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Series L8 UL1077 Supplementary Protectors

Supplemental short circuit protection for a variety of applications up to 63 Amps

Sprecher+Schuh Series L8 Supplementary Protectors provide supplemental overcurrent protection for control circuits, solenoids, actuators, appliances, business equipment and a range of other applications where a high performance current limiting device is required. Advanced features and global approvals make them ideal for use in equipment installed throughout the world.

Broad product range

Series L8 Supplementary Protectors are available in up to 20 different current ratings from 0.5A to 63A, in one, two and three pole configurations. Over 180 base models are available with a full compliment of accessories.

Devices can be used in applications up to 480V AC and 48V DC with interrupting capacities up to 10kA.

Safety features provide enhanced protection

The terminals of Series L8 Supplementary Protectors provide IP20 protection to guard against accidental contact with live parts.

To aid troubleshooting, a color-coded indicator provides positive visual indication of the device status (green for OFF, red for ON) and isolation function.

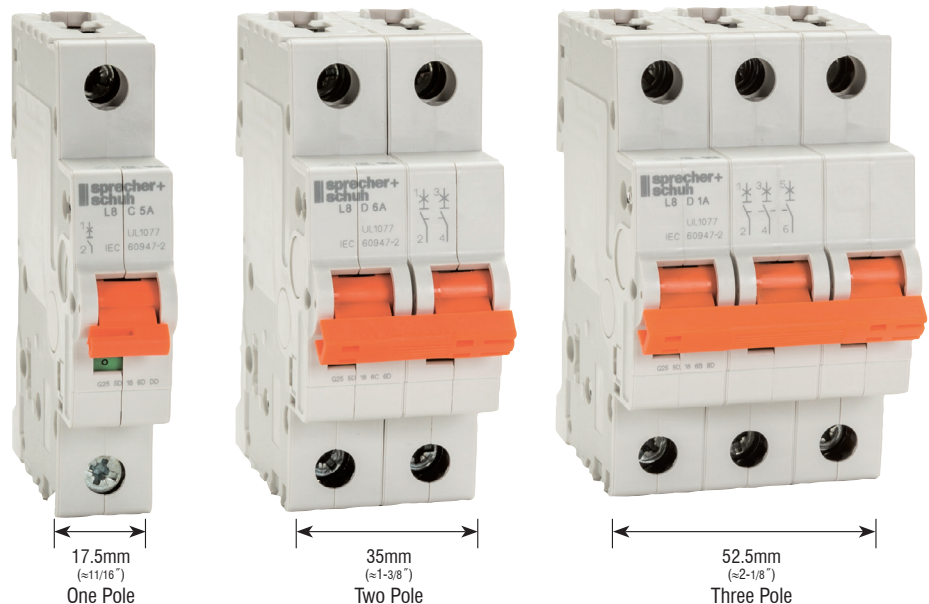
Sprecher+Schuh Supplementary Protectors also incorporate a trip-free mechanism - ensuring that the device operation cannot be defeated by holding the operator in the ON position.

Easy installation

Sprecher+Schuh Supplementary Protectors mount on a standard 35mm DIN-rail. Wire terminals accept multiple conductors, and UL 508 approved bus bars can be used to quickly distribute power to many Supplementary Protectors simultaneously. In addition, power to the circuit breakers can be fed from the line or load side.

Global approvals for worldwide acceptance

Series L8 Supplementary Protectors are UL Recognized for use in the United States in accordance with NFPA 79 (NEC, National Electrical Code). The devices comply with UL 1077 and CSA 22.2 No.235, meeting the requirements for supplementary protectors intended for use as overcurrent protection where branch circuit protection is not required, or is provided by another device such as a fuse or molded case circuit breaker. These Supplementary Protectors also comply with IEC 60947-2 for use in commercial and residential applications and are CE marked.



See online white paper

Methods

of Applying

Circuit Protection

Three trip characteristics

All Sprecher+Schuh L8 Supplementary Protectors are available with three different tripping characteristics, Type “B”, “C”, and “D”. The tripping characteristic defines the device’s speed of response (trip-time) to various levels of overcurrent. Figure 1 shows trip-time versus overcurrent for Type B, C, and D devices. The time-current characteristics enable the device to be optimally matched to the application. For example, PLC outputs that can only tolerate minimal overcurrents are best protected by Supplementary Protectors with Type B trip characteristics.

Sprecher+Schuh L8 Supplementary Protectors are also current limiting - interrupting fault currents within one half cycle. Current limiting devices protect circuit components from damage by reducing the peak let-through current which causes damaging magnetic forces

and let-through energy which generates heat.

Type “B” Characteristic

Developed primarily to protect conductors and low level signal devices such as PLCs. Instantaneous trip is three to five times the rated current of the Supplementary Protector ($3\sim 5 \times I_n$). The fast trip time of these devices minimizes damage to control circuit conductors from low-level faults.

Type “C” Characteristic

Developed primarily for applications with moderate inrush currents such as lighting, control circuits and coils, computers and appliances. Instantaneous trip is five to ten times the rated current of the Supplementary Protector ($5\sim 10 \times I_n$). The higher instantaneous trip level prevents nuisance tripping, and components being protected can typically withstand higher fault currents without being damaged.



Type “D” Characteristic

Developed primarily for applications with high inrush currents, i.e., transformers, power supplies and heaters. Instantaneous trip is ten to twenty times the rated current of the Supplementary Protector ($10\sim 20 \times I_n$). The high instantaneous trip level prevents nuisance tripping, and components being protected can typically withstand higher fault currents without being damaged.

Compare these advanced features

Box lug terminals accept #18...#4 (1.0...25mm²) wire as standard

Ratings to 480Y/277V AC @ 230/440V AC - 10kA Interrupt Rating

Amp rating and trip curve characteristic clearly marked on the device for easy identification

Magnetic trip elements provide Type B, C and D trip characteristics, while bimetallic elements protect against slight overloads.

Line and load side terminals designed with dual terminals which allows the connection of two wires, or both a wire and a bus bar.

Guarded No.2 pozidrive terminal screws with finger-safe IP20 protection

Devices install on standard 35mm DIN-rail (EN 50022)

Trip-free mechanism; device operation cannot be defeated by holding the operator in the ON position

Color coded indicator provides visual indication of the device status and isolation function

Available in one, two and three pole

M

L8 Supplementary Protectors

Trip Characteristic B ($3 \sim 5 \times I_N$) – Resistive or slightly inductive loads ③

Rated Current (A)	1 Pole ①		2 Pole ②		3 Pole ②	
	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.
0.5	L8-0.5/1/B	2	L8-0.5/2/B	1	L8-0.5/3/B	1
1	L8-1/1/B	2	L8-1/2/B	1	L8-1/3/B	1
2	L8-2/1/B	2	L8-2/2/B	1	L8-2/3/B	1
3	L8-3/1/B	2	L8-3/2/B	1	L8-3/3/B	1
4	L8-4/1/B	2	L8-4/2/B	1	L8-4/3/B	1
5	L8-5/1/B	2	L8-5/2/B	1	L8-5/3/B	1
6	L8-6/1/B	2	L8-6/2/B	1	L8-6/3/B	1
7	L8-7/1/B	2	L8-7/2/B	1	L8-7/3/B	1
8	L8-8/1/B	2	L8-8/2/B	1	L8-8/3/B	1
10	L8-10/1/B	2	L8-10/2/B	1	L8-10/3/B	1
13	L8-13/1/B	2	L8-13/2/B	1	L8-13/3/B	1
15	L8-15/1/B	2	L8-15/2/B	1	L8-15/3/B	1
16	L8-16/1/B	2	L8-16/2/B	1	L8-16/3/B	1
20	L8-20/1/B	2	L8-20/2/B	1	L8-20/3/B	1
25	L8-25/1/B	2	L8-25/2/B	1	L8-25/3/B	1
30	L8-30/1/B	2	L8-30/2/B	1	L8-30/3/B	1
32	L8-32/1/B	2	L8-32/2/B	1	L8-32/3/B	1
40	L8-40/1/B	2	L8-40/2/B	1	L8-40/3/B	1
50	L8-50/1/B	2	L8-50/2/B	1	L8-50/3/B	1
63	L8-63/1/B	2	L8-63/2/B	1	L8-63/3/B	1

L8 Supplementary Protector Features:

- UL-1077 Approved, CSA 22.2 No. 235 and IEC/EN 60947-2
- Thermal Magnetic Overcurrent Protection
- Trip characteristics based on 40°C ambient for UL/CSA
- Up to 10kA interruption ratings
- Finger safe design
- DIN-rail mounting

① 1-Pole ratings: UL/CSA 277VAC 48VDC, IEC 240/440VAC

② Multi-pole ratings: UL/CSA 480Y/277VAC 96VDC, IEC 440VAC

③ See UL Short Circuit ratings U1/U2 in the technical data sections.

Trip Characteristic C (5~10 x I_N) – Inductive loads ③

Rated Current (A)	1 Pole ①		2 Pole ②		3 Pole ②	
	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.
0.5	L8-0.5/1/C	2	L8-0.5/2/C	1	L8-0.5/3/C	1
1	L8-1/1/C	2	L8-1/2/C	1	L8-1/3/C	1
2	L8-2/1/C	2	L8-2/2/C	1	L8-2/3/C	1
3	L8-3/1/C	2	L8-3/2/C	1	L8-3/3/C	1
4	L8-4/1/C	2	L8-4/2/C	1	L8-4/3/C	1
5	L8-5/1/C	2	L8-5/2/C	1	L8-5/3/C	1
6	L8-6/1/C	2	L8-6/2/C	1	L8-6/3/C	1
7	L8-7/1/C	2	L8-7/2/C	1	L8-7/3/C	1
8	L8-8/1/C	2	L8-8/2/C	1	L8-8/3/C	1
10	L8-10/1/C	2	L8-10/2/C	1	L8-10/3/C	1
13	L8-13/1/C	2	L8-13/2/C	1	L8-13/3/C	1
15	L8-15/1/C	2	L8-15/2/C	1	L8-15/3/C	1
16	L8-16/1/C	2	L8-16/2/C	1	L8-16/3/C	1
20	L8-20/1/C	2	L8-20/2/C	1	L8-20/3/C	1
25	L8-25/1/C	2	L8-25/2/C	1	L8-25/3/C	1
30	L8-30/1/C	2	L8-30/2/C	1	L8-30/3/C	1
32	L8-32/1/C	2	L8-32/2/C	1	L8-32/3/C	1
40	L8-40/1/C	2	L8-40/2/C	1	L8-40/3/C	1
50	L8-50/1/C	2	L8-50/2/C	1	L8-50/3/C	1
63	L8-63/1/C	2	L8-63/2/C	1	L8-63/3/C	1

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- Up to 10kA interruption ratings
- Finger safe design
- DIN-rail mounting

① 1-Pole ratings: UL/CSA 277VAC 48VDC, IEC 240/440VAC

② Multi-pole ratings: UL/CSA 480Y/277VAC 96VDC, IEC 440VAC

③ See UL Short Circuit ratings U1/U2 in the technical data sections.

Trip Characteristic D (10~20 x I_N) – Highly inductive loads ③

Rated Current (A)	1 Pole ①		2 Pole ②		3 Pole ②	
	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.
0.5	L8-0.5/1/D	2	L8-0.5/2/D	1	L8-0.5/3/D	1
1	L8-1/1/D	2	L8-1/2/D	1	L8-1/3/D	1
2	L8-2/1/D	2	L8-2/2/D	1	L8-2/3/D	1
3	L8-3/1/D	2	L8-3/2/D	1	L8-3/3/D	1
4	L8-4/1/D	2	L8-4/2/D	1	L8-4/3/D	1
5	L8-5/1/D	2	L8-5/2/D	1	L8-5/3/D	1
6	L8-6/1/D	2	L8-6/2/D	1	L8-6/3/D	1
7	L8-7/1/D	2	L8-7/2/D	1	L8-7/3/D	1
8	L8-8/1/D	2	L8-8/2/D	1	L8-8/3/D	1
10	L8-10/1/D	2	L8-10/2/D	1	L8-10/3/D	1
13	L8-13/1/D	2	L8-13/2/D	1	L8-13/3/D	1
15	L8-15/1/D	2	L8-15/2/D	1	L8-15/3/D	1
16	L8-16/1/D	2	L8-16/2/D	1	L8-16/3/D	1
20	L8-20/1/D	2	L8-20/2/D	1	L8-20/3/D	1
25	L8-25/1/D	2	L8-25/2/D	1	L8-25/3/D	1
30	L8-30/1/D	2	L8-30/2/D	1	L8-30/3/D	1
32	L8-32/1/D	2	L8-32/2/D	1	L8-32/3/D	1
40	L8-40/1/D	2	L8-40/2/D	1	L8-40/3/D	1
50	L8-50/1/D	2	L8-50/2/D	1	L8-50/3/D	1
63	L8-63/1/D	2	L8-63/2/D	1	L8-63/3/D	1

L8 Supplementary Protector Features:





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- Finger safe design
- DIN-rail mounting

① 1-Pole ratings: UL/CSA 277VAC 48VDC, IEC 240/440VAC

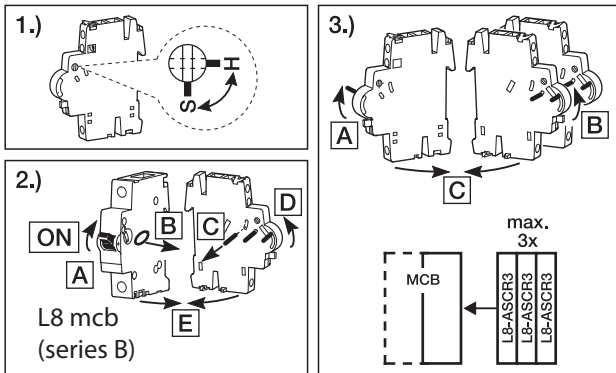
② Multi-pole ratings: UL/CSA 480Y/277VAC 96VDC, IEC 440VAC

③ See UL Short Circuit ratings U1/U2 in the technical data sections.

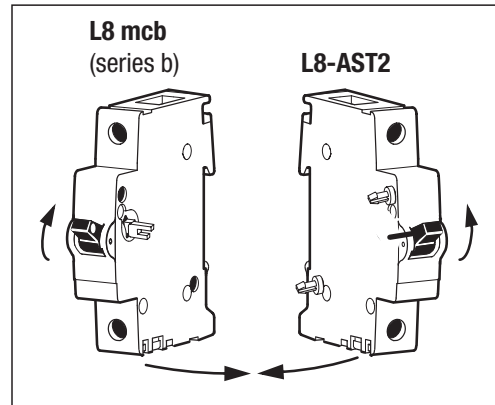
Accessories

Module	Description	For use with...	UL/CSA Max. Current/Voltage	IEC Ratings Current/Voltage	Connection Diagrams	Catalog Number
	Auxiliary/Signal Contact • Mounts on right side of L8 (series B only) ❶	All L8 Series B & Shunt Trips	1A @ 480 VAC 2A @ 277 VAC 1.5A @ 125 VDC 2A @ 60 VDC 4A @ 24 VDC	2A @ 230 V (AC-14) 1A @ 400 V (AC-14) 1.5A @ 110 V (DC-12) 1A @ 220 V (DC-12) 4A @ 24 V (DC-13) 2A @ 60 V (DC-13)	1 NO/NC (1 C.O.) 	L8-ASCR3
	Shunt Trip – • Remotely trips the device • Installs on right side of L8 (Series B only) ❷	All L8 Series B	110...415V AC 110...250V DC 12...60V AC/DC	110...415V AC 110...250V DC 12...60V AC/DC		L8-AST1 L8-AST2

L8-ASCR3 Assembly



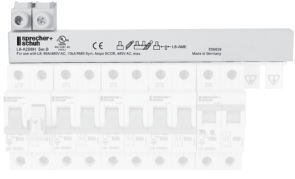
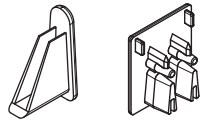
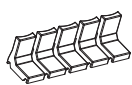
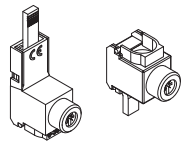
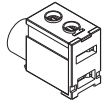

L8-AST1/2 Assembly



❶ A maximum of 3 L8-ASCR3 auxiliary contacts may be installed with or without shunt trip per L8 Series B.

❷ A maximum of 3 ASCR3 plus one (1) L8-AST1/2 shunt trip allowed per L8. The shunt must be mounted closest to the L8, then the signal contacts.

