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
- Current Limiting
- 240V, 480Y/277V AC, 50/60Hz
- 125V DC (1 pole); 250V DC (2pole)
- 10kA Short Circuit Interrupting Capacity
- HACR Type 40°C
- Line/Load reversible

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C.B.
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PENDING

IEC 60947-2
Short Circuit Tested

Current/ Voltage Rating	
UL-Series	0.3 - 63A/ 240V AC, 0.3-32A/ 480Y/277V AC*
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 Torque (min/max)	2 Nm (17.7 lb.in.) / 2.5Nm (22.2 lb.in)
Electrical Life	6000 switching cycles ON/ OFF
Mechanical Life	10000 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

**One device dual voltage ratings.*

Short Circuit Interrupting Capacity
According to UL 489

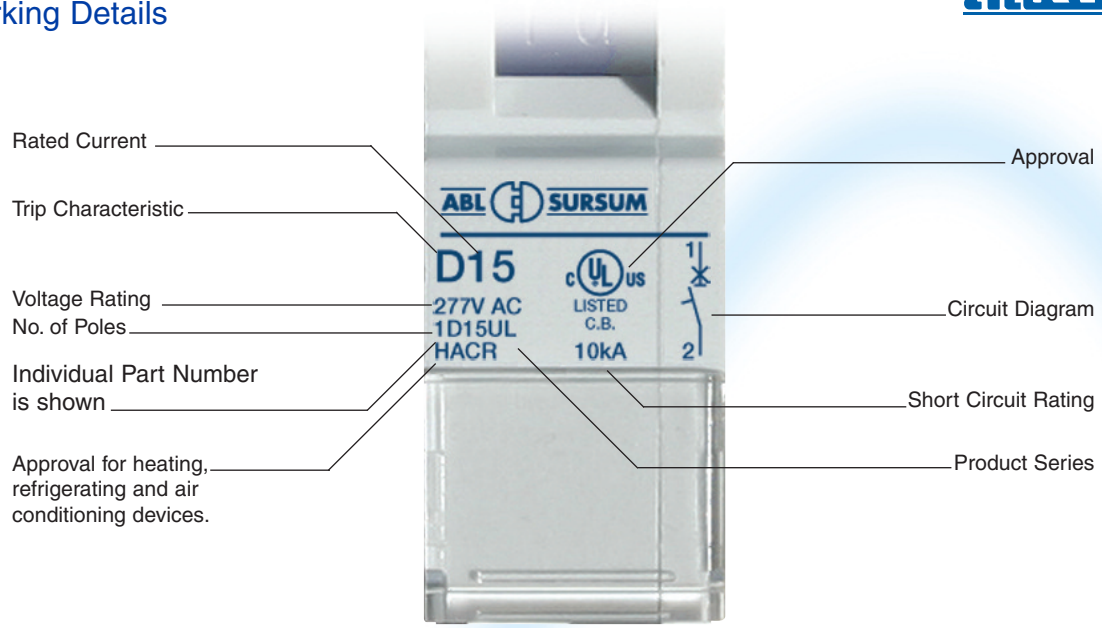
No. Poles	Type	0.3-32A	40-63A
1	**AC**	10kA @ 120, 240, 277V	10kA @ 120, 240V
2-3	**AC**	10kA @ 120, 240, 480Y/277V	10kA @ 120 240V

No. Poles	Type	0.3-32A	40-63A
1	**DC**	10kA @ 125V	10kA @ 125V
2	**DC**	10kA @ 250V	10kA @ 250V

