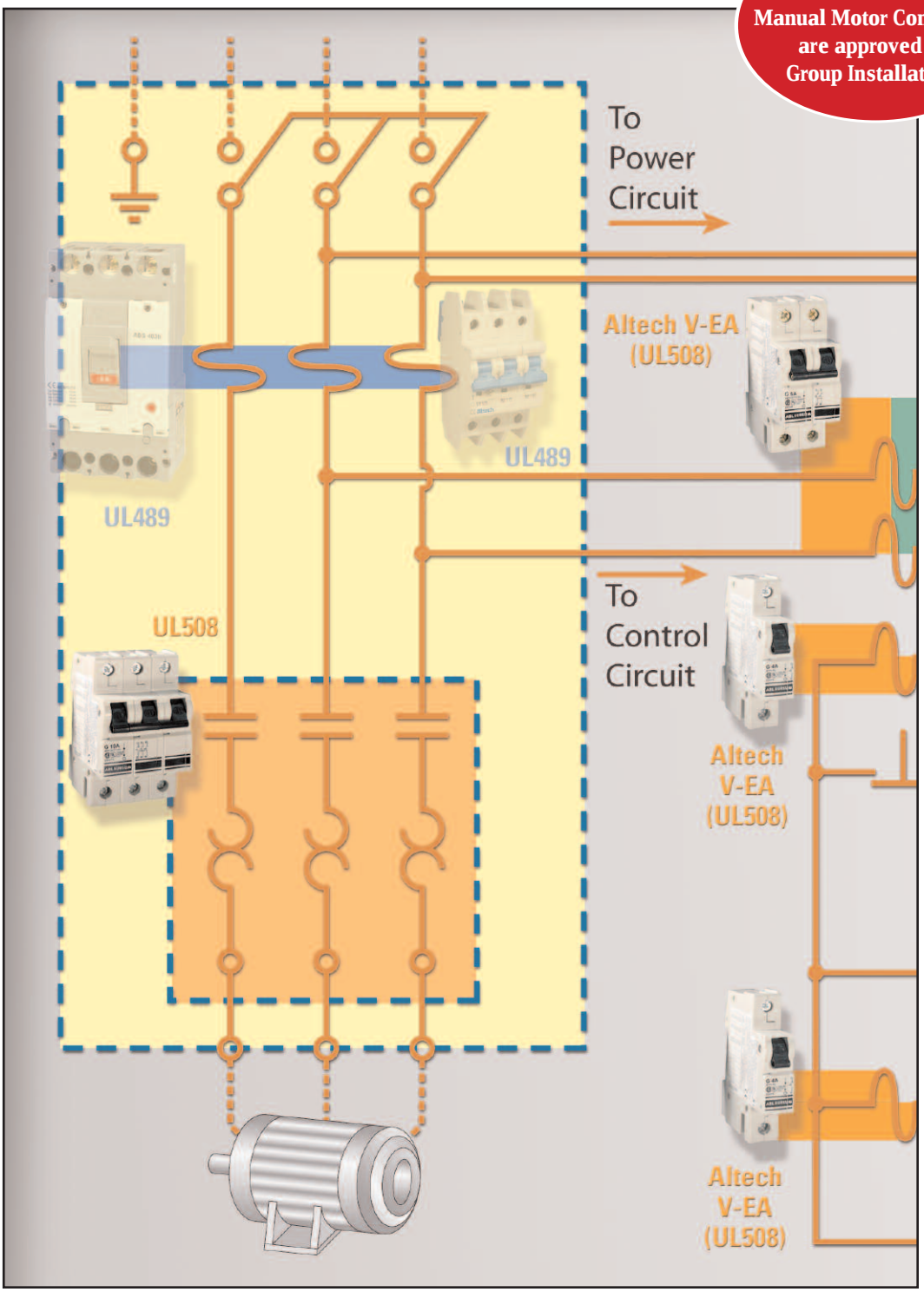
Typical UL508 Application

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..

