

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
- 125VDC (1 pole); 250VDC (2pole)
- 10kA Short Circuit Interrupting Capacity
- HACR Type 40°C
- Line/Load reversible



Current/ Voltage Rating

UL-Series	0.3 - 63A/ 240 VAC, 0.3-32A/ 480Y/277 VAC*
DL-Series	0.3 - 63A/ 125/ 250 VDC
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	max. 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.

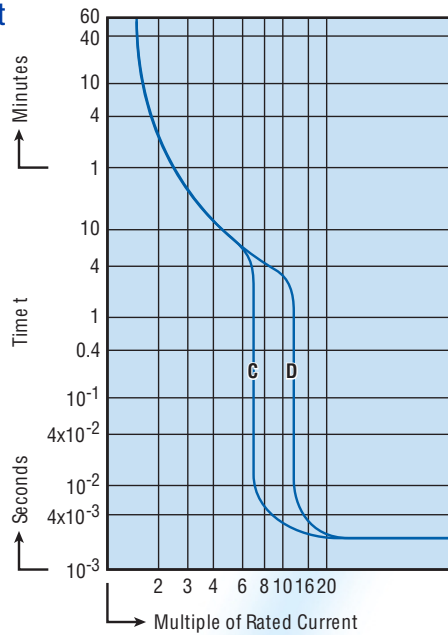
AC - short Circuit interrupting rating

No. Poles	Type	03-32A	33-63A
1	AC	10kA @ 120, 240, 277 VAC	10kA @ 120, 240 VAC
2-4	AC	10kA @ 120, 240, 480Y/277 VAC	10kA @ 120, 240 VAC

DC - short Circuit interrupting rating

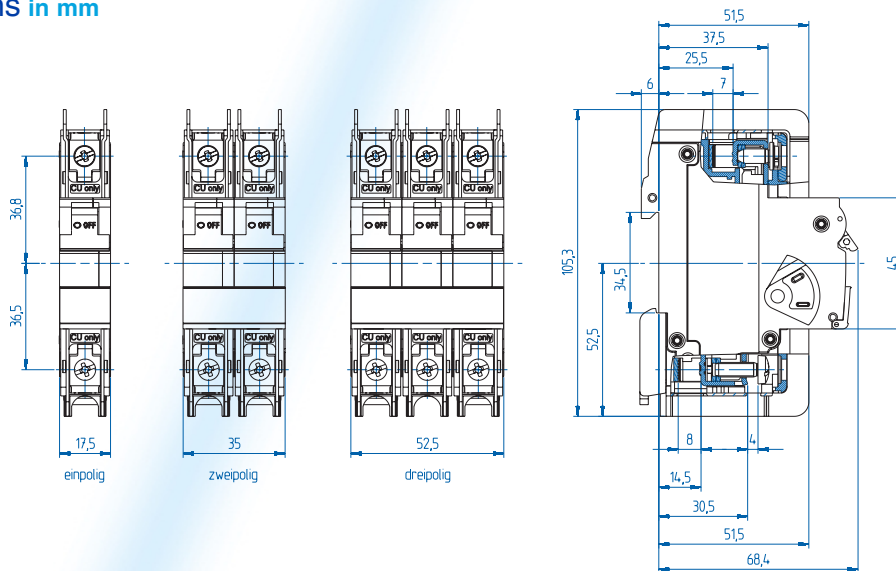
No. Poles	Type	0.2-32A	33-63A
1	DC	10kA @ 125 VDC	10kA @ 125 VDC
2	DC	10kA @ 250 VDC	10kA @ 250 VDC

Time versus Current Trip Curve



For exact trip curves and additional technical data please refer to pages 15-17.

Dimensions in mm



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	1.35xRC	5xRC	10xRC	AC							
1.05xRC	1.35xRC	7xRC	14xRC	DC							
D-Characteristics											
1.05xRC	1.35xRC	10xRC	16xRC	AC							
1.05xRC	1.35xRC	14xRC	22.4xRC	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.

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.



Standard Pack: 12

Weight:
1.86kg (4.1lb.)

One Pole

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



Standard Pack: 4

Weight:
16.6kg (3.66lb.)

Three Pole

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



Standard Pack: 6

Weight:
1.86kg (4.1lb.)

Two Pole

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



Add-on Neutral Pole

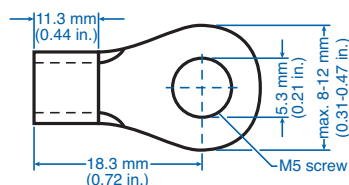
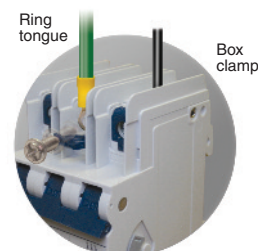
Rated Current	Rated Voltage	Type/ Cat. No.
0.3-32A	277/480VAC	N32UL
40-63A	240VAC	N63UL

Standard Pack: 6

Weight:
0.99kg (2.18)

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



Standard Pack: 12

Weight:
1.86kg (4.1lb.)

