Littelfuse®

Expertise Applied | Answers Delivered

POWR-GARD®
PRODUCTS
CATALOG

POWR-GARD PRODUCTS

Indicating Fuses • Blocks and Holders • Protection Relays • MOVs • Medium Voltage Fuses

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UL FUSE CLASSES AND SELECTION CHART

UL CLASS	LITTELFUSE SERIES	OVERLOAD CHARACTERISTICS	AC RATINGS			DC RATINGS			RECOMMENDED FUSEBLOCKS AND FUSEHOLDERS	FUSE SERIES PAGE NUMBERS
			VOLTAGE (VOLTS)	CURRENT (AMPERES)	INTERRUPTING (AMPERES)	VOLTAGE (VOLTS)	CURRENT (AMPERES)	INTERRUPTING (AMPERES)		
L	KLPC	Time-Delay	600	200 - 6000	200K / 300K*	480	200 - 6000	20,000	–	11
	KLLU			601 - 4000	200,000	–	–	–		12
	LDC			150 - 2000	200,000	600	150 - 2000	50,000		13
RK1	LLNRK	Time-Delay	250	0.1 - 600	200K / 300K*	125	0.1 - 600	20,000	LFR25	16
	LLSRK_ID	Time-Delay	600	0.1 - 600		300	0.1 - 600		LFR60	16
	LLSRK	Time-Delay	600	0.1 - 600		300	0.1 - 600		LFR60	16
	KLNR	Fast-Acting	250	1 - 600	200,000	125	1 - 600		LFR25	17
	KLSR	Fast-Acting	600	1 - 600		250 300	1 - 30 35 - 600		LFR60	17
RK5	FLNR_ID	Time-Delay	250	35 - 600	200K / 300K*	125	35 - 600	20,000	LFR25	20
	FLNR		250	0.1 - 600		125	0.1 - 30			20
	FLSR_ID		600	0.1 - 600		300	0.1 - 600		LFR60	20
	FLSR		600	0.1 - 600		300	0.1 - 600			20
	IDSR		600	0.1 - 600		600	0.1 - 600			19
J	JTD_ID	Time-Delay	600	0.8 - 600	200K / 300K*	300	0.8 - 100	20,000	LFJ60 / LPSJ	27
	JTD	Time-Delay	600	0.8 - 600		500	110 - 600			27
	JLS	Fast-Acting	600	1 - 600	200,000	–	–	–		28
T	JLLN	Fast-Acting	300	1 - 1200	200,000	125 160 125	1 - 30 35 - 60 110 - 1200	20,000	LFT30 / LSCR002 (700 - 1200A)	30
	JLLS		600	1 - 1200		300	1 - 1200		LFT60 / LSCR002 (700 - 1200A)	30
CC	CCMR	Time-Delay	600	0.2 - 30	200K / 300K*	250 250 300 500	0.2 - 2 4.5 - 10 2.25 - 4 12 - 30	20,000	L60030C / LPSC / LINK00_C / 571 / 572 / LEC / LEY	33
	KLDR	Time-Delay	600	0.1 - 30	200,000	300	0.1 - 30			34
	KLKR	Fast-Acting	600	0.1 - 30	200,000	300	0.1 - 30			34
CD	CCMR	Time-Delay	600	35 - 60	200K / 300K*	250	35 - 60	20,000	L60060C	33
G	SLC	Time Lag	600 480	0.2 - 20 25 - 60	100,000	–	–	–	LFG30 LG300G30 (for 25 & 30A)	32
H	NLKP	Non-Renewable	250	15 - 60	10,000	–	–	–	LFH25	24
	RLN	Renewable	250	1 - 600						25
	RLS	Renewable	600	1 - 600					LFH60	25
Solar	SPFR	Fast-Acting	–	–	–	1000	250 - 400	10,000	SPFRHV	23
K5	NLN	Fast-Acting	250	1 - 600	50,000	250	1 - 600	20K (1 - 60A) 50K (70 - 600A)	LFH25	24
	NLS		600	1 - 600		600 500 400 600 500	1 - 7 8 - 30 35 - 60 70 - 200 225 - 600	20K (1 - 60A) 50K (70 - 600A)	LFH60	24
Semiconductor	L15S	Fast-Acting	150	1 - 1000	200,000	150 100	1 - 60 70 - 1000	20,000	LSCR / 1LS	67
	L25S		250	1 - 800		250 400	1 - 200 225 - 800			67
	L50S		500	10 - 800		450	10 - 800			67
	L60S		600	1 - 800		–	–			67
	L70S		700	10 - 800		650	6 - 800			67
Midget (Supplementary)	BLF	Fast-Acting	250 125	0.5 - 15 20 - 30	10,000	–	–	–	L60030M / LPSM / LINK00_M / 571 / 572 / LEB / LEX	38
	BLN	Fast-Acting	250	1 - 30	10,000	–	–	–		38
	BLS	Fast-Acting	600 250	0.2 - 5 6 - 10	10,000	–	–	–		39
	FLA	Time-Delay	125	0.1 - 30	10,000	–	–	–		39
	FLM	Time-Delay	250	0.1 - 30	10,000	125	0.1 - 30	10,000		38
	FLQ	Time-Delay	500	0.1 - 30	10,000	300	0.1 - 30	10,000		38
	KLK	Fast-Acting	600	0.1 - 30	100K / 200K*	500	0.1 - 30	–		38
	KLKD	Fast-Acting	600	0.1 - 30	100,000	600	0.1 - 30	10,000		38
	KLQ	Time-Delay	600	1 - 6	10,000	–	–	–		39
	FLU	Fast-Acting	1000	0.44 11	10,000 20,000	1000	0.44 11	10,000 20,000	LPHV	39
	SPF	Time-Delay	–	–	–	1000	1 - 30	20,000	LPHV	37
Plug	SOO, TOO	Time-Delay	125	0.25 - 30	10,000	–	–	–	SAO (for SOO & SLO)	63
	SLO, TLO	Medium Time-Delay	125	15 - 30	10,000	–	–	–		
Telecom	L17T	Fast-Acting	–	–	–	170	70 - 1200	100,000	LTFD6001 / LTFD1200	57
	TLN		–	–	–		1 - 600		LFR25	58
	TLS		–	–	–		1 - 125		LTFD / LFT20060 (cartridge)	59

* Series are UL Listed with I.R. of 200,000A and Littelfuse® self-certified with 300,000A I.R.

Littelfuse POWR-GARD®—Advanced Protection and Facility Savings

POWR-PRO®

Be safer with POWR-PRO® Fuses

- Superior current-limitation from $^{1}/_{10}$ – 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

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

UL FUSE CLASS	PAGE NUMBERS	POWR-PRO®	PAGE NUMBERS
Class L	11-15	KLPC	11, 14
Class RK1	16-18	LLNRK/LLSRK_ID	16
Class J	27-29	JTD/JTD_ID	27
Class CC / CD	33-35	CCMR ($^{2}/_{10}$–60)	33

MRO™ PLUS

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 and free customized inventory bin labels

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!

Saving Space with the Next Generation of Fuseblocks

Littelfuse® understands your challenge to constantly improve your products— that's why we developed a brand new line of next generation fuseblocks.

Introducing the LF Series Fuseblocks.
Smaller. More efficient. More valuable to your customers.
These products meet your design and business objectives, provide value to your customers and differentiate your products from the competition.

For additional technical information on the new LF Series Fuseblocks visit
www.littelfuse.com/fuseblocks

Indication of Forward Thinking

From the inventors of the Indicator® fuses comes another innovation—DIN-releasable, compact, indicating fuseblocks that feature modern design and universal mounting holes for drop-in replacement.

We understand your products are a reflection of your brand and expertise. That's why our latest innovation provides you more value.

Now that's what we call forward thinking.

Smaller Footprint Provides Space Savings

What would you do with more space? That's a great position to be in. Maybe you'll choose a smaller enclosure to realize cost savings. Or use the room to add more features and differentiate your design from the competition.

Either way, you'll appreciate the added value of indication and a modern, clean design that conveys high quality and professionalism to your customers.

DIN-Rail Mounting Eases Installation

DIN-Rail mounting on the new LF Series fuseblocks eases initial design layout and assembly time. With no additional hardware or holes to drill, the DIN mounting feature also speeds rework or design changes. Just snap and release the fuseblocks from the rails to make adjustments.

The universal mounting holes eliminate the need to change existing back-panel layouts, making the Littelfuse LF Series fuseblocks the perfect choice for drop-in replacements.

Indication Improves Functionality

Your customers want to increase efficiency, troubleshoot faster, reduce downtime and improve their bottom line. You can help them do just that by using the Littelfuse indicating fuseblocks to instantly let them know which circuit is open. This extra benefit can be provided with virtually no extra investment on your part.

Do the smart thing for your customers and for your business—opt for the value of indication that only Littelfuse provides. Outperform your competitors and be the first to offer a valuable benefit to your customers.

See page 82 for more information on fuseblocks.

Protection Beyond Fuses

IMPROVE ELECTRICAL SAFETY

POWR-GARD® Protection Relays

Our comprehensive line of protection relays safeguard equipment and personnel in order to prevent expensive damage, downtime or injury due to electrical faults.

The features and flexibility within the products and the software allow you to select the appropriate protection for each part of your electrical system.

See page 145 for more information on Protection Relays.

POWR-GARD® Electrical Safety Services

Littelfuse POWR-GARD Services offers an extensive package of services specializing in project management of power studies, electrical hazard assessments, electrical safety "compliance" and worker training. Electrical Safety Services along with safety products such as current-limiting fuses and ground fault protection relays enable Littelfuse to offer a variety of solutions for employers to protect workers against Arc-Flash and other electrical hazards while meeting OSHA, NFPA 70E and NEC standards.

See page 161 for more information on Electrical Safety Services.

Improve Safety by Reducing:

- Shock Hazard
- Injury to Personnel
- Arc-Flash Hazards
- Open CT Hazards
- Failed Resistors

Reduce Cost and Downtime by Minimizing:

- Fault Damage
- Equipment Replacement
- Calibration Costs
- Compliance Citations
- Motor Rewinds
- Replacement Time
- Nuisance Tripping
- Intermittent Faults

Comply with NEC® and OSHA with POWR-GARD® Services

- Engineering Services
- Power Studies
- Arc-Flash Hazard Analysis
- S.C. and Coordination Studies
- Inspections and Data Gathering
- One-Line Drawings
- Warning Labels
- Training and Consultation

Solar Circuit Protection for Today's Evolving Technologies

WWW.LITTELFUSE.COM/GREEN

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.

High-voltage solar products

Other circuit protection products used in solar applications

SOLAR-RATED

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

Meet NEC® Requirements and Save Time with Littelfuse Pre-Engineered Solutions




LCP Series Coordination Panel

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

See pg. 138-139

LPS Series POWR-Switch

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

See pg. 140-141

LPMP Series POWR-Switch Panel

Fusible panel board with shunt trip capabilities for the control of power to a bank of equipment. Typical applications include elevator circuits.

See pg. 142-143

www.littelfuse.com

All of the Information You Need in One Convenient Place

Catalogs, Datasheets and Product Literature

- Datasheets, product catalogs, and brochures for the full Littelfuse line
- Comparison chart and cross reference
- Space-savings calculator
- Agency certifications
- Product dimensions
- Application notes and white papers

In-Depth Technical Information

- Detailed specifications
- CAD drawings
- Downloadable 2-D .dxf and 3-D .igs files
- Comparison chart and cross reference
- Line drawings
- Time current and peak let-through curves

Sales, Distribution and Customer Support

- Distributor listings
- Online inventory
- **800-TEC-FUSE** technical support hotline

Look on each catalog page for specific product web links to access additional technical information.

Section Overview

For over 80 years Littelfuse® has been providing fuses to the electrical 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.

FUSES

Table of Contents

KLPC SERIES POWR-PRO® FUSES

POWR-PRO® 600 VAC • Time-Delay • 200-6000 Amperes

Description

KLPC series POWR-PRO® fuses meet or exceed the most stringent project specifications, such as 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 (see pg. 3)
- 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 V
	DC:	480 V
Interrupting Ratings:	AC:	200 kA rms symmetrical 300 kA rms symmetrical (Littelfuse self-certified)
	DC:	20,000 A
Ampere Range:		200 – 6000 A
Approvals:	AC:	Standard 248-10, Class L UL Listed 601–6000 A (File No. E81895) UL Recognized 200–600 A (File No. E71611) CSA Certified 200–6000 A (File No. LR29862) Federal Specifications 700–6000 A (QPL-W-F-1814)
	DC:	Littelfuse self-certified

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	SYSTEM NUMBER
KLPC	800	KLPC800	KLPC800.X

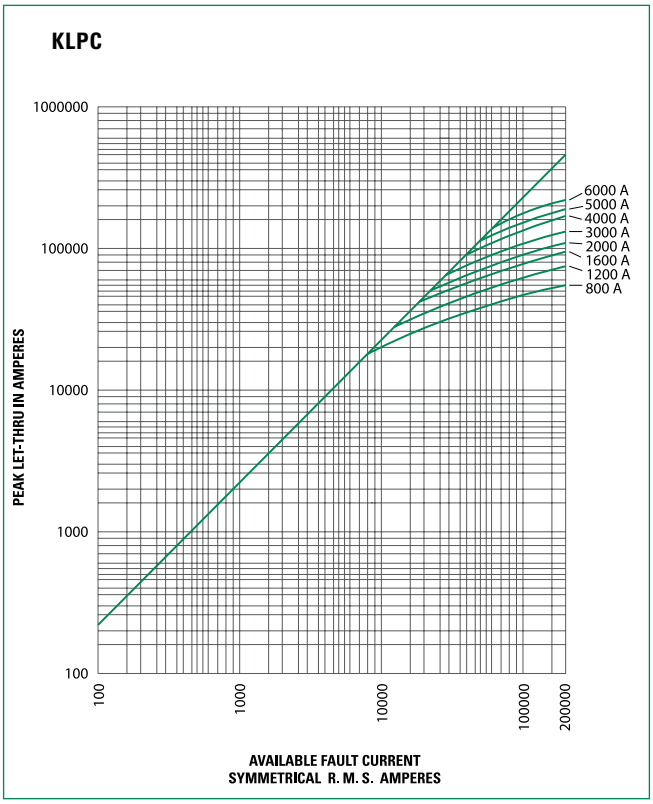
Web Resources

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

Dimensions

Please refer to Class L dimensions ..... pg. 15

Peak Let-Thru Curve



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

KLLU SERIES FUSES

600 VAC • Time-Delay • 601-4000 Amperes

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

Voltage Ratings: AC: 600 V
DC: 300 V

Interrupting Ratings: AC: 200 kA
DC: 20 kA

Ampere Range: 601–4000 A

Approvals: Standard 248-10, Class L
UL Listed (File No. E81895)
CSA Certified (File No. LR29862)
DC: Littelfuse self-certified

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	SYSTEM NUMBER
KLLU	601	KLLU601	KLLU601.X

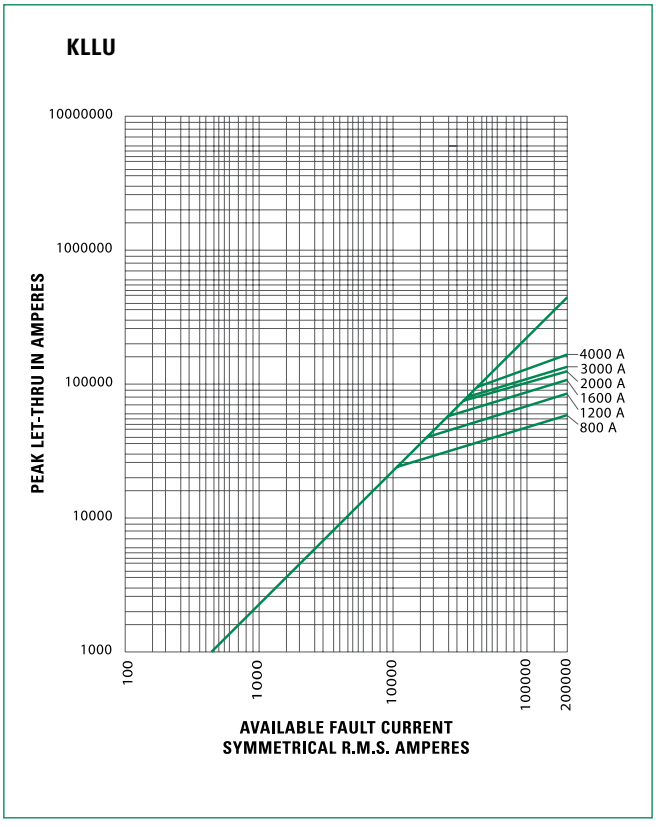
Web Resources

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

Dimensions

Please refer to the Class L dimensions ..... pg. 15

Peak Let-Thru Curve



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

LDC SERIES POWR-PRO® FUSES

POWR-PRO® 600 V AC/DC • Time-Delay • 150-2000 Amperes

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 (see pg. 3)
- Extremely Current-Limiting
- 600 V AC/DC rated
- 200 kA AC Interrupting Rating
- 50 kA DC Interrupting Rating

Specifications

Voltage Ratings: AC: 600 V
DC: 600 V

Interrupting Ratings: AC: 200 kA rms symmetrical
DC: 50 kA
(16 millisecond time-constant)

Ampere Range: 150–2000 A

Approvals: Standard 248-10, Class L
UL Listed 601–2000 A (File No. E81895)
UL Recognized 150–600 A
(File No. E71611)
CSA Certified 150–2000 A
(File No. LR29862)

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	SYSTEM NUMBER
LDC	700	LDC700	0LDC700.X

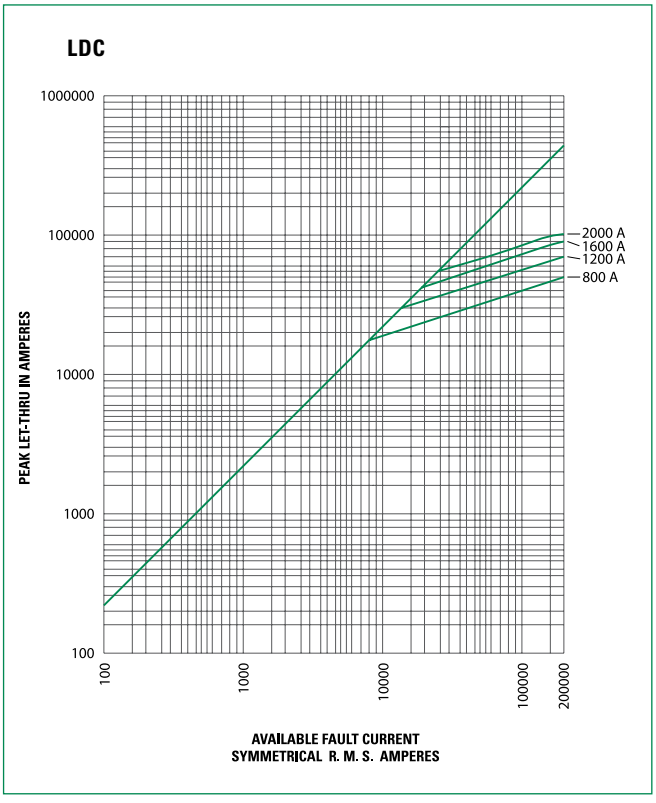
Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/ldc**

Dimensions

Please refer to the Class L dimensions ..... pg. 15

Peak Let-Thru Curve



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

CLASS L CURRENT-LIMITING EFFECTS

Current-Limiting Effects of KLPC (600 V) Fuses

SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS							
	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 CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS					
	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 CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS			
	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

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

CLASS L SERIES DIMENSIONS

Dimensions in inches (mm)

AMPERES	FIG. NO.	DIMENSIONS IN INCHES (mm)												
		A	B	C	D	E	F	G	H	J	K	L	M	N
200-800	1	3¾ (95.3)	5¾ (146.1)	6¾ (171.5)	—	—	8⅝ (219.1)	—	—	2 (50.8)	2½ (63.5)	⅜ (9.5)	⅝ x 1⅛ (15.9) x (28.6)	—
900-1200	2	3¾ (95.3)	5¾ (146.1)	6¾ (171.5)	9¼ (235.0)	9½ (241.3)	10¾ (273.1)	—	—	2 (50.8)	2½ (63.5)	⅜ (9.5)	⅝ x ¾ (15.9) X (19.1)	⅝ x 1⅛ (15.9) X (28.6)
1300-1600	2	3¾ (95.3)	5¾ (146.1)	6¾ (171.5)	9¼ (235.0)	9½ (241.3)	10¾ (273.1)	—	—	2⅜ (60.3)	3 (76.2)	7⁄16 (11.1)	⅝ X ¾ (15.9) X (19.1)	⅝ X 1⅛ (15.9) X (28.6)
1800-2000	2	3¾ (95.3)	5¾ (146.1)	6¾ (171.5)	9¼ (235.0)	9½ (241.3)	10¾ (273.1)	—	—	2¾ (69.9)	3½ (88.9)	½ (12.7)	⅝ x ¾ (15.9) x (19.1)	⅝ x 1⅛ (15.9) x (28.6)
2100-2500	3	4 (101.6)	5¾ (146.1)	6¾ (171.5)	9¼ (235.0)	9½ (241.3)	10¾ (273.1)	1⅝ (41.3)	1¾ (44.5)	3½ (88.9)	5 (127.0)	¾ (19.1)	⅝ X ¾ (15.9) x (19.1)	⅝ X 1⅛ (15.9) x (28.6)
2501-3000	3	4 (101.6)	5¾ (146.1)	6¾ (171.5)	9¼ (235.0)	9½ (241.3)	10¾ (273.1)	1⅝ (41.3)	1¾ (44.5)	4 (101.6)	5 (127.0)	¾ (19.1)	⅝ X ¾ (15.9) x (19.1)	⅝ X 1⅛ (15.9) x (28.6)
3500-4000	4	4 (101.6)	5¾ (146.1)	6¾ (171.5)	9¼ (235.0)	9½ (241.3)	10¾ (273.1)	1¾ (44.5)	3¼ (82.6)	4¾ (120.7)	5¾ (146.1)	¾ (19.1)	⅝ x 1⅜ (15.9) x (34.9)	⅝ x 1⅜ (15.9) x (34.9)
4500-5000	5	4 (101.6)	5¾ (146.1)	—	9¼ (235.0)	—	10¾ (273.1)	1⅝ (41.3)	3¼ (82.6)	5¼ (133.4)	7⅛ (181.0)	1 (25.4)	⅝ DIA. (15.9)	—
6000	5	4 (101.6)	5¾ (146.1)	—	9¼ (235.0)	—	10¾ (273.1)	1⅝ (41.3)	3¼ (82.6)	5¼ (133.4)	7⅛ (181.0)	1 (25.4)	⅝ DIA. (15.9)	—

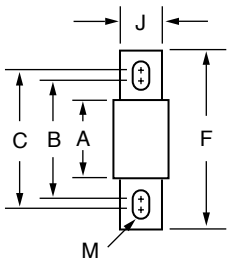


FIG.1

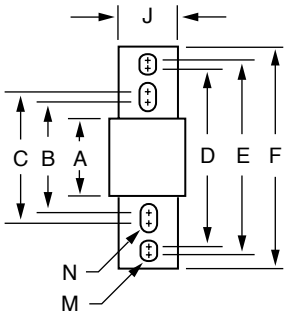


FIG.2

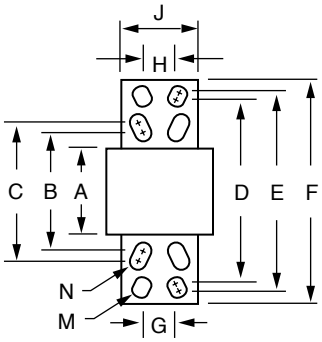


FIG. 3

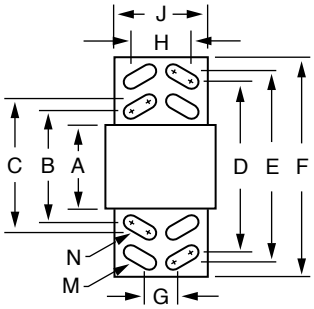


FIG. 4

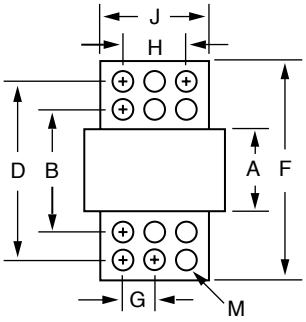
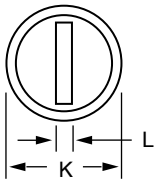


FIG. 5



LLNRK/LLSRK/LLSRK_ID SERIES INDICATOR® POWR-PRO® FUSES

POWR-PRO® 250/600 VAC • Dual Element • Time-Delay • 1/10-600 Amperes

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 (see pg. 3)
- Indication
- Dual-element design
- Extremely Current-Limiting
- IEC Type 2 "No Damage" protection to IEC and NEMA type motor starters
- Indicating and DIN mount fuseholders available

Specifications

Voltage Ratings: 600 VAC/300 VDC (LLSRK/LLSRK_ID)
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

Approvals: AC: Standard 248-12, Class RK1
UL Listed (File No. E81895)
CSA Certified (File No. LR29862)
DC: Littelfuse self-certified
Federal Specification WF-1814
(QPL- W-F-1814)

Recommended Fuseholders

LFR60 Series ..... pg. 90
LFR25 Series ..... pg. 90

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	1 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 ava lable for the 600 V.*

600 V

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

250 V

TYPE	SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
NON-INDICATING	LLNRK	80	LLNRK080	LNRK080.V

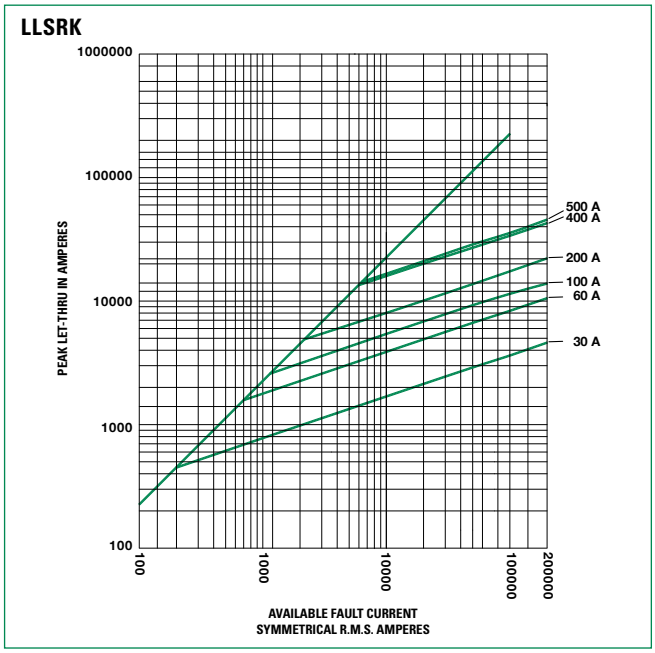
Web Resources

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

Dimensions

Please refer to the Class R dimensions..... pg. 22

Peak Let-Thru Curve (600 V)



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

KLNR/KLSR SERIES FUSES

250/600 VAC • Fast-Acting • 1-600 Amperes

Description

KLSR/KLNR fuses are an economical single element design providing the safety of an RK1 fuse.

Applications

- Resistance heaters
- Lighting circuits
- Non-inductive loads

Features/Benefits

- Extremely Current-Limiting
- Indicating and DIN mount fuseholders available

Specifications

Voltage Ratings:	AC:	250 V (KLNR); 600 V (KLSR)
	DC:	125 V (1 – 600 A KLNR); 250 V (1 – 30 A KLSR); 300 V (35 – 600 A KLSR).
Interrupting Ratings:	AC:	200 kA rms symmetrical
	DC:	20 kA
Ampere Range:		1 – 600 A
Approvals:	AC:	Standard 248-12, Class RK1 UL Listed (File No. E81895) CSA Certified (File No. LR29862)
	DC:	Littelfuse self-certified

Recommended Fuseholders

LFR60 Series ..... pg. 90
LFR25 Series ..... pg. 90

Dimensions

Please refer to the Class R dimensions..... pg. 22

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

600 V

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
KLSR	90	KLSR090	KLSR090.V

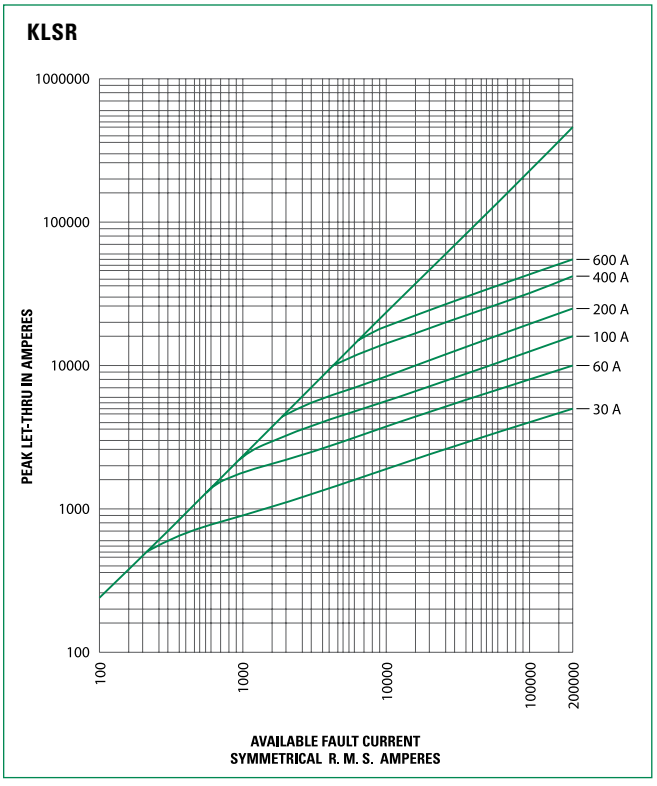
250 V

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
KLNR	90	KLNR090	KLNR090.V

Web Resources

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

Peak Let-Thru Curve



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

CLASS RK1 CURRENT LIMITING EFFECTS

Current-Limiting Effects of LLSRK and LLSRK_ID (600 V) Fuses

SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS					
	30 A	60 A	100 A	200 A	400 A	600 A
5,000	1,060	1,600	2,100	2,600	4,100	--
10,000	1,350	2,000	2,800	3,400	5,250	8,000
15,000	1,600	2,300	3,200	3,900	6,000	9,000
20,000	1,700	2,600	3,600	4,500	6,700	10,000
25,000	1,900	2,800	3,800	4,800	7,500	11,000
30,000	2,000	3,000	4,100	5,200	8,000	12,000
35,000	2,100	3,100	4,400	5,700	8,500	12,500
40,000	2,200	3,300	4,600	6,000	9,000	13,000
50,000	2,400	3,500	4,900	6,500	9,500	14,000
60,000	2,500	3,800	5,200	7,000	10,000	15,000
80,000	2,700	4,000	5,700	7,750	11,000	17,000
100,000	2,900	4,200	6,200	8,500	12,000	18,000
150,000	3,200	4,600	7,300	10,000	14,000	21,000
200,000	3,300	4,700	8,000	11,000	16,000	23,000

Visit **www.littelfuse.com/llsrk** for 600 V Current-Limiting effects

Current-Limiting Effects of LLNRK (250 V) Fuses

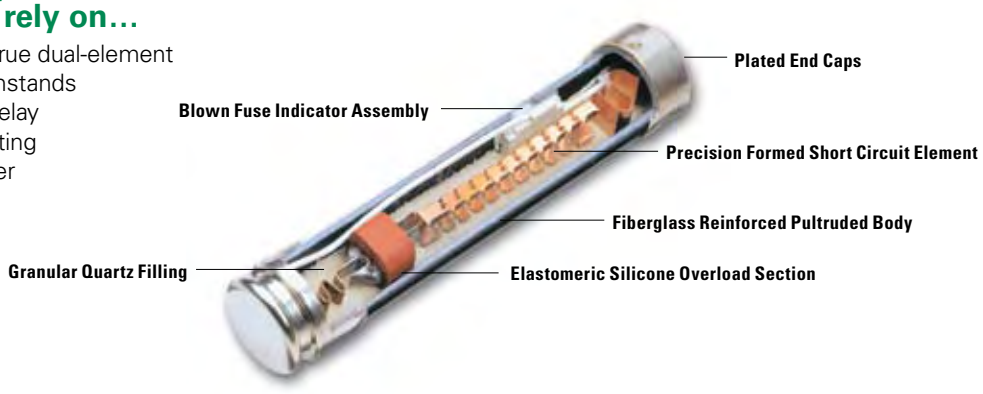
SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS					
	30 A	60 A	100 A	200 A	400 A	600 A
5,000	900	1,400	2,000	2,700	4,800	5,000
10,000	1,100	1,900	2,700	3,500	6,200	8,500
15,000	1,250	2,100	3,100	4,200	7,000	9,500
20,000	1,400	2,400	3,500	4,600	8,000	10,800
25,000	1,500	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

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

Visit **www.littelfuse.com/llnrk** for 250 V Current-Limiting effects

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 needless downtime caused by power surges or equipment demands.



IDSR SERIES INDICATOR® POWR-PRO® FUSES

POWR-PRO® 600 V AC/DC • Time-Delay • 1/10-600 Amperes

Description

The IDSR combines a 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 (see pg. 3)
- Indication

Specifications

Voltage Ratings: AC: 600 V
DC: 600 V

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 and UL 198M, Class RK5
UL Listed (File No. E81895)
CSA Certified (File No. LR29862)

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

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

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
IDSR	30	IDSR30	IDSR030.T

Web Resources

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

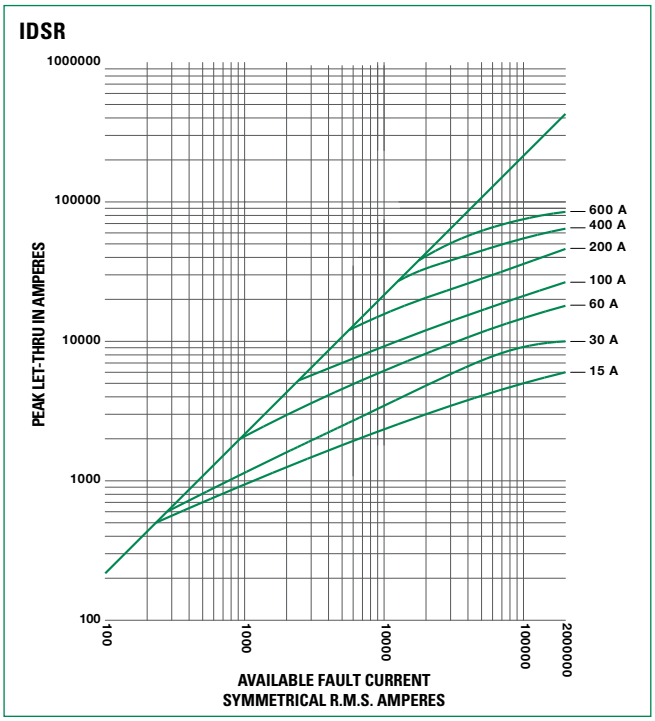
Recommended Fuseholders

LFR60 Series ..... pg. 90
Additional information in Blocks & Holders section ..... pg. 90-94

Dimensions

Please refer to the Class R dimensions..... pg. 22

Peak Let-Thru Curve



Note: For more information, see Peak Let-Thru Table on pg. 21

FLNR_ID/FLSR_ID SERIES INDICATOR® FUSES

250/600 VAC • Dual Element • Time Delay • 1/10-600 Amperes

Description

Available in both Indicating and Non-Indicating versions, the FLNR/FLSR series of fuses sets 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
- 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 1/10 – 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 No. E81895)
CSA Certified (File No. LR29862)
Federal Specification WF-1814
(QPL- W-F-1814)

Dimensions

Please refer to the Class R dimensions.....pg. 22
Refer to the FLNR Series dimensions for FLNR_ID, and FLSR dimensions for FLSR_ID.

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. †FLNR, FLSR, FLSR_ID only. **FLNR, FLSR, FLSR_ID only
Note: For 1/10 – 30A 250 volt fuses, order non-indicating FLNR series fuses.

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

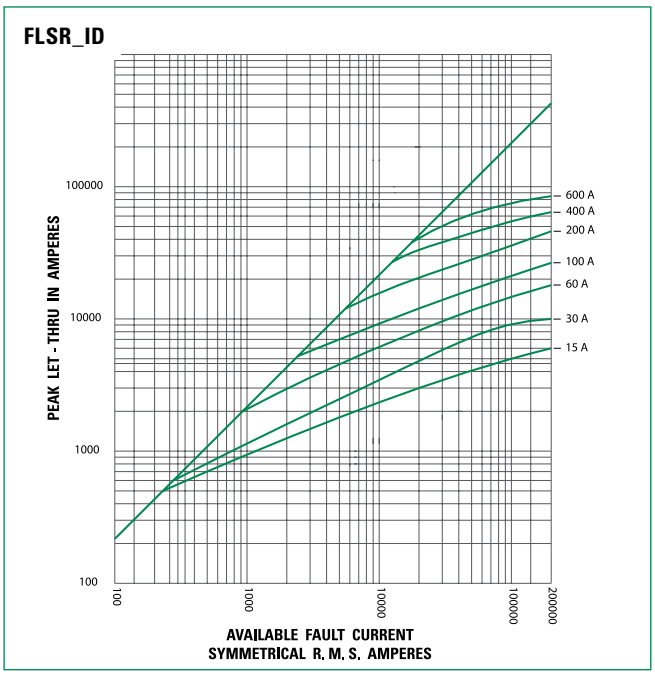
Web Resources

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

Recommended Fuseholders

LFR60 Series .....pg. 90
LFR25 Series .....pg. 90

Peak Let-Thru Curve



Note: For more information, see Peak Let-Thru Table on pg. 21

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 SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS					
	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					
	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

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

CLASS R SERIES DIMENSIONS

Dimensions in inches (mm)

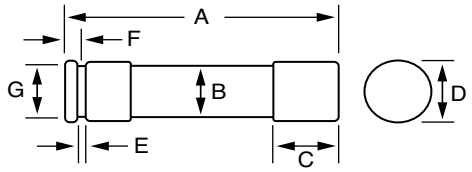
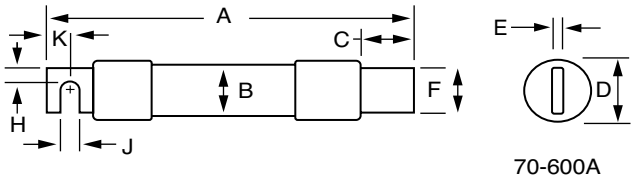


FIG. 1



70-600A

FIG. 2

AMPS	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm)									
			A	B	C	D	E	F	G	H	J	K
1/10–30	1	LLNRK/ FLNR	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)	—	—	—
		LLSRK/ FLSR/ IDSR	5 (127.0)	3/4 (19.1)	5/8 (15.9)	13/16 (20.6)	3/32 (2.4)	3/16 (4.8)	5/8 (15.9)	—	—	—
35–60	1	LLNRK/ FLNR	3 (76.2)	3/4 (19.1)	5/8 (15.9)	13/16 (20.6)	3/32 (2.4)	3/16 (4.8)	5/8 (15.9)	—	—	—
		LLSRK/ FLSR/ IDSR	5 1/2 (139.7)	1 (25.4)	5/8 (15.9)	1 1/16 (27.0)	3/32 (2.4)	1/4 (6.4)	7/8 (22.2)	—	—	—
70–100	2	LLNRK/ FLNR	5 7/8 (149.2)	1 (25.4)	1 1/16 (27.0)	1 1/16 (27.0)	1/8 (3.2)	3/4 (19.1)	—	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
		LLSRK/ FLSR/ IDSR	7 7/8 (200.0)	1 1/4 (31.8)	1 1/16 (27.0)	1 5/16 (33.3)	1/8 (3.2)	3/4 (19.1)	—	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
110–200	2	LLNRK/ FLNR	7 1/8 (181.0)	1 1/2 (38.1)	1 15/32 (37.3)	1 19/32 (40.5)	3/16 (4.8)	1 1/8 (28.6)	—	7/16 (11.1)	9/32 (7.1)	11/16 (17.5)
		LLSRK/ FLSR/ IDSR	9 5/8 (244.5)	1 3/4 (44.5)	1 15/32 (37.3)	1 27/32 (46.8)	3/16 (4.8)	1 1/8 (28.6)	—	7/16 (11.1)	9/32 (7.1)	11/16 (17.5)
225–400	2	LLNRK/ FLNR	8 5/8 (219.1)	2 (50.8)	1 15/16 (49.2)	2 3/32 (53.2)	1/4 (6.4)	1 5/8 (41.3)	—	5/8 (15.9)	13/32 (10.3)	15/16 (23.8)
		LLSRK/ FLSR/ IDSR	11 5/8 (295.3)	2 1/2 (63.5)	2 (50.8)	2 19/32 (65.9)	1/4 (6.4)	1 5/8 (41.3)	—	5/8 (15.9)	13/32 (10.3)	15/16 (23.8)
450–600	2	LLNRK/ FLNR	10 3/8 (263.5)	2 1/2 (63.5)	2 3/8 (60.3)	2 19/32 (65.9)	1/4 (6.4)	2 (50.8)	—	3/4 (19.1)	17/32 (13.5)	1 1/8 (28.6)
		LLSRK/ FLSR/ IDSR	13 3/8 (339.7)	3 (76.2)	2 13/32 (61.1)	3 3/32 (78.6)	1/4 (6.4)	2 (50.8)	—	3/4 (19.1)	17/32 (13.5)	1 1/8 (28.6)

SPFR SERIES 1000 VDC HIGH-AMPERAGE SOLAR FUSES

1000 VDC • Fast-Acting • 250-400 Amperes

Specifications

Voltage Rating: 1000 VDC
Ampere Ratings: 250, 300, 350 and 400 A
Interrupting Rating: 10,000 A; Time Constant less than 1ms
Fuse Type: Fast-Acting
Approvals: UL Recognized 1000 VDC UL 248 (File No. 71611)
CSA Certified (File No. 29862)

Ordering Information

CATALOG NUMBER	SYSTEM NUMBER	AMPERAGE
SPFR 250	SPFR250.X	250
SPFR 300	SPFR300.X	300
SPFR 350	SPFR350.X	350
SPFR 400	SPFR400.X	400

Recommended Fuseholders

SPFRHV Series ..... pg. 106

Description

The SPFR series was designed to meet the growing needs of the solar industry with higher amperage and voltage requirements. It was developed specifically for solar applications ranging from 250 A to 400 A.

Applications

- Solar inverters
- High-amperage combiner boxes

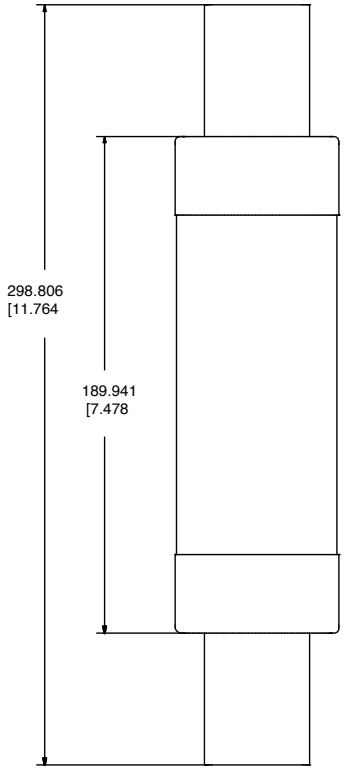
Features/Benefits

- DC voltage rating meets European system requirements and North American utility scale requirements
- Multiple amperage ratings
- UL Class H Dimensions
- Full range protection

Web Resources

Downloadable CAD drawings and other technical information:
www.littelfuse.com/spfr

Dimensions in mm (inches)



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

NLN/NLS SERIES (ONE-TIME) FUSES

250/600 VAC • "One-Time" • 1-600 Amperes

Description

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

Canadian Electrical Code NLKP Type P fuse available. See Web Resources links for more information.

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

Specifications

Voltage Ratings:	AC:	250 V	(NLN)
		600 V	(NLS)
	DC:	250 V	(NLN)
		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)
Interrupting Ratings:	AC:	50 kA rms symmetrical (NLN/NLS)	
	DC:	20 kA (NLN/NLS 1 – 60 A)	
		50 kA (NLN/NLS 70 – 600 A)	
Ampere Range:	1 – 600 amperes (NLN/NLS)		
Approvals:	NLN/NLS:	Standard 248-9, Class K5	
		UL Listed (File No. E81895)	
		CSA Certified (File No. LR29862)	

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

*NLKP series available only in those amperages preceded by an asterisk.

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
NLS	20	NLS020	0NLS020.T
NLN	15	NLN015	0NLN015.T

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/nln**
www.littelfuse.com/nls
www.littelfuse.com/nlkp

Recommended Fuseholders

LFH60 Series ..... pg. 90
LFH25 Series ..... pg. 89

Dimensions

Please refer to the Class K/H dimensions ..... pg. 26

RLN/RLS SERIES RENEWABLE FUSES AND LKN/LKS SERIES LINKS

250/600 VAC • Renewable • 1-600 Amperes

Ordering Information

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

*RLS only.
†These ampere ratings require two links per fuse.

TYPE	VOLTAGE	CATALOG NUMBER	SYSTEM NUMBER
FUSE	600	RLS020	0RLS020.T
FUSE	250	RLN020	0RLN020.T
LINK	600	LKS025	0LKS025.S
LINK	250	LKN030	0LKN030.S

Description

Littelfuse RLN and RLS series renewable fuses are a quality product that have traditionally been used to provide low cost protection of general purpose feeder and branch circuits where available short-circuit currents do not exceed 10,000 amperes. However, generally increased levels of available fault current and the distinct possibility that renewable fuses may be improperly renewed, have rendered them unsafe. The use of these fuses in new applications is prohibited by law.

Applications

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

Features/Benefits

- Replaceable fuse links
- 10 kA Interrupting Rating

Specifications

Voltage Ratings: AC: 250 V (RLN); 600 V (RLS)
Interrupting Ratings: AC: 10 kA rms symmetrical
Ampere Range: 1 – 600 A
Approvals: Standard 248-6, Class H
UL Listed (File No. E81895)
CSA Certified (File No. LR29862)
Fuse Links: To order, specify LKN (250V) or LKS (600V) plus ampere rating.

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/rln**
www.littelfuse.com/rls

Recommended Fuseholders

LFH60 Series ..... pg. 90
LFH25 Series ..... pg. 89

Dimensions

Please refer to the Class K/H dimensions ..... pg. 26

Still using Class H fuses?

Littelfuse offers several fuse and fuseblock combinations that can greatly improve electrical safety.

LLNRK/LLSRK..... pg. 16
FLNR/FLSR fuses ..... pg. 20
LFR fuseholders ..... pg. 88-94

Renewable Fuse Guide for Proper Usage

- Renewable fuses should only be used where short-circuit currents are known to be less than 10,000 amperes, and where correct replacement of open links is assured.
- Renewable fuses and links are not recommended for new applications.

CLASS K/H DIMENSIONS

Dimensions in inches (mm)

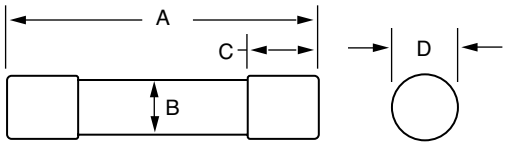


FIG. 1

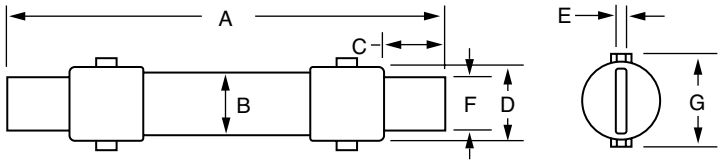


FIG. 2

AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm IN PARENTHESES)						
			A	B	C	D	E	F	G
1 – 30	1	NLN/RLN	2 (50.8)	½ (12.7)	½ (12.7)	9/16 (14.3)	—	—	—
		NLS/RLS	5 (127.0)	¾ (19.1)	5/8 (15.9)	13/16 (20.6)	—	—	—
35 – 60	1	NLN/RLN	3 (76.2)	¾ (19.1)	5/8 (15.9)	13/16 (20.6)	—	—	—
		NLS/RLS	5½ (139.7)	1 (25.4)	5/8 (15.9)	1 1/16 (27.0)	—	—	—
70 – 100	2	NLN/RLN	5 7/8 (149.2)	1 (25.4)	1 (25.4)	1 1/16 (27.0)	1/8 (3.2)	¾ (19.1)	1 5/16 (33.3)
		NLS/RLS	7 7/8 (200.0)	1¼ (31.8)	1 (25.4)	1 5/16 (33.3)	1/8 (3.2)	¾ (19.1)	1 9/16 (39.7)
110 – 200	2	NLN/RLN	7 1/8 (181.0)	1½ (38.1)	1 3/8 (34.9)	1 9/16 (39.7)	3/16 (4.8)	1 1/8 (28.6)	1 7/8 (47.6)
		NLS/RLS	9 5/8 (244.5)	1¾ (44.5)	1 3/8 (34.9)	1 27/32 (46.8)	3/16 (4.8)	1 1/8 (28.6)	2 3/32 (53.2)
225 – 400	2	NLN/RLN	8 5/8 (219.1)	2 (50.8)	1 7/8 (47.6)	2 3/32 (53.2)	¼ (6.4)	1 5/8 (41.3)	2 13/32 (61.1)
		NLS/RLS	11 5/8 (295.3)	2½ (63.5)	1 7/8 (47.6)	2 19/32 (65.9)	¼ (6.4)	1 5/8 (41.3)	2 7/8 (73.0)
450 – 600	2	NLN/RLN	10 3/8 (263.5)	2½ (63.5)	2¼ (57.2)	2 19/32 (65.9)	¼ (6.4)	2 (50.8)	2 7/8 (73.0)
		NLS/RLS	13 3/8 (339.7)	3 (76.2)	2¼ (57.2)	3 3/32 (78.6)	¼ (6.4)	2 (50.8)	3 7/16 (87.3)

JTD_ID SERIES INDICATOR® POWR-PRO® FUSES

POWR-PRO® 600 VAC • Time Delay • 8/10-600 Amperes

Ordering Information

AMPERE RATINGS							
8/10	2¼	4½	10	35	90	225	600
1	2½	5	12	40	100	250	
1¼	2 8/10	5 6/10	15	45	110	300	
1½	3	6	17½	50	125	350	
1 6/10	3 2/10	7	20	60	150	400	
1 8/10	3½	8	25	70	175	450	
2	4	9	30	80	200	500	

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

Web Resources

Time-current curves, data sheets and additional technical information: **www.littelfuse.com/jtd**

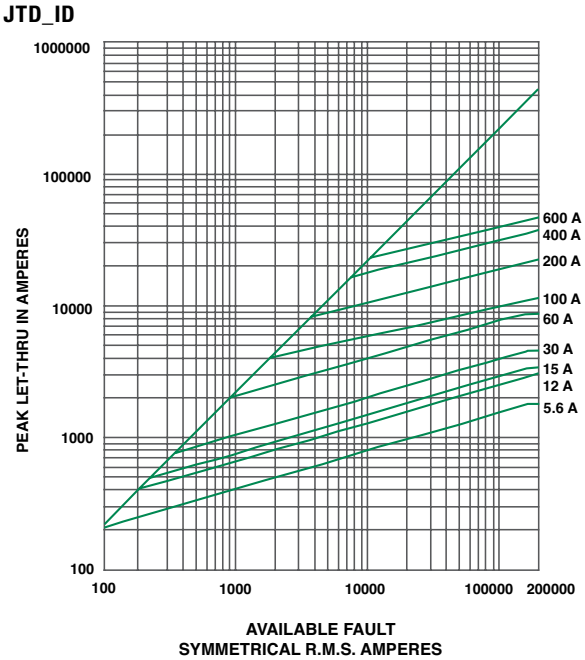
Recommended Fuseholders

LFJ60 Series ..... pg. 85
LPSJ Series ..... pg. 114

Dimensions

Please refer to the Class J dimensions ..... pg. 29

Peak Let-Thru Curve



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

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.

Applications

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

Features

- Current-Limiting
- IEC Type 2 Protection
- Indication and non-indication version available
- POWR-PRO Performance (see pg. 3)
- Indicating and DIN mount holders available

Specifications

Voltage Ratings: AC: 600 V
DC: 300 V (8/10–100 A); 500 V (110–600 A)

Interrupting Rating: AC: 200 kA rms symmetrical
300 kA rms symmetrical
DC: 20 kA

Ampere Range: 8/10–600 A

Approvals: AC: Standard 248-8, Class J
UL Listed (File No. E81895)
CSA Certified (File No. LR29862)
DC: Littelfuse self-certified

JLS SERIES FUSES

600 VAC • Fast-Acting • 1-600 Amperes

Description

JLS series fuses provide space saving, fast-acting overload and short-circuit protection for non-inductive loads. For applications where short-duration surges and spikes may cause nuisance fuse opening, consider the use of Littelfuse POWR-PRO® JTD or JTD_ID series time-delay fuses.

Applications

- General purpose circuits with little or no motor load.
- Resistive loads, such as resistance electric heat.
- Loads requiring fast-acting overload protection, such as equipment containing solid-state devices.

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 No. E81895)
CSA Certified (File No. LR29862)
Federal Specification WF-1814
(QPL-W-F-1814)

Dimensions

Please refer to the Class J dimensions ..... pg. 29

Ordering Information

AMPERE RATINGS					
1	20	45	90	175	350
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	SYSTEM NUMBER
NON-INDICATING	JLS	110	JLS110	0JLS110.X

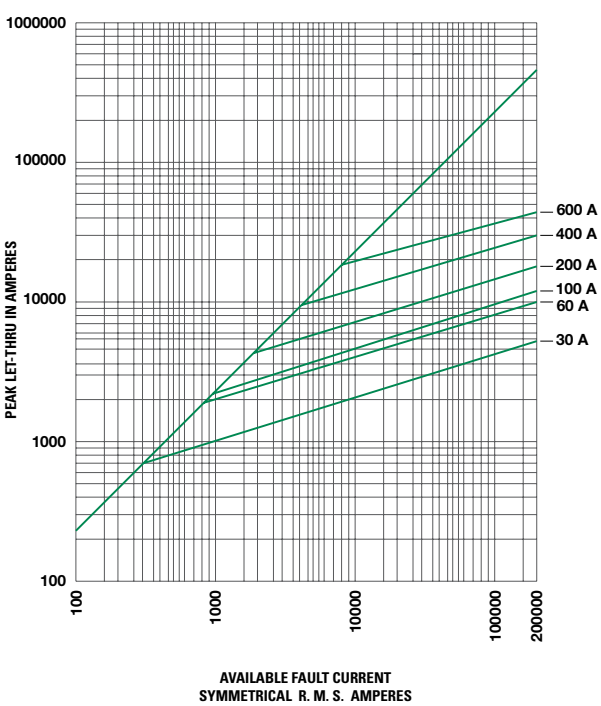
Web Resources

TC curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/jls**

Recommended Fuseholders

LFJ60 Series ..... pg. 85
LPSJ Series ..... pg. 114

Peak Let-Thru Curve



CLASS J DIMENSIONS AND CURRENT-LIMITING EFFECTS

Dimensions in inches (mm)

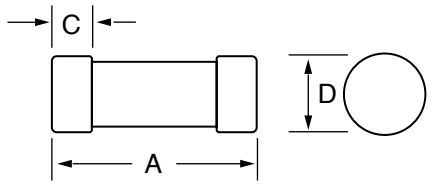


Fig. 1

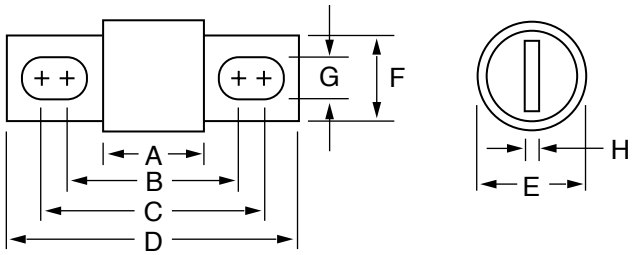


Fig. 2

Dimensions JTD_ID, JTD and JLS

AMPERES	REFER TO FIG. NO.	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
1 – 30	1	2¼ (57.2)	—	½ (12.7)	13/16 (20.6)	—	—	—	—
35 – 60	1	2⅜ (60.3)	—	⅝ (15.9)	1 1/16 (27.0)	—	—	—	—
70 – 100	2	2⅝ (66.7)	3 17/32 (89.7)	3 23/32 (94.5)	4⅝ (117.5)	1⅛ (28.6)*	¾ (19.1)	9/32 (7.1)	⅛ (3.2)
110 – 200	2	3 (76.2)	4 9/32 (108.7)	4 15/32 (113.5)	5¾ (146.1)	1½ (38.1)	1⅛ (28.6)	9/32 (7.1)	3/16 (4.8)
225 – 400	2	3⅜ (85.7)	5⅛ (130.2)	5⅜ (136.5)	7⅛ (181.0)	2 (50.8)	1⅝ (41.3)	13/32 (10.3)	¼ (6.4)
450 – 600	2	3¾ (95.3)	5 27/32 (148.4)	6 5/32 (156.4)	8 (203.2)	2½ (63.5)	2 (50.8)	17/32 (13.5)	⅜ (9.5)

*70-100 A JLS dimension = 1 (25.4)

Current-Limiting Effects of JTD_ID (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	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

JLLN/JLLS CLASS T FUSES

300/600 VAC • Fast-Acting • 1-600 Amperes

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.

Applications

- Variable speed drive protection
- Compact mains switches

Features/Benefits

- Extremely current-limiting
- Compact design
- 200 kA Interrupting Rating
- JLLN Series is RoHS Compliant

Specifications

Voltage Ratings: AC: 300 V (JLLN); 600 V (JLLS)
DC: 125 V (JLLN 1 – 30 A)
160 V (JLLN 35 – 60 A)
125 V (JLLN 70 – 100 A)
125 V (JLLN 110 – 1200 A)
300 V (JLLS)

Interrupting Ratings: AC: 200 kA rms symmetrical
DC: 20 kA
(JLLN 70 – 100 A)
(JLLN 110 – 1200 A)
(JLLS 1 – 1200 A)

Ampere Range: 1 – 1200 A

Approvals: AC: Standard 248-15, Class T
UL Listed (File No. E81895):
JLLN (1-1200 A)
JLLS (1-800 A)
UL Recognized (File No. E71611)
JLLS (900 – 1200 A)
CSA Certified (File No. LR29862)
JLLN/JLLS (1 – 600 A)
DC: UL Listed (File No. E81895):
JLLN (35 – 1200 A)
JLLN (110 – 1200 A)
Littelfuse self-certified: JLLN 1-30 A
JLLS (1 – 1200 A)

Ordering Information

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

*JLLS only
Note: Contact the factory for RoHS compliant Class T fuses.

SERIES	VOLTAGE	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
JLLS	600 V	6	JLLS006	JLLS006.T
JLLN	300 V	10	JLLN010	JLLN010.T

Web Resources

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

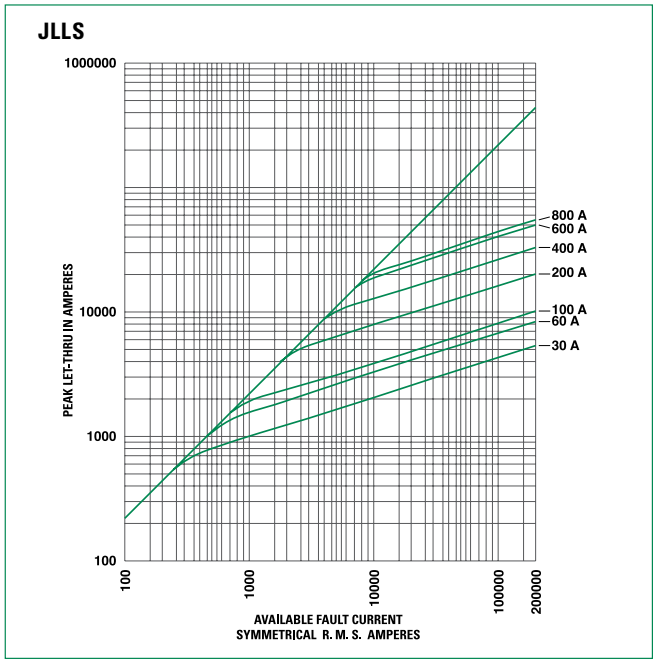
Recommended Fuseholders

LFT30 Series..... pg. 95
LFT60 Series..... pg. 95
LSCR Series for 700-800 A..... pg. 120

Dimensions

Please refer to the Class T dimensions..... pg. 31

Peak Let-Thru Curve



Note: For more information, see Peak Let-Thru Table on pg. 31

CLASS T DIMENSIONS AND CURRENT-LIMITING EFFECTS

Dimensions in inches (mm)

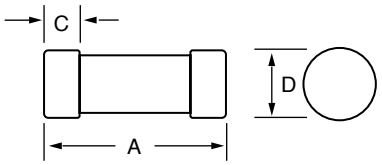


Fig. 1

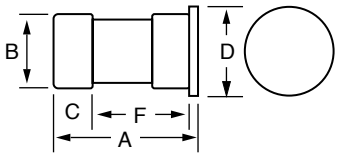


Fig. 2

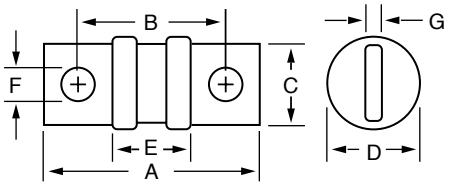


Fig. 3

AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm)						
			A	B	C	D	E	F	G
1 – 30	1	JLLN	7/8 (22.2)	—	9/32 (7.1)	13/32 (10.3)	—	—	—
		JLLS	1 1/2 (38.1)	—	9/32 (7.1)	9/16 (14.3)	—	—	—
35 – 60	1	JLLN	7/8 (22.2)	—	9/32 (7.1)	9/16 (14.3)	—	—	—
	2	JLLS	1 9/16 (39.7)	13/16 (20.6)	13/32 (10.3)	1 (25.4)	1/16 (1.6)	1 3/32 (27.8)	—
70 – 100	3	JLLN	2 5/32 (54.8)	1 9/16 (39.7)	3/4 (19.1)	13/16 (20.6)	27/32 (21.4)	9/32 (7.1)	1/8 (3.2)
		JLLS	2 61/64 (75.0)	2 23/64 (59.9)	3/4 (19.1)	13/16 (20.6)	1 41/64 (41.7)	9/32 (7.1)	1/8 (3.2)
110 – 200	3	JLLN	2 7/16 (61.9)	1 11/16 (42.9)	7/8 (22.2)	1 1/16 (27.0)	27/32 (21.4)	11/32 (8.7)	3/16 (4.8)
		JLLS	3 1/4 (82.6)	2 1/2 (63.5)	7/8 (22.2)	1 1/16 (27.0)	1 21/32 (42.1)	11/32 (8.7)	3/16 (4.8)
225 – 400	3	JLLN	2 3/4 (69.9)	1 27/32 (46.8)	1 (25.4)	1 5/16 (33.3)	53/64 (21.0)	13/32 (10.3)	1/4 (6.4)
		JLLS	3 5/8 (92.1)	2 23/32 (69.1)	1 (25.4)	1 19/32 (40.5)	1 23/32 (43.7)	13/32 (10.3)	1/4 (6.4)
450 – 600	3	JLLN	3 1/16 (77.8)	2 1/32 (51.6)	1 1/4 (31.8)	1 19/32 (40.5)	7/8 (22.2)	31/64 (12.3)	5/16 (7.9)
		JLLS	3 63/64 (101.2)	2 61/64 (75.0)	1 1/4 (31.8)	2 1/16 (52.4)	1 49/64 (44.8)	31/64 (12.3)	5/16 (7.9)
700 – 800	3	JLLN	3 3/8 (85.7)	2 7/32 (64.3)	1 3/4 (44.5)	2 1/16 (52.4)	7/8 (22.2)	35/64 (13.9)	3/8 (9.5)
		JLLS	4 21/64 (109.9)	3 11/64 (80.6)	1 3/4 (44.5)	2 1/2 (63.5)	1 55/64 (47.2)	35/64 (13.9)	3/8 (9.5)
900 – 1200	3	JLLN	4 (101.6)	2 17/32 (64.3)	2 (50.8)	2 1/2 (63.5)	1 1/32 (26.2)	39/64 (15.5)	7/16 (11.1)
		JLLS	5.27 (133.9)	3.80 (96.5)	2 (50.8)	2.63 (66.8)	2.30 (58.4)	0.67 (15.5)	0.44 (11.2)

Current-Limiting Effects of JLLN (300 V) fuses

SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS							
	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

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

Current-Limiting Effects of JLLS (600 V) fuses

SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS							
	30 A	60 A	100 A	200 A	400 A	600 A	800 A	1200 A
5,000	750	1,225	1,400	2,850	4,600	5,000	5,000	5,000
10,000	945	1,525	1,700	3,600	6,000	8,500	9,400	10,000
15,000	1,050	1,700	2,000	4,050	6,600	9,750	10,500	13,000
20,000	1,150	1,900	2,200	4,450	7,250	10,500	11,000	14,750
25,000	1,300	2,050	2,400	4,800	8,000	11,500	12,500	15,500
30,000	1,375	2,150	2,450	5,000	8,250	12,000	13,750	16,500
35,000	1,400	2,250	2,600	5,100	8,500	13,000	14,000	17,000
40,000	1,425	2,400	2,800	5,200	8,700	14,000	14,750	18,000
50,000	1,600	2,450	2,900	6,000	9,500	14,500	16,000	20,000
60,000	1,650	2,625	3,100	6,250	10,000	15,500	17,300	21,000
80,000	1,825	2,800	3,400	7,000	11,000	17,000	18,750	23,000
100,000	2,000	3,100	3,700	7,250	12,000	18,000	20,000	25,000
150,000	2,250	3,400	4,300	8,500	13,000	21,000	23,000	28,500
200,000	2,450	3,800	4,600	9,000	15,000	23,000	25,000	31,000

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

SLC CLASS G FUSES

480/600 VAC • Time-Delay • 1/2-60 Amperes

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.

Applications

- Branch circuit protection

Features/Benefits

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

Specifications

Voltage Ratings: 600 VAC (1/2 – 20 A)
480 VAC (25 – 60 A)
170 VDC (1/2 – 30 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 No. E81895)
CSA Certified (File No. LR29862)
Federal Specification WF-1814
(QPL-W-F-1814)

Ordering Information

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

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
SLC	10	SLC010	0SLC010.T

Web Resources

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

Recommended Fuseholders

LG300 Series ..... pg. 100
L30030G Series ..... pg. 100

AMPERES	REFER TO FIG. NO.	DIMENSIONS IN INCHES (mm)			
		A	B	C	D
1/2 – 15	1	1 5/16 (33.3)	3/8 (9.5)	9/32 (7.1)	13/32 (10.3)
20	1	1 13/32 (35.7)	3/8 (9.5)	9/32 (7.1)	13/32 (10.3)
25, 30	1	1 5/8 (41.3)	3/8 (9.5)	9/32 (7.1)	13/32 (10.3)
35 – 60	1	2 1/4 (57.2)	3/8 (9.5)	1/2 (12.7)	13/32 (10.3)

Dimensions in inches (mm)

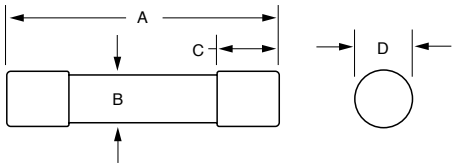


Fig 1

CCMR SERIES POWR-PRO® FUSES

POWR-PRO® 600 VAC • Dual Element • Time-Delay • 2/10-60 Amperes

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.

