



UL GENERAL INDUSTRIAL FUSES HIGH-SPEED FUSES MEDIUM VOLTAGE FUSES
BLOCKS & HOLDERS PRE-ENGINEERED PANELS & SWITCHES SOLAR PRODUCTS
AUTOMOTIVE & ELECTRONIC FUSES SURGE SUPPRESSION PRODUCTS

# **NEW POWR-SPEED**™High-Speed Fuses



# **NEW 1500V Solar Fuses & Holders**



SPNH Series Solar Fuse



LFNH Series Fuse Terminal Covers



LFPXV Series Touch-Safe Fuse Holders

...plus 30% more fuse blocks!

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# **FUSE CLASS AND SELECTION CHART**

		 		AC RATING	30		DC RATINGS		DECOMMENDED	FUSE SERIES
UL CLASS	LITTELFUSE SERIES	OVERLOAD CHARACTERISTICS	VOLTAGE	CURRENT	INTERRUPTING	VOLTAGE	CURRENT	INTERRUPTING	RECOMMENDED FUSE BLOCKS AND	PAGE
	KLPC	Time-Delay	(VOLTS) 600	(AMPERES) 200 - 6000	(AMPERES) 200K / 300K*	(VOLTS) 480	(AMPERES) 200 - 6000	(AMPERES) 20,000	FUSE HOLDERS	NUMBERS 8
L	KLLU	Time-Delay	600	601 - 4000	200.000	300	601 - 4000	20,000	_	9
-	LDC	Fast-Acting	600	150 - 2000	200,000	600	150 - 2000	50,000		10
	LLNRK	Time-Delay	250	0.1 - 600		125	0.1 - 600		LFR25	13
,	LLSRK_ID	Time-Delay	600	0.1 - 600	200K / 300K*	300	0.1 - 600		LFR60	13
RK1	LLSRK KLNR	Time-Delay Fast-Acting	600 250	0.1 - 600 1 - 600		300 125	0.1 - 600 1 - 600	20,000	LFR60 LFR25	13
					200,000	250	1 - 30			
	KLSR	Fast-Acting	600	1 - 600	200,000	300	35 - 600		LFR60	15
	FLNR_ID		250	35 - 600		125	35 - 600		LFR25	17
D.//-	FLNR		250	0.1 - 600	0001/ / 0001/*	125	0.1 - 600		LITIZO	17
RK5	FLSR_ID FLSR	Time-Delay	600 600	0.1 - 600 0.1 - 600	200K / 300K*	300	0.1 - 600 0.1 - 600	20,000	LFR60	17 17
	IDSR	-	600	0.1 - 600		600	0.1 - 600		LFNOU	16
	JTD_ID	Time-Delay	600	0.8 - 600						21
	JTD	Time-Delay	600	0.8 - 600	200K / 300K*	300 500	0.8 - 100 110 - 600	20,000	15100 15001	21
J		,							LFJ60 • LFPSJ	
	JLS	Fast-Acting	600	1 - 600	200,000	_	_	_		22
	JLLN		300	1 - 1200		160	1 - 60		LFT30 •	24
T		Fast-Acting			200,000	125	70 - 1200	20,000	LSCR002 (700-800A) LFT60 •	
	JLLS		600	1 - 1200		300	1 - 1200		LSCR002 (700-800A)	24
						250	0.2 - 2		, , , , , , , , , , , , , , , , , , , ,	
	CCMR	Time-Delay	600	0.2 - 30	200K / 300K*	250 300	4.5 - 10 2.25 - 4		L60030C • LFPSC •	27
CC						500	12 - 30	20,000	LPSC • 571 • 572 •	
	KLDR	Time-Delay	600	0.1 - 30	200,000	300	0.1 - 30		LEC • LEY	28
	KLKR	Fast-Acting	600	0.1 - 30	200,000	300	0.1 - 30			28
CD	CCMR	Time-Delay	600	35 - 60	200K / 300K*	250	35 - 60	20,000	LFC60060	27
G	SLC	Time Lag	600 480	0.5 - 20 25 - 60	100,000	170	0.5 - 60	10,000	LFG600 (½ - 20A) LFG480 (25 - 60A)	26
	SPF		-	-	_	1000	1 - 30	20,000	LFPHV	62
		1						20K (70 - 200A)		
	SPFJ		600	125-450	200,000	1000	70 - 450	10K (250 - 400A) 20K (450A)	LFJ1000	63
Solar	SPFI	Solar	_	-	_	1000	2 - 30	20,000	Not Required	61
	SPNH		-	-	_	1500	50 - 400	15,000	LFNH	60
	SPXV	_	_	-	-	1500	6 - 30	30,000	LPXV	58
	SPXI		_	_	_	1500	2.5 - 30	30,000 20K (1 - 60A)	Not Required	59
	NLN		250	1 - 600		250	1 - 600	50K (70 - 600A)	LFH25	20
					50.000	600	1 - 7			
K5	NLS	Fast-Acting	600	1 - 600	50,000	500 400	8 - 30 35 - 60	20K (1 - 60A)	LFH60	20
	INLO		000	1 - 000		600	70 - 200	50K (70 - 600A)	LITIOO	20
						500	225 - 600			
	L15S		150	1 - 1000		150 100	1 - 60 70 - 1000			81
	1050	1	250	1 000		250	1 - 200	20,000	LSCR • 1LFS	01
	L25S		250	1 - 800		200	225 - 800			81
High-Speed	L50QS	Very Fast-Acting	500	35-800	200,000	500	35-800	50,000	LSCR	71
	L50S L60S	-	600	10 - 800 1 - 800		450 —	10 - 800	20,000	LSCR ● 1LFS	77 81
	L70QS	-		35-800		700	35-800	50,000	LSCR	74
	L70S		700	10 - 800		650	10 - 800	20,000	LSCR • 1LFS	79
	BLF	Fast-Acting	250 125	0.5 - 15	10,000	_	_	-		30
	BLN	Fast-Acting	250	20 - 30 1 - 30	10,000	_	_	_		30
			600	0.2 - 5						
	BLS	Fast-Acting	250	6 - 10	10,000	_	_	_	L60030M • LFPSM •	31
	FLA	Time-Delay	125	0.1 - 30	10,000	-	-	-	571 ◆ 572 ◆ LEB ◆ LEX	31
	FLM FLQ	Time-Delay Time-Delay	250 500	0.1 - 30 0.1 - 30	10,000 10,000	125 300	0.1 - 30 0.1 - 30	10,000 10,000	LLD • LEX	30
Midget	KLK	Fast-Acting	600	0.1 - 30	100K / 200K*	500	0.1 - 30	50,000		30
(Supplementary)	KLKD	Fast-Acting	600	0.1 - 30	100,000	600	0.1 - 30	50,000		30
	KLQ	Time-Delay	600	1 - 6	10,000	-	-	-		31
	FLU	Fast-Acting	1000	0.44/ 11	10,000 20,000	1000	0.44	10,000 20,000	LFPHV	31
D.	S00, T00	Time-Delay	125	0.25 - 30	10,000	_	11 –		5 0	0-
Plug	SLO, TLO	Medium Time-Delay	125	15 - 30	10,000	-	-	_	Box Cover Units	65
	L17T		-	-	_		70 - 1200		LTFD Series	50
Telecom	TLN	Fast-Acting	-	-	_	170	1 - 600	100,000	LFR25 LTFD101 ◆	51
	TLS		-	-	-		1 - 125		LIFD101 • LFT30060 (cartridge)	52
									,	

<sup>\*</sup> Littelfuse® self-certified



# Littelfuse POWR-GARD®-Advanced Protection and Facility Savings





### Increase safety with POWR-PRO® Fuses

- Superior current-limitation from <sup>1</sup>/<sub>10</sub> 6000 amperes
- Type 2 "No Damage" coordination with NEMA and IEC motor circuits
- Blown fuse indication (LLSRK\_ID and JTD\_ID Series)
- Compact motor protection (JTD/JTD\_ID, CCMR Series)
- 300,000 AIR to meet trends toward higher SCCR



# Look for the POWR-PRO® logo for superior protection

UL FUSE CLASS	POWR-PRO®	PAGE NUMBERS
Class L	KLPC & LDC	8, 10
Class RK1	LLNRK/LLSRK_ID	13
Class J	JTD/JTD_ID	21
Class CC / CD	CCMR ( <sup>2</sup> / <sub>10</sub> —60)	27



**Material Reduction Opportunity Program** 

# Increase safety and reduce inventory with MROplus

Your detailed reports will include:

- A streamlined current-limiting fuse inventory recommendation
- A guide to reducing electrical hazards within your facility
- An annual cost savings estimate
- A detailed cross reference

All you need to do is e-mail an Excel file of your fuse inventory to **techline@littelfuse.com** or to your local sales representative. We will do the rest!

# **Developing Next Generation** 1500 Vdc Products for High **And Low Current Ratings**

# 

This catalog incorporates our line of products designed specifically for the growing solar industry. As global standards are constantly changing, Littelfuse continues to develop circuit protection products that meet the requirements of the evolving photovoltaic market.



### 1500 Vdc Solar Products

SPXV Series Space-Saving	Solar Fuse58
SPXI Series In-Line Solar F	use59
SPNH Series 1500 Vdc Sol	ar Fuse60
LPXV Series 1500 Vdc Fuse	e Holder112
LFPXV Series 1500 Vdc Fu	se Holder113
New Products	littelfuse com/solar



### 600-1000 Vdc Solar Products

SPFI Series 1000 Vdc In-Line Solar Fuse
SPF Series 1000 Vdc 10x38mm Fuse
SPFJ Series 1000 Vdc Class J Size Fuse
LPHV 1000 Vdc Fuse Holder1
IDSR Series 600 Vdc Class RK5 Fuse
KLKD Series 600 Vdc 10x38mm Fuse



Look for this logo to indicate products that are used in solar applications. Visit our website littelfuse.com/solar for the latest updates on approvals, certifications, and new products.



# FINDING RELAYS IS EASIER THAN EVER!



# **Expanding our Line of Protection Relay Products**

SymCom and SSAC the names you know and trust for Motor Protection, Pump Protection, and Timers have officially become part of the Littelfuse family. Over 1000 MotorSaver, PumpSaver, and SSAC parts have been added to Littelfuse.com. These robust products are used to control and protect applications in the Industrial Pumping, Irrigation, Water and Waste Water, HVAC/R, Oil and Gas, Food and Beverage, and Elevator markets.

Find all of our new and updated product pages at littelfuse.com/protection-relays.

### New protection relay products include:



# **Enhanced Overload Relays**

Protect motors and pumps from over/ under current, over/ under voltage, phase issues and ground faults. Communication modules also available.



# Voltage/Phase Monitors

A cost-effective means to protect motors and pumps from voltage and phase issues.



# Alternating Relays

Start and stop up to four pumps or use as a multi-channel switch. Intrinsically safe options available.



### Pump Controllers

Balance runtime between loads and can be used in hazardous locations.



### **Load Sensors**

Detect if the load is running or if there is an overload or underload condition.



# Timers & Flashers

Delay starting and stopping loads, cycling, and sequencing of motors, pumps, compressors, heaters, and lighting.

To view the full line of protection relay products please visit www.littelfuse.com/protection-relays



### **LCP Series Coordination Panel**

Ideal for circuits that require selective coordination such as emergency lighting circuits or essential electrical systems.

### Features/Benefits

- Meets NEC® requirements
- Class CC & J fuse holders have open-circuit indication
- Fast-acting fuses protect against short circuits
- Feed through/sub feed lugs and 84-circuit configuration available
- Ground and neutral bars
- Copper bus standard

### littelfuse.com/LCP

See page 155

### LPS Series POWR-Switch

Individual fusible shunt trip disconnect switch easily coordinates with system's overcurrent protection. Typical applications include elevator circuits.

### Features/Benefits

- Pre-engineered single unit makes procurement easy
- Reduces labor costs up to 66%
- Flexibility for a variety of applications
- Control power terminal block
- UL Listed package
- Cu and Al wire rated
- Lockable operating handle meets all code and safety requirements

### littelfuse.com/LPS

See page 157

### **Section Overview**

For 90 years Littelfuse® has been providing fuses to the industrial market. You can continue to count on our manufacturing and supply chain processes to deliver high quality fuses when you need them. At Littelfuse we leverage our global reach to stay on top of the latest applications and standards. Whether your circuit protection needs are focused on OEM, MRO, or construction, we are committed to being your circuit protection partner and appreciate your business.







# 

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### CLASS L - KLPC SERIES POWR-PRO® FUSES







### **Description**

KLPC series POWR-PRO® fuses meet or exceed the most stringent project specifications, including silver links, silver-plated copper end bells, glass-reinforced melamine bodies, O-ring seals between body and end bells, and granular quartz fillers.

### **Applications**

- Switchboard mains and feeders
- Motor control center mains
- Large motor branch circuits
- Protection of power circuit breakers

### Features/Benefits

- POWR-PRO® Performance
- Best-in-class time-delay withstand
- Current-Limiting
- Easily coordinated with other system components
- 300 kA AC Interrupting Rating (self-certified)

### **Specifications**

Voltage Ratings AC: 600 Vac or less

DC: 480 V

 $\textbf{Ampere Range} \qquad \qquad 200-6000 \ \mathsf{A}$ 

Interrupting Ratings AC: 200 kA rms symmetrical

300 kA rms symmetrical

(Littelfuse self-certified)

DC: 20,000 A

**Approvals** AC: Standard 248-10, Class L

UL Listed 601–6000 A (File: E81895) UL Recognized 200–600 A (File: E71611) CSA Certified 601–6000 A (File: LR29862)

Federal Specifications 700–6000 A

(QPL-W-F-1814) DC: Littelfuse self-certified

Melamine body, Copper caps (silver plated)

Country of Origin Mexico

### **Ordering Information**

AMPERE RATINGS						
200	500	800	1350	2000	3000	
250	600	900	1400	2100	3500	
300	601	1000	1500	2200	4000	
350	650	1100	1600	2300	4500	
400	700	1200	1800	2400	5000	
450	750	1300	1900	2500	6000	

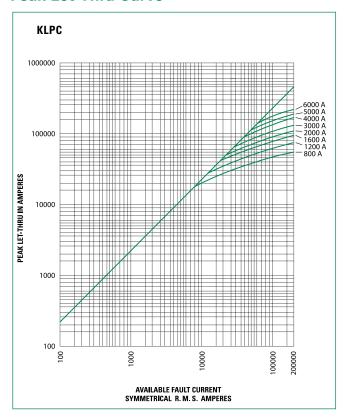
SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
KLPC	800	KLPC800	KLPC800.X

### **Web Resources**

Download TC Curves, CAD drawings and other technical information: **littelfuse.com/klpc** 

### **Dimensions**

### **Peak Let-Thru Curve**



Note: For more information, see Peak Let-Thru Table on pg. 11

Material



### **CLASS L - KLLU SERIES FUSES**

600 Vac • Time-Delay • 601-4000 A





### **Description**

KLLU series fuses meet or exceed UL requirements for UL Class L fuses. The KLLU series offers an economical alternative to KLPC POWR-PRO® fuse with a slightly higher peak let through current.

### **Applications**

- · Service switches
- Switchboard mains and feeders
- Motor control center mains
- · Large motor branch circuits
- · Circuit breaker protection

### Features/Benefits

- Current-Limiting
- Easily coordinated with other system components
- 200 kA AC Interrupting Rating

### **Specifications**

**Approvals** 

**Voltage Ratings** AC: 600 Vac or less DC: 300 V

Ampere Range 601–4000 A

Interrupting Ratings AC: 200 kA rms symmetrical DC: 20 kA rms symmetrical

Standard 248-10, Class L UL Listed (File: E81895)

CSA Certified (File: LR29862) DC: Littelfuse self-certified

Material Melamine body, Copper caps (silver plated)

Country of Origin Mexico

### **Ordering Information**

AMPERE RATINGS							
601	750	1000	1400	1800	3000		
650	800	1200	1500	2000	3500		
700	900	1350	1600	2500	4000		

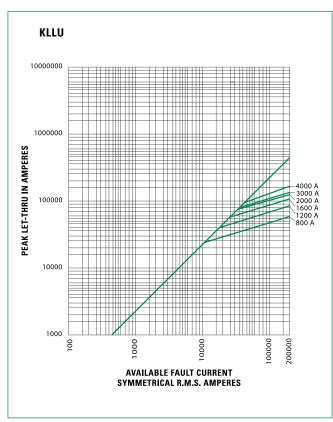
SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER	
KLLU	601	KLLU601	KLLU601.X	

### **Web Resources**

Download TC Curves, CAD drawings and other technical information: **littelfuse.com/kllu** 

### **Dimensions**

### **Peak Let-Thru Curve**



Note: For more information, see Peak Let-Thru Table on pg. 11



### CLASS L - LDC SERIES POWR-PRO® FUSES









### **Description**

High DC voltage and interrupting ratings make the POWR-PRO® LDC ideal for DC applications. The DC interrupting performance exceeds UL listing requirements.

### **Applications**

- Solar inverter and array protection
- UPS protection especially for large battery circuits
- · DC distribution and variable speed drives
- Mass transit systems

### Features/Benefits

- POWR-PRO® Performance
- Extremely Current-Limiting
- 600 Vac/dc rated
- 200 kA AC Interrupting Rating
- 50 kA DC Interrupting Rating

### **Specifications**

**Voltage Ratings** 600 Vac/dc or less **Ampere Range** 150–2000 A

Interrupting Ratings AC: 200 kA rms symmetrical

DC: 50 kA

**Time Constant** 16 ms

**Approvals** Standard 248-10, Class L

UL Listed 601–2000 A (File: E81895) UL Recognized 150–600 A (File: E71611) CSA Certified 800-2000 A (File: LR29862)

Material Melamine body, Copper caps (silver plated)

Country of Origin Mexico

### **Ordering Information**

AMPERE RATINGS							
150	450	750	1201	1601			
200	500	800	1300	1800			
250	600	900	1350	1900			
300	601	1000	1400	2000			
350	650	1100	1500				
400	700	1200	1600				

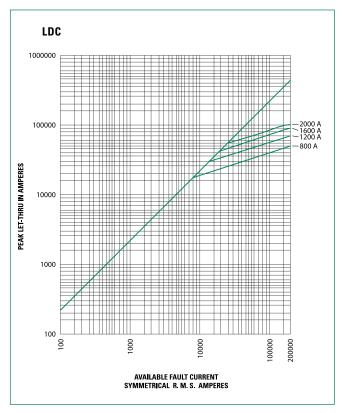
SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
LDC	700	LDC700	0LDC700.X

### **Web Resources**

Download TC curves, CAD drawings and other technical documents: **littelfuse.com/ldc** 

### **Dimensions**

### **Peak Let-Thru Curve**



Note: For more information, see Peak Let-Thru Table on pg. 11



# **CLASS L CURRENT-LIMITING EFFECTS**

### **Current-Limiting Effects of KLPC (600 V) Fuses**

SHORT CIRCUIT	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS									
CURRENT*	800 A	1200 A	1600 A	2000 A	3000 A	4000 A	5000 A	6000 A		
5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000		
10,000	8,800	10,000	10,000	10,000	10,000	10,000	10,000	10,000		
15,000	10,500	13,500	15,000	15,000	15,000	15,000	15,000	15,000		
20,000	12,000	15,000	19,000	20,000	20,000	20,000	20,000	20,000		
25,000	13,000	16,000	21,000	24,000	25,000	25,000	25,000	25,000		
30,000	14,000	18,000	23,000	26,000	30,000	30,000	30,000	30,000		
35,000	15,000	19,000	24,000	27,000	32,000	35,000	35,000	35,000		
40,000	16,000	20,000	25,000	28,000	34,000	40,000	40,000	40,000		
50,000	17,000	22,000	27,000	31,000	37,000	42,500	50,000	50,000		
60,000	18,000	24,000	29,000	34,000	40,000	46,000	52,000	60,000		
80,000	20,000	26,000	32,000	37,000	44,000	51,000	57,000	70,000		
100,000	21,000	27,000	34,000	40,000	46,000	57,000	65,000	75,000		
150,000	23,000	31,000	38,000	44,000	54,000	67,000	75,000	87,000		
200,000	24,000	34,000	42,000	46,000	57,000	70,000	80,000	95,000		

### **Current-Limiting Effects of KLLU (600 V) Fuses**

SHORT-CIRCUIT	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS								
CURRENT*	800 A	1200 A	1600 A	2000 A	3000 A	4000 A			
5,000	5,000	5,000	5,000	5,000	5,000	5,000			
10,000	10,000	10,000	10,000	10,000	10,000	10,000			
15,000	11,900	15,000	15,000	15,000	15,000	15,000			
20,000	13,000	18,500	20,000	20,000	20,000	20,000			
25,000	14,000	20,000	25,000	25,000	25,000	25,000			
30,000	14,500	21,000	26,500	30,000	30,000	30,000			
35,000	15,000	22,000	28,500	34,000	35,000	35,000			
40,000	16,000	23,000	30,000	35,000	37,000	40,000			
50,000	17,000	24,000	32,000	38,000	39,000	44,000			
60,000	18,000	26,000	34,000	42,000	43,000	50,000			
80,000	19,000	28,000	36,000	44,000	46,000	54,500			
100,000	21,000	30,000	38,000	46,000	48,000	57,500			
150,000	24,000	35,000	44,000	50,000	51,000	68,000			
200,000	26,000	38,000	48,000	53,000	60,000	74,000			

### **Current-Limiting Effects of LDC (600 V) Fuses**

SHORT CIRCUIT	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS						
CURRENT*	800 A	1200 A	1600 A	2000 A			
5,000	5,000	5,000	5,000	5,000			
10,000	8,500	10,000	10,000	10,000			
15,000	9,750	14,000	15,000	15,000			
20,000	10,500	15,000	19,000	20,000			
25,000	11,500	16,000	21,000	25,000			
30,000	12,000	17,000	22,000	26,000			
35,000	12,500	18,000	23,000	28,000			
40,000	13,500	19,000	24,000	30,000			
50,000	14,000	21,000	26,000	32,000			
60,000	15,000	22,000	28,000	34,000			
80,000	16,000	24,000	30,000	36,000			
100,000	18,000	25,000	33,000	40,000			
150,000	20,000	30,000	38,000	44,000			
200,000	23,000	32,000	41,000	46,000			

<sup>\*</sup>Prospective RMS Symmetrical Amperes Short-Circuit Current Note: Data derived from Peak Let-Thru Curves



# **CLASS L SERIES DIMENSIONS**

### **Dimensions**

AMPERES FIG. DIMENSIONS INCHES (mm							n)							
AMPERES	NO.	Α	В	С	D	E	F	G	Н	J	K	L	M	N
150-800	1	3 <sup>3</sup> / <sub>4</sub> (95.3)	5 <sup>3</sup> / <sub>4</sub> (146.1)	6 <sup>3</sup> / <sub>4</sub> (171.5)	_	_	85/8 (219.1)	-	_	2 (50.8)	2½ (63.5)	<sup>3</sup> / <sub>8</sub> (9.5)	5⁄8 x 11∕8 (15.9) x (28.6)	_
900-1200	2	3 <sup>3</sup> / <sub>4</sub> (95.3)	5 <sup>3</sup> / <sub>4</sub> (146.1)	6 <sup>3</sup> / <sub>4</sub> (171.5)	9½ (235.0)	9½ (241.3)	10 <sup>3</sup> / <sub>4</sub> (273.1)	_	_	2 (50.8)	2½ (63.5)	<sup>3</sup> / <sub>8</sub> (9.5)	<sup>5</sup> / <sub>8</sub> x <sup>3</sup> / <sub>4</sub> (15.9) x (19.1)	5⁄8 x 11∕8 (15.9) x (28.6)
1300-1600	2	3 <sup>3</sup> / <sub>4</sub> (95.3)	5 <sup>3</sup> / <sub>4</sub> (146.1)	6 <sup>3</sup> / <sub>4</sub> (171.5)	9½ (235.0)	9½ (241.3)	10 <sup>3</sup> / <sub>4</sub> (273.1)	_	_	2 <sup>3</sup> / <sub>8</sub> (60.3)	3 (76.2)	<sup>7</sup> / <sub>16</sub> (11.1)	<sup>5</sup> / <sub>8</sub> x <sup>3</sup> / <sub>4</sub> (15.9) x (19.1)	5% x 11/8 (15.9) x (28.6)
1800-2000	2	3 <sup>3</sup> / <sub>4</sub> (95.3)	5 <sup>3</sup> / <sub>4</sub> (146.1)	6 <sup>3</sup> / <sub>4</sub> (171.5)	9½ (235.0)	9½ (241.3)	10 <sup>3</sup> / <sub>4</sub> (273.1)	_	_	2 <sup>3</sup> / <sub>4</sub> (69.9)	3½ (88.9)	½ (12.7)	<sup>5</sup> / <sub>8</sub> x <sup>3</sup> / <sub>4</sub> (15.9) x (19.1)	⅓ x 1⅓ (15.9) x (28.6)
2100-2500	3	4 (101.6)	5 <sup>3</sup> / <sub>4</sub> (146.1)	6 <sup>3</sup> / <sub>4</sub> (171.5)	9½ (235.0)	9½ (241.3)	10 <sup>3</sup> / <sub>4</sub> (273.1)	15/8 (41.3)	1 <sup>3</sup> / <sub>4</sub> (44.5)	3½ (88.9)	5 (127.0)	<sup>3</sup> / <sub>4</sub> (19.1)	<sup>5</sup> / <sub>8</sub> x <sup>3</sup> / <sub>4</sub> (15.9) x (19.1)	5% x 11/8 (15.9) x (28.6)
2501-3000	3	4 (101.6)	5 <sup>3</sup> / <sub>4</sub> (146.1)	6 <sup>3</sup> / <sub>4</sub> (171.5)	9½ (235.0)	9½ (241.3)	10 <sup>3</sup> / <sub>4</sub> (273.1)	15/8 (41.3)	1 <sup>3</sup> / <sub>4</sub> (44.5)	4 (101.6)	5 (127.0)	<sup>3</sup> / <sub>4</sub> (19.1)	<sup>5</sup> / <sub>8</sub> x <sup>3</sup> / <sub>4</sub> (15.9) x (19.1)	5% x 11/8 (15.9) x (28.6)
3500-4000	4	4 (101.6)	5 <sup>3</sup> / <sub>4</sub> (146.1)	6 <sup>3</sup> / <sub>4</sub> (171.5)	9½ (235.0)	9½ (241.3)	10 <sup>3</sup> / <sub>4</sub> (273.1)	1 <sup>3</sup> / <sub>4</sub> (44.5)	3½ (82.6)	4 <sup>3</sup> / <sub>4</sub> (120.7)	5³/ <sub>4</sub> (146.1)	<sup>3</sup> / <sub>4</sub> (19.1)	5/8 x 13/8 (15.9) x (34.9)	5/8 x 13/8 (15.9) x (34.9)
4500-5000	5	4 (101.6)	5 <sup>3</sup> / <sub>4</sub> (146.1)	_	9½ (235.0)	_	10 <sup>3</sup> / <sub>4</sub> (273.1)	15/8 (41.3)	3½ (82.6)	5½ (133.4)	7½ (181.0)	1 (25.4)	5⁄8 DIA. (15.9)	_
6000	5	4 (101.6)	5 <sup>3</sup> / <sub>4</sub> (146.1)	_	9½ (235.0)	_	10 <sup>3</sup> / <sub>4</sub> (273.1)	15/8 (41.3)	3½ (82.6)	5½ (133.4)	7½ (181.0)	1 (25.4)	5⁄8 DIA. (15.9)	_

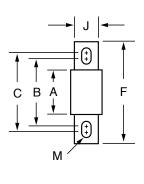


FIG.1

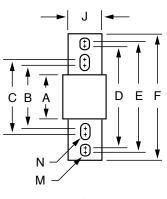
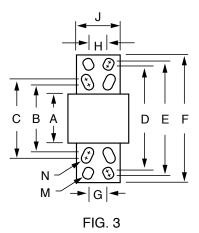
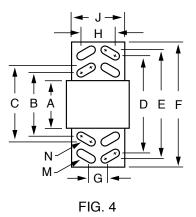
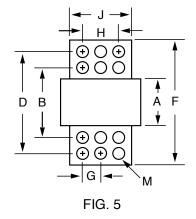
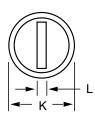


FIG.2











# CLASS RK1 - LLNRK • LLSRK • LLSRK\_ID SERIES FUSES

POWR- PRO 250/600 Vac • Dual Element • Time-Delay • 1/10-600 A







### **Description**

RK1 fuses are extremely current-limiting fuses meaning they greatly reduce or eliminate damage to circuits and equipment under short-circuit conditions. Replacing existing Class H, K and RK5 fuses with RK1 fuses is one of the easiest ways to immediately improve the protection of plant workers and equipment.

### **Applications**

- All general purpose circuits
- Motors
- Transformers
- Safety upgrades

### Features/Benefits

- POWR-PRO Performance
- Indication available
- Dual-element design
- Extremely Current-Limiting
- IEC Type 2 "No Damage" protection to IEC and NEMA type motor starters
- Indicating and DIN mount fuse holders available

### Specifications

600 Vac/300 Vdc (LLSRK/LLSRK ID) Voltage Ratings

250 Vac/125 Vdc (LLNRK)

**Interrupting Ratings** AC: 200 kA rms symmetrical

300 kA rms symmetrical (Littelfuse self-certified)

DC: 20 kA **Ampere Range** 1/10 - 600 A

AC: Standard 248-12, Class RK1 **Approvals** UL Listed (File: E81895) CSA Certified (File: LR29862)

> DC: Littelfuse self-certified Federal Specification WF-1814

(QPL- W-F-1814)

### **Recommended Fuse Holders**

### **Ordering Information**

AMPERE RATINGS										
1/10	1	2 8/10	6 1/4	25	80	250				
15/100	1 1/8	3	7	30	90	300				
2/10	1 1/4	3 2/10	8	35	100	350				
1/4	1 4/10	3 1/2	9	40	110	400				
3/10	<b>1</b> 6/10	4	10	45	125	450				
4/10	1 8/10	4 1/2	12	50	150	500				
1/2	2	5	15	60	175	600				
6/10	2 1/4	5 6/10	17 1/2	70	200					
8/10	2 1/2	6	20	75*	225					

Note: All LLSRK\_ID fuses rated 1 amp and above are Indicator® fuses. \*75 A is only available for the 600 V.

### 600 V

TYPE	SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
INDICATING	LLSRK_ID	60	LLSRK060ID	LSRK060.TXID
NON-INDICATING	LLSRK	60	LLSRK060	LSRK060.T

### 250 V

	TYPE	SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
NON-II	NDICATING	LLNRK	80	LLNRK080	LNRK080.V

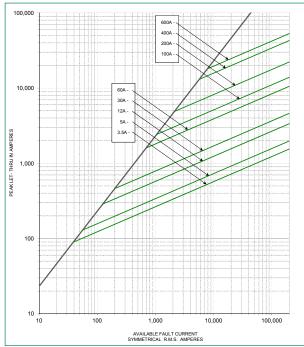
### **Web Resources**

Download TC Curves, CAD drawings and other technical information: littelfuse.com/llsrk littelfuse.com/llnrk

### **Dimensions**

### Peak Let-Thru Curve (600 V)

### **LLSRK & LLSRKID**



Note: For more information, see Peak Let-Thru Table on pg. 14



# CLASS RK1 - LLNRK • LLSRK • LLSRK\_ID SERIES FUSES

### Current-Limiting Effects of LLSRK and LLSRK\_ID (600 V) Fuses

SHORT CIRCUIT	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS								
CURRENT*	3.5 A	5 A	12 A	30 A	100 A	200 A	400 A	600 A	
5,000	196	251	427	586	1,764	2,821	-	-	
10,000	247	316	538	739	2,222	3,554	6,850	8,489	
15,000	283	362	616	845	2,544	4,069	7,842	9,718	
20,000	312	399	677	930	2,800	4,478	8,631	10,696	
25,000	336	430	730	1,002	3,016	4,824	9,297	11,522	
30,000	357	456	776	1,065	3,205	5,126	9,880	12,244	
35,000	376	481	816	1,121	3,374	5,397	10,401	12,889	
40,000	393	502	854	1,172	3,528	5,642	10,874	13,476	
50,000	423	541	919	1,263	3,800	6,078	11,714	14,516	
60,000	450	575	977	1,342	4,038	6,459	12,448	15,426	
80,000	495	633	1,075	1,477	4,445	7,109	13,700	16,979	
100,000	533	682	1,158	1,591	4,788	7,658	14,758	18,290	
150,000	610	781	1,326	1,821	5,481	8,766	16,894	20,936	
200,000	671	859	1,460	2,005	6,032	9,648	18,594	23,043	

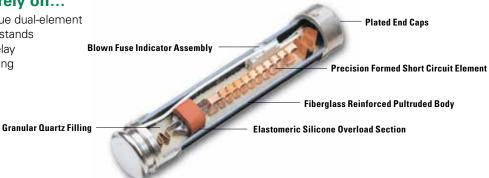
### **Current-Limiting Effects of LLNRK (250 V) Fuses**

SHORT CIRCUIT		APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS							
CURRENT*	30 A	60 A	100 A	200 A	400 A	600 A			
5,000	900	1,400	2,000	2,700	4,800	5,000			
10,000	1,100	1,900	2,700	3,500	6,200	8,500			
15,000	1,250	2,100	3,100	4,200	7,000	9,500			
20,000	1,400	2,400	3,500	4,600	8,000	10,800			
25,000	1,500	2,600	3,900	5,000	8,300	11,500			
30,000	1,600	2,800	4,000	5,250	9,000	12,000			
35,000	1,700	2,850	4,300	5,500	9,500	12,500			
40,000	1,800	3,000	4,600	5,800	9,800	13,500			
50,000	1,900	3,200	4,800	6,300	10,200	14,000			
60,000	2,000	3,500	5,200	6,700	11,000	15,000			
80,000	2,200	3,900	5,700	7,200	12,200	16,000			
100,000	2,300	4,000	6,000	8,100	12,700	17,000			
150,000	2,500	4,500	6,700	9,100	14,000	19,000			
200,000	2,600	4,800	7,000	9,700	15,000	20,000			

<sup>\*</sup>Prospective RMS Symmetrical Amperes Short-Circuit Current Note: Data derived from Peak Let-Thru Curves

# LLSRK\_ID Fuses—Quality Construction for performance you can rely on...

Littelfuse **LLSRK\_ID** Fuses feature true dual-element construction. This robust design withstands repeated surges within rated time delay without opening needlessly, eliminating downtime caused by power surges or equipment demands.



14



# CLASS RK1 – KLNR / KLSR SERIES FUSES

250/600 Vac • Fast-Acting • 1-600 A





### **Description**

KLSR and KLNR series are en economical design providing the safety of a RK1 fuse. The single element design provides fast-acting overload and short-circuit protection.

Use POWR-PRO® LLNRK and LLSRK series RK1, dualelement, time-delay fuses in all new applications requiring the current-limiting ability of UL Class RK1 fuses or in existing applications where fast-acting RK1 or RK5 fuses have been opening on harmless system surges such as motor starting currents.

### **Applications**

- Resistance heaters
- Lighting circuits
- Non-inductive loads

### Features/Benefits

- Extremely Current-Limiting
- Indicating and DIN mount fuse blocks available

### **Specifications**

**Voltage Ratings** AC: 600 Vac or less (KLSR)

250 Vac or less (KLNR) DC: 250 V (1 - 30 A KLSR);

300 V (35 – 600 A KLSR)

125 V (KLNR)

**Ampere Range** 1-600 A

Interrupting Ratings AC: 200 kA rms symmetrical

DC: 20 kA

Approvals AC: Standard 248-12, Class RK1
UL Listed (File: E81895)

CSA Certified (File: LR29862)
DC: Littelfuse self-certified

Material 1-60 A: Composite body, Bronze cap (nickel plated)

70-100 A: Composite body, Copper caps 110-600 A: Melamine body, Copper caps

Country of Origin Mexico

### **Ordering Information**

AMPERE RATINGS									
1	10	40	100	250					
2	12	45	110	300					
3	15	50	125	350					
4	20	60	150	400					
5	25	70	175	450					
6	30	80	200	500					
8	35	90	225	600					

VOLTAGE	SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
600	KLSR	90	KLSR090	KLSR090.V
250	KLNR	90	KLNR090	KLNR090.V

### **Web Resources**

Download TC Curves, CAD drawings and other technical information: **littelfuse.com/klsr** 

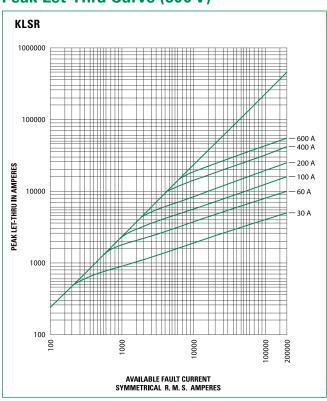
littelfuse.com/klsr

### **Recommended Fuse Blocks**

LFR Series ......94

### **Dimensions**

### Peak Let-Thru Curve (600 V)





# CLASS RK5 - IDSR SERIES INDICATOR® POWR-PRO® FUSES

POWR-PRO 600 Vac/dc • Dual Element • Time-Delay • 1/10-600 A







### **Description**

The IDSR combines 600 Vdc capability with indication to provide an ideal solution for many DC applications.

### **Applications**

- DC circuits
- Solar inverters
- Motors
- Transformers
- Solenoids
- Fluorescent lighting

### Features/Benefits

- POWR-PRO® Performance
- Current limiting
- Indication

### **Specifications**

Voltage Ratings AC: 600 Vac or less DC: 600 Vdc or less Ampere Range 1/10 - 600 A

Interrupting Ratings AC: 200 kA rms symmetrical

300 kA rms symmetrical (Littelfuse self-certified)

DC: 20 kA

**Approvals** Standard 248-12, Class RK5

UL Listed (File: E81895) CSA Certified (File: LR29862)

**Material** 1/10-60 A: Composite body, Bronze caps

70-600 A: Composite body, Copper caps

Country of Origin Mexico

### **Ordering Information**

AMPERE RATINGS										
1/10	6/10	1 8/10	4	8	30	80	225			
1/8	8/10	2	4 1/2	9	35	90	250			
15/100	1	2 1/4	5	10	40	100	300			
2/10	1 1/8	2 1/2	5 6/10	12	45	110	350			
1/4	1 1/4	2 8/10	6	15	50	125	400			
3/10	1 4/10	3	6 1/4	17 1/2	60	150	450			
4/10	1 1/2	3 2/10	7	20	70	175	500			
1/2	<b>1</b> 6/10	3 1/2	7 1/2	25	75	200	600			
	1/8 15/100 2/10 1/4 3/10 4/10	1/8 8/10 15/100 1 2/10 1 1/8 1/4 1 1/4 3/10 1 4/10 4/10 1 1/2	1/10 6/10 1 8/10 1/8 8/10 2 15/100 1 2 1/4 2/10 1 1/8 2 1/2 1/4 1 1/4 2 8/10 3/10 1 1/2 3 2/10	1/10         6/10         1 8/10         4           1/8         8/10         2         4 1/2           15/100         1         2 1/4         5           2/10         1 1/8         2 1/2         5 6/10           1/4         1 1/4         2 8/10         6           3/10         1 4/10         3         6 1/4           4/10         1 1/2         3 2/10         7	1/10         6/10         1 8/10         4         8           1/8         8/10         2         4 1/2         9           15/100         1         2 1/4         5         10           2/10         1 1/8         2 1/2         5 6/10         12           1/4         1 1/4         2 8/10         6         15           3/10         1 4/10         3         6 1/4         17 1/2           4/10         1 1/2         3 2/10         7         20	1/8         8/10         2         4 1/2         9         35           15/100         1         2 1/4         5         10         40           2/10         1 1/8         2 1/2         5 6/10         12         45           1/4         1 1/4         2 8/10         6         15         50           3/10         1 4/10         3         6 1/4         17 1/2         60           4/10         1 1/2         3 2/10         7         20         70	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			

Note: All fuses rated 1A and above are Indicator® fuses.

VOLTAGE	SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
600	IDSR	30	IDSR030	IDSR030.T

### **Web Resources**

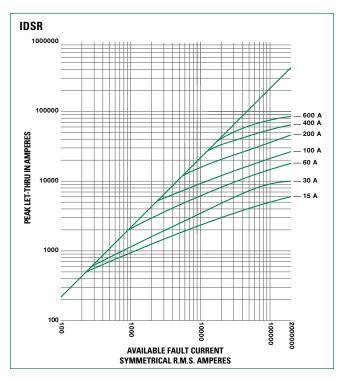
Download TC Curves, CAD drawings and other technical information: **littelfuse.com/idsr** 

### **Recommended Fuse Blocks**

LFR Series ......94

### **Dimensions**

### **Peak Let-Thru Curve**



Note: For more information, see Peak Let-Thru Table on pg. 18



# CLASS RK5 - FLNR\_ID • FLSR\_ID SERIES INDICATOR® FUSES

250/600 Vac • Dual Element • Time Delay • 1/10-600 A







### **Description**

Available in both Indicating and Non-Indicating versions, the FLNR/FLSR series of fuses set the standard for general purpose fuses. The dual-element design provides advanced short circuit and overload protection. FLSR series fuses provide excellent protection for all types of circuits especially those containing motors.

### **Applications**

- Service entrance switches
- Transformers
- Switchboard mains and feeders
- Motor control central mains and motor branch circuits
- All general purpose circuits

### Features/Benefits

- Indication
- Dual-element design
- · Available without indication
- Current limiting

### **Specifications**

**Voltage Ratings** AC: 250 V (FLNR\_ID); 600 V (FLSR\_ID)

DC: 125 V (FLNR <sup>1</sup>/<sub>10</sub> – 30 A); 125 V (FLNR\_ID 35 – 600 A);

300 V (FLSR\_ID)

Interrupting Ratings AC: 200 kA rms symmetrical

300 kA rms symmetrical (Littelfuse self-certified)

DC: 20 kA

**Ampere Range** 1/10 - 600 A

Approvals Standard 248-12, Class RK5 UL Listed (File: E81895)

CSA Certified (File: LR29862) Federal Specification WF-1814

(QPL- W-F-1814)

### **Dimensions**

Please refer to the Class R dimensions page 19.

### **Ordering Information**

	AMPERE RATINGS										
1/10	6/10	1 8/10	4	8	30	80	225				
1/8*	8/10	2	4 1/2	9	35	90	250				
15/100	1	2 1/4	5	10	40	100	300				
2/10	1 1/8	2 1/2	5 6/10	12	45	110	350				
1/4	1 1/4	2 8/10	6	15	50	125	400				
3/10†	1 4/10	3	6 1/4	17 1/2	60	150	450				
4/10	1 1/2	3 2/10	7	20	70	175	500				
1/2	1 6/10	3 1/2	7 1/2	25	75**	200	600				

\*FLNR only.  $^{1}$ CD only.  $^{2}$ CD only.

TYPE	VOLT	SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
NON-INDICATING	600	FLSR	15	FLSR015	FLSR015.T
INDICATING	600	FLSR_ID	15	FLSR015ID	FLSR015.TXID
NON-INDICATING	250	FLNR	60	FLNR060	FLNR060.T
INDICATING	250	FLNR_ID	60	FLNR060ID	FLNR060.TXID

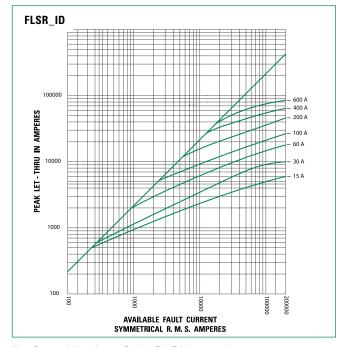
### **Web Resources**

Download TC Curves, CAD drawings and other technical information: **littelfuse.com/flsr** 

littelfuse.com/flnr

### **Recommended Fuse Holders**

### Peak Let-Thru Curve (600 V)



Note: For more information, see Peak Let-Thru Table on page 18.



### CLASS RK5 CURRENT-LIMITING EFFECTS

### **Current-Limiting Effects of IDSR (600 V) Fuses**

SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS										
	15 A	30 A	60 A	100 A	200 A	400 A	600 A				
5,000	800	1,100	2,100	3,200	5,000	5,000	5,000				
10,000	1,100	1,600	2,900	4,300	7,300	10,000	10,000				
15,000	1,300	1,900	3,400	5,000	8,600	13,700	15,000				
20,000	1,400	2,200	3,800	5,600	9,500	15,500	19,000				
25,000	1,500	2,500	4,100	6,100	10,300	16,700	21,500				
30,000	1,600	2,700	4,500	6,500	11,000	17,700	23,500				
35,000	1,700	2,900	4,700	6,800	11,600	18,600	25,200				
40,000	1,800	3,100	5,000	7,200	12,100	19,400	26,600				
50,000	1,900	3,400	5,400	7,800	13,100	20,800	29,500				
60,000	2,000	3,600	5,800	8,300	13,900	22,000	30,600				
80,000	2,200	4,000	6,300	9,100	15,400	24,000	33,200				
100,000	2,300	4,200	6,800	9,800	16,700	25,500	35,100				
150,000	2,600	4,500	7,700	11,200	19,300	28,100	38,000				
200,000	2,800	4,600	8,400	12,400	21,400	30,000	39,600				

### Current-Limiting Effects of FLSR and FLSR\_ID (600 V) Fuses

SHORT-CIRCUIT CURRENT*		APPARENT RMS	S SYMMETRICAL CUI	RRENT FOR VARIOUS	S FUSE RATINGS	
Onom omoor connext	30 A	60 A	100 A	200 A	400 A	600 A
5,000	1,250	2,100	3,200	5,000	5,000	5,000
10,000	1,600	2,850	4,300	7,250	10,000	10,000
15,000	1,800	3,400	5,000	8,500	13,500	15,000
20,000	2,250	3,800	5,500	9,500	15,750	19,000
25,000	2,450	4,100	5,700	10,250	17,000	21,000
30,000	2,700	4,500	6,400	10,750	18,000	23,000
35,000	2,900	4,800	6,700	11,500	19,000	24,250
40,000	3,000	5,000	7,250	12,000	19,500	27,000
50,000	3,400	5,250	7,750	13,000	21,000	29,000
60,000	3,600	5,750	8,100	14,000	22,000	30,500
80,000	3,900	6,250	9,000	15,000	24,000	33,000
100,000	4,300	6,750	9,750	16,500	26,000	35,000
150,000	4,500	7,600	11,100	19,000	28,000	38,000
200,000	4,600	8,400	12,250	21,500	30,000	40,000

### Current-Limiting Effects of FLNR and FLNR\_ID (250V) Fuses

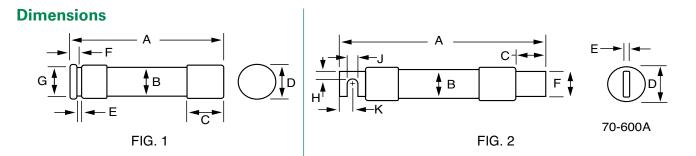
SHORT-CIRCUIT CURRENT*		APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS									
SHOTT-CITICOTT CONTIENT	30 A	60 A	100 A	200 A	400 A	600 A					
5,000	1,400	2,100	3,100	5,000	5,000	5,000					
10,000	1,550	2,500	3,900	6,500	9,500	10,000					
15,000	2,000	3,150	4,400	7,250	10,500	14,000					
20,000	2,250	3,400	5,000	8,250	12,000	16,000					
25,000	2,400	3,750	5,250	9,000	12,500	16,500					
30,000	2,550	4,100	5,600	9,500	13,500	18,000					
35,000	2,650	4,300	5,800	9,750	14,000	19,000					
40,000	2,800	4,400	6,250	10,250	15,000	20,000					
50,000	3,000	5,000	6,500	10,500	16,000	21,000					
60,000	3,200	5,250	7,000	11,500	17,000	23,000					
80,000	3,400	5,750	7,500	12,500	19,000	25,500					
100,000	3,850	6,000	8,000	13,500	21,000	27,500					
150,000	4,100	7,000	9,000	15,200	24,000	31,500					
200,000	4,300	7,500	9,750	16,500	26,000	34,000					

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<sup>\*</sup>Prospective RMS Symmetrical Amperes Short-Circuit Current Note: Data Derived from Peak Let-Thru Curves



# **CLASS R SERIES DIMENSIONS**



AMPS	FIGURE	SERIES				D	IMENSIONS	INCHES (mr	n)			
AWITO	NUMBER	OLITICO	Α	В	С	D	E	F	G	Н	J	K
1/- 20	1	LLNRK KLNR FLNR	2 (50.8)	½ (12.7)	½ (12.7)	9/16 (14.3)	<sup>5</sup> / <sub>64</sub> (2.0)	5/32 (4.0)	<sup>3</sup> / <sub>8</sub> (9.5)	_	_	_
1/10—30	1	LLSRK KLSR FLSR IDSR	5 (127.0)	<sup>3</sup> / <sub>4</sub> (19.1)	5∕8 (15.9)	<sup>13</sup> / <sub>16</sub> (20.6)	<sup>3</sup> / <sub>32</sub> (2.4)	<sup>3</sup> / <sub>16</sub> (4.8)	5⁄8 (15.9)	_	_	_
35 – 60	1	LLNRK KLNR FLNR	3 (76.2)	<sup>3</sup> / <sub>4</sub> (19.1)	⁵⁄8 (15.9)	<sup>13</sup> / <sub>16</sub> (20.6)	<sup>3</sup> / <sub>32</sub> (2.4)	<sup>3</sup> / <sub>16</sub> (4.8)	⁵⁄ <sub>8</sub> (15.9)	_	1	_
33 – 00	1	LLSRK KLSR FLSR IDSR	5½ (139.7)	1 (25.4)	<sup>5</sup> / <sub>8</sub> (15.9)	1½ (27.0)	<sup>3</sup> / <sub>32</sub> (2.4)	1/4 (6.4)	<sup>7</sup> ∕8 (22.2)	_	1	
70 – 100	2	LLNRK KLNR FLNR	51/8 (149.2)	1 (25.4)	1½16 (27.0)	1½16 (27.0)	1/8 (3.2)	<sup>3</sup> / <sub>4</sub> (19.1)	_	1/4 (6.4)	<sup>9</sup> / <sub>32</sub> (7.1)	½ (12.7)
70 – 100	2	LLSRK KLSR FLSR IDSR	77/8 (200.0)	11/4 (31.8)	11/16 (27.0)	15/16 (33.3)	1/8 (3.2)	<sup>3</sup> / <sub>4</sub> (19.1)	_	1/4 (6.4)	<sup>9</sup> / <sub>32</sub> (7.1)	½ (12.7)
110 – 200	2	LLNRK KLNR FLNR	71//8 (181.0)	1½ (38.1)	1 <sup>15</sup> / <sub>32</sub> (37.3)	119/32 (40.5)	<sup>3</sup> / <sub>16</sub> (4.8)	1½ (28.6)	_	<sup>7</sup> ∕16 (11.1)	<sup>9</sup> / <sub>32</sub> (7.1)	<sup>11</sup> / <sub>16</sub> (17.5)
110 – 200	2	LLSRK KLSR FLSR IDSR	95/8 (244.5)	13/4 (44.5)	115/32 (37.3)	127/32 (46.8)	<sup>3</sup> / <sub>16</sub> (4.8)	1½ (28.6)	_	<sup>7</sup> ∕16 (11.1)	<sup>9</sup> / <sub>32</sub> (7.1)	<sup>11</sup> / <sub>16</sub> (17.5)
225 – 400	2	LLNRK KLNR FLNR	8 <sup>5</sup> / <sub>8</sub> (219.1)	2 (50.8)	115/16 (49.2)	2 <sup>3</sup> / <sub>32</sub> (53.2)	1/4 (6.4)	15/8 (41.3)	_	<sup>5</sup> ⁄ <sub>8</sub> (15.9)	<sup>13</sup> / <sub>32</sub> (10.3)	<sup>15</sup> / <sub>16</sub> (23.8)
225 – 400	2	LLSRK KLSR FLSR IDSR	11 <sup>5</sup> / <sub>8</sub> (295.3)	2½ (63.5)	2 (50.8)	219/32 (65.9)	1/4 (6.4)	15/8 (41.3)	_	⁵⁄8 (15.9)	<sup>13</sup> / <sub>32</sub> (10.3)	<sup>15</sup> / <sub>16</sub> (23.8)
450 – 600	2	LLNRK KLNR FLNR	103/8 (263.5)	2½ (63.5)	23/8 (60.3)	219/32 (65.9)	1/4 (6.4)	2 (50.8)	_	<sup>3</sup> / <sub>4</sub> (19.1)	<sup>17</sup> / <sub>32</sub> (13.5)	1½ (28.6)
450 — 600	Z	LLSRK KLSR FLSR IDSR	133/8 (339.7)	3 (76.2)	2 <sup>13</sup> / <sub>32</sub> (61.1)	3 <sup>3</sup> / <sub>32</sub> (78.6)	1/4 (6.4)	2 (50.8)	_	<sup>3</sup> / <sub>4</sub> (19.1)	<sup>17</sup> / <sub>32</sub> (13.5)	1½ (28.6)



## CLASS K5 - NLN / NLS SERIES (ONE-TIME) FUSES

250/600 Vac • "One-Time" • 1-600 A









### **Description**

NLN and NLS fuses provide low cost protection for general purpose feeder and branch circuits when available short circuit currents are less than 50 kA.

Note: Canadian Electrical Code NLKP Type P fuse available. Visit littelfuse.com/nlkp

### **Applications**

General purpose residential and commercial circuits with little or no motor load.

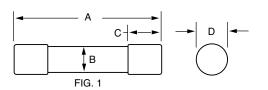
### Features/Benefits

- Economical
- 50 kA interrupting rating
- Indicating and DIN mount holders available

### **Web Resources**

Download TC Curves, CAD drawings and other technical information: littelfuse.com/nln littelfuse.com/nls

### **Dimensions**



### **Specifications**

Material

**Voltage Ratings** AC: 600 Vac or less (NLS) 250 Vac or less (NLN)

DC: 400 V (NLS 35 - 60 A)

500 V (NLS 8 - 30 A) (NLS 225 - 600 A) 600 V (NLS 1 - 7 A) (NLS 70 - 200 A)

250 V (NLN)

**Ampere Range** 1 - 600 A**Interrupting Ratings** AC: 50 kA rms symmetrical

DC: 20 kA (1 - 60 A) 50 kA (70 - 600 A)

**Approvals** Standard 248-9, Class K5

UL Listed (File: E81895) CSA Certified (File: LR29862)

NLS: 1-15 A: Fiber body, Bronze cap 20-60 A: Composite body, Bronze cap 70-600 A: Fiber body, Copper cap (tin plated)

NLN: 1-30 A: Ceramic body 35-60 A: Fiber body, Bronze cap

70-600 A: Fiber body, Copper cap (tin plated)

**Country of Origin** Mexico

### **Ordering Information**

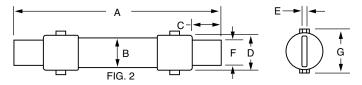
AMPERE RATINGS									
1	7	*25	*60	125	300				
2	8	*30	70	150	350				
3	10	*35	80	175	400				
4	12	*40	90	200	450				
5	*15	*45	100	225	500				
6	*20	*50	110	250	600				

<sup>\*</sup>NLKP series available only in those amperages preceded by an asterisk

VOLTAGE	SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
600	NLS	20	NLS020	0NLS020.T
250	NLN	15	NLN015	0NLN015.T

### **Recommended Fuse Blocks**

LFH Series .......94



AMPERES	REFER TO	SERIES			DIME	NSIONS INCHES	(mm)		
AIVIF LILLS	FIG. NO.	SLIILS	Α	В	С	D	E	F	G
1 – 30	1	NLN	2 (50.8)	1/2 (12.7)	1/2 (12.7)	9/16 (14.3)	_	_	_
1 – 30	l I	NLS	5 (127.0)	<sup>3</sup> / <sub>4</sub> (19.1)	5⁄8 (15.9)	13/16 (20.6)	_	_	_
35 – 60	1	NLN	3 (76.2)	<sup>3</sup> / <sub>4</sub> (19.1)	5/8 (15.9)	<sup>13</sup> / <sub>16</sub> (20.6)	_	_	_
33 – 60	l	NLS	5½ (139.7)	1 (25.4)	5/8 (15.9)	11/16 (27.0)	_	-	_
70 – 100	2	NLN	51/8 (149.2)	1 (25.4)	1 (25.4)	11/16 (27.0)	1/8 (3.2)	<sup>3</sup> / <sub>4</sub> (19.1)	15/16 (33.3)
70 – 100	_ Z	NLS	71/8 (200.0)	11/4 (31.8)	1 (25.4)	15/16 (33.3)	1/8 (3.2)	<sup>3</sup> / <sub>4</sub> (19.1)	1 <sup>9</sup> / <sub>16</sub> (39.7)
110 – 200	2	NLN	71//8 (181.0)	1½ (38.1)	13/8 (34.9)	19/16 (39.7)	3/16 (4.8)	11/8 (28.6)	17/8 (47.6)
110 – 200		NLS	95/8 (244.5)	13/4 (44.5)	13/8 (34.9)	127/32 (46.8)	3/16 (4.8)	11/8 (28.6)	23/32 (53.2)
225 – 400	2	NLN	85/8 (219.1)	2 (50.8)	17/8 (47.6)	23/32 (53.2)	1/4 (6.4)	15/8 (41.3)	213/32 (61.1)
223 – 400		NLS	115/8 (295.3)	2½ (63.5)	17/8 (47.6)	219/32 (65.9)	1/4 (6.4)	15/8 (41.3)	21/8 (73.0)
450 – 600	2	NLN	103/8 (263.5)	2½ (63.5)	21/4 (57.2)	219/32 (65.9)	1/4 (6.4)	2 (50.8)	21/8 (73.0)
450 - 600	2	NLS	133/8 (339.7)	3 (76.2)	21/4 (57.2)	33/32 (78.6)	1/4 (6.4)	2 (50.8)	37/16 (87.3)



# CLASS J - JTD SERIES INDICATOR® POWR-PRO® FUSES

POWR- PRO- 600 Vac • Time Delay • 8/10-600 A







**Description** 

The Littelfuse POWR-PRO® JTD\_ID Indicator Class J fuse provides visual blown fuse indication and maximum protection in a compact package. The current-limiting time delay JTD\_ID offers a patented design which reduces nuisance fuse openings.

### **Features/Benefits**

- POWR-PRO® Performance
- **Current-Limiting**
- IEC Type 2 Protection
- Indication and non-indication version available
- Indicating and DIN mount holders available

### **Applications**

- Fused combination motor controllers and motor control centers
- Transformer protection
- Protection for series rated molded case circuit-breaker panels
- General purpose circuits

### Web Resources

Download TC Curves, CAD drawings and other technical information: littelfuse.com/itd

### **Recommended Fuse Holders**

LFJ60 Series	91
LFPSJ Series (%/10-60 A)	118

### **Dimensions**

### **Specifications**

**Approvals** 

**Voltage Ratings** AC: 600 V

> DC: 300 V (8/10-100 A) 500 V (110-600 A)

**Amperage Range** 8/10-600 A

**Interrupting Rating** AC: 200 kA rms symmetrical 300kA rms symmetrical

(Littelfuse self-certified)

DC: 20 kA

Material Body: Melamine

Caps: Nickel-plated Bronze (8/10-60 A)

Brass (70-200 A)

Brass Cap with Copper Blade (225-600 A)

AC: Standard 248-8, Class J UL Listed (File: E81895)

CSA Certified (File: LR29862)

DC: Littelfuse self-certified

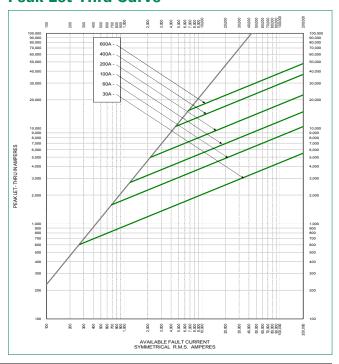
**Country of Origin** Mexico

### **Ordering Information**

	AMPERAGE RATINGS									
8/10	21/4	41/2	10	35	90	225	600			
1	21/2	5	12	40	100	250	_			
11/4	28/10	5 %10	15	45	110	300	_			
11/2	3	6	171/2	50	125	350	_			
16/10	32/10	7	20	60	150	400	_			
18/10	3½	8	25	70	175	450	_			
2	4	9	30	80	200	500	_			

TYPE	SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
INDICATING	JTD_ID	60	JTD60ID	0JTD060.TXID
NON-INDICATING	JTD	60	JTD60	0JTD060.T

### **Peak Let-Thru Curve**



Note: For more information, see Peak Let-Thru Table on page 23.



### CLASS J – JLS SERIES FUSES

600 VAC • Fast-Acting • 1-600 A



### **Description**

The UL Listed Class J JLS Series fuses provide space saving, fast-acting overload and short-circuit protection for vital industrial and power conversion applications.

Littelfuse's JLS Series fuses offer best in class current limitation that prevents equipment damage from overcurrent faults.

### **Features and Benefits**

- Superior performance in a space saving package
- Reliable interruption of all overcurrents with protection up to 200kA
- Extremely current limiting
- Fast-acting protection for surge-sensitive devices and components
- Reduces heating and magnetic effects due to overcurrents, extending equipment life
- · Economical and readily available

### **Applications**

- Power conversion device protection
- Variable speed drives
- Rectifiers
- Resistive loads
- Solid-state devices

### **Web Resources**

Download TC curves, CAD drawings and other technical information: **littelfuse.com/ils** 

### **Recommended Fuse Holders**

LFJ60 Series	91
LFPSJ Series (%/10-60 A)	118

# (I) (I) QPL ( €

### **Specifications**

Voltage Ratings 600 VAC

Interrupting Ratings 200 kA rms symmetrical

Ampere Range 1–600 A

**Approvals** Standard 248-8, Class J

UL Listed (File: E81895) CSA Certified (File: LR29862) Federal Specification WF-1814

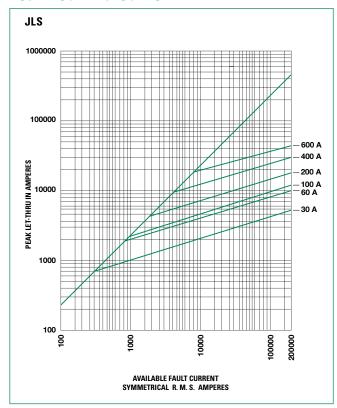
(QPL-W-F-1814)

### **Ordering Information**

AMPERE RATINGS									
1	20   45   90   175   35								
3	25	50	100	200	400				
6	30	60	110	225	450				
10	35	70	125	250	500				
15	40	80	150	300	600				

TYPE	SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
NON-INDICATING	JLS	110	JLS110	0JLS110.X

### **Peak Let-Thru Curve**



### **Dimensions**

Please	refer	to the	Class J	dimensions	2	23



# **CLASS J DIMENSIONS AND CURRENT-LIMITING EFFECTS**

### **Dimensions Inches (mm)**

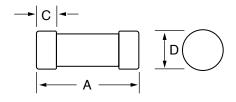
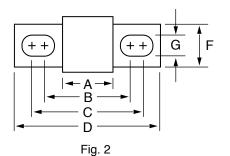


Fig. 1





### Dimensions of JTD\_ID, JTD and JLS

AMPERES	FIGURE	DIMENSIONS INCHES (mm)							
AIVIPERES NI	NUMBER	Α	В	С	D	Е	F	G	Н
1 – 30	1	21/4 (57.2)	_	½ (12.7)	13/16 (20.6)	_	_	_	_
35 - 60	1	23/8 (60.3)	_	⁵⁄₃ (15.9)	11/16 (27.0)	_	_	_	_
70 – 100	2	25/8 (66.7)	3 <sup>17</sup> / <sub>32</sub> (89.7)	3 <sup>23</sup> / <sub>32</sub> (94.5)	4 <sup>5</sup> / <sub>8</sub> (117.5)	11/8 (28.6)*	<sup>3</sup> / <sub>4</sub> (19.1)	9/32 (7.1)	1/8 (3.2)
110 - 200	2	3 (76.2)	49/32 (108.7)	4 <sup>15</sup> / <sub>32</sub> (113.5)	53/4 (146.1)	1½ (38.1)	11/8 (28.6)	9/32 (7.1)	<sup>3</sup> / <sub>16</sub> (4.8)
225 - 400	2	33/8 (85.7)	51/8 (130.2)	53/8 (136.5)	71/8 (181.0)	2 (50.8)	15/8 (41.3)	<sup>13</sup> / <sub>32</sub> (10.3)	1/4 (6.4)
450 - 600	2	33/4 (95.3)	5 <sup>27</sup> / <sub>32</sub> (148.4)	65/32 (156.4)	8 (203.2)	2½ (63.5)	2 (50.8)	<sup>17</sup> / <sub>32</sub> (13.5)	<sup>3</sup> / <sub>8</sub> (9.5)

<sup>\*70-100</sup> A JLS dimension = 1 (25.4)

### Current-Limiting Effects of JTD\_ID (600 V) Fuses

SHORT CIRCUIT		APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS						
CURRENT <sup>†</sup>	15 A	30 A	60 A	100 A	200 A	400 A	600 A	
5,000	565	750	1,500	1,800	2,800	4,800	5,000	
10,000	675	925	1,900	2,450	3,600	5,700	7,750	
15,000	775	1,050	2,100	2,800	4,100	6,500	9,000	
20,000	825	1,125	2,300	3,000	4,400	7,250	9,700	
25,000	900	1,200	2,500	3,300	5,000	8,000	10,500	
30,000	950	1,300	2,600	3,500	5,100	8,400	11,000	
35,000	1,000	1,350	2,700	3,700	5,400	9,000	12,000	
40,000	1,050	1,400	2,800	3,900	5,600	9,200	12,500	
50,000	1,100	1,500	3,000	4,200	6,000	10,000	13,000	
60,000	1,200	1,600	3,200	4,500	6,400	10,500	14,000	
80,000	1,300	1,700	3,400	4,900	7,200	11,200	15,500	
100,000	1,375	1,800	3,600	5,200	7,800	12,200	16,500	
150,000	1,500	2,000	3,950	6,000	9,000	14,500	19,000	
200,000	1,600	2,175	4,000	6,500	10,000	16,000	20,500	

†Prospective RMS Symmetrical Amperes Short-Circuit Current Note: Data derived from Peak Let-Thru Curves



### CLASS T - JLLN / JLLS SERIES FUSES

### 300/600 Vac • Fast-Acting • 1-1200 A





### **Description**

JLLN / JLLS fuses are less than 1/3 the size of comparable Class R fuses and are typically used for short circuit protection of drives and surge sensitive components. When rated in accordance with the NEC®, JLLN / JLLS fuses provide fast-acting overload and short circuit protection for non-inductive circuits and equipment.

### Features/Benefits

- · Extremely current-limiting
- Compact design
- 200 kA Interrupting Rating
- JLLN 35-60 A available with PCB mounts (see datasheet)

### **Applications**

- Variable speed drive protection
- Compact mains switches

### **Specifications**

**Interrupting Ratings** 

**Ampere Range** 

**Approvals** 

Voltage Ratings	AC: 300 V (JLLN)
	600 V (JLLS)
	DC: 125 V (JLLN 70 – 1200 A)

160 V (JLLN 1 – 60 A) 300 V (JLLS)

AC: 200 kA rms symmetrical DC: 20 kA (JLLN 35-1200 A only)

1 – 1200 A

AC: Standard 248-15, Class T UL Listed (File: E81895): JLLN (1 – 1200 A) JLLS (1 – 1200 A) CSA Certified (File: LR29862)

JLLN/JLLS (1 – 600 A) DC: UL Listed (File: E81895): JLLN (35 – 1200 A)

Littelfuse self-certified JLLN (1 – 30 A) JLLS (1 – 1200 A)

Material JLLN: 1-30 A: Melamine body, Bronze caps 35-1200 A: Melamine body, Copper caps

JLLS: 1-30 A: Melamine body, Copper caps 35-60 A: Melamine body, Bronze caps 70-1200 A: Melamine body, Copper caps

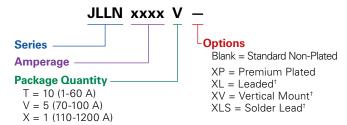
**Environmental** RoHS Compliant

### **Ordering Information**

	AMPERE RATINGS									
1	25	70	175	450	1100					
2	30	80	200	500	1200					
3	35	90	225	600						
6	40	100	250	700						
10	45	110	300	800						
15	50	125	350	900*						
20	60	150	400	1000						

<sup>\*</sup>JLLS only

### **Part Numbering System**



SERIES	AMP	PACK SIZE	PLATING SUFFIX	MOUNT SUFFIX	CATALOG NUMBER	ORDERING NUMBER
JLLS	6	T	-	-	JLLS006	JLLS006.T
JLLN	35	V	-	$XL^{\dagger}$	JLLN035L	JLLN035.VXL
JLLN	100	V	XP	-	JLLN100P	JLLN100.VXP

<sup>&</sup>lt;sup>†</sup>Option is available for JLLN 35-60 A only. Premium plating is standard

### **Web Resources**

Download TC Curves, CAD drawings and other technical information: littelfuse.com/jlln littelfuse.com/jlls

### **Recommended Fuse Holders**

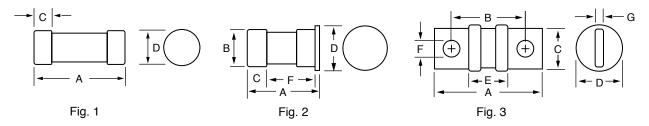
LFT30 Series	100
LFT60 Series	
LSCR Series for 70-800 A	

### **Dimensions**



# CLASS T DIMENSIONS AND CURRENT-LIMITING EFFECTS

### **Dimensions Inches (mm)**



AMPERES	REFER TO	SERIES	DIMENSIONS INCHES (mm)						
AWIPENES	FIG. NO.	SENIES	А	В	С	D	E	F	G
1 20	1	JLLN	.875 (22.2)	_	.281 (7.1)	.406 (10.3)	_	_	_
1 – 30		JLLS	1.500 (38.1)	_	.281 (7.1)	.562 (14.3)	_	_	_
35 – 60	1	JLLN	.875 (22.2)	_	.281 (7.1)	.562 (14.3)	_	_	_
35 – 60	2	JLLS	1.562 (39.7)	.812 (20.6)	.406 (10.3)	.994 (25.2)	.062 (1.6)	1.094 (27.8)	_
70 – 100	3	JLLN	2.156 (54.8)	1.562 (39.7)	.750 (19.1)	.812 (20.6)	.830 (21.1)	.281 (7.1)	.125 (3.2)
70 – 100	J	JLLS	2.953 (75.0)	2.352 (59.7)	.750 (19.1)	.828 (21.0)	1.625 (41.3)	.281 (7.1)	.125 (3.2)
110 – 200	110 – 200 3	JLLN	2.437 (61.9)	1.687 (42.9)	.875 (22.2)	1.062 (27.0)	.830 (21.1)	.343 (8.7)	.187 (4.8)
110 – 200	J	JLLS	3.250 (82.6)	2.507 (63.7)	.875 (22.2)	1.078 (27.4)	1.656 (42.1)	.343 (8.7)	.187 (4.8)
225 – 400	3	JLLN	2.750 (69.9)	1.843 (46.8)	1.000 (25.4)	1.312 (33.3)	.828 (21.0)	.406 (10.3)	.250 (6.4)
225 – 400	ა	JLLS	3.625 (92.1)	2.718 (69.1)	1.000 (25.4)	1.593 (40.5)	1.712 (43.5)	.406 (10.3)	.250 (6.4)
450 – 600	3	JLLN	3.062 (77.8)	2.031 (51.6)	1.250 (31.8)	1.593 (40.5)	.875 (22.2)	.484 (12.3)	.312 (7.9)
450 — 600	3	JLLS	3.984 (101.2)	2.953 (75.0)	1.250 (31.8)	2.062 (52.4)	1.765 (44.8)	.484 (12.3)	.312 (7.9)
700 – 800	3	JLLN	3.375 (85.7)	2.218 (56.4)	1.750 (44.5)	2.062 (52.4)	.875 (22.2)	.546 (13.9)	.375 (9.5)
700 – 800	3	JLLS	4.328 (109.9)	3.171 (80.6)	1.750 (44.5)	2.500 (63.5)	1.860 (47.2)	.546 (13.9)	.375 (9.5)
000 1200	3	JLLN	4.000 (101.6)	2.531 (64.3)	2.000 (50.8)	2.500 (63.5)	1.033 (26.2)	.609 (15.5)	.437 (11.1)
900 – 1200	3	JLLS	5.271 (133.9)	3.801 (96.5)	2.000 (50.8)	2.625 (66.7)	2.303 (58.5)	.609 (15.5)	.437 (11.1)

### **Current-Limiting Effects of JLLN (300 V) fuses**

SHORT	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS								
CURRENT*	30 A	60 A	100 A	200 A	400 A	600 A	800 A	1200 A	
5,000	700	775	1,100	1,650	3,500	4,000	5,000	5,000	
10,000	900	1,000	1,400	2,100	4,400	5,100	6,750	8,250	
15,000	1,000	1,100	1,600	2,400	5,000	5,900	7,750	10,000	
20,000	1,100	1,250	1,800	2,700	5,500	6,500	8,750	11,000	
25,000	1,230	1,300	1,950	2,900	6,000	7,000	9,500	12,000	
30,000	1,300	1,475	2,050	3,100	6,400	7,500	10,000	12,500	
35,000	1,330	1,575	2,150	3,300	6,750	7,750	10,500	13,500	
40,000	1,430	1,600	2,300	3,500	7,000	8,000	11,000	14,000	
50,000	1,500	1,750	2,400	3,700	7,500	8,750	12,000	15,000	
60,000	1,700	1,900	2,700	4,000	8,000	9,500	12,500	16,000	
80,000	1,850	2,100	2,800	4,400	9,000	10,500	14,000	17,500	
100,000	2,000	2,250	3,150	4,800	9,750	11,500	15,000	18,500	
150,000	2,300	2,600	3,600	5,500	11,000	13,000	17,500	22,000	
200,000	2,600	2,800	3,900	6,000	12,000	14,500	19,500	24,000	

<sup>\*</sup>Prospective RMS Symmetrical Amperes Short-Circuit Current Note: Data Derived from Peak Let-Thru Curves

### **Current-Limiting Effects of JLLS (600 V) fuses**

SHORT		APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS								
CURRENT*	30 A	60 A	100 A	200 A	400 A	600 A	800 A	1200 A		
5,000	750	1,225	1,810	2,500	4,600	5,000	5,000	5,000		
10,000	945	1,525	2,300	3,150	6,000	8,500	9,400	10,000		
15,000	1,050	1,700	2,610	3,600	6,600	9,750	10,500	13,000		
20,000	1,150	1,900	2,900	3,950	7,250	10,500	11,000	14,750		
25,000	1,300	2,050	3,100	4,250	8,000	11,500	12,500	15,500		
30,000	1,375	2,150	3,300	4,500	8,250	12,000	13,750	16,500		
35,000	1,400	2,250	3,500	4,750	8,500	13,000	14,000	17,000		
40,000	1,425	2,400	3,650	4,950	8,700	14,000	14,750	18,000		
50,000	1,600	2,450	3,900	5,350	9,500	14,500	16,000	20,000		
60,000	1,650	2,625	4,150	5,650	10,000	15,500	17,300	21,000		
80,000	1,825	2,800	4,570	6,250	11,000	17,000	18,750	23,000		
100,000	2,000	3,100	4,950	6,700	12,000	18,000	20,000	25,000		
150,000	2,250	3,400	5,650	7,700	13,000	21,000	23,000	28,500		
200,000	2,450	3,800	6,200	8,450	15,000	23,000	25,000	31,000		

<sup>\*</sup>Prospective RMS Symmetrical Amperes Short-Circuit Current Note: Data Derived from Peak Let-Thru Curves



### CLASS G - SLC CLASS G FUSES

### 480/600 VAC • Time-Delay • 1/2-60 A





### **Specifications**

**Voltage Ratings** 600 VAC (1/2 – 20 A)

480 VAC (25 – 60 A)

170 VDC (1/2 – 60 A) (Littelfuse self-certified)

Interrupting Ratings AC: 100 kA rms symmetrical

DC: 10 kA

Ampere Range 1/2 - 60 A

**Approvals** Standard 248-5, Class G

UL Listed (File: E81895) CSA Certified (File: LR29862) Federal Specification WF-1814

(QPL-W-F-1814)

**Environmental** RoHS Compliant

### **Description**

Littelfuse SLC fuses provide cost effective branch circuit protection. Fuse length varies to prevent over-fusing. Compact Class G fuses were the first fuse series to approach midget fuse dimensions and meet NEC® requirements for branch-circuit protection.