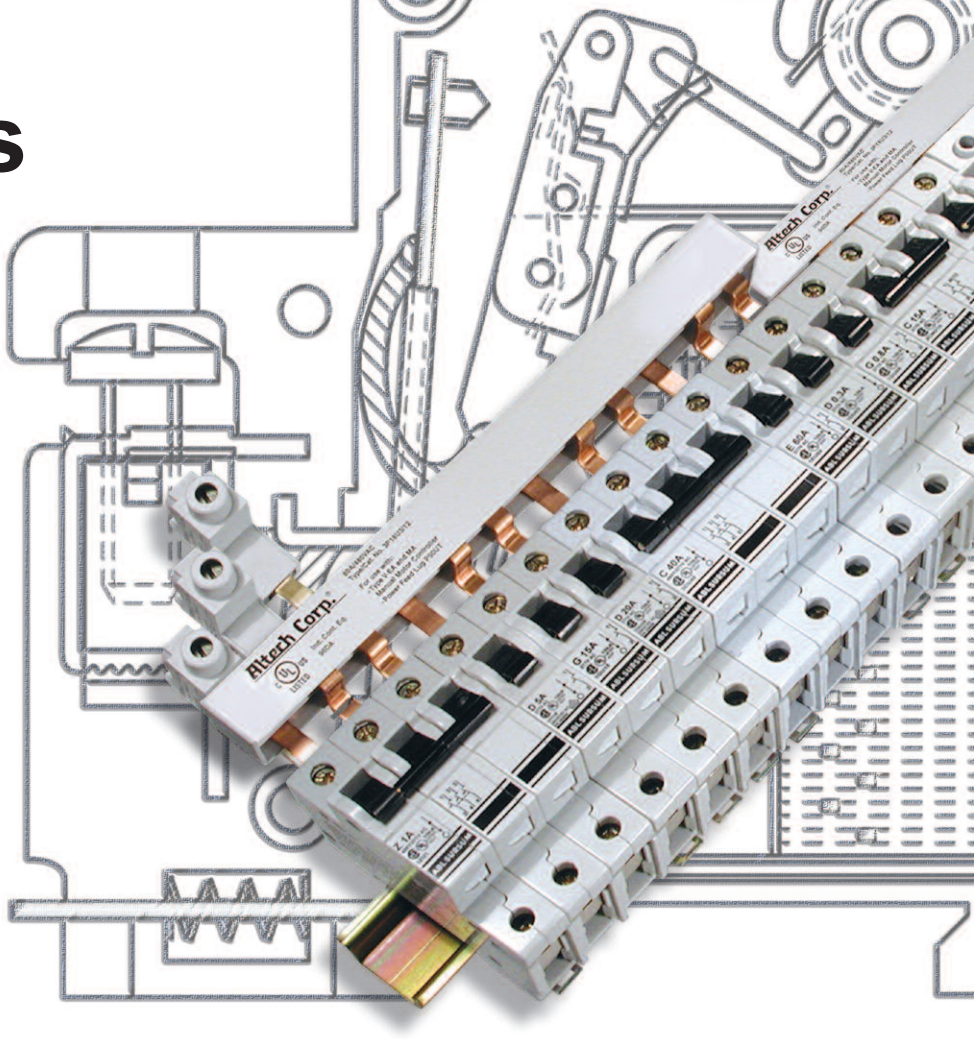
V-EA Series

508 listed
E137938

C22.2 No.14 certified
LR104391

UL508 Listed
Manual Motor Controller
"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)

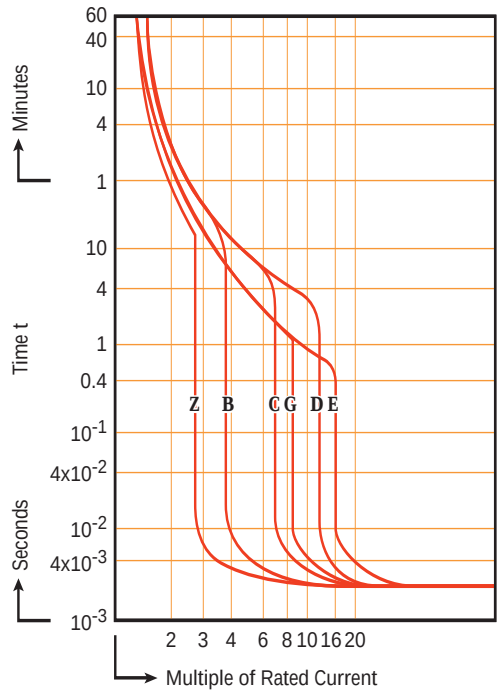


Voltage Rating	480Y/277VAC 0.3-25A: 1 pole - 42VDC; 2 Pole - 80VDC 30-60A: 1 pole - 24VDC; 2 Pole - 60VDC
Short Circuit Withstand Rating (UL/CSA - Ratings)	0.3-60A (RC): 10kA with UL-listed RK5 back-up fuse or MCCB
Group Short Circuit Withstand Rating (UL/CSA - Ratings)	0.3-10A (RC): 10kA; 13-60A (RC): 5kA no branch circuit protection required
Interrupting Capacity (VDE - Ratings)	0.3-63A (RC): 10kA
Calibration Temperature	40°C (104°F)
Terminal Size Acceptability	Top: 18-3 AWG; Bottom: 18-2 AWG
Terminal Torque	20 lb.in.
Terminal Protection Degree	IP20
Horse Power Ratings	see page 34
Mechanical Endurance Ratings	see page 35

SHORT CIRCUIT WITHSTAND RATINGS FOR V-EA MANUAL MOTOR CONTROLLER

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

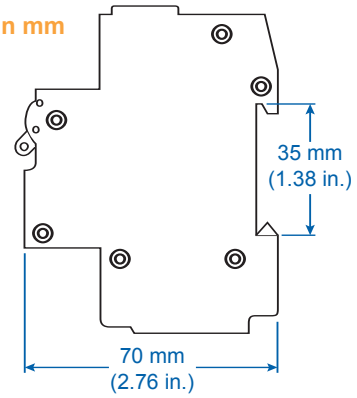
*up to nearest rated current



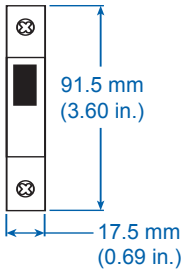
Time versus Current Trip Curve

For the exact trip curve, please refer to pages 32-33.

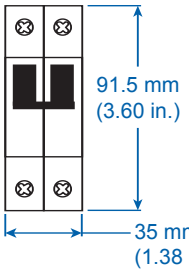
Dimensions in mm
side view



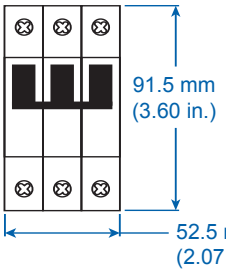
1 POLE



2 POLE



3 POLE



Trip-Characteristics*				Applications											
Characteristic Trip Boundaries				Lighting Wiring Protection Control Circuits	Business Equipment Appliances	Transformers	Power Supplies Heaters	Motors				General Electronics	Solenoid	Semi-conductors Components/ devices with low surge-current and short circuit withstand capabilities	Reactive Load
Thermal Trip		Magnetic Trip						General	Low Inrush	High Inrush	High Efficiency				
Must not Trip>100ms	Must Trip <1hr	Must not Trip>100ms	Must Trip 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
1.68kg (3.7 lb.)
40A - 63A
1.92kg (4.23 lb.)

Rated Current	Type/ Cat. No.	Approvals
1.0A	1BU1	
1.6A	1BU1.6	
2.0A	1BU2	
2.5A	1BU2.5	
3.0A	1BU3	
3.5A	1BU3.5	
4.0A	1BU4	
5.0A	1BU5	
6.0A	1BU6	
8.0A	NA	
10A	1BU10	
12A	NA	
12.5A	NA	
13A	1BU13	
15A	1BU15	
16A	1BU16	
20A	1BU20	
25A	1BU25	
30A	1BU30	
32A	1BU32	
40A	1BU40	
50A	1BU50	
60A	1BU60	
63A	1BU63	

One Pole plus neutral

Standard Pack: 6

Weight:
0.3A - 32A
1.56kg (3.44 lb.)
40A - 63A
1.74kg (3.84 lb.)

