POWR-PRO® Fuses

POWR-PRO Fuses

Complete Circuit Protection Plus
Time Saving Indication.

Indicator™ fuses combat one of the most common and frustrating obstacles to productivity: down time. Every time a fuse opens and production stops, money is wasted. Locating a blown fuse used to take 20 minutes or more. With Littelfuse Indicator™ fuses, they can be spotted in an instant — and safely...with the power off. There is no need to work in an energized panel to locate a blown fuse.

Now it couldn't be easier to locate the blown fuse — without meters or special skills. Simply look at the fuses Indicator™ window. When the fuse blows the window turns from clear to dark instantly, indicating which fuse needs to be replaced without headaches or hassles.

These technologically advanced fuses feature solid-state designs that improve overall performance and increase fuse life. When properly applied, these fuses provide superior protection and improved time-delay over conventional fuse designs. The patented solid-state overload section provides consistent and reliable operation by eliminating moving parts which are subject to fatigue. This provides longer fuse life by eliminating needless fuse openings due to motor inrush currents. The superior performance allows you to consolidate your inventories by replacing many older, conventional fuses which have limited performance characteristics.

Use Indicator™ fuses and you can:

- Reduce **Down-Time**
- Reduce **Nuisance Opening**
- Reduce **Fuse Inventory**
- Reduce **Equipment Damage**
- Reduce **Accidents**
- Reduce **Housekeeping Headaches**

The Indicator™ Solution Software

Indicator Solution

This easy to use software analyzes your plant operations and calculates six areas of cost savings when you use Indicator™ fuses.

To calculate your savings, call 1-800-TEC-FUSE for a free copy of the Indicator™ Solution software.

Littelfuse Indicator™ Fuses

During an overload or short-circuit situation, the Indicator™ fuse will promptly notify you of an open circuit. Using patented Littelfuse technology, the Indicator™ fuse's window changes from clear to dark. Once blown, there is absolutely no current through the fuse.

LLSRK_ID

- Class RK1
- 600 VAC
- Dual-Element, Time-Delay
- 1/10-600 Amperes

see pages 11-12

FLNR_ID/FLSR_ID

- Class RK5
- 250/600 VAC
- Dual-Element, Time-Delay
- 1/10-600 Amperes

see pages 28-30

IDSR

- Class RK5
- 600 V AC/DC
- Dual-Element, Time-Delay
- 1/10-600 Amperes

see pages 21

JTD_ID

- Class J
- 600 VAC
- Time-Delay
- 8/10-600 Amperes

see pages 16-18

313_ID

- Electronic 3AG
- 125/32 VAC
- Slo-Blo®
- 1/2-10 Amperes

see page 53

POWR-PRO Fuses

Introducing the Global Pro System

GlobalPro GLOBAL CIRCUIT PROTECTION

Offering World Class Performance and Global Acceptance

The International Challenge

Engineers and equipment designers are faced with a dilemma when choosing the right circuit protection for their globally distributed equipment. They need to determine what markets the product will be used in, what local electrical standards apply in each of those markets, and what fuses should be used so users can find replacements easily. These can be daunting questions particularly because some of this information often is not available to the engineer when a particular piece of equipment is being designed.

The Global Pro system resolves these design issues by incorporating North American standards to fit internationally accepted IEC fuse dimensions. This allows use of touch-safe fuseholders that can be used in virtually any market and permits equipment to be easily adapted by simply replacing the fuse with one that meets local standards. It's that simple.

The benefits of the Global Pro system include:

- Global acceptance
- UL and IEC approval
- Universal voltages
- Touch-safe components
- Integrated lockout/tagout device for OSHA +compliance
- Blown fuse indication
- Design versatility for OEM's

Global Acceptance – Total Pro-Tection

The Littelfuse Global-Pro circuit protection system combines fuses, fuse holders and fusible disconnect switches in a simple, integrated package designed to comply with UL and IEC requirements. The result is the single best solution for your worldwide circuit protection needs. No matter where your product is used, Global Pro will be accepted. More significantly, it's easy too! It meets universal voltage standards, offers universal fuse sizes and uses universally understood product labels and part numbers.

Flexible Components

The components of the Global Pro system are vital to its revolutionary performance, and the key component within the system is the fuse. The Littelfuse Global Fuse is designed to offer UL Class J performance, but with the compact size and the international compatibility associated with fuses manufactured to IEC dimensions.

More Protection In Less Space

Littelfuse's Global Pro fuses are significantly smaller in size than 30 amp, 60 amp, and 100 amp Class J fuses. But their small size does not limit their performance. All Global Pro fuses offer the following:

- Extremely compact size
- Pop-up indication
- Performance to UL Class J fuse requirements
- Compatibility with IEC style fuseholders

Note: For more information refer to pages 156–157 of this catalog.

The POWR-PRO® System will:

- Provide superior current limiting protection with innovative, tested designs to prevent or reduce electrical system damage.
- Reduce inventory by standardizing system protection.
- Provide visual blown fuse indication with LLSRK_ID, JTD_ID, and IDSR Indicator™ fuses.
- Reduce fuse replacement downtime with simple color coded fuse labels.

See for yourself why the POWR-PRO® System gives you the widest range of circuit protection available today when compared to other systems.

UL Fuse Class	POWR-PRO®	Low Peak	System 2000
Class L Class RK1 Class J Class CC	KLPC LLNRK/LLSRK_ID JTD/JTD_ID CCMR (2/10–60)	KRPC LPNRK/LPSRK LPJ LPCC (1/2–30)	A4BQ A2DR/A6DR AJT ATDR (0–30)
Class RK5 Class L	IDSR LDC	— —	— —

COLOR COORDINATED FOR EASE OF IDENTITY AND REPLACEMENT

Green labeled fuses provide all the inventory you need for:

- Superior current limitation from 1/10 – 6000 amperes.
- Type II “No Damage” coordination with NEMA and IEC motor circuits.
- Blown fuse indication (LLSRK_ID and JTD_ID).
- Compact protection for motor circuits (JTD, JTD_ID, and CCMR).
- 300,000 AIR to meet future trends toward higher available short circuit currents.

Red labeled fuses provide all the inventory you need for:

- The only UL Listed 600 volt AC/DC fuses 1/10 through 2000 amperes.
- Non-electrical blown fuse indication in the cost effective IDSR series.

KLPC Series POWR-PRO® Class L Fuses

600 VAC ▪ Time-Delay ▪ 200 – 6000 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

SPECIFICATIONS

Voltage Ratings: AC: 600 Volts
DC: 480 Volts

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
300,000 amperes rms symmetrical
(Littelfuse self-certified).
DC: 20,000 amperes

Ampere Range: 200 – 6000 amperes

Approvals: AC: Standard 248-10, Class L
UL Listed 601 – 6000 amps
(File No: E81895)
UL Recognized 200 – 600 amps
(File No: E71611)
CSA Certified 200 – 6000 amps
(File No: LR29862)
QPL Federal Specifications WF-1814
700 – 6000 amps
DC: Littelfuse self-certified

AMPERE RATINGS

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

Example part number (series & amperage): KLPC 1000

KLPC series POWR-PRO® fuses provide ideal overcurrent protection for circuits from 200 through 6000 amperes. KLPC series POWR-PRO® fuses specification-grade construction and performance meet or exceed the most stringent project specifications: 99.9% pure silver links, silver-plated copper end bells, glass-reinforced melamine bodies, O-ring seals between body and end bells, and granular quartz fillers.

KLPC series POWR-PRO® fuses are the only UL listed Class L fuses that provide a minimum of ten seconds time delay at 500% rated current and are also as current limiting as the fastest Class L fuse on the market. On average, the peak let-through currents of KLPC series fuses are 10% less than any other “time-delay” Class L fuse.

APPLICATIONS

Service switches

Switchboard mains and feeders

Bolted pressure contact switches

Motor control center mains

Large motor branch circuits

UL Listed series-rated protection for molded case circuit breaker panelboards and loadcenters. (See panelboard manufacturers’ literature for recommended fuse rating.)

Primary and secondary protection for transformers

Protection of power circuit breakers

FEATURES AND BENEFITS

- **Eliminate unnecessary downtime —** KLPC **POWR-PRO®** series fuses’ time delay withstands system surges and keeps your circuits in service.
- **Best protection for system components —** Maximum current limitation means less equipment and system damage when short circuits occur. Reduced damage means that electrical service can be restored quickly, reducing costly downtime, and often permitting equipment repair rather than replacement.
- **Coordinates with other system components —** KLPC series fuses provide maximum coordination with fuses and circuit breakers both on the line and load side of the fuses. See the Fuseology section of this catalog for additional information.
- **Eliminate need to oversize fuses —** This may permit the use of smaller less expensive switches, and, since the lower rated fuses are more current limiting, equipment receives even better protection.
- **300kA Interrupting Rating —** Littelfuse self-certified to 300,000 amperes as standard. Meets future trend towards higher available short circuit currents.

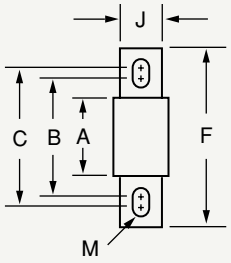


FIG.1

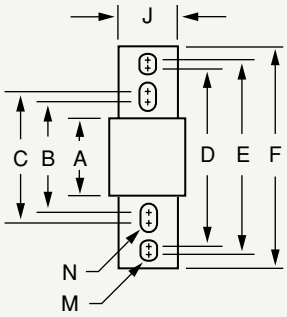


FIG.2

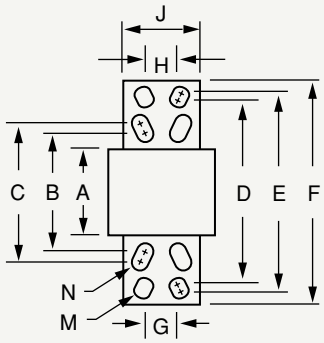


FIG. 3

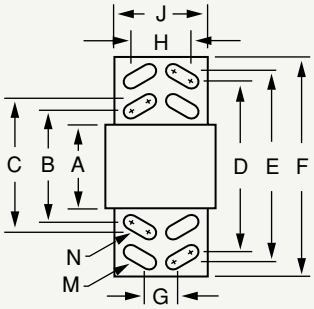


FIG. 4

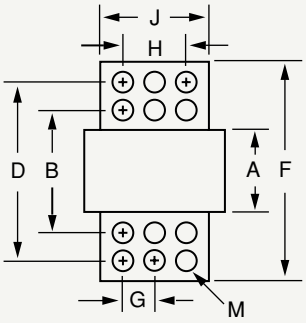
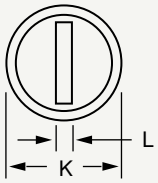


FIG. 5



AMPERES	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)												
		A	B	C	D	E	F	G	H	J	K	L	M	N
200 – 800	1	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	—	—	8-5/8 (219.1)	—	—	2 (50.8)	2-1/2 (63.5)	3/8 (9.5)	5/8 x 1-1/8 (15.9) x (28.6)	—
801 – 1200	2	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10-3/4 (273.1)	—	—	2 (50.8)	2-1/2 (63.5)	3/8 (9.5)	5/8 x 3/4 (15.9) X (19.1)	5/8 x 1- 1/8 (15.9) X (28.6)
1201 – 1600	2	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10-3/4 (273.1)	—	—	2-3/8 (60.3)	3 (76.2)	7/16 (11.1)	5/8 X 3/4 (15.9) X (19.1)	5/8 X 1- 1/8 (15.9) X (28.6)
1601 – 2000	2	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10-3/4 (273.1)	—	—	2-3/4 (69.9)	3-1/2 (88.9)	1/2 (12.7)	5/8 x 3/4 (15.9) x (19.1)	5/8 x 1- 1/8 (15.9) x (28.6)
2001 – 2500	3	4 101.6)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10- 3/4 (273.1)	1-5/8 (41.3)	1-3/4 (44.5)	3-1/2 (88.9)	5 (127.0)	3/4 (19.1)	5/8 X 3/4 (15.9) x (19.1)	5/8 X 1- 1/8 (15.9) x (28.6)
2501 – 3000	3	4 (101.6)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10- 3/4 (273.1)	1-5/8 (41.3)	1-3/4 (44.5)	4 (101.6)	5 (127.0)	3/4 (19.1)	5/8 x 3/4 (15.9) x (19.1)	5/8 x 1- 1/8 (15.9) x (28.6)
3001 – 4000	4	4 (101.6)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10- 3/4 (273.1)	1-3/4 (44.5)	3-1/4 (82.6)	4-3/4 (120.7)	5-3/4 (146.1)	3/4 (19.1)	5/8 x 1-3/8 (15.9) x (34.9)	5/8 x 1-3/8 (15.9) x (34.9)
4001 – 5000	5	4 (101.6)	5-3/4 (146.1)	—	9-1/4 (235.0)	—	10-3/4 (273.1)	1-5/8 (41.3)	3-1/4 (82.6)	5-1/4 (133.4)	7-1/8 (181.0)	1 (25.4)	5/8 DIA. (15.9)	—
5001 – 6000	5	4 (101.6)	5-3/4 (146.1)	—	9-1/4 (235.0)	—	10-3/4 (273.1)	1-5/8 (41.3)	3-1/4 (82.6)	5-3/4 (146.1)	7-1/8 (181.0)	1 (25.4)	5/8 DIA. (15.9)	—

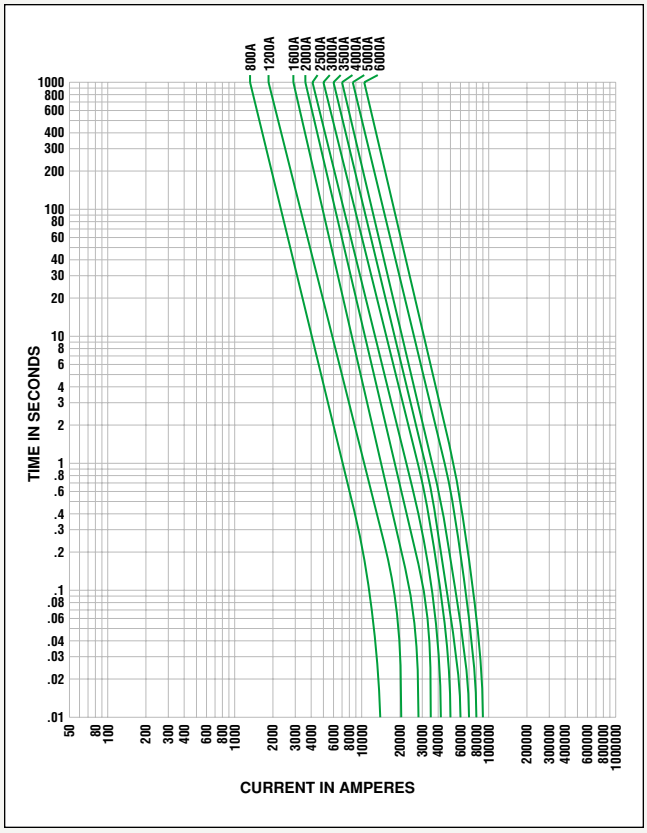
POWR-PRO Fuses

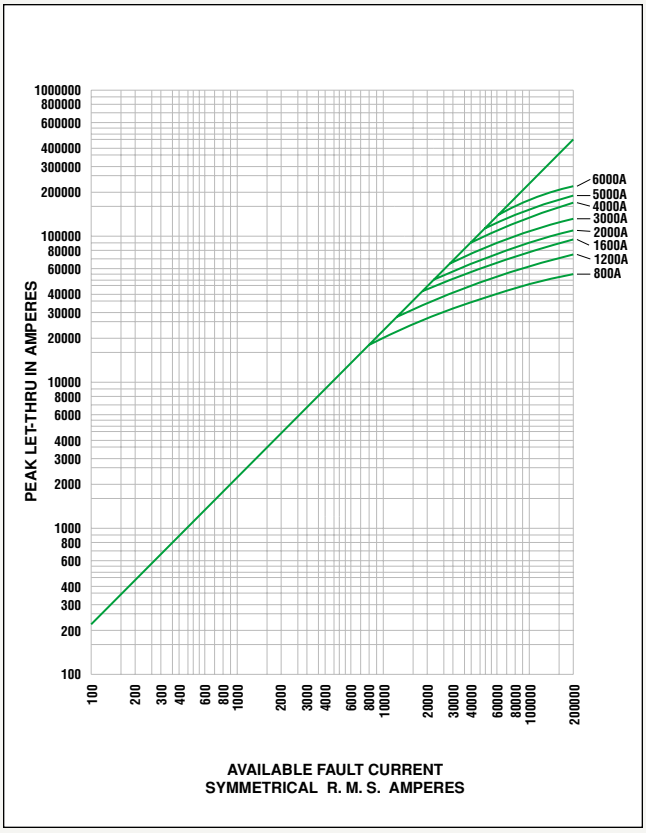
Current-Limiting Effects of KLPC (600V) fuses

*** Prospective RMS Symmetrical Amperes Short-Circuit Current**

Note: Data derived from Peak Let-Thru Curves

Short Circuit Current*	Apparent RMS Symmetrical Current for various fuse ratings							
	800A	1200A	1600A	2000A	3000A	4000A	5000A	6000A
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





LLSRK_ID Series Indicator™ POWR-PRO® Class RK1

600 VAC ▪ Dual-Element, Time-Delay ▪ 1/10 – 600 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

The all new LLSRK_ID series fuse is the most advanced Class RK1 fuse available today providing unparalleled performance and protection to modern circuits. The patented Indicator™ technology provides instant identification of a blown fuse greatly enhancing system up-time, while the precision formed short circuit elements virtually eliminate damage to components from unexpected electrical faults. In addition, the all new solid-state overload section has no moving parts, stopping unnecessary fatigue failures commonly found in other spring loaded fuses.

SPECIFICATIONS

Voltage Rating: 600 VAC/300 VDC

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
300,000 amperes rms symmetrical
(Littelfuse self-certified)
DC: 20,000 amperes

Ampere Range: 1/10 – 600 amperes

Approvals: AC: Standard 248-12, Class RK1
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)

DC: Littelfuse self-certified

AMPERE RATINGS

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

Example part number (series & amperage): LLSRK30ID

NOTE: All fuses rated 1 amp and above are Indicator fuses.

RECOMMENDED FUSE BLOCKS

LR600 Series

Refer to Fuse Block section of this catalog for additional information.

APPLICATIONS

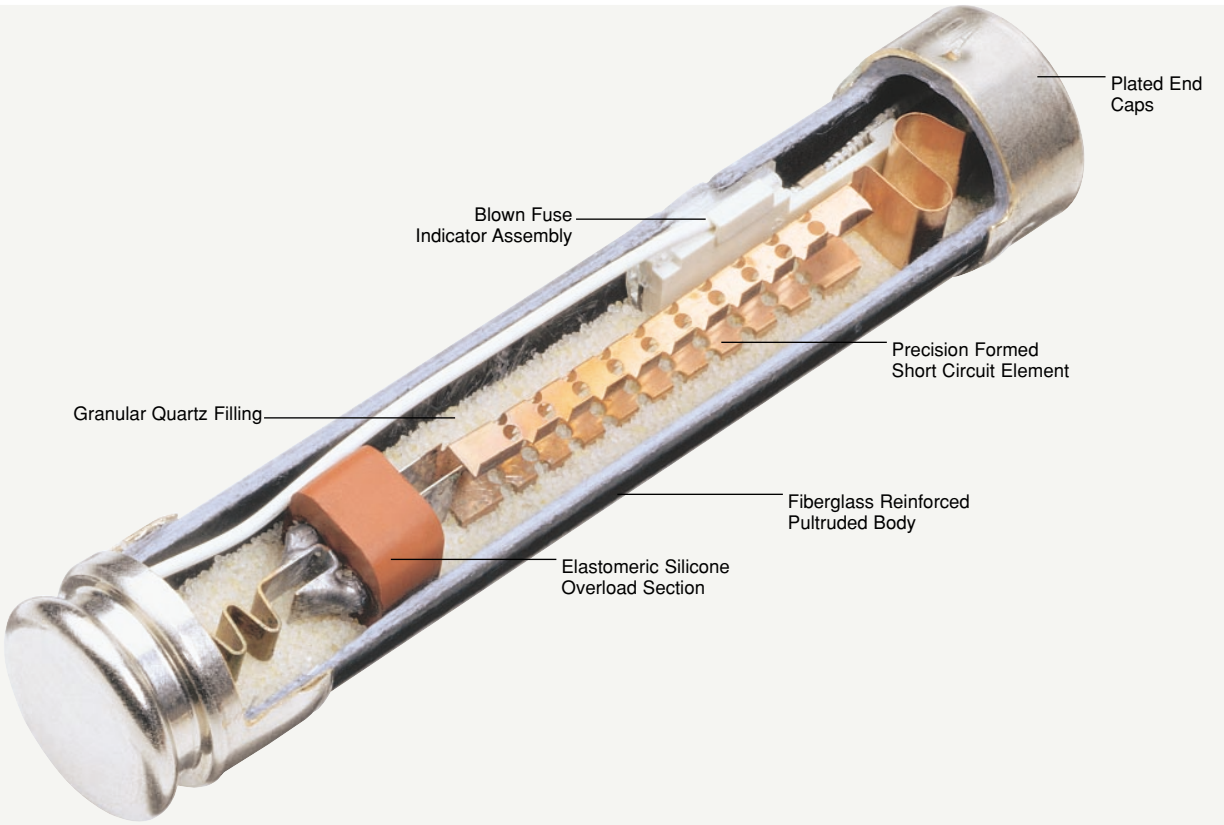
All general-purpose circuits
Motors
Transformers
Solenoids
Fluorescent lighting
All system components with high in-rush currents

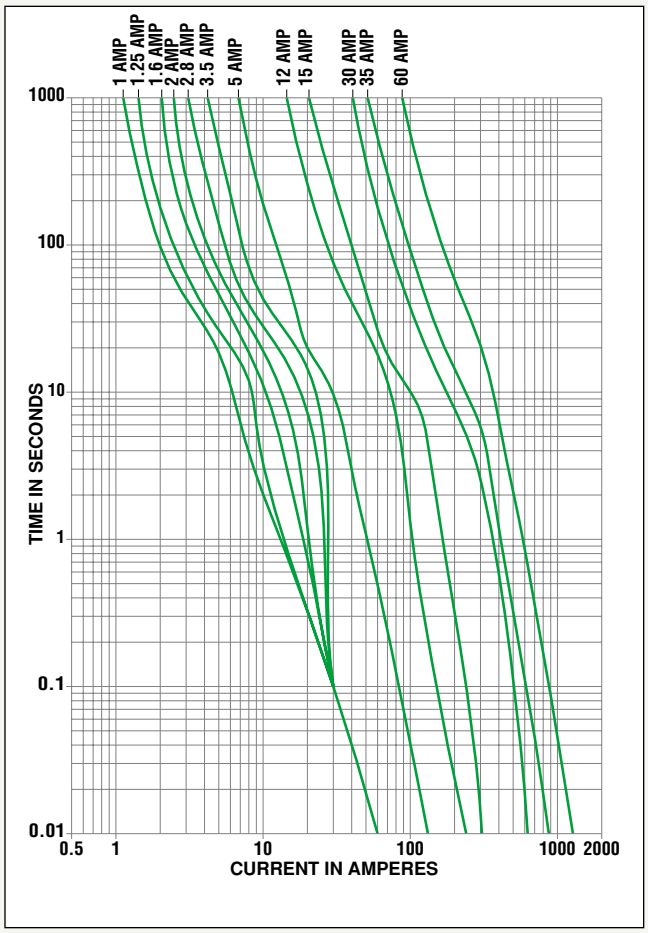
FEATURES/BENEFITS

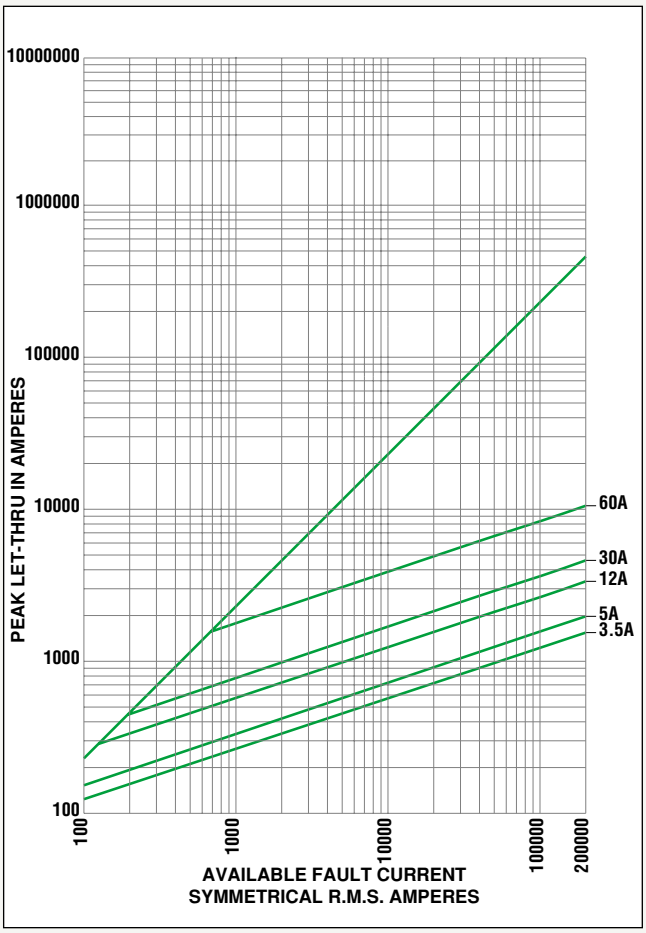
- **Reduce down-time** — The indicating window of the LLSRK_ID immediately identifies the open fuse. If the window is dark, the fuse has opened. It's that simple. Maintenance personnel can immediately determine that there is an open fuse.
- **Reduce fuse inventory** — The superior performance of the LLSRK_ID allows it to be used in a variety of applications, thus decreasing fuse inventory.
- **Reduce nuisance opening** — Indicator fuses offer superior time delay and cycling characteristics, which can lengthen fuse life.
- **Reduce equipment damage** — Indicator fuses provide superior overload and short-circuit protection that can reduce equipment damage. The LLSRK_ID is extremely current limiting and provides IEC Type II "No Damage" protection to IEC and NEMA type motor starters.
- **Reduce accidents** — The LLSRK_ID Indicator fuse improves safety by minimizing exposure to live circuits. Unlike other forms of blown fuse indication, once the indicator window darkens, it stays dark. Other forms of indication require the power to remain on, which causes a potential safety hazard to personnel.

LLSRK_ID Series Indicator™ POWR-PRO® Class RK1

600 VAC ▪ Dual-Element, Time-Delay ▪ 1/10 – 600 Amperes







Contact Littelfuse for additional fuse curves.

LLNRK/LLSRK Series POWR-PRO® Class RK1

250/600 VAC ▪ Dual-Element, Time-Delay ▪ 1/10 – 600 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

SPECIFICATIONS

Voltage Ratings: AC: 250 Volts (LLNRK)
600 Volts (LLSRK)
DC: 125 Volts (LLNRK)
300 Volts (LLSRK)

Interrupting Ratings:
AC: 200,000 amperes rms symmetrical
300,000 amperes rms symmetrical
(Littelfuse self-certified)
DC: 20,000 amperes

Ampere Range: 1/10 – 600 amperes

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

AMPERE RATINGS

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

* LLSRK Only.

Example part number (series & amperage): LLNRK 450

RECOMMENDED FUSE BLOCKS

LR250 series (LLNRK Series)
LR600 series (LLSRK Series)

Refer to Fuse Block section of this catalog for additional information.

Littelfuse LLNRK and LLSRK series POWR-PRO® fuses provide superior overload and short circuit protection for service entrance, main, feeder and general-purpose branch circuits up to 600 amperes.

LLNRK/LLSRK series fuses can be installed in existing Class H fuse blocks to upgrade systems containing lower interrupting rating Class H one-time or renewable fuses.

APPLICATIONS

All general-purpose circuits

Motors

Transformers

Solenoids

Fluorescent lighting

All system components with high in-rush currents

FEATURES/BENEFITS

- **Extremely current limiting —** Reduces damage to circuits and equipment under short-circuit conditions. Stops damaging short circuits faster than any mechanical protective device.
- **300kA Interrupting Rating —** Littelfuse self-certified to 300,000 amperes as standard. Meets future trend towards higher available short circuit currents.
- **Reduced costs —** Current limiting design often permits use of readily available, less costly equipment. Low resistance design reduces power consumption and utility bills.
- **Excellent time delay —** True dual-element construction, with separate non-fatiguing thermally-reversible spring-loaded thermal overload element, withstands repeated surges within rated time delay without opening needlessly. Eliminates needless downtime caused by power surges or equipment demands.

LLNRK/LLSRK Series POWR-PRO® Class RK1

250/600 VAC ▪ Dual-Element, Time-Delay ▪ 1/10 – 600 Amperes

Littelfuse
POWR-GARD™ Products

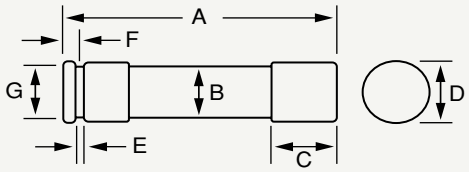
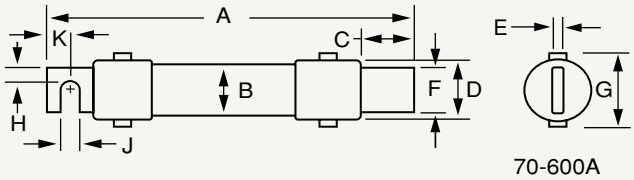


FIG. 1

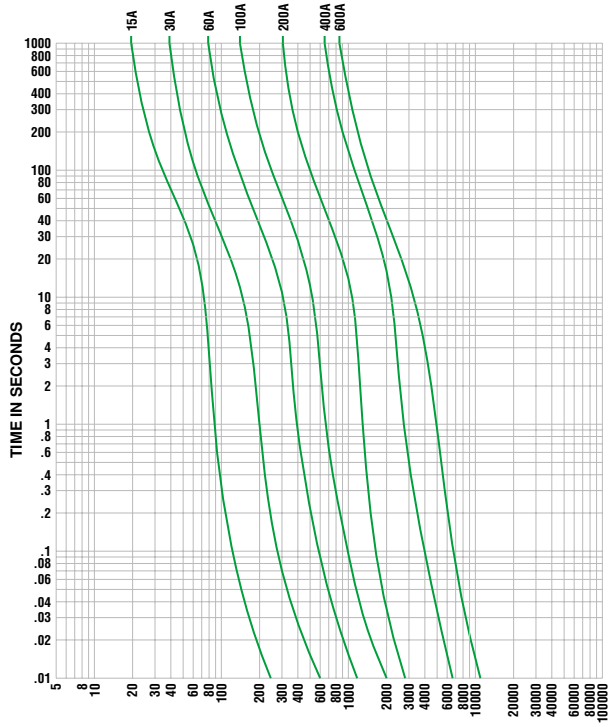


70-600A

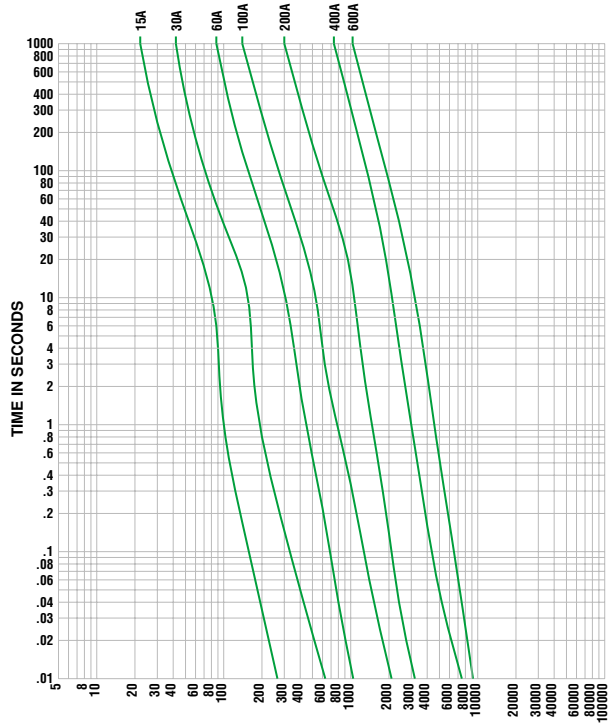
FIG. 2

AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm in parentheses)									
			A	B	C	D	E	F	G	H	J	K
1/10 – 30	1	LLNRK	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	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	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	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	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)	1-1/4 (31.8)	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
		LLSRK	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)	1-1/2 (38.1)	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
110 – 200	2	LLNRK	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)	1-27/32 (46.8)	7/16 (11.1)	9/32 (7.1)	11/16 (17.5)
		LLSRK	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)	2-3/32 (53.2)	7/16 (11.1)	9/32 (7.1)	11/16 (17.5)
225 – 400	2	LLNRK	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)	2-11/32 (59.5)	5/8 (15.9)	13/32 (10.3)	15/16 (23.8)
		LLSRK	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)	2-27/32 (72.2)	5/8 (15.9)	13/32 (10.3)	15/16 (23.8)
450 – 600	2	LLNRK	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)	2-27/32 (72.2)	3/4 (19.1)	17/32 (13.5)	1-1/8 (28.6)
		LLSRK	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)	3-11/32 (84.93)	3/4 (19.1)	17/32 (13.5)	1-1/8 (28.6)

LLNRK



LLSRK



Current-Limiting Effects of LLNRK (250V) fuses

*** Prospective RMS Symmetrical Amperes Short-Circuit Current**

**** Apparent RMS Symmetrical**

Note: Data derived from Peak Let-Thru Curves

Short Circuit Current*	Peak Let-Thru Current** for various fuse ratings					
	30A	60A	100A	200A	400A	600A
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

Current-Limiting Effects of LLSRK (600V) fuses

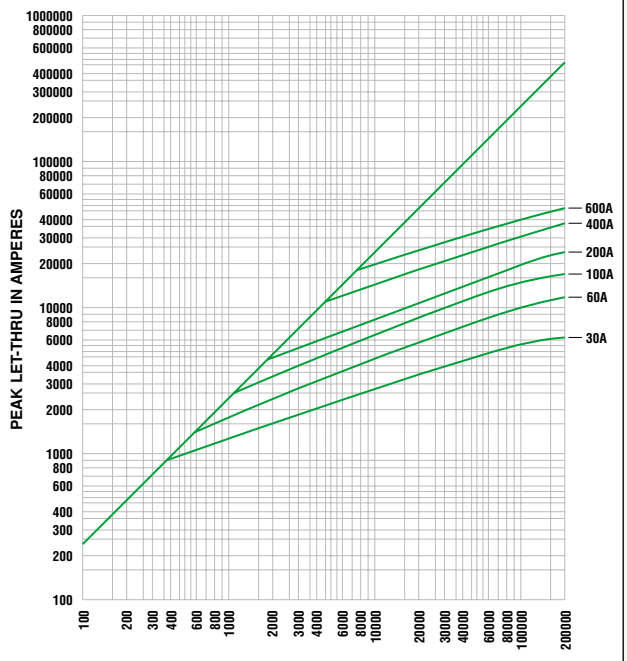
*** Prospective RMS Symmetrical Amperes Short-Circuit Current**

**** Apparent RMS Symmetrical**

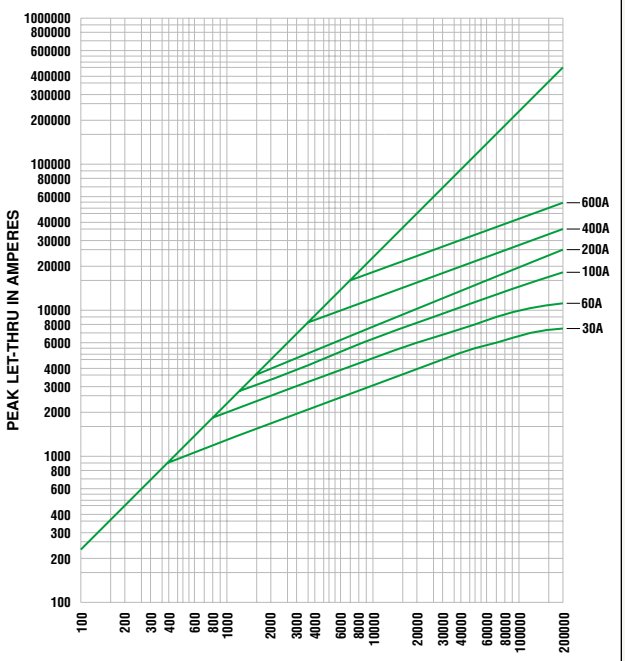
Note: Data derived from Peak Let-Thru Curves

Short Circuit Current*	Peak Let-Thru Current** for various fuse ratings					
	30A	60A	100A	200A	400A	600A
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

LLNRK



LLSRK



JTD_ID Series Indicator POWR-PRO® Class J Fuses

600 VAC ■ Time Delay ■ 8/10 – 600 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

Plant Engineering PRODUCT of the YEAR 1998 94

SPECIFICATIONS

Voltage Ratings: AC: 600 Volts
DC: Contact Factory

Interrupting Ratings:
AC: 200,000 amperes rms symmetrical
300,000 amperes rms symmetrical
(Littelfuse self-certified)

Ampere Range: 8/10 – 600 amperes

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

AMPERE RATINGS

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

Example part number (series & amperage): JTD 60 ID

RECOMMENDED FUSE BLOCKS

LJ600 series

Refer to Fuse Block section of this catalog for additional information.

The Littelfuse® POWR-PRO® JTD_ID Indicator Class J fuse provides visual blown fuse indication and maximum protection in a compact package. The compact Class J package was designed specifically for circuits where space is at a premium. The current limiting time delay JTD_ID offers a patented true dual-element design that is ideal for use in circuits with high inrush currents. Superior performance characteristics of JTD_ID Indicator fuses reduce nuisance fuse opening and the blown fuse indication reduces down-time and increases safety.

APPLICATIONS

Fused combination motor controllers to provide IEC Type II (no damage) motor branch-circuit short-circuit and ground fault protection

Motor control centers

Transformer protection

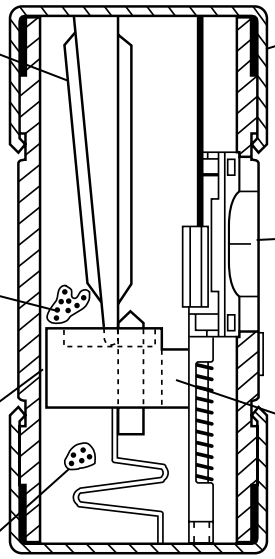
Protection for UL Listed series-rated molded case circuit breaker panels

General purpose circuits — mains, feeders and branch circuits — especially when space is at a premium

FEATURES/BENEFITS

- **Reduce down-time —** A glance at the indicating window of a JTD_ID Indicator fuse pinpoints open fuses immediately. If the window is dark, the fuse has opened. It's that simple. No fuse testing required. Machine operators can immediately determine that there is an open fuse and request maintenance personnel to bring the proper replacement.
- **Reduce nuisance opening —** Indicator fuses have superior time-delay and cycling characteristics which can lengthen fuse life and decrease needless opening.
- **Reduce fuse inventory —** Because JTD_ID Indicator fuses have superior performance characteristics they can be used on a variety of applications, thus decreasing fuse inventory.
- **Reduce equipment damage —** Indicator fuses provide superior overload and short circuit protection that can reduce equipment damage. Indicator fuses also provide IEC Type II "No Damage" protection to IEC and NEMA type motor starters.
- **Reduce accidents —** The JTD_ID Indicator fuse improves safety by minimizing exposure to live circuits. Unlike other forms of blown fuse indication, once the indicator window darkens, it stays dark. It does not matter if the power is on or off or if the fuse is in a tool box. Other forms of indication require the power to remain on, which causes a safety hazard for personnel.

An Inside Look . . .



Superior Short-Circuit Elements – reduce damage to equipment and enables the Littelfuse JTD_ID to provide IEC Type II "NO DAMAGE" protection to IEC and NEMA motor starters.

Stone-Sand Filler – helps provide I^2t and I Peak values well below UL maximum limits and improves heat dissipation and reliability.

Elastomeric Silicone EPR Plug – a space-age material used in the patented overload section of the Littelfuse JTD_ID.

Granular Quartz Filler – assists in quenching the arc that occurs during overload conditions.

Plated End Caps – help reduce corrosion and provide superior contact that aids in lower heat generation.

Blown Fuse Indicator – incorporates precision-wound elements to provide consistent and reliable blown fuse indication.

Solid State Overload Section – patented thermally reversible design utilizes high-tech aircraft grade polymers to ensure reliable operation every time.

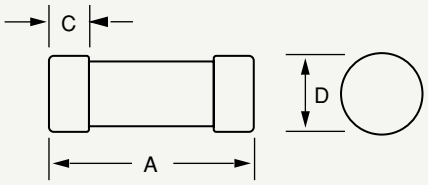


FIG. 1

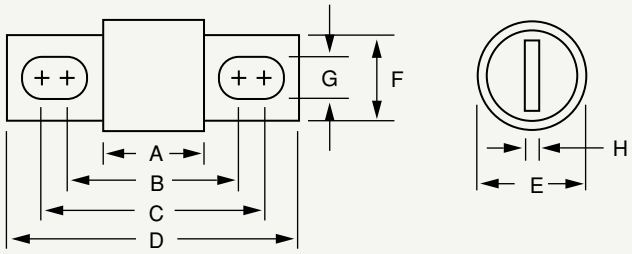


FIG.2

AMPERES	REFER TO FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		A	B	C	D	E	F	G	H
8/10– 30	1	2-1/4 (57.2)	—	1/2 (12.7)	13/16 (20.6)	—	—	—	—
35 – 60	1	2-3/8 (60.3)	—	5/8 (15.9)	1-1/16 (27.0)	—	—	—	—
70 – 100	2	2-5/8 (66.7)	3-17/32 (89.7)	3-23/32 (94.5)	4-5/8 (117.5)	1 (25.4)	3/4 (19.1)	9/32 (7.1)	1/8 (3.2)
110 – 200	2	3 (76.2)	4-9/32 (108.7)	4-15/32 (113.5)	5-3/4 (146.1)	1-1/2 (38.1)	1-1/8 (28.6)	9/32 (7.1)	3/16 (4.8)
225 – 400	2	3-3/8 (85.7)	5-1/8 (130.2)	5-3/8 (136.5)	7-1/8 (181.0)	2 (50.8)	1-5/8 (41.3)	13/32 (10.3)	1/4 (6.4)
450 – 600	2	3-3/4 (95.3)	5-27/32 (148.4)	6-5/32 (156.4)	8 (203.2)	2-1/2 (63.5)	2 (50.8)	17/32 (13.5)	3/8 (9.5)

POWR-PRO Fuses

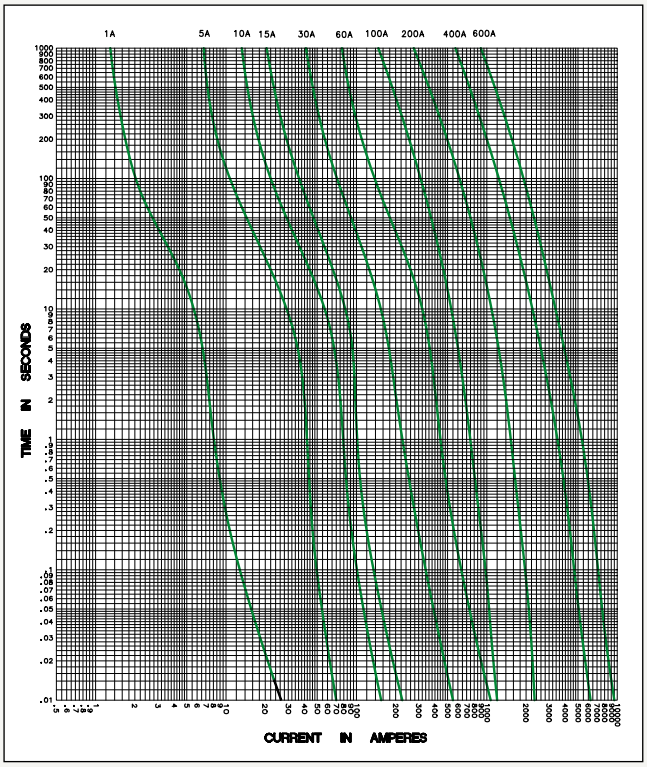
Current-Limiting Effects of JTD_ID (600V) fuses

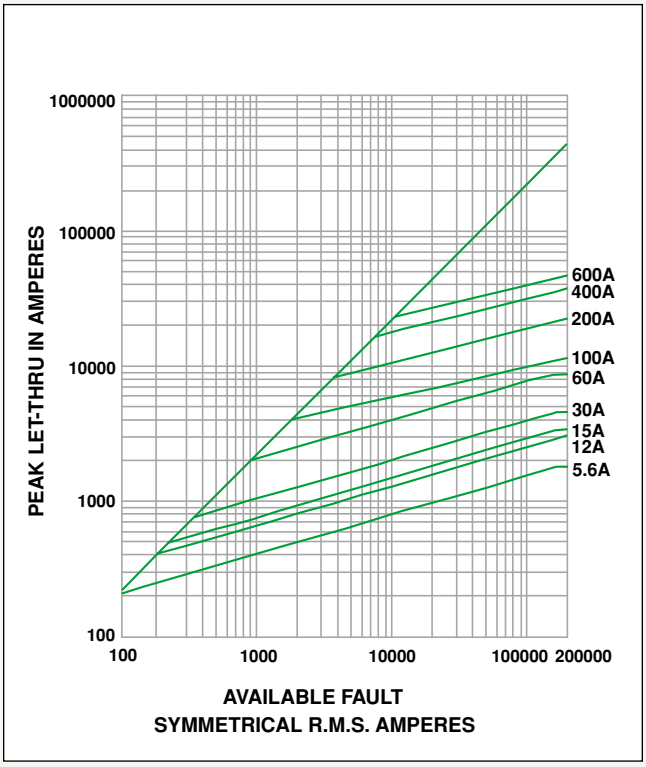
* Prospective RMS Symmetrical Amperes Short-Circuit Current

** Apparent RMS Symmetrical

Note: Data derived from Peak Let-Thru Curves

Short Circuit Current*	Let-Thru Current** For Various Fuse Ratings						
	15A	30A	60A	100A	200A	400A	600A
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





CCMR Series POWR-PRO® CC Fuses

600 VAC ▪ Dual-Element, Time-Delay ▪ 2/10 – 60 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

SPECIFICATIONS

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

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
300,000 amperes rms symmetrical
(Littelfuse self-certified)
DC: 20,000 amperes

Ampere Range: 2/10 — 60 amperes

Approvals: AC: Standard 248-4, Class CC
UL Listed 2/10 – 30 amps (File No: E81895)
Standard 248, Class CD
UL Listed 35 – 60 amps (File No: E71611)
CSA Certified 2/10 – 60 amps
(File No: LR29862)
DC: Littelfuse self-certified

AMPERE RATINGS

2/10	1	2	3½	6¼	12	35
¼	1¼	2¼	4	7	15	40
3/10	1 3/10	2½	4½	7½	17½	45
½	1½	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	

Example part number (series & amperage): CCMR 40

RECOMMENDED FUSE BLOCKS

L60030C series (CCMR 2/10 — 30A)
L60060C series (CCMR 35 — 60A)

Refer to Fuse Block section of this catalog for additional information.

For space-saving protection of motor circuits up to 40 HP*, we recommend Littelfuse POWR-PRO® CCMR series fuses. These fuses are the only true dual-element, time-delay fuses in a package this small that are specifically engineered for motor branch circuit protection. They provide Type 2 protection (no damage) to both NEMA-rated and the more sensitive IEC (International Electrotechnical Commission) type motor circuit components.

Because CCMR fuses are the most current limiting rating for rating, and because their time-delay characteristics permit the use of smaller fuse ratings in motor circuits than would be possible with fast-acting fuses, CCMR fuses provide superior short-circuit protection. Furthermore, they provide this superior protection in a fraction of the space required by other fuse classes. For example, when 600V three-pole, 30 ampere Class R fuse blocks are replaced by Littelfuse Class CC fuse blocks, mounting space requirements may be reduced 70% or more. This is especially important when a panel contains control devices for many motors.

In addition to the UL Listed smaller sizes, Littelfuse CCMR series fuses are now available in larger sizes — from 35 to 60 amperes! ***No other fuse is available with this current carrying capacity in a package this small. As a matter of fact, the 60 ampere CCMR fuse is the smallest 60A fuse available which is rated at 600 volts.***

*Consult the Motor Protection Tables in the Fuseology section for specific motor sizing information

APPLICATIONS

CCMR series fuses are specifically designed to withstand sustained starting currents of small motors

Provide short-circuit protection for motor branch circuits

Use with IEC- and NEMA-rated motor controllers and contactors

General purpose circuits up to 60 amps

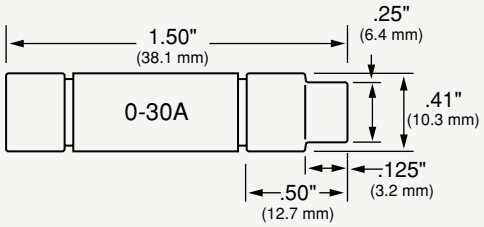
FEATURES/BENEFITS

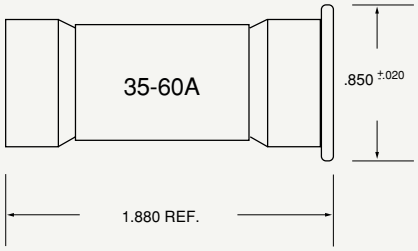
- **Space savings —** No other fuse class approved for branch-circuit protection has a 600 volt rating and 300,000 A.I.R. in a package this small.
- **Extremely current-limiting —** Reduces damage caused by heating and magnetic effects of short-circuit currents — stops damaging short-circuit currents faster than any mechanical protective device.
- **Excellent time delay —** Eliminates needless downtime caused by power surges or equipment demands . . . permits selection of fuse sizes closer to actual load conditions — provides better protection.
- **300kA Interrupting Rating —** Littelfuse self-certified to 300,000 amperes as standard. Meets future trend towards higher available short circuit currents.

CCMR Series POWR-PRO® CC Fuses

600 VAC ▪ Dual-Element, Time-Delay ▪ 2/10 – 60 Amperes

Littelfuse
POWR-GARD™ Products





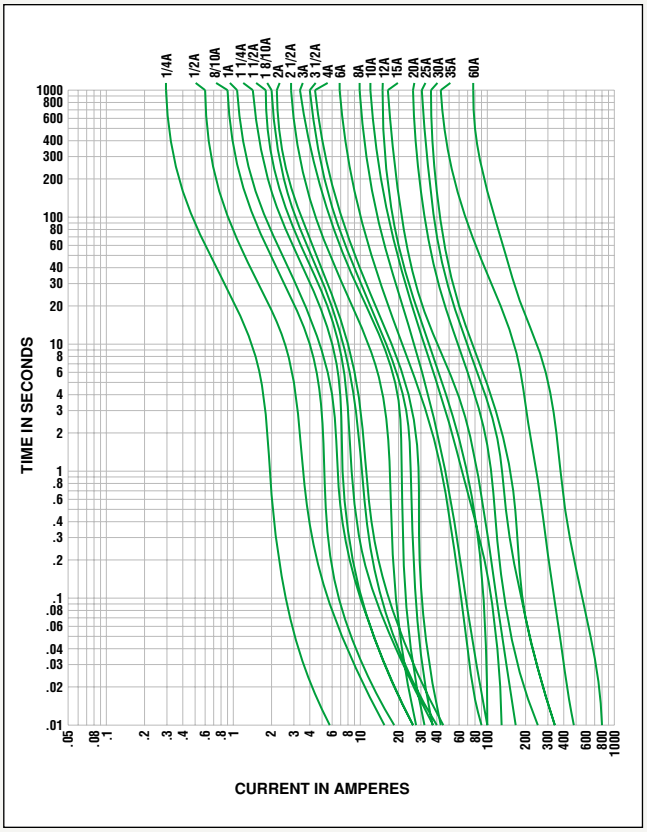
Current-Limiting Effects of CCMR (600V) fuses

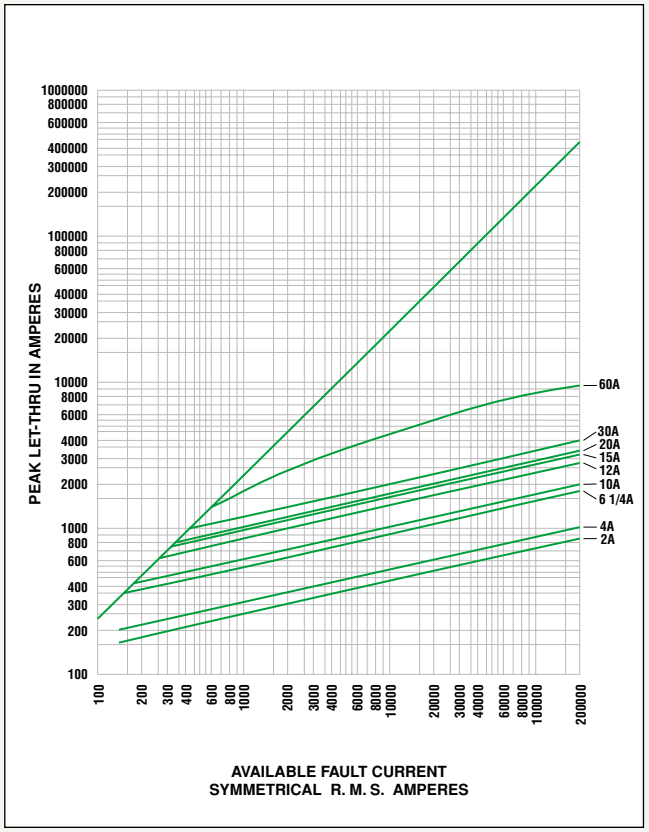
* Prospective RMS Symmetrical Amperes Short-Circuit Current

** Apparent RMS Symmetrical

Note: Data derived from Peak Let-Thru Curves

Short Circuit Current*	Let-Thru Current** For Various Fuse Ratings							
	2A	4A	6¼A	10A	12A	15A	20A	30A
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





IDSR Series Indicator™ POWR-PRO® Class RK5

600 V AC/DC ▪ Time-Delay ▪ 1/10 – 600 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

The Littelfuse IDSR Indicator™ fuse is the first indicating power fuse ever. Its solid-state design provides state-of-the-art reliability; it will forever change the way you look at modern circuit protection.

Money is wasted each time a circuit opens and halts production. Thousands of dollars can be lost with every minute spent testing to discover the cause.

The Littelfuse IDSR Indicator™ fuse offers you a better way. Just a simple glance at the IDSR Indicator's window tells which circuit is open. The circuit can be tested and any problem corrected without unnecessary delay. No time wasted finding the faulted circuit. No system damage. And no costly down time.

APPLICATIONS

All general-purpose circuits

Motors

Transformers

Solenoids

Fluorescent lighting

All system components with high inrush currents

SPECIFICATIONS

Voltage Ratings: AC: 600 Volts
DC: 600 Volts
(Min. 75 volts AC/DC required for indication)

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
300,000 amperes rms symmetrical
(Littelfuse self-certified)
DC: 20,000 amperes

Ampere Range: 1/10 – 600 amperes

Approvals: Standard 248-12 and UL 198M, Class RK5
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)
MSHA 600 Volt Listing

AMPERE RATINGS

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

Example part number (series & amperage): IDSR 30
Note: All fuses rated 1 amp and above are Indicator™ fuses.

RECOMMENDED FUSE BLOCKS

LR600 series

Refer to Fuse Block section of this catalog for additional information.

DIMENSIONS

Please refer to the FLSR_ID dimensions.

FEATURES/BENEFITS

- **Patented design fuses —** The first totally new dual-element time-delay Class RK5 fuses in 10 years. They look different because they are different! Even the Littelfuse SLO-BLO® fuse, the fuse that set new standards for dual-element fuses when it was introduced in 1984, cannot match the performance of POWR-PRO® Indicator™ fuses.
- **Pinpoint open fuses immediately —** A glance at the window tells if the fuse has blown. If the window is dark, the fuse has opened. It's that simple. No fuse testing required.
- **Reduce down-time —** Machine operators can immediately determine that there is an open fuse and request maintenance personnel to bring the correct replacement.
- **Superior time delay —** POWR-PRO® Indicator™ fuses provide superior time delay to override current surges without sacrificing protection for sustained overloads. This superior time delay is achieved by a remarkable advance in the science of fuse design. Littelfuse-patented leading edge metallurgy eliminates all moving parts in a true dual-element fuse.

LDC Series POWR-PRO® Class L Fuses

600 V AC/DC ▪ 150 – 2000 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

SPECIFICATIONS

Voltage Ratings: AC: 600 Volts
DC: 600 Volts

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
DC: 50,000 amperes
(16 millisecond time-constant)

Ampere Range: 150 – 2000 amperes

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

AMPERE RATINGS

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

Example part number (series & amperage): LDC 1200

DIMENSIONS

Please refer to the KLPC dimensions

Littelfuse POWR-PRO® LDC series Class L fuses represent another first in fuse protection. LDC series fuses are the *first* UL Listed 600 volts AC and DC Class L fuse. Since they may be used for both AC and DC, they eliminate the concern that AC only fuses may be inserted into DC circuits.

While LDC series fuses' UL Listed DC interrupting rating is more than adequate for most applications (50,000 amperes at a 16 millisecond time constant), tests in our high power testing laboratory have shown that this remarkable fuse is capable of performing at much longer time constants. This makes the fuse uniquely suited for such applications as crane rail circuits and mass transit systems. Contact the factory for application information for special needs such as this.

For AC-only systems, consider the use of POWR-PRO® KLPC series fuses. They have a full ten seconds time-delay at 500% rated current, and have a wider range of ratings.

APPLICATIONS

UPS protection, especially for large battery circuits

DC distribution

DC variable speed drives

Protection of crane rail circuits and other large DC equipment such as electrical power shovels, ship and dock cranes, etc.

Mass transit systems, including new light rail applications

General-purpose AC/DC circuits for mains, feeders, and branch circuits

FEATURES/BENEFITS

- **600 Volt AC/DC rated —** "All-purpose" Class L fuse reduces inventory requirements because the need for special fuses is eliminated.
- **UL Listed 200,000 A.I.R. AC – 50,000 A.I.R. DC —** Reliable interruption of all overcurrents up to their ratings. Minimizes the need for time-consuming and expensive short-circuit studies.
- **Moderate time delay —** Four seconds time delay at 500% current provides adequate time-delay for many AC applications and most DC applications. They will withstand most harmless overloads or line surges. If your needs exceed the LDC capabilities, consider the use of KLPC fuses for AC applications.
- **Selective coordination —** LDC series fuses coordinate well with all Littelfuse fuses rated 600 amperes or less. A combination of LDC and IDSR series fuses provide a complete 600 volt rated DC system.
- **Extremely current limiting —** Maximum current limitation reduces damage to circuits and equipment under short-circuit conditions. Stops damaging short circuits faster than any mechanical protective device.

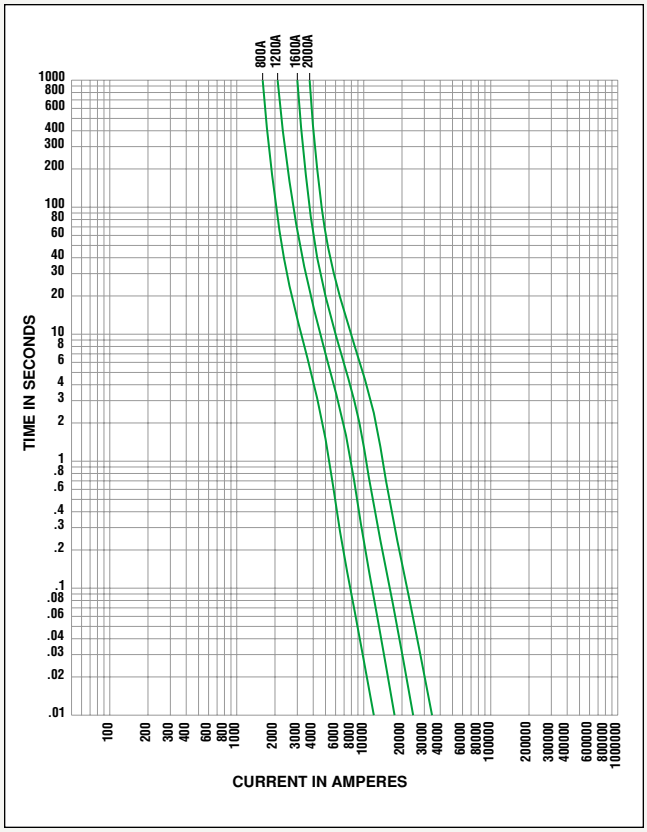
Current-Limiting Effects of LDC (600V) fuses

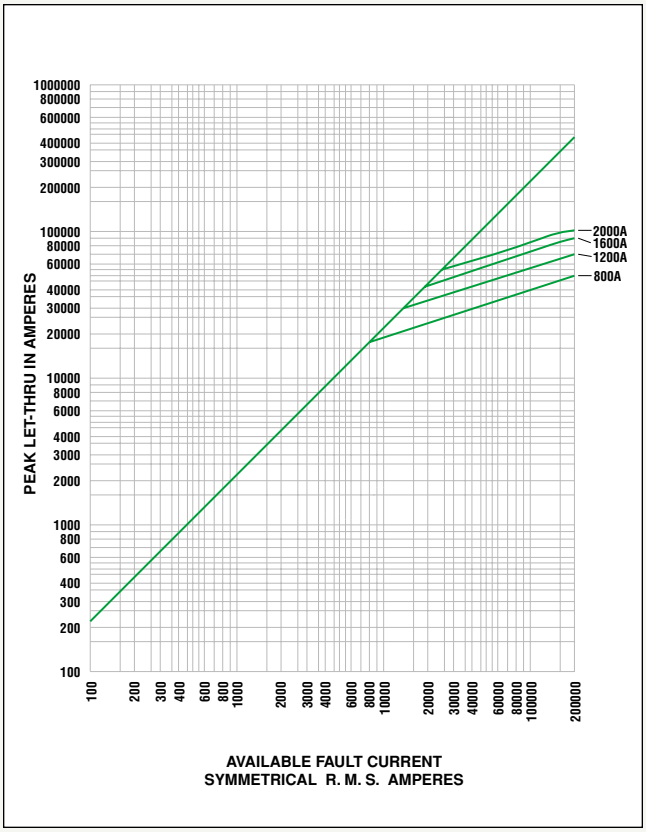
*** Prospective RMS Symmetrical Amperes Short-Circuit Current**

**** Apparent RMS Symmetrical**

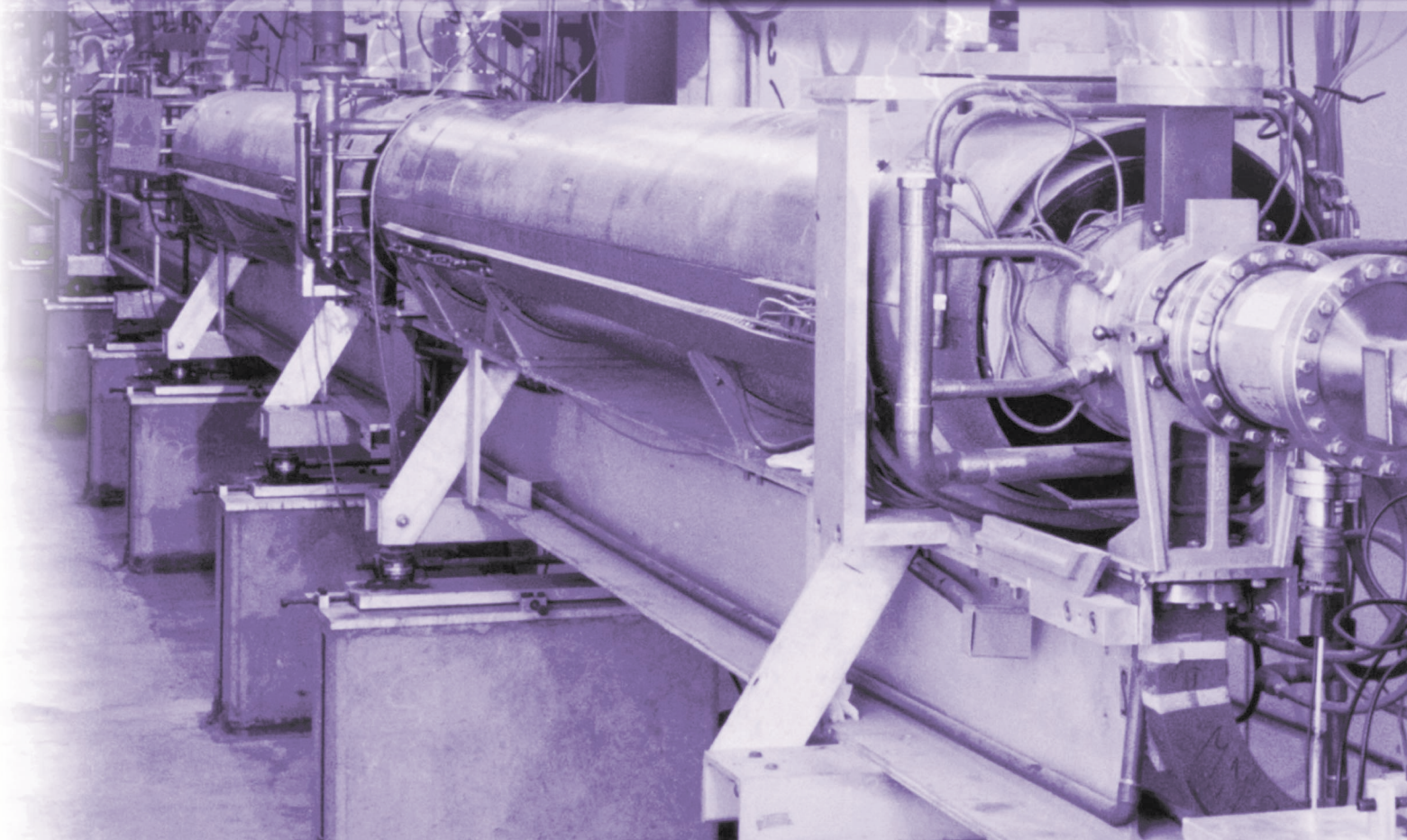
Note: Data derived from Peak Let-Thru Curves

Short Circuit Current*	Peak Let-Thru Current** for various fuse ratings			
	800A	1200A	1600A	2000A
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





General Purpose Fuses



KLLU Class L Fuses

600 VAC ▪ Time-Delay ▪ 601 – 4000 Amperes

Littelfuse
POWR-GARD™ Products

SPECIFICATIONS

Voltage Ratings: AC: 600 Volts
DC: Contact factory

Interrupting Ratings: 200,000 amperes rms symmetrical

Ampere Range: 601 – 4000 amperes

Approvals: Standard 248-10, Class L
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)

AMPERE RATINGS

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

Example part number (series & amperage): KLLU 1000

General Purpose Fuses

KLLU series UL Listed, time-delay, Class L fuses are **quality** fuses in every sense of the word. They were developed to provide a somewhat lower priced alternate to the POWR-PRO® KLPC series fuses. KLLU series fuses meet or exceed all UL requirements for Class L fuses. For superior protection and performance, specification-grade POWR-PRO® KLPC series fuses are the recommended fuse. Complete information on KLPC fuses may be found in the POWR-PRO® section of this catalog.

APPLICATIONS

Service switches

Switchboard mains and feeders

Bolted pressure contact switches

Motor control center mains

Large motor branch circuits

UL Listed series-rated protection for molded case circuit breaker panelboards and loadcenters. See panelboard manufacturers' literature for recommended fuse rating.

SAFETY

- 200,000 A.I.R. — Provides reliable interruption of all overcurrents up to 200,000 amperes.
- When used for motor branch circuit protection, KLLU fuses may be sized close to the motor full-load current, providing excellent protection to branch circuit conductors, motor control equipment and motors.

LONGER EQUIPMENT LIFE

- Current Limiting — Reduces short circuit damage to systems and equipment.
- Reduced downtime.
- Ten second minimum time delay at 500 percent of rating eliminates needless downtime caused by heavy starting currents of large motors and other inductive loads.
- Selective coordination — KLLU fuses coordinate well with other Class L fuses and with all current-limiting Littelfuse fuses rated 600 amps or less. This means less time spent trying to locate short circuits or overloaded equipment, because only the fuse immediately on the line side of the affected circuit opens.

EASY TO USE

- 200,000 A.I.R. rating minimizes need for short circuit calculations . . . meets present and future system requirements.
- KLLU fuse time-current characteristics closely match typical time-current curves of circuit breakers. Although fuse/circuit breaker systems can seldom be 100% coordinated, KLLU series fuses permit use of a wider range of breaker setting than fast-acting Class L fuses. Excellent protection for a single breaker or a group of breakers.

General Purpose Fuses

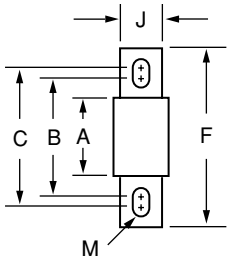


FIG.1

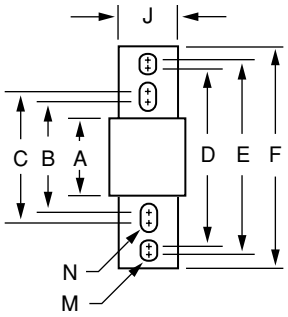


FIG.2

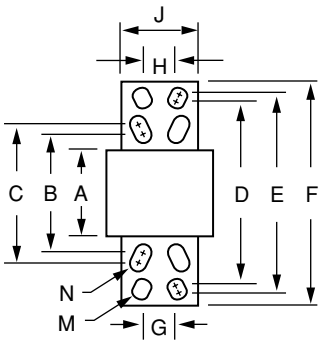


FIG. 3

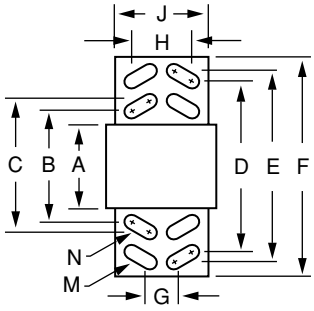
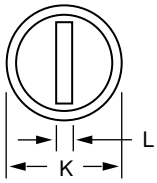


FIG. 4

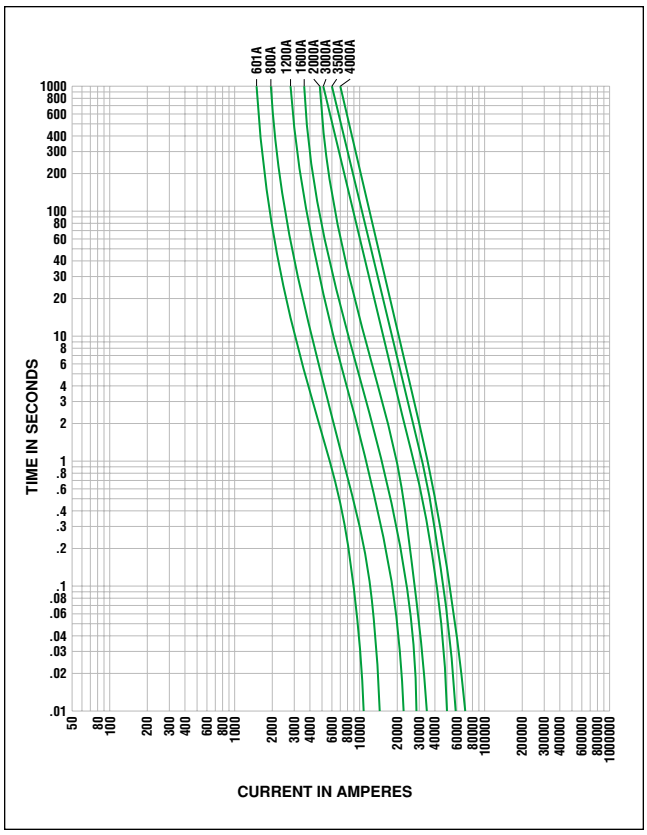


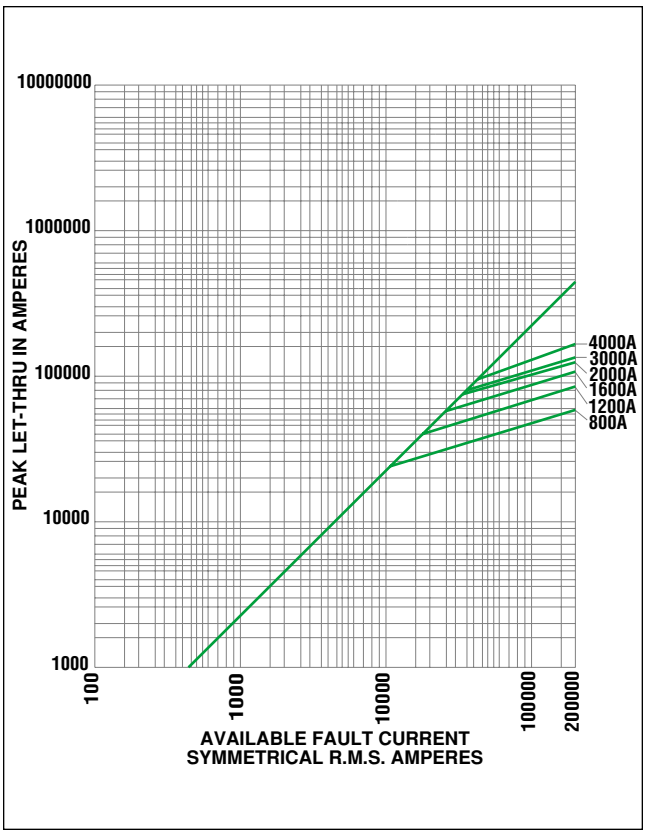
AMPERES	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)												
		A	B	C	D	E	F	G	H	J	K	L	M	N
601 – 800	1	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	—	—	8-5/8 (219.1)	—	—	2 (50.8)	2-1/2 (63.5)	3/8 (9.5)	5/8 x 1-1/8 (15.9) x (28.6)	—
801 – 1200	2	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10-3/4 (273.1)	—	—	2 (50.8)	2-1/2 (63.5)	3/8 (9.5)	5/8 x 3/4 (15.9) X (19.1)	5/8 x 1- 1/8 (15.9) X (28.6)
1201 – 1600	2	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10-3/4 (273.1)	—	—	2-3/8 (60.3)	3 (76.2)	7/16 (11.1)	5/8 X 3/4 (15.9) X (19.1)	5/8 X 1- 1/8 (15.9) X (28.6)
1601 – 2000	2	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10-3/4 (273.1)	—	—	2-3/4 (69.9)	3-1/2 (88.9)	1/2 (12.7)	5/8 x 3/4 (15.9) x (19.1)	5/8 x 1- 1/8 (15.9) x (28.6)
2001 – 2500	3	4 101.6)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10- 3/4 (273.1)	1-5/8 (41.3)	1-3/4 (44.5)	3-1/2 (88.9)	5 (127.0)	3/4 (19.1)	5/8 X 3/4 (15.9) x (19.1)	5/8 X 1- 1/8 (15.9) x (28.6)
2501 – 3000	3	4 (101.6)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10- 3/4 (273.1)	1-5/8 (41.3)	1-3/4 (44.5)	4 (101.6)	5 (127.0)	3/4 (19.1)	5/8 x 3/4 (15.9) x (19.1)	5/8 x 1- 1/8 (15.9) x (28.6)
3001 – 4000	4	4 (101.6)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	9-1/2 (241.3)	10- 3/4 (273.1)	1-3/4 (44.5)	3-1/4 (82.6)	4-3/4 (120.7)	5-3/4 (146.1)	3/4 (19.1)	5/8 x 1-3/8 (15.9) x (34.9)	5/8 x 1-3/8 (15.9) x (34.9)

KLLU Class L Fuses

600 VAC ▪ Time-Delay ▪ 601 – 4000 Amperes

Littelfuse
POWR-GARD™ Products





FLNR_ID/FLSR_ID Indicator™ Class RK5 Fuses

250/600 VAC ▪ Dual-Element, Time Delay ▪ 1/10 – 600 Amperes

Littelfuse POWR-GARD™ Products

General Purpose Fuses

Littelfuse FLNR_ID/FLSR_ID Indicator™ fuses provide visual blown fuse indication at a glance. The patented state-of-the-art solid state design provides maximum reliability and superior performance characteristics in a true dual-element design. The use of Indicator™ fuses reduces down-time, nuisance opening, increases safety, and can save thousands of dollars in lost production time.

