altechcorp.com

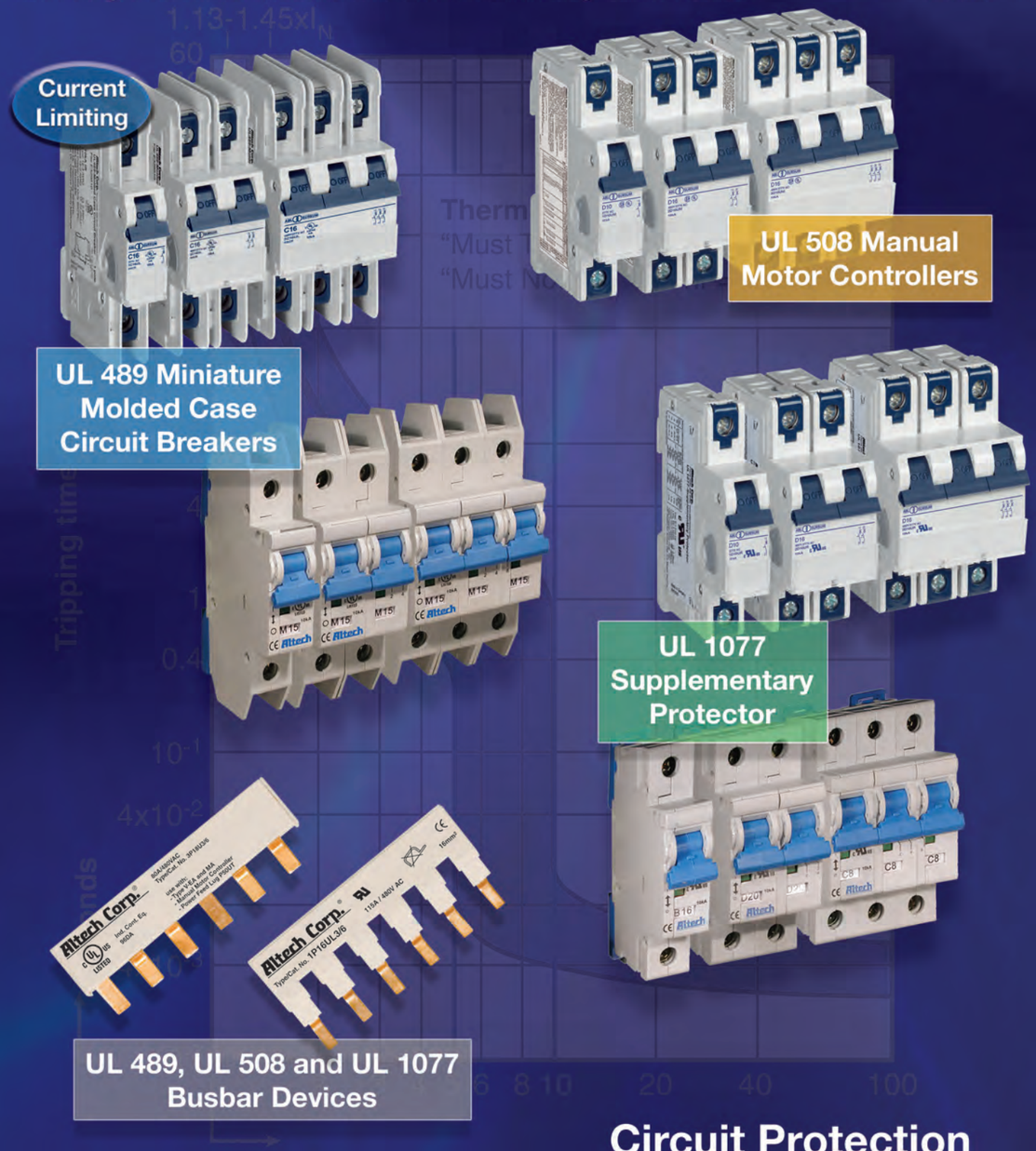
Altech Corporation
35 Royal Road
Flemington, NJ 08822-6000
Phone (908) 806-9400
Fax (908) 806-9490
www.altechcorp.com

Altech Corp.® 345-042016-5M

Altech Corp.®

Serving the Automation & Control Industry since 1984

Certified System™ ISO 9001 QMI-SAI Global



Circuit Protection Products

Altech Corp.®

Since 1984, Altech Corporation has grown to become a leading supplier of automation and industrial control components. Headquartered in Flemington, NJ, Altech has an experienced staff of engineering, manufacturing and sales personnel to provide the highest quality products with superior service. This is the Altech Commitment!

With experienced Product Engineers and Customer Service personnel, Altech provides solutions to your most pressing application challenges. All with one thought in mind - ***to ensure that we solve your problem the first time!***

Quality Commitment

Altech's control components meet diverse national and international standards such as UL, NEC, CSA, IEC, VDE and more. Altech provides superior customer service and delivery through Total Quality Management and Continuous Process Improvement. Altech is ISO 9001 approved. We perform these services with honesty and integrity and are committed to achieve these goals.

Table of Contents

Altech Corp.®

The Altech Selection of Breakers

The Advantages

In today's very competitive marketplace you need reliability, so you need to use circuit breakers that are high quality and technically correct for your application. Altech is a US leader in DIN rail mounted breakers with ratings up to 63A. Only Altech offers DIN rail mounted breakers that meet UL489, UL508 or UL1077 approvals with a short circuit interrupt capacity of up to 10kA. No other manufacturer offers this complete line. This assures you the right product for your application requirements.

UL (AC), DL (DC), V-EA and UR Series Advantages

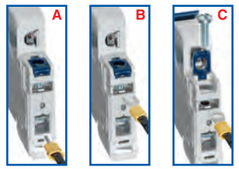
1 Hinged terminal cover design allows easy access to terminal screws with a broad range of screwdrivers!

2 Individual Part Number is shown on each circuit breaker and is legible when installed in the panel.

3 A clear-hinged cover protects designated marking area.

4 DIN Clip can be released when necessary.

5 Flexible replaceable terminal barriers reduce the possibility of breakage if accidentally dropped!



Unique Standard Dual Connection Terminals

A Box terminal for solid conductors or flexible conductors with or without cable lug.
B Screw terminal for forked cable lug.
C Screw terminal for ring tongue connection.

L and R Series Advantages

1 Strong thermoplast housing.

2 Strong terminal barriers.

3 Spring action DIN Rail clips for both top and bottom.

4 Removable circuit identification tag.

5 Indicator window.

ON

OFF

6 Trip curve (D) and amperage (15A) window display.

D15

UL 489

UL (AC), DL (DC) Series UL489 Miniature Molded Case Circuit Breakers

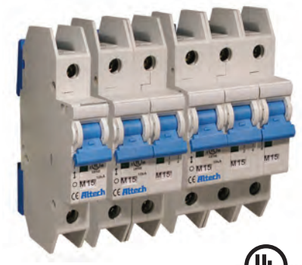
LISTED
C.B.
E329510

IEC 60947-2
Short Circuit Tested

ACCESSORIES

- Auxiliary Contact, Alarm Switch
- Shunt Trip
- Neutral Pole
- Undervoltage Trip (not UL)
- Touch Protection Caps
- Cooling Spacer
- Mounting Screw 34mm
- Lock-out Adapter

L Series, AC or DC UL489 Miniature Molded Case Circuit Breakers



LISTED
C.B.
E305318

ACCESSORIES

- Auxiliary Contact
- Shunt Trip
- Neutral Pole
- Undervoltage Trip
- Front Mounting Kit with hardware
- Lock-out Adapter

UL 508

UM (V-EA) Series UL508 Manual Motor Controllers "Suitable as Motor Disconnect"

UL508 Listed
E137938

up to 25A
B,C,D curve

up to 25A
B,C,D curve

ACCESSORIES

- Auxiliary Contact, Alarm Switch
- Shunt Trip
- Undervoltage Trip (not UL)
- Neutral Pole
- Touch Protection Caps
- Cooling Spacer
- Mounting Screw 34mm
- Lock-out Adapter**

UL 1077

UR Series UL1077 Recognized Supplementary Protector

E137915

ACCESSORIES

- Auxiliary Contact, Alarm Switch
- Shunt Trip
- Undervoltage Trip (not UL)
- Neutral Pole
- Touch Protection Caps
- Cooling Spacer
- Mounting Screw 34mm
- Lock-out Adapter

R Series UL1077 Recognized Supplementary Protector

E301611

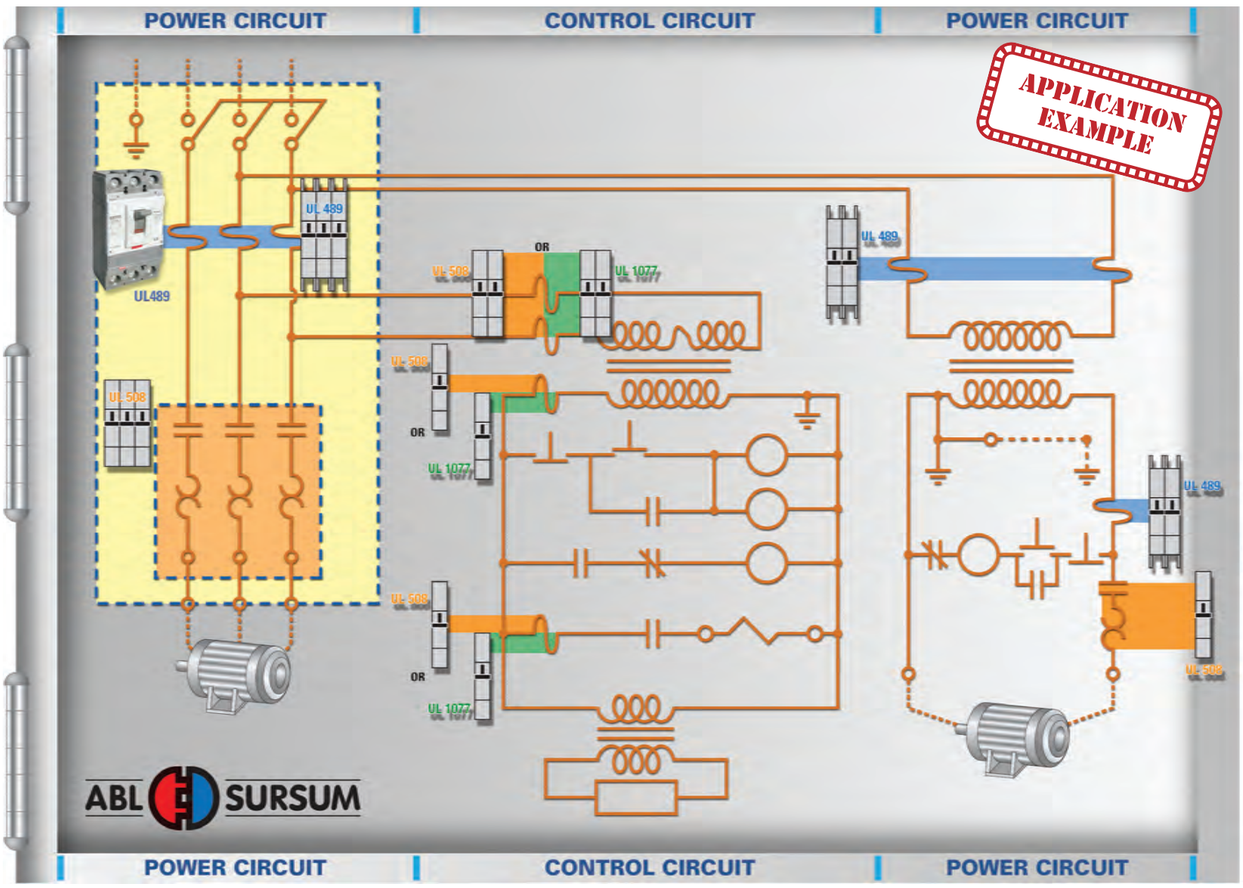
ACCESSORIES

- Auxiliary Contact
- Shunt Trip and Undervoltage Trip (not UL)
- Neutral Pole
- Lock-out Adapter

2 series, 5 lines, 3 UL approvals, AC and DC models and the most trip curves in the industry.

Altech has the broadest offering in the industry.

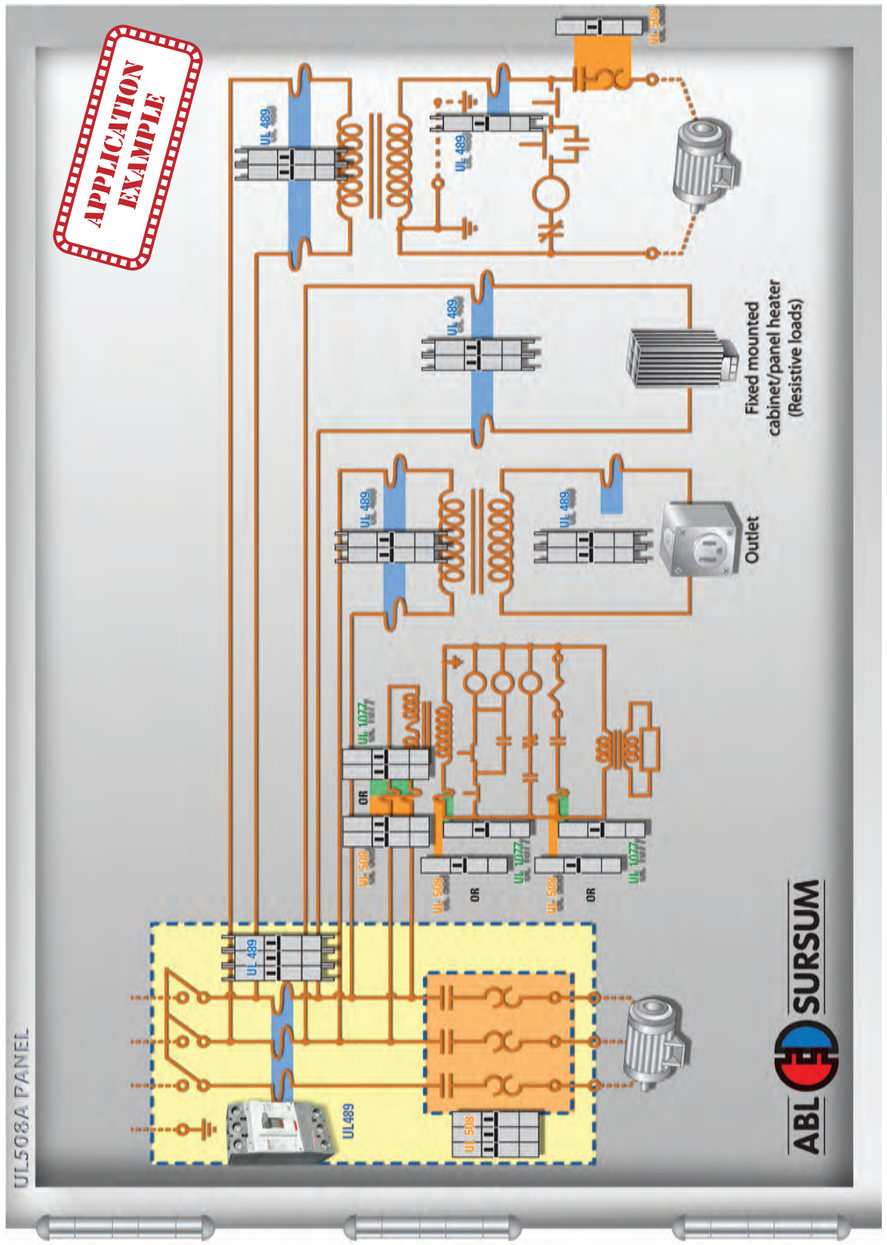
Typical UL508A Panel



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

Variation of UL508A Panel

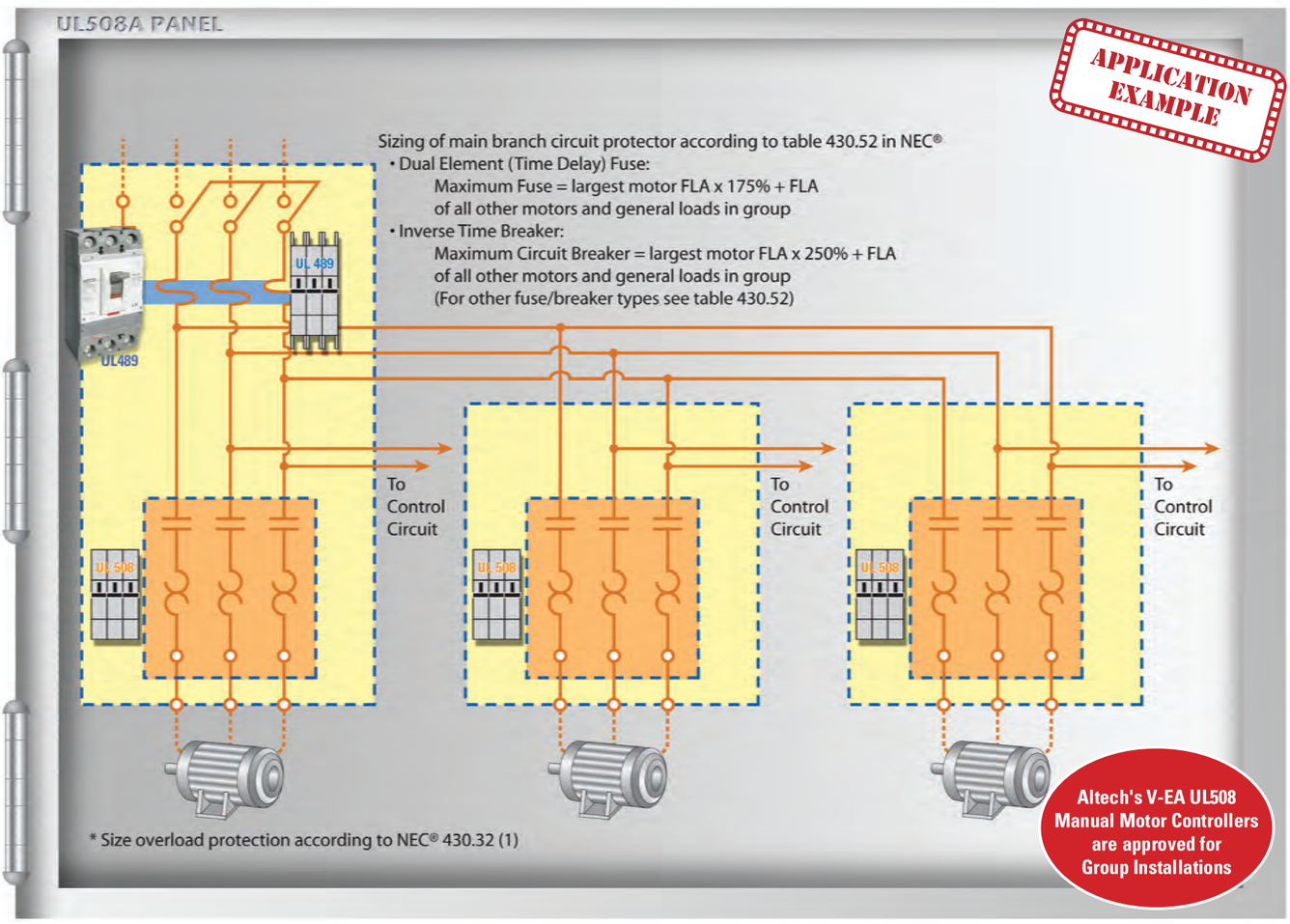
(see NEC® article 430.53 for reference and more information).



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

Typical Motor Group Installation

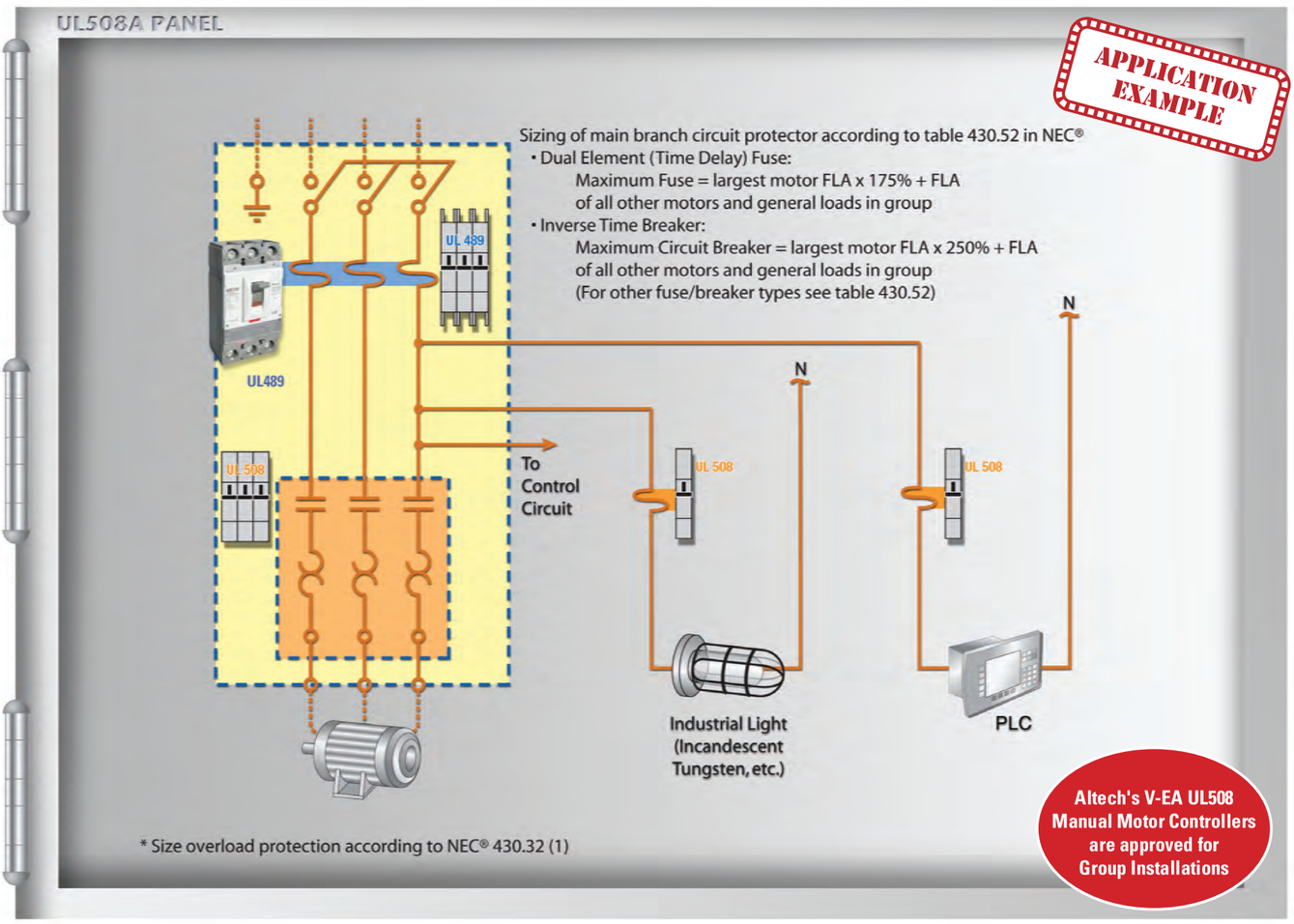
(see NEC® article 430.53 for reference and more information).



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

Typical Motor Group Installation

(see NEC® article 430.53 for reference and more information).



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

UL(AC), DL(DC) Series

UL489 Miniature Molded Case Circuit Breakers

- Available in AC and DC models
- DIN Rail Mounted
- 17.5mm width
- Thermal Magnetic
- 240V, 480Y/277V AC, 50/60Hz
- 125V DC (1 pole); 250V DC (2 pole)
- 10kA Short Circuit Interrupting Capacity
- HACR Type 40°C
- Line/Load reversible

E329510

IEC 60947-2
Short Circuit Tested

Current/ Voltage Rating	
UL-Series	0.3 - 63A/ 240V AC, 0.3-32A/ 480Y/277V AC* (48V DC / pole pending)
DL-Series	0.3 - 63A/ 125/ 250V DC
Calibration Temperature	40°C (104°F)
Ambient Temperature	-25°C to +55°C (-13°F to 131°F)
Storage Temperature	-40°C to +70°C (-40°F to 158°F)
Terminal Size Acceptability	Top: 18-3 AWG; Bottom: 18-2 AWG
Terminal Torque (min/max)	2 Nm (17.7 lb.in.) / 2.5Nm (22.2 lb.in)
Electrical Life	6,000 switching cycles ON/ OFF
Mechanical Life	10,000 switching cycles ON/ OFF
Vibration Resistance	> 15g according to DIN EN 60069-2-59 during a load with $I_1 = 1.05 \times I_N$
Resistance to mechanical shocks	25g @ 11ms
Degree of protection acc. IEC/EN 60529	IP20
Mounting Orientation	In any plane

**One device, dual voltage ratings.*

Short Circuit Interrupting Capacity
According to UL 489

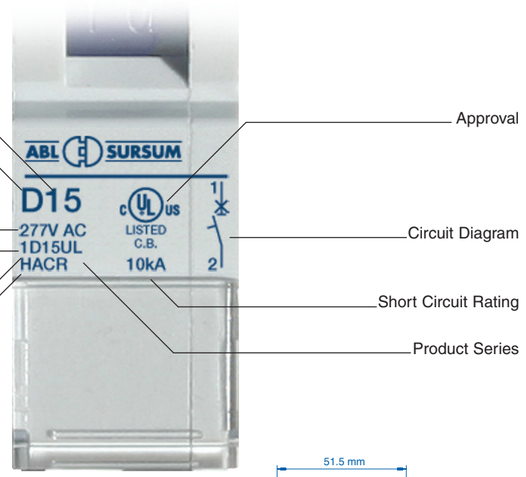
Poles	Type	0.3-32A	40-63A
1	**AC**	10kA @ 120, 240, 277V	10kA @ 120, 240V
2-3	**AC**	10kA @ 120, 240, 480Y/277V	10kA @ 120 240V

Poles	Type	0.3-32A	40-63A
1	**DC**	10kA @ 125V	10kA @ 125V
2	**DC**	10kA @ 250V	10kA @ 250V

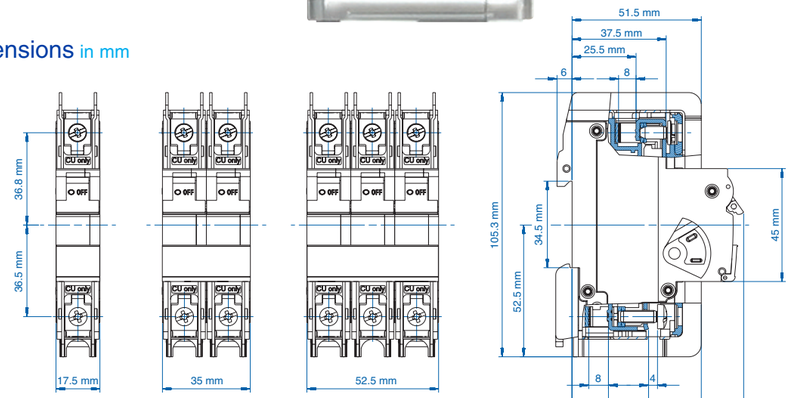
Short Circuit Interrupting Capacity
According to IEC 60947-2, DIN EN 60947-2

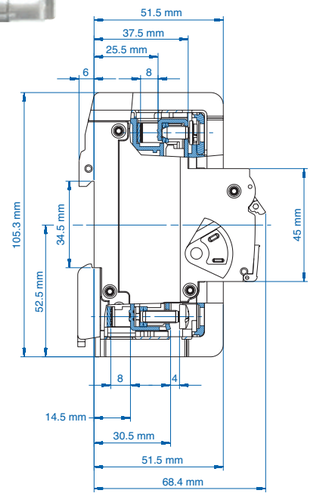
Poles	Type	0.3-32	40-63A
1	AC	15kA@240V	15kA@240V
2-3	AC	15kA@415V	10kA@415V

Marking Details



Dimensions in mm





Trip-Characteristics*				Applications									
Characteristic Trip Boundaries				Lighting Wiring Protection Control Circuits	Business Equipment Appliances	Transformers	Power Supplies Heaters	Motors		Reactive Load	Telecommu-nications/ Computer Equipment	Power Supplies
Thermal Trip		Magnetic Trip						Low Inrush	High Inrush			
Must not Trip>100ms	Must Trip <1hr	Must not Trip>100ms	Must Trip at 100ms									
C-Characteristics AC												
1.05xRC	1.35xRC	5xRC	10xRC									
C-Characteristics DC												
1.05xRC	1.35xRC	7xRC	14xRC									
D-Characteristics AC												
1.05xRC	1.35xRC	10xRC	16xRC									
D-Characteristics DC												
1.05xRC	1.35xRC	14xRC	22.4xRC									

**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 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 for his specific application.

UL - Series

C-Trip Characteristic

Application Examples:

Low inrush motors, resistive loads, wiring protection, receptacles, lighting, and control circuit applications. Relatively short thermal trip delay and medium magnetic trip point.

c UL us LISTED C.B.
E329510

One Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**1C03UL**	277V AC
0.5A	**1C05UL**	277V AC
1.0A	**1C1UL**	277V AC
1.6A	**1C1.6UL**	277V AC
2.0A	**1C2UL**	277V AC
3.0A	**1C3UL**	277V AC
4.0A	**1C4UL**	277V AC
5.0A	**1C5UL**	277V AC
6.0A	**1C6UL**	277V AC
8.0A	**1C8UL**	277V AC
10A	**1C10UL**	277V AC
12A	**1C12UL**	277V AC
13A	**1C13UL**	277V AC
15A	**1C15UL**	277V AC
16A	**1C16UL**	277V AC
20A	**1C20UL**	277V AC
25A	**1C25UL**	277V AC
30A	**1C30UL**	277V AC
32A	**1C32UL**	277V AC
40A	**1C40UL**	240V AC
50A	**1C50UL**	240V AC
60A	**1C60UL**	240V AC
63A	**1C63UL**	240V AC

Standard Pack: 12

Weight:
0.3-32A:
1.74kg (3.83lb.)

40-63A:
1.98kg (4.37lb.)

Three Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**3C03UL**	480Y/277V AC
0.5A	**3C05UL**	480Y/277V AC
1.0A	**3C1UL**	480Y/277V AC
1.6A	**3C1.6UL**	480Y/277V AC
2.0A	**3C2UL**	480Y/277V AC
3.0A	**3C3UL**	480Y/277V AC
4.0A	**3C4UL**	480Y/277V AC
5.0A	**3C5UL**	480Y/277V AC
6.0A	**3C6UL**	480Y/277V AC
8.0A	**3C8UL**	480Y/277V AC
10A	**3C10UL**	480Y/277V AC
12A	**3C12UL**	480Y/277V AC
13A	**3C13UL**	480Y/277V AC
15A	**3C15UL**	480Y/277V AC
16A	**3C16UL**	480Y/277V AC
20A	**3C20UL**	480Y/277V AC
25A	**3C25UL**	480Y/277V AC
30A	**3C30UL**	480Y/277V AC
32A	**3C32UL**	480Y/277V AC
40A	**3C40UL**	240V AC
50A	**3C50UL**	240V AC
60A	**3C60UL**	240V AC
63A	**3C63UL**	240V AC

Standard Pack: 4

Weight:
0.3-32A:
1.74kg (3.83lb.)

40-63A:
1.98kg (4.37lb.)

Two Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**2C03UL**	480Y/277V AC
0.5A	**2C05UL**	480Y/277V AC
1.0A	**2C1UL**	480Y/277V AC
1.6A	**2C1.6UL**	480Y/277V AC
2.0A	**2C2UL**	480Y/277V AC
3.0A	**2C3UL**	480Y/277V AC
4.0A	**2C4UL**	480Y/277V AC
5.0A	**2C5UL**	480Y/277V AC
6.0A	**2C6UL**	480Y/277V AC
8.0A	**2C8UL**	480Y/277V AC
10A	**2C10UL**	480Y/277V AC
12A	**2C12UL**	480Y/277V AC
13A	**2C13UL**	480Y/277V AC
15A	**2C15UL**	480Y/277V AC
16A	**2C16UL**	480Y/277V AC
20A	**2C20UL**	480Y/277V AC
25A	**2C25UL**	480Y/277V AC
30A	**2C30UL**	480Y/277V AC
32A	**2C32UL**	480Y/277V AC
40A	**2C40UL**	240V AC
50A	**2C50UL**	240V AC
60A	**2C60UL**	240V AC
63A	**2C63UL**	240V AC

Standard Pack: 6

Weight:
0.3-32A:
1.74kg (3.83lb.)

40-63A:
1.98kg (4.37lb.)

Add-on Neutral Pole

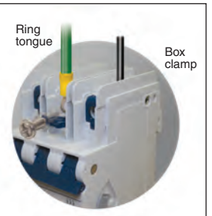
Rated Current	Type/ Cat. No.	Rated Voltage
0.3-32A	**N32UL**	480/277V AC
40-63A	**N63UL**	240V AC

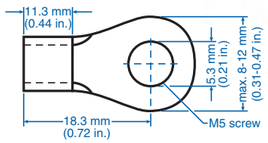
Standard Pack: 6

Weight:
0.99kg (2.18 lb.)

