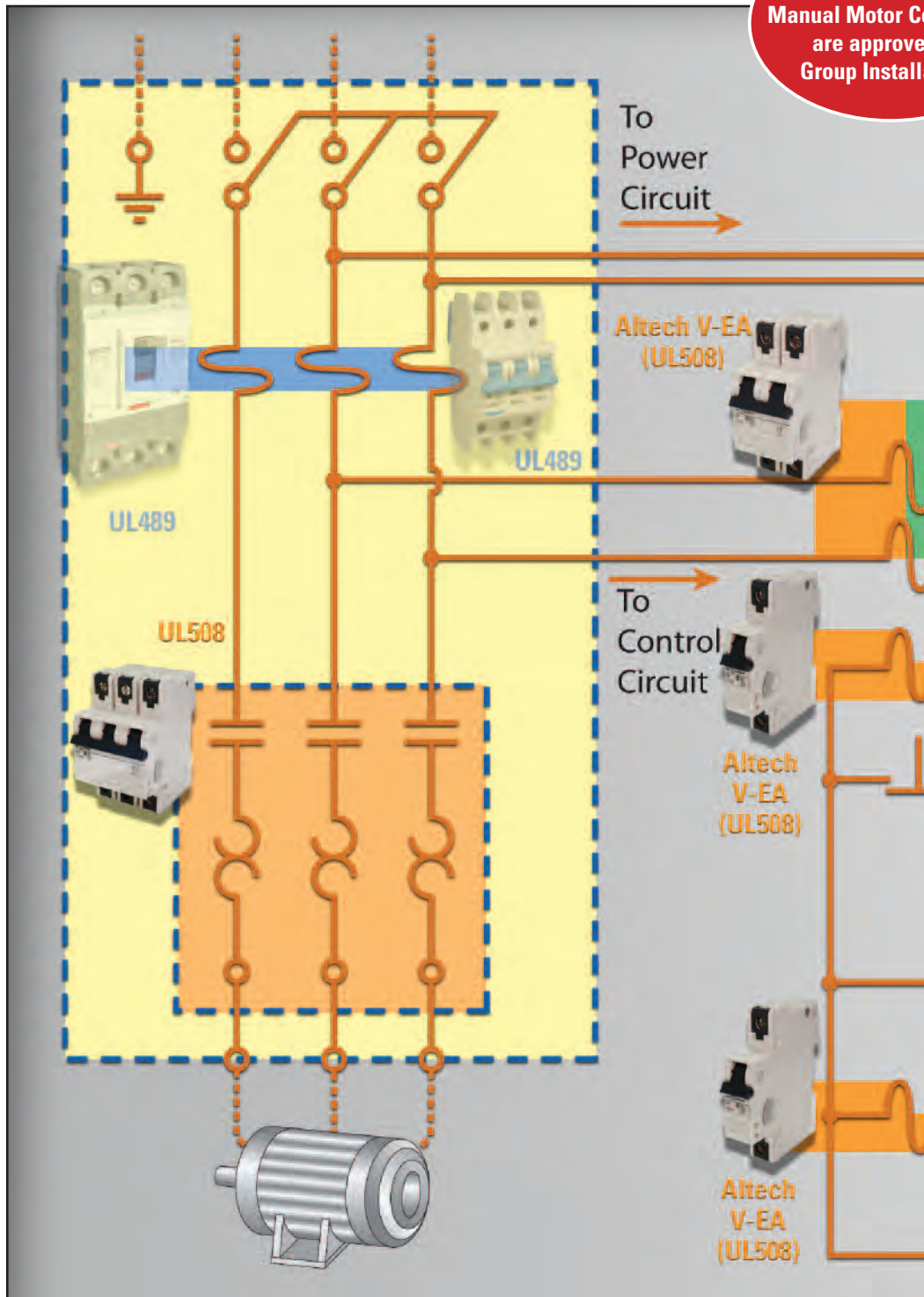


## Typical UL508 Application

Power Circuit of a UL508A Panel

Altech's V-EA UL508  
Manual Motor Controllers  
are approved for  
Group Installations



**Disclaimer:** This an application example. Installation should be done by a qualified electrician under the guidance of UL/NEC® specifications..