Rated Current	Type/ Cat. No.	Approvals
1.0A	2BNU1	
1.6A	2BNU1.6	
2.0A	2BNU2	
2.5A	2BNU2.5	
3.0A	2BNU3	
3.5A	2BNU3.5	
4.0A	2BNU4	
5.0A	2BNU5	
6.0A	2BNU6	
8.0A	NA	
10A	2BNU10	
12A	NA	
12.5A	NA	
13A	2BNU13	
15A	2BNU15	
16A	2BNU16	
20A	2BNU20	
25A	2BNU25	
30A	2BNU30	
32A	2BNU32	
40A	2BNU40	
50A	2BNU50	
60A	2BNU60	
63A	2BNU63	

Two Pole

Standard Pack: 6

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
1.0A	2BU1	
1.6A	2BU1.6	
2.0A	2BU2	
2.5A	2BU2.5	
3.0A	2BU3	
3.5A	2BU3.5	
4.0A	2BU4	
5.0A	2BU5	
6.0A	2BU6	
8.0A	NA	
10A	2BU10	
12A	NA	
12.5A	NA	
13A	2BU13	
15A	2BU15	
16A	2BU16	
20A	2BU20	
25A	2BU25	
30A	2BU30	
32A	2BU32	
40A	2BU40	
50A	2BU50	
60A	2BU60	
63A	2BU63	

Three Pole

Standard Pack: 4

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
1.0A	3BU1	
1.6A	3BU1.6	
2.0A	3BU2	
2.5A	3BU2.5	
3.0A	3BU3	
3.5A	3BU3.5	
4.0A	3BU4	
5.0A	3BU5	
6.0A	3BU6	
8.0A	NA	
10A	3BU10	
12A	NA	
12.5A	NA	
13A	3BU13	
15A	3BU15	
16A	3BU16	
20A	3BU20	
25A	3BU25	
30A	3BU30	
32A	3BU32	
40A	3BU40	
50A	3BU50	
60A	3BU60	
63A	3BU63	

For ring tongue terminal version, replace “U” with “**R**” in part number. For example **1BR20** instead of *1BU20*.

C-Trip Characteristic

UL508 Listed
E137938

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
1.68kg (3.7 lb.)
40A - 63A
1.92kg (4.23 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	1CU03	
0.5A	1CU05	
0.75A	1CU075	
0.8A	NA	
1.0A	1CU1	
1.6A	1CU1.6	
2.0A	1CU2	
2.5A	1CU2.5	
3.0A	1CU3	
3.5A	1CU3.5	
4.0A	1CU4	
5.0A	1CU5	
6.0A	1CU6	
8.0A	1CU8	
10A	1CU10	
12A	NA	
12.5A	NA	
13A	1CU13	
15A	1CU15	
16A	1CU16	
20A	1CU20	
25A	1CU25	
30A	1CU30	
32A	1CU32	
40A	1CU40	
50A	1CU50	
60A	1CU60	
63A	1CU63	

One Pole plus neutral

Standard Pack: 6

Weight:
0.3A - 32A
1.56kg (3.44 lb.)
40A - 63A
1.74kg (3.84 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2CNU03	
0.5A	2CNU05	
0.75A	2CNU075	
0.8A	NA	
1.0A	2CNU1	
1.6A	2CNU1.6	
2.0A	2CNU2	
2.5A	2CNU2.5	
3.0A	2CNU3	
3.5A	2CNU3.5	
4.0A	2CNU4	
5.0A	2CNU5	
6.0A	2CNU6	
8.0A	2CNU8	
10A	2CNU10	
12A	NA	
12.5A	NA	
13A	2CNU13	
15A	2CNU15	
16A	2CNU16	
20A	2CNU20	
25A	2CNU25	
30A	2CNU30	
32A	2CNU32	
40A	2CNU40	
50A	2CNU50	
60A	2CNU60	
63A	2CNU63	

Two Pole

Standard Pack: 6

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2CU03	
0.5A	2CU05	
0.75A	2CU075	
0.8A	NA	
1.0A	2CU1	
1.6A	2CU1.6	
2.0A	2CU2	
2.5A	2CU2.5	
3.0A	2CU3	
3.5A	2CU3.5	
4.0A	2CU4	
5.0A	2CU5	
6.0A	2CU6	
8.0A	2CU8	
10A	2CU10	
12A	NA	
12.5A	NA	
13A	2CU13	
15A	2CU15	
16A	2CU16	
20A	2CU20	
25A	2CU25	
30A	2CU30	
32A	2CU32	
40A	2CU40	
50A	2CU50	
60A	2CU60	
63A	2CU63	

Three Pole

Standard Pack: 4

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	3CU03	
0.5A	3CU05	
0.75A	3CU075	
0.8A	NA	
1.0A	3CU1	
1.6A	3CU1.6	
2.0A	3CU2	
2.5A	3CU2.5	
3.0A	3CU3	
3.5A	3CU3.5	
4.0A	3CU4	
5.0A	3CU5	
6.0A	3CU6	
8.0A	3CU8	
10A	3CU10	
12A	NA	
12.5A	NA	
13A	3CU13	
15A	3CU15	
16A	3CU16	
20A	3CU20	
25A	3CU25	
30A	3CU30	
32A	3CU32	
40A	3CU40	
50A	3CU50	
60A	3CU60	
63A	3CU63	

For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1BR20** instead of *1BU20*.

