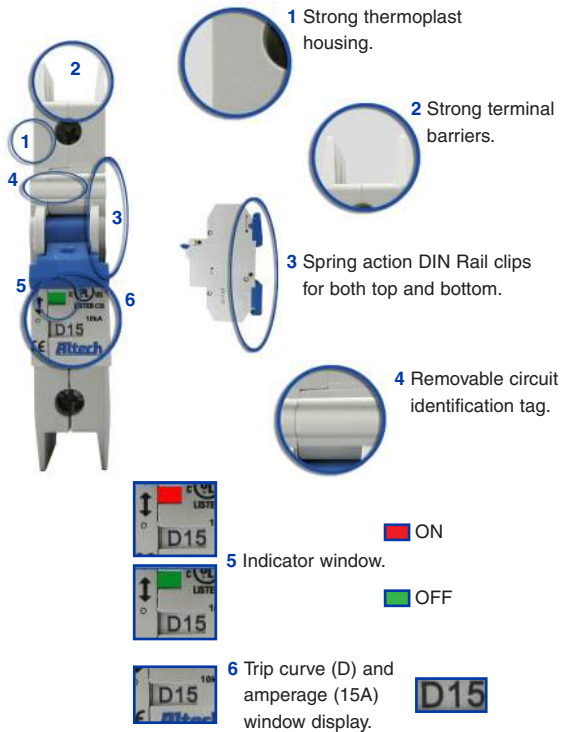


## Overview of Physical Attributes

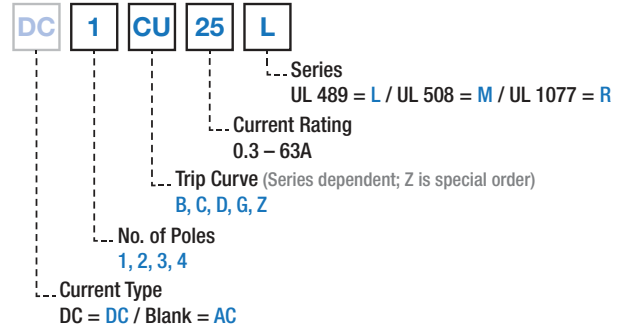
### L, M and R Series



## Ordering Nomenclature

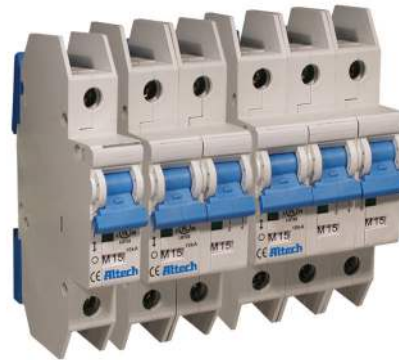
### L, M and R Series

#### 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

# 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

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

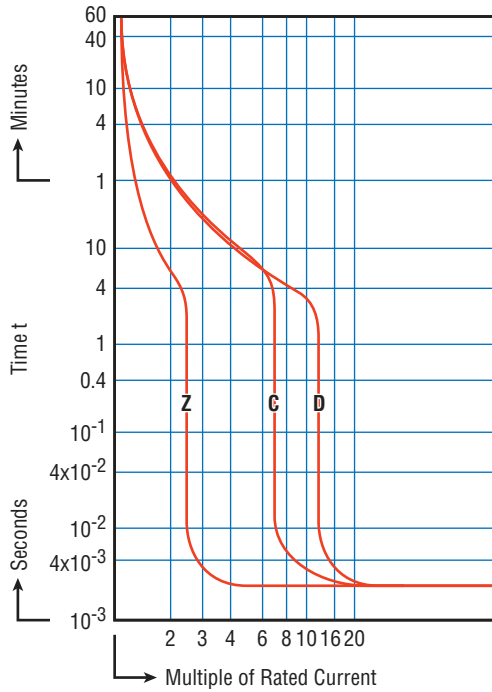
- Auxiliary Contact
- Shunt Trip
- Neutral Pole
- Undervoltage Trip
- Front Mounting Kit with hardware
- Lock-out Adapter

