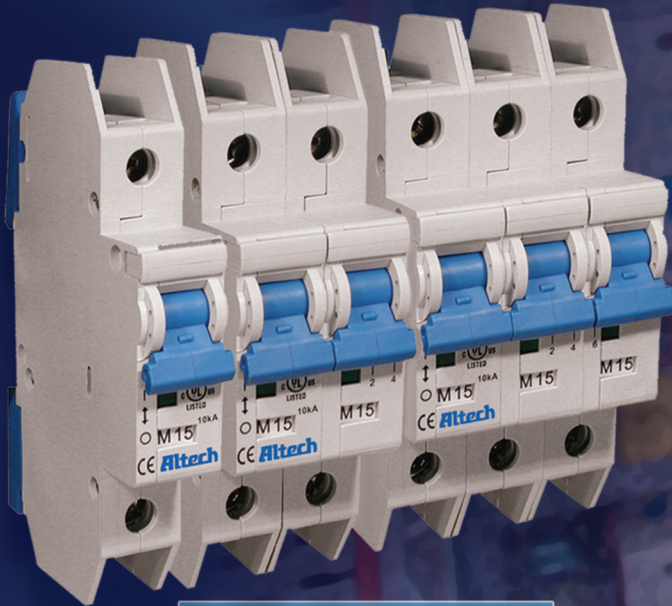


# Altech Corp.®

Serving the Automation & Control Industry since 1984



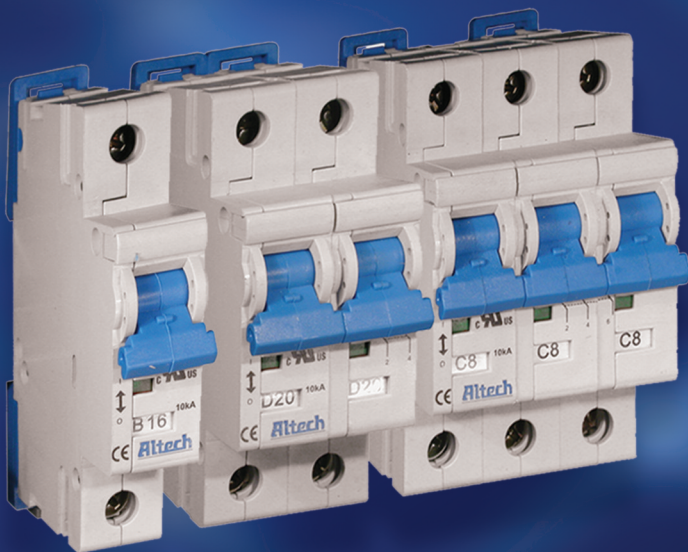
ISO 9001  
QMI-SAI Global



**UL 489 Miniature  
Molded Case  
Circuit Breakers**



**UL 508 Manual  
Motor Controllers**



**UL 1077  
Supplementary  
Protectors**

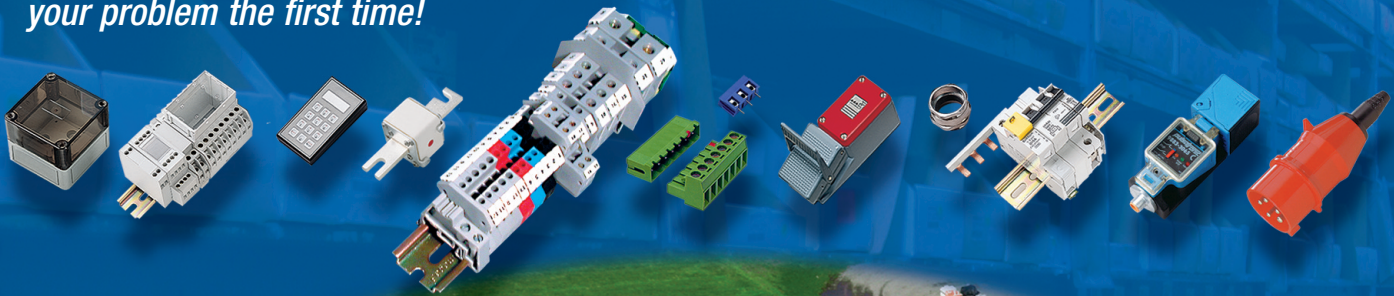
## Circuit Protection Devices & Busbars



# 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!*



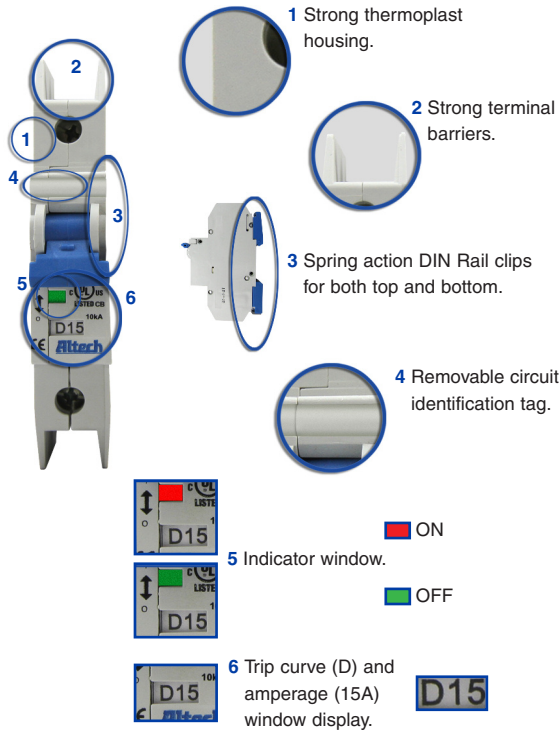
## Quality Commitment

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.



