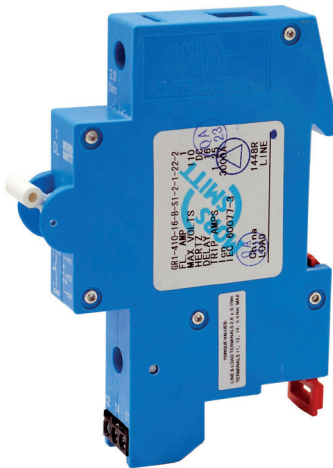


## /// GR Circuit breaker, hydraulic magnetic, 35 mm rail

Rugged plug-in relays for extreme reliability, within long endurance applications and harsh environments

### GR Circuit breaker



### Description

Compact hydraulic magnetic circuit breaker for railway applications, to protect electronic equipment and components against unintended high currents. Optional with integrated auxiliary contacts to monitor the circuit.

The trip point is always at maximum allowable current, independent of ambient temperature. Mid-trip handle to indicate clearly a breaker operation caused by electrical fault. With unique arc chute design which results in high interrupting capacities. Integrated 35 mm rail connection for easy and quick mounting on 35 mm rails. Wide range of currents and options available.

### Application

GR circuit breakers are used in every application where electrical systems, circuits or components must be protected against too high currents. This situation can occur, when under strained or heavy use a motor or other load-generating component within the equipment will draw additional current from the power source. High currents cause the wires or components to overheat and ultimately burn up.

A circuit protection device should be employed at any point where a conductor size changes. Many electronic circuits and components like transformers have a lower overload withstand threshold level than conductors such as wires and cables. These components require circuit protection devices featuring very fast overload sensing and opening capabilities.

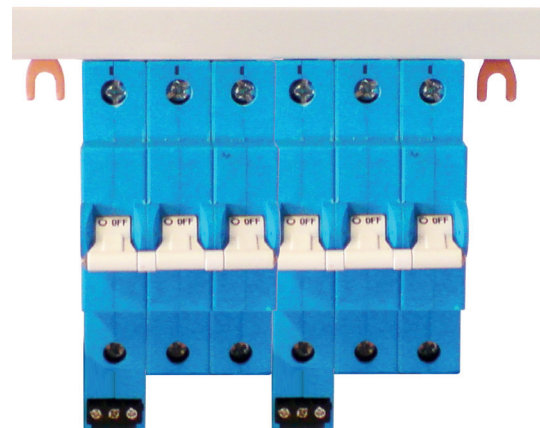
GR circuit breakers can be used in all railway applications where protection against overload and short circuit is necessary, for example HVAC systems, (door) control systems, braking systems, passenger information systems, etc.

### Features

- Precise, temperature independent operation
- 35 mm rail mount
- Integrated auxiliary contacts with screw terminals or internal connector (optional)
- Up to 4 poles configuration
- High interrupting capacities due to unique arc chute method
- Mid-trip handle for electrical trip indication (optional)
- Immediate resetting possible
- Wide current range: 0.2 - 63 A
- Wide choice of time delays
- Maximum voltage 137.5 VDC / 484 VAC
- High contact pressure & longer contact life due to wiping self-cleaning contacts

### Busbar

Example configuration of GR and CR circuitbreakers including busbar.



### Railway compliancy

|                     |                                       |
|---------------------|---------------------------------------|
| EN 50155            | NF F16-101/102                        |
| IEC 60077 - 1/2/3/4 | NF F 62-001 - 1/2/3                   |
| IEC 61373           | NF F61-010                            |
| EN 50124-1          | IEC 60068-2-30                        |
| EN 45545-2          | IEC 60068-2-52                        |
| IEC 60947-2         | MIL-STD-202G Method 107D, condition A |
|                     | MIL-STD-202G Method 106D              |

**Technical specifications**
**Electrical characteristics**

|                        |   |  |   |
|------------------------|---|--|---|
| Application voltage    | <b>DC for 1-4 poles</b>   | <b>AC for 1-2 poles</b>  | <b>AC for 3-4 poles</b>                                 |
| Rated voltage          | 12 - 110 VDC  | 12 - 240 VAC   | 12 - 440 VAC  |
| Min. operating voltage | 8.4 VDC   | 10.8 VAC   | 10.8 VAC  |
| Max. operating voltage | 137.5 VDC   | 264 VAC  | 484 VAC   |
| Current ratings        | 0.2 – 63 A. The GR circuit breaker is polarity insensitive. (except single pole DC breaker)   |  |   |
| Dielectric strength    | 3000 VAC, 50/60 Hz for 1 minute between all electrically isolated terminals.  |  |   |
| Creepage and clearance | EN 50124-1 8 mm spacing requirements from hazardous voltage to operator accessible surfaces, between adjacent poles and from main circuits to auxiliary circuits. |  |   |
| Insulation resistance  | Minimum of 100 MΩ @ 500 VDC   |  |   |
| Operating frequency    | 16 <sup>2/3</sup> / 50 / 60 Hz, DC  |  |   |
| Overload               | 12 operations at 600% of the rated current AC, 250% DC per IEC 60947-2  |  |   |
| Max. interrupting cap. | IEC 60077   | 3000 A @ 137.5 VDC, 63 A (1-pole)<br>5000 A @ 137.5 VDC, 63 A (2-pole)<br>5000 A @ 264 VAC, 63 A (1- or 2-pole)<br>4000 A @ 484 VAC, 63 A (3- or 4-pole)   |   |
|                        | IEC 60947-2   | 10000 A @ 63 VDC, 63 A (1-pole)<br>2500 A @ 116 VDC, 63 A (1-pole)<br>8200 A @ 116 VDC, 63 A (2-pole)<br>5000 A @ 252 VAC, 63 A (1-pole)<br>4000 A @ 462 VAC, 63 A (3- or 4-pole)<br>4000 A @ 572 VAC, 10 A (2-pole) |   |
|                        | UL 1077   | 10000 A @ 110 VDC, 40 A (1-pole)   |   |
| Auxiliary switch       | Integrated, load side. SPST. Auxiliary switch senses the on-off position of circuit breaker handle, as well as the open-closed position of breaker contact.       |  |   |
|                        |   | Silver auxiliary contacts  | Gold auxiliary contacts                                 |
| AC min. switching cap. |   | 5 - 20 VAC: 100 mA<br>≥ 20 VAC: 10 mA  | 5 mA / 5 VAC  |
| AC max. switching cap. |   | 5 A / 125 VAC  | 100 mA / 125 VAC  |
| DC min switching cap.  |   | ≤ 20 VDC: 100 mA<br>≥ 20 VDC: 10 mA  | 5 mA / 5 VDC  |
| DC max. switching cap. |   | 3 A / 32 VDC<br>100 mA / 125 VDC<br>(max. 2000 cycles)   | 100 mA / 32 VDC<br>2 mA / 110 VDC<br>(max. 2000 cycles) |
|                        | All loads mentioned are resistive loads.  |  |   |

## Circuit breaker GR

### General characteristics

|                            |  |   |
|----------------------------|--|---|
| Number of poles            | 1, 2, 3 or 4 poles   |   |
| Terminals                  | <p>Line terminal</p> <p>Minimum wire size</p> <p>Maximum wire size</p> <p>Busbar/tab connection thickness range</p> <p>Load terminal</p> <p>Minimum wire size</p> <p>Maximum wire size</p> <p>Busbar/tab connection thickness range:</p> <p>Wires of different cross sectional area in one terminal is not recommended. 2 wires of identical cross sectional area in one terminal is possible with restrictions. Contact Mors Smitt for more information.</p> <p>Torque value (line &amp; load)</p>  | <p>dual connection, see form &amp; fit drawings</p> <p>1.0 mm<sup>2</sup></p> <p>9.0 x 9.0 mm</p> <p>1.19 ~ 1.57 mm (0.047 ~ 0.062 inches)</p> <p>See form &amp; fit drawings</p> <p>1.0 mm<sup>2</sup></p> <p>8.7 x 6.5 mm</p> <p>1.19 ~ 1.57 mm (0.047 ~ 0.062 inches)</p> <p>Nominal 2.8 Nm with tool tolerance +/- 0.1 Nm, maximum 2.9 Nm</p> |
| Auxiliary contacts         | <p>Captive screws</p> <p>Minimum wire size</p> <p>Maximum wire size</p> <p>Maximum torque value</p> <p>Wire strip length: 5.5 mm</p> <p>Internal connector</p>   | <p>0.2 mm<sup>2</sup></p> <p>1.5 mm<sup>2</sup></p> <p>0.4 Nm</p> <p>5.5 mm</p> <p>See page 6</p>   |
| Mounting                   | <p>35 mm rail lock is located at bottom of circuit breaker (load terminal side) when mounted vertically (wall mount position). The hydraulic-magnetic circuit breakers of Mors Smitt can be mounted in any position. A hydraulic-magnetic breaker is designed to "must hold" at 100% of the breaker's current rating and is calibrated to "must trip" at 125% of the breaker's current rating. If the mounting position is +90 degrees from a vertical panel mount (handle facing down, ceiling mount position) the trip and must hold rating is reduced by 10%.</p> |   |
| Body                       | Blue colour  |   |
| Actuator                   | Handle, white or black with "I O" and/or "On-off" legends  |   |
| Int. circuit configuration | Series trip & switch only  |   |
| Weight                     | <p>1-pole without aux. contact</p> <p>2-pole without aux. contact</p> <p>3-pole without aux. contact</p> <p>4-pole without aux. contact</p><br><p>1-pole with aux. contact</p> <p>2-pole with aux. contact</p> <p>3-pole with aux. contact</p> <p>4-pole with aux. contact</p>   | <p>135 g</p> <p>270 g</p> <p>405 g</p> <p>540 g</p><br><p>140 g</p> <p>275 g</p> <p>410 g</p> <p>545 g</p>  |
| Width per pole             | 17.5 mm  |   |
| Material                   | <p>Half shell - BMC 605</p> <p>Handle - Valox 420SEO UL94V0</p> <p>Terminals - Brass with acid tin plate</p>   | <p>(weight per pole ~ 69.4 g)</p> <p>(weight per pole ~ 1.2 g)</p>  |

## Circuit breaker GR

### Mechanical characteristics

|                     |   |
|---------------------|---|
| Endurance           | 10.000 "On-Off" operations with rated current & voltage.  |
| Trip free mechanism | Trips on short-circuit or on overload, even when actuator is forcibly held in the "On" position.  |
| Mid trip indication | The operating handle moves positively to the mid position and an auxiliary switch is actuated, when an overload or a short circuit causes the circuit breaker to trip.<br>Remark:<br>It is possible to manually switch the circuit breaker to the mid-trip position when the handle is switched from OFF to ON position quickly and with strong upwards force. Normally this won't occur in standard use. This is a normal phenomenon related to the design of the product. |