D-Trip Characteristic

Application Examples:

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

UL508 Listed
E137938

One Pole

Standard Pack: 12

Weight:
0.3A - 32A
1.68kg (3.7 lb.)
40A - 63A
1.92kg (4.23 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	1DU03	
0.5A	1DU05	
0.75A	1DU075	
0.8A	NA	
1.0A	1DU1	
1.6A	1DU1.6	
2.0A	1DU2	
2.5A	1DU2.5	
3.0A	1DU3	
3.5A	1DU3.5	
4.0A	1DU4	
5.0A	1DU5	
6.0A	1DU6	
8.0A	1DU8	
10A	1DU10	
12A	NA	
12.5A	NA	
13A	1DU13	
15A	1DU15	
16A	1DU16	
20A	1DU20	
25A	1DU25	
30A	1DU30	
32A	1DU32	
40A	1DU40	
50A	1DU50	
60A	1DU60	
63A	1DU63	

One Pole plus neutral

Standard Pack: 6

Weight:
0.3A - 32A
1.56kg (3.44 lb.)
40A - 63A
1.74kg (3.84 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2DNU03	
0.5A	2DNU05	
0.75A	2DNU075	
0.8A	NA	
1.0A	2DNU1	
1.6A	2DNU1.6	
2.0A	2DNU2	
2.5A	2DNU2.5	
3.0A	2DNU3	
3.5A	2DNU3.5	
4.0A	2DNU4	
5.0A	2DNU5	
6.0A	2DNU6	
8.0A	2DNU8	
10A	2DNU10	
12A	NA	
12.5A	NA	
13A	2DNU13	
15A	2DNU15	
16A	2DNU16	
20A	2DNU20	
25A	2DNU25	
30A	2DNU30	
32A	2DNU32	
40A	2DNU40	
50A	2DNU50	
60A	2DNU60	
63A	2DNU63	

Two Pole

Standard Pack: 6

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2DU03	
0.5A	2DU05	
0.75A	2DU075	
0.8A	NA	
1.0A	2DU1	
1.6A	2DU1.6	
2.0A	2DU2	
2.5A	2DU2.5	
3.0A	2DU3	
3.5A	2DU3.5	
4.0A	2DU4	
5.0A	2DU5	
6.0A	2DU6	
8.0A	2DU8	
10A	2DU10	
12A	NA	
12.5A	NA	
13A	2DU13	
15A	2DU15	
16A	2DU16	
20A	2DU20	
25A	2DU25	
30A	2DU30	
32A	2DU32	
40A	2DU40	
50A	2DU50	
60A	2DU60	
63A	2DU63	

Three Pole

Standard Pack: 4

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	3DU03	
0.5A	3DU05	
0.75A	3DU075	
0.8A	NA	
1.0A	3DU1	
1.6A	3DU1.6	
2.0A	3DU2	
2.5A	3DU2.5	
3.0A	3DU3	
3.5A	3DU3.5	
4.0A	3DU4	
5.0A	3DU5	
6.0A	3DU6	
8.0A	3DU8	
10A	3DU10	
12A	NA	
12.5A	NA	
13A	3DU13	
15A	3DU15	
16A	3DU16	
20A	3DU20	
25A	3DU25	
30A	3DU30	
32A	3DU32	
40A	3DU40	
50A	3DU50	
60A	3DU60	
63A	3DU63	

For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1BR20** instead of *1BU20*.

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
1.68kg (3.7 lb.)
40A - 63A
1.92kg (4.23 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	1EU03	
0.5A	1EU05	
0.75A	1EU075	
0.8A	NA	
1.0A	1EU1	
1.6A	1EU1.6	
2.0A	1EU2	
2.5A	1EU2.5	
3.0A	1EU3	
3.5A	1EU3.5	
4.0A	1EU4	
5.0A	1EU5	
6.0A	1EU6	
8.0A	1EU8	
10A	1EU10	
12A	1EU12	
12.5A	1EU125	
13A	1EU13	
15A	1EU15	
16A	1EU16	
20A	1EU20	
25A	1EU25	
30A	1EU30	
32A	1EU32	
40A	1EU40	
50A	1EU50	
60A	1EU60	
63A	1EU63	

One Pole plus neutral

Standard Pack: 6

Weight:
0.3A - 32A
1.56kg (3.44 lb.)
40A - 63A
1.74kg (3.84 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2ENU03	
0.5A	2ENU05	
0.75A	2ENU075	
0.8A	NA	
1.0A	2ENU1	
1.6A	2ENU1.6	
2.0A	2ENU2	
2.5A	2ENU2.5	
3.0A	2ENU3	
3.5A	2ENU3.5	
4.0A	2ENU4	
5.0A	2ENU5	
6.0A	2ENU6	
8.0A	2ENU8	
10A	2ENU10	
12A	2ENU12	
12.5A	2ENU125	
13A	2ENU13	
15A	2ENU15	
16A	2ENU16	
20A	2ENU20	
25A	2ENU25	
30A	2ENU30	
32A	2ENU32	
40A	2ENU40	
50A	2ENU50	
60A	2ENU60	
63A	2ENU63	

Two Pole

Standard Pack: 6

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2EU03	
0.5A	2EU05	
0.75A	2EU075	
0.8A	NA	
1.0A	2EU1	
1.6A	2EU1.6	
2.0A	2EU2	
2.5A	2EU2.5	
3.0A	2EU3	
3.5A	2EU3.5	
4.0A	2EU4	
5.0A	2EU5	
6.0A	2EU6	
8.0A	2EU8	
10A	2EU10	
12A	2EU12	
12.5A	2EU125	
13A	2EU13	
15A	2EU15	
16A	2EU16	
20A	2EU20	
25A	2EU25	
30A	2EU30	
32A	2EU32	
40A	2EU40	
50A	2EU50	
60A	2EU60	
63A	2EU63	

Three Pole

Standard Pack: 4

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	3EU03	
0.5A	3EU05	
0.75A	3EU075	
0.8A	NA	
1.0A	3EU1	
1.6A	3EU1.6	
2.0A	3EU2	
2.5A	3EU2.5	
3.0A	3EU3	
3.5A	3EU3.5	
4.0A	3EU4	
5.0A	3EU5	
6.0A	3EU6	
8.0A	3EU8	
10A	3EU10	
12A	3EU12	
12.5A	3EU125	
13A	3EU13	
15A	3EU15	
16A	3EU16	
20A	3EU20	
25A	3EU25	
30A	3EU30	
32A	3EU32	
40A	3EU40	
50A	3EU50	
60A	3EU60	
63A	3EU63	

For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1BR20** instead of *1BU20*.