Accessories

Accessory	Description	Devices per Meter	For use with...	Catalog Number	
	Bus Bar, Pin Style 1-Phase ②③ Qty 1 bar at 1 meter	57	L8 1-pole, 80A max	L8-A1B8	
				L8 1-pole, 100A max	L8-A1B1
		36	L8 1-pole w/ Aux, 80A max	L8-A1B8H	
			L8 1-pole w/ Aux, 100A max	L8-A1B1H	
	Bus Bar, Pin Style 2-Phase ②③ Qty 1 bar at 1 meter	29	L8 2-pole, 80A max	L8-A2B8	
			L8 2-pole, 100A max	L8-A2B1	
		22	L8 2-pole w/ Aux, 80A max	L8-A2B8H	
		L8 2-pole w/ Aux, 100A max	L8-A2B1H		
	Bus Bar, Pin Style 3-Phase ②③ Qty 1 bar at 1 meter	19	L8 3-pole, 80A max	L8-A3B8	
		L8 3-pole, 100A max	L8-A3B1		
16		L8 3-pole w/ Aux, 80A max	L8-A3B8H		
	L8 3-pole w/ Aux, 100A max	L8-A3B1H			
 1-Phase 2- & 3-Phase	End Caps , sold only in pkgs of 10 ①		L8 1-Phase Bus Bar L8 2-/3-Phase Bus Bar	L8-A1E L8-AME	
	Protective Shroud , sold only in pkgs of 10 ①		All L8 bus bars	L8-AAP	
 Straight Low Profile	Terminal Power Feed • Sold only in pkgs of 10 ①		L8 2-/3-Phase Bus Bar Straight Lug 10...1/0 AWG 6...50mm ²	L8-AAT1S	
			L8 1-Phase Bus Bar Offset Lug 10...1/0 AWG low profile 6...50mm ²	L8-AAT1LP	
	Dedicated Power Feed • Sold only in pkgs of 10 ①		All L8 bus bars Offset Lug 14...1 AWG 2.5...50mm ²	L8-AAT2	
 1-pole multi-pole	Lock Out Toggle Mount – • Fits securely over switch toggle. Prevents unauthorized activation of L8 or L9 (series B) during maintenance		L8 or L9 1-pole L8 or L9 Multi-pole (Series B Only)	L8-ALOA1 L8-ALOA2	

① Sold in packages of 10. Minimum order quantity 10. Priced per piece. Example, one package = 10 pcs of L8-A1E.

② Cuttable, copper bus bar provided in 1 m length. UL 508 Listed, E56639, Category NMTR, cULus. CE to IEC 664 10 kA SCCR for use with L8 Supplementary protectors. See page M14 for dimensions.

③ Bus Bars L8- H are designed to accommodate the L8-ASCR3 Auxiliary Contact module, excluding Shunt Trip.

Technical Information
Electrical Ratings

Number of Poles	1, 2, or 3	
Tripping Characteristics	B, C, or D	
Rated Current I_n	0.5...63A	
Rated Frequency f	50/60 Hz	
Rated Insulation voltage U_i acc. to IEC/EN 60664-1	Phase-to-ground	250V AC
	Phase-to-phase	440V AC
Oversvoltage Category	III	
Pollution Degree	3	

Data acc. to UL/CSA ⑤

Rated voltage	1-pole	AC	277V AC
		DC	48V DC
	2-pole	AC	480Y/277V AC
		DC	96V DC
	3-pole	AC	480Y/277V AC
Rated interrupting capacity per UL 1077		≤ 32 A: 10 kA (AC); > 32 A: 5kA (AC); 0.5...63 A: 10 kA (DC)	
Application ①		Supplementary protector for general use; application codes: TC1: [1P] OL0 277V AC, [2P, 3P] OL0 480Y/277V AC; SC: 10 kA (0.5...32 A), 5 kA (35...63 A), U2 480Y/277V AC; FW3	
Reference temperature for tripping characteristics		40°C	
Electrical Endurance		6,000 ops (AC), 6,000 ops. (DC) 1 cycle (1s - ON, 9s - OFF)	

Data acc. to IEC/EN 60947-2

Rated operational voltage U_e	1-pole	230V AC	
	2-, 3-pole	400V AC	
Highest supply or utilization voltage U_{max}	AC	1-pole	253V AC
		2-, 3-pole	440V AC
	DC ②	1-pole	48V DC
		2-pole	96V DC
Min. operating voltage		12V AC/DC	
Rated ultimate short-circuit breaking capacity I_{cu}		15 kA	
Rated service short-circuit breaking capacity I_{cs}	≤ 40 A: 11.25 kA		
	> 40 A: 7.5 kA		
Rated impulse withstand voltage U_{imp} . (1.2/50 μs)		4 kV (test voltage 6.2kV at sea level, 5kV at 2,000m)	
Dielectric test voltage		2 kV (50/60Hz, 1 min.)	
Reference temperature for tripping characteristics		30 °C	
Electrical endurance	1 cycle (2s - ON, 13s - OFF, I_n ≤ 32A)	$I_n < 30A$:	20,000 operations (AC)
	1 cycle (2s - ON, 28s - OFF, I_n > 32A)	$I_n \geq 30A$:	10,000 ops. (AC); 1,000 ops. (DC)

Mechanical Data

Housing	Insulation group II, RAL 7035
Indicator window	red ON/green OFF
Protection degree per EN 60529	IP20, IP40 in enclosure with cover
Mechanical endurance	20,000 operations
Shock resistance per IEC/EN 60068-2-27	25 g - 2 shocks - 13 ms
Vibration resistance per IEC/EN 60068-2-6	5g - 20 cycles at 5...150...5 Hz with load 0.8 In

Environmental

Environmental conditions (damp heat) per IEC/EN 60068-2-30	28 cycles with 55°C/90-96% and 25°C/95-100%
Ambient temperature ③	-25...+55°C
Storage temperature	-40...+70°C

Installation

Terminal	Dual terminal	
Cross-section of wire – solid, stranded (front/back terminal slot) ④	35/35 mm ²	
	18...4/18...10 AWG	
Flexible	25/10 mm ²	
Multi-wire rating per UL, CSA	1 wire, 18...4 AWG	
	2-4 wires ⑥, 18...10 AWG	
Cross-section of bus bars (top / bottom)	10/10 mm ²	
	IEC	2.8 N•m
Tightening torque	UL/CSA	AWG 18...16: 13.3 in•lb AWG 14...10: 17.7 in•lb AWG 8...4: 39.8 in•lb
Screwdriver	No. 2 Pozidrive	
Mounting	DIN Rail (EN 60715, 35 mm) with fast clip	
Mounting position	Any	
Supply	Optional	

Approximate Dimensions/Weight

Pole dimensions	H x D x W	88 x 69 x 17.5 mm (3.46" x 2.72" x 0.69")
Pole weight		115 g (4.1 oz)

Combination with Auxiliary Elements

Auxiliary contact	Yes
Signal contact	Yes
Shunt trip	Yes

① 2-pole/3-pole single pole load: TC2

② IEC DC Ratings Self-declared

③ 35mm² self-declared. Not included in IEC/EN approval.

④ Refer to Ambient Temperature Derating tables.

⑤ UL File E65138

⑥ Wires must be of like size and stranding. Up to two wires per terminal slot.

Power Loss Due to Current

Rated Current [A]	Power Loss Per Pole [W]	Rated Current [A]	Power Loss Per Pole [W]
0.5	1.4	13	2.3
1	1.4	15	2.4
2	1.8	16	2.5
3	1.6	20	2.5
4	1.8	25	3.2
5	1.9	30	3.5
6	2.0	32	3.7
7	1.1	40	4.5
8	1.5	50	4.5
10	2.1	63	5.4

Zero-stack Derating

The installation of several miniature circuit breaker side by side with rated current on all poles requires a correction factor to the rated current (not required if spacers are used).

Number of Adjacent Devices	Factor
1	1
2,3	0.9
4,5	0.8
≥ 6	0.75

L8 Supplementary Protection Devices Ambient Temperature Derating

Note: Application below 0° C is for non-condensing atmosphere. Care should be taken for applications below 0 °C. These devices are not certified to operate correctly in the presence of ice.

Temperature Derating, UL

Reference temperature = 40 °C

Current Rating [A]	Ambient temperature (°C)										
	-25	-20	-10	0	10	20	30	40	50	55	60
0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
1	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1	1.0	0.9	0.9
2	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2	1.9	1.9	1.8
3	3.7	3.7	3.6	3.4	3.3	3.2	3.1	3	2.9	2.8	2.8
4	5.0	4.9	4.7	4.6	4.4	4.3	4.1	4	3.9	3.8	3.7
5	6.2	6.1	5.9	5.7	5.6	5.4	5.2	5	4.8	4.7	4.6
6	7.4	7.3	7.1	6.9	6.7	6.4	6.2	6	5.8	5.7	5.6
7	8.7	8.6	8.3	8.0	7.8	7.5	7.3	7	6.7	6.6	6.5
8	9.9	9.8	9.5	9.2	8.9	8.6	8.3	8	7.7	7.6	7.4
10	12.4	12.2	11.9	11.5	11.1	10.7	10.4	10	9.6	9.4	9.3
13	16.1	15.9	15.4	14.9	14.4	14.0	13.5	13	12.5	12.3	12.0
15	18.6	18.3	17.8	17.2	16.7	16.1	15.6	15	14.4	14.2	13.9
16	19.8	19.6	19.0	18.4	17.8	17.2	16.6	16	15.4	15.1	14.8
20	24.8	24.4	23.7	23.0	22.2	21.5	20.7	20	19.3	18.9	18.5
25	31.0	30.6	29.6	28.7	27.8	26.9	25.9	25	24.1	23.6	23.1
30	37.2	36.7	35.6	34.4	33.3	32.2	31.1	30	28.9	28.3	27.8
32	39.7	39.1	37.9	36.7	35.6	34.4	33.2	32	30.8	30.2	29.6
40	49.6	48.9	47.4	45.9	44.4	43.0	41.5	40	38.5	37.8	37.0
50	62.0	61.1	59.3	57.4	55.6	53.7	51.9	50	48.2	47.2	46.3
63	78.2	77.0	74.7	72.3	70.0	67.7	65.3	63	60.7	59.5	58.3

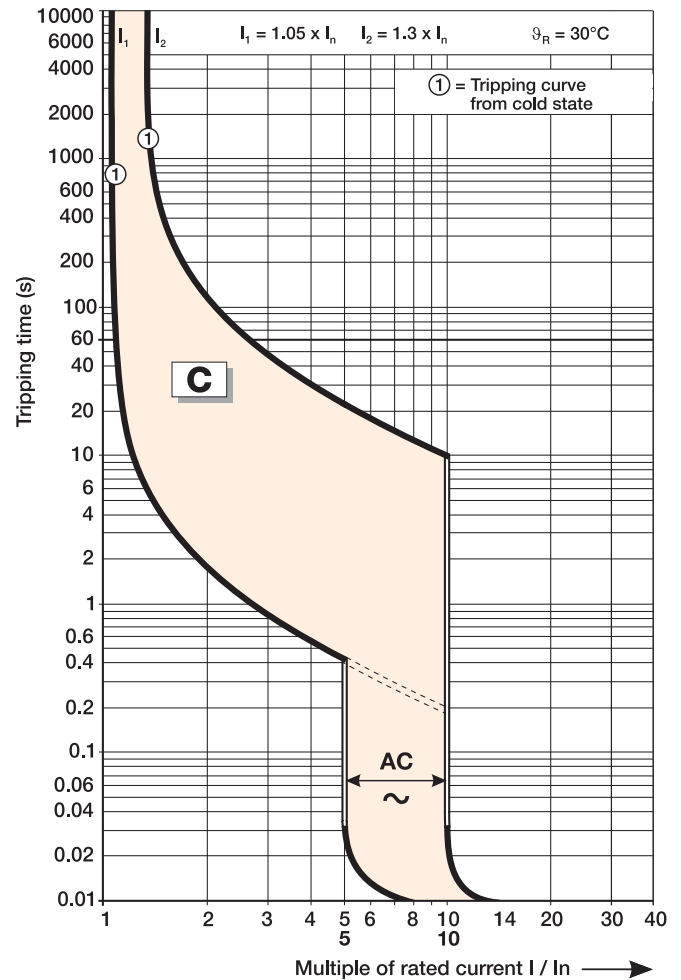
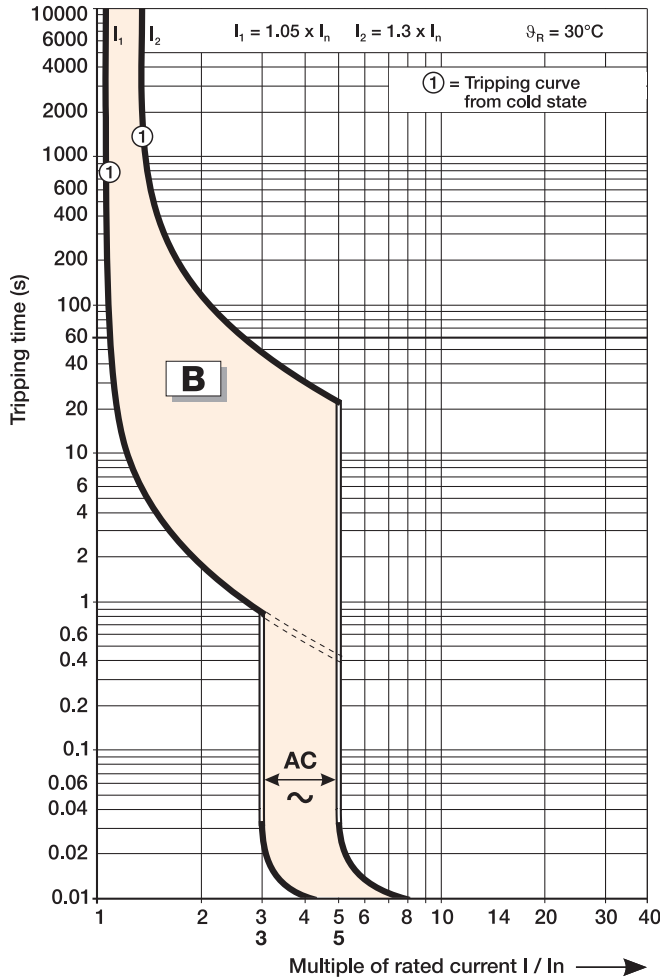
Temperature Derating, IEC

Reference temperature = 30 °C

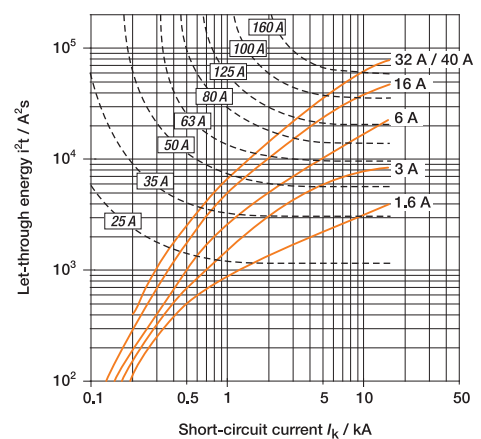
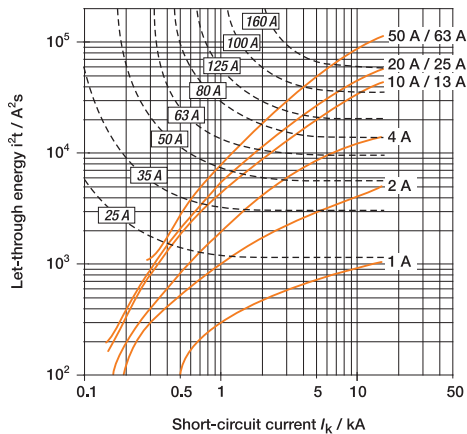
Current Rating [A]	Ambient temperature (°C)										
	-25	-20	-10	0	10	20	30	40	50	55	60
0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1	1.2	1.2	1.1	1.1	1.1	1.0	1	1.0	0.9	0.9	0.9
2	2.3	2.3	2.2	2.2	2.1	2.1	2	1.9	1.9	1.9	1.8
3	3.5	3.5	3.4	3.3	3.2	3.1	3	2.9	2.8	2.8	2.7
4	4.7	4.6	4.5	4.4	4.2	4.1	4	3.9	3.8	3.7	3.6
5	5.8	5.8	5.6	5.5	5.3	5.2	5	4.9	4.7	4.6	4.5
6	7.0	6.9	6.7	6.5	6.4	6.2	6	5.8	5.6	5.6	5.5
7	8.2	8.1	7.8	7.6	7.4	7.2	7	6.8	6.6	6.5	6.4
8	9.3	9.2	9.0	8.7	8.5	8.2	8	7.8	7.5	7.4	7.3
10	11.7	11.5	11.2	10.9	10.6	10.3	10	9.7	9.4	9.3	9.1
13	15.1	15.0	14.6	14.2	13.8	13.4	13	12.6	12.2	12.0	11.8
15	17.5	17.3	16.8	16.4	15.9	15.5	15	14.6	14.1	13.9	13.6
16	18.6	18.4	17.9	17.4	17.0	16.5	16	15.5	15.0	14.8	14.6
20	23.3	23.0	22.4	21.8	21.2	20.6	20	19.4	18.8	18.5	18.2
25	29.1	28.8	28.0	27.3	26.5	25.8	25	24.3	23.5	23.1	22.7
30	35.0	34.5	33.6	32.7	31.8	30.9	30	29.1	28.2	27.8	27.3
32	37.3	36.8	35.8	34.9	33.9	33.0	32	31.0	30.1	29.6	29.1
40	46.6	46.0	44.8	43.6	42.4	41.2	40	38.8	37.6	37.0	36.4
50	58.3	57.5	56.0	54.5	53.0	51.5	50	48.5	47.0	46.3	45.5
63	73.4	72.5	70.6	68.7	66.8	64.9	63	61.1	59.2	58.3	57.3

Note: In order to use MCB at 60°C you must use cable suitable for this temperature. Any third party certifications are not covering this ambient temperature rating.