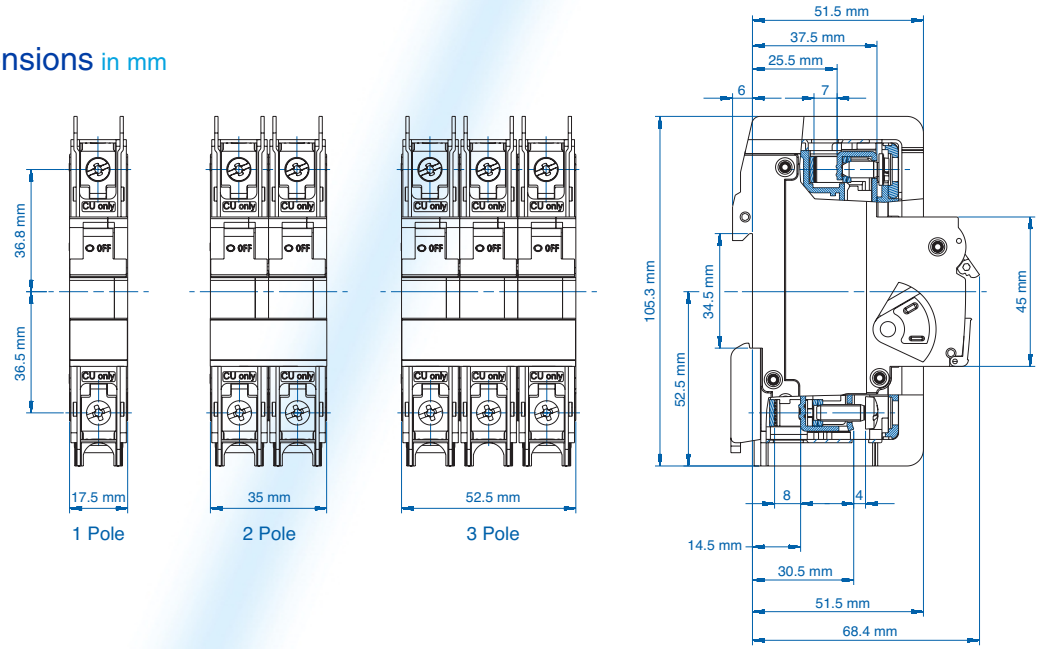
Interrupting Capacity
According to IEC 60947-2, DIN EN 60937-2

No. 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	Business Equipment	Transformers	Power Supplies	Motors		Reactive Load	Telecommu-nications/ Computer Equipment	Power Supplies
Thermal Trip		Magnetic Trip		Wiring Protection								
Must not Trip>100ms	Must Trip <1hr	Must not Trip>100ms	Must Trip at 100ms	Control Circuits	Appliances		Heaters	Low Inrush	High Inrush			
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.

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CE

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	**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

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	**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

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	**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

Add-on Neutral Pole

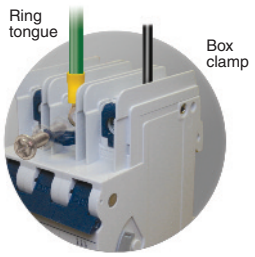
Rated Current	Type/ Cat. No.	Rated Voltage
0.3-32A	**N32UL**	480/277V AC
40-63A	**N63UL**	240V AC

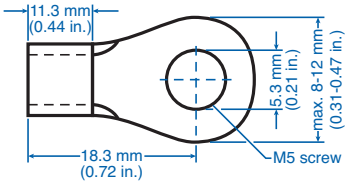
Standard Pack: 6

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

Application Examples:

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

Altech Corp.®

UL489

c UL us LISTED C.B.
E329510

CE

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

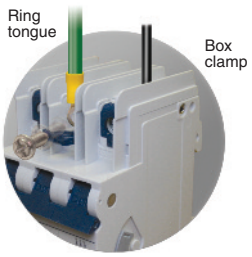
Rated Current	Type/ Cat. No.	Rated Voltage
0.3-32A	N32UL	480/277V AC
40-63A	N63UL	240V AC

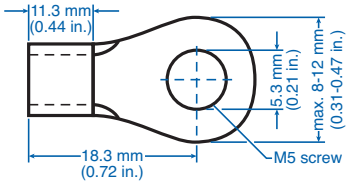
Standard Pack: 6

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.*

DL - Series
C-Trip (DC) Characteristic

Application Examples:

Telecommunication equipment,
computer equipment, uniterruptable power supplies.