Applications

- Motor and motor branch circuit protection

Features/Benefits

- POWR-PRO Performance (see pg. 3)
- Extremely current-limiting
- Ratings up to 60 Amps
- 300 kA Interrupting Rating (self-certified)

Specifications

Voltage Ratings: AC: 600 V
DC: 250 V (CCMR 2/10– 2 A)
(CCMR 4 1/2– 10 A)
(CCMR 35– 60 A)
300 V (CCMR 2 1/4– 4 A)
500 V (CCMR 12– 30 A)

Interrupting Ratings: AC: 200 kA rms symmetrical
300 kA Littelfuse self-certified
DC: 20 kA

Ampere Range: 2/10 – 60 A

Approvals: AC: Standard 248-4, Class CC
UL Listed 1/10-30 A (File No. E81895)
Standard 248, Class CD
UL Listed 35-60 A (File No. E81895)
CSA Certified 1/10-30 A
(File No. LR29862)
DC: Littelfuse self-certified

*Consult Motor Protection Tables on pg. 203 in the Technical Application Guide section for specific motor sizing information.

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	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
CCMR	45	CCMR045	CCMR045.T

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/ccmr**

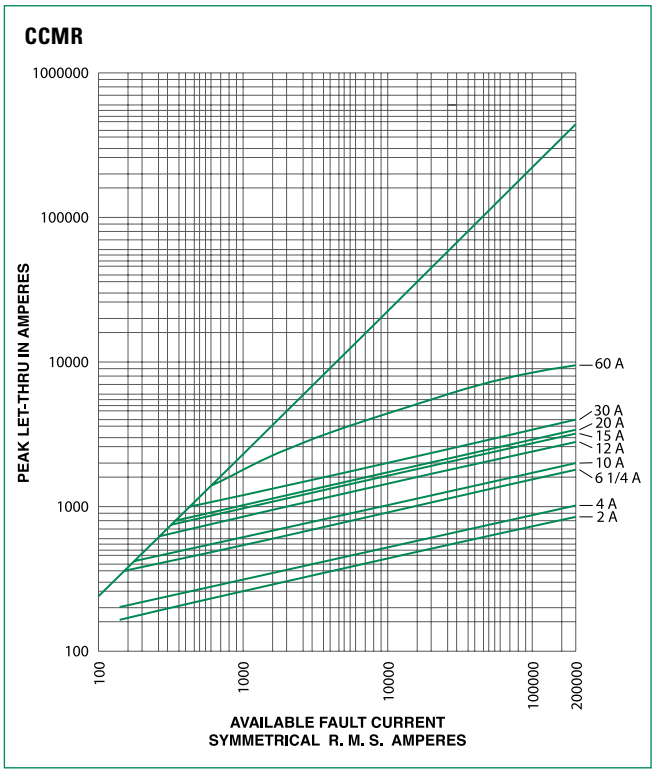
Recommended Fuseholders

LPSC Series..... pg. 108
L60030C Series .....pg. 101
L60060C Series .....pg. 101

Dimensions

Please refer to the Class CC/CD dimensions ..... pg. 35

Peak Let-Thru Curve



Note: For more information, see Peak Let-Thru Table on pg. 35

CLASS CC FUSES

KLDR Series
600 VAC/300 VDC • Time-Delay • 1/10-30 Amperes

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 Ratings: AC: 600 V
DC: 300 V

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

Ampere Range: 1/10 – 30 A

Approvals: AC: Standard 248-4, Class CC
UL Listed 1/10-30 A
(File No. E81895)
CSA Certified 1/10-30 A
(File No. LR29862)
DC: Littelfuse self-certified

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	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
KLDR	10	KLDR010	KLDR010.T

Web Resources

For additional information, visit:
www.littelfuse.com/kldr

Recommended Fuseholders

LPSC Series.....pg. 108
L60030C Series.....pg. 101

Dimensions

Please refer to the Class CC/CD dimensions... pg. 35

KLKR Series
600 VAC/300 VDC • Fast-Acting • 1/10-30 Amperes

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

Voltage Ratings: AC: 600 V
DC: 300 V

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

Ampere Range: 1/10 – 30 A

Approvals: AC: Standard 248-4, Class CC
UL Listed 1/10-30 A
(File No. E81895)
CSA Certified 1/10-30 A
(File No. LR29862)
DC: Littelfuse self-certified

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	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
KLKR	12	KLKR012	KLKR012.T

Web Resources

For additional information, visit:
www.littelfuse.com/klkr

Recommended Fuseholders

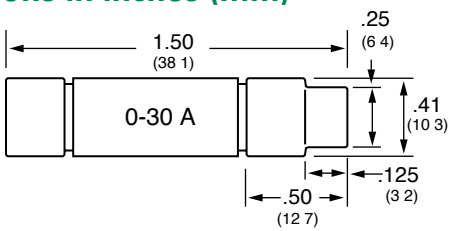
LPSC Series.....pg. 108
L60030C Series.....pg. 101

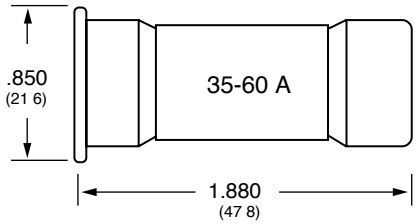
Dimensions

Please refer to the Class CC/CD dimensions... pg. 35

CLASS CC/CD DIMENSIONS AND CURRENT-LIMITING EFFECTS

Dimensions in inches (mm)



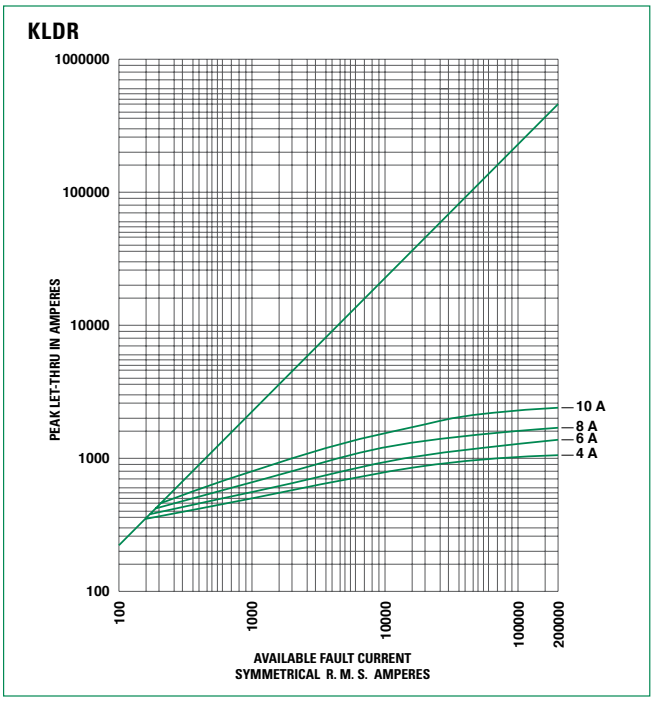


Current-Limiting Effects of CCMR (600 V) fuses

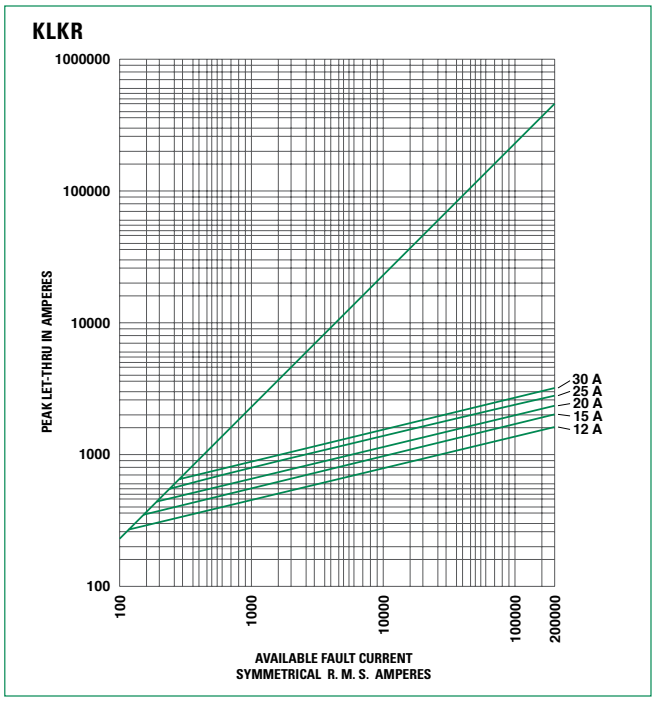
SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS							
	2 A	4 A	6¼ A	10 A	12 A	15 A	20 A	30 A
5,000	160	190	330	370	525	600	625	750
10,000	180	220	400	440	600	700	725	875
15,000	200	250	430	480	675	775	800	950
20,000	220	260	460	520	720	825	850	1,000
25,000	230	280	480	550	750	850	900	1,050
30,000	240	290	500	570	800	900	950	1,125
35,000	245	300	520	590	825	925	975	1,175
40,000	255	310	550	600	850	975	1,000	1,200
50,000	260	330	570	640	875	1,000	1,100	1,300
60,000	280	340	600	670	900	1,050	1,125	1,350
80,000	300	360	625	700	1,000	1,125	1,200	1,400
100,000	310	380	650	750	1,050	1,200	1,250	1,500
150,000	340	420	700	800	1,150	1,300	1,400	1,600
200,000	350	440	750	850	1,200	1,400	1,450	1,750

*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



Section Overview

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

10 x 38 MIDGET, BLADE, AND ELECTRONIC FUSES

Table of Contents

SPF SERIES SOLAR FUSES

1000 VDC • 1-30 Amperes

Description

The SPF Solar Protection Fuse series has been specifically designed for photovoltaic (PV) systems. This family of Midget style fuses (10 x 38) can safely protect PV modules and conductors from reverse overcurrent conditions despite the associated challenges of DC power.

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 midget designs are not optimized for Solar Protection requirements. However, the SPF series is UL Recognized to safely interrupt circuits up to this demanding voltage level.

Littelfuse offers thirteen ampere ratings to match designers' specific requirements in applications including combiner boxes, inverters and battery charge controllers.

Features/Benefits

- UL Recognized 1000 VDC maximum
- 13 ampere ratings for flexible design
- 20,000 A Interrupting Rating
- High performance in compact 10 x 38 mm midget size
- Touch safe DIN rail holder available
- PCB leaded version available

Recommended Fuseholders

LPHV Series..... pg. 109

Specifications

Voltage Rating:	1000 VDC
Amperage Rating:	1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30
Max. Interrupting Rating:	20 kA; Time Constant less than 2ms
Min. Interrupting Rating:	1–12 A, 2x Current Rating 15–30 A, 1.35x Current Rating
Approvals:	UL Recognized (File No. E71611) CSA Certified (File No. 29862)
Environmental:	RoHS Compliant Lead (Pb) Free

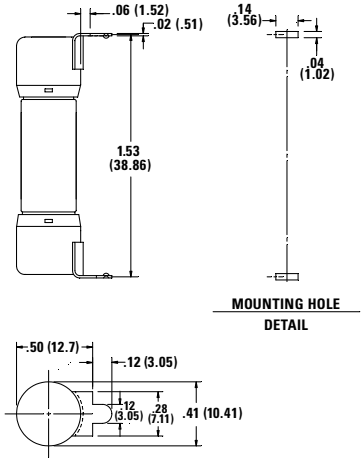
Ordering Information

AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
2	SPF002	SPF002.T
8	SPF008	SPF008.T
30	SPF030	SPF030.T
30 (WITH PCB TABS)	SPF030R	SPF030.HXR

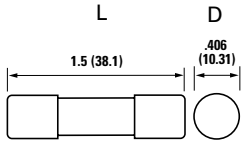
Web Resources

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

Dimensions in inches—PCB Version (mm)



Dimensions in inches (mm)



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

SUPPLEMENTAL PROTECTION • 10 X 38 MIDGET FUSES

KLK Series
Fast-Acting Fuse 600 VAC

QPL 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-interrupting capacity fuse designed for control circuits, HID lighting, street-lighting, meter circuits.

Voltage Ratings: 600 VAC
500 VDC
Interrupting Ratings: 100 kA @ 600 VAC
50 kA @ 500 VDC
(capable of 200 kA)
Dimensions: **L** 38.1mm (1 1/2")
D 10.31mm (13/32")

www.littelfuse.com/klk

KLKD Series
Fast-Acting Fuse 600 VAC/600 VDC

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 standard and board mount configurations.

Voltage Ratings: 600 VAC/DC
Interrupting Ratings: 100 kA @ 600 VAC
50 kA @ 600 VDC
(capable of 200 kA)
Dimensions: **L** 38.1mm (1 1/2")
D 10.31mm (13/32")

www.littelfuse.com/klkd

FLM Series
Time-Delay Fuse 250 VAC

QPL RoHS

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

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
Interrupting Ratings: 10 kA @ 250 VAC
Dimensions: **L** 38.1mm (1 1/2")
D 10.31mm (13/32")

www.littelfuse.com/flm

FLQ Series
Time-Delay Fuse 500 VAC

RoHS

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

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
Interrupting Ratings: 10 kA @ 500V AC
Dimensions: **L** 38.1mm (1 1/2")
D 10.31mm (13/32")

www.littelfuse.com/flq

BLN Series
Fiber Body Fast-Acting Fuse 250 VAC

QPL RoHS

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

Specifications

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

Voltage Ratings: 250 VAC
Interrupting Ratings: 10 kA @ 250 VAC
Dimensions: **L** 38.1mm (1 1/2")
D 10.31mm (13/32")

www.littelfuse.com/bln

BLF Series
Laminated Fast-Acting Fuse 125/250 VAC

RoHS

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

Laminated tube 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
Interrupting Ratings: 10 kA @ rated VAC
Dimensions: **L** 38.1mm (1 1/2")
D 10.31mm (13/32")

www.littelfuse.com/blf

SUPPLEMENTAL PROTECTION • 10 X 38 MIDGET FUSES

BLS Series
Fast-Acting Fuse
600 VAC/250 VAC

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

www.littelfuse.com/bls

KLQ Series
Increased Time-Delay
600 VAC

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

www.littelfuse.com/klq

FLA Series
Time-Delay Pin Indicating Fuse
125 VAC

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

*12-30 A are dual tube design

Specifications

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

Voltage Ratings: 125 VAC
Interrupting Ratings: 10 kA @ rated VAC
Dimensions: **L** 38.1 mm (1 1/2")
D 10.31 mm (13/32")

www.littelfuse.com/fla

FLU Series
Multimeter Protection
1000 VAC/VDC

Specifications

Multimeter protection fuses.

Voltage Rating: 1000 VAC/VDC
Interrupting Rating: 44/100 A: 10 kA
11 A: 20 kA
Ampere Range: FLU 44/100 =1 A and FLU 11 = 15 A
Approvals: UL Recognized (File No. E10480)
CSA Certified (File No. LR29862)
Dimensions: 44/100 A: 13/32" x 1 3/8"
11 A: 13/32" x 1½"

www.littelfuse.com/flu

10 x 38 Midget Holder Configurations

STANDARD	TOUCH SAFE QUICK CONNECT	BOARD MOUNT
		
L60030M pg. 101	LPSM QC pg.111	L60030MPCB pg. 104

TOUCH SAFE		
		
LPSM pg. 108	LPHV pg. 109	UP-LINK pg. 112

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.
Sample part # 0MIN010.VPGLO

Voltage range: 14 VDC

www.littelfuse.com/smartglow

MINI® Fast-Acting

Specifications

The MINI® Fuse, with its miniature design patented by Littelfuse, meets the need for more circuits to be protected while utilizing less space.
Sample part # 0MIN020.V

Voltage range: 32 VDC

www.littelfuse.com/mini

Fuses Rated 58 V Low Profile MINI®

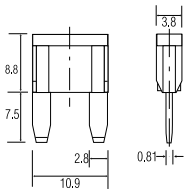
Specifications

The low profile mini has similar performance as the standard mini fuse. The lower overall height allows for more space and weight savings.
Sample part # LMIN010.V

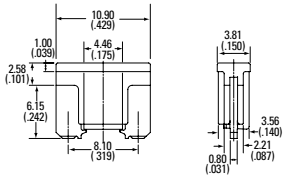
Voltage range: 58 VDC

www.littelfuse.com/lmin

MINI dimensions in mm

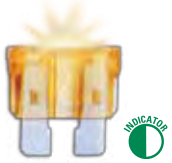


Low Profile MINI dimensions in mm (inches)



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

ATO® 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.
Sample part # 0ATO010.VPGLO

Voltage range: 14 VDC

www.littelfuse.com/smartglow

ATO® Fast-Acting

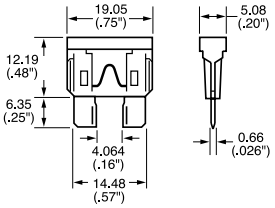
Specifications

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.
Sample part # 0ATO020.V

Voltage range: 32 VAC/DC

www.littelfuse.com/ato

ATO dimensions in mm (inches)



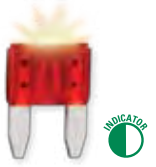
ATO® / MINI® Color Key

CURRENT RATING	HOUSING COLOR
1 A	
2 A	
3 A	
4 A	
5 A	
7.5 A	
10 A	
15 A	
20 A	
25 A	
30 A	
40 A	

Note: Mini not available in 1 A or 40 A.

ATO Fuses are available in packaged and bulk configurations. See 257 series on web.

MAXI™ 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.
Sample part # 0MAX030.XPGLO

Voltage range: 14 VDC

www.littelfuse.com/smartglow

MAXI™ Slo-Blo

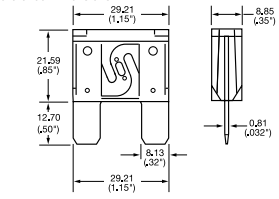
Specifications

Designed and patented by Littelfuse, the MAXI™ Fuse is ideal for motor powered applications which have large inrush currents.
Sample part # 0MAX030.X

Voltage range: 32 VDC

www.littelfuse.com/maxi

MAXI dimensions in mm (inches)



MAXI™ Color Key

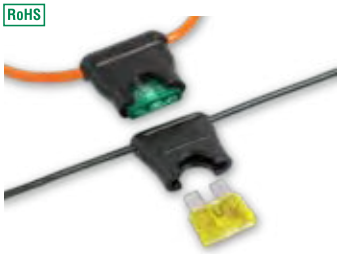
CURRENT RATING	HOUSING COLOR
20 A	
25 A	
30 A	
35 A	
40 A	
50 A	
60 A	
70 A	
80 A	

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

BLADE FUSES

FHA Blade Fuseholders—In-Line Fuseholder for ATO® Style Blade Fuse

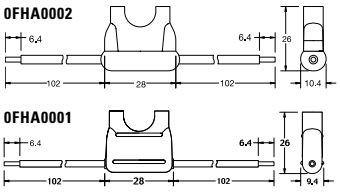
RoHS



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

www.littelfuse.com/fha

Dimensions in mm



PART NUMBER	DESCRIPTION	FUSE RATING
0FHA0001_	16AWG/1.3mm² STRANDED BLACK WIRE	20 A
0FHA0002_	12AWG/3.3mm² STRANDED ORANGE WIRE	30 A

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

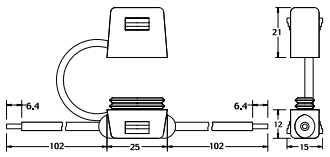
FHAC Blade Fuseholders—In-Line Splash-Waterproof Fuseholder for ATO® Style Blade Fuse

RoHS

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

www.littelfuse.com/fha

Dimensions in mm



PART NUMBER	DESCRIPTION	FUSE RATING
FHAC0001_	16AWG/1.3mm² STRANDED BLACK WIRE	20 A
FHAC0002_	12AWG/3.3mm² STRANDED ORANGE WIRE	30 A

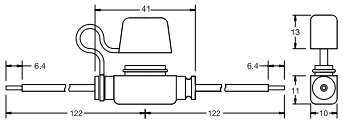
Wire length, color and diameter can be customized upon request.

FHM Blade Fuseholders—In-Line Splash-Waterproof Fuseholder for MINI® Style Blade Fuse

RoHS

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.

www.littelfuse.com/fhm



PART NUMBER	DESCRIPTION	FUSE RATING
0FHM0001_	14AWG/2.1mm² STRANDED BLACK WIRE	20 A
0FHM0002_	12AWG/3.3mm² STRANDED ORANGE WIRE	30 A

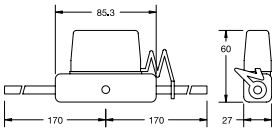
Wire length, color and diameter can be customized upon request.

MAH Blade Fuseholders—In-Line Fuseholder for MAXI™ Style Blade Fuse

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

www.littelfuse.com/mah

Dimensions in mm



PART NUMBER	DESCRIPTION	FUSE RATING
0MAH0001Z	WIRE COLOR BLACK	60 A

JCASE® Cartridge Fuse Rated 32 V

RoHS Pb

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.

www.littelfuse.com/jcase

Low Profile JCASE® Fuse Rated 58 V

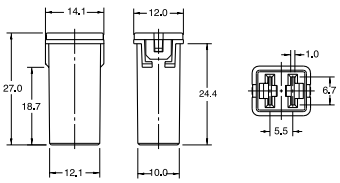
RoHS Pb

Specifications

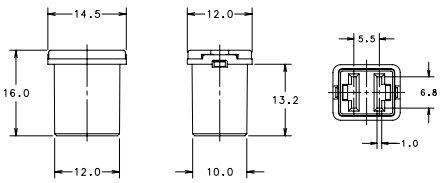
The Low Profile JCASE fuse has similar performance characteristics as the standard JCASE fuse. The lower overall height reduction allows for more space and weight savings and also allows for a shorter male blade terminal, saving additional weight and material savings in fuse box designs.

www.littelfuse.com/ljcase

JCASE® 32 V
Dimensions in mm



Low Profile JCASE® 58 V
Dimensions in mm



JCASE® Color Key

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

LEADED AND CARTRIDGE FUSES

312/318 Series
3AG Fast-Acting

AMPERE RATINGS				
1/100	2/10	1 1/4	3	15
1/32	1/4	1 1/2	4	20
1/16	3/10	1 6/10	5	25
1/10	3/8	1 3/4	6	30
1/8	1/2	1 8/10	7	35
15/100	6/10	2	8	—
17.5/100	3/4	2 1/4	10	—
3/16	1	2 1/2	12	—

Specifications

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

Voltage Ratings: 250 VAC: 1/100 – 10 A
32 VAC: 12 – 35 A

Sample Part: 0312005.VXP

www.littelfuse.com/312

For fuses with axial leads, request 318 Series.

313/315 Series
3AG Slo-Blo®

AMPERE RATINGS							
1/100	15/100	3/8	8/10	1 8/10	3 2/10	8	30
1/32	17.5/100	4/10	1	2	4	10	—
4/100	3/16	1/2	1 2/10	2 1/4	5	12	—
1/16	2/10	6/10	1 1/4	2 1/2	6 1/4	15	—
1/10	1/4	7/10	1 1/2	2 8/10		20	—
1/8	3/10	3/4	1 6/10	3	7	25	—

Specifications

313 and 315 series fuses have time-delay in the overload range, which provides superior protection for inductive loads such as motors, transformers, and solenoids.

Voltage Ratings: 250 VAC: 1/100 – 8 A
32 VAC: 10 – 30 A

Sample part: 0313005.VXP

www.littelfuse.com/313

For fuses with axial leads, request 315 Series.

314/324 Series
3AB Fast-Acting

AMPERE RATINGS				
1/8	3/4	4	8	20
1/4	1	5	10	25
3/8	2	6	12	30
1/2	3	7	15	40

Specifications

Similar to 312 series, but ceramic tube permits higher interrupting ratings and voltage ratings: 250 volt ratings all the way through 30 amps.

Voltage Rating: 250 VAC: 1/8 – 40 A

Sample part: 03145005.VXP

www.littelfuse.com/314

For fuses with axial leads, request 324 Series.

326/325 Series
3AB Slo-Blo®

AMPERE RATINGS					
1/100	3/16	6/10	1 1/2	4	15
1/32	2/10	7/10	1 6/10	5	20
1/16	1/4	3/4	2	6 1/4	25
1/10	3/10	8/10	2 1/2	7	30
1/8	3/8	1	2 8/10	8	—
15/100	4/10	1 2/10	3	10	—
17.5/100	1/2	1 1/4	3 2/10	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

Sample Part: 0326.100VXP

www.littelfuse.com/326

For fuses with axial leads, request 325 Series.

229/230 Series
2AG Slo-Blo®

AMPERE RATINGS			
1/4	3/4	2	4
.350	8/10	2 1/4	5
3/8	1	2 1/2	6
1/2	1 1/4	3	7
6/10	1 1/2	3 1/2	—

Specifications

2AG indicating fuses instantly identify themselves upon opening by showing a discoloration of their glass bodies. Guesswork and time consuming circuit testing is eliminated. This unique design offers the same quality performance characteristics as the standard 2AG fuse design.

Voltage Ratings: 250 VAC: 1/4 – 3 1/2 A
125 VAC: 4 – 7 A

Sample Part: 02291.25VXP

www.littelfuse.com/229

For fuses with axial leads, request 230 Series.

225/224 Series
2AG Fast-Acting

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

Specifications

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

Voltage Ratings: 250 VAC: 1/10 – 3 1/2 A
125 VAC: 4 – 10 A

Sample Part: 0225003.VXP

www.littelfuse.com/225

For fuses with axial leads, request 224 Series.

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

5 X 20 mm IEC LEADED AND CARTRIDGE FUSES

215 Series
5 x 20 mm IEC Slo-Blo®

AMPERE RATINGS						
.125	.315	.800	2	5	12	25
.160	.400	1	2.5	6.3	15	—
.200	.500	1.25	3.15	8	16	—
.250	.630	1.6	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
Sample Part: 0215005.VXP

www.littelfuse.com/215

216 Series
5 x 20 mm IEC Fast-Acting

AMPERE RATINGS						
.050	.125	.315	.800	2	5	12.5
.063	.160	.400	1	2.5	6.3	16
.080	.200	.500	1.25	3.15	8	—
.100	.250	.630	1.6	4	10	—

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
Sample Part: 0216005.VXP

www.littelfuse.com/216

217 Series
5 x 20 mm IEC Fast-Acting

AMPERE RATINGS						
.032	.080	.200	.500	1.25	3.15	8
.040	.100	.250	.630	1.6	4	10
.050	.125	.315	.800	2	5	15
.063	.160	.400	1	2.5	6.3	—

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
Sample Part: 0217005.VXP

www.littelfuse.com/217

218 Series
5 x 20 mm IEC Slo-Blo®

AMPERE RATINGS						
.032	.080	.200	.500	1.25	3.15	8
.040	.100	.250	.630	1.6	4	10
.050	.125	.315	.800	2	5	15
.063	.160	.400	1	2.5	6.3	16

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
Sample Part: 0218005.VXP

www.littelfuse.com/218

235 Series
5 x 20 mm UL/CSA Fast-Acting

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

Specifications

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

Voltage Ratings: 250 VAC: 1/10 – 3 1/2 A
125 VAC: 4 – 7 A
Sample Part: 0235005.VXP

www.littelfuse.com/235

239 Series
5 x 20 mm UL/CSA Slo-Blo®

AMPERE RATINGS						
8/100	2/10	1/2	8/10	2	3 2/10	7
1/10	1/4	6/10	1	2 1/2	3 1/2	—
1/8	3/10	7/10	1 1/4	3	4	—
15/100	4/10	3/4	1 6/10	3 15/100	5	—

Specifications

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

Voltage Ratings: 250 VAC: 2/10 – 3 1/2 A
125 VAC: 4 – 7 A
Sample Part: 0239005.VXP

www.littelfuse.com/239

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

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/DC (10 – 12 A)
500 VAC/DC (16 – 30 A)
Sample Part: 0505010.MXP*

www.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.

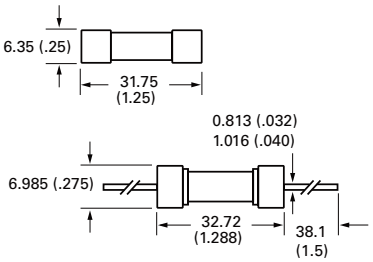
Voltage Rating: 500 VAC
400 VDC
Sample Part: 0477002.MXP*

www.littelfuse.com/477

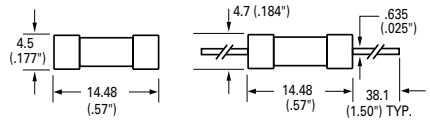
*Bulk configurations only

Dimensions in mm (inches)

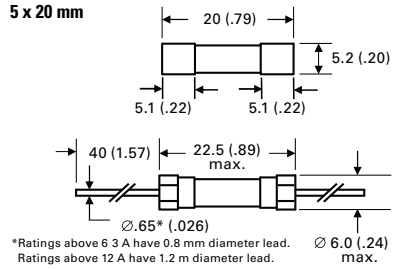
3AG/3AB



2AG



5 x 20 mm



*Ratings above 6 3 A have 0.8 mm diameter lead.
Ratings above 12 A have 1.2 m diameter lead.

273 Series
Fast-Acting Microfuse

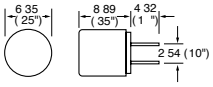
AMPERE RATINGS					
1/500	1/32	1/8	4/10	3/4	2
1/200	1/20	2/10	1/2	8/10	3
1/100	1/16	1/4	6/10	1	4
1/64	1/10	3/10	7/10	1 1/2	5

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
Sample Part: 0273002.V

www.littelfuse.com/273



251 Series
Fast-Acting Pico® II Fuse

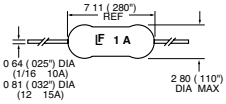
AMPERE RATINGS					
1/16	3/8	1	2 1/2	4	10
1/8	1/2	1 1/2	3	5	12
1/4	3/4	2	3 1/2	7	15

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 V: 1/16 – 10 A
32 V: 12 – 15 A
Sample Part: 0251001.NAT1L

www.littelfuse.com/251



451 Series
NANO²® Very Fast-Acting

Add "L" suffix when ordering RoHS compliant 451 series

AMPERE RATINGS					
0.01	0.187	.075	2	7	30
0.031	0.2	1	2.25	8	35
0.062	0.25	1.25	2.5	10	–
0.1	0.3	1.5	3	12	–
0.125	0.375	1.6	4	15	–
0.15	0.5	1.75	5	20	–
0.175	0.6	1.8	6	25	–

Specifications

The Nano² 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

www.littelfuse.com/451

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.

MEDIUM VOLTAGE FUSES

Table of Contents

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 is available. Call 800-227-0029, Option 6.

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 ½" 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.

R-RATED MEDIUM VOLTAGE FUSES

Current-Limiting

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 x 100 = 200 amperes.

Part Number System **130-4R-1C-5.5**

- Max Voltage (KV)
- Style:
  - C (Cartridge)
  - B (Bolt Mount)
  - IB (Inverted Bolt Mount)
  - BI (Bolt-In Mount)
- No. of Barrels
- Rating (size)
- Continuous Current

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

*See web for Bolt Mount, Inverted Bolt Mount, and Bolt-W dimensions

Dimensions

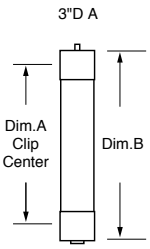


Figure 1

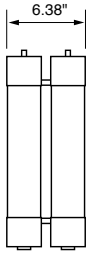


Figure 2

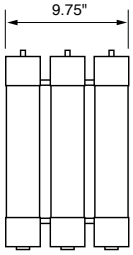
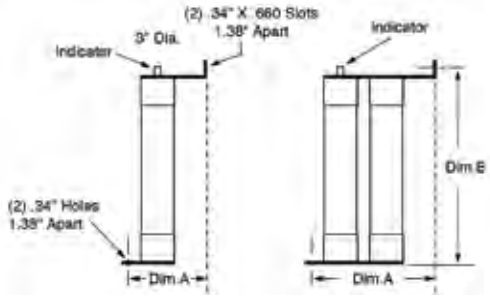
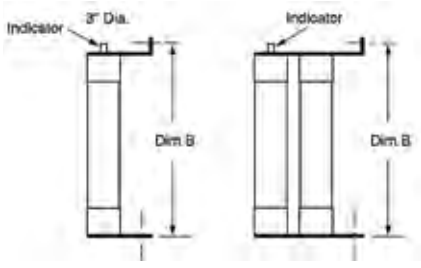


Figure 3

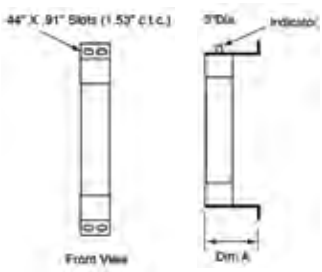
Cartridge "C"



Bolt Mount "B"
Sample Part #: 130-4R-1B-5.5



Inverted-Bolt "IB"
Sample Part #: 130-4R-1IB-5.5



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

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 **www.littelfuse.com/technicalcenter** for additional protection tables, sizing recommendations, and applications.

R-RATED MEDIUM VOLTAGE FUSES

Current-Limiting

R RATED	SYSTEM/ 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
2.75 KV	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
	1706R1C2.75	6R	170	7"	10.875"	500	80,000	1
	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	SYSTEM/ 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
5.5 KV	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
	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	SYSTEM/ 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
5.5 KV 14"CLIP CENTERS	702R1C5.5X	2R	70	14"	17.875"	170	80,000	1
	1003R1C5.5X	3R	100	14"	17.875"	250	80,000	1
	1304R1C5.5X	4R	130	14"	17.875"	340	80,000	1
	1505R1C5.5X	5R	150	14"	17.875"	390	80,000	1
	1706R1C5.5X	6R	170	14"	17.875"	500	80,000	1
	2009R1C5.5X	9R	200	14"	17.875"	760	80,000	1
	23012R1C5.5X	12R	230	14"	17.875"	1000	80,000	1
	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	SYSTEM/ 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
8.25 KV	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
	1706R1C8.25	6R	170	12"	15.875"	500	80,000	1
	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

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

E-RATED MEDIUM VOLTAGE FUSES

Current-Limiting

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

Voltage Ratings: 2,750 V – 38,000 V
Current Range: 10E – 600E

Options

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

Dimensions

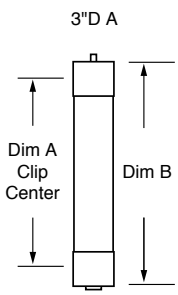


Figure 4

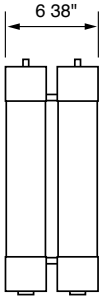


Figure 5

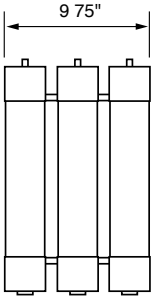


Figure 6

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
2.75 MAX. KV	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
	125E1C2.75	125E	7"	10.875"	80,000	4
	150E1C2.75	150E	7"	10.875"	80,000	4
	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
	225E2C2.75	225E	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

E-RATED MEDIUM VOLTAGE FUSES

Current-Limiting

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
5.5 MAX. KV	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
	200E1C5.5	200E	12"	15.875"	80,000	4
	125E2C5.5	125E	12"	15.875"	80,000	5
	150E2C5.5	150E	12"	15.875"	80,000	5
	175E2C5.5	175E	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	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
5.5 MAX. KV	5NLE10E	10E	14"	17⅞"	80,000	4
	5NLE15E	15E	14"	17⅞"	80,000	4
	5NLE20E	20E	14"	17⅞"	80,000	4
	5NLE25E	25E	14"	17⅞"	80,000	4
	5NLE30E	30E	14"	17⅞"	80,000	4
	5NLE40E	40E	14"	17⅞"	80,000	4
	5NLE50E	50E	14"	17⅞"	80,000	4
	5NLE65E	65E	14"	17⅞"	80,000	4
	5NLE80E	80E	14"	17⅞"	80,000	4
	5NLE100E	100E	14"	17⅞"	80,000	4
	5NLE125E	125E	14"	17⅞"	80,000	4
	5NLE150E	150E	14"	17⅞"	80,000	4
	5NLE175E	175E	14"	17⅞"	80,000	4
	5NLE200E	200E	14"	17⅞"	80,000	4
	5NLE2225E	225E	14"	17⅞"	80,000	5
	5NLE2250E	250E	14"	17⅞"	80,000	5
	5NLE2300E	300E	14"	17⅞"	80,000	5
	5NLE2350E	350E	14"	17⅞"	80,000	5
	5NLE2400E	400E	14"	17⅞"	80,000	5
	5NLE2450E	450E	14"	17⅞"	80,000	5

E-RATED MEDIUM VOLTAGE FUSES

Current-Limiting

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
8.25 MAX. KV	10E1C8.25	10E	12"	15⅞"	80,000,	4
	15E1C8.25	15E	12"	15⅞"	80,000	4
	20E1C8.25	20E	12"	15⅞"	80,000	4
	25E1C8.25	25E	12"	15⅞"	80,000	4
	30E1C8.25	30E	12"	15⅞"	80,000	4
	40E1C8.25	40E	12"	15⅞"	80,000	4
	50E1C8.25	50E	12"	15⅞"	80,000	4
	65E1C8.25	65E	12"	15⅞"	80,000	4
	80E1C8.25	80E	12"	15⅞"	80,000	4
	100E1C8.25	100E	12"	15⅞"	80,000	4
	125E1C8.25	125E	12"	15⅞"	80,000	4
	150E1C8.25	150E	12"	15⅞"	80,000	4
	125E2C8.25	125E	12"	15⅞"	80,000	5
	150E2C8.25	150E	12"	15⅞"	80,000	5
	200E2C8.25	200E	12"	15⅞"	80,000	5
	250E2C8.25	250E	12"	15⅞"	80,000	5
	300E2C8.25	300E	12"	15⅞"	80 000	5
	350E3C8.25	350E	12"	15⅞"	80,000	6
	400E3C8.25	400E	12"	15⅞"	80,000	6

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
8.25 MAX. KV	8NLE10E	10E	14"	17⅞"	80,000	4
	8NLE15E	15E	14"	17⅞"	80,000	4
	8NLE20E	20E	14"	17⅞"	80,000	4
	8NLE25E	25E	14"	17⅞"	80,000	4
	8NLE30E	30E	14"	17⅞"	80,000	4
	8NLE40E	40E	14"	17⅞"	80,000	4
	8NLE50E	50E	14"	17⅞"	80,000	4
	8NLE65E	65E	14"	17⅞"	80,000	4
	8NLE80E	80E	14"	17⅞"	80,000	4
	8NLE100E	100E	14"	17⅞"	80,000	4
	8NLE2100E	100E	14"	17⅞"	80,000	5
	8NLE2125E	125E	14"	17⅞"	80,000	5
	8NLE2150E	150E	14"	17⅞"	80,000	5
	8NLE2200E	200E	14"	17⅞"	80,000	5
	8NLE2250E	250E	14"	17⅞"	80,000	5

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
15.5 MAX. KV	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
	40E1C15.5	40E	15"	18.875"	80,000	4
	50E1C15.5	50E	15"	18.875"	80,000	4
	65E1C15.5	65E	15"	18.875"	80,000	4
	80E1C15.5	80E	15"	18.875"	80,000	4
	100E1C15.5	100E	15"	18.875"	80,000	4
	65E2C15.5	65E	15"	18.875"	80,000	5
	80E2C15.5	80E	15"	18.875"	80,000	5
	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
	200E2C15.5	200E	15"	18.875"	80,000	5
	200E3C15.5	200E	15"	18.875"	80,000	6
	250E3C15.5	250E	15"	18.875"	80,000	6
	300E3C15.5	300E	15"	18.875"	80,000	6

E-RATED MEDIUM VOLTAGE FUSES

Current-Limiting

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
15.5 MAX. KV	15GSE65E	65E	18"	21⅞"	60,000	4
	15GSE80E	80E	18"	21⅞"	60,000	4
	15GSE100E	100E	18"	21⅞"	60,000	4
	15GSE2125E	125E	18"	21⅞"	60,000	5
	15GSE2150E	150E	18"	21⅞"	60,000	5
	15GSE2175E	175E	18"	21⅞"	60,000	5
	15GSE2200E	200E	18"	21⅞"	60,000	5

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
15.5 MAX. KV	15NLE10E	10E	20"	23⅞"	60,000	4
	15NLE15E	15E	20"	23⅞"	60,000	4
	15NLE20E	20E	20"	23⅞"	60,000	4
	15NLE25E	25E	20"	23⅞"	60,000	4
	15NLE30E	30E	20"	23⅞"	60,000	4
	15NLE40E	40E	20"	23⅞"	60,000	4
	15NLE50E	50E	20"	23⅞"	60,000	4
	15NLE65E	65E	20"	23⅞"	60,000	4
	15NLE80E	80E	20"	23⅞"	60,000	4
	15NLE100E	100E	20"	23⅞"	60,000	4
	15NLE280E	80E	20"	23⅞"	60,000	5
	15NLE2100E	100E	20"	23⅞"	60,000	5
	15NLE2125E	125E	20"	23⅞"	60,000	5
	15NLE2150E	150E	20"	23⅞"	60,000	5
	15NLE2175E	175E	20"	23⅞"	60,000	5
	15NLE2200E	200E	20"	23⅞"	60,000	5
	15NLE3150E	150E	20"	23⅞"	60,000	6
	15NLE3175E	175E	20"	23⅞"	60,000	6
	15NLE3250E	250E	20"	23⅞"	60,000	6
	15NLE3300E	300E	20"	23⅞"	60,000	6

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
25.8 MAX. KV	15E1C25.8	15E	21"	24⅝"	40,000	4
	20E1C25.8	20E	21"	24⅝"	40,000	4
	25E1C25.8	25E	21"	24⅝"	40,000	4
	30E1C25.8	30E	21"	24⅝"	40,000	4
	40E1C25.8	40E	21"	24⅝"	40,000	4
	50E1C25.8	50E	21"	24⅝"	40,000	4
	65E2C25.8	65E	21"	24⅝"	40,000	5
	80E2C25.8	80E	21"	24⅝"	40,000	5
	100E2C25.8	100E	21"	24⅝"	40,000	5

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
38 MAX. KV	3E1C38.0	3E	27"	30⅝"	20,000	4
	7E1C38.0	7E	27"	30⅝"	20,000	4
	10E1C38.0	10E	27"	30⅝"	20,000	4
	15E1C38.0	15E	27"	30⅝"	20,000	4
	20E1C38.0	20E	27"	30⅝"	20,000	4
	25E1C38.0	25E	27"	30⅝"	20,000	4
	30E1C38.0	30E	27"	30⅝"	20,000	4
	40E1C38.0	40E	27"	30⅝"	20,000	4
	50E2C38.0	50E	27"	30⅝"	20,000	5
	65E2C38.0	65E	27"	30⅝"	20,000	5
	80E2C38.0	80E	27"	30⅝"	20,000	5

E-RATED MEDIUM VOLTAGE FUSES

Current-Limiting

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.

Dimensions in inches

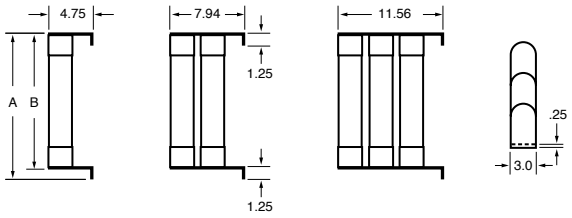


Figure 7 **Figure 8** **Figure 9**

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
5.5 MAX. KV CLIP LOCK	10E1CL5.5	10E	16.38"	15.13"	80,000	7
	15E1CL5.5	15E	16.38"	15.13"	80,000	7
	20E1C5.5	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
	100E1CL5.5	100E	16.38"	15.13"	80,000	7
	125E1CL5.5	125E	16.38"	15.13"	80,000	7
	150E1CL5.5	150E	16.38"	15.13"	80 000	7
	225E2CL5.5	225E	17.38"	16.13"	80,000	8
	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

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
8.25 MAX. KV CLIP LOCK	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
	80E1CL8.25	80E	17.38"	16.13"	80,000	7
	100E1CL8.25	100E	17.38"	16.13"	80 000	7
	125E2CL8.25	125E	17.38"	16.13"	80,000	8
	150E2CL8.25	150E	17.38"	16.13"	80,000	8
	175E2CL8.25	175E	17.38"	16.13"	80,000	8
	200E2CL8.25	200E	17.38"	16.13"	80,000	8
	225E2CL8.25	225E	17.38"	16.13"	80,000	8
	250E2CL8.25	250E	17.38"	16.13"	80,000	8
	300E2CL8.25	300E	17.38"	16.13"	80 000	8
	350E3CL8.25	350E	17.38"	16.13"	80,000	9

E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIM. A (INCHES)	DIM. B (INCHES)	MAX INTERRUPTING RATING RMS (ASYM)	FIGURE NUMBER
15.5 MAX. KV CLIP LOCK	10E1CL15.5	10E	19.8"	18.1"	60,000	7
	15E1CL15.5	15E	19.8"	18.1"	60,000	7
	20E1CL15.5	20E	19.8"	18.1"	60,000	7
	25E1CL15.5	25E	19.8"	18.1"	60,000	7
	30E1CL15.5	30E	19.8"	18.1"	60,000	7
	40E1CL15.5	40E	19.8"	18.1"	60,000	7
	50E1CL15.5	50E	19.8"	18.1"	60 000	7
	65E1CL15.5	65E	22.81"	21.13"	60,000	7
	80E1CL15.5	80E	22.81"	21.13"	60,000	7
	100E1CL15.5	100E	22.81"	21.13"	60 000	7
	125E2CL15.5	125E	22.81"	19.1"	60,000	8
	150E2CL15.5	150E	22.81"	19.1"	60,000	8
	175E2CL15.5	175E	22.81"	19.1"	60,000	8
	200E2CL15.5	200E	22.81"	19.1"	60 000	8
	150E3CL15.5	150E	22.81"	19.1"	60,000	9
	200E3CL15.5	200E	22.81"	19.1"	60,000	9
	250E3CL15.5	250E	22.81"	19.1"	60,000	9
	300E3CL15.5	300E	22.81"	19.1"	60,000	9

E-RATED POTENTIAL TRANSFORMER FUSES

Current-Limiting

Description

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

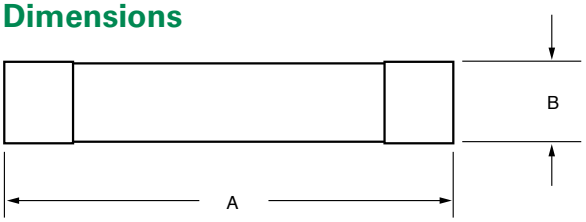
Application Note

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: 1/2E – 10E

Dimensions



E RATED	SYSTEM/CATALOG NUMBER	SIZE	DIMENSION A (INCHES)	DIAMETER DIMENSION B (INCHES)	MAX INTERRUPTING RATING RMS (SYM)
625 VOLT	3E4PT6	3E	4.6"	0.8125"	37,500
	5E4PT6	5E	4.6"	0.8125"	37,500
	7E4PT6	7E	4.6"	0.8125"	37,500
	10E4PT6	10E	4.6"	0.8125"	37,500
2.75 MAX. KV	500E4PT2.4	1/2E	4.6"	0.8125"	37,500
	1E4PT2.4	1E	4.6"	0.8125"	37,500
	2E4PT2.4	2E	4.6"	0.8125"	37,500
2.75 MAX. KV	1E6PT2.75	1E	7.4"	1.5625"	37,500
	2E6PT2.75	2E	7.4"	1.5625"	37,500
	3E6PT2.75	3E	7.4"	1.5625"	37,500
	1E8PT2.75	1E	9.5"	1.5625"	37,500
	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
	2E5PT4.8	2E	5.6"	0.8125"	50,000
5.5 MAX. KV	1/2E6PT5.5	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
	5E6PT5.5	5E	7.4"	1.5625"	50,000
	1/2E8PT5.5	1/2E	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
8.25 MAX. KV	1/2E8PT8.25	1/2E	9.5"	1.5625"	50,000
	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
15.5 MAX. KV	1/2E11PT15.5	1/2E	12.8"	1.5625"	35,000
	1E11PT15.5	1E	12.8"	1.5625"	35,000
	2E11PT15.5	2E	12.8"	1.5625"	35,000
	3E11PT15.5	3E	12.8"	1.5625"	35,000
	3E16PT15.5	3E	17.5"	1.5625"	35,000
	5E16PT15.5	5E	17.5"	1.5625"	35,000
25.8 MAX. KV	1/2E16PT25.5	1/2E	17.5"	1.5625"	32,000
	1E16PT25.5	1E	17.5"	1.5625"	32,000

LIVE PARTS

Description

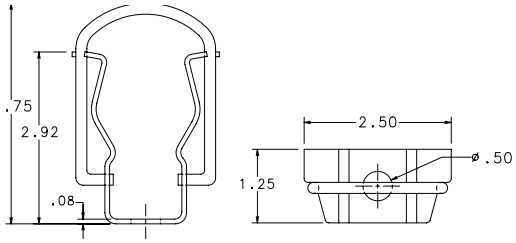
Live parts are available for mounting E, R, and PT single, double, and triple barrel fuses. Mounting clips are available for ferrule type and clip lock style fuses. All clips are sold in pairs.

Part Number: 700-156

System Number: 0700156.Z

For use with 1 9/16" to 1 5/8" (1.625") diameter PT fuses.

Dimensions in inches

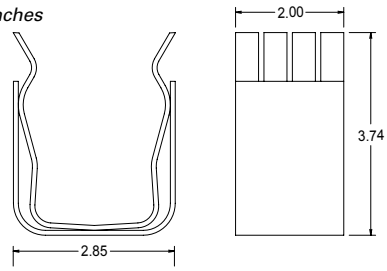


Part Number: 700-300

System Number: 0700300.Z

For use with 3" diameter fuses.

Dimensions in inches

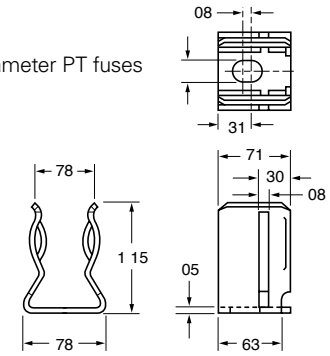


Part Number: 700-500

System Number: 0700500.Z

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

Dimensions in inches

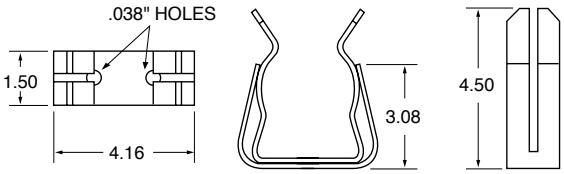


Part Number: 700-530

System Number: 0700530.Z

For use with all 3" diameter fuses.

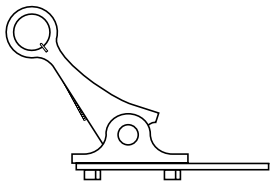
Dimensions in inches



Part Number: 700-520-CL

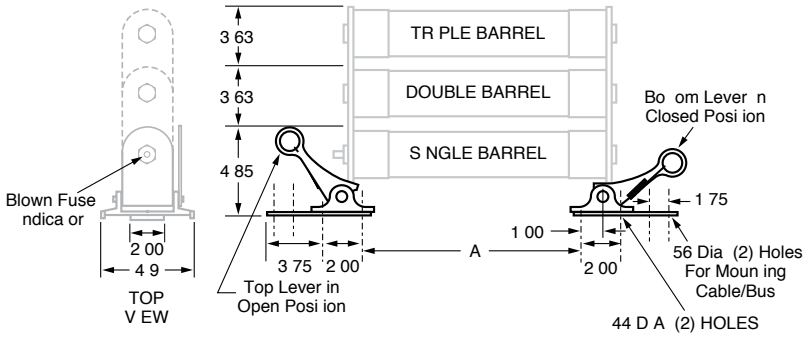
System Number: 0700520.ZXCL

Clip Lock Design



Dimensions for reference only.

Mounting Details for Clip Lock *Dimensions in inches*



Section Overview

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

TELECOM PRODUCTS

Table of Contents

L17T SERIES TELECOMMUNICATIONS POWER FUSE

170 VDC • Current-Limiting • 70-1200 Amperes

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 I^2t 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^2t
- Extremely current-limiting
- Low operating temperature
- 170 VDC rating

Specifications

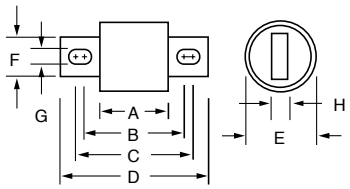
Voltage Rating: 170 VDC
Interrupting Rating: 100 kA
Ampere Range: 70 – 1200 A
Approvals: UL Recognized (File No. E71611)
CSA Recognized (File No. LR29862)

Ordering Information

AMPERE RATINGS						
70	100	175	250	400	600	1000
80	125	200	300	450	800	1100
90	150	225	350	500	900	1200

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

Dimensions in inches (mm)



AMPERE RATING	DIMENSIONS IN INCHES (mm)							
	A	B	C	D	E	F	G	H
70 – 250	1 5/32 (29.4)	1 7/8 (47.6)	2 3/16 (55.6)	2 21/32 (67.5)	1 (25.4)	7/8 (22.2)	5/16 (7.9)	3/16 (4.8)
300 – 800	1 1/4 (31.8)	1 15/16 (49.2)	2 9/16 (65.1)	3 1/2 (88.9)	1 1/2 (38.1)	1 (25.4)	13/32 (10.3)	1/4 (6.35)
900–1200	1 11/32 (34.0)	—	—	4 1/16 (103.1)	—	1 1/2 (38.1)	—	1/4 (6.35)

Web Resources

For additional information, visit:
www.littelfuse.com/l17t

Recommended Fuseholders

LTFD 6001 and LTFD 1200 series–see website:
www.littelfuse.com/ltfd

TLN SERIES TELECOMMUNICATIONS POWER FUSE

170 VDC • Current-Limiting • 1-600 Amperes

Specifications

Voltage Rating: 170 VDC
Interrupting Rating: 100 kA
Ampere Range: 1 – 600 A
Approvals: UL Recognized (File No. 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	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
TLN	170VDC	6	TLN006	0TLN006.T

Replaces competitors' TPN and TGN Series.

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

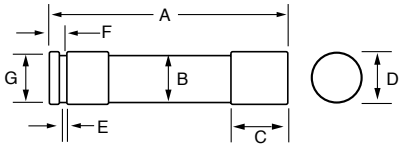
Web Resources

For additional information, visit:
www.littelfuse.com/tln

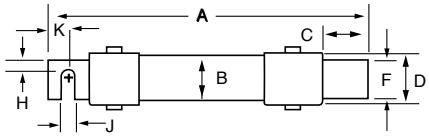
Recommended Fuseholders

LFR25 Series ..... pg. 90

Dimensions in inches (mm)



FG 1



FG 2

Figure 1

AMPERE RATING	DIMENSIONS IN INCHES (mm)									
	A	B	C	D	E	F	G	H	J	K
1 – 30	2 (50.8)	½ (12.7)	½ (12.7)	9/16 (14.3)	5/64 (2.0)	5/32 (4.0)	3/8 (9.5)	—	—	—
35 – 60	3 (76.2)	¾ (19.1)	5/8 (15.9)	13/16 (20.6)	3/32 (2.4)	3/16 (4.8)	5/8 (15.9)	—	—	—

Figure 2

AMPERE RATING	DIMENSIONS IN INCHES (mm)									
	A	B	C	D	E	F	G	H	J	K
70 – 100	5 7/8 (149.2)	1 (25.4)	1 1/16 (27.0)	1 1/16 (27.0)	1/8 (3.2)	¾ (19.1)	1 ¼ (31.6)	¼ (6.4)	9/32 (7.1)	½ (12.7)
110 – 200	7 1/8 (181.0)	1 ½ (38.1)	1 15/32 (37.3)	1 19/32 (40.5)	3/16 (4.8)	1 1/8 (28.6)	1 27/32 (46.8)	7/16 (11.1)	9/32 (7.1)	11/16 (17.5)
225 – 400	8 5/8 (219.1)	2 (50.8)	1 15/16 (49.2)	2 3/32 (53.2)	¼ (6.4)	1 5/8 (41.3)	2 11/32 (59.5)	5/8 (15.9)	13/32 (10.3)	15/16 (23.8)
450 – 600	10 3/8 (263.5)	2 ½ (63.5)	2 3/8 (60.3)	2 19/32 (65.9)	¼ (6.4)	2 (50.8)	2 27/32 (72.2)	¾ (19.1)	17/32 (13.5)	1 1/8 (28.6)

TLS SERIES TELECOMMUNICATIONS POWER FUSE

170 VDC • Current-Limiting • 1-125 Amperes

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
- RoHS Compliant

Specifications

Voltage Rating:	170 VDC
Interrupting Rating:	100 kA
Ampere Range:	1 – 125 A
Approvals:	UL Recognized (File No. E71611)
Construction:	Caps: Silver-plated brass
Body:	Glass melamine

Ordering Information

AMPERE RATINGS				
1	6	25	50	90
2	10	30	60	100
3	15	35	70	110*
5	20	40	80	125*

*Available in cartridge only.

Note: To order leaded versions of TLS fuses, add suffix V, L, LB, or LS to part number.

SERIES	VOLTAGE	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
TLS	170VDC	6	TLS006V	0TLS006.TXV

Replaces competitors' TPS and TGS Series.

Web Resources

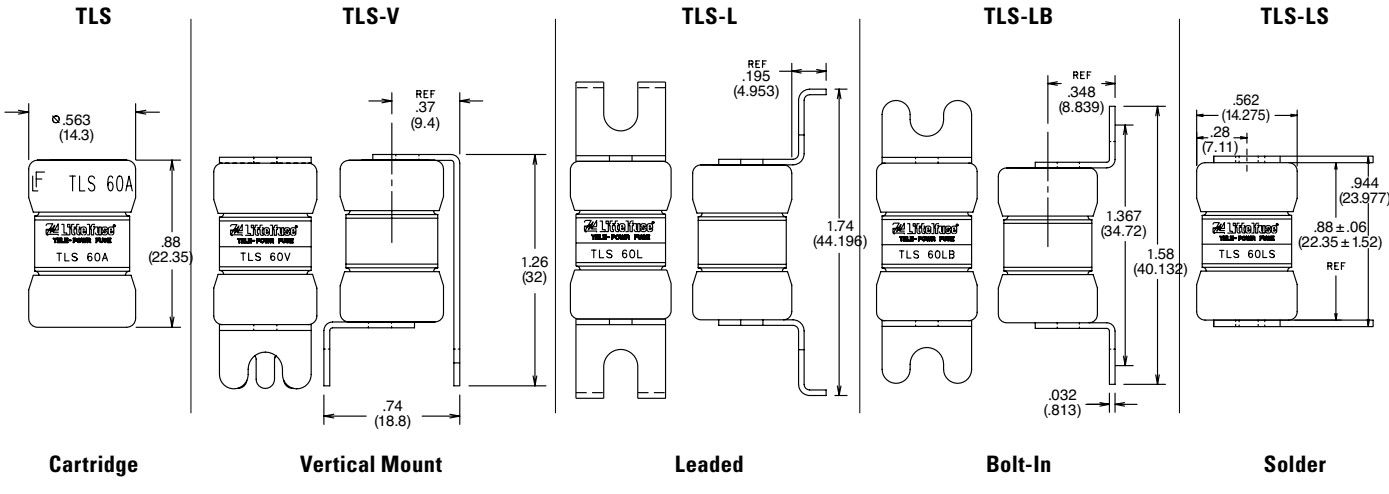
For additional information, visit: **www.littelfuse.com/tls**

Recommended Fuseholders

LTFD series disconnect switches .....pg. 61
LFT30060 for TLS series cartridge style fuse .....pg. 95
Contact factory for more information.

Contact Littelfuse for characteristic curves. Dimensions for reference only.

Dimensions in inches (mm)



TELECOMMUNICATIONS POWER FUSES

Alarm Indicating Fuses

70 Series Alarm Indicating Fuses

Description

The 70 Series alarm indicating fuses are designed for use in telecommunications equipment. A color coded tip provides visual identification of the ampere rating and the fuse status.

Features

- Color coded tip
- Rated 125 VAC, 300 VDC

Specifications

Voltage Ratings: 125 VAC
300 VDC
Interrupting Ratings: 1,000 A @ 125 VAC
1,000 A @ 300 VDC

Ordering Information

AMPERE RATINGS				
100 mA	200 mA	500 mA	2	5
150 mA	250 mA	750 mA	3	8
180 mA	350 mA	1.33	3.5	10

10 MINUTE RATING	CATALOG NUMBER	SYSTEM NUMBER	COLOR CODE
100 mA	70P	70P00000Z	GREY/WHITE
150 mA	70R	70R00000Z	RED/WHITE
180 mA	70E	70E00000Z	YELLOW
200 mA	70X	70X00000Z	BLACK
250 mA	70F	70F00000Z	VIOLET
250 mA	70K	70K00000Z	VIOLET/WHITE
350 mA	70S	70S00000Z	GRAY
500 mA	70G	70G00000Z	RED
750 mA	70H	70H00000Z	BROWN
1.33 A	70A	70A00000Z	WHITE
2 A	70B	70B00000Z	ORANGE
3 A	70C	70C00000Z	BLUE
3.5 A	70J	70J00000Z	BLACK/WHITE
5 A	70D	70D00000Z	GREEN/BLACK
8 A	70M	70M00000Z	TAN/WHITE
10 A	70N	70N00000Z	YELLOW/PURPLE

Web Resources

For additional information, see website:
www.littelfuse.com/70

481 Series Alarm Indicating Fuses

Description

For telecommunications equipment and similar applications. Color coded indicator flags indicate ampere rating. Body is constructed of black polyphenylene sulfide with UL94-V0 flammability rating, contacts are of bright alloy-plated beryllium copper. Available with or without protective lens.

Specifications

Voltage Rating: 125 VAC/DC
Approvals: UL Recognized
CSA Recognized

Ordering Information

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

SERIES	VOLTAGE	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
481	125 AC/DC	2	481002L	0481002.VXL

Note: For 481 Dummy fuse, order 481000.

Recommended Fuseholders

482 Series, see website: **www.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, see website:
www.littelfuse.com/481

LTFD 101 SERIES TELECOMMUNICATIONS DISCONNECT SWITCH

80 VDC • 1-125 Amperes

Specifications

Voltage Rating: 80 VDC
Ampere Range: 1 – 125 A
Approvals: UL Recognized (File No. E122674)

Recommended Fuses

Littelfuse TLS Series fuses ..... pg. 59

Ordering Information

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM 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

Description

Littelfuse compact LTFD 101 fuseholders 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.

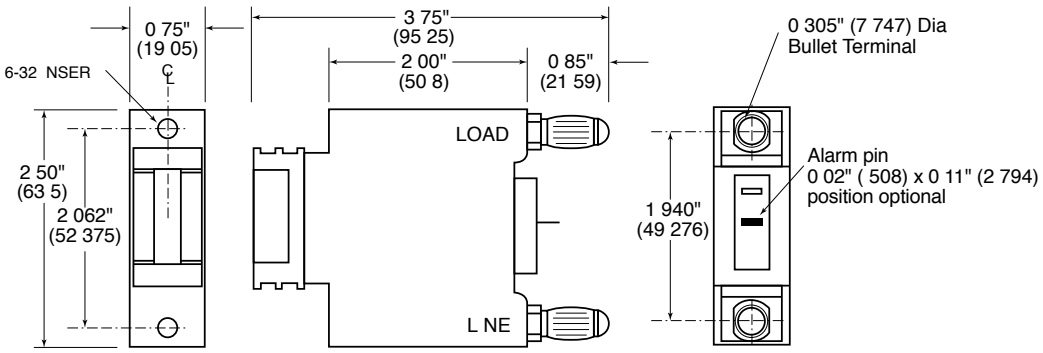
Web Resources

For additional information, visit:
www.littelfuse.com/ltfd101

Features

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

Dimensions in inches (mm)



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

Section Overview

Whether you are protecting power semiconductors or finding a replacement fuse for an aging HVAC unit, Littelfuse 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.

SPECIAL PURPOSE FUSES

Table of Contents

PLUG FUSES AND BOLT-DOWN FUSES

125 VAC

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.

Specifications

Voltage Rating: 125 VAC
Interrupting Rating: 10 kA rms symmetrical
Approvals: UL Listed Plug Fuses, Standard UL 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. Use for replacement purposes only.

TOO Fuses Sample Part #: 0TOO020.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 #: 0TLO020.Z

AMPERE RATINGS			
15	20	25	30

32 VAC/DC

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	SYSTEM 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 Fuseholders

298900, see website: **www.littelfuse.com/mega**

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/mega**

FORK-LIFT STUD-MOUNTED FUSES

48 or 80 Volts DC • Fast-Acting and Time-Delay • 35-800 Amperes

CNN Limiter Fuses

Description

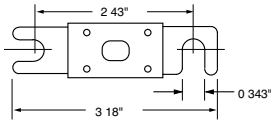
CNN/E fuses are rated for applications up to 80 VDC. As fork lift trucks and electrical vehicle system voltages increase, circuit protection needs to be rated higher than the standard CNN products to handle the increased voltage. The CNN/E is considered very fast-acting for quicker reaction time.

Specifications

Voltage Ratings: 48-80 VDC
Max. Interrupting Rating: 2,500 A
Ampere Ratings: 35 – 800 A
Approval: UL Recognized (File No. E71611)

Features/Benefits

- 80 VDC Protection
- Window shows fuse status
- 2,500 A interrupting rating
- Compact size saves space
- RoHS compliant and lead free



Ordering Information

AMPERE RATINGS CNN/E					
35	80	150	250	350	700*
40	90	175	275	400	800*
50	100	200	300	500	—
60	125	225	325	600	—

*Contact factory for availability

SERIES	AMP	VOLT	CATALOG NUMBER	SYSTEM NUMBER	TYPE
CNN/E	200	80	CNN200E	0CNN200E.V	FAST-ACTING
CNN	200	48	CNN200	0CNN200.V	FAST-ACTING
CNL	200	48	CNL200	0CNL200.V	TIME-DELAY

48 VDC products are available in time-delay and fast-acting.
See Web for details. Contact factory for 48V and time-delay products.