### Features/Benefits

- Branch circuit rated
- Current-limiting
- 100 kA interrupting rating
- 600 VAC rated 1/2-20 A

### **Applications**

• Branch circuit protection

### **Web Resources**

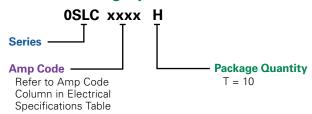
Download TC Curves, CAD drawings and other technical information: **littelfuse.com/slc** 

### **Recommended Fuse Holders**

LFG60 Series (1-20 A)	105
LFG48 Series (25-60 A)	105

### **Ordering Information**

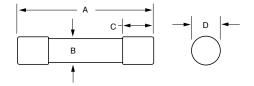
### **Part Numbering System**



SERIES	AMP	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
SLC	2	10	SLC002	OSLC002.T

### **Dimensions**

### **Ferrule Version**



AMP	DIMENSIONS INCHES (mm )						
Alvii	Α	В	С	D			
$^{1}/_{2}-15$	1 5/16 (33.3)	3/8 (9.5)	9/32 (7.1)	13/32 (10.3)			
20	1 13/32 (35.7)	3/8 (9.5)	9/32 (7.1)	13/32 (10.3)			
25, 30	1 5/8 (41.3)	3/8 (9.5)	9/32 (7.1)	13/32 (10.3)			
35 – 60	2 1/4 (57.2)	3/8 (9.5)	1/2 (12.7)	13/32 (10.3)			

# CLASS CC/CD - CCMR SERIES POWR-PRO® FUSES

# - POWR- PRO 600 Vac • Dual Element • Time-Delay • 2/10-60 A





### **Description**

The CCMR series is ideal for space saving protection of motors up to 40 hp\*. It was designed specifically to withstand sustained starting currents of small motors. The CCMR 60 fuse is the smallest 60 A fuse available rated at 600 V. Compared to other UL Listed fuses, Class CC fuses are the most current-limiting, rating for rating.

### Features/Benefits

- POWR-PRO® Performance
- Extremely current-limiting
- Ratings up to 60 Amps
- 300 kA Interrupting Rating (self-certified)

### **Applications**

• Motor and motor branch circuit protection

### **Specifications**

Voltage Rating	AC: 600 Vac or less
	DC: 250 V (CCMR 2/10-2 A)
	(CCMR 41/2-10 A)

(CCMR 35-60 A) 300 V (CCMR 21/4-4 A) 500 V (CCMR 12-30 A)

**Ampere Rating**  $^{2}/_{10} - 60 A$ 

**Interrupting Rating** AC: 200 kA rms symmetrical 300 kA Littelfuse self-certified

DC: 20 kA

AC: Standard 248-4, Class CC **Approvals** UL Listed 2/10-30 A (File: E81895)

Standard 248, Class CD UL Listed 35-60 A (File: E81895) CSA Certified (File: LR29862)

DC: Littelfuse self-certified 2/10-30 A: Melamine body,

Material Bronze cap (nickel plated)

RoHS Compliant (except 35-60 A)

**Country of Origin** Mexico

**Environmental** 

### **Ordering Information**

	AMPERE RATINGS								
2/10	1	2	3 1/2	6 1/4	12	35			
1/4	1 1/4	2 1/4	4	7	15	40			
3/10	1 4/10	2 1/2	4 1/2	7 1/2	17 1/2	45			
1/2	1 1/2	2 8/10	5	8	20	50			
6/10	1 6/10	3	5 6/10	9	25	60			
8/10	1 8/10	3 2/10	6	10	30				

SERIES	AMP	ROHS	CATALOG NUMBER	ORDERING NUMBER
CCMR	10	•	CCMR010	CCMR010.TXP
CCMR	45		CCMR045	CCMR045.T

### Web Resources

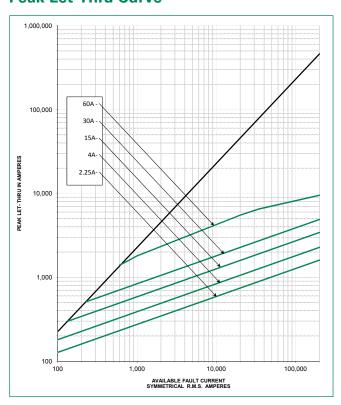
Download TC Curves, CAD drawings and other technical information: littelfuse.com/ccmr

### **Recommended Fuse Holders**

LFC600 Series	107
L60030C Series	107
LPSC Touch-Safe Series	117

### **Dimensions**

### Peak Let-Thru Curve



Note: For more information, see Peak Let-Thru Table on pg. 29

<sup>\*</sup>Consult Motor Protection Tables on page 208 in the Technical Application Guide section for specific motor sizing information.



### CLASS CC - KLDR / KLKR SERIES FUSES



# KLDR Series 600 Vac/300 Vdc • Time-Delay • 1/10-30 A



### **Description**

KLDR fuses are time-delay fuses designed to protect control transformers, solenoids and similar inductive components with high magnetizing currents during the first half-cycle. They provide excellent protection of motor branch circuits containing IEC or NEMA rated motor controllers or contactors.

### **Specifications**

**Voltage Rating** AC: 600 Vac or less

DC: 300 Vdc

 $\begin{tabular}{lll} \textbf{Ampere Range} & & 1/10-30 \ A \end{tabular}$ 

Interrupting Rating AC: 200 kA rms symmetrical

DC: 20 kA

**Approvals** AC: Standard 248-4, Class CC

UL Listed 1/10-30 A (File: E81895) CSA Certified 1/10-30 A (File: LR29862)

DC: Littelfuse self-certified

Material Melamine body

Bronze caps (nickel plated)

**Environmental** RoHS Compliant

Country of Origin Mexico

### **Ordering Information**

AMPERE RATINGS						
1/10	6/10	1 8/10	4 1/2	10		
1/8	3/4	2	5	12		
15/100	8/10	2 1/4	5 6/10	15		
3/16	1	2 1/2	6	17 1/2		
2/10	1 1/8	2 8/10	6 1/4	20		
1/4	1 1/4	3	7	25		
3/10	1 4/10	3 2/10	7 1/2	30		
4/10	1 1/2	3 1/2	8	_		
1/2	1 6/10	4	9	_		

SERIES	SERIES AMP		ORDERING NUMBER	
KLDR	10	KLDR010	KLDR010.TXP	

### **Web Resources**

For additional information, visit:

littelfuse.com/kldr

### **Recommended Fuse Holders**

L60030C Series	. 107
LPSC Touch-Safe Series	. 117

### **Dimensions**

### KLKR Series 600 Vac/300 Vdc • Fast-Acting • 1/10-30 A



### Description

KLKR Series Class CC fuses are fast-acting fuses intended for general purpose branch circuit protection. Their compact size, fast-acting overload response, and highly current-limiting design make them ideal for use in OEM equipment and control panels.

### **Specifications**

**Ampere Range** 

Voltage Rating AC: 600 Vac or less DC: 300 Vdc

DC: 300 Vdc

Interrupting Rating AC: 200 kA rms symmetrical

DC: 20 kA

**Approvals** AC: Standard 248-4, Class CC

UL Listed 1/10-30 A (File: E81895) CSA Certified 1/10-30 A (File: LR29862)

DC: Littelfuse self-certified

Material Melamine body

Bronze caps (nickel plated)

**Environmental** RoHS Compliant **Country of Origin** Mexico

# (I) (SP·C € RoHS)

### Ordering Information

AMPERE RATINGS						
1/10	1/2	2 1/2	6	12		
1/8	3/4	3	7	15		
2/10	1	3 1/2	8	20		
1/4	1 1/2	4	9	25		
3/10	2	5	10	30		

SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
KLKR	12	KLKR012	KLKR012.T

### Web Resources

For additional information, visit:

littelfuse.com/klkr

### **Recommended Fuse Holders**

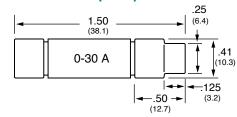
L60030C Series	107
LPSC Touch-Safe Series	117

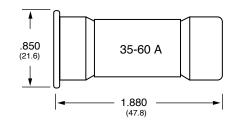
### **Dimensions**



# CLASS CC / CD DIMENSIONS AND CURRENT-LIMITING EFFECTS

### **Dimensions Inches (mm)**



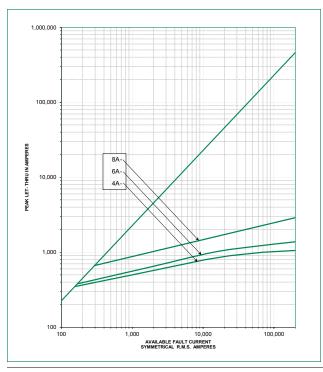


### **Current-Limiting Effects of CCMR (600 V) fuses**

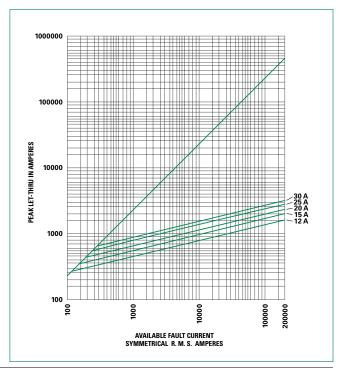
SHORT		APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS																
CURRENT*	2.25A	2.5A	3A	4A	5A	6.25A	7.5A	8A	10A	12A	15A	20A	30A	35A	40A	45A	50A	60A
5,000	203	224	287	289	460	472	442	437	359	369	435	355	621	1,170	1,240	1,320	1,070	1,525
10,000	256	282	361	364	580	595	557	551	452	465	548	447	783	1,480	1,565	1,670	1,355	1,930
15,000	293	323	413	416	664	681	637	631	517	532	627	512	896	1,695	1,795	1,915	1,555	2,200
20,000	323	356	455	458	730	750	702	694	569	585	690	563	987	1,870	1,980	2,110	1,710	2,430
25,000	348	383	490	493	787	808	756	748	613	630	743	607	1,063	2,015	2,135	2,275	1,845	2,620
30,000	370	407	521	524	836	858	803	795	651	670	790	645	1,129	2,145	2,270	2,420	1,965	2,780
35,000	389	429	548	552	880	903	845	837	686	705	832	679	1,189	2,260	2,390	2,550	2,070	2,885
40,000	407	448	573	577	920	944	884	875	717	737	870	709	1,243	2,360	2,500	2,665	2,165	3,025
50,000	438	483	617	622	991	1,017	952	942	772	794	937	764	1,339	2,545	2,695	2,875	2,330	3,200
60,000	466	513	656	661	1,053	1,081	1,012	1,001	821	844	995	812	1,423	2,705	2,865	3,055	2,480	3,350
80,000	513	564	722	727	1,159	1,190	1,114	1,102	903	929	1,096	894	1,566	2,985	3,160	3,365	2,730	3,540
100,000	552	608	778	783	1,249	1,282	1,200	1,187	973	1,001	1,180	963	1,687	3,215	3,405	3,630	2,945	3,685
150,000	632	696	890	897	1,430	1,467	1,373	1,359	1,114	1,146	1,351	1,102	1,931	3,685	3,905	4,160	3,375	4,030
200,000	696	766	980	987	1,574	1,615	1,511	1,496	1,226	1,261	1,487	1,213	2,125	4,060	4,300	4,580	3,720	4,230

<sup>\*</sup>Prospective RMS Symmetrical Amperes Short-Circuit Current Note: Data Derived from Peak Let-Thru Curves

### **Peak Let-Thru Curve KLDR**



### **Peak Let-Thru Curve KLKR**





### 10 x 38mm MIDGET FUSES

### **KLK Series Fast-Acting Fuse** 600 Vac





AMPERE RATINGS						
1/10	1	5	15			
1/8	1 1/2	6	20			
2/10	2	7	25			
1/4	2 1/2	8	30			
3/10	3	9	_			
1/2	3 1/2	10	_			
3/4	4	12	_			

### **Specifications**

Fast-acting, high-interrupting capacity fuse designed for control circuits, HID lighting, street-lighting, meter circuits.

**Voltage Ratings** 

500 Vdc

**Interrupting Ratings** 100 kA @ 600 Vac 50 kA @ 500 Vdc

(capable of 200 kA) UL Listed (E10480)

**Approvals** CSA Certified (LR29862)

**Dimensions** L 38.1mm (1 1/2") **D** 10.31mm (<sup>13</sup>/<sub>32</sub>")

littelfuse.com/klk

**KLKD Series Fast-Acting Fuse** 600 Vac/dc (I) (II) ES GPV ROHS





AMPERE RATINGS						
1/10	1	5	15			
1/8	1 1/2	6	20			
2/10	2	7	25			
1/4	2 1/2	8	30			
3/10	3	9	_			
1/2	3 1/2	10	_			
3/4	4	12	_			

### **Specifications**

Fast-acting, high DC rated fuse used in solar combiner boxes, DC control circuits, UPS protection. Available in PC board mount.

**Voltage Ratings** 600 Vac/dc Interrupting Ratings 100 kA @ 600 Vac

10 kA @ 600 Vdc (UL2579) 50 kA @ 600 Vdc (UL248-14)

UL Listed (E339112 & E10480) **Approvals** 

CSA Certified (LR29862)

**Dimensions** L 38.1mm (1 1/2")

**D** 10.31mm (13/32")

(capable of 200 kA)

littelfuse.com/klkd

### **FLM Series Time-Delay Fuse** 250 Vac

( QPL RoHS P





AMPERE RATINGS						
1/10	8/10	2	$4^{1/2}$	10		
15/100	1	2 1/4	5	12		
2/10	1 1/8	2 1/2	5 6/10	15		
1/4	1 1/4	2 8/10	6	20		
3/10	1 4/10	3	6 1/4	25		
4/10	1 1/2	3 2/10	7	30		
1/2	1 6/10	3 1/2	8	_		
6/10	1 8/10	4	9	_		

### **Specifications**

250V time-delay fuses used to protect circuits with high in-rush. Especially suited for supplemental protection of small motors.

Voltage Ratings 250 Vac

125 Vdc self-certified @ 10 kA

10 kA @ 250 Vac **Interrupting Ratings** Approvals

UL Listed (File: E10480) CSA Certified (029862\_0\_000)

**Dimensions** L 38.1mm (1 <sup>1</sup>/<sub>2</sub>")

**D** 10.31mm (<sup>13</sup>/<sub>32</sub>")

littelfuse.com/flm

### **FLQ Series Time-Delay Fuse** 500 Vac







AMPERE RATINGS					
1/10	1/2	2	5	12	
1/8	6/10	2 1/4	5 6/10	14	
15/100	8/10	2 1/2	6	15	
3/16	1	3	6 1/4	20	
2/10	1 1/8	3 2/10	7	25	
1/4	1 1/4	3 1/2	8	30	
3/10	1 1/2	4	9	_	
4/10	1 6/10	4 1/2	10	_	

### **Specifications**

500V time-delay fuses for supplemental protection of control power transformers, solenoids, and circuits with high in-rush. Ideal for 480 V systems.

**Voltage Ratings** 500 Vac

300 Vdc self-certified @ 10 kA

10 kA @ 500V ac

**Interrupting Ratings Approvals** 

UL Listed (E10480) CSA Certified (LR29862)

Dimensions

**L** 38.1mm (1 <sup>1</sup>/<sub>2</sub>") **D** 10.31mm (13/32")

littelfuse.com/flq

### **BLN Series Fast-Acting Fuse** 250 Vac





AMPERE RATINGS							
1	3	6	12	25			
1 1/2	4	8	15	30			
2	5	10	20				

### **Specifications**

250 volt BLN fuses provide low-cost protection for military applications and control circuits.

**Voltage Ratings Interrupting Ratings** Approvals

250 Vac 10 kA @ 250 Vac UL Listed (E10480)

CSA Certified (LR29862) L 38.1mm (1 1/2")

**Dimensions** 

**D** 10.31mm (13/32")

30

littelfuse.com/bln

### **BLF Series Fast-Acting Fuse** 125/250 Vac





AMPERE RATINGS						
1/2	3	7	15			
1	4	8	20			
1 1/2	5	9	25			
2	6	10	30			
2 1/2	6 1/4	12	_			

### **Specifications**

BLF fuses are the lowest price midget fuse. They are suitable for control circuit and instrument protection in dry locations.

**Voltage Ratings** 

250 Vac 1/2 - 15 A 125 Vac 20 - 30 A

**D** 10.31mm (13/32")

**Approvals** 

Interrupting Ratings 10 kA @ rated Vac UL Listed (E10480)

**Dimensions** 

CSA Certified (LR29862) L 38.1mm (1 1/2")

littelfuse.com/blf



### 10 x 38mm MIDGET FUSES

### **BLS Series Fast-Acting Fuse** 600 Vac / 250 Vac

(I) (SP RoHS



AMPERE RATINGS						
2/10	1	3	8			
4/10	1 1/2	4	10			
1/2	1 6/10	5	_			
3/4	1 8/10	6	_			
8/10	2	7	_			

### **Specifications**

Slightly shorter than a traditional 10 x 38, BLS fuses provide space saving protection for low amperage applications.

**Voltage Ratings** 

600 Vac 2/10 - 5 A 250 Vac 6 - 10 A

Interrupting Ratings 10 kA @ rated Vac

ULListed (F10480) CSA Certified (LR29862)

**Approvals Dimensions** 

L 34.9 mm (1 3/8")

**D** 10.31 mm (13/32")

littelfuse.com/bls

### **KLQ Series Increased Time-Delay** 600 Vac





AMPERE RATINGS						
1	1 2 5					
1 6/10	3	6				

### **Specifications**

Same physical size as the BLS fuse with more time delay. Designed to protect gaseous vapor fixtures, HID ballasts and other electronic lighting circuits.

**Voltage Ratings** 600 Vac

Interrupting Ratings 10 kA @ rated Vac

**Approvals** UL Listed (E10480) CSA Certified (LR29862)

**Dimensions** L 34.9 mm (1 3/8") **D** 10.31 mm (13/32")

littelfuse.com/klg

### **FLA Series Time-Delay Pin Indicating Fuse** 125 Vac

⊕ ❖



AMPERE RATINGS					
1/10	8/10	2	4 1/2	12*	
15/100	1	2 1/4	5	15*	
2/10	1 1/8	2 1/2	5 6/10	20*	
1/4	1 1/4	2 8/10	6	25*	
3/10	1 4/10	3	6 1/4	30*	
4/10	1 1/2	3 2/10	7	_	
1/2	1 6/10	3 1/2	8	_	
6/10	1 8/10	4	10	_	

<sup>\*12-30</sup> A are dual tube design

### **Specifications**

Pin indicating time-delay fuses. Use in conjunction with special fuse blocks to operate mechanical signal switches or energize alarm circuits.

**Voltage Ratings** 125 Vac

Interrupting Ratings 10 kA @ rated Vac **Approvals** UL Listed (E10480) **L** 38.1 mm (1 1/2") Dimensions

**D** 10.31 mm (13/32")

littelfuse.com/fla

### **FLU Series Multimeter Protection** 1000 Vac/dc







### **Specifications**

Multimeter protection fuses.

1000 Vac/Vdc **Voltage Rating** 44/100 A: 10 kA Interrupting Rating 11 A: 20 kA

**Ampere Ratings** 44/100 & 11 A **Time Constant** 10 ms

Approvals UL Recognized (E10480)

CSA Certified (LR29862) 44/100 A: 13/32" x 13/8" **Dimensions** 

11 A: 13/32" x 11/2"

littelfuse.com/flu

# 10 x 38mm Midget Fuse Holder Configurations PC BOARD MOUNT FUSE BLOCK **OPEN FUSE BLOCK** L60030M L60030MPCB pg. 107 pg. 109 **POWR-SAFE DEAD FRONT HOLDERS** LPSC/LPSM (600 V) LPHV (1000 V) pg. 117 pg. 116

### **Section Overview**

Diverse application needs require a broad range of fuses. Littelfuse offers a full line of fuses for various applications. As the market leader in Automotive and Electronics fuses, we are able to deliver innovative circuit protection solutions to our customers. Visit **littelfuse.com** for our full line of Automotive and Electronics solutions.







# ELECTRONIC FUSES AND BLADE FUSES ##

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### HIGH DC VOLTAGE AND PC BOARD MOUNT FUSES

### 505 Series Lead-Free 3AB, Fast-Acting



AMPERE RATINGS					
10 16 25					
12	20	30			

### **Specifications**



A 500 Vac/Vdc rated ceramic fuse with remarkable interrupting rating in a compact 6.3 x 32 mm package, well suited for circuit protection in high energy applications.

**Voltage Rating** 

450 Vac (10 - 12 A) 250 Vdc (10 - 12 A) 500 Vac/dc (16 - 30 A)

Sample Part Axial Lead **Dimensions** 

505\_XEP Series L 31.75 mm (1.25") **D** 6.35 mm (.25")

0505010.MXP\*

littelfuse.com/505

\*Bulk configurations only

### **477 Series** 5 x 20 mm Slo-Blo® Fuse



	AMPERE RATINGS					
.5	2	5	10			
.8	3.15	6.3	12			
1	4	8	16			

### **Specifications**



500 Vac/400 Vdc rated, 5 x 20 mm, time-lag, surge withstand ceramic body fuse.

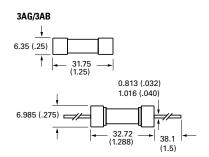
**Voltage Rating** 500 Vac 400 Vdc

Sample Part 0477002.MXP\* Axial Lead 477 XEP Series L 20 mm (.79") **Dimensions** 

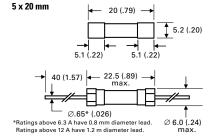
**D** 5.2 mm (.20") littelfuse.com/477

\*Bulk configurations only

### **Dimensions mm (inches)**



2AG	
4.5	4.7 (.184")
(.177")	



### 273 Series **Very Fast-Acting Microfuse**



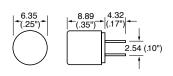


AMPERE RATINGS							
.002	.031	.125	.400	.750	2		
.005	.050	.200	.500	.800	3		
.010	.062	.250	.600	1	4		
.015	.100	.300	.700	1.5	5		

### **Specifications**

Similar to 272 and 278 series, except has transparent cap for visual indication of fuse status. \*See web for approvals by part.

Voltage Rating 125 Vac/dc 0273002.V Sample Part littelfuse.com/273



### 251 Series Fast-Acting Pico® II Fuse





AMPERE RATINGS						
.062	.500	1.25	3	7		
.125	.630	1.5	3.5	10		
.250	.750	2	4	12		
.375	1	2.5	5	15		

### **Specifications**

Subminiature fuse for soldered mounting on printed circuit boards. Available on tape and reel for automatic insertion. \*See web for approvals by part.

**Voltage Ratings** 125 Vac/dc 1/16 - 10 A 32 Vac/dc 12 - 15 A

Sample Part 0251001.NAT1L littelfuse.com/251

E 1A 0.64 (.025") DIA. (1/16 – 10A) 0.81 (.032") DIA. (12 – 15A) 2.80 (.110") DIA. MAX.

### 451 Series NANO<sup>2®</sup> Very Fast-Acting

RoHS (SP. CE) ROHS



Add "L" suffix when ordering RoHS compliant 451 series

	AMPERE RATINGS						
0.062	0.25	0.630	1.5	3.15	7		
0.1	0.315	0.750	1.6	3.5	8		
0.125	0.375	0.800	2	4	10		
0.160	0.400	1	2.5	5	12		
0.2	0.5	1.25	3	6.3	15		

### **Specifications**

The Nano<sup>2</sup> SMF Fuse is a very small, Wire-in-Air (WIA) square shape surface mount fuse which is very suitable for the secondary side circuit over-current protection applications and is designed for PCB using surface mount technology

\*See web for approvals by part.

Voltage Rating 65 - 125 V **Sample Part** 0451.125MP

littelfuse.com/451



### LEADED AND CARTRIDGE FUSES

### 312/318 Series **3AG Fast-Acting**





AMPERE RATINGS						
.062	.200	.750	1.8	5	15	
.100	.250	1	2	6	20	
.125	.300	1.25	2.25	7	25	
.15	.375	1.5	2.5	8	30	
.175	.500	1.6	3	10	35	
.187	.600	1.75	4	12	_	

### **Specifications**

Designed for fast-acting protection of electronic equipment and appliances. The "standard" fast-acting, glass tube fuse.

Voltage Ratings	250 Vac <sup>1</sup> / <sub>100</sub> – 10 A 32 Vac 12 – 35 A
Dimensions	<b>L</b> 31.75 mm (1.25") <b>D</b> 6.35 mm (.25")

Sample Part 0312005.VXP For fuses with axial leads, request 318 Series.

littelfuse.com/312

### 313/315 Series 3AG Slo-Blo®

(I) (F). RoHS



		AMPE	RE RA	TINGS		
.010	.175	.500	1.25	2.8	7	30
.031	.187	.600	1.5	3	8	_
.040	.200	.700	1.6	3.2	10	—
.062	.250	.750	1.8	4	12	_
.100	.300	.800	2	5	15	—
.125	.375	1	2.25	6.25	20	l —
.150	.400	1.2	2.5	6.3	25	_

### **Specifications**

313 and 315 series fuses have time-delay in the overload range, providing superior protection for inductive loads. ID feature available which discolors upon opening.

Voltage Katıngs	250 Vac 1/100 – 8 A
	32 Vac 10 - 30 A
Dimensions	L 31.75 mm (1.25"
	<b>D</b> 6.35 mm (.25")
Sample Part	0313005.VXP

For fuses with axial leads, request 315 Series. For Fuses with ID, add "ID" suffix.

littelfuse.com/313

### 314/324 Series **3AB Fast-Acting**





AMPERE RATINGS				
.375	2	6	12	30
.500	3	7	15	40
.750	4	8	20	_
1	5	10	25	_

### **Specifications**

Similar to 312 series, but ceramic tube permits higher interrupting ratings and voltage ratings: 250 volt ratings to 40 amps.

Voltage Rating	250 Vac 3/8 - 40 A
	125 Vdc <sup>3</sup> / <sub>8</sub> - 30 A
	150 Vdc 40 A

**Dimensions** L 31.75 mm (1.25") **D** 6.35 mm (.25") Sample Part 03145005.VXP For fuses with axial leads, request 324 Series.

littelfuse.com/314

### 326/325 Series 3AB Slo-Blo®







AMPERE RATINGS					
.010	.187	.600	1.5	4	15
.031	.200	.700	1.6	5	20
.062	.250	.750	2	6.25	25
.100	.300	.800	2.5	7	30
.125	.375	1	2.8	8	_
.150	.400	1.2	3	10	_
.175	.500	1.25	3.2	12	_

### **Specifications**

The 326 series fuse has time-delay similar to the 313 series, but the ceramic body permits higher voltage ratings for the 8 - 30 ampere sizes and faster opening of short-circuits.

Voltage Ratings	250 Vac 1/100 - 30 A		
	125 Vdc 1/4 - 3 A		
	125 Vdc 12 - 30 A		
Dimensions	<b>L</b> 31.75 mm (1.25")		
	<b>D</b> 6.35 mm (.25")		
Sample Part	0326.100VXP		
For fuses with axial leads, request 325 Series.			

229/230 Series 2AG Slo-Blo®







AMPERE RATINGS				
.250	.750	2	4	
.350	.800	2.25	5	
.375	1	2.5	6	
.500	1.25	3	7	
.600	1.5	3.5	_	

### **Specifications**

2AG indicating fuses instantly identify themselves upon opening by showing a discoloration of their glass bodies, eliminating guesswork. This unique design offers the same

	performance characteristics as the ard 2AG fuse design.*		
Voltage Ratings	250 Vac <sup>1</sup> / <sub>4</sub> – 3 <sup>1</sup> / <sub>2</sub> A 125 Vac 4 – 7 A		

125 Vdc 1/4 - 7 A Dimensions L 14.48 mm (.57") **D** 4.5 mm (.177") 02291 25VXP

Sample Part For fuses with axial leads, request 230 Series. \*Must add "S" suffix when ordering indicating fuse

littelfuse.com/229

### 225/224 Series **2AG Fast-Acting**





AMPERE RATINGS					
.375   1   2.5   4   7					
.500	1.5	3	5	8	
.750	2	3.5	6	10	

### **Specifications**

Fast-acting performance of the 312 series 3AG fuses in less than one-third the space. For protection of electronic equipment and appliances.

**Voltage Ratings** 250 Vac  $^{3}/_{8}$  - 3  $^{1}/_{2}$  A 125 Vac 4 - 10 A 125 Vdc <sup>3</sup>/<sub>8</sub> - 3 <sup>1</sup>/<sub>2</sub> A

**Dimensions** L 14.48 mm (.57") **D** 4.5 mm (.177")

Sample Part 0225003.VXP For fuses with axial leads, request 224 Series.

littelfuse.com/225

Note: All fuses on this page are available in packaged and bulk configurations

2



# 5 x 20 mm IEC LEADED AND CARTRIDGE FUSES

#### 215 Series 5 x 20 mm IEC Slo-Blo®

(S) (P) RoHS



	1A	MPERE	RATING	SS	
.125	.315	.800	2	5	12
.160	.400	1	2.5	6.3	15
.200	.500	1.25	3.15	8	16
250	630	16	4	10	20

#### **Specifications**

Time-delay protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuse for foreign equipment.

**Voltage Rating** 250 Vac L 20 mm (.79") **Dimensions D** 5.2 mm (.20") Sample Part 0215005.VXP

For fuses with axial leads, request 215\_XEP series.

littelfuse.com/215

# 216 Series 5 x 20 mm IEC Fast-Acting

(S) O'E ROHS



AMPERE RATINGS						
.050	.125	.315	1	2.5	6.3	16
.063	.160	.500	1.25	3.15	8	_
.080	.200	.630	1.6	4	10	_
.100	.250	.800	2	5	12.5	_

#### **Specifications**

Fast-acting protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuse for foreign equipment.

**Voltage Rating** 

60 Vdc (1.25-3.15, 4-6.3 A only) L 20 mm (.79")

**Dimensions D** 5.2 mm (.20")

Sample Part 0216005.VXP For fuses with axial leads, request 216\_XEP series.

littelfuse.com/216

#### 217 Series 5 x 20 mm IEC Fast-Acting



AMPERE RATINGS									
.032	.100	.250	.630	1.6	4	10			
.050	.125	.315	.800	2	5	15			
.063	.160	.400	1	2.5	6.3	_			
.080	.200	.500	1.25	3.15	8	_			

#### **Specifications**

Fast-acting protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuse for foreign equipment.

**Voltage Rating** 250 Vac

75Vdc (2-3.15 A only)

60 Vdc (6.3, 2.-5 A only)

Dimensions L 20 mm (.79") **D** 5.2 mm (.20")

Sample Part 0217005.VXP

For fuses with axial leads, request 217\_XEP series.

littelfuse.com/217

#### 218 Series 5 x 20 mm IEC Slo-Blo®





#### **Specifications**

Time-delay protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuse for foreign equipment.

**Voltage Rating** 250 Vac L 20 mm (.79") **Dimensions D** 5.2 mm (.20") Sample Part 0218005.VXP For fuses with axial leads, request 218 XEP series.

littelfuse.com/218

#### 235 Series 5 x 20 mm UL/CSA Fast-Acting (I) (Sp. C € RoHS



AMPERE RATINGS									
.100	.300	.700	1.60	3.5	7				
.125	.400	.800	2	4	_				
.200	.500	1	2.5	5	_				
.250	.600	1.25	3	6	_				

#### **Specifications**

5 x 20 mm fuses designed to UL and CSA standards. Fast-acting protection of electronic equipment and appliances.

250 Vac <sup>1</sup>/<sub>10</sub> – 3 <sup>1</sup>/<sub>2</sub> A 125 Vac 4 – 7 A **Voltage Ratings Dimensions L** 20 mm (.79") **D** 5.2 mm (.20") Sample Part 0235005.VXP For fuses with axial leads, request 235\_XEP series.

littelfuse.com/235

# 239 Series 5 x 20 mm UL/CSA Slo-Blo®



AMPERE RATINGS										
.080   .200   .500   .800   2   3.20   7										
.100	.250	.600	1	2.5	3.50	_				
.125	.300	.700	1.25	3	4	_				
.150	.400	.750	1.60	3.15	5	_				

#### **Specifications**

5 x 20 mm fuses designed to UL and CSA standards. Time-delay protection of electronic equipment and appliances.

250 Vac  $^2/_{10} - 3 \, ^1/_2 \, A$ **Voltage Ratings**  $125 \ Vac \ 4 - 7 \ A$ **Dimensions L** 20 mm (.79") **D** 5.2 mm (.20") Sample Part 0239005.VXP

For fuses with axial leads, request 239\_XEP series.

littelfuse.com/239



# **BLADE FUSES**

#### **MINI® Smart Glow**



#### **Specifications**

Smart Glow fuses are innovative automotive style fuses (ATO, MINI, and MAXI) that feature an indicator light that glows when the fuse is blown, saving time to troubleshoot an open circuit.

**Voltage Rating** Sample Part

14 Vdc

OMIN010.VPGLO

#### MINI® Fast-Acting (I) RoHS (PD)



#### **Specifications**

The MINI® Fuse, with its miniature design patented by Littelfuse, meets the need for more circuits to be protected while utilizing less space.

**Voltage Rating** 32 Vdc OMINO20 V Sample Part

littelfuse.com/mini

MINI Fuses are available in packaged and bulk configurations. See 297 series on web.

#### **Fuses Rated 58 V** Low Profile MINI®





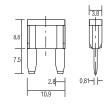
#### **Specifications**

The low profile MINI has similar performance as the standard mini fuse. The lower overall height allows for more space and weight savings.

**Voltage Rating** 58 Vdc Sample Part LMIND10 V

littelfuse.com/lmin

#### MINI dimensions in mm



Low Profile MINI dimensions in mm (inches)





# **ATO**<sup>®</sup> **Smart Glow**



#### **Specifications**

Smart Glow fuses are innovative automotive style fuses (ATO, MINI, and MAXI) that feature indicator light that glows when the fuse is blown, saving time to troubleshoot an open circuit.

**Voltage Rating** Sample Part

14 Vdc 0ATO010.VPGLO **ATO® Fast-Acting** 





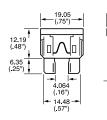
#### **Specifications**

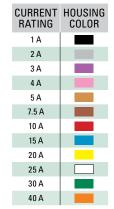
The ATO® Fuse was designed and patented by Littelfuse in 1976 and set the standard for automotive circuit protection. It features industry standard color coding to indicate amperage rating.

**Voltage Rating** 32 Vac/dc Sample Part 0AT0020.V

littelfuse.com/ato

ATO dimensions in mm (inches)





ATO® / MINI® Color Key

Note: MINI not available in 1 A or 40 A

#### ATO Fuses are available in packaged and bulk configurations. See 287 series on web.

#### **MAXITM Smart Glow**



#### **Specifications**

Smart Glow fuses are innovative automotive style fuses (ATO, MINI, and MAXI) that feature an indicator light that glows when the fuse is blown, saving time to troubleshoot an open circuit.

**Voltage Rating** Sample Part

14 Vdc

0MAX030.XPGL0

#### MAXI™ Slo-Blo

RoHS



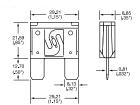
#### **Specifications**

Designed and patented by Littelfuse, the MAXI™ Fuse is ideal for motor powered applications which have large inrush currents.

**Voltage Rating** 32 Vdc 0MAX030.X Sample Part

littelfuse.com/maxi

#### MAXI dimensions in mm (inches)



#### MAXI™ **Color Key**

CURRENT RATING	HOUSING COLOR
20 A	
25 A	
30 A	
35 A	
40 A	
50 A	
60 A	
70 A	
80 A	

MAXI Fuses are available in packaged and bulk configurations. See 299 series on web.

60 A



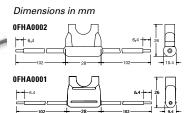
# **BLADE FUSES**

# FHA Blade Fuse Holders—In-Line Fuse Holder for ATO® Style Blade Fuse



Used with ATO Fuse 1 to 20 A or 25 A and 30 A. Supplied with two 4" (102mm) wire leads.

littelfuse.com/fha



PART NUMBER	DESCRIPTION	FUSE RATING
0FHA0001_	16AWG/1.3mm <sup>2</sup> STRANDED BLACK WIRE	20 A
0FHA0002_	12AWG/3.3mm <sup>2</sup> STRANDED ORANGE WIRE	30 A

DESCRIPTION

14AWG/2.1mm<sup>2</sup>
STRANDED BLACK WIRE

12AWG/3.3mm<sup>2</sup> STRANDED ORANGE WIRE

Wire length, color and diameter can be

customized upon request.

20 A

30 A

Wire length, color and diameter can be customized upon request.

# FHAC Blade Fuse Holders—In-Line Splash-Waterproof Fuse Holder for ATO® Style Blade Fuse

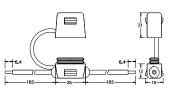
RoHS



Used with ATO Fuse 1 to 20 A or 25 A and 30 A. Supplied with two 4" (102mm) wire leads. Includes protective cover for harsh environments.

littelfuse.com/fha

Dimensions in mm



PART NUMBER	DESCRIPTION	FUSE RATIN
FHAC0001_	16AWG/1.3mm <sup>2</sup> STRANDED BLACK WIRE	20 A
FHAC0002_	12AWG/3.3mm <sup>2</sup> STRANDED ORANGE WIRE	30 A

Wire length, color and diameter can be customized upon request.

# FHM Blade Fuse Holders—In-Line Splash-Waterproof Fuse Holder for MINI® Style Blade Fuse

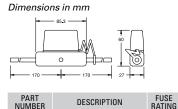


Used with MINI Fuse 1 to 20 A or 25 A and 30 A. Supplied with two 4.78" (122 mm) wire leads. Includes protective cover for harsh environment.

littelfuse.com/fhm

# MAH Blade Fuse Holders—In-Line Fuse Holder for MAXI™ Style Blade Fuse





omahoootz | Wire color black wads

Supplied with two 6", 6-gauge wire leads for up to 60 A MAXI Fuse applications, this In-Line Fuse holder also provides a protective cover for harsh under-the-hood environments. Mounting hole permits easy bulkhead installation.

littelfuse.com/mah

# JCASE® Cartridge Fuse Rated 32 V



#### **Specifications**

The JCASE is a cartridge style fuse with female terminal design. JCASE provides both increased time delay and low voltage drop to protect high current circuits. JCASE has the ability to handle in-rush currents. The JCASE was designed and patented by Littelfuse.

littelfuse.com/jcase

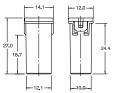
#### Low Profile JCASE® Fuse Rated 58 V



#### **Specifications**

The Low Profile JCASE fuse has similar performance characteristics as the standard JCASE fuse. The lower overall height reduction allows for more space and weight savings and also allows for a shorter male blade terminal, saving additional weight and material savings in fuse box designs.

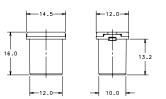
#### JCASE® 32 V Dimensions in mm





# -| 5.5 |--

#### Low Profile JCASE® 58 V Dimensions in mm



# JCASE® Color Key

20 A 25 A 30 A 40 A 50 A	CURRENT RATING	HOUSING COLOR
30 A 40 A 50 A	20 A	
40 A 50 A	25 A	
50 A	30 A	
	40 A	
60 A	50 A	
	60 A	



### **Section Overview**

Littelfuse is your source for a fast replacement of E- and R-rated medium voltage fuses. Our emergency service gets you the fuses you need quickly to minimize downtime of your critical operations.







# 

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# MEDIUM VOLTAGE FUSES

#### 2,400-38,000 Vac • Current-Limiting



# **Description**

Littelfuse® offers a selection of E- and R-rated medium voltage fuses for the protection of transformers, potential transformers, feeders, and motor circuits. Single, double, and triple barrel designs are available to cover a wide range of current, voltage, and interrupting ratings. Conventional ferrule type, clip lock, and bolt-in mounting configurations are available for virtually any application. Hermetically sealed fuses for use in hazardous environments are also offered.

Contact the factory or your local Littelfuse representative for additional fuse ratings or custom mounting configurations.

#### 24-Hour Emergency Service - Call 800-227-0029

# **Applications**

- Power Transformer Protection
- Potential Transformer Protection
- Motor Controller Back-up Protection
- Fused Switches
- · Feeder Circuits



Current-limiting E- and R-rated fuses are equipped with a mechanical indicator or striker pin that protrudes through the fuse cap upon operation of the fuse. This provides visual identification of a blown fuse and can be used as a trigger for external devices.

Note: Extension distance 1/2" minimum; extension force 2 lb. minimum.

#### **General Information**

The terms "Medium Voltage" and "High Voltage" have been used interchangeably by many people to describe fuses operating above 600 volts. Technically speaking, medium voltage fuses are those intended for the voltage range from 2,400 to 38,000 Vac. High voltage fuses are for circuits carrying voltages greater than 38,000 Vac.

E-rated fuses are considered to be general purpose fuses and can be used to protect against low and high values of fault current. R-rated fuses are designed for back-up protection. They must be used in series with other devices such as motor overload relays in order to achieve both overload and short-circuit protection.

Medium voltage fuses are not intended to provide overload protection in the same sense as fuses rated 600 volts or less. Medium voltage fuse current ratings do not have the same meanings as the ampere ratings of low voltage fuses.

All medium voltage fuses are limited in their ability to interrupt low value overcurrents, especially those between 100% and 200% of the fuse's continuous current rating. They are designed to carry their rated current without exceeding the temperature rise permitted by NEMA and ANSI standards.



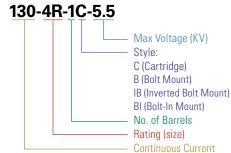


# **Description**

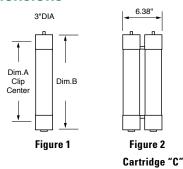
R-rated fuses provide required short-circuit protection for medium voltage motors, motor controllers and associated circuitry. These components have limited ability to absorb the energy of large short-circuit currents. Medium voltage motor controllers contain overload relays which provide both overload protection and locked rotor protection to the motor. The controllers are also intended to interrupt low value short-circuits within the capability of the motor controller. This protects the medium voltage fuse from sustained overcurrents which are less than their minimum interrupting rating.

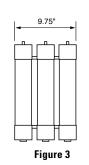
NEMA Standards for R-rated medium voltage power fuses require they operate within 15-35 seconds when subjected to an rms current 100 times the R rating. For example, a fuse with a 2R rating will open within 15 to 35 seconds on an applied current of  $2 \times 100 = 200$  amperes.

## **Ordering Number**



#### **Dimensions**





#### **Characteristics**

**Voltage Ratings** 2,750 V - 8,250 V**Current Range** 2R - 36R

#### **Options**

- Hermetically sealed for use in hazardous locations (add "S" suffix to part number)
- Bolt-in mounting configurations



#### **Hookeye Feature\***

For hookeye attachment; add "W" suffix to part number

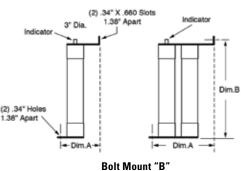
 ${}^{*}\mathsf{See}$  web for Bolt Mount, Inverted Bolt Mount, and Bolt-In dimensions

#### Medium Voltage Fuse Protection

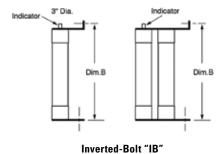
POWR-GARD® medium voltage fuses provide short-circuit protection for motors and transformers rated 2,400 to 38,000 volts AC.



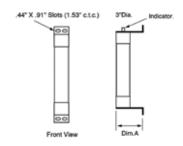
Visit **littelfuse.com/MediumVoltage** to download the white paper featuring protection tables, sizing recommendations, and applications.



Sample Part #: 130-4R-1B-5.5



Sample Part #: 130-4R-1IB-5.5



**Bolt-In Mount "BI"**Sample Part #: 130-4R-1BI-5.5



R RATED	ORDERING/ CATALOG NUMBER	SIZE	MAXIMUM CONTINUOUS CURRENT @ 40 DEGREES C°	DIM. A (INCHES)	DIM. B (INCHES)	MINIMUM INTERRUPTING RATING RMS AMPS	MAXIMUM INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	702R1C2.75	2R	70	7"	10.875"	170	80,000	1
	1003R1C2.75	3R	100	7"	10.875"	250	80,000	1
	1304R1C2.75	4R	130	7"	10.875"	340	80,000	1
≥	1505R1C2.75	5R	150	7"	10.875"	390	80,000	1
2	1706R1C2.75	6R	170	7"	10.875"	500	80,000	1
2.7	2009R1C2.75	9R	200	7"	10.875"	760	80,000	1
	23012R1C2.75	12R	230	7"	10.875"	1000	80,000	1
	39018R2C2.75	18R	390	7"	10.875"	1500	80,000	2
	45024R2C2.75	24R	450	7"	10.875"	1950	80,000	2

R RATED	ORDERING/ CATALOG NUMBER	SIZE	MAXIMUM CONTINUOUS CURRENT @ 40 DEGREES C°	DIM. A (INCHES)	DIM. B (INCHES)	MINIMUM INTERRUPTING RATING RMS AMPS	MAXIMUM INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	702R1C5.5	2R	70	12"	15.875"	170	80,000	1
	1003R1C5.5	3R	100	12"	15.875"	250	80,000	1
	1304R1C5.5	4R	130	12"	15.875"	340	80,000	1
	1505R1C5.5	5R	150	12"	15.875"	390	80,000	1
	1706R1C5.5	6R	170	12"	15.875"	500	80,000	1
	2009R1C5.5	9R	200	12"	15.875"	760	80,000	1
_	23012R1C5.5	12R	230	12"	15.875"	1000	80,000	1
≥	39018R2C5.5	18R	390	12"	15.875"	1500	80,000	2
5.5	45024R2C5.5	24R	450	12"	15.875"	1950	80,000	2
	48026R2C5.5	26R	480	12"	15.875"	2100	80,000	2
	55030R2C5.5	30R	550	12"	15.875"	2400	80,000	2
	60032R2C5.5	32R	600	12"	15.875"	2600	80,000	2
	65036R2C5.5	36R	650	12"	15.875"	2900	80,000	2
	55030R3C5.5	30R	550	12"	15.875"	2400	80,000	3
	60032R3C5.5	32R	600	12"	15.875"	2600	80,000	3
	65036R3C5.5	36R	650	12"	15.875"	2900	80,000	3

R RATED	ORDERING/ CATALOG NUMBER	SIZE	MAXIMUM CONTINUOUS CURRENT @ 40 DEGREES C°	DIM. A (INCHES)	DIM. B (INCHES)	MINIMUM INTERRUPTING RATING RMS AMPS	MAXIMUM INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	702R1C5.5X	2R	70	14"	17.875"	170	80,000	1
	1003R1C5.5X	3R	100	14"	17.875"	250	80,000	1
KV CENTERS	1304R1C5.5X	4R	130	14"	17.875"	340	80,000	1
. 📙	1505R1C5.5X	5R	150	14"	17.875"	390	80,000	1
호현	1706R1C5.5X	6R	170	14"	17.875"	500	80,000	1
5.5 IP (	2009R1C5.5X	9R	200	14"	17.875"	760	80,000	1
- H	23012R1C5.5X	12R	230	14"	17.875"	1000	80,000	1
14"	39018R2C5.5X	18R	390	14"	17.875"	1500	80,000	2
_	45024R2C5.5X	24R	450	14"	17.875"	1950	80,000	2
	55030R2C5.5X	30R	550	14"	17.875"	2400	80,000	2

R RATED	ORDERING/ CATALOG NUMBER	SIZE	MAXIMUM CONTINUOUS CURRENT @ 40 DEGREES C°	DIM. A (INCHES)	DIM. B (INCHES)	MINIMUM INTERRUPTING RATING RMS AMPS	MAXIMUM INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	702R1C8.25	2R	70	12"	15.875"	190	80,000	1
	1003R1C8.25	3R	100	12"	15.875"	225	80,000	1
	1304R1C8.25	4R	130	12"	15.875"	330	80,000	1
≥	1505R1C8.25	5R	150	12"	15.875"	440	80,000	1
8.25 F	1706R1C8.25	6R	170	12"	15.875"	500	80,000	1
2.5	2009R1C8.25	9R	200	12"	15.875"	740	80,000	1
	23012R1C8.25	12R	230	12"	15.875"	955	80,000	1
	39018R2C8.25	18R	390	12"	15.875"	1440	80,000	2
	45024R2C8.25	24R	450	12"	15.875"	1910	80,000	2

<sup>\*</sup> RMS Asymmetrical amperes = RMS Symmetrical amperes x 1.6 For hookeye attachment add "W" suffix to part number



### **Description**

E-rated fuses have time current characteristics designed to provide current-limiting protection for power transformers, potential transformers, power centers, feeder centers, and unit sub stations. When properly applied, they can protect against high and low fault currents.

NEMA Standards for E-rated medium voltage fuses require that fuses rated 100E or less open within 300 seconds (5 minutes) when subjected to an RMS value of 200-240% of the fuse continuous current rating; and fuses with an E rating larger than 100E must open within 600 seconds (10 minutes) when subjected to an RMS current of 220-240% of the fuse's continuous current rating. These values establish one point on the time-current curve.

#### **Application Note**

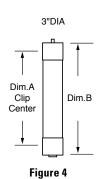
Since these fuses are used for the protection of general purpose circuits which may contain transformers, motors, and other equipment producing in-rush and/or overload currents, fuses should generally be rated at 140% of the normal full load current, and circuits should be analyzed to ensure that system load currents will not exceed the current rating of the fuse.

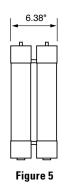
#### **Characteristics**

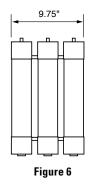
# **Options**

- Hermetically sealed for use in hazardous locations (add "S" suffix to part number)
- Clip-lock (CL) available.

#### **Dimensions**







E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	10E1C2.75	10E	7"	10.875"	80,000	4
	15E1C2.75	15E	7"	10.875"	80,000	4
	20E1C2.75	20E	7"	10.875"	80,000	4
	25E1C2.75	25E	7"	10.875"	80,000	4
	30E1C2.75	30E	7"	10.875"	80,000	4
	40E1C2.75	40E	7"	10.875"	80,000	4
	50E1C2.75	50E	7"	10.875"	80,000	4
	65E1C2.75	65E	7"	10.875"	80,000	4
≥	80E1C2.75	80E	7"	10.875"	80,000	4
×	100E-1C2.75	100E	7"	10.875"	80,000	4
ĕ	125E1C2.75	125E	7"	10.875"	80,000	4
2.75 MAX.	150E1C2.75	150E	7"	10.875"	80,000	4
2.7	200E1C2.75	200E	7"	10.875"	80,000	4
	125E2C2.75	125E	7"	10.875"	80,000	5
	150E2C2.75	150E	7"	10.875"	80,000	5
	200E2C2.75	200E	7"	10.875"	80,000	5
	250E2C2.75	250E	7"	10.875"	80,000	5
	300E2C2.75	300E	7"	10.875"	80,000	5
	350E2C2.75	350E	7"	10.875"	80,000	5
	400E2C2.75	400E	7"	10.875"	80,000	5
	450E2C2.75	450E	7"	10.875"	80,000	5

<sup>\*</sup> RMS Asymmetrical amperes = RMS Symmetrical amperes x 1.6



E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	10E1C5.5	10E	12"	15.875"	80,000	4
	15E1C5.5	15E	12"	15.875"	80,000	4
	20E1C5.5	20E	12"	15.875"	80,000	4
	25E1C5.5	25E	12"	15.875"	80,000	4
	30E1C5.5	30E	12"	15.875"	80,000	4
	40E1C5.5	40E	12"	15.875"	80,000	4
	50E1C5.5	50E	12"	15.875"	80,000	4
	65E1C5.5	65E	12"	15.875"	80,000	4
	80E1C5.5	80E	12"	15.875"	80,000	4
	100E1C5.5	100E	12"	15.875"	80,000	4
≥	125E1C5.5	125E	12"	15.875"	80,000	4
	150E1C5.5	150E	12"	15.875"	80,000	4
€	175E1C5.5	175E	12"	15.875"	80,000	4
5.5 MAX.	200E1C5.5	200E	12"	15.875"	80,000	4
5.	125E2C5.5	125E	12"	15.875"	80,000	5
	150E2C5.5	150E	12"	15.875"	80,000	5
	200E2C5.5	200E	12"	15.875"	80,000	5
	250E2C5.5	250E	12"	15.875"	80,000	5
	300E2C5.5	300E	12"	15.875"	80,000	5
	350E2C5.5	350E	12"	15.875"	80,000	5
	400E2C5.5	400E	12"	15.875"	80,000	5
	450E2C5.5	450E	12"	15.875"	80,000	5
	500E3C5.5	500E	12"	15.875"	80,000	6
	550E3C5.5	550E	12"	15.875"	80,000	6
	600E3C5.5	600E	12"	15.875"	80,000	6

E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	5NLE10E	10E	14"	171/8"	80,000	4
	5NLE15E	15E	14"	17%"	80,000	4
	5NLE20E	20E	14"	17%"	80,000	4
	5NLE25E	25E	14"	17%"	80,000	4
	5NLE30E	30E	14"	17%"	80,000	4
	5NLE40E	40E	14"	17%"	80,000	4
	5NLE50E	50E	14"	17%"	80,000	4
_	5NLE65E	65E	14"	17%"	80,000	4
≥	5NLE80E	80E	14"	17%"	80,000	4
5.5 MAX.	5NLE100E	100E	14"	17%"	80,000	4
Σ	5NLE125E	125E	14"	17%"	80,000	4
5.5	5NLE150E	150E	14"	17%"	80,000	4
_,	5NLE175E	175E	14"	17%"	80,000	4
	5NLE200E	200E	14"	17%"	80,000	4
	5NLE2225E	225E	14"	17%"	80,000	5
	5NLE2250E	250E	14"	17%"	80,000	5
	5NLE2300E	300E	14"	17%"	80,000	5
	5NLE2350E	350E	14"	17 <sup>7</sup> /8"	80,000	5
	5NLE2400E	400E	14"	171/8"	80,000	5
	5NLE2450E	450E	14"	171/8"	80,000	5

<sup>\*</sup> RMS Asymmetrical amperes = RMS Symmetrical amperes x 1.6



E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	10E1C8.25	10E	12"	15¾"	80,000,	4
	15E1C8.25	15E	12"	151/8"	80,000	4
	20E1C8.25	20E	12"	15%"	80,000	4
	25E1C8.25	25E	12"	151/8"	80,000	4
	30E1C8.25	30E	12"	15%"	80,000	4
	40E1C8.25	40E	12"	15%"	80,000	4
	50E1C8.25	50E	12"	15%"	80,000	4
>		65E	12"	15%"	80,000	
≥	65E1C8.25				· ·	4
<b>×</b>	80E1C8.25	80E	12"	15%"	80,000	4
È	100E1C8.25	100E	12"	15%"	80,000	4
8.25 MAX.	125E1C8.25	125E	12"	15%"	80,000	4
<u>∞</u>	150E1C8.25	150E	12"	15%"	80,000	4
	125E2C8.25	125E	12"	15¾"	80,000	5
	150E2C8.25	150E	12"	15%"	80,000	5
	200E2C8.25	200E	12"	15%"	80,000	5
	250E2C8.25	250E	12"	151/8"	80,000	5
	300E2C8.25	300E	12"	151/8"	80,000	5
	350E3C8.25	350E	12"	15%"	80,000	6
	400E3C8.25	400E	12"	151/8"	80,000	6
E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	8NLE10E	10E	14"	17¾"	80,000	4
				· ·	· · · · · · · · · · · · · · · · · · ·	
	8NLE15E	15E	14"	17%"	80,000	4
	8NLE20E	20E	14"	17%"	80,000	4
	8NLE25E	25E	14"	171/8"	80,000	4
	8NLE30E	30E	14"	171/8"	80,000	4
≥	8NLE40E	40E	14"	171/8"	80,000	4
×	8NLE50E	50E	14"	17%"	80,000	4
8.25 MAX.	8NLE65E	65E	14"	171/8"	80,000	4
2	8NLE80E	80E	14"	171/8"	80,000	4
3.2	8NLE100E	100E	14"	171/8"	80,000	4
~	8NLE2100E	100E	14"	171/8"	80,000	5
	8NLE2125E	125E	14"	17%"	80,000	5
	8NLE2150E	150E	14"	17 1/8"	80,000	5
			14"	17 %"	,	5
	8NLE2200E	200E			80,000	
	8NLE2250E	250E	14"	17%"	80,000	5
E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	10E1C15.5	10E	15"	18.875"	80,000	4
	15E1C15.5	15E	15"	18.875"	80,000	4
	20E1C15.5	20E	15"	18.875"	80,000	4
	25E1C15.5	25E	15"	18.875"	80,000	4
	30E1C15.5	30E	15"	18.875"	80,000	4
			15"			4
	40E1C15.5	40E		18.875"	80,000	
	50E1C15.5	50E	15"	18.875"	80,000	4
5	65E1C15.5	65E	15"	18.875"	80,000	4
ن	80E1C15.5	80E	15"	18.875"	80,000	4
à l	100E1C15.5	100E	15"	18.875"	80,000	4
Σ	65E2C15.5	65E	15"	18.875"	80,000	5
15.5 MAX. KV	80E2C15.5	80E	15"	18.875"	80,000	5
<del>-</del>	100E2C15.5	100E	15"	18.875"	80,000	5
	125E2C15.5	125E	15"	18.875"	80,000	5
	150E2C15.5	150E	15"	18.875"	80,000	5
	175E2C15.5	175E	15"	18.875"	80,000	5
	1,022010.0			18.875"	80,000	5
		200E	15"			
	200E2C15.5	200E	15"		· · · · · · · · · · · · · · · · · · ·	
	200E2C15.5 200E3C15.5	200E	15"	18.875"	80,000	6
	200E2C15.5				· · · · · · · · · · · · · · · · · · ·	

<sup>\*</sup> RMS Asymmetrical amperes = RMS Symmetrical amperes x 1.6



E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	15GSE65E	65E	18"	217/8"	60,000	4
≥	15GSE80E	80E	18"	211/8"	60,000	4
- -	15GSE100E	100E	18"	21 1/8"	60,000	4
¥ [	15GSE2125E	125E	18"	211//8"	60,000	5
2	15GSE2150E	150E	18"	211/8"	60,000	5
15.	15GSE2175E	175E	18"	211/8"	60,000	5
	15GSE2200E	200E	18"	211/8"	60,000	5

E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	15NLE10E	10E	20"	231/8"	60,000	4
	15NLE15E	15E	20"	231/8"	60,000	4
	15NLE20E	20E	20"	23%"	60,000	4
	15NLE25E	25E	20"	231/8"	60,000	4
	15NLE30E	30E	20"	231/8"	60,000	4
	15NLE40E	40E	20"	23%"	60,000	4
	15NLE50E	50E	20"	231/8"	60,000	4
>	15NLE65E	65E	20"	23%"	60,000	4
≥	15NLE80E	80E	20"	231/8"	60,000	4
MAX.	15NLE100E	100E	20"	23%"	60,000	4
Ĭ (	15NLE280E	80E	20"	23¾"	60,000	5
15.5	15NLE2100E	100E	20"	23%"	60,000	5
==	15NLE2125E	125E	20"	231/8"	60,000	5
	15NLE2150E	150E	20"	23%"	60,000	5
	15NLE2175E	175E	20"	231/8"	60,000	5
	15NLE2200E	200E	20"	23¾"	60,000	5
	15NLE3150E	150E	20"	23%"	60,000	6
	15NLE3175E	175E	20"	231/8"	60,000	6
	15NLE3250E	250E	20"	23%"	60,000	6
	15NLE3300E	300E	20"	231/8"	60,000	6

E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	15E1C25.8	15E	21"	247/8"	40,000	4
	20E1C25.8	20E	21"	247/8"	40,000	4
≥	25E1C25.8	25E	21"	241/8"	40,000	4
×	30E1C25.8	30E	21"	24 <sup>7</sup> /8"	40,000	4
MAX	40E1C25.8	40E	21"	241/8"	40,000	4
∞.	50E1C25.8	50E	21"	247/8"	40,000	4
72	65E2C25.8	65E	21"	247/8"	40,000	5
	80E2C25.8	80E	21"	24 <sup>7</sup> /8"	40,000	5
	100E2C25.8	100E	21"	24 <sup>7</sup> /8"	40,000	5

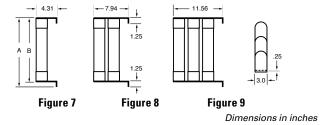
E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	3E1C38.0	3E	27"	307/8"	20,000	4
	7E1C38.0	7E	27"	301/8"	20,000	4
	10E1C38.0	10E	27"	301/8"	20,000	4
≥	15E1C38.0	15E	27"	301/8"	20,000	4
	20E1C38.0	20E	27"	30¾"	20,000	4
MAX.	25E1C38.0	25E	27"	301/8"	20,000	4
	30E1C38.0	30E	27"	301/8"	20,000	4
88	40E1C38.0	40E	27"	301/8"	20,000	4
	50E2C38.0	50E	27"	301/8"	20,000	5
	65E2C38.0	65E	27"	301/8"	20,000	5
	80E2C38.0	80E	27"	301/8"	20,000	5

<sup>\*</sup> RMS Asymmetrical amperes = RMS Symmetrical amperes x 1.6



# **Clip Lock Design**

The clip lock type designs ensures a positive contact between the fuse and the connection cam. The fuse's clip lock tab slides in between the clip casting and the cam to prevent the fuse from slipping or blowing out of the holder. This positive contact improves heat dissipation and allows fuses to run cooler.



	neat dissipation and all	JVVS TUSES II	Jiuli Coolei.			
E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	10E1CL5.5	10E	16.38"	15.13"	80,000	7
	15E1CL5.5	15E	16.38"	15.13"	80,000	7
	20E1CL5.5	20E	16.38"	15.13"	80,000	7
	25E1CL5.5	25E	16.38"	15.13"	80,000	7
	30E1CL5.5	30E	16.38"	15.13"	80,000	7
	40E1CL5.5	40E	16.38"	15.13"	80,000	7
	50E1CL5.5	50E	16.38"	15.13"	80,000	7
	65E1CL5.5	65E	16.38"	15.13"	80,000	7
≥×	80E1CL5.5	80E	16.38"	15.13"	80,000	7
- 58 T	100E1CL5.5	100E	16.38"	15.13"	80,000	7
<b>₹</b> □	125E1CL5.5	125E	16.38"	15.13"	80,000	7
5.5 MAX. KV CLIP LOCK	150E1CL5.5	150E	16.38"	15.13"	80,000	7
5.5	225E2CL5.5	225E	17.38"	16.13"	80,000	8
Δ,	250E2CL5.5	250E	17.38"	16.13"	80,000	8
	300E2CL5.5	300E	17.38"	16.13"	80,000	8
	350E2CL5.5	350E	17.38"	16.13"	80,000	8
	400E2CL5.5	400E	17.38"	16.13"	80,000	8
	450E2CL5.5	450E	17.38"	16.13"	80,000	8
-	500E3CL5.5	500E	17.38"	16.13"	80,000	9
	550E3CL5.5	550E	17.38"	16.13"	80,000	9
	600E3CL5.5	600E	17.38"	16.13"	80,000	9
		UUUL	17.50	10.15		
E-RATED	ORDERING/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*	FIGURE NUMBER
	10E1CL8.25	10E	17.38"	16.13"	80,000	7
	15E1CL8.25	15E	17.38"	16.13"	80,000	7
	20E1C8.25	20E	17.38"	16.13"	80,000	7
	25E1CL8.25	25E	17.38"	16.13"	80,000	7
	30E1CL8.25	30E	17.38"	16.13"	80,000	7
	40E1CL8.25	40E	17.38"	16.13"	80,000	7
	50E1CL8.25	50E	17.38"	16.13"	80,000	7
	65E1CL8.25	65E	17.38"	16.13"	80,000	7
$\sim$ $\sim$						
$\forall$	80E1CL8.25	80E	17.38"	16.13"	80,000	7
MA P L(	80E1CL8.25 100E1CL8.25	80E 100E	17.38" 17.38"	16.13" 16.13"	80,000 80,000	7 7
25 MA CLIP L(	100E1CL8.25	100E	17.38" 17.38" 17.38"	16.13" 16.13" 16.13"	80,000	7
8.25 MA CLIP L(	100E1CL8.25 125E2CL8.25	100E 125E	17.38"	<u>16.13"</u> 16.13"	80,000 80,000	
8.25 MAX. KV CLIP LOCK	100E1CL8.25 125E2CL8.25 150E2CL8.25	100E 125E 150E 175E	17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000	7 8 8
8.25 MA CLIP L(	100E1CL8.25 125E2CL8.25	100E 125E 150E 175E	17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000	7 8
8.25 MA CLIP L(	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25	100E 125E 150E 175E 200E	17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000 80,000	7 8 8 8 8
8.25 MA CLIP L(	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25	100E 125E 150E 175E 200E 225E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000 80,000 80,000	7 8 8 8 8 8
8.25 MA CLIP L(	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25	100E 125E 150E 175E 200E 225E 250E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000	7 8 8 8 8 8
8.25 MA CLIP L(	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25	100E 125E 150E 175E 200E 225E 250E 300E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000	7 8 8 8 8 8
8.25 MA'	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25 ORDERING/CATALOG	100E 125E 150E 175E 200E 225E 250E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 MAX INTERRUPTING	7 8 8 8 8 8 8 8 9
	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25 ORDERING/CATALOG NUMBER	100E 125E 150E 175E 200E 225E 250E 300E 350E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" DIM. B (INCHES)	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 MAX INTERRUPTING RATING RMS (ASYM)*	7 8 8 8 8 8 8 8 9 FIGURE NUMBER
	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25 ORDERING/CATALOG NUMBER 10E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" DIM. A (INCHES)	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" DIM. B (INCHES) 18.1"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 MAX INTERRUPTING RATING RMS (ASYM)* 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7
	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25 350E3CL8.25 ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E SIZE	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" DIM. A (INCHES)	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7
	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E SIZE 10E 15E 20E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7 7
	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E7CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  SIZE  10E 15E 20E 25E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7
	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 30E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  SIZE  10E 15E 20E 25E 30E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 30E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 19.8"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E SIZE 10E 15E 20E 25E 30E 40E 50E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 19.8"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5 40E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  SIZE 10E 15E 20E 25E 30E 40E 50E 65E 80E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  17.38" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5 65E1CL15.5 80E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 80E 100E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 200E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5 50E1CL15.5 50E1CL15.5 100E1CL15.5 100E1CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 65E 80E 100E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7 7
	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 30E1CL15.5 30E1CL15.5 50E1CL15.5 50E1CL15.5 100E1CL15.5 125E2CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 65E 80E 100E 125E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13" 21.13" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 350E3CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5 50E1CL15.5 10DE1CL15.5 125E2CL15.5 125E2CL15.5 150E2CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 65E 80E 100E 125E 150E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 230E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5 65E1CL15.5 10DE1CL15.5 125E2CL15.5 125E2CL15.5 150E2CL15.5 150E2CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 65E 80E 100E 125E 150E 175E 200E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000	7 8 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5 65E1CL15.5 100E1CL15.5 100E1CL15.5 125E2CL15.5 175E2CL15.5 175E2CL15.5 200E2CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 40E 50E 10E 15E 20E 25E 30E 40E 50E 10E 15E 20E 15E 30E 40E 50E 15E 15E 20E 15E 15E 15E 15E 15E 15E 15E 15E 15E 15	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 200E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 20E1CL15.5 30E1CL15.5 50E1CL15.5 50E1CL15.5 100E1CL15.5 100E1CL15.5 150E2CL15.5 175E2CL15.5 175E2CL15.5 175E2CL15.5 175E2CL15.5 200E2CL15.5 150E3CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 65E 80E 10E 125E 150E 150E 175E 20E 25E 30E 40E 50E 65E 80E 80E 80E 80E 80E 80E 80E	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7 7 7 7 7 7 7
E-RATED	100E1CL8.25 125E2CL8.25 150E2CL8.25 175E2CL8.25 200E2CL8.25 225E2CL8.25 250E2CL8.25 300E2CL8.25 300E2CL8.25 350E3CL8.25  ORDERING/CATALOG NUMBER 10E1CL15.5 15E1CL15.5 20E1CL15.5 30E1CL15.5 40E1CL15.5 50E1CL15.5 65E1CL15.5 100E1CL15.5 100E1CL15.5 125E2CL15.5 175E2CL15.5 175E2CL15.5 200E2CL15.5	100E 125E 150E 175E 200E 225E 250E 300E 350E  10E 15E 20E 25E 30E 40E 50E 40E 50E 10E 15E 20E 25E 30E 40E 50E 10E 15E 20E 15E 30E 40E 50E 15E 15E 20E 15E 15E 15E 15E 15E 15E 15E 15E 15E 15	17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38" 17.38"  DIM. A (INCHES)  19.8" 19.8" 19.8" 19.8" 19.8" 22.81" 22.81" 22.81" 22.81" 22.81" 22.81"	16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13" 16.13"  DIM. B (INCHES)  18.1" 18.1" 18.1" 18.1" 18.1" 18.1" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13" 21.13"	80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000 80,000  MAX INTERRUPTING RATING RMS (ASYM)* 60,000	7 8 8 8 8 8 8 9 FIGURE NUMBER 7 7 7 7 7 7 7 7 7 7 7 7

<sup>\*</sup> RMS Asymmetrical amperes = RMS Symmetrical amperes x 1.6

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# E-RATED POTENTIAL TRANSFORMER FUSES

### **Description**

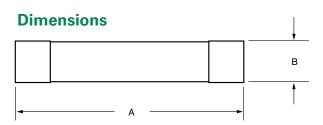
Potential Transformer (PT) fuses are current-limiting fuses with high interrupting ratings designed for the protection of potential transformers.

# **Application Note**

When applying fuses for the protection of transformers, the magnetizing current in-rush must be considered. The characteristics of the in-rush, which can be matched with a fuse time-current curve, should be available from the transformer manufacturer.