One Pole

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



Standard Pack: 4

Weight:
16.6kg (3.66lb.)

Three Pole

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



Standard Pack: 6

Weight:
1.86kg (4.1lb.)

Two Pole

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



Add-on Neutral Pole

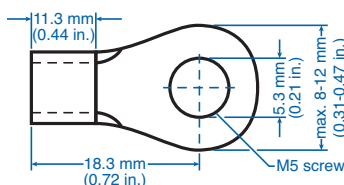
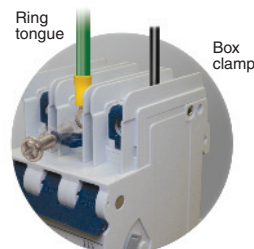
Rated Current	Rated Voltage	Type/Cat. No.
0.3-32A	277/480VAC	N32UL
40-63A	240VAC	N63UL

Standard Pack: 6

Weight:
0.99kg (2.18)

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, uninterruptible power supplies.

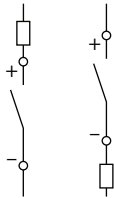


One Pole



Standard Pack: 12

Weight:
1.86kg (4.1lb.)



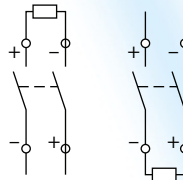
Rated Current	Rated Voltage	Type/ Cat. No.
0.3A	125VDC	1C03DL
0.5A	125VDC	1C05DL
1.0A	125VDC	1C1DL
1.6A	125VDC	1C1.6DL
2.0A	125VDC	1C2DL
3.0A	125VDC	1C3DL
4.0A	125VDC	1C4DL
5.0A	125VDC	1C5DL
6.0A	125VDC	1C6DL
8.0A	125VDC	1C8DL
10A	125VDC	1C10DL
12A	125VDC	1C12DL
13A	125VDC	1C13DL
15A	125VDC	1C15DL
16A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

Two Pole



Standard Pack: 6

Weight:
16.6kg (3.66lb.)



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



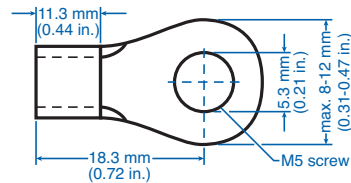
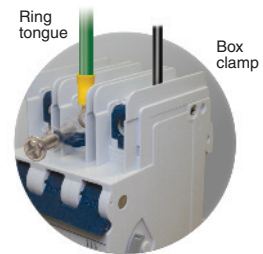
Warning!

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

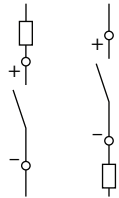
Application Examples:

Telecommunication equipment,
computer equipment, uninterruptible power supplies.



Standard Pack: 12

Weight:
1.86kg (4.1lb.)



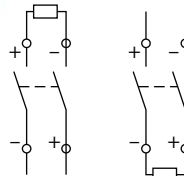
One Pole

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



Standard Pack: 6

Weight:
16.6kg (3.66lb.)



Two Pole

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



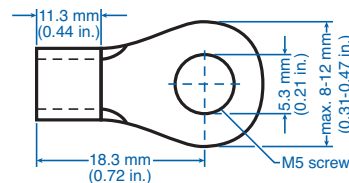
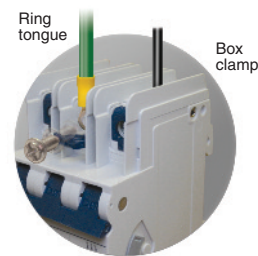
Warning!

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.

UL489



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	1NO + 1 Signal	6

Rated Operating Currents

10A@240V AC
3A@110V AC
1A@220V AC

Minimum Contact Load

1mA @ 24VDC

Torque

max. 0.8Nm (7 lb.in)

Wire Range:

Single Wire

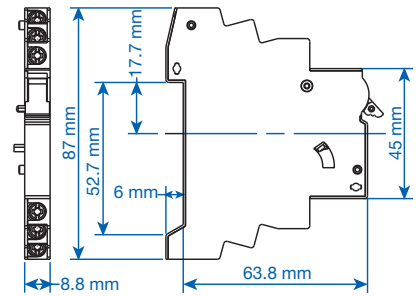
1.0mm² - 2.5mm² (18-14 AWG)

Stranded Wire

1.0mm² - 1.5mm² (18-16 AWG)

Stranded Wire with Ferrule

1.0mm² - 1.5mm² (18-16 AWG)

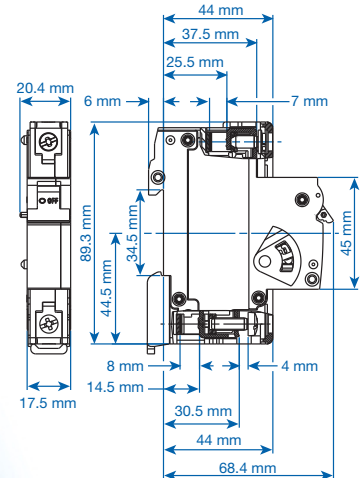


Dimensions HxxUL, HLS11L.