Recommended Fuseholders

LFFB0003Z .....pg. 116

Web Resources

80 V: **www.littelfuse.com/cnne**
48 V: **www.littelfuse.com/cnn**

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	SYSTEM 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

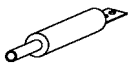
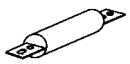
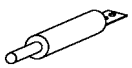
Voltage Ratings: 48 VAC/DC
Interrupting Rating: 2,500 A
Ampere Rating: 10 – 800 A
Approval: UL Recognized (File No. E71611)
Fuseholder: LFFB003

AMPERE RATINGS		
10	135	400
35	150	425
50	160	500
90	200	675
100	225	750*
125	250	800*
130	300	—

*Contact factory for availability

CABLE LIMITERS

600 Volts AC

DESCRIPTION			CATALOG NUMBER	
TYPE	TERMINATION	CABLE SIZE	CABLE TYPE	
			COPPER	ALUMINUM
1	 CABLE TO CABLE	4/0	LFCL4/0C1	LFCL4/0A1
		250MCM	LFCL250C1	LFCL250A1
		350MCM	LFCL350C1	LFCL350A1
		500MCM	LFCL500C1	LFCL500A1
		750MCM	LFCL750C1	LFCL750A1
3	 CABLE TO OFFSET BUS	4/0	LFCL4/0C3	LFCL4/0A3
		250MCM	LFCL250C3	LFCL250A3
		350MCM	LFCL350C3	LFCL350A3
		500MCM	LFCL500C3	LFCL500A3
		750MCM	LFCL750C3	LFCL750A3
5	 STRAIGHT BUS TO OFFSET BUS	4/0	LFCL4/0C5	–
		250MCM	LFCL250C5	–
		350MCM	LFCL350C5	–
		500MCM	LFCL500C5	–
		750MCM	LFCL750C5	–
6	 MOLE TO CABLE	4/0	LFCL4/0C6	LFCL4/0A6
		250MCM	LFCL250C6	LFCL250A6
		350MCM	LFCL350C6	LFCL350A6
		500MCM	LFCL500C6	LFCL500A6
		750MCM	LFCL750C6	LFCL750A6
8	 MOLE TO OFFSET BUS	4/0	LFCL4/0C8	–
		250MCM	LFCL250C8	–
		350MCM	LFCL350C8	–
		500MCM	LFCL500C8	–
		750MCM	LFCL750C8	–

Web Resources

For additional information, see website:
www.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 busway terminal boxes
- Large feeders with three or more conductors per phase

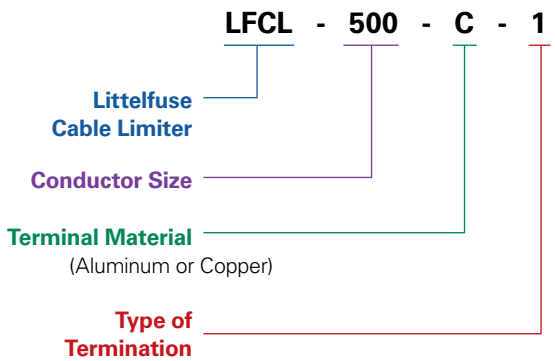
Features

- 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: 600 VAC
Interrupting Rating: 200 kA
Cable Size Range: 4/0 – 75MCM Copper or Aluminum
Note: For Type 5 and Type 8 Aluminum cable limiters, use the Copper Type C5 and C8.

Ordering Information

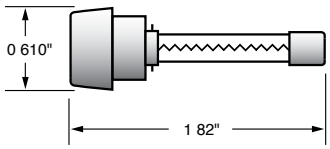


LGR/LMF IN-LINE FUSES AND LHR HOLDER

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: 300 VAC
Maximum Interrupting Rating: 10 kA
Approvals: Standard 248-14
UL Listed (File No. E10480)
CSA Certified (File No. LR29862)

Ordering Information

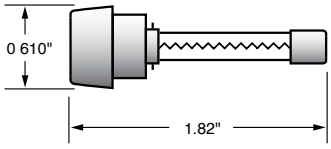
AMPERE RATINGS					
1/2	1 6/10	3	6	9	15
1	2	4	7	10	—
1 1/2	2 1/2	5	8	12	—

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
LGR	5	LGR005	0LGR005.V

LMF Fuses

Time-Delay • 300 VAC

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



Specifications

Voltage Rating: 300 VAC
Maximum Interrupting Rating: 10 kA
Approvals: Standard 248-14
UL Listed (File No. E10480)
CSA Certified (File No. LR29862)

Ordering Information

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

SERIES	AMPERAGE	CATALOG NUMBER	SYSTEM NUMBER
LMF	5	LMF005	0LMF005.V

LHR Fuse Holder

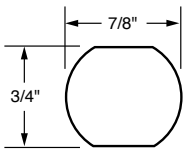
Used as in-line protection for fluorescent fixtures, the Littelfuse LGR and LMF series fuses and LHR holder offer increased safety and reliability to lighting systems.

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.

Fuseholders 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
Flammability Rating: UL94 V-0
Example part number: LHR001
System number: 0LHR001T

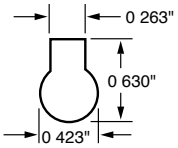


Knock-out Hole

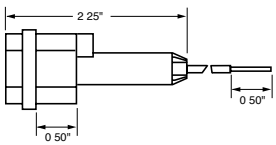
Mounting Information

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.



Keyhole Punch



TRADITIONAL SEMICONDUCTOR FUSES

150/250/500/600/700 VAC • Very Fast-Acting • 1 – 1200 Amperes

AMPERE RATINGS	SERIES & VOLTAGE RATINGS					
	L15S 150 VAC 150 VDC (1 – 60 A) 100 VDC (70 – 1000 A)	L25S 250 VAC 250 VDC (1 – 200 A) 200 VDC (225 – 800 A)	L50S 500 VAC 450 VDC	L60S 600 VAC	KLC‡ 600 VAC	L70S 700 VAC 650 VDC
1	L15S 1	L25S 1	–	L60S 1	KLC 1	–
2	L15S 2	L25S 2	–	L60S 2	KLC 2	–
3	L15S 3	L25S 3	–	L60S 3	KLC 3	–
4	L15S 4	L25S 4	–	L60S 4	KLC 4	–
5	L15S 5	L25S 5	–	L60S 5	KLC 5	–
6	L15S 6	L25S 6	–	L60S 6	KLC 6	–
7	L15S 7	–	–	–	KLC 7	–
8	L15S 8	L25S 8	–	L60S 8	KLC 8	–
9	L15S 9	–	–	–	–	–
10	L15S 10	L25S 10	L50S 10	L60S 10	KLC 10	L70S 10
12	L15S 12	L25S 12	L50S 12	L60S 12	KLC 12	–
15	L15S 15	L25S 15	L50S 15	L60S 15	KLC 15	L70S 15
17½	–	–	–	L60S 17½	KLC 17½	–
20	L15S 20	L25S 20	L50S 20	L60S 20	KLC 20	L70S 20
25	L15S 25	L25S 25	L50S 25	L60S 25	KLC 25	L70S 25
30	L15S 30	L25S 30	L50S 30	L60S 30	KLC 30	L70S 30
35	L15S 35	L25S 35	L50S 35	L60S 35	KLC 35	L70S 35
40	L15S 40	L25S 40	L50S 40	L60S 40	KLC 40	L70S 40
45	L15S 45	L25S 45	–	L60S 45	KLC 45	–
50	L15S 50	L25S 50	L50S 50	L60S 50	KLC 50	L70S 50
60	L15S 60	L25S 60	L50S 60	L60S 60	KLC 60	L70S 60
70	L15S 70	L25S 70	L50S 70	L60S 70	KLC 70	L70S 70
80	L15S 80	L25S 80	L50S 80	L60S 80	KLC 80	L70S 80
90	L15S 90	L25S 90	L50S 90	L60S 90	KLC 90	L70S 90
100	L15S 100	L25S 100	L50S 100	L60S 100	KLC 100	L70S 100
110	–	–	–	–	KLC 110	–
125	L15S 125	L25S 125	L50S 125	L60S 125	KLC 125	L70S 125
150	L15S 150	L25S 150	L50S 150	L60S 150	KLC 150	L70S 150
175	–	L25S 175	L50S 175	L60S 175	KLC 175	L70S 175
200	L15S 200	L25S 200	L50S 200	L60S 200	KLC 200	L70S 200
225	–	L25S 225	L50S 225	L60S 225	KLC 225	L70S 225
250	L15S 250	L25S 250	L50S 250	L60S 250	KLC 250	L70S 250
275	–	L25S 275	L50S 275	–	–	–
300	L15S 300	L25S 300	L50S 300	L60S 300	KLC 300	L70S 300
350	L15S 350	L25S 350	L50S 350	L60S 350	KLC 350	L70S 350
400	L15S 400	L25S 400	L50S 400	L60S 400	KLC 400	L70S 400
450	L15S 450	L25S 450	L50S 450	L60S 450	KLC 450	L70S 450
500	L15S 500	L25S 500	L50S 500	L60S 500	KLC 500	L70S 500
550	–	–	L50S 550	–	–	–
600	L15S 600	L25S 600	L50S 600	L60S 600	KLC 600	L70S 600
700	–	L25S 700	L50S 700	L60S 700	KLC 700	L70S 700
800	L15S 800	L25S 800	L50S 800	L60S 800	KLC 800	L70S 800
900	–	–	LA50P9004	–	–	LA70P9004
1000	L15S 1000	–	LA50P10004	–	–	LA70P10004
1200	–	–	LA50P12004	–	–	LA70P12004

‡ KLC series fuses are recommended for replacement use only.

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)
L50S:	500 VAC/450 VDC
L60S:	600 VAC
KLC:	600 VAC
L70S:	700 VAC/650 VDC

L25S series fuses are Littelfuse Certified for DC ratings shown in Rating Table.

Interrupting Rating:

AC:	200 kA rms
	(L15S series 100 kA)
DC:	20 kA

Ampere Range:
1 – 1200 A
See Rating Table for ratings available in each series.

Approvals:
UL Recognized (File No. E71611)
CSA Recognized (File No. LR29862)

Recommended Fuseholders

1LFS101/1LFS102 ..... pg. 121
LSCR001/LSCR002 ..... pg. 120

Web Resources

For additional information, visit:
www.littelfuse.com/semi

TRADITIONAL SEMICONDUCTOR FUSES

150/250/500/600/700 VAC • Very Fast-Acting • 1-1000 Amperes

L15S Series, 150 Volts AC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
1 – 30	1	1½ (38.1)	—	⅜ (9.5)	13/32 (10.3)	—	—	—	—
31 – 60	1	2 (50.8)	—	⅝ (15.9)	13/16 (20.6)	—	—	—	—
61 – 450	3	1 5/32 (29.4)	1⅞ (47.6)	2 3/16 (55.6)	2 21/32 (67.5)	1 (25.4)	43/64 (17.1)	5/16 (7.9)	3/16 (4.8)
451 – 1000	3	1¼ (31.8)	1 15/16 (49.2)	2 9/16 (65.1)	3½ (88.9)	1½ (38.1)	1 (25.4)	13/32 (10.3)	¼ (6.4)

L25S Series, 250 Volts AC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
1 – 30	1	2 (50.8)	—	½ (12.7)	9/16 (14.3)	—	—	—	—
31 – 60	2	1⅝ (41.3)	2¼ (57.2)	2½ (63.5)	3 3/16 (81.0)	13/16 (20.6)	23/32 (18.3)	11/32 (8.7)	⅛ (3.2)
61 – 200	3	1⅝ (41.3)	2 5/16 (58.7)	2 7/16 (61.9)	3⅛ (79.4)	1 7/32 (31.0)	1 (25.4)	5/16 (7.9)	3/16 (4.8)
201 – 700	3	1 19/32 (40.5)	2 9/32 (57.9)	2 29/32 (73.8)	3 27/32 (97.6)	1½ (38.1)	1 (25.4)	13/32 (10.3)	¼ (6.4)
701 – 800	3	1 19/32 (40.5)	2 9/32 (57.9)	2 29/32 (73.8)	3 27/32 (97.6)	2 (50.8)	1½ (38.1)	13/32 (10.3)	¼ (6.4)

L50S Series, 500 Volts AC / 450 Volts DC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
10 – 30	1	2 (50.8)	—	½ (12.7)	9/16 (14.3)	—	—	—	—
31 – 60	2	1⅝ (41.3)	2¼ (57.2)	2½ (63.5)	3 3/16 (81.0)	13/16 (20.6)	23/32 (18.3)	11/32 (8.7)	⅛ (3.2)
61 – 100	3	2⅛ (54.0)	2 11/16 (68.3)	3 (76.2)	3⅝ (92.1)	1 (25.4)	¾ (19.1)	11/32 (8.7)	⅛ (3.2)
101 – 200	3	2⅛ (54.0)	2 13/16 (71.4)	2 15/16 (74.6)	3⅝ (92.1)	1 7/32 (31.0)	1 (25.4)	5/16 (7.9)	3/16 (4.8)
201 – 400	3	2 3/32 (53.2)	2 25/32 (70.6)	3 13/32 (86.5)	4 11/32 (110.3)	1½ (38.1)	1 (25.4)	13/32 (10.3)	¼ (6.4)
401 – 600	3	2 7/32 (56.4)	2 29/32 (73.8)	3 17/32 (89.7)	4 15/32 (113.5)	2 (50.8)	1½ (38.1)	13/32 (10.3)	¼ (6.4)
601 – 800	3	2 7/32 (56.4)	4 9/32 (108.7)	4⅝ (117.5)	6 15/32 (164.3)	2½ (63.5)	2 (50.8)	17/32 (13.5)	⅜ (9.5)

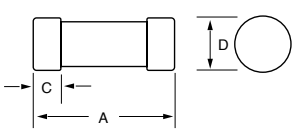


Fig 1

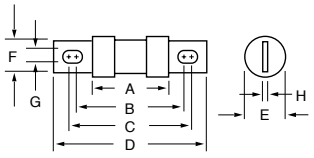


Fig 2

NORTH AMERICAN SEMICONDUCTOR FUSES

150/250/500/600/700 VAC • Very Fast-Acting • 1-1000 Amperes

L60S Series, 600 Volts AC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
1 – 30	1	5 (127.0)	—	5/8 (15.9)	13/16 (20.6)	—	—	—	—
31 – 60	2	2 25/32 (70.6)	3 7/16 (87.3)	3 11/16 (93.7)	4 3/8 (111.1)	13/16 (20.6)	23/32 (18.3)	11/32 (8.7)	1/8 (3.2)
61 – 100	2	2 29/32 (73.8)	3 17/32 (89.7)	3 25/32 (96.0)	4 15/32 (113.5)	1 1/16 (27.0)	23/32 (18.3)	11/32 (8.7)	1/8 (3.2)
101 – 200	2	2 29/32 (73.8)	3 9/16 (90.5)	3 3/4 (95.3)	4 13/32 (111.9)	1 5/16 (33.3)	1 (25.4)	5/16 (7.9)	3/16 (4.8)
201 – 400	2	2 29/32 (73.8)	3 31/32 (100.8)	4 5/32 (105.6)	5 1/8 (130.2)	1 37/64 (40.1)	1 (25.4)	13/32 (10.3)	1/4 (6.4)
401 – 600	2	2 7/8 (73.0)	3 31/32 (100.8)	4 9/64 (105.2)	5 1/8 (130.2)	2 1/16 (52.8)	1 1/2 (38.1)	13/32 (10.3)	1/4 (6.4)
601 – 800	2	3 1/32 (77.0)	5 5/32 (133.4)	5 11/32 (135.7)	7 1/4 (184.2)	2 1/2 (63.5)	2 (50.8)	17/32 (13.5)	3/8 (9.5)

L70S Series, 700 Volts AC/600 Volts DC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm)								
		A	B	C	D	E	F	G	H	J
10 – 30	1	2 (50.8)	—	1/2 (12.7)	9/16 (14.3)	—	—	—	—	—
31 – 60	3	2 7/8 (73.0)	3 7/16 (87.3)	3 25/32 (96.0)	4 3/8 (111.1)	1 (25.4)	43/64 (17.1)	11/32 (8.7)	1/8 (3.2)	—
61 – 100	3	2 7/8 (73.0)	3 9/16 (90.5)	3 11/16 (93.7)	4 3/8 (111.1)	1 7/32 (31.0)	29/32 (22.9)	5/16 (7.9)	3/16 (4.8)	—
101 – 200	3	2 27/32 (72.2)	3 17/32 (89.7)	4 5/32 (105.6)	5 3/32 (129.4)	1 1/2 (38.1)	1 (25.4)	13/32 (10.3)	1/4 (6.4)	—
201 – 400	3	2 27/32 (72.2)	3 17/32 (89.7)	4 5/32 (105.6)	5 3/32 (129.4)	2 (50.8)	1 1/2 (38.1)	13/32 (10.3)	1/4 (6.4)	—
401 – 600	3	2 27/32 (72.2)	4 29/32 (124.6)	5 1/4 (133.4)	7 3/32 (180.2)	2 1/2 (63.5)	2 (50.8)	17/32 (13.5)	3/8 (9.5)	—
601 – 800	4	3 5/16 (84.1)	5 5/16 (134.9)	6 13/16 (173.0)	—	2 7/8 (73.0)	2 (50.8)	5/8 (15.9)	3/8 (9.5)	5/16 (7.9)

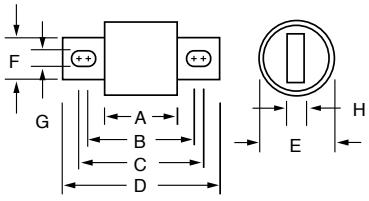


Fig 3

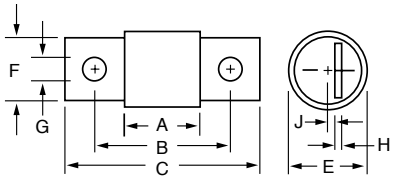


Fig 4

KLC Series, 600 Volts AC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
1 – 30	2	1 7/8 (47.6)	2 1/2 (63.5)	—	2 7/8 (73.0)	9/16 (14.3)	13/32 (10.3)	1/4 (6.4)	3/64 (1.2)
31 – 60	2	2 3/4 (69.9)	3 3/8 (85.7)	3 5/8 (92.1)	4 5/16 (109.5)	13/16 (20.6)	23/32 (18.3)	11/32 (8.7)	1/8 (3.2)
61 – 100	3	2 7/8 (73.0)	3 21/32 (92.9)	4 1/16 (103.2)	5 (127.0)	1 (25.4)	3/4 (19.1)	13/32 (10.3)	1/8 (3.2)
101 – 200	3	2 27/32 (72.2)	3 17/32 (89.7)	4 3/8 (111.1)	5 3/32 (129.4)	1 1/2 (38.1)	1 (25.4)	13/32 (10.3)	1/4 (6.4)
201 – 400	3	2 27/32 (72.2)	4 21/32 (118.3)	4 27/32 (123.0)	6 1/4 (158.8)	2 (50.8)	1 5/8 (41.3)	9/16 (14.3)	1/4 (6.4)
401 – 800	3	2 27/32 (72.2)	4 21/32 (118.3)	5 11/32 (135.7)	6 1/4 (158.8)	2 1/2 (63.5)	2 (50.8)	9/16 (14.3)	3/8 (9.5)

ALTERNATE DIMENSION SEMICONDUCTOR FUSES

150 VAC • Very Fast-Acting • 1-6000 Amperes

LA15QS Series

AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2t @150 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
1	LA15QS1-2	2	0.0002	0.68
2	LA15QS2-2	2	0.001	1.3
3	LA15QS3-2	2	0.003	1.7
4	LA15QS4-2	2	0.007	2.1
5	LA15QS5-2	2	0.012	2.8
6	LA15QS6-2	2	0.022	3.1
7	LA15QS7-2	2	0.011	2.2
8	LA15QS8-2	2	0.015	2.5
10	LA15QS10-2	2	0.019	2.6
12	LA15QS12-2	2	0.030	3
15	LA15QS15-2	2	0.042	3
20	LA15QS20-2	2	0.072	4
25	LA15QS25-2	2	0.14	5.2
30	LA15QS30-2	2	0.25	5.6
35	LA15QS35-1	1	0.21	9
40	LA15QS40-1	1	0.28	10
40	LA15QS40-4TI	4TI	0.39	3.1
45	LA15QS45-1	1	0.34	12
50	LA15QS50-1	1	0.47	13
50	LA15QS50-4	4	0.64	4
55	LA15QS55-1	1	Contact Factory	Contact Factory
60	LA15QS60-1	1	0.94	14
70	LA15QS70-4	4	2	5.6
70	LA15QS70-4TI	4TI	2	5.6
80	LA15QS80-4	4	2.5	8
80	LA15QS80-4TI	4TI	2.5	8
90	LA15QS90-4	4	3.1	9
100	LA15QS100-4	4	3.6	10
100	LA15QS100-4TI	4TI	3.6	10
130	LA15QS130-4	4	5.3	14
130	LA15QS130-4TI	4TI	5.3	14
150	LA15QS150-4	4	6.8	16
150	LA15QS150-4IL	4IL	6.8	16
150	LA15QS150-4TI	4TI	6.8	16
200	LA15QS200-4	4	9	22
200	LA15QS200-4IL	4IL	9	22
250	LA15QS250-4	4	15	22
250	LA15QS250-4TI	4TI	15	27
300	LA15QS300-4	4	22	33
300	LA15QS300-4IL	4IL	22	33
300	LA15QS300-4TL	4TI	22	33
350	LA15QS350-4	4	32	40
350	LA15QS350-4TI	4TI	32	40
400	LA15QS400-4	4	40	45
400	LA15QS400-4IL	4IL	40	45
400	LA15QS400-4TI	4TI	40	45
450	LA15QS450-4	4	50	50
450	LA15QS450-4IL	4IL	50	50
500	LA15QS500-4	4	90	30
500	LA15QS500-4IL	4IL	90	30
600	LA15QS600-4	4	130	35
600	LA15QS600-4IL	4IL	130	35
800	LA15QS800-4	4	290	57
1000	LA15QS1000-4	4	520	75
1000	LA15QS1000-4IL	4IL	520	75
1000	LA15QS1000-4TI	4TI	520	75
1000	LA15QS1000-128	128	540	88
1000	LA15QS1000-128IL	128IL	540	88
1200	LA15QS1200-128	128	680	100
1200	LA15QS1200-128IL	128IL	680	100
1500	LA15QS1500-128	128	1200	130
1500	LA15QS1500-128IL	128IL	1200	130
2000	LA15QS2000-128	128	1900	165
2000	LA15QS2000-128IL	128IL	1900	165
2500	LA15QS2500-128	128	3200	195
2500	LA15QS2500-128IL	128IL	3200	195
3000	LA15QS3000-128	128	4800	240
3000	LA15QS3000-128IL	128IL	4800	240
3500	LA15QS3500-128	128	6500	260
4000	LA15QS4000-128	128	8500	270
4000	LA15QS4000-128IL	128IL	8500	270
5000	LA15QS5000-128	128	Contact Factory	Contact Factory
6000	LA15QS6000-128	128	Contact Factory	Contact Factory

Specifications

Voltage Rating: AC: 150 V
DC: 150 V
Interrupting Rating: 100 kA
Ampere Range: 1 – 6000 A
Approvals: UL Recognized

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/la15qs**

Figure 1

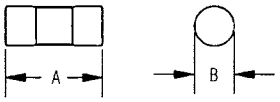


Figure 2

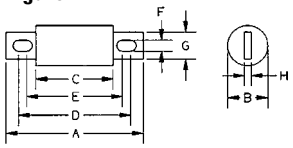


Figure 3

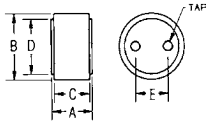


Figure 4

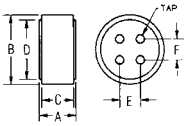
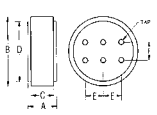


Figure 5



Dimensions for reference only.

Dimensions

AMPERE RATINGS	MOUNTING TYPE	FIGURE NO.	DIMENSIONS IN INCHES (mm IN PARENTHESES)								TAP
			A	B	C	D	E	F	G	H	
1 – 30	2	1	1.50 (38.1)	0.41 (10.4)	–	–	–	–	–	–	–
35 – 60	1	1	2.00 (50.8)	0.81 (20.6)	–	–	–	–	–	–	–
40 – 450	4, 4TI*, 4IL*	2	2.66 (67.6)	1.13 (28.7)	1.16 (29.5)	2.19 (55.6)	1.91 (48.5)	0.31 (7.9)	0.88 (22.4)	0.19 (4.8)	–
500 – 1000	4, 4TI*, 4IL*	2	3.50 (88.9)	1.50 (38.1)	1.25 (31.8)	2.56 (65.0)	1.94 (49.3)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)	–
750 – 2000	128, 128IL*	3	1.88 (47.9)	2.00 (50.8)	1.63 (41.4)	1.75 (44.5)	1.00 (25.4)	–	–	–	⅜-24-½ deep
2500 – 3000	128, 128IL*	3	1.88 (47.9)	3.00 (76.2)	1.63 (41.4)	2.50 (63.5)	1.50 (38.1)	–	–	–	½-20-½ deep
3500 – 4000	128, 128IL*	4	1.88 (47.9)	3.50 (88.9)	1.63 (41.4)	3.00 (76.2)	1.06 (27.0)	1.06 (27.0)	–	–	½-20-½ deep
5000 – 6000	128	5	2.38 (60.5)	5.75 (146)	1.88 (47.7)	5.00 (127)	1.50 (38.1)	1.50 (38.1)	–	–	½-20-½ deep

*Optional Trigger Actuator (IL). Optional Trigger Indicator (TI) see web for dimensions.

ALTERNATE DIMENSION SEMICONDUCTOR FUSES

300 VAC • Very Fast-Acting • 35-4500 Amperes

LA30QS Series

AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2T @300 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
35	LA30QS35-4	4	0.9	6.4
40	LA30QS40-4	4	1.2	7
50	LA30QS50-4	4	2	9.9
60	LA30QS60-4	4	2.7	11.6
70	LA30QS70-4	4	1.6	11
80	LA30QS80-4	4	2.6	11
90	LA30QS90-4	4	3.2	13
100	LA30QS100-4	4	4.1	13
100	LA30QS100-4TI	4TI	4.1	13
125	LA30QS125-4	4	6.3	16
130	LA30QS130-4	4	6.3	16
150	LA30QS150-4	4	9.3	19
150	LA30QS150-4TI	4TI	9.3	19
175	LA30QS175-4	4	10	27
200	LA30QS200-4	4	15	30
200	LA30QS200-4TI	4TI	15	30
225	LA30QS225-4	4	22	33
250	LA30QS250-4	4	25	41
250	LA30QS250-4TI	4TI	25	41
300	LA30QS300-4	4	37	47
300	LA30QS300-4TI	4TI	37	47
350	LA30QS350-4	4	62	49
400	LA30QS400-4	4	83	56
400	LA30QS400-4IL	4IL	83	56
400	LA30QS400-4TI	4TI	83	56
450	LA30QS450-4	4	130	53
500	LA30QS500-4	4	160	59
550	LA30QS550-4	4	190	65
600	LA30QS600-4	4	230	69
600	LA30QS600-4TI	4TI	230	69
600	LA30QS600-4IL	4IL	230	69
700	LA30QS700-4	4	260	90
700	LA30QS700-128	128	260	73
800	LA30QS800-4	4	330	108
800	LA30QS800-4IL	4IL	330	108
800	LA30QS800-128	128	330	84
1000	LA30QS1000-128	128	460	105
1000	LA30QS1000-128IL	128IL	460	105
1200	LA30QS1200-128	128	880	110
1500	LA30QS1500-128	128	1400	140
1500	LA30QS1500-128IL	128IL	1400	140
1600	LA30QS1600-128	128	1690	150
2000	LA30QS2000-128	128	2600	190
2000	LA30QS2000-128IL	128IL	2600	190
2500	LA30QS2500-128	128	4000	230
2500	LA30QS2500-128IL	128IL	4000	230
3000	LA30QS3000-128	128	4700	340
3500	LA30QS3500-128	128	6500	380
3500	LA30QS3500-128IL	128IL	6500	380
4000	LA30QS4000-128	128	8600	450
4500	LA30QS4500-128	128	11000	500

Specifications

Voltage Rating: AC: 300 V
DC: 300 V
Interrupting Rating: 200 kA
Ampere Range: 35 – 4500 A
Approvals: UL Recognized

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/la30qs**

Figure 1

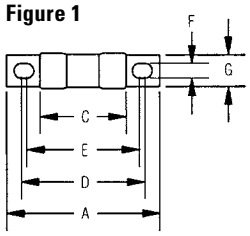


Figure 2

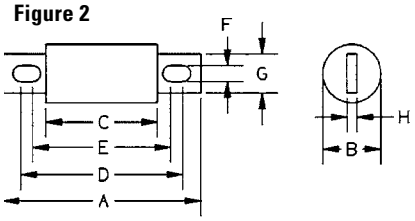


Figure 3

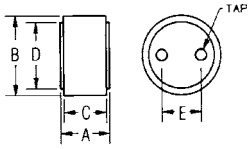
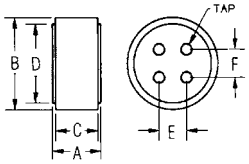


Figure 4



Dimensions

Dimensions for reference only.

AMPERE RATING	MOUNTING TYPE	FIGURE NO.	DIMENSIONS IN INCHES (mm IN PARENTHESES)								TAP
			A	B	C	D	E	F	G	H	
35 – 60	4	1	3.19 (81.0)	0.81 (20.6)	1.63 (41.4)	2.50 (63.5)	2.25 (57.5)	0.34 (8.6)	0.72 (18.3)	0.13 (3.3)	–
70 – 200	4	2	3.13 (79.5)	1.22 (31.0)	1.63 (41.4)	2.44 (62.0)	2.31 (58.7)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)	–
225 – 700	4, 4IL*	2	3.84 (97.5)	1.50 (38.1)	1.59 (40.1)	2.91 (73.9)	2.28 (57.9)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)	–
700 – 1200	128	3	2.59 (65.8)	3.00 (76.2)	2.34 (59.4)	2.50 (63.5)	1.50 (38.1)	–	–	–	⅜-24-½ deep
1500 – 2500	128, 128IL*	4	2.59 (65.8)	3.50 (88.9)	2.34 (59.4)	3.00 (76.2)	1.50 (38.1)	1.50 (38.1)	–	–	⅜-24-½ deep
3000 – 4500	128, 128IL*	4	2.59 (65.8)	4.50 (114)	2.34 (59.4)	3.75 (95.3)	1.50 (38.1)	1.50 (38.1)	–	–	½-20-½ deep

*Optional Trigger Actuator (IL). Optional Trigger Indicator (TI) see web for dimensions.

ALTERNATE DIMENSION SEMICONDUCTOR FUSES

500 VAC • Very Fast-Acting • 35-1200 Amperes

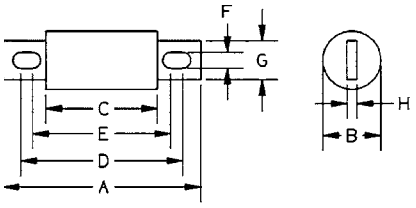
LA50QS Series

AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2T @500 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
35	LA50QS35-4	4	0.56	6
40	LA50QS40-4	4	0.69	7
50	LA50QS50-4	4	1.1	8
60	LA50QS60-4	4	1.8	10
70	LA50QS70-4	4	1.9	12
80	LA50QS80-4	4	2.6	14
90	LA50QS90-4	4	3.6	15
100	LA50QS100-4	4	4.4	17
125	LA50QS125-4	4	5.6	21
150	LA50QS150-4	4	9	25
175	LA50QS175-4	4	15	29
200	LA50QS200-4	4	20	33
225	LA50QS225-4	4	25	37

AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2T @500 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
250	LA50QS250-4	4	29	41
300	LA50QS300-4	4	55	49
350	LA50QS350-4	4	88	57
400	LA50QS400-4	4	98	65
450	LA50QS450-4	4	130	69
500	LA50QS500-4	4	160	77
600	LA50QS600-4	4	220	92
700	LA50QS700-4	4	270	110
800	LA50QS800-4	4	360	130
900	LA50QS900-4	4	500	140
1000	LA50QS1000-4	4	560	160
1200	LA50QS1200-4	4	930	175

Specifications

Voltage Rating: AC: 500 V
DC: 500 V
Interrupting Rating: AC: 200 kA
DC: 100 kA
Ampere Range: 35 – 1200 A
Approvals: UL Recognized
CSA Certified



Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/la50qs**

Dimensions

Dimensions for reference only.

AMPERE RATING	MOUNTING TYPE	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
35 – 100	4	3.63 (92.2)	1.00 (25.4)	2.13 (54.1)	2.94 (74.7)	2.75 (69.9)	0.31 (7.9)	0.75 (19.1)	0.13 (3.3)
125 – 200	4	3.63 (92.2)	1.22 (31.0)	2.13 (54.1)	2.94 (74.7)	2.81 (71.4)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)
225 – 400	4	4.34 (110)	1.50 (38.1)	2.09 (53.1)	3.41 (86.6)	2.78 (70.6)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)
450 – 600	4	4.47 (114)	2.00 (50.8)	2.22 (56.4)	3.53 (89.7)	2.91 (73.9)	0.41 (10.4)	1.50 (38.1)	0.25 (6.4)
700 – 800	4	6.47 (164.3)	2.50 (63.5)	2.22 (56.4)	5.00 (127.0)	3.44 (87.3)	0.53 (13.5)	1.50 (38.1)	0.25 (6.4)
900 – 1200	4	6.97 (177.0)	3.00 (76.2)	3.22 (81.8)	5.47 (138.9)	4.47 (113.5)	0.63 (15.9)	2.38 (60.3)	0.44 (11.1)

Contact Littelfuse for characteristic curves.

ALTERNATE DIMENSION SEMICONDUCTOR FUSES

600 VAC/DC • Very Fast-Acting • 5-40 Amperes

LA60QS Series Semiconductor Fuses

AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2T @600 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
5	LA60Q5-2	2	60	0.7
8	LA60Q8-2	2	70	1.1
10	LA60Q10-2	2	110	1.6
12	LA60Q12-2	2	150	2
15	LA60Q15-2	2	180	3
20	LA60Q20-2	2	330	4.4
25	LA60Q25-2	2	440	5.5
30	LA60Q30-2	2	860	5.6
35	LA60Q35-2	2	1300	6.4
40	LA60Q40-2	2	1800	7

Specifications

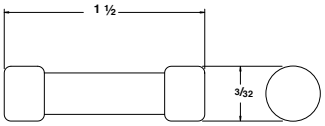
Voltage Rating: AC: 600 V
DC: 600 V
Interrupting Rating: AC: 200 kA
DC: 100 kA
Ampere Range: 5 – 40 A
Approvals: UL Recognized

Contact Littelfuse for characteristic curves.

Description

Littelfuse LA60Q semiconductor protection fuses feature a 600 volt AC/DC rating in a compact size (1 ½" x 13/32"). LA60Q also has the lowest I^2t of all similar fuses and excellent cycling ability. Applications include inverters and small equipment requiring extremely fast response to faults, without the need to carry sustained heavy overloads.

Dimensions in inches



Recommended Fuseholders

L60030M .....pg. 101

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/la60qs**

690 VAC/700 VDC • Very Fast-Acting • 10-100 Amperes

LA70QS Series French Cylindrical Fuses

AMPERE RATING	LITTELFUSE CATALOG NUMBER (NO STRIKER)	LITTELFUSE CATALOG NUMBER (WITH STRIKER)	BODY SIZE	MAXIMUM CLEARING I^2T @700 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
10	LA70QS10-14F	LA70QS10-14FI	14 x 51	0.04	3.5
12	LA70QS12-14F	LA70QS12-14FI	14 x 51	0.06	4.4
16	LA70QS16-14F	LA70QS16-14FI	14 x 51	0.10	4.8
20	LA70QS20-14F	LA70QS20-14FI	14 x 51	0.16	5.2
25	LA70QS25-14F	LA70QS25-14FI	14 x 51	0.27	5.8
32	LA70QS32-14F	LA70QS32-14FI	14 x 51	1.50	7.0
40	LA70QS40-14F	LA70QS40-14FI	14 x 51	0.70	10.7
50	LA70QS50-14F	LA70QS50-14FI	14 x 51	1.50	11.6
20	LA70QS20-22F	LA70QS20-22FI	22 x 58	0.076	8.0
25	LA70QS25-22F	LA70QS25-22FI	22 x 58	0.125	10.0
32	LA70QS32-22F	LA70QS32-22FI	22 x 58	0.27	11.0
40	LA70QS40-22F	LA70QS40-22FI	22 x 58	0.48	13.0
50	LA70QS50-22F	LA70QS50-22FI	22 x 58	0.80	14.9
63	LA70QS63-22F	LA70QS63-22FI	22 x 58	1.85	16.0
80	LA70QS80-22F	LA70QS80-22FI	22 x 58	3.80	17.8
100	LA70QS100-22F	LA70QS100-22FI	22 x 58	8.00	19.0

Recommended Fuseholders

CYH series for non-striker fuses LA70QS(amp)22F .. pg. 173
CYH1451 series for LA70QS(amp)14F ..... pg. 173

Description

Littelfuse LA70QS semiconductor fuses were developed to provide improved performance required by today's new equipment. The LA70QS features lower I^2t, improved cycling, and lower watts loss. It is the best choice for the protection of dynamic solid-state equipment.

Dimensions in inches (mm)

Please see website for dimensions:
www.littelfuse.com/la70qs

Specifications

Voltage Rating: AC: 690 V
DC: 700 V
Interrupting Rating: AC: 200 kA
DC: 100 kA
Ampere Range: 10 – 100 A
Approvals: UL Recognized
CSA Certified

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/la70qs**

ALTERNATE DIMENSION SEMICONDUCTOR FUSES

700 VAC/VDC • Very Fast-Acting • 35-800 Amperes

LA70QS Series Semiconductor Fuses

AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2T @700 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
35	LA70QS35-4	4	0.47	6.2
40	LA70QS40-4	4	0.58	7.5
50	LA70QS50-4	4	0.88	9.8
60	LA70QS60-4	4	1.2	12
70	LA70QS70-4	4	1.8	15
80	LA70QS80-4	4	2.3	16
90	LA70QS90-4	4	3	20
100	LA70QS100-4	4	3.6	24
125	LA70QS125-4	4	6.9	22
125	LA70QS125-4K	4K	6.9	22
150	LA70QS150-4	4	11	28
150	LA70QS150-4K	4K	11	29
175	LA70QS175-4	4	14	35
175	LA70QS175-4K	4K	14	35

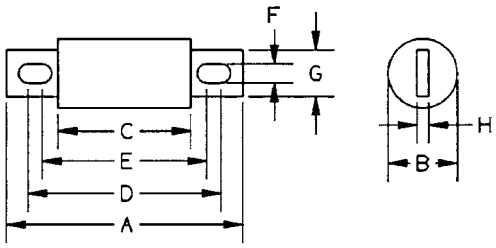
AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2T @700 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
200	LA70QS200-4	4	19	41
200	LA70QS200-4K	4	19	41
250	LA70QS250-4	4	42	42
300	LA70QS300-4	4	55	53
350	LA70QS350-4	4	72	64
400	LA70QS400-4	4	99	75
450	LA70QS450-4	4	125	75
450	LA70QS450-4K	4K	125	75
500	LA70QS500-4	4	150	92
500	LA70QS500-4K	4K	160	92
600	LA70QS600-4	4	222	116
600	LA70QS600-4K	4K	222	116
700	LA70QS700-4	4	332	125
800	LA70QS800-4	4	433	143

Specifications

Voltage Rating: AC: 700 V
DC: 700 V
Interrupting Rating: AC: 200 kA
DC: 100 kA
Ampere Range: 35 – 800 A
Approvals: UL Recognized
CSA Certified

Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/la70qs**



Dimensions in inches (mm)

Dimensions for reference only.

AMPERES	MOUNTING TYPE	DIMENSIONS IN INCHES (mm)							
		A	B	C	D	E	F	G	H
35 – 100	4	4.38 (111)	1.00 (25.4)	2.88 (73)	3.69 (93.6)	3.50 (88.9)	0.31 (7.9)	0.75 (19.0)	0.13 (3.2)
125 – 200	4	4.38 (111)	1.22 (31.0)	2.88 (73)	3.69 (93.6)	3.56 (90.5)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)
125 – 200	4K	5.09 (129)	1.22 (31.0)	2.88 (73)	4.19 (106)	3.50 (88)	0.41 (10.3)	1.00 (25.4)	0.19 (4.8)
225 – 400	4	5.09 (129)	1.50 (38.1)	2.84 (72.2)	4.16 (106)	3.53 (89.7)	0.40 (10.3)	1.50 (38.1)	0.25 (6.4)
450 – 600	4	5.09 (129)	2.00 (50.8)	2.84 (72.2)	4.16 (106)	3.53 (89.7)	0.41 (10.3)	1.50 (38.1)	0.25 (6.4)
450 – 600	4K	7.09 (180)	2.00 (50.8)	2.84 (72.2)	6.16 (156)	3.53 (89.7)	0.53 (13.5)	1.50 (38.1)	0.25 (6.4)
700 – 800	4	7.09 (180)	2.50 (63.5)	2.84 (72.2)	5.28 (134)	4.91 (125)	0.53 (13.5)	2.00 (50.8)	0.38 (9.5)

Contact Littelfuse for characteristic curves.

ALTERNATE DIMENSION SEMICONDUCTOR FUSES

1000 VAC • Very Fast-Acting • 15 – 1000 Amperes

LA100P Series Semiconductor Fuses

AMPERE RATING	LITTELFUSE CATALOG NUMBER	MOUNTING TYPE	MAXIMUM CLEARING I^2T @1000 VAC ($A^2S \times 10^3$)	WATTS LOSS @ RATED CURRENT (W)
15	LA100P15-1	1	0.6	3.4
20	LA100P20-1	1	0.8	5.9
25	LA100P25-1	1	1,3	9
30	LA100P30-1	1	1.5	12.8
35	LA100P35-4	4	2.2	7.3
40	LA100P40-4	4	2.9	8.3
50	LA100P50-4	4	4.5	11
60	LA100P60-4	4	6.5	13
80	LA100P80-4	4	12	14
100	LA100P100-4	4	18	18
125	LA100P125-4	4	28	23
150	LA100P150-4	4	41	28
200	LA100P200-4	4	72	36
225	LA100P225-4	4	91	40
250	LA100P250-4	4	110	46
300	LA100P300-4	4	160	55
350	LA100P350-4	4	220	65
400	LA100P400-4	4	290	70
500	LA100P500-4	4	450	90
600	LA100P600-4	4	650	110
650	LA100P650-4	4	780	120
700	LA100P700-4	4	880	125
800	LA100P800-4	4	1200	140
1000	LA100P1000-4	4	1900	190

Figure 1

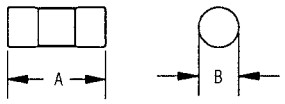


Figure 2

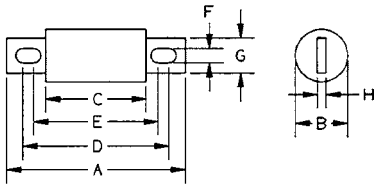


Figure 3

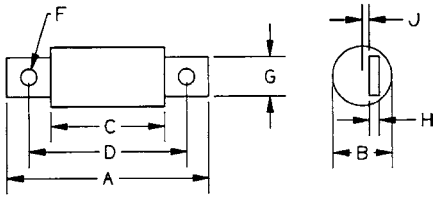
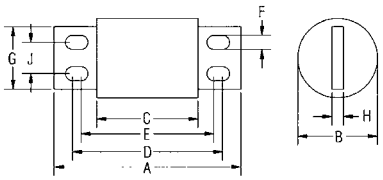


Figure 4



Web Resources

TC Curves, downloadable CAD drawings and other technical information: **www.littelfuse.com/la100p**

Specifications

Voltage Rating: AC: 1000 V
DC: 750 V
Interrupting Rating: 100 kA
Ampere Range: 15 – 1000 A
Approvals: UL Recognized

Dimensions in inches (mm)

Dimensions for reference only.

AMPERES	MOUNTING TYPE	FIGURE NO.	DIMENSIONS IN INCHES (mm)								
			A	B	C	D	E	F	G	H	J
15 – 30	1	1	2.53 (66.8)	0.56 (14.2)	–	–	–	–	–	–	–
35 – 60	4	2	5.00 (127)	1.00 (25.4)	3.50 (88.9)	4.31 (109)	4.19 (106)	0.31 (7.9)	0.75 (19.1)	0.13 (3.3)	–
65 – 100	4	2	5.00 (127)	1.22 (31)	3.50 (88.9)	4.31 (109)	4.19 (106)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)	–
125 – 200	4	2	5.72 (145)	1.50 (38.1)	3.47 (88.1)	4.78 (121)	4.16 (106)	0.41 (10.4)	1.00 (25.4)	0.25 (6.4)	–
225 – 400	4	2	5.72 (145)	2.00 (50.8)	3.47 (88.1)	4.78 (121)	4.16 (106)	0.41 (10.4)	1.50 (25.4)	0.25 (6.4)	–
500 – 600	4	2	7.72 (196)	2.50 (63.5)	3.47 (88.1)	5.88 (149)	5.56 (147)	0.53 (13.5)	2.00 (50.8)	0.38 (9.7)	–
650 – 800	4	3	7.44 (189)	2.88 (73.2)	3.94 (100)	5.94 (151)	–	0.63 (16)	2.00 (50.8)	0.38 (9.7)	0.31 (7.9)
1000	4	4	8.22 (209)	3.50 (88.9)	4.47 (114)	6.59 (167)	5.84 (148)	0.63 (16)	2.75 (69.9)	0.50 (12.7)	1.38 (35.1)

Contact Littelfuse for characteristic curves.

SQUARE BODY SEMICONDUCTOR FUSES

700/1300 VAC • Very Fast-Acting • 63 – 2500 Amperes

Description

Littelfuse North American style square body semiconductor 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 SCR's, diodes, thyristors, GTO's, and IGBT devices, Littelfuse square body fuses have pure die-cut elements embedded in solidified sand to control arcing and lower I^2t. 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^2t 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.

Ordering Information

LA 070 URD 31 LI 350

Littelfuse

Voltage
070=700 V
130=1300 V

Class

Size

700 V	1300 V
30	70
31	71
32	72
33	73

Mounting Type

Straight-blade	KI	LI
Straight-blade	LI	LLI
Flat-type, one hole	TTI	TTI

Amp Rating

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 .....pg. 78-80

Web Resources

For additional information, visit: **www.littelfuse.com/la070**

SQUARE BODY SEMICONDUCTOR FUSES

700/1300 VAC • Very Fast-Acting • 63-2500 Amperes

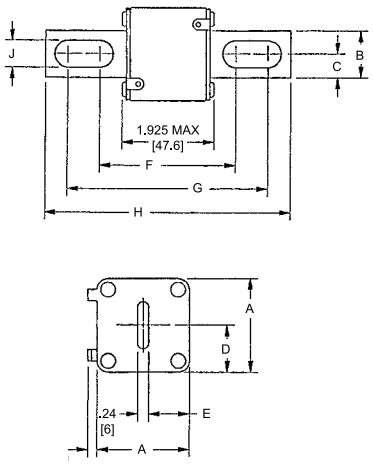
BODY SIZE	AMPERE RATING	RATED VOLTAGE	MELTING I^2T ($A^2S \times 10^3$)	TOTAL I^2T @ RATED VOLTAGE ($A^2S \times 10^3$)	*WATTS LOSS @ RATED CURRENT (W)	LONG BLADE CATALOG NUMBER TYPE LI	SHORT BLADE CATALOG NUMBER TYPE KI	TAPPED TERMINAL CATALOG NUMBER TYPE TTI
30	63	700	0.2	1.2	14	LA070URD30LI0063	LA070URD30KI0063	LA070URD30TTI0063
	80	700	0.33	1.9	19	LA070URD30LI0080	LA070URD30KI0080	LA070URD30TTI0080
	100	700	0.47	2.7	26	LA070URD30LI0100	LA070URD30KI0100	LA070URD30TTI0100
	125	700	0.85	4.9	30	LA070URD30LI0125	LA070URD30KI0125	LA070URD30TTI0125
	160	700	1.6	9.2	37	LA070URD30LI0160	LA070URD30KI0160	LA070URD30TTI0160
	200	700	3	16.7	42/43	LA070URD30LI0200	LA070URD30KI0200	LA070URD30TTI0200
	250	700	5.8	32.4	48/50	LA070URD30LI0250	LA070URD30KI0250	LA070URD30TTI0250
	315	700	12	67	53/55	LA070URD30LI0315	LA070URD30KI0315	LA070URD30TTI0315
	350	700	15.5	86	57/60	LA070URD30LI0350	LA070URD30KI0350	LA070URD30TTI0350
	400	700	23	130	60/65	LA070URD30LI0400	LA070URD30KI0400	LA070URD30TTI0400
	450	700	26	165	80/88	LA070URD30LI0450	LA070URD30KI0450	LA070URD30TTI0450
	500	700	41	264	80/88	LA070URD30LI0500	LA070URD30KI0500	LA070URD30TTI0500
	550	700	52	330	80/90	LA070URD30LI0550	LA070URD30KI0550	LA070URD30TTI0550
31	200	700	2.5	14.6	45	LA070URD31LI0200	LA070URD31KI0200	LA070URD31TTI0200
	250	700	4.7	27	52	LA070URD31LI0250	LA070URD31KI0250	LA070URD31TTI0250
	315	700	7.5	43	65	LA070URD31LI0315	LA070URD31KI0315	LA070URD31TTI0315
	350	700	10.5	59	67	LA070URD31LI0350	LA070URD31KI0350	LA070URD31TTI0350
	400	700	19	110	68	LA070URD31LI0400	LA070URD31KI0400	LA070URD31TTI0400
	450	700	26.5	150	70	LA070URD31LI0450	LA070URD31KI0450	LA070URD31TTI0450
	500	700	37	210	70/72	LA070URD31LI0500	LA070URD31KI0500	LA070URD31TTI0500
	550	700	52	300	70/75	LA070URD31LI0550	LA070URD31KI0550	LA070URD31TTI0550
	630	700	75	421	75/85	LA070URD31LI0630	LA070URD31KI0630	LA070URD31TTI0630
	700	700	95	530	85/95	LA070URD31LI0700	LA070URD31KI0700	LA070URD31TTI0700
	800	700	140	880	105/120	LA070URD31LI0800	LA070URD31KI0800	LA070URD31TTI0800
32	400	700	15	86	72/75	LA070URD32LI0400	LA070URD32KI0400	LA070URD32TTI0400
	450	700	22	124	77/80	LA070URD32LI0450	LA070URD32KI0450	LA070URD32TTI0450
	500	700	28	157	85/90	LA070URD32LI0500	LA070URD32KI0500	LA070URD32TTI0500
	550	700	37	211	90/95	LA070URD32LI0550	LA070URD32KI0550	LA070URD32TTI0550
	630	700	54	302	95/105	LA070URD32LI0630	LA070URD32KI0630	LA070URD32TTI0630
	700	700	76	432	100/110	LA070URD32LI0700	LA070URD32KI0700	LA070URD32TTI0700
	800	700	115	648	110/120	LA070URD32LI0800	LA070URD32KI0800	LA070URD32TTI0800
	900	700	170	972	110/125	LA070URD32LI0900	LA070URD32KI0900	LA070URD32TTI0900
	1000	700	240	1350	115/135	LA070URD32LI1000	LA070URD32KI1000	LA070URD32TTI1000
	1100	650	270	1620	140/165	LA065URD32LI1100	–	LA065URD32TTI1100
	1250	600	410	2100	150/180	LA060URD32LI1250	–	LA060URD32TTI1250
	1400	550	555	2600	160/190	LA055URD32LI1400	–	LA055URD32TTI1400
	1600	550	870	4000	165/195	LA055URD32LI1600	–	LA055URD32TTI1600
	1800	500	1050	4400	195/330	LA050URD32LI1800	–	LA050URD32TTI1800
33	500	700	19	108	105	LA070URD33LI0500	LA070URD33KI0500	LA070URD33TTI0500
	550	700	27	151	105/110	LA070URD33LI0550	LA070URD33KI0550	LA070URD33TTI0550
	630	700	40	227	110/120	LA070URD33LI0630	LA070URD33KI0630	LA070URD33TTI0630
	700	700	55	324	115/125	LA070URD33LI0700	LA070URD33KI0700	LA070URD33TTI0700
	800	700	95	529	120/130	LA070URD33LI0800	LA070URD33KI0800	LA070URD33TTI0800
	900	700	135	760	120/135	LA070URD33LI0900	LA070URD33KI0900	LA070URD33TTI0900
	1000	700	170	970	135/155	LA070URD33LI1000	LA070URD33KI1000	LA070URD33TTI1000
	1100	700	240	1360	135/160	LA070URD33LI1100	LA070URD33KI1100	LA070URD33TTI1100
	1250	700	350	2000	150/180	LA070URD33LI1250	LA070URD33KI1250	LA070URD33TTI1250
	1400	700	480	2700	160/200	LA070URD33LI1400	LA070URD33KI1400	LA070URD33TTI1400
	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
	2500	500	1870	7600	280/330	LA050URD33LI2500	–	LA050URD33TTI2500

*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.

SQUARE BODY SEMICONDUCTOR FUSES

700/1300 VAC • Very Fast-Acting • 63-2500 Amperes

TYPES KI AND LI



North American Straight Blade, Type KI

Dimensions

Dimensions for reference only.

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

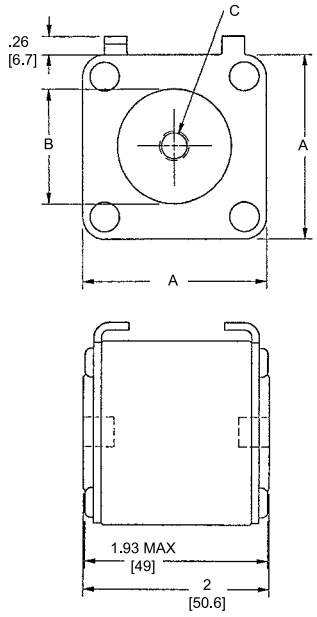
North American Straight Blade, Type LI

Dimensions

Dimensions for reference only.

CATALOG NUMBER	DIMENSIONS IN INCHES (mm)								
	A	B	C	D	E	F	G	H	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)
LA070URD32LI (400-1000) LA065URD32LI (1250) LA055URD32LI (1400-1600) LA050URD32LI (1800)	2.36 (60)	1.26 (32)	0.63 (16)	1.18 (30)	1.06 (27)	3.71 (94.2)	5.08 (129)	6.02 (153)	0.57 (14.6)
LA070URD33LI (500-1400) LA065URD33LI (1600-1800) LA060URD33LI (2000) LA055URD33LI (2250) LA050URD33LI (2500)	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)

TYPE TTI



North American Flat Single Hole, Type TTI

Dimensions

Dimensions for reference only.

CATALOG NUMBER	DIMENSIONS IN INCHES (mm)		
	A	B	C
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) LA060URD32TTI (1250) LA055URD32TTI (1400-1600)	2.37 (60.3)	1.50 (38.1)	3/8-16 x 0.35
LA060URD33TTI (1800) LA070URD33TTI (500-1400) LA065URD33TTI (1600) LA060URD33TTI (2000) LA055URD33TTI (2250) LA050URD33TTI (2500)	2.94 (74.5)	1.81 (46)	1/2-18 x 0.35

SQUARE BODY SEMICONDUCTOR FUSES

700/1300 VAC • Very Fast-Acting • 63-2500 Amperes

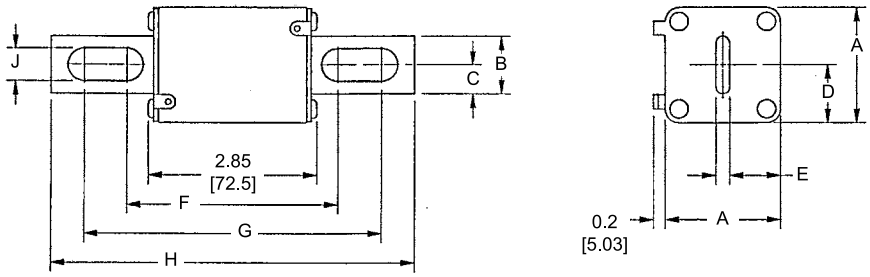
BODY SIZE	AMPERE RATING	RATED VOLTAGE	MELTING I^2T ($A^2S \times 10^3$)	TOTAL I^2T @ RATED VOLTAGE ($A^2S \times 10^3$)	*WATTS LOSS @ RATED CURRENT (W)	LONG BLADE CATALOG NUMBER TYPE LI/LLI	TAPPED TERMINAL CATALOG NUMBER TYPE TTI
70	63	1300	0.21	1.8	26	LA130URD70LI0063	LA130URD70TTI0063
	80	1300	0.47	4	27	LA130URD70LI0080	LA130URD70TTI0080
	100	1300	0.83	7.2	30	LA130URD70LI0100	LA130URD70TTI0100
	125	1300	1.3	11	38	LA130URD70LI0125	LA130URD70TTI0125
	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
71	160	1300	2.6	22	46	LA130URD71IL0160	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
	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
72	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
	500	1300	57	500	94/98	LA130URD72LI0500	LA130URD72TTI0500
	550	1300	68	590	110/120	LA130URD72LI0550	LA130URD72TTI0550
	630	1200	105	920	113	LA120URD72LI0630	–
	630	1300	105	920	125	–	LA130URD72TTI0630
	700	1100	145	1040	122	LA110URD72LI0700	–
	700	1200	145	1040	140	–	LA120URD72TTI0700
	800	1100	215	1590	125	LA110URD72LI0800	–
	800	1200	215	1590	146	–	LA120URD72TTI0800
73	315	1300	12	102	84	LA130URD73LI0315	LA130URD73TTI0315
	350	1300	17	150	86	LA130URD73LI0350	LA130URD73TTI0350
	400	1300	25	220	93	LA130URD73LI0400	LA130URD73TTI0400
	450	1300	35	310	99/100	LA130URD73LI0450	LA130URD73TTI0450
	500	1300	44	390	110/112	LA130URD73LI0500	LA130URD73TTI0500
	550	1300	57	500	116/120	LA130URD73LI0550	LA130URD73TTI0550
	630	1300	84	730	125/132	LA130URD73LI0630	LA130URD73TTI0630
	700	1300	110	960	135/146	LA130URD73LI0700	LA130URD73TTI0700
	800	1200	190	1630	136	LA120URD73LI0800	–
	800	1300	190	1630	148	–	LA130URD73TTI0800
	900	1100	250	2160	150	LA110URD73LI0900	–
	900	1000	250	2160	170	–	LA100URD73TTI0900
	1000	1000	370	2430	152/174	LA100URD73LI1000	LA100URD73TTI1000
	1100	1000	445	2580	168/208	LA100URD73LI1100	LA100URD73TTI1100
	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

*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.

SQUARE BODY SEMICONDUCTOR FUSES

700/1300 VAC • Very Fast-Acting • 63-2500 Amperes

TYPES LI AND LLI



North American Straight Blade, Types LI and LLI

Dimensions

Dimensions for reference only.

CATALOG NUMBER	DIMENSIONS IN INCHES (mm)								
	A	B	C	D	E	F	G	H	J
LA130URD70LI (63-315) LA120URD70LI (350)	1.57 (40)	0.98 (25)	0.49 (12.5)	0.83 (21)	0.71 (18)	3.60 (91.4)	5.13 (130.4)	6.00 (152.4)	0.41 (10.5)
LA130URD71LLI (160-450) LA120URD71LLI (500-550) LA110URD71LLI (630)	2.01 (51)	0.98 (25)	0.49 (12.5)	1.0 (26.5)	0.89 (22.5)	3.60 (91.4)	5.13 (130.4)	6.00 (152.4)	0.57 (14.6)
LA130URD72LI (280-550) LA120URD72LI (800) LA110URD72LI (700-800)	2.36 (60)	1.26 (32)	0.63 (16)	1.18 (30)	1.06 (27)	3.84 (97.6)	5.2 (132.4)	6.20 (157.4)	0.57 (14.6)
LA130URD73LI (315-700) LA120URD73LI (800) LA110URD73LI (900-1000) LA090URD73LI (1400) LA070URD73LI (1600) LA065URD73LI (1800)	2.93 (74.5)	1.57 (40)	0.79 (20)	1.46 (37.2)	1.35 (34.2)	3.89 (98.8)	5.21 (132.4)	6.20 (157.4)	0.63 (15.9)

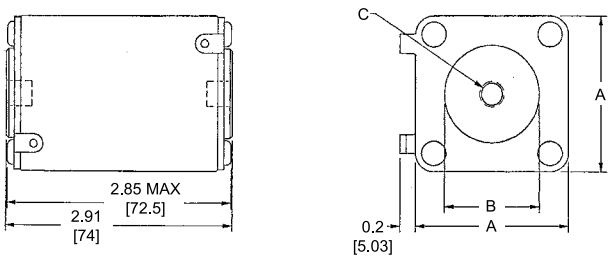
North American Flat Single Hole, Type TTI

Dimensions

Dimensions for reference only.

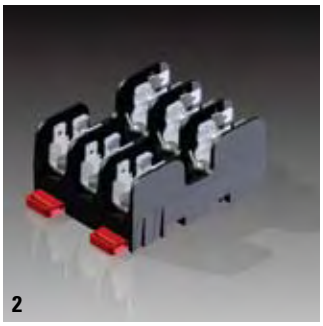
CATALOG NUMBER	DIMENSIONS IN INCHES (mm)		
	A	B	C
LA130URD70TTI (63-315) LA120URD70TTI (350)	1.57 (40)	1.00 (26.4)	5/16-18 x 0.23 DP
LA130URD71TTI (160-450) LA120URD71TTI (550-630)	2.01 (51)	1.19 (30.2)	5/16-18 x 0.36 DP
LA130URD72TTI (280-630) LA120URD72TTI (700-800)	2.36 (60)	1.50 (38.1)	3/8-18 x 0.36 DP
LA130URD73TTI (315-900) LA120URD73TTI (1000) LA110URD73TTI (1250) LA090URD73TTI (1400) LA070URD73TTI (1600) LA065URD73TTI (1800)	2.93 (74.5)	1.81 (46)	1/2-18 x 0.36 DP

TYPE TTI



OEM CUSTOM PRODUCTS


1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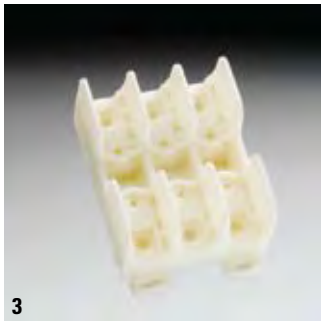
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To speak with a sales associate regarding your application needs, call 800-TEC-FUSE (800-382-3873) or email techline@littelfuse.com.

Description

We understand that existing solutions don't always solve your current problems. Building on more than 80 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
4. Final production parts that meet your design needs and specifications

Additional Customized Products

HAZGARD Fork Lift Fuse .....pg. 64

Web Resources

To view examples of Littelfuse's custom solutions, visit: **www.littelfuse.com/industrialoem** and to see additional examples of Littelfuse's products solutions, visit: **www.littelfuse.com/custom**

Examples:

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 fuseblock with a two-openings-per-pole splicer block.

Custom-Leaded Fuse

Save space and reduce cost by eliminating the fuseblock 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® offers a wide variety of dead-front and open-face fuseblocks, in addition to a variety of accessories, distribution/splicer blocks and in-line holders.

BLOCKS AND HOLDERS

Table of Contents

FUSEBLOCKS OVERVIEW

Description

Littelfuse offers a comprehensive line of fuseblocks that incorporate many benefits such as indication, snap to-release, 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 neon 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

Fuseblock Selection

The following guidelines should help simplify the selection of proper fuseblocks:

1. Determine the system voltage—Since fuses are selected on the basis of system voltage, fuseblocks 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 fuseblocks 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. Fuseblocks may be used with a fuse rated at the corresponding amperage rating or below. For example, a fuseblock rated at 30 amperes may be used with a fuse rated from 0 to 30 amperes.

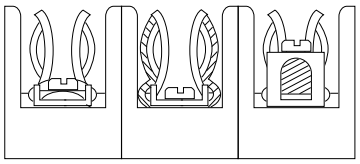
4. Determine if NEC®, CSA, UL, or other requirements are applicable—Any of these requirements should be obtained from the approving agency in advance of fuse and fuseblock selection.

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.

*¼" Quick Connect terminals rated for up to 20 amperes are available on the Midget and Class CC fuseblocks.



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.

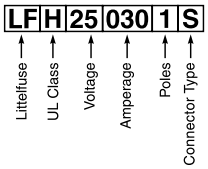
7. Determine if block should be DIN Rail mounted—Many of the new Littelfuse fuseblocks are DIN Rail mountable. Be sure to look to corresponding ordering tables to match the correct part number on the following product pages.

8. Determine if fuse clips need to be reinforced

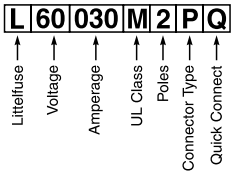
Fuse clips may have a tendency to lose some of their tension over a period of time. This may be prevented by specifying reinforced fuse clips.

Ordering Information

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



†For all Class R, H, J, and T Fuseblocks



For all Class CC, G, and Midget-Style

†These new fuseblocks replace previous Littelfuse fuseblocks 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 fuseholders 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 fuseholders.

CLASS J FUSEBLOCKS

NEW!
Indicating Fuseblocks

Smaller Footprint Provides Space Savings

DIN-Rail Mounting Eases Installation

Indication Improves Functionality

Littelfuse understands your challenge to constantly improve your products—that's why we developed a brand new line of next generation fuseblocks.

Introducing the LF Series Fuseblocks. Smaller. More efficient. More valuable to your customers. These products meet your design and business objectives, provide value to your customers and differentiate your products from the competition.

CLASS J FUSEBLOCKS

600 V

Description

Littelfuse 600 V Class J blocks offer generous space savings and enhanced benefits such as indication, snap-to-release DIN Rail mounting feature, and universal mounting holes.

The LFJ Series fuseblocks have replaced the LJ Series blocks.

Features/Benefits

- Indication offered on all versions except 200 A–600 A
- One hand release from DIN Rail (snap-to-release) for all non-knife blade style fuses
- Phenolic blocks have side barriers for isolation
- Standard reinforced fuse clips on all Class J blocks
- Universal mounting holes for easy replacement
- Space-saving design—up to 45% smaller than existing blocks
- RoHS compliant, Pb free

Specifications

Voltage Ratings: 600 V
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 No. E14721)
CSA Certified (File No. LR73091)

Recommended Fuses

Time Delay
Series: JTD_ID ..... pg. 27
Series: JTD ..... pg. 27

Fast Acting
Series: JLS ..... pg. 28

For information about Touch Safe Class J fuseholders, visit **http://www.littelfuse.com/lpsj**

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lfj**
www.littelfuse.com/fuseblocks

Ordering Information (Class J 600 V)

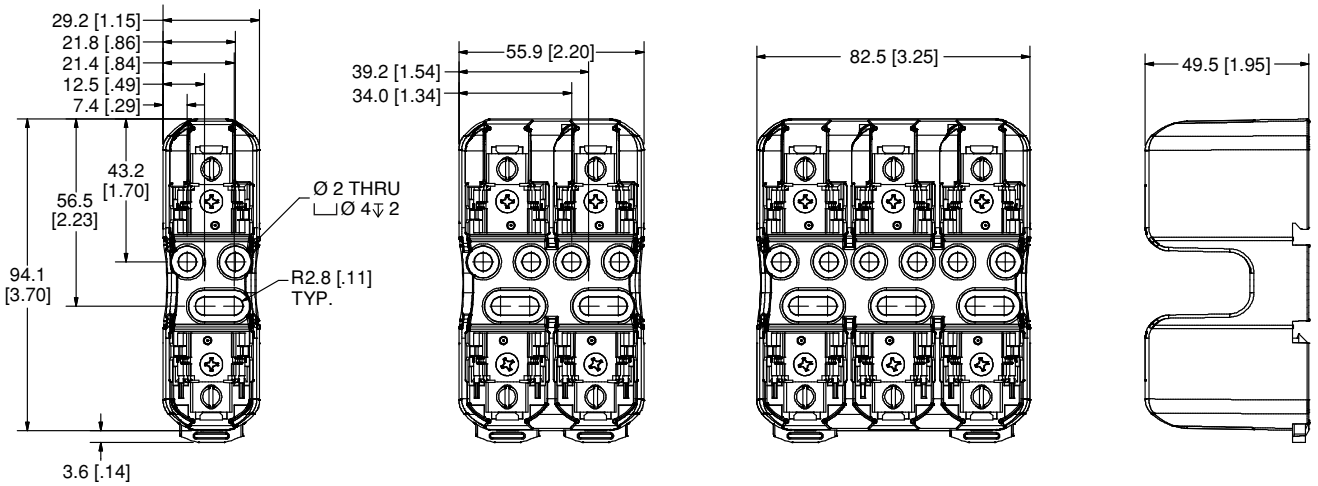
AMP RATING	POLES	CATALOG/SYSTEM NUMBER				TORQUE	TERMINAL	WIRE RANGE	WIRE TYPE		BASE TEMP RATING	SNAP TO RELEASE	INDICATION
		BASE PART NUMBER	SUFFIX										
			BOX LUG	PRESSURE PLATE	SCREW								
30	1	LFJ600301	CID	PID	SID	2.8 N-m (25 in-lbs)	C	6-14 AWG	CU Only	Solid/ Stranded	125°C	•	•
	2	LFJ600302	CID	PID	SID		P	10-14 AWG					
	3	LFJ600303	CID	PID	SID		S	10-22 AWG					
60	1	LFJ600601	CID	—	—	5.6 N-m (50 in-lbs)	2-4 AWG		CU-AL	Solid/ Stranded	125°C	•	•
	2	LFJ600602	CID	—	—								
	3	LFJ600603	CID	—	—	2.8 N-m (25 in-lbs)	6-14 AWG						
100	1	LFJ601001	CID	—	—	13.6 N-m (120 in-lbs)	2/0-6 AWG		CU-AL	Solid/ Stranded	130°C	—	•
	3	LFJ601003	CID	—	—	4.5 N-m (40 in-lbs)	8 AWG						
						4.0 N-m (35 in-lbs)	10-14 AWG						
200	1	LFJ602001	C	—	—	31.1 N-m (275 in-lbs)	250 kcmil-6		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFJ602003	C	—	—								
400	1	LFJ604001	C	—	—	31.1 N-m (275 in-lbs)	(2) 350 kcmil-1/0		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFJ604003	C	—	—								
600	1	LFJ606001	C	—	—	42.4 N-m (375 in-lbs)	(2) 500 kcmil-4		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFJ606003	C	—	—								

Note: Reinforcing springs standard on all Class J fuseblocks.