## Overview of Physical Attributes

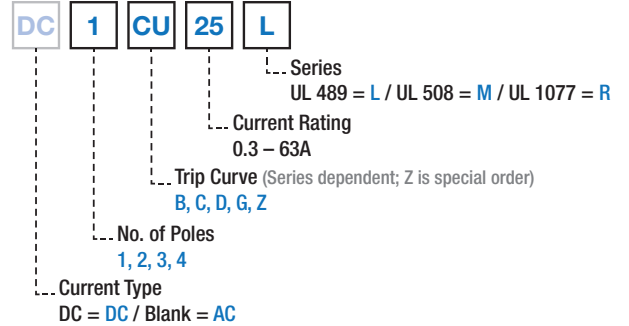
### L, M and R Series



## Ordering Nomenclature

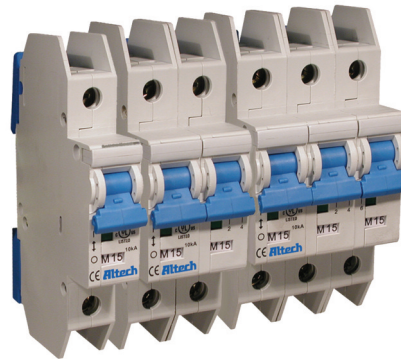
### L, M and R Series

#### EXAMPLE



## UL 489

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



#### Current/ Voltage Rating

<b>AC Version</b> (one device - dual voltage ratings)	0.2-63A/ 240V AC, 0.2-32A/ 480Y/277VAC
<b>DC Version</b>	0.2-63A/ 125/ 250V DC
<b>Poles</b>	1, 2, 3 (4 poles available upon request.)
<b>Trip Characteristics</b>	C, D; AC and DC
<b>Interrupting Capacity</b>	10kA
<b>Calibration Temperature</b>	40°C (104°F)
<b>Ambient Temperature</b>	-25°C to 60°C (-13°F to 140°F)
<b>Storage Temperature</b>	-25°C to 75°C (-13°F 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>Electrical Life</b>	6,000 switching cycles ON/ OFF
<b>Mechanical Life</b>	10,000 switching cycles ON/ OFF
<b>Terminal Protection Degree</b>	IP20 at front
<b>Mounting Orientation</b>	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**



Introduction

UL 489

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Busbars

ANNEX

**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

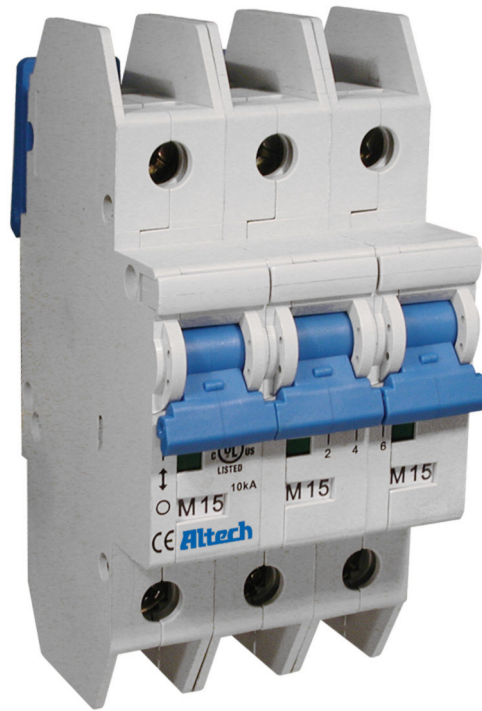
# L-Series AC or DC

## 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



#### 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; (Z special order only)

**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**

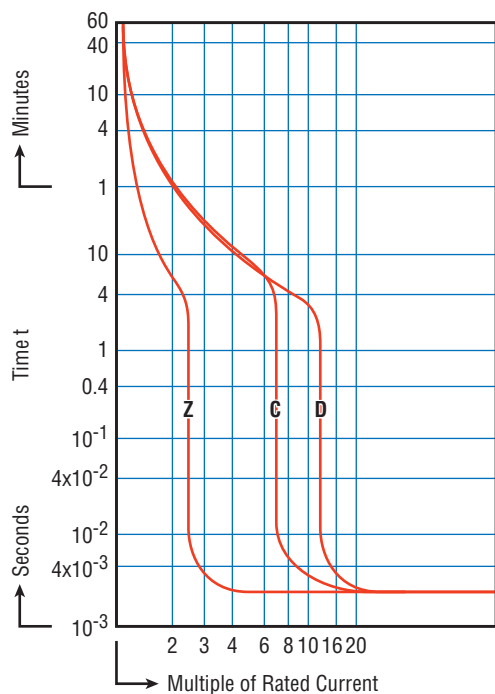
- Auxiliary Contact
- Shunt Trip
- Neutral Pole
- Undervoltage Trip
- Front Mounting Kit with hardware
- Lock-out Adapter

#### 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

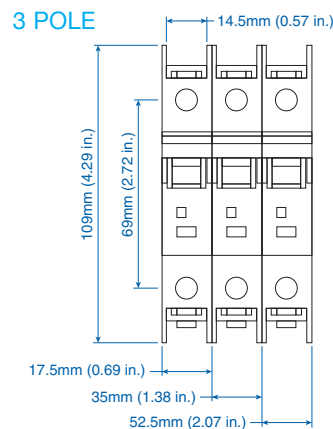
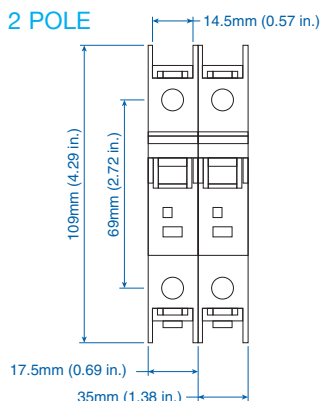
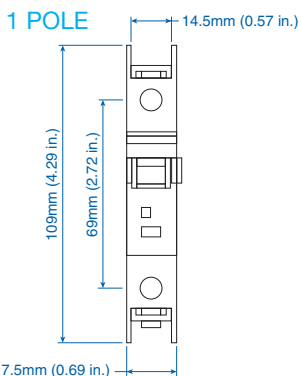
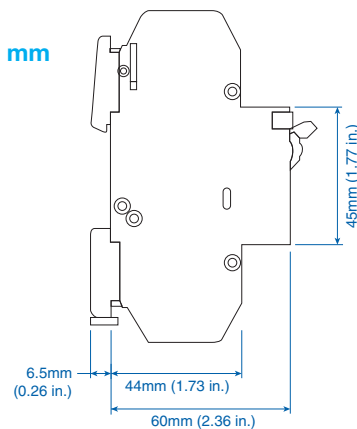
No. Poles	Type	0.2-32A	33-63A
1	DC	10kA@125V	10kA@125V
2	DC	10kA@250V	10kA@250V



## Time versus Current Trip Curve

For the exact trip curve, please refer to page 11

Dimensions in mm side view



Trip-Characteristics*				AC Applications								DC Applications		
Characteristic Trip Boundaries				Lighting Wiring Protection Control Circuits	Business Equipment Appliances	Transformers	Power Supplies Heaters	Motors		Reactive Load	General Electronics	Semi-conductors Components/ devices with low surge-current and short circuit withstand capabilities	Telecommunications/ 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/DC														
1.05xRC	1.35xRC	5xRC	10xRC											
D-Characteristics AC/DC														
1.05xRC	1.35xRC	10xRC	20xRC											
Z-Characteristics AC														
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 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 their specific application.