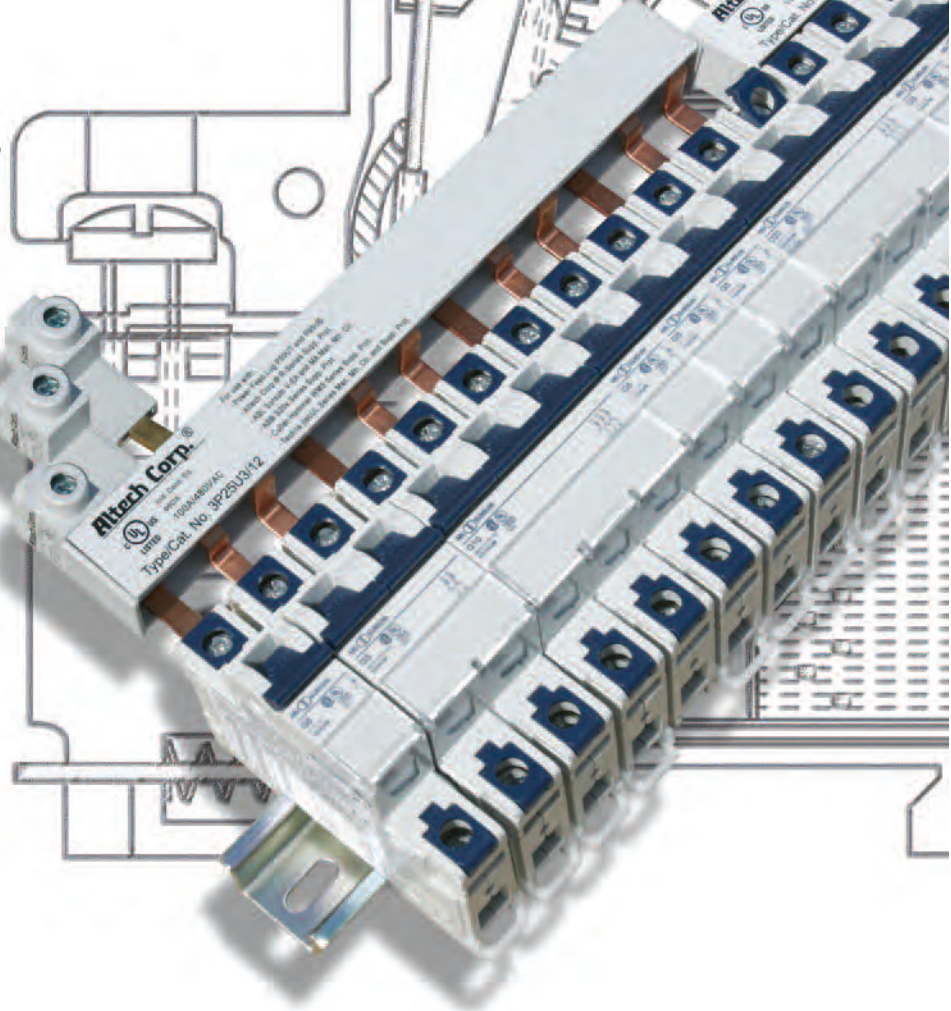
# V-EA Series

**UL** 508 listed  
E137938

**CSA** 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)

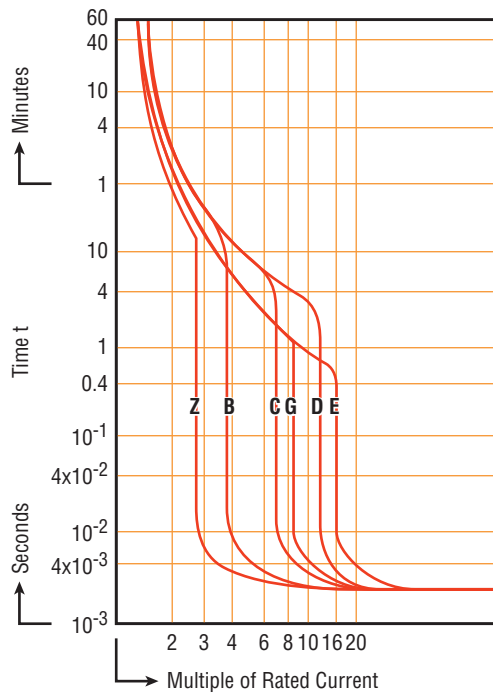


|                                                                |                                                                                                  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <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                    |

