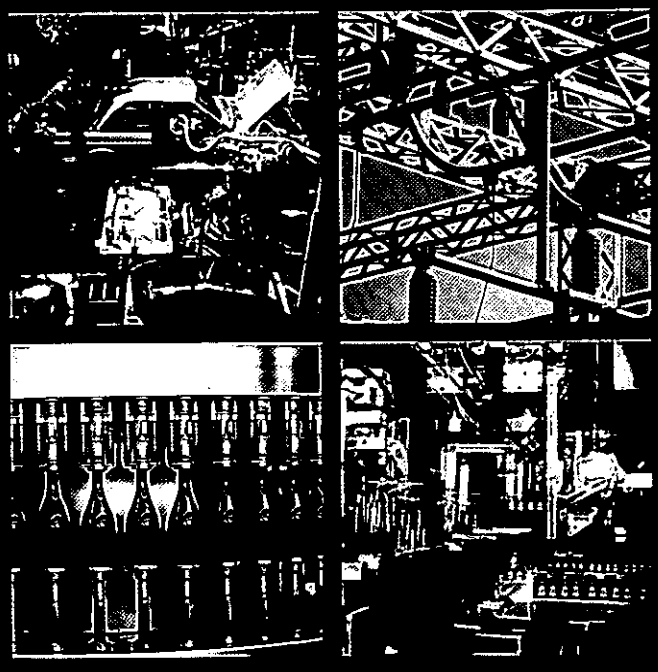
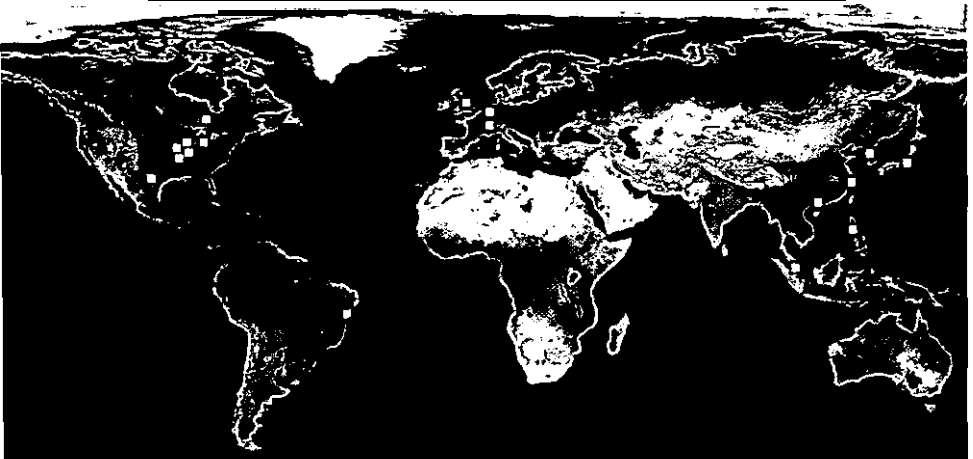
Littelfuse®

Volume 9
PF101-





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Innovation in Circuit Protection

Littelfuse® Worldwide

Littelfuse is an international corporation dedicated and committed to serving customers the world over with innovative circuit protection products that consistently surpass commonly accepted performance standards worldwide. With sales, service an distribution centers in the United States, United Kingdom, The Netherlands, Singapore, Japan, Korea, China and Brazil, product accessibility and design support is available to equipment manufacturers, buildings, plants and construction sites around the world.

Proven Performance

Since the 1920's, Littelfuse has continued to design and manufacture patented circuit protection innovations that are now the standards in the electrical, electronic and automotive industries.

Littelfuse has built a reputation on the firm belief that product quality begins long before the product is manufactured. Following Six Sigma strategies for defect reduction and an aggressive program to certify all its manufacturing facilities, Littelfuse has earned ISO 9001 and 9002 certifications for all its manufacturing locations and QS9000 certification in locations where automotive products are manufactured.

Product Innovation

Innovative concepts such as the award winning JTD_ID Class J Indicator" fuse, the smallest time delay 60 amp CCMR Class CD fuse, and the 600V AC/DC LDC Class L fuse are recent products that are rapidly launching Littelfuse into global electrical circuit protection leadership. Superior electrical, electronic and automotive products, along with the addition of bolt-in and cartridge style medium voltage fuses further solidify Littelfuse's position as the world leader in circuit protection.

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New Littelfuse POWR-GARD™ Product

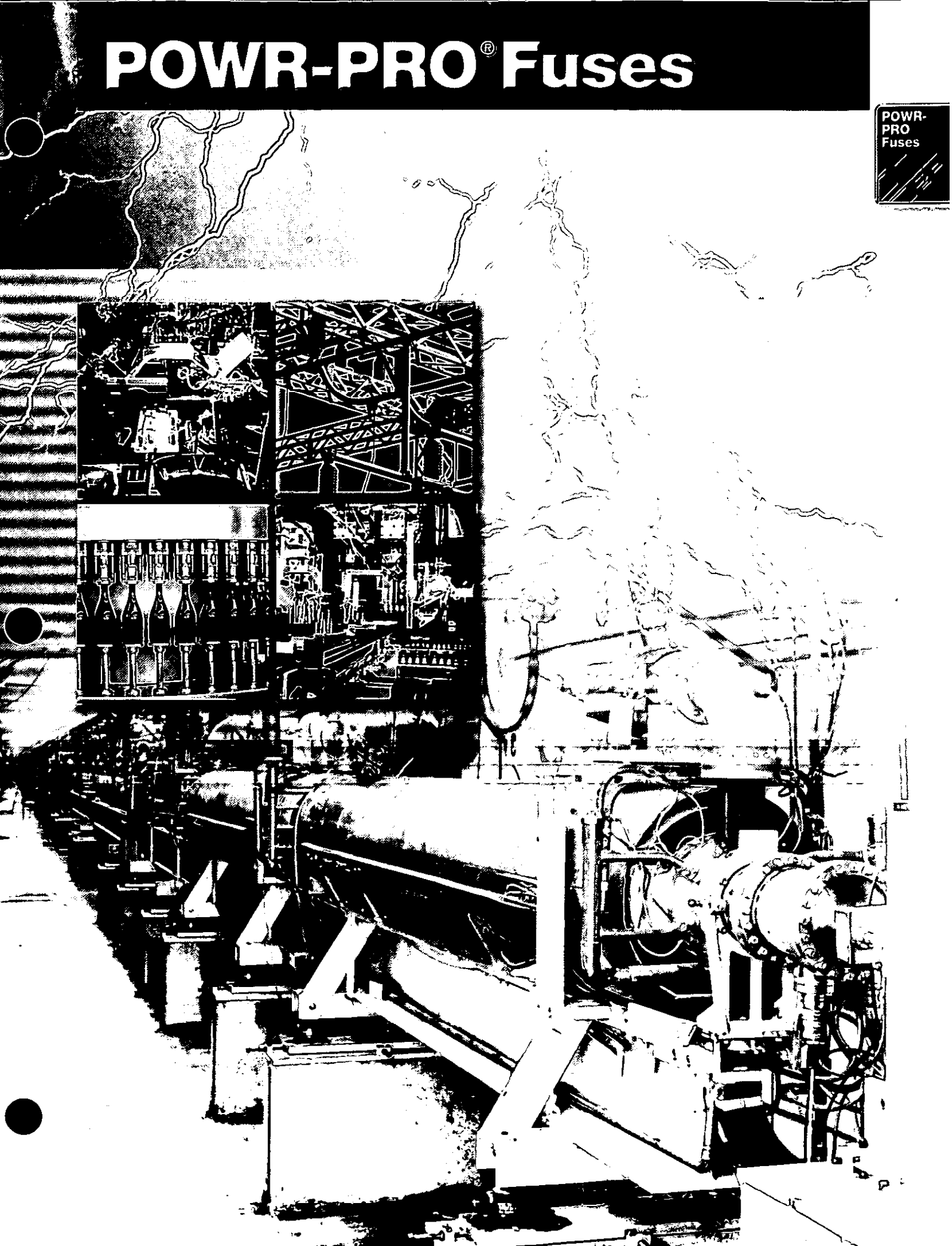
UL FUSE CLASSES

POWR-PRO Fuses

UL CLASS	FUSE OVERLOAD CHARACTERISTICS	INTERRUPTING RATING, AMPERES	AC VOLTAGE RATING	AVAILABLE AMPERE RATINGS	LITTELFUSE SERIES NUMBER	PAGE NUMBER
L	TIME-DELAY	200,000 300,000**	600	200 – 6000 601 – 4000 200 – 2000	KLPC** KLLU LDC*	7-9 25-27 22-23
RK1	TIME-DELAY	200,000 300,000**	250 600	1/10 – 600	LLNRK** LLSRK** LLSRK_ID**	12-14 10-11
	FAST-ACTING	200,000	250 600	1 – 600	KLNR KLSR	33-34
RK5	TIME-DELAY	200,000 300,000**	250 600	1/10 – 600	FLNR/FLNR_ID** FLSR/FLSR_ID** IDSR**,*	28-32 28-32 20-21
T	FAST-ACTING	200,000	300 600	1 – 1200	JLLN JLLS	40-42
J	TIME-DELAY	200,000/300,000**	600	8/10 – 600	JTD/JTD_ID**	15-17
	FAST-ACTING	200,000	600	1 – 600	JLS	38-39
CC	TIME-DELAY	200,000 300,000**	600	1/10 – 30 2/10 – 30	KLDR CCMR**	44-46 18-19
	FAST-ACTING	200,000	600	1/10 – 30	KLKR	44-46
CD	TIME-DELAY	200,000/300,000**	600	35 – 60	CCMR**	18-19
G	TIME-LAG	100,000	600 480	1/2 – 20 25 – 60	SLC SLC	43
K5	"ONE-TIME" FUSES FAST-ACTING	50,000	250 600	1 – 600 1 – 600	NLN NLS	35-36
H	RENEWABLE FUSES FAST-ACTING	10,000	250 600	1 – 600 1 – 600	RLN RLS	37
PLUG	TIME-DELAY	10,000	125	1/4 – 30	SOO, TOO	47
	MEDIUM TIME-DELAY	10,000	125	15 – 30	SLO, TLO	47
	FAST-ACTING	10,000	125	1/2 – 30	WOO	47
SUPPLEMENTARY	MIDGET FUSES ELECTRONIC FUSES	VARIES	32 TO 600	1/10 – 30 1/500 – 30	SEE PRODUCT LISTINGS	49-58
TELECOMMUNICATIONS	FAST-ACTING	100,000	170VDC	70 – 1200 1 – 600 1 – 70	L17T TLN TLS	74 75 76

* LDC and IDSR are rated 600 volts AC/DC.
** Series are UL listed with I.R. of 200,000 amps and Littelfuse self-certified with 300,000 I.R.

POWR-PRO® Fuses



POWR-PRO Fuses

Complete Circuit Protection Plus Time Saving Indication.

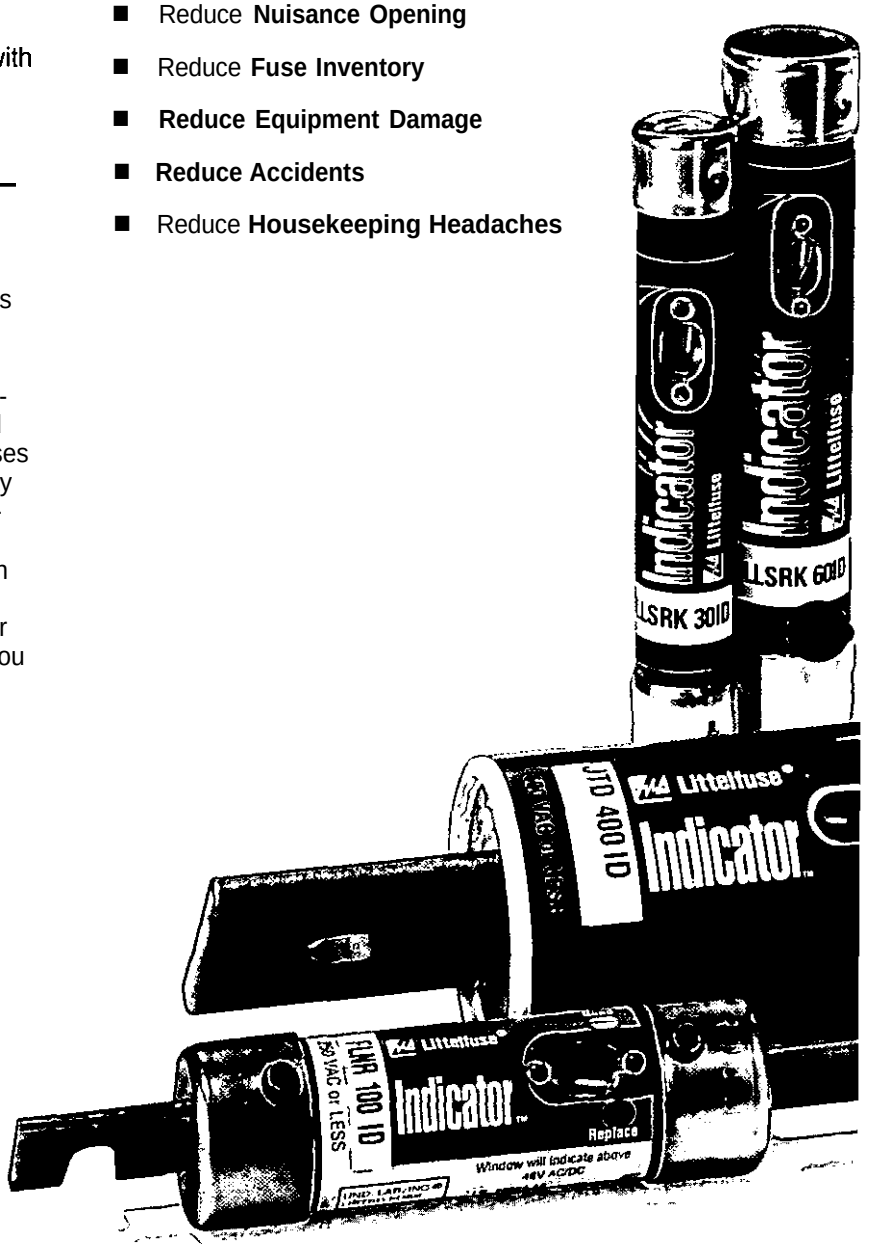
Indicator™ fuses combat one of the most common and frustrating obstacles to productivity: down time. Every time a fuse opens and production stops, money is wasted. Locating a blown fuse used to take 20 minutes or more. With Littelfuse Indicator™ fuses, they can be spotted in an instant — and safely...with 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.

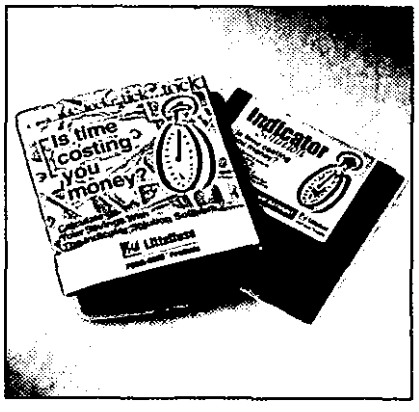
These technologically advanced fuses feature solid-state designs that improve overall performance and increase fuse life. When properly applied, these fuses provide superior protection and improved time-delay over conventional fuse designs. The patented solid-state overload section provides consistent 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**



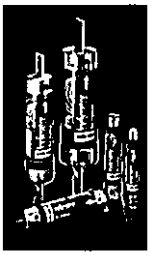
The Indicator™ Solution Software



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.

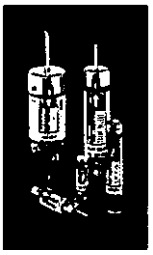
During an overload or short-circuit situation, the Indicator™ fuse will promptly notify you of an open circuit. Using patented Littelfuse technology the Indicator™ fuse's window changes from clear to dark. Once blown, there is absolutely no current through the **fuse.**



LLSRK_ID

- Class RK1
- 600 VAC
- Dual-Element, Time-Delay
- 1110-600 Amperes

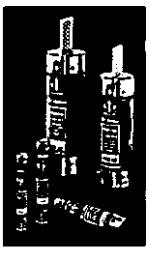
see pages 1 o- 11



FLNR_ID/FLSR_ID

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

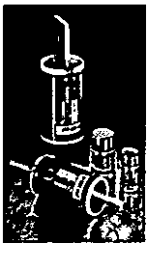
see pages *28-30*



IDSR

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

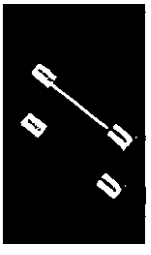
see pages 20-21



JTD_ID

- Class J
- 600 VAC
- Time-Delay
- 8/1 O-600 Amperes

see pages 15-1 7



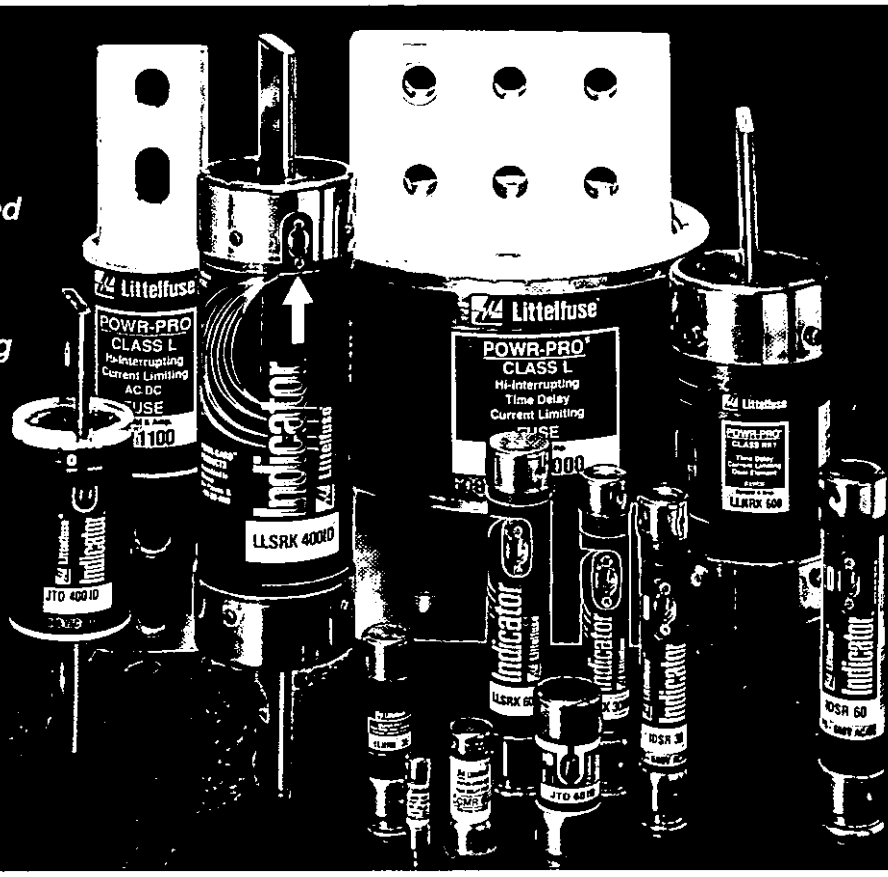
313_ID

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

see page 54

POWR-PRO Fuses

The Littelfuse POWR-PRO® System of fuses gives you all the fuses you need for complete circuit protection coverage while reducing inventory and controlling costs.



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.

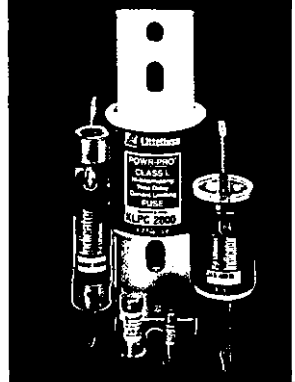
. Reduce fuse replacement downtime with simple color coded fuse labels.

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	[illegible]	Low Peak	System 2000
Class L	[illegible]	KRPC	A4BQ
Class RK1	[illegible]	LPNRK/LPSRK	A2DR/A6DR
Class J	[illegible]	LPJ	AJT
Class CC	[illegible]	LPCC (1/2–30)	ATDR (0–30)
Class RK5	IDSR	—	—
Class L	LDC	—	—

COLOR COORDINATED FOR EASE OF /DENT/NAND REPLACEMENT

Green labeled fuses provide all the inventory you need for:



: Superior current limitation from 1/10 – 6000 amperes.

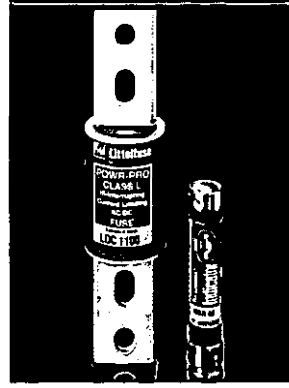
▪ Type II 'No Damage" coordination with NEMA and IEC motor circuits.

. 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.

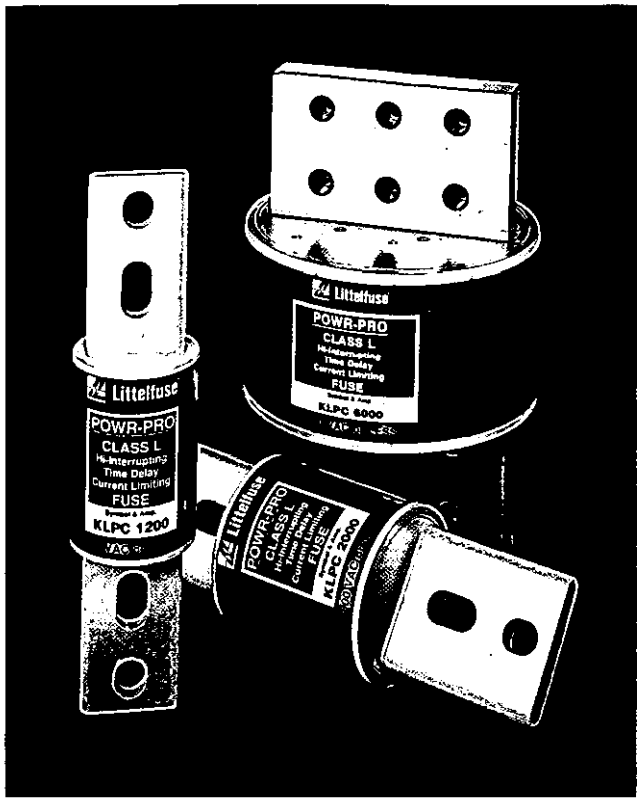
. Non-electrical blown fuse indication in the cost effective IDSR series.

KLPC Series POWR-PRO@ Class L Fuses

600 VAC ▪ Time-Delav ▪ 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
(Littelluse self-certified).

DC: 20,000 amperes

Ampere Range: 200 – 6000 amperes

Approvals: AC: Standard 248-l 0, 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 — Littelluse self-certified to 300,000 amperes as standard. Meets future trend towards higher available short circuit currents.

KLPC Series POWR-PRO@ Class L Fuses

600 VAC ■ Time-Delay ■ 200 – 6000 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

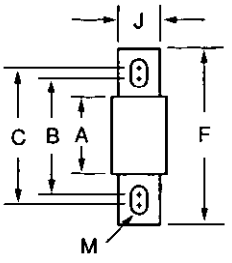


FIG.1

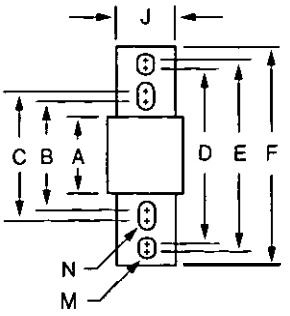


FIG.2

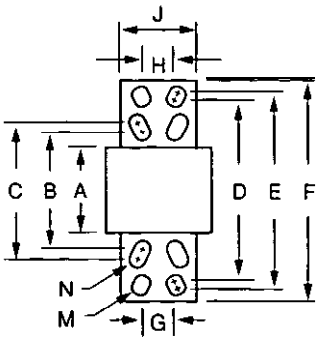


FIG. 3

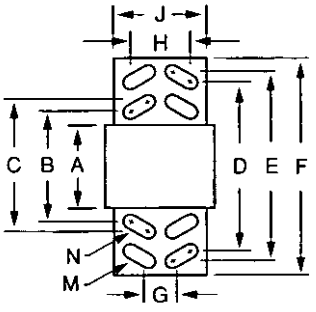


FIG. 4

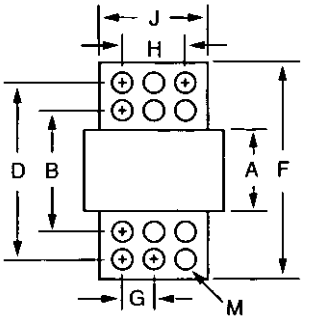
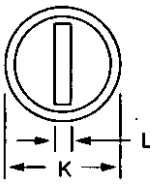


FIG. 5



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)	—

KLPC Series POWR-PRO@ Class L Fuses

600 VAC ▪ Time-Delay • 200 – 6000 Amperes

Littelfuse
POWR-GARD™ Products

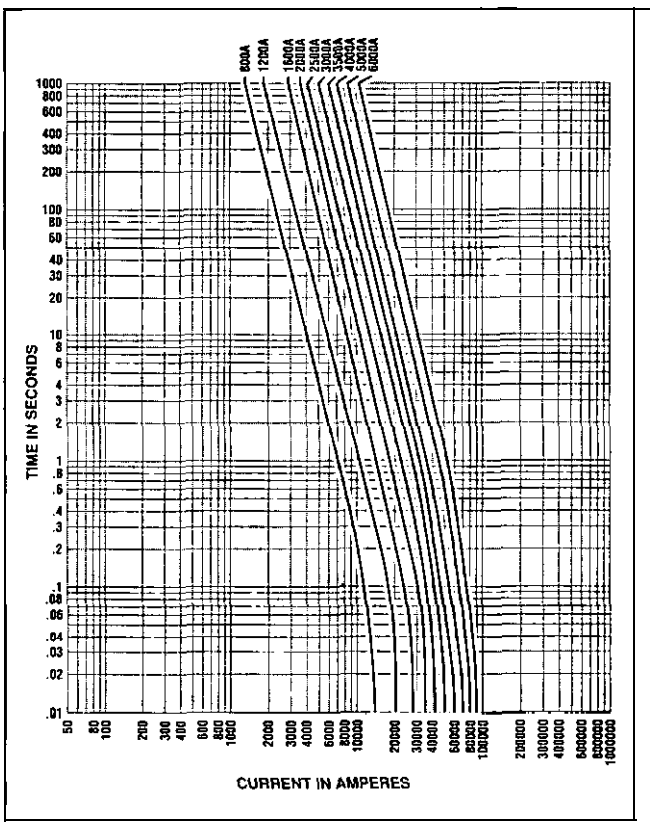
POWR-PRO Fuses

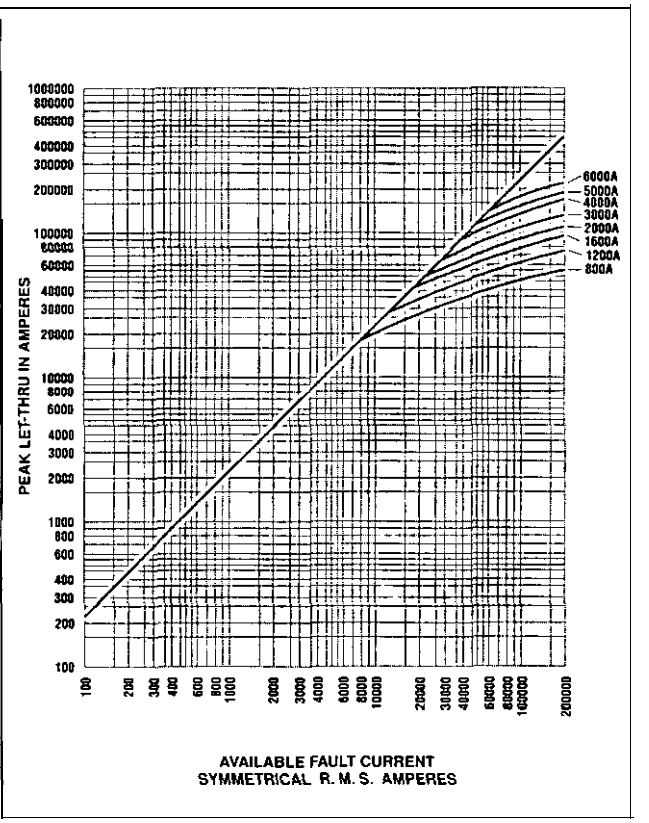
Current-Limiting Effects of KLPC (600V) fuses

* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data derived from Peak Let-Thru Curves

Short Circuit 6 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;ooo	15;ooo	19;ooo	20;ooo	20;ooo	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	28,000	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;OOO	51;OOO	57;OOO	70;OOO
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





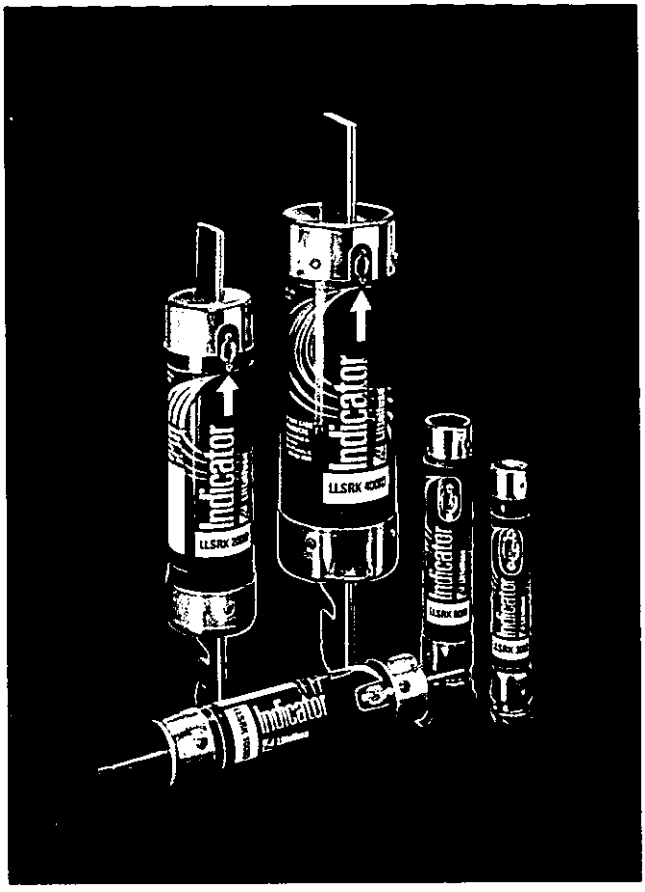
LLSRK-ID Series Indicator™ POWR-PRO@ Class RK1

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

Littelfuse'
POWR-GARD™ Products

POWR-PRO Fuses

NEW!



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%.	6%	25	90	300
15/100	1%	3	7	30	100	350
2/10	1%	3¾	8	35	110	400
¼	IX.	3½	9	40	125	450
3/10	1%	4	10	50	150	500
4/10	1%.	4%	12	60	175	600
½	2	5	15	70	200	
6/10	2%	5⅝	17%	80	225	
8/10	2½	6	20		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.

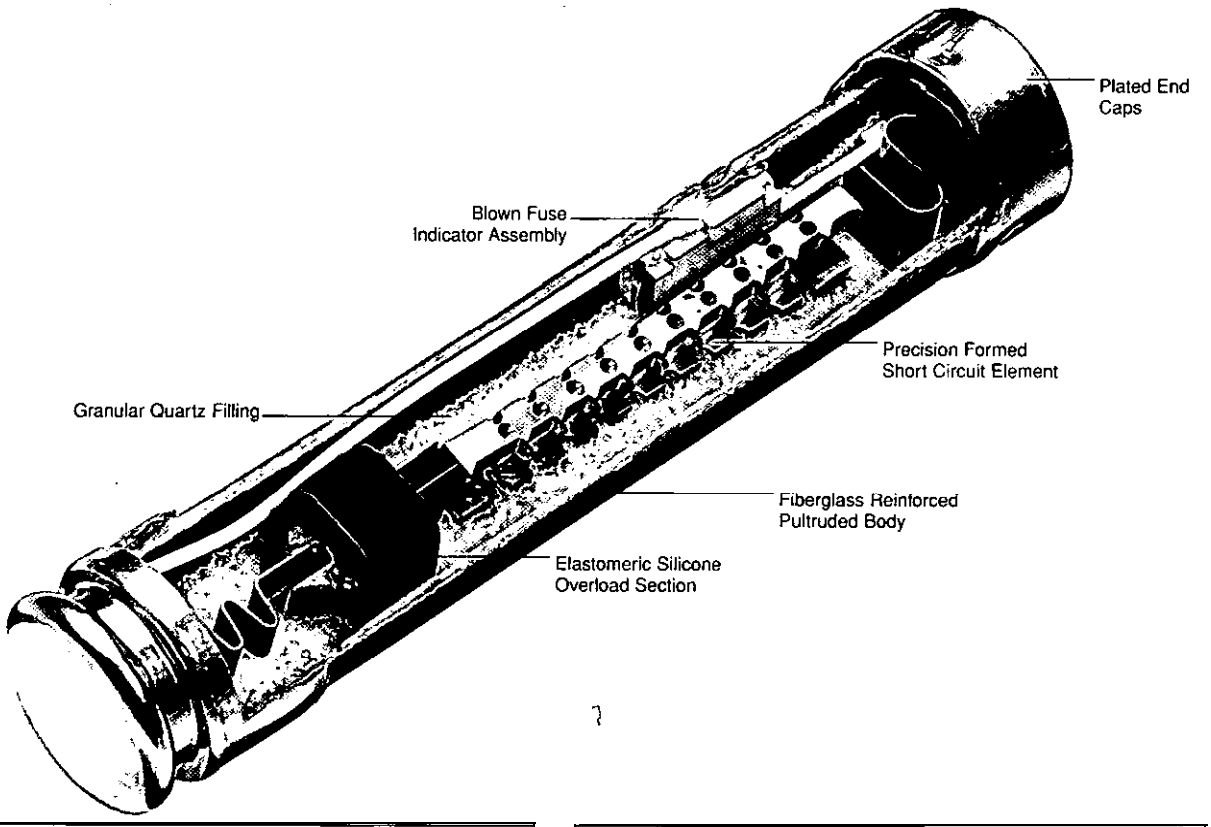
LLSRK ID Series Indicator™ POWR-PRO@ Class RK1

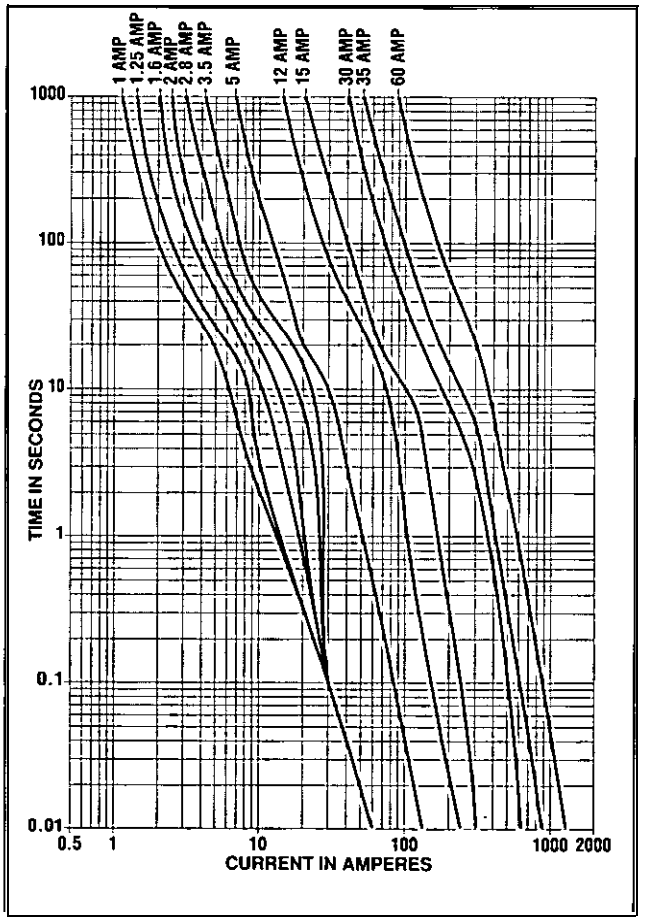
600 VAC ■ Dual-Element, Time-Delay ■ 1/10 – 600 Amperes

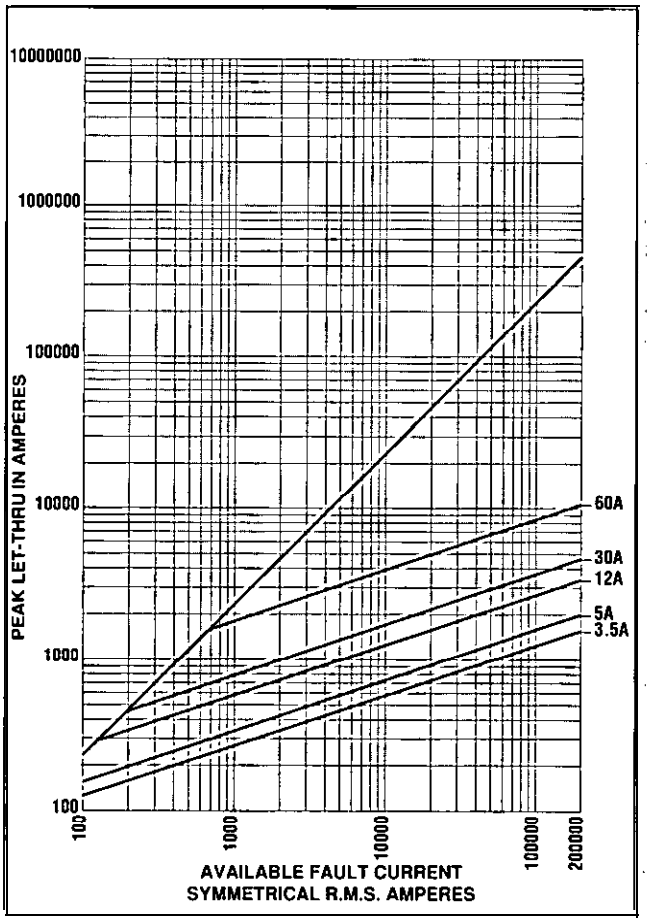
Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

NEW







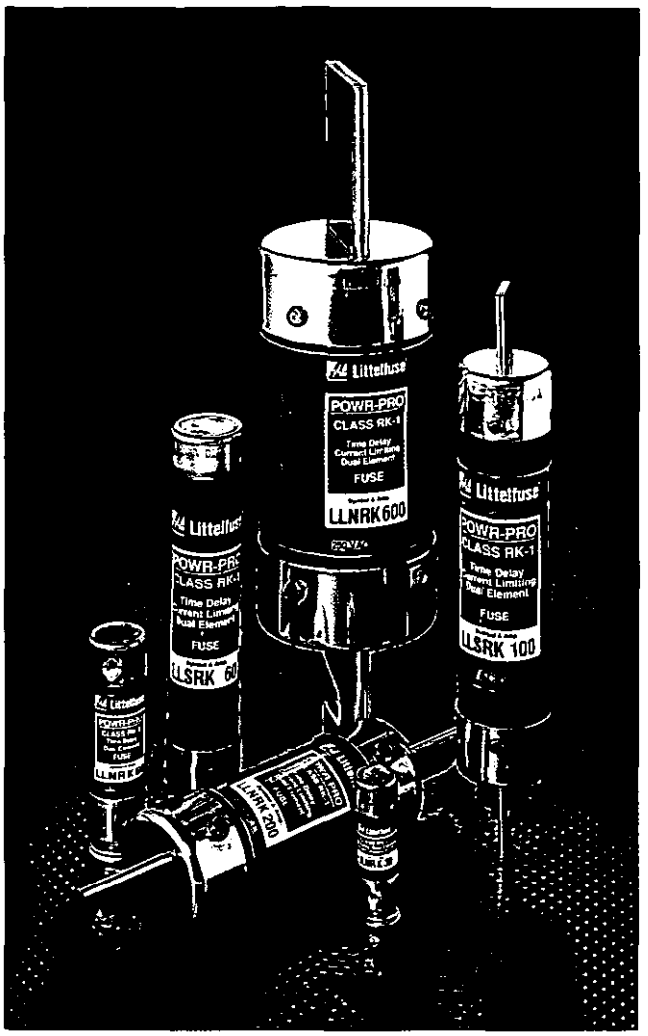
Contact Littelfuse for additional fuse curves.

LLNRWLLSRK 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%.	6%	25	90	300
15/100	1⅛	3	7	30	100	350
3/10	1%	3x0	8	35	110	400
¼ *	IX.	3½	9	40	125	450
3/10	1%	4	10	45	150	500
4/10	1⅝	4½	12	50	175	600
½	2	5	15	60	200	
6/10	2%	5⅝	17%	70	225	
¾	2½	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 lo 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 "on-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.