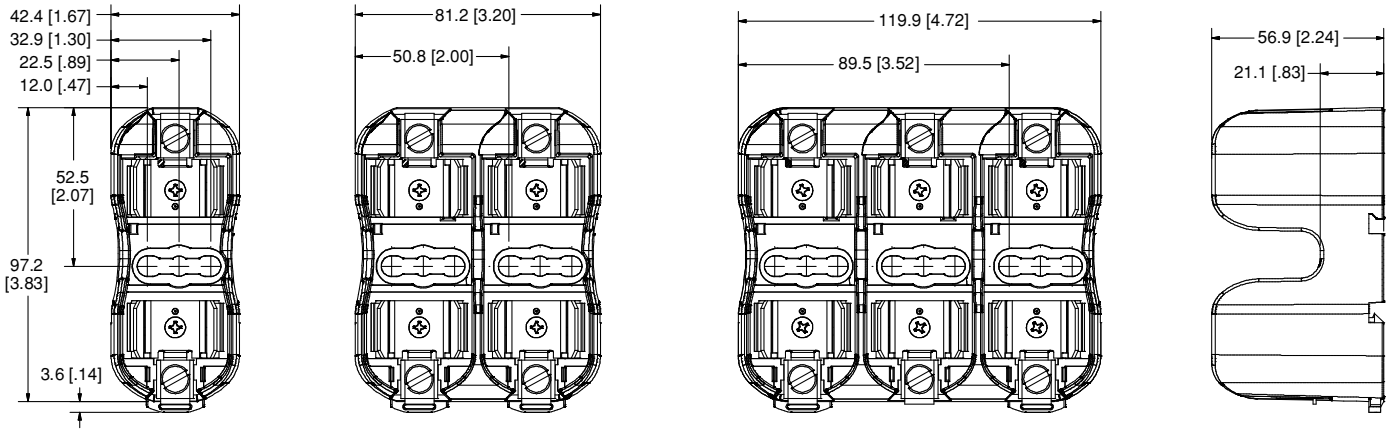
CLASS J FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

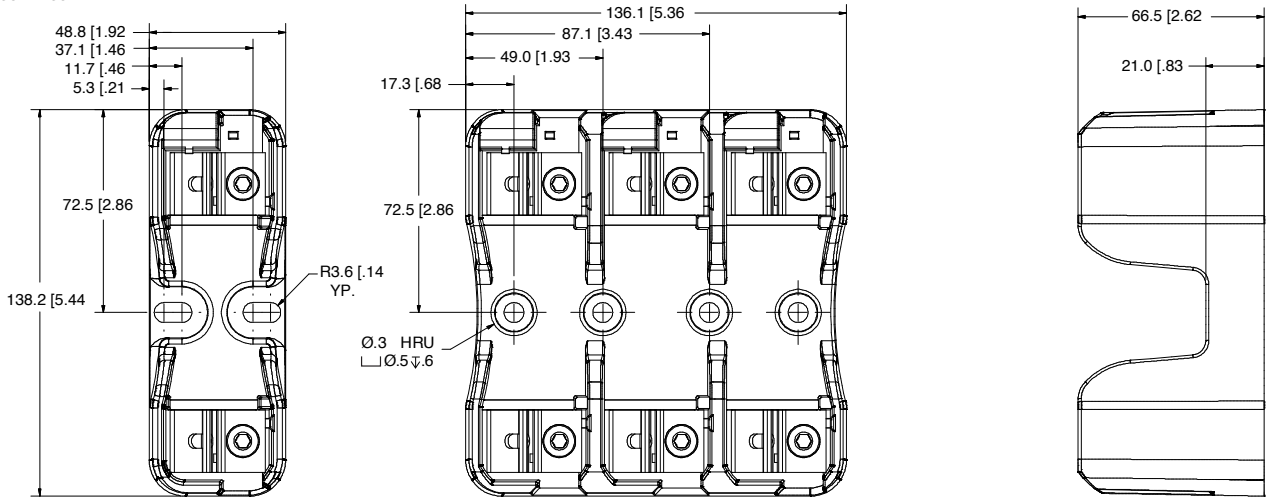
600 V 30 A



600 V 60 A



600 V 100 A

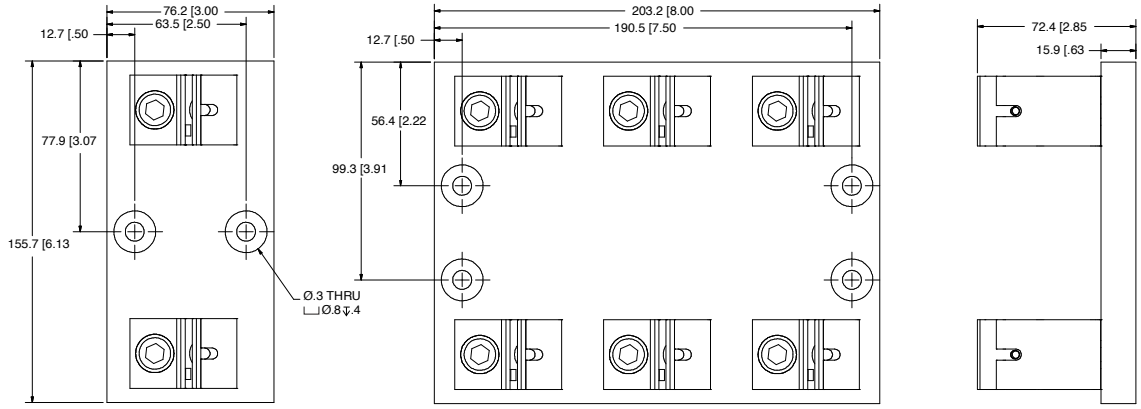


Dimensions available at **www.littelfuse.com/fuseblocks**

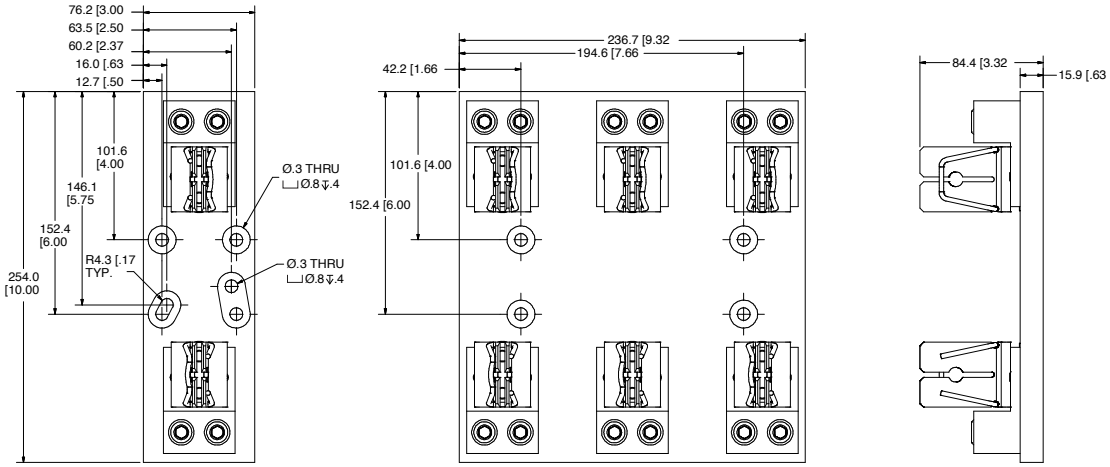
CLASS J FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

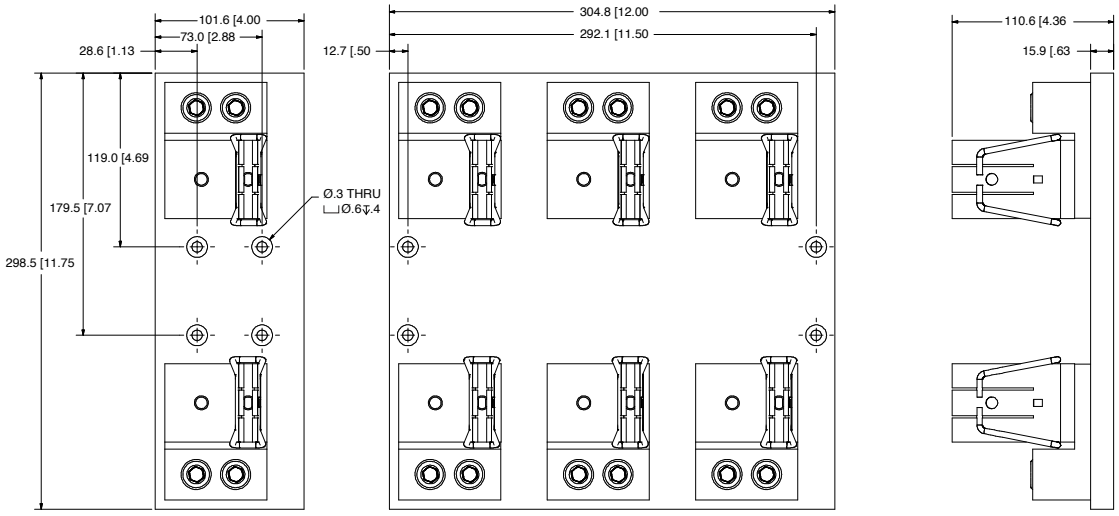
600 V 200 A



600 V 400 A



600 V 600 A



Dimensions available at **www.littelfuse.com/fuseblocks**

CLASS H/K5 AND R FUSEBLOCKS

NEW!
Indicating Fuseblocks

Smaller Footprint Provides Space Savings

DIN-Rail Mounting Eases Installation

Indication Improves Functionality

Littelfuse understands your challenge to constantly improve your products—that's why we developed a brand new line of next generation fuseblocks.

Introducing the LF Series Fuseblocks. Smaller. More efficient. More valuable to your customers. These products meet your design and business objectives, provide value to your customers and differentiate your products from the competition.

CLASS H/K5 AND R FUSEBLOCKS

Description

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

The LFH and LFR line of fuseblocks have replaced the LH and LR Series blocks, respectively.

Features/Benefits

- Indication offered on most 250 V and 600 V versions
- One hand release from DIN Rail (snap-to-release) for all non-knife blade style fuses
- Universal mounting holes for easy replacement
- Clip designs maximize electrical contact and minimize heat rise
- Standard reinforcing clips on all Class R fuseblocks and Class H fuseblocks
- RoHS compliant, Pb free

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 No. E14721)
CSA Certified (File No. LR73091)

Recommended Fuses

Class H/K5 Blocks – 250 V

NLN ..... pg. 24
RLN ..... pg. 25

Class R Blocks – 250 V

FLNR/FLNR_ID ..... pg. 20
KLNR ..... pg. 17
LLNRK ..... pg. 16
TLN ..... pg. 58

Class H/K5 Blocks – 600 V

NLS ..... pg. 24
RLS ..... pg. 25

Class R Blocks – 600 V

FLSR/FLSR_ID ..... pg. 20
KLSR ..... pg. 17
LLSRK/LLSRK_ID ..... pg. 16
IDSR ..... pg. 19

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lfh**
www.littelfuse.com/lfr
www.lettelfuse.com/fuseblocks

Ordering Information (Class H 250 V)

AMP RATING	POLES	CATALOG/SYSTEM NUMBER				TORQUE	TERMINAL	WIRE RANGE	WIRE TYPE		BASE TEMP RATING	SNAP TO RELEASE	INDICATION
		BASE PART NUMBER	SUFFIX										
			BOX LUG	PRESSURE PLATE	SCREW								
30	1	LFH250301	C	P	S	2.8 N-m (25 in-lbs)	C	6-14 AWG	CU Only	Solid/ Stranded	125°C	•	—
	2	LFH250302	C	P	S		P	10-14 AWG					
	3	LFH250303	C	P	S		S	10-22 AWG					
60	1	LFH250601	CID	—	—	5.6 N-m (50 in-lbs)	2-4 AWG		CU-AL	Solid/ Stranded	125°C	•	•
	2	LFH250602	CID	—	—								
	3	LFH250603	CID	—	—	2.8 N-m (25 in-lbs)	6-14 AWG						
100	1	LFH251001	CID	—	—	13.6 N-m (120 in-lbs)	2/0-6 AWG		CU-AL	Solid/ Stranded	130°C	—	•
	3	LFH251003	CID	—	—	4.5 N-m (40 in-lbs)	8 AWG						
						4.0 N-m (35 in-lbs)	10-14 AWG						
200	1	LFH252001	C	—	—	31.1 N-m (275 in-lbs)	250 kcmil-6		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFH252003	C	—	—								
400	1	LFH254001	C	—	—	31.1 N-m (275 in-lbs)	(2) 350 kcmil-1/0		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFH254003	C	—	—								
600	1	LFH256001	C	—	—	42.4 N-m (375 in-lbs)	(2) 500 kcmil-4		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFH256003	C	—	—								

Note: Reinforcing springs standard on all Class H fuseblocks.

CLASS H/K5 AND R FUSEBLOCKS

Class H 600 V

AMP RATING	POLES	CATALOG/SYSTEM NUMBER				TORQUE	TERMINAL	WIRE RANGE	WIRE TYPE		BASE TEMP RATING	SNAP TO RELEASE	INDICATION
		BASE SYSTEM NUMBER	SUFFIX										
			BOX LUG	PRESSURE PLATE	SCREW								
30	1	LFH600301	CID	PID	SID	2.8 N-m (25 in-lbs)	C	6-14 AWG	CU Only	Solid/ Stranded	130°C	•	•
	2	LFH600302	CID	PID	SID		P	10-14 AWG					
	3	LFH600303	CID	PID	SID		S	10-22 AWG					
60	1	LFH600601	CID	—	—	5.6 N-m (50 in-lbs)	2-4 AWG		CU-AL	Solid/ Stranded	130°C	•	•
	2	LFH600602	CID	—	—								
	3	LFH600603	CID	—	—	2.8 N-m (25 in-lbs)	6-14AWG						
100	1	LFH601001	CID	—	—	13.6 N-m (120 in-lbs)	2/0-6AWG		CU-AL	Solid/ Stranded	130°C	—	•
	3	LFH601003	CID	—	—	4.5 N-m (40 in-lbs)	8 AWG						
						4.0 N-m (35 in-lbs)	10-14 AWG						
200	1	LFH602001	C	—	—	31.1 N-m (275 in-lbs)	250 kcmil-6		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFH602003	C	—	—								
400	1	LFH604001	C	—	—	31.1 N-m (275 in-lbs)	(2) 350 kcmil-1/0		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFH604003	C	—	—								
600	1	LFH606001	C	—	—	42.4 N-m (375 in-lbs)	(2) 500 kcmil-4		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFH606003	C	—	—								

Note: Reinforcing springs standard on all Class H fuseblocks.

Class R 250 V

AMP RATING	POLES	CATALOG/SYSTEM NUMBER				TORQUE	TERMINAL	WIRE RANGE	WIRE TYPE		BASE TEMP RATING	SNAP TO RELEASE	INDICATION
		BASE SYSTEM NUMBER	SUFFIX										
			BOX LUG	PRESSURE PLATE	SCREW								
30	1	LFR250301	C	P	S	2.8 N-m (25 in-lbs)	C	6-14 AWG	CU Only	Solid/ Stranded	125°C	•	—
	2	LFR250302	C	P	S		P	10-14 AWG					
	3	LFR250303	C	P	S		S	10-22 AWG					
60	1	LFR250601	CID	—	—	5.6 N-m (50 in-lbs)	2-4 AWG		CU-AL	Solid/ Stranded	125°C	•	•
	2	LFR250602	CID	—	—								
	3	LFR250603	CID	—	—	2.8 N-m (25 in-lbs)	6-14 AWG						
100	1	LFR251001	CID	—	—	13.6 N-m (120 in-lbs)	2/0-6 AWG		CU-AL	Solid/ Stranded	130°C	—	•
	3	LFR251003	CID	—	—	4.5 N-m (40 in-lbs)	8 AWG						
						4.0 N-m (35 in-lbs)	10-14 AWG						
200	1	LFR252001	C	—	—	31.1 N-m (275 in-lbs)	250 kcmil-6		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFR252003	C	—	—								
400	1	LFR254001	C	—	—	31.1 N-m (275 in-lbs)	(2) 350 kcmil-1/0		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFR254003	C	—	—								
600	1	LFR256001	C	—	—	42.4 N-m (375 in-lbs)	(2) 500 kcmil-4		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFR256003	C	—	—								

Note: Reinforcing springs standard on all Class R fuseblocks.

Class R 600 V

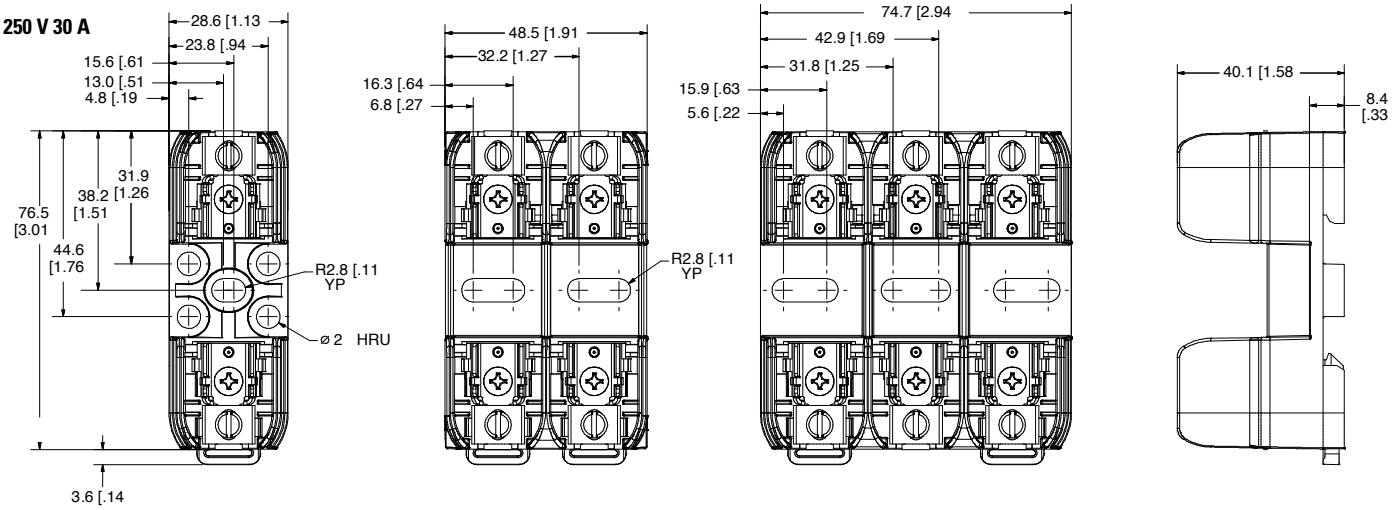
AMP RATING	POLES	CATALOG/SYSTEM NUMBER				TORQUE	TERMINAL	WIRE RANGE	WIRE TYPE		BASE TEMP RATING	SNAP TO RELEASE	INDICATION
		BASE SYSTEM NUMBER	SUFFIX										
			BOX LUG	PRESSURE PLATE	SCREW								
30	1	LFR600301	CID	PID	SID	2.8 N-m (25 in-lbs)	C	6-14 AWG	CU Only	Solid/ Stranded	130°C	•	•
	2	LFR600302	CID	PID	SID		P	10-14 AWG					
	3	LFR600303	CID	PID	SID		S	10-22 AWG					
60	1	LFR600601	CID	—	—	5.6 N-m (50 in-lbs)	2-4 AWG		CU-AL	Solid/ Stranded	130°C	•	•
	2	LFR600602	CID	—	—								
	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		CU-AL	Solid/ Stranded	130°C	—	•
	3	LFR601003	CID	—	—	4.5 N-m (40 in-lbs)	8 AWG						
				—	—	4.0 N-m (35 in-lbs)	10-14 AWG						
200	1	LFR602001	C	—	—	31.1 N-m (275 in-lbs)	250 kcmil-6		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFR602003	C	—	—								
400	1	LFR604001	C	—	—	31.1 N-m (275 in-lbs)	(2) 350 kcmil-1/0		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFR604003	C	—	—								
600	1	LFR606001	C	—	—	42.4 N-m (375 in-lbs)	(2) 500 kcmil-4		CU-AL	Solid/ Stranded	130°C	—	—
	3	LFR606003	C	—	—								

Note: Reinforcing springs standard on all Class R fuseblocks.

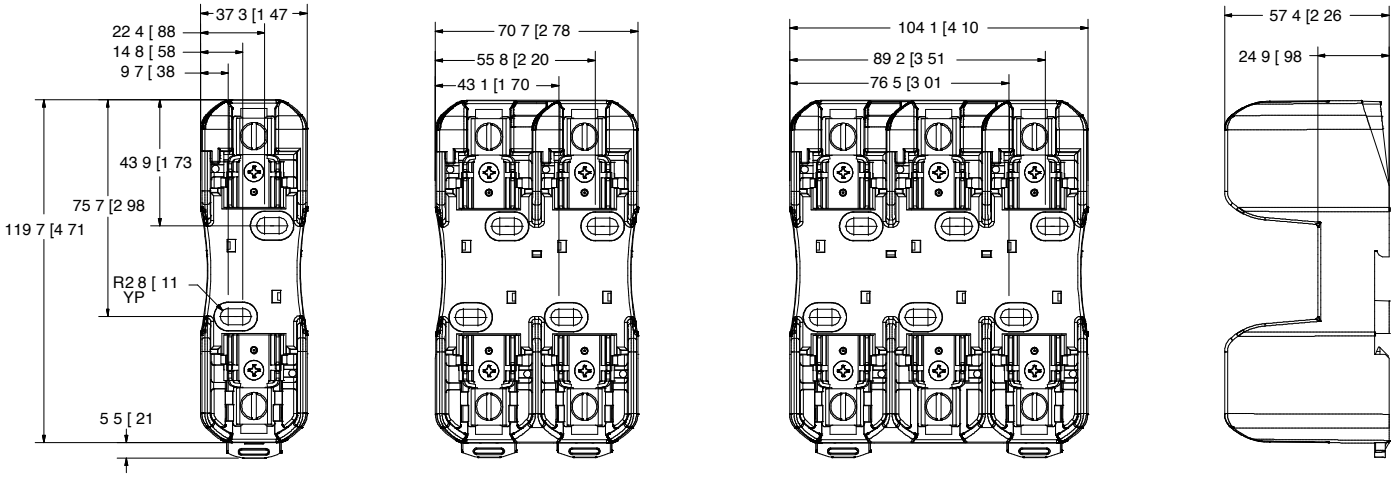
CLASS H/K5 AND R FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

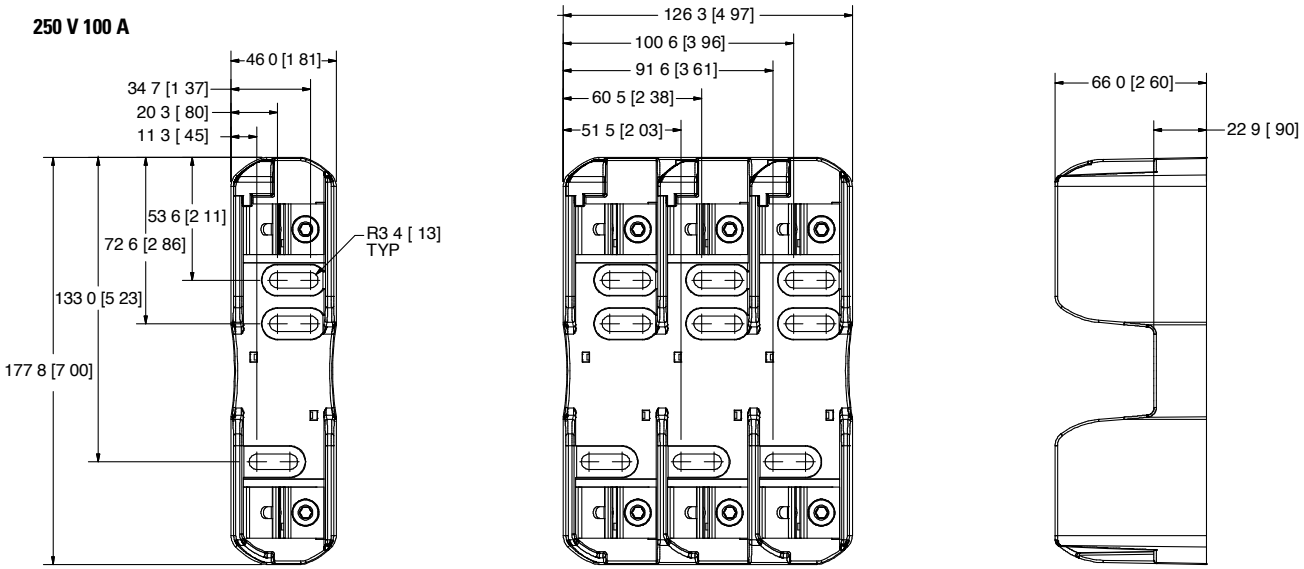
250 V 30 A



250 V 60 A



250 V 100 A

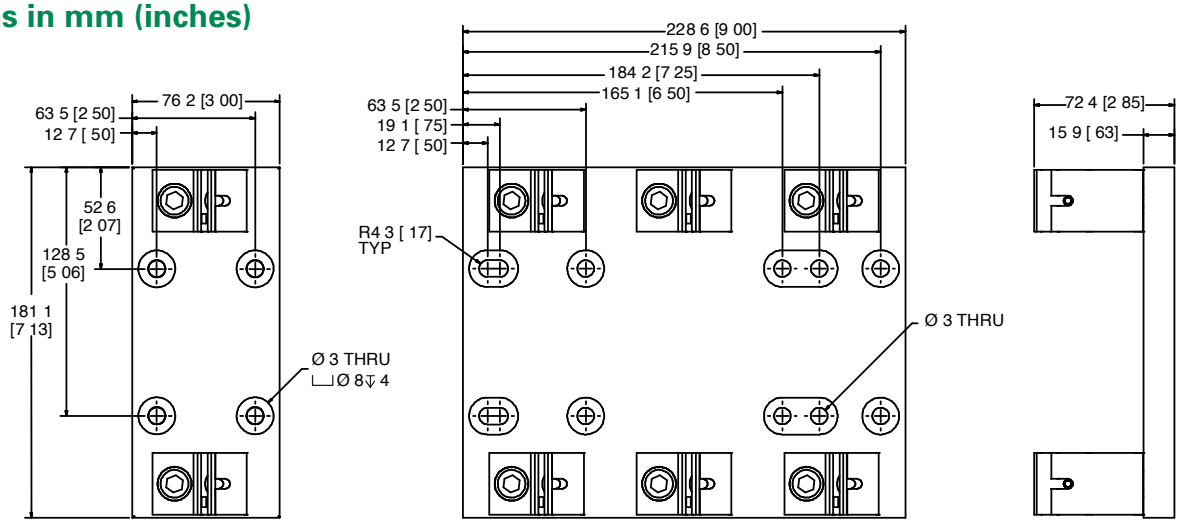


Dimensions available at **www.littelfuse.com/fuseblocks**

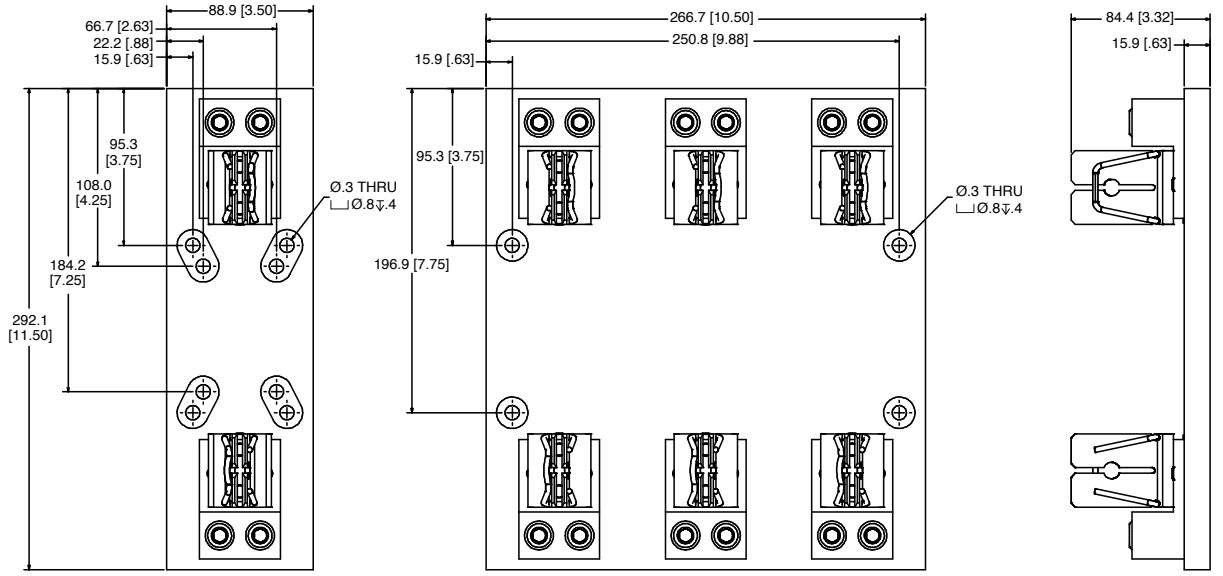
CLASS H/K5 AND R FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

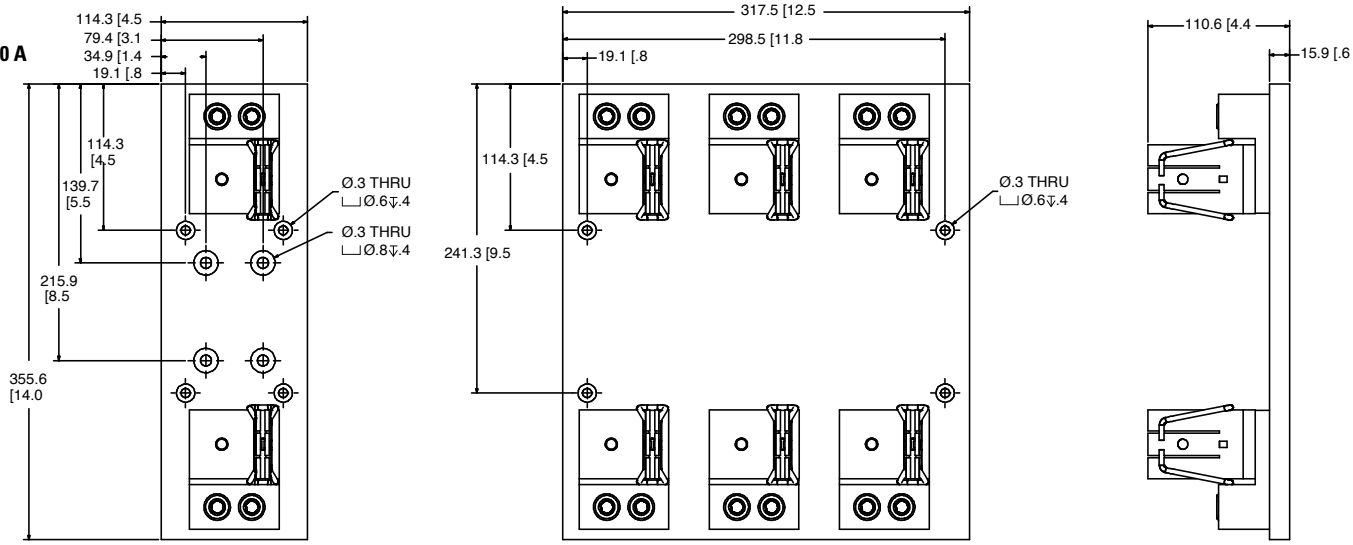
250 V 200 A



250 V 400 A



250 V 600 A

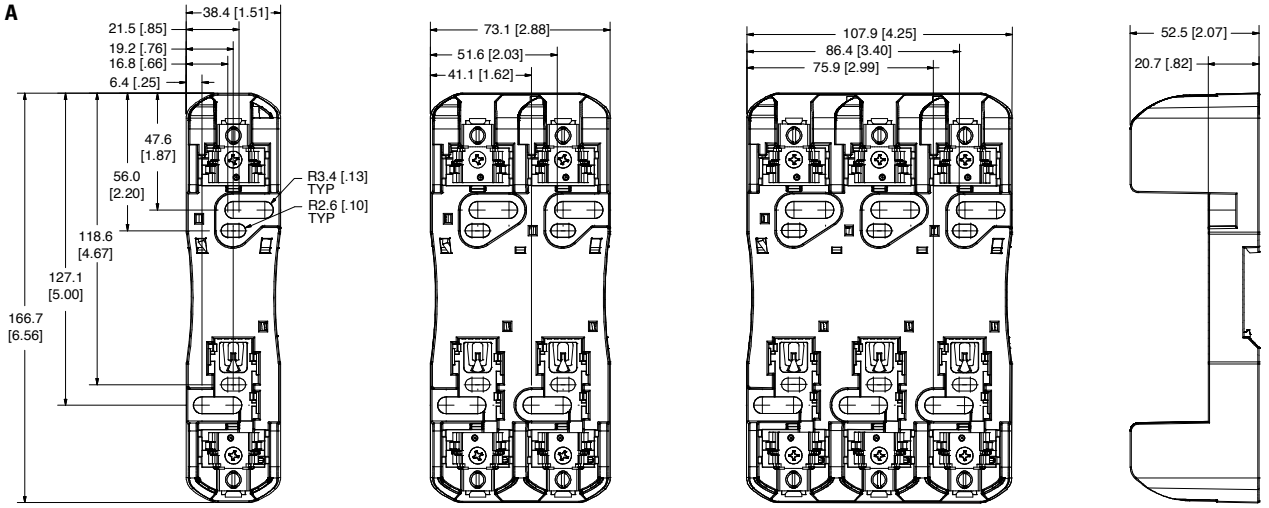


Dimensions available at **www.littelfuse.com/fuseblocks**

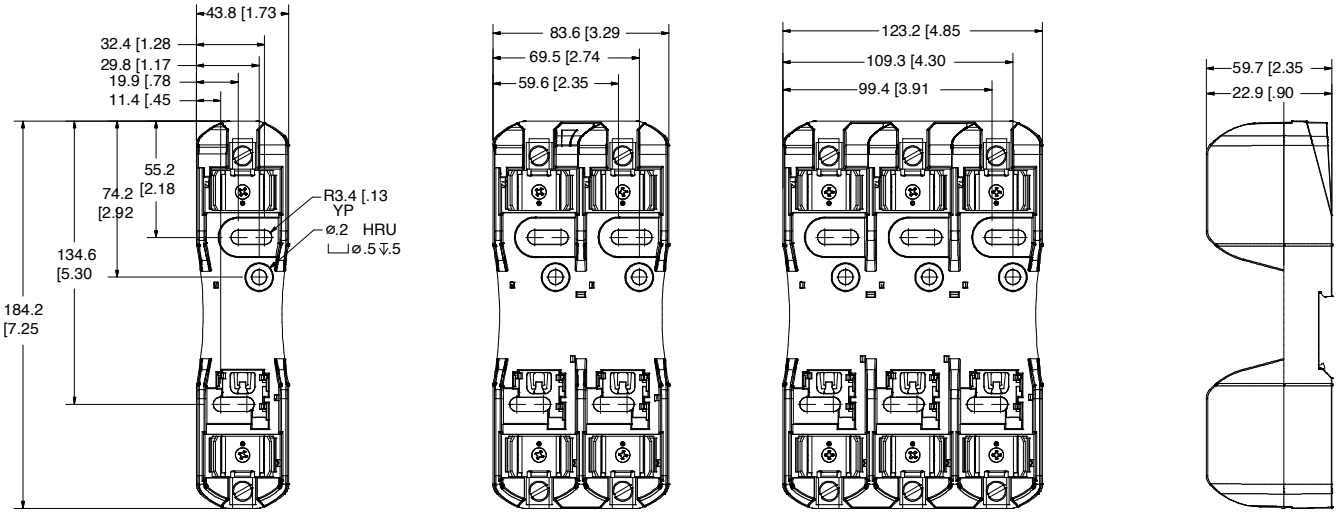
CLASS H/K5 AND R FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

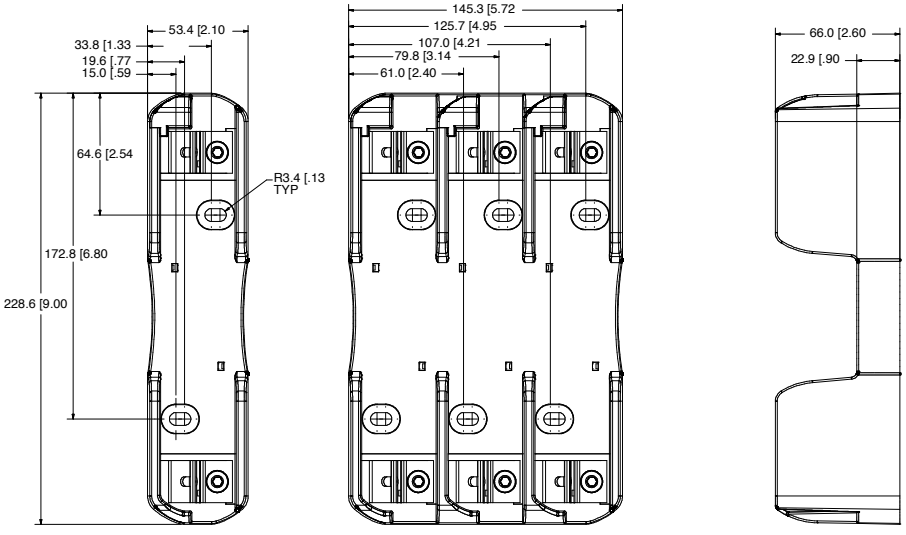
600 V 30 A



600 V 60 A



600 V 100 A

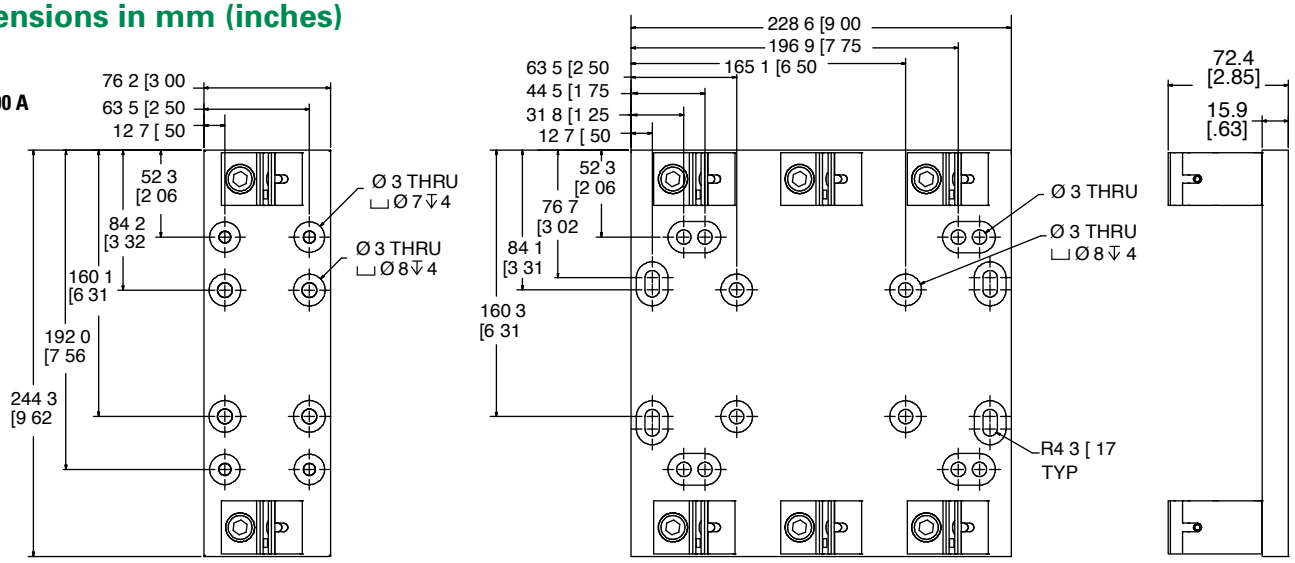


Dimensions available at **www.littelfuse.com/fuseblocks**

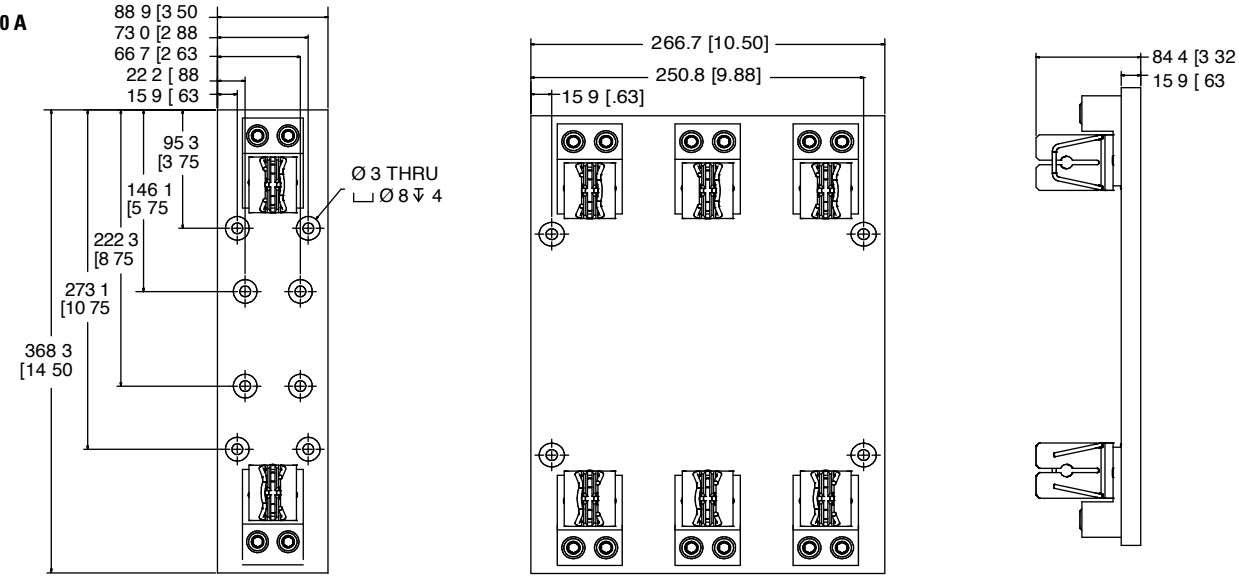
CLASS H/K5 AND R FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

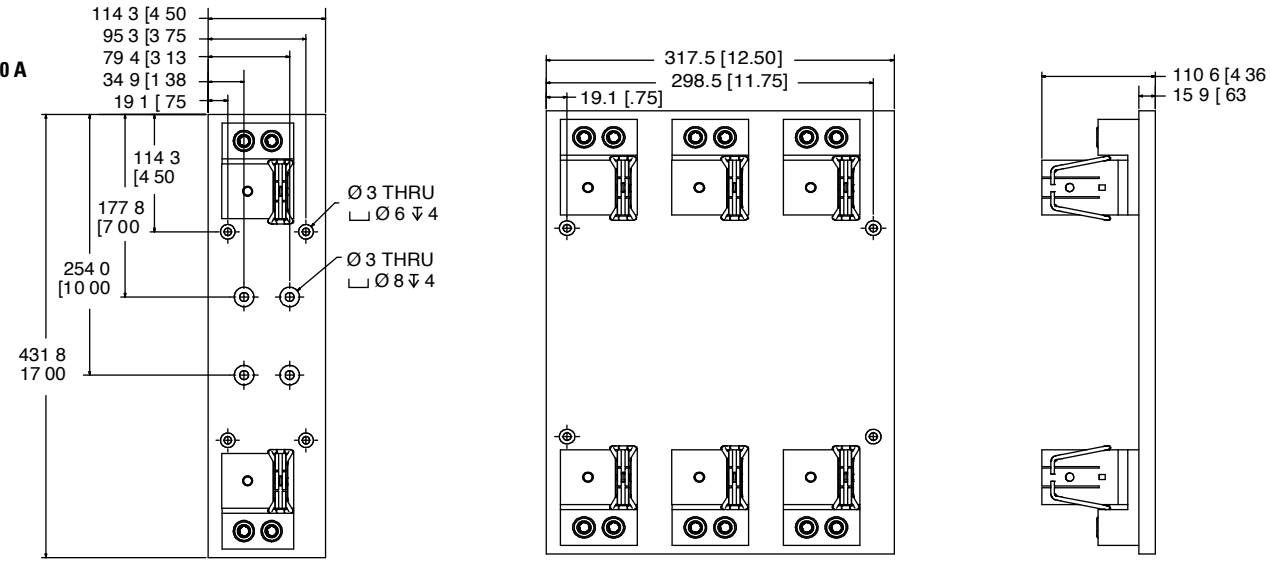
600 V 200 A



600 V 400 A



600 V 600 A



Dimensions available at **www.littelfuse.com/fuseblocks**

CLASS T FUSEBLOCKS

NEW! Smaller Design

Description

The new Littelfuse Class T fuseblocks offer many advantages over previous generations that are noted in the features and benefits section. Of particular value is the space savings these new blocks provide.

Features/Benefits

- Compact design means increased space savings
- DIN Rail releasable for all 30 A-60 A fuseblocks
- One hand release from DIN Rail (snap-to-release)
- Molded phenolic base
- Steel reinforcing springs supplied as standard in order to provide low resistance connection and long-range reliability
- Larger blocks employ integral heat sink for maximum heat dissipation
- Universal mounting holes make for easy replacement

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 No. E14721)
CSA Certified (File No. LR73091)

Recommended Fuses

300 V: JLLN ..... pg. 30

600 V: JLLS ..... pg. 30

Designed for use with miniaturized Class T fuses. Class T fuses are fast acting, current-limiting, and approximately one-third the size of electrically comparable Class RK1 fuse.

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lft**
www.littelfuse.com/fuseblocks

Ordering Information (Class T 300 V)

AMP RATING	CATALOG/SYSTEM NUMBER							TORQUE	WIRE RANGE	WIRE TYPE		BASE TEMP RATING	SNAP TO RELEASE
	BASE SYSTEM NUMBER	POLES			TERMINAL SUFFIX								
		1	2	3	BOX LUG	PRESSURE PLATE	SCREW						
30	LFT30030	1	2	3	C	—	—	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	•
60	LFT30060	1	2	3	C	—	—	5.6 N-m (50 in-lbs) 2.8 N-m (25 in-lbs) 13.6 N-m (120 in-lbs)	2-4 AWG 6-14 AWG 2/0-6 AWG				
100	LFT30100	1	—	3	CS	—	—	4.5 N-m (40 in-lbs) 4.0 N-m (35 in-lbs)	8 AWG 10-14 AWG			130°C	—
200	LFT30200	1	—	3	CS	—	—	31.1 N-m (275 in-lbs)	250 kcmil-6				
400	LFT30400	1	—	3	CS	—	—	(2) 31.1 N-m (275 in-lbs)	250 kcmil-6				
600	LFT30600	1	—	3	CS	—	—	(2) 42.4 N-m (375 in-lbs)	500 kcmil-6				

Ordering Information (Class T 600 V)

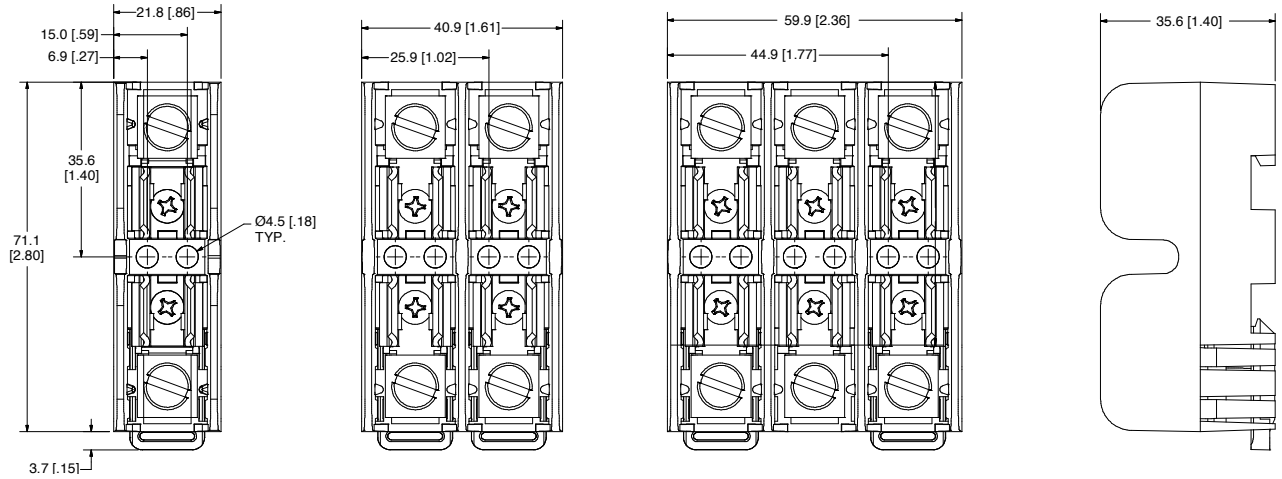
AMP RATING	CATALOG/SYSTEM NUMBER							TORQUE	WIRE RANGE	WIRE TYPE		BASE TEMP RATING	SNAP TO RELEASE
	BASE SYSTEM NUMBER	POLES			TERMINAL SUFFIX								
		1	2	3	BOX LUG	PRESSURE PLATE	SCREW						
30	LFT60030	1	2	3	C	P	S	5.6 N-m (50 in-lbs) 2.8 N-m (25 in-lbs)	2-4 AWG 6-14 AWG	* see note	Solid/Stranded	125°C	•
60	LFT60060	1	2	3	C	—	—	5.6 N-m (50 in-lbs) 2.8 N-m (25 in-lbs)	2-4 AWG 6-14 AWG	CU-AL			
100	LFT60100	1	—	3	CS	—	—	13.6 N-m (120 in-lbs) 4.0 N-m (40 in-lbs)	2/0-6 AWG 8 AWG			130°C	—
200	LFT60200	1	—	3	CS	—	—	4.0 N-m (35 in-lbs) 31.1 N-m (275 in-lbs)	10-14 AWG 250 kcmil-6				
400	LFT60400	1	—	3	CS	—	—	(2) 31.1 N-m (275 in-lbs)	250 kcmil-6				
600	LFT60600	1	—	3	CS	—	—	(2) 42.4 N-m (375 in-lbs)	500 kcmil-6				

*Wire Type for Pressure Plate and Screw Terminal is CU only

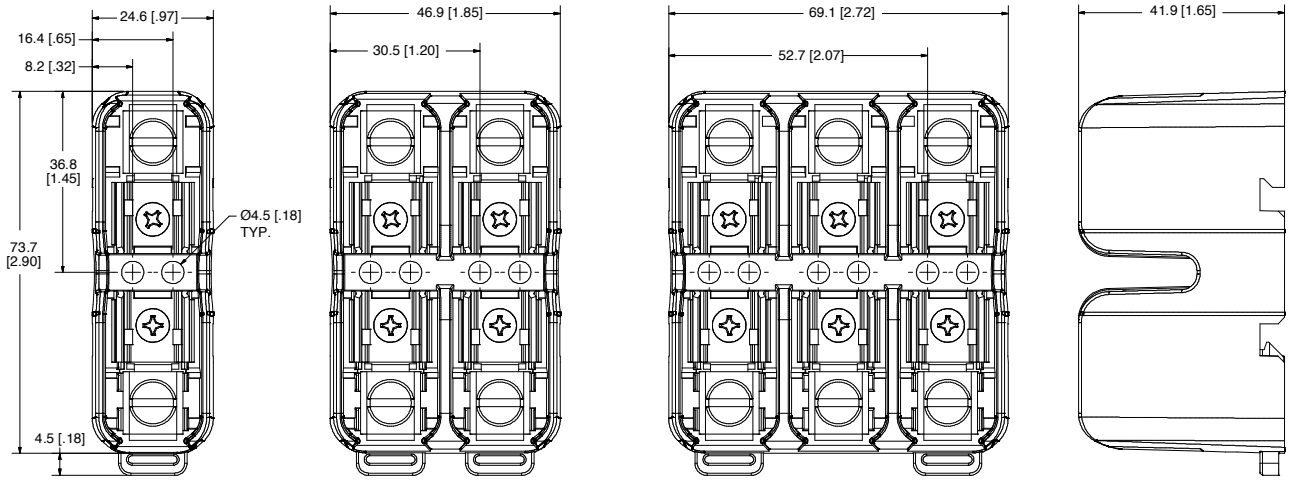
CLASS T FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

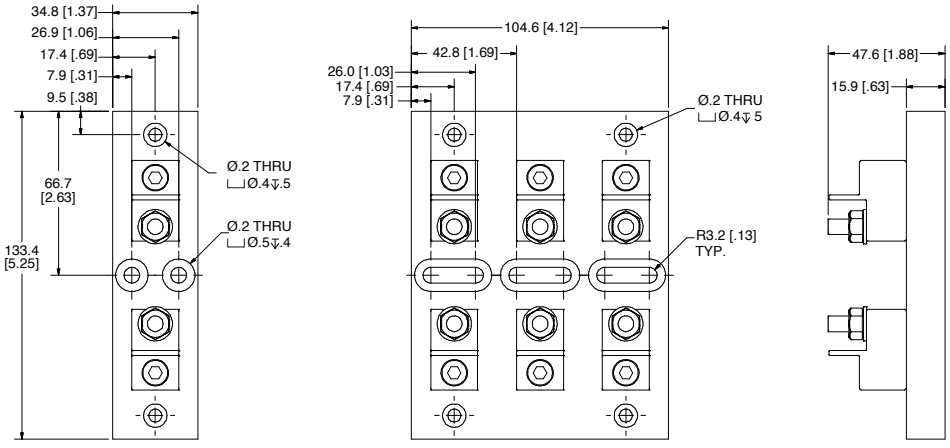
300 V 30 A



300 V 60 A



300 V 100 A

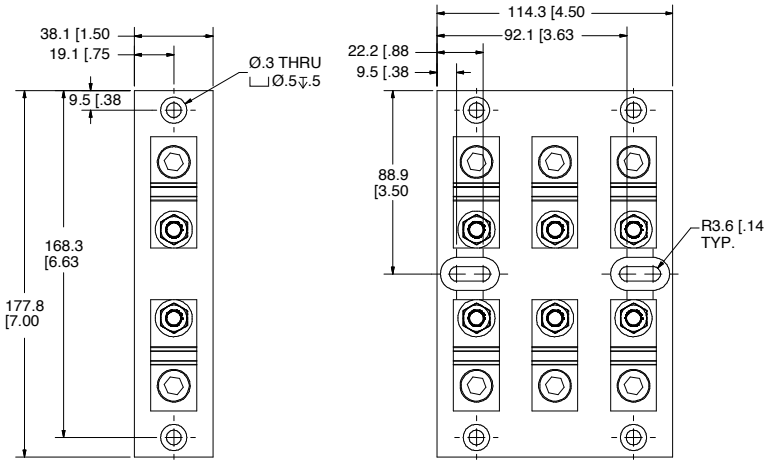


Dimensions available at **www.littelfuse.com/fuseblocks**

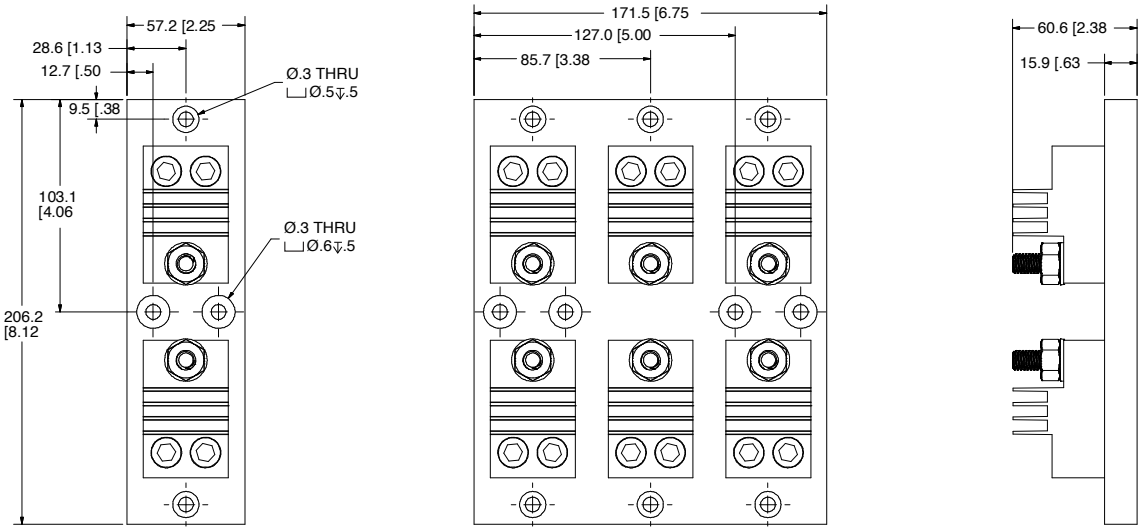
CLASS T FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

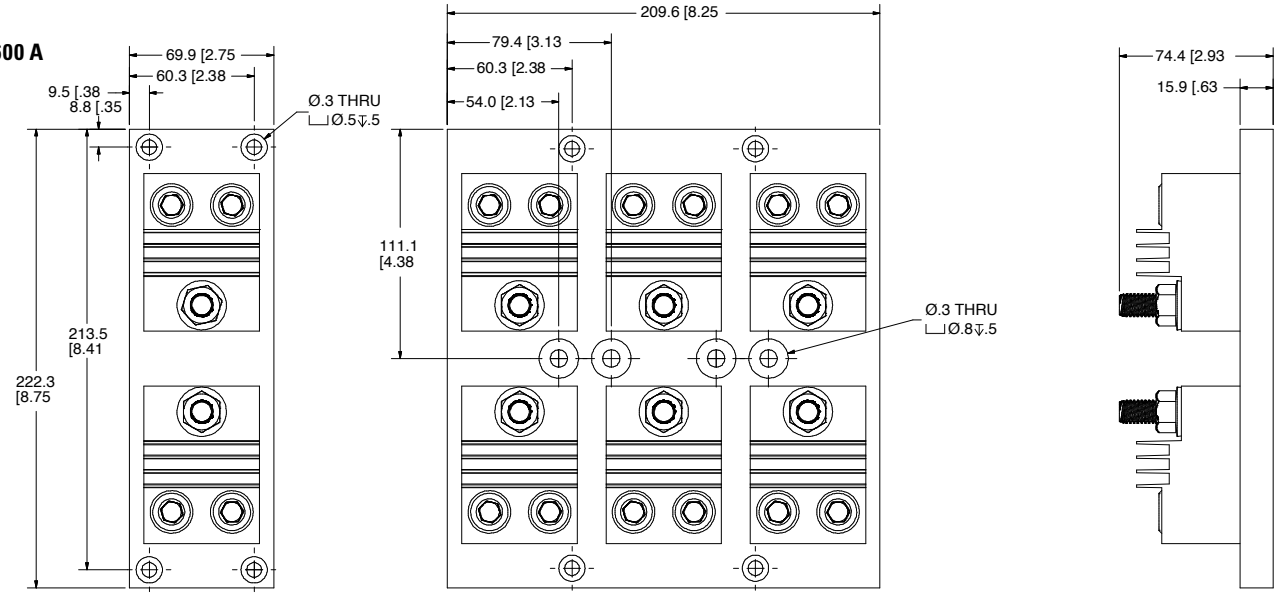
300 V 200 A



300 V 400 A



300 V 600 A

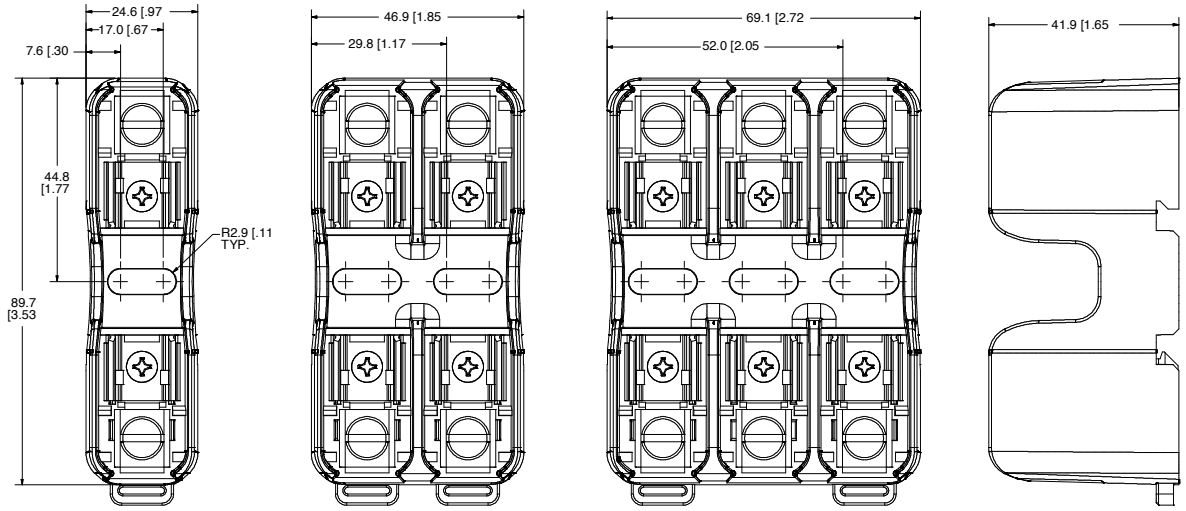


Dimensions available at **www.littelfuse.com/fuseblocks**

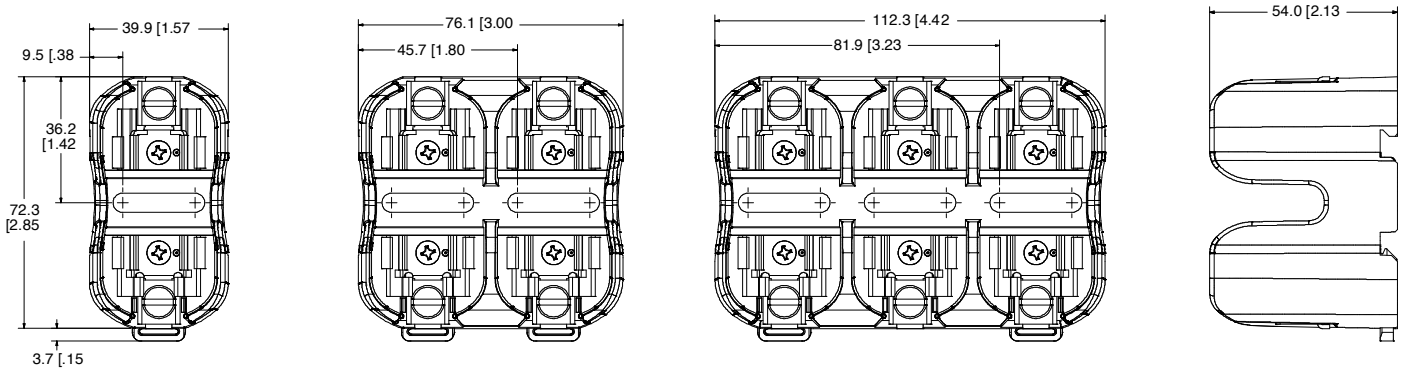
CLASS T FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

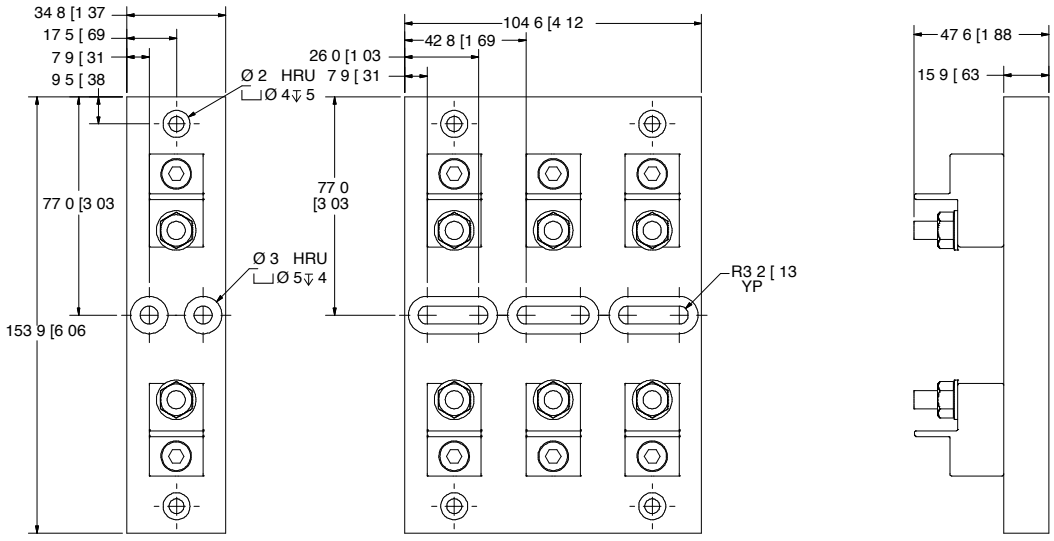
600 V 30 A



600 V 60 A



600 V 100 A

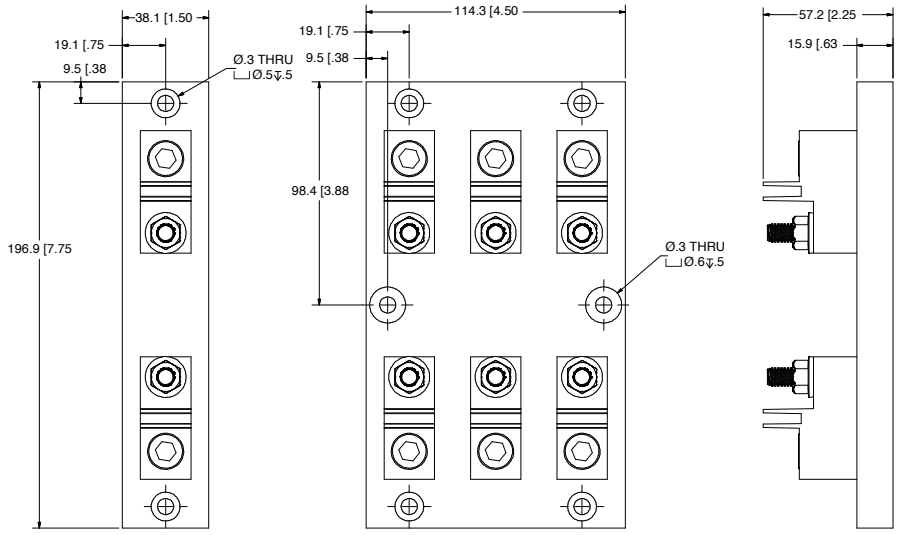


Dimensions available at **www.littelfuse.com/fuseblocks**

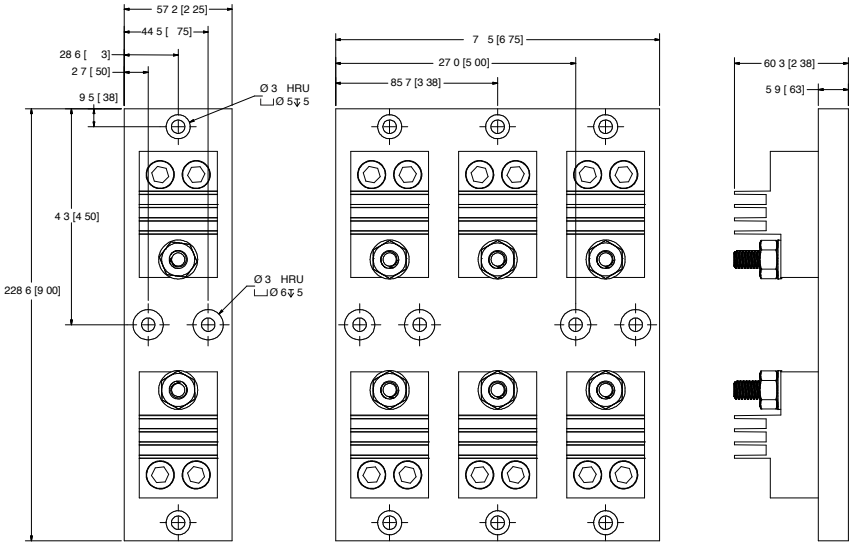
CLASS T FUSEBLOCKS DIMENSIONS

Dimensions in mm (inches)

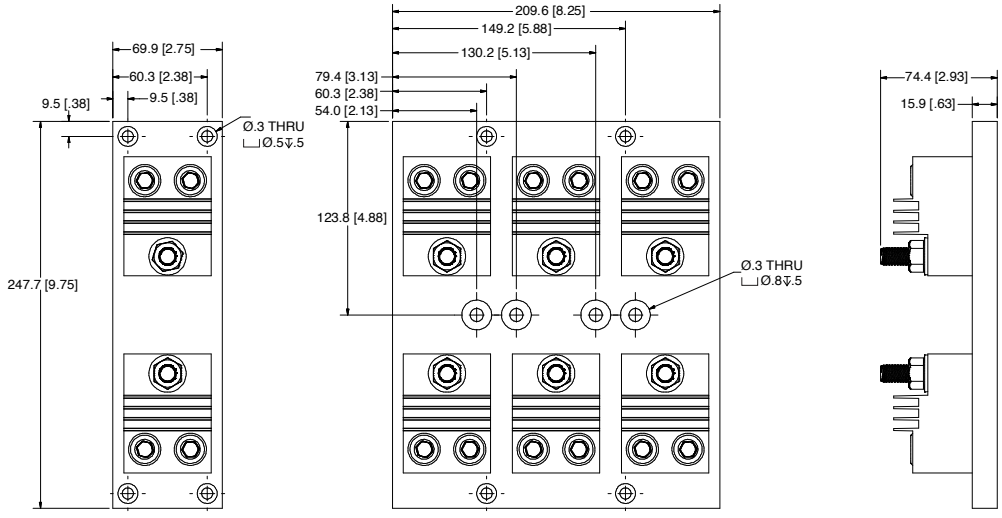
600 V 200 A



600 V 400 A



600 V 600 A



Dimensions available at **www.littelfuse.com/fuseblocks**

CLASS G FUSEBLOCKS

Description

Several Littelfuse Class G fuseblocks offer snap-to-release DIN Rail Mounting feature and universal mounting holes. Class G fuseblocks are designed for use with time-delay current limiting Class G fuses.