Standard Dual Connection Terminal

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





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

UL - Series

D-Trip Characteristic

c UL us LISTED C.B.

E329510

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:
0.3-32A:
1.74kg (3.83lb.)

40-63A:
1.98kg (4.37lb.)

Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**1D03UL**	277V AC
0.5A	**1D05UL**	277V AC
1.0A	**1D1UL**	277V AC
1.6A	**1D1.6UL**	277V AC
2.0A	**1D2UL**	277V AC
3.0A	**1D3UL**	277V AC
4.0A	**1D4UL**	277V AC
5.0A	**1D5UL**	277V AC
6.0A	**1D6UL**	277V AC
8.0A	**1D8UL**	277V AC
10A	**1D10UL**	277V AC
12A	**1D12UL**	277V AC
13A	**1D13UL**	277V AC
15A	**1D15UL**	277V AC
16A	**1D16UL**	277V AC
20A	**1D20UL**	277V AC
25A	**1D25UL**	277V AC
30A	**1D30UL**	277V AC
32A	**1D32UL**	277V AC
40A	**1D40UL**	240V AC
50A	**1D50UL**	240V AC
60A	**1D60UL**	240V AC
63A	**1D63UL**	240V AC

Three Pole

Standard Pack: 4

Weight:
0.3-32A:
1.74kg (3.83lb.)

40-63A:
1.98kg (4.37lb.)

Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**3D03UL**	480Y/277V AC
0.5A	**3D05UL**	480Y/277V AC
1.0A	**3D1UL**	480Y/277V AC
1.6A	**3D1.6UL**	480Y/277V AC
2.0A	**3D2UL**	480Y/277V AC
3.0A	**3D3UL**	480Y/277V AC
4.0A	**3D4UL**	480Y/277V AC
5.0A	**3D5UL**	480Y/277V AC
6.0A	**3D6UL**	480Y/277V AC
8.0A	**3D8UL**	480Y/277V AC
10A	**3D10UL**	480Y/277V AC
12A	**3D12UL**	480Y/277V AC
13A	**3D13UL**	480Y/277V AC
15A	**3D15UL**	480Y/277V AC
16A	**3D16UL**	480Y/277V AC
20A	**3D20UL**	480Y/277V AC
25A	**3D25UL**	480Y/277V AC
30A	**3D30UL**	480Y/277V AC
32A	**3D32UL**	480Y/277V AC
40A	**3D40UL**	240V AC
50A	**3D50UL**	240V AC
60A	**3D60UL**	240V AC
63A	**3D63UL**	240V AC

Two Pole

Standard Pack: 6

Weight:
0.3-32A:
1.74kg (3.83lb.)

40-63A:
1.98kg (4.37lb.)

Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**2D03UL**	480Y/277V AC
0.5A	**2D05UL**	480Y/277V AC
1.0A	**2D1UL**	480Y/277V AC
1.6A	**2D1.6UL**	480Y/277V AC
2.0A	**2D2UL**	480Y/277V AC
3.0A	**2D3UL**	480Y/277V AC
4.0A	**2D4UL**	480Y/277V AC
5.0A	**2D5UL**	480Y/277V AC
6.0A	**2D6UL**	480Y/277V AC
8.0A	**2D8UL**	480Y/277V AC
10A	**2D10UL**	480Y/277V AC
12A	**2D12UL**	480Y/277V AC
13A	**2D13UL**	480Y/277V AC
15A	**2D15UL**	480Y/277V AC
16A	**2D16UL**	480Y/277V AC
20A	**2D20UL**	480Y/277V AC
25A	**2D25UL**	480Y/277V AC
30A	**2D30UL**	480Y/277V AC
32A	**2D32UL**	480Y/277V AC
40A	**2D40UL**	240V AC
50A	**2D50UL**	240V AC
60A	**2D60UL**	240V AC
63A	**2D63UL**	240V AC

Add-on Neutral Pole

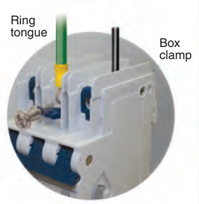
Rated Current	Type/ Cat. No.	Rated Voltage
0.3-32A	**N32UL**	480/277V AC
40-63A	**N63UL**	240V AC

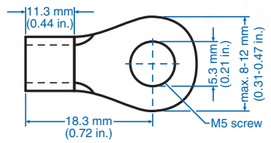
Standard Pack: 6

Weight:
0.99kg (2.18 lb.)

Standard Dual Connection Terminal

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





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

UL - Series
C-Trip (DC) Characteristic

Application Examples:

Telecommunication equipment,
computer equipment, uninterruptable power supplies.

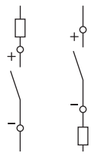
c UL us LISTED C.B.
E329510

CE

Standard Pack: 12

Weight:
0.3-32A:
1.86kg (4.1lb.)

40-63A:
2.10kg (4.6lb.)



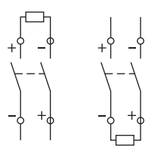
One Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**1C03DL**	125V DC
0.5A	**1C05DL**	125V DC
1.0A	**1C1DL**	125V DC
1.6A	**1C1.6DL**	125V DC
2.0A	**1C2DL**	125V DC
3.0A	**1C3DL**	125V DC
4.0A	**1C4DL**	125V DC
5.0A	**1C5DL**	125V DC
6.0A	**1C6DL**	125V DC
8.0A	**1C8DL**	125V DC
10A	**1C10DL**	125V DC
12A	**1C12DL**	125V DC
13A	**1C13DL**	125V DC
15A	**1C15DL**	125V DC
16A	**1C16DL**	125V DC
20A	**1C20DL**	125V DC
25A	**1C25DL**	125V DC
30A	**1C30DL**	125V DC
32A	**1C32DL**	125V DC
40A	**1C40DL**	125V DC
50A	**1C50DL**	125V DC
60A	**1C60DL**	125V DC
63A	**1C63DL**	125V DC

Standard Pack: 6

Weight:
0.3-32A:
1.86kg (4.1lb.)

40-63A:
2.10kg (4.6lb.)



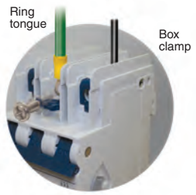
Two Pole

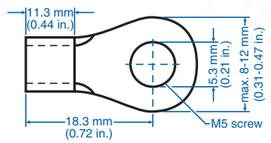
Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**2C03DL**	250V DC
0.5A	**2C05DL**	250V DC
1.0A	**2C1DL**	250V DC
1.6A	**2C1.6DL**	250V DC
2.0A	**2C2DL**	250V DC
3.0A	**2C3DL**	250V DC
4.0A	**2C4DL**	250V DC
5.0A	**2C5DL**	250V DC
6.0A	**2C6DL**	250V DC
8.0A	**2C8DL**	250V DC
10A	**2C10DL**	250V DC
12A	**2C12DL**	250V DC
13A	**2C13DL**	250V DC
15A	**2C15DL**	250V DC
16A	**2C16DL**	250V DC
20A	**2C20DL**	250V DC
25A	**2C25DL**	250V DC
30A	**2C30DL**	250V DC
32A	**2C32DL**	250V DC
40A	**2C40DL**	250V DC
50A	**2C50DL**	250V DC
60A	**2C60DL**	250V DC
63A	**2C63DL**	250V DC

Warning!
Correct polarity must be observed
when connecting the DC circuit breakers.

Standard Dual Connection Terminal

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





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

UL - Series
D-Trip (DC) Characteristic

Application Examples:

Telecommunication equipment,
computer equipment, uninterruptable power supplies.

c UL us LISTED C.B.
E329510

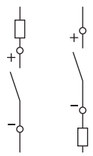
CE

One Pole

Standard Pack: 12

Weight:
0.3-32A:
1.86kg (4.1lb.)

40-63A:
2.10kg (4.6lb.)

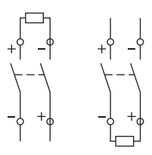


Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**1D03DL**	125V DC
0.5A	**1D05DL**	125V DC
1.0A	**1D1DL**	125V DC
1.6A	**1D1.6DL**	125V DC
2.0A	**1D2DL**	125V DC
3.0A	**1D3DL**	125V DC
4.0A	**1D4DL**	125V DC
5.0A	**1D5DL**	125V DC
6.0A	**1D6DL**	125V DC
8.0A	**1D8DL**	125V DC
10A	**1D10DL**	125V DC
12A	**1D12DL**	125V DC
13A	**1D13DL**	125V DC
15A	**1D15DL**	125V DC
16A	**1D16DL**	125V DC
20A	**1D20DL**	125V DC
25A	**1D25DL**	125V DC
30A	**1D30DL**	125V DC
32A	**1D32DL**	125V DC
40A	**1D40DL**	125V DC
50A	**1D50DL**	125V DC
60A	**1D60DL**	125V DC
63A	**1D63DL**	125V DC

Standard Pack: 6

Weight:
0.3-32A:
1.86kg (4.1lb.)

40-63A:
2.10kg (4.6lb.)



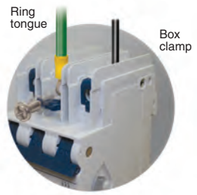
Two Pole

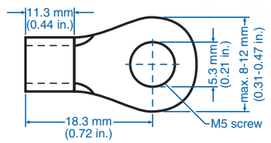
Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**2D03DL**	250V DC
0.5A	**2D05DL**	250V DC
1.0A	**2D1DL**	250V DC
1.6A	**2D1.6DL**	250V DC
2.0A	**2D2DL**	250V DC
3.0A	**2D3DL**	250V DC
4.0A	**2D4DL**	250V DC
5.0A	**2D5DL**	250V DC
6.0A	**2D6DL**	250V DC
8.0A	**2D8DL**	250V DC
10A	**2D10DL**	250V DC
12A	**2D12DL**	250V DC
13A	**2D13DL**	250V DC
15A	**2D15DL**	250V DC
16A	**2D16DL**	250V DC
20A	**2D20DL**	250V DC
25A	**2D25DL**	250V DC
30A	**2D30DL**	250V DC
32A	**2D32DL**	250V DC
40A	**2D40DL**	250V DC
50A	**2D50DL**	250V DC
60A	**2D60DL**	250V DC
63A	**2D63DL**	250V DC

Warning!
Correct polarity must be observed
when connecting the DC circuit breakers.

Standard Dual Connection Terminal

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





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

UL/DL Series Accessories

For mounting instructions please refer to page 43.

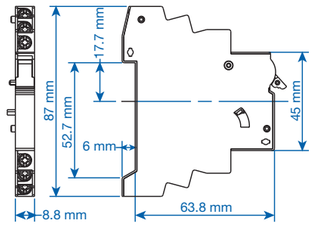
c UL us LISTED C.B. ACC. 3NY7 E335632

CE

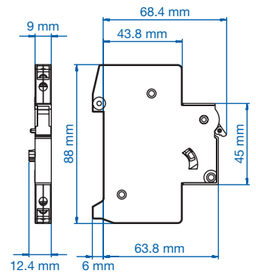
Auxiliary Contact, Alarm Switch

Type/ Cat No.	Description	Contacts Type	Std Pk
H10UL	1 Auxiliary Contact	1NO	6
H11UL	2 Auxiliary Contacts	1NO + 1NC	6
H12UL	3 Auxiliary Contacts	1NO + 2NC	6
H21UL	3 Auxiliary Contacts	2NO + 1NC	6
HLS11L*	1 Auxiliary/1 Signal Contact	1CO + 1CO (Signal)	6

Rated Operating Currents	10A@240V AC 3A@110V DC 1A@220V DC
Minimum Contact Load	1mA @ 24V DC
Torque	max. 0.8Nm (7 lb.in)
Wire Range:	
Single Wire	1.0mm² - 2.5mm² (18-14 AWG)
Stranded Wire	1.0mm² - 1.5mm² (18-16 AWG)
Stranded Wire with Ferrule	1.0mm² - 1.5mm² (18-16 AWG)



Dimensions HxxUL.



Dimensions HLS11L.

Shunt Trip

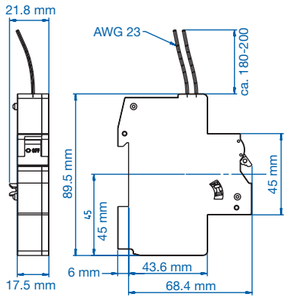
Type/ Cat No.	Rated Voltage U_N	Max. Operating Current @ U_N	Std Pk
FA12UL	12V AC/DC	1.3A	5
FA24UL	24V AC/DC	0.6A	5
FA48UL	48 - 72V AC/DC	0.2A	5
FA110UL	110 - 240V AC/DC, 277V AC	0.25A @ 110V 0.5A @ 240V 0.58A @ 277V	5

Undervoltage Trip*

Type/ Cat No.	Line Voltage V_E	Std Pk
UA120UL	120V AC, 60Hz	5

Reset-Hold Voltage = 0.85 x V_E
Drop-Out Voltage = 0.35 ~ 0.7 x V_E

V_E = Rated Voltage



Dimensions UA120UL

Neutral Pole

Type/ Cat No.	Rated Current I_N	Rated Voltage U_N	Std Pk
N32UL	0.3 - 32A	480Y/277V AC	6
N63UL	40 - 63A	240V AC	6

Touch Protection Caps

to cover the terminal screw holes on the switching devices, neutral Poles and shunt trips for increased touch protection.

Type/ Cat No.	Std Pk
BS.UL	100

Cooling Spacer

Type/ Cat No.	Std Pk
15.960	1

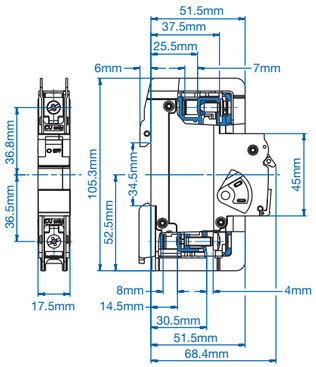
Mounting Screw 34mm

to connect the auxiliary contact and shunt trip or neutral Pole to the circuit breaker.

Type/ Cat No.	Std Pk
E983419	10

Lock-out Adapter**

Type/ Cat No.	Std Pk
EASS	10



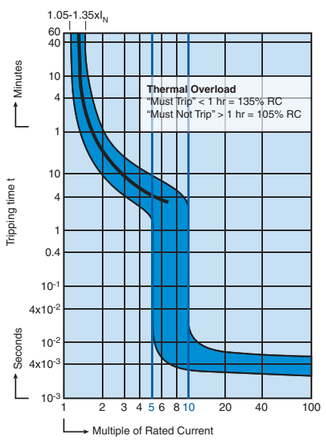
Dimensions NxxUL, FAxxUL

* UL not approved.

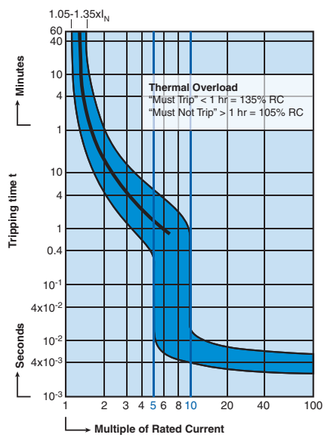
** UL and DL series can also be locked in the on and off position by simply using a common lead or meter seal, which gets fed through the hole in the handle and a corresponding hole in the housing.

UL Series (AC) Trip Curves

C (AC) Trip Curve



0.3A Through 10A Rated Current

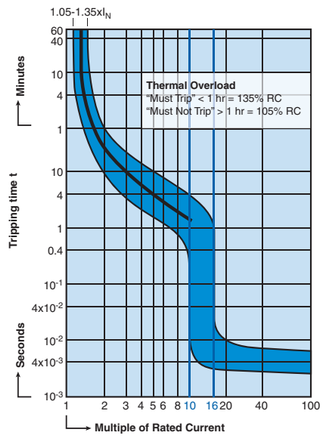


12A Through 63A Rated Current

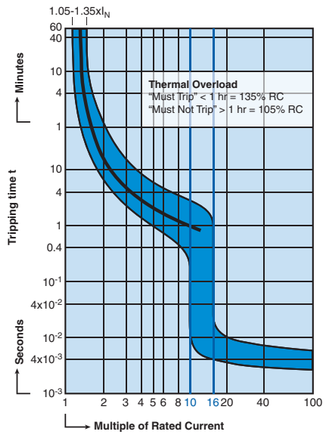
"C" Magnetic Trip Parameters
Rated current 0.3A to 63A.

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 (AC) Trip Curve



0.3A Through 10A Rated Current



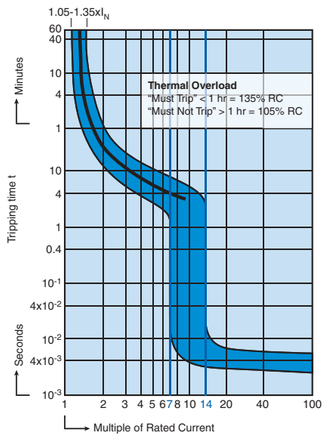
12A Through 63A Rated Current

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

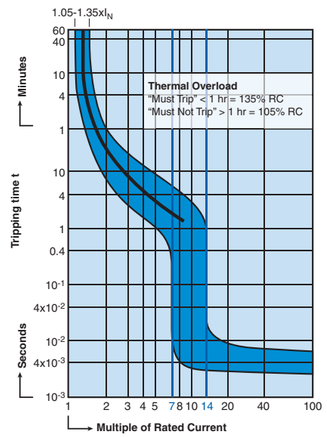
1. Hold for a minimum of 100ms at surge of 10 times rated current.
2. Trip in under 100ms at 16 times rated current.

UL Series (DC) Trip Curves

C (DC) Trip Curve



0.3A Through 10A Rated Current

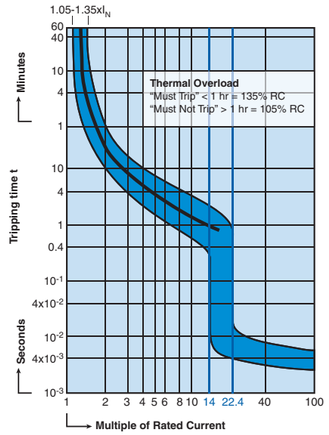


12A Through 63A Rated Current

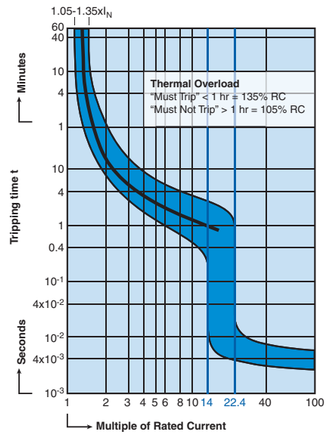
"C" Magnetic Trip Parameters
Rated current 0.3A to 63A.

1. Hold for a minimum of 100ms at surge of 7 times rated current.
2. Trip in under 100ms at 14 times rated current.

D (DC) Trip Curve



0.3A Through 10A Rated Current



12A Through 63A Rated Current

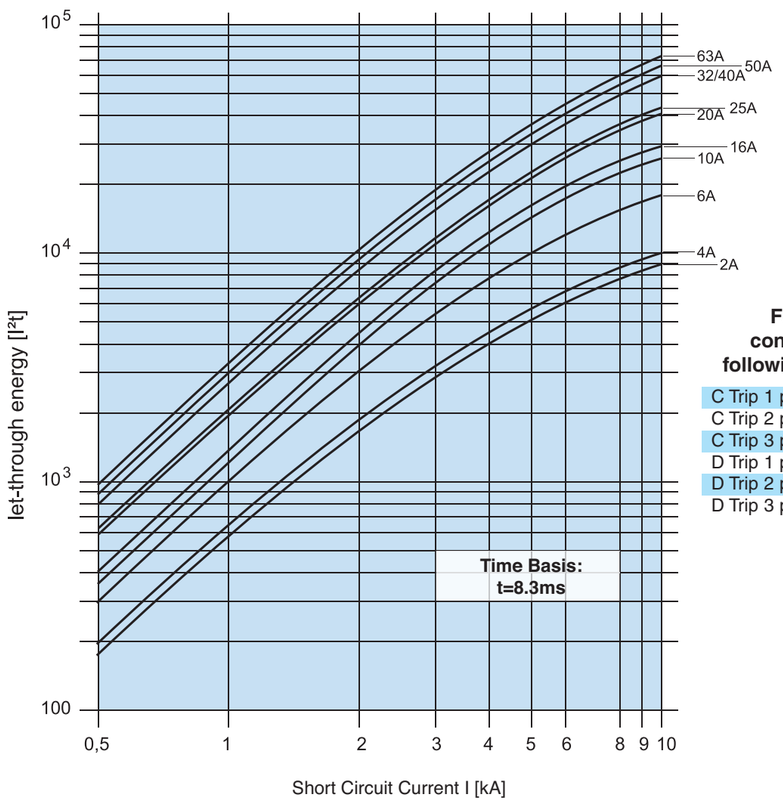
"D" Magnetic Trip Parameters
Rated current 0.3A to 63A.

1. Hold for a minimum of 100ms at surge of 14 times rated current.
2. Trip in under 100ms at 22.4 times rated current.

UL/ DL Series Internal Resistance

Rated Current (A)	Trip Characteristic C (Ohm)	D (Ohm)
0.3	16.8620	16.8620
0.5	6.8540	6.0009
1.0	1.7000	1.7560
1.6	0.5870	0.5870
2.0	0.4190	0.4190
3.0	0.2020	0.2020
4.0	0.1090	0.1090
5.0	0.0654	0.0654
6.0	0.0528	0.0491
8.0	0.0278	0.0240
10	0.0216	0.0187
12	0.0084	0.0085
13	0.0084	0.0085
15/ 16	0.0085	0.0076
20	0.0067	0.0064
25	0.0050	0.0041
30/ 32	0.0032	0.0027
40	0.0025	0.0022
50	0.0019	0.0018
60/ 63	0.0018	0.0017

UL Series Let-through Energy I²t Diagram, D Trip 1 pole



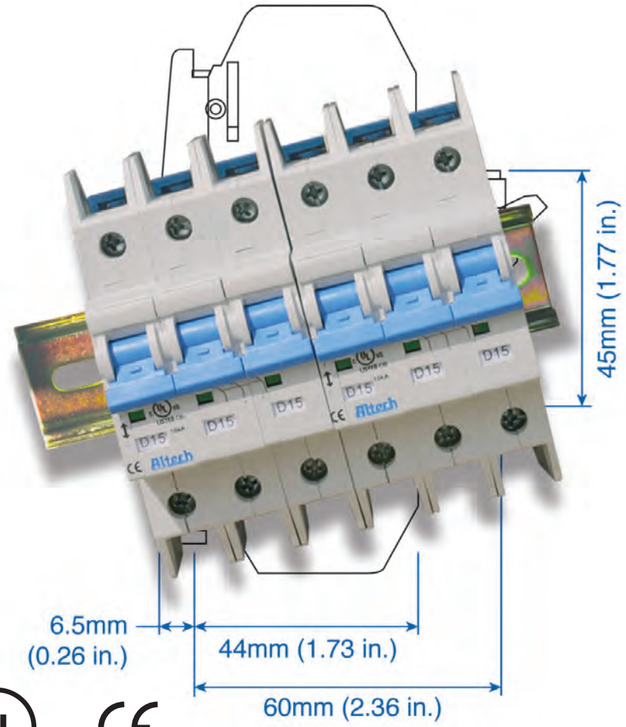
For other Trip/Pole configurations use the following correction factors:

C Trip 1 pole + 0.84 x curve value
C Trip 2 pole + 0.71 x curve value
C Trip 3 pole + 0.92 x curve value
D Trip 1 pole + 1.00 x curve value
D Trip 2 pole + 0.87 x curve value
D Trip 3 pole + 1.08 x curve value

L-Series
AC or DC
Miniature Molded Case Circuit Breakers

UL489 Listed
Circuit Breakers

- Available in AC and DC models
- DIN Rail Mounted
- 17.5mm width
- Thermal Magnetic
- 240V, 480Y/277V AC, 50/60Hz
- 125VDC (1 pole); 250VDC (2 pole)
- 10kA Short Circuit Interrupting Capacity
- Positive Trip indicator (Green - off/tripped, Red - on)
- HACR Type 40°C
- Line/Load reversible



C UL US
LISTED
E305318

CE

AC Version Current/ Voltage Rating	**0.2-63A/240VAC, 0.2-32A/480Y/277VAC***
DC Version Current/ Voltage Rating	**0.2-63A/125/250VDC**
Calibration Temperature	40°C (104°F)
Operating Temperature	-25° to 60°C (-13° to 140°F)
Storage Temperature	-25° to 75°C (-13° to 167°F)
Terminal Size Acceptability and Torque	14-3 AWG: 17.5 lb-in. (2.0 Nm) 18-16 AWG: 25 lb-in. (2.8 Nm)
Terminal Protection Degree	IP20 at front
Electrical Life	6,000 cycles on/off
Mechanical Life	10,000 cycles on/off
Wire Connection	copper wire only 60/75°C
Vibration Resistance	3g (18-50Hz)
Mounting Orientation	In any plane

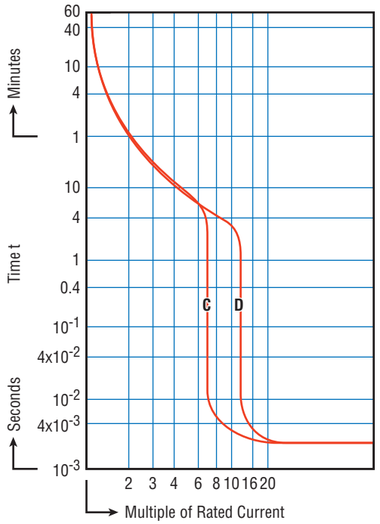
**One device dual voltage ratings.*

AC - SHORT CIRCUIT INTERRUPTING RATING

No. Poles	Type	0.2-32A	33-63A
1	AC	10kA@120, 240, 277V	10kA@120, 240V
2-4	AC	10kA@120, 240V, 480Y/277V	10kA@120, 240V

DC - SHORT CIRCUIT INTERRUPTING RATING

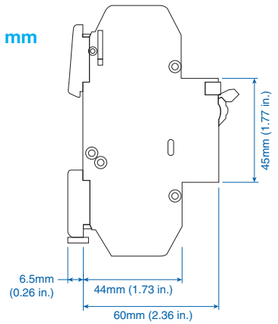
No. Poles	Type	0.2-32A	33-63A
1	DC	10kA@125V	10kA@125V
2	DC	10kA@250V	10kA@250V

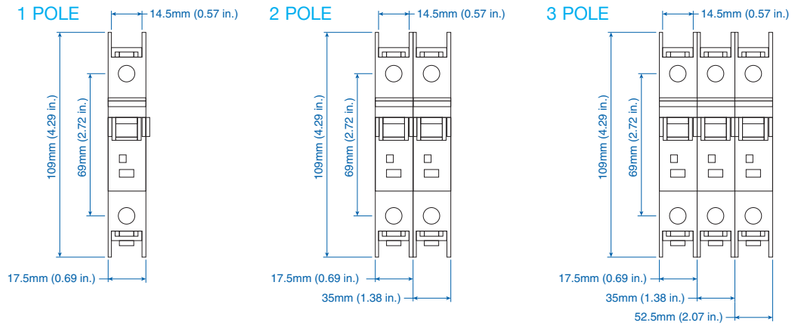


Time versus Current Trip Curve

For the exact trip curve, please refer to page 25.

Dimensions in mm
side view





Trip-Characteristics*				Type	Applications						
Characteristic Trip Boundaries					Lighting Wiring Protection Control Circuits	Business Equipment Appliances	Transformers	Power Supplies Heaters	Motors		Reactive Load
Thermal Trip		Magnetic Trip							Low Inrush	High Inrush	
Must not Trip>100ms	Must Trip <1hr	Must not Trip>100ms	Must Trip at 100ms								
C-Characteristics											
1.05xRC	1.3xRC	5xRC	10xRC	AC							
1.05xRC	1.3xRC	5xRC	10xRC	DC							
D-Characteristics											
1.05xRC	1.3xRC	10xRC	16xRC	AC							
1.05xRC	1.3xRC	10xRC	16xRC	DC							

**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 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 for his specific application.

AC C-Trip Characteristics

Application Examples:
Low inrush motors, resistive loads, wiring protection, receptacles, lighting, and control circuit applications. Relatively short thermal trip delay and medium magnetic trip point.

C UL US

LISTED
E305318

One Pole

Rated Current	Type/ Cat. No.
0.2A	1CU02L
0.5A	1CU05L
1.0A	1CU1L
1.6A	1CU1.6L
2.0A	1CU2L
3.0A	1CU3L
4.0A	1CU4L
5.0A	1CU5L
6.0A	1CU6L
8.0A	1CU8L
10A	1CU10L
12A	1CU12L
13A	1CU13L
15A	1CU15L
16A	1CU16L
20A	1CU20L
25A	1CU25L
30A	1CU30L
32A	1CU32L
40A	1CU40L
50A	1CU50L
60A	1CU60L
63A	1CU63L

Standard Pack: 12

Weight: 1.7kg (3.74 lb.)

Two Pole

Rated Current	Type/ Cat. No.
0.2A	2CU02L
0.5A	2CU05L
1.0A	2CU1L
1.6A	2CU1.6L
2.0A	2CU2L
3.0A	2CU3L
4.0A	2CU4L
5.0A	2CU5L
6.0A	2CU6L
8.0A	2CU8L
10A	2CU10L
12A	2CU12L
13A	2CU13L
15A	2CU15L
16A	2CU16L
20A	2CU20L
25A	2CU25L
30A	2CU30L
32A	2CU32L
40A	2CU40L
50A	2CU50L
60A	2CU60L
63A	2CU63L

Standard Pack: 6

Weight: 1.7kg (3.74 lb.)

Three Pole

Rated Current	Type/ Cat. No.
0.2A	3CU02L
0.5A	3CU05L
1.0A	3CU1L
1.6A	3CU1.6L
2.0A	3CU2L
3.0A	3CU3L
4.0A	3CU4L
5.0A	3CU5L
6.0A	3CU6L
8.0A	3CU8L
10A	3CU10L
12A	3CU12L
13A	3CU13L
15A	3CU15L
16A	3CU16L
20A	3CU20L
25A	3CU25L
30A	3CU30L
32A	3CU32L
40A	3CU40L
50A	3CU50L
60A	3CU60L
63A	3CU63L

Standard Pack: 4

Weight: 1.7kg (3.74 lb.)

Four Pole
Please contact Altech.

For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1CR20L** instead of *1CU20L*.

AC D-Trip Characteristics

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

C UL US
LISTED
E305318

CE

One Pole

Rated Current	Type/ Cat. No.
0.2A	1DU02L
0.5A	1DU05L
1.0A	1DU1L
1.6A	1DU1.6L
2.0A	1DU2L
3.0A	1DU3L
4.0A	1DU4L
5.0A	1DU5L
6.0A	1DU6L
8.0A	1DU8L
10A	1DU10L
12A	1DU12L
13A	1DU13L
15A	1DU15L
16A	1DU16L
20A	1DU20L
25A	1DU25L
30A	1DU30L
32A	1DU32L
40A	1DU40L
50A	1DU50L
60A	1DU60L
63A	1DU63L

Standard Pack: 12

Weight: 1.7kg (3.74 lb.)

Two Pole

Rated Current	Type/ Cat. No.
0.2A	2DU02L
0.5A	2DU05L
1.0A	2DU1L
1.6A	2DU1.6L
2.0A	2DU2L
3.0A	2DU3L
4.0A	2DU4L
5.0A	2DU5L
6.0A	2DU6L
8.0A	2DU8L
10A	2DU10L
12A	2DU12L
13A	2DU13L
15A	2DU15L
16A	2DU16L
20A	2DU20L
25A	2DU25L
30A	2DU30L
32A	2DU32L
40A	2DU40L
50A	2DU50L
60A	2DU60L
63A	2DU63L

Standard Pack: 6

Weight: 1.7kg (3.74 lb.)

Three Pole

Rated Current	Type/ Cat. No.
0.2A	3DU02L
0.5A	3DU05L
1.0A	3DU1L
1.6A	3DU1.6L
2.0A	3DU2L
3.0A	3DU3L
4.0A	3DU4L
5.0A	3DU5L
6.0A	3DU6L
8.0A	3DU8L
10A	3DU10L
12A	3DU12L
13A	3DU13L
15A	3DU15L
16A	3DU16L
20A	3DU20L
25A	3DU25L
30A	3DU30L
32A	3DU32L
40A	3DU40L
50A	3DU50L
60A	3DU60L
63A	3DU63L

Standard Pack: 4

Weight: 1.7kg (3.74 lb.)

Four Pole
Please contact Altech.

For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1CR20L** instead of *1CU20L*.

DC C- & D-Trip Characteristics

Application Examples:
Telecommunication equipment, computer equipment, uninterruptable power supplies.