#### 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

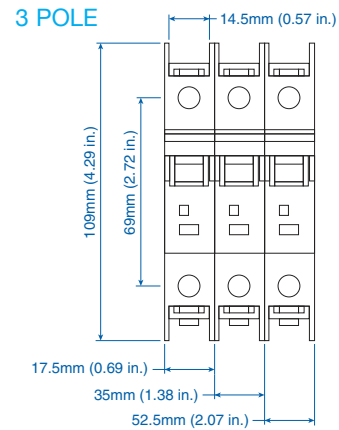
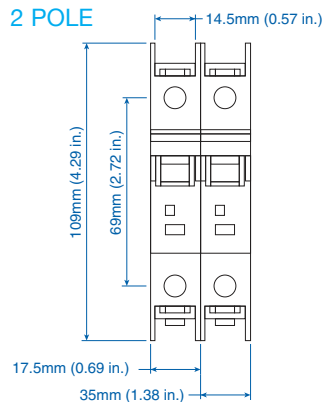
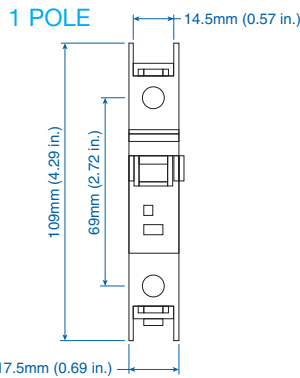
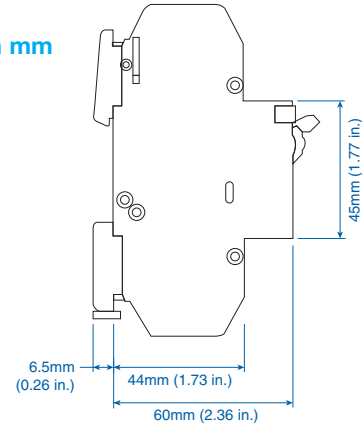
No. Poles	Type	0.2-32A	33-63A
1	DC	10kA@125V	10kA@125V
2	DC	10kA@250V	10kA@250V



## 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	Telecommu- nications/ Computer Equipment	Power Supplies
Thermal Trip		Magnetic Trip						Low Inrush	High Inrush					
Must not Trip>100ms	Must Trip <1hr	Must not Trip>100ms	Must Trip at 100ms											
C-Characteristics AC/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.

# 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**.



# DC C- & D-Trip Characteristics

**Application Examples:**  
Telecommunication equipment,  
computer equipment, uninterruptable  
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

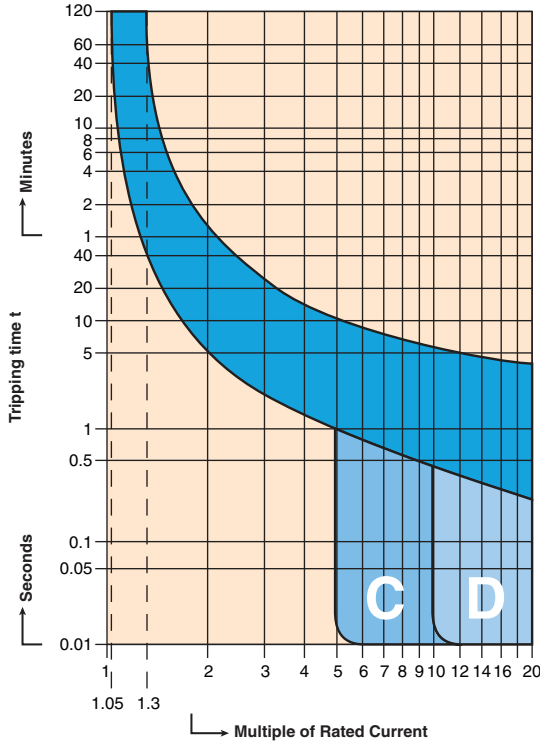
Weight: 1.7kg (3.74 lb.)