### Environmental characteristics

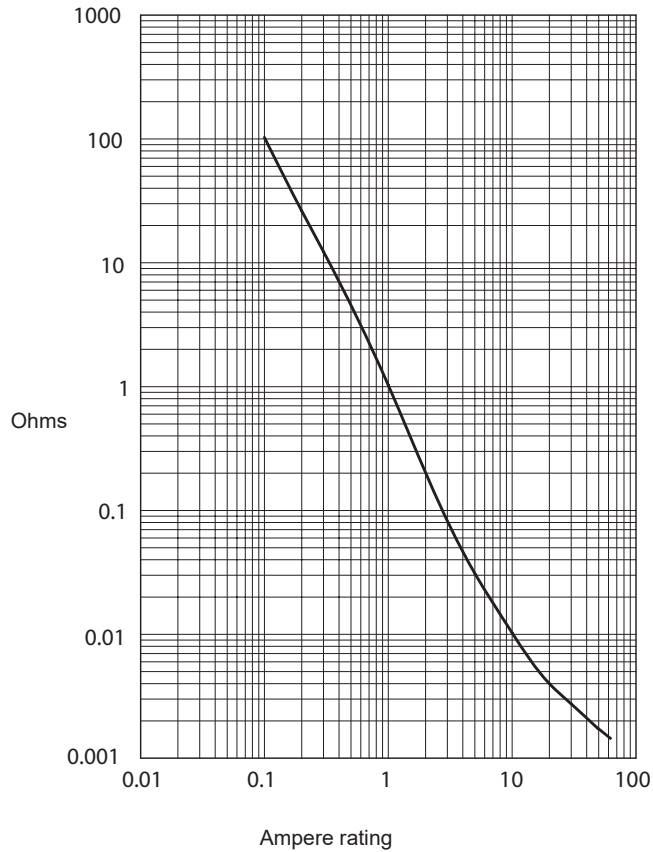
|                                |   |
|--------------------------------|---|
| Environmental                  | Complies to EN 50125-1 and IEC 60077-1  |
| Operating temperature          | -50 °C...+85 °C   |
| Vibration                      | IEC 61373, Category 1, class B body mounted   |
| Shock                          | IEC 61373, Category 1, class A & B body mounted   |
| Thermal shock                  | Complies to MIL-STD 202G method 107D, test condition A  |
| Salt mist                      | Complies to IEC 60068-2-52 severity level 3   |
| Damp heat                      | Complies to IEC 60068-2-30 test method Db variant 1   |
| Fire & smoke                   | Complies to NF F 16101, NF F 16102, EN 45545-2  |
| Protection                     | IEC 60529, IP40 when a panel is mounted over the circuit breaker; when no panel is mounted IP20 |
| Moisture resistance / humidity | Complies to MIL-STD 202G method 106D  |

### Railway compliancy

|                                       |  |
|---------------------------------------|--|
| EN 50155                              | Railway applications - Rolling stock - Electronic equipment  |
| IEC 60077 - 1/2/3/4                   |  |
| IEC 61373                             | Railway applications - Rolling stock equipment - Shock and vibration tests   |
| EN 50124-1                            |  |
| EN 45545-2                            | Railway applications - Fire protection on railway vehicles<br>Part 2: Requirements for fire behavior of materials and components |
| NF F16-101/102                        | Railway rolling stock - Fire behavior  |
| NF F62-001 - 1/2/3                    |  |
| NF F61-010                            |  |
| IEC 60068-2-30                        |  |
| IEC 60068-2-52                        |  |
| IEC 60947-2                           |  |
| MIL-STD-202G Method 107D, condition A |  |
| MIL-STD-202G Method 106D              |  |

**Resistance, impedance**

Resistance, impedance values from Line to Load terminals  
(Values based on series trip circuit breaker)



| Current (amps) | Tolerance (%) |
|----------------|---------------|
| 0.10 - 5.0     | ± 15%         |
| 5.1 - 20.0     | ± 25 %        |
| 20.1 - 63.0    | ± 35 %        |

# Circuit breaker GR

## Auxiliary contact with internal connector

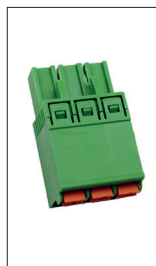
The GR circuit breaker with auxiliary contact with internal connector has no screw terminals but a (male) Phoenix Combicon connector inside. Wires can be connected to a (female) plug, which can easily be connected into the circuit breaker.

### Advantages:

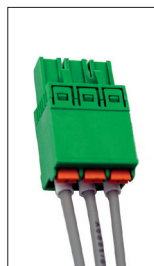
- Pre-wiring is possible
- Easy interchangeable
- Time saving solution
- Various connection methods possible
- Many different plugs available, for example spring clamp terminals, screw terminals, terminals under different angles or position, with or without integrated test points, etc.



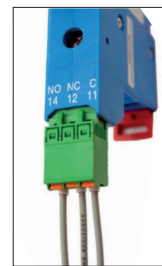
Internal connector



Plug with spring clamp terminals



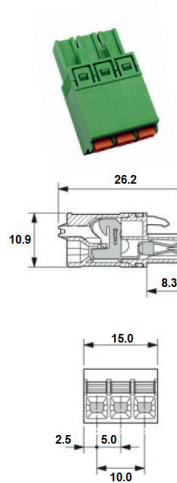
Plug with wires connected



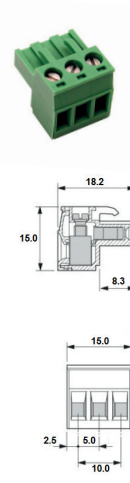
GR circuit breaker with plug and wires connected

### Example plugs

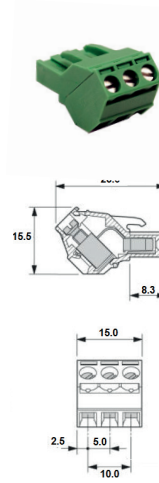
Spring clamp terminals



Screw terminals  
45° angle



Screw terminals



Dimensions in mm

|                                      |                            |                            |                            |
|--------------------------------------|----------------------------|----------------------------|----------------------------|
| Wire size solid wire                 | 0.2 - 1.5 mm <sup>2</sup>  | 0.2 - 2.5 mm <sup>2</sup>  | 0.2 - 2.5 mm <sup>2</sup>  |
| Wire size stranded wire              | 0.2 - 2.5 mm <sup>2</sup>  | 0.2 - 2.5 mm <sup>2</sup>  | 0.2 - 2.5 mm <sup>2</sup>  |
| Wire size stranded wire with ferrule | 0.25 - 1.5 mm <sup>2</sup> | 0.25 - 2.5 mm <sup>2</sup> | 0.25 - 2.5 mm <sup>2</sup> |
| Wire stripping length                | 10 mm                      | 7 mm                       | 7 mm                       |

The auxiliary contact with internal connector can be used with accompanying Phoenix Combicon plugs.

Phoenix item number internal connector: 1753453.

The circuit breaker is standard delivered without plugs.

# Circuit breaker GR

## GR circuit breaker with diode inside auxiliary contac

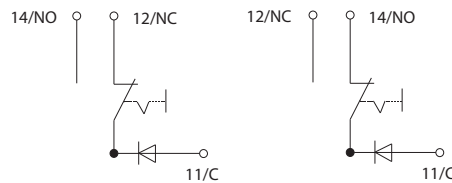
If there are several circuit breakers connected to one I/O card, the diode in the auxiliary contacts makes it possible to detect which circuit breaker has tripped. This can reduce the number of I/O cards.

Type of diode: 1N4007

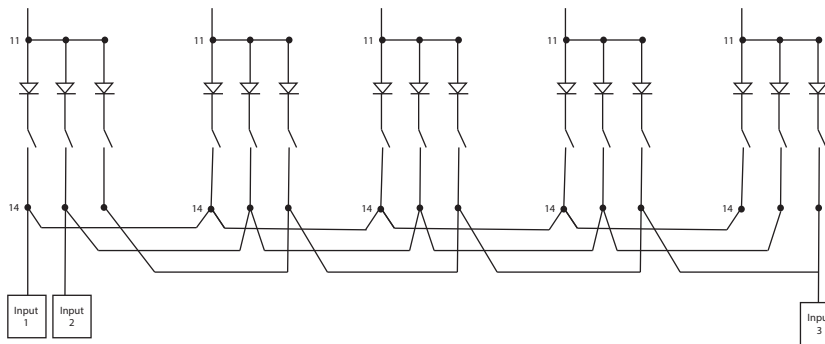
Auxiliary contact schematic

Screw terminals

Internal connector



Connection example (screw terminals)