Features/Benefits

- Meet requirements for branch circuit protection
- One hand release from DIN Rail (snap-to-release) for several blocks
- Universal mounting holes make for easy replacement

Recommended Fuses

SLC series fuses ..... pg. 32

See page 103 for Class G 30 A DIN Releasable Fuseblock Drawings

Specifications

UL LISTED

Voltage Ratings:	600 VAC (0–20 A)	
	480 VAC (25–60 A)	
Ampere Ratings:	0–60 A	
Approvals:	15, 20 & 30 A:	UL Listed (File No. E14721)
	60 A	UL Listed (File No. E14853)
	15, 20 & 30 A:	CSA Certified (File No. LR7316)
	60 A	CSA Certified (File No. LR47235)

Ordering Information

AMP RATING	POLES	CATALOG/SYSTEM NUMBER				MAXIMUM WIRE SIZE	SNAP TO RELEASE
		BASE PART NUMBER	BOX LUG	PRESSURE PLATE	SCREW		
15*	1	LG30015-1			S	#10 CU	•
	2	LG30015-2			S		•
	3	LG30015-3			S		•
20*	1	LG30020-1			S	#10 CU	•
	2	LG30020-2			S		•
	3	LG30020-3			S		•
30*	1	L30030G-1		P	S	#10 CU	•
	2	L30030G-2		P	S		•
	3	L30030G-3		P	S		•
60	1	LG30060-1	C			#2 CU-AL	•
	2	LG30060-2	C				•
	3	LG30060-3	C				•

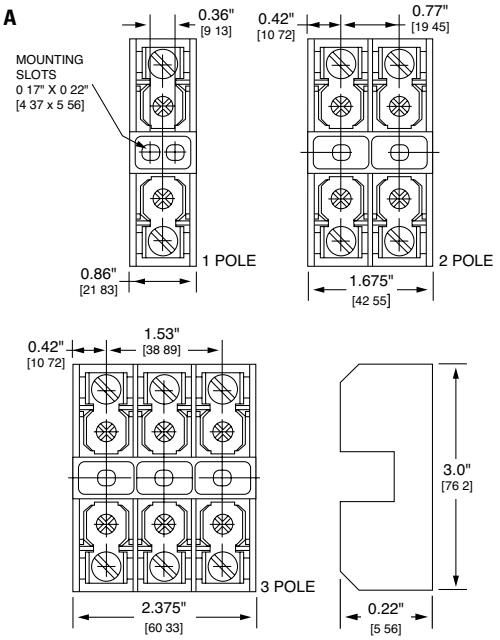
* 15, 20 & 30 A Class G fuseblocks are equipped with 20 A Quick Connect Terminals. 60 A fuseblock equipped with reinforcing spring as standard.

Web Resources

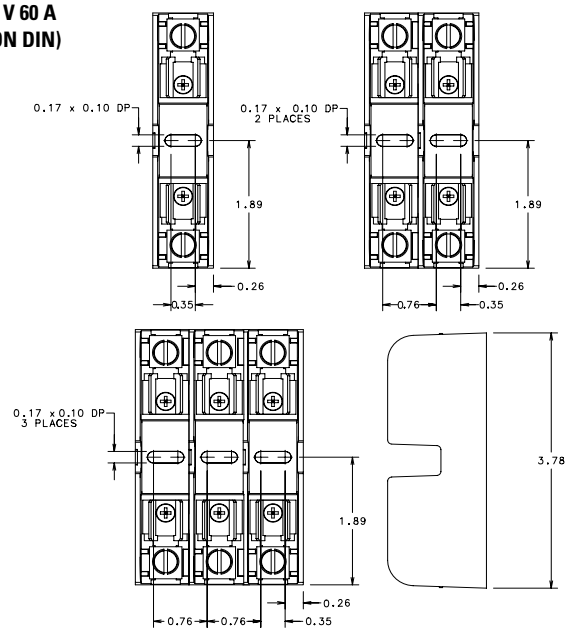
For additional technical information visit:
www.littelfuse.com/fuseblocks

Dimensions in inches (mm)

600 V 15 & 20 A (NON DIN)



480 V 60 A (NON DIN)



Note: Refer to the Midget/Class CC Fuseblocks for DIN Releasable Class G Block dimensions.

CLASS CC/CD AND MIDGET (10 X 38 mm) FUSEBLOCKS

600 V

Description

Space-saving 600 volt, 30 amp molded case fuseblocks with side barriers for isolation. Class CC blocks and Midget blocks are identical except Class CC blocks incorporate a rejection feature to assure proper fusing.

Features/Benefits

- DIN Rail (snap-to-release) mountable optional
- Universal mounting holes for easy replacement
- Rejection feature that prevents the insertion of fuses with lower interrupting rating or voltage ratings.
  - Class CC fuses are rated 600 volts and have an interrupting rating of 200,000 amperes
  - Midget fuse voltage ratings vary and their interrupting rating may be as low as 10,000 A
- High-strength, high-temperature material to minimize block breakage during handling and installation, as well as damage caused by overheating
- Reduced resistance and heat
- One-piece copper alloy fuse clips have lower resistance than traditional two-piece brass or phosphor bronze fuse clips, which minimizes heat rise and watts loss within the fuseblock
- Non DIN Rail fuseblocks have interlocking feature allowing ganging to produce a fuseblock with any number of poles
- Flexible terminal arrangements—30 A Class CC and Midget fuseblocks are available with type C box lug, type SQ screw, or type PQ pressure plate terminals

Specifications

Voltage Rating:	600 VAC/600 VDC	
Ampere Ratings:	L60030C:	30 A
	L60030M:	30 A
	L60060C:	60 A
Dielectric strength:	1200 V minimum	
Clip/terminals:	Tin-plated copper alloy	
Box lug:	Copper	
Screw and captive pressure plate:		Zinc-plated steel
Base:	Thermoplastic UL94 V-0 flammability rating	
Approvals:	Class CC/CD:	UL Listed (File No. E14721)
	Midget:	UL Recognized (File No. E14721)
	Class CC/Midget:	CSA Certified (File No. LR7316)

For Touch Safe Class CC/Midget fuseholders, see pg 108.

Recommended Fuses

Class CC Blocks:

CCMR ..... pg. 33
KLDR ..... pg. 34
KLKR ..... pg. 34

Midget Blocks:

BLF ..... pg. 38
BLN ..... pg. 38
BLS ..... pg. 39
FLA ..... pg. 39
FLM ..... pg. 38
FLQ ..... pg. 38
FLU ..... pg. 39
KLK ..... pg. 38
KLKD ..... pg. 38
KLQ ..... pg. 39

Class CD Blocks:

CCMR ..... pg. 33

Web Resources

For additional technical information visit:
www.littelfuse.com/fuseblocks

CLASS CC/CD AND MIDGET (10 X 38 mm) FUSEBLOCKS

600 V

Class CC 30 A Fuseblocks

AMP RATING	POLES	CATALOG/ SYSTEM #		CONNECTOR TYPE (ADD SUFFIX SHOWN)	MAX. WIRE SIZE
		NON-DIN*	DINR		
30	1	L60030C1C	L60030C1CDINR	Box Lug	#6 CU
	2	L60030C2C	L60030C2CDINR		
	3	L60030C3C	L60030C3CDINR		
30	1	L60030C1PQ	L60030C1PQDINR	Pressure Plate/ Q. C. Terminal	#10 CU
	2	L60030C2PQ	L60030C2PQDINR		
	3	L60030C3PQ	L60030C3PQDINR		
30	1	L60030C1SQ	L60030C1SQDINR	Screw/ Q. C. Terminal	#10 CU
	2	L60030C2SQ	L60030C2SQDINR		
	3	L60030C3SQ	L60030C3SQDINR		

* Gangable
Note: Quick Connect Terminals are rated at 20 A.
See page 103 for Class CC and Midget DIN Releasable Fuseblock Drawings

Midget 30 A Fuseblocks

AMP RATING	POLES	CATALOG/SYSTEM #		CONNECTOR TYPE (ADD SUFFIX SHOWN)	MAX. WIRE SIZE
		NON-DIN*	DINR		
30	1	L60030M1C	L60030M1CDINR	Box Lug	#6 CU
	2	L60030M2C	L60030M2CDINR		
	3	L60030M3C	L60030M3CDINR		
30	1	L60030M1PQ	L60030M1PQDINR	Pressure Plate/ Q. C. Terminal	#10 CU
	2	L60030M2PQ	L60030M2PQDINR		
	3	L60030M3PQ	L60030M3PQDINR		
30	1	L60030M1SQ	L60030M1SQDINR	Screw/ Q. C. Terminal	#10 CU
	2	L60030M2SQ	L60030M2SQDINR		
	3	L60030M3SQ	L60030M3SQDINR		

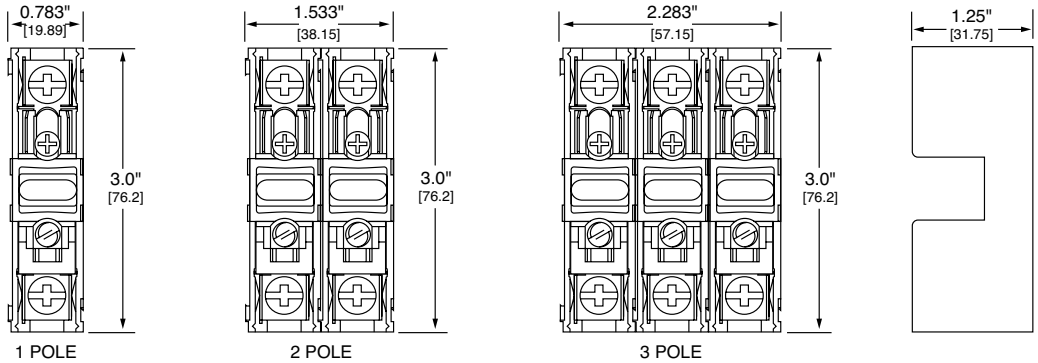
* Gangable
Note: Quick Connect Terminals are rated at 20 A.

Class CD 60 A Fuseblocks

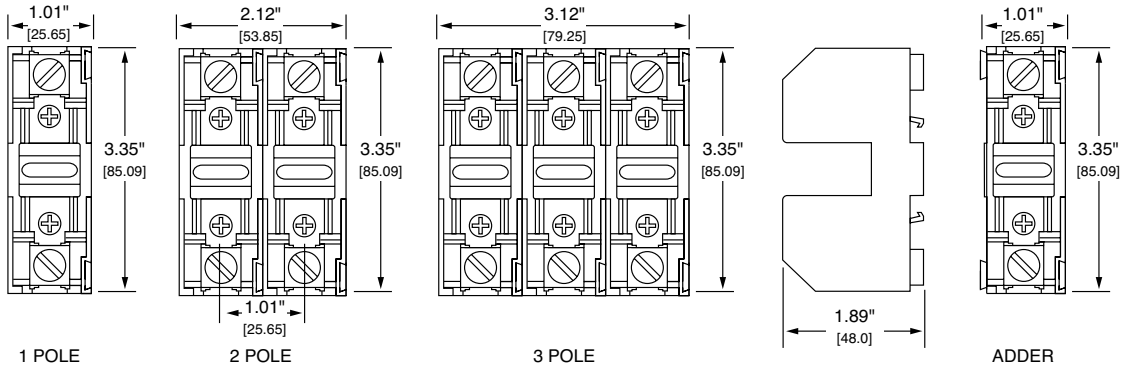
AMP RATING	POLES	CATALOG/SYSTEM NUMBER	CONNECTOR TYPE (ADD SUFFIX SHOWN)	MAX. WIRE SIZE
60	1	L60060C-1C	Box Lug	#6 CU
	2	L60060C-2C		
	3	L60060C-3C		

Dimensions in inches (mm)

600 V 30 A (NON DIN)



600 V 60 A



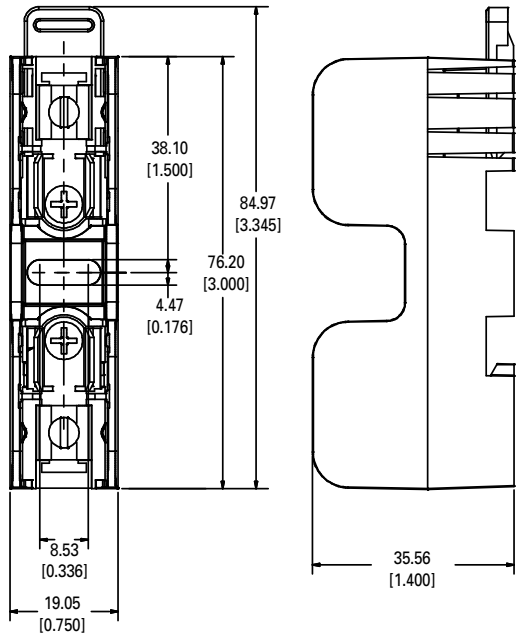
CLASS CC/CD AND MIDGET (10 X 38 mm) FUSEBLOCKS

Dimensions of DIN Rail Mountable Class CC, Class G, and Midget Fuseblocks

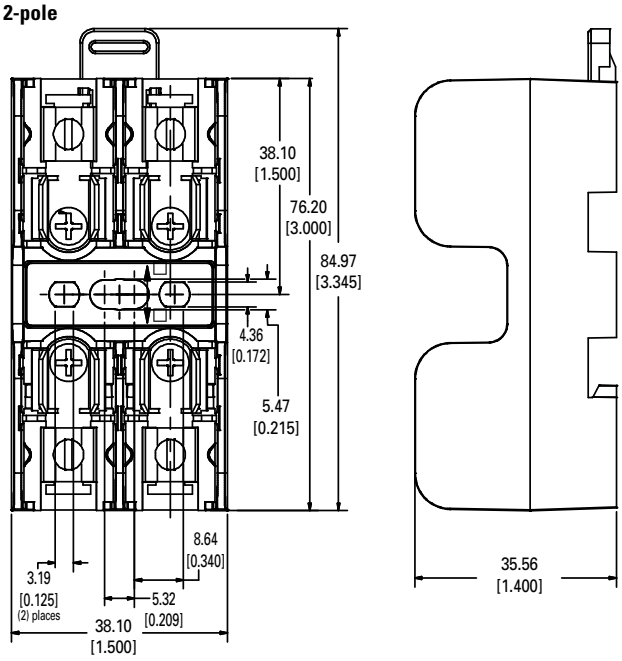
Dimensions in mm (inches)

600 V 30 A

1-pole

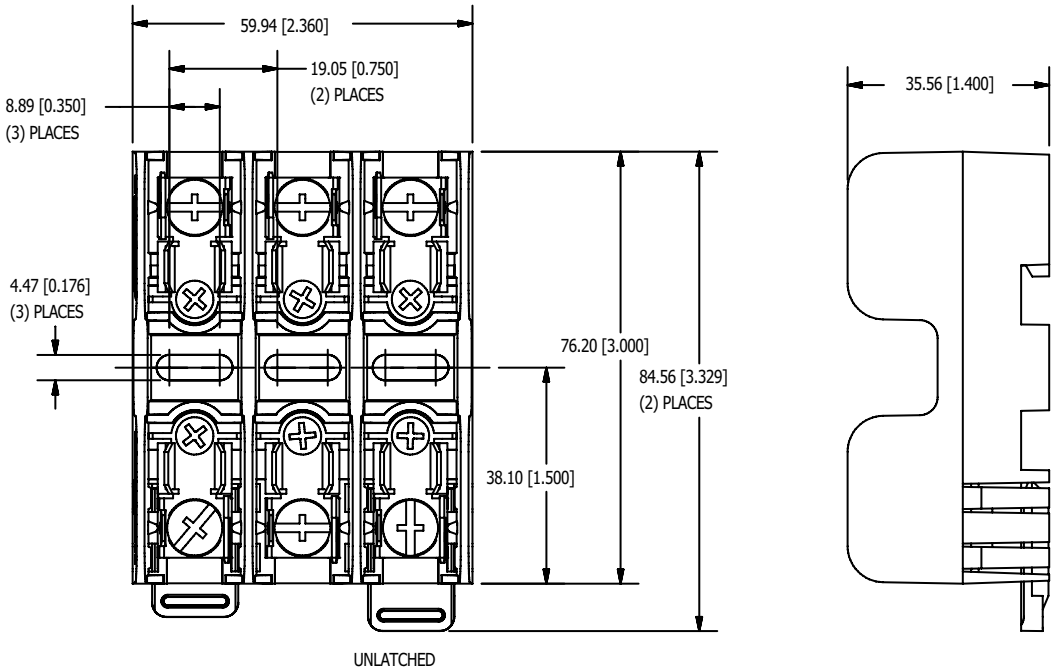


2-pole



600 V 30 A

3-pole



Dimensions available at **www.littelfuse.com/fuseblocks**

BOARD MOUNT MIDGET HOLDER (10 X 38 mm)

Description

The PC board-mounted midget fuseholder 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.

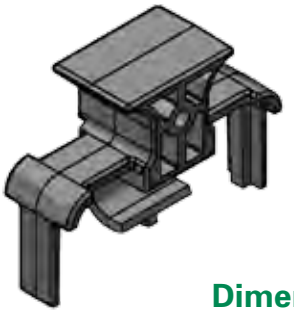
Features/Benefits

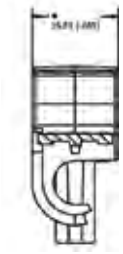
- Through hole PCB mounting
- Robust and secure block design
- All-in-one package offers easy installation
- Space saving footprint
- Touch Safe cover/puller available
- 3-pole configurations

Applications

- HVAC market
- Industrial manufacturing
- Mass production facilities

SPL001PCB Cover





Dimensions in mm (inches)

Specifications

Voltage Rating: 600 VAC/600 VDC
Amperage Rating: 30 A
Approval: UL Recognized (File No. E14721)
Mounting Method: Through hole solder/PCB

Ordering Information

	CATALOG NUMBER	SYSTEM NUMBER
Block	L60030M3PCB	L60030M3PCB
Cover*	SPL001PCB	SPL0001PCBT

*Covers are single pole—need to order a Quantity of 3 for each block.

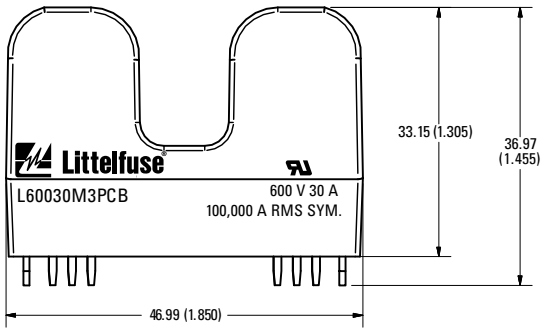
Recommended Fuses

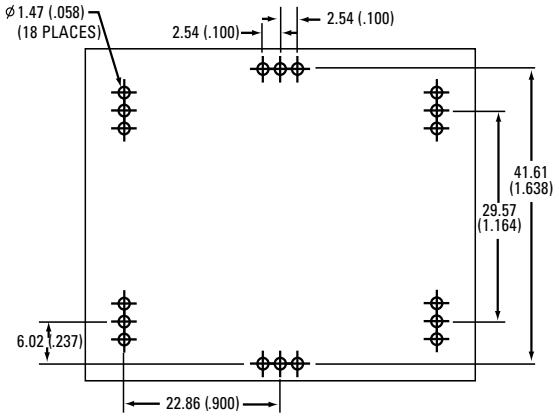
Midget (10 x 38 mm) series ..... pg 38-39

Web Resources

For additional technical information visit:
www.littelfuse.com/fuseblocks

Dimensions in mm (inches)





CLASS CC AND MIDGET FUSEBLOCK ACCESSORIES

FBDIN1 Rail Adapter

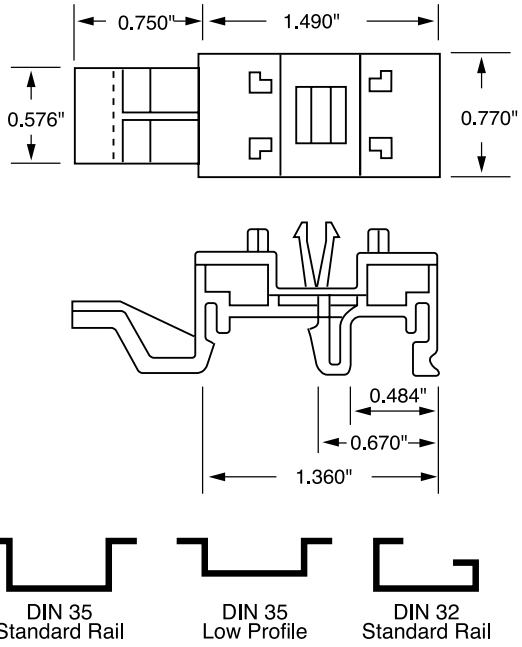
Features/Benefits

- DIN Rail adaptor for 30 A Midget, Class CC and Class G fuseblocks
- Patented design with no tools necessary for installation
- Permits snap-mounting of Class CC, Class G and Midget 30 A fuseblocks 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:
www.littelfuse.com/fbdin1

Dimensions in inches

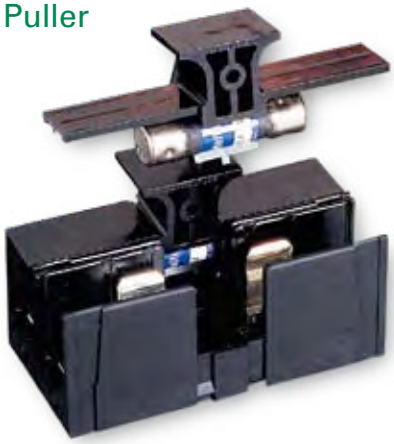


Recommended Fuseblocks

Midget-Style and Class CC .....pg. 101-102
Class G ..... pg. 100

New DIN rail mountable fuse holders available on page 101

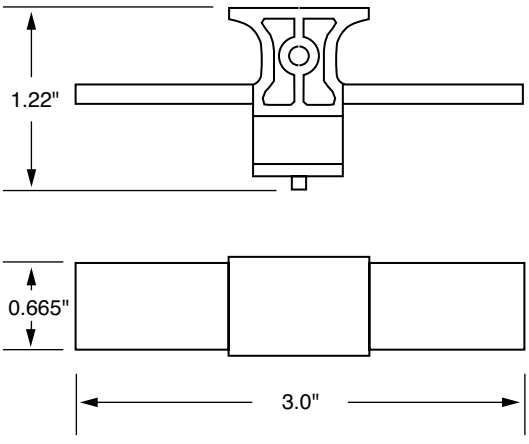
SPL001 Cover Puller



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 5/16" diameter wire
- For use with all 600 V Class CC and Midget 1/10-30 A fuses
- Label provided for easy fuse identification

Dimensions in inches



Recommended Fuseblocks

L60030C .....pg. 102
L60030M .....pg. 102

Web Resources

For additional technical information visit:
www.littelfuse.com/spl001

SPFRHV FUSEHOLDER

1000 VDC Fuseholder

Description

The Littelfuse SPFRHV fuseholder is designed to house Littelfuse high amperage (250-400 A) SPFR fuses.

Features/Benefits

- Houses 250 A, 300 A, 350 A, and 400 A fuses offering protection up to 1000 VDC
- Hard plastic body is durable and compact

Specifications

Voltage Rating:	1000 VDC
Ampere Rating:	400 A
Approvals:	UL Recognized 1000 VDC UL 4248 (File No. E14721) CSA (File No. 29862)
Fuse Type:	SPFR Series

Ordering Information

CATALOG/SYSTEM NUMBER	CURRENT
SPFRHV4001ST	250 A–400 A

Note: SPFRHV4001ST fits SPFR 250–400 A fuses.

Web Resources

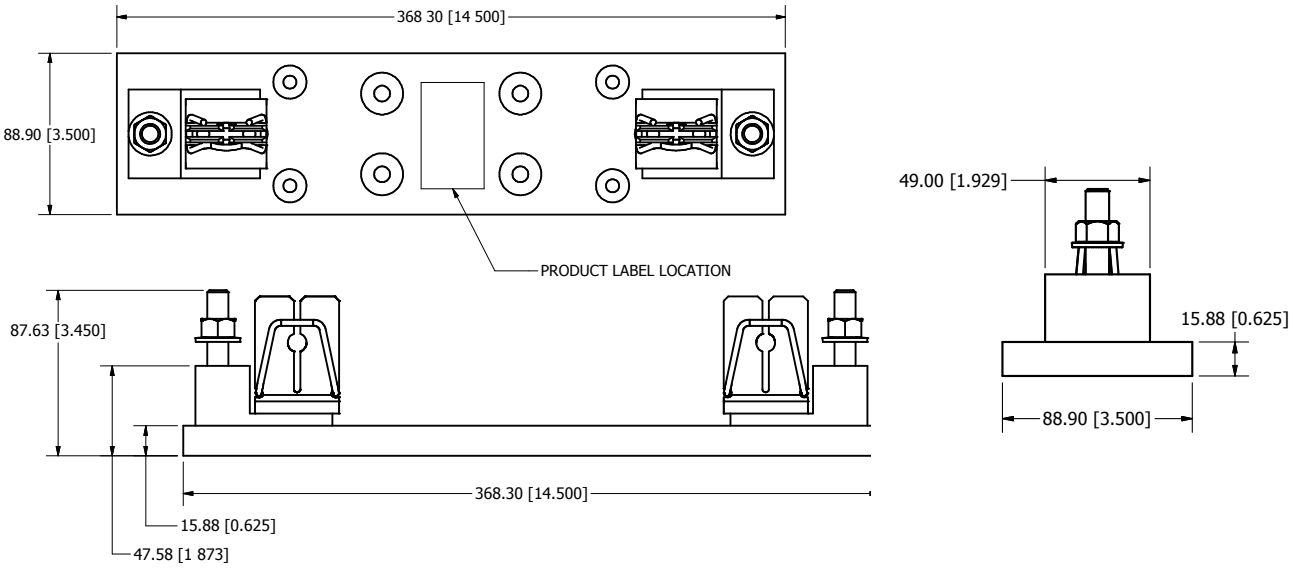
Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/spfrhv**

More information about solar applications and fuseholder details: **www.littelfuse.com/green**

Recommended Fuses

SPFR Series ..... pg. 23

Dimensions in mm (inches)

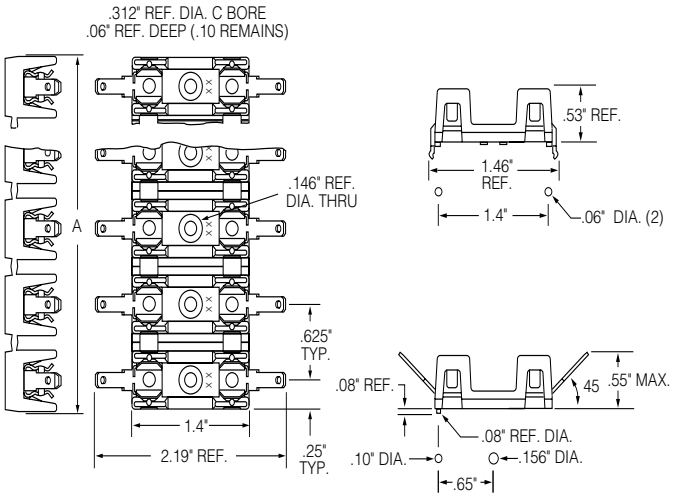


Look for this logo to indicate products that are used in solar applications. Visit our website **www.littelfuse.com/green** for the latest updates on approvals, certifications, codes and standards.

3AG OMNI BLOCK®

3AG OMNI-BLOK (Molded Base Type Fuseblock)

Dimensions in inches



Description

A low profile fuseblock 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:
- UL94 V-0 flammability rating
- Gray color (GY) for anti-rotational series, black color for all others

Ambient Temperature –40°C to +85°C

Ordering Information

CATALOG NUMBER	TERMINALS	VOLTAGE	CURRENT RATING	
			UL	CSA
354 000	Solder	300 V*	30 A	30 A
354 600	3/16" Q.C.	300 V	20 A	20 A
354 800	1/4" Q.C.	300 V	20 A	20 A
354 900	1/4" Q.C.	300 V	30 A	25 A
354 101-GY	P.C. Board	300 V	15 A	15 A

*30 A capability is based on temperature rise with #10 AWG wire properly soldered.

Recommended Fuses

3AG ..... pg. 42

Web Resources

For additional technical information visit:
www.littelfuse.com/fuseblocks

Technical

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	354901GY	1	.50"
354 002GY	354 602GY	354 802GY	354902GY	2	1.12"
354 003GY	354 603GY	354 803GY	354 903GY	3	1.75"
354 004 GY	354 604GY	354 804 GY	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"
354012GY	354 612GY	354 812GY	354912GY	12	7.38"
354021BL†	354 621BL†	354 821BL†	354921BL†	1	.50"
354101GY	—	—	—	1	.50"

†NEMA style

DEAD FRONT LPSC/LPSM POWR-SAFE FUSEHOLDERS

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

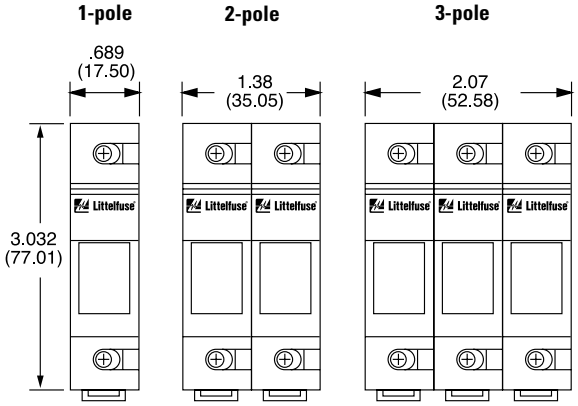
Specifications

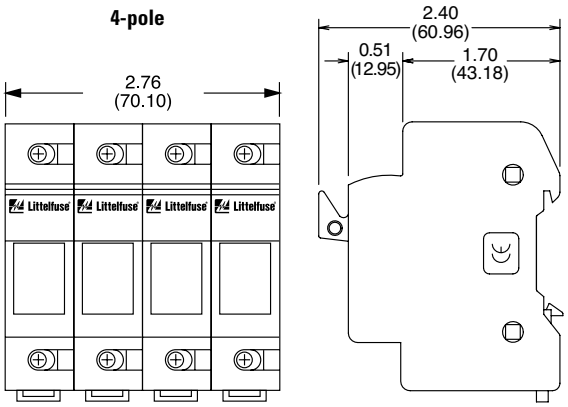
Voltage Rating: 600 VAC/DC
Ampere Rating: 30 A
Interrupting Rating: 200 kA (Class CC)
100 kA (Midget)
Terminal Type: Pressure plate
Suggested Torque: 17.7 in–lbs
Wire Range: #8–#14 CU
Material: Thermoplastic
Flammability Rating: UL94 V-0
Approvals: UL Listed (LPSC File No. E14721)
UL Recognized (LPSM File No. E14721)
CSA Certified (LPSC/LPSM File No. LR7316)
CE Certified

Description

Littelfuse POWR-SAFE Dead Front holders provide optimum protection to personnel for Class CC and Midget-Style fuses.

Dimensions in inches (mm)





Ordering Information

INDICATING CATALOG/SYSTEM#		NON-INDICATING CATALOG/SYSTEM#		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

Multi-pole Assembly Kit: System No. CYHP001
(Kit contains 20 connector pincers and 10 handle pins.)
Pincer: CYHP002
Pin: CYHP003

For information on Class CC/Midget fuseblocks, see pg. 101-103.

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lpsc**
www.littelfuse.com/lpsm

Recommended Fuses

Class CC ..... pg. 33-35
Midget-Style (10 X 38 mm) ..... pg. 38-39

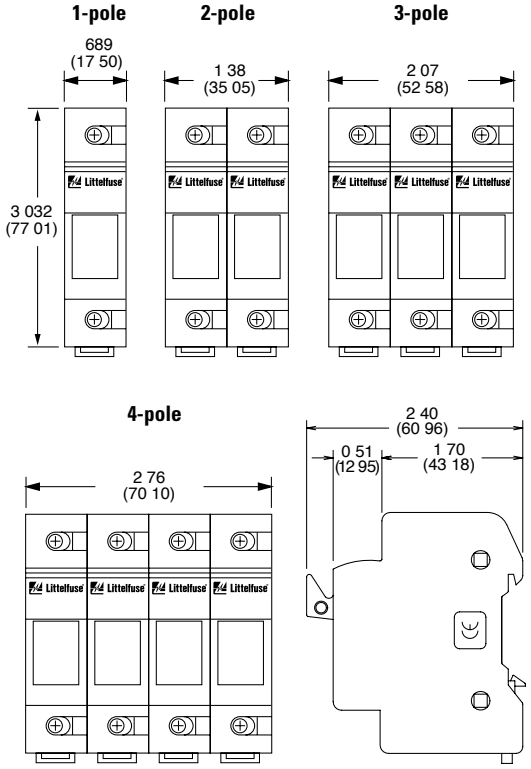
1000 VDC LPHV FUSEHOLDER

RoHS Pb

Description

The Littelfuse LPHV fuseholder is designed to house 1000 V SPF solar and FLU 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.

Dimensions in inches (mm)



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
- RoHS Compliant and PB free

Specifications

Voltage Ratings:	1000 VDC
Amperage Rating:	30 A
Approval:	Self-certified with SPF and FLU fuses
Wire Range:	#8 - 14 CU 75 C
Terminal Type:	Pressure Plate
Terminal Torque:	17.7 in-lbs
Fuse Type:	SPF and FLU midget (10 X 38 mm)
Material:	Thermoplastic
Flammability Rating:	UL94 V-0
SCCR Rating:	20 kA

Ordering Information

LPHV (1000 VDC)		
POLES	CATALOG NUMBER	SYSTEM NUMBER
1	LPHV001	LPHV0001Z
2	LPHV002	LPHV0002Z
3	LPHV003	LPHV0003Z
4	LPHV004	LPHV0004Z

Multi-pole assembly kit: CYHP001 (allows up to LPHV 10 holders to be connected). Kit contains 20 connector pincers and 10 handle pins
Pincer: CYHP002
Pin: CYHP003

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lphv**

More information about solar applications and fuseholder details: **www.littelfuse.com/green**

Recommended Fuses

1000 VDC SPF Fuses.....pg. 37
1000 VAC/VDC FLU Fuses ..... pg. 39

SOLAR-RATED

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

BUS BAR SYSTEM

POWR Distribution

Description

A key objective for panel designers is safe distribution of power to multiple fuseholders in a compact design. The Littelfuse UL508 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 fuseholders.

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
- RoHS Compliant and Pb free
- Can be cut down to optimal size

Recommended Fuseholders

LPSM (600 V)..... pg. 108
LPSC (600 V)..... pg. 108
LPHV (1000 V)..... pg. 109

Web Resources

Downloadable CAD drawings and other technical information:
www.littelfuse.com/busbar

Specifications

Voltage Ratings: 600 VAC/DC
Current Ratings:

CROSS SECTION (mm²)	18 mm²	25 mm²
END FED	80 A	100 A
CENTER FED	160 A	200 A

SCCR: 10 kA, 100 kA*
Conductor: Copper
Pitch: 17.8 mm
Approvals: UL508 File E328654
Environmentals: RoHS Compliant and Pb free

*When protected directly upstream by Class J 175 amperes max (18 mm² bus bar) and Class J 200 amperes max (25 mm² bus bar).

Ordering Information

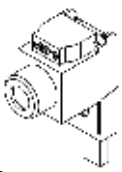
1 PHASE, 18 mm²		LENGTH (mm)	1 PHASE, 25 mm²		LENGTH (mm)
SYSTEM NUMBER	POLES		SYSTEM NUMBER	POLES	
1PH3P18mm	3	50	1PH3P25mm	3	50
1PH6P18mm	6	104	1PH6P25mm	6	104
1PH9P18mm	9	155	1PH9P25mm	9	155
1PH12P18mm	12	208	1PH12P25mm	12	208
1PH15P18mm	15	270	1PH15P25	15	270
1PH57P18mm	57	1009	1PH57P25mm	57	1009

3 PHASE, 18 mm²		LENGTH (mm)	3 PHASE, 25 mm²		LENGTH (mm)
SYSTEM NUMBER	POLES		SYSTEM NUMBER	POLES	
3PH6P18mm	6	104	3PH6P25mm	6	104
3PH9P18mm	6	158	3PH9P25mm	9	158
3PH12P18mm	12	214	3PH12P25mm	12	214
3PH15P18mm	15	266	3PH15P25mm	15	266
3PH57P18mm	57	1009	3PH57P25mm	57	1009

End caps are standard with all 3 phase configurations except 57-pole meter length. End caps aren't 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.

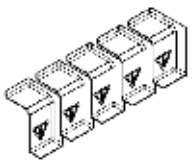
Accessories

Power Feed Lug



Part Number: BB18
Ampere Rating: 115 A
Wire: #10 – 1/0 AWG copper
Torque: 50 lb-in

Pole Protective Covers



Part Number: CTPT5
5 covers

Endcaps

Part Number: EDCP42 for Single Phase 50 piece bag
Part Number: EDCP7 for Three Phase 50 piece bag

LPSM QUICK CONNECT POWR-SAFE FUSEHOLDERS

Features/Benefits

- Dual ¼" 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
Approval:	UL Recognized (File No. E14721), CSA Certified (File No. LR7316), 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
Indication:	Indicating Fuseholder (LED)

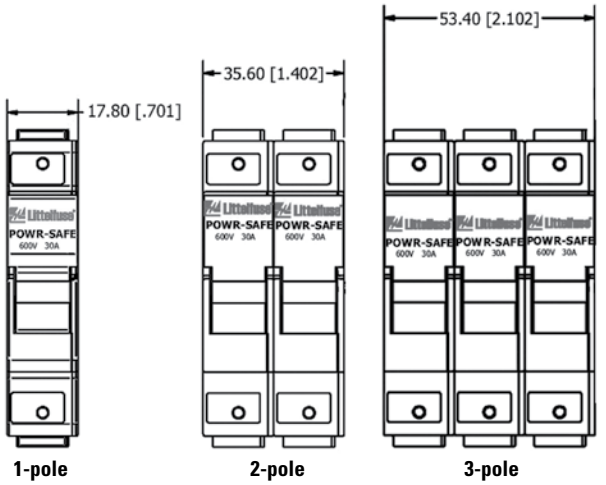
Description

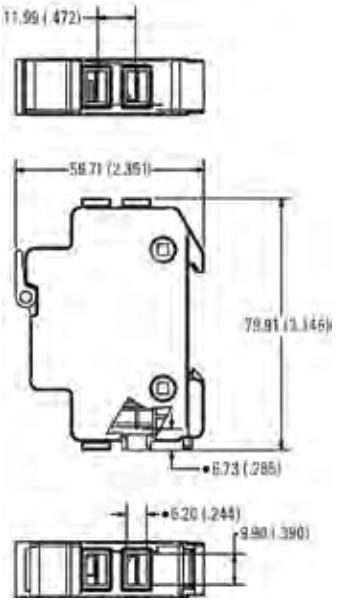
The LPSM midget fuseholder series is a dead front design providing protection to personnel when installing and removing fuses. The compact fuseholder mounts quickly onto 35 mm DIN rail, decreasing panel layout and assembly time. This product has two Quick Connect terminals on both the top and bottom of the holder, offering an additional connection option. It is available in 1-, 2-, 3- and 4-pole configurations.

Ordering Information

POLES	CATALOG NUMBER	SYSTEM NUMBER
1	LPSM001QCID	LPSM0001ZQCID
2	LPSM002QCID	LPSM0002ZQCID
3	LPSM003QCID	LPSM0003ZQCID
4	LPSM004QCID	LPSM0004ZQCID

Dimensions in mm [inches]





Recommended Fuses

Midget-Style.....pg. 38-39

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lpsmqc**

Multi-pole Assembly Kit

Assembly kit is designed for use with LPSC/LPSM fuse holders. Kit contains 20 connector pincers and 10 handle pins.

Part No: CYHP001

UP-LINK™ REMOTE INDICATION FUSEHOLDER

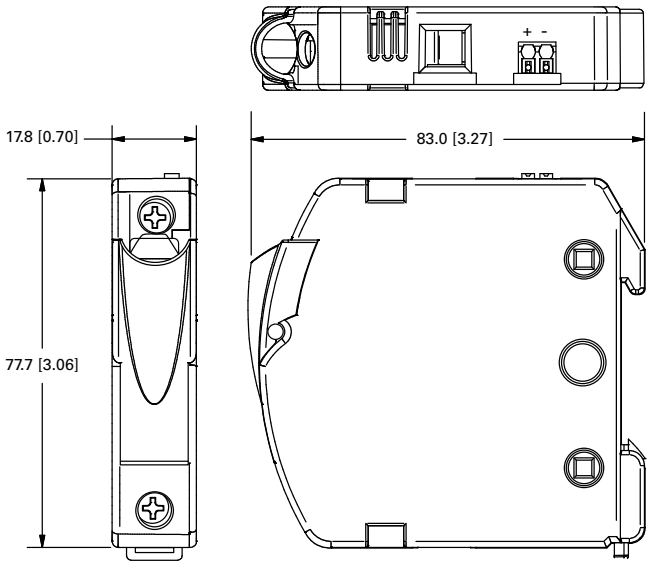
Description

The Littelfuse Up-LINK remote indicating fuseholder can be easily integrated with a PLC to offer remote notification when a fuse has opened. Accompanied with local LED indication, this reduces downtime by allowing instant communication and helping plant and maintenance personnel to quickly fix the problem.

Features/Benefits

- Cost effective solution for remote blown-fuse indication
- Easily integrates with an existing PLC or system
- Utilizes reliable solid state circuitry
- Meets stringent IEC and UL Touch-Safe Standards to improve worker safety

Dimensions in mm [inches]



Specifications

Voltage Rating:	600 VAC/DC
Amperage:	30 A max
SCCR:	200 kA AC (Class CC) 20 kA DC 100 kA (KLK Midget)
Terminal Type:	Pressure Plate (torque 17.7 in-lbs)
Wire Range:	#8–#14 CU Stranded #10–#14 CU Solid
Flammability Rating:	UL94 V-0
Approvals:	Class CC: UL Listed (File No. E14721) Midget: UL Recognized (File No. E14721) CSA Certified (File No. LR 7316)

Remote Indicating Circuit

Output (open fuse):	Open Collector
Max Current Sink:	25 mA (28 VDC Max)
Terminals:	Push In
Wire Range:	#16–#24 CU Solid/Stranded

Suggested Insulation Strip Length: 8 mm (0.31 in)

Ordering Information

CLASS CC		
POLES	PART NUMBER	SYSTEM NUMBER
1	LINK001C	LINK001C.Z
2	LINK002C	LINK002C.Z
3	LINK003C	LINK003C.Z
10 X 38 mm MIDGET		
POLES	PART NUMBER	SYSTEM NUMBER
1	LINK001M	LINK001M.Z
2	LINK002M	LINK002M.Z
3	LINK003M	LINK003M.Z

Web Resources

Training videos, downloadable CAD drawings, industry downtime reports and other technical information:
www.littelfuse.com/up-link

Recommended Fuses

Class CC.....pg. 33-35
Midget-Style.....pg. 38-39

QUICK-LINK ACCESSORY FOR UP-LINK™ FUSEHOLDER

Daisy Chain Connector

Description

Littelfuse Quick-LINK daisy chain connectors provide optimal utilization of multiple Up-LINK remote indicating fuseholders when integrated with a PLC. These four products are used in various combinations (examples noted in the ordering table) to daisy chain multiple Up-LINK units together and reduce the number of PLC I/O ports required.

Features/Benefits

- Requires only one PLC I/O port for multiple Up-LINK fuseholders
- Simple snap-in feature saves installation and assembly costs
- Allow for parallel connection of any number of Up-LINK fuseholders
- Only two wire connections required for use
- Compatible with Up-LINK remote indication fuseholder

Web Resources

Sample requests, and other technical information:
www.littelfuse.com/quick-link

FAQ Document for integration with Up-LINK Fuseholder
www.littelfuse.com/up-link

Specifications

Voltage Rating: 28 VDC
Amperage: 25 mA maximum current
Approvals: UL Listed materials

Ordering Information

POLES	TYPE	PART NUMBER
2	Base	LK2M30B
2	Extender	LK2M30E
3	Base	LK3M30B
3	Extender	LK3M30E

QUANTITY NEEDED (BY PART NUMBERS)				
UP-LINK POLES	LK2M30B	LK3M30B	LK2M30E	LK3M30E
2	1			
3		1		
4	1		1	
5		1	1	
6		1		1
7		1	2	
8		1	1	1
9		1		2
10		1	2	1

DEAD FRONT CLASS J POWR-SAFE FUSEHOLDERS

Description

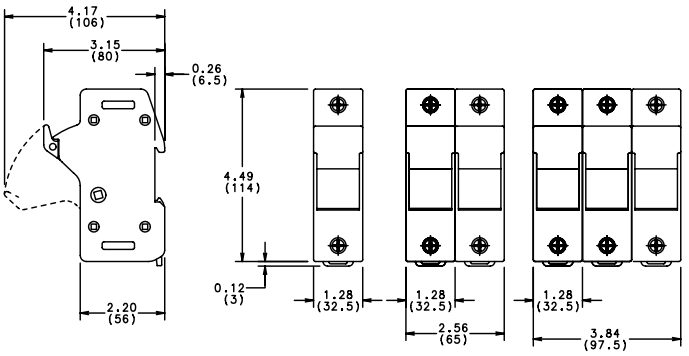
Littelfuse Class J POWR-SAFE Dead Front holders provide optimum protection to personnel.

Features

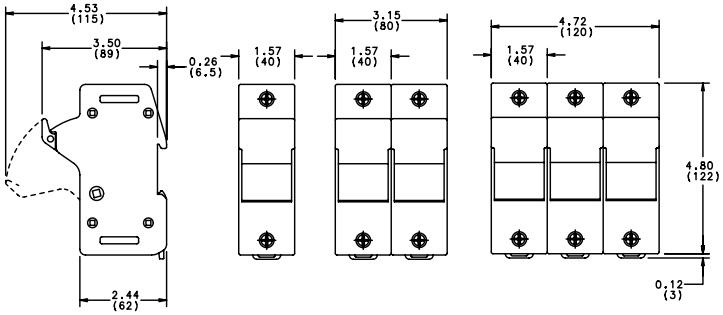
- Indicating and non-indicating options available
- 1-, 2-, and 3-pole configurations
- Easy installation and fuse removal with no additional pullers or tools required
- 35 mm DIN Rail Mountable
- Ventilated design for cooler operation

Dimensions in inches (mm)

30 Amp



60 Amp



Specifications

Voltage Ratings:	600 VAC
Interrupting Rating:	200 kA
Ampere Rating:	30 and 60 A
Terminal Type:	Pressure Plate
Suggested Torque:	30 A – 35 in-lbs. 60 A – 45 in-lbs.
Wire Range:	#2 – #14CU
Material:	Thermoplastic
Flammability Rating:	UL94 V-0
Approvals:	UL Listed (File No. E14721) CE Certified

Ordering Information

CATALOG NUMBER	SYSTEM NUMBER	POLES	PACK QTY.	VOLTS	AMPERE RATING	INDICATION
LPSJ30-1	LPSJ301.Z	1	6	600 V	30 A	–
LPSJ30-2	LPSJ302.Z	2	3	600 V	30 A	–
LPSJ30-3	LPSJ303.Z	3	2	600 V	30 A	–
LPSJ30-1ID	LPSJ301.ZXID	1	6	600 V	30 A	•
LPSJ30-2ID	LPSJ302.ZXID	2	3	600 V	30 A	•
LPSJ30-3ID	LPSJ303.ZXID	3	2	600 V	30 A	•
LPSJ60-1	LPSJ601.Z	1	6	600 V	60 A	–
LPSJ60-2	LPSJ602.Z	2	3	600 V	60 A	–
LPSJ60-3	LPSJ603.Z	3	2	600 V	60 A	–
LPSJ60-1ID	LPSJ601.ZXID	1	6	600 V	60 A	•
LPSJ60-2ID	LPSJ602.ZXID	2	3	600 V	60 A	•
LPSJ60-3ID	LPSJ603.ZXID	3	2	600 V	60 A	•

Multi-Pole Assembly Kit: Order No. US3J2PAK to assemble two LPSJ30-1
US3J3PAK to assemble three LPSJ30-1
US6J2PAK to assemble two LPSJ60-1
US6J3PAK to assemble three LPSJ60-1

For information on Open Face Class J blocks, see pg. 84-87.

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lpsj**

Recommended Fuses

Class J ..... pg. 27-29

Note: These dimensions are for reference only. Please contact factory for additional information.

FUSE PULLERS & POWR-JAW CLIP CLAMPS

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" - 1/2" fuses
Pocket Fuse	LPFP	250 V fuses from 0-200 A 600 V fuses from 0-100 A 9/16" - 1 19/32" fuses
Giant Fuse	GFP	250 V fuses from 61-600 A 600 V fuses from 61-400 A 1 1/16" - 2 19/32" fuses
Tri-puller	097023	For ATO and glass fuses

Web Resources

Sample requests and other technical information:
www.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 severe environments
- Wide range of coverage with simple design

Ordering Information

CATALOG NUMBER	SYSTEM NUMBER	VOLTS	AMPERES
LCC1	0LCC1	250	0-30
LCC2	0LCC2	250	35-60
LCC2	0LCC2	600	0-30
LCC4	0LCC4	600	35-60
LCC5	0LCC5	250 or 600	70-100
LCC6	0LCC6	250 or 600	110-200
LCC7	0LCC7	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 fuseblock barrier and fuse clip is required to install Clip Clamps.

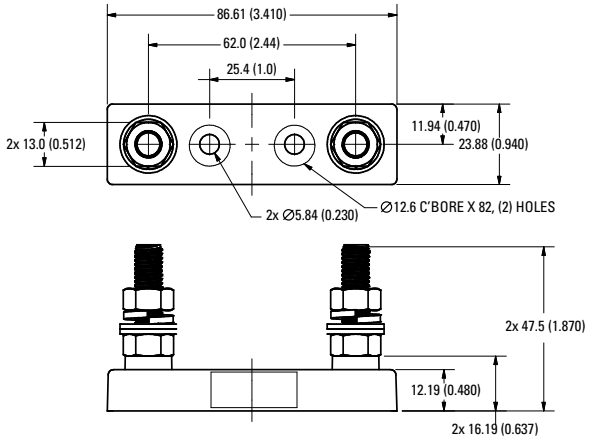
Web Resources

Sample requests and other technical information:
www.littelfuse.com/clipclamps

LFFB SERIES LIMITER BLOCK/LHFB INLINE HOLDER

LFFB

Dimensions in mm [inches]



Description

The LFFB003 fuseblock 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: 800 A
Approvals: UL Listed (File No. E14721)
Construction: Base—Thermoset
Studs—Steel Zinc Plated

Ordering Information

CATALOG NUMBER	SYSTEM NUMBER
LFFB003	LFFB0003Z

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lffb**

Recommended Fuses

CNL/CNN Cable limiter fuses ..... pg. 64
HAZGARD fuse ..... pg. 64

LHFB

Description

The Littelfuse LHFB waterproof in-line fuseholder 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 fuseholder 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" to 1 1/4" fuses
Wire Size: Accepts #16 to #18 gauge wire
Operating Temperature: -20° C to 80° C

Installation Instructions

1. Thread wire through fuseholder 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, downloadable CAD drawings and other technical information: **www.littelfuse.com/lhfb**

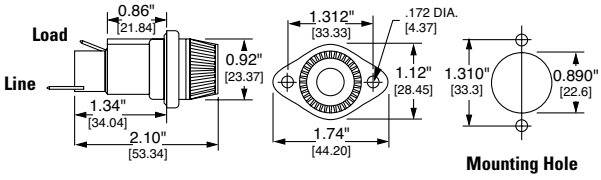
571 & 572 SERIES PANEL-MOUNT FUSEHOLDERS

571

Description

Panel mount fuseholders 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 to prevent the installation of fuses with lower voltage ratings or interrupting ratings. Watertight version must be front panel mounted.

Dimensions in inches (mm)



Ordering Information

CATALOG/SYSTEM NUMBER				BOTTOM TERMINAL	FUSE LENGTH RANGE*	FOR USE WITH
STANDARD		WATERTIGHT				
571027	05710027L	571027P	05710027LXP	Straight	1 5/16" – 1 3/8"	Midget Fuses
571028	05710028L	571028P	05710028LXP	Rt. Angle		
571007	05710007L	571007P	05710007LXP	Straight	1 13/32" – 1½"	Midget Fuses
571008	05710008L	571008P	05710008LXP	Rt. Angle		
5710CC	057100CCL	5710CCP	057100CCLXP	Straight	1½"	Class CC Fuses
571RCC	05710RCCL	571RCCP	05710RCCLXP	Rt. Angle		

*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 and quick-connect
O-Rings: 901-184 (body), 901-260 (knob)
Molded Parts: Black thermoplastic
Approvals: UL Recognized (File No. E14721)
UL Recognized for branch circuit protection (5710CC/RCC)
CSA Certified (File No. LR7316)

Web Resources

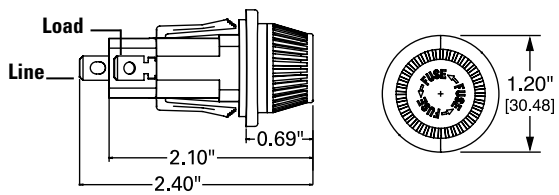
Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/571**

572

Description

The 572 series panel mount fuseholders 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 in inches (mm)



Ordering Information

CATALOG/SYSTEM NUMBER				BOTTOM TERMINAL	FUSE LENGTH RANGE†	FOR USE WITH
STANDARD		WATERTIGHT				
572027	05720027L	572027P	05720027LXP	Straight	1 5/16" – 1 3/8"	Midget Fuses
572028	05720028L	572028P	05720028LXP	Rt. Angle		
572007	05720007L	572007P	05720007LXP	Straight	1 13/32" – 1½"	Midget Fuses
572008	05720008L	572008P	05720008LXP	Rt. Angle		
5720CC	057200CCL	5720CCP	057200CCLXP	Straight	1½"	Class CC Fuses
572RCC	05720RCCL	572RCCP	05720RCCLXP	Rt. Angle		

†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 and quick-connect
Molded Parts: Black thermoplastic
Approvals: UL Recognized (File No. E14721)
UL Recognized for branch circuit protection (5720CC/RCC) Class CC version
CSA Certified (File No. LR7316)
Mounting: Double "D" punch or 0.875" knock-out hole
Designed to fit 14-18 gauge

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/572**

PANEL MOUNT 3AG (¼" X 1¼") FUSEHOLDERS

342 Series (Traditional Panel Mount Type)

Straight Terminal
Fluted Knob

Right Angle Terminal
Knurled Knob

Specifications

Electrical: Rated at 20 A for any voltage up to 250 V
Dielectric Strength: 2400 V minimum
Mounting: Withstands 15 lb-in mounting torque; maximum panel thickness: .187"
Molded Parts: Black thermoplastic (UL94 V-0)
Knob: Bayonet style with lettering
Terminals: Copper & copper alloy. Tin plated, except ¼" Quick-Connect terminals are nickel plated
Ambient Temperature: –40°C to +85°C

Description

Panel Mount Fuseholders for 3AG (¼" x 1¼") fuses. Both fluted and knurled knob terminal options.

Recommended Fuses

3AG (¼" x 1¼") ..... pg. 42

Web Resources

Additional technical information available at:
www.littelfuse.com/342

Ordering Information

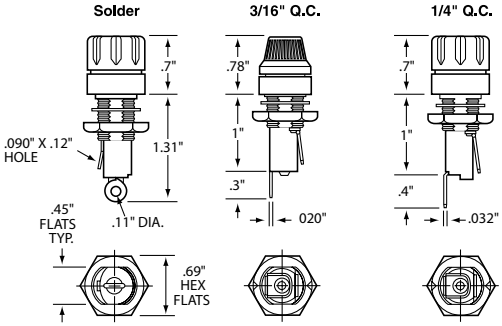
Straight Terminal

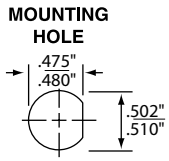
FLUTED KNOB		KNURLED KNOB		TERMINAL
CATALOG/SYSTEM NUMBER		CATALOG/SYSTEM NUMBER		
342014A	03420014X	342012A	03420012X	Solder
342038A	03420038X	342058A	03420058X	3/16" Q.C.
342838A	03420838X	342858A	03420858X	¼" Q.C.

Right Angle Terminal

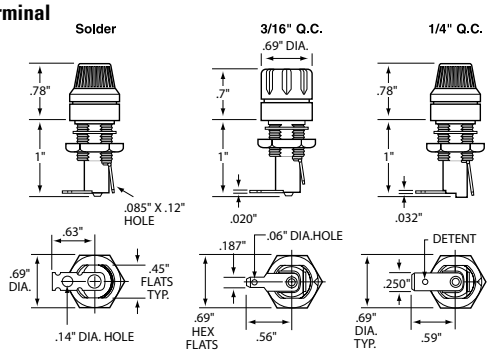
FLUTED KNOB		KNURLED KNOB		TERMINAL
CATALOG/SYSTEM NUMBER		CATALOG/SYSTEM NUMBER		
342048A	03420048X	342022A	03420022X	Solder
342028A	03420028X	342048A	03420048X	3/16" Q.C.
342838A	03420838X	342858A	03420858X	¼" Q.C.

Straight Terminal





Right Angle Terminal



Dimensions in inches

342 Series (Watertight Panel Mount Type)

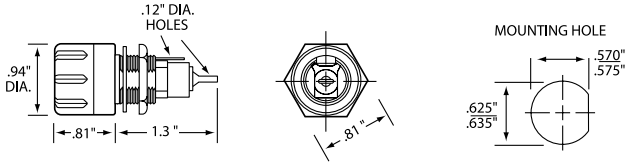
Web Resources

Additional technical information available at:
www.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°C to +85°C
Hardware: O-rings (2) and hex nut, unassembled

Dimensions in inches



Ordering Information

CATALOG NUMBER	SYSTEM NUMBER
342006A	0342006ZXA

Recommended Fuses

3AG (¼" x 1¼") ..... pg. 42

INTERNATIONAL SHOCK SAFE PANEL MOUNT

345 Series (International Shock-Safe Panel Mount Type)

Description

Designed to eliminate electrical shock as defined by IEC standards 60065 and 60127, these panel-mount fuses 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 fuseholder 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

Web Resources

Downloadable CAD drawings and other technical information:
www.littelfuse.com/shocksafe

Recommended Fuses

2AG ..... pg. 42
3AG ..... pg. 42
5 x 20 mm ..... pg. 43

Specifications

Insulation Resistance: 10,000 megaohm minimum at 500 VDC
Contact Resistance: Less than .005 ohm average at currents up to 1 A
Mounting: 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.
Body Material: Black glass-filled thermoplastic (UL94 V-0)
Knob Material: Grey, blue or black glass-filled thermoplastic (UL94 V-0)
Hex Nut Material: Black glass-filled thermoplastic
Knob: 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°C to +85°C
Hardware: Threaded style fuseholders are supplied with a thermoplastic hex nut unassembled
Quick mount style fuseholders 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 fuseholder de-rating.

Ordering Information

EXAMPLE:
(Complete Assembly with Options)

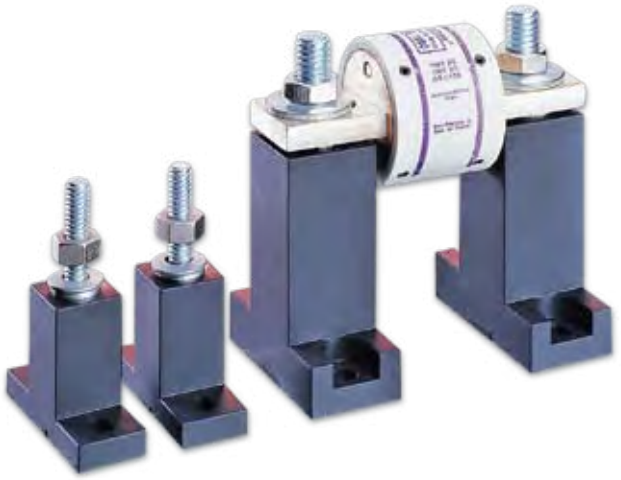
Series Number 345 3 LS 7 LNP

FUSE SIZE	STYLE	TERMINALS	OPTIONS*
2	LF	1	L
2AG .177" x .570"	Low Profile Body Black Fingergrip Knob	3/16" (Right Angle) Dual Purpose Solder/QC	Lockwasher
3	RF	2	N
3AG .250" x 1.250"	Rear Mount Body Black Fingergrip Knob	3/16" (Straight) Dual Purpose Solder/QC	Neoprene Washer
5	HF	3	NP
5 x 20 mm .197" X .787"	High Profile Body Screwdriver Slot Knob	3/16" (Right Angle) NEMA QC	Drip-Proof O-Ring† with Neoprene Washer
	LS	4	
	Low Profile Body Screwdriver Slot Knob	3/16" (Straight) NEMA QC	
	QS	7	
	Quick Mount Body Screwdriver Slot Knob	1/4" (Right Angle) NEMA/DIN QC	
	Screwdriver Slot Knob 2AG–Blue Knob 3AG–Grey Knob 5 x 20 mm–Black Knob	8	
		1/4" (Straight) NEMA/DIN QC	

*Options (L, N, NP) can be ordered individually or in combination.
†Screwdriver slot knob only.

SEMICONDUCTOR FUSEBLOCKS

LSCR Series



Specifications

Voltage Rating: LSCR001: Accepts fuses 1" diameter or less at 600 V
Also accepts 13/16" diameter fuses at 700 – 1000 V
LSCR002: Accepts fuses up to 3" diameter at 1000 V

Ampere Ratings: LSCR001: 1 – 400 A capacity
LSCR002: 70 – 800 A capacity

Approvals: UL Recognized (File No. E14721)

Stud Size: LSCR001: ¼ -20 thread (Torque: 65 in-lbs.)
LSCR002: ⅜ -16 thread (Torque: 192 in-lbs)

Base: Molded phenolic. 150° C temperature rating

Terminal Construction: Plated steel. Supplied with nut and belleville washer

Recommended Fuses

Semiconductor fuses. See tables below.

LSCR001 Semiconductor Fuseblock Selection Guide

FUSE SERIES	AMPERE RATING	PAGE
L15S	70 – 400	68
L25S, LA30QS	35 – 60	68. 71
L25S	70 – 200	68
L50S, LA50QS	35 – 60	68, 72
L50S, LA50QS	70 – 100	68, 72
LA50QS	125 – 200	72
L60S	35 – 60	69
L60S	70 – 100	69
L60S	125 – 200	69
L70S, LA70QS	35 – 60	69, 73-74
L70S, LA70QS	70 – 200	69, 73-74
KLC	1 – 30	69
KLC	35 – 60	69
LA100P	35 – 60	75
LA15QS	70 – 400	70
LA30QS	70 – 200	71

LSCR002 Semiconductor Fuseblock Selection Guide

FUSE SERIES	AMPERE RATING	PAGE
L15S, LA15QS	500 – 800	68, 70
L25S, LA30QS	225 – 700	68, 71
L25S, LA30QS	800	68, 71
L50S, LA50QS	225 – 400	68, 71
L50S, LA50QS	450 – 600	68, 71
L50S, LA50QS	700 – 800	68, 71
L60S	225 – 400	69
L60S	450 – 600	69
L60S	700 – 800	69
L70S, LA70QS	125 – 400	69, 73-74
L70S, LA70QS	450 – 800	69, 73-74
KLC	70 – 100	69
KLC	125 – 200	69
KLC	225 – 400	69
KLC	450 – 800	69
LA100P	70 – 800	75
JLLN	700 – 800	30-31
JLLS	250 – 400	30-31
JLLS	700 – 800	30-31

Description

Modular-designed Semiconductor fuseblocks are designed to accommodate a wide range of Semiconductor fuses, with a maximum diameter of 3".