Shunt Trip

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



Dimensions UA120L

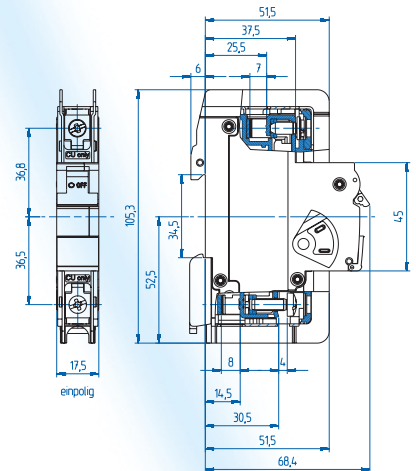


Undervoltage Trip (UL Pending)

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

Reset-Hold Voltage = 0.85 x V_E

Drop-Out Voltage = 0.35 ~ 0.7 x V_E



Dimensions NxxUL, FxxUL



Neutral Pole

Type/ Cat No.	Rated Current In	Rated Voltage	Std Pk
N32UL	0.3 - 32A	277Y/ 480 VAC	6
N63UL	40 - 63A	240 VAC	6

Touch Protection Caps

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



Type/ Cat No.	Standard Pack
BS.UL	100



Mounting Screw 34mm

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

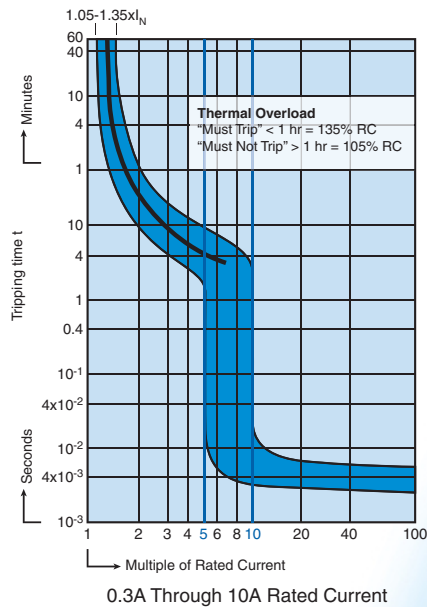
Type/ Cat No.	Standard Pack
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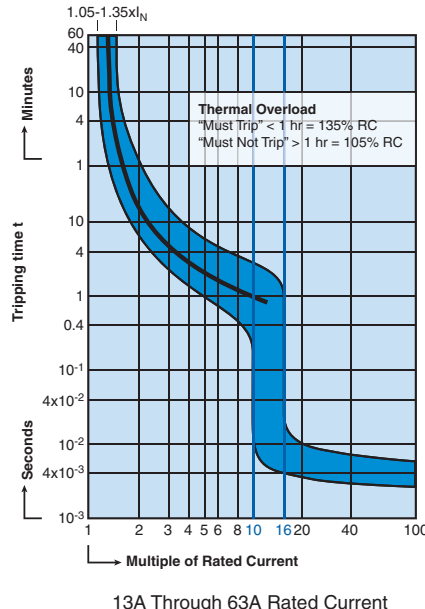
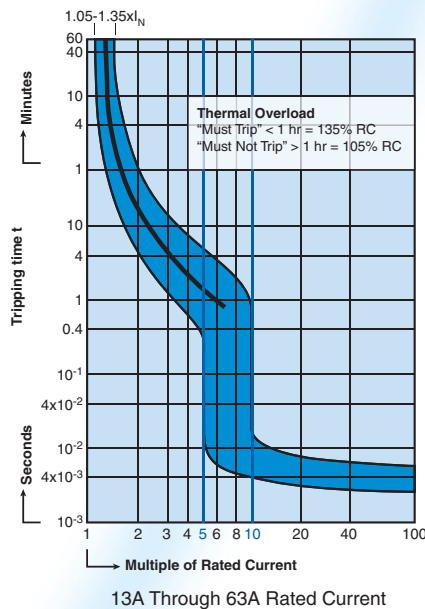
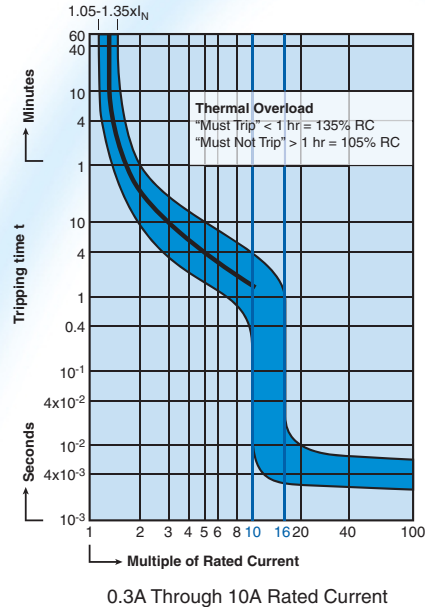
Lock-out Adapter

