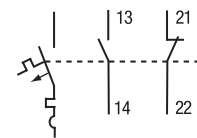
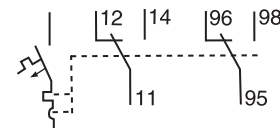
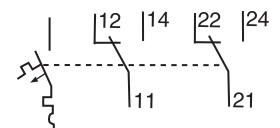
| Amperes | Three-Pole<br>Catalog Number | Four-Pole<br>Catalog Number |
|---------|------------------------------|-----------------------------|
| 0.5     | FAZ-Z0.5/3                   | FAZ-Z0.5/4                  |
| 1       | FAZ-Z1/3                     | FAZ-Z1/4                    |
| 1.6     | FAZ-Z1.6/3                   | FAZ-Z1.6/4                  |
| 2       | FAZ-Z2/3                     | FAZ-Z2/4                    |
| 3       | FAZ-Z3/3                     | FAZ-Z3/4                    |
| 4       | FAZ-Z4/3                     | FAZ-Z4/4                    |
| 6       | FAZ-Z6/3                     | FAZ-Z6/4                    |
| 8       | FAZ-Z8/3                     | FAZ-Z8/4                    |
| 10      | FAZ-Z10/3                    | FAZ-Z10/4                   |
| 13      | FAZ-Z13/3                    | FAZ-Z13/4                   |
| 16      | FAZ-Z16/3                    | FAZ-Z16/4                   |
| 20      | FAZ-Z20/3                    | FAZ-Z20/4                   |
| 25      | FAZ-Z25/3                    | FAZ-Z25/4                   |
| 32      | FAZ-Z32/3                    | FAZ-Z32/4                   |
| 40      | FAZ-Z40/3                    | FAZ-Z40/4                   |
| 50      | FAZ-Z50/3                    | FAZ-Z50/4                   |
| 63      | FAZ-Z63/3                    | FAZ-Z63/4                   |

### Notes

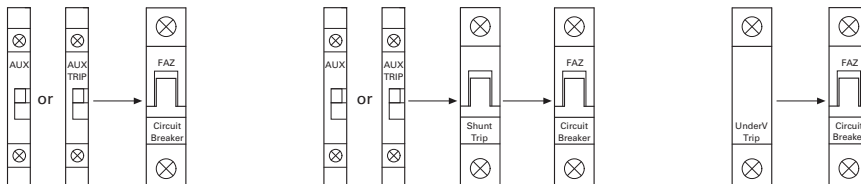
- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② These breakers are available by special order and may result in additional delivery time.
- ③ Two-piece box order, quantities of 2.

## Accessories

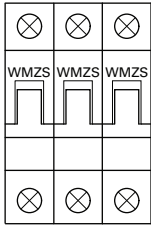
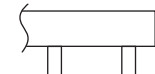
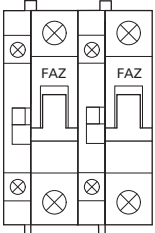
## FAZ Auxiliary Contacts and Voltage Trips

|                                                                                     | Circuit Diagram                                                                                              | Description                                                                                                                                                                                                                                                                                                                                 | Rated Operational Voltage  | Catalog Number       |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------|
| Standard Auxiliary Contacts                                                         |                                                                                                              |                                                                                                                                                                                                                                                                                                                                             |                            |                      |
|    |                             | <ul style="list-style-type: none"><li>1NO/1NC</li><li>Installs on left side of FAZ or shunt trip</li><li>Max. one per FAZ (1077) device</li><li>Switches when FAZ is tripped electrically or manually</li></ul>                                                                                                                             | 230 Vac                    | FAZ-XHIN11           |
|                                                                                     |                             | <ul style="list-style-type: none"><li>1 changeover contact</li><li>Installs on left side of FAZ or shunt trip</li><li>Max. one per FAZ (1077) device</li><li>Switches when FAZ is tripped electrically or manually</li></ul>                                                                                                                | 230 Vac                    | FAZ-XHINW1           |
| Auxiliary/Trip Indicating Contact                                                   |                                                                                                              |                                                                                                                                                                                                                                                                                                                                             |                            |                      |
|    | <br>Two-pole auxiliary mode | <ul style="list-style-type: none"><li>Small selector screw changes mode</li><li>Two Form C (changeover) contacts</li><li>Installs on left side of FAZ or shunt trip</li><li>Auxiliary contacts switch when FAZ is tripped electrically or manually</li><li>Trip indicating contact switches only when FAZ is tripped electrically</li></ul> | 230 Vac                    | FAZ-XAM002           |
|                                                                                     | <br>Trip indicating mode   |                                                                                                                                                                                                                                                                                                                                             |                            |                      |
| Undervoltage Trip                                                                   |                                                                                                              |                                                                                                                                                                                                                                                                                                                                             |                            |                      |
|  |                           | <ul style="list-style-type: none"><li>Prevents FAZ from operating unless voltage is present</li></ul>                                                                                                                                                                                                                                       | 115 Vac                    | FAZ-XUA(115VAC)      |
|                                                                                     |                                                                                                              | <ul style="list-style-type: none"><li>Installs on left side of FAZ</li></ul>                                                                                                                                                                                                                                                                | 230 Vac                    | FAZ-XUA(230VAC)      |
|                                                                                     |                                                                                                              | <ul style="list-style-type: none"><li>Includes test button</li></ul>                                                                                                                                                                                                                                                                        | 400 Vac                    | FAZ-XUA(400VAC)      |
| Shunt Trip                                                                          |                                                                                                              |                                                                                                                                                                                                                                                                                                                                             |                            |                      |
|  |                           | <ul style="list-style-type: none"><li>Allows remote trip of FAZ</li><li>Installs on left side of FAZ</li></ul>                                                                                                                                                                                                                              | 12–110 Vac<br>12–60 Vdc    | FAZ-XAA-C-12-110VAC  |
|                                                                                     |                                                                                                              |                                                                                                                                                                                                                                                                                                                                             | 110–415 Vac<br>110–230 Vdc | FAZ-XAA-C-110-415VAC |