APPLICATIONS

Service entrance switches
Switchboard main and feeder switches
Motor control center mains and motor branch circuits
Individual fused combination motor controllers
Distribution panelboards
Industrial control panels
Protection of fully-rated panelboards and loadcenters
All general purpose circuits

FEATURES/BENEFITS

- Reduce Down-Time — A glance at the indicating window of a FLNR_ID or FLSR_ID Indicator™ fuse pinpoints open fuses immediately. If the window is dark, the fuse has opened. It's that simple. No fuse testing required. Machine operators can immediately determine that there is an open fuse and request maintenance personnel to bring the proper replacement.
- Reduce Nuisance Opening — FLNR_ID and FLSR_ID Indicator™ fuses have superior time-delay and cycling characteristics which can lengthen fuse life and decrease needless opening.
- Reduce Fuse Inventory — Because FLNR_ID and FLSR_ID Indicator™ fuses have superior performance characteristics they can be used on a variety of applications, thus decreasing fuse inventory.
- Reduce Equipment Damage — FLNR_ID and FLSR_ID Indicator™ fuses have superior overload and short circuit protection which can reduce equipment damage.
- Reduce Accidents — The FLNR_ID and FLSR_ID Indicator™ fuses improve safety by minimizing exposure to live circuits. Unlike other forms of blown fuse indication, Indicator™ fuses provide built-in blown fuse indication with the power on or off. No second guessing whether a light means a good or bad fuse and no current going across a blown fuse to power a lighted accessory.

SPECIFICATIONS

Voltage Ratings: AC: 250 Volts (FLNR_ID); 600 Volts (FLSR_ID)
DC: 125 Volts (FLNR 1/10 – 30A); 125 Volts (FLNR_ID 35 – 600A); 300 Volts (FLSR_ID)

Interrupting Ratings: AC: 200,000 amperes rms symmetrical; 300,000 amperes rms symmetrical (Littelfuse self-certified)
DC: 20,000 amperes

Ampere Range: 1/10 – 600 amperes

Approvals: Standard 248-12, Class RK5
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)
MSHA 300 Volt Listing (FLSR_ID)
QPL: Federal Specification WF-1814

AMPERE RATINGS

1/10**	9/10	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 6/10	7	20	70	175	500
1/2	1 6/10	3 1/2	7 1/2	25	75	200	600

**FLNR only

NOTE: For 1/10 – 30 ampere 250 volt fuses, order non-indicating FLNR series fuses.

NOTE: All FLNR_ID fuses rated 35 – 600A are Indicator fuses.

NOTE: All FLSR_ID fuses rated 1 amp and above are Indicator fuses.

Example part number (series & amperage): FLSR100ID

RECOMMENDED FUSE BLOCKS

LR250 series (for FLNR_ID series fuses)
LR600 series (for FLSR_ID series fuses)

Refer to Fuse Block section of this catalog for additional information.

FLNR_ID/FLSR_ID Indicator™ Class RK5 Fuses

250/600 VAC ▪ Dual-Element, Time Delay ▪ 1/10 – 600 Amperes

Littelfuse POWR-GARD™ Products

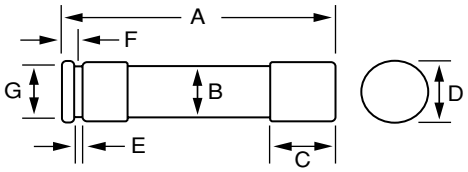
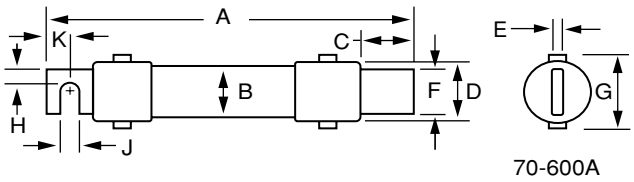


FIG. 1



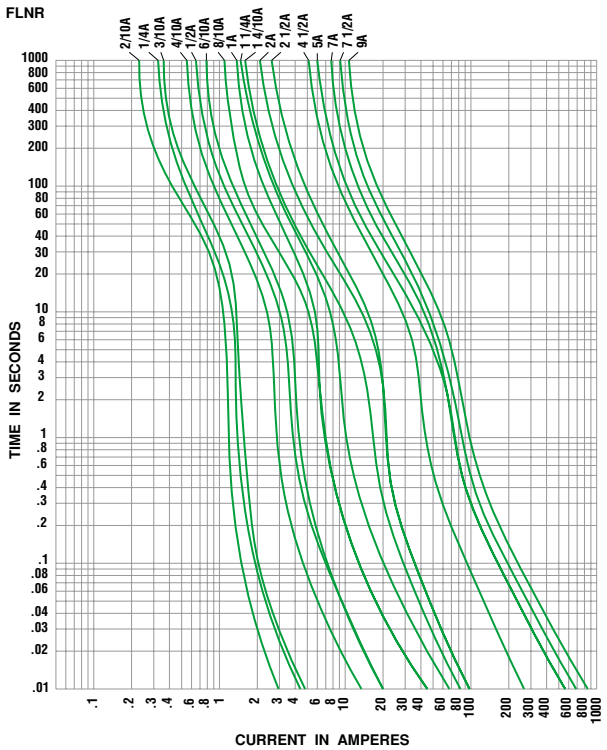
70-600A

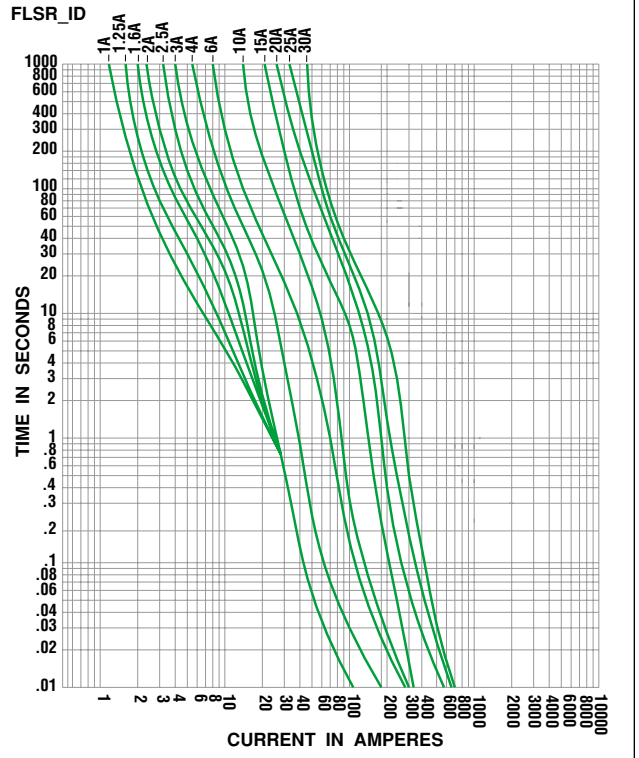
FIG. 2

General Purpose Fuses

AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm in parentheses)									
			A	B	C	D	E	F	G	H	J	K
1/10 – 30	1	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)	—	—	—
		FLSR_ID	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	FLNR_ID	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)	—	—	—
		FLSR_ID	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	FLNR_ID	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)	1-1/4 (31.8)	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
		FLSR_ID	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)	1-1/2 (38.1)	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
110 – 200	2	FLNR_ID	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)	1-27/32 (46.8)	7/16 (11.1)	9/32 (7.1)	11/16 (17.5)
		FLSR_ID	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)	2-3/32 (53.2)	7/16 (11.1)	9/32 (7.1)	11/16 (17.5)
225 – 400	2	FLNR_ID	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)	2-11/32 (59.5)	5/8 (15.9)	13/32 (10.3)	15/16 (23.8)
		FLSR_ID	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)	2-27/32 (72.2)	5/8 (15.9)	13/32 (10.3)	15/16 (23.8)
450 – 600	2	FLNR_ID	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)	2-27/32 (72.2)	3/4 (19.1)	17/32 (13.5)	1-1/8 (28.6)
		FLSR_ID	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)	3-11/32 (84.93)	3/4 (19.1)	17/32 (13.5)	1-1/8 (28.6)

For additional application information request Product Bulletin EL-4

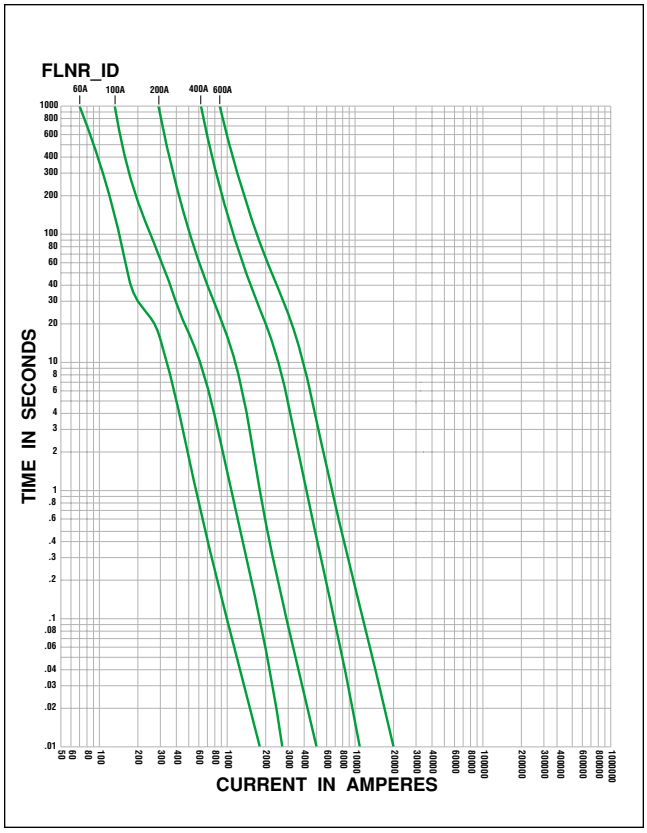


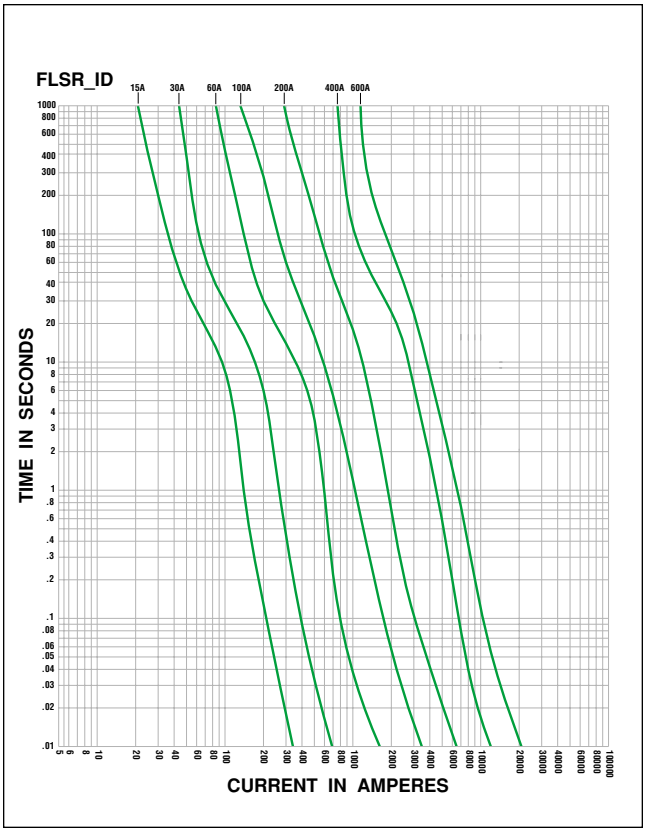


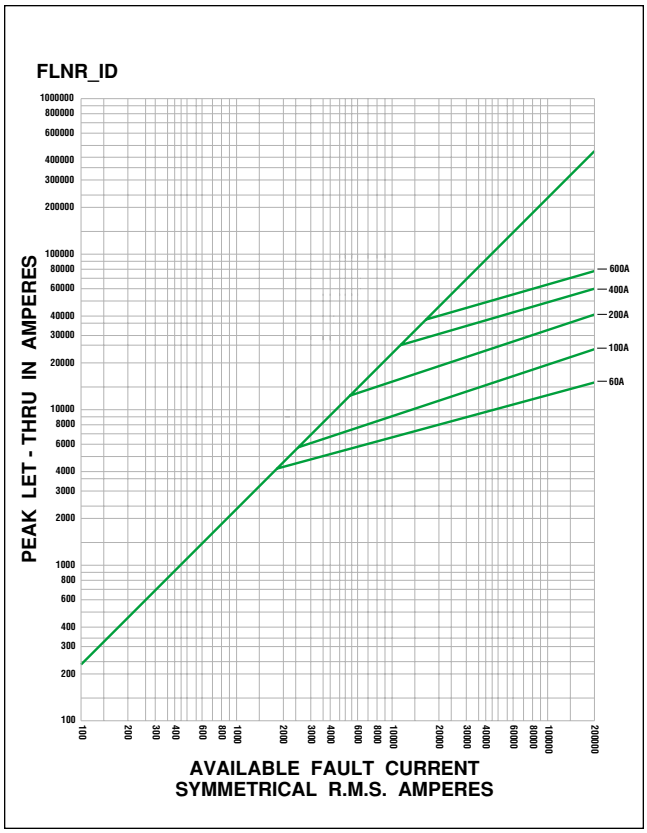
FLNR_ID/FLSR_ID Indicator™ Class RK5 Fuses

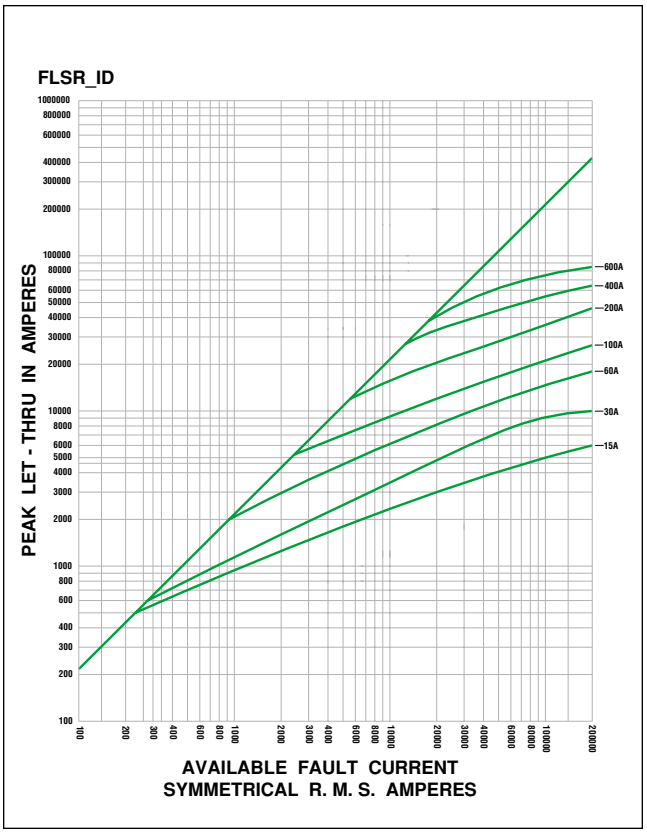
250/600 VAC ■ Dual-Element, Time Delay ■ 1/10 – 600 Amperes

Littelfuse
POWR-GARD™ Products









FLNR/FLSR Class RK5 Fuses

250/600 VAC ▪ Dual-Element, Time-Delay ▪ 1/10 – 600 Amperes

Littelfuse
POWR-GARD™ Products

Littelfuse FLNR/FLSR series fuses have been the superior UL Class RK5 dual-element time-delay fuses, and are the most widely used class of fuses. FLNR/FLSR series fuses provide excellent protection for all types of circuits especially those containing motors. However, users and specifiers should consider the significant benefits offered by Indicator fuses. Complete information on these fuses may be found in this section of this catalog.

APPLICATIONS

Service entrance switches
Switchboard main and feeder switches
Motor control center mains and motor branch circuits
Individual fused combination motor controllers
Distribution panelboards
Industrial control panels
Protection of fully-rated panelboards and loadcenters
All general purpose circuits

SAFETY

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Faster acting short circuit protection than any non-current limiting mechanical protective device.

RELIABILITY

- Accurate and reliable — Automated, precision manufactured and assembled parts ensure accurate, consistent response to overloads and short circuits.

SPECIFICATIONS

Voltage Ratings: AC: 250 Volts (FLNR); 600 Volts (FLSR)
DC: 125 Volts (FLNR)
300 Volts (FLSR)

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
DC: 20,000 amperes

Ampere Range: 1/10 – 600 amperes

Approvals: Standard 248-12, Class RK5
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)
MSHA 300 Volt Listing (FLSR)
QPL: Federal Specification WF-1814

AMPERE RATINGS

1/10	9/10	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, *FLSR only

Example part number (series & amperage): FLSR100

RECOMMENDED FUSE BLOCKS

LR250 series (for FLNR series fuses)
LR600 series (for FLSR series fuses)

Refer to Fuse Block section of this catalog for additional information.

DIMENSIONS

Refer to FLNR_ID series for FLNR dimensions and FLSR_ID series for FLSR dimensions.

LONGER EQUIPMENT LIFE

- Reduced damage to equipment caused by heating and magnetic forces of short circuits.
- Equipment runs cooler with low-resistance dual-element fuses.

KLNR/KLSR Class RK1 Fuses

250/600 VAC ■ Fast-Acting ■ 1 – 600 Amperes

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

SPECIFICATIONS

Voltage Ratings: AC: 250 Volts (KLNR); 600 Volts (KLSR)
DC: 125 Volts (1 – 600A KLNR);
250 Volts (1 – 30A KLSR);
300 Volts (35 – 600A KLSR).

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
DC: 20,000 amperes

Ampere Range: 1 – 600 amperes.

Approvals: AC: Standard 248-12, Class RK1
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)
DC: Littelfuse Self-certified

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

Example part number (series & amperage): KLNR 200

RECOMMENDED FUSE BLOCKS

LR250 series (for KLNR series fuses)
LR600 series (for KLSR series fuses)

Refer to Fuse Block section of this catalog for additional information.

KLNR/KLSR series RK1 fuses were the earliest type of current-limiting fuse developed. Their single-element, silver link design enables them to provide fast-acting overload and short-circuit protection. When used to protect inductive loads such as motors, solenoids, and transformers, KLNR/KLSR series fuses must be greatly oversized to prevent opening the fuses on harmless inrush currents. In such applications, KLNR/KLSR series fuses may only provide short-circuit protection.

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

APPLICATIONS

Resistance heaters

Lighting circuits

Non-inductive loads

Molded case circuit breaker load centers and panelboards have increased interrupting ratings when “series rated” with Littelfuse KLNR/KLSR Class RK1 fuses. Refer to panelboard manufacturer’s literature for UL Listed combination of fuses and panelboards. Series ratings up to 200,000 amperes are available.

SAFETY

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Extremely current limiting — Stops damaging short-circuit current faster than any mechanical protective device.
- Fast-acting — Provides fast-acting protection to equipment such as variable speed drives, rectifiers and other equipment containing surge-sensitive components.

LONGER EQUIPMENT LIFE

- Current-limiting design reduces damage to equipment caused by heating and magnetic effects of short-circuit currents.

ECONOMICAL

- Extremely current-limiting — often permits use of readily available, less costly equipment.
- Used as input or output fuses for surge-sensitive components, such as variable speed drives and rectifiers, fast-acting KLNR/KLSR fuses may prevent opening of expensive semiconductor fuses protecting individual components.

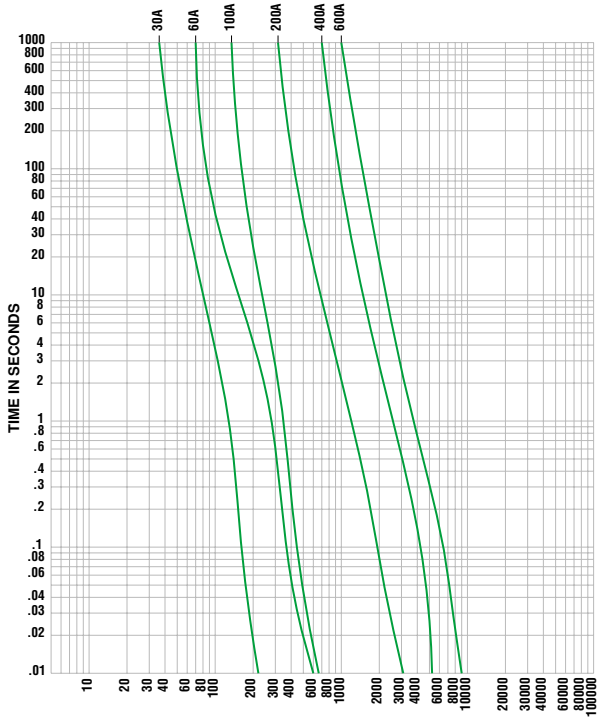
EASY TO USE

- 200,000 A.I.R. rating minimizes need for short circuit calculations.

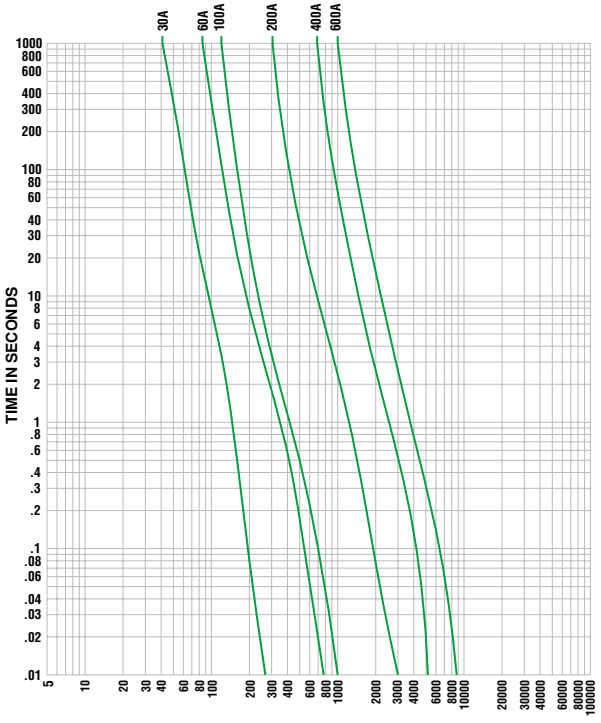
DIMENSIONS

- Refer to FLNR for KLNR dimensions and FLSR for KLSR dimensions.

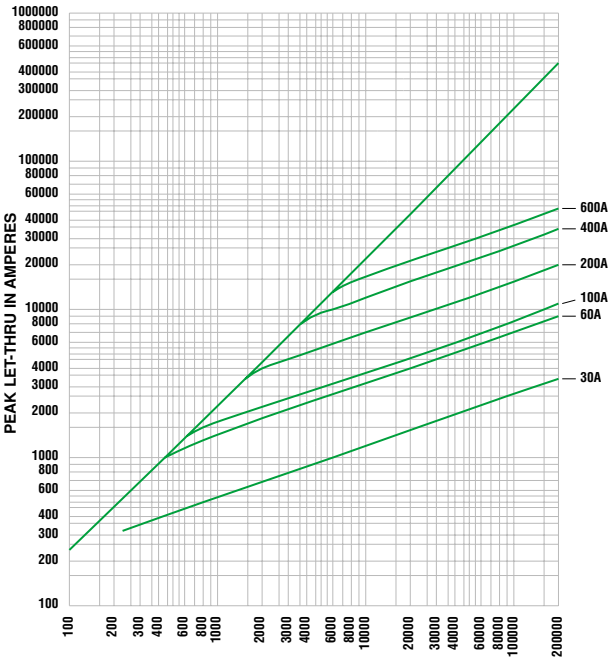
KLNR



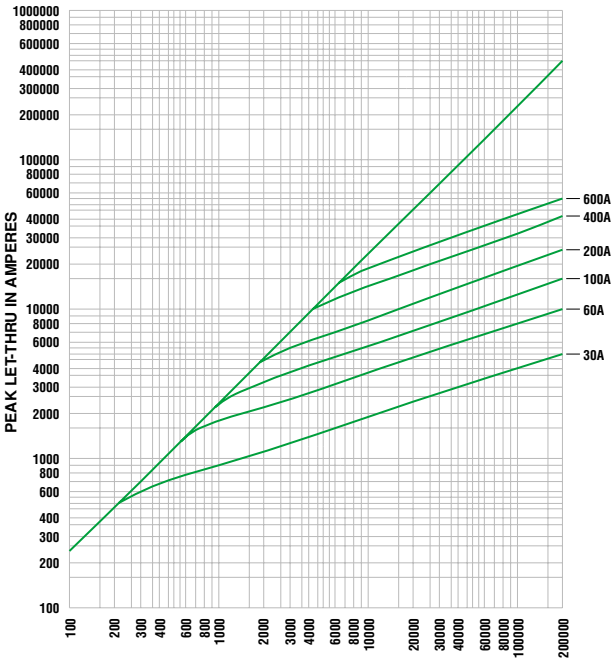
KLSR



KLNR



KLSR



NLN/NLS Class K5 Fuses

250/600 VAC ■ “ONE-TIME” ■ 1 – 600 Amperes

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

NLN and NLS series fuses provide low cost protection for general purpose feeder and branch circuits when available short circuit currents are less than 50,000 amperes. They replace all Class H fuses which have only a 10,000 ampere interrupting rating. They are suitable for use in many residential and smaller commercial and industrial applications.

NLKP series fuses are Canadian “Code” fuses specifically designed to meet Canadian Electrical Code Type P fuse requirements for residential use. They have a 10,000 ampere interrupting rating.

However, to obtain the added benefits of time-delay, current-limitation, and higher interrupting rating, consider the use of POWR-PRO® IDSR Indicator™ fuses for circuits between 250 and 600 volts. The user gets all the benefits of time-delay RK5 fuses plus the added benefits of an indicating fuse that tells when it has opened. Complete information on these fuses may be found in the POWR-PRO® section of this catalog. For circuits up to 250 volts, see FLNR fuses in this section of the catalog.

APPLICATIONS

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

Resistive heating loads.

ECONOMICAL

- For use in applications where lowest initial cost is the major consideration.

SAFETY

- 50,000 A.I.R., Class K5 — Adequate interrupting capacity for residences and many smaller facilities.

SPECIFICATIONS

Voltage Ratings: AC: 250 Volts (NLN, NLKP)
600 Volts (NLS)
DC: 250 Volts (NLN)
400 Volts (NLS 35 – 60A)
500 Volts (NLS 8 – 15A)
(NLS 225 – 600A)
600 Volts (NLS 1 – 7A)
(NLS 20 – 30A)
(NLS 70 – 200A)

Interrupting Ratings:
AC: 50,000 amperes rms symmetrical (NLN/NLS)
10,000 amperes (NLKP)
DC: 20,000 amperes (NLN/NLS 1 – 60A)
50,000 amperes (NLN/NLS 70 – 600A)

Ampere Range: 1– 600 amperes (NLN/NLS)
15 – 60 amperes (NLKP)

Approvals: NLN/NLS: Standard 248-9, Class K5
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)**
****Excludes NLN 15-60A**
NLKP: Standard 248-6, Class H
UL Listed (File No: E81895)
CSA Certified (File No: LR29865)
Meets CSA “Type P” requirements

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.

Example part number (series & amperage): NLS 125

RECOMMENDED FUSE BLOCKS

LH250 series (for NLN and NLKP series fuses)
LH600 series (for NLS series fuses)

Refer to Fuse Block section of this catalog for additional information.

NOTE: NLKP series fuses have limited interrupting rating and should be used only where available short circuit current is known to be less than the fuse interrupting rating. Where available fault current is unknown, where it exceeds NLN/NLS interrupting rating, or where it may increase in the future, 200,000 ampere interrupting rating Littelfuse POWR-PRO™ FLNR_ID/FLSR_ID Indicator™ fuses and FLNR/FLSR series fuses provide superior protection for all motor and general purpose circuits containing inductive loads.

NLN/NLS Class K5 Fuses

250/600 VAC ■ "ONE-TIME" ■ 1 – 600 Amperes

Littelfuse
POWR-GARD™ Products

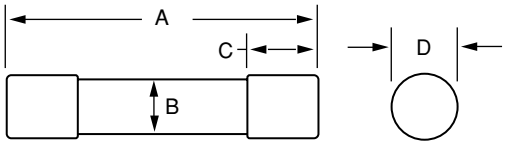


FIG. 1

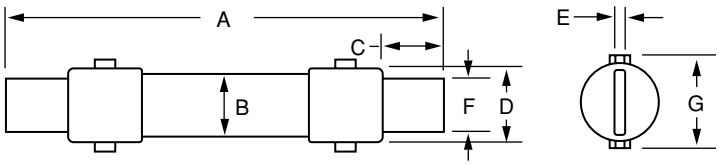
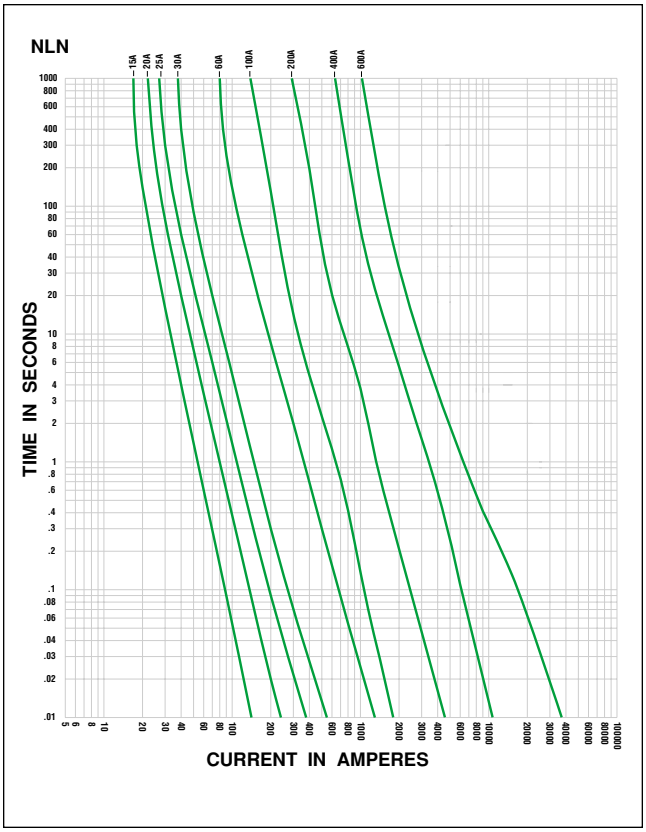
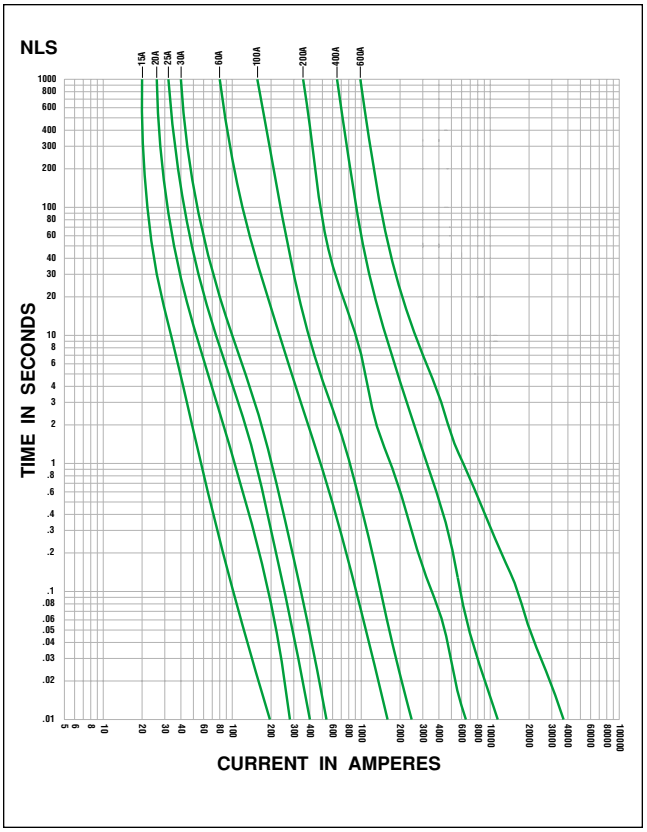


FIG. 2

AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm in parentheses)						
			A	B	C	D	E	F	G
1 – 30	1	NLN NLKP	2 (50.8)	1/2 (12.7)	1/2 (12.7)	9/16 (14.3)	—	—	—
		NLS	5 (127.0)	3/4 (19.1)	5/8 (15.9)	13/16 (20.6)	—	—	—
35 – 60	1	NLN NLKP	3 (76.2)	3/4 (19.1)	5/8 (15.9)	13/16 (20.6)	—	—	—
		NLS	5-1/2 (139.7)	1 (25.4)	5/8 (15.9)	1-1/16 (27.0)	—	—	—
70 – 100	2	NLN	5-7/8 (149.2)	1 (25.4)	1 (25.4)	1-1/16 (27.0)	1/8 (3.2)	3/4 (19.1)	1-5/16 (33.3)
		NLS	7-7/8 (200.0)	1-1/4 (31.8)	1 (25.4)	1-5/16 (33.3)	1/8 (3.2)	3/4 (19.1)	1-9/16 (39.7)
110 – 200	2	NLN	7-1/8 (181.0)	1-1/2 (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	9-5/8 (244.5)	1-3/4 (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	8-5/8 (219.1)	2 (50.8)	1-7/8 (47.6)	2-3/32 (53.2)	1/4 (6.4)	1-5/8 (41.3)	2-13/32 (61.1)
		NLS	11-5/8 (295.3)	2-1/2 (63.5)	1-7/8 (47.6)	2-19/32 (65.9)	1/4 (6.4)	1-5/8 (41.3)	2-7/8 (73.0)
450 – 600	2	NLN	10-3/8 (263.5)	2-1/2 (63.5)	2-1/4 (57.2)	2-19/32 (65.9)	1/4 (6.4)	2 (50.8)	2-7/8 (73.0)
		NLS	13-3/8 (339.7)	3 (76.2)	2-1/4 (57.2)	3-3/32 (78.6)	1/4 (6.4)	2 (50.8)	3-7/16 (87.3)





RLN/RLS Class H Fuses

250/600 VAC ■ Renewable ■ 1 – 600 Amperes

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

SPECIFICATIONS

Voltage Ratings: AC: 250 Volts (RLN); 600 Volts (RLS)

Interrupting Ratings: AC: 10,000 amperes rms symmetrical

Ampere Range: 1 – 600 amperes

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 shown below.

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 *

**These ampere ratings require two links per fuse.*
***RLS Only.*

Example part number (series & amperage): RLN 20

RECOMMENDED FUSE BLOCKS

LH250 series (for RLN series fuses)
LH600 series (for RLS series fuses)

Refer to Fuse Block section of this catalog for additional information.

Littelfuse RLN/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, rendering them unsafe, have all but eliminated the use of these fuses in new applications. In addition, escalating labor costs and increasing automation, which makes downtime very expensive, have greatly reduced or eliminated the cost savings attributed to renewable fuses.

We recommend the use of POWR-PRO® IDSR series Indicator™ fuses for circuits between 250 and 600 volts and FLNR series for 250 volt and below circuits. Complete information on POWR-PRO® Indicator fuses may be found in the POWR-PRO® section of this catalog. FLNR fuses are in this section of the catalog.

COST CONSIDERATIONS

- When comparing the cost of using renewable fuses with the cost of other fuses, the labor required for replacing links and the cost of additional downtime should be included.

CAUTIONS

- 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.
- After disassembly of fuse, examine carefully. Discard any fuses which show evidence of weakened tube or damaged components.
- Remove all link residue from fuse tube.
- Carefully clean all contact surfaces, and remove metal spatter from all surfaces.
- Install the proper rated fuse link and tighten all connections securely.
- Visually examine fuses for correct alignment of blades.

DIMENSIONS

- For dimensions, please refer to NLN series for RLN dimensions and NLS series for RLS dimensions.

JLS CLASS J FUSES

600 VAC ■ Fast-Acting ■ 1 – 600 Amperes

Littelfuse
POWR-GARD™ Products

SPECIFICATIONS

Voltage Ratings: 600 Volts AC

Interrupting Ratings: 200,000 amperes rms symmetrical

Ampere Range: 1 – 600 amperes

Approvals: Standard 248-8, Class J
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)
QPL: Federal Specification No: WF-1814

AMPERE RATINGS

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

Example part number (series & amperage): JLS 110

RECOMMENDED FUSE BLOCKS

LJ600 series

Refer to Fuse Block section of this catalog for additional information.

JLS series fuses provide space-saving, fast-acting overload and short-circuit protection for non-inductive loads. When used for motors or other inductive loads, the ampere rating of JLS series fuses must be increased to prevent nuisance opening on inrush currents. In such applications, JLS fuses may provide only short circuit protection. Consider using Littelfuse POWR-PRO® JTD series time-delay fuses in such circuits.

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.

SPACE SAVING

- JLS fuse characteristics are similar to KLNR/KLSR fast-acting Class RK1 fuses, but they are much smaller.

SAFETY

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Extremely current limiting — Stops damaging short-circuit current faster than any mechanical protective device.
- Fast-acting — Provides fast-acting protection to equipment such as variable speed drives, rectifiers and other equipment containing surge-sensitive components.

LONGER EQUIPMENT LIFE

- Current-limiting design reduces damage to equipment caused by heating and magnetic effects of short-circuit currents.

ECONOMICAL

- Extremely current-limiting design often permits use of readily available, less costly equipment.
- Manufacturers of equipment containing dual voltage devices can simplify manufacturing and reduce inventory by standardizing on 600 volt JLS fuses and Class J fuse blocks for all AC voltage ratings.

EASY TO USE

- 200,000 A.I.R. rating minimizes need for short-circuit calculations.

NOTE: Littelfuse JLS fuses are not time-delay fuses. For applications where short-duration surges and spikes may cause nuisance fuse opening, consider the use of Littelfuse POWR-PRO® JTD series time-delay fuses.

General Purpose Fuses

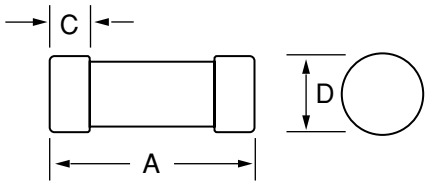


Fig. 1

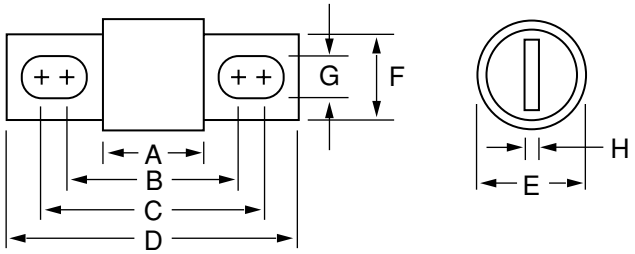
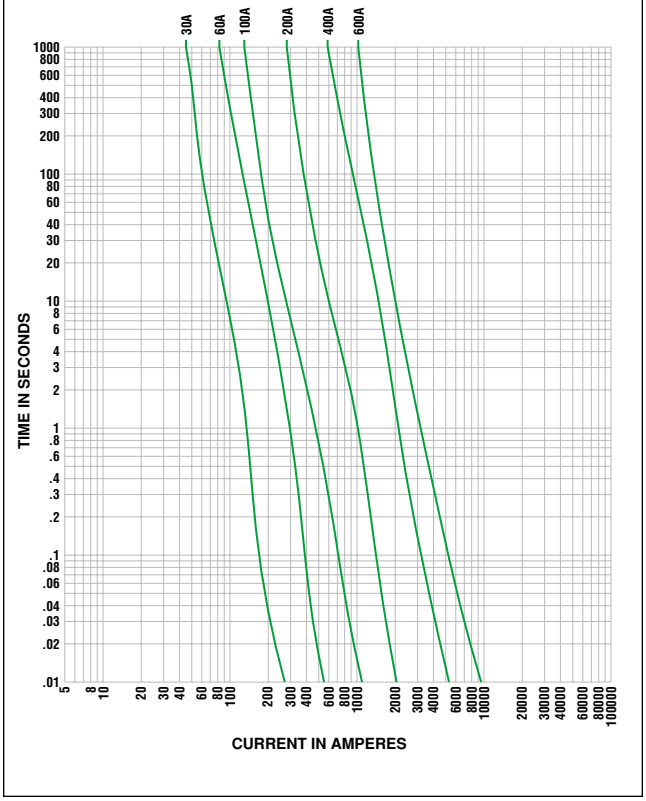
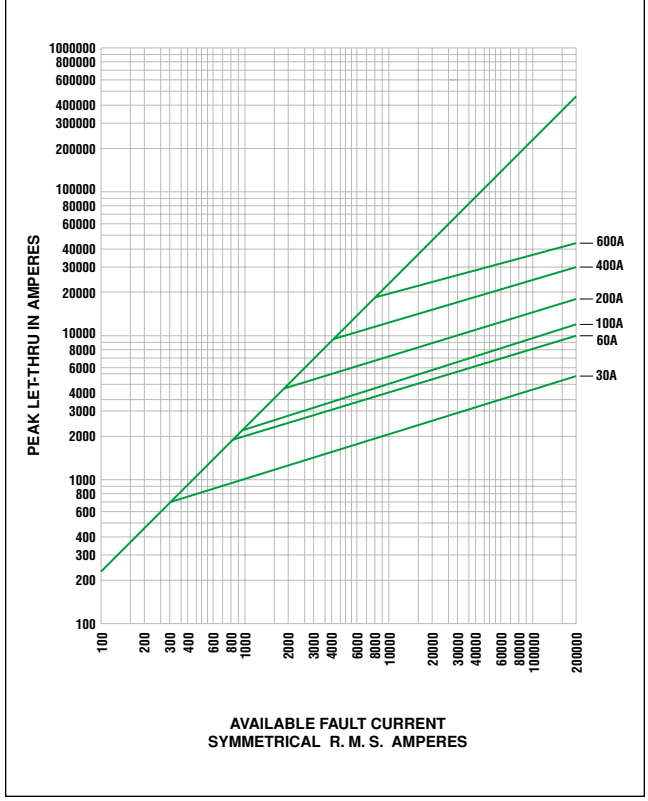


Fig. 2

AMPERES	REFER TO FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		A	B	C	D	E	F	G	H
1 – 30	1	2-1/4 (57.2)	—	1/2 (12.7)	13/16 (20.6)	—	—	—	—
35 – 60	1	2-3/8 (60.3)	—	5/8 (15.9)	1-1/16 (27.0)	—	—	—	—
70 – 100	2	2-5/8 (66.7)	3-17/32 (89.7)	3-23/32 (94.5)	4-5/8 (117.5)	1 (25.4)	3/4 (19.1)	9/32 (7.1)	1/8 (3.2)
110 – 200	2	3 (76.2)	4-9/32 (108.7)	4-15/32 (113.5)	5-3/4 (146.1)	1-1/2 (38.1)	1-1/8 (28.6)	9/32 (7.1)	3/16 (4.8)
225 – 400	2	3-3/8 (85.7)	5-1/8 (130.2)	5-3/8 (136.5)	7-1/8 (181.0)	2 (50.8)	1-5/8 (41.3)	13/32 (10.3)	1/4 (6.4)
450 – 600	2	3-3/4 (95.3)	5-27/32 (148.4)	6-5/32 (156.4)	8 (203.2)	2-1/2 (63.5)	2 (50.8)	17/32 (13.5)	3/8 (9.5)





JLLN/JLLS POWR-T™ Class T Fuses

300/600 VAC ■ Fast-Acting ■ 1 – 1200 Amperes

Littelfuse
POWR-GARD™ Products

Space saving POWR-T™ fuses are the most compact fuses available in ratings above 30 amperes — less than one-third the size of comparable Class R fuses. When rated in accordance with the NEC, POWR-T fuses provide fast-acting overload and short circuit protection for non-inductive circuits and equipment. Used in inductive circuits, the ampere rating of POWR-T fuses must be increased to prevent opening on inrush currents. In such instances, POWR-T fuses may provide only short circuit protection.

For motor and general purpose circuits where space is not critical, we recommend POWR-PRO® JTD_ID Indicator series, LLNRK/LLSRK series, or FLSR_ID Indicator series.

APPLICATIONS

Protection of individual electric services and meters.

Main switches containing Class T fuses may be used to provide compact protection for meter stacks.

Molded case circuit breaker load centers and panelboards have increased interrupting ratings when “series rated” with Littelfuse Class T fuses. Refer to panelboard manufacturers’ literature for UL Listed combination of fuses and panelboards. Series ratings up to 200,000 amperes are available.

SPACE-SAVING

Typical three-pole Class T fuse blocks require less than 50% of the panel area required for Class R fuse blocks. Switch enclosures, fuse pullouts, and other equipment using Class T fuses are often correspondingly more compact.

SAFETY

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Extremely current limiting — Stops damaging short circuit current faster than any mechanical protective device.
- Fast-acting — Provides fast-acting overload protection to equipment such as variable speed drives, rectifiers and other equipment containing surge-sensitive components.

LONGER EQUIPMENT LIFE

- Current limiting design greatly reduces damage to equipment caused by heating and magnetic effects of short circuit currents.

ECONOMICAL

- Extremely current limiting design often permits use of readily available, less costly equipment.
- Used as input or output fuses for surge-sensitive components, such as variable speed drives and rectifiers, fast-acting POWR-T JLLN/JLLS fuses may prevent opening of expensive semiconductor fuses protecting individual components.

NOTE: JLLN Class T 300 volt fuses are UL listed for circuits not exceeding 300 volts to ground. However, since UL does not include testing 300 volt Class T fuses on 277/480 volt three-phase bolted faults, Littelfuse does not recommend using 300 volt Class T fuses where phase-to-phase voltage exceeds 300 volts.

SPECIFICATIONS

Voltage Ratings: AC: 300 Volts (JLLN); 600 Volts (JLLS)
DC: 125 Volts (JLLN 110 – 1200A);
300 Volts (JLLS)

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
DC: 20,000 amperes
(JLLN 110 – 1200A)
(JLLS 1 – 1200A)

Ampere Range: 1– 1200 amperes

Approvals: AC: Standard 248-15, Class T
UL Listed (File No: E81895):
JLLN/JLLS (1 – 800A)
UL Recognized (File No: E71611):
JLLS (900 – 1200A)
CSA Certified (File No: LR29862):
JLLN/JLLS (1 – 600A)
DC: UL Listed (File No: E81895):
JLLN (110 – 1200A)
Littelfuse Self-certified: JLLS 300 VDC

AMPERE RATINGS

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

Example part number (series & amperage): JLLS 100

RECOMMENDED FUSE BLOCKS

LT300 series (for JLLN series fuses)
LT600 series (for JLLS series fuses)

Refer to Fuse Block section of this catalog for additional information.

JLLN/JLLS POWR-T™ Class T Fuses

300/600 VAC ■ Fast-Acting ■ 1 – 1200 Amperes

Littelfuse POWR-GARD™ Products

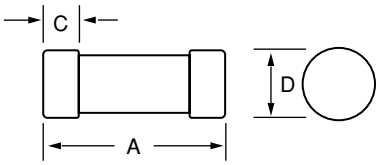


Fig. 1

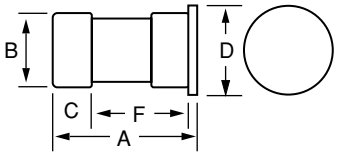


Fig. 2

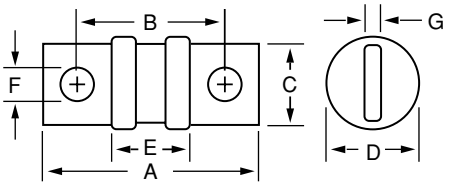
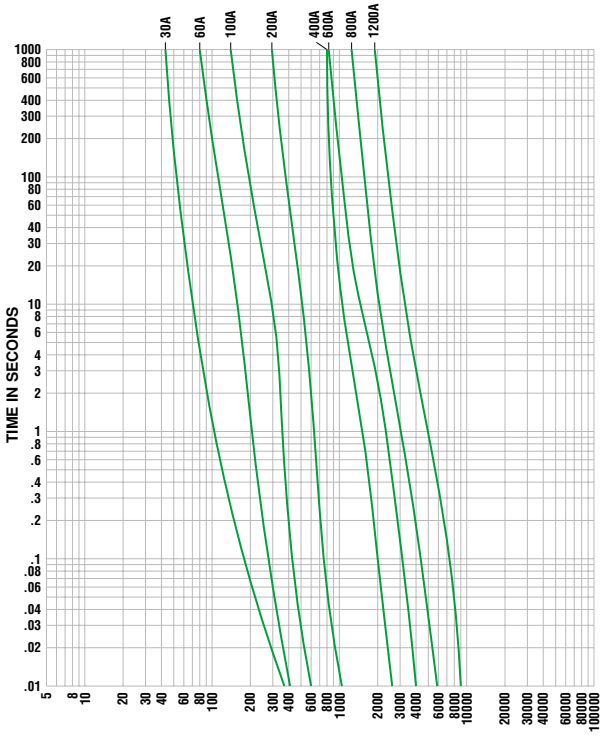


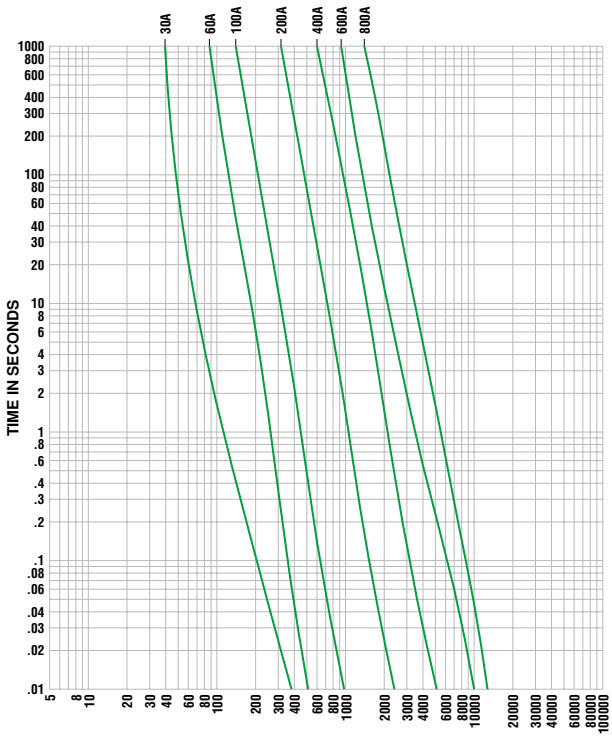
Fig. 3

AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm in parentheses)						
			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)	.67 (15.5)	.44 (11.2)

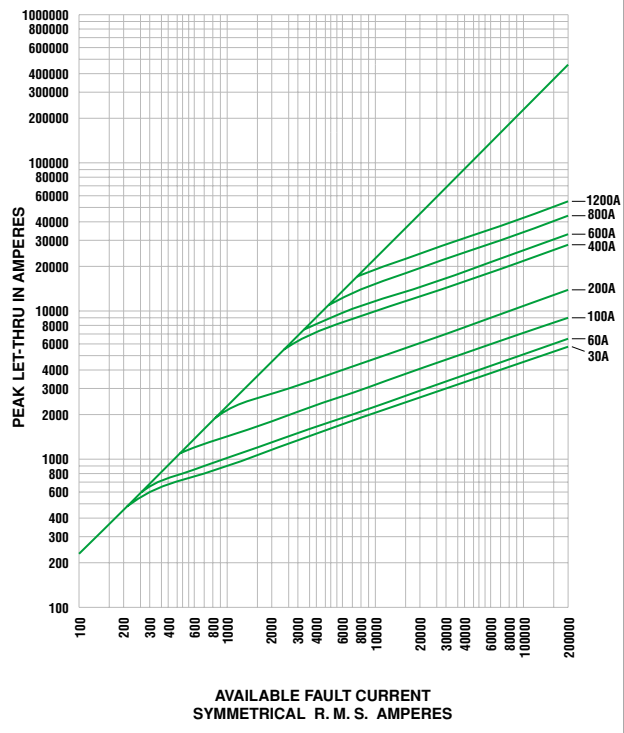
JLLN



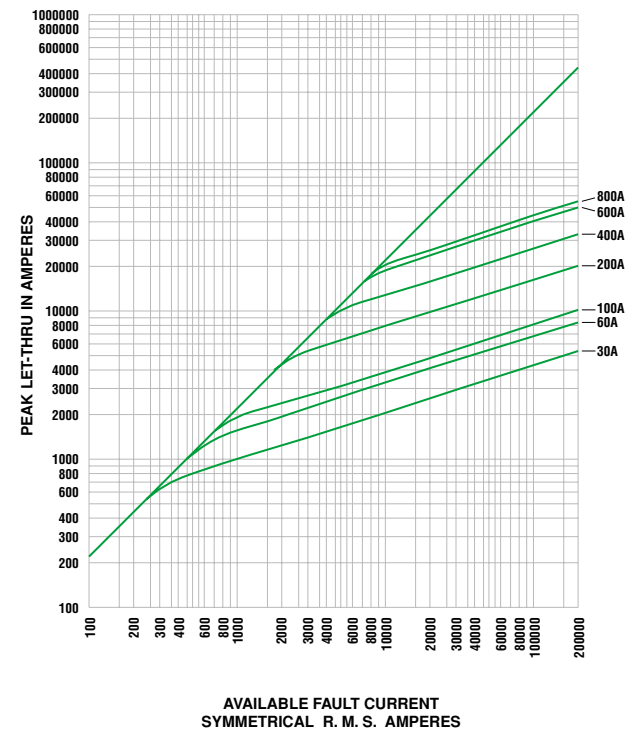
JLLS



JLLN



JLLS



SLC Class G Fuses

480 VAC, 600 VAC ■ Medium Time-Delay ■ 1/2 – 60 Amperes

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

The unique design of Littelfuse's compact SLC series Class G fuses provide additional time-delay over competitive products which increases system reliability.

Compact Class G fuses were the first fuse series to approach midget fuse dimensions and meet NEC requirements for branch-circuit protection. The unique dimensions of SLC series Class G fuses prevents insertion of lower voltage fuses in Class G fuse holders. The fuse's varying length prevents insertion of higher ampere rated fuses in fuse holders designed for lower ampere ratings.

Class CC fuses are replacing Class G fuses in many new designs. Class CC fuses' superior time delay plus higher voltage and interrupting ratings meet the needs of modern circuits. Littelfuse's introduction of POWR-PRO® CCMR series fuses, with ratings up to 60 Amperes for providing branch circuit protection, are accelerating this trend. Complete information on POWR-PRO® CCMR series fuses may be found in the POWR-PRO® section of this catalog.

SAFETY

- 100,000 A.I.R. — Reliable interruption of all overcurrents up to 100,000 amperes.
- Current limiting design reduces damage to equipment caused by heating and magnetic effects of short circuit currents.
- Medium time-delay allows fuses to be sized closer to actual equipment requirements — no need to greatly oversize to withstand harmless equipment or system surges.

REDUCED DOWNTIME

- Medium time-delay may reduce downtime caused by power surges or equipment demands.

NOTE: For applications where greater time delay is required, or where ratings exceed 60 amperes, consider selecting Littelfuse time-delay RK1, RK5, or Class J fuses.

SPECIFICATIONS

Voltage Ratings: 600Volts AC (1/2 – 20A)
480 Volts AC (25 – 60A)

Interrupting Ratings: 100,000 amperes rms symmetrical

Ampere Range: 1/2 – 60 amperes

Approvals: Standard 248-5, Class G
UL Listed (File No: E81895)
CSA Certified (File No: LR29862)
QPL: Federal Specification No: WF-1814

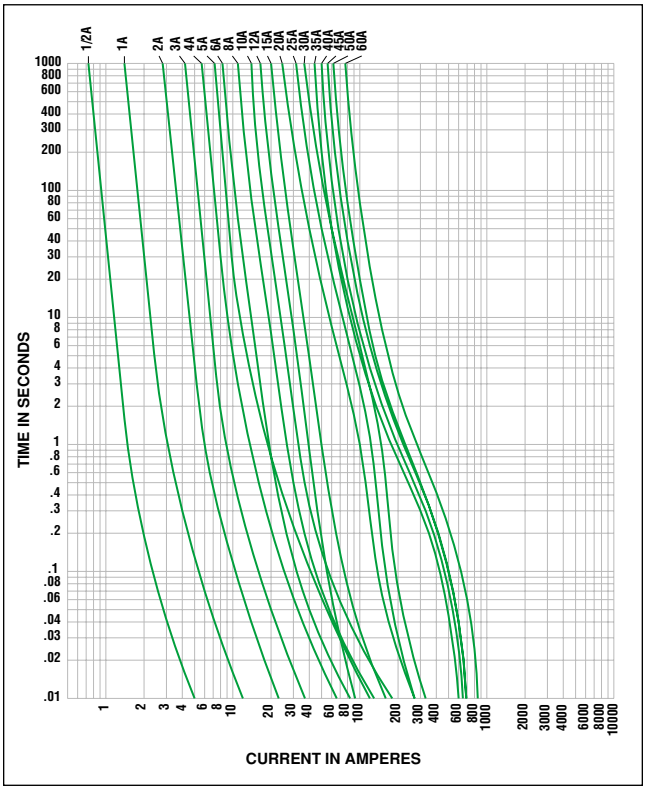
AMPERE RATINGS

½	3	6	15	30	45
1	4	8	20	35	50
2	5	10	25	40	60

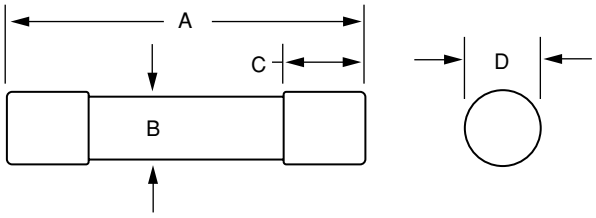
Example part number (series & amperage): SLC 10

RECOMMENDED FUSE BLOCKS

LG300 series
L300G30 (for 25 and 30 amp fuses)
Refer to Fuse Block section of this catalog for additional information.



AMPERES	REFER TO FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)			
		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)



Class CC Fuses

600 VAC ▪ 1/10 – 60 Amperes

Littelfuse
POWR-GARD™ Products

Compared to other UL Listed fuses, Class CC fuses are the most current limiting, rating for rating. Because they are physically compact, they provide this superior protection in a fraction of the space required by other fuse classes. For example, when 600V three-pole, 30 ampere Class R fuse blocks are replaced by Littelfuse Class CC fuse blocks, panel mounting space is reduced approximately 70%. This is especially important when a panel contains many fuses to protect multiple circuit components.

APPLICATIONS

Three Types of Class CC Fuses, Specifically Designed to Protect Different Types of Components

1) Motor protection — CCMR series; dual-element, time-delay fuses specifically designed to protect motor circuits up to 40 HP**.

2) Small transformer protection (control power transformers) — KLDR series, time-delay fuses designed to withstand the high magnetizing inrush of transformers.

3) General purpose protection of equipment requiring fast overload protection — KLKR series, fast-acting fuses used for protection of equipment containing solid-state devices or other electronic components requiring fast response on overloads.

SAFETY

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Extremely current limiting — Reduces damage caused by heating and magnetic effects of short-circuit currents . . . stops damaging short-circuit currents faster than any mechanical protective device.

SPACE SAVING

- Class CC fuses are the smallest 600V, 200,000 A.I.R. fuses approved for branch circuit protection.

ECONOMICAL

- Current limiting design often permits use of readily available, less costly equipment.

**Consult the Motor Protection Tables in the Fuseology section for specific motor sizing information

SPECIFICATIONS

Voltage Ratings: AC: 600 Volts
DC: 250 – 500 Volts (CCMR)†
300 Volts (KLDR)
300 Volts (KLKR)

Interrupting Ratings: AC: 200,000 amperes rms symmetrical
DC: 20,000 amperes

Ampere Range: CCMR: 2/10 – 60 amperes
KLDR: 1/10 – 30 amperes
KLKR: 1/10 – 30 amperes

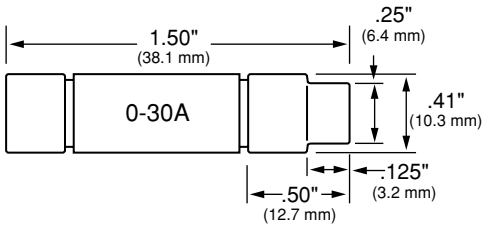
Approvals: AC: Standard 248-4, Class CC
UL Listed 1/10-30 Amps (File No: E81895)
Standard 248, Class CD
UL Listed 35-60 Amps (File No: E71611)
CSA Certified 1/10-60 Amps
(File No: LR29862)
DC: Littelfuse Self-certified

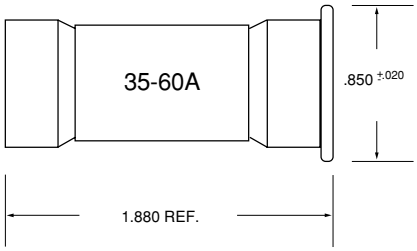
RECOMMENDED FUSE BLOCKS

L60030C series
L60060C series (for CCMR 35–60A)

Refer to Fuse Block section of this catalog for additional information.

†Refer to the POWR-PRO® section for additional information.





Class CC Fuses

600 VAC ▪ 1/10 – 60 Amperes

Littelfuse POWR-GARD™ Products

CCMR Series

For space-saving protection of motor circuits up to 40 HP**, we recommend Littelfuse POWR-PRO® CCMR series fuses. These fuses are the only true dual-element time-delay CC fuses specifically engineered for motor branch circuit protection. They provide Type II protection (no damage) to both NEMA-rated and the more sensitive IEC (International Electromechanical Commission) type motor circuit components.

CCMR series fuses are now available in larger sizes — from 35 to 60 amperes! ***No other 600V fuse is available with this current carrying capacity in a package this small.***

**Consult the Motor Protection Tables in the Fuseology section for specific motor sizing information

For more information on CCMR series Class CC fuses, see the CCMR series pages in the POWR-PRO® section of this catalog.

1/10 – 30A: UL Listed Time-Delay Class CC

35 – 60A: UL Listed Class CD

AMPERE RATINGS

2/10	1¼	2½	5	9	30
¼	1 4/10	2 8/10	5 6/10	10	35
3/10	1½	3	6	12	40
½	1 6/10	3 3/10	6¼	15	45
6/10	1 8/10	3½	7	17½	50
8/10	2	4	7½	20	60
1	2¼	4½	8	25	

Example part number (series & amperage): CCMR 30

KLDR Series

KLDR fuses are time-delay fuses specifically designed for the protection of control transformers, solenoids and similar inductive components with high magnetizing currents during the first half-cycle. They closely match most control power transformer characteristics, which permits the fuses to be sized in accordance with the latest revisions of UL 508 (Industrial Control) and UL 845 (Motor Control Centers). When the time delay of KLDR fuses is adequate to carry motor starting current, they provide excellent protection of motor branch circuits containing IEC or NEMA rated motor controllers or contactors.

AMPERE RATINGS

1/10	½	1 4/10	2 8/10	5 6/10	10
1/8	6/10	1½	3	6	12
15/100	¾	1 6/10	3 3/10	6¼	15
3/16	8/10	1 8/10	3½	7	17½
2/10	1	2	4	7½	20
¼	1⅛	2¼	4½	8	25
3/10	1¼	2½	5	9	30
4/10					

Example part number (series & amperage): KLDR 5 6/10

KLKR Series

KLKR series Class CC fuses are fast-acting fuses intended for general purpose branch circuit protection. Their compact size, fast-acting overload response, and their highly current limiting design make them ideal for use in OEM equipment and control panels. Solid-state devices such as SCRs and other electronic equipment generally require fast-acting protection.

AMPERE RATINGS

1/10	½	2	4	8	15
1/8	¾	2½	5	9	20
2/10	1	3	6	10	25
¼	1½	3½	7	12	30
3/10					

Example part number (series & amperage): KLKR 25

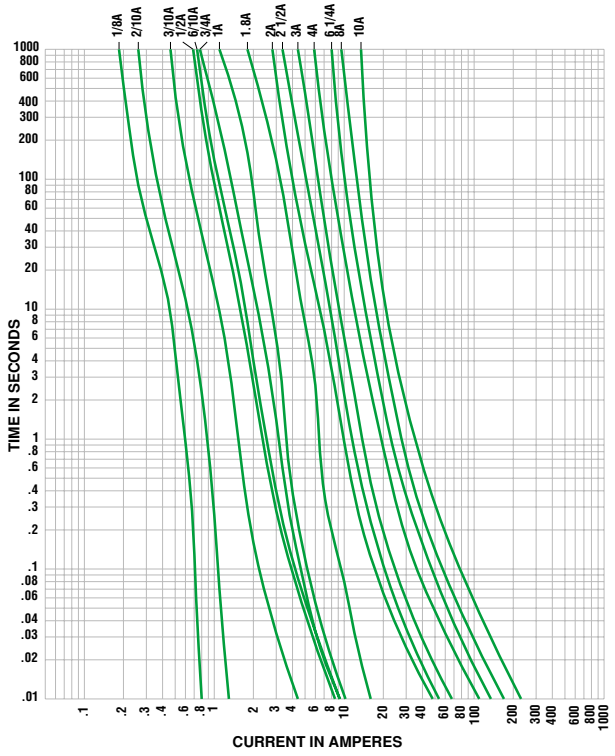
Class CC Fuses

600 VAC ▪ 1/10 – 60 Amperes

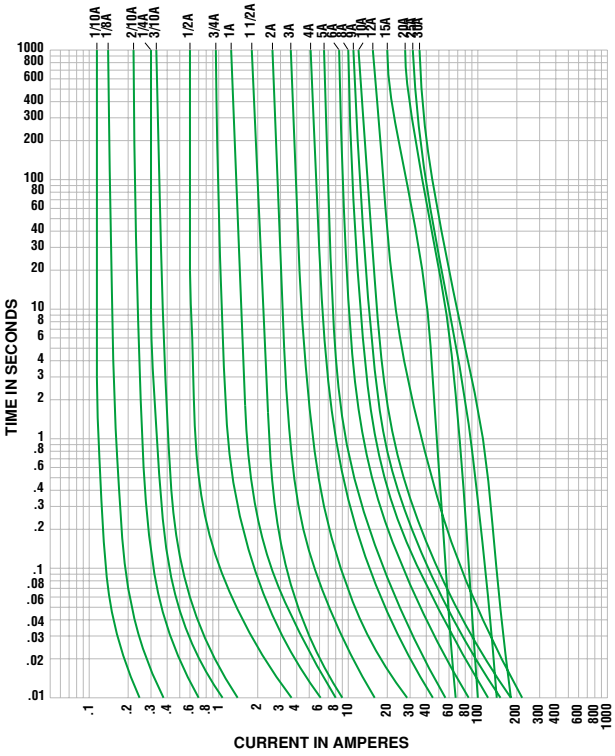
Littelfuse
POWR-GARD™ Products

For performance data on Littelfuse CCMR series Class CC fuses, see the CCMR pages in the POWR-PRO® section of this catalog.

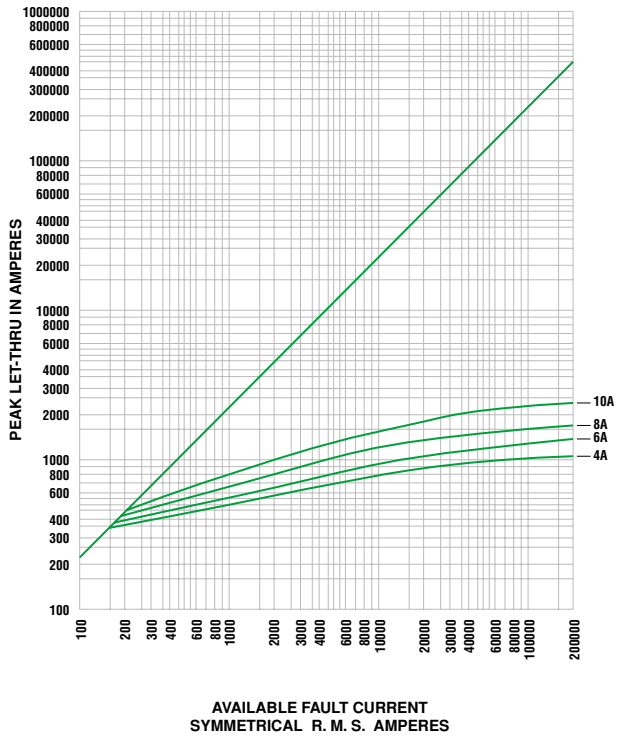
KLDR



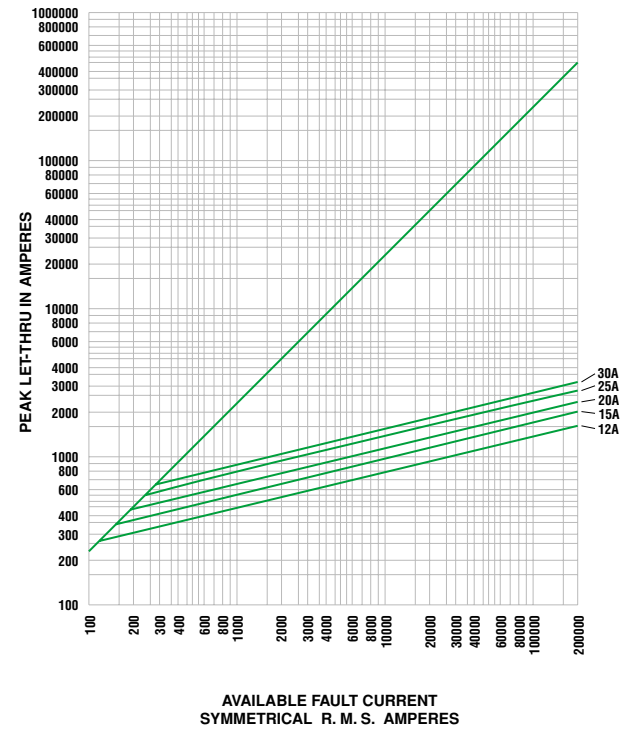
KLKR



KLDR



KLKR



Plug Fuses

125 VAC ▪ Fast-Acting or Time-Delay ▪ 1/4 – 30 Amperes

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

APPLICATIONS

The National Electric Code now permits Edison-base fuses to be used only for replacements in existing installations, and then, only when there is no evidence of overfusing or tampering. All new Edison-base fuseholders must have Type S fuse adapters installed before they are placed in service. Designed to prevent installation of wrong size fuses, Type S Adapters (SAO series) screw into Edison-base fuseholders so they may accept Type S fuses. Once installed the adapters cannot be removed.

To prevent shunting of open fuses or overfusing, and to reduce nuisance fuse opening, it is recommended that SAO adapters with properly rated SLO or SOO series fuses be installed in all Edison-base fuseholders.

DESCRIPTION

Edison-base plug fuses (TOO, and TLO series) have threaded metal shells and contacts similar to incandescent lamp bases. Fuseholders for Edison-base fuses have matching metal threads similar to standard light sockets.

Type S fuses (SLO and SOO series) have nonmetallic threaded bases which fit matching nonmetallic threads in Type S fuseholders. Type S fuseholders are size-limiting, and will not accept Type S fuses with ampere ratings greater than the ampere rating marked on the Type S fuseholder. Type S fuses will not fit Edison-base fuseholders, nor can Edison-base fuses be used in Type S fuseholders.

Approvals: Standard 248-11, UL Listed Plug Fuses

Note: Although rated at 125 volts, NEC permits plug fuses to be used in circuits not exceeding 150 volts to ground. See NEC Article 240-V.

SAO Type S Fuse Adapters inserted into Edison-base fuseholders permanently convert them to Type S fuseholders. They accept Type S fuses only.

SAO Adapter Rating	Accepts Fuse Ratings:	Other SOO Fuse Ratings Which Fit
SAO 1	3/10 – 1	—
SAO 1-1/4	1⅛, 1¼	3/10 – 1
SAO 1-6/10	1 3/10, 1 6/10	3/10 – 1¼
SAO 2	1 8/10, 2	—
SAO 2-1/2	2¼, 2½	1 8/10, 2
SAO 3-2/10	2 8/10, 3 2/10	1 8/10 – 2½
SAO 4	3½, 4	—
SAO 5	4½, 5	3½, 4
SAO 6-1/4	3½, 6¼	3½ – 5
SAO 15	7, 8, 9, 10, 12, 14, 15	7, 8, 9, 10
SAO 20	20 Only	—
SAO 30	20, 25, 30	—

HOLDERS

See Littelfuse box cover units in the Miscellaneous Products section of this catalog.

EDISON-BASE PLUG FUSES

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.

AMPERE RATINGS

¼	1	2	3½	6¼	14
3/10	1⅛	2¼	4	7	15
4/10	1¼	2½	4½	8	20
½	1 4/10	2 8/10	5	9	25
6/10	1 6/10	3	5 6/10	10	30
8/10	1 8/10	3 2/10	6	12	

TLO Fuses are medium time-delay Edison-base fuses designed for general-purpose branch-circuit protection. See TOO and SOO fuses for motor protection. Use for replacement purposes only.

AMPERE RATINGS

15	20	25	30

TYPE S PLUG FUSES

SOO Fuses are dual-element time-delay Type S fuses designed for motor and motor branch-circuit protection; also suitable for all general-purpose circuits.

AMPERE RATINGS

¼	1	2	3½	6¼	14
3/10	1⅛	2¼	4	7	15
4/10	1¼	2½	4½	8	20
½	1 4/10	2 8/10	5	9	25
6/10	1 6/10	3	5 6/10	10	30
8/10	1 8/10	3 2/10	6	12	

SLO Fuses are medium time-delay Type S fuses for general-purpose branch-circuit protection.

AMPERE RATINGS

15	20	25	30

Midget & Electronic Fuses

KLK Fuses

FAST-ACTING ■ 600 VAC

Fast-acting, high-interrupting capacity, current-limiting type fuse. Especially suited for control circuits, street lighting, H.I.D. lighting, computers, and other applications without high inrush currents.

Voltage Rating: 600 Volts AC
500 Volts DC

Interrupting Rating: UL Listed 100,000 amperes rms symmetrical
(Capable of 200,000 amperes)

Ampere Ratings:

1/10	1	4	10
1/8	1½	5	12
3/10	2	6	15
1/4	2½	7	20
3/10	3	8	25
½	3½	9	30
¾			

Approvals: Standard 248-14
UL Listed 3/10-30A
(File No: E10480)
CSA Certified 3/10-30A
(File No: LR29862)
Versions available to meet MIL-F-5160/60, QPL F60C: Contact Factory.

Dimensions: 13/32" x 1-1/2"

Example part number (series & amperage): KLK 1-1/2

KLKD Fuses

FAST-ACTING ■ 600 VAC/DC

Fast-acting, high-interrupting capacity, current-limiting type fuse. Especially suited for DC control circuits, street lighting, H.I.D. lighting, computers, and other applications.

Voltage Rating: 600 Volts AC/DC

Interrupting Rating: AC: 100,000 amperes rms symmetrical; DC: 10,000 amperes

Ampere Ratings:

1/10	1	4	10
1/8	1½	5	12
3/10	2	6	15
1/4	2½	7	20
3/10	3	8	25
½	3½	9	30
¾			

Approvals: Standard 248-14
UL Listed 3/10-30A
(File No: E10480)
CSA Certified 3/10-30A
(File No: LR29862)

Dimensions: 13/32" x 1-1/2"

Example part number (series & amperage): KLKD 30

FLM Fuses

TIME-DELAY ■ 250 VAC

Use FLM 250 volt time-delay fuses to protect control circuit transformers, solenoids, and other circuits with high inrush currents. Excellent for supplemental protection of small motors. For motor **branch-circuit** protection, See Class CC fuses.

Voltage Rating: 250 Volts AC

Interrupting Rating: AC: 10,000 amperes rms symmetrical.