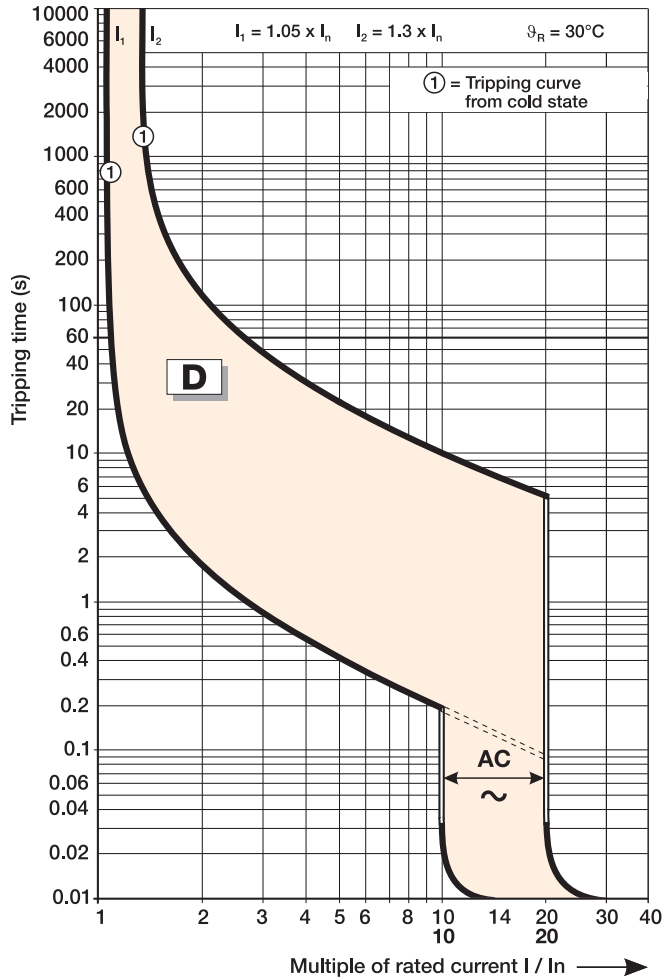
Tripping Characteristics - B and C Curve



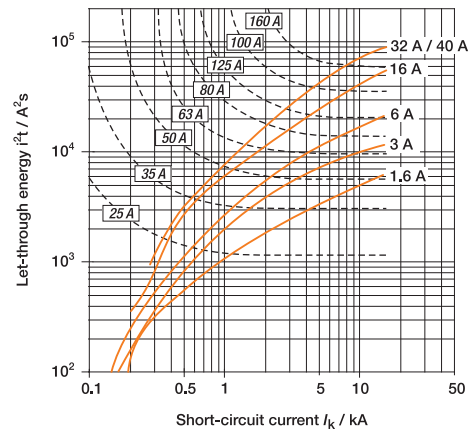
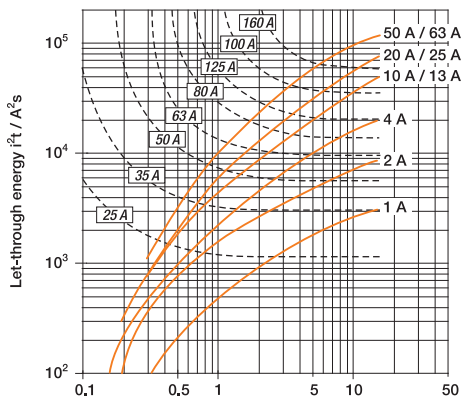
B and C Curve - 230/400V AC Let-through Energy



Tripping Characteristics - D Curve

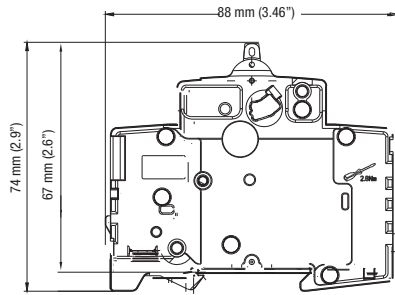


D Curve - 230/400V AC Let-through Energy

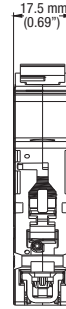


L8 Supplementary Protectors (Curve B, C & D)

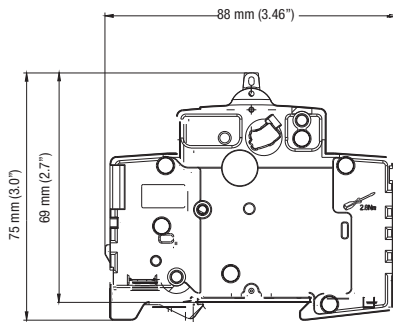
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



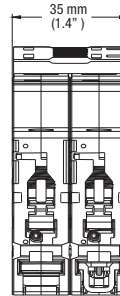
1-Pole



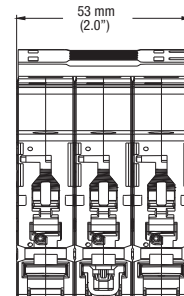
1-Pole



2- & 3-Pole

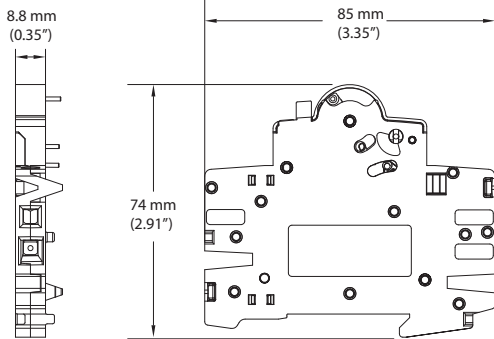


2-Pole

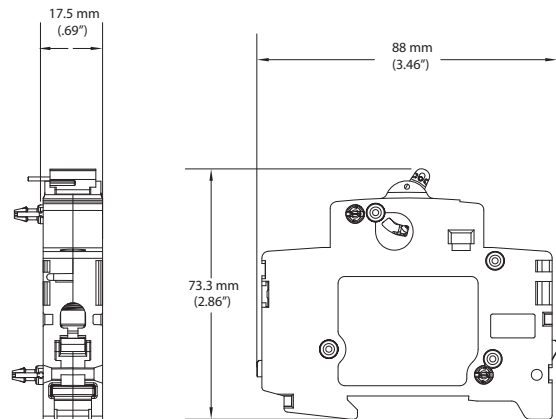


3-Pole

Auxiliary Contact/Signal Alarm (L8-ASCR3)

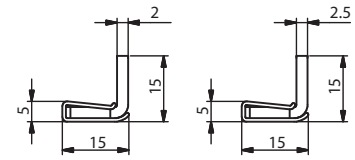
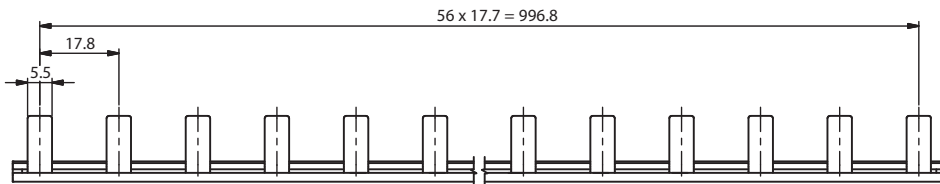
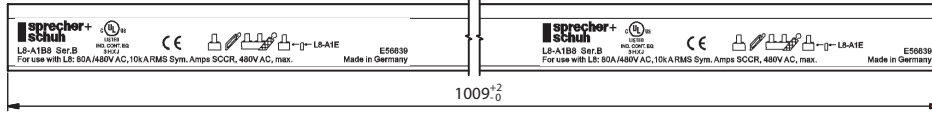


Shunt Trip Modules (L8-AST1/2)



L8 - 1-Pole Bus Bars (L8-A1B...)

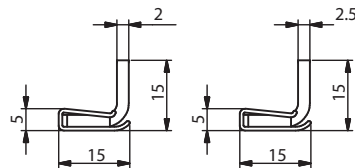
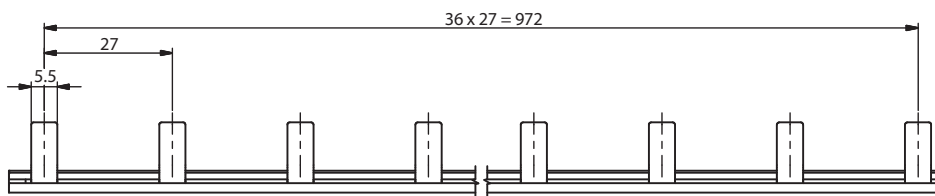
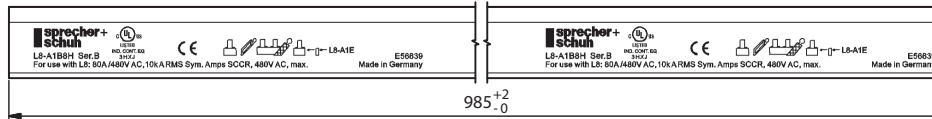
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



L8-A1B8

L8-A1B1

L8 - 1-Pole Bus Bars with Auxiliary (L8-A1B...H)



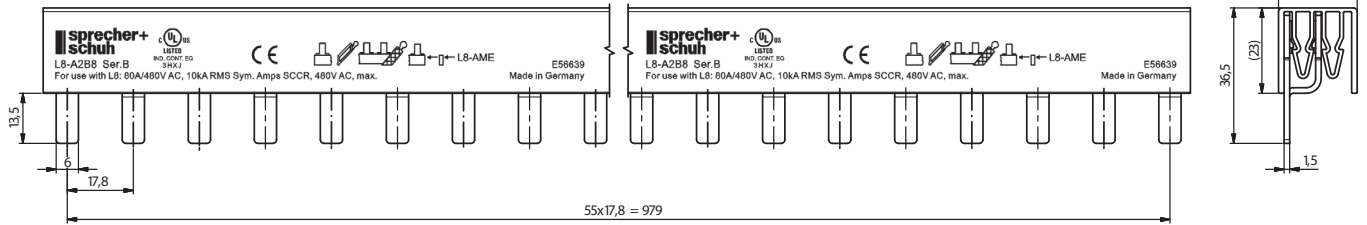
L8-A1B8H

L8-A1B1H

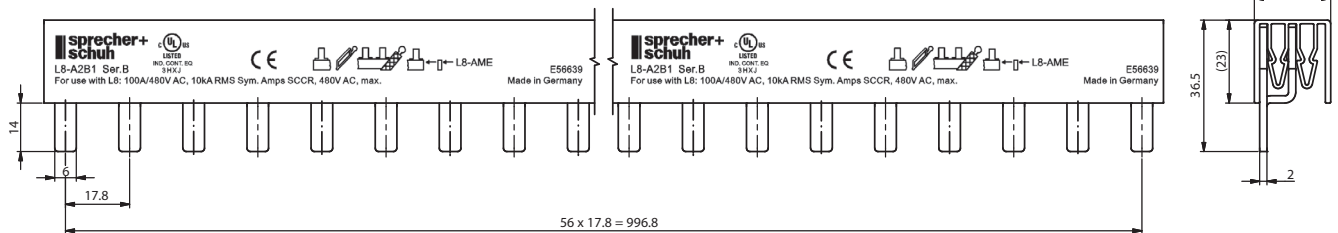
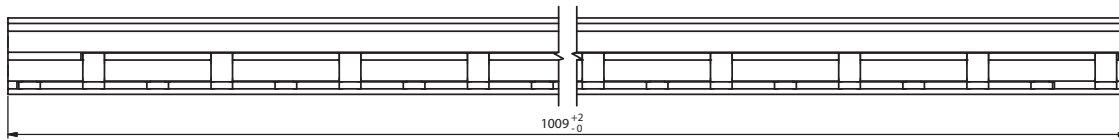


L8-A2B8 - 2 Pole Bus Bars

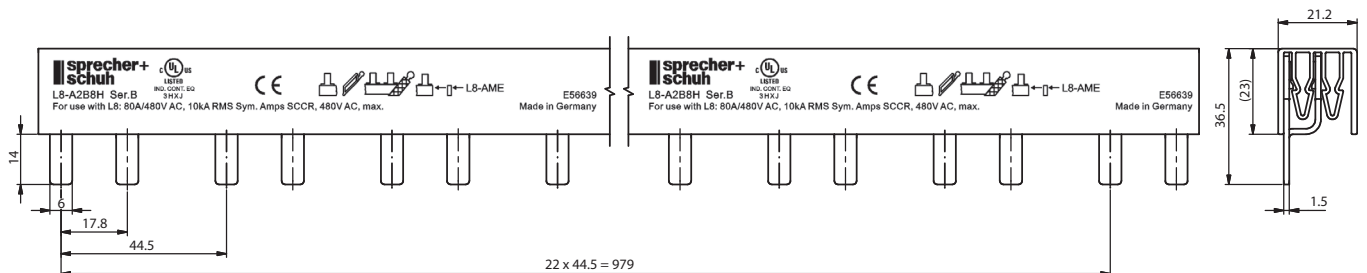
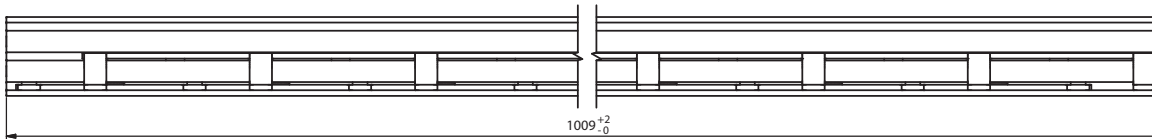
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



L8-A2B1 - 2 Pole Bus Bars



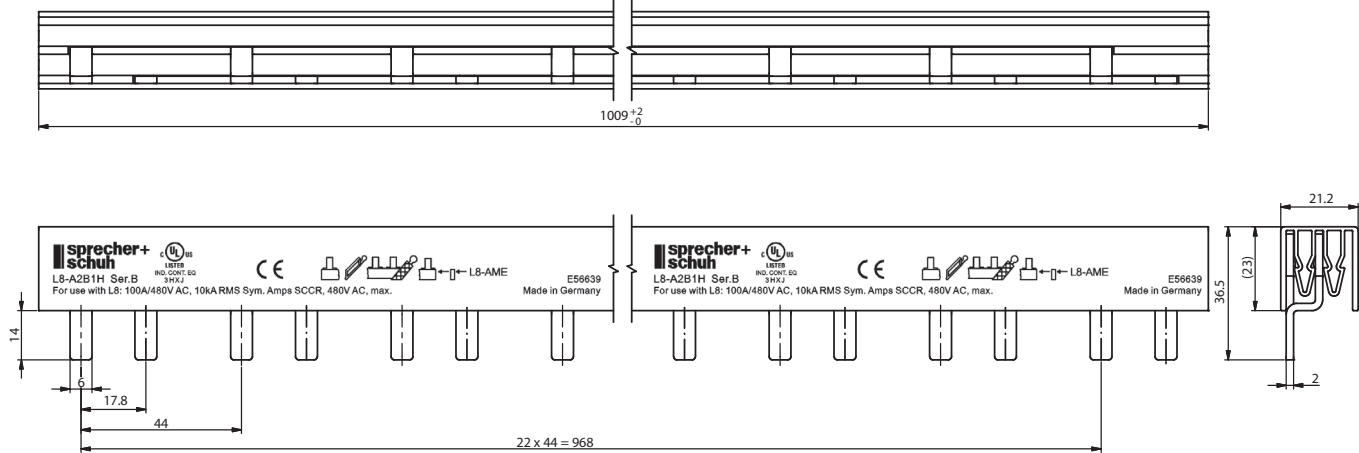
L8-A2B8H - 2 Pole Bus Bars w/ Auxiliary



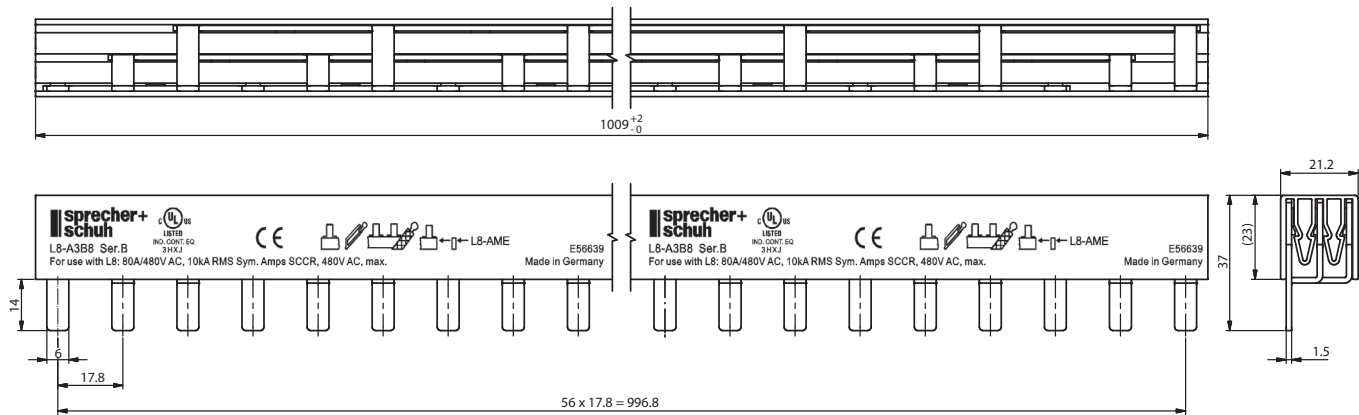
L8 Supplementary Protectors

L8-A2B1H - 2 Pole Bus Bars w/ Auxiliary

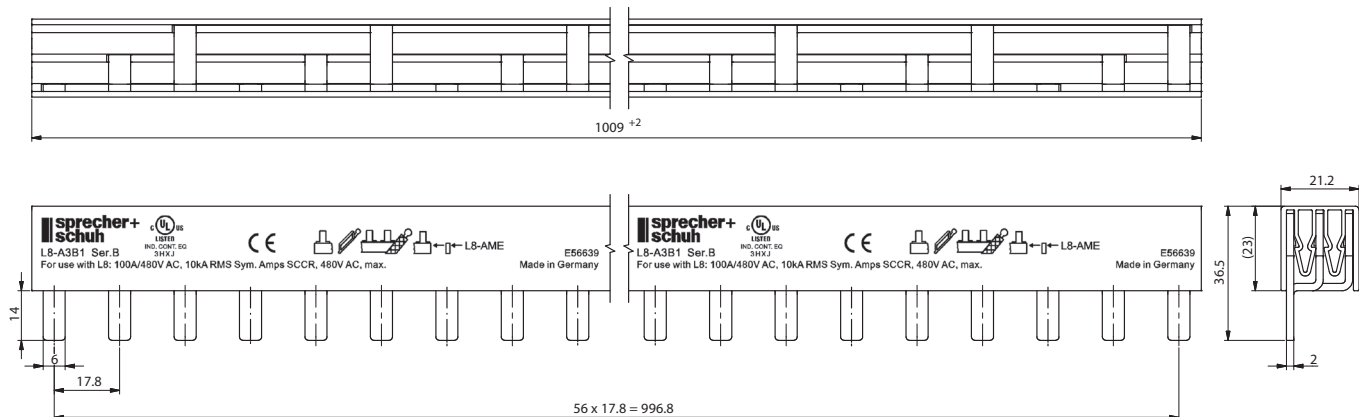
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