LLNRWLLSRK Series POWR-PRO@ Class RK1

250/600 VAC . Dual-Element, Time-Delay ▪ I/I 0 – 600 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses

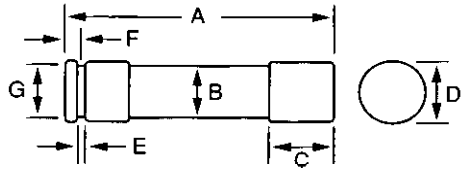
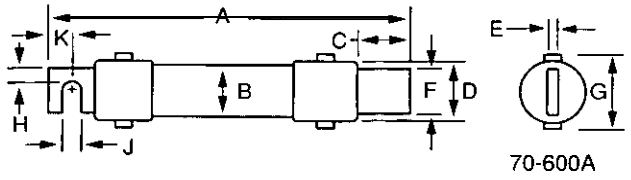


FIG. 1

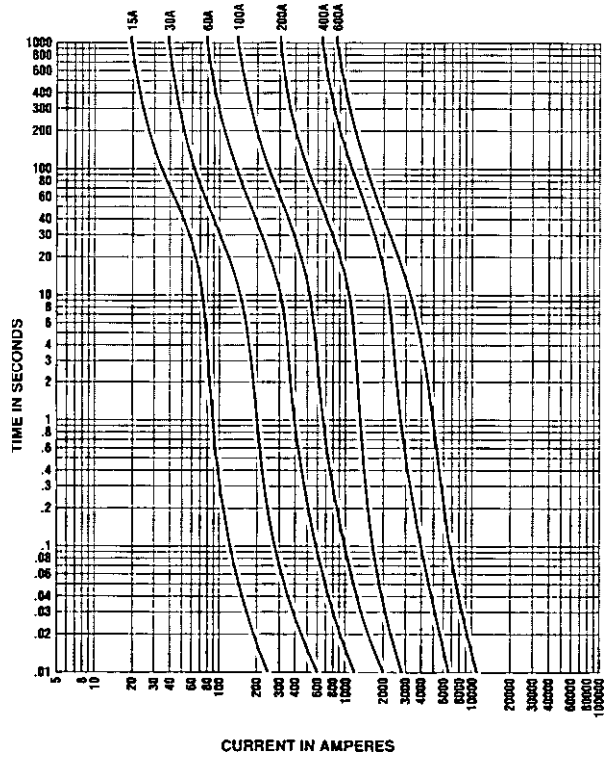


70-600A

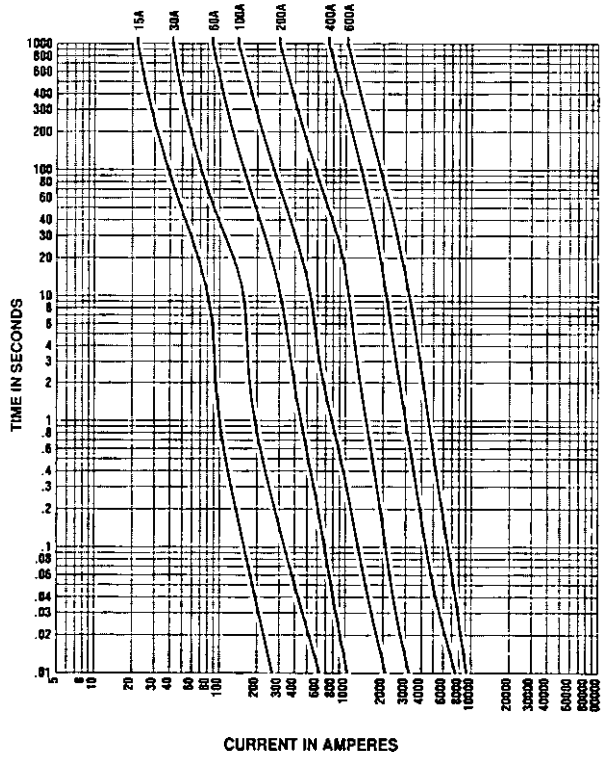
FIG. 2

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)

LNRK



LLSRK



POWR-PRO Fuses

Current-Limiting Effects of LLNRK (250V) fuses

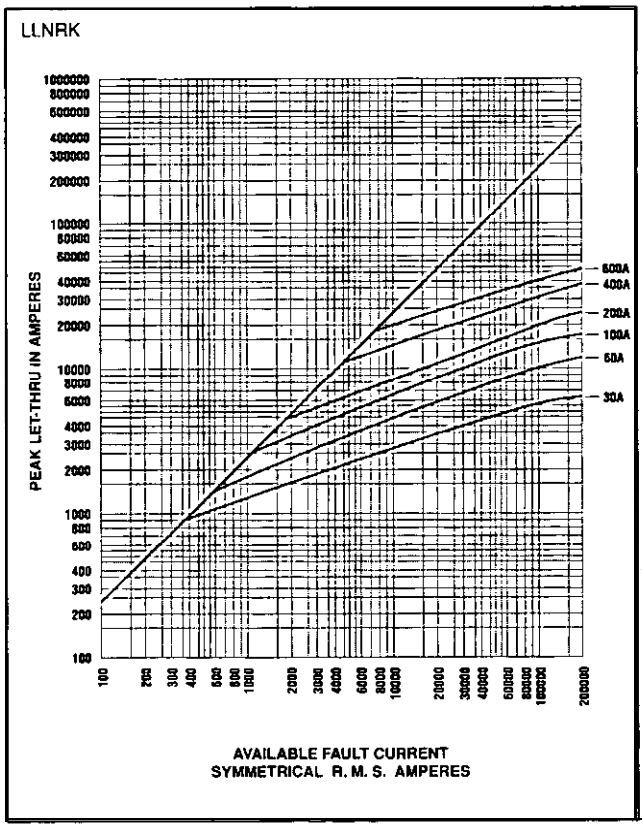
* Prospective RMS Symmetrical Amperes Short-Circuit Current
** Apparent RMS Symmetrical
Note: Data derived from Peak Let-Thru Curves

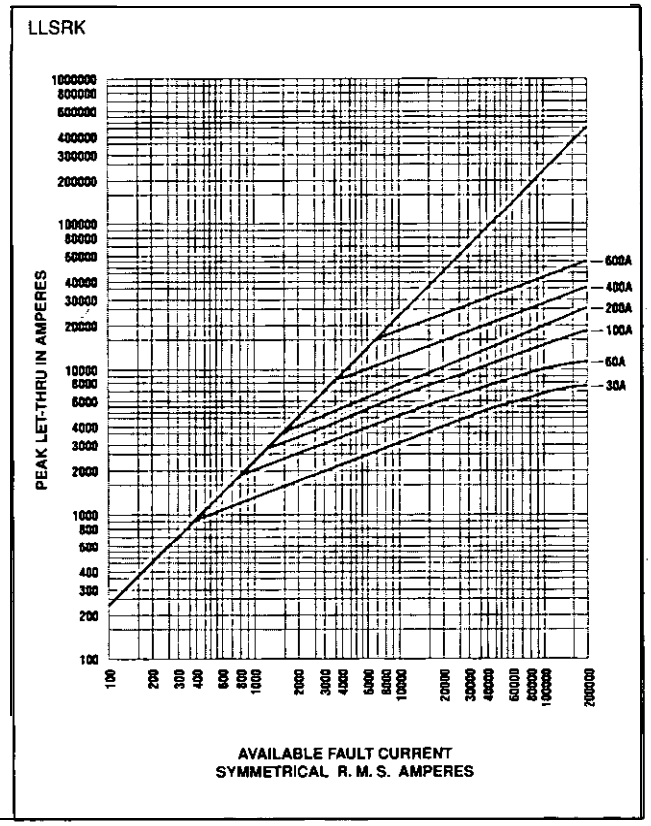
Short Circuit Current*	Peak Let-Thru Current** for various fuse ratings					
	30A	60A	100A	200A	400A	600A
5,000	900	1,400	2,000	2,700	4,800	5,000
10.000	1,100	1,900	2,700	3,500	6,200	8,500
15,000	1,250	2,100	3,100	4,200	7,000	9,500
20,000	1,400	2,400	3,500	4,600	8,000	10,800
25,000	1,500	2,600	3,900	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	8,700	11,000	15,000
80,000	2,200	3.900	5.700	7.200	12,200	16.000
100,000	2,300	4;OOO	6;OOO	8;100	12,700	17;OOO
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	2,800	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	4,800	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	1'3.000
150,000	3,200	4,600	7,300	10,000	14,000	21,000
200,000	3,300	4,700	8,000	11,000	18,000	23,000



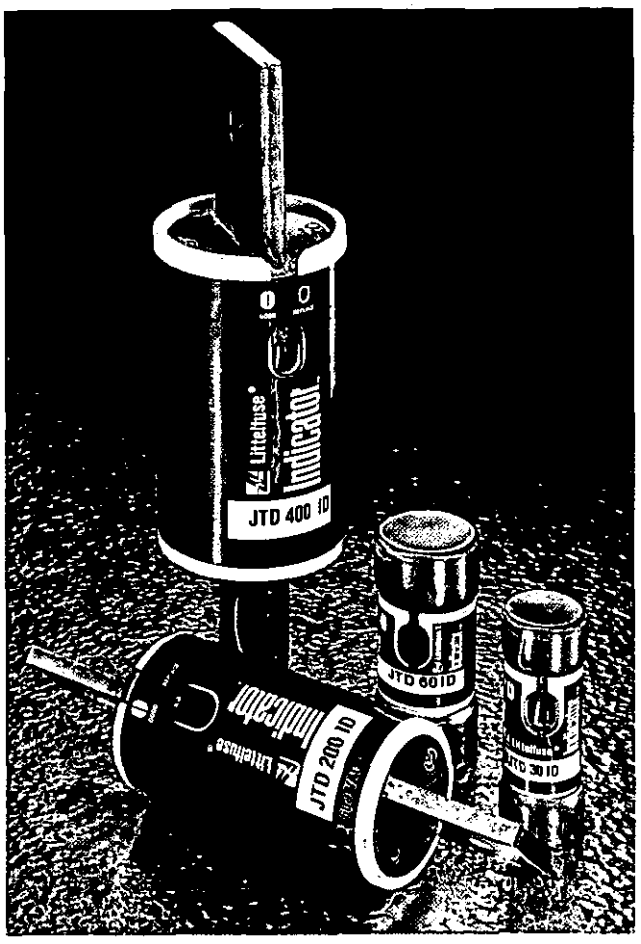


JTD-ID Series Indicator POWR-PRO@ Class J Fuses

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

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses



Ask for the indicator

PRODUCT OF THE YEAR 1998

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	2¼	4	8	25	50	110	250
1	2½	4½	9	30	60	125	300
1¼	2⅝	5	10		70	150	400
1⅝	3	5⅝	12	35	80	175	450
1⅚	3⅜	6	15	40	90	200	500
1⅞	3⅝	7	17½	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.

JTD-ID Series Indicator POWR-PRO@ Class J Fuses

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

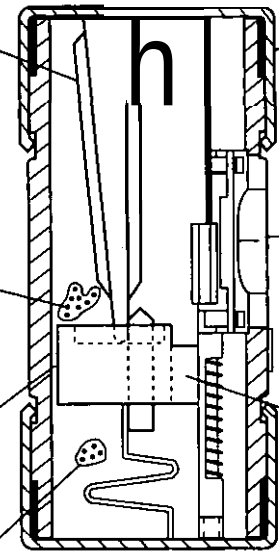
Littelfuse'
POWR-GARD™ Products

An Inside Look. . .

Superior Short-Circuit Elements – reduce damage to equipment and enables the Littelfuse JTD_ID lo 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.



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.

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

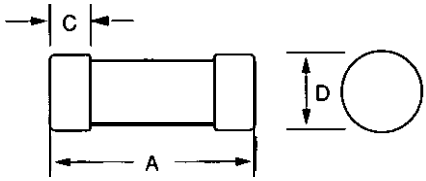


FIG. 1

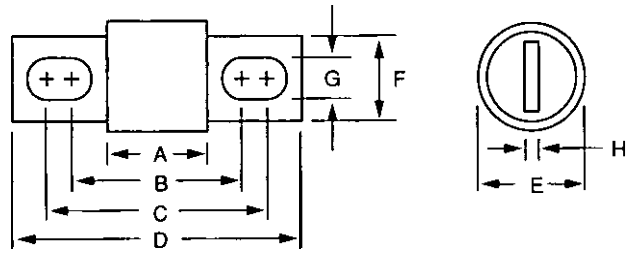


FIG.2

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)

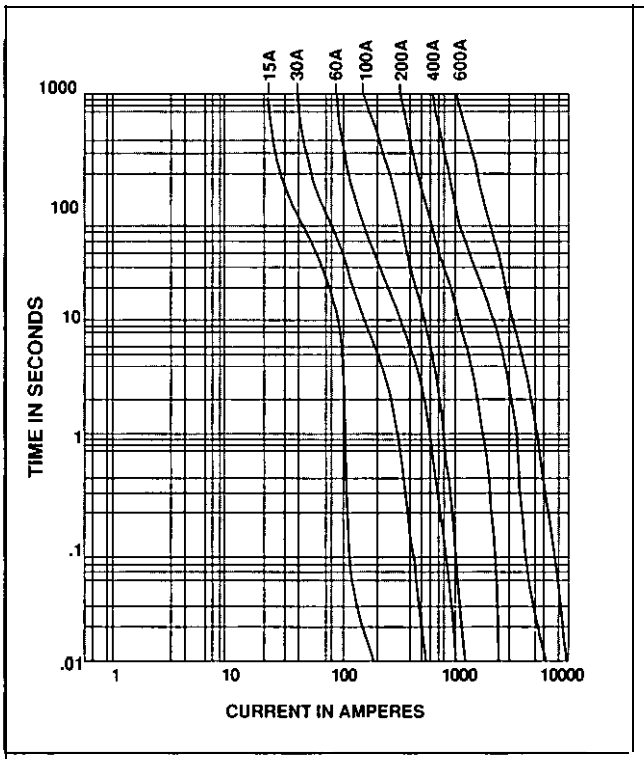
Current-Limiting Effects of JTD-ID (600V) fuses

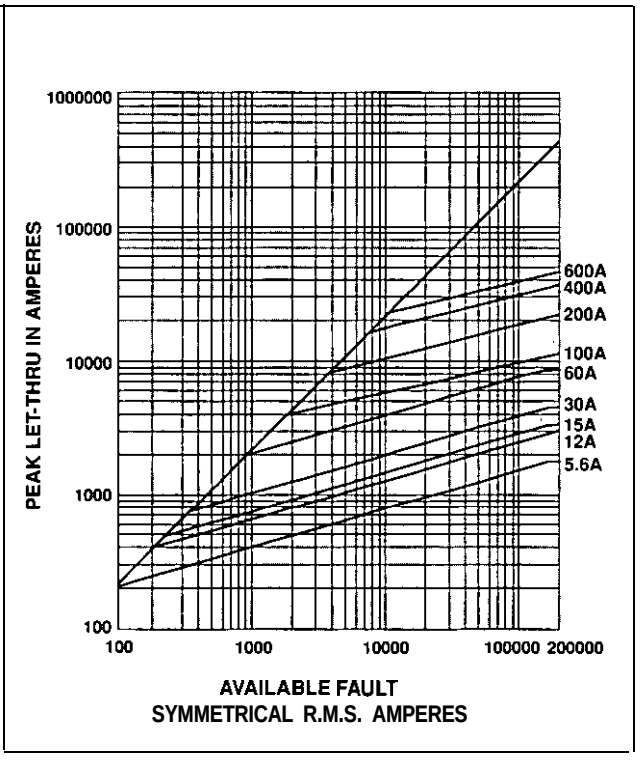
* Prospective RMS Symmetrical Amperes Short-Circuit Current

*"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
lo;ooo	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;ooo	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 sell-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	3X	6%	12	35
¼	1%	2%	4	7	15	40
3/10	1%.	2½	4½	7%	17½	45
½	1%	2⅘	5	a	20	50
6/10	1%	3	5%	9	25	60
8/10	1%.	3%	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.

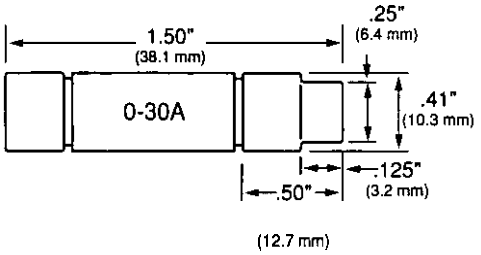
. 300kA Interrupting Rating — Littelfuse self-certilied to 300,000 amperes as standard. Meets future trend towards higher available short circuit currents.

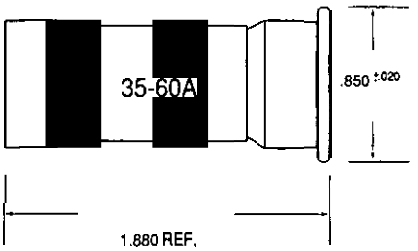
CCMR Series POWR-PRO@ CC Fuses

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

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses





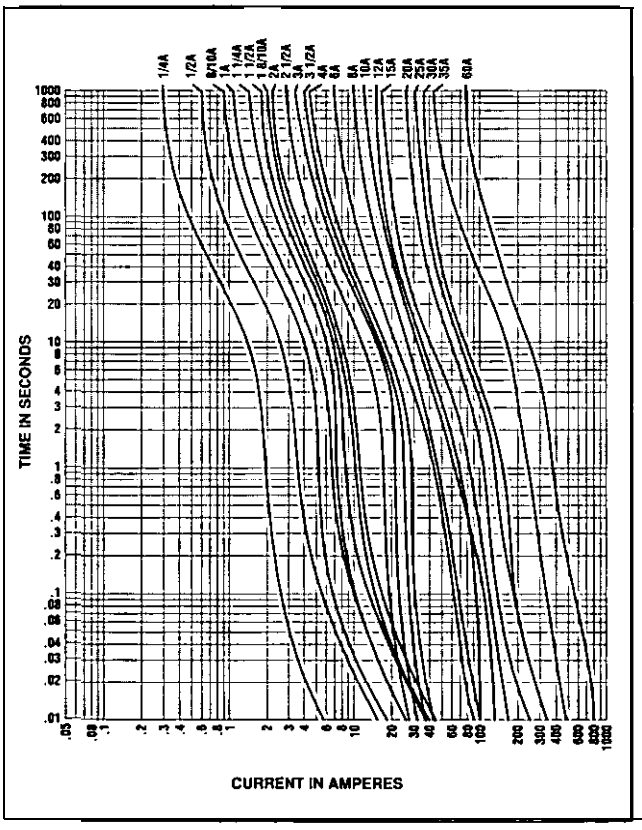
Current-Limiting Effects of CCMR (600V) fuses

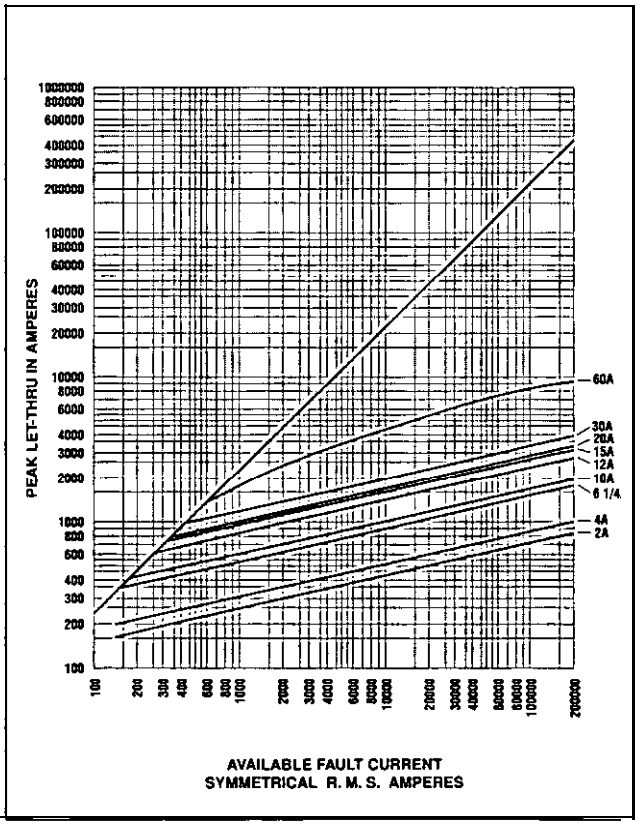
* Prospective RMS Symmetrical Amperes Short-Circuit Current

*'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;ooo	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
loo;ooo	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



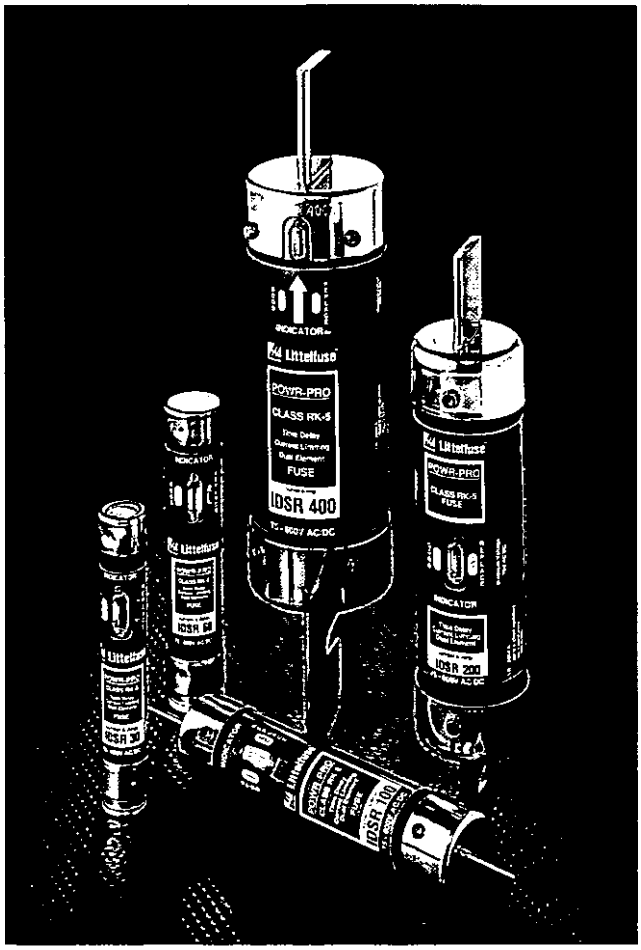


IDSR Series Indicator" POWR-PRO@ Class RK5

600 V AC/DC . Time-Delay • 1110 — 600 Amperes

Littelfuse
POWR-GARD™ Products

POWR-PRO Fuses



The Linelfuse 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 Linelfuse 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
(Linelfuse self-certified)

DC: 20,000 amperes

Ampere Range: l/l 0 — 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	8/10	2%	5%	15	60	200
1/8	1	2X	6	17½	70	225
15/100	1⅛	2%	6%	25	80	250
3/10	1%	3	7	30	90	300
¼	1%	3⅜	7½		100	350
3/10	1½	3½	8	35	110	400
4/10	1⅝	4	9	40	125	450
½	1%	4½	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 Linelfuse 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. Linelfuse-patented leading edge metallurgy eliminates all moving parts in a true dual-element fuse.

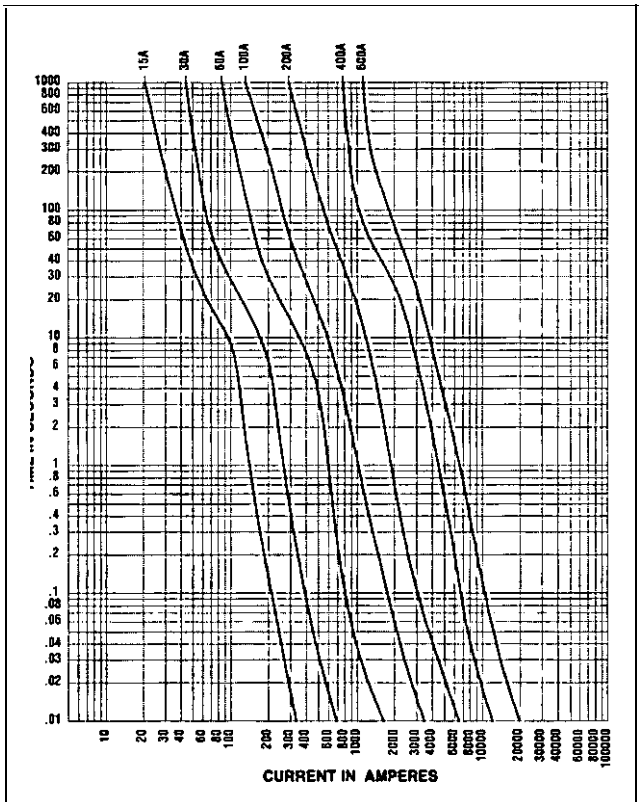
Current-Limiting Effects of IDSR (600V) fuses

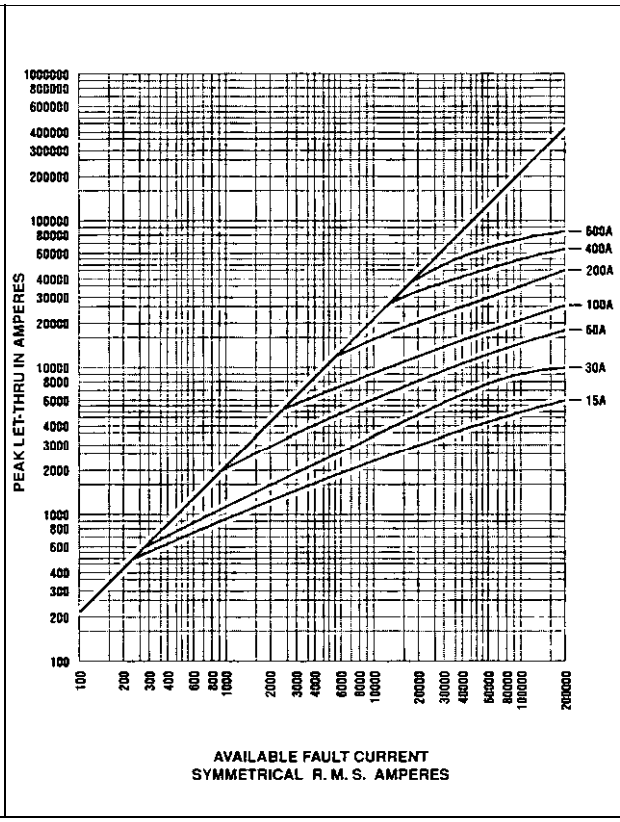
* Prospective RMS Symmetrical Amperes Short-Circuit Current

** 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	1150	2000	3250	5000	5000	5000
10,000	1650	2600	4400	7400	10000	10000
15,000	2000	3150	5000	8700	13500	15000
20,000	2250	3600	5600	9500	15000 16000	20000 16000
25,000	2600	4000	6000	10000		
30,000	2800	4300	6500	11000	17500	22000
35,000	3000	4400	6800	11500	16500	24000
40,000	3150	4800	7000	12000	19400	25000
50,000	3400	5200	7600	13200	20500	26000
60,000	3600	5500	6400	14000	22000	26500
60,000	4000	6150	9200	16000	24000	31000
100,000	4200	6500	10000	16000	26000	33500
150,000	4600	7700	11000	16000	26000	35000
200,000	4600	6500	12000	20000	30000	36000



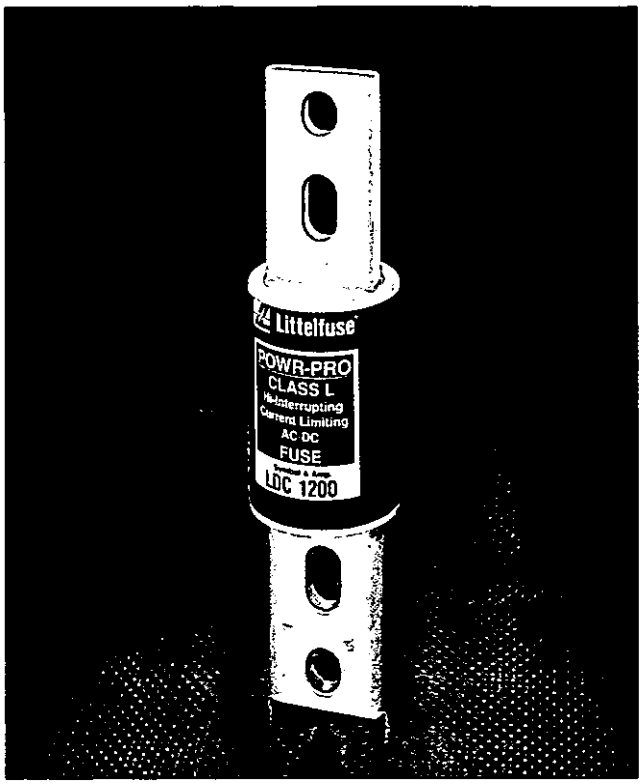


LDC Series POWR-PRO@ Class L Fuses

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**	**1600**
250	**500**	**750**	1100	1400	1900
300	**600**	**600**	**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.

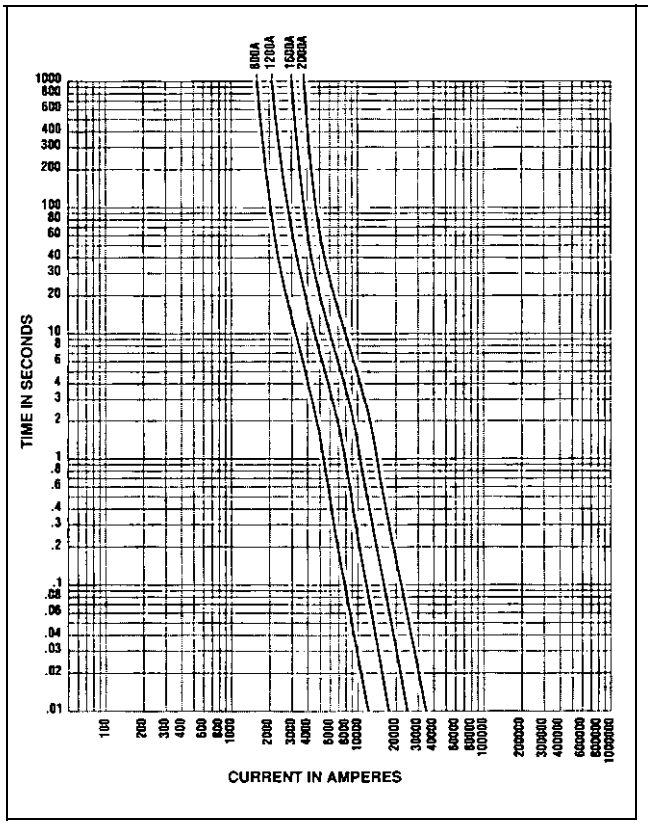
Current-Limiting Effects of LDC (600V) fuses

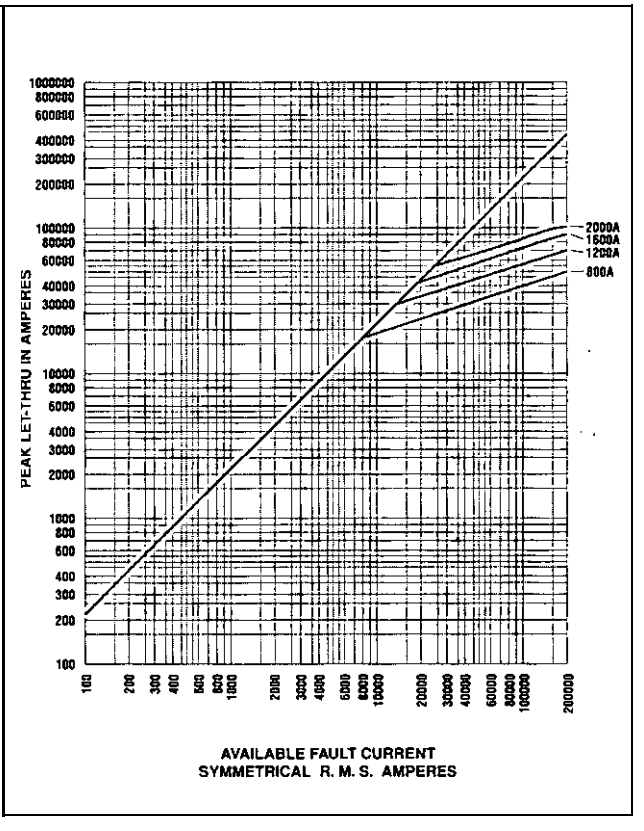
***Prospective** RMS **Symmetrical Amperes** Short-Circuit **Current**

"Apparent RMS Symmetrical

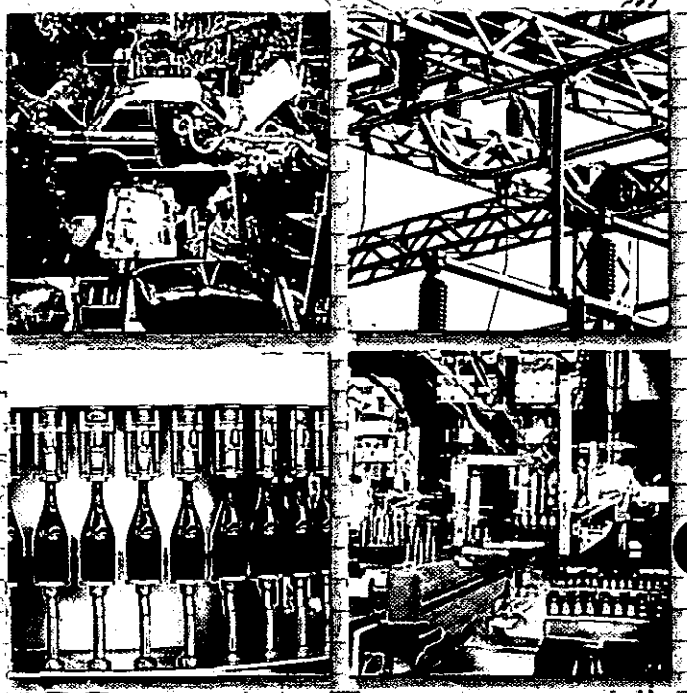
Note: Data derived from Peak **Let-Thru Curves**

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;ooo	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	26,000	34,000
80,000	16,000	24,000	30,000	36,000
100.000	18.000	25.000	33.000	40.000
150;ooo	20;ooo	30;ooo	38;000	44,000
200,000	23,000	32,000	41,000	46,000





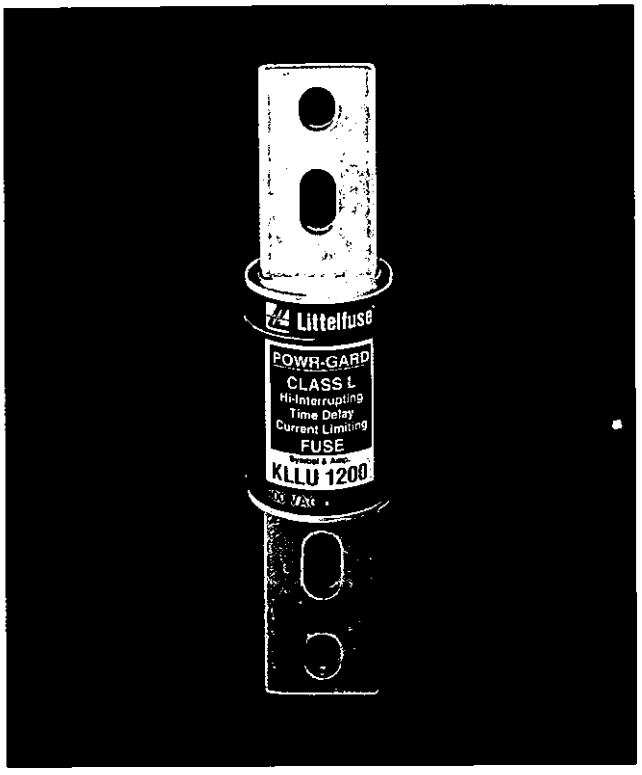
General Purpose Fuses



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)

General Purpose Fuses

AMPERE RATINGS

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

Example part number (series & amperage): KLLU 1000

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.

KLLU Class L Fuses

600 VAC . Time-Delay • 601 – 4000 Amperes

Littelfuse
POWR-GARD™ Products

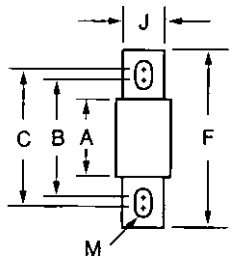


FIG.1

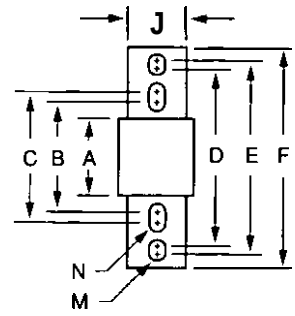


FIG.2

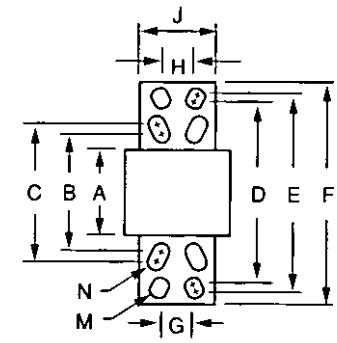


FIG. 3

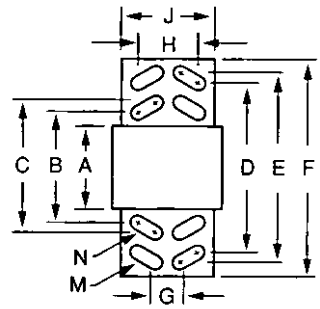
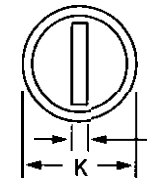


FIG. 4

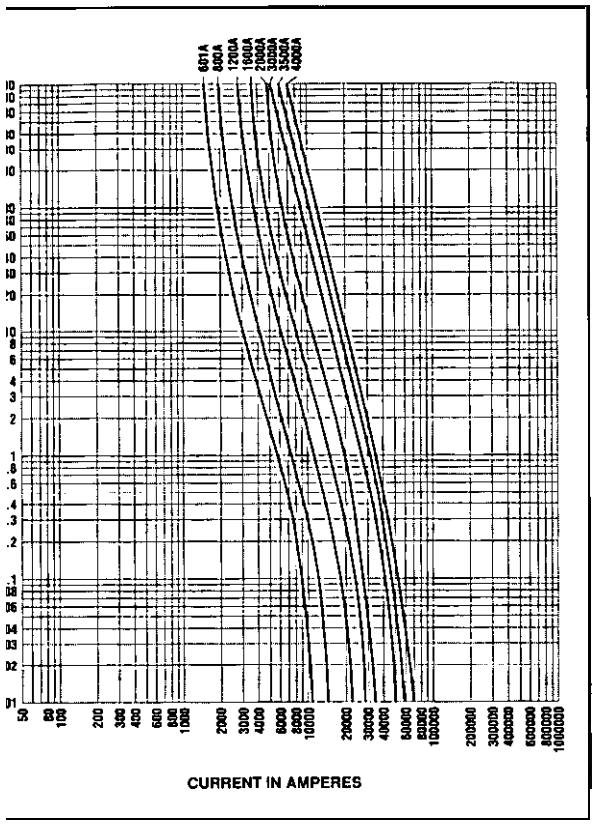


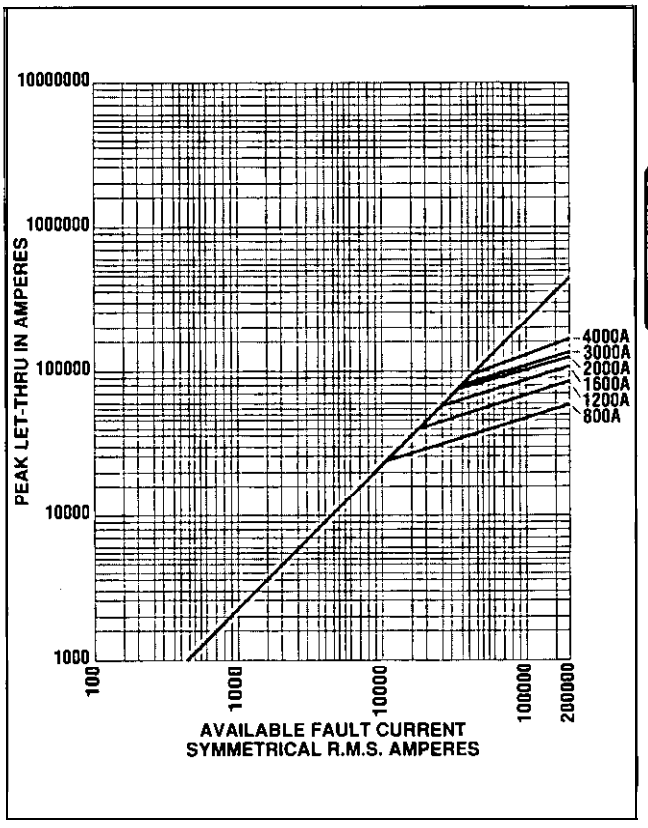
AMPERES	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)												
		A	B	C	D	E	F	G	H	J	K	L	M	N
601 – 800	1	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	—	—	8-5/8 (219.1)	—	—	2 (50.8)	2-1/2 (63.5)	3/8 (9.5)	5/8 x 1-1/8 (15.9) x (28.6)	—
801 – 1200	2	3-3/4 (95.3)	5-3/4 (146.1)	6-3/4 (171.5)	9-1/4 (235.0)	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





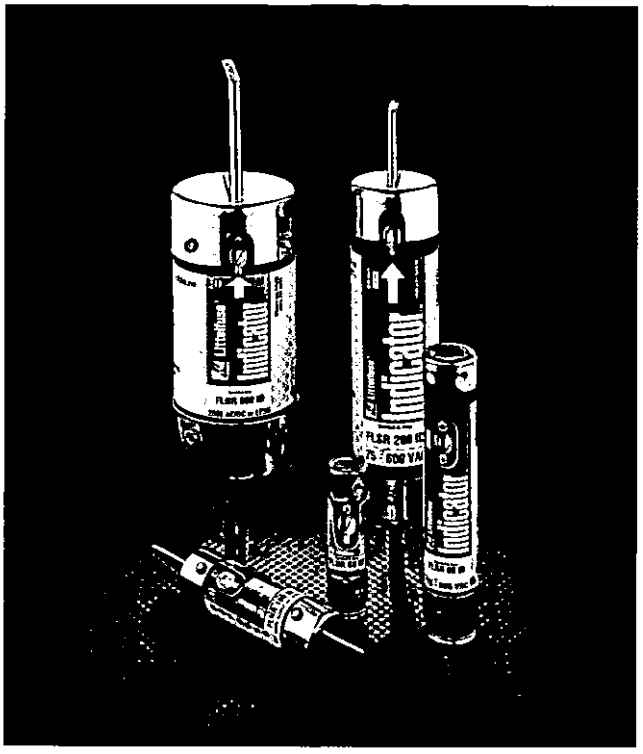
FLNR_ID/FLSR_ID Indicator™ Class RK5 Fuses

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

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

Ask for the Indicator



Littelfuse FLNR_ID/FLSR_ID Indicator™ fuses provide visual blown fuse indication at a glance. The patented slate-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-lime-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. Indicator' fuses also provide IEC Type II protection to NEMA motor starters without the high cost of RK1 fuses.
- 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 I/IO-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**	5/10	1¼	4	8	30	80	225
1/8	8/10	2	4½	9	35	90	250
15/100	1	2¼	5	10	40	100	300
3/10	1⅛	2¼	5¾	12	45	110	350
¼	1¼	2¾	6	15	50	125	400
3/10	1¾	3	6¾	17½	60	150	450
5/10	1½	3¾	7	20	70	175	500
½	1¾	3X	7½	25	75	200	600

"FLNR only

NOTE: For 1110 – 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 pan 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

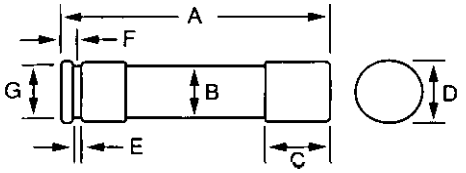


FIG. 1

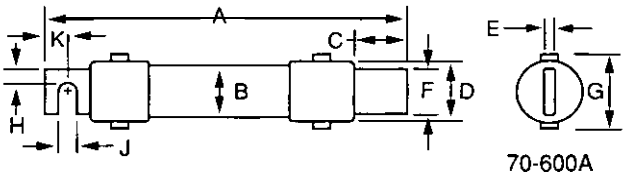
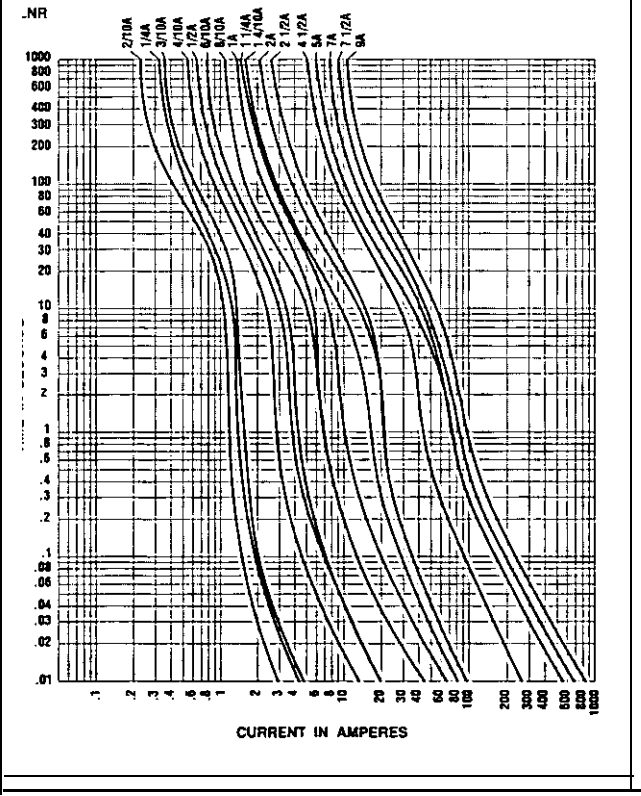