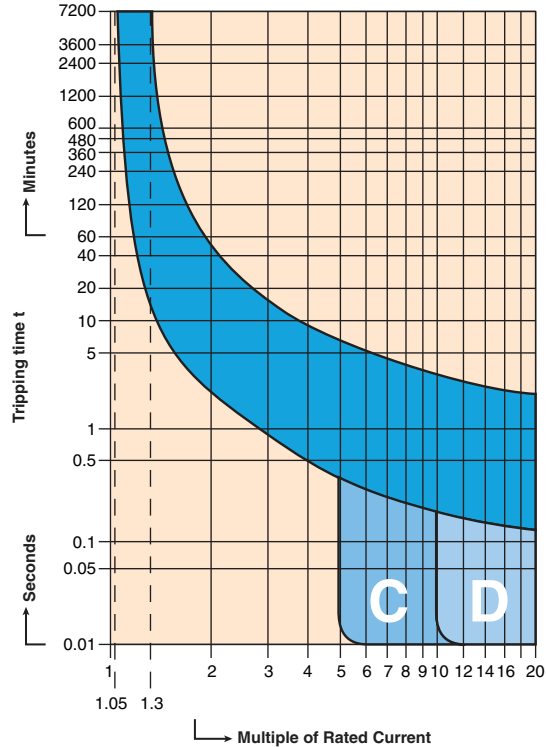
For ring tongue terminal version, replace "U" with "R" in part number. For example 1CR20L instead of 1CU20L.

### 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



# 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

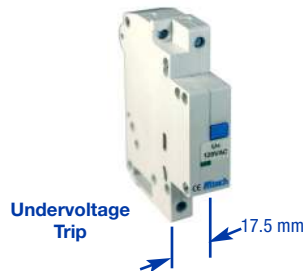
(63A/240VAC; 32A/480Y/277VAC)

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).

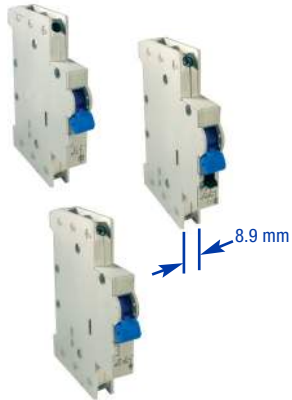
Standard Pack: 10

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

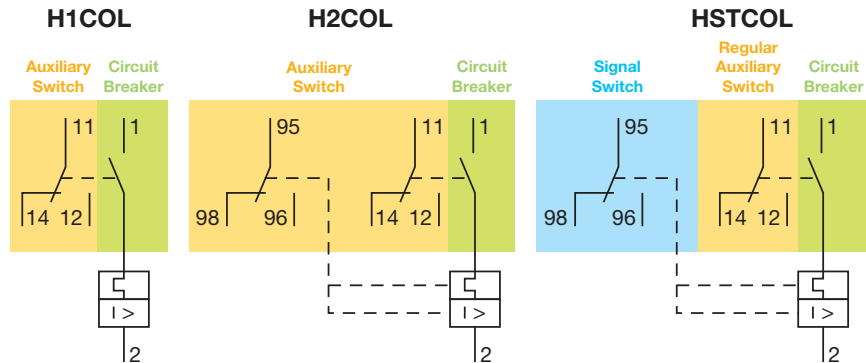


### Auxiliary Contact (6A/120V AC; 3A/240V AC; 6A/24V DC; 0.5A/125V DC)

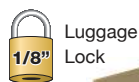
Description	Type/ Cat. No.	Cable Max	Cable Min	Torque Max	Torque Min
1 x CO	H1COL	2.5mm <sup>2</sup> 12 AWG	0.5mm <sup>2</sup> 20 AWG	0.5Nm 4 lb-in	0.33Nm 3 lb-in
2 x CO	H2COL				
1 x CO, 1 Signal & Test Button	HSTCOL				

Standard Pack: 15  
Weight: 0.5kg (1.32 lb.)

### Wiring Diagram



### Lock-out Adapter



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

Introduction

UL 489

UL 508

UL 1077

Busbars

ANNEX