## Allowable Combinations of Accessories

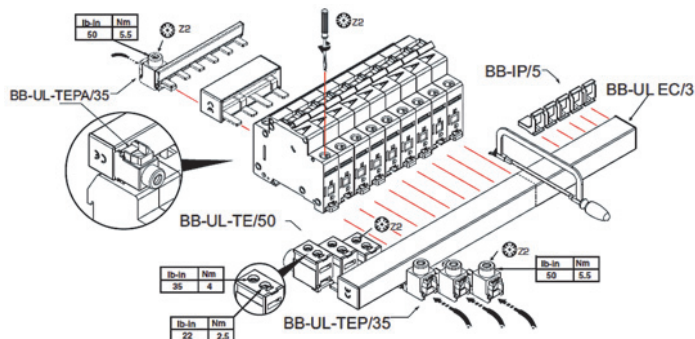


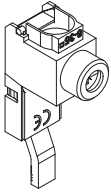
### Busbar System

| Description                                                                                                | Rated Operational Current | Number of Poles per Device | Number of Terminals | Catalog Number <sup>①</sup> |
|------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|---------------------|-----------------------------|
| <b>Without Auxiliary Contacts</b>                                                                          |                           |                            |                     |                             |
| For connecting FAZ supplementary protectors without auxiliary contacts. May be fed from line or load side. | 80A                       | 1                          | 57                  | BB-UL-18/1P-1M/57           |
|                           |                           | 2                          | 56                  | BB-UL-18/2P-2M/56           |
|                           |                           | 3                          | 57                  | BB-UL-18/3P-3M/57           |
|                                                                                                            | 100A                      | 1                          | 57                  | BB-UL-25/1P-1M/57           |
|                                                                                                            |                           | 2                          | 56                  | BB-UL-25/2P-2M/56           |
|                                                                                                            |                           | 3                          | 57                  | BB-UL-25/3P-3M/57           |
| <b>Auxiliary/Trip Indicating Contacts</b>                                                                  |                           |                            |                     |                             |
| For connecting FAZ supplementary protectors with auxiliary contacts. May be fed from line or load side.    | 80A                       | 1                          | 37                  | BB-UL-18/1P-1,5M/37         |
|                         |                           | 2                          | 46                  | BB-UL-18/2P+AS-2,5M/46      |
|                         |                           | 3                          | 48                  | BB-UL-18/3P+AS-3,5M/48      |
|                                                                                                            | 100A                      | 1                          | 37                  | BB-UL-25/1P-1,5M/37         |
|                                                                                                            |                           | 2                          | 46                  | BB-UL-25/2P+AS-2,5M/46      |
|                                                                                                            |                           | 3                          | 48                  | BB-UL-25/3P+AS-3,5M/48      |

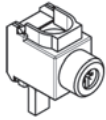
### Note

① Bus may be center fed for high current capacity.

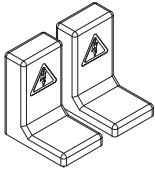


**Incoming Terminal****Pin Type Incoming Supply Terminals**

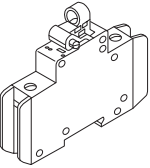
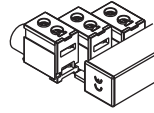
| Description                                                                                                                                                                   | Catalog Number      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <ul style="list-style-type: none"> <li>■ Accommodates conductors from 6–35 mm<sup>2</sup>/#10–2 AWG</li> <li>■ 4–5.5 Nm/35–50 lb-in</li> <li>■ Two- and three-pole</li> </ul> | <b>BB-UL-TEP/35</b> |

**Incoming Terminal****Pin Type Incoming Supply Terminals—Single-Phase Only**

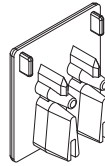
| Description                                                                                                                                    | Catalog Number       |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <ul style="list-style-type: none"> <li>■ Accommodates conductors from 6–35 mm<sup>2</sup>/#10–2 AWG</li> <li>■ 4–5.5 Nm/35–50 lb-in</li> </ul> | <b>BB-UL-TEPA/35</b> |

**Busbar Terminal Cover****Protective Accessories**

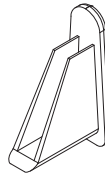
| Description                                                                                                                             | Catalog Number    |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| For covering unused terminals                                                                                                           | <b>BB-IP/5</b>    |
| <ul style="list-style-type: none"> <li>■ Prevents reactivation of the device during maintenance</li> <li>■ Holds one padlock</li> </ul> | <b>IS/SPE-1TE</b> |

**Padlock Hasp****Incoming Terminal****Bus Incoming Supply Terminals**

| Description                                                                                                                                                               | Catalog Number     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <ul style="list-style-type: none"> <li>■ 50 mm<sup>2</sup></li> <li>■ #14–1 AWG</li> <li>■ 75 Deg wire</li> <li>■ 115 A/Y, 480V UL</li> <li>■ 160 A/Y 690V IEC</li> </ul> | <b>BB-UL-TE/50</b> |

**Fork Connector****Busbar End Cap**

| Description                    | Poles   | Catalog Number    |
|--------------------------------|---------|-------------------|
| ■ Install after cutting busbar | 2 and 3 | <b>BB-UL-EC/3</b> |
| ■ Protects end of busbar       | 1       | <b>BB-UL-EC/1</b> |



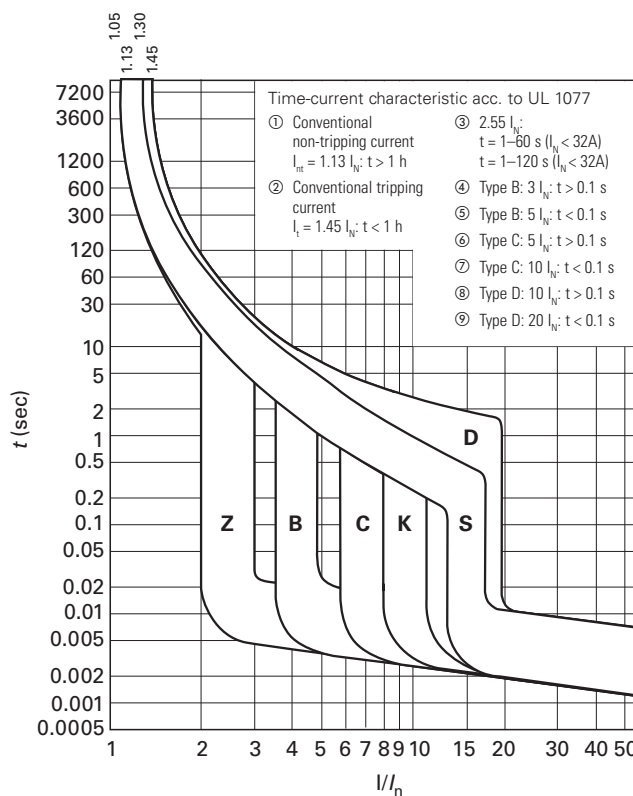
### Technical Data and Specifications

#### Trip Curves Chart

Eaton FAZ supplementary protectors are available with six different tripping characteristics, including Type B, C, D, K, S and Z. Definitions for each trip curve are contained on the ordering pages and can be used to determine the optimal characteristic for your application. For example, low-level short-circuit faults in control wiring, such as PLCs, are best protected by devices with Type B trip characteristics (3–5X continuous rating of the device ( $I_N$ )).

Even though not required by NEC or CEC for supplementary protectors, Eaton's FAZ devices are current limiting, which means that they interrupt fault currents within one half cycle. Current limiting devices offer superior protection by reducing peak let-through current and energy.