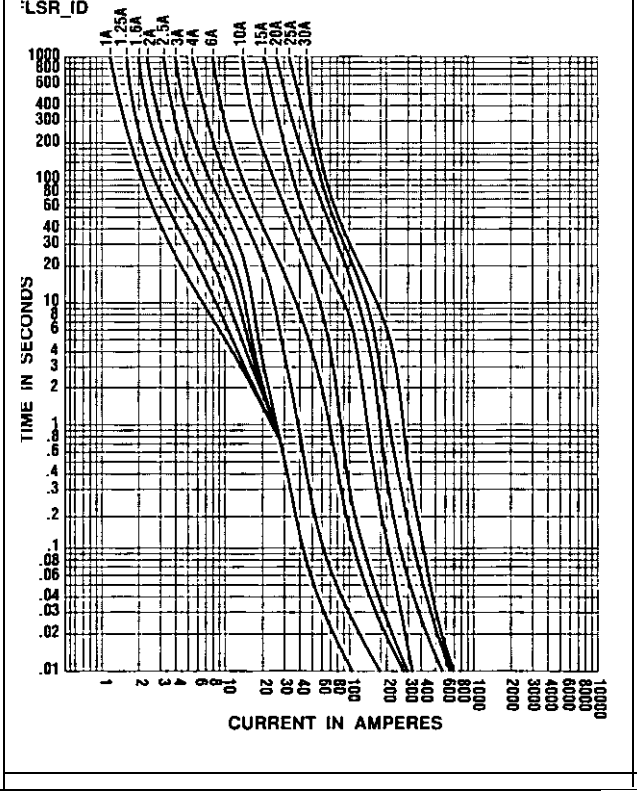
FIG. 2

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_ID	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)

r additional application information request Product Bulletin EL-4

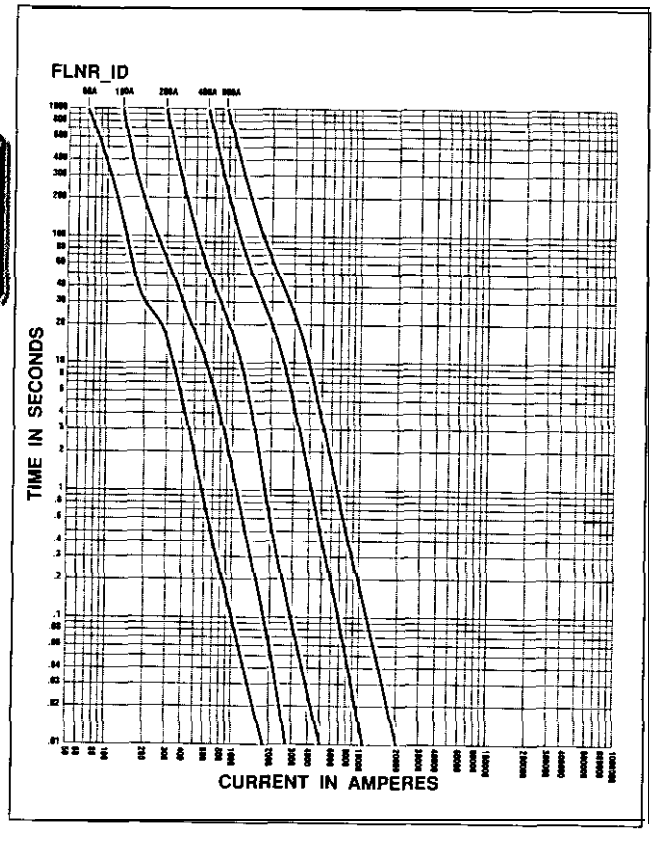


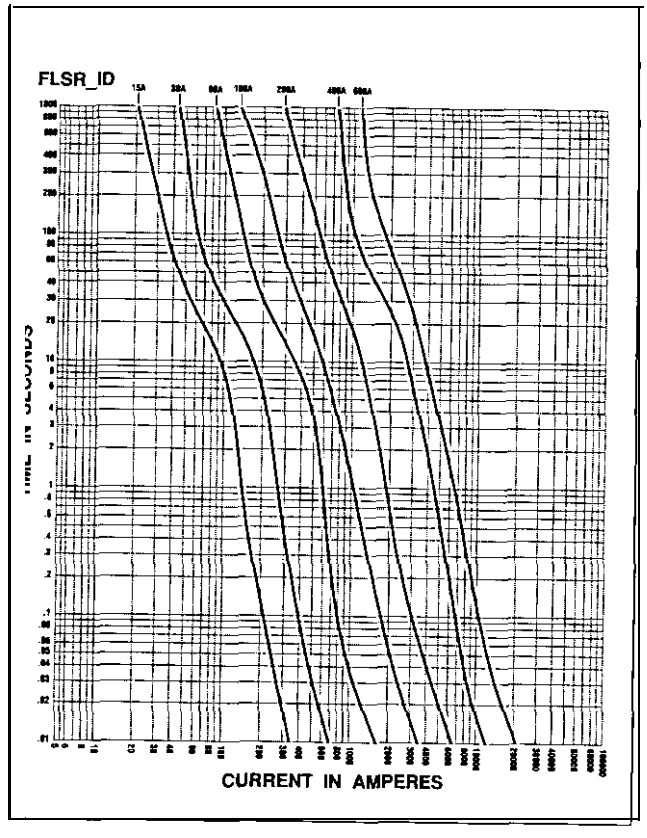


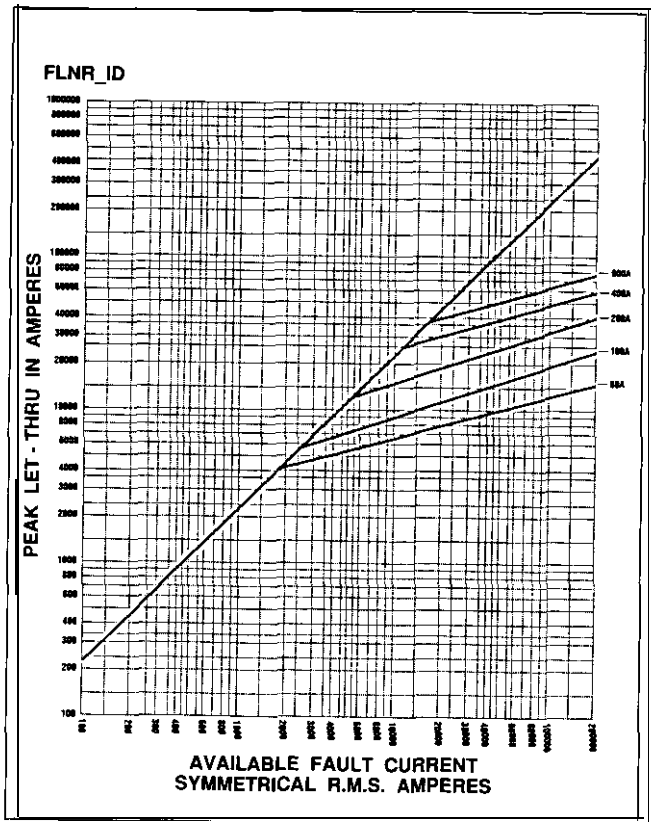
FLNR_ID/FLSR_ID Indicator™ Class RK5 Fuses

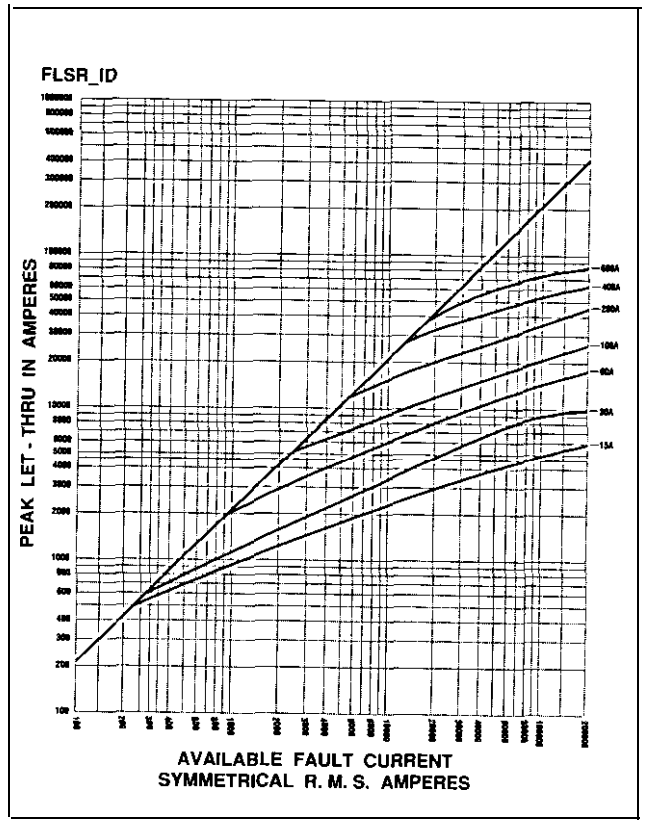
250/600 VAC . Dual-Element, Time Delay ▪ 1110 – 600 Amperes

Littelfuse
POWR-GARD™ Products









FLNWFLSR Class RK5 Fuses

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

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

Littelfuse FLNWFLSR series fuses have been the superior UL Class RK5 dual-element time-delay fuses, and are the most widely used class of fuses. FLNWFLSR 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: E61695)
CSA Certified (File No: LR29662)
MSHA 300 Volt Listing (FLSR)
QPL: Federal Specification WF-1614

AMPERE RATINGS

1/10	5/10	1 8/10	4	6	30	80	225
1/8	8/10	2	4½	9	35	90	250
15/100	1	2 4/10	5	10	40	100	300
3/10	1 4/10	2½	5 6/10	12	45	110	350
¼	1 4/10	2 6/10	6	15	50	125	400
3/10 **	1 4/10	3	6 6/10	17½	60	150	450
5/10	1½	3 3/10	7	20	70	175	500
½	1 6/10	3½	7½	25	75'	200	600

"FLNR only, 'FLSR only

Example part number (series & amperage): FLSRIOO

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.

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.

FLNR/FLSR Class RK5 Fuses

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

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

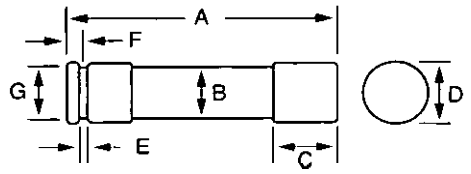
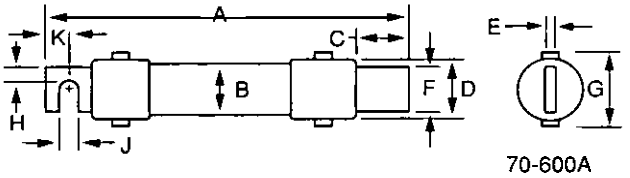


FIG. 1



70-600A

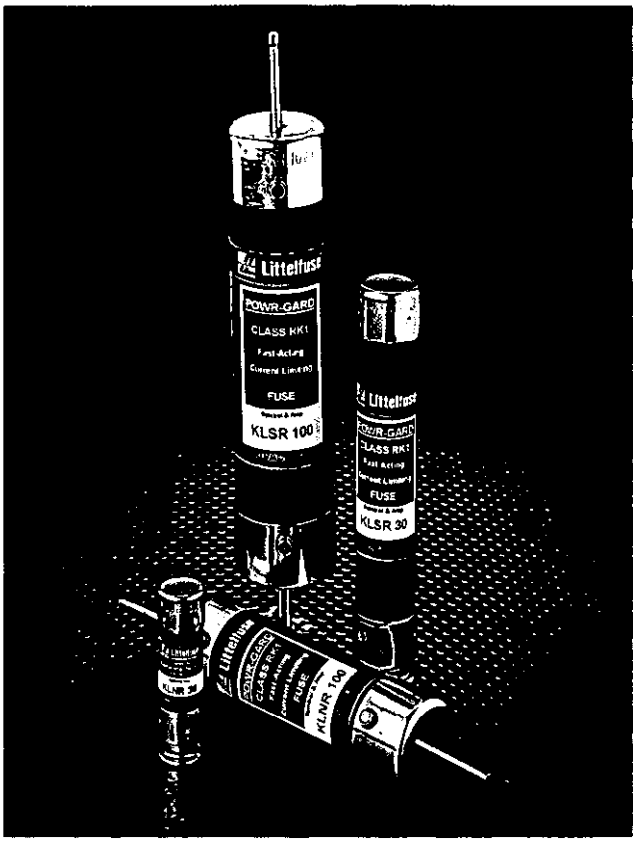
FIG. 2

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	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	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	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	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	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	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	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	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	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	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	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	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)

KLNR/KLSR Class RK1 Fuses

250/600 VAC • Fast-Actina ■ 1 – 600 Amperes

Littelfuse
POWR-GARD™ Products



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: E61695)
CSA Certified (File No: LR29662)
DC: Littelfuse Self-certified

General Purpose Fuses

AMPERE RATINGS

1	**10**	40	100	250
2	12	45	110	300
3	15	50	*125*	350
4	20	60	150	400
5				
6	25 30 60	70	200 175	450 500
6	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® LLNRWLLSRK 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 KLNRIKLSR 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.

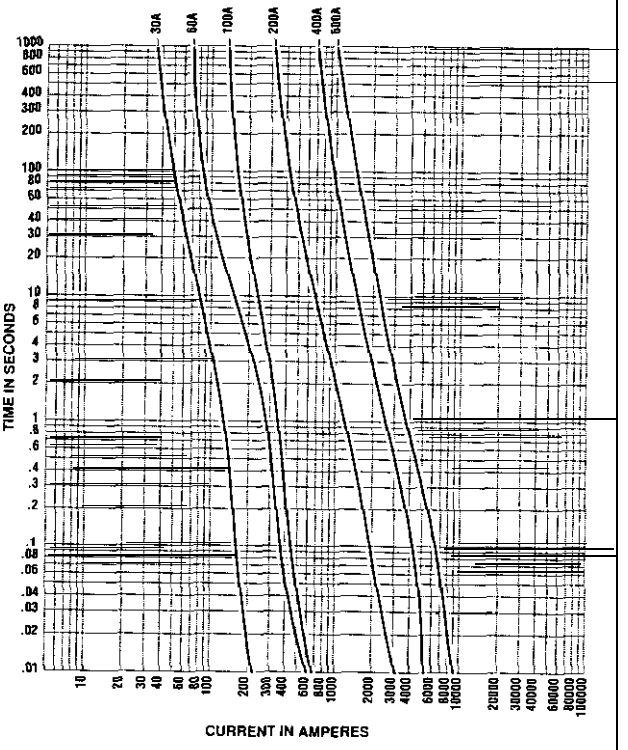
EASY TO USE

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

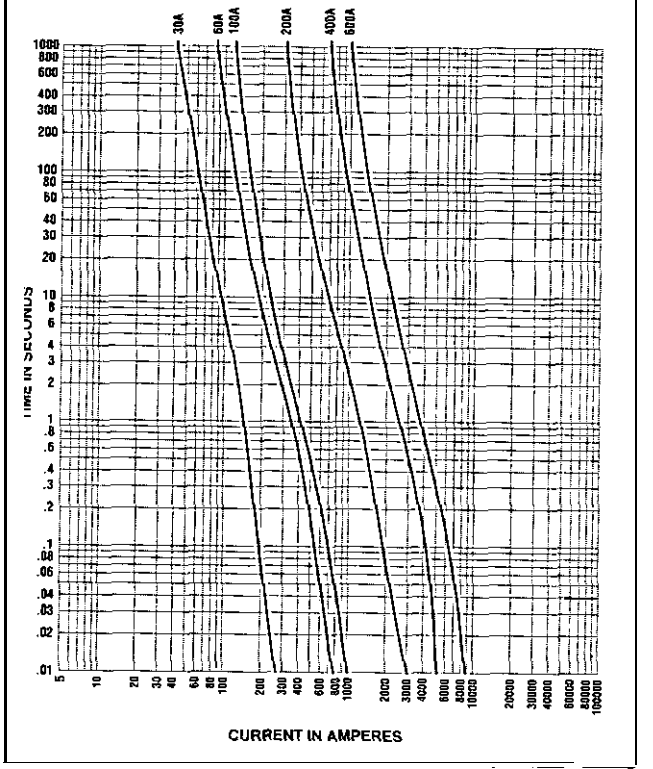
DIMENSIONS

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

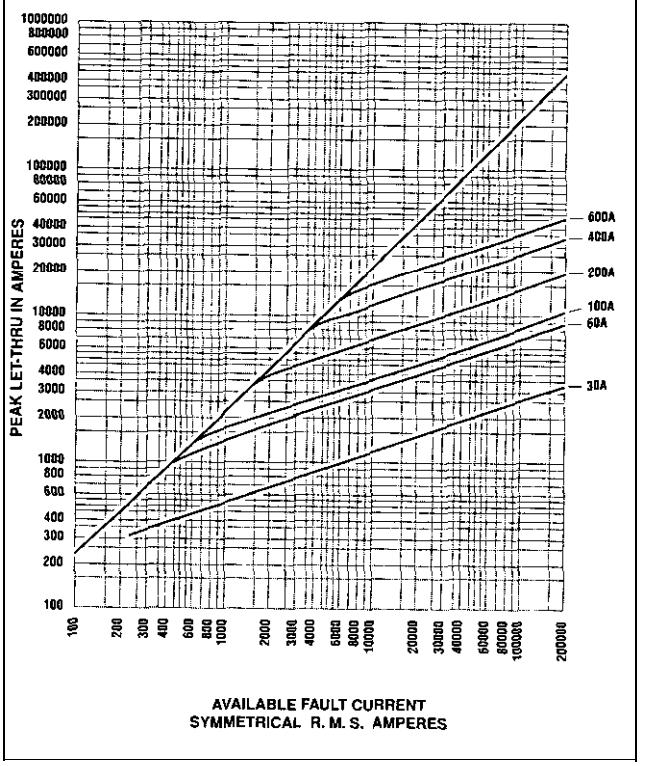
KLNR



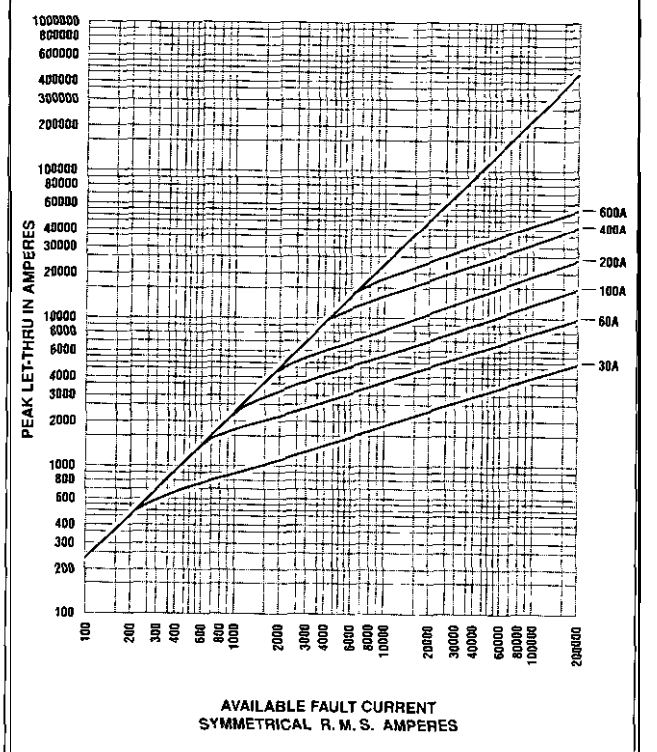
KLSR



KLNR



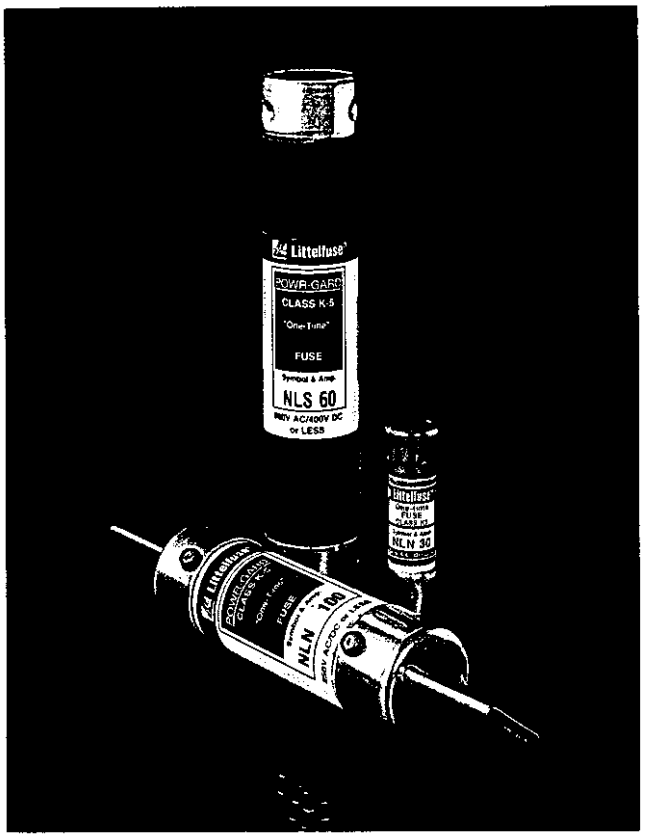
KLSR



NLN/NLS Class K5 Fuses

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

Littelfuse
POWR-GARD™ Products



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 (NLNINLS)
10,000 amperes (NLKP)
DC: 20,000 amperes (NLNINLS 1 – 60A)
50,000 amperes (NLN/NLS 70 – 600A)

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

Approvals: NLNINLS: **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: LR29665)
Meets CSA "Type P" requirements

AMPERE RATINGS

1	7	* 25	* 70	125	300
2	8	* 30	80	150	350
3	10	* 35		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 lo 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 FLNWFLSR 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

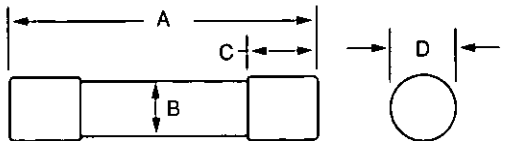


FIG. 1

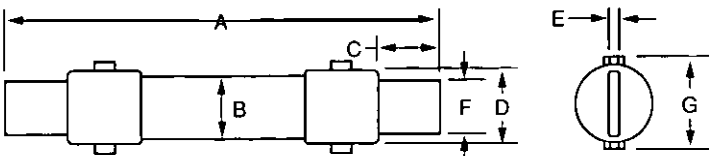
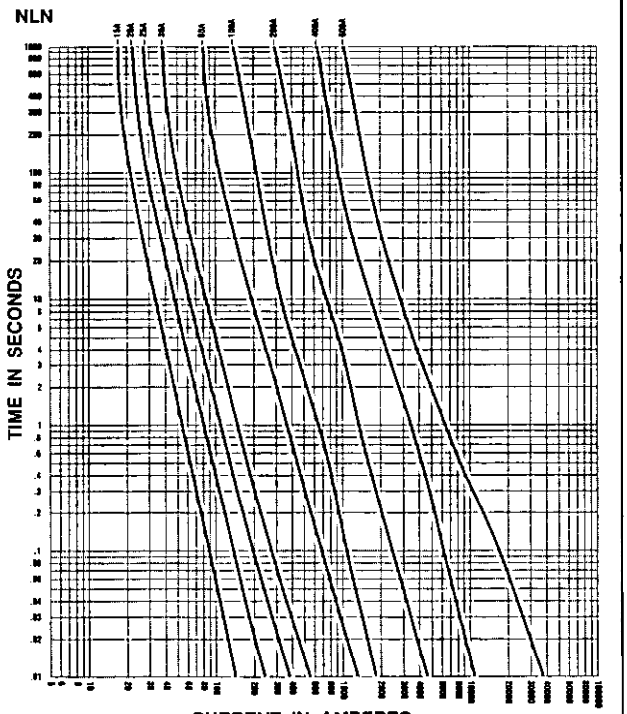
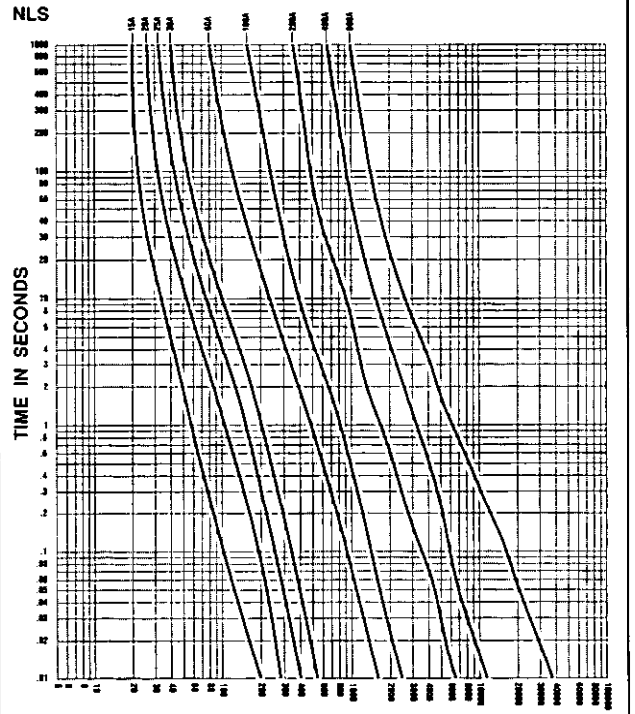


FIG. 2

General Purpose Fuses

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

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: E81695)
CSA Certified (File No: LR29662)

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 On/y.*

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.

General Purpose Fuses

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-Actina ▪ 1 – 600 Amperes

Littelfuse"

POWR-GARD™ Products

General Purpose Fuses

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**	80	**150**	**350**
6	**35**	90	**175**	**400**
10	**40**		**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 shod-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 KLNWKLSR 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 shod-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.

JLS CLASS J FUSES

600 VAC ■ Fast-Acting . 1 — 600 Amperes

Littelfuse
POWR-GARD™ Products

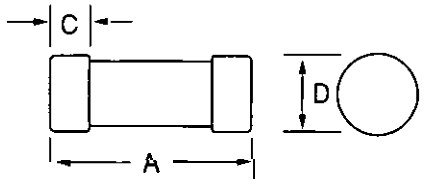


Fig. 1

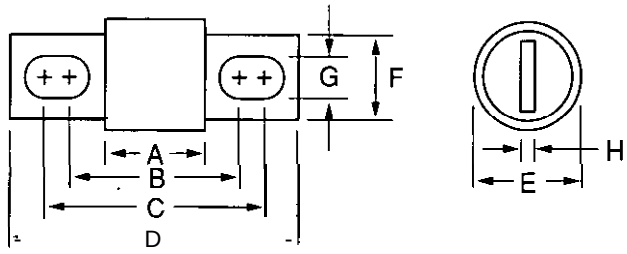
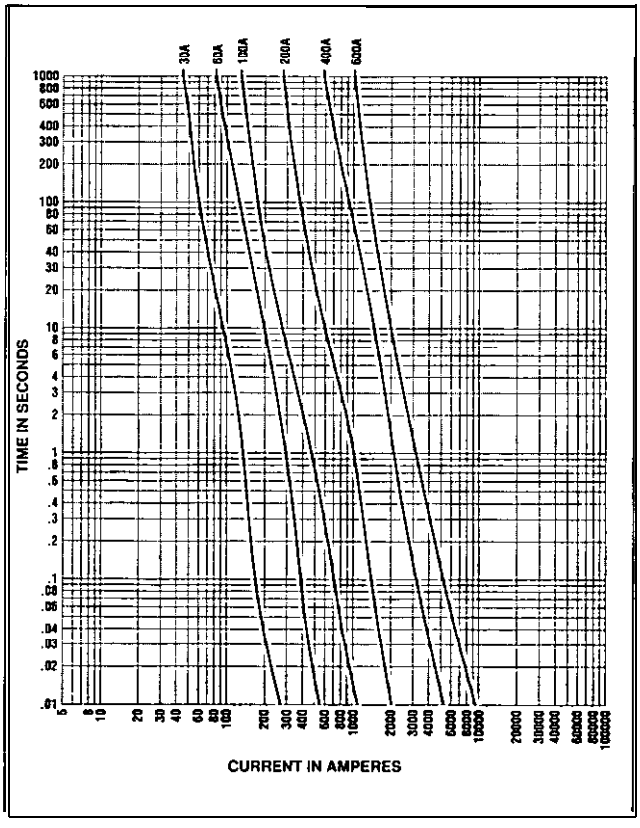
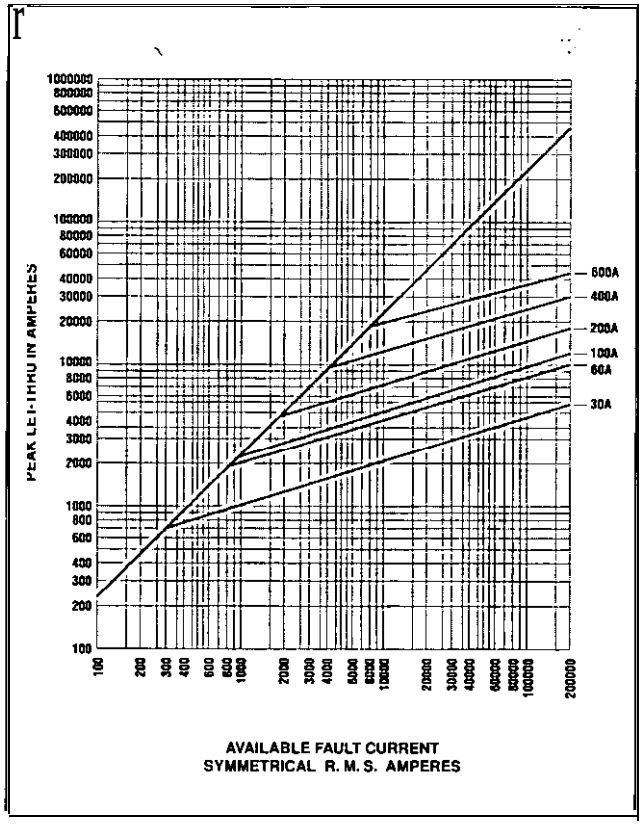


Fig. 2

General Purpose Fuses

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)



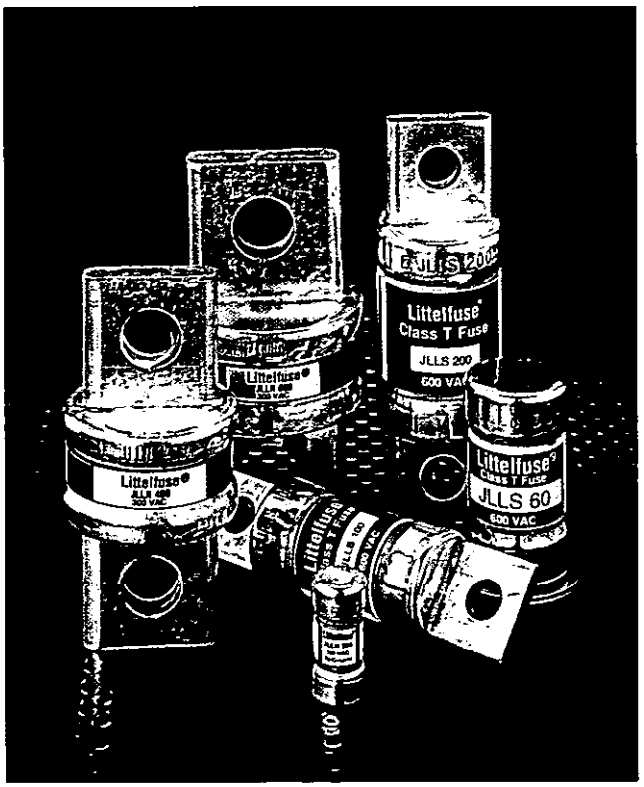


JLLN/JLLS POWR-T'" Class T Fuses

300/600 VAC . Fast-Acting ▪ 1 – 1200 Amperes

Littelfuse
POWR-GARD™ Products

General Purpose Fuses



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, LLNRWLLSRK 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.

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.

. 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.

JLLN/JLLS POWR-T™ Class T Fuses

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

Littelfuse
POWR-GARD™ Products

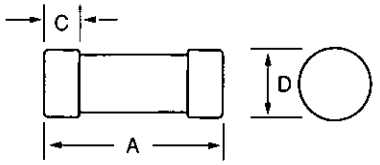


Fig. 1

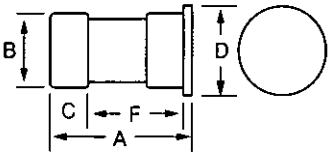


Fig. 2

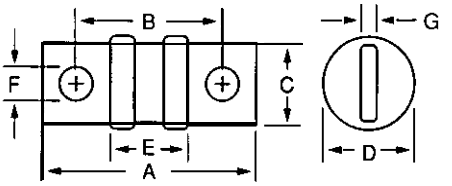


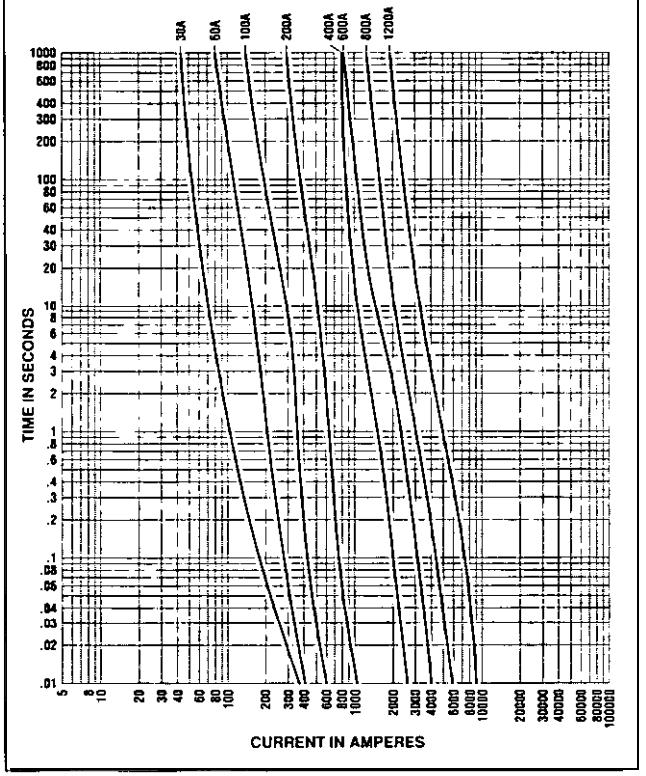
Fig. 3

General Purpose Fuses

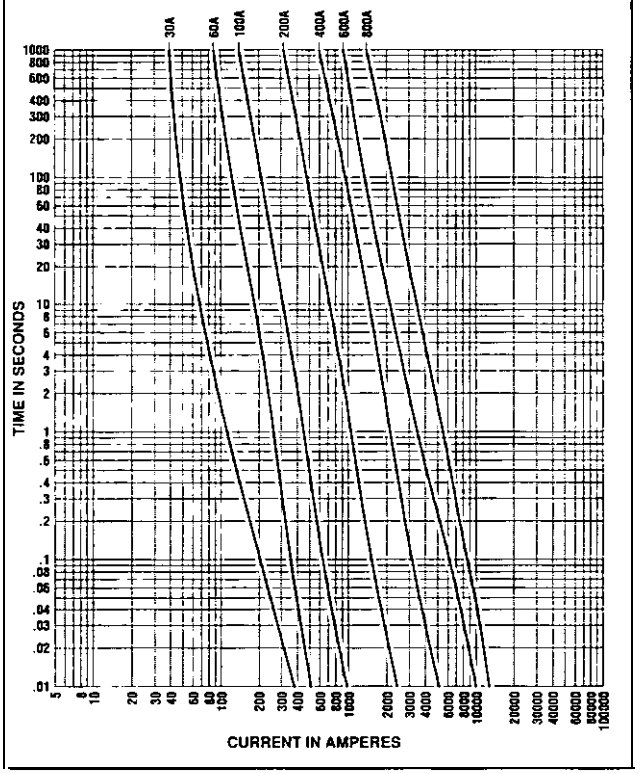
AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm in parentheses)						
			A	B	C	D	E	F	G
1 – 30	1	JLLN	7/8 (22.2)	—	9/32 (7.1)	13/32 (10.3)	—	—	—
		JLLS	1-1/2 (38.1)	—	9/32 (7.1)	9/16 (14.3)	—	—	—
35 – 60	1	JLLN	7/8 (22.2)	—	9/32 (7.1)	9/16 (14.3)	—	—	—
	2	JLLS	1-9/16 (39.7)	13/16 (20.6)	13/32 (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)

General Purpose Fuses

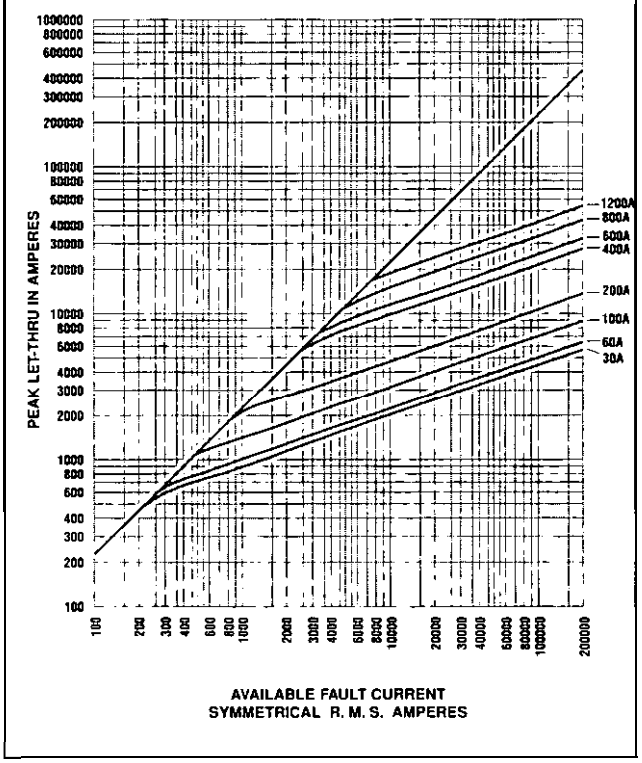
JLLN



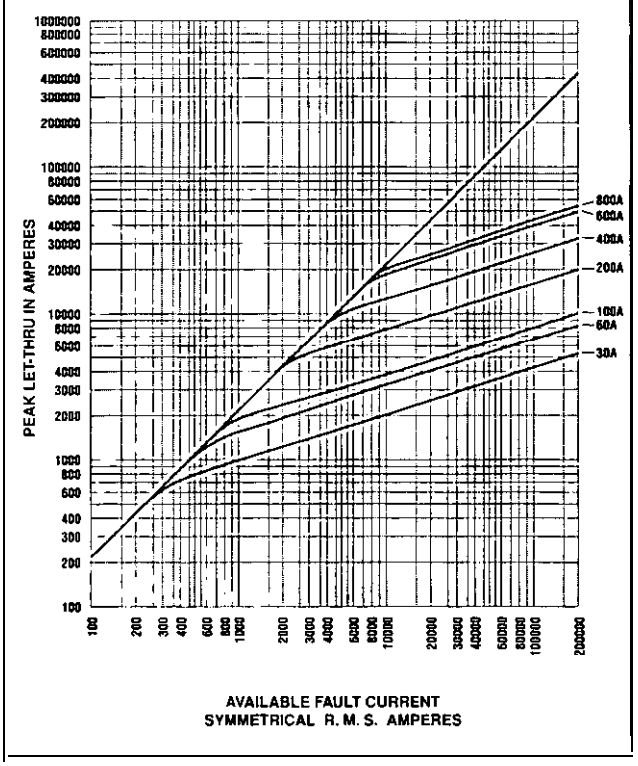
JLLS



JLLN



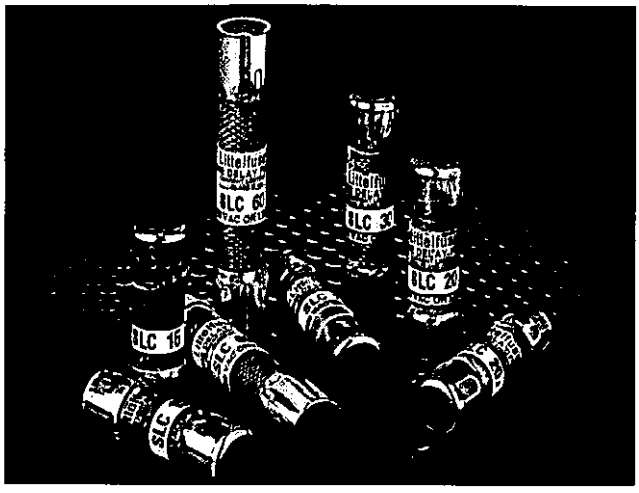
JLLS



SLC Class G Fuses

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

Littelfuse
POWR-GARD™ Products



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)
460 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: LR29662)
QPL: Federal Specification No: WF-1614

General Purpose Fuses

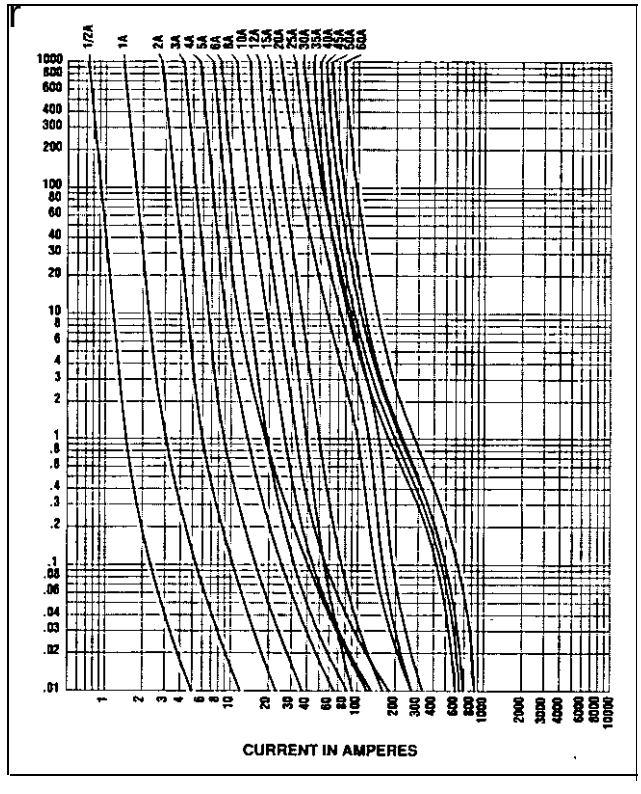
AMPERE RATINGS

½	3	6	15	30	4.5
1	4	8	20	35	50
2	5	10	25	40	60

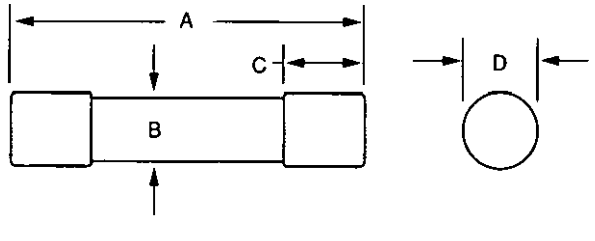
Example part number (series & amperage): SLC 10

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 ■ I/I 0 – 60 Amperes

Littelfuse
POWR-GARD™ Products

General Purpose Fuses

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 lo 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 Rang.?: CCMR: 2/10 – 60 amperes
KLDR: 1/10 – **30 amperes**
KLKR: 1/10 – 30 amperes

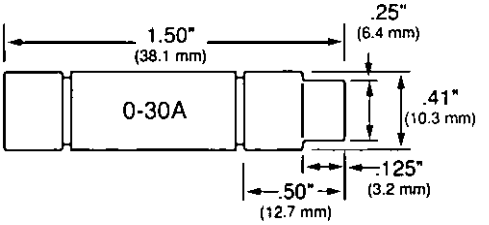
Approvals: AC: Standard 248-4, Class CC
UL Listed 1/10-30 Amps (File No: E81895)
Standard 246, Class CD
UL Listed 35-60 Amps (File No: E71611)
CSA Certified 1/10-60 Amps
(File No: LR29862)
DC: Littelfuse Self-certified

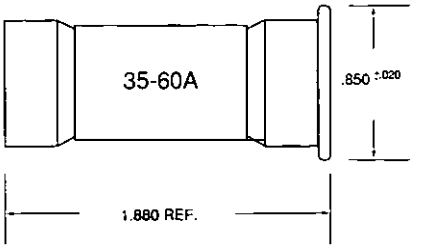
RECOMMENDED FUSE BLOCKS

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.





