

## Power Circuit of a UL508A Panel

The diagram illustrates a three-phase motor control circuit. It features a three-phase power supply at the top, connected to a main switch (UL489) and a thermal relay (UL508). The circuit is divided into a power circuit (UL489) and a control circuit (UL508). The power circuit is shown in a yellow dashed box, and the control circuit is shown in an orange dashed box. The motor is connected to the power circuit. Labels include 'To Power Circuit', 'To Control Circuit', 'UL489', 'UL508', and 'Altech V-EA (UL508)'.

21

# V-EA Series

**UL** 508 listed  
E137938

**SP** C22.2 No.14 certified  
LR104391

## UL508 Listed Manual Motor Controllers “Suitable as Motor Disconnect”

- DIN Rail Mounted
- 17.5mm width per pole
- Thermal Magnetic
- 480Y/277V AC, 50/60Hz
- 10kA Short Circuit Withstand Capacity
- Applications Include:
  - AC Motor Starting, Across the Line
  - AC General Use
  - AC Resistance
  - AC Discharge Lamps (Ballast)
  - AC Incandescent Lamps (Tungsten)



|                                                                |                                                                                                  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>                                          | 480Y/277VAC<br>0.3-25A: 1 pole - 42VDC; 2 Pole - 80VDC<br>30-60A: 1 pole - 24VDC; 2 Pole - 60VDC |
| <b>Short Circuit Withstand Rating (UL/CSA - Ratings)</b>       | 0.3-60A (RC): 10kA with UL-listed RK5 back-up fuse or MCCB                                       |
| <b>Group Short Circuit Withstand Rating (UL/CSA - Ratings)</b> | 0.3-10A (RC): 10kA; 12-60A (RC): 5kA<br>no branch circuit protection required                    |
| <b>Interrupting Capacity (VDE - Ratings)</b>                   | 0.3-63A (RC): 10kA                                                                               |
| <b>Calibration Temperature</b>                                 | 40°C (104°F)                                                                                     |
| <b>Operating Temperature</b>                                   | -25°C to 55°C (-13°F to 131°F)                                                                   |
| <b>Storage Temperature</b>                                     | -40°C to 70°C (-40°F to 158°F)                                                                   |
| <b>Terminal Size Acceptability</b>                             | Top: 18-3 AWG; Bottom: 18-2 AWG (Line/Load reversible)                                           |
| <b>Terminal Torque</b>                                         | 20 lb.in.                                                                                        |
| <b>Terminal Protection Degree</b>                              | IP20                                                                                             |
| <b>Horse Power Ratings</b>                                     | see page 32                                                                                      |
| <b>Mechanical Endurance Ratings</b>                            | see page 33                                                                                      |

### short circuit Withstand ratings for v-ea manual motor controller

| Trip Curve | Amp Range   | Backup Protection | UL-Listed RK5-Fuse up to 10kA | UL-Listed MCCB up to 10kA | No BCP Required up to: |
|------------|-------------|-------------------|-------------------------------|---------------------------|------------------------|
| all        | 0.3 - 10A   |                   | 4xRC*<br>min 15A, max 70A     | 4xRC*<br>min 15A, max 70A | 10kA                   |
| all        | 12 - 30/32A |                   | 4xRC*<br>max 125A             | 4xRC*<br>max 125A         | 5kA                    |
| all        | 40 - 50A    |                   | 4xRC*<br>max 200A             | 4xRC*<br>max 200A         | 5kA                    |
| all        | 60 / 63A    |                   | 4xRC*<br>max 250A             | 4xRC*<br>max 250A         | 5kA                    |

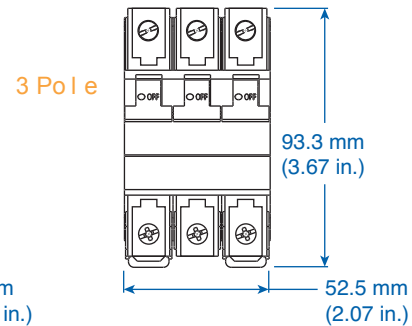
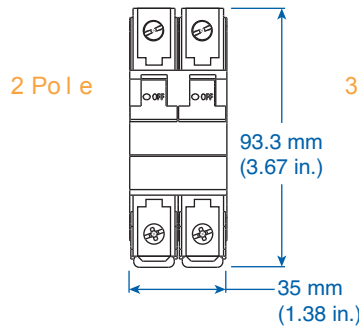
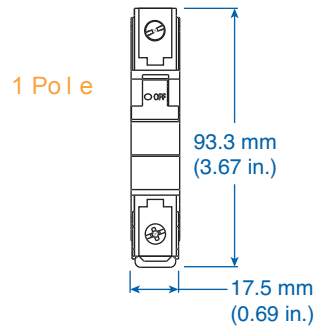
\*up to nearest rated current



## Time versus Current Trip Curve

For the exact trip curve, please refer to pages 30-31.

Dimensions in mm side view



## Application Overview

| Trip-Characteristics*          |                   |                        |                       | Applications                                                                        |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
|--------------------------------|-------------------|------------------------|-----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------|
| Characteristic Trip Boundaries |                   |                        |                       | Lighting<br>Wiring<br>Protection<br>Control<br>Circuits                             | Business<br>Equipment<br>Appliances                                                 | Transformers                                                                        | Power<br>Supplies<br>Heaters                                                        | Motors                                                                              |                                                                                     |                                                                                       |                                                                                       | General<br>Electronics                                                                | Solenoid                                                                              | Semi-<br>conductors<br><br>Components/<br>devices with<br>low surge-<br>current and<br>short circuit<br>withstand<br>capabilities | Reactive<br>Load |
| Thermal Trip                   |                   | Magnetic Trip          |                       |                                                                                     |                                                                                     |                                                                                     |                                                                                     | General                                                                             | Low<br>Inrush                                                                       | High<br>Inrush                                                                        | High<br>Efficiency                                                                    |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| Must not<br>Trip>100ms         | Must Trip<br><1hr | Must not<br>Trip>100ms | Must Trip<br>at 100ms |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| B-Characteristics              |                   |                        |                       |  |  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |  |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| 1.13xRC                        | 1.45xRC           | 3xRC                   | 5xRC                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| C-Characteristics              |                   |                        |                       |  |  |                                                                                     |                                                                                     |                                                                                     |  |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| 1.13xRC                        | 1.45xRC           | 5xRC                   | 10xRC                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| D-Characteristics              |                   |                        |                       |                                                                                     |                                                                                     |  |  |                                                                                     |                                                                                     |   |                                                                                       |                                                                                       |                                                                                       |                                              |                  |
| 1.13xRC                        | 1.45xRC           | 10xRC                  | 16xRC                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| E-Characteristics              |                   |                        |                       |                                                                                     |                                                                                     |  |  |                                                                                     |                                                                                     |  |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| 1.05xRC                        | 1.35xRC           | 14xRC                  | 18xRC                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| G-Characteristics              |                   |                        |                       |  |                                                                                     |  |                                                                                     |  |  |                                                                                       |                                                                                       |  |                                                                                       |                                                                                                                                   |                  |
| 1.05xRC                        | 1.35xRC           | 8xRC                   | 10xRC                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |
| Z-Characteristics              |                   |                        |                       |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |  |                                                                                       |  |                                                                                                                                   |                  |
| 1.05xRC                        | 1.35xRC           | 2xRC                   | 3xRC                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                                                                   |                  |

\*The value of each characteristic is shown vertically beneath its corresponding heading.



### Warning!

This information should only be used as a selection guide. The use of a Miniature Circuit Breaker/Manual Motor Controller in an application with a certain Trip-Characteristic always requires prototype testing! It is the responsibility of the circuit design engineer to select the appropriate Miniature Circuit Breaker/Manual Motor Controller for his specific application.

## B-Trip Characteristic



UL508 Listed  
E137938



### Application Examples:

Business equipment, wiring protection, lighting, appliances, control circuits, some motors and some electronic applications. Relatively long thermal trip delay but low magnetic trip point.