#### Tripping Characteristics



# 1.3

## Miniature Circuit Breakers and Supplementary Protectors

### UL 1077 DIN Rail Supplementary Protectors

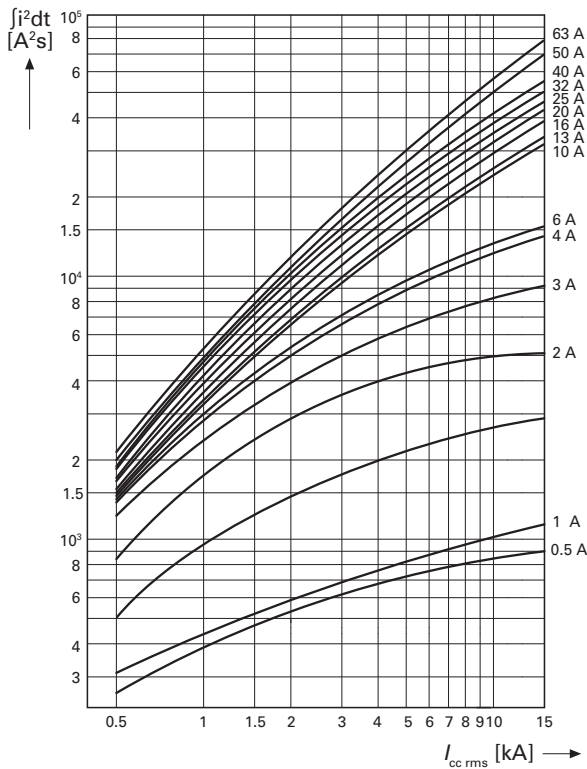
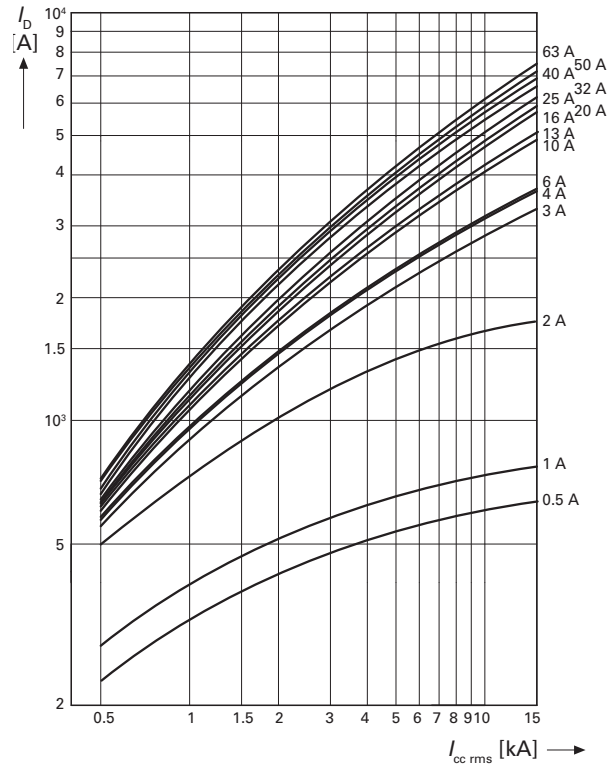
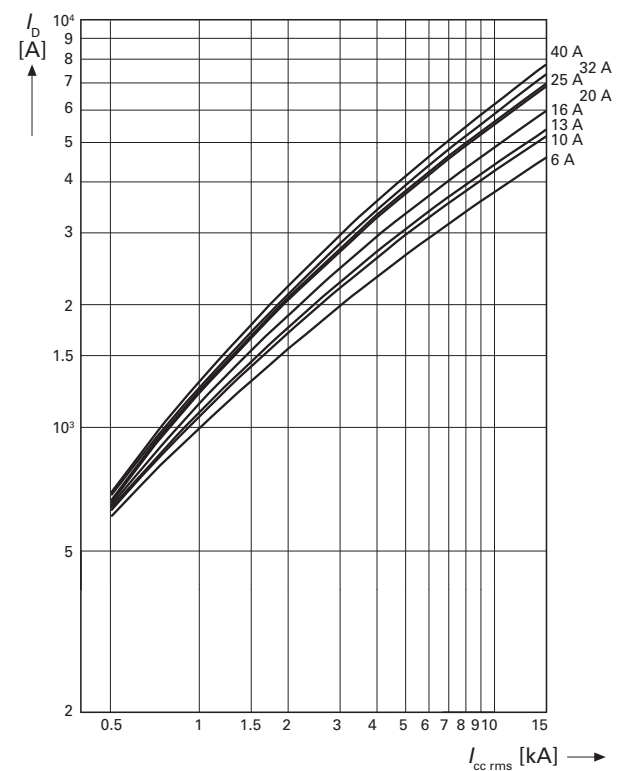
1