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 lime-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

3/10	1%	2½	5	9	30
¼	1 4/10	2%	5 6/10	10	35
3/10	1½	3	6	12	40
½	1 8/10	3 3/10	6%	15	45
6/10	1%.	3½	7	17½	50
8/10	2	4	7½	20	60
1	2%	4X	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 magnatizing 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%.	5%.	to
1/8	6/10	1½	3	6	12
15/100	¾	1 6/10	3 3/10	6%	15
3/16	9/10	1 8/10	3%	7	17½
3/10	1	2	4	7½	20
¼	1 1/8	2%	4½	8	25
3/10	1%	2½	5	9	30
4/10					

Example part number (series 8 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.

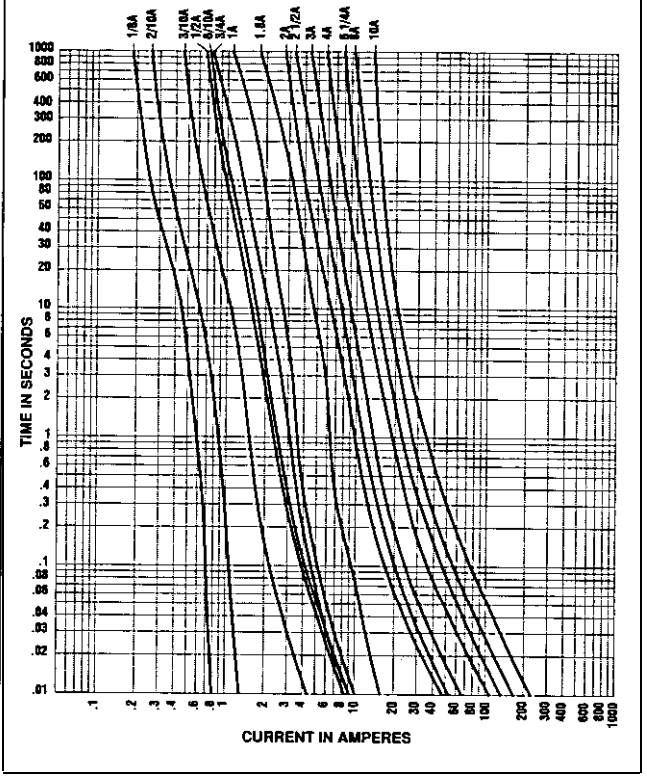
AMPERE RATINGS

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

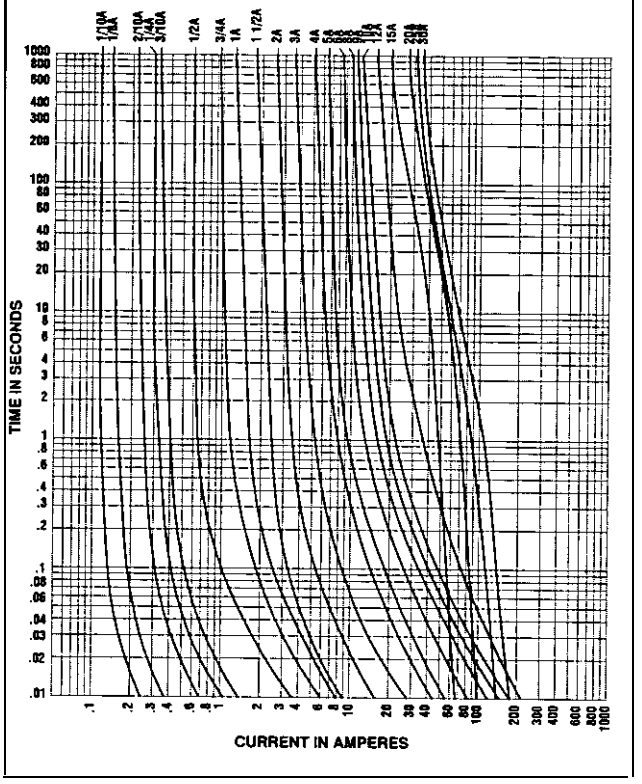
Example part number (series & amperage): KLKR 25

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

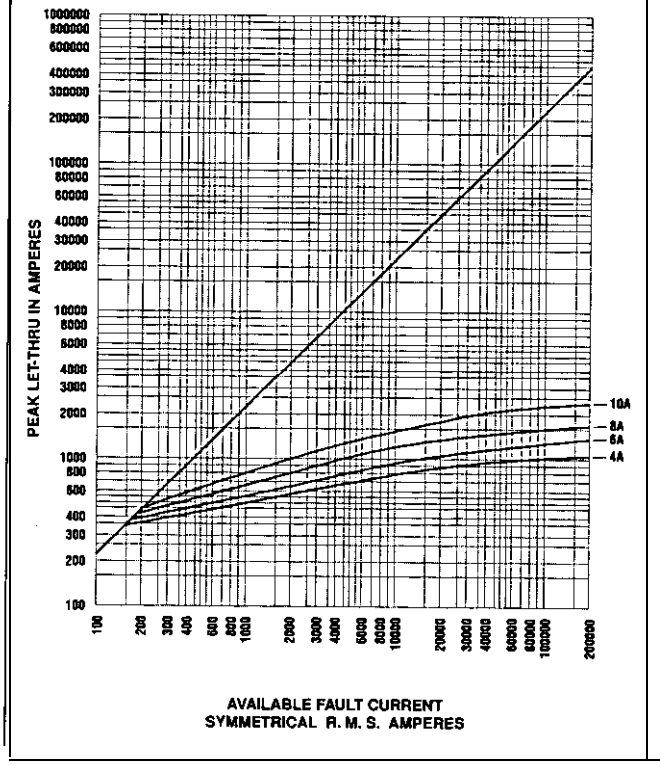
KLDR



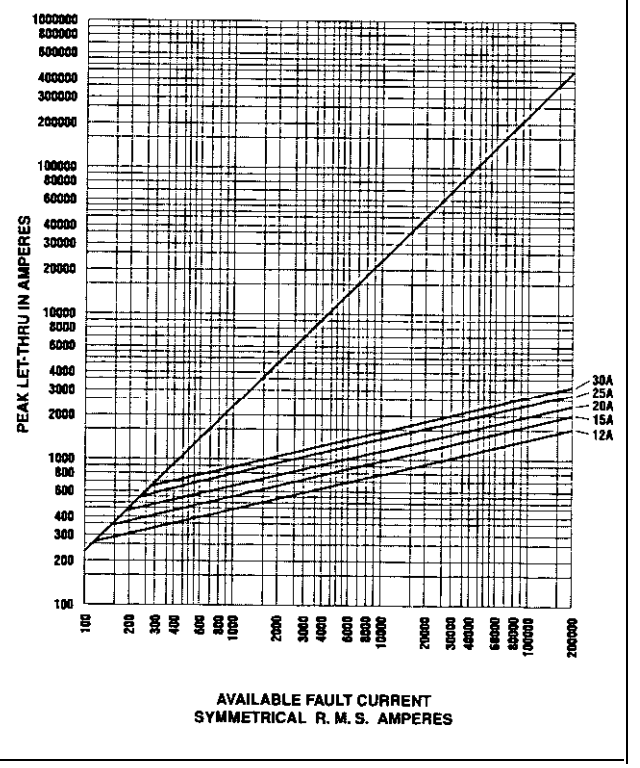
KLKR



KLDR



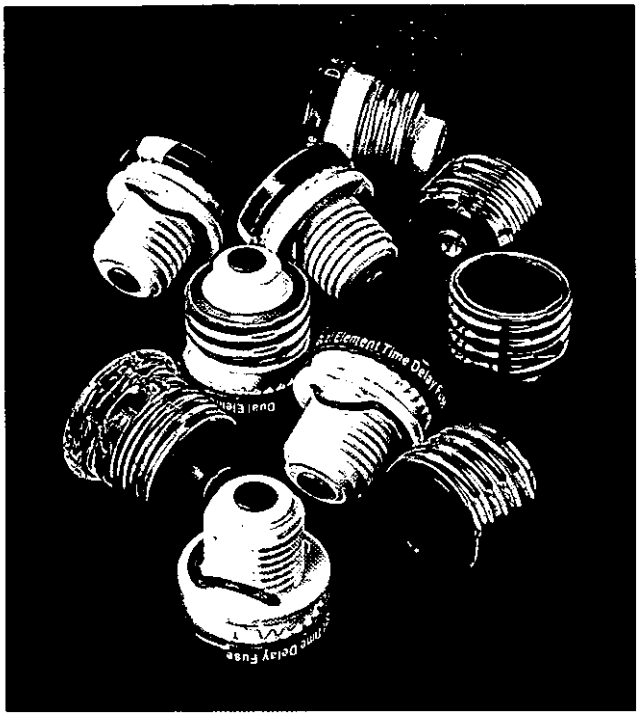
KLKR



Plug Fuses

125 VAC ■ Fast-Actina or Time-Delav ▪ 1/4 – 30 Amperes

Littelfuse
POWR-GARD™ Products



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 (WOO, 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-E.

General Purpose Fuses

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	1⅗, 1⅘	3/10 – 1¼
SAO 2	1⅘. 2	—
SAO 2-1/2	2¼, 2½	1⅘, 2
SAO 3-2/10	2⅗. 3⅖	1⅘ – 2½
SAO 4	3½, 4	—
SAO 5	4½, 5	3½, 4
SAO 6-1/4	3½, 6¼	3x-5
SAO 15	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	2⅖	4	7	15
4/10	1⅘	2½	4½	8	20
½	IX.	2⅘	5	9	25
6/10	1⅗	3	5⅗	IO	30
8/10	1⅘	3⅗	6	12	

WOO Fuses are non-delay Edison-base fuses, best suited for incandescent lighting, resistance heating, and general purpose circuits with no significant motor load. Not recommended for motor circuits. See TOO and SOO fuses. Use for replacement purposes only.

AMPERE RATINGS

½	2	5	8	15	25
1	3	6	10	20	30

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

TYPES 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

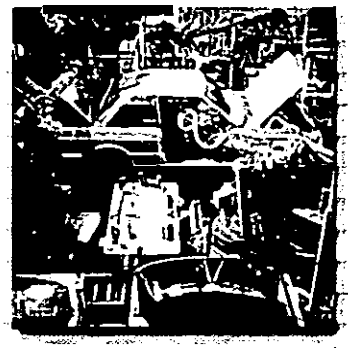
¼	1	2	3½	6¼	14
3/10	1⅘	2⅖	4	7	15
4/10	1⅘	2½	4½	8	20
½	1⅘	2⅘.	5	9	25
6/10	1⅗	3	5⅗	10	30
8/10	1⅘	3⅗	6	12	

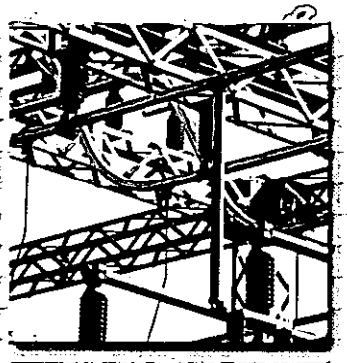
SLO Fuses are medium time-delay Type S fuses for general-purpose branch-circuit protection.

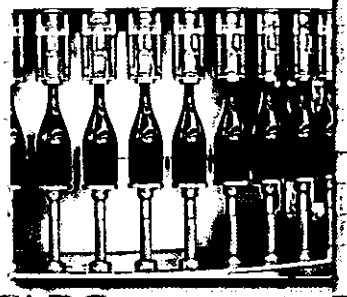
AMPERE RATINGS

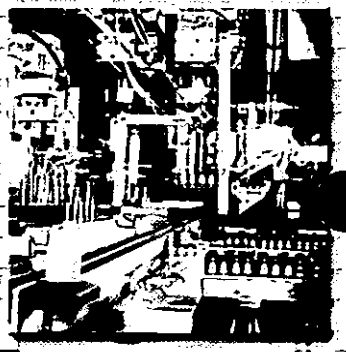
15	20	25	30

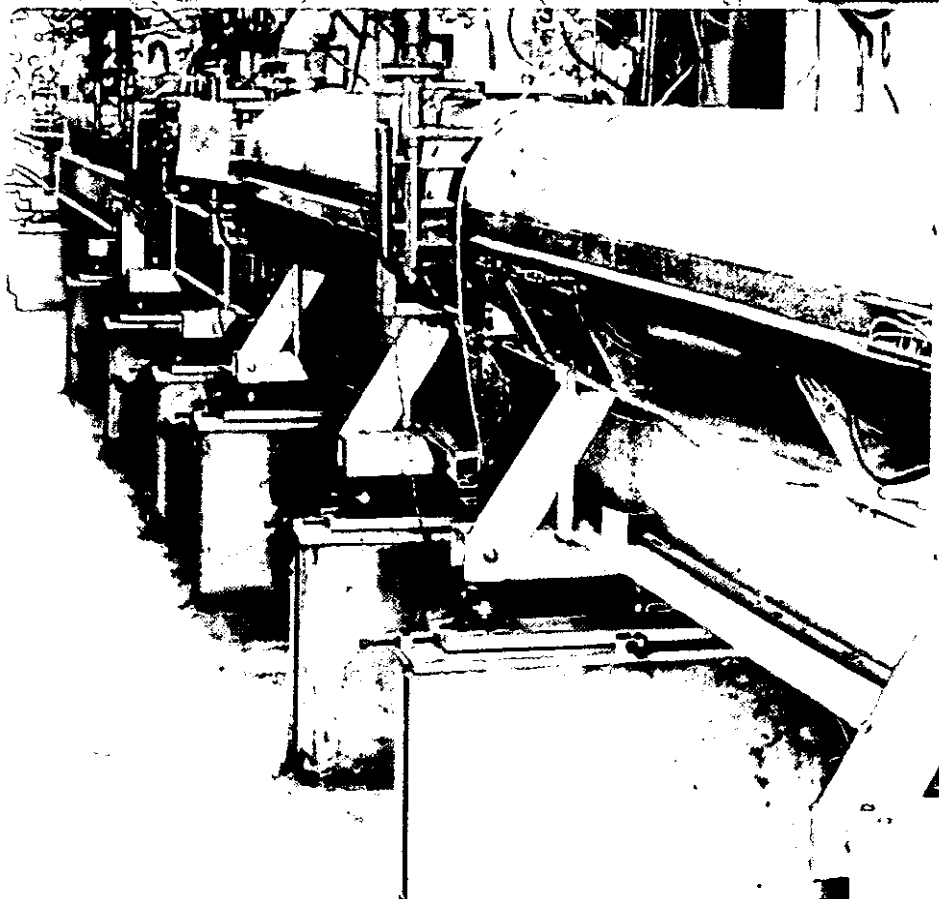
Midget & Electronic Fuses

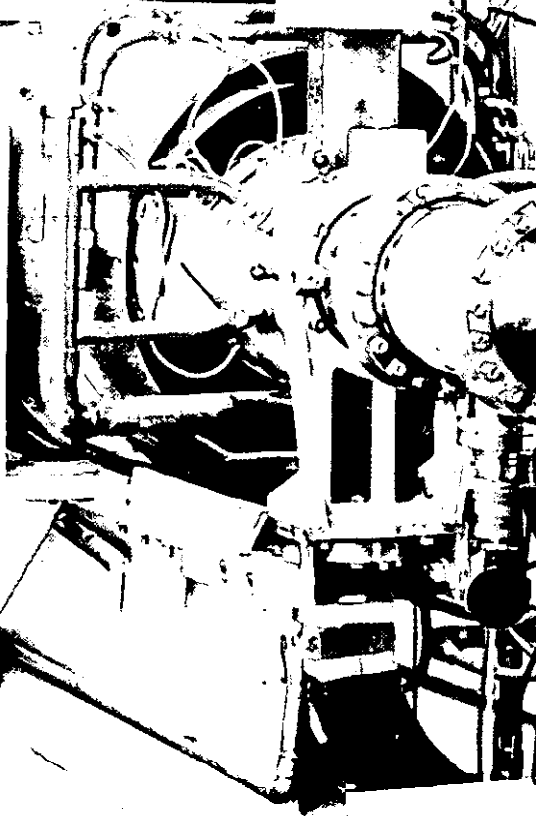












KLK Fuses

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

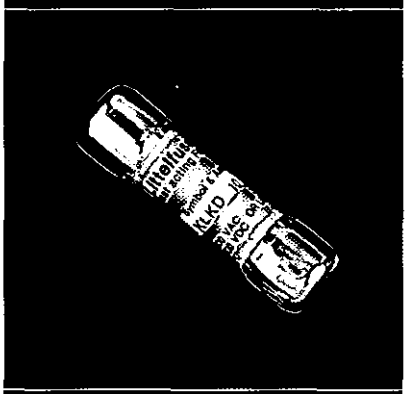
Interrupting Rating: UL Listed 100.000 amperes rms symmetrical
(Capable of 200,000 amperes)

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	6	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: LR29662)
Versions available to meet MIL-F-6160160, QPL F60C: ContactFactory.

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	1¼	5	12
3/10	2	6	15
1/4	3	7	20
1/20	3½	8	25
¾		9	30

Approvals: Standard 246-14
UL Listed 3/10-30A
(File No: E10460)
CSA Certified 3/10-30A
(File No: LR29662)

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	1¼	3	7
15/100	1¾	3¾	6
3/10	1⅘	3½	9
1/4	1½	4	10
3/10	1⅘	4¾	12
4/10	1⅘	5	15
½	2	5⅘	20
6/10	2¾	6	25
8/10	2½	6¾	30
1	2¾		

Approvals: Standard 246-14
UL Listed (File No: E10480)
CSA Certified
(File No: LR29662)

Dimensions: 13132' 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 460 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	6/10	3¾	6
1/8	1	3½	9
'Km	1¼	4	10
3/16	1¾	4¾	12
3/10	1½	5	14
1/4	1⅘	5⅘	15
3/10	2	6	20
4/10	2¼	6¼	25
½	2¾	7	30
6/10	3		

Approvals: Standard 248-14
UL Listed (File No: E10460)
CSA Certified
(File No: LR29862)

Dimensions: 13/32" x 1-1/2
Example part number (series & amperage,: FLQ1/2

RECOMMENDED FUSE BLOCKS

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

Midget Fuses

Supplementary Overcurrent Protection

Littelfuse
POWR-GARD™ Products

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 ■ 125/250VAC

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
2	5	9	25
2½	6 6%	10 12	30

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 t-316" long in contrast to other midget fuses which are l-112". 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:

3/10	1	2	6
4/10	1½	3	7
½	1 9/10	4	8
¾	1 9/10	5	10
9/10			

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

Dimensions: 13132" x 1-3/8

Example part number (series & amperage,: BLS10

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:

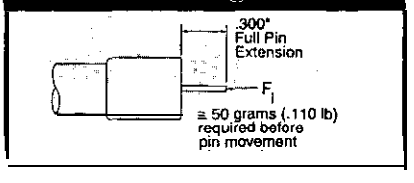
1/10	1 1/8	2 %	6¼
15/100	1¼	3	7
2/10	1 4/10	3 2/10	8
¼	1½	3½	10
3/10	1 9/10	4	12 '
4/10	1%	4½	15 *
½	2	5	20 *
6/10	2%	5%	25 *
8/10	2½	6	30 *
1			

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

Dimension*: 13/32" x 1-1/2

* Note: Dual tube construction

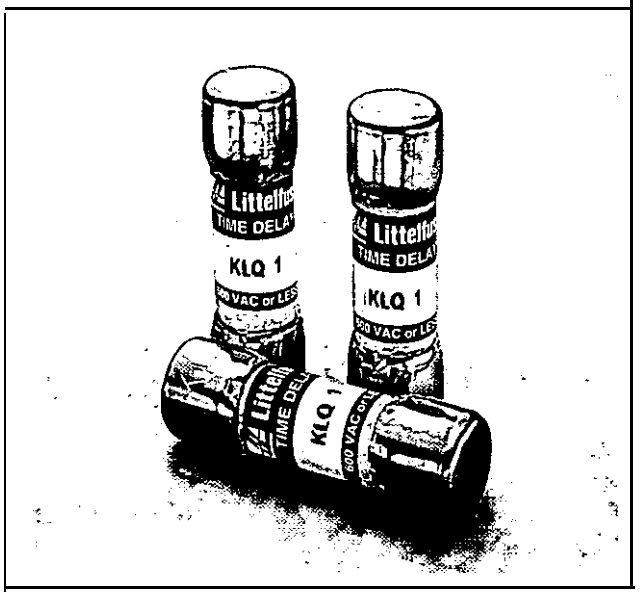
Example part number (series & amperage): FLA 15



RECOMMENDED FUSE BLOCKS

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

NEW



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	4	6
1-6/10	3	5	

RECOMMENDED FUSE BLOCKS

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

ORDERING INFORMATION

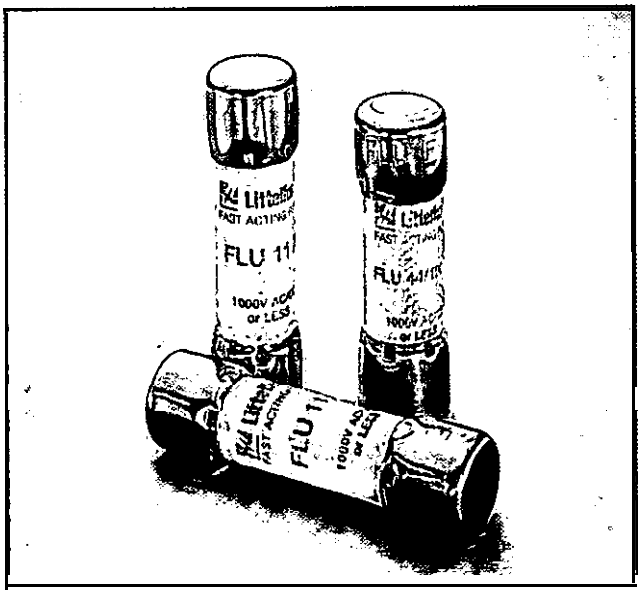
Example catalog number: KLCl005
Example system number: OKLQO05.T

CROSS REFERENCE

Littelfuse	Buss	Ferraz-Shawmut
KLQ	KTQ	

Midget & Electronic Fuses

NEW



FLU Series Fuses

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

SPECIFICATIONS

Voltage Rating: 1000 VACNDC
Interrupting Rating: 44/100A: 10kA
11A: 20kA
Ampere Range: 44/100 and 11 amperes
Approvals: UL **Recognized** under the components program.
(File No: El0460)
CSA Certified (File No: LR29862)
Dimensions: 44/100A: 13/32" x 1-3/8
11A: 13/32" x 1-1/2

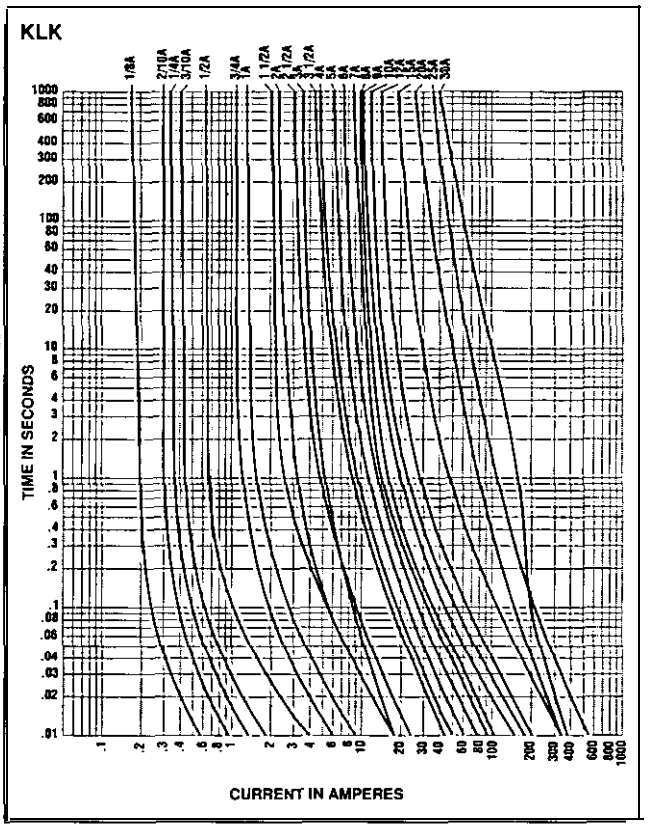
ORDERING INFORMATION

Example catalog number: FLU01 1
Example system number: 0FLU01 1 .T

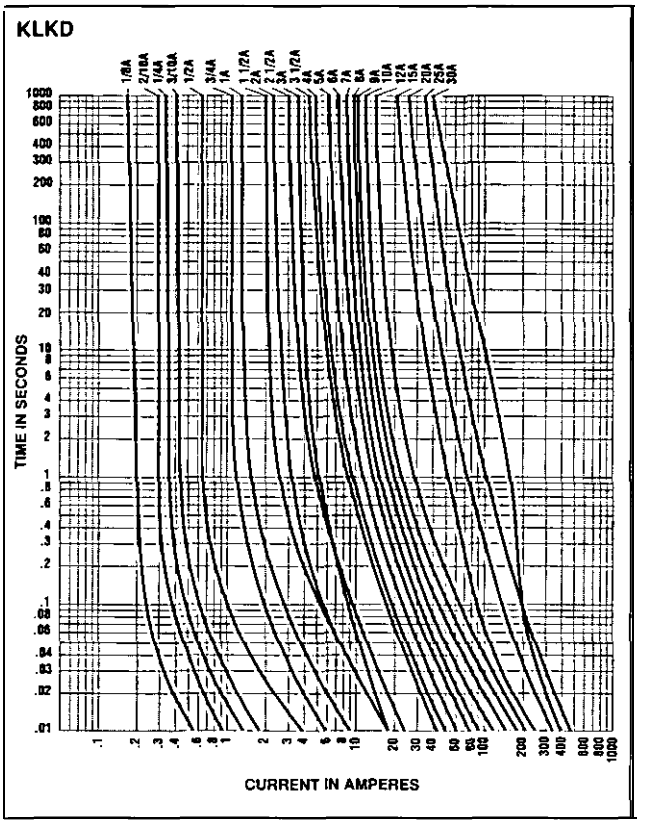
CROSSREFERENCE

Littelfuse	Buss	Ferraz-Shawmut
FLU	DMM	

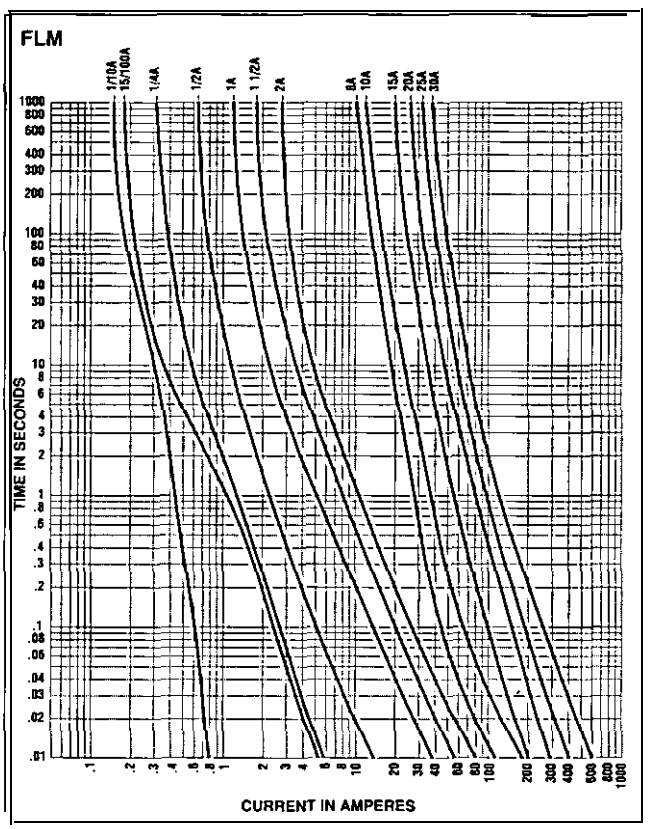
KLK



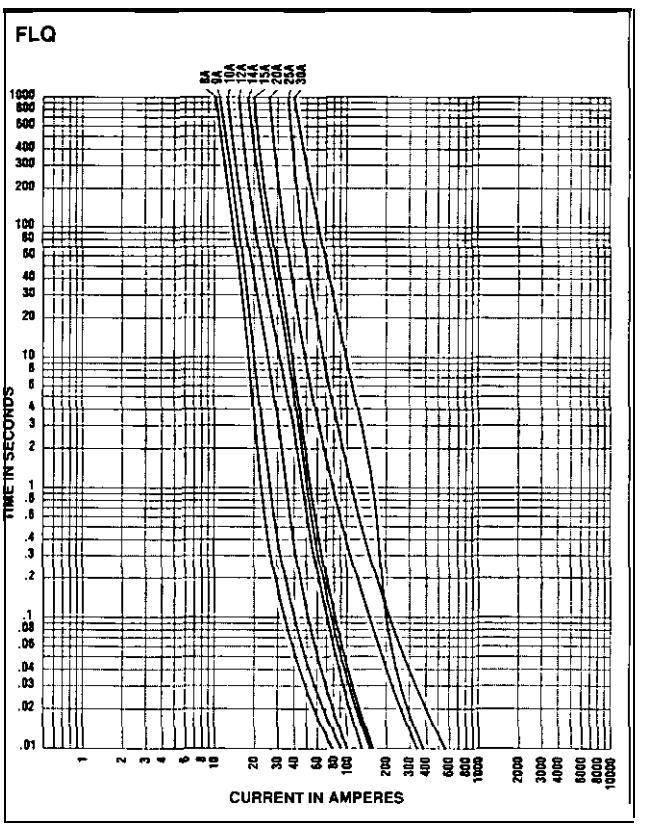
KLKD

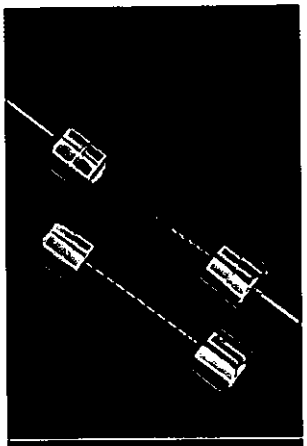


FLM



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:

Km	0.175	½	1⅝₀	4	12
1/32	3/16	6/10	1¾	5	15
1/16	3/10	¾	2	6	20
1/10	¼	1	2¼	7	25
⅛	3/10	1¼	2½	8	30
15/100	⅜	1½	3	10	35

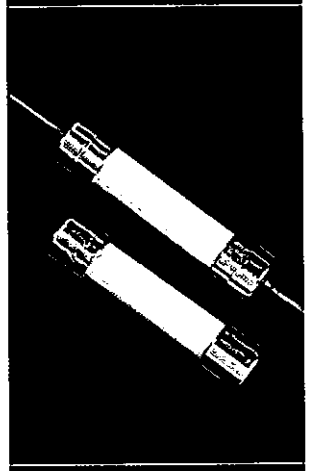
Approvals: Standard 248-14, UL Listed 1/100-10 Amps and UL Listed 12 – 30 Amps per Standard UL 275. CSA Certified through 30 Amps.

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

For fuses with axial leads, request 316 series. Order 312 series without leads.

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

Midget & Electronic Fuses



3141324 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:

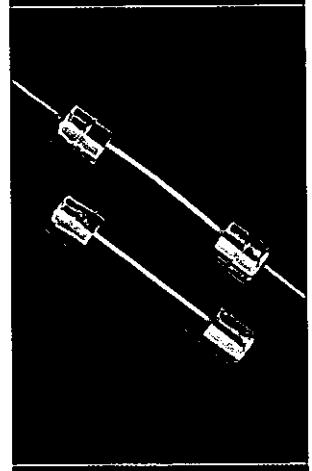
⅛	¾	3	6	10	20
¼	1	4	7	12	25
⅜	2	5	8	15	30
½					

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: 250": 1,100 -6A. 32": 10 – 30A.

Ampere Ratings:

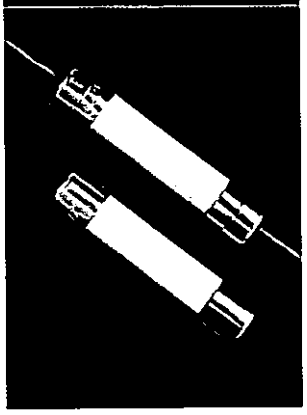
1/100	0.175	½	1¼	2%	8
1/32	3/16	6/10	1½	3	10
1/100	3/10	7/10	1⅝₀	3%	12
1/16	¼	¾	1⅝₀	4	15
1/10	3/10	8/10	2	5	20
⅛	⅜	1	2%	6%	25
15/100	1/10	1⅜₀	2½	7	30

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***



3261325 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.
125": 25 – 30A.

Ampere Ratings:

1/100	3/16	6/10	1½	4	15
1/32	3/10	7/10	1⅝₀	5	20
1/16	¼	¾	2	6%	25
1/10	3/10	8/10	2½	7	30
⅛	⅜	1	2⅝₀	6	
15/100	1/10	1%	3	10	
0.175	½	1%	3%	12	

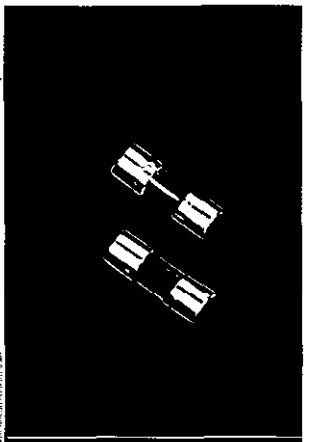
Approvals: Standard 248-14, UL Listed 1/4 – 10 Amps. UL Recognized under the Components Program 12-30 Amps. CSA Certified 1/4 – 30 Amps.

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***

Ask for the indicator



2291230 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	⅝	1	2	3	5
.350	¾	1¼	2¼	3½	6
⅜	⅞	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)

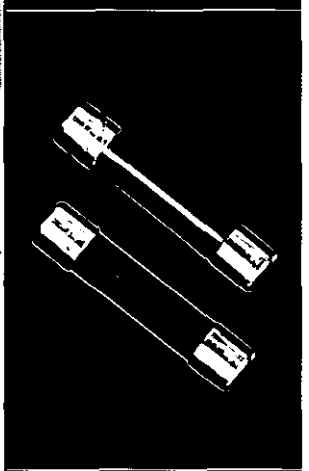
For fuses with axial leads. request 230-S series. Order 229-S series without leads.

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

Midget & Electronic Fuses

PRODUCT OF THE YEAR 1994

Ask for the indicator



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 – *6A. 32V:* 10A.

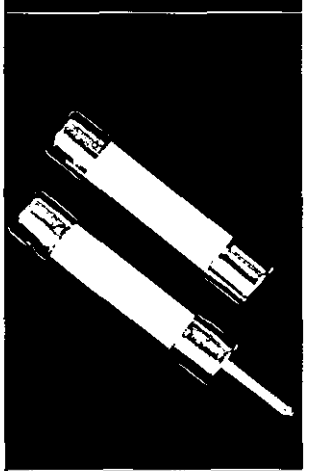
Ampere Ratings:

½	1½	3	5	7	10
1	*2*	*4*	*6¾*	8	

Approvals: Standard 248-14, UL Listed and CSA Certified 1/2 – 6 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": 16.4 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 tie end of the fuse when the fuse is blown.

Voltage Rating: **125V:** ¾ –6A.

Ampere Ratings:

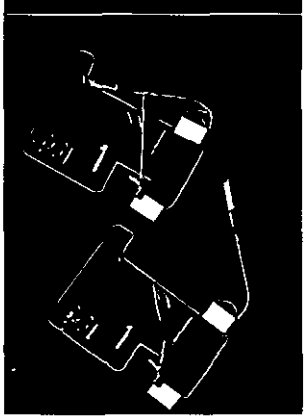
¾	1½	*3*	5
1	*2*	*4*	6

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***



481 Series
FAST-ACTING INDICATING/ALARM FUSE

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.

Voltage **Rating:** 125V AC, DC

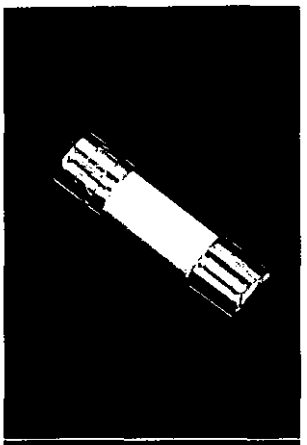
Ampere Ratings:

1⅝₀₀	6⅝₀₀	1⅛	*3*	5	*12*
¼	¾	1½	3½	7½	15
½	1	*2*	*4*	10	

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

Example part number (series & amperage): ***481005***

Recommended Fuse Blocks:
Part Number ***48200*** *1.*



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	3.16	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

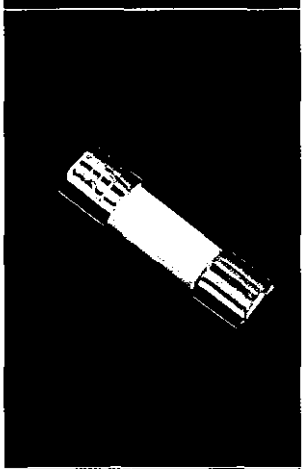
Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO, VDE. and BSI approved 1 – 6.3 Amps. MITI approved 1 – 10 Amps.

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***

Midget & Electronic Fuses



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.

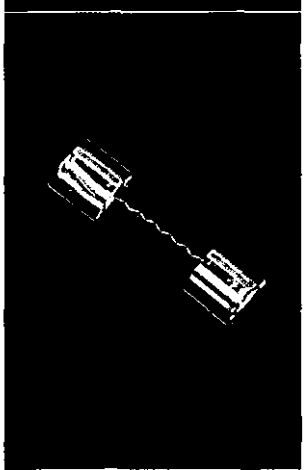
Interrupting Capacity: 1500A

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.

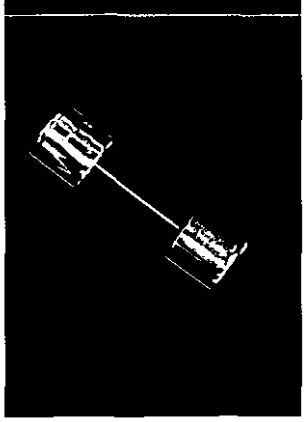
Interrupting Capacity: 35A or 10x rated current, whichever is greater.

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.

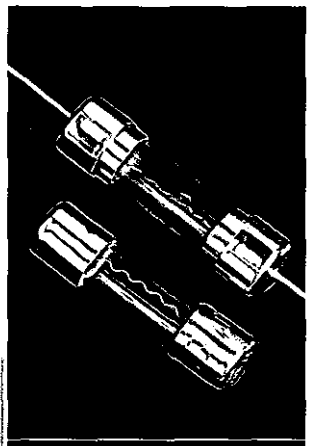
Interrupting Capacity: 35A or 10X rated current. whichever is greater.

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 0.6 – 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***



2351236 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:

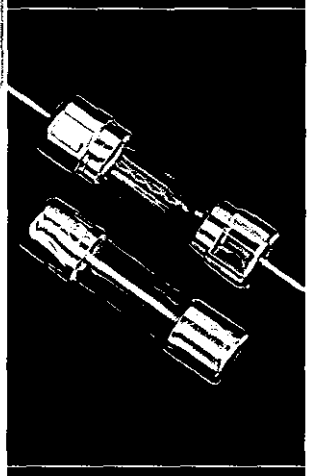
1/10	3/10	5/10	1	2	4
1/8	4/10	7/10	1¼	2½	5
2/10	½	8/10	1⅘	3	6
¼					

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

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

For fuses with axial leads, request 236 series. Order 235 series without leads.

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



2391238 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:** 3/10 – 3A. **125V:** 4A.

Ampere Ratings:

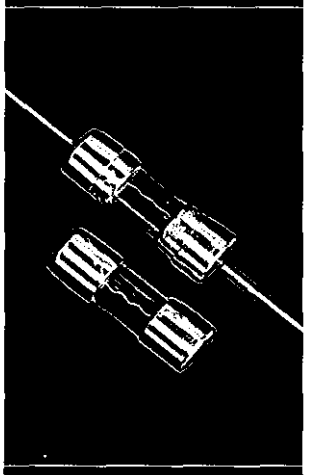
3/10	4/10	7/10	1	2	4
¼	½	¾	1¼	2x	5
3/10	5/10	8/10	1⅘	3	

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

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

For fuses with axial leads, request 238 series. Order 239 series without leads.

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



2251224 Series

2AG FAST-ACTING FUSE

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

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

Ampere Ratings:

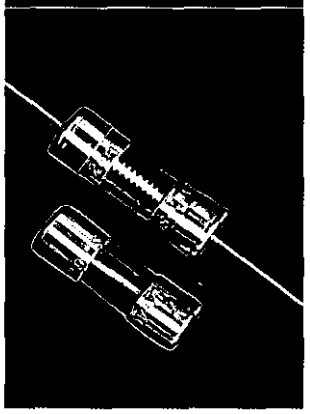
1/10	3/8	1	2x	4	7
1/8	½	1½	3	5	8
¼	¾	2	3½	6	10

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



2291230 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.

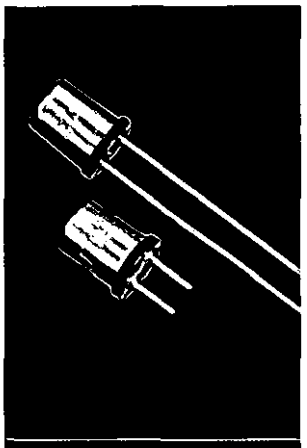
Voltage Rating: **250V**: ¼ – 3XA. **125V**: 4 – 7A.

Ampere Ratings:

¼	5/10	1½	2½	4	6
3/8	¾	2	3	5	7
½	1	2½	3x		

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 pan *number (series & amperage):* ***229.375***



2721278 Series

FAST-ACTING MICROFUSE

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

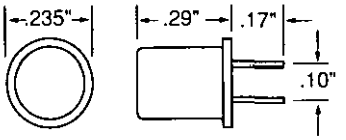
Voltage Rating: 125V AC

Ampere Ratings:

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

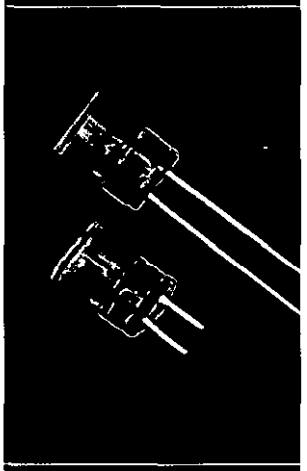
Approvals: UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

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***



2731279 Series

FAST-ACTING MICROFUSE

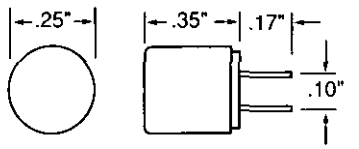
Similar to 272 and 278 series. except has transparent cap for visual indication of fuse status.