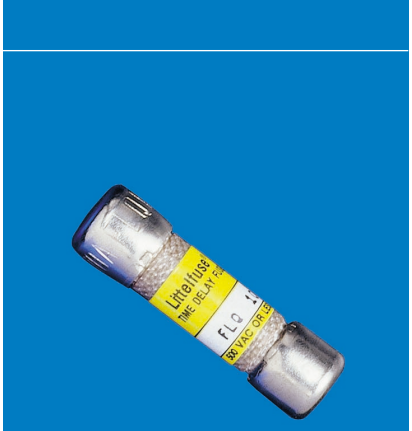
Ampere Ratings:

1/10	1⅛	3	7
15/100	1¼	3⅔0	8
2/10	1⅔0	3½	9
¼	1½	4	10
3/10	1⅝0	4½	12
4/10	1⅞0	5	15
½	2	5⅝0	20
6/10	2¼	6	25
8/10	2½	6¼	30
1	2⅞0		

Approvals: Standard 248-14
UL Listed (File No: E10480)
CSA Certified
(File No: LR29862)

Dimensions: 13/32" x 1-1/2"

Example part number (series & amperage): FLM 15



FLQ Fuses

TIME-DELAY ■ 500 VAC

These 500 volt time-delay fuses provide excellent supplemental protection of control power transformers, solenoids, and circuits with high inrush currents. UL and CSA 500 volt ratings permit use on 480 volt circuits. FLQ fuses also provide supplemental protection to small motors. For motor **branch-circuit** protection, see Class CC fuses.

Voltage Rating: 500 Volts AC

Interrupting Rating: 10,000 amperes rms symmetrical

Ampere Ratings:

1/10	8/10	3⅔0	8
1/8	1	3½	9
15/100	1⅛	4	10
3/16	1¼	4½	12
2/10	1½	5	14
¼	1⅝0	5⅝0	15
3/10	2	6	20
4/10	2¼	6¼	25
½	2½	7	30
6/10	3		

Approvals: Standard 248-14
UL Listed (File No: E10480)
CSA Certified
(File No: LR29862)

Dimensions: 13/32" x 1-1/2"

Example part number (series & amperage): FLQ 1/2

RECOMMENDED FUSE BLOCKS

L60030M series. Refer to Fuse Block section of this catalog for additional information.

BLN Fuses

FAST-ACTING ■ 250 VAC

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

Voltage Rating: 250 Volts AC

Interrupting Rating: 10,000 amperes rms symmetrical

Ampere Ratings:

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

Approvals: Standard 248-14
UL Listed (File No: E10480)
CSA Certified
(File No: LR29862)
Versions available to meet MIL-F-15160/9, QPL F09A: Contact Factory

Dimensions: 13/32" x 1-1/2"

Example part number (series & amperage): BLN 30

BLF Fuses

FAST-ACTING ■ 125/250 VAC

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 Volts AC: 1/2 – 15 amperes; 125 Volts AC: 20 – 30 amperes

Interrupting Rating: 10,000 amperes rms symmetrical

Ampere Ratings:

½	3	7	15
1	4	8	20
1½	5	9	25
2	6	10	30
2½	6¼	12	

Approvals: Standard 248-14
UL Listed (File No: E10480)
CSA Certified
(File No: LR29862)

Dimensions: 13/32" x 1-1/2"

Example part number (series & amperage): BLF 5

BLS Fuses

FAST-ACTING ■ 250/600 VAC

BLS fuses are 1-3/8" long in contrast to other midget fuses which are 1-1/2". They provide space-saving, low-cost, protection to street lighting, metering, control and electronic circuits.

Voltage Rating: 600 Volts AC: 2/10 – 5 amperes; 250 Volts AC: 6 – 10 amperes

Interrupting Rating: 10,000 amperes rms symmetrical

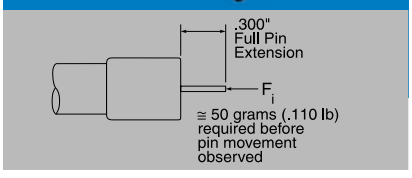
Ampere Ratings:

2/10	1	2	6
4/10	1½	3	7
½	1⅘	4	8
¾	1⅘	5	10
8/10			

Approvals: Standard 248-14
UL Listed 1/2-5 Amps
(File No: E10480)
CSA Certified 1/2 – 5 Amps
(File No: LR29862)

Dimensions: 13/32" x 1-3/8"

Example part number (series & amperage): BLS 10



FLA Fuses

TIME-DELAY ■ 125 VAC

FLA fuses are 125 volt, *pin-indicating* time-delay fuses for protection of control circuit transformers, solenoids, and other circuits with high inrush currents. Metal indicating pin "pops-out" when fuse opens. Pin gives visual indication of open fuse. Use FLA fuses in conjunction with special fuseblocks to operate mechanical signal switches or energize alarm circuits. Fuses rated 12 amperes and above have dual-tube construction.

Voltage Rating: 125 Volts AC

Interrupting Rating: 10,000 amperes rms symmetrical

Ampere Ratings:

1/10	1⅛	2⅘	6¼
15/100	1¼	3	7
2/10	1⅖	3⅖	8
¼	1½	3½	10
3/10	1⅘	4	12 *
4/10	1⅘	4½	15 *
½	2	5	20 *
6/10	2¼	5⅘	25 *
8/10	2½	6	30 *
1			

Approvals: Standard 248-14
UL Listed (File No: E10480)
CSA Certification Pending

Dimensions: 13/32" x 1-1/2"

* Note: Dual tube construction

Example part number (series & amperage): FLA 15

RECOMMENDED FUSE BLOCKS

L60030M series. Refer to Fuse Block section of this catalog for additional information.

KLQ Series Fuses

The Littelfuse KLQ series is designed to protect gaseous vapor fixtures, HID ballasts, and other electronic and lighting circuits. The KLQ is the same physical size as the Littelfuse BLS, but has more time delay to handle transient and inrush currents.

SPECIFICATIONS

Voltage Rating: 600VAC
Interrupting Rating: 10,000 amperes
Ampere Range: 1 – 6 amperes
Approvals: Standard 248-14 UL Listed (File No: E10480)
Dimensions: 13/32" x 1-3/8"

AMPERE RATINGS

1	2	5
1-6/10	3	6

RECOMMENDED FUSE BLOCKS

L60030M Series. Refer to Fuse Block section of this catalog for additional information.

ORDERING INFORMATION

Example catalog number: KLQ005
Example system number: 0KLQ005.T

CROSS REFERENCE

Littelfuse	Buss	Ferraz-Shawmut
KLQ	KTQ	–

FLU Series Fuses

The Littelfuse FLU series is designed specifically for the protection of multimeters. The 1000 VAC/VDC rating also makes the FLU ideal for a variety of other applications.

SPECIFICATIONS

Voltage Rating: 1000 VAC/VDC
Interrupting Rating: 44/100A: 10kA
11A: 20kA
Ampere Range: 44/100 and 11 amperes
Approvals: UL Recognized under the components program. (File No: E10480)
CSA Certified (File No: LR29862)
Dimensions: 44/100A: 13/32" x 1-3/8"
11A: 13/32" x 1-1/2"

ORDERING INFORMATION

Example catalog number: FLU011
Example system number: 0FLU011.T

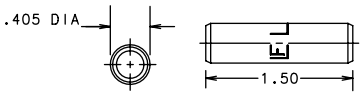
CROSS REFERENCE

Littelfuse	Buss	Ferraz-Shawmut
FLU	DMM	–

NEW

LNNB Dummy Fuse

Also known as a “neutral”, the LNNB is actually not a fuse. It is the same physical size as a standard Midget fuse.



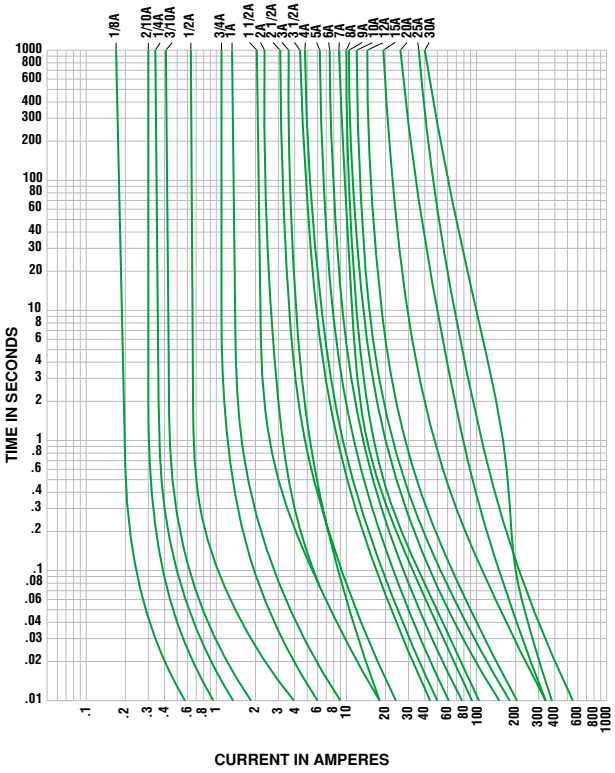
SPECIFICATIONS

Dimensions: 13/32" x 1-1/2"

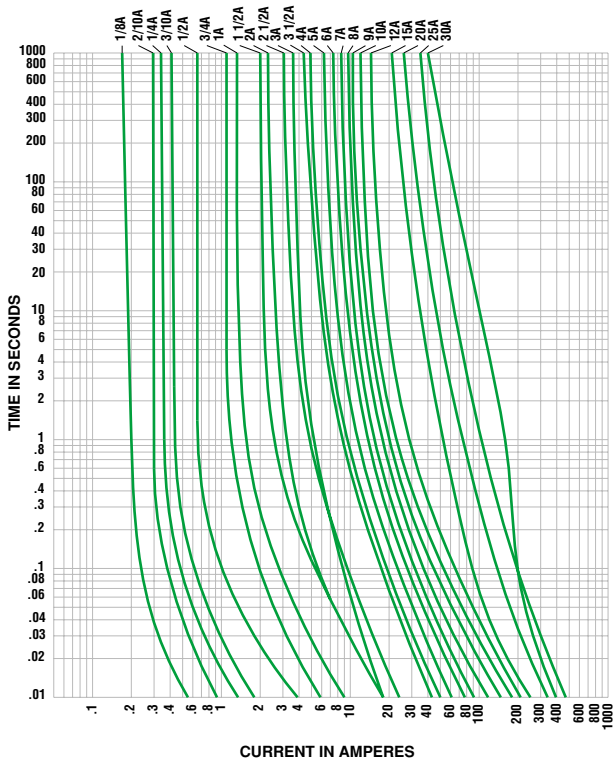
ORDERING INFORMATION

Example catalog number: LNNB001
Example system number: LNNB0001Z

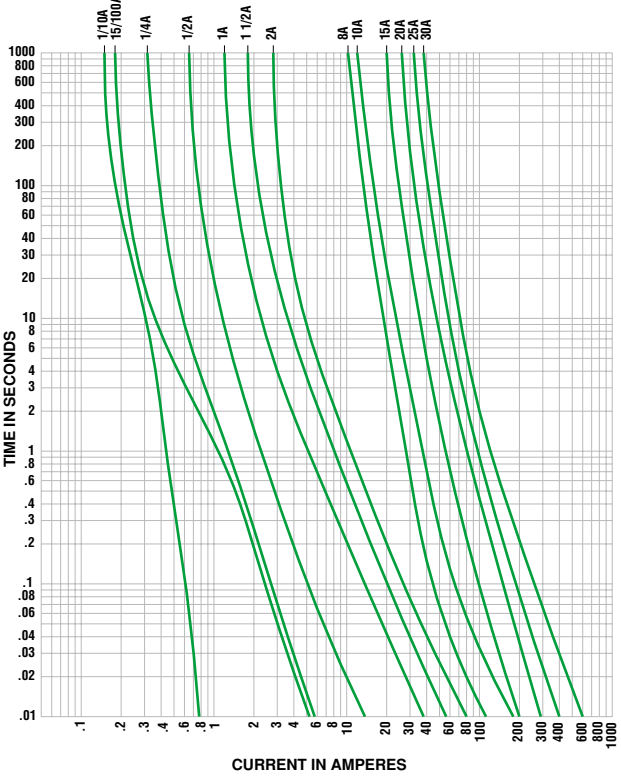
KLK



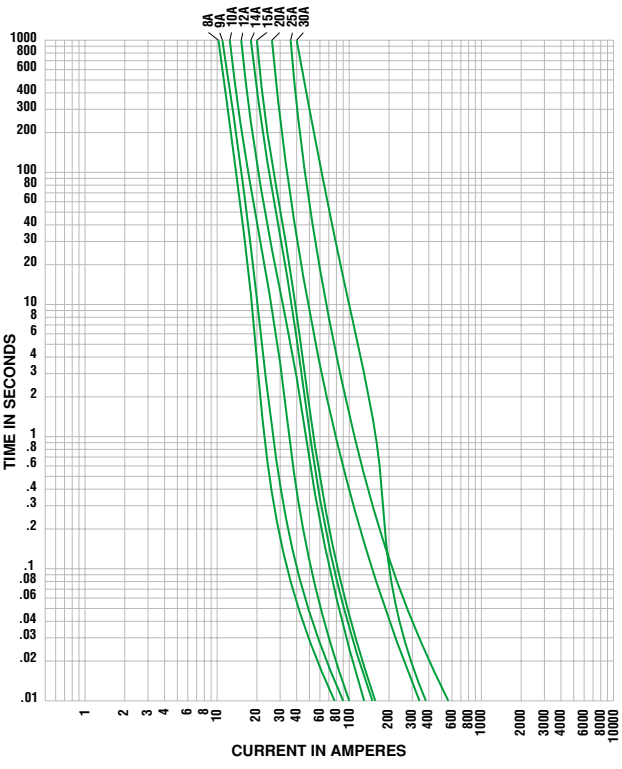
KLKD



FLM



FLQ



312/318 Series

3AG FAST-ACTING FUSE

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

Voltage Rating: 250V: 1/100 – 10A.
32V: 12 – 35A.

Ampere Ratings:

1/100	0.175	1/2	1 6/10	4	12
1/32	3/16	6/10	1 3/4	5	15
1/16	2/10	3/4	2	6	20
1/10	1/4	1	2 1/4	7	25
1/8	3/10	1 1/4	2 1/2	8	30
15/100	3/8	1 1/2	3	10	35

Approvals: Standard 248-14, UL Listed 1/100-10 Amps and UL Listed 12 – 30 Amps per Standard UL 275. CSA Certified through 30 Amps.

Dimensions: 1/4" x 1-1/4" (6.4 x 31.8mm)

For fuses with axial leads, request 318 series. Order 312 series without leads.

Example part number (series & amperage): ***312.375***

To order a 3AG "Dummy" fuse request part number 310033.

314/324 Series

3AB FAST-ACTING FUSE

Similar to 312 series, but ceramic tube permits additional ampere ratings: 250 volt ratings through 20 amps, and 125 volts through 30 amps.

Voltage Rating: 250V: 1/8 – 20A.
125V: 25 – 30A.

Ampere Ratings:

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

Approvals: Standard 248-14, UL Listed and CSA Certified 1/8 – 15 Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 20 – 30 Amps. Approved by MITI from 10 – 30 Amps.

Dimensions: 1/4" x 1-1/4" (6.4 x 31.8mm)

For fuses with axial leads, request 324 series. Order 314 series without leads.

Example part number (series & amperage): ***324.375***

313/315 Series

3AG SLO-BLO® FUSE

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 Rating: 250V: 1/100 – 8A. **32V**: 10 – 30A.

Ampere Ratings:

1/100	0.175	1/2	1 1/4	2 8/10	8
1/32	3/16	6/10	1 1/2	3	10
4/100	2/10	7/10	1 6/10	3 2/10	12
1/16	1/4	3/4	1 8/10	4	15
1/10	3/10	8/10	2	5	20
1/8	3/8	1	2 1/4	6 1/4	25
15/100	4/10	1 2/10	2 1/2	7	30

Approvals: Standard 248-14, UL Listed and CSA Certified 1/100-8 Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 10 – 30 Amps. MITI approved 1 – 5 Amps.

Dimensions: 1/4" x 1-1/4" (6.4 x 31.8mm)

For fuses with axial leads, request 315 series. Order 313 series without leads.

Example part number (series & amperage): ***313.500***

To order a 3AG "Dummy" fuse request part number 310033.

326/325 Series

3AB SLO-BLO® FUSE

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 Rating: 250V: 1/100 – 20A.
125V: 25 – 30A.

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	
0.175	1/2	1 1/4	3 3/10	12	

Approvals: Standard 248-14, UL Listed 1/4 – 10 Amps. UL Recognized under the Components Program 12-30 Amps. CSA Certified 1/4 – 30 Amps.

Dimensions: 1/4" x 1-1/4" (6.4 x 31.8mm)

For fuses with axial leads, request 325 series. Order 326 series without leads.

Example part number (series & amperage): ***326012***

229/230 Series

2AG SLO-BLO® INDICATING FUSE

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 Rating: 250V: ¼ – 3½A; **125V:** 4 – 7A

Ampere Ratings:

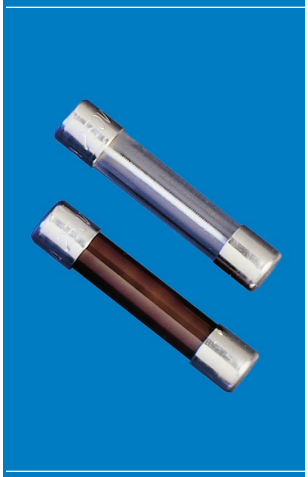
¼	6/10	1	2	3	5
.350	¾	1¼	2¼	3½	6
⅜	8/10	1½	2½	4	7
½					

Approvals: Standard 248-14, UL Listed and CSA Certified 1/4 – 3-1/2 Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 4 – 7 Amps.

Dimensions: .177" x .57" (4.5 x 14.5mm)

For fuses with axial leads, request 230___S series. Order 229___S series without leads.

Example part number (series & amperage): ***22902.5S***



313 Series

3AG SLO-BLO® INDICATING FUSE

3AG 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 3AG fuse design.

Voltage Rating: 250V: ½ – 8A. **32V**: 10A.

Ampere Ratings:

½	1½	3	5	7	10
1	2	4	6¼	8	

Approvals: Standard 248-14, UL Listed and CSA Certified 1/2 – 8 Amps. The 10 Amp is UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

Dimensions: 1/4" x 1-1/4": (6.4 x 31.8mm)

Example part number (series plus amperage, followed by "ID"): ***313007 ID***

334 Series

3AB FAST-ACTING PIN INDICATING

3AB Pin Indicating fuses provide visual indication and may be used to activate an alarm circuit. Indicating Pin extends a minimum of 3/16" from the end of the fuse when the fuse is blown.

Voltage Rating: 125V: ¾ –6A.

Ampere Ratings:

¾	1½	3	5
1	2	4	6

Approvals: Standard 248-14, UL Listed: 3/4 – 5 Amps.

Dimensions: 1/4" x 1-1/4"

Order 334 series for silver indicating pin.

Example part number (series & amperage): ***334004***

215 Series (Type T)

5 X 20MM SLO-BLO® FUSE

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

Voltage Rating: 250V AC

Ampere Ratings:

.200	.400	.800	1.6	3.15	6.3
.250	.500	1	2	4	8*
.315	.630	1.25	2.5	5	10*

*Available but not included in International Standards.

Interrupting Capacity: 1500A

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO, VDE, and BSI approved 1 – 6.3 Amps. MITI approved 1 – 10 Amps.

Design Standards: Meets IEC 60127-2, Sheet 5 Specification for Time Lag fuses.

Dimensions: 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): ***215.315***

216 Series (Type F)

5 X 20MM FAST-ACTING FUSE

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

Voltage Rating: 250V AC

Ampere Ratings:

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

*Available but not included in International Standards.

Interrupting Capacity: 1500A

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO and VDE approved through 6.3 Amps. BSI approved 1 – 6.3 Amps.

Design Standards: Meets IEC 60127-2, Sheet 1 Specification for Fast-Acting Fuses.

Dimensions: 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): ***216.200***

217 Series (Type F)

5 X 20MM FAST-ACTING FUSE

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

Voltage Rating: 250V AC

Ampere Ratings:

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

*Available but not included in International Standards.

Interrupting Capacity: 35A or 10x rated current, whichever is greater.

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO and VDE approved through 6.3 Amps. BSI approved 0.4 – 6.3 Amps.

Design Standards: Meets IEC 60127-2, Sheet 2 Specification for Fast-Acting Fuses.

Dimensions: 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): ***217.050***

218 Series (Type T)

5 X 20MM SLO-BLO® FUSE

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

Voltage Rating: 250V AC

Ampere Ratings:

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

*Available but not included in International Standards.

Interrupting Capacity: 35A or 10X rated current, whichever is greater.

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO and VDE approved through 6.3 Amps. BSI approved 0.8 – 6.3 Amps.

Design Standards: Meets IEC 60127-2, Sheet 3 Specification for Time Lag Fuses.

Dimensions: 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): ***218.630***

235 Series

5 X 20MM FAST-ACTING FUSE

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

Voltage Rating: 250V: 1/10 – 3A. **125V:** 4 – 6A.

Ampere Ratings:

1/10	3/10	6/10	1	2	4
1/8	4/10	7/10	1¼	2½	5
2/10	½	8/10	1 6/10	3	6
¼					

Approvals: Standard 248-14, UL Listed and CSA Certified. MITI approved 1 – 5 Amps.

Dimensions: 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): ***235.600***

239 Series

5 X 20MM SLO-BLO® FUSE

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

Voltage Rating: 250V: 2/10 – 3A. **125V:** 4A.

Ampere Ratings:

2/10	4/10	7/10	1	2	4
¼	½	¾	1¼	2½	5
3/10	6/10	8/10	1 6/10	3	

Approvals: Standard 248–14, UL Listed and CSA Certified. MITI approved 1 – 5 Amps.

Dimensions: 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): ***239.400***

225/224 Series

2AG FAST-ACTING FUSE

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

Voltage Rating: 250V: 1/10 – 3½A. **125V**: 4 – 10A

Ampere Ratings:

1/10	⅜	1	2½	4	7
⅛	½	1½	3	5	8
¼	¾	2	3½	6	10

Approvals: Standard 248–14, UL Listed and CSA Certified. 224 series approved by MITI 1 – 5 Amps.

Dimensions: 2AG Fuse .177" x .57" (4.5 x 14.5mm)

For fuses with axial leads, request series number 224. Order 225 series without leads.

Example part number (series & amperage): ***224.500***

229/230 Series

2AG SLO-BLO® FUSE

229 series 2AG fuses have time-delay of 313 series 3AG fuses in less than one-third the space. They provide superior protection for inductive loads such as motors, transformers, and solenoids. Use whenever time-delay fuses are indicated.

Voltage Rating: 250V: ¼ – 3½A. **125V**: 4 – 7A.

Ampere Ratings:

¼	6/10	1½	2½	4	6
⅜	¾	2	3	5	7
½	1	2¼	3½		

Approvals: Standard 248-14, UL Listed and CSA Certified 1/4 – 3-1/2 Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 4 – 7 Amps.

Example part number (series & amperage): ***229.375***

272/278 Series

FAST-ACTING MICROFUSE

Fast-acting Microfuses for protection of printed circuit boards and similar equipment.

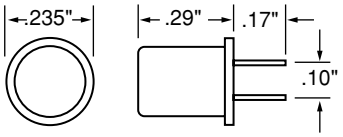
Voltage Rating: 125V AC

Ampere Ratings:

1/500	1/32	1/8	4/10	3/4	2
1/200	1/20	3/10	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

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

For data on 262 and 268 series High Reliability (Hi-Rel) microfuses, request Electronic Catalog.



Note: 278 series has 1" leads

Example part number (series & amperage): ***27201.5***

273/279 Series

FAST-ACTING MICROFUSE

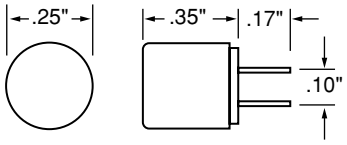
Similar to 272 and 278 series, except has transparent cap for visual indication of fuse status.

Voltage Rating: 125V AC

Ampere Ratings:

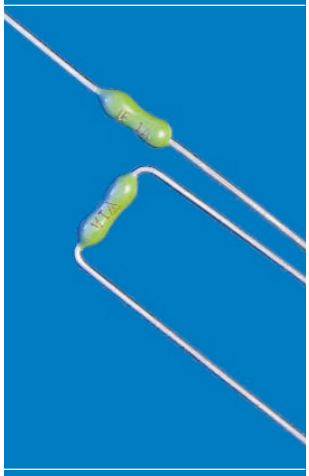
1/500	1/32	1/8	4/10	3/4	2
1/200	1/20	3/10	1/2	8/10	3
1/100	1/16	1/4	6/10	1	4
1/64	1/10	3/10	7/10	1 1/2	5

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.



Note: 279 series has 1" leads

Example part number (series & amperage): ***273002***



251/252 Series

FAST-ACTING PICO®II FUSE

Subminiature fuse for soldered mounting on printed circuit boards. Available on tape and reel for automatic insertion.

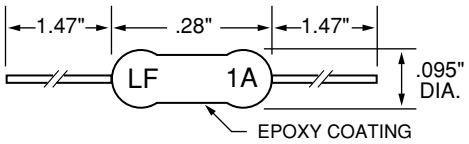
Voltage Rating: 125V: 1/16 – 10A. **32V:** 12 – 15A.

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

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

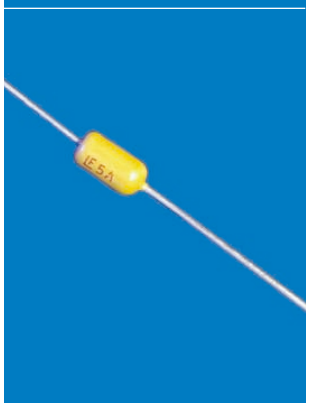
Example part number (series & amperage): ***251.125.***



Order 252 series for radial leads. To order PICO II fuses with ampere ratings color-coded, order 255 series for axial leads and 256 for radial leads.

For data on 265 and 266 series High Reliability (Hi-Rel) Picofuses, request Electronic Catalog.

For information on PICO II 250V fast-acting fuses, contact factory.



473 Series

SLO-BLO® PICO®II FUSE

Subminiature time-delay fuse for soldered mounting on printed circuit boards. Available on tape and reel for automatic insertion. Request bulletin PB-1027 for further information.

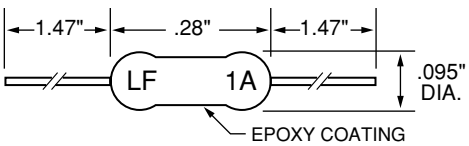
Voltage Rating: 125V AC

Ampere Ratings:

3/8	1	2	2 1/2	3 1/2	5
1/2	1 1/2	2 1/4	3	4	7
3/4					

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. MITI approved 1 – 5 Amp.

Example part number (series & amperage): ***473005.***



307/SFE Series

FAST-ACTING FUSE

Low-voltage fuse for automotive and electronic applications.

Voltage Rating: 32V AC/DC

Ampere Ratings/Dimensions:

Ampere Rating	Length	Diameter
4	5/8"	1/4"
6	3/4"	1/4"
7 1/2	7/8"	1/4"
9	7/8"	1/4"
14	1 1/16"	1/4"
20	1 1/4"	1/4"
30	1 7/16"	1/4"

Approvals: UL Listed under UL Standard #275. Society of Automotive Engineers (SAE) J554.

Example part number (series & amperage): ***307006***

ATO®/257 Series

FAST-ACTING FUSE

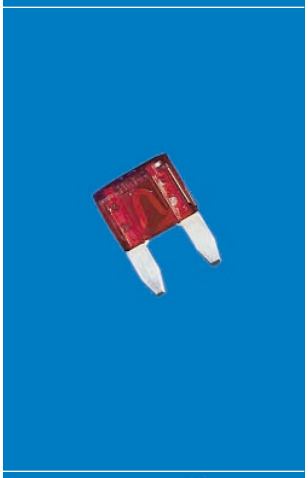
The 257 series ATO fuse is a low-voltage blade type fuse for automotive and electronic applications. Designed, originated and patented by Littelfuse, it has become the standard for OEM circuit protection on foreign and domestic autos and trucks. They are color-coded and readily identifiable and may be specified for a variety of low voltage applications.

Voltage Rating: 32V AC/DC

Approvals: UL Listed. CSA Certified 3 – 30 A. Society of Automotive Engineers (SAE) J1284.

Example part number (series & amperage): ***ATO015***

Catalog No.	Amp. Rating	Volt. Rating	Color Code
ATO 001	1	32	Black
ATO 002	2	32	Grey
ATO 003	3	32	Violet
ATO 004	4	32	Pink
ATO 005	5	32	Tan
ATO 07.5	7 1/2	32	Brown
ATO 010	10	32	Red
ATO 015	15	32	Blue
ATO 020	20	32	Yellow
ATO 025	25	32	Natural
ATO 030	30	32	Green
ATO 040	40	32	Orange



MIN/297 Series

MINI® FAST-ACTING FUSE

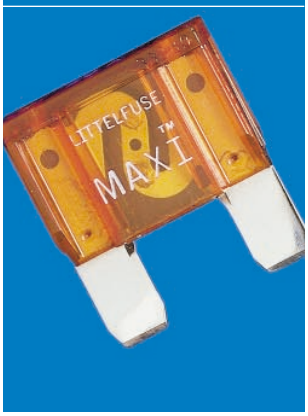
The MINI® fuse is smaller than its predecessor, the ATO® fuse, which permits using more fuses in the same amount of space. More fuses in the same space satisfies the requirement that more circuits be individually fused in newer automobiles. Patented by Littelfuse.

Voltage Rating: 32V AC/DC

Approvals: UL Listed. Society of Automotive Engineers (SAE) J2077.

Example part number (series & amperage): ***MIN025***

Catalog No.	Amp. Rating	Volt. Rating	Color Code
MIN 002	2	32	Grey
MIN 003	3	32	Violet
MIN 004	4	32	Pink
MIN 005	5	32	Tan
MIN 07.5	7 1/2	32	Brown
MIN 010	10	32	Red
MIN 015	15	32	Blue
MIN 020	20	32	Yellow
MIN 025	25	32	Natural
MIN 030	30	32	Green



MAX/299 Series

MAXI™ SLO-BLO® FUSE

The patented MAXI™ Fuse is available in a higher range of amperage ratings (20 – 80 amperes) than the ATO® or MINI® fuses, and is physically larger in size. It is color-coded for easy identification. A typical MAXI Fuse application in today's more sophisticated automobile circuits is protection of the wiring harness by replacing the fusible wire or fusible link, which is often a plain piece of small wire.

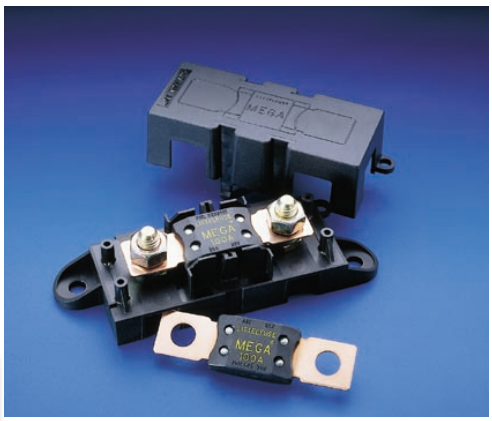
Voltage Rating: 32V AC/DC

Approvals: UL Listed. Society of Automotive Engineers (SAE) J1888.

Example part number (series & amperage): ***MAX070***

Catalog No.	Amp. Rating	Volt. Rating	Color Code
MAX 020	20	32	Yellow
MAX 030	30	32	Green
MAX 040	40	32	Orange
MAX 050	50	32	Red
MAX 060	60	32	Blue
MAX 070	70	32	Tan
MAX 080	80	32	Natural

NEW



Midget & Electronic Fuses

MEGA® SLO-BLO® Bolt-On Fuse

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.

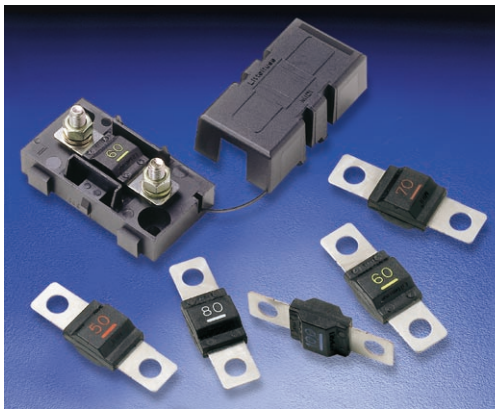
SPECIFICATIONS

Voltage Rating: 32V AC/DC
Interrupting Rating: 2000 A @ 32VDC

Catalog No.	Amp. Rating	Volt. Rating	Color Code
MEG100	100	32	Yellow
MEG125	125	32	Green
MEG150	150	32	Orange
MEG175	175	32	White
MEG200	200	32	Blue
MEG225	225	32	Tan
MEG250	250	32	Pink

Example part number (series & amperage): ***MEG200***

NEW



MIDI® SLO-BLO® Bolt-On Fuse

The patented design of the Littelfuse MIDI® fuse offers a bolt-on space-saving fuse with SLO-BLO® characteristics for high current wiring protection.

SPECIFICATIONS

Voltage Rating: 32V AC/DC
Interrupting Rating: 1000 A @ 32VDC

Catalog No.	Amp. Rating	Volt. Rating	Color Code
498030	30	32	Pink
498040	40	32	Green
498050	50	32	Red
498060	60	32	Yellow
498070	70	32	Brown
498080	80	32	White
498100	100	32	Blue
498125	125	32	Orange
498150	150	32	Grey
498200	200	32	Violet

Example part number (series & amperage): ***498080***

NEW

JCASE SLO-BLO® Fuse

The patented JCASE is a cartridge style fuse with female terminals. It was designed to provide increased time delay to handle inrush currents and low voltage drop to protect high current automotive circuits.

SPECIFICATIONS

Voltage Rating: 32V AC/DC
Interrupting Rating: 1000 A @ 32VDC

Catalog No.	Amp. Rating	Volt. Rating	Color Code
JCAS20	20	32	Blue
JCAS30	30	32	Pink
JCAS40	40	32	Green
JCAS50	50	32	Red
JCAS60	60	32	Yellow

Example part number (series & amperage): ***JCAS60***

NEW

CablePro® Cable Protector

The CablePro® is a high performance alternative for providing a reliable, safe, and cost effective fusible link. It provides similar circuit protection as the MEGA® fuse in a slim package that fits into tight locations.

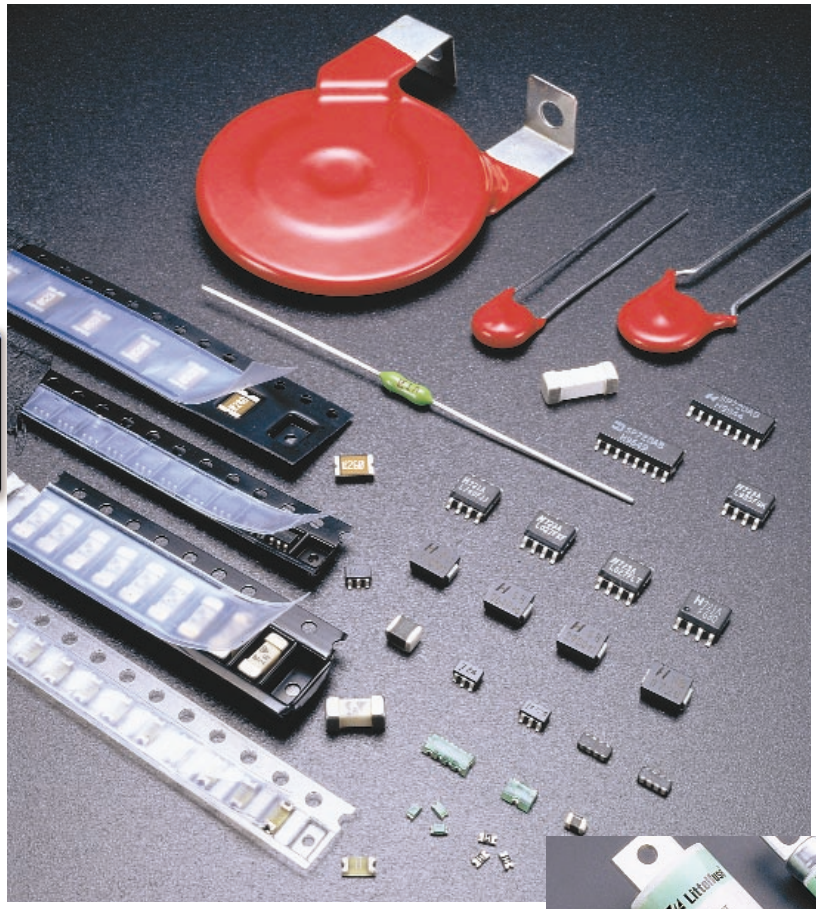
SPECIFICATIONS

Voltage Rating: 32V AC/DC
Interrupting Rating: 2000 A @ 32VDC

Catalog No.	Amp. Rating	Volt. Rating	Wire Gauge
496060	60	32	10AWG
496080	80	32	8AWG
496100	100	32	8AWG
496125	125	32	6AWG
496150	150	32	4AWG
496175	175	32	4AWG
496200	200	32	4AWG

Example part number (series & amperage): ***496060***

Total Solutions Provider



In addition to POWR-GARD Products, Littelfuse provides the broadest offering of circuit protection solutions in the world and is a “one stop” shopping opportunity for electronic, automotive, and electrical circuit protection. For both overcurrent and overvoltage, Littelfuse is your Total Solution Provider for circuit protection.

For more detailed information on Electronic products, please refer to the **Electronic Designer’s Guide EC101**, or visit the Littelfuse website at www.littelfuse.com.

For more detailed information on Automotive products, please refer to the **Automotive Catalog AA101**, or visit the Littelfuse website at www.littelfuse.com.

Medium Voltage Fuses

Medium Voltage Fuses

Littelfuse now offers a complete 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 now 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 1-800-227-0029.

APPLICATIONS

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

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

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.

Additional application data can be found in the Fuse Application section of the POWR-GARD Products catalog (PF101).

Bolt-in Mount Fuses

R Rated Medium Voltage Fuses

Current Limiting

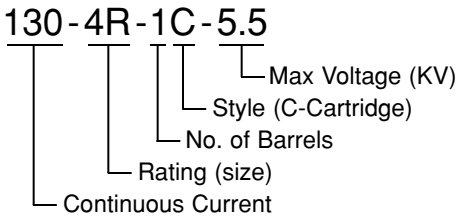
Littelfuse POWR-GARD™ Products

FEATURES

"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 that 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



CHARACTERISTICS

Voltage Rating: 2,400 volts – 15,500 volts

Current Range: 2R – 36R

OPTIONS

- Hermitically sealed for use in hazardous locations (add "S" suffix to part number)
- Hookeye attachment (add "W" suffix to part number)
- Bolt-in mounting configurations

Hookeye Feature*

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

Medium Voltage Fuses

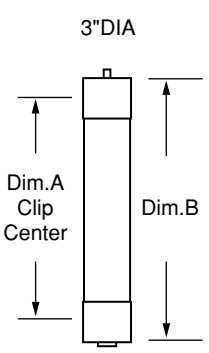


FIGURE 1

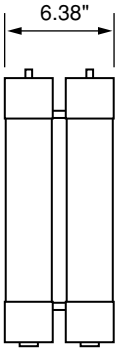


FIGURE 2

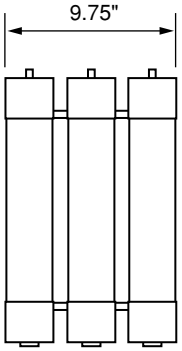


FIGURE 3

R RATED	Catalog Number	Old Catalog Number	Size	Maximum Continuous Current @ 40 deg C.	Dim. A (inches)	Dim. B (inches)	Minimum Interrupting Rating RMS Amps	Max Interrupting Rating RMS Asym	Figure Number
2.75 KV	70-2R-1C-2.75	LCK 2R	2R	70	7"	10.875"	170	80,000	1
	100-3R-1C-2.75	LCK 3R	3R	100			250	80,000	1
	130-4R-1C-2.75	LCK 4R	4R	130			340	80,000	1
	150-5R-1C-2.75	LCK 5R	5R	150			390	80,000	1
	170-6R-1C-2.75	LCK 6R	6R	170			500	80,000	1
	200-9R-1C-2.75	LCK 9R	9R	200			760	80,000	1
	230-12R-1C-2.75	LCK 12R	12R	230			1000	80,000	1
	390-18R-2C-2.75	LCK 18R	18R	390	7"	10.875"	1500	80,000	2
	450-24R-2C-2.75	LCK 24R	24R	450			1950	80,000	2

Add "w" suffix to part number for hookeye attachment.

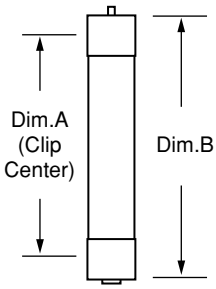


FIGURE 4

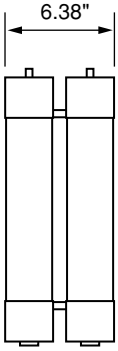


FIGURE 5

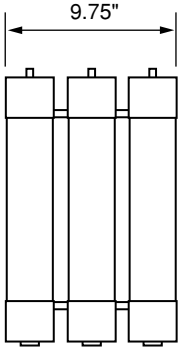


FIGURE 6

Medium Voltage Fuses

R RATED	Catalog Number	Old Catalog Number	Size	Maximum Continuous Current @ 40 deg C.	Dim. A (inches)	Dim. B (inches)	Minimum Interrupting Rating RMS Amps	Max Interrupting Rating RMS (Asym)	Figure Number
5.5 KV	70-2R-1C-5.5	LCL 2R	2R	70			170	80,000	4
	100-3R-1C-5.5	LCL 3R	3R	100			250	80,000	4
	130-4R-1C-5.5	LCL 4R	4R	130			340	80,000	4
	150-5R-1C-5.5	LCL 5R	5R	150	12"	15.875"	390	80,000	4
	170-6R-1C-5.5	LCL 6R	6R	170			500	80,000	4
	200-9R-1C-5.5	LCL 9R	9R	200			760	80,000	4
	230-12R-1C-5.5	LCL 12R	12R	230			1000	80,000	4
	390-18R-2C-5.5	LCL 18R	18R	390			1500	80,000	5
	450-24R-2C-5.5	LCL 24R	24R	450			1950	80,000	5
	480-26R-2C-5.5	—	26R	480	12"	15.875"	2100	80,000	5
	550-30R-2C-5.5	—	30R	550			2400	80,000	5
	600-32R-2C-5.5	—	32R	600			2600	80,000	5
	650-36R-2C-5.5	—	36R	650			2900	80,000	5
	550-30R-3C-5.5	—	30R	550			2400	80,000	6
	600-32R-3C-5.5	—	32R	600	12"	15.875"	2600	80,000	6
	650-36R-3C-5.5	LCL 36R	36R	650			2900	80,000	6
5.5 KV 14"Clip Centers	70-2R-1C-5.5X	—	2R	70			170	80,000	4
	100-3R-1C-5.5X	—	3R	100			250	80,000	4
	130-4R-1C-5.5X	—	4R	130			340	80,000	4
	150-5R-1C-5.5X	—	5R	150	14"	17.875"	390	80,000	4
	170-6R-1C-5.5X	—	6R	170			500	80,000	4
	200-9R-1C-5.5X	—	9R	200			760	80,000	4
	230-12R-1C-5.5X	—	12R	230			1000	80,000	4
	390-18R-2C-5.5X	—	18R	390			1500	80,000	5
	450-24R-2C-5.5X	—	24R	450	14"	17.875"	1950	80,000	5

R RATED	Catalog Number	Old Catalog Number	Size	Maximum Continuous Current @ 40 deg C.	Dim. A (inches)	Dim. B (inches)	Minimum Interrupting Rating RMS Amps	Max Interrupting Rating RMS (Asym)	Figure Number
8.25 KV	70-2R-1C-8.25	—	2R	70			190	80,000	4
	100-3R-1C-8.25	—	3R	100			225	80,000	4
	130-4R-1C-8.25	—	4R	130			330	80,000	4
	150-5R-1C-8.25	—	5R	150	12"	15.875"	440	80,000	4
	170-6R-1C-8.25	—	6R	170			500	80,000	4
	200-9R-1C-8.25	—	9R	200			740	80,000	4
	230-12R-1C-8.25	—	12R	230			955	80,000	4
	390-18R-2C-8.25	—	18R	390			1440	80,000	5
	450-24R-2C-8.25	—	24R	450	12"	15.875"	1910	80,000	5

Add “w” suffix to part number for hookeye attachment.

R Rated Medium Voltage Fuses

Current Limiting

Littelfuse POWR-GARD™ Products

Littelfuse's POWR-GARD medium voltage fuses are available in several bolt-in mounting configurations. Contact factory for custom configurations

"B" Bolt mount
"BI" Bolt-In mount
"IB" Inverted-Bolt mount

Refer to illustrations for mounting dimensions.

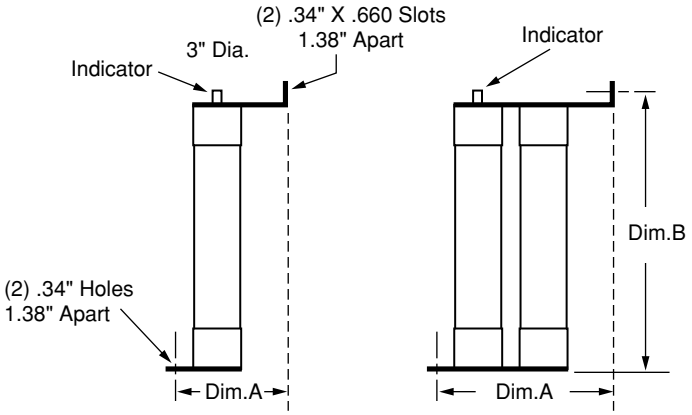


FIGURE 7

FIGURE 8

Bolt Mount "B"

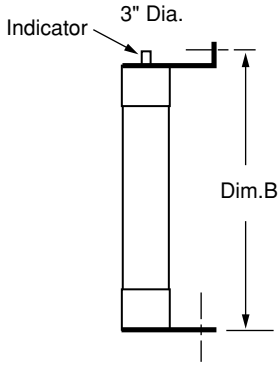


FIGURE 9

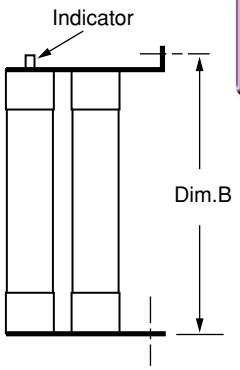


FIGURE 10

Inverted Bolt "IB"

R RATED	Catalog Number	Old Catalog Number	Size	Maximum Continuous Current @ 40 deg C.	Dim. A (inches)	Dim. B (inches)	Minimum Interrupting Rating RMS Amps	Max Interrupting Rating RMS (Asym)	Figure Number
2.75 KV Bolt Mount "B"	70-2R-1B-2.75	—	2R	70	4.6"	13"	170	80,000	7
	100-3R-1B-2.75		3R	100			250	80,000	7
	130-4R-1B-2.75		4R	130			240	80,000	7
	150-5R-1B-2.75		5R	150			390	80,000	7
	170-6R-1B-2.75		6R	170			500	80,000	7
	200-9R-1B-2.75		9R	200			760	80,000	7
	230-12R-1B-2.75		12R	230			1000	80,000	7
	390-18R-2B-2.75	—	18R	390	7.4"	13"	1500	80,000	8
	450-24R-2B-2.75		24R	450			1950	80,000	8
2.75 KV Inverted Bolt "IB"	70-2R-1IB-2.75	—	2R	70	—	13"	170	80,000	9
	100-3R-1IB-2.75		3R	100			250	80,000	9
	130-4R-1IB-2.75		4R	130			340	80,000	9
	150-5R-1IB-2.75		5R	150			390	80,000	9
	170-6R-1IB-2.75		6R	170			500	80,000	9
	200-9R-1IB-2.75		9R	200			760	80,000	9
	230-12R-1IB-2.75		12R	230			1000	80,000	9
	390-18R-2IB-2.75	—	18R	390	—	13"	1500	80,000	10
	450-24R-2IB-2.75		24R	450			1950	80,000	10

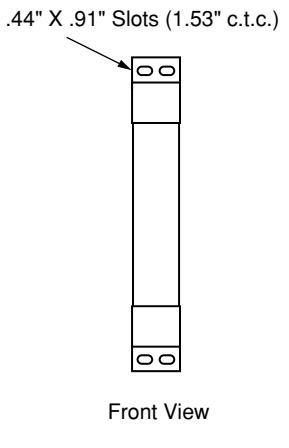


FIGURE 11

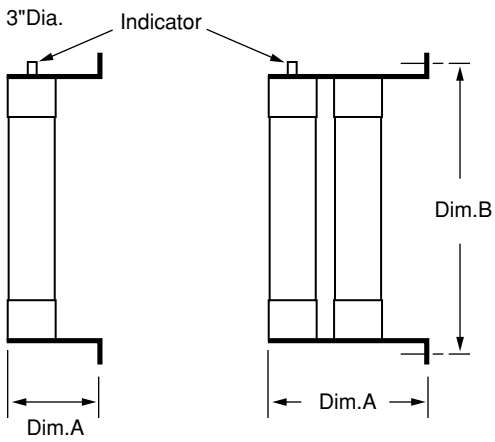


FIGURE 12

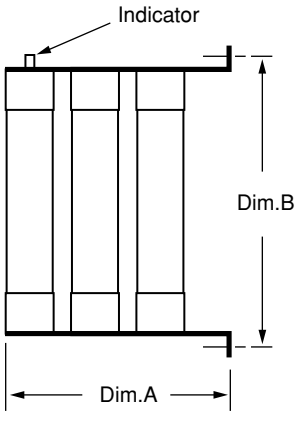


FIGURE 13

Bolt-In Mount "BI"

Medium Voltage Fuses

R RATED	Catalog Number	Old Catalog Number	Size	Maximum Continuous Current @ 40 deg C.	Dim. A (inches)	Dim. B (inches)	Minimum Interrupting Rating RMS Amps	Max Interrupting Rating RMS (Asym)	Figure Number
5.5 KV Bolt In Mount "BI"	70-2R-1BI-5.5	—	2R	70	3.6	18"	170	80,000	11
	100-3R-1BI-5.5		3R	100			250	80,000	11
	130-4R-1BI-5.5		4R	130			340	80,000	11
	150-5R-1BI-5.5		5R	150			390	80,000	11
	170-6R-1BI-5.5		6R	170			500	80,000	11
	200-9R-1BI-5.5		9R	200			760	80,000	11
	230-12R-1BI-5.5		12R	230			1000	80,000	11
	390-18R-2BI-5.5	—	18R	390	7.6	18"	1500	80,000	12
	450-24R-2BI-5.5		24R	450			1950	80,000	12
	480-26R-2BI-5.5		26R	480			2200	80,000	12
	550-30R-2BI-5.5		30R	550			2400	80,000	12
	600-32R-2BI-5.5		32R	600			2650	80,000	12
	650-36R-2BI-5.5		36R	650			2900	80,000	12
	550-30R-3BI-5.5	—	30R	550		18"		80,000	13
	600-32R-3BI-5.5		32R	600				80,000	13
	650-36R-3BI-5.5		36R	650				80,000	13
	700-38R-3BI-5.5		38R	700				80,000	13
5.5 KV Bolt Mount "B"	70-2R-1B-5.5	—	2R	70	4.6	18"	170	80,000	7
	100-3R-1B-5.5		3R	100			250	80,000	7
	130-4R-1B-5.5		4R	130			340	80,000	7
	150-5R-1B-5.5		5R	150			390	80,000	7
	170-6R-1B-5.5		6R	170			500	80,000	7
	200-9R-1B-5.5		9R	200			760	80,000	7
	230-12R-1B-5.5		12R	230			1000	80,000	7
	390-18R-2B-5.5	—	18R	390	7.4	18"	1500	80,000	8
	450-24R-2B-5.5		24R	450			1950	80,000	8
	550-30R-2B-5.5		30R	550			2400	80,000	8
	600-32R-2B-5.5		32R	600	8.4		2650	80,000	8
	650-36R-2B-5.5		36R	650			2900	80,000	8
5.5 KV Inverted Bolt "IB"	70-2R-1IB-5.5	—	2R	70	—	18"	170	80,000	9
	100-3R-1IB-5.5		3R	100			250	80,000	9
	130-4R-1IB-5.5		4R	130			340	80,000	9
	150-5R-1IB-5.5		5R	150			390	80,000	9
	170-6R-1IB-5.5		6R	170			500	80,000	9
	200-9R-1IB-5.5		9R	200			760	80,000	9
	230-12R-1IB-5.5		12R	230			1000	80,000	9
	390-18R-2IB-5.5	—	18R	390	—	18"	1500	80,000	10
	450-24R-2IB-5.5		24R	450			1950	80,000	10
	550-30R-2IB-5.5		30R	550			2400	80,000	10
	600-32R-2IB-5.5		32R	600			2650	80,000	10
	650-36R-2IB-5.5		36R	650			2900	80,000	10
8.25 KV Bolt-In Mount "BI"	70-2R-1BI-8.25	—	2R	70	3.6	18"	190	80,000	11
	100-3R-1BI-8.25		3R	100			225	80,000	11
	130-4R-1BI-8.25		4R	130			330	80,000	11
	150-5R-1BI-8.25		5R	150			400	80,000	11
	170-6R-1BI-8.25		6R	170			500	80,000	11
	200-9R-1BI-8.25		9R	200			740	80,000	11
	230-12R-1BI-8.25		12R	230			955	80,000	11
	390-18R-2BI-8.25	—	18R	390	7.6	18"	1440	80,000	12
	450-24R-2BI-8.25		24R	450			1910	80,000	12

E Rated Medium Voltage Fuses

Current Limiting

Littelfuse POWR-GARD™ Products

"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 value 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's 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 inrush 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 Rating: 2,400 volts – 38,000 volts

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.

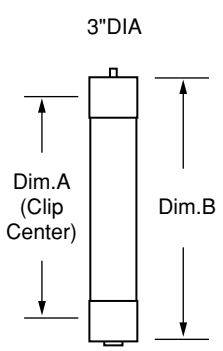


FIGURE 14

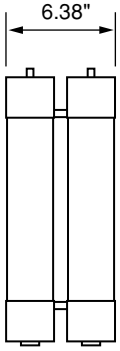


FIGURE 15

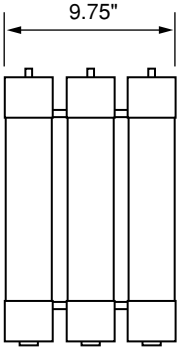


FIGURE 16

E RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
2.75 Max. KV	10E-1C-2.75	LCX 10E	10E				14
	15E-1C-2.75	—	15E				14
	20E-1C-2.75	—	20E				14
	25E-1C-2.75	—	25E				14
	30E-1C-2.75	LCX 30E	30E				14
	40E-1C-2.75	LCX 40E	40E				14
	50E-1C-2.75	LCX 50E	50E	7"	10.875"	80,000	14
	65E-1C-2.75	LCX 65E	65E				14
	80E-1C-2.75	LCX 80E	80E				14
	100E-1C-2.75	LCX 100E	100E				14
	125E-1C-2.75	—	125E				14
	150E-1C-2.75	—	150E				14
	200E-1C-2.75	—	200E				14
	125E-2C-2.75	LCX 125E	125E				15
	150E-2C-2.75	LCX 150E	150E				15
	175E-2C-2.75	LCX 175E	175E				15
	200E-2C-2.75	LCX 200E	200E				15
	225E-2C-2.75		225E				15
	250E-2C-2.75	LCX 250E	250E	7"	10.875"	80,000	15
	300E-2C-2.75	LCX 300E	300E				15
	350E-2C-2.75		350E				15
	400E-2C-2.75	LCX 400E	400E				15
	450E-2C-2.75	—	450E				15

E Rated Medium Voltage Fuses

Current Limiting

Littelfuse POWR-GARD™ Products

E RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Diagram
5.5 Max. KV	10E-1C-5.5	—	10E	12"	15.875"	80,000	14
	15E-1C-5.5	—	15E				14
	20E-1C-5.5	—	20E				14
	25E-1C-5.5	—	25E				14
	30E-1C-5.5	LCY 30E	30E				14
	40E-1C-5.5	LCY 40E	40E				14
	50E-1C-5.5	LCY 50E	50E				14
	65E-1C-5.5	LCY 60E	65E				14
	80E-1C-5.5	LCY 80E	80E				14
	100E-1C-5.5	LCY 100E	100E				14
	125E-1C-5.5	LCY 125E	125E				14
	150E-1C-5.5	LCY 150E	150E				14
	175E-1C-5.5	LCY 175E	175E				14
	200E-1C-5.5	LCY 200E	200E				14
	125E-2C-5.5	—	125E	12"	15.875"	80,000	15
	150E-2C-5.5	—	150E				15
	175E-2C-5.5	—	175E				15
	200E-2C-5.5	—	200E				15
	250E-2C-5.5	LCY 250E	250E				15
	300E-2C-5.5	LCY 300E	300E				15
	350E-2C-5.5	LCY 350E	350E				15
	400E-2C-5.5	LCY 400E	400E				15
	450E-2C-5.5	LCY 450E	450E				15
	500E-3C-5.5	—	500E	12"	15.875"	80,000	16
	550E-3C-5.5	—	550E				16
	600E-3C-5.5	—	660E				16
5.5 Max. KV	5NLE-10E		10E	14	17-7/8"	80,000	14
	5NLE-15E		15E				14
	5NLE-20E		20E				14
	5NLE-25E		25E				14
	5NLE-30E	LCU 30E	30E				14
	5NLE-40E	LCU 40E	40E				14
	5NLE-50E	LCU 50E	50E				14
	5NLE-65E	LCU 65E	65E				14
	5NLE-80E	LCU 80E	80E				14
	5NLE-100E	LCU 100E	100E				14
	5NLE-125E	LCU 125E	125E				14
	5NLE-150E	LCU 150E	150E				14
	5NLE-175E	LCU 175E	175E				14
	5NLE-200E	LCU 200E	200E				14
	5NLE2-225E		225E	14"	17-7/8"	80,000	15
	5NLE2-250E	LCU 250E	250E				15
	5NLE2-300E	LCU 300E	300E				15
	5NLE2-350E	LCU 350E	350E				15
	5NLE2-400E	LCU 400E	400E				15
	5NLE2-450E	LCU 450E	450E				15

E Rated Medium Voltage Fuses

Current Limiting

Littelfuse POWR-GARD™ Products

RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Diagram
8.25 Max. KV	10E-1C-8.25		10E	12"	15-7/8"	80,000	14
	15E-1C-8.25		15E				14
	20E-1C-8.25		20E				14
	25E-1C-8.25		25E				14
	30E-1C-8.25	LDZ 30E	30E				14
	40E-1C-8.25	LDZ 40E	40E				14
	50E-1C-8.25	LDZ 50E	50E				14
	65E-1C-8.25	LDZ 65E	65E				14
	80E-1C-8.25	LDZ 80E	80E				14
	100E-1C-8.25	LDZ 100E	100E				14
	125E-1C-8.25	LDZ 125E	125E				14
	150E-1C-8.25	LDZ 150E	150E				14
	125E-2C-8.25	LDZ 125E	125E	12"	15-7/8"	80,000	15
	150E-2C-8.25	LDZ 150E	150E				15
	200E-2C-8.25	LDZ 200E	200E				15
	250E-2C-8.25	LDZ 250E	250E				15
	300E-2C-8.25	LDZ 300E	300E				15
	350E-3C-8.25	LDZ 350Z	350E	12"	15-7/8"	80,000	16
	400E-3C-8.25		400E				16
8.25 Max. KV	8NLE-10E		10E	14"	17-7/8"	80,000	14
	8NLE-15E		15E				14
	8NLE-20E		20E				14
	8NLE-25E		25E				14
	8NLE-30E	LCZ 30E	30E				14
	8NLE-40E	LCZ 40E	40E				14
	8NLE-50E	LCZ 50E	50E				14
	8NLE-65E	LCZ 65E	65E				14
	8NLE-80E	LCZ 80E	80E				14
	8NLE-100E	LCZ 100E	100E				14
	8NLE2-100E	LCZ 100E	100E	14"	17-7/8"	80,000	15
	8NLE2-125E	LCZ 125E	125E				15
	8NLE2-150E	LCZ 150E	150E				15
	8NLE2-200E	LCZ 200E	200E				15
	8NLE2-250E		250E				15

Medium Voltage Fuses

RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
15.5 Max. KV	10E-1C-15.5	LDN 10E	10E	15"	18.875"	60,000	14
	15E-1C-15.5	LDN 15E	15E				14
	20E-1C-15.5	LDN 20E	20E				14
	25E-1C-15.5	LDN 25E	25E				14
	30E-1C-15.5	LDN 30E	30E				14
	40E-1C-15.5	LDN 40E	40E				14
	50E-1C-15.5	LDN 50E	50E				14
	65E-1C-15.5	LDN 65E	65E				14
	80E-1C-15.5	LDN 80E	80E				14
	100E-1C-15.5	LDN 100E	100E				14
	65E-2C-15.5		65E	15"	18.875"	60,000	15
	80E-2C-15.5		80E				15
	100E-2C-15.5		100E				15
	125E-2C-15.5		125E				15
	150E-2C-15.5	LDN 150E	150E				15
	175E-2C-15.5	LDN 175E	175E				15
	200E-2C-15.5		200E				15
	200E-3C-15.5		200E	15"	18.875"	60,000	16
	250E-3C-15.5		250E				16
	300E-3C-15.5		300E				16

E Rated Medium Voltage Fuses

Current Limiting

Littelfuse POWR-GARD™ Products

RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
15.5 Max. KV	15GSE-65E	—	65E	18"	21-7/8"	60,000	14
	15GSE-80E		80E				14
	15GSE-100E		100E				14
	15GSE2-125E	—	125E	18"	21-7/8"	60,000	15
	15GSE2-150E		150E				15
	15GSE2-175E		175E				15
	15GSE2-200E		200E				15
15.5 Max. KV	15NLE-10E		10E	20"	23-7/8"	60,000	14
	15NLE-15E		15E				14
	15NLE-20E		20E				14
	15NLE-25E		25E				14
	15NLE-30E	LCN 30E	30E				14
	15NLE-40E	LCN 40E	40E				14
	15NLE-50E	LCN 50E	50E				14
	15NLE-65E	LCN 65E	65E				14
	15NLE-80E	LCN 80ES	80E				14
	15NLE-100E	LCN 100ES	100E				14
	15NLE2-80E	LCN 80E	80E	20"	23-7/8"	60,000	15
	15NLE2-100E	LCN 100E	100E				15
	15NLE2-125E	LCN 125X	125E				15
	15NLE2-150E	LCN 150E	150E				15
	15NLE2-175E		175E				15
	15NLE2-200E	LCN 200ED	200E				15
	15NLE3-150E	—	150E	20"	23-7/8"	60,000	16
	15NLE3-175E		175E				16
	15NLE3-250E		250E				16
	15NLE3-300E		300E				16

RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
25.8 Max. KV	15E-1C-25.8	—	15E	21"	24-5/8"	40,000	14
	20E-1C-25.8		20E				14
	25E-1C-25.8		25E				14
	30E-1C-25.8		30E				14
	40E-1C-25.8		40E				14
	50E-1C-25.8		50E				14
	65E-2C-25.8	—	65E	21"	24-5/8"	40,000	15
	80E-2C-25.8		80E				15
	100E-2C-25.8		100E				15

RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
38 Max. KV	3E-1C-38.0	—	3E	27"	30-5/8"	20,000	14
	7E-1C-38.0		7E				14
	10E-1C-38.0		10E				14
	15E-1C-38.0		15E				14
	20E-1C-38.0		20E				14
	25E-1C-38.0		25E				14
	30E-1C-38.0		30E				14
	40E-1C-38.0		40E				14
	50E-2C-38.0	—	50E	27"	30-5/8"	20,000	15
	65E-2C-38.0		65E				15
	80E-2C-38.0		80E				15

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.

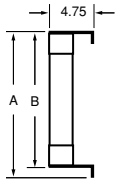


FIGURE 17

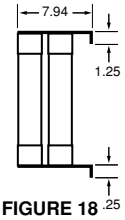


FIGURE 18

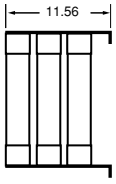
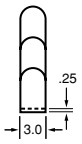


FIGURE 19



E RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
5.5 Max. KV Clip Lock	10E-1CL-5.5	—	10E	16.38"	15.13"	80,000	17
	15E-1CL-5.5		15E				17
	20E-1C-5.5		20E				17
	25E-1CL-5.5		25E				17
	30E-1CL-5.5		30E				17
	40E-1CL-5.5		40E				17
	50E-1CL-5.5		50E				17
	65E-1CL-5.5		65E				17
	80E-1CL-5.5		80E				17
	100E-1CL-5.5		100E				17
	125E-1CL-5.5		125E				17
	150E-1CL-5.5		150E				17
	225E-2CL-5.5	—	225E	17.38"	16.13"	80,000	18
	250E-2CL-5.5		250E				18
	300E-2CL-5.5		300E				18
	350E-2CL-5.5		350E				18
	400E-2CL-5.5		400E				18
	450E-2CL-5.5		450E				18
	500E-3CL-5.5	—	500E	17.38"	16.13"	80,000	19
	550E-3CL-5.5		550E				19
	600E-3CL-5.5		600E				19

E RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
8.25 Max. KV Clip Lock	10E-1CL-8.25	—	10E	17.38"	16.13"	80,000	17
	15E-1CL-8.25		15E				17
	20E-1C-8.25		20E				17
	25E-1CL-8.25		25E				17
	30E-1CL-8.25		30E				17
	40E-1CL-8.25		40E				17
	50E-1CL-8.25		50E				17
	65E-1CL-8.25		65E				17
	80E-1CL-8.25		80E				17
	100E-1CL-8.25		100E				17
	125E-2CL-8.25	—	125E	17.38"	16.13"	80,000	18
	150E-2CL-8.25		150E				18
	175E-2CL-8.25		175E				18
	200E-2CL-8.25		200E				18
	225E-2CL-8.25		225E				18
	250E-2CL-8.25		250E				18
	300E-2CL-8.25		300E				18
	350E-3CL-8.25	—	350E	17.38"	16.13"	80,000	19

E RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
15.5 Max. KV Clip Lock	10E-1CL-15.5	—	10E	19.8"	18.1"	60,000	17
	15E-1CL-15.5		15E				17
	20E-1CL-15.5		20E				17
	25E-1CL-15.5		25E				17
	30E-1CL-15.5		30E				17
	40E-1CL-15.5		40E				17
	50E-1CL-15.5		50E				17
	65E-1CL-15.5	—	65E	22.81"	21.13"	60,000	17
	80E-1CL-15.5		80E				17
	100E-1CL-15.5		100E				17
	125E-2CL-15.5	—	125	22.81"	19.1"	60,000	18
	150E-3CL-15.5	—	150E	22.81"	19.1"	60,000	19
	175E-3CL-15.5		175E				19
	200E-3CL-15.5		200E				19
	225E-3CL-15.5		225E				19
	250E-3CL-15.5		250E				19
	300E-3CL-15.5		300E				19

E Rated Potential Transformer Fuses

Current Limiting

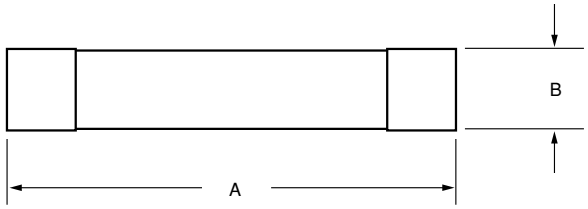
Littelfuse
POWR-GARD™ Products

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 inrush must be considered. The characteristics of the inrush, which can be matched with a fuse's time-current curve, should be available from the transformer manufacturer.

CHARACTERISTICS

Voltage Rating: 600VAC – 25,500 VAC
Current Range: 1/2E – 10E



PT	Catalog Number	Old Catalog Number	Size	Length Dim. A (inches)	Diameter Dim. B (inches)	Max Interrupting Rating RMS (Asym)
600 Volt	3E-4PT-6		3E	4.625	0.8125	62,500
	5E-4PT-6		5E	4.625	0.8125	62,500
	7E-4PT-6		7E	4.625	0.8125	62,500
	10E-4PT-6		10E	4.625	0.8125	62,500
2.4 Max. KV	500E-4PT-2.4		1/2E	4.625	0.8125	40,000
	1E-4PT-2.4	LCD 1E-4	1E	4.625	0.8125	40,000
	2E-4PT-2.4	LCD 2E-4	2E	4.625	0.8125	40,000
2.75 Max. KV	1E-6PT-2.75		1E	7.375	1.625	37,500
	2E-6PT-2.75		2E	7.375	1.625	37,500
	3E-6PT-2.75		3E	7.375	1.625	37,500
	1E-8PT-2.75		1E	9.5	1.625	50,000
	2E-8PT-2.75		2E	9.5	1.625	50,000
	3E-8PT-2.75		3E	9.5	1.625	50,000
4.8 Max. KV	1E-5PT-4.8	LCE 1E-4	1E	5.5	0.8125	50,000
	2E-5PT-4.8	LCE 2E-4	2E	5.5	0.8125	50,000
5.5 Max. KV	1/2E-6PT-5.5		1/2E	7.375	1.625	37,500
	1E-6PT-5.5		1E	7.375	1.625	37,500
	2E-6PT-5.5		2E	7.375	1.625	37,500
	3E-6PT-5.5		3E	7.375	1.625	37,500
	5E-6PT-5.5		5E	7.375	1.625	37,500
	1/2E-8PT-5.5	LCQ .5E	1/2E	9.5	1.625	37,500
	1E-8PT-5.5	LCQ 1E	1E	9.5	1.625	37,500
	2E-8PT-5.5	LCQ 2E	2E	9.5	1.625	37,500
	3E-8PT-5.5	LCQ 3E	3E	9.5	1.625	37,500
	5E-8PT-5.5	LCQ 5E	5E	9.5	1.625	37,500
	10E-8PT-5.5	LCQ 10E	10E	9.5	1.625	37,500
8.25 Max. KV	1/2E-8PT-8.25		1/2E	9.5	1.625	50,000
	1E-8PT-8.25		1E	9.5	1.625	50,000
	2E-8PT-8.25		2E	9.5	1.625	50,000
	3E-8PT-8.25		3E	9.5	1.625	50,000
15.5 Max. KV	1/2E-11PT-15.5	LCT .5E	1/2E	12.875	1.625	80,000
	1E-11PT-15.5	LCT 1E	1E	12.875	1.625	80,000
	2E-11PT-15.5	LCT 2E	2E	12.875	1.625	80,000
	3E-11PT-15.5	LCT 3E	3E	12.875	1.625	80,000
	3E-16PT-15.5		3E	17.5	1.625	80,000
	5E-16PT-15.5		5E	17.5	1.625	80,000
25.5 Max. KV	1/2E-16PT-25.5	LCJ 1E-4	1/2E	17.5	1.625	43,500
	1E-16PT-25.5	LCJ 2E-4	1E	17.5	1.625	43,500

NEW

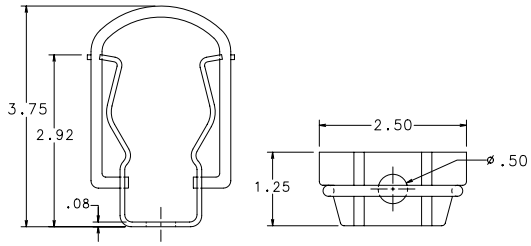
Live parts are available for mounting “E”, “R”, and “PT” single, double, and triple barrel fuses. Mounting clips are available for ferrule type and clip lock style fuses. All clips are sold in pairs.

Contact factory for additional live parts.

Part Number: 700-156*

System Number: 0700156.Z

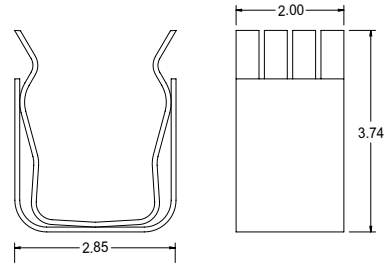
For use with 1-9/16" to 1-5/8” (1.625”) diameter PT fuses.



Part Number: 700-300*

System Number: 0700300.Z

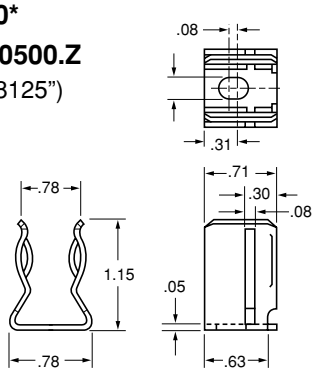
For use with 3" diameter fuses.



Part Number: 700-500*

System Number: 0700500.Z

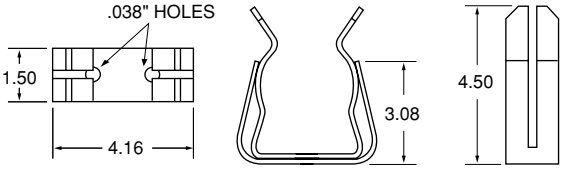
For use with all 13/16" (.8125”) diameter PT fuses.



Part Number: 700-530*

System Number: 0700530.Z

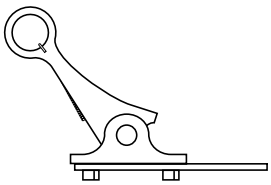
For use with all 3" diameter fuses.



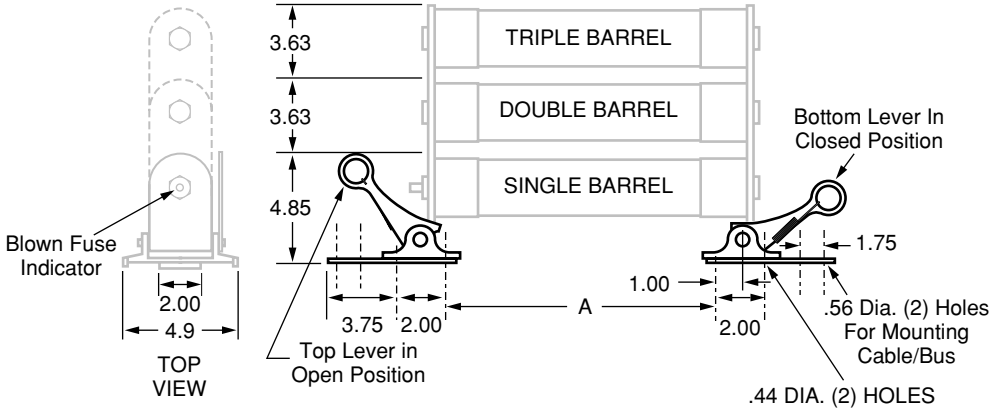
Part Number: 700-520-CL*

System Number: 0700520.ZXCL

Clip Lock Design (For CL-14)

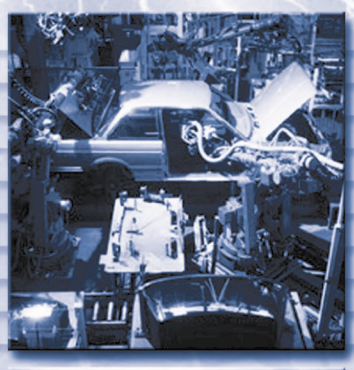


Mounting Details for Clip Lock



* One Pair.
Dimensions for reference only.

Telecom Products



L17T Series Telecommunications Power Fuse

170 VDC ▪ Current Limiting ▪ 70 – 1200 Amperes

Littelfuse POWR-GARD™ Products

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's unique element geometry also provides cooler running temperatures, helping to minimize heat within enclosures.

SPECIFICATIONS

Voltage Rating: 170 VDC

Interrupting Rating: 100,000 amperes

Ampere Range: 70 – 1200 amperes

Approvals: UL Recognized under the Components Program (File No: E71611)
CSA Recognized under the Component Acceptance Program (File No: LR29862)

AMPERE RATINGS

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

Example part number (series & amperage): L17T 200

RECOMMENDED FUSE BLOCKS

LTFD 6001 and LTFD1200 series

Refer to the LTFD series in this catalog section for additional information.