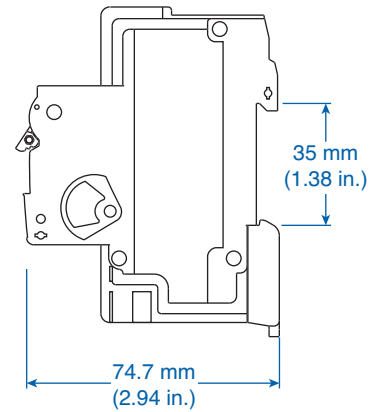
\*up to nearest rated current



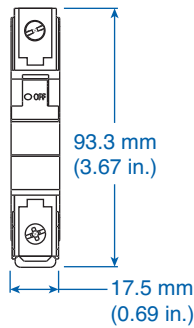
## Time versus Current Trip Curve

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

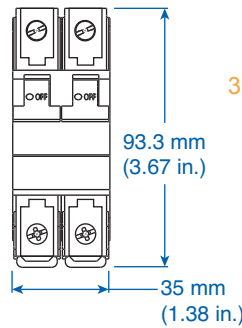
Dimensions in mm side view



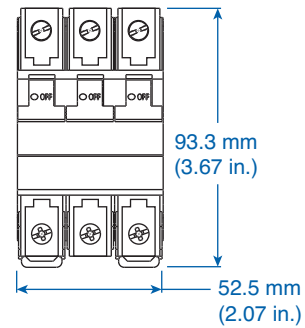
1 Pole



2 Pole



3 Pole



## 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:

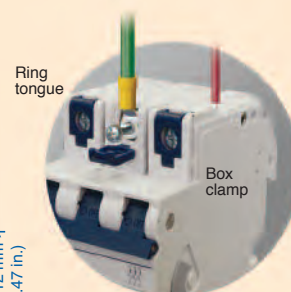
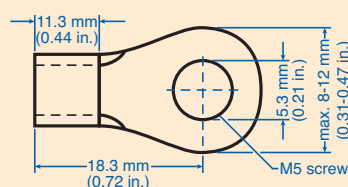
0.775kg (1.71lb.)

### 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

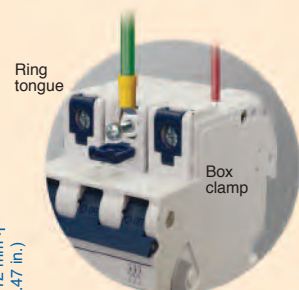
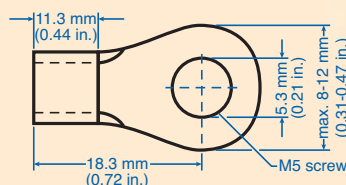
Weight:  
0.775kg (1.71lb.)

### 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:

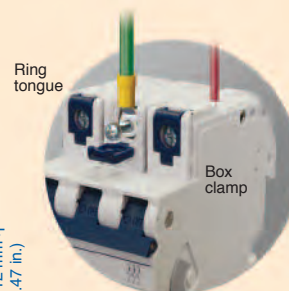
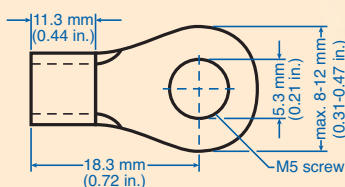
0.775kg (1.71lb.)

### 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

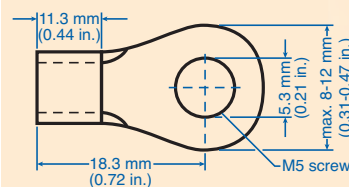
Weight:  
0.775kg (1.71lb.)