L8-A3B8 - 3 Pole Bus Bars



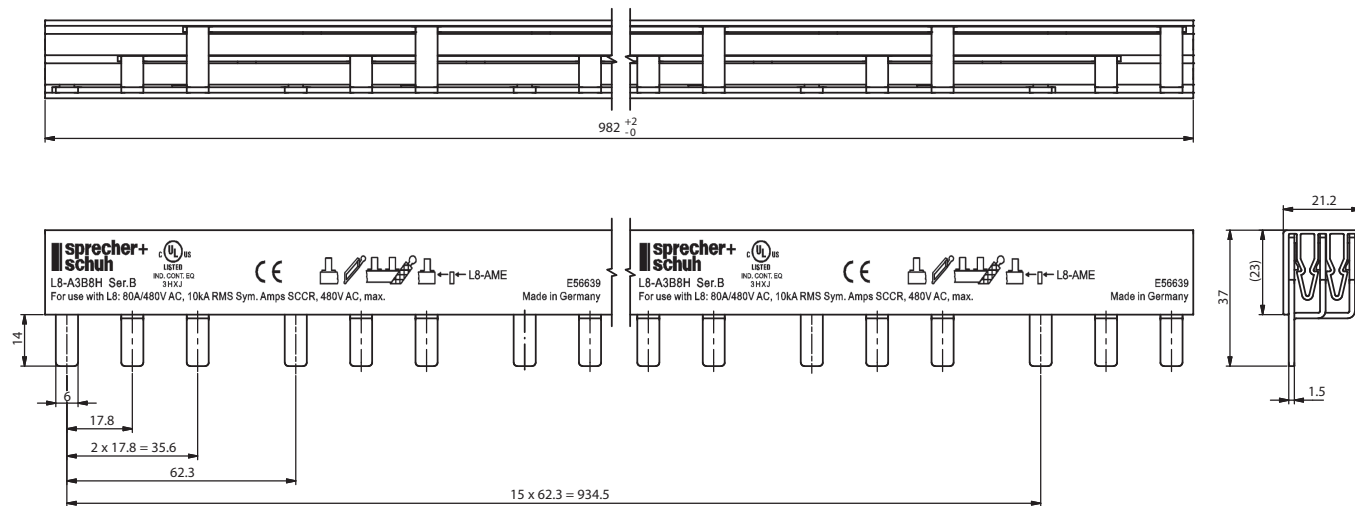
L8-A3B1 - 3 Pole Bus Bars



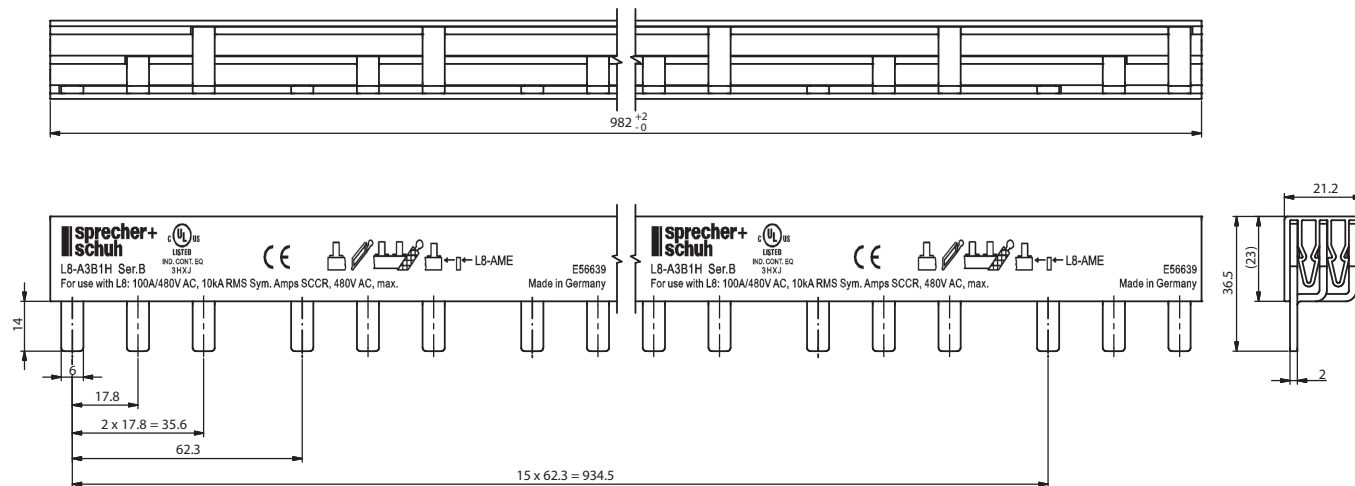
L8 Supplementary Protectors

L8-A3B8H - 3 Pole Bus Bars w/ Auxiliary

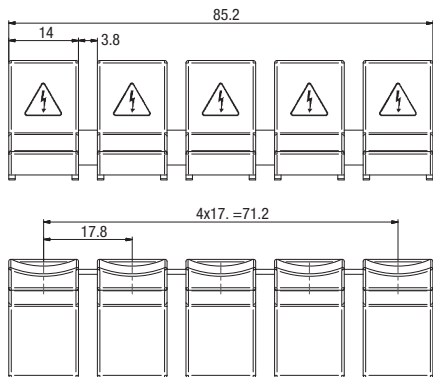
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



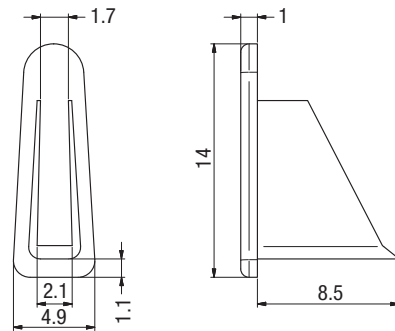
L8-A3B1H - 3 Pole Bus Bars w/ Auxiliary

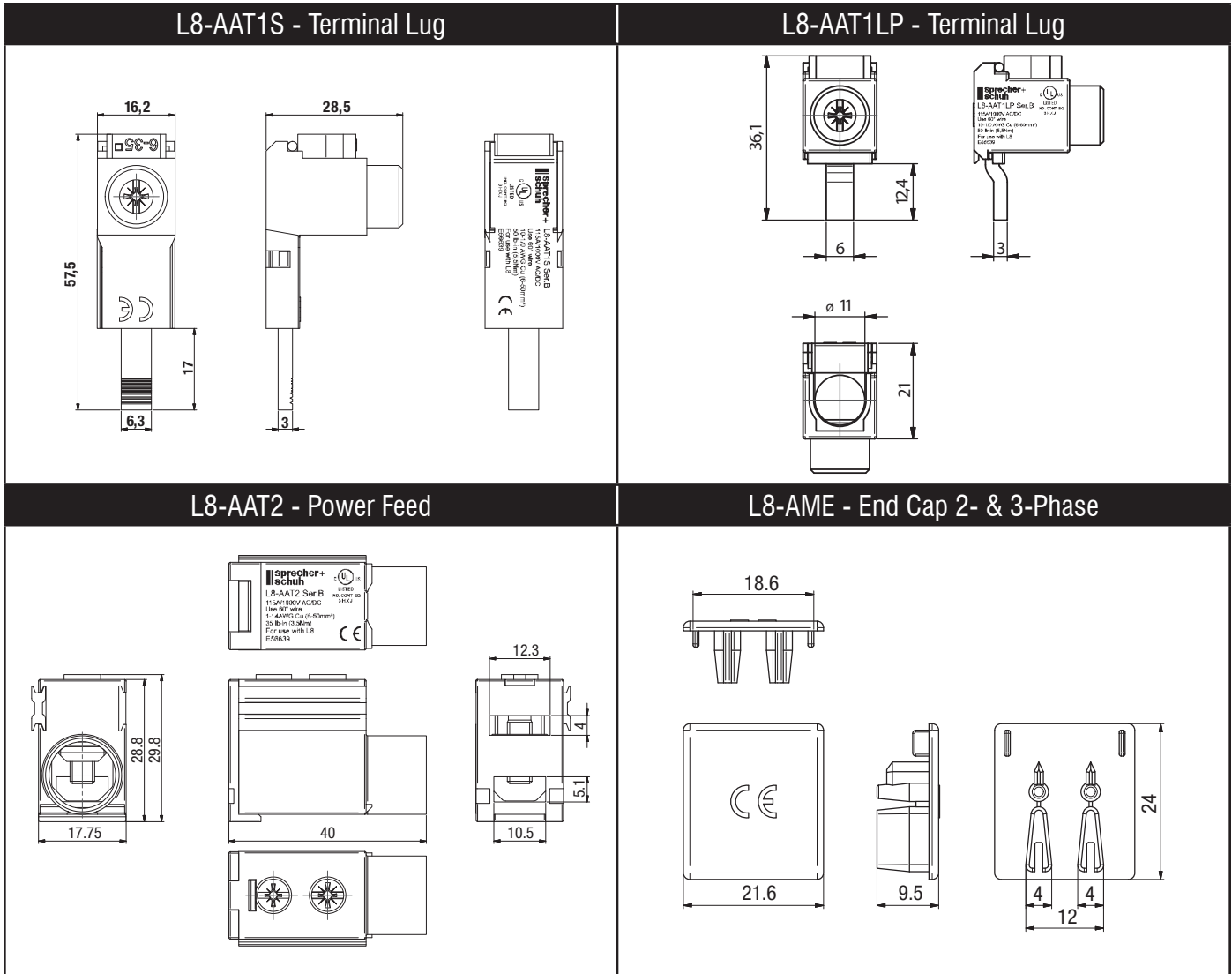


L8-AAP - Protective Shroud

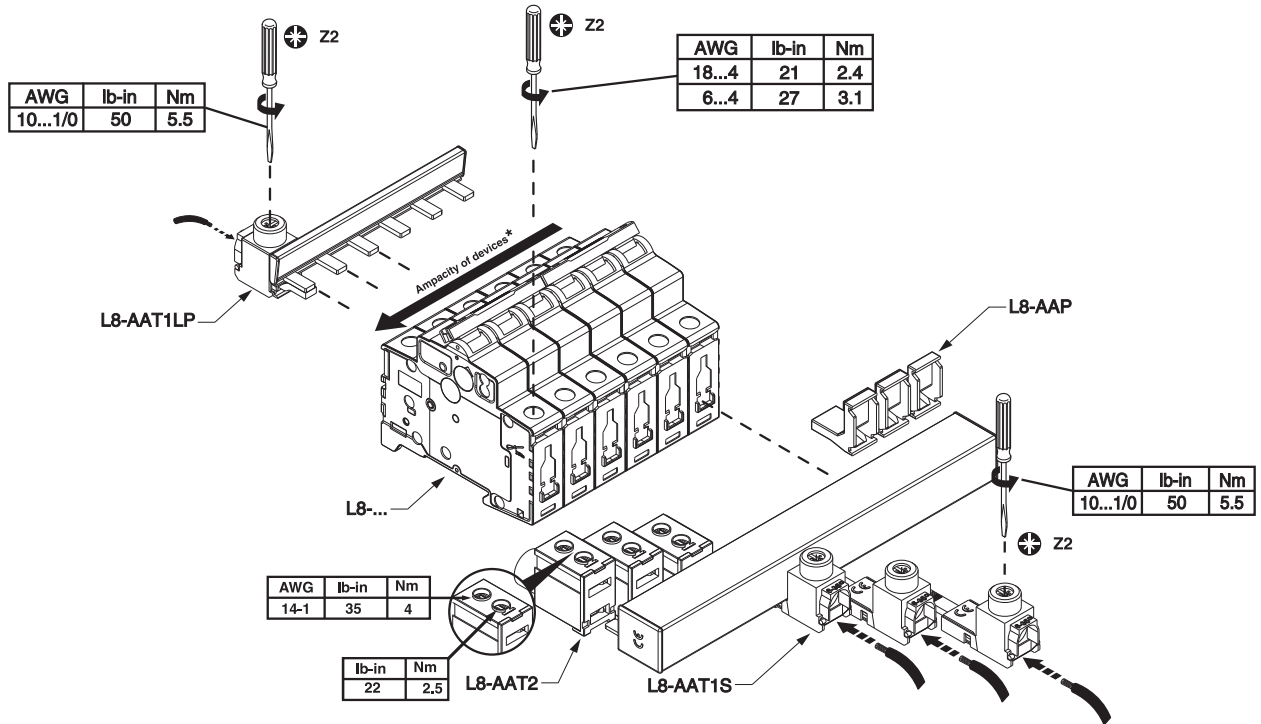


L8-A1E - End Cap 1-Phase

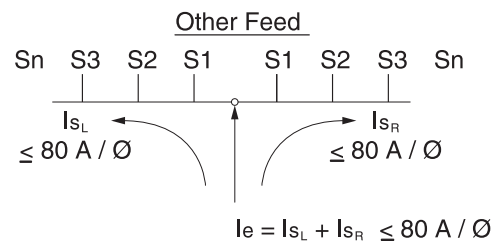
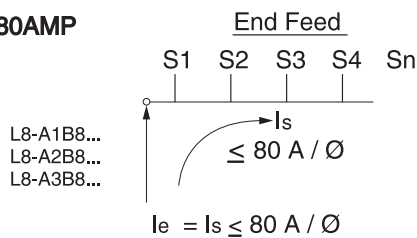




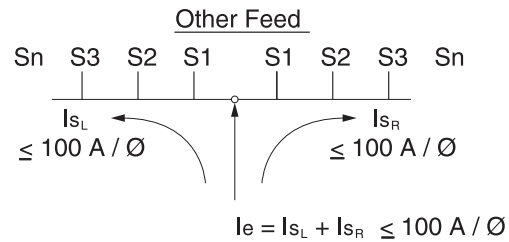
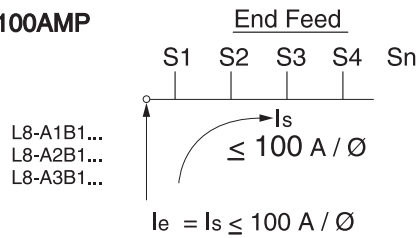
Applying L8 Bus Bars & Accessories



80AMP



100AMP



Series L9 UL489 Miniature Circuit Breakers

Industrial Circuit
Breakers for Branch
Circuit Protection
up to 63 Amps



Sprecher+Schuh includes a line of circuit breakers approved for branch circuit applications in the United States and Canada and certified as a Miniature Circuit Breaker for IEC applications.

Broad product range & flexibility

The Sprecher + Schuh L9 Miniature Circuit Breakers provide a variety of product configurations by offering current ranges of 0.5A to 63A with voltage ranges of 240V AC and 480Y/277V AC. The Series L9 DIN Rail-mounted circuit breakers are similar in width and current range to supplementary protectors with the added benefit of providing listed branch circuit protection for US/Canada applications.

Also available for control circuit applications are add-on auxiliary and signal contacts plus shunt trip modules to provide modern control circuit applications. A lock-off attachment is available for applications requiring that feature.

Safety features provide enhanced protection

The series L9 Miniature Circuit Breakers feature finger-safe IP20 from the front of the circuit breaker to guard against accidental contact with live parts.

To aid troubleshooting, a color-coded indicator provides positive visual indication of the device status (green for OFF, red for ON and isolation function).

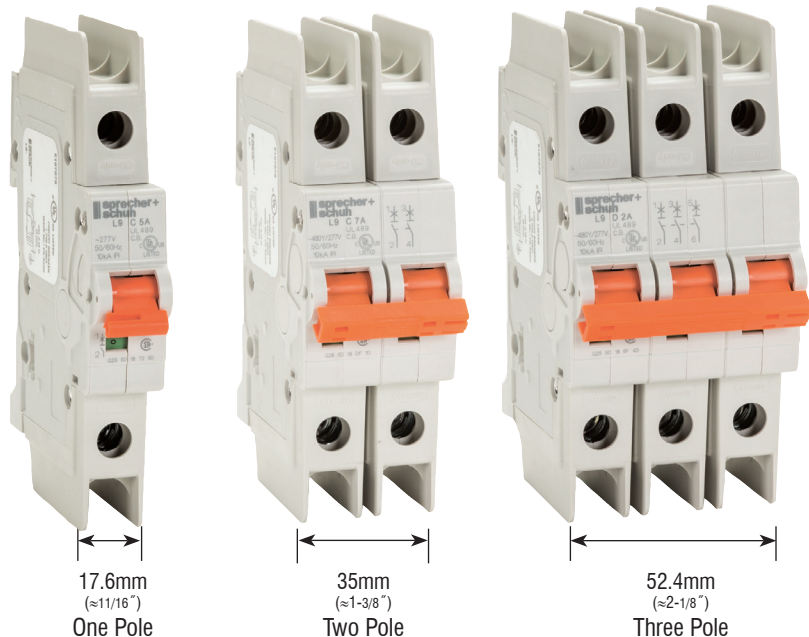
The Series L9 also incorporate a trip free mechanism - ensuring that the device operation cannot be defeated by holding the operator in the ON position.