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
1.68kg (3.7 lb.)
40A - 63A
1.92kg (4.23 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	1GU03	
0.5A	1GU05	
0.75A	NA	
0.8A	1GU08	
1.0A	1GU1	
1.6A	1GU1.6	
2.0A	1GU2	
2.5A	1GU2.5	
3.0A	1GU3	
3.5A	1GU3.5	
4.0A	1GU4	
5.0A	1GU5	
6.0A	1GU6	
8.0A	1GU8	
10A	1GU10	
12A	1GU12	
12.5A	1GU125	
13A	1GU13	
15A	1GU15	
16A	1GU16	
20A	1GU20	
25A	1GU25	
30A	1GU30	
32A	1GU32	
40A	1GU40	
50A	1GU50	
60A	1GU60	
63A	1GU63	

One Pole plus neutral

Standard Pack: 6

Weight:
0.3A - 32A
1.56kg (3.44 lb.)
40A - 63A
1.74kg (3.84 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2GNU03	
0.5A	2GNU05	
0.75A	NA	
0.8A	2GNU08	
1.0A	2GNU1	
1.6A	2GNU1.6	
2.0A	2GNU2	
2.5A	2GNU2.5	
3.0A	2GNU3	
3.5A	2GNU3.5	
4.0A	2GNU4	
5.0A	2GNU5	
6.0A	2GNU6	
8.0A	2GNU8	
10A	2GNU10	
12A	2GNU12	
12.5A	2GNU125	
13A	2GNU13	
15A	2GNU15	
16A	2GNU16	
20A	2GNU20	
25A	2GNU25	
30A	2GNU30	
32A	2GNU32	
40A	2GNU40	
50A	2GNU50	
60A	2GNU60	
63A	2GNU63	

Two Pole

Standard Pack: 6

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2GU03	
0.5A	2GU05	
0.75A	NA	
0.8A	2GU08	
1.0A	2GU1	
1.6A	2GU1.6	
2.0A	2GU2	
2.5A	2GU2.5	
3.0A	2GU3	
3.5A	2GU3.5	
4.0A	2GU4	
5.0A	2GU5	
6.0A	2GU6	
8.0A	2GU8	
10A	2GU10	
12A	2GU12	
12.5A	2GU125	
13A	2GU13	
15A	2GU15	
16A	2GU16	
20A	2GU20	
25A	2GU25	
30A	2GU30	
32A	2GU32	
40A	2GU40	
50A	2GU50	
60A	2GU60	
63A	2GU63	

Three Pole

Standard Pack: 4

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	3GU03	
0.5A	3GU05	
0.75A	NA	
0.8A	3GU08	
1.0A	3GU1	
1.6A	3GU1.6	
2.0A	3GU2	
2.5A	3GU2.5	
3.0A	3GU3	
3.5A	3GU3.5	
4.0A	3GU4	
5.0A	3GU5	
6.0A	3GU6	
8.0A	3GU8	
10A	3GU10	
12A	3GU12	
12.5A	3GU125	
13A	3GU13	
15A	3GU15	
16A	3GU16	
20A	3GU20	
25A	3GU25	
30A	3GU30	
32A	3GU32	
40A	3GU40	
50A	3GU50	
60A	3GU60	
63A	3GU63	

For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1BR20** instead of *1BU20*.

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
1.68kg (3.7 lb.)
40A - 63A
1.92kg (4.23 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	1ZU03	
0.5A	1ZU05	
0.75A	1ZU075	
0.8A	NA	
1.0A	1ZU1	
1.6A	1ZU1.6	
2.0A	1ZU2	
2.5A	1ZU2.5	
3.0A	1ZU3	
3.5A	1ZU3.5	
4.0A	1ZU4	
5.0A	1ZU5	
6.0A	1ZU6	
8.0A	1ZU8	
10A	1ZU10	
12A	1ZU12	
12.5A	1ZU125	
13A	1ZU13	
15A	1ZU15	
16A	1ZU16	
20A	1ZU20	
25A	1ZU25	
30A	1ZU30	
32A	1ZU32	
40A	1ZU40	*
50A	1ZU50	*

One Pole plus neutral

Standard Pack: 6

Weight:
0.3A - 32A
1.56kg (3.44 lb.)
40A - 63A
1.74kg (3.84 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2ZNU03	
0.5A	2ZNU05	
0.75A	2ZNU075	
0.8A	NA	
1.0A	2ZNU1	
1.6A	2ZNU1.6	
2.0A	2ZNU2	
2.5A	2ZNU2.5	
3.0A	2ZNU3	
3.5A	2ZNU3.5	
4.0A	2ZNU4	
5.0A	2ZNU5	
6.0A	2ZNU6	
8.0A	2ZNU8	
10A	2ZNU10	
12A	2ZNU12	
12.5A	2ZNU125	
13A	2ZNU13	
15A	2ZNU15	
16A	2ZNU16	
20A	2ZNU20	
25A	2ZNU25	
30A	2ZNU30	
32A	2ZNU32	
40A	2ZNU40	*
50A	2ZNU50	*

Two Pole

Standard Pack: 6

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

Rated Current	Type/ Cat. No.	Approvals
0.3A	2ZU03	
0.5A	2ZU05	
0.75A	2ZU075	
0.8A	NA	
1.0A	2ZU1	
1.6A	2ZU1.6	
2.0A	2ZU2	
2.5A	2ZU2.5	
3.0A	2ZU3	
3.5A	2ZU3.5	
4.0A	2ZU4	
5.0A	2ZU5	
6.0A	2ZU6	
8.0A	2ZU8	
10A	2ZU10	
12A	2ZU12	
12.5A	2ZU125	
13A	2ZU13	
15A	2ZU15	
16A	2ZU16	
20A	2ZU20	
25A	2ZU25	
30A	2ZU30	
32A	2ZU32	
40A	2ZU40	*
50A	2ZU50	*

Three Pole

Standard Pack: 4

Weight:
0.3A - 63A
1.68kg (3.7 lb.)

