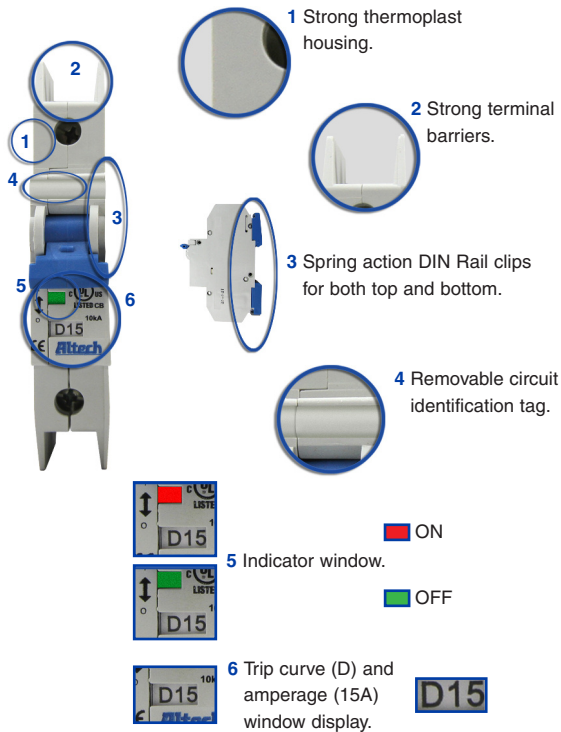


## Overview of Physical Attributes

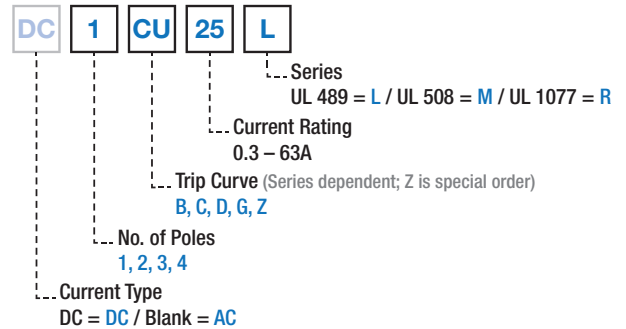
### L, M and R Series



## Ordering Nomenclature

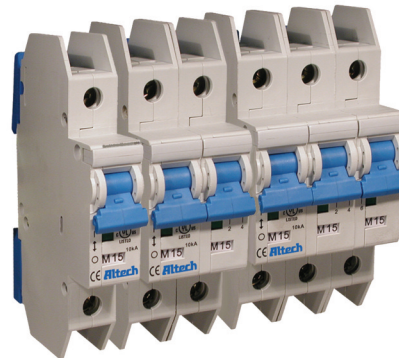
### L, M and R Series

#### EXAMPLE



## UL 489

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



#### Current/ Voltage Rating

**AC Version** (one device - dual voltage ratings) 0.2-63A/ 240V AC, 0.2-32A/ 480Y/277VAC

**DC Version** 0.2-63A/ 125/ 250V DC

#### Poles

1, 2, 3 (4 poles available upon request.)

#### Trip Characteristics

C, D; AC and DC

#### Interrupting Capacity

10kA

#### Calibration Temperature

40°C (104°F)

#### Ambient Temperature

-25°C to 60°C (-13°F to 140°F)

#### Storage Temperature

-25°C to 75°C (-13°F to 167°F)

#### Terminal Size Acceptability and Terminal Torque

14-3 AWG: 17.7 lb-in. (2.0 Nm)  
18-16 AWG: 25 lb-in. (2.8 Nm)

#### Electrical Life

6,000 switching cycles ON/ OFF

#### Mechanical Life

10,000 switching cycles ON/ OFF

#### Terminal Protection Degree

IP20 at front

#### Mounting Orientation

In any plane

#### Accessories (see page 12-13)

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

**UL 508**

**M-Series - UL508 Manual Motor Controller with Disconnecting Mean**



**Current/ Voltage Rating**

<b>AC Version</b>	0.5-63A / 480Y/ 277V AC
<b>DC Rating</b>	
<b>Poles</b>	1, 2, 3 (4 poles available upon request.)
<b>Trip Characteristics</b>	B, C, D, G
<b>Short Circuit Withstand Rating (UL/CSA - Ratings)</b>	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
<b>Calibration Temperature</b>	30°C (86°F)
<b>Ambient Temperature</b>	-25°C to 60°C (-13°C to 140°F)
<b>Storage Temperature</b>	-25°C to 75°C (-13°C to 167°F)
<b>Terminal Size Acceptability and Terminal Torque</b>	14-3 AWG: 17.7 lb-in. (2.0 Nm) 18-16 AWG: 25 lb-in. (2.8 Nm)
<b>Terminal Protection Degree</b>	IP20
<b>Mounting Orientation</b>	In any plane
<b>Horsepower Ratings</b>	see catalog