Easy installation

The Series L9 Miniature Circuit Breakers mount on a standard 35mm DIN-rail. Wire terminals accept multiple conductors. In addition, power to the circuit breakers can be fed from the line or load side.

Global approvals for worldwide acceptance

The Sprecher + Schuh L9 Circuit Breakers are UL489 listed, CSA 22.2 No. 5.1 approved and meets IEC 60 947-2. The Series L9 also have an HACR rating (heating and air conditioning) as well as a "Switching Duty" (SWD) rating from 0.5 to 20A. Switching Duty ratings are related to fluorescent light applications only, not High intensity discharge (HID) lights or any other types of loads. Advanced features and global approvals make the Series L9 an ideal product for use in industrial equipment installed throughout the world.



See online white paper

Methods
of Applying
Circuit Protection

Product Design & Application

The Series L9 products are thermal-magnetic (inverse time) circuit breakers offering the benefits of a modern circuit breaker design in a compact size. The L9 is used mainly in control circuit applications where branch circuit approved circuit breakers are required.

Because of its range of protection (from 0.5 to 63A) many customers may use this product for protection of load devices where fuses or other supplementary protector devices previously were used in the U.S. and Canada.

Protection of PLC I/O, solenoids, power supplies and control transformers along with providing the listed branch circuit protection is available in one device.

Description

L9 Circuit Breakers for Branch Circuit protection are available in one (1-), two (2-), and three (3-) pole construction and are rated 0.5 to 63A at 240V AC and 0.5 to 40A at 480Y/277V AC for North American applications (UL

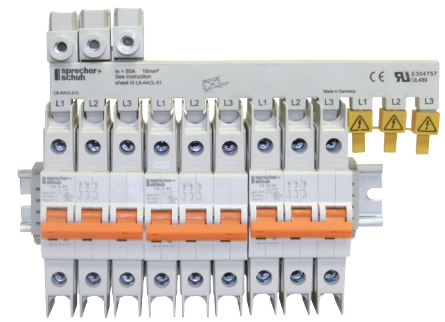
489 and CSA 22.2 No. 5.1). For IEC applications, the products are rated 415V AC 0.5 to 40A.

Continuous Current Rating

Standard current ratings are: 0.5A, 1A, 1.6A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 10A, 15A, 16A, 20A, 25A, 30A, 32A, 35A, 40A, 50A, 60A and 63A.

The L9 circuit breakers are rated in RMS amperes at 40°C (104°F) ambient temperature per the UL 489 (CSA 22.2 No. 5.1) standard. This temperature is generally used as the average temperature within an industrial enclosure. If a circuit breaker is applied in a temperature that exceeds 40°C (104°F) ambient, then the circuit breaker should be derated. For IEC 60 947-2 standard, the products carry an ambient rating of 30° C. Follow standard IEC application considerations for temperature rating in different ambient temperatures.

Detailed characteristic trip curves are shown in our online white paper, Methods of Applying Circuit Protection. The trip bands shown for each breaker represent current tripping limits for a circuit breaker and are within the limits established



by UL. For a specific current at 40°C (104°F), a circuit breaker will open (“clear the circuit”) automatically at some total time that will be within the “Minimum” and “Maximum” time shown on the curves.

Example: The L9 time-current graph on page M28 shows that a one-pole, 15 A, L9 circuit breaker trips in not less than 10 sec, and not more than 120 sec. on a 30 A current. Because the UL standard defines this time spread, users should not specify exact tripping time. The lower current portion of the curves (upper left) depict the time to trip due to thermal action and reflect overload protection of the wire and connect load. The higher current portion of the curves (lower right) depicts the trip due to the magnetic action of the circuit breaker and reflects protection due to short circuit level currents.

Compare these advanced features

- Box lug terminals accept #18...#4 AWG wire as standard
- Current limiting and interrupting capacity of 10kA at 480Y/277V AC.
- Amp rating and trip curve characteristic clearly marked on the device for easy identification.
- Trip-free mechanism; device operation cannot be defeated by holding the operator in the ON position
- Available in one, two and three pole
- Line and load side terminals designed with dual terminals which allows the connection of two wires, or both a wire and a bus bar.
- Guarded No.2 pozidrive terminal screws with finger-safe IP20 protection
- Accepts right-mounted shunt trips, auxiliary and signal contacts.
- Devices install on standard 35mm DIN-rail (EN 50022)
- Color coded indicator provides visual indication of the device status and isolation function
- Magnetic trip elements provide Type C and D trip characteristics (IEC and EN 60947-2), while bimetallic elements protect against slight overloads.



L9 Circuit Breakers

Trip Characteristic C (5~10 x I_N) – Inductive loads

① UL/CSA Max. Volt.	Interrupt Rating (kA)	Rated Current (A)	1 Pole ②		2 Pole ③		3 Pole	
			Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.
480Y/277	10	0.5	L9-0.5/1/C	2	L9-0.5/2/C	1	L9-0.5/3/C	1
		1	L9-1/1/C	2	L9-1/2/C	1	L9-1/3/C	1
		1.6	L9-1.6/1/C	2	L9-1.6/2/C	1	L9-1.6/3/C	1
		2	L9-2/1/C	2	L9-2/2/C	1	L9-2/3/C	1
		3	L9-3/1/C	2	L9-3/2/C	1	L9-3/3/C	1
		4	L9-4/1/C	2	L9-4/2/C	1	L9-4/3/C	1
		5	L9-5/1/C	2	L9-5/2/C	1	L9-5/3/C	1
		6	L9-6/1/C	2	L9-6/2/C	1	L9-6/3/C	1
		7	L9-7/1/C	2	L9-7/2/C	1	L9-7/3/C	1
		8	L9-8/1/C	2	L9-8/2/C	1	L9-8/3/C	1
		10	L9-10/1/C	2	L9-10/2/C	1	L9-10/3/C	1
		13	L9-13/1/C	2	L9-13/2/C	1	L9-13/3/C	1
		15	L9-15/1/C	2	L9-15/2/C	1	L9-15/3/C	1
		16	L9-16/1/C	2	L9-16/2/C	1	L9-16/3/C	1
		20	L9-20/1/C	2	L9-20/2/C	1	L9-20/3/C	1
		25	L9-25/1/C	2	L9-25/2/C	1	L9-25/3/C	1
30	L9-30/1/C	2	L9-30/2/C	1	L9-30/3/C	1		
32	L9-32/1/C	2	L9-32/2/C	1	L9-32/3/C	1		
35	L9-35/1/C ④	2	L9-35/2/C ④	1	L9-35/3/C ④	1		
40	L9-40/1/C ④	2	L9-40/2/C ④	1	L9-40/3/C ④	1		
240	10	50	L9-50/1/C	2	L9-50/2/C	1	L9-50/3/C	1
		60	L9-60/1/C	2	L9-60/2/C	1	L9-60/3/C	1
		63	L9-63/1/C	2	L9-63/2/C	1	L9-63/3/C	1

L9 Miniature Circuit Breaker Features:

- UL-489 listed for Branch Circuit protection and CSA 22.2 No. 5.1 Approved
- Thermal magnetic protection
- Trip characteristic based on 40°C ambient for UL/CSA
- All ratings are HACR rated (SWD rated up to 20 A)
- Finger safe design (front)
- DIN rail mounting

① See page M26 for IEC 60947-2 miniature circuit breaker ratings.
 ② 1-Pole 277V AC 0.5...40A; 240V AC 50...63A, 48V DC 0.5...63A
 ③ 2-Pole (series) 96V DC 0.5...63A
 ④ Rated 480Y/277VAC.

Trip Characteristic D (10~20 x I_N) – Highly inductive loads


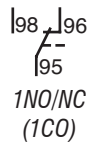

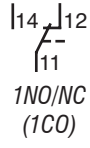



① UL/CSA Max. Volt.	Interrupt Rating (kA)	Rated Current (A)	1 Pole Ⓣ		2 Pole Ⓢ		3 Pole	
			Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.	Catalog Number	Std. Pkg.
480Y/277	10	0.5	L9-0.5/1/D	2	L9-0.5/2/D	1	L9-0.5/3/D	1
		1	L9-1/1/D	2	L9-1/2/D	1	L9-1/3/D	1
		1.6	L9-1.6/1/D	2	L9-1.6/2/D	1	L9-1.6/3/D	1
		2	L9-2/1/D	2	L9-2/2/D	1	L9-2/3/D	1
		3	L9-3/1/D	2	L9-3/2/D	1	L9-3/3/D	1
		4	L9-4/1/D	2	L9-4/2/D	1	L9-4/3/D	1
		5	L9-5/1/D	2	L9-5/2/D	1	L9-5/3/D	1
		6	L9-6/1/D	2	L9-6/2/D	1	L9-6/3/D	1
		7	L9-7/1/D	2	L9-7/2/D	1	L9-7/3/D	1
		8	L9-8/1/D	2	L9-8/2/D	1	L9-8/3/D	1
		10	L9-10/1/D	2	L9-10/2/D	1	L9-10/3/D	1
		13	L9-13/1/D	2	L9-13/2/D	1	L9-13/3/D	1
		15	L9-15/1/D	2	L9-15/2/D	1	L9-15/3/D	1
		16	L9-16/1/D	2	L9-16/2/D	1	L9-16/3/D	1
		20	L9-20/1/D	2	L9-20/2/D	1	L9-20/3/D	1
240	10	40	L9-40/1/D	2	L9-40/2/D	1	L9-40/3/D	1
		50	L9-50/1/D	2	L9-50/2/D	1	L9-50/3/D	1
		60	L9-60/1/D	2	L9-60/2/D	1	L9-60/3/D	1
		63	L9-63/1/D	2	L9-63/2/D	1	L9-63/3/D	1

L9 Miniature Circuit Breaker Features:

- UL-489 listed for Branch Circuit protection and CSA 22.2 No. 5.1 Approved
- Thermal magnetic protection
- Trip characteristic based on 40°C ambient for UL/CSA
- All ratings are HACR rated (SWD rated up to 20 A)
- Finger safe design (front)
- DIN rail mounting

① See page M26 for IEC 60947-2 miniature circuit breaker ratings.
 ② 1-Pole 277V AC 0.5...35A; 240V AC 40...63A, 48V DC 0.5...63A
 ③ 2-Pole (series) 96V DC 0.5...63A
 ④ Rated 480Y/277VAC.

Accessories ①②

Module	Description	For use with...	UL/CSA Max. Current/Voltage	IEC Ratings Current/Voltage	Connection Diagrams	Catalog Number
	Signal Contact <ul style="list-style-type: none"> Mounts on right side of L9 (series B only) Contacts change state only during an electrical (or tripped) operation. 	All L9 Series B & Shunt Trips	1A @ 480V AC 2A @ 277V AC 1.5A @ 125V DC 2A @ 60V DC 4A @ 24V DC	2A @ 230V (AC-14) 1A @ 400V (AC-14) 1.5A @ 110V (DC-12) 1A @ 220V (DC-12) 4A @ 24V (DC-13) 2A @ 60V (DC-13)		L9-AMRS3
	Auxiliary Contact <ul style="list-style-type: none"> Mounts on right side of L9 (series B only) Contacts change state when L9 breaker is operated either manually or electrically. 	All L9 Series B & Shunt Trips	1A @ 480V AC 2A @ 277V AC 1.5A @ 125V DC 2A @ 60V DC 4A @ 24V DC	2A @ 230V (AC-14) 1A @ 400V (AC-14) 1.5A @ 110V (DC-12) 1A @ 220V (DC-12) 4A @ 24V (DC-13) 2A @ 60V (DC-13)		L9-AMRA3
	Shunt Trip – <ul style="list-style-type: none"> Remotely trips the device Installs on right side of L9 (Series B only) 	All L9 Series B	110...415V AC 110...250V DC 12...60V AC/DC	~ ~		L9-AMST1 L9-AMST2
 1-pole multi-pole	Lock Out Toggle Mount – <ul style="list-style-type: none"> Fits securely over switch toggle. Prevents unauthorized activation of L8 or L9 (series B) during maintenance 				L8 or L9 1-pole L8 or L9 Multi-pole (Series B only)	L8-ALOA1 L8-ALOA2

① A maximum of one shunt trip, two signal contacts, or two auxiliary contacts may be installed per L9 Circuit Breaker.

② A maximum of three accessories may be installed per L9 Circuit Breaker. The shunt trip must be mounted closest to the L9, then the signal contact, then the auxiliary contact(s). For allowed combinations, and installation instructions please contact your local Sprecher + Schuh representative.

L9 Bus Bars ①③④⑤

Description	No. of Poles	No. of Phases	Length ⌀	UL Max. Amps @ 40°C	No. of Circuit Breakers	Catalog Number	Pkg Qty
	6	1	106 mm	80	6	L9-AMCL106	10
	12		212 mm		12	L9-AMCL112	
	18		318 mm		18	L9-AMCL118	
	6	2	106 mm		3	L9-AMCL206	
	12		212 mm		6	L9-AMCL212	
	18		318 mm		9	L9-AMCL218	
	6	3	106 mm		2	L9-AMCL306	
	12		212 mm		4	L9-AMCL312	
	18		318 mm		6	L9-AMCL318	

L9 Bus Bar Accessories ①⑤

Accessory	Description	Wire Range	Catalog Number	Pkg Qty
	Terminal Lug • 1-pole for circuit breaker termination	#14 ... #2 AWG 2.5 ... 35mm ²	L9-AMCLT35	10
	Dedicated Power Feed	#14 ... #1 AWG 2.5 ... 50mm ²	L9-AMCLT50D	10
	Protective Cover • For covering unused terminations • 3 pole set (May be separated)	~	L9-AMCLPS	10

Other Accessories

Accessory	Description	Catalog Number
	DIN-rail - 2 meter lengths (6' 6") Top Hat, low profile (price per rail) Top Hat, high profile (price per rail)	3F 3AF

① cULus, UL508 E56639, EN60947-2, CE Marked.

② Total length from Circuit Breaker to Circuit Breaker when mounted on bus bars (not measurement of bus bar length).

③ Bus bar can not be cut.

④ Use of multiple bus bars permitted with overlap joint. Maximum of two joints permitted.

⑤ Sold in complete package only. Order minimum quantity of 10 to receive one package of 10.

Technical Information

Electrical Ratings

Number of Poles	1, 2, or 3	
Tripping Characteristics	C, D	
Rated Current I_n	0.5...63A	
Rated Frequency f	50/60 Hz	
Rated Insulation voltage U_i acc. to IEC/EN 60664-1	Phase-to-ground	250V AC
	Phase-to-phase	440V AC
Overvoltage Category	III	
Pollution Degree	3	

Data acc. to UL/CSA ④

Rated voltage	AC	1-pole	C Curve	0.5...40 A	277V AC
			D Curve	50...63 A	240V AC
		2-pole	C Curve	0.5...35 A	277V AC
	D Curve		40...63 A	240V AC	
	3-pole		C Curve	0.5...40 A	480Y/277V AC
		D Curve	50...63 A	240V AC	
DC	1-pole	48V DC			
	2-pole	96V DC (2-pole in series)			
Rated interrupting capacity per UL 489				10 kA	
Reference temperature for tripping characteristics				40 °C	
Electrical endurance				6,000 operations	
1 cycle (1s - ON, 9s -OFF)				(AC and DC)	

Data acc. to IEC/EN 60947-2

Rated operational voltage U_e	1-pole		230V AC
	2-, 3-pole		400V AC
Highest supply or utilization voltage U_{max}	AC	1-pole	253/440V AC
		2-, 3-pole	440V AC
	DC ①	1-pole	48V DC
		2-, 3-pole	96V DC
Min. operating voltage	12V AC, 12V DC		
Rated ultimate short-circuit breaking capacity I_{cu}	15 kA		
Rated service short-circuit breaking capacity I_{cs}	≤40 A: 11.25 kA		
	>40 A: 7.5 kA		
Rated impulse withstand voltage U_{imp}	(1.2/50 μ s) 4 kV (test voltage 6.2kV at sea level, 5kV at 2,000m)		
Dielectric test voltage	2 kV (50/60Hz, 1 min.)		
Reference temperature for tripping characteristics	30 °C		
Electrical endurance			
1 cycle (2s - ON, 13s - OFF, $I_n \leq 32A$)	$I_n < 30A$:	20,000 operations (AC)	
1 cycle (2s - ON, 28s - OFF, $I_n > 32A$)	$I_n \geq 30A$:	10,000 ops. (AC); 1,000 ops. (DC)	

Mechanical Data

Housing	Insulation group II, RAL 7035	
Indicator window	red ON/green OFF	
Protection degree per EN 60529	IP20, IP40 in enclosure with cover	
Mechanical endurance	20,000 operations	
Shock resistance per IEC/EN 60068-2-27	25 g - 2 shocks - 13 ms	
Vibration resistance per IEC/EN 60068-2-6	5g - 20 cycles at 5...150...5 Hz with load 0.8 In	
Environmental conditions (damp heat) per IEC/EN 60068-2-30	°C/RH	28 cycles with 55°C/90-96% and 25°C/95-100%
Ambient temperature ③	-25...+55°C	
Storage temperature	-40...+70°C	

Installation

Housing	Terminal Dual terminal	
Cross-section of wire solid, stranded (front/back terminal slot) ②	35/35 mm ² 18...4/18...10 AWG	
Flexible (front/back terminal slot)	25/10 mm ²	
Multi-wire rating per UL/CSA	1 wire; 18...4 AWG 2-4 wires ⑤; 18...10 AWG	
Cross-section of bus bars (back terminal slot)	IEC	10 mm ² 2.8 N•m
	UL/CSA	AWG 18...16: 13.3 in•lb AWG 14...10: 17.7 in•lb AWG 8...4: 39.8 in•lb
Tightening torque		
Screwdriver	No. 2 Pozidrive	
Mounting	DIN Rail (EN 60715, 35 mm) with fast clip	
Mounting position	Any	
Supply	Optional	

Approximate Dimensions/Weight

Pole dimensions	H x D x W	111 x 69 x 17.5 mm (4.37" x 2.72" x 0.69")
Pole weight	125 g (4.4 oz)	

Combination with Auxiliary Elements

Auxiliary contact	Yes
Signal contact	Yes
Shunt trip	Yes

- ① Self-declared IEC DC ratings.
- ② 35mm self-declared. Not included in IEC/EN approval.
- ③ Refer to Ambient Temperature tables.
- ④ UL file E197878.
- ⑤ Wires must be of like size and stranding. Up to two wires per terminal slot.