#### FAZ Miniature Circuit Breakers Technical Data

| Description                                          | B Curve                                                       | C Curve                                                       | D Curve                                                       |
|------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| <b>Electrical</b>                                    |                                                               |                                                               |                                                               |
| Approvals                                            | UR (UL 1077), CSA (CSA 22.2 No. 235), CE                      |                                                               |                                                               |
| Standards                                            | IEC/EN 60947-2                                                |                                                               |                                                               |
| Short-circuit trip response                          | 3–5 $I_n$                                                     | 5–10 $I_n$                                                    | 10–20 $I_n$                                                   |
| <b>Supplementary Protectors—UL/CSA</b>               |                                                               |                                                               |                                                               |
| Current range                                        | 1–63A                                                         | 0.5–63A                                                       | 0.5–40A                                                       |
| Maximum voltage ratings—UL/CSA                       |                                                               |                                                               |                                                               |
| Single-pole, single-pole + neutral                   | 277 Vac<br>48 Vdc                                             | 277 Vac<br>48 Vdc                                             | 277 Vac<br>48 Vdc                                             |
| Two-, three-pole, four-pole and three-pole + neutral | 480Y/277 Vac                                                  | 480Y/277 Vac                                                  | 480Y/277 Vac                                                  |
| Two poles in series                                  | 96 Vdc                                                        | 96 Vdc                                                        | 96 Vdc                                                        |
| Thermal tripping characteristics                     |                                                               |                                                               |                                                               |
| Single-pole                                          | 1.35 x $I_n$ @ 40°C                                           | 1.35 x $I_n$ @ 40°C                                           | 1.35 x $I_n$ @ 40°C                                           |
| Multi-pole                                           | 1.45 x $I_n$ @ 40°C                                           | 1.45 x $I_n$ @ 40°C                                           | 1.45 x $I_n$ @ 40°C                                           |
| Short-circuit ratings (at max. voltage)              |                                                               |                                                               |                                                               |
| Single-pole                                          | 10 kA (5 kA for 40–63A device)                                | 10 kA (5 kA for 40–63A device)                                | 5 kA                                                          |
| Two-, three-pole                                     | 10 kA (5 kA for 40–63A device)                                | 10 kA (5 kA for 40–63A device)                                | 5 kA                                                          |
| Single-pole                                          | 10 kA @ 48 Vdc                                                | 10 kA @ 48 Vdc                                                | 10 kA @ 48 Vdc                                                |
| Two poles in series                                  | 10 kA @ 96 Vdc                                                | 10 kA @ 96 Vdc                                                | 10 kA @ 96 Vdc                                                |
| <b>Miniature Circuit Breaker—IEC</b>                 |                                                               |                                                               |                                                               |
| Current range                                        | 1–63A                                                         | 0.5–63A                                                       | 0.5–63A                                                       |
| Maximum voltage ratings—IEC 68898-1                  |                                                               |                                                               |                                                               |
| Single-pole                                          | 230 Vac                                                       | 230 Vac                                                       | 230 Vac                                                       |
| Two-, three-pole                                     | 230/400 Vac                                                   | 230/400 Vac                                                   | 230/400 Vac                                                   |
| Maximum voltage ratings—IEC 60947-2                  |                                                               |                                                               |                                                               |
| Single-pole                                          | 240 Vac<br>48 Vdc                                             | 240 Vac<br>48 Vdc                                             | 240 Vac<br>48 Vdc                                             |
| Two-, three-pole                                     | 240/415 Vac                                                   | 240/415 Vac                                                   | 240/415 Vac                                                   |
| Two poles in series                                  | 96 Vdc                                                        | 96 Vdc                                                        | 96 Vdc                                                        |
| Thermal tripping characteristics                     |                                                               |                                                               |                                                               |
| Single-pole                                          | > 1 hour @ 1.05 x $I_n$                                       | > 1 hour @ 1.05 x $I_n$                                       | > 1 hour @ 1.05 x $I_n$                                       |
| Multi-pole                                           | < 1 hour @ 1.3 x $I_n$                                        | < 1 hour @ 1.3 x $I_n$                                        | < 1 hour @ 1.3 x $I_n$                                        |
| Interrupt ratings (at max. voltage)                  |                                                               |                                                               |                                                               |
| IEC 60947-2                                          | 15 kA                                                         | 15 kA                                                         | 15 kA (10 kA for 50 and 63A)                                  |
| IEC 60898                                            | 10 kA                                                         | 10 kA                                                         | 10 kA (50 and 63A not available)                              |
| Operational switching capacity                       | 7.5 kA                                                        | 7.5 kA                                                        | 7.5 kA                                                        |
| Max. backup fuse [gL/gG]                             | 125A                                                          | 125A                                                          | 125A                                                          |
| Rated impulse withstand— $U_{imp}$                   | 4000 Vac                                                      | 4000 Vac                                                      | 4000 Vac                                                      |
| Rated insulation voltage— $U_i$                      | 440 Vac                                                       | 440 Vac                                                       | 440 Vac                                                       |
| <b>Environmental/General</b>                         |                                                               |                                                               |                                                               |
| Selectivity class                                    | 3                                                             | 3                                                             | 3                                                             |
| Lifespan (operations)                                | > 10,000 (1 operation = ON/OFF)                               | > 10,000 (1 operation = ON/OFF)                               | > 10,000 (1 operation = ON/OFF)                               |
| Shock (IEC 68-2-22)                                  | 10g–120 ms                                                    | 10g–120 ms                                                    | 10g–120 ms                                                    |
| Operating temperature range                          | –40 to +167°F (–40 to +75°C)                                  | –40 to +167°F (–40 to +75°C)                                  | –40 to +167°F (–40 to +75°C)                                  |
| Shipment and short-term storage                      | –40 to +185°F (–40 to +85°C)                                  | –40 to +185°F (–40 to +85°C)                                  | –40 to +185°F (–40 to +85°C)                                  |
| Housing material                                     | Nylon                                                         | Nylon                                                         | Nylon                                                         |
| <b>Mechanical</b>                                    |                                                               |                                                               |                                                               |
| Standard front dimension                             |                                                               |                                                               |                                                               |
| Device height                                        | 80 mm                                                         | 80 mm                                                         | 80 mm                                                         |
| Terminal protection                                  | Finger and back-of-hand proof to IEC 536                      | Finger and back-of-hand proof to IEC 536                      | Finger and back-of-hand proof to IEC 536                      |
| Mounting width per pole                              | 17.5 mm                                                       | 17.5 mm                                                       | 17.5 mm                                                       |
| Mounting                                             | IEC/EN 60715 top-hat rail                                     | IEC/EN 60715 top-hat rail                                     | IEC/EN 60715 top-hat rail                                     |
| Degree of protection                                 | IP20                                                          | IP20                                                          | IP20                                                          |
| Terminals top and bottom                             | Twin-purpose terminals                                        | Twin-purpose terminals                                        | Twin-purpose terminals                                        |
| Supply connection                                    | Line or load side                                             | Line or load side                                             | Line or load side                                             |
| Terminal capacity [mm <sup>2</sup> ]                 | 1 x 25 (AWG 4–18)/2 x 10 (AWG 8–18)                           | 1 x 25 (AWG 4–18)/2 x 10 (AWG 8–18)                           | 1 x 25 (AWG 4–18)/2 x 10 (AWG 8–18)                           |
| Torque                                               | 2.4 Nm                                                        | 2.4 Nm                                                        | 2.4 Nm                                                        |
| Imperial torque                                      | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) |
| Thickness of busbar material                         | 0.8–2 mm                                                      | 0.8–2 mm                                                      | 0.8–2 mm                                                      |
| Mounting position                                    | As required                                                   | As required                                                   | As required                                                   |