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# AC C-Trip Characteristics



LISTED  
E305318

## 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.

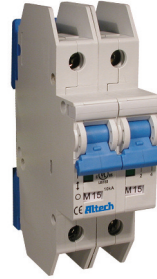


One Pole

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.)

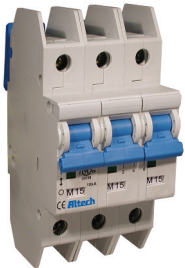


Two Pole

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.)

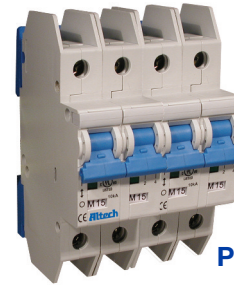


Three Pole

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



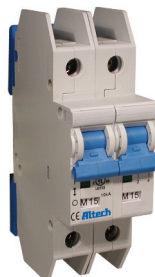
**Application Examples:**  
 High inrush motors, transformers, power supplies, heaters and reactive loads.  
 Relatively long thermal trip delay and very high magnetic trip point.



**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

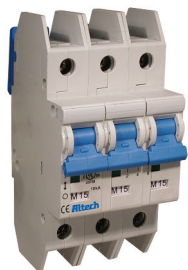
Standard Pack: 12  
 Weight: 1.7kg (3.74 lb.)



**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

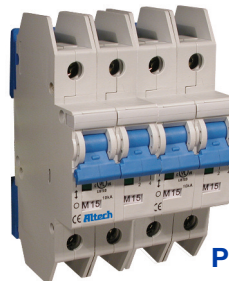
Standard Pack: 6  
 Weight: 1.7kg (3.74 lb.)



**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**.

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Busbars

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# DC C- & D-Trip Characteristics

## Application Examples:

Telecommunication equipment,  
computer equipment, uninterruptible  
power supplies.



LISTED  
E305318



### 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

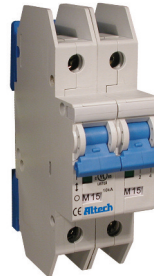


One Pole

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

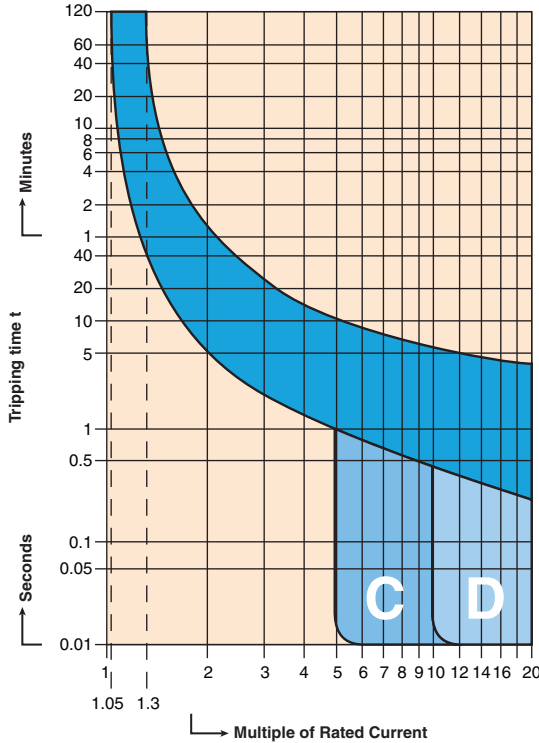
Weight: 1.7kg (3.74 lb.)



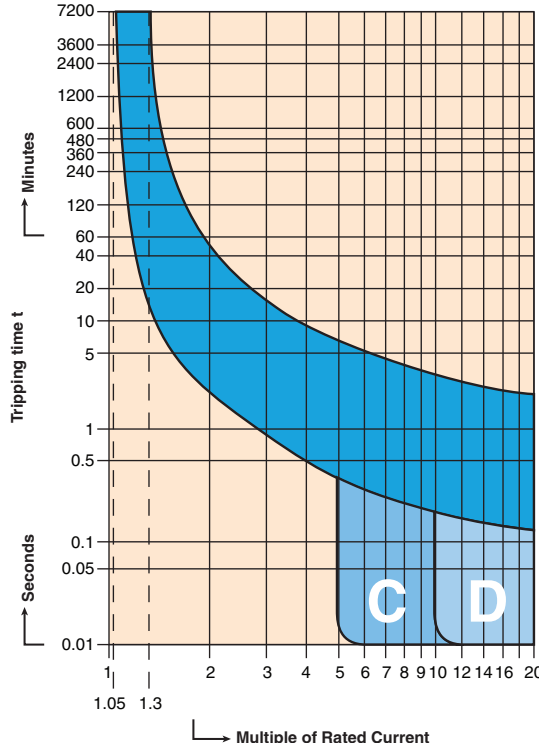
For ring tongue terminal version, replace "U" with "R" in part number. For example **1CR20L** instead of **1CU20L**.