FEATURES

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

Telecom Products

ORDERING INFORMATION & CROSS REFERENCE

Catalog Number	Ampere Rating	Competitor A Part Number	Competitor B Part Number
L17T 70	70	TPL-BA	TGL-BA
L17T 90	90	TPL-BC	TGL-BC
L17T 100	100	TPL-BD	TGL-BD
L17T 125	125	TPL-BE	TGL-BE
L17T 150	150	TPL-BF	TGL-BF
L17T 175	175	TPL-BG	TGL-BG
L17T 200	200	TPL-BH	TGL-BH
L17T 225	225	TPL-BK	TGL-BK
L17T 250	250	TPL-BL	TGL-BL
L17T 300	300	TPL-CN	TGL-CN
L17T 350	350	TPL-CO	TGL-CO
L17T 400	400	TPL-CR	TGL-CR
L17T 450	450	TPL-CU	TGL-CU
L17T 500	500	TPL-CV	TGL-CV
L17T 600	600	TPL-CZ	TGL-CZ
L17T 800	800	TPL-CZH	TGL-CZH
L17T 900	900	-	-
L17T 1000	1000	-	-
L17T 1100	1100	-	-
L17T 1200	1200	-	-

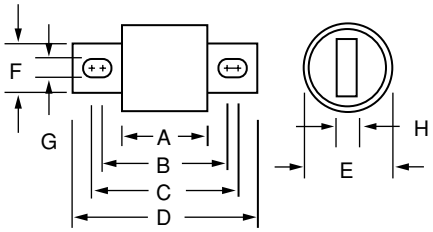


Fig. 3

AMPERE RATING	DIMENSIONS IN INCHES (mm in parentheses)							
	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)
1000 – 1200	1-11/32 (34.0)	—	—	4-1/16 (103.12)	—	1-1/2 (38.1)	—	1/4 (6.35)

Contact Littelfuse for characteristic curves.

TLN Series Telecommunications Power Fuse

170 VDC ■ Current Limiting ■ 1 – 600 Amperes

Littelfuse POWR-GARD™ Products

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

SPECIFICATIONS

Voltage Rating: 170 VDC

Interrupting Rating: 100,000 amperes

Ampere Range: 1 – 600 amperes

Approvals: UL Recognized under the components program (File No: E71611)

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	

Example part number (series & amperage): TLN450

RECOMMENDED FUSE BLOCKS

LR250 Series

Refer to Fuse Block section of this catalog for additional information.

FEATURES

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

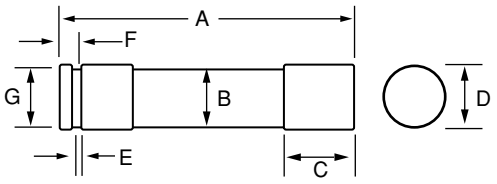


FIG. 1

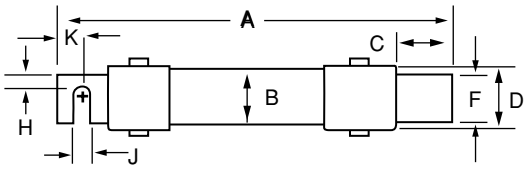


FIG. 2

AMPERE RATING	DIMENSIONS IN INCHES (mm in parentheses)									
	A	B	C	D	E	F	G	H	J	K
Figure 1										
1 – 30	2 (50.8)	1/2 (12.7)	1/2 (12.7)	9/16 (14.3)	5/64 (2.0)	5/32 (4.0)	3/8 (9.5)	—	—	—
35 – 60	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)	—	—	—
Figure 2										
70 – 100	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)	1-1/4 (31.6)	1/4 (6.4)	9/32 (7.1)	1/2 (12.7)
110 – 200	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)	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)	1/4 (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)	2-1/2 (63.5)	2-3/8 (60.3)	2-19/32 (65.9)	1/4 (6.4)	2 (50.8)	2-27/32 (72.2)	3/4 (19.1)	17/32 (13.5)	1-1/8 (28.6)

Contact Littelfuse for characteristic curves.

Replaces competitors' TPN and TGN Series.

TLS Series Telecommunications Power Fuse

170 VDC ▪ Current Limiting ▪ 1 – 125 Amperes

Littelfuse
POWR-GARD™ Products

NEW

Littelfuse's 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 TLS' compact design provides superior protection and high power density in an extremely compact package.

FEATURES

- 170 VDC
- Current limiting
- 1 to 125 amperes
- Multiple mounting configurations

SPECIFICATIONS

Voltage Rating: 170 VDC

Interrupting Rating: 100,000 amperes

Ampere Range: 1 – 125 amperes

Approvals: UL Recognized under the components program (File No: E71611)

Construction: Caps: Silver-plated brass
Body: Glass melamine

AMPERE RATINGS

1	6	20	35	60	90
3	10	25	40	70	100
5	15	30	50	80	125

Example part number (series & amperage): TLS050

ORDERING INFORMATION

Catalog No.	Catalog No. Leaded Version*	Ampere Rating
TLS001	TLS001L	1
TLS003	TLS003L	3
TLS005	TLS005L	5
TLS006	TLS006L	6
TLS010	TLS010L	10
TLS015	TLS015L	15
TLS020	TLS020L	20
TLS025	TLS025L	25
TLS030	TLS030L	30
TLS035	TLS035L	35
TLS040	TLS040L	40
TLS050	TLS050L	50
TLS060	TLS060L	60
TLS070	TLS070L	70
TLS080	TLS080L	80
TLS090	TLS090L	90
TLS100	TLS100L	100
TLS125	TLS125L	125

* Used for circuit board applications.

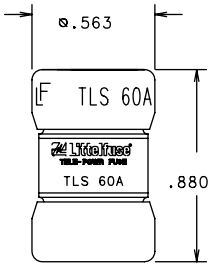
RECOMMENDED FUSE BLOCKS

LTFD series disconnect switches

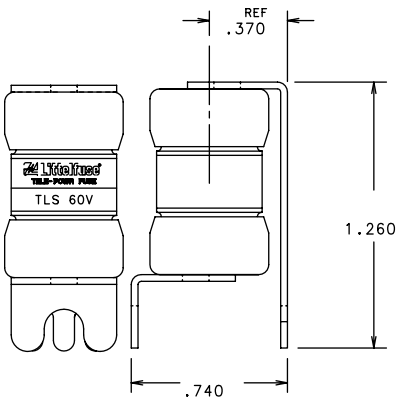
Contact factory for more information.

Telecom Products

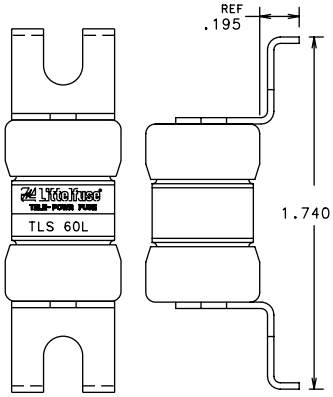
TLS



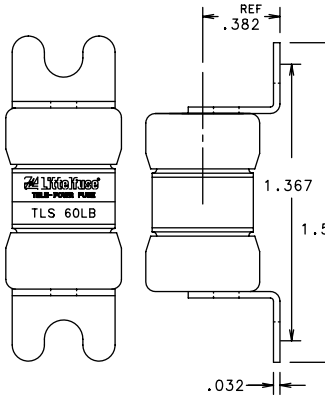
TLS-V



TLS-L



TLS-LB



Contact Littelfuse for characteristic curves. Dimensions for reference only.
Replaces competitors' TPS and TGS Series.

NEW

70 Series Alarm Indicating Fuses

Telecom Products

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 Rating: 125 VAC, 300 VDC

Interrupting Rating: 1,000 amperes @ 125 VAC
1,000 amperes @ 300 VDC

Approvals: UL Recognized

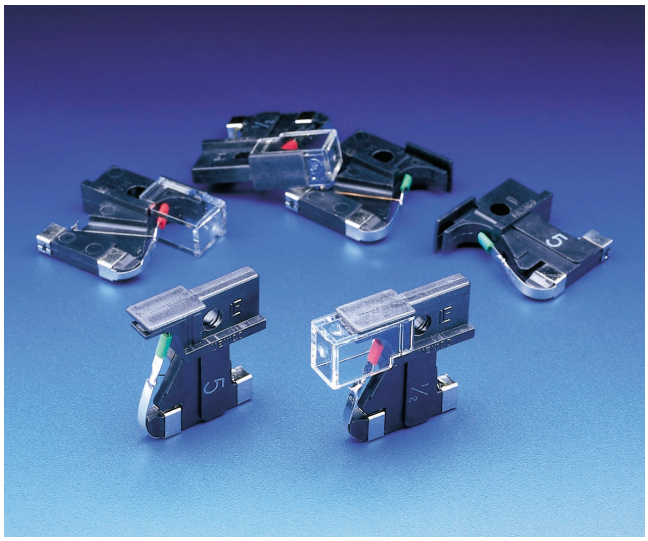
AMPERE RATINGS

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

ORDERING INFORMATION

10 Minute Rating	Catalog Number	System Number	Color Code
100mA	70P	70P00000Z	Grey/White
150mA	70R	70R00000Z	Red/White
180mA	70E	70E00000Z	Yellow
200mA	70X	70X00000Z	Black
250mA	70F	70F00000Z	Violet
250mA	70K	70K00000Z	Violet/White
350mA	70S	70S00000Z	Gray
500mA	70G	70G00000Z	Red
750mA	70H	70H00000Z	Brown
1.33A	70A	70A00000Z	White
2A	70B	70B00000Z	Orange
3A	70C	70C00000Z	Blue
3.5A	70J	70J00000Z	Black/White
5A	70D	70D00000Z	Green/Black
8A	70M	70M00000Z	Tan/White
10A	70N	70N00000Z	Yellow/Purple

NEW



481 Series Alarm Indicating Fuses

For telecommunications equipment and similar applications. Color-coded indicator flags indicate ampere rating. Body is constructed of black polyphenylene sulfide with UL 94V0 flammability rating, contacts are of bright alloy-plated beryllium copper. Available with or without protective lens.

SPECIFICATIONS

Voltage Rating: 125V AC, DC

Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

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-$^{1}/_{3}$	2-$^{1}/_{2}$	4	10	20

Example part number (series & amperage): 481005

RECOMMENDED FUSE BLOCKS

482 Series

Available 1-20 pole with PCB or panel mounting

NOTE: For 481 Dummy fuse order 481000.

LTFD 101 Series Telecommunications Disconnect Switch

80 VDC ■ 1 – 125A

Littelfuse POWR-GARD™ Products

NEW

SPECIFICATIONS

Voltage Rating: 80 VDC

Ampere Range: 1-125A

Approvals: UL Recognized (File No. E122874)

RECOMMENDED FUSES

- Littelfuse TLS Series fuses
- Littelfuse 481 Series Alarm fuses

ORDERING INFORMATION

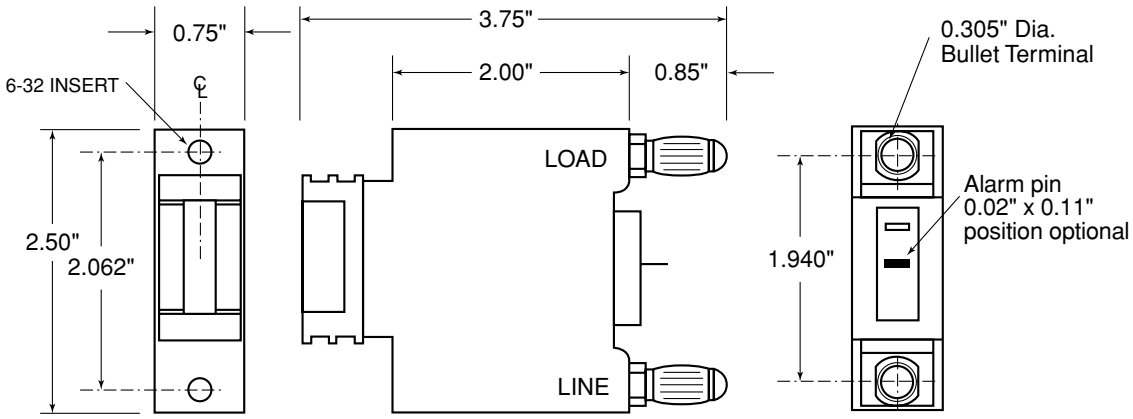
Catalog Number	System Number	Terminal Type
LTFD101-1	LTFD0101ZX1	Bullet
LTFD101-2	LTFD0101ZX2	Screw
LTFD101-3	LTFD0101ZX3	Stud
LTFD101-4	LTFD0101ZX4	Clip

Littelfuse's 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 they 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.

Telecom Products

FEATURES

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



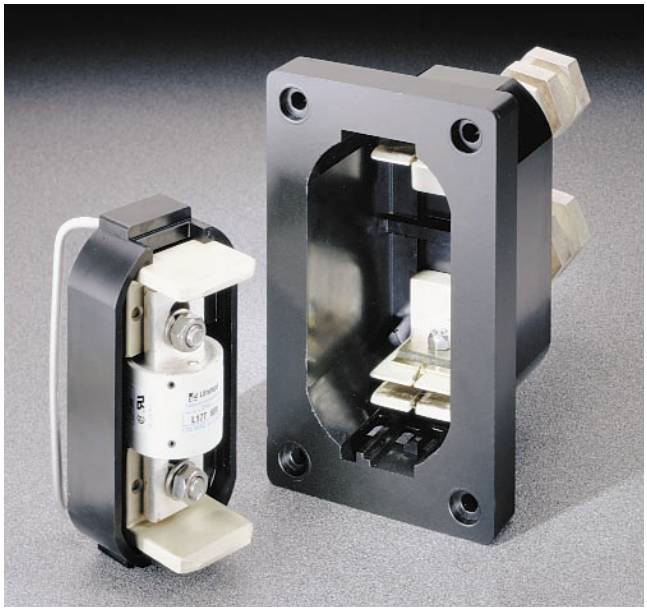
Dimensions for reference only. For additional options and dimensions, contact the factory.

LTFD Series Telecommunications Disconnect Switch

145 VDC, 60 VDC ■ 70 – 1200 Amperes

Littelfuse
POWR-GARD™ Products

NEW



Littelfuse's compact LTFD Series holders are designed for use as a combination fuseholder and disconnect switch for telecommunications equipment. The rugged unit utilizes a pull-out fuse carrier to safely disconnect power and provide easy fuse replacement.

Telecom Products

SPECIFICATIONS

Voltage Rating: 145 VDC 70 – 600 amperes
60 VDC 800 – 1200 amperes

Ampere Range: 70 – 1200 amperes

Approvals: UL Recognized (E122674)

RECOMMENDED FUSES

L17T Series fuses

ORDERING INFORMATION

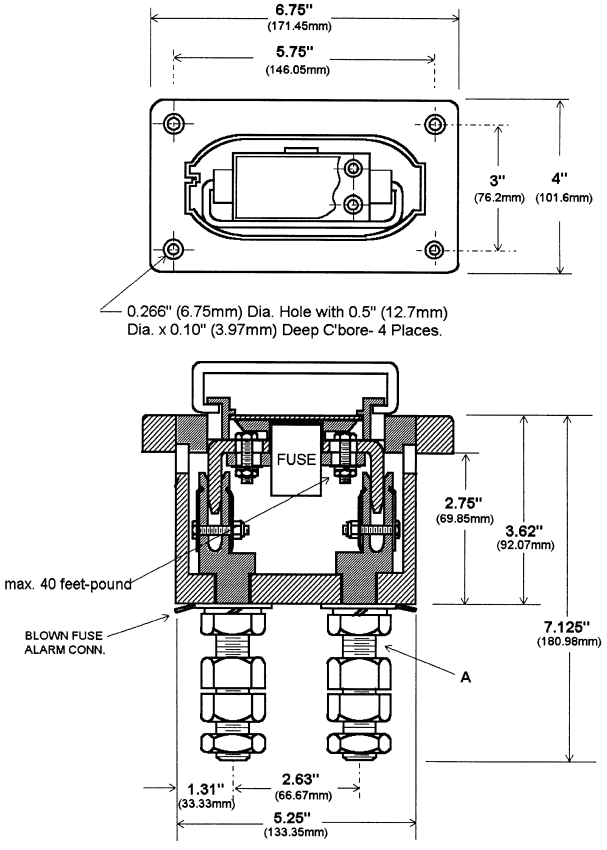
Catalog No.	Stud Size (A)	Amperes	Contact Nut Max. Torque
LTFD6001-00	3/4 – 16 x 3.5 in.	70 – 600	100 feet-pound
LTFD6001-01	7/8 – 14 x 3.5 in.	70 – 800	120 feet-pound
LTFD1200-01	1.12 – 12 x 4 in	900 – 1200	120 feet-pound
LTFD1200-01A	1.12 – 12 x 4 in	900 – 1200	120 feet-pound

FEATURES

- Innovative pullout design of the 1200A switch eliminates the need for tools to replace the fuse
- Thermoplastic housing material
- Alarm signaling circuit

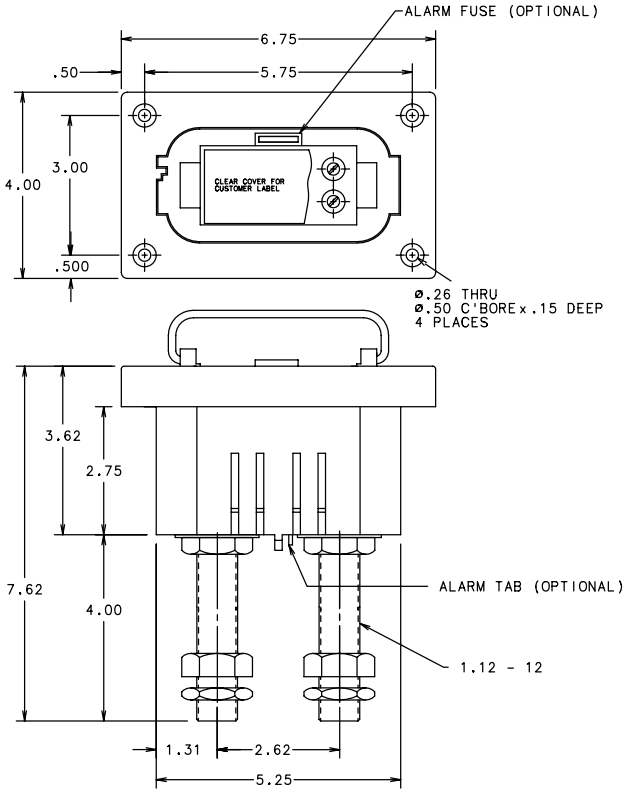
LTFD 6001 Series

(0–800 Amperes)



LTFD 1200A

(9–1200 Amperes)



Dimensions for reference only.

Special Purpose Fuses

Semiconductor Fuses

150 – 1300 VAC ■ Very Fast-Acting ■ 1 – 6000 Amperes

Littelfuse
POWR-GARD™ Products

NEW

SEMICONDUCTOR FUSES

Littelfuse Semiconductor fuses are very fast-acting fuses designed specifically for the protection of diodes, thyristors, triacs, and other solid-state power semiconductor devices. These fuses are used in power electronic applications including variable speed drives, power rectifiers, UPS systems, and DC power supplies. They can be used wherever extremely fast-acting, current-limiting fuses are needed to provide superior protection against the potentially damaging effects of short-circuit currents.

The extensive line of Littelfuse Semiconductor fuses includes the traditional round body fuses, enhanced state-of-the-art round body fuses, and North American style square body fuses. Available ratings range from 150 to 1300 volts up to 6000 amps.

APPLICATIONS

Designed specifically for supplementary protection of semiconducting devices such as silicon controlled rectifiers (SCR's), diodes, thyristors, triacs, transistors, and similar solid-state devices. These devices are used in power equipment including variable speed drives, power rectifiers, UPS systems, DC power supplies, and in a wide range of electronic equipment.

May be used wherever extremely fast-acting, current limiting fuses with no time delay are required.

Special Purpose Fuses

FEATURES & BENEFITS

- Extremely current-limiting
- Low I^2t and peak let-through currents
- Low watts loss
- High Interrupting ratings
- UL Recognized
- Wide range of ampere ratings
- Optional mounting types
- DC ratings
- Superior cycling abilities
- Compact sizes
- Optional blown fuse indicators

RATINGS

150V: 1 – 6000A
250V: 1 – 4500A
300V: 35 – 4500A
500V: 10 – 1200A
600V: 1 – 2000A
700V: 6 – 2500A
1000V: 15 – 1000A
1200V: 1 – 30A
1300V: 50 – 1800A

RECOMMENDED FUSE BLOCK:

LSCR and 1LS series: Refer to the Fuse Block section of this catalog for additional information.

SPECIFICATIONS

Voltage Ratings:

L15S: 150 V AC/DC (1 – 60A)
150 VAC (70 – 1000A)
100 VDC (70 – 1000A)

L25S: 250 V AC/DC (1 – 200A)
250 VAC (225 – 800A)
200 VDC (225 – 800A)

L50S: 500 VAC/450VDC

L60S: 600 VAC

KLC: 600 VAC

L70S: 700VAC/650VDC

Interrupting Rating:

AC: 200,000 rms amperes
(L15S series 100,000A)

DC: 20,000 amperes

Ampere Range:

1 – 1200 amperes
See Rating Table for ratings available in each series.

Approvals:

UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.
UL File No: E71611
CSA File No: LR29862

L15S and L25S series fuses are Littelfuse Certified for DC ratings shown in Rating Table.

RATING TABLE

Ampere Ratings	Series & Voltage					
	L15S 150V AC 150V DC (1 – 60A) 100V DC (70 – 1000A)	**L25S** 250V AC 250V DC (1 – 200A) 200V DC (225 – 800A)	**L50S** 500V AC 450V DC	**L60S** 600V AC	**KLC‡** 600V AC	**L70S** 700V AC 650V DC
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			LA50P900			LA70P900
1000	L15S 1000		LA50P1000			LA70P1000
1200			LA50P1200			LA70P1200

‡ KLC series fuses are recommended for replacement use only.

Special Purpose Fuses

Traditional Semiconductor Fuses

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

Littelfuse POWR-GARD™ Products

L15S SERIES, 150* VOLTS AC
(Replaces KLA, KLW, L13S)

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		A	B	C	D	E	F	G	H
1 – 30	1	1-1/2 (38.1)	—	3/8 (9.5)	13/32 (10.3)	—	—	—	—
31 – 60	1	2 (50.8)	—	5/8 (15.9)	13/16 (20.6)	—	—	—	—
61 – 450	3	1-5/32 (29.4)	1-7/8 (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	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 (6.4)

L25S SERIES, 250 VOLTS AC
(Replaces KLB)

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		A	B	C	D	E	F	G	H
1 – 30	1	2 (50.8)	—	1/2 (12.7)	9/16 (14.3)	—	—	—	—
31 – 60	2	1-5/8 (41.3)	2-1/4 (57.2)	2-1/2 (63.5)	3-3/16 (81.0)	13/16 (20.6)	23/32 (18.3)	11/32 (8.7)	1/8 (3.2)
61 – 200	3	1-5/8 (41.3)	2-5/16 (58.7)	2-7/16 (61.9)	3-1/8 (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)	1-1/2 (38.1)	1 (25.4)	13/32 (10.3)	1/4 (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)	1-1/2 (38.1)	13/32 (10.3)	1/4 (6.4)

L50S SERIES, 500 VOLTS AC / 450 VOLTS DC
(Replaces KLH)

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		A	B	C	D	E	F	G	H
10 – 30	1	2 (50.8)	—	1/2 (12.7)	9/16 (14.3)	—	—	—	—
31 – 60	2	1-5/8 (41.3)	2-1/4 (57.2)	2-1/2 (63.5)	3-3/16 (81.0)	13/16 (20.6)	23/32 (18.3)	11/32 (8.7)	1/8 (3.2)
61 – 100	3	2-1/8 (54.0)	2-11/16 (68.3)	3-1/32 (77.0)	3-5/8 (92.1)	1 (25.4)	3/4 (19.1)	11/32 (8.7)	1/8 (3.2)
101 – 200	3	2-1/8 (54.0)	2-13/16 (71.4)	2-15/16 (74.6)	3-5/8 (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)	1-1/2 (38.1)	1 (25.4)	13/32 (10.3)	1/4 (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)	1-1/2 (38.1)	13/32 (10.3)	1/4 (6.4)
601 – 800	3	2-7/32 (56.4)	4-9/32 (108.7)	4-5/8 (117.5)	6-15/32 (164.3)	2-1/2 (63.5)	2 (50.8)	17/32 (13.5)	3/8 (9.5)

Contact Littelfuse for characteristic curves.

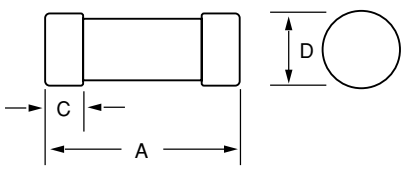
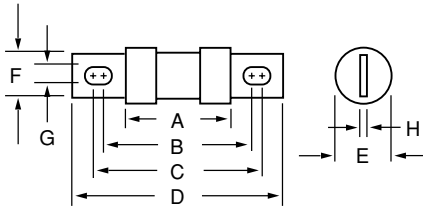


Fig. 1



Fig, 2

Traditional Semiconductor Fuses

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

Littelfuse POWR-GARD™ Products

L60S SERIES, 600 VOLTS AC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		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 / 650 VOLTS DC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)								
		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)

KLC SERIES, 600 VOLTS AC

AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		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)

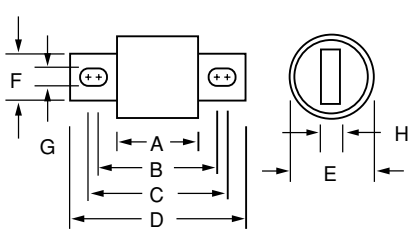


Fig. 3

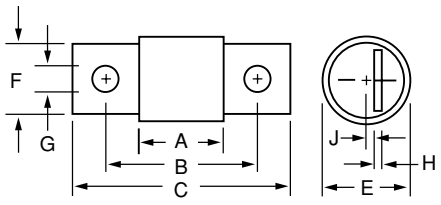


Fig. 4

Contact Littelfuse for characteristic curves.

Special Purpose Fuses

LA15QS Semiconductor Fuses

150 VAC ■ Very Fast-Acting ■ 1 – 6000 Amperes

Littelfuse
POWR-GARD™ Products

NEW

Littelfuse's LA15QS series Semiconductor fuses were designed for the specific protection of diodes and other semiconductor devices rated 150VAC/DC. The LA15QS product lines compact design is perfect for those applications that have limitations on available space.

Special Purpose Fuses

FEATURES

- **Low I^2t** minimizes damage to protected components on short circuit.
- **Controlled arc voltage** reduces stress to circuit components during fuse clearing.
- **Choice of mounting types** provides options for unique termination requirements.
- **Indicator options** allow identification of blown fuses.

APPLICATIONS

Protection of heavy duty devices such as electromechanical rectifiers.

SPECIFICATIONS

Voltage Rating: AC: 150 volts
DC: 150 volts

Interrupting Rating: 100,000 Amperes

Ampere Range: 1 – 6000 Amperes

Approvals: UL Recognized under the components program.

ORDERING INFORMATION

LA	15	QS	400	-4	TI

Littelfuse

Voltage (150)

Style

Ampere Rating

Mounting Type

Ferrule	1
Ferrule, midget dim.	2
Blades/Bolt-in	4
Hockey Puck, bolt-in	128

Integral Blown-Fuse Indicator

Trigger Indicator	TI
Trigger Actuator	IL

Note: Mounting types and integral blown fuse indicators are optional for specified ratings.

Contact Littelfuse for characteristic curves.

LA15QS Semiconductor Fuses

150 VAC ■ Very Fast-Acting ■ 1 – 6000 Amperes

Littelfuse POWR-GARD™ Products

Catalog Numbers & Technical Data

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	LA15QS300-4TI	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

FIGURE 1

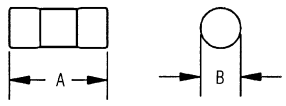


FIGURE 2

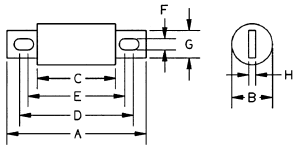


FIGURE 3

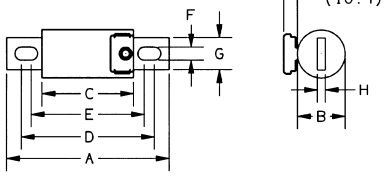


FIGURE 4

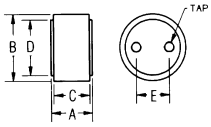


FIGURE 5

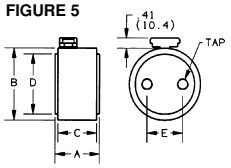


FIGURE 6

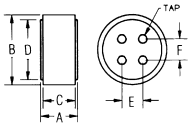


FIGURE 7

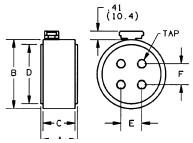
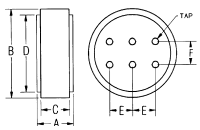


FIGURE 8



DIMENSIONS

Dimensions for reference only.

AMPERES	MOUNT. TYPE	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)								Tap
			A	B	C	D	E	F	G	H	
1 – 30	2	1	1.50 (38.1)	.41 (10.4)	- -	- -	- -	- -	- -	- -	- -
35 – 60	1	1	2.00 (50.8)	.81 (20.6)	- -	- -	- -	- -	- -	- -	- -
70 – 450	4, 4TI*, 4IL*	2, 3*	2.66 (67.6)	1.13 (28.7)	1.16 (29.5)	2.19 (55.6)	1.91 (48.5)	.31 (7.9)	.88 (22.4)	.19 (4.8)	- -
500 – 1000	4, 4TI*, 4IL*	2, 3*	3.50 (88.9)	1.50 (38.1)	1.25 (31.8)	2.56 (65.0)	1.94 (49.3)	.41 (10.4)	1.00 (25.4)	.25 (6.4)	- -
750 – 2000	128, 128IL*	4, 5*	1.88 (47.88)	2.00 (50.8)	1.63 (41.4)	1.75 (44.5)	1.00 (25.4)	- -	- -	- -	3/8-24-1/2 deep -
2500 – 3000	128, 128IL*	4, 5*	1.88 (47.88)	3.00 (76.2)	1.63 (41.4)	2.50 (63.5)	1.50 (38.1)	- -	- -	- -	1/2-20-1/2 deep -
3500 – 4000	128, 128IL*	6, 7*	1.88 (47.88)	3.50 (88.9)	1.63 (41.4)	3.00 (76.2)	1.06 (27.0)	1.06 (27.0)	- -	- -	1/2-20-1/2 deep -
5000 – 6000	128	8	2.38 (60.5)	5.75 (146)	1.88 (47.7)	5.00 (127)	1.50 (38.1)	1.50 (38.1)	- -	- -	1/2-20-1/2 deep -

* Optional Trigger Actuator (IL)

Special Purpose Fuses

LA30QS Semiconductor Fuses

300 VAC ■ Very Fast-Acting ■ 35 – 4500 Amperes

Littelfuse POWR-GARD™ Products

NEW

Littelfuse's LA30QS series Semiconductor protection fuses are intended for the protection of Power Semiconductors such as Diodes, Phase Control SCR's and other Power Semiconductor devices. The LA30QS is recommended for new applications providing solutions for your critical protection needs at 300V and less semiconductors.

Special Purpose Fuses

FEATURES

- **Low I^2t** minimizes damage to protected components on short circuit.
- **Controlled arc voltage** reduces stress to circuit components during fuse clearing.
- **Choice of mounting types** provides options for unique termination requirements.
- **Indicator options** allow identification of blown fuses.
- **Superior DC capabilities.**

APPLICATIONS

Protection of 300 volt heavy duty rectifiers and similar heavy duty power supplies.

Contact Littelfuse for characteristic curves.

SPECIFICATIONS

Voltage Rating: AC: 300 volts
DC: 300 volts

Interrupting Rating: 200,000 Amperes

Ampere Range: 35 – 4500 Amperes

Approvals: UL Recognized under the components program.

ORDERING INFORMATION

LA	30	QS	600	-4	TI

- Littelfuse
- Voltage (300): 30
- Style: QS
- Ampere Rating: 600
- Mounting Type: -4
  - Ferrule: 1
  - Blades/Bolt-in: 4
  - Hockey Puck, bolt-in: 128
- Integral Blown-Fuse Indicator: TI
  - Trigger Indicator: TI
  - Trigger Actuator: IL

Note: Mounting types and integral blown fuse indicators are optional for specified ratings.

LA30QS Semiconductor Fuses

300 VAC ▪ Very Fast-Acting ▪ 35 – 4500 Amperes

Littelfuse POWR-GARD™ Products

Catalog Numbers & Technical Data

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

Ampere Rating	Littelfuse Catalog Number	Mounting Type	Maximum Clearing I^2t @300 VAC ($A^2S \times 10^3$)	Watts Loss @ Rated Current (W)
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

FIGURE 1

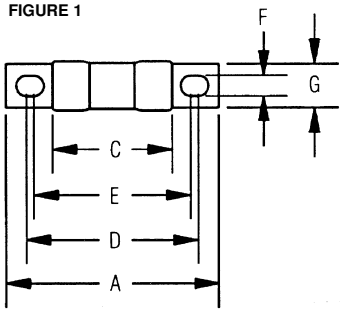


FIGURE 2

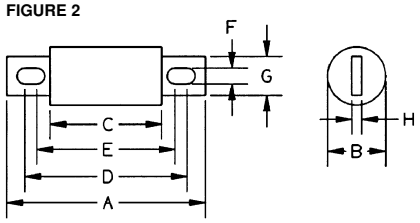


FIGURE 3

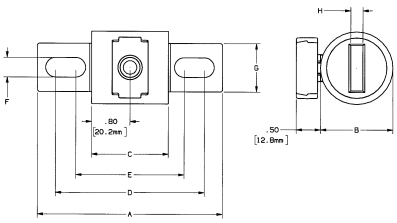


FIGURE 4

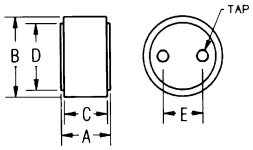


FIGURE 5

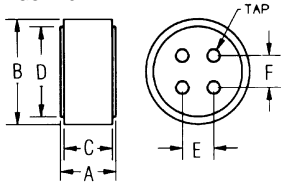
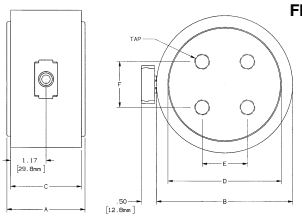


FIGURE 6



DIMENSIONS

Dimensions for reference only.

AMPERES	MOUNT. TYPE	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)								Tap
			A	B	C	D	E	F	G	H	
35 – 60	4	1	3.19 (81.0)	.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)	.31 (7.9)	1.00 (25.4)	.19 (4.8)	- -
225 – 700	4, 4IL*	2, 3*	3.84 (97.5)	1.50 (38.1)	1.59 (40.1)	2.91 (73.9)	2.28 (57.9)	.41 (10.4)	1.00 (25.4)	.25 (6.4)	- -
700 – 1200	128	4	2.59 (65.8)	3.00 (76.2)	2.34 (59.4)	2.50 (63.5)	1.50 (38.1)	- -	- -	- -	3/8-24-1/2 deep -
1500 – 2500	128, 128IL*	5, 6*	2.59 (65.8)	3.50 (88.9)	2.34 (59.4)	3.00 (76.2)	1.50 (38.1)	1.50 (38.1)	- -	- -	3/8-24-1/2 deep -
3000 – 4500	128, 128IL*	5, 6*	2.59 (65.8)	4.50 (114)	2.34 (59.4)	3.75 (95.3)	1.50 (38.1)	1.50 (38.1)	- -	- -	1/2-20-1/2 deep -

* Optional Actuator (IL)

Special Purpose Fuses

LA50QS Semiconductor Fuses

500 VAC ■ Very Fast-Acting ■ 35 – 1200 Amperes

Littelfuse POWR-GARD™ Products

NEW

Special Purpose Fuses

In response to new equipment requirements, Littelfuse's LA50QS series fuses were developed to improve the overall performance of semiconductor fuses. The LA50QS provides the best protection features including lower I^2t, longer life when subjected to cyclic loading and lower watts loss. LA50QS is today's choice for the protection of dynamic solid state equipment.

SPECIFICATIONS

Voltage Rating: AC: 500 volts
DC: 500 volts

Interrupting Rating: AC: 200,000 Amperes
DC: 100,000 Amperes

Ampere Range: 35 – 1200 Amperes

Approvals: UL Recognized under the components program.
CSA Certified.

ORDERING INFORMATION

LA	50	QS	250	-4
Littelfuse	Voltage (500)	Style	Ampere Rating	Mounting Type (Blades/Bolt-in)

FEATURES

- **Lowest I^2t** for greatest protection of semiconductor circuits.
- **Low watts loss** for cooler operation.
- **Superior cycling ability** gives an equipment design advantage.
- **State-of-the-art protection** for 500 volt equipment.
- **Ultra compact sizes** allow down-sizing of existing equipment.

APPLICATIONS

Protection of 500 volts or less solid state equipment such as motor drives, UPS, inverters, etc.

LA50QS Semiconductor Fuses

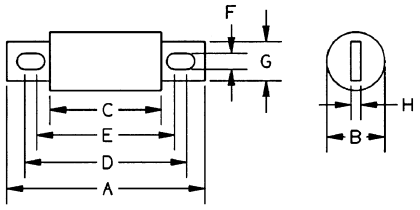
500 VAC ▪ Very Fast-Acting ▪ 35 – 1200 Amperes

Littelfuse POWR-GARD™ Products

Catalog Numbers & Technical Data

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



DIMENSIONS

Dimensions for reference only.

AMPERES	MOUNT. TYPE	DIMENSIONS IN INCHES (mm in parentheses)							
		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)	.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)	.41 (104)	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)	.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)	.63 (15.9)	2.38 (60.3)	0.44 (11.1)

Contact Littelfuse for characteristic curves.

LA60Q Semiconductor Fuses

600 VAC ■ Very Fast-Acting ■ 5 – 40 Amperes

Littelfuse
POWR-GARD™ Products

NEW

Littelfuse's LA60Q semiconductor protection fuses feature a 600 volt AC/DC rating in a compact size (1-1/2" x 13/32"). LA60Q also has the lowerst 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..

Special Purpose Fuses

FEATURES

- **Lowest I^2t** of any fuse this size for greater protection.
- **Excellent cycling ability** gives advantage in equipment design.

SPECIFICATIONS

Voltage Rating: AC: 600 volts
DC: 600 volts

Interrupting Rating: AC: 200,000 Amperes
DC: 100,000 Amperes

Ampere Range: 5 – 40 Amperes

Approvals: UL Recognized under the components program.

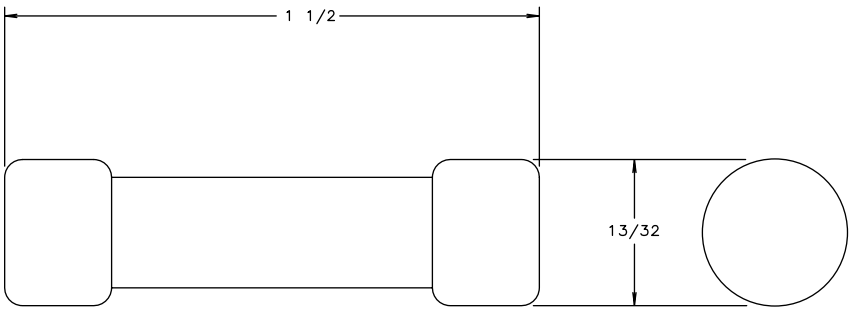
ORDERING INFORMATION

LA	60	Q	30	-2
Littelfuse	Voltage (600)	Style	Ampere Rating	Mounting Type (Ferrule, midget dim. 1-1/2" x 13/32")

Catalog Numbers & Technical Data

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

DIMENSIONS



Contact Littelfuse for characteristic curves.

LA60X Semiconductor Fuses

600 VAC ▪ Very Fast-Acting ▪ 700 – 2000 Amperes

Littelfuse POWR-GARD™ Products

NEW

Littelfuse's LA60X semiconductor protection fuses are popular for the protection of higher voltage heavy rectifiers such as traction rectifiers. They can carry long sustained overloads common with heavy-duty apparatus. The compact "hockey-puck" design provides high power protection in a small space.

FEATURES

- **Lowest I^2t** minimizes damage to protected components on short circuit.
- **Controlled arc voltage** reduces stress to circuit components during fuse clearing.

APPLICATIONS

Protection of heavy traction and electrochemical as well as rectifiers and other heavy-duty equipment.

SPECIFICATIONS

Voltage Rating: AC: 600 volts
Interrupting Rating: AC: 100,000 Amperes
Ampere Range: 700 – 2000 Amperes
Approvals: UL Recognized under the components program.

AMPERE RATINGS

700	1200	1800
800	1500	2000
1000	1600	

ORDERING INFORMATION

LA	60	X	700	-128
Littelfuse	Voltage (600)	Style	Ampere Rating	Mounting Type (Hockey Puck, bolt-in)

Special Purpose Fuses

FIGURE 1

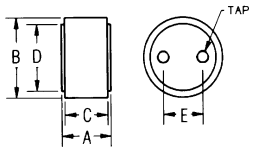
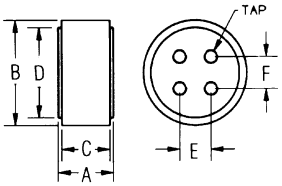


FIGURE 2



DIMENSIONS

Dimensions for reference only.

AMPERES	MOUNT. TYPE	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)						Tap
			A	B	C	D	E	F	
700 – 800	128	1	4.00 (102)	3.00 (76.2)	3.75 (95.3)	2.50 (63.5)	1.50 (38.1)	- -	3/8-24-1/2 deep -
1000 – 1200	128	2	4.00 (102)	3.50 (88.9)	3.75 (95.3)	3.00 (76.2)	1.50 (38.1)	1.50 (38.1)	3/8-24-1/2 deep -
1500 – 2000	128	2	4.00 (102)	4.50 (114)	3.75 (95.3)	3.75 (95.3)	1.50 (38.1)	1.50 (38.1)	1/2-20-1/2 deep -

Contact Littelfuse for technical information.

LA70QS Semiconductor Fuses

700 VAC ■ Very Fast-Acting ■ 35 – 800 Amperes

Littelfuse
POWR-GARD™ Products

NEW

Littelfuse's 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.

Special Purpose Fuses

FEATURES

- **Very low I^2t** improved protection of equipment.
- **Superior cycling ability** for long, reliable life on high cycling loading.
- **Lower watts loss** for cooler operation.
- **700 Volt AC/DC rating** provides greater design versatility.
- **Compact sizes** allow down-sizing of equipment.

APPLICATIONS

Protection of 700 volt or less solid state equipment such as motor drives, UPS, inverters, etc.

SPECIFICATIONS

Voltage Rating: AC: 700 Volts
DC: 700 Volts
Interrupting Rating: AC: 200,000 Amperes
DC: 100,000 Amperes
Ampere Range: 35 – 800 Amperes
Approvals: UL Recognized under the components program.
CSA Certified.

ORDERING INFORMATION

LA	70	QS	150	-4
Littelfuse	Voltage (700)	Style	Ampere Rating	Mounting Type (Blades/Bolt-in)

LA70QS Semiconductor Fuses

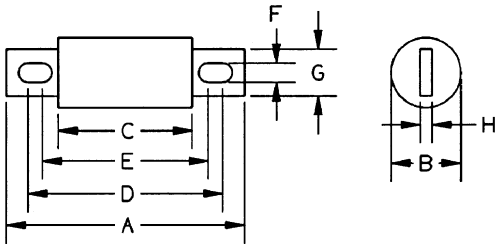
700 VAC ▪ Very Fast-Acting ▪ 35 – 800 Amperes

Littelfuse POWR-GARD™ Products

Catalog Numbers & Technical Data

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	4K	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



DIMENSIONS

Dimensions for reference only.

AMPERES	MOUNT. TYPE	DIMENSIONS IN INCHES (mm in parentheses)							
		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 (13.50	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.

LA70QS French Cylindrical Fuses

690 Volts ▪ Very Fast-Acting ▪ 10 – 100 Amperes

Littelfuse
POWR-GARD™ Products

NEW

Littelfuse's French Cylindrical style semiconductor fuses are an extension to the LA70QS series. They offer a solid-fill design with high interrupting ratings and an optional striker for visual or remote blown fuse indication. The international 14x51mm and 22x58mm sizes are accepted worldwide

Special Purpose Fuses

SPECIFICATIONS

Voltage Rating: AC: 690 Volts
DC: 700 Volts
Interrupting Rating: AC: 200,000 Amperes
DC: 100,000 Amperes
Ampere Range: 10 – 100 Amperes
Approvals: UL Recognized under the components program.
CSA Certified.

ORDERING INFORMATION

LA	70	QS	20	-14F	I

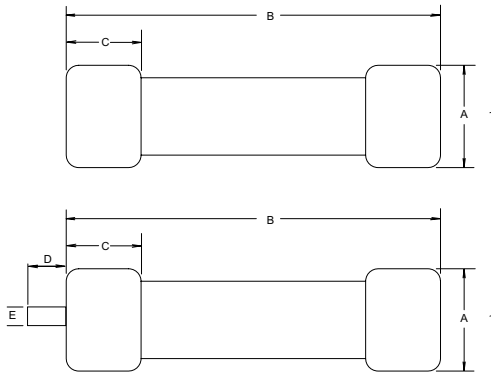
- Littelfuse
- Voltage (700)
- Style
- Ampere Rating
- Size: 14x51mm 14F; 22x58mm 22F
- Optional Striker (I)

Catalog Numbers & Technical Data

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	14x51	0.04	3.5
12	LA70QS12-14F	LA70QS12-14FI	14x51	0.06	4.4
16	LA70QS16-14F	LA70QS16-14FI	14x51	0.10	4.8
20	LA70QS20-14F	LA70QS20-14FI	14x51	0.16	5.2
25	LA70QS25-14F	LA70QS25-14FI	14x51	0.27	5.8
32	LA70QS32-14F	LA70QS32-14FI	14x51	1.50	7.0
40	LA70QS40-14F	LA70QS40-14FI	14x51	0.70	10.7
50	LA70QS50-14F	LA70QS50-14FI	14x51	1.50	11.6
10	LA70QS10-22F	LA70QS10-22FI	22x58	0.025	4.0
15	LA70QS15-22F	LA70QS15-22FI	22x58	0.049	6.2
20	LA70QS20-22F	LA70QS20-22FI	22x58	0.076	8.0
25	LA70QS25-22F	LA70QS25-22FI	22x58	0.125	10.0
32	LA70QS32-22F	LA70QS32-22FI	22x58	0.27	11.0
40	LA70QS40-22F	LA70QS40-22FI	22x58	0.48	13.0
50	LA70QS50-22F	LA70QS50-22FI	22x58	0.80	14.9
63	LA70QS63-22F	LA70QS63-22FI	22x58	1.85	16.0
70	LA70QS70-22F	LA70QS70-22FI	22x58	2.80	16.5
80	LA70QS80-22F	LA70QS80-22FI	22x58	3.80	17.8
90	LA70QS90-22F	LA70QS90-22FI	22x58	5.64	17.0
100	LA70QS100-22F	LA70QS100-22FI	22x58	8.00	19.0

FUSE SIZE	Dimensions in mm				
	A	B	C	D	E
14x51 (no striker)	14	51	14	-	-
22x58 (no striker)	22	58	16	-	-
14x51 (with striker)	14	51	14	7.5	3.8
22x58 (with striker)	22	58	16	7.5	3.8

Dimensions for reference only.



Contact Littelfuse for characteristic curves.

LA100P Semiconductor Fuses

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

Littelfuse POWR-GARD™ Products

NEW

Littelfuse's LA100P semiconductor protection fuses are rated 1000V, extending the range of protection for UPS systems, AC and DC drives, reduced voltage motor starters and similar applications where lower I^2t and superior reliability are needed. With ratings from 15-1000 amperes, a wide range of high voltage applications can be served.

FEATURES

- **Low I^2t** minimizes damage to protected components on short circuit.
- **Controlled arc voltage** reduces stress to circuit components during fuse clearing.

APPLICATIONS

Protection of UPS systems, AC/DC drives, reduced voltage motor starters and other 1000V or less semiconductor devices.

SPECIFICATIONS

Voltage Rating: AC: 1000 Volts
DC: 750 Volts
Interrupting Rating: 100,000 Amperes
Ampere Range: 15 – 1000 Amperes
Approvals: UL Recognized under the components program.

ORDERING INFORMATION

LA	100	P	80	-4	TI

- Littelfuse
- Voltage (1000)
- Style
- Ampere Rating
- Mounting Type
  - Ferrule 1
  - Blades/Bolt-in 4
- Integral Blown-Fuse Indicator
  - Trigger Indicator TI

Note: Mounting types and integral blown fuse indicators are optional for specified ratings.

Special Purpose Fuses

LA100P Semiconductor Fuses

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

Littelfuse POWR-GARD™ Products

Catalog Numbers & Technical Data

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
50	LA100QP50-4TI	4TI	4.5	11
60	LA100P60-4	4	6.5	13
60	LA100P60-4TI	4TI	6.5	13
70	LA100P70-4TI	4TI	8.8	13
80	LA100P80-4	4	12	14
80	LA100P80-4TI	4TI	12	14
100	LA100P100-4	4	18	18
100	LA100P100-4TI	4TI	18	18
125	LA100P125-4	4	28	23
125	LA100P125-4TI	4TI	28	23
150	LA100P150-4	4	41	28
150	LA100P150-4TI	4TI	41	28

Ampere Rating	Littelfuse Catalog Number	Mounting Type	Maximum Clearing I^2t @1000 VAC ($A^2S \times 10^3$)	Watts Loss @ Rated Current (W)
200	LA100P200-4	4	72	36
200	LA100P200-4TI	4TI	72	36
225	LA100P225-4	4	91	40
250	LA100P250-4	4	110	46
300	LA100P300-4	4	160	55
300	LA100P300-4TI	4TI	160	55
350	LA100P350-4	4	220	65
350	LA100P350-4TI	4TI	220	65
400	LA100P400-4	4	290	70
400	LA100P400-4TI	4TI	290	70
500	LA100P500-4	4	450	90
500	LA100P500-4TI	4TI	450	90
600	LA100P600-4	4	650	110
600	LA100P600-4TI	4TI	650	110
650	LA100P650-4	4	780	120
700	LA100P700-4	4	880	125
800	LA100P800-4	4	1200	140
800	LA100P800-4TI	4TI	1200	140
1000	LA100P1000-4	4	1900	190

FIGURE 1

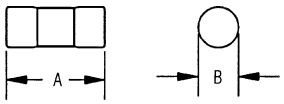


FIGURE 2

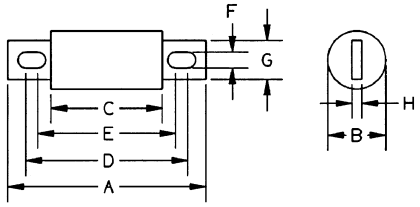


FIGURE 3

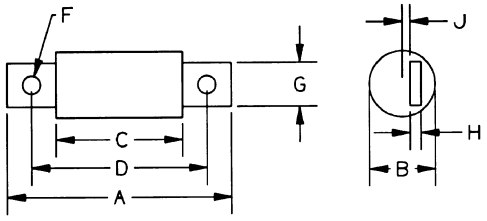
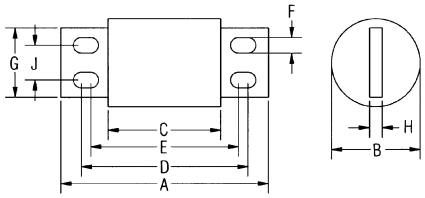


FIGURE 4



DIMENSIONS

Dimensions for reference only.

AMPERES	MOUNT. TYPE	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)								
			A	B	C	D	E	F	G	H	J
15 – 30	1	1	2.53 (66.8)	0.56 (14.2)	- -	- -	- -	- -	- -	- -	- -
35 – 60	4, 4TI	2	5.00 (127)	1.00 (25.4)	3.50 (173)	4.31 (109)	4.19 (106)	0.31 (7.9)	0.75 (19.1)	0.13 (3.3)	- -
65 – 100	4, 4TI	2	5.00 (127)	1.22 (31)	3.50 (173)	4.31 (109)	4.19 (106)	0.31 (7.9)	1.00 (25.4)	0.19 (4.8)	- -
125 – 200	4, 4TI	2	5.72 (145)	2.00 (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, 4TI	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, 4TI	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, 4TI	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.

LA120X Semiconductor Fuses

1200 VAC ■ Very Fast-Acting ■ 1/2 – 30 Amperes

Littelfuse POWR-GARD™ Products

NEW

Littelfuse's LA120X semiconductor protection fuses, rated 1/2 through 30A, 1200 VAC are popular for use in traction drive auxiliary circuits and similar applications. LA120X fuses are also suitable for use on 1000VDC auxiliary circuits with low time constants.

FEATURES

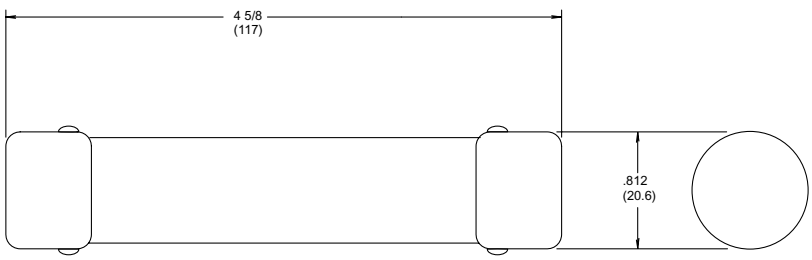
- **1000 Volt DC rating** for a wide range of circuits.
- **Compact size** fits in where competitive sizes will not fit.

APPLICATIONS

Protection of traction drive auxiliary circuits, etc.

DIMENSIONS

In Inches (mm in parentheses)



SPECIFICATIONS

Voltage Rating: AC: 1200 Volts
DC: 1000 Volts
Interrupting Rating: 100,000 Amperes
Ampere Range: 1/2 – 30 Amperes

ORDERING INFORMATION

LA	120	X	25	-1
Littelfuse	Voltage (1200)	Style	Ampere Rating	Mounting Type (Ferrule)

Catalog Numbers & Technical Data

Ampere Rating	Littelfuse Catalog Number	Mounting Type	Maximum Clearing I^2t @1200 VAC (A^2S)
1/2	LA120X1/2-1	1	1.9
1	LA120X1-1	1	7.5
2	LA120X2-1	1	30
3	LA120X3-1	1	69
4	LA120X4-1	1	120
5	LA120X5-1	1	190
6	LA120X6-1	1	280
10	LA120X10-1	1	970
15	LA120X15-1	1	2100
20	LA120X20-1	1	3700
25	LA120X25-1	1	5700
30	LA120X30-1	1	8300

Special Purpose Fuses

Contact Littelfuse for characteristic curves.

Square Body Semiconductor Fuses

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

Littelfuse
POWR-GARD™ Products

NEW

Littelfuse's 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.

Special Purpose Fuses

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.

APPLICATIONS

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

SPECIFICATIONS

Voltage Rating: AC: 700 Volts (LA070)
1300 Volts (LA130)
DC: Contact factory

Interrupting Rating: AC: 200,000 Amperes (LA070)
100,000 Amperes (LA130)
DC: Contact factory

Ampere Range: 63 – 2500 Amperes

Approvals: UL Recognized Component

ORDERING INFORMATION

LA	070	URD	31	LI	350

Littelfuse

Voltage
070=700V
130=1300V

Class

Size

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

Mounting Types

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

Amp Rating

700 Volt North American Style Ratings and Application Data

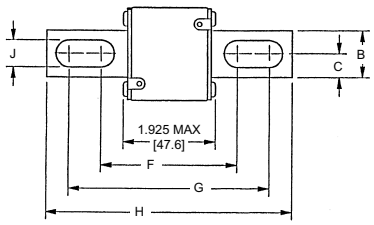
Body Size	Amp Rating	Rated Voltage	Melting I^2t ($A^2S \times 10^3$)	Total I^2t @ Rated Voltage ($A^2S \times 10^3$)	**Watts Loss @ Rated Current (W)	Long Blade Catalog No. Type LI	Short Blade Catalog No. Type KI	Tapped Terminal Catalog No. Type TTI
	63	700	0.2	1.2	14	LA070URD30LI0063	LA070URD30KI0063	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
30	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
	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
31	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
	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
32	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
	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
33	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	LA050URD33LI2250	-	LA055URD33TTI2250
	2500	500	1870	7600	280/330	LA050URD33LI2500	-	LA050URD33TTI2500

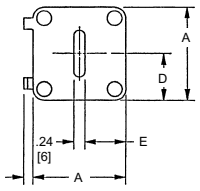
** Watts loss data is published for both blade and tapped style mounting configurations.
When two watts loss values are shown this represents tapped/blade values respectively.

Contact Littelfuse for characteristic curves.

Special Purpose Fuses

TYPES KI AND LI





North American Straight Blade, Type KI

DIMENSIONS - 700V Fuses Dimensions for reference only.

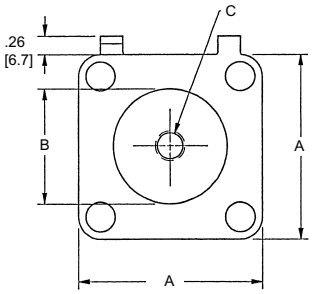
CATALOG NUMBER	DIMENSIONS IN INCHES (mm in parentheses)								
	A	B	C	D	E	F	G	H	J
LA070URD30KI (63-550)	1.57 (40)	0.98 (25)	0.49 (12.5)	0.83 (21)	0.71 (18)	2.68 (68)	4.21 (107)	5.08 (129)	0.41 (10.5)
LA070URD31KI (200-800)	2.01 (51)	0.98 (25)	0.49 (12.5)	1.0 (25.5)	0.89 (22.5)	2.66 (67.6)	4.22 (107.1)	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)

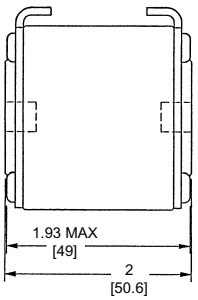
North American Straight Blade Types LI

DIMENSIONS - 700V Fuses Dimensions for reference only.

CATALOG NUMBER	DIMENSIONS IN INCHES (mm in parentheses)								
	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 - 700V Dimensions for reference only.

CATALOG NUMBER	DIMENSIONS IN INCHES (mm)		
	A	B	C
LA070URD30TTI (100-550)	1.57 (40)	1.00 (25)	5/16-18x .35
LA070URD31TTI (200-800)	2.00 (50.8)	1.19 (30.2)	5/16-18x .35
LA070URD32TTI (400-1000) LA065URD32TTI (1100) LA060URD32TTI (1250) LA055URD32TTI (1400-1600)	2.37 (60.3)	1.50 (38.1)	3/8-16x .35
LA060URD33TTI (1800) LA070URD33TTI (500-1400) LA065URD33TTI (1600) LA060URD33TTI (2000) LA055URD33TTI (2250) LA050URD33TTI (2500)	2.94 (74.5)	1.81 (46)	1/2-18x.35

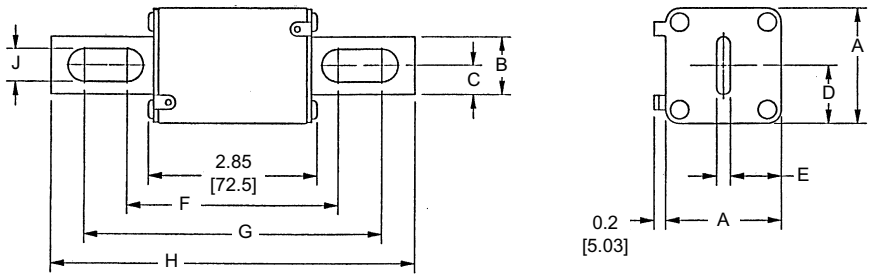
1300 Volt North American Style Ratings and Application Data

Body Size	Amp 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 No. Type LI/LLI	Tapped Terminal Catalog No. Type TTI
	63	1300	0.21	1.8	26	LA130URD70LI0063	LA130URD70TTI0063
	80	1300	0.47	4	27	LA130URD70LI0080	LA130URD70TTI0080
	100	1300	0.83	7.2	30	LA130URD70LI0100	LA130URD70TTI0100
	125	1300	1.3	11	38	LA130URD70LI0125	LA130URD70TTI0125
70	160	1300	2.5	22	45	LA130URD70LI0160	LA130URD70TTI0160
	200	1300	4.7	40	54/56	LA130URD70LI0200	LA130URD70TTI0200
	250	1300	9.6	82	58/61	LA130URD70LI0250	LA130URD70TTI0250
	315	1300	20	172	66/72	LA130URD70LI0315	LA130URD70TTI0315
	350	1200	28	205	68/75	LA120URD70LI0350	LA120URD70TTI0350
	160	1300	2.6	22	46	LA130URD71LLI0160	LA130URD71TTI0160
	200	1300	4.7	40	54	LA130URD71LLI0200	LA130URD71TTI0200
	250	1300	8.9	76	61	LA130URD71LLI0250	LA130URD71TTI0250
	280	1300	12	102	68/70	LA130URD71LLI0280	LA130URD71TTI0280
	315	1300	16	138	73/76	LA130URD71LLI0315	LA130URD71TTI0315
71	350	1300	22	190	76/80	LA130URD71LLI0350	LA130URD71TTI0350
	400	1300	38	330	76/80	LA130URD71LLI0400	LA130URD71TTI0400
	450	1300	47	405	87/95	LA130URD71LLI0450	LA130URD71TTI0450
	500	1200	68	500	90/100	LA120URD71LLI0500	LA120URD71TTI0500
	550	1200	84	620	98/112	LA120URD71LLI0550	LA120URD71TTI0550
	630	1100	125	930	105	LA110URD71LLI0630	-
	630	1200	125	930	120	-	LA120URD71TTI0630
	280	1300	10	90	72	LA130URD72LI0280	LA130URD72TTI0280
	315	1300	15	130	76	LA130URD72LI0315	LA130URD72TTI0315
	350	1300	21	180	77	LA130URD72LI0350	LA130URD72TTI0350
	400	1300	32	285	80	LA130URD72LI0400	LA130URD72TTI0400
	450	1300	44	380	87/89	LA130URD72LI0450	LA130URD72TTI0450
	500	1300	57	500	94/98	LA130URD72LI0500	LA130URD72TTI0500
72	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	-	LA110URD72TTI0700
	800	1100	215	1590	125	LA110URD72LI0800	-
	800	1200	215	1590	146	-	LA120URD72TTI0800
	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	-
73	800	1300	190	1630	148	-	LA130URD73TTI0800
	900	1100	250	2160	150	LA110URD73LI0900	-
	900	1300	250	2160	170	-	LA130URD73TTI0900
	1000	1100	370	2430	152/174	LA110URD73LI1000	LA110URD73TTI1000
	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.

TYPES LI AND LLI



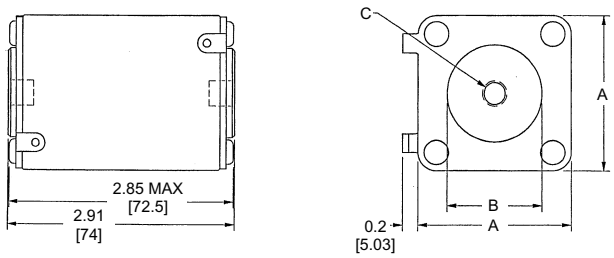
North American Straight Blade, Types LI and LLI

DIMENSIONS - 1300V Fuses Dimensions for reference only.

CATALOG NUMBER	DIMENSIONS IN INCHES (mm in parentheses)								
	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)

Special Purpose Fuses

TYPE TTI



North American Flat Single Hole, Type TTI

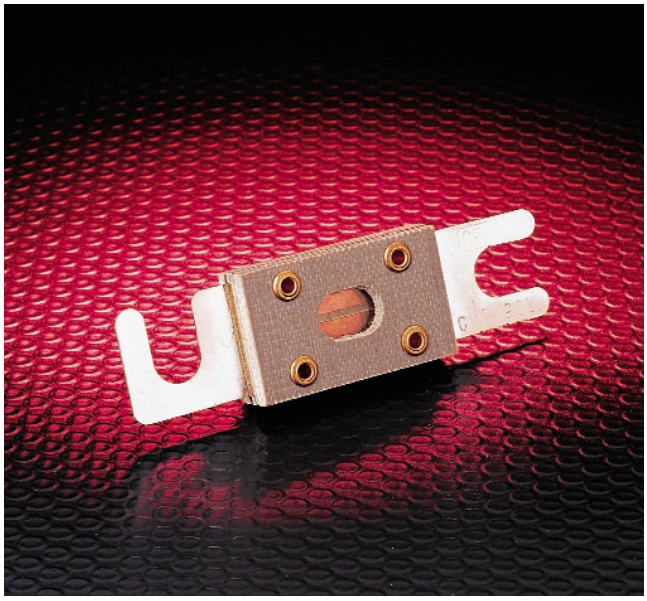
DIMENSIONS - 1300V Dimensions for reference only.

CATALOG NUMBER	DIMENSIONS IN INCHES (mm)		
	A	B	C
LA130URD70TTI (63-315) LA120URD70TTI (350)	1.57 (40)	1.00 (26.4)	5/16-18x .23 DP
LA130URD71TTI (160-450) LA120URD71TTI (550-630)	2.01 (51)	1.19 (30.2)	5/16-18x .36 DP
LA130URD72TTI (280-630) LA120URD72TTI (700-800)	2.36 (60)	1.50 (38.1)	3/8-18x .36 DP
LA130URD73TTI (315-900) LA120URD73TTI (1000) LA110URD73TTI (1250) LA090URD73TTI (1400) LA070URD73TTI (1600) LA065URD73TTI (1800)	2.93 (74.5)	1.81 (46)	1/2-18x.36 DP

Fork-Lift and Stud-Mounted Fuses

32 – 130 Volts DC ▪ Fast-Acting and Time-Delay

Littelfuse
POWR-GARD™ Products



CNL/CNN Limiter Fuses

CNL fast-acting and CNN very fast-acting fuses are recommended for use on battery-operated lift-trucks and other low voltage battery-operated equipment.

SPECIFICATIONS

Voltage Ratings: CNL: 32 Volts DC
CNN: 48 Volts DC, 75 Volts AC

Interrupting Rating: 2,500 amperes

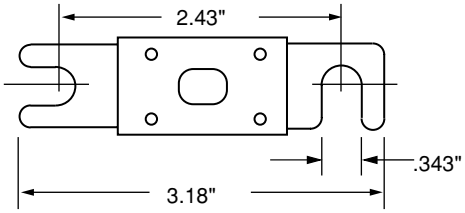
Ampere Range: 10 – 800 amperes

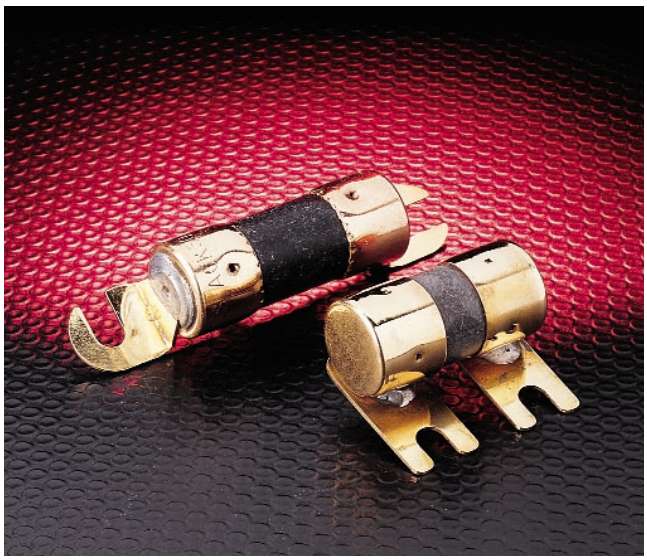
Recommended Fuse Block: LFFB001

AMPERE RATINGS

CNL	35	80	150	250	350
	40	100	175	275	400
	50	125	200	300	500
	60	130	225	325	
CNN	10	80	175	300	500
	35	90	200	325	600
	40	100	225	350	700
	50	125	250	400	800
	60	150	275		

Example part number (series & amperage): CNN 700





CBO/CCK/CCL Lift-Truck Fuses

CBO fast-acting, CCK and CCL dual-element time-delay fuses are recommended for fork-lift trucks and other similar battery-operated equipment.

PART NO.	A	B	C
CCK 1-15A	2.810	2.204	.510
CCK 20-30A	3.060	2.454	.510
CCK 35-60A	3.629		.750
CCK 70-120A	4.129	3.454	1.00
CCK 140-200A	4.362	3.579	1.00
CCK 225-300A	4.612	3.829	1.00
CCL 30-60A	3.060	2.454	.510
CCL 80-120A	3.38	2.70	.75

SPECIFICATIONS

Voltage Ratings: CBO: 32 Volts DC
CCK: 130 Volts DC (1-100A)
72 Volts DC (120-200A)
48 Volts DC (225-300A)
CCL: 125 Volts DC

Interrupting Rating: CBO, CCK & CCL: 10,000A

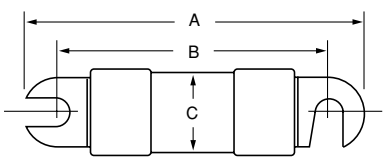
Ampere Range: 1 – 300 amperes

For operating characteristics contact factory

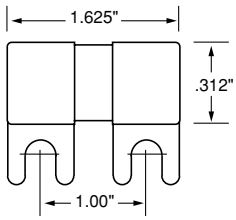
AMPERE RATINGS

CBO Fast-Acting	10	25	40	70	100
	12	30	50	75	125
	15	35	60	80	150
	20				
CCK Time-Delay	1	25	60	100	175
	2	30	70	120	200
	10	35	75	140	225
	15	40	80	150	250
	20	50	90	160	300
CCL Time-Delay	30	40	60	100	
	35	50	80	120	

Example part number (series & amperage): CCK 150



CCK/CCL



CBO

Cable Limiters

600 Volts AC

Littelfuse POWR-GARD™ Products

Special Purpose Fuses

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. Cable limiters are 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

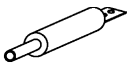
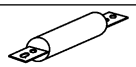
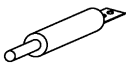
- Current-limiting characteristics provide protection to conductor insulation and reduce damage when faults occur.
- Properly applied cable limiters may permit the use of equipment with reduced withstand ratings
- Wide variety of terminations and cable ratings permit use in almost every situation.

SPECIFICATIONS

Voltage Rating: 600 volts AC
Interrupting Rating: 200,000 Amperes
Cable Size Range: 4/0 – 750MCM Copper or Aluminum
Minimum Operating Temperature: 80°C

ORDERING INFORMATION

LFCL	-	500	-	C	-	1
Littelfuse Cable Limiter		Conductor Size		Terminal Material (Aluminum or Copper)		Type of Termination

DESCRIPTION			CATALOG NUMBER	
			Cable Type	
Type	Termination	Cable Size	COPPER	ALUMINUM
1	 Cable to Cable	4/0 250MCM 350MCM 500MCM 750MCM	LFCL4/0C1 LFCL250C1 LFCL350C1 LFCL500C1 LFCL750C1	LFCL4/0A1 LFCL250A1 LFCL350A1 LFCL500A1 LFCL750A1
3	 Cable to Offset Bus	4/0 250MCM 350MCM 500MCM 750MCM	LFCL4/0C3 LFCL250C3 LFCL350C3 LFCL500C3 LFCL750C3	LFCL4/0A3 LFCL250A3 LFCL350A3 LFCL500A3 LFCL750A3
5	 Straight Bus to Offset Bus	4/0 250MCM 350MCM 500MCM 750MCM	LFCL4/0C5 LFCL250C5 LFCL350C5 LFCL500C5 LFCL750C5	
6	 Mole to Cable	4/0 250MCM 350MCM 500MCM 750MCM	LFCL4/0C6 LFCL250C6 LFCL350C6 LFCL500C6 LFCL750C6	LFCL4/0A6 LFCL250A6 LFCL350A6 LFCL500A6 LFCL750A6
8	 Mole to Offset Bus	4/0 250MCM 350MCM 500MCM 750MCM	LFCL4/0C8 LFCL250C8 LFCL350C8 LFCL500C8 LFCL750C8	

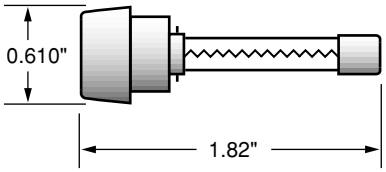
LGR/LMF In-Line Fuses
LHR Holder

Littelfuse
POWR-GARD™ Products

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 volts AC

Maximum Interrupting Rating: 10,000A

Approvals: Standard 248-14,
UL Listed (File No: E10480)
CSA Certified (File No: LR29862)

AMPERE RATINGS

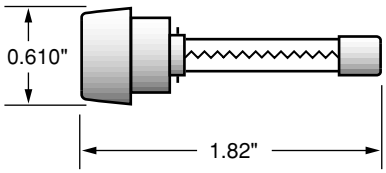
½	2	5	9
1	2½	6	10
1½	3	7	12
1⅘	4	8	15

Example part number (series & amperage): LGR 1-1/2

LMF Fuses

Time-Delay ■ 300 VAC

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



SPECIFICATIONS

Voltage Rating: 300 volts AC

Maximum Interrupting Rating: 10,000A

Approvals: Standard 248-14,
UL Listed (File No: E10480)
CSA Certified (File No: LR29862)

AMPERE RATINGS

⅜	⅝	1⅘	2⅝	4	7
½	1	2	3	5	8
⅝	1¼	2½	3⅜	6¼	10

Example part number (series & amperage): LMF 2-1/2

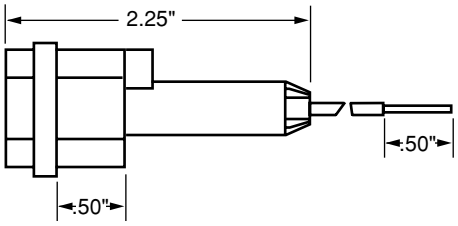
Special Purpose Fuses

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. On a 277 volt system, a fault occurring in an un-fused fixture could take out the entire branch circuit affecting up to 100 fixtures. This could cause safety problems as well as shut down operations.

By individually fusing fixtures, these problems will be avoided. The added benefits of this is the ability to quickly identify the problem fixture and reduce the repair time.

Fuse holders are rated up to 10 amperes at 300 volts and are equipped with 7" 18 AWG leads. Order part number LHR 000 for two leads, and part number LHR 001 for one lead and one terminal for insertion of 18 AWG ballast lead.



SPECIFICATIONS

Voltage Rating: 300 volts AC

Ampere Rating: LHR 000: 10A
LHR 001: 10A

Approvals: UL Recognized

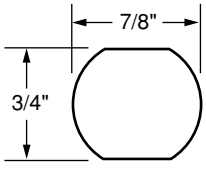
Flammability Rating: 94VO

Example part number: LHR 000

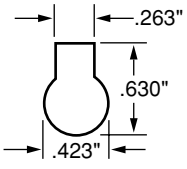
MOUNTING INFORMATION

LHR 001/LHR 000 will fit keyhole punch or .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 LHR OCA.

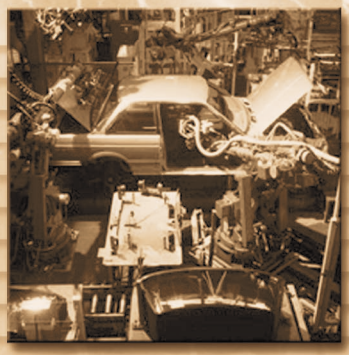


Knock-out Hole



Keyhole Punch

Blocks And Holders



FUSE BLOCK SELECTION

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

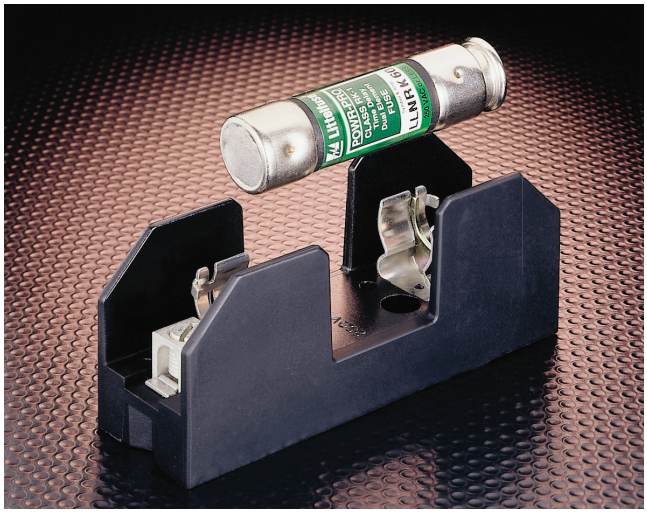
1. Determine the system voltage

Since fuses are selected on the basis of system voltage, fuse blocks are selected to match the voltage rating of the fuse.