#### **Characteristics**

**Voltage Ratings** 625 Vac - 25,800 Vac **Current Range**  $\frac{1}{2}$ E - 10E



E-RATED	ORDERING/CATALOG NUMBER	SIZE	LENGTH DIM. A (INCHES)	DIAMETER DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)*
	3E4PT.6	3E	4.6"	0.8125"	37,500
625 VOLT	5E4PT.6	5E	4.6"	0.8125"	37,500
30	7E4PT.6	7E	4.6"	0.8125"	37,500
	10E4PT.6	10E	4.6"	0.8125"	37,500
ندد	500E4PT2.4	1/2E	4.6"	0.8125"	37,500
2.75 MAX. KV	1E4PT2.4	1E	4.6"	0.8125"	37,500
``≥	2E4PT2.4	2E	4.6"	0.8125"	37,500
	1E6PT2.75	1E	7.4"	1.5625"	37,500
>	2E6PT2.75	2E	7.4"	1.5625"	37,500
53	3E6PT2.75	3E	7.4"	1.5625"	37,500
2.75 MAX.KV	1E8PT2.75	1E	9.5"	1.5625"	37,500
Σ	2E8PT2.75	2E	9.5"	1.5625"	37,500
	3E8PT2.75	3E	9.5"	1.5625"	37,500
4.8 MAX. KV	1E5PT4.8	1E	5.6"	0.8125"	50,000
4.₹	2E5PT4.8	2E	5.6"	0.8125"	50,000
	500E6PT5.5	1/2E	7.4"	1.5625"	50,000
	1E6PT5.5	1E	7.4"	1.5625"	50,000
	2E6PT5.5	2E	7.4"	1.5625"	50,000
	3E6PT5.5	3E	7.4"	1.5625"	50,000
5.5 MAX. KV	5E6PT5.5	5E	7.4"	1.5625"	50,000
5.5 .×.	500E8PT5.5	½E	9.5"	1.5625"	50,000
₹	1E8PT5.5	1E	9.5"	1.5625"	50,000
	2E8PT5.5	2E	9.5"	1.5625"	50,000
	3E8PT5.5	3E	9.5"	1.5625"	50,000
	5E8PT5.5	5E	9.5"	1.5625"	50,000
	10E8PT5.5	10E	9.5"	1.5625"	50,000
	500E8PT8.25	1½E	9.5"	1.5625"	50,000
8.25 MAX. KV	1E8PT8.25	1E	9.5"	1.5625"	50,000
∞≥≥	2E8PT8.25	2E	9.5"	1.5625"	50,000
	3E8PT8.25	3	9.5"	1.5625"	50,000
	500E11PT15.5	½E	12.8"	1.5625"	35,000
>	1E11PT15.5	1E	12.8"	1.5625"	35,000
.5. 7.	2E11PT15.5	2E	12.8"	1.5625"	35,000
15.5 MAX. KV	3E11PT15.5	3E	12.8"	1.5625"	35,000
2	3E16PT15.5	3E	17.5"	1.5625"	35,000
	5E16PT15.5	5E	17.5"	1.5625"	35,000
25.8 MAX. KV	500E16PT25.5	½E	17.5"	1.5625"	32,000
25 25 2	1E16PT25.5	1E	17.5"	1.5625"	32,000

<sup>\*</sup> RMS Asymmetrical amperes = RMS Symmetrical amperes x 1.6



# LIVE PARTS



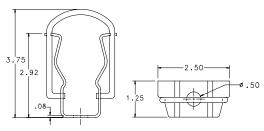
# **Description**

Live parts are available for mounting E, R, and PT single, double, and triple barrel fuses. Mounting clips are available for ferrule type and clip lock style fuses. All clips are sold in pairs.

#### Part Number 700-156

#### Ordering Number 0700156.Z

For use with  $1^9/_{16}$ " (1.5625") to  $1^5/_8$ " (1.625") diameter PT fuses.

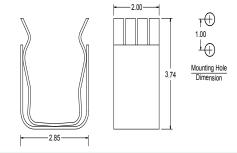


Dimensions in inches

#### Part Number 700-300

#### Ordering Number 0700300.Z

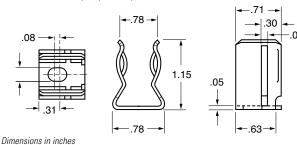
For use with 3" diameter fuses.



#### Part Number 700-500

#### Ordering Number 0700500.Z

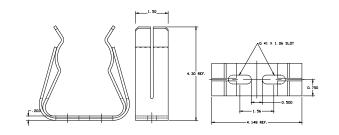
For use with all 13/16" (.8125") diameter PT fuses



#### Part Number 700-530

#### Ordering Number 0700530.Z

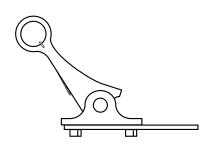
For use with all 3" diameter fuses.



#### Part Number 700-520-CL

#### Ordering Number 0700520.ZXCL

Clip Lock Design

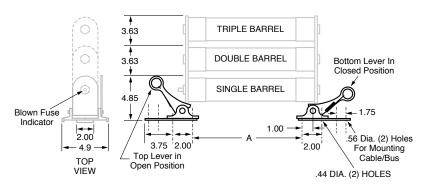


Dimensions	for	rafaranca	only

# **Mounting Details for Clip Lock**

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CATALOG NUMBER	DIMENSION A (INCHES)
10E1CL5.5 thru 150E1CL5.5	12.88
225E2CL5.5 thru 600E3CL5.5	13.88
10E1CL8.25 thru 350E3CL8.25	13.88
10E1CL15.5 thru 50E1CL15.5	16.25
65E1CL15.5 thru 300E3CL15.5	19.25



### **Section Overview**

Rely on Littelfuse for short circuit protection of telecommunications circuits and sensitive DC power distribution circuits.







# 

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LTFD101 Telecommunication Disconnect Switch	55



# L17T SERIES TELECOM POWER FUSE

170 Vdc • Current-Limiting • 70-1200 A





# **Description**

Specifically designed for short-circuit protection of telecommunications circuits, the Littelfuse L17T series fuses provide reliable protection of sensitive DC power distribution systems. Constructed with silver plated elements for low I2t and peak let-through, these advanced fuses virtually eliminate equipment damage due to surges and spikes. The L17T series fuse unique element geometry also provides cooler running temperatures, helping to minimize heat within enclosures.

#### **Features**

- Low I<sup>2</sup>t
- · Extremely current-limiting
- Low operating temperature
- 170 Vdc rating

# **Specifications**

**Voltage Rating Interrupting Rating Ampere Range Approvals** 

170 Vdc 100 kA 70 - 1200 A

UL Recognized (File: E71611)

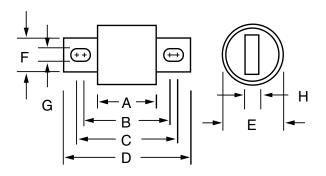
CSA Recognized (File: LR29862)

# **Ordering Information**

AMPERE RATINGS										
70   125   200   300   450   800										
90	150	225	350	500	900	1200				
100	175	250	400	600	1000	_				

SERIES	VOLTAGE	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
L17T	170	1200	L17T 1200	L17T1200V

#### **Dimensions Inches (mm)**



AMPERE	DIMENSIONS INCHES (mm)							
RATING	Α	В	С	D	Е	F	G	Н
70 – 250	1 <sup>5</sup> / <sub>32</sub> (29.4)	1 <sup>7</sup> / <sub>8</sub> (47.6)	2 <sup>3</sup> / <sub>16</sub> (55.6)	2 <sup>21</sup> / <sub>32</sub> (67.5)	1 (25.4)	<sup>7</sup> / <sub>8</sub> (22.2)	0.327 (8.3)	<sup>3</sup> / <sub>16</sub> (4.8)
300 - 800	1½ (31.8)	1 15/16 (49.2)	2 <sup>9</sup> / <sub>16</sub> (65.1)	3½ (88.9)	1½ (38.1)	1 (25.4)	<sup>13</sup> / <sub>32</sub> (10.3)	½ (6.35)
900-1200	1 <sup>11</sup> / <sub>32</sub> (34.0)	_	_	4½16 (103.1)	2 (50.8)	1½ (38.1)	_	<sup>1</sup> / <sub>4</sub> (6.35)

#### **Web Resources**

For additional information, visit:

littelfuse.com/l17t



# TLN SERIES TELECOM POWER FUSE

170 Vdc • Current-Limiting • 1-600 A





# **Description**

The TLN Series fuses are specifically designed for the protection of telecommunications DC power distribution circuits.

#### **Features**

- 170 Vdc rating
- Fast-acting and current-limiting
- 1 to 600 amperes rating
- Dimensionally similar to 250 V Class R fuses

# Dimensions Inches (mm)

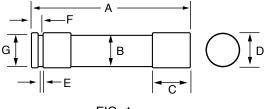


FIG. 1

# **Specifications**

**Approvals** UL Recognized (File: E71611)

# **Ordering Information**

	AMPERE RATINGS											
1	15	40	80	150	300	600						
3	20	45	90	175	350	_						
5	25	50	100	200	400	_						
6	30	60	110	225	450	_						
10	35	70	125	250	500	_						

SERIES	VOLTAGE	AMP	CATALOG NUMBER	ORDERING NUMBER
TLN	170VDC	6	TLN006	OTLN006.T

Replaces competitors' TPN and TGN Series.

#### **Web Resources**

For additional information, visit:

littelfuse.com/tln

#### **Recommended Fuse Holders**

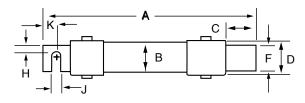


FIG. 2

AMPERES	FIGURE	DIMENSIONS INCHES (mm)									
AWII EILEO	NUMBER	Α	В	С	D	E	F	G	Н	J	K
1 – 30	1	2 (50.8)	1/2 (12.7)	1/2 (12.7)	9/16 (14.3)	5/64 (2.0)	5/32 (4.0)	3/8 (9.5)	_	_	_
35 - 60	1	3 (76.2)	3/4 (19.1)	5/8 (15.9)	<sup>13</sup> / <sub>16</sub> (20.6)	3/32 (2.4)	<sup>3</sup> / <sub>16</sub> (4.8)	5/8 (15.9)	_	_	_
70 – 100	2	5 <sup>7</sup> / <sub>8</sub> (149.2)	1 (25.4)	11/16 (27.0)	11/16 (27.0)	1/8 (3.2)	<sup>3</sup> / <sub>4</sub> (19.1)	11/4 (31.6)	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
110 - 200	2	71/8 (181.0)	1½ (38.1)	115/32 (37.3)	119/32 (40.5)	<sup>3</sup> / <sub>16</sub> (4.8)	11/8 (28.6)	127/32 (46.8)	<sup>7</sup> / <sub>16</sub> (11.1)	9/32 (7.1)	<sup>11</sup> / <sub>16</sub> (17.5)
225 - 400	2	85/8 (219.1)	2 (50.8)	115/16 (49.2)	23/32 (53.2)	1/4 (6.4)	15/8 (41.3)	211/32 (59.5)	5/8 (15.9)	<sup>13</sup> / <sub>32</sub> (10.3)	<sup>15</sup> / <sub>16</sub> (23.8)
450 - 600	2	103/8 (263.5)	2½ (63.5)	23/8 (60.3)	219/32 (65.9)	1/4 (6.4)	2 (50.8)	227/32 (72.2)	3/4 (19.1)	<sup>17</sup> / <sub>32</sub> (13.5)	11/8 (28.6)



# TLS SERIES TELECOM POWER FUSE

### 170 Vdc • Current-Limiting • 1-125 A





#### **Description**

Littelfuse TLS Series fuses are designed specifically for the protection of telecommunications equipment. TLS fuses have been engineered to operate up to 170 Vdc to provide current-limiting short-circuit protection for cables and components found in the DC power distribution circuits of telecommunications systems. The compact design and multiple mounting configurations of the TLS series allow it to be used in a variety of applications.

#### **Features**

- 170 Vdc rating
- Current-limiting
- 1 to 125 amperes rating
- Multiple mounting configurations —
   Cartridge, Vertical, Leaded, Bolt-In, or Solder type. See dimensions on page 2 for mounting style details.
- RoHS Compliant

#### Web Resources

For additional information, visit:

littelfuse.com/tls

#### **Recommended Fuse Holders**

# **Specifications**

 $\begin{array}{lll} \mbox{Voltage Rating} & 170 \mbox{ Vdc} \\ \mbox{Ampere Range} & 1-125 \mbox{ A} \\ \mbox{Interrupting Rating} & 100 \mbox{ kA} \\ \end{array}$ 

Approvals

Construction

UL Recognized (File: E71611)

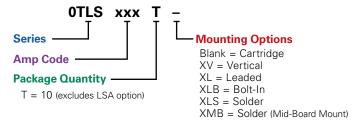
Body: Glass melamine
Caps: Silver-plated brass

**Environmental** RoHS Compliant, Lead (Pb) Free

## **Ordering Information**

AMPERE RATINGS										
1	90									
2	10	30	60	100						
3	15	35	70	110*						
5	20	40	80	125*						

<sup>\*</sup>Available in standard cartridge only.

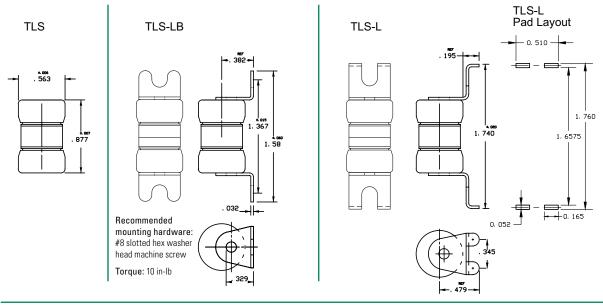


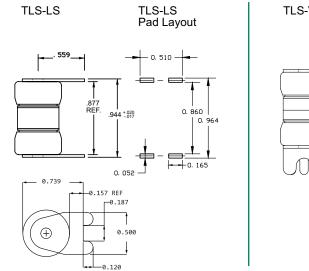
SERIES	AMP	MOUNTING METHOD	MOUNTING SUFFIX	CATALOG NUMBER	ORDERING NUMBER
TLS	6	Cartridge	_	TLS006	OTLS006.T
TLS	15	Vertical	V	TLS015V	0TLS015.TXV
TLS	35	Leaded	L	TLS035L	0TLS035.TXL
TLS	50	Bolt-In	LB	TLS050LB	OTLS050.TXLB
TLS	80	Solder	LS	TLS080LS	OTLS080.TXLS
TLS	100	Solder	MB	TLS100MB	0TLS100.TXMB

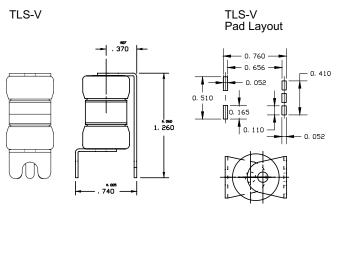


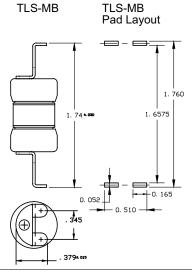
# TLS SERIES TELECOM POWER FUSE

# **Dimensions Inches (mm)**











# **481 SERIES ALARM INDICATING FUSES**

# **Alarm Indicating Fuses**



### **481 Series Alarm Indicating Fuses**

#### **Description**

481 Series alarm indicating fuses are designed to reduce down time by immediately pinpointing the blown (open) circuit while triggering an LED or audio alarm. This item requires 482 Series mating fuse holder.

All ranges of 481 Series fuses are available as our original design, and the 2-20 amp range is now available as a RoHS compliant option (use the "P" designator when ordering). See the part numbering section of the datasheet for related ordering instructions.

# **Specifications**

RoHS RoHS

Voltage Rating Approvals 125 Vac/dc UL Recognized (File: E71611)

UL Recognized (File: E71611)
CSA Recognized (File: LR29862)

# **Ordering Information**

AMPERE RATINGS										
18/100     3/8     3/4     1 ½     3     5     12										
1/5	1/2	1	2	3 1/2	7 1/2	15				
1/4	65/100	1 1/3	2 1/2	4	10	20				
	CATALOC OPPEDING									

SERIES	VOLTAGE	AMP	CATALOG NUMBER	ORDERING NUMBER
481	125 ac/dc	2	481002L	0481002.VXL

Note: For 481 Dummy fuse, order 481000.

#### **Recommended Fuse Holders**

482 Series, see website: **littelfuse.com/482**Available 1-20 pole with PCB or panel mounting.
To order with protective lens add suffix XL.

#### **Web Resources**

For additional information, visit: littelfuse.com/481



# LTFD 101 SERIES TELECOM DISCONNECT SWITCH

80 Vdc • 1-125 A





# **Description**

Littelfuse compact LTFD 101 fuse holders for TLS fuses are designed for quick installation into telecom equipment panels. Their modular design fits into spaces originally designed for circuit breakers and can be front panel mounted or rear mounted using bullet connectors. The innovative new pull-out design eliminates the need for tools to replace fuses and includes an alarm signaling circuit to identify the blown fuse.

#### **Features**

- Extremely compact
- Quick mounting
- · Replaces circuit breakers
- Includes alarm signaling circuit

# **Specifications**

 $\begin{array}{lll} \textbf{Voltage Rating} & 80 \ \text{Vdc} \\ \textbf{Ampere Range} & 1-125 \ \text{A} \end{array}$ 

**Approvals** UL Recognized (File: E122674)

#### **Recommended Fuses**

# **Ordering Information**

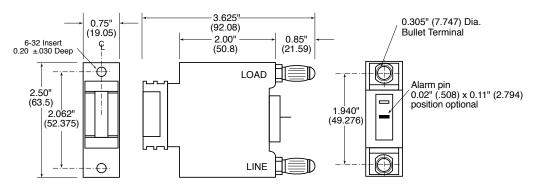
SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER	TERMINAL TYPE
LTFD	125 A MAX	LTFD101-1	LTFD0101ZX1	BULLET
LTFD	125 A MAX	LTFD101-2	LTFD0101ZX2	SCREW
LTFD	125 A MAX	LTFD101-3	LTFD0101ZX3	STUD
LTFD	70 A MAX	LTFD101-4	LTFD0101ZX4	CLIP

#### **Web Resources**

For additional information, visit:

littelfuse.com/ltfd101

# **Dimensions Inches (mm)**



Dimensions for reference only. For additional options and dimensions, contact the factory.

#### **Section Overview**

Whether you are protecting solar equipment or finding a replacement fuse for an aging HVAC unit, Littlefuse carries the breadth of fuses to meet your needs. Our "special purpose" fuse section includes application-specific products to meet all of your application needs.







# 

#### **Table of Contents**



#### **POWR-GARD®** Circuit Protection

Littelfuse engineering is constantly developing new products to meet the needs of the photovoltaic industry. For the latest information on the growing POWR-GARD Product portfolio, visit: littelfuse.com/solar

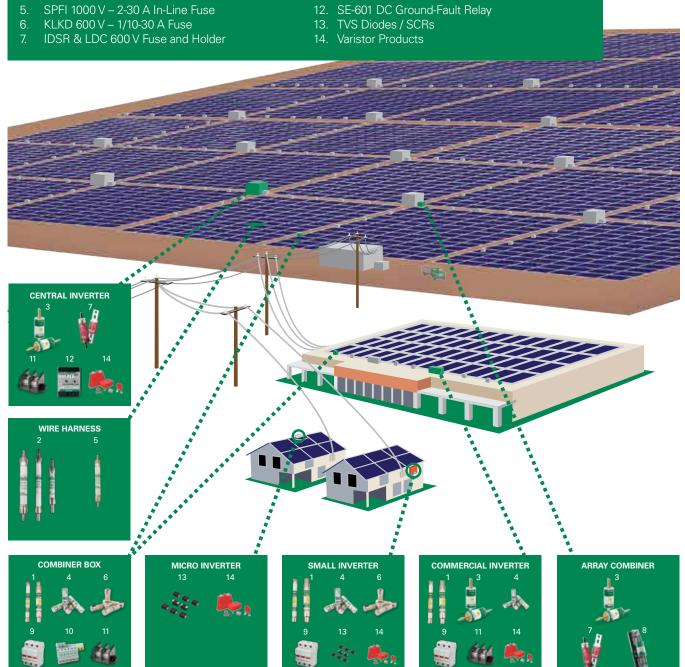
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# SOLAR PRODUCTS BY APPLICATION

- 1. SPXV 1500 V 6-30 A Fuse
- 2. SPXI 1500 V 2.5-30 A In-Line Fuse
- 3. SPFJ 1000 V 70-450 A Fuse
- 4. SPF 1000 V 1-30 A Fuse

- 8. LFJ1000 Fuse Block for SPFJ Fuse
- 9. LFPXV, LPHV & LPSM Series Fuse Holder
- 10. Busbar for Touch-Safe Fuse Holders
- 11. Power Distribution Block





# SPXV SERIES SOLAR FUSE

#### 1500 Vdc • 6 - 30 A





# **Description**

The Littelfuse SPXV solar string fuse is designed specifically for 6-30 A 1500 Vdc applications.

#### **Features/Benefits**

- 10 x 85 mm package size
- UL 2579 Listed
- Meets IEC 60269-6 electrical performance requirements
- 30,000 A interrupting rating

# **Applications**

- Inverters
- Combiner boxes

#### **Web Resources**

Download technical resources at:

littelfuse.com/spxv

# **Specifications**

Voltage Rating 1500 Vdc

**Amperage Rating** 6, 8, 10, 12, 15, 20, 25, 30 A

Interrupting Rating 15 kA (UL 2579) 30 kA (Self-Certified)

Time Constant ≤ 1ms

Material Body: Melamine

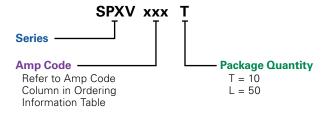
Caps: Copper Alloy (Nickel Plated)
Approvals
UL 2579 Listed (File: E339112)

**Environmental** RoHS Compliant

REACH

Country of Origin Mexico

# **Part Numbering System**

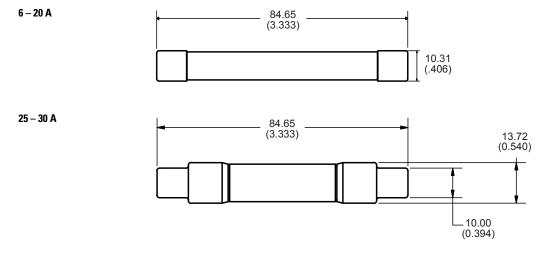


SERIES	AMP	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
SPXV	6	10	SPXV006	SPXV006.T
SPXV	20	50	SPXV020	SPXV020.L

#### **Recommended Fuse Holders**

LFPXV 1500VTOUCH SAFE Holder......113

# **Dimensions mm (inches)**



5



# SPXI SERIES IN-LINE SOLAR FUSES

#### 1500 Vdc • 2.5-30 A (Patent Pending)







# **Description**

The Littelfuse SPXI solar fuse is designed to integrate into an in-line assembly within a wire harness. The fuse provides photovoltaic (PV) protection that meets UL 2579 for photovoltaic applications. The SPXI can be electrically insulated by either overmolding or using heat-shrink.

#### Features/Benefits

- UL 2579 Recognized
- Meets IEC 60269-6 electrical performance requirements
- 30,000 A interrupting rating
- No fuse holder required

#### **Applications**

• Photovoltaic wire harness

# **Recommended Crimping Tool**

T&B Sta-Kon ERG4002

# **Dimensions mm (in)**

# **Specifications**

Voltage Rating: 1500 Vdc

**Amperage Rating:** 2.5, 3.5, 4, 6, 8, 10, 12, 15, 20, 25, 30 A

Interrupting Ratings: 15 kA (UL 2579) 30 kA (Self-Certified)

Time Constant ≤ 1ms

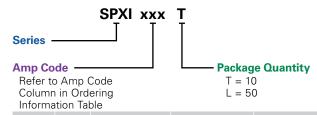
Material: Body: Melamine

Caps: Copper Alloy (Nickel Plated) **Approvals:**UL 2579 Recognized (File: E339112)

**Environmental:** RoHS Compliant

REACH Country of Origin: Mexico

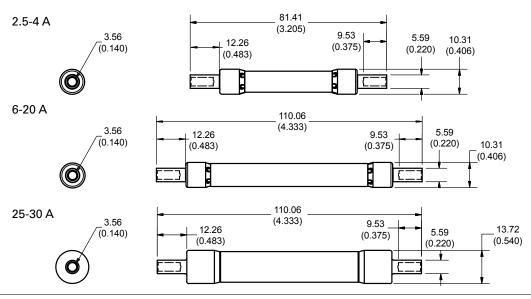
# **Part Numbering System**



SERIES	AMP	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
SPXI	3.5	10	SPXI03.5	SPXI03.5T
SPXI	4	10	SPXI004	SPXI004.T
SPXI	20	50	SPXI020	SPXI020.L

#### **Web Resources**

Download additional technical information and view the complete solar portfolio: **littelfuse.com/spxi** 



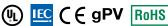


# SPNH SERIES SOLAR FUSE

1500 Vdc • 50-400 A • NH Style











# **Description**

The SPNH series has been designed to meet the emerging circuit protection needs for 1500 volt photovoltaic systems. These fuses provide full range protection for all potential overcurrent conditions that exist in PV applications. Suitable for PV inverter protection and array combiner applications.

#### Features/Benefits

- Meets UL and IEC photovoltaic standards
- Compact NH XL Sizes
- Low Watt Loss Design
- 1500Vdc rating for emerging market needs
- Designed to protect against a full range of overcurrents

### **Applications**

- Inverters
- Re-combiner boxes
- Array/Re-combiner application
- PV Inverter DC input protection

#### **Web Resources**

Download technical documents: Littelfuse.com/spnh

# **Specifications**

**Voltage Rating** 1500 Vdc

**Amperage Rating** 50, 63, 80, 100, 125, 160, 200 250 - 400: Consult Factory

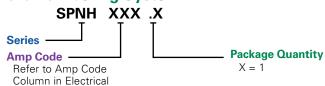
**Interrupting Rating** 15kA (50-200A) **Time Constant** ≤ 2ms Material Body: Ceramic End Bells: Copper Alloy

**Approvals** UL 248-19 Listed (File: E339112, Vol. 4) (50-200A)

IEC 60269-6

**Environmental RoHS Compliant** 

# **Part Numbering System**



SERIES	AMP	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
SPNH	50	1	SPNH050	SPNH050.X
SPNH	200	1	SPNH200	SPNH200.X

#### **Recommended Accessories**

Fuse Holder: LFNH152001CST

Specifications Table

Fuse Terminial Covers: LFNH15200FBC





littelfuse.com

Look for this logo to indicate products that are used in solar applications. Visit our website Littelfuse.com/solar for the latest updates on approvals, certifications, and new products.



# SPFI SERIES IN-LINE SOLAR FUSE

# 1000 Vdc • 2-30 A (Patent Pending)







#### **Description**

The Littelfuse SPFI solar fuse is designed to integrate into an in-line assembly within a wire harness. The fuse provides photovoltaic (PV) protection that meets UL 2579 for photovoltaic applications. The SPFI can be electrically insulated by either overmolding or using heat-shrink.

#### Features/Benefits

- UL 2579 Recognized
- Meets IEC 60269-6 electrical performance requirements
- 20,000 A Interrupting Rating
- No fuse holder required

## **Applications**

Photovoltaic wire harness

# **Specifications**

Voltage Rating 1000 Vdc

**Amperage Rating** 2, 2.5, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30 A

Interrupting Rating20 kATime Constant≤ 1ms

Material Body: Melamine

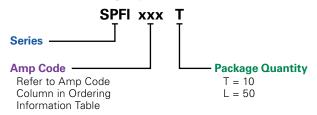
Caps: Copper Alloy (Nickel Plated) **Approvals**UL 2579 Recognized (File: E339112)

**Environmental** RoHS Compliant

REACH

Country of Origin Mexico

# **Part Numbering System**



AMP	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
2	10	SPFI002	SPFI002.T
3.5	10	SPFI03.5	SPFI03.5T
20	50	SPFI020	SPFI020.L
	2 3.5	2 10 3.5 10	AMP         QUANTITY         NUMBER           2         10         SPFI002           3.5         10         SPFI03.5

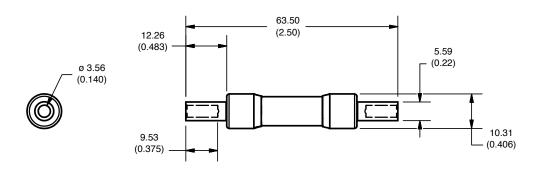
#### **Web Resources**

Downloadable CAD drawings and other technical information: **littelfuse.com/spfi** 

# **Recommended Crimping Tool**

T&B Sta-Kon ERG4002

# Dimensions mm (in)





# SPF SERIES SOLAR FUSES

1000 Vdc • 1-30 A





# **Description**

The SPF Solar Protection Fuse series has been specifically designed for the protection of photovoltaic (PV) systems. This family of Midget style fuses (10 x 38 mm) can safely protect PV modules and conductors from reverseovercurrent conditions.

As PV systems have grown in size, so have the corresponding voltage requirements. This increase in system voltage has typically been intended to minimize power loss associated with long conductor runs. Standard circuit protection devices are not designed to completely protect photovoltaic panels. However, the SPF series is UL Listed to safely interrupt faulted circuits up to this demanding voltage level.

Littelfuse offers 14 ampere ratings to match specific requirements in a variety of applications.

#### Features/Benefits

- Meets UL, IEC and VDE photovoltaic standards
- UL 2579 Listed 1000 Vdc maximum
- 1-30 A ratings available
- 20,000 A Interrupting Rating
- Both PCB mount and dead-front holder options available

#### **Applications**

- Inverters
- Combiner boxes
- Battery charge controllers

#### Recommended Fuse Holders

LPHV 1000 Vdc POWR-Safe Holder......116

#### **Web Resources**

Download technical documents: littelfuse.com/spf











# **Specifications**

**Voltage Rating** 1000 VDC

**Amperage Rating** 1, 2, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30 Max. Interrupting Rating 20 kA

**Time Constant** ≤ 2ms

Material Body: Melamine Caps: Copper Alloy

**Approvals** UL 2579 Listed (File: E339112)

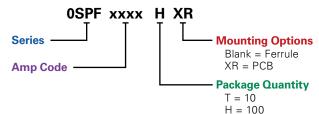
IEC 60269-6 (1-25 A)

VDE Certified (No. 40033098)\* CSA Certified (File: 029862\_0\_000)

**Environmental RoHS Compliant** 

**Country of Origin** Mexico

# **Part Numbering System**



SERIES	AMP	PACKAGE QUANTITY	MOUNTING METHOD	CATALOG NUMBER	ORDERING NUMBER
SPF	2	10	FERRULE	SPF002	OSPF002.T
SPF	3.5	10	FERRULE	SPF03.5	0SPF03.5T
SPF	30	100	PCB TABS	SPF030R	OSPF030.HXR

**PCB Version** 

#### **Dimensions Inches (mm)**

**Ferrule Version** 

# 1.5 (38.1) 1.53 (38.86) MOUNTING HOLE .406 (10.31 DETAIL -.12 (3.05) (3.05) (7.11) .406 (10.31)



Look for this logo to indicate products that are used in solar applications. Visit our website littelfuse.com/solar for the latest updates on approvals, certifications, and new products.



# SPFJ SERIES SOLAR FUSES

1000 Vdc • 70-450 A





# **Description**

The SPFJ series is the smallest 1000 Vdc 70-450 A photovoltaic fuse available in the market. The SPFJ series is manufactured in Class J case sizes that allows for both fuse holder and busbar mounting configuration. The SPFJ meets both UL and IEC requirements.

#### Features/Benefits

- Meets UL and IEC photovoltaic standards
- VDE certified specifications
- Small footprint reduces panel size
- Flexibility of fuse holder or busbar mounting
- Higher amperage solar fuses in standard sizes
- UL Listed branch and feeder circuit rated
- Class J case sizes for the 70-450 A ratings

## **Applications**

- Inverters
- Re-combiner boxes

#### **Recommended Fuse Holders**

#### Web Resources

Download the complete datasheet and other technical documents: **littelfuse.com/spfj** 

# **Specifications**

**Voltage Rating** 1000 Vdc 600 Vac (125-450 A)

Amperage Rating 70, 80, 90, 100, 125, 160, 200, 250, 300, 350, 400, 450
Interrupting Rating AC: 200 kAIC (125-450 A)

DC: 70-200 A: 20 kAIC 250-400 A: 10 kAIC 450 A: 20 kAIC

Time Constant ≤ 1ms
Material Body: Melamine

End Bells: Copper Alloy **Approvals**UL 2579 Listed (File: E339112)

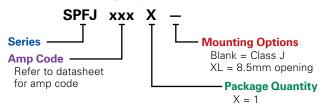
UL 248-8, Class J (125-450 A)

C UL (125-450 A) IEC 60269-6 (125-450 A) VDE Certified (125-450 A)

(No. 40033659, 40033660, 40033661)

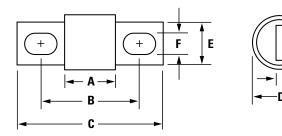
**Environmental** RoHS Compliant **Country of Origin** Mexico

# **Part Numbering System**



SERIES	AMP	PACKAGE QUANTITY	MOUNTING METHOD	CATALOG NUMBER	ORDERING NUMBER
SPFJ	70	1	CLASS J	SPFJ070	SPFJ070.X
SPFJ	200	1	LARGE	SPFJ200	SPFJ200.XXL

# **Dimensions Inches (mm)**



AMPERAGE	DIMENSIONS IN INCHES (MM)								
AWIFERAGE	Α	В	С	D	Е	F	G		
70-100	3.02 (76.5)	4.38 (111.3)	5.75 (146.1)	1.5 (38.1)	1.125 (28.3)	.335 (8.5)	.189 (4.8)		
125-200	3.02 (76.5)	4.38 (111.3)	5.75 (146.1)	1.5 (38.1)	1.125 (28.3)	.281 (7.1)*	.189 (4.8)		
250-400	3.37 (85.7)	5.25 (133.4)	7.125 (181.0)	2.0 (50.8)	1.63 (41.3)	.406 (10.3)	.252 (6.4)		
450	3.75 (95.3)	5.98 (152.0)	8.0 (203.2)	2.5 (63.5)	2.0 (50.8)	.531 (13.5)	.374 (9.5)		

<sup>\*</sup> SPFJ L option = 8.5 mm (UL 2579 approval only)



# FORK-LIFT STUD-MOUNTED FUSES

32/48/80 Vdc • Fast-Acting and Very Fast-Acting • 35-800 A









#### **CNN E, CNN & CNL Limiter Fuses**

#### **Description**

CNN\_E fuses are rated for applications up to 80 Vdc. As fork lift trucks voltages increase, circuit protection needs to be rated higher than the standard CNN products to handle the increased voltage. The CNN\_E is considered very fast-acting for quicker reaction time.

### **Specifications**

**Voltage Ratings** 

**Ampere Ratings** Max. Interrupting Rating **Approval Environmental Country of Origin** 

CNN\_E: 80 Vdc / 125 Vac CNN: 48 Vdc / 125 Vac

CNL: 32 Vdc / 32 Vac 10 - 800 A\* 2,500 A

UL Recognized (File: E71611) RoHS Compliant, Lead (Pb) Free Mexico (CNN\_E only)

# **Ordering Information**

AMPERE RATINGS CNN_E & CNN						
10 <sup>†</sup>	60	125	225	325	600	
35	80	150	250	350	700	
40	90	175	275	400	800	
50	100	200	300	500	_	

<sup>†</sup>CNN Series only

AMPERE RATINGS CNL (32 Vdc)								
35	80	150	250	350				
40	100	175	275	400				
50	125	200	300	500				
60	130	225	325	_				

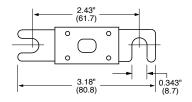
SERIES	TYPE	VOLT DC	AMP	CATALOG NUMBER	ORDERING NUMBER
CNN_E	VERY-FAST-ACTING	80	200	CNN200E	OCNN200E.V
CNN	VERY FAST-ACTING	48	125	CNN125	0CNN125.V
CNL	FAST-ACTING	32	50	CNL050	0CNL050.V

#### **Recommended Fuse Holders**

LFFB0003Z......123

#### Web Resources littelfuse.com/ForkLift

#### **Dimensions**



RoHS



#### HAZGARD™ Forklift Fuses

### **Description**

HAZGARD fuses are designed to provide overcurrent protection for low voltage equipment used in hazardous operations. It is UL 248 recognized and has been evaluated for the use in UL 583 type EE and ES applications. Unique design does not require an additional enclosure as is needed with a standard forklift fuse, saving assembly time and costs.

# **Ordering Information**

SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
581	200	581200	0581200.X

# **Applications**

Lift trucks, scissor lifts, pallet movers, and other low voltage battery operated equipment used to move hazardous materials.

#### Features/Benefits

- Evaluated for use in UL 583 hazardous applications
- Easily upgrade Type E and ES equipment to Type EE
- Does not require an external enclosure

#### **Specifications**

**Voltage Ratings** 48 Vac/dc **Interrupting Rating** 2,500 A 35 - 800 A **Ampere Rating** 

**Approval** UL Recognized (File: E71611)

Torque 90 in-lb Fuse Holder LFFB003 **Environmental RoHS Compliant Country of Origin** Mexico

AMPERE RATINGS					
35	100	250	500		
50	125	300	750*		
60	150	400	800*		
90	200	425	_		

<sup>\*</sup>Contact factory for availability

<sup>\*</sup>See ordering information table for available amperages by series

# Littelfuse® Expertise Applied | Answers Delivered

# PLUG FUSES AND BOLT-DOWN FUSES

125 Vac • 2-30 A





## Edison-base plug fuses Description

Littelfuse plug fuses provide overcurrent protection to general purpose circuits and small motor loads. Edison-base plug fuses (TOO and TLO series) feature metal threads similar to incandescent lamp bases.

Type S plug fuses (SOO and SLO series) utilize a nonmetallic threaded base and must be used with Type S adapters (SAO series).

The National Electrical Code® permits Edison base plug fuses to be used for replacement purposes only. Type S fuses and adapters prevent shunting open fuses and over-fusing.

### **Specifications**

Voltage Rating Interrupting Rating Approvals 125 Vac 10 kA rms symmetrical

UL Listed 248-11

TOO fuses are dual-element time-delay Edison-base fuses designed for motor and motor branch circuit protection; also suitable for all general purpose circuits.

#### **TOO Fuses**

#### Sample Part # 0T00020.Z

AMPERE RATINGS					
2	6 1/4	12	25		
4	8	15	30		
5	10	20	_		

TLO fuses are medium time-delay Edison-base fuses designed for general purpose branch circuit protection.

TLO Fuses		Sample	Part # 0TL0020.Z		
AMPERE RATINGS					
15	20	25	30		

#### **Web Resources**

Fine more information: littelfuse.com/plug

#### 32 Vac/dc • 100-300 A



#### MEGA® SLO-BLO® bolt-on fuse

#### **Description**

The MEGA Fuse is designed for the protection of high current applications. Designed and patented by Littelfuse, it is ideal for battery and alternator protection and other heavy gauge cable applications.

# **Specifications**

Voltage Rating 32 Vac/dc Interrupting Rating 2000 A @ 32 Vdc

# **Ordering Information**

CATALOG NUMBER	ORDERING NUMBER	AMPERAGE RATING	VOLTAGE RATING	COLOR CODE
MEG100	0MEG100.X	100	32	
MEG125	0MEG125.X	125	32	
MEG150	0MEG150.X	150	32	
MEG175	0MEG175.X	175	32	
MEG200	0MEG200.X	200	32	
MEG225	0MEG225.X	225	32	
MEG250	0MEG250.X	250	32	
MEG300	0MEG300.X	300	32	

#### **Recommended Fuse Holders**

Part Number - 298900, see website: littelfuse.com/mega

#### **Web Resources**

Find more information: littelfuse.com/mega



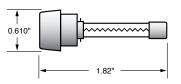
# LGR / LMF IN-LINE FUSES & LHR FUSE HOLDER



#### **LGR Fuses**

Fast-Acting • 300 Vac

Used as in-line protection for fluorescent fixtures, this fast-acting fuse is ideal for increasing the safety and reliability of lighting fixtures.



#### **Specifications**

**Voltage Rating Interrupting Rating Approvals** 

300 Vac 10 kA Standard 248-14

UL Listed (File: E10480) CSA Certified (File: LR29862)

(I) (Sp. C ∈ RoHS

(I) (SP. C € RoHS

# **Ordering Information**

AMPERE RATINGS						
1/2	1 6/10	3	6	9	15	
1	2	4	7	10	_	
1 1/2	2 1/2	5	8	12	_	

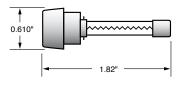
SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
LGR	5	LGR005	OLGR005.V



#### **LMF** Fuses

Time-Delay • 300 Vac

Perfect for use in lighting systems, this 300 Vac timedelay fuse is designed to handle ballast transformer in-rush currents.



# **Specifications**

**Voltage Rating** Interrupting Rating **Approvals** 

10 kA Standard 248-14 UL Listed (File: E10480)

300 Vac

CSA Certified (File: LR29862)

# **Ordering Information**

AMPERE RATINGS						
3/10	8/10	1 <sup>6</sup> / <sub>10</sub>	2 8/10	4	7	
1/2	1	2	3	5	8	
6/10	1 1/4	2 1/2	3 <sup>2</sup> /10	6 1/4	10	

SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
LMF	5	LMF005	OLMF005.V



#### **LHR Fuse Holder**

Used as in-line protection for fluorescent fixtures, the Littelfuse LGR and LMF series fuses and LHR holder offer increased safety and reliability to lighting systems.

By individually fusing fixtures, electrical problems are isolated from the rest of the circuit. The added benefits of this is the ability to quickly identify the problem fixture and reduce the repair time.

Fuse holders are rated up to 10 amperes at 300 volts and are equipped with 7" 18 AWG leads. Order part number LHR000 for two leads, and part number LHR001 for one lead; with the other terminal used for insertion of 18 AWG ballast lead.

#### **Specifications**

**Voltage Rating** 300 Vac Ampere Rating LHR000 10 A LHR001 10 A **Approvals UL** Recognized

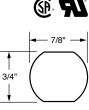
**CSA Certified** (File: 73160)

Flammability Rating UL94 V-0 **Example part number** LHR001 **Ordering number** 0LHR001T

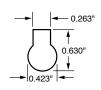
# **Mounting Information**

LHR001/LHR000 will fit keyhole punch or 0.875" knock-out hole. Anti-rotation feature is provided when used with keyhole punch.

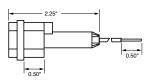
A "U-shaped" clip is available for panel mounting (packaged 10 clips per bag): Order part number LHROCA.



**Knock-out Hole** 



**Keyhole Punch** 



# littelfuse.com

# Littelfuse® Expertise Applied | Answers Delivered

# LFCL • CABLE LIMITERS

#### 250/600 VAC



TYPE	TERMINATION	VOLTAGE RATING	COPPER CABLE SIZE	ORDERING NUMBER
		600 VAC	4 AWG	LFCL0004ZC1
		600 VAC	3 AWG	LFCL0003ZC1
		600 VAC	2 AWG	LFCL0002ZC1
		600 VAC	1 AWG	LFCL0001ZC1
	200	600 VAC	1/0 AWG	LFCL01/0ZC1
	05)	600 VAC	2/0 AWG	LFCL02/0ZC1
1	CABLE TO CABLE	600 VAC	3/0 AWG	LFCL03/0ZC1
'	CADLL TO CADLL	600 VAC	4/0 AWG	LFCL04/0ZC1
		600 VAC	250 kcmil	LFCL0250ZC1
		600 VAC	350 kcmil	LFCL0350ZC1
		600 VAC	500 kcmil	LFCL0500ZC1
		600 VAC	600 kcmil	LFCL0600ZC1
		600 VAC	750 kcmil	LFCL0750ZC1
		600 VAC	1000 kcmil	LFCL1000ZC1
		600 VAC	12 AWG	LFCL0012ZC3
		600 VAC	10 AWG	LFCL0010ZC3
50		600 VAC	6 AWG	LFCL0006ZC3
	5	600 VAC	4 AWG	LFCL0004ZC3
		600 VAC	2 AWG	LFCL0002ZC3
		600 VAC	1 AWG	LFCL0001ZC3
	CADIFTO	600 VAC	1/0 AWG	LFCL01/0ZC3
3	3 CABLE TO OFFSET BUS	600 VAC	2/0 AWG	LFCL02/0ZC3
	OTTOLT DOS	600 VAC	3/0 AWG	LFCL03/0ZC3
		600 VAC	4/0 AWG	LFCL04/0ZC3
		600 VAC	250 kcmil	LFCL0250ZC3
		600 VAC	350 kcmil	LFCL0350ZC3
		600 VAC	500 kcmil	LFCL0500ZC3
		600 VAC	600 kcmil	LFCL0600ZC3
		600 VAC	750 kcmil	LFCL0750ZC3
	~~	250 VAC	2/0 & 3/0 AWG	LFCL-UHA*
	D.	250 VAC	3/0 AWG	LFCL-UHJ-M*
		250 VAC	350 kcmil	LFCL-UHJ-T*
	STRAIGHT BUS	250 VAC	600 kcmil	LFCL-UHJ-W*
5	TO OFFSET BUS	600 VAC	4/0 AWG	LFCL04/0ZC5*
5	10 011 311 003	600 VAC	250 kcmil	LFCL0250ZC5*
		600 VAC	350 kcmil	LFCL0350ZC5*
		600 VAC	500 kcmil	LFCL0500ZC5*
		600 VAC	750 kcmil	LFCL0750ZC5*
	5	600 VAC	4/0 AWG	LFCL04/0ZC6
6	63	600 VAC	250 kcmil	LFCL0250ZC6
	MOLE TO CABLE	600 VAC	500 kcmil	LFCL0500ZC6

<sup>\*</sup>Suitable for use with aluminum cables / conductors. For sizing contact Tech-Line at 800-TEC-FUSE.

#### **Web Resources**

For additional information, see website:

littelfuse.com/lfcl

# **Description**

Cable limiters are fusible devices that provide very fast short-circuit protection, primarily to faulted cables, but also to other conductors such as busway. Cable limiters do not have an ampere rating, and cannot be used to provide overload protection. They are instead selected by cable size; for example, a 500 kcmil cable requires a 500 kcmil cable limiter. Their main use is to isolate faulted cables in circuits containing three or more parallel conductors per phase. They may be installed on the line side of the main service to provide short-circuit protection to the service conductors. This is especially important when service conductors are tapped from large low voltage networks or from large low impedance transformers.

Cable limiters have terminals which permit them to be installed in a variety of equipment. The most common configuration is the offset blade on one end and the crimp terminal on the other end. This permits the limiter to replace a cable terminal (lug).

#### **Applications**

- Service Entrance Conductors
- Between Transformer or network bus and bus-way terminal boxes as secondary ties.
- Feeders with three or more conductors per phase to share heavier load in large commercial and industrial installations
- Multiple Single conductor services, tapped from single (utility) transformer in multi-family residential and small commercial installations.

#### **Features**

- Current-limiting characteristics provide protection to conductor insulation and reduce damage when faults occur.
- Properly applied cable limiters may permit the use of equipment with reduced withstand ratings
- Wide variety of terminations and cable ratings permit use in almost every situation.

#### **Specifications**

Voltage Ratings Interrupting Rating Cable Size Range Approvals Recommended Installation Tool 250 VAC, 600 VAC 100 kA (250 VAC), 200 kA (600 VAC)

12 AWG – 1000Kcmil Copper Contact Tech-Line at 800-TEC-FUSE

Make: Thomas & Betts Crimp Tool: TBM14\_, TBM15\_



# CYLINDRICAL FUSES

500 Volts • 0.5-100 A





# **Description**

Littelfuse fast acting (gL-gG) fuses are used for the protection of cables against short-circuits. Time-lag (aM) fuses are used for protection of motors.

# **Specifications**

**Standards** 10x38 mm: IEC 60269

14x51 mm / 22x58mm: IEC 269-2-1

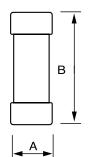
# **Ordering Information**

BASE PART NUMBER	SIZE (mm)	CURRENT RANGE	VOLTAGE (AC)	INTERRUPTING RATING
		0.5-16 A	500 V	120 kA
CY10X38	10 x 38	20-25 A (aM)	400 V	120 kA
		20-25 A (gL-gG)	500 V	120 kA
		32 A	400 V	120 kA
	14 x 51	2-25 A	690 V	80 kA
CY14X51		32-40 A	500 V	120 kA
		50 A	400 V	120 kA
CY22X58	22 v E0	16-63 A	690 V	80 kA
01ZZX38	22 x 58	80-100 A	500 V	120 kA

AMPERAGE	gL-gG ORDERING NUMBERS			aM ORDERING NUMBERS		
AWIPERAGE	10 X 38	14 X 51	22 X 58	10 X 38	14 X 51	22 X 58
0.5	CY10X38G05	_	_	CY10X38M05	_	_
1	CY10X38G1	_	_	CY10X38M1	_	_
2	CY10X38G2	CY14X51G2	_	CY10X38M2	CY14X51M2	_
4	CY10X38G4	CY14X51G4	_	CY10X38M4	CY14X51M4	_
6	CY10X38G6	CY14X51G6	_	CY10X38M6	CY14X51M6	_
8	CY10X38G8	CY14X51G8	_	CY10X38M8	CY14X51M8	_
10	CY10X38G10	CY14X51G10	_	CY10X38M10	CY14X51M10	_
12	CY10X38G12	CY14X51G12	_	CY10X38M12	CY14X51M12	_
16	CY10X38G16	CY14X51G16	CY22X58G16	CY10X38M16	CY14X51M16	CY22X58M16
20	CY10X38G20	CY14X51G20	CY22X58G20	CY10X38M20	CY14X51M20	CY22X58M20
25	CY10X38G25	CY14X51G25	CY22X58G25	CY10X38M25	CY14X51M25	CY22X58M25
32	CY10X38G32	CY14X51G32	CY22X58G32	CY10X38M32	CY14X51M32	CY22X58M32
40	_	CY14X51G40	CY22X58G40	_	CY14X51M40	CY22X58M40
50	_	CY14X51G50	CY22X58G50	_	CY14X51M50	CY22X58M50
63	_	_	CY22X58G63	_	_	CY22X58M63
80	_	_	CY22X58G80	_	_	CY22X58M80
100	_	_	CY22X58G100	_	_	CY22X58M100

#### **Dimensions**

FUSE SIZE	DIMENSIONS mm			
FUSE SIZE	Α	В		
10 X 38	10	38		
14 X 51	14	51		
22 X 58	22	58		



#### **Web Resources**

For additional product information

Fuses: littelfuse.com/cy

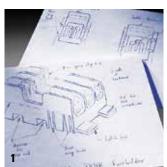
Fuse Holders: littelfuse.com/lfpsm littelfuse.com/cyh

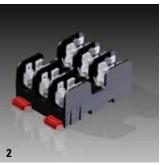
#### **Fuse Holders**

AMP RATING	POLES	SIZE	CATALOG / ORDERING #	TERMINAL TYPE	DIN RAIL MOUNT
32 A	1	10 X 38	LFPSM0001Z	Pressure Plate	•
32 A	2	10 X 38	LFPSM0002Z	Pressure Plate	•
32 A	3	10 X 38	LFPSM0003Z	Pressure Plate	•
32 A	4	10 X 38	LFPSM0004Z	Pressure Plate	•
32 A	1	10 X 38	LFPSM0001ZXID*	Pressure Plate	•
32 A	2	10 X 38	LFPSM0002ZXID*	Pressure Plate	•
32 A	3	10 X 38	LFPSM0003ZXID*	Pressure Plate	•
32 A	4	10 X 38	LFPSM0004ZXID*	Pressure Plate	•
50 A	1	14 X 51	CYH14511	Pressure Plate	•
50 A	2	14 X 51	CYH14512	Pressure Plate	•
50 A	3	14 X 51	CYH14513	Pressure Plate	•
125 A	1	22 X 58	CYH22581	Pressure Plate	•
125 A	2	22 X 58	CYH22582	Pressure Plate	•
125 A	3	22 X 58	CYH22583	Pressure Plate	•
	_				•

# Littelfuse® Expertise Applied | Answers Delivered

# **OEM CUSTOM PRODUCTS**









To speak with a sales associate regarding your application needs, call 800-TEC-FUSE (800-382-3873) or email techline@littelfuse.com.



#### **Two-Pole Combination Block**

Save space and money by combining multiple components in one unit. Littelfuse collaborated with the customer to develop a cost effective UL listed component that combined a 600 Volt 100A two-pole Class T fuse block with a two-openings-per-pole splicer block.

#### **Description**

We understand that existing solutions don't always solve your current problems. Building on 90 years of circuit protection experience, the Littelfuse engineering team collaborates with customers to develop customized solutions for applications such as solar panels, HVAC systems, lift trucks, lighting fixtures, industrial restaurant equipment and power converters.

#### **Process**

The custom product design process begins with a situation analysis from our experienced engineers followed by our 4-step collaborative product development process.

- 1. Initial concept sketch created
- 2. CAD drawings to formalize the product description
- 3. 3D solid prototype to verify design
- Final production parts that meet your design needs and specifications

#### **Additional Customized Products**

HAZGARD Fork Lift Fuse ......64

#### Web Resources

To learn more and contact our OEM team, visit: littelfuse.com/industrialoem



#### **Custom-Leaded Fuse**

Save space and reduce cost by eliminating the fuse block component. Littelfuse designed a series of custom through-hole PC-board mountable KLKD Midget fuses for a consumer application where reduced cost was more important than replaceability.

#### **Section Overview**

Littelfuse high-speed fuses protect critical power semiconductors against short circuits in applications including inverters, variable-speed drives, UPS and DC drive systems.

For the complete portfolio of high-speed products visit:

littelfuse.com/High-Speed







# HIGH-SPEED FUSES #

#### **Table of Contents**

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Square Body High-Speed Fuses	83



# POWR-GARD® High-Speed Circuit Protection

Littelfuse engineering is constantly developing new products to meet the needs of the industry. For the latest information on the growing POWR-GARD Product portfolio, visit:

littelfuse.com/High-Speed



## L50QS SERIES HIGH-SPEED ROUND-BODY FUSES

500 Vac/dc • 35-800 A • Traditional Round-Body Bolted Style





#### **Description**

The L50QS Series is a next generation High-Speed Fuse for the protection of power semiconductor devices and is designed in the Traditional North American Bolted Style package.

L50QS Series High-Speed Fuses are extremely current limiting and are used to protect power converters, drives and control circuit applications. Designed with lower I²t performance characteristics, these fuses provide balanced performance to extend longevity while lowering potentially damaging heat energy to the devices being protected.

In addition L50QS Series fuses have been designed with a universal mounting option to meet customer requirements for installation into a variety of application configurations

Littelfuse POWR-SPEED™ products offer optimized circuit protection at the extremely fast speed required to protect modern day, sensitive, high-power semiconductor devices. Such products are commonly found in various industries including pulp and paper industries, cranes and heavy-lifting equipment, processing industries, wastewater treatment plants and large factories and MRO facilities.

#### Features/Benefits

- Compliance with US and Canadian Requirements
- Traditional North American Bolted Style dimensions
- Class aR performance
- Direct bus-bar mount or stud mount design
- RoHS and REACH Compliant

#### **Applications**

- Power Converters (Inverters, Rectifiers)
- Power Supplies
- UPS
- Variable Speed Drives
- Control Circuits
- Soft Starters

#### **Specifications**

Voltage Rating
AC: 500V
DC: 500V

Amperage Rating
35 - 800
Interrupting Rating
AC: 200 kA
DC: 50 kA

Material
Body: Melamine
Caps: Copper Alloy (Silver Plated)

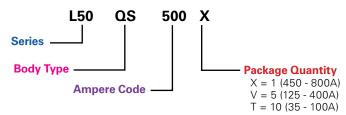
**Approvals** UL Recognized (E71611)

c-UR-us (E71611)

**Environmental** RoHS Compliant, REACH

Country of Origin Mexico

#### **Part Numbering System**



SERIES	BODY TYPE	AMPERE CODE	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
L50	QS	500	1	L50QS500	L50QS500.X

#### **Recommended Fuse Blocks**

LSCR001 (35-200 A)	. 127
LSCR002 (225-800 A)	. 127



#### **Web Resources**

Download technical documents: littelfuse.com/L50QS



## L50QS SERIES HIGH-SPEED ROUND-BODY FUSES

## **Electrical Specifications**

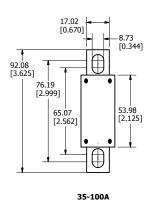
CATALOG NUMBER	AMPERAGE RATING	VOLT RAT	TAGE TING	INTEF RAT		MELTING (PRE-ARC) I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	WATTS LOSS AT 80% RATED CURRENT	WATTS LOSS AT 100% RATED CURRENT
	Ā	AC	DC	AC	DC		200 kA @ 500 Vac 50 kA @		(W)	(W)
L50QS035	35	500	500	200kA	50kA	111	430	290	3	5
L50QS040	40	500	500	200kA	50kA	137	530	363	3	9
L50QS050	50	500	500	200kA	50kA	211	770	516	5	8
L50QS060	60	500	500	200kA	50kA	269	1,500	881	5	9
L50QS070	70	500	500	200kA	50kA	393	1,775	1,185	6	11
L50QS080	80	500	500	200kA	50kA	616	3,550	1,720	6	11
L50QS090	90	500	500	200kA	50kA	720	4,075	1,990	8	14
L50QS100	100	500	500	200kA	50kA	905	4,577	2,313	9	17
L50QS125	125	500	500	200kA	50kA	1,503	7,655	4,815	10	17
L50QS150	150	500	500	200kA	50kA	2,382	11,100	7,190	12	21
L50QS175	175	500	500	200kA	50kA	3,148	16,500	9,900	14	25
L50QS200	200	500	500	200kA	50kA	4,102	18,233	11,567	17	32
L50QS225	225	500	500	200kA	50kA	5,379	25,300	16,700	19	35
L50QS250	250	500	500	200kA	50kA	7,094	31,350	22,500	20	37
L50QS300	300	500	500	200kA	50kA	11,240	53,800	36,150	25	46
L50QS350	350	500	500	200kA	50kA	14,246	68,850	44,800	30	61
L50QS400	400	500	500	200kA	50kA	21,155	100,300	67,300	33	65
L50QS450	450	500	500	200kA	50kA	26,425	121,000	84,650	35	63
L50QS500	500	500	500	200kA	50kA	31,747	141,000	103,500	39	72
L50QS600	600	500	500	200kA	50kA	43,922	193,500	128,000	49	92
L50QS700	700	500	500	200kA	50kA	75,597	314,000	230,000	51	92
L50QS800	800	500	500	200kA	50kA	92,717	393,500	280,000	63	117

# Littelfuse® Expertise Applied | Answers Delivered

## L50QS SERIES HIGH-SPEED ROUND-BODY FUSES

## **Dimensions**Millimeters [inches]

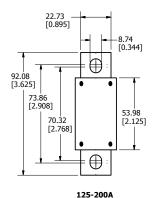
**Document Number:** OL-L50QS000



3.18 [0.125] + O

Stud Size: M8 (5/16")

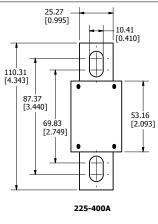
Recommended Torque: 15 Nm (132.76 in-lb)





Stud Size: M8 (5/16")

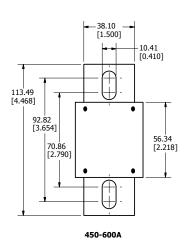
Recommended Torque: 15 Nm (132.76 in-lb)

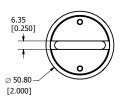




Stud Size: M8 (5/16")

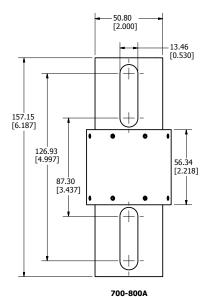
Recommended Torque: 15 Nm (132.76 in-lb)

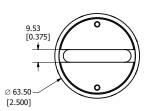




Stud Size: M8 (5/16")

Recommended Torque: 15 Nm (132.76 in-lb)





Stud Size: M12 (1/2")

Recommended Torque: 54 Nm (477.94 in-lb)



## L70QS SERIES HIGH-SPEED ROUND-BODY FUSES

700 Vac/dc • 35-800 A • Traditional Round-Body Bolted Style





#### **Description**

The L70QS Series is a next generation High-Speed Fuse for the protection of power semiconductor devices and is designed in the Traditional North American Bolted Style package.

L70QS Series High-Speed Fuses are extremely current limiting and are used to protect power converters, drives and control circuit applications. Designed with lower l<sup>2</sup>t performance characteristics, these fuses provide balanced performance to extend longevity while lowering potentially damaging heat energy to the devices being protected.

In addition L70QS Series fuses have been designed with a universal mounting option to meet customer requirements for installation into a variety of application configurations

Littelfuse POWR-SPEED™ products offer optimized circuit protection at the extremely fast speed required to protect modern day, sensitive, high-power semiconductor devices. Such products are commonly found in various industries including pulp and paper industries, cranes and heavy-lifting equipment, processing industries, wastewater treatment plants and large factories and MRO facilities.

#### Features/Benefits

- Compliance with US and Canadian Requirements
- Traditional North American Bolted Style dimensions
- Class aR performance
- Direct bus-bar mount or stud mount design
- RoHS and REACH Compliant

#### **Applications**

- Power Converters (Inverters, Rectifiers)
- Power Supplies
- UPS
- Variable Speed Drives
- Control Circuits
- Soft Starters

#### **Specifications**

Voltage Rating
AC: 700V
DC: 700V

Amperage Rating
35 - 800
Interrupting Rating
AC: 200 kA
DC: 50 kA

Material Body: Melamine
Caps: Copper Alloy (Silver Plated)

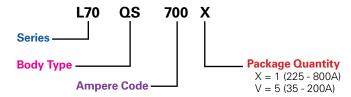
**Approvals** UL Recognized (E71611)

c-UR-us (E71611)

**Environmental** RoHS Compliant, REACH

Country of Origin Mexico

#### **Part Numbering System**



SERIES	BODY TYPE	AMPERE CODE	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
L70	QS	700	1	L70QS700	L70QS700.X

#### **Recommended Fuse Blocks**

LSCR001 (35-200 A)	127
LSCR002 (225-800 Δ)	127



#### Web Resources

Download technical documents: littelfuse.com/L70QS



## L70QS SERIES HIGH-SPEED ROUND-BODY FUSES

## **Electrical Specifications**

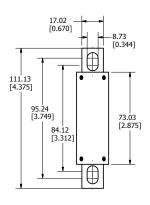
CATALOG NUMBER	AMPERAGE RATING	VOLT RAT	TAGE TING		RRUPT TING	MELTING (PRE-ARC) I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	WATTS LOSS AT 80% RATED CURRENT	WATTS LOSS AT 100% RATED CURRENT
	₹	AC	DC	AC	DC		200 kA @ 700 Vac	50 kA @ 700 Vdc	(VV)	(VV)
L70QS035	35	700	700	200kA	50kA	129	332	308	5	8
L70QS040	40	700	700	200kA	50kA	153	599	416	6	9
L70QS050	50	700	700	200kA	50kA	196	711	588	6	12
L70QS060	60	700	700	200kA	50kA	269	1,233	678	9	15
L70QS070	70	700	700	200kA	50kA	359	1,575	1,075	10	20
L70QS080	80	700	700	200kA	50kA	452	2,755	1,415	12	22
L70QS090	90	700	700	200kA	50kA	625	3,365	1,920	13	25
L70QS100	100	700	700	200kA	50kA	966	3,747	2,347	15	30
L70QS125	125	700	700	200kA	50kA	2,208	8,795	5,570	13	24
L70QS150	150	700	700	200kA	50kA	3,026	13,650	8,195	17	32
L70QS175	175	700	700	200kA	50kA	4,219	19,550	11,650	20	38
L70QS200	200	700	700	200kA	50kA	5,529	22,067	16,100	22	42
L70QS225	225	700	700	200kA	50kA	9,226	34,900	25,400	22	40
L70QS250	250	700	700	200kA	50kA	10,999	43,750	31,650	27	46
L70QS300	300	700	700	200kA	50kA	16,296	64,400	45,500	31	57
L70QS350	350	700	700	200kA	50kA	24,778	91,500	65,250	35	67
L70QS400	400	700	700	200kA	50kA	34,225	110,667	94,666	41	79
L70QS450	450	700	700	200kA	50kA	38,946	145,500	113,500	45	81
L70QS500	500	700	700	200kA	50kA	42,747	173,000	125,500	56	112
L70QS600	600	700	700	200kA	50kA	67,363	220,333	179,667	67	138
L70QS700	700	700	700	200kA	50kA	99,387	368,000	298,000	72	138
L70QS800	800	700	700	200kA	50kA	156,137	466,333	415,333	76	142



## L70QS SERIES HIGH-SPEED ROUND-BODY FUSES

## **Dimensions**Millimeters [inches]

Document Number: OL-L70QS000

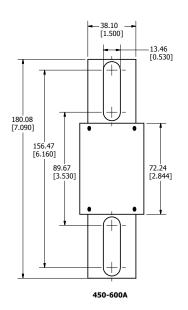


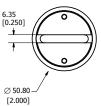
35-100A



Stud Size: M8 (5/16")

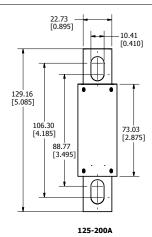
Recommended Torque: 15 Nm (132.76 in-lb)





Stud Size: M12 (1/2")

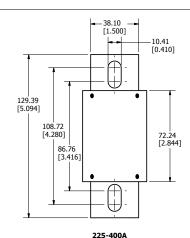
Recommended Torque: 54 Nm (477.94 in-lb)





Stud Size: M8 (5/16")

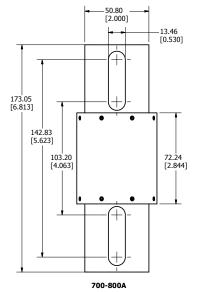
Recommended Torque: 15 Nm (132.76 in-lb)



6.35 [0.250] 1 0 0 50.80 [2.000]

Stud Size: M8 (5/16")

Recommended Torque: 15 Nm (132.76 in-lb)



9.53 [0.375] 0 0 63.50 (2.500)

Stud Size: M12 (1/2")

Recommended Torque: 54 Nm (477.94 in-lb)

# Littelfuse® Expertise Applied | Answers Delivered

## L50S SERIES HIGH-SPEED FUSE

#### 500 Vac • 450 Vdc • 10-800 A • Traditional Round-Body Style





### **Description**

Littelfuse L50S Series High-Speed Fuses are designed to protect today's equipment and systems, and are manufactured with Littelfuse-developed technology that sets standards for accuracy, consistent quality, reliability, and predictable performance.

Littelfuse engineers have redefined High-Speed Fuse Technology by using advanced metallurgical, polymer, and materials research, mathematical modeling, and computerized statistical analysis.

#### Features/Benefits

- Extremely Current Limiting
- Low Watt Losses
- Controlled Transient Over-voltages
- UL Recognized

#### **Applications**

- AC & DC Drives
- DC Common Bus Protection
- Power Converters
- UPS
- Soft-Starters

#### **Specifications**

Voltage Rating 500 Vac

450 Vdc

**Amperage Rating** 10, 12, 15, 20, 25, 30, 35, 40, 50, 60,

70, 80, 90, 100, 125, 150, 175, 200, 225, 250, 275, 300, 350, 400, 450, 500, 550,

600, 700, 800

**Interrupting Rating** AC: 200 kAIC

DC: 20 kAIC

Material Body: Melamine

Terminals: Copper (silver plated)

Mounting Type Cylindrical (10 - 30 A)

Bolted Tags (35 - 800 A)

**Operating Temperature**  $-55^{\circ}$  C to  $+125^{\circ}$  C

**Storage Temperature** Up to 35° C with relative humidity less

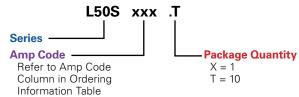
than 65%

**Approvals** UL Recognized (File: E71611)

CSA Recognized (File: LR29862)

Environmental RoHS Compliant
Country of Origin Mexico

## **Part Numbering System**



SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
L50S	10	L50S010	L50S010.T
L50S	500	L50S500	L50S500.X

#### **Recommended Fuse Holder**

LSCR001 (35-	-200 A)	127
LSCR002 (22)	5-800 A)	127

#### **Web Resources**

Download technical documents: littelfuse.com/L50S



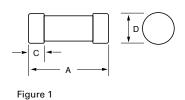
## L50S SERIES HIGH-SPEED FUSE

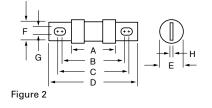
## **Electrical Specifications**

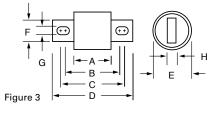
CATALOG NUMBER	AMPERAGE RATING	VOLT RAT		INTER RAT		MELTING (PRE-ARC)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	WATTS LOSS AT 100% RATED CURRENT	WATTS LOSS AT 80% RATED CURRENT
	A A	AC	DC	AC	DC	I <sup>2</sup> T (A <sup>2</sup> s)	100 kA @ 500 Vac	00 kA @ 500 Vac   200 kA @ 500 Vac   20 kA @ 450 Vdc		(W)	(W)
L50S010	10	500	450	200kA	20kA	21	112	128	85	2	1
L50S012	12	500	450	200kA	20kA	26	149	170	97	2	1
L50S015	15	500	450	200kA	20kA	34	222	250	116	2	2
L50S020	20	500	450	200kA	20kA	48	363	400	143	5	3
L50S025	25	500	450	200kA	20kA	62	528	600	170	7	4
L50S030	30	500	450	200kA	20kA	77	707	820	193	10	5
L50S035	35	500	450	200kA	20kA	130	1,120	1,210	400	6	3
L50S040	40	500	450	200kA	20kA	161	1,420	1,550	525	7	4
L50S050	50	500	450	200kA	20kA	222	2,150	2,360	867	11	6
L50S060	60	500	450	200kA	20kA	259	3,016	3,300	1,287	13	7
L50S070	70	500	450	200kA	20kA	420	4,100	4,930	1,670	17	10
L50S080	80	500	450	200kA	20kA	554	5,300	6,950	2,240	19	10
L50S090	90	500	450	200kA	20kA	677	6,750	9,500	2,900	24	13
L50S100	100	500	450	200kA	20kA	807	8,273	12,600	3,626	30	16
L50S125	125	500	450	200kA	20kA	1,290	13,100	19,000	5,150	22	12
L50S150	150	500	450	200kA	20kA	2,504	19,100	26,500	6,700	27	15
L50S175	175	500	450	200kA	20kA	3,224	26,300	35,000	8,700	33	17
L50S200	200	500	450	200kA	20kA	3,938	34,233	44,583	11,297	35	19
L50S225	225	500	450	200kA	20kA	6,034	43,500	56,000	14,750	31	17
L50S250	250	500	450	200kA	20kA	7,510	54,000	69,000	19,600	36	19
L50S275	275	500	450	200kA	20kA	9,000	65,500	82,000	25,500	41	22
L50S300	300	500	450	200kA	20kA	10,808	78,500	97,500	32,200	42	23
L50S350	350	500	450	200kA	20kA	16,500	107,000	132,000	50,100	50	28
L50S400	400	500	450	200kA	20kA	22,941	142,333	169,667	72,270	58	30
L50S450	450	500	450	200kA	20kA	29,300	178,500	208,000	95,000	58	32
L50S500	500	500	450	200kA	20kA	37,000	220,000	250,000	118,000	64	35
L50S550	550	500	450	200kA	20kA	45,851	311,667	347,333	176,766	75	41
L50S600	600	500	450	200kA	20kA	45,851	311,667	347,333	176,766	98	50
L50S700	700	500	450	200kA	20kA	82,396	460,000	622,333	289,000	96	51
L50S800	800	500	450	200kA	20kA	115,656	647,667	687,500	465,590	118	60

## **Dimensions**

AMPERE	FIGURE NO.	DIMENSIONS INCHES (MM)								
RATING	FIGURE NO.	Α	В	С	D	E	F	G	Н	
10 - 30	1	2 (50.8)	_	1/2 (12.7)	9⁄ <sub>16</sub> (14.3)	_	_	_	_	
31 - 60	2	15⁄8 (41.3)	21/4 (57.2)	2½ (63.5)	3¾16 (81.0)	<sup>13</sup> ⁄ <sub>16</sub> (20.6)	<sup>23</sup> / <sub>32</sub> (18.3)	<sup>11</sup> / <sub>32</sub> (8.7)	1/8 (3.2)	
61 – 100	3	21/8 (54.0)	2 <sup>1</sup> 1⁄16 (68.3)	3 (76.2)	35/8 (92.1)	1 (25.4)	.670 (17.0)	<sup>11</sup> / <sub>32</sub> (8.7)	1/8 (3.2)	
101 - 200	3	21/8 (54.0)	2 <sup>13</sup> ⁄16 (71.4)	2 <sup>15</sup> ⁄ <sub>16</sub> (74.6)	35/8 (92.1)	<sup>17</sup> / <sub>32</sub> (31.0)	.895 (22.7)	5/16 (7.9)	<sup>3</sup> ⁄16 (4.75)	
201 - 400	3	23/32 (53.2)	2 <sup>25</sup> / <sub>32</sub> (70.6)	313/32 (86.5)	411/32 (110.3)	1½ (38.1)	1 (25.4)	13/32 (10.3)	1/4 (6.4)	
401 - 600	3	27/32 (56.4)	2 <sup>29</sup> / <sub>32</sub> (73.8)	317/32 (89.7)	4 <sup>15</sup> / <sub>32</sub> (113.5)	2 (50.8)	1½ (38.1)	13/32 (10.3)	1/4 (6.4)	
601 - 800	3	27/32 (56.4)	4%32 (108.7)	45/8 (117.5)	6 <sup>15</sup> / <sub>32</sub> (164.3)	2½ (63.5)	2 (50.8)	17/32 (13.5)	<sup>3</sup> / <sub>8</sub> (9.5)	









## L70S SERIES HIGH-SPEED FUSE

700 Vac • 650 Vdc • 10-800 A • Traditional Round-Body Style





#### **Description**

Littelfuse L70S Series High-Speed Fuses are designed to protect today's equipment and systems, and are manufactured with Littelfuse-developed technology that sets standards for accuracy, consistent quality, reliability, and predictable performance.