### Trip Characteristics

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 Icor (A)									Internal impedance Z (mΩ) char B, C, D, K	Power Loss B, C, D, K P (W)
	-20	-10	0	10	20	30	40	50	60		
0.2	0.25	0.24	0.24	0.23	0.22	0.21	0.2	0.19	0.18	45100.0	1.80
0.5	0.63	0.61	0.59	0.57	0.55	0.53	0.5	0.47	0.44	8000.0	2.00
1	1.24	1.21	1.18	1.14	1.1	1.05	1.0	0.93	0.88	2000.0	2.00
2	2.48	2.42	2.36	2.28	2.2	2.1	2.0	1.86	1.76	490.0	1.96
3	3.70	3.63	3.54	3.42	3.3	3.15	3.0	2.79	2.64	230.0	2.07
4	4.96	4.84	4.72	4.56	4.4	4.2	4.0	3.72	3.52	150.0	2.40
5	6.3	6.1	5.9	5.7	5.5	5.3	5.0	4.7	4.4	95.0	2.38
6	7.5	7.3	7.1	6.8	6.6	6.3	6.0	5.6	5.3	69.0	2.48
7	8.8	8.5	8.2	8.0	7.7	7.4	7.0	6.5	6.2	52.0	2.55
8	10.0	9.7	9.4	9.1	8.8	8.4	8.0	7.4	7.0	35.0	2.24
10	12.4	12.1	11.8	11.4	11.0	10.5	10.0	9.3	8.8	23.5	2.35
12	14.8	14.5	14.2	13.7	13.2	12.6	12.0	11.2	10.6	18.7	2.69
13	15.9	15.7	15.3	14.8	14.3	13.7	13.0	12.1	11.5	14.3	2.42
14	17.3	16.9	16.5	16.0	15.4	14.7	14.0	13.0	12.3	12.4	2.43
15	18.7	18.2	17.7	17.1	16.5	15.8	15.0	14.0	13.2	10.1	2.27
16	19.7	19.4	18.9	18.2	17.6	16.8	16.0	14.9	14.1	7.5	1.92
20	24.6	24.2	23.6	22.8	22.0	21.0	20.0	18.6	17.6	6.3	2.52
25	30.9	30.3	29.5	28.5	27.5	26.3	25.0	23.3	22.0	4.6	2.88
30	37.0	36.3	35.4	34.2	33.0	31.5	30.0	27.9	26.5	3.6	3.24
32	39.1	38.7	37.8	36.5	35.2	33.6	32.0	29.8	28.2	3.6	3.69
35	43.0	42.3	41.3	39.9	38.5	36.8	35.0	32.6	30.8	3.6	4.41
40	48.9	48.4	47.2	45.6	44.0	42.0	40.0	37.2	35.2	3.0	4.80
50	61.2	60.5	59.0	57.0	55.0	52.5	50.0	46.5	44.1	2.4	6.00
60	73.4	72.6	70.9	68.4	66.0	63.0	60.0	55.9	52.9	1.8	6.48

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# Accessories

## L-Series Circuit Breakers



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.

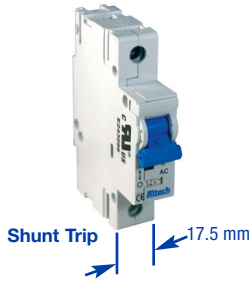


### Neutral Pole (63A/240VAC; 32A/480Y/277VAC)

Description	Type/ Cat. No.	Cable Max	Cable Min	Torque Max	Torque Min
Neutral	ALTN2L	25mm <sup>2</sup> 3 AWG	2.5mm <sup>2</sup> 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\*\*

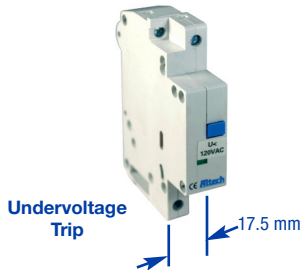
Description	Shunt Trip Type/Cat. No.	Operational Voltage	Rated Coil Current	Undervoltage Trip* Type/Cat. No.
<b>AC Coil:</b>				
12V AC	FA12ACL	8.4 - 13.2V	6A	UV12ACL
24V AC	FA24ACL	16.8 - 26.4V	2.8A	UV24ACL
48V AC	FA48ACL	33.6 - 52.8V	0.8A	UV48ACL
60V AC	FA60ACL	42 - 66V	~0.7A	UV60ACL
110V AC	FA110ACL	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
<b>DC Coil:</b>				
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 =  $0.85 \times V_E$ ; Drop-Out Voltage =  $0.2 \times V_E$

\*\* Special order in conjunction with circuit breaker that is factory assembled (not field assembled).

Standard Pack: 10

Weight: 1.1kg (2.43 lb.)



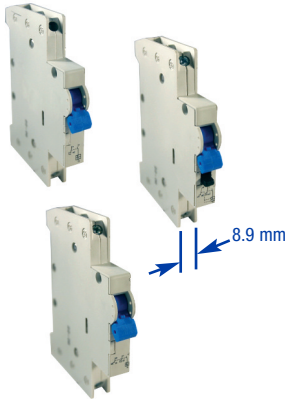
Terminal Size - min/max	2.5 mm <sup>2</sup> (12 AWG) / 25mm <sup>2</sup> (3 AWG)
Terminal Torque - min/max	1.5 Nm (12 lb. in.) / 2 Nm (17.5 lb. in.)

# Accessories

## L-Series Circuit Breakers



LISTED  
E305318



### Auxiliary Contact

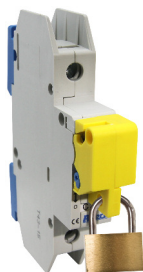
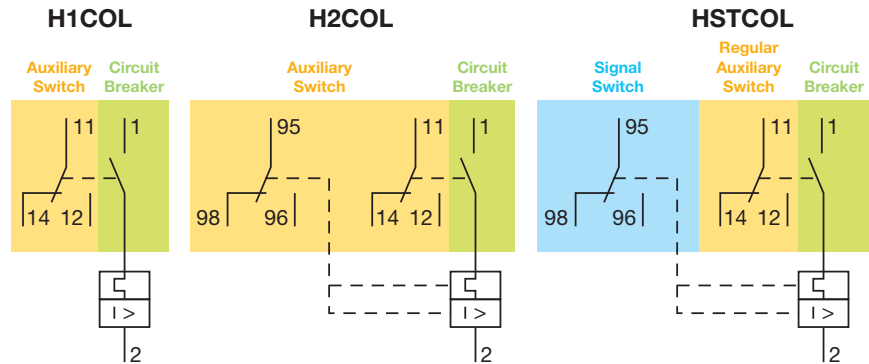
(6A/120V AC; 3A/240V AC; 6A/24V DC; 0.5A/125V DC)

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

Standard Pack: 15

Weight: 0.5kg (1.32 lb.)