### 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 SP     |
| 0.5A          | 1G05UM            | UL SP     |
| 0.75A         | NA                |           |
| 0.8A          | 1G08UM            | UL SP     |
| 1.0A          | 1G1UM             | UL SP     |
| 1.6A          | 1G1.6UM           | UL SP     |
| 2.0A          | 1G2UM             | UL SP     |
| 2.5A          | 1G2.5UM           | UL SP     |
| 3.0A          | 1G3UM             | UL SP     |
| 3.5A          | 1G3.5UM           | UL SP     |
| 4.0A          | 1G4UM             | UL SP     |
| 5.0A          | 1G5UM             | UL SP     |
| 6.0A          | 1G6UM             | UL SP     |
| 8.0A          | 1G8UM             | UL SP     |
| 10A           | 1G10UM            | UL SP     |
| 12A           | 1G12UM            | UL SP     |
| 13A           | 1G13UM            | UL SP     |
| 15A           | 1G15UM            | UL SP     |
| 16A           | 1G16UM            | UL SP     |
| 20A           | 1G20UM            | UL SP     |
| 25A           | 1G25UM            | UL SP     |
| 30A           | 1G30UM            | UL SP     |
| 32A           | 1G32UM            | UL SP     |
| 40A           | 1G40UM            | UL SP     |
| 50A           | 1G50UM            | UL SP     |
| 60A           | 1G60UM            | UL SP     |
| 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 SP     |
| 0.5A          | 3G05UM            | UL SP     |
| 0.75A         | NA                |           |
| 0.8A          | 3G08UM            | UL SP     |
| 1.0A          | 3G1UM             | UL SP     |
| 1.6A          | 3G1.6UM           | UL SP     |
| 2.0A          | 3G2UM             | UL SP     |
| 2.5A          | 3G2.5UM           | UL SP     |
| 3.0A          | 3G3UM             | UL SP     |
| 3.5A          | 3G3.5UM           | UL SP     |
| 4.0A          | 3G4UM             | UL SP     |
| 5.0A          | 3G5UM             | UL SP     |
| 6.0A          | 3G6UM             | UL SP     |
| 8.0A          | 3G8UM             | UL SP     |
| 10A           | 3G10UM            | UL SP     |
| 12A           | 3G12UM            | UL SP     |
| 13A           | 3G13UM            | UL SP     |
| 15A           | 3G15UM            | UL SP     |
| 16A           | 3G16UM            | UL SP     |
| 20A           | 3G20UM            | UL SP     |
| 25A           | 3G25UM            | UL SP     |
| 30A           | 3G30UM            | UL SP     |
| 32A           | 3G32UM            | UL SP     |
| 40A           | 3G40UM            | UL SP     |
| 50A           | 3G50UM            | UL SP     |
| 60A           | 3G60UM            | UL SP     |
| 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 SP     |
| 0.5A          | 2G05UM            | UL SP     |
| 0.75A         | NA                |           |
| 0.8A          | 2G08UM            | UL SP     |
| 1.0A          | 2G1UM             | UL SP     |
| 1.6A          | 2G1.6UM           | UL SP     |
| 2.0A          | 2G2UM             | UL SP     |
| 2.5A          | 2G2.5UM           | UL SP     |
| 3.0A          | 2G3UM             | UL SP     |
| 3.5A          | 2G3.5UM           | UL SP     |
| 4.0A          | 2G4UM             | UL SP     |
| 5.0A          | 2G5UM             | UL SP     |
| 6.0A          | 2G6UM             | UL SP     |
| 8.0A          | 2G8UM             | UL SP     |
| 10A           | 2G10UM            | UL SP     |
| 12A           | 2G12UM            | UL SP     |
| 13A           | 2G13UM            | UL SP     |
| 15A           | 2G15UM            | UL SP     |
| 16A           | 2G16UM            | UL SP     |
| 20A           | 2G20UM            | UL SP     |
| 25A           | 2G25UM            | UL SP     |
| 30A           | 2G30UM            | UL SP     |
| 32A           | 2G32UM            | UL SP     |
| 40A           | 2G40UM            | UL SP     |
| 50A           | 2G50UM            | UL SP     |
| 60A           | 2G60UM            | UL SP     |
| 63A           | 2G63UM            |           |



### Add-on Neutral Pole

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

Standard Pack: 5

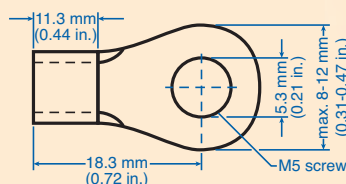
Weight:  
0.775kg (1.71lb.)