2. Determine the design short-circuit current

Available and/or design short-circuit current is an important consideration when determining the class of fuse and fuse blocks to use. If available short-circuit current cannot be determined, or if it will vary with equipment location, select fuses with a 200,000 ampere interrupting rating (A.I.R.) and mating fuse blocks with a withstand rating of 200,000 amperes for maximum safety.

Class H fuse blocks will accept Class H or K5 fuses (which have an interrupting rating of up to 50,000 amperes) and Class R fuses (which have a 200,000 A.I.R.). To prevent the possibility of inserting a fuse with the incorrect interrupting rating, the use of Class R fuse blocks is recommended for use with Class R fuses. Use Class H fuse blocks with Class H or K5 fuses. These fuse blocks are dimensionally the same, but the Class R fuse blocks incorporate a rejection feature which allows only Class R fuses to be inserted.



3. Determine the type and ampere rating of the fuse to be used

In addition to voltage and interrupting rating, as discussed above, the fuse's ampere rating, opening characteristics (fast-acting or time-delay) and size are other important considerations in fuse selection. Once the fuse type is selected, the mating fuse block can be chosen. Fuse blocks are available in 30, 60, 100, 200, 400 and 600 amp ratings, and may be used with a fuse rated at the corresponding amperage rating or below. For example, a fuse block rated at 30 amperes may be used with a fuse rated from 0 to 30 amperes.

4. Determine if NEC, CSA, UL or other requirements are applicable

If fuse blocks will be installed in equipment to be submitted for agency approval, the requirements should be obtained from the approving agency in advance of fuse and fuse block selection.

5. Select the type of wire termination

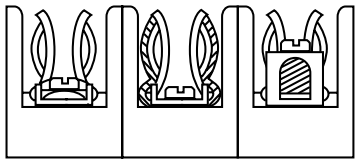
A choice of three types of wire termination is available:

a) Screw* — for use with spade lugs or ring terminals.

b) Screw with pressure plate* — for use with solid or stranded wire without terminal. Recommended where vibration will be a factor.

c) Box lug — the most durable. For use with all types of solid wire and Class B and Class C stranded wire. Not for use with welding cable or other rope-stranded conductors.

* 1/4" Quick connect terminals rated for up to 20A are available on the midget and Class CC fuse blocks.



Screw with Pressure Plate (P) | Screw (S) | Box Lug (C)

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. Whether to gang the fuse blocks into long strips will be determined by the available space and by the type of wire being used.

7. 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. Reinforced clips are standard on certain fuse blocks (see individual product pages).

Ordering information

The Littelfuse fuse block part number consists of 5 or 6 components, as shown below and in the individual fuse block data tables.

Blocks And Holders

ORDERING INFORMATION

For all Class R, H, J, T and 15, 20 & 60A Class G Fuse Blocks:

L	H	250	30	-1	S
Littelfuse	UL Class	Voltage	Amperage	Poles	Connector Type

For all Class CC, Midget and 30A Class G Fuse Blocks:

L	600	30	M	-2	P	Q
Littelfuse	Voltage	Amperage	UL Class	Poles	Connector Type	Quick Connect

Class H/K5 and R Fuse Blocks

250 and 600 Volt

Littelfuse POWR-GARD™ Products

SPECIFICATIONS

Voltage Rating: 250 Volts; 600 Volts

Ampere Ratings: 0 – 600 amperes

Approvals: UL Listed (File No. E14721)
CSA Certified (File No. LR73091)

RECOMMENDED FUSES

Class H Blocks		Class R Blocks	
250V	**600V**	**250V**	**600V**
NLN	NLS	FLNR	FLSR/FLSR_ID
RLN	RLS	KLNR	KLSR
		LLNRK	LLSRK/LLSRK_ID
		TLN	IDSR

Class H fuse blocks are for use with Class H/K5 fuses, which have an interrupting rating of up to 50,000 amperes. When higher interrupting ratings are required, use Class R fuses (200,000 A.I.R.) and Class R fuse blocks. Class R fuse blocks are dimensionally the same as Class H blocks, but incorporate a rejection feature which allows only Class R fuses to be inserted.

FEATURES/BENEFITS

Class H and Class R fuse blocks feature a one-piece fuse clip design for positive electrical contact and minimum heat rise. Side barriers provide isolation between poles. Bases on most blocks are of molded phenolic or thermoplastic, UL rated at 150° C.

Class H 250V

Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)			Maximum Wire Size
			Screw	Pressure Plate	Box Lug	
30	1 2 3	LH25030-1 LH25030-2 LH25030-3	S (R) S (R) S (R)	P (R) P (R) P (R)	C (R) C (R) C (R)	S & P = #10 CU C = #6 CU-AL
60	1 2 3	LH25060-1 LH25060-2 LH25060-3	S (R) S (R) S (R)		C (R) C (R) C (R)	S = #10 CU C = #2 CU-AL
100	1 2 3	LH25100-1 LH25100-2 LH25100-3			C C C	#2/0 CU-AL
200	1 3	LH25200-1 LH25200-3			C C	250 MCM CU-AL
400	1 3	LH25400-1 LH25400-3			CR CR	(2) 350 MCM CU-AL
600	1 3	LH25600-1 LH25600-3			C C	(2) 500 MCM CU-AL

Note: Reinforcing springs standard on all Class H fuse blocks 100 amperes and above.

Class H 600V

Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)			Maximum Wire Size
			Screw	Pressure Plate	Box Lug	
30	1 2 3	LH60030-1 LH60030-2 LH60030-3	S (R) S (R) S (R)	P (R) P (R) P (R)	C (R) C (R) C (R)	S & P = #10 CU C = #6 CU-AL
60	1 2 3	LH60060-1 LH60060-2 LH60060-3			C (R) C (R) C (R)	S = #10 CU C = #2 CU-AL
100	1 2 3	LH60100-1 LH60100-2 LH60100-3			C C C	#2/0 CU-AL
200	1 3	LH60200-1 LH60200-3			C C	250 MCM CU-AL
400	1 3	LH60400-1 LH60400-3			CR CR	(2) 350 MCM CU-AL
600	1 3	LH60600-1 LH60600-3			C C	(2) 500 MCM CU-AL

Note: Reinforcing springs standard on all Class H fuse blocks 100 amperes and above.

Class R 250V

Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)			Maximum Wire Size
			Screw	Pressure Plate	Box Lug	
30	1 2 3	LR25030-1 LR25030-2 LR25030-3	SR SR SR	PR PR PR	CR CR CR	S & P = #10 CU C = #6 CU-AL
60	1 2 3	LR25060-1 LR25060-2 LR25060-3			CR CR CR	S = #10 CU C = #2 CU-AL
100	1 2 3	LR25100-1 LR25100-2 LR25100-3			C C C	#2/0 CU-AL
200	1 3	LR25200-1 LR25200-3			C C	250 MCM CU-AL
400	1 3	LR25400-1 LR25400-3			CR CR	(2) 350 MCM CU-AL
600	1 3	LR25600-1 LR25600-3			C C	(2) 500 MCM CU-AL

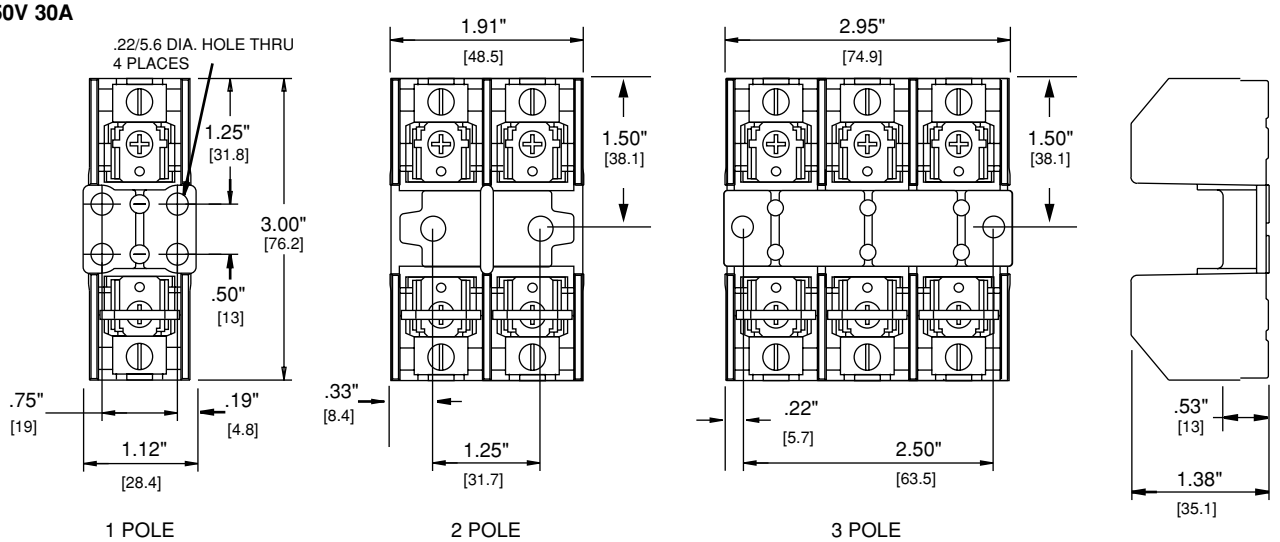
Note: Reinforcing springs standard on all Class R fuse blocks.

Class R 600V

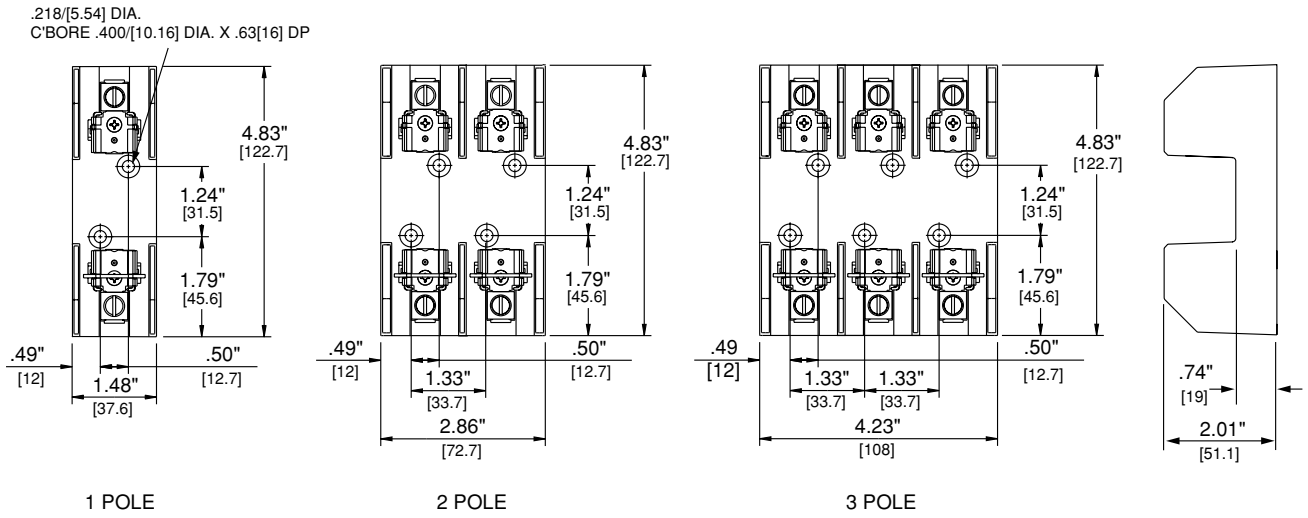
Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)			Maximum Wire Size
			Screw	Pressure Plate	Box Lug	
30	1 2 3	LR60030-1 LR60030-2 LR60030-3	SR SR SR	PR PR PR	CR CR CR	S & P = #10 CU C = #6 CU-AL
60	1 2 3	LR60060-1 LR60060-2 LR60060-3			CR CR CR	S = #10 CU C = #2 CU-AL
100	1 2 3	LR60100-1 LR60100-2 LR60100-3			C C C	#2/0 CU-AL
200	1 3	LR60200-1 LR60200-3			C C	250 MCM CU-AL
400	1 3	LR60400-1 LR60400-3			CR CR	(2) 350 MCM CU-AL
600	1 3	LR60600-1 LR60600-3			C C	(2) 500 MCM CU-AL

Note: Reinforcing springs standard on all Class R fuse blocks.

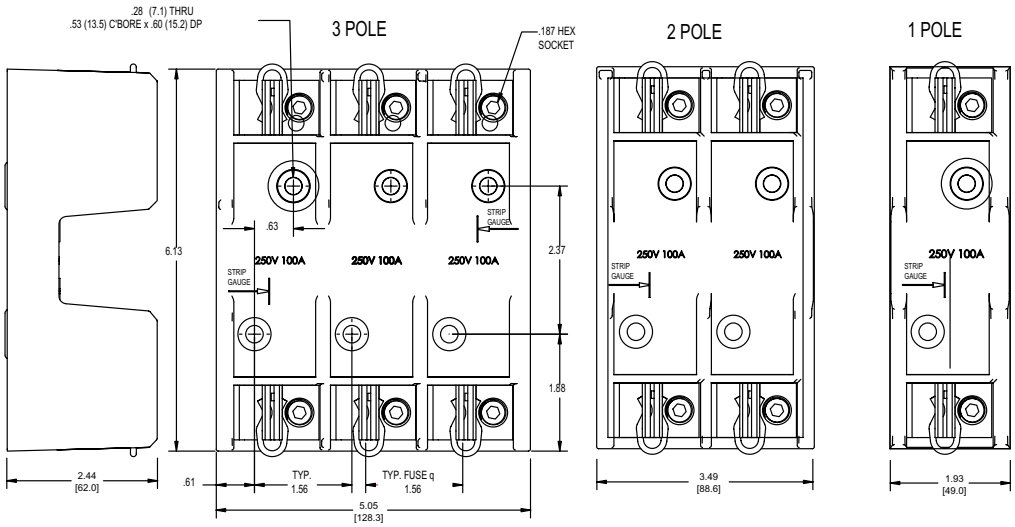
250V 30A



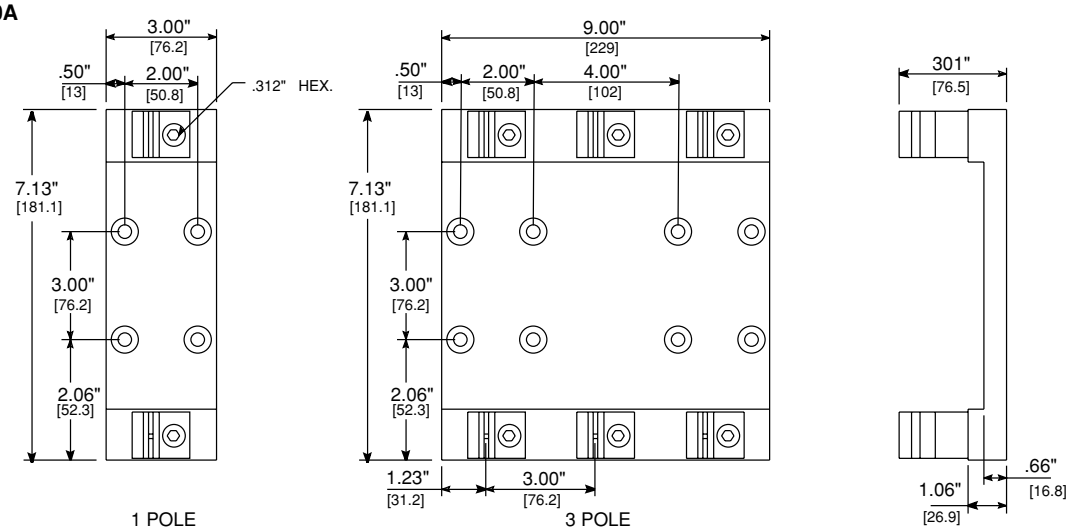
250V 60A



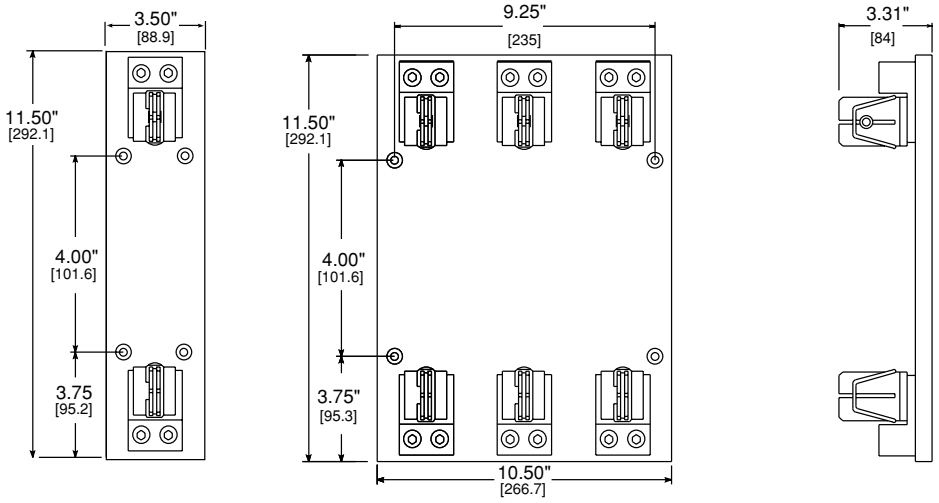
250V 100A



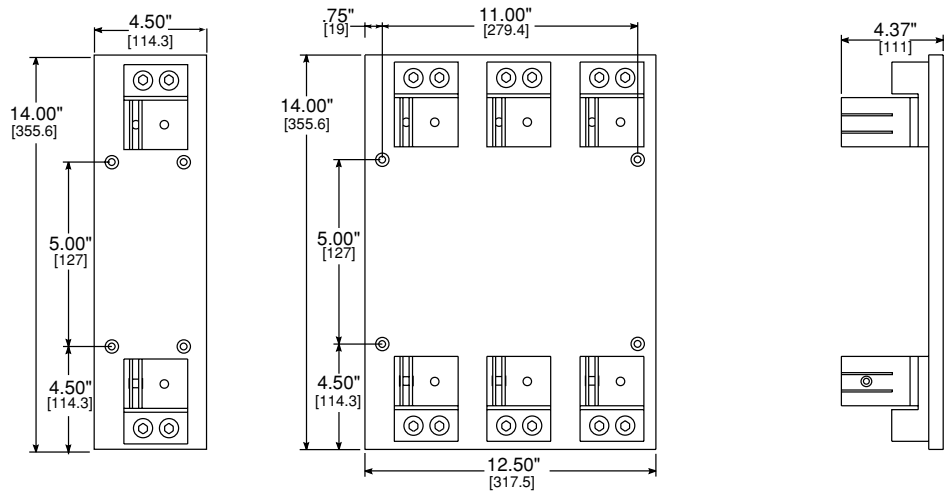
250V 200A



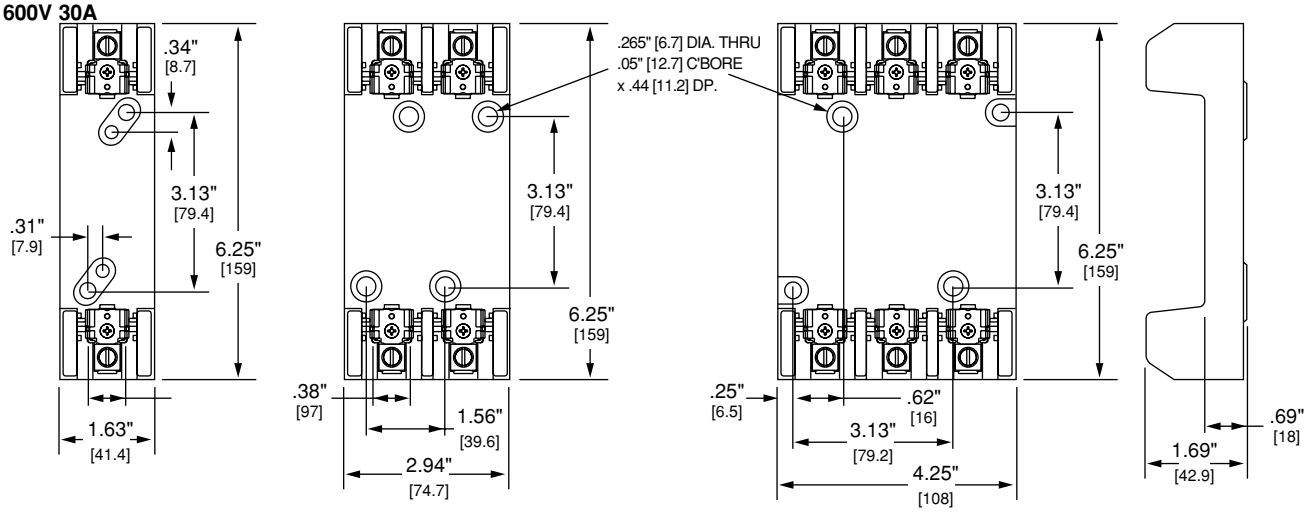
250V 400A



250V 600A

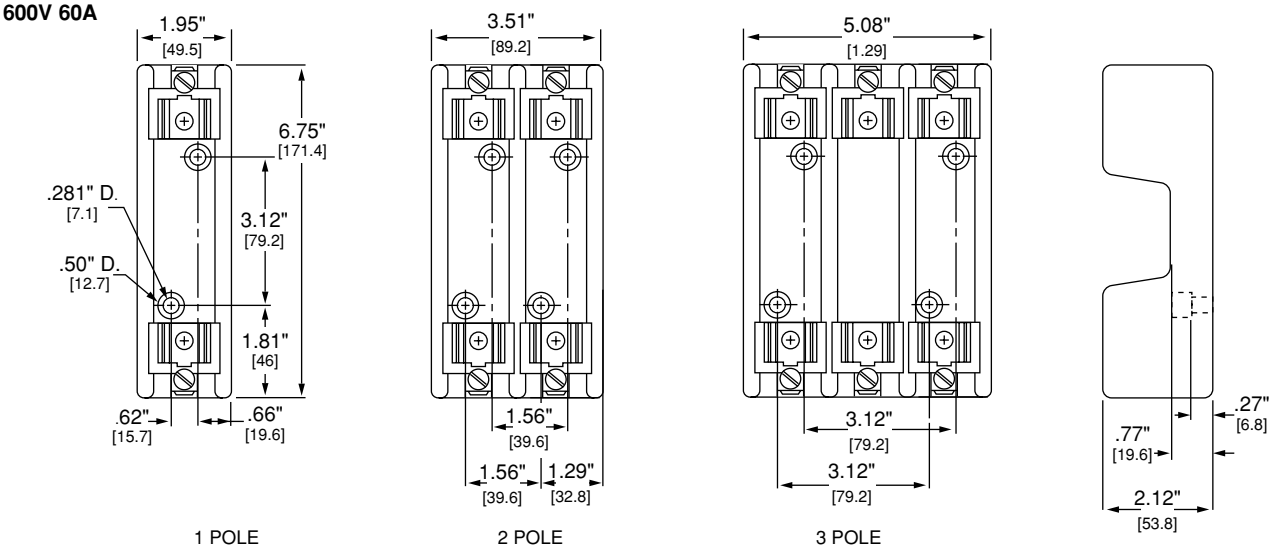


600V 30A



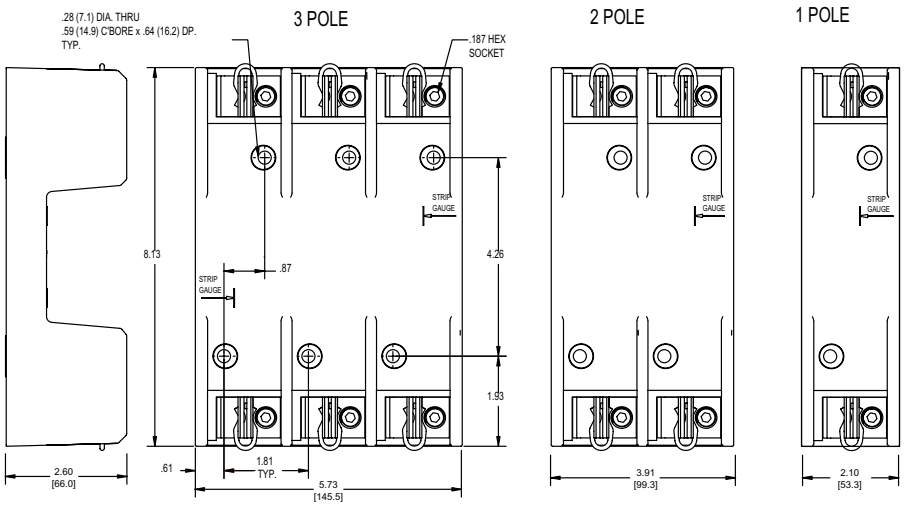
1 POLE 2 POLE 3 POLE

600V 60A

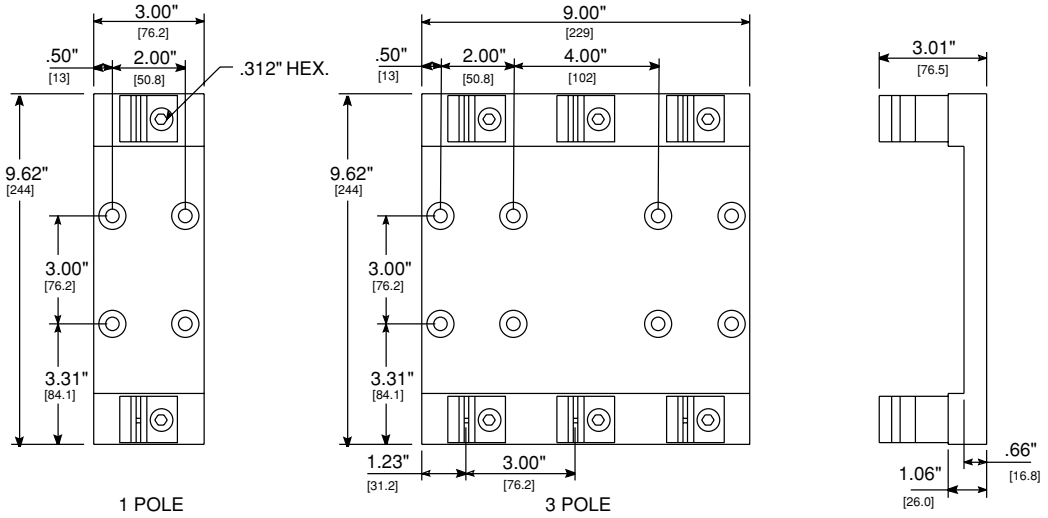


1 POLE 2 POLE 3 POLE

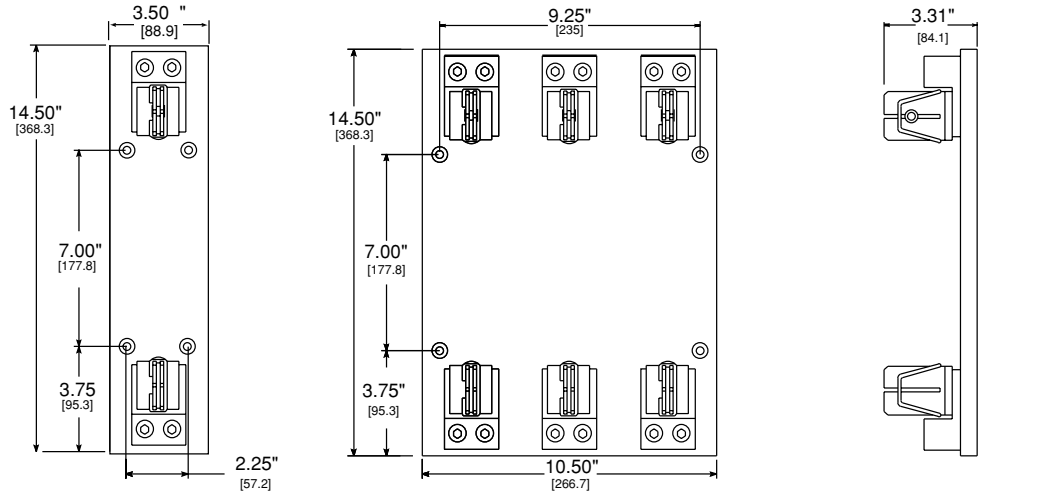
600V 100A



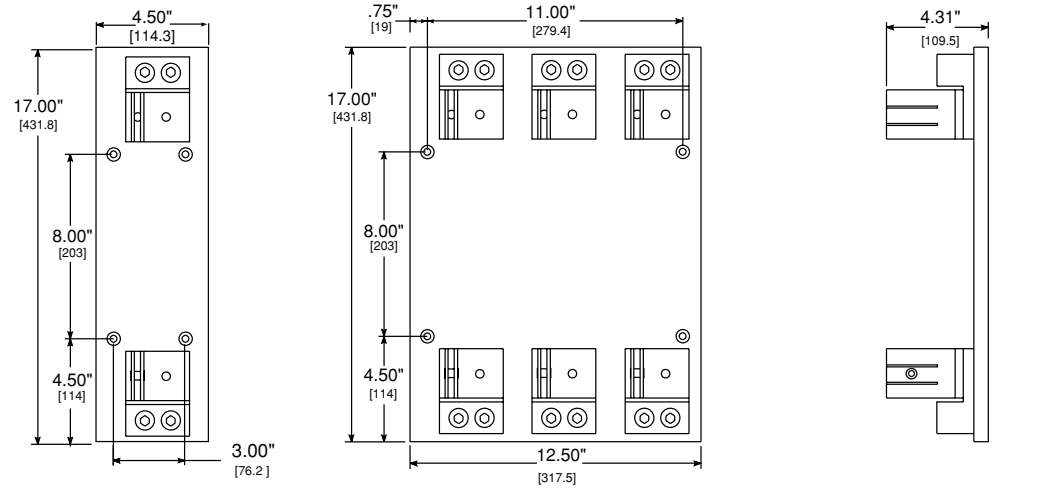
600V 200A



600V 400A



600V 600A



Class J Fuse Blocks

600 Volt

Littelfuse POWR-GARD™ Products

FEATURES/BENEFITS

- Phenolic blocks have side barriers for isolation.
- Spring reinforced fuse clips are standard on 100A and larger blocks. Reinforcing springs are optional on 30 and 60 amp blocks.
- **Space saving 30A design —** Up to 45% smaller than existing 30 A fuse blocks. 30A interlocking adder block available to create any number of poles (consult factory for availability). Integral DIN rail mount allows this block to be securely fastened to 35 mm "hat" type DIN rails without the use of tools.

SPECIFICATIONS

Voltage Ratings: 600 Volts

Ampere Ratings: 0 – 600 amperes

Approvals: UL Listed: File No. E14721
CSA Certified: File No. LR73091

RECOMMENDED FUSES

JTD_ID/JTD (time-delay) and JLS (fast-acting) series fuses

For use with space-saving, high interrupting capacity, very current-limiting 600 volt Class J fuses.

Class J 600V

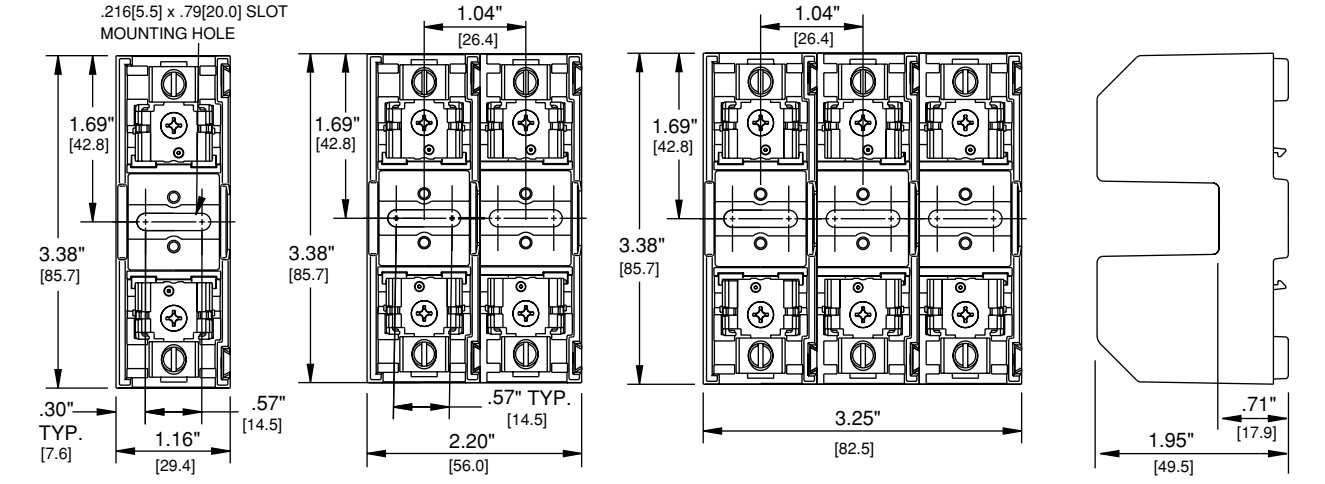
Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)			Maximum Wire Size
			Screw	Pressure Plate	Box Lug	
30	1	LJ60030-1	S (R)	P (R)	C (R)	S & P = #10 CU C = #6 CU
	2	LJ60030-2	S (R)	P (R)	C (R)	
	3	LJ60030-3	S (R)	P (R)	C (R)	
	Adder	LJ60030-A	S (R)	P (R)	C (R)	
60	1	LJ60060-1			C (R)	C = #2 CU-AL
	2	LJ60060-2			C (R)	
	3	LJ60060-3			C (R)	
100	1	LJ60100-1			CR	#2/0 CU-AL
	3	LJ60100-3			CR	
200	1	LJ60200-1			C	250 MCM CU-AL
	3	LJ60200-3			C	
400	1	LJ60400-1			CR	350 MCM CU-AL
	3	LJ60400-3			CR	
600	1	LJ60600-1			CR	(2) 500 MCM CU-AL
	3	LJ60600-3			CR	

Note: Reinforcing springs standard on all Class J fuse blocks rated 100A and above.

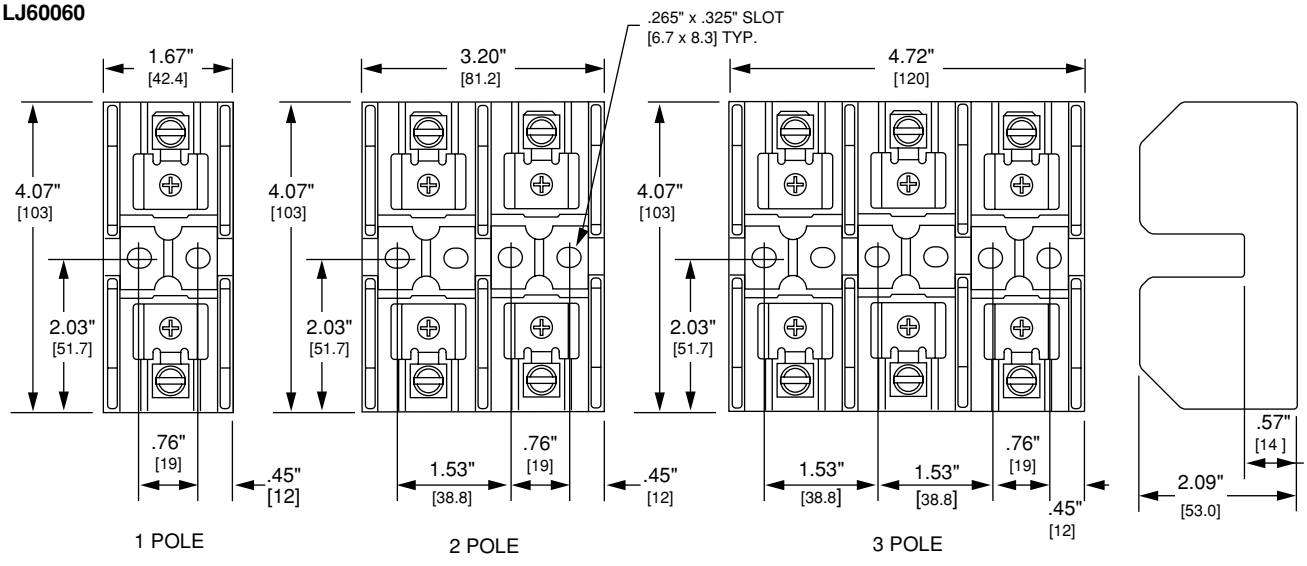
*For optional fuse block covers, refer to Blocks and Holders section.

Blocks And Holders

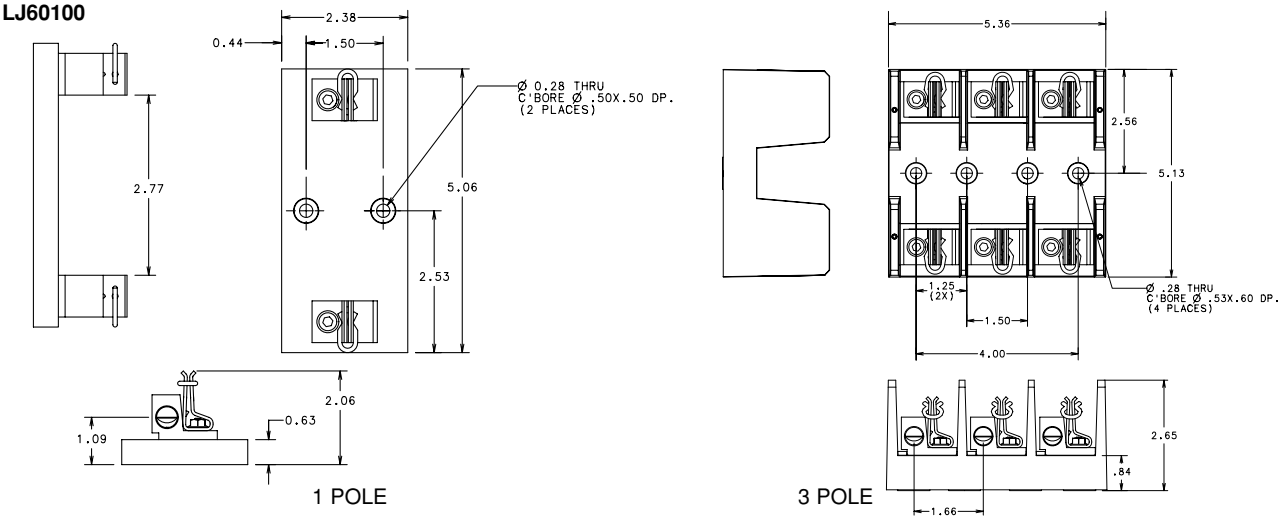
LJ60030



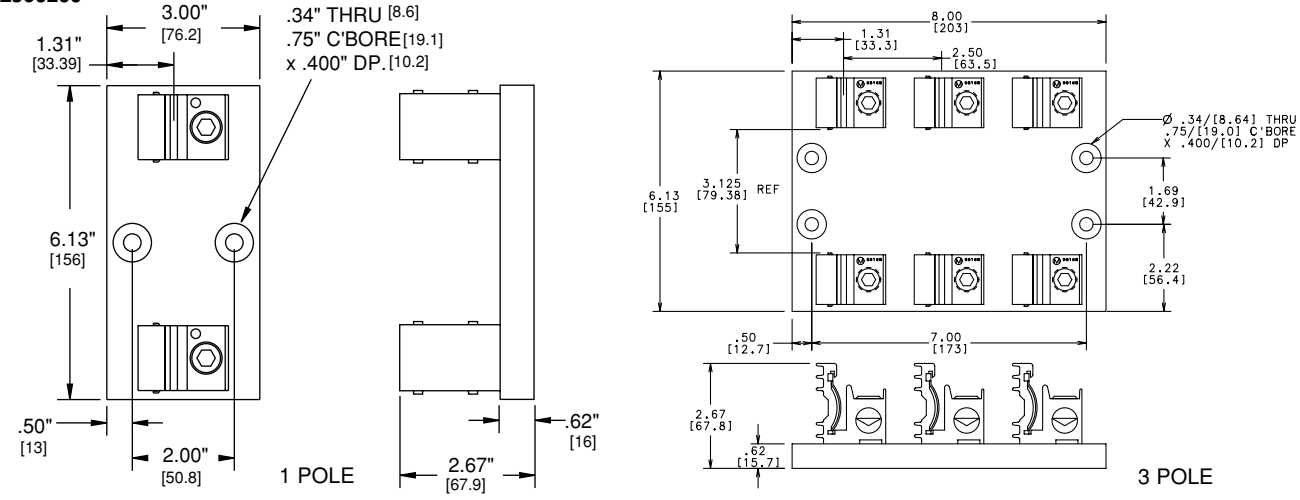
LJ60060



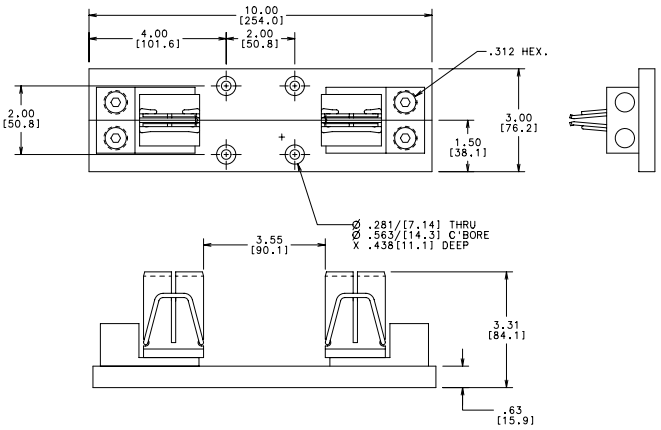
LJ60100



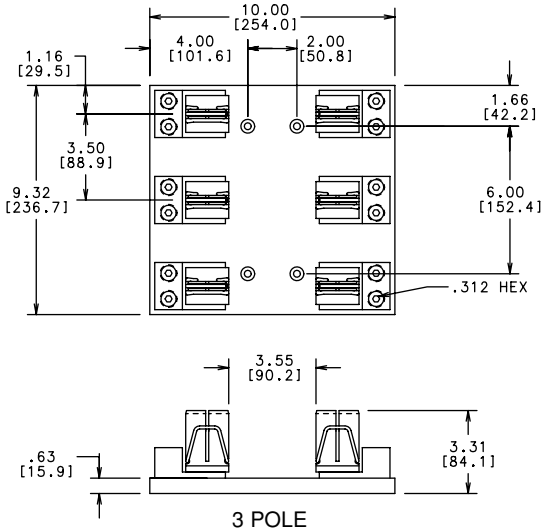
LJ60200



LJ60400

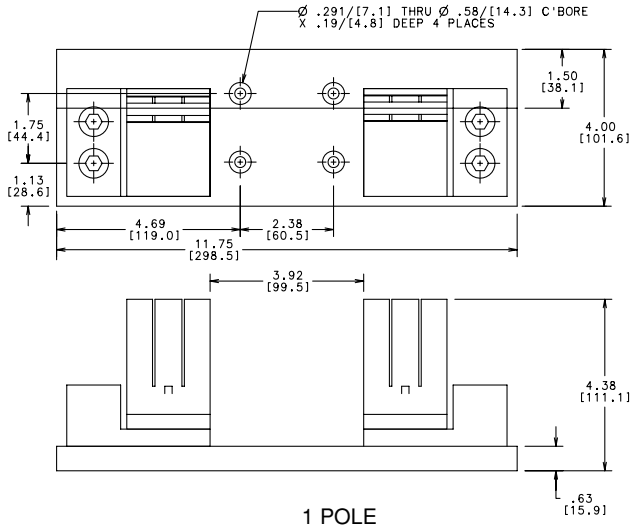


1 POLE

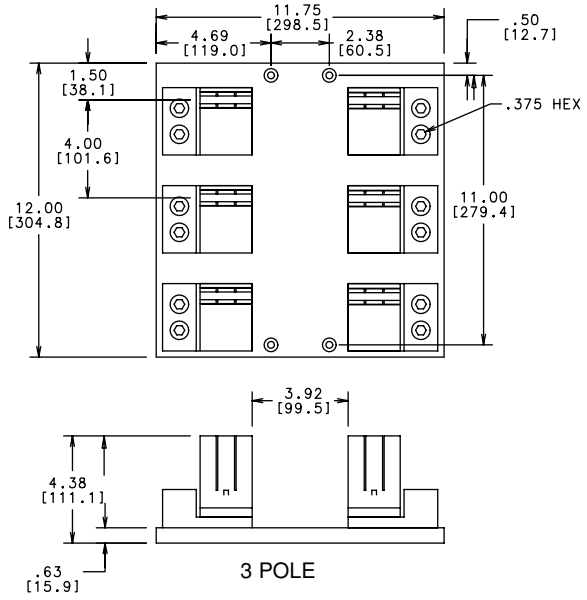


3 POLE

LJ60600



1 POLE



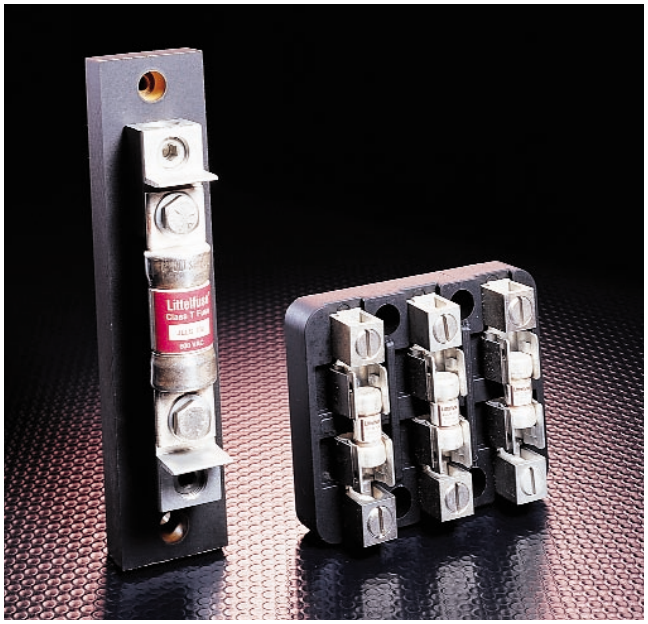
3 POLE

Blocks And Holders

Class T Fuse Blocks

300 and 600 Volt

Littelfuse POWR-GARD™ Products



SPECIFICATIONS

Voltage Ratings: 300 Volts AC
600 Volts AC

Ampere Ratings: 0 – 600 amperes

Approvals: UL Listed (File No. E14721)
CSA Certified (File No. LR73091)

RECOMMENDED FUSES

JLLN (300V) and JLLS (600V) series fuses

300 and 600 volt fuse blocks are designed for use with miniaturized Class T fuses. Class T fuses are very fast-acting, current limiting, and approximately one-third the size of electrically-comparable Class RK1 fuses.

FEATURES/BENEFITS

Bases are molded phenolic. To provide a low resistance connection and long-range reliability, steel reinforcing springs are supplied as standard. Larger blocks employ an integral heat sink for maximum heat dissipation.

Class T 300V

Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)		Maximum Wire Size
			Screw	Box Lug	
30	2 3	LT30030-2 LT30030-3		CR CR	S = #10 CU C = #2 CU
60	2 3 4	LT30060-2 LT30060-3 LT30060-4		CR CR CR	C = #2 CU-AL
100	1 2 3	LT30100-1 LT30100-2 LT30100-3		C C C	#2/0 CU-AL
200	1	LT30200-1		C	250 MCM CU-AL
400	1	LT30400-1		C	(2) 250 MCM CU-AL
600	1	LT30600-1		C	(2) 500 MCM CU-AL

Note: Reinforcing springs standard on all 300 volt Class T fuse blocks up to 100 amperes. 300 volt Class T blocks 200 amperes and larger have stud mountings.

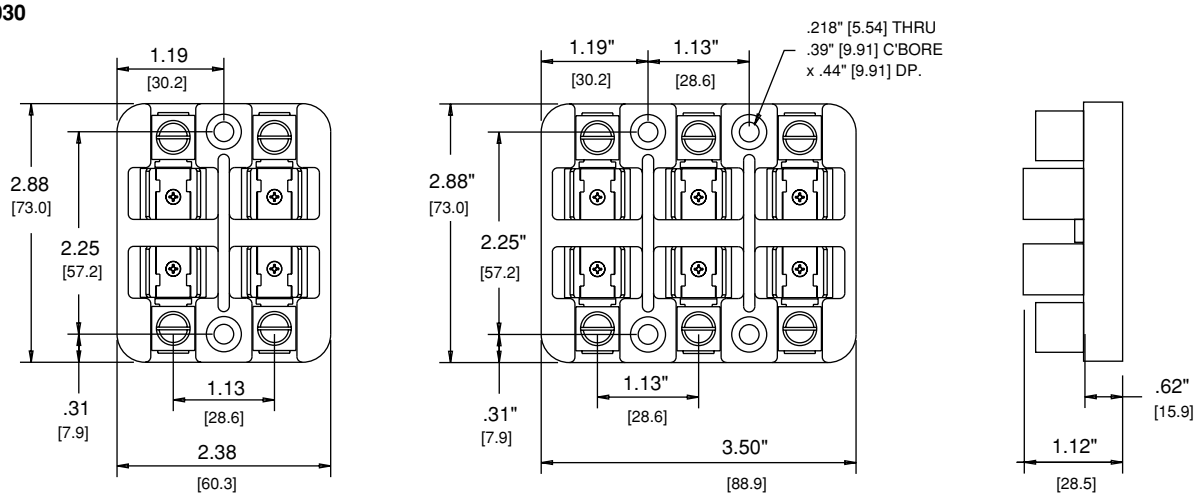
Class T 600V

Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)		Maximum Wire Size
			Screw	Box Lug	
30	1 2 3	LT60030-1 LT60030-2 LT60030-3	SR SR SR	CR CR CR	S = #10 CU C = #2 CU-AL
60	1 2 3	LT60060-1 LT60060-2 LT60060-3		CR CR CR	C = #2 CU-AL
100	1 2 3	LT60100-1 LT60100-2 LT60100-3		C C C	#2/0 CU-AL
200	1	LT60200-1		C	250 MCM CU-AL
400	1	LT60400-1		C	(2) 250 MCM CU-AL
600	1	LT60600-1		C	(2) 500 MCM CU-AL

Note: Reinforcing springs standard on all 600 volt Class T fuse blocks up to 60 amperes. 600 volt Class T blocks 100 amperes and larger have stud mountings.

Blocks And Holders

LT30030

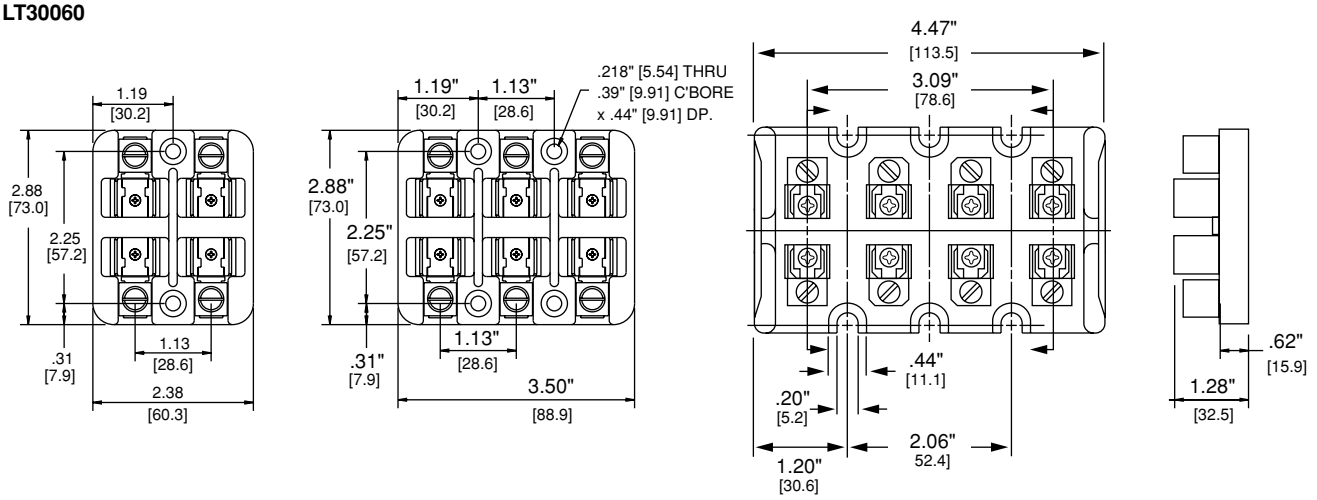


Class T Fuse Blocks

300 Volt

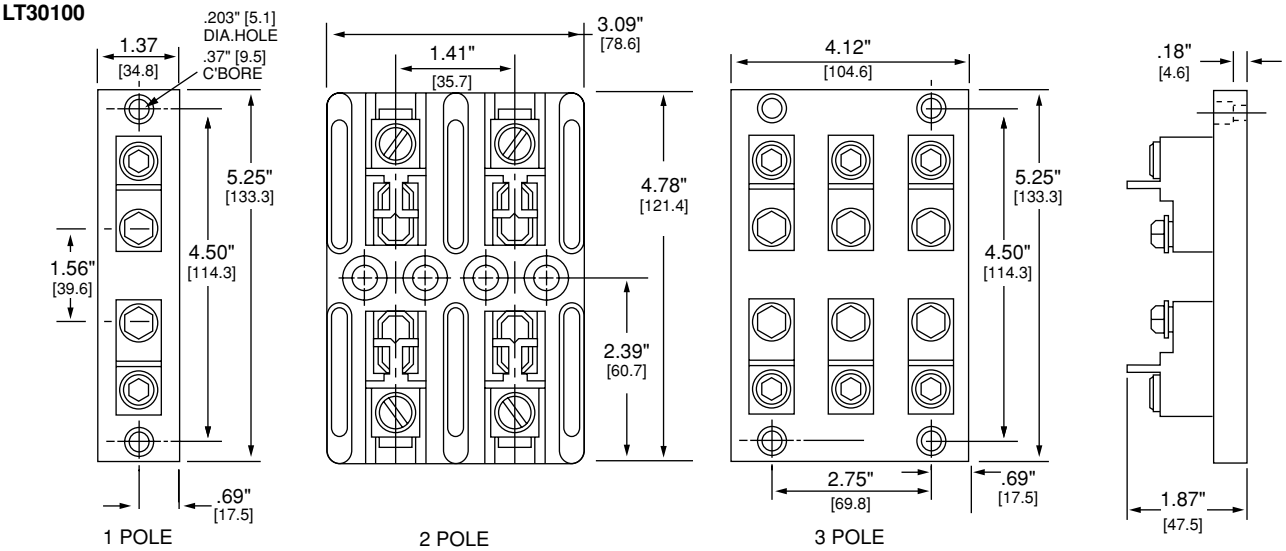
Littelfuse
POWR-GARD™ Products

LT30060



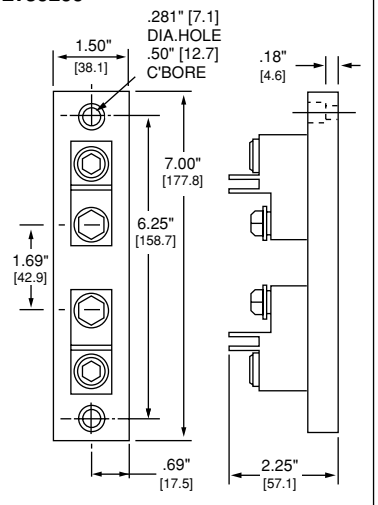
2 POLE 3 POLE 4 POLE

LT30100



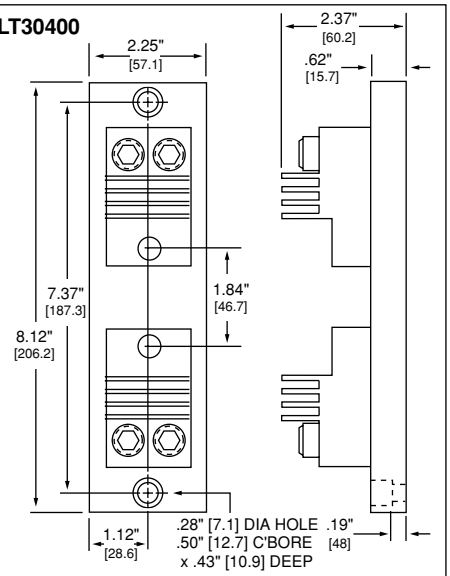
1 POLE 2 POLE 3 POLE

LT30200



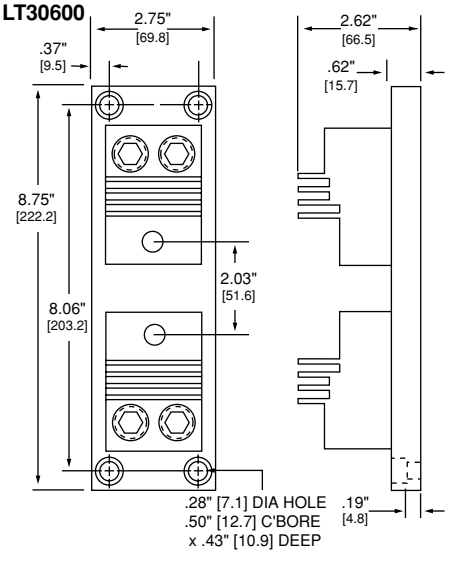
1 POLE

LT30400



1 POLE

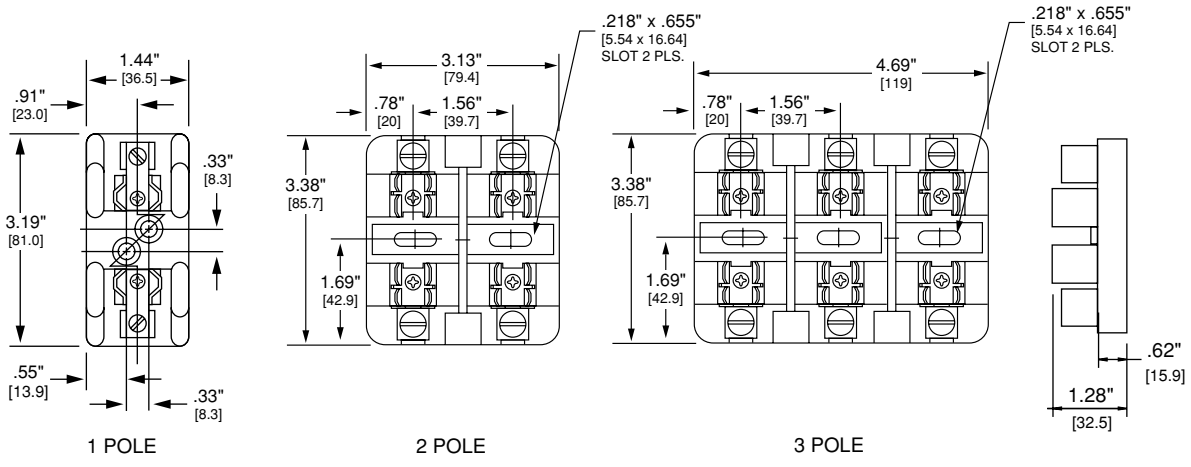
LT30600



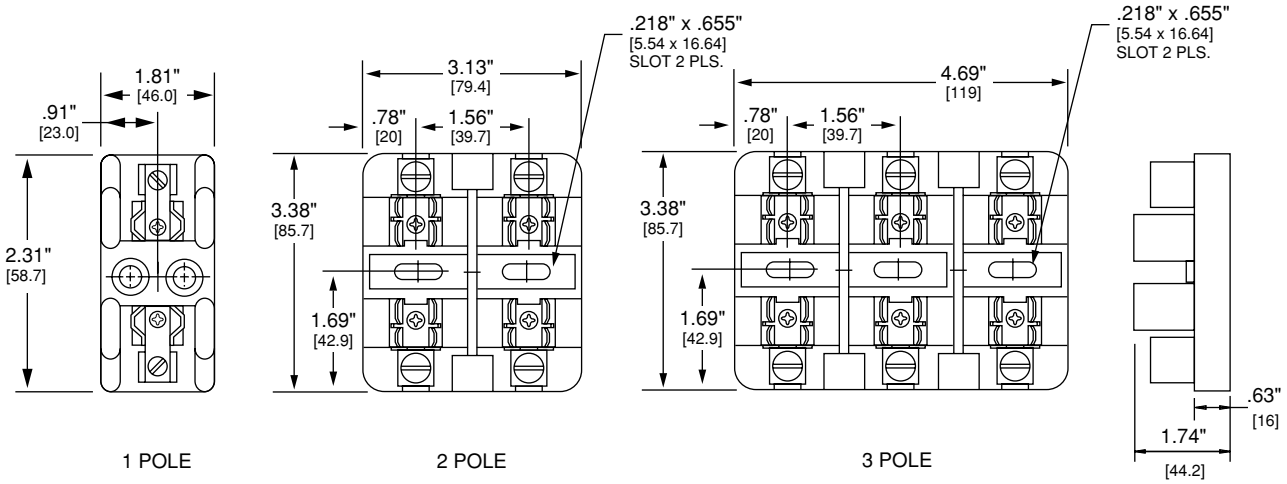
1 POLE

Blocks And Holders

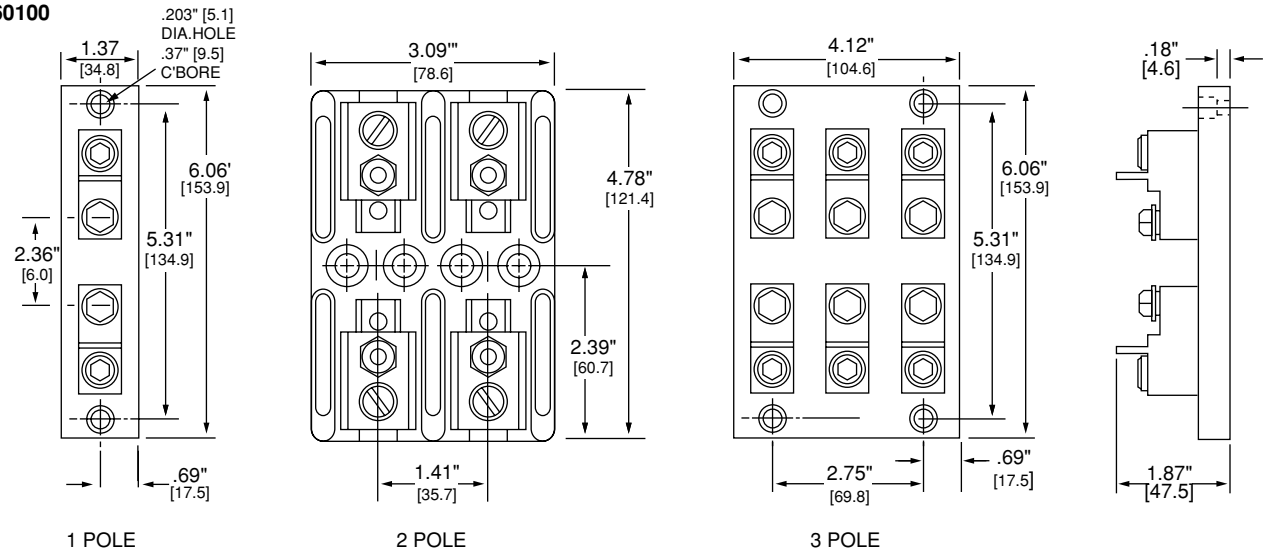
LT60030



LT60060

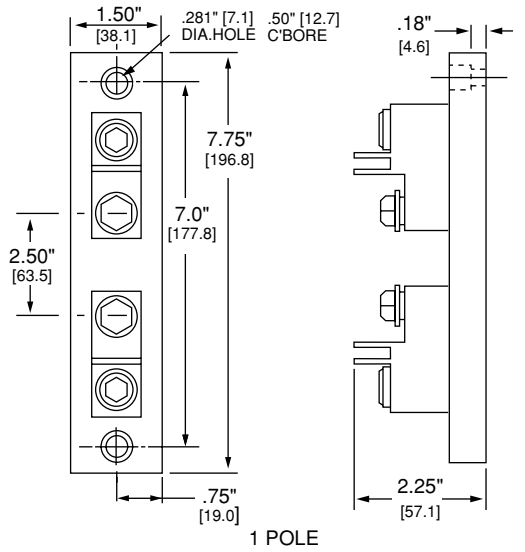


LT60100

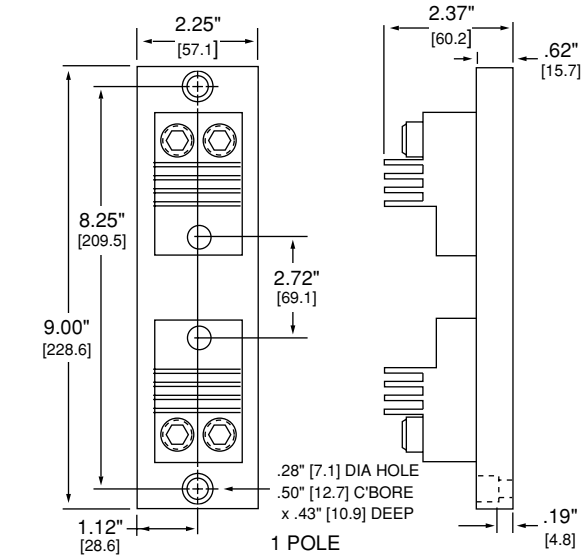


Blocks And Holders

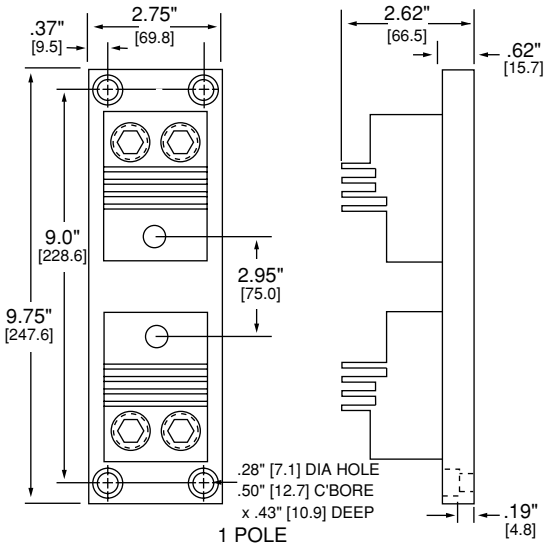
LT60200



LT60400



LT60600



Blocks And Holders

Class G Fuse Blocks

Class G fuse blocks are designed for use with 480 volt time-delay, current-limiting Class G fuses. They meet requirements for branch circuit protection.

SPECIFICATIONS

Voltage Ratings: 600 Volts AC (0 – 20A)
480 Volts AC (25 – 60A)

Ampere Ratings: 0 – 60 amperes

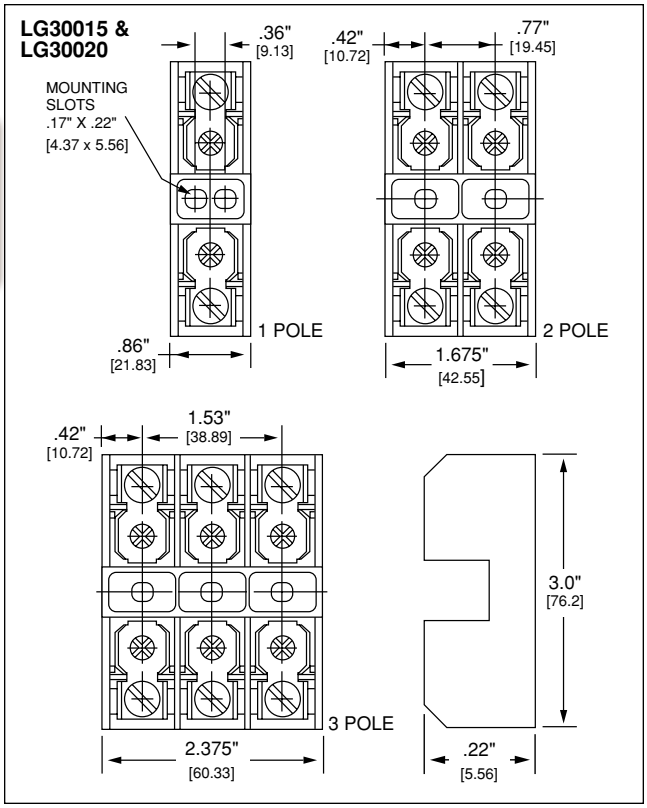
Approvals: UL Listed: 15, 20 & 30A (File No. E14721)
60A (File No. E14853)
CSA Certified: 15, 20 & 30A (File No. LR7316)
60A (File No. LR47235)

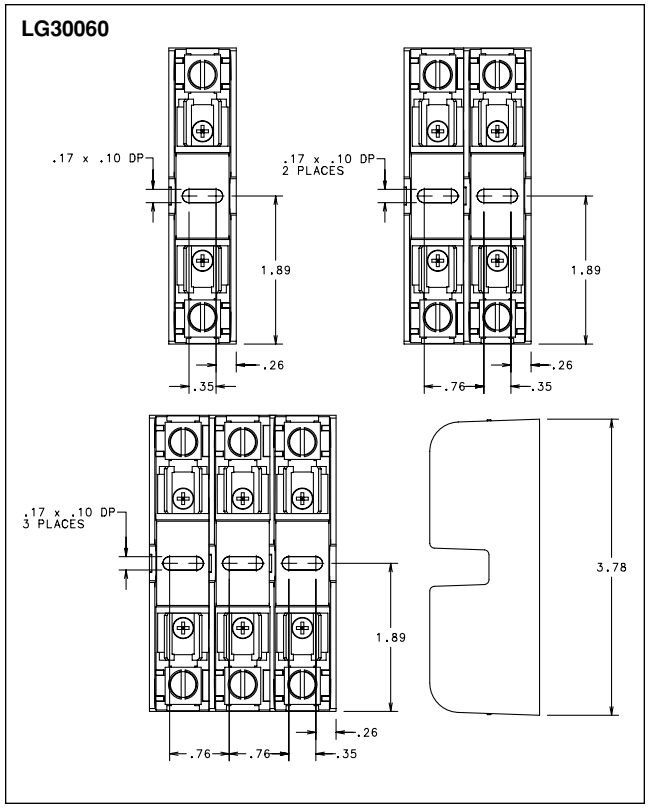
RECOMMENDED FUSES

SLC series fuses

Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)			Maximum Wire Size
			Screw	Pressure Plate	Box Lug	
15*	1 2 3	LG30015-1 LG30015-2 LG30015-3	SQ SQ SQ			#10 CU
20*	1 2 3	LG30020-1 LG30020-2 LG30020-3	SQ SQ SQ			#10 CU
30*	1 2 3	L30030G-1 L30030G-2 L30030G-3	SQ SQ SQ	PQ PQ PQ		#10 CU
60	1 2 3	LG30060-1 LG30060-2 LG30060-3			CR CR CR	#2 CU-AL

* Note: 15, 20 & 30A Class G fuse blocks are equipped with 20A Quick Connect Terminals. 60A fuse block equipped with reinforcing spring as standard.





Note: Refer to the Midget/Class CC Fuse Blocks for L30030G 30A Class G Block dimensions.

Blocks And Holders

Class CC/CD and Midget Fuse Blocks

600 Volt

Littelfuse
POWR-GARD™ Products

SPECIFICATIONS

Voltage Rating: 600 Volt

Ampere ratings: L60030C: 30 amps
L60030M: 30 amps
L60060C: 60 amps

Dielectric strength: 1200 volts minimum

Clip/terminals: Tin-plated copper alloy

Box lug: Copper

Screw and captive pressure plate: Zinc-plated steel

Base: Thermoplastic. UL 94VO flammability rating.

Approvals: Class CC: UL Listed (File No. E14721)
Midget: UL Recognized (File No. E14721)
Class CC/Midget: CSA Certified
(File No. LR7316)

RECOMMENDED FUSES

Class CC Blocks
KLDR
KLKR
CCMR

Midget Blocks
BLF FLM
BLN FLQ
BLS KLK
FLA KLKD
KLQ

Class CD Blocks
CCMR

Space-saving 600 volt, 30 amp molded-case fuse blocks 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.

SAFETY

- **Rejection feature —** Class CC fuse blocks have a rejection feature which 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 amperes. Note that Class CC fuses may be used in Midget fuse blocks, but Midget fuses cannot be used in Class CC blocks.

LONG LIFE

- **High-strength materials —** Class CC and Midget fuse blocks are molded of high-strength, high-temperature material to minimize block breakage during handling and installation, as well as damage due to heat.
- **Reduced resistance, less heat —** High conductivity, one-piece copper alloy fuse clips have lower resistance than traditional two-piece brass or phosphor bronze fuse clips . . . minimizes heat rise and watts loss within the fuse block.

REDUCED INVENTORY

- **Gangable —** Interlocking fuse blocks allow ganging to produce a fuse block with any number of poles.
- **Flexible terminal arrangements —** 30A Class CC and Midget fuse blocks are available with type C box lug, type SQ screw, or type PQ pressure plate terminals. Type SQ terminals have binding-head screws, while type PQ terminals have captive pressure plates. Both terminal types can accommodate side- or top-mounted quick-connect terminals. This flexibility allows the accommodation of most needs and reduces part inventory requirements.

  60A CC fuse blocks are available with type C box lug terminals.
- **DIN rail mountable —** FBDIN1 adapters permit snap-mounting Littelfuse Class CC and Midget 30 amp fuse blocks directly to standard or low profile 35mm symmetrical "hat" and 32mm asymmetrical DIN rails. Patented DIN rail adapters snap securely to Littelfuse fuse blocks and to DIN rails without tools. They can be readily removed from rails by lifting the disconnect tab.

  L60060C 60A fuse blocks have patented integral DIN rail adapters which allow direct mounting to 35mm "hat" type DIN rails.

Class CC and Midget Fuse Blocks

600 Volt

Littelfuse POWR-GARD™ Products

Class CC 30A Fuse Blocks

Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)	Maximum Wire Size
30	1 2 3	L60030C-1C L60030C-2C L60030C-3C	Box Lug	#6 CU
30	1 2 3	L60030C-1PQ L60030C-2PQ L60030C-3PQ	Pressure Plate/ Q. C. Terminal	#10 CU
30	1 2 3	L60030C-1SQ L60030C-2SQ L60030C-3SQ	Screw/ Q. C. Terminal	#10 CU

Note: Quick Connect Terminals are rated at 20 amperes.