C UL US LISTED C.B.
E329510

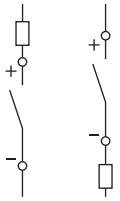
CE

One Pole

Standard Pack: 12

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

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



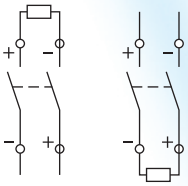
Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**1C03DL**	125V DC
0.5A	**1C05DL**	125V DC
1.0A	**1C1DL**	125V DC
1.6A	**1C1.6DL**	125V DC
2.0A	**1C2DL**	125V DC
3.0A	**1C3DL**	125V DC
4.0A	**1C4DL**	125V DC
5.0A	**1C5DL**	125V DC
6.0A	**1C6DL**	125V DC
8.0A	**1C8DL**	125V DC
10A	**1C10DL**	125V DC
12A	**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

Two Pole

Standard Pack: 6

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

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

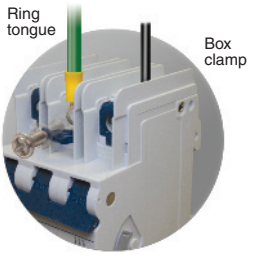


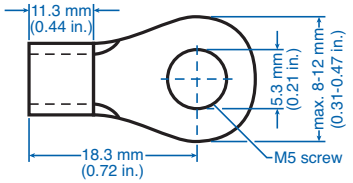
Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**2C03DL**	250V DC
0.5A	**2C05DL**	250V DC
1.0A	**2C1DL**	250V DC
1.6A	**2C1.6DL**	250V DC
2.0A	**2C2DL**	250V DC
3.0A	**2C3DL**	250V DC
4.0A	**2C4DL**	250V DC
5.0A	**2C5DL**	250V DC
6.0A	**2C6DL**	250V DC
8.0A	**2C8DL**	250V DC
10A	**2C10DL**	250V DC
12A	**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.*

DL - Series
D-Trip (DC) Characteristic

Altech Corp.®

UL489

Application Examples:

Telecommunication equipment,
computer equipment, uniterruptable power supplies.

c UL us LISTED C.B.
E329510

CE

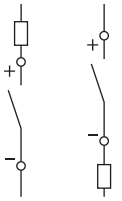
One Pole

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



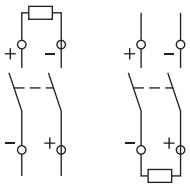
Two Pole

Standard Pack: 6

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

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

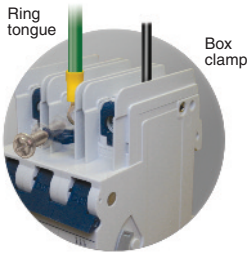
Rated Current	Type/ Cat. No.	Rated Voltage
0.3A	**2D03DL**	250V DC
0.5A	**2D05DL**	250V DC
1.0A	**2D1DL**	250V DC
1.6A	**2D1.6DL**	250V DC
2.0A	**2D2DL**	250V DC
3.0A	**2D3DL**	250V DC
4.0A	**2D4DL**	250V DC
5.0A	**2D5DL**	250V DC
6.0A	**2D6DL**	250V DC
8.0A	**2D8DL**	250V DC
10A	**2D10DL**	250V DC
12A	**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

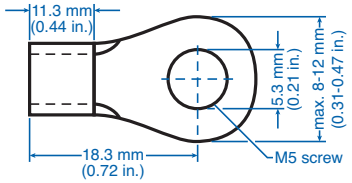


Warning!
Correct polarity must be observed
when connecting the DC circuit breakers.

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.

LISTED
C.B. ACC.
3NY7
E335632

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 AC 1A@220V AC
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)

Shunt Trip

Type/ Cat No.	Description	Max. Operating Current @ Un	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

Neutral Pole

Type/ Cat No.	Rated Current In	Rated Voltage	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