Applying L9 UL489 Miniature Circuit Breakers in accordance with UL & NEC Guidelines

The L9 circuit breakers are rated in RMS amperes at a 40 °C (104 °F) ambient temperature per UL 489/CSA C22.2 No. 5. This temperature is used as the ambient temperature external to an industrial enclosure. If a circuit breaker is applied in a temperature that exceeds the 40 °C (104 °F) ambient rating, then the circuit breaker should be derated using the table below. For IEC 60947-2 standard, the products carry an ambient rating of 30 °C. Follow standard IEC application considerations for temperature rating in different ambient temperatures.

Note: Application below 0° C is for non-condensing atmosphere. Care should be taken for applications below 0 °C. These devices are not certified to operate correctly in the presence of ice.

Temperature Derating, UL
Reference temperature = 40 °C

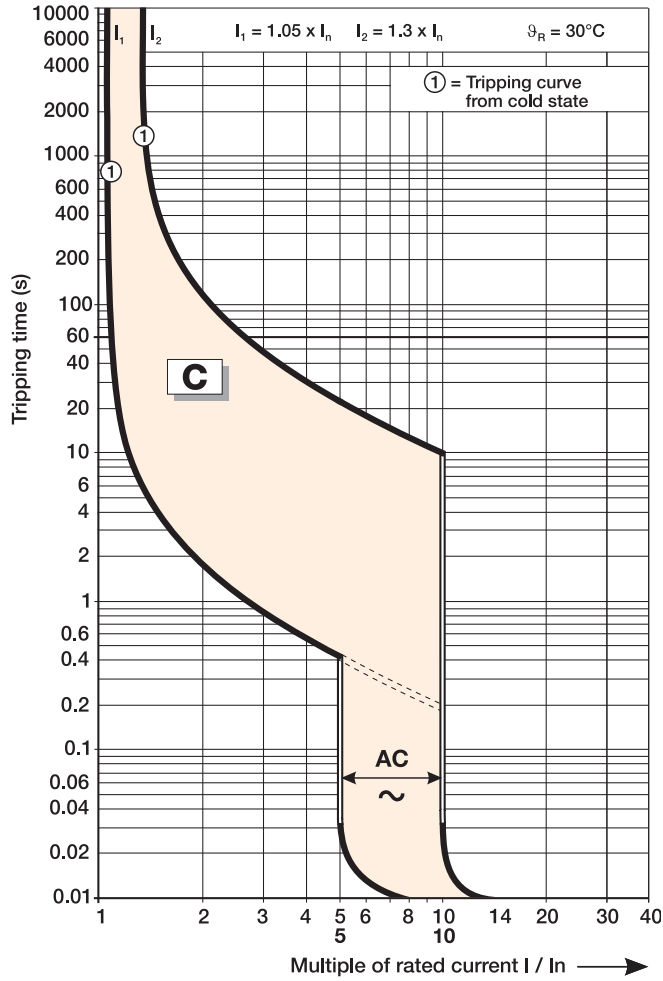
Current Rating [A]	Ambient temperature (°C)									
	-25	-20	-10	0	10	20	30	40	50	55
0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
1	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1	1.0	0.9
1.6	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.6	1.5	1.5
2	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2	1.9	1.9
3	3.7	3.7	3.6	3.4	3.3	3.2	3.1	3	2.9	2.8
4	5.0	4.9	4.7	4.6	4.4	4.3	4.1	4	3.9	3.8
5	6.2	6.1	5.9	5.7	5.6	5.4	5.2	5	4.8	4.7
6	7.4	7.3	7.1	6.9	6.7	6.4	6.2	6	5.8	5.7
7	8.7	8.6	8.3	8.0	7.8	7.5	7.3	7	6.7	6.6
8	9.9	9.8	9.5	9.2	8.9	8.6	8.3	8	7.7	7.6
10	12.4	12.2	11.9	11.5	11.1	10.7	10.4	10	9.6	9.4
13	16.1	15.9	15.4	14.9	14.4	14.0	13.5	13	12.5	12.3
15	18.6	18.3	17.8	17.2	16.7	16.1	15.6	15	14.4	14.2
16	19.8	19.6	19.0	18.4	17.8	17.2	16.6	16	15.4	15.1
20	24.8	24.4	23.7	23.0	22.2	21.5	20.7	20	19.3	18.9
25	31.0	30.6	29.6	28.7	27.8	26.9	25.9	25	24.1	23.6
30	37.2	36.7	35.6	34.4	33.3	32.2	31.1	30	28.9	28.3
32	39.7	39.1	37.9	36.7	35.6	34.4	33.2	32	30.8	30.2
35	43.4	42.8	41.5	40.2	38.9	37.6	36.3	35	33.7	33.1
40	49.6	48.9	47.4	45.9	44.4	43.0	41.5	40	38.5	37.8
50	62.0	61.1	59.3	57.4	55.6	53.7	51.9	50	48.2	47.2
60	74.4	73.3	71.1	68.9	66.7	64.4	62.2	60	57.8	56.7
63	78.2	77.0	74.7	72.3	70.0	67.7	65.3	63	60.7	59.5

Temperature Derating, IEC
Reference temperature = 30 °C

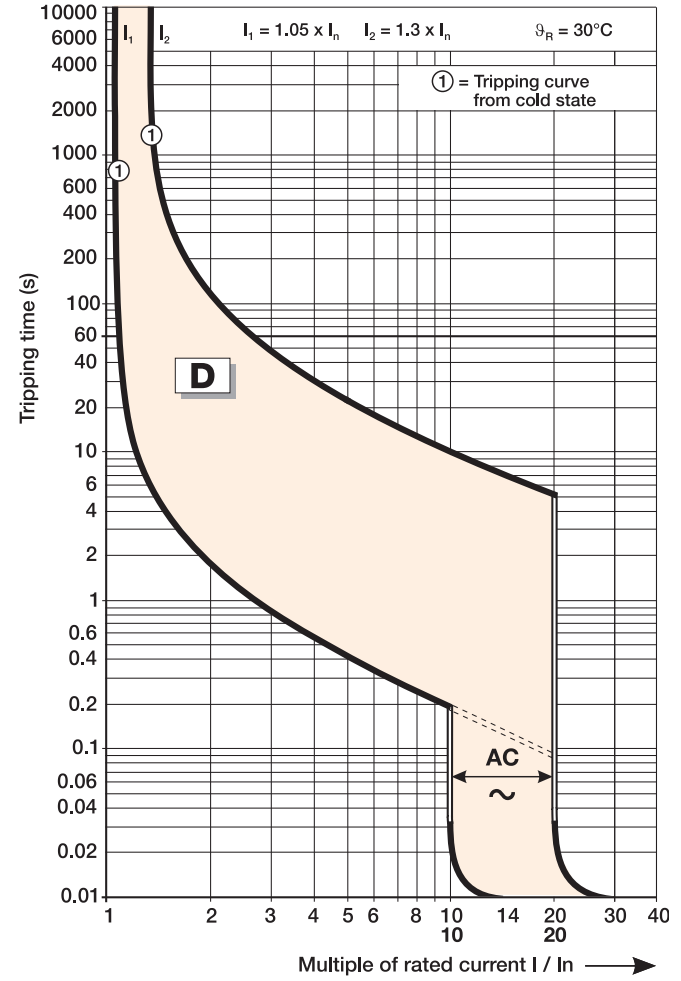
Current Rating [A]	Ambient temperature (°C)									
	-25	-20	-10	0	10	20	30	40	50	55
0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1	1.2	1.2	1.1	1.1	1.1	1.0	1	1.0	0.9	0.9
1.6	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5
2	2.3	2.3	2.2	2.2	2.1	2.1	2	1.9	1.9	1.9
3	3.5	3.5	3.4	3.3	3.2	3.1	3	2.9	2.8	2.8
4	4.7	4.6	4.5	4.4	4.2	4.1	4	3.9	3.8	3.7
5	5.8	5.8	5.6	5.5	5.3	5.2	5	4.9	4.7	4.6
6	7.0	6.9	6.7	6.5	6.4	6.2	6	5.8	5.6	5.6
7	8.2	8.1	7.8	7.6	7.4	7.2	7	6.8	6.6	6.5
8	9.3	9.2	9.0	8.7	8.5	8.2	8	7.8	7.5	7.4
10	11.7	11.5	11.2	10.9	10.6	10.3	10	9.7	9.4	9.3
13	15.1	15.0	14.6	14.2	13.8	13.4	13	12.6	12.2	12.0
15	17.5	17.3	16.8	16.4	15.9	15.5	15	14.6	14.1	13.9
16	18.6	18.4	17.9	17.4	17.0	16.5	16	15.5	15.0	14.8
20	23.3	23.0	22.4	21.8	21.2	20.6	20	19.4	18.8	18.5
25	29.1	28.8	28.0	27.3	26.5	25.8	25	24.3	23.5	23.1
30	35.0	34.5	33.6	32.7	31.8	30.9	30	29.1	28.2	27.8
32	37.3	36.8	35.8	34.9	33.9	33.0	32	31.0	30.1	29.6
35	40.8	40.3	39.2	38.2	37.1	36.1	35	34.0	32.9	32.4
40	46.6	46.0	44.8	43.6	42.4	41.2	40	38.8	37.6	37.0
50	58.3	57.5	56.0	54.5	53.0	51.5	50	48.5	47.0	46.3
60	69.9	69.0	67.2	65.4	63.6	61.8	60	58.2	56.4	55.5
63	73.4	72.5	70.6	68.7	66.8	64.9	63	61.1	59.2	58.3

Tripping Characteristics

C Curve



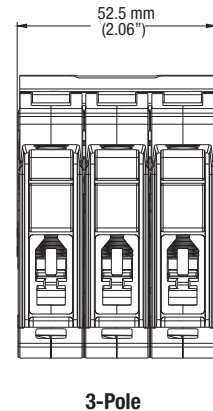
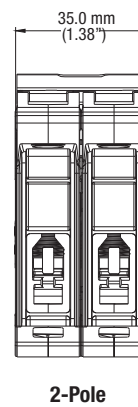
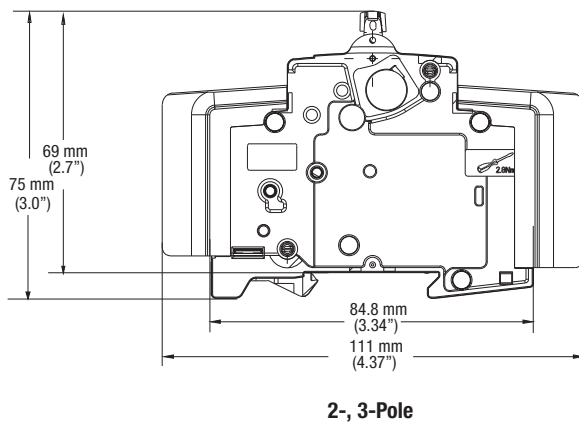
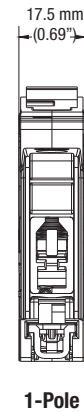
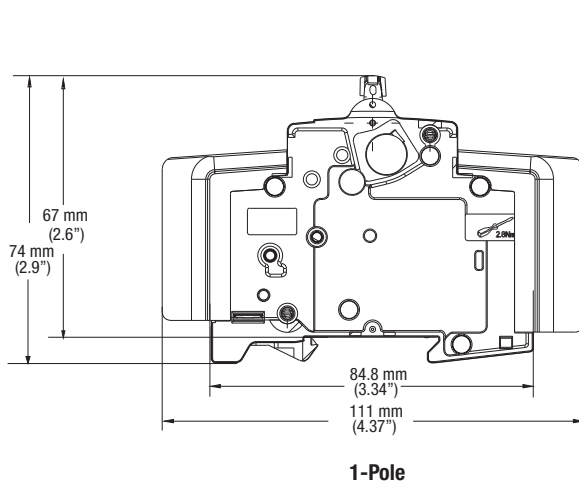
D Curve



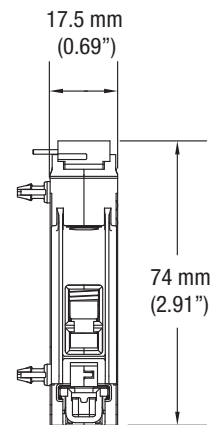
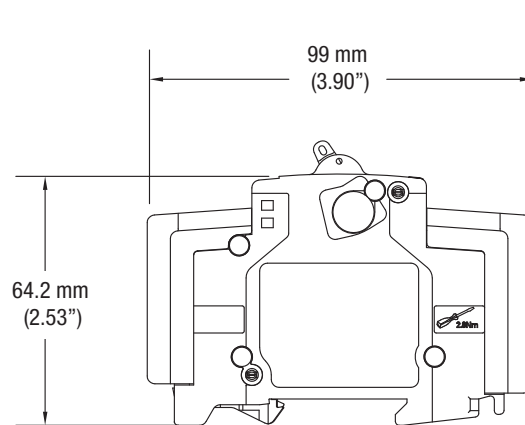
L9 Circuit Breakers

L9 Miniature Circuit Breakers (Series B...Curve C & D)

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.

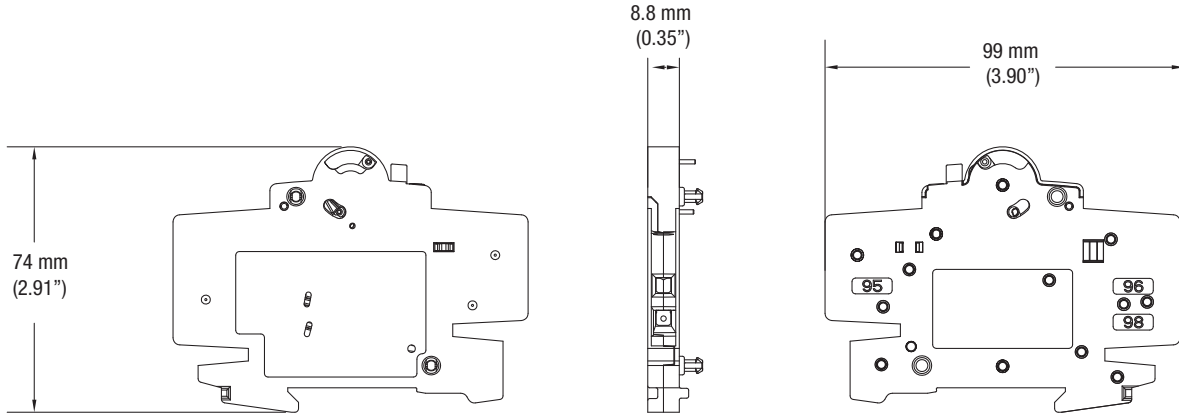


Shunt Trip (L9-AMST1, -AMST2)

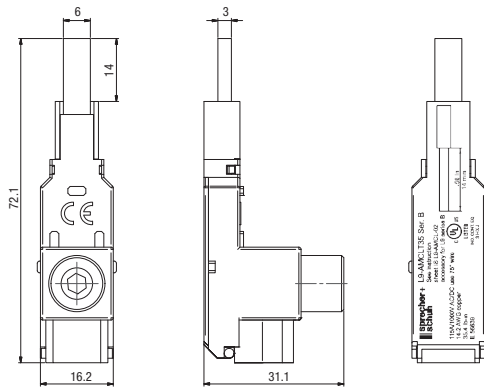


Signal Contact (L9-AMRS3) and Auxiliary Contact (L9-AMRA3)