C UL US

LISTED
E305318

CE

C-Trip

One Pole

Rated Current	Type/ Cat. No.
0.2A	DC1CU02L
0.5A	DC1CU05L
1.0A	DC1CU1L
1.6A	DC1CU1.6L
2.0A	DC1CU2L
3.0A	DC1CU3L
4.0A	DC1CU4L
5.0A	DC1CU5L
6.0A	DC1CU6L
8.0A	DC1CU8L
10A	DC1CU10L
12A	DC1CU12L
13A	DC1CU13L
15A	DC1CU15L
16A	DC1CU16L
20A	DC1CU20L
25A	DC1CU25L
30A	DC1CU30L
32A	DC1CU32L
40A	DC1CU40L
50A	DC1CU50L
60A	DC1CU60L
63A	DC1CU63L

Standard Pack: 12

Weight: 1.7kg (3.74 lb.)

Two Pole

Rated Current	Type/ Cat. No.
0.2A	DC2CU02L
0.5A	DC2CU05L
1.0A	DC2CU1L
1.6A	DC2CU1.6L
2.0A	DC2CU2L
3.0A	DC2CU3L
4.0A	DC2CU4L
5.0A	DC2CU5L
6.0A	DC2CU6L
8.0A	DC2CU8L
10A	DC2CU10L
12A	DC2CU12L
13A	DC2CU13L
15A	DC2CU15L
16A	DC2CU16L
20A	DC2CU20L
25A	DC2CU25L
30A	DC2CU30L
32A	DC2CU32L
40A	DC2CU40L
50A	DC2CU50L
60A	DC2CU60L
63A	DC2CU63L

Standard Pack: 6

Weight: 1.7kg (3.74 lb.)

D-Trip

One Pole

Rated Current	Type/ Cat. No.
0.2A	DC1DU02L
0.5A	DC1DU05L
1.0A	DC1DU1L
1.6A	DC1DU1.6L
2.0A	DC1DU2L
3.0A	DC1DU3L
4.0A	DC1DU4L
5.0A	DC1DU5L
6.0A	DC1DU6L
8.0A	DC1DU8L
10A	DC1DU10L
12A	DC1DU12L
13A	DC1DU13L
15A	DC1DU15L
16A	DC1DU16L
20A	DC1DU20L
25A	DC1DU25L
30A	DC1DU30L
32A	DC1DU32L
40A	DC1DU40L
50A	DC1DU50L
60A	DC1DU60L
63A	DC1DU63L

Standard Pack: 12

Weight: 1.7kg (3.74 lb.)

Two Pole

Rated Current	Type/ Cat. No.
0.2A	DC2DU02L
0.5A	DC2DU05L
1.0A	DC2DU1L
1.6A	DC2DU1.6L
2.0A	DC2DU2L
3.0A	DC2DU3L
4.0A	DC2DU4L
5.0A	DC2DU5L
6.0A	DC2DU6L
8.0A	DC2DU8L
10A	DC2DU10L
12A	DC2DU12L
13A	DC2DU13L
15A	DC2DU15L
16A	DC2DU16L
20A	DC2DU20L
25A	DC2DU25L
30A	DC2DU30L
32A	DC2DU32L
40A	DC2DU40L
50A	DC2DU50L
60A	DC2DU60L
63A	DC2DU63L

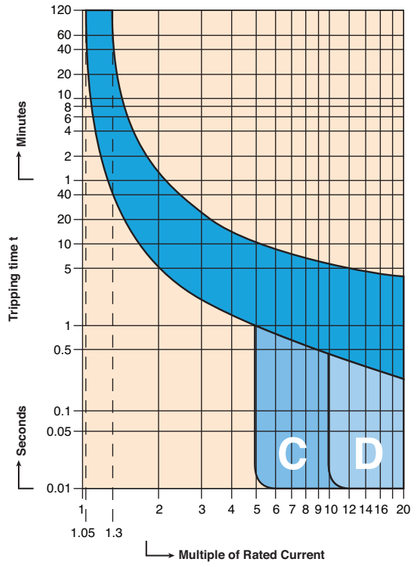
Standard Pack: 6

Weight: 1.7kg (3.74 lb.)

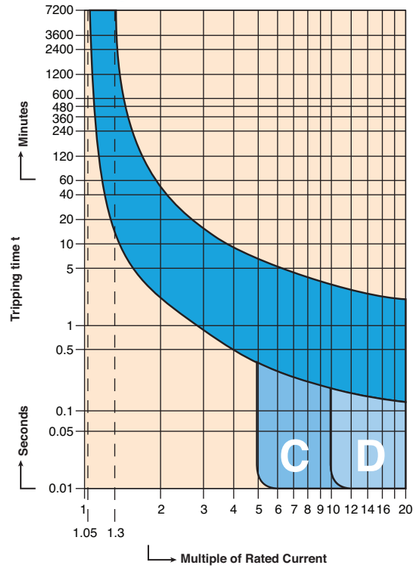
For ring tongue terminal version, replace "U" with "**R**" in part number. For example **1CR20L** instead of *1CU20L*.

L-Series Trip Curves

C and D Trip
Less than 10A



C and D Trip
10A and higher



Temperature and Power Loss Specifications

Rated current In (A)	Effective rated current allowing for ambient temperature I cor (A)									Internal impedance Z (m Ω) char. B, C, D, K	Power Loss B, C, D, K P (W)
	-20	-10	0	10	20	30	40	50	60		
0.2	0.24	0.24	0.23	0.22	0.21	0.2	0.19	0.18	0.17	45100.0	1.80
0.5	0.61	0.59	0.57	0.55	0.53	0.5	0.47	0.44	0.42	8000.0	2.00
1	1.21	1.18	1.14	1.1	1.05	1.0	0.93	0.88	0.83	2000.0	2.00
2	2.42	2.36	2.28	2.2	2.1	2.0	1.86	1.76	1.67	490.0	1.96
3	3.63	3.54	3.42	3.3	3.15	3.0	2.79	2.64	2.5	230.0	2.07
4	4.84	4.72	4.56	4.4	4.2	4.0	3.72	3.52	3.33	150.0	2.40
5	6.1	5.9	5.7	5.5	5.3	5.0	4.7	4.4	4.2	95.0	2.38
6	7.3	7.1	6.8	6.6	6.3	6.0	5.6	5.3	5.0	69.0	2.48
7	8.5	8.2	8.0	7.7	7.4	7.0	6.5	6.2	5.8	52.0	2.55
8	9.7	9.4	9.1	8.8	8.4	8.0	7.4	7.0	6.7	35.0	2.24
10	12.1	11.8	11.4	11.0	10.5	10.0	9.3	8.8	8.3	23.5	2.35
12	14.5	14.2	13.7	13.2	12.6	12.0	11.2	10.6	10.0	18.7	2.69
13	15.7	15.3	14.8	14.3	13.7	13.0	12.1	11.5	10.8	14.3	2.42
14	16.9	16.5	16.0	15.4	14.7	14.0	13.0	12.3	11.7	12.4	2.43
15	18.2	17.7	17.1	16.5	15.8	15.0	14.0	13.2	12.5	10.1	2.27
16	19.4	18.9	18.2	17.6	16.8	16.0	14.9	14.1	13.3	7.5	1.92
20	24.2	23.6	22.8	22.0	21.0	20.0	18.6	17.6	16.7	6.3	2.52
25	30.3	29.5	28.5	27.5	26.3	25.0	23.3	22.0	20.8	4.6	2.88
30	36.3	35.4	34.2	33.0	31.5	30.0	27.9	26.5	25.0	3.6	3.24
32	38.7	37.8	36.5	35.2	33.6	32.0	29.8	28.2	26.7	3.6	3.69
35	42.3	41.3	39.9	38.5	36.8	35.0	32.6	30.8	29.2	3.6	4.41
40	48.4	47.2	45.6	44.0	42.0	40.0	37.2	35.2	33.3	3.0	4.80
50	60.5	59.0	57.0	55.0	52.5	50.0	46.5	44.1	41.7	2.4	6.00
60	72.6	70.9	68.4	66.0	63.0	60.0	55.9	52.9	50.1	1.8	6.48

Accessories

L-Series Circuit Breakers

c UL us
LISTED
E305318

Accessories can be factory or field mounted on L-Series miniature molded case circuit breakers 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.

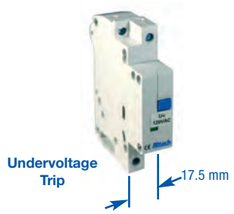
Neutral Pole (63A/240VAC; 32A/480Y/277VAC)

Description	Type/ Cat. No.	Cable Max	Cable Min	Torque Max	Torque Min
Neutral	ALTN2L	25mm² 3 AWG	2.5mm² 12 AWG	2Nm 17.5 lb-in	1.5Nm 12 lb-in

Standard Pack: 10

Weight: 1.2kg (2.64 lb.)

Shunt Trip and Undervoltage Trip



Description	Shunt Trip Type/Cat. No.	Operational Voltage	Rated Coil Current	Undervoltage Trip* Type/Cat. No.
AC Coil:				
12V AC	FA12ACL	8.4 - 13.2V	6A	UV12ACL
24V AC	FA24ACL	16.8 - 26.4V	2.8A	UV24ACL
48V AC	FA48ACL	33.6 - 52.8V	0.8A	UV48ACL
60V AC	FA60ACL	42 - 66V	~0.7A	UV60ACL
110V AC	FA110ACL	77 - 121V	0.5A	UV110ACL
120V AC	FA120ACL	84 - 132V	~0.5A	UV120ACL
230V AC	FA230ACL	161 - 253V	0.6A	UV230ACL
277V AC	FA277ACL	194 - 305V	~0.5A	UV277ACL
400V AC	FA400ACL	280 - 440V	0.5A	UV400ACL
DC Coil:				
12V DC	FA12DCL	8.4 - 13.2V	~6A	UV12DCL
24V DC	FA24DCL	16.8 - 26.4V	3A	UV24DCL
48V DC	FA48DCL	33.6 - 52.8V	2A	UV48DCL
110V DC	FA110DCL	77 - 121V	0.6A	UV110DCL

* Reset-Hold Voltage = 0.85 x V_E; Drop-Out Voltage = 0.2 x V_E

Standard Pack: 10

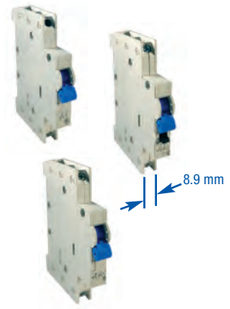
Weight: 1.1kg (2.43 lb.)

Terminal Size - min/max	2.5 mm² (12 AWG) / 25mm² (3 AWG)
Terminal Torque - min/max	1.5 Nm (12 lb. in.) / 2 Nm (17.5 lb. in.)

Accessories

L-Series
Circuit Breakers

c UL us
LISTED
E305318



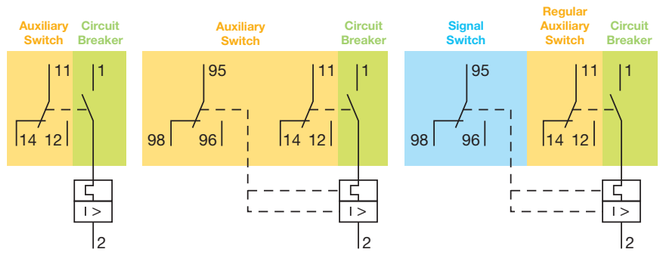
Auxiliary Contact (6A/120V AC; 3A/240V AC; 6A/24V DC; 0.5A/125V DC)

Description	Type/ Cat. No.	Cable Max	Cable Min	Torque Max	Torque Min
1 x CO	H1COL	2.5mm² 12 AWG	0.5mm² 20 AWG	0.5Nm 4 lb-in	0.33Nm 3 lb-in
2 x CO	H2COL				
1 x CO, 1 Signal & Test Button	HSTCOL				

Standard Pack: 15

Weight: 0.5kg (1.32 lb.)

Wiring Diagram



Lock-out Adapter

Luggage Lock 1/8"

Description	Type/ Cat. No.
Yellow	EASS2L

Standard Pack: 10

Weight: 50g (1.76 oz.)

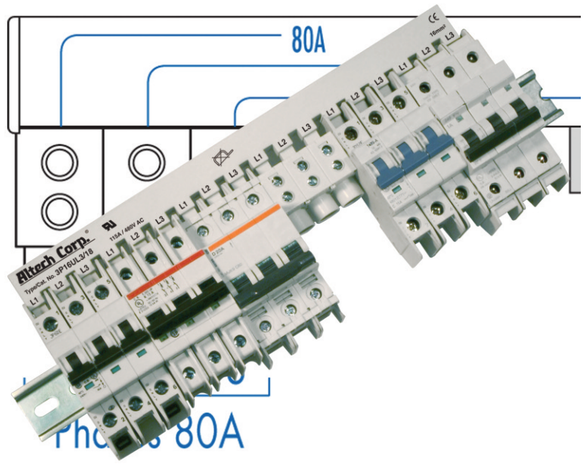
Front Mounting Kit with hardware

Description	Type/ Cat. No.	Weight
1 Pole	FMA1PL	40g (1.41 oz.)
2 Pole	FMA2PL	45g (1.59 oz.)
3 Pole	FMA3PL	50g (1.76 oz.)

Standard Pack: 1

Altech UL489 Busbar System

UL489 recognized
E305318



UL489 Listed Busbars

The Altech Busbar System is an innovative way to jumper up to 57 poles of Miniature Molded Case Circuit Breakers.

The advantages of this busbar system are:

- 30% Installation time savings
- Panel space savings
- Reduced maintenance
- High electrical ratings

Universal UL489 Busbar fits most UL489 Miniature Circuit Breakers in the market!

Please contact Altech for details and further information.

UL489 Busbar System

- Every pin configuration is possible by combination of existing 6, 12 and 18 pin busbars.
- Power Feeding:
  Power Feed Lug (115A), Direct Power Feed (115A)
- UL listed for Altech's L-Series and ABL's UL-Series of Miniature Circuit Breakers
- UL listed for use with most popular UL489 Miniature Circuit Breakers in the market.

Technical Specifications	Busbars UL489
Material of Busbar	Copper
Material of Insulation (Housing)	Polyamide
Electrical Ratings	115A/600V AC/DC
Short Circuit Withstand Rating	10kA
Applying Standards	UL489, VDE0660 Part 100, IEC60749, DIN EN60947-1

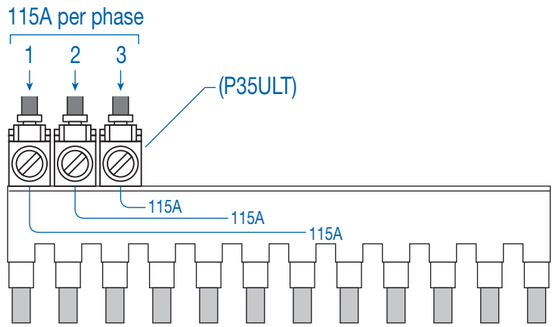
Altech UL489 Busbar System

Power Feed Methods

End Feed Method

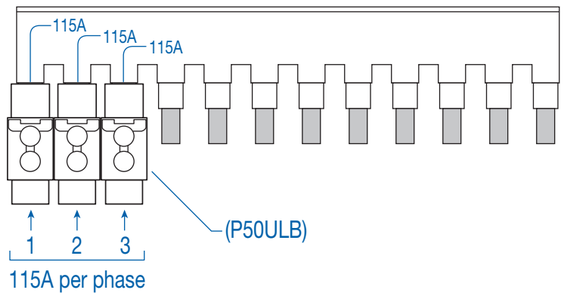
P35ULT

With the **P35ULT** Power Feed Lug as a Start/End Feeding Device a maximum input current of **115A per Phase** can be achieved.



P50ULB

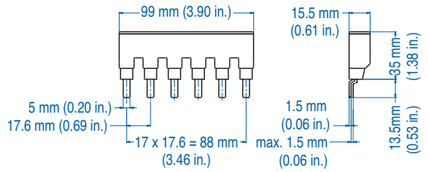
With the **P50ULB** Modular Direct Power Feed as a Start/End Feeding Device a maximum input current of **115A per Phase** can be achieved.



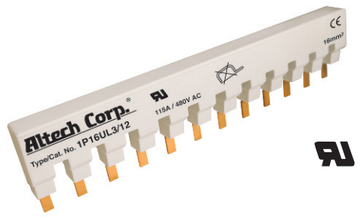
* *For complete specifications and description of Feeding Devices see page 33.*

1 PHASE BUSBAR 16mm² for 115A

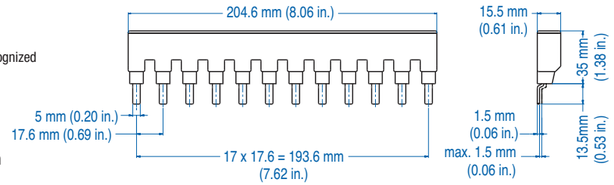
UL489 recognized
E305318



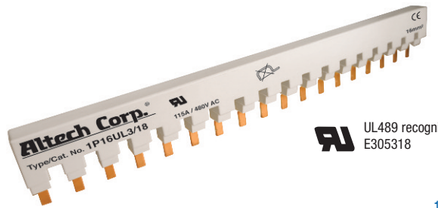
Type/ Cat. No.	No. of Pins	Length [mm]
1P16UL3/6	6	99



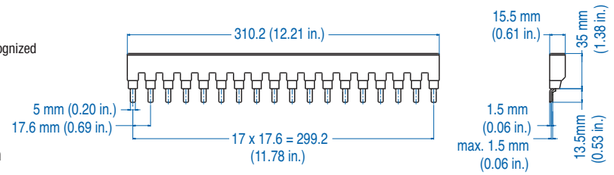
UL489 recognized
E305318



Type/ Cat. No.	No. of Pins	Length [mm]
1P16UL3/12	12	204.6



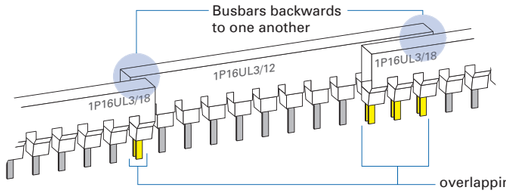
UL489 recognized
E305318



Type/ Cat. No.	No. of Pins	Length [mm]
1P16UL3/18	18	310.2

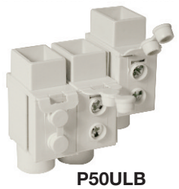
Example for different No. of Pins

eg. 44 pins use 1x 1P16UL3/12 + 2x 1P16UL3/18



- No. of overlapping pins of 2 busbars must be a multiplier of the No. of phases
- Overlapping busbars are backwards to each other

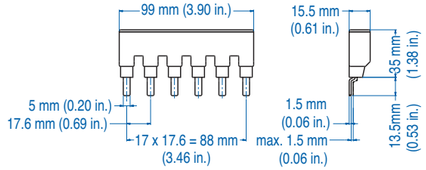
ACCESSORIES



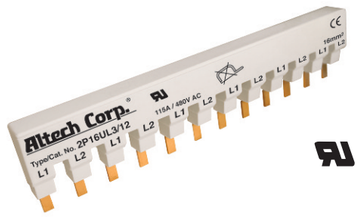
Type/Cat. No:	P35ULT	P50ULB	BRUL *(3 per strip)*
Description:	Power Feed Lug	Modular Direct Power Feed	Insulation Cap

2 PHASE BUSBAR 16mm² for 115A

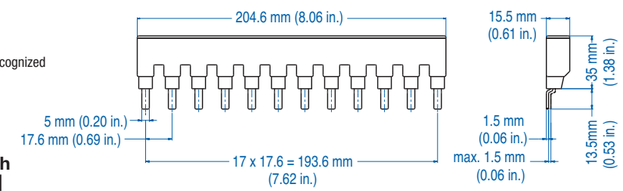
UL489 recognized
E305318



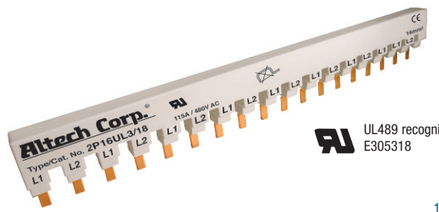
Type/ Cat. No.	No. of Pins	Length [mm]
2P16UL3/6	6	99



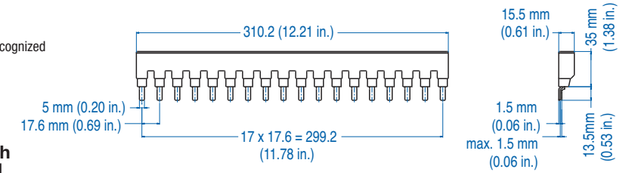
UL489 recognized
E305318



Type/ Cat. No.	No. of Pins	Length [mm]
2P16UL3/12	12	204.6



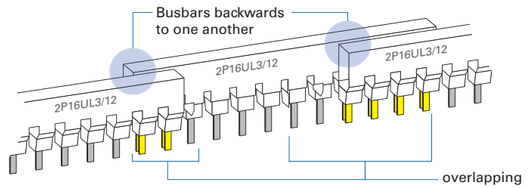
UL489 recognized
E305318



Type/ Cat. No.	No. of Pins	Length [mm]
2P16UL3/18	18	310.2

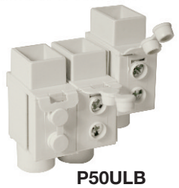
Example for different No. of Pins

eg. 30 pins use 3x 2P16UL3/12



- No. of overlapping pins of 2 busbars must be multiplier of the No. of phases
- Overlapping busbars are backwards to each other

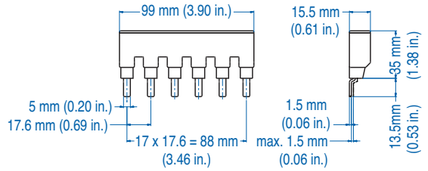
ACCESSORIES



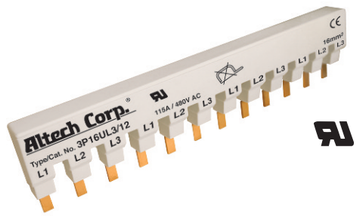
Type/Cat. No:	P35ULT	P50ULB	BRUL *(3 per strip)*
Description:	Power Feed Lug	Modular Direct Power Feed	Insulation Cap

3 PHASE BUSBAR 16mm² for 115A

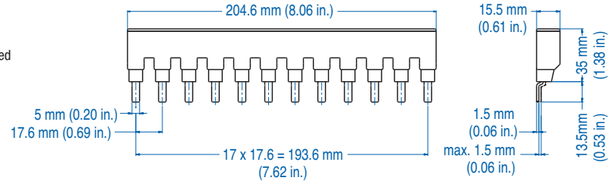
UL489 listed
E305318



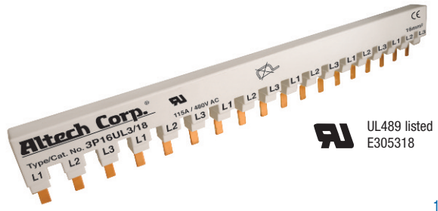
Type/ Cat. No.	No. of Pins	Length [mm]
3P16UL3/6	6	99



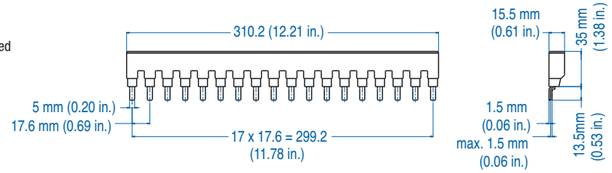
UL489 listed
E305318



Type/ Cat. No.	No. of Pins	Length [mm]
3P16UL3/12	12	204.6



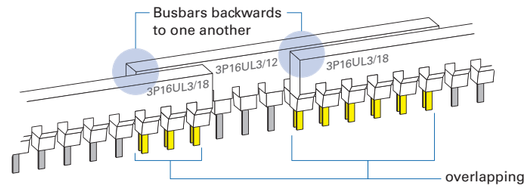
UL489 listed
E305318



Type/ Cat. No.	No. of Pins	Length [mm]
3P16UL3/18	18	310.2

Example for different No. of Pins

eg. 39 pins use 1x 3P16UL3/12 + 2x 3P16UL3/18



- No. of overlapping pins of 2 busbars must be multiplier of the No. of phases
- Overlapping busbars are backwards to each other

ACCESSORIES

Type/Cat. No:	P35ULT	P50ULB	BRUL *(3 per strip)*
Description:	Power Feed Lug	Modular Direct Power Feed	Insulation Cap

Power Feed Devices

Easy connection of power supply wires to the busbar/MCB. Power Feed Devices ensure permanent connection.

Power Feed Lug

UL489 listed
E305318

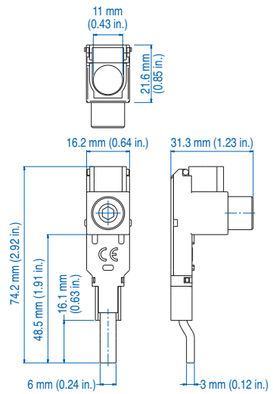
Modular Direct Power Feed

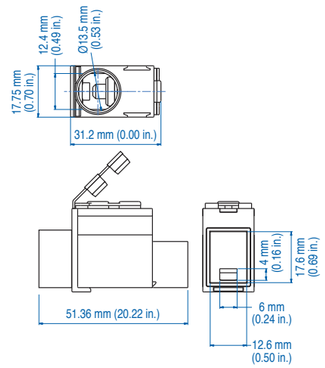
UL489 listed
E305318

CE

Type/Cat. No.	P35ULT	P50ULB
Electrical Ratings	115A/600V AC/DC	115A/600V AC/DC
Wire Range	14-2 AWG Cu	14-1 AWG Cu
Wire Temperature Rating	75°C	75°C
Required Torque	4Nm (35.4 lb. in.)	Cable Side 3.5Nm/31 lb. in. (14-6AWG) 4Nm/35.4 lb. in. (4-1AWG) Busbar Side 2.5Nm/22 lb. in.
Material of Lug	Brass	Brass
Insulation Material	Polyamide	Polyamide
For use with	UL489 1, 2, 3 phase Busbar	UL489 1, 2, 3 phase Busbar

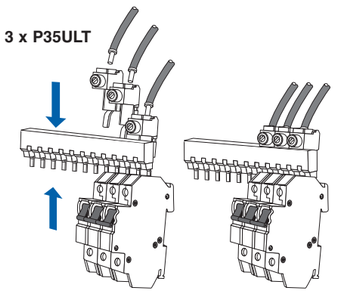
Dimensions



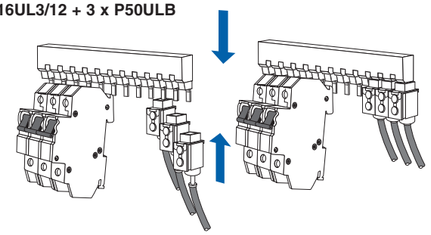


Assembly Instructions

3P16UL3/12 + 3 x P35ULT



3P16UL3/12 + 3 x P50ULB



Accessories

Insulation Caps

Type/Cat. No:	BRUL *(3 per strip)*
Description:	Insulation Cap

Altech UL489 Busbar Systems

Configuration and Assembly of UL489 Busbars

UL489 Busbars are available in 3 different Pin Configurations per Phase, (6, 12 and 18 Pins).

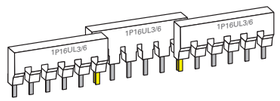
The UL489 busbar cannot be cut, since the creepage and clearance distance requirements from UL are too stringent. Therefore, to obtain the desired No. of Pins, Busbar-Pins can be overlapped as explained below:

1) Busbars are overlapped backwards to each other. Both Pins of each Busbar fit together in the terminals of the Miniature Circuit Breaker.
2 The Number of overlapping Pins of 2 Busbar must be a multiplier of the Number of Phases to keep existing Phase sequence. (Can be overlapped by more than the number of phases).
3) Any available combination of the 3 different Pin configurations is possible.
4) In most cases there is more than 1 combination possible.
5) For more possible configurations see Busbar Selection Table on page 21.

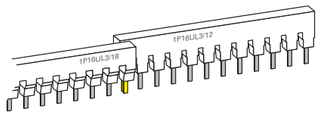
Configuration Examples*

1 Phase

16 Pins: 3 x 1P16UL3/6

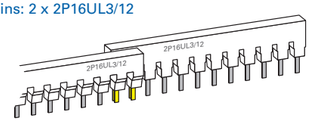


29 Pins: 1 x 1P16UL3/12 + 1 x 1P16UL3/18

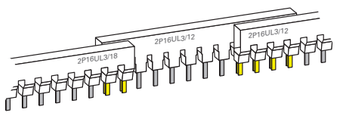


2 Phase

22 Pins: 2 x 2P16UL3/12

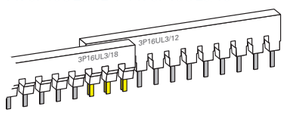


36 Pins: 2 x 2P16UL3/12 + 1 x 2P16UL3/18

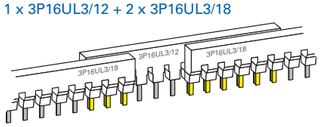


3 Phase

27 Pins: 1 x 3P16UL3/12 + 1 x 3P16UL3/18



39 Pins: 1 x 3P16UL3/12 + 2 x 3P16UL3/18



*For Questions, other configurations and detailed information please contact Altech Corp.