Voltage Rating: 125V AC

Ampere Ratings:

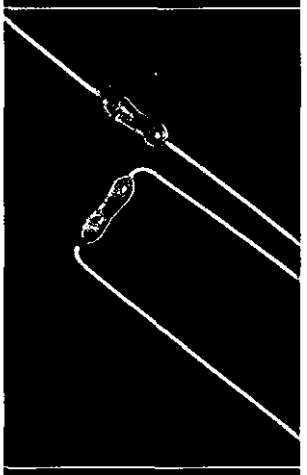
1/500	1/32	1/8	4/10	3/4	2
1/200	1/20	2/10	1/2	8/10	3
1/100	1/16	1/4	6/10	1	4
1/64	1/10	3/10	7/10	1 1/2	5

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***



2511252 Series

FAST-ACTING PICO®II FUSE

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

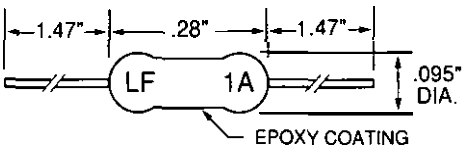
Voltage Rating: **125V:** 1/16 – 10A. **32V:** 12 – 15A.

Ampere Ratings:

1/16	3/8	1	2½	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.

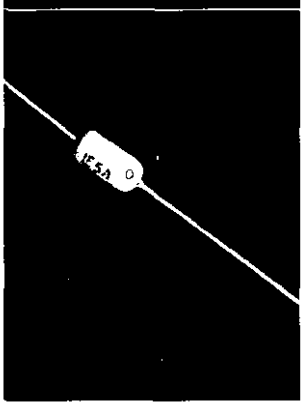
Example part number (series & amperage): ***251.125.***



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 PE-1027 for further information.

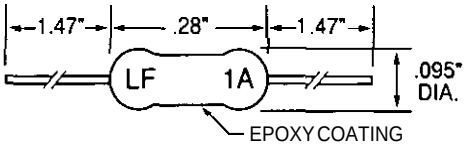
Voltage Rating: 125V AC

Ampere Ratings:

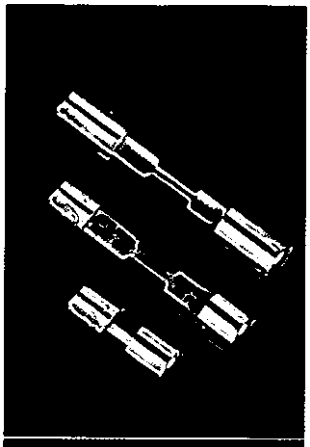
3/16	1	2	2½	3½	5
1/8	1 1/2	2½	3	4	7
1/4					

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



Midget & Electronic Fuses



307/SFE Series

FAST-ACTING FUSE

Low-voltage fuse for automotive and electronic applications.

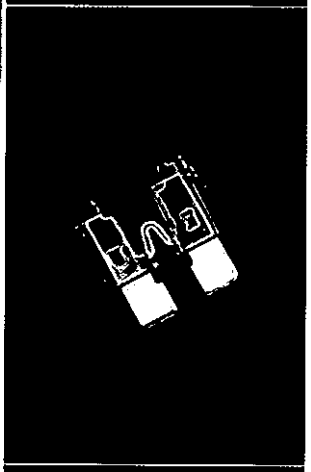
Voltage Rating: 32V AC/DC

Ampere R&/Dimensions:

Ampere Rating	Length	Diameter
4	5/8"	1/4"
6	3/4"	1/4"
7½	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

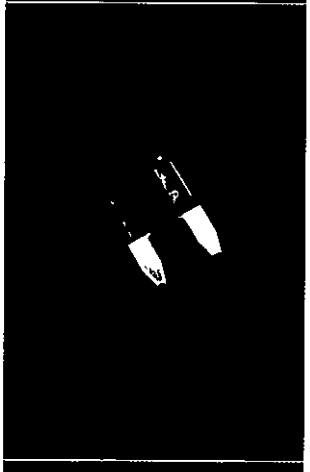
The 257 series AT0 fuse is a low-voltage blade type fuse for automotive and electronic applications. Designed. originated and patented by Littelfuse, it has become the standard for OEM circuit protection on foreign and domestic autos and trucks. They are color-coded and readily identifiable and may be 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

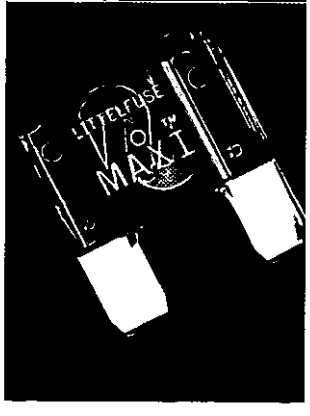
The MINI' fuse is smaller than its predecessor. the ATO® fuse. which permits using more fuses in the same amount of space. More fuses in the same space satisfies the requirement that more circuits be individually fused in newer automobiles. Patented by Littelfuse.

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.

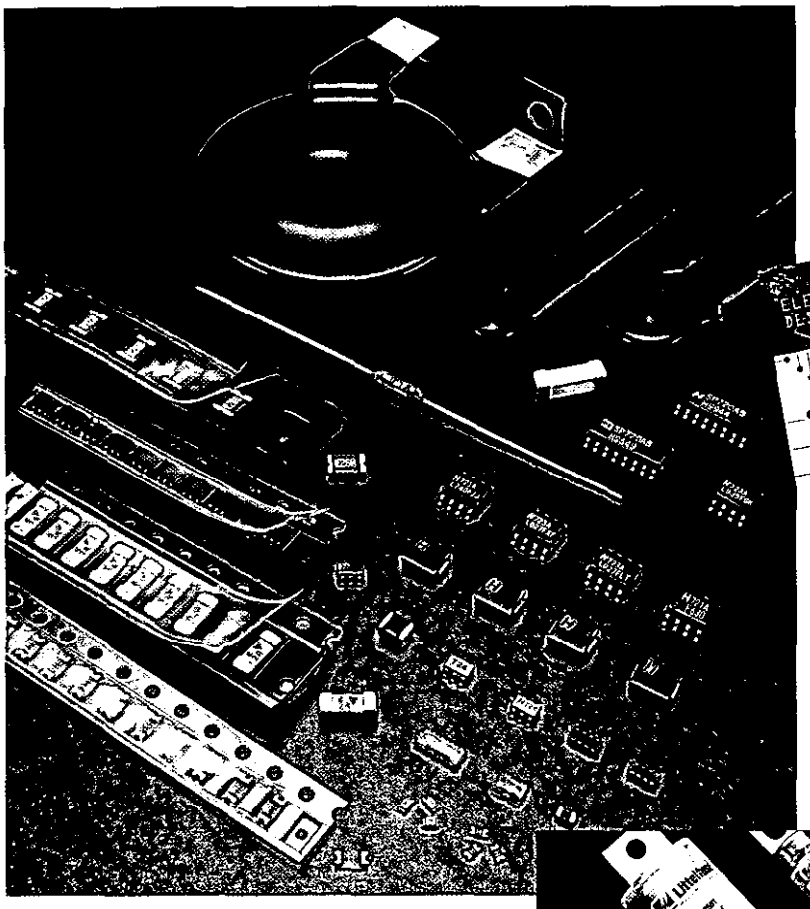
Voltage Rating: 32V AC/DC

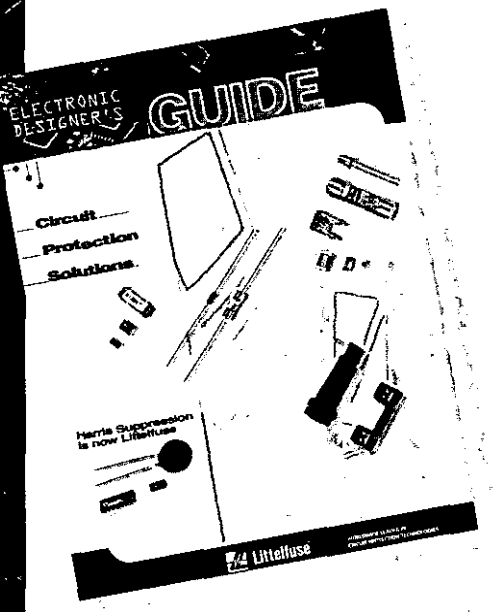
Approvals: UL Listed. Society of Automotive Engineers (SAE) J1888.

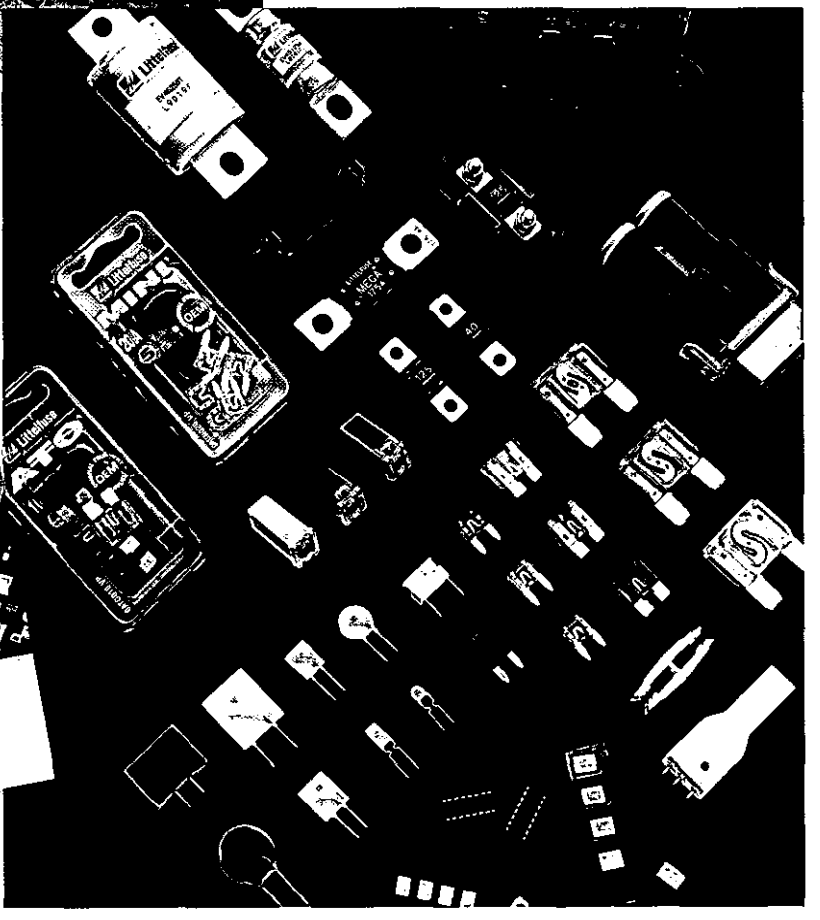
*Example part number (series & amperage): **MAX070***

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

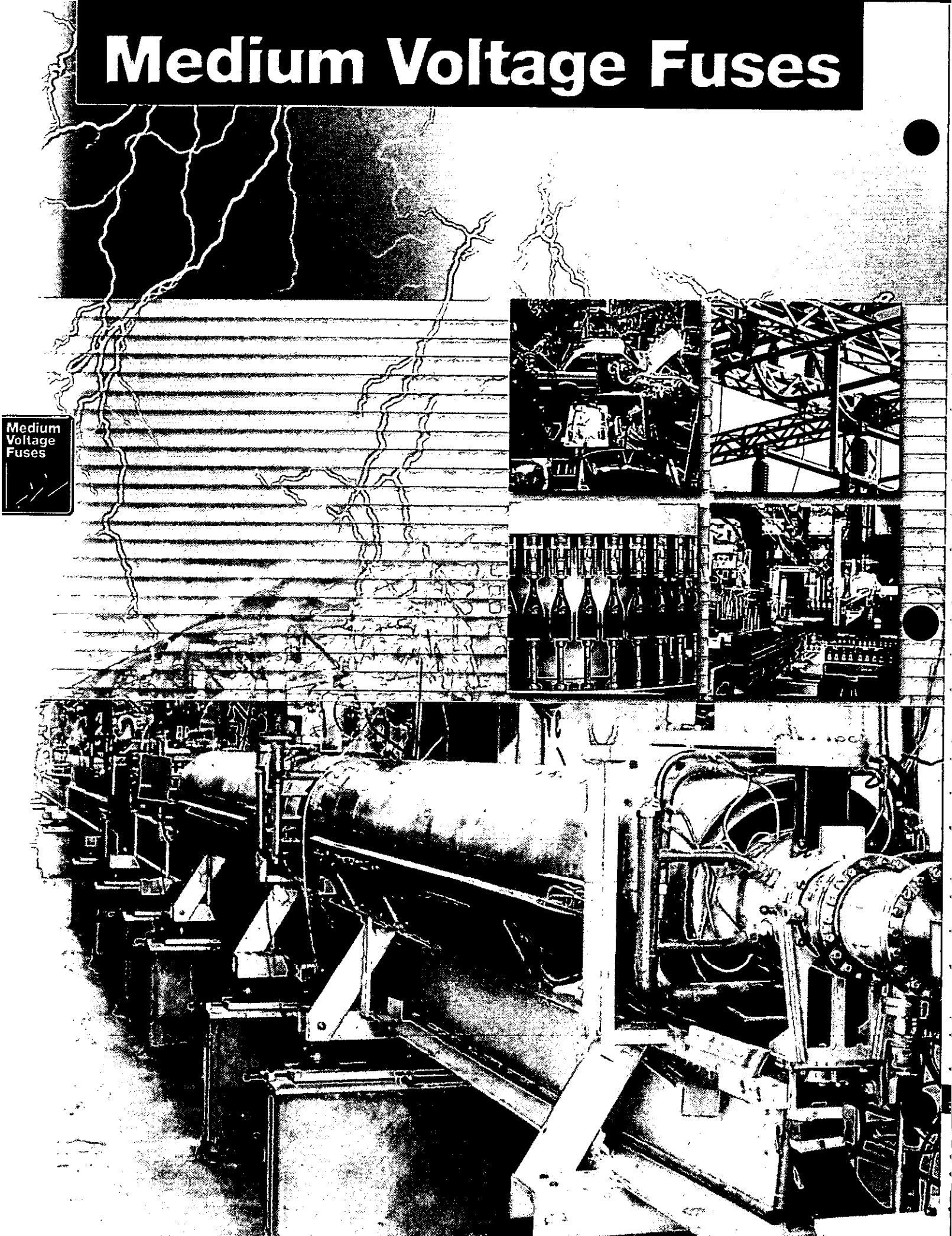
In addition to POWR-GARD Products, Littelfuse manufactures a wide range of state-of-the-art electronic and automotive products. For more detailed information on electronic and automotive products please refer to catalog EC101 and AA101.







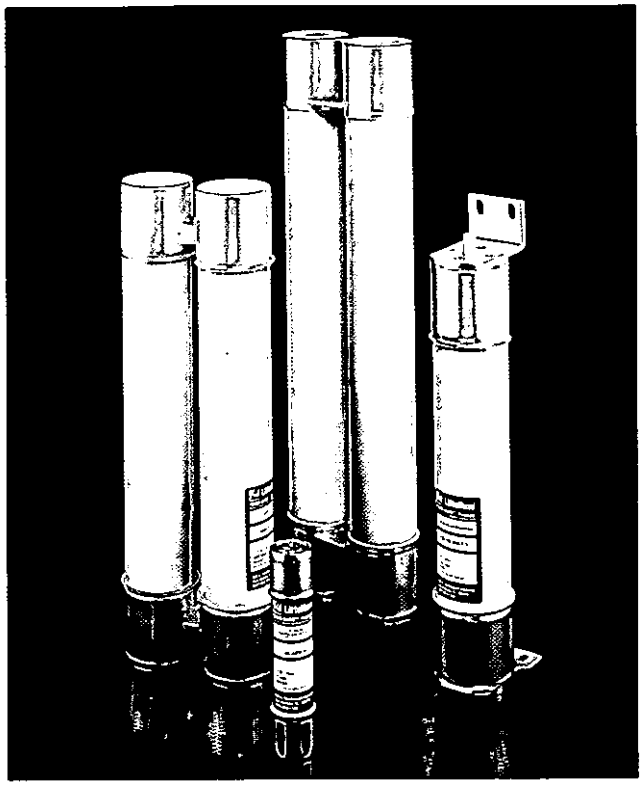
Medium Voltage Fuses



Medium Voltage Fuses

2400 - 25,500 VAC ■ Current Limiting

Littelfuse
POWR-GARD™ Products



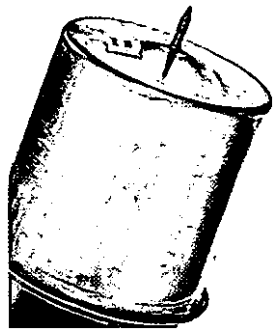
Littelfuse now offers a complete selection of "E" and "R" rated medium voltage fuses for the protection of transformers, potential transformers, feeders, and motor circuits. Single, double, and triple barrel designs are available to cover a wide range of current, voltage, and interrupting ratings. Conventional 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 36,000 VAC. "High voltage fuses are for circuits carrying voltages greater than 36,000 VAC.

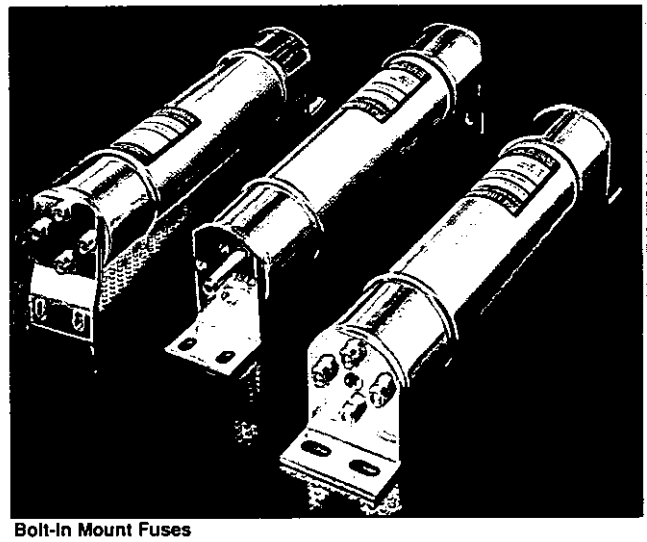
Medium Voltage Fuses

"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

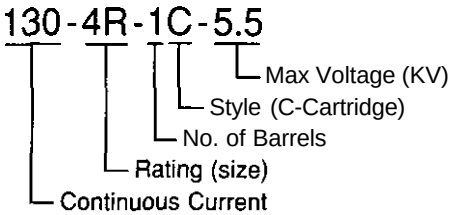
Littelfuse
POWR-GARD™ Products

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

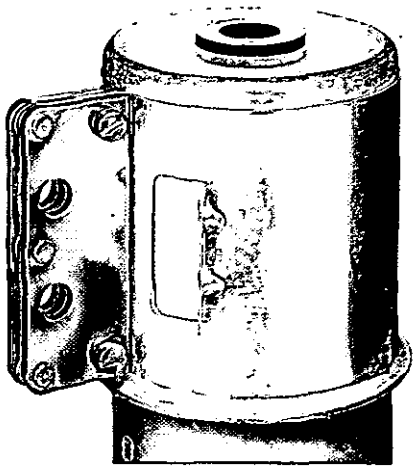
Current Range: 2R – 36R

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

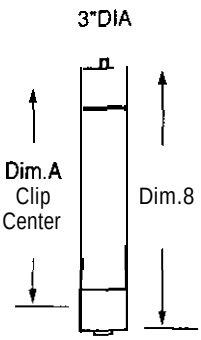


FIGURE 1

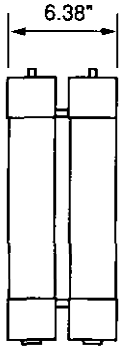


FIGURE 2

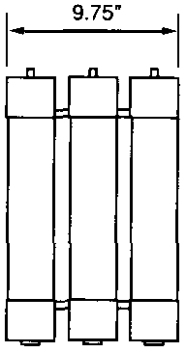


FIGURE 3

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

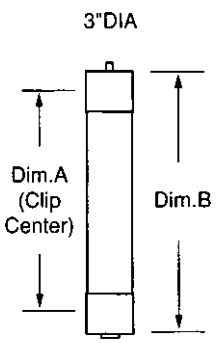


FIGURE 4

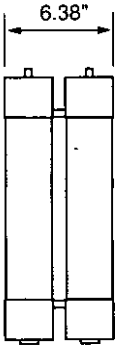


FIGURE 5

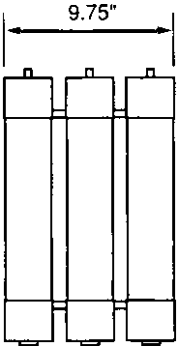


FIGURE 6

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

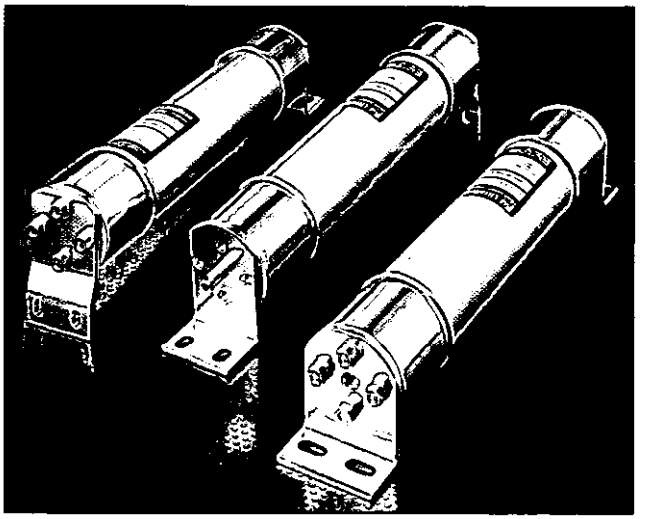
Littelfuse

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.



Medium Voltage Fuses

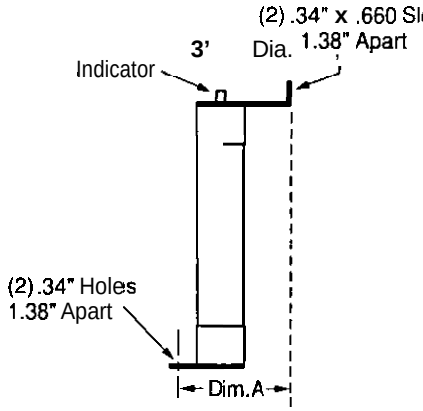


FIGURE 7

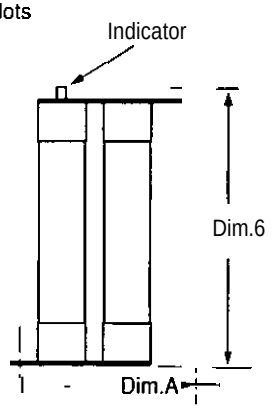


FIGURE 8

Bolt Mount "B"

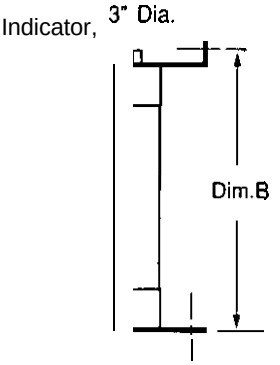


FIGURE 9

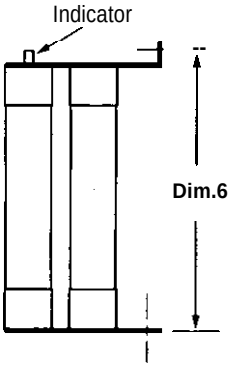


FIGURE 10

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

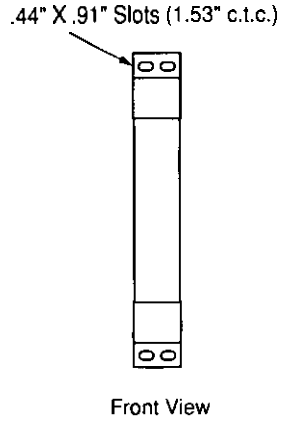


FIGURE 11

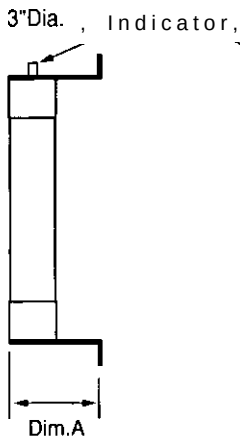


FIGURE 12

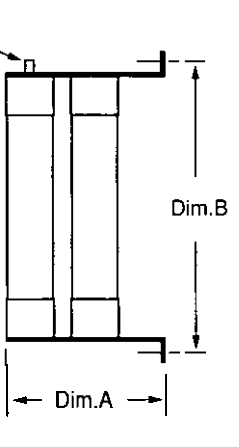


FIGURE 13

Bolt-h Mount "BI"

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			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	3.6	18"	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			1500	80,000	12
	450-24R-2BI-5.5		24R	450			1950	80,000	12
	480-26R-2BI-5.5		26R	480	7.6	18	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				80,000	13
	600-32R-3BI-5.5		32R	600		18"		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			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	4.6	18	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		1500	80,000	8
	450-24R-2B-5.5		24R				1950	80,000	8
	550-30R-2B-5.5	—	30R	550		18	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			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	—	18	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			1500	80,000	10
	450-24R-2IB-5.5		24R	450			1950	80,000	10
	550-30R-2IB-5.5	—	30R	550	—	18"	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			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	3.6	18"	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 ZOO-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.

Medium Voltage Fuses

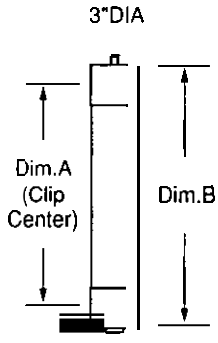


FIGURE 14

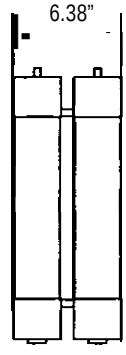


FIGURE 15

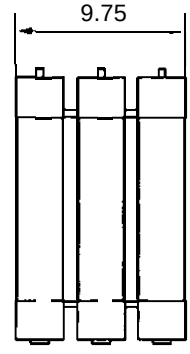


FIGURE 16

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		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

E 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

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	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
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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		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

Medium Voltage Fuses

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

E Rated Medium Voltage Fuses

Current Limitina

Littelfuse
POWR-GARD™ Products

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,

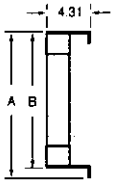


FIGURE 17

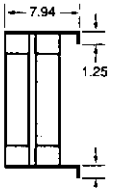


FIGURE 18

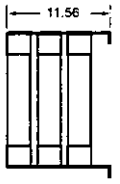
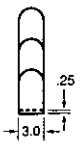


FIGURE 19



Medium Voltage Fuses

5.5 Max. KV Clip Lock

E RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
	10E-1CL-5.5		10E				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	16.38"	15.13"	80,000	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				18
	250E-2CL-5.5		250E				18
	300E-2CL-5.5		300E				18
	350E-2CL-5.5	—	350E	17.38"	16.13"	80,000	18
	400E-2CL-5.5		400E				18
	450E-2CL-5.5		450E				18
	500E-3CL-5.5		500E				19
	550E-3CL-5.5	—	550E	17.38"	16.13"	80,000	19
	600E-3CL-5.5		600E				19

8.25 Max. KV Clip Lock

E RATED	Catalog Number	Old Catalog Number	Size	Dim. A (inches)	Dim. B (inches)	Max Interrupting Rating RMS (Asym)	Figure Number
	10E-1CL-8.25		10E				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	17.38"	16.13"	80,000	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				18
	150E-2CL-8.25		150E				18
	175E-2CL-8.25		175E				18
	200E-2CL-8.25	—	200E	17.38"	16.13"	80,000	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

15.5 Max. KV Clip Lock

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

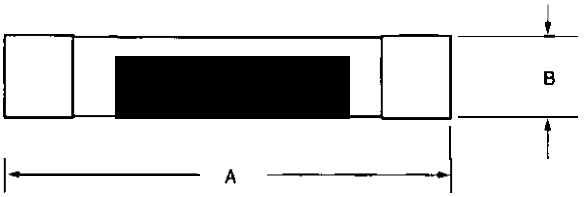
Littelfuse
POWR-GARD™ Products

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

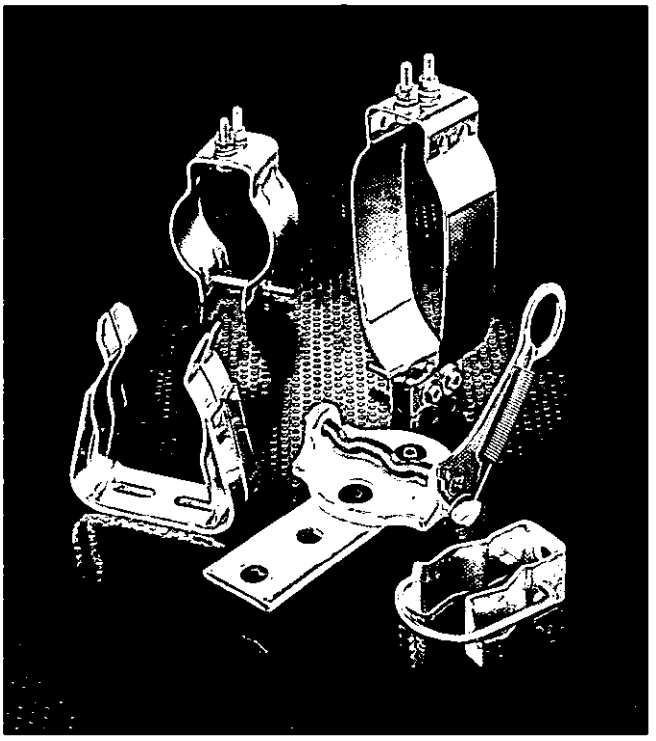
Application Note:
When applying fuses for the protection of transformers, the magnetizing current inrush must be considered. The characteristics of the inrush, which can be matched with a fuse's time-current curve, should be available from the transformer manufacturer.

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	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

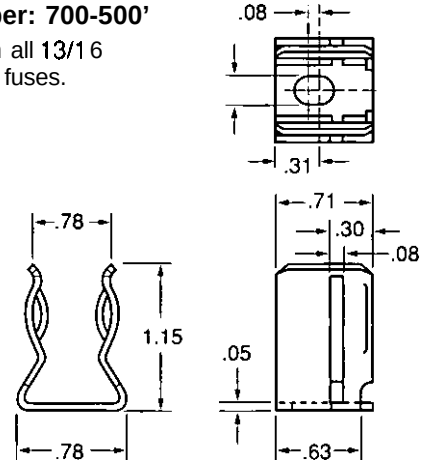


Live parts are available for mounting "E", "R", and "PT" single, double, and triple barrel fuses. Mounting clips are available for ferrule type and clip lock style fuses. All clips are sold in pairs.

Contact factory for additional live parts.

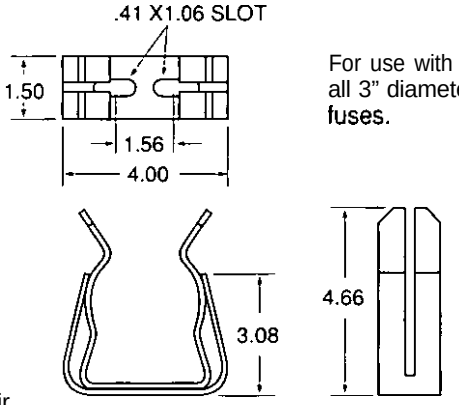
Part Number: 700-500'

For use with all 13/16 diameter PT fuses.



* One Pair

Part Number: 700-530'

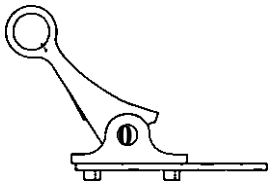


For use with all 3" diameter fuses.

* One Pair

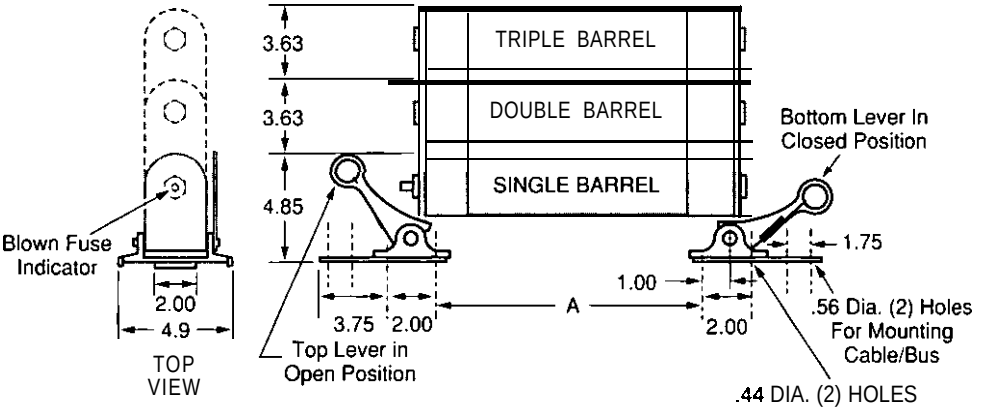
Part Number: 700-520-CL*

Clip Lock Design (For CL-14)



* One Pair

Mounting Details for Clip Lock



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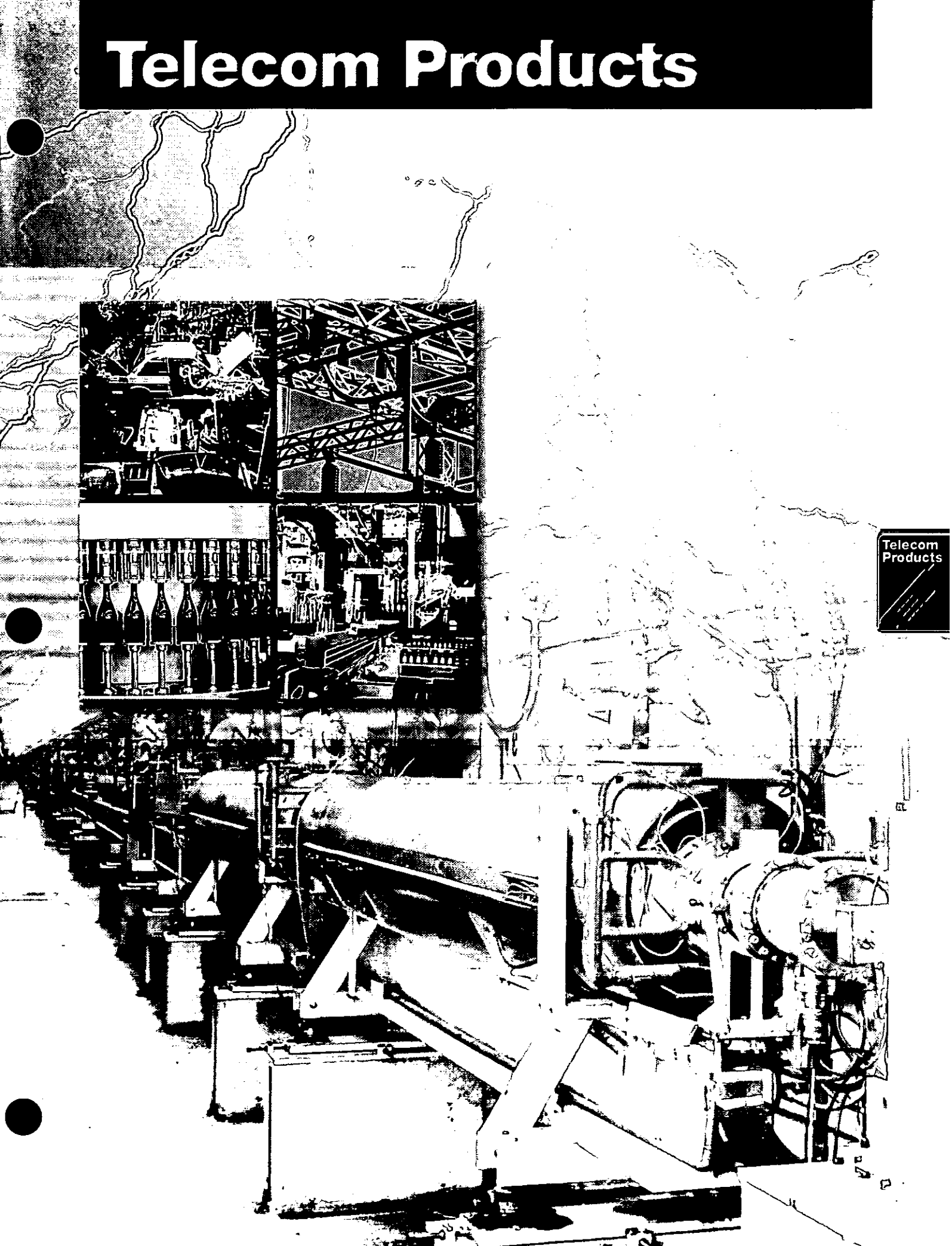


L17T Series Telecommunications Power Fuse

170 VDC ▪ Current Limitina ▪ 70 – 1200 Amperes

Littelfuse
POWR-GARD™ Products

NEW

Specifically designed for short circuit protection of Telecommunications circuits, the Linelfuse 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.

Telecom Products

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**	**225**	**350**	**500**	1000
80	150	**250**	**400**	**600**	**1200**
100	**200**	**300**	**450**	**800**	

Example part number (series & amperage): L 17T 200

RECOMMENDED FUSE BLOCKS

LTFD 6001 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

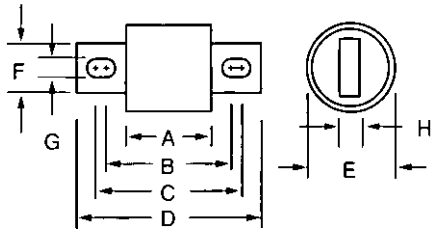


Fig. 3

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 Linelfuse for characteristic curves.

TLN Series Telecommunications Power Fuse

170 VDC ▪ Current Limiting ▪ 1 – 600 Amperes

Littelfuse
POWR-GARD™ Products

NEW

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	45	80	150	300	600
3	20	50	90	175	350	
5						
6 25	30	60	100 110	200 225	400 450	
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

. 170VDC

. Fast acting and current limiting

. 1 to 600 amperes

. Dimensionally similar to 250V Class R fuses

Telecom Products

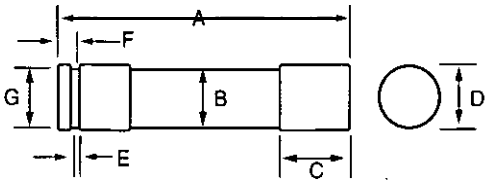


FIG. 1

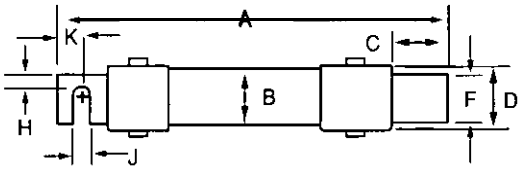


FIG. 2

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.

TLS Series Telecommunications Power Fuse

170 VDC ■ Current Limiting ■ 1 – 70 Amperes

Littelfuse
POWR-GARD™ Products

NEW!

Telecom Products

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

- **170VDC**
- **Current limiting**
- **1 to 70 amperes**
- **Circuit board mounting available** (TLS_L **series)**

SPECIFICATIONS

Voltage Rating: 170 VDC

Interrupting Rating: 100,000 amperes

Ampere Range: 1 – 70 amperes

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

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

AMPERE RATINGS

1	6	20	40	70
3	10	25	50	
5	15	30	60	

Example part number (series & amperage): TLS050

ORDERING INFORMATION

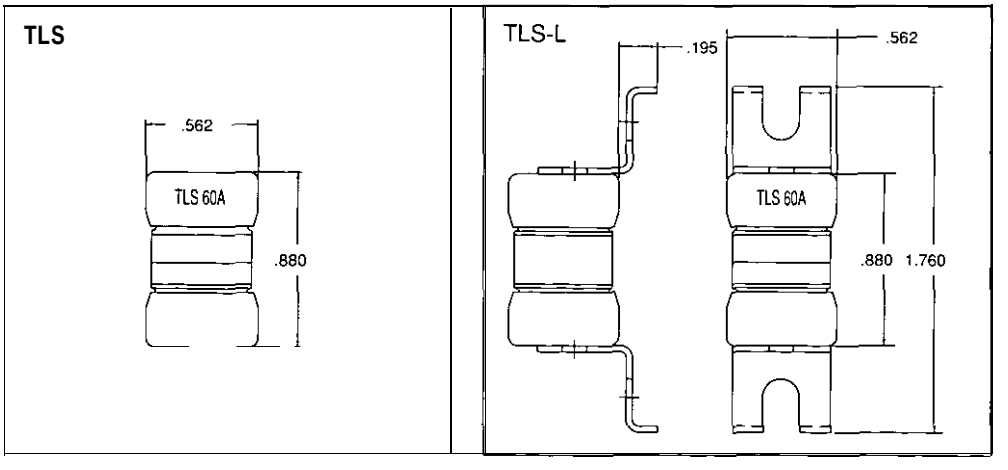
Catalog No.	Catalog No. Leaded Version*	Ampere Rating
TLS001	TLS001L	1
TLS003	TLS003L	3
TLS005	TLS005L	5
TLS006	TLS006L	6
TLS010	TLS010L	10
TLS015	TLS015L	15
TLS020	TLS020L	20
TLS025	TLS025L	25
TLS030	TLS030L	30
TLS040	TLS040L	40
TLS050	TLS050L	50
TLS060	TLS060L	60
TLS070	TLS070L	70

* Used for circuit board applications.

RECOMMENDED FUSE BLOCKS

LTFD series disconnect switches

Contact factory for more information.



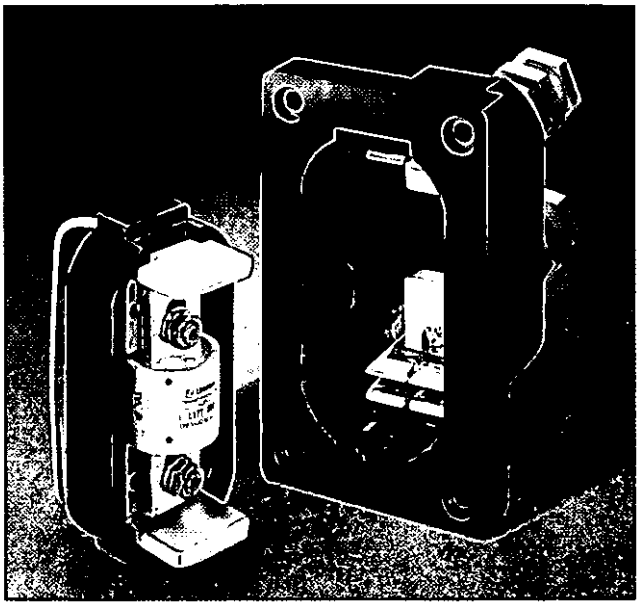
Contact Linelfuse for characteristic curves

LTFD 6001 Series Telecommunications Disconnect Switch

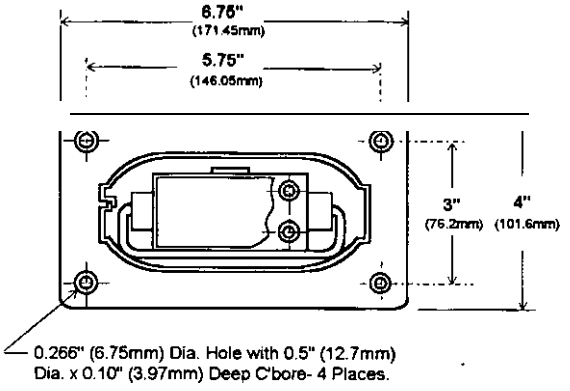
145 VDC, 60 VDC ▪ 70 – 1200 Amperes

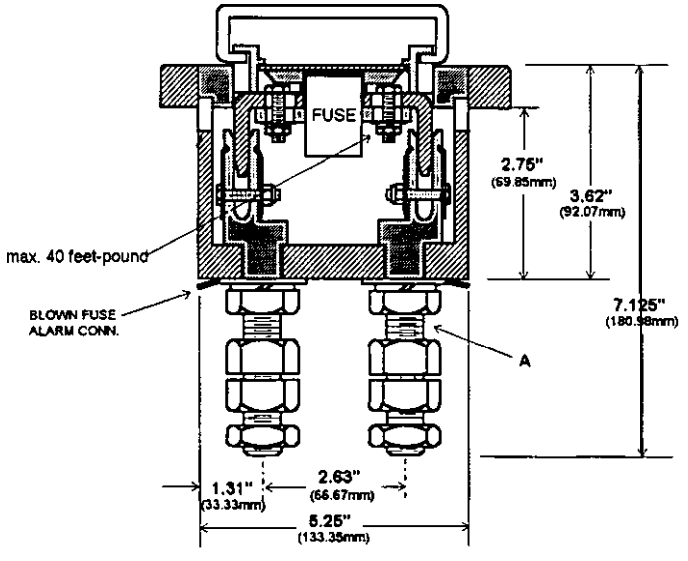
Littelfuse
POWR-GARD™ Products

NEW!