### Wiring Diagram



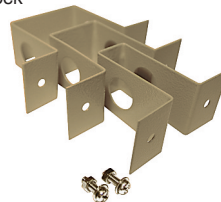
### Lock-out Adapter



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

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# M-Series

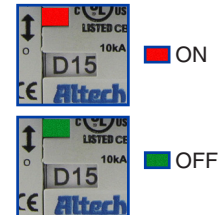
## M-Series - UL508 Manual Motor Controller with Disconnecting Mean

- 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 Include:
  - AC Motor Starting, Across the Line
  - AC General Use

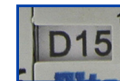


<b>Voltage Rating</b>	480Y/277VAC
<b>Short Circuit Withstand Rating (UL - Ratings)</b>	0.5-6A (RC): 10kA with no back-up fuse 8-63A (RC): 10kA with UL-listed Class J back-up fuse; 5kA with no back-up fuse
<b>Interrupting Capacity (IEC/EN60898/60947-2)</b>	0.5-63A (RC): 10kA
<b>Calibration Temperature</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
<b>Vibration Resistance</b>	3g (8-50Hz)

### Indicator window



### Trip curve and amperage window display.

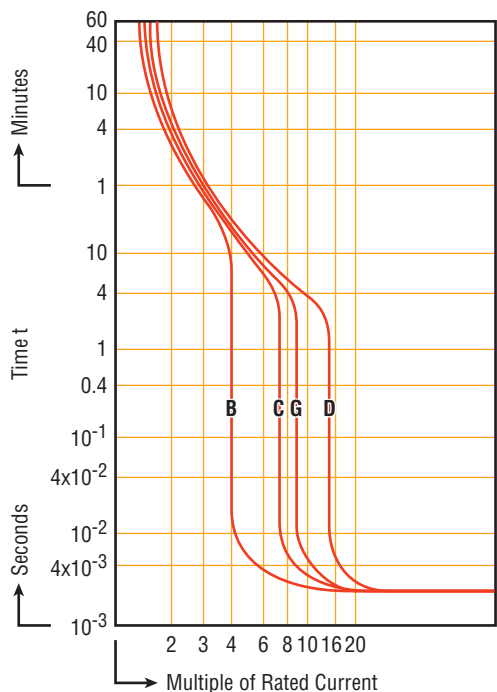


### SHORT CIRCUIT WITHSTAND RATINGS FOR M-SERIES MANUAL MOTOR CONTROLLER

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

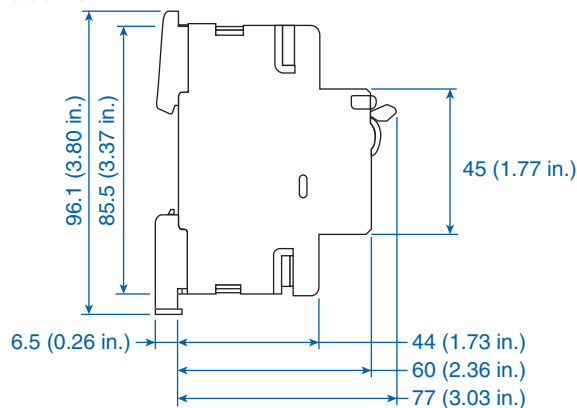
DC voltage rating: 48 VDC (self-certified).



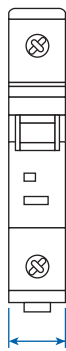
## Time versus Current Trip Curve

For the exact trip curve, please refer to page 20

Dimensions in mm side view



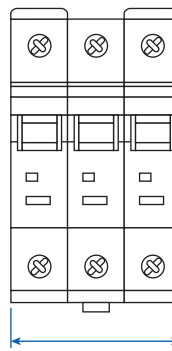
1 POLE



2 POLE



3 POLE



Trip-Characteristics*				Applications									
Characteristic Trip Boundaries				Lighting Wiring Protection Control Circuits	Business Equipment Appliances	Transformers	Power Supplies Heaters	Motors			General Electronics	Solenoid	Reactive Load
Thermal Trip		Magnetic Trip						General	Low Inrush	High Inrush			
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										
G-Characteristics													
1.05xRC	1.35xRC	8xRC	10xRC										

\*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 their specific application.

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## 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.



One Pole

Rated Current	Type/ Cat. No.
0.5A	1BU05M
1.0A	1BU1M
2.0A	1BU2M
3.0A	1BU3M
4.0A	1BU4M
5.0A	1BU5M
6.0A	1BU6M
8.0A	1BU8M
10A	1BU10M
12A	1BU12M
13A	1BU13M
15A	1BU15M
16A	1BU16M
20A	1BU20M
25A	1BU25M
30A	1BU30M
32A	1BU32M
40A	1BU40M
50A	1BU50M
60A	1BU60M
63A	1BU63M

Standard Pack: 12

Weight:

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



Two Pole

Rated Current	Type/ Cat. No.
0.5A	2BU05M
1.0A	2BU1M
2.0A	2BU2M
3.0A	2BU3M
4.0A	2BU4M
5.0A	2BU5M
6.0A	2BU6M
8.0A	2BU8M
10A	2BU10M
12A	2BU12M
13A	2BU13M
15A	2BU15M
16A	2BU16M
20A	2BU20M
25A	2BU25M
30A	2BU30M
32A	2BU32M
40A	2BU40M
50A	2BU50M
60A	2BU60M
63A	2BU63M

Standard Pack: 6

Weight:

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



Three Pole

Rated Current	Type/ Cat. No.
0.5A	3BU05M
1.0A	3BU1M
2.0A	3BU2M
3.0A	3BU3M
4.0A	3BU4M
5.0A	3BU5M
6.0A	3BU6M
8.0A	3BU8M
10A	3BU10M
12A	3BU12M
13A	3BU13M
15A	3BU15M
16A	3BU16M
20A	3BU20M
25A	3BU25M
30A	3BU30M
32A	3BU32M
40A	3BU40M
50A	3BU50M
60A	3BU60M
63A	3BU63M

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	1CU05M
1.0A	1CU1M
2.0A	1CU2M
3.0A	1CU3M
4.0A	1CU4M
5.0A	1CU5M
6.0A	1CU6M
8.0A	1CU8M
10A	1CU10M
12A	1CU12M
13A	1CU13M
15A	1CU15M
16A	1CU16M
20A	1CU20M
25A	1CU25M
30A	1CU30M
32A	1CU32M
40A	1CU40M
50A	1CU50M
60A	1CU60M
63A	1CU63M

Standard Pack: 12

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



**Two Pole**

Rated Current	Type/ Cat. No.
0.5A	2CU05M
1.0A	2CU1M
2.0A	2CU2M
3.0A	2CU3M
4.0A	2CU4M
5.0A	2CU5M
6.0A	2CU6M
8.0A	2CU8M
10A	2CU10M
12A	2CU12M
13A	2CU13M
15A	2CU15M
16A	2CU16M
20A	2CU20M
25A	2CU25M
30A	2CU30M
32A	2CU32M
40A	2CU40M
50A	2CU50M
60A	2CU60M
63A	2CU63M

Standard Pack: 6

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



**Three Pole**

Rated Current	Type/ Cat. No.
0.5A	3CU05M
1.0A	3CU1M
2.0A	3CU2M
3.0A	3CU3M
4.0A	3CU4M
5.0A	3CU5M
6.0A	3CU6M
8.0A	3CU8M
10A	3CU10M
12A	3CU12M
13A	3CU13M
15A	3CU15M
16A	3CU16M
20A	3CU20M
25A	3CU25M
30A	3CU30M
32A	3CU32M
40A	3CU40M
50A	3CU50M
60A	3CU60M
63A	3CU63M

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.