### 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.

# 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

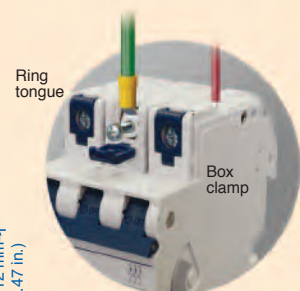
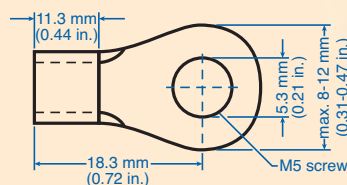
Weight:  
0.775kg (1.71lb.)

### Standard Dual Connection Terminal

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

- Ring tongue terminals

Dimensions\*:

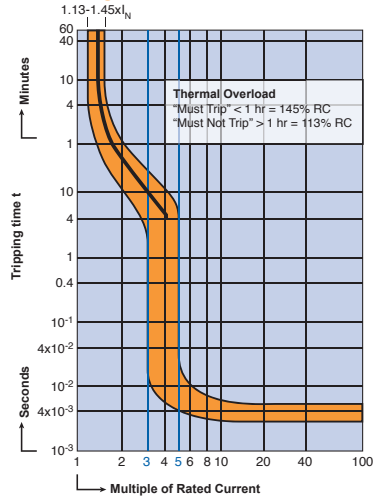


\* May differ by manufacturer.  
Top terminal ring tongue  
maximum thickness 1.6 mm.

# V-EA Trip Curves

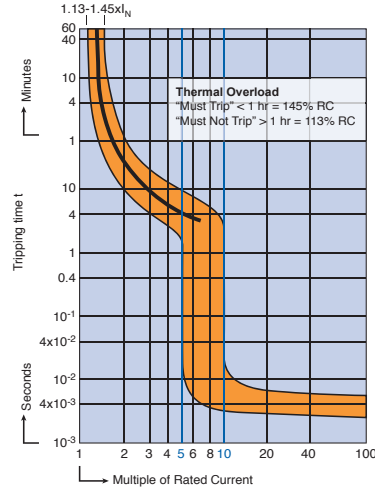
## B Trip Curve

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



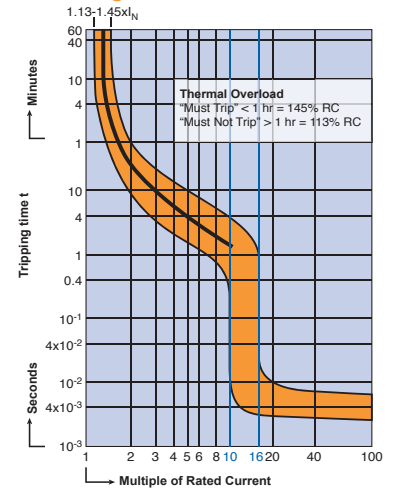
## C Trip Curve

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

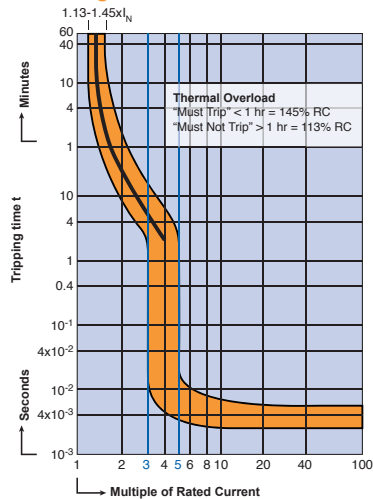


## D Trip Curve

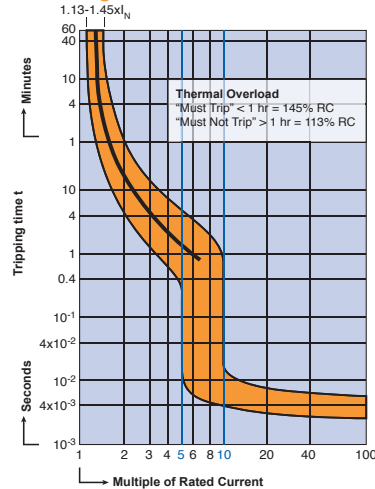
### V-EA-D Trip 0.3A Through 10A Rated Current