Features/Benefits

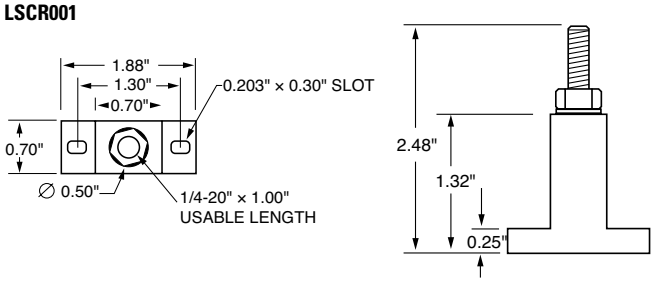
- Modular design reduces inventory requirements
- Sold in pairs for convenience
- Constructed of molded phenolic (with plated steel studs)

Web Resources

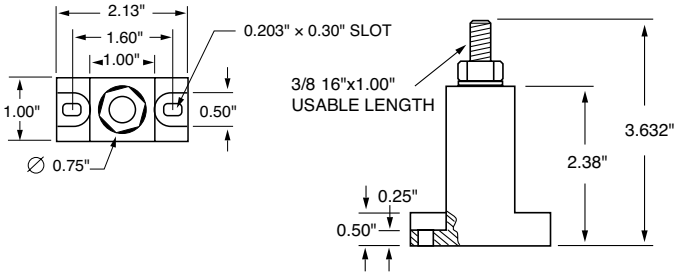
Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lscr**

Dimensions in inches

LSCR001



LSCR002



SEMICONDUCTOR FUSEBLOCKS

1LFS and 1LS Series

Description

Littelfuse modular style semiconductor fuseblocks 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 molded phenolic (with plated steel studs)

Specifications

Voltage Rating: 600 V
Ampere Range: 1 – 600 A
Approvals: UL Recognized
Insulator Base: 150° C general purpose phenolic
Box Lug Terminal: Tin plated aluminum

Ordering Information

CATALOG/ SYSTEM 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
1LS103	400 A	250MCM - #6 CU/AL	275 in-lbs	UL Recognized
1LS104	600 A	500MCM - #6 CU/AL	375 in-lbs	UL Recognized
1LS108	400 A	250MCM - #6 CU/AL	275 in-lbs	Self-Certified
1LS109	400 A	250MCM - #6 CU/AL	275 in-lbs	Self-Certified
1LS110	400 A	250MCM - #6 CU/AL	275 in-lbs	Self-Certified

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/1lfs**

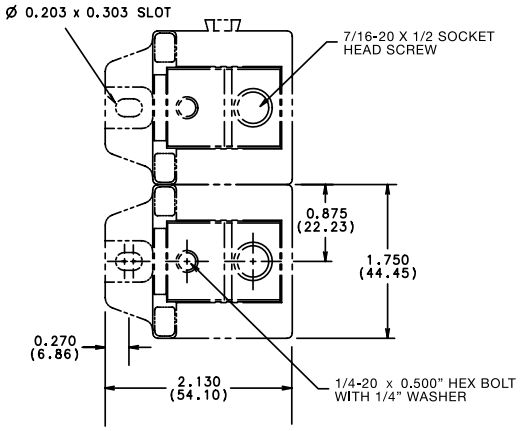
Recommended Fuses

Wide range of semiconductor fuses.....pg. 67-80

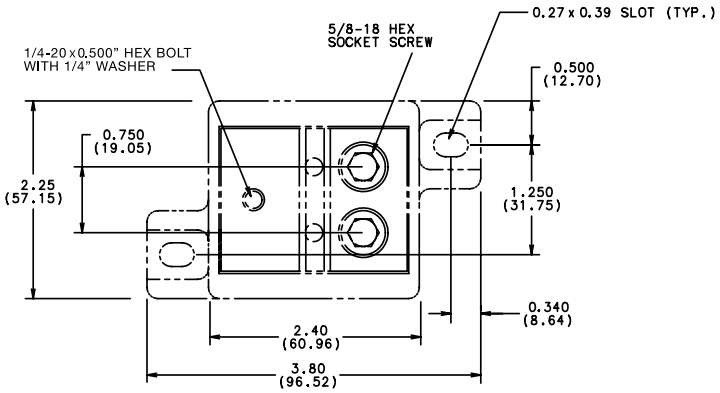
Dimensions in inches (mm)

Dimensions for reference only.

1LFS101



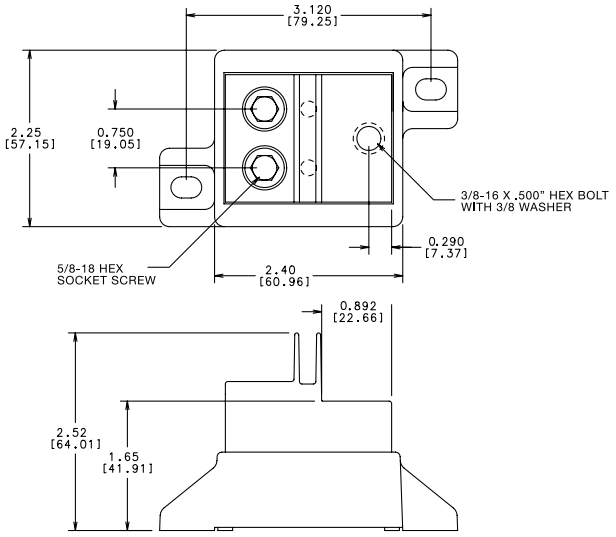
1LFS102



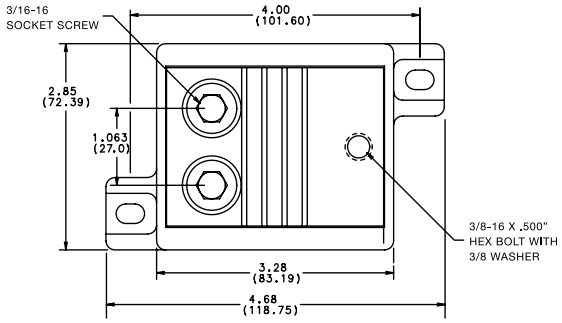
SEMICONDUCTOR FUSEBLOCKS

Dimensions in inches (mm)

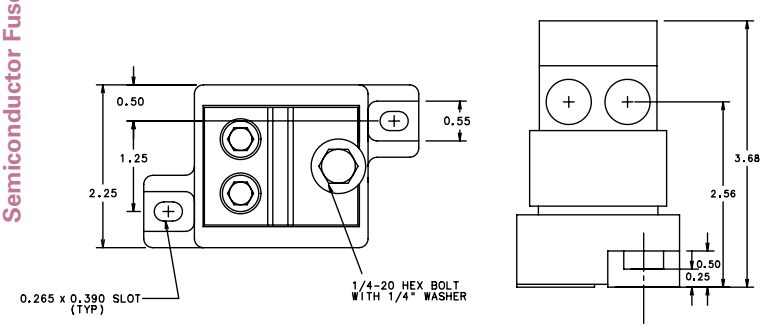
1LS103



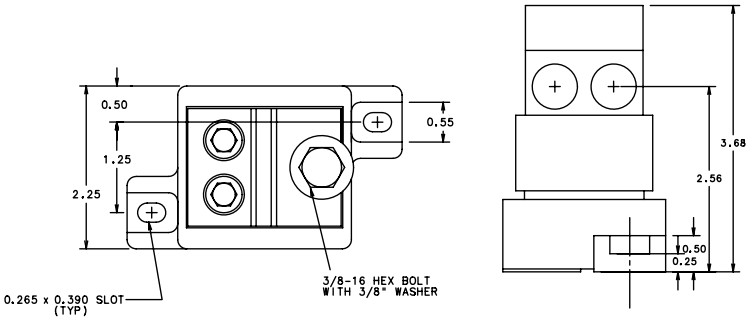
1LS104



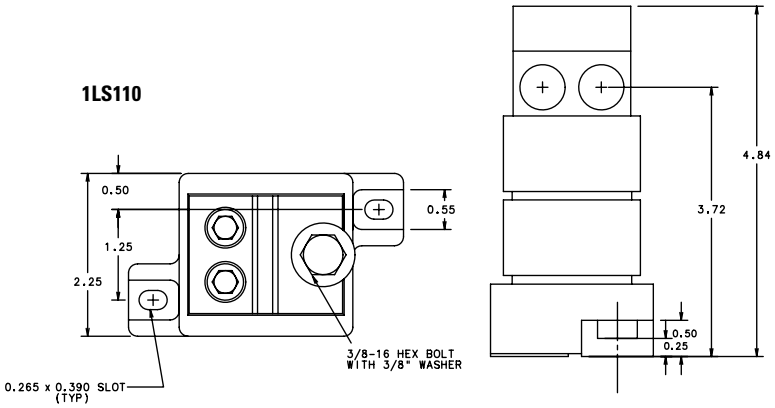
1LS108



1LS109



1LS110



Dimensions available at **www.littelfuse.com/1lfs**

POWR-BLOKS™

Distribution/Splicer Blocks and Covers

Description

POWR-BLOKS™ 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.

Hinged Plastic Covers

CATALOG/SYSTEM NUMBER		FOR USE WITH DISTRIBUTION/SPLICER BLOCK NO.	POLES
LCH132-1	0LCH1321Z	LD2xxx-1DIN / LS2xxx-1DIN	1
LCH132-2	0LCH1322Z	LD2xxx-2DIN / LS2xxx-2DIN	2
LCH132-3	0LCH1323Z	LD2xxx-3DIN / LS2xxx-3DIN	3

Note: Optional hinged covers snap on to blocks.

Clear Plastic Covers

CATALOG/SYSTEM NUMBER		FOR USE WITH DISTRIBUTION/SPLICER BLOCK NO.	POLES
LPBC0-2	LPBC02	LD0xxx-2 / LS0xxx-2	2
LPBC0-3	LPBC03	LD0xxx-3 / LS0xxx-3	3
LPBC2-1	LPBC21	LD2xxx-1 / LS2xxx-1	1
LPBC2-2	LPBC22	LD2xxx-2 / LS2xxx-2	2
LPBC2-3	LPBC23	LD2xxx-3 / LS2xxx-3	3
LPBC3-1	LPBC31	LD3xxx-1 / LS3xxx-1	1
LPBC3-2	LPBC32	LD3xxx-2 / LS3xxx-2	2
LPBC3-3	LPBC33	LD3xxx-3 / LS3xxx-3	3
LPBC4-1	LPBC41	LD4xxx-1 / LS4xxx-1	1
LPBC4-2	LPBC42	LD4xxx-2 / LS4xxx-2	2
LPBC4-3	LPBC43	LD4xxx-3 / LS4xxx-3	3
LPBC5-1	LPBC51	LD5xxx-1 / LS5xxx-1	1
LPBC5-2	LPBC52	LD5xxx-2 / LS5xxx-2	2
LPBC5-3	LPBC53	LD5xxx-3 / LS5xxx-3	3

Note: For installation of optional clear plastic covers, use the screws provided with each 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

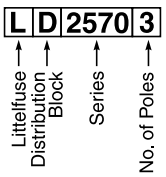
The ampere rating per pole for power distribution blocks is based on the line ampacity of 75°C insulated conductors per NEC® Table 310.16. If 60°C insulated conductors are used, load must not exceed the ampacity of 60°C conductors. Use of conductors rated in excess of 75°C is permitted (for example 90°C), however, load must not exceed the ampacity of 75°C conductors.

Specifications

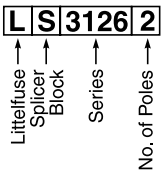
Voltage Rating: 600 V
Current Rating: Based on NEC Table 310.16, using 75°C copper wire
Material: Phenolic rated at 150°C and Thermoplastic rated at 125°C (LD1400 and LS1300 series only)
Connector: Standard: Highly conductive aluminum, tin plated
Copper: Highly conductive copper, tin plated
Flammability Rating: UL94 V-0
Approvals: UL Recognized (File No. E171395)
CSA Certified (File No. LR700111)

Ordering Information

Distribution Block Example Part No.



Splicer Block Example Part No.



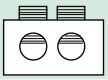
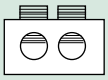
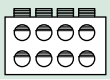
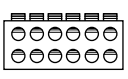
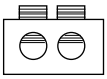
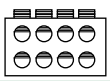
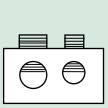
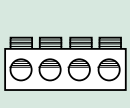
Note: Aluminum blocks can use copper or aluminum wire; copper blocks can only use copper wire.

Web Resources

For more information, visit: **www.littelfuse.com/powr-bloks**

DISTRIBUTION/SPLICER BLOCKS AND COVERS

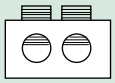
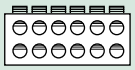
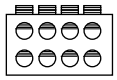
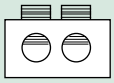
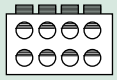
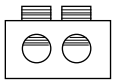
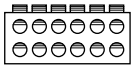
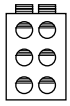
Distribution Block Selection Guide

CONNECTOR CONFIGURATION			AMP RATING PER POLE	POLES	LINE		LOAD		OUTLINE DRAWING FIGURE	CATALOG/SYSTEM NUMBER	
MATERIAL	LINE	LOAD			WIRE RANGE	OPENINGS PER POLE	WIRE RANGE	OPENINGS PER POLE			
AL			115	1	#2 - #14	1	#10 - #18	4	2	LD1400-1	0LD14001Z
			115	2	#2 - #14	1	#10 - #18	4	2	LD1400-2	0LD14002Z
			115	3	#2 - #14	1	#10 - #18	4	2	LD1400-3	0LD14003Z
			115	4	#2 - #14	1	#10 - #18	4	2	LD1400-4	0LD14004Z
AL			175	2	2/0 - #14	1	#4 - #14	6	1	LD0401-2	0LD04012Z
			175	3	2/0 - #14	1	#4 - #14	6	1	LD0401-3	0LD04013Z
AL			175	2	2/0 - #14	1	#4 - #14	4	1	LD0402-2	0LD04022Z
			175	3	2/0 - #14	1	#4 - #14	4	1	LD0402-3	0LD04023Z
AL			310	2	350mcm - #6	1	#4 - #14	6	1	LD0404-2	0LD04042Z
			310	3	350mcm - #6	1	#4 - #14	6	1	LD0404-3	0LD04043Z
AL			175	1	2/0 - #14	1	#4 - #14	4	3	LD2570-1	0LD25701Z
			175	2	2/0 - #14	1	#4 - #14	4	3	LD2570-2	0LD25702Z
			175	3	2/0 - #14	1	#4 - #14	4	3	LD2570-3	0LD25703Z
CU			175	1	2/0 - #14	1	#4 - #14	4	3	LD2970-1	0LD29701Z
			175	2	2/0 - #14	1	#4 - #14	4	3	LD2970-2	0LD29702Z
			175	3	2/0 - #14	1	#4 - #14	4	3	LD2970-3	0LD29703Z
AL			335	1	400mcm - #6	1	#2 - #14	4	5	LD3552-1	0LD35521Z
			335	2	400mcm - #6	1	#2 - #14	4	5	LD3552-2	0LD35522Z
			335	3	400mcm - #6	1	#2 - #14	4	5	LD3552-3	0LD35523Z
AL			335	1	400mcm - #6	1	#2 - #14	6	5	LD3553-1	0LD35531Z
			335	2	400mcm - #6	1	#2 - #14	6	5	LD3553-2	0LD35532Z
			335	3	400mcm - #6	1	#2 - #14	6	5	LD3553-3	0LD35533Z
AL			350	1	2/0 - #14	2	#4 - #14	6	5	LD3555-1	0LD35551Z
			350	2	2/0 - #14	2	#4 - #14	6	5	LD3555-2	0LD35552Z
			350	3	2/0 - #14	2	#4 - #14	6	5	LD3555-3	0LD35553Z
CU			380	1	500mcm - #4	1	#2 - #14	6	5	LD3953-1	0LD39531Z
			380	2	500mcm - #4	1	#2 - #14	6	5	LD3953-2	0LD39532Z
			380	3	500mcm - #4	1	#2 - #14	6	5	LD3953-3	0LD39533Z
CU			350	1	2/0 - #14	2	#4 - #14	6	5	LD3955-1	0LD39551Z
			350	2	2/0 - #14	2	#4 - #14	6	5	LD3955-2	0LD39552Z
			350	3	2/0 - #14	2	#4 - #14	6	5	LD3955-3	0LD39553Z
AL			380	1	500mcm - #4	1	#2 - #14	6	6	LD4551-1	0LD45511Z
			380	2	500mcm - #4	1	#2 - #14	6	6	LD4551-2	0LD45512Z
			380	3	500mcm - #4	1	#2 - #14	6	6	LD4551-3	0LD45513Z
AL			335	1	400mcm - #6	1	#2 - #14	8	6	LD4560-1	0LD45601Z
			335	2	400mcm - #6	1	#2 - #14	8	6	LD4560-2	0LD45602Z
			335	3	400mcm - #6	1	#2 - #14	8	6	LD4560-3	0LD45603Z
AL			380	1	500mcm - #4	1	#2 - #14	12	7	LD5552-1	0LD55521Z
			380	2	500mcm - #4	1	#2 - #14	12	7	LD5552-2	0LD55522Z
			380	3	500mcm - #4	1	#2 - #14	12	7	LD5552-3	0LD55523Z
AL			380	1	500mcm - #4	1	2/0 - #14	6	7	LD5579-1	0LD55791Z
			380	2	500mcm - #4	1	2/0 - #14	6	7	LD5579-2	0LD55792Z
			380	3	500mcm - #4	1	2/0 - #14	6	7	LD5579-3	0LD55793Z
AL			760	1	500mcm - #4	2	2/0 - #14	8	7	LD5586-1	0LD55861Z
			760	2	500mcm - #4	2	2/0 - #14	8	7	LD5586-2	0LD55862Z
			760	3	500mcm - #4	2	2/0 - #14	8	7	LD5586-3	0LD55863Z
AL			665	1	500mcm - #4 350mcm - #6	1 1	2/0 - #14	4	7	LD5587-1	0LD55871Z
			665	2	500mcm - #4 350mcm - #6	1 1	2/0 - #14	4	7	LD5587-2	0LD55872Z
			665	3	500mcm - #4 350mcm - #6	1 1	2/0 - #14	4	7	LD5587-3	0LD55873Z

AL=Aluminum, CU=Copper

DISTRIBUTION/SPLICER BLOCKS AND COVERS

Distribution Block Selection Guide

CONNECTOR CONFIGURATION			AMP RATING PER POLE	POLES	LINE		LOAD		OUTLINE DRAWING FIGURE	CATALOG/SYSTEM NUMBER	
MATERIAL	LINE	LOAD			WIRE RANGE	OPENINGS PER POLE	WIRE RANGE	OPENINGS PER POLE			
AL			760	1	500mcm-#4	2	#4 - #14	12	7	LD5592-1	0LD55921Z
			760	2	500mcm-#4	2	#4 - #14	12	7	LD5592-2	0LD55922Z
			760	3	500mcm-#4	2	#4 - #14	12	7	LD5592-3	0LD55923Z
AL			380	1	500mcm-#4	1	#2 - #14	8	7	LD5594-1	0LD55941Z
			380	2	500mcm-#4	1	#2 - #14	8	7	LD5594-2	0LD55942Z
			380	3	500mcm-#4	1	#2 - #14	8	7	LD5594-3	0LD55943Z
CU			760	1	500mcm-#4	2	2/0 - #14	8	7	LD5986-1	0LD59861Z
			760	2	500mcm-#4	2	2/0 - #14	8	7	LD5986-2	0LD59862Z
			760	3	500mcm-#4	2	2/0 - #14	8	7	LD5986-3	0LD59863Z
CU			760	1	500mcm-#4	2	#2 - #14	12	7	LD5992-1	0LD59921Z
			760	2	500mcm-#4	2	#2 - #14	12	7	LD5992-2	0LD59922Z
			760	3	500mcm-#4	2	#2 - #14	12	7	LD5992-3	0LD59923Z
AL			175	1	2/0 - #14	1	#4 - #14	4	4	LD2570-1DIN	0LD25701ZXDIN
			175	2	2/0 - #14	1	#4 - #14	4	4	LD2570-2DIN	0LD25702ZXDIN
			175	3	2/0 - #14	1	#4 - #14	4	4	LD2570-3DIN	0LD25703ZXDIN
			175	Adder	2/0 - #14	1	#4 - #14	4	4	LD2570-ADIN	0LD2570AZXDIN
AL			175	1	2/0 - #14	1	#4 - #14	6	4	LD2580-1DIN	0LD25801ZXDIN
			175	2	2/0 - #14	1	#4 - #14	6	4	LD2580-2DIN	0LD25802ZXDIN
			175	3	2/0 - #14	1	#4 - #14	6	4	LD2580-3DIN	0LD25803ZXDIN
			175	Adder	2/0 - #14	1	#4 - #14	6	4	LD2580-ADIN	0LD2580AZXDIN
CU			175	1	2/0 - #14	1	#4 - #14	4	4	LD2970-1DIN	0LD29701ZXDIN
			175	2	2/0 - #14	1	#4 - #14	4	4	LD2970-2DIN	0LD29702ZXDIN
			175	3	2/0 - #14	1	#4 - #14	4	4	LD2970-3DIN	0LD29703ZXDIN
			175	Adder	2/0 - #14	1	#4 - #14	4	4	LD2970-ADIN	0LD2970AZXDIN

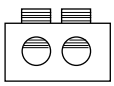
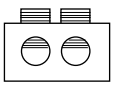
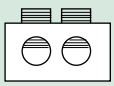
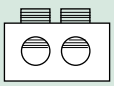
AL=Aluminum, CU=Copper

Hinged Plastic Covers

Clear Plastic Covers

DISTRIBUTION/SPLICER BLOCKS AND COVERS

Splicer Block Selection Guide

CONNECTOR CONFIGURATION			AMP RATING PER POLE	POLES	LINE		LOAD		OUTLINE DRAWING FIGURE	CATALOG/SYSTEM NUMBER	
MATERIAL	LINE	LOAD			WIRE RANGE	OPENINGS PER POLE	WIRE RANGE	OPENINGS PER POLE			
AL			310	2	350mcm-#6	1	350mcm-#6	1	1	LS0303-2	0LS03032Z
			310	3	350mcm-#6	1	350mcm-#6	1	1	LS0303-3	0LS03033Z
AL			115	1	#2 - #14	1	#2 - #14	1	2	LS1300-1	0LS13001Z
			115	2	#2 - #14	1	#2 - #14	1	2	LS1300-2	0LS13002Z
			115	3	#2 - #14	1	#2 - #14	1	2	LS1300-3	0LS13003Z
			115	4	#2 - #14	1	#2 - #14	1	2	LS1300-4	0LS13004Z
CU			150	1	1/0 - #18	1	1/0 - #18	1	3	LS2121-1	0LS21211Z
			150	2	1/0 - #18	1	1/0 - #18	1	3	LS2121-2	0LS21212Z
			150	3	1/0 - #18	1	1/0 - #18	1	3	LS2121-3	0LS21213Z
AL			115	1	#2 - #14	1	#2 - #14	1	3	LS2552-1	0LS25521Z
			115	2	#2 - #14	1	#2 - #14	1	3	LS2552-2	0LS25522Z
			115	3	#2 - #14	1	#2 - #14	1	3	LS2552-3	0LS25523Z
AL			175	1	2/0 - #14	1	2/0 - #14	1	3	LS2572-1	0LS25721Z
			175	2	2/0 - #14	1	2/0 - #14	1	3	LS2572-2	0LS25722Z
			175	3	2/0 - #14	1	2/0 - #14	1	3	LS2572-3	0LS25723Z
AL			255	1	250mcm-#6	1	250mcm-#6	1	5	LS3123-1	0LS31231Z
			255	2	250mcm-#6	1	250mcm-#6	1	5	LS3123-2	0LS31232Z
			255	3	250mcm-#6	1	250mcm-#6	1	5	LS3123-3	0LS31233Z
CU			255	1	250mcm-#6	1	250mcm-#6	1	5	LS3124-1	0LS31241Z
			255	2	250mcm-#6	1	250mcm-#6	1	5	LS3124-2	0LS31242Z
			255	3	250mcm-#6	1	250mcm-#6	1	5	LS3124-3	0LS31243Z
AL			310	1	350mcm-#6	1	350mcm-#6	1	5	LS3126-1	0LS31261Z
			310	2	350mcm-#6	1	350mcm-#6	1	5	LS3126-2	0LS31262Z
			310	3	350mcm-#6	1	350mcm-#6	1	5	LS3126-3	0LS31263Z
AL			420	1	600mcm-#4	1	600mcm-#4	1	6	LS4557-1	0LS45571Z
			420	2	600mcm-#4	1	600mcm-#4	1	6	LS4557-2	0LS45572Z
			420	3	600mcm-#4	1	600mcm-#4	1	6	LS4557-3	0LS45573Z
AL			620	1	350mcm-#4	2	350mcm-#4	2	7	LS5129-1	0LS51291Z
			620	2	350mcm-#4	2	350mcm-#4	2	7	LS5129-2	0LS51292Z
			620	3	350mcm-#4	2	350mcm-#4	2	7	LS5129-3	0LS51293Z
AL			760	1	500mcm-#4	2	500mcm-#4	2	7	LS5301-1	0LS53011Z
			760	2	500mcm-#4	2	500mcm-#4	2	7	LS5301-2	0LS53012Z
			760	3	500mcm-#4	2	500mcm-#4	2	7	LS5301-3	0LS53013Z
AL			175	1	2/0 - #14	1	2/0 - #14	1	4	LS2572-1DIN	0LS25721ZXDIN
			175	2	2/0 - #14	1	2/0 - #14	1	4	LS2572-2DIN	0LS25722ZXDIN
			175	3	2/0 - #14	1	2/0 - #14	1	4	LS2572-3DIN	0LS25723ZXDIN
			175	Adder	2/0 - #14	1	2/0 - #14	1	4	LS2572-ADIN	0LS2972AZXDIN
CU			175	1	2/0 - #14	1	2/0 - #14	1	4	LS2972-1DIN	0LS29721ZXDIN
			175	2	2/0 - #14	1	2/0 - #14	1	4	LS2972-2DIN	0LS29722ZXDIN
			175	3	2/0 - #14	1	2/0 - #14	1	4	LS2972-3DIN	0LS29723ZXDIN
			175	Adder	2/0 - #14	1	2/0 - #14	1	4	LS2972-ADIN	0LS2972AZXDIN

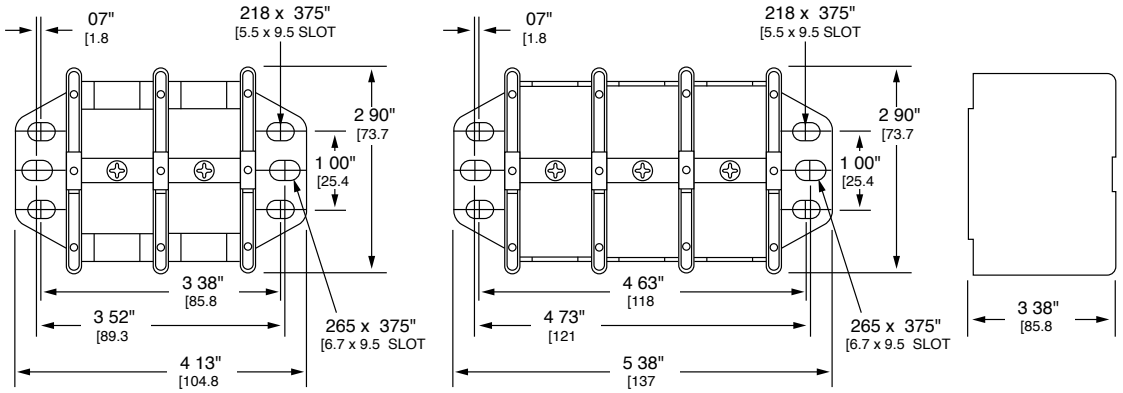
AL=Aluminum, CU=Copper

DISTRIBUTION/SPLICER BLOCKS AND COVERS DIMENSIONS

Outline Drawing Figures

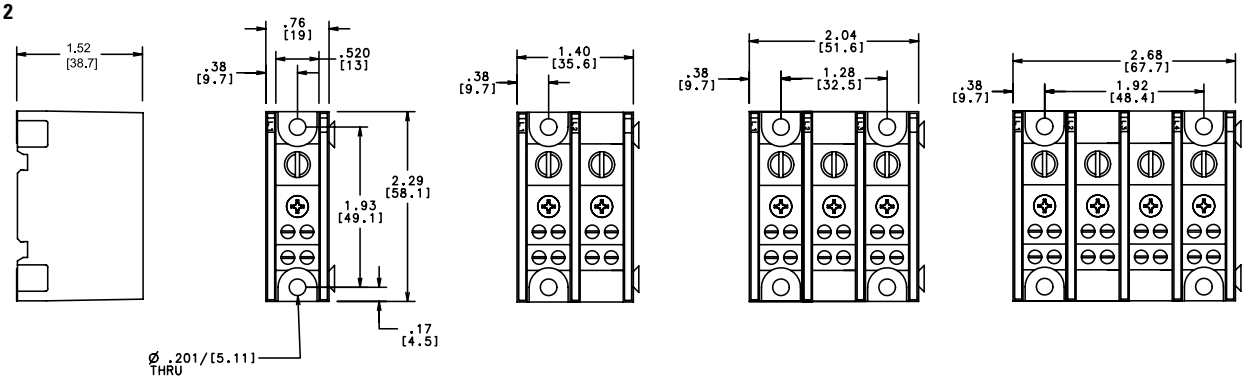
Dimensions in inches (mm)

LX0XXX
Figure 1



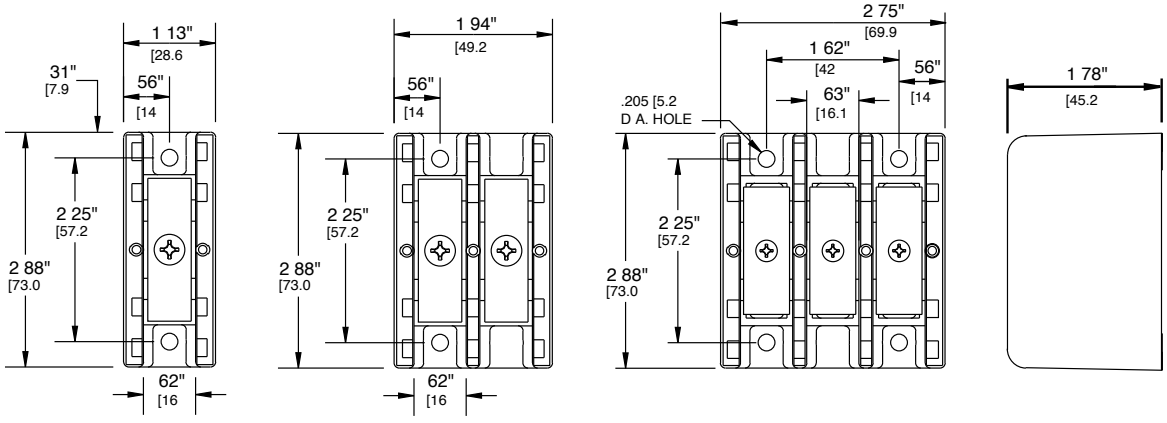
2-pole **3-pole**

LX1XXX
Figure 2



1-pole **2-pole** **3-pole** **4-pole**

LX2XXX
Figure 3



1-pole **2-pole** **3-pole**

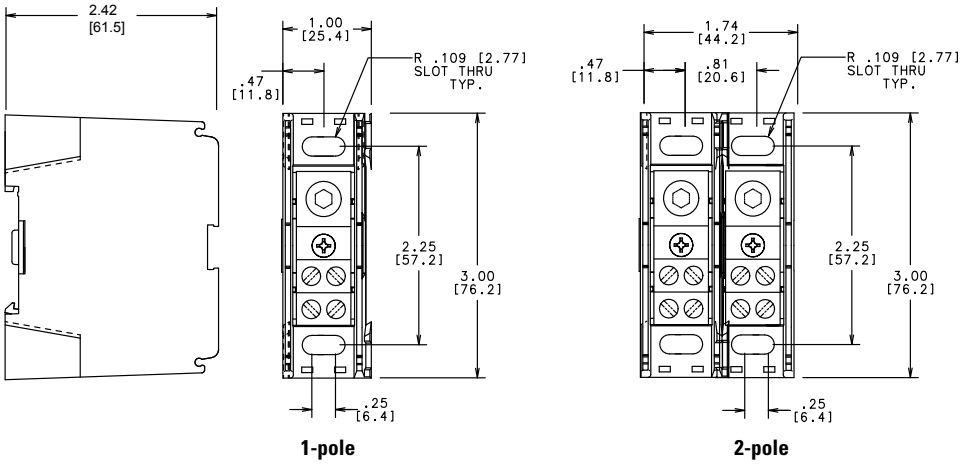
Dimensions available at **www.littelfuse.com/powr-bloks**

DISTRIBUTION/SPLICER BLOCKS AND COVERS DIMENSIONS

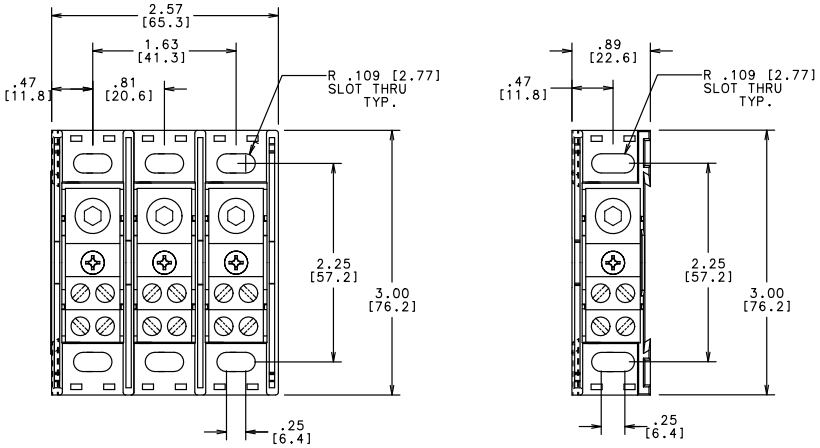
Outline Drawing Figures

Dimensions in inches (mm)

LX2XXX-XDIN
Figure 4

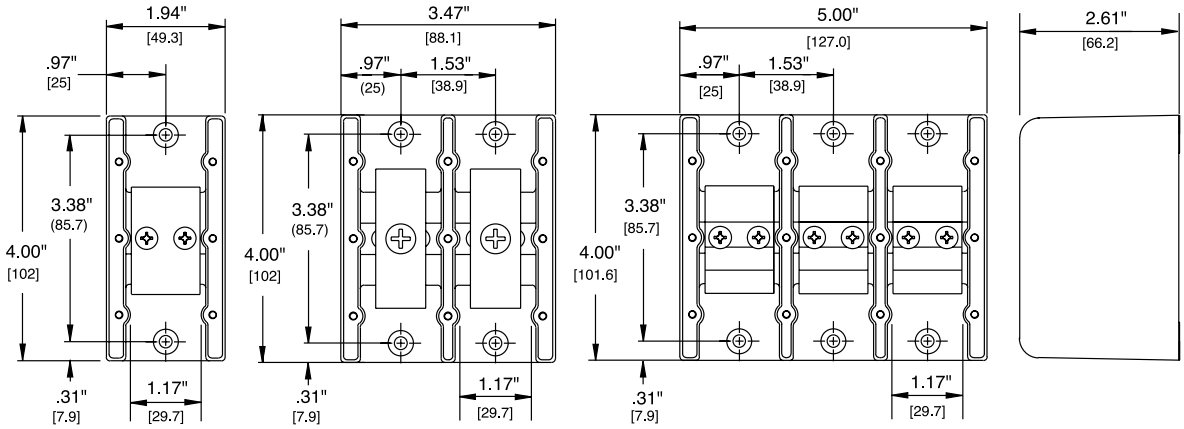


1-pole 2-pole



3-pole Adder

LX3XXX
Figure 5



1-pole 2-pole 3-pole

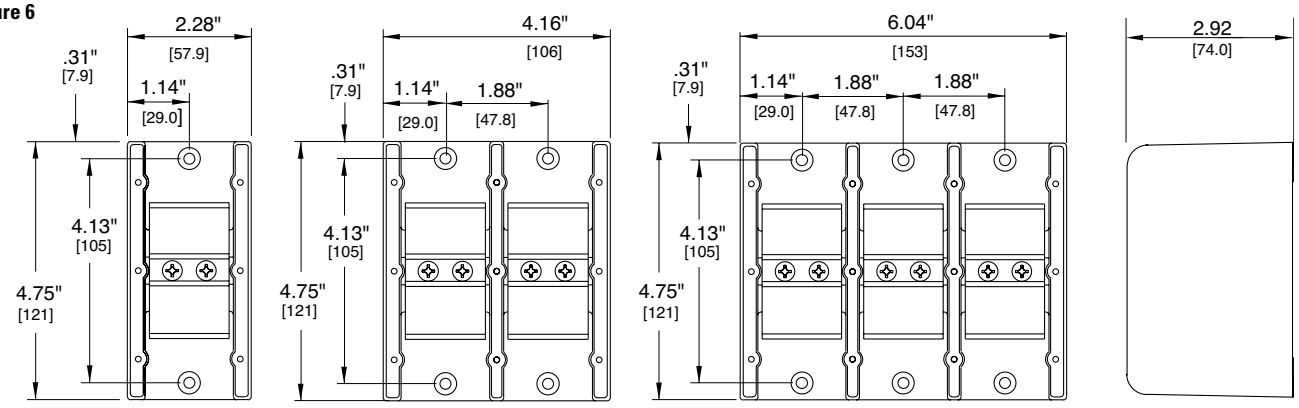
Dimensions available at **www.littelfuse.com/powr-bloks**

DISTRIBUTION/SPLICER BLOCKS AND COVERS DIMENSIONS

Outline Drawing Figures

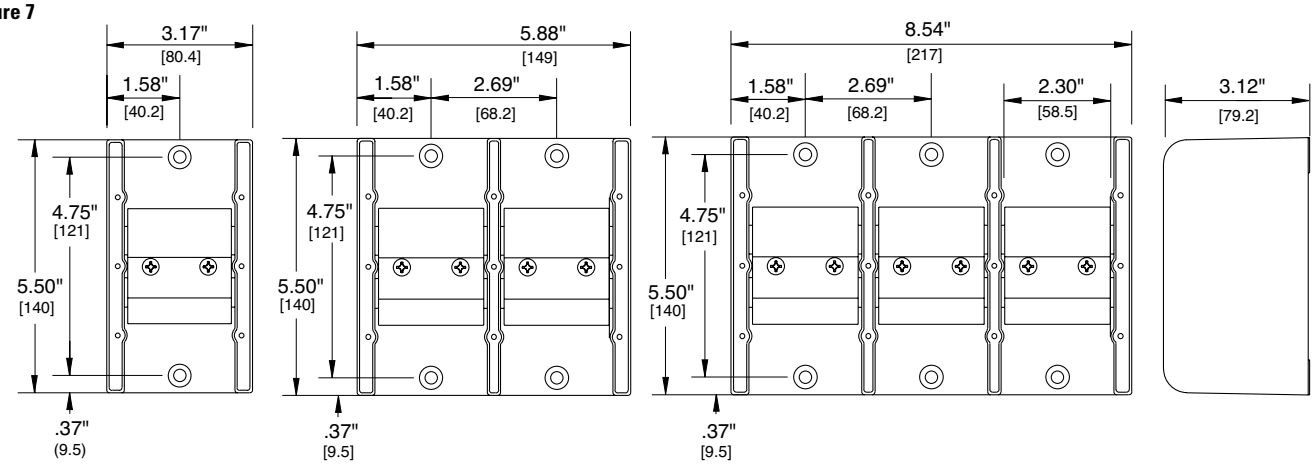
Dimensions in inches (mm)

LX4XXX
Figure 6



1-pole **2-pole** **3-pole**

LX5XXX
Figure 7



1-pole **2-pole** **3-pole**

Dimensions available at **www.littelfuse.com/powr-bloks**

IN-LINE GLASS FUSEHOLDERS

150322

Description

The 150322 is a 500 VAC/125 VDC rated inline fuseholder 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.

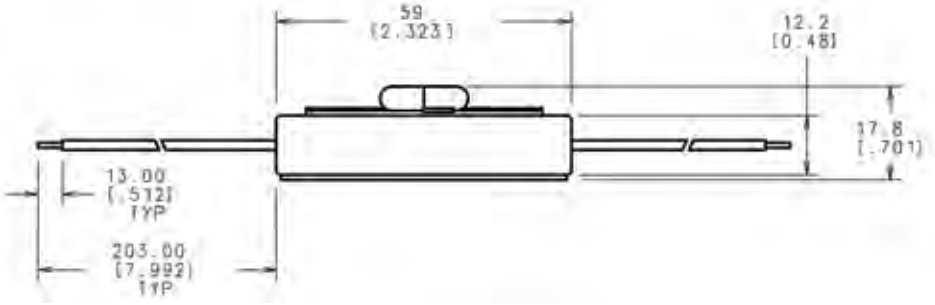
Features/Benefits

- 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).....pg. 42
3AB (314, 326, 505 Series).....pg. 42

Dimensions in mm (inches)



Specifications

Voltage Rating:	500 VAC, 125 VDC
Ampere Rating:	15 A
Fuse Type:	¼" x 1¼"
Fuse Clips:	Tin-plated brass
Wire:	Black 18 AWG, 150° C Stranded
Molded Body:	Single piece thermoplastic
Flammability Rating:	UL94 V-0
Approvals:	UL Recognized (File No. E14721)
Environmental:	RoHS complaint and Pb free
Storage Temperature:	-40° C to 80° C
Operating Temperature:	-55° C to 125° C

Ordering Information

CATALOG NUMBER	SYSTEM NUMBER	STANDARD PACK
150322	01500322H	100 PIECES

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/150322**

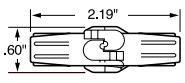
Additional In-Line Glass Fuseholders

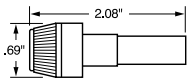
Twist-Lock
155 Series
In-Line Mount
Low Voltage 3AG, SFE

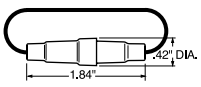
Heavy-Duty Bayonet
155 Series
In-Line Mount
Low Voltage 3AG

Special Type
150 Series
In-Line Mount
2AG, 5x20mm

Dimensions in (inches)





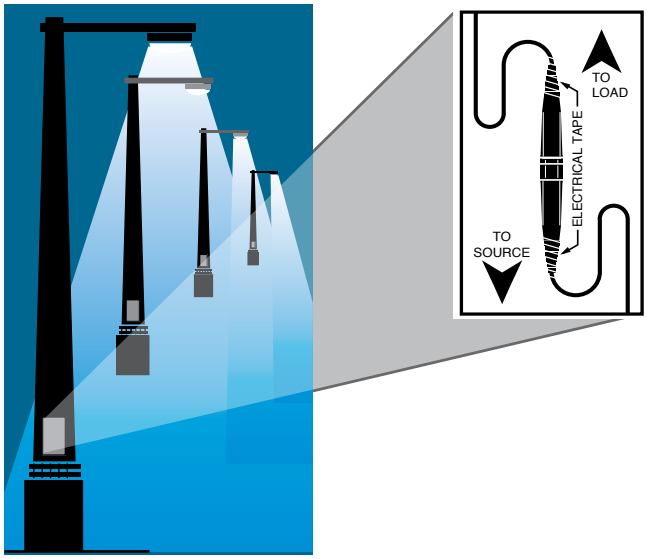


Web Resources

For more information, visit: **www.littelfuse.com/150**
www.littelfuse.com/155

IN-LINE WATERTIGHT FUSEHOLDERS

LEB/LEX LEC/LEY



Description

Littelfuse 600 V in-line watertight fuseholders allow maximum flexibility for high humidity/corrosive environments where fuses are required. A variety of options offer flexibility for several applications.

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 V
Ampere rating: 30 A
Interrupting rating: 200 kA rms symmetrical (with Class CC fuses)
Approvals: **LEB/LEX series:** UL Recognized Miscellaneous Fuseholder per UL 512 (File No. E14721)
CSA Certified per C22.2, No. 39 (File No. LR7316)
LEC/LEY series: UL Listed Class CC Branch Circuit Fuseholder per UL 512 (File No. E14721)
CSA Certified per C22.2, No. 39 (File No. LR7316)

Features/Benefits

- Design increases safety by individual device disconnection for easy servicing, eliminating shock risk
- Individual fixture fusing simplifies maintenance by allowing individual faulted fixture to be assessed and serviced without affecting the rest of the circuit
- Increases efficiency by preventing faulted ballast from severely damaging fixture or device
- Watertight seal
- Fiberglass reinforced polymer body resists damage from impact (better than phenolic look-a-likes)
- Variety of terminations available for flexible design
- Ultrasonically-welded terminals provide maximum strength and eliminate leakage
- Variety of fuseholders available with breakaway feature for applications where light poles may be accidentally knocked-down

Recommended Fuses:

LEB/LEX series:
Accepts all 1-½" x 13/32" Littelfuse Midget and Class CC fuses:
CCMR ..... pg. 33
KLDR, KLKR ..... pg. 34
BLF, BLN, FLM, FLQ, KLK, KLKD ..... pg. 38

LEC/LEY series:
Accepts only Littelfuse Class CC fuses:
CCMR ..... pg. 33
KLDR, KLKR ..... pg. 34

Web Resources

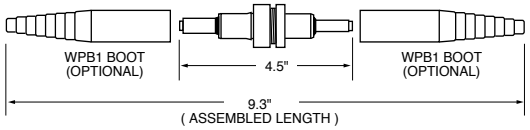
Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/leb**
www.littelfuse.com/lec
www.littelfuse.com/lex
www.littelfuse.com/ley
www.littelfuse.com/let

FUSEHOLDER TYPE	DESCRIPTION
LEB	One-pole in-line fuseholder for Midget and Class CC fuses
LEC	One-pole in-line fuseholder for Class CC fuses
LET	One-pole in-line solid neutral disconnect
LEX	Two-pole in-line fuseholder for Midget and Class CC fuses
LEY	Two-pole in-line fuseholder for Class CC fuses

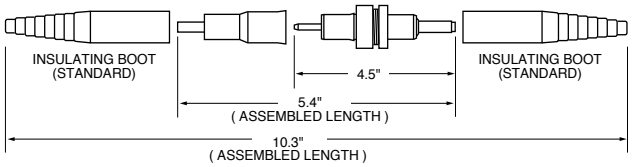
IN-LINE WATERTIGHT FUSEHOLDERS

Dimensions in inches

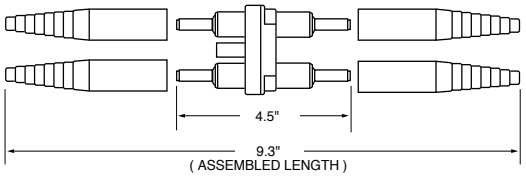
1-Pole



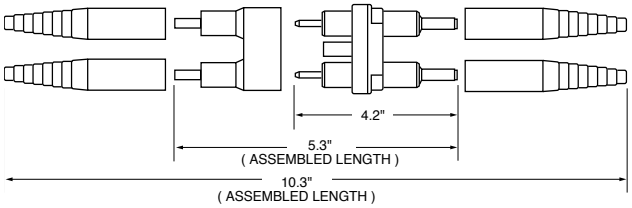
1-Pole Breakaway



2-Pole

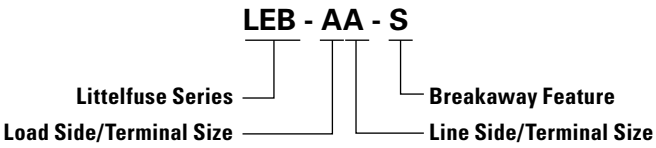


2-Pole Breakaway



Ordering Information

To order Littelfuse in-line fuseholders and disconnects by part number, refer to the charts on the next page.



Recommended Crimping Tools

The following crimping tools or equivalents may be used on either the non-breakaway or breakaway watertight in-line fuseholders.

TERMINAL SIZE	T&B PART NUMBER	BURNDY PART NUMBER
A	WT161M	–
B	WT161M	MR4C
C	M5-GREY	Hypress Y34A
D	M5-BROWN	Hypress Y34A

Insulating Boots

- Molded from engineering-grade thermoplastics, WPB1 and WPB3 boots provide high resistance to corrosive environments
- WPB1 contains one standard boot for A, B, C, D or J terminations
- WPB3 offers one Y-pole boot for use with Y-pole termination
- For watertight protection of non-breakaway Y-pole termination, order one WPB1 and one WPB3 boot

IN-LINE WATERTIGHT FUSEHOLDERS

Ordering Information (1-Pole LEB/LEC and 2-Pole LEX/LEY)

SINGLE POLE		DOUBLE POLE		FUSE TYPE	LOAD TERMINAL SELECTION					LINE TERMINAL SELECTION				
STANDARD PART NUMBER	BREAKAWAY PART NUMBER	STANDARD PART NUMBER	BREAKAWAY PART NUMBER		TERMINAL TYA PE	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
LEB-AA LEC-AA	LEB-AA-S LEC-AA-S	LEX-AA LEY-AA	LEX-AA-S LEY-AA-S	Midget Class CC	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	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	• •	• •	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •
LEB-AC LEC-AC	— —	LEX-AC LEY-AC	— —	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	• •	• •	Copper Crimp	#8 #4	2 1	• —	• •
LEB-AD LEC-AD	— —	LEX-AD LEY-AD	— —	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	• •	• •	Copper Crimp	#6 #2	2 1	• —	• •
LEB-AJ LEC-AJ	LEB-AJ-S LEC-AJ-S	— —	— —	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	• •	• •	Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •
LEB-AYC LEC-AYC	LEB-AYC-S LEC-AYC-S	LEX-AYC LEY-AYC	LEX-AYC-S LEY-AYC-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	• •	• •	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •
LEB-BA LEC-BA	LEB-BA-S LEC-BA-S	LEX-BA LEY-BA	LEX-BA-S LEY-BA-S	Midget Class CC	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	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •
LEB-BC LEC-BC	— —	LEX-BC LEY-BC	— —	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •	Copper Crimp	#8 #4	2 1	• —	• •
LEB-BD LEC-BD	— —	LEX-BD LEY-BD	— —	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •	Copper Crimp	#6 #2	2 1	• —	• •
LEB-BJ LEC-BJ	LEB-BJ-S LEC-BJ-S	— —	— —	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •	Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •
LEB-BYC LEC-BYC	LEB-BYC-S LEC-BYC-S	LEX-BYC LEY-BYC	LEX-BYC-S LEY-BYC-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •
LEB-CA LEC-CA	— —	LEX-CA LEY-CA	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	• —	• •	Copper Crimp	#12 to #8 #12	1 2	• •	• •
LEB-CB LEC-CB	— —	LEX-CB LEY-CB	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	• —	• •	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •
LEB-CC LEC-CC	— —	LEX-CC LEY-CC	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	• —	• •	Copper Crimp	#8 #4	2 1	• —	• •
LEB-CD LEC-CD	— —	LEX-CD LEY-CD	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	• —	• •	Copper Crimp	#6 #2	2 1	• —	• •
LEB-CJ LEC-CJ	— —	LEX-CJ LEY-CJ	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	• —	• •	Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	• •
LEB-CYC LEC-CYC	— —	LEX-CYC LEY-CYC	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	• —	• •	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •
LEB-DA LEC-DA	— —	LEX-DA LEY-DA	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	• —	• •	Copper Crimp	#12 to #8 #12	1 2	• •	— •
LEB-DB LEC-DB	— —	LEX-DB LEY-DB	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	• —	• •	Copper Crimp	#10 #6 #4	2 1 1	• • —	• • •
LEB-DC LEC-DC	— —	LEX-DC LEY-DC	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	• —	• •	Copper Crimp	#8 #4	2 1	• —	• •
LEB-DD LEC-DD	— —	LEX-DD LEY-DD	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	• —	• •	Copper Crimp	#6 #2	2 1	• —	• •
LEB-DJ LEC-DJ	— —	LEX-DJ LEY-DJ	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	• —	• •	Copper Set-Screw	#12 to #8 #10 to #2	2 1	• —	• •
LEB-DYC LEC-DYC	— —	LEX-DYC LEY-DYC	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	• —	• •	"Y" Type Copper Set-Screw	#12 to #8 #10 to #8	1 1	• —	— •
LEB-JJ LEC-JJ	LEB-JJ-S LEC-JJ-S	LEX-JJ LEY-JJ	LEX-JJ-S LEY-JJ-S	Midget Class CC	Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •	Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •
LEB-JYC LEC-JYC	LEB-JYC-S LEC-JYC-S	— —	— —	Midget Class CC	Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	• —	— •

IN-LINE WATERTIGHT FUSEHOLDERS

Ordering Information (Solid Neutral LET Fuseholders)

STANDARD PART NUMBER	BREAKAWAY PART NUMBER	FUSE TYPE	LOAD TERMINAL SELECTION					LINE TERMINAL SELECTION				
			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	1	•	•	Copper Crimp	#12 to #8	1	•	•
				#12	2	•	•		#12	2	•	•
LET-AB	LET-AB-S	Solid Neutral	Copper Crimp	#12 to #8	1	•	•	Copper Crimp	#10	2	•	•
				#12	2	•	•		#6	1	•	•
									#4	1	—	•
LET-AYC	LET-AYC-S	Solid Neutral	Copper Crimp	#12 to #8	1	•	•	"Y" Type Copper Set-Screw	#12 to #8	1	•	—
				#12	2	•	•		#10 to #2	1	—	•
LET-BA	LET-BA-S	Solid Neutral	Copper Crimp	#10	2	•	•	Copper Crimp	#12 to #8	1	•	•
				#6	1	•	•		#12	2	•	•
				#4	1	—	•					
LET-BB	LET-BB-S	Solid Neutral	Copper Crimp	#10	2	•	•	Copper Crimp	#10	2	•	•
				#6	1	•	•		#6	1	•	•
				#4	1	—	•		#4	1	—	•
LET-BYC	LET-BYC-S	Solid Neutral	Copper Crimp	#10	2	•	•	"Y" Type Copper Set-Screw	#12 to #8	1	•	—
				#6	1	•	•		#10 to #2	1	—	•
				#4	1	—	•					
LET-JJ	LET-JJ-S	Solid Neutral	Copper Set-Screw	#12 to #8	1	•	—	Copper Set-Screw	#12 to #8	1	•	—
				#10 to #2	1	—	•		#10 to #2	1	—	•
LET-JYC	LET-JYC-S	Solid Neutral	Copper Set-Screw	#12 to #8	1	•	—	"Y" Type Copper Set-Screw	#12 to #8	1	•	—
				#10 to #2	1	—	•		#10 to #2	1	—	•

Ordering Information (Terminals)

TERMINAL DESIGNATION	TERMINAL DESCRIPTION	NUMBER OF WIRES PER TERMINAL	WIRE RANGE	SOLID WIRE	STRANDED WIRE
A	Copper Crimp	1	#12-#8	•	•
		2	#12	•	•
B	Copper Crimp	2	#10	•	•
		1	#6	•	•
		1	#4	—	•
C	Copper Crimp	2	#8	•	•
		1	#4	—	•
D	Copper Crimp	2	#6	•	•
		1	#2	—	•
J	Copper Set-Screw	1	#12-#8	•	—
		1	#10-#2	—	•
Y (2 terminals)	"Y" Style Copper Set-Screw	1	#12-#8	•	—
		1	#10-#2	—	•

IN-LINE WATERTIGHT FUSEHOLDERS

Two-Pole Breakaway Holder

Features/Benefits

- LEXT-YY version has a permanently installed "neutral" slug to prevent the neutral from accidentally being fused
- LEX-YY 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 Cu or Al 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)

Description

New Littelfuse LEXT-YY-S and LEX-YYC-S series breakaway fuseholders meet state and federal highway commission safety standards requiring fuseholders 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 fuseholder with matching terminals. If a knockdown occurs, the parts separate, leaving the energized conductor recessed and unexposed.

Applications

- Street lighting
- Marinas
- Travel trailer parks and other locations where fuseholders may be exposed to physical strain

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lext**
www.littelfuse.com/lex

Ordering Information

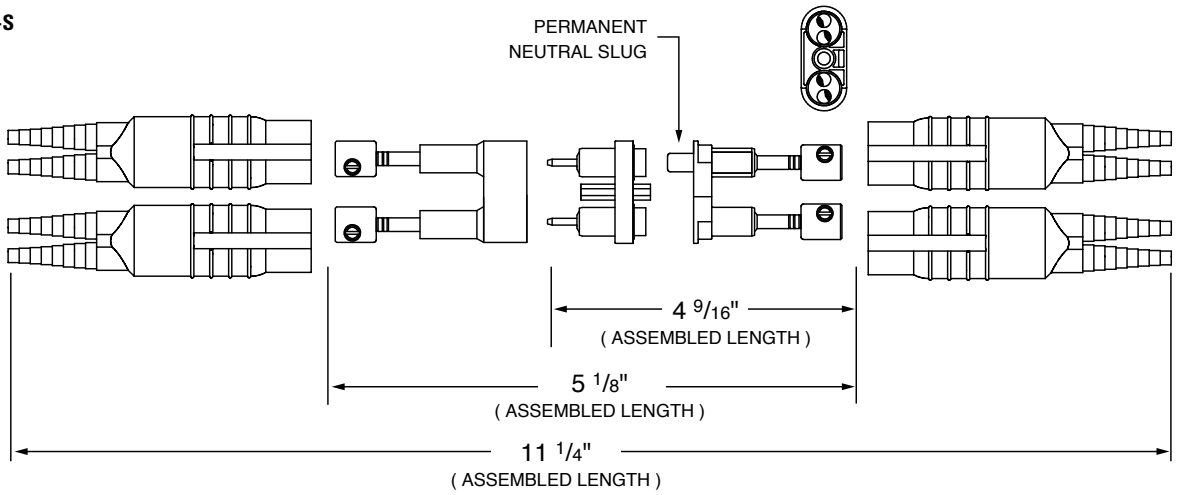
CATALOG/SYSTEM NUMBER		FUSE TYPE	LOAD TERMINAL SELECTION					LINE TERMINAL SELECTION				
			TERMINAL TYPE	LOAD TERMINAL WIRE SIZE RANGE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STANDARD WIRE	TERMINAL TYPE	LINE TERMINAL WIRE SIZE RANGE	NUMBER OF WIRES PER TERMINAL	SOLID WIRE	STANDARD WIRE
LEXTYYS	LEXT0YYSX	Midget Class CC	"Y" type Copper Set-Screw	#12 to #8	1	•	—	"Y" type Copper Set-Screw	#12 to #8	1	•	—
				#10 to #2	1	—	•		#10 to #2	1	—	•
LEXYYCS	0LEXYYCSX	Midget Class CC	"Y" type Copper Set-Screw	#12 to #8	1	•	—	"Y" type Copper Set-Screw	#12 to #8	1	•	—
				#10 to #2	1	—	•		#10 to #2	1	—	•

IN-LINE WATERTIGHT FUSEHOLDERS

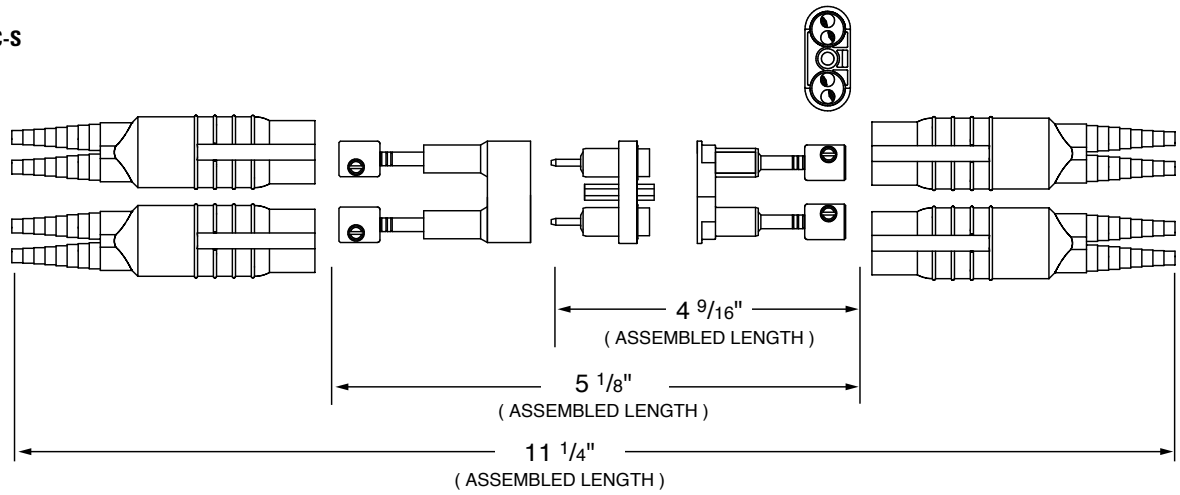
Two-Pole Breakaway Holder

Dimensions in inches

LEXT-YY-S



LEX-YY-C-S



Recommended Fuses

Midget Littelfuse types: BLF, BLN, FLM, FLQ, KLK, KLKD ..... pg. 38
Class CC Littelfuse types: CCMR, KLDR, KLKR..... pg. 33-35

Four WPB3 insulating boots come standard with the LEXT-YY-S and LEX-YY-C-S fuseholders. 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.

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 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 517.26)
- Elevators (NEC 620.62)
- Emergency Systems (NEC 700.27)
- Legally Required Standby Systems (NEC 701.18)
- Critical Operations Power Systems (NEC 708.54)

Features/Benefits

- Meets NEC® requirements
- Class CC and J fuseholders 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 (see pg. 144) to easily identify panel configurations from tens of thousands of options

Specifications

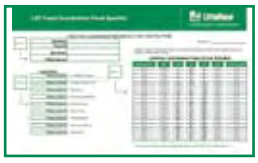
Voltage Ratings: 120/208, 120/240, 277/480 VAC
Main Bus Rating: 100 A - 400 A Standard
Conductor Terminals: 6 AWG - 300 kcmil
SCCR: 100 kA Max*
UL Listed: UL 67 Panel boards and UL 50 Enclosures

*The following current-limiting fuses must be used directly upstream for 100kA SCCR:
1. 120/208 Volt Panels – LLNRK 100 A max, JTD_ID 200 A max, or JLLN 200 A max
2. 120/240 Volt Panels – LLSRK_ID 200 A max, JTD_ID 200 A max, or JLLS 200 A max
3. 277/480 Volt Panels – LLSRK_ID 200 A max, JTD_ID 200 A max, or JLLS 200 A max

Web Resources

Fuse Curves, sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/lcp**

To quickly specify the LCP panel, visit **www.littelfuse.com/lcp** and download the Specifier Tool.



Customizable Options (select one from each column)

NUMBER OF CIRCUITS	VOLTAGE	MA N DEVICES	NEUTRAL RATING	PANEL MOUNTING	PANEL DOOR	FUSE-HOLDERS	BRANCH CIRCUIT PROTECTION DEVICES (1-3 POLE)†	PANEL FEED	OPTIONAL LUGS	STANDARD ENCLOSURE RATING
2 - 42	120/208 V 3P, 4 W 120/240 V 1P, 3 W 277/480 V 3P, 4 W	125, 225, 400 or 600 A MLO Up to 600 A MCB or Main Fuse Pullout	100% 200%	Surface Flush	Standard Door-in-door	30 A Class CC 60 A Class J	10 A - 60 A fused circuit breaker 60 A - 200 A fused pullouts Sub-fed circuit breakers >60 A (not fused)	Top Bottom	None Sub-Fed (MLO panels) Feed-Through	NEMA 1 NEMA 3R NEMA 4X

†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.

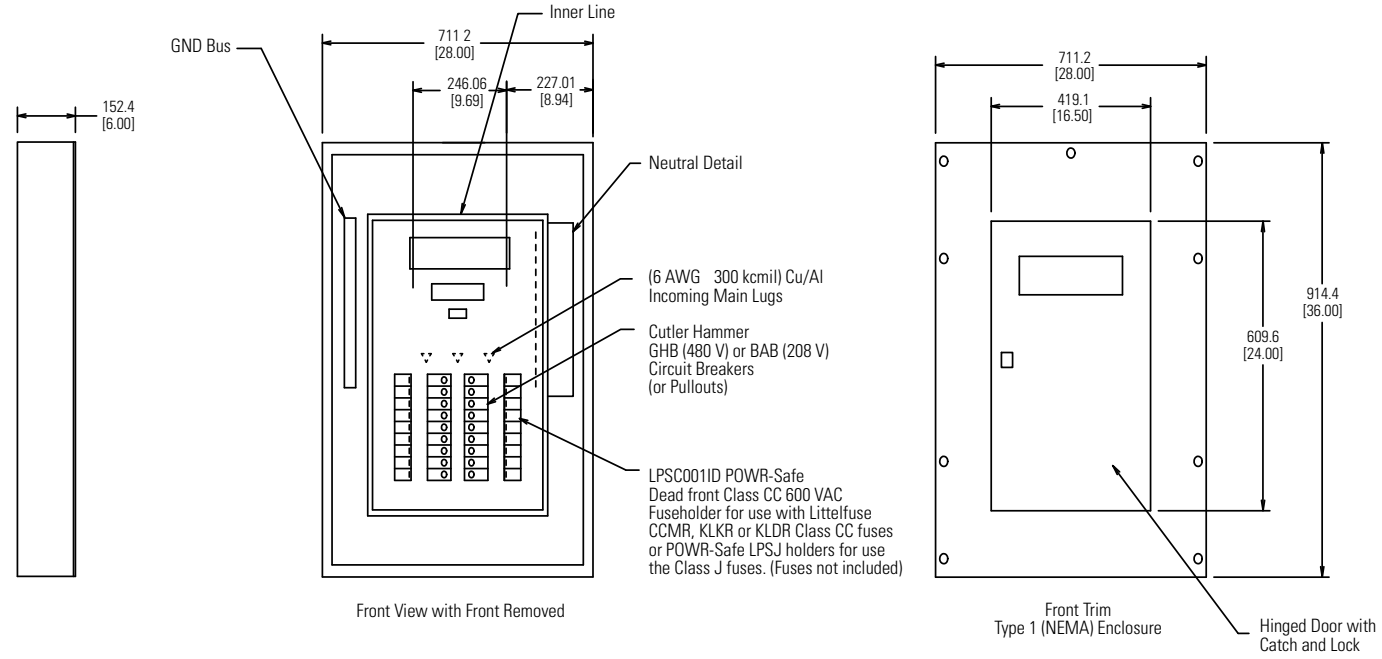
Note: The Littelfuse LPS, LPMP and LCP products are custom designed products that fall outside standard specifications.