### One Pole

Standard Pack: 12

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 1.0A          | 1B1UM             | UL SF     |
| 1.6A          | 1B1.6UM           | UL SF     |
| 2.0A          | 1B2UM             | UL SF     |
| 2.5A          | 1B2.5UM           | UL SF     |
| 3.0A          | 1B3UM             | UL SF     |
| 3.5A          | 1B3.5UM           | UL SF     |
| 4.0A          | 1B4UM             | UL SF     |
| 5.0A          | 1B5UM             | UL SF     |
| 6.0A          | 1B6UM             | UL SF     |
| 8.0A          | NA                |           |
| 10A           | 1B10UM            | UL SF     |
| 12A           | NA                |           |
| 13A           | 1B13UM            | UL SF     |
| 15A           | 1B15UM            | UL SF     |
| 16A           | 1B16UM            | UL SF     |
| 20A           | 1B20UM            | UL SF     |
| 25A           | 1B25UM            | UL SF     |
| 30A           | 1B30UM            | UL SF     |
| 32A           | 1B32UM            | UL SF     |
| 40A           | 1B40UM            | UL SF     |
| 50A           | 1B50UM            | UL SF     |
| 60A           | 1B60UM            | UL SF     |
| 63A           | 1B63UM            |           |



### Three Pole

Standard Pack: 4

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 1.0A          | 3B1UM             | UL SF     |
| 1.6A          | 3B1.6UM           | UL SF     |
| 2.0A          | 3B2UM             | UL SF     |
| 2.5A          | 3B2.5UM           | UL SF     |
| 3.0A          | 3B3UM             | UL SF     |
| 3.5A          | 3B3.5UM           | UL SF     |
| 4.0A          | 3B4UM             | UL SF     |
| 5.0A          | 3B5UM             | UL SF     |
| 6.0A          | 3B6UM             | UL SF     |
| 8.0A          | NA                |           |
| 10A           | 3B10UM            | UL SF     |
| 12A           | NA                |           |
| 13A           | 3B13UM            | UL SF     |
| 15A           | 3B15UM            | UL SF     |
| 16A           | 3B16UM            | UL SF     |
| 20A           | 3B20UM            | UL SF     |
| 25A           | 3B25UM            | UL SF     |
| 30A           | 3B30UM            | UL SF     |
| 32A           | 3B32UM            | UL SF     |
| 40A           | 3B40UM            | UL SF     |
| 50A           | 3B50UM            | UL SF     |
| 60A           | 3B60UM            | UL SF     |
| 63A           | 3B63UM            |           |



### Two Pole

Standard Pack: 6

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 1.0A          | 2B1UM             | UL SF     |
| 1.6A          | 2B1.6UM           | UL SF     |
| 2.0A          | 2B2UM             | UL SF     |
| 2.5A          | 2B2.5UM           | UL SF     |
| 3.0A          | 2B3UM             | UL SF     |
| 3.5A          | 2B3.5UM           | UL SF     |
| 4.0A          | 2B4UM             | UL SF     |
| 5.0A          | 2B5UM             | UL SF     |
| 6.0A          | 2B6UM             | UL SF     |
| 8.0A          | NA                |           |
| 10A           | 2B10UM            | UL SF     |
| 12A           | NA                |           |
| 13A           | 2B13UM            | UL SF     |
| 15A           | 2B15UM            | UL SF     |
| 16A           | 2B16UM            | UL SF     |
| 20A           | 2B20UM            | UL SF     |
| 25A           | 2B25UM            | UL SF     |
| 30A           | 2B30UM            | UL SF     |
| 32A           | 2B32UM            | UL SF     |
| 40A           | 2B40UM            | UL SF     |
| 50A           | 2B50UM            | UL SF     |
| 60A           | 2B60UM            | UL SF     |
| 63A           | 2B63UM            |           |



### Add-on Neutral Pole

| Rating                | Type/<br>Cat. No. | Approvals |
|-----------------------|-------------------|-----------|
| 0.3-63A/<br>480Y/277V | N63UM             | UL SF     |

Standard Pack: 5

Weight:

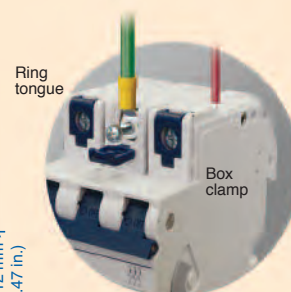
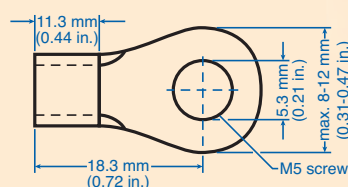
0.775kg (1.71lb.)

### Standard Dual Connection Terminal

- Box clamp terminals  
Top: 18-3 AWG;  
Bottom: 18-2 AWG  
(Line/Load reversible)

- Ring tongue terminals

Dimensions\*:



\* May differ by manufacturer.

Top terminal ring tongue maximum thickness 1.6 mm.

## C-Trip Characteristic



### Application Examples:

Low inrush motors, lighting, wiring protection, appliances, business equipment, and control circuit applications. Relatively long thermal trip delay and medium magnetic trip point.



### One Pole

Standard Pack: 12

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 1C03UM            | UL SP DVE |
| 0.5A          | 1C05UM            | UL SP DVE |
| 0.75A         | 1C075UM           | UL SP DVE |
| 0.8A          | NA                |           |
| 1.0A          | 1C1UM             | UL SP DVE |
| 1.6A          | 1C1.6UM           | UL SP DVE |
| 2.0A          | 1C2UM             | UL SP DVE |
| 2.5A          | 1C2.5UM           | UL SP DVE |
| 3.0A          | 1C3UM             | UL SP DVE |
| 3.5A          | 1C3.5UM           | UL SP DVE |
| 4.0A          | 1C4UM             | UL SP DVE |
| 5.0A          | 1C5UM             | UL SP DVE |
| 6.0A          | 1C6UM             | UL SP DVE |
| 8.0A          | 1C8UM             | UL SP DVE |
| 10A           | 1C10UM            | UL SP DVE |
| 12A           | NA                |           |
| 13A           | 1C13UM            | UL SP DVE |
| 15A           | 1C15UM            | UL SP DVE |
| 16A           | 1C16UM            | UL SP DVE |
| 20A           | 1C20UM            | UL SP DVE |
| 25A           | 1C25UM            | UL SP DVE |
| 30A           | 1C30UM            | UL SP DVE |
| 32A           | 1C32UM            | UL SP DVE |
| 40A           | 1C40UM            | UL SP DVE |
| 50A           | 1C50UM            | UL SP DVE |
| 60A           | 1C60UM            | UL SP DVE |
| 63A           | 1C63UM            | UL SP DVE |



### Three Pole

Standard Pack: 4

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 3C03UM            | UL SP DVE |
| 0.5A          | 3C05UM            | UL SP DVE |
| 0.75A         | 3C075UM           | UL SP DVE |
| 0.8A          | NA                |           |
| 1.0A          | 3C1UM             | UL SP DVE |
| 1.6A          | 3C1.6UM           | UL SP DVE |
| 2.0A          | 3C2UM             | UL SP DVE |
| 2.5A          | 3C2.5UM           | UL SP DVE |
| 3.0A          | 3C3UM             | UL SP DVE |
| 3.5A          | 3C3.5UM           | UL SP DVE |
| 4.0A          | 3C4UM             | UL SP DVE |
| 5.0A          | 3C5UM             | UL SP DVE |
| 6.0A          | 3C6UM             | UL SP DVE |
| 8.0A          | 3C8UM             | UL SP DVE |
| 10A           | 3C10UM            | UL SP DVE |
| 12A           | NA                |           |
| 13A           | 3C13UM            | UL SP DVE |
| 15A           | 3C15UM            | UL SP DVE |
| 16A           | 3C16UM            | UL SP DVE |
| 20A           | 3C20UM            | UL SP DVE |
| 25A           | 3C25UM            | UL SP DVE |
| 30A           | 3C30UM            | UL SP DVE |
| 32A           | 3C32UM            | UL SP DVE |
| 40A           | 3C40UM            | UL SP DVE |
| 50A           | 3C50UM            | UL SP DVE |
| 60A           | 3C60UM            | UL SP DVE |
| 63A           | 3C63UM            | UL SP DVE |



### Two Pole

Standard Pack: 6

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 2C03UM            | UL SP DVE |
| 0.5A          | 2C05UM            | UL SP DVE |
| 0.75A         | 2C075UM           | UL SP DVE |
| 0.8A          | NA                |           |
| 1.0A          | 2C1UM             | UL SP DVE |
| 1.6A          | 2C1.6UM           | UL SP DVE |
| 2.0A          | 2C2UM             | UL SP DVE |
| 2.5A          | 2C2.5UM           | UL SP DVE |
| 3.0A          | 2C3UM             | UL SP DVE |
| 3.5A          | 2C3.5UM           | UL SP DVE |
| 4.0A          | 2C4UM             | UL SP DVE |
| 5.0A          | 2C5UM             | UL SP DVE |
| 6.0A          | 2C6UM             | UL SP DVE |
| 8.0A          | 2C8UM             | UL SP DVE |
| 10A           | 2C10UM            | UL SP DVE |
| 12A           | NA                |           |
| 13A           | 2C13UM            | UL SP DVE |
| 15A           | 2C15UM            | UL SP DVE |
| 16A           | 2C16UM            | UL SP DVE |
| 20A           | 2C20UM            | UL SP DVE |
| 25A           | 2C25UM            | UL SP DVE |
| 30A           | 2C30UM            | UL SP DVE |
| 32A           | 2C32UM            | UL SP DVE |
| 40A           | 2C40UM            | UL SP DVE |
| 50A           | 2C50UM            | UL SP DVE |
| 60A           | 2C60UM            | UL SP DVE |
| 63A           | 2C63UM            | UL SP DVE |



### Add-on Neutral Pole

| Rating                | Type/<br>Cat. No. | Approvals |
|-----------------------|-------------------|-----------|
| 0.3-63A/<br>480Y/277V | N63UM             | UL SP     |

Standard Pack: 5

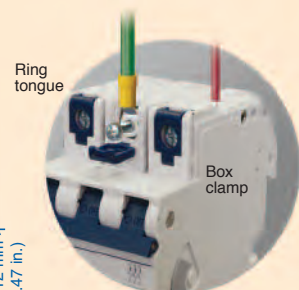
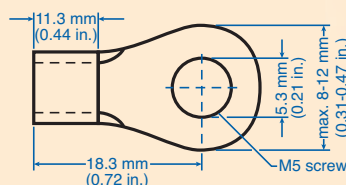
Weight:  
0.775kg (1.71lb.)