Busbar Selection Table

Altech Corp.®

No. of Pins	Necessary Busbars
1 Phase System	
6	1x 1P16UL3/6
7	2x 1P16UL3/6
8	2x 1P16UL3/6
9	2x 1P16UL3/6
10	2x 1P16UL3/6
11	2x 1P16UL3/6
12	1x 1P16UL3/12 3x 1P16UL3/6
13	2x 1P16UL3/12 3x 1P16UL3/6 1x 1P16UL3/6 + 1x 1P16UL3/12
14	2x 1P16UL3/12 3x 1P16UL3/6 1x 1P16UL3/6 + 1x 1P16UL3/12
15	2x 1P16UL3/12 3x 1P16UL3/6 1x 1P16UL3/6 + 1x 1P16UL3/12
16	2x 1P16UL3/12 3x 1P16UL3/6 1x 1P16UL3/6 + 1x 1P16UL3/12
17	2x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/12
18	1x 1P16UL3/18 2x 1P16UL3/12 2x 1P16UL3/6 + 1x 1P16UL3/12 1x 1P16UL3/6 + 2x 1P16UL3/12
19	2x 1P16UL3/12 2x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/12 1x 1P16UL3/6 + 2x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18
20	2x 1P16UL3/12 2x 1P16UL3/18 1x 1P16UL3/6 + 2x 1P16UL3/12 2x 1P16UL3/6 + 1x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/18 1x 1P16UL3/6 + 2x 1P16UL3/12
21	2x 1P16UL3/12 2x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/12 1x 1P16UL3/6 + 2x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18
22	2x 1P16UL3/12 2x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/12 1x 1P16UL3/6 + 2x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18
23	2x 1P16UL3/12 2x 1P16UL3/18 1x 1P16UL3/6 + 1x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18
24	2x 1P16UL3/12 2x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/18 3x 1P16UL3/12
25	2x 1P16UL3/12 2x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/18 3x 1P16UL3/12
26	2x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/18 3x 1P16UL3/12
27	2x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/18 3x 1P16UL3/12
28	2x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/6 + 1x 1P16UL3/18 3x 1P16UL3/12
29	2x 1P16UL3/18 1x 1P16UL3/12 + 1x 1P16UL3/18 3x 1P16UL3/12
30	2x 1P16UL3/18 3x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
31	2x 1P16UL3/18 3x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
32	2x 1P16UL3/18 3x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
33	2x 1P16UL3/18 3x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
34	2x 1P16UL3/18 3x 1P16UL3/12 1x 1P16UL3/6 + 1x 1P16UL3/12 + 1x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
35	2x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
36	1x 1P16UL3/6 + 2x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 3x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
37	1x 1P16UL3/6 + 2x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 3x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
38	1x 1P16UL3/6 + 2x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 3x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
39	1x 1P16UL3/6 + 2x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 3x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18
40	1x 1P16UL3/6 + 2x 1P16UL3/18 2x 1P16UL3/12 + 1x 1P16UL3/18 1x 1P16UL3/12 + 2x 1P16UL3/18 3x 1P16UL3/18
41	1x 1P16UL3/12 + 2x 1P16UL3/18 3x 1P16UL3/18
42	1x 1P16UL3/12 + 2x 1P16UL3/18 3x 1P16UL3/18
43	1x 1P16UL3/12 + 2x 1P16UL3/18 3x 1P16UL3/18
44	1x 1P16UL3/12 + 2x 1P16UL3/18 3x 1P16UL3/18
45	1x 1P16UL3/12 + 2x 1P16UL3/18 3x 1P16UL3/18
46	1x 1P16UL3/12 + 2x 1P16UL3/18 3x 1P16UL3/18
47	3x 1P16UL3/18
48	3x 1P16UL3/18
49	3x 1P16UL3/18
50	3x 1P16UL3/18
51	3x 1P16UL3/18
52	3x 1P16UL3/18
2 Phase System	
6	1x 2P16UL3/6
8	2x 2P16UL3/6
10	2x 2P16UL3/6
12	3x 2P16UL3/6 1x 2P16UL3/12
14	3x 2P16UL3/6 2x 2P16UL3/12 1x 2P16UL3/6 + 1x 2P16UL3/12
16	2x 2P16UL3/12 1x 2P16UL3/6 + 1x 2P16UL3/12
18	1x 2P16UL3/18 2x 2P16UL3/12 2x 2P16UL3/6 + 1x 2P16UL3/12
20	2x 2P16UL3/6 + 1x 2P16UL3/12 1x 2P16UL3/6 + 1x 2P16UL3/18 2x 2P16UL3/12 2x 2P16UL3/18
22	2x 2P16UL3/12 2x 2P16UL3/18 1x 2P16UL3/6 + 1x 2P16UL3/18 1x 2P16UL3/12 + 1x 2P16UL3/18
24	2x 2P16UL3/6 + 1x 2P16UL3/18 1x 2P16UL3/6 + 2x 2P16UL3/12 3x 2P16UL3/12 2x 2P16UL3/18 1x 2P16UL3/12 + 1x 2P16UL3/18
26	2x 2P16UL3/6 + 1x 2P16UL3/18 1x 2P16UL3/6 + 2x 2P16UL3/12 3x 2P16UL3/12 2x 2P16UL3/18 1x 2P16UL3/12 + 1x 2P16UL3/18
28	3x 2P16UL3/12 2x 2P16UL3/18 1x 2P16UL3/12 + 1x 2P16UL3/18
30	1x 2P16UL3/6 + 1x 2P16UL3/12 + 1x 2P16UL3/18 3x 2P16UL3/12 2x 2P16UL3/12 + 1x 2P16UL3/18 2x 2P16UL3/18
32	1x 2P16UL3/6 + 1x 2P16UL3/12 + 1x 2P16UL3/18 3x 2P16UL3/12 2x 2P16UL3/12 + 1x 2P16UL3/18 2x 2P16UL3/18
34	1x 2P16UL3/6 + 1x 2P16UL3/12 + 1x 2P16UL3/18 2x 2P16UL3/12 + 1x 2P16UL3/18 2x 2P16UL3/18
36	1x 2P16UL3/6 + 2x 2P16UL3/18 3x 2P16UL3/18 2x 2P16UL3/12 + 1x 2P16UL3/18 1x 2P16UL3/12 + 2x 2P16UL3/18
38	1x 2P16UL3/6 + 2x 2P16UL3/18 3x 2P16UL3/18 2x 2P16UL3/12 + 1x 2P16UL3/18 1x 2P16UL3/12 + 2x 2P16UL3/18
40	3x 2P16UL3/18 1x 2P16UL3/12 + 2x 2P16UL3/18
42	3x 2P16UL3/18 1x 2P16UL3/12 + 2x 2P16UL3/18
44	3x 2P16UL3/18 1x 2P16UL3/12 + 2x 2P16UL3/18
46	3x 2P16UL3/18
48	3x 2P16UL3/18
50	3x 2P16UL3/18
3 Phase System	
9	2x 3P16UL3/6
12	1x 3P16UL3/12 3x 3P16UL3/6
15	1x 3P16UL3/6 + 1x 3P16UL3/12 2x 3P16UL3/12
18	1x 3P16UL3/18 1x 3P16UL3/12 + 2x 3P16UL3/6 2x 3P16UL3/12
21	2x 3P16UL3/12 1x 3P16UL3/6 + 1x 3P16UL3/18 1x 3P16UL3/12 + 1x 3P16UL3/18 2x 3P16UL3/18
24	1x 3P16UL3/12 + 1x 3P16UL3/18 2x 3P16UL3/6 + 1x 3P16UL3/18 1x 3P16UL3/6 + 2x 3P16UL3/12 3x 3P16UL3/12 2x 3P16UL3/18
27	1x 3P16UL3/12 + 1x 3P16UL3/18 2x 3P16UL3/18 3x 3P16UL3/12
30	2x 3P16UL3/18 2x 3P16UL3/12 + 1x 3P16UL3/18 3x 3P16UL3/12 1x 3P16UL3/6 + 1x 3P16UL3/12 + 1x 3P16UL3/18
33	2x 3P16UL3/18 2x 3P16UL3/12 + 1x 3P16UL3/18
36	1x 3P16UL3/6 + 2x 3P16UL3/18 2x 3P16UL3/12 + 1x 3P16UL3/18 1x 3P16UL3/12 + 2x 3P16UL3/18 3x 3P16UL3/18
39	1x 3P16UL3/12 + 2x 3P16UL3/18 3x 3P16UL3/18
42	1x 3P16UL3/12 + 2x 3P16UL3/18 3x 3P16UL3/18
45	3x 3P16UL3/18
48	3x 3P16UL3/18

Note: For detailed information and examples see page 20.

UM (V-EA) Series

UL508 Listed
Manual Motor Controllers
"Suitable as Motor Disconnect"

- DIN Rail Mounted
- 17.5mm width per pole
- Thermal Magnetic
- 0.3-60A / 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)

UL508 Listed E137938 | up to 25A B,C,D curve | up to 25A B,C,D curve

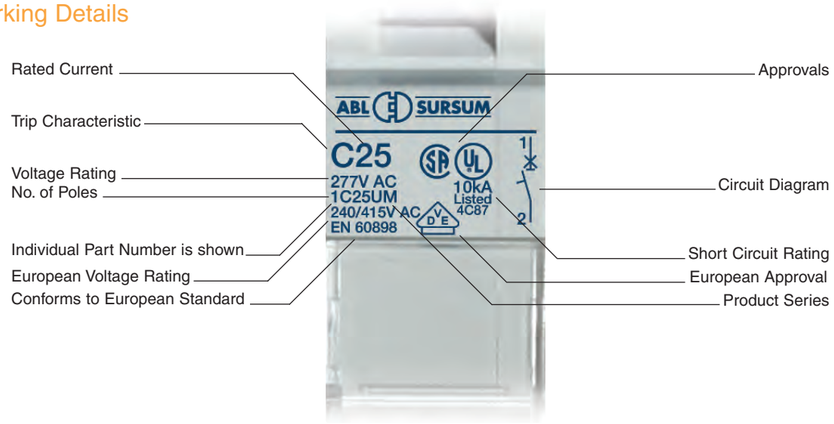
Current/ Voltage Rating	0.3-60A/480Y/277V AC 0.3-25A: 1 pole - 42V DC; 2 Pole - 80V DC 30-60A: 1 pole - 24V DC; 2 Pole - 60V DC
Short Circuit Withstand Rating (UL/CSA - Ratings)	0.3-60A (RC): 10kA with UL-listed RK5 back-up fuse or MCCB
Group Short Circuit Withstand Rating (UL/CSA - Ratings)	0.3-10A (RC): 10kA; 12-60A (RC): 5kA no branch circuit protection required
Interrupting Capacity (VDE - Ratings)	0.3-63A (RC): 10kA
Calibration Temperature	40°C (104°F)
Operating Temperature	-25°C to 55°C (-13°F to 131°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Terminal Size Acceptability	Top: 18-3 AWG; Bottom: 18-2 AWG
Terminal Torque (min/max)	2 Nm (17.7 lb.in.) / 2.5Nm (22.2 lb.in)
Horse Power Ratings	see page 46
Mechanical Endurance Ratings	see page 47
Vibration Resistance	> 15g according to DIN EN 60069-2-59 during a load with $I_1 = 1.05 \times I_N$
Degree of protection acc. IEC/EN 60529	IP20
Mounting Orientation	In any plane

Short Circuit Withstand Ratings for UM (V-EA) Manual Motor Controller

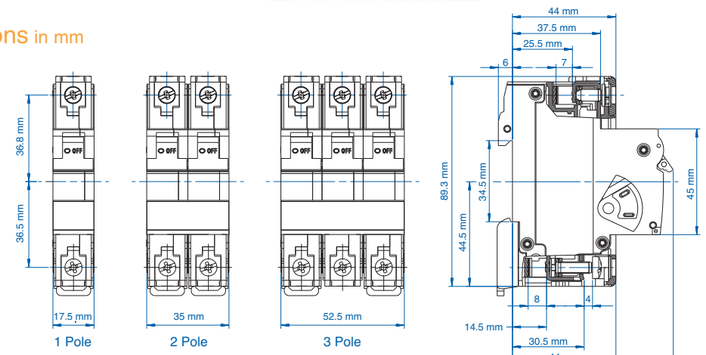
Trip Curve	Amp Range / Backup Protection	UL-Listed RK5-Fuse up to 10kA	UL-Listed MCCB up to 10kA	No BCP Required up to:
all	0.3 - 10A	4xRC* min 15A, max 70A	4xRC* min 15A, max 70A	10kA
all	12 - 30/32A	4xRC* max 125A	4xRC* max 125A	5kA
all	40 - 50A	4xRC* max 200A	4xRC* max 200A	5kA
all	60 / 63A	4xRC*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

*up to nearest rated current

Marking Details



Dimensions in mm



Application Overview

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.

V-EA Series
B-Trip Characteristic

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.

UL508 Listed
E137938

upto 25A
B,C,D curve

One Pole

Standard Pack: 12

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

Rated Current	Type/ Voltage	Approvals
1.0A	**1B1UM**	
1.6A	**1B1.6UM**	
2.0A	**1B2UM**	
2.5A	**1B2.5UM**	
3.0A	**1B3UM**	
3.5A	**1B3.5UM**	
4.0A	**1B4UM**	
5.0A	**1B5UM**	
6.0A	**1B6UM**	
10A	**1B10UM**	
13A	**1B13UM**	
15A	**1B15UM**	
16A	**1B16UM**	
20A	**1B20UM**	
25A	**1B25UZ**	
30A	**1B30UM**	
32A	**1B32UM**	
40A	**1B40UM**	
50A	**1B50UM**	
60A	**1B60UM**	
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/ Cat. No.	Approvals
1.0A	**3B1UM**	
1.6A	**3B1.6UM**	
2.0A	**3B2UM**	
2.5A	**3B2.5UM**	
3.0A	**3B3UM**	
3.5A	**3B3.5UM**	
4.0A	**3B4UM**	
5.0A	**3B5UM**	
6.0A	**3B6UM**	
10A	**3B10UM**	
13A	**3B13UM**	
15A	**3B15UM**	
16A	**3B16UM**	
20A	**3B20UM**	
25A	**3B25UM**	
30A	**3B30UM**	
32A	**3B32UM**	
40A	**3B40UM**	
50A	**3B50UM**	
60A	**3B60UM**	
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/ Cat. No.	Approvals
1.0A	**2B1UM**	
1.6A	**2B1.6UM**	
2.0A	**2B2UM**	
2.5A	**2B2.5UM**	
3.0A	**2B3UM**	
3.5A	**2B3.5UM**	
4.0A	**2B4UM**	
5.0A	**2B5UM**	
6.0A	**2B6UM**	
10A	**2B10UM**	
13A	**2B13UM**	
15A	**2B15UM**	
16A	**2B16UM**	
20A	**2B20UM**	
25A	**2B25UM**	
30A	**2B30UM**	
32A	**2B32UM**	
40A	**2B40UM**	
50A	**2B50UM**	
60A	**2B60UM**	
63A	**2B63UM**	

Add-on Neutral Pole

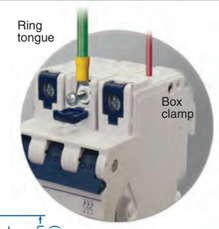
Rated Current	Type/ Cat. No.	Approvals
0.3-63A/ 480Y/277V	**N63UM**	

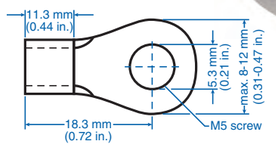
Standard Pack: 6

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





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

V-EA Series
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.

UL508 Listed
E137938

upto 25A
B,C,D curve

Standard Pack: 12

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

One Pole

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

Standard Pack: 4

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

Three Pole

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

Standard Pack: 6

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

Two Pole

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

Add-on Neutral Pole

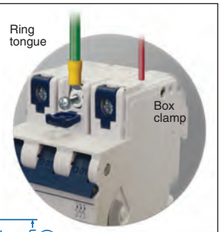
Rated Current	Type/ Cat. No.	Approvals
0.3-63A/ 480Y/277V	**N63UM**	

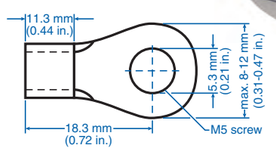
Standard Pack: 6

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





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

V-EA Series
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

upto 25A
B,C,D curve

One Pole

Standard Pack: 12

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

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

Three Pole

Standard Pack: 4

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

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

Two Pole

Standard Pack: 6

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

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

Add-on Neutral Pole

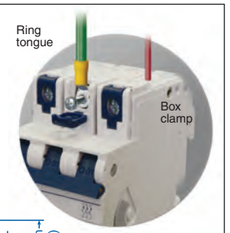
Rated Current	Type/ Cat. No.	Approvals
0.3-63A/ 480Y/277V	**N63UM**	

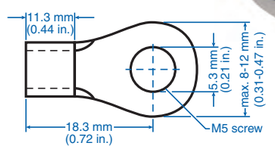
Standard Pack: 6

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





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

V-EA Series
E-Trip Characteristic

Application Examples:

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

UL508 Listed
E137938

Standard Pack: 12

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

One Pole

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

Standard Pack: 4

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

Three Pole

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

Standard Pack: 6

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

Two Pole

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

Add-on Neutral Pole

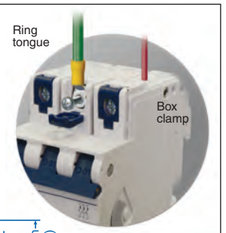
Rated Current	Type/ Cat. No.	Approvals
0.3-63A/ 480Y/277V	N63UM	

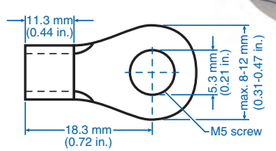
Standard Pack: 6

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





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

V-EA Series
G-Trip Characteristic

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.

UL508 Listed
E137938

Standard Pack: 12

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

One Pole

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

Standard Pack: 4

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

Three Pole

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

Standard Pack: 6

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

Two Pole

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

Add-on Neutral Pole

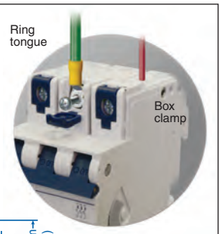
Rated Current	Type/ Cat. No.	Approvals
0.3-63A/ 480Y/277V	**N63UM**	

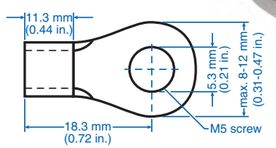
Standard Pack: 6

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





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

V-EA Series
Z-Trip Characteristic

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.

UL508 Listed
E137938

Standard Pack: 12

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

One Pole

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

Standard Pack: 4

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

Three Pole

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

Standard Pack: 6

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

Two Pole

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

Add-on Neutral Pole

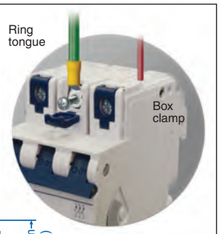
Rated Current	Type/ Cat. No.	Approvals
0.3-63A/ 480Y/277V	**N63UM**	

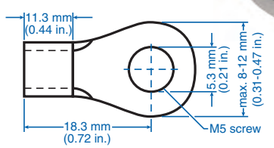
Standard Pack: 6

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

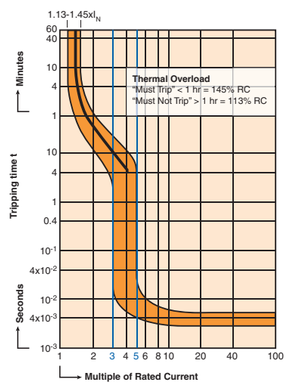




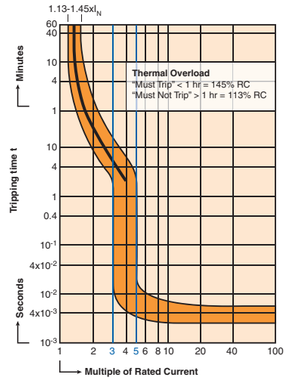
** May differ by manufacturer. Top terminal ring tongue max. thickness 1.6mm.*

V-EA Trip Curves

B Trip Curve



1.0A Through 10A Rated Current

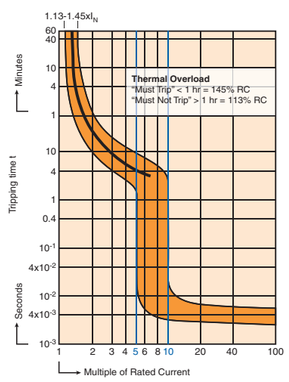


13A Through 63A Rated Current

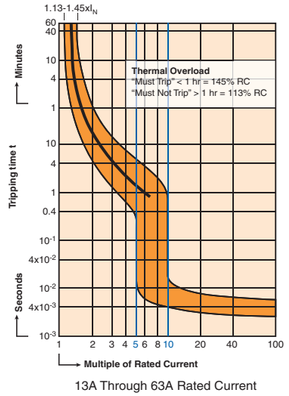
"B" Magnetic Trip Parameters
Rated current 1.0A to 63A.

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



0.3A Through 10A Rated Current

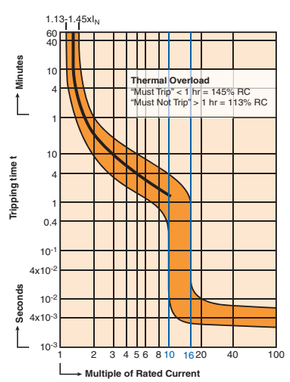


13A Through 63A Rated Current

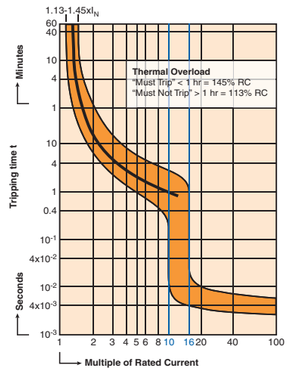
"C" Magnetic Trip Parameters
Rated current 0.3A to 63A.

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



0.3A Through 10A Rated Current



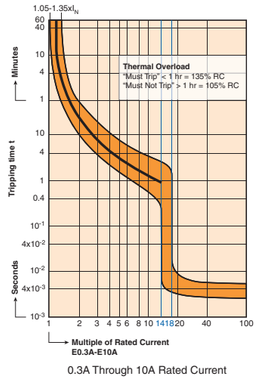
13A Through 63A Rated Current

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

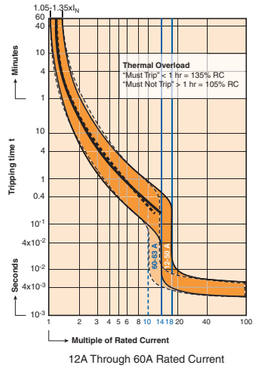
1. Hold for a minimum of 100ms at surge of 10 times rated current.
2. Trip in under 100ms at 16 times rated current.

V-EA Trip Curves

E Trip Curve



0.3A Through 10A Rated Current

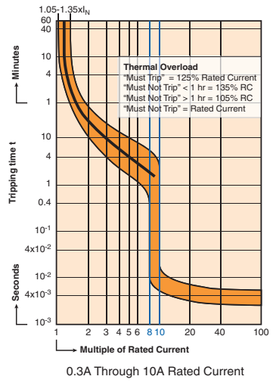


12A Through 60A Rated Current

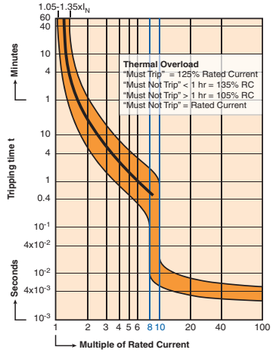
"E" Magnetic Trip Parameters
Rated Current, 0.3A to 50A, 60/63A (dotted line).

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 Trip Curve



0.3A Through 10A Rated Current

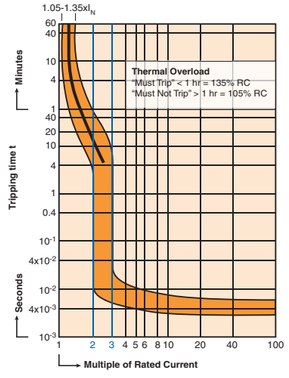


12A Through 63A Rated Current

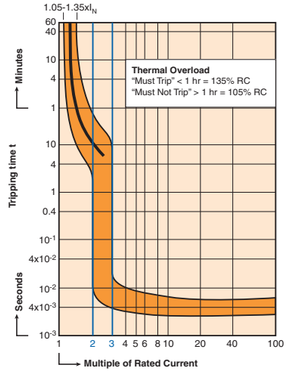
"G" Magnetic Trip Parameters
Rated Current, 0.3A to 63A.

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



0.3A Through 10A Rated Current



12A Through 50A 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 & 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	MOTOR NAMEPLATE	MOTOR NAMEPLATE	110-120 VAC	200 VAC	208 VAC	220-240 VAC	265 VAC	277 VAC
CURRENT (SEE NOTE #1)	FLA RATING	STARTING/ LRC RATING						
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® 2011 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 Motor Design		200 VAC Motor Design		208 VAC Motor Design		220-240 VAC (SEE NOTE #3) Motor Design		440-480 VAC 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 12.0A 12.5A	10.0A 12.0A 12.5A	84.0A 100.8A 105.0A	1hp 1 1/2hp 1 1/2hp	1hp 1 1/2hp 1 1/2hp	2hp 3hp 3hp	2hp 3hp 3hp	2hp 3hp 3hp	2hp 3hp 3hp	3hp 3hp 3hp	3hp 3hp 3hp	5hp 7 1/2hp 7 1/2hp	5hp 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® 2011 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:

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

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

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	—	6,000	—	4,000	10,000
AC Motor Starting Across the Line	1,000	—	5,000	4,000	10,000
AC Incandescent Lamps (Tungsten)	—	—	6,000	4,000	10,000
AC Electrical Discharge Lamps (Ballast)	—	6,000	—	4,000	10,000
AC Resistance	—	6,000	—	4,000	10,000

Manufacturers self certification	20000 ON/OFF operations with no load

MA- Series

Three Phase Adjustable Trip Miniature Circuit Breakers/ Manual Motor Controllers

UL508 listed
E137938

CAN/CSA-C22.2 No.14 certified

The MA was designed to handle the high inrush loads of 3 phase transformers, power supplies, motors, etc. The MA protects wiring and equipment from damage caused by the three major classes of over-current, yet greatly reduces the number of nuisance trips in high starting and inrush current circuits.

An IEC device with excellent ratings under a UL listing at 480Y/277V (including group ratings) and at 500V under international standards, the Altech/ABL Sursum MA provides short and long term cost effective circuit protection for USA and/or export applications. The short term advantages include: (1) adjustable thermal trip allows finalization of initial designs before procurement of the load equipment is complete; (2) snap-on mounting for readily available, internationally standardized DIN Rail saves panel layout design time as well as installation and change labor; (3) large cage-clamp terminals with screws suitable to power screwdrivers, simplifies and speeds wiring; (4) convenient switched disconnect during factory testing and/or initial start-up saves time and aggravation. The key long term advantage is customer satisfaction and proven over-current protection of wiring and equipment (and the lack of rework/repair costs).

Type Designation

MA	16	U	M
(a)	**(b)**	**(c)**	**(d)**

(a) = MA - Manual Motor Controller
(b) = Rated Current
(c) = U - US Housing
= R - US Housing + Ring Tongue
(d) = M - Part No. Designation

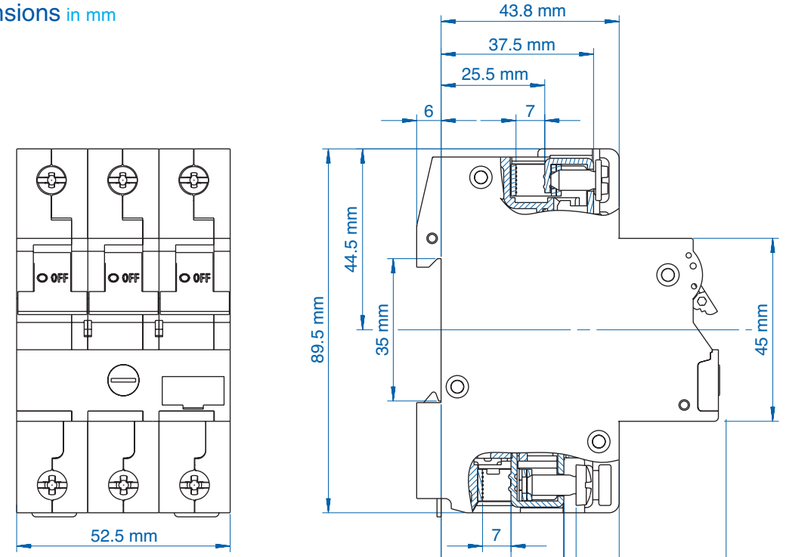
Voltage Rating	480Y/277V AC
AIC (Interrupt Capacity)	0.16A-2.5A: 42kA; 4.0A-16A: 14kA; 20A-40A: 10kA
Standard Short Circuit Withstand Rating (UL/CSA Ratings)	0.16A-2.5A: 42kA; 4.0A-16A: 14kA; 20A-40A: 10kA
Group Short Circuit Ratings (UL/CSA Ratings)	see above
Typical Life	6,000 on/off operations with 2xRC
Calibration Temperature	25°C, +0°, -5° (77°F, +0° -9°)
Standard Pack and Weight	1/450g (1.0 lb.)
Terminal Size Acceptability	Top/Bottom: 18-3 AWG
Terminal Torque (min/max)	2 Nm (17.7 lb.in.) / 2.5Nm (22.2 lb.in)

Cat. No.	Rated Current	FLA Dial Adjustment Markings	GROUP SHORT CIRCUIT RATING AT 480VAC[a] (and BCP size)	3Ø HORSEPOWER RATINGS AT NOMINAL LINE VOLTAGE (See Note for HEA Definition)				
				110-120V HP (HEA)	200V HP (HEA)	208V HP (HEA)	220-240V HP (HEA)	460-480V HP (HEA)
MA016UM	0.16A	0.1/ 0.12/0.14/0.16	42kA$_{RMS}$ symmetrical (max. 1200A MCCB or RK5)	Through MA2.5U, ampere rated for motor circuits having a full-load-amperage (FLA) not exceeding the MA's general purpose rated current (RC, equals maximum dial setting) and a locked rotor current not exceeding 6 times the MA's RC.				
MA025UM	0.25A	0.16/0.19/0.22/0.25						
MA040UM	0.40A	0.25/0.30/0.35/0.40						
MA063UM	0.63A	0.40/0.48/0.56/0.63						
MA1.0UM	1.0A	0.63/0.75/0.87/1.0						
MA1.6UM	1.6A	1.0/1.2/1.4/1.6						
MA2.5UM	2.5A	1.6/1.9/2.2/2.5						
MA4.0UM	4.0A	2.5/3.0/3.5/4.0	14kA$_{RMS}$ symmetrical (max. 350A MCCB or RK5)	1/2 (4.0)	3/4 (3.2)	3/4 (3.1)	1 (3.6)	2 (3.42)
MA6.3UM	6.3A	4.0/4.8/5.6/6.3		3/4 (5.6)	1 1/2 (6.0)	1 1/2 (5.7)	1 1/2 (5.2)	3 (4.8)
MA10UM	10A	6.3/7.5/8.7/10		1 (7.2)	2 (7.8)	2 (7.5)	3 (9.6)	5 (7.6)
MA16UM	16A	10/12/14/16		2 (13.6)	3 (11.0)	3 (10.6)	5 (15.2)	10 (14.0)
MA20UM	20A	16/17/18.5/20	10kA$_{RMS}$ symmetrical (max. 350A MCCB or RK5)	3 (19.2)	5 (17.5)	5 (16.7)	5 (15.2)	10 (14.0)
MA25UM	25A	20/21.5/23/25		3 (19.2)	5 (17.5)	7 1/2 (24.2)	7 1/2 (22.0)	15 (21.0)
MA32UM	32A	25/27/30/32		5 (30.4)	7 1/2 (25.0)	7 1/2 (24.2)	10 (28.0)	20 (27.0)
MA40UM	40A	32/34/37/40		5 (30.4)	10 (32.0)	10 (31.0)	10 (28.0)	25 (34.0)

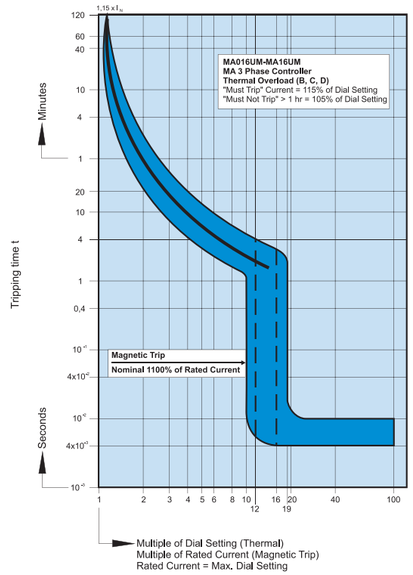
Note: **HEA - Horsepower Equivalent Amperes**, the nominal amperage assigned to standard motor horsepower ratings in design guide tables such as NFPA-70 Tables 430-248, 430-249, 430-250; UL1077 Table 16.2; CSA - C22.2 No. 235-M89 Tables 44 and 45; CSA-C22.2 No. 14-M91 Table 19, etc. Multiply HEA values (in parenthesis) by 1.1 if power factor is 90%, and by 1.2 if power factor is 80%.

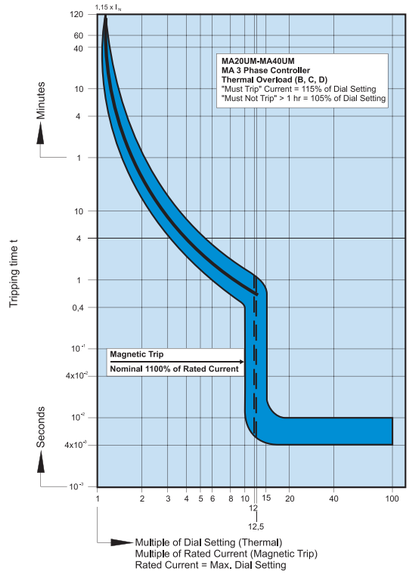
[a] The standard-circuit short-circuit rating is 14kA for all types. Group ratings can be used in a standard circuit (e.g., MA1.0U at 42kA), but a higher standard rating cannot be used in a group circuit (e.g., MA40U at 14kA only in standard circuit.)

Dimensions in mm



MA- Series Trip Curves





MA/USA Manual Motor Controller

UM (V-EA) and MA Accessories

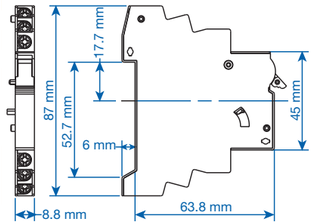
For mounting instructions please refer to page 43.

UL Listed
E137938

Auxiliary Contact, Alarm Switch

Type/ Cat No.	Description	Contacts Type	Std Pk
H10UM	1 Auxiliary Contact	1NO	6
H11UM	2 Auxiliary Contacts	1NO + 1NC	6
H12UM	3 Auxiliary Contacts	1NO + 2NC	6
H21UM	3 Auxiliary Contacts	2NO + 1NC	6
HLS11M*	1 Auxiliary/1 Signal Contacts	1CO + 1CO (Signal)	6

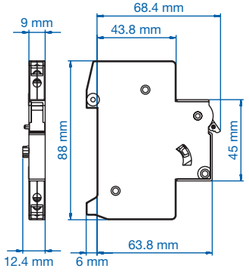
Rated Operating Currents	10A@240V AC 3A@110V DC 1A@220V DC
Minimum Contact Load	1mA @ 24V DC
Torque	max. 0.8Nm (7 lb.in)
Wire Range:	
Single Wire	1.0mm² - 2.5mm² (18-14 AWG)
Stranded Wire	1.0mm² - 1.5mm² (18-16 AWG)
Stranded Wire with Ferrule	1.0mm² - 1.5mm² (18-16 AWG)



Dimensions HxxUM.

Shunt Trip

Type/ Cat No.	Rated Voltage U_N	Max. Operating Current @ U_N	Std Pk
FA12UM	12V AC/DC	1.3A	5
FA24UM	24V AC/DC	0.6A	5
FA48UM	48 - 72V AC/DC	0.2A	5
FA110UM	110 - 240V AC/DC, 277V AC	0.25A @ 110V 0.5A @ 240V 0.58A @ 277V	5



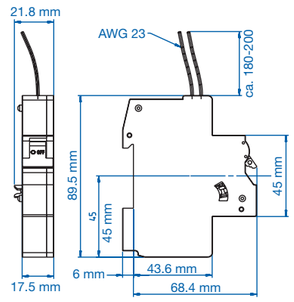
Dimensions HLS11M.

Undervoltage Trip*

Type/ Cat No.	Line Voltage V_E	Std Pk
UA120UM	120V AC, 60Hz	5

Reset-Hold Voltage = 0.85 x V_E
Drop-Out Voltage = 0.35 ~ 0.7 x V_E

V_E = Rated Voltage



Dimensions UA120UM.

* Not UL approved.

** UM (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.

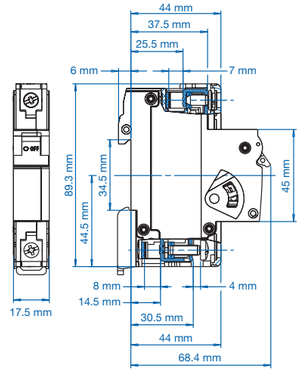
UM (V-EA) and MA Accessories

For mounting instructions please refer to page 43.