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## 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	1DU05M
1.0A	1DU1M
2.0A	1DU2M
3.0A	1DU3M
4.0A	1DU4M
5.0A	1DU5M
6.0A	1DU6M
8.0A	1DU8M
10A	1DU10M
12A	1DU12M
13A	1DU13M
15A	1DU15M
16A	1DU16M
20A	1DU20M
25A	1DU25M
30A	1DU30M
32A	1DU32M
40A	1DU40M
50A	1DU50M
60A	1DU60M
63A	1DU63M

Standard Pack: 12

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



Two Pole

Rated Current	Type/ Cat. No.
0.5A	2DU05M
1.0A	2DU1M
2.0A	2DU2M
3.0A	2DU3M
4.0A	2DU4M
5.0A	2DU5M
6.0A	2DU6M
8.0A	2DU8M
10A	2DU10M
12A	2DU12M
13A	2DU13M
15A	2DU15M
16A	2DU16M
20A	2DU20M
25A	2DU25M
30A	2DU30M
32A	2DU32M
40A	2DU40M
50A	2DU50M
60A	2DU60M
63A	2DU63M

Standard Pack: 6

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



Three Pole

Rated Current	Type/ Cat. No.
0.5A	3DU05M
1.0A	3DU1M
2.0A	3DU2M
3.0A	3DU3M
4.0A	3DU4M
5.0A	3DU5M
6.0A	3DU6M
8.0A	3DU8M
10A	3DU10M
12A	3DU12M
13A	3DU13M
15A	3DU15M
16A	3DU16M
20A	3DU20M
25A	3DU25M
30A	3DU30M
32A	3DU32M
40A	3DU40M
50A	3DU50M
60A	3DU60M
63A	3DU63M

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.

## G-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	1GU05M
1.0A	1GU1M
2.0A	1GU2M
3.0A	1GU3M
4.0A	1GU4M
5.0A	1GU5M
6.0A	1GU6M
8.0A	1GU8M
10A	1GU10M
12A	1GU12M
13A	1GU13M
15A	1GU15M
16A	1GU16M
20A	1GU20M
25A	1GU25M
30A	1GU30M
32A	1GU32M
40A	1GU40M
50A	1GU50M
60A	1GU60M
63A	1GU63M

Standard Pack: 12

Weight:

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



Two Pole

Rated Current	Type/ Cat. No.
0.5A	2GU05M
1.0A	2GU1M
2.0A	2GU2M
3.0A	2GU3M
4.0A	2GU4M
5.0A	2GU5M
6.0A	2GU6M
8.0A	2GU8M
10A	2GU10M
12A	2GU12M
13A	2GU13M
15A	2GU15M
16A	2GU16M
20A	2GU20M
25A	2GU25M
30A	2GU30M
32A	2GU32M
40A	2GU40M
50A	2GU50M
60A	2GU60M
63A	2GU63M

Standard Pack: 6

Weight:

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



Three Pole

Rated Current	Type/ Cat. No.
0.5A	3GU05M
1.0A	3GU1M
2.0A	3GU2M
3.0A	3GU3M
4.0A	3GU4M
5.0A	3GU5M
6.0A	3GU6M
8.0A	3GU8M
10A	3GU10M
12A	3GU12M
13A	3GU13M
15A	3GU15M
16A	3GU16M
20A	3GU20M
25A	3GU25M
30A	3GU30M
32A	3GU32M
40A	3GU40M
50A	3GU50M
60A	3GU60M
63A	3GU63M

Standard Pack: 4

Weight:

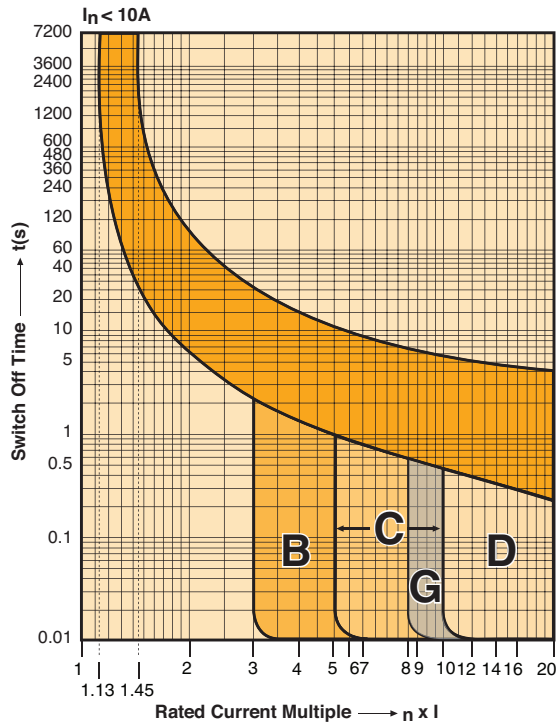
0.5A - 63A: 1.66kg (3.67 lb.)

**Four Pole  
Please contact  
Altech.**

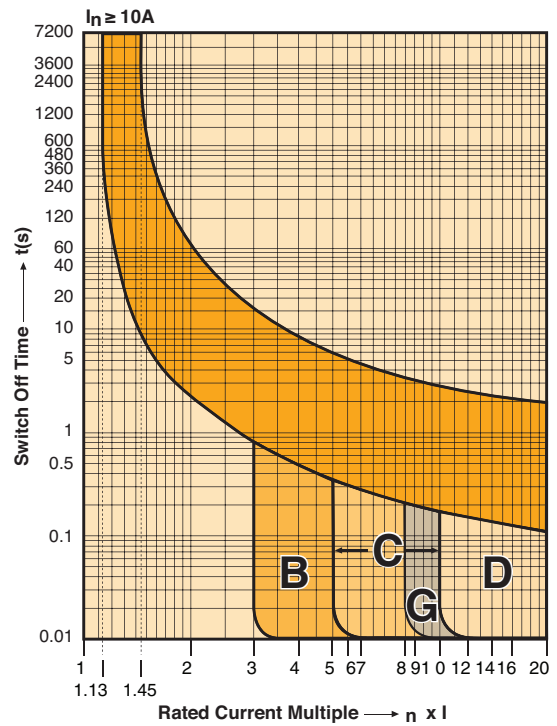
Non-standard current ratings available. Minimum quantities may apply. Please contact Altech for further details.