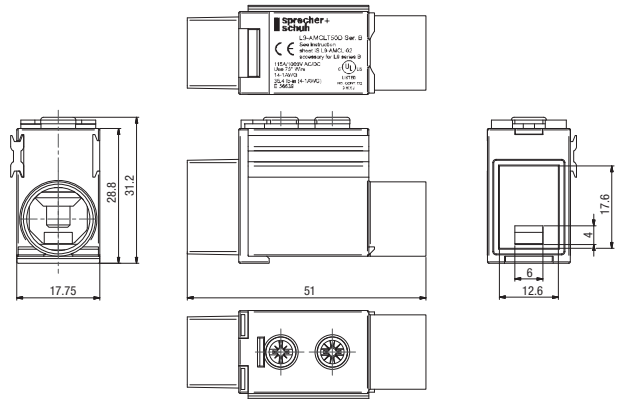
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



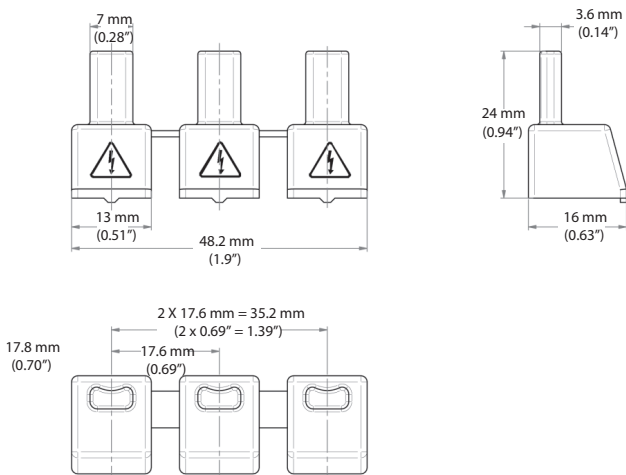
L9-AMCLT35 - Terminal Lug



L9-AMCLT50D - Power Feed



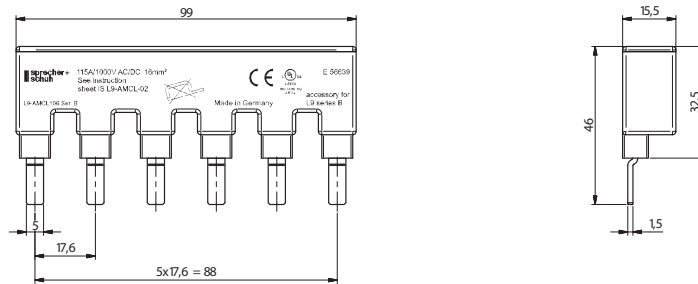
L9-AMCLPS - Protective Cover



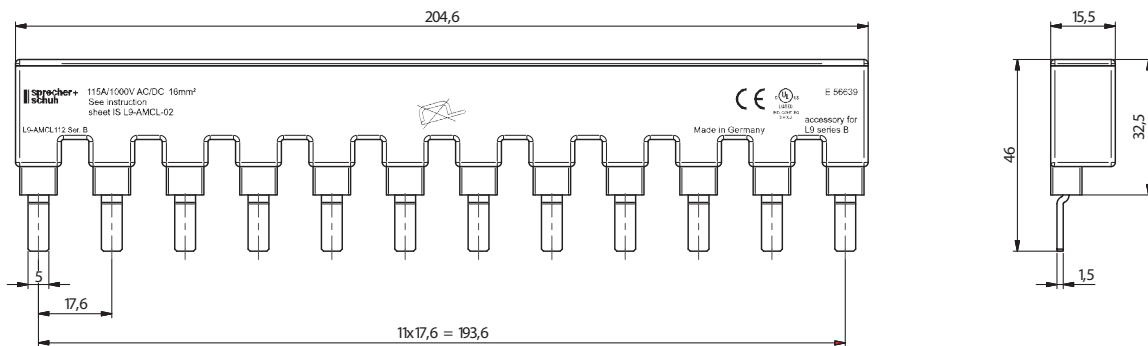
L9 Circuit Breakers

L9 -AMCL_06 - 6 Pole Bus Bars

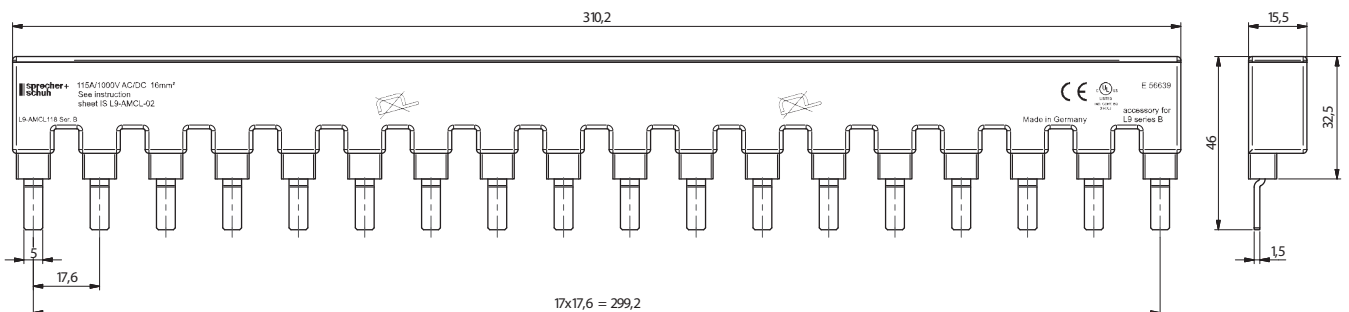
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



L9-AMCL_12 - 12 Pole Bus Bars

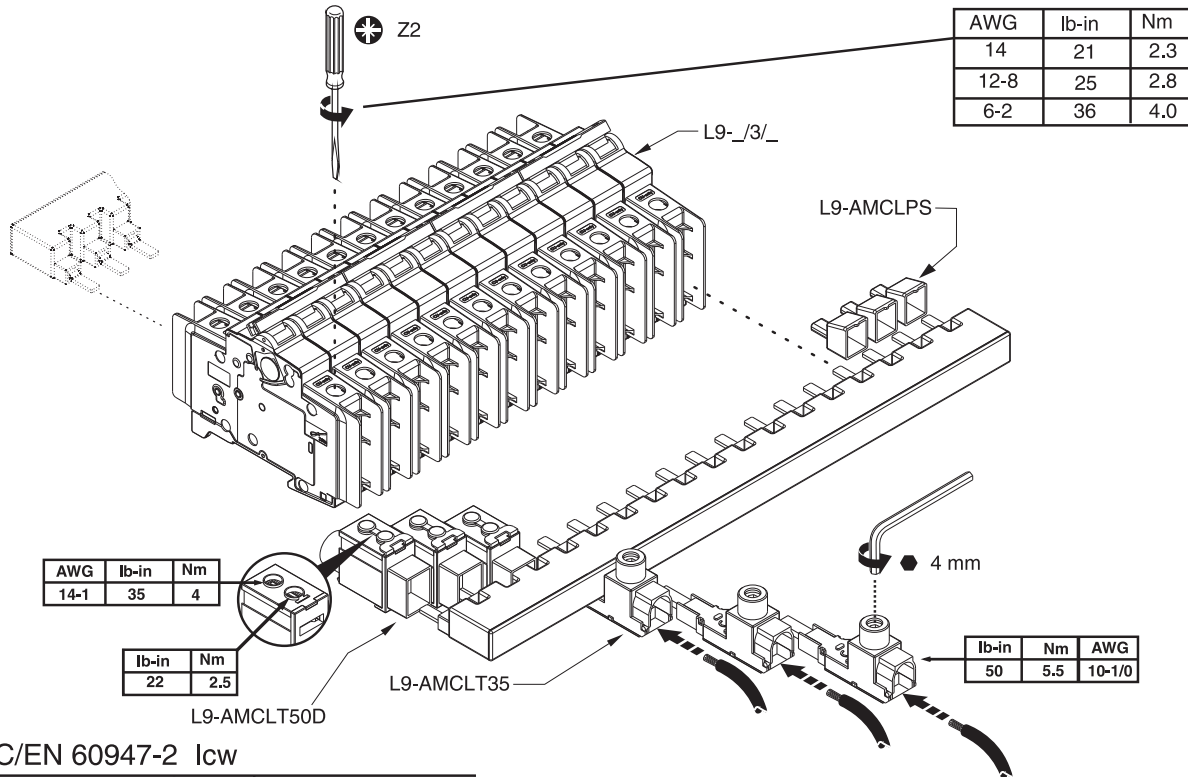


L9-AMCL_18 - 18 Pole Bus Bars



L9 Circuit Breakers

Applying L9 Bus Bars & Accessories



IEC/EN 60947-2 I_{cw}

U _e	U _e VAC	L9-AMCL I _{cw} Amps
t = 1 s	240/415	10000

UL SCCR

U _e	L9-_//_ In Amps	U _e VAC	L9-AMCL SCCR RMS Sym Amps
	0.5-25	480Y/277	10000
	30-40	240	10000

	L9-_/1/_	L9-_/2/_	L9-_/3/_
L9-AMCL106	6	-	-
L9-AMCL112	12	-	-
L9-AMCL118	18	-	-
L9-AMCL206	-	3	-
L9-AMCL212	-	6	-
L9-AMCL218	-	9	-
L9-AMCL306	-	-	2
L9-AMCL312	-	-	4
L9-AMCL318	-	-	6
L9-AMCLT35	1	2	3
L9-AMCLT50D	1	2	3

NOTE: Do not cut bus bars. Maximum of 3 bus bars allowed in any combination of the same phase configuration. Multiple bus bars must be installed back-to-back.

AMBUS® EasySwitch DIN-rail Mounted Fuse Holders

The design standard for fuse block overcurrent protection



Wöhner's AMBUS® EasySwitch Fuse Blocks feature the latest enclosed design for the ultimate in safety and convenience. Built for control and power circuits, the AMBUS line is DIN-rail mountable, compact and reliable. Both AC and DC models are available, with and without blown fuse indication.

Sized for many applications

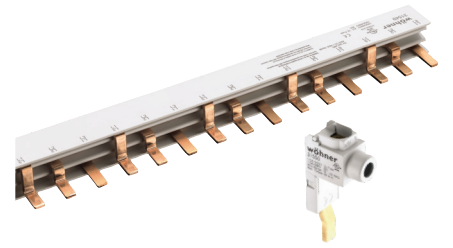
AMBUS Fuse Blocks are available in one, two and three pole configurations for the following fuse types:

- Class CC
- Midget; 1-1/2 x 13/32
- DC rated fuses up to 30A
- Class J 30A fuses
- Class J 60A fuses

All AC fuse blocks are rated to 600V, with 12-72V AC/DC models available for midget and Class CC fuses. All devices carry a withstand rating to 200kA. Midget fuse blocks are rated to 50kA.

Enclosed design offers many advantages

Unlike "open" fuse blocks that were extremely dangerous, the enclosed design of the AMBUS series features IP2 dead-front construction under IEC and DIN standards. In operation, there is no access to live fuses or fuse clips. With the flip of a finger, fuse access is gained via



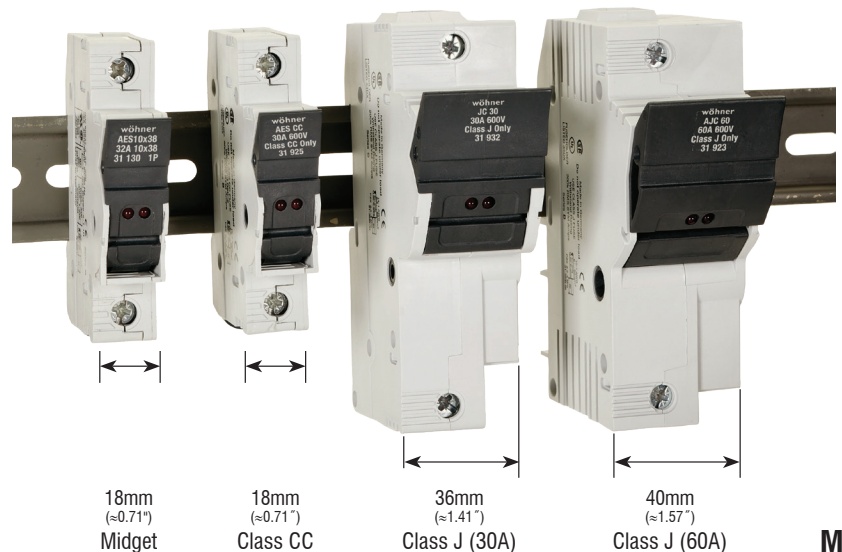
a levered compartment on the front of the holder that isolates the fuse from the line power. This makes fuse changeout quick, easy, convenient... *and safe.*

Other great features

The AMBUS line is compact, saving up to 15% in panel space over conventional fuse blocks. The entire line is also DIN-rail mountable, resulting in extra savings in panel building time. All models are available with blown fuse indication, saving time on maintenance and troubleshooting. The bodies are made up of tough and durable polyamide, known for its exceptional insulating properties. Wire terminals accept multiple conductors, and UL 508 approved bus bars can be used to quickly distribute power to many AMBUS Fuse Holders simultaneously.

International approvals

Class CC and J fuse holders are UL listed for branch circuit protection in electrical distribution systems. They are excellent for small motor loads and group protection of small motors. Midget holders are UL listed for control circuit protection. The entire line is CSA Approved and carries the CE Mark for use in international markets.



AmBUS Fuse Holders

DIN-rail Mounted Fuse Holders – Midget Fuses (1-1/2 x 13/32) 1 2

Ordering and Technical Information	One Pole		Two Pole		Three Pole		
	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty	
Fuse Holder - Without Blown Fuse LED With Blown Fuse LED 12-72V AC/DC (with LED indicator)	31 110	12	31 112	6	31 113	4	
	31 130	12	31 132	6	31 133	4	
	31 930	12					
Accessories							
DIN-rail	Top Hat, low profile (priced per rail)	3F	12	3F	12	3F	12
	Top Hat, high profile (priced per rail)	3AF	12	3AF	12	3AF	12
End Anchors	DIN Rail — Normal Duty	V7-EA35	50	V7-EA35	50	V7-EA35	50
	DIN Rail — Heavy Duty	V7-EAH35	10	V7-EAH35	10	V7-EAH35	10
Fuse Block Specifications							
Approvals							
Voltage Rating	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	
Maximum Current	30 A	30 A	30 A	30 A	30 A	30 A	
Wire Range: 1 Wire per Terminal	#18...4 AWG (0.75...25 mm ²)		#18...4 AWG (0.75...25 mm ²)		#18...4 AWG (0.75...25 mm ²)		
Wire Range: 2 Wires per Terminal 3	#18...8 AWG (0.75...10 mm ²)		#18...8 AWG (0.75...10 mm ²)		#18...8 AWG (0.75...10 mm ²)		
Wire Strip Length	0.43" (11 mm)		0.43" (11 mm)		0.43" (11 mm)		
Recommended Tightening Torque	#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25mm ² : 2.5 N•m		#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25mm ² : 2.5 N•m		#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25mm ² : 2.5 N•m		
Working Voltage (indicating circuit) 31 930	110...600V AC/DC 12...72V AC/DC		110...600V AC/DC ~		110...600V AC/DC ~		
Leakage Current (indicating circuit)	2mA		2mA		2mA		
Withstand Rating	50kA		50kA		50kA		
Fuse Type	Midget fuses only 1		Midget fuses only 1		Midget fuses only 1		
Operating Temperature	-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)		
Contact Material	Silver, Ag		Silver, Ag		Silver, Ag		

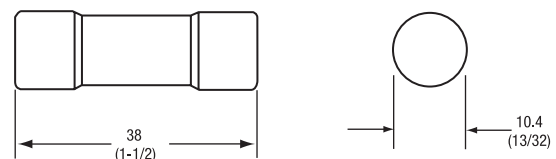
Common Midget Fuse Applications

- Transformer secondary protection
- Supplemental protection of:
 - Control circuits
 - Lighting
 - Solenoids

Approvals



Typical Midget Fuse Dimensions 1



1 Fuses not offered by Sprecher + Schuh.
 2 Wöhner UL File E230163, CSA 110285
 3 Both wires must be the same size.

DIN-rail Mounted Fuse Holders – Class CC Fuses ①②③

Ordering and Technical Information	One Pole		Two Pole		Three Pole	
	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty
Fuse Holder - Without Blown Fuse LED With Blown Fuse LED 12-72V AC/DC (with LED indicator)	31 295 31 298 31 929	12 12 12	31 296 31 299	6 6	31 297 31 300	4 4
Accessories						
DIN-rail Top Hat, low profile (priced per rail) Top Hat, high profile (priced per rail)	3F 3AF	12 12	3F 3AF	12 12	3F 3AF	12 12
End Anchors DIN Rail — Normal Duty DIN Rail — Heavy Duty	V7-EA35 V7-EAH35	50 10	V7-EA35 V7-EAH35	50 10	V7-EA35 V7-EAH35	50 10
Fuse Block Specifications						
Approvals						
Voltage Rating	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC
Maximum Current	30 A	30 A	30 A	30 A	30 A	30 A
Wire Range: 1 Wire per Terminal	#18...4 AWG (0.75...25 mm ²)		#18...4 AWG (0.75...25 mm ²)		#18...4 AWG (0.75...25 mm ²)	
Wire Range: 2 Wires per Terminal ④	#18...8 AWG (0.75...10 mm ²)		#18...8 AWG (0.75...10 mm ²)		#18...8 AWG (0.75...10 mm ²)	
Wire Strip Length	0.43" (11 mm)		0.43" (11 mm)		0.43" (11 mm)	
Recommended Tightening Torque	#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25mm ² : 2.5 N•m		#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25mm ² : 2.5 N•m		#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25mm ² : 2.5 N•m	
Working Voltage (indicating circuit) 31 929	110...600V AC/DC 12...72V AC/DC		110...600V AC/DC ~		110...600V AC/DC ~	
Leakage Current (indicating circuit)	2mA		2mA		2mA	
Withstand Rating	200kA		200kA		200kA	
Fuse Type	Class CC fuses only ①		Class CC fuses only ①		Class CC fuses only ①	
Operating Temperature	-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)	
Contact Material	Silver, Ag		Silver, Ag		Silver, Ag	

Common Class CC Applications

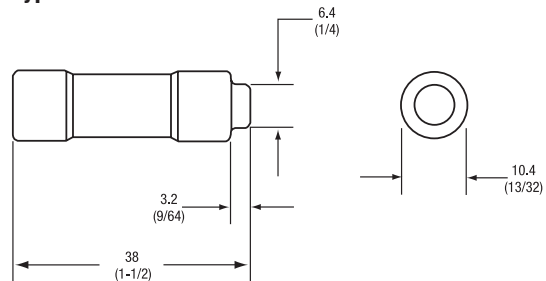
- Control transformer protection
- Motor circuits
- Branch circuit protection
- Lighting loads
- General purpose loads
- Heating loads

- ① Fuses not offered by Sprecher + Schuh.
② All major fuse brands and current ranges have been evaluated for this fuse holder. Due to the heat they generate, the following fuses must be derated:
Ferraz Shamut ATQR 1.25 I = 0.42 A max.
Ferraz Shamut ATQR 1.40 I = 0.47 A max.