## Table of time delay values

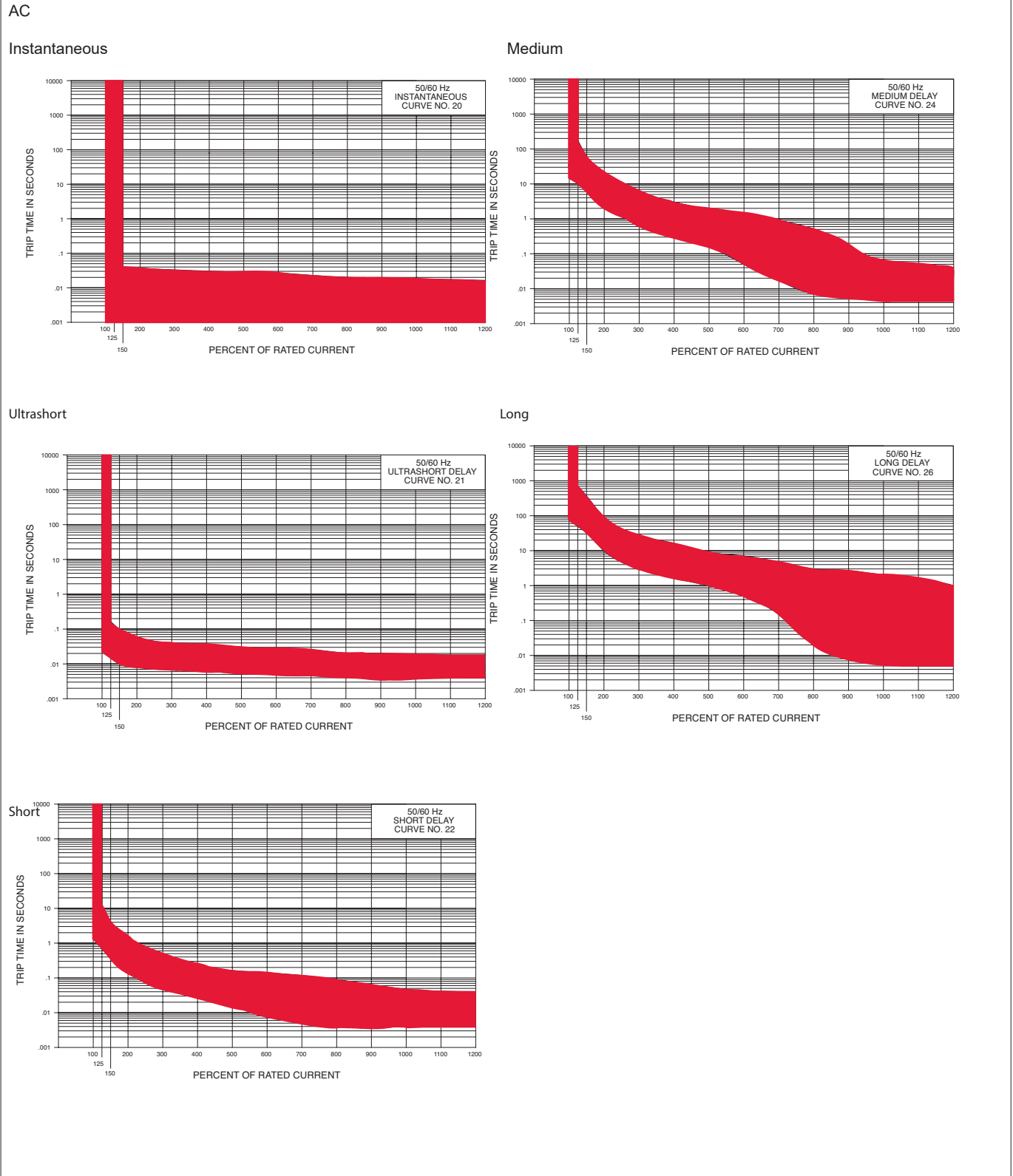
| TRIP TIME (SECONDS) | PERCENT OF RATED CURRENT |             |      |             |             |             |             |             |             |             |       |
|---------------------|--------------------------|-------------|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|
|                     | DELAY                    | 100%        | 125% | 135%        | 150%        | 200%        | 400%        | 600%        | 800%        | 1000%       | 1200% |
| 10                  | No Trip                  | May Trip    | ---  | .032 MAX    | .024 MAX    | .020 MAX    | .018 MAX    | .016 MAX    | .015 MAX    | .013 MAX    |       |
| 11                  | No Trip                  | .013 - .125 | ---  | .010 - .070 | .008 - .032 | .006 - .020 | .005 - .020 | .004 - .020 | .004 - .020 | .004 - .020 |       |
| 12                  | No Trip                  | .500 - 6.50 | ---  | .300 - 3.00 | .130 - 1.20 | .031 - .220 | .011 - .120 | .004 - .090 | .004 - .060 | .004 - .040 |       |
| 14                  | No Trip                  | 2.00 - 60.0 | ---  | 1.20 - 40.0 | .600 - 20.0 | .150 - 3.00 | .030 - 1.30 | .004 - .600 | .004 - .100 | .004 - .100 |       |
| 16                  | No Trip                  | 45.0 - 345  | ---  | 20.0 - 150  | 9.00 - 60.0 | 1.40 - 11.4 | .150 - 5.80 | .009 - 3.70 | .005 - 1.70 | .005 - .500 |       |
| 20                  | No Trip                  | May Trip    | ---  | .040 MAX    | .035 MAX    | .030 MAX    | .025 MAX    | .020 MAX    | .017 MAX    | .015 MAX    |       |
| 21                  | No Trip                  | .014 - .150 | ---  | .011 - .095 | .008 - .055 | .006 - .035 | .005 - .027 | .005 - .021 | .004 - .018 | .004 - .017 |       |
| 22                  | No Trip                  | .700 - 12.0 | ---  | .350 - 4.00 | .130 - 1.30 | .027 - .220 | .008 - .130 | .004 - .090 | .004 - .045 | .004 - .040 |       |
| 24                  | No Trip                  | 10.0 - 160  | ---  | 6.00 - 60.0 | 2.20 - 20.0 | .300 - 3.00 | .050 - 1.30 | .007 - .500 | .005 - .060 | .005 - .040 |       |
| 26                  | No Trip                  | 50.0 - 700  | ---  | 32.0 - 350  | 10.0 - 90.0 | 1.50 - 15.0 | .500 - 7.00 | .020 - 3.00 | .006 - 2.00 | .005 - 1.00 |       |
| 42                  | No Trip                  | .700 - 12.0 | ---  | .400 - 6.00 | .180 - 2.30 | .050 - .600 | .026 - .300 | .018 - .200 | .014 - .150 | .012 - .130 |       |
| 44                  | No Trip                  | 7.00 - 100  | ---  | 3.00 - 50.0 | 1.10 - 18.0 | .220 - 3.00 | .120 - 1.70 | .075 - 1.20 | .050 - .850 | .042 - .720 |       |
| 46                  | No Trip                  | 50.0 - 700  | ---  | 31.0 - 350  | 12.0 - 150  | 1.50 - 20.0 | .700 - 10.0 | .404 - 7.90 | .260 - 6.50 | .198 - 5.80 |       |
| 52                  | No Trip                  | .500 - 6.50 | ---  | .340 - 4.50 | .180 - 2.30 | .051 - .600 | .030 - .320 | .018 - .220 | .014 - .200 | .012 - .130 |       |
| 54                  | No Trip                  | 1.50 - 50.0 | ---  | .750 - 35.0 | .350 - 18.0 | .110 - 3.00 | .070 - 1.70 | .045 - 1.40 | .039 - 1.30 | .035 - 1.30 |       |
| 56                  | No Trip                  | 45.0 - 345  | ---  | 19.0 - 170  | 8.50 - 100  | 1.24 - 15.0 | .410 - 9.00 | .256 - 8.00 | .210 - 5.50 | .198 - 2.90 |       |

### Notes:

- Delay curves 11, 12, 14, 16, 21, 22, 24, 26, 42, 44, 46, 52, 54, 56: Breakers to hold 100% and must trip at 125% of rated current and greater within the time limit shown in this curve
- Delay curves 10, 20: Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in this curve
- All curves: Curve data shown represents breaker response at ambient temperature of 25 °C (77 °F) with no preloading. Breakers are mounted in standard wall-mount position. Delay times may vary at different temperature, the trip current rating remains unchanged
- On 50 amp and less current ratings, the minimum inrush pulse tolerance handling capability is 12 times the rated current on standard delays and 25 times the rated current on high inrush delays. These values are based on a 60 Hz 1/2 cycle, 8.33 ms pulse. High inrush delays should be specified for applications with high initial surge currents of short duration such as switching power supplies, highly capacitive loads and transformer loads