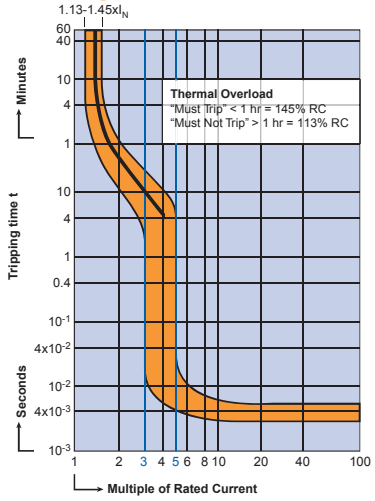
Rated Current	Type/ Cat. No.	Approvals
0.3A	3ZU03	
0.5A	3ZU05	
0.75A	3ZU075	
0.8A	NA	
1.0A	3ZU1	
1.6A	3ZU1.6	
2.0A	3ZU2	
2.5A	3ZU2.5	
3.0A	3ZU3	
3.5A	3ZU3.5	
4.0A	3ZU4	
5.0A	3ZU5	
6.0A	3ZU6	
8.0A	3ZU8	
10A	3ZU10	
12A	3ZU12	
12.5A	3ZU125	
13A	3ZU13	
15A	3ZU15	
16A	3ZU16	
20A	3ZU20	
25A	3ZU25	
30A	3ZU30	
32A	3ZU32	
40A	3ZU40	*
50A	3ZU50	*

For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1BR20** instead of *1BU20*.

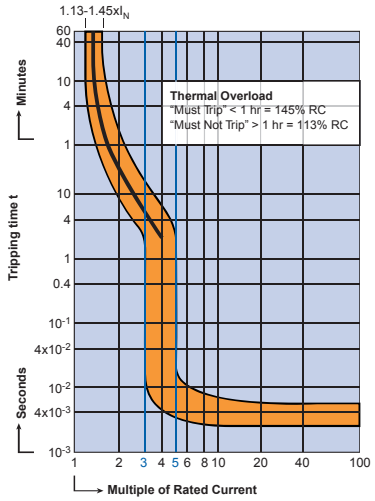
V-EA Trip Curves

B Trip Curve

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



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

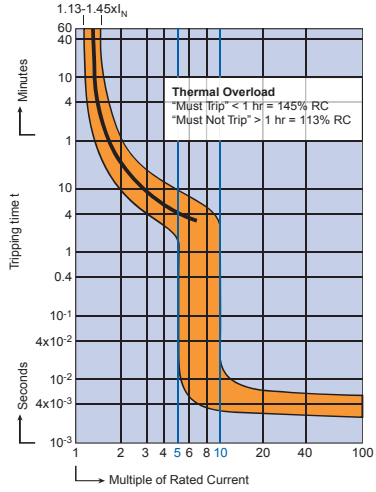


"B" Magnetic Trip Parameters
Rated current 1.0A to 63A.

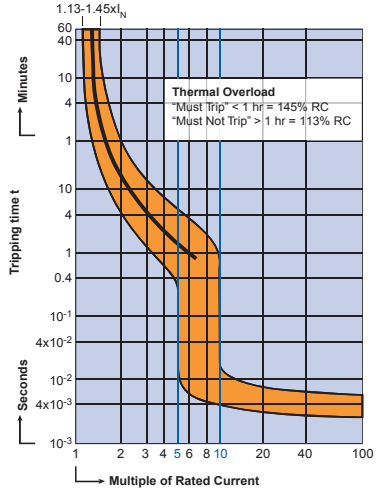
1. Hold for a minimum of 100ms at surge of 3 times rated current.
2. Trip in under 100ms at 5 times rated current.

C Trip Curve

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



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

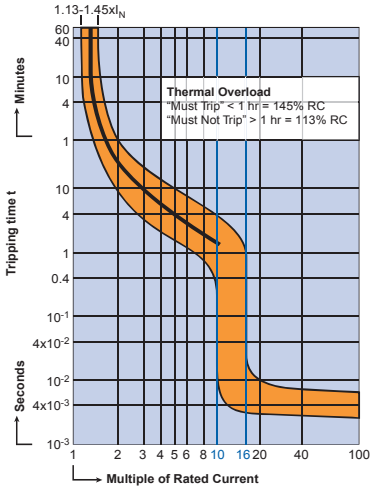


"C" Magnetic Trip Parameters
Rated current 0.3A to 63A.

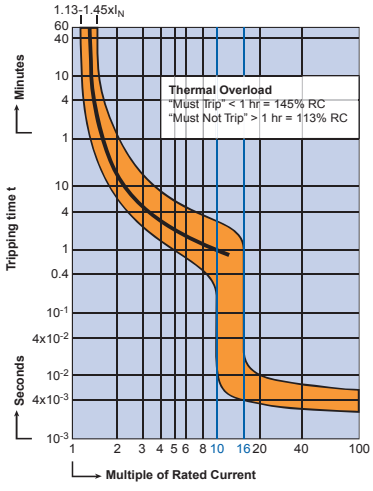
1. Hold for a minimum of 100ms at surge of 5 times rated current.
2. Trip in under 100ms at 10 times rated current.

D Trip Curve

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



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



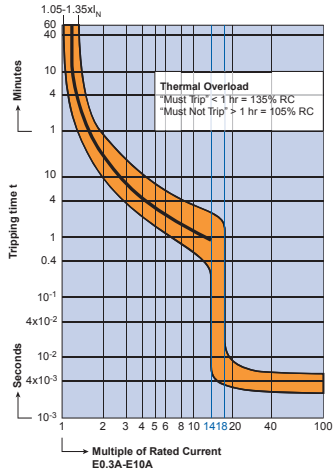
"D" Magnetic Trip Parameters
Rated current 0.3A to 63A.

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

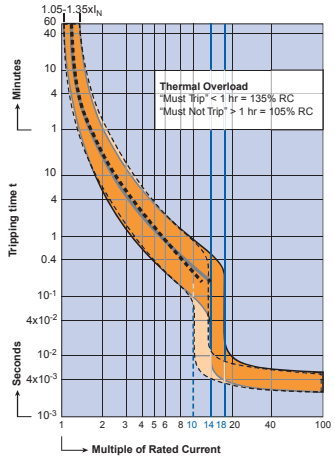
V-EA Trip Curves

E Trip Curve

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



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

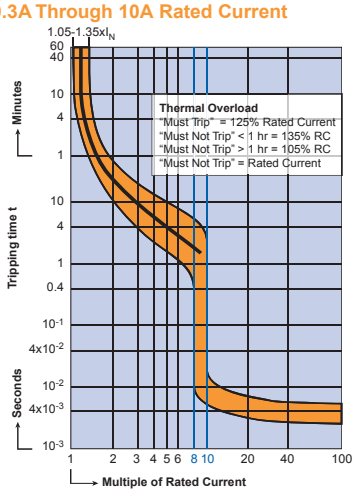


"E" Magnetic Trip Parameters
Rated Current, 0.3A to 50A (——), 60/63A (- - - - -).