## FAZ Miniature Circuit Breakers Technical Data, continued

| Description                                      | B Curve                                                       | C Curve                                                       | D Curve                                                       |
|--------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| <b>Electrical</b>                                |                                                               |                                                               |                                                               |
| Approvals                                        | UR (UL 1077), CSA (CSA 22.2 No. 235), CE                      |                                                               |                                                               |
| Standards                                        | IEC/EN 60947-2, E177451, 204453                               |                                                               |                                                               |
| Short-circuit trip response                      | 8–12 $I_n$                                                    | 13–17 $I_n$                                                   | 2–3 $I_n$                                                     |
| <b>Supplementary Protectors—UL/CSA</b>           |                                                               |                                                               |                                                               |
| Current range                                    | 0.5–63A                                                       | 0.5–40A                                                       | 1–63A                                                         |
| Maximum voltage ratings—UL/CSA                   |                                                               |                                                               |                                                               |
| Single-pole, single-pole + neutral               | 277 Vac<br>48 Vdc                                             | 277 Vac<br>48 Vdc                                             | 277 Vac<br>48 Vdc                                             |
| Two-, three-, four-pole and three-pole + neutral | 480Y/277 Vac                                                  | 480Y/277 Vac                                                  | 480Y/277 Vac                                                  |
| Two poles in series                              | 96 Vdc                                                        | 96 Vdc                                                        | 96 Vdc                                                        |
| Thermal tripping characteristics                 |                                                               |                                                               |                                                               |
| Single-pole                                      | 1.35 x $I_n$ @ 40°C                                           | 1.35 x $I_n$ @ 40°C                                           | 1.35 x $I_n$ @ 40°C                                           |
| Multi-pole                                       | 1.45 x $I_n$ @ 40°C                                           | 1.45 x $I_n$ @ 40°C                                           | 1.45 x $I_n$ @ 40°C                                           |
| Short-circuit ratings (at max. voltage)          |                                                               |                                                               |                                                               |
| Single-pole                                      | 5 kA @ 277 Vac                                                | 5 kA @ 277 Vac                                                | 5 kA @ 277 Vac                                                |
| Single-pole + neutral                            | 5 kA @ 277 Vac                                                | 5 kA @ 277 Vac                                                | 5 kA @ 277 Vac                                                |
| Two-, three-, four-pole                          | 5 kA @ 480Y/277 Vac                                           | 5 kA @ 480Y/277 Vac                                           | 5 kA @ 480Y/277 Vac                                           |
| Two poles in series                              | —                                                             | —                                                             | —                                                             |
| <b>Miniature Circuit Breaker—IEC</b>             |                                                               |                                                               |                                                               |
| Current range                                    | 0.5–63A                                                       | 0.5–40A                                                       | 1–63A                                                         |
| Maximum voltage ratings—IEC 60947-2              |                                                               |                                                               |                                                               |
| Single-pole, single-pole + neutral               | 240 Vac                                                       | 240 Vac                                                       | 240 Vac                                                       |
| Two-, three-, four-pole, three-pole + neutral    | 240/415 Vac                                                   | 240/415 Vac                                                   | 240/415 Vac                                                   |
| Thermal tripping characteristics                 |                                                               |                                                               |                                                               |
| Single-pole                                      | > 1 Hour @ 1.05 x $I_n$                                       | > 1 Hour @ 1.05 x $I_n$                                       | > 1 Hour @ 1.05 x $I_n$                                       |
| Multi-pole                                       | < 1 Hour @ 1.3 x $I_n$                                        | < 1 Hour @ 1.3 x $I_n$                                        | < 1 Hour @ 1.3 x $I_n$                                        |
| Interrupt ratings (at max. voltage)              |                                                               |                                                               |                                                               |
| IEC 60947-2                                      | 15 kA                                                         | 10 kA                                                         | 10 kA                                                         |
| Operational switching capacity                   | 7.5 kA                                                        | 7.5 kA                                                        | 7.5 kA                                                        |
| Max. backup fuse [gL/gG]                         | 125A                                                          | 125A                                                          | 125A                                                          |
| Rated impulse withstand— $U_{imp}$               | 4000 Vac                                                      | 4000 Vac                                                      | 4000 Vac                                                      |
| Rated insulation voltage— $U_i$                  | 440 Vac                                                       | 440 Vac                                                       | 440 Vac                                                       |
| <b>Environmental/General</b>                     |                                                               |                                                               |                                                               |
| Selectivity class                                | 3                                                             | 3                                                             | 3                                                             |
| Lifespan (operations)                            | > 10,000 (1 operation = ON/OFF)                               | > 10,000 (1 operation = ON/OFF)                               | > 10,000 (1 operation = ON/OFF)                               |
| Shock (IEC 68-2-22)                              | 10g–120 ms                                                    | 10g–120 ms                                                    | 10g–120 ms                                                    |
| Operating temperature range                      | –40 to +167°F (–40 to +75°C)                                  | –40 to +167°F (–40 to +75°C)                                  | –40 to +167°F (–40 to +75°C)                                  |
| Shipment and short-term storage                  | –40 to +185°F (–40 to +85°C)                                  | –40 to +185°F (–40 to +85°C)                                  | –40 to +185°F (–40 to +85°C)                                  |
| Housing material                                 | Nylon                                                         | Nylon                                                         | Nylon                                                         |
| <b>Mechanical</b>                                |                                                               |                                                               |                                                               |
| Standard front dimension                         |                                                               |                                                               |                                                               |
| Device height                                    | 80 mm                                                         | 80 mm                                                         | 80 mm                                                         |
| Terminal protection                              | Finger and back-of-hand proof to IEC 536                      | Finger and back-of-hand proof to IEC 536                      | Finger and back-of-hand proof to IEC 536                      |
| Mounting width per pole                          | 17.7 mm                                                       | 17.7 mm                                                       | 17.7 mm                                                       |
| Mounting                                         | IEC/EN 60715 top-hat rail                                     | IEC/EN 60715 top-hat rail                                     | IEC/EN 60715 top-hat rail                                     |
| Degree of protection                             | IP20                                                          | IP20                                                          | IP20                                                          |
| Terminals top and bottom                         | Twin-purpose terminals                                        | Twin-purpose terminals                                        | Twin-purpose terminals                                        |
| Supply connection                                | Line or load side                                             | Line or load side                                             | Line or load side                                             |
| Terminal capacity [mm <sup>2</sup> ]             | 1 x 25 (AWG 4–18) / 2 x 10 (AWG 8–18)                         | 1 x 25 (AWG 4–18) / 2 x 10 (AWG 8–18)                         | 1 x 25 (AWG 4–18) / 2 x 10 (AWG 8–18)                         |
| Torque                                           | 2.4 Nm                                                        | 2.4 Nm                                                        | 2.4 Nm                                                        |
| Imperial torque                                  | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) |
| Thickness of busbar material                     | 0.8–2 mm                                                      | 0.8–2 mm                                                      | 0.8–2 mm                                                      |
| Mounting position                                | As required                                                   | As required                                                   | As required                                                   |

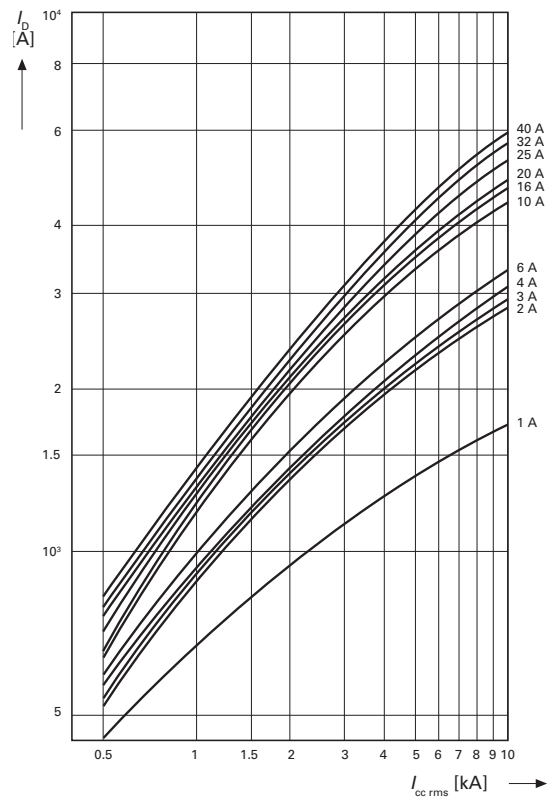
**Let-Through Energy  $I^2t$** **Characteristic B and C****Let-Through Energy  $I_D$** **Characteristic B and C****Characteristic D****Characteristic D**