# Circuit breaker GR

## Time delay values



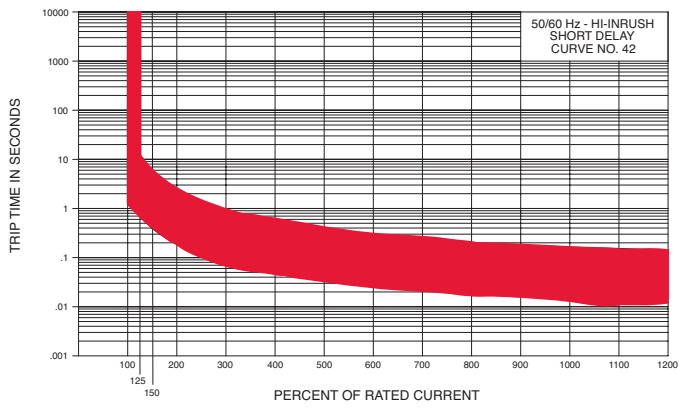


# Circuit breaker GR

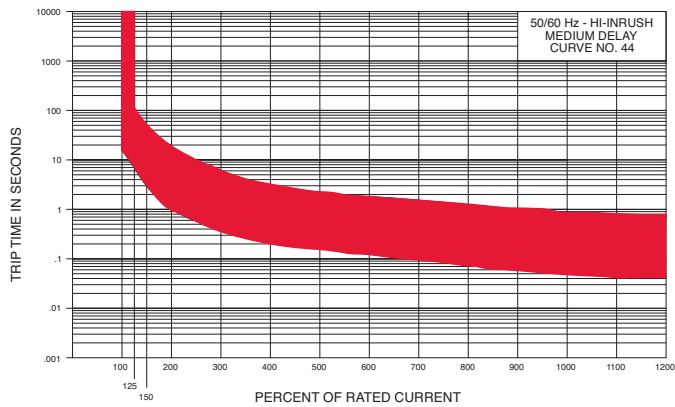
## Time delay values

High Inrush AC

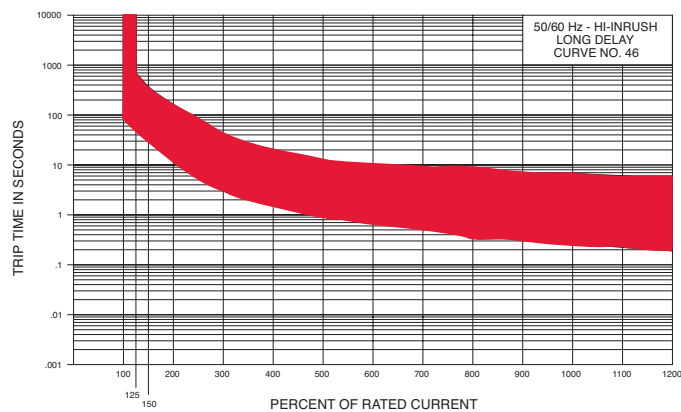
Short



Medium

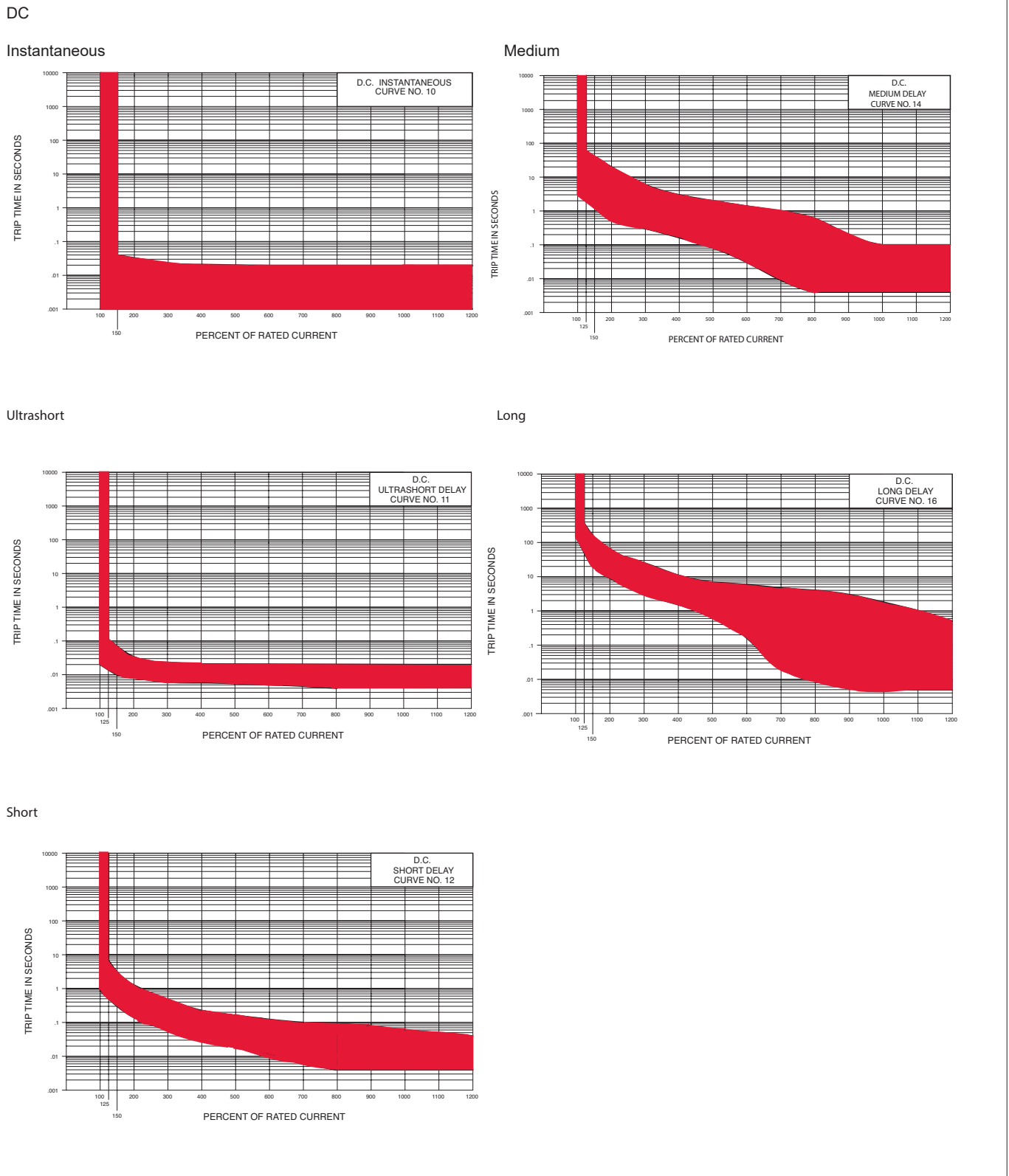


Long



# Circuit breaker GR

## Time delay values

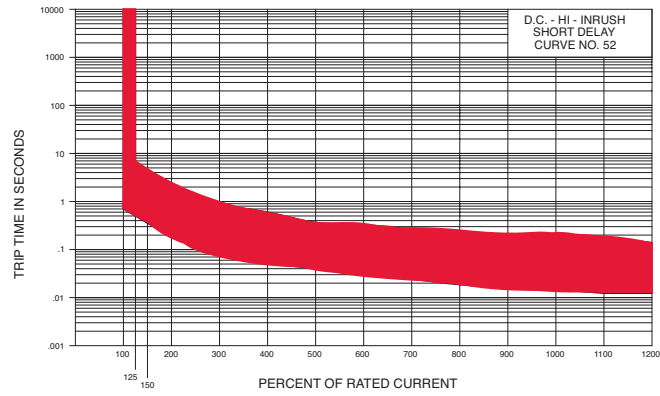


# Circuit breaker GR

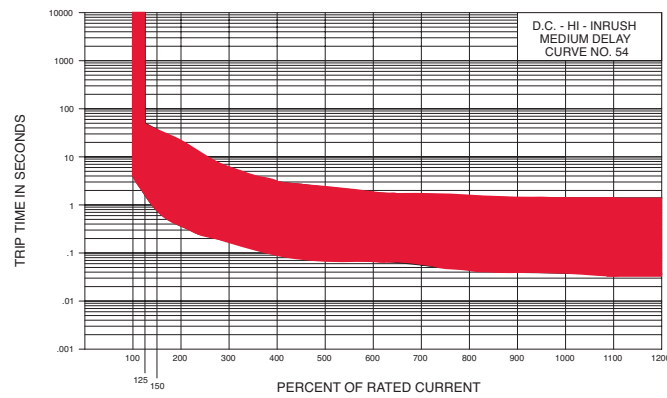
## Time delay values

High Inrush DC

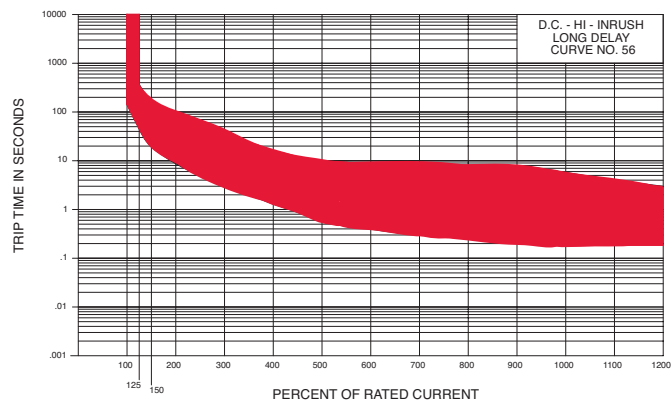
Short



Medium



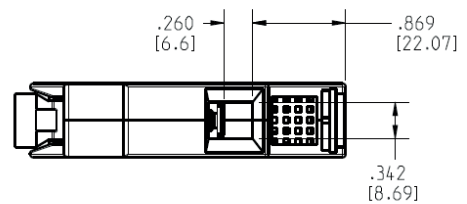
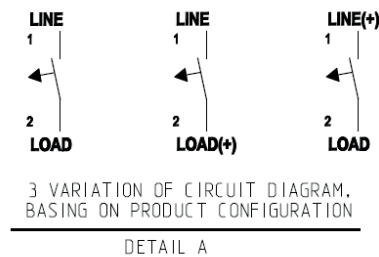
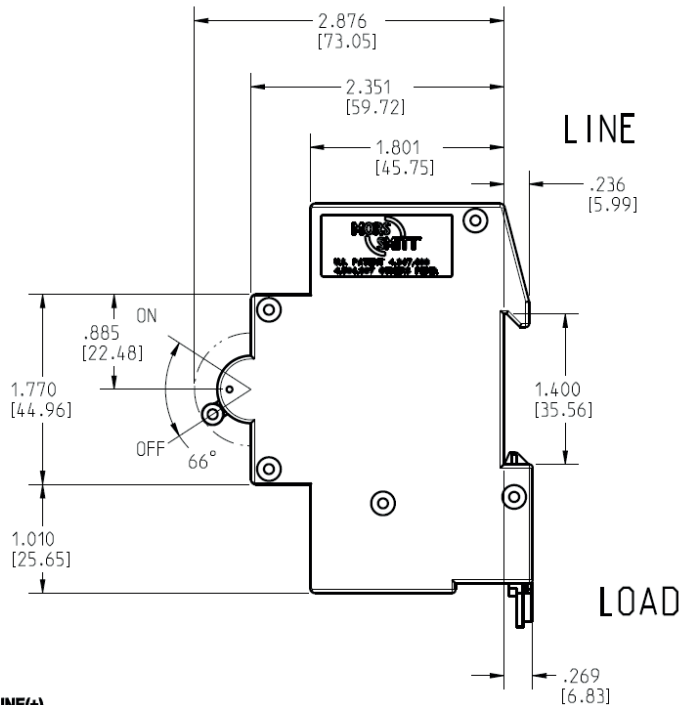
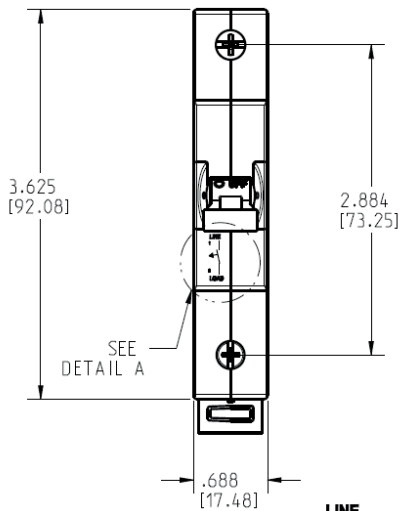
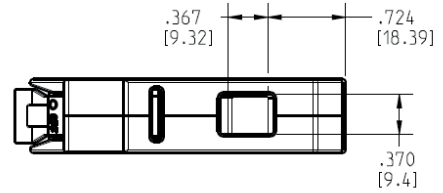
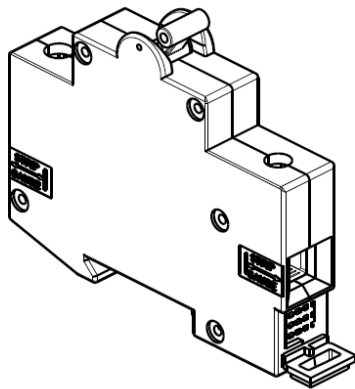
Long



# Circuit breaker GR

## Form & fit drawings

GR 1 pole without auxiliary switch

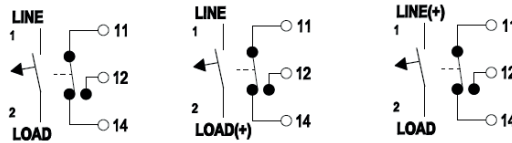
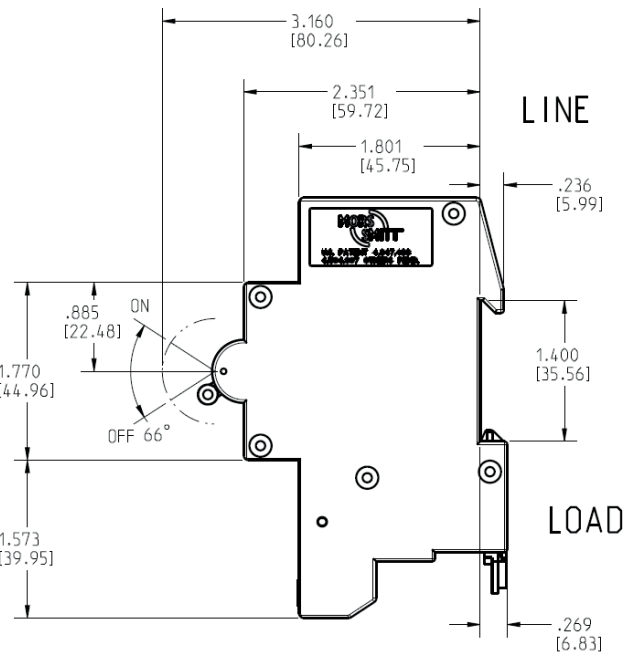
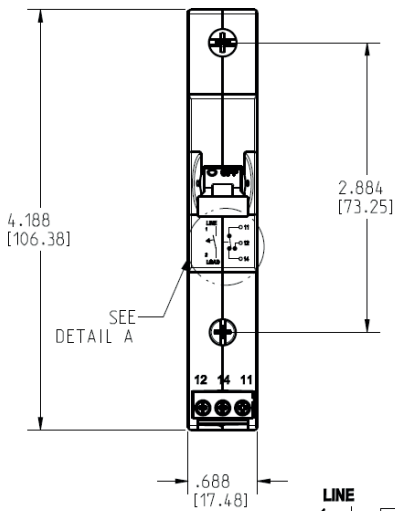
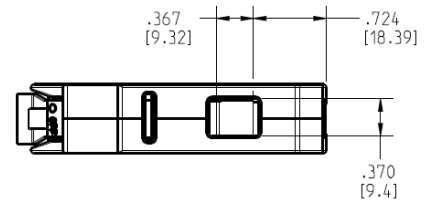
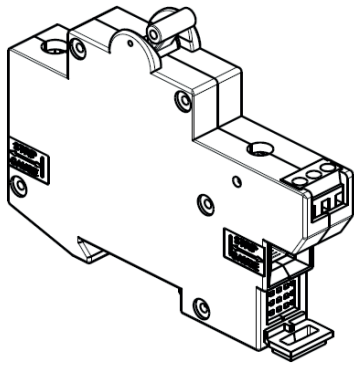