Littelfuse engineers have redefined High-Speed Fuse technology by using advanced metallurgical, polymer, and materials research, mathematical modeling, and computerized statistical analysis.

#### Features/Benefits

- Extremely Current Limiting
- Low Watt Losses
- Controlled Transient Over-voltages
- UL Recognized

#### **Applications**

- AC & DC Drives
- DC Common Bus Protection
- Power Converters
- UPS
- Soft-Starters

#### **Specifications**

Voltage Rating 700 Vac 650 Vdc

**Amperage Rating** 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 125, 150, 175, 200, 225, 250, 300, 350,

100, 123, 130, 173, 200, 223, 230, 3

400, 450, 500, 600, 700, 800

**Interrupting Rating** AC: 200 kAIC

DC: 20 kAIC

Material Body: Melamine

Terminals: Copper (silver plated)

Mounting Type Cylindrical (10 - 30 A) Bolted Tags (35 - 800 A)

Duited Tags (55 - 0

**Operating Temperature**  $-55^{\circ}$  C to  $+125^{\circ}$  C

**Storage Temperature** Up to 35° C with relative humidity less than 65%

Approvals

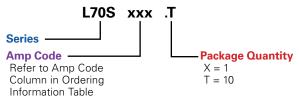
UL Recognized (File: E71611)

CSA Recognized (File: LR29862)

**Environmental** RoHS Compliant

Country of Origin Mexico

#### **Part Numbering System**



SERIES	AMP	CATALOG NUMBER	ORDERING NUMBER
L70S	10	L70S010	L70S010.T
L70S	500	L70S500	L70S500.X

#### **Recommended Fuse Block**

LSCR001 (35-200 A)	1	127
LSCR002 (225-800 Δ)	1	127

#### **Web Resources**

Download technical documents: littelfuse.com/L70S



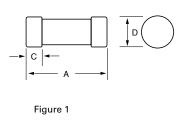
## L70S SERIES HIGH-SPEED FUSE

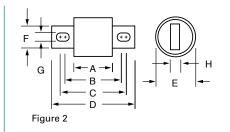
## **Electrical Specifications**

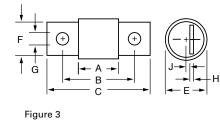
CATALOG NUMBER	AMPERAGE RATING		ATING		RUPT ING	MELTING (PRE-ARC) I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	TOTAL CLEARING I <sup>2</sup> T (A <sup>2</sup> s)	WATTS LOSS AT 100% RATED CURRENT	WATTS LOSS AT 80% RATED CURRENT
	₹	AC	DC	AC	DC		100 kA @ 700 Vac	200 kA @ 700 Vac	20 kA @ 650 Vdc	(VV)	(W)
L70S010	10	700	650	200kA	20kA	21	160	173	346	2	1
L70S015	15	700	650	200kA	20kA	34	330	355	270	2	2
L70S020	20	700	650	200kA	20kA	48	550	599	300	5	2
L70S025	25	700	650	200kA	20kA	62	810	900	340	7	4
L70S030	30	700	650	200kA	20kA	77	1,130	1,220	417	10	5
L70S035	35	700	650	200kA	20kA	110	1,470	1,500	500	12	6
L70S040	40	700	650	200kA	20kA	150	1,830	2,000	660	13	7
L70S050	50	700	650	200kA	20kA	250	2,670	3,200	1,070	16	9
L70S060	60	700	650	200kA	20kA	380	3,646	4,674	1,572	18	9
L70S070	70	700	650	200kA	20kA	545	4,800	6,000	1,970	16	9
L70S080	80	700	650	200kA	20kA	745	6,180	7,550	2,380	21	11
L70S090	90	700	650	200kA	20kA	990	7,650	9,250	2,830	25	13
L70S100	100	700	650	200kA	20kA	1,266	9,407	11,117	3,266	29	14
L70S125	125	700	650	200kA	20kA	2,150	14,700	17,550	4,900	33	17
L70S150	150	700	650	200kA	20kA	3,280	21,250	25,700	6,800	51	24
L70S175	175	700	650	200kA	20kA	4,700	28,750	34,800	9,000	63	28
L70S200	200	700	650	200kA	20kA	6,411	37,300	45,583	11,447	75	33
L70S225	225	700	650	200kA	20kA	8,000	46,500	57,000	16,000	43	24
L70S250	250	700	650	200kA	20kA	9,900	58,000	69,500	22,000	49	27
L70S300	300	700	650	200kA	20kA	14,000	83,000	97,700	37,500	60	33
L70S350	350	700	650	200kA	20kA	19,000	113,000	131,000	59,000	71	36
L70S400	400	700	650	200kA	20kA	24,373	147,290	169,000	87,875	107	49
L70S450	450	700	650	200kA	20kA	33,000	191,000	219,000	119,000	85	47
L70S500	500	700	650	200kA	20kA	44,200	240,000	275,000	155,000	92	49
L70S600	600	700	650	200kA	20kA	72,000	370,250	405,000	246,182	106	56
L70S700	700	700	650	200kA	20kA	110,000	526,000	573,000	255,000	128	67
L70S800	800	700	650	200kA	20kA	157,082	735,330	762,333	262,949	156	78

#### **Dimensions**

AMPERE	FIGURE	DIMENSIONS INCHES (MM)											
RATING	NO.	Α	В	С	D	E	F	G	Н	J			
10 – 30	1	2 (50.8)	_	1/2 (12.7)	9/16 (14.3)	_	_	_	_	_			
31 - 60	2	21/8 (73.0)	37/16 (87.3)	3¾ (95.2)	4¾ (111.1)	1 (25.4)	<sup>43</sup> ⁄ <sub>64</sub> (17.1)	11/32 (8.7)	1/8 (3.2)	_			
61 – 100	2	21/8 (73.0)	31/16 (90.5)	311/16 (93.7)	4% (111.1)	17/32 (31.0)	<sup>29</sup> / <sub>32</sub> (22.9)	5/16 (7.9)	<sup>3</sup> ⁄ <sub>16</sub> (4.8)	_			
101 – 200	2	2 <sup>27</sup> / <sub>32</sub> (72.2)	3 <sup>17</sup> / <sub>32</sub> (89.7)	45⁄32 (105.6)	53⁄32 (129.4)	1½ (38.1)	1 (25.4)	<sup>13</sup> / <sub>32</sub> (10.3)	1/4 (6.4)	_			
201 – 400	2	227/32 (72.2)	317/32 (89.7)	45⁄32 (105.6)	53/32 (129.4)	2 (50.8)	1½ (38.1)	13/32 (10.3)	1/4 (6.4)	_			
401 - 600	2	2 <sup>27</sup> / <sub>32</sub> (72.2)	4 <sup>29</sup> / <sub>32</sub> (124.6)	5¼ (133.4)	73/32 (180.2)	2½ (63.5)	2 (50.8)	<sup>17</sup> / <sub>32</sub> (13.5)	3/8 (9.5)	_			
601 - 800	3	35/16 (84.1)	55/16 (134.9)	6 <sup>13</sup> /16(173.0)	_	21/8 (73.0)	2 (50.8)	5/8 (15.9)	3/8 (9.5)	5/16 (7.9)			









## TRADITIONAL HIGH-SPEED FUSES

#### 150/250/600 Vac • Very Fast-Acting • 1-1200 A





#### **Specifications**

**Voltage Ratings** 

**L15S:** 150 Vac/dc (1-60 A)

150 Vac (70 – 1000 A) 100 Vdc (70 – 1000 A)

**L25S:** 250 Vac/dc (1 – 200 A)

250 Vac (225 – 800 A) 200 Vdc (225 – 800 A)

L25S series fuses are Littelfuse Certified

for DC ratings shown in Rating Table.

**L60S:** 600 Vac **0KLC:** 600 Vac

**Interrupting Rating** 

**AC:** 200 kA rms (L15S series 100 kA)

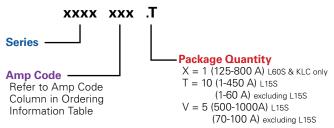
**DC**: 20 kA

**Ampere Range** 1 - 1000A (See Ordering Information Table

for ratings available in each series)
UL Recognized (File: E71611)

Approvals UL Recognized (File: E71611)
CSA Recognized (File: LR29862)

### **Part Numbering System**



#### **Recommended Fuse Holders**

1LFS101/1LFS102	129
LSCR001/LSCR002	127

#### **Web Resources**

For additional information, visit: littelfuse.com/high-speed

Note: High-Speed fuses are designed for fixed installations. They are not intended for use in moving vehicle applications.

## Ordering Information

AMP	:	SERIES ORDER	ING NUMBER	
CODE	L15S	L25S	L60S	0KLC‡
001	L15S001	L25S001	L60S001	0KLC001
002	L15S002	L25S002	L60S002	0KLC002
003	L15S003	L25S003	L60S003	0KLC003
004	L15S004	L25S004	L60S004	0KLC004
005	L15S005	L25S005	L60S005	0KLC005
006	L15S006	L25S006	L60S006	0KLC006
007	L15S007	-	-	0KLC007
800	L15S008	L25S008	L60S008	0KLC008
009	L15S009	-	-	-
010	L15S010	L25S010	L60S010	OKLC010
012	L15S012	L25S012	L60S012	0KLC012
015	L15S015	L25S015	L60S015	0KLC015
17.5	-	-	L60S17.5	0KLC17.5
020	L15S020	L25S020	L60S020	0KLC020
025	L15S025	L25S025	L60S025	0KLC025
030	L15S030	L25S030	L60S030	0KLC030
035	L15S035	L25S035	L60S035	0KLC035
040	L15S040	L25S040	L60S040	OKLC040
045	L15S045	L25S045	L60S045	0KLC045
050	L15S050	L25S050	L60S050	OKLC050
060	L15S060	L25S060	L60S060	OKLC060
070	L15S070	L25S070	L60S070	OKLC070
080	L15S080	L25S080	L60S080	OKLC080
090	L15S090	L25S090	L60S090	OKLC090
100	L15S100	L25S100	L60S100	OKLC100
110	-	-	_	OKLC110
125	L15S125	L25S125	L60S125	0KLC125
150	L15S150	L25S150	L60S150	OKLC150
175	-	L25S175	L60S175	0KLC175
200	L15S200	L25S200	L60S200	OKLC200
225	-	L25S225	L60S225	0KLC225
250	L15S250	L25S250	L60S250	0KLC250
275	-	L25S275	-	-
300	L15S300	L25S300	L60S300	OKLC300
350	L15S350	L25S350	L60S350	0KLC350
400	L15S400	L25S400	L60S400	OKLC400
450	L15S450	L25S450	L60S450	0KLC450
500	L15S500	L25S500	L60S500	0KLC500
550	-	-	-	-
600	L15S600	L25S600	L60S600	OKLC600
700	-	L25S700	L60S700	OKLC700
800	L15S800	L25S800	L60S800	OKLC800
1000	L15S1000	-	-	-

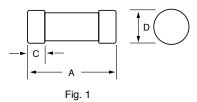
<sup>\*</sup> OKLC series fuses are recommended for replacement use only.

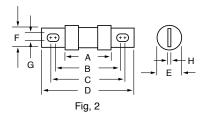


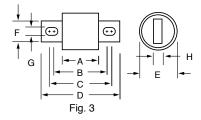
## TRADITIONAL HIGH-SPEED FUSES

#### **Dimensions**

AMPERE FIG. DIMENSIONS INCHES (MM)											
AMPERE RATING	FIG. NO.							0			
		Α	В	С	D	E	F	G	Н		
L15S Series		l		A / 4= =\	404 415 51						
1 – 30	1	1½ (38.1)	_	¾ (9.5)	<sup>13</sup> / <sub>32</sub> (10.3)	_	_	_	_		
31 – 60	1	2 (50.8)	_	5⁄8 (15.9)	<sup>13</sup> / <sub>16</sub> (20.6)	_	_	_	_		
61 – 450	3	15/32 (29.4)	17/8 (47.6)	23/16 (55.6)	221/32 (67.5)	1 (25.4)	<sup>43</sup> ⁄ <sub>64</sub> (17.1)	5/16 (7.9)	<sup>3</sup> / <sub>16</sub> (4.8)		
451 – 1000	3	1¼ (31.8)	115/16 (49.2)	29/16 (65.1)	3½ (88.9)	1½ (38.1)	1 (25.4)	<sup>13</sup> / <sub>32</sub> (10.3)	1/4 (6.4)		
L25S Series	, 250 V	/ac									
1 – 30	1	2 (50.8)	_	1/2 (12.7)	<sup>9</sup> / <sub>16</sub> (14.3)	_	_	_	_		
31 – 60	2	15/8 (41.3)	2¼ (57.2)	2½ (63.5)	3¾16 (81.0)	<sup>13</sup> ⁄ <sub>16</sub> (20.6)	<sup>23</sup> / <sub>32</sub> (18.3)	11/32 (8.7)	1/8 (3.2)		
61 – 200	3	15⁄8 (41.3)	25/16 (58.7)	27/16 (61.9)	31/8 (79.4)	17/32 (31.0)	1 (25.4)	5/16 (7.9)	<sup>3</sup> / <sub>16</sub> (4.8)		
201 – 700	3	119/32 (40.5)	2%32 (57.9)	2 <sup>29</sup> / <sub>32</sub> (73.8)	327/32 (97.6)	1½ (38.1)	1 (25.4)	<sup>13</sup> / <sub>32</sub> (10.3)	1/4 (6.4)		
701 – 800	3	119/32 (40.5)	2%2 (57.9)	229/32 (73.8)	327/32 (97.6)	2 (50.8)	1½ (38.1)	<sup>13</sup> / <sub>32</sub> (10.3)	1/4 (6.4)		
L60S Series	, 600 V	/ac									
1 – 30	1	5 (127.0)	_	<sup>5</sup> ⁄ <sub>8</sub> (15.9)	<sup>13</sup> ⁄ <sub>16</sub> (20.6)	-	_	_	_		
31 – 60	2	2 <sup>25</sup> / <sub>32</sub> (70.6)	37/16 (87.3)	311/16 (93.7)	4¾ (111.1)	<sup>13</sup> ⁄ <sub>16</sub> (20.6)	<sup>23</sup> / <sub>32</sub> (18.3)	11/32 (8.7)	1/8 (3.2)		
61 – 100	2	2 <sup>29</sup> / <sub>32</sub> (73.8)	317/32 (89.7)	325/32 (96.0)	4 <sup>15</sup> ⁄ <sub>32</sub> (113.5)	11/16 (27.0)	<sup>23</sup> / <sub>32</sub> (18.3)	11/32 (8.7)	1/8 (3.2)		
101 – 200	2	2 <sup>29</sup> / <sub>32</sub> (73.8)	3%16 (90.5)	3¾ (95.3)	4 <sup>13</sup> ⁄ <sub>32</sub> (111.9)	15/16 (33.3)	1 (25.4)	5/16 (7.9)	<sup>3</sup> / <sub>16</sub> (4.8)		
201 – 400	2	2 <sup>29</sup> / <sub>32</sub> (73.8)	331/32 (100.8)	45/32 (105.6)	51/8 (130.2)	1 <sup>37</sup> / <sub>64</sub> (40.1)	1 (25.4)	13/32 (10.3)	1/4 (6.4)		
401 – 600	2	2% (73.0)	331/32 (100.8)	4%4 (105.2)	51/8 (130.2)	21/16 (52.8)	1½ (38.1)	13/32 (10.3)	1/4 (6.4)		
601 – 800	2	31/32 (77.0)	55/32 (133.4)	5 <sup>1</sup> / <sub>32</sub> (135.7)	7¼ (184.2)	2½ (63.5)	2 (50.8)	17⁄32 (13.5)	3/8 (9.5)		
KLC Series,	600 Va	ас									
1 – 30	2	17/8 (47.6)	2½ (63.5)	_	21/8 (73.0)	<sup>9</sup> ⁄ <sub>16</sub> (14.3)	<sup>13</sup> / <sub>32</sub> (10.3)	1/4 (6.4)	<sup>3</sup> / <sub>64</sub> (1.2)		
31 – 60	2	2¾ (69.9)	3% (85.7)	3% (92.1)	45/16 (109.5)	<sup>13</sup> ⁄ <sub>16</sub> (20.6)	<sup>23</sup> / <sub>32</sub> (18.3)	11/32 (8.7)	1/8 (3.2)		
61 – 100	3	27/8 (73.0)	321/32 (92.9)	41/16 (103.2)	5 (127.0)	1 (25.4)	3/4 (19.1)	<sup>13</sup> / <sub>32</sub> (10.3)	1/8 (3.2)		
101 – 200	3	2 <sup>27</sup> / <sub>32</sub> (72.2)	317/32 (89.7)	4% (111.1)	53/32 (129.4)	1½ (38.1)	1 (25.4)	<sup>13</sup> / <sub>32</sub> (10.3)	1/4 (6.4)		
201 – 400	3	2 <sup>27</sup> / <sub>32</sub> (72.2)	4 <sup>21</sup> / <sub>32</sub> (118.3)	4 <sup>27</sup> / <sub>32</sub> (123.0)	6¼ (158.8)	2 (50.8)	15/8 (41.3)	% <sub>16</sub> (14.3)	1/4 (6.4)		
401 – 800	3	2 <sup>27</sup> / <sub>32</sub> (72.2)	4 <sup>21</sup> / <sub>32</sub> (118.3)	5 <sup>1</sup> / <sub>32</sub> (135.7)	6¼ (158.8)	2½ (63.5)	2 (50.8)	% <sub>16</sub> (14.3)	3⁄8 (9.5)		







# Littelfuse® Expertise Applied | Answers Delivered

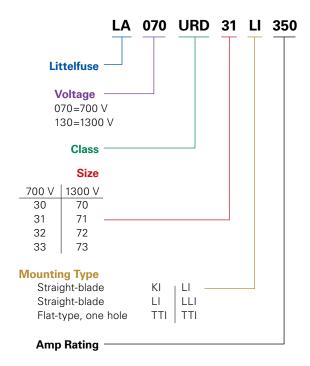
## SQUARE BODY HIGH-SPEED FUSES

700/1300 Vac • Very Fast-Acting • 63-2500 A





#### **Ordering Information**



#### **Description**

Littelfuse North American style square body high-speed fuses provide maximum flexibility in equipment design and ultimate protection for today's power conversion equipment. Available in different body sizes and multiple mounting styles, the broad range of ampere ratings allows great flexibility in equipment design.

Engineered to provide state-of-the-art protection for SCRs, diodes, thyristors, GTOs, and IGBT devices, Littelfuse square body fuses have pure die-cut elements embedded in solidified sand to control arcing and lower I<sup>2</sup>t. All fuses are also equipped with a blown fuse trip indicator.

#### **Features**

- Choice of mounting styles provides a wide choice for equipment design.
- Broad range of ampere ratings in a given body size for design flexibility.
- Very low I<sup>2</sup>t minimizes damage to protected components.
- Superior cycling ability for long, reliable life on high cyclic loading.
- Extremely fast-acting and current-limiting for improved protection to equipment.

#### **Applications**

Protection of rectifiers, inverters, DC drives, UPS systems, reduced voltage motor starters, and other equipment in globally accepted applications.

## **Specifications**

Voltage Rating	AC: 700 V (LA070) 1300 V (LA130)
	DC: Contact factory
Interrupting Rating	AC: 200 kA (LA070)
	100 kA (LA130)
	DC: Contact factory
Ampere Range	63 – 2500 A
Approvals	UL Recognized Component

#### **Dimensions**

Please refer to the Square Body dimensions .................. 85-87

#### **Web Resources**

For additional information, visit: littelfuse.com/la070



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S3	BODY SIZE	AMPERE RATING	RATED VOLTAGE	MELTING I <sup>2</sup> T (A <sup>2</sup> S X 10 <sup>3</sup> )	TOTAL I <sup>2</sup> T @ RATED VOLTAGE	*WATTS LOSS @ RATED CURRENT	LONG BLADE CATALOG NUMBER	SHORT BLADE CATALOG NUMBER	TAPPED TERMINAL CATALOG NUMBER
B0	SIZL	MATING	VULIAGE	(A 3 X 10°)			TYPE LI	TYPE KI	TYPE TTI
B0		63	700	0.2	1.2	14	LA070URD30LI0063	LA070URD30KI0063	LA070URD30TTI0063
125   700									
160		100	700	0.47	2.7	26	LA070URD30LI0100	LA070URD30KI0100	LA070URD30TTI0100
200		125	700	0.85			LA070URD30LI0125	LA070URD30KI0125	LA070URD30TTI0125
30			700	1.6			-	LA070URD30KI0160	LA070URD30TTI0160
315   700   15.5   86   57.760   16.5   86   57.760   16.5   86   57.760   16.5   86   57.760   16.5   86   57.760   16.5   86.765   1.4070URD300UR350   1.4070URD30000350   1.4070URD3000000   1.4070URD3000000   1.4070URD3000000   1.4070URD3000000   1.4070URD3000000   1.4070URD3000000   1.4070URD3000000   1.4070URD30000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD30000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000   1.4070URD300000000000000000000000000000000000							LA070URD30LI0200	LA070URD30KI0200	LA070URD30TTI0200
A00	30								
400   700   26   165   88   88   LAD7UNEDSIUNADO   LAD7UNEDSICIADO   LAD7UNEDSICIA					-				
\$600   700   26   165   80 / 88									
S00									
S50									
200									
250   700   4.7   27   52									
315   700   7.5   4.3   6.5									
350   700   10.5   59   67									
400   700   19   110   68									
31									
500   700   37   210   70/72	21								
	31								
630   700   75									
100   700   700   95   530   85/95   LA070URD31LI0700   LA070URD31KI0700   LA070URD31TITI0700									
800   700									
400   700									
150   700   22   124   77/80									
S00									
100		500	700	28	157		LA070URD32LI0500	LA070URD32KI0500	LA070URD32TTI0500
100		550	700	37	211	90/95	LA070URD32LI0550	LA070URD32KI0550	LA070URD32TTI0550
32   800   700   115   648   110/120			700	54	302		LA070URD32LI0630	LA070URD32KI0630	LA070URD32TTI0630
900   700   170   972   110/125   LA070URD32LI0900   LA070URD32KI0900   LA070URD32TTI0900		700	700	76	432	100/110	LA070URD32LI0700	LA070URD32KI0700	LA070URD32TTI0700
900	22	800	700	115	648	110/120	LA070URD32LI0800	LA070URD32KI0800	LA070URD32TTI0800
1100	32	900	700	170	972	110/125	LA070URD32LI0900	LA070URD32KI0900	LA070URD32TTI0900
1250		1000					LA070URD32LI1000	LA070URD32KI1000	
1400			650				LA065URD32LI1100	_	LA065URD32TTI1100
1600								-	
1800   500   1050   4400   195/330   LA050URD32LI1800   — LA050URD32TTI1800								-	
S00								-	
S50									
630									
700									
800									
900									
1000   700   170   970   135/155   LA070URD33LI1000   LA070URD33KI1000   LA070URD33TTI1000									
33									
1250   700   350   2000   150/180   LA070URD33L11250   LA070URD33K11250   LA070URD33T11250   1400   700   480   2700   160/200   LA070URD33L11400   LA070URD33K11400   LA070URD33K11400   LA070URD33T11400   1600   650   555   3250   210/240   LA065URD33L1600   -   LA065URD33T11600   1800   650   720   4330   225/260   LA065URD33L1800   -   LA065URD33T11800   2000   600   950   5000   250/290   LA060URD33L12000   -   LA060URD33T12000   2250   550   1250   5900   280/330   LA055URD33L12250   -   LA055URD33T112250	22								
1400         700         480         2700         160/200         LA070URD33LI1400         LA070URD33KI1400         LA070URD33TI1400           1600         650         555         3250         210/240         LA065URD33LI1600         —         LA065URD33TTI1600           1800         650         720         4330         225/260         LA065URD33LI1800         —         LA065URD33TTI1800           2000         600         950         5000         250/290         LA060URD33LI2000         —         LA060URD33TTI2000           2250         550         1250         5900         280/330         LA055URD33LI2250         —         LA055URD33TTI2250	33								
1600     650     555     3250     210/240     LA065URD33LI1600     -     LA065URD33TTI1600       1800     650     720     4330     225/260     LA065URD33LI1800     -     LA065URD33TTI1800       2000     600     950     5000     250/290     LA060URD33LI2000     -     LA060URD33TTI2000       2250     550     1250     5900     280/330     LA055URD33LI2250     -     LA055URD33TTI2250									
1800     650     720     4330     225/260     LA065URD33LI1800     -     LA065URD33TTI1800       2000     600     950     5000     250/290     LA060URD33LI2000     -     LA060URD33TTI2000       2250     550     1250     5900     280/330     LA055URD33LI2250     -     LA055URD33TTI2250									
2000 600 950 5000 250/290 LA060URD33LI2000 - LA060URD33TTI2000 2250 550 1250 5900 280/330 LA055URD33LI2250 - LA055URD33TTI2250									
2250 550 1250 5900 280/330 LA055URD33LI2250 – LA055URD33TTI2250									
								_	
Z000   000   1070   7000   Z007 Jan   FABIOUNDAIDZION   -   FABIOUNDASTITZION		2500	500	1870	7600	280/330	LA050URD33LI2500	-	LA050URD33TTI2500

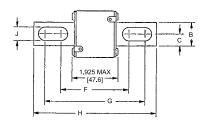
<sup>\*</sup>Watts loss data is published for both blade and tapped style mounting configurations. When two watts loss values are shown, this represents tapped/blade values respectively. Contact Littelfuse for characteristic curves.

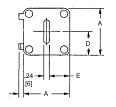
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#### **TYPES KI AND LI**





#### North American Straight Blade, Type KI

#### **Dimensions**

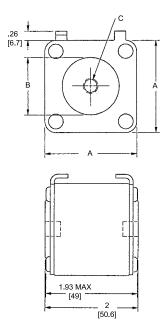
							Dimension	is for refer	ence only.	
CATALOG NUMBER	DIMENSIONS INCHES (mm)									
CATALOG NOWBER	Α	В	С	D	E	F	G	Н	J	
LA070URD30KI (63-550)	1.57	0.98	0.49	0.83	0.71	2.68	4.21	5.08	0.41	
	(40)	(25)	(12.5)	(21)	(18)	(68)	(107)	(129)	(10.5)	
LA070URD31KI (200-800)	2.01	0.98	0.49	1.0	0.89	2.66	4.22	5.07	0.56	
	(51)	(25)	(12.5)	(25.5)	(22.5)	(67.6)	(107.1)	(128.8)	(14.3)	
LA070URD32KI (400-1000)	2.36	1.26	0.63	1.18	1.06	2.92	4.29	5.28	0.57	
	(60)	(32)	(16)	(30)	(27)	(74.2)	(109)	(134)	(14.6)	
LA070URD33KI (500-1400)	2.93	1.57	0.79	1.46	1.35	2.97	4.24	5.28	0.63	
	(74.5)	(40)	(20)	(37.2)	(34.2)	(75.4)	(107.6)	(134)	(15.9)	

#### North American Straight Blade, Type LI

#### **Dimensions**

		Dimensions for reference only.										
	CATALOG NUMBER	DIMENSIONS INCHES (mm)										
	CATALOG NOWIDLIT	Α	В	С	D	E	F	G	Н	J		
	LA070URD30LI (63-550)	1.57 (40)	0.98 (25)	0.49 (12.5)	0.83 (21)	0.71 (18)	3.45 (87.6)	4.98 (126.6)	5.85 (148.6)	0.41 (10.5)		
	LA070URD31LI (200-800)	2.01 (51)	0.98 (25)	0.49 (12.5)	1.0 (25.5)	0.89 (22.5)	3.61 (91.6)	4.82 (122.4)	5.85 (148.6)	0.57 (14.6)		
ĺ	LA070URD32LI (400-1000)											
	LA060URD32LI (1250)	2.36	1.26	0.63	1.18	1.06	3.71	5.08	6.02	0.57		
	LA055URD32LI (1400-1600)	(60)	(32)	(16)	(30)	(27)	(94.2)	(129)	(153)	(14.6)		
	LA050URD32LI (1800)											
ĺ	LA070URD33LI (500-1400)											
	LA065URD33LI (1600-1800)	0.00	4 57	0.70	1.40	1.05	0.70	4.00	0.00	0.00		
	LA060URD33LI (2000)	2.93 (74.5)	1.57 (40)	0.79 (20)	1.46 (37.2)	1.35 (34.2)	3.72 (94.4)	4.98 (126.6)	6.02 (153)	0.63 (15.9)		
	LA055URD33LI (2250)	(74.3)	(40)	(20)	(37.2)	(34.2)	(94.4)	(120.0)	(133)	(13.3)		
	LA050LIRD33LL(2500)											

#### **TYPE TTI**



#### North American Flat Single Hole, Type TTI

Dimensions		Din	nensions for reference only.
CATALOG NUMBER	DII	MENSIONS INCHES	G (mm)
OATALOG NOMBLIT	А	В	С
LA070URD30TTI (100-550)	1.57 (40)	1.00 (25)	⁵⁄16-18 x 0.35
LA070URD31TTI (200-800)	2.00 (50.8)	1.19 (30.2)	⁵⁄16-18 x 0.35
LA070URD32TTI (400-1000)			
LA065URD32TTI (1100)	2.37	1.50	³/8-16 x 0.35
LA060URD32TTI (1250)	(60.3)	(38.1)	78-10 X 0.33
LA055URD32TTI (1400-1600)			
LA060URD33TTI (1800)			
LA070URD33TTI (500-1400)			
LA065URD33TTI (1600)	2.94	1.81	½-18 x 0.35
LA060URD33TTI (2000)	(74.5)	(46)	/2-10 X U.33
LA055URD33TTI (2250)			
LA050URD33TTI (2500)			



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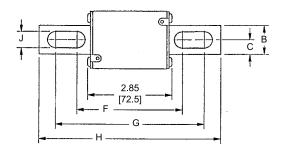
BODY SIZE	AMPERE RATING	RATED VOLTAGE	MELTING I <sup>2</sup> T (A <sup>2</sup> S X 10 <sup>3</sup> )	TOTAL I <sup>2</sup> T @ RATED VOLTAGE (A <sup>2</sup> S X 10 <sup>3</sup> )	*WATTS LOSS @ RATED CURRENT (W)	LONG BLADE CATALOG NUMBER TYPE LI/LLI	TAPPED TERMINAL CATALOG NUMBER TYPE TTI
	63	1300	0.21	1.8	26	LA130URD70LI0063	LA130URD70TTI0063
	80	1300	0.47	4	27	LA130URD70LI0080	LA130URD70TTI0080
	100	1300	0.83	7.2	30	LA130URD70LI0100	LA130URD70TTI0100
	125	1300	1.3	11	38	LA130URD70LI0125	LA130URD70TTI0125
70	160	1300	2.5	22	45	LA130URD70LI0160	LA130URD70TTI0160
	200	1300	4.7	40	54/56	LA130URD70LI0200	LA130URD70TTI0200
	250	1300	9.6	82	58/61	LA130URD70LI0250	LA130URD70TTI0250
	315	1300	20	172	66/72	LA130URD70LI0315	LA130URD70TTI0315
	350	1200	28	205	68/75	LA120URD70LI0350	LA120URD70TTI0350
	160	1300	2.6	22	46	LA130URD71LLI0160	LA130URDT1TTI0160
	200	1300	4.7	40	54	LA130URD71LLI0200	LA130URD71TTI0200
	250	1300	8.9	76	61	LA130URD71LLI0250	LA130URD71TTI0250
	280	1300	12	102	68/70	LA130URD71IL0280	LA130URD71TTI0280
	315	1300	16	138	73/76	LA130URD71LLI0315	LA130URD71TTI0315
71	350	1300	22	190	76/80	LA130URD71LLI0350	LA130URD71TTI0350
	400	1300	38	330	76/80	LA130URD71LLI0400	LA130URD71TTI0400
	450	1300	47	405	87/95	LA130URD71LLI0450	LA130URD71TTI0450
	500	1200	68	500	90/100	LA120URD71LLI0500	LA120URD71TTI0500
	550	1200	84	620	98/112	LA120URD71LLI0550	LA120URD71TTI0550
	630	1100	125	930	105	LA110URD71LLI0630	-
	630 1200		125	930	120	-	LA120URD71TTI0630
	280	1300	10	90	72	LA130URD72LI0280	LA130URD72TTI0280
	315 1300		15	130	76	LA130URD72LI0315	LA130URD72TTI0315
	350 1300		21	180	77	LA130URD72LI0350	LA130URD72TTI0350
	400 1300		32	285	80	LA130URD72LI0400	LA130URD72TTI0400
	450	1300	44	380	87/89	LA130URD72LI0450	LA130URD72TTI0450
70	500	1300	57	500	94/98	LA130URD72LI0500	LA130URD72TTI0500
72	550	1300	68	590	110/120	LA130URD72LI0550	LA130URD72TTI0550
	630	1200	105	920	113	LA120URD72LI0630	- L 4420LIDD72TTI0020
	630 700	1300 1100	105 145	920 1040	125 122	LA110URD72LI0700	LA130URD72TTI0630
	700	1200	145	1040	140	LATIUURD/2LIU/UU	- L 4420LIDD72TTI0700
	800	1100	215	1590	125	LA110URD72LI0800	LA120URD72TTI0700
	800	1200		1590	146	LATIUUND/ZLIU8UU	- L 4420LIDD72TTI0000
	315	1300	215 12	102	84	 LA130URD73LI0315	LA120URD72TTI0800 LA130URD73TTI0315
	350	1300	17	150	86	LA130URD73LI0350	LA130URD73TTI0315 LA130URD73TTI0350
	400	1300	25	220	93	LA130URD73LI0350	LA130URD73TTI0400
	450	1300	35	310	99/100	LA130URD73LI0450	LA130URD73TTI0450
	500	1300	44	390	110/112	LA130URD73LI0500	LA130URD73TTI0430
	550	1300	57	500	116/120	LA130URD73LI0550	LA130URD73TTI0550
	630	1300	84	730	125/132	LA130URD73LI0630	LA130URD73TTI0630
	700	1300	110	960	135/146	LA130URD73L10030	LA130URD73TTI0030
	800	1200	190	1630	136	LA120URD73LI0800	
73	800	1300	190	1630	148	EA120011D/3E10000	LA130URD73TTI0800
	900	1100	250	2160	150	LA110URD73LI0900	
	900	1000	250	2160	170		LA100URD73TTI0900
	1000	1000	370	2430	152/174	LA100URD73LI1000	LA1000ND73TT10900 LA100URD73TT11000
	1100	1000	445	2580	168/208	LA100URD73L11000	LA100URD73TTI1000
	1250	1000	585	3480	186/200	LA100URD73LI1250	LA100URD73TTI1250
	1400	900	755	3880	210/228	LA090URD73LI1400	LA090URD73TTI1400
	1600	700	1430	5630	203	LA070URD73LI1600	LA070URD73TTI1600
	1800	660	2040	7600	206	LA065URD73LI1800	LA065URD73TTI1800
	1000	000	2040	7000	200	LU003011013L11000	LU0000110101111000

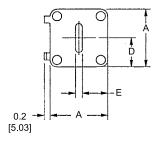
<sup>\*</sup>Watts loss data is published for both blade and tapped style mounting configurations. When two watts loss values are shown, this represents tapped/blade values respectively. Contact Littelfuse for characteristic curves.



700/1300 Vac • Very Fast-Acting • 63-2500 A

#### **TYPES LI AND LLI**





#### North American Straight Blade, Types LI and LLI

### **Dimensions**

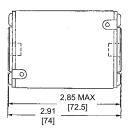
Dimensions								Dimensions for	or reference only.		
CATALOC NUMBER	DIMENSIONS INCHES (mm)										
CATALOG NUMBER	Α	В	С	D	Е	F	G	Н	J		
LA130URD70LI (63-315)	1.57	0.98	0.49	0.83	0.71	3.60	5.13	6.00	0.41		
LA120URD70LI (350)	(40)	(25)	(12.5)	(21)	(18)	(91.4)	(130.4)	(152.4)	(10.5)		
LA130URD71LLI (160-450)	2.01	0.00	0.40	1.0	0.00	2.00	F 10	0.00	0.57 (14.6)		
LA120URD71LLI (500-550)	2.01 (51)	0.98	0.49 (12.5)	1.0 (26.5)	0.89 (22.5)	3.60 (91.4)	5.13 (130.4)	6.00 (152.4)			
LA110URD71LLI (630)	(51)	(23)		(20.3)	(22.3)	(31.4)	(130.4)	(132.4)	(14.0)		
LA130URD72LI (280-550)	0.00	1.00	0.00	1.18	1.00	2.04	г о	6.20 (157.4)	0.57 (14.6)		
LA120URD72LI (800)	2.36 (60)	1.26 (32)	0.63 (16)	(30)	1.06 (27)	3.84 (97.6)	5.2 (132.4)				
LA110URD72LI (700-800)	(00)				(27)	(37.0)					
LA130URD73LI (315-700)											
LA120URD73LI (800)											
LA110URD73LI (900-1000)	2.93	1.57	0.79	1.46	1.35	3.89	5.21	6.20	0.63		
LA090URD73LI (1400)	(74.5)	(40)	(20)	(37.2)	(34.2)	(98.8)	(132.4)	(157.4)	(15.9)		
LA070URD73LI (1600)											
LA065URD73LI (1800)											

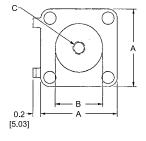
#### North American Flat Single Hole, Type TTI

#### **Dimensions**

Difficusions		Dimension:	s for reference only.
CATALOG NUMBER	DIME	<b>NSIONS INCHES</b>	S (mm)
CATALOG NOWIDER	А	В	С
LA130URD70TTI (63-315)	1.57	1.00	5/16-18 x 0.23 DP
LA120URD70TTI (350)	(40)	(26.4)	716-10 X U.Z3 DF
LA130URD71TTI (160-450)	2.01	1.19	5∕16-18 x 0.36 DP
LA120URD71TTI (550-630)	(51)	(30.2)	716-10 X U.30 DF
LA130URD72TTI (280-630)	2.36	1.50	3/8-18 x 0.36 DP
LA120URD72TTI (700-800)	(60)	(38.1)	78-18 X U.30 DP
LA130URD73TTI (315-900)			
LA120URD73TTI (1000)			
LA110URD73TTI (1250)	2.93	1.81	1/ 10 0 00 DD
LA090URD73TTI (1400)	(74.5)	(46)	½-18 x 0.36 DP
LA070URD73TTI (1600)			
LA065URD73TTI (1800)			

#### TYPE TTI





#### **Section Overview**

Littelfuse® offers a wide variety of open-face and dead-front fuse blocks, in addition to a variety of in-line fuse holders, distribution/splicer blocks, fuse pullers and accessories.







## 

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# Littelfuse® Expertise Applied | Answers Delivered

## FUSE BLOCK OVERVIEW



#### **Description**

Littelfuse offers a comprehensive line of fuse blocks that incorporate many benefits such as indication, snap torelease, DIN-Rail mounting and universal mounting holes.

#### **New Options Available**

- Reduced Footprint—Save space with designs up to 35% smaller in width
- Indication—Increase safety and reduce downtime with built-in local indication
- Universal Mounting Holes—Simplify replacement with universal mounting options
- DIN Rail Mountable—Ease installation with a 35 mm hat DIN Rail mounting option
- One-Hand Release—Save time by using only one hand for a simple release from DIN Rail

#### **Fuse Block Selection**

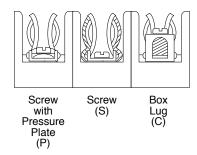
The following guidelines should help simplify the selection of proper fuse blocks:

- **1. Determine the system voltage**—Since fuses are selected on the basis of system voltage, fuse blocks are selected to match the voltage rating of the fuse.
- 2. Determine the design short-circuit current—If available short-circuit current cannot be determined, or if it will vary with equipment location, select fuses with a 200,000 ampere interrupting rating (A.I.R.) and mating fuse blocks with a withstand rating of 200,000 amperes for maximum safety.
- 3. Determine the type and ampere rating of the fuse to be used—The fuse ampere rating, opening characteristics (fast acting or time-delay) and size are important considerations in fuse selection. Fuse blocks may be used with a fuse rated at the corresponding amperage rating or below. For example, a fuse block rated at 30 amperes may be used with a fuse rated from 0 to 30 amperes.
- **4. Determine if NEC®, CSA, UL, or other requirements are applicable**—Any of these requirements should be obtained from the approving agency in advance of fuse and fuse block selection.

#### 5. Select the type of wire termination

Three types of wire termination are available:

- Screw\*—for use with spade lugs or ring terminals
- Screw with Pressure Plate\*—for use with solid or stranded wire without terminal. Recommended where vibration will be a factor
- Box Lug—for use with all types of solid wire and Class B and Class C stranded wire. The most durable, but not for use with welding cable or other rope-stranded conductors.
- \*¹/4" Quick Connect terminals are available on the Midget and Class CC fuse blocks.



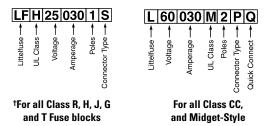
- **6. Decide on the number of poles in each block**—The number of poles for each set of fuses is determined by the characteristics of the circuit.
- **7. Determine if block should be DIN Rail mounted**—Many of the new Littelfuse fuse blocks are DIN Rail mountable. Be sure to look to corresponding ordering tables to match the correct part number on the following product pages.

#### 8. Determine if fuse clips need to be reinforced

Fuse clips may have a tendency to lose some of their tension over a period of time. This may be prevented by specifying reinforced fuse clips.

#### **Ordering Information**

The Littelfuse fuse block part number consists of the below skeleton. Please refer to UL Class Tables for specific information.



†These new fuse blocks replace previous Littelfuse fuse blocks that had very similar part numbers for customer convenience. The only change is an "F" has been added as the second character in the new block part numbers.

Caution: Littelfuse indicating fuse blocks are intended to quickly identify open fuses while power is still applied. Only qualified electrically trained technicians should replace fuses and follow standard OSHA and NFPA 70E safe work practices, such as Lock-Out and Tag-Out procedures and verification before replacing any fuses in indicating fuse blocks.



## LF SERIES INDICATING FUSE BLOCKS













Smaller Footprint Provides Space Savings



DIN-Rail Mounting Eases Installation



Indication Improves Functionality

#### An Indication of Value

The Littelfuse LF Series Fuse Blocks and Covers offer generous space savings and a greater value over previous generations. View the different series classes for available indication, snap-to-release DIN rail mounting, universal mounting holes and touch-safe covers.

600 V











## **Description**

The Littelfuse 600 V Class J blocks offer generous space savings and enhanced value over previous generations, such as indication, snap-to-release DIN rail mounting and universal mounting holes.

#### Features/Benefits

- Space-saving design up to 45% smaller
- Universal mounting holes for easy replacement
- Indication offered on all versions except 200-600 A
- One hand release from DIN rail for ferrule style fuses
- Reinforced fuse clips are standard on all Class J blocks
- Covers available for up to 100 A to enhance safety

#### **Specifications**

**Voltage Ratings** 600 V **Ampere Ratings** 0 - 600 A**Leakage Current** <0.6 mA at 600 V **Flammability Rating** UL94 V-0

**Approvals** UL Listed (File: E14721) CSA Certified (File: LR7316)

**Environmental** RoHS Compliant, Lead (Pb) Free

#### **Recommended Fuses**

Time Delay Series: JTD_ID Series: JTD	
Fast Acting	22

#### Web Resources

Download CAD drawings, fuse block cover datasheet and other technical information:

littelfuse.com/lfj

## **Ordering Information (Class J 600 V)**

ANAD		0	RDERING I	NUMBER			_						Z		
	AMP	POLES	BASE	TERI	MINAL SUF	FIX	TORQUE	AN I	WIRE RANGE	MIDE T	VDE	BASE TEMP	DIN	4TI0	COVER ORDERING
RA	ATING	POI	PART NUMBER	BOX LUG	PRESSURE PLATE	SCREW	TONGOE	TORQUE WIRE RANGE		VVINE	TE	RATING	RAIL	INDICATION	NUMBER*
		1	LFJ600301	CID	PID	SID		С	6-14 AWG						
	30	2	LFJ600302	CID	PID	SID	2.8 N-m (25 in-lbs)	Р	10-14 AWG	CU Only		125°C	•	•	LFJ60030FBC
		3	LFJ600303	CID	PID	SID		S	10-22 AWG						
		1	LFJ600601	CID	_	_	5.6 N-m (50 in-lbs)		2-4 AWG						
	60	2	LFJ600602	CID	_	_	2.8 N-m (25 in-lbs)	6-14 AWG		CU-AL		125°C	•	•	LFJ60060FBC
		3	LFJ600603	CID	_	_					р				
		1	LFJ601001	CID	_	_	13.6 N-m (120 in-lbs)	:	2/0-6 AWG		nde				
	100						4.5 N-m (40 in-lbs)		8 AWG	CU-AL	Stranded	130°C	_	•	LFJ60100FBC
		3	LFJ601003	CID	_	_	4.0 N-m (35 in-lbs)		10-14 AWG		Solid /				
	000	1	LFJ602001	С	_	_	04.4 N (075 : 11 )	,	2501 310	OLL AL	SS	400°0			
	200	3	LFJ602003	С	_	_	31.1 N-m (275 in-lbs)	•	250 kcmil-6	CU-AL		130°C	_		_
	400	1	LFJ604001	С	_	_	01.1 N /07E : II\	(2)	250 1: 1 1/0	CLLAI		10000			
	400	3	LFJ604003	С	_	_	31.1 N-m (275 in-lbs)	(2)	350 kcmil-1/0	CU-AL		130°C	_	_	_
	000	1	LFJ606001	С	_	_	40 4 N (07E : II)	10	\ F00  :  4	CLLAI		10000			
	600	3	LFJ606003	С	_	_	42.4 N-m (375 in-lbs)	(2	) 500 kcmil-4	CU-AL		130°C	_		_

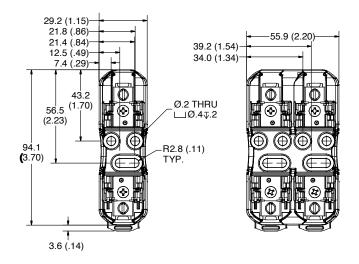
Note: Reinforcing springs standard on all Class J fuse blocks. \*Covers sold individually. One cover needed for each pole.

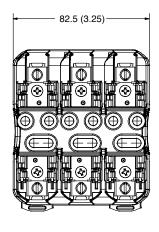


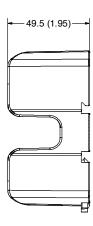
## **CLASS J FUSE BLOCK DIMENSIONS**

#### **Dimensions mm (inches)**

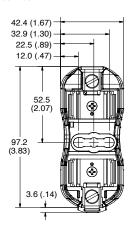
#### 600 V 30 A

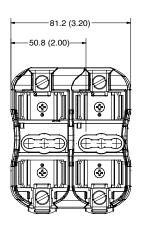


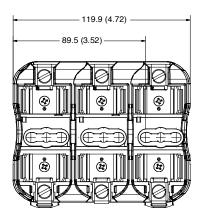


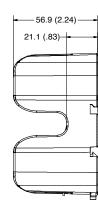


#### 600 V 60 A

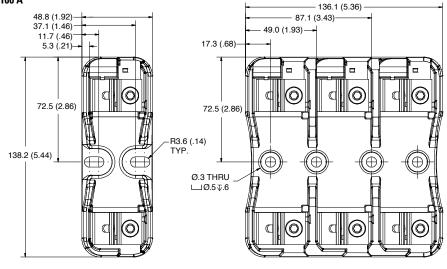


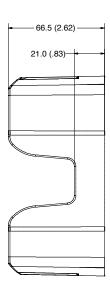






#### 600 V 100 A



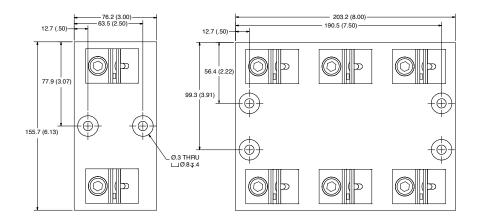


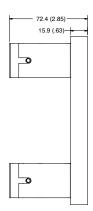


## **CLASS J FUSE BLOCK DIMENSIONS**

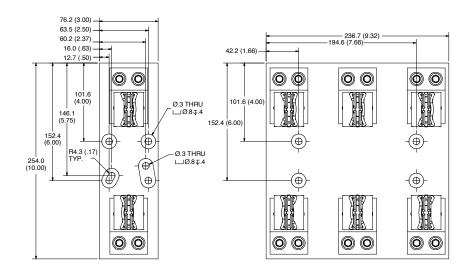
#### **Dimensions mm (inches)**

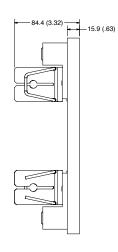
#### 600 V 200 A



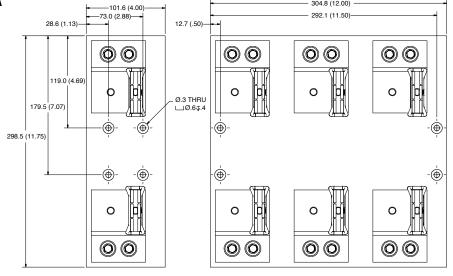


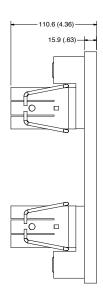
#### 600 V 400 A





#### 600 V 600 A







250 V • 600 V











#### **Description**

The Littelfuse Class R and H/K5 blocks offer many benefits such as indication, snap-to-release DIN rail mounting and universal mounting holes. Class H and Class R fuse blocks are dimensionally the same, but Class R blocks incorporate a rejection feature, which only allows Class R fuses to be inserted.

#### Features/Benefits

- · Universal mounting holes for easy replacement
- Indication offered on most 250 V and 600 V versions
- One hand release from DIN rail for ferrule style fuses
- Reinforced fuse clips are standard on all Class H and Class R fuse blocks
- Covers available for 100 A and lower to enhance safety

#### Web Resources

Download CAD drawings, fuse block cover datasheet and other technical information: littelfuse.com/lfr littelfuse.com/lfh

#### **Specifications**

**Voltage Rating** 250 V, 600 V **Ampere Ratings** 0-600 A **Leakage Current** <0.6 mA at 600 V

**Withstand Rating** Class H: 10 kA RMS SYM

Class R: 200 kA RMS SYM

Flammability Rating UL94 V-0

**Approvals** UL Listed (File: E14721) CSA Certified (File: LR7316)

**Environmental** RoHS Compliant, Lead (Pb) Free

#### **Recommended Fuses**

#### 250 V - Class R Blocks KLNR ...... 15 FLNR/FLNR\_ID ......17 250 V - Class H / K5 Blocks 600 V - Class R Blocks FLSR/FLSR\_ID ......17 600 V - Class H / K5 Blocks

## Ordering Information (Class H 250 V)

		OR	DERING	G NUMBER		TOPOUE	AL				BASE		NO	COVER
AMP RATING	POLES	BASE PART NUMBER	BOX LUG	SUFFIX PRESSURE PLATE	SCREW	TORQUE	TERMINAL	WIRE RANGE	WIRE	TYPE	TEMP RATING	DIN RAIL	INDICATION	ORDERING NUMBER*
	1	LFH250301	С	Р	S		С	6-14 AWG						
30	2	LFH250302	С	Р	S	2.8 N-m (25 in-lbs)	Р	10-14 AWG	CU Only		125°C	•	_	LFH25030FBC
	3	LFH250303	С	P	S		S	10-22 AWG						
	1	LFH250601	CID	_		5.6 N-m (50 in-lbs)		2-4 AWG						
60	2	LFH250602	CID	_		2 0 N /2F : Ib\		C 14 AVA/C	CU-AL		125°C	•	•	LFH25060FBC
	3	LFH250603	CID	_	_	2.8 N-m (25 in-lbs)		6-14 AWG						
400	1	LFH251001	CID	_	_	13.6 N-m (120 in-lbs)		2/0-6 AWG		Solid/	40000			151105100500
100	3	LFH251003	CID	_	_	4.5 N-m (40 in-lbs) 4.0 N-m (35 in-lbs)		8 AWG 10-14 AWG	CU-AL	Stranded	130°C	_	•	LFH25100FBC
200	1	LFH252001	С	_	_	31.1 N-m (275 in-lbs)		250 kcmil-6	CU-AL		130°C			
200	3	LFH252003	С		_	31.1 N-III (2/5 III-IUS)		ZOU KUIIII-0	CU-AL		130 6		_	_
400	1	LFH254001	С	_	_	31.1 N-m (275 in-lbs)	121	350 kcmil-1/0	CU-AL		130°C			
400	3	LFH254003	С			31.1 14-111 (2/3 111-108)	(2)	JUU KUIIII-1/U	UU-AL		130 6			_
600	1	LFH256001	С	_		42.4 N-m (375 in-lbs)	os) (2) 500 kcmil-4		CU-AL		130°C			
000	3	LFH256003	C.			42.4 14-111 (3/3 111-103)	(2	.) JUU KUIIII-4	GO-AL		130 6			

Note: Reinforcing springs standard on all Class H fuse blocks.

<sup>\*</sup>Covers sold individually. One cover needed for each pole.



### **Ordering Information (Class H 600 V)**

AMP	LES	OR BASE	DERIN	G NUMBER SUFFIX		TORQUE	TERMINAL	WIRE	WID	E TYPE	BASE TEMP	SNAP TO	CATION	COVER ORDERING
RATING	PO	ORDERING NUMBER	BOX LUG	PRESSURE PLATE	SCREW	TONGOL	TERN	RANGE	VVIIIL		RATING	RELEASE	INDIC	
30	1	LFH600301 LFH600302	CID	PID PID	SID SID	2.8 N-m (25 in-lbs)	C P	6-14 AWG 10-14 AWG	CU Only		130°C	•	•	LFH60030FBC
00	3	LFH600303 LFH600601	CID	PID —	SID —	5.6 N-m (50 in-lbs)	S 2	10-22 AWG 2-4 AWG	011.41		40000			LELIGOGOGEDO
60	3	LFH600602 LFH600603	CID			2.8 N-m (25 in-lbs)		i-14AWG	CU-AL		130°C	•	•	LFH60060FBC
100	3	LFH601001 LFH601003	CID	_		13.6 N-m (120 in-lbs) 4.5 N-m (40 in-lbs)		/0-6AWG 8 AWG	CU-AL	Solid/ Stranded	130°C	_	•	LFH60100FBC
200	1 3	LFH602001 LFH602003	С			4.0 N-m (35 in-lbs) 31.1 N-m (275 in-lbs)		0-14 AWG 50 kcmil-6	CU-AL		130°C	_	_	_
400	1	LFH604001 LFH604003	C	_		31.1 N-m (275 in-lbs)	(2) 3	50 kcmil-1/0	CU-AL		130°C	_	_	_
600	1 3	LFH606001 LFH606003	C	_ _	_	42.4 N-m (375 in-lbs)	(2)	500 kcmil-4	CU-AL		130°C	_	_	_

Note: Reinforcing springs standard on all Class H fuse blocks.

#### **Ordering Information (Class R 250 V)**

AMP RATING	LES	OR BASE	DERIN	G NUMBER SUFFIX		TORQUE	TERMINAL	WIRE	WIDI	TYPE	BASE TEMP	SNAP TO	CATION	COVER ORDERING
RATING	PO	ORDERING NUMBER	BOX LUG	PRESSURE PLATE	SCREW	TONGOL	TERN	RANGE	VVIII		RATING	RELEASE		NUMBER*
	1	LFR250301	С	Р	S		С	6-14 AWG						
30	2	LFR250302	С	Р	S	2.8 N-m (25 in-lbs)	Р	10-14 AWG	CU Only		125°C	•	_	LFH25030FBC
	3	LFR250303	С	Р	S		S	10-22 AWG						
	1	LFR250601	CID	_		5.6 N-m (50 in-lbs)		2-4 AWG						
60	2	LFR250602	CID	_		2.0 N /25 : /5-)		2 1 4 4 4 4 4 6	CU-AL		125°C	•	•	LFH25060FBC
	3	LFR250603	CID	_	_	2.8 N-m (25 in-lbs)		6-14 AWG						
100	1	LFR251001	CID	_	_	13.6 N-m (120 in-lbs) 4.5 N-m (40 in-lbs)	2	/0-6 AWG 8 AWG	CU-AL	Solid/	130°C			LFH25100FBC
100	3	LFR251003	CID	_	_	4.0 N-m (35 in-lbs)	1	0-14 AWG	CU-AL	Stranded	130 6	_		LITIZUTUULDG
200	1	LFR252001	С	_	_	31.1 N-m (275 in-lbs)	2	50 kcmil-6	CU-AL		130°C			
200	3	LFR252003	С		_	31.1 N-111 (2/3 111-108)	4	OU KUIIII-0	GU-AL		130 6			_
400	1	LFR254001	С	_	_	31.1 N-m (275 in-lbs)	121.3	350 kcmil-1/0	CU-AL		130°C			
400	3	LFR254003	С	_	_	31.1 N-111 (2/3 111-108)	(2) 3	SOU KCIIIII- I/U	GU-AL		130 6	_		_
600	1	LFR256001	С		_	42.4 N-m (375 in-lbs)	121	(2) 500 kcmil-4			130°C			
000	3	LFR256003	С	_	_	42.4 111 (373 111-103)	(2)	JUU KUIIII-4	CU-AL		130 6			

Note: Reinforcing springs standard on all Class R fuse blocks.

## **Ordering Information (Class R 600 V)**

AMP		OF	DERIN	G NUMBER			AL				BASE	SNAP	TION	COVER
	LES	BASE		SUFFIX		TORQUE	₹ Ş	WIRE	WIRI	TYPE	TEMP	TO	CAT	ORDERING
RATING	PO	ORDERING NUMBER	BOX LUG	PRESSURE PLATE	SCREW	.0202	TERMINAL	RANGE			RATING	RELEASE	INDIC	NUMBER*
	1	LFR600301	CID	PID	SID		С	6-14 AWG						
30	2	LFR600302	CID	PID	SID	2.8 N-m (25 in-lbs)	Р	10-14 AWG	CU Only		130°C	•	•	LFH60030FBC
	3	LFR600303	CID	PID	SID		S	10-22 AWG						
	1	LFR600601	CID	—		5.6 N-m (50 in-lbs)		2-4 AWG						
60	2	LFR600602	CID	_		0.011 (05: 11.)	C 14 AVA/C		CU-AL		130°C	•	•	LFH60060FBC
	3	LFR600603	CID	_	_	2.8 N-m (25 in-lbs)	6-14 AWG							
100	1	LFR601001	CID	_	_	13.6 N-m (120 in-lbs)	2	/0-6 AWG 8 AWG	CU-AL	Solid/	130°C			LFH60100FBC
100	3	LFR601003	CID	_	_	4.5 N-m (40 in-lbs) 4.0 N-m (35 in-lbs)	1	0-14 AWG	CU-AL	Stranded	130 6	_	•	LFHOUTUUFBU
200	1	LFR602001	С	_	_	i í	2	F0  :  C	CLLAI		1000			
200	3	LFR602003	С	_	_	31.1 N-m (275 in-lbs)		50 kcmil-6	CU-AL		130°C	_		_
400	1	LFR604001	С	_	_	31.1 N-m (275 in-lbs)	121.0	50 kcmil-1/0	CU-AL		130°C			
400	3	LFR604003	С	_	_	31.1 N-III (2/5 III-IDS)	(2) 3	OU KUIIII-I/U	UU-AL		130 6			_
600	1	LFR606001	С	_	_	42.4 N-m (375 in-lbs)	121	500 kcmil-4	CU-AL		130°C			
000	3	LFR606003	С	_	_	42.4 11-111 (3/3) 111-103)	(2)	JUU KUIIII-4	UU-AL		130 6			

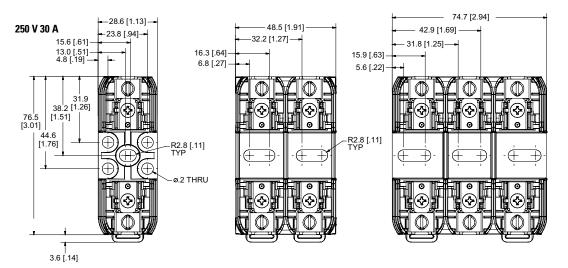
Note: Reinforcing springs standard on all Class R fuse blocks.

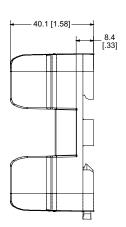
<sup>\*</sup>Covers sold individually. One cover needed for each pole.

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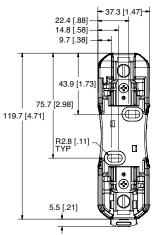


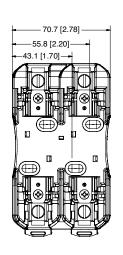
## LF SERIES CLASS R & H/K5 FUSE BLOCKS

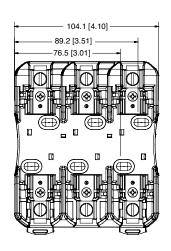


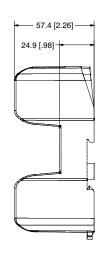




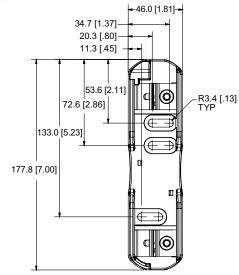


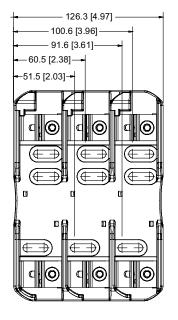


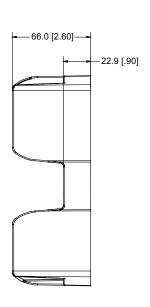




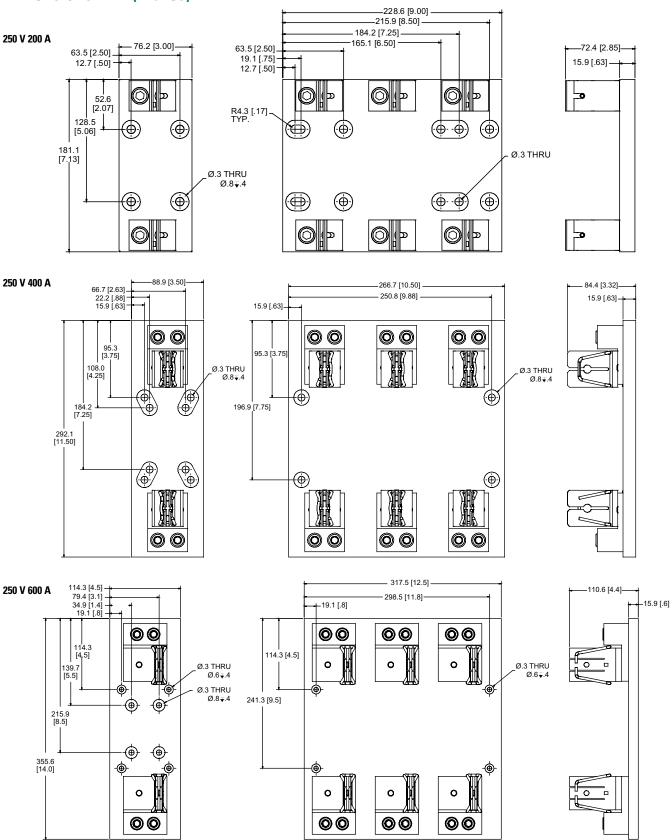




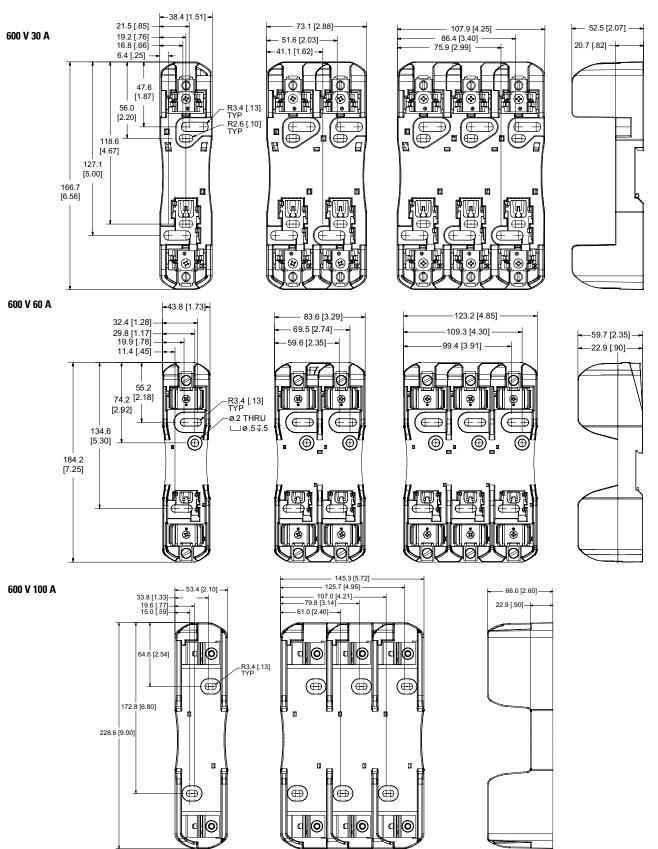




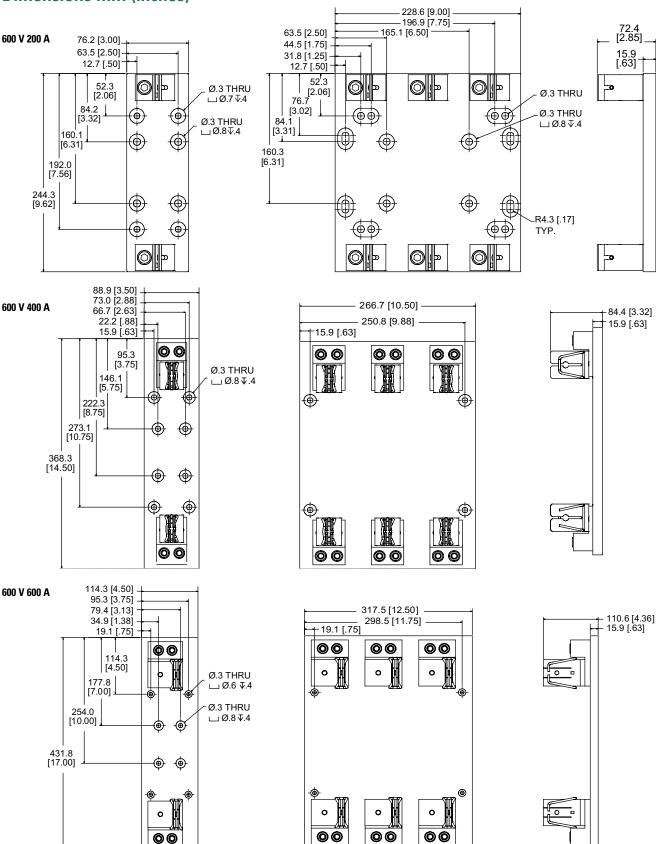














300 V • 600 V













#### **Description**

The Littelfuse Class T fuse blocks offer many advantages such as space saving design, universal mounting holes, snap-to-release DIN rail mounts and available covers.

#### Features/Benefits

- Space-saving design
- Universal mounting holes for easy replacement
- One hand release from DIN rail for 30-60 A fuses
- Reinforced fuse clips are standard
- Covers available for most amperages to enhance safety

#### **Specifications**

**Voltage Ratings** 300 VAC/600 VAC **Ampere Ratings** 0 - 600 A**Leakage Current**  $<\!0.6$  mA at 600 V Withstand Rating 200 kA RMS SYM **Flammability Rating** UL94 V-0

**Approvals** 

UL Listed (File: E14721) CSA Certified (File: LR7316)

**Environmental** RoHS Compliant, Lead (Pb) Free

#### **Recommended Fuses**

<b>00 V</b> JLLN 2	4
<b>00 V</b> JLLS	4

#### **Web Resources**

Sample requests, downloadable CAD drawings and other technical information:

littelfuse.com/lft littelfuse.com/fuseblocks

#### **Ordering Information (Class T 300 V)**

9		ORDERING NUMBER							MP G	≓⊢	COVER			
AMP RATING	BASE		POLES	;	TEI	RMINAL SUI	FIX	TORQUE	WIRE	WI		HE	₹ <u>S</u>	ORDERING
A A	ORDERING NUMBER	1	2	3	BOX LUG	PRESSURE PLATE	SCREW		RANGE	TY	rE	BASE TEMP RATING	DIN RAIL MOUNT	NUMBER*
30	LFT30030	1	2	3	_			5.6 N-m (50 in-lbs)	2-4 AWG			125°C		LFT30030FBC
30	LI 130030	'		٥	L			2.8 N-m (25 in-lbs)	6-14 AWG			123 6	_	LI 1300301 DC
60	LFT30060	1	2	3	С		_	5.6 N-m (50 in-lbs)	2-4 AWG		ъ	125°C	•	LFT30060FBC
00	LI 130000			3	U			2.8 N-m (25 in-lbs)	6-14 AWG		lid/Stranded	123 0	_	LI 1300001 DC
								13.6 N-m (120 in-lbs)	2/0-6 AWG	₹	traı			
100	LFT30100	1	—	3	CS	_	_	4.5 N-m (40 in-lbs)	8 AWG	CO	3/S	130°C	_	LFT30100FBC
								4.0 N-m (35 in-lbs)	10-14 AWG		0			
200	LFT30200	1	—	3	CS	_	_	31.1 N-m (275 in-lbs)	250 kcmil-6		Š	130°C	_	_
400	LFT30400	1	_	3	CS	_	_	(2) 31.1 N-m (275 in-lbs)	250 kcmil-6			130°C	_	_
600	LFT30600	1	<u> </u>	3	CS	_	_	(2) 42.4 N-m (375 in-lbs)	500 kcmil-6			130°C	_	_

## **Ordering Information (Class T 600 V)**

9			ORDI	ERING	NUMBE	R						ASE TEMP RATING	≓≒	COVER
불를	BASE		<b>POLES</b>	;	TEI	RMINAL SUF	FIX	TORQUE	WIRE	WII			≥≤	ORDERING
AMP RATING	ORDERING NUMBER	1	2	3	BOX LUG	PRESSURE PLATE	SCREW		RANGE	TYI	'E	BASE RA	DIN RAIL MOUNT	NUMBER*
30	LFT60030	1	2	2	С	D	S	5.6 N-m (50 in-lbs)	2-4 AWG	† see		125°C	•	LFT60030FBC
30	LF100030	ı	2	3	U	Р	3	2.8 N-m (25 in-lbs)	6-14 AWG	note		125 6	•	LF100030FBC
60	LFT60060	1	2	2	С			5.6 N-m (50 in-lbs)	2-4 AWG		р	125°C		LFT60060FBC
00	LI 100000	'	4	J	U			2.8 N-m (25 in-lbs)	6-14 AWG		Solid/Stranded	123 6		LI TOUUUUI DC
								13.6 N-m (120 in-lbs)	2/0-6 AWG		trai			
100	LFT60100	1	—	3	CS	_	_	4.5 N-m (40 in-lbs)	8 AWG	-AL	3/S	130°C	_	LT60100FBC
								4.0 N-m (35 in-lbs)	10-14 AWG	CC	olic			
200	LFT60200	1	l —	3	CS	_	_	31.1 N-m (275 in-lbs)	250 kcmil-6		S	130°C	_	LT60200FBC
400	LFT60400	1	_	3	CS	_	_	(2) 31.1 N-m (275 in-lbs)	250 kcmil-6			130°C	_	LT60400FBC
600	LFT60600	1	l —	3	CS	_	_	(2) 42.4 N-m (375 in-lbs)	500 kcmil-6			130°C	_	LT60600FBC

<sup>\*</sup> Covers sold individually. One cover needed for each pole.