Littelfuse's compact LTFD 6001 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.





Contact factory for 1200A switch dimensions.

SPECIFICATIONS

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

Ampere Range: 70 – 1200 amperes

Approvals: UL Recognized (E122674)

RECOMMENDED FUSES

L17T Series fuses

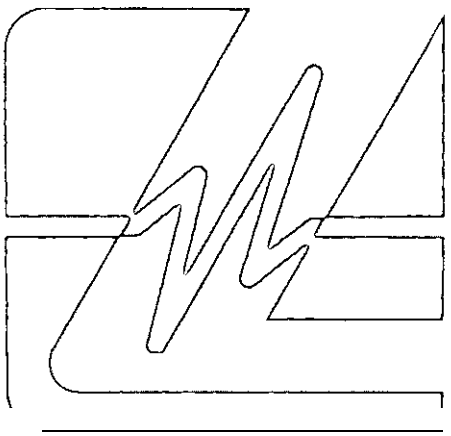
ORDERING INFORMATION

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	Contact Factory	800 – 1200	Contact Factory

FEATURES

- 145 VDC, 70 to 600 amperes
- 60 VDC, 800 amperes

Telecom Products



Littelfuse®
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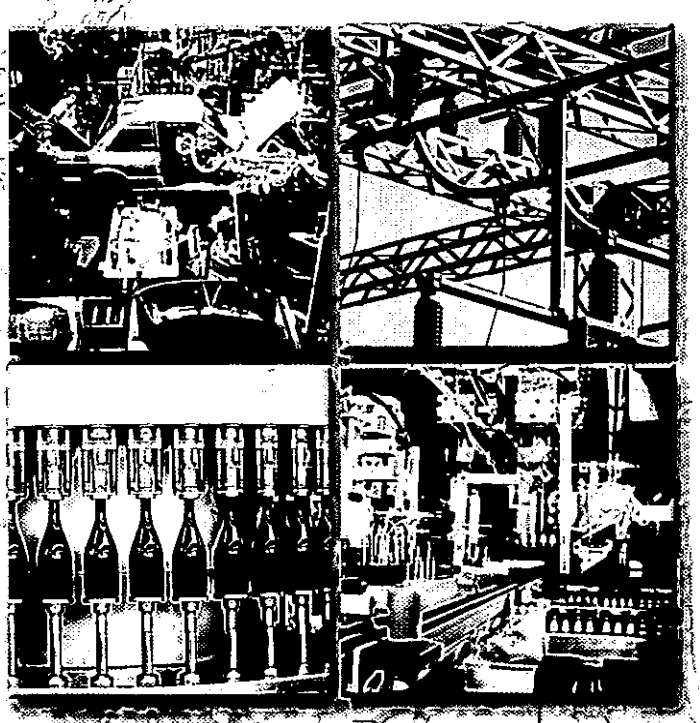
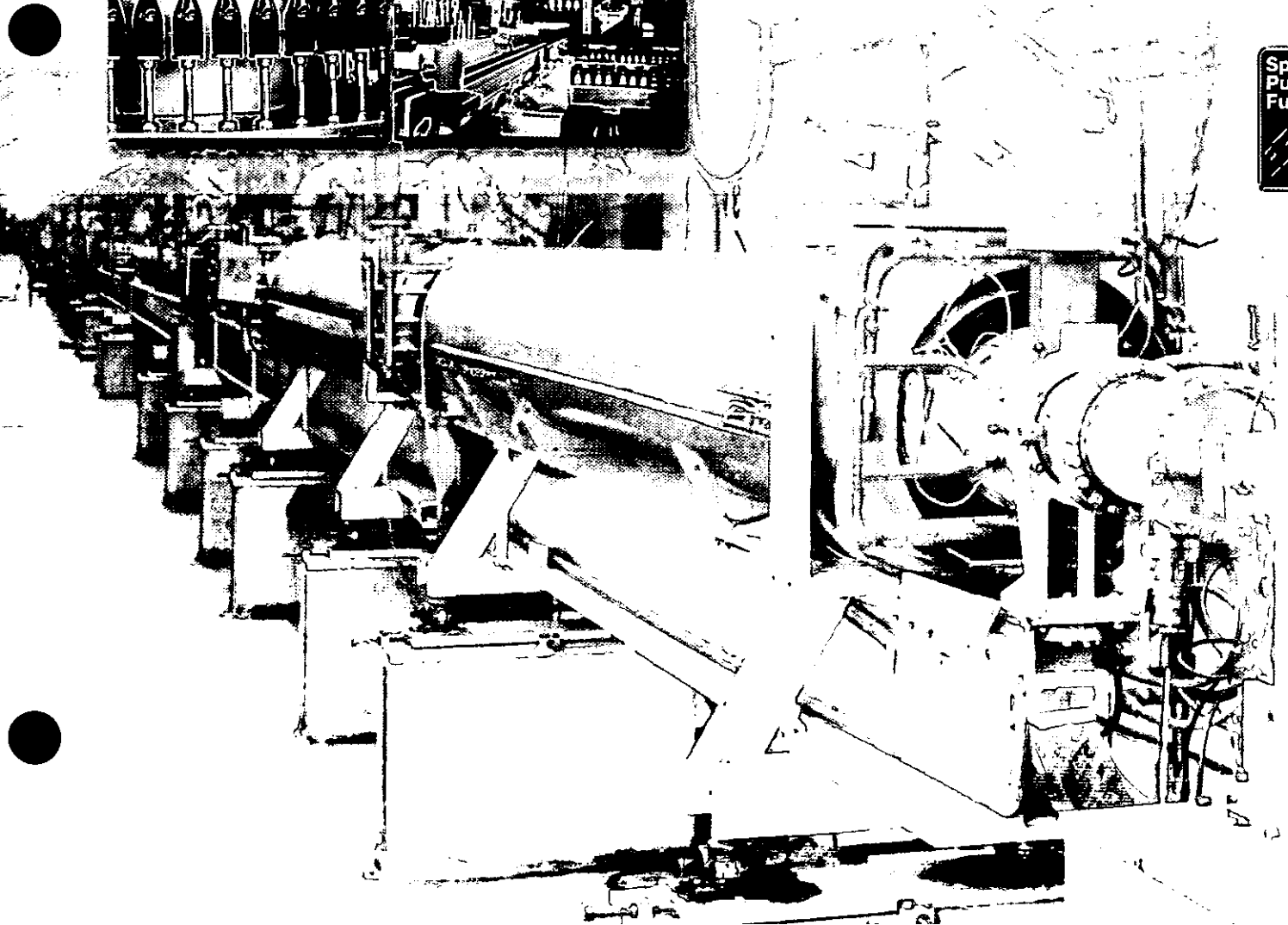
Special Purpose Fuses





Semiconductor Fuses

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

Littelfuse
POWR-GARD™ Products

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 100,000 amperes)

DC: 20,000 amperes

Ampere Range: 1 – 1000 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: LR29662

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

AMPERE RATINGS

See Rating Table.

RECOMMENDED FUSE BLOCKS

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

Special Purpose Fuses

Designed to protect today's equipment and systems, Littelfuse semiconductor fuses are manufactured with Littelfuse-developed technology that sets tomorrow's standards for accuracy, consistent quality, reliability, and predictable performance. By using advanced metallurgical, polymer, and materials research; mathematical modeling, and computerized statistical analysis; Littelfuse engineers have redefined "State-of-the-Art."

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.

SAFETY

. 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes meets present and future system requirements. (Note: L15S series has 100,000 A.I.R.)

. Extremely Current Limiting — Low I^2t and peak let-through currents meet most semiconductor requirements.

. UL Recognized — Littelfuse semiconductor fuses are recognized under the components program of Underwriters Laboratories, Inc., and carry the ᴿᵁ mark. UL Recognized semiconductor fuses may be used to provide supplementary protection in UL listed equipment.

LONGER EQUIPMENT LIFE

. Low Watt Losses — Means less heating and power consumption in circuit.

. Controlled Transient Overvoltages — All circuits are subject to transient overvoltages during fault current interruption. These transient overvoltages (arc voltages) start when fuse links melt or circuit breaker contacts part, and subside when circuit is interrupted. Semiconductors are very sensitive to overvoltages. Littelfuse semiconductor fuse designs keep transient overvoltages to low levels and help reduce semiconductor failure.

RATING TABLE

Ampere Ratings	Series & Voltage					
	L15S 150" AC 150" DC (1– 60A) 100V DC (70–1000A	L25S 250V AC 250V DC (1 – 200A) 300V DC (225 – 800A)	L50S 500V AC 450" 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				L60S17%	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 12:	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						
1000	L15S 1000					

‡ KLC series fuses are recommended for replacement use only.

Special Purpose Fuses

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)

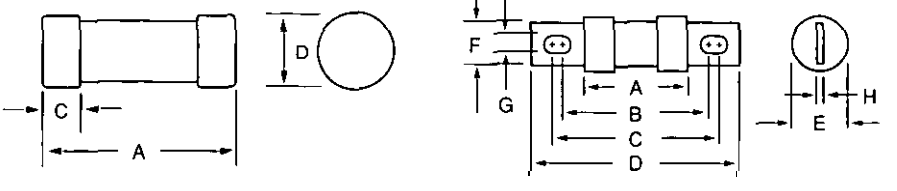
AMPERE RATING	FIG. NO.	DIMENSIONS IN INCHES (mm in parentheses)							
		A	B	C	D	E	F	G	H
1 – 30	1	1-1/2 (38.1)	—	3/8 (9.5)	13/32 (10.3)	—	—	—	—
31 – 60	1	2 (50.8)	—	5/8 (15.9)	13/16 (20.6)	—	—	—	—
61 – 450	3	1-5/32 (29.4)	1-7/8 (47.6)	2-3/16 (55.6)	2-21/32 (67.5)	1 (25.4)	43/64 (17.1)	5/16 (7.9)	3/16 (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)

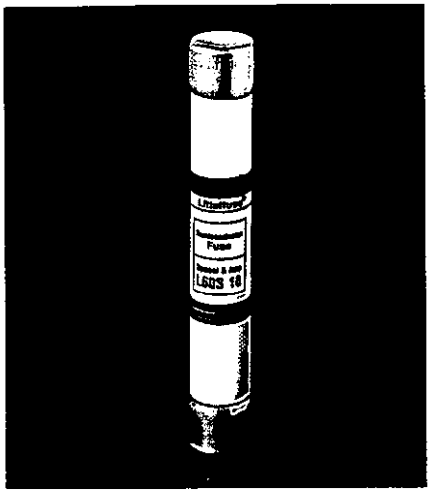


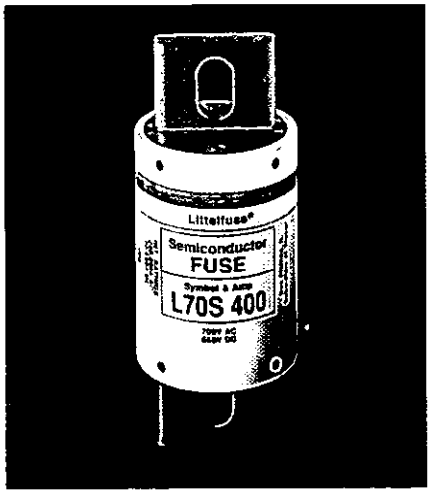
Special Purpose Fuses

Semiconductor Fuses

150/250/500/600/700 VAC . Verv 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)

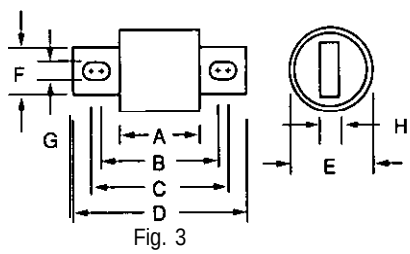


Fig. 3

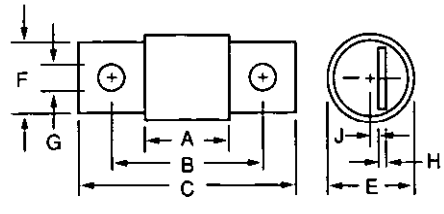


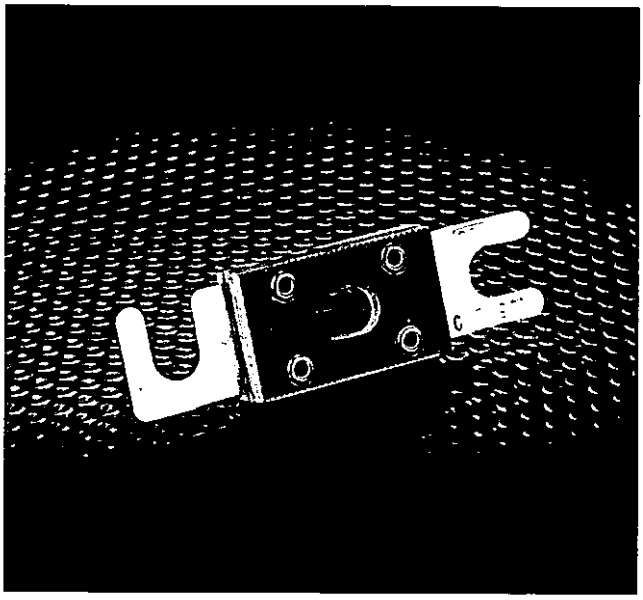
Fig. 4

Special Purpose Fuses

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.

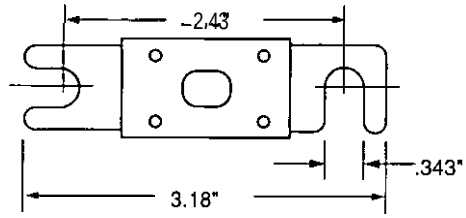
SPECIFICATIONS

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

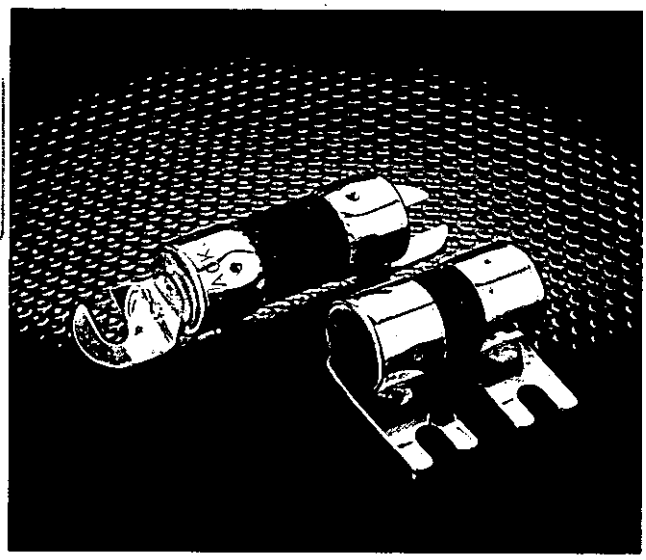
AMPERE RATINGS

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

Example part number (series & amperage): CNN 700



Special Purpose Fuses



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

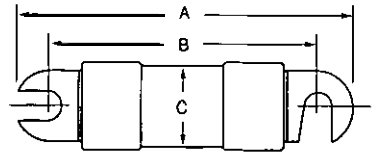
SPECIFICATIONS

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

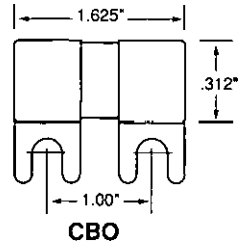
AMPERE RATINGS

CBO Fast-Acting	10	30	50	75	100
	12	35	60	80	125
	15				150
CCK Time-Delay	1	20	50	so	160
	2	25	60	too	175
	5	30	70	120	200
	10	35	75	140	225
	15	40	80	150	250
					300
CCL Time-Delay	30	40	60	100	
	35	50	80	120	

Example part number (series & amperage): CCK 150



CCK/CCL

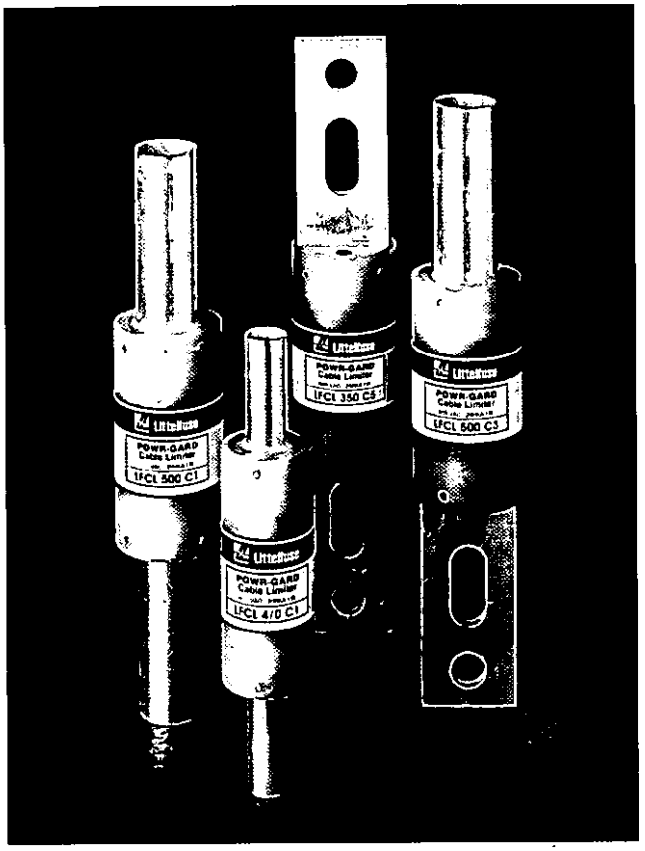


CBO

Cable Limiters

600 Volts AC

Littelfuse
POWR-GARD™ Products



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 a" 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

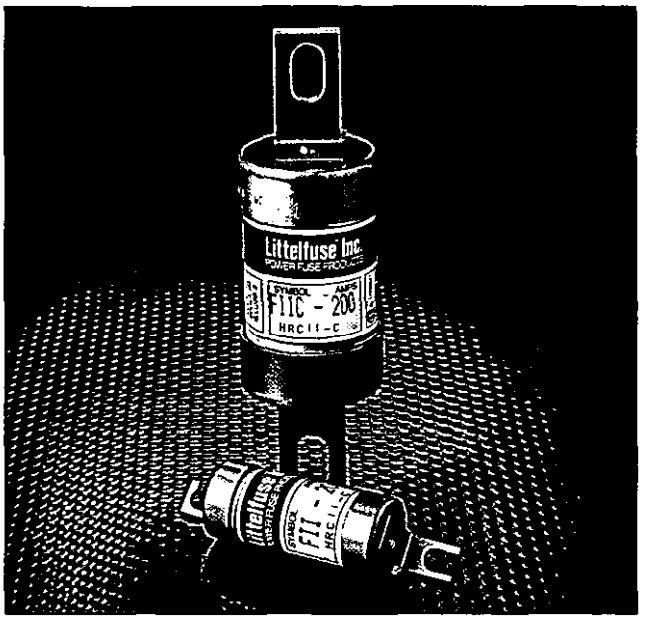
Type	Termination	Cable Size	CATALOG NUMBER Cable Type COPPER	ALUMINUM
1	Cable to Cable	4/0	LFCL4/0C1	LFCL4/0A1
		250MCM	LFCL250C1	LFCL250A1
		350MCM	LFCL350C1	LFCL350A1
		500MCM	LFCL500C1	LFCL500A1
		750MCM	LFCL750C1	LFCL750A1
3	Cable to Offset Bus	4/0	LFCL4/0C3	LFCL4/0A3
		250MCM	LFCL250C3	LFCL250A3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

ontact factory for shrink tubing availability

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	4	10	25	50	
	6	20 15	30 40	60	80
					100
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 1.50

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.

Special Purpose Fuses

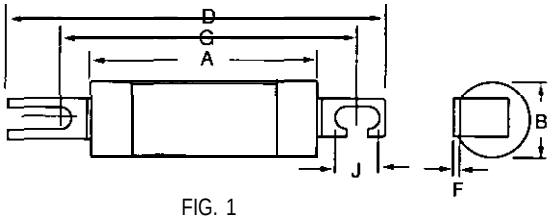


FIG. 1

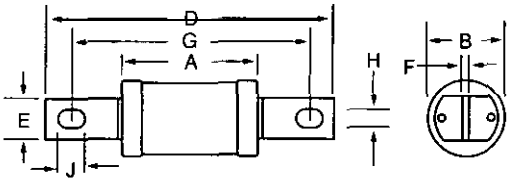


FIG. 2

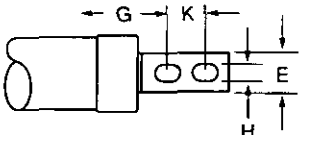


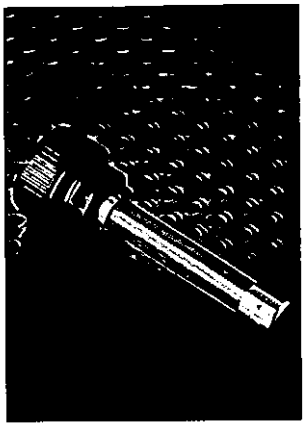
FIG. 3

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

LGR/LMF In-Line Fuses
LHR Holder

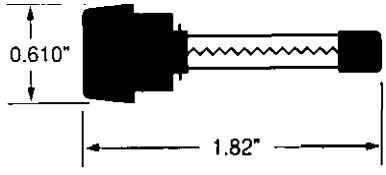
Littelfuse
POWR-GARD™ Products



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

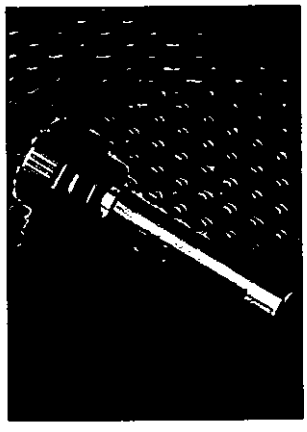
Maximum Interrupting Rating: 10,000A

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

AMPERE RATINGS

½	2	5	9
1	2x	6	10
1½	3	7	12
1⅘	4	8	15

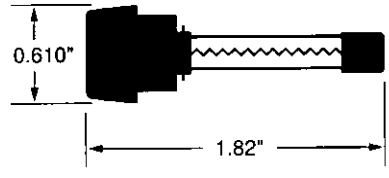
Example part number (series & amperage): LGR 1-1/2



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: E10460)
CSA Certified (File No: LR29862)

AMPERE RATINGS

⅜	⅝	1⅘	2⅝	4	7
½	1	2	3	5	8
⅝	1¼	2½	3⅘	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 par, number LHR 000 for two leads. and part number LHR 001 for one lead and one terminal for insertion of 16 AWG ballast lead.

SPECIFICATIONS

Voltage Rating: 300 volts AC

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

Approvals: UL Recognized .ꓤ

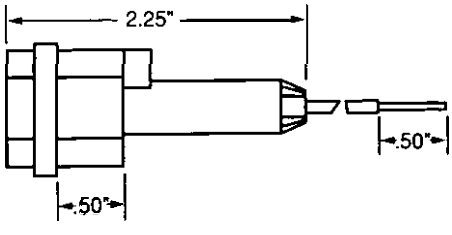
Flammability Rating: 94V0

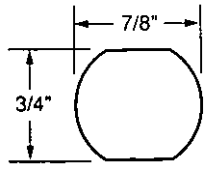
Example part number: LHR 000

MOUNTING INFORMATION

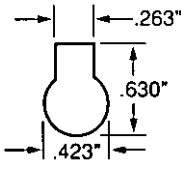
LHR 001/LHR 000 will fit keyhole punch or .875" knock-out hole. Anti-rotation feature is provided when used with keyhole punch.

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



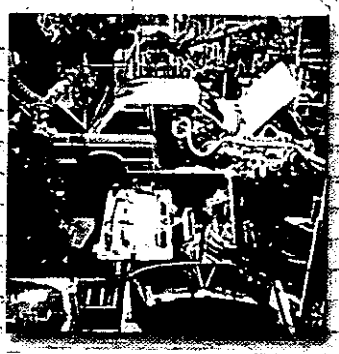


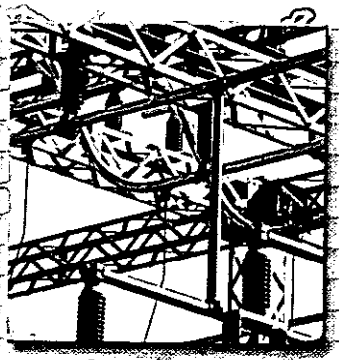
Knock-out Hole

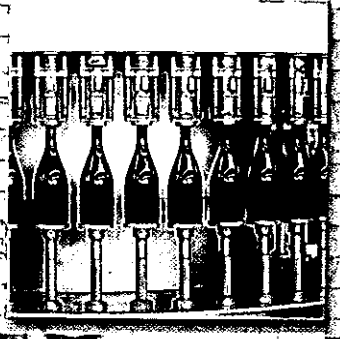


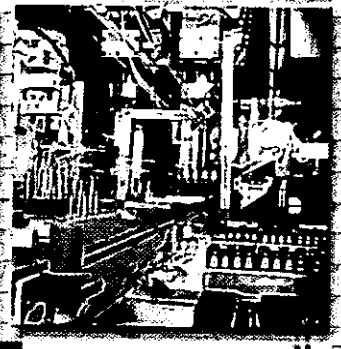
Keyhole Punch

Blocks And Holders









FUSE BLOCK SELECTION

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

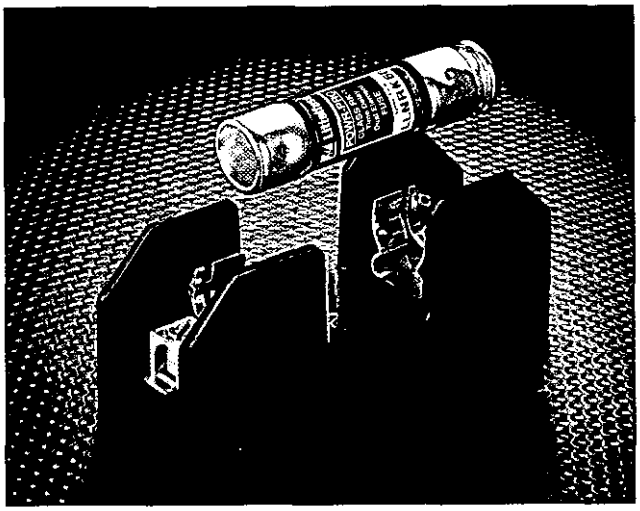
1. Determine the system voltage

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 consider-**ations** 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 blacks 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

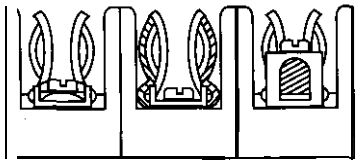
A choice of three types of wire termination is available:

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.



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).

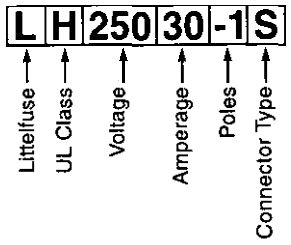
Ordering information

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

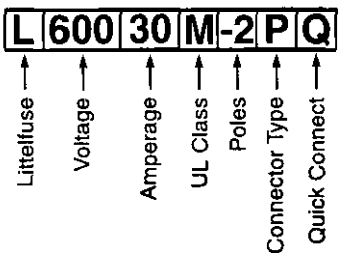
Blocks And Holders

ORDERING INFORMATION

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



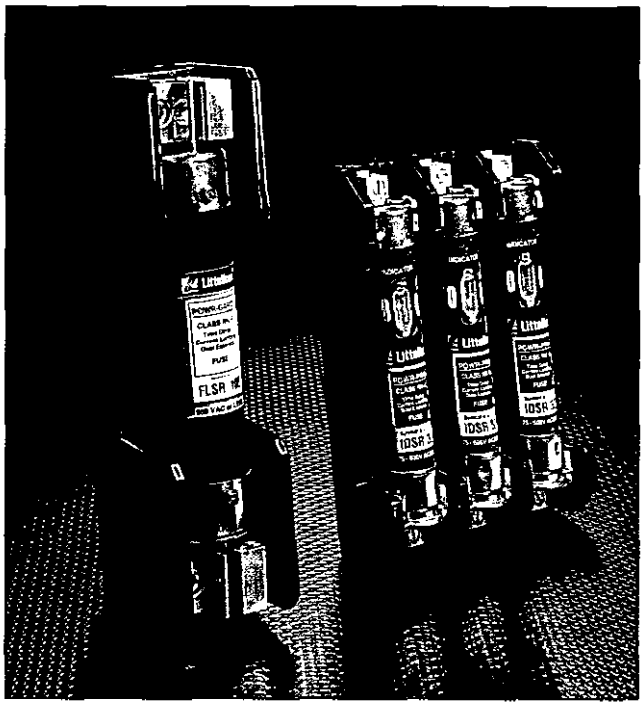
For all Class CC, Midget and 30A Class G Fuse Blocks:



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. Et4721)
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	LH25030-1	S (R)	P (R)	C (R)	S & P = #10 CU C = #6 CU-AL
	2	LH25030-2	S (R)	P (R)	C (R)	
	3	LH25030-3	S (R)	P (R)	C (R)	
60	1	LH25060-1	S (R)		C (R)	S = #10 CU C = #2 CU-AL
	2	LH25060-2	S (R)		C (R)	
	3	LH25060-3	S (R)		C (R)	
100	1	LH25100-1			C	#2/0 CU-AL
	2	LH25100-2			C	
	3	LH25100-3			C	
200	1	LH25200-1			C	250 MCM CU-AL
	3	LH25200-3			C	
400	1	LH25400-1			CR	(2) 350 MCM CU-AL
	3	LH25400-3			CR	
600	1	LH25600-1			C	(2) 500 MCM CU-AL
	3	LH25600-3			C	

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	LH60030-1	S (R)	P (R)	C (R)	S & P = #10 CU C = #6 CU-AL
	2	LH60030-2	S (R)	P (R)	C (R)	
	3	LH60030-3	S (R)	P (R)	C (R)	
60	1	LH60060-1			C (R)	S = #10 CU C = #2 CU-AL
	2	LH60060-2			C (R)	
	3	LH60060-3			C (R)	
100	1	LH60100-1			C	#2/0 CU-AL
	2	LH60100-2			C	
	3	LH60100-3			C	
200	1	LH60200-1			C	250 MCM CU-AL
	3	LH60200-3			C	
400	1	LH60400-1			CR	(2) 350 MCM CU-AL
	3	LH60400-3			CR	
600	1	LH60600-1			C	(2) 500 MCM CU-AL
	3	LH60600-3			C	

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	LR25030-1	SR	PR	CR	S & P = #10 CU C = #6 CU-AL
	2	LR25030-2	SR	PR	CR	
	3	LR25030-3	SR	PR	CR	
60	1	LR25060-1			CR	S = #10 CU C = #2 CU-AL
	2	LR25060-2			CR	
	3	LR25060-3			CR	
100	1	LR25100-1			C	#2/0 CU-AL
	2	LR25100-2			C	
	3	LR25100-3			C	
200	1	LR25200-1			C	250 MCM CU-AL
	3	LR25200-3			C	
400	1	LR25400-1			CR	(2) 350 MCM CU-AL
	3	LR25400-3			CR	
600	1	LR25600-1			C	(2) 500 MCM CU-AL
	3	LR25600-3			C	

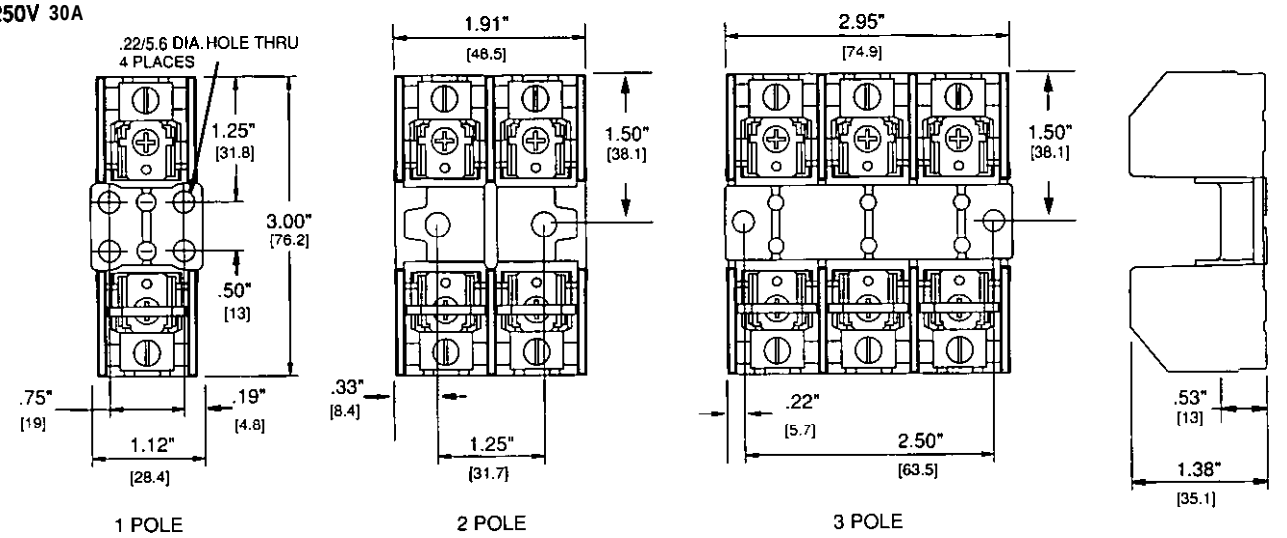
Note: Reinforcing springs standard on all Class R fuse blocks.

Class R 600V

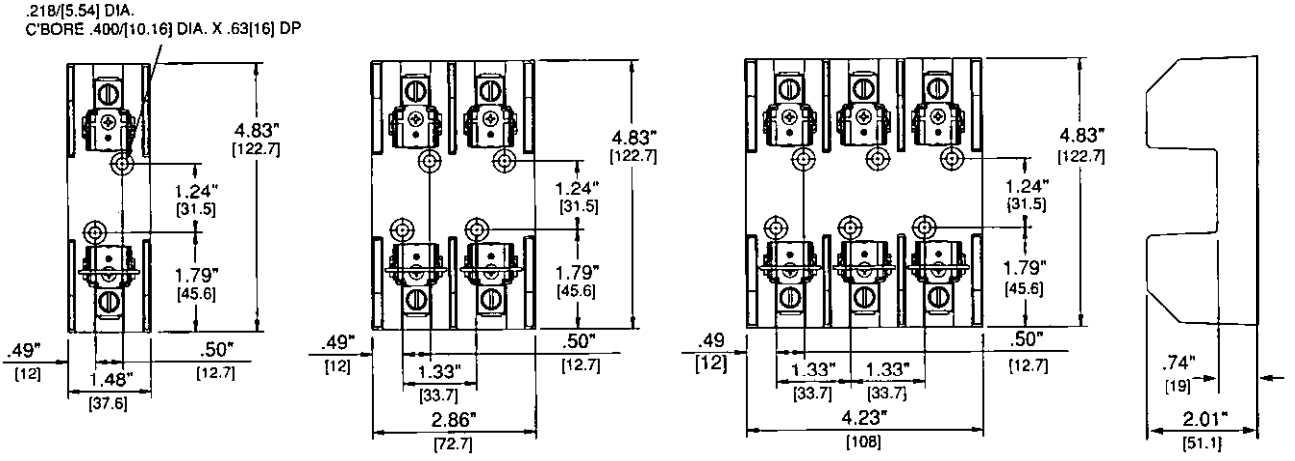
Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)			Maximum Wire Size
			Screw	Pressure Plate	Box Lug	
30	1	LR60030-1	SR	PR	CR	S & P = #10 CU C = #6 CU-AL
	2	LR60030-2	SR	PR	CR	
	3	LR60030-3	SR	PR	CR	
60	1	LR60060-1			CR	S = #10 CU C = #2 CU-AL
	2	LR60060-2			CR	
	3	LR60060-3	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