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

# Circuit breaker GR

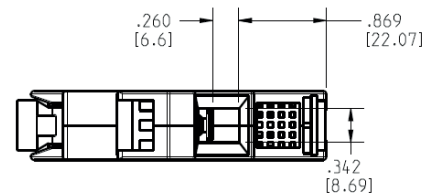
## Form & fit drawings

GR 1 pole with auxiliary switch (screw terminals)



3 VARIATION OF CIRCUIT DIAGRAM,  
BASING ON PRODUCT CONFIGURATION

DETAIL A

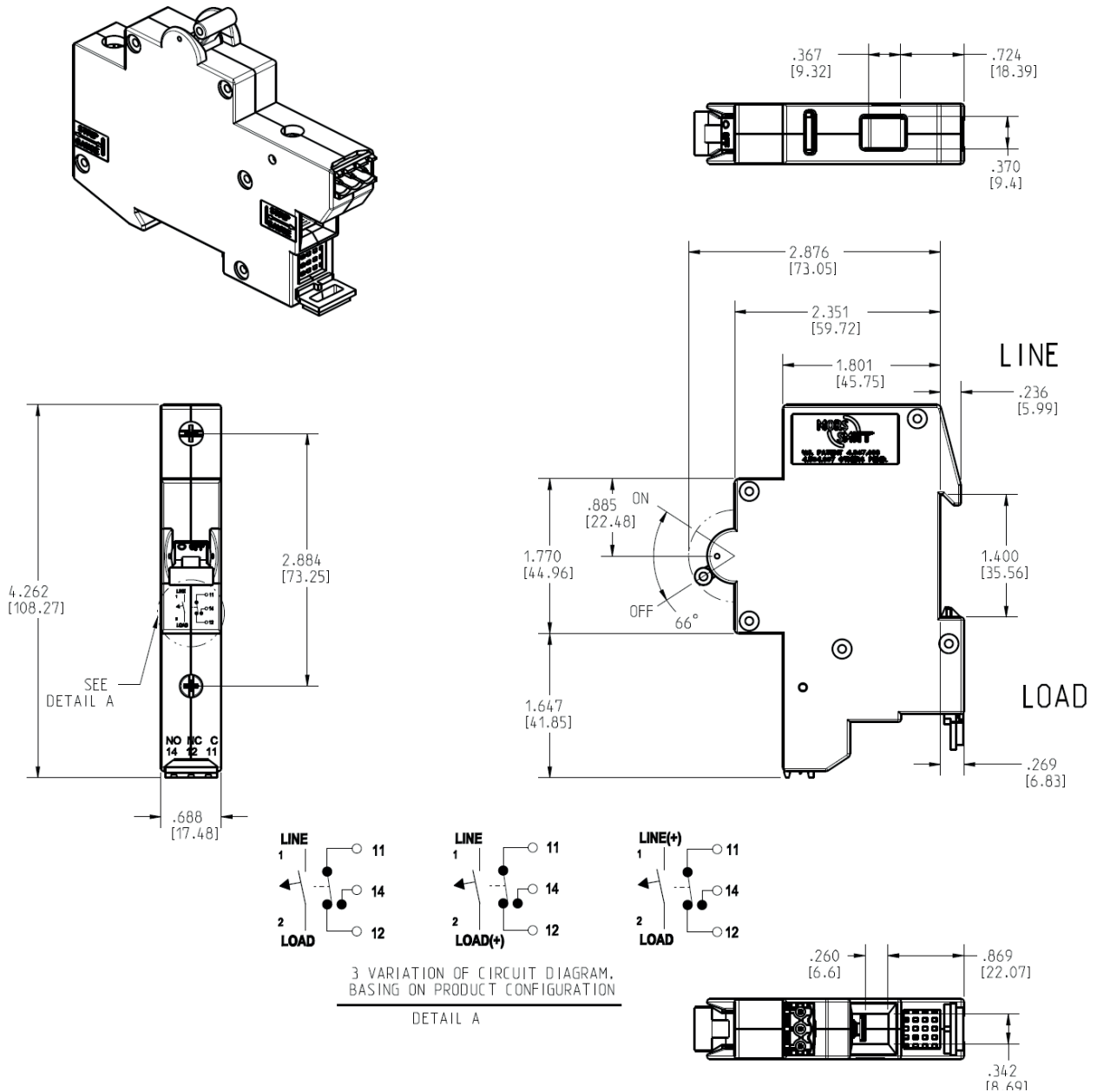


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

## Circuit breaker GR

### Form & fit drawings

GR 1 pole with auxiliary switch (internal connector)

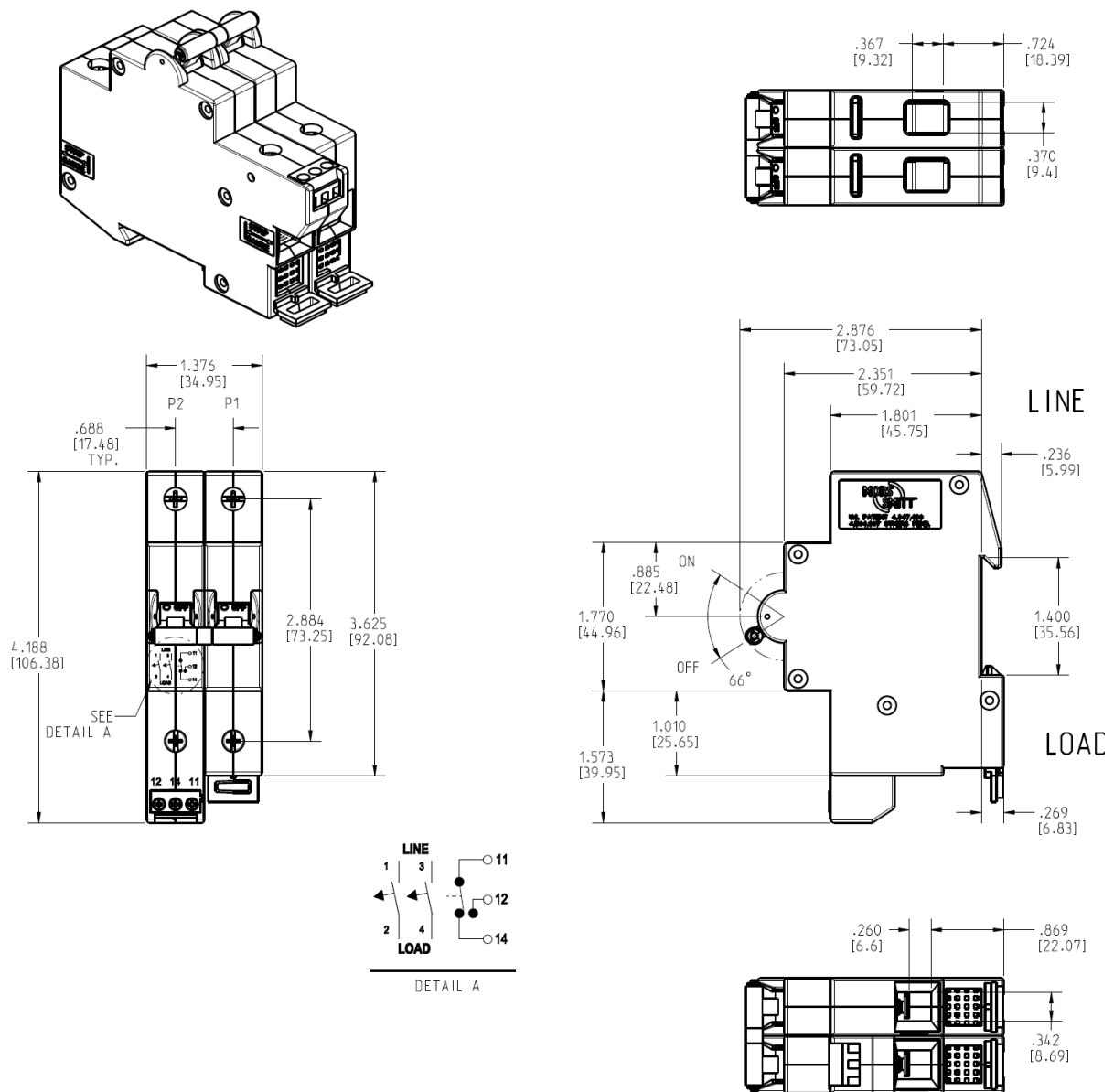


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

## Circuit breaker GR

### Form & fit drawings

GR 2 poles with auxiliary switch (screw terminals)