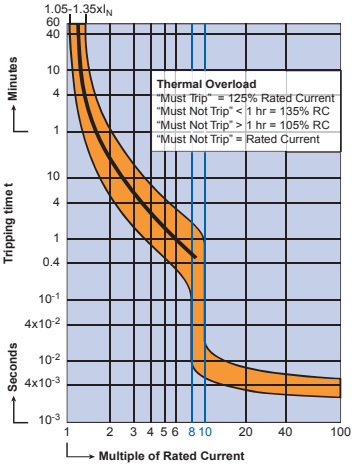
Magnetic Trip:
1. Hold for a minimum of 100ms at surge of 14 times (60A, 10 times) rated current.
2. Trip in under 100ms at 18 times (60A, 14 times) rated current.

G Trip Curve

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



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

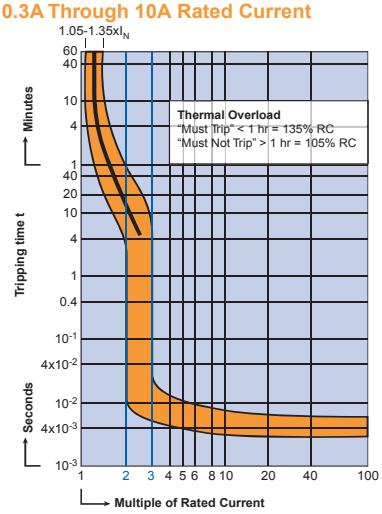


"G" Magnetic Trip Parameters
Rated Current, 0.3A to 63A.

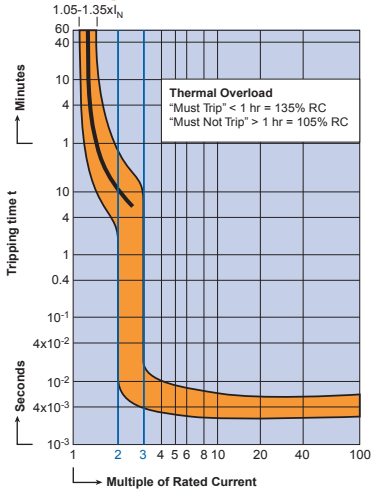
Magnetic Trip:
1. Hold for a minimum of 100ms at surge of 8 times rated current.
2. Trip in under 100ms at 10 times rated current.

Z Trip Curve

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



V-EA-Z Trip
12.5A Through 32A Rated Current



"Z" Trip Parameters
Rated Current, 0.3A to 32A.

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 & HORSEPOWER RATING 1 PHASE

			FLA & LRC CONVERTED TO TABLE HORSEPOWER (SEE NOTE #2) USE FLA & LRC RATINGS WHERE NO HP RATING IS GIVEN					
			NOMINAL CIRCUIT VOLTAGE					
V-EA RATED CURRENT (SEE NOTE #1)	MOTOR NAMEPLATE FLA RATING	MOTOR NAMEPLATE STARTING/ LRC RATING	110-120 VAC	200 VAC	208 VAC	220-240 VAC	265 VAC	277 VAC
0.30A 0.50A 0.75A	0.30A 0.50A 0.75A	1.80A 3.00A 4.35A						
0.80A 1.0A 1.6A	0.80A 1.0A 1.6A	4.8A 6.0A 9.6A						
2.0A 2.5A 3.0A	2.0A 2.5A 3.0A	12.0A 15.0A 18.0A		1/6hp 1/6hp	1/6hp 1/6hp	1/6hp 1/6hp 1/4hp	1/6hp 1/6hp 1/4hp	1/6hp 1/4hp 1/3hp
3.5A 4.0A	3.5A 4.0A	21.0A 24.0A		1/4hp 1/4hp	1/4hp 1/3hp	1/4hp 1/3hp	1/3hp 1/3hp	1/3hp 1/3hp
5.0A 6.0A 8.0A	5.0A 6.0A 8.0A	30.0A 36.0A 48.0A	1/6hp 1/4hp 1/3hp	1/3hp 1/2hp 3/4hp	1/2hp 1/2hp 3/4hp	1/2hp 1/2hp 1hp	1/2hp 3/4hp 1hp	1/2hp 3/4hp 1hp
10.0A	10.0A	60.0A	1/2hp	1hp	1hp	1 1/2hp	1 1/2hp	2hp
12.0A 12.5A	12.0A 12.5A	72.0A 75.0A	1/2hp 1/2hp	1 1/2hp 1 1/2hp	1 1/2hp 1 1/2hp	2hp 2hp	2hp 2hp	2hp 2hp
13.0A 15.0A 16.0A	13.0A 15.0A 16.0A	78.0A 90.0A 96.0A	1/2hp 3/4hp 1hp	1 1/2hp 2hp 2hp	1 1/2hp 2hp 2hp	2hp 2hp 2hp	2hp 3hp 3hp	2hp 3hp 3hp
20.0A 25.0A	20.0A 25.0A	120.0A 150.0A	1 1/2hp 2hp	3hp 3hp	3hp 3hp	3hp 3hp	3hp 5hp	3hp 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 60.0A	50.0A 60.0A	300.0A 360.0A	3hp 5hp	7 1/2hp 10hp	10hp 10hp	10hp 10hp	10hp 10hp	10hp 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® 2005 Tables 430-248 and 430-251(A).