### Standard Dual Connection Terminal

- Box clamp terminals  
Top: 18-3 AWG;  
Bottom: 18-2 AWG  
(Line/Load reversible)

- Ring tongue terminals

Dimensions\*:



\* May differ by manufacturer.

Top terminal ring tongue maximum thickness 1.6 mm.

## D-Trip Characteristic



UL508 Listed  
E137938



### Application Examples:

High inrush motors, transformers, power supplies, heaters and reactive loads.  
Relatively long thermal trip delay and very high magnetic trip point.



**One Pole**

Standard Pack: 12

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 1D03UM            | UL SP     |
| 0.5A          | 1D05UM            | UL SP     |
| 0.75A         | 1D075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 1D1UM             | UL SP     |
| 1.6A          | 1D1.6UM           | UL SP     |
| 2.0A          | 1D2UM             | UL SP     |
| 2.5A          | 1D2.5UM           | UL SP     |
| 3.0A          | 1D3UM             | UL SP     |
| 3.5A          | 1D3.5UM           | UL SP     |
| 4.0A          | 1D4UM             | UL SP     |
| 5.0A          | 1D5UM             | UL SP     |
| 6.0A          | 1D6UM             | UL SP     |
| 8.0A          | 1D8UM             | UL SP     |
| 10A           | 1D10UM            | UL SP     |
| 12A           | NA                |           |
| 13A           | 1D13UM            | UL SP     |
| 15A           | 1D15UM            | UL SP     |
| 16A           | 1D16UM            | UL SP     |
| 20A           | 1D20UM            | UL SP     |
| 25A           | 1D25UM            | UL SP     |
| 30A           | 1D30UM            | UL SP     |
| 32A           | 1D32UM            | UL SP     |
| 40A           | 1D40UM            | UL SP     |
| 50A           | 1D50UM            | UL SP     |
| 60A           | 1D60UM            | UL SP     |
| 63A           | 1D63UM            | UL SP     |



**Three Pole**

Standard Pack: 4

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 3D03UM            | UL SP     |
| 0.5A          | 3D05UM            | UL SP     |
| 0.75A         | 3D075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 3D1UM             | UL SP     |
| 1.6A          | 3D1.6UM           | UL SP     |
| 2.0A          | 3D2UM             | UL SP     |
| 2.5A          | 3D2.5UM           | UL SP     |
| 3.0A          | 3D3UM             | UL SP     |
| 3.5A          | 3D3.5UM           | UL SP     |
| 4.0A          | 3D4UM             | UL SP     |
| 5.0A          | 3D5UM             | UL SP     |
| 6.0A          | 3D6UM             | UL SP     |
| 8.0A          | 3D8UM             | UL SP     |
| 10A           | 3D10UM            | UL SP     |
| 12A           | NA                |           |
| 13A           | 3D13UM            | UL SP     |
| 15A           | 3D15UM            | UL SP     |
| 16A           | 3D16UM            | UL SP     |
| 20A           | 3D20UM            | UL SP     |
| 25A           | 3D25UM            | UL SP     |
| 30A           | 3D30UM            | UL SP     |
| 32A           | 3D32UM            | UL SP     |
| 40A           | 3D40UM            | UL SP     |
| 50A           | 3D50UM            | UL SP     |
| 60A           | 3D60UM            | UL SP     |
| 63A           | 3D63UM            | UL SP     |



**Two Pole**

Standard Pack: 6

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 2D03UM            | UL SP     |
| 0.5A          | 2D05UM            | UL SP     |
| 0.75A         | 2D075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 2D1UM             | UL SP     |
| 1.6A          | 2D1.6UM           | UL SP     |
| 2.0A          | 2D2UM             | UL SP     |
| 2.5A          | 2D2.5UM           | UL SP     |
| 3.0A          | 2D3UM             | UL SP     |
| 3.5A          | 2D3.5UM           | UL SP     |
| 4.0A          | 2D4UM             | UL SP     |
| 5.0A          | 2D5UM             | UL SP     |
| 6.0A          | 2D6UM             | UL SP     |
| 8.0A          | 2D8UM             | UL SP     |
| 10A           | 2D10UM            | UL SP     |
| 12A           | NA                |           |
| 13A           | 2D13UM            | UL SP     |
| 15A           | 2D15UM            | UL SP     |
| 16A           | 2D16UM            | UL SP     |
| 20A           | 2D20UM            | UL SP     |
| 25A           | 2D25UM            | UL SP     |
| 30A           | 2D30UM            | UL SP     |
| 32A           | 2D32UM            | UL SP     |
| 40A           | 2D40UM            | UL SP     |
| 50A           | 2D50UM            | UL SP     |
| 60A           | 2D60UM            | UL SP     |
| 63A           | 2D63UM            | UL SP     |



**Add-on  
Neutral Pole**

| Rating                | Type/<br>Cat. No. | Approvals |
|-----------------------|-------------------|-----------|
| 0.3-63A/<br>480Y/277V | N63UM             | UL SP     |

Standard Pack: 5

Weight:

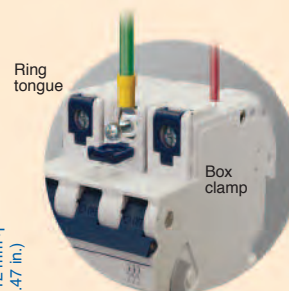
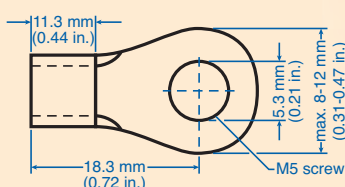
0.775kg (1.71lb.)

### Standard Dual Connection Terminal

- Box clamp terminals  
Top: 18-3 AWG;  
Bottom: 18-2 AWG  
(Line/Load reversible)

- Ring tongue terminals

Dimensions\*:



\* May differ by manufacturer.

Top terminal ring tongue  
maximum thickness 1.6 mm.

# E-Trip Characteristic



UL508 Listed

E137938

## Application Examples:

High efficiency motors, which have exceedingly high inrush currents. Relatively short thermal trip delays and very high magnetic trip points.



### One Pole

Standard Pack: 12

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 1E03UM            | UL SP     |
| 0.5A          | 1E05UM            | UL SP     |
| 0.75A         | 1E075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 1E1UM             | UL SP     |
| 1.6A          | 1E1.6UM           | UL SP     |
| 2.0A          | 1E2UM             | UL SP     |
| 2.5A          | 1E2.5UM           | UL SP     |
| 3.0A          | 1E3UM             | UL SP     |
| 3.5A          | 1E3.5UM           | UL SP     |
| 4.0A          | 1E4UM             | UL SP     |
| 5.0A          | 1E5UM             | UL SP     |
| 6.0A          | 1E6UM             | UL SP     |
| 8.0A          | 1E8UM             | UL SP     |
| 10A           | 1E10UM            | UL SP     |
| 12A           | 1E12UM            | UL SP     |
| 13A           | 1E13UM            | UL SP     |
| 15A           | 1E15UM            | UL SP     |
| 16A           | 1E16UM            | UL SP     |
| 20A           | 1E20UM            | UL SP     |
| 25A           | 1E25UM            | UL SP     |
| 30A           | 1E30UM            | UL SP     |
| 32A           | 1E32UM            | UL SP     |
| 40A           | 1E40UM            | UL SP     |
| 50A           | 1E50UM            | UL SP     |
| 60A           | 1E60UM            | UL SP     |
| 63A           | 1E63UM            |           |