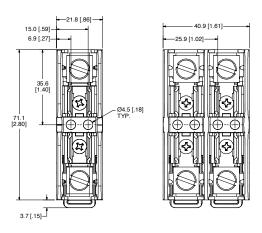
<sup>†</sup> Wire Type for Pressure Plate and Screw Terminal is CU only

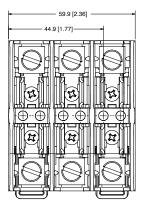
# Littelfuse Expertise Applied | Answers Delivered

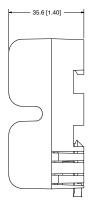
## LF SERIES CLASS T FUSE BLOCKS

#### **Dimensions mm (inches)**

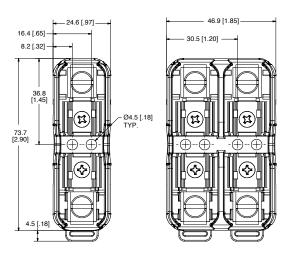
#### 300 V 30 A

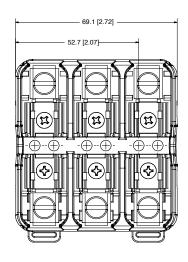


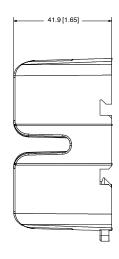




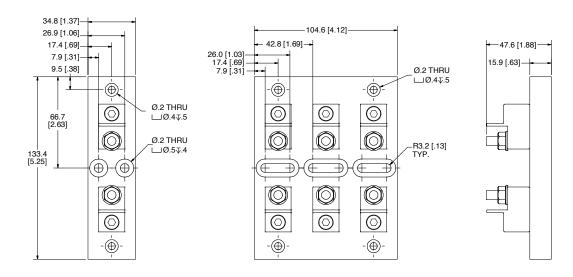
#### 300 V 60 A



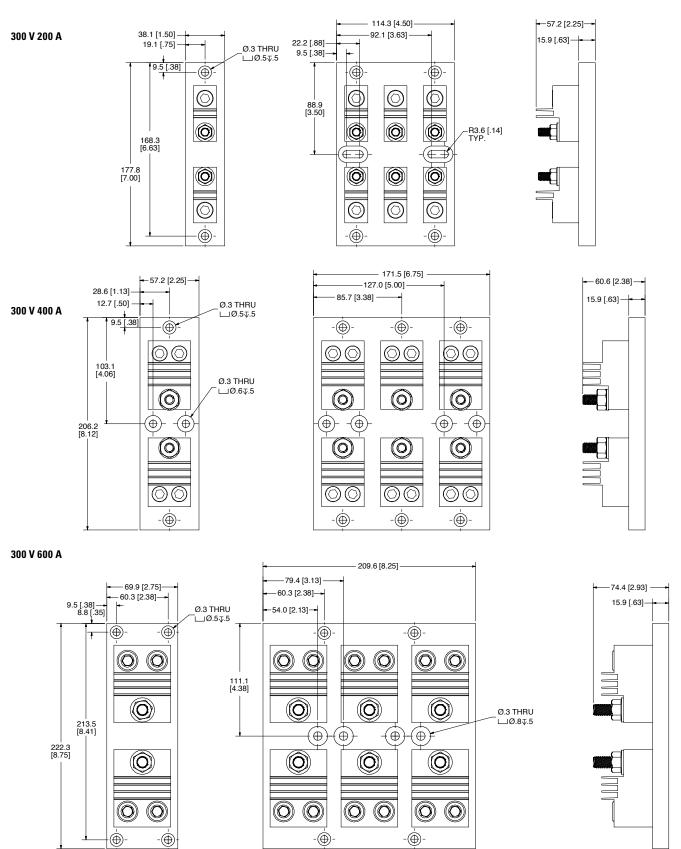


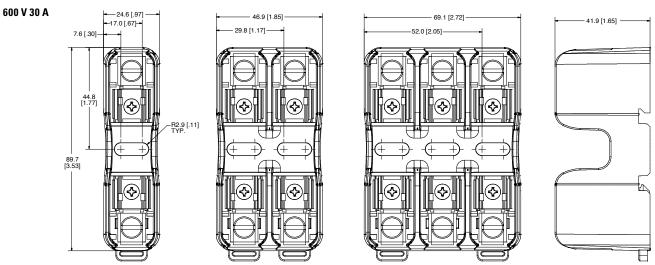


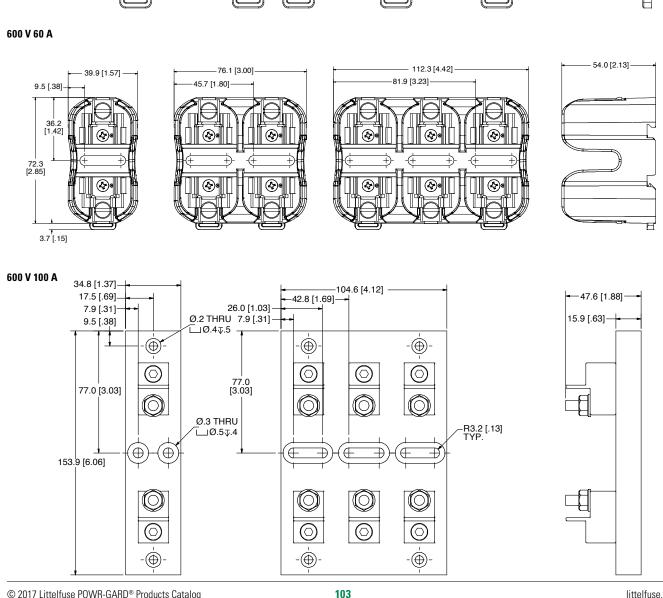
#### 300 V 100 A







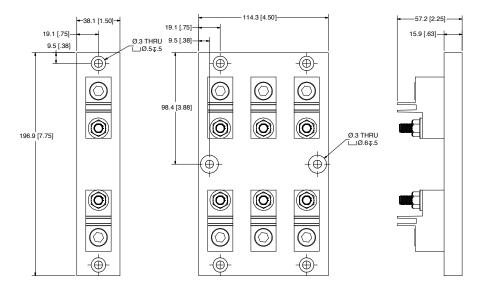




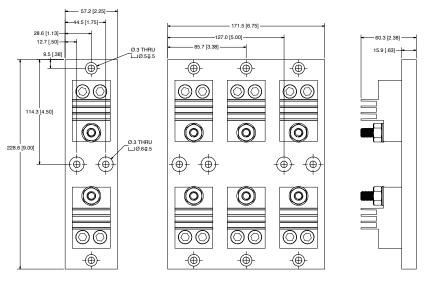


#### **Dimensions mm (inches)**

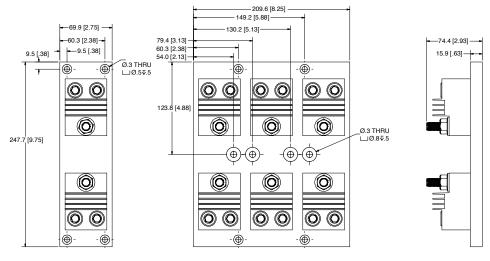




#### 600 V 400 A



#### 600 V 600 A





480 V • 600 V











#### **Description**

All Littelfuse Class G fuse blocks offer snap-to-release DIN rail mounting and universal mounting holes. Class G fuse blocks are designed for use with time-delay current limiting Class G fuses.

#### Features/Benefits

- Universal mounting holes for easy replacement
- One hand release from DIN rail for most amperages
- Meet requirements for branch circuit protection

## **Specifications**

**Voltage Ratings** 600 Vac (0-20 A) 480 Vac (25-60 A)

**Ampere Ratings** 0 - 60 AUL94 V-0 **Flammability Rating** 

**Approvals** UL Listed (File: E14721) CSA Certified (File: LR7091)

#### **Recommended Fuses**

**Time Delay** 

#### **Web Resources**

Download CAD drawings and other technical information: littelfuse.com/lfg

### **Ordering Information (Class G 600 V)**

ΔMP S		0	RDERIN	G NUMBER		WIDE		BASE		TERMINAL INFORMATION					
AMP RATING	POLES	BASE PART NUMBER	BOX LUG	SUFFIX PRESSURE PLATE	SCREW	WIRE TYPE	VIKE TEMP DINKAIL		TERMINAL	WIRE RANGE	TORQUE				
	1	LFG600151	CDINR	PQDINR	SQDINR					Box Lug	6-14 AWG	4.0 N-m (35 in-lbs)			
15	2	LFG600152	CDINR	PQDINR	SQDINR		peq	150° C	•	Pressure Plate	10-14 AWG	2.3 N-m (20 in-lbs)			
	3	LFG600153	CDINR	PQDINR	SQDINR	011 0-1.	Stranded			Screw	10-14 AWG	2.3 N-m (20 in-lbs)			
	1	LFG600201	CDINR	PQDINR	SQDINR	CU Only	_			Box Lug	6-14 AWG	4.0 N-m (35 in-lbs)			
20	2	LFG600202	CDINR	PQDINR	SQDINR		Solid	150° C	•	Pressure Plate	10-14 AWG	2.3 N-m (20 in-lbs)			
	3	LFG600203	CDINR	PQDINR	SQDINR					Screw	10-14 AWG	2.3 N-m (20 in-lbs)			

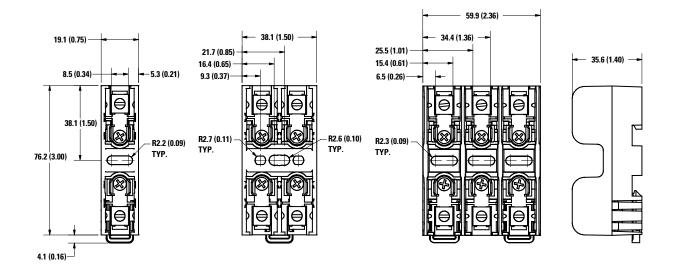
### **Ordering Information (Class G 480 V)**

AMP RATING	POLES	ORDERING NUMBER						BASE		TERMINAL INFORMATION		
		BASE		SUFFIX		WIRE		TEMP	DIN RAIL			
		PART NUMBER	BOX LUG	PRESSURE PLATE	SCREW	TYPE		RATING	MOUNT	TERMINAL	WIRE RANGE	TORQUE
30	1	LFG480301	CDINR	PQDINR	SQDINR	CU Only	Stranded	150° C	•	Box Lug	6-14 AWG	4.0 N-m (35 in-lbs)
	2	LFG480302	CDINR	PQDINR	SQDINR					Pressure Plate	10-14 AWG	2.3 N-m (20 in-lbs)
	3	LFG480303	CDINR	PQDINR	SQDINR					Screw	10-14 AWG	2.3 N-m (20 in-lbs)
60	1	LFG480601	CDINR	_	_		/ pil	125° C	•	Box Lug	2-4 AWG	5.6 N-m (50 in-lbs)
	2	LFG480602	CDINR	_	_						6-14 AWG	2.8 N-m (25 in-lbs)
	3	LFG480603	CDINR	_	_							

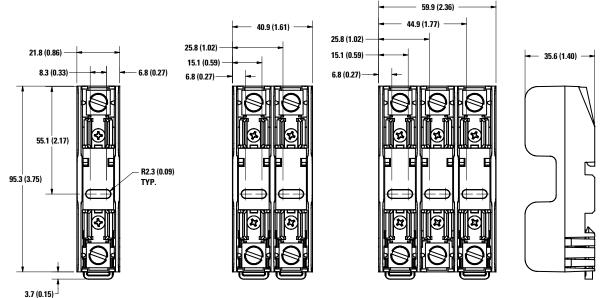


#### **Dimensions mm (inches)**

600 V 15 & 20 A 480 V 30 A



#### 480 V 60 A





## LF SERIES CLASS CC/CD AND MIDGET (10X38 mm) FUSE BLOCKS

600 V





**Description** 

The Littelfuse Class CC, CD and midget blocks offer generous space savings and enhanced value. DIN rail mounting and universal mounting holes are available as well as an indication feature on all Class CD fuse blocks.

#### Features/Benefits

- Space-saving design
- Universal mounting holes for easy replacement
- Indication offered on CD blocks
- One hand release from DIN rail optional
- Rejection feature that prevents the insertion of fuses with lower interrupting rating or voltage ratings
- Clip design reduces resistance and heat
- Non DIN Rail fuse blocks have interlocking feature allowing ganging for any number of poles
- Covers available for all amperages to enhance safety

#### **Specifications**

**Voltage Rating** 600 Vac/dc

**Ampere Ratings** L600M Midget (10x38): 30 A

L600C Class CC: 30 A

LFC Class CD: 60 A 1200 V minimum

**Dielectric strength** Material Base: Thermoplastic

Clip/Terminals: Copper alloy (tin plated)

Box Lug: Copper

Screw & Pressure Plate: Steel (zinc plated)

UL94 V-0 Flammability Rating

**Approvals** L600M: UL Recognized (File: E14721)

CSA Certified (File: LR7316)

UL Listed (File: E14721) L600C:

CSA Certified (File: LR7316) LFC:

UL Listed (File: E14721)

CSA Certified (File: LR7316)

**Environmental** RoHS Compliant, Lead (Pb) Free

#### **Recommended Fuses**

#### Class CC & CD

#### Web Resources

Download CAD drawings, fuse block cover datasheet and other technical information: littelfuse.com/fuseblocks

#### Ordering Information (L600C Class CC and L600M Midget 30 A)

_	9	S	CLASS CC ORDERING NUMBER		MIDGET ORDE	RING NUMBER	CONNECTOR		WIRE			BASE	COVER
AM	RATING	POLES	NON-DIN*	DIN-RAIL	NON-DIN*	DIN-RAIL	TYPE	TORQUE	RANGE	WIRE TYPE		TEMP	ORDERING NUMBER <sup>†</sup>
		1	L60030C1C	L60030C1CDINR	L60030M1C	L60030M1CDINR		4.0 N					
3	30 [	2	L60030C2C	L60030C2CDINR	L60030M2C	L60030M2CDINR	Box Lug	4.0 N-m (35 in-lbs)	6-14 AWG			125°C	SPL001
		3	L60030C3C	L60030C3CDINR	L60030M3C	L60030M3CDINR		(00 111 100)			eq		
		1	L60030C1PQ	L60030C1PQDINR	L60030M1PQ	L60030M1PQDINR	D DI	0.0 N	10-14 AWG 20	<u>~</u>	Stranded		
;	30 [	2	L60030C2PQ	L60030C2PQDINR	L60030M2PQ	L60030M2PQDINR	Pressure Plate w/Q.C. Terminal	2.3 N-m (20 in-lbs)			'Str	125°C	SPL001
		3	L60030C3PQ	L60030C3PQDINR	L60030M3PQ	L60030M3PQDINR	W/ Q.O. Torrillia	(20 111 100)		33	₽		
		1	L60030C1SQ	L60030C1SQDINR	L60030M1SQ	L60030M1SQDINR	0	0.0 N			So		
30	30 [	2	L60030C2SQ	L60030C2SQDINR	L60030M2SQ	L60030M2SQDINR	Screw w/Q.C. Terminal	2.3 N-m (20 in-lbs)	10-14 AWG			125°C	SPL001
		3	L60030C3SQ	L60030C3SQDINR	L60030M3SQ	L60030M3SQDINR	w/ Q.O. IGIIIIIIai	(20 111-103)					

#### Ordering Information (LFC Class CD 60 A)

	ordering information (El o class ob co A)											
	AMP RATING	POLES	ORDERING NUMBER	CONNECTOR TYPE	TORQUE	WIRE RANGE	WIR	E TYPE	BASE TEMP RATING	DIN RAIL MOUNT	INDICATION	COVER ORDERING NUMBER <sup>†</sup>
		1	LFC600601CID	Box Lug	5.6 N-m (50 in-lbs) 2.8 N-m (25 in-lbs)	2-4 AWG 6-14 AWG	CU-AL	Solid / Stranded	125°C	•	•	LFC60060FBC
	60	2	LFC600602CID									
		3	LFC600603CID		2.0 14-111 (23 111-103)	0-14 AVVU		Juanueu				

<sup>&</sup>lt;sup>†</sup> Covers sold individually. One cover needed for each pole.

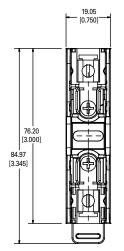
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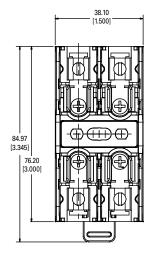


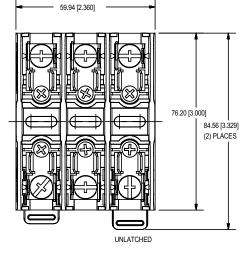
## LF SERIES CLASS CC/CD AND MIDGET (10X38 mm) FUSE BLOCKS

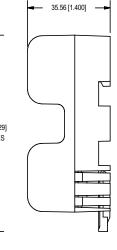
#### **Dimensions mm (inches)**

#### CLASS CC / MIDGET DIN RAIL 600 V 30 A

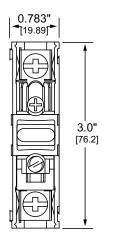


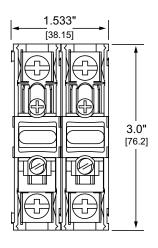


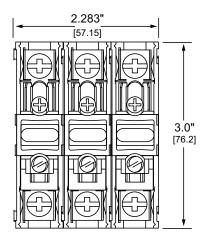


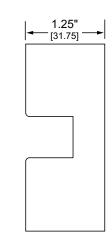


#### CLASS CC / MIDGET NON-DIN RAIL 600 V 30 A

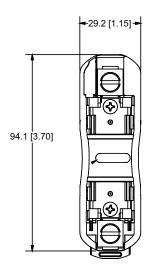


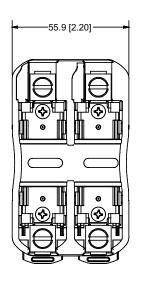


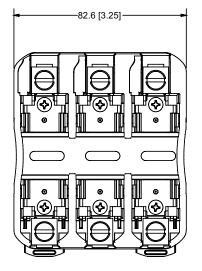


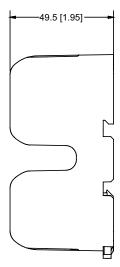


#### CLASS CD DIN RAIL 600 V 60 A











## **BOARD MOUNT MIDGET (10X38 mm) FUSE HOLDER**

600 V





#### **Description**

The PC board-mounted midget fuse holder is a one-piece holder designed to provide a more robust and secure solution. It offers a smaller footprint and flexible mounting options.

For use with Midget-style fuses and fuse covers, it is UL Recognized and can be covered for additional protection.

#### Features/Benefits

- Through hole PCB mounting
- Robust and secure block design
- All-in-one package offers easy installation
- Space saving footprint
- Touch Safe cover/puller available
- 3-pole configurations

#### **Applications**

- HVAC market
- Industrial manufacturing
- Mass production facilities

# SPL001PCB Cover Dimensions mm (inches)

#### **Specifications**

Voltage Rating 600 Vac/dc Amperage Rating 30 A

**Approval** UL Recognized (File: E14721) **Mounting Method** Through hole solder/PCB

#### **Ordering Information**

	CATALOG NUMBER	ORDERING NUMBER		
Block	L60030M3PCB	L60030M3PCB		
Cover*	SPL001PCB	SPL0001PCBT		

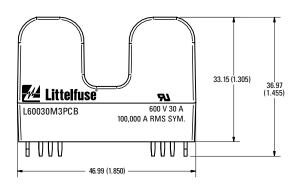
<sup>\*</sup>Covers are single pole—need to order a quantity of 3 for each block.

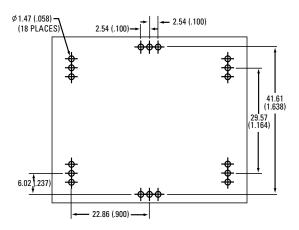
#### **Recommended Fuses**

#### **Web Resources**

Download CAD drawings and other technical information: **littelfuse.com/fuseblocks** 

#### **Dimensions mm (inches)**







## CLASS CC AND MIDGET FUSE BLOCK ACCESSORIES

#### FBDIN1 Rail Adapter



#### Features/Benefits

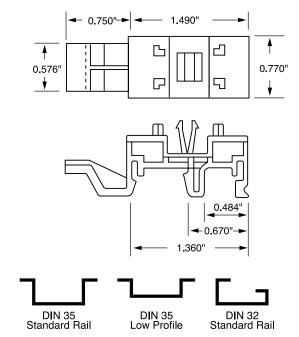
- DIN Rail adaptor for 30 A Midget, Class CC and Class G fuse blocks
- Patented design with no tools necessary for installation
- Permits snap-mounting of 30 A Midget, Class CC and Class G fuse blocks to standard and low profile 35 mm symmetrical DIN rails and 32 mm asymmetrical DIN rails
- · Easy removal via disconnect tab

#### **Web Resources**

For additional technical information visit:

littelfuse.com/fbdin1

#### **Dimensions Inches**



#### **Recommended Fuse Blocks**

Midget-Style and Class CC	107
Class G	105
New DIN rail mountable fuse holders available on page 107	
New Din fail mountable fuse holders available on bade 107	

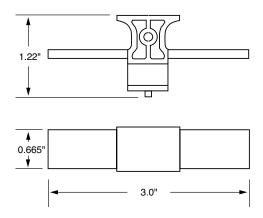
#### SPL001 Cover Puller



#### Features/Benefits

- 600 V 1/10-30 A Class CC and Midget fuse cover puller that offers increased protection when removing fuses
- · Simple removal without the need for a separate puller
- Meets Dead Front requirements
- Easily gangable with 1/8" diameter wire
- For use with all 600 V Class CC and Midget 1/10-30 A fuses
- Label provided for easy fuse identification

#### **Dimensions Inches**



#### **Recommended Fuse Blocks**

L60030C	. 107
L60030M	107

#### Web Resources

For additional technical information visit:

littelfuse.com/spl001

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## LF SERIES FUSE BLOCK COVERS







#### **Description**

Littelfuse fuse block covers protect personnel from accidentally coming into contact with energized parts. Covers are for use with Littelfuse LF Series UL class fuse blocks.

Contact the Littelfuse Tech-Line (800-TEC-FUSE) for block and cover compatibility questions.

#### **Specifications**

ConnectionSnap to fuse bodyMaterialBlack thermoplastic

Flammability Rating UL94 V-0

**Approvals** UL Listed (File: E184929)

**CSA Certified** 

(File: 007316\_0\_000 Class 6225-01)

#### Features/Benefits

- Added safety to personnel
- · Ventilation helps avoid fuse derating
- Reusable and convenient snap-on design
- UL listed and CSA certified
- Available for Class H/R, Class J, Class T and Class CD
- Allows visibility of LF series fuse block indicator

#### **Web Resources**

For dimensions, cad drawings and additional technical information visit: **littelfuse.com/fuseblocks** 

#### **Ordering Information**

UL CLASS	FUSE BLOCK BASE PART NUMBER*	VOLTAGE	AMPERAGE	COVER ORDERING NUMBER
Class H/R	LFH25030 / LFR25030	250	30	LFH25030FBC
Class H/R	LFH25060 / LFR25030	250	60	LFH25060FBC
Class H/R	LFH25100 / LFR25100	250	100	LFH25100FBC
Class H/R	LFH60030 / LFR60030	600	30	LFH60030FBC
Class H/R	LFH60060 / LFR60060	600	60	LFH60060FBC
Class H/R	LFH60100 / LFR60100	600	100	LFH60100FBC
Class J	LFJ60030	600	30	LFJ60030FBC
Class J	LFJ60060	600	60	LFJ60060FBC
Class J	LFJ60100	600	100	LFJ60100FBC <sup>†</sup>
Class T	LFT30030	300	30	LFT30030FBC
Class T	LFT30060	300	60	LFT30060FBC
Class T	LFT30100	300	100	LFT30100FBC
Class T	LFT60030	600	30	LFT60030FBC
Class T	LFT60060	600	60	LFT60060FBC
Class T	LFT60100	600	100	LT60100FBC
Class T	LFT60200	600	200	LT60200FBC
Class T	LFT60400	600	400	LT60400FBC
Class T	LFT60600	600	600	LT60600FBC
Class CD	LFC60060	600	60	LFC60060FBC
Class CC	L60030C	600	30	SPL001

<sup>\*</sup> Part number shown excludes reference to number of poles and terminal type

<sup>†</sup> Cover is not compatible with 70-100 A JLS series fuses

## LPXV TOUCH-SAFE FUSE HOLDERS

1500 V • 30 A







#### **Description**

The Littelfuse LPXV fuse holder is designed to hold 1500 V 10x85mm fuses.

#### Features/Benefits

- Finger-Safe design offers personnel protection
- No fuse pullers or tools required for fuse removal
- 35 mm DIN Rail Mountable
- Compact design

#### **Recommended Fuses**

Littelfuse SPXV 1500 V Fuses.....

#### **Web Resources**

Download the complete datasheet and other technical documents: Littelfuse.com/lpxv

#### **Specifications**

**Environmental** 

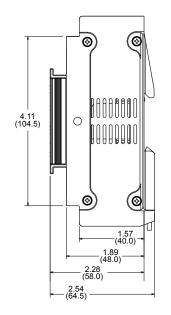
**Voltage Ratings** 1500 Vdc **Amperage Rating** 30 A **SCCR Rating** 15 kA **Fuse Type** 10x85mm Material Thermoplastic -40°C to +125°C **Operating Temperature** Flammability Rating UL94 V-0 Body: 125° C **Temperature Stability** 

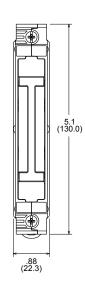
Carrier: 140° C

**Approvals** UL 4248-18 Listed (File: E345481)

IEC 60269-1 & IEC 60269-2 RoHS compliant, Lead (Pb) free

#### **Dimensions Inches (mm)**





#### **Ordering Information**

	VOLTAGE (Vdc)	POLES	CATALOG NUMBER	ORDERING NUMBER	PACK QTY	TERMINAL INFORMATION						
SERIES						TERMINAL TYPE	WIRE TYPE	NUMBER OF WIRES	WIRE SIZE	TORQUE		
		1	LPXV001	LPXV0001Z	5	Box Lug	90° Max CU Only Stranded	1	6-4 AWG (16-25 mm <sup>2</sup> )	22-26 lb-in (2.5-3 N-m)		
LPXV	1500							1	18-8 AWG (.75-10 mm²)	18-22 lb-in (2-2.5 N-m)		
								2*	18-6 AWG ( 75-16 mm <sup>2</sup> )	18-22 lb-in (2-2 5 N-m)		

<sup>\*</sup>Must be the same cross-sectioned size



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## LFPXV TOUCH-SAFE FUSE HOLDERS

1500 V • 30 A





#### **Description**

The Littelfuse LFPXV fuse holder is designed to hold 1500 V 10x85mm fuses.

#### Features/Benefits

- Finger-Safe design offers personnel protection
- No fuse pullers or tools required for fuse removal
- 35 mm DIN Rail Mountable
- · Compact design

#### **Recommended Fuses**

#### **Specifications**

Voltage Ratings1500 VdcAmperage Rating30 ASCCR Rating50 kAFuse Type10x85mmMaterialThermoplastic

Fuse Clip: Silver plated copper alloy

Screws: Zinc plated steel

Operating Temperature -55°C to +125°C Flammability Rating UL94 V-0 Temperature Stability Carrier: 130°C

**Approvals** UL 4248-19 Listed (Pending)

IEC 60269-6

**Environmental** RoHS compliant, Lead (Pb) free

#### **Web Resources**

Download the complete datasheet and other technical documents: **Littelfuse.com/lfpxv** 

WIRE TYPE								
75°C or 90°C	UL Class B and Class C wire							
CU Only	AlphaWire PV series Photovoltaic Wire							
Stranded	IEC Class 5 Flexible Wire							

## Ordering Information

	VOLTAGE (Vdc)		CATALOG NUMBER	ORDERING NUMBER	PACK	TERMINAL INFORMATION					
SERIES		POLES			QTY	TERMINAL TYPE	NUMBER OF WIRES	WIRE SIZE	TORQUE		
	1500		LFPXV001	LFPXV0001Z	20	Box Lug	1	4-14 AWG (25-2.5 mm <sup>2</sup> )	24-28 lb-in (2.71-3.16 N-m)		
LFPXV							1	16-18 AWG (1.5-0.75 mm <sup>2</sup> )	18-22 lb-in (2.03-2.49 N-m)		
LFFAV		l					2*	6-14 AWG (16-2.5 mm²)	26-30 lb-in (2.94-3.69 N-m)		
							2*	16-18 AWG (1.5-0.75 mm <sup>2</sup> )	20-24 lb-in (2.26-2.71 N-m)		

<sup>\*</sup>Must be the same cross-sectioned size



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## LFJ1000 SERIES SOLAR FUSE BLOCKS

1000 Vdc • Clip-to-Box • Stud-to-Stud • Clip-to-Stud







#### **Description**

The LFJ1000 series fuse block is specifically designed for the Littelfuse SPFJ 1000 V Solar Fuse. It meets UL electrical requirements, is available in multiple amperages, and comes in a variety of fuse mounting and termination configurations; fuse clip to box lug, fuse stud to wire stud and fuse clip to wire stud.

#### Features/Benefits

- Narrow width increases space savings
- Range of amperages to match all SPFJ fuse options
- Box Lug termination style accommodates a wide range of cable sizes
- Stud-mounted option increases convenience
- Approval for use with copper or aluminum lugs allowing for design flexibility

#### **Specifications**

Voltage Ratings 1000 Vdc
Ampere Ratings 200, 400, 450 A
Flammability Rating UL94 V-0
Termination Type Box Lug or Stud Mount
Base Temp Rating 130° C
Approvals UL 4248-18 Listed
File: E345481 Vol. 1

#### **Recommended Fuses**

**RoHS Compliant** 

#### Web Resources

**Environmental** 

Download CAD drawings, dimensions and other technical information: **littelfuse.com/LFJ1000** 

## Ordering Information

#### (Clip-to-Box Lug 1000 V)

	•		•				
AMPERAGE		ORDERING NUMBER	INTERRUPT RATING	WIRE RANGE STANDARD (METRIC)	WIF	RE TYPE	RECOMMENDED TORQUE
	200	LFJ102001C	20 kA	250 kcmil - #6 (127mm² - 16mm²)			275 in-lb (31.1 N-m)
	400	LFJ104001C	10 kA	350 kcmil - 1/0 (177mm² - 55mm²)	Cu/Al	Solid/ Stranded	275 in-lb (31.1 N-m)
	450	LFJ104501C	20 kA	500 kcmil - #4 (253mm² - 25mm²)		Otranada	375 in-lb (42.4 N-m)

#### (Stud-to-Stud 1000 V)

AMPERAGE	ORDERING	INTERRUPT	RECOMMENI	DED TORQUE	MAX. BUSBAR	RECOMMENDE	D BASE TORQUE	
AIVIFENAGE	NUMBER	RATING	FUSE	TERMINAL	THICKNESS	BOLT SIZE	TORQUE	
200	LFJ102001STST	20 kA	65 in-lb (7.3 N-m)	200 in-lb (22.6 N-m)	.774" (19.66 mm)		30-40 in-lb 40-50 in-lb	
400	LFJ104001STST	10 kA	170 in-lb (19.2 N-m)	200 in-lb (22.6 N-m)	.555" (14.10 mm)	1/4" 5/16"		
450	LFJ104501STST	20 kA	300 in-lb (33.9 N-m)	300 in-lb (33.9 N-m)	.570" (14.18 mm)	0,10	40 00 111 15	

#### (Clip-to-Stud 1000 V)

AMPERAGE	ORDERING	INTERRUPT	RECOMMENDED TORQUE	MAX. BUSBAR	RECOMMENDED BASE TORQUE		
AIVIPENAGE	NUMBER	RATING	TERMINAL	THICKNESS	BOLT SIZE	TORQUE	
200	LFJ102001CST	20 kA	200 in-lb (22.6 N-m)	.774" (19.66 mm)			
400	LFJ104001CST	10 kA	200 in-lb (22.6 N-m)	.555" (14.10 mm)	1/4" 5/16"	30-40 in-lb 40-50 in-lb	
450	LFJ104501CST	20 kA	300 in-lb (33.9 N-m)	.570" (14.18 mm)	5, 10	40 00 111 15	

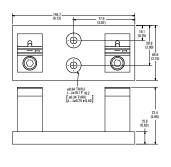


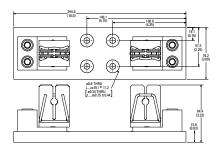
## LF SERIES SOLAR FUSE BLOCKS

#### 1000 Vdc

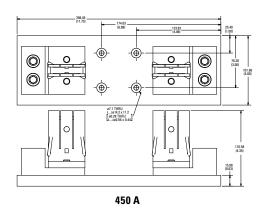
#### **Dimensions mm (inches)**

#### Clip-to-Box



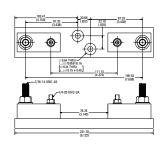


400 A

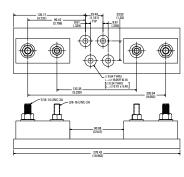


200 A

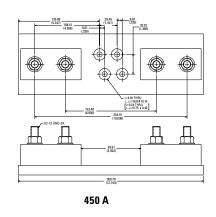
#### Stud-to-Stud



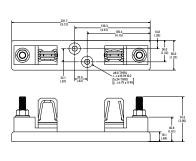
200 A



400 A



#### Clip-to-Stud



450 A

200 A

400 A



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## LPHV POWR-SAFE FUSE HOLDERS

#### 1000 VDC





#### **Description**

The Littelfuse LPHV fuse holder is designed to house 1000 V fuses. It is not designed for load break but is ideal for isolating photovoltaic module strings for maintenance and meets UL requirements for 1000 V solar fuse protection

#### Features/Benefits

- Touch-safe design offers protection when replacing fuses
- Compact design
- 35 mm DIN Rail Mountable
- Available in 1-, 2-, 3- and 4-pole configurations
- · No fuse pullers or tools required for fuse removal

#### Multi-Pole Assembly Kit

Kits are used to create multi-pole holders from 1-pole LPHV fuse holders. Please contact factory for more information

#### **Specifications**

Voltage Rating1000 VDCAmperage Rating30 ASCCR Rating20 kA

Power Dissipation 4 W Maximum

Fuse Type 10 X 38 mm up to 1000 VDC

Housing Material Thermoplastic

**Terminal Screws** Zinc Plated Steel, Phillips/Slotted Head

Pressure Plate
Nickel Plated Steel
Fuse Clip Material:
Silver Plated Copper Alloy
Operating Temperature
-55°C to +125°C

Flammability Rating UL94 V-0

**Approval** Self-certified 1000 VDC IEC 60269-2, -4, -6

**Environmental** RoHS compliant, Lead (Pb) Free

#### **Web Resources**

Sample requests, downloadable CAD drawings and other technical information: **Littelfuse.com/lphv** 

More information about solar applications:

Littelfuse.com/solar

#### **Recommended Fuses**

10x38 mm 1000 VDC Fuses

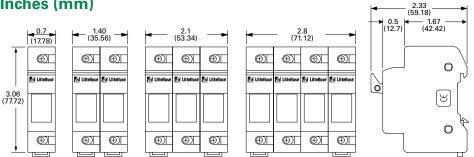
SPF 1000 V Series	62
FLU 1000 V Series	31

ORDERING NUMBER	DESCRIPTION
CYHP001	20 Connector Pincers & 10 handle Pins
CYHP002	Connector Pincer Only
CYHP003	Handle Pin Only

#### **Ordering Information**

SERIES	POLES	CATALOG NUMBER	ORDERING NUMBER	TERMINAL TYPE	WI TY	RE PE	WIRE RANGE	TERMINAL TORQUE	ROHS							
LPHV	1	LPHV001	LPHV0001Z	Pressure Plate	Pressure Plate 7					•						
LPHV	2	LPHV002	LPHV0002Z			Pressure Plate	75° C or 90° C	Stranded /	#8-14 AWG (2-10 mm²) /	17.7 in-lbs	•					
LPHV	3	LPHV003	LPHV0003Z				riessule riale	i ressure i iate	i ressure i iate	i lessule i late	riessule ridle	riessure riate		CU Only	[Solid]	[#10-14 AWG (2-6 mm <sup>2</sup> )]
LPHV	4	LPHV004	LPHV0004Z						•							

#### **Dimensions Inches (mm)**





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## LPSC / LPSM POWR-SAFE FUSE HOLDERS

600 V

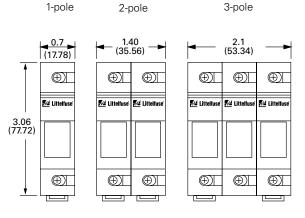


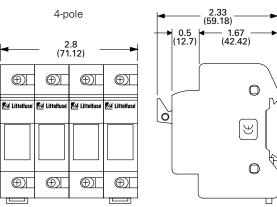


## Description

Littelfuse POWR-SAFE Dead Front holders provide optimum protection to personnel for Class CC and Midget-Style fuses.

#### **Dimensions Inches (mm)**





#### Features/Benefits

- · Indicating and non-indicating options available
- 1-, 2-, 3- and 4-pole configurations
- Easy installation and fuse removal with no additional pullers or tools required
- 35 mm DIN Rail Mountable
- Ventilated design for cooler operation

#### **Specifications**

**Terminal Type** 

**Suggested Torque** 

Voltage Rating 600 Vac/dc Ampere Rating 30 A

Interrupting Rating 200 kA (Class CC)

100 kA (Midget) Pressure plate 17.7 in–lbs #8–#14 CU

Wire Range #8-#14 CU
Material Thermoplastic
Flammability Rating UL94 V-0

**Approvals** UL Listed (LPSC File: E14721)

UL Recognized (LPSM File: E14721) CSA Certified (LPSC/LPSM File: LR7316)

**Environmental** RoHS compliant, Lead (Pb) Free

#### Ordering Information

INDI	CATING	NON-IN				
CATALOG NUMBER	ORDERING NUMBER	CATALOG ORDERING NUMBER NUMBER		FUSE TYPE	POLES	
LPSC001ID	LPSC0001ZXID	LPSC001	LPSC0001Z	Class CC	1	
LPSC002ID	LPSC0002ZXID	LPSC002	LPSC0002Z	Class CC	2	
LPSC003ID	LPSC0003ZXID	LPSC003	LPSC0003Z	Class CC	3	
LPSC004ID	LPSC0004ZXID	LPSC004	LPSC0004Z	Class CC	4	
LPSM001ID	LPSM0001ZXID	LPSM001	LPSM0001Z	Midget	1	
LPSM002ID	LPSM0002ZXID	LPSM002	LPSM0002Z	Midget	2	
LPSM003ID	LPSM0003ZXID	LPSM003	LPSM0003Z	Midget	3	
LPSM004ID	LPSM0004ZXID	LPSM004	LPSM0004Z	Midget	4	

**2-Pole Assembly Kit** Ordering No. CYHP0001Z-KIT

(Kit contains 20 connector pincers & 10 handle pins.)

#### **Web Resources**

Download CAD drawings and other technical information:

littelfuse.com/lpsc littelfuse.com/lpsm

#### **Recommended Fuses**

Class CC	27
Midget-Style (10 x 38 mm)	30



## LFPSJ POWR-SAFE DEAD FRONT CLASS J FUSE HOLDERS



## **Description**

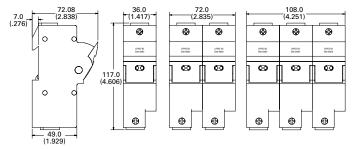
Littelfuse Class J POWR-SAFE Dead Front holders provide optimum protection to personnel and are UL Listed and CSA Certified.

#### **Features**

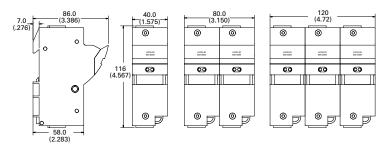
- Indicating and non-indicating options available
- IP20 degree of protection
- Dual LED indication distinguishes polarity in DC power applications
- Small compact design offers ultimate flexibility
- 35mm DIN Rail Mountable
- 1-, 2-, and 3-pole configurations
- Easy installation and fuse removal with no additional pullers or tools required

#### **Dimensions mm (inches)**

#### 30 Amp



#### 60 Amp



Note: These dimensions are for reference only. Please contact factory for additional information.

## (I) (I) C ∈ RoHS

#### **Specifications**

Voltage Ratings Interrupting Rating Ampere Rating LEDs Terminal Type Material Flammability Rating Terminal Screws Approvals

**Environmental** 

600 Vac/dc 200 kA 30 and 60 A 110 V - 600 V Pressure Plate Thermoplastic UL94 V-0 Phillips / Slotted UL Listed (File: E14721) CSA Certified (File: 2529839 RoHS compliant

#### **Ordering Information**

AMP	POLES	INDICATION	ORDERING NUMBER	PACK QTY.	WIRE TYPE	WIRE RANGE	TORQUE
	1	_	LFPSJ301.Z	6			
30	2	_	LFPSJ302.Z	3		075 2 4 2	2.5 N-m 4.0 N-m
	3	_	LFPSJ303.Z	2		0.75mm <sup>2</sup> – 1mm <sup>2</sup> 1.5mm <sup>2</sup> – 50mm <sup>2</sup>	
	1 •		LFPSJ301.ZXID	6		18 – 1 AWG	35 lb-in
30	2	•	LFPSJ302.ZXID	3	_	10 17470	00 10 111
	3		LFPSJ303.ZXID	2	Stranded		
	1 – LFPSJ601.Z		LFPSJ601.Z	6	tra		
60	2	_	LFPSJ602.Z	3	0)		
	3	_	LFPSJ603.Z	2		2.5mm <sup>2</sup> – 50mm <sup>2</sup>	4.0 N-m
	1	•	LFPSJ601.ZXID	6		14 – 1 AWG	35 lb-in
60	2	•	LFPSJ602.ZXID	3			
	3	•	LFPSJ603.ZXID	2			

#### **Multi-Pole Assembly Kit**

Kits are used to create multi-pole holders from 1-pole LFPSJ fuse holders. Please contact factory for more information.



AMP	POLES	PINCER QUANTITY	PIN QUANTITY	ASSEMBLY SETS	ORDERING NUMBER
30	2	30	10	10	LF3J2PAK
30	3	60	10	10	LF3J3PAK
60	2	30	10	10	LF6J2PAK
60	3	60	10	10	LF6J3PAK

#### **Web Resources**

Download CAD drawings and other technical information: **littelfuse.com/lfpsi** 

#### **Recommended Fuses**

Class J - JTD, JTD\_ID, JLS ......21

## **BUS BAR SYSTEM**

#### **POWR-BAR Distribution**





#### **Description**

A key objective for panel designers is safe distribution of power to multiple fuse holders in a compact design. The Littelfuse UL 508 Listed bus bar system eliminates most wire terminations in a timesaving package. A power distribution block and associated conductors are no longer needed to feed multiple POWR-SAFE fuse holders.

#### **Features/Benefits**

- Touch-safe design offers protection when replacing fuses
- Compact design
- 35 mm DIN Rail Mountable
- Available in one and three phase configurations
- No fuse pullers or tools required for fuse removal
- Can be cut down to optimal size

#### **Recommended Fuse Holders**

LPSM / LPSC (600 Vac/dc)	117
LPHV (1000 Vdc)	116

#### **Web Resources**

Download CAD drawings, dimensions and other technical information: **littelfuse.com/busbar** 

#### **Specifications**

**Voltage Ratings** 600 Vac/dc 1000 Vdc\*

#### **Current Ratings**

CROSS SECTION (mm²)	18 mm²	25 mm <sup>2</sup>
END FED	80 A	100 A
CENTER FED	160 A	200 A

 SCCR
 10 kA, 100 kA†

 Conductor
 Copper

 Pitch
 17.8 mm

Approvals UL 508 Listed (File E328654)
Environmental RoHS Compliant, Lead (Pb) free

\*1 Phase 18 mm² rated 1000 Vdc up to 160 A when center fed 1 Phase 25 mm² rated 1000 Vdc up to 200 A when center fed

<sup>†</sup>When protected directly upstream by Class J 175 amperes max (18 mm<sup>2</sup> bus bar) and Class J 200 amperes max (25 mm<sup>2</sup> bus bar).

#### **Ordering Information**

1 PHASE, 18 mm <sup>2</sup>		LENGTH	1 PHASE, 25 m	LENGTH	
ORDERING NUMBER	POLES	(mm)	ORDERING NUMBER	POLES	(mm)
1PH3P18mm	3	50	1PH3P25mm	3	50
1PH4P18mm	4	79	1PH4P25mm	4	79
1PH6P18mm	6	104	1PH6P25mm	6	104
1PH9P18mm	9	155	1PH9P25mm	9	155
1PH12P18mm	12	208	1PH12P25mm	12	208
1PH15P18mm	15	270	1PH15P25mm	15	270
1PH57P18mm	57	1009	1PH57P25mm	57	1009

3 PHASE, 18 mm <sup>2</sup>		LENGTH	3 PHASE, 25 n	LENGTH	
ORDERING NUMBER	POLES	(mm)	ORDERING NUMBER	POLES	(mm)
3PH6P18mm	6	104	3PH6P25mm	6	104
3PH9P18mm	9	158	3PH9P25mm	9	158
3PH12P18mm	12	214	3PH12P25mm	12	214
3PH15P18mm	15	266	3PH15P25mm	15	266
3PH57P18mm	57	1009	3PH57P25mm	57	1009

Endcaps are standard with all 3 phase configurations except 57-pole. Endcaps are not needed for the 1 phase configurations from the factory or if the copper bus is trimmed per the supplied instructions. Power feed lugs and protective covers are extra.

#### **Accessories**

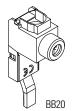
#### **Power Feed Lug**

PART NUMBER	AMP RATING	VOLTAGE (AC/DC)	WIRE RANGE	WIRE TYPE	TORQUE
BB17	115	1000	#10 - 1/0 AWG	CU	50 lb-in
BB18	115	1000	#10 - 1/0 AWG	CU	50 lb-in
BB19	115	1000	#10 - 1/0 AWG	CU	50 lb-in
BB20	115	1000	#10 - 1/0 AWG	CU	50 lb-in









#### **Endcaps**

•		
PART NUMBER	PHASE	QUANTITY
EDCP42	Single	50
EDCP7	Three	50





#### **Pole Protective Covers**

PART NUMBER	QUANTITY
CTPT5	5



## LPSM QUICK CONNECT POWR-SAFE FUSE HOLDERS











#### **Description**

The LPSM midget fuse holder series is a dead front design providing protection to personnel when installing and removing fuses. The compact fuse holder mounts quickly onto 35 mm DIN rail, decreasing panel layout and assembly time. This product has two Quick Connect terminals on both the top and bottom of the holder, offering an additional connection option. It is available in 1-, 2-, 3- and 4-pole configurations.

#### Features/Benefits

- Dual 1/4" Quick Connect Terminals on Top and Bottom of Holder
- Meets Dead Front requirements
- Mountable on 35 mm DIN Rail
- Local LED Indication

#### **Specifications**

**Voltage Rating** 600 Vac/dc **Amperage Rating** 30 A

UL Recognized (File No. E14721) Approval

CSA Certified (File No. LR7316)

IEC 60269-2 CCC Approved

**Terminal Type** 1/4" Quick Connect Terminals **Fuse Type** Midget (10 X 38 mm) series

Material Thermoplastic Flammability Rating UL94 V-0

**SCCR Rating** Same as Fuse Rating

#### **Ordering Information**

POLES	CATALOG NUMBER	ORDERING NUMBER
1	LPSM001QCID	LPSM0001ZQCID
2	LPSM002QCID	LPSM0002ZQCID
3	LPSM003QCID	LPSM0003ZQCID
4	LPSM004QCID	LPSM0004ZQCID

2-Pole Assembly Kit Ordering No. CYHP0001Z-KIT

(Kit contains 20 connector pincers & 10 handle pins.)

#### **Recommended Fuses**

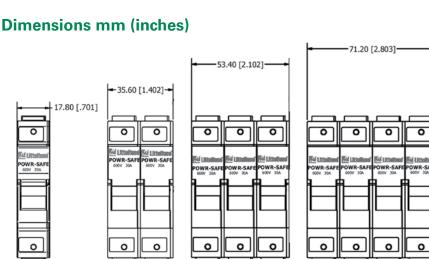
Midget-Style (10x38mm) .......30

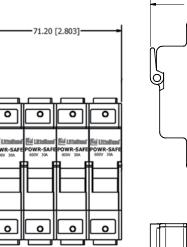
#### Web Resources

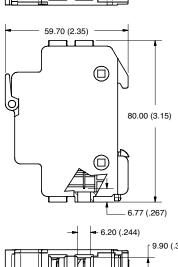
Download CAD drawings and other technical information:

11.99 (4.72)

littelfuse.com/lpsmqc







## 354 SERIES 3AG OMNI BLOCK®

#### Molded Base Type Fuse Block



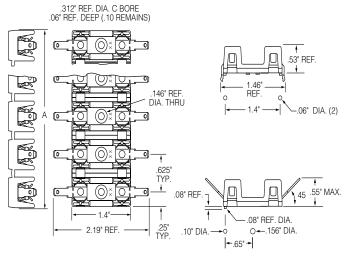








#### **Dimensions Inches**



#### **Description**

A low profile fuse block featuring individual barriers that reinforce the fuse clips while providing greater protection against clip damage and electrical shock. The unique design permits self-alignment of clips to fuse cap. This, plus a one-piece clip/terminal, assures low contact resistance.

#### **Specifications**

**Dielectric Strength** 1500 V Minimum

Clip/Terminals Tin-Plated Spring Brass; two different style clips

can be supplied for circuit identity or polarization

Base Glass reinforced Thermoplastic:

Gray except anit-rotation series which is black

Flammability Rating UL94 V-0 **Ambient Temperature**  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ 

#### **Ordering Information**

CATALOG	TERMINALS	VOLTAGE	CURRENT RATING		
NUMBER	TEHIVIIIVALO	VOLIAGE	UL	CSA	
354 000	Solder	600VAC/VDC*	30 A	30 A	
354 600	3/16" Q.C.	600VAC/VDC	20 A	20 A	
354 800	1/4" Q.C.	600VAC/VDC	20 A	20 A	
354 900	1/4" Q.C.	600VAC/VDC	30 A	25 A	
354 101-GY	P.C. Board	600VAC/VDC	15 A	15 A	

<sup>\*30</sup> A capability is based on temperature rise with #10 AWG wire properly soldered.

#### **Recommended Fuses**

3AG Cartridge .......34

#### **Web Resources**

For additional technical information visit: littelfuse.com

#### **Technical Information**

SOLDER TYPE TERMINALS	3/16" Q.C. TERMINALS†	1/4" Q.C. TERMINALS	1/4" Q.C. TERMINALS†	POLES	DIM "A"
354 001GY	354 601GY	354 801GY	354 901GY	1	.50"
354 002GY	354 602GY	354 802GY	354 902GY	2	1.12"
354 003GY	354 603GY	354 803GY	354 903GY	3	1.75"
354 004 GY	354 604GY	354 804GY	354 904GY	4	2.38"
354 005GY	354 605GY	354 805GY	354 905GY	5	3.00"
354 006GY	354 606GY	354 806GY	354 906GY	6	3.63"
354 007GY	354 607GY	354 807GY	354 907GY	7	4.25"
354 008GY	354 608GY	354 808GY	354 908GY	8	4.88"
354 009GY	354 609GY	354 809GY	354 909GY	9	5.50"
354 010GY	354 610GY	354 810GY	354 910GY	10	6.13"
354 011GY	354 611GY	354 811GY	354 911GY	11	6.75"
354 012GY	354 612GY	354 812GY	354 912GY	12	7.38"
354 021BL*	354 621BL*	354 821BL*	354 921BL*	1	.50"
354 101GY	_	_	_	1	.50"

<sup>†</sup> NEMA style

<sup>\*</sup> With Anti-Rotation Boss



## FUSE PULLERS & POWR-JAW CLIP CLAMPS

MFP • LPFP • GFP • 097023



#### Features/Benefits

- Ergonomically designed fuse pullers designed to safely remove power fuses
- Molded design offers more comfortable and natural grip than traditional pullers, increasing performance

#### **Specifications**

TYPE OF FUSE PULLER	PART NUMBER	FUSE SIZE (DIAMETER)	
Midget Fuse	MFP	3/16" - ½" fuses	
Pocket Fuse	LPFP	250 V fuses from 0-200 A 600 V fuses from 0-100 A ½16" - 11½32" fuses	
Giant Fuse	GFP	250 V fuses from 61-600 A 600 V fuses from 61-400 A 1½6" - 219/22" fuses	
Tri-puller	097023	For ATO, MINI and glass fuses	

#### **Web Resources**

For additional technical information visit:

littelfuse.com/fusepullers



#### Features/Benefits

- Improve contact between fuse and clip
- Help prevent unnecessary heat from poor contact due to the loss of spring force. This reduces:
  - 1. Nuisance fuse opening
  - 2. Premature aging of surrounding components
- High temperature phenolic resin knob for durability
- · Wide range of coverage with simple design

#### **Ordering Information**

CATALOG NUMBER	ORDERING NUMBER	VOLTS	AMPERES
LCC1	OLCC1	250	0-30
LCC2	OLCC2	250	35-60
LCC2	OLCC2	600	0-30
LCC4	0LCC4	600	35-60
LCC5	OLCC5	250 or 600	70-100
LCC6	0LCC6	250 or 600	110-200
LCC7	OLCC7	250 or 600	225-400
LCC8	0LCC8	250 or 600	450-600

Note: POWR-JAW Clip Clamps are sold individually, not in pairs.

A minimum of 1/8" of clearance between the fuse block barrier and fuse clip is required to install Clip Clamps.

#### **Web Resources**

For additional technical information visit:

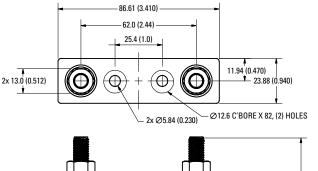
littelfuse.com/clipclamps

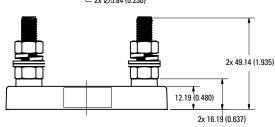


## LFFB SERIES LIMITER BLOCK / LHFB INLINE HOLDER









#### **Description**

The LFFB003 fuse block is designed to accept CNN and CNL style limiter fuses. Applications include but are not limited to forklifts, golf carts and other low-voltage battery equipment. It is specifically designed for the HAZGARD™ fuse but can be used for CNN/CNL fuses as well.

#### **Specifications**

**Voltage Rating** 150 Vac/Vdc Ampere Rating A 008

Approvals UL Recognized (File: E14721) Construction Base—Thermoplastic Studs—Steel Zinc Plated

#### **Ordering Information**

CATALOG NUMBER	ORDERING NUMBER
LFFB003	LFFB0003Z

#### Web Resources

Sample requests and other technical information:

#### littelfuse.com/lffb

#### **Recommended Fuses**

CNL/CNN Fork Lift fuses6	34
HAZGARD fuse6	34

#### **LHFB**



#### **Description**

The Littelfuse LHFB waterproof in-line fuse holder is ideal for harsh environments. The LHFB holder features the voltage and ampere rating molded into the body, along with a wire strip gauge. It also withstands solvents and vibration.

#### Features/Benefits

- Waterproof in-line fuse holder for harsh environments
- One-piece molded thermoplastic body
- Bright green color offers high visibility
- Voltage and ampere rating molded into body

#### **Specifications**

**Voltage Rating** 32 V Ampere Rating 30 A

**Fuses** 1/4" x 11/4" fuses

Wire Size Accepts #16 to #18 gauge wire

**Operating Temperature** -20° C to 80° C

#### **Installation Instructions**

- 1. Thread wire through fuse holder body
- 2. Strip wire insulation per strip gauge
- 3. Crimp wire to fuse clip\*
- 4. Pull wire through and seat fuse clip in the holder body
- 5. Insert desired fuse type and rating
- 6. Snap holder body together

\*Recommended crimping tools: Thomas & Betts No. WT-111M Note: Wire is not supplied with the holder.

#### Web Resources

Sample requests and other technical information:

littelfuse.com/lhfb



#### 571 & 572 SERIES PANEL-MOUNT FUSE HOLDERS

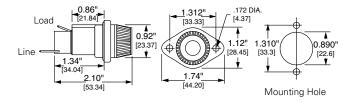
571



#### **Description**

Panel mount fuse holders are for Midget-Style and Class CC fuses. Class CC fuses have a rejection feature on one end cap, which mates with the rejection feature of Littelfuse Class CC fuses holders to prevent the installation of fuses with lower voltage ratings or interrupting ratings. Watertight version must be front panel mounted.

#### **Dimensions Inches (mm)**



#### **Ordering Information**



_	CATALOG/ORDERING NUMBER STANDARD WATERTIGHT			BOTTOM TERMINAL	FUSE LENGTH RANGE*	FOR USE WITH
571027	05710027L	571027P	05710027LXP	Straight	1 <sup>5</sup> /16" – 1 <sup>3</sup> /8"	Midget
571028	05710028L	571028P	05710028LXP	Rt. Angle	1716 - 178	Fuses
571007	05710007L	571007P	05710007LXP	Straight	113/32" - 11/2"	Midget
571008	05710008L	571008P	05710008LXP	Rt. Angle	1 /32 - 1/2	Fuses
5710CC	057100CCL	5710CCP	057100CCLXP	Straight	11/2"	Class CC
571RCC	05710RCCL	571RCCP	05710RCCLXP	Rt. Angle	172	Fuses

<sup>\*</sup>Fuse diameter is 13/32"

Note: Contact factory for versions with pre-assembled wire leads.

#### **Specifications**

Voltage Rating 600 V

Ampere Rating 30 A for Class CC and Midget fuses

Dielectric Strength 4000 V Minimum

**Terminals** Tin-plated brass combination solder & quick-connect

O-Rings 901-184 (body), 901-260 (knob)

Molded Parts Black thermoplastic

**Approvals** UL Recognized (File: E14721)

UL Recognized for branch circuit protection

(5710CC/RCC)

CSA Certified (File: LR7316)

#### **Web Resources**

Additional technical information: littelfuse.com/571

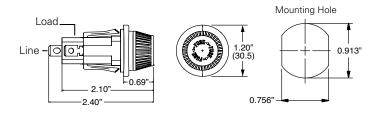
#### 572



#### **Description**

The 572 series panel mount fuse holders are designed to minimize installation time. Its unique design incorporates a snap-mount feature that allows the holder to be installed without any tools or mounting hardware.

#### **Dimensions Inches (mm)**



#### **Ordering Information**



CATALOG/ORDERING NUMBER				BOTTOM	FUSE LENGTH	FOR USE
51A	NDARD	WAII	ERTIGHT	TERMINAL	RANGE†	WITH
572027	05720027L	572027P	05720027LXP	Straight	1 <sup>5</sup> /16" – 1 <sup>3</sup> /8"	Midget
572028	05720028L	572028P	05720028LXP	Rt. Angle	1 219 - 1 28	Fuses
572007	05720007L	572007P	05720007LXP	Straight	113/32" – 11/2"	Midget
572008	05720008L	572008P	05720008LXP	Rt. Angle	1.732 - 172	Fuses
5720CC	057200CCL	5720CCP	057200CCLXP	Straight	1½"	Class CC
572RCC	05720RCCL	572RCCP	05720RCCLXP	Rt. Angle	172	Fuses

†Fuse diameter is 13/32"

Note: Contact factory for versions with pre-assembled wire leads.

## **Specifications**

Voltage Rating 600 V

Ampere Rating 30 A for Class CC and Midget fuses

Dielectric Strength 4000 V Minimum

**Terminals** Tin-plated brass combination solder & quick-connect

Molded Parts Black thermoplastic
Approvals UL Recognized (File: E14721)

UL Recognized for branch circuit protection

(5720CC/RCC) Class CC version CSA Certified (File: LR7316)

**Mounting** Double "D" punch - Greenlee #61092

(14-18 gauge panel thickness recommended)

#### **Web Resources**

Additional technical information: littelfuse.com/572



## 342 SERIES 3AG (1/4" X 11/4") PANEL MOUNT FUSE HOLDERS

#### Traditional Panel Mount Type







Right Angle Terminal Fluted Knob

## **Description**

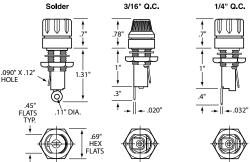
Panel Mount Fuse holders for 3AG (1/4" x 11/4") fuses. Both fluted and knurled knob terminal options are available.

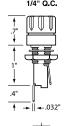
#### **Ordering Information**

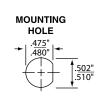
#### **Straight Terminal**

FLUTE	KNOB	KNURLE	D KNOB		
CATALOG/ORDERING NUMBER		CATALOG/ NUM		TERMINAL	
342014A	03420014X	342012A	03420012X	Solder	
342038A	03420038X	342058A	03420058X	³/16″ Q.C.	
342838A	03420838X	342858A	03420858X	1/4" Q.C.	

#### Straight Terminal







**Dimensions** in inches

## (F) QPL RoHS (P)

#### **Specifications**

**Molded Parts** 

**Electrical** Rated at 20 A for any voltage up to 250 V

**Dielectric Strength** 2400 V minimum

Withstands 15 lb-in mounting torque; Mounting

maximum panel thickness .187' Black thermoplastic (UL94 V-0) Bayonet style with lettering

Knob **Terminals** Copper & copper alloy. Tin plated, except ¼"

Quick-Connect terminals are nickel plated

Ambient Temperature  $-40^{\circ}$ C to  $+85^{\circ}$ C

#### **Recommended Fuses**

3AG Cartridge .......34

#### Web Resources

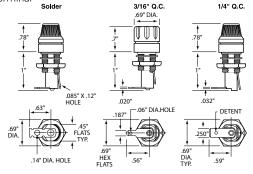
Additional technical information available at:

littelfuse.com/342

#### **Right Angle Terminal**

FLUTE	KNOB	KNURLE	D KNOB	
CATALOG/ NUM		CATALOG/ NUM		TERMINAL
342004	03420004X	342022A	03420022X	Solder
342028A	03420028X	342048A	03420048X	³/16″ Q.C.
342828	03420828X	342848A	03420848X	¹/₄″ Q.C.

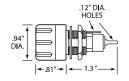




#### 342 Series (Watertight Panel Mount Type)



#### **Dimensions Inches**







#### Web Resources

Additional technical information available at: littelfuse.com/342

#### **Specifications**

Electrical Rated at 20 A for any voltage up to 250 V **Dielectric Strength** 1500 V minimum

Mounting Withstands 15 lb-in mounting torque; maximum panel thickness is .250

**Molded Parts** Black thermoset (UL94 V-0) Knob

Screw type

Seal O-ring provides a watertight seal on the front side of the panel per MIL-PRF-19207 **Terminals** Copper & copper alloy. Tin plated, Solder type

Ambient Temperature  $-40^{\circ}$ C to  $+85^{\circ}$ C

Hardware O-rings (2) and hex nut, unassembled

#### Ordering Information

CATALOG NUMBER	ORDERING NUMBER
342006A	0342006ZXA

#### **Recommended Fuses**

3AG Cartridge ......34

**GAL** QPL



#### 345 SERIES PANEL MOUNT FUSE HOLDERS

#### International Shock-Safe Panel Mount Type

#### **Description**

Designed to eliminate electrical shock as defined by IEC Standards 60065 and 60127, these panelmount fuses holders offer a wide variety of options. This allows for inventory reduction and versatility.

#### Features/Benefits

- Anti-tease feature eliminates circuit interruption when knob is accidentally depressed
- Five fuse holder types for maximum flexibility
- Two knob styles screwdriver slot and fingergrip
- Drip proof option available on screwdriver slot knob style
- Two terminal choices depending on application



For more informations, visit: **littelfuse.com/shocksafe** 

#### **Recommended Fuses**





#### **Specifications**

Insulation Resistance10,000 megaohm minimum at 500 VdcContact ResistanceLess than .005 ohm average at current

Mounting

Woulding

Body Material Knob Material Hex Nut Material Knob Less than .005 ohm average at currents up to 1 A Threaded styles withstand 15 in-lb mounting torque Profile panel thickness .032" min/310" max. Quick mount panel thickness .012" min/360" max. Rear mount panel thickness .012" min/260" max.

RoHS PO

Black glass-filled thermoplastic (UL94 V-0) Grey, blue or black glass-filled thermoplastic (UL94 V-0)

Black glass-filled thermoplastic

Finger-Grip, Fuse Extractor type or Screwdriver Slot, Fuse Extractor type with plated copper alloy insert

Plated copper alloy contact clips.

Spring loaded, locking mechanism provides an anti-

tease feature and will not vibrate loose

**Terminals** Copper alloy, Tin-plated **Ambient Temperature**  $-40^{\circ}$ C to  $+85^{\circ}$ C

Ambient Temperature -40°C to +85° Hardware Threaded styl

Threaded style fuse holders are supplied with a thermoplastic hex nut unassembled

Quick mount style fuse holders are supplied with a push-on type retaining nut, black oxide finish, unassembled

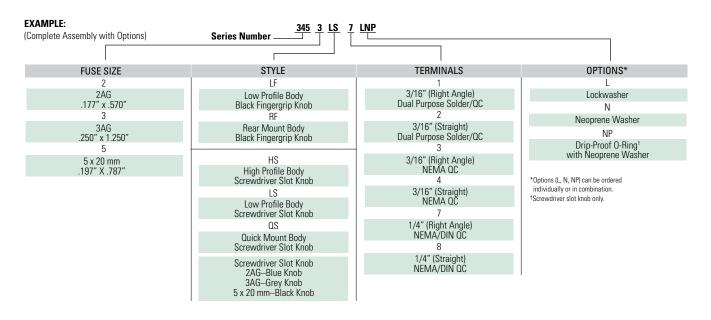
A synthetic rubber O-ring will be supplied only with the screwdriver slot knob when the drip-proof version is requested

AGENCY APPROVAL	FILE NUMBER	3AG	5 X 20 mm	2AG
UL	E75961	20 A 250 V	10 A 250 V	10 A 250 V
CSA	LR91788	20 A 250 V	10 A 250 V	10 A 250 V
VDE	116895E	10 A 250 V	10 A 250 V	_

Note: To order with a metal internal tooth lockwasher (L) and/or neoprene panel washer (N) and/or drip-proof synthetic rubber "O" ring with Neoprene washer (NP) [Screwdriver slot knob only], add the appropriate suffix (L, N, or NP) respectively.

Please refer to Technical Application Guide section for information on proper fuse holder de-rating.

## **Ordering Information**





## LSCR SERIES HIGH-SPEED FUSE BLOCKS

700 V/1000 V





#### **Description**

Littelfuse LSCR Series is a comprehensive line of modular fuse blocks, designed to accommodate a wide range of High-Speed and UL Power Fuses. These LSCR Series blocks have modular stud type design that enables easy mounting in panel boards.

LSCR Series blocks are CE Certified and RoHS Compliant.

#### **Features/Benefits**

- Modular design reduces inventory requirements
- Sold in pairs for convenience
- Supplied with nut and belleville washer
- 200kA short-circuit withstand rating
- Constructed of molded phenolic (with plated steel studs) provide greater heat dissapation

#### **Specifications**

**Voltage Rating** 700 V / 1000 V **Ampere Ratings** 400A, 800A and 1200A

Withstand Rating 200kA

Approvals UL Recognized (File: E14721)

cURus Recognized (E14721) CSA Certified (File: 73160)

Material Base: Molded Phenolic or Thermoplastic

**Terminal Construction:** Plated steel.

Flammability Rating UL94 V-0
Environmental RoHS Compliant
Country of Origin LSCR0xx - China

LSCR1xx - USA

#### **Web Resources**

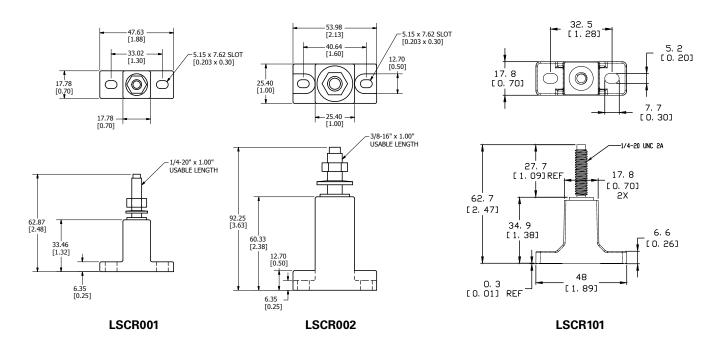
For more information, visit: littelfuse.com/lscr

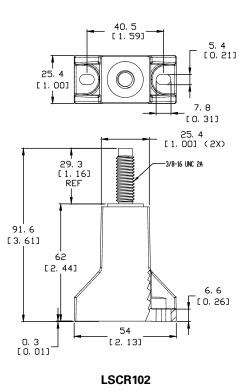
	ELECTRICAL & MECHANICAL SPECIFICATIONS														
CATALOG/	AAADEDE	VOLTAGE	TERMINAL	INSU	LATOR	TEDRAINIAL	STUD T	ORQUE		FAST TOR		AGEN	CY APPRO	OVALS	
ORDERING NUMBER	AMPERE RATING	VOLTAGE RATING	(STUD) MATERIAL	MATERIAL	MAX. BASE TEMPERATURE	TERMINAL (STUD) SIZE	(in.lbs)	(N-m)	MOUNTING FASTNER SIZE	(in.lbs)	(N-m)	UR	CURUS	CSA	
LSCR001	400A	700Vac/dc	Plated Steel	Molded Phenolic	150°C (302°F)	14-20 UNC	61	6.9	#10	20-25	2.3-2.8	•		•	
LSCR002	800A	700Vac/dc	Plated Steel	Molded Phenolic	150°C (302°F)	3/8-16 UNC	192	21.7	#10	20-25	2.3-2.8	•		•	
LSCR101	400A	1000Vac/dc	Steel, Zinc Plated	Thermoplastic	125°C (257°F)	1/4-20 UNC	75	8.5	#10	25-30	2.8-3.4		•		
LSCR102	800A	1000Vac/dc	Steel, Zinc Plated	Thermoplastic	125°C (257°F)	3/8-16 UNC	230	26	#10	25-30	2.8-3.4		•		
LSCR103	1200A	1000Vac/dc	Steel, Zinc Plated	Thermoplastic	125°C (257°F)	½-13 UNC	300	34	1/4"	25-30	2.8-3.4		•		

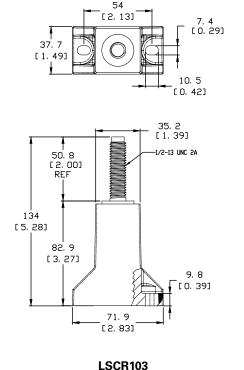


## LSCR SERIES HIGH-SPEED FUSE BLOCKS

#### **Dimensions mm (inches)**







# Littelfuse® Expertise Applied | Answers Delivered

## 1LFS SERIES HIGH-SPEED FUSE BLOCKS

600V • 1-400 A





#### **Specifications**

**Approvals** UL Recognized E14721

**Material Base:** 150° C general purpose phenolic

**Terminal:** Tin plated aluminum

#### **Web Resources**

Download CAD drawings and other technical information:

littelfuse.com/1lfs

#### **Description**

Littelfuse modular style high-speed semiconductor fuse blocks accommodate a wide range of semiconductor fuses. Blocks are provided in pairs with fuse mounting hardware.

#### **Features/Benefits**

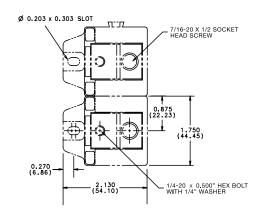
- Modular design reduces inventory requirements
- Sold in pairs for convenience
- Constructed of general purpose phenolic (with tin plated aluminum terminations)

#### **Ordering Information**

CATALOG NUMBER	AMPERE RATING	WIRE RANGE	WIRE RATING	APPROVALS
1LFS101	100 A	#2/0 - 14 CU/AL	120 in-lbs	UL Recognized
1LFS102	400 A	250MCM - #6 CU/AL	275 in-lbs	UL Recognized

#### **Dimensions Inches (mm)**

#### 1LFS101



#### **Recommended Fuses**

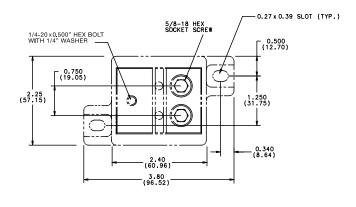
#### 1LFS101

AMPERE RATINGS
70-100
35-100
35-100
35-100
1-100

#### 1LFS102

FUSE SERIES	AMPERE RATINGS
L15S	70-400
L25S	70-200
L50S	125-200
L60S	125-200

#### 1LFS102





## POWR-BLOKS™

#### Distribution Blocks • Splicer Blocks • Covers









#### **Description**

POWR-BLOKS<sup>™</sup> power distribution blocks offer a safe, convenient way of splicing cables, providing a fixed junction tap-off point or splitting primary power into secondary circuits. Lx2xxx-DIN series offers integral DIN-Rail mount and an optional hinged safety cover.

Optional power distribution block covers provide protection against accidental shorting between poles caused by loose wires, tools, or other conductive material. They also protect personnel from accidentally contacting energized connectors. To order protective covers, match the number of poles for the block to the cover.

#### **Applications**

Typical applications include heating, air conditioning and refrigeration systems, elevator systems, material handling equipment, control panels, motor controls, switchgear, and anywhere power needs to be distributed to more than one load.

#### Connectors

Box lug connectors are designed for use with a single, solid or class B or C stranded conductor. Use of more than one conductor per connector opening or use of extra-flexible, fine-stranded conductors, such as welding cable, voids the UL Listing and may cause overheating. Manufacturers of cable terminations can furnish crimp-on sleeves for fine stranded conductors which permit these conductors to be used with box lugs.

#### **Ampere Ratings**

The ampere rating per pole for power distribution blocks is based on the line ampacity of 75°C insulated conductors per 2014 NEC® Table 310.16 (this reference has changed to Table 310.15(B)(16) effective with the 2017 NEC®). If 60°C insulated conductors are used, load must not exceed the ampacity of 60°C conductors. Use of conductors rated in excess of 75°C is permitted (for example 90°C), however, load must not exceed the ampacity of 75°C conductors.