Table HP 2: AMPERE RATING & HORSEPOWER RATING 3 PHASE & 2 PHASE - 4 WIRE

			FLA & LRC RATINGS CONVERTED TO TABLE HORSEPOWER (SEE NOTE #2) USE FLA & LRC RATINGS WHERE NO HP IS LISTED									
V-EA RATED CURRENT (SEE NOTE #1)	MOTOR NAMEPLATE FLA RATING	MOTOR NAMEPLATE STARTING/ LRC RATING	110-120 VAC		200 VAC		208 VAC		220-240 VAC (SEE NOTE #3)		440-480 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 0.50A 0.75A	0.30A 0.50A 0.75A	3.0A 5.0A 7.5A										
0.80A 1.0A 1.6A	0.80A 1.0A 1.6A	8.0A 10.0A 16.0A									1/2hp	1/2hp
2.0A 2.5A 3.0A	2.0A 2.5A 3.0A	20.0A 25.0A 30.0A			1/2hp 1/2hp	1/2hp 1/2hp	1/2hp 1/2hp	1/2hp 1/2hp	1/2hp 1/2hp 1/2hp	1/2hp 1/2hp 1/2hp	3/4hp 1hp 1 1/2hp	3/4hp 1hp 1 1/2hp
3.5A 4.0A	3.5A 4.0A	35.0A 40.0A			1/2hp 3/4hp	1/2hp 3/4hp	3/4hp 3/4hp	3/4hp 3/4hp	3/4hp 3/4hp	3/4hp 3/4hp	2hp 2hp	2hp 2hp
5.0A 6.0A 8.0A	5.0A 6.0A 8.0A	42.0A 50.4A 67.2A	1/2hp 1/2hp 3/4hp	1/2hp 1/2hp 3/4hp	1hp 1hp 2hp	1hp 1hp 2hp	1hp 1hp 2hp	1hp 1hp 2hp	1hp 1 1/2hp 2hp	1hp 1 1/2hp 2hp	3hp 3hp 5hp	3hp 3hp 5hp
10.0A	10.0A	84.0A	1hp	1hp	2hp	2hp	2hp	2hp	3hp	3hp	5hp	5hp
12.0A 12.5A	12.0A 12.5A	100.8A 105.0A	1 1/2hp 1 1/2hp	1 1/2hp 1 1/2hp	3hp 3hp	3hp 3hp	3hp 3hp	3hp 3hp	3hp 3hp	3hp 3hp	7 1/2hp 7 1/2hp	7 1/2hp 7 1/2hp
13.0A 15.0A 16.0A	13.0A 15.0A 16.0A	109.2A 126.0A 134.4A	1 1/2hp 2hp 2hp	1 1/2hp 2hp 2hp	3hp 3hp 3hp	3hp 3hp 3hp	3hp 3hp 3hp	3hp 3hp 3hp	3hp 3hp 5hp	3hp 3hp 5hp	7 1/2hp 10hp 10hp	7 1/2hp 10hp 10hp
20.0A 25.0A	20.0A 25.0A	168.0A 210.0A	3hp 3hp	3hp 3hp	5hp 5hp	5hp 5hp	5hp 7 1/2hp	5hp 7 1/2hp	5hp 7 1/2hp	5hp 7 1/2hp	10hp 15hp	10hp 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 60.0A	50.0A 60.0A	282.5A 339.0A	7 1/2hp 10hp	7 1/2hp 10hp	15hp 15hp	10hp 10hp	15hp 20hp	10hp 10hp	15hp 20hp	10hp 15hp	30hp 40hp	25hp 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® 2005 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:

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

$P_{LOSS\ P/P} = I^2_{OPERATING} \times R_{TABLE}$

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

V-EA and MA Circuit Breaker Accessories

Accessories can be factory or field mounted on V-EA and MA manual motor controllers for enhanced control and monitoring capabilities. Field mounting kits include all necessary parts and instructions. Accessories can be gang mounted on a single controller (the Auxiliary Switch in the outside position). The mounting arrangement links the internal latch-pins for the tripping mechanisms, ensuring simultaneous trips. Handles are linked to simplify manual resetting.

c UL us CE

UL508 listed
E137938

FA - Shunt Trip

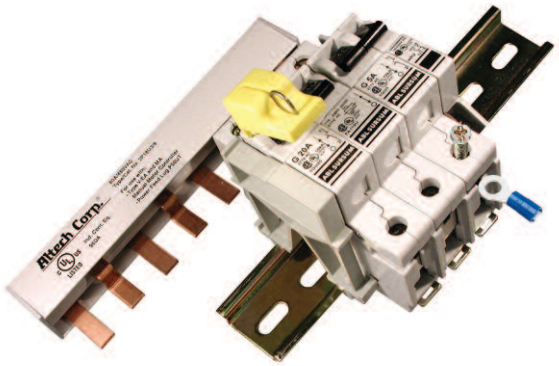
Type/ Cat. No.	Trip/Coil Voltage AC or DC	Max. Coil Current	Approvals
FA12U	12V	1.3A	UL SP
FA24U	24V	0.6A	UL SP
FA48U	48-72V	0.2A	UL SP
FA110U	110V/220V	0.25A/0.5A	UL SP

Std.Pk.: 1
Unit Weight: 120 grams (0.27 lb.)
Width: 17.5mm (.689in.)

UA - Undervoltage Trip

Type/ Cat. No.	Line Voltage 60Hz*
UA120	120VAC
UA240	240VAC
UA277	277VAC
UA415	415VAC
UA480	480VAC

Std.Pk.: 1
Unit Weight: 70 grams (0.16 lb.)
Width: 17.5mm (.689in.)



H - Auxiliary Switch

Type/ Cat. No.	Contact Rating	Wire Size	Approvals	For Use With:
H11U	10A / 220V AC 3A / 110V DC or pulsed 1A / 220V DC or pulsed	4mm² (12 AWG)	UL SP	V-EA, MA

Std. Pk.: 1
Unit Weight: 45 grams (0.12 lb.)
Width: 9mm (.354in.)

Lock-out ** Cat. No. EASS

Prevent inadvertent resetting of the V-EA or MA during maintenance.
Fits 1/4" pad lock.

Cooling Spacer Cat. No. 15.960

* Please consult Altech for your 50Hz application needs.

** V-EA and MA can also be locked in the on and off position by simply using a common lead or meter seal, which gets fed through the hole in the handle and a corresponding hole in the housing.

TEMPERATURE CORRECTION CURVE

Ambient Temperature and Adjacent Mounting/Loading Adjustment

(V-EA/MA Ambient Temperature - 25°C to 55°C, Storage Temperature -40°C to 70°C)