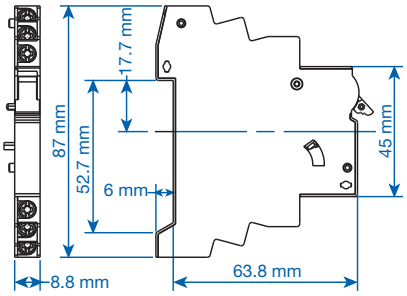
Mounting Screw 34mm

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

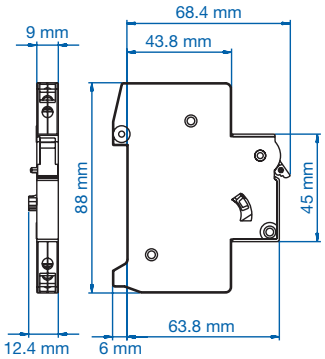
Type/ Cat No.	Std Pk
E983419	10

Lock-out Adapter

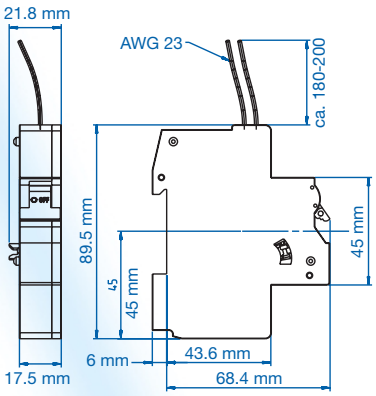
Type/ Cat No.	Std Pk
EASS	10



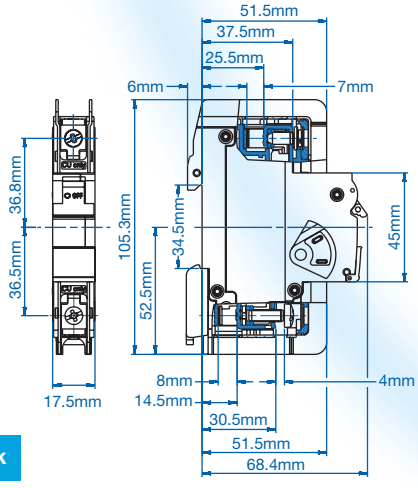
Dimensions HxxUL.



Dimensions HLS11L.