Approvals



Typical Class CC Fuse Dimensions ①



- ① Wöhner UL File E230163, CSA 110285
④ Both wires must be the same size.

DIN-rail Mounted Fuse Holders – Class J Fuses, 30A ①②

Ordering and Technical Information	One Pole		Two Pole		Three Pole	
	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty
Fuse Holder -						
Without Blown Fuse LED	31 284	12	31 285	6	31 287	4
With Blown Fuse LED	31 932	12	31 933	6	31 934	4
Accessories						
DIN-rail						
Top Hat, low profile (priced per rail)	3F	12	3F	12	3F	12
Top Hat, high profile (priced per rail)	3AF	12	3AF	12	3AF	12
End Anchors						
DIN Rail — Normal Duty	V7-EA35	50	V7-EA35	50	V7-EA35	50
DIN Rail — Heavy Duty	V7-EAH35	10	V7-EAH35	10	V7-EAH35	10
Fuse Block Specifications						
Approvals						
Voltage Rating	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC
Maximum Current	30 A	30 A	30 A	30 A	30 A	30 A
Wire Range: 1 Wire per Terminal	#18...1 AWG (0.75...50 mm ²)		#18...1 AWG (0.75...50 mm ²)		#18...1 AWG (0.75...50 mm ²)	
Wire Range: 2 Wires per Terminal ③	#18...6 AWG (0.75...16 mm ²)		#18...6 AWG (0.75...16 mm ²)		#18...6 AWG (0.75...16 mm ²)	
Wire Strip Length	0.79" (20 mm)		0.79" (20 mm)		0.79" (20 mm)	
Recommended Tightening Torque	35 lb•in (4 N•m)		35 lb•in (4 N•m)		35 lb•in (4 N•m)	
Working Voltage (indicating circuit)	110...600V AC/DC		110...600V AC/DC		110...600V AC/DC	
Leakage Current (indicating circuit)	2.0 mA		2.0 mA		2.0 mA	
Withstand Rating	200kA		200kA		200kA	
Fuse Type	Class J fuses only ①		Class J fuses only ①		Class J fuses only ①	
Operating Temperature	-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)	
Contact Material	Silver, Ag		Silver, Ag		Silver, Ag	

M
Ambus Fuse Holders

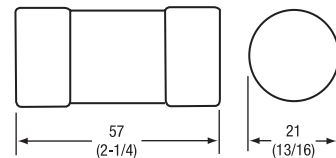
Common Class J Applications

- Motor circuits
- Feeders and mains
- Branch circuit protection
- Lighting, heating and general loads
- Power transformers
- Control transformers
- Control circuits

Approvals



Typical Class J (1-30A) Fuse Dimensions ①



① Fuses not offered by Sprecher + Schuh.
② Wöhner UL File E230163, CSA 110285
③ Both wires must be the same size.

DIN-rail Mounted Fuse Holders – Class J Fuses, 60A ①②

Ordering and Technical Information	One Pole		Two Pole		Three Pole	
	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty	Catalog Number	Pkg Qty
Fuse Holder - Without Blown Fuse LED With Blown Fuse LED	31 920 31 923	12 12	31 921 31 924	6 6	31 922 31 925	4 4
Accessories						
DIN-rail Top Hat, low profile (priced per rail) Top Hat, high profile (priced per rail)	3F 3AF	12 12	3F 3AF	12 12	3F 3AF	12 12
End Anchors DIN Rail — Normal Duty DIN Rail — Heavy Duty	V7-EA35 V7-EAH35	50 10	V7-EA35 V7-EAH35	50 10	V7-EA35 V7-EAH35	50 10
Fuse Block Specifications						
Approvals						
Voltage Rating	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC	600V AC/DC
Maximum Current	60 A	60 A	60 A	60 A	60 A	60 A
Wire Range: 1 Wire per Terminal	#14...1 AWG (2.5...50 mm ²)		#14...1 AWG (2.5...50 mm ²)		#14...1 AWG (2.5...50 mm ²)	
Wire Range: 2 Wires per Terminal ③	#14...6 AWG (2.5...16 mm ²)		#14...6 AWG (2.5...16 mm ²)		#14...6 AWG (2.5...16 mm ²)	
Wire Strip Length	0.79" (20 mm)		0.79" (20 mm)		0.79" (20 mm)	
Recommended Tightening Torque	35 lb•in (4 N•m)		35 lb•in (4 N•m)		35 lb•in (4 N•m)	
Working Voltage (indicating circuit)	110...600V AC/DC		110...600V AC/DC		110...600V AC/DC	
Leakage Current (indicating circuit)	2.0 mA		2.0 mA		2.0 mA	
Withstand Rating	200kA		200kA		200kA	
Fuse Type	Class J fuses only ①		Class J fuses only ①		Class J fuses only ①	
Operating Temperature	-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)		-4°...+130°F (-20°...+55°C)	
Contact Material	Silver, Ag		Silver, Ag		Silver, Ag	

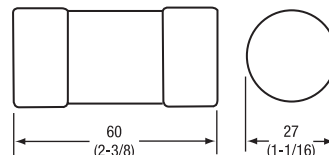
Common Class J Applications

- Motor circuits
- Feeders and mains
- Branch circuit protection
- Lighting, heating and general loads
- Power transformers
- Control transformers
- Control circuits

Approvals

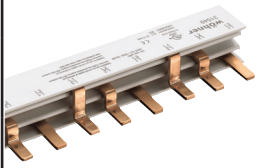
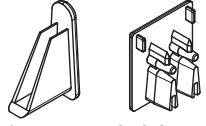
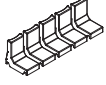

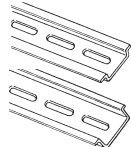


Typical Class J (31-60A) Fuse Dimensions ①



① Fuses not offered by Sprecher + Schuh.
② Wöhner UL File E230163, CSA 110285
③ Both wires must be the same size.

Accessories

Accessory	Description	Devices per Meter	Bus Protection Max. Fuse Types	Ampacity	For use with...	Catalog Number
	Bus Bar, Pin Style 1-Phase ② Qty 1 bar at 1 meter	57	200A	100A max	Class CC or Midget, 1-pole	31 548
	Bus Bar, Pin Style 2-Phase ② Qty 1 bar at 1 meter	29	200A	100A max	Class CC or Midget, 2-pole	31 561
	Bus Bar, Pin Style 3-Phase ② Qty 1 bar at 1 meter	19	200A	100A max	Class CC or Midget, 3-pole	31 549
 1-Phase 2- & 3-Phase	End Caps , sold only in pkgs of 10 ①				1-Phase Bus Bar 2-/3-Phase Bus Bar	31 042 31 552
	Protective Shroud , sold only in pkgs of 10 ①				All Wöhner bus bars	31 035
	Terminal Lug , sold only in pkgs of 10 ①				80A to 100A	31 550
	DIN-rail - 2 meter lengths (6' 6") Top Hat, low profile (price per rail) Top Hat, high profile (price per rail)					3F 3AF

① Sold in packages of 10. Minimum order quantity 10. Priced per piece. 10 pcs of 31566 is price x 10.
② Cuttable, copper bus bar provided in 1 m length. UL 508 Listed, E123577, Category NMTR, cULus. CE to IEC 664
10 kA SCCR for use with AMBUS® Type CC and Midget Fuse Holders. Contact factory for dimensions.

Cross Reference Series FH8 to AMBUS® EasySwitch

Description	FH8 Catalog Number	AMBUS Catalog Number
FUSE BLK MIDGET 1-Pole	FH8-1PM30	31 110
FUSE BLK MIDGET 1-Pole w/LED	FH8-1PM30-L	31 130
FUSE BLK MIDGET 1-Pole w/LED 12-72V AC/DC	FH8-1PM30-D1	31 930
FUSE BLK MIDGET 2-Pole	FH8-2PM30	31 112
FUSE BLK MIDGET 2-Pole w/LED	FH8-2PM30-L	31 132
FUSE BLK MIDGET 3-Pole	FH8-3PM30	31 113
FUSE BLK MIDGET 3-Pole w/LED	FH8-3PM30-L	31 133
FUSE BLK CLASS CC 1-Pole	FH8-1PC30	31 295
FUSE BLK CLASS CC 1-Pole w/LED	FH8-1PC30-L	31 298
FUSE BLK CLASS CC 1-Pole w/LED 12-72V AC/DC	FH8-1PC30-D1	31 929
FUSE BLK CLASS CC 2-Pole	FH8-2PC30	31 296
FUSE BLK CLASS CC 2-Pole w/LED	FH8-2PC30-L	31 299
FUSE BLK CLASS CC 3-Pole	FH8-3PC30	31 297
FUSE BLK CLASS CC 3-Pole w/LED	FH8-3PC30-L	31 300
FUSE BLK CLASS J 30A 1-Pole	FH8-1PJ30	31 284
FUSE BLK CLASS J 30A 1-Pole w/LED	FH8-1PJ30-L	31 932
FUSE BLK CLASS J 30A 2-Pole	FH8-2PJ30	31 285
FUSE BLK CLASS J 30A 2-Pole w/LED	FH8-2PJ30-L	31 933
FUSE BLK CLASS J 30A 3-Pole	FH8-3PJ30	31 287
FUSE BLK CLASS J 30A 3-Pole w/LED	FH8-3PJ30-L	31 934
FUSE BLK CLASS J 60A 1-Pole	FH8-1PJ60	31 920
FUSE BLK CLASS J 60A 1-Pole w/LED	FH8-1PJ60-L	31 923
FUSE BLK CLASS J 60A 2-Pole	FH8-2PJ60	31 921
FUSE BLK CLASS J 60A 2-Pole w/LED	FH8-2PJ60-L	31 924
FUSE BLK CLASS J 60A 3-Pole	FH8-3PJ60	31 922
FUSE BLK CLASS J 60A 3-Pole w/LED	FH8-3PJ60-L	31 925
BUSBAR 1PH 80A	FHL8-A1B8	31 548
BUSBAR 1PH 100A	FHL8-A1B1	31 548
BUSBAR 2PH 80A	FHL8-A2B8	31 561
BUSBAR 2PH 100A	FHL8-A2B1	31 561
BUSBAR 3PH 80A	FHL8-A3B8	31 549
BUSBAR 3PH 100A	FHL8-A3B1	31 549
BUSBAR END CAP 1PH	FHL8-A1E	31 042
BUSBAR END CAP 2/3PH	FHL8-AME	31 552
BUSBAR SHROUD	FHL8-AAP	31 035
TERMINAL LUG 2/3P	FHL8-AAT1	31 550

Control Transformers - Primary ①

Transformer	Max. Value	Fuse Block	Max. Value	Fuse Block	Max. Value	Fuse Block	Max. Value	Fuse Block
VA	208V		240V		480		575V	
50	1.125	30A	1.0	30A	0.5	30A	0.4	30A
100	2.25	30A	2.0	30A	1.0	30A	0.6	30A
150	3.5	30A	3.0	30A	1.5	30A	1.25	30A
200	4.5	30A	4.0	30A	2.0	30A	1.6	30A
250	6.0	30A	5.0	30A	2.5	30A	2.0	30A
300	7.0	30A	6.25	30A	3.0	30A	2.5	30A
500	6.0	30A	5.0	30A	5.0	30A	4.0	30A
1000	12.0	30A	10.0	30A	5.0	30A	8.0	30A
1500	17.5	30A	15.0	30A	7.5	30A	6.25	30A
2000	20.0	30A	20.0	30A	10.0	30A	8.0	30A
3000	35.0	60A	30.0	60A	15.0	30A	12.0	30A
5000	60.0	60A	50.0	60A	25.0	30A	20.0	30A
7500	~	~	~	~	35.0	60A	30.0	60A
10000	~	~	~	~	50.0	60A	40.0	60A

Control Transformers - Secondary

Transformer	Max. Value	Fuse Block	Max. Value	Fuse Block
VA	24V		120V	
50	3.2	30A	0.6	30A
100	6.25	30A	1.25	30A
150	10.0	30A	2.0	30A
200	12.0	30A	2.5	30A
250	15.0	30A	3.2	30A
300	20.0	30A	4.0	30A
500	30.0	30A	6.25	30A
1000	60.0	60A	12.0	30A
1500	~	~	17.5	30A
2000	~	~	25.0	30A
3000	~	~	35.0	60A
5000	~	~	60.0	60A
7500	~	~	~	~
10000	~	~	~	~

The Maximum Values listed in the tables are calculated from the following procedures, which can be found in the NEC . Always compute the Max. Value for your specific application prior to selecting a fuse block.

Calculating NEC Maximum Values

Selecting the proper fuse block current ratings for the primary and secondary protection of control transformers (per UL/NEC) is as follows:

Primary Overcurrent Protection for Control Transformers

Control Circuits: If the rated primary current is less than 2 amps, the maximum rating of the overcurrent device is 500%. If the rated primary current is more than 2 amps, the maximum rating of the overcurrent device is 250%.

Secondary Overcurrent Protection for Control Transformers

Control Circuits: If the rated secondary current is less than 9 amps, the maximum rating of the overcurrent device is 167%. If 9 amps or more, the maximum rating of the overcurrent device is 125%. The next larger size of an overcurrent device may be used if 125% does not correspond to a standard size.

Reference: UL 508 19.3, NEC 430-72(c) exception No. 2, 450-3(b) 1 & 2

Primary Fuse Block Selection Example:

1000VA Transformer
480V Primary
1000/480 = 2.08 Amps [May increase by 250% if above 2A]
2.08 x 250% = 5.21 Amps
Select 30A AMBUS® Class CC fuse block for 5A Class CC Fuse

Secondary Fuse Block Selection Example:

5000VA Transformer
120V Secondary
5000/120 = 41.7 Amps [May increase by 125% if above 9A]
41.7 x 125% = 52.1 Amps
Select 60A AMBUS® Class J fuse block for 50A Class J Fuse

① Class CC and Class J fuses may be used for Primary Protection, contact fuse manufacturer for specific use.

Three Phase Motor Loads ①②③

Horsepower	FLA	Fuse Block	FLA	Fuse Block	FLA	Fuse Block	FLA	Fuse Block
	208V		240V		480V		575V	
1/2	2.4	30A	2.2	30A	1.1	30A	0.9	30A
3/4	3.5	30A	3.2	30A	1.6	30A	1.3	30A
1	4.6	30A	4.2	30A	2.1	30A	1.7	30A
1-1/2	6.6	30A	6.0	30A	3.0	30A	2.4	30A
2	7.5	30A	6.8	30A	3.4	30A	2.7	30A
3	10.6	30A	9.6	30A	4.8	30A	3.9	30A
5	16.8	30A	15.2	30A	7.6	30A	6.1	30A
7-1/2	24.2	60A	22.0	60A	11.0	30A	9.0	30A
10	30.8	60A	28.0	60A	14.0	30A	11.0	30A
15	~	~	42.0	60A	21.0	30A	17.0	30A
20	~	~	~	~	27	60A	22.0	60A
25	~	~	~	~	34	60A	27.0	60A
30	~	~	~	~	40	60A	32.0	60A
40	~	~	~	~	~	~	41.0	60A

Single Phase Motor Loads ①②③

Horsepower	FLA	Fuse Block	FLA	Fuse Block
	115V		230V	
1/6	4.4	30A	2.2	30A
1/4	5.8	30A	2.9	30A
1/3	7.2	30A	3.6	30A
1/2	9.8	30A	4.9	30A
3/4	13.8	30A	6.9	30A
1	16	30A	8	30A
1-1/2	20	30A	10	30A
2	24	60A	12	30A
3	34	60A	17	30A
5	~	~	28	60A
7-1/2	~	~	40	60A
10	~	~	50	60A

- ① Fuse block size is based on Class J Type time-delay fuses for typical motor acceleration up to 5 seconds. Limited use of Class CC fuse blocks may be used for motor loads, contact fuse manufacturer for acceptance.
- ② FLA Data is in accordance with UL-508 Table 42.2 & NEC Tables 430-148 & 150.
- ③ Selection of fuse block should be based on selected fuse manufacturer data.