LCP FUSED COORDINATION PANEL

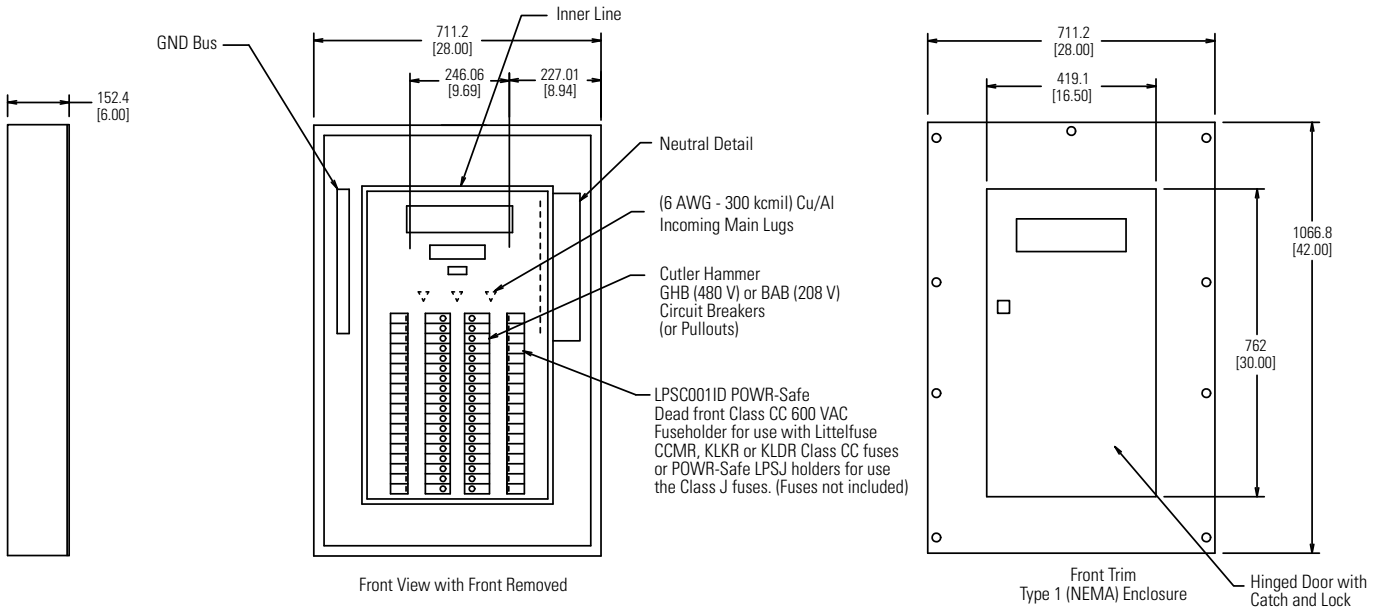
Selective Coordination Panel

Dimensions in mm (inches)

Standard Coordination Panel Board (up to 30 circuits)



Standard Coordination Panel Board (31-42 circuits)



To quickly specify the LCP panel, visit **www.littelfuse.com/lcp** and download the Specifier Tool

Note: The Littelfuse LPS, LPMP 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.

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

Specifications

Voltage Rating*:	208 V, 240 V, 480 V
Interrupting Rating:	200 kA
Shunt Trip:	120 V
Enclosures:	NEMA 1 (standard) NEMA 3R, NEMA 4, NEMA 12 (optional)
Approvals:	UL Listed CSA Certified

*Contact factory for 600 V and other options.

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%
- Optional features offer flexibility for a variety of applications
- Control power terminal block
- UL Listed package
- Lockable operating handle
- Cu and Al wire rated
- Pre-wired control circuits lower installation time
- Lockable operating handle meets all code and safety requirements
- 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)

Web Resources

Downloadable CAD drawings, Maintenance and Operation Manuals, and other technical information:
www.littelfuse.com/lps

Note: The Littelfuse LPS, LPMP and LCP products are custom designed products that fall outside standard specifications.

More specialized configurations are also available.
Contact factory for more information.

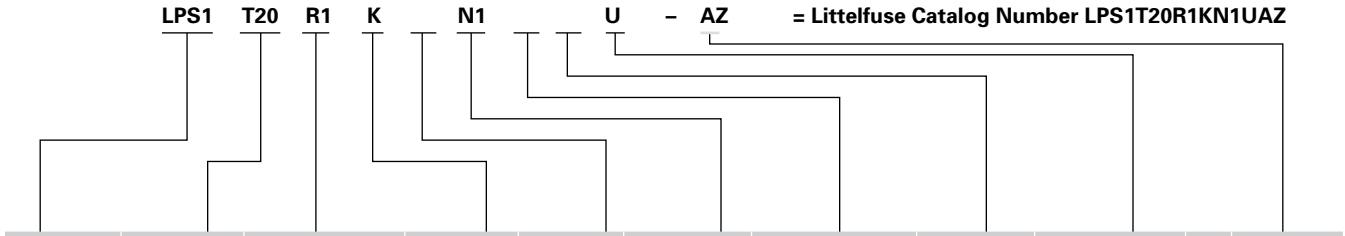
LPS SERIES POWR-SWITCH

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:



LITTELFUSE SWITCH CATALOG NUMBER		CONTROL POWER TRANSFORMER STD. 100VA WITH PRI & SEC FUSE (120 V SEC.)		FIRE SAFETY INTERFACE RELAY (3 PDT, 10 A, 120 V)		KEY TO TEST SWITCH		PILOT LIGHT "ON"		ISOLATED NEUTRAL LUG		MECHANICAL INTERLOCK AUX. CONTACT FOR HYDRAULIC ELEVATORS W/ AUTOMATIC RECALL (5 A ,120 VAC)		FIRE ALARM SHUNT TRIP VOLTAGE MONITORING RELAY		OPTIONAL ENCLOSURES		—	AZ OPTION (BYPASS FIRE ALARM DURING MAINT. TEST)
BASE CATALOG #	RATING	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION CODE	RATING	OPTION CODE		OPTION CODE
LPS3*	30 A	208 V	T20	24 VDC Coil	R2	120 V	K	Red	R	30–60 A	N6	1 NO & 1 NC	A	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	B	3-Pole	F3	NEMA 4	Y	–	AZ
LPS1*	100 A	480 V	T48					White	W	200 A	N2					NEMA 12	Z	–	AZ
LPS2*	200 A									400 A	N4							–	AZ
LPS4*	400 A																	–	AZ

*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 details.

Contact factory for 600 V and other options.

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	26"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	26"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	26"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	32"H x 20"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 12"D	Contact Factory	Contact Factory	3/0 AL or CU

Note: Over-size enclosures used to accommodate control power transformer, interface relay and terminal blocks.

Specifications (Shunt Trip)

Voltage Rating: 120 V, 60 Hz
Ampere Range: 30-400 A
Max Inrush: 4 A
Max On time: 1.5 cycles
Momentary Inrush: 140 VA

Note: The Littelfuse LPS, LPMP and LCP products are custom designed products that fall outside standard specifications.

More specialized configurations are also available. Contact factory for more information.

LPMP SERIES POWR-SWITCH PANEL

600 Volts • Shunt-Trip Disconnect Switch

UL LISTED

Description

Littelfuse LPMP series POWR-Switch Panel is designed specifically for applications that require shunt-trip capabilities.

The POWR-Switch Panel offers the flexibility to incorporate multiple switches into a single panel enclosure and meet all applicable code requirements, reducing wiring costs.

Applications

- Elevator circuits
- Building emergency systems
- Hotels / Entertainment Industry
- Dormitories / Apartment Complexes

Features/Benefits

- Cost effective solution when multiple elevator switches are needed
- UL Listed package
- NEMA 1 Enclosure
- Fusible Class J Switches (rated 30 A – 400 A)
- 200 kA RMS SCCR

Optional Features

- Control Power Transformers
- Fire Safety Interface Relay
- Key to Test Switch
- Pilot Light "On"
- Mechanical Interlock Auxiliary Contact (for hydraulic elevators with recall)
- Fire Alarm Voltage Monitor Relay
- NEMA 3R Enclosures

Ordering Information

SERIES	AMPERAGE	BASE PART NUMBER	CATALOG/ SYSTEM NUMBER
LPMP	400	LPMP 400	Custom
LPMP	600	LPMP 600	Custom
LPMP	800	LPMP 800	Custom

Note: Many configurations outside the standard design options can be designed. Contact factory for details

Specifications

Voltage Rating: 600 V
Short-Circuit Rating: 200 kA RMS
Ampere Ratings: 400, 600, 800 A
Approvals: UL Listed to UL 67 Panel boards and UL 891 Dead Front Switches

Web Resources

Downloadable CAD drawings, FAQs, and other technical information: **www.littelfuse.com/lpmp**

Note: The Littelfuse LPS, LPMP and LCP products are custom designed products that fall outside standard specifications.

More specialized configurations are also available.
Contact factory for more information.

LPMP SERIES POWR-SWITCH PANEL

600 Volts • Shunt-Trip Disconnect Switch

UL LISTED

Panel Spacing

	Main Lugs Only
8X	Accessory Bucket A
4X	30 A Switch | 30 A Switch
4X	60 A Switch | 60 A Switch
4X	100 A Switch | 100 A Switch
6X	200 A Switch | 200 A Switch
8X	Accessory Bucket A
12X	400 A Switch
	Thru-Feed Lugs

Note: Main Lug Only is standard.

Standard Panel Dimensions

DIMENSIONS (INCHES) H X W X D	AVAILABLE SPACE (X UNITS)	
	3 WIRE	4 WIRE
57 x 40 x 12	18 X	16 X
73.5 x 40 x 12	26 X	24 X
90 x 40 x 12	38 X	35 X

Note: "X" Space = 1 3/8 inches (refers to height only)

Main Lug Terminal Information

PANEL RATING	COND./ PHASE	WIRE RANGE	BENDING SPACE	
			TOP/BOT.	SIDE
400 A	(2)	# 6 - 300 kcmil Al or Cu	11.31"	10.00"
	(1)	3/0 - 750 kcmil Al or Cu		
600 A	(2)	3/0 - 500 kcmil Al or Cu	11.31"	10.00"
800 A	(3)	3/0 - 500 kcmil Al or Cu	11.31"	10.00"
	(2)	3/0 - 750 kcmil Al or Cu		

Note: Local codes may change minimum wire bends.

Note: The Littelfuse LPS, LPMP and LCP products are custom designed products that fall outside standard specifications.

More specialized configurations are also available.
Contact factory for more information.

POWR-Switch Panel "Bucket" Options

BUCKET/SWITCH RATING	DESCRIPTION	SPACE	CONDUCTORS PER PHASE	WIRE RANGE
30/30	Twin 30 A switches	4X	(1)	# 14 – # 8 Al or Cu
30	Single 30 A switch	4X	(1)	# 14 – # 8 Al or Cu
60/60	Twin 60 A switches	4X	(1)	# 14 – # 2 Al or Cu
60	Single 60 A switch	4X	(1)	# 14 – # 2 Al or Cu
100/100	Twin 100 A switches	4X	(1)	# 8 – 1/0 Al or Cu
100	Single 100 A switch	4X	(1)	# 8 – 1/0 Al or Cu
200/200	Twin 200 A switches	6X	(1)	# 6 – 250 kcmil Al or Cu
200	Single 200 A switch	6X	(1)	# 6 – 250 kcmil Al or Cu
400	Single 400 A switch	12X	(2)	3/0 – 750 kcmil Al or Cu
Accessory Bucket A	1 required for every 4 switches	8X	N/A	N/A
-or-				
Accessory Bucket B	1 required for every 6 switches	12X	N/A	N/A

AUTOMATED EXCEL® SPECIFIER TOOL FOR LCP COORDINATION PANEL

Simplify Communication and Minimize Errors

A Microsoft Excel® spreadsheet designed to help engineers and contractors clearly convey which technical components they would like incorporated into the Littelfuse Coordination Panel.

- Easily specify technical components of your panels/system
- Quickly and accurately captures desired electrical protection devices
- Effectively manage each job with up-to-date information
- Ensures all pertinent information is captured to prevent unnecessary delays

Get Started Today!

1. Download The Specifier from **www.littelfuse.com/lcp** or request it from your Littelfuse sales representative
2. Fill it out to identify what you need (See sample below)
3. Send it back to Littelfuse and get a quick quote
4. Automatically generate your custom Bill of Material and base part number

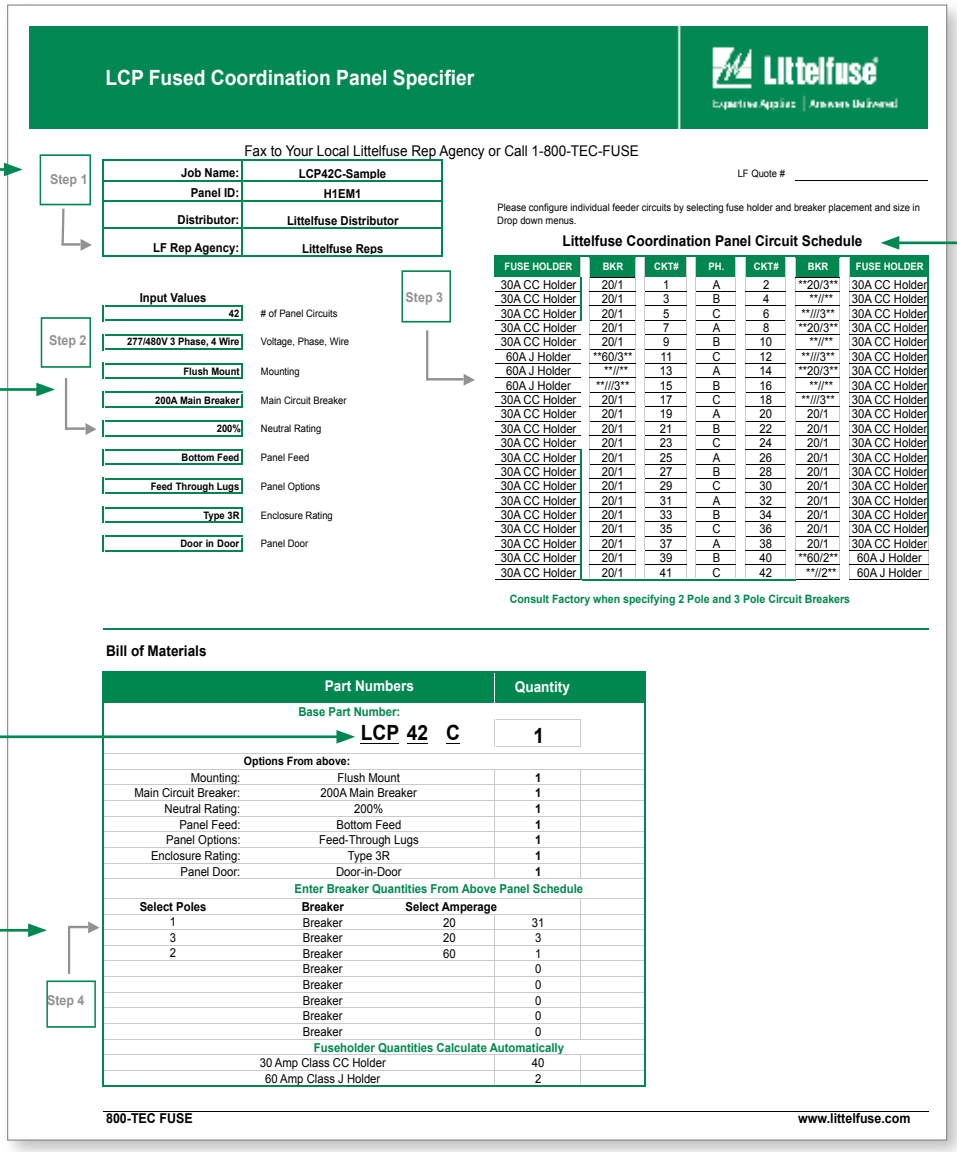
Easy identification for project tracking

Identify specific panel options

Automatically generates base part number

Automatically tabulates your Bill of Material to keep an accurate count

Panel circuit schedule identifies specific branch circuit protection devices each panel needs



LCP Fused Coordination Panel Specifier

Littelfuse
Expertise Applied | Answers Delivered

Fax to Your Local Littelfuse Rep Agency or Call 1-800-TEC-FUSE

LF Quote # _____

Step 1

Job Name:	LCP42C-Sample
Panel ID:	H1EM1
Distributor:	Littelfuse Distributor
LF Rep Agency:	Littelfuse Reps

Step 2

Input Values	
42	# of Panel Circuits
277/480V 3 Phase, 4 Wire	Voltage, Phase, Wire
Flush Mount	Mounting
200A Main Breaker	Main Circuit Breaker
200%	Neutral Rating
Bottom Feed	Panel Feed
Feed Through Lugs	Panel Options
Type 3R	Enclosure Rating
Door in Door	Panel Door

Step 3

Please configure individual feeder circuits by selecting fuse holder and breaker placement and size in Drop down menus.

Littelfuse Coordination Panel Circuit Schedule

FUSE HOLDER	BKR	CKT#	PH.	CKT#	BKR	FUSE HOLDER
30A CC Holder	20/1	1	A	2	**20/3**	30A CC Holder
30A CC Holder	20/1	3	B	4	**//**	30A CC Holder
30A CC Holder	20/1	5	C	6	**///3**	30A CC Holder
30A CC Holder	20/1	7	A	8	**20/3**	30A CC Holder
30A CC Holder	20/1	9	B	10	**//**	30A CC Holder
60A J Holder	**60/3**	11	C	12	**///3**	30A CC Holder
60A J Holder	**//**	13	A	14	**20/3**	30A CC Holder
60A J Holder	**///3**	15	B	16	**//**	30A CC Holder
30A CC Holder	20/1	17	C	18	**///3**	30A CC Holder
30A CC Holder	20/1	19	A	20	20/1	30A CC Holder
30A CC Holder	20/1	21	B	22	20/1	30A CC Holder
30A CC Holder	20/1	23	C	24	20/1	30A CC Holder
30A CC Holder	20/1	25	A	26	20/1	30A CC Holder
30A CC Holder	20/1	27	B	28	20/1	30A CC Holder
30A CC Holder	20/1	29	C	30	20/1	30A CC Holder
30A CC Holder	20/1	31	A	32	20/1	30A CC Holder
30A CC Holder	20/1	33	B	34	20/1	30A CC Holder
30A CC Holder	20/1	35	C	36	20/1	30A CC Holder
30A CC Holder	20/1	37	A	38	20/1	30A CC Holder
30A CC Holder	20/1	39	B	40	**60/2**	60A J Holder
30A CC Holder	20/1	41	C	42	**//2**	60A J Holder

Consult Factory when specifying 2 Pole and 3 Pole Circuit Breakers

Bill of Materials

Step 4

Part Numbers			Quantity
Base Part Number: LCP 42 C			1
Options From above:			
Mounting:	Flush Mount		1
Main Circuit Breaker:	200A Main Breaker		1
Neutral Rating:	200%		1
Panel Feed:	Bottom Feed		1
Panel Options:	Feed-Through Lugs		1
Enclosure Rating:	Type 3R		1
Panel Door:	Door-in-Door		1
Enter Breaker Quantities From Above Panel Schedule			
Select Poles	Breaker	Select Amperage	
1	Breaker	20	31
3	Breaker	20	3
2	Breaker	60	1
	Breaker		0
	Breaker		0
	Breaker		0
	Breaker		0
	Breaker		0
Fuseholder Quantities Calculate Automatically			
30 Amp Class CC Holder			40
60 Amp Class J Holder			2

800-TEC FUSE www.littelfuse.com

Section Overview

Our comprehensive line of single- and multi-function protection relays safeguard equipment and personnel in order to prevent expensive damage, downtime or injury due to electrical faults.

The features and flexibility within the products and the software allow you to select the appropriate protection for each part of your electrical system.

PROTECTION RELAYS

Table of Contents

Download our full Protection Relay Catalog

For more information on protection relays or to download our full-line relay catalog, visit **www.littelfuse.com/protectionrelays**.

SELECT CATEGORY

SELECT FEATURES

RECOMMENDED PRODUCT

GFP

GROUND FAULT PROTECTION

UNGROUNDED DC

Detect Ground Faults

UNGROUNDED AC

Locate Ground Fault & Reduce Transient Overvoltage

YES

Convert System to Resistance Grounding

pg. 153

NO

Detect Insulation Breakdown

YES

NO

SOLIDLY GROUNDED AC

Increase Up-Time & Reduce Potential for Arc Flash

YES

Convert System to Resistance Grounding

pg. 153

NO

Ground Fault Protection for Generators

YES

Ground Fault Alarm Level

10 mA-5 A

>5 A

RG

RESISTANCE GROUNDING

RESISTANCE GROUNDED AC SYSTEM

Pulsing, Digital Filtering, Communications and Software

YES

NO

Implement Resistance Grounding

BASIC

Ground Fault Protection & Insulation Monitoring

PGR-2601 pg. 150

PGR-3200 pg. 150

PGR-3100 pg. 150

PGR-4300 pg. 151

PGR-4704 pg. 151

PGR-5701 pg. 151

PGR-5330 pg. 153

PGM-8325 pg. 153

PGN-1000 & PGN-3000 pg. 153

PGR-6100 pg. 156

Ground-Fault Protection Relays

Resistance Grounding Systems

SELECT CATEGORY ▼ SELECT FEATURES ▼ RECOMMENDED PRODUCT ▼

MP

MOTOR PROTECTION

STANDARD		ADVANCED	PUMPS
	Protection for Low-Voltage Motors (<1000 V)	Multi-Function Overload Protection	Motor & Undercurrent Protection

Typically <75 hp

Typically >50 hp

Voltage Protection & Starter Control

NO

YES

PGR-6130 *pg. 156*

PGR-6150 *pg. 156*

PGR-6200 *pg. 157*

PGR-6300 *pg. 157*

PGR-6800 *pg. 157*

Motor Protection Relays

FP

FEEDER PROTECTION

BASIC	ADVANCED
Ground Fault Protection & Insulation Monitoring	Multi-Function IEEE/IEC Overload Protection

PGR-6100 *pg. 156*

PGR-7200 *pg. 158*

Feeder Protection Relays

SM

SUPPLEMENTAL MONITORING

MONITORS		
Monitor Ground Conductor	Monitor Neutral to Ground	Monitor Insulation

PGM-8134 *pg. 159*

PGM-8325 *pg. 153*

PGM-8600 *pg. 159*

Monitors

Ground-Fault Relays

What is a Ground Fault?

A ground fault is an inadvertent contact between an energized conductor and ground or equipment frame. The return path of the fault current is through the grounding system and any personnel or equipment that becomes part of that system. Ground faults are frequently the result of insulation breakdown, but can also be caused by other forms of cable damage or human error.

It is important to note that damp, wet, and dusty environments require extra diligence in design and maintenance. Since water is conductive, it exposes degradation of insulation and increases the potential for hazards to develop.

The First Step in Protecting Equipment And Personnel

Ground faults represent the vast majority of electrical faults experienced in most facilities. In fact, some studies have indicated that ground faults can make up more than 95% of the recorded electrical faults. By quickly detecting the fault and initiating the appropriate response, ground-fault relays minimize the damage and help protect personnel.

Ground-fault protection relays improve safety for workers and equipment without affecting the uptime of critical operations. Important in manufacturing environments, sensitive ground-fault relays with advanced filtering will detect the breakdown in insulation caused by moisture, vibration, chemicals, and dust.

SAFETY

Ground faults are the most common type of fault in an electrical system, and most electrical codes require ground-fault protection for industrial systems.

RELIABILITY

With 35 years of experience designing and manufacturing products for the harshest industrial markets, POWR-GARD® ground-fault relays are out-of-box dependable and field-proven to be reliable in the toughest applications.

DOWNTIME

Provides sensitive ground-fault protection without false tripping. Ground-fault relays are intelligent devices that are able to detect electrical problems in the early stages, minimizing the impact. This significantly reduces the damage, allowing for quick repairs.

Avoid False Operation

POWR-GARD® ground-fault relays are uniquely suited for use on systems with significant harmonic content, with microprocessor-based DFT-filtering technology. Selectable DFT filtering and peak detection algorithms are available to allow excellent filtering for both fixed-frequency and variable- frequency applications.

Simplify Installation

POWR-GARD ground-fault relays can be surface and DIN-rail mounted, or panel mounted with available adapters. When replacing other ground-fault relays, existing CTs can be used in many cases, greatly simplifying the installation. Adapter plates are also available for many retrofits, minimizing the amount of work required to complete the upgrade.

TYPICAL APPLICATIONS

FEEDERS
MOTORS
GENERATORS
WELDERS
PROCESS HEATERS
VARIABLE-FREQUENCY DRIVES

UNGROUNDED

Ground faults on an ungrounded system cannot be detected with current-sensing devices. Although the first ground fault does not produce a fault current, it is still a hazardous condition that needs to be corrected as soon as possible. POWR-GARD provides a series of products that not only indicate when a phase has faulted to ground, but also monitor the insulation resistance of the system. This provides an advance warning that a ground fault is imminent, due to insulation breakdown or mechanical damage.

SOLIDLY GROUNDED

Ground faults on a solidly grounded system can cause significant damage because the resistance of the fault, ground return path, and transformer winding are all that limits the fault current. If this fault is not cleared it can very quickly escalate into a phase-to-phase fault, causing even more damage to equipment and hazards to personnel. POWR-GARD ground-fault relays provide flexible protection that can be used on a wide variety of applications.

RESISTANCE GROUNDED

Ground faults on a resistance-grounded system are limited to a specified value; therefore, the system may continue to operate with a ground fault. However, it remains critical for the ground fault to be detected and corrected as soon as possible. If a second ground fault develops, a phase-to-phase fault exists through the two ground faults. Sensitive ground-fault relays such as the PGR-4704 provide accurate detection of faults as low as 10 mA, while minimizing false operations with digital filtering algorithms.

GROUND-FAULT PROTECTION

PGR-2601 DC Ground-Fault Relay
For Ungrounded DC Systems

GFP

Features/Benefits

- Sensitive 1- to 20-mA trip settings
- A microprocessor-based ground-fault relay for ungrounded dc systems
- 50-ms to 2.5-s time-delay settings
- Limits ground-fault current to 25 mA
- Form-A and Form-B trip contacts

Specifications

IEEE Device Number: 76G
Dimensions: **H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Communications: Analog Output
Warranty: 5 Year

Web Resources

www.littelfuse.com/pgr-2601

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-2601-0D	9-36 Vdc Control Power	PGG Series Ground Reference Modules PGA-0500 Analog Current Meter
PGR-2601-0T	32-70 Vdc Control Power	
PGR-2601-0U	75-275 Vac/dc 50/60 Hz Control Power	

PGR-3100 Ground-Fault Indication System
For Ungrounded AC Systems

GFP

Features/Benefits

- Meets NEC® Article 250.21 (B)
- Indicates the presence of voltage on each phase of a three-phase system by illuminating the LEDs
- Indicates ground-fault and phase
- Lamp test button to verify operation
- Redundant long-life LEDs

Specifications

IEEE Device Numbers: 27, 64
Dimensions: **H** 108 mm (4.3"); **W** 88.9 mm (3.5"); **D** 54 mm (2.1")
Warranty: 5 Year

Web Resources

www.littelfuse.com/pgr-3100

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-3100	Panel Mount	—

PGR-3200 Ground-Fault Protection System
For Ungrounded AC Systems

GFP

Features/Benefits

- Meets NEC Article 250.21 (B)
- Continuously monitors the insulation integrity of ungrounded electrical systems for ground faults
- Provides 2 warnings and 1 alarm
- Analog output for insulation reading

Specifications

IEEE Device Number: 27, 64
Dimensions: **H** 99.7 mm (3.9"); **W** 75 mm (4.3"); **D** 110 mm (4.3")
Communications: Analog Output
Warranty: 5 Year

Web Resources

www.littelfuse.com/pgr-3200

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-3200	240 Vac Control Power	PGA-0510 Analog Insulation Meter PGH family High Tension Couplers

GROUND-FAULT PROTECTION

PGR-4300 Generator Ground-Fault Relay
For Solidly Grounded Systems

GFP

Features/Benefits
- No CTs needed
- Provides a simple method for tripping a ground-fault condition on generators
- Use with 3- or 4-pole transfer switches
- Monitors neutral-to-ground integrity
- Adjustable pick-up settings from 100 to 1200 A
- Adjustable time-delay settings from 0 to 1 sec

Specifications
IEEE Device Numbers: 50G, 50N, 51G, 51N
Dimensions: **H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Communications: Analog Output
Warranty: 5 Year

Web Resources
www.littelfuse.com/pgr-4300

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-4300-12	12 Vdc Control Power	PGA-0500 Analog Current Meter
PGR-4300-24	24 Vdc Control Power	
PGR-4300-120	120 Vac Control Power	

PGR-4704 Sensitive Ground-Fault Relay
For Solidly and Resistance Grounded Systems

GFP RG

Features/Benefits
- Provides sensitive ground-fault protection
- A microprocessor-based ground-fault relay for resistance-grounded and solidly grounded systems
- Microprocessor-based unit with DFT
- Non-volatile trip memory retains trip state
- Compatible with VFD applications
- Adjustable pick-up settings from 10 mA to 5 A
- Adjustable time-delay settings from 0.5 to 2.5 sec

Specifications
IEEE Device Numbers: 50G, 50N, 51G, 51N
Dimensions: **H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Communications: Analog Output
Warranty: 5 Year

Web Resources
www.littelfuse.com/pgr-4704

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-4704-24	24 Vdc Control Power	PGA-0500 Analog Current Meter PGC-5000 series Current Transformers
PGR-4704-120	120 Vac Control Power	
PGR-4704-240	240 Vac Control Power	

PGR-5701 Ground-Fault Relay
For Solidly and Resistance Grounded Systems

GFP RG

Features/Benefits
- Choice of input CT gives wide setting range
- A microprocessor-based ground-fault relay for resistance-grounded and solidly grounded systems
- Microprocessor-based unit with DFT
- Non-volatile trip memory retains trip state
- Compatible with VFD applications
- Adjustable pick-up settings from 1% to 99% of CT primary rating, as low as 50 mA
- Adjustable time-delay settings from 0.5 to 2.5 sec

Specifications
IEEE Device Numbers: 50G, 50N, 51G, 51N
Dimensions: **H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Communications: Analog Output
Warranty: 5 Year

Web Resources
www.littelfuse.com/pgr-5701

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-5701-OD	9-36 Vdc Control Power	PGA-0500 Analog Current Meter PGC family Current Transformers
PGR-5701-OT	32-70 Vdc Control Power	
PGR-5701-OU	75-275 Vac/dc Control Power	

Resistance Grounding

Resistance grounding solves the problems commonly associated with both ungrounded systems and solidly grounded systems by adding a resistor between the system neutral and ground. The specifications of the resistor are user determined to achieve a desired ground-fault current, which must be greater than the system capacitive charging current.

For systems 2.4 kV and higher, low-resistance grounding systems can be used. Typically in those systems the ground-fault current is 25 A or above and is cleared within 10 s.

SAFETY

Resistance Grounding eliminates excessive ground-fault damage and single phase Arc-Flash Hazards associated with solidly grounded systems by reducing the ground-fault current to 5 A. Per IEEE Standard 141-1993, Arc-Flash hazards associated with ground faults are eliminated if the ground-fault current is reduced to 5 A or less.

COST

Properly sized resistance grounding systems solve two problems of ungrounded systems—transient overvoltages and difficulty locating ground faults. Resistance grounding systems eliminate transient overvoltages, single phase Arc-Flash hazards, and provide an ability to locate the ground fault. These capabilities reduce unscheduled shutdowns due to electrical faults and equipment damage. The PGN Family of Resistance Grounding Systems include all necessary components to convert or design a resistance-grounded system. Additional ground-fault relays (PGR-4704) can be installed on feeders to provide selective coordination as well as the ability to locate ground faults.

DOWNTIME

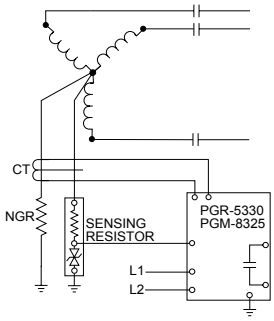
A protection relay for resistance-grounded systems is used to detect a ground fault and to monitor the neutral-to-ground connection. The relay can provide a pulsing circuit that can assist in locating the ground fault. The relay can also alarm or trip if the neutral-to-ground path fails. For systems 5 kV and less, high-resistance grounding can be used. High-resistance grounding typically limits the resistor current to 10 A or less. By doing so, the ground fault can remain on the system, given that the system is rated for the voltage shift.

PGN-1000
Low-Resistance Grounding System

Low-Resistance grounding is typically applied on transformers and generators, and limits the ground-fault current to 25 A and above. Since ground-fault current is above 25 A, the faulted feeder must be de-energized. The reduced ground-fault current allows for an orderly shut-down procedure, typically within 10 seconds.

Web Resources
For more information on Resistance Grounding Systems, visit **www.littelfuse.com/pgn-1000**

RG

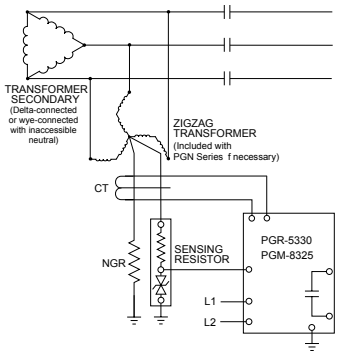


PGN-3000
High-Resistance Grounding System

High-Resistance grounding is typically applied on transformers and generators, and limits the ground-fault current to 10 A or less. Since ground-fault current is below 10 A, the faulted feeder can remain in operation. The reduced ground-fault current allows for an orderly shut-down procedure.

Web Resources
For more information on Resistance Grounding Systems, visit **www.littelfuse.com/pgn-3000**

RG



PGM-8325
Neutral Grounding Monitor

Description
The PGM-8325 Neutral Grounding Monitor is used on resistance-grounded systems up to 25 kVac to monitor the integrity of the neutral-to-ground path for loose connection, corrosion, and ground faults, or NGR failure.

Features/Benefits
- Adjustable ground-fault detection
- Adjustable time-delay settings
- Selectable fail-safe mode
- Conformally coated circuit boards

SM RG

Specifications
IEEE Device Numbers: 50G, 50N, 51G, 51N, 59N, 86
Dimensions: **H** 150 mm (5.9"); **W** 109 mm (4.3"); **D** 100 mm (4.0")
Warranty: 5 Year

Web Resources
www.littelfuse.com/pgm-8325

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGM-8325	120 Vac 50/60 Hz	PGC-2000 series Current Transformers PGE family Sensing Resistors PGB-0302 or 0325 Remote Indicators
PGM-8325-E	240 Vac 50/60 Hz	

PGR-5330
Resistance Grounding Relay

Description
An advanced resistor-monitoring relay that measures neutral current, voltage and resistance.

Features/Benefits
- Pulsing feature to detect ground faults
- Monitors neutral-to-ground integrity
- Software for remote monitoring
- Several network communication options

GFP RG

Specifications
IEEE Device Numbers: 50G, 50N, 51G, 51N, 59N, 86
Dimensions: **H** 150 mm (5.9"); **W** 109 mm (4.3"); **D** 100 mm (4.0")
Communications: RS-232; DeviceNet™, Profibus®, Ethernet
Warranty: 5 Year

Web Resources
www.littelfuse.com/pgr-5330

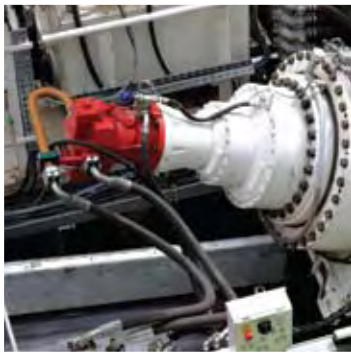
CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-5330-00-00	RS-232 Communications; 80-265 Vac/dc	PGE family Sensing Resistors PGC family Current Transformers
PGR-5330-01-00	RS-232 & DeviceNet™; 80-265 Vac/dc	
PGR-5330-02-00	RS-232 & Profibus®; 80-265 Vac/dc	
PGR-5330-03-00	RS-232 & Ethernet; 80-265 Vac/dc	

Motor and Feeder

Safeguarding Critical Applications

Motor Protection Relays prevent expensive damage to motors caused by overloads, jams, phase loss or unbalance, heat from non-electric sources, heavy start-ups or excessive operational cycles. Features, such as integrated protection, metering, data logging, and remote communications extend motor life and maximize process efficiency.

Feeder Protection Relays protect feeder circuits from overcurrents, ground faults, phase loss or other detrimental conditions in critical applications and processes. Feeder Protection Relays provide essential data for predictive and preventative maintenance—extending the life of equipment, enhancing safety and maximizing efficiency.



SAFETY

Motor Protection Relays provide overload protection for motors. This protection is required by various electrical codes to reduce the chance of fire caused by problems with the motor or load.

Littelfuse® Motor and Feeder Protection relays have a reduced-overcurrent feature that can reduce Arc-Flash Hazards during maintenance near energized equipment, allowing for a much safer system.

COST

Over 50% of new motors fail within the first seven years of operation. Since motors and other electrical equipment represent a significant investment to many industrial operations, Motor and Feeder Protection relays are used to extend the life of this equipment and improve safety to personnel exposed to the equipment.

DOWNTIME

Modern industrial operations cannot tolerate unscheduled shutdowns, as each lost hour of production can cost hundreds of thousands of dollars. The cost of downtime combined with lost or scrapped production, replacement parts, motor rewinds and troubleshooting is significant. Motor Protection relays reduce unscheduled downtime and loss of productivity by continuously monitoring the motor performance to safeguard against unwanted damages. Littelfuse relays are field-proven and have been protecting motors for 35 years.

Protection Relays

Motor Protection Typical Applications

Motor Protection relays provide basic overload protection for small motors to advanced protection for large motors to help extend the life of the motor. This is extremely important for large or critical motors or for smaller motors located in hard to access locations. POWR-GARD's Motor Protection relays can provide a warning that a problem is developing before damage occurs, as well as uncover potential problems with the customer's process.

Feeder Protection Typical Applications

Feeder Protection relays are designed to detect faults in an electrical distribution system. They provide a high degree of flexibility and can coordinate with other protection devices on the system. Feeder Protection relays are used in processing, manufacturing, petroleum, chemical, mining, forestry, water, and waste water facilities. Modern Feeder Protection relays are an excellent choice for retrofitting obsolete electromechanical relays.

TYPICAL APPLICATIONS

MOTORS
PUMPS
VARIABLE FREQUENCY DRIVES
SWITCHGEAR
MOTOR CONTROL CENTERS
PORTABLE POWER CABLES
ELECTRICAL DISTRIBUTION
PROCESS CONTROL PANELS
POWER DISTRIBUTION PANELS

Motor Protection Comparison Chart

FEATURE	BENEFIT	PGR-6100	PGR-6130	PGR-6150	PGR-6200	PGR-6300	PGR-6800
OVERLOAD (49, 51)	Prevent insulation damage and fires. Extends motor life.		✔	✔	✔	✔	✔
OVERCURRENT / JAM (50, 51)	Prevents catastrophic failures and fires. Extends motor life.			✔	✔	✔	
UNDERCURRENT (37)	Detects low-level or no-load conditions.			✔	✔	✔	✔
CURRENT UNBALANCE / PHASE LOSS / PHASE REVERSE (46)	Prevents overheating and extends motor life.		✔	✔	✔	✔	✔
GROUND FAULT (50G/N, 51G/N)	Prevents catastrophic failures and fires.	✔		✔	✔	✔	
OVERTEMPERATURE (49)	Extends motor life by ensuring that cooling is effective.		✔	✔	✔	✔	
OVERVOLTAGE (59)	Prevents stress to insulation.					✔	
UNDERVOLTAGE (27)	Prevents a start attempt when it will damage the motor.					✔	
VOLTAGE UNBALANCE (47)	Detects unhealthy supply voltage.					✔	
DIFFERENTIAL (87)	Provides sensitive protection for high-resistance winding faults.				✔	✔	
STARTER CONTROL	Simplifies the installation by reducing component count.					✔	
METERING	Alphanumeric display of conditions.			✔	✔	✔	
DATA LOGGING	Record of trips and starts.			✔	✔	✔	
INTEGRATED CTs	External current transformers not required.		✔	✔			✔
OFF-LINE MONITORING	Continuously monitors motor windings when de-energized.	✔					
REDUCED OVERCURRENT	Minimizes Arc-Flash Hazards during maintenance.				✔	✔	
COMMUNICATIONS	Provides means to interface with the relay remotely.			✔	✔	✔	

NOTE: IEEE Device Numbers are shown in parenthesis after the applicable features.

MOTOR PROTECTION RELAYS

PGR-6100
Motor Ground-Fault and Insulation Relay

MP FP

Features/Benefits
- Online monitoring to detect ground faults
- Offline monitoring of insulation resistance
- Continuously monitors for predictive protective capabilities
- CT loop monitoring
- Individual alarm contacts (form C)
- Individual analog outputs to indicate insulation resistance and ground-fault current

Specifications
IEEE Device Numbers: 50, 50G, 50N, 51, 51G, 51N, 74
Dimensions: **H** 99.7 mm (3.9"); **W** 75 mm (3"); **D** 110 mm (4.3")
Communications: 2 Analog Outputs
Warranty: 5 years

Web Resources
www.littelfuse.com/pgr-6100

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-6100-120	24 Vdc/120 Vac Control Power	PGA-0500-series Analog Meters PGC Family Current Transformers PGH Family High Tension Couplers
PGR-6100-240	240 Vac Control Power	

PGR-6130
Motor Protection Relay

MP

Features/Benefits
- No external CT required for currents up to 91 A
- Cause-of-trip indication
- N.O. and N.C. alarm contacts
- Adjustable overload trip class setting
- Adjustable current pickup
- Overtemperature (PTC) protection
- Thermal overload protection

Specifications
IEEE Device Numbers: 46, 49, 51
Dimensions: **H** 83 mm (3.3"); **W** 78 mm (3.1"); **D** 99 mm (3.9")
Warranty: 5 years

Web Resources
www.littelfuse.com/pgr-6130

CATALOG/SYSTEM #	SPECIFICATIONS	FULL-LOAD CURRENT	ACCESSORIES
PGR-6131-24	24 Vac/dc	4-16.7 A	PGB-6130, Remote Indication and Reset Assembly
PGR-6131-120	120 Vac	4-16.7 A	
PGR-6131-240	240 Vac	4-16.7 A	
PGR-6132-24	24 Vac/dc	15-40.5 A	
PGR-6132-120	120 Vac	15-40.5 A	
PGR-6132-240	240 Vac	15-40.5 A	
PGR-6133-24	24 Vac/dc	40-91 A	
PGR-6133-120	120 Vac	40-91 A	
PGR-6133-240	240 Vac	40-91 A	

PGR-6150
Motor Protection System

MP

Features/Benefits
- 13 protective functions
- 2 relay outputs, 1 digital input
- No external CT required for currents < 25 A
- Thermal protection through starting, running, overload and cooling cycles
- RS-485 interface with Modbus® RTU
- Optional PGR-6150-OPI Operator Interface

Specifications
IEEE Device Numbers: 37, 46, 49, 50, 50G, 50N, 51, 51G, 51N, 66
Dimensions (Relay): **H** 83 mm (3.3"); **W** 78 mm (3.1"); **D** 99 mm (3.95")
Dimensions (OPI): **H** 56 mm (2.2"); **W** 106 mm (4.2"); **D** 23 mm (0.9")
Communications: RS-485 with Modbus® RTU
Warranty: 5 years

Web Resources
www.littelfuse.com/pgr-6150

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-6150-24	24/48 Vdc (Control Unit)	PGR-6150-OPI Operator Interface
PGR-6150-240	120/240 Vac/dc (Control Unit)	

MOTOR PROTECTION RELAYS

PGR-6200
Motor Protection Relay

MP

Features/Benefits

- Reduced overcurrent setting for maintenance
- Dynamic thermal modeling
- Communications for different networks
- Optional RTD protection
- Optional differential protection
- Conformal coating
- Modular system and compact design makes installation easy for new or retrofit applications

Specifications

IEEE Device Numbers: 37, 38, 46, 49, 50, 50G, 50N, 51, 51G, 51N, 66, 74, 86, 87
Dimensions: **H** 96 mm (3.78"); **W** 96 mm (3.78"); **D** 132 mm (5.2")
Communications: RS-232 (Standard); RS-485, DeviceNet™, Ethernet (Optional)
Warranty: 10 years

Web Resources

www.littelfuse.com/pgr-6200

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-6200-00-00	RS-232 Communications	PGC Family Current Transformers PGA-0140 Differential Current Module PGA-0120 Temperature Input Module
PGR-6200-01-00	RS-232 & RS-485 Communications	
PGR-6200-02-00	RS-232 & DeviceNet™ Communications	
PGR-6200-04-00	RS-232 & Ethernet Communications	

PGR-6300
Motor Protection System

MP

Features/Benefits

- Overcurrent reduction setting for maintenance
- Monitors voltage, current, and temperature
- 22 motor protection functions
- Conformal coating
- Dynamic thermal modeling
- Starter control, Metering, and Data Logging
- Optional RTD protection with hazardous-location certified RTD module
- Optional differential protection
- Modular design makes installation easy

Specifications

IEEE Device Numbers: 1, 2, 3, 5, 9, 14, 18, 19, 27, 34, 37, 38, 46, 47, 48, 49, 50, 50G, 50N, 51, 51G, 51N, 55, 59, 66, 74, 81, 86, 87, 94
Dimensions (OPI): **H** 98 mm (3.86"); **W** 192 mm (7.56"); **D** 0.42 mm (1.65")
Communications: Allen-Bradley® DF1 and Modbus® RTU (Standard); DeviceNet™, Profibus®, Ethernet (Optional)
Warranty: 10 years

Web Resources

www.littelfuse.com/pgr-6300

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-6300-01-00	RS-485 Communication	PGC Family Current Transformers PGA-0120 Temperature Input Module PGA-0140 Differential Current Module
PGR-6300-02-00	RS-485 & DeviceNet™ Communication	
PGR-6300-03-00	RS-485 & Profibus® Communication	
PGR-6300-04-00	RS-485 & Ethernet Communication	

PGR-6800
Pump Protection Relay

MP

Features/Benefits

- No external CT required for currents up to 90 A
- Cause-of-trip indication
- N.O. and N.C. alarm contacts
- Adjustable overload trip class setting
- Adjustable current pickup
- Undercurrent protection
- Thermal overload protection

Specifications

IEEE Device Numbers: 37, 46, 49, 51
Dimensions: **H** 83 mm (3.3") **W** 78 mm (3.1") **D** 99 mm (3.9")
Warranty: 5 years

Web Resources

www.littelfuse.com/pgr-6800

CATALOG/SYSTEM #	SPECIFICATIONS	FULL-LOAD CURRENT	ACCESSORIES
PGR-6801-24	24 Vac/dc	7-19.6 A	PGB-6800, Remote Indication and Reset Assembly
PGR-6801-120	120 Vac	7-19.6 A	
PGR-6801-240	240 Vac	7-19.6 A	
PGR-6802-24	24 Vac/dc	19-44.2 A	
PGR-6802-120	120 Vac	19-44.2 A	
PGR-6802-240	240 Vac	19-44.25 A	
PGR-6803-24	24 Vac/dc	40-90.4 A	
PGR-6803-120	120 Vac	40-90.4 A	
PGR-6803-240	240 Vac	40-90.4 A	

FEEDER PROTECTION RELAYS, KITS AND ACCESSORIES

PGR-7200
Feeder Protection Relay

FP

Features/Benefits
- Protection, metering, and data-logging functions
- Programmable using the operator interface, the TIA-232 port, or an optional communications network
- IEC & IEEE protection curves
- CT saturation compensation
- Communications for different networks
- Two set-point groups

Specifications
IEEE Device Numbers: 26, 46, 49, 50, 50G, 50N, 51, 51G, 51N, 74, 86
Dimensions: **H** 96 mm (3.78"); **W** 96 mm (3.78"); **D** 132 mm (5.2")
Communications: RS-232, RS-485, DeviceNet™, Ethernet
Warranty: 10 years

Web Resources
www.littelfuse.com/pgr-7200

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGR-7200-00-00	RS-232 Communications	PGC Family Current Transformers
PGR-7200-01-00	RS-232 & RS-485 Communications	
PGR-7200-02-00	RS-232 & DeviceNet™ Communications	
PGR-7200-04-00	RS-232 & Ethernet Communications	

PGR-6210 and PGR-6310
Motor Protection Retrofit Kits

MP

Features/Benefits
- Direct replacement for GE Multilin 169, 269, 369 and 469 relays (mounting holes and openings are exact match)
- Microprocessor-based protection
- Proven reliability
- Conformally coated circuit boards
- Additional protective functions, including reduced overcurrent and dynamic thermal model
- Pre-wired module allows minimal change-out time
- Use existing current transformers and RTD temperature sensors (and PTs on PGR-6310 applications)
- Ability to match existing overcurrent curves
- 100% factory-tested, pre-assembled components

Web Resources
www.littelfuse.com/pgr-6210
www.littelfuse.com/pgr-6310

PGR-6210 Ordering Information

		MODULE	COMMUNICATIONS
PGR–6210	–	X	X
		0 = None	0 = RS-232
		1 = RTD PGA-0120	1 = RS-232 & RS-485
			2 = RS-232 & DeviceNet™
			3 = RS-232 & Ethernet

PGR-6310 Ordering Information

		MODULES	COMMUNICATIONS
PGR–6310	–	X	X
		0 = None	0 = RS-232
		1 = 1 RTD PGA-0120	1 = RS-232 & RS-485
		2 = 2 RTD PGA-0120	2 = RS-232 & DeviceNet™
		3 = 1 Differential PGA-0140	3 = RS-232 & Ethernet
		4 = 1 Differential PGA-0140 + 1 RTD PGA-0120	

PGK Family
Panel Mount Adapters

Features/Benefits
- Add communications capability to older switchgear and improve system performance
- Save cost by not calibrating older electromechanical devices
- Conformally coated circuit boards*
- Additional protective functions, including reduced overcurrent and dynamic thermal model*
- Minimal change-out time by using existing CTs
- PGR-6200 and PGR-6300 can use existing RTDs with an optional RTD module
- Ability to match existing overcurrent curves*

*Included on PGR-6200, PGR-6300 and PGR-7200

Replacements

RELAY TO REPLACE:	PANEL MOUNT	RELAY
AB BULLETIN 1406	PGK-0014	PGR-6300
FPL-GFRM	PGK-0006	PGR-4700
FPL-GFRM	PGK-0006	PGR-5701
GE S1	PGK-0009	PGR-6200
GE S1	PGK-0009	PGR-7200
GE LODTRAK III	PGK-0010	PGR-6200
GE MULTILIN 169, 269, OR 369	PGK-0013	PGR-6300
	PGK-0016	PGR-6200
	PGK-0016	PGR-7200
GE MULTILIN 469	PGK-0024	PGR-6300
GE MULTILIN P4A	PGK-0015	PGR-6200
GE MULTILIN P4A	PGK-0015	PGR-7200
GEC/MCGG	PGK-0003	PGR-4700
GEC/MCGG	PGK-0003	PGR-5701
GE & WESTINGHOUSE FT-11	PGK-0012	PGR-6200
P & B GOLDS	Contact Factory	PGR-7200
WESTINGHOUSE CO9 & CO11	Contact Factory	PGR-7200

SUPPLEMENTAL MONITORS

Supplemental Monitors work together with existing protection to enhance electrical system safety and performance. These monitors are designed for application-specific functionality such as insulation monitoring, and ground-continuity monitoring.

Ground-check monitors are used to detect problems in equipment ground conductors. Mobile equipment typically has an extra wire, sometimes called a pilot wire, routed with the phase and ground conductors. A ground-check monitor uses this pilot wire to send a signal down to the equipment to a terminating device. The signal then returns on the equipment ground conductor to the monitor.

The most common reason for electrical system failure is insulation breakdown. Insulation monitors can be installed at any point in the system to detect a problem with the insulation. The monitor is connected to one phase and injects a dc signal to continuously measure the system's insulation resistance.

PGM-8134
Ground Continuity Monitor

SM

Features/Benefits
- Fail-safe ground check circuit
- Combination ground-wire monitor and ground-fault relay
- Zener-characteristic termination device
- High-induced-ac rejection
- DFT (harmonic) filter

Specifications
IEEE Device Numbers: 3GC, 50G, 50N, 51G, 51N
Dimensions: **H** 213 mm (8.4"); **W** 99 mm (3.9"); **D** 145 mm (5.7")
Warranty: 5 Year

Web Resources
www.littelfuse.com/pgm-8134

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGM-8134-00	60-265 Vac; 80-370 Vdc Control Power	PGC-4000 series Current Transformers PGA-0TA6 or 0TA7 Termination Device

PGM-8600
Insulation Monitor

SM

Features/Benefits
- Provides 2 warnings and 1 alarm
- Monitors insulation resistance for failures
- Operates on grounded, resistance grounded or ungrounded systems up to 6 kV
- Analog output for insulation reading
- 1 local and 2 remote resets
- DIN-rail or surface mount

Specifications
IEEE Device Number: 86
Dimensions: **H** 99.7 mm (3.9"); **W** 75 mm (3"); **D** 110 mm (4.3")
Warranty: 5 Year

Web Resources
www.littelfuse.com/pgm-8600

CATALOG/SYSTEM #	SPECIFICATIONS	ACCESSORIES
PGM-8600	240 Vac Control Power	PGA-0510 Analog Insulation Meter PGH Family High Tension Couplers

ACCESSORIES

PGT-0400
Ground-Fault Relay Test Unit

Features/Benefits

- The PGT-0400 tests the entire ground-fault circuit including current transformers, wiring, ground-fault relay and the operation of the interrupting device
- Current range is 0.5 to 9.9 A
- Duration range is 0.1 to 9.9 s or continuous output
- Lightweight and compact for portability

Specifications

Dimensions: **H** 219 mm (8.6")
W 99 mm (3.9")
D 143 mm (5.6")

Warranty: 5 Year

Web Resources

www.littelfuse.com/pgt-0400

CATALOG/SYSTEM #	SPECIFICATIONS
PGT-0400	120 Vac Control Power

Software

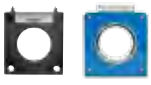
SOFTWARE		
Product		Software For
PGW-COMM Relay Interface Software		**PGR-6200 PGR-6300 PGR-7200**
VPG-6200 Virtual Motor Protection Relay		**PGR-6200**
VPG-6300 Virtual Motor Protection System		**PGR-6300**
VPG-7200 Virtual Feeder Protection Relay		**PGR-7200**

SOFTWARE		
Product		Software For
PGW-FLSH Firmware Update Utility		**PGR-5330 PGR-6200 PGR-6300 PGR-7200**
PGW-5330 Relay Interface Software		**PGR-5330**
PGW-OSTT PGR-6200 Online Self-Training Tutorial		**PGR-6200**
PGW-6150 Relay Interface Software		**PGR-6150**

Accessories

Most protective relays require an accessory for operation. Consult **www.littelfuse.com/protectionrelays** for a complete listing.

FAMILY	PRODUCT	
PGA	Analog Meters	
PGA	Communication Converter Cables	
PGA	Termination Assemblies	
PGA-0120	Temperature Input Module	
PGA-0140	Differential Current Module	

FAMILY	PRODUCT	
PGB	Remote Indication and Reset	
PGC	Current Transformers	
PGE	Sensing Resistors	
PGG	Ground Reference Modules	
PGH	High Tension Couplers	

Section Overview

Littelfuse® has built its reputation on safety. For decades, we've been the leader in designing and manufacturing products that meet NEC®, UL, NFPA®, CSA, and other safety standards. Littelfuse POWR-GARD® Services focuses on power systems analysis, electrical hazard analysis, electrical safety training, consultation and optimization of electrical safety, reliability and efficiency.



ELECTRICAL SAFETY SERVICES

Table of Contents

ENGINEERING SERVICES

Description

Littelfuse® offers a variety of services and products to increase electrical safety in the work environment and to facilitate compliance with applicable codes and standards such as OSHA, NEC®, NFPA 70E, CSA Z462, the NESC or other industry consensus standards. Littelfuse POWR-GARD® Services can provide turnkey or unique solutions to ensure safety within your facility, and has vast experience in various industries covering multiple markets including:

- Industrial / Manufacturing
- Commercial
- Energy Utility / Power Generation / Oil / Gas
- Municipal / Water Treatment
- Government / Local / Federal / Military / GSA
- Consulting Engineering

Services

Littelfuse POWR-GARD® Services offers an extensive package of services, offered nationally, that specializes in the project management of power studies, electrical hazard assessments, electrical safety "compliance" and worker training.

- Facility Inspections & Data Gathering
- One-line Drawing Creation & Maintenance
- Power Analysis & Design
- Short Circuit Studies
- Protective Device & Coordination Studies
- Electrical Hazard Assessments
  - Arc-Flash Analysis
  - Shock Analysis
- System Grounding Studies
- Load Flow & Harmonic Analysis
- Thermo Scanning / Imaging
- Electrical Warning Label Creation & Installation
- Engineering Study Maintenance Programs
- Written Electrical Equipment Preventative Maintenance Programs
- Electrical Safety Consultation & Safety Program Review

Web Resources

Find out more about Littelfuse electrical safety services and request a quote for specific projects online at **www.littelfuse.com/services**

Included on the website are:

- Free Electrical Safety Downloads & Resource Library
- "Ask the Safety Expert!" e-mail link at **SafetyExperts@Littelfuse.com**
- Arc-Flash Information and White Papers
- Links to Electrical Safety Products
- Request for Engineering & Training Services Quotes

WORKER TRAINING

Description

Every year, Littelfuse® Electrical Safety Trainers train thousands of electricians, engineers, electrical maintenance workers, safety managers, supervisors, contractors and consultants on electrical safety, NFPA and OSHA regulations and safe electrical work practices. Course instructors are OSHA and NFPA trained and know what OSHA expects of employers, assuring that the material is practical and up-to-date.

Upon completion of a Littelfuse® training course, attendees receive a Certificate of Accomplishment that documents OSHA and NFPA 70E mandated training. Training is available onsite, online or as a webinar and can be customized for your specific training needs.

Services

In order to help meet OSHA and other industry standards, POWR-GARD® Services offers a range of training for both qualified and unqualified workers.

Topics include:

- Electrical Safety Basics (Shock, Arc-Flash, Arc-Blast)
- OSHA, NFPA 70E, CSA Z462 and Other Industry Electrical Safety Code Requirements
- Electrical Safety and Hazard Awareness (Electricians & Non-Electricians)
- Qualified & Unqualified Training for Workers
- Personnel Protective Equipment (PPE) Selection
- Overcurrent Protection Basics
- NEC Basics & Overcurrent Protection Requirements
- Selective Coordination Basics
- Electrical Panel Short Circuit Current Rating (SCCR)
- Power System Grounding Basics

Web Resources

Additional information on specific 1, 2, 4, and 8 hour courses are listed online at **www.littelfuse.com/services**.

Ordering Information

COURSE #	DESCRIPTION	HOURS
PGS101	INTRO TO ELECTRICAL SAFETY	1 - 2
PGS201	INTRO TO OSHA & NFPA 70E	4
PGS401	ELECTRICAL HAZARDS AWARENESS	1
PGS402	PRE-ASSESSMENT NFPA 70E	4
PGS403	POST-ASSESSMENT NFPA 70E	4
PGS404	OSHA & NFPA 70E SAFETY TRAINING	6 - 8
PGS501	PROPER FUSE SELECTION & APPLICATION	1
PGS502	UNDERSTANDING SCCR	1 - 2
PGS503	SELECTIVE COORDINATION BASICS	1
PGS504	POWER SYSTEM GROUNDING	2 - 4

Contact Littelfuse® for more information on customizing course content, combining courses or for the availability of additional courses.

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.

SUPPRESSION PRODUCTS

Table of Contents

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.
Our 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

SERIES NAME[1]		OPERATING AC VOLTAGE RANGE	OPERATING DC VOLTAGE RANGE	PEAK CURRENT RANGE[2] (A)	PEAK ENERGY RANGE[3]	OPERATING TEMPERATURE RANGE	MOUNT/ FORM FACTOR	DISC SIZE	AGENCY				ROHS	LEAD FREE
									UL	CSA	VDE	CECC		
TMOV®/iTMOV®		115-750	—	6000-10,000	35-480	-55 to +85°C	Radial Leaded	14, 20, 34 mm	•	•	•	•	•	•
TMOV® 25S		115-750	—	20,000	170-670			25 mm	•				•	•
UltraMOV™		130-625	170-825	1750-10,000	12.5-720			7, 10, 14, 20, 25 mm	•	•	•	•	•	•
UltraMOV™ 25S		115-750	150-970	22,000	230-890			25 mm	•	•	•	•	•	•
C-III		130-660		3500-9000	40-530			10, 14, 20 mm	•	•	•		•	•
LA		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

SERIES NAME[1]		OPERATING AC VOLTAGE RANGE	OPERATING DC VOLTAGE RANGE	PEAK CURRENT RANGE[2] (A)	PEAK ENERGY RANGE[3]	OPERATING TEMPERATURE RANGE	MOUNT/ FORM FACTOR	DISC SIZE	AGENCY		ROHS	LEAD FREE
									UL	CSA		
BA/BB		130-2800	175-3500	50,000 70,000	450-10000	-55 to +85°C	Screw / Clip Terminals	60 mm	•		•	
DA/DB		130-750	175-970	40,000	270-1050			40 mm	•		•	•
HA		130-750	175-970	25,000 40,000	200-1050		Industrial Packaged Radial Leads	32, 40 mm	•	•	•	•
TMOV34S®		115-750	—	40,000	235-1050			34 mm	•		•	•
HB34, HG34, HF34		130-750	175-970	40,000	270-1050			34 mm	•	•	•	•
DHB34		250-2800	330-3500	20,000 70,000	330-10000			34 mm			•	
CA		250-2800	330-3500	20,000 70,000	330-10000		Bare Disc	60 mm			•	

High Power TVS Diodes

Series Name[1]		Package Type	Reverse Standoff Voltage (V_R)	Peak Pulse Power Range [1] (P_{PP})	Peak Pulse Current (I_{PP} 8x20µs)	Operating Temperature	Halogen Free	RoHS Compliant
15KPA		P600	17-280	15000W	Not Applicable	-85° to +302° F (-55° to +175° C)	•	•
20KPA		P600	20.0-300	20000W			•	•
30KPA		P600	28.0-288	30000W			•	•
AK6		Radial Lead	58-430	NA	6000A	-67° to +347° F (-55° to +150° C)	•	•
AK10		Radial Lead	58-430	NA	10000A		•	•

1. Detailed information about most product series listed here can be found on www.littelfuse.com/varistor
2. Not an applicable parameter for Crowbar devices
3. Value shown in Joules

LVSP SURGE SUPPRESSION FUSE

600 Volt • 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 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 LVSP is not rated for continuous current and the ratings are specific 8 x 20 µs 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).

Dimensions in Inches (mm)

Figure 1: Cartridge 5-20 A

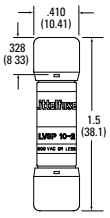


Figure 2: Cartridge 30-80 A

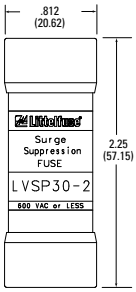


Figure 3: Leaded 5-20 A

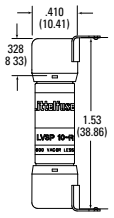


Figure 4: Bolt-In 30-80 A

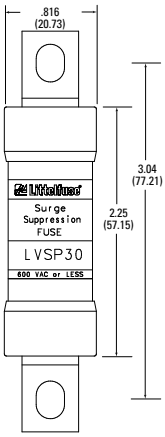
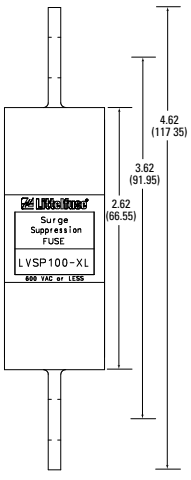


Figure 5: Bolt-In 100 A



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

CATALOG NUMBER	SYSTEM NUMBER	8 X 20 µS SURGE RATING	NOMINAL MELTING I^2T (A^2S)	NOMINAL CLEARING I^2T (A^2S)	Ipeak@100 kA 60 HZ (A)
LVSP5	LVSP005T	5,000	359	981	3,700
LVSP10	LVSP0010T	10,000	1,300	3,210	5,823
LVSP15	LVSP0015T	15,000	3,267	6,235	7,765
LVSP20	LVSP0020T	20,000	4,940	11,710	8,135
LVSP30	LVSP0030T	30,000	11,950	35,325	12,478
LVSP40	LVSP0040T	40,000	20,550	61,700	15,250
LVSP60	LVSP0060T	60,000	39,240	145,555	19,604
LVSP80	LVSP0080T	80,000	75,000	254,000	24,600
LVSP100	LVSP0100T	100,000	Contact Factory		

Specifications

Voltage Rating: 600 VAC
Interrupting Rating: 200 kA
Ratings: 5 – 100 kA 8 x 20 µs surge withstand
Approvals: UL Recognized (File No. E71611)

Recommended Fuseblocks

LVSP (5-20)-2
LF60030M (open block).....pg. 101
LPSM (dead front).....pg. 108, 111

LVSP (30-80)-2
LFJ60030 (open block).....pg. 85
LPSJ30 (dead front).....pg. 114

LVSP (100)
LFJ60100 (open block).....pg. 85

Mounting Options

SURGE RATING	CATALOG/SYSTEM NUMBER					
	CARTRIDGE		LEADED		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	LVSP100VXL

Note: Contact factory for dimensions and availability of specific mounting configurations.

For additional information, visit **www.littelfuse.com/lvsp**

Section Overview

With over 25 locations around the globe, Littelfuse® is the supplier of choice when it comes to international fuses, fuseholders and accessories. With an ever expanding portfolio of products and global resources, we provide comprehensive solutions for each customer's unique application no matter where they are located around the world.

INTERNATIONAL PRODUCTS

Table of Contents

NH FUSE LINKS

500 Volts • 2-630 Amperes

Description

Littelfuse® European style NH fuse links are designed for the protection of conductors and motors. The gL-gG characteristic fuse links are generally used to protect cables and installation lines from overloads and short-circuits. The aM characteristic fuse links are used for the short-circuit protection of motors and switchgear. They are available in NH00C to NH3 sizes up to 630 amperes.