UL Listed
E137938

Neutral Pole

Type/ Cat No.	Rated Current I_N	Rated Voltage U_N	Std Pk
N63UM	0.3 - 63A	480Y/277V AC	6



Dimensions N63UM, FAxxUM.

Touch Protection Caps

to cover the terminal screw holes on the switching devices, neutral Poles and shunt trips for increased touch protection.

Type/ Cat No.	Std Pk
BS.UL	100

Cooling Spacer

Type/ Cat No.	Std Pk
15.960	1

Mounting Screw 34mm

to connect the auxiliary contact and shunt trip or neutral Pole to the circuit breaker.

Type/ Cat No.	Std Pk
E983419	10

Lock-out Adapter**

Type/ Cat No.	Std Pk
EASS	10

MS-Series
Three Phase Adjustable Trip Economy Manual Motor Controllers

with overload and short circuit protection, phase failure sensitivity according to IEC 947-4-1, DIN VDE 0660 Part 102

With its high breaking capacity and current limitation the MS Manual Motor Controllers provide optimum protection for electrical motors as well as for other consumer units up to 25 amps. They are equipped with phase failure sensitivity, isolating and main switch functions. 13 ranges cover nominal rated currents from 0.1 up to 25 amps.
The MS's are temperature compensated; the trip current of the magnetic part is 12 x I_n. The Manual Motor Controllers are built in accordance with IEC 947.

E137938

Type Designation

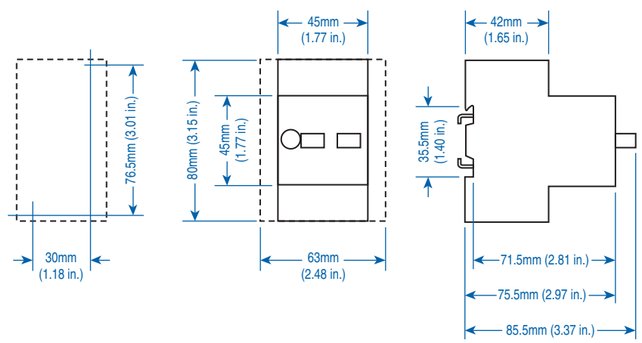
MS 016
(a) (b)

(a) = MS - Manual Motor Controller
(b) = Rated Current

Type/ Cat. No.	Rated Current	Overload release adjustment/FLA	Instantaneous setting	3Ø Horsepower Rating				
		(A)	(A)	115V	200V	230V	480V	600V
MS016	0.16	0.1 - 0.16	1.92	Ampere rated for motor circuits having a full-load-amperage (FLA) not exceeding the MS's general purpose rated current and a locked rotor current not exceeding 6 times the MS's rated current.				
MS025	0.25	0.16 - 0.25	3					
MS04	0.4	0.25 - 0.4	4.8					
MS063	0.63	0.4 - 0.63	7.6				–	–
MS1	1.0	0.63 - 1	12				1/2hp	1/2hp
MS1.6	1.6	1 - 16	19.2	–	–	–	3/4hp	1hp
MS2.5	2.5	1.6 - 2.5	30	–	1/2hp	1/2hp	1hp	1 1/2hp
MS4	4.0	2.5 - 4	48	1/2hp	3/4hp	1hp	2hp	3hp
MS6.3	6.3	4 - 6.3	75.6	3/4hp	1 1/2hp	1 1/2hp	3hp	5hp
MS10	10.0	6.3 - 10	120	1hp	2hp	3hp	5hp	7 1/2hp
MS16	16.0	10 - 16	192	2hp	3hp	5hp	10hp	10hp
MS20	20.0	16 - 20	240	3hp	5hp	7 1/2hp	15hp	–
MS25	25.0	20 - 25	300	3hp	5hp	7 1/2hp	15hp	–

Maximum Voltage	600V AC (MS20 and MS25, 480V AC)
Short Circuit Withstanding Rating (UL/CSA Rating)	5kA
Group Short Circuit Withstanding Rating (UL/CSA Rating)	5kA
Interrupting Capacity (VDE - Ratings)	0.16-6.3A: Self protected 10-25A: 6kA
Mechanical Endurance	10,000 on/off operations
Standard Pack and Weight	1/250g (0.55lb)
Terminal Size Acceptability	14-10 AWG
Terminal Torque	1.8Nm (16lb. in.)

Dimensions



Accessories

MS Three Phase Adjustable Trip Economy Manual Motor Controllers

Auxiliary contact blocks for side mounting (3.5A/230V AC; 2A/400V AC)

Width mm	Contacts	Type/ Cat. No.	Weight g/pc.	Std. Pk.
9	2NO	**HMS20**	40	10
9	1NO + 1NC	**HMS11**	40	10
9	1NO	**HMS10**	35	10
9	2NC	**HMS02**	40	10
9	1NC	**HMS01**	35	10

Insulated Enclosure IP55

with integrated PE(N) terminal; top and bottom each have 2 metric knock-outs

Type/ Cat. No.	Weight g/pc.	Std. Pk.
MS.G55	240	1

Emergency-Stop

twist or key to release, red on yellow background

Release Type	Type/ Cat. No.	Weight g/pc.	Std. Pk.
Twist	**MS.PV**	60	5
Key	**MS.PS2**	65	5

Flush Mounting Enclosure IP55

with integrated PE(N) terminal

Type/ Cat. No.	Weight g/pc.	Std. Pk.
MS.F55	170	1

Indicator Light

with neon bulb, nominal rated voltage: 220 - 240V or 380 - 440V

Color	Type/ Cat. No. 220-240V	Type/ Cat. No. 380-440V	Weight g/pc.	Std. Pk.
trans	**MS.SLW2**	**MS.SLW3**	10	5
green	**MS.SLG2**	**MS.SLG3**	10	5
red	**MS.SLR2**	**MS.SLR3**	10	5
yellow	**MS.SLJ2**	**MS.SLJ3**	10	5

Busbar

Busbar 63A	Type/Cat. No. for 2 MS	for 3 MS	for 4 MS	for 5 MS
no spacing	**G45-14-2**	**G45-14-3**	**G45-14-4**	**G45-14-5**
with auxiliary switch (1/2 pole) spacing	**G54-14-2**	**G54-14-3**	**G54-14-4**	**G54-14-5**

Power Feed Block

Type/ Cat. No.	Rating (A)	Std. Pk.
GE2-14	63A	1

UR Series

UL1077 Recognized Supplementary Protector

- DIN Rail Mounted
- 17.5mm width per pole
- Thermal Magnetic
- 0.5-60A / 480Y/277V AC, 50/60Hz
- 10kA Short Circuit Withstand Capacity
- Applications (on the load side of Branch Circuit Protection) include: Sensitive Electronics, Power Supplies, Appliance circuits, etc.

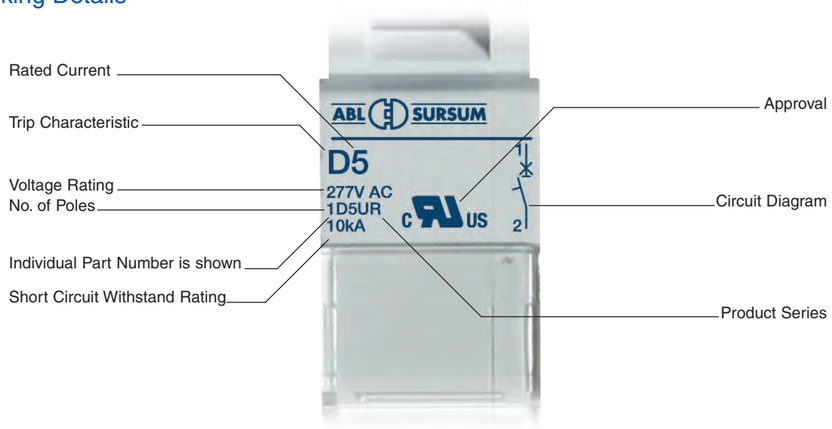
UR - Series	
Voltage Rating	0.5-60A / 480Y/277V AC
Short Circuit Withstand Rating	0.5 - 10A (RC): 10 kA with no back-up fuse 8 - 63A (RC): 10 kA with UL-listed Class J back-up fuse; 5 kA with no back-up fuse
Calibration Temperature	30°C (86°F)
Ambient Temperature	-25°C to +55°C (-13°F to 131°F)
Storage Temperature	-40°C to +70°C (-40°F to 158°F)
Terminal Torque (min/max)	2 Nm (17.7 lb.in.) / 2.5Nm (22.2 lb.in)
Electrical Life	6,000 switching cycles ON/ OFF
Mechanical Life	10,000 switching cycles ON/ OFF
Vibration Resistance	> 15g according to DIN EN 60069-2-59 during a load with 1.05 x I_N
Resistance to mechanical shocks	25g @ 11ms
Degree of protection acc. IEC/EN 60529	IP20
Mounting Orientation	In any plane

Short Circuit Withstand Ratings for R-Series Supplementary Protector

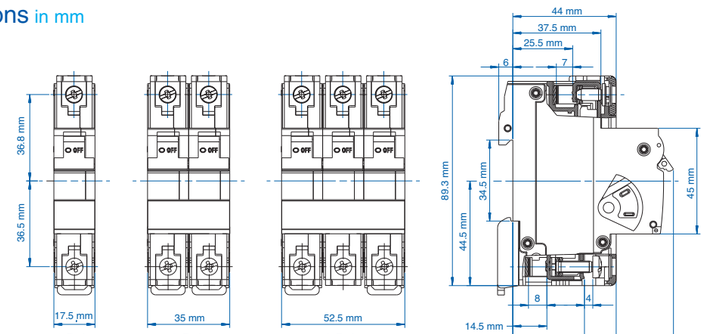
Trip Curve	Amp Range	Backup Protection	
		UL-Listed Class J Fuse up to 10kA	No Backup Fuse Required up to:
All	0.5 - 10A	70A	10kA
All	12 - 60A	4xRC*	5kA

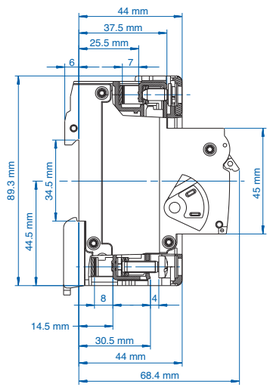
*up to nearest rated current

Marking Details



Dimensions in mm





Application Overview

Trip-Characteristics*				Applications					
Characteristic Trip Boundaries				Lighting Wiring Protection Control Circuits	Business Equipment Appliances	Control Transformers	Power Supplies	General Electronics	Reactive Load
Thermal Trip		Magnetic Trip							
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	20xRC						

**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/Supplementary Protector 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/Supplementary Protector for his specific application.

UR - Series
B-Trip Characteristic

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.

c UL us
UL Recognized
E137915

CE

Standard Pack: 12

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

One Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**1B05UR**	277V AC
1.0A	**1B1UR**	277V AC
2.0A	**1B2UR**	277V AC
3.0A	**1B3UR**	277V AC
4.0A	**1B4UR**	277V AC
5.0A	**1B5UR**	277V AC
6.0A	**1B6UR**	277V AC
8.0A	**1B8UR**	277V AC
10A	**1B10UR**	277V AC
12A	**1B12UR**	277V AC
13A	**1B13UR**	277V AC
15A	**1B15UR**	277V AC
16A	**1B16UR**	277V AC
20A	**1B20UR**	277V AC
25A	**1B25UR**	277V AC
30A	**1B30UR**	277V AC
32A	**1B32UR**	277V AC
40A	**1B40UR**	277V AC
50A	**1B50UR**	277V AC
60A	**1B60UR**	277V AC
63A*	**1B63UR**	277V AC

Standard Pack: 4

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

Three Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**3B05UR**	480Y/277V AC
1.0A	**3B1UR**	480Y/277V AC
2.0A	**3B2UR**	480Y/277V AC
3.0A	**3B3UR**	480Y/277V AC
4.0A	**3B4UR**	480Y/277V AC
5.0A	**3B5UR**	480Y/277V AC
6.0A	**3B6UR**	480Y/277V AC
8.0A	**3B8UR**	480Y/277V AC
10A	**3B10UR**	480Y/277V AC
12A	**3B12UR**	480Y/277V AC
13A	**3B13UR**	480Y/277V AC
15A	**3B15UR**	480Y/277V AC
16A	**3B16UR**	480Y/277V AC
20A	**3B20UR**	480Y/277V AC
25A	**3B25UR**	480Y/277V AC
30A	**3B30UR**	480Y/277V AC
32A	**3B32UR**	480Y/277V AC
40A	**3B40UR**	480Y/277V AC
50A	**3B50UR**	480Y/277V AC
60A	**3B60UR**	480Y/277V AC
63A*	**3B63UR**	480Y/277V AC

Standard Pack: 6

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

Two Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**2B05UR**	480Y/277V AC
1.0A	**2B1UR**	480Y/277V AC
2.0A	**2B2UR**	480Y/277V AC
3.0A	**2B3UR**	480Y/277V AC
4.0A	**2B4UR**	480Y/277V AC
5.0A	**2B5UR**	480Y/277V AC
6.0A	**2B6UR**	480Y/277V AC
8.0A	**2B8UR**	480Y/277V AC
10A	**2B10UR**	480Y/277V AC
12A	**2B12UR**	480Y/277V AC
13A	**2B13UR**	480Y/277V AC
15A	**2B15UR**	480Y/277V AC
16A	**2B16UR**	480Y/277V AC
20A	**2B20UR**	480Y/277V AC
25A	**2B25UR**	480Y/277V AC
30A	**2B30UR**	480Y/277V AC
32A	**2B32UR**	480Y/277V AC
40A	**2B40UR**	480Y/277V AC
50A	**2B50UR**	480Y/277V AC
60A	**2B60UR**	480Y/277V AC
63A*	**2B63UR**	480Y/277V AC

*63A is not UL Recognized.

Add-on Neutral Pole

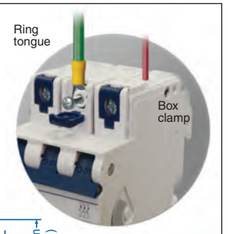
Rated Current	Type/ Cat. No.	Rated Voltage
0.3-63A	**N63UM**	480/277V AC

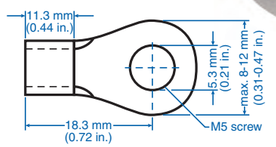
Standard Pack: 6

Weight:
0.775kg (1.71)

Standard Dual Connection Terminal

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





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

UR - Series
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.

c UL us
UL Recognized
E137915

CE

Standard Pack: 12

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

One Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**1C05UR**	277V AC
1.0A	**1C1UR**	277V AC
2.0A	**1C2UR**	277V AC
3.0A	**1C3UR**	277V AC
4.0A	**1C4UR**	277V AC
5.0A	**1C5UR**	277V AC
6.0A	**1C6UR**	277V AC
8.0A	**1C8UR**	277V AC
10A	**1C10UR**	277V AC
12A	**1C12UR**	277V AC
13A	**1C13UR**	277V AC
15A	**1C15UR**	277V AC
16A	**1C16UR**	277V AC
20A	**1C20UR**	277V AC
25A	**1C25UR**	277V AC
30A	**1C30UR**	277V AC
32A	**1C32UR**	277V AC
40A	**1C40UR**	277V AC
50A	**1C50UR**	277V AC
60A	**1C60UR**	277V AC
63A*	**1C63UR**	277V AC

Standard Pack: 4

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

Three Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**3C05UR**	480Y/277V AC
1.0A	**3C1UR**	480Y/277V AC
2.0A	**3C2UR**	480Y/277V AC
3.0A	**3C3UR**	480Y/277V AC
4.0A	**3C4UR**	480Y/277V AC
5.0A	**3C5UR**	480Y/277V AC
6.0A	**3C6UR**	480Y/277V AC
8.0A	**3C8UR**	480Y/277V AC
10A	**3C10UR**	480Y/277V AC
12A	**3C12UR**	480Y/277V AC
13A	**3C13UR**	480Y/277V AC
15A	**3C15UR**	480Y/277V AC
16A	**3C16UR**	480Y/277V AC
20A	**3C20UR**	480Y/277V AC
25A	**3C25UR**	480Y/277V AC
30A	**3C30UR**	480Y/277V AC
32A	**3C32UR**	480Y/277V AC
40A	**3C40UR**	480Y/277V AC
50A	**3C50UR**	480Y/277V AC
60A	**3C60UR**	480Y/277V AC
63A*	**3C63UR**	480Y/277V AC

Standard Pack: 6

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

Two Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**2C05UR**	480Y/277V AC
1.0A	**2C1UR**	480Y/277V AC
2.0A	**2C2UR**	480Y/277V AC
3.0A	**2C3UR**	480Y/277V AC
4.0A	**2C4UR**	480Y/277V AC
5.0A	**2C5UR**	480Y/277V AC
6.0A	**2C6UR**	480Y/277V AC
8.0A	**2C8UR**	480Y/277V AC
10A	**2C10UR**	480Y/277V AC
12A	**2C12UR**	480Y/277V AC
13A	**2C13UR**	480Y/277V AC
15A	**2C15UR**	480Y/277V AC
16A	**2C16UR**	480Y/277V AC
20A	**2C20UR**	480Y/277V AC
25A	**2C25UR**	480Y/277V AC
30A	**2C30UR**	480Y/277V AC
32A	**2C32UR**	480Y/277V AC
40A	**2C40UR**	480Y/277V AC
50A	**2C50UR**	480Y/277V AC
60A	**2C60UR**	480Y/277V AC
63A*	**2C63UR**	480Y/277V AC

*63A is not UL Recognized.

Add-on Neutral Pole

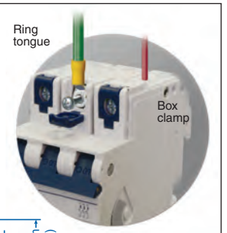
Rated Current	Type/ Cat. No.	Rated Voltage
0.3-63A	**N63UM**	480/277V AC

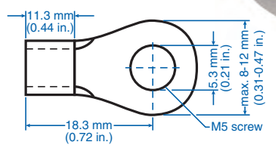
Standard Pack: 6

Weight:
0.775kg (1.71)

Standard Dual Connection Terminal

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





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

UR - Series
D-Trip Characteristic

Application Examples:

Control transformers, power supplies, reactive loads. Relatively long thermal trip delay and very high magnetic trip point.

c UL us
UL Recognized
E137915

CE

Standard Pack: 12

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

One Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**1D05UR**	277V AC
1.0A	**1D1UR**	277V AC
2.0A	**1D2UR**	277V AC
3.0A	**1D3UR**	277V AC
4.0A	**1D4UR**	277V AC
5.0A	**1D5UR**	277V AC
6.0A	**1D6UR**	277V AC
8.0A	**1D8UR**	277V AC
10A	**1D10UR**	277V AC
12A	**1D12UR**	277V AC
13A	**1D13UR**	277V AC
15A	**1D15UR**	277V AC
16A	**1D16UR**	277V AC
20A	**1D20UR**	277V AC
25A	**1D25UR**	277V AC
30A	**1D30UR**	277V AC
32A	**1D32UR**	277V AC
40A	**1D40UR**	277V AC
50A	**1D50UR**	277V AC
60A	**1D60UR**	277V AC
63A*	**1D63UR**	277V AC

Standard Pack: 4

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

Three Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**3D05UR**	480Y/277V AC
1.0A	**3D1UR**	480Y/277V AC
2.0A	**3D2UR**	480Y/277V AC
3.0A	**3D3UR**	480Y/277V AC
4.0A	**3D4UR**	480Y/277V AC
5.0A	**3D5UR**	480Y/277V AC
6.0A	**3D6UR**	480Y/277V AC
8.0A	**3D8UR**	480Y/277V AC
10A	**3D10UR**	480Y/277V AC
12A	**3D12UR**	480Y/277V AC
13A	**3D13UR**	480Y/277V AC
15A	**3D15UR**	480Y/277V AC
16A	**3D16UR**	480Y/277V AC
20A	**3D20UR**	480Y/277V AC
25A	**3D25UR**	480Y/277V AC
30A	**3D30UR**	480Y/277V AC
32A	**3D32UR**	480Y/277V AC
40A	**3D40UR**	480Y/277V AC
50A	**3D50UR**	480Y/277V AC
60A	**3D60UR**	480Y/277V AC
63A*	**3D63UR**	480Y/277V AC

Standard Pack: 6

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

Two Pole

Rated Current	Type/ Cat. No.	Rated Voltage
0.5A	**2D05UR**	480Y/277V AC
1.0A	**2D1UR**	480Y/277V AC
2.0A	**2D2UR**	480Y/277V AC
3.0A	**2D3UR**	480Y/277V AC
4.0A	**2D4UR**	480Y/277V AC
5.0A	**2D5UR**	480Y/277V AC
6.0A	**2D6UR**	480Y/277V AC
8.0A	**2D8UR**	480Y/277V AC
10A	**2D10UR**	480Y/277V AC
12A	**2D12UR**	480Y/277V AC
13A	**2D13UR**	480Y/277V AC
15A	**2D15UR**	480Y/277V AC
16A	**2D16UR**	480Y/277V AC
20A	**2D20UR**	480Y/277V AC
25A	**2D25UR**	480Y/277V AC
30A	**2D30UR**	480Y/277V AC
32A	**2D32UR**	480Y/277V AC
40A	**2D40UR**	480Y/277V AC
50A	**2D50UR**	480Y/277V AC
60A	**2D60UR**	480Y/277V AC
63A*	**2D63UR**	480Y/277V AC

**63A is not UL Recognized.*

Add-on Neutral Pole

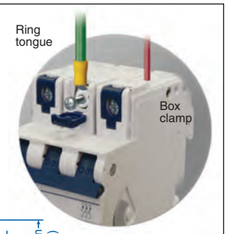
Rated Current	Type/ Cat. No.	Rated Voltage
0.3-63A	**N63UM**	480/277V AC

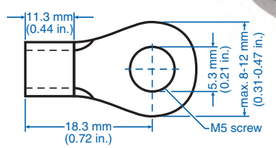
Standard Pack: 6

Weight:
0.775kg (1.71)

Standard Dual Connection Terminal

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





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

UR Series Accessories

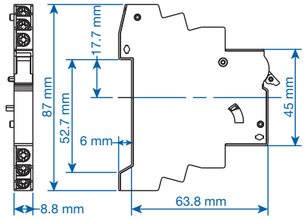
For mounting instructions please refer to page 43.

UL Listed
E137938

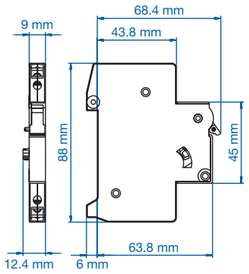
Auxiliary Contact, Alarm Switch

Type/ Cat No.	Description	Contacts Type	Std Pk
H10UM	1 Auxiliary Contact	1NO	6
H11UM	2 Auxiliary Contacts	1NO + 1NC	6
H12UM	3 Auxiliary Contacts	1NO + 2NC	6
H21UM	3 Auxiliary Contacts	2NO + 1NC	6
HLS11M*	1 Auxiliary/ 1 Signal Contacts	1CO + 1CO (Signal)	6

Rated Operating Currents	10A@240V AC 3A@110V DC 1A@220V DC
Minimum Contact Load	1mA @ 24V DC
Torque	max. 0.8Nm (7 lb.in)
Wire Range:	
Single Wire	1.0mm² - 2.5mm² (18-14 AWG)
Stranded Wire	1.0mm² - 1.5mm² (18-16 AWG)
Stranded Wire with Ferrule	1.0mm² - 1.5mm² (18-16 AWG)



Dimensions HxxUM.



Dimensions HLS11M.

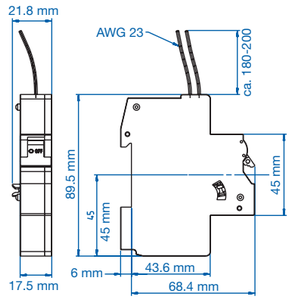
Shunt Trip

Type/ Cat No.	Rated Voltage U_N	Max. Operating Current @ U_N	Std Pk
FA12UM	12V AC/DC	1.3A	5
FA24UM	24V AC/DC	0.6A	5
FA48UM	48 - 72V AC/DC	0.2A	5
FA110UM	110 - 240 V AC/DC, 277V AC	0.25A @ 110V 0.5A @ 240V 0.58A @ 277V	5

Undervoltage Trip*

Type/ Cat No.	Line Voltage V_E	Std Pk
UA120UM	120V AC, 60Hz	5

Reset-Hold Voltage = 0.85 x V_E
Drop-Out Voltage = 0.35 ~ 0.7 x V_E
V_E = Rated Voltage



Dimensions UA120UM.

Neutral Pole

Type/ Cat No.	Rated Current I_N	Rated Voltage U_N	Std Pk
N63UM	0.3 - 63A	480Y/277V AC	6

Touch Protection Caps

to cover the terminal screw holes on the switching devices, neutral Poles and shunt trips for increased touch protection.

Type/ Cat No.	Std Pk
BS.UL	100

Cooling Spacer

Type/ Cat No.	Std Pk
15.960	1

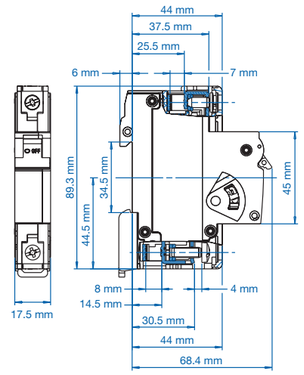
Mounting Screw 34mm

to connect the auxiliary contact and shunt trip or neutral Pole to the circuit breaker.

Type/ Cat No.	Std Pk
E983419	10

Lock-out Adapter**

Type/ Cat No.	Std Pk
EASS	10



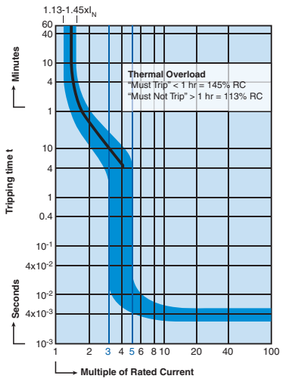
Dimensions N63UM, FAxxUM.

* Not UL approved.

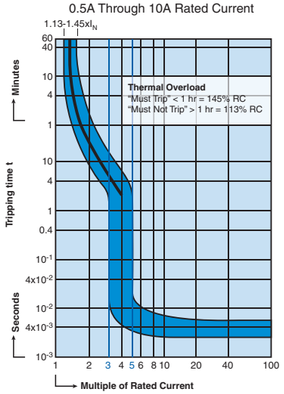
** UR series can also be locked in the on and off position by simply using a common lead or meter seal, which gets fed through the hole in the handle and a corresponding hole in the housing.

UR Series Trip Curves

B Trip Curve



0.5A Through 10A Rated Current

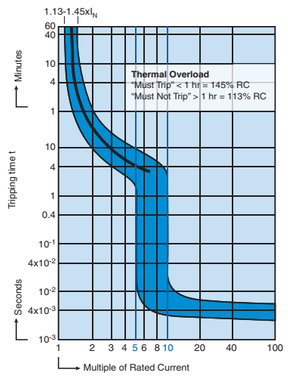


12A Through 63A Rated Current

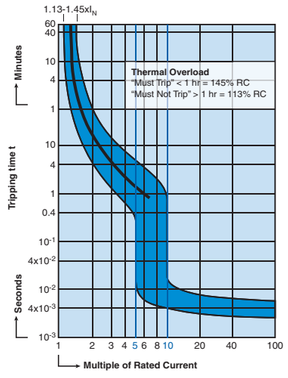
"B" Magnetic Trip Parameters
Rated current 0.5A to 63A.

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



0.5A Through 10A Rated Current

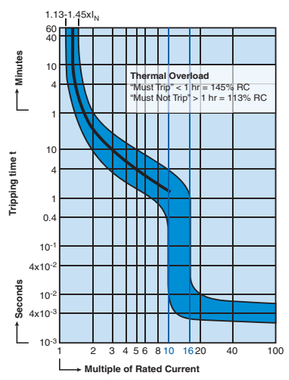


12A Through 63A Rated Current

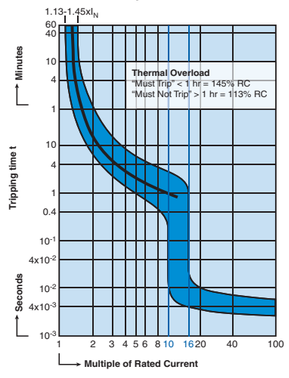
"C" Magnetic Trip Parameters
Rated current 0.5A to 63A.

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



0.3A Through 10A Rated Current



12A Through 63A Rated Current

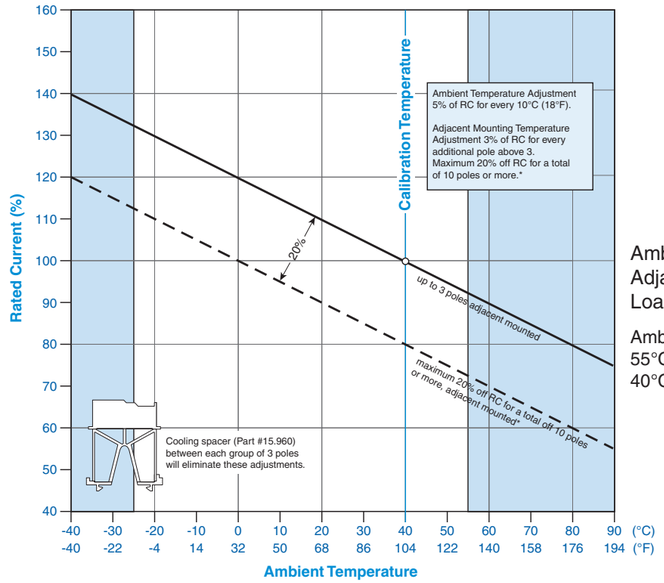
"D" Magnetic Trip Parameters
Rated current 0.5A to 63A.

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

UR Series Internal Resistance

Rated Current (A)	Trip Characteristic B (Ohm)	C (Ohm)	D (Ohm)
0.5	8.0400	6.8540	6.0009
1.0	1.7000	1.7000	1.7560
2.0	0.4190	0.4190	0.4190
3.0	0.2020	0.2020	0.2020
4.0	0.1090	0.1090	0.1090
5.0	0.0654	0.0654	0.0654
6.0	0.0528	0.0528	0.0491
8.0	0.0278	0.0278	0.0240
10	0.0216	0.0216	0.0187
12/ 13	0.0113	0.0084	0.0085
15/ 16	0.0085	0.0085	0.0076
20	0.0067	0.0067	0.0064
25	0.0050	0.0050	0.0041
30/ 32	0.0032	0.0032	0.0027
40	0.0025	0.0025	0.0022
50	0.0019	0.0019	0.0018
60/ 63*	0.0018	0.0018	0.0017

Temperature Correction Curve (UL, DL, V-EA, MA and UR series)

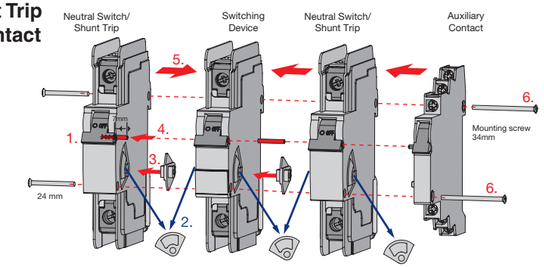


Ambient Temperature and Adjacent Mounting/ Loading Adjustment

Ambient Temperature 25°C to 55°C, Storage Temperature -40°C to 70°C

Accessory Mounting Instructions (UL, V-EA and UR series)

Neutral / Shunt Trip + Auxiliary Contact

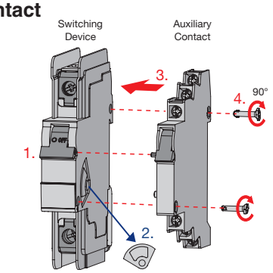


Neutral Poles N63UM, N32UL, N63UL or Shunt Trips FA..UM, FA..UL can be mounted on the right or left side of the circuit protection device.

1. Turn handle to off position.
2. Remove gray cover from the circuit protection device and accessory.
3. Insert linkage component between circuit protection device and neutral pole (N63UM, N32UL, N63UL) or shunt trip (FA..UM, FA..UL).
4. Insert connecting pin into handle.
5. Assemble circuit protection device and neutral pole (N63UM, N32UL, N63UL) or shunt trip (FA..UM, FL..UL).
6. The auxiliary contact (H..UM, H..UL) can also be mounted on the right side by using a different screw (E983419; see accessory pages 14, 32 or 41).

After final assembly check operation by moving the handle to the ON/OFF position several times.

Auxiliary Contact



Auxiliary contact can be mounted on the right side of the circuit protection device only.