Class CD 60A Fuse Blocks

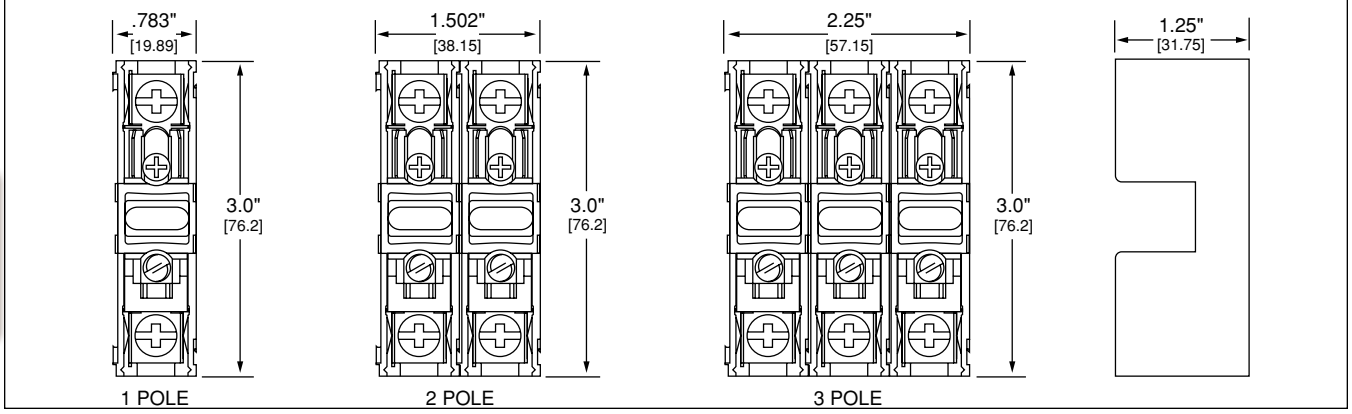
Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)	Maximum Wire Size
60	1 2 3	L60060C-1C L60060C-2C L60060C-3C	Box Lug	#6 CU
60	Adder Block	L60060C-AC	Box Lug	#6 CU

Midget Fuse Blocks

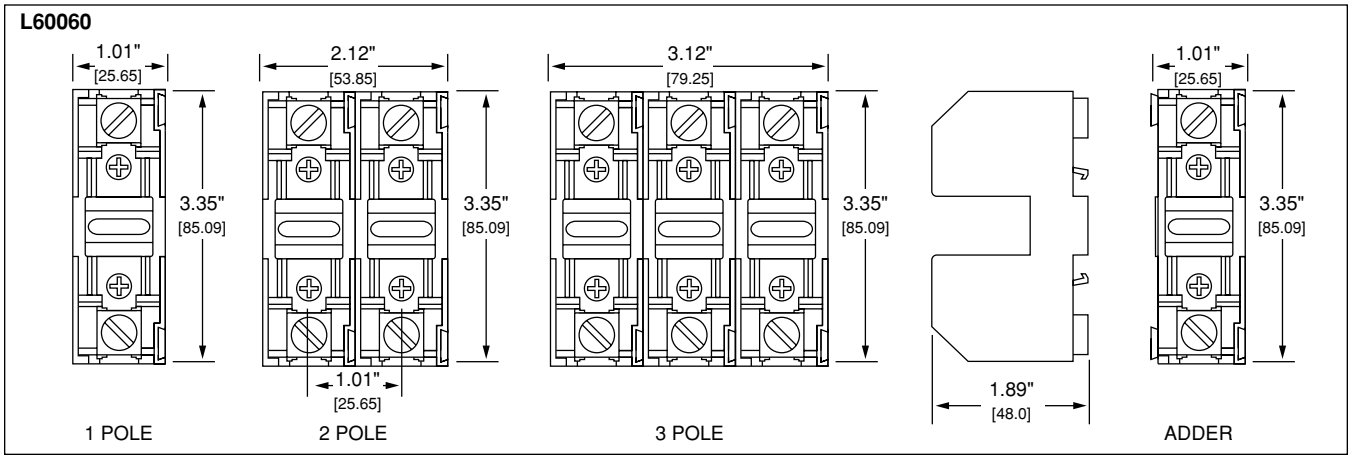
Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)	Maximum Wire Size
30	1 2 3	L60030M-1C L60030M-2C L60030M-3C	Box Lug	#6 CU
30	1 2 3	L60030M-1PQ L60030M-2PQ L60030M-3PQ	Pressure Plate/ Q. C. Terminal	#10 CU
30	1 2 3	L60030M-1SQ L60030M-2SQ L60030M-3SQ	Screw/ Q. C. Terminal	#10 CU

Note: Quick Connect Terminals are rated at 20 amperes.

L60030



L60060

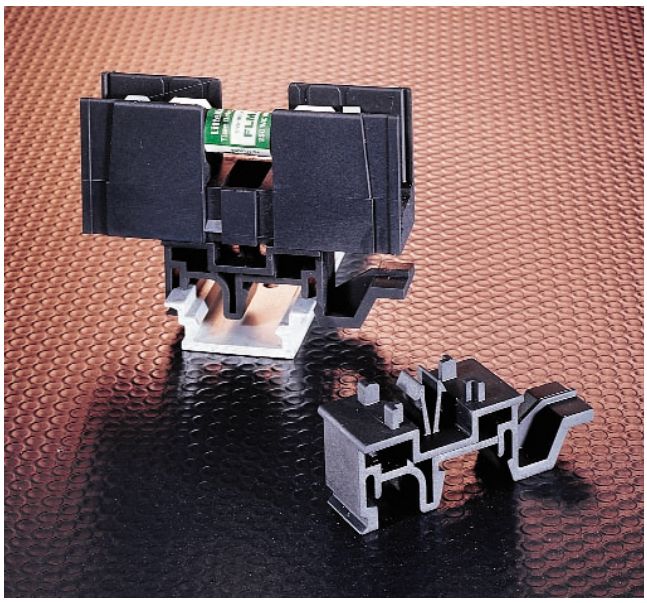


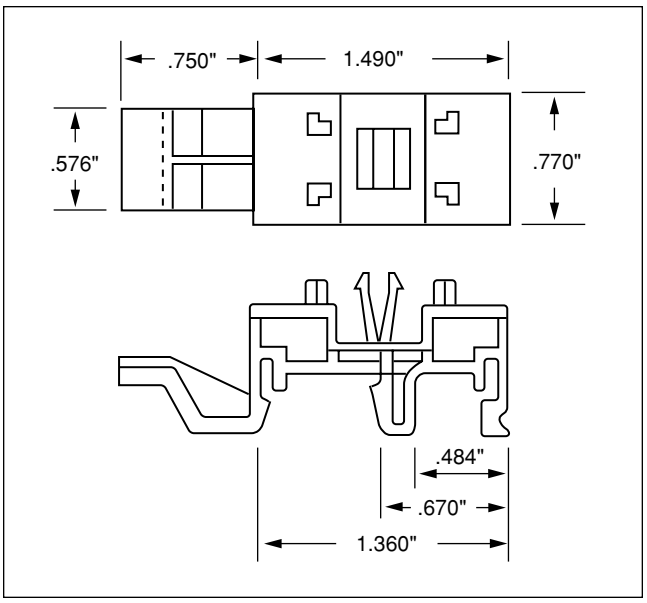
Dimensions for reference only.

Class CC and Midget Fuse Block Accessories

DIN Rail Adapters and Cover Pullers

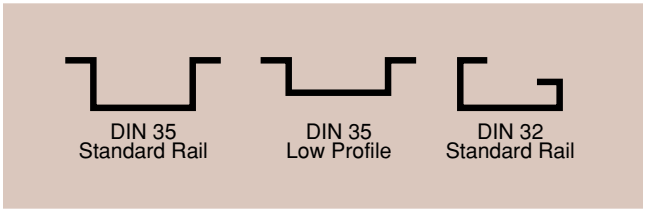
Littelfuse POWR-GARD™ Products

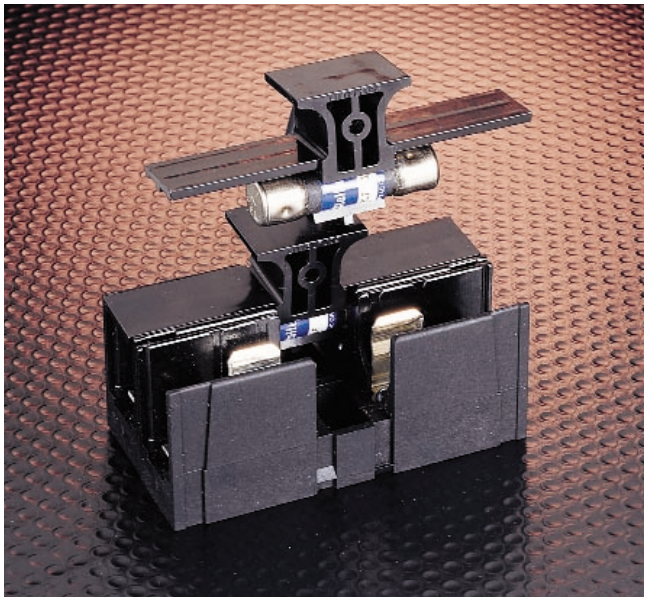


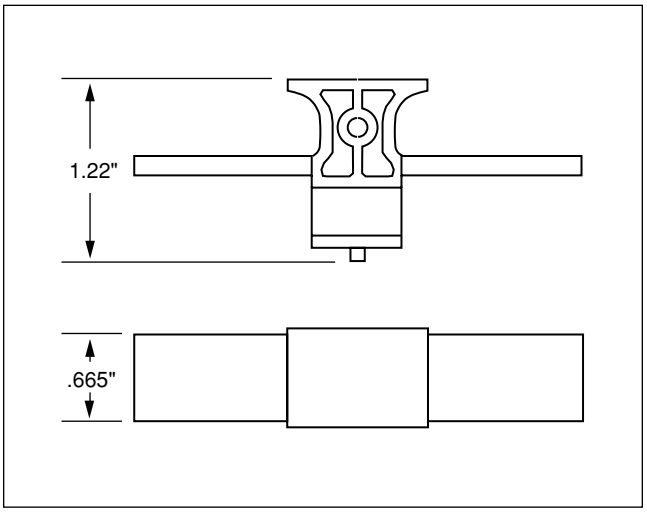


DIN Rail Adapter — FBDIN1

FBDIN1 is for use with 30A Midget, Class CC and Class G fuse blocks. The patented design permits snap-mounting of Littelfuse Class CC and Midget 30A fuse blocks directly to standard and low profile 35mm symmetrical “hat” and 32mm asymmetrical DIN rails. Adapters snap securely to Littelfuse fuse blocks and to DIN rails without tools. They may be readily removed from rails by lifting the disconnect tab.







Cover Puller — SPL001

Littelfuse’s Class CC and Midget fuse cover puller is designed to provide protection to personnel, as well as make removal of fuses from fuse blocks easy and safe. Once installed on the fuse, the cover puller allows removal of the fuse without the use of a separate puller.

- Meets “Dead Front” requirements for use in control panels.
- Permits safe, easy removal.
- Works with existing fuse block. No special hinged fuse blocks are required.
- Easily gangable with 1/8" diameter wire.
- For use with all 600 volt Class CC and Midget 1/10 — 30A fuses.
- Use with Class CC L60030C series and L60030M series fuse blocks.
- Label provided for easy fuse identification.
- For 2-pole cover puller, order DSPL001.

POWR-SAFE "Dead Front" Holders

Littelfuse POWR-SAFE "Dead Front" holders provide optimum protection to personnel. Indicating and non-indicating versions are available in 1, 2, 3, or 4 poles for Class CC and Midget fuses.

FEATURES/BENEFITS

- Meets "Dead Front" requirements and IEC Type IP20 Protection
- Mountable on 35mm Din Rail
- Blown fuse identification (Indicating versions only)
- Easy installation and removal of fuses. No special fuse pullers or tools required.
- UL Listed for branch circuit protection (Class CC versions only)
- Compact design
- Ventilated design for cooler operation
- Indicates above 80 volts (ID versions only)

SPECIFICATIONS

Voltage Rating: 600 Volts
Ampere Rating: 30 amperes
Interrupting Rating: 200 kA (Class CC)
100 kA (Midget)
Terminal type: Pressure plate
Suggested Torque: 15 lb.
Wire Range: #6—#14CU
Material: Thermo-Plastic
Flammability Rating: 94VO
Approvals: UL Listed (LPSC File No: E14721)
UL Recognized (LPSM File No: E14721)
CSA Certified (LPSC/LPSM File No: LR7316)
IEC Type IP20 Protection
CE Certified

ORDERING INFORMATION

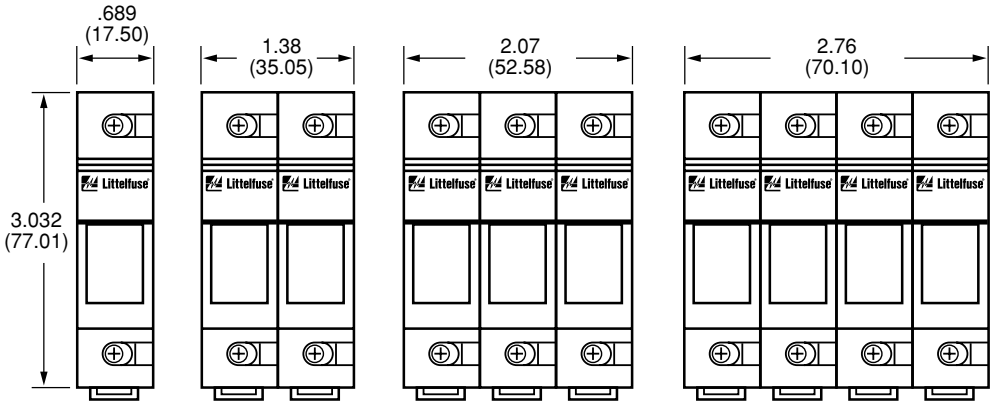
Indicating Part Number	Non-Indicating Part Number	Fuse Type	Number of Poles
LPSC001ID	LPSC001	Class CC	1
LPSC002ID	LPSC002	Class CC	2
LPSC003ID	LPSC003	Class CC	3
LPSC004ID	LPSC004	Class CC	4
LPSM001ID	LPSM001	Midget	1
LPSM002ID	LPSM002	Midget	2
LPSM003ID	LPSM003	Midget	3
LPSM004ID	LPSM004	Midget	4

Multi-pole Assembly Kit: Order No: CYHP001
(Kit contains 20 connector pincers and 10 handle pins.)

NOTE: Contact factory for DC rated versions.

DIMENSIONS in inches (mm in parentheses)

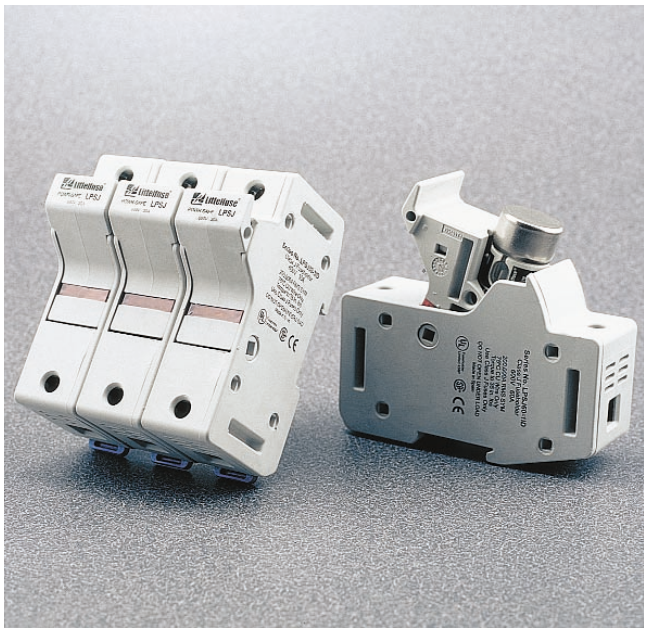
- **LPSM/LPSC** POWR-SAFE Holders



Fuse Blocks, Holders and Accessories

Class J POWR-SAFE Holders

NEW



Littelfuse POWR-SAFE "Dead Front" fuseholders provide optimum protection to personnel. An integral DIN-Rail adapter system allows fuse holders to be mounted on 35mm DIN-Rail without the use of tools or special parts. Indicating and non-indicating versions are available in 1, 2, or 3 poles for Class J fuses.

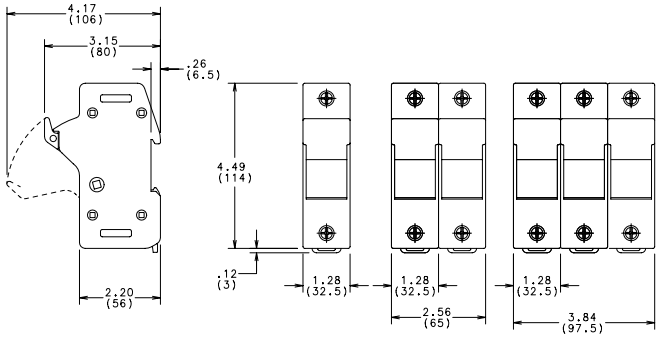
SPECIFICATIONS

Voltage Rating: 600 VAC
Interrupting Rating: 200 kA
Ampere Rating: 30 and 60 amperes
Terminal Type: Pressure plate
Suggested Torque: 30A – 35 inch-pounds
60A – 45 inch-pounds
Wire Range: #2 – #14CU
Material: Thermo-plastic
Flammability Rating: 94V0
Approvals: UL Listed
CSA Certified
IEC Type IP20 Protection
CE

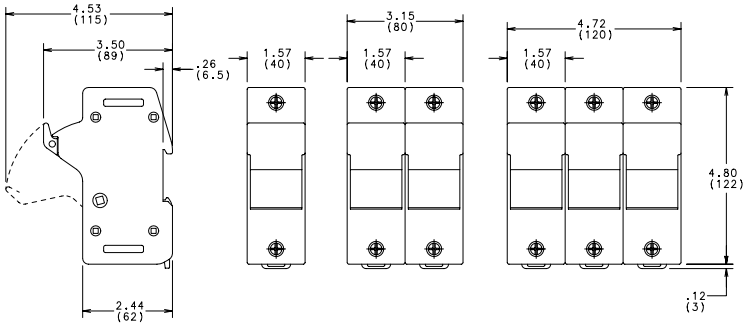
FEATURES/BENEFITS

- Meets "Dead Front" requirements and IEC Type IP20 protection.
- Mountable on 35mm DIN-Rail.
- Blown fuse identification (Indicating versions only).
- Easy installation and removal of fuses. No special fuse pullers or tools required.
- UL listed for branch circuit protection.
- Ventilated design for cooler operation.

DIMENSIONS in inches (mm in parentheses)



30 Amp

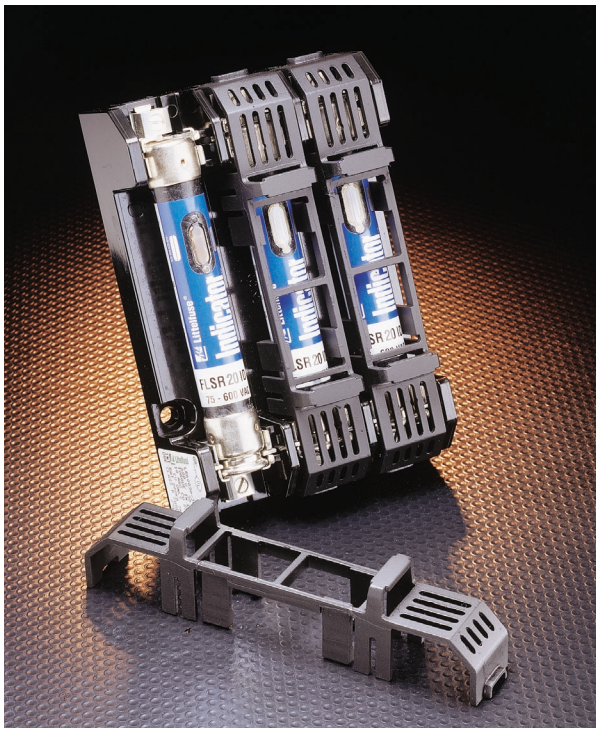


60 Amp

ORDERING INFORMATION

Littelfuse Catalog No.	Littelfuse System No.	No. of Poles	Pack Qty.	Voltage Rating	Ampere Rating	Options
LPSJ30-1	LPSJ301.Z	1	6	600V	30A	–
LPSJ30-2	LPSJ302.Z	2	3	600V	30A	–
LPSJ30-3	LPSJ303.Z	3	2	600V	30A	–
LPSJ30-1ID	LPSJ301.ZXID	1	6	600V	30A	Indicating
LPSJ30-2ID	LPSJ302.ZXID	2	3	600V	30A	Indicating
LPSJ30-3ID	LPSJ303.ZXID	3	2	600V	30A	Indicating
LPSJ60-1	LPSJ601.Z	1	6	600V	60A	–
LPSJ60-2	LPSJ602.Z	2	3	600V	60A	–
LPSJ60-3	LPSJ603.Z	3	2	600V	60A	–
LPSJ60-1ID	LPSJ601.ZXID	1	6	600V	60A	Indicating
LPSJ60-2ID	LPSJ602.ZXID	2	3	600V	60A	Indicating
LPSJ60-3ID	LPSJ603.ZXID	3	2	600V	60A	Indicating

POWR-Covers - Fuse Block Covers



Littelfuse fuse block covers protect personnel from accidentally contacting energized contacts. Covers are available for Class H, R, J, and CD type fuses up to 100 amps.

SPECIFICATIONS

Voltage Rating: 600 Volts

Ampere Rating: Class H: 0-100 amps
Class R: 0-100 amps
Class J: 0-100 amps
Class CD: 60 amps

Material: Thermoplastic

Approvals: UL Listed (File No: E184929)
CSA Certified (File No: LR7316)

FEATURES/BENEFITS

- Meets “Dead Front” requirements and IEC Type IP20 Protection for most applications (see note)
- Easily gangable with optional “gang-slide” adapters
- Added safety to personnel
- Unique design allows Littelfuse Indicator™ fuses to be seen through covers
- Ventilated to avoid fuse derating
- Covers are reusable
- Covers fit most competitor blocks
- Designed to meet IEC Type IP20 Protection

For “Gang Slide” Adapters order:

PCGS-2 for 2 poles
PCGS-3 for 3 poles

NOTE: Contact Factory for specific applications.

ORDERING INFORMATION

Littelfuse Part Number	For Use With Fuse Block Number	Voltage	Amp	Fuse Class
LH25030-PC	LH25030/LR25030 series	250	30	H/R
LH25060-PC	LH25060/LR25060 series	250	60	H/R
LH25100-PC	LH25100/LR25100 series	250	100	H/R
LH60030-PC	LH60030/LR60030 series	600	30	H/R
LH60060-PC	LH60060/LR60060 series	600	60	H/R
LH60100-PC	LH60100/LR60100 series	600	100	H/R
LJ60030-PC	LJ60030 series only	600	30	J
LJ60060-PC	LJ60060 series only	600	60	J
L60060C-PC	L60060C series only	600	60	CD

Fuse Pullers

Littelfuse fuse pullers are the safe way of handling power fuses.

Littelfuse’s new ergonomically-designed fuse puller offers greater ease in removing fuses. This new molded design is superior to standard pullers because it offers a more comfortable and natural grip when pulling fuses, improving performance. Part No. LPFP

PART NUMBER & APPLICATION

Midget Fuse Puller

MFP: For 3/16" to 1/2" dia. fuses.

Pocket Fuse Puller

LPFP: For 0 – 200A 250V,
0 – 100A 600V
(9/16" – 1-19/32" dia. fuses)

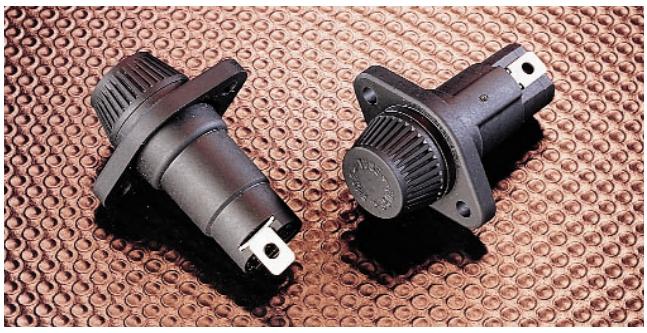
Giant Fuse Puller

GFP: 61 – 600A 250V,
61 – 400A 600V
(1-1/16" – 2-19/32" dia. fuses)

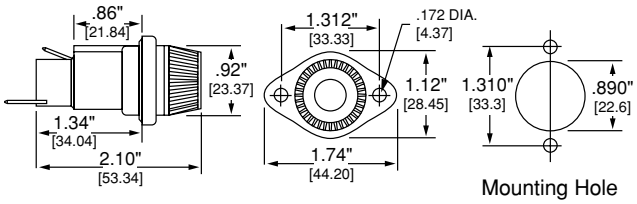
Tri-Puller

097023: For ATO® and glass fuses.

571 Series Panel Mounted Fuseholders



Panel mount fuseholders are available for supplementary or Class CC branch circuit protection. Class CC fuses have a rejection feature on one end cap which mates with the rejection feature of Littelfuse Class CC fuse blocks and fuseholders to prevent the installation of fuses with lower voltage ratings or interrupting ratings. Watertight version must be front panel mounted.



Mounting Hole

SPECIFICATIONS

Voltage Rating: 600 Volts

Ampere Rating: 30 amperes for Class CC and Midget fuses

Dielectric strength: 4000 Volts

Terminals: Tin-plated brass combination solder and quick-connect

Molded parts: Black thermoplastic

Approvals: UL Recognized (File No. E14721) — 571 series
UL Recognized for branch circuit protection — 571 OCC/RCC
CSA Certified (File No. LR7316)

ORDERING INFORMATION

Part Number		Bottom Terminal	Fuse Length Range*	For Use With
Standard	Watertight			
571 027 **571** 028	**571** 027P **571** 028P	Straight Rt. Angle	$1^{5}/_{16}$" — $1^{3}/_{8}$"	Midget Fuses
571 007 **571** 008	**571** 007P **571** 008P	Straight Rt. Angle	$1^{13}/_{32}$" — $1^{1}/_{2}$"	Midget Fuses
571 0CC **571** RCC	**571** 0CCP **571** RCCP	Straight Rt. Angle	$1^{1}/_{2}$"	Class CC Fuses

* Fuse diameter is $^{13}/_{32}$".

O-Rings: 901-184 (body)
901-260 (knob)

POWR-JAW Clip Clamps

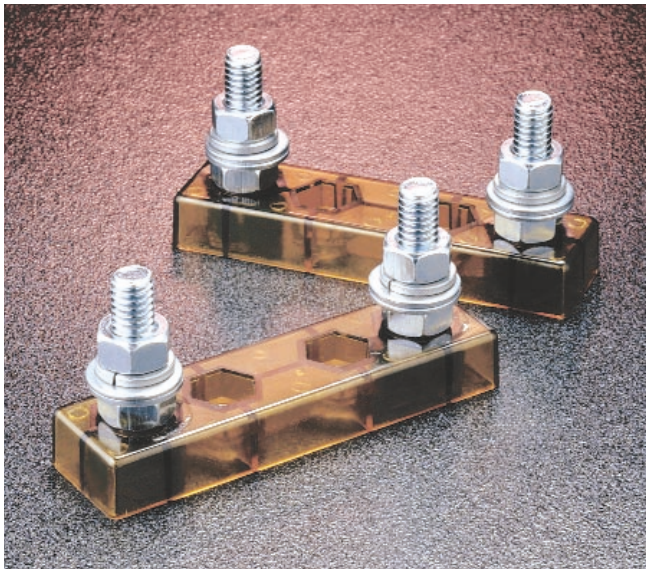
POWR-JAW clamps improve the contact between fuse and clip. The unnecessary heat from poor contact due to the loss of spring force in the clips can cause nuisance fuse opening and premature aging of surrounding components.

- High temperature phenolic resin knob designed for the most severe environments.
- 7 sizes to provide effective coverage.
- Simple design makes installation easy.

Part Number	Volts	Amperes
LCC 1	250	0-30
LCC 2	250	35-60
LCC 2	600	0-30
LCC 4	600	35-60
LCC 5	250/600	70-100
LCC 6	250/600	110-200
LCC 7	250/600	225-400
LCC 8	250/600	450-600

LFFB Series Limiter Fuse Block

NEW



The Littelfuse LFFB fuse block is designed to accept CNL and CNN style limiter fuses. Typical applications include: forklifts, golf carts, and other low voltage battery-operated equipment.

SPECIFICATIONS

Voltage Rating: 150 VAC/VDC
Ampere Range: 1 – 400 amperes
Approvals: Pending
Construction: Base — thermoplastic
Studs — steel zinc plated

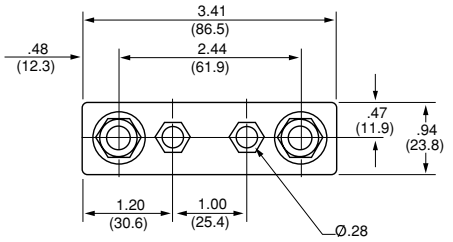
RECOMMENDED FUSES

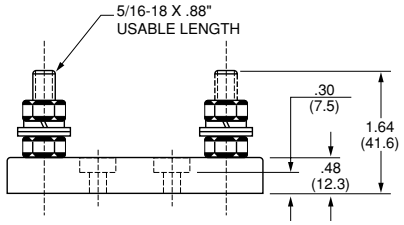
Littelfuse CNL/CNN limiter fuses and competitors' equivalents.

ORDERING INFORMATION

Example catalog number: LFFB001
Example system number: LFFB0001Z

DIMENSIONS





Blocks And Holders

LHFB Inline Fuse Holder

NEW

The Littelfuse LHFB waterproof inline fuse holder is ideal for harsh environments. The easy to assemble one-piece molded thermoplastic body is a bright green color for high visibility. The LHFB holder accepts #12 to #18 gauge wire and features the voltage and ampere rating molded into the body, along with a wire strip gauge. Withstands solvents and vibration, for use with 1/4" x 1-1/4" fuses.

SPECIFICATIONS

Voltage Rating: 32 Volts
Ampere Rating: 30 amperes

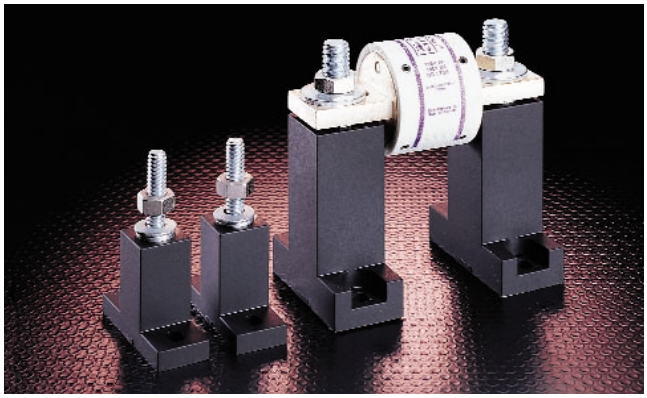
INSTALLATION INSTRUCTIONS

1. Thread wire through fuse holder body.
2. Strip wire insulation per strip gauge.
3. Crimp wire to fuse clip.*
4. Pull wire through and seat fuse clip in the holder body.
5. Insert desired fuse type and rating.
6. Snap holder body together.

*Recommended crimping tools: Thomas & Betts No. WT-11-M or Radio Shack No. 64-409

NOTE: Wire is not supplied with the holder.

Semiconductor Fuse Blocks



Modular-designed Semiconductor fuse blocks are designed to accommodate a wide range of Semiconductor fuses, with a maximum diameter of 3". This modular design greatly reduces inventory requirements. They are sold in pairs and are constructed of molded phenolic, with plated steel studs.

SPECIFICATIONS

Voltage rating: LSCR001: Accepts fuses 1" diameter or less at **600V**. Also accepts 13/16" diameter fuses at **700 — 1000V**.

LSCR002: Accepts fuses up to 3" diameter at **1000V**.

Ampere ratings: LSCR001: 1 – 400 ampere capacity.

LSCR002: 70 – 800 ampere capacity.

Approvals: UL Recognized (File No. E14721)

Stud Size: LSCR001: 1/4 - 20 thread (Torque: 61 In. LBS.)
LSCR002: 3/8 - 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 fuse block selection guide

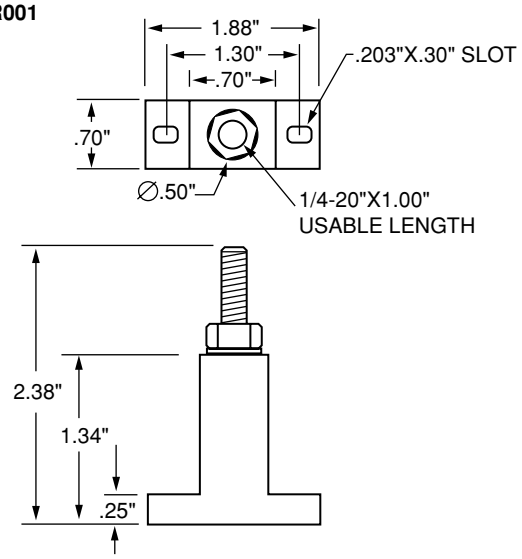
Fuse Series	Ampere Rating
L15S	70 – 400
L25S	35 – 60
L25S	70 – 200
L50S	35 – 60
L50S	70 – 100
L50S	125 – 200
L60S	35 – 60
L60S	70 – 100
L60S	125 – 200
L70S	35 – 60
L70S	70 – 100
KLC	1 – 30
KLC	35 – 60

LSCR002

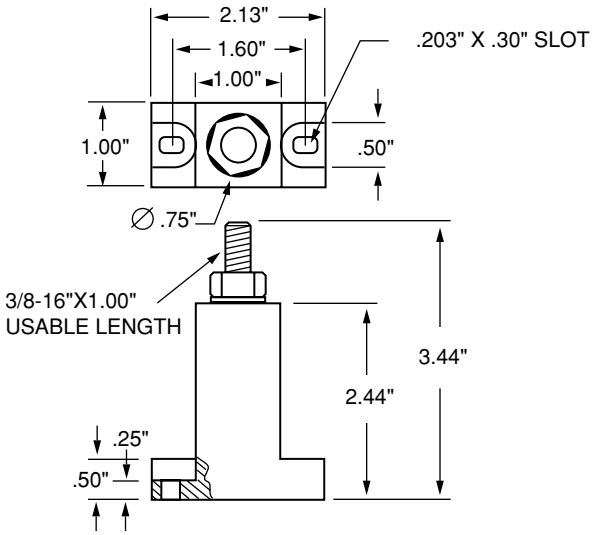
Semiconductor fuse block selection guide

Fuse Series	Ampere Rating
L15S	500 – 800
L25S	225 – 700
L25S	800
L50S	225 – 400
L50S	450 – 600
L50S	700 – 800
L60S	225 – 400
L60S	450 – 600
L60S	700 – 800
L70S	125 – 200
L70S	225 – 400
L70S	450 – 800
KLC	70 – 100
KLC	125 – 200
KLC	225 – 400
KLC	450 – 800

LSCR001



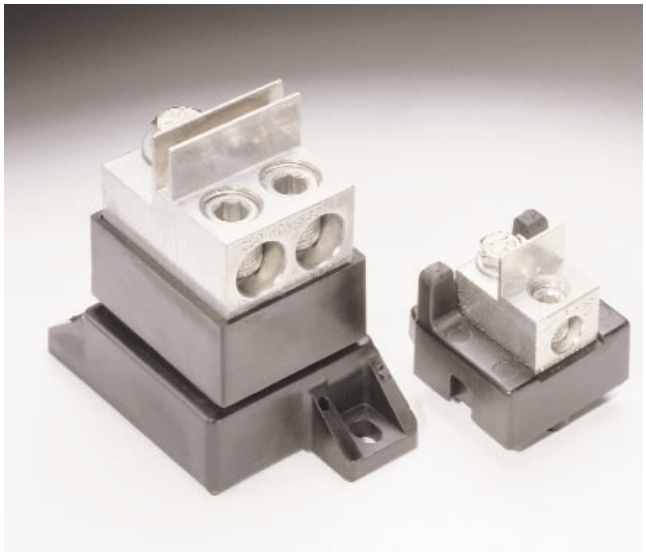
LSCR002



Blocks And Holders

Semiconductor Fuse Blocks

NEW



Littelfuse's 1LS series modular style semiconductor fuse blocks accommodate a wide range of semiconductor fuses. Blocks are provided in pairs with fuse mounting hardware.

- 2-piece modular design
- General purpose phenolic base
- Tin plated aluminum box lugs
- Dove-tailed interlocking feature (1LS101 only)
- Hex-head bolts and Belleville washers provided

SPECIFICATIONS

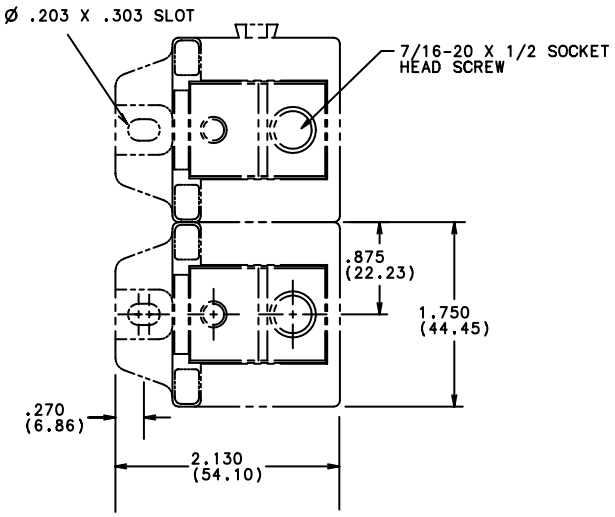
Voltage Rating: 600 Volts
Ampere Range: 1 – 600 amperes
Approvals: UL Recognized under the components program
Insulator Base: 150° C general purpose phenolic
Box Lug Terminal: Tin plated aluminum

ORDERING INFORMATION

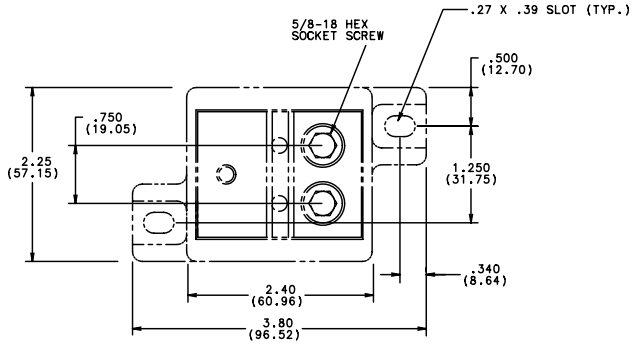
Littelfuse Catalog No.	Ampere Rating	Wire Range	Torque Rating	Approvals
1LS101	100A	#2/0 - 14 CU/AL	120 IN. LBS.	UL Recognized
1LS102	400A	250MCM - #6 CU/AL	275 IN. LBS.	UL Recognized
1LS103	400A	250MCM - #6 CU/AL	275 IN. LBS.	UL Recognized
1LS104	600A	500MCM - #6 CU/AL	375 IN. LBS.	UL Recognized
1LS108	400A	250MCM - #6 CU/AL	275 IN. LBS.	Self-Certified
1LS109	400A	250MCM - #6 CU/AL	275 IN. LBS.	Self-Certified
1LS110	400A	250MCM - #6 CU/AL	275 IN. LBS.	Self-Certified

DIMENSIONS

1LS101



1LS102

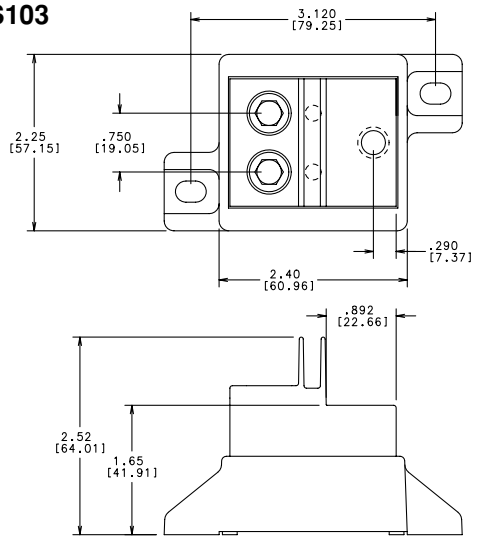


Dimensions for reference only.

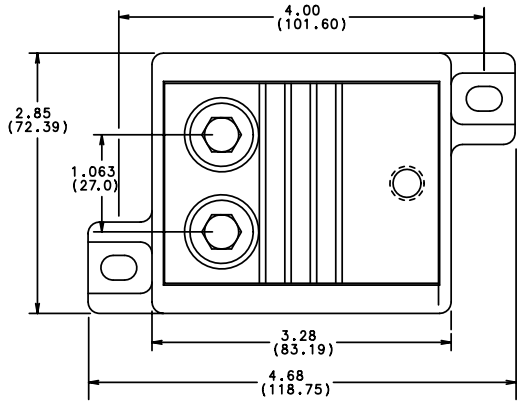
Blocks And Holders

DIMENSIONS

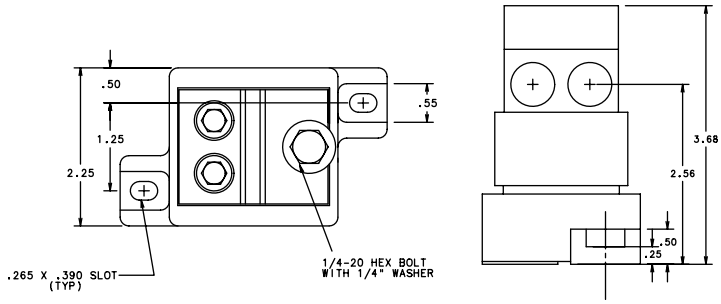
1LS103



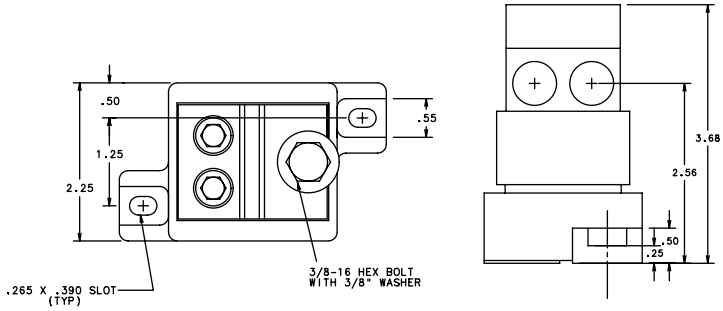
1LS104



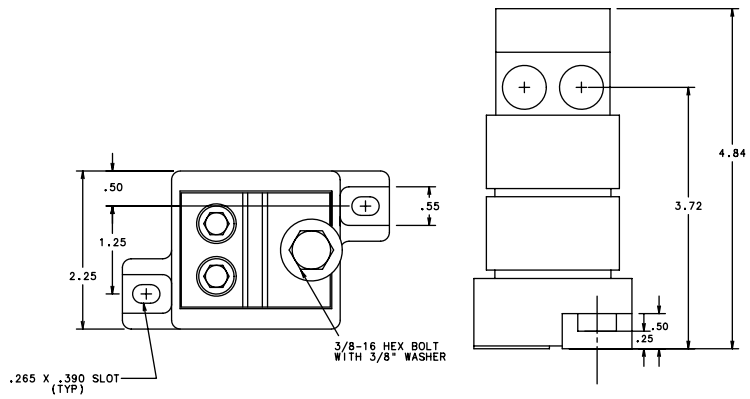
1LS108



1LS109



1LS110



Dimensions for reference only.

POWR-BLOKS™
Distribution/Splicer Blocks and Covers

NEW

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.

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.

SPECIFICATIONS

Voltage Rating: 600V

Amperage: 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: 94V-0

Approvals: UL Recognized (File No. E171395)
CSA Certified (File No. LR700111)

ORDERING INFORMATION

Distribution Block Example Part No.

L	D	2570	-3
Littelfuse	Distribution Block	Series	No. of Poles

Splicer Block Example Part No.

L	S	3126	-2
Littelfuse	Splicer Block	Series	No. of Poles

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.

Blocks And Holders

Distribution Block Covers

NEW

Littelfuse's 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. Clear plastic covers are available for most blocks. New LX2XXX-DIN series blocks offer a hinged cover.

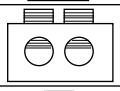
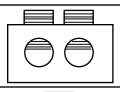
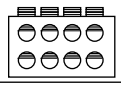
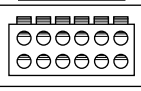
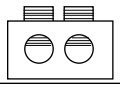
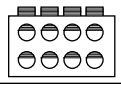
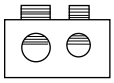
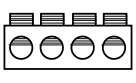
Clear Plastic Covers

Littelfuse Part Number	For use with Power Distribution Block No.
LPBC0-2	LX0XXX-2
LPBC0-3	LX0XXX-3
LPBC2-1	LX2XXX-1
LPBC2-2	LX2XXX-2
LPBC2-3	LX2XXX-3
LPBC3-1	LX3XXX-1
LPBC3-2	LX3XXX-2
LPBC3-3	LX3XXX-3
LPBC4-1	LX4XXX-1
LPBC4-2	LX4XXX-2
LPBC4-3	LX4XXX-3
LPBC5-1	LX5XXX-1
LPBC5-2	LX5XXX-2
LPBC5-3	LX5XXX-3

Hinged Covers

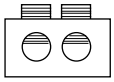
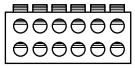
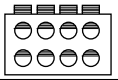
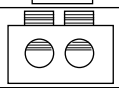
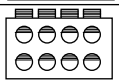
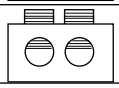
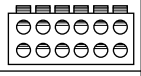
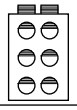
Littelfuse Part Number	For use with Power Distribution Block No.
LCH132-1	LX2XXX-1DIN
LCH132-2	LX2XXX-2DIN
LCH132-3	LX2XXX-3DIN

Distribution Block Selection Guide

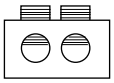
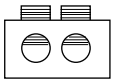
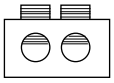
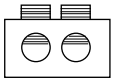
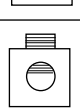
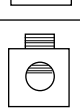
Connector Configuration			Amp Rating per Pole	Number of Poles	Line		Load		Figure	Littelfuse Catalog Number	
Mat'l	Line	Load			Wire Range	Openings per Pole	Wire Range	Openings per Pole			
AL			115	1	#2 - #14	1	#10 - #18	4	2	LD1400-1	NEW
			115	2	#2 - #14	1	#10 - #18	4	2	LD1400-2	NEW
			115	3	#2 - #14	1	#10 - #18	4	2	LD1400-3	NEW
			115	4	#2 - #14	1	#10 - #18	4	2	LD1400-4	NEW
AL			175	2	2/0 - #14	1	#4 - #14	6	1	LD0401-2	
			175	3	2/0 - #14	1	#4 - #14	6	1	LD0401-3	
AL			175	2	2/0 - #14	1	#4 - #14	4	1	LD0402-2	NEW
			175	3	2/0 - #14	1	#4 - #14	4	1	LD0402-3	NEW
AL			310	2	350mcm - #6	1	#4 - #14	6	1	LD0404-2	NEW
			310	3	350mcm - #6	1	#4 - #14	6	1	LD0404-3	NEW
AL			175	1	2/0 - #14	1	#4 - #14	4	3	LD2570-1	
			175	2	2/0 - #14	1	#4 - #14	4	3	LD2570-2	
			175	3	2/0 - #14	1	#4 - #14	4	3	LD2570-3	
CU			175	1	2/0 - #14	1	#4 - #14	4	3	LD2970-1	NEW
			175	2	2/0 - #14	1	#4 - #14	4	3	LD2970-2	NEW
			175	3	2/0 - #14	1	#4 - #14	4	3	LD2970-3	NEW
AL			335	1	400mcm - #6	1	#2 - #14	4	5	LD3552-1	
			335	2	400mcm - #6	1	#2 - #14	4	5	LD3552-2	
			335	3	400mcm - #6	1	#2 - #14	4	5	LD3552-3	
AL			335	1	400mcm - #6	1	#2 - #14	6	5	LD3553-1	
			335	2	400mcm - #6	1	#2 - #14	6	5	LD3553-2	
			335	3	400mcm - #6	1	#2 - #14	6	5	LD3553-3	
AL			350	1	2/0 - #14	2	#4 - #14	6	5	LD3555-1	
			350	2	2/0 - #14	2	#4 - #14	6	5	LD3555-2	
			350	3	2/0 - #14	2	#4 - #14	6	5	LD3555-3	
CU			380	1	500mcm - #4	1	#2 - #14	6	5	LD3953-1	NEW
			380	2	500mcm - #4	1	#2 - #14	6	5	LD3953-2	NEW
			380	3	500mcm - #4	1	#2 - #14	6	5	LD3953-3	NEW
CU			350	1	2/0 - #14	2	#4 - #14	6	5	LD3955-1	NEW
			350	2	2/0 - #14	2	#4 - #14	6	5	LD3955-2	NEW
			350	3	2/0 - #14	2	#4 - #14	6	5	LD3955-3	NEW
AL			380	1	500mcm - #4	1	#2 - #14	6	6	LD4551-1	NEW
			380	2	500mcm - #4	1	#2 - #14	6	6	LD4551-2	NEW
			380	3	500mcm - #4	1	#2 - #14	6	6	LD4551-3	
AL			335	1	400mcm - #6	1	#2 - #14	8	6	LD4560-1	
			335	2	400mcm - #6	1	#2 - #14	8	6	LD4560-2	
			335	3	400mcm - #6	1	#2 - #14	8	6	LD4560-3	
AL			380	1	500mcm - #4	1	#2 - #14	12	7	LD5552-1	
			380	2	500mcm - #4	1	#2 - #14	12	7	LD5552-2	
			380	3	500mcm - #4	1	#2 - #14	12	7	LD5552-3	
AL			380	1	500mcm - #4	1	2/0 - #14	6	7	LD5579-1	NEW
			380	2	500mcm - #4	1	2/0 - #14	6	7	LD5579-2	NEW
			380	3	500mcm - #4	1	2/0 - #14	6	7	LD5579-3	
AL			760	1	500mcm - #4	2	2/0 - #14	8	7	LD5586-1	
			760	2	500mcm - #4	2	2/0 - #14	8	7	LD5586-2	
			760	3	500mcm - #4	2	2/0 - #14	8	7	LD5586-3	
AL			665	1	500mcm - #4 350mcm - #6	1 1	2/0 - #14	4	7	LD5587-1	NEW
			665	2	500mcm - #4 350mcm - #6	1 1	2/0 - #14	4	7	LD5587-2	NEW
			665	3	500mcm - #4 350mcm - #6	1 1	2/0 - #14	4	7	LD5587-3	NEW

Blocks And Holders

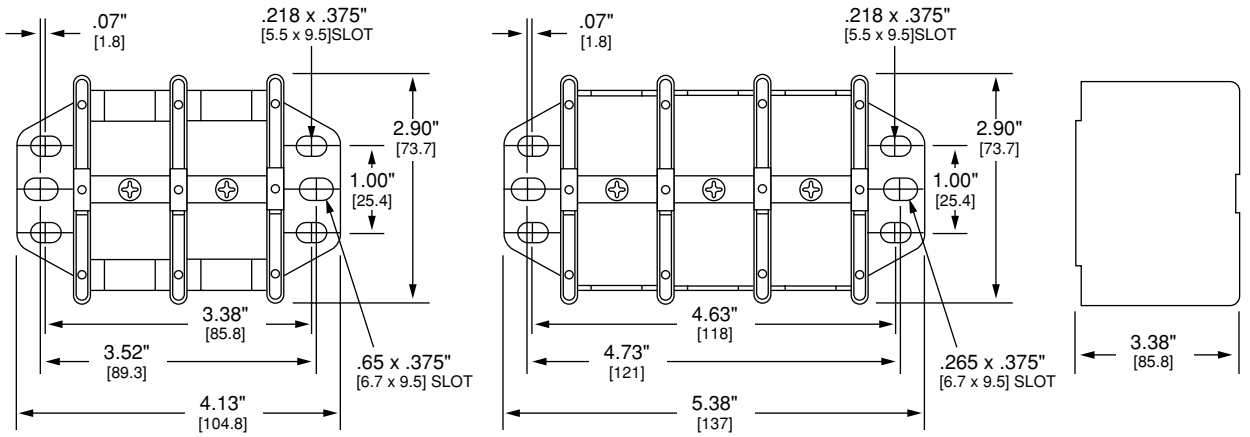
Distribution Block Selection Guide

Connector Configuration			Amp Rating per Pole	Number of Poles	Line		Load		Figure	Littelfuse Catalog Number	
Mat'l	Line	Load			Wire Range	Openings per Pole	Wire Range	Openings per Pole			
AL			760 760 760	1 2 3	500mcm-#4 500mcm-#4 500mcm-#4	2 2 2	#4 - #14 #4 - #14 #4 - #14	12 12 12	7 7 7	LD5592-1 LD5592-2 LD5592-3	
AL			380 380 380	1 2 3	500mcm-#4 500mcm-#4 500mcm-#4	1 1 1	#2 - #14 #2 - #14 #2 - #14	8 8 8	7 7 7	LD5594-1 LD5594-2 LD5594-3	NEW NEW NEW
CU			760 760 760	1 2 3	500mcm-#4 500mcm-#4 500mcm-#4	2 2 2	2/0 - #14 2/0 - #14 2/0 - #14	8 8 8	7 7 7	LD5986-1 LD5986-2 LD5986-3	NEW NEW NEW
CU			760 760 760	1 2 3	500mcm-#4 500mcm-#4 500mcm-#4	2 2 2	#2 - #14 #2 - #14 #2 - #14	12 12 12	7 7 7	LD5992-1 LD5992-2 LD5992-3	NEW NEW NEW
AL			175 175 175 175	1 1 3 Adder	2/0 - #14 2/0 - #14 2/0 - #14 2/0 - #14	1 1 1 1	#4 - #14 #4 - #14 #4 - #14 #4 - #14	4 4 4 4	4 4 4 4	LD2570-1DIN LD2570-2DIN LD2570-3DIN LD2570-ADIN	NEW NEW NEW NEW
AL			175 175 175 175	1 1 3 Adder	2/0 - #14 2/0 - #14 2/0 - #14 2/0 - #14	1 1 1 1	#4 - #14 #4 - #14 #4 - #14 #4 - #14	6 6 6 6	4 4 4 4	LD2580-1DIN LD2580-2DIN LD2580-3DIN LD2580-ADIN	NEW NEW NEW NEW
CU			175 175 175 175	1 1 3 Adder	2/0 - #14 2/0 - #14 2/0 - #14 2/0 - #14	1 1 1 1	#4 - #14 #4 - #14 #4 - #14 #4 - #14	4 4 4 4	4 4 4 4	LD2970-1DIN LD2970-2DIN LD2970-3DIN LD2970-ADIN	NEW NEW NEW NEW

Splicer Block Selection Guide

Connector Configuration			Amp Rating per Pole	Number of Poles	Line		Load		Figure	Littelfuse Catalog Number	
Mat'l	Line	Load			Wire Range	Openings per Pole	Wire Range	Openings per Pole			
AL			310 310	2 3	350mcm-#6 350mcm-#6	1 1	350mcm-#6 350mcm-#6	1 1	1 1	LS0303-2 LS0303-3	NEW NEW
AL			115 115 115 115	1 2 3 4	#2 - #14 #2 - #14 #2 - #14 #2 - #14	1 1 1 1	#2 - #14 #2 - #14 #2 - #14 #2 - #14	1 1 1 1	2 2 2 2	LS1300-1 LS1300-2 LS1300-3 LS1300-4	NEW NEW NEW NEW
CU			150 150 150	1 2 3	1/0 - #18 1/0 - #18 1/0 - #18	1 1 1	1/0 - #18 1/0 - #18 1/0 - #18	1 1 1	3 3 3	LS2121-1 LS2121-2 LS2121-3	NEW NEW NEW
AL			115 115 115	1 2 3	#2 - #14 #2 - #14 #2 - #14	1 1 1	#2 - #14 #2 - #14 #2 - #14	1 1 1	3 3 3	LS2552-1 LS2552-2 LS2552-3	NEW NEW NEW
AL			175 175 175	1 2 3	2/0 - #14 2/0 - #14 2/0 - #14	1 1 1	2/0 - #14 2/0 - #14 2/0 - #14	1 1 1	3 3 3	LS2572-1 LS2572-2 LS2572-3	
AL			255 255 255	1 2 3	250mcm-#6 250mcm-#6 250mcm-#6	1 1 1	250mcm-#6 250mcm-#6 250mcm-#6	1 1 1	5 5 5	LS3123-1 LS3123-2 LS3123-3	
CU			255 255 255	1 2 3	250mcm-#6 250mcm-#6 250mcm-#6	1 1 1	250mcm-#6 250mcm-#6 250mcm-#6	1 1 1	5 5 5	LS3124-1 LS3124-2 LS3124-3	NEW NEW NEW
AL			310 310 310	1 2 3	350mcm-#6 350mcm-#6 350mcm-#6	1 1 1	350mcm-#6 350mcm-#6 350mcm-#6	1 1 1	5 5 5	LS3126-1 LS3126-2 LS3126-3	
AL			420 420 420	1 2 3	600mcm-#4 600mcm-#4 600mcm-#4	1 1 1	600mcm-#4 600mcm-#4 600mcm-#4	1 1 1	6 6 6	LS4557-1 LS4557-2 LS4557-3	NEW NEW NEW
AL			620 620 620	1 2 3	350mcm-#4 350mcm-#4 350mcm-#4	2 2 2	350mcm-#4 350mcm-#4 350mcm-#4	2 2 2	7 7 7	LS5129-1 LS5129-2 LS5129-3	NEW NEW
AL			760 760 760	1 2 3	500mcm-#4 500mcm-#4 500mcm-#4	2 2 2	500mcm-#4 500mcm-#4 500mcm-#4	2 2 2	7 7 7	LS5301-1 LS5301-2 LS5301-3	
AL			175 175 175 175	1 2 3 A	2/0 - #14 2/0 - #14 2/0 - #14 2/0 - #14	1 1 1 1	2/0 - #14 2/0 - #14 2/0 - #14 2/0 - #14	1 1 1 1	4 4 4 4	LS2572-1DIN LS2572-2DIN LS2572-3DIN LS2572-ADIN	NEW NEW NEW NEW
CU			175 175 175 175	1 2 3 A	2/0 - #14 2/0 - #14 2/0 - #14 2/0 - #14	1 1 1 1	2/0 - #14 2/0 - #14 2/0 - #14 2/0 - #14	1 1 1 1	4 4 4 4	LS2972-1DIN LS2972-2DIN LS2972-3DIN LS2972-ADIN	NEW NEW NEW NEW

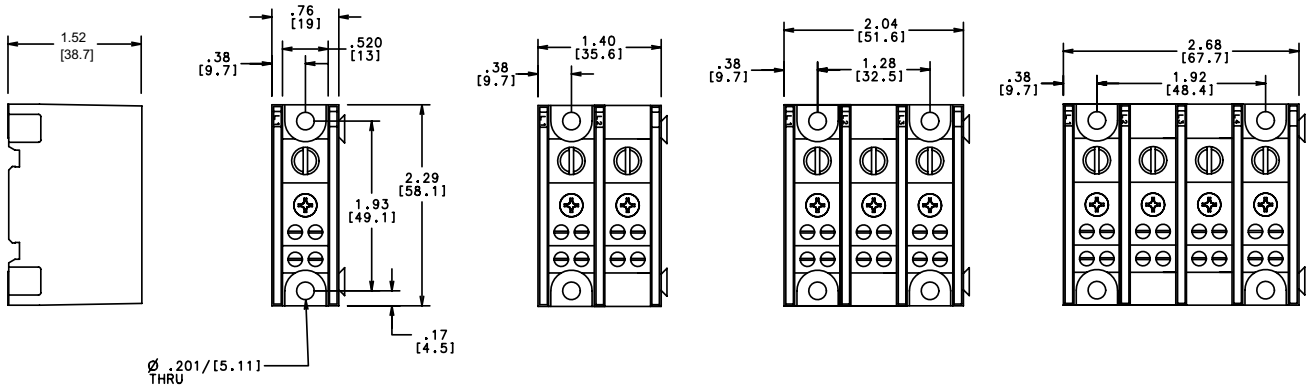
LX0XXX



2 POLE 3 POLE

Figure 1

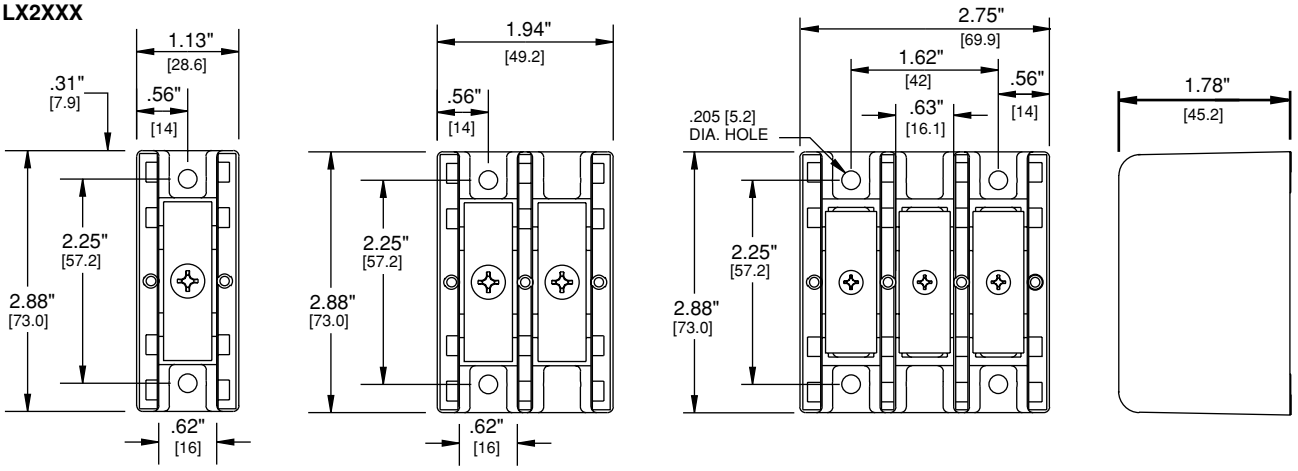
LX1XXX



1 POLE **2 POLE** **3 POLE** **4 POLE**

Figure 2

LX2XXX

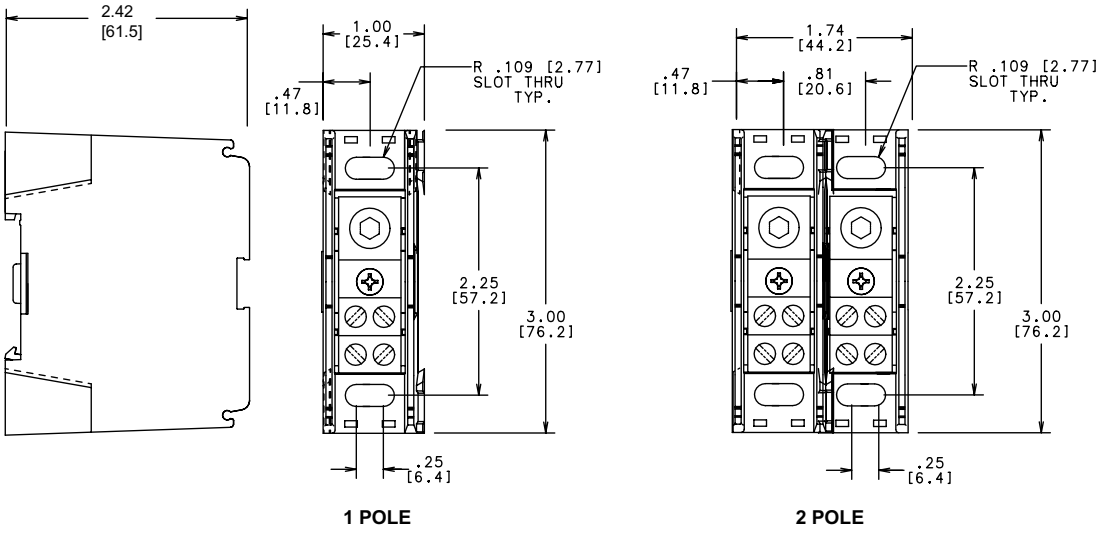


1 POLE 2 POLE 3 POLE

Figure 3

Blocks And Holders

LX2XXX-DIN



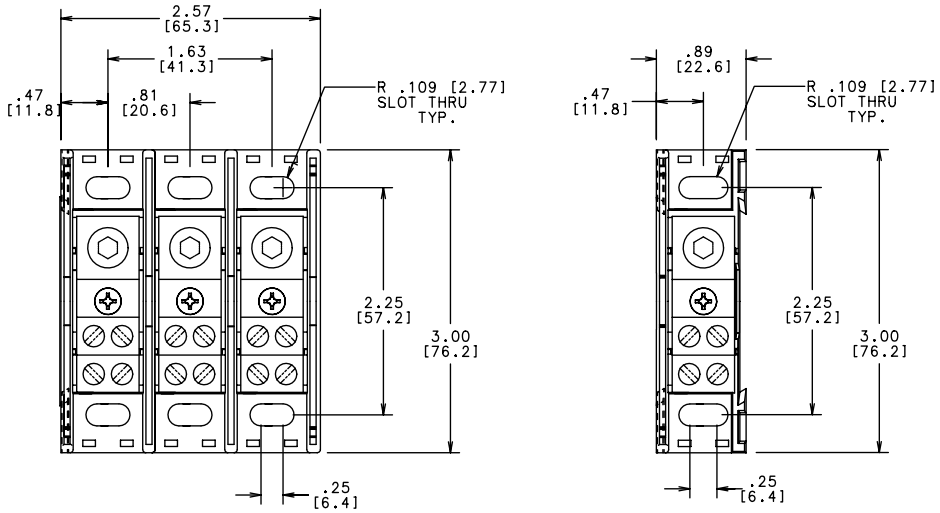


Figure 4

LX3XXX

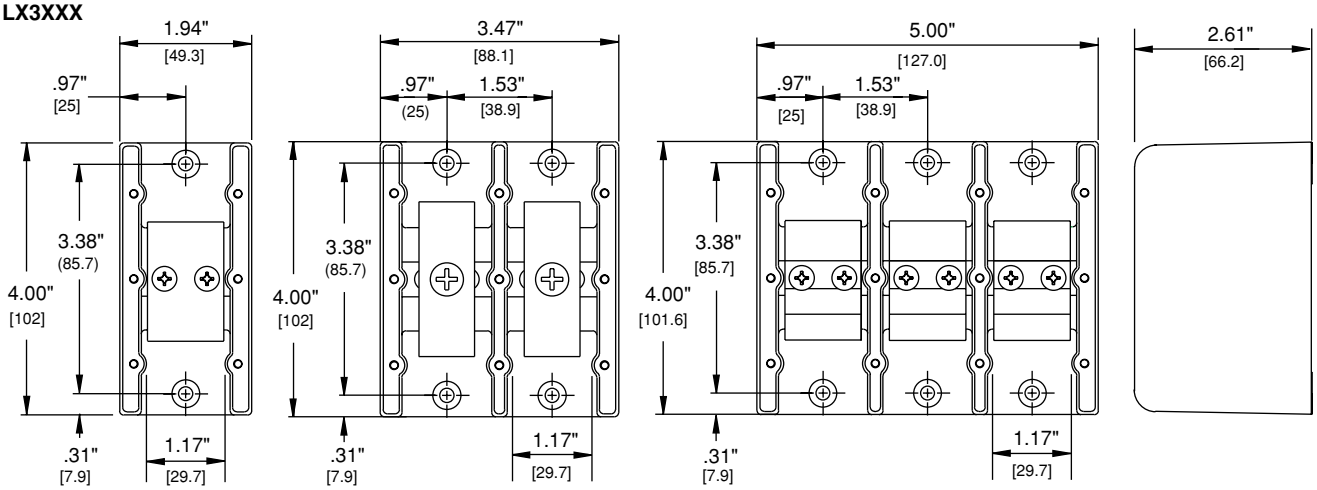
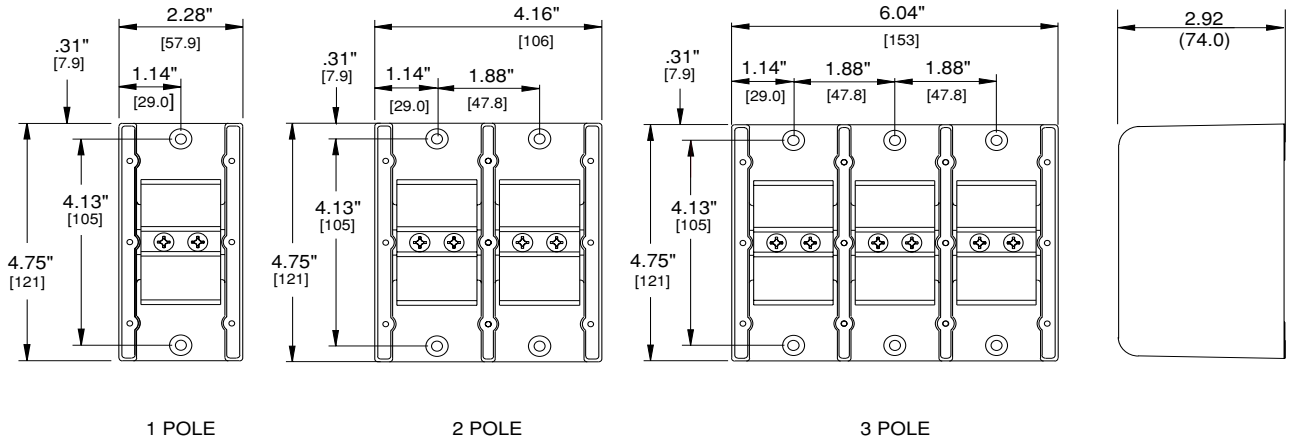


Figure 5

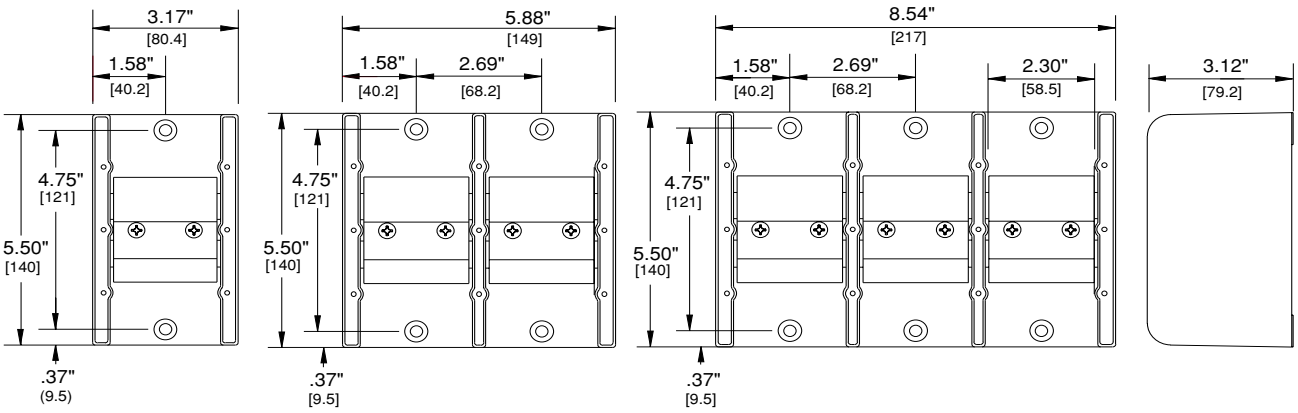
LX4XXX



1 POLE 2 POLE 3 POLE

Figure 6

LX5XXX



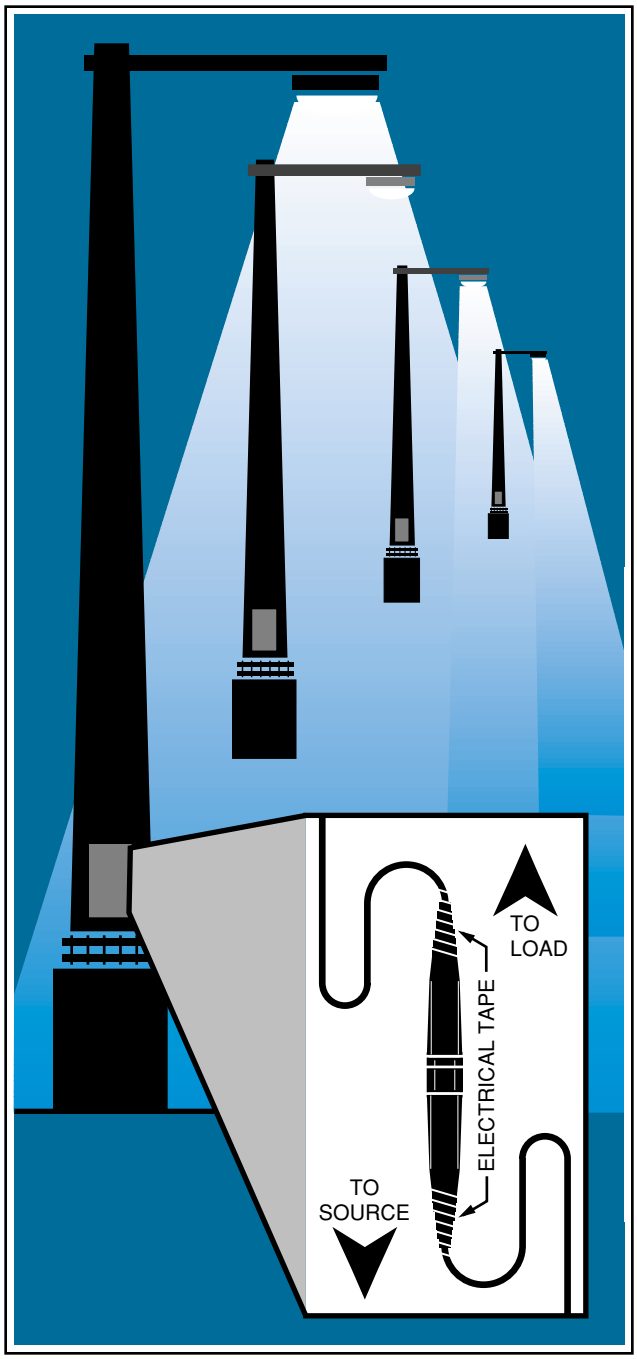
1 POLE 2 POLE 3 POLE

Figure 7

Blocks And Holders

In-Line Watertight Fuseholders

Littelfuse
POWR-GARD™ Products



Littelfuse's 600 volt in-line watertight fuse holders are the ideal answer for all high humidity and corrosive environments where fuses are required. Available in both breakaway and non-breakaway, single and double pole versions, these fuseholders allow maximum flexibility for any application.

APPLICATIONS

Street, alley, and parking lot lighting
Security and perimeter lighting
Traffic signals
Outdoor illuminated signs
Sports lighting
Boat electrical circuits
Tractors and yard equipment
General outdoor circuit protection

SPECIFICATIONS

Voltage rating: 600 Volts

Ampere rating: 30 amperes
200,000 amperes 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)

MATING FUSES

LEB/LEX series: Accepts all 1 1/2" x 13/32" Midget and Class CC fuses. Littelfuse types BLF, BLN,FLM,FLQ, KLK, KLKD, KLKR, KLDR and CCMR.

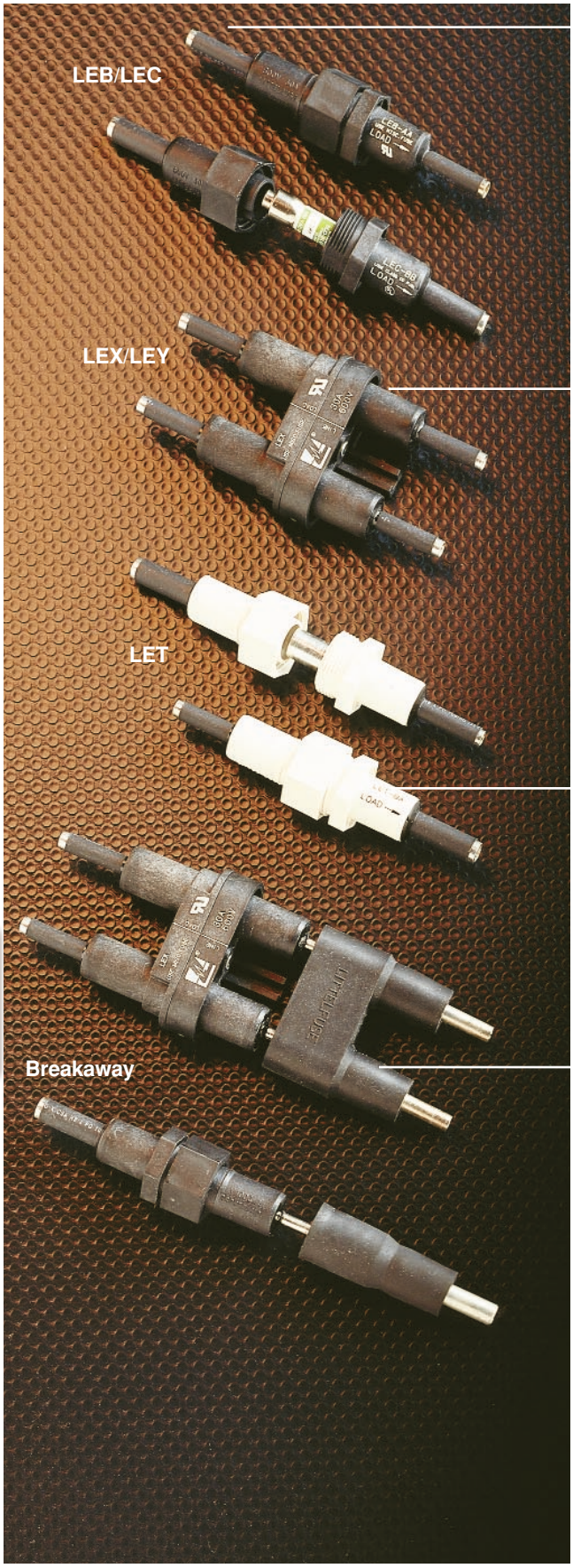
LEC/LEY series: Accepts only Class CC fuses. Littelfuse types KLKR, KLDR and CCMR.