Specifications

Voltage Rating: 500 VAC
440 VDC

Ampere Range: 2-630 A

Interrupting Rating: 120 kA AC
25 kA DC

Standards: DIN 43.620, IEC 269-2-1

Approvals: VDE

Example part number: NH1CG25 (size, characteristic and amperage)

Indication: All NH fuse links incorporate a blown fuse indicator

Recommended Fuseholders

NH Fuse Base .....pg. 170
NH Fuse Disconnects .....pg. 170

Web Resources

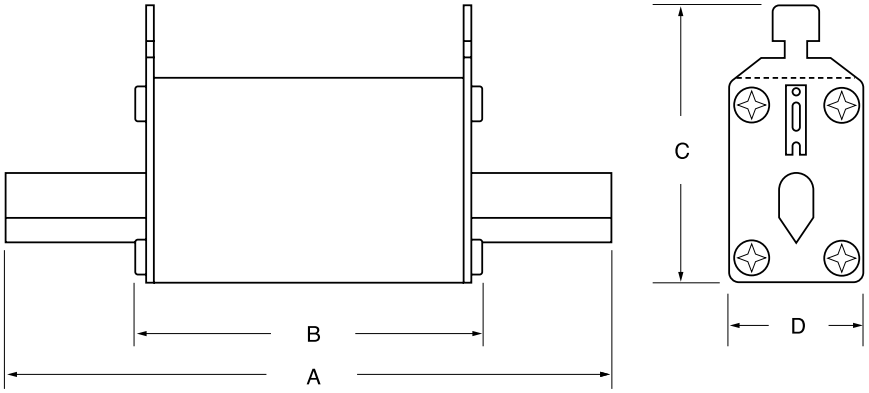
www.littelfuse.com/nh

Ordering Information

AMPERAGE	gL-gG 500 V CATALOG / SYSTEM NUMBER					aM 500 V CATALOG / SYSTEM NUMBER			
	NH00C / NH00	NH0	NH1C / NH1	NH2C / NH2	NH3C / NH3	NH00CM	NH1	NH2	NH3
2	NH00CG2	—	—	—	—	NH00CM2	—	—	—
4	NH00CG4	—	—	—	—	NH00CM4	—	—	—
6	NH00CG6	NH0G6	—	—	—	NH00CM6	—	—	—
10	NH00CG10	NH0G10	—	—	—	NH00CM10	—	—	—
16	NH00CG16	NH0G16	—	—	—	NH00CM16	—	—	—
20	NH00CG20	NH0G20	—	—	—	NH00CM20	—	—	—
25	NH00CG25	NH0G25	NH1CG25	—	—	NH00CM25	—	—	—
32	NH00CG32	NH0G32	NH1CG32	—	—	NH00CM32	—	—	—
35	NH00CG35	NH0G35	NH1CG35	—	—	NH00CM35	—	—	—
40	NH00CG40	NH0G40	NH1CG40	NH2CG40	—	NH00CM40	—	—	—
50	NH00CG50	NH0G50	NH1CG50	NH2CG50	—	NH00CM50	—	—	—
63	NH00CG63	NH0G63	NH1CG63	NH2CG63	—	NH00CM63	NH1M63	—	—
80	NH00CG80	NH0G80	NH1CG80	NH2CG80	—	NH00CM80	NH1M80	—	—
100	NH00CG100	NH0G100	NH1CG100	NH2CG100	—	NH00CM100	NH1M100	—	—
125	NH00G125	NH0G125	NH1CG125	NH2CG125	—	—	NH1M125	NH2M125	—
160	NH00G160	NH0G160	NH1CG160	NH2CG160	—	—	NH1M160	NH2M160	—
200	—	—	NH1G200	NH2CG200	—	—	NH1M200	NH2M200	—
224	—	—	NH1G224	NH2CG224	—	—	NH1M224	NH2M224	—
250	—	—	NH1G250	NH2CG250	—	—	NH1M250	NH2M250	—
300	—	—	—	NH2G300	—	—	—	NH2M300	—
315	—	—	—	NH2G315	NH3CG315	—	—	NH2M315	NH3M315
355	—	—	—	NH2G355	NH3CG355	—	—	NH2M355	NH3M355
400	—	—	—	NH2G400	NH3CG400	—	—	NH2M400	NH3M400
425	—	—	—	—	NH3G425	—	—	—	—
500	—	—	—	—	NH3G500	—	—	—	NH3M500
630	—	—	—	—	NH3G630	—	—	—	NH3M630

NH FUSE LINKS DIMENSIONS, BASES, AND DISCONNECTS

Dimensions in mm



SIZE	CURRENT RANGE	VOLTAGE (AC/DC)	INTERRUPTING RATING (AC/DC)	NOMINAL FREQUENCY	SELECTIVITY	DIMENSIONS (mm)			
						A	B	C	D
00C	2-100 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	78.00	54.00	51.30	20.00
00	125-160 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	78.00	54.00	56.40	30.00
0	6-160 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	123.95	70.11	53.34	30.00
1C	25-160 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	135.00	72.00	56.40	30.00
1	63-250 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	135.00	72.00	65.00	40.00
2C	40-250 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	150.00	72.00	61.00	40.00
2	125-400 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	150.00	72.00	74.20	50.00
3C	315-400 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	150.00	72.00	74.20	50.00
3	315-630 A	500 V/440 V	120 kA/25 kA	45 - 62 HZ	1:1 25	150.00	72.00	84.00	71.88

NH Fuse Bases and Disconnects

Fuse Bases

CATALOG NUMBER	SYSTEM NUMBER	SIZE	RATING	CONNECTION
NHB00B	NHB00B	00	690 V/160 A	Bolt
NHB00C	NHB00C	00	690 V/160 A	V-Clamp
NHB1B	NHB1B	1	690 V/250 A	Bolt
NHB2B	NHB2B	2	690 V/400 A	Bolt
NHB3B	NHB3B	3	690 V/630 A	Bolt

All fuse bases are single pole and gangable.

Fuse Disconnects

CATALOG NUMBER	SYSTEM NUMBER	SIZE	RATING	CONNECTION
NHFSC00B	NHFSC00B	C00	690 V/100 A	Bolt
NHFS0B	NHFS0B	0	690 V/160 A	Bolt
NHFS1B	NHFS1B	1	690 V/250 A	Bolt
NHFS2B	NHFS2B	2	690 V/400 A	Bolt
NHFS3B	NHFS3B	3	690 V/630 A	Bolt

All disconnects are 3 pole.

Contact factory for dimensional information.

Web Resources

www.littelfuse.com/nh

DIAZED/NEOZED FUSES

380-500 Volts AC • 2-63 Amperes

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. Ratings are available in standard Diazed and compact Neozed styles.

Specifications

Standards: DIN 49.522-DIN 49.525, IEC 269-3

Approvals: VDE

BASE SIZE	TYPE	CURRENT RANGE	VOLTAGE AC/DC	INTERRUPTING RATING
14	D01	2-16 A	380 V/250 V	50 KA
18	D02	20-63 A	380 V/250 V	50 KA
16	DI	2-25 A	500 V	80 KA
27	DII	2-25 A	500 V	80 KA
33	DIII	35-63 A	500 V	80 KA

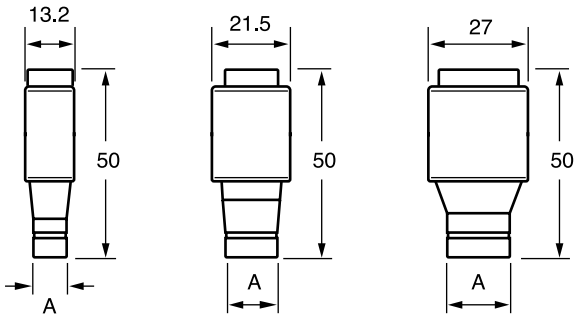
All Diazed and Neozed fuses incorporate a blown fuse indicator.

Web Resources

www.littelfuse.com/diazed

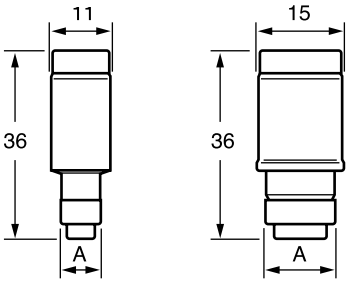
Dimensions in mm

Diazed Fuses



DI DII DIII

Neozed Fuses



D01 D02

Ordering Information

AMPERAGE	COLOR	DIAZED FUSES							NEOZED FUSES		
		gL-gG CATALOG / SYSTEM NUMBER			aM CATALOG / SYSTEM NUMBER			DIM. A (mm)	gL-gG CATALOG / SYSTEM #		DIM. A (mm)
		DI	DII	DIII	DI	DII	DIII		D01	D02	
2	Pink	DZ16F2	DZ27F2	—	DZ16T2	DZ27T2	—	6	D0Z14G2	—	7.3
4	Brown	DZ16F4	DZ27F4	—	DZ16T4	DZ27T4	—	6	D0Z14G4	—	7.3
6	Green	DZ16F6	DZ27F6	—	DZ16T6	DZ27T6	—	6	D0Z14G6	—	7.3
10	Red	DZ16F10	DZ27F10	—	DZ16T10	DZ27T10	—	8	D0Z14G10	—	8.5
16	Grey	DZ16F16	DZ27F16	—	DZ16T16	DZ27T16	—	10	D0Z14G16	—	9.7
20	Blue	DZ16F20	DZ27F20	—	DZ16T20	DZ27T20	—	12	—	D0Z18G20	10.9
25	Yellow	DZ16F25	DZ27F25	—	DZ16T25	DZ27T25	—	14	—	D0Z18G25	12.1
35	Black	—	—	DZ33F35	—	—	DZ33T35	16	—	D0Z18G35	13.3
50	White	—	—	DZ33F50	—	—	DZ33T50	18	—	D0Z18G50	14.5
63	Copper	—	—	DZ33F63	—	—	DZ33T63	20	—	D0Z18G63	15.9
BASE SIZE (mm)		16	27	33	16	27	33	—	14	18	—

DIAZED/NEOZED FUSE ACCESSORIES

Bases, Carriers and Gauge Rings

Figure 1

Figure 2

Figure 3

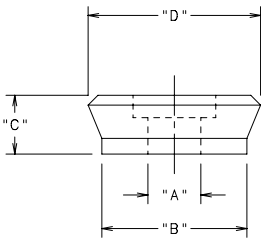


Figure 4

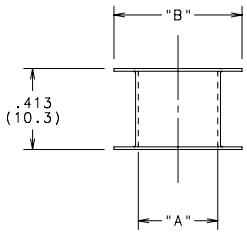


Figure 6

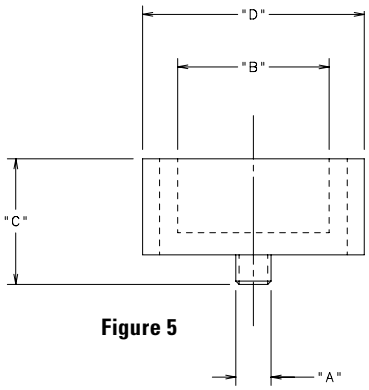


Figure 5

Description

Fuse bases, carriers, and gauge rings are available for Diazed (DZ) and Neozed (D0Z) type fuses. Fuseholders are comprised of a fuse base and carrier. Optional gauge rings act as a rejection feature and are used to prevent oversizing of fuses. All bases and carriers are single pole units. Contact factory for additional information.

Fuse Bases

CATALOG NUMBER	SYSTEM NUMBER	FUSE TYPE	BASE SIZE (mm)	MOUNTING TYPE	FIGURE
DZB27S	0DZB027SZ	DZ	27	Screw	1
DZB27DR	0DZB27DRZ	DZ	27	DIN Rail	1
DZB33S	0DZB033SZ	DZ	33	Screw	1
DZB33DR	0DZB33DRZ	DZ	33	DIN Rail	1
D0ZB14S	D0ZB014SZ	D0Z	14	Screw	2
D0ZB14DR	D0ZB14DRZ	D0Z	14	DIN Rail	2
D0ZB18S	D0ZB018SZ	D0Z	18	Screw	2
D0ZB18DR	D0ZB18DRZ	D0Z	18	DIN Rail	2

Fuse Carriers

CATALOG NUMBER	SYSTEM NUMBER	FUSE TYPE	BASE SIZE (mm)	FIGURE
DZC27	0DZC0027Z	DZ	27	3
DZC33	0DZC0033Z	DZ	33	3

Gauge Rings

AMP	COLOR	CATALOG NUMBERS			
		DZ (FIGURE 4)	DZ (FIGURE 5)	D0Z (FIGURE 6)	D0Z (FIGURE 6)
2	Pink	DZ27PK	—	D0Z14PK	D0Z18PK
4	Brown	DZ27BR	—	D0Z14BR	D0Z18BR
6	Green	DZ27GN	—	D0Z14GN	D0Z18GN
10	Red	DZ27RD	—	D0Z14RD	D0Z18RD
16	Grey	DZ27GY	—	—	D0Z18GY
20	Blue	DZ27BE	—	—	D0Z18BE
25	Yellow	DZ27YW	—	—	D0Z18YW
35	Black	—	DZ33BK	—	D0Z18BK
50	White	—	DZ33WE	—	D0Z18WE
63	Copper	—	DZ33CR	—	—

Contact factory for dimensional information.

Web Resources

www.littelfuse.com/diazed

CYLINDRICAL FUSES

500 Volts • 0.5-100 Amperes

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: IEC 269-2-1

Ordering Information

CATALOG/ SYSTEM #	SIZE (mm)	CURRENT RANGE	VOLTAGE AC	INTERRUPTING RATING
CY10X38G1	10 X 38 mm	0.5-25 A 32 A	500 V 400 V	120 kA
CY14X51G2	14 X 51 mm	2-25 A 32-40 A 50A	690 V 500 V 400 V	80 kA 120 kA 120 kA
CY22X58G50	22 X 58 mm	16-63 A 80-100 A	690 V 500 V	80 kA 120 kA

AMPERAGE		gL-gG			aM		
		10 X 38	14 X 51	22 X 58	10 X 38	14 X 51	22 X 58
0.5		CY10X38G.5	—	—	CY10X38M.5	—	—
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 (mm)	A	10	14	22	10	14	22
	B	38	51	58	38	51	58

Fuseholders

CATALOG/ SYSTEM #	SIZE	POLES	AMP RATING	VOLTAGE	TERMINAL TYPE
CYH10381	10 X 38	1	32 A	690 V	Pressure Plate
CYH10382	10 X 38	2	32 A	690 V	Pressure Plate
CYH10383	10 X 38	3	32 A	690 V	Pressure Plate
CYH10381ID*	10 X 38	1	32 A	690 V	Pressure Plate
CYH14511	14 X 51	1	50 A	690 V	Pressure Plate
CYH14512	14 X 51	2	50 A	690 V	Pressure Plate
CYH14513	14 X 51	3	50 A	690 V	Pressure Plate
CYH22581	22 X 58	1	125 A	690 V	Pressure Plate
CYH22582	22 X 58	2	125 A	690 V	Pressure Plate
CYH22583	22 X 58	3	125 A	690 V	Pressure Plate

* Indicating

NOTE: All fuseholders are DIN-Rail mountable. Contact factory for dimensional information.

Web Resources

www.littelfuse.com/cy

HRC FORM II CLASS C FUSES

600 VAC-600 Amperes

Description

HRCII-C fuses are stud-mounted fuses designed to British standard dimensions. They are generally used for motor short-circuit protection in dead-front holders, and are normally required to be used in conjunction with a motor running overload device.

Specifications

Voltage Rating: 600 VAC, 460 VDC
Interrupting Rating: 200 kA rms symmetrical AC
40 kA rms symmetrical DC
Ampere Range: 2 – 600 A
Approvals: CSA Certified to Standard C22.2 No. 106-M90 (File No. LR90341)
IEC 269-1&2

Dimensions in inches (mm)

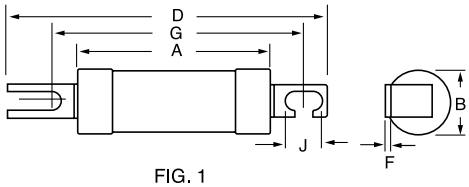


FIG. 1

Recommended Fuseholders

DF30F, DF30B, DF30FB (2-30 A) 00DF030.ZX
DF60F, DF60B, DF60FB (40-60 A) 00DF060.ZX
DF100F, DF100B, DF100FB (80-100 A)..... 00DF100.ZX

Specify Fuseblock Terminations F=Front, FB=Front/Back, B=Back
With part # suffix (Example: 600 V 30 A Dead front Holder with Front/Back termination 00DF030.ZXFB)

Web Resources

www.littelfuse.com/hrc

Ordering Information

FUSE		FUSE-HOLDER SYSTEM NUMBER	AMPS	FIGURE NO	DIMENSIONS IN INCHES (mm)					
CATALOG NUMBER	SYSTEM NUMBER				A	B	D	F	G	J
02CO002	02CO002.Z	00DF002.ZX	2	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO004	02CO004.Z	00DF004.ZX	4	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO006	02CO006.Z	00DF006.ZX	6	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO010	02CO010.Z	00DF010.ZX	10	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO015	02CO015.Z	00DF015.ZX	15	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO020	02CO020.Z	00DF020.ZX	20	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO025	02CO025.Z	00DF025.ZX	25	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO030	02CO030.Z	00DF030.ZX	30	1	56 (2.2)	21 (0.83)	85 (3.3)	1 (0.04)	73 (2.87)	7.5 (0.29)
02CO040	02CO040.Z	00DF040.ZX	40	1	57 (2.24)	26 (1.02)	88 (3.45)	1.6 (0.06)	73 (2.87)	7.5 (0.29)
02CO050	02CO050.Z	00DF050.ZX	50	1	57 (2.24)	26 (1.02)	88 (3.45)	1.6 (0.06)	73 (2.87)	7.5 (0.29)
02CO060	02CO060.Z	00DF060.ZX	60	1	57 (2.24)	26 (1.02)	88 (3.45)	1.6 (0.06)	73 (2.87)	7.5 (0.29)
02CO080	02CO080.Z	00DF080.ZX	80	1	68 (2.88)	36 (1.42)	110 (4.33)	2.4 (0.09)	93 (3.7)	—
02CO100	02CO100.Z	00DF100.ZX	100	1	68 (2.88)	36 (1.42)	110 (4.33)	2.4 (0.09)	93 (3.7)	—

Up to 600 A available. Contact factory for higher amperages.

Section Overview

Miscellaneous Accessories include custom-built solutions designed specifically to meet code requirements, fused and non-fused disconnect switches and an assortment of useful fuse and holder accessories.



MISCELLANEOUS ACCESSORIES

Table of Contents

DISCONNECT SWITCHES

Fusible/Non-fusible

Description

The LFFS series fusible switches eliminate the need for a separate fuseblock by integrating a three pole fuseholder into the switch body, saving panel space and reducing wiring time.

Features/Benefits

- Meets NEC® requirement that a separate disconnect means be located within sight of all motor loads
- Compact size minimizes panel space and reduces enclosure costs
- Fusible 30 A Class CC switch offers small footprint
- Panel-mount or integral DIN-rail mount allows quick and easy mounting
- Optional accessories offer flexibility for various applications
- Dead-front design and optional terminal covers minimizes exposure to live parts
- LFRK001 style knob meets OSHA standard for control of hazardous energy sources. Other knobs and handles meet IP65

Specifications

Voltage Rating:	600 VAC
Interrupting Rating:	10 kA
Required Screw Torque:	16 in-lb
Ampere Ratings:	30–60 A
Approvals:	UL Listed (File No. E166081) CSA Certified

Applications

- Used as a main switch or distribution switches. Ideal for use as safety switches for air conditioners, pumps and compressors
- The LFDS series can be used with external fuseblocks, and use of Class RK1 (pg. 16-18), RK5 (pg. 18-22), J (pg. 27-29) and CC fuses (pg. 33-35)

Web Resources

Downloadable CAD drawings, FAQs, and other technical information: **www.littelfuse.com/lffs**
www.littelfuse.com/lfds

Ordering Information

CATALOG NUMBER	SYSTEM NUMBER	DESCRIPTION
LFFS030CC	LFFS0030XXCC	30 A Fusible Class CC Switch
LFDS030	LFDS0030X	30 A Non-Fusible Switch
LFDS040	LFDS0040X	40 A Non-Fusible Switch
LFDS060	LFDS0060X	60 A Non-Fusible Switch

Note: Handles and accessories sold separately.

Product specifications and availability subject to change.
Please contact factory for more information.

Accessories

CATALOG NUMBER	DESCRIPTION
LFRH001*	Red Handle
LFRK001*	Red Knob
LFBH001*	Black Handle
LFBK001*	Black Knob
LFBK002†	Black Knob

CATALOG NUMBER	DESCRIPTION
LFCB001	Add-on Contact Block (N.O.)
LFCB002	Add-on Contact Block (N.C.)
LFPP001	30 A Add-on Power Pole (N.O.)
LFPP002	30 A Add-on Power Pole (N.C.)
SHFT002	Shaft (19.68")
SHFT003	Shaft (11.81")
SHFT005	Shaft (7.78")

CATALOG NUMBER	DESCRIPTION
LFTC001	Terminal Cover (1 Pair)

* Includes mounting hardware and standard length shaft for enclosures 3.5"through 8" deep.
† Supplied with 2" shaft

Note: LFRH001, LFBH001, LFBK001 and LFBK002 are not lockable.

FUSE REDUCERS

Ordering Information

250 Volt

CATALOG/SYSTEM NUMBER		FUSE CLIP	FUSE CASE SIZE
CLASS H/K5	CLASS R		
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

*Only one reducer required.

600 Volt

CATALOG /SYSTEM NUMBER			FUSE CLIP	FUSE CASE SIZE
CLASS H/K5	CLASS R	CLASS J		
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

†Only one reducer required.

¶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.

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 No. E136855)
- CSA Certified (File No. LR92899)

Web Resources

Downloadable CAD drawings, FAQs, and other technical information visit: **www.littelfuse.com/lruh**
www.littelfuse.com/lrur
www.littelfuse.com/lruj

Refer to fuse section of this catalog for fuse dimensions.

Recommended Fuses

Class H/K5 Fuse Reducers

NLN / NLS ..... pg. 24
RLN / RLS..... pg. 25

Class R Fuse Reducers

FLNR / FLSR..... pg. 20-22
FLNR_ID / FLSR_ID ..... pg. 20-22
IDSR ..... pg. 19
LLNRK / LLSRK ..... pg. 16
LLSRK_ID..... pg. 16
KLNR / KLSR ..... pg. 17

Class J Fuse Reducers

JTD_ID / JTD..... pg. 27
JLS ..... pg. 28

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

Web Resources

Sample requests, downloadable CAD drawings and other technical information: **www.littelfuse.com/boxcover**

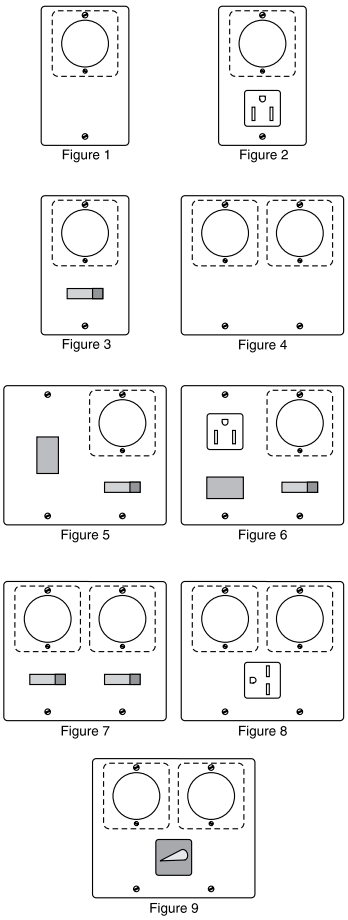


FIGURE NUMBER	LITTELFUSE PART NUMBER	BOX COVER FEATURES					TO BE MOUNTED ON:
		EDISON BASE FUSEHOLDER	GROUNDING RECEPTACLE	SINGLE POLE SWITCH	TWO POLE SWITCH	PILOT LIGHT	
1	LSOU	1	—	—	—	—	2-1⁄4" Handy Box
	LSOW	1	—	—	—	—	2-3⁄4" Switch Box
	LSOX	1	—	—	—	—	4" Octagon Box
	LSOY	1	—	—	—	—	4" Square Box
2	LSRU*	1	1	—	—	—	2-1⁄4" Handy Box
	LSRW	1	1	—	—	—	2-3⁄4" Switch Box
	LSRX	1	1	—	—	—	4" Octagon Box
	LSRY	1	1	—	—	—	4" Square Box
3	LSSU*	1	—	1	—	—	2-1⁄4" Handy Box
	LSSW	1	—	1	—	—	2-3⁄4" Switch Box
	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)	—	—	—	4-1⁄16" Square Box
9	LSTY	2	—	—	1	—	4" Square Box

*UL Listed (File No. E308725)

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 × 9"W × 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 (GLASS) FAST ACTING FUSES		3AG (GLASS) SLO-BLO® FUSES	
QUANTITY	CATALOG NUMBER	QUANTITY	CATALOG NUMBER
25	312 ½A	25	313 ½A
50	312 1A	25	313 ¾A
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 (CERAMIC) NORMAL-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	SYSTEM 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	SYSTEM NUMBER
Spare Fuse Cabinet	LSFC	LSFC
Spare Keys	LKEY001	LKEY0001Z

Web Resources

Sample requests and data sheets **www.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) or visit us online at **www.littelfuse.com**.

TECHNICAL APPLICATION GUIDE

Table of Contents

Additional Technical Information

An expanded Technical Application Guide and Fuseology section, white papers, and a library of technical information is available online at **www.littelfuse.com/technicalcenter**.

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 and Engineering Services 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:

1. 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.
4. 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.
6. 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^2t). An overcurrent of 10,000 amperes that lasts for 0.01 seconds has an I^2t of 1,000,000 A^2s. If the current could be reduced from 10,000 amperes to 1,000 amperes for the same period of time, the corresponding I^2t would be reduced to 10,000 A^2s, or just one percent of the original value.

If the current in a conductor increases 10 times, the I^2t 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.

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 www.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.

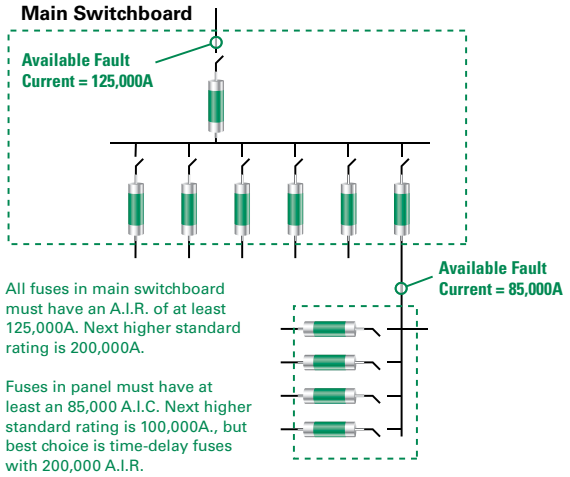


Figure 1 – Interrupting Rating Requirements per NEC

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 'Semiconductor Fuses' have special characteristics including quick overload response, very low I^2t and I_{peak} 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. At higher ambient temperatures, the continuous current carrying capacity will be decreased as shown in *Figure 2*. This closely follows the derating tables for all electrical equipment and can help reduce equipment burnout due to high ambient conditions.

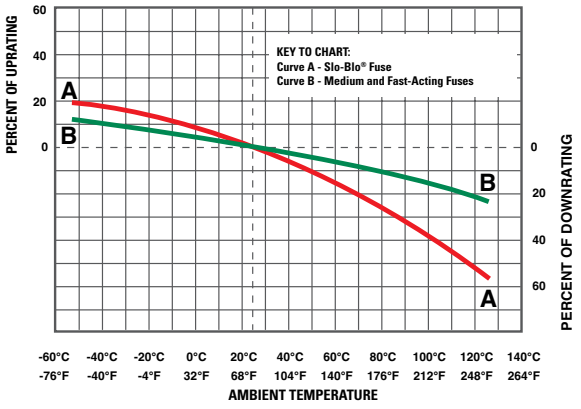


Figure 2 – Fuse Rerating Curve

SELECTION CONSIDERATIONS

Littelfuse time-delay (SLO-BLO) fuses derate quicker in higher ambient conditions, thus acting as "self-protecting" devices that maintain their integrity until after opening.

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 (I^2t) 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 fuseholders and/or fuseblocks 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 fuseblock 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 space-saving 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 time-delay 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 FUSEHOLDERS

Equally important to the selection of the proper fuse is the correct selection of the proper fuseholder or fuse block for a given application. Fuseholders are available using most of the same Selection Considerations outlined above for UL fuse classes. Considerations for fuseholders include:

- Current Rating
- Voltage Rating
- Interrupting Rating
- Physical Size
- Indication

Additional selection considerations for fuseholders and fuseblocks 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 fuseblocks 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 fuseblock is mounted or inserted into the panel. Historically, fuseblocks 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 fuseblocks, 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 fuseholder or fuseblock needed for a given application. UL Class H blocks accept Class H, Class K5, and Class R fuses. Similarly, Midget-style fuseblocks accept both Midget and UL Class CC fuses.

Both UL Class R and Class CC fuseholders 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 expected?
- 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.

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 **www.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

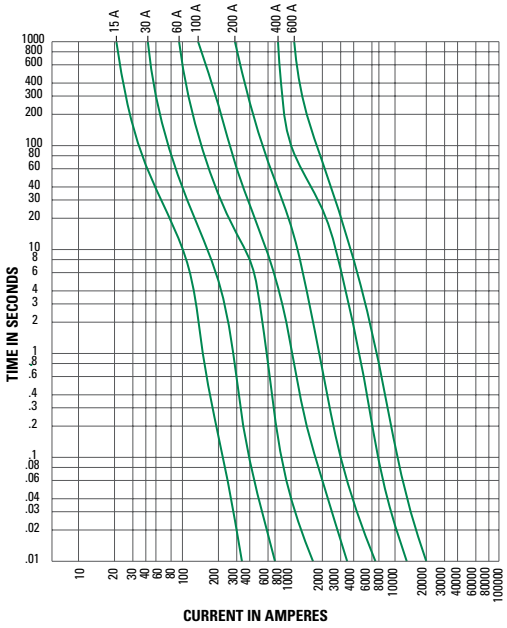


Figure 4 – Average Melting Time Curves for Typical Time-Delay Fuse Series

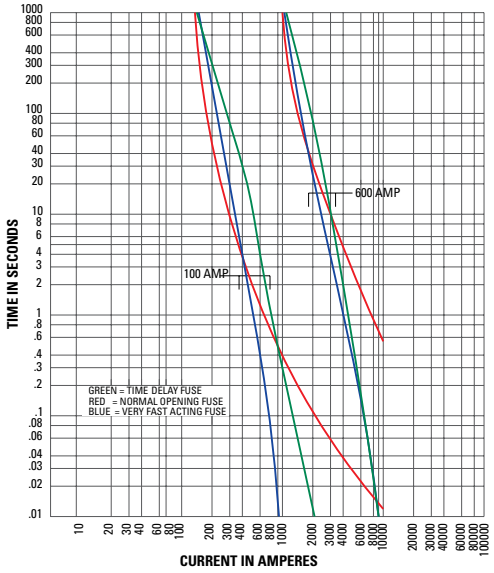


Figure 5 – Comparison of Average Melting Times for Three Fuse Types

of three fuse types: Littelfuse dual-element, time-delay LLSRK series RK1 fuses; Littelfuse normal opening NLS series fuses; and Littelfuse very fast acting L60S series semiconductor fuses.

To better illustrate this point, *Table 3* also compares the opening times for each of these fuses.

AMPERE RATING	FUSE TYPE	OPENING TIME IN SECONDS		
		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

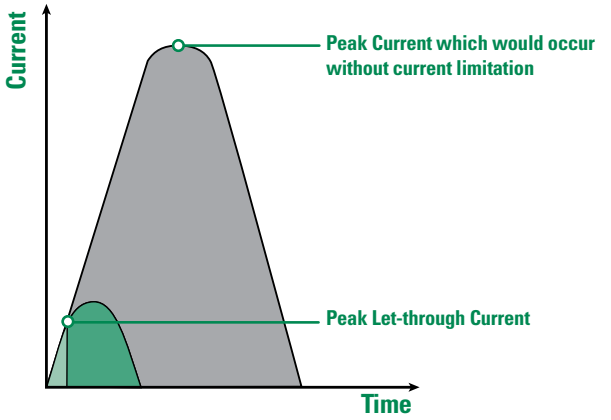


Figure 6 – Current limiting effect of fuses

(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 let-through 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.

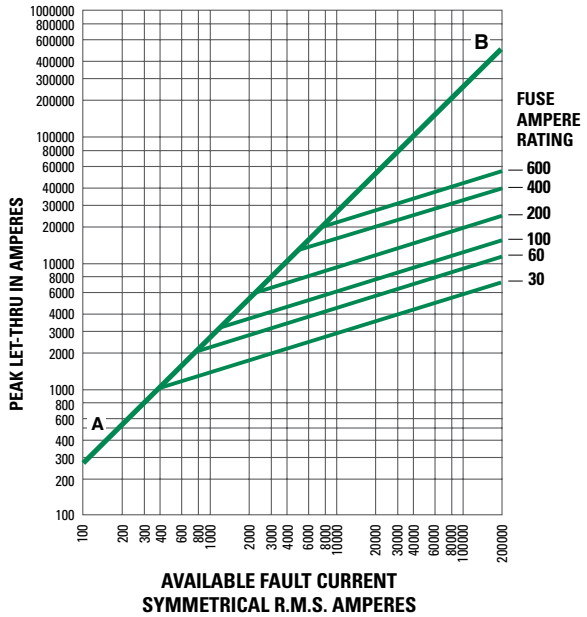


Figure 7 – Peak Let-through Charts

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 **www.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:

1. Provide back-up short-circuit protection to large air power circuit breakers.
2. Enable non-interrupting equipment such as bus duct to be

FUSE CHARACTERISTICS CURVES AND CHARTS

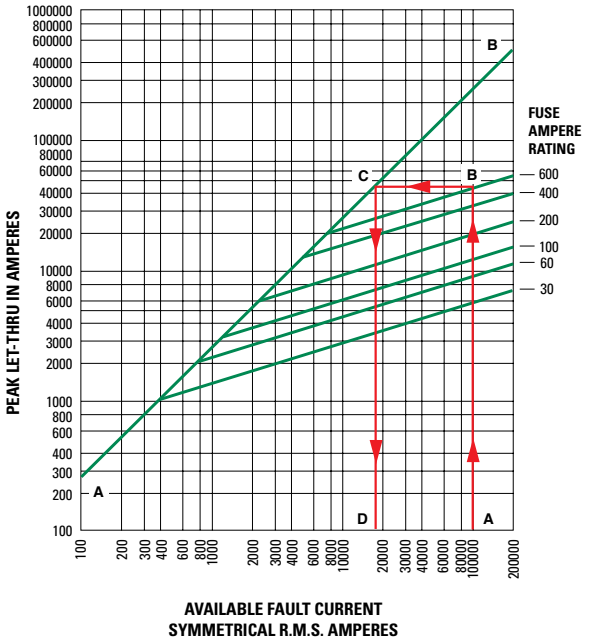


Figure 8 – Peak Let-through Chart for POWR-PRO® LLNRK Class RK1 Dual-Element Fuses Using the Up-Over-and-Down Method

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. For additional information, the latest specific NEC requirements, and solutions on how to increase the SCCR for a panel, visit **www.littelfuse.com/SCCR**.

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 I^2t and arcing I^2t (see definition of Ampere-Squared-Seconds). The sum of these is the total clearing I^2t.

For a system to be considered coordinated, the smaller fuse total clearing I^2t must be less than the larger fuse melting I^2t. 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 I^2t, 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 2008 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 620.62 – Elevators
- NEC 700.27 – Emergency Systems
- NEC 701.18 – Legally Required Standby Systems
- NEC 708.54 – Critical Operations Power Systems

LINE-SIDE FUSES			LOAD-SIDE FUSES								
			TIME-DELAY FUSES AMPERE RANGE, UL CLASS AND CATALOG NO.					FAST-ACTING FUSES AMPERE RANGE, UL CLASS AND CATALOG NO.			
AMPERE RANGE	UL CLASS	LITTELFUSE CATALOG NO.	601-6000	601-4000	30-600	30-600	30-600	30-600	30-1200	30-600	1-60
			L	L	RK1	J	RK5	RK1	T	J	G
			KLPC LDC	KLLU	LLNRK LLSRK_ID	JTD_ID JTD	FLNR_ID FLSR_ID IDSR	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	N/A
601-4000	L	KLLU	2:1	2:1	2:1	2:1	4:1	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	N/A
30-600	RK1	LLNRK	N/A	N/A	2:1	2:1	8:1	3:1	3:1	3:1	4:1
30-600	RK1	LLSRK_ID	N/A	N/A	2:1	2:1	8:1	3:1	3:1	3:1	4:1
30-600	J	JTD_ID	N/A	N/A	2:1	2:1	8:1	3:1	3:1	3:1	4:1
30-600	RK5	IDSR	N/A	N/A	1.5:1	1.5:1	2:1	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	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	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	3:1	3:1	3:1	4:1
30-600	RK1	KLSR	N/A	N/A	3:1	3:1	8:1	3:1	3:1	3:1	4:1
30-1200	T	JLLN	N/A	N/A	3:1	3:1	8:1	3:1	3:1	3:1	4:1
30-1200	T	JLLS	N/A	N/A	3:1	3:1	8:1	3:1	3:1	3:1	4:1
30-600	J	JLS	N/A	N/A	3:1	3:1	8:1	3:1	3:1	3:1	4:1
1-60	G	SLC	N/A	N/A	3:1	3:1	4:1	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)
- LPMP Series POWR-Switch Panel (multiple elevator shunt-trip disconnect switches)
- 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 **www.littelfuse.com/lcp** for more information on Littelfuse Pre-Engineered Solution products and corresponding selective coordination requirements.

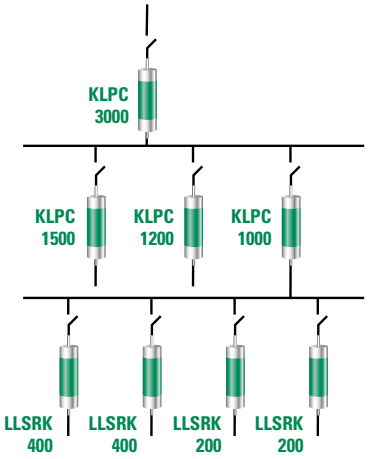


Figure 9 – Example of Selectively Coordinated Fused System

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 not less than the nominal circuit voltage and 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 not less than the current that must be interrupted.

110.10 Circuit Impedance, Short-Circuit 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 600 volts, nominal. Part VIII covers overcurrent protection for those portions of supervised industrial installations operating at voltages of not more than 600 volts, nominal. Part IX covers overcurrent protection over 600 volts, nominal.

(FPN): 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.

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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 248-14,
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
LDC: 4 seconds at 500% current rating

LF SERIES: KLPC, KLLU, LDC

PAGES: 11-13

CLASS R

STANDARDS: UL Standard 248-12,
CSA Standard C22.2, No. 106, classified as HRCI-R
VOLTAGE RATINGS: 250 and 600 volts, AC; 125 and 300 volts DC
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 fuseholders 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 fuseholders.

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

PAGES: 16-18

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 fuse.

LF SERIES: FLNR, FLNR_ID, FLSR, FLSR_ID, and IDSR

PAGES: 19-22

CLASS J

STANDARDS: UL Standard 248-8,
CSA Standard C22.2, No. 106, classified as HRCI-J
VOLTAGE RATING: 600 volts, AC
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

PAGES: 27-29

CLASS CC/CD

STANDARDS: UL Standard 248-4,
CSA Standard C22.2, No. 106, classified as HRCI Misc.
VOLTAGE RATING: 600 volts, AC
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

PAGES: 33-35

CLASS T

STANDARDS: UL Standard 248-15
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

PAGES: 30-31

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: 32

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 fuseholders.
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

PAGE: 16

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

PAGE: 24

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 to 600 volts; CSA, 0-600 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
12 seconds for fuses rated more than 3 amps

LF SERIES: BLF, BLN, BLS, FLA, FLM, FLQ, FLU, KLK, KLKD (600 Volts DC), SPF
NOTE: Littelfuse electronic fuses are also covered by these standards; see electronic section of this catalog, or request Electronic Designer's Guide (Publication No. EC101) for complete listing.

PAGES: 37-39

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 Group for assistance.

LF SERIES: KLC, LA15QS, LA30QS, LA50QS, LA60QS, LA60X, LA70QS, LA100P, LA120X, LA070URD, LA130URD, L15S, L25S, L50S, L60S, L70S, JLLS 900 amp through 1200 amp

PAGES: 62-81

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
VOLTAGE RATINGS: 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 fuseholders 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.

ONE-TIME FUSES (NON-RENEWABLE)

Time delay: Optional
Time-delay fuses must hold 500% current rating for a minimum of ten seconds.

LF SERIES: NLKP

PAGES: 25-26

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: RLN, RLS
REPLACEABLE LINKS SERIES: LKN, LKS

PAGES: 25-26

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

PAGE: 63

ELECTRICAL SAFETY GUIDE

Introduction

Electrical safety is an important issue for employers and employees alike. Unfortunately, thousands of electrical accidents continue to occur each year resulting in permanent disabilities to personnel and excessive medical and equipment replacement costs.

OSHA requirements are often the motivating factor increasing electrical safety in the workplace. OSHA continues to increase enforcement activities and is seeking to increase penalties for violations.

Typical OSHA violations related to electrical safety include improper Lockout/Tagout, faulty electrical wiring, failure to follow electrical safe work practices, failure to assess and identify hazards, failure to train employees and failure to provide PPE (personal protective equipment) to workers.

Industry consensus standards such as NFPA 70E, *Standard for Electrical Safety in the Workplace*, has been created at the request of OSHA to define and quantify electrical hazards including Shock, Arc-Flash and Arc-Blast.

Steps to Electrical Safety Compliance

- Define the project scope and identify any current safety program gaps
- Collect data and document your electrical system
- Evaluate your electrical system through engineering analysis
- Identify hazards and re-engineer to reduce hazards
- Label equipment to communicate hazards
- Update or develop an Electrical Safety Program
- Obtain Personnel Protective Equipment (PPE) and insulated tools
- Train Personnel
- Maintain and Audit One-Line Drawings and Electrical Safety Programs

WHAT: OSHA REQUIRES YOU... TO COMPLY WITH 1910 SUBPART S	**HOW: NFPA 70E MUST BE FOLLOWED...** TO COMPLY WITH 1910 SUBPART S
You MUST assess and identify all hazards above 50 volts	NFPA 70E explains how to perform a Shock & Arc-Flash Hazard Assessment down to 50 volts using tables and calculations
You MUST put safeguards in place for hazards above 50 volts	NFPA 70E establishes Hazard Risk Categories, Protection Boundaries, LO/TO, PPE requirements and the use of Energized Work Permits
You MUST train employees on safe work practices	NFPA 70E defines Qualified and Unqualified workers along with training requirements

Table 5 - Comparison of OSHA and NFPA 70E

OSHA Standard 29 Part 1910 Subpart S (electrical) generally addresses electrical safety standards, work practices, and maintenance requirements.

NFPA 70E *Standard for Electrical Safety in the Workplace* is an industry consensus standard that focuses on safety requirements to protect employees. OSHA commonly is referred to as the "What" or "Shall" and NFPA 70E as the "How" with regards to electrical safety compliance.

OSHA and NFPA 70E reinforce the need for Electrical Hazard Analysis. Electrical Hazard Analysis should address all potential hazards including Shock, Arc-Flash, Arc-Blast and burns. OSHA's general duty clause requires a workplace free from hazards and OSHA 1910.132(d) requires employers to identify hazards and protect workers. NFPA 70E Article 110.8(B)(1) specifically requires Electrical Hazard Analysis within all areas of the electrical system that operate at 50 volts or greater.

ELECTRICAL SAFETY GUIDE

Sources of Electrical Hazards and Faults

- Exposed energized parts
- Equipment fatigue or failure
- Accidental contact with energized parts
- Worn or broken insulation
- Loose connections
- Improperly maintained equipment or circuit breakers
- Water or liquid near electrical equipment
- Obstructions near or on equipment
- Improper grounding

Types of Electrical Faults

It is well documented and estimated that 95% of electrical faults start as ground faults. The remaining 5% are either phase-to-phase or three-phase faults. So in essence, if we are able to eliminate phase-to-ground faults, or 95% of all faults, we have essentially reduced the potential for 95% of the Arc-Flash Hazard, making the electrical system much safer.

LEADING INITIATORS OF FAULTS	% OF ALL FAULTS
Exposure to moisture	22.5%
Shortening by tools, rodents, etc.	18.0%
Exposure to dust	14.5%
Other mechanical damage	12.1%
Exposure to chemicals	9.0%
Normal deterioration from age	7.0%

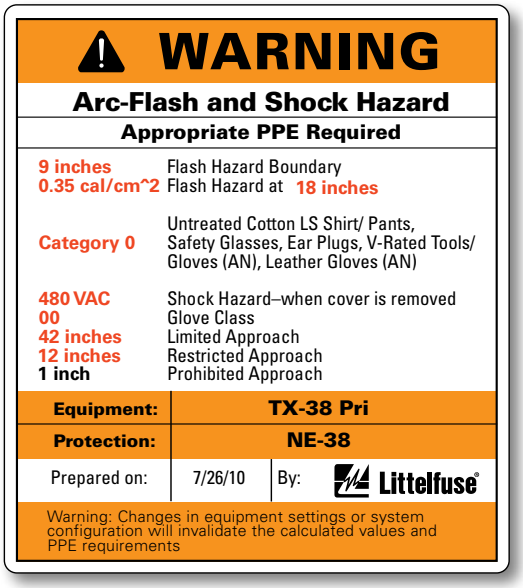
Table 6 - Leading initiators of electrical faults

For more information on Electrical Safety, visit www.littelfuse.com/services

Reducing Electrical Hazards

There are many methods and practices for reducing Arc-Flash and other electrical hazards while conforming to OSHA, NEC®, and NFPA 70E regulations and guidelines. Circuit designers and electrical engineers should carefully consider the following recommendations:

- Design the hazard out of the system through engineering design and component selection
- Identify and assess electrical hazards
- Use and upgrade to current-limiting overcurrent protective devices
- Implement an Electrical Safety Program
- Observe safe work practices
- Use properly selected Personal Protective Equipment (PPE) including insulated tools
- Use Warning Labels to identify and communicate electrical hazards
- Enforce Lockout/Tagout procedures and use Energized Electrical Work Permits
- Increase system protection by achieving Selective Coordination and using Ground Fault Protection devices.



Example of warning label

TERMS AND DEFINITIONS

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 (I^2t) – 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 I^2t.

- Melting I^2t 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 I^2t approaches a constant value for a given fuse.
- Arcing I^2t 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^2t (also Total Clearing I^2t) is the ampere-squared seconds (I^2t) through an overcurrent device from the inception of the overcurrent until the current is completely interrupted. Clearing I^2t is the sum of the Melting I^2t plus the Arcing I^2t.

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/cm².

Arcing Current (See *Figure 11*) – The current that flows through the fuse after the fuse link has melted and until the circuit is interrupted.

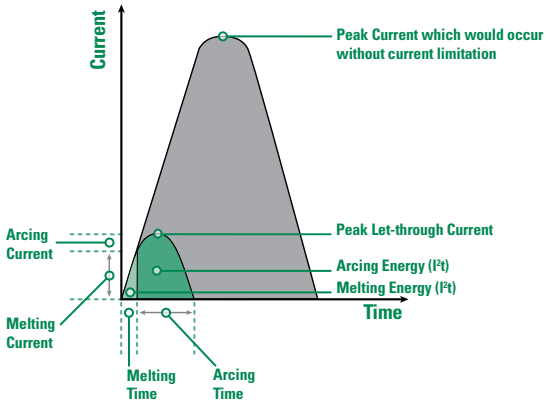


Figure 11 – Arcing and melting currents plus arcing, melting and clearing times

Arcing I^2t – See Ampere-Squared-Seconds (I^2t).

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 (V_{peak} or E_{peak}), 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.

TERMS AND DEFINITIONS

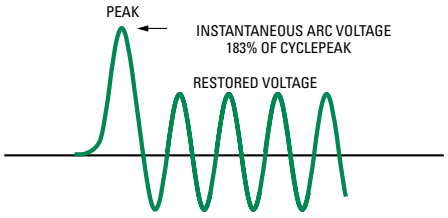


Figure 12 – Transient overvoltage during arcing time

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 I^2t – See Ampere-Square-Seconds (I^2t).

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 fuseblock or fuseholder that has either a rejection feature or dimensions that will reject non-current-limiting fuses.

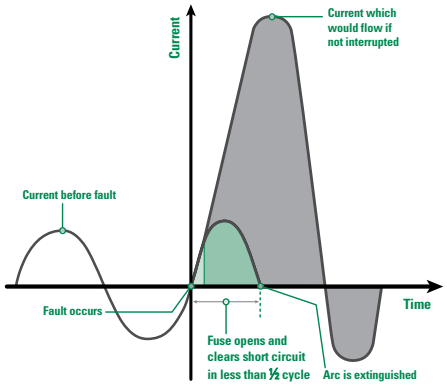


Figure 13 – Current-limiting Fuse

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.

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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 or alarm.

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 quartz, 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 neutral-ground 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.

I^2t – See Ampere-Squared-Seconds (I^2t).

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.

IEC Type 2 Protection – Fused protection for control components that prevents damage to these components under short-circuit conditions. See definition of No Damage.

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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^2.

Instantaneous Peak Current (I_p or I_{peak}) – 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^2t – See Ampere-Squared-Seconds (I^2t).

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.

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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.

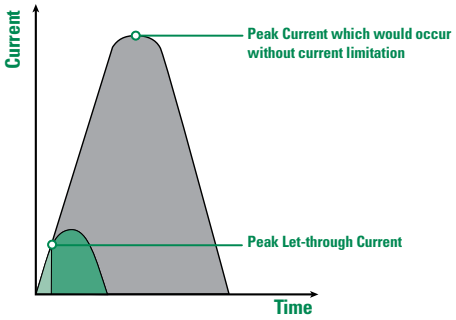

Figure 14 – Peak Let-through Current

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 Semiconductor Fuse.

Rejection Feature – The physical characteristic(s) of a fuse block or fuseholder 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

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equipment or short-circuits. For additional information, refer to the Selective Coordination pages of this Technical Application Guide.

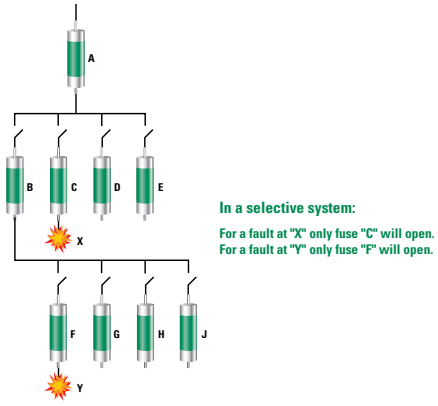

Figure 15 – Selective Coordination Example

Semiconductor Fuse – 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 short-circuit 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.

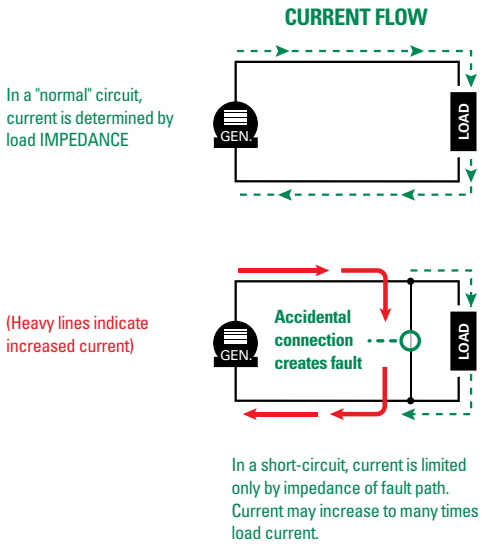

Figure 16 – Current Flow in Normal and Short Circuit Situations

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.

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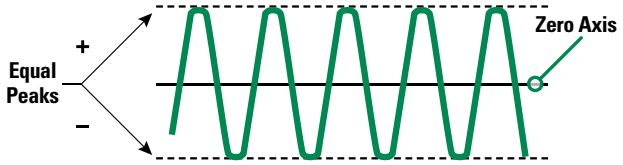

Figure 17 – Symmetrical Current

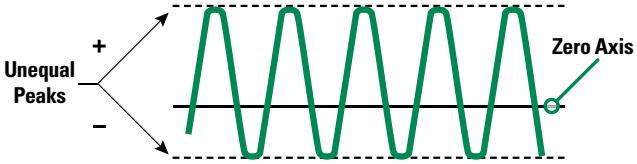

Figure 18 – Asymmetrical Current

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.*)

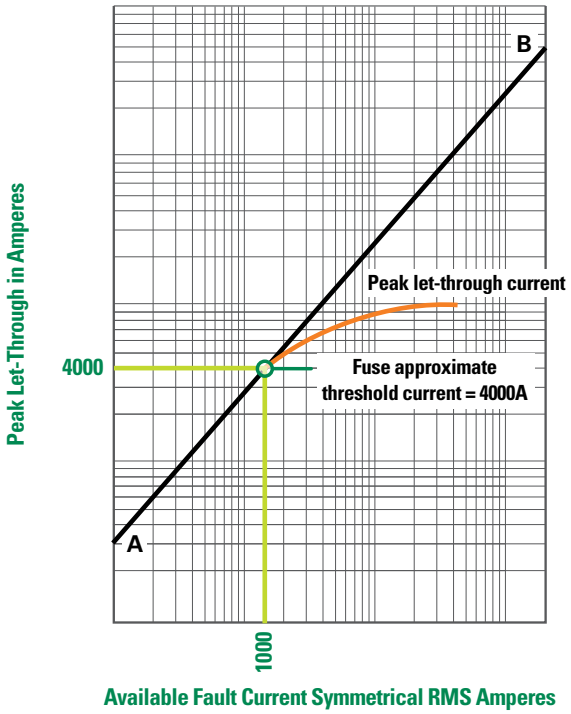

Figure 19 – Determining Threshold Current from Peak Let-through Chart

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 time-delay. 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.

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 UL CLASS RK1 OR RK5 FUSE AMPERE RATING	MOTOR RUNNING PROTECTION (USED WITHOUT PROPERLY SIZED OVERLOAD RELAYS) MOTOR FULL-LOAD AMPS		BACK-UP MOTOR RUNNING PROTECTION (USED WITH PROPERLY SIZED OVERLOAD RELAYS) MOTOR FULL-LOAD AMPS	
	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
2/10	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
3/10	0.24-0.30	0.27-0.30	0.21-0.24	0.23-0.26
4/10	0.32-0.39	0.35-0.40	0.25-0.32	0.27-0.35
1/2	0.40-0.47	0.44-0.50	0.33-0.40	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
1 1/8	0.90-0.99	0.98-1.08	0.81-0.90	0.88-0.98
1 1/4	1.00-1.11	1.09-1.21	0.91-1.00	0.99-1.09
1 4/10	1.12-1.19	1.22-1.30	1.01-1.12	1.10-1.22
1 1/2	1.20-1.27	1.31-1.39	1.13-1.20	1.23-1.30
1 6/10	1.28-1.43	1.40-1.56	1.21-1.28	1.31-1.39
1 8/10	1.44-1.59	1.57-1.73	1.29-1.44	1.40-1.57
2	1.60-1.79	1.74-1.95	1.45-1.60	1.58-1.74
2 1/4	1.80-1.99	1.96-2.17	1.61-1.80	1.75-1.96
2 1/2	2.00-2.23	2.18-2.43	1.81-2.00	1.97-2.17
2 8/10	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
3 2/10	2.56-2.79	2.79-3.04	2.41-2.56	2.61-2.78
3 1/2	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
4 1/2	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 6/10	4.48-4.79	4.87-5.21	4.01-4.48	4.36-4.87
6	4.80-4.99	5.22-5.43	4.49-4.80	4.88-5.22
6 1/4	5.00-5.59	5.44-6.08	4.81-5.00	5.23-5.43
7	5.60-5.99	6.09-6.52	5.01-5.60	5.44-6.09
7 1/2	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
17 1/2	14.00-15.99	15.22-17.39	12.01-14.00	13.05- 15.21
20	16.00-19.99	17.40-20.00	14.01-16.00	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	56.00-59.99	60.87-65.21	48.01-56.00	52.18-60.87
75	60.00-63.99	65.22-69.56	56.01-60.00	60.88-65.22
80	64.00-71.99	69.57-78.25	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	180.00-199.99	195.65-217.38	160.01-180.00	173.92-195.62
250	200.00-239.99	217.39-250.00	180.01-200.00	195.63-217.39
300	240.00-279.99	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 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 HP	FULL LOAD AMPS	WITHOUT OVERLOAD RELAYS		WITH OVERLOAD RELAYS		SWITCH OR FUSE CLIP RATING
		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	
120 VOLT 1-PHASE MOTORS (120V CIRCUIT)						
1/6	4.4	5	5	5 6/10	5 6/10	30
1/4	5.8	7	6 1/4	7 1/2	7	30
1/3	7.2	9	8	9	9	30
1/2	9.8	12	10	15	12	30
3/4	13.8	15	15	17 1/2	17 1/2	30
1	16	20	17 1/2	20	20	30
1 1/2	20	25	20	25	25	30
2	24	30	25	30	30	30
230 VOLT 1-PHASE MOTORS (240V CIRCUIT)						
1/6	2.2	2 1/2	2 1/2	2 8/10	2 8/10	30
1/4	2.9	3 1/2	3 2/10	4	3 1/2	30
1/3	3.6	4 1/2	4	4 1/2	4 1/2	30
1/2	4.9	5 6/10	5 6/10	6 1/4	6	30
3/4	6.9	8	7 1/2	9	8	30
1	8	10	9	10	10	30
1 1/2	10	12	10	15	12	30
2	12	15	12	15	15	30
3	17	20	17 1/2	25	20	30
5	28	35	30*	35	35	60
7 1/2	40	50	45	50	50	60
10	50	60	50	70	60	60
200 VOLT 3-PHASE MOTORS (208V CIRCUIT)						
1/2	2.5	3	2 8/10	3 2/10	3	30
3/4	3.7	4 1/2	4	5	4 1/2	30
1	4.8	6	5 6/10	6 1/4	6	30
1 1/2	6.9	8	7 1/2	7 1/2	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
7 1/2	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	400
75	221	250	250	300	300	400
100	285	350	300	400	350	400
125	359	400*	400*	450	450	600
150	414	500	450	600	500	600
230 VOLT 3-PHASE MOTORS (240V CIRCUIT)						
1/2	2.2	2 8/10	2 1/2	2 8/10	2 8/10	30
3/4	3.2	4	3 1/2	4	4	30
1	4.2	5	4 1/2	5 6/10	5	30
1 1/2	6.0	7 1/2	6 1/4	7 1/2	7 1/2	30
2	6.8	8	7 1/2	9	8	30
3	9.6	12	10	12	12	30
5	15.2	17 1/2	17 1/2	20	17 1/2	30
7 1/2	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
100	248	300	250	350	300	400
125	312	350	350	400	400	400
150	360	450	400*	450	450	600
200	480	600	500	600	600	600

MOTOR HP	FULL LOAD AMPS	WITHOUT OVERLOAD RELAYS		WITH OVERLOAD RELAYS		SWITCH OR FUSE CLIP RATING
		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	
460 VOLT 3-PHASE MOTORS (480V CIRCUIT)						
1/2	1.1	1 4/10	1 1/4	1 4/10	1 4/10	30
3/4	1.6	2	1 8/10	2	2	30
1	2.1	2 1/2	2 1/4	2 8/10	2 1/2	30
1 1/2	3.0	3 1/2	3 2/10	4	3 1/2	30
2	3.4	4	3 1/2	4 1/2	4	30
3	4.8	5 6/10	5	6	5 6/10	30
5	7.6	9	8	10	9	30
7 1/2	11	12	12	15	15	30
10	14	17 1/2	15	17 1/2	17 1/2	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
575 VOLT 3-PHASE MOTORS (600V CIRCUIT)						
1/2	0.9	1 1/8	1	1 1/8	1 1/8	30
3/4	1.3	1 6/10	1 4/10	1 6/10	1 6/10	30
1	1.7	2	1 8/10	2 1/4	2	30
1 1/2	2.4	3	2 1/2	3	3	30
2	2.7	3 2/10	2 8/10	3 1/2	3 2/10	30
3	3.9	4 1/2	4	5	4 1/2	30
5	6.1	7 1/2	7	8	7 1/2	30
7 1/2	9	10	10	12	12	30
10	11	12	12	15	15	30
15	17	20	17 1/2	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
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 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	1¼	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 CCMR Time-Delay Fuses Based on Motor Full Load Amps

MOTOR FULL LOAD CURRENT (F.L.A.)						CCMR AMPERE RATING
FOR MOTORS WITH AN ACCELERATION TIME OF 2 SECONDS OR LESS		FOR MOTORS WITH AN ACCELERATION TIME OF 5 SECONDS OR LESS		FOR MOTORS WITH AN ACCELERATION TIME OF 8 SECONDS OR LESS		
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	½
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	1¼
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	1 8/10
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	5 8/10
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	6¼
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 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%

*If motor LRA varies from these values, contact Littelfuse.

ALPHANUMERIC INDEX

ALPHANUMERIC INDEX

CONDENSED CROSS REFERENCE

Power (Electrical) and Electronic Fuses

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 only for product selection. We suggest you check all applicable specifications before making substitutions. For special applications, more complete information, and for fuseblock and medium voltage fuse cross referencing, visit **www.littelfuse.com** or call 1-800-TEC-FUSE (1-800-832-3873).

COMPETITION	LITTELFUSE	COMPETITION	LITTELFUSE	COMPETITION	LITTELFUSE	COMPETITION	LITTELFUSE
10KOTN	**NLN**	CNM	**FLM**	KAB	**L25S**	NOS	**NLS**
10KOTS	**NLS**	CNQ	**FLQ**	KAC	**KLC**	NRN	**NLN**
50KOTN	**NLN**	CRN-R	**FLNR_ID (note 3)**	KBH	**L50S**	NRN (15-60A)	**NLKP**
50KOTS	**NLS**	CRS-R	**FLSR_ID**	KLM	**KLKD**	NRS	**NLS**
A	**251**	CSF13X	**L15S**	KLMR	**CCMR**	OT	**NLN**
A013F	**L15S**	CSF25X	**L25S (AC only)**	KLU	**KLLU or KLPC**	OTM	**BLF or BLN**
A015F	**L15S**	CSF50P	**L50S**	KN	**KLNR**	OTN	**NLN**
A015R	**L15S**	CSF60C	**KLC (AC only)**	KON	**NLN**	OTS	**NLS**
A025F	**L25S**	CSF60X	**L60S (AC only)**	KOS	**NLS**	REN	**RLN**
A050F	**L50S**	CSF70P	**L70S**	KRPC (SP)	**KLPC**	RES	**RLS**
A060F	**L60S**	CTN-R	**KLNR**	KRPC-L	**KLPC**	RF	**RLN**
A060URL	**KLK**	CTS-R	**KLSR**	KS	**KLSR**	RFA	**L15S**
A070F	**L70S**	EBS	**BLS**	KTK	**KLK**	RFC	**KLC**
A13X	**L15S**	ECNR	**FLNR_ID (note 3)**	KTKR	**KLKR**	RFL (750V)	**L70S (700 V)**
A25X	**L25S (AC only)**	ECSR	**FLSR_ID**	KTNR	**KLNR**	RFN (Ferraz)	**RLN**
A2D-R	**LLNRK**	ELN	**LKN**	KTSR	**KLSR**	RFS (Ferraz)	**RLS**
A2K-R	**KLNR**	ELS	**LKS**	KTU	**KLPC**	RFV	**L50S**
A3T	**JLLN**	ERN	**RLN**	L	**KLLU or KLPC**	RHN	**KLNR**
A4BQ	**KLPC**	ERS	**RLS**	LCL	**KLPC or KLLU**	RHS	**KLSR**
A4BT	**KLLU or KLPC**	FNA	**FLA**	LCU	**KLPC or KLLU**	RLN (Ferraz)	**LKN**
A4BY	**KLPC or KLLU**	FNB	**235**	LENRK	**LLNRK**	RLS (Ferraz)	**LKS**
A4J	**JLS**	FNM	**FLM**	LESRK	**LLSRK_ID**	S	**SOO**
A50P (type 1 & 4)	**L50S**	FNQ	**FLQ**	LKN	**LKN**	SA	**SAO**
A60X	**L60S**	FNQ-R	**KLDR**	LKS	**LKS**	SC	**SLC**
A6D-R	**LLSRK_ID**	FRN-R	**FLNR_ID (note 3)**	LKU	**KLLU**	SCLR	**KLSR**
A6K-R	**KLSR**	FRS-R	**FLSR_ID**	LONRK	**LLNRK**	SEC	**SLC**
A6T	**JLLS**	FWA (note 2)	**L15S**	LOSRK	**LLSRK_ID**	SF13X	**L15S**
A70P	**L70S**	FWH (note 2)	**L50S**	LPCC	**CCMR**	SF25X	**L25S**
ACK	**CCK**	FWP (note 1)	**L70S**	LPJ (SP)	**JTD_ID**	SF50P	**L50S**
AG	**SLC**	FWX (note 1)	**L25S**	LPNRK (SP)	**LLNRK**	SF60X	**L60S**
AGA	**AGA**	GDA	**216**	LPSRK (SP)	**LLSRK_ID**	SF70P	**L70S**
AGC	**312**	GDB	**217**	MCL	**KLK**	SFE	**SFE**
AGU (1-30A)	**BLN**	GDC	**218**	MDA	**326**	SL	**SLO**
AGW	**AGW**	GDL	**313**	MDL	**313**	T	**TOO**
AJT	**JTD_ID**	GEB	**LEB**	MDQ	**313**	TJN	**JLLN**
ANL	**CNL**	GEBN	**LET**	MDV	**315**	TJS	**JLLS**
ANN	**CNN**	GFA	**251**	MDX	**313**	TL	**TLO**
ATC	**ATO (257)**	GFN	**FLA**	MEN	**FLM**	TR	**FLNR_ID (note 3)**
AT-DE	**FLNR_ID (note 3)**	GGC	**312**	MEQ	**FLQ**	TRM	**FLM**
ATDR	**CCMR**	GGM	**235**	MID	**FLA**	TRN-R	**FLNR_ID (note 3)**
ATM (Ferraz)	**KLKD**	GLR	**LGR**	MOF	**BLN**	TRS	**FLSR_ID**
ATMR	**KLKR**	GMT	**481**	MOL	**BLF**	TRS-R	**FLSR_ID**
ATQ	**FLQ**	HCLR	**KLKR**	MTH	**312**	XL25X	**L25S**
ATQR	**KLDR**	HCTR	**KLDR**	NCLR	**KLNR**	XL50F	**L50S (note 1)**
AX	**481**	HEB	**LEB**	NON	**NLN**	XL70F	**L70S (note 1)**
BAF	**BLF**	HET	**LET**				
BAN	**BLN**	HLR	**LHR**				
BBS	**BLS**	J	**JLS**				
CJ	**JLS**	JDL	**JTD_ID**				
CJS	**JLS**	JFL	**JLS**				
CLF	**KLPC or KLLU**	JHC	**JTD_ID**				
CLL	**KLLU or KLPC**	JJN	**JLLN**				
CLU	**KLLU or KLPC**	JJS	**JLLS**				
CM	**BLF**	JKS	**JLS**				
CMF	**BLN**	KAA	**L15S**				

1) Check specific mounting dimensions before substituting.
2) Check fuse characteristics and mounting dimensions for specific application before substituting.
3) For $^{1}/_{10}$ - 30 amperes, order non-indicating FLNR series fuses.

Remember 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.

Littelfuse® POWR-GARD® products and services enhance the productivity and safety of electrical systems. POWR-GARD offers current-limiting fuses to decrease Arc-Flash exposure, fuseholders and fusecovers to reduce incidental contact, protection relays to safeguard equipment and Electrical Safety Services and worker training to improve safety.

- **Fuses and Fuseholders**
- **Protection Relays**
- **Solar-Rated Products**
- **Electrical Safety Services**
- **Worker Training**
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Protection Relay Catalog The comprehensive line of electronic and microprocessor-based protection relays safeguard equipment and personnel to prevent expensive damage, downtime or injury due to electrical faults.

Up-LINK™ Product Brochure Up-LINK is a patented remote indication technology, incorporated in a growing number of fuseholders and other products that improve productivity by providing necessary information to monitoring sites.

Varistor Catalog Littelfuse offers industrial Metal Oxide Varistors (MOVs) to protect against transient voltage surges.

Safety Services Catalog From Arc-Flash Hazard assessments to worker training, POWR-GARD Safety Services improve facility safety and help safety managers meet OSHA standards.

OEM Design Brochure Design engineers can work with Littelfuse POWR-GARD to add value to their products with standard or custom circuit protection solutions.

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FORM NO. 101-12