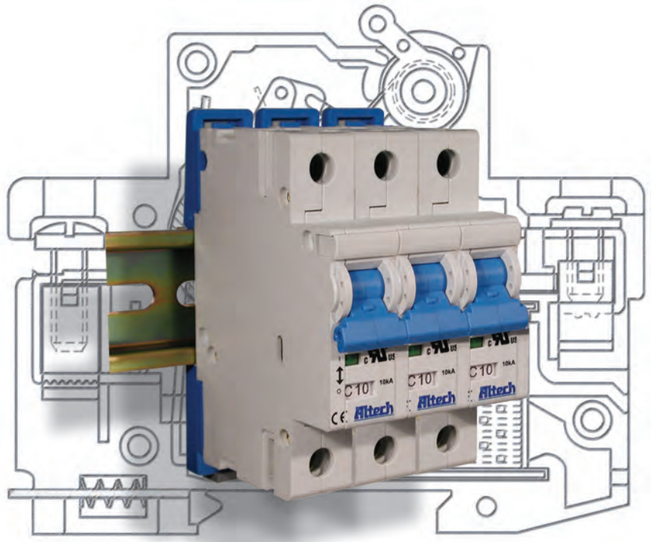
1. Turn handles to OFF position.
2. Remove gray cover from switching device.
3. Combine circuit protection device and auxiliary contact (H...UM, H...UL).
4. Insert mounting screws and connect the two devices by turning the screws 90° clockwise.

After final assembly check operation by moving the handle to the ON/OFF position several times.

R-Series

UL1077 Recognized Supplementary Protector

- DIN Rail Mounted
- 17.5mm width per pole
- Thermal Magnetic
- 480Y/277V AC, 50/60Hz
- 10kA Short Circuit Withstand Capacity
- Positive Trip indicator (Green - off/tripped, Red - on)
- Applications (on the load side of Branch Circuit Protection) include: Sensitive Electronics, Power Supplies, Appliance circuits, etc.



c UL us CE

E301611

Voltage Rating	480Y/277VAC
Short Circuit Withstand Rating (UL - Ratings)	0.5-6A (RC): 10kA with no back-up fuse 8-63A (RC): 10kA with UL-listed Class J back-up fuse; 5kA with no back-up fuse
Interrupting Capacity (IEC/EN60898/60947-2)	0.5-63A (RC): 10kA
Calibration Temperature	30°C (86°F)
Operating Temperature	-25° to 60°C (-13° to 140°F)
Storage Temperature	-25° to 75°C (-13° to 167°F)
Terminal Size Acceptability	14-3 AWG: 17.5 lb-in. (2.0 Nm)
and Torque	18-16 AWG: 25 lb-in. (2.8 Nm)
Terminal Protection Degree	IP20 at front
Electrical Life	6,000 cycles on/off
Mechanical Life	10,000 cycles on/off
Wire Connection	copper wire only 60/75°C
Vibration Resistance	3g (18-50Hz)
Mounting Orientation	In any plane

Indicator window

ON

OFF

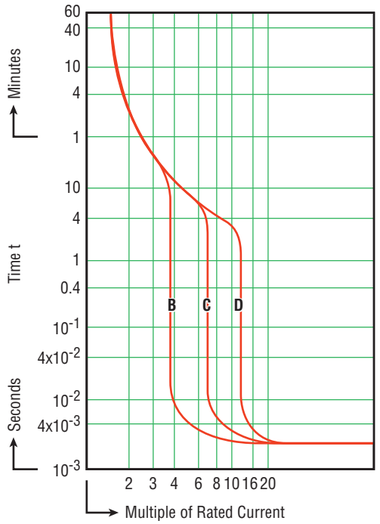
Trip curve and amperage window display.

SHORT CIRCUIT WITHSTAND RATINGS FOR R-SERIES SUPPLEMENTARY PROTECTOR

Trip Curve	Amp Range	Backup Protection	
		UL-Listed Class J Fuse up to 10kA	No Backup Fuse Required up to:
All	0.5 - 6A	4xRC*	10kA
All	8 - 63A	4xRC*	5kA

*up to nearest rated current

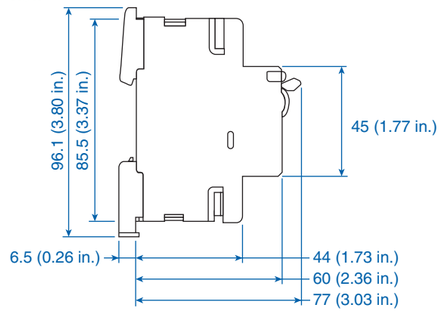
DC voltage rating: 48 VDC (self-certified).



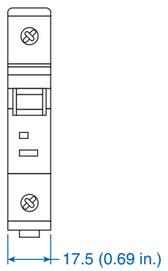
Time versus Current Trip Curve

For the exact trip curve, please refer to page 67.

Dimensions in mm
side view

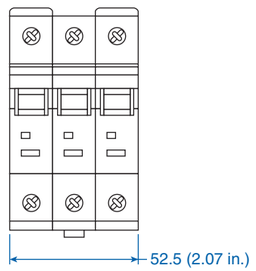


1 POLE



2 POLE

3 POLE



Trip-Characteristics*				Applications					
Characteristic Trip Boundaries				Lighting Wiring Protection Control Circuits	Business Equipment Appliances	Control Transformers	Power Supplies	General Electronics	Reactive Load
Thermal Trip		Magnetic Trip							
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	20xRC						

**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/Supplementary Protector 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/Supplementary Protector for his specific application.

B-Trip Characteristic

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

C US
E301611

One Pole

Rated Current	Type/ Cat. No.
0.5A	1BU05R
1.0A	1BU1R
2.0A	1BU2R
3.0A	1BU3R
4.0A	1BU4R
5.0A	1BU5R
6.0A	1BU6R
8.0A	1BU8R
10A	1BU10R
12A	1BU12R
13A	1BU13R
15A	1BU15R
16A	1BU16R
20A	1BU20R
25A	1BU25R
30A	1BU30R
32A	1BU32R
40A	1BU40R
50A	1BU50R
60A	1BU60R
63A	1BU63R

Standard Pack: 12

Weight:
0.5A - 63A: 1.6kg (3.54 lb.)

Two Pole

Rated Current	Type/ Cat. No.
0.5A	2BU05R
1.0A	2BU1R
2.0A	2BU2R
3.0A	2BU3R
4.0A	2BU4R
5.0A	2BU5R
6.0A	2BU6R
8.0A	2BU8R
10A	2BU10R
12A	2BU12R
13A	2BU13R
15A	2BU15R
16A	2BU16R
20A	2BU20R
25A	2BU25R
30A	2BU30R
32A	2BU32R
40A	2BU40R
50A	2BU50R
60A	2BU60R
63A	2BU63R

Standard Pack: 6

Weight:
0.5A - 63A: 1.6kg (3.54 lb.)

Three Pole

Rated Current	Type/ Cat. No.
0.5A	3BU05R
1.0A	3BU1R
2.0A	3BU2R
3.0A	3BU3R
4.0A	3BU4R
5.0A	3BU5R
6.0A	3BU6R
8.0A	3BU8R
10A	3BU10R
12A	3BU12R
13A	3BU13R
15A	3BU15R
16A	3BU16R
20A	3BU20R
25A	3BU25R
30A	3BU30R
32A	3BU32R
40A	3BU40R
50A	3BU50R
60A	3BU60R
63A	3BU63R

Standard Pack: 4

Weight:
0.5A - 63A: 1.66kg (3.67 lb.)

Four Pole
Please contact Altech.

Non-standard current ratings available. Minimum quantities may apply. Please contact Altech for further details.

C-Trip Characteristic

Application Examples:
Lighting, wiring protection, appliances, business equipment, and control circuit applications. Relatively long thermal trip delay and medium magnetic trip point.

C US
E301611

One Pole

Rated Current	Type/ Cat. No.
0.5A	1CU05R
1.0A	1CU1R
2.0A	1CU2R
3.0A	1CU3R
4.0A	1CU4R
5.0A	1CU5R
6.0A	1CU6R
8.0A	1CU8R
10A	1CU10R
12A	1CU12R
13A	1CU13R
15A	1CU15R
16A	1CU16R
20A	1CU20R
25A	1CU25R
30A	1CU30R
32A	1CU32R
40A	1CU40R
50A	1CU50R
60A	1CU60R
63A	1CU63R

Standard Pack: 12

Weight:
0.5A - 63A: 1.6kg (3.54 lb.)

Two Pole

Rated Current	Type/ Cat. No.
0.5A	2CU05R
1.0A	2CU1R
2.0A	2CU2R
3.0A	2CU3R
4.0A	2CU4R
5.0A	2CU5R
6.0A	2CU6R
8.0A	2CU8R
10A	2CU10R
12A	2CU12R
13A	2CU13R
15A	2CU15R
16A	2CU16R
20A	2CU20R
25A	2CU25R
30A	2CU30R
32A	2CU32R
40A	2CU40R
50A	2CU50R
60A	2CU60R
63A	2CU63R

Standard Pack: 6

Weight:
0.5A - 63A: 1.6kg (3.54 lb.)

Three Pole

Rated Current	Type/ Cat. No.
0.5A	3CU05R
1.0A	3CU1R
2.0A	3CU2R
3.0A	3CU3R
4.0A	3CU4R
5.0A	3CU5R
6.0A	3CU6R
8.0A	3CU8R
10A	3CU10R
12A	3CU12R
13A	3CU13R
15A	3CU15R
16A	3CU16R
20A	3CU20R
25A	3CU25R
30A	3CU30R
32A	3CU32R
40A	3CU40R
50A	3CU50R
60A	3CU60R
63A	3CU63R

Standard Pack: 4

Weight:
0.5A - 63A: 1.66kg (3.67 lb.)

Four Pole
Please contact Altech.

Non-standard current ratings available. Minimum quantities may apply. Please contact Altech for further details.

D-Trip Characteristic

Application Examples:
Control transformers, power supplies and reactive loads. Relatively long thermal trip delay and very high magnetic trip point.

c UL us CE

E301611

One Pole

Rated Current	Type/ Cat. No.
0.5A	1DU05R
1.0A	1DU1R
2.0A	1DU2R
3.0A	1DU3R
4.0A	1DU4R
5.0A	1DU5R
6.0A	1DU6R
8.0A	1DU8R
10A	1DU10R
12A	1DU12R
13A	1DU13R
15A	1DU15R
16A	1DU16R
20A	1DU20R
25A	1DU25R
30A	1DU30R
32A	1DU32R
40A	1DU40R
50A	1DU50R
60A	1DU60R
63A	1DU63R

Standard Pack: 12

Weight:
0.5A - 63A: 1.6kg (3.54 lb.)

Two Pole

Rated Current	Type/ Cat. No.
0.5A	2DU05R
1.0A	2DU1R
2.0A	2DU2R
3.0A	2DU3R
4.0A	2DU4R
5.0A	2DU5R
6.0A	2DU6R
8.0A	2DU8R
10A	2DU10R
12A	2DU12R
13A	2DU13R
15A	2DU15R
16A	2DU16R
20A	2DU20R
25A	2DU25R
30A	2DU30R
32A	2DU32R
40A	2DU40R
50A	2DU50R
60A	2DU60R
63A	2DU63R

Standard Pack: 6

Weight:
0.5A - 63A: 1.6kg (3.54 lb.)

Three Pole

Rated Current	Type/ Cat. No.
0.5A	3DU05R
1.0A	3DU1R
2.0A	3DU2R
3.0A	3DU3R
4.0A	3DU4R
5.0A	3DU5R
6.0A	3DU6R
8.0A	3DU8R
10A	3DU10R
12A	3DU12R
13A	3DU13R
15A	3DU15R
16A	3DU16R
20A	3DU20R
25A	3DU25R
30A	3DU30R
32A	3DU32R
40A	3DU40R
50A	3DU50R
60A	3DU60R
63A	3DU63R

Standard Pack: 4

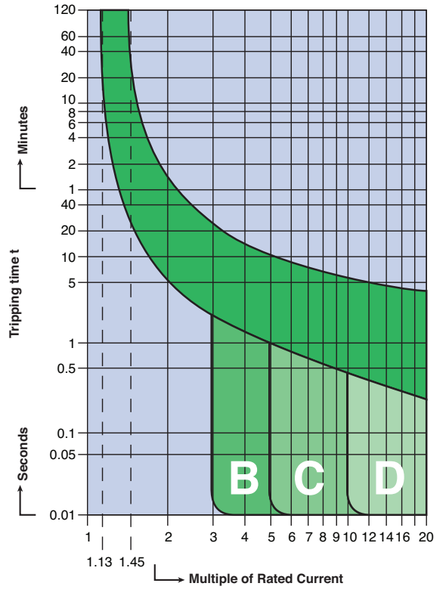
Weight:
0.5A - 63A: 1.66kg (3.67 lb.)

Four Pole
Please contact Altech.

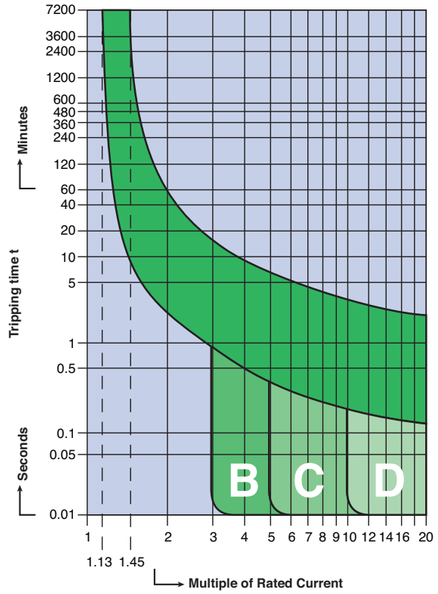
Non-standard current ratings available. Minimum quantities may apply. Please contact Altech for further details.

R-Series Trip Curves

B, C and D Trip
Less than 10A



B, C and D Trip
10A and higher



Temperature and Power Loss Specifications

Rated current of MCB	Internal Impedances & Power Loss					MCB Temperature Compensation								
	Internal impedance	Power loss on CB	Maximum allowable impedance of breakdown loop (0.2/0.4s)			Effective rated current allowing for ambient temperature.								
	Z (m Ω)	P (W)	Z_s (Ω)			I cor (A)								
I_n (A)	Char. B,C,D	Char. B,C,D	Char.B	Char.C	Char.D	Ambient Temperature								
						-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
0.50	6600	1.7	42.0	51.1	28.8	0.61	0.59	0.57	0.55	0.53	0.50	0.47	0.44	0.42
1.00	1650	1.7	46.0	25.6	14.4	1.21	1.18	1.14	1.10	1.05	1.00	0.93	0.88	0.83
2.00	370	1.5	23.0	12.8	7.2	2.42	2.36	2.28	2.20	2.10	2.00	1.86	1.76	1.67
3.00	210	1.9	15.3	8.5	4.8	3.63	3.54	3.42	3.30	3.15	3.00	2.79	2.64	2.50
4.00	126	2.0	11.5	6.4	3.6	4.84	4.72	4.56	4.40	4.20	4.00	3.72	3.52	3.33
6.00	51	1.8	7.7	4.3	2.4	7.30	7.10	6.80	6.60	6.30	6.00	5.60	5.30	5.00
8.00	21	1.3	5.8	3.2	1.8	9.70	9.40	9.10	8.80	8.40	8.00	7.40	7.00	6.70
10.00	14.8	1.5	4.6	2.6	1.4	12.1	11.8	11.40	11.00	10.50	10.00	9.30	8.80	8.30
13.00	11.3	1.9	3.5	2.0	1.1	15.7	15.3	14.80	14.30	13.70	13.00	12.10	11.50	10.80
16.00	7.5	1.9	2.9	1.6	0.9	19.4	18.9	18.20	17.60	16.80	16.00	14.90	14.10	13.30
20.00	6.3	2.5	2.3	1.3	0.7	24.2	23.60	22.80	22.00	21.00	20.00	18.60	17.60	16.70
25.00	4.4	2.8	1.8	1.0	0.6	30.3	29.50	28.50	27.50	26.30	25.00	23.30	22.00	20.80
32.00	3.1	3.2	1.4	0.8	0.4	38.7	37.80	36.50	35.20	33.60	32.00	29.80	28.20	26.70
40.00	2.5	4.0	1.2	0.6	0.4	48.4	47.20	45.60	44.00	42.00	40.00	37.20	35.20	33.30
50.00	2.2	5.5	0.9	0.5	0.3	60.5	59.0	57.00	55.00	52.50	50.00	46.50	44.10	41.70
63.00	1.6	6.4	0.7	0.4	0.2	76.2	74.30	71.80	69.30	66.20	63.00	58.60	55.50	52.50

Accessories

R-Series Supplementary Protector

C UL US

E301611

Accessories can be factory or field mounted on R-Series supplementary protectors 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.

Neutral Pole (63A/480Y/277 VAC)

Description	Type/ Cat. No.	Cable Max	Cable Min	Torque Max	Torque Min
Neutral	ALTN2	25mm² AWG 3	2.5mm² AWG 12	2Nm 17.5 lb-in	1.5Nm 12 lb-in

Standard Pack: 10

Weight: 1.25kg (2.77 lb.)

Shunt Trip

Undervoltage Trip

Shunt Trip and Undervoltage Trip

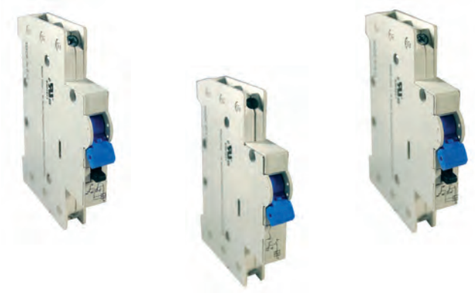
Description	Shunt Trip Type/Cat. No.	Operational Voltage	Rated Coil Current	Undervoltage Trip* Type/Cat. No.
AC Coil:				
12V AC	FA12ACR	8.4 - 13.2V	6A	UV12ACR
24V AC	FA24ACR	16.8 - 26.4V	2.8A	UV24ACR
48V AC	FA48ACR	33.6 - 52.8V	0.8A	UV48ACR
60V AC	FA60ACR	42 - 66V	~0.7A	UV60ACR
110V AC	FA110ACR	77 - 121V	0.5A	UV110ACR
120V AC	FA120ACR	84 - 132V	~0.5A	UV120ACR
230V AC	FA230ACR	161 - 253V	0.6A	UV230ACR
277V AC	FA277ACR	194 - 305V	~0.5A	UV277ACR
400V AC	FA400ACR	280 - 440V	0.5A	UV400ACR
DC Coil:				
12V DC	FA12DCR	8.4 - 13.2V	~6A	UV12DCR
24V DC	FA24DCR	16.8 - 26.4V	3A	UV24DCR
48V DC	FA48DCR	33.6 - 52.8V	2A	UV48DCR
110V DC	FA110DCR	77 - 121V	0.6A	UV110DCR

* Reset-Hold Voltage = 0.85 x V_E; Drop-Out Voltage = 0.2 x V_E

Standard Pack: 10

Weight: 1.1kg (2.43 lb.)

Terminal Size - min/max	2.5 mm² (12 AWG) / 25mm² (3 AWG)
Terminal Torque - min/max	1.5 Nm (12 lb. in.) / 2 Nm (17.5 lb. in.)



Auxiliary Contact (4A/230 VAC)

Description	Type/ Cat. No.	Cable Max	Cable Min	Torque Max	Torque Min
1 x CO	H1COR	2.5mm² AWG 12	0.5mm² AWG 20	0.5Nm 4 lb-in	0.33Nm 3 lb-in
2 x CO	H2COR				
1 x CO, 1 Signal & Test Button	HSTCOR				

Standard Pack: 15

Weight: H1COR: 0.5kg (1.32 lb.); H2COR, HSTCOR: 0.72kg (1.59 lb.)

Wiring Diagram

Lock-out Adapter

Luggage Lock

Description	Type/ Cat. No.
Yellow	EASS2

Standard Pack: 10

Weight: 50g (1.76 oz.)

Altech UL1077/508 Busbar System

UL508 listed
E205412

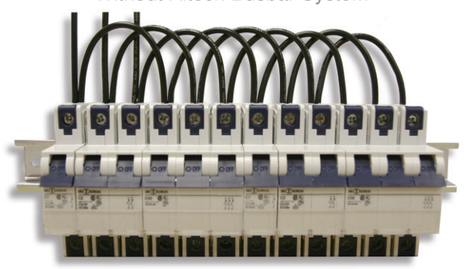
UL1077/508 Listed Busbars

The Altech Busbar System is an innovative way to jumper up to 57 poles of Manual Motor Controllers (MMC) and Supplementary Protectors (SP).

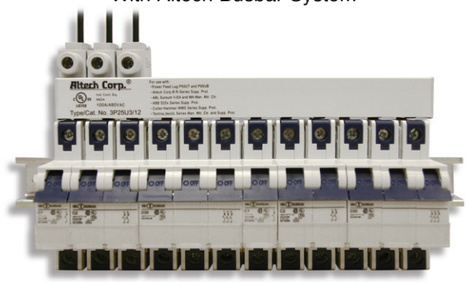
The advantages of this busbar system are:

- 30% Installation time savings
- Panel space savings
- Reduced maintenance
- High electrical ratings

Without Altech Busbar System



With Altech Busbar System



Universal UL1077/508 Busbar fits most Supplementary Protectors and Manual Motor Controllers in the market!

Please contact Altech for details and further information.

UL1077/508 Busbar System

- 1-57 different pin configurations
- 1/2 pole spacing (auxiliary switch) available
- Power Feeding:
  Power Feed Lugs (115A), Direct Power Feed (115A), Power Feed Block (200A)
- UL recognized and listed for Altech's R-Series, ABL's UR, V-EA and MA Series of Manual Motor Controllers and Supplementary Protectors
- UL recognized and listed for use with most popular UL1077 supplementary protectors and UL508 Manual Motor Controllers in the market.
- Customers can cut the Busbar without losing the UL approval
- Line/Load reversible

Technical Specifications	Busbars UL1077/ 508
Material of Busbar	Copper
Material of Insulation (Housing)	Polyamide
Electrical Ratings	18mm²: 80A/600V AC/DC* 25mm²: 100A/600V AC/DC*
Short Circuit Withstand Rating	10kA
Applying Standards	UL508, VDE0660 Part 100 and 502, VDE 0606, VDE 0659

** 1000VDC ratings can be achieved by using all poles at the same voltage and polarity.*

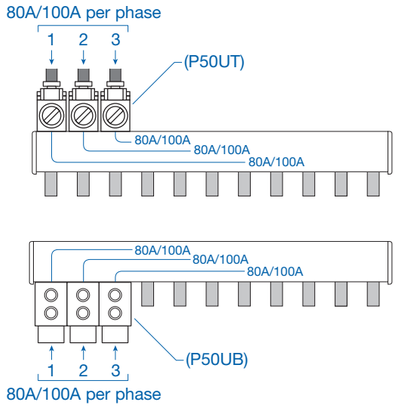
Altech UL1077/508 Busbar System

Power Feed Methods

1) Start/ End Feed Method

P50UT* / P50UB*

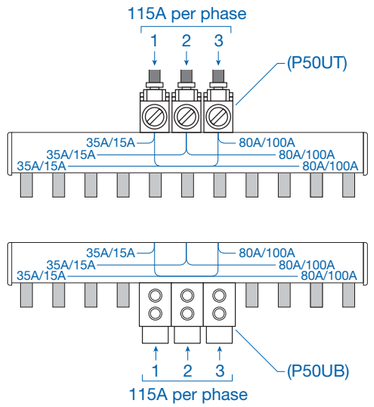
With the **P50UT** Power Feed Lug or the **P50UB** Modular Direct Power Feed as a Start/End Feeding Device a maximum input current of **80A/100A per Phase** can be achieved. 80A with 18mm² Busbar and 100A with 25mm² Busbar.



2) Center/ Middle Feed Method

P50UT* / P50UB*

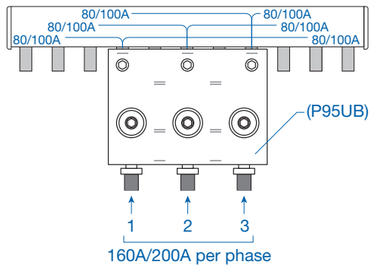
With the **P50UT** Power Feed Lug or the **P50UB** Modular Direct Power Feed as a Center/Middle Feeding Device a maximum input current of **115A per Phase** can be achieved. (18mm²: 80A + 35A; 25mm²: 100A + 15A)



P95UB*

With the **P95UB** Power Feed Block as a Center/Middle Feeding Device a maximum input current of **160A/200A per Phase** can be achieved (160A with 18mm² Busbar and 200A with 25mm² Busbar).

Note: The Power Feed Block can only be used with a standard spacing ***3 Phase*** UL1077/508 Busbar.

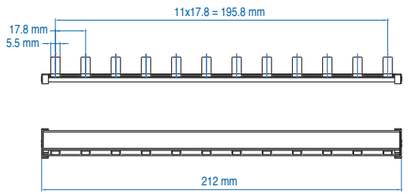


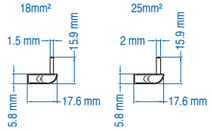
** For complete specifications and description of Feeding Devices see page 78-79.*

1 PHASE BUSBAR - standard spacing

18mm² for 80A

UL508 listed
E205412





shown: 1P18U1/12

18mm² for 80A*			18mm² for 80A*		
Type/ Cat. No.	**No. of Pins**	**Length [mm]**	**Type/ Cat. No.**	**No. of Pins**	**Length [mm]**
1P18U1/2	2	32	1P18U1/30	30	536
1P18U1/3	3	54	1P18U1/31	31	554
1P18U1/4	4	79	1P18U1/32	32	572
1P18U1/5	5	88	1P18U1/33	33	590
1P18U1/6	6	106	1P18U1/34	34	608
1P18U1/7	7	122	1P18U1/35	35	626
1P18U1/8	8	140	1P18U1/36	36	638
1P18U1/9	9	158	1P18U1/37	37	656
1P18U1/10	10	177	1P18U1/38	38	674
1P18U1/11	11	195	1P18U1/39	39	692
1P18U1/12	12	212	1P18U1/40	40	710
1P18U1/13	13	230	1P18U1/41	41	728
1P18U1/14	14	248	1P18U1/42	42	746
1P18U1/15	15	269	1P18U1/43	43	764
1P18U1/16	16	286	1P18U1/44	44	782
1P18U1/17	17	304	1P18U1/45	45	800
1P18U1/18	18	322	1P18U1/46	46	818
1P18U1/19	19	340	1P18U1/47	47	836
1P18U1/20	20	354	1P18U1/48	48	854
1P18U1/21	21	374	1P18U1/49	49	872
1P18U1/22	22	392	1P18U1/50	50	890
1P18U1/23	23	410	1P18U1/51	51	908
1P18U1/24	24	428	1P18U1/52	52	926
1P18U1/25	25	446	1P18U1/53	53	942
1P18U1/26	26	464	1P18U1/54	54	960
1P18U1/27	27	482	1P18U1/55	55	978
1P18U1/28	28	500	1P18U1/56	56	996
1P18U1/29	29	518	1P18U1/57	57	1014

ACCESSORIES

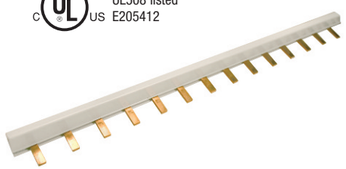
Type/Cat. No:	**P50UT-LP**	**P50UB**	**BRB5W**	**18/25CAP1P**
Description:	Power Feed Lug	Modular Direct Power Feed	Insulation Cap	End Cap

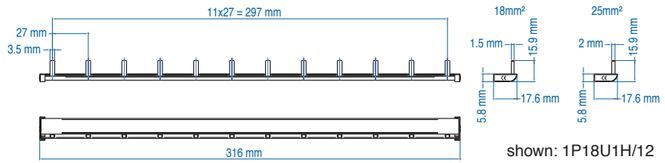
* 25mm² version for 100A available upon request.

1 PHASE BUSBAR - 1/2 pole spacing

18mm² for 80A

UL508 listed
E205412





shown: 1P18U1H/12

18mm² for 80A*

Type/ Cat. No.	No. of Pins	Length [mm]
1P18U1H/2	2	40
1P18U1H/3	3	68
1P18U1H/4	4	95
1P18U1H/5	5	122
1P18U1H/6	6	150
1P18U1H/7	7	176
1P18U1H/8	8	204
1P18U1H/9	9	230
1P18U1H/10	10	258
1P18U1H/11	11	284
1P18U1H/12	12	316
1P18U1H/13	13	338
1P18U1H/14	14	365
1P18U1H/15	15	392
1P18U1H/16	16	420
1P18U1H/17	17	446
1P18U1H/18	18	474
1P18U1H/19	19	500

18mm² for 80A*

Type/ Cat. No.	No. of Pins	Length [mm]
1P18U1H/20	20	528
1P18U1H/21	21	554
1P18U1H/22	22	582
1P18U1H/23	23	608
1P18U1H/24	24	635
1P18U1H/25	25	662
1P18U1H/26	26	690
1P18U1H/27	27	716
1P18U1H/28	28	744
1P18U1H/29	29	770
1P18U1H/30	30	798
1P18U1H/31	31	824
1P18U1H/32	32	852
1P18U1H/33	33	878
1P18U1H/34	34	905
1P18U1H/35	35	932
1P18U1H/36	36	960

ACCESSORIES

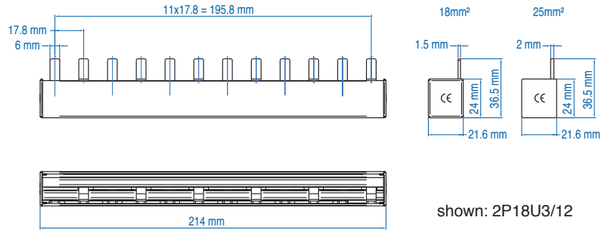
Type/Cat. No:	P50UT-LP	P50UB	BRB5W	18/25CAP1P
Description:	Power Feed Lug	Modular Direct Power Feed	Insulation Cap	End Cap

* 25mm² version for 100A available upon request.