Type/ Cat No.	Standard Pack
EASS	10

C (AC) Trip Curve



D (AC) Trip Curve



"C" Magnetic Trip Parameters

Rated current 0.3A to 63A.

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

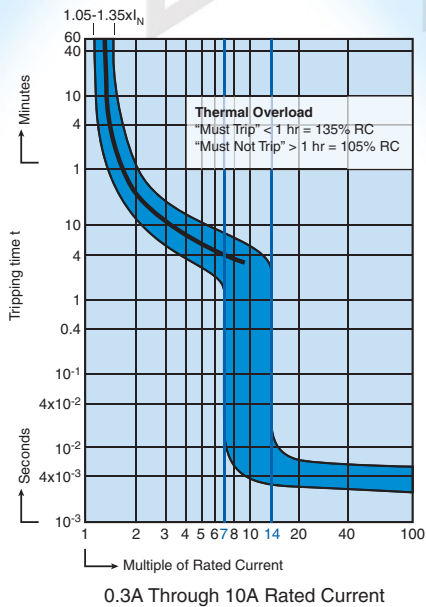
"D" Magnetic Trip Parameters

Rated current 0.3A to 63A.

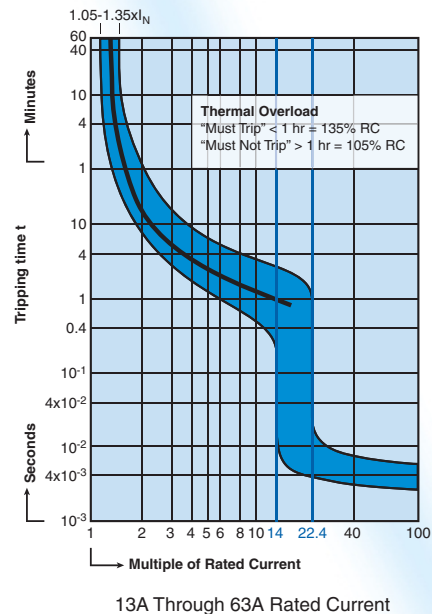
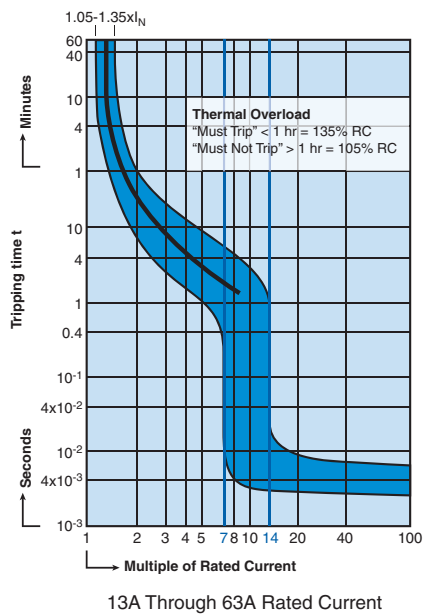
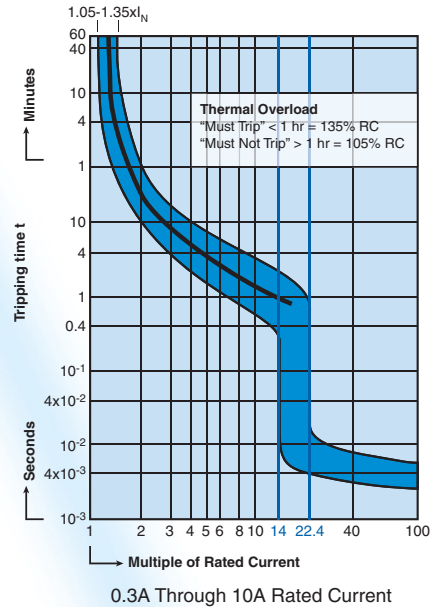
1. Hold for a minimum of 100ms at surge of 10 times rated current.
2. Trip in under 100ms at 16 times rated current.

UL Series (DC) Trip Curves

C (DC) Trip Curve



D (DC) Trip Curve



"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" 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.

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 I^2t Diagram, D Trip 1 pole