**Accessories** (see page 22-23)

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

**UL 1077**

**R Series UL1077 Recognized Supplementary Protector**



**Current/ Voltage Rating**

<b>AC Version</b>	0.5-63A / 480Y/ 277V AC
<b>Poles</b>	1, 2, 3 (4 poles available upon request.)
<b>Trip Characteristics</b>	B, C, D
<b>Short Circuit Withstand Rating</b>	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
<b>Calibration Temperature</b>	30°C (86°F)
<b>Ambient Temperature</b>	-25°C to 60°C (-13° to 140°F)
<b>Storage Temperature</b>	-25°C to 75°C (-13° to 167°F)
<b>Terminal Size Acceptability and Torque</b>	14-3 AWG: 17.5 lb-in. (2.0 Nm) 18-16 AWG / 25 lb-in.(2.8 Nm)
<b>Electrical Life</b>	6,000 switching scycles ON/ OFF
<b>Mechanical Life</b>	10,000 cycles ON/ OFF
<b>Terminal Protection Degree</b>	IP20 at front
<b>Mounting Orientation</b>	In any plane

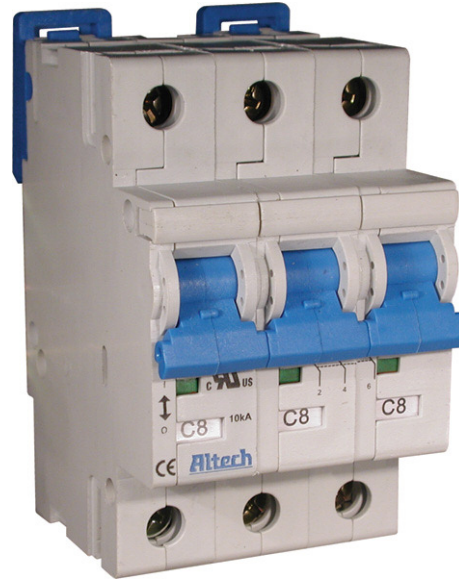
**Accessories** (see page 30-31)

- Auxiliary Contact
- Shunt Trip
- Neutral Pole
- Undervoltage (special order)
- Lock-out Adapter

# 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.



<b>Voltage Rating</b>	480Y/277VAC
<b>Short Circuit Withstand Rating (UL - Ratings)</b>	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
<b>Interrupting Capacity (IEC/EN60898/60947-2)</b>	0.5-63A (RC): 10kA
<b>Calibration Temperature</b>	30°C (86°F)
<b>Operating Temperature</b>	-25° to 60°C (-13° to 140°F)
<b>Storage Temperature</b>	-25° to 75°C (-13° to 167°F)
<b>Terminal Size Acceptability and Torque</b>	14-3 AWG: 17.5 lb-in. (2.0 Nm) 18-16 AWG: 25 lb-in. (2.8 Nm)
<b>Terminal Protection Degree</b>	IP20 at front
<b>Electrical Life</b>	6,000 cycles on/off
<b>Mechanical Life</b>	10,000 cycles on/off
<b>Wire Connection</b>	copper wire only 60/75°C
<b>Vibration Resistance</b>	3g (18-50Hz)
<b>Mounting Orientation</b>	In any plane