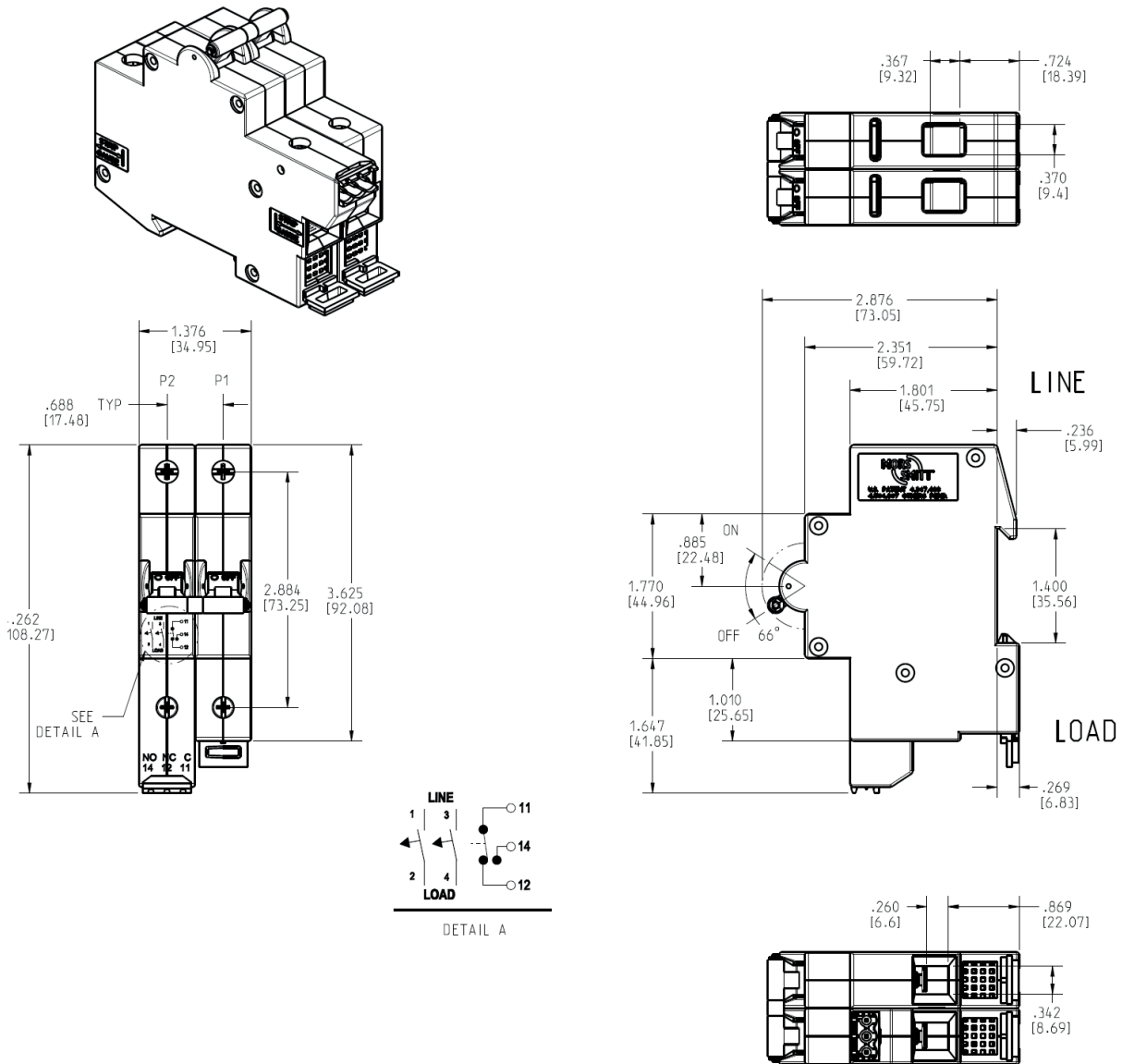


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

# Circuit breaker GR

## Form & fit drawings

GR 2 poles with auxiliary switch (internal connector)



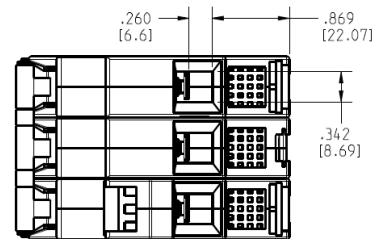
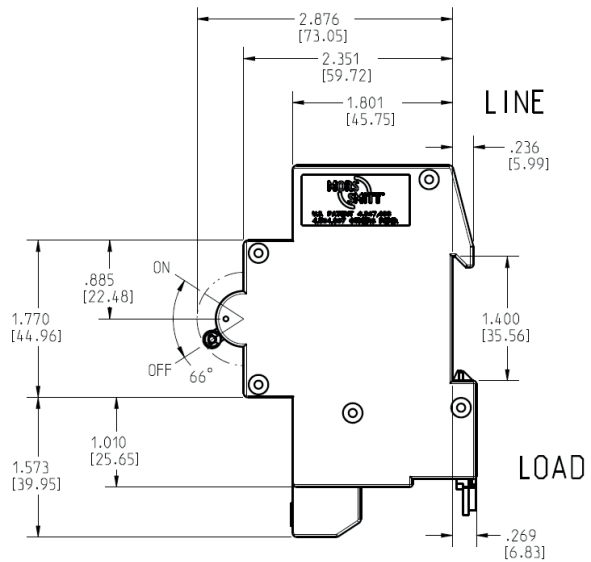
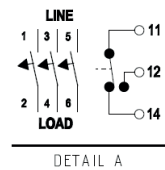
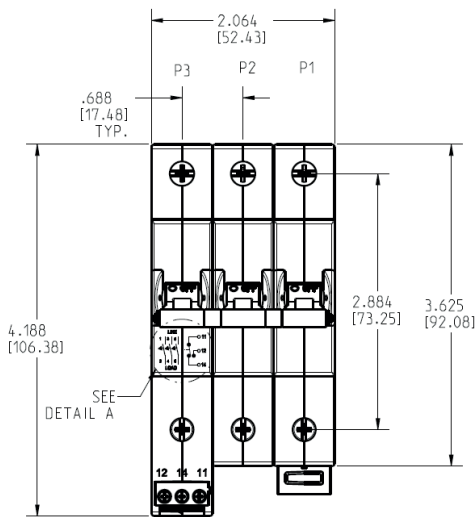
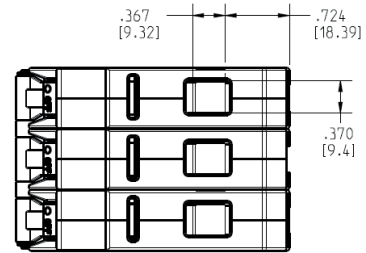
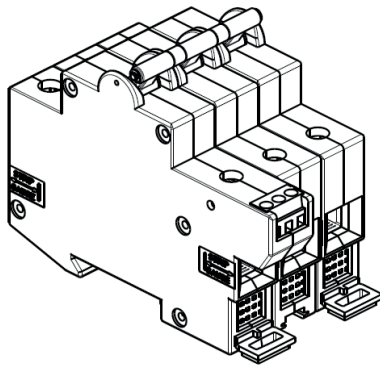
- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$



# Circuit breaker GR

## Form & fit drawings

GR 3 poles with auxiliary switch (screw terminals)

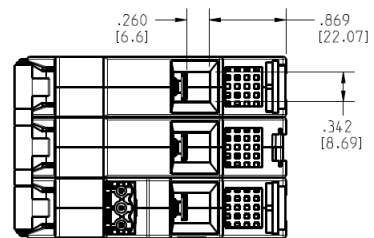
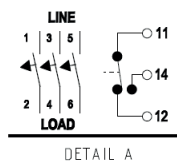
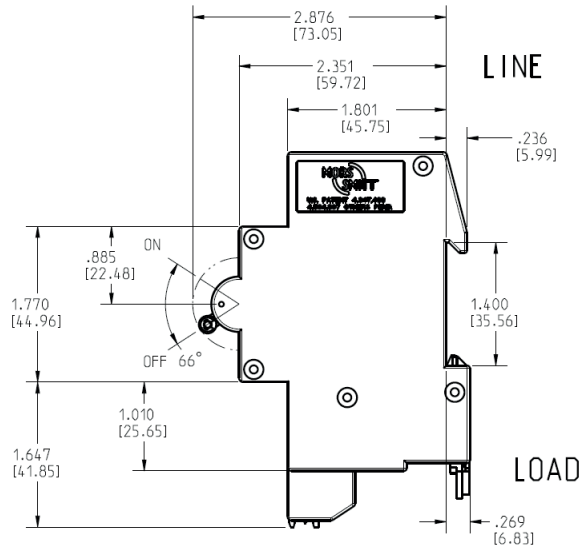
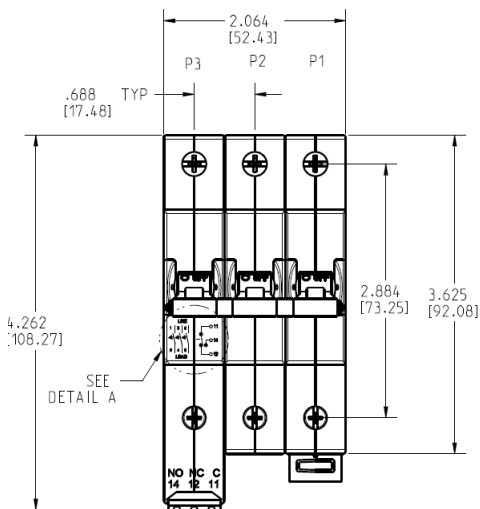
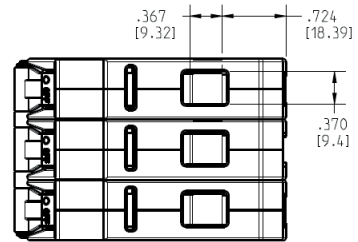
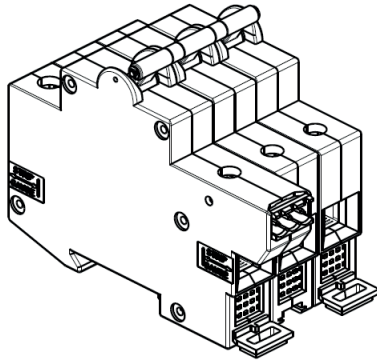


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

# Circuit breaker GR

## Form & fit drawings

GR 3 poles with auxiliary switch (internal connector)