### Let-Through Energy $I^2t$

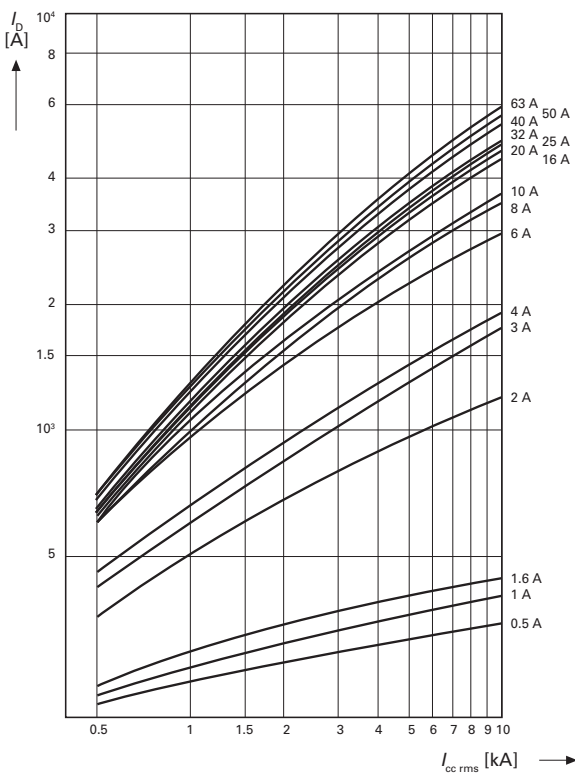
#### Characteristic K



#### Characteristic S



#### Characteristic Z



# 1.3

## Miniature Circuit Breakers and Supplementary Protectors

### UL 1077 DIN Rail Supplementary Protectors

1

#### Influence of the Ambient Temperature on the Thermal Tripping Behavior

Corrected values of the rated current dependent on the ambient temperature

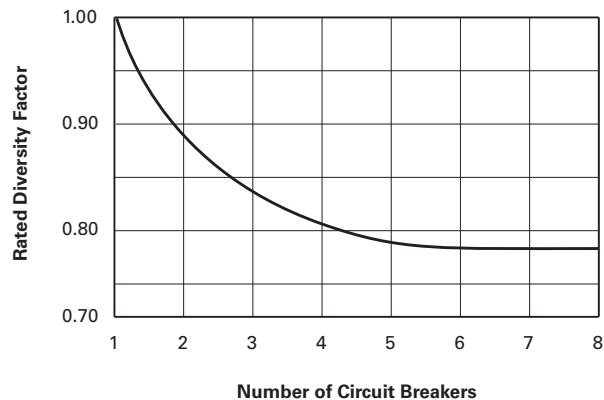
| $I_n$ (A) | Ambient Temperature T |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|           | -40°C                 | -30°C | -20°C | -10°C | 0°C   | 10°C  | 20°C  | 30°C  | 35°C  | 40°C  | 45°C  | 50°C  | 55°C  | 60°C  | 65°C  | 75°C  |
| 0.16      | 0.20                  | 0.20  | 0.19  | 0.19  | 0.18  | 0.17  | 0.17  | 0.16  | 0.16  | 0.15  | 0.15  | 0.15  | 0.14  | 0.14  | 0.14  | 0.13  |
| 0.25      | 0.32                  | 0.31  | 0.30  | 0.29  | 0.28  | 0.27  | 0.26  | 0.25  | 0.25  | 0.24  | 0.24  | 0.23  | 0.23  | 0.22  | 0.22  | 0.21  |
| 0.50      | 0.64                  | 0.62  | 0.60  | 0.58  | 0.56  | 0.54  | 0.52  | 0.50  | 0.49  | 0.48  | 0.47  | 0.46  | 0.45  | 0.44  | 0.43  | 0.41  |
| 0.75      | 0.96                  | 0.93  | 0.90  | 0.87  | 0.84  | 0.81  | 0.78  | 0.75  | 0.74  | 0.73  | 0.71  | 0.69  | 0.68  | 0.66  | 0.65  | 0.62  |
| 1.00      | 1.30                  | 1.20  | 1.20  | 1.20  | 1.10  | 1.10  | 1.00  | 1.00  | 0.99  | 0.97  | 0.95  | 0.93  | 0.90  | 0.89  | 0.87  | 0.83  |
| 1.50      | 1.90                  | 1.90  | 1.80  | 1.70  | 1.70  | 1.60  | 1.60  | 1.50  | 1.50  | 1.50  | 1.40  | 1.40  | 1.40  | 1.30  | 1.30  | 1.20  |
| 1.60      | 2.00                  | 2.00  | 1.90  | 1.90  | 1.80  | 1.70  | 1.70  | 1.60  | 1.60  | 1.50  | 1.50  | 1.50  | 1.40  | 1.40  | 1.40  | 1.30  |
| 2.00      | 2.60                  | 2.50  | 2.40  | 2.30  | 2.20  | 2.20  | 2.10  | 2.00  | 2.00  | 1.90  | 1.90  | 1.90  | 1.80  | 1.80  | 1.70  | 1.70  |
| 2.50      | 3.20                  | 3.10  | 3.00  | 2.90  | 2.80  | 2.70  | 2.60  | 2.50  | 2.50  | 2.40  | 2.40  | 2.30  | 2.30  | 2.20  | 2.20  | 2.10  |
| 3.00      | 3.80                  | 3.70  | 3.60  | 3.50  | 3.40  | 3.30  | 3.10  | 3.00  | 3.00  | 2.90  | 2.80  | 2.80  | 2.70  | 2.70  | 2.60  | 2.50  |
| 3.50      | 4.50                  | 4.40  | 4.20  | 4.10  | 3.90  | 3.80  | 3.70  | 3.50  | 3.40  | 3.40  | 3.30  | 3.20  | 3.20  | 3.10  | 3.00  | 2.90  |
| 4.00      | 5.10                  | 5.00  | 4.80  | 4.70  | 4.50  | 4.30  | 4.20  | 4.00  | 3.90  | 3.90  | 3.80  | 3.70  | 3.60  | 3.50  | 3.50  | 3.40  |
| 5.00      | 6.40                  | 6.20  | 6.00  | 5.80  | 5.60  | 5.40  | 5.20  | 5.00  | 4.90  | 4.80  | 4.70  | 4.60  | 4.50  | 4.40  | 4.30  | 4.10  |
| 6.00      | 7.70                  | 7.50  | 7.20  | 7.00  | 6.70  | 6.50  | 6.30  | 6.00  | 5.90  | 5.80  | 5.70  | 5.60  | 5.40  | 5.30  | 5.20  | 5.00  |
| 7.00      | 9.00                  | 8.70  | 8.40  | 8.20  | 7.80  | 7.60  | 7.40  | 7.00  | 6.90  | 6.80  | 6.70  | 6.50  | 6.30  | 6.20  | 6.10  | 5.80  |
| 8.00      | 10.20                 | 9.90  | 9.60  | 9.30  | 9.00  | 8.70  | 8.40  | 8.00  | 7.90  | 7.70  | 7.60  | 7.40  | 7.20  | 7.10  | 6.90  | 6.60  |
| 10.00     | 13.00                 | 12.00 | 12.00 | 12.00 | 11.00 | 11.00 | 10.00 | 10.00 | 9.90  | 9.70  | 9.50  | 9.30  | 9.00  | 8.90  | 8.70  | 8.30  |
| 12.00     | 15.00                 | 15.00 | 14.00 | 14.00 | 13.00 | 13.00 | 13.00 | 12.00 | 12.00 | 12.00 | 11.00 | 11.00 | 11.00 | 11.00 | 10.00 | 10.00 |
| 13.00     | 17.00                 | 16.00 | 16.00 | 15.00 | 15.00 | 14.00 | 14.00 | 13.00 | 13.00 | 13.00 | 12.00 | 12.00 | 12.00 | 12.00 | 11.00 | 11.00 |
| 15.00     | 19.00                 | 19.00 | 18.00 | 17.00 | 17.00 | 16.00 | 16.00 | 15.00 | 15.00 | 15.00 | 14.00 | 14.00 | 14.00 | 13.00 | 13.00 | 12.00 |
| 16.00     | 20.00                 | 20.00 | 19.00 | 19.00 | 18.00 | 17.00 | 17.00 | 16.00 | 16.00 | 15.00 | 15.00 | 15.00 | 14.00 | 14.00 | 14.00 | 13.00 |
| 20.00     | 26.00                 | 25.00 | 24.00 | 23.00 | 22.00 | 22.00 | 21.00 | 20.00 | 20.00 | 19.00 | 19.00 | 19.00 | 18.00 | 18.00 | 17.00 | 17.00 |
| 25.00     | 32.00                 | 31.00 | 30.00 | 29.00 | 28.00 | 27.00 | 26.00 | 25.00 | 25.00 | 24.00 | 24.00 | 23.00 | 23.00 | 22.00 | 22.00 | 21.00 |
| 32.00     | 41.00                 | 40.00 | 38.00 | 37.00 | 36.00 | 35.00 | 33.00 | 32.00 | 32.00 | 31.00 | 30.00 | 30.00 | 29.00 | 28.00 | 28.00 | 26.00 |
| 35.00     | 45.00                 | 43.00 | 41.00 | 41.00 | 38.00 | 38.00 | 36.00 | 35.00 | 35.00 | 34.00 | 33.00 | 32.00 | 32.00 | 32.00 | 30.00 | 29.00 |
| 40.00     | 51.00                 | 50.00 | 48.00 | 47.00 | 45.00 | 43.00 | 42.00 | 40.00 | 39.00 | 39.00 | 38.00 | 37.00 | 36.00 | 35.00 | 35.00 | 33.00 |
| 50.00     | 64.00                 | 62.00 | 60.00 | 58.00 | 56.00 | 54.00 | 52.00 | 50.00 | 49.00 | 48.00 | 47.00 | 46.00 | 45.00 | 44.00 | 43.00 | 41.00 |
| 63.00     | 81.00                 | 78.00 | 76.00 | 73.00 | 71.00 | 68.00 | 66.00 | 63.00 | 62.00 | 61.00 | 60.00 | 58.00 | 57.00 | 56.00 | 55.00 | 52.00 |