Dimensions UA120UL

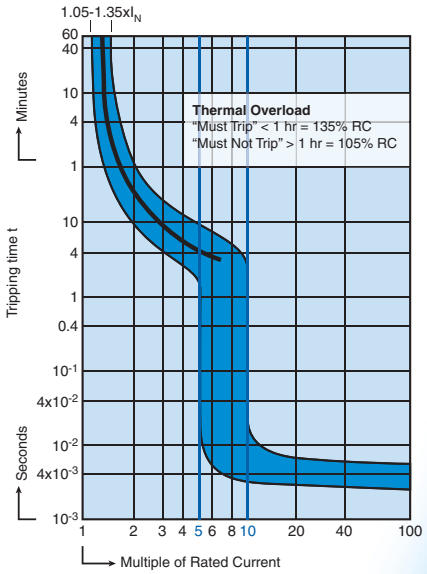


Dimensions NxxUL, FAxxUL

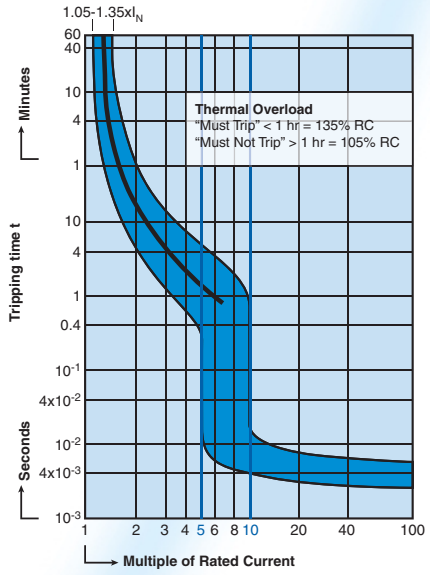
* UL Pending

UL Series (AC) Trip Curves

C (AC) Trip Curve



0.3A Through 10A Rated Current

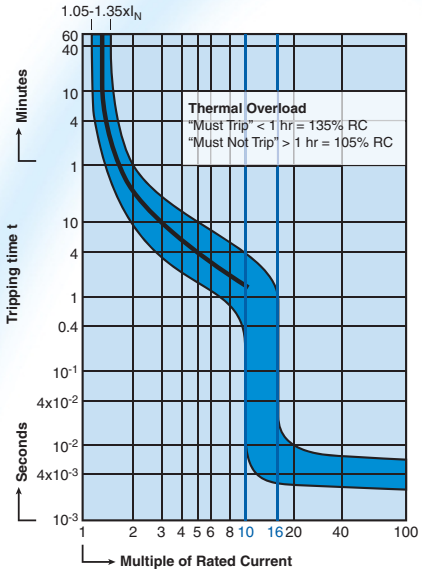


12A Through 63A Rated Current

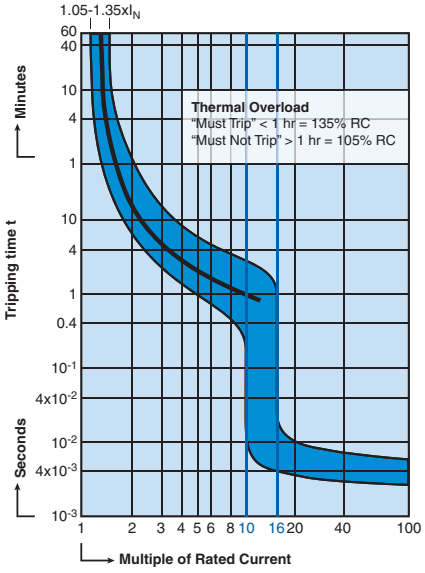
"C" Magnetic Trip Parameters
Rated current 0.3A to 63A.

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



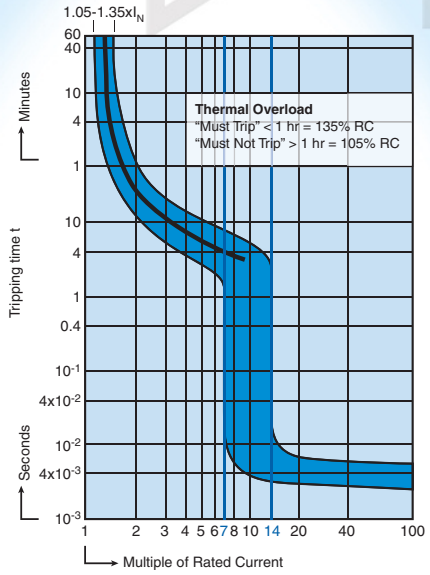
12A Through 63A Rated Current

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

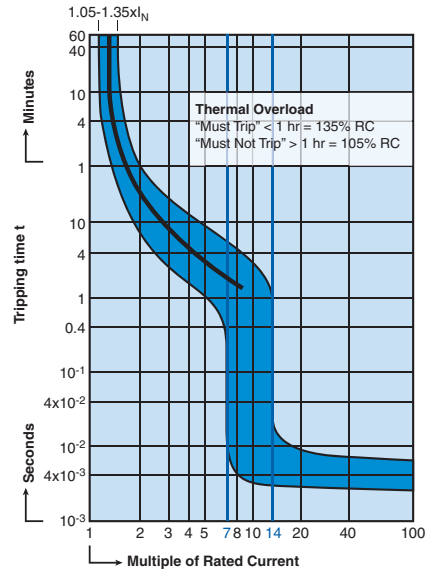
1. Hold for a minimum of 100ms at surge of 10 times rated current.
2. Trip in under 100ms at 16 times rated current.

UL Series (DC) Trip Curves

C (DC) Trip Curve



0.3A Through 10A Rated Current

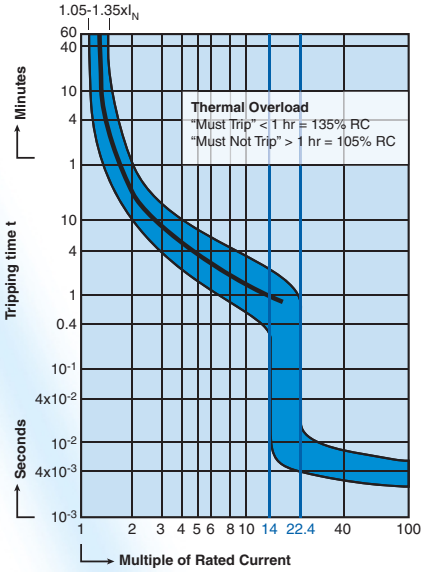


12A Through 63A Rated Current

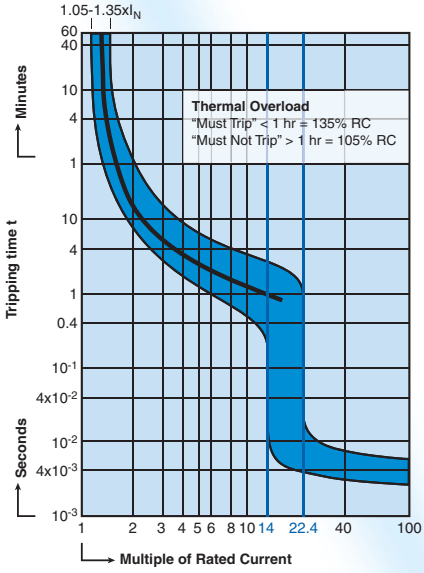
"C" Magnetic Trip Parameters
Rated current 0.3A to 63A.