## M-Series Trip Curves

### B, C, G and D Trip Less than 10A



### B, C, G and D Trip 10A and higher



## Temperature and Power Loss Specifications

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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.									
I <sub>n</sub> (A)	Z (m Ω)	P (W)	Z <sub>s</sub> (Ω)			I cor (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

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



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



### 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 =  $0.2 \times V_E$

\*\* Special order in conjunction with circuit breaker that is factory assembled (not field assembled).



Undervoltage Trip

Standard Pack: 10

Weight: 1.1kg (2.43 lb.)

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.)



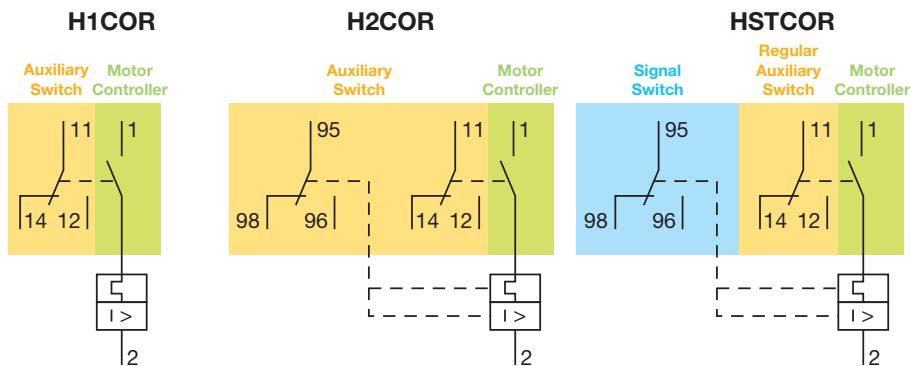
**Auxiliary Contact (4A/230 VAC)**

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.)

Introduction

UL 489

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UL 1077

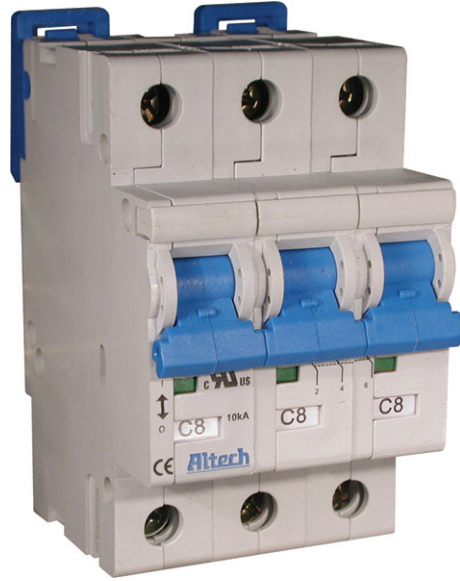
Busbars

ANNEX

# 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

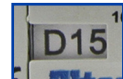
### Indicator window



ON

OFF

### Trip curve and amperage window display.

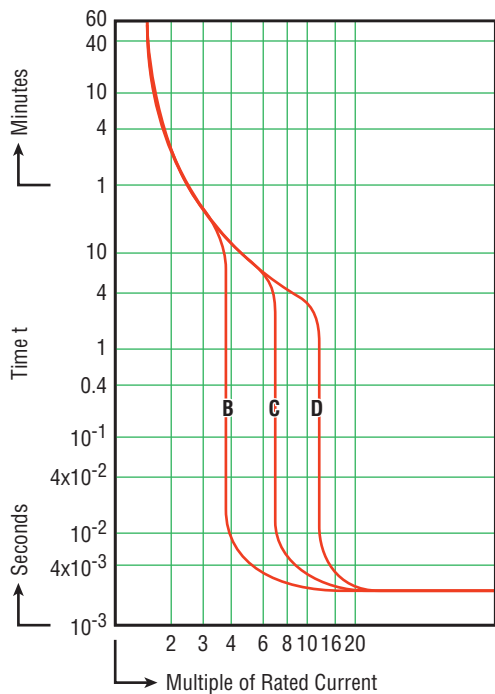


### SHORT CIRCUIT WITHSTAND RATINGS FOR R-SERIES SUPPLEMENTARY PROTECTOR

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

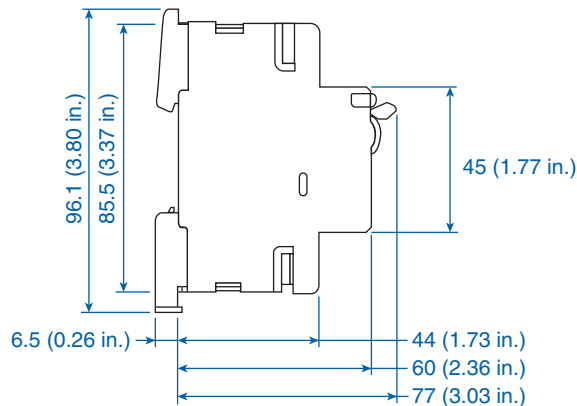
DC voltage rating: 48 VDC (self-certified).



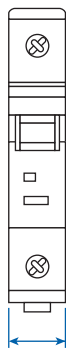
## Time versus Current Trip Curve

For the exact trip curve, please refer to page 29

Dimensions in mm side view



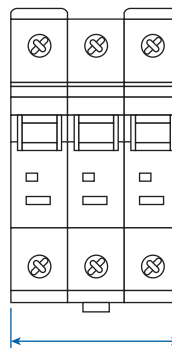
1 POLE



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.

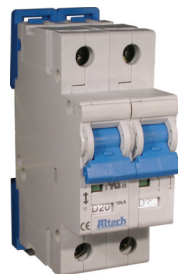


**One Pole**

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.)

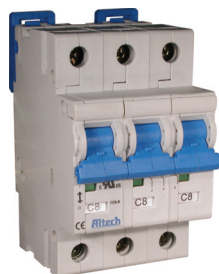


**Two Pole**

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

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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.