#### Influence of the Mains Frequency

Influence of the mains frequency on the tripping behavior  $I_{MA}$  of the instantaneous release

|                                       | Mains Frequency f [Hz] |     |     |     |     |     |     |
|---------------------------------------|------------------------|-----|-----|-----|-----|-----|-----|
|                                       | 16 2/3                 | 50  | 60  | 100 | 200 | 300 | 400 |
| $I_{MA}(f)/I_{MA}(50 \text{ Hz})$ [%] | 91                     | 100 | 101 | 106 | 115 | 134 | 141 |

#### Load Carrying Capacity of Adjoining Miniature Circuit Breakers



## Accessories Technical Data

| Description                                                            | FAZ-XHIN<br>FAZ-XAM002                             | FAZ-XAA-C                                      | FAZ-XUA                                                    |
|------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------|------------------------------------------------------------|
| <b>Electrical</b>                                                      |                                                    |                                                |                                                            |
| Contact function                                                       | 1A + 1B<br>2 C/O                                   | —                                              | —                                                          |
| Rated operational voltage $U_n$                                        | 250 Vac                                            | —                                              | 115 Vac<br>230 Vac<br>400 Vac                              |
| Voltage range                                                          | —                                                  | 12–110 Vac<br>12–60 Vdc                        | —                                                          |
| Voltage range                                                          | —                                                  | 110–415 Vac<br>110–230 Vdc                     | —                                                          |
| Closing threshold [ $\times U_n$ ]                                     | —                                                  | —                                              | 0.8                                                        |
| Tripping threshold [ $\times U_n$ ]                                    | —                                                  | —                                              | 0.5                                                        |
| Rated frequency $f$                                                    | 50/60 Hz                                           | 50/60 Hz                                       | 50/60 Hz                                                   |
| General use (UL/CSA)<br>AC—230/240 Vac<br>DC—110/120 Vdc               | 2/2A<br>0.5/0.5A                                   | —                                              | —                                                          |
| Pilot duty                                                             | A600/Q600                                          | —                                              | —                                                          |
| Conventional free air thermal current $I_{th}$                         | 4A                                                 | —                                              | —                                                          |
| Rated operational current<br>AC-13 $I_b$<br>AC-15 $I_b$<br>DC-13 $I_b$ | 3A (250 Vac)<br>2A (250 Vac)<br>0.5A (110 Vdc)     | —                                              | —                                                          |
| Rated insulation voltage $U_i$                                         | 250 Vac                                            | —                                              | —                                                          |
| Minimum operating voltage per contract $U_{min}$                       | 5 Vdc                                              | —                                              | —                                                          |
| Rated impulse withstand voltage (1.2/50 $\mu$ ) $U_{imp}$              | 2.5 kV                                             | —                                              | —                                                          |
| Rated conditional short-circuit current with 6A backup fuse $I_{SC}$   | 1 kA                                               | —                                              | —                                                          |
| Max. admissible backup fuse                                            | 4A gL                                              | —                                              | —                                                          |
| <b>Mechanical</b>                                                      |                                                    |                                                |                                                            |
| Standard front dimension                                               | 45 mm                                              | 45 mm                                          | 45 mm                                                      |
| Device height                                                          | 80 mm                                              | 80 mm                                          | 80 mm                                                      |
| Mounting width                                                         | 8.8 mm                                             | 17.6 mm                                        | 17.8 mm                                                    |
| Mounting                                                               | On MCB                                             | IEC/EN 60715 top-hat rail                      | IEC/EN 60715 top-hat rail                                  |
| Degree of protection enclosed                                          | IP40                                               | IP40                                           | IP40                                                       |
| Terminal protection                                                    | Protection against electric shock to IEC 536       | Protection against electric shock to IEC 536   | Protection against electric shock to IEC 536               |
| Terminals                                                              | Lift terminals                                     | Twin-purpose terminals                         | Twin-purpose terminals                                     |
| Terminal capacity<br>Solid<br>Flexible                                 | 0.5–2.5 mm <sup>2</sup><br>0.5–2.5 mm <sup>2</sup> | 1–2.5 mm <sup>2</sup><br>1–2.5 mm <sup>2</sup> | 2 x (1–2.5) mm <sup>2</sup><br>2 x (1–2.5) mm <sup>2</sup> |
| Tightening torque of terminal screws                                   | 0.8–1.0 Nm (7–9 lb-in)                             | 2.4 Nm (21 lb-in)                              | 0.8 Nm (7 lb-in)                                           |

# 1.3

## Miniature Circuit Breakers and Supplementary Protectors

### UL 1077 DIN Rail Supplementary Protectors

#### 1

#### Dimensions

Approximate Dimensions in Inches (mm)

#### Miniature Circuit Breakers

##### FAZ

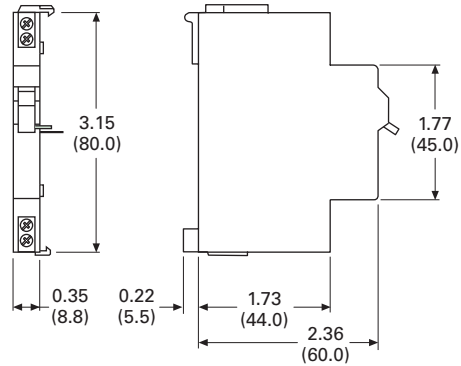


#### Auxiliary Contacts

##### FAZ-XHI11 and FAZ-XH1NW1



##### FAZ-XAM002



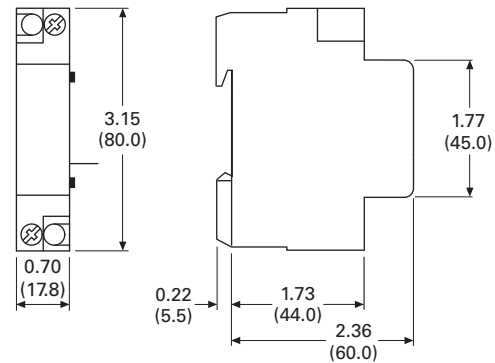
#### Shunt Releases

##### FAZ-XAA



#### Undervoltage Releases

##### FAZ-XUA

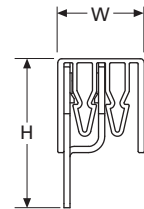
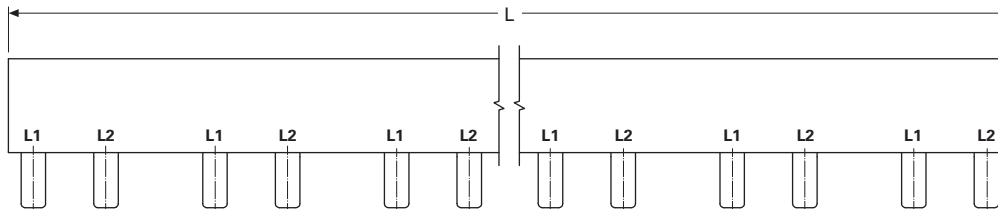