BENEFITS

- **Safety —** Permits individual fixture or device to be disconnected from circuit for servicing. Eliminates possibility of shock.
- **Individual fixture fusing —** Prevents loss of one fixture through accident, vandalism, or end of life from darkening the entire circuit.
- **Simplifies maintenance —** Being able to immediately identify the one faulted fixture eliminates testing the entire circuit, speeds repair, and permits servicing the individual unit while the rest of the circuit is functioning.
- **Reduces damage from fault —** Can prevent faulted ballast or other failure from severely damaging fixture or device, reducing necessary repair or need of replacement.

FEATURES

- **Watertight —** Internal O-ring provides watertight seal.
- **Superior terminal seals —** Ultrasonically-welded terminals provide maximum strength and eliminate leaking at terminals.
- **Break-resistant —** Fiberglass-reinforced polymer body resists damage from dropping or impact much better than phenolic look-alikes.
- **Flexible terminations —** Accommodates a wide range of stranded or solid copper or aluminum conductors. Terminations are available for one or two conductors, with either crimp or screw terminals.
- **One-pole and two-pole models** available to accommodate all system voltages up to 600V.



One-pole LEB and LEC Fuseholders

Basic single-pole LEB and LEC watertight fuseholders provide protection for a variety of circuits. LEB fuseholders accept all 13/32" x 1-1/2" midget fuses providing supplemental overcurrent protection. LEC fuseholders are UL Listed Class CC fuseholders which accept only Class CC fuses. They meet National Electrical Code requirements for branch-circuit protection. The most common use for either fuseholder is for protection of lighting circuits. However, consider them wherever there is a need for secure in-line protection, from boat circuits to electric wheelchairs. Great flexibility is achieved when the basic holders are combined with breakaway receptacles, Y-terminals and insulating boots.

Two-pole LEX and LEY Fuseholders

LEX and LEY fuseholders are intended for use on line-to-line circuits up to 600 volts. Ideal for line-to-line loads such as 240 or 480 volt ballasts. When the line and load sections of LEX and LEY fuseholders are separated, or when the fuseholder is removed from a two-pole breakaway receptacle, both lines are disconnected simultaneously. This prevents the possibility of shock from backfeeding through an exposed fuse, which could happen with single-pole fuseholders. The LEX holder is a two-pole version of the LEB and accepts midget fuses, providing supplementary overcurrent protection. The LEY holder is a two-pole version of the LEC, which accepts only Class CC fuses, and may be used to provide branch-circuit protection. Both fuseholders may be equipped with Y-terminals, breakaway receptacles and insulating boots.

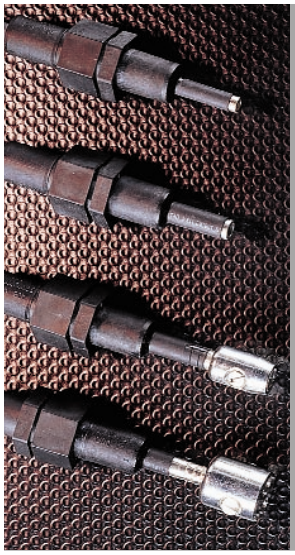
One-pole LET Solid Neutral Disconnects

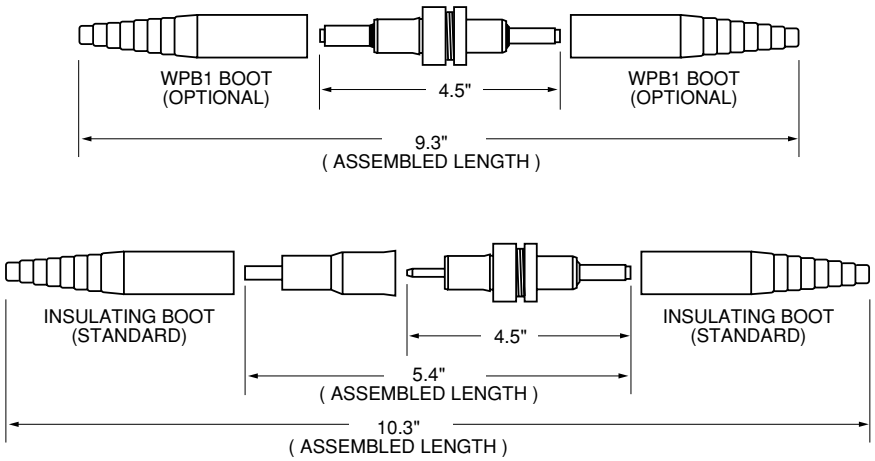
The LET solid neutral disconnect is designed for use as a no-load non-fused disconnect. Similar in design to the LEB series fuseholders, the LET is easily identified by its all-white body. Internally, it has a permanently-installed solid tin-plated copper neutral slug which eliminates the possibility of placing a fuse in the neutral side of the circuit. Fusing the neutral side causes a safety hazard and also violates the National Electrical Code. The LET is available in both breakaway and non-breakaway configurations with a wide variety of terminations.

Breakaway Feature

Littelfuse LEB, LEC, and LET single-pole fuseholders and LEX and LEY two-pole fuseholders are available with an optional breakaway feature required to meet state and federal highway commission standards requiring fuseholders to readily disconnect from the line 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. When knockdown occurs, the parts separate readily. The breakaway receptacle's terminal is deeply recessed so that energized parts are not exposed. The fuse remains safely enclosed inside the now de-energized watertight fuseholder. After the pole has been reinstalled, the fuseholder is easily plugged into the receptacle, immediately restoring service. The breakaway feature may also find application in marinas, travel trailer parks and other locations where circuits subjected to strain must be safely disconnected.

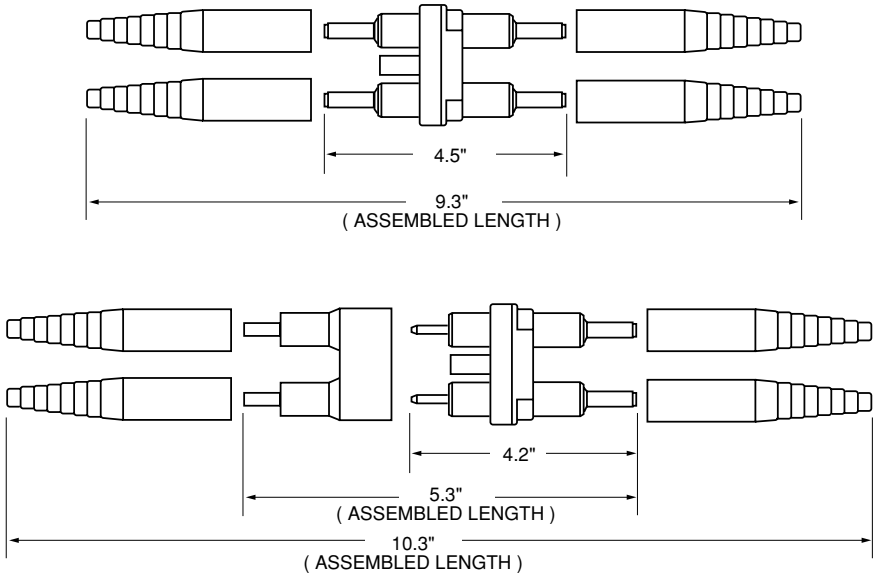
In-Line Watertight Fuseholders





Insulating Boots

Molded from engineering grade thermoplastics, the WPB1 and WPB2 provide a high resistance to corrosive environments and deliver a watertight seal. Boots are supplied as standard with all breakaway versions. Weatherproof boots WPB1 and WPB2 can be purchased separately for all non-breakaway holders. Part number WPB1 contains one standard boot for use with A, B, C, D, or J termination. Part number WPB2 contains one Y-pole boot for use with the Y-pole termination. For watertight protection of non-breakaway Y-pole fuseholders, order one WPB1 and one WPB2 boot. For non-breakaway double-pole LEX and LEY holders with A, B, C, D, or J terminations, order four WPB1 boots. These insulating boots are designed to fit snugly onto wire insulation, but for best results with varying wire insulation sizes, a tape wrap should be completed.



Blocks And Holders

Recommended Crimping Tools

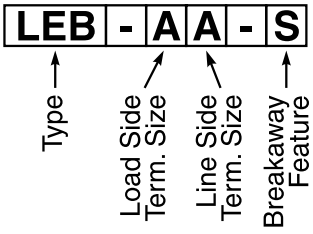
The following crimping tools or equivalents may be used on either the non-breakaway or breakaway watertight in-line fuseholders.

Terminal Size	T&B Part No.	Burndy Part No.
A	WT161M	Y14MF
B	WT161M	MR4C
C	WT115A	Hypress Y34A
D	WT115A	Hypress Y34A

Ordering Information

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

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



Selection Guide For Single Pole LEB/LEC Fuseholders

Standard Part No.	Breakaway Part No.	Fuse Type	Load Terminal Selection					Line Terminal Selection				
			Terminal Type	Load Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire	Terminal Type	Line Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire
LEB-AA LEC-AA	LEB-AA-S LEC-AA-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEB-AB LEC-AB	LEB-AB-S LEC-AB-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEB-AC LEC-AC	— —	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#8 #4	2 1	X —	X X
LEB-AD LEC-AD	— —	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#6 #2	2 1	X —	X X
LEB-AJ LEC-AJ	LEB-AJ-S LEC-AJ-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-AYC LEC-AYC	LEB-AYC-S LEC-AYC-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-BA LEC-BA	LEB-BA-S LEC-BA-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEB-BB LEC-BB	LEB-BB-S LEC-BB-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEB-BC LEC-BC	— —	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#8 #4	2 1	X —	X X
LEB-BD LEC-BD	— —	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#6 #2	2 1	X —	X X
LEB-BJ LEC-BJ	LEB-BJ-S LEC-BJ-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-BYC LEC-BYC	LEB-BYC-S LEC-BYC-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-CA LEC-CA	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEB-CB LEC-CB	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEB-CC LEC-CC	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#8 #4	2 1	X —	X X
LEB-CD LEC-CD	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#6 #2	2 1	X —	X X
LEB-CJ LEC-CJ	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-CYC LEC-CYC	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-DA LEC-DA	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEB-DB LEC-DB	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEB-DC LEC-DC	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#8 #4	2 1	X —	X X
LEB-DD LEC-DD	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#6 #2	2 1	X —	X X
LEB-DJ LEC-DJ	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Set-Screw	#12 to #8 #10 to #2	2 1	X —	— X
LEB-DYC LEC-DYC	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-JJ LEC-JJ	LEB-JJ-S LEC-JJ-S	Midget Class CC	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEB-JYC LEC-JYC	LEB-JYC-S LEC-JYC-S	Midget Class CC	Copper Set Screw	#12 to #8 #10 to #2	1 1	X —	— X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X

Selection Guide For Double Pole LEX/LEY Fuseholders

Standard Part No.	Breakaway Part No.	Fuse Type	Load Terminal Selection					Line Terminal Selection				
			Terminal Type	Load Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire	Terminal Type	Line Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire
LEX-AA LEY-AA	LEX-AA-S LEY-AA-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEX-AB LEY-AB	LEX-AB-S LEY-AB-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEX-AC LEY-AC	— —	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#8 #4	2 1	X —	X X
LEX-AD LEY-AD	— —	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#6 #2	2 1	X —	X X
LEX-AYC LEY-AYC	LEX-AYC-S LEY-AYC-S	Midget Class CC	Copper Crimp	#12 to #8 #12	1 2	X X	X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEX-BA LEY-BA	LEX-BA-S LEY-BA-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEX-BB LEY-BB	LEX-BB-S LEY-BB-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEX-BC LEY-BC	— —	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#8 #4	2 1	X —	X X
LEX-BD LEY-BD	— —	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	Copper Crimp	#6 #2	2 1	X —	X X
LEX-BYC LEY-BYC	LEX-BYC-S LEY-BYC-S	Midget Class CC	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEX-CA LEY-CA	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEX-CB LEY-CB	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEX-CC LEY-CC	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#8 #4	2 1	X —	X X
LEX-CD LEY-CD	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Crimp	#6 #2	2 1	X —	X X
LEX-CJ LEY-CJ	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEX-CYC LEY-CYC	— —	Midget Class CC	Copper Crimp	#8 #4	2 1	X —	X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEX-DA LEY-DA	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LEX-DB LEY-DB	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#10 #6 #4	2 1 1	X X —	X X X
LEX-DC LEY-DC	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#8 #4	2 1	X —	X X
LEX-DD LEY-DD	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Crimp	#6 #2	2 1	X —	X X
LEX-DJ LEY-DJ	—	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEX-DYC LEY-DYC	— —	Midget Class CC	Copper Crimp	#6 #2	2 1	X —	X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X
LEX-JJ LEY-JJ	LEX-JJ-S LEY-JJ-S	Midget Class CC	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X	Copper Set-Screw	#12 to #8 #10 to #2	1 1	X —	— X

Blocks And Holders

Selection Guide For Solid Neutral LET Fuseholders

Standard Part No.	Breakaway Part No.	Fuse Type	Load Terminal Selection					Line Terminal Selection				
			Terminal Type	Load Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire	Terminal Type	Line Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire
LET-AA	LET-AA-S	Solid Neutral	Copper Crimp	#12 to #8	1	X	X	Copper Crimp	#12 to #8	1	X	X
				#12	2	X	X		#12	2	X	X
LET-AB	LET-AB-S	Solid Neutral	Copper Crimp	#12 to #8	1	X	X	Copper Crimp	#10	2	X	X
				#12	2	X	X		#6	1	X	X
									#4	1	—	X
LET-AYC	LET-AYC-S	Solid Neutral	Copper Crimp	#12 to #8	1	X	X	"Y" Type Copper Set-Screw	#12 to #8	1	X	—
				#12	2	X	X		#10 to #2	1	—	X
LET-BA	LET-BA-S	Solid Neutral	Copper Crimp	#10	2	X	X	Copper Crimp	#12 to #8	1	X	X
				#6	1	X	X		#12	2	X	X
				#4	1	—	X					
LET-BB	LET-BB-S	Solid Neutral	Copper Crimp	#10	2	X	X	Copper Crimp	#10	2	X	X
				#6	1	X	X		#6	1	X	X
				#4	1	—	X		#4	1	—	X
LET-BYC	LET-BYC-S	Solid Neutral	Copper Crimp	#10	2	X	X	"Y" Type Copper Set-Screw	#12 to #8	1	X	—
				#6	1	X	X		#10 to #2	1	—	X
				#4	1	—	X					
LET-JJ	LET-JJ-S	Solid Neutral	Copper Set-Screw	#12 to #8	1	X	—	Copper Set-Screw	#12 to #8	1	X	—
				#10 to #2	1	—	X		#10 to #2	1	—	X
LET-JYC	LET-JYC-S	Solid Neutral	Copper Set-Screw	#12 to #8	1	X	—	"Y" Type Copper Set-Screw	#12 to #8	1	X	—
				#10 to #2	1	—	X		#10 to #2	1	—	X

Misc Products

LPS Series POWR-SWITCH

Littelfuse
POWR-GARD™ Products

NEW

The Littelfuse POWR-Switch provides a simple and economical solution for applications that require selective coordination and shunt trip capabilities. Common applications include elevator circuits, data processing rooms, and building emergency systems.

By utilizing Class J time delay fuses, the POWR-Switch is 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. The POWR-Switch also features pre-wired control circuits that can help reduce installation costs.

STANDARD FEATURES

- 600V 3-pole fuse power switch
- 200,000 RMS interrupting rating
- Shunt trip 120V
- Control power terminal block
- Ground lug per NEC
- Class J fuse block
- NEMA 1 enclosures

OPTIONAL FEATURES

- Control power transformer with fuses and blocks
- Fire safety interface relay
- Key to test switch
- Pilot light ”On”
- Isolated neutral lug
- Mechanical interlock auxilliary contact for hydraulic elevators with automatic recall (5 amp 120 VAC rated)
- Fire alarm voltage monitoring relay
- NEMA 3R, 4, and 12 enclosures

BENEFITS

- Optional features offer flexibility for a variety of applications
- UL Listed package
- Lower installation costs than systems with many separate components
- Pre-wired control circuits lower installation time
- Lockable Operating handle meets all code and safety requirements
- No confusion over which building trade is supplying the components
- POWR-Switch is a single unit...which makes procurement easier than systems with multiple components

Misc. Products

ORDERING INFORMATION

Complete catalog numbers consist of switch catalog numbers and the desired options. See example below.

Example Catalog Number:

LPS T8 R1 K __ N1 __ __ U = Littelfuse Catalog Number LPS1T48R1KN1U

Littelfuse Switch Catalog Number		Control Power Transformer Std. 100VA with PRI & SEC Fuse (120V Sec.)		Fire Safety Interface Relay (3PDT, 10amp, 120V)		Key to Test Switch		Pilot Light "ON"		Isolated Neutral Lug		Mechanical Interlock Auxilliary Contact forHydraulic Elevators w/ Automatic Recall (5 amp 120 VAC rated)		Fire Alarm Voltage Monitoring Relay (Tp Monitor Shunt Trip Voltage)		Optional Enclosures	
Catalog No	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
LPS3	30A	208V	T20	24 VDC Coil	R2	120V	K	Red	R	30–60A	N6	1 NO & 1 NC	A	Single Pole	F1	NEMA 3R	U
LPS6	60A	240V	T24	120 VAC Coil	R1			Green	G	100A	N1	2 NO & 2 NC	B	Three Pole	F3	NEMA 4	Y
LPS1	100A	480V	T48					White	W	200A	N2					NEMA 12	Z
LPS2	200A	600V	T60							400A	N4						
LPS4	400A																

Note: Desired options must appear 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.

SPECIFICATIONS

Approvals: UL Listed and CSA Certified

Rating: 30A, 60A, 100A, 200A, 400A

Shunt Trip Ratings:

Amp Rating	Voltage Rating	Max Inrush	Max Ontime	Momentary Inrush
30–400	120V, 60Hz	4A	1.5 cycles	140VA

ENCLOSURE DIMENSIONS

Catalog Series	Amp Rating	NEMA 1 Dimensions	NEMA 3R Dimensions	NEMA 4, 12 Dimensions	Lug Size
LPS3	30	24"H x 20"W x 9"D	24"H* x 20"W x 8"D	24"H x 20"W x 10"D	#14 - #8 AL or CU
LPS6	60	24"H x 20"W x 9"D	24"H* x 20"W x 8"D	24"H x 20"W x 10"D	#14 - #8 AL or CU
LPS1	100	24"H x 20"W x 9"D	24"H* x 20"W x 8"D	24"H x 20"W x 10"D	#8 - 1/0 AL or CU
LPS2	200	30"H x 20"W x 9"D	30"H* x 20"W x 8"D	24"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	Contact Factory

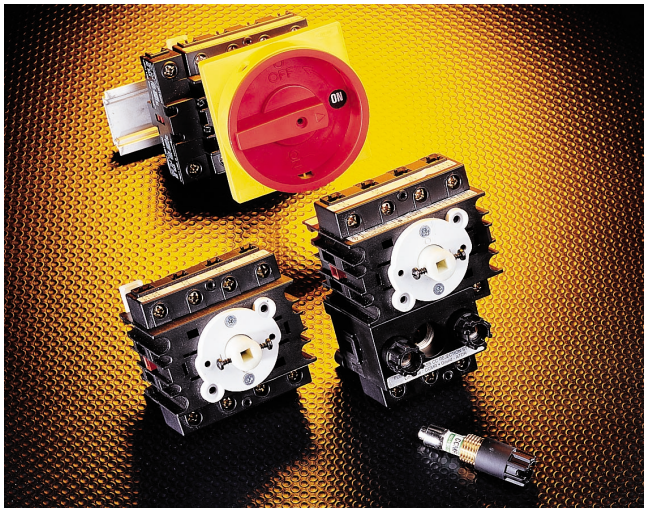
Note: Over-size enclosures used to accomodate control power transformer, interface relay and terminal blocks.

*For NEMA 3R enclosures add 2 inches to height for mounting tabs.

Disconnect Switches

Fusible/Non-fusible

Littelfuse POWR-GARD™ Products



SPECIFICATIONS

Voltage: 600VAC

Interrupting Rating: 10,000 amperes

Required Screw Torque: 16 inch pounds

Ampere Rating: LFFS030CC: 30 Amperes
LFDS040: 40 Amperes
LFDS060: 60 Amperes

Approvals: UL Listed (File No. E166081)
CSA Certified

Terminals: Accepts wire size through 8AWG

ORDERING INFORMATION

Part Number

LFFS030 CC	30A fusible switch with integrated Class CC fuse holder
LFDS040	40A non-fusible switch
LFDS060	60A non-fusible switch

See below for Handles and Accessories (sold separately)

The LFFS series fusible switches eliminate the need for a separate fuse block by integrating a three pole fuse holder into the switch body. This saves precious panel space and reduces wiring time. These rod-operated devices are UL Listed and CSA Certified.

The LFDS series disconnect switches can be used with external fuse blocks, permitting the use of RK1, RK5, Class J and Class CC fuses.

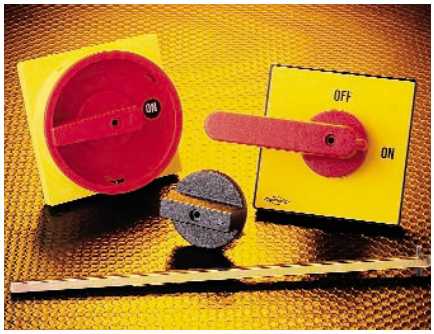
APPLICATIONS

Littelfuse disconnect switches are perfect for use where the National Electrical Code requires that a separate disconnect means be located within sight of all motor loads. Commonly used as a main switch or distribution switches, these units are also ideal for use as safety switches for air conditioners, pumps and compressors.

FEATURES/BENEFITS

- **Reduce panel costs —** This is the smallest 30A disconnect switch and fuse block on the market. This minimizes panel space, reducing enclosure costs.
- **Minimize wiring time —** Integral Class CC block eliminates the need to install separate fuse blocks (LFFS only).
- **Reduce installation costs —** Panel-mount or integral DIN rail adapter allows quick and easy mounting.
- **Protect personnel —** Dead Front design eliminates contact with live parts. Optional terminal covers add extra degree of protection for personnel.
- **Expandable —** Optional auxiliary contact blocks and power poles quickly attach for up to 6 poles per switch.
- **Optional shafts available for enclosures 3.5" through 20" deep.**
- **Lockout style available to meet OSHA Standard for control of hazardous energy sources** (LFRK001 only).
- **Operator handles meet IP65.**

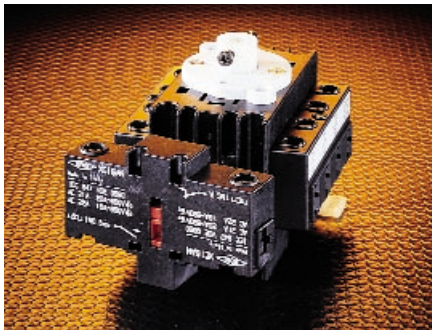
Accessories



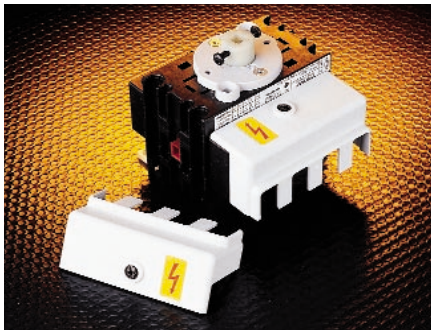
LFRH001*	Red Handle
LFRK001*	Red Knob
LFBH001*	Black Handle
LFBK001*	Black Knob
LFBK002**	Black Knob
SHFT002	Shaft (19.68")
SHFT003	Shaft (11.81")
SHFT005	Shaft (7.78")

* Includes mounting hardware and standard length shaft for enclosures 3.5" through 8" deep.

**Supplied with 2" shaft



LFCB001	Add-on Contact Block (N. O.)
LFCB002	Add-on Contact Block (N. C.)
LFPP001	Add-on Power Pole (N. O.)
LFPP002	Add-on Power Pole (N. C.)



LFTC001 Terminal Cover (1 Pair)

Littelfuse fuse reducers allow smaller size fuses to be installed into existing fuse clips. This prevents overfusing.

- Allows lower ampere-rated fuses to be used in existing fuse clips.
- Simple installation.
- Reduces inventory requirements.
- Silver brazed joints for maximum strength.
- UL Listed (File No. E136855)
  CSA Certified (File No. LR92899)

Refer to fuse section of this catalog for fuse dimensions.

Class H/K5 Fuse Reducers

For use with Littelfuse NLN/NLS and RLN/RLS series fuses.

250 Volt

Part No. (pair)	Fuse Clip	Fuse Case Size
LRU 263 M	60	30
LRU 213 M	100	30
LRU 216	100	60
LRU 226	200	60
LRU 2621	200	100
LRU 2641	400	100
LRU 2642	400	200
LRU 2661	600	100
LRU 2662	600	200
LRU 2664	600	400

600 Volt

Part No. (pair)	Fuse Clip	Fuse Case Size
LRU 663	60	30
LRU 216	100	30
LRU 616	100	60
LRU 626	200	60
LRU 2621	200	100
LRU 2641	400	100
LRU 2642	400	200
LRU 2661	600	100
LRU 2662	600	200
LRU 2664	600	400

Class R Fuse Reducers

For use with Littelfuse FLNR_ID/ FLSR_ID, IDSR, LLNRK/LLSRK and KLNR/KLSR series fuses.

250 Volt

Part No. (pair)	Fuse Clip	Fuse Case Size
LRU 263 R	60	30
LRU 213 R	100	30
LRU 216 R	100	60
LRU 226 R	200	60
LRU 2621 R	200	100
LRU 2641 R	400	100
LRU 2642 R	400	200
LRU 2661 R	600	100
LRU 2662 R	600	200
* LRU 2664 R	600	400

600 Volt

Part No. (pair)	Fuse Clip	Fuse Case Size
LRU 663 R	60	30
LRU 216 R	100	30
LRU 616 R	100	60
LRU 626 R	200	60
LRU 2621 R	200	100
LRU 2641 R	400	100
LRU 2642 R	400	200
LRU 2661 R	600	100
LRU 2662 R	600	200
* LRU 2664 R	600	400

* Only one reducer required.

Class J Fuse Reducers

For use with Littelfuse JTD_ID/JTD and JLS series fuses.

600 Volt

Part No. (pair)	Fuse Clip	Fuse Case Size
LRUJ63	60A	30A
LRUJ13	100A	30A
LRUJ16*	100A	60A
LRUJ26	200A	60A
LRUJ21	200A	100A
LRUJ41	400A	100A
LRUJ42	400A	200A
LRUJ64	600A	400A

* Fuse and reducer combination is slightly larger in diameter than 100A Class J fuses. For specific applications, contact factory.

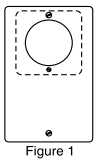
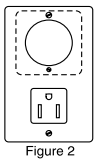
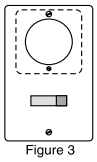
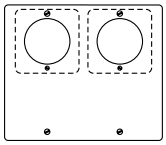
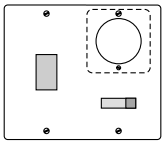
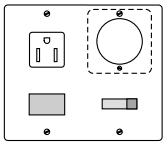
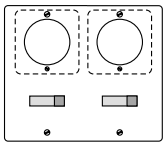
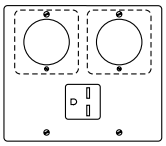
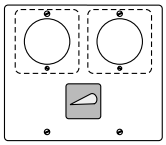
Class J reducers can not be used in bolt-on applications.

Box Cover Units

Box cover units provide an economical method of protecting small motors against overcurrent damage. For use with Edison-Base plug fuses (TOO, TLO) or Type S plug fuses (SOO, SLO) with adapters (SAO).

SPECIFICATIONS

Voltage: 125V
Ampere Rating: 15 Amperes
Approvals: UL Listed

	Fig. No.	Littelfuse Part No.	Box Cover Features	To Be Mounted On:
 Figure 1  Figure 2  Figure 3  Figure 4  Figure 5  Figure 6  Figure 7  Figure 8  Figure 9	1	LSOU	One Edison-Base Fuse Holder	2¼" Handy Box
		LSOW	One Edison-Base Fuse Holder	2¾" Switch Box
		LSOX	One Edison-Base Fuse Holder	4" Octagon Box
		LSOY	One Edison-Base Fuse Holder	4" Square Box
	2	LSRU	One Edison-Base Fuse Holder and Grounding Receptacle	2¼" Handy Box
		LSRW	One Edison-Base Fuse Holder and Grounding Receptacle	2¾" Switch Box
		LSRX	One Edison-Base Fuse Holder and Grounding Receptacle	4" Octagon Box
		LSRY	One Edison-Base Fuse Holder and Grounding Receptacle	4" Square Box
	3	LSSU	One Edison-Base Fuse Holder and Single Pole Switch	2¼" Handy Box
		LSSW	One Edison-Base Fuse Holder and Single Pole Switch	2¾" Switch Box
		LSSX	One Edison-Base Fuse Holder and Single Pole Switch	4" Octagon Box
		LSSY	One Edison-Base Fuse Holder and Single Pole Switch	4" Square Box
	4	LSOY-B	Two Edison-Base Fuse Holders	4" Square Box
	5	LSSY-L	One Edison-Base Fuse Holder One Single Pole Switch and Pilot Light	4" Square Box
	6	LSSY-RL	One Edison-Base Fuse Holder One Grounding Receptacle One Single Pole Switch and Pilot Light	4" Square Box
	7	LSCY	Two Edison-Base Fuse Holders and Two Single Pole Switches	4" Square Box
	8	LSKA	Two Edison-Base Fuse Holders One 250V Grounding Receptacle	4 1/16" Square Box
	9	LSTY	Two Edison-Base Fuse Holders and One 2-Pole Switch	4" Square Box


2-1/4 Handy Box
4" Handy Box
LSOU
LSOW
LSOY
LSOY-B
LSRU
LSRW
LSRY
LSCY
LSSU
LSSW
LSSY
LSTY
LSSY-L
LSSY-RL
3-1/2" Octagonal Box
LSOX
LSRX
LSSX
4-1/2" Box
LSKA

Spare Fuse Cabinet

Sturdy steel cabinet holds spare fuses. Cabinet can be locked to prevent unauthorized access and is weather stripped to reduce the accumulation of dust, dirt and moisture. Convenient inventory card located inside door. Measures 30" H x 24" W x 12" D. Keyhole mounting holes 16" on center for easy installation.

ORDERING INFORMATION

Spare Fuse Cabinet: Part No. LSFC

Spare Keys: Part No. LKEY001

Electronic Fuse Display

The sturdy wall-mountable/free-standing modular rack system prominently displays the most popular Littelfuse glass and automotive fuses. Additional sections can be quickly snapped on to provide a larger product selection. Each rack features a cross reference and full color identification guide to help customers locate the proper replacement fuse.

- Holds 720 (144 5-packs) of the most popular glass, ceramic, and automotive fuses.
- Designed to save space—measures 4" deep, 9" wide, and 14" high.
- 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.

ORDERING INFORMATION

Fully stocked display: Littelfuse part number: 094324PG
Littelfuse system number: 00940324ZXPG

Empty display rack: Littelfuse part number: FDR001PG
Littelfuse system number: 0FDR0001ZXPG

Additional Sections: Littelfuse part number: MRS001PG
Littelfuse system number: 0MRS0001ZXPG

Misc. Products

Fully stocked rack includes the following parts:

3AG (Glass) Fast-Acting Fuses		3AG (Glass) Slo-Blo® Fuses		3AB (Ceramic) Normal-Blo Fuses		3AB (Ceramic) Slo-Blo® Fuses	
Quantity	Part No.	Quantity	Part No.	Quantity	Part No.	Quantity	Part No.
25	312 ⅛A	25	313 ⅛A	25	314 15A	25	326 8A
50	312 1A	25	313 ¾A	25	314 20A	20	326 10A
25	312 1½A	25	313 1A	25	314 30A		
75	312 2A	25	313 1½A				
25	312 2½A	50	313 2A				
75	312 3A	25	313 2½A				
25	312 4A	25	313 3A				
25	312 5A	25	313 4A				
25	312 10A	25	313 5A				

International Products

LgD Series Global Pro™-*tection* Fuses

600 Volts AC ■ Time-Delay ■ 1 – 100 Amperes

GlobalPro GLOBAL CIRCUIT PROTECTION

Littelfuse POWR-GARD™ Products

NEW

The Global Pro-*tection* system from Littelfuse is the world's only fuse system designed for use anywhere, in any equipment, in virtually any country. The Global Protection system simplifies circuit protection by incorporating North American electrical requirements into fuse styles found in the rest of the world. The system's reduced size, touch-safe design, and international acceptance make the Global Pro system the easy circuit protection choice for engineers and equipment designers everywhere.

Global Pro fuses provide quick and positive visual identification of blown fuses by using a pop-up indicator design that protrudes from the top of the fuse, immediately alerting maintenance personnel that it needs to be replaced. The pop-up indicator is designed to activate a microswitch that is built into every Global Pro system to activate stack-lights or to integrate into PLC networks and provide equipment operators with a remote method of determining when the fuse needs to be replaced.

The Global Pro system is designed to save valuable space in a crowded panel while providing designers with the flexibility of a universally accepted design for easy replacement. Global Pro fuses are far more compact and have greater power handling capability than conventional products. Global Pro fuses are up to 75% smaller than Class RK5 fuses and up to 50% smaller than Class J fuses while providing the time delay characteristics that are necessary for motor circuit protection.

International Products

APPLICATIONS

- Motor control centers
- Motor branch circuits
- Primary and secondary protection for transformers
- Equipment designed for export

SPECIFICATIONS

Voltage Ratings: 600 Volts AC (UL)
690 Volts AC (IEC)

Interrupting Rating: AC: 200,000 amperes rms symmetrical

Ampere Range: 1 – 100* amperes

Approvals: UL Listed Special Purpose 1–30 amps
(File No. E71611)
UL Recognized 35–60 amps (File No. E71611)
CSA Certified 1–60 amps (File No. LR29862)

*Contact factory for ratings above 60A

AMPERE RATINGS

1	3	6	8	10	12
15	20	25	30	35	40
45	50	60	70*	80*	90*
100*					

*Contact factory for ratings above 60A

Example part number (series & amperage): LgD 60

FEATURES AND BENEFITS

The Global Pro Fuse is physically compatible with IEC style fuseholders allowing it to be used in virtually any market. The IEC dimensions of the Global Pro fuseholder allow easy adaptation of exported equipment by simply replacing the fuse with one that meets local standards.

FEATURES

- Extremely compact size
- Pop-up Indication
- **Meets performance requirements of UL Class J fuses**

BENEFITS

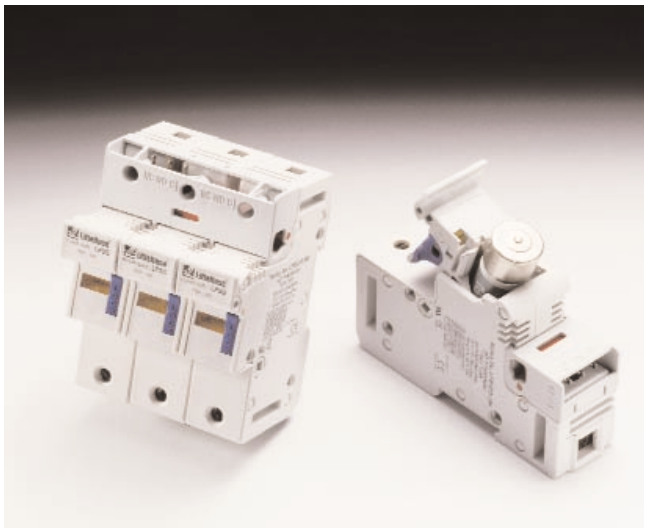
- Global acceptance
- UL and IEC approval
- Universal voltages
- Touch-safe components
- Integrated lockout/tagout device for OSHA compliance
- Blown fuse indication
- Design versatility for OEMs

SIZE CHART

Part Number	Amperage	English	Metric
LgD 0–30A	0–30A	9/16" x 2"	14mm x 51mm
LgD 35–60A	35–60A	13/16" x 2-1/4"	22mm x 58mm
LgD 70–100A	70–100A	1-1/16" x 2-3/8"	27mm x 60mm

LPSG Series Global Pro™ Fuseholders

NEW



The Global Pro-*tection* system from Littelfuse is the world's only fuse system designed for use anywhere, in any equipment, in virtually any country. The Global Protection system simplifies circuit protection by incorporating North American electrical requirements into fuse styles found in the rest of the world. The system's reduced size, touch-safe design, and international acceptance make the Global Pro system the easy circuit protection choice for engineers and equipment designers everywhere.

Every Global Pro fuseholder includes a microswitch that is actuated by a blown fuse, allowing the Global Pro system to integrate into PLC networks and provide equipment operators with a remote method of determining when the fuse needs to be replaced. Global Pro holders also feature a blown fuse indicator light to help maintenance personnel quickly locate the proper circuit.

The Global Pro system is designed to save valuable space in a crowded panel while providing designers with the flexibility of a universally accepted design for easy replacement. Global Pro fuses are far more compact and have greater power handling capability than conventional products. Global Pro fuses are up to 75% smaller than Class RK5 fuses and up to 50% smaller than Class J fuses while providing the time delay characteristics that are necessary for motor circuit protection.

SPECIFICATIONS

Voltage Ratings: 750 Volts AC/DC
Interrupting Rating: 200kA rms symmetrical
Ampere Range: 30, 60, and 100* amperes
Terminal Type: Pressure Plate
Wire Range: #2 – #14 CU
Material: Thermo-plastic
Approvals: UL Recognized 1–60 amps (File No. E71611)
CSA Certified 1–60 amps (File No. LR29862)
*Contact factory for ratings above 60A

FEATURES AND BENEFITS

The Global Pro Fuseholder also accepts IEC dimension cartridge style fuses, allowing equipment to be easily adapted for export markets by simply replacing the fuse with one that meets local standards.

FEATURES

- Extremely compact size
- Blown fuse indicator
- Touch-Safe design
- Integrated lockout/tagout tab
- Din-Rail mountable (35mm DIN-Rail)
- Integrated microswitch with N.O. and N.C. contacts

BENEFITS

- Global compatibility - accepts Global Pro fuses and European IEC dimension cartridge style fuses
- UL and IEC approval
- Safe – Touch-safe design with integrated lockout/tagout device for OSHA compliance
- Design versatility for OEMs

ORDERING INFORMATION

Catalog No.	Amp Rating	Poles
LPSG30-1ID	30A	1
LPSG30-2ID	30A	2
LPSG30-3ID	30A	3
LPSG60-1ID	60A	1
LPSG60-2ID	60A	2
LPSG60-3ID	60A	3
LPSG100-1ID	100A	1
LPSG100-2ID	100A	2
LPSG100-3ID	100A	3

Contact factory for dimensions.

NH Fuse Links

All NH fuse links incorporate a blown fuse indicator.

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 overload 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

Standards: DIN 43.620, IEC 269-2-1

Approvals: VDE

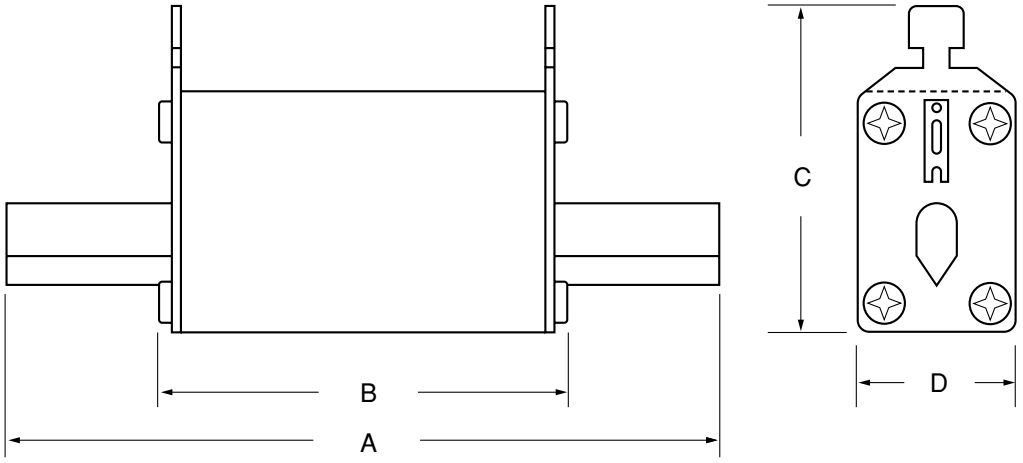
Example part number: *NH1CG25* (size, characteristic and amperage)

Size	Current Range	Voltage (AC/DC)	Interrupting Rating	Nominal Frequency	Selectivity
00C	2A up to 100A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
00	2A up to 160A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
0	6A up to 160A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
1C	25A up to 160A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
1	40A up to 250A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
2C	40A up to 250A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
2	40A up to 400A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
3C	100A up to 400A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25
3	425A up to 630A	500V/440V	120kA/25kA	45 - 62 Hz	1:1 25

	gL-gG 500V					*aM 500V*			
Amperage	**NH00C/NH00**	**NH0**	**NH1C/NH1**	**NH2C/NH2**	**NH3C/NH3**	**NH00M**	**NH1**	**NH2**	**NH3**
2	NH00CG2	—	—	—	—	NH00M2	—	—	—
4	NH00CG4	—	—	—	—	NH00M4	—	—	—
6	NH00CG6	NH0G6	—	—	—	NH00M6	—	—	—
10	NH00CG10	NH0G10	—	—	—	NH00M10	—	—	—
16	NH00CG16	NH0G16	—	—	—	NH00M16	—	—	—
20	NH00CG20	NH0G20	—	—	—	NH00M20	—	—	—
25	NH00CG25	NH0G25	NH1CG25	—	—	NH00M25	—	—	—
32	NH00CG32	NH0G32	NH1CG32	—	—	NH00M32	—	—	—
35	NH00CG35	NH0G35	NH1CG35	—	—	NH00M35	—	—	—
40	NH00CG40	NH0G40	NH1CG40	NH2CG40	—	NH00M40	—	—	—
50	NH00CG50	NH0G50	NH1CG50	NH2CG50	—	NH00M50	—	—	—
63	NH00CG63	NH0G63	NH1CG63	NH2CG63	—	NH00M63	NH1M63	—	—
80	NH00CG80	NH0G80	NH1CG80	NH2CG80	—	NH00M80	NH1M80	—	—
100	NH00CG100	NH0G100	NH1CG100	NH2CG100	—	NH00M100	NH1M100	—	—
125	NH00G125	NH0G125	NH1CG125	NH2CG125	—	NH00M125	NH1M125	NH2M125	—
160	NH00G160	NH0G160	NH1CG160	NH2CG160	—	NH00M160	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

Inter-national Products

NH FUSE LINK DIMENSIONS



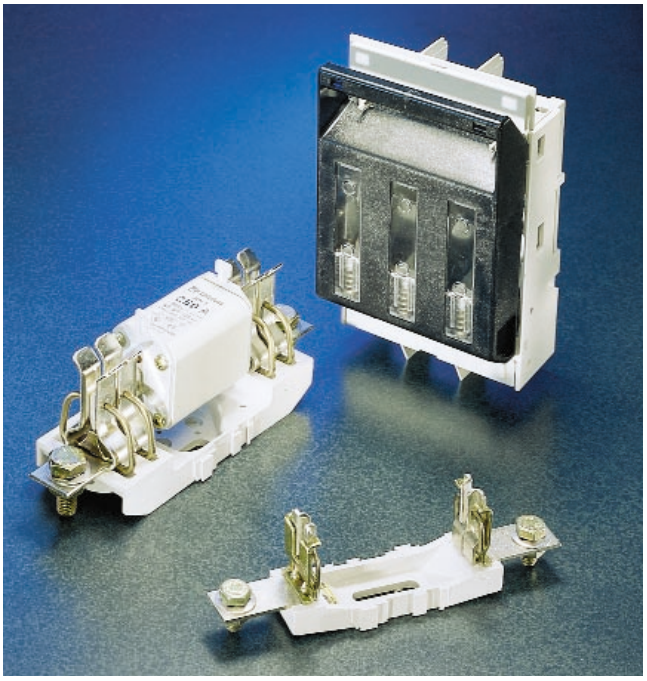
Size	Current Range	Dimensions (mm)			
		A	B	C	D
00C	2-100A	78.00	54.00	51.30	20.00
00	2-160A	78.00	54.00	56.40	30.00
0	2-160A	123.95	70.11	53.34	30.00
1C	25-160A	135.00	75.00	56.40	30.00
1	63-250A	135.00	75.00	64.30	40.00
2C	40-250A	150.00	75.00	64.26	40.00
2	125-400A	150.00	75.00	74.20	50.00
3C	315-400A	150.00	75.00	74.20	50.00
3	315-630A	150.00	75.00	87.37	71.88

NH BASES / DISCONNECTS

FUSE BASES

Part No.	Size	Rating	Connection
NHB00B	00	690V/160A	Bolt
NHB00C	00	690V/160A	V-Clamp
NHB1B	1	690V/250A	Bolt
NHB2B	2	690V/400A	Bolt
NHB3B	3	690V/630A	Bolt

All fuse bases are single pole and gangable.



FUSE DISCONNECTS

Part No.	Size	Rating	Connection
NHFSC00B	C00	690V/100A	Bolt
NHFS0B	0	690V/160A	Bolt
NHFS1B	1	690V/250A	Bolt
NHFS2B	2	690V/400A	Bolt
NHFS3B	3	690V/630A	Bolt

All disconnects are 3 pole.

Contact factory for dimensional information.

International Products

Diazed/Neozed Fuses

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

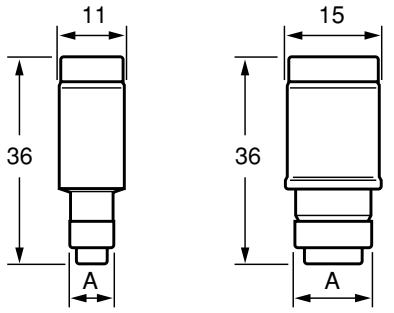
Approvals: VDE

Example part number: *DZ27F4*

Base Size	Type	Current Range	Voltage AC/DC	Interrupting Rating
14	D01	2-16A	380V/250V	50kA
18	D02	20-63A	380V/250V	50kA
16	DI	2-25A	500V	80kA
27	DII	2-25A	500V	80kA
33	DIII	35-63A	500V	80kA

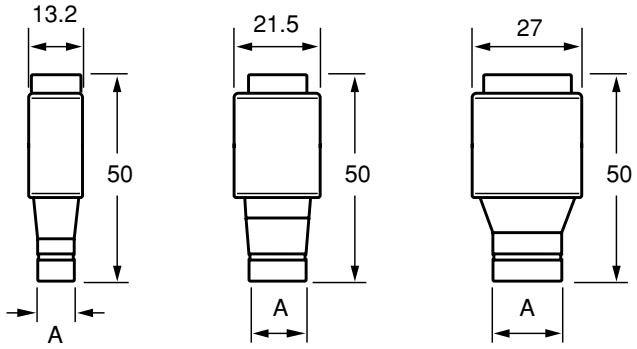
All Diazed and Neozed fuses incorporate a blown fuse indicator.

Neozed Fuses



D01 **D02**

Diazed Fuses



DI **DII** **DIII**

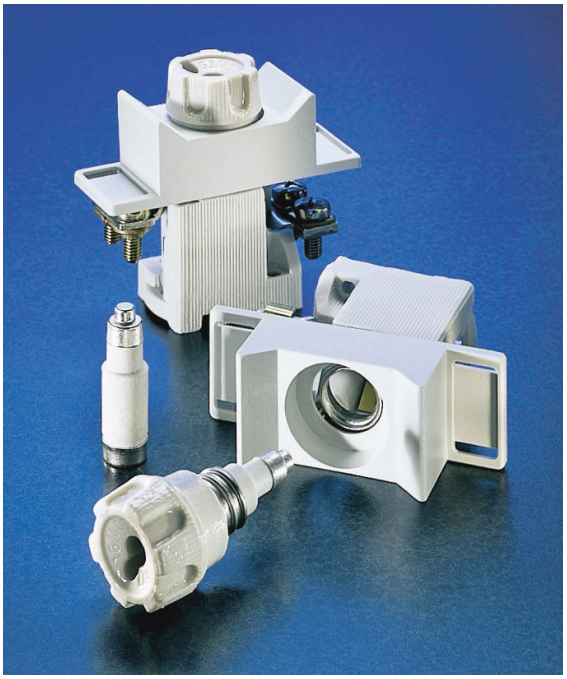
All dimensions are in “mm”.

Amperage	Color	DIAZED FUSES gL-gG DI	gL-gG DII	gL-gG DIII	aM DI	aM DII	aM DIII	DIM. A (mm)	NEOZED FUSES gL-gG D01	gL-gG D02	DIM. A (mm)
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	—

International Products

Diazed/Neozed Fuses

Fuse bases, carriers, and gauge rings are available for Diazed (DZ) and Neozed (D0Z) type fuses. Fuse holders are comprised of a fuse base and carrier. Optional gauge rings act as a rejection feature and are used to prevent over-sizing of fuses. All bases and carriers are single pole units. Contact factory for additional information.



FUSE BASES

Part No.	Fuse Type	Base Size (mm)	Mounting Type
DZB27S DZB27DR	DZ DZ	27 27	Screw Din Rail
DZB33S DZB33DR	DZ DZ	33 33	Screw Din Rail
D0ZB14S D0ZB14DR	D0Z D0Z	14 14	Screw Din Rail
D0ZB18S D0ZB18DR	D0Z D0Z	18 18	Screw Din Rail

FUSE CARRIERS

Part No.	Fuse Type	Base Size (mm)
DZC27 DZC33	DZ DZ	27 33
D0ZC14 D0ZC18	D0Z D0Z	14 18

GAUGE RINGS

Amp Rating.	Color	DZ	DZ	D0Z	D0Z
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.

International Products

Cylindrical Fuses

Littelfuse
POWR-GARD™ Products

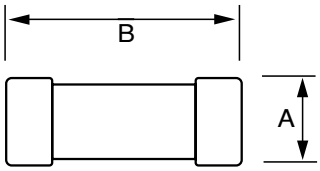
Littelfuse fast-acting (gL-gG) fuses are used for the protection of cables against short circuits. Time-lag (aM) fuses are used for protection of motors.

SPECIFICATIONS

Standards: IEC 269-2-1

Example part number: *CY22X58G50*

Size	Current Range	Voltage AC	Interrupting Rating
10 x 38 mm	.5-32A	500V	120kA
14 x 51 mm	2-50A	500V	80kA
22 x 58 mm	16-100A	500V	80kA



Amperage		gL-gG 10X38	gL-gG 14X51	gL-gG 22X58	aM 10X38	aM 14X51	aM 22X58
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

Part No.	Size	Amp Rating	Voltage	Terminal Type
CYH10381	10X38	32A	690V	Pressure Plate
CYH10382	10X38	32A	690V	Pressure Plate
CYH10383	10X38	32A	690V	Pressure Plate
CYH10381ID*	10X38	32A	690V	Pressure Plate
CYH14511	14X51	50A	690V	Pressure Plate
CYH14512	14X51	50A	690V	Pressure Plate
CYH14513	14X51	50A	690V	Pressure Plate
CYH22581	22X58	125A	690V	Pressure Plate
CYH22582	22X58	125A	690V	Pressure Plate
CYH22583	22X58	125A	690V	Pressure Plate

International Products

• Indicating
NOTE: All fuseholders are DIN-Rail mountable.

Contact factory for dimensional information.

MULTI-POLE ASSEMBLY KIT

Assembly kit is designed for use with CYH1038 and LPSC/LPSM fuse holders. Kit contains 20 connector pincers and 10 handle pins.

Part No: CYHP001

British Dimension HRCII-C Fuses

600 Volts AC ▪ 2 – 600 Amperes

Littelfuse POWR-GARD™ Products

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 Volts AC, 250 Volts DC

Interrupting Rating: 200,000 amperes rms symmetrical AC
80,000 amperes rms symmetrical DC

Ampere Range: 2 – 600 amperes

Approvals: CSA Certified to Standard C22.2 No. 106-M90 (File No. LR90341)

AMPERE RATINGS

2CO	2	10	25	50	80
	4	15	30	60	100
	6	20	40		
2CC	125	200	300	400	500
	150	250	350	450	600
2CM	80	125	200	300	400
	100	150	250	350	

Example part number (series & amperage): 2CM 150

RECOMMENDED FUSE BLOCKS

DF30 (F, B, FB) — Fits 2 – 30 amps
DF60 (F, B, FB) — Fits 40 – 60 amps
DF100 (F, B, FB)— Fits 80 – 100 amps

For additional information on HRCII-C fuse holders, contact factory.

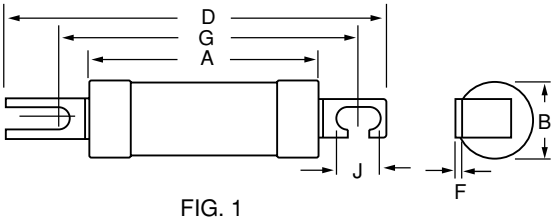


FIG. 1

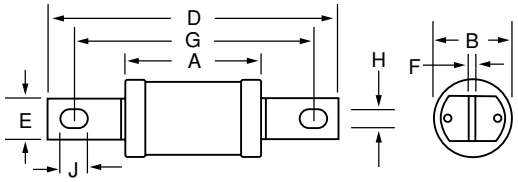


FIG. 2

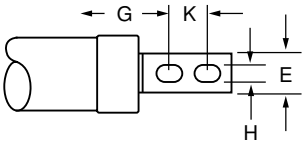


FIG. 3

CAT. NO.	OLD LF PART NO.	REFER TO FIG. NO.	DIMENSIONS IN MM (Inches in parentheses)									
			A	B	C	D	E	F	G	H	J	K
2CO 2-30	FII	1	56 (2.2)	21 (0.83)	—	85 (3.3)	9 (0.35)	1 (0.04)	73 (2.87)	5.5 (0.21)	7.5 (0.29)	—
2CO 40-60	FII	1	57 (2.24)	26 (1.02)	—	88 (3.45)	13 (0.51)	1.6 (0.06)	73 (2.87)	5.5 (0.21)	7.5 (0.29)	—
2CO 80-100	FII	1	68 (2.88)	36 (1.42)	—	110 (4.33)	19 (0.75)	2.4 (0.09)	94 (3.7)	8.7 (0.34)	—	—
2CC 125-200	FIIC	2	76 (3)	41 (1.61)	—	137 (5.39)	19 (0.75)	3.6 (0.14)	111 (4.37)	8.7 (0.34)	16 (0.63)	—
2CC 250-400	FIIC	3	81 (3.19)	58 (2.28)	—	210 (8.27)	26 (1.02)	6.5 (0.26)	133 (5.24)	10.3 (0.4)	16 (0.63)	25.4 (1)
2CC 450-600	FIIC	3	83 (3.27)	74 (2.91)	—	210 (8.27)	26 (1.02)	6.5 (0.25)	133 (5.24)	10.3 (0.4)	16 (0.63)	25.4 (1)
2CM 80-100	FIIM	2	66 (2.6)	31 (1.22)	—	135 (5.31)	19 (0.75)	3.6 (0.14)	111 (4.37)	8.7 (0.34)	16 (0.63	—
2CM 125-200	FIIM	1	77 (3.03)	41 (1.81)	—	110 (4.33)	19 (0.75)	2.4 (0.09)	94 (3.7)	8.7 (0.34)	10.3 (0.4)	—
2CM 250-400	FIIM	2	81 (3.19)	58 (2.25)	—	136 (5.35)	26 (1.02)	5.2 (0.2)	111 (4.37)	8.7 (0.34)	16 (0.63)	—

*Hole diameter to accept insulated stud (types C and D) mm min

Fuseology

FUSEOLOGY

Fuseology provides the information needed to choose the correct types of Littelfuse POWR-GARD® fuses for most applications. Definition of Terms is followed by Overcurrent Protection Fundamentals. If there are any questions or if additional data is needed for a specific use, Littelfuse application engineers may be reached at 1-800-TEC-FUSE (1-800-832-3873).

Definition of Terms Frequently Used When Selecting Overcurrent Protection

AIC or A.I.C.:

See Interrupting Capacity.

AIR or A.I.R.:

See Interrupting Rating.

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. These 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 until the fuse link melts. It equals the rms current squared multiplied by 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 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 and the Arcing I^2t.

Arcing Current (See Figure 1):

The current that flows through the fuse after the fuse link has melted and until the circuit is interrupted.

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.

Arc Flash:

The heat energy and intense light at the point of an arc. For more information on Arc Flash request Littelfuse's technical whitepaper "Understanding and Reducing Arc Flash Hazards."

Arcing Time (See Figure 1):

The time between the melting of a fuse link, or parting of circuit breaker contacts, until the overcurrent is interrupted.

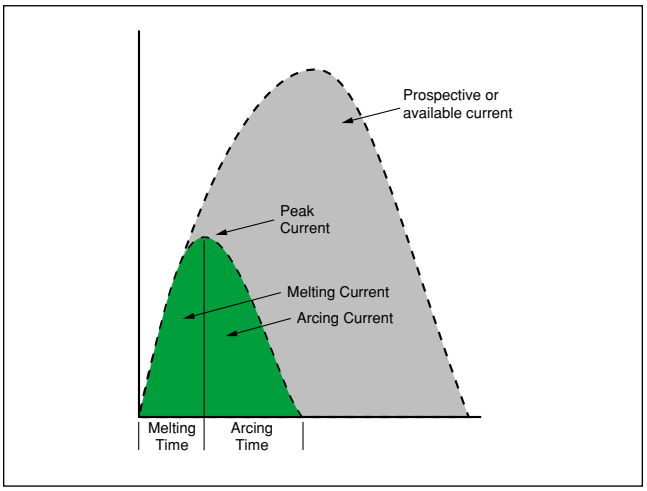


Figure 1
Showing arcing and melting currents and arcing and melting times.

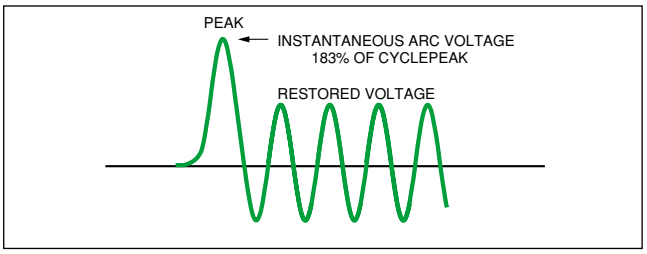


Figure 2

Arc Voltage (See Figure 2):

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}), rarely 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.

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.

Cartridge Fuse:

A fuse that contains a current-responsive element inside a tubular fuse body with cylindrical (ferrules) or endcaps.

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).

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 3 hours or more.

Current-limiting Fuse (See Figure 3):

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.

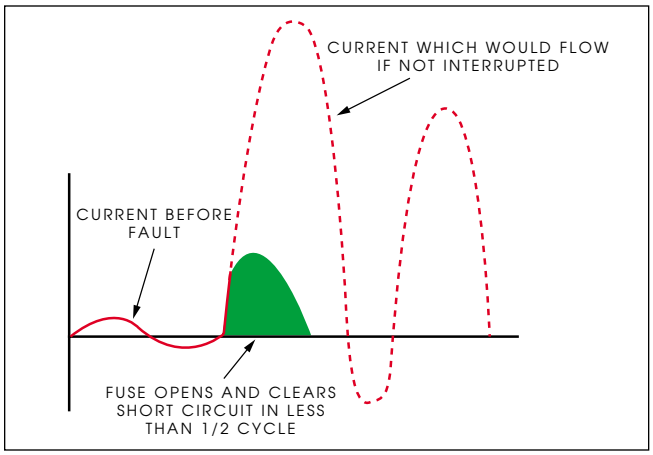


Figure 3

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.

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.

Element:

A fuse's internal current-carrying parts that melt and interrupt the current when subjected to an overcurrent of sufficient duration or value. Also called fuse link.

Fast-acting Fuse:

May also be termed Normal-opening fuse.

A fuse that has no intentional, built-in, time delay. Actual opening time is determined by the fuse class, the overcurrent, and other conditions.

Fault:

Same as short circuit and used interchangeably.

Fault Current:

Same as short-circuit current.

Filler:

A material, such as granular quartz, which is used to fill a section or sections of a fuse and which aids in arc quenching.

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-fault:

A short circuit caused by insulation breakdown between a phase conductor and a grounded object or conductor.

I^2t:

See Ampere-Squared-Seconds (I^2t).

IEC Type 2 Protection:

Fused protection for control components that prevents damage to these components under short-circuit conditions. A more complete discussion of this subject is included in the Motor and Motor Circuit Protection Section. See definition of No Damage.

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.

Interrupting Capacity (AIC):

The highest available symmetrical rms alternating current (for DC fuses the highest DC current) at which the protec-

tive 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.

Melting I^2t:

See Ampere-Squared-Seconds (I^2t).

Melting Time:

The time span from the initiation of an overcurrent condition to the instant arcing begins inside the fuse.

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 2002 NEC reprinted herein, and/or quotations therefrom, 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 2002 NEC; many are still using earlier editions.

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.

One-time Fuse:

Technically, any non-renewable fuse. However, the term usually refers to UL Class H fuses and to fast-acting 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.

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.

See Fuseology section for information on fuse applications for overload protection.

Peak Let-through Current (See Figure 4):

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.

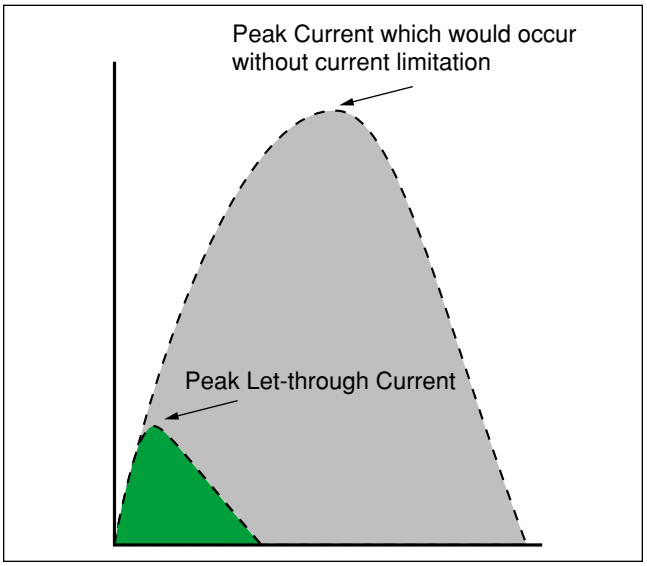


Figure 4

Power Factor (X/R):

As used in overcurrent protection, power factor is the relationship between the inductive reactance and the resistance 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.

Prospective Current:

See Available Short-circuit Current.

Rating:

A designated limit of operating characteristics based on definite conditions, such as current rating, voltage rating, interrupting rating, etc.

Rectifier Fuse:

See Semiconductor Fuse.

Rejection Feature:

The physical characteristics of a fuse block or fuseholder that prevents the insertion of a fuse unless it has mating characteristics. This may be done 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.

Renewable Element (Also Renewable Link):

A renewable fuse's current-carrying part 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.

Selective Coordination (See Figure 5):

In a selectively coordinated system, only the protective device immediately on the line side of an overcurrent opens. Upstream protective devices remain closed. All other equipment remains in service, which simplifies the identification and location of overloaded equipment or short circuits. For additional information, refer to the Fuse Coordination section.

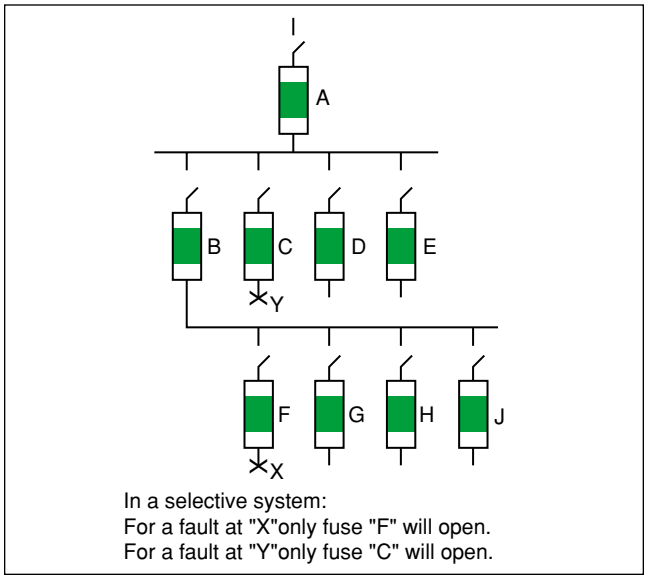


Figure 5

Semiconductor Fuse:

A fuse specifically designed to protect semiconductors such as silicon rectifiers, silicon-controlled rectifiers, thyristers, transistors, and similar components. For additional information, refer to the Semiconductor Section.

Short Circuit (See Figure 6):

A current flowing outside its normal path. It is 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.

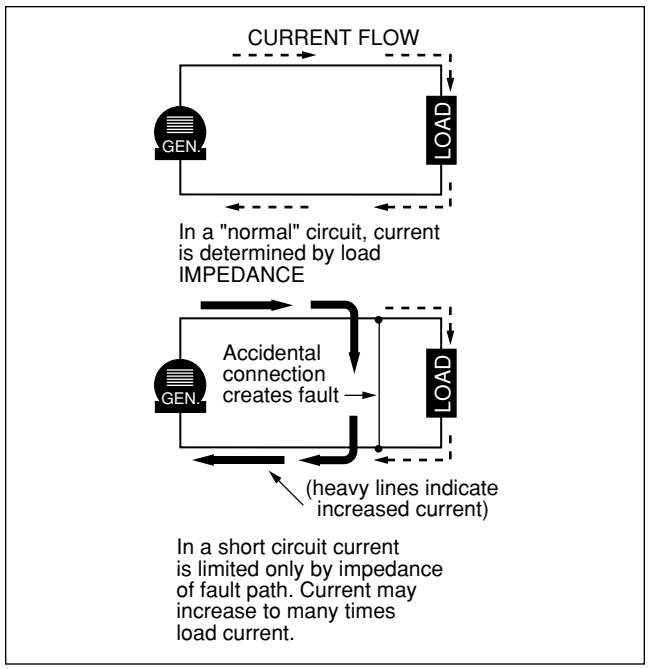


Figure 6

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 "substantially" 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, transformers, etc.

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 so protected 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.

Symmetrical Current:

The terms "Symmetrical Current" and "Asymmetrical Current" describe an AC wave's 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 8**. If the peak currents are not equal, as shown in **Figure 7**, the current is asymmetrical.

The degree of asymmetry during a fault is determined by the change in power factor (X/R) and the point in the voltage wave when the fault occurs. See definition of Power Factor. In general, lower short-circuit power factors increase the degree of asymmetry.

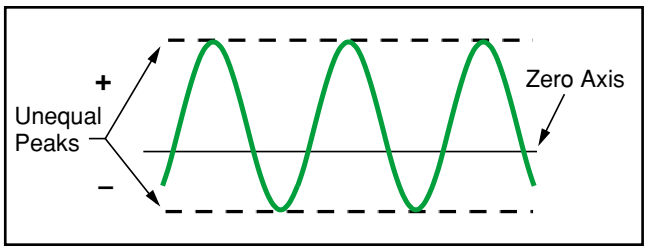


Figure 7
Asymmetrical Current

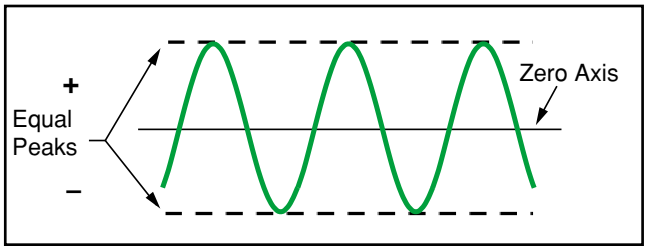


Figure 8
Symmetrical Current

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 9**.

Threshold Ratio:

The threshold current divided by the ampere rating of a specific type or class overcurrent device. A fuse with a threshold ratio of 15 becomes current limiting at 15 times its current rating.

Time-delay Fuse:

Fuses that have 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's 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, G, Plug, and Miscellaneous fuses have different requirements. See the descriptions given in the Product Information Section.

Class L fuses have no standard time delay. The time delay varies from type to type for a given manufacturer, as well as from manufacturer to manufacturer. Littelfuse KLPC series POWR-PRO® fuses hold 500% of rated current for a minimum of ten seconds.

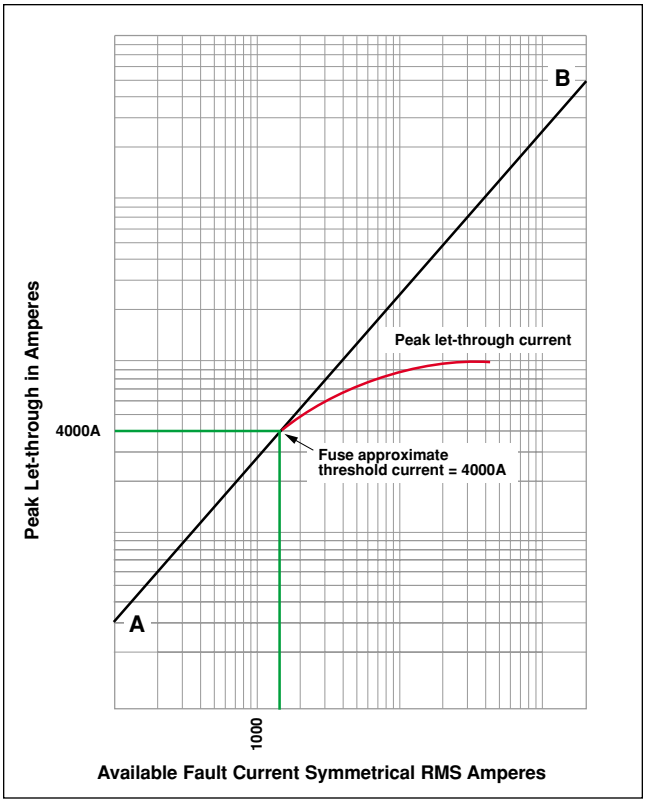


Figure 9

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.

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 Application Engineering Group at 1-800-TEC-FUSE (1-800-832-3873). Definitions of terms used in this section are located in the preceding section.

INDEX **Page**

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. They can pull cables from their terminals and crack insulators and spacers.

Too frequently, fires, explosions, poisonous fumes and panic accompany uncontrolled overcurrents. They not only damage electrical systems and equipment, but may cause injury or death to personnel.

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 Prevention Association (NFPA) working 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 can 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.
5. Is cost effective. Provides reserve interrupting capacity for future growth. Not subject to obsolescence. Requires minimum maintenance, and what is required can be done 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 that is confined to normal current paths. There is no insulation breakdown.

Sustained overloads are commonly caused by installing excessive equipment, such as additional lighting fixtures, They 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 seriously reduces its life. For example, motors overloaded by only 15% may have less than 50% insulation life.

Temporary overloads occur frequently. They may be caused by temporary equipment overloads, such as a machine tool taking too deep of a cut; or they may result from starting inductive loads, such as motors. Since temporary overloads are, by definition, harmless, overcurrent protective devices should not open the circuit.

Fuses selected must have sufficient time delay to allow motors to start and temporary overloads to subside. However, should the overcurrent continue, fuses must

open before system components are damaged. Littelfuse POWR-PRO® and POWR-GARD® time-delay fuses are designed to meet these needs. They hold 500% current for a minimum of ten seconds, and yet open quickly on higher values of current. Even though government mandated high efficiency motors and the new NEMA design E motors have much higher locked rotor currents, POWR-PRO time-delay fuses, such as the IDSR series, have sufficient time delay to permit motors to start when the fuses are selected in accordance with the NEC.

Short Circuits:

Types of Short Circuits:

Short circuits are divided into bolted-faults, arcing-faults and ground-faults. They are defined in the Definition section.

Causes of Short Circuits:

A short circuit is current out of its normal path. It is caused by an insulation breakdown or faulty connection. During a circuit's normal operation, connected load determines current. During a short circuit, current bypasses load, current takes a "shorter path," hence: short circuit. Since there is no load impedance, only the total distribution system impedance from the utility's generators to the fault will limit current flow. **See Figure 6**.

Many electrical systems have 0.005 ohms or less single-phase impedance. Applying Ohm's Law (I = E/Z for AC systems) a 480 volt single-phase circuit with a ten ohm load impedance would draw 48 amperes (480/10 = 48). If, when the load is shorted, the same circuit has a 0.005 ohm system impedance, the available fault current would be 96,000 amperes (480 0.005 = 96,000). Short circuits are currents out of their normal path, and regardless of their value, they must be removed quickly,

Effects of Short-circuit Currents:

If not removed quickly, the large currents associated with short circuits may have three profound effects on an electrical system: heating, magnetic stress, and arcing.

Heating. Current passing through an electrical system heats every part of it. 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. If the current could be reduced to 1,000 amperes for the same period of time, I^2t would be reduced to 10,000 — only 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.

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. 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. These stresses may injure insulation, pull conductors from terminals, and stress equipment terminals sufficiently to cause damage.

Arcing. Arcing at the point of fault melts and vaporizes 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 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. These vapors may explode or burn.

FUSE CHARACTERISTICS (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 need to be evaluated:

Voltage Rating

Fuse voltage ratings must equal or exceed the circuit voltage where the fuses will be installed, and fuses used in DC circuits must be rated for DC. Exceeding the voltage ratings or using an AC only fuse in a DC circuit could result in violent destruction of the fuse. Standard 600 volt and below fuses may be applied at any voltage less than their rating. For example, a 600 volt fuse may be used in a 277 volt or even a 32 volt system.

NOTE: This does not apply to semiconductor fuses and medium voltage fuses. See the semiconductor and medium voltage fuse application data later in this section for voltage limitations of these fuses.

UL Listed low-voltage power fuses are available with AC voltage ratings of 125, 250, 300, 480, and 600 volts, and DC voltage ratings of 60, 125, 160, 250, 300, 400, 500, and 600 volts. Fuses may be rated for AC only or DC only, or they may have both an AC and a DC voltage rating. Supplementary fuses have voltage ratings from 32 to 1,000 volts AC and/or DC.

300 volt Class T fuses (Littelfuse JLLN series) may only be used for single-phase to neutral loads where the voltage does not exceed 300 volts to ground. They may not be used in three-phase, four wire, 480/277 volt, wye systems or in 480 volt corner-grounded delta systems.

Interrupting Rating

A fuse's interrupting rating is the highest available symmetrical rms alternating current that the fuse is required to safely interrupt at rated voltage under standardized test conditions without being damaged. A fuse must interrupt all overcurrents up to its interrupting rating. Fuses are available with interrupting ratings of 10,000A, 50,000A, 100,000A 200,000A, and 300,000A.

NEC Section 110-9 requires all equipment intended to break current at fault levels to have an interrupting rating sufficient for system voltage and current available at the equipment's line terminals. Refer to **Figure 10**. Select fuses with interrupting ratings which equal or exceed the available fault current.