### Three Pole

Standard Pack: 4

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 3E03UM            | UL SP     |
| 0.5A          | 3E05UM            | UL SP     |
| 0.75A         | 3E075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 3E1UM             | UL SP     |
| 1.6A          | 3E1.6UM           | UL SP     |
| 2.0A          | 3E2UM             | UL SP     |
| 2.5A          | 3E2.5UM           | UL SP     |
| 3.0A          | 3E3UM             | UL SP     |
| 3.5A          | 3E3.5UM           | UL SP     |
| 4.0A          | 3E4UM             | UL SP     |
| 5.0A          | 3E5UM             | UL SP     |
| 6.0A          | 3E6UM             | UL SP     |
| 8.0A          | 3E8UM             | UL SP     |
| 10A           | 3E10UM            | UL SP     |
| 12A           | 3E12UM            | UL SP     |
| 13A           | 3E13UM            | UL SP     |
| 15A           | 3E15UM            | UL SP     |
| 16A           | 3E16UM            | UL SP     |
| 20A           | 3E20UM            | UL SP     |
| 25A           | 3E25UM            | UL SP     |
| 30A           | 3E30UM            | UL SP     |
| 32A           | 3E32UM            | UL SP     |
| 40A           | 3E40UM            | UL SP     |
| 50A           | 3E50UM            | UL SP     |
| 60A           | 3E60UM            | UL SP     |
| 63A           | 3E63UM            |           |



### Two Pole

Standard Pack: 6

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 2E03UM            | UL SP     |
| 0.5A          | 2E05UM            | UL SP     |
| 0.75A         | 2E075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 2E1UM             | UL SP     |
| 1.6A          | 2E1.6UM           | UL SP     |
| 2.0A          | 2E2UM             | UL SP     |
| 2.5A          | 2E2.5UM           | UL SP     |
| 3.0A          | 2E3UM             | UL SP     |
| 3.5A          | 2E3.5UM           | UL SP     |
| 4.0A          | 2E4UM             | UL SP     |
| 5.0A          | 2E5UM             | UL SP     |
| 6.0A          | 2E6UM             | UL SP     |
| 8.0A          | 2E8UM             | UL SP     |
| 10A           | 2E10UM            | UL SP     |
| 12A           | 2E12UM            | UL SP     |
| 13A           | 2E13UM            | UL SP     |
| 15A           | 2E15UM            | UL SP     |
| 16A           | 2E16UM            | UL SP     |
| 20A           | 2E20UM            | UL SP     |
| 25A           | 2E25UM            | UL SP     |
| 30A           | 2E30UM            | UL SP     |
| 32A           | 2E32UM            | UL SP     |
| 40A           | 2E40UM            | UL SP     |
| 50A           | 2E50UM            | UL SP     |
| 60A           | 2E60UM            | UL SP     |
| 63A           | 2E63UM            |           |



### Add-on Neutral Pole

| Rating                | Type/<br>Cat. No. | Approvals |
|-----------------------|-------------------|-----------|
| 0.3-63A/<br>480Y/277V | N63UM             | UL SP     |

Standard Pack: 5

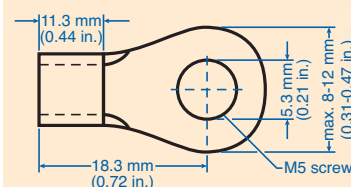
Weight:  
0.775kg (1.71lb.)

### Standard Dual Connection Terminal

- Box clamp terminals  
Top: 18-3 AWG;  
Bottom: 18-2 AWG  
(Line/Load reversible)

- Ring tongue terminals

Dimensions\*:



\* May differ by manufacturer.

Top terminal ring tongue maximum thickness 1.6 mm.

## G-Trip Characteristic



UL508 Listed  
E137938



### Application Examples:

General industrial, including motors, some transformers, solenoids, control circuits, lighting and wiring. Meets the US trip norms with relatively short thermal trip delay and high magnetic trip point.



### One Pole

Standard Pack: 12

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 1G03UM            | UL SF     |
| 0.5A          | 1G05UM            | UL SF     |
| 0.75A         | NA                |           |
| 0.8A          | 1G08UM            | UL SF     |
| 1.0A          | 1G1UM             | UL SF     |
| 1.6A          | 1G1.6UM           | UL SF     |
| 2.0A          | 1G2UM             | UL SF     |
| 2.5A          | 1G2.5UM           | UL SF     |
| 3.0A          | 1G3UM             | UL SF     |
| 3.5A          | 1G3.5UM           | UL SF     |
| 4.0A          | 1G4UM             | UL SF     |
| 5.0A          | 1G5UM             | UL SF     |
| 6.0A          | 1G6UM             | UL SF     |
| 8.0A          | 1G8UM             | UL SF     |
| 10A           | 1G10UM            | UL SF     |
| 12A           | 1G12UM            | UL SF     |
| 13A           | 1G13UM            | UL SF     |
| 15A           | 1G15UM            | UL SF     |
| 16A           | 1G16UM            | UL SF     |
| 20A           | 1G20UM            | UL SF     |
| 25A           | 1G25UM            | UL SF     |
| 30A           | 1G30UM            | UL SF     |
| 32A           | 1G32UM            | UL SF     |
| 40A           | 1G40UM            | UL SF     |
| 50A           | 1G50UM            | UL SF     |
| 60A           | 1G60UM            | UL SF     |
| 63A           | 1G63UM            |           |



### Three Pole

Standard Pack: 4

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 3G03UM            | UL SF     |
| 0.5A          | 3G05UM            | UL SF     |
| 0.75A         | NA                |           |
| 0.8A          | 3G08UM            | UL SF     |
| 1.0A          | 3G1UM             | UL SF     |
| 1.6A          | 3G1.6UM           | UL SF     |
| 2.0A          | 3G2UM             | UL SF     |
| 2.5A          | 3G2.5UM           | UL SF     |
| 3.0A          | 3G3UM             | UL SF     |
| 3.5A          | 3G3.5UM           | UL SF     |
| 4.0A          | 3G4UM             | UL SF     |
| 5.0A          | 3G5UM             | UL SF     |
| 6.0A          | 3G6UM             | UL SF     |
| 8.0A          | 3G8UM             | UL SF     |
| 10A           | 3G10UM            | UL SF     |
| 12A           | 3G12UM            | UL SF     |
| 13A           | 3G13UM            | UL SF     |
| 15A           | 3G15UM            | UL SF     |
| 16A           | 3G16UM            | UL SF     |
| 20A           | 3G20UM            | UL SF     |
| 25A           | 3G25UM            | UL SF     |
| 30A           | 3G30UM            | UL SF     |
| 32A           | 3G32UM            | UL SF     |
| 40A           | 3G40UM            | UL SF     |
| 50A           | 3G50UM            | UL SF     |
| 60A           | 3G60UM            | UL SF     |
| 63A           | 3G63UM            |           |



### Two Pole

Standard Pack: 6

Weight:

0.3A - 32A

1.75kg (3.86 lb.)

40A - 63A

2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 2G03UM            | UL SF     |
| 0.5A          | 2G05UM            | UL SF     |
| 0.75A         | NA                |           |
| 0.8A          | 2G08UM            | UL SF     |
| 1.0A          | 2G1UM             | UL SF     |
| 1.6A          | 2G1.6UM           | UL SF     |
| 2.0A          | 2G2UM             | UL SF     |
| 2.5A          | 2G2.5UM           | UL SF     |
| 3.0A          | 2G3UM             | UL SF     |
| 3.5A          | 2G3.5UM           | UL SF     |
| 4.0A          | 2G4UM             | UL SF     |
| 5.0A          | 2G5UM             | UL SF     |
| 6.0A          | 2G6UM             | UL SF     |
| 8.0A          | 2G8UM             | UL SF     |
| 10A           | 2G10UM            | UL SF     |
| 12A           | 2G12UM            | UL SF     |
| 13A           | 2G13UM            | UL SF     |
| 15A           | 2G15UM            | UL SF     |
| 16A           | 2G16UM            | UL SF     |
| 20A           | 2G20UM            | UL SF     |
| 25A           | 2G25UM            | UL SF     |
| 30A           | 2G30UM            | UL SF     |
| 32A           | 2G32UM            | UL SF     |
| 40A           | 2G40UM            | UL SF     |
| 50A           | 2G50UM            | UL SF     |
| 60A           | 2G60UM            | UL SF     |
| 63A           | 2G63UM            |           |



### Add-on Neutral Pole

| Rating                | Type/<br>Cat. No. | Approvals |
|-----------------------|-------------------|-----------|
| 0.3-63A/<br>480Y/277V | N63UM             | UL SF     |

Standard Pack: 5

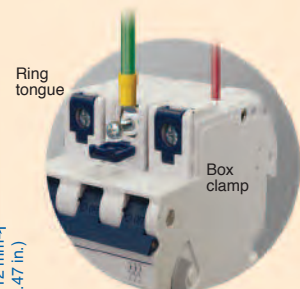
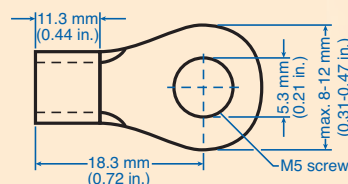
Weight:  
0.775kg (1.71lb.)