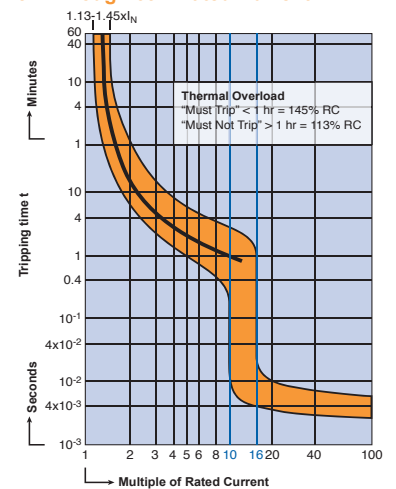
### V-EA-B Trip 13A Through 63A Rated Current



### 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.

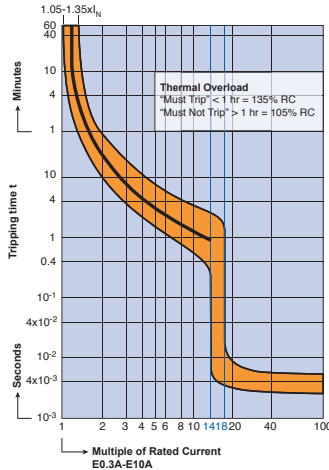
### "D" Magnetic Trip Parameters Rated current 0.3A to 63A.

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

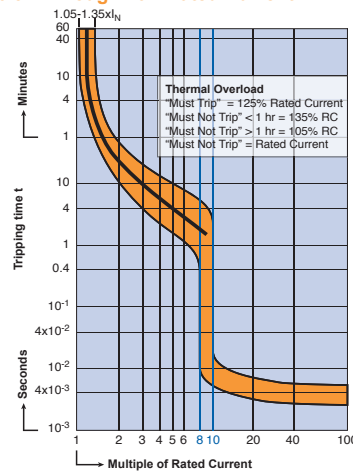
E Trip Curve

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



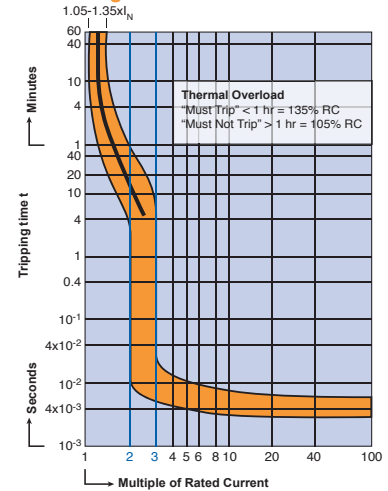
G Trip Curve

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

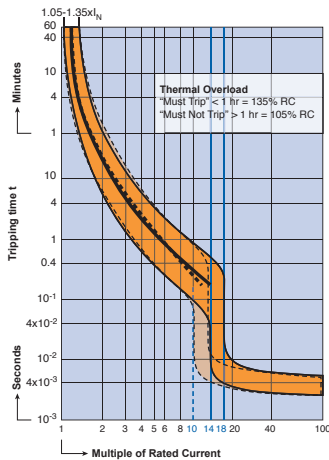


Z Trip Curve

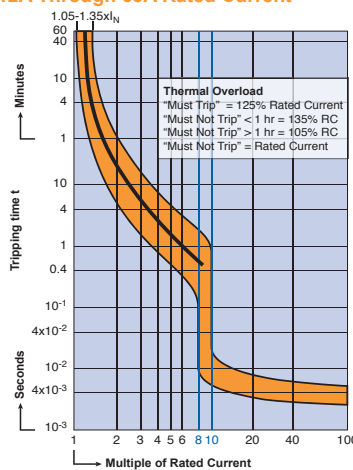
V-EA-Z Trip  
0.3A Through 10A Rated Current



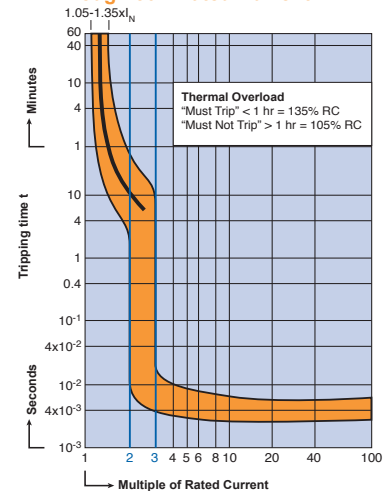
V-EA-E Trip  
12A Through 60A Rated Current



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>7 1/2hp    | 5hp<br>7 1/2hp    | 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 430-251(B).

## 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 |        |      |         |       |