#### **Specifications**

**Voltage Rating** 

**Current Rating** Based on 2014 NEC Table 310.16 (or NEC Table

310.15(B)(16) effective with 2017 NEC),

using 75°C copper wire

Material Phenolic rated at 150°C and Thermoplastic rated at 125°C (LD1400 and LS1300 series only)

Connector Standard: Highly conductive aluminum, tin plated Copper: Highly conductive copper, tin plated

Flammability Rating UL94 V-0

UL Recognized - OLD/OLS Series (File: E171395) **Approvals** 

LFD/LFS Series (File: E309688)

CSA Certified - OLD/OLS Series (File: LR700111)

LFD/LFS Series (File: 007316\_0\_000) UL Listed - OLD57xxxx (File: E482231)

Environmental RoHS compliant, Lead (Pb) free

#### Ordering Information

See Selection Guide on next page

#### Web Resources

For dimension, CAD and 3-D drawings, visit:

littelfuse.com/powrbloks





# Littelfuse® Expertise Applied | Answers Delivered

## POWR-BLOKS™

#### Distribution Block Selection Guide

		L 3R	LINE CONNECTION					LOAD CONNECTION							
AMP	S	집	c	SШ		2011011							щ	CATALOG/	*PLASTIC
PER	POLES		CONNECTOR	POL	LUG TYPE	WIRE	TORQUE	CONNECTOR		LUG TYPE	WIRE	TORQUE	FIGURE	ORDERING	COVER ORDERING
POLE	_	CONNECTOR MATERIAL	CONNECTOR S	필	LUGITTE	RANGE	RANGE	CONNECTOR IMAGE	PEN PEN	LUGITE	RANGE	RANGE	正	NUMBER	NUMBER
115	1			1	Slotted	#2 - #14	35-50 in-lbs		4	Slotted	#10 - #18	7 in-lbs	2	0LD14001Z	-
115	2	AL		1	Slotted	#2 - #14	35-50 in-lbs		4	Slotted	#10 - #18	7 in-lbs	2	0LD14002Z	-
115	3	AL		11	5/32" Hex	#2 - #14	50-40 in-lbs	00	4	5/64" Hex	#10 - #18	7 in-lbs	2	LFD14003Z	-
115 175	1			1	Slotted 5/16" Hex	#2 - #14 2/0 - #14	35-50 in-lbs 35-120 in-lbs	_==,	4	Slotted 1/8" Hex	#10 - #18 #4 - #14	7 in-lbs 35 in-lbs	3	0LD14004Z 0LD25701Z	LPBC21
175	2	AL		1	3/16" Hex	2/0 - #14	40-120 in-lbs		4	1/8" Hex	#4 - #14	35 in-lbs	3	LFD25701Z	LPBC22
175	3	, ,_		1	3/16" Hex	2/0 - #14	40-120 in-lbs	00	4	1/8" Hex	#4 - #14	35 in-lbs	3	LFD25703Z	LPBC23
175	1			1	3/16" Hex	2/0 - #14	35-120 in-lbs		4	1/8" Hex	#4 - #14	35 in-lbs	4	0LD25701ZXDIN	
175	2	AL		1	3/16" Hex	2/0 - #14	35-120 in-lbs	66	4	1/8" Hex	#4 - #14	35 in-lbs	4	OLD25702ZXDIN	0LCH1322Z
175	3	AL		1	3/16" Hex	2/0 - #14	35-120 in-lbs	00	4	1/8" Hex	#4 - #14	35 in-lbs		OLD25703ZXDIN	0LCH1323Z
175	Adder			1	-	2/0 - #14	35-120 in-lbs		4	_	#4 - #14	35 in-lbs		OLD2570AZXDIN	-
175	1		┌═┐	1	3/16" Hex	2/0 - #14	35-120 in-lbs		4	Slotted	#4 - #14	35 in-lbs	3	0LD29701Z	LPBC21
175	2	CU		1	3/16" Hex	2/0 - #14	35-120 in-lbs	00	4	Slotted	#4 - #14	35 in-lbs	3	0LD29702Z	LPBC22
175	3			1	3/16" Hex	2/0 - #14	35-120 in-lbs		4	Slotted	#4 - #14	35 in-lbs	3	0LD29703Z	LPBC23
175	1			1	3/16" Hex	2/0 - #14	35-120 in-lbs	_ <b></b>	4	Slotted	#4 - #14	35 in-lbs			
175 175	3	CU	<u>-</u>	1	3/16" Hex 3/16" Hex	2/0 - #14 2/0 - #14	35-120 in-lbs 35-120 in-lbs	00	4	Slotted Slotted	#4 - #14 #4 - #14	35 in-lbs 35 in-lbs		OLD29702ZXDIN OLD29703ZXDIN	
175	Adder		ا كا ا	1	3/10 Hex	2/0 - #14	35-120 in-lbs	00	4	Storren	#4 - #14	35 in-lbs		OLD29703ZXDIN	ULUH 13232
175	2			1	5/16" Hex	2/0 - #14	35-120 in-lbs	[ <del>0</del> 0]	4	Slotted	#4 - #14	35 in-lbs	1	0LD04022Z	LPBC02
175	3	AL	<u></u>	1	5/16" Hex	2/0 - #14	35-120 in-lbs		4	Slotted	#4 - #14	35 in-lbs	1	0LD04022Z	LPBC03
175	2		<b>-</b>	1	5/16" Hex	2/0 - #14	35-120 in-lbs	[000]	6	Slotted	#4 - #14	35 in-lbs	1	0LD04012Z	LPBC02
175	3	AL		1	3/16" Hex	2/0 - #14	40-120 in-lbs	000	6	1/8" Hex	#4 - #14	35 in-lbs	1	LFD04013Z	LPBC03
175	1			1	-	2/0 - #14	35-120 in-lbs		6	-	#4 - #14	35 in-lbs		OLD25801ZXDIN	
175	2			1	5/16" Hex	2/0 - #14	35-120 in-lbs	000	6	Slotted	#4 - #14	35 in-lbs		OLD25802ZXDIN	
175	3	AL		1	5/16" Hex	2/0 - #14	35-120 in-lbs		6	Slotted	#4 - #14	35 in-lbs	4	OLD25803ZXDIN	
175	Adder		ا ت	1	-	2/0 - #14	35-120 in-lbs		6	-	#4 - #14	35 in-lbs	4	OLD2580AZXDIN	-
310	3	AL		1	5/16" Hex	350kcmil - #6	40-120 in-lbs	00	2	3/16" Hex	2/0 - #14	35-120 in-lbs	9	0LD335543Z	OLCH1333Z
310	2	AL		1	,	350kcmil - #6	275 in-lbs	000	6	Slotted	#4 - #14	35 in-lbs	1	0LD04042Z	LPBC02
310	3	712		1	,	350kcmil - #6	275 in-lbs	000	6	Slotted	#4 - #14	35 in-lbs	1	0LD04043Z	LPBC03
335	1		┌═┐	1		400kcmil - #6	275 in-lbs	[88]	4	Slotted	#2 - #14	35-50 in-lbs	5	0LD35521Z	LPBC31
335	2	AL		1		400kcmil - #6	275 in-lbs	66	4	Slotted	#2 - #14	35-50 in-lbs	5	0LD35522Z	LPBC32
380	3			1		500kcmil - #6 400kcmil - #6	375 in-lbs		4 6	5/32" Hex	#2 - #14 #2 - #14	35-50 in-lbs 35-50 in-lbs	5	LFD35523Z	LPBC33 LPBC31
335 335	2	AL	<b>┌<del>ॗ</del></b> ┐ ├	1		400kcmil - #6 400kcmil - #6	275 in-lbs 275 in-lbs	000	6	Slotted Slotted	#2 - #14	35-50 in-lbs	5	0LD35531Z 0LD35532Z	LPBC31
380	3	AL		1		500kcmil - #6		000	6	5/32" Hex	#2 - #14	40-50 in-lbs		LFD35533Z	LPBC33
335	1			1	-, -	400kcmil - #6		,====,	8	Slotted	#2 - #14	35-50 in-lbs	6	0LD45601Z	LPBC41
335	2	AL		1		400kcmil - #6	275 in-lbs		8	Slotted	#2 - #14	35-50 in-lbs	6	0LD45602Z	LPBC42
335	3			1		400kcmil - #6	275 in-lbs	0000	8	Slotted	#2 - #14	35-50 in-lbs	6	0LD45603Z	LPBC43
350	1			2	5/16" Hex	2/0 - #14	35-120 in-lbs		6	Slotted	#4 - #14	35 in-lbs	5	0LD35551Z	LPBC31
350	2	AL		2	5/16" Hex	2/0 - #14	35-120 in-lbs	000	6	Slotted	#4 - #14	35 in-lbs	5	0LD35552Z	LPBC32
350	3		الثقا	2	3/16" Hex	2/0- #14	40-120 in-lbs	[000]	6	1/8" Hex	#4 - #14	35 in-lbs	5	LFD35553Z	LPBC33
350	1		┌══┐	2	Slotted	2/0 - #14	35-120 in-lbs		6	1/8" Hex	#4 - #14	35 in-lbs	5	0LD39551Z	LPBC31
350	2	CU		2	Slotted	2/0 - #14	35-120 in-lbs		6	1/8" Hex	#4 - #14	35 in-lbs	5	0LD39552Z	LPBC32
350	3			2	Slotted	2/0 - #14	35-120 in-lbs		6	1/8" Hex	#4 - #14	35 in-lbs	5	0LD39553Z	LPBC33
380	1	CLI		1		500kcmil - #4	375 in-lbs	000	6	5/32" Hex	#2 - #14	35-50 in-lbs	5	0LD39531Z	LPBC31
380	2	CU		1	-	500kcmil - #4	375 in-lbs	000	6	5/32" Hex	#2 - #14	35-50 in-lbs	5	0LD39532Z	LPBC32
380	3			1 1		500kcmil - #4 500kcmil - #4	375 in-lbs 375 in-lbs		6	5/32" Hex Slotted	#2 - #14 #2 - #14	35-50 in-lbs 35-50 in-lbs	5 6	0LD39533Z 0LD45511Z	LPBC33 LPBC41
380	2	AL		1		500kcmil - #4 500kcmil - #4	375 in-lbs		6	Slotted	#2 - #14	35-50 in-lbs	6	0LD45512Z	LPBC42
380	3			1		500kcmil - #4	375 in-lbs	000	6	Slotted	#2 - #14	35-50 in-lbs		0LD45513Z	LPBC43
380	1		<b></b>	1		500kcmil - #4	375 in-lbs	000	6	5/16" Hex	2/0 - #14	35-120 in-lbs	7	0LD55791Z	LPBC51
380	2	AL		1		500kcmil - #4	375 in-lbs	000	6	5/16" Hex	2/0 - #14	35-120 in-lbs		0LD55792Z	LPBC52
380	3			Ί	3/8" Hex	500kcmil - #4	375 in-lbs		6	3/16" Hex	2/0 - #14	40-120 in-lbs	7	LFD55793Z	LPBC53

Note: AL = Aluminum / CU = Copper \*Covers sold separately



## POWR-BLOKS™

#### Distribution Block Selection Guide

		æ			LINE CON	NECTION		LOAD CONNECTION							*PI ASTIC	
AMP PER POLE	POLES	CONNECTOR MATERIAL	CONNECTOR IMAGE	OPENINGS PER POLE		WIRE RANGE	TORQUE RANGE	CONNECTOR IMAGE	OPENINGS PER POLE	LUG TYPE	WIRE RANGE	TORQUE RANGE	FIGURE	CATALOG/ ORDERING NUMBER	*PLASTIC COVER ORDERING NUMBER	
380	1		_ <del>_</del> _	1	3/8" Hex	500kcmil- #4	375 in-lbs	[0000]	8	5/32" Hex	#2 - #14	35-50 in-lbs	7	0LD55941Z	LPBC51	
380	2	AL		1	3/8" Hex	500kcmil- #4	375 in-lbs		8	5/32" Hex	#2 - #14	35-50 in-lbs	7	0LD55942Z	LPBC52	
380	3			1	3/8" Hex	500kcmil- #4 500kcmil - #4	375 in-lbs 375 in-lbs	[2222]	8 12	5/32" Hex Slotted	#2 - #14 #2 - #14	35-50 in-lbs 35-50 in-lbs	7	0LD55943Z 0LD55521Z	LPBC53 LPBC51	
380	2	AL		1	Slotted Slotted	500kcmil - #4	375 in-lbs	000000	12	Slotted	#2 - #14	35-50 in-lbs	7	0LD55521Z	LPBC52	
380	3	AL		1	3/8" Hex	500kcmil - #4	375 in-lbs	[000000]	12	5/32" Hex	#2 - #14	40-50 in-lbs	7	LFD55523Z	LPBC53	
									3	3/16" Hex	1/0 - #14	35-120 in-lbs				
420	1	AL		1	1/2" Hex	600kcmil- #2	375 in-lbs	000	6	5/32" Hex	#2 - #14	35-50 in-lbs	9	0LD35881Z	0LCH1331Z	
400		A.I.		1	1 /0	0001 1 #0	075 : 11		3	3/16" Hex	1/0 - #14	35-120 in-lbs	_	01 D050007	01.01.14.00.07	
420	3	AL		1	1/2" Hex	600kcmil- #2	375 in-lbs	[000]	6	5/32" Hex	#2 - #14	35-50 in-lbs	9	0LD35883Z	OLCH1333Z	
420	1	AL		1	1/2" Hex	600kcmil- #2	375 in-lbs	0000	12	1/8" Hex	#4 - #14	35 in-lbs	9	0LD35951Z	0LCH1331Z	
420	2			1	1/2" Hex	600kcmil- #2	375 in-lbs	0000	12	1/8" Hex	#4 - #14	35 in-lbs	9	0LD35952Z	0LCH1332Z	
510	1			2	5/16" Hex	250kcmil - #6	275 in-lbs	[0000]	12	1/8" Hex	#4 - #14	35 in-lbs	9	0LD35961Z	0LCH1331Z	
510	2	AL		2	5/16" Hex	250kcmil - #6	275 in-lbs	0000	12	1/8" Hex	#4 - #14	35 in-lbs	9	0LD35962Z	0LCH1332Z	
510	3			2	5/16" Hex	250kcmil - #6	275 in-lbs	0000	12	1/8" Hex	#4 - #14	35 in-lbs	9	0LD35963Z	0LCH1333Z	
				1	,	500kcmil - #4	375 in-lbs									
665	1		_	1	3/8" Hex	350kcmil - #4	275 in-lbs		4	Slotted	2/0 - #14	35-120 in-lbs	7	0LD55871Z	LPBC51	
665	2	AL		1	3/8" Hex	500kcmil - #4	375 in-lbs	<u> </u>	4	Slotted	2/0 - #14	35-120 in-lbs	7	0LD55872Z	LPBC52	
		/ \L		1	0/0 110/	350kcmil - #4	275 in-lbs	00		Olottou	2,0 111	00 120 111 103	′	OLD 000722	LI BOOZ	
665	3			1	3/8" Hex	500kcmil - #4	375 in-lbs	-	4	Slotted	2/0 - #14	35-120 in-lbs	7	0LD55873Z	LPBC53	
760	1			2	3/8" Hex	350kcmil - #4 500kcmil - #6	275 in-lbs 375 in-lbs		8	5/16" Hex	2/0 - #14	35-120 in-lbs	7	0LD55861Z	LPBC51	
760	2	AL		2	3/8" Hex	500kcmil - #6	375 in-lbs	0000	8	5/16 Hex	2/0 - #14	35-120 in-lbs	7	0LD55862Z	LPBC52	
760	3	,		2	3/8" Hex	500kcmil - #4	375 in-lbs	0000	8	3/16" Hex	2/0 - #14	40-120 in-lbs	7	LFD55863Z	LPBC53	
760	1			2	3/8" Hex	500kcmil- #4	375 in-lbs	_===,	8	3/16" Hex	2/0 - #14	35-120 in-lbs	7	0LD59861Z	LPBC51	
760	2	CU	00	2	3/8" Hex	500kcmil- #4	375 in-lbs	0000	8	3/16" Hex	2/0 - #14	35-120 in-lbs	7	0LD59862Z	LPBC52	
760	3			2	3/8" Hex	500kcmil- #4	375 in-lbs	0000	8	3/16" Hex	2/0 - #14	35-120 in-lbs	7	0LD59863Z	LPBC53	
760	1			2	3/8" Hex	500kcmil- #6	375 in-lbs		12	Slotted	#4 - #14	35 in-lbs	7	0LD55921Z	LPBC51	
760	2	AL		2	3/8" Hex	500kcmil- #6	375 in-lbs	000000	12	Slotted	#4 - #14	35 in-lbs	7	0LD55922Z	LPBC52	
760	3			2	3/8" Hex	500kcmil- #4	375 in-lbs		12	1/8" Hex	#4 - #14	35 in-lbs	7	LFD55923Z	LPBC53	
760	1	011		2	3/8" Hex	500kcmil- #6	375 in-lbs	000000	12	Slotted	#2 - #14	35-50 in-lbs	7	0LD59921Z	LPBC51	
	3	CU		2	3/8" Hex 3/8" Hex	500kcmil- #6 500kcmil- #6	375 in-lbs 375 in-lbs	000000	12 12	Slotted Slotted	#2 - #14 #2 - #14	35-50 in-lbs 35-50 in-lbs	7	0LD59922Z 0LD59923Z	LPBC52 LPBC53	
760	3	AL	00	2	1/2" Hex	500kcmil - #4	375 in-lbs	000000	12	5/16" Hex	#2 - #14	35-50 in-lbs	7	0LD54083Z	LPBC53	
			, <b></b>						4	5/16" Hex	3/0 - #6	120 in-lbs				
840	3	AL		2	1/2" Hex	600kcmil- #2	375 in-lbs	00	4	5/16" Hex	#4 - #14	35 in-lbs	7	0LD54113Z	LPBC53	
950	1	AL		2	9/16" Hex	750kcmil - 1/0	600 in-lbs	00000	10	3/16" Hex	2/0 - #14	50-120 in-lbs	8	0LD57041Z	OLCH1351Z	
950	3	AL		2	9/16" Hex	750kcmil - 1/0	600 in-lbs	00000	10	3/16" Hex	2/0 - #14	50-120 in-lbs	8	0LD57043Z	OLCH1351Z	
950	1	AL		2	9/16" Hex	750kcmil - 1/0	600 in-lbs	000000	3 12	5/32" Hex	250kcmil - #6 #2 - #14	275 in-lbs 40-50 in-lbs	8	0LD57051Z	OLCH1351Z	
950	3	AL		2	9/16" Hex	750kcmil - 1/0	600 in-lbs	000	12	5/32" Hex	250kcmil - #6 #2 - #14	275 in-lbs 40-50 in-lbs	8	0LD57053Z	OLCH1351Z	
950	1	AL		2	9/16" Hex	750kcmil - 1/0	600 in-lbs	000000	12	1/4" Hex 5/32" Hex	3/0 - #6 #2 - #14	180 in-lbs 40-50 in-lbs	8	0LD57071Z	0LCH1351Z	
950	3	AL		2	9/16" Hex	750kcmil - 1/0	600 in-lbs	0000	12	1/4" Hex 5/32" Hex	3/0 - #6 #2 - #14	180 in-lbs 40-50 in-lbs	8	0LD57073Z	OLCH1351Z	

Note: AL = Aluminum / CU = Copper \*Covers sold separately



## POWR-BLOKS™

#### Splicer Block Selection Guide

Splicer block Selection duide															
		œ .			LINE CONN	ECTION			L	OAD CON	NECTION				
AMP PER POLE	POLES	CONNECTOR MATERIAL	CONNECTOR IMAGE	OPENINGS PER POLE	LUG TYPE	WIRE RANGE	TORQUE RANGE	CONNECTOR IMAGE	OPENINGS PER POLE	LUG TYPE	WIRE RANGE	TORQUE RANGE	FIGURE	CATALOG/ ORDERING NUMBER	*PLASTIC COVER ORDERING NUMBER
115	1			1	Slotted	#2 - #14	35-50 in-lbs		1	Slotted	#2 - #14	35-50 in-lbs	2	0LS13001Z	-
115	2	AL		1	Slotted	#2 - #14	35-50 in-lbs		1	Slotted	#2 - #14	35-50 in-lbs	2	0LS13002Z	-
115	3			1	5/32" Hex	#2 - #14	40-50 in-lbs		1	5/32" Hex	#2 - #14	40-50 in-lbs	2	LFS13003Z	-
115	4			1	Slotted	#2 - #14	35-50 in-lbs		1	Slotted	#2 - #14	35-50 in-lbs	2	0LS13004Z	-
115	1		<b>⊢</b> ■¬	1	Slotted	#2 - #14	35-50 in-lbs		1	Slotted	#2 - #14	35-50 in-lbs	3	0LS25521Z	LPBC21
115	2	AL		1	Slotted	#2 - #14	35-50 in-lbs		1	Slotted	#2 - #14	35-50 in-lbs	3	0LS25522Z	LPBC22
115	3	/ \_		1	Slotted	#2 - #14	35-50 in-lbs		1	Slotted	#2 - #14	35-50 in-lbs	3	0LS25523Z	LPBC23
150	1			1	3/16" Hex	1/0 - #14	35-120 in-lbs		1	3/16" Hex	1/0 - #18	35-120 in-lbs	3	0LS21211Z	LPBC21
150	2	CU	[ <del>-</del>	1	3/16" Hex	1/0 - #14	35-120 in-lbs		1	3/16" Hex		35-120 in-lbs	3	0LS21212Z	LPBC22
150	3			1	3/16" Hex	1/0 - #14	35-120 in-lbs		1	3/16" Hex	,	35-120 in-lbs	3	0LS21213Z	LPBC23
175	1			1	5/16" Hex	-	35-120 in-lbs		1	5/16" Hex		35-120 in-lbs	3	0LS25721Z	LPBC21
175	2	AL		1	5/16" Hex	2/0 - #14	35-120 in-lbs	<u> </u>	1	5/16" Hex		35-120 in-lbs	3	0LS25722Z	LPBC22
175	3			1	3/16" Hex		40-120 in-lbs		1	3/16" Hex		40-120 in-lbs	3	LFS25723Z	LPBC23
175	1			1	5/16" Hex	2/0 - #14	35-120 in-lbs		1	5/16" Hex	2/0 - #14	35-120 in-lbs	4	OLS25721ZXDIN	
175	2		<b>,=</b> ,	1	5/16" Hex		35-120 in-lbs	ł	1	5/16" Hex	2/0 - #14	35-120 in-lbs	4	OLS25722ZXDIN	0LCH1322Z
175	3	AL		1	5/16" Hex	2/0 - #14	35-120 in-lbs		1	5/16" Hex		35-120 in-lbs	4	OLS25723ZXDIN	
175	Adder			1	-	2/0 - #14	35-120 in-lbs		1	_		35-120 in-lbs	4	OLS2572AZXDIN	-
175	1			1	5/16" Hex	2/0 - #14	35-120 in-lbs		1	5/16" Hex	2/0 - #14	35-120 in-lbs	4	0LS29721ZXDIN	0LCH1321Z
175	2	CLI	│ ┌ <del>■</del> ┐	1	5/16" Hex	2/0 - #14	35-120 in-lbs	┌┸	1	5/16" Hex	2/0 - #14	35-120 in-lbs	4	OLS29722ZXDIN	0LCH1322Z
175	3	CU		1	5/16" Hex	2/0 - #14	35-120 in-lbs		1	5/16" Hex	2/0 - #14	35-120 in-lbs	4	OLS29723ZXDIN	0LCH1323Z
175	Adder			1	-	2/0 - #14	35-120 in-lbs		1	-	2/0 - #14	35-120 in-lbs	4	OLS2972AZXDIN	-
255	1			1	5/16" Hex	250kcmil - #6	275 in-lbs		1	5/16" Hex	250kcmil - #6	275 in-lbs	5	0LS31231Z	LPBC31
255	2	AL		1	5/16" Hex	250kcmil - #6	275 in-lbs		1	5/16" Hex	250kcmil - #6	275 in-lbs	5	0LS31232Z	LPBC32
255	3		ت	1	5/16" Hex	250kcmil - #6	275 in-lbs	لنا	1	5/16" Hex	250kcmil - #6	275 in-lbs	5	0LS31233Z	LPBC33
255	1		_ <b>=</b> _	1	3/8" Hex	250kcmil - #6	375 in-lbs	<b></b>	1	3/8" Hex	250kcmil - #6	375 in-lbs	5	0LS31241Z	LPBC31
255	2	CU		1	3/8" Hex	250kcmil - #6	375 in-lbs		1	3/8" Hex	250kcmil - #6	375 in-lbs	5	0LS31242Z	LPBC32
255	3			1	3/8" Hex	250kcmil - #6	375 in-lbs		1	3/8" Hex	250kcmil - #6	375 in-lbs	5	0LS31243Z	LPBC33
310	2	AL		1	5/16" Hex	350kcmil - #6	275 in-lbs		1	5/16" Hex	350kcmil - #6	275 in-lbs	1	0LS03032Z	LPBC02
310	3	AL		1	5/16" Hex	350kcmil - #6	275 in-lbs		1	5/16" Hex	350kcmil - #6	275 in-lbs	1	0LS03033Z	LPBC03
310	1		<b>,≡</b> ,	1	5/16" Hex	350kcmil - #6	275 in-lbs	<b>⊢■</b> ⊣	1	5/16" Hex	350kcmil - #6	275 in-lbs	5	0LS31261Z	LPBC31
310	2	AL		1	5/16" Hex	350kcmil - #6	275 in-lbs		1	5/16" Hex		275 in-lbs	5	0LS31262Z	LPBC32
310	3		اتا ا	1	5/16" Hex	350kcmil - #6	275 in-lbs	التا ا	1	5/16" Hex	350kcmil - #6	275 in-lbs	5	0LS31263Z	LPBC33
350	3	AL	00	2	5/16" Hex	2/0 - #14	35-120 in-lbs	00	2	5/16" Hex	2/0 - #14	35-120 in-lbs	9	0LS33053Z	0LCH1333Z
420	1			1	1/2" Hex	600kcmil - #4	500 in-lbs		1	1/2" Hex	600kcmil - #4	500 in-lbs	6	0LS45571Z	LPBC41
420	2	AL	$\overline{\bullet}$	1	1/2" Hex	600kcmil - #4	500 in-lbs	<u>-</u>	1	1/2" Hex	600kcmil - #4	500 in-lbs	6	0LS45572Z	LPBC42
420	3			1	1/2" Hex	600kcmil - #4	500 in-lbs		1	1/2" Hex	600kcmil - #4	500 in-lbs	6	0LS45573Z	LPBC43
510	3	AL	00	2	5/16" Hex	250kcmil - #6	275 in-lbs	00	2	5/16" Hex	250kcmil - #6	275 in-lbs	9	0LS33203Z	OLCH1333Z
620	1			2	5/16" Hex	350kcmil - #4	275 in-lbs		2	5/16" Hex	350kcmil - #4	275 in-lbs	7	0LS51291Z	LPBC51
620	2	AL		2	5/16" Hex	350kcmil - #4		60	2	-	350kcmil - #4	275 in-lbs	7	0LS51292Z	LPBC52
620	3			2	5/16" Hex	350kcmil - #4			2	+	350kcmil - #4	275 in-lbs	7	0LS51293Z	LPBC53
760	1			2	3/8" Hex	500kcmil - #4			2	1	500kcmil - #4	375 in-lbs	7	0LS53011Z	LPBC51
760	2	AL	00	2	3/8" Hex	500kcmil - #4		00	2		500kcmil - #4	375 in-lbs	7	0LS53012Z	LPBC52
760	3			2	3/8" Hex	500kcmil - #4			2		500kcmil - #4	375 in-lbs	7	0LS53013Z	LPBC53
Note: A	L = Alum	inum / C	CU = Copper												

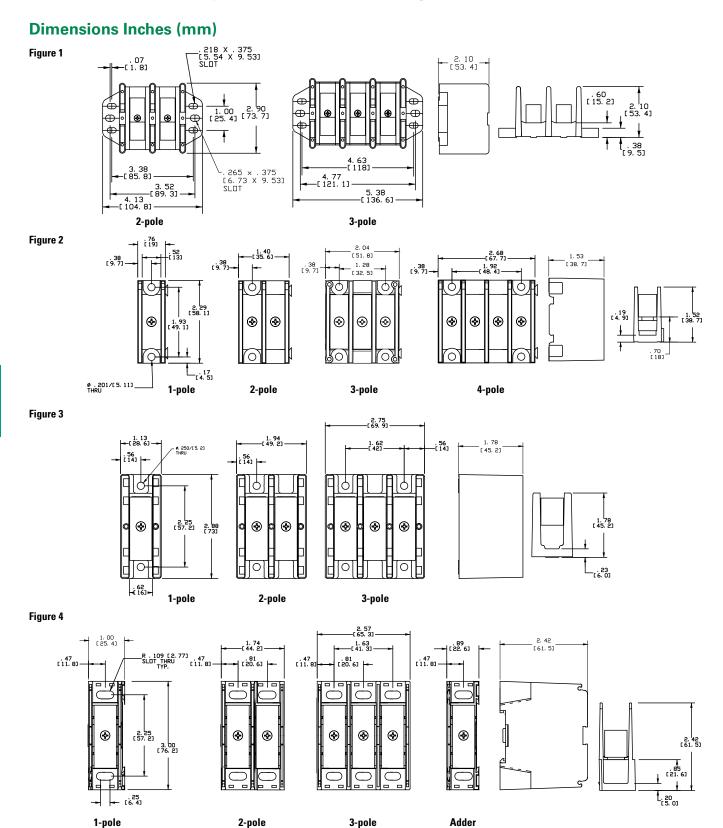
Note: \*Covers sold separately

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## POWR-BLOKS™

#### Distribution Block and Splicer Block Outline Drawings

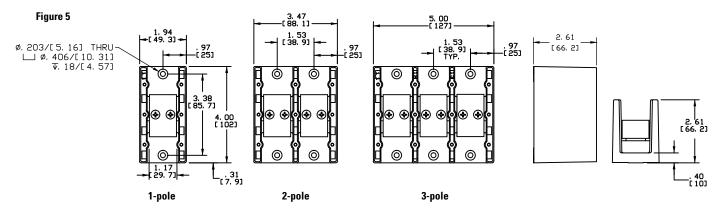




## POWR-BLOKS™

#### Distribution Block and Splicer Block Outline Drawings

#### **Dimensions Inches (mm)**



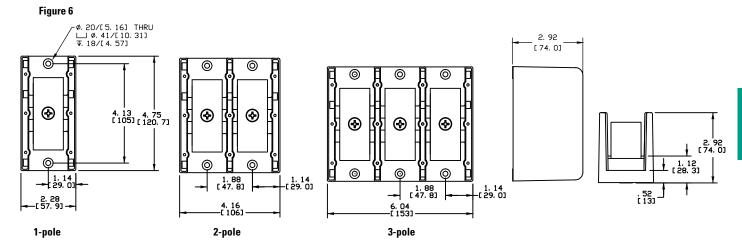
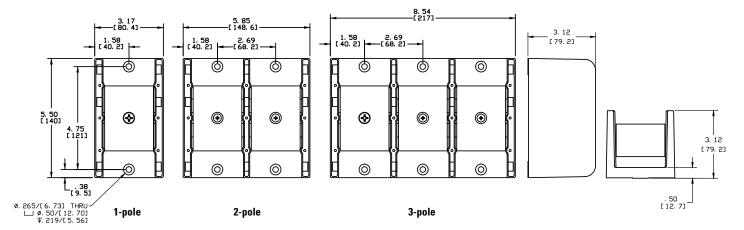


Figure 7





## POWR-BLOKS™

## Distribution Block and Splicer Block Outline Drawings

#### **Dimensions Inches (mm)**

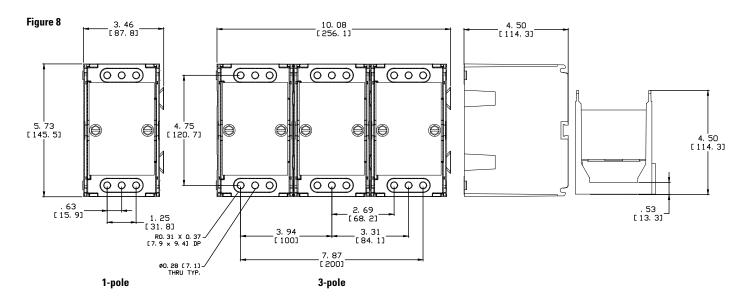
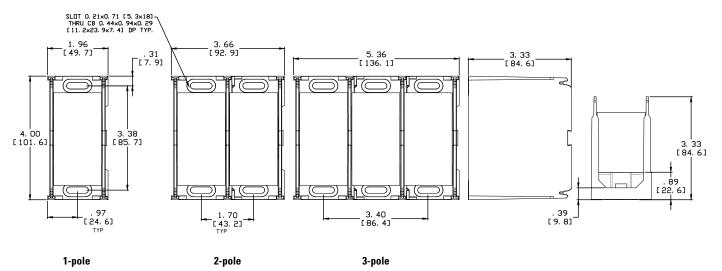


Figure 9





#### Global Distribution Blocks



#### **Description**

POWR-BLOKS™ Global Distribution Blocks add safety and mounting versatility to our distribution block solutions. The Global Distribution Blocks are approved to UL standards. The Global Distribution Blocks are IP20 finger safe to reduce the risk of contact and eliminate the need for block or panel covers. Installation is quick and easy, all blocks can be mounted on DIN rail or to the panel.

#### **Electrical Specifications**



#### Features/Benefits

- Global part meeting UL standards
- Space saving design
- Integrated touch-safe cover to increase safety
- IP20 protection rating
- Mounts to DIN rail or panels
- Reliable brass connections for excellent continuity in a smaller design

#### **Specifications**

Voltage Rating
Ampere Rating
80 – 335 A
Material
Connector
UL: 600 VAC/VDC
80 – 335 A
Thermoplastic
GDBxxxx: Brass

GDBAxxxx: Aluminum (Tin Plated)

Flammability Rating UL94 V-0

**Approvals** UL Recognized (File: E309688, E171395)

UL Listed (File: E482231) CSA Certified (File: 700111)

 Operating Temperature
 -40°C to +90°C

 Storage Temperature
 -40°C to +100°C

 Relative Humidity
 50% @ 40°C, 90% @ 20°C

**Environmental** RoHS compliant

**Web Resources** 

For additional information visit Littelfuse.com/gdb

Liectific	,aı	9	JECI	lication	15												
				WIR	E RANGE				OVERCURREN	NT PROTECTION	V				AGE		
CATALOG/	ES	Sc	CON	NNECTION	LOAD CONN	IECTION				EQUIRED			SCCR IN RMS	AF	PRC	OVAL	.S
ORDERING NUMBER	POLES	AMPS	LINE	OPENINGS PER POLE	OPENINGS PER POLE	LOAD	CLASS J (JTD_ID)	Class T (JLLN, JLLS)	Class RK1 (LLNRK, LLSRK, KLNR, KLSR)	Class RK5 (FLNR, FLSR, IDSR)	CLASS G (SLC)	CLASS CC (CCMR, KLDR, KLKR)	SYM AMPS	NB	cURus	nr	CSA
GDB60801Z	1	80	1	#8 - #4	6	#8 - #4 #10 - #14	80	-	-	-	-	-	100,000		•		
GDB61151Z	1	115	1	#8 - #2 #10 - #6	6	#14 - #4	125	-	-	-	-	-	100,000		•		
GDB61153Z	3	115	1	#8 - #2	6	#14 - #4	125	-	-	-	-	-	100,000		•		
GDBAD211Z	1	115	1	#14 - #2	1	#14 - #2	175	225	100	60	60	30	100,000			•	•
GDBAD241Z	1	115	1	#10 - #2	4	#14 - #10	125	200	100	30	60	30	65,000			•	•
GDB61601Z	1	160	1	#8 - 2/0	6	#14 - #4	175	-	-	-	-	-	100,000	•			
GDB61753Z	3	175	1	#8 - 2/0	6	#14 - #4	175	-	-	-	-	-	100,000		•		
GDBAD421Z	1	200	1	#8 - 3/0	1	#8 - 3/0	225	225	200	60	60	30	100,000			•	•
GDBAP421Z	1	200	1	#8 - 3/0	1	#8 - 3/0	225	225	200	60	60	30	100,000			•	•
GDBAD451Z	1	200	1	#8 - 3/0	4	#8 - #2	225	225	200	60	60	30	100.000				
UDDAD4312	'	200	'	#8 - 3/0	7	#14 - #8	100	110	100	30	60	30	100,000				_
GDBAP451Z	1	200	1	#8 - 3/0	4	#8 - #2	225	225	200	60	60	30	100,000				•
0DDAI 4012	'	200	'	#8 - 3/0	7	#14 - #8	100	110	100	30	60	30	100,000				_
GDB63101Z	1	310	1	3/0 - 350 kcmil	11	#14 - #2 #14 - #6 #14 - #8	350	-	-	-	-	-	100,000	•			
GDBAD741Z	1	335	1	#6 - 400 kcmil #14 - 3/0	8	#14 - #2	-	·	-	-	-	-	10,000	•			•



#### **Global Distribution Blocks**

#### **Mechanical Specification**

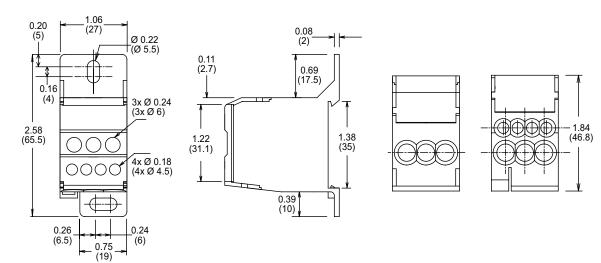
CATALOG/		AMP			LINE CONNEC	TION		LOAD CONNECTION							
ORDERING NUMBER	POLES	RATING PER POLE (UL)	OPENINGS PER POLE	OPENING DIAMETER	SCREW TYPE	WIRE RANGE	TORQUE LB-IN (NM)	OPENINGS PER POLE	OPENING DIAMETER	SCREW TYPE	WIRE RANGE	TORQUE LB-IN (NM)			
GDB60801Z	1	80	1	0.28 in (7.0 mm)	Slotted	#8 – #4 (Cu)	13.5 (1.5)	6	2x 0.28 in (2x 7.0 mm) 4x 0.18 in	Slotted	#8 - #4 (Cu) #10 - #14	13.5 (1.5)			
									(4x 4.5 mm)		(Cu)	7.2 (0.8)			
GDB61151Z	1	115	2	0.39 in (10.0 mm)	Hex 4 mm	#8 – #2 (Cu) #10 – #6 (Cu)	31 (3.5)	6	0.28 in (7.0 mm)	Slotted	#14 — #4 (Cu)	17.5 (2)			
GDB61153Z	3	115	1	0.39 in (10.0 mm)	Hex 4mm	#8 - #2 (Cu)	31 (3.5)	6	0.25 in (6.5 mm)	Hex 3mm	#14 - #4 (Cu)	17.5 (2)			
GDBAD211Z	1	115	1	0.323 in (8.2 mm)	Hex 4 mm	#14 - #2 (Cu/Al)	35 (4.0) #14 - #10 40 (4.5) #8 45 (5.1) #6 - #4 50 (5.6) #3 - #2	1	0.323 in (8.2 mm)	Hex 4 mm	#14 - #2 (Cu/Al)	35 (4.0) #14 - #10 40 (4.5) #8 45 (5.1) #6 - #4 50 (5.6) #3 - #2			
GDBAD241Z	1	115	1	0.312 in (7.9 mm)	Hex 4 mm	#14 - #2 (Cu/Al)	35 (4.0) #14 - #10 40 (4.)5 #8 45 (5.1) #6 - #4 50 (5.6) #3 - #2	4	0.159 in (4.0 mm)	Hex 2 mm	#14 - #10 (Cu/Al)	7 (0.8)			
GDB61601Z	1	160	1	0.49 in (12.5 mm)	Hex 5mm	#8 - 2/0 (Cu)	35.5 (4)	6	0.28 in ( 7.0 mm)	Slotted	#14 - #4 (Cu)	17.5 (2.0)			
GDB61753Z	3	175	1	0.47 in (12.0 mm)	Hex 5mm	#8 - 2/0 (Cu)	35.5 (4)	6	0.25 in ( 6.5 mm)	Hex 3mm	#14 - #4 (Cu)	17.5 (2.0)			
GDBAD421Z	1	200	1	0.531 in (13.5 mm)	Hex 6mm	#14 - 3/0 (Cu/Al)	50 (5.6) #14 - #10 180 (20.3) #8 - 3/0	1	0.531 in (13.5 mm)	Hex 6mm	#14 - 3/0 (Cu/Al)	50 (5.6) #14 - #10 180 (20.3) #8 - 3/0			
GDBAP421Z	1	200	1	0.531 in (13.5 mm)	Hex 6mm	#14 - 3/0 (Cu/Al)	50 (5.6) #14 - #10 180 (20.3) #8 - 3/0	1	0.531 in (13.5 mm)	Hex 6mm	#14 - 3/0 (Cu/Al)	50 (5.6) #14 - #10 180 (20.3) #8 - 3/0			
GDBAD451Z	1	200	1	0.531 in (13.5 mm)	Hex 6mm	#14 - 3/0 (Cu/Al)	50 (5.6) #14 - #10 180 (20.3) #8 - 3/0	4	0.313 in (7.9mm)	Hex 5mm	#14 - #2 (Cu/Al)	40 (4.5) #14 - #10 50 (5.6) #8 - #2			
GDBAP451Z	1	200	1	0.531 in (13.5 mm)	Hex 6mm	#14 - 3/0 (Cu/Al)	50 (5.6) #14 - #10 180 (20.3) #8 - 3/0	4	0.313 in (7.9mm)	Hex 5mm	#14 - #2 (Cu/Al)	40 (4.5) #14 - #10 50 (5.6) #8 - #2			
									2x 0.35 in (2x 9.0mm)		#14 - #2 (Cu)	31 (3.5)			
GDB63101Z	1	310	1	0.75 in (19.0 mm)	Hex 8mm	3/0 - 350 kcmil (Cu)	230 (26.0)	11	5x 0.25 in (5x 6.5mm)	Slotted	#14 - #6 (Cu)	18 (2.0)			
									4x 0.21 in (4x 5.3mm)		#14 - #8 (Cu)	10 (2.0)			
				. =4-1		#14 - 400	40 (4.5)#14 - #8 80 (9.0) #6 - #2					40 (4.5) #14 - #8			
GDBAD741Z	1	335	1	0.516 in (13.1 mm)	Hex 8mm & 6mm	kcmil (Cu/Al)	120 (13.6) #1 - #3/0 275 (31.10 #6 - #1/0 375 (42.4) 2/0 - 400 kcmil	8	0.375 in (9.5 mm)	Hex 5mm	#14 - #2 (Cu/AI)	80 (9.0) #6 - #2			



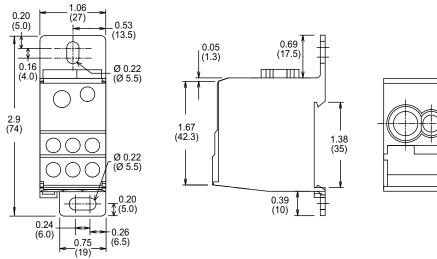
#### **Global Distribution Blocks**

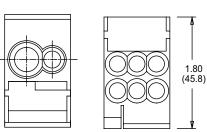
#### **Dimensions Inches (mm)**

#### GDB60801Z

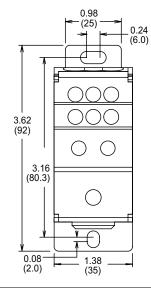


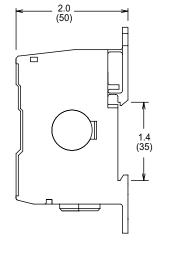
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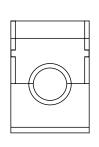


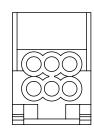


#### GDB61601Z









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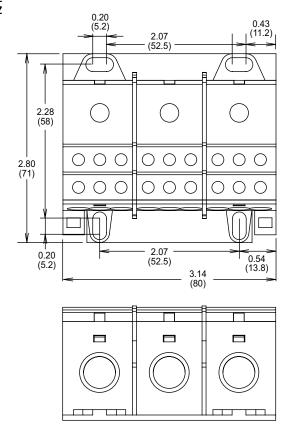


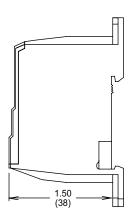
## GDB SERIES TOUCH-SAFE POWR-BLOKS™

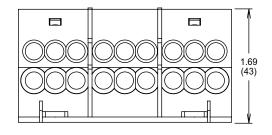
#### **Global Distribution Blocks**

#### **Dimensions Inches (mm)**

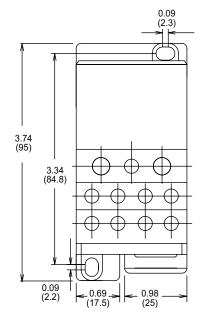
GDB61153Z GDB61753Z

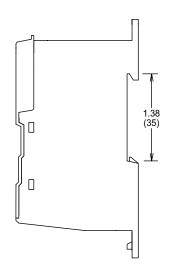


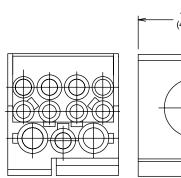




#### GDB63101Z





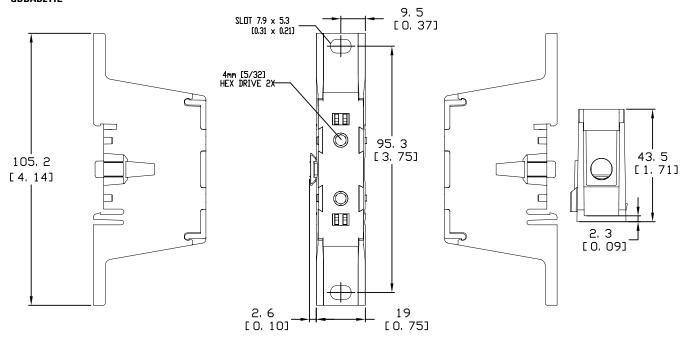




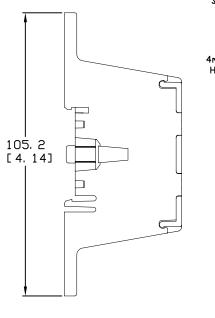
#### Global Distribution Blocks

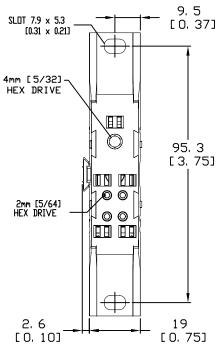
#### **Dimensions Millimeters (in)**

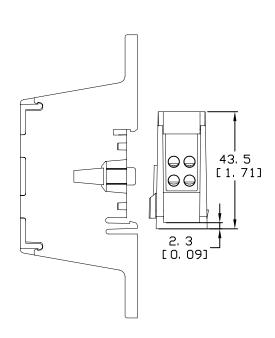
#### GDBAD211Z



#### GDBAD241Z





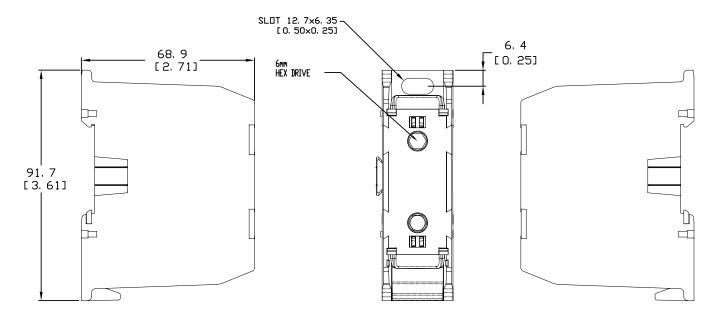


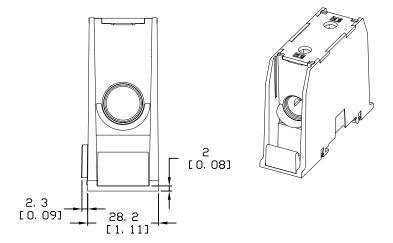


#### **Global Distribution Blocks**

#### **Dimensions Millimeters (in)**

#### GDBAD421Z



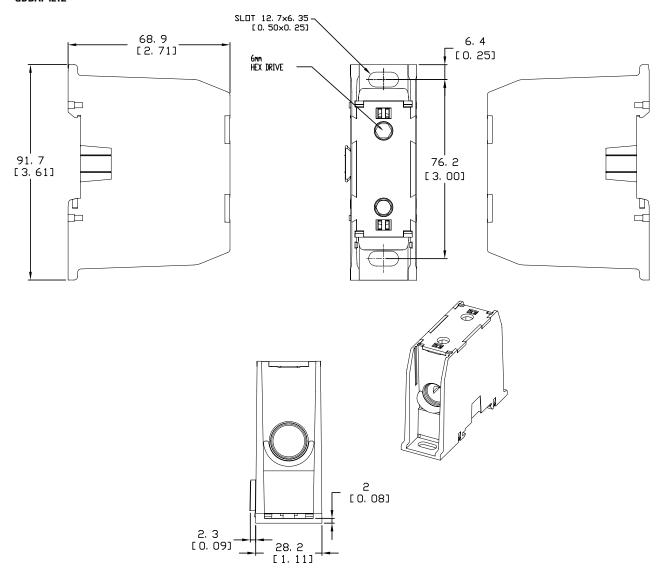




## **Global Distribution Blocks**

## **Dimensions Millimeters (in)**

#### GDBAP421Z

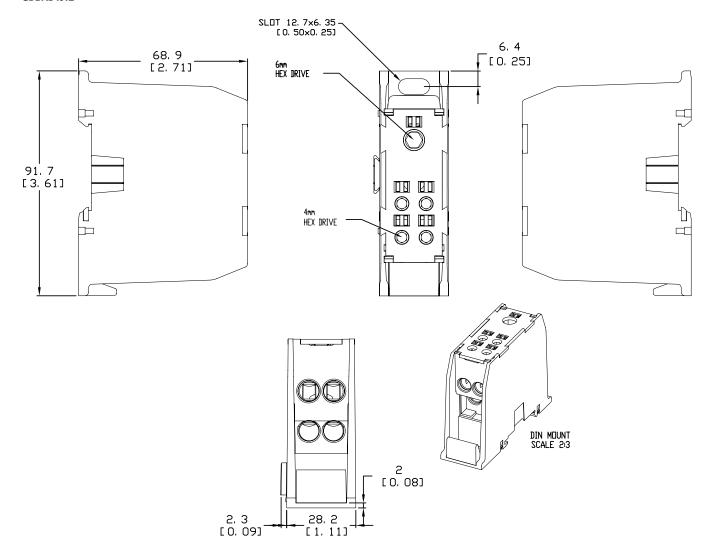




## **Global Distribution Blocks**

## **Dimensions Millimeters (in)**

#### GDBAD451Z

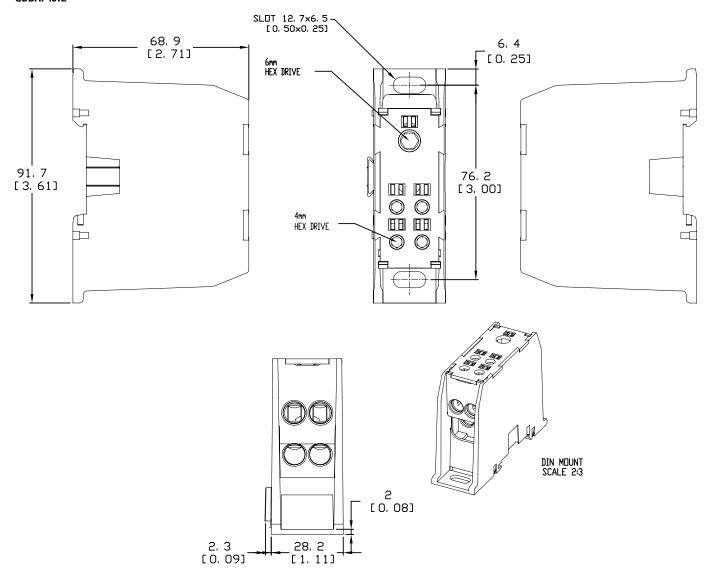




#### **Global Distribution Blocks**

## **Dimensions Millimeters (in)**

#### GDBAP451Z

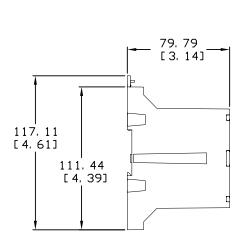


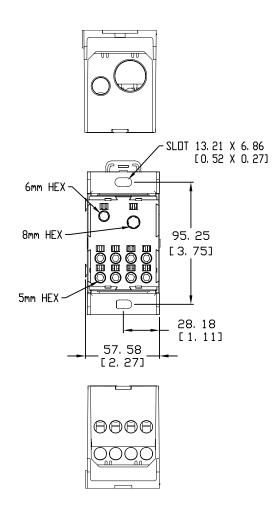


## **Global Distribution Blocks**

## **Dimensions Millimeters (in)**

#### GDBAD741Z





# Littelfuse® Expertise Applied | Answers Delivered

# IN-LINE GLASS FUSE HOLDERS

150322









#### **Description**

The 150322 is a 500 Vac/125 Vdc rated inline fuse holder ideal for applications where supplemental protection is needed, such as lighting ballasts and power supplies. 8-inch pre-stripped wire leads and fuse clips come preassembled for quick installation.

#### Features/Benefits

- Single piece body minimizes component count
- High voltage rating accommodates many power applications
- Wire leads are pre-attached to fuse clips for quick assembly
- Single piece molded body
- UL Recognized

#### **Recommended Fuses**

3AG (312, 313 Series)	34
3AB (314, 326, 505 Series)	33

#### **Specifications**

Voltage Rating 500 Vac, 125 Vdc

Ampere Rating15 AFuse Type½" x 1½"Fuse ClipsTin-plated brass

Wire Black 18 AWG, 150° C Stranded Molded Body Single piece thermoplastic

Flammability Rating UL94 V-0

ApprovalsUL Recognized (File: E14721)EnvironmentalRoHS complaint, Lead (Pb) free

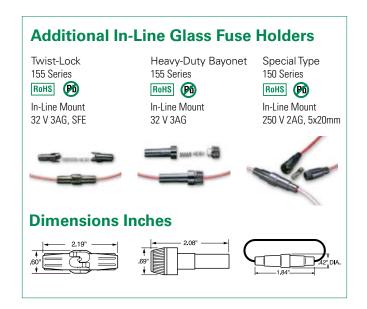
**Storage Temperature**  $-40^{\circ}$  C to  $80^{\circ}$  C **Operating Temperature**  $-55^{\circ}$  C to  $125^{\circ}$  C

#### **Ordering Information**

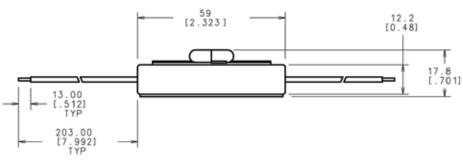
CATALOG NUMBER	ORDERING NUMBER	STANDARD PACK
150322	01500322H	100 PIECES

#### **Web Resources**

For more information, visit: littelfuse.com/150322



# **Dimensions mm (inches)**





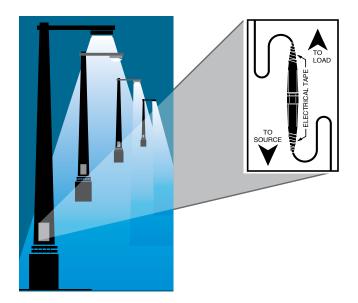


#### **Description**

Recently redesigned, the Littelfuse 600 VAC/VDC in-line watertight fuse holders allow maximum protection for high humidity and corrosive environments. The fuse holders are designed to be touch-safe and flexible for use in a variety of applications. See the list below for the redesigned part numbers.

#### **Applications**

- Street lighting and parking lot lighting
- Sports lighting and various outdoor illuminated signs
- Boat electrical circuits, tractors/yard equipment and general outdoor circuit protection (such as traffic signals, alley lighting and electric wheelchairs)





#### **Specifications**

**Voltage rating** 600 VAC/VDC **Ampere rating** up to 30 A

Interrupting rating
Approvals

200 kA rms symmetrical (with Class CC fuses) **LEB/LEX series** UL Recognized Miscellaneous

Fuse holder per UL UL 4248 (File: E14721)

CSA Certified per C22.2, No. 39 (File: LR7316) **LEC/LEY series** UL Listed Class CC Branch Circuit

Fuse holder per UL 512 (File: E14721) CSA Certified per C22.2, No. 39 (File: LR7316)

#### Features/Benefits

- Design increases safety by individual device disconnection for easy servicing, eliminating shock risk
- Increases efficiency by preventing faulted ballast from severely damaging fixture or device
- Watertight seal
- Variety of terminations available for flexible design
- Insulating boots available for harsh environments

#### **Recommended Fuses**

#### LEB/LEX series:

Accepts all Littelfuse Midget and Class CC series fuses	
CCMR	27
KLDR, KLKR	28
BLF, BLN, FLM, FLQ, KLK, KLKD	30

#### LEC/LEY series:

Accepts only Littelfuse Class CC fuses	
CCMR	27
KLDR, KLKR	28

#### **Web Resources**

Download CAD drawings, dimensions and other technical information: **littelfuse.com/in-line** 

# Look for these part numbers featuring our improved design

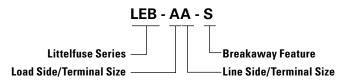
- Better surface area for ergonomic comfort, improved grip and better torque
- More pronounced seating automatically seats as user begins twisting
- · Chamfered edges for additional installation comfort

BASE PART NUMBER	PREVIOUS ORDERING NUMBER	NEW ORDERING NUMBER
LEB-AA	0LEB00AAX	0LEB00AAXK
LEB-AA-S	0LEB0AASX	0LEB0AASXK
LEB-AB	0LEB00ABX	0LEB00ABXK
LEB-AYC-S	OLEBAYCSX	OLEBAYCSXK
LEB-BB	0LEB00BBX	OLEB00BBXK
LEB-JJ	0LEB00JJX	0LEB00JJXK
LEB-JJ-S	OLEBOJJSX	0LEB0JJSXK



#### **Ordering Information**

To order Littelfuse in-line fuse holders by part number, refer to the charts on the next page.



SERIES	DESCRIPTION
LEB	One-pole in-line fuse holder for Midget and Class CC fuses
LEC	One-pole in-line fuse holder for Class CC fuses
LET	One-pole in-line fuse holder with permanently installed solid neutral
LEX	Two-pole in-line fuse holder for Midget and Class CC fuses
LEY	Two-pole in-line fuse holder for Class CC fuses



# **Recommended Crimping Tools**

The following crimping tools or equivalents may be used on either the non-breakaway or breakaway watertight in-line fuse holders.

TERMINAL SIZE	T&B PART NUMBER	BURNDY PART NUMBER
А	WT161M	-
В	WT161M	MR4C
С	M5-GREY	Hypress Y34A
D	M5-BROWN	Hypress Y34A

#### **Insulating Boots**

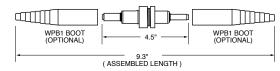
- Molded from engineering-grade thermoplastics which provide high resistance to corrosive environments
- Standard with all breakaway style fuse holders
- For watertight protection of non-breakaway Y-pole termination, order one WPB1 and one WPB3 boot



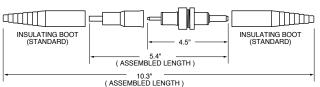
ORDERING NUMBER	TERMINAL TYPE
WPB1	A, B, C, D, J
WPB3	Υ

#### **Dimensions Inches**

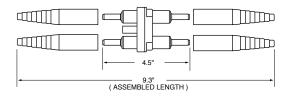
#### 1-Pole



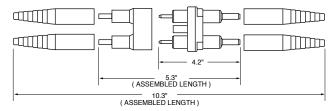
#### 1-Pole Breakaway



#### 2-Pole



#### 2-Pole Breakaway





## Ordering Information (1-Pole LEB/LEC and 2-Pole LEX/LEY for Class CC and Midget Fuses)

SINGL	E POLE	DOUBL	E POLE		LOAD TE	RMINAL SEL	ECTION			LINE TE	RMINAL SEL	ECTION	
STANDARD PART NUMBER	BREAKAWAY PART NUMBER	STANDARD PART NUMBER	BREAKAWAY PART NUMBER	TERMINAL TYPE	LOAD TERMINAL WIRE SIZE RANGE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STRANDED WIRE	TERMINAL TYPE	WIRE SIZE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STRANDED WIRE
LEB-AA LEC-AA	LEB-AA-S LEC-AA-S	LEX-AA LEY-AA	LEX-AA-S LEY-AA-S	Copper Crimp	#12 to #8 #12	1 2	•	:	Copper Crimp	#12 to #8 #12	1 2	•	•
LEB-AB LEC-AB	LEB-AB-S LEC-AB-S	LEX-AB LEY-AB	LEX-AB-S LEY-AB-S	Copper Crimp	#12 to #8 #12	1 2	•	:	Copper Crimp	#10 #6 #4	2 1 1	<u>:</u>	•
LEB-AC LEC-AC	_	LEX-AC LEY-AC	_	Copper Crimp	#12 to #8 #12	1 2	•	:	Copper Crimp	#8 #4	2	<u>•</u>	•
LEB-AD LEC-AD	_	LEX-AD LEY-AD	=	Copper Crimp	#12 to #8 #12	1 2	•	:	Copper Crimp	#6 #2	2	<u>•</u>	•
LEB-AJ LEC-AJ	LEB-AJ- S LEC-AJ-S	_	_	Copper Crimp	#12 to #8 #12	1 2	•	:	Copper Set-Screw	#12 to #8 #10 to #2	1	•	•
LEB-AYC LEC-AYC	LEB-AYC-S LEC-AYC-S	LEX-AYC LEY-AYC	LEX-AYC-S LEY-AYC-S	Copper Crimp	#12 to #8 #12	1 2	•	:	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1	<u>•</u>	•
LEB-BA LEC-BA	LEB-BA-S LEC-BA-S	LEX-BA LEY-BA	LEX-BA-S LEY-BA-S	Copper Crimp	#10 #6 #4	2 1 1	•	•	Copper Crimp	#12 to #8 #12	1 2	•	•
LEB-BB LEC-BB	LEB-BB-S LEC-BB-S	LEX-BB LEY-BB	LEX-BB-S LEY-BB-S	Copper Crimp	#10 #6 #4	2 1 1	<u>:</u>		Copper Crimp	#10 #6 #4	2 1 1	<u>:</u>	•
LEB-BC LEC-BC	_	LEX-BC LEY-BC	_	Copper Crimp	#10 #6 #4	2 1 1	•	•	Copper Crimp	#8 #4	2	<u>•</u>	•
LEB-BD LEC-BD	_	LEX-BD LEY-BD	_	Copper Crimp	#10 #6 #4	2 1 1	<u>:</u>		Copper Crimp	#6 #2	2	<u>•</u>	•
LEB-BJ LEC-BJ	LEB-BJ-S LEC-BJ-S	=	_	Copper Crimp	#10 #6 #4	2 1 1	•	•	Copper Set-Screw	#12 to #8 #10 - #2	1	•	•
LEB-BYC LEC-BYC	LEB-BYC-S LEC-BYC-S	LEX-BYC LEY-BYC	LEX-BYC-S LEY-BYC-S	Copper Crimp	#10 #6 #4	2 1 1	<u>:</u>	•	"Y" Type Copper Set-Screw	#12 to #8 #10 - #2	1	<u>•</u>	<u> </u>
LEB-CA LEC-CA	_	LEX-CA LEY-CA	_	Copper Crimp	#8 #4	2	•	:	Copper Crimp	#12 to #8 #12	1 2	:	:
LEB-CB LEC-CB	_	LEX-CB LEY-CB	_	Copper Crimp	#8 #4	2 1	<u>•</u>	:	Copper Crimp	#10 #6 #4	2 1 1	<u>:</u>	•
LEB-CC LEC-CC	_	LEX-CC LEY-CC	_	Copper Crimp	#8 #4	2 1	<u>•</u>	•	Copper Crimp	#8 #4	2	<u>•</u>	•
LEB-CD LEC-CD	_	LEX-CD LEY-CD	=	Copper Crimp	#8 #4	2 1	<u>•</u>	:	Copper Crimp	#6 #2	2	<u>•</u>	•
LEB-CJ LEC-CJ	_	LEX-CJ LEY-CJ	_	Copper Crimp	#8 #4	2 1	_	•	Copper Set-Screw	#12 to #8 #10 - #2	1	<u>•</u>	•
LEB-CYC LEC-CYC	_	LEX-CYC LEY-CYC	_	Copper Crimp	#8 #4	2 1	<u>•</u>	:	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1	<u>•</u>	-
LEB-DA LEC-DA	_	LEX-DA LEY-DA	_	Copper Crimp	#6 #2	2 1	<u>•</u>	:	Copper Crimp	#12 to #8 #12	1 2	•	•
LEB-DB LEC-DB	_	LEX-DB LEY-DB	_	Copper Crimp	#6 #2	2 1	<u>•</u>	:	Copper Crimp	#10 #6 #4	2 1 1	<u>:</u>	•
LEB-DC LEC-DC	_	LEX-DC LEY-DC	_	Copper Crimp	#6 #2	2 1	<u>•</u>	•	Copper Crimp	#8 #4	2	<u>•</u>	•
LEB-DD LEC-DD	_	LEX-DD LEY-DD	=	Copper Crimp	#6 #2	2	<u>•</u>	:	Copper Crimp	#6 #2	2	<u>•</u>	•
LEB-DJ LEC-DJ	_	LEX-DJ LEY-DJ	_	Copper Crimp	#6 #2	2 1	•	:	Copper Set-Screw	#12 to #8 #10 - #8	2 1	<u>•</u>	•
LEB-DYC LEC-DYC	_	LEX-DYC LEY-DYC	=	Copper Crimp	#6 #2	2 1	<u>•</u>	:	"Y" Type Copper Set-Screw	#12 to #8 #10 to #8	1	<u>•</u>	<u> </u>
LEB-JJ LEC-JJ	LEB-JJ-S LEC-JJ-S	LEX-JJ LEY-JJ	LEX-JJ-S LEY-JJ-S	Copper Set-Screw	#12 to #8 #10 to #2	1 1	•	-	Copper Set-Screw	#12 to #8 #10 to #2	1	•	-
LEB-JYC LEC-JYC	LEB-JYC-S LEC-JYC-S	=	=	Copper Set-Screw	#12 to #8 #10 to #2	1 1	<u>•</u>	-	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1	<u>•</u>	<u> </u>



# **Ordering Information (Solid Neutral LET Fuse Holders)**

			LOAD TERMINAL SELECTION						LINE TE	RMINAL SEL	ECTION	
STANDARD PART NUMBER	BREAKAWAY PART NUMBER	FUSE TYPE	TERMINAL TYPE	LOAD TERMINAL WIRE SIZE RANGE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STRANDED WIRE	TERMINAL TYPE	LINE TERMINAL WIRE SIZE RANGE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STRANDED WIRE
LET-AA	LET-AA-S	Solid Neutral	Copper Crimp	#12 to #8 #12	1 2	•	•	Copper Crimp	#12 to #8 #12	1 2	•	•
LET-AB	LET-AB-S	Solid Neutral	Copper Crimp	#12 to #8 #12	1 2	•	:	Copper Crimp	#10 #6 #4	2 1 1	•	:
LET-AYC	LET-AYC-S	Solid Neutral	Copper Crimp	#12 to #8 #12	1 2	•	:	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1	•	-
LET-BA	LET-BA-S	Solid Neutral	Copper Crimp	#10 #6 #4	2 1 1	•	:	Copper Crimp	#12 to #8 #12	1 2	•	:
LET-BB	LET-BB-S	Solid Neutral	Copper Crimp	#10 #6 #4	2 1 1	•	•	Copper Crimp	#10 #6 #4	2 1 1	•	•
LET-BYC	LET-BYC-S	Solid Neutral	Copper Crimp	#10 #6 #4	2 1 1	• •	:	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1	-	<u> </u>
LET-JJ	LET-JJ-S	Solid Neutral	Copper Set-Screw	#12 to #8 #10 to #2	1	•	<u>-</u>	Copper Set-Screw	#12 to #8 #10 to #2	1	•	•
LET-JYC	LET-JYC-S	Solid Neutral	Copper Set-Screw	#12 to #8 #10 to #2	1	÷	-	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1	-	<u>-</u>

# **Ordering Information (Terminals)**

TERMINAL DESIGNATION	TERMINAL DESCRIPTION	NUMBER OF WIRES PER TERMINAL	WIRE RANGE	SOLID WIRE	STRANDED WIRE
Λ	Copper Crimp	1	#12-#8	•	•
А	Copper Crimp	2	#12	•	•
		2	#10	•	•
В	Copper Crimp	1	#6	•	•
		1	#4	_	•
C	Copper Crimp	2	#8	•	•
C	Copper Crimp	1	#4	_	•
D	Connex Crimp	2	#6	•	•
D	Copper Crimp	1	#2	_	•
1	Cannar Cat Carau	1	#12-#8	•	_
J	Copper Set-Screw	1	#10-#2	_	•
V/2 tarminals)	"V" Ctula Cannar Cat Carau	1	#12-#8	•	_
Y (2 terminals)	"Y" Style Copper Set-Screw	1	#10-#2	_	•



#### Two-Pole Breakaway Holder





#### **Description**

New Littelfuse LEXT-YY-S and LEX-YYC-S series breakaway fuse holders meet state and federal highway commission safety standards requiring fuse holders to readily disconnect from power in case of a pole knockdown.

The breakaway feature consists of a receptacle permanently attached to the power line and a fuse holder with matching terminals. If a knockdown occurs, the parts separate, leaving the energized conductor recessed and unexposed.

#### **Applications**

- Street lighting
- Marinas
- Travel trailer parks
- Physically strained fuse holders applications

#### Features/Benefits

- LEXT-YY version has a permanently installed "neutral" slug to prevent the neutral from accidentally being fused
- LEX-YYC version allows for fusing of line-to-line loads or other applications requiring two fuses to disconnect under strain
- Fiberglass polymer body resists damage from impact
- Four "Y" type set-screw terminals accommodate a wide range of solid and stranded copper conductors
- O-ring and terminal boots form watertight seal, preventing leakage

#### **Specifications**

Part numbers LEXT-YY-S (Solid neutral)

LEX-YYC-S

Voltage Rating 600 Vac/Vdc Ampere Rating 30 A

 Interrupting Rating
 200 kA with Class CC Fuses

 Y Terminals
 Tin Plated Copper w/ set screws

**Wire Size** 1 solid #12 to #8 or 1 stranded #10 to #2

**Approvals** UL Recognized (File: E14721)

CSA Certified (File: LR7316)

#### **Recommended Fuses**

Accepts all Littelfuse Midget and Class CC series fuses	
CCMR	. 27
KLDR, KLKR	. 28
BLF, BLN, FLM, FLQ, KLK, KLKD	. 30

Four WPB3 insulating boots come standard with the LEXT-YY-S and LEX-YY-C-S fuse holders. Molded from non-conductive engineering grade thermoplastic to deliver a watertight seal in corrosive environments, they can be trimmed to the specific conductor size insuring a snug fit.

#### Web Resources

Additional technical information:

littelfuse.com/in-line

# **Ordering Information**

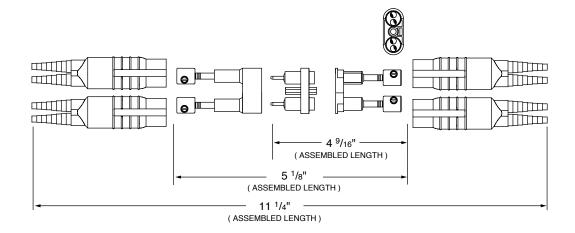
				LOAD TERM	INAL SELECT	ION		LINE TERMINAL SELECTION					
ORDERING NUMBER		FUSE TYPE	TERMINAL TYPE	LOAD TERMINAL WIRE SIZE RANGE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STRANDED WIRE	TERMINAL TYPE	LINE TERMINAL WIRE SIZE RANGE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STRANDED WIRE	
LEXTYYS	LEXTOYYSX	Midget Class CC	"Y" type Copper Set-Screw	#12 to #8 #10 to #2	1	•	•	"Y" type Copper Set-Screw	#12 to #8 #10 to #2	1	• —	•	
LEXYYCS	OLEXYYCSX	Midget Class CC	"Y" type Copper Set-Screw	#12 to #8 #10 to #2	1	• _	•	"Y" type Copper Set-Screw	#12 to #8 #10 to #2	1	• -	- •	



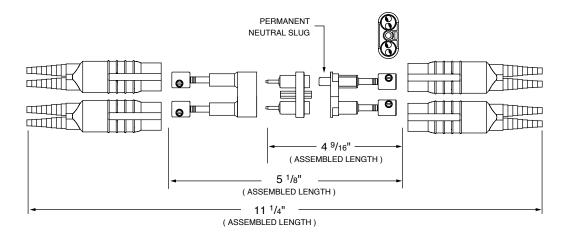
Two-Pole Breakaway Holder

#### **Dimensions Inches**

#### LEX-YY-C-S



#### **LEXT-YY-S**



#### **Section Overview**

POWR-GARD's Pre-Engineered Solutions include custom-built electrical panels designed specifically to meet NEC® requirements, as well as fused and non-fused disconnect switches.







# PRE-ENGINEERED SOLUTIONS #

## **Table of Contents**

LCP Fused	d Selective Coordinatio	n Panel	155
LPS Series	s POWR-Switch (Shun	t Trip Disconnect)	157

# LCP FUSED COORDINATION PANEL

#### Selective Coordination Panel





#### **Description**

The Littelfuse® Coordination Panel provides a simple, time-saving solution for circuits that require selective coordination. This UL Listed product saves time and money, and increases safety by minimizing system downtime.