### Standard Dual Connection Terminal

- Box clamp terminals  
Top: 18-3 AWG;  
Bottom: 18-2 AWG  
(Line/Load reversible)

- Ring tongue terminals

Dimensions\*:



\* May differ by manufacturer.

Top terminal ring tongue  
maximum thickness 1.6 mm.

# Z-Trip Characteristic



UL508 Listed  
E137938

## Application Examples:

Semiconductors, components which fail-short (vs. fail-open), and components/devices with low surge-current and short circuit withstand capabilities. Relatively short thermal delay and very low magnetic trip point.



**One Pole**

Standard Pack: 12

Weight:

0.3A - 32A  
1.75kg (3.86 lb.)  
40A - 63A  
2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 1Z03UM            | UL SP     |
| 0.5A          | 1Z05UM            | UL SP     |
| 0.75A         | 1Z075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 1Z1UM             | UL SP     |
| 1.6A          | 1Z1.6UM           | UL SP     |
| 2.0A          | 1Z2UM             | UL SP     |
| 2.5A          | 1Z2.5UM           | UL SP     |
| 3.0A          | 1Z3UM             | UL SP     |
| 3.5A          | 1Z3.5UM           | UL SP     |
| 4.0A          | 1Z4UM             | UL SP     |
| 5.0A          | 1Z5UM             | UL SP     |
| 6.0A          | 1Z6UM             | UL SP     |
| 8.0A          | 1Z8UM             | UL SP     |
| 10A           | 1Z10UM            | UL SP     |
| 12A           | 1Z12UM            | UL SP     |
| 13A           | 1Z13UM            | UL SP     |
| 15A           | 1Z15UM            | UL SP     |
| 16A           | 1Z16UM            | UL SP     |
| 20A           | 1Z20UM            | UL SP     |
| 25A           | 1Z25UM            | UL SP     |
| 30A           | 1Z30UM            | UL SP     |
| 32A           | 1Z32UM            | UL SP     |
| 40A           | 1Z40UM            | UL SP     |
| 50A           | 1Z50UM            | UL SP     |



**Three Pole**

Standard Pack: 4

Weight:

0.3A - 32A  
1.75kg (3.86 lb.)  
40A - 63A  
2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 3Z03UM            | UL SP     |
| 0.5A          | 3Z05UM            | UL SP     |
| 0.75A         | 3Z075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 3Z1UM             | UL SP     |
| 1.6A          | 3Z1.6UM           | UL SP     |
| 2.0A          | 3Z2UM             | UL SP     |
| 2.5A          | 3Z2.5UM           | UL SP     |
| 3.0A          | 3Z3UM             | UL SP     |
| 3.5A          | 3Z3.5UM           | UL SP     |
| 4.0A          | 3Z4UM             | UL SP     |
| 5.0A          | 3Z5UM             | UL SP     |
| 6.0A          | 3Z6UM             | UL SP     |
| 8.0A          | 3Z8UM             | UL SP     |
| 10A           | 3Z10UM            | UL SP     |
| 12A           | 3Z12UM            | UL SP     |
| 13A           | 3Z13UM            | UL SP     |
| 15A           | 3Z15UM            | UL SP     |
| 16A           | 3Z16UM            | UL SP     |
| 20A           | 3Z20UM            | UL SP     |
| 25A           | 3Z25UM            | UL SP     |
| 30A           | 3Z30UM            | UL SP     |
| 32A           | 3Z32UM            | UL SP     |
| 40A           | 3Z40UM            | UL SP     |
| 50A           | 3Z50UM            | UL SP     |



**Two Pole**

Standard Pack: 6

Weight:

0.3A - 32A  
1.75kg (3.86 lb.)  
40A - 63A  
2.07kg (4.56 lb.)

| Rated Current | Type/<br>Cat. No. | Approvals |
|---------------|-------------------|-----------|
| 0.3A          | 2Z03UM            | UL SP     |
| 0.5A          | 2Z05UM            | UL SP     |
| 0.75A         | 2Z075UM           | UL SP     |
| 0.8A          | NA                |           |
| 1.0A          | 2Z1UM             | UL SP     |
| 1.6A          | 2Z1.6UM           | UL SP     |
| 2.0A          | 2Z2UM             | UL SP     |
| 2.5A          | 2Z2.5UM           | UL SP     |
| 3.0A          | 2Z3UM             | UL SP     |
| 3.5A          | 2Z3.5UM           | UL SP     |
| 4.0A          | 2Z4UM             | UL SP     |
| 5.0A          | 2Z5UM             | UL SP     |
| 6.0A          | 2Z6UM             | UL SP     |
| 8.0A          | 2Z8UM             | UL SP     |
| 10A           | 2Z10UM            | UL SP     |
| 12A           | 2Z12UM            | UL SP     |
| 13A           | 2Z13UM            | UL SP     |
| 15A           | 2Z15UM            | UL SP     |
| 16A           | 2Z16UM            | UL SP     |
| 20A           | 2Z20UM            | UL SP     |
| 25A           | 2Z25UM            | UL SP     |
| 30A           | 2Z30UM            | UL SP     |
| 32A           | 2Z32UM            | UL SP     |
| 40A           | 2Z40UM            | UL SP     |
| 50A           | 2Z50UM            | UL SP     |



**Add-on  
Neutral Pole**

| Rating                | Type/<br>Cat. No. | Approvals |
|-----------------------|-------------------|-----------|
| 0.3-63A/<br>480Y/277V | N63UM             | UL SP     |

Standard Pack: 5

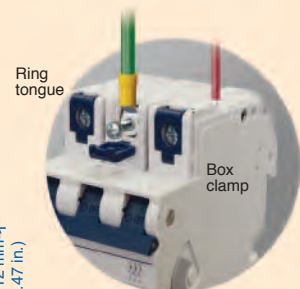
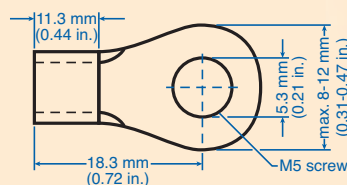
Weight:  
0.775kg (1.71lb.)

## Standard Dual Connection Terminal

- Box clamp terminals  
Top: 18-3 AWG;  
Bottom: 18-2 AWG  
(Line/Load reversible)

- Ring tongue terminals

Dimensions\*:

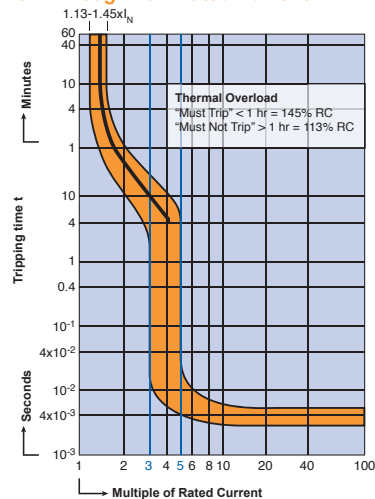


\* May differ by manufacturer.  
Top terminal ring tongue  
maximum thickness 1.6 mm.