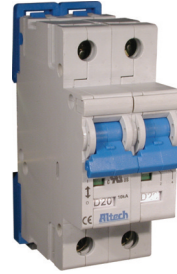


One Pole

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.)

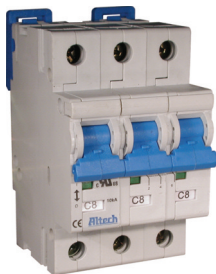


Two Pole

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.)

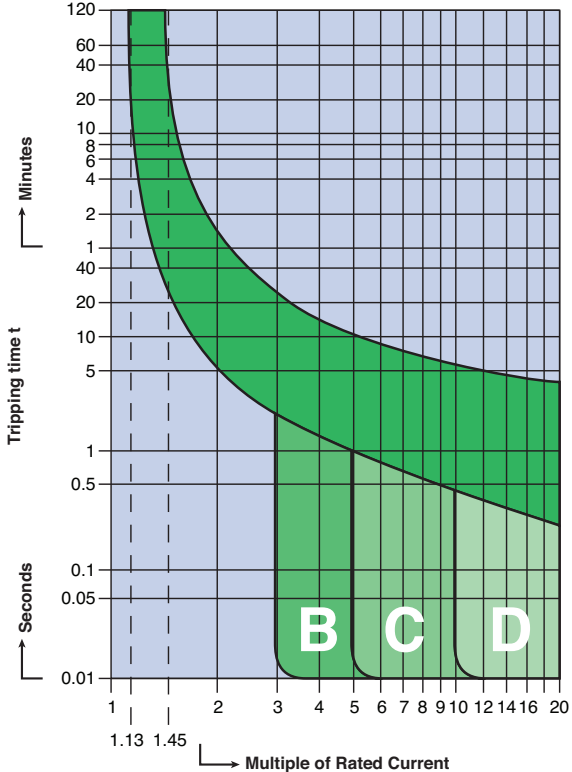


Four Pole  
Please contact  
Altech.

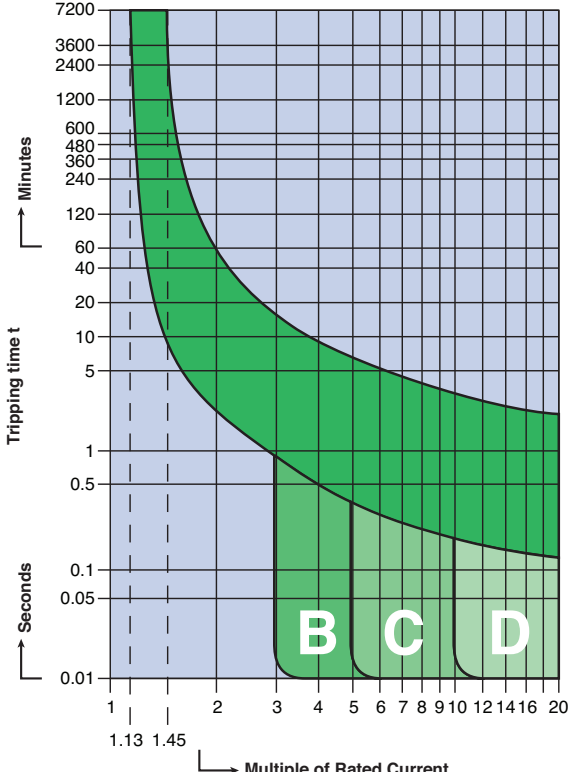
Non-standard current ratings available. Minimum quantities may apply. Please contact Altech for further details.

# 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.										
I <sub>n</sub> (A)	Z (m Ω)	P (W)	Z <sub>s</sub> (Ω)			I <sub>cor</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

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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.)



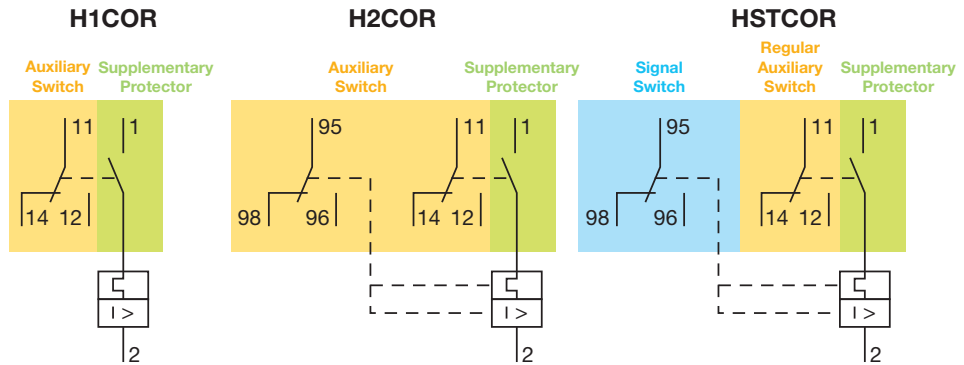
**Auxiliary Contact (4A/230 VAC)**

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**



Luggage  
Lock

Description	Type/ Cat. No.
Yellow	EASS2

Standard Pack: 10

Weight: 50g (1.76 oz.)

Introduction

UL 489

UL 508

UL 1077

Busbars

ANNEX

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# Altech



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### CONNECTORS

	Pin & Sleeve Devices		Receptacles
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### ENCLOSURES

	Industrial & ATEX Enclosures		DIN Enclosures		Control Enclosures and Suspension Systems
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### FOOT SWITCHES

	Industrial		Medical
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### MODULES & RELAYS

	Interface Modules		Safety Relays		Industrial & Slimline Relays
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### PANEL ACCESSORIES

	Panel Lights		Heaters, Filters & Thermostats
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### SPARE PARTS

	European Spare Parts
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### PILOT DEVICES

	22 & 30 mm Push Buttons & Enclosures		Pilot Lights & E-Stops
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	Power Supplies		DC-UPS & Battery Chargers
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### POWER MANAGEMENT

	Altech Smart Relays		Digital Panel Meters		Digital Timers
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### SAFETY SWITCHES

	Keyed Safety Switches		Keyed Solenoid Locking Switches		Hinged Safety Switches		Non-Contact Safety Switches		Safety Rope Pull Switches
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### STANDARD SWITCHES

	Limit Switches		Foot Switches
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### SENSORS

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