#### **Applications**

- Elevators
- Hospitals
- · Hotel and Entertainment Industry
- Amusement Parks and Stadiums

#### **Code Requirements**

Systems required by the NEC® to be selectively coordinated include:

- Health Care Essential Electrical Systems (NEC 517.30)
- Elevators (NEC 620.62)
- Emergency Systems (NEC 700.32)
- Legally Required Standby Systems (NEC 701.27)
- Critical Operations Power Systems (NEC 708.54)

#### Features/Benefits

- Meets NEC® requirements
- Class CC and J fuse holders have built-in open-circuit indication
- Fast-acting UL Listed fuses protect against short circuits
- Feed through/sub feed lugs and 84-circuit configuration available
- Ground and neutral bars
- Copper bus standard

#### **Advanced Design Options**

- MLO, Main Circuit Breaker, or Main Fused Pullout device
- Fused Class T branch circuit pullout
- Spare fuse cabinet accessory (holds six spare fuses)
- TVSS overvoltage protection
- Any NEMA enclosure required
- High amperage sub-fed branch breakers (J60A)
- Unique Specifier Tool to easily identify panel configurations from tens of thousands of options

#### **Specifications**

**Voltage Ratings** 120/208, 120/240, 277/480 Vac Main Bus Rating 100 A - 400 A Standard **Conductor Terminals** 6 AWG - 300 kcmil

**UL Listed** UL 67 Panel boards and UL 50 Enclosures

#### Web Resources

For more information, visit:

#### littelfuse.com/lcp

To quickly specify the LCP panel, visit littelfuse.com/lcp and download the Specifier Tool.



# **Customizable Options (select one from each column)**

NUMBER OF CIRCUITS	VOLTAGE	MAIN DEVICES	NEUTRAL RATING	PANEL MOUNTING	PANEL DOOR	FUSE HOLDERS	BRANCH CIRCUIT PROTECTION DEVICES (1-3 POLE)†	PANEL FEED	OPTIONAL LUGS	STANDARD ENCLOSURE RATING
	120/208 V 3P, 4 W	125, 225, 400 or 600 A MLO	100%	Surface	Standard	30 A Class CC	10 A-60 A fused circuit breaker	Тор	None	NEMA 1
2 - 42	120/240 V 1P, 3 W	Up to 600 A MCB					60 A-200 A fused pullouts		Sub-Fed (MLO panels)	NEMA 3R
	277/480 V 3P, 4 W	or Main Fuse Pullout	200%	Flush	Door-in-door	60 A Class J	Sub-fed circuit breakers >60 A (not fused)	Bottom	Feed-Through	NEMA 4X

<sup>†</sup>Fuses quoted separately to meet panel specifications. Coordination for breakers >60 A depends on upstream and downstream devices. More specialized configurations are also available. Contact factory for more information.

Note: The Littelfuse LPS and LCP products are custom designed products that fall outside standard specifications.

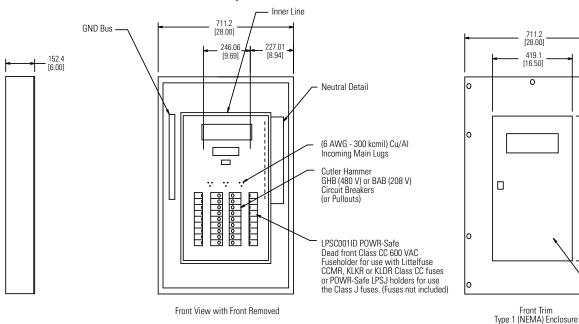


# LCP FUSED COORDINATION PANEL

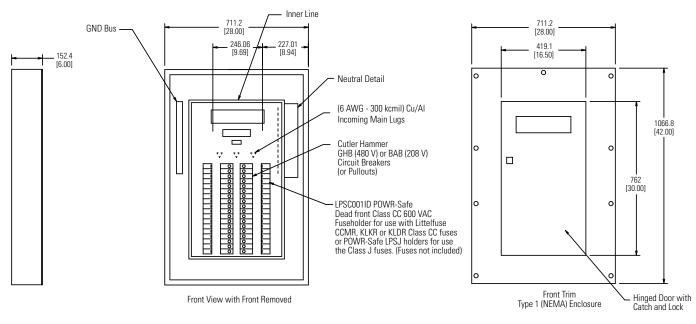
#### Selective Coordination Panel

#### **Dimensions mm (inches)**

#### Standard Coordination Panel Board (up to 30 circuits)



#### Standard Coordination Panel Board (31-42 circuits)





To quickly specify the LCP panel, visit **littelfuse.com/lcp** and download the Specifier Tool

Note: The Littelfuse LPS and LCP products are custom designed products that fall outside standard specifications.

Dimensions may change depending on panel components. More specialized configurations are also available. Contact factory for more information. 0

0

[36.00]

Hinged Door with Catch and Lock

609.6 [24.00]

LPS SERIES POWR-SWITCH

# Shunt Trip Disconnect Switch





## Description

The Littelfuse® POWR-Switch provides a simple and economical solution for applications that require selective coordination and shunt trip capabilities.

Utilizes Class J time-delay fuses that are easily coordinated with other system overcurrent devices. The shunt trip capability allows the POWR-Switch to meet the ANSI/ASME standard that requires power to be automatically disconnected before water is turned on by the fire safety system.

## **Applications**

- · Elevator circuits
- Data processing rooms
- Building emergency systems

#### Web Resources

Download technical information: littelfuse.com/lps

#### Specifications (POWR-Switch)

**Supply Voltage Rating\*** 208 V, 240 V, 480 V

**Ampere Range** 30 A, 60 A, 100 A, 200 A, 400 A

**Enclosures** NEMA 1 (standard)

NEMA 3R, NEMA 4, NEMA 12 (optional)

**Approvals** UL Listed (File: E219511)

\*Contact factory for 600 V options.

#### **Specifications** (Shunt Trip)

Voltage Rating 120 V, 60 Hz
Max Inrush 4 A
Max On time 1.5 cycles
Momentary Inrush 140 VA

#### Features/Benefits

- Pre-engineered single unit, which makes procurement easier than systems with multiple components
- Reduces labor costs up to 66% and total installation costs by over 30%
- Pre-installed UL listed Class J fuse holder unique Class J size eliminates the need for any rejection type fuse clips
- Optional features offer flexibility for a variety of applications
- Control power terminal block
- UL Listed package
- Cu and AI wire rated
- Pre-wired control circuits lower installation time
- Lockable operating handle meets all code and safety requirements (Accepts up to 3 locks)
- Every unit is fully tested before delivery

#### **Options**

- Control power transformer with fuses and blocks
- Fire safety interface relay
- Key to test switch
- Pilot light "On"
- Isolated neutral lug
- Mechanical interlock auxiliary contact for hydraulic elevators with automatic recall (5 amp 120 Vac rated)
- Fire alarm voltage monitoring relay
- Option to bypass alarm when performing maintenance (-AZ option)
- XPress-Ship<sup>TM</sup> service offers 48 Hours direct shipment service on select fully loaded LPS POWR-Switches



# LPS SERIES POWR-SWITCH

#### Shunt Trip Disconnect Switch



#### **Ordering Information**

Complete catalog numbers consist of switch catalog numbers and the desired options. See example below.

#### **Example Catalog Number from Desired Options**

		LI	PS1	T20 R1	K	G	N1	B F	3 L	J –	ΑZ	= Littelfus	e Cata	log Nu	mber	LPS1T20	R1KG	N1BF	-3U-AZ
Γ																			
LITTE SWI CATA NUM	TCH ALOG	CON' POV TRANSF STD. 100' PRI & SI (120 V	VER FORMER VA WITH EC FUSE	FIRE SAFE INTERFACE I (3 PDT, 10 A,	RELAY		/TO WITCH	PILOT I		ISOLA NEUTI LUG	RAL	MECHANII INTERLOCK CONTACT HYDRAUI ELEVATORS AUTOMATIC F (5 A ,120 V.	AUX. FOR LIC S W/ RECALL	FIRE A SHUN' VOLT MONIT REL	TTRIP AGE ORING	OPTION ENCLOSU		_	AZ OPTION (BYPASS FIRE ALARM DURING MAINT. TEST)
REQU	IIRED	REQU	IIRED	REQUIRE	D	OPTI	ONAL	OPTIO	NAL	OPTIO	NAL	REQUIRE	:D	OPTIO	NAL	OPTION	AL		OPTIONAL
BASE CATALOG#	RATING	RATING	OPTION CODE	RATING	OPTION	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION	RATING	OPTION CODE	RATING	OPTION		OPTION
LPS3*	30 A	208 V	T20	24 VDC Coil	R2	120 V	K	Red	R	30–60 A	N6	1 NO & 1 NC	А	1-Pole	F1	NEMA 3R	U	-	AZ
LPS6*	60 A	240 V	T24	120 VAC Coil	R1			Green	G	100 A	N1	2 NO & 2 NC	В	3-Pole	F3	NEMA 4	Υ	-	
LPS1*	100 A	480 V	T48					White	W	200 A	N2					NEMA 12	Z	-	
LPS2*	200 A									400 A	N4							-	
LPS4*	400 A																	-	

<sup>\*</sup>Part Numbers: Any voltage can be paired with any amperage. Options can be any combination but the ratings must match the option code. Not all options are required. Contact factory for 600 V control power transformer option.

Note: When ordering - desired options must be listed in the order shown above. Typical options include Control Power Transformer, Fire Safety Interface Relay, Mechanical Interlock Auxiliary Contact and Fire Alarm Voltage Monitoring Relay.

#### **Dimensions of Enclosure**

CATALOG SERIES	AMPERE RATING	NEMA 1 DIMENSIONS	NEMA 3R DIMENSIONS	NEMA 4, 12 DIMENSIONS	LUG SIZE
LPS3	30	24"H x 20"W x 9"D	24"H x 20"W x 8"D	24"H x 20"W x 10"D	#14 - #8 AL or CU
LPS6	60	24"H x 20"W x 9"D	24"H x 20"W x 8"D	24"H x 20"W x 10"D	#14 - #2 AL or CU
LPS1	100	24"H x 20"W x 9"D	24"H x 20"W x 8"D	24"H x 20"W x 10"D	#8 - 1/0 AL or CU
LPS2	200	30"H x 20"W x 9"D	30"H x 24"W x 8"D	30"H x 20"W x 10"D	#6 - 250kcmil AL or CU
LPS4	400	48"H x 36"W x 11"D	42"H x 36"W x 12"D	Contact Factory	3/0 AL or CU

Note: Over-size enclosures used to accommodate control power transformer, interface relay and terminal blocks.

# **XPress-Ship**<sup>™</sup>

Littelfuse XPress-Ship™ service offers 48 Hours\*\* direct-shipment service on select fully-loaded LPS POWR-Switch to meet your urgent system requirements on time.

# XPress-Ship $^{\rm TM}$ switches include three JTD\_ID Series fuses rated at the device's maximum ampacity.

	AMPERE RATING	RATING	CATALOG NUMBER	XPress-Ship''' ORDERING NUMBER
	60 A	480 V	LPS6T48R1KGN6BF3-AZ	XPS6T48R1KGN6F3-AZ*
	100 A	480 V	LPS1T48R1KGN1BF3-AZ	XPS1T48R1KGN1F3-AZ*
t	100 A	480 V	LPS1T48R1KGN1BF3	XPS1T48R1KGN1BF3
	200 A	208 V	LPS2T20R1KGN2BF3-AZ	XPS2T20R1KGN2F3-AZ*
	200 A	480 V	LPS2T48R1KGN2BF3	XPS2T48R1KGN2BF3

<sup>\*</sup>AZ option includes B & F3 options.

<sup>\*\*</sup>XPress-Ship<sup>™</sup> 48 hour service requires ordering from XPress-Ship Ordering Numbers shown above and is subject to a maximum of any combination of three switches per customer order. XPress-Ship service offers 48 hour shipment from the factory through standard ground transportation. For expedited delivery, contact your local Littelfuse Representative.



## LPS SERIES POWR-SWITCH

#### **Shunt Trip Disconnect Switch**

#### **Shunt-Trip Operation**

The disconnecting means is a shunt-trip operated switch. The control power source for the shunt-trip operator is a 120 Vac supply originating in the Littelfuse POWR-Switch LPS Series disconnect. Current to the shunt-trip device is switched by an isolation relay, which is in turn controlled by the FACP (Fire Alarm Control Panel).

The control signal may be either 24 Vdc from the FACP (option R2) or a "dry" contact closure in the FACP (option R1). In the case of a "dry" contact closure, the sensing voltage is 120 VAC originating in the Littelfuse POWR-Switch LPS Series disconnect.

CAUTION: When using the "dry" contact closure, option 1, DO NOT supply 120 Vac from the FACP as equipment damage or personnel injury may occur.

A key test option (option K) is available to test the shunt-trip circuit.

#### **Supervisory Indication**

Additionally, an optional separate relay can be specified to monitor the 120 Vac control power source in the Littelfuse POWR-Switch LPS Series disconnect. This relay (option FR) is used to provide supervisory indication of "Control Power Available" as required by NFPA 72 Section 6.15.4.4.

#### **Fuse Table**

POWR-SWITCH VOLTAGE/	PRIMARY	FUSES (2)	SECONDARY FUSE (1)				
TRANSFORMER TYPE	FUSE TYPE	FUSE RATING (AMPS)	FUSE TYPE	FUSE RATING (AMPS)			
208/120 Vac	KLDR001	1	FLM1.12	1-1/8			
240/120 Vac	KLDR500	1/2	FLM1.12	1-1/8			
480/120 Vac	KLDR400	4/10	FLM1.12	1-1/8			
600/120 Vac	KLDR250	1/4	FLM1.12	1-1/8			

All Littelfuse POWR-Switch LPS Series disconnect switches are UL Listed and designed for safe access by qualified personnel. When maintenance or shutdown service is required, no energized parts are exposed inside the enclosure when the disconnect switch is manually turned to the OFF position. For proper maintenance safety precautions, always turn off incoming power to the Littelfuse POWR-Switch LPS Series switch when possible. When servicing any live electrical equipment, always wear appropriate personal protective equipment.

## **Power Wiring Torque Specifications**

CHARACTERISTICS	LPS3	LPS6	LPS1	LPS2	LPS4
Amps	30	60	100	200	400
AWG	10	6	3	3/0	(2) 3/0
Molded Case Switch (MCS) Mfr.	ABB	ABB	ABB	ABB	ABB
MCS Catalog No.	TS3H150DBBS4	TS3H150DBBS4	TS3H150DBBS4	TS3H225DQQS4	T5H400DWS4
MCS Lug Type	K4TB	K4TB	K4TB	K4TD	KT5400-3
MCS Lug Torque (in-lbs)	50 in-lb*	50 in-lb*	50 in-lb*	200 in-lb*	275 in-lb*
Fuse Block Mfr.	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE
Fuse Block Catalog No.	LFJ60030-3	LFJ60060-3	LFJ60100-3	LFJ60200-3	LFJ60400-3
Fuse Lug Torque (in-lbs)	25 in-lb <sup>†</sup>	45 in-lb⁺	120 in-lb <sup>†</sup>	275 in-lb⁺	275 in-lb <sup>†</sup>
Neutral Lug Mfr.	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE
Neutral Lug Catalog No.	LS21211	LS21211	LS21211	LS31231	LS455712
Neutral Lug Torque (in-lbs)	35 in-lb <sup>†</sup>	45-120 in-lb <sup>†</sup>	120 in-lb <sup>†</sup>	275 in-lb <sup>†</sup>	500 in-lb <sup>†</sup>
Ground Lug Mfr.	PANDUIT	PANDUIT	PANDUIT	PANDUIT	PANDUIT
Ground Lug Catalog No.	LAMA 1/0-14-Q	LAMA 1/0-14-Q	LAMA 1/0-14-Q	LAMA 250-56-Q	LAMA 350-38-Q
Ground Lug Torque	25 in-lb <sup>‡</sup>	45 in-lb‡	120 in-lb‡	275 in-lb‡	275 in-lb‡

Note: Torque specs apply only to wire compression screws. Other requirements may exist for attachment of lugs and accessories to these devices. See manufacturer data.

<sup>\*</sup>Per ABB.com

<sup>†</sup> Littelfuse Device nameplate data.

<sup>‡</sup> Panduit, "Torque Chart for Aluminum Mechanical Connectors".

#### **Section Overview**

System overvoltage is a growing concern in the electrical industry. Component miniaturization has resulted in increased sensitivity to many devices. The majority of these devices are unable to handle high currents that result from Electrostatic Discharge (ESD) and other voltage transients. Littelfuse® offers a broad range of overvoltage protection to safeguard against these conditions.







# 

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# Littelfuse® Expertise Applied | Answers Delivered

# OVERVOLTAGE SUPPRESSION PRODUCTS

#### Varistors, Surge Fuses and Varistor Assemblies













#### What Are Transients?

Transients are short duration surges of electrical energy that result from the sudden release of previously stored energy. In terms of electrical and electronic circuits, this energy can be released through intentional, controlled switching action, or induced into a circuit from external sources. If the voltage magnitude of the transient is large enough, circuit component damage or malfunction of the circuit may result.

#### **Transient Sources and Magnitude**

	VOLTAGE	CURRENT	RISE-TIME	DURATION
Lightning	25 kV	20 kA	10 μs	50 ms
Switching	600 V	500 A	50 µs	500 ms
EMP	300 kV	10 A	20 ns	1 ms
ESD	15 kV	30 A	1-5 ns	100 ns

#### **Transient Voltage Scenarios**

The switching of inductive loads generates high energy transients that increase in magnitude with increasingly heavy loads. When the inductive load is switched off, the collapsing magnetic field is converted into electrical energy, which takes the form of a double exponential transient. Depending on the source, these transients can be as large as hundreds of volts and hundreds of amps with duration times of 400 milliseconds.

Typical sources of inductive transients are:

- Generators
- Motors
- Relays
- Transformers

These examples are extremely common in electrical and electronic systems. Because the sizes of the loads vary according to the application, the wave shape, duration, peak current, and peak voltage are all variables which exist in real world transients. Once these variables can be approximated, a suitable suppressor technology can be selected.

#### **Overvoltage Applications**

- Industrial, High Energy AC Products such as Solenoids, Motor Drives and Robotics
- Telecommunications Products
- UPS, AC Panels, Power Supplies, Circuit Breakers (TVSS Products)
- Portable and Automotive Electronic Equipment

#### **Lightning Induced Transients**

Transients induced by lightning are not the result of a direct strike. When a lightning strike occurs, the event creates a magnetic field which can induce transients of large magnitude in nearby electrical cables.

#### Technological Solutions for Transient Threats

Because of the various types of transients and applications, it is necessary to employ protection devices with different characteristics in different applications. Littelfuse offers the broadest range of circuit protection technologies.

# Overvoltage Protection Portfolio Includes:

#### **MOVs (Metal Oxide Varistors)**

A ceramic technology that offers medium to very high energy ratings for a wide range of applications. Available in screw terminal, radial, square and axial leaded connections.

#### **Discrete TVS Diode**

This Silicon Avalanche Diode Technology is available in surface mount and axial leaded packages. It offers protection from medium to very high energy transients and can be used in wide range of applications.



# OVERVOLTAGE SUPPRESSION PRODUCTS

## Varistors, Surge Fuses and Varistor Assemblies











#### **Radial Leaded MOV**

		OPERATING	OPERATING	PEAK	PEAK	OPERATING	MOUNT/			AGE	NCY			FREE
SERIES NAME <sup>1</sup>		AC VOLTAGE RANGE	DC VOLTAGE RANGE	CURRENT RANGE <sup>2</sup> (A)	ENERGY RANGE <sup>3</sup>	TEMPERATURE RANGE	FORM FACTOR	DISC SIZE	ᆿ	CSA	VDE	CECC	ROHS	LEAD FF
TM0V <sup>®</sup> /iTM0V <sup>®</sup>		115-750	_	6000-10,000	35-480			14, 20, 34 mm	•	•	•	•	•	•
TMOV® 25S	BEB	115-750	_	20,000	170-670			25 mm	•				•	•
UltraMOV™		130-625	170-825	1750-10,000	12.5-720	-55 to +85°C	Radial	7, 10, 14, 20, 25 mm	•	•	•	•	•	•
UltraMOV™ 25S	-	115-750	150-970	22,000	230-890		Leaded	25 mm	•	•	•	•	•	•
C-III		130-660		3500-9000	40-530			10, 14, 20 mm	•	•	•		•	•
LA	%0°.	130-1000	175-1200	1200-6500	11-360			7, 10, 14, 20 mm	•	•	•	•	•	•
ZA		4-460	5.5-615	50-6500	0.1-52			5, 7, 10, 14, 20 mm	•		•	•	•	•

#### **Industrial High Energy Terminal MOV**

OFFICE		OPERATING	OPERATING	PEAK	PEAK	OPERATING	MOUNT/		AGE	NCY	S	REE
SERIES NAME <sup>1</sup>		AC VOLTAGE RANGE	DC VOLTAGE RANGE	CURRENT RANGE <sup>2</sup> (A)	ENERGY RANGE <sup>3</sup>	TEMPERATURE RANGE	FORM FACTOR	DISC SIZE	Н	CSA	ROHS	LEAD FREE
BA/BB		130-2800	175-3500	50,000 70,000	450-10,000		Screw / Clip	60 mm	•		•	
DA/DB		130-750	175-970	40,000	270-1050		Terminals	40 mm	•		•	•
НА	<b>GR</b>	130-750	175-970	25,000 40,000	200-1050			32, 40 mm	•	•	•	•
TMOV34S®	-	115-750	_	40,000	235-1050	-55 to +85°C	Industrial	34 mm	•		•	•
HB34, HG34, HF34	50	130-750	175-970	40,000	270-1050		Packaged Radial Leads	34 mm	•	•	•	•
DHB34	-	250-2800	330-3500	20,000 70,000	330-10,000			34 mm			•	
CA	9	250-2800	330-3500	20,000 70,000	330-10,000		Bare Disc	60 mm			•	

#### **High Power TVS Diodes**

SERIES NAME <sup>1</sup>		PACKAGE TYPE	REVERSE STANDOFF VOLTAGE (V <sub>R</sub> )	PEAK PULSE POWER RANGE 1 (P <sub>PP</sub> )	PEAK PULSE CURRENT (I <sub>PP</sub> 8x20µs)	OPERATING TEMPERATURE	HALOGEN FREE	ROHS COMPLIANT	
15KPA	000	P600	17-280	15,000 W			•	•	
20KPA	224	P600	20.0-300	20,000 W	Not Applicable	-85° to +302° F (-55° to +175° C)	•	•	
30KPA	***	P600	28.0-288	30,000 W				•	•
AK6	xxx	Radial Lead	58-430	NA	6,000 A	-67° to +347° F	•	•	
AK10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Radial Lead	58-430	NA	10,000 A	(-55° to +150° C)	•	•	

- 1. Detailed information about most product series listed here can be found on littelfuse.com/varistor
- 2. Not an applicable parameter for Crowbar devices
- 3. Value shown in Joules

littelfuse.com

# Littelfuse® Expertise Applied | Answers Delivered

# LVSP SURGE SUPPRESSION FUSE

600 Vac • 5-100 kA





#### **Description**

The Littelfuse® Varistor Protection (LVSP) Fuses are intended for the protection of TVSS products. The LVSP series has been designed to survive the 8 x 20  $\mu s$  lightning surges described in various standards (UL 1449, IEC 61000-4-5 and IEEE C62.41) without opening. This allows the TVSS to perform the necessary suppression. The LVSP is not rated for continuous current and the ratings are specific 8 x 20  $\mu s$  surge capability. The LVSP series can be used to facilitate TVSS module compliance to UL 1449 in permanently connected applications (abnormal overvoltage, unlimited current conditions).

#### Features/Benefits

- Very current limiting under AC short-circuit conditions
- Available in multiple mounting configurations (cartridge, bolt-in, PC board mount)
- Provides short circuit protection in TVSS systems and complements the Littelfuse line of overvoltage products (HA, HB34, TMOV® and iTMOV® varistors as well as the AK-10 series TVS diodes)

#### **Applications**

- TVSS products
- Surge arrestors

#### **Recommended Fuse Blocks**

# LVSP (5-20)-2 107 L60030M (open block) 117 LVSP (30-80)-2 117 LFJ60030 (open block) 91 LFPSJ30 (dead front) 118 LVSP (100) LFJ60100 (open block) 91

#### Web Resources

Download other technical information:

littelfuse.com/lvsp

#### **Specifications**

**Voltage Rating** 600 Vac **Interrupting Rating** 200 kA

Ratings 5 – 100 kA 8 x 20 µs surge withstand Approvals UL Recognized (File: E71611)

**Environmental** RoHs Compliant

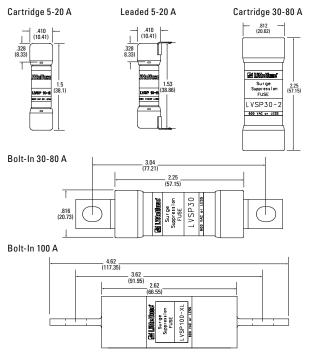
#### **Electrical Specifications**

CATALOG NUMBER	8 X 20 μS SURGE RATING	NOMINAL MELTING I <sup>2</sup> T (A <sup>2</sup> S)	NOMINAL CLEARING I <sup>2</sup> T (A <sup>2</sup> S)	Ipeak@100 kA 60 HZ (A)		
LVSP5	5,000	359	981	3,700		
LVSP10	10,000	1,300	3,210	5,823		
LVSP15	15,000	3,267	6,235	7,765		
LVSP20	20,000	4,940	11,710	8,135		
LVSP30	30,000	11,950	35,325	12,478		
LVSP40	40,000	20,550	61,700	15,250		
LVSP60	60,000	39,240	145,555	19,604		
LVSP80	80,000	75,000 254,000		24,600		
LVSP100	100,000	Contact Factory				

#### **Ordering Information**

9 R R	CATALOG/ORDERING NUMBER						
SURGE	CAF	RTRIDGE	LE	ADED	BOLT-IN		
5	LVSP52	LVSP0005TX2	LVSP5R	LVSP0005TXR	_	_	
10	LVSP102	LVSP0010TX2	LVSP10R	LVSP0010TXR	_	_	
15	LVSP152	LVSP0015TX2	LVSP15R	LVSP0015TXR	-	_	
20	LVSP202	LVSP0020TX2	LVSP20R	LVSP0020TXR	_	_	
30	LVSP302	LVSP0030TX2	-	-	LVSP30	LVSP0030T	
40	LVSP402	LVSP0040TX2	_	_	LVSP40	LVSP0040T	
60	LVSP60-2	LVSP0060TX2	-	-	LVSP60	LVSP0060T	
80	LVSP802	LVSP0080TX2	_	_	LVSP80	LVSP0080T	
100	-	-	-	-	LVSP100-L	LVSP0100VXL	

#### **Dimensions Inches (mm)**





# BVSP SERIES SURGE PROTECTION DEVICE

600 Vac • 10 kA



#### **Description**

The Littelfuse® BVSP surge protection device (SPD) is intended for the protection of transient voltage surge suppressions (TVSS) systems. The BVSP series has been designed to survive the 8 x 20 µs lightning surges described in various standards (UL 1449, IEC 61000-4-5 and IEEE C62.41) without opening. This allows the TVSS to perform the necessary suppression. The BVSP is not rated for continuous current and the ratings are specific 8 x 20 µs surge capability. The BVSP series can be used to facilitate TVSS module compliance to UL 1449 in permanently connected applications (abnormal overvoltage, unlimited current conditions).

#### Features/Benefits

- Very current limiting under AC short-circuit conditions
- Available in ferrule and printed circuit board (PCB) configurations
- Provides short circuit protection in TVSS systems and complements the Littelfuse line of overvoltage products (HA, HB34, TMOV® and iTMOV® varistors as well as the AK-10 series TVS diodes)

#### **Applications**

- TVSS products
- Surge arrestors

#### **Recommended Fuse Holders**

L60030M (open block)	107
LPSM (dead front)	117

#### **Specifications**

**Voltage Rating** 600 Vac **Interrupting Rating** 200 kA Ratings

10 kA 8 x 20 µs surge withstand

#### **Ordering Information**

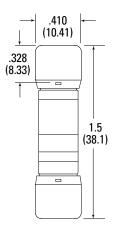
SERIES	8 X 20 μS SURGE RATING (A)	PACKAGE QUANTITY	MOUNTING METHOD	CATALOG NUMBER	ORDERING NUMBER
BVSP	10,000	10	Ferrule	BVSP10-2	BVSP0010TX2
BVSP	10,000	10	PCB Tabs	BVSP10-R	BVSP0010TXR

#### **Electrical Specifications**

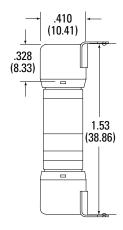
CATALOG NUMBER	8 X 20 μS SURGE RATING (A)	NOMINAL MELTING I <sup>2</sup> T (A <sup>2</sup> S)	NOMINAL CLEARING I <sup>2</sup> T (A <sup>2</sup> S)	Ipeak @ 200 kA 60 HZ (A)
BVSP10-2	10,000	1,580	9,960	8,160
BVSP10-R	10,000	1,580	9,960	8,160

#### **Dimensions Inches (mm)**

#### **Ferrule Version**



#### **PCB Version**



#### **Section Overview**

Miscellaneous Accessories include custom-built solutions designed specifically to meet code requirements, fuse reducers, box cover units and an assortment of useful fuse and holder accessories.







# MISCELLANEOUS PRODUCTS #

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# **FUSE REDUCERS**







#### **Ordering Information**

#### **250 Volt**

, -	RDERING NUMBER	FUSE CLIP	FUSE CASE SIZE	
CLASS H/K5	CLASS R		CASE SIZE	
LRU 263	LRU 263 R	60 A	30 A	
LRU 213	LRU 213 R	100 A	30 A	
LRU 216	LRU 216 R	100 A	60 A	
LRU 226	LRU 226 R	200 A	60 A	
LRU 2621	LRU 2621 R	200 A	100 A	
LRU 2641	LRU 2641 R	400 A	100 A	
LRU 2642	LRU 2642 R	400 A	200 A	
LRU 2661	LRU 2661 R	600 A	100 A	
LRU 2662	LRU 2662 R	600 A	200 A	
LRU 2664	LRU 2664 R*	600 A	400 A	

<sup>\*</sup>Only one reducer required.

#### 600 Volt

CATALO	ORDERING I	NUMBER	FUSE CLIP	FUSE	
CLASS H/K5	CLASS R	CLASS J	FUSE CLIP	CASE SIZE	
LRU 663	LRU 663 R	LRUJ63	60 A	30 A	
LRU 216	LRU 216 R	LRUJ13	100 A	30 A	
LRU 616	LRU 616 R	LRUJ16¶	100 A	60 A	
LRU 626	LRU 626 R	LRUJ26	200 A	60 A	
LRU 2621	LRU 2621 R	LRUJ21	200 A	100 A	
LRU 2641	LRU 2641 R	LRUJ41	400 A	100 A	
LRU 2642	LRU 2642 R	LRUJ42	400 A	200 A	
LRU 2661	LRU 2661 R	_	600 A	100 A	
LRU 2662	LRU 2662 R	_	600 A	200 A	
LRU 2664	LRU 2664 R†	LRUJ64	600 A	400 A	

<sup>†</sup>Only one reducer required.

#### **Description**

Littelfuse® fuse reducers allow smaller size fuses to be installed into existing fuse clips to prevent overfusing.

#### **Features/Benefits**

- Simple installation
- · Reduces inventory requirements
- Silver brazed joints for maximum strength
- UL Listed (File: E136855)
- CSA Certified (File: LR92899)

#### **Web Resources**

Download technical information: littelfuse.com/lruh littelfuse.com/lrur littelfuse.com/lruj

#### **Dimensions**

Refer to the fuse section of this catalog for fuse dimensions.

#### **Recommended Fuses**

#### Class H/K5 Fuse Reducers

NLN / NLS	20
Class R Fuse Reducers	
FLNR / FLSR	17
FLNR_ID / FLSR_ID	17
IDSR	16
LLNRK / LLSRK	13
LLSRK_ID	13
KLNR / KLSR	
Class J Fuse Reducers	
JTD_ID / JTD	21

JLS .......22

<sup>¶</sup>Fuse and reducer combination is slightly larger in diameter than 100 A Class J fuses. For specific applications, contact factory.

Class J reducers cannot be used in bolt-on applications.

# Littelfuse® Expertise Applied | Answers Delivered

TO BE

# **BOX COVER UNITS**





## **Description**

Provide economical method of protecting small motors against overcurrent damage.

#### **Applications**

- Edison-Base plug fuses (TOO, TLO)
- Type S plug fuses (SOO, SLO) with adapters (SAO)

#### **Specifications**

**Voltage Rating** 125 V **Max Ampere Rating** 15 A

**Approvals** UL Listed parts (Except LSSY-RL)

#### **Web Resources**

**BOX COVER FEATURES** 

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/boxcover** 

		FIGURE NUMBER	LITTELFUS PART NUME
•		1	LSOU LSOW LSOX LSOY
Figure 1	Figure 2	2	LSRU* LSRW LSRY
Figure 3	e e Figure 4	3	LSSU* LSSW LSSX LSSY*
		4	LSOY-B
e e Figure 5	e e	5	LSSY-L
(	(	6	LSSY-RL
		7	LSCY
e e	Figure 8	8	LSKA
		9	LSTY
		*III Listed (Fil	e No. F308725)

NUMBER	PART NUMBER	EDISON BASE FUSE HOLDER	GROUNDING RECEPTACLE	SINGLE POLE SWITCH	TWO POLE SWITCH	PILOT LIGHT	MOUNTED ON
	LSOU	1	_	_	_	_	2-1/4" Handy Box
4	LSOW	1	_	_	_	_	2-3/4" Switch Box
1	LSOX	1	_	_	_	_	4" Octagon Box
	LSOY	1	_	_	_	_	4" Square Box
	LSRU*	1	1	_	_	_	2-1/4" Handy Box
2	LSRW	1	1	_	_	_	2-3/4" Switch Box
	LSRY	1	1	_	_	_	4" Square Box
	LSSU*	1	_	1	_	_	2-1/4" Handy Box
3	LSSW	1	_	1	_	_	2-3/4" Switch Box
3	LSSX	1	_	1	_	_	4" Octagon Box
	LSSY*	1	_	1	_	_	4" Square Box
4	LSOY-B	2	_	_	_	_	4" Square Box
5	LSSY-L	1	_	1	_	1	4" Square Box
6	LSSY-RL	1	1	1	_	1	4" Square Box
7	LSCY	2	_	2	_	_	4" Square Box
8	LSKA	2	1 (250V)	_	_	_	4-11/16" Square Box
9	LSTY	2	_	_	1	_	4" Square Box

\*UL Listed (File No. E308725)



# FRCK SERIES FUSE REPLACEMENT & CUSTOM KITS



#### **Description**

Fuse Replacement and Custom Kits help reduce downtime by providing mobile storage and organization for replacement fuses. The FRCK Series provides a custom solution that can be filled with multiple fuse series that are more common or specific to your needs or application.

#### Features/Benefits

- Custom sized compartments fit various fuse series
- Large kit features a convenient handle for carrying
- Kits are sold empty for complete customization
- Each kit comes with a blank label on the inside cover so users can write in part numbers or use bar code labels to help with refills.

#### **Web Resources**

Additional information: littelfuse.com/kits

# **Ordering Information**

KIT SIZE	DIMENSIONS L X W X H (INCHES)	DESCRIPTION	CATALOG NUMBER
Large	16.00 x 12.00 x 10.00	Mobile organizer with 2 small and 3 medium drawers; Unique FRACK Label for Oil & Gas	FRCK-OG
Large	16.00 x 12.00 x 10.00	Mobile organizer with 2 small and 3 medium drawers	FRCK-LG
Medium	14.00 x 9.13 x 2.00	14" organizer with adjustable dividers	FRCK-MD
Small	8.25 x 4.25 x 1.00	8" organizer with up to 6 compartments	FRCK-SM







FRCK-OG & FRCK-LG FRCK-MD FRCK-SM



# FUSE DISPLAYS AND CABINETS

#### **Electronic Fuse Display**



#### **Description**

This wall-mountable or free-standing modular rack system prominently displays Littelfuse glass and automotive fuses. Additional sections can be quickly snapped on for a larger product selection. Each rack features a cross reference guide to help customers locate the proper replacement fuse.

#### Features/Benefits

- Holds 720 (144 5-packs) of the most popular glass, ceramic, and automotive fuses
- Designed to save space—measures 14" H x 9"W x 4"D Suitable for wall or counter mounting
- Includes cross reference, product identification guide, and back-up card for easy reordering
- Expandable with modular section that can hold 240 fuses (48 5-packs) per section

#### Fully stocked rack includes the following parts

3AG (0 FAST ACTI	•	3AG (GLASS) SLO-BLO® FUSES		
QUANTITY CATALOG NUMBER		QUANTITY	CATALOG NUMBER	
25	312 ½A	25	313 ½A	
50	312 1A	25	313 <sup>3</sup> /4A	
25	312 1 ½A	25	313 1A	
75	312 2A	25	313 1 ½A	
25	312 2 ½A	50	313 2A	
75	312 3A	25	313 2 ½A	
25	312 4A	25	313 3A	
25	312 5A	25	313 4A	
25	312 10A	25	313 5A	

3AB (CE NORMAL-E	RAMIC) BLO FUSES	3AB (CERAMIC) SLO-BLO® FUSES		
QUANTITY	CATALOG NUMBER	QUANTITY	CATALOG NUMBER	
25	314 15A	25	326 8A	
25	314 20A	20	326 10A	
25	314 30A	_	_	

#### **Ordering Information**

TYPE	CATALOG NUMBER	ORDERING NUMBER	
Fully Stocked Display	094324PG	00940324ZXPG	
Empty Display Rack	FDR001PG	0FDR0001ZXPG	
Additional Sections	MRS001PG	0MRS0001ZXPG	

#### **Spare Fuse Cabinet**



#### **Description**

- Steel cabinet with piano hinges that can be locked to prevent unauthorized access. Weather stripped to reduce the accumulation of dust, dirt and moisture
- Convenient inventory card located inside door.
   Measures 30" H × 24" W × 12" D. Keyhole mounting holes 16" on center for easy installation

## **Ordering Information**

TYPE	CATALOG NUMBER	ORDERING NUMBER	
Spare Fuse Cabine	et LSFC	LSFC	
Spare Keys	LKEY001	LKEY0001Z	

#### **Web Resources**

Additional information: littelfuse.com/lsfc

#### **Section Overview**

This Technical Application Guide or 'Fuseology' section provides the information needed to select the correct types of Littelfuse POWR-GARD® fuses for most applications. If there are any questions or if additional data is needed for a specific use, call the Littelfuse Technical Support and Engineering Service Group at **1-800-TEC-FUSE** (1-800-832-3873), email them at **techline@littelfuse.com** or visit us at **littelfuse.com**.







# TECHNICAL APPLICATION GUIDE

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White papers, and a library of technical information is available online at

littelfuse.com/technicalcenter

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# **FUSEOLOGY FUNDAMENTALS**

# I. OVERCURRENT PROTECTION FUNDAMENTALS (FUSES AND HOW THEY WORK)

#### Introduction

An important part of developing quality overcurrent protection is an understanding of system needs and overcurrent protective device fundamentals. This section discusses these topics with special attention to the application of fuses. If you have additional questions, call our Technical Support Group at 1-800-TEC-FUSE (1-800-832-3873). Definitions of terms used in this section are located towards the end of this Technical Application Guide.

#### Why Overcurrent Protection?

All electrical systems eventually experience overcurrents. Unless removed in time, even moderate overcurrents quickly overheat system components, damaging insulation, conductors, and equipment. Large overcurrents may melt conductors and vaporize insulation. Very high currents produce magnetic forces that bend and twist bus bars. These high currents can pull cables from their terminals and crack insulators and spacers.

Too frequently, fires, explosions, poisonous fumes and panic accompany uncontrolled overcurrents. This not only damages electrical systems and equipment, but may cause injury or death to personnel nearby.

To reduce these hazards, the National Electrical Code® (NEC®), OSHA regulations, and other applicable design and installation standards require overcurrent protection that will disconnect overloaded or faulted equipment.

Industry and governmental organizations have developed performance standards for overcurrent devices and testing procedures that show compliance with the standards and with the NEC. These organizations include: the American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), and the National Fire Protection Association (NFPA), all of which work in conjunction with Nationally Recognized Testing Laboratories (NRTL) such as Underwriters Laboratories (UL).

Electrical systems must meet applicable code requirements including those for overcurrent protection before electric utilities are allowed to provide electric power to a facility.

#### **What is Quality Overcurrent Protection?**

A system with quality overcurrent protection has the following characteristics:

- Meets all legal requirements, such as NEC®, OSHA, local codes, etc.
- 2. Provides maximum safety for personnel, exceeding minimum code requirements as necessary.

- 3. Minimizes overcurrent damage to property, equipment, and electrical systems.
- Provides coordinated protection. Only the protective device immediately on the line side of an overcurrent opens to protect the system and minimize unnecessary downtime.
- 5. Is cost effective while providing reserve interrupting capacity for future growth.
- Consists of equipment and components not subject to obsolescence and requiring only minimum maintenance that can be performed by regular maintenance personnel using readily available tools and equipment.

#### **Overcurrent Types and Effects**

An overcurrent is any current that exceeds the ampere rating of conductors, equipment, or devices under conditions of use. The term "overcurrent" includes both overloads and short-circuits.

#### **Overloads**

An overload is an overcurrent confined to normal current paths in which there is no insulation breakdown.

Sustained overloads are commonly caused by installing excessive equipment such as additional lighting fixtures or too many motors. Sustained overloads are also caused by overloading mechanical equipment and by equipment breakdown such as failed bearings. If not disconnected within established time limits, sustained overloads eventually overheat circuit components causing thermal damage to insulation and other system components.

Overcurrent protective devices must disconnect circuits and equipment experiencing continuous or sustained overloads before overheating occurs. Even moderate insulation overheating can seriously reduce the life of the components and/or equipment involved. For example, motors overloaded by just 15% may experience less than 50% of normal insulation life.

Temporary overloads occur frequently. Common causes include temporary equipment overloads such as a machine tool taking too deep of a cut, or simply the starting of an inductive load such as a motor. Since temporary overloads are by definition harmless, overcurrent protective devices should not open or clear the circuit.

It is important to realize that fuses selected must have sufficient time-delay to allow motors to start and temporary overloads to subside. However, should the overcurrent continue, fuses must then open before system components are damaged. Littelfuse POWR-PRO® and POWR-GARD® time-delay fuses are designed to meet these types of protective needs. In general, time-delay fuses hold 500% of the rated current for a minimum of ten seconds, yet will still open quickly on higher values of current.



# **FUSEOLOGY FUNDAMENTALS**

Even though government-mandated high-efficiency motors and NEMA Design E motors have much higher locked rotor currents, POWR-PRO® time-delay fuses such as the FLSR\_ ID, LLSRK\_ID, or IDSR series have sufficient time-delay to permit motors to start when the fuses are properly selected in accordance with the NEC®.

#### **Short-Circuits**

A short-circuit is an overcurrent flowing outside of its normal path. Types of short-circuits are generally divided into three categories: bolted faults, arcing faults, and ground faults. Each type of short-circuit is defined in the Terms and Definitions section.

A short-circuit is caused by an insulation breakdown or faulty connection. During a circuit's normal operation, the connected load determines current. When a short-circuit occurs, the current bypasses the normal load and takes a "shorter path," hence the term 'short-circuit'. Since there is no load impedance, the only factor limiting current flow is the total distribution system's impedance from the utility's generators to the point of fault.

A typical electrical system might have a normal load impedance of 10 ohms. But in a single-phase situation, the same system might have a load impedance of 0.005 ohms or less. In order to compare the two scenarios, it is best to apply Ohm's Law (I = E/R for AC systems). A 480 volt single-phase circuit with the 10 ohm load impedance would draw 48 amperes (480/10 = 48). If the same circuit has a 0.005 ohm system impedance when the load is shorted, the available fault current would increase significantly to 96,000 amperes (480/0.005 = 96,000).

As stated, short-circuits are currents that flow outside of their normal path. Regardless of the magnitude of overcurrent, the excessive current must be removed quickly. If not removed promptly, the large currents associated with short-circuits may have three profound effects on an electrical system: heating, magnetic stress, and arcing.

Heating occurs in every part of an electrical system when current passes through the system. When overcurrents are large enough, heating is practically instantaneous. The energy in such overcurrents is measured in ampere-squared seconds (I<sup>2</sup>t). An overcurrent of 10,000 amperes that lasts for 0.01 seconds has an I2t of 1,000,000 A2s. If the current could be reduced from 10,000 amperes to 1,000 amperes for the same period of time, the corresponding I2t would be reduced to 10,000 A<sup>2</sup>s, or just one percent of the original value.

If the current in a conductor increases 10 times, the I2t increases 100 times. A current of only 7,500 amperes can melt a #8 AWG copper wire in 0.1 second. Within eight milliseconds (0.008 seconds or one-half cycle), a current of 6,500 amperes can raise the temperature of #12 AWG THHN thermoplastic insulated copper wire from its operating temperature of 75°C to its maximum short-circuit temperature of 150°C. Any currents larger than this may immediately vaporize organic insulations. Arcs at the point of fault or from mechanical switching such as automatic transfer switches or circuit breakers may ignite the vapors causing violent explosions and electrical flash.

Magnetic stress (or force) is a function of the peak current squared. Fault currents of 100,000 amperes can exert forces of more than 7,000 lb. per foot of bus bar. Stresses of this magnitude may damage insulation, pull conductors from terminals, and stress equipment terminals sufficiently such that significant damage occurs.

Arcing at the point of fault melts and vaporizes all of the conductors and components involved in the fault. The arcs often burn through raceways and equipment enclosures, showering the area with molten metal that quickly starts fires and/or injures any personnel in the area. Additional short-circuits are often created when vaporized material is deposited on insulators and other surfaces. Sustained arcing-faults vaporize organic insulation, and the vapors may explode or burn.

Whether the effects are heating, magnetic stress, and/or arcing, the potential damage to electrical systems can be significant as a result of short-circuits occurring.

#### II. SELECTION CONSIDERATIONS

Selection Considerations for Fuses (600 volts and below)

Since overcurrent protection is crucial to reliable electrical system operation and safety, overcurrent device selection and application should be carefully considered. When selecting fuses, the following parameters or considerations need to be evaluated:

- Current Rating
- Voltage Rating
- Interrupting Rating
- Type of Protection and Fuse Characteristics
- **Current Limitation**
- Physical Size
- Indication

#### **Current Rating**

The current rating of a fuse is the AC or DC current, expressed in amperes, which the fuse is capable of carrying continuously under specified conditions. Fuses selected for a circuit must have ampere ratings that meet NEC® requirements, namely those found in NEC® Articles 240 and 430. These NEC® requirements establish maximum ratings and in some cases, minimum ratings. When selecting a fuse, it is generally recommended to select a current rating as close as possible to the system's normal running current.

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# SELECTION CONSIDERATIONS

#### **Voltage Rating**

The voltage rating of a fuse is the maximum AC or DC voltage at which the fuse is designed to operate. Fuse voltage ratings must equal or exceed the circuit voltage where the fuses will be installed, and fuses used in DC circuits must be specifically rated for DC applications. In terms of voltage, fuses may be rated for AC only, DC only, or both AC and DC. However, exceeding the voltage ratings or using an AC only fuse in a DC circuit could result in violent destruction of the fuse.

The standard 600 volt rated fuses discussed in this section may be applied at any voltage less than or equal to their rating. For example, a 600 volt fuse may be used in a 277 volt or even a 32 volt system, but not any system exceeding 600 volts.

NOTE: This does not apply to semiconductor fuses and medium voltage fuses. See the semiconductor and medium voltage fuse application information on littelfuse.com for voltage limitations of these fuses.

#### **Interrupting Rating**

The interrupting rating of a fuse is the highest available symmetrical rms alternating current that the fuse is required to safely interrupt at its rated voltage under standardized test conditions. A fuse must interrupt all overcurrents up to its interrupting rating without experiencing damage. Standard UL fuses are available with interrupting ratings of 10,000 A, 50,000 A, 100,000 A, 200,000 A, and 300,000 A.

NEC® Article 110.9 requires that all equipment intended to break current at fault levels have an interrupting rating sufficient for the system voltage and current available at the equipment's line terminals. Refer to *Figure 1*. It is vitally important to select fuses with interrupting ratings which equal or exceed the available fault current.

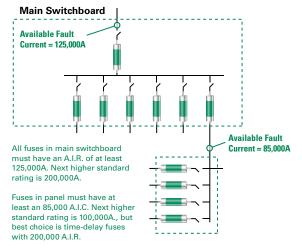


Figure 1 - Interrupting Rating Requirements per NEC

The recommendation to standardize on fuses with at least a 200,000 ampere interrupting rating (AIR) ensures that all fuses have an adequate interrupting rating while providing reserve interrupting capacity for future increases in available fault current.

#### 300,000 AIR Fuses

Littelfuse POWR-PRO® fuse series have a Littelfuse Self-Certified interrupting rating of 300,000 amperes rms symmetrical. The 300,000 ampere testing was performed in a Nationally Recognized Testing Laboratory, and the tests were UL witnessed. UL has ruled that fuses with a UL interrupting rating greater than 200,000 amperes must be marked as "Special Purpose Fuses" and may not be labeled as UL Listed Class RK5, RK1, L, etc.

#### Type of Protection and Fuse Characteristics

Time current characteristics determine how fast a fuse responds to overcurrents. All fuses have inverse time characteristics; that is, the fuse opening time decreases as the magnitude of overcurrent increases. When properly rated in accordance with NEC® requirements, fuses provide both overload and short-circuit protection to system conductors and components. However, in some instances such as when fuses are used to backup circuit breakers or to provide motor branch circuit short-circuit and ground fault protection, fuses provide only short-circuit protection. A fuse's response to overcurrents is divided into short-circuits and overloads.

#### Short-Circuits

A fuse's short-circuit response is its opening time on higher-value currents. For power fuses, higher-value currents are generally over 500-600% of the fuse's current rating. As stated earlier, all fuses have inverse time characteristics: the higher the current, the faster the opening time. Since short-circuits should be removed quickly, inverse time is especially important for short-circuit protection.

#### **Overloads**

While fuses must disconnect overloaded conductors and equipment before the conductors and components are seriously overheated, they should not disconnect harmless temporary overloads. To provide sufficient overload protection for system conductors, UL has established maximum fuse opening times at 135% and 200% of a fuse's current rating. All UL Listed fuses for application in accordance with the National Electrical Code® must meet these limits whether they are fast-acting or time-delay fuses.

As just stated, a fuse is designed to respond to two types of overcurrents – short circuits and overloads. As a result, selecting the proper fuse for a given application usually involves deciding whether to use a time-delay fuse or a fast-acting fuse. A more in-depth review of both possible scenarios is important at this time.



# SELECTION CONSIDERATIONS

#### Fast-Acting (Normal-Opening) Fuses

Fast-acting fuses (sometimes called "Normal-opening" fuses) have no intentional time-delay. Typical opening times at 500% of the fuse ampere rating range from 0.05 second to approximately 2 seconds. Fast-Acting fuses are suitable for non-inductive loads such as incandescent lighting and general-purpose feeders, or branch circuits with little or no motor load. When protecting motors and other inductive loads, fast-acting fuses must be rated at 200-300% of load currents to prevent nuisance opening on in-rush currents. Fuses with such increased ratings no longer furnish adequate protection from overloads and only provide short-circuit protection. Overload relays or other overload protection devices must be provided to properly protect conductors and equipment from overload conditions.

All fast-acting fuses provide fast short-circuit response within their interrupting rating. Some are considered current-limiting, such as UL Class T and Class J. Others are non-current-limiting, such as UL Class H.

#### Time-Delay (SLO-BLO®) Fuses

Most UL Class CC, CD, G, J, L, RK5 and RK1 fuses, plus some of the UL Listed Miscellaneous fuses are considered time-delay. If so, they are identified as such on the fuse label with the words "Time-Delay," "T-D," "D," or some other suitable marking. Minimum time-delay varies with the fuse class, and to some degree with the fuse ampere rating. UL standards for POWR-GARD® fuse series FLNR, FLNR\_ID, FLSR, FLSR\_ID, IDSR (UL Class RK5), LLNRK, LLSRK, LLSRK\_ID (UL Class RK1), and JTD, JTD\_ID (UL Class J) require these fuses to carry 500% rated current for a minimum of 10 seconds. Standards for CCMR and KLDR (UL Class CC and CD) and SLC (UL Class G) fuses require them to carry 200% rated current for a minimum of 12 seconds.

Although there is no UL Classification for time-delay Class L fuses, it is still permissible for them to be marked "Time-Delay." The amount of time-delay is determined by the manufacturer. Littelfuse KLPC series and KLLU series fuses will hold 500% current for 10 seconds or more.

In addition to providing time-delay for surges and short time overloads, time-delay fuses meet all UL requirements for sustained overload protection. On higher values of current, time-delay fuses are current-limiting; meaning they remove large overcurrents in less than one-half cycle (0.00833 seconds). Time-delay fuses provide the best overall protection for both motor and general purpose circuits, and eliminate nuisance fuse opening and most situations of downtime.

Compared to fast-acting fuses, time-delay fuses can be selected with ratings much closer to a circuit's operating current. For example, on most motor circuits Class RK5 and RK1 fuses can be rated at 125-150% of a motor's full load current (FLA). This provides superior overload and short-

circuit protection, and often permits the use of smaller, less expensive disconnect switches. Time-delay fuses have gradually replaced most one-time (UL Class K5) and renewable (UL Class H) fuses. Today, more than 50% of all fuses sold by electrical distributors are time-delay fuses.

#### **Dual Element Fuses**

Littelfuse time-delay FLNR, FLNR\_ID, FLSR, FLSR\_ID, IDSR (UL Class RK5), and LLNRK, LLSRK, LLSRK\_ID (UL Class RK1), and some JTD, JTD\_ID (UL Class J) series fuses have true dual-element construction meaning the fuse has an internal construction consisting of separate short-circuit and overload sections or elements. Time-delay elements are used for overload protection, and separate fast acting fuse elements or links are used to provide current-limiting short-circuit protection.

#### Very Fast-Acting Fuses

This category of fuses exists for limited applications. The principle use of very fast acting fuses is to protect solid-state electronic components, such as semiconductors. Fuse series designated as 'High-Speed (Semiconductor) Fuses' have special characteristics including quick overload response, very low I²t and Ipeak currents, and peak transient voltages, that provide protection for components that cannot withstand line surges, low value overloads, or short-circuit currents. Very fast-acting fuses are designed for very fast response to overloads and short-circuits, and are very current-limiting.

#### Effect of Ambient Temperature on Fuses

The current carrying capacity of fuses is 110% of the fuse rating when installed in a standard UL test circuit and tested in open air at 25°C ambient. This allows for derating to 100% of rating in an enclosure at 40°C ambient.

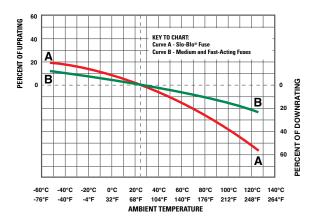


Figure 2 – Fuse Rerating Curve

# Littelfuse® Expertise Applied | Answers Delivered

# SELECTION CONSIDERATIONS

#### **Current Limitation**

A current-limiting fuse is one that opens and clears a fault in less than 180 electrical degrees, or in other words, within the first half electrical cycle (0.00833 seconds). See the definition of Current-limiting Fuse and *Figure 13* in the Terms and Definitions section.

NEC® Article 240.2 states that a current-limiting overcurrent protective device must reduce the peak let-through current to a value substantially less than the potential peak current that would have occurred if the fuse were not used in the circuit or were replaced with solid conductors of the same impedance. The total destructive heat energy (I²t) to the circuit and its components is greatly minimized as a result of using current-limiting fuses.

It is important to note that UL Class H 'Renewable' fuses designed decades ago are considered non-current limiting. Other than Midget fuses, almost all other fuse types used in today's electrical systems and applications are considered current-limiting per the above parameters. This selection consideration now involves determining the degree or level of current limitation required to properly protect a given device or system.

It is also important to point out that matching fuse holders and/or fuse blocks must reject non-current-limiting fuses and accept only current-limiting fuses of the stated UL Class.

#### **Physical Size**

While often overlooked, the physical size or overall dimensions of the fuse to be used in a given application is another important selection consideration to evaluate. There is a trend toward reduction of size in almost everything, and electrical equipment is no exception. Fuse size is actually determined by the size and dimensions of the fuse block or disconnect switch in which it is installed.

While saving space may be an important factor when selecting the proper fuses, other considerations should not be overlooked. Some of these include:

- Does the smallest fuse have the most desirable characteristics for the application?
- Does the equipment in which the fuse will be installed provide adequate space for maintenance?
- Do smaller fuses coordinate well with the system's other overcurrent protection?

If looking at just physical dimensions, a 600 volt, 60 ampere, 200,000 AIR, time-delay, dual-element UL Class CD fuse is smaller than a similarly rated UL Class J fuse, which is in turn, considerably smaller than a similarly rated UL Class RK1 or Class RK5 fuse. However, smaller-sized fuses can sometimes have less time-delay or more nuisance openings than their larger counterparts, so it is always important to consider all factors involved.

#### Indication

The newest consideration for selecting the best fuse for a given application is indication. Many of the more commonly used UL fuse classes are now available in both indicating and non-indicating versions. Built-in, blown-fuse indication that quickly identifies which fuse or fuses within an electrical panel or system have blown can be found on the Littelfuse POWR-PRO® LLSRK\_ID Class RK1, FLNR\_ID, FLSR\_ID and IDSR Class RK5, and JTD\_ID Class J fuse series.

The indicating feature on these fuses provides reduced downtime, increased safety, and reduced housekeeping or troubleshooting headaches and delays. Littelfuse Indicator® fuses will help lower the costs associated with downtime, provide longer fuse life by minimizing nuisance openings, increase system performance by minimizing equipment damage, and improve safety by minimizing accidents.

#### III. GENERAL FUSING RECOMMENDATIONS

Based on the above selection considerations, the following is recommended:

Fuses with ampere ratings from 1/10 through 600 amperes

- When available fault currents are less than 100,000 amperes and when equipment does not require the more current-limiting characteristics of UL Class RK1 fuses, FLNR and FLSR\_ID Series Class RK5 current-limiting fuses provide superior time-delay and cycling characteristics at a lower cost than RK1 fuses. If available fault currents exceed 100,000 amperes, equipment may need the additional current-limitation capabilities of the LLNRK, LLSRK and LLSRK ID series Class RK1 fuses.
- Fast-acting JLLN and JLLS series Class T fuses possess space-saving features that make them especially suitable for protection of molded case circuit breakers, meter banks, and similar limited-space applications.
- Time-delay JTD\_ID and JTD series Class J fuses are used in OEM motor control center applications as well as other MRO motor and transformer applications requiring spacesaving IEC Type 2 protection.
- Class CC and Class CD series fuses are used in control circuits and control panels where space is at a premium.
   The Littelfuse POWR-PRO CCMR series fuses are best used for protection of small motors, while the Littelfuse KLDR series fuses provide optimal protection for control power transformers and similar devices.

For questions about product applications, call our Technical Support Group at 800-TEC-FUSE.



# SELECTION CONSIDERATIONS

#### Fuses with ampere ratings from 601 through 6,000 amperes

For superior protection of most general-purpose and motor circuits, it is recommended to use the POWR-PRO® KLPC series Class L fuses. The Class L fuses are the only timedelay fuse series available in these higher ampere ratings.

Information on all the Littelfuse fuse series referenced above can be found on the UL/CSA Fuse Classes and Applications Charts found later in this Technical Application Guide.

#### IV. SELECTION CONSIDERATIONS FOR **FUSE HOLDERS**

Equally important to the selection of the proper fuse is the correct selection of the proper fuse holder or fuse block for a given application. Fuse holders are available using most of the same Selection Considerations outlined above for UL fuse classes. Considerations for fuse holders include:

- Current Rating
- Voltage Rating
- Interrupting Rating
- Physical Size
- Indication

Additional selection considerations for fuse holders and fuse blocks include:

- Number of poles
- Mounting configuration
- Connector type

#### **Number of Poles**

The number of poles for each set of fuses is determined by the characteristics of the circuit. Most fuse block series are available in 1, 2, or 3 pole configurations, although some are also available with four or more poles. The option to gang individual fuse blocks into longer strips will be determined by the available space and type of wire being used.

# **Mounting Configuration**

Depending on the fuse block design, another selection consideration to evaluate is how the fuse block is mounted or inserted into the panel. Historically, fuse blocks simply screwed into the back of the panel, but many newer designs have now added (or replaced the screw-in design with) a DIN rail mounting capability. The DIN rail mounting feature allows the blocks to be quickly installed and removed from the rails.

#### **Connector Type**

For Littelfuse fuse blocks, a choice of three connector types or wire terminations is available:

- Screw for use with spade lugs or ring terminals.
- Screw with Pressure Plate for use with solid or stranded wire without terminal and recommended for applications where vibration will be a factor.
- Box Lug the most durable of the three options and used with all types of solid wire and Class B and Class C stranded wire.

There are a few additional aspects to keep in mind when selecting the fuse holder or fuse block needed for a given application. UL Class H blocks accept Class H, Class K5, and Class R fuses. Similarly, Midget-style fuse blocks accept both Midget and UL Class CC fuses.

Both UL Class R and Class CC fuse holders contain a rejection feature which prevents the insertion of a different Class or type of fuse. The physical size and dimensions of UL Class J and Class T fuses accomplish the same thing in preventing the insertion of a different Class of fuse as well.

#### V. CIRCUIT PROTECTION CHECKLIST

To select the proper overcurrent protective device for an electrical system, circuit and system designers should ask themselves the following questions before a system is designed:

- What is the normal or average current expected?
- What is the maximum continuous (three hours or more) current expected?
- What inrush or temporary surge currents can be
- Are the overcurrent protective devices able to distinguish between expected inrush and surge currents, and open under sustained overloads and fault conditions?
- What kind of environmental extremes are possible? Dust, humidity, temperature extremes and other factors need to be considered.
- What is the maximum available fault current the protective device may have to interrupt?
- Is the overcurrent protective device rated for the system voltage?
- Will the overcurrent protective device provide the safest and most reliable protection for the specific equipment?
- Under short-circuit conditions, will the overcurrent protective device minimize the possibility of a fire or explosion?
- Does the overcurrent protective device meet all the applicable safety standards and installation requirements?

Answers to these questions and other criteria will help to determine the type overcurrent protection device to use for optimum safety, reliability and performance.

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# FUSE CHARACTERISTIC CURVES AND CHARTS

The performance capabilities of various fuses are graphically represented by two different types of fuse characteristic curves: time-current curves and peak let-through charts. These curves and charts define the operating characteristics of a given fuse, and assist system designers and engineers in selecting the proper fuse to protect equipment and electrical systems.

#### **Understanding Time-current Curves**

Time-current curves provide a graphical representation or plot of a fuse's average melting (opening) time at any current. Time-current curves for Littelfuse POWR-GARD® fuses can be found online at

#### littelfuse.com/technicalcenter.

In order to make the curves more readable, the performance information is presented on log-log paper. The overcurrent values appear across the bottom and increase in magnitude from left to right. Average melting times appear on the left-hand side of the curve and increase in magnitude from bottom to top. The ampere ratings of the individual fuses for a given series are listed at the top and increase in rating from left to right. *Figure 4* shows the average melting time curves for a typical time-delay fuse series.

As discussed earlier in the Fuseology Fundamentals section, time-delay, fast-acting, and very fast-acting fuses all respond differently based on the overcurrents occurring in the systems each is protecting. To illustrate the basic differences between each type of fuse, *Figure 5* compares the average melting times for 100 and 600 amp ratings

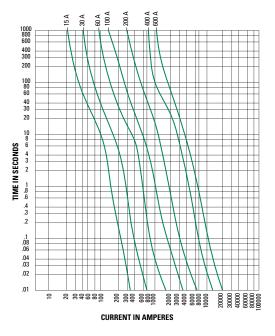


Figure 4 – Average Melting Time Curves for Typical Time-Delay Fuse Series

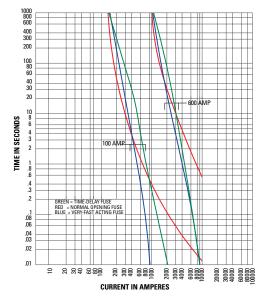


Figure 5 – Comparison of Average Melting Times for Three Fuse Types

of three fuse types: Littelfuse dual-element, time-delay LLSRK series class RK1 fuses (green); Littelfuse normal opening NLS series class K5 fuses (red); and Littelfuse very fast acting L60S series semiconductor fuses (blue).

To better illustrate this point, *Table 3* also compares the opening times for each of these fuses.

AMPERE	FUSE TYPE	OPENING TIME IN SECONDS		
RATING		500% RATING	800% RATING	1200% RATING
100	TIME-DELAY	12 secs.	0.9 secs.	0.14 secs.
	NORMAL OPENING	2 secs.	0.7 secs.	0.3 secs.
	VERY FAST-ACTING	1.3 secs.	0.02 secs.	>0.01 secs.
600	TIME-DELAY	14 secs.	0.7 secs.	0.045 secs.
	NORMAL OPENING	10 secs.	3 secs.	1.1 secs.
	VERY FAST-ACTING	2 secs.	0.05 secs.	>0.01 secs.

Table 3 – Comparative Opening Times for Time-Delay, Fast-Acting, and Very Fast-Acting Fuses

#### **Peak Let-through Charts**

Peak let-through charts illustrate the maximum instantaneous current through the fuse during the total clearing time. This represents the current limiting ability of a fuse.

Fuses that are current-limiting open severe short-circuits within the first half-cycle (180 electrical degrees or 0.00833 seconds) after the fault occurs. Current-limiting fuses also reduce the peak current of the available fault current to a value less than would occur without the fuse. This reduction is shown in *Figure 6*.

A fuse's current-limiting effects are shown graphically on Peak Let-through charts such as the one shown in *Figure 7*. The values across the chart's bottom represent the available



# FUSE CHARACTERISTIC CURVES AND CHARTS

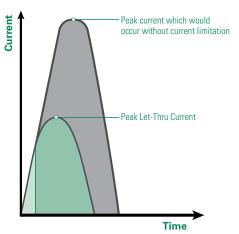


Figure 6 - Current limiting effect of fuses

(also referred to as potential or prospective) rms symmetrical fault current. The values on the chart's left side represent the instantaneous available peak current and the peak letthrough current for various fuse ratings.

To better explain the function of these charts, let's run through an example. Start by entering the chart on the bottom at 100,000 rms symmetrical amperes and read upwards to the A-B line. From this point, read horizontally to the left and read the instantaneous peak let-thru current of 230,000 amperes. In a circuit with a typical 15% short-circuit power factor, the instantaneous peak of the available current is approximately 2.3 times the rms symmetrical value. This occurs since the A-B line on the chart has a 2.3:1 slope.

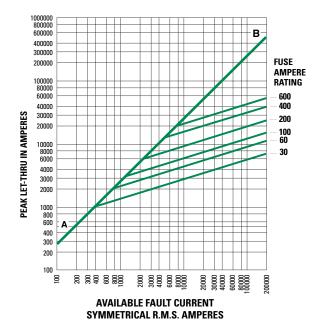


Figure 7 - Peak Let-through Charts

The diagonal curves that branch off the A-B line illustrate the current-limiting effects of different fuse ampere ratings for a given fuse series. To continue the example from above, enter the chart in *Figure 7* on the bottom at 100,000 rms symmetrical amperes and read upwards to the intersection of the 200 ampere fuse curve. Now read from this point horizontally to the left and read a peak let-through current of approximately 20,000 amperes.

What this tells us is that the 200 ampere fuse has reduced the peak current during the fault from 230,000 amperes to 20,000 amperes. In other words, this is the current-limiting effect of the 200 ampere fuse. 20,000 amperes is less than one-tenth of the available current. This is important because the magnetic force created by current flow is a function of the peak current squared. If the peak let-through current of a current-limiting fuse is one-tenth of the available peak, the magnetic force is reduced to less than 1/100 of what would occur without the fuse.

# Using the Peak Let-through Charts ("Up-Over-and-Down")

Peak Let-through Charts for Littelfuse POWR-GARD® fuses can be found online at **littelfuse.com/technicalcenter**. These charts are useful in determining whether a given fuse can properly protect a specific piece of equipment.

For example, given an available fault-current of 100,000 rms symmetrical amperes, determine whether 600 amp 250 volt time-delay Class RK1 fuses can sufficiently protect equipment that has a 22,000 amp short-circuit rating. Refer to *Figure 8*.

Start by locating the 100,000 A available fault-current on the bottom of the chart (Point A) and follow this value upwards to the intersection with the 600 amp fuse curve (Point B). Next, follow this point horizontally to the left to intersect with the A-B line (Point C). Finally, read down to the bottom of the chart (Point D) to read a value of approximately 18,000 amps.

Can the fuse selected properly protect the equipment for this application? Yes, the POWR-PRO® LLNRK 600 ampere RK1 current-limiting fuses have reduced the 100,000 amperes available current to an apparent or equivalent 18,000 amps. When protected by 600 amp LLNRK RK1 fuses, equipment with short-circuit ratings of 22,000 amps may be safely connected to a system having 100,000 available rms symmetrical amperes.

This method, sometimes referred to as the "Up-Over-and-Down" method, may be used to:

- Provide back-up short-circuit protection to large air power circuit breakers.
- 2. Enable non-interrupting equipment such as bus duct to be

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## **FUSE CHARACTERISTICS CURVES AND CHARTS**

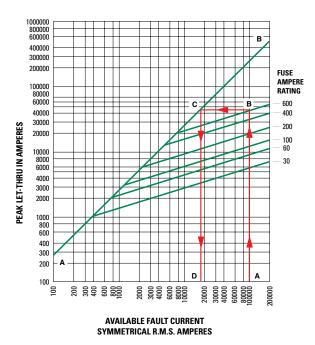


Figure 8 – Peak Let-through Chart for POWR-PRO® LLNRK Class RK1 Dual-Element Fuses Using the Up-Over-and-Down Method

installed in systems with available short-circuit currents greater than their short circuit (withstand) ratings.

However, this method may not be used to select fuses for backup protection of molded case or intermediate frame circuit breakers. National Electrical Code® (NEC®) Article 240.86 requires Series Ratings. Refer to the NEC® for more information.

UL Listed fuse-to-circuit breaker series ratings are now available from most national load center and panelboard manufacturers. Listings are shown in their product digests, catalogs, and online. Many local builders have also obtained fuse-to-circuit breaker series ratings. For additional information contact the Littelfuse Technical Support Group at 1-800-TEC-FUSE (1-800-832-3873).

## **Short-Circuit Current Rating (SCCR)**

Since 2005, the NEC® has required Industrial Control Panels to be labeled with their SCCR. These labels allow users and inspectors to compare the SCCR of the equipment to the available fault current in order to avoid potential hazards in facilities.

#### **Selective Coordination**

A "coordinated" or "selective" system is a system whose overcurrent protective devices have been carefully chosen and their time-current characteristics coordinated.

Only the overcurrent device immediately on the line side of an overcurrent will open for any overload or short-circuit condition.

To further clarify, refer to the Terms and Definitions section for the definition of Selective Coordination and *Figure 15* for a graphical example.

Since the advent of electrical and electronic equipment, businesses have become entirely dependent on the continuous availability of electric energy. Loss of power halts all production and order processing, yet expenses continue to increase. Even many UPS systems become unintentionally non-selective causing power loss to computers and other critical equipment. Non-selectivity may defeat otherwise well-engineered UPS systems.

In a selective system, none of this occurs. Overloads and faults are disconnected by the overcurrent protective device immediately on the line side of the problem. The amount of equipment removed from service is minimized, the faulted or overloaded circuit is easier to locate, and a minimum amount of time is required to restore full service.

For these and many other reasons, selectivity is the standard by which many systems are judged and designed.

### **Fuse Selectivity**

To get a better sense of how to ensure that fuses are selectively coordinated within an electrical system, refer to *Figure 4* shown earlier in this Technical Application Guide. This figure shows typical average melting time-current curves for one class of fuses. Note that the curves are roughly parallel to each other and that for a given overcurrent, the smaller fuse ratings respond quicker than the larger ratings. The heat energy required to open a fuse is separated into melting I²t and arcing I²t (see definition of Ampere-Squared-Seconds). The sum of these is the total clearing I²t.

For a system to be considered coordinated, the smaller fuse total clearing I²t must be less than the larger fuse melting I²t. In other words, if the downstream (branch) fuse opens the circuit before the overcurrent affects the upstream (feeder) fuse element, the system will be considered selective. This can be determined by analyzing curves displaying melting and total clearing I²t, or from minimum melting and maximum clearing time-current curves.

But the simplest method of coordinating low voltage power fuses is by using a Fuse Coordination Table such as the one shown in *Table 4*. This table is only applicable for the Littelfuse POWR-PRO® and POWR-GARD® fuse series listed. Tables such as this greatly reduce design time. For example, the coordination table shows that POWR-PRO KLPC Class L fuses coordinate at a two-to-one ratio with other Class L fuses, with POWR-PRO LLNRK / LLSRK / LLSRK\_ID series



## SELECTIVE COORDINATION

Class RK1 fuses, and POWR-PRO JTD / JTD\_ID series Class J fuses.