# V-EA Trip Curves

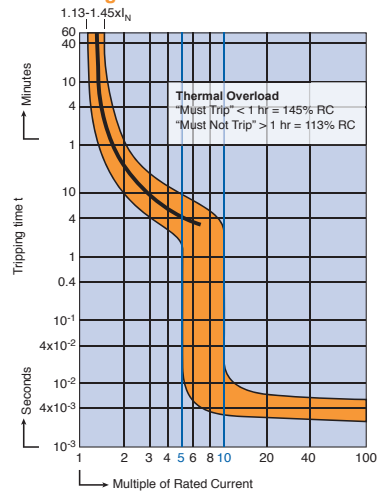
## B Trip Curve

### V-EA-B Trip 1.0A Through 10A Rated Current



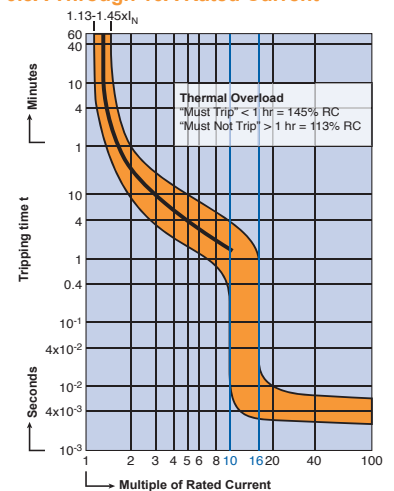
## C Trip Curve

### V-EA-C Trip 0.3A Through 10A Rated Current

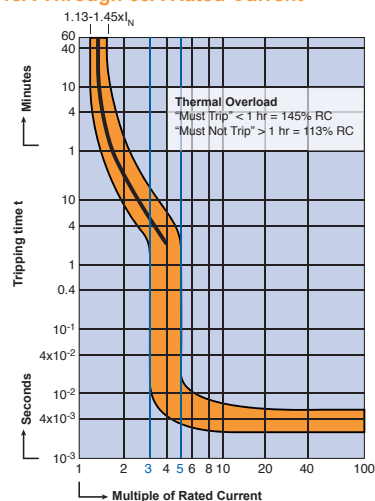


## D Trip Curve

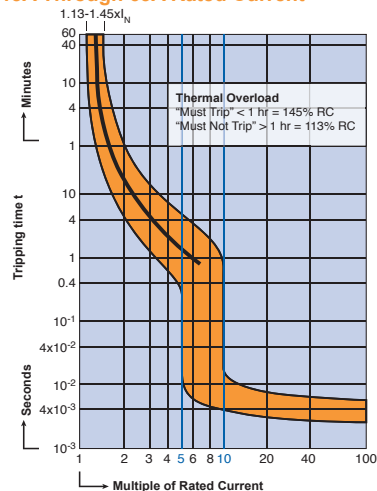
### V-EA-D Trip 0.3A Through 10A Rated Current



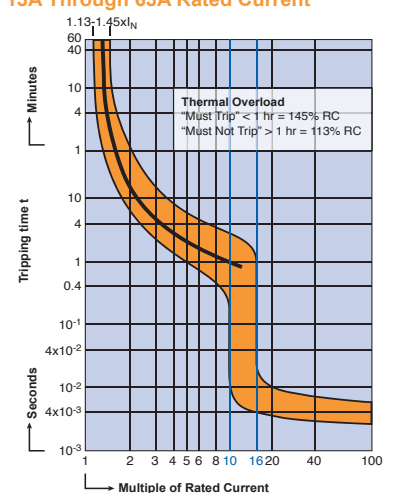
### V-EA-B Trip 13A Through 63A Rated Current



### V-EA-C Trip 13A Through 63A Rated Current



### V-EA-D Trip 13A Through 63A Rated Current



### "B" Magnetic Trip Parameters Rated current 1.0A to 63A.

1. Hold for a minimum of 100ms at surge of 3 times rated current.
2. Trip in under 100ms at 5 times rated current.

### "C" Magnetic Trip Parameters Rated current 0.3A to 63A.

1. Hold for a minimum of 100ms at surge of 5 times rated current.
2. Trip in under 100ms at 10 times rated current.

### "D" Magnetic Trip Parameters Rated current 0.3A to 63A.

1. Hold for a minimum of 100ms at surge of 10 times rated current.
2. Trip in under 100ms at 16 times rated current.

# V-EA Trip Curves

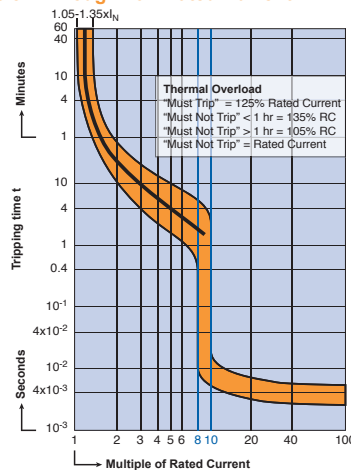
E Trip Curve

V-EA-E Trip  
0.3A Through 10A Rated Current



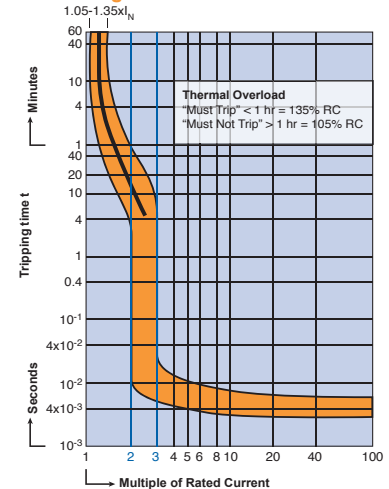
G Trip Curve

V-EA-G Trip  
0.3A Through 10A Rated Current



Z Trip Curve

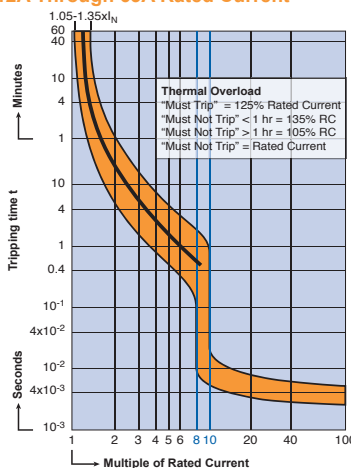
V-EA-Z Trip  
0.3A Through 10A Rated Current



V-EA-E Trip  
12A Through 60A Rated Current



V-EA-G Trip  
12A Through 63A Rated Current



V-EA-Z Trip  
12A Through 50A Rated Current



**“E” Magnetic Trip Parameters**  
Rated Current, 0.3A to 50A,  
60/63A (dotted line).

**Magnetic Trip:**

1. Hold for a minimum of 100ms at surge of 14 times (60A, 10 times) rated current.
2. Trip in under 100ms at 18 times (60A, 14 times) rated current.