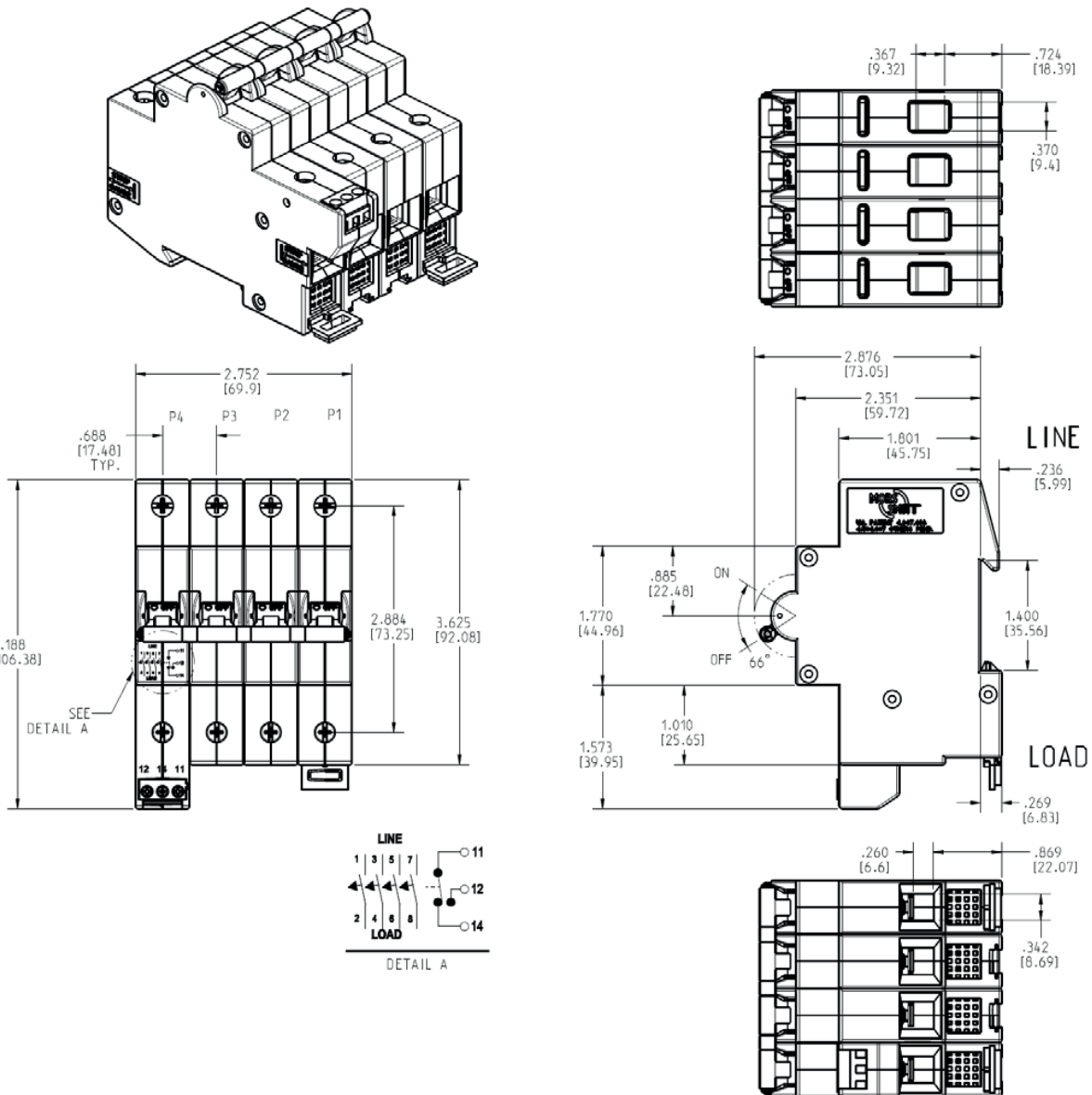


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

# Circuit breaker GR

## Form & fit drawings

GR 4 poles with auxiliary switch (screw terminals)

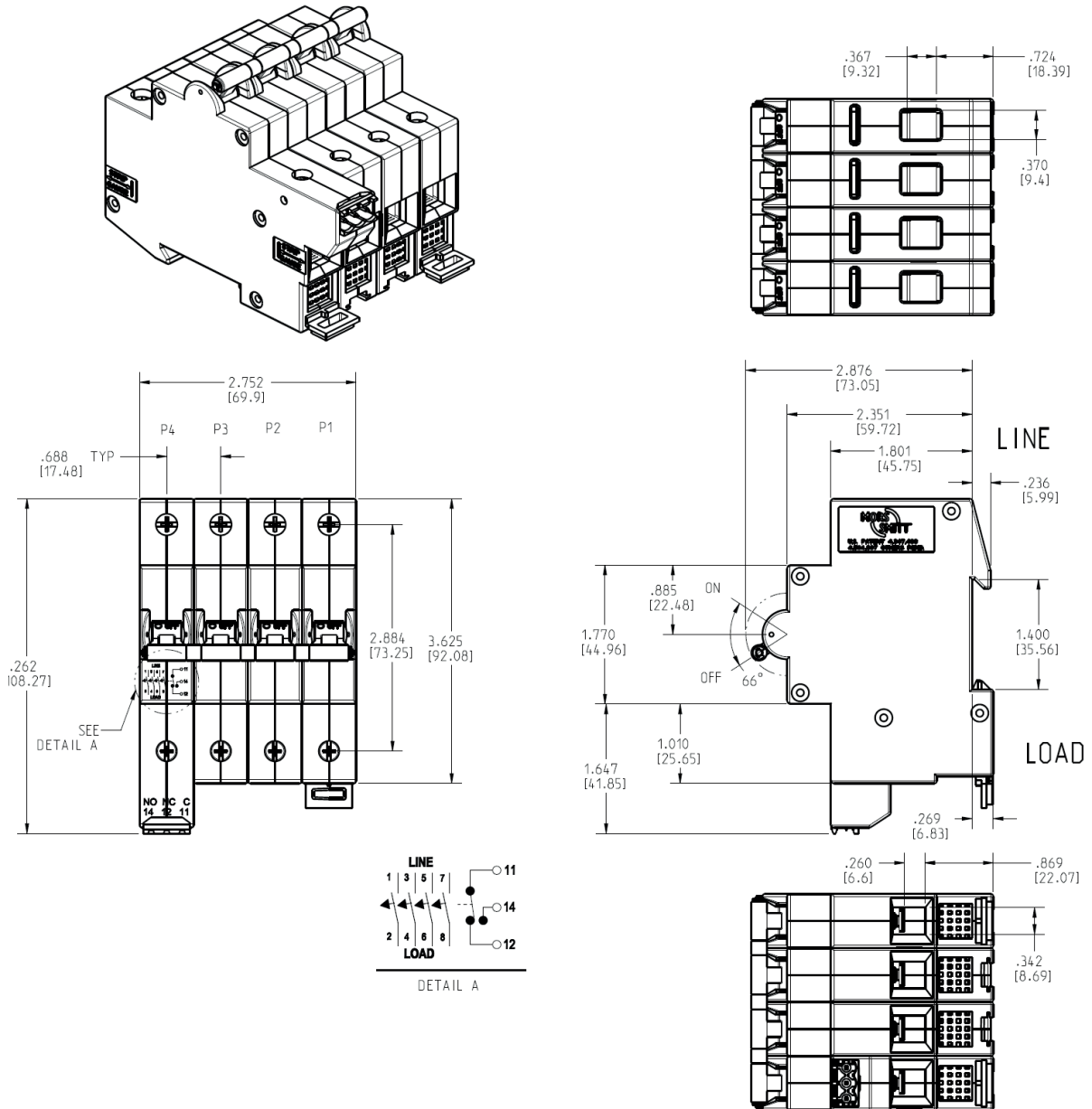


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

# Circuit breaker GR

## Form & fit drawings

GR 4 poles with auxiliary switch (internal connector)