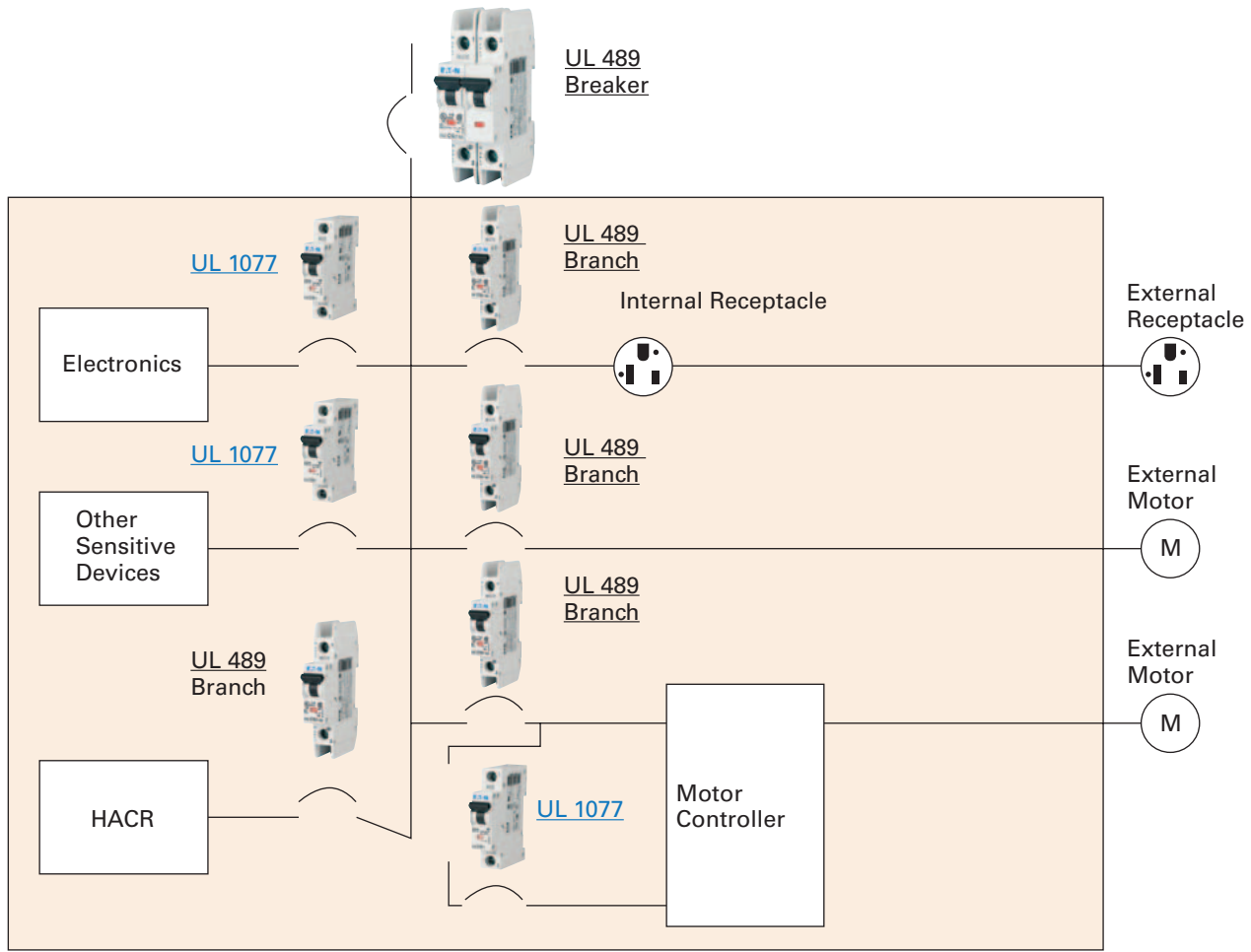
Approximate Dimensions in Inches (mm)

1

### Busbar and Accessory Weights and Dimensions

| Unit Weight (kg) | Length         | Width       | Height      | Catalog Number         |
|------------------|----------------|-------------|-------------|------------------------|
| 0.29             | 39.72 (1009.0) | 0.59 (15.0) | 0.59 (15.0) | BB-UL-18/1P-1M/57      |
| 0.64             | 39.02 (991.0)  | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/2P-2M/56      |
| 0.83             | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/3P-3M/57      |
| 0.26             | 38.78 (985.0)  | 0.59 (15.0) | 0.59 (15.0) | BB-UL-18/1P-1.5M/37    |
| 0.63             | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/2P+AS-2.5M/46 |
| 0.79             | 38.66 (982.0)  | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/3P+AS-3.5M/48 |
| 0.36             | 39.72 (1009.0) | 0.59 (15.0) | 0.59 (15.0) | BB-UL-25/1P-1M/57      |
| 0.79             | 39.02 (991.0)  | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/2P-2M/56      |
| 1.04             | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/3P-3M/57      |
| 0.31             | 38.78 (985.0)  | 0.59 (15.0) | 0.59 (15.0) | BB-UL-25/1P-1.5M/37    |
| 0.73             | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/2P+AS-2.5M/46 |
| 0.97             | 38.66 (982.0)  | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/3P+AS-3.5M/48 |
| 0.03             | 2.36 (60.0)    | 0.67 (17.0) | 1.14 (29.0) | BB-UL-TEP/35           |
| 0.03             | 1.42 (36.0)    | 0.67 (17.0) | 1.14 (29.0) | BB-UL-TEPA/35          |
| 0.03             | 1.57 (40.0)    | 0.71 (18.0) | 1.18 (30.0) | BB-UL-TE/50            |
| 0.003            | 3.35 (85.0)    | 0.47 (12.0) | 0.94 (24.0) | BB-IP/5                |
| 0.001            | 0.55 (14.0)    | 0.20 (5.0)  | 0.39 (10.0) | BB-UL-EC/3             |
| 0.001            | 0.94 (24.0)    | 0.87 (22.0) | 0.39 (10.0) | BB-UL-EC/1             |



**Application Guidelines****Example of UL 489 and UL 1077 Application****Example of UL 489 and UL 1077 Application****UL 489 circuit breakers**

Used for branch circuit protection, internal/external receptacles, external motors and HACR equipment (heating, air conditioning and refrigeration).

**UL 1077 supplementary protectors**

Used for overcurrent protection within appliances or electrical equipment, where branch circuit protection is already provided or not required.

**Note:** UL 489 devices can be used in place of UL 1077; UL 1077 devices cannot be used in place of UL 489.