**“G” Magnetic Trip Parameters**  
Rated Current, 0.3A to 63A.

**Magnetic Trip:**

1. Hold for a minimum of 100ms at surge of 8 times rated current.
2. Trip in under 100ms at 10 times rated current.

**“Z” Trip Parameters**  
Rated Current, 0.3A to 50A.

**Magnetic Trip:**

1. Hold for a minimum of 100ms at 2 times rated current.
2. Trip in under 100ms at 3 times rated current.

Table HP 1: AMPERE RATINGS &amp; HORSEPOWER RATING 1 PHASE

|                          |                         |                         | FLA & LRC CONVERTED TO<br>TABLE HORSEPOWER (SEE NOTE #2)<br>USE FLA & LRC RATINGS WHERE<br>NO HP RATING IS GIVEN |                         |                         |                         |                         |                         |
|--------------------------|-------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                          |                         |                         | NOMINAL CIRCUIT VOLTAGE                                                                                          |                         |                         |                         |                         |                         |
| V-EA<br>RATED            | MOTOR<br>NAMEPLATE      | MOTOR<br>NAMEPLATE      | 110-120<br>VAC                                                                                                   | 200<br>VAC              | 208<br>VAC              | 220-240<br>VAC          | 265<br>VAC              | 277<br>VAC              |
| CURRENT<br>(SEE NOTE #1) | FLA<br>RATING           | STARTING/<br>LRC RATING |                                                                                                                  |                         |                         |                         |                         |                         |
| 0.30A<br>0.50A<br>0.75A  | 0.30A<br>0.50A<br>0.75A | 1.80A<br>3.00A<br>4.35A |                                                                                                                  |                         |                         |                         |                         |                         |
| 0.80A<br>1.0A<br>1.6A    | 0.80A<br>1.0A<br>1.6A   | 4.8A<br>6.0A<br>9.6A    |                                                                                                                  |                         |                         |                         |                         |                         |
| 2.0A<br>2.5A<br>3.0A     | 2.0A<br>2.5A<br>3.0A    | 12.0A<br>15.0A<br>18.0A |                                                                                                                  | 1/6hp<br>1/6hp          | 1/6hp<br>1/6hp          | 1/6hp<br>1/6hp<br>1/4hp | 1/6hp<br>1/6hp<br>1/4hp | 1/6hp<br>1/4hp<br>1/3hp |
| 3.5A<br>4.0A             | 3.5A<br>4.0A            | 21.0A<br>24.0A          |                                                                                                                  | 1/4hp<br>1/4hp          | 1/4hp<br>1/3hp          | 1/4hp<br>1/3hp          | 1/3hp<br>1/3hp          | 1/3hp<br>1/3hp          |
| 5.0A<br>6.0A<br>8.0A     | 5.0A<br>6.0A<br>8.0A    | 30.0A<br>36.0A<br>48.0A | 1/6hp<br>1/4hp<br>1/3hp                                                                                          | 1/3hp<br>1/2hp<br>3/4hp | 1/2hp<br>1/2hp<br>3/4hp | 1/2hp<br>1/2hp<br>1hp   | 1/2hp<br>3/4hp<br>1hp   | 1/2hp<br>3/4hp<br>1hp   |
| 10.0A                    | 10.0A                   | 60.0A                   | 1/2hp                                                                                                            | 1hp                     | 1hp                     | 1 1/2hp                 | 1 1/2hp                 | 2hp                     |
| 12.0A<br>12.5A           | 12.0A<br>12.5A          | 72.0A<br>75.0A          | 1/2hp<br>1/2hp                                                                                                   | 1 1/2hp<br>1 1/2hp      | 1 1/2hp<br>1 1/2hp      | 2hp<br>2hp              | 2hp<br>2hp              | 2hp<br>2hp              |
| 13.0A<br>15.0A<br>16.0A  | 13.0A<br>15.0A<br>16.0A | 78.0A<br>90.0A<br>96.0A | 1/2hp<br>3/4hp<br>1hp                                                                                            | 1 1/2hp<br>2hp<br>2hp   | 1 1/2hp<br>2hp<br>2hp   | 2hp<br>2hp<br>2hp       | 2hp<br>3hp<br>3hp       | 2hp<br>3hp<br>3hp       |
| 20.0A<br>25.0A           | 20.0A<br>25.0A          | 120.0A<br>150.0A        | 1 1/2hp<br>2hp                                                                                                   | 3hp<br>3hp              | 3hp<br>3hp              | 3hp<br>3hp              | 3hp<br>5hp              | 3hp<br>5hp              |
| 30.0A                    | 30.0A                   | 180.0A                  | 2hp                                                                                                              | 3hp                     | 3hp                     | 5hp                     | 5hp                     | 5hp                     |
| 32.0A                    | 32.0A                   | 192.0A                  | 2hp                                                                                                              | 3hp                     | 5hp                     | 5hp                     | 5hp                     | 5hp                     |
| 40.0A                    | 40.0A                   | 240.0A                  | 3hp                                                                                                              | 5hp                     | 7 1/2hp                 | 7 1/2hp                 | 7 1/2hp                 | 7 1/2hp                 |
| 50.0A<br>60.0A           | 50.0A<br>60.0A          | 300.0A<br>360.0A        | 3hp<br>5hp                                                                                                       | 7 1/2hp<br>10hp         | 10hp<br>10hp            | 10hp<br>10hp            | 10hp<br>10hp            | 10hp<br>15hp            |

NOTE #1: For AC motor circuit nameplate full load current, AC general-use loads, AC resistance loads, AC incandescent lamp (tungsten) loads, AC electric discharge lamp (ballast) loads.

NOTE #2: Conversions per UL508® Table 45.2 and NFPA-70: National Electrical Code® 2008 Tables 430-248 and 430-251(A).

Table hP 2: amPer e r at ing &amp; hor sePoWer r at ing 3 Phase &amp; 2 Phase - 4 Wir e

| FLA & LRC RATINGS CONVERTED TO TABLE HORSEPOWER (SEE NOTE #2)<br>USE FLA & LRC RATINGS WHERE NO HP IS LISTED                                                                             |                                     |                                               |                           |                           |                   |                   |                   |                   |                              |                           |                           |                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------|---------------------------|---------------------------|-------------------|-------------------|-------------------|-------------------|------------------------------|---------------------------|---------------------------|---------------------------|
| V-EA<br>RATED<br>CURRENT<br>(SEE NOTE #1)                                                                                                                                                | MOTOR<br>NAMEPLATE<br>FLA<br>RATING | MOTOR<br>NAMEPLATE<br>STARTING/<br>LRC RATING | 110-120<br>VAC            |                           | 200<br>VAC        |                   | 208<br>VAC        |                   | 220-240 VAC<br>(SEE NOTE #3) |                           | 440-480<br>VAC            |                           |
|                                                                                                                                                                                          |                                     |                                               | Motor Design              |                           | Motor Design      |                   | Motor Design      |                   | Motor Design                 |                           | Motor Design              |                           |
|                                                                                                                                                                                          |                                     |                                               | B, C, D                   | E                         | B, C, D           | E                 | B, C, D           | E                 | B, C, D                      | E                         | B, C, D                   | E                         |
| 0.30A<br>0.50A<br>0.75A                                                                                                                                                                  | 0.30A<br>0.50A<br>0.75A             | 3.0A<br>5.0A<br>7.5A                          |                           |                           |                   |                   |                   |                   |                              |                           |                           |                           |
| 0.80A<br>1.0A<br>1.6A                                                                                                                                                                    | 0.80A<br>1.0A<br>1.6A               | 8.0A<br>10.0A<br>16.0A                        |                           |                           |                   |                   |                   |                   |                              |                           | 1/2hp                     | 1/2hp                     |
| 2.0A<br>2.5A<br>3.0A                                                                                                                                                                     | 2.0A<br>2.5A<br>3.0A                | 20.0A<br>25.0A<br>30.0A                       |                           |                           | 1/2hp<br>1/2hp    | 1/2hp<br>1/2hp    | 1/2hp<br>1/2hp    | 1/2hp<br>1/2hp    | 1/2hp<br>1/2hp<br>1/2hp      | 1/2hp<br>1/2hp<br>1/2hp   | 3/4hp<br>1hp<br>1 1/2hp   | 3/4hp<br>1hp<br>1 1/2hp   |
| 3.5A<br>4.0A                                                                                                                                                                             | 3.5A<br>4.0A                        | 35.0A<br>40.0A                                |                           |                           | 1/2hp<br>3/4hp    | 1/2hp<br>3/4hp    | 3/4hp<br>3/4hp    | 3/4hp<br>3/4hp    | 3/4hp<br>3/4hp<br>3/4hp      | 3/4hp<br>3/4hp<br>3/4hp   | 2hp<br>2hp                | 2hp<br>2hp                |
| 5.0A<br>6.0A<br>8.0A                                                                                                                                                                     | 5.0A<br>6.0A<br>8.0A                | 42.0A<br>50.4A<br>67.2A                       | 1/2hp<br>1/2hp<br>3/4hp   | 1/2hp<br>1/2hp<br>3/4hp   | 1hp<br>1hp<br>2hp | 1hp<br>1hp<br>2hp | 1hp<br>1hp<br>2hp | 1hp<br>1hp<br>2hp | 1hp<br>1 1/2hp<br>2hp        | 1hp<br>1 1/2hp<br>2hp     | 3hp<br>3hp<br>5hp         | 3hp<br>3hp<br>5hp         |
| 10.0A<br>12.0A<br>12.5A                                                                                                                                                                  | 10.0A<br>12.0A<br>12.5A             | 84.0A<br>100.8A<br>105.0A                     | 1hp<br>1 1/2hp<br>1 1/2hp | 1hp<br>1 1/2hp<br>1 1/2hp | 2hp<br>3hp<br>3hp | 2hp<br>3hp<br>3hp | 2hp<br>3hp<br>3hp | 2hp<br>3hp<br>3hp | 3hp<br>3hp<br>3hp            | 3hp<br>3hp<br>3hp         | 5hp<br>7 1/2hp<br>7 1/2hp | 5hp<br>7 1/2hp<br>7 1/2hp |
| 13.0A<br>15.0A<br>16.0A                                                                                                                                                                  | 13.0A<br>15.0A<br>16.0A             | 109.2A<br>126.0A<br>134.4A                    | 1 1/2hp<br>2hp<br>2hp     | 1 1/2hp<br>2hp<br>2hp     | 3hp<br>3hp<br>3hp | 3hp<br>3hp<br>3hp | 3hp<br>3hp<br>3hp | 3hp<br>3hp<br>3hp | 3hp<br>3hp<br>5hp            | 3hp<br>3hp<br>5hp         | 7 1/2hp<br>10hp<br>10hp   | 7 1/2hp<br>10hp<br>10hp   |
| 20.0A<br>25.0A                                                                                                                                                                           | 20.0A<br>25.0A                      | 168.0A<br>210.0A                              | 3hp<br>3hp                | 3hp<br>3hp                | 5hp<br>5hp        | 5hp<br>5hp        | 5hp<br>5hp        | 5hp<br>5hp        | 5hp<br>7 1/2hp<br>7 1/2hp    | 5hp<br>7 1/2hp<br>7 1/2hp | 10hp<br>15hp              | 10hp<br>15hp              |
| 30.0A                                                                                                                                                                                    | 30.0A                               | 252.0A                                        | 5hp                       | 5hp                       | 5hp               | 5hp               | 7 1/2hp           | 7 1/2hp           | 10hp                         | 10hp                      | 20hp                      | 20hp                      |
| 32.0A                                                                                                                                                                                    | 32.0A                               | 268.8A                                        | 5hp                       | 5hp                       | 5hp               | 5hp               | 10hp              | 10hp              | 10hp                         | 10hp                      | 20hp                      | 20hp                      |
| 40.0A                                                                                                                                                                                    | 40.0A                               | 226.0A                                        | 5hp                       | 5hp                       | 10hp              | 7 1/2hp           | 10hp              | 7 1/2hp           | 10hp                         | 10hp                      | 30hp                      | 20hp                      |
| 50.0A<br>60.0A                                                                                                                                                                           | 50.0A<br>60.0A                      | 282.5A<br>339.0A                              | 7 1/2hp<br>10hp           | 7 1/2hp<br>10hp           | 15hp<br>15hp      | 10hp<br>10hp      | 15hp<br>20hp      | 10hp<br>10hp      | 15hp<br>20hp                 | 10hp<br>15hp              | 30hp<br>40hp              | 25hp<br>30hp              |
| NOTE #1: For AC motor circuit nameplate full load current, AC general-use loads, AC resistance loads, AC incandescent lamp (tungsten) loads, AC electric discharge lamp (ballast) loads. |                                     |                                               |                           |                           |                   |                   |                   |                   |                              |                           |                           |                           |
| NOTE #2: Conversions per UL508® proposed Tables 45.2 and 45.4 and NFPA-70: National Electrical Code® 2008 Tables 430-249, 430-250 and 430-251B).                                         |                                     |                                               |                           |                           |                   |                   |                   |                   |                              |                           |                           |                           |