### Indicator window

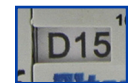


ON



OFF

### Trip curve and amperage window display.

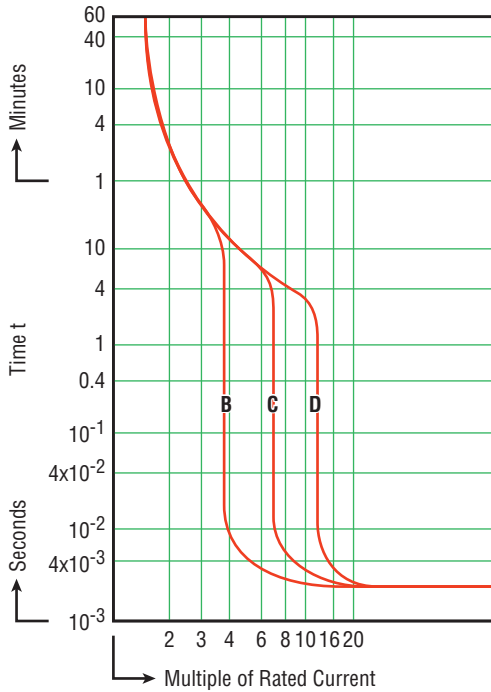


### SHORT CIRCUIT WITHSTAND RATINGS FOR R-SERIES SUPPLEMENTARY PROTECTOR

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

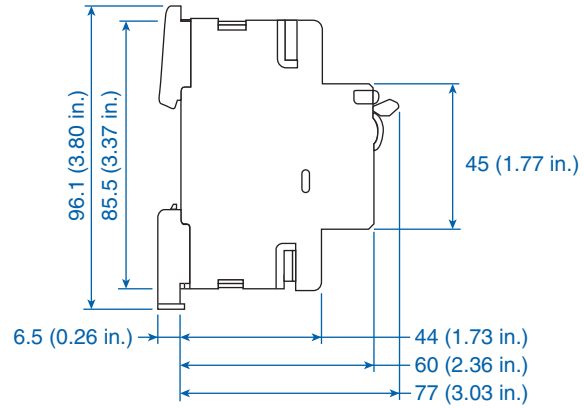
DC voltage rating: 48 VDC (self-certified).



## Time versus Current Trip Curve

For the exact trip curve, please refer to page 29

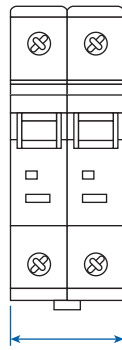
Dimensions in mm side view



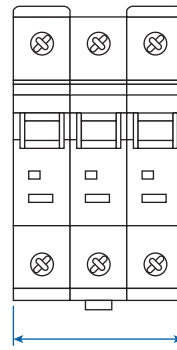
1 POLE



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 their 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.

UL US  
E301611



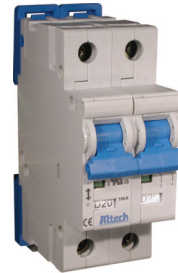
One Pole

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.)



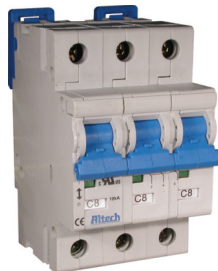
Two Pole

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

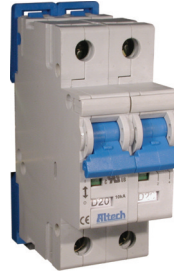
**Application Examples:**  
Lighting, wiring protection, appliances, business equipment, and control circuit applications. Relatively long thermal trip delay and medium magnetic trip point.



**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

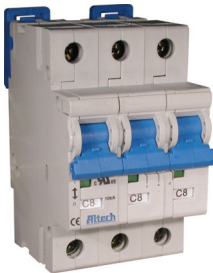
Standard Pack: 12  
Weight:  
0.5A - 63A: 1.6kg (3.54 lb.)



**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.

- Introduction
- UL 489
- UL 508
- UL 1077
- Busbars
- ANNEX

## D-Trip Characteristic



### Application Examples:

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



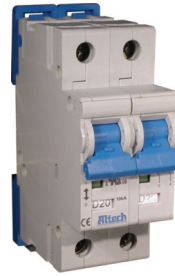
One Pole

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.)

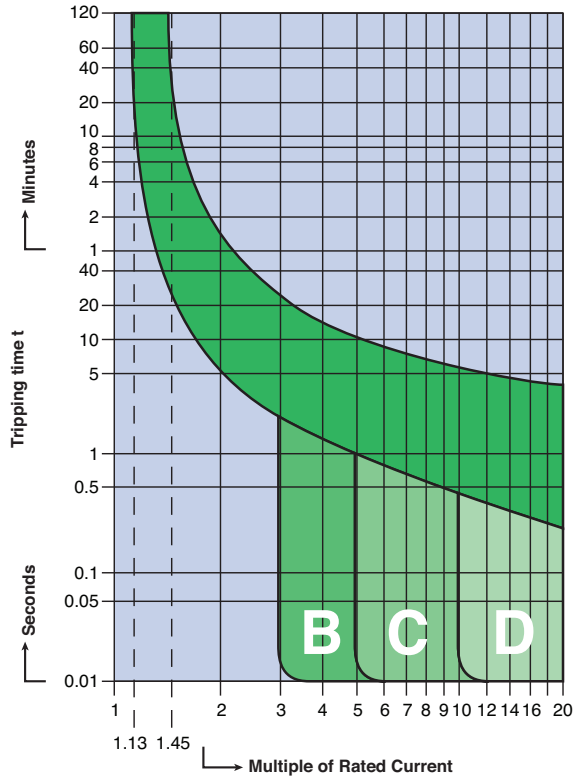


Four Pole  
Please contact  
Altech.