In the system shown in *Figure 9*, the 3000 amp Class L main fuses are at least twice the ratings of the 1500, 1200, and 1000 amp Class L feeder fuses. Using the 2:1 ratio just referenced above, it is determined that these fuses will coordinate. The Coordination Table also shows that the LLSRK\_ID series time-delay RK1 feeder and branch circuit fuses coordinate at a two-to-one ratio with the Class L feeder fuses, so the entire system in *Figure 9* would be considered 100% coordinated.

#### **Circuit Breaker Coordination**

As a result of the numerous types of circuit breakers and circuit breaker trip units available in today's market, developing a coordinated circuit breaker system or coordinating circuit breakers with fuses is beyond the scope of this Technical Application Guide. For further questions, contact the Littelfuse Technical Support Group.

## **NEC®** Requirements for Selective Coordination

#### **Component Short-Circuit Protecting Ability**

As shown in Figure 10, the NEC® requires equipment protection to be coordinated with overcurrent protective devices and the available fault current in order to prevent extensive damage to the equipment. Essentially, this means that electrical equipment must be capable of withstanding heavy overcurrents without damage or be

properly protected by overcurrent protective devices that will limit damage.

When a severe fault occurs in an unprotected circuit, current immediately increases to a very high value. This is the available or prospective fault current. Some fuses respond so quickly to the increasing current that they interrupt current within the first half-cycle - or before the current even reaches its first peak. This is illustrated in *Figure 6* found earlier in the Technical Application Guide. Such fuses are termed "current-limiting fuses."

Current-limiting fuses stop damaging current faster than any other protective device, and greatly reduce or totally prevent component damage from high fault currents. This performance capability helps users meet the NEC® Article 110.10 requirements listed in *Figure 10*.

### **Pre-Engineered Solutions**

Applicable code requirements also continue to expand with each new edition of the National Electrical Code®. As of the 2014 edition of the NEC®, the following requirements need to be met – and can be, utilizing Littelfuse POWR-GARD® Pre-Engineered Solutions:

- NEC 517.26 Healthcare Essential Electrical Systems
- NEC 620.82 Elevators
- NEC 700.32 Emergency Systems
- NEC 701.27 Legally Required Standby Systems
- NEC 708.54 Critical Operations Power Systems

LINE-SIDE FUSES			LOAD-SIDE FUSES									
				AMPERE R	TIME-DEL ANGE, UL CL		TALOG NO.		AMPERE F	FAST-ACT RANGE, UL CL	ING FUSES ASS AND CA	TALOG NO.
AMPERE		LITTELFUSE	601-6000	601-4000	30-600	30-600	30-600	0-30	30-600	30-1200	30-600	1-60
RANGE	ULCLASS	CATALOG	L	L	RK1	J	RK5	CC	RK1	T	J	G
		NUMBER	KLPC LDC	KLLU	LLNRK LLSRK_ID	JTD_ID JTD	FLNR_ID FLSR_ID IDSR	CCMR	KLNR KLSR	JLLN JLLS	JLS	SLC
601-6000	L	KLPC	2:1	2:1	2:1	2:1	4:1	2:1	2:1	2:1	2:1	N/A
601-4000	L	KLLU	2:1	2:1	2:1	2:1	4:1	2:1	2:1	2:1	2:1	N/A
601-2000	L	LDC	2:1	2:1	2:1	2:1	4:1	2:1	2:1	2:1	2:1	N/A
30-600	RK1	LLNRK	N/A	N/A	2:1	2:1	8:1	2:1	3:1	3:1	3:1	4:1
30-600	RK1	LLSRK_ID	N/A	N/A	2:1	2:1	8:1	2:1	3:1	3:1	3:1	4:1
30-600	J	JTD_ID	N/A	N/A	2:1	2:1	8:1	2:1	3:1	3:1	3:1	4:1
30-600	RK5	IDSR	N/A	N/A	1.5:1	1.5:1	2:1	2:1	1.5:1	1.5:1	1.5:1	1.5:1
30-600	RK5	FLNR_ID	N/A	N/A	1.5:1	1.5:1	2:1	2:1	1.5:1	1.5:1	1.5:1	1.5:1
30-600	RK5	FLSR_ID	N/A	N/A	1.5:1	1.5:1	2:1	2:1	1.5:1	1.5:1	1.5:1	1.5:1
30-600	RK1	KLNR	N/A	N/A	3:1	3:1	8:1	N/A	3:1	3:1	3:1	4:1
30-600	RK1	KLSR	N/A	N/A	3:1	3:1	8:1	N/A	3:1	3:1	3:1	4:1
30-1200	T	JLLN	N/A	N/A	3:1	3:1	8:1	N/A	3:1	3:1	3:1	4:1
30-1200	T	JLLS	N/A	N/A	3:1	3:1	8:1	N/A	3:1	3:1	3:1	4:1
30-600	J	JLS	N/A	N/A	3:1	3:1	8:1	N/A	3:1	3:1	3:1	4:1
1-60	G	SLC	N/A	N/A	3:1	3:1	4:1	N/A	2:1	2:1	2:1	2:1

Table 4 – Fuse Coordination Table. Selecting the Correct Fuse Ampere Ratio to Maintain Selectively Coordinated Systems. (Ratios are expressed as Line-Side Fuse to Load-Side Fuse.)

## SELECTIVE COORDINATION

The Littelfuse product line of Pre-Engineered Solutions includes:

- LPS Series POWR-Switch (single elevator shunt-trip disconnect switch)
- LCP Selective Coordination Panel

These products continue to gain in popularity because they meet NEC® requirements and offer simple, economical solutions for a variety of applications.

Visit **littelfuse.com/lcp** for more information on Littelfuse Pre-Engineered Solution products and corresponding selective coordination requirements.

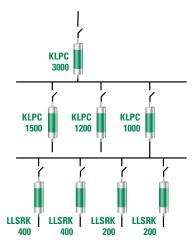


Figure 9 - Example of Selectively Coordinated Fused System

#### **NATIONAL ELECTRICAL CODE® ARTICLE 110 – Requirements for Electrical Installations**

#### I. General

110.3. Examination, Identification, Installation, and Use of Equipment.

- (A) Examination. In judging equipment, considerations such as the following shall be evaluated:
- (5) Heating effects under normal conditions of use and also under abnormal conditions likely to arise in service.
- (6) Arcing effects.
- (B) Installation and Use. Listed or labeled equipment shall be used or installed in accordance with any instructions included in the listing or labeling.

110.9 Interrupting Rating. Equipment intended to interrupt current at fault levels shall have an interrupting rating at nominal circuit voltage sufficient for the current that is available at the line terminals of the equipment.

Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage sufficient for the current that must be interrupted.

110.10 Circuit Impedance, Short-Circuit Current Ratings, and Other Characteristics. The overcurrent protective devices, the total impedance, the equipment short-circuit current ratings, and other characteristics of the circuit to be protected shall be selected and coordinated to permit the circuit protective devices used to clear a fault to do so without extensive damage to the electrical equipment of the circuit. This fault shall be assumed to be either between two or more of the circuit conductors or between any circuit conductor and the equipment grounding conductor(s) permitted in 250.118. Listed equipment applied in accordance with their listing shall be considered to meet the requirements of this section.

#### **ARTICLE 240 – Overcurrent Protection**

240.1 Scope. Parts I through VII of this article provide the general requirements for overcurrent protection and overcurrent protective devices not more than 1000 volts, nominal. Part VIII covers overcurrent protection for those portions of supervised industrial installations operating at voltages of not more than 1000 volts, nominal. Part IX covers overcurrent protection over 1000 volts, nominal.

Informational Note: Overcurrent protection for conductors and equipment is provided to open the circuit if the current reaches a value that will cause an excessive or dangerous temperature in conductors or conductor insulation. See also Articles 110.9 for requirements for interrupting ratings and 110.10 for requirements for protection against fault currents.

(Reproduced by permission of NFPA per 2014 Edition of NEC)

Figure 10 – National Electrical Code Requires Effective Overcurrent Protection



## UL/CSA FUSE CLASSES AND APPLICATIONS

## Overcurrent and short-circuit protection of power and lighting feeders and branch circuits

### Current Limiting

Fuses which meet the requirements for current limiting fuses are required to be labeled "Current Limiting". Fuse labels must include: UL/CSA fuse class, manufacturer's name or trademark, current rating, AC and/or DC voltage rating, and AC and/or DC interrupting rating. "Time Delay", "D", "TD" or equivalent may also be included on the label when the fuse complies with the time delay requirements of its class.

CLASS L

STANDARDS: UL Standard 248-10,

CSA Standard C22.2, No. 106, classified as HRCI-L

**VOLTAGE RATING:** 600 volts, AC and/or DC

**CURRENT RATINGS:** 601-6000 amps

KLPC also available 200-600A; LDC also available 150-600A

INTERRUPTING RATING: AC: 200,000 amps rms symmetrical

DC: 50,000, 100,000, or 200,000 amps

Not interchangeable with any other UL fuse class. Time delay: Class L fuses may be marked "Time-Delay" although UL does not investigate time-delay characteristics of Class L fuses.

KLPC & KLLU: 10 seconds at 500% current rating 4 seconds at 500% current rating LDC:

LF SERIES: KLPC, KLLU, LDC

PAGE: 8

#### **CLASS R**

STANDARDS: UL Standard 248-13

CSA Standard C22.2, No. 106, classified as HRCI-R 250 and 600 volts, AC; 125 and 300 volts DC

**VOLTAGE RATINGS:** CURRENT RATINGS: 0-600 amps

INTERRUPTING RATING: 200,000 amps rms symmetrical

TWO CLASSES: RK1 and RK5

Time delay is optional for Class R fuses

Time Delay fuses are required to hold 500% current rating for a minimum of ten seconds. Same dimensions as UL Class H fuses, terminals modified to provide rejection feature.

Fits UL Class R fuse holders which reject non Class R fuses. Physically interchangeable with UL Class H, NEMA Class H, and UL Classes K1 &

K5 when equipment has Class H fuse holders.

#### **CLASS RK1**

High degree of current limitation. Provides IEC Type 2 (no damage) protection for motor starters and control components. Time Delay optional, LLSRK\_ID Series provides visual indication of blown fuse

LF SERIES: Time Delay: LLNRK,

LLSRK, LLSRK\_ID Fast Acting: KLNR, KLSR

**PAGE**: 13

#### **CLASS RK5**

Moderate degree of current limitation, adequate for most applications. Time delay optional FLNR ID FLSR ID and IDSR series provides visual indication of blown

LF SERIES: FLNR, FLNR\_ID, FLSR, FLSR\_ID, and IDSR

**PAGE**: 16

#### **CLASS J**

STANDARDS: UL Standard 248-

CSA Standard C22.2, No. 106, classified as HRCI-J 600 volts, AC

**VOLTAGE RATING: CURRENT RATINGS:** 0-600 amps

INTERRUPTING RATING: 200,000 amps rms symmetrical

Not interchangeable with any other UL fuse class

Time delay optional: Minimum of 10 seconds at 500% current rating

LF SERIES: Time Delay: JTD ID, JTD Fast Acting: JLS

**PAGE**: 21

CLASS CC/CD

STANDARDS: UL Standard 248-

CSA Standard C22.2, No. 106, classified as HRCI Misc.

600 volts, AC **VOLTAGE RATING:** CURRENT RATINGS: UL Class CC: 0-30 amps UL Class CD: 35-60 amps

INTERRUPTING RATINGS: 200,000 amps rms symmetrical Time delay optional: Minimum of 12 seconds at 200% current rating.

LF SERIES: Time Delay: CCMR (motors), KLDR (transformers)

Fast Acting: KLKR

**PAGE**: 27

CLASSI

STANDARDS: UL Standard 248-19 CSA Standard C22.2, No. 106, classified as HRCI-T

VOLTAGE RATINGS: 300 and 600 volts AC, 125 and 300 volts DC CURRENT RATINGS:

0-1200 amps

900 to 1200 amps UL Recognized for 600V version

INTERRUPTING RATING: 200,000 amps rms symmetrical

Fast-Acting fuses. High degree of current limitation

Very small fuses; space-saving and non-interchangeable with any other UL fuse class.

LF SERIES: JLLN, JLLS

PAGE: 24

#### **CLASS G**

STANDARDS: UL Standard 248-5

CSA Standard C22.2, No. 106, classified as HRCI Misc.

VOLTAGE RATING: 480 volts, AC **CURRENT RATINGS:** 0-60 amps

INTERRUPTING RATING: 100,000 amps rms symmetrical

Not interchangeable with any other UL fuse class

Time delay optional: Minimum of 12 seconds at 200% current rating.

LF SERIES: SLC **PAGE**: 26

CLASS K

STANDARDS: UL Standard 248-9; No CSA Standard **VOLTAGE RATINGS:** 250 and 600 volts, AC

**CURRENT RATING:** 0-600 amps

INTERRUPTING RATINGS: Three permitted: 50,000, 100,000, and 200,000 amps

rms symmetrical Time delay is optional for Class K fuses.

Time Delay fuses are required to hold 500% current rating for a minimum of ten seconds. Same Dimensions and Physically interchangeable with UL Class H fuse holders Class K fuses are not permitted to be labeled Current Limiting because there is no rejection feature as required by NEC® Article 240-60(B).

#### **CLASS K1**

Same prescribed degree of current limitation as RK1 fuses when tested at 50,000 or 100,000 amps rms symmetrical

LF SERIES: Time Delay: LLNRK, LLSRK

Fast Acting: KLNR,

KLSR

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#### **CLASS K5**

Same prescribed degree of current limitation as RK5 fuses when tested at 50,000 or 100,000 amps rms symmetrical

LF SERIES: NLN, NLS

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## **UL/CSA FUSE CLASSES AND APPLICATIONS**

## Overcurrent and short-circuit protection of power and lighting feeders and branch circuits

#### **FUSES FOR SUPPLEMENTARY OVERCURRENT PROTECTION**

STANDARDS: UL Standard 248-14; CSA Standard C22.2, No. 59-1. Three Classifications covered:

**NOTE:** Fuses may be rated for AC and/or DC when suitable for

such use

(1) MICRO FUSES

Voltage ratings: UL, 125 volts; CSA, 0-250 volts Current ratings: UL, 0-10 amps; CSA, 0-60 amps Interrupting rating: 50 amps rms symmetrical

(2) MINIATURE FUSES (CSA classifies these as Supplemental Fuses)
Voltage ratings: UL, 125 or 250 volts; CSA, 0-600 volts
Current ratings: UL, 0-30 amps; CSA, 0-60 amps
Interrupting rating: 10,000 amps rms symmetrical

(3) MISCELLANEOUS CARTRIDGE FUSES (CSA classifies these as

Supplemental Fuses)

Voltage ratings: UL, 125-1000 volts; CSA, 0-100 volts Current ratings: UL, 0-30 amps; CSA 0-60 amps

Interrupting ratings: 10,000, 50,000, or 100,000 amps rms symmetrical

Time delay (Optional); Minimum delay at 200% fuse rating: 5 seconds for fuses rated 3 amps or less

5 seconds for fuses rated 3 amps or less 12 seconds for fuses rated more than 3 amps

LF SERIES: BLF, BLN, BLS, FLA, FLM, FLQ, FLU, KLK, KLQ KLKD, SPF

NOTE: Littelfuse electronic fuses are also covered by these standards; see electronic section of this catalog, or littelfuse.com for complete listing.

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#### **SPECIAL PURPOSE FUSES**

There are no UL Standards covering this category of fuses. These fuses have special characteristics designed to protect special types of electrical or electronic equipment such as diodes, SCR, transistors, thyristors, capacitors, integrally fused circuit breakers, parallel cable runs, etc.

Fuses may be UL Recognized for use as a component in UL Listed equipment. UL Recognized fuses are tested for characteristics such as published interrupting capacity. They are also covered by UL re-examination service.

Non-renewable

VOLTAGE RATINGS: up to 1000 volts AC and/or DC AMPERE RATINGS: up to 6000 amperes INTERRUPTING RATINGS: up to 200,000 amperes

Many of these fuses are extremely current limiting. When considering application of these fuses, or if you have special requirements, contact Littelfuse Technical Support Grunn for assistance.

**LF SERIES:** KLC, L15S, L25S, L50QS, L50S, L60S, L70QS, L70S, JLLS 900 amp

through 1200 amp

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## **Non-Current Limiting**

#### CLASS H

STANDARDS: UL Standard 248-6

CSA Standard C22.2, No. 59.1

Also known as NEMA Class H, and sometimes

referred to as "NEC" or "Code" fuses

250 and 600 volts, AC

AMPERE RATINGS: 0-600 amps

**INTERRUPTING RATINGS:** 10,000 amps rms symmetrical Two types: one-time and renewable

Physically interchangeable with UL Classes K1 & K5;

Fits UL Class H fuse holders which will also accept K1, K5, RK5, and RK1 fuses. Manufacturers are upgrading Class H One-time fuses to Class K5 per UL Standard

248-9D, See Class K fuses.

**VOLTAGE RATINGS:** 

## ONE-TIME FUSES (NON-RENEWABLE)

Time delay: Optional Time-delay fuses must hold 500% current rating for a minimum of ten seconds.

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#### **RENEWABLE FUSES**

Only Class H fuses may be renewable. While time delay is optional, no renewable fuses meet requirements for time delay. Some renewable fuses have a moderate amount of time delay, referred to as "time lag" to differentiate from true time delay.

**LF SERIES:** Discontinued - Please cross to RK5 or RK1 class fuses

#### PLUG FUSES

STANDARDS: UL Standard 248-11, CSA Standard C22.2, No. 59.1

VOLTAGE RATINGS: 125 volts AC only AMPERE RATINGS: 0-30 amps

INTERRUPTING RATINGS: 10,000 amps rms symmetrical. Interrupting rating need not be marked on fuse.

Two types: Edison-base and Type S

EDISON-BASE: Base is same as standard light bulb. All amp ratings interchange able. NEC® permits Edison-base plug fuses to be used only as replacements for existing fuses, and only when there is no evidence of tampering or overfusing.

TYPE S: Not interchangeable with Edison-base fuses unless non-removable Type S fuse adapter is installed in Edison-base fuse socket. To prevent overfusing, adapters have three ampere ratings: 10-15, 16-20, and 21-30 amps.

Time delay: Fuses may be time delay, if so, they are required to hold 200% of rating for 12 seconds minimum.

NOTE: Plug fuses may be used where there is not more than 125 volts between conductors or more than 150 volts from any conductor to ground. This permits their use in 120/240 volts grounded, single-phase circuits.

LF SERIES: Edison-base: TOO, TLO Type S: SOO, SLO Type S Adapters: SAO

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#### Additional Resources and POWR-GARD® Products

Littelfuse is continually developing new technical resources and products that meeting evolving industry standards. For the latest information, visit:

littelfuse.com



Adjustable Alarm Level – A setting on a protection relay at which an LED or an output contact operates to activate a visual or audible alarm.

Adjustable Time Delay – A setting on a protection relay that determines the time between the fault detection and relay operation.

AIC or A.I.C. - See Interrupting Capacity.

**AIR or A.I.R.** – See Interrupting Rating.

Alarm Relay Contact – The output of the relay that acts as a switch and is connected to a visual or audible alarm.

Ambient Temperature – The air temperature surrounding a device. For fuses or circuit breakers in an enclosure, the air temperature within the enclosure.

Ampacity - The current in amperes that a conductor can carry continuously under the conditions of use without exceeding its temperature rating. It is sometimes informally applied to switches or other devices which are more properly referred to by their ampere rating.

Ampere Rating – The current rating, in amperes, that is marked on fuses, circuit breakers, or other equipment.

Ampere-Squared-Seconds (I2t) - A means of describing the thermal energy generated by current flow. When a fuse is interrupting a current within its current-limiting range, the term is usually expressed as melting, arcing, or total clearing l2t.

- Melting I<sup>2</sup>t is the heat energy passed by a fuse after an overcurrent occurs and until the fuse link melts. It equals the rms current squared multiplied by the melting time in seconds. For times less than 0.004 seconds, melting l<sup>2</sup>t approaches a constant value for a given fuse.
- Arcing I2t is the heat energy passed by a fuse during its arcing time. It is equal to the rms arcing current squared (see definition below), multiplied by arcing time.
- Clearing I<sup>2</sup>t (also Total Clearing I<sup>2</sup>t) is the ampere-squared seconds (I2t) through an overcurrent device from the inception of the overcurrent until the current is completely interrupted. Clearing I<sup>2</sup>t is the sum of the Melting I<sup>2</sup>t plus the Arcing I2t.

**Analog Output** – A 0–1 mA, 4–20 mA or 0–5 Vdc signal from a protection relay used to pass information to a device or controller.

Arc-Blast – A pressure wave created by the heating, melting, vaporization, and expansion of conducting material and surrounding gases or air.

**Arc-Flash** – The sudden release of heat energy and intense light at the point of an arc. Can be considered a short-circuit through the air, usually created by accidental contact between live conductors.

**Arc Gap** – The distance between energized conductors or between energized conductors and ground. Shorter arc gaps result in less energy being expended in the arc, while longer gaps reduce arc current. For 600 volts and below, arc gaps of 1.25 inches (32 mm) typically produce the maximum incident energy.

**Arc Rating** – A rating assigned to material(s) that relates to the maximum incident energy the material can resist before break open of the material or onset of a second-degree burn. The arc rating is typically shown in cal/cm<sup>2</sup>.

**Arcing Current** (See *Figure 11*) – The current that flows through the fuse after the fuse link has melted and until the circuit is interrupted.

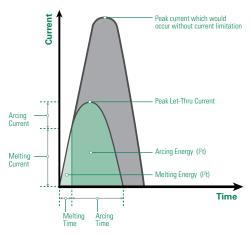


Figure 11 – Arcing and melting currents plus arcing, melting and clearing

Arcing I<sup>2</sup>t - See Ampere-Squared-Seconds (I<sup>2</sup>t).

Arcing Fault - A short-circuit that arcs at the point of fault. The arc impedance (resistance) tends to reduce the short-circuit current. Arcing faults may turn into bolted faults by welding of the faulted components. Arcing faults may be phase-to-phase or phase-to-ground.

**Arcing Time** (See *Figure 11*) – The time between the melting of a fuse link or parting of circuit breaker contacts, until the overcurrent is interrupted.

Arc Voltage (See Figure 12) - Arc voltage is a transient voltage that occurs across an overcurrent protection device during the arcing time. It is usually expressed as peak instantaneous voltage (Vpeak or Epeak), or on rare occasion as rms voltage.

Asymmetrical Current - See Symmetrical Current.

Available Short-Circuit Current (also Available or Prospective Fault Current) - The maximum rms Symmetrical Current that would flow at a given point in a system under bolted-fault conditions. Short-circuit current is maximum during the first half-cycle after the fault occurs. See definitions of Bolted Fault and Symmetrical Current.

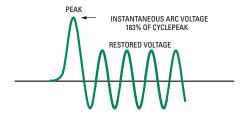


Figure 12 - Transient overvoltage during arcing time

Blade Fuse - See Knife Blade Fuse.

**Body** – The part of a fuse enclosing the fuse elements and supporting the contacts. Body is also referred to as cartridge, tube, or case.

**Bolted Fault** – A short-circuit that has no electrical resistance at the point of the fault. It results from a firm mechanical connection between two conductors, or a conductor and ground. Bolted faults are characterized by a lack of arcing. Examples of bolted faults are a heavy wrench lying across two bare bus bars, or a crossed-phase condition due to incorrect wiring

**Boundaries of Approach** – Protection boundaries established to protect personnel from shock and Arc-Flash hazards.

**Calorie** – The amount of heat needed to raise the temperature of one gram of water by one degree Celsius.1 cal/cm² is equivalent to the exposure on the tip of a finger by a cigarette lighter for one second.

**Cartridge Fuse** – A fuse that contains a current-responsive element inside a tubular fuse body with cylindrical ferrules (end caps).

Case Size (also Cartridge Size) – The maximum allowable ampere rating of a cartridge fuse having defined dimensions and shape. For example, case sizes for UL Listed Class H, K, J, RK1, and RK5 are 30, 60, 100, 200, 400, and 600 amperes. The physical dimensions vary with fuse class, voltage, and ampere rating. UL Standards establish the dimensions for each UL Fuse Class. This catalog's product section contains case size dimensions for all Littelfuse POWR-GARD® fuses.

Clearing I2t - See Ampere-Square-Seconds (I2t).

**Clearing Time** (see *Figure 11*) – The time between the initiation of an overcurrent condition to the point at which the overcurrent is interrupted. Clearing Time is the sum of Melting Time and Arcing Time.

**Conformal Coating** – Coating used to protect circuit boards from pollutants, corrosion, and mildew.

**Contacts (Fuse)** – The external metal parts of the fuse used to complete the circuit. These consist of ferrules, caps, blades or terminals, as shown in this catalog.

**Coordination or Coordinated System** – See Selective Coordination.

**Continuous Load** – An electrical load where the maximum current is expected to continue for three hours or more.

**CT Loop** – The electrical circuit between a current transformer and a protection relay or monitoring device.

**Current-Based Protection** – Protection parameters (trip-levels/data collection etc.) derived from current levels in a circuit.

**Current-limiting Fuse** (See *Figure 13*) – A fuse which, when interrupting currents within its current-limiting range, reduces the current in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device was replaced with a solid conductor having comparable impedance. To be labeled "current limiting," a fuse must mate with a fuse block or fuse holder that has either a rejection feature or dimensions that will reject non-current-limiting fuses.

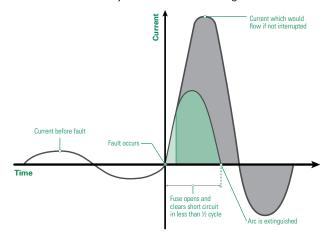


Figure 13 - Current-limiting Fuse

**Current-limiting Range** - For an individual overcurrent protective device, the current-limiting range begins at the lowest value of rms symmetrical current at which the device becomes current-limiting (the threshold current) and extends to the maximum interrupting capacity of the device. See definitions of Threshold Current and Interrupting Capacity.

**Current Rating** – See Ampere Rating.

**Current Transformer (CT)** – A transformer that produces a current in its secondary circuit in a known proportion to current in its primary circuit.

**Data Logging** – Collecting and storing information in a format that can be reviewed for trending, troubleshooting and reporting.

**DFT (Discrete Fourier Transform) Harmonic Filter** – An algorithm used to measure the fundamental component of current and voltage and reject harmonics. This allows lower trip settings and eliminates nuisance trips due to harmonics.



**Distance to Arc** – Refers to the distance from the receiving surface to the arc center. The value used for most calculations is typically 18 inches.

**Dual-Element Fuse** – A fuse with internal construction consisting of a separate time-delay overload element(s) that interrupts overcurrents up to approximately 500%-600% of its nominal rating, plus separate fuse links that quickly open higher value currents. All dual-element fuses have time delay, but, since there are other methods of achieving time delay, not all time-delay fuses have dual-element construction. See Time-Delay Fuse.

EFCT (Earth Fault Current Transformer) - A current transformer engineered to accurately detect low level ground-fault current.

**Electrical Hazard Analysis** – A study performed to identify the potential electrical hazards to which personnel may be exposed. The analysis should address both shock and Arc-Flash hazards.

Electrically Safe Work Condition - Condition where the equipment and or circuit components have been disconnected from electrical energy sources, locked/tagged out, and tested to verify all sources of power are removed.

**Element** – A fuse's internal current-carrying components that melt and interrupt the current when subjected to an overcurrent of sufficient duration or value. Also called fuse link.

## Fail-Safe Mode (also known as Under Voltage or UV) -

Output relay is energized during normal (not tripped) operation. If the protection relay loses supply voltage, the system will trip

**Fast-Acting Fuse** – May also be termed Normal-opening fuse, this is a fuse that has no intentional or built-in time delay. Actual opening time is determined by the fuse class, the overcurrent, and other conditions. Fast-acting is indicated on the fuse label by "Fast-Acting", "F-A", "F", or other suitable marking.

Fault – Same as Short-Circuit and used interchangeably.

Fault Current - The current that flows when a phase conductor is faulted to another phase or ground.

**Feeder Protection** – Overcurrent or overvoltage devices installed on a feeder circuit to supplement, compliment or replace downstream protective devices.

Filler - A material, such as granular guartz, used to fill a section or sections of a fuse and aid in arc quenching.

Filter - An algorithm used to measure the fundamental component of current and voltage and reject harmonics. This allows lower trip settings and eliminates nuisance trips due to harmonics.

Flash Hazard Analysis – A study that analyzes potential exposure to Arc-Flash hazards. The outcome of the study establishes Incident Energy levels, Hazard Risk Categories, Flash Protection Boundaries, and required PPE. It also helps define safe work practices.

Flash Protection Boundary – A protection boundary established to protect personnel from Arc-Flash hazards. The Flash Protection Boundary is the distance at which an unprotected worker can receive a second-degree burn to bare skin.

**Fuse** – An overcurrent protective device consisting of one or more current carrying elements enclosed in a body fitted with contacts, so that the fuse may be readily inserted into or removed from an electrical circuit. The elements are heated by the current passing through them, thus interrupting current flow by melting during specified overcurrent conditions.

**Ground Continuity Monitor** - A protection relay that continuously monitors a ground conductor and trips if this conductor opens or shorts to the ground-check conductor.

**Ground-Fault** – Unintentional contact between a phase conductor and ground or equipment frame. The words "ground" and "earth" are used interchangeably when it comes to electrical applications.

**Ground-Fault Current** – The current that returns to the supply neutral through the ground-fault and the ground-return path.

**Ground-Fault Protection** – A system that protects equipment from damaging ground-fault current by operating a disconnecting means to open all ungrounded conductors of a faulted circuit. This protection is at current levels less than those required to operate a supply circuit overcurrent device.

**Ground-Fault Relay** – A protection relay designed to detect a phase-to-ground-fault on a system and trip when current exceeds the pickup setting for greater than the trip time setting.

Hazard Risk Category - A classification of risks (from 0 to 4) defined by NFPA 70E®. Each category requires PPE and is related to incident energy levels.

High-Resistance Grounding – Achieved when a neutralground resistor (NGR) is used to limit the current to a low level. Typically high-resistance grounding is 25 A and lower. See Low-Resistance Grounding.

I2t - See Ampere-Squared-Seconds (I2t).

**IEEE Device Numbers** – The devices in switching equipment are referred to by numbers, according to the functions they perform. These numbers are based on a system which has been adopted as standard for automatic switchgear by IEEE. This system is used on connection diagrams, in instruction books and in specifications.

**IECType 2 Protection** – Fused protection for control components that prevents damage to these components under short-circuit conditions. See definition of No Damage.

# Littelfuse® Expertise Applied | Answers Delivered

## TERMS AND DEFINITIONS

**Incident Energy** – The amount of thermal energy impressed on a surface generated during an electrical arc at a certain distance from the arc. Typically measured in cal/cm<sup>2</sup>.

Instantaneous Peak Current (I<sub>P</sub> or I<sub>Peak</sub>) – The maximum instantaneous current value developed during the first half-cycle (180 electrical degrees) after fault inception. The peak current determines magnetic stress within the circuit. See Symmetrical Current.

**Insulation Monitoring** – Monitoring the resistance from phase to ground to detect insulation breakdown on a system.

Interrupting Capacity (AIC) – The highest available symmetrical rms alternating current (for DC fuses the highest direct current) at which the protective device has been tested, and which it has interrupted safely under standardized test conditions. The device must interrupt all available overcurrents up to its interrupting capacity. Also commonly called interrupting rating. See Interrupting Rating below.

**Interrupting Rating (IR, I.R., AIR or A.I.R.)** – The highest RMS symmetrical current, at specified test conditions, which the device is rated to interrupt. The difference between interrupting capacity and interrupting rating is in the test circuits used to establish the ratings.

**Inverse-time Characteristics** – A term describing protective devices whose opening time decreases with increasing current.

IR or I.R. (also AIR or A.I.R.) – See Interrupting Rating above.

Kiloamperes (kA) - 1,000 amperes.

Knife Blade Fuse – Cylindrical or square body fuses with flat blade terminals extending from the fuse body. Knife blades may be designed for insertion into mating fuse clips and/or to be bolted in place. Knife blade terminals may include a rejection feature that mates with a similar feature on a fuse block of the same class.

**Leakage Current** – Very low level ground-fault current, typically measured in milliamperes (mA, thousandths of amperes).

**Limited Approach Boundary** – An approach boundary to protect personnel from shock. A boundary distance is established from an energized part based on system voltage. To enter this boundary, unqualified persons must be accompanied with a qualified person and use the proper PPE.

**Low-Resistance Grounding** – A Resistance Grounded System that allows high currents to flow during a ground-fault. Typically 100A and higher is considered Low-Resistance grounding. See High-Resistance Grounding.

**Melting Current** (see *Figure 11*) – The current that flows through the fuse from the initiation of an overcurrent condition to the instant arcing begins inside the fuse.

Melting I<sup>2</sup>t – See Ampere-Squared-Seconds (I<sup>2</sup>t).

**Melting Time** (see *Figure 11*) – The time span from the initiation of an overcurrent condition to the instant arcing begins inside the fuse.

**Motor Protection** – Overload protection designed to protect the windings of a motor from high current levels. Modern motor protection relays add many additional features, including metering, data logging and communications.

**NEC** – In general, the National Electrical Code® (NEC®). Specifically, as referenced herein, NEC refers to NFPA Standard 70, *National Electrical Code*, National Fire Protection Association, Quincy, MA 02269.

Sections of the NEC reprinted herein, and/or quotations there from, are done so with permission. The quoted and reprinted sections are not the official position of the National Fire Protection Association which is represented only by the Standard in its entirety. Readers are cautioned that not all authorities have adopted the most recent edition of the NEC; many are still using earlier editions.

**Neutral Grounding Resistor (NGR)** – A current-limiting resistor connecting the power-system neutral to ground.

**No Damage** – A term describing the requirement that a system component be in essentially the same condition after the occurrence of a short-circuit as prior to the short-circuit.

**Non-renewable Fuse** – A fuse that must be replaced after it has opened due to an overcurrent. It cannot be restored to service.

Normal-opening Fuse – See Fast-Acting Fuse.

**Nuisance Trip** – An undesired change in relay output due to misinterpreted readings.

**One-time Fuse** – Technically, any non-renewable fuse. However, the term usually refers to UL Class H fuses and to fast acting UL Class K5 fuses. Such fuses are not current-limiting and do not have a rejection feature. One-time fuses are also referred to as "Code" fuses.

**Open CT Hazard** – An open-circuited CT secondary can develop a dangerously high voltage when the primary is energized.

**Overcurrent** – Any current larger than the equipment, conductor, or devices are rated to carry under specified conditions.

**Overload** – An overcurrent that is confined to the normal current path (e.g., not a short-circuit), which if allowed to persist, will cause damage to equipment and/or wiring. Additional information regarding fuse applications for overload protection can be found earlier in this Technical Application Guide.



**Peak Let-through Current** (See *Figure 14*) – The maximum instantaneous current that passes through an overcurrent protective device during its total clearing time when the available current is within its current-limiting range.

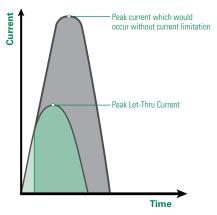


Figure 14 - Peak Let-through Current

**Phase Current** – The current present in a phase conductor.

Phase Voltage – The voltage measured between a phase conductor and ground.

**Power Factor (X/R)** – As used in overcurrent protection, power factor is the relationship between the inductive reactance (X) and the resistance (R) in the system during a fault. Under normal conditions a system may be operating at a 0.85 power factor (85%). When a fault occurs, much of the system resistance is shorted out and the power factor may drop to 25% or less. This may cause the current to become asymmetrical. See definition of Symmetrical Current. The UL test circuits used to test fuses with interrupting ratings exceeding 10,000 amperes are required to have a power factor of 20% or less. Since the power factor of test circuits tends to vary during test procedures, actual test circuits are usually set to a 15% power factor. The resulting asymmetrical current has an rms value of 1.33 times the available symmetrical rms. The instantaneous peak current of the first peak after the fault is 2.309 times the available symmetrical rms.

PPE - An acronym for Personal Protective Equipment. It can include clothing, tools, and equipment.

**Primary Rating (for CTs)** – The current rating of the primary side of a current transformer. The first number in the ratio 500:5 is the primary rating. Under ideal conditions 500 A of primary current flow through the CT will produce 5 A of current out the secondary terminals.

**Prohibited Approach Boundary** – An approach boundary to protect personnel from shock. Work in this boundary is considered the same as making direct contact with an energized part. Only qualified persons are allowed to enter this boundary and they must use the proper PPE.

**Prospective Current** – See Available Short-Circuit Current.

Protection Boundaries - Boundaries established to protect personnel from electrical hazards.

**Pulsing** – Modulating the ground-fault current on a resistance grounded system using a contactor to short out part of the NGR elements (or to open one of two NGRs connected in parallel). Another version of pulsing is imposing a higher frequency signal on power lines and using a wand detector to locate the point of fault on a conductor.

QPL (Qualified Products List) - A list of approved fuses and holders that meet various Military specifications.

**Qualified Person** – A person who is trained, knowledgeable, and has demonstrated skills on the construction and operation of the equipment, and can recognize and avoid electrical hazards that may be encountered.

Rating – A designated limit of operating characteristics based on definite conditions such as current rating, voltage rating and interrupting rating.

**Rectifier Fuse** – See High-Speed Semiconductor Fuses.

Rejection Feature – The physical characteristic(s) of a fuse block or fuse holder that prevents the insertion of a fuse unless it has the proper mating characteristics. This may be achieved through the use of slots, grooves, projections, or the actual physical dimensions of the fuse. This feature prevents the substitution of fuses of a Class or size other than the Class and size intended.

**Relay** – An electrical switch that opens and closes a contact (or contacts) under the control of another circuit. Typically an electromagnet.

Renewable Element (also Renewable Link) – A renewable fuse current-carrying component that is replaced to restore the fuse to a functional condition after the link opens due to an overcurrent condition.

**Renewable Fuse** – A fuse that may be readily restored to service by replacing the renewable element after operation.

Resistance-Grounded System – An electrical system in which the transformer or generator neutral is connected to ground through a current-limiting resistor. See Solidly Grounded System, Ungrounded System.

**Restricted Approach Boundary** – An approach boundary to protect personnel from shock. A boundary distance is established from an energized part based on system voltage. Only qualified persons are allowed in the boundary and they must use the proper PPE.

**Selective Coordination** (See *Figure 15*) – In a selectively coordinated system, only the protective device immediately on the line side of an overcurrent opens. Upstream protective devices remain closed. All other equipment remains in service, which simplifies the identification and location of overloaded

equipment or short-circuits. For additional information, refer to the Selective Coordination pages of this Technical Application Guide.

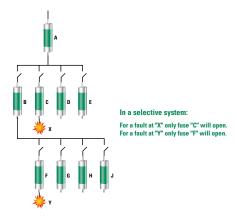


Figure 15 - Selective Coordination Example

**Semiconductor Fuse** – (Also known as High-Speed Fuses) A fuse specifically designed to protect semiconductors such as silicon rectifiers, silicon-controlled rectifiers, thyristors, transistors, and similar components.

Sensitive Ground-Fault Protection – Protection designed to accurately detect extremely low ground-fault current levels without nuisance tripping.

**Shock** – A trauma subjected to the body by electrical current. When personnel come in contact with energized conductors, it can result in current flowing through their body often causing serious injury or death.

**Short-Circuit** (See *Figure 16*) – A current flowing outside its normal path, caused by a breakdown of insulation or by faulty equipment connections. In a short-circuit, current bypasses the normal load. Current is determined by the system impedance (AC resistance) rather than the load impedance. Short-circuit currents may vary from fractions of an ampere to 200.000 amperes or more.

Short-Circuit Current Rating (SCCR) - The prospective symmetrical fault current at a nominal voltage to which an apparatus or system is able to be connected without sustaining damage exceeding defined acceptance criteria.

**Short-Circuit Rating** – The maximum RMS symmetrical shortcircuit current at which a given piece of equipment has been tested under specified conditions, and which, at the end of the test is in essentially the same condition as prior to the test. Short-circuit ratings (also called withstand ratings) apply to equipment that will be subjected to fault currents, but which are not required to interrupt them. This includes switches, busway (bus duct), switchgear and switchboard structures, motor control centers and transformers.

Most short-circuit ratings are based on tests which last three complete electrical cycles (0.05 seconds). However, if the equipment is protected during the test by fuses or by a circuit breaker with instantaneous trips, the test duration is the time required for the overcurrent protective device to open the circuit.

When protected as such during testing, the equipment instructions and labels must indicate that the equipment shall be protected by a given fuse class and rating or by a specific make, type, and rating of circuit breaker. Circuit breakers equipped with short-delay trip elements instead of instantaneous trip elements have withstand (short-circuit) ratings in addition to their interrupting rating. The breaker must be able to withstand the available fault current during the time that opening is delayed.

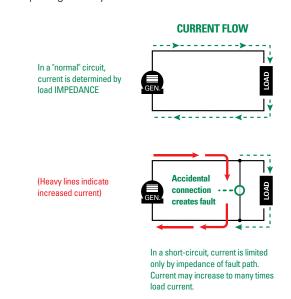


Figure 16 - Current Flow in Normal and Short Circuit Situations

Solidly Grounded System - An electrical system in which the neutral point of a wye connected supply transformer is connected directly to ground.

**Symmetrical Current** – The terms "Symmetrical Current" and "Asymmetrical Current" describe an AC wave symmetry around the zero axis. The current is symmetrical when the peak currents above and below the zero axis are equal in value, as shown in Figure 17 (next page). If the peak currents are not equal, as shown in Figure 18, the current is considered asymmetrical. The degree of asymmetry during a fault is determined by the change in power factor (X/R) and the point in the voltage wave when the fault occurs. See definition of Power Factor. In general, lower short-circuit power factors increase the degree of asymmetry.





Figure 17 - Symmetrical Current

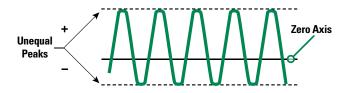


Figure 18 - Asymmetrical Current

**Threshold Current** – The minimum current for a given fuse size and type at which the fuse becomes current-limiting. It is the lowest value of available rms symmetrical current that will cause the device to begin opening within the first 1/4 cycle (90 electrical degrees) and completely clear the circuit within 1/2 cycle (180 electrical degrees). The approximate threshold current can be determined from the fuse's peak let-through charts. (See *Figure 19*.)

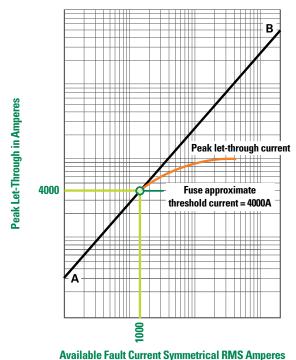


Figure 19 – Determining Threshold Current from Peak

**Threshold Ratio** – Consists of the threshold current divided by the ampere rating of a specific type or class of overcurrent device. A fuse with a threshold ratio of 15 becomes current-limiting at 15 times its current rating.

**Time-Delay Fuse** – Fuses designed with an intentional, built-in delay in opening. When compared to fast-opening fuses, time-delay fuses have an increased opening time for overcurrents between approximately 200% and 600% of the fuse's current rating. Time-delay is indicated on the fuse label by "Time-Delay," "T-D", "D", or other suitable marking. Time-delay in the overload range (200%-600% of the fuse rating) permits the fuse to withstand system switching surges, motor starting currents, and other harmless temporary overcurrents.

UL Standards require time-delay Class H, K, RK1, RK5, and J fuses to hold 500% of their normal current rating for a minimum of 10 seconds. They must also pass the same opening time tests (135% and 200% of current rating) as fast acting fuses.

Time-delay Class CC, CD, G, Plug, and Miscellaneous fuses have different requirements. For more information, please refer to the corresponding descriptions provided in the Product Information Section.

For the UL Standard, Class L fuses have no standard timedelay. The time-delay varies from series to series for a given manufacturer, as well as from manufacturer to manufacturer. For reference, Littelfuse KLPC series POWR-PRO® fuses hold 500% of rated current for a minimum of 10 seconds.

**Ungrounded System** – An electrical system in which no point in the system is intentionally grounded. This was most common in process industries where continuity of service during a single-phase-to-ground-fault was required.

**Unqualified Person** – A person that does not possess all the skills and knowledge or has not been trained for a particular task.

**Voltage Rating** – The maximum rms AC voltage and/or the maximum DC voltage at which the fuse is designed to operate. For example, fuses rated 600 volts and below may be applied at any voltage less than their rating. There is no rule for applying AC fuses in DC circuits such as applying the fuse at half its AC voltage rating. Fuses used on DC circuits must have DC ratings.

Withstand Rating - See Short-Circuit.

Let-through Chart



BACK-UP MOTOR RUNNING

## MOTOR PROTECTION TABLES

# Selection of Class RK5 Fuses (FLNR\_ID / FLSR\_ID / IDSR Series) or POWR-PRO® Class RK1 Fuses (LLNRK / LLSRK / LLSRK\_ID Series) Based on Motor Full Load Amps

## Using AC Motor Protection Tables to Select Fuse Ratings

Time-delay RK1 and RK5 fuse ratings selected in accordance with the following recommendations also meet NEC® requirements for Motor Branch circuit and Short-Circuit Protection.

#### Selecting Fuses for Motor Running Protection Based on Motor Horsepower

Motor horsepower and motor Full Load Amperes (FLA) shown are taken from NEC® Tables 430.248 through 430.250 covering standard speed AC motors with normal torque characteristics. Fuse ratings for motors with special characteristics may need to vary from given values.

If motor running protection will be provided by the fuses, select fuse ratings for correct type of motor from Motor Protection Table Columns headed, "Without Overload Relays."

If overload relays will provide principal motor running protection, select fuse ratings for correct type of motor from Motor Protection Table Columns headed, "Back-up Running Protection" or "With Overload Relays." Fuse ratings selected from these columns coordinate with most UL Class 10 and 20 overload relays which covers over 90% of motor applications.

#### Selecting Fuses for Motor Running Protection Based on Motor Actual Full Load Currents

Better protection is achieved when fuse ratings are based on motor actual FLA obtained from motor nameplates. Locate motor nameplate FLA in the column appropriate for the type of motor and type of protection required. Then select the corresponding ampere rating of the fuse from the first column of that line.

TIME DELAY	(USED WITHOUT OVERLOAI MOTOR FULL	D RELAYS)	PROTECTION (USED WITH PROPERLY SIZED OVERLOAD RELAYS) MOTOR FULL-LOAD AMPS		
UL CLASS RK1 OR RK5 FUSE AMPERE RATING	MOTOR SERVICE FACTOR OF 1.15 OR GREATER OR WITH TEMP. RISE NOT OVER 40°C.	MOTOR SERVICE FACTOR LESS THAN 1.15 OR WITH TEMP. RISE GREATER THAN 40°C.	MOTOR SERVICE FACTOR OF 1.15 OR GREATER OR WITH TEMP. RISE NOT OVER 40°C.	MOTOR SERVICE FACTOR LESS THAN 1.15 OR WITH TEMP. RISE GREATER THAN 40°C	
1/10	0.08-0.09	0.09-0.10	0-0.08	0-0.09	
1/8	0.10-0.11	0.11-0.125	0.09-0.10	0.10-0.11	
15/100	0.12-0.15	0.14-0.15	0.11-0.12	0.12-0.13	
<sup>2</sup> / <sub>10</sub>	0.16-0.19	0.18-0.20	0.13-0.16	0.14-0.17	
1/4	0.20-0.23	0.22-0.25	0.17-0.20	0.18-0.22	
<sup>3</sup> / <sub>10</sub>	0.24-0.30 0.32-0.39	0.27-0.30	0.21-0.24	0.23-0.26	
4/10 1/2	0.40-0.47	0.35-0.40 0.44-0.50	0.25-0.32 0.33-0.40	0.27-0.35 0.36-0.43	
6/10	0.48-0.60	0.53-0.60	0.41-0.48	0.44-0.52	
8/10	0.64-0.79	0.70-0.80	0.49-0.64	0.53-0.70	
1	0.80-0.89	0.87-0.97	0.65-0.80	0.71-0.87	
11//8	0.90-0.99	0.98-1.08	0.81-0.90	0.88-0.98	
11/4	1.00-1.11	1.09-1.21	0.91-1.00	0.99-1.09	
14/10	1.12-1.19	1.22-1.30	1.01-1.12	1.10-1.22	
1½	1.20-1.27	1.31-1.39	1.13-1.20	1.23-1.30	
1 <sup>6</sup> /10	1.28-1.43	1.40-1.56	1.21-1.28	1.31-1.39	
18/10 2	1.44-1.59 1.60-1.79	1.57-1.73 1.74-1.95	1.29-1.44 1.45-1.60	1.40-1.57 1.58-1.74	
21/4	1.80-1.79	1.96-2.17	1.61-1.80	1.75-1.96	
21/2	2.00-2.23	2.18-2.43	1.81-2.00	1.97-2.17	
28/10	2.24-2.39	2.44-2.60	2.01-2.24	2.18-2.43	
3	2.40-2.55	2.61-2.78	2.25-2.40	2.44-2.60	
32/10	2.56-2.79	2.79-3.04	2.41-2.56	2.61-2.78	
31/2	2.80-3.19	3.05-3.47	2.57-2.80	2.79-3.04	
4	3.20-3.59	3.48-3.91	2.81-3.20	3.05-3.48	
4½	3.60-3.99	3.92-4.34	3.21-3.60	3.49-3.91	
5	4.00-4.47	4.35-4.86	3.61-4.00	3.92-4.35	
5 <sup>6</sup> /10 6	4.48-4.79 4.80-4.99	4.87-5.21 5.22-5.43	4.01-4.48 4.49-4.80	4.36-4.87 4.88-5.22	
6 <sup>1</sup> / <sub>4</sub>	5.00-5.59	5.44-6.08	4.49-4.80	5.23-5.43	
7	5.60-5.99	6.09-6.52	5.01-5.60	5.44-6.09	
7½	6.00-6.39	6.53-6.95	5.61-6.00	6.10-6.52	
8	6.40-7.19	6.96-7.82	6.01-6.40	6.53-6.96	
9	7.20-7.99	7.83-8.69	6.41-7.20	6.97-7.83	
10	8.00-9.59	8.70-10.00	7.21-8.00	7.84-8.70	
12	9.60-11.99	10.44-12.00	8.01-9.60	8.71-10.43	
15	12.00-13.99	13.05-15.00	9.61-12.00	10.44-13.04	
17½ 20	14.00-15.99 16.00-19.99	15.22-17.39 17.40-20.00	12.01-14.00 14.01-16.00	13.05- 15.21 15.22-17.39	
25	20.00-23.99	21.74-25.00	16.01-20.00	17.40-21.74	
30	24.00-27.99	26.09-30.00	20.01-24.00	21.75-26.09	
35	28.00-31.99	30.44-34.78	24.01-28.00	26.10-30.43	
40	32.00-35.99	34.79-39.12	28.01-32.00	30.44-37.78	
45	36.00-39.99	39.13-43.47	32.01-36.00	37.79-39.13	
50	40.00-47.99	43.48-50.00	36.01-40.00	39.14-43.48	
60	48.00-55.99	52.17-60.00	40.01-48.00	43.49-52.17	
70 75	56.00-59.99 60.00-63.99	60.87-65.21 65.22-69.56	48.01-56.00	52.18-60.87 60.88-65.22	
80	64.00-71.99	69.57-78.25	56.01-60.00 60.01-64.00	65.23-69.57	
90	72.00-79.99	78.26-86.95	64.01-72.00	69.58-78.26	
100	80.00-87.99	86.96-95.64	72.01-80.00	78.27-86.96	
110	88.00-99.99	95.65-108.69	80.01-88.00	86.97-95.65	
125	100.00-119.99	108.70-125.00	88.01-100.00	95.66-108.70	
150	120.00-139.99	131.30-150.00	100.01-120.00	108.71-130.43	
175	140.00-159.99	152.17-173.90	120.01-140.00	130.44-152.17	
200	160.00-179.99	173.91-195.64	140.01-160.00	152.18-173.91	
225 250	180.00-199.99 200.00-239.99	195.65-217.38 217.39-250.00	160.01-180.00 180.01-200.00	173.92-195.62 195.63-217.39	
300	240.00-239.99	260.87-300.00	200.01-240.00	217.40-260.87	
350	280.00-319.99	304.35-347.82	240.01-280.00	260.88-304.35	
400	320.00-359.99	347.83-391.29	280.01-320.00	304.36-347.83	
450	360.00-399.99	391.30-434.77	320.01-360.00	347.84-391.30	
500	400.00-479.99	434.78-500.00	360.01-400.00	391.31-434.78	
600	480.00-600.00	521.74-600.00	400.01-480.00	434.79-521.74	

MOTOR RUNNING PROTECTION



# Motor Protection White Paper

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## MOTOR PROTECTION TABLES

## Selection of Class RK5 Fuses (FLNR\_ID / FLSR\_ID / IDSR Series) or POWR-PRO® Class RK1 Fuses (LLNRK / LLSRK / LLSRK ID Series) Based on Motor Horsepower

MOTOR   FULL LOAD   AMPS   MORE, TEMP   RISE NOT   TEMP RISE NOT   TEMP RISE NOT   TEMP RISE NOT   TEMP RISE NOT   TEMP RISE   TEMP RIS			WITHOUT	OVERLOAD AYS	WITH OVERL	OAD RELAYS	
			S.F. = 1.15 OR MORE, TEMP RISE NOT	S.F. = LESS THAN 1.15 OR TEMP RISE MORE THAN	MORE, TEMP RISE NOT	THAN 1.15 OR TEMP RISE MORE THAN	FUSE CLIP
			120 VOLT 1-P		S (120V CIRC		
Ye   9.8   12   10   15   12   30		4.4	5			56/10	30
1							
1							
1							
11/2							
2			-	-			
					_		
					S (240V CIRC	UIT)	
1	1/6	2.2	21/2	21/2	28/10	28/10	30
1/2		2.9		32/10			30
1					· ·	4½	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						_	
11/2							
2							
3							
5         28         35         30*         35         35         60           7½*         40         50         45         50         50         60         60           200 VOLT 3-PHASE MOTORS (208V CIRCUIT)           ½*         2.5         3         28½*/10         3²½*/10         3         30           ¾*         3.7         4½*         4         5         4½*         30           1         4.8         6         5½*/10         6½*         6         30           1½*         6.9         8         7½*         7½*         8         30           2         7.8         9         8         10         9         30           3         11         12         12         15         15         30           5         17.5         20         20         25         25         30           7½*         25.3         30*         25*         35         30*         60           10         32.2         40         35         45         40         60           15         48.3         60         50         70†         60         60							
10   50   60   50   70   60   60							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	10	50	60	50	70	60	60
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			200 VOLT 3-P	HASE MOTOR	S (208V CIRC	UIT)	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							
1½   6.9   8   7½   7½   8   30							
2         7.8         9         8         10         9         30           3         11         12         12         15         15         30           5         17.5         20         20         25         25         30           7½         25.3         30*         25*         35         30*         60           10         32.2         40         35         45         40         60           15         48.3         60         50         70†         60         60           20         62.1         75         70         80         75         100           25         78.2         90         80         100         90         100           30         92         110         100*         125         110         200           40         120         150         125         150         150         200           40         120         150         175         150         200         175         200           50         150         175         150         200         175         200         225         225         225         400		-					
3         11         12         12         15         15         30           5         17.5         20         20         25         25         30           7½         25.3         30*         25*         35         30*         60           10         32.2         40         35         45         40         60           15         48.3         60         50         70†         60         60           20         62.1         75         70         80         75         100           25         78.2         90         80         100         90         100           30         92         110         100*         125         110         200           40         120         150         125         150         150         200           50         150         175         150         200         175         200           60         177         200*         200*         225         225         225         400           75         221         250         250         300         300         300         400         120         40         1				-	· ·		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						_	
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15					_		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							
25							
30   92   110   100*   125   110   200   40   120   150   125   150   150   200   50   150   175   150   200   175   200   60   177   200*   200*   225   225   225   400   75   221   250   250   300   300   400   100   285   350   300   400   350   400   125   359   400*   450   600   500   600							
\$\begin{array}{c c c c c c c c c c c c c c c c c c c							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							
60         177         200*         200*         225         225         400           75         221         250         250         300         300         400           100         285         350         300         400         350         400           125         359         400*         400*         450         450         600         500         600           230 VOLT 3-PHASE MOTORS (240V CIRCUIT)           ½         2.2.2         28/10         2½         28/10         28/10         30           ¾         3.2         4         3½         4         4         30           1         4.2         5         4½         58/10         5         30           1½         6.0         7½         6¼         7½         7½         30           2         6.8         8         7½         9         8         30           3         9.6         12         10         12         12         30           5         15.2         17½         17½         20         17½         30           7½         22         25         25         30         30<							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	75	221	250	250	300	300	400
150							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	150	414					600
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	16	2.2					20
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				-			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						-	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				-			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		6.8	-	-	-	-	
7½         22         25         25         30         30         30           10         28         35         30*         35         35         60           15         42         50         45         60         50         60           20         54         60*         60*         70         70         100           25         68         80         75         90         80         100           30         80         100         90         100         100         100           40         104         125         110         150         125         200           50         130         150         150         175         150         200           60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
10         28         35         30*         35         35         60           15         42         50         45         60         50         60           20         54         60*         60*         70         70         100           25         68         80         75         90         80         100           30         80         100         90         100         100         100           40         104         125         110         150         125         200           50         130         150         150         175         150         200           60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
15         42         50         45         60         50         60           20         54         60*         60*         70         70         100           25         68         80         75         90         80         100           30         80         100         90         100         100         100           40         104         125         110         150         125         200           50         130         150         150         175         150         200           60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
20         54         60*         60*         70         70         100           25         68         80         75         90         80         100           30         80         100         90         100         100         100           40         104         125         110         150         125         200           50         130         150         150         175         150         200           60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
25         68         80         75         90         80         100           30         80         100         90         100         100         100           40         104         125         110         150         125         200           50         130         150         150         175         150         200           60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
30         80         100         90         100         100         100           40         104         125         110         150         125         200           50         130         150         150         175         150         200           60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
50         130         150         150         175         150         200           60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
60         154         175         175         200         200         200           75         192         225         200*         250         225         400							
75 192 225 200* 250 225 400							
100   440   300   400   300   300   400							
125 312 350 350 400 400 400							
150 360 450 400* 450 450 600							
200 480 600 500 600 600 600		480		500	600	600	600

•	, Das	eu on	WIOLOI	110136	power				
				OVERLOAD AYS	WITH OVERL	OAD RELAYS			
	MOTOR HP	FULL LOAD AMPS	S.F. = 1.15 OR MORE, TEMP RISE NOT OVER 40°C	S.F. = LESS THAN 1.15 OR TEMP RISE MORE THAN 40°C	S.F. = 1.15 OR MORE, TEMP RISE NOT OVER 40°C	S.F. = LESS THAN 1.15 OR TEMP RISE MORE THAN 40°C	SWITCH OR FUSE CLIP RATING		
	460 VOLT 3-PHASE MOTORS (480V CIRCUIT)								
	1/2	1.1	14/10	11/4	14/10	14/10	30		
	3/4	1.6	2	18/10	2	2	30		
	1	2.1	21/2	21/4	28/10	2½	30		
	11/2	3.0	3½	32/10	4	3½	30		
	2	3.4	4	3½	4½	4	30		
	3	4.8	56/10	5	6	5 <sup>6</sup> /10	30		
	5	7.6	9	8	10	9	30		
	71/2	11	12	12	15	15	30		
	10	14	17½	15	17½	17½	30		
	15	21	25	20	30	25	30		
	20	27	30*	30*	35	35	60		
	25	34	40	35	45	40	60		
	30	40	50	45	50	50	60		
	40	54	60*	60*	70	60*	100		
	50	65	80	70	90	75	100		
	60	77	90	80	100	90	100		
	75	96	110	110	125	125	200		
	100	124	150	125	175	150	200		
	125	156	175	175	200	200	200		
	150	180	225	200*	225	225	400		
	200	240	300	250	300	300	400		
				HASE MOTOR					
	1/2	0.9	11/8	1	11/8	11/8	30		
	3/4	1.3	16/10	14/10	16/10	16/10	30		
	1	1.7	2	18/10	21/4	2	30		
	1½	2.4	3	21/2	3	3	30		
	2	2.7	32/10	28/10	3½	32/10	30		
	3	3.9	4½	4	5	4½	30		
	5 7½	6.1 9	7½	7 10	8 12	7½ 12	30		
	10	11	10 12	12	15	15	30		
	15	17	20	17½	25	20	30		
	20	22	25	25	30	30	30		
	25	27	30*	30*	35	35	60		
	30	32	40	35	40	40	60		
	40	41	50	45	60	50	60		
	50	52	60	60	70†	60	60		
ı	60	62	75	70	80	75	100		
	75	77	90	80	100	90	100		
	100	99	110	110	125	125	200		
	125	125	150	125	175	150	200		
	150	144	175	150	200	175	200		
	200	192	225	200*	250	225	400		

#### **NOTES**

S.F. = Motor Service Factor

- \* Fuse Reducers Required
- † 100 Amp Switch Required



## **Motor Protection White Paper**

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## MOTOR PROTECTION TABLES

# Selection of POWR-PRO® Class J Fuses (JTD\_ID / JTD Series) Based on Motor Full Load Amps

MOTOR F.L.A.	JTD_ID / JTD AMPERE RATING	MOTOR F.L.A.	JTD_ID / JTD AMPERE RATING	MOTOR F.L.A.	JTD_ID / JTD AMPERE RATING
0.00 - 0.60	8/10	12.1 – 14.5	17 1/2	76.1 – 84.0	110
0.61 - 0.80	1	14.6 – 17.0	20	84.1 – 90.0	125
0.81 - 1.00	11/4	17.1 – 21.0	25	90.1 – 102	150
1.01 – 1.20	1½	21.1 – 25.0	30	103 – 125	175
1.21 - 1.65	2	25.1 – 28.5	35	126 – 144	200
1.66 – 2.00	2½	28.6 – 34.0	40	145 – 162	225
2.01 - 2.40	3	34.1 – 37.0	45	163 – 180	250
2.41 – 3.30	4	37.1 – 41.0	50	181 – 204	300
3.31 - 4.10	5	41.1 – 48.0	60	205 – 240	350
4.11 – 4.90	6	48.1 – 52.0	70	241 – 288	400
4.91 - 6.40	8	52.1 – 59.0	80	289 – 312	450
6.41 – 8.00	10	59.1 – 66.0	90	313 – 360	500
8.01 - 9.80	12	66.1 – 76.0	100	361 – 432	600
9.81 – 12.0	15				

NOTE: For severe motor starting conditions, fuses may be sized up to 225% motor F.L.A. (See NEC® Article 430.52 for Exceptions)

## **Selection of CCMRTime-Delay Fuses Based on Motor Full Load Amps**

MOTOR FULL LOAD CURRENT (F.L.A.)						
FOR MOTORS WITH TIME OF 2 SEC		FOR MOTORS WITH AN ACCELERATION TIME OF 5 SECONDS OR LESS		FOR MOTORS WITH AN ACCELERATION TIME OF 8 SECONDS OR LESS		CCMR AMPERE RATING
MIN. F.L.A. (1)	MAX F.L.A. (3)	MIN. F.L.A. (1)	MAX F.L.A. (3)	MIN F.L.A. (2)	MAX F.L.A. (3)	
0.2	0.2	0.2	0.2	0.2	0.2	3/10
0.3	0.4	0.3	0.4	0.3	0.3	1/2
0.4	0.6	0.4	0.5	0.4	0.5	8/10
0.5	0.7	0.5	0.6	0.5	0.6	1
0.6	1.0	0.6	0.9	0.6	0.8	11/4
0.8	1.1	0.8	1.0	0.7	0.9	1½
0.9	1.3	0.9	1.1	0.8	1.0	18/10
1.1	1.4	1.1	1.2	0.9	1.1	2
1.2	2.1	1.2	2.1	1.2	1.8	2½
1.5	2.6	1.5	2.6	1.4	2.3	3
1.8	3.0	1.8	3.0	1.6	2.6	3½
2.1	3.4	2.1	3.2	1.8	2.8	4
2.3	3.9	2.3	3.3	2.0	2.8	4½
2.6	4.3	2.6	3.4	2.3	2.8	5
2.9	4.8	2.9	3.7	2.5	3.1	<b>5</b> <sup>6</sup> /10
3.3	5.2	3.3	4.0	2.7	3.4	6
3.5	5.4	3.5	4.1	2.8	3.5	61/4
3.6	5.7	3.6	4.2	3.2	3.7	7
4.1	5.8	4.1	4.3	3.4	3.8	7½
4.3	6.2	4.3	4.6	3.6	4.2	8
4.6	6.9	4.6	5.2	4.0	4.5	9
5.2	7.7	5.2	5.8	4.5	4.9	10
5.8	8.9	5.8	6.6	5.4	5.5	12
6.9	10.0	6.9	7.7	6.7	6.7	15
8.9	13.5	8.9	10.0	6.8	9.0	20
11.5	15.8	11.2 (2)	11.8	9.0	11.0	25
14.3	17.8	13.4 (2)	13.4	10.0	15.0	30
20.7	23.3	16.1	17.9	15.6	15.9	35
23.7	26.7	18.4	20.5	17.8	18.2	40
26.6	30.0	20.7	23.1	20.0	20.4	45
30.0	33.3	23.0	25.6	22.3	22.7	50
35.5	40.0	27.6	30.1	26.7	27.3	60

- 1 Based on NEC $^{\odot}$  requirement limiting the rating of time-delay fuses to 175% of motor F.L.A., or next higher rating.
- 2 Based on NEC® exception permitting fuse rating to be increased, but not to exceed, 225% motor F.L.A., however per NEC® Article 430.52 Class CC (0-30) fuses can now be sized up to 400% of motor F.L.A.
- 3 Based on Littelfuse CCMR time-delay characteristics.

NOTE: These values were calculated for motors with Locked Rotor Current (LRA), not exceeding the following values:

MOTOR F.L.A.	*LRA
0.00 - 1.00	850%
1.01 – 2.00	750%
2.01 – 10.0	650%
10.1 – 17.8	600%

<sup>\*</sup>If motor LRA varies from these values, contact Littelfuse.



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LSSW

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## CONDENSED CROSS REFERENCE GUIDE

This cross reference covers the most popular fuses for which there is a similar Littelfuse standard item. Furnished for your convenience, it is meant to serve as a guide for product selection. We suggest you check all applicable specifications before making substitutions. For special applications, more complete information, and for fuse block and medium voltage fuse cross referencing, visit Littelfuse.com or call 1-800-TEC-FUSE (1-800-832-3873).



Competitor	Littelfuse	Competitor	Littelfuse	Competitor	Littelfuse	Competitor	Littelfuse
10KOTN	NLN	CHSF	L50QS	KAA	L15S	NRN	NLN
10KOTS	NLS	CJ	JLS	KAB	L25S	NRN (15-60A)	NLKP
50KOTN	NLN	CJS	JLS	KAC	KLC	NRS	NLS
50KOTS	NLS	CLF	KLPC or KLLU	KBH	L50S	OT	NLN
A013F	L15S	CLL	KLLU or KLPC	KLM	KLKD	OTM	BLF or BLN
A015F	L15S	CLU	KLLU or KLPC	KLU	KLLU or KLPC	OTN	NLN
A015R	L15S	CM	BLF	KN	KLNR	OTS	NLS
A025F	L25S	CRN-R	FLNR_ID ‡	KON	NLN	PV-(1-30)A10F	SPF
A050F	L50S	CRS-R	FLSR_ID	KOS	NLS	REN	FLNR +
A060F	L60S	CTN-R	KLNR	KRP-C	KLPC	RES	FLSR +
A070F	L70S	CTS-R	KLSR	KS	KLSR	RF	FLNR +
A13X	L15S	DCT	SPF†	KTK	KLK	RFA	L15S
A25X	L25S †	EBS	BLS	KTKR	KLKR	RFC	KLC
A2D-R	LLNRK §	ECNR	FLNR_ID ‡	KTNR	KLNR	RFL (750V)	L70S (700 V)
A2K-R	KLNR	ECSR	FLSR_ID	KTSR	KLSR	RFN (Mersen)	FLNR +
A3T	JLLN	ERN	FLNR +	KTU 601-2000A	LDC	RFS (Mersen)	FLSR+
A4BQ	KLPC	ERS	FLSR +	KTU 2500-6000A	KLPC	RFV	L50S
A4BT	KLLU or KLPC	FNA	FLA	LCL	KLPC or KLLU	RHN	KLNR
A4BY	KLPC or KLLU	FNM	FLM	LCU	LDC	RHS	KLSR
A4J	JLS	FNQ	FLQ	LENRK	LLNRK	S	S00
A50P (type 1 & 4)	L50S	FNQ-R	KLDR	LESRK	LLSRK_ID	SA	SA0
A50QS	L50QS	FRN-R	FLNR ID‡	LKU	KLLU	SC	SLC
A60X	L60S	FRS-R	FLSR_ID	LONRK	LLNRK	SEC	SLC
A6D-R	LLSRK_ID §	FWA	L15S †§	LOSRK	LLSRK_ID	SF13X	L15S
A6K-R	KLSR	FWH	L50QS	LPCC	CCMR	SF25X	L25S
A6T	JLLS	FWP	L70QS	LPJ (SP)	JTD_ID	SF50P	L50S
A70P	L70S	FWX	L25S * †	LPNRK (SP)	LLNRK §	SF60X	L60S
A70QS	L70QS	GDA	216	LPSRK (SP)	LLSRK_ID	SF70P	L70S
ABC	314	GDB	217	MCL	KLK	SFE	SFE
ACK	ССК	GDC	218	MCR	251	SL	SL0
AG	SLC	GDL	313	MDA	326	T	T00
AGA	AGA	GEB	LEB	MDL	313	TJN	JLLN
AGC	312	GEBN	LET	MDQ	313	TJS	JLLS
AGU (1-30A)	BLN	GFA	251	MDV	315	TL	TL0
AGW	AGW	GFN	FLA	MDX	313	TR	FLNR_ID */§
AJT	JTD_ID	GGC	312	MEN	FLM	TRM	FLM
AMG	MEG	GGM	235	MEQ	FLQ	TRN-R	FLNR_ID */§
AMI	MID	GLR	LGR	MID	FLA	TRS	FLSR_ID §
ANL	CNL §	GMA	235	MOF	BLN	TRS-R	FLSR_ID §
ANN	CNN_E	GMD	239	MOL	BLF	XL25X	L25S
ASO	SPF	GMT	481	MTH	312	XL50F	L50S *
ATC	ATO (287)	HCLR	KLKR	NCLR	KLNR	XL70F	L70S *
AT-DE	FLNR_ID *	HCTR	KLDR	NON	NLN		
ATDR	CCMR §	HEB	LEB	NOS	NLS		
ATM (Mersen)	KLKD	HET	LET				

A fuse may be used in circuits where the fuse's voltage rating is equal to or greater than the circuit voltage, unless otherwise stated on the fuse. For example, the FLSR\_ID indicating fuse has a voltage rating of 75-600 volts. This fuse can be used on 600 volts, 480 volts, 250 volts, 125 volts, or 75 volts. Never use a fuse in a circuit having a higher rated voltage than the fuse.

ATMR

ATQ

**ATQR** 

AX

BAF

BAN

**BBS** 

C519

littelfuse.com

KLKR 5

FLQ.

481

BLF

BLN

**BLS** 

229

225

**KLDR** 

HLR

HP10M

HP6J

JDL

JFL

JHC

JJN

JJS

JKS

LHR

SPF

JLS

SPFJ\*

JTD\_ID

JTD\_ID

JLLN

**JLLS** 

JLS

<sup>\*</sup> Check specific mounting dimensions before substituting.

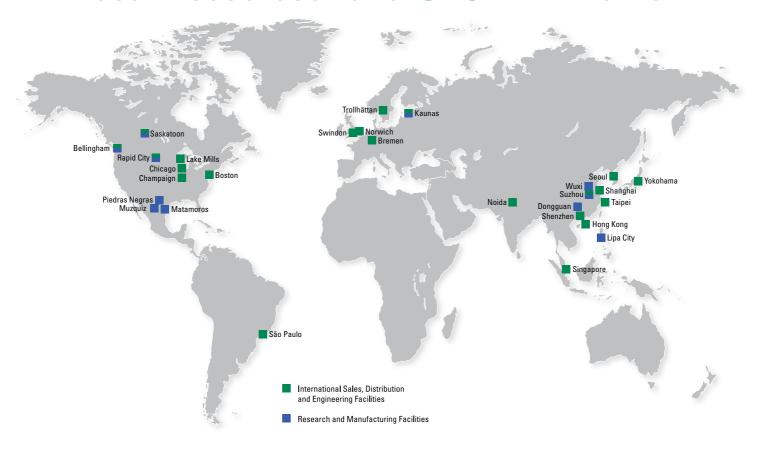
 $<sup>\</sup>ensuremath{^{\dagger}}$  Check characteristics and dimensions for application before substituting.

 $<sup>\</sup>ddagger$  For 1/10 - 30 amperes, order non-indicating FLNR series fuses.

<sup>§</sup> Verify voltage for DC applications.

<sup>+</sup> Littelfuse product is a non-renewable fuse.

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#### Visit Technical Resources at Littelfuse.com

Technical information is only a click away. The Littelfuse Technical Resources contains datasheets, product manuals, whitepapers, application guides, demos, on-line design tools, and more.

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## Technical Hotline (800-TEC-FUSE or 800-832-3873)

Littelfuse engineers are a phone call away to help identify potential issues and provide product recommendations to resolve problems.

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Littelfuse products are certified to many standards around the world. To check certifications on specific product please refer to the product datasheet on Littelfuse.com.

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