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

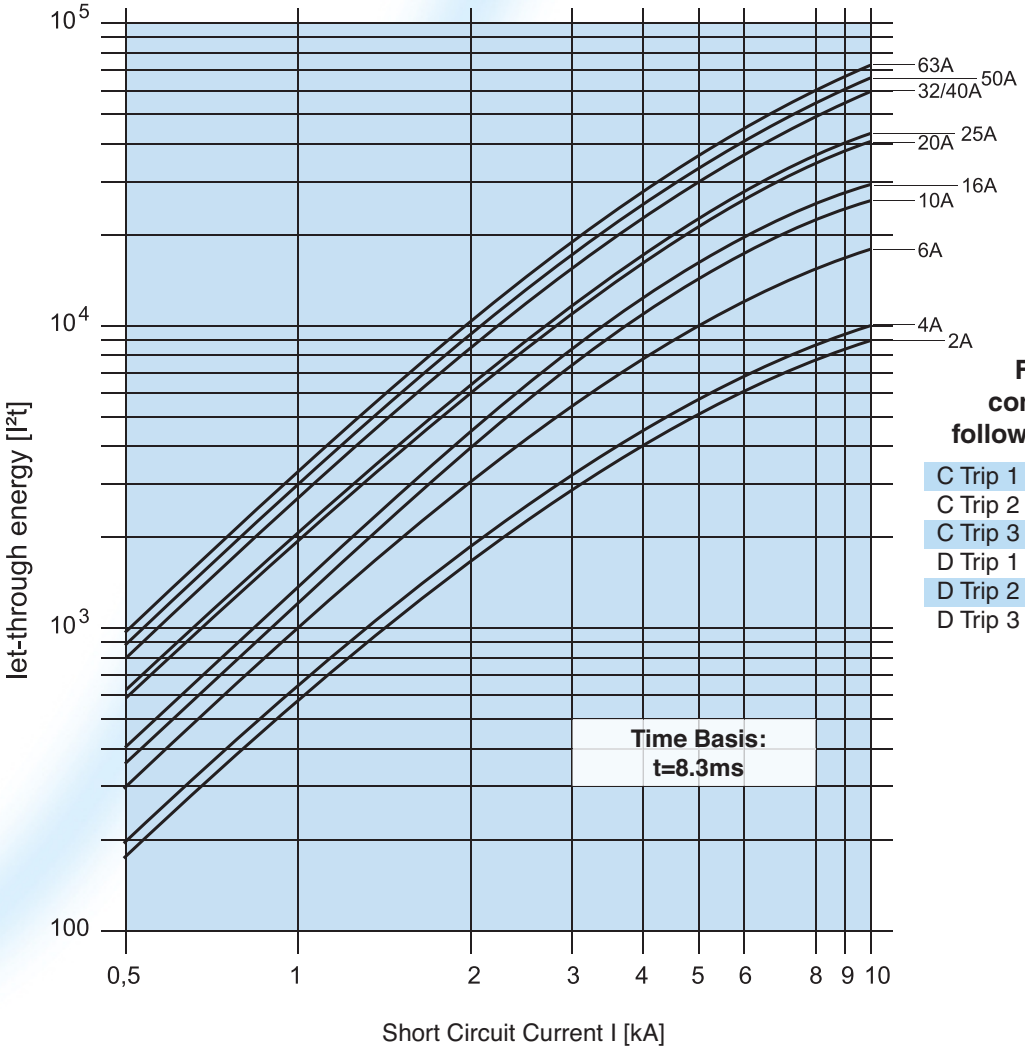
"D" Magnetic Trip Parameters
Rated current 0.3A to 63A.

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