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

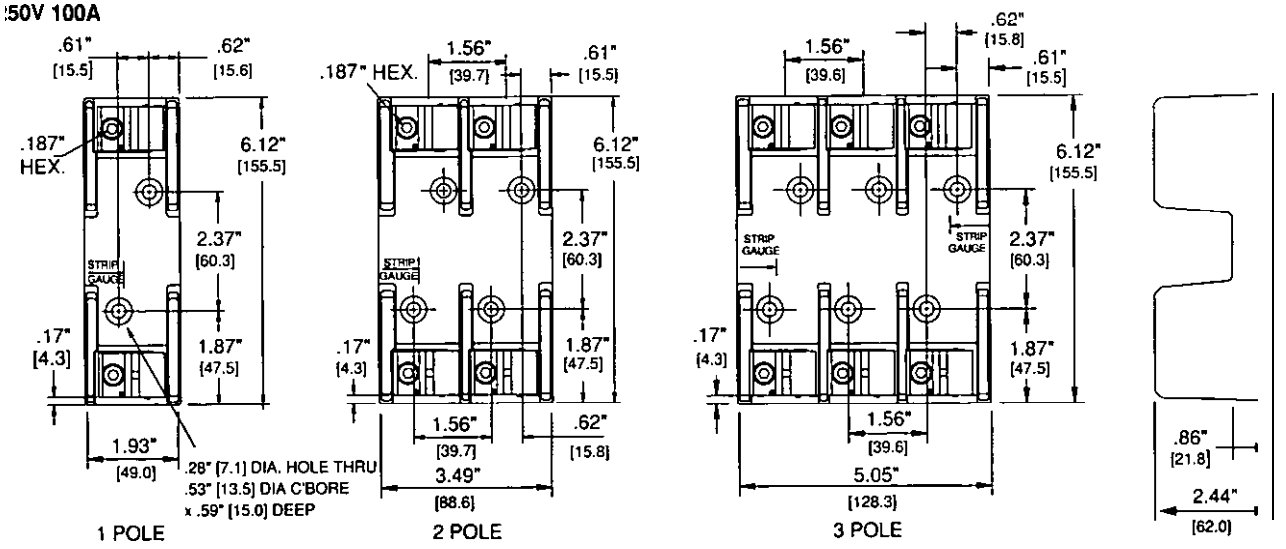
250V 30A



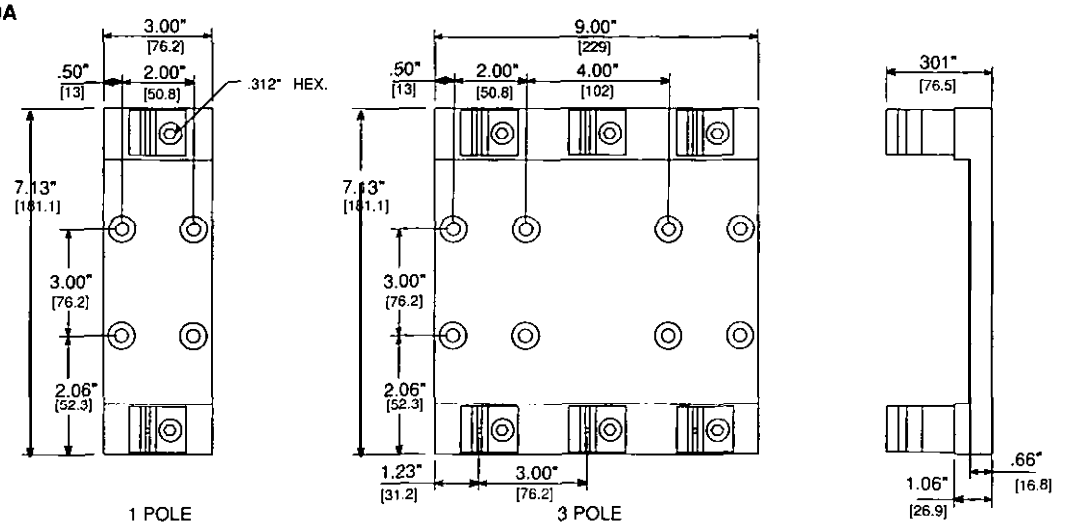
250V 60A



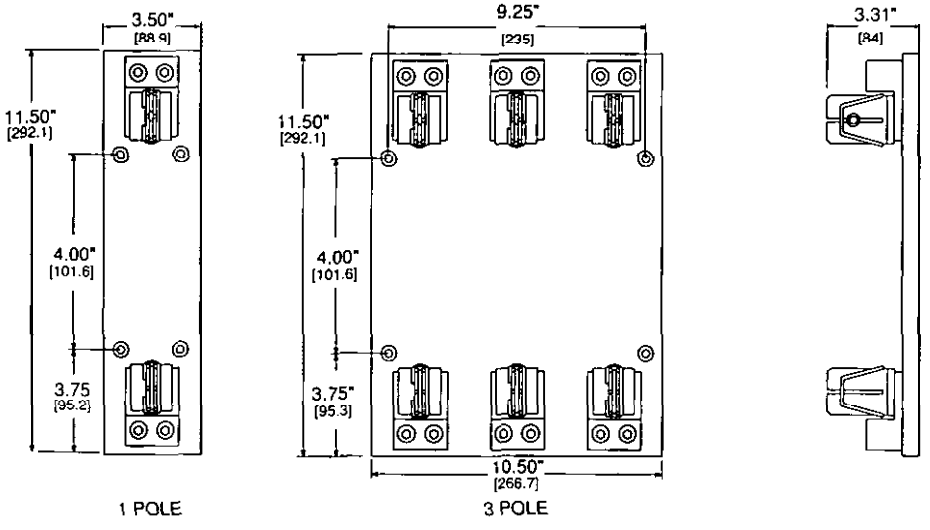
250V 100A



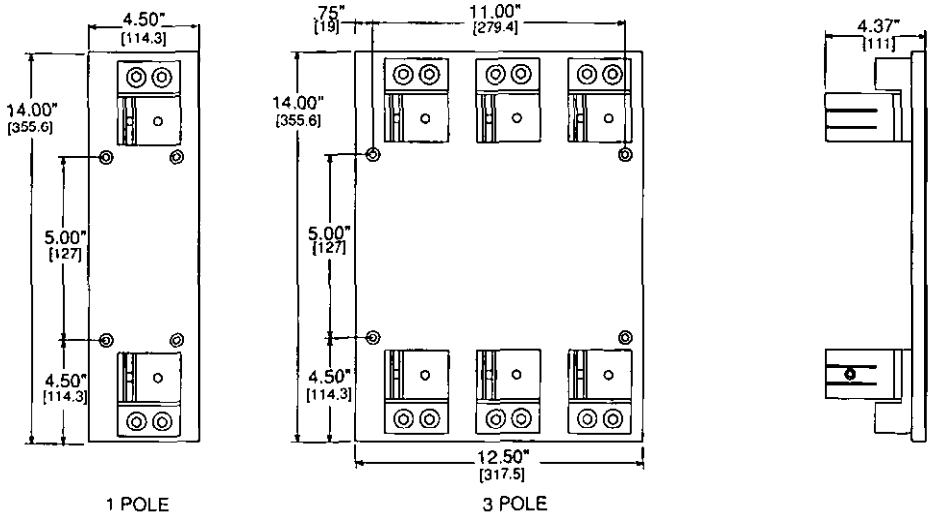
250V 200A



250V 400A

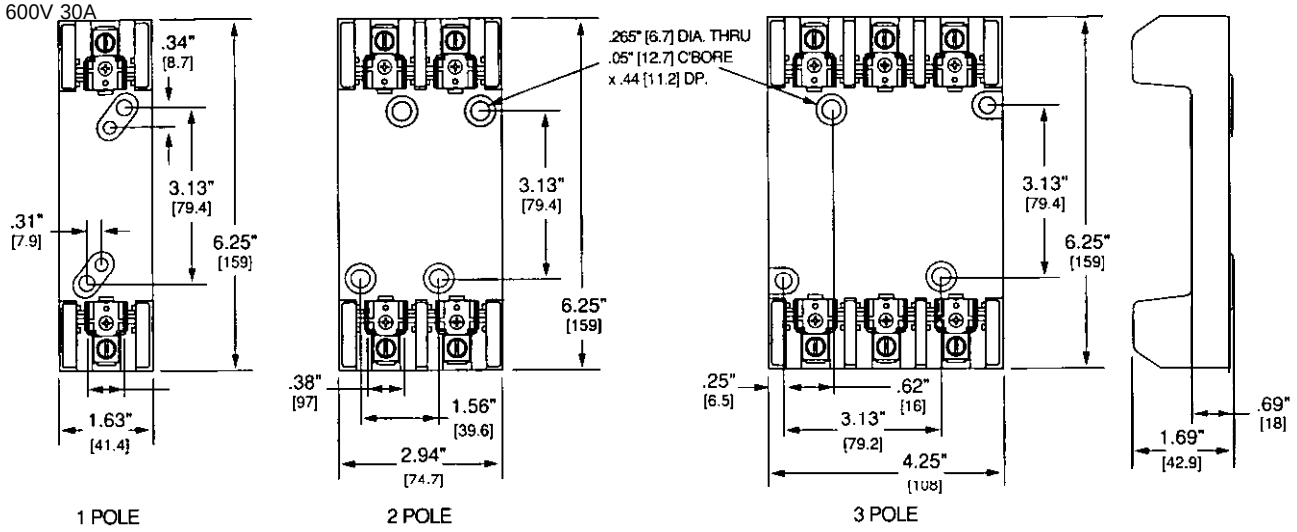


250V 600A

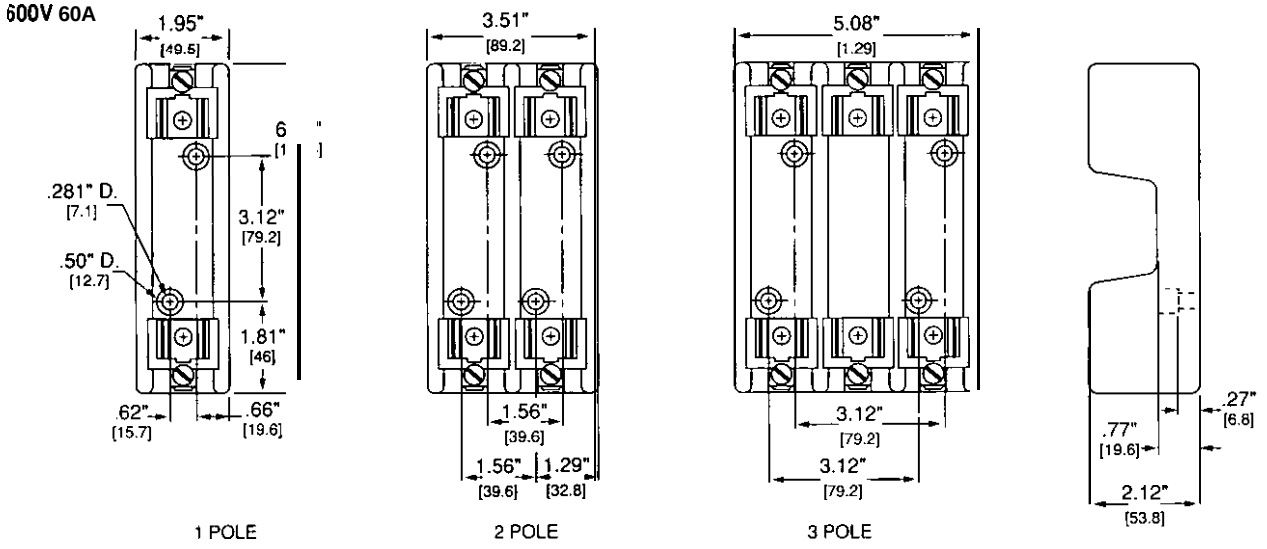


Blocks And Holders

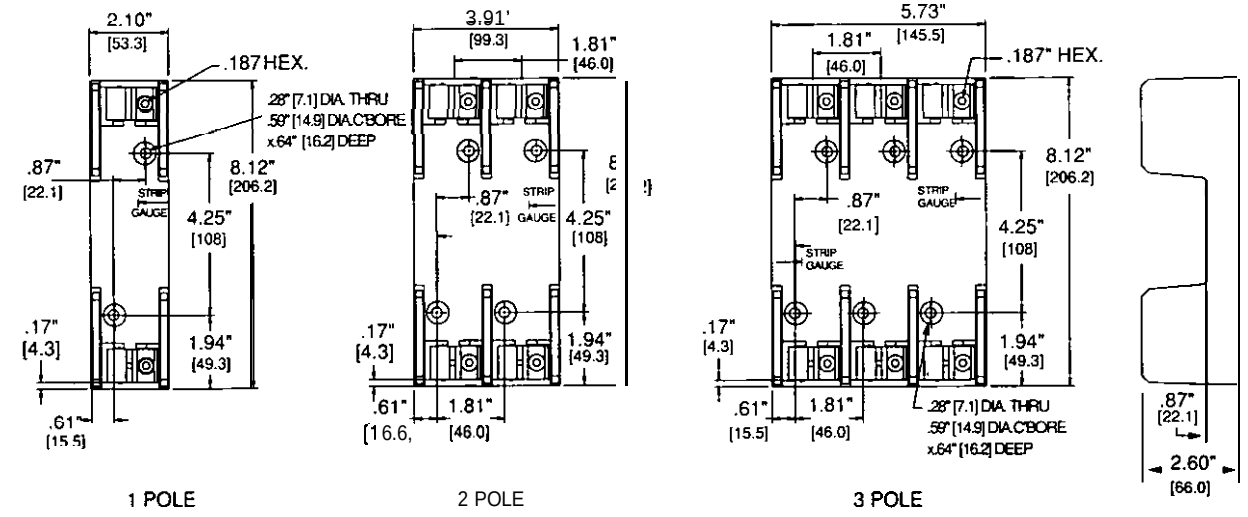
600V 30A



600V 60A

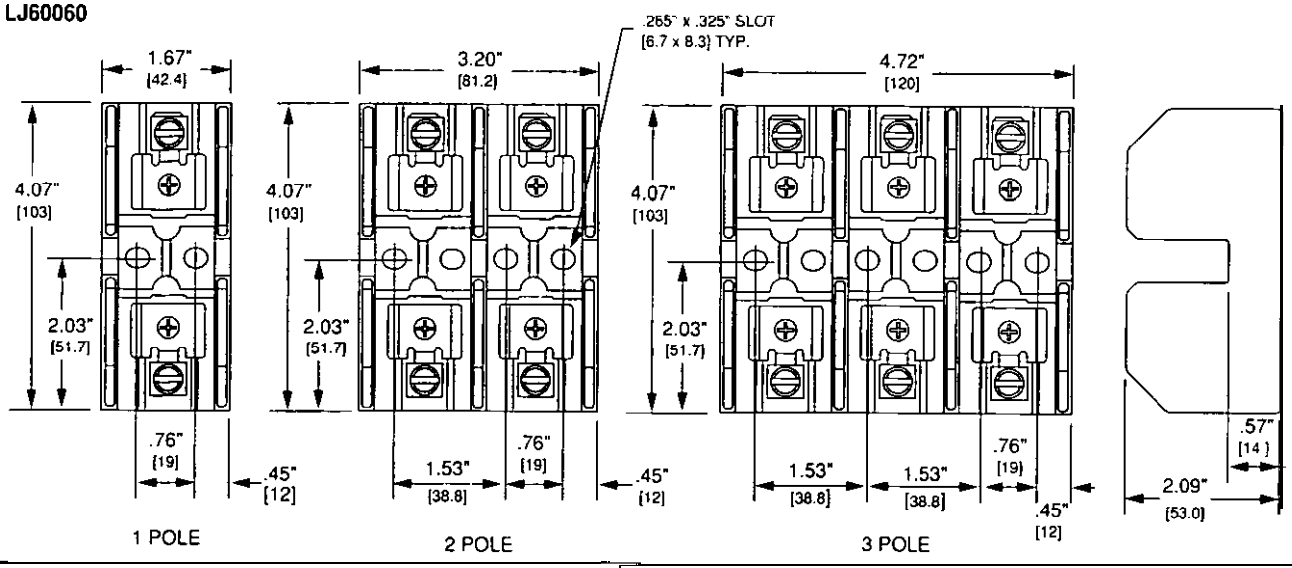


600V 100A

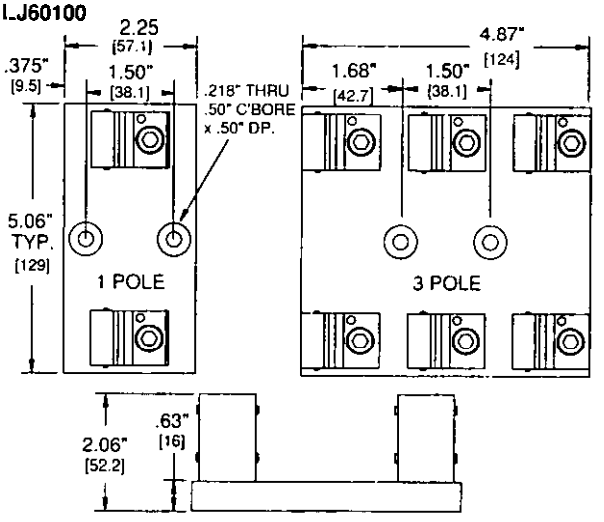


Blocks And Holders

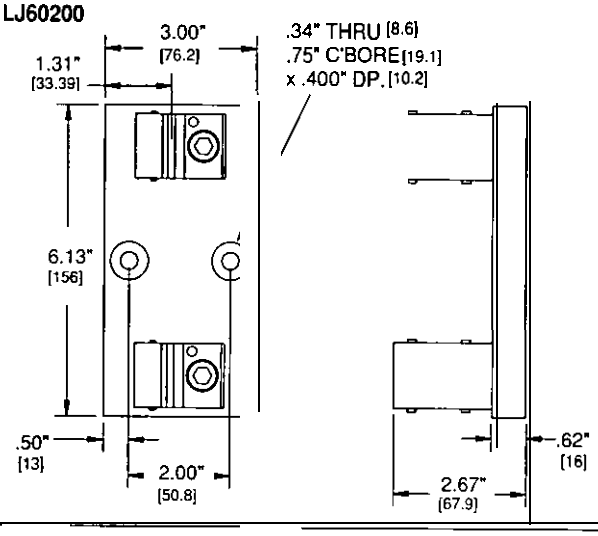
LJ60060



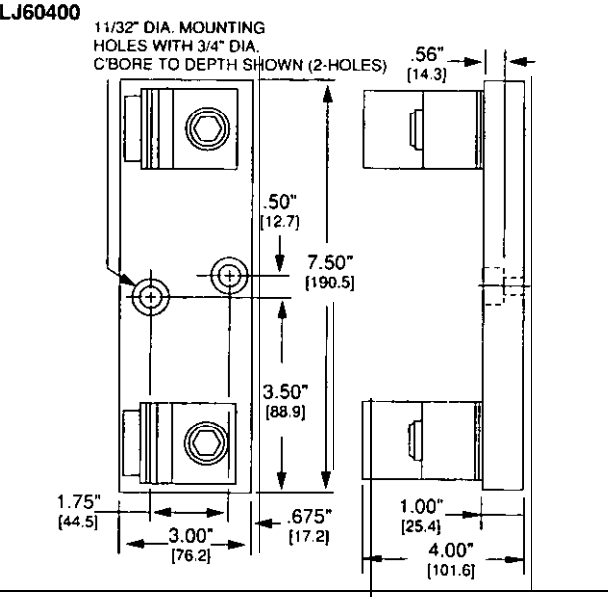
LJ60100



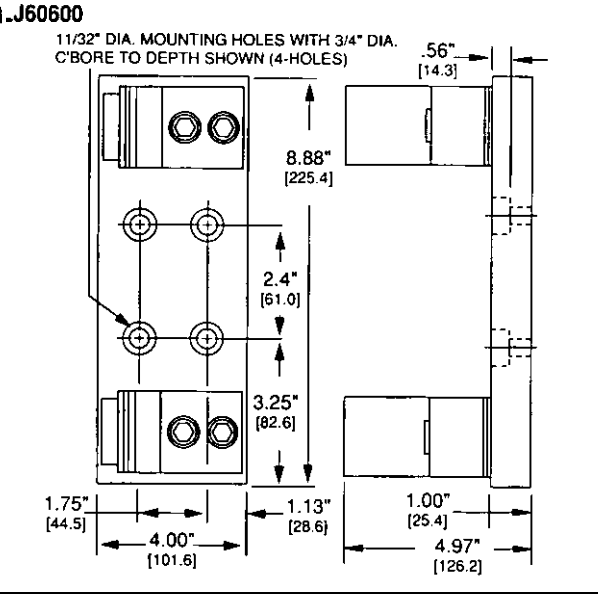
LJ60200



LJ60400



LJ60600

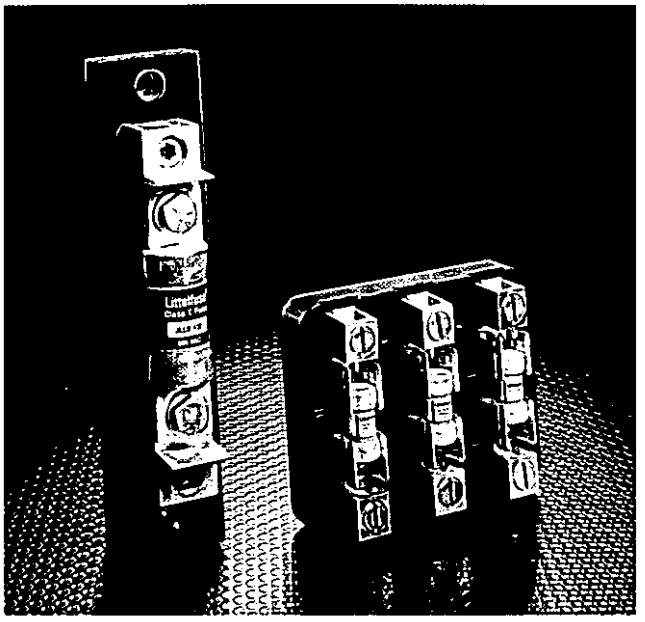


Blocks And Holders

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	LT30030-2		CR	S = #10 CU
	3	LT30030-3		CR	C = #2 CU
60	2	LT30060-2		CR	C = #2 CU-AL
	3	LT30060-3		CR	
	4	LT30060-4		CR	
100	1	LT30100-1		C	#2/0 CU-AL
	2	LT30100-2		C	
	3	LT30100-3		C	
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.

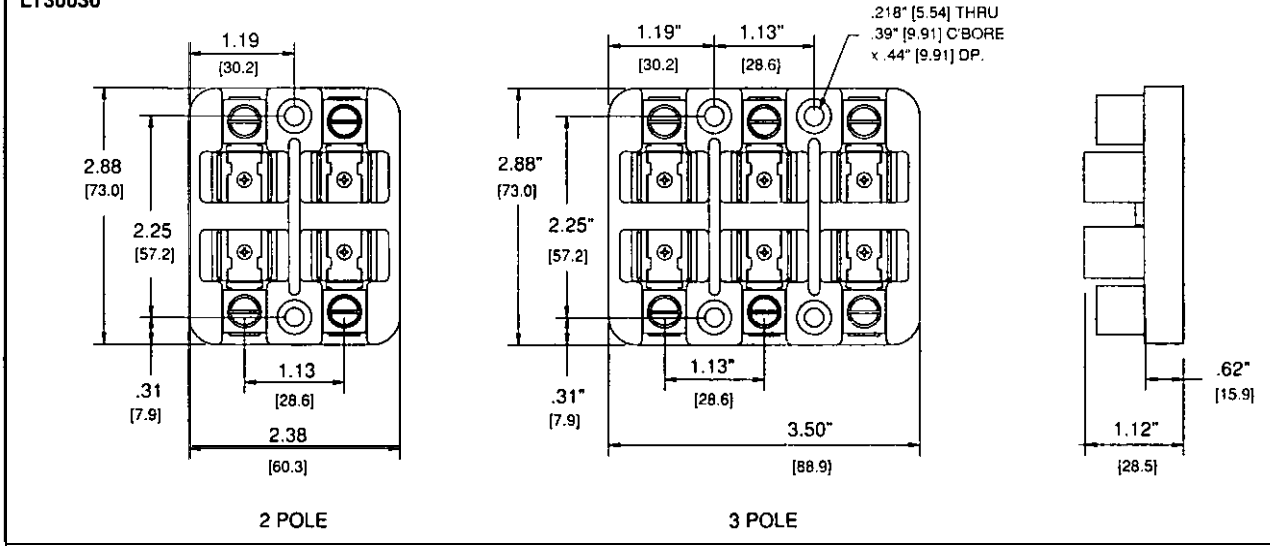
Class T 600V

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

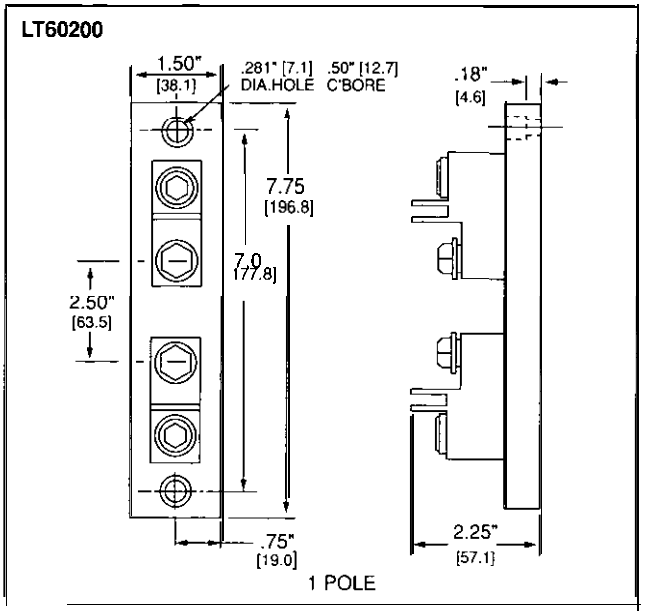
Note: Reinforcing springs standard on all 600 volt Class T fuse blocks up to 60 amperes. 600 volt Class T blocks 100 amperes and larger have stud mountings.

Blocks And Holders

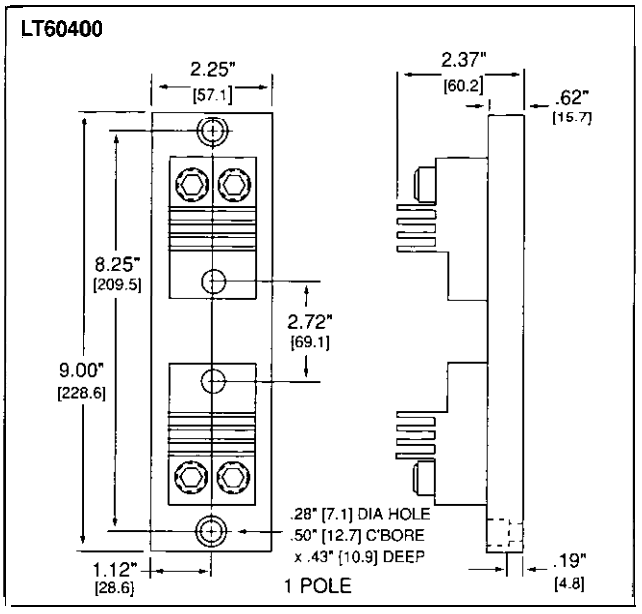
LT30030



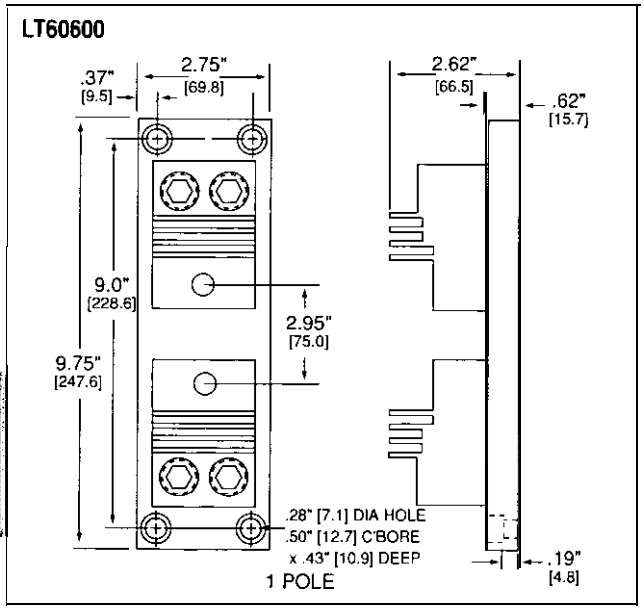
LT60200



LT60400



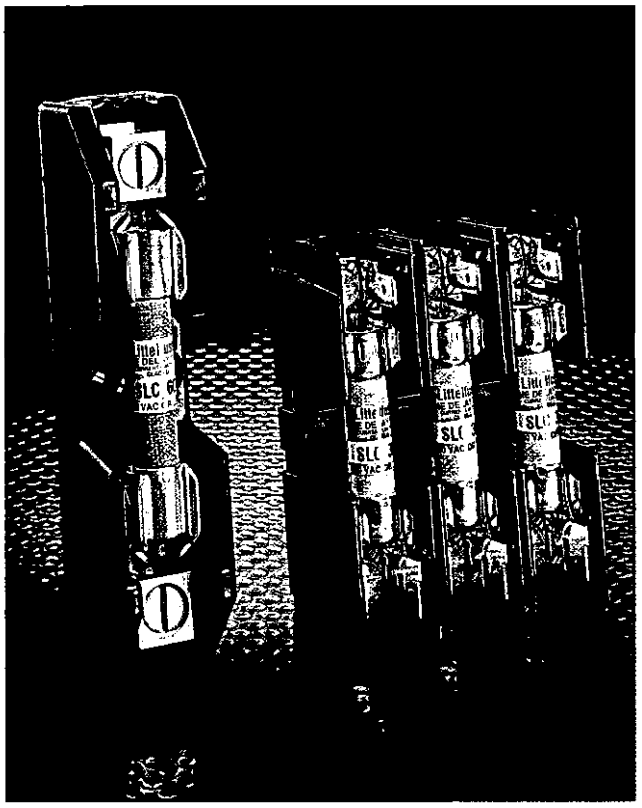
LT60600



Blocks And Holders

Class G Fuse Blocks

Littelfuse
POWR-GARD™ Products



Class G fuse blocks are designed for use with 460 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

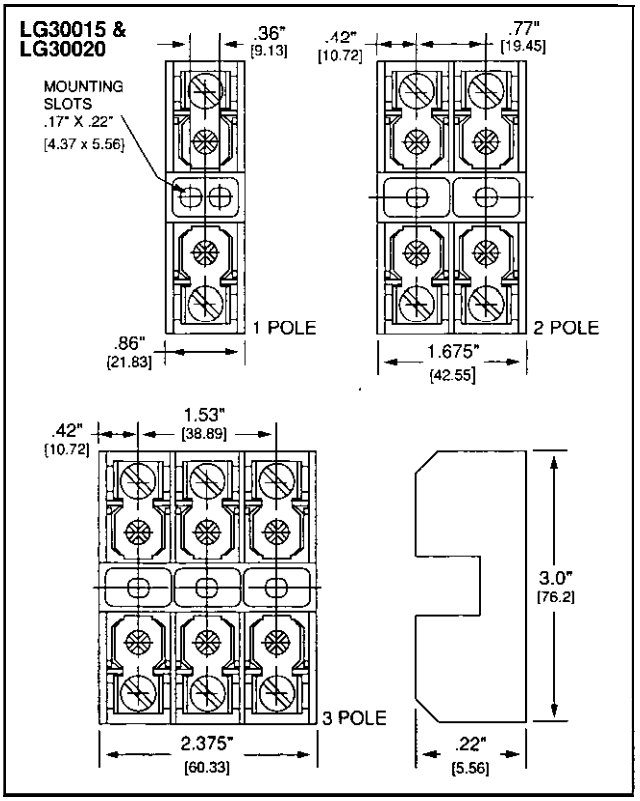
Approvals: UL Listed: 15, 20 & 60A (File No. E14853)
30A (File No. E14721)
CSA Certified: 15, 20 & 60A (File No. LR47235)
30A (File No. LR7316)

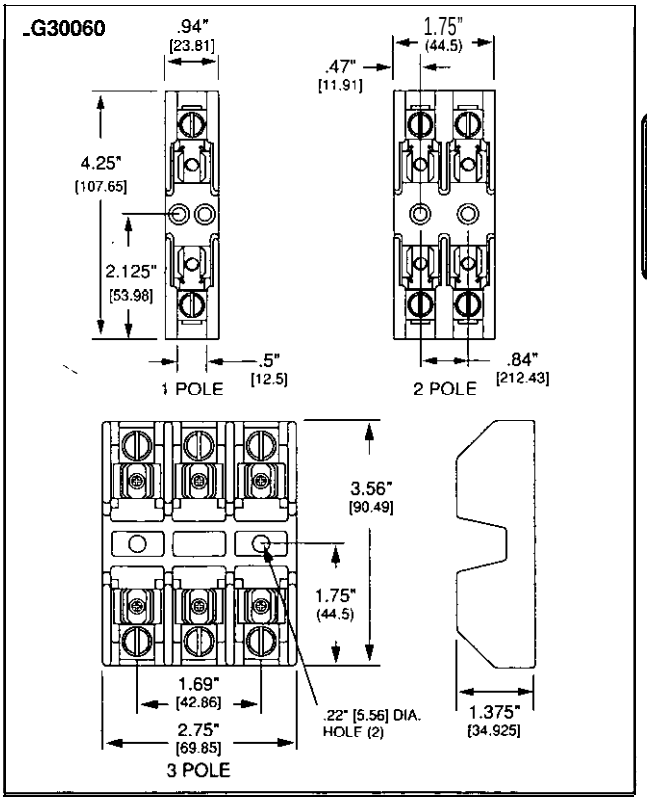
RECOMMENDED FUSES

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	LG30015-1	SQ			#10 CU
	2	LG30015-2	SQ			
	3	LG30015-3	SQ			
20*	1	LG30020-1	SQ			#10 CU
	2	LG30020-2	SQ			
	3	LG30020-3	SQ			
30*	1	L30030G-1	SQ	PQ		#10 CU
	2	L30030G-2	SQ	PQ		
	3	L30030G-3	SQ	PQ		
60	1	LG30060-1			CR	#2 CU-AL
	2	LG30060-2			CR	
	3	LG30060-3			CR	

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





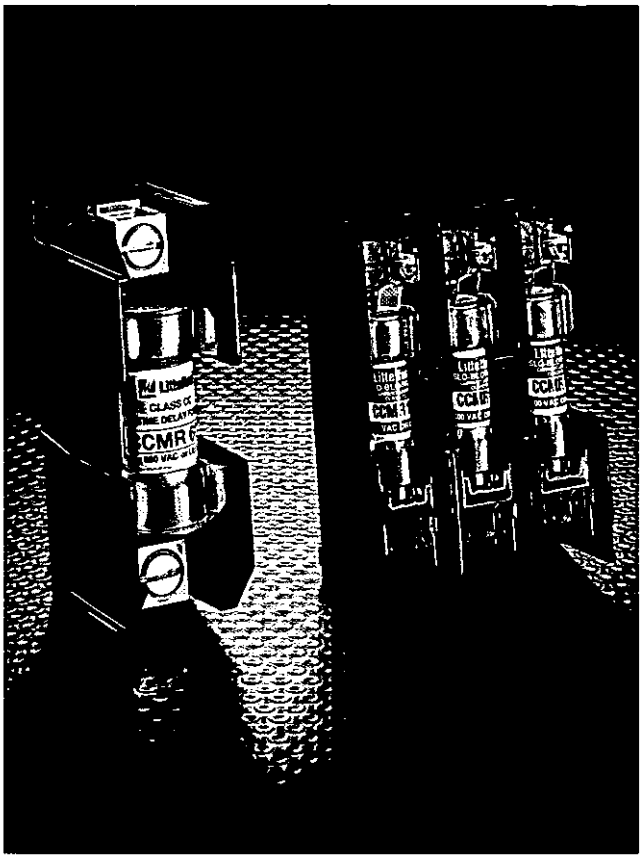
Note: Refer to the Midget/Class CC Fuse Blocks for L30030G 30A Class G Block dimensions.

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 94V0 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.

Blocks And Holders

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.01 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

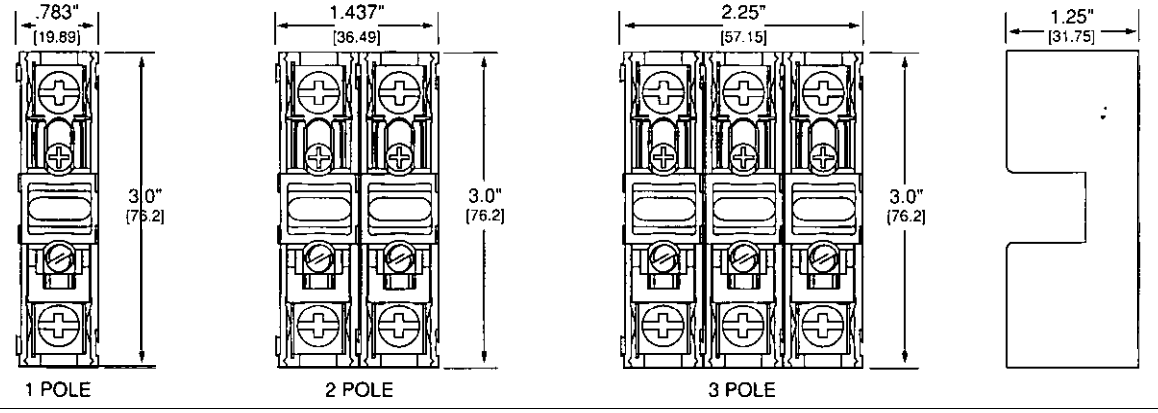
Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)	Maximum Wire Size
60	1 2 3	L60060C-1C L60060C-2C L60060C-3C	Box Lug	#6 CU
60	Adder Block	L60060C-AC	Box Lug	#6 CU

Midget Fuse Blocks

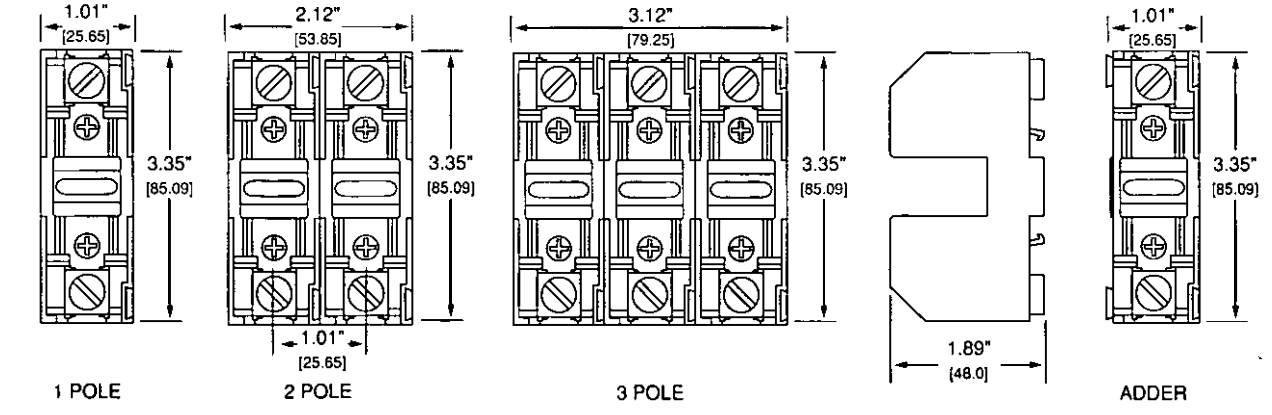
Amp Rating	No. of Poles	Catalog Number	Connector Type (Add suffix shown)	Maximum Wire Size
30	1 2 3	L60030M-1C L60030M-2C L60030M-3C	Box Lug	#6 CU
30	1 2 3	L60030M-1PQ L60030M-2PQ L60030M-3PQ	Pressure Plate/ Q. C. Terminal	#10 CU
30	1 2 3	L60030M-1SQ L60030M-2SQ L60030M-3SQ	Screw/ Q. C. Terminal	#10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

Note: Quick Connect Terminals are rated at 20 amperes.

L60030



L60060

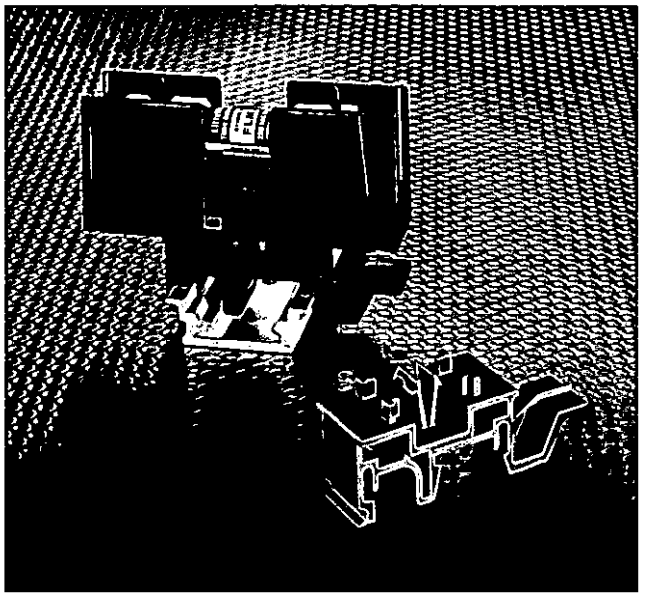


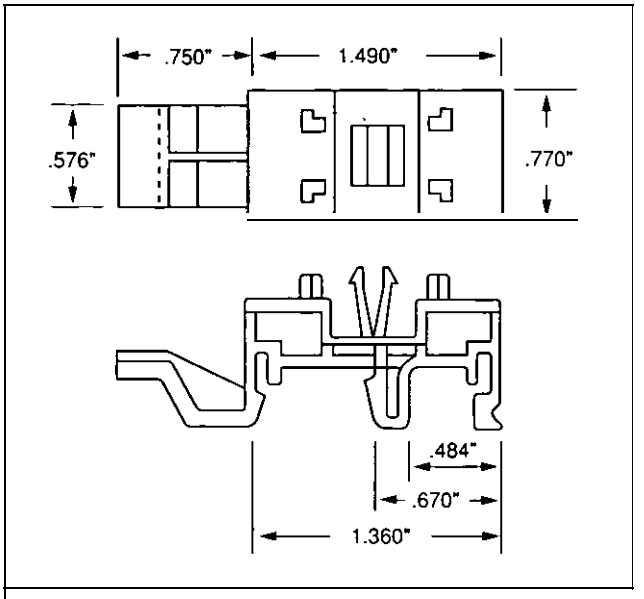
Blocks And Holders

Class CC and Midget Fuse Block Accessories

DIN Rail Adapters and Cover Pullers

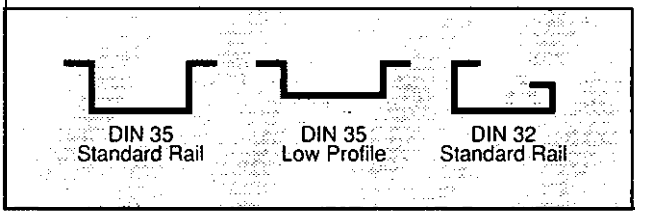
Littelfuse
POWR-GARD™ Products

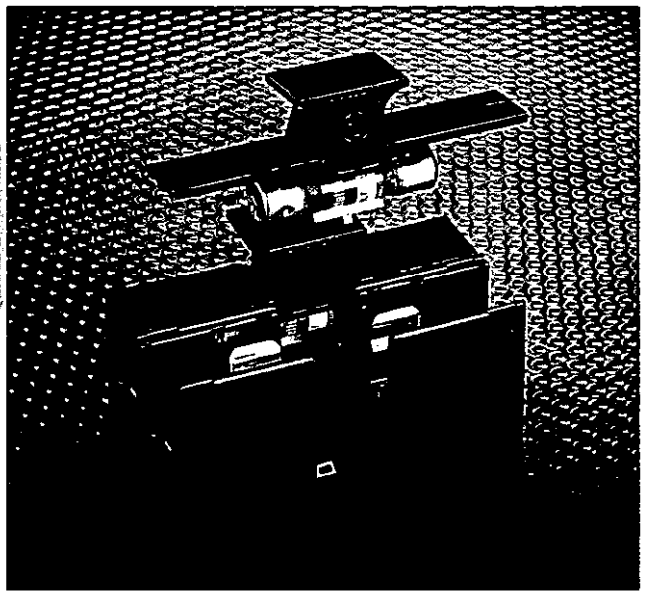


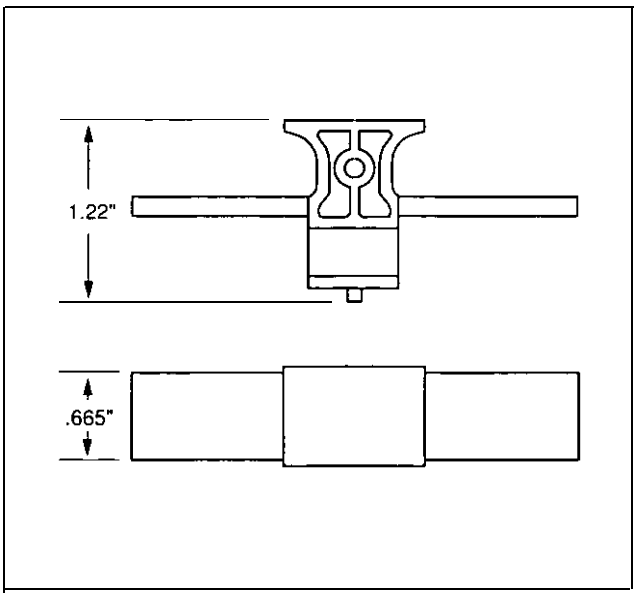


DIN Rail Adapter — FBDIN1

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.

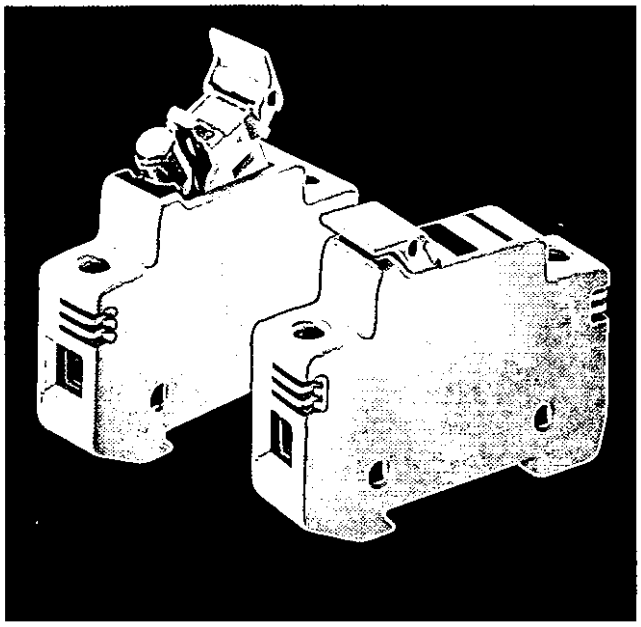
. Easily gangable with 1/8" diameter wire.

. 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.

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 60 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: 94V0
Approvals: UL Listed (LPSC File No: E14721)
UL Recognized (LPSM File No: Ei4721)
CSA Certified (LPSC/LPSM File No: LR7316)
IEC Type IP20 Protection
CE Certilied

ORDERING INFORMATION

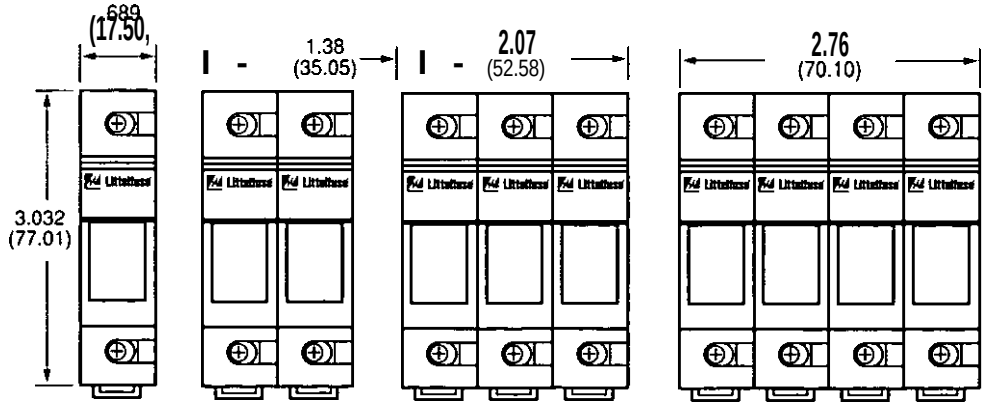
Indicating Part Number	Non-Indicating Part Number	Fuse Type	Number Of Poles
LPSCOOI ID	LPSC001	Class cc	1
LPSC002ID	LPSC002	Class cc	2
LPSC003ID	LPSC003	Class cc	3
LPSC004ID	LPSC004	Class cc	4
LPSM001ID	LPSM001	Midget	1
LPSM002ID	LPSM002	Midget	2
LPSM003ID	LPSM003	Midget	3
LPSM004ID	LPSM004	Midget	4

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

Blocks And Holders

DIMENSIONS in inches (mm in parentheses)

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

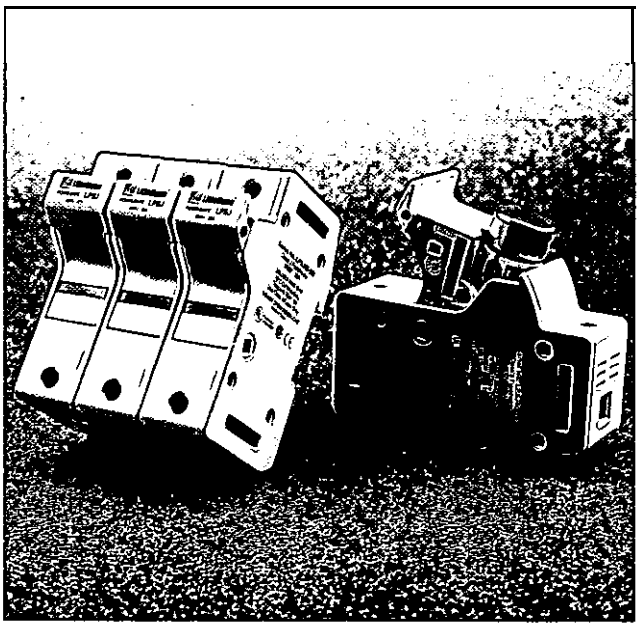


Fuse Blocks, Holders and Accessories

Class J POWR-SAFE Holders

Littelfuse
POWR-GARD™ Products

NEW



Linelfuse 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.