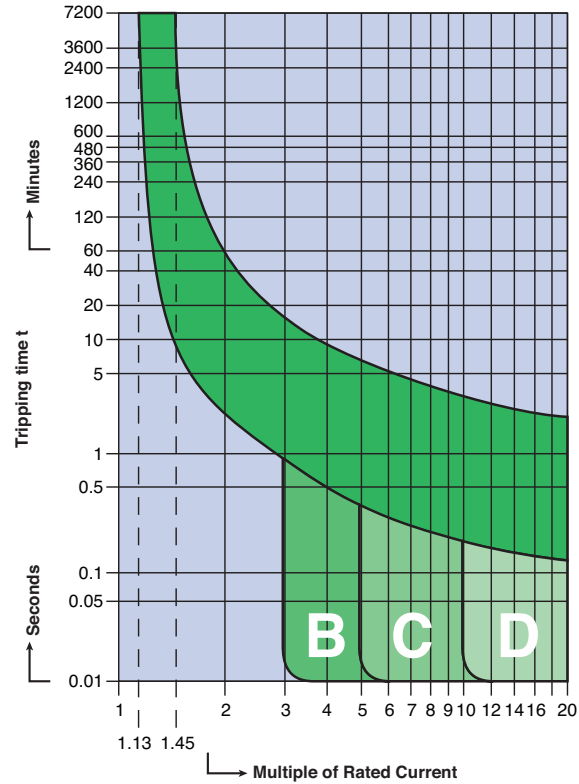
Non-standard current ratings available. Minimum quantities may apply. Please contact Altech for further details.

## 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 <sub>s</sub> (Ω)			I <sub>cor</sub> (A)						
I <sub>n</sub> (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

Introduction

UL 489

UL 508

UL 1077

Busbars

ANNEX



## Accessories

### R-Series Supplementary Protector



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	25mm <sup>2</sup> AWG 3	2.5mm <sup>2</sup> AWG 12	2Nm 17.5 lb-in	1.5Nm 12 lb-in

Standard Pack: 10

Weight: 1.25kg (2.77 lb.)



Shunt Trip

#### Shunt Trip and Undervoltage Trip

Description	Shunt Trip Type/Cat. No.	Operational Voltage	Rated Coil Current	Undervoltage Trip* Type/Cat. No.
<b>AC Coil:</b>				
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
<b>DC Coil:</b>				
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 =  $0.85 \times V_E$ ; Drop-Out Voltage =  $0.2 \times V_E$

Standard Pack: 10

Weight: 1.1kg (2.43 lb.)



Undervoltage Trip

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



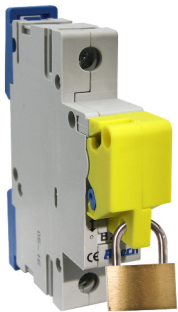
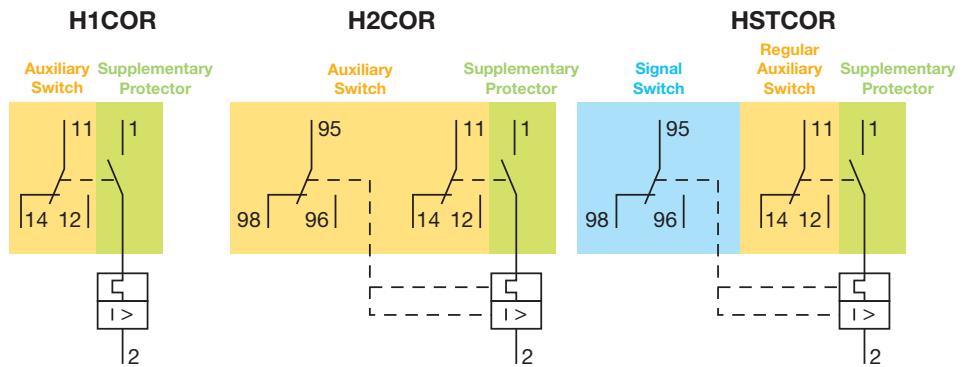
## Auxiliary Contact (4A/230 VAC)

Description	Type/ Cat. No.	Cable Max	Cable Min	Torque Max	Torque Min
1 x CO	H1COR	2.5mm <sup>2</sup> AWG 12	0.5mm <sup>2</sup> 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



Description	Type/ Cat. No.
Yellow	EASS2

Standard Pack: 10

Weight: 50g (1.76 oz.)