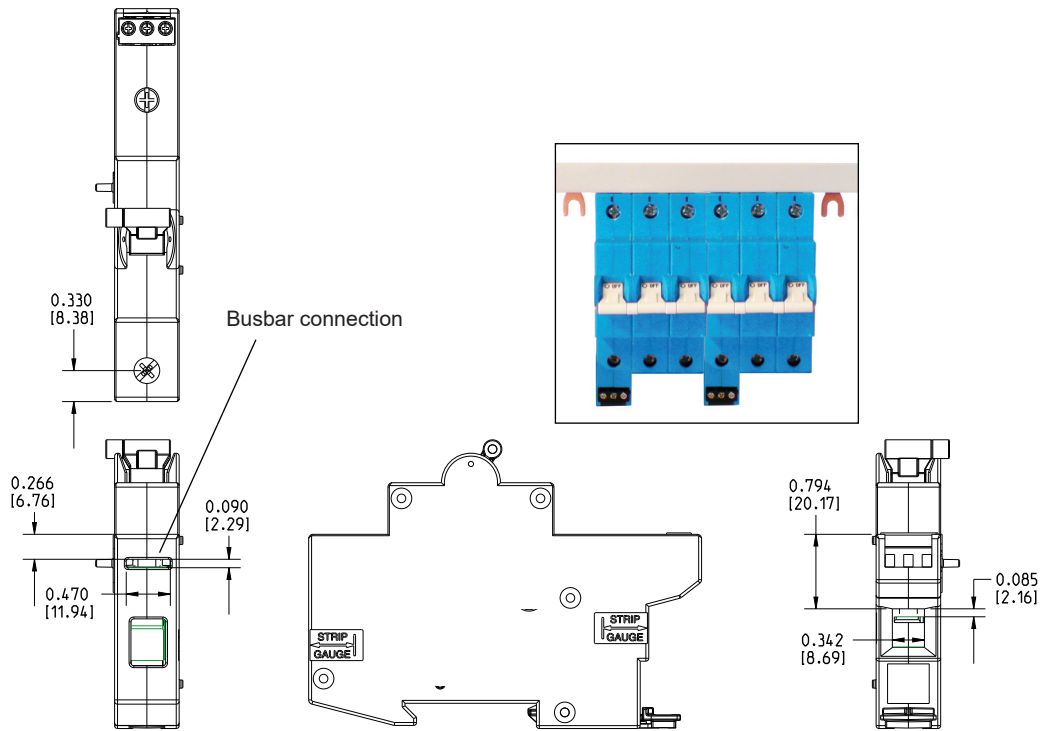


- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

# Circuit breaker GR

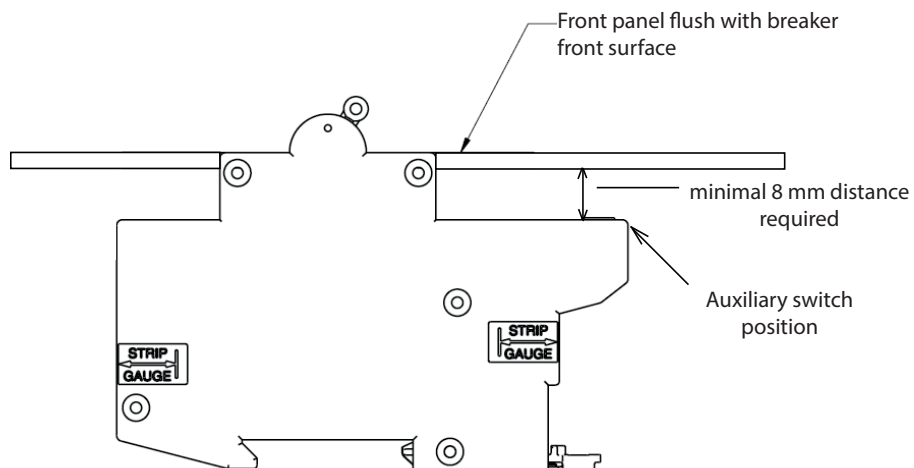
## Form & fit drawings

### Busbar connection



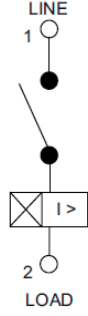
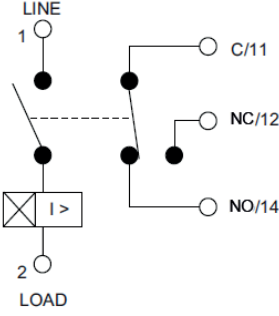
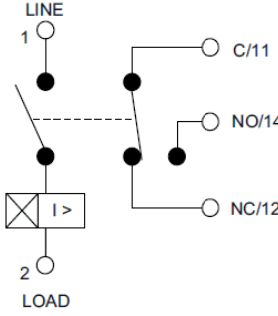
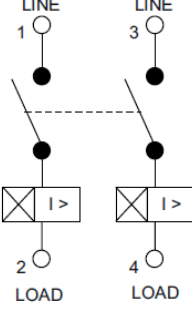
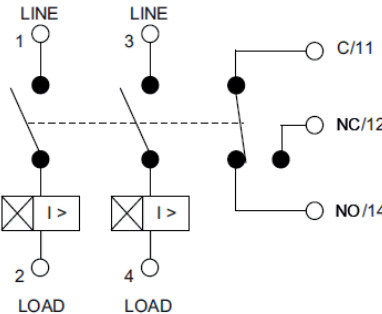
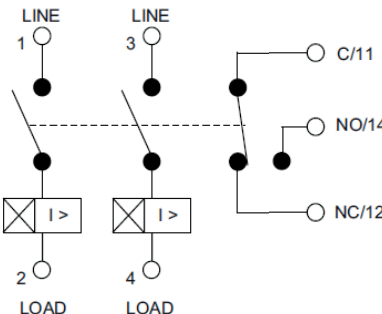
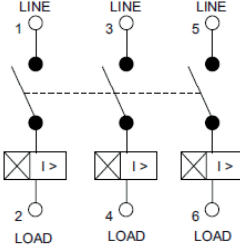
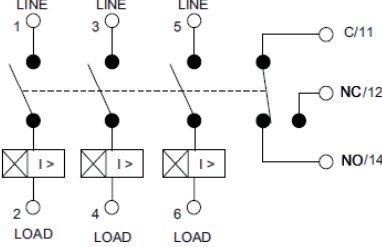
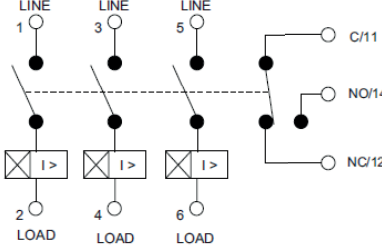
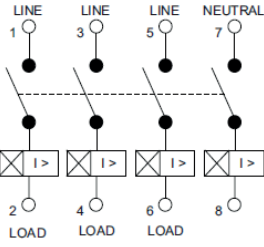
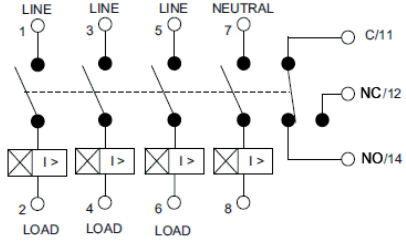
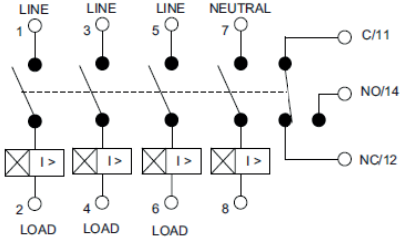
- Notes:
1. All dimensions are in inches [millimeters]
  2. Tolerance  $\pm 0.01$  [0.25] unless otherwise specified
  3. Angles  $\pm 1^\circ$

### Front panel clearance for circuitbreakers with an auxiliary switch (when panel is made of a conducting material)



# Circuit breaker GR

## Circuit schematic

| CIRCUIT SCHEMATIC   |   |   |
|---|---|---|
| <p><b>GR1</b></p>    | <p><b>WITH AUXILIARY SWITCH (SCREW TERMINALS)</b></p>    | <p><b>WITH AUXILIARY SWITCH (INTERNAL CONNECTOR)</b></p>    |
| <p><b>GR2</b></p>   | <p><b>WITH AUXILIARY SWITCH (SCREW TERMINALS)</b></p>   | <p><b>WITH AUXILIARY SWITCH (INTERNAL CONNECTOR)</b></p>   |
| <p><b>GR3</b></p>  | <p><b>WITH AUXILIARY SWITCH (SCREW TERMINALS)</b></p>  | <p><b>WITH AUXILIARY SWITCH (INTERNAL CONNECTOR)</b></p>  |
| <p><b>GR4</b></p>  | <p><b>WITH AUXILIARY SWITCH (SCREW TERMINALS)</b></p>  | <p><b>WITH AUXILIARY SWITCH (INTERNAL CONNECTOR)</b></p>  |

## Circuit breaker GR

### Codes

At front of breaker the current rating and the delay type is shown with the following codes:

| Half shell marking | Delay                        |
|--------------------|------------------------------|
| SO                 | Switch only                  |
| DI                 | DC instantaneous             |
| DU                 | DC ultra short               |
| DS                 | DC short                     |
| DM                 | DC medium                    |
| DL                 | DC long                      |
| AI                 | 50/60 Hz instantaneous       |
| AUS                | 50/60 Hz ultra short         |
| AS                 | 50/60 Hz short               |
| AM                 | 50/60 Hz medium              |
| AL                 | 50/60 Hz long                |
| ASH                | 50/60 Hz short, high inrush  |
| AMH                | 50/60 Hz medium, high inrush |
| ALH                | 50/60 Hz long, high inrush   |
| DSH                | DC short, high inrush        |
| DMH                | DC medium, high inrush       |
| DLH                | DC long, high inrush         |

## Circuit breaker

### GR

### Ordering scheme GR - page 1

| GR                                    |     | .....code continues on following page..... |
|---------------------------------------|-----|--|
| Poles                                 | 1   | 1 pole                                     |
|                                       | 2   | 2 poles                                    |
|                                       | 3   | 3 poles                                    |
|                                       | 4   | 4 poles                                    |
| Current rating (amperes) <sup>1</sup> | 220 | 0.200                                      |
|                                       | 250 | 0.500                                      |
|                                       | 410 | 1.000                                      |
|                                       | 415 | 4.500                                      |
|                                       | 420 | 2.000                                      |
|                                       | 425 | 2.500                                      |
|                                       | 430 | 3.000                                      |
|                                       | 435 | 3.500                                      |
|                                       | 440 | 4.000                                      |
|                                       | 445 | 4.500                                      |
|                                       | 450 | 5.000                                      |
|                                       | 460 | 6.000                                      |
|                                       | 470 | 7.000                                      |
|                                       | 480 | 8.000                                      |
|                                       | 490 | 9.000                                      |
|                                       | 610 | 10.000                                     |
|                                       | 611 | 11.000                                     |
|                                       | 612 | 12.000                                     |
|                                       | 613 | 13.000                                     |
|                                       | 615 | 15.000                                     |
|                                       | 616 | 16.000                                     |
|                                       | 617 | 17.000                                     |
|                                       | 618 | 18.000                                     |
|                                       | 620 | 20.000                                     |
|                                       | 625 | 25.000                                     |
|                                       | 630 | 30.000                                     |
|                                       | 632 | 32.000                                     |
|                                       | 635 | 35.000                                     |
|                                       | 640 | 40.000                                     |
|                                       | 650 | 50.000                                     |
|                                       | 660 | 60.000                                     |
| (Other ratings on request)            | 663 | 63.000                                     |
| Frequency & delay                     | 03  | DC, 50/60 Hz, switch only                  |
|                                       | 10  | DC instantaneous                           |
|                                       | 11  | DC ultra short                             |
|                                       | 12  | DC short                                   |
|                                       | 14  | DC medium                                  |
|                                       | 16  | DC long                                    |
|                                       | 20  | 50/60 Hz instantaneous                     |
|                                       | 21  | 50/60 Hz ultra short                       |
|                                       | 22  | 50/60 Hz short                             |
|                                       | 24  | 50/60 Hz medium                            |
|                                       | 26  | 50/60 Hz long                              |
|                                       | 42  | 50/60 Hz short, hi-inrush                  |
|                                       | 44  | 50/60 Hz medium, hi-inrush                 |
|                                       | 46  | 50/60 Hz long, hi-inrush                   |
|                                       | 52  | DC, short, hi-inrush                       |
|                                       | 54  | DC, medium, hi-inrush                      |
|                                       | 56  | DC, long, hi-inrush                        |



## Circuit breaker GR

### Ordering scheme GR - page 2

| .....                        | .....  | .....  | .....                                     | ..... | .....       | ..... | .....  | ..... |
|------------------------------|--------|--------|---|-------|-------------|-------|--------|-------|
| Circuit                      | A<br>B |        |   |       |             |       |        |       |
| Actuator                     |        | A<br>S |   |       |             |       |        |       |
| Actuator colour & legend     |        |        | ..  |       |             |       |        |       |
| Auxiliary switch             |        |        | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 |       |             |       |        |       |
| Terminal                     |        |        |   | 1     |             |       |        |       |
| Application rating           |        |        |   |       | 2<br>D<br>3 |       |        |       |
| Terminal polarity            |        |        |   |       |             | A     |        |       |
| Agency approval <sup>6</sup> |        |        |   |       |             |       | 2<br>A |       |

|                                    |     |        |      |               |
|------------------------------------|-----|--------|------|---------------|
| Switch only (no coil) <sup>2</sup> |     |        |      |               |
| Series trip (current)              |     |        |      |               |
| Handle, one per pole               |     |        |      |               |
| Mid-trip handle, one per pole      |     |        |      |               |
| Actuator colour                    | I-O | On-Off | Dual | Legend colour |
| White                              | A   | B      | 1    | Black         |
| Black                              | C   | D      | 2    | White         |

|   |
|---|
| Without auxiliary switch  |
| S.P.D.T. screw terminal   |
| S.P.D.T. screw terminal, gold contacts                              |
| S.P.D.T. screw terminal with internal diode                         |
| S.P.D.T. screw terminal, gold contacts, with internal diode         |
| Internal connector  |
| Internal connector, gold contacts                                   |
| Internal connector with internal diode                              |
| Internal connector, gold contacts, with internal diode              |
| Screw terminal  |
| 110 VDC   |
| 240 VAC   |
| 440VAC <sup>4</sup>   |
| Non-polarity sensitive <sup>5</sup>                                 |
| For single pole DC breaker:   |
| 1 Load terminal (+connected with bottom terminal)                   |
| 2 Line terminal (+connected with top terminal)                      |
| 2 TUV certified   |
| A No agency approvals (configuration not tested by external agency) |

Special configurations, not covered by this ordering scheme, on request.

Example : GR1-610-24-B-A1-2-1-DA-2

#### Notes:

- When a breaker is mounted with the handle pointing downwards (e.g. ceiling mounting) the nominal value of the breaker will decrease with 10%. In this situation it is recommended to add 10 % to the rated current
- Current rating in switch only circuit:
  - for 0.2 to 30 A select current code 630
  - for 30 to 50 A select current code 650
  - for 50 to 63 A select current code 663
- On multi-pole breakers one auxiliary switch is supplied, mounted in the extreme left pole (front view)
- 3 pole breaker required
- Requires AC rating or multi-pole DC break (contacts in series)
- TUV certified: only for actuator legend 'Dual' and 'I-O'  
 Not for actuator legend 'ON-OFF', not for switch only circuit, not for DC more than 2 poles, not for delay curve 56; use code A instead (no agency approvals)

**Circuit breaker**  
**GR**

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