## V-EA INTERNAL RESISTANCE

| Rated Current (Amp) | Trip Characteristic |          |          |          |          |          |
|---------------------|---------------------|----------|----------|----------|----------|----------|
|                     | B (Ohms)            | C (Ohms) | D (Ohms) | E (Ohms) | G (Ohms) | Z (Ohms) |
| 0.3                 | —                   | 16.8620  | 16.8620  | 14.52000 | 16.8620  | 31.5060  |
| 0.5                 | —                   | 6.8540   | 6.0009   | 5.92000  | 6.8540   | 10.2460  |
| 0.75/0.8            | —                   | 3.0540   | 3.0540   | 2.70000  | 3.0540   | 5.3920   |
| 1.0                 | —                   | 1.7000   | 1.7560   | 1.48000  | 1.7560   | 2.6910   |
| 1.6                 | —                   | 0.5870   | 0.5870   | 0.57400  | 0.5870   | 0.9440   |
| 2.0                 | —                   | 0.4190   | 0.4190   | 0.40500  | 0.4190   | 0.8900   |
| 2.5                 | —                   | 0.2950   | 0.2950   | 0.26900  | 0.2950   | 0.4290   |
| 3.0                 | —                   | 0.2020   | 0.2020   | 0.18600  | 0.2020   | 0.3460   |
| 3.5                 | —                   | 0.1390   | 0.1390   | 0.13900  | 0.1390   | 0.1790   |
| 4.0                 | —                   | 0.1090   | 0.1090   | 0.10600  | 0.1090   | 0.1620   |
| 5.0                 | —                   | 0.0654   | 0.0654   | 0.05900  | 0.0654   | 0.1050   |
| 6.0                 | 0.0528              | 0.0528   | 0.0491   | 0.04600  | 0.0491   | 0.0823   |
| 8.0                 | —                   | 0.0278   | 0.0240   | 0.03040  | 0.0333   | 0.0371   |
| 10                  | 0.0216              | 0.0216   | 0.0187   | 0.02020  | 0.0211   | 0.0278   |
| 12/12.5             | —                   | —        | —        | 0.00724  | 0.0084   | 0.0151   |
| 13                  | 0.0113              | 0.0084   | 0.0085   | 0.00724  | 0.0084   | 0.0151   |
| 15/16               | 0.0085              | 0.0085   | 0.0076   | 0.00731  | 0.0076   | 0.0114   |
| 20                  | 0.0067              | 0.0067   | 0.0064   | 0.00582  | 0.0064   | 0.0075   |
| 25                  | 0.0050              | 0.0050   | 0.0041   | 0.00411  | 0.0046   | 0.0050   |
| 30/32               | 0.0032              | 0.0032   | 0.0027   | 0.00272  | 0.0030   | 0.0032   |
| 40                  | 0.0025              | 0.0025   | 0.0022   | 0.00212  | 0.0022   | 0.0022   |
| 50                  | 0.0019              | 0.0019   | 0.0018   | 0.00184  | 0.0019   | 0.00195  |
| 60/63               | 0.0018              | 0.0018   | 0.0017   | 0.00172  | 0.00179  | —        |

Resistances listed are “hot” values, as opposed to cold start values. Operating voltage drop across the V-EA and power loss per pole can be approximated with basic formulas:

$$V_{\text{DROP}} = I_{\text{OPERATING}} \times R_{\text{TABLE}}$$

$$P_{\text{LOSS P/P}} = I_{\text{OPERATING}}^2 \times R_{\text{TABLE}}$$

Voltage drops should be reviewed when V-EAs with high internal resistance are used (e.g., load voltage minimums). Power loss should be reviewed when V-EAs with high rated currents are used (e.g., enclosure heating).

The listed V-EA internal resistance values should not be used in calculations of available short-circuit current downstream of the V-EA. The dynamic impedance of the V-EA under short-circuit conditions can vary significantly from internal resistance values in normal operation.

## Line current frequency effects on trip curves

| Frequency Effects on Magnetic Trip Curves |                                   |                            |                            |                            |                        |
|-------------------------------------------|-----------------------------------|----------------------------|----------------------------|----------------------------|------------------------|
| Trip Curve                                | Trip Zone At 16 2/3 - 60Hz (x RC) | Trip Zone At 100 Hz (x RC) | Trip Zone At 200 Hz (x RC) | Trip Zone At 400 Hz (x RC) | Trip Zone At DC (x RC) |
| Z                                         | 2 - 3                             | 2.2 - 3.3                  | 2.4 - 3.6                  | 2.8 - 4.2                  | 3.0 - 4.5              |
| B                                         | 3 - 5                             | 3.3 - 5.5                  | 3.6 - 6.0                  | 4.2 - 7.0                  | 4.5 - 7.5              |
| C                                         | 5 - 10                            | 5.5 - 11.0                 | 6.0 - 12                   | 7.0 - 14.0                 | 7.5 - 15.0             |
| G                                         | 8 - 10                            | 8.8 - 11.0                 | 9.6 - 12.0                 | 11.2 - 14.0                | 12.0 - 15.0            |
| D                                         | 10 - 16                           | 11.0 - 17.6                | 12.0 - 19.2                | 14.0 - 22.4                | 15.0 - 24.0            |
| E                                         | 14 - 18                           | 15.4 - 19.8                | 16.8 - 21.6                | 19.6 - 25.2                | 21.0 - 27.0            |

The thermal trip is not affected by the frequency of the line current. The magnetic trip is within the trip zone of the characteristic curve for frequencies from 16 2/3 to 60Hz. At lower and higher frequencies, the magnetic trip will be delayed longer than indicated by the characteristic curve, roughly as follows:

**At 100Hz:** Mag. Trip Current = 1.1 x curve current

**At 200Hz:** Mag. Trip Current = 1.2 x curve current

**At 400Hz:** Mag. Trip Current = 1.4 x curve current

**At DC:** Mag. Trip Current = 1.5 x curve current

For example, at 16 2/3 - 60 Hz the magnetic trip zone for the “G” characteristic is 8 to 10 times the rated current of the specific V-EA (i.e., hold for at least 100ms at 8 x RC, trip in less than 100ms at 10 x RC). With a 400Hz current, a magnetic trip at 10 x RC would be greatly delayed (thermal would likely trip first), as the magnetic trip zone is now 11.2 to 14 x RC. If a quicker magnetic trip is required with 400Hz, the “B” or “C” characteristic should be considered.

## Mechanical endurance ratings (on/off operations)

| Application                             | 2 x (1.15 x RC)                      | 2 x RC | RC   | No Load | Total |
|-----------------------------------------|--------------------------------------|--------|------|---------|-------|
| AC General Use                          | —                                    | 6000   | —    | 4000    | 10000 |
| AC Motor Starting Across the Line       | 1000                                 | —      | 5000 | 4000    | 10000 |
| AC Incandescent Lamps (Tungsten)        | —                                    | —      | 6000 | 4000    | 10000 |
| AC Electrical Discharge Lamps (Ballast) | —                                    | 6000   | —    | 4000    | 10000 |
| AC Resistance                           | —                                    | 6000   | —    | 4000    | 10000 |
| Manufacturers self certification        | 20000 ON/OFF operations with no load |        |      |         |       |