2 PHASE BUSBAR - standard spacing

18mm² for 80A / 25mm² for 100A

UL508 listed
E205412



shown: 2P18U3/12

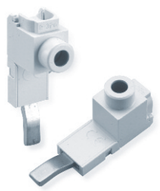
18mm² for 80A

Type/ Cat. No.	No. of Pins	Length [mm]
2P18U3/4	4	69
2P18U3/6	6	104
2P18U3/8	8	140
2P18U3/10	10	177
2P18U3/12	12	214
2P18U3/14	14	249
2P18U3/16	16	283
2P18U3/18	18	319
2P18U3/20	20	357
2P18U3/22	22	390
2P18U3/24	24	426
2P18U3/26	26	460
2P18U3/28	28	498
2P18U3/30	30	532
2P18U3/32	32	568
2P18U3/34	34	604
2P18U3/36	36	640
2P18U3/38	38	675
2P18U3/40	40	710
2P18U3/42	42	746
2P18U3/44	44	782
2P18U3/46	46	818
2P18U3/48	48	854
2P18U3/50	50	888
2P18U3/52	52	924
2P18U3/54	54	960
2P18U3/56	56	994

25mm² for 100A

Type/ Cat. No.	No. of Pins	Length [mm]
2P25U3/4	4	69
2P25U3/6	6	104
2P25U3/8	8	140
2P25U3/10	10	177
2P25U3/12	12	214
2P25U3/14	14	249
2P25U3/16	16	283
2P25U3/18	18	319
2P25U3/20	20	357
2P25U3/22	22	390
2P25U3/24	24	426
2P25U3/26	26	460
2P25U3/28	28	498
2P25U3/30	30	532
2P25U3/32	32	568
2P25U3/34	34	604
2P25U3/36	36	640
2P25U3/38	38	675
2P25U3/40	40	710
2P25U3/42	42	746
2P25U3/44	44	782
2P25U3/46	46	818
2P25U3/48	48	854
2P25U3/50	50	888
2P25U3/52	52	924
2P25U3/54	54	960
2P25U3/56	56	994

ACCESSORIES



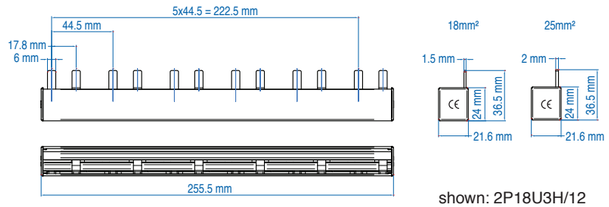
Type/Cat. No:	P50UT	P50UB	BRB5W	18/25CAP3P
Description:	Power Feed Lug	Modular Direct Power Feed	Insulation Cap	End Cap

Altech Corp.®

2 PHASE BUSBAR - 1/2 pole spacing

18mm² for 80A / 25mm² for 100A

UL508 listed
E205412



shown: 2P18U3H/12

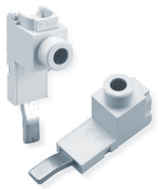
18mm² for 80A

Type/ Cat. No.	No. of Pins	Length [mm]
2P18U3H/4	4	78
2P18U3H/6	6	124
2P18U3H/8	8	168
2P18U3H/10	10	212
2P18U3H/12	12	256
2P18U3H/14	14	302
2P18U3H/16	16	346
2P18U3H/18	18	390
2P18U3H/20	20	435
2P18U3H/22	22	480
2P18U3H/24	24	524
2P18U3H/26	26	568
2P18U3H/28	28	612
2P18U3H/30	30	658
2P18U3H/32	32	702
2P18U3H/34	34	746
2P18U3H/36	36	790
2P18U3H/38	38	835
2P18U3H/40	40	880
2P18U3H/42	42	924
2P18U3H/44	44	968
2P18U3H/46	46	1012
2P18U3H/48	48	1058
2P18U3H/50	50	1102
2P18U3H/52	52	1146
2P18U3H/54	54	1192
2P18U3H/56	56	1235

25mm² for 100A

Type/ Cat. No.	No. of Pins	Length [mm]
2P25U3H/4	4	78
2P25U3H/6	6	124
2P25U3H/8	8	168
2P25U3H/10	10	212
2P25U3H/12	12	256
2P25U3H/14	14	302
2P25U3H/16	16	346
2P25U3H/18	18	390
2P25U3H/20	20	435
2P25U3H/22	22	480
2P25U3H/24	24	524
2P25U3H/26	26	568
2P25U3H/28	28	612
2P25U3H/30	30	658
2P25U3H/32	32	702
2P25U3H/34	34	746
2P25U3H/36	36	790
2P25U3H/38	38	835
2P25U3H/40	40	880
2P25U3H/42	42	924
2P25U3H/44	44	968
2P25U3H/46	46	1012
2P25U3H/48	48	1058
2P25U3H/50	50	1102
2P25U3H/52	52	1146
2P25U3H/54	54	1192
2P25U3H/63	56	1235

ACCESSORIES

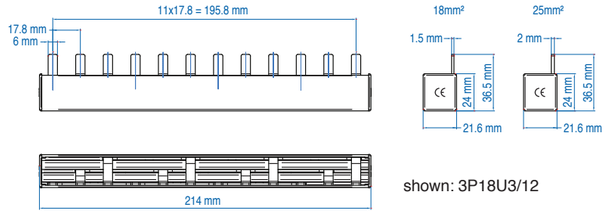


Type/Cat. No:	P50UT	P50UB	BRB5W	18/25CAP3P
Description:	Power Feed Lug	Modular Direct Power Feed	Insulation Cap	End Cap

3 PHASE BUSBAR - standard spacing

18mm² for 80A / 25mm² for 100A

UL508 listed
E205412



shown: 3P18U3/12

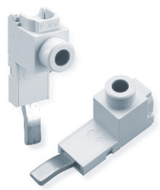
18mm² for 80A

Type/ Cat. No.	No. of Pins	Length [mm]
3P18U3/6	6	104
3P18U3/9	9	159
3P18U3/12	12	214
3P18U3/15	15	266
3P18U3/18	18	318
3P18U3/21	21	374
3P18U3/24	24	427
3P18U3/27	27	481
3P18U3/30	30	545
3P18U3/33	33	586
3P18U3/36	36	639
3P18U3/39	39	692
3P18U3/42	42	746
3P18U3/45	45	800
3P18U3/48	48	854
3P18U3/51	51	906
3P18U3/54	54	960
3P18U3/57	57	1012

25mm² for 100A

Type/ Cat. No.	No. of Pins	Length [mm]
3P25U3/6	6	104
3P25U3/9	9	159
3P25U3/12	12	214
3P25U3/15	15	266
3P25U3/18	18	318
3P25U3/21	21	374
3P25U3/24	24	427
3P25U3/27	27	481
3P25U3/30	30	545
3P25U3/33	33	586
3P25U3/36	36	639
3P25U3/39	39	692
3P25U3/42	42	746
3P25U3/45	45	800
3P25U3/48	48	854
3P25U3/51	51	906
3P25U3/54	54	960
3P25U3/57	57	1012

ACCESSORIES



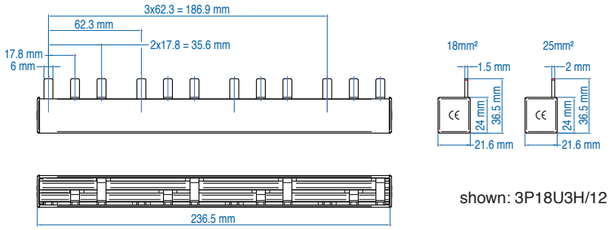
Type/Cat. No:	P50UT	P50UB	P95UB
Description:	Power Feed Lug	Modular Direct Power Feed	Power Feed Block

Type/Cat. No:	BRB5W	18/25CAP3P
Description:	Insulation Cap	End Cap

3 PHASE BUSBAR - 1/2 pole spacing

18mm² for 80A / 25mm² for 100A

UL508 listed
E205412



shown: 3P18U3H/12

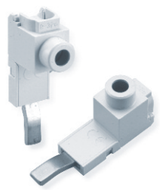
18mm² for 80A

Type/ Cat. No.	No. of Pins	Length [mm]
3P18U3H/6	6	114
3P18U3H/9	9	176
3P18U3H/12	12	235
3P18U3H/15	15	302
3P18U3H/18	18	364
3P18U3H/21	21	426
3P18U3H/24	24	488
3P18U3H/27	27	550
3P18U3H/30	30	612
3P18U3H/33	33	675
3P18U3H/36	36	738
3P18U3H/39	39	800
3P18U3H/42	42	862
3P18U3H/45	45	924
3P18U3H/48	48	982
3P18U3H/51	51	1048
3P18U3H/54	54	1112
3P18U3H/57	57	1174

25mm² for 100A

Type/ Cat. No.	No. of Pins	Length [mm]
3P25U3H/6	6	114
3P25U3H/9	9	176
3P25U3H/12	12	235
3P25U3H/15	15	302
3P25U3H/18	18	364
3P25U3H/21	21	426
3P25U3H/24	24	488
3P25U3H/27	27	550
3P25U3H/30	30	612
3P25U3H/33	33	675
3P25U3H/36	36	738
3P25U3H/39	39	800
3P25U3H/42	42	862
3P25U3H/45	45	924
3P25U3H/48	48	982
3P25U3H/51	51	1048
3P25U3H/54	54	1112
3P25U3H/57	57	1174

ACCESSORIES



Type/Cat. No:	P50UT	P50UB
Description:	Power Feed Lug	Modular Direct Power Feed

Type/Cat. No:	BRB5W	18/25CAP3P
Description:	Insulation Cap	End Cap

Power Feed Devices

Easy connection of power supply wires to the busbar/MCB. Power Feed Devices ensure permanent connection.

Power Feed Lug

c UL us
UL508 listed
E205412

Power Feed Lug

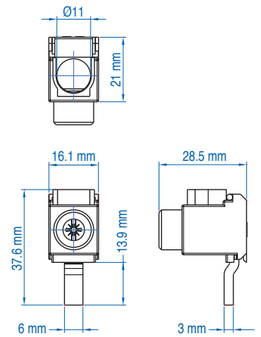
c UL us
UL508 listed
E205412

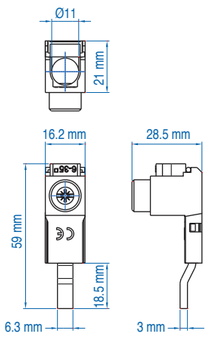
Modular Direct Power Feed

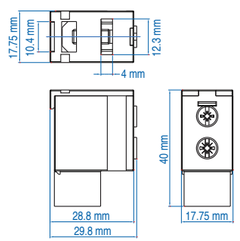
CE c UL us
UL508 listed
E205412

Type/Cat. No.	P50UT-LP	P50UT	P50UB
Electrical Ratings	115A/1000V AC/DC	115A/1000V AC/DC	115A/1000V AC/DC
Wire Range	10-1/0 AWG Cu	10-1/0 AWG Cu	14-1 AWG Cu
Wire Temperature Rating	60°C	60°C	75°C
Recommended/ Required Torque	5.6Nm (50lb. in.)	5.6Nm (50lb. in.)	Cable Side 3.5Nm/31 lb. in. (14-6AWG) 4Nm/35.4 lb. in. (4-1AWG); Busbar Side 2.5Nm/22 lb. in.
Material of Lug/ Terminal	Brass	Brass	Brass
Insulation Material	Polyamide	Polyamide	Polyamide
For use with	UL1077/508 18 and 25mm² 1 phase busbars	UL1077/508 18 and 25mm² 2, 3 phase busbars	UL1077/508 18 and 25mm² 1, 2, 3 phase busbars

Dimensions

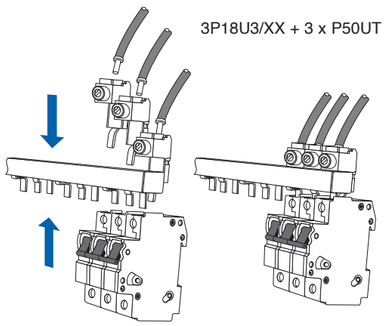




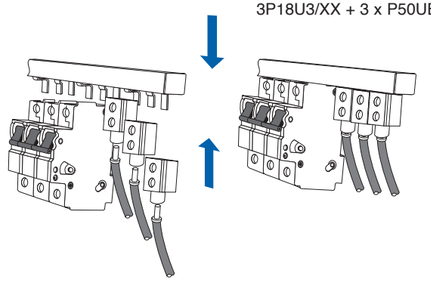


Assembly Instructions

3P18U3/XX + 3 x P50UT



3P18U3/XX + 3 x P50UB



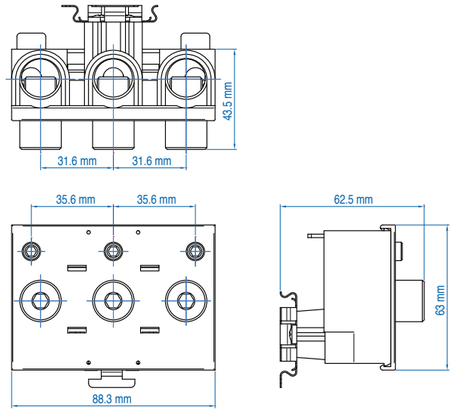
The power feed lugs (Cat. # P50UT) fit together with the lugs of the busbar in the terminals of the connected device.

Power Feed Block

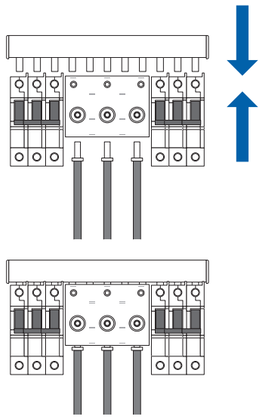
c UL us
UL508 listed
E205412

Type/Cat. No.	P95UB
Electrical Ratings	200A/ 600V AC/DC
Wire Range	1-4/0 AWG Cu
Wire Temperature Rating	75°C
Recommended/ Required Torque	19.5Nm (175lb. in.)
Material of Lug/ Terminal	Brass
Insulation Material	Polyamide
For use with	UL1077/508 18 and 25mm² 3 phase busbars (standard spacing only)

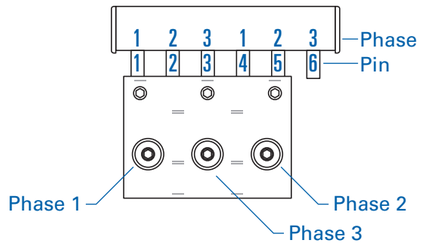
Dimensions



Assembly Instructions



NOTE: The Power Feed Block uses the space of 5 Pins of the standard spacing Busbar (see drawing below). Phase 1 connects to Pin 1, Phase 2 to Pin 3 and Phase 3 to Pin 5. Pin 2 and 4 are not in use. Pin 6 should be covered with an insulation cap if phase sequence stays the same. Therefore, the Power Feed Block covers 6 pins to connect to the three phases.



Miscellaneous Accessories

End Caps

18/25CAP1P

18/25CAP3P

Type/Cat. No: **18/25CAP1P**
For use with: 18/25mm² 1 phase Busbar

Type/Cat. No: **18/25CAP3P**
For use with: 18/25mm² 2, 3 phase Busbar

Insulation Caps

Type/Cat. No: **BRB5W** *(5 per strip)*
For use with: 18/25mm² 1, 2, 3 phase Busbar

TR11 Series

UL1077 Recognized Supplementary Protector/ Circuit Breaker for Equipment

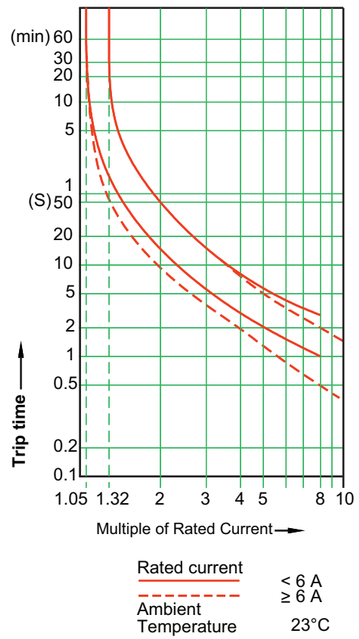
Applications:
Protection of Control Transformers, UPS, Power strips, Solenoids etc., against damage due to overload conditions.

E209569

up to 12 Amps

Current Rating (A)	0.1 - 16A
Standard Current Rating (A)	0.1, 0.25, 0.5, 0.9, 1.0, 1.2, 1.5, 1.8, 2.0, 2.2, 2.5, 2.7, 3.0, 3.3, 4.0, 5.0, 6.0, 6.5, 7.0, 8.0, 9.0, 10.0, 12.0, 15.0, 16.0
Rated Voltage	240V AC, 50/60Hz, 50V DC / 24V DC (VDE)
Initial insulation resistance (500V DC)	> 100 M ohms. (As per EN 60934)
Dielectric strength	1.5 KV for One minute. (As per EN 60934)
Overload Switching Capacity	6 I_n - AC up to 9.0A 4 I_n - DC up to 12.0A (As per EN 60934) 60A AC/DC Max. - from 10.0A to 12.0A
Maximum Breaking Capacity	8x I_n AC/DC for <6.0A 60A AC/DC MAX. for > 6.0A
Power Loss	1 - 2 Watts
Operating Temperature	Maximum 60°C Ambient
Operational Life at 2xI_n	1000 Cycles
Rated Conditional Short Circuit Current Capacity I nc1 (PC1) Ref.: EN60934	1000 Amps PC 1,240V AC, 24V DC, Ref.: EN60934 SC: 1KA, C1, 240V AC 50V DC Ref.: CSA22.2 No.235-04, UL-1077
Tripping Current Code TC	TC 2Ref.: CSA22.2 No. 235-04
Overload Rating	OL0 240V AC, 50V DC, Ref.: CSA22.2 No. 235-04
Application Type	General Industrial Ref.: CSA22.2 No. 235-04
Method of Tripping	Thermal 'TO' Trip Free
Type of Actuation	Reset Type 'R'
Application Standards	CSA 22.2 No. 235-04, UL-1077, EN 60934
Weight	aprox. 11g
Approvals	0.1 - 16.0A 240V AC 50V DC 0.5 - 12.0A 240V AC 24V DC

Operating Characteristic



Time Current Characteristics:
The standard characteristic is valid for ambient temperatures of +23°C. If the device is to be used in an ambient temperature other than +23°C, allowances must be made when selecting the current rating according to the following guidelines:

Ambient temp.°C	-20	-5	0	+10	+20	+30	+40	+50	+60
Correction Factor	0.8	0.88	0.9	0.96	1	1.05	1.12	1.2	1.3

Example:

Normal Continuous Current	1.8A
Ambient Temperature	40°C
Correction Factor	1.12
Recommended Current Rating	1.8 x 1.12 = 2.016
Select the nearest	2.0A

ORDERING INSTRUCTIONS

TR11 – B – X – 63 – B – 1 – A – 7.0A

PRODUCT TYPE

MOUNTING TYPE
Body Mouting - B
Central nut - C
Snap fit - S
Wing clip - W
Wing clip - D
Wing clip - D1
PCB - P

TERMINAL CONFIGURATION
Terminal 1&2 upto I_n 12A - X
Terminal 2&3 I_n>6A - Y
Shunt terminal Terminal 1, 2 & 3 Upto I_n 6A - N

TERMINAL SIZE
6.3 - 63
4.8 - 48
2.8 - 28
PCB - 10

COLOUR OF THE SLIDER WITHOUT TRIP BAND
Black - B
White - W

COLOUR OF THE SLIDER WITH TRIP BAND
Black - BB (Black slider with white trip band)
White - WB (White slider with black trip band)

SLIDER MARKING
0 - None
1 - Vertical
2 - Horizontal

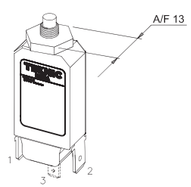
MOUNTING NUT
N - None
A - Knurled metal nut
B - Sloted knurled metal nut
C - Hex metal nut
D - Sealing knurled boot

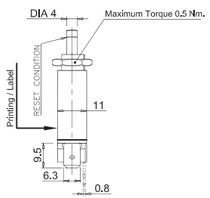
CURRENT RATING
0.1 TO 16.0A

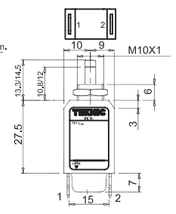
*** SPECIAL ORDER ONLY. Contact Altech for more details. TR11-C Series stocked; contact Altech for availability.**
PCB Mounting and additional Shunt Terminal available, please contact Altech.

TR-11 Dimensions & Mounting Options

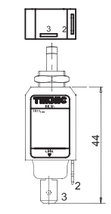
Central Mounting





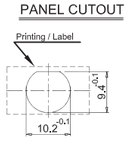


TERMINAL 1&2 'X' TYPE

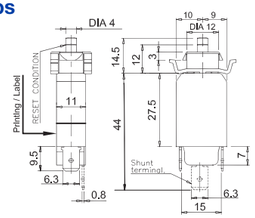


TERMINAL 2&3 'Y' TYPE

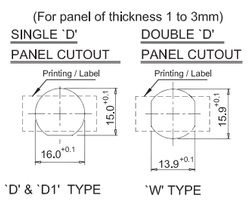
TERMINAL 1, 2 & 3 'N' TYPE



Wing Clips

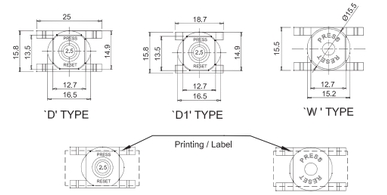


(For panel of thickness 1 to 3mm)



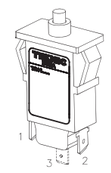
`D' & `D1' TYPE `W' TYPE

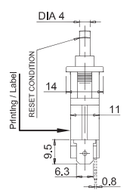
Wing Clip Types

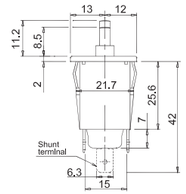


`D' TYPE `D1' TYPE `W ' TYPE

Snap Fitting



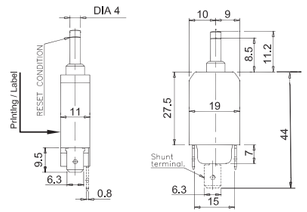




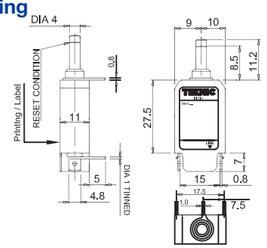
PANEL CUTOUT

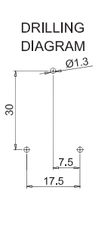
PANEL THICKNESS	DIMENSION 'X'
0.8 MM	21.9 MM
1.0 MM	22.0 MM
1.5 MM	22.1 MM
2.0 MM	22.3 MM
3.0 MM	22.6 MM

Body Mounting

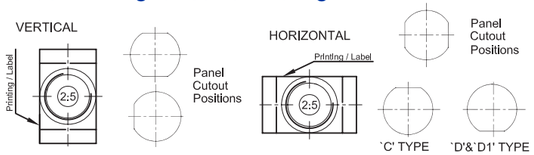


PCB Mounting

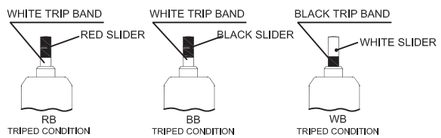




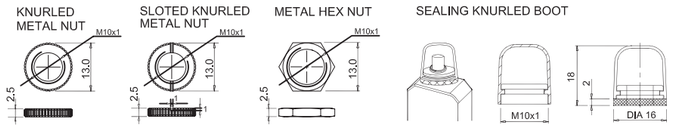
Slider Printing for Current Rating



Slider Color with Trip Band



Accessories

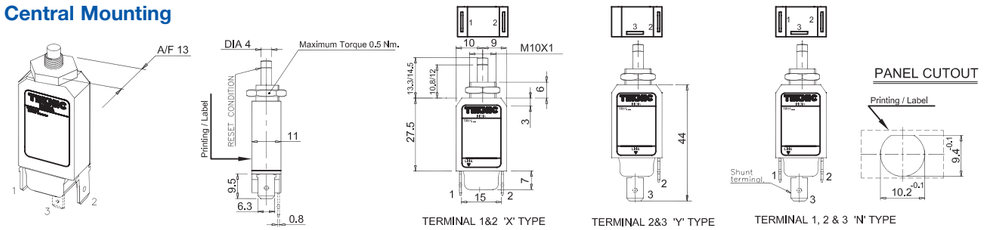


A sealing boot for central mounting Type (C) Circuit breaker to provide dust &splash protection (IP 54).

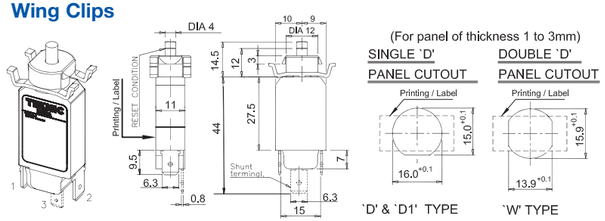
Dimensions in mm (to convert to inches multiply by 0.03937)

TR-11 Dimensions & Mounting Options

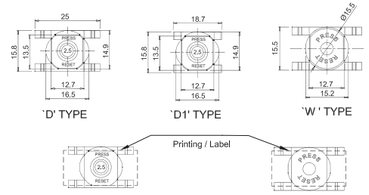
Central Mounting



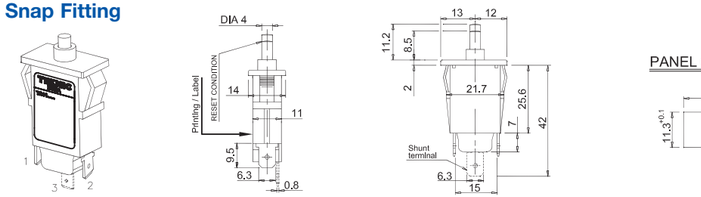
Wing Clips



Wing Clip Types

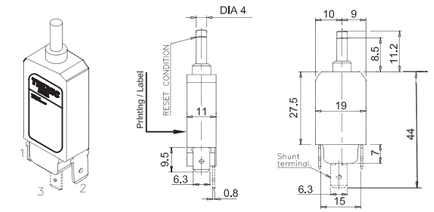


Snap Fitting

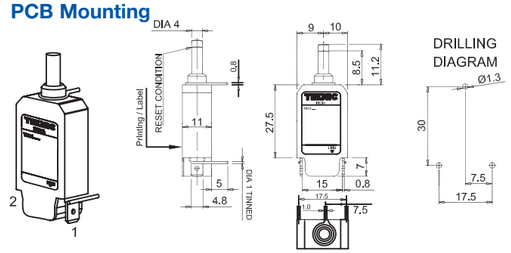


PANEL THICKNESS	DIMENSION 'X'
0.8 MM	21.9 MM
1.0 MM	22.0 MM
1.5 MM	22.1 MM
2.0 MM	22.3 MM
3.0 MM	22.6 MM

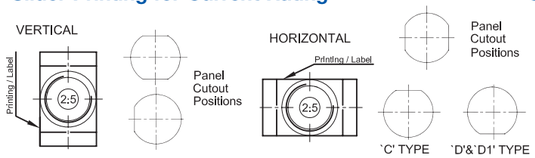
Body Mounting



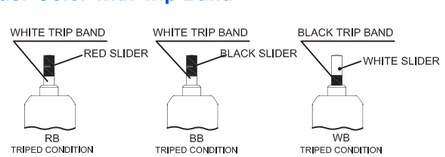
PCB Mounting



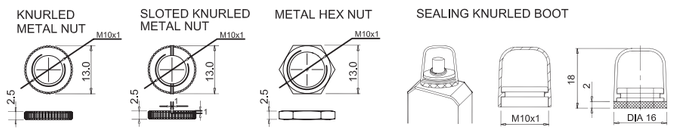
Slider Printing for Current Rating



Slider Color with Trip Band



Accessories



A sealing boot for central mounting Type (C) Circuit breaker to provide dust &splash protection (IP 54).

Dimensions in mm (to convert to inches multiply by 0.03937)

TR20 Series

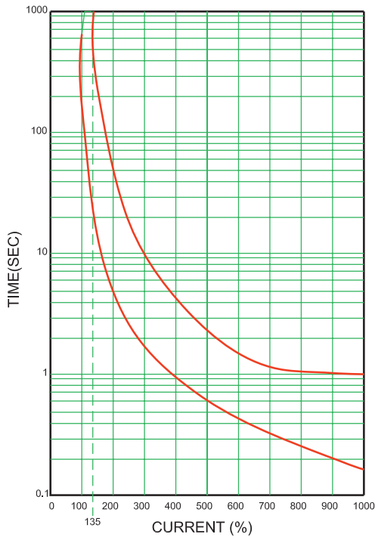
UL1077 Recognized Supplementary Protector/ Circuit Breaker for Equipment

Applications:
Protection of Control Transformers, UPS, Power strips, Solenoids etc., against damage due to overload conditions.

E209569 up to 12 Amps

Application Type	General Industrial Ref. CSA22.2 No.235-04
Function	SPST
Standard Current Rating (A)	3, 4, 5, 6, 7, 8, 10, 12, 15, 16 & 20 AC-Inductive, DC-Resistive
Rated Voltage	125/125V AC, 50/60 Hz, 50V DC
Method of tripping	Thermol TO, Cycling trip - free
Type of Actuation	Reset Type 'R'
Initial insulation resistance	> 100 M ohms. (DC500V)
Dielectric strength	1.500 KV for 1 minute
Impulse withstand voltage	2.5kV Ref.: EN 60934
Contact Gap	Micro disconnection(μ) Ref.: EN60934
Housing Material	Thermoplastic / Thermoset
Slider Material	Thermoset
Contact Material	Silver alloy
Terminal Material	Copper alloy
Fixing	By a nut or snap fitting
Resettable overload capacity	10 times the rated current
Overload capacity	2 times rated current for 50 switching cycles min. Ref.: UL 1077
Rated Short Circuit Capacity I_{cn} Ref.: EN60934	Min 6 times the rated current (6_{In}) for 250V AC (Inductive) Min 4 times the rated current (4_{In}) for 50V DC (Resistive)
Rated Conditional Short Circuit Current Capacity I_{nc1} (PC1) Ref.: EN60934	1000 Amps 125/250V AC, 50V DC SC: 1kA, C1, 125/250V AC, 50V AC Ref.: CSA22.2 No.235-04, UL-1077
Tripping Current Code TC	TC 2Ref.: CSA22.2 No. 235-04
Overload Rating	OLO 125/250V AC, 50V DC, Ref.: CSA 22.2 No. 235-04
Weight	aprox. 17g
Application Standards	UL 1077, CSA 22.2 No. 235-04, EN 60934
Approvals	

Operating Characteristic



ORDERING INSTRUCTIONS

TR20 – C – 63 S – B 1 – A – 7.0A – 2

- PRODUCT TYPE
- MOUNTING TYPE
  - A Plastic 3/8"-27UNS
  - B Plastic M11
  - W Wing clip
- TERMINAL SIZE
  - 63 6.3 x 0.8mm
- TERMINAL CONFIGURATION
  - S Straight
  - L 90° Bend,Left side
  - R 90 Bend, Right side
- SLIDER COLOR
  - B Black
  - W White with trip indication
- SLIDER MARKING
  - 0 None
  - 1 White, Vertical
  - 2 Black, Vertical
  - 3 White, Horizontal
  - 4 Black, Horizontal
- MOUNTING NUT
  - N None or wing clip
  - A Plastic knurled
  - B Metal knurled
  - C Metal Hex Nut
  - D Sealing knurled boot
- CURRENT RATING
  - 3A, 4A, 5A, 6A, 7A, 8A, 10A, 12A, 15A, 10A & 20A
- INDICATOR PLATE
  - 0 None
  - 1 Black letters on Aluminium Background
  - 2 Silver Letters on Black Background

*** SPECIAL ORDER ONLY. Contact Altech for more details.**
PCB Mounting and additional Shunt Terminal available, please contact Altech.

Time Current Characteristics:

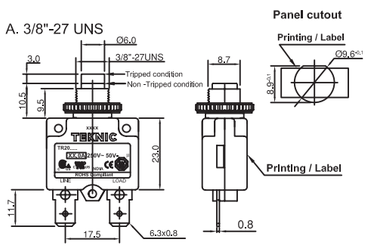
The standard characteristic is valid for ambient temperatures of +25°C. If the device is to be used in an ambient temperature other than +25°C, allowances must be made when selecting the current rating according to the following guidelines:

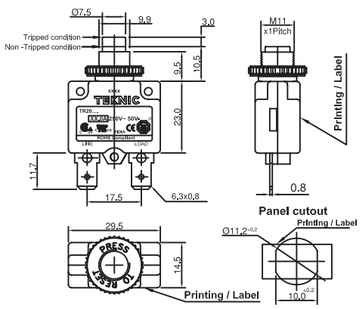
Ambient temp. °C	-20	-10	0	+10	+25	+30	+35
Multiplication Factor 3A to 4A	0.8	0.85	0.9	0.9	1	1	1.1
Multiplication Factor 5A to 20A	0.8	0.85	0.88	0.9	1	1.1	1.3	1.4

Example: Normal Continuous Current 5.0A
Ambient Temperature 40°C
Multiplication Factor 1.1
Selected rated current at +40°C 5 x 1.1 = 5.5
Ambient temperature 6.0A (nearest)

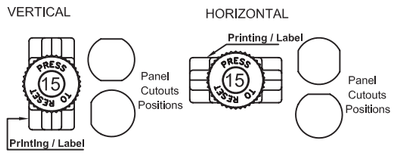
TR-20 Dimensions & Mounting Options

Central Mounting

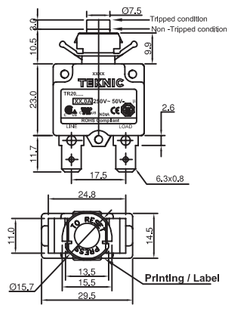


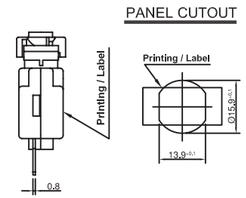


Slider Printing for Current Rating



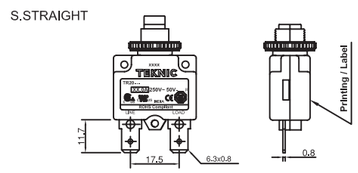
Wing Clips

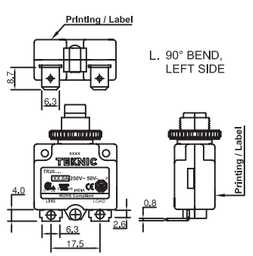


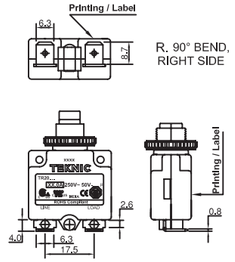


PANEL THICKNESS 1 TO 3MM.

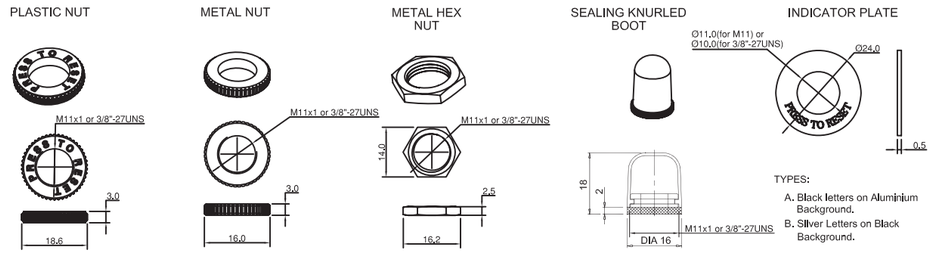
Terminal Options







Accessories



Dimensions in mm (to convert to inches multiply by 0.03937)

TR30 Series

UL1077 Recognized Supplementary Protector/ Circuit Breaker for Equipment

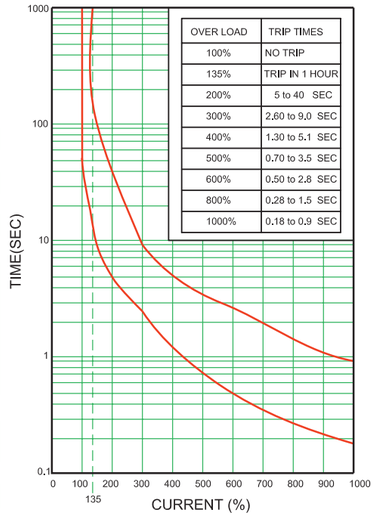
Applications:
Protection of Control Transformers, UPS, Power strips, Solenoids etc., against damage due to overload conditions.