Standardizing on fuses with at least a 200,000 ampere interrupting capacity (AIC) ensures that all fuses have an

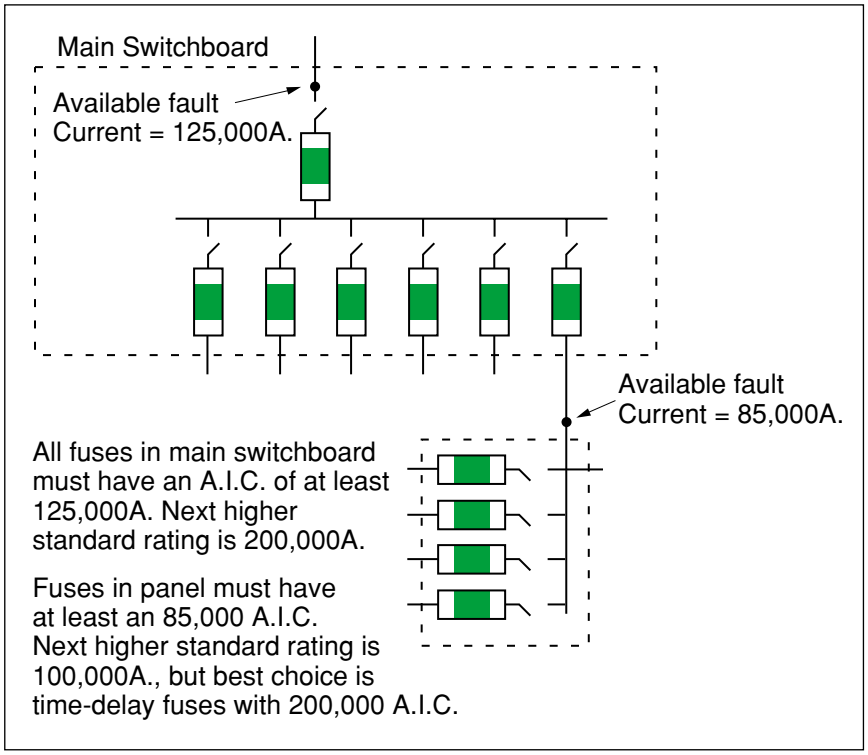


Figure 10

adequate interrupting rating, and provides reserve interrupting capacity for future increases in available fault current.

300,000 AIC 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 marked with a UL interrupting rating greater than 200,000 amperes must be labeled as “Special Purpose Fuses”, and may not be labeled as RK5, RK1, Class L, etc.

Littelfuse feels that the “Special Purpose Fuse” classification adds confusion to specification writing for both fuses and switches and complicates fuse procurement. Since only a very small number of installations have real need for fuses with interrupting ratings in excess of 200,000 amperes, Littelfuse will continue to UL List their fuses by UL standard fuse classes that have interrupting ratings up to 200,000 amperes. Littelfuse fuses which have passed the 300,000 ampere tests are marked on the label: “300kA (Self certified by Littelfuse)”. UL listing cards showing 300,000 AIC and the special purpose classification are available on request. Refer to the product section of this catalog for information on specific fuse classes.

UL is considering increasing the standard interrupting ratings for some fuse classes to 300,000 amperes. When this is done, the confusion surrounding labeling will be eliminated.

Time-current Characteristics

Time-current characteristics determine how fast a fuse responds to overcurrents. All fuses have inverse time characteristics, that is, a fuse’s opening time decreases as the value 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 overloads and short circuits.

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 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 (NEC) must meet these limits whether they are fast-acting or time-delay fuses.

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’s ampere rating range from 0.05 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. They provide only short-circuit protection. Overload relays or other overload protection must be provided to protect conductors and equipment from overload conditions.

Time-delay (Dual-element) Fuses:

UL Classes CC, G, H, L, RK5 and RK1 fuses, plus some of the UL Listed Miscellaneous fuses, may have time delay. If so, they are identified on the fuse label with “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’s ampere rating. UL standards for POWR-GARD® Products series IDSR, FLNR_ID, and FLSR_ID (UL Class RK5), LLNRK, LLSRK (UL Class RK1), and JTD (UL Class J) fuses require them to carry 500% rated current for a minimum of 10 seconds. Standards for CCMR and KLDR (UL Class CC) and SLC (UL Class G) 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, they may be marked time delay. The amount of time delay is determined by the manufacturer. POWR-PRO® KLPC series and POWR-GARD® KLLU series 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: removing large overcurrents in less than one-half cycle (0.008 seconds). Time-delay fuses provide the best overall protection for both motor and general-purpose circuits. They eliminate nuisance fuse opening and most downtime.

Time-delay fuses can be selected with ratings much closer to a circuit's operating current. For example, on most motor circuits 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 using smaller, less expensive switches. Time-delay fuses have gradually replaced most one-time and renewable fuses. Today, more than 50% of all fuses sold by electrical distributors are time-delay fuses such as Littelfuse's POWR-PRO® LLSRK_ID series.

Very Fast-acting Fuses:

The principle use of very fast-acting fuses is to protect solid-state electronic components, such as semiconductors. Their special characteristics, such as quick overload response, very low I^2t, I_{peak} and peak transient voltages provide protection for components that cannot withstand line surges, low-value overloads, or short-circuit currents.

Short circuits:

A fuse's short-circuit response is its opening time on higher-value currents . . . generally for power fuses, over 500 – 600% of 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.

Current-limiting Fuses:

Current-limiting fuses must have the following characteristics:

1. Limit peak currents to values less than those which would occur if the fuses were replaced with solid conductors of the same impedance. This reduced peak current is termed a fuse's "Peak Let-through Current."
2. When the fault current exceeds the fuse's threshold current, the fuse must open the circuit in less than 180 electrical degrees (1/2 cycle) after the start of the fault.
3. Mating fuse holders and/or fuse blocks must reject non-current-limiting fuses, and accept only current-limiting fuses of the stated UL Class.

Fast-acting (Normal-opening) Fuses:

All fast-acting fuses provide fast short-circuit response within their interrupting rating. Some are current-limiting, such as Class T and J. Others are non-current-limiting, such as Class H.

Dual Element (Time-delay) Fuses:

Littelfuse time-delay IDSR, FLNR_ID/FLSR_ID Class RK5, and LLNRK/LLSRK_ID Class RK1 series fuses have true dual-element construction. Time-delay elements are used for overload protection, and separate fast-acting fuse links are used to provide current-limiting short-circuit protection.

Very Fast-acting Fuses:

Very fast-acting fuses are designed for very fast response to overloads and short circuits. They are very current limiting.

Understanding Time-current Curves:

Time-current curves for Littelfuse POWR-GARD® fuses are shown in each product section. They show the average melting times for that series fuse at any current. In order to make the curves more readable, they are presented on log-log paper. The current values appear at the bottom, and increase from left to right. Average melting times appear on the left-hand side of the curve and increase from bottom to top. **Figure 11** shows the average melting time curves for a typical time-delay fuse series.

Figure 12 compares the average melting times for 100 and 600 amp ratings of three fuse types: Littelfuse

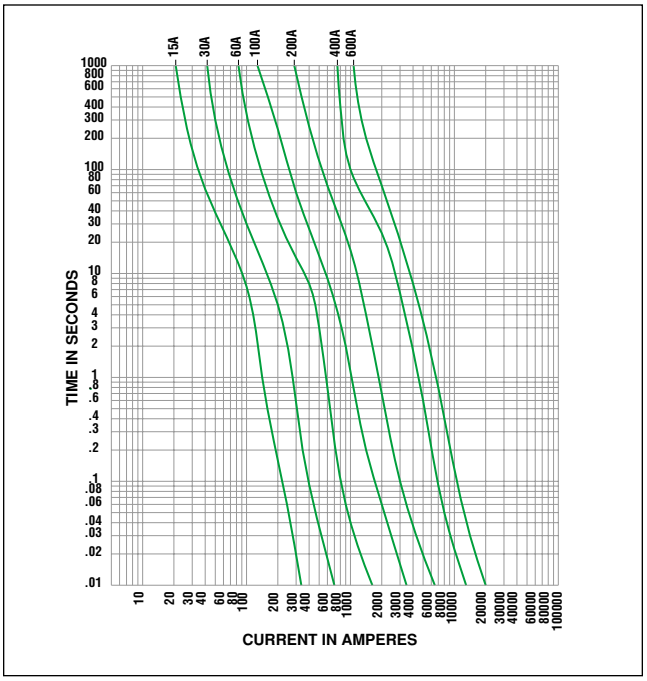


Figure 11

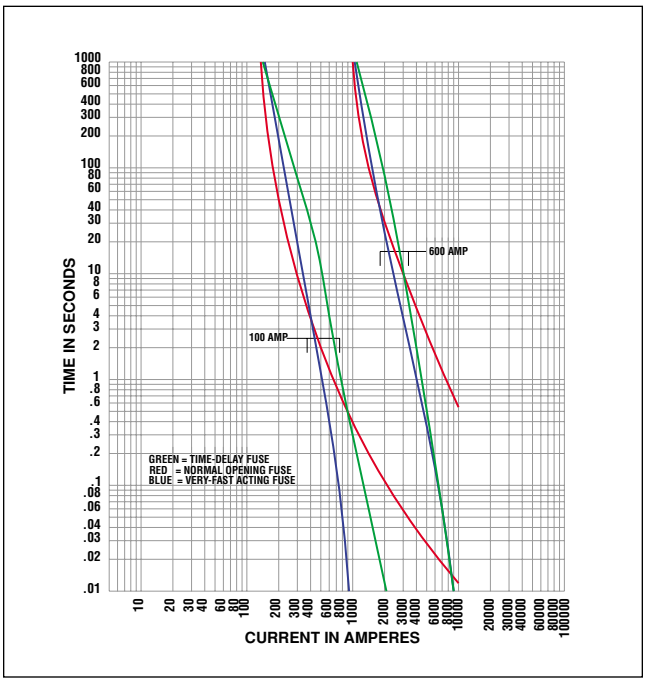


Figure 12

POWR-GARD® dual-element, time-delay, LLSRK series RK1, fuses; Littelfuse NLS series fuses and Littelfuse very fast-acting L60S series semiconductor fuses. **Table 1** compares the opening times for these fuses.

Table 1
Comparative Opening Times for Time-delay. Fast-acting, and Very Fast-acting 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.

Peak Let-through Charts:

Fuses that are current limiting open severe short circuits within the first half-cycle (180 electrical degrees) after the fault occurs. And, they reduce the peak current of the available fault current to a value less than would occur without the fuse. This is shown in **Figure 13**.

A fuse's current-limiting effects are shown graphically on Peak Let-through charts, such as the one in **Figure 14**. The values across the chart's bottom represent the available (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.

As an example, enter the chart on the bottom at 100,000 rms symmetrical amperes and read upwards to line A-B. From this point read horizontally to the left and read an instantaneous peak current of 230,000 amperes. In a circuit with a 15% short-circuit power factor, the instantaneous peak of the available current approximates 2.3 times the rms symmetrical value. Line A-B on the chart has a 2.3:1 slope.

The curves that branch off line A-B show the current-limiting effects of different fuse ampere ratings. Enter the chart in Figure 14 on the bottom at 100,000 rms symmetrical amperes and read upwards to the intersection of the 200 ampere fuse curve. Read horizontally to left from this point and read approximately 20,000 amperes. The 200 ampere fuse has reduced the peak current during the fault from 230,000 amperes to 20,000 amperes. 20,000 amperes is less than one-tenth of the available current. 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 are shown in each product section of this catalog. These charts are useful in determining whether a given fuse can protect a specific piece of equipment.

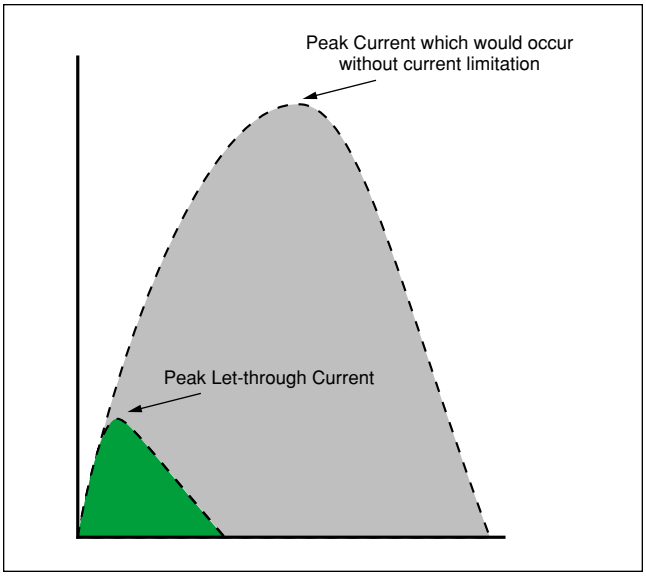


Figure 13
Current limiting effect of fuses

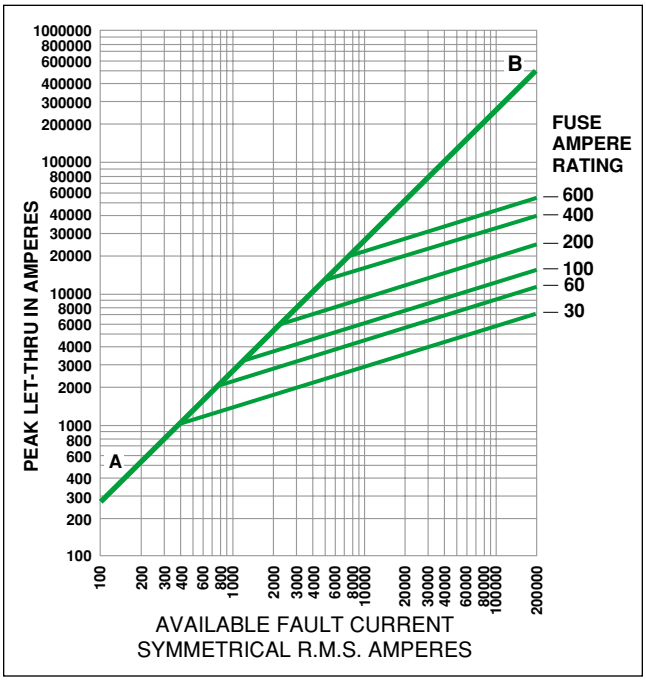


Figure 14
Peak Let-through Charts

For example, with an available fault-current of 100,000 rms symmetrical amperes determine whether 600 amp 250 volt time-delay Class RK1 fuses can protect equipment with a 22,000 amp short-circuit rating. Refer to **Figure 15**.

Locate 100,000A available fault-current on the bottom of the chart (Point A) follow this value upwards to the intersection with the 600A fuse curve (Point B). Follow this point horizontally to the left to intersect with Line A-B (Point C). Read down to the bottom of the chart (Point D) and read approximately 18,000 amps.

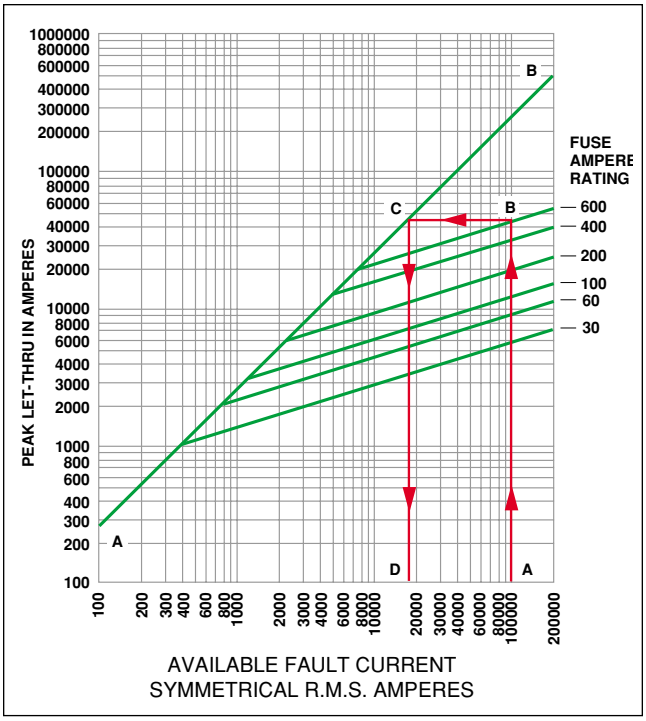


Figure 15

Peak Let-through Chart for POWR-PRO™ LLNRK Class RK1 Dual-element Fuses. Using the Up-Over-and-Down Method.

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 installed in systems with available short-circuit currents greater than their short circuit (withstand) ratings.

This method **may not** be used to select fuses for backup protection of molded case or intermediate frame circuit breakers. National Electrical Code (NEC) Section 240.86 states:

> "Where a circuit breaker is used on a circuit having an available fault current higher than its marked interrupting rating by being connected on the load side of an acceptable overcurrent protective device having the higher rating, 240.86(A) and (B) shall apply.
>
> **(A) Marking.** The additional series combination interrupting rating shall be marked on the end use equipment, such as switchboards and panelboards."

NEC Section 110.22 states:

> "Where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:
>
> CAUTION - SERIES COMBINATION SYSTEM RATED _____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.

UL Listed fuse-to-circuit breaker series ratings are now available from most national loadcenter and panelboard manufacturers. The Listings are shown in their product digests and catalogs. Many local builders have also obtained fuse-to-circuit breaker series ratings. For additional information on this subject contact the Littelfuse Application Engineering Group at 1-800-TEC-FUSE (1-800-832-3873).

Ampere (Current) Rating

A fuse's ampere rating is the AC or DC current that the fuse can continuously carry under specified conditions. Fuses selected for a circuit must have ampere ratings that meet NEC requirements. These NEC requirements establish maximum ratings and, in some cases, minimum ratings. NEC Articles 240 and 430 contain specific requirements. For answers to your questions, contact our Application Engineers.

Fuse Dimensions

There is a trend toward miniaturization in almost everything, and electrical equipment is no exception. While saving space may be an important factor, when selecting fuses other considerations should not be overlooked. Some of these are:

a) Does the smallest fuse have the most desirable characteristics for the application?

b) Does the equipment in which the fuse will be installed provide adequate space for maintenance?

c) Do smaller fuses coordinate well with the system's other overcurrent protection?

GENERAL FUSING RECOMMENDATIONS

Fuse 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 RK1 fuses, POWR-PRO® FLSR_ID series Indicating, Class RK5, current-limiting fuses provide superior time-delay, best cycling characteristics, and the benefits of an indicating fuse at lower cost than RK1 fuses. FLSR_ID series fuses tell you when they have protected your circuit and need to be replaced. If available fault current exceeds 100,000 amperes, equipment may need the additional current-limitation of the POWR-PRO® LLNRK/LLSRK series Class RK1 fuses.

Fast-acting 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/JTD series Class J fuses are primarily used in OEM motor control center applications for space-saving IEC Type II protection.

Class CC series fuses find application in control circuits and control panels where space is at a premium. Choose Littelfuse POWR-PRO® CCMR series fuses for protection of small motors. They are now available with ampere ratings up to 60 amperes. Choose Littelfuse KLDR series fuses for the protection of control power transformers and similar devices.

Should you have any questions concerning application, call our application engineers.

Fuses with ampere ratings from 601 through 6,000 amperes

For superior protection of most general-purpose and motor circuits, we recommend POWR-PRO® KLPC series Class L fuses.

COORDINATED (SELECTIVE) SYSTEMS

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.

See definition of selective system in Definitions, and refer to **Figure 5**.

When a system is not coordinated, a fault at X might cause Fuse B to open. This increases the amount of equipment out of service, and makes it more difficult to locate the problem, increasing downtime.

Since the advent of electrical and electronic business machines, businesses have become entirely dependent on the continuous availability of electric energy. Loss of power halts all production. Customer service is interrupted; order processing ceases; while wages continue.

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. Minimum equipment is removed from service; the faulted or overloaded circuit is easy to locate; and minimum time is required to restore full service.

For these and many other reasons, selectivity is the standard by which many systems are judged.

Fuse Selectivity

Refer to **Figure 11** which shows typical average melting time curves for one class of fuses. Note that the curves are roughly parallel, 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 divided into melting I^2t, and arcing I^2t, (see definition of ampere-squared-seconds). The sum of these is the total clearing I^2t.

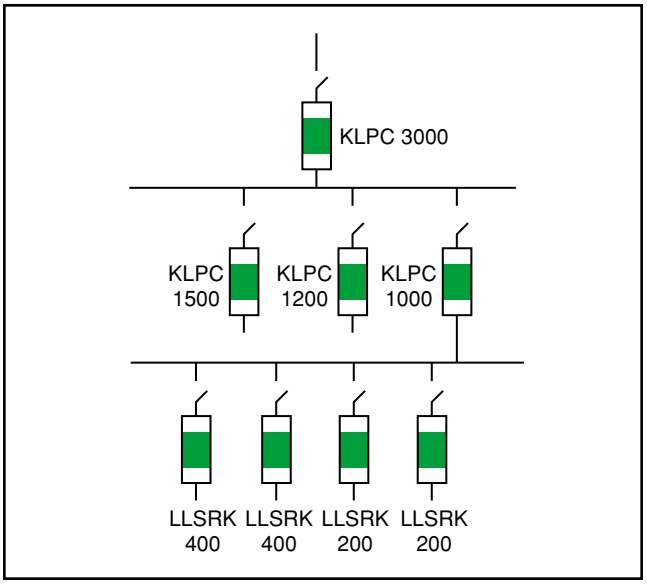


Figure 16
A Coordinated (selective) Fused System

For a system to be coordinated, the smaller fuse's total clearing I^2t must be less than the larger fuse's melting I^2t. Put another way, if the downstream (branch) fuse opens the circuit before the overcurrent affects the upstream (feeder) fuse's element, the system will be selective. This can be determined from curves showing melting and total clearing I^2t, or from minimum melting and maximum clearing, time-current curves.

The simplest method of coordinating low-voltage power fuses is by use of a coordination table such as is shown in **Table 2**. This table is only applicable for the Littelfuse POWR-PRO® and POWR-GARD® fuse series shown. Such tables 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, and with POWR-PRO® LLNRK/LLSRK series Class RK1 and POWR-PRO® JTD series Class J fuses.

In the system shown in **Figure 16**, the 3,000 amp Class L main fuses are at least twice the ratings of the 1,500, 1,200, and 1,000 amp Class L feeder fuses, therefore they will coordinate. The coordination Table also shows that LLSRK series time-delay RK1 feeder and branch-circuit fuses coordinate at a two to one ratio with Class L feeder fuses, so the system is 100% coordinated.

Circuit Breaker Coordination

Because of the many types of circuit breakers and circuit breaker trip units, developing a coordinated circuit breaker system and coordinating circuit breakers with fuses is beyond the scope of this paper. If you have questions concerning, these subjects contact Littelfuse Application Engineers. For more information on fuses and circuit breakers request Littelfuse Tech Topics Volume 2 – Fuses Vs. Breakers (PF327).

Table 2 — 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

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.			
			601-6000	601-6000	30-600	30-600	30-600	30-600	30-1200	30-600	1-60
			L	L	RK-1	J	RK-5	RK-1	T	J	G
Ampere Range	UL Class	Littelfuse Cat. No.	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
30-800	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

Component Short-Circuit Protecting Ability

NEC requires equipment protection to be coordinated with overcurrent protective devices and available fault current to prevent extensive damage to equipment. See **Figure 17**. Essentially, this means that electrical equipment must be capable of withstanding heavy overcurrents without damage or that they are 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; before the current reaches its first peak. See **Figure 13**. Such fuses are termed “current-limiting fuses.” Current-limiting fuses stop damaging current faster than any other protective device. Current-limiting fuses greatly reduce or totally prevent component damage from high fault currents. This helps meet NEC Section 110.10 requirements shown in **Figure 17**.

NATIONAL ELECTRICAL CODE

ARTICLE 110 – REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

A. 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 sufficient for 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 sufficient for the current that must be interrupted.

110.10 Circuit Impedance and Other Characteristics. The overcurrent protective devices, the total impedance, the component 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 components 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 grounding conductor or enclosing metal raceway. Listed products 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 Sections 110.9 for requirements for interrupting ratings and 110.10 for requirements for protection against fault currents.

(Reproduced by permission of NFPA)

Figure 17
National Electrical Code Requires Effective Overcurrent Protection

Fuses for Supplementary Overcurrent Protection

Standards: UL Standard 248-14 (formerly 198F); 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, 50,0000, 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, KLK, KLKD (600 Volts DC)
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.

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, thyristers, 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 such characteristics as published interrupting capacity. They are also covered by UL re-examination service.

Non-renewable

Voltage ratings: to 1,000 volts AC and/or DC

Ampere ratings: to 6,000 amperes

Interrupting ratings: To 200,000 amperes

Dimensions vary widely depending on application, voltage and current ratings.

Many of these fuses are extremely current limiting. When considering application of these fuses, or if you have special requirements, contact Littelfuse application engineers 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

FUSES FOR OVERCURRENT AND SHORT-CIRCUIT PROTECTION OF POWER AND LIGHTING FEEDERS AND/OR BRANCH CIRCUITS

CURRENT LIMITING

NONCURRENT LIMITING

Plug Fuses

Standards: UL Standard 248-11 (formerly 198F), CSA Standard C22.2, No. 59.1

Voltage ratings: 125 volts AC only

Current 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 interchangeable. NEC permits Edison-base plug fuses to be used only as replacements for existing fuses, and only then 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.

Time delay plug fuses are marked T, TD, or time delay

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

CLASS H

Standards: UL Standard 248-6 (formerly 198B), 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

Current 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 gradually upgrading Class H One-time fuses to Class K5 per UL Standard 198D, 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

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, which is referred to as time lag to differentiate from true time delay.

LF Series: RLN, RLS

Replaceable links Series: LKN, LKS

CURRENT-LIMITING FUSE LABELING

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.

The words "Time Delay" or equivalent may be included on the label when the fuse complies with time delay requirements of its class.

CLASS G

Standards: UL Standard 248-5 (formerly 198C), CSA Standard C22.2, No. 106, classified as HRC1 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

CLASS J

Standards: UL Standard 248-8 (formerly 198C), 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

CLASS L

Standards: UL Standard 248-10 (formerly 198C), CSA Standard C22.2, No. 106, classified as HRCI-L
Voltage rating: 600 volts, AC and/or DC
Current ratings: 601-6000 amps
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% rating

LF Series: KLPC, KLLU, LDC
LDC: Rated 600 volts, AC & DC
UL Listed 198C & 198L
Interrupting ratings:
200,000 amps AC & 50,000 amps DC

CLASS R

Standards: UL Standard 248-12 (formerly 198E), CSA Standard C22.2, No. 106, classified as HRCI-R
Voltage ratings: 250 and 600 volts, AC
Current ratings: 0-600 amps
Interrupting rating: 200,000 amps rms symmetrical
Two classes: RK1 & RK5
Non-renewable
Time delay is optional for Class R fuses.
Fuses marked "time delay", "D", "TD", or similar indications of time delay, 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 T

Standards: UL Standard 248-15 (formerly 198H), CSA Standard C22.2, No. 106, classified as HRCI-T
Voltage ratings: 300 and 600 volts AC and/or DC
Current ratings: 0-1200 amps
600V 900 to 1200 amps UL Recognized
Interrupting rating: 200,000 amps rms symmetrical
Non-renewable
No time delay, fast-acting fuses.
Very small fuses, space-saving non interchangeable with any other fuse class.
High degree of current limitation

LF Series: JLLN/JLLS

CLASS CC/CD

Standards: UL Standard 248-4 (formerly 198C), CSA Standard C22.2, No. 106, classified as HRCI Misc.
Voltage rating: 600 volts, AC
Current ratings: UL Class CC; 0-30 amps
For ratings to 60 amps, see note below.
Interrupting ratings: 200,000 amps rms symmetrical
Non-renewable
Fuseholders: Fit UL Class CC fuseholders which reject non Class CC fuses.
Time delay optional: Minimum of 12 seconds at 200% current rating.

LF Series: FAST-ACTING KLKR;
TIME DELAY: CCMR & KLDR
CCMR 35-60 amps are UL Listed Class CD fuses

CLASS K

Standards: UL Standard 248-9 (formerly 198D), No CSA Standard
Voltage ratings: 250 and 600 volts, AC
Current ratings: 0-600 amps
Interrupting ratings: Three permitted:
50,000, 100,000, and 200,000 amps rms symmetrical
Non-renewable
Time delay is optional for Class K fuses.
Fuses marked "time delay", "D", "TD", etc. are required to hold 500% current rating for a minimum of ten seconds.
Same Dimensions and Physically Interchangeable with UL Class H fuses
Fits UL Class H fuseholders
Although UL Standard 198D for Class K fuses requires the fuses to have a degree of current limitation, Class K fuses are not permitted to be labeled current limiting because there is no rejection feature as required by NEC Section 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 – Use LLNRK/LLSRK series RK1 fuses
FAST-ACTING – Use Littelfuse KLNR/KLSR series RK1 fuses

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

CLASS RK1

High degree of current limitation.
Provides IEC Type 2 (no damage) protection for motor starters and control components
Time delay optional

LF Series:
TIME DELAY: LLNRK/LLSRK/LLSRK_ID
FAST-ACTING: KLNR/KLSR

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_ID/FLSR_ID and IDSR

FUSES FOR SPECIFIC APPLICATIONS (600 VOLTS AND BELOW)

INDEX **Page**

PROTECTING SERVICE ENTRANCE AND FEEDER CONDUCTORS

601 through 6,000 amperes

Select POWR-PRO® KLPC series Class L fuses for AC circuits from 601 through 6,000 amperes. The construction and operating characteristics of KLPC series fuses meet the toughest project specifications for Class L fuses:

- They provide maximum time-delay and current-limitation.
- They have a 300,000 amp interrupting rating.
- They have an “O-ring” seal to improve short-circuit performance.
- Fuse links are 99% pure silver.

If the system has DC circuits another choice is POWR-PRO® LDC series Class L fuses for AC and DC circuits from 601 through 2,000 amperes. LDC series fuses are the only Class L fuses which are UL Listed at 600 Volts AC and DC. When facilities have a mix of large AC and DC circuits, standardizing on LDC series for all Class L fuses should be considered. This reduces inventory, and eliminates the possibility that an AC-only fuse will be used in a DC circuit.

Recommended fuse ratings for mains and feeders with combined motor and non-motor load, when conductors are selected in accordance with the NEC:

150% of the largest motor’s full load current plus,
100% of all other motors’ full load currents plus,
125% of the continuous[1] non-motor load plus,
100% of non-continuous, non-motor load.

If the largest motor has long acceleration time requiring branch-circuit protection to be increased to 175-225% of FLA, it may be necessary to increase main and feeder fuse ratings to 175%-225% of the largest motor’s FLA plus the other current values as indicated above. However, if conductor ampacity has been increased to provide spare capacity for future loads, fuse ratings may be increased to the ampacity of the conductors.

When standard fuse ratings do not match conductor ampacities, the next larger standard fuse ratings may be used only if they are rated less than 800 amperes. If fuse ratings are over 800 amperes the next smaller ratings must be used. In addition to all standard ampere ratings, KLPC and LDC series fuses have many additional ampere ratings. The additional ratings permit minimum downsizing of fuses, saving valuable conductor ampacity.

Main Services and feeders 600 amps and less

Several fuse series may be used for main services and feeders under 600 amperes. Choice should be made on the needs of the particular facility. Some of the needs which should be considered follow, with recommendations for fuses that meet those needs.

The vast majority of electrical systems, especially those 600 amps and smaller, have available short-circuit currents less than 100,000 amperes. Class RK5 fuses have provided excellent protection for such circuits for many years. When fault currents exceed 100,000 amperes at the service entrance, a study should be made to determine if the additional current limitation provided by RK1 or Class J fuses is required.

POWR-PRO® RK5, 600 Volt FLSR_ID series Indicator™ fuses provide superior time delay plus substantially better current limitation than required by UL RK5 standards. In addition, the patented indicating window on the fuse immediately shows which fuses are blown. This can significantly reduce downtime.

POWR-PRO® 250/600 Volt LLNRK/LLSRK series time-delay fuses are the fuse of choice for circuits where fault currents exceed 100,000 amperes. The LLSRK’s advanced design reduces short-circuit damage to full-size NEMA and sensitive IEC motor controllers. It is capable of providing Type 2 “No Damage” protection to NEMA size motor starters. Together with the KLPC series fuses, the LLNRK/LLSRK series form the foundation of the POWR-PRO® system of overcurrent protection.

POWR-PRO® 600 Volt JTD_ID series of time-delay Class J fuses provide time-delay adequate for most applications and are substantially smaller than RK5 or RK1 fuses with current-limitation equal to the RK1 fuse. JTD_ID series fuses provide IEC Type II (no-damage) protection to both NEMA and IEC control components and motor controllers. When time delay is indicated, and space is the determining factor, JTD_ID time-delay Class J fuses provide the answer.

Recommended fuse ratings for mains and feeders 1 to 600 A. with combined motor and non-motor load, when conductors are selected in accordance with the NEC:

150% of the largest motor’s full load current plus,
100% of all other motors’ full load currents plus,
125% of the continuous[1] non-motor load plus,
100% of non-continuous, non-motor load.

Motor Protection

The importance of effective motor and motor circuit protection cannot be over emphasized.

Motors are consistently the largest single cause of industrial and commercial fires.

[1] See Definitions for “Continuous Load.”

In today's highly automated commercial and industrial facilities the failure of even one relatively minor motor may shut down an entire installation.

Motor Characteristics:

Motors discussed herein are standard characteristic AC induction motors, which covers about 80-85% of all motors. Special purpose motors are beyond the scope of this publication. Specific application information and protection requirements for these motors should be obtained from motor manufacturers.

Horsepower Ratings:

A motor's assigned horsepower rating indicates the work that it can do under standard test conditions. It is the maximum horsepower load the motor can drive over a long period without exceeding its rated temperature rise. However, a motor can develop far more horsepower than its rating, and if the overload does not last long enough to overheat the motor no damage occurs.

A motor tries to rotate any load attached to it. If the load is too large, the motor will not be able to rotate and will overheat and fail within a very short period. However, if the motor is able to start and run with an overload, excess heat will be generated. If the motor is not stopped, or the overload removed, the excess heat will gradually deteriorate the insulation, and the motor will prematurely fail.

Motor RPM:

The motor nameplate shows the rated speed of the motor in revolutions per minute (RPM) with rated full load attached. The no-load speed of the motor is somewhat higher. The no-load (synchronous) speed of a motor is a function of its design and the number of poles (windings). **Table 3** shows the relationship between the number of poles, no-load speed, and full load speed shown on the motor nameplate.

All non-synchronous induction motors begin to slow down as the load increases. This is commonly referred to as "slip." As load increases motor current and slip increase.

Table 3

Synchronous Speed of Induction Motors vs Full Load Speed

Number of Poles	Synchronous Speed (RPM)	Typical Full Load Speed range (RPM)
2	3600	3450 – 3500
4	1800	1710 – 1760
8	900	855 – 880
12	600	520 – 610

Motor Running Current:

Full Load Amperes (FLA or F.L.A.): A motor's rated full load amps (full load current) is the motor's running current when connected to a load equal to its horsepower rating. If load exceeds the horsepower rating, current will exceed the FLA and the motor may overheat. The vast majority of motors are only partially loaded. As load decreases, motor current decreases.

Partly Loaded Motors: If a motor is not connected to any external load, it still requires a certain amount of current to turn the rotor. This is defined as the "no-load amps" or "no-load current." No-load current is a constant for any given motor and does not change with load. However, no-load current varies widely for different motor designs and horsepower ratings.

A motor's actual running current is the sum of no-load current and load current. For all practical purposes, load current increases directly as the load increases. If a motor is loaded to 50% of rated horsepower, load current will be approximately 50% of load current.

If a given motor's no-load current is 30% of FLA, load current is 70% FLA (100% - 30% = 70%). At 50% rated load the load current would be about 35% FLA (one-half of 70%). Added to no-load current of 30%, motor running current at 50% load will be about 65% FLA (30 + 35 = 65%). If the same motor were 75% loaded, the motor running current would be about 83% FLA (.70 X .75 + .30 = 0.83).

Motor starting currents: When a motor is first energized, a great deal of energy (torque) is required to overcome the inertia of the motor and the load. Once the load is moving, it requires much less energy to keep it moving.

At the instant a motor is energized, motor current peaks at about 12-15 times the nameplate FLA. This is the current required to magnetize the motor windings. Within 1/2 to 3/4 cycles (0 .008-0.0125 seconds) the full magnetic field is developed, and current decreases from 12 to 15 times FLA to roughly 4.5 to 8 times FLA. This is called the motor starting current, and it is also the current the motor will draw if it stops while energized, so it is also called locked-rotor amps (LRA).

The exact value of LRA is determined by motor design, and is shown on the motor nameplate by the NEMA design letter. Motors designed to start only low inertia loads have the lowest starting current. Motors with the same horsepower ratings designed to start very high inertia loads such as large flywheels, hammer mills, etc. will have much higher starting currents. **Table 4** shows the starting current for various designs.

As the motor speed increases from zero, current remains high until the motor reaches about 85-90% full speed. Current then begins to decrease, and when the motor reaches full speed for the attached load, current decreases to normal running current.

Table 4

NEMA Code Leter	Locked Rotor KVA Per Hrspwr.	Maximum Locked Rotor Amps for NEMA Code Letter Motors					
		Single Phase		Three Phase			
		115V	230V	200V	230V	460V	575V
A	3.14	27.3	13.7	9.1	7.9	4.0	3.1
B	3.54	30.8	15.4	10.2	8.9	4.5	3.5
C	3.99	34.7	17.4	11.5	10.0	5.0	4.0
D	4.49	39.1	19.5	13.0	11.3	5.7	4.5
E	4.99	43.4	21.7	14.4	12.5	6.3	5.0
F	5.59	48.6	24.3	16.2	14.0	7.0	5.6
G	6.29	54.7	27.4	18.2	15.8	7.9	6.3
H	7.09	61.7	30.8	20.5	17.8	8.9	7.1
J	7.99	69.5	34.8	23.1	20.1	10.1	8.0
K	8.99	78.2	39.1	26.0	22.6	11.3	9.0
L	9.99	86.9	43.5	28.9	25.1	12.6	10.0
M	11.19	97.4	48.7	32.3	28.1	14.1	11.2
N	12.49	108.7	54.3	36.1	31.3	15.7	12.5
P	13.99	121.7	60.9	40.4	35.1	17.6	14.0
R	15.99	139.1	69.6	46.2	40.1	20.1	16.0
S	17.99	156.5	78.3	52.0	45.2	22.7	18.0
T	19.99	173.9	87.0	57.8	50.2	25.2	20.0
U	22.39	194.8	97.4	64.7	56.2	28.2	22.4
V	24.00	208.8	104.4	69.4	60.2	30.2	24.0

Single-phasing of three-phase motors:

Three phase motors are designed to operate with three balanced phases. When one phase is missing, severe damage may occur if the motor is not rapidly de-energized. This may be due to an open wire in a motor junction box, an open motor winding, a blown fuse, a burned contact in a motor controller, a defective circuit breaker, or other conditions. What happens when single-phasing occurs depends on the nature of the circuit. There are several possibilities which must be examined to fully understand the problem:

When there is only one motor on the circuit which is single-phased:

If the motor is not running at the time, and then tries to start while single-phased, it will not have sufficient available energy to overcome starting inertia, and it stays in a locked rotor condition. It draws full locked rotor current, and most overcurrent protection will open the circuit quickly enough to prevent serious motor damage.

If the motor is running at the time it is single-phased, current in the remaining legs theoretically increases to 1.73 times the current being drawn when the single-phasing occurs. Single-phased motors, however, do not have the capability of developing full horsepower and torque, so the motors may begin to slow down (increased slip) depending on the amount of load. The motor design calls upon it to operate at full speed, so the current increases as the slip increases.

A motor that is more than 80% fully loaded will slow down quite rapidly and stop. Current increases to locked rotor values, and the running overcurrent protection will de-energize the circuit in sufficient time to protect the motor from significant damage.

A motor that is loaded to less than 50-60% load will not slow down significantly, while the current increases to 173% of the current being drawn just prior to single-phasing. Since this is less than FLA, ordinary running overcurrent protection will not sense this as an abnormal condition, and the motor will continue to run. When it stops, of course, it will not restart again until the single-phasing is eliminated. Fortunately, the extra heat generated under these single-phase conditions can usually be dissipated by the motor. Little damage is done, unless the single-phasing continues for an extended period of time. For added protection to large, expensive motors, especially those over 600 volts, consideration should be given to installation of single-phase detection or voltage imbalance relays.

It is the motors loaded from 55-60% through 80% that present the greatest challenge. When these motors are single-phased, they slow down, but continue to rotate. Current in the energized legs increases to approximately 200-220% of current being drawn at time motor was single-phased. This is a combination of the increase due to single-phasing (173%) plus that due to slow down (slip increase).

Since this may be slightly less than FLA or up to 200% FLA, standard overcurrent protection may not provide adequate protection when sized in accordance with rated full load amps of the motor.

There is also extra heat as result of the voltage imbalance in the circuit. This additional heat produces damage in excess of that produced by current alone.

The best way of reducing this type of damage is to measure the actual current drawn by the motor under normal conditions, determine if there may be temporary overloads that need to be considered, and size overcurrent protection just large enough to permit the motor to run under normal conditions.

Several motors single-phased on one circuit:

When there is more than one motor on a circuit that is single-phased, the effects on motor current depend on the relative size of the motors, and whether they are all three-phase, or whether there is a mix of three-phase and single-phase motors.

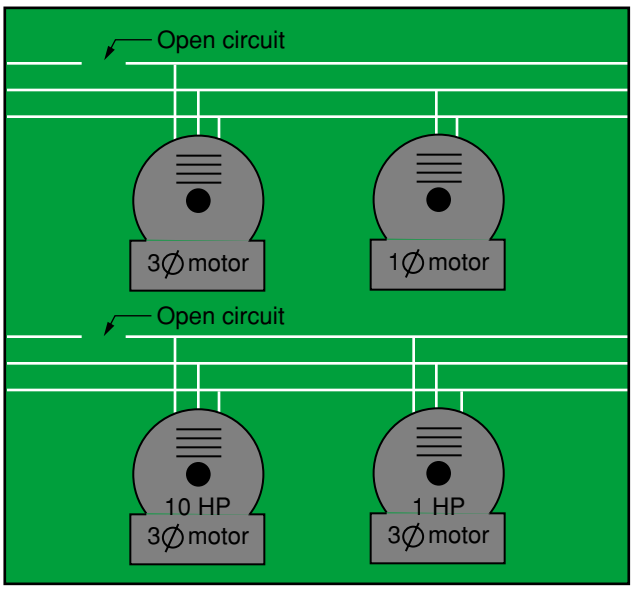


Figure 18

Figure 18 presents two such cases. In the circuit with a three-phase and a single-phase motor, the three-phase motor was loaded to 70% of full load. The feeder was then single-phased as shown. The currents in the three-phase motor increased to 52 %, 120%, and 36 % of full load current in the three phases. At 120% current it is questionable whether standard running overcurrent protection sized at 115% of rated FLA could provide protection from damage due to overload and voltage imbalance.

When the circuit with the ten horsepower and one horsepower three-phase motors was single-phased, the smaller motor did little to affect the currents in the larger motor, but the one horsepower motor was in serious trouble. One of the currents was 140% of normal, while the other two currents were only slightly above the standard rating of running overcurrent protection.

When the ampere rating of a motor's running overcurrent protection is based on the motor's actual running current, adequate protection may be provided for such conditions. However, as is usually the case, if the ampere rating of a motor's running overcurrent protection is based on nameplate FLA and the motor is only partially loaded, the protective devices (overload relays and fuses) may not open in time to protect the motor because the current will not increase enough to operate the relays.

For these reasons, and many others, it is strongly recommended that Littelfuse POWR-GARD™ dual-element fuses be sized as recommended herein.

Protection required by motors:

Since mains and feeders usually serve a mix of inductive and resistive loads, time-delay fuses provide significant advantages. Even when there is no motor load, time-delay fuses reduce other nuisance outages caused by temporary overloads or switching surges. Available short-circuit current is generally highest at the main service disconnect so that adequate interrupting capacity and maximum current limitation are also desirable.

Motor Branch Circuits:

Most motor circuits contain motor controllers (starters) which start and stop the motor and contain overload relays to provide motor running protection and may contain other relays to provide other types of protection.

Time-delay fuses should be considered a must for motor branch circuits. Motor starting currents and the possibility of temporary overloads and/or voltage surges would require oversizing of non-time delay fuses — often as much as 300%. In such cases, only short-circuit protection is provided, and because of the oversizing, larger switches and enclosures are required. This is true of MCC as well. Properly selected, time-delay fuses also provide back-up protection to the motor controllers for such conditions as single-phasing and contact welding.

Recommended ratings of RK1 and RK5 time-delay fuses for motor branch circuits containing motor controllers with overload relays:

For general purpose motors with 1.15 service factor or 40° C rise may generally be rated at 125% of motor's FLA. When fuse ratings do not match motor's FLA, use the next larger standard fuse, but do not exceed NEC limitation of 175% of motor's FLA as given in NEC Tables 430.148 through 430.150. This provides optimum protection to the circuit.

High efficiency motors and NEMA Design E motors (which were announced by NEMA in December of 1993) have much higher efficiencies, and also higher locked rotor currents in relation to FLA. They will require careful selection of both fuses and overload relays. In these circuits we recommend sizing fuses at 150% of FLA or the next smaller rating.

These recommendations will cover about 90% of all motor applications. For those motors with especially severe starting duty and long acceleration times, **Table 430.52** of the NEC permits time-delay fuses to be sized up to 175% of motor FLA.

If 175% of FLA will not permit the motor to start, fuse rating may be increased to a maximum of 225% of motor FLA.

Pages 196 – 198 contain motor protection tables that simplify the selection of Littelfuse RK5, RK1, J and CC fuses for motor running protection and motor branch short-circuit and ground fault protection.

Motor Feeders Over 600A With 100% Motor Load:

Recommended fuses are POWR-PRO® KLPC series.

Recommended fuse ratings when conductors are selected in accordance with the NEC are 150% of largest motor's full load current plus the full load current of the other motors. If required rating does not correspond with a KLPC ampere rating, use the next larger rating.

Fuses for Mains and Feeders With No Motor Loads. Minimum fuse rating is 125% of the continuous load plus 100% of the non-continuous load.

Fusing Motor Control Centers (MCC):

The same general considerations apply to protecting MCC as apply to mains and feeders. Use time-delay current-limiting fuses as described above to provide protection to the entire MCC including buses and internal construction.

Feeders serving MCC are sized the same as general-purpose mains and feeders, since many MCC have both motor and non-motor loads. The non-motor loads may be fused switches serving dry-type power transformers used for lighting panels, or feeders to distribution panels. MCC ampere ratings are based on the MCC main buses. These usually exceed the load connected to the MCC. Therefore, fuses feeding MCC or located in a main switch in the MCC may be rated to protect the MCC buses, as long as they meet the minimum size as determined above.

Fusing Control Transformers:

Control transformers are protected the same as regular transformers which are covered below, with one exception. Control transformers with primary current less than 2 amperes and which are part of a Listed motor controller may have primary fusing not greater than 500% of rated primary current.

Protecting Branch Circuits:

Multioutlet branch circuits must be protected in accordance with the ampere rating of the overcurrent protective device. Ratings shall be 15, 20, 30, 40, and 50 amperes. Non-lighting loads in industrial facilities with adequate maintenance may have branch circuits larger than 50 amperes.

Special-purpose branch circuits must have adequate capacity for the load to be served. Refer to NEC Section 210.2 for a listing of Articles and Sections covering requirements for specific equipment not covered in this section.

TRANSFORMER PROTECTION

Transformers over 600 volts:

The basic rule for transformers rated over 600 volts requires them to have primary and secondary protection in accordance with **Table 5**.

Table 5 — Fuses for Transformers over 600 volts

Transformer Rated Impedance	Maximum Fuse Rating in percent of transformer rated current			
	Primary Fuse Rating Over 600 Volts	Secondary Fuse Rating		
		Over 600 Volts in all locations	600 volts or less in un-supervised locations	600 volts or less in supervised locations
Not more than 6%	300%	250%	125%	250%
More than 6% and not more than 10%	300%	225%	125%	250%

Notes to Table 5

1. Littelfuse IDSR, LLNRK/LLSRK, FLNR_ID/FLSR_ID, and JTD_ID series time-delay fuses may be rated at 125% of transformer secondary current.
2. Where the required fuse rating does not correspond to a standard fuse rating, the next higher standard rating is permitted.
3. An individual primary fuse is not required if the primary circuit fuse is not greater than 300% of transformer primary current.

Transformers rated 600 volts and less:

UL Industrial Control Standards (No. 508) and Motor Control Center Standards (No. 845) specify control power transformer protection corresponding to NEC 430.72(c). In addition, UL requires the primary of control power transformers used in controllers having short-circuit ratings in excess of 10,000 amperes to be protected by UL Class CC, J, R, or T fuses. For maximum fuse ratings permitted by the NEC, refer to **Table A** for sizing of primary fusing and **Table B** for sizing of secondary fusing.

Table A — Maximum Acceptable Rating of Primary Overcurrent Device

Rated primary current amperes	Maximum rating of overcurrent protective device % of transformer primary current rating	
	No secondary fusing provided	Secondary fusing provided in accordance with Table B
Less than 2	300[1]	250[1]
2 to less than 9	167	250
9 or more	125[2]	250

Table B — Maximum Acceptable Rating of Secondary Overcurrent Device

Rated secondary current amperes	Maximum rating of overcurrent protective device % of transformer secondary current rating
less than 9	167
9 or more	125[2]

Notes to Tables A & B

1. 500% for Motor Circuit Control Power Transformers.
2. If 125 % does not correspond to a standard fuse rating, the next higher standard rating may be used.

Reference NEC 430.72 (c) Exception No. 2: 450.3 (b) 1 and 2 UL 508 32.7: 845 11.16 and 11.17.

FUSING CAPACITORS

Capacitors installed on the load side of motor running overcurrent protection are required to have individual protection. All other capacitors are required to have an individual fuse in each ungrounded conductor. NEC Section 460.8(b) requires that the fuse rating be as small as possible. Use POWR-PRO® dual-element time-delay fuses rated at 150 to 175% of capacitor rated current.

LIGHTING FIXTURE BALLASTS

Ballasts for all types of discharge lighting should be protected with individual fuses. Even the newer electronic ballasts with internal fusing benefit from fusing of the fixture. Individual fusing helps prevent loss of an entire lighting circuit when one ballast or fixture fails. This prevents loss of production. When only one fixture is removed from service it identifies the fixture in trouble and eliminates the need to test all the fixtures to locate the problem. UL Listed Class P ballasts are only tested at 200 amps fault current, and the test circuit has a fuse ahead of the ballast. With the ever increasing available current, individual fixture fusing reduces the possibility of the ballast failing in such a way that the fixture is damaged Since ballast designs and characteristics vary so much, recommendations for ballast fusing should be obtained from the ballast manufacturer.

Fusing of Outdoor Lighting Standards:

Whether the lighting fixtures are being used for highway lighting, street lighting or for parking lots, each fixture should be fused using a Littelfuse Class CC or midget fuse installed in a LEB or LEC weather proof fuseholder. These fuseholders were designed to fit in the base of lighting standards. They withstand the wet and corrosive conditions caused by snow melting chemicals. Fusing each fixture eliminates testing the entire circuit for the faulted fixture when only one fails. In industrial plants where outdoor lighting provides safety and security, this is particularly important.

CABLE SHORT-CIRCUIT PROTECTION (APPLICATION OF CABLE LIMITERS)

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. Cable limiters are 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.

The principle is illustrated in **Figures 19** and **20**. With two cables per phase, as shown in **Figure 19**, when a fault occurs in either cable as illustrated by the "X", most of the fault current will flow directly to the fault through limiter "L-1". L-1 will open, and all the fault current will back feed the fault via limiters L-3, L-4, and L-2. Since all of the limiters have the same rating, they will all open shutting down the circuit.

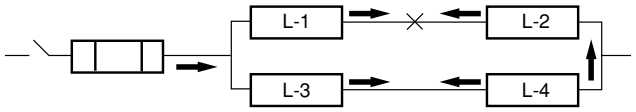


Figure 19
One line diagram of circuit with two conductors per phase

When a fault occurs, and there are three or more cables per phase, this does not happen. This is illustrated in **Figure 20**. When a fault occurs at point "X", current will flow directly to the fault opening limiter L-1. The fault current will back feed the fault, but when there are three or more conductors in parallel, it divides between the remaining cables. When there are three conductors in parallel as shown in **Figure 20**, one half of the fault current will flow through limiters L-3 and L-4, and one-half will flow through limiters L-5 and L-6. All of the fault current will flow through limiter L-2 causing it to open before the other limiters. Only the one cable is removed from service.

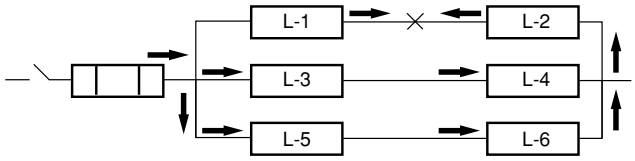


Figure 20
One line diagram of circuit with three or more conductors per phase

By isolating faulted cables quickly, cable limiters prevent damage to conductor insulation caused by the heating effects of large fault currents. For example, If the cable run shown in **Figure 20** passed through pull boxes or man holes, and one section of the cable faulted, only the faulted section would require replacement instead of one or more entire lengths.

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/Benefits:

- Fast-acting 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.

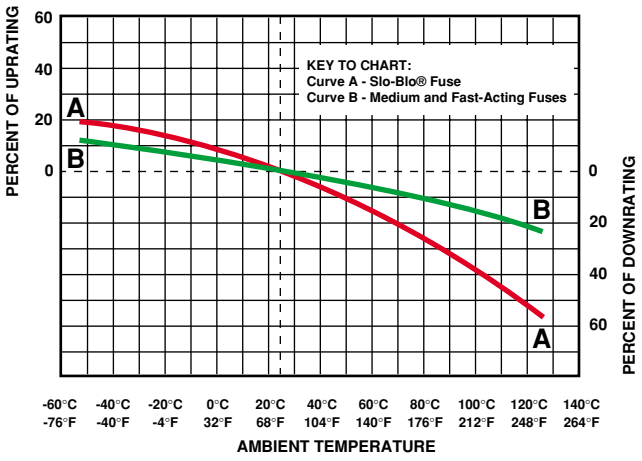
SEMICONDUCTORS AND SOLID-STATE DEVICE PROTECTION:

Semiconductors generally are very sensitive to even low value overloads and to short-circuit currents. They require very fast-acting fuses. Littelfuse Semiconductor fuses are designed specifically to protect power electronics equipment. Refer to the Semiconductor fuse section of this catalog. For application information refer to Littelfuse Semiconductor Application Guide PF336.

EFFECT OF AMBIENT TEMPERATURE ON FUSES

The current carrying capacity of fuses is 110% of 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, continuous current-carrying capacity will be decreased as shown in the chart below. This closely follows the derating tables for all electrical equipment, and reduces equipment burnout due to high ambient conditions. Because Littelfuse SLO-BLO® fuses derate in high ambient conditions, they maintain their integrity until they open to protect the systems; that is, they are "self-protecting".

Fuse Rerating Curve



Medium Voltage (MV) Fuse Application (2,400 - 25,500 Volts AC)

Medium voltage fuses are applied quite differently than fuses rated 600 volts and less. The biggest difference is: medium voltage fuses are not intended to provide overload protection. They should only be applied where they will not be required to open small overcurrents. Another major difference is the wide range of system voltages which results in a correspondingly large number of fuse voltage ratings.

Descriptions and ratings of Littelfuse medium voltage fuses are located in the medium voltage fuse section of this catalog, which also contains some application data. The following is a more detailed discussion of factors which must be considered.

Littelfuse medium voltage fuses are silver-sand, non-expulsion, current-limiting type. When properly applied, they are designed to carry their nominal current rating continuously without “fatigue failure”. This means that the fuse will not age, become brittle, or deteriorate under the most severe duty cycling.

There are two basic types of current-limiting, medium voltage fuses: general purpose and back-up. General purpose fuses have the ability to interrupt both large and small short-circuits down to currents which would cause the fuse to open within one hour. General purpose fuses are used to provide short-circuit protection for transformers, switchgear, and similar equipment.

Back-up fuses are designed to only protect against high fault currents and must be used in series with equipment which provides the circuit’s required overload and low value short-circuit protection.

Medium Voltage “E” rated fuses are general-purpose fuses. Their mounting dimensions permit them to be installed in a wide variety of medium voltage switches, in pad-mounted transformers and similar locations. “R” rated MV fuses are specifically designed to provide short-circuit protection for medium voltage motor controllers and associated equipment.

SELECTING MEDIUM VOLTAGE FUSES

Four factors must be considered when applying MV fuses: voltage rating, interrupting rating, current rating, and coordination with other overcurrent protective devices.

Voltage Rating:

In common with fuses rated 600 volts and less, MV fuses’ minimum voltage ratings must be equal to or greater than the maximum recovery voltage which the fuse will experience under the worst possible conditions. Normally, this requires the fuse’s voltage rating to be greater than the system’s maximum line-to-line voltage. However, when fusing single-phase loads which are connected from line-to-neutral on an effectively grounded four wire wye system, a fuse’s maximum design voltage only needs to be greater than the system’s maximum line-to-neutral voltage. When fuses are selected on this basis, it must be impossible for the fuse to experience line-to-line voltage. Therefore, if more than one phase is extended beyond the fuse’s location, it is best to use fuses with a voltage rating greater than the maximum line-to-line voltage.

While not required for low voltage fuses, MV fuses’ maximum voltage rating must also be considered. For a fuse to be current-limiting, it must interrupt the circuit withing 180 electrical degrees (one-half cycle) after the fault occurs. It does this by producing an arc voltage across the fuse which is greater than the system voltage. This forces current to zero before the available short-circuit current reaches its first peak.

Arc voltages are created in the fuse by the melting of the fuse links. This produces a number of high resistance arcs (gaps) in series. There is a voltage drop across each gap. When the total voltage drop exceeds system voltage, current flow stops. As this occurs, a transient voltage spike is generated in the system, see **Figure 21**. Care must be taken to see that this voltage is not greater than the system’s basic insulation level (BIL). If the fuse’s maximum design voltage rating does not exceed 140% of the electrical system’s voltage, arc (transient) voltage will not usually be a problem.

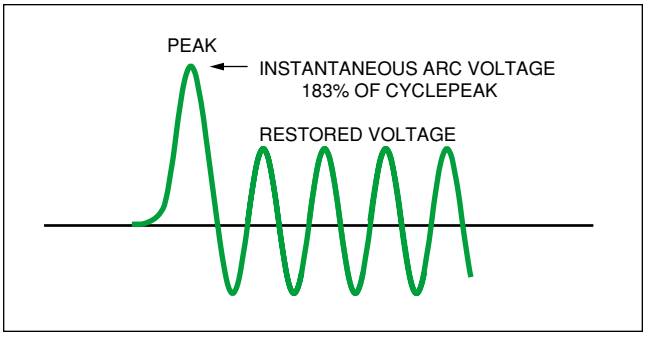


Figure 21

However, higher voltage fuses may be used if certain conditions are met. When tested at nominal voltage rating and rated interrupting current, Littelfuse MV fuses are designed so that the peak arc voltage does not exceed three times the fuse’s nominal voltage. If the electrical system being protected has a basic insulation level (BIL) greater than three times the fuse’s maximum design voltage, the higher voltage fuses may be used. See the following example:

Given: System nominal voltage = 4,800 volts
System BIL = 50 kV

Can a POWR-GARD™ 15NLE-80E fuse, rated 14,400 volts nominal and 15,500 volts max. be used in this system?

Maximum peak voltage produced by this fuse = 3 X 14,400 = 43,200 volts.

43,200 volts is less than the BIL of 50 kV, so the 15NLE-80E fuse may be used.

Medium Voltage Fuses Used With Lightning Arresters:

When MV fuses are in the same circuit with lightning arresters some precautions must be taken to insure that

the transient voltage spike, which occurs when the fuse is interrupting a fault, does not cause lightning arresters to spark over. When checking the BIL of the system, lightning arresters are the first things that should be investigated. Lightning arrester spark over voltage must be higher than the transient voltages which can be produced by the MV fuses. If arc voltages produced by the fuses cause lightning arresters to spark over, a relatively high current will be shunted into the arresters. They are not designed to interrupt such currents.

If the fuses have a voltage rating higher than the arrester and are installed on the arrester's load side, the arrester may spark over when the fuse is interrupting a large fault. If the system has only distribution class arresters, there will seldom be a problem because distribution class arresters have sufficient impedance to prevent large amounts of current from passing through them. Intermediate, line, and station type arresters, however, have low impedance, and if they spark over, sufficient current may flow in an arrester to damage it severely. Intermediate, line, and station type arresters should not be applied on the line side or in parallel with current-limiting MV fuses unless the arresters' spark over voltages are greater than the arc voltages the fuses can produce. If the lightning arresters and the fuses have the same voltage rating, arc voltages will be within desired limits, and the problem is eliminated.

Another approach is to locate the fuses on the line side of the arresters. However, in many cases this is not possible: Utilities prefer to locate fuses on the load side of lightning arresters to prevent lightning from damaging the fuses. In still other cases fuses may be mounted on the primary transformer bushings or within pad-mounted transformer enclosures so that lightning arresters will be on the line side of the fuses.

Machine protection lightning arresters, such as those used to protect large motors and motor control, have very low spark over values and may be easily damaged if they are located on the fuses' line side . However, arresters should always be mounted directly on the machine terminals which will place them on the load side of the fuses.

Interrupting Ratings:

Maximum rms symmetrical AC component and maximum asymmetrical current interrupting ratings for Littelfuse MV power fuses are shown in the medium voltage fuse section of this catalog. MV fuses are tested with a short-circuit X/R ratio of 25:1 which produces an rms asymmetrical multiplier of 1.6 times the symmetrical component 1/2 cycle after the fault occurs and an instantaneous asymmetrical peak current 2.66 times the rms symmetrical component. The interrupting ratings indicate the maximum symmetrical and asymmetrical fault current permitted at point where the fuse is installed.

Short-circuit kVA Ratings:

It is common to state the short-circuit ratings of MV breakers and other equipment such as switchgear in terms of short-circuit kVA. It must be remembered that MV power fuses are not constant kVA devices. If, for example, the voltage is half of the fuse rating, the interrupting capacity does not double. MV fuse interrupting ratings are given in symmetrical and asymmetrical amperes. These values must not be exceeded at any voltage.

When the short-circuit kVA is known, the rms symmetrical AC component may be determined from the formula:

Where: I_{SC} = rms symmetrical short-circuit current

$$I_{SC} = \frac{kVA \times 1000}{1.732 \times E}$$

kVA = Three phase short-circuit kVA

E = System line-to-line voltage

Effect of Frequency and Altitude:

Interrupting ratings of MV fuses shown in the Product section are valid for 50 and 60 Hertz systems. For 25 Hertz systems, multiply the interrupting ratings shown by 0.74.

The continuous current ratings and interrupting ratings of MV fuses shown in the product section are valid up to 3,000 feet. Since the density of air and its dielectric strength decreases as altitude increases, at altitudes exceeding 3,000 feet continuous current ratings and interrupting ratings are affected. **Table 6** provides altitude correction factors.

Table 6 —
Altitude Correction Factors per ANSI C37.40-2.3

Altitude Above Sea Level		Continuous Current	Interrupting Rating
Feet	Meters	Multiplier	Multiplier
4000	1200	.99	.98
6000	1800	.98	.92
8000	2400	.97	.86
10000	3000	.96	.80
12000	3600	.95	.75
14000	4300	.93	.70
16000	4900	.92	.65
18000	5500	.91	.61
20000	6100	.90	.56

Continuous Current Ratings:

Available current ratings of "E-rated" and "R-rated" MV fuses are shown in the MV fuse section of this catalog. The current ratings for MV fuses carry a different meaning than ratings for 600 volt and below fuses. MV fuses are not intended to provide protection against overloads or other overcurrents less than two times their continuous current rating. If MV fuses are exposed to currents only slightly over their continuous current rating, a large amount of heat is generated within the fuse. The heat may cause the fuse tube to char and weaken, and the time-current characteristics may be changed. If circuits can produce sustained currents that are 100% to 200% of MV fuses' current ratings, other overcurrent devices must be in series with the fuses to provide overload protection.,

MV fuses are designed to carry their rated current without exceeding the temperature rise permitted by NEMA and ANSI standards. The "E" and "R" ratings help define the operating characteristics of the fuses:

NEMA Standards for "E-rated" MV power fuses require that fuses rated 100E or less open within 300 seconds (5 minutes) when subjected to an rms current of 200-240% of the fuse's continuous current rating; and fuses with "E" rating larger than 100E must open within 600 seconds (10minutes) when subjected to an rms current of 220-264% of the fuse's continuous current rating.

NEMA Standards for “R-rated” MV power fuses require that they open within 15-35 seconds when subjected to an rms current 100 times the “R” rating.

These values establish one point on the fuses’ time-current curves and help define the characteristics of E- and R-rated fuses. Since all E and R rated fuses must meet these requirements, the time-current characteristics of E-rated and R-rated fuses of different manufacture will have a certain similarity, although they are not necessarily identical.

A long-standing rule of thumb for applying MV fuses states that the minimum fuse rating should be at least 1.4 times the circuit’s full load current. This generally insures that MV fuses will not be required to open overloads. If the nature of the load is such that load currents will never exceed the rating of the fuse, MV fuses may be rated as close as 1.1 times full load current.

TRANSFORMER PROTECTION

A principle use of MV fuses is to provide primary short-circuit protection for transformers. When selecting MV fuses to protect transformers, the following factors must be considered in descending order of importance:

1. As explained above, fuses’ voltage and interrupting ratings must equal or exceed system requirements at the point where fuses will be applied.
2. The fuse’s continuous current rating must be large enough to withstand transformer magnetizing (inrush) current. (Minimum Fuse Rating).
3. The fuse’s continuous current rating must be able to withstand transformer overloading and emergency operation, and meet NEC requirements. (Maximum Fuse Rating).
4. Fuses must protect the system on the line side of the fuse from the effects of short circuits on the load side of the fuses. (Utility System Coordination).
5. Fuses must coordinate with the transformer secondary protection in-so-far as possible.(Facility System Coordination).
6. Fuses must protect transformer against secondary bolted faults.
7. In so far as is possible, fuses should protect the transformer against higher impedance secondary faults.

Transformer magnetizing or inrush current depends on several factors such as transformer design, residual flux in the core at the instant the transformer is energized, the point on the voltage wave at which the switch is closed, and the characteristics of the electrical system powering the transformer. Power transformers’ inrush current approximates 12 times the transformer full load current, and distribution transformers 25 to 40 times full load current. The current generally lasts less than 1/10 second.

To determine the minimum size fuse which will hold the inrush current, obtain the inrush current from the transformer manufacturer and mark the current on the fuses’ minimum melting time-current curves at 0.10 second as shown in **Figure 22**. The minimum fuse rating is the fuse whose minimum melting curve is just to the right and above the transformer inrush point.

When the inrush current is not greater than 12 times transformer full load current, MV fuses with current ratings that equal or exceed a transformer’s self-cooled, full load current will usually meet this requirement. However,

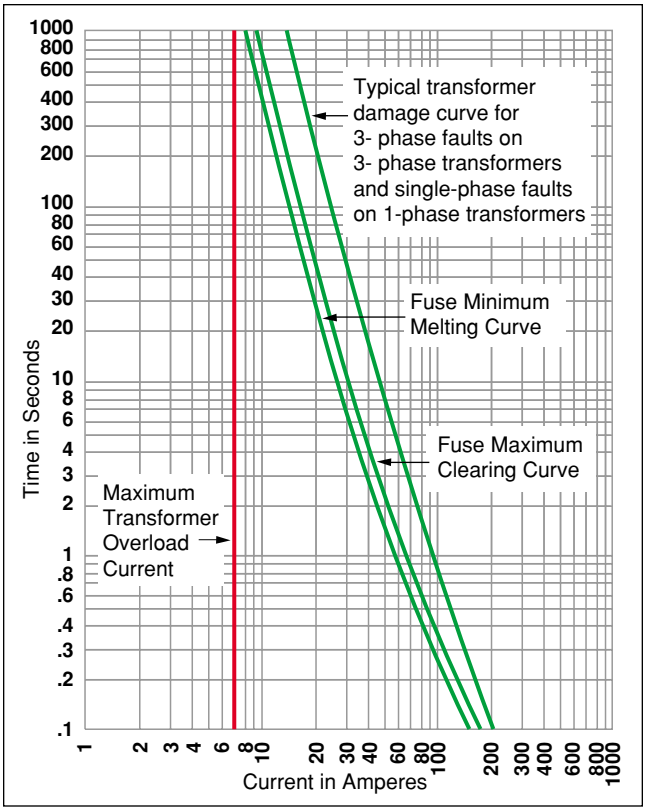


Figure 22

transformers are generally operated at close to full load current on a continuous basis, and are overloaded under emergency conditions. A typical example is a double-ended loadcenter operated with a normally open bus tie. See **Figure 23**. Each transformer is rated to carry 150% of the load on its half of the loadcenter. With loss of service to one transformer, the main switch for that line is opened, and the bus tie switch is closed shifting all load to the remaining transformer. The system is operated overloaded until the other line is back in service. If the outage will continue for a long period of time, manual load shedding can be used to control transformer overloading.

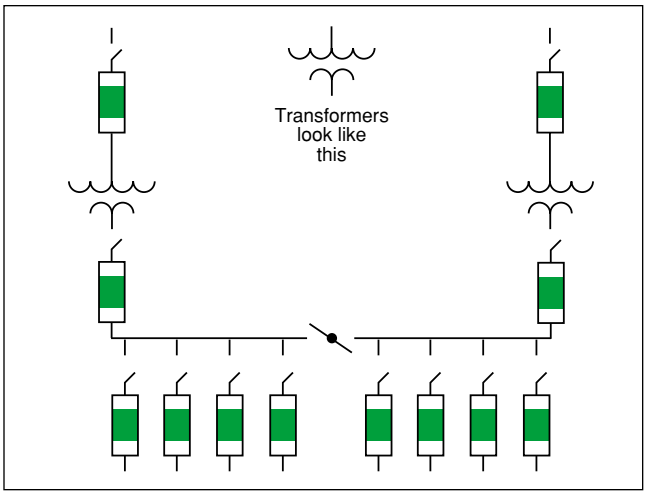


Figure 23

NEC Table 450.3(a)(1).
Transformers over 600 Volts

Maximum Setting or Rating for Overcurrent Device					
	Primary		Secondary		
	Over 600 Volts		Over 600 Volts		600 Volts or Below
Transformer Rated Impedance	Circuit Breaker Setting	Fuse Rating	Circuit Breaker Setting	Fuse Rating	Circuit Breaker Setting or Fuse Rating
Not more than 6%	600%	300%	300%	250%	125%
More than 6% and not more than 10%	400%	300%	250%	225%	125%

Other similar operating schemes also result in transformer overloading. So that MV fuses usually have continuous current ratings larger than required to withstand transformer inrush current.

NEC Article 450 covers transformer installations, and establishes the maximum ratings of transformer overcurrent protective devices. Section 450.3 states in part:

"Transformers Over 600 Volts, Nominal:"

"(1) Primary and Secondary. Each transformer over 600 volts, nominal, shall have primary and secondary protective devices rated or set to open at no more than the values of transformer rated currents as noted in **Table 450.3(a)(1)**. Electronically-actuated fuses that may be set to open at a specific current shall be set in accordance with settings for circuit breakers.

"Exception No. 1: Where the required fuse rating or circuit breaker setting does not correspond to a standard rating or setting, the next higher standard rating or setting shall be permitted.

"Exception No. 2: As provided in (a)(2) below."

"(2) Supervised Installations. Where conditions of maintenance and supervision assure that only qualified persons will monitor and service the transformer installation, overcurrent protection as provided in (a)(2)a. shall be permitted."

"Primary. Each transformer over 600 volts, nominal, shall be protected by an individual overcurrent device on the primary side. Where fuses are used, their continuous current rating shall not exceed 250 percent of the rated primary current of the transformer. Where circuit breakers or electronically-actuated fuses are used, they shall be set at not more than 300 percent of the rated primary current of the transformer."

"Exception No. 1: Where the required fuse rating or circuit breaker setting does not correspond to a standard rating or setting, the next higher standard rating or setting shall be permitted."

"Exception No. 2: An individual overcurrent device shall nor be required where the primary overcurrent device provides the protection specified in this section"

"Exception No. 3: As provided in Table (a)(2)b below:

NEC Table 450.3(a)(2)b.
Transformers over 600 Volts in Supervised Locations

Maximum Rating or Setting for Overcurrent Device					
	Primary		Secondary		
	Over 600 Volts		Over 600 Volts		600 Volts or Below
Transformer Rated Impedance	Circuit Breaker Setting	Fuse Rating	Circuit Breaker Setting	Fuse Rating	Circuit Breaker Setting or Fuse Rating
Not more than 6%	600%	300%	300%	250%	250%
More than 6% and not more than 10%	400%	300%	250%	225%	250%

"Primary and Secondary. A transformer over 600 volts, nominal, having an overcurrent device on the secondary side rated or set to open at not more than the values noted in **Table 450.3(a)(2)b**, or a transformer equipped with a coordinated thermal overload protection by the manufacturer, shall not be required to have an individual overcurrent device in the primary connection, provided the primary feeder overcurrent device is rated or set to open at not more than the values noted in **Table 450.3(a)(2)b**. The limits established by the NEC permit a wide range of primary protection. When selecting primary fuses, designers should determine the maximum load current that the transformer will draw under the most severe conditions, and plot this value as a straight line as shown in **Figure 22**. Transformer damage curves (available from transformer manufacturers) should then be plotted on the time-current curve as shown in **Figure 22**. When possible, select a fuse whose minimum melting time is to the left and below the transformer damage curve and to the right of the desired transformer overload current.

Motor Protection Tables

Selection of Class RK5 (FLNR_ID/FLSR_ID & IDSR Series) or POWR-PRO® Class RK1 (LLNRK/LLSRK Series) Fuses 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 430.148 through 430.150 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, "When No Overload Relays Are Used."

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." Fuse ratings selected from these columns coordinate with most UL Class 10 and 20 overload relays which cover 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 as obtained from motor nameplates. Locate motor nameplate FLA in the column appropriate for the type motor and type of protection required. Read to the left and obtain the recommended 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	
Slo-Blo or LittelPeak Fuse Ampere Rating	Motor Service Factor of 1.15 or Greater or With Temp. Rise Not over 40°C.	Motor Service Factor Less Than 1.15 or with Temp. Rise Greater Than 40°C.	Motor Service Factor of 1.15 or Greater or With Temp. Rise Not Over 40°C.	Motor Service Factor Less Than 1.15 or with Temp. Rise Greater Than 40°C
1/10	0.08-0.09	0.09-0.10	0-0.08	0-0.09
1/8	0.10-0.11	0.11-0.125	0.09-0.10	0.10-0.11
15/100	0.12-0.15	0.14-0.15	0.11-0.12	0.12-0.13
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

Selection of Class RK5 (FLNR_ID/FLSR_ID & IDSR Series) or POWR-PRO® Class RK1 (LLNRK/LLSRK Series) Fuses Based on Motor Horsepower

Motor HP	Full Load Amps	Without Overload Relays: S.F. = 1.15 Or More, Temp Rise Not Over 40°C	Without Overload Relays: S.F. = Less Than 1.15 Or Temp Rise More Than 40°C	With Overload Relays: S.F. = 1.15 Or More, Temp Rise Not Over 40°C	With Overload Relays: S.F. = Less Than 1.15 Or Temp Rise More Than 40°C	Switch or Fuse Clip Rating
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: S.F. = 1.15 Or More, Temp Rise Not Over 40°C	Without Overload Relays: S.F. = Less Than 1.15 Or Temp Rise More Than 40°C	With Overload Relays: S.F. = 1.15 Or More, Temp Rise Not Over 40°C	With Overload Relays: S.F. = Less Than 1.15 Or Temp Rise More Than 40°C	Switch or Fuse Clip Rating
460 VOLT 3-PHASE MOTORS (480V CIRCUIT)						
1/2	1.1	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

Selection of POWR-PRO® Class J (JTD_ID/JTD Series) Fuses 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 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	1 1/4	17.1 – 21.0	25	90.1 – 102	150
1.01 – 1.20	1 1/2	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	2 1/2	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 Section 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	1/2
0.4	0.6	0.4	0.5	0.4	0.5	8/10
0.5	0.7	0.5	0.6	0.5	0.6	1
0.6	1.0	0.6	0.9	0.6	0.8	1 1/4
0.8	1.1	0.8	1.0	0.7	0.9	1 1/2
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	2 1/2
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	3 1/2
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	4 1/2
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 6/10
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	6 1/4
3.6	5.7	3.6	4.2	3.2	3.7	7
4.1	5.8	4.1	4.3	3.4	3.8	7 1/2
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 section 430.52 Class CC (0-30) fuses can now be sized up to 300% 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.