Application Type	General Industrial Ref. CSA22.2 No.235-04
Function	SPST
Standard Current Rating (A)	5A-25A 5A, 6A, 7A, 10A, 12A, 15A, 20A, 25A, 30A & 35A
Rated Voltage	125/125V AC, 50/60 Hz, 50V DC
Method of tripping	Thermol TO, Cycling trip - free
Type of Actuation	Reset Type 'R'
Initial insulation resistance	> 100 M ohms. (DC500V)
Dielectric strength	1.500 KV for 1 minute
Impulse withstand voltage	2.5kV Ref.: EN 60934
Contact Gap	Micro disconnection(μ) Ref.: EN60934
Housing Material	Thermoset - UL94-V0 flammability class
Slider Material	Thermoset - UL94-V0 flammability class
Contact Material	Silver alloy
Terminal Material	Copper alloy
Fixing	By a nut or snap fitting
Resettable overload capacity	10 times the rated current
Rated Short Circuit Capacity I_{cn} Ref.: EN60934	Min 6 times the rated current (6_{In}) for 250V AC (Inductive) Min 4 times the rated current (4_{In}) for 50V DC (Resistive)
Rated Conditional Short Circuit Current Capacity I_{nc1} (PC1) As per EN60934 As per CSA 22.2 No. 235-04 & UL 1077	1kA, 5 to 15A, 250V AC, 2kA, 20 to 35A, 250V AC, 1kA, 5 to 35A, 50V DC 1kA, C1, 50V Dc, -(5-35A); 500A, U3, 125V AC, -(20-35A); 1kA, U1a, 125V AC, -(5-35A); 2kA, C1, 125V AC, -(5-35A); 1kA, C1, 250V AC, -(5-15A); 2kA, C1, 250V AC, -(20-35A)
Tripping Current Code TC	TC 3 Ref.: CSA22.2 No. 235-04
Overload Rating As per CSA 22.2 No. 235-04	5-35A - OL0 125/250V AC, 50V DC; 5-35A - OL1 125V AC; 5-35A - OL1 250V AC
Weight	aprox. 25g
Application Standards	UL 1077, CSA 22.2 No. 235-04, EN 60934, UL 1500
Approvals	
Ignition Protected	Compliant as per UL 1500 (Standard for safety for Ignition protection test for Marine products)

E209569

up to 12 Amps

Operating Characteristic



OVER LOAD	TRIP TIMES
100%	NO TRIP
135%	TRIP IN 1 HOUR
200%	5 to 40 SEC
300%	2.60 to 9.0 SEC
400%	1.30 to 5.1 SEC
500%	0.70 to 3.5 SEC
600%	0.50 to 2.8 SEC
800%	0.28 to 1.5 SEC
1000%	0.18 to 0.9 SEC

ORDERING INSTRUCTIONS

TR30 – C – 63 – S – W – 1 – A – 7.0A – 2

PRODUCT TYPE: TR30

MOUNTING TYPE:
- A Plastic 3/8"-27UNS
- B Plastic M11
- C Metal 3/8"-27UNS
- D Metal M11
- E Metal M12
- W Wing clip

TERMINAL SIZE:
- 63 6.3 x 0.8mm

TERMINAL CONFIGURATION:
- S Straight
- L 90° Bend,Left side
- R 90 Bend, Right side
- T Screw type terminal (#8-32NCF pan head screw with external teeth star washer)

SLIDER COLOR:
- W White
- RB Red slider with white trip band
- BB Black slider with white trip band

SLIDER MARKING:
- 0 None
- 1 Vertical
- 2 Horizontal

Note: Color of marking is standard. On red / black slider -white marking white slider -black marking.

MOUNTING NUT:
- N None or wing clip
- A Plastic knurled
- B Metal knurled
- C Metal Hex Nut
- D Sealing knurled boot

CURRENT RATING: 5A, 6A, 7A, 10A, 12A, 15A, 20A, 25A, 30A & 35A

INDICATOR PLATE:
- 0 None
- 1 Black letters on Aluminium Background
- 2 Silver Letters on Black Background

*** SPECIAL ORDER ONLY. Contact Altech for more details.**
PCB Mounting and additional Shunt Terminal available, please contact Altech.

Time Current Characteristics:

The standard characteristic is valid for ambient temperatures of +25°C. If the device is to be used in an ambient temperature other than +25°C, allowances must be made when selecting the current rating according to the following guidelines:

Ambient temp. °C	-5	-0	+10	+20	+25	+30	+40	+50	+60
Multiplication Factor 5A	0.9	0.92	0.95	0.98	1	1.12	1.15	1.25	1.5
Multiplication Factor 56A to 30A	0.9	0.92	0.95	0.98	1	1.05	1.15	1.25	1.35
Multiplication Factor 35A	0.9	0.93	0.95	0.98	1	1.05	1.15	1.25	1.35

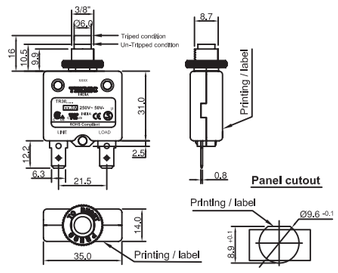
Example:

Normal Continuous Current	5.0A
Ambient Temperature	40°C
Multiplication Factor	1.15
Selected rated current at +40°C ambient temperature	5 x 1.15 = 5.75 6.0A (nearest)

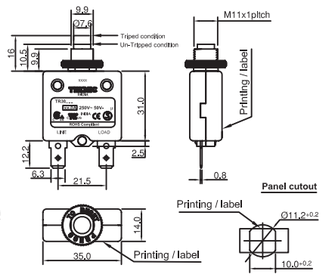
TR-30 Dimensions & Mounting Options

Central Mounting

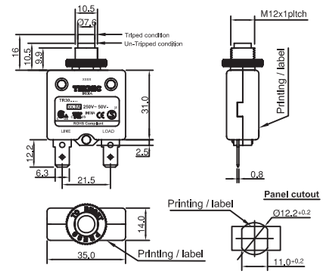
A/C. 3/8"-27 UNS



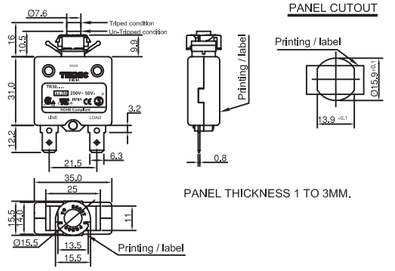
B/D. M11



E. M12

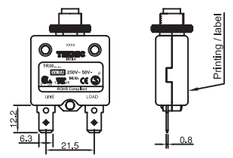


Wing Clips

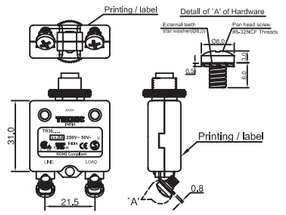


Terminal Options

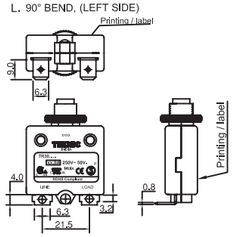
S.STRAIGHT



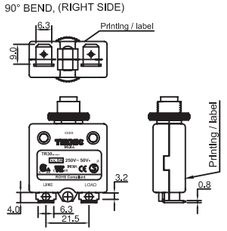
T. SCREW TYPE (#8 - 32NCF Threads)



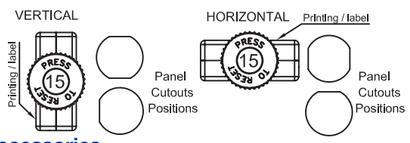
L. 90° BEND, (LEFT SIDE)



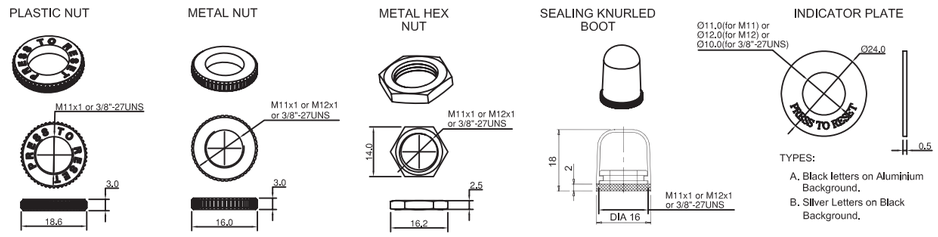
R. 90° BEND, (RIGHT SIDE)



Slider Printing for Current Rating



Accessories



Dimensions in mm (to convert to inches multiply by 0.03937)

DFS Series
RCCB Earth Leakage Circuit Breakers

RCCB Series compact Earth Leakage Circuit Breakers detect and interrupt earth (ground) faults. They are VDE approved for the European system of protecting people, animals, equipment and property from dangerous line-to-ground and shock hazard currents.

US applications include ground-fault protection of equipment (GFPE) using the 10mA and 30mA fault current ratings, especially when high distributed capacitance or other leakages cause excessive nuisance trips at lower fault currents. Applications for the 300mA and 500mA ratings are equipment protection and fire prevention, limiting the energy of a fault to less than the minimum ignition energy for many materials.

Type Designation

RP (a) (b) (c)

(a): 11 = 16A, 12 = 25A, 13 = 40A, 14 = 63A, 15 = 80A, 16 = 100A, 17 = 125A
(b): 2 = 10mA, 4 = 30mA, 6 = 300mA, 7 = 500mA
(c): 601 = 2 pole, 911 = 4 pole

DFS2

DFS4

Maximum Rated Line Current	Fault Trip Current	Cat. No.	Supersedes	Fault Trip Current	Cat. No.	Supersedes
16A	10mA	**09112601**	RP2101			
25A	30mA	**09124601**	RP2203	30mA	**09124911**	RP4203
25A	300mA	**09126601**	RP2230	300mA	**09126911**	RP4230
25A				500mA	09127911	RP4250
40A	30mA	**09134601**	RP2303	30mA	**09134911**	RP4303
40A	300mA	**09136601**	RP2330	300mA	**09136911**	RP4330
40A				500mA	09137911	RP4350
63A	30mA	09144601	RP2403	30mA	**09144911**	RP4403
63A	300mA	09146601	RP2430	300mA	**09146911**	RP4430
63A	500mA			500mA	09147911	RP4450
80A				30mA	09154911	RP4503
80A				300mA	09156911	RP4530
80A				500mA	09157911	RP4550
100A				30mA	09164911	RP4603
100A				300mA	09166911	RP4630
100A				500mA	09167911	RP4650
125A				30mA	09174911	RP4703
125A				300mA	09176911	RP4730
125A				500mA	09177911	RP4750

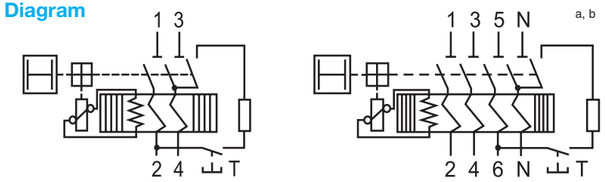
Stock items are shown in BOLD.

Voltage Rating (maximum)	230V AC, 50Hz	400Y/230V AC, 50Hz
Min Operating Voltage Bank of Test Circuit	150V	200V
Short Circuit Withstand Rating	No back-up fuse: Rated current (RC) 16/25/40A: 500A; RC 63/80A: 800A; RC 100A: 1000A; RC 125A-1250A. With back-up fuse: 10kA; Size of fuse: (2 pole version): RC 25/40/63: 100A; (4 pole version): RC 25/40/63A: 100A; RC 80/100/125A: 125A	
Fault Trip Current Calibration	FI trips are calibrated at less than fault trip current for ensured safety (Typical trip range between 66.6-83.3% fault trip current, e.g., typical trip at 20-25mA for fault RC of 30mA)	
Typical Life	Fully functional after 5,000 operations to DIN/VDE 0664T10, IEC 61008-1 and 2000 additional fault current trips.	
Standard Pack and Weight	1/230g (0.6 lb.)	1/420-460g (0.9 lb.-1.0 lb.)
Terminal Size Acceptability	1.5-50mm² (16-1 AWG)	1.5-50mm² (16-1 AWG)
Terminal Torque	3Nm (26.5 lb.in.)	3Nm (26.5 lb.in.)

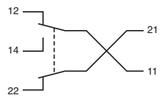
[a] For 2-Phase applications, terminal 5 and 6 (next to Neutral terminals) must be connected to one phase for the test circuit to be operable.

[b] For voltage systems without a neutral conductor. Please use jumper from "1" or "3" to top "N" terminal. This will assure proper functioning of the "test" circuit.

Circuit Diagram

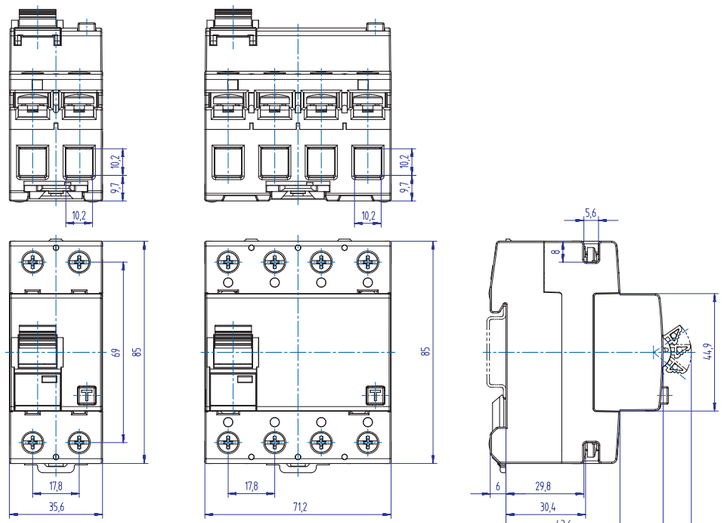


DHI11 - Auxiliary Switches / Error Signal Switch

Contact Rating	Wire Size	Torque	Cat. No.	Supersedes	Circuit Diagram
6A / 230V AC 1A / 110V DC Std. Pk.: 1 Unit Weight: 45 grams (0.12 lb.) Width: 9mm (.354in.)	1-1.5mm² (16 AWG)	max. 0.8Nm (7lb.in.)	**DHI11**	RH11	

Note: If the power system has a marked conductor, it must connect through the FI and not be grounded at any point downstream.

Dimensions in mm



DFS2 **DFS4** **DFS2 and DFS4**

Temperature Range	Environmental Information marked with “Snowflake” approval for -25°C to 40°C (-13°F to 104°F) ambient temperature. (Temperature effect on RC: for every 10°C temperature rise above 40°C decrease RC by 7%.)
Fluctuating Climate Conditions	According to IEC 60068-2-30: heat (25°C~55°C), relative humidity (93%~95%)
Electrical Shock Protection	Uninsulated electrically live parts within 30mm of the operating handle are “finger safe” (terminal screw heads) and uninsulated live parts within 100mm of the operating handle are “back-of-hand safe” (terminals).
Impact/Shock Protection	20g with impact force half-cycle sinusoidal and 20ms duration, 18 impacts total with 6 on each principal axis (3 impacts each face). FI is DIN Rail mounted during the test, and electrically loaded with 25% of Fault RC. Successful testing required no trip during the test, no damage and no loosened parts.
Vibration/Seismic Resistance	5g, at frequency of ≤80Hz, applied for 30 minutes along each of the three principal axes, plus 5 minutes of application at every established critical resonant frequency. FI is DIN Rail mounted during the test, and loaded with 25% Fault RC. To pass, the FI did not trip at 25% Fault RC, but did trip between each of the principal axis tests when the fault current was raised to 125% Fault RC, and there was no damage and no loosened parts. Suitable for machinery and mobile vehicle applications.
Protection Class	IP20; higher protection Class is dependent on housing.
Non-Sinusoidal Fault	The FI is tested and approval stamped for tripping sensitivity to non-sinusoidal fault currents, which become zero or almost zero within one cycle of the line frequency. Waveforms and allowed trip-current ranges are as follows: 1. AC Sinusoidal Fault - 0.5-1.0 times Fault RC 2a. Pulsating DC Fault; Positive and Negative Half-Waves - 0.35-1.4 times Fault RC 2b. Phased Half-Wave, 90° - 0.25-1.4 times Fault RC Phased Half-Wave, 135° - 0.11-1.4 times Fault RC 3. Pulsating DC on 6mA DC (continuous) Base - Max. 1.4 times Fault RC + 6mA
Insulation Category	At VDE rated voltage, suitable for Class C environments with relatively high dust and moisture levels and little HVAC control, e.g., industrial, commercial, agricultural; on machine tools, hoists, warehouse equipment, etc.; in boiler rooms, unheated storage, covered shipping/receiving, open workshops, etc.

Index

Index

Index

Index

Index

Index

Terms & Conditions

TITLE - Title to the products of ALTECH shall remain with ALTECH until payment is made in full by Customer. Such reservation of title is for the purpose of securing the purchase price and shall not relieve Customer of the duty to inspect the products upon receipt, to notify ALTECH of any deficiencies or defects, and to exercise due care in the use, installation, operation, and maintenance of the products when on the premise of the Customer or under the control of the Customer. Notwithstanding any reservation of title by ALTECH, risk of loss shall pass to customer at any time of shipment.

SHIPMENT AND DELIVERY - All orders for destination in the mainland United States (less Hawaii, Alaska and non-continental United States possessions) will be shipped F.O.B. Flemington, N.J. All destination, shipping and other charges shall be paid by the Customer in accordance with ALTECH's then current shipping and billing practices.

Delivery dates given in the acceptance of any order are approximate. ALTECH shall not be liable for delays in delivery or in performance due to causes beyond its reasonable control including acts of God, acts of Customer, acts of civil or military authority, fires, strikes or other labor disturbances, war, riot or delays in transportation. In the event of such delay, the date of delivery or performance shall be extended for a period equal to the time lost by reason of the delay.

PRICE - PRICES in any ALTECH publication are subject to change without prior notification. Catalog prices are based on prices published in the current price list. All written quotations are valid for thirty (30) days from the date of quotation. Customer shall pay all sales, use, excise or similar taxes whenever ALTECH must itself pay and/or collect such tax from Customer arising out of the sale.

PAYMENT - Customer agrees to make payment within thirty (30) days of date of the invoice from ALTECH. Customer agrees to pay a late payment charge of one and one-half percent (1.5% per month, or the maximum late payment charge permitted by applicable law, whichever is less, on any unpaid amount for each calendar month (or fraction thereof) that such payment is in default. Orders amounting to less than $100.00 will be billed at $100.00 plus freight. Full carton purchases are required. In the event of referral to an attorney for collection, reasonable attorney's fees for collection of the overdue amount shall be paid by Customer. In the event payment is not received within 30 days from the date of invoice, any discount shall be cancelled and the full list price will be due.

LIMITED WARRANTY - ALTECH warrants to Customer that the equipment purchases shall be free from defects in material and workmanship under normal use and service for a period of one year from shipment.

Written notice as an explanation of the circumstances of any claim that the equipment has proved defective in material or workmanship shall be given promptly by the Customer to ALTECH.

ALTECH will not be liable for any misuse, improper operations, improper installation, improper maintenance, alteration, modification, accident or unusual degradation of the equipment or parts due to an unsuitable installation environment.

No representation of other affirmation of facts, including but not limited to statements regarding capacity, suitability for use or performance of the equipment, shall be or be deemed to be a warranty or representation by ALTECH for any purpose, nor give rise to any liability or obligation of ALTECH whatsoever.

Customer's sole and exclusive remedy in the event of breach of warranty, as set forth herein, is expressly limited to (1) the correction of the defect by adjustment, repair, modification, or replacement, or (2) issuance of a credit or refund of the purchase price for the defective equipment at ALTECH's election and sole expense.

EXCEPT AS SPECIFICALLY PROVIDED IN THIS AGREEMENT, THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

THIS WARRANTY EXTENDS ONLY TO THE CUSTOMER FROM ALTECH OR ITS AUTHORIZED DISTRIBUTOR.

LIMITATION OF LIABILITY - IN NO EVENT, SHALL ALTECH BE LIABLE FOR LOSS OF PROFITS, INDIRECT, SPECIAL, CONSEQUENTIAL OR OTHER SIMILAR DAMAGES ARISING OUT OF ANY BREACH OF THIS AGREEMENT OR OBLIGATIONS UNDER THE AGREEMENT.

ALTECH SHALL NOT BE LIABLE FOR ANY DAMAGES CAUSED BY DELAY IN SHIPMENT, INSTALLATION OR FURNISHING OF EQUIPMENT OR SERVICES UNDER THIS AGREEMENT.

No action arising out of any claimed breach of this Agreement may be brought by either party more than two (2) years after the cause of action has accrued.

PATENT INDEMNITY - ALTECH shall defend or settle any suit or proceeding brought against Customer based on a claim that any equipment made to ALTECH design and furnished hereunder constitutes an infringement of any existing United States patent, provided (ALTECH) is notified promptly in writing and is given complete authorization and information required for the defense, and ALTECH shall pay all damages and costs awarded against Customer, but shall not be responsible for any costs, expense or compromise incurred or made by Customer without ALTECH's prior written consent. If any equipment is in ALTECH's opinion likely to or does become the subject of a claim for patent infringement, ALTECH may at its option and expense procure for Customer the right to continue using the device, modify it to become non-infringing, but in the event ALTECH is not reasonably able to modify, substitute, or otherwise procure for Customer the right to continue using it, ALTECH will remove such equipment and refund to Customer the amount paid in excess of a reasonable rental for past use.

ALTECH shall not be liable for any infringement or claim based upon use of the equipment in combination with other equipment not supplied by ALTECH or with modifications made by Customer.

The foregoing states the entire liability of ALTECH to Customer arising from patent infringement.

SELLER'S REMEDIES - Should Customer fail to make any payment within ten (10) days of its due date, or fail to perform any other of the Customer's obligation hereunder upon thirty (30) days written notice, or should Customer be or become insolvent or be a party to any bankruptcy receivership proceeding prior to full payment of all amounts payable hereunder, ALTECH may: (a) with or without demand or notice to customer declare the entire amount unpaid immediately due and payable; (b) enter upon the premises where the equipment may be found and remove it (Customer shall assemble the equipment and make it available to ALTECH at a place reasonably convenient to both parties and shall permit and assist ALTECH in effecting the retaking and removal of the equipment); and (c) sell any or all the equipment as permitted under applicable law, applying the proceeds of the sale to payment of the expenses of retaking, repairing and selling the equipment, reasonable attorney fees and to the satisfaction of all indebtedness then due and unpaid under this Agreement. Any surplus shall be paid to Customer and any deficiency shall be paid to ALTECH by Customer.

The remedies provided herein shall be cumulative and in addition to all other remedies provided by law or equity or under the Uniform Commercial Code.

GOVERNING LAW - This agreement will be governed by the Laws of the State of New Jersey.

GENERAL - This Agreement shall only become effective and binding when either (a) it has been accepted and executed by an authorized representative of ALTECH, or (b) the equipment has been shipped to Customer, with or without acceptance in writing hereon. Notice of acceptance is hereby waived by Customer. Customer hereby acknowledges receipt of a true and complete copy hereof.

No addition to or modification of any of the Terms and Conditions of Sale as they appear herein shall be binding upon ALTECH unless signed in writing by duly authorized representative of ALTECH in Flemington, N.J.

Typographical and clerical errors in quotations, orders and acknowledgments are subject to correction.

This Agreement is not assignable without the prior written consent of ALTECH. Any attempt to assign any of the rights, duties or obligations of this Agreement without such consent is void.

If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability, of the remaining provisions shall not in any way be affected or impaired thereby.

ALTECH is not responsible for failure to fulfill its obligation under this Agreement due to causes beyond its control, or except as agreed herein.

THE CUSTOMER ACKNOWLEDGES THAT HE HAS READ THE AGREEMENT, UNDERSTANDS IT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS. FURTHERMORE, THE CUSTOMER AGREES THAT IT IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN THE PARTIES, WHICH SUPERSEDES ALL PROPOSALS OR PRIOR AGREEMENTS, ORAL OR WRITTEN, EXPRESSED OR IMPLIED, AND ALL OTHER COMMUNICATIONS BETWEEN THE PARTIES RELATING TO THE SUBJECT MATTER OF THIS AGREEMENT.

Altech Corp.®

Here are other great products available from Altech!

Smart Relays and Digital Timers

Supports up to 48 I/Os (32 digital inputs & 16 digital outputs). DST Feature Available. Backlit LCD Screen for display & modification of pre-selected parameters of functional blocks, viewing I/O status and programming on the device. PC software for programming, online & offline simulation, documentation & printing. Designed for use in automation for commercial & Industrial sectors. Modbus Communication. UL 508 (UL File No. E352868), IEC 61000-3-2 and IEC 61000-4-2-1~11. 250 lines of ladder programming. 16 soft text messages, Time Switches, Compare Counters, Timers, Counters & 12 analog functions.

Interface Modules and Power Supplies

Altech offers a wide range of DIN Rail or panel mount cable interface modules, relay interface modules, power supplies, carrier modules, and custom designed modules. Cable to connector models include: D-Sub connectors, ribbon cable connectors, and Dip socket connectors to terminals. Standard relay modules from 1 to 16 channels, and safety relay modules from 1 to 16 channels and up to 10 poles are included. The catalog also contains switching power supplies, linear power supplies, and custom designed interface modules.

Contactors, Mini Contactors, Overload Relays and Manual Motor Starters

Contactors
- UL508 • CSA C22.2 No.14
- IEC 60947-2 & IEC 60947-4-2
- 1/2HP up to 600HP @ 480V AC
- Direct Mounting Overload Relays
- Full line of accessories UL508 Type E Manual Motor Starters
- UL508 (Type E self-protected Manual Motor Controller)
- CSA C22.2 No.14
- IEC 60947-2 & IEC 60947-4-2
- Type F combination Manual Motor Controller (with MC-Series Contactor)

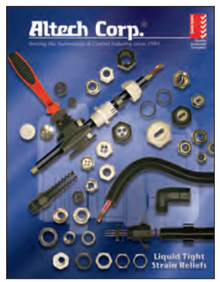
Terminal Blocks

Altech offers a NEW Terminal Block catalog with the most competitively priced blocks in the industry. We feature screw and spring clamp models for DIN rail and panel mount applications. This advanced line of wire termination products will increase your design options and help to get the job done more efficiently. Our line of blocks include feed-through (single, double or triple level), distribution, ground, fuse, disconnect, thermocouple, surge suppressor and indicator. A wide variety of accessories, tools and ferrules are available.

Industrial Enclosures

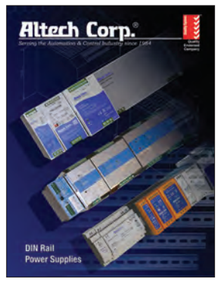
Altech offers a broad selection of non-metallic and aluminum Industrial Enclosures to meet your diverse design requirements. Sizes range from 1.97 x 2.05 x 1.38 to 35.43 x 11.81 x 5.59 inches. Materials include polycarbonate, polystyrene, polypropylene, ABS or aluminum. Polycarbonate and aluminum series have been recently expanded. Protection up to IP67 (NEMA 4, 4X). Smooth sidewalls or sidewalls with knockouts. Enclosures can be mounted directly onto a panel, frame or other mounting surfaces. EMI / RFI Coating is available. Competitive cover printing is available. Hinge Kits. Customization available.

Liquid Tight Strain Reliefs



This 64-page catalog introduces Altech's full line Liquid Tight Strain Reliefs (Cord Grips) which are used to seal cable entries, keep contaminant's from entering enclosures, provide strain relief and thus reduce stress on components and termination points inside enclosures. Available in standard, high-performance, and economy versions, functions include Straight-Through, Increased Strain Relief, Bend Protection, Pull/Bend Protection, Multi-conductor, Flat Cable and EMI/RFI. They can be used with almost any type of cable, cord or conductor - solid, stranded, flat, shielded, high temperature, etc.

DIN Rail Power Supplies



Altech DIN RAIL mountable power supplies have Universal AC input. They are suitable for industrial and automation applications. UL508 Listed or UL Recognized. Single and Three phases up to 960W. Outputs of 5V, 12V, 15V, 24V and 48V. Class 2 devices are available. Installed on DIN rail TS35/ 7.5 or 15. Protections of Short circuit / Overload / Overvoltage / Over temperature. Cooling by free air convection. All-In-One DC-UPS, battery based. Ultra Capacitor DC-UPS, no battery required. Worldwide approvals. 3 year warranty.

Motor Disconnect Switches

Altech's line of Motor Disconnect Switches are UL 508 listed as Manual Motor Controllers for AC Motor Starting Across-the-line and AC General use. This new 16 page catalog includes the 3 different handle designs, which are all available in gray/black or yellow/red housings. Electrical ratings are 25-150A / 600V. The switches are non-fused DIN Rail mountable. Neat features include: snap-on auxiliary switches, door mounting kit and a retrofit 30A fuse holder. Also featured are Enclosed Motor Disconnect Switches & Fused Enclosed Motor Disconnect Switch (30A) in plastic or stainless housings.

altechcorp.com

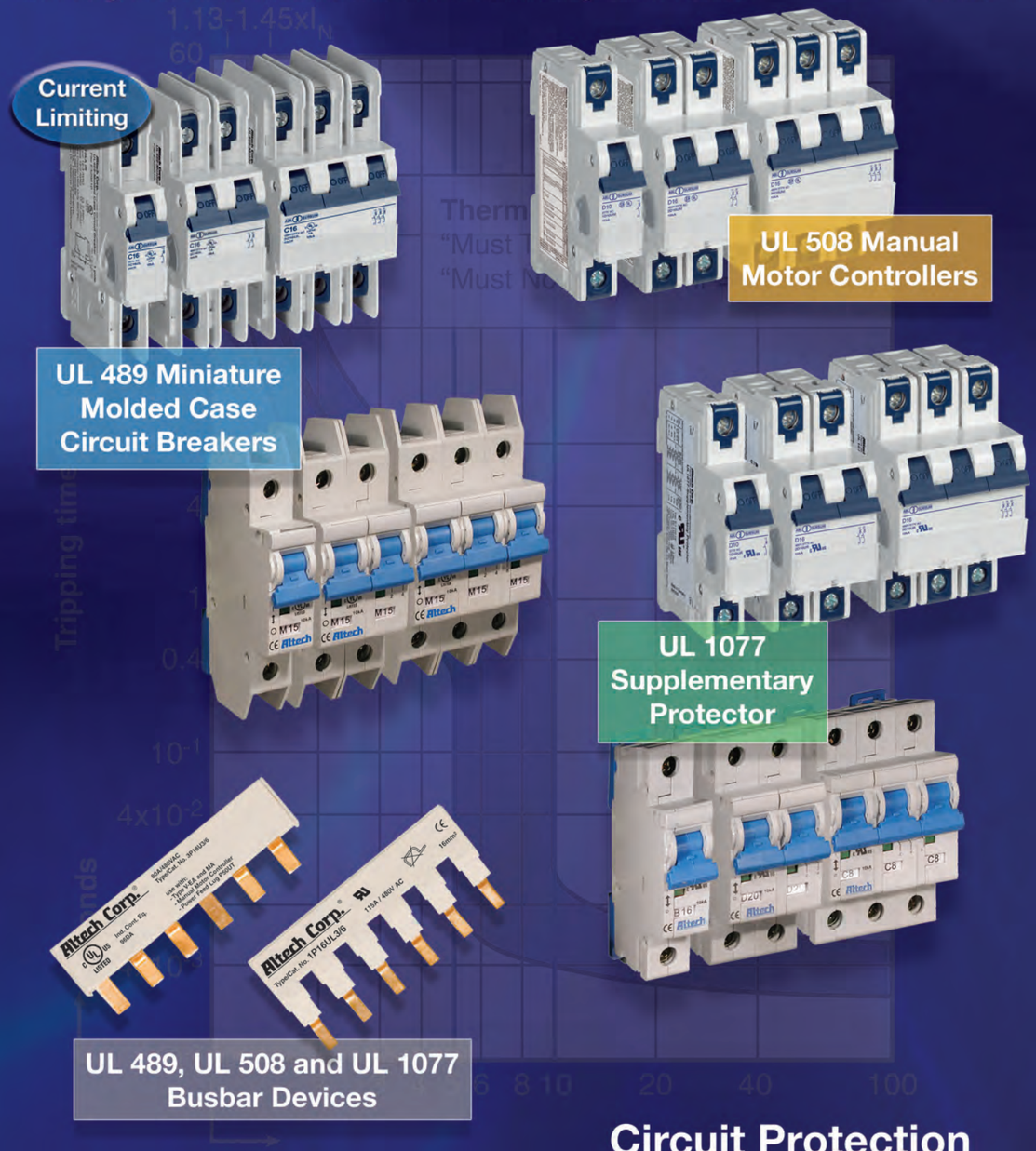
Altech Corporation
35 Royal Road
Flemington, NJ 08822-6000
Phone (908) 806-9400
Fax (908) 806-9490
www.altechcorp.com

Altech Corp.® 345-042016-5M

Altech Corp.®

Serving the Automation & Control Industry since 1984

Certified System™ ISO 9001 QMI-SAI Global



Circuit Protection Products