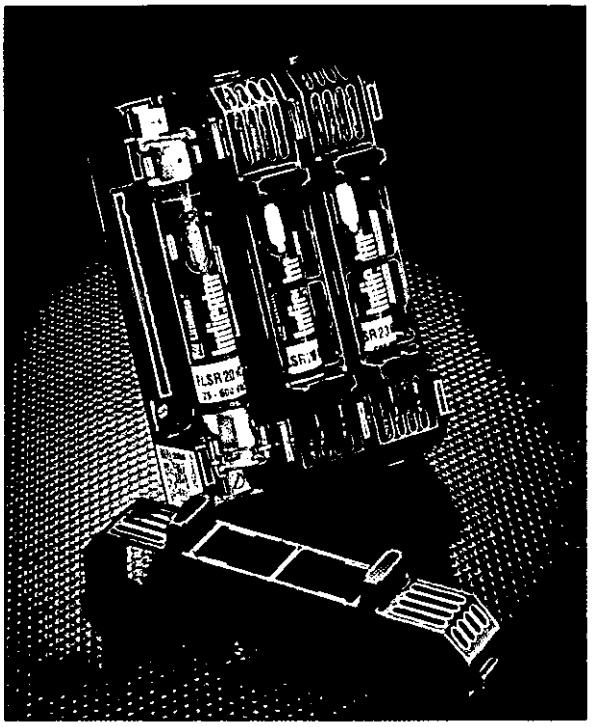
ORDERING INFORMATION

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

Blocks And Holders

Contact Linelfuse for dimensions

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: O-100 amps
Class R: O-l 00 amps
Class J: O-100 amps
Class CD: 60 amps

Material: Thermoplastic

Approvals: UL Listed (File No: E164929)
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:

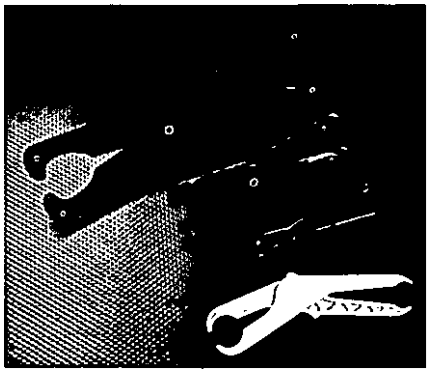
PCGS-2 for 2 poles
PCGS-3 for 3 poles

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
LJ60100-PC	LJ60100 series only	600	100	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)

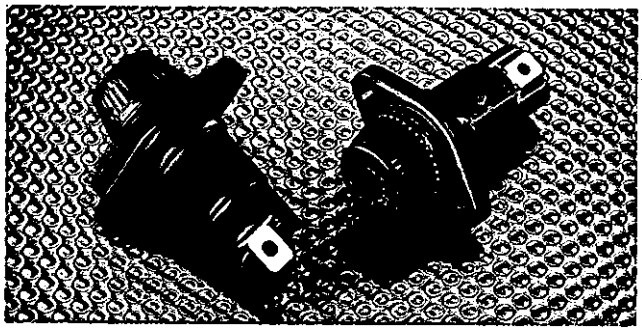
Giant Fuse Puller

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

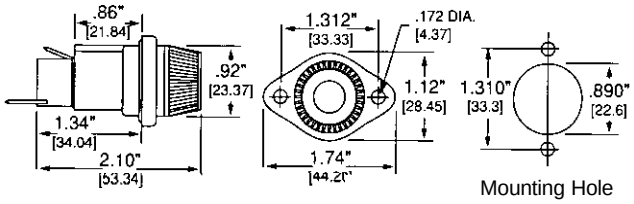
Tri-Puller

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.



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

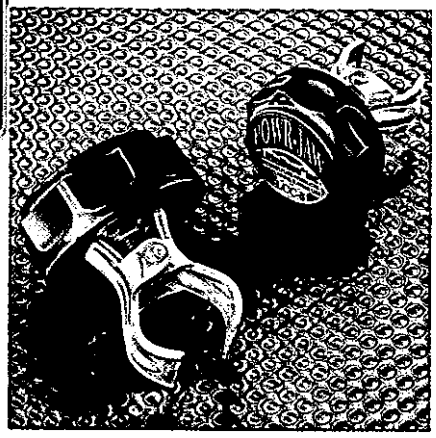
Part Number		Bottom Terminal	Fuse Range	For Use With
571 027 **571** 028	**571** 027P **571** 028P	Straight Rt. Angle	$1^{5}/_{16}$" — $1^{3}/_{8}$"	Midget Fuses
571 007 **571** 008	**571** 007P **571** 008P	Straight Rt. Angle	$1^{13}/_{32}$" — $1^{1}/_{2}$"	Midget Fuses
571 OCC 571 RCC	571 OCCP 571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

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

O-Rings: 901-I 84 (body)
901-260 (knob)

Blocks And Holders

POWR-JAW Clip Clamps

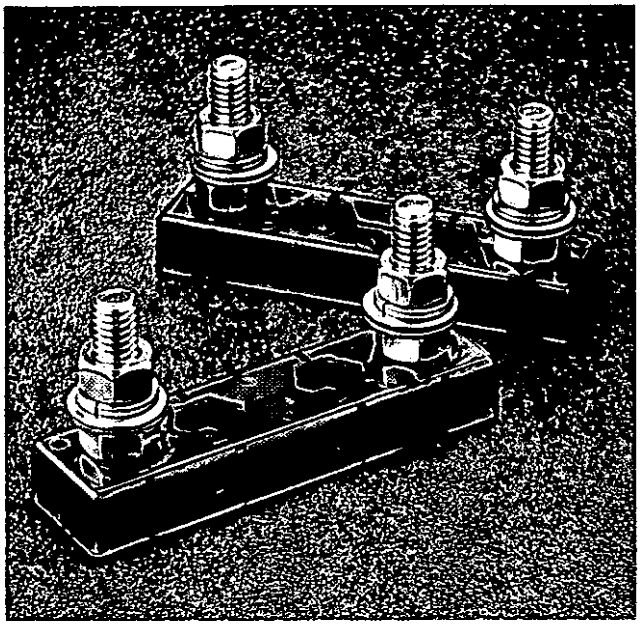


POWR-JAW clamps improve the contact between fuse and clip. The unnecessary heat from poor contact due to the loss of spring force in the clips can cause nuisance fuse opening and premature aging of surrounding components.

- 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

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: 130 VACNOC
Ampere Range: 1 – 400 amperes
Approvals: Pending
Construction: Base-thermoplastic
Studs — steel zinc plated

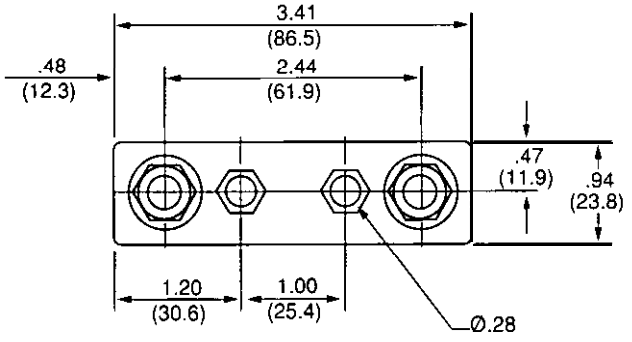
RECOMMENDED FUSES

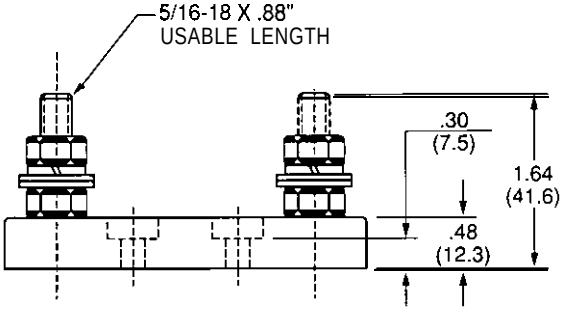
Littelfuse CNUCNN limiter fuses and competitors' equivalents.

ORDERING INFORMATION

Example catalog number: LFFB001
Example system number: LFFB0001Z

DIMENSIONS

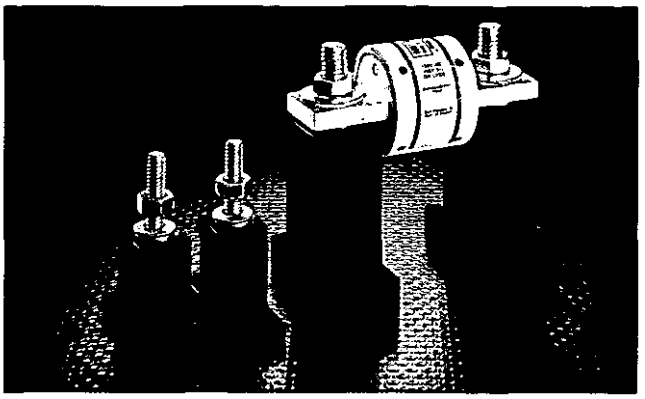




Blocks And Holders

Semiconductor Fuse Blocks

Littelfuse
POWR-GARD™ Products



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

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

Ampere ratings: LSCROOI: 1 – 450 ampere capacity.

LSCROOZ: 70 – 1000 ampere capacity.

Approvals: UL Recognized (File No. E14721)

Stud Size: LSCROOI: 1/4 20 thread
LSCR002: 3/8 - 16 thread

Base: Molded phenolic. 150" C temperature rating.

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

RECOMMENDED FUSES

Semiconductor fuses. See tables below.

LSCROOI

Semiconductor fuse block selection guide

Fuse Series	Ampere Rating
L15S	70 – 450
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

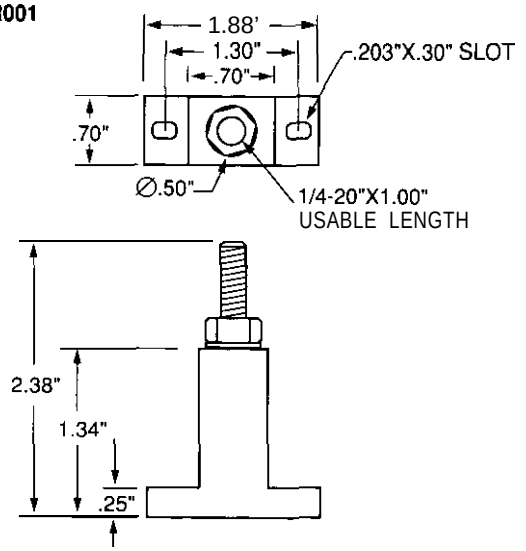
LSCR002

Semiconductor fuse block selection guide

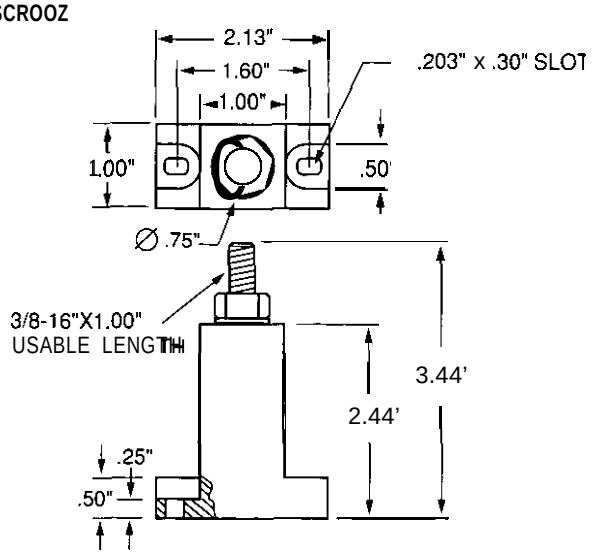
Fuse Series	Ampere Rating
L15S	500 – 1000
L25S	225 – 700
L25S	800
L50S	225 – 400
L50S	450 – 600
L50S	700 – 800
L60S	225 – 400
L60S	450 – 600
L60S	700 – 600
L70S	125 – 200
L70S	225 – 400
L70S	450 – 600
KLC	70 – 100
KLC	125 – 200
KLC	225 – 400
KLC	450 – 800
KLC	1000

Blocks And Holders

LSCR001

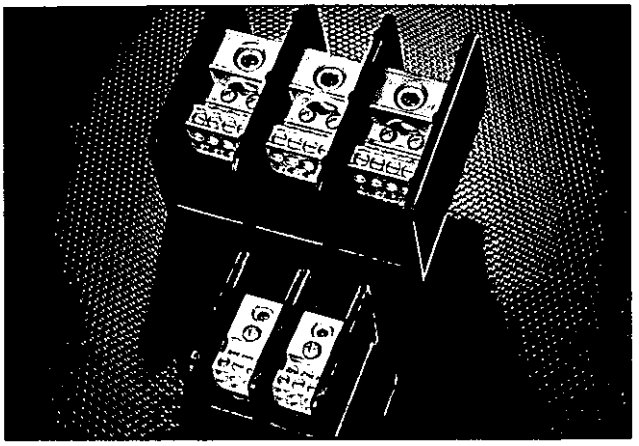


LSCROOZ



POWR-BLOKS'" Distribution/Splicer Blocks and Covers

Littelfuse
POWR-GARD™ Products



POWR-BLOKS" power distribution and splicer blocks offer a safe, convenient way of splicing cables, providing a fixed junction tap-off point, or splitting primary power into secondary circuits. Blocks have one or two primary inputs, with up to twelve secondary outputs par pole. The number of poles available ranges from one to four.

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 31 O-1 6, 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

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

Splicer Block Example Part No.

L S 3126 -2

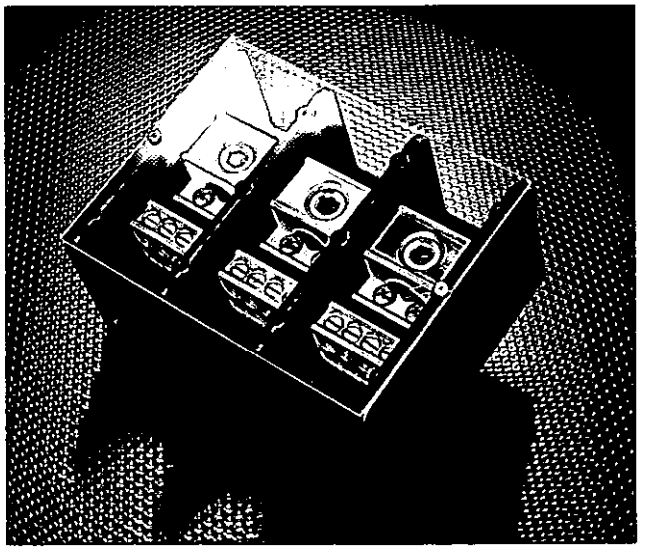
- L — Littelfuse
- S — Splicer Block
- 3126 — Series
- -2 — No. of Poles

AMPERE RATINGS

The ampere rating par pole for power distribution blocks is based on the line ampacity of 75" C insulated conductors par 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



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.

SPECIFICATIONS

Material: 0.06" clear plexiglas™.

FEATURES

Two thread-cutting screws are furnished for each cover.

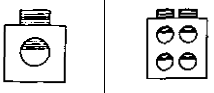
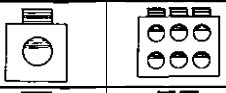
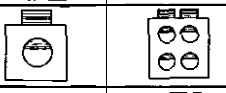
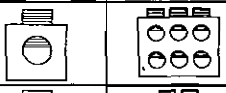
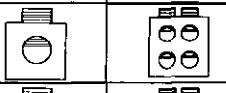
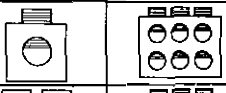
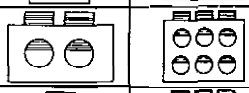
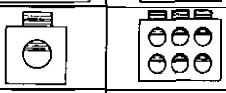
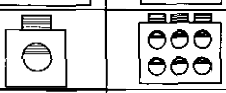
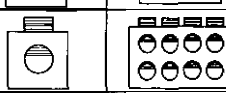
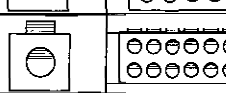
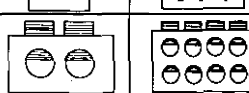
Covers are slotted for easy installation.

Covers available for all Power Distribution Blocks.. see below.

Power Distribution/Splicer Block Cover Selection Guide & Dimensions

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

Distribution Block Selection Guide

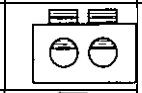
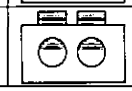
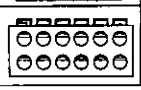
Connector Configuration			Amp Rating per Pole	Number of Poles	Line		Load		Littelfuse Catalog Number	Littelfuse System Number	
Matl	Line	Load			Wire Range	Openings per Pole	Wire Range	Openings per Pole			
AL			115	1	#2 - #14	1	#10 - #18	4	LD1400-1	0LD14001Z	NEW
			115	2	#2 - #14	1	#10 - #18	4	LD1400-2	0LD14002Z	NEW
			115	3	#2 - #14	1	#10 - #18	4	LD1400-3	0LD14003Z	NEW
			115	4	#2 #14	1	#10 - #18	4	LD1400-4	0LD14004Z	NEW
AL			175	2	210 #14	1	#4 - #14	6	LD0401-2	0LD04012Z	
			175	3	210 #14	1	#4 - #14	6	LD0401-3	0LD04013Z	
AL			175	2	210 #14	1	#4 #14	4	LD0402-2	0LD04022Z	NEW
			175	3	210 #14	1	#4 - #14	4	LD0402-3	0LD04023Z	NEW
AL			310	2	350mcm #6	1	#4 #14	6	LD0404-2	0LD04042Z	NEW
			310	3	350mcm - #6	1	#4 - #14	6	LD0404-3	0LD04043Z	NEW
AL			175	,	2/0 #14	1	#4 - #14	4	LD2570-1	0LD25701Z	
			175	2	2/0 - #14	1	#4 #14	4	LD2570-2	0LD25702Z	
			175	3	2/0 #14	1	#4 - #14	4	LD2570-3	0LD25703Z	
CU			175	1	2/0 #14	1	#4 - #14	4	LD2970-1	0LD29701Z	NEW
			175	2	210 #14	1	#4 - #14	4	LD2970-2	0LD29702Z	NEW
			175	3	2/0 - #14	1	#4 - #14	4	LD2970-3	0LD29703Z	NEW
AL			335	1	400mcm #6	1	#2 - #14	4	LD3552-1	0LD35521Z	
			335	2	400mcm #6	1	#2 - #14	4	LD3552-2	0LD35522Z	
			335	3	400mcm #6	1	#2 - #14	4	LD3552-3	0LD29703Z	
AL			335	1	400mcm #6	1	#2 - #14	6	LD3553-1	0LD35531Z	
			335	2	400mcm #6	1	#2 - #14	6	LD3553-2	0LD35532Z	
			335	3	400mcm #6	1	#2 - #14	6	LD3553-3	0LD29733Z	
AL			350	1	210 #14	2	#4 - #14	6	LD3555-1	0LD35551Z	
			350	2	2/0 #14	2	#4 - #14	6	LD3555-2	0LD35552Z	
			350	3	2/0 #14	2	#4 - #14	6	LD3555-3	0LD35553Z	
CU			360	,	500mcm #4	1	#2 - #14	6	LD3953-1	0LD39531Z	NEW
			360	2	500mcm #4	1	#2 #14	6	LD3953-2	0LD39532Z	NEW
			360	3	500mcm #4	1	#2 - #14	6	LD3953-3	0LD39533Z	NEW
CU			350	1	2/0 #14	2	#4 - #14	6	LD3955-1	0LD39551Z	NEW
			350	2	2/0 #14	2	#4 #14	6	LD3955-2	0LD39552Z	NEW
			350	3	210 #14	2	#4 #14	6	LD3955-3	0LD39553Z	NEW
AL			360	1	500mcm #4	1	#2 - #14	6	LD4551-1	0LD45511Z	NEW
			360	2	500mcm #4	1	#2 - #14	6	LD4551-2	0LD45512Z	NEW
			360	3	500mcm #4	1	#2 - #14	6	LD4551-3	0LD45513Z	
AL			335	1	400mcm #6	1	#2 - #14	8	LD4560-1	0LD45601Z	
			335	2	400mcm #6	1	#2 - #14	8	LD4560-2	0LD45602Z	
			335	3	400mcm #6	1	#2 - #14	8	LD4560-3	0LD45603Z	
AL			360	1	500mcm #4	1	#2 #14	12	LD5552-1	0LD55521Z	
			360	2	500mcm #4	1	#2 - #14	12	LD5552-2	0LD55522Z	
			360	3	500mcm #4	1	#2 - #14	12	LD5552-3	0LD55523Z	
AL			360	1	500mcm #4	1	2/0 #14	6	LD5579-1	0LD55791Z	NEW
			360	2	500mcm #4	1	2/0 #14	6	LD5579-2	0LD55792Z	NEW
			360	3	500mcm #4	1	2/0 - #14	6	LD5579-3	0LD55793Z	
AL			760	1	500mcm #4	2	210 #14	8	LD5586-1	0LD55861Z	
			760	2	500mcm #4	2	2/0 - #14	8	LD5586-2	0LD55862Z	
			760	3	500mcm #4	2	210 #14	6	LD5586-3	0LD55863Z	
AL			665	1	500mcm #4 350mcm #6	1 1	2/0 #14	4	LD5587-1	0LD55871Z	NEW
			665	2	500mcm #4 350mcm #6	1 1	210 #14	4	LD5587-2	0LD55872Z	NEW
			665	3	500mcm #4 350mcm #6	1 1	2,0 #14	4	LD5587-3	0LD55873Z	NEW

Blocks And Holders

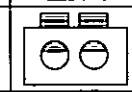
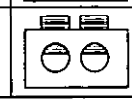
POWR-BLOKS™ Distribution/Splicer Blocks and Covers

Littelfuse
POWR-GARD™ Products

Distribution Block Selection Guide

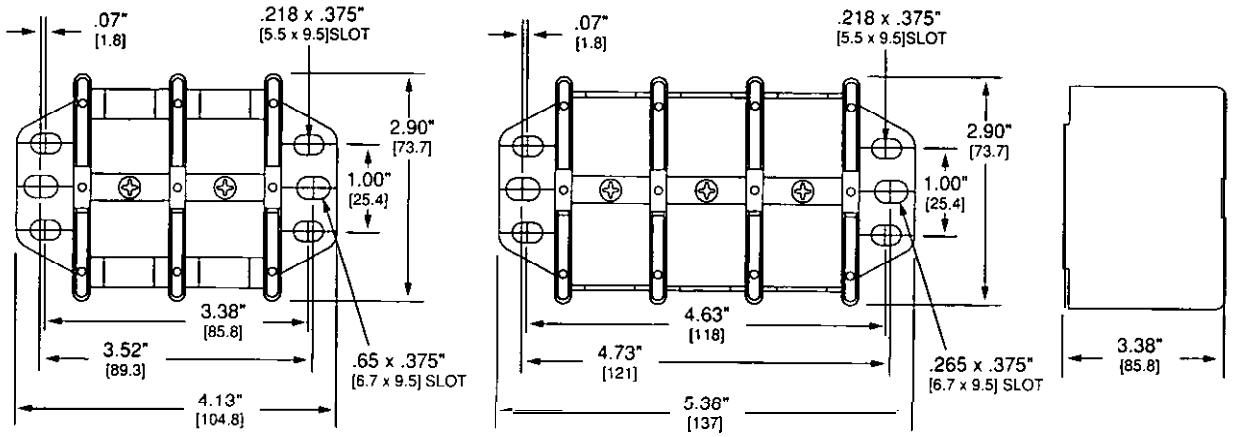
Connector Configuration Mat'l	Line	Load	Amp Rating per Pole	Number of Poles	Line Wire Range	Line Openings per Pole	Load Wire Range	Load Openings per Pole	Littelfuse Catalog Number	Littelfuse System Number
AL			760	1	500mcm-#4	2	#4 - #14	12	LD5592-1	0LD55921Z
			760	2	500mcm-#4	2	#4 - #14	12	LD5592-2	0LD55922Z
			760	3	500mcm-#4	2	#4 - #14	12	LD5592-3	0LD55923Z
AL			380	1	500mcm-#4	1	#2 - #14	8	LD5594-1	0LD55941Z NEW
			360	2	500mcm-#4	1	#2 - #14	8	LD5594-2	0LD55942Z NEW
			360	3	500mcm-#4	1	#2 - #14	8	LD5594-3	0LD55943Z NEW
CU			760	1	500mcm-#4	2	2/0 - #14	8	LD5986-1	0LD59861Z NEW
			760	2	500mcm-#4	2	2/0 - #14	8	LD5986-2	0LD59862Z NEW
			760	3	500mcm-#4	2	2/0 - #14	8	LD5986-3	0LD59863Z NEW
CU			760	1	500mcm-#4	2	#2 - #14	12	LD5992-1	0LD59921Z NEW
			760	2	500mcm-#4	2	#2 - #14	12	LD5992-2	0LD59922Z NEW
			760	3	500mcm-#4	2	#2 - #14	12	LD5992-3	0LD59923Z NEW

Splicer Block Selection Guide

Connector Configuration Mat'l	Line	Load	Amp Rating per Pole	Number Of Poles	Line Wire Range	Line Openings per Pole	Load Wire Range	Load Openings per Pole	Littelfuse Catalog Number	Littelfuse System Number
AL			310	2	350mcm-#6	1	350mcm-#6	1	LS0303-2	0LS03032Z NEW
			310	3	350mcm-#6	1	350mcm-#6	1	LS0303-3	0LS03033Z NEW
AL			115	1	#2 - #14	1	#2 - #14	1	LS1300-1	0LS13001Z NEW
			115	2	#2 - #14	1	#2 - #14	1	LS1300-2	0LS13002Z NEW
			115	3	#2 - #14	1	#2 - #14	1	LS1300-3	0LS13003Z NEW
			115	4	#2 - #14	1	#2 - #14	1	LS1300-4	0LS13004Z NEW
CU			150	1	1/0 - #18	1	1/0 - #18	1	LS2121-1	0LS21211Z NEW
			150	2	1/0 - #18	1	1/0.- #18	1	LS2121-2	0LS21212Z NEW
			150	3	1/0 - #18	1	1/0 - #18	1	LS2121-3	0LS21213Z NEW
AL			115	1	#2 - #14	1	#2 - #14	1	LS2552-1	0LS25521Z NEW
			115	2	#2 - #14	1	#2 - #14	1	LS2552-2	0LS25522Z NEW
			115	3	#2 - #14	1	#2 - #14	1	LS2552-3	0LS25523Z NEW
AL			175	1	2/0 - #14	1	2/0 - #14	1	LS2572-1	0LS25721Z
			175	2	2/0 - #14	1	2/0 - #14	1	LS2572-2	0LS25722Z
			175	3	2/0 - #14	1	2/0 - #14	1	LS2572-3	0LS25723Z
AL			255	1	250mcm-#6	1	250mcm-#6	1	LS3123-1	0LS31231Z
			255	2	250mcm-#6	1	250mcm-#6	1	LS3123-2	0LS31232Z
			255	3	250mcm-#6	1	250mcm-#6	1	LS3123-3	0LS31233Z
CU			255	1	250mcm-#6	1	250mcm-#6	1	LS3124-1	0LS31241Z NEW
			255	2	250mcm-#6	1	250mcm-#6	1	LS3124-2	0LS31242Z NEW
			255	3	250mcm-#6	1	250mcm-#6	1	LS3124-3	0LS31243Z
AL			310	1	350mcm-#6	1	350mcm-#6	1	LS3126-1	0LS31261Z
			310	2	350mcm-#6	1	350mcm-#6	1	LS3126-2	0LS31262Z
			310	3	350mcm-#6	1	350mcm-#6	1	LS3126-3	0LS31263Z
AL			420	1	600mcm-#4	1	600mcm-#4	1	LS4557-1	0LS45571Z NEW
			420	2	600mcm-#4	1	600mcm-#4	1	LS4557-2	0LS45572Z NEW
			420	3	600mcm-#4	1	600mcm-#4	1	LS4557-3	0LS45573Z NEW
AL			620	1	350mcm-#4	2	350mcm-#4	2	LS5129-1	0LS51291Z NEW
			620	2	350mcm-#4	2	350mcm-#4	2	LS5129-2	0LS51292Z
			620	3	350mcm-#4	2	350mcm-#4	2	LS5129-3	0LS51293Z
AL			760	1	500mcm-#4	2	500mcm-#4	2	LS5301-1	0LS53011Z
			760	2	500mcm-#4	2	500mcm-#4	2	LS5301-2	0LS53012Z
			760	3	500mcm-#4	2	500mcm-#4	2	LS5301-3	0LS53013Z

Blocks And Holders

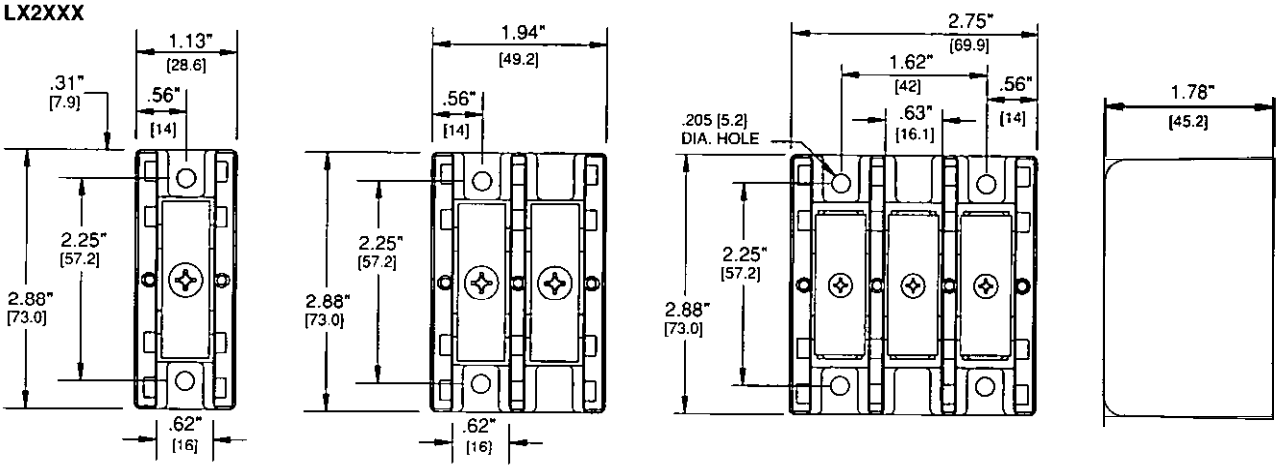
LX0XXX



2 POLE 3 POLE

Figure 1

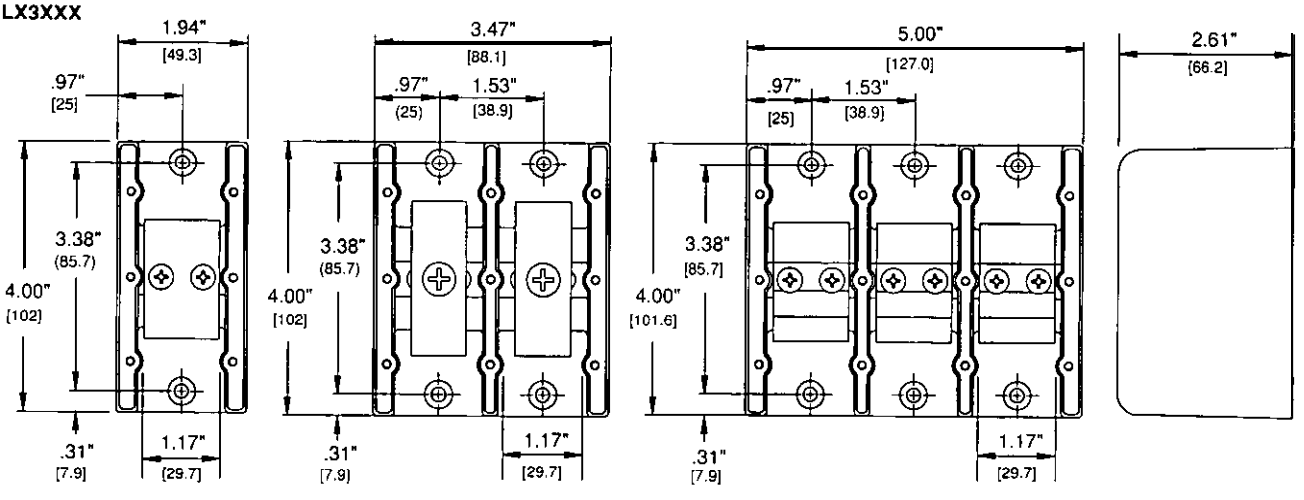
LX2XXX



1 POLE 2 POLE 3 POLE

Figure 2

LX3XXX



1 POLE 2 POLE 3 POLE

Figure 3

Blocks And Holders

LX4XXX

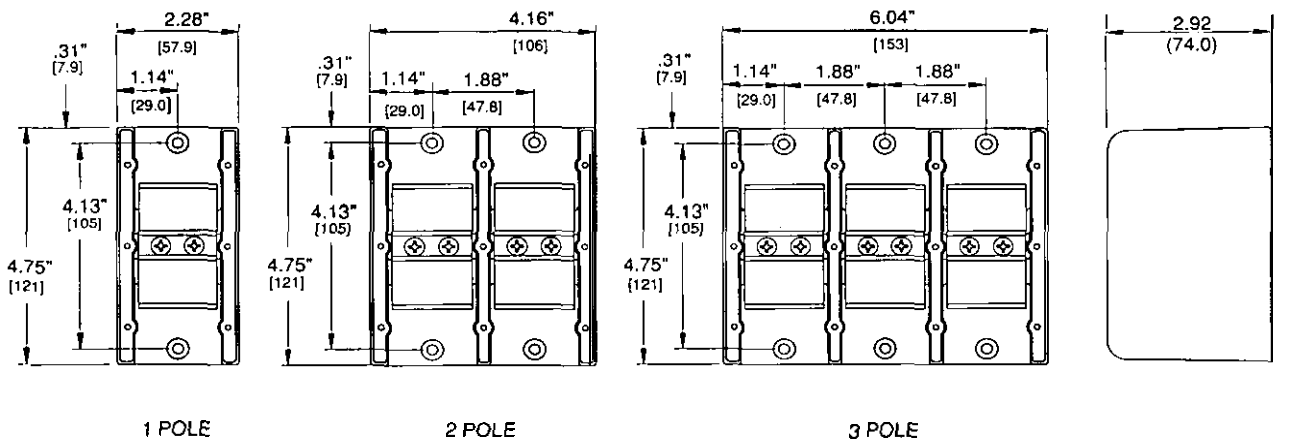


Figure 4

LX5XXX

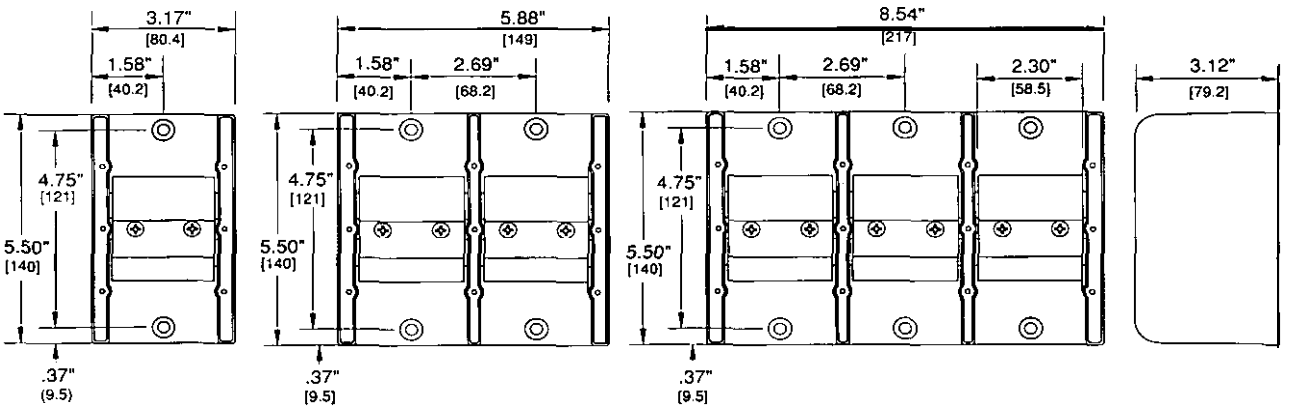
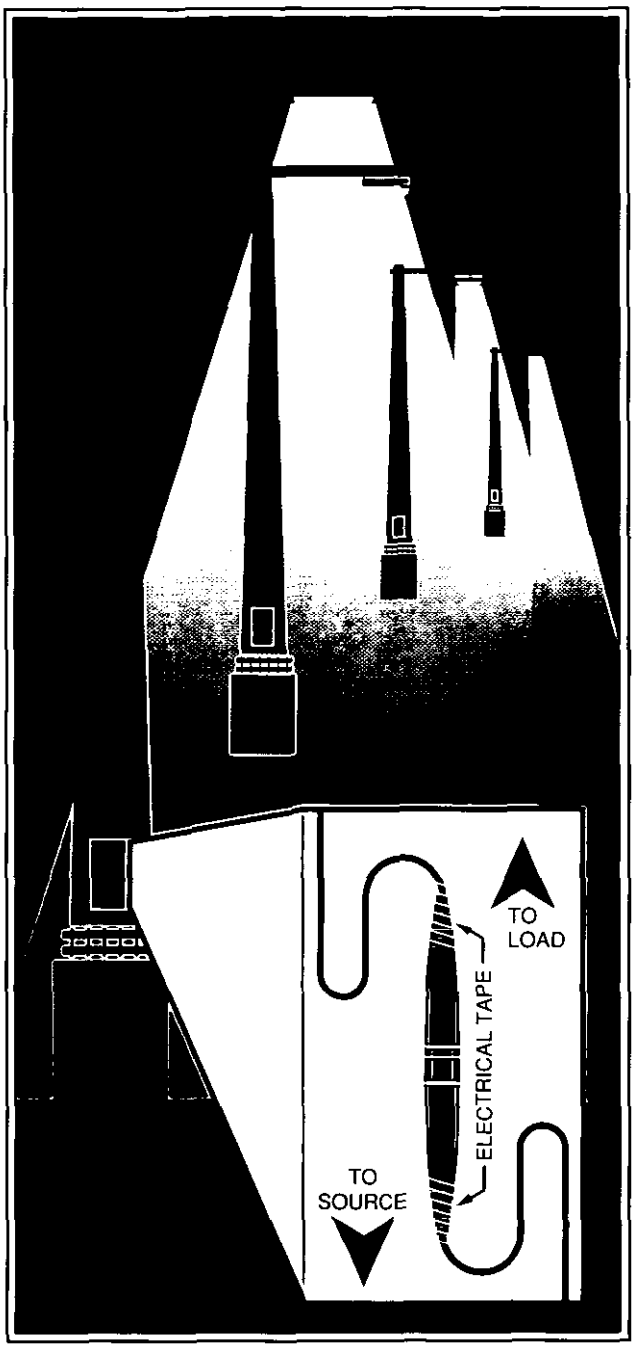


Figure 5

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 13132" 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

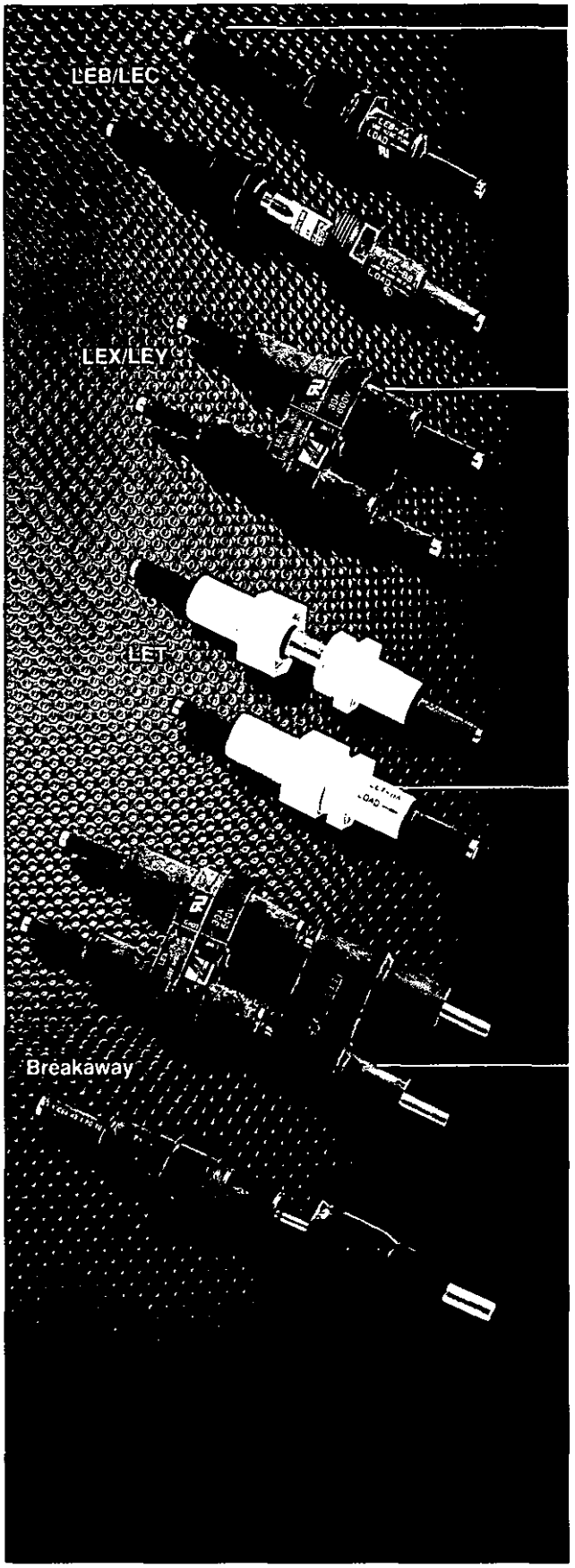
- Safety — Permits individual fixture or device to be disconnected from circuit for servicing. Eliminates possibility of shock.
- Individual fixture fusing — Prevents loss of one fixture through accident, vandalism, or end of life from darkening the entire circuit.
- Simplifies maintenance — Being able 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-alike%
- 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.

In-Line Watertight Fuseholders

Littelfuse
POWR-GARD™ Products



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 13132" 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 460 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 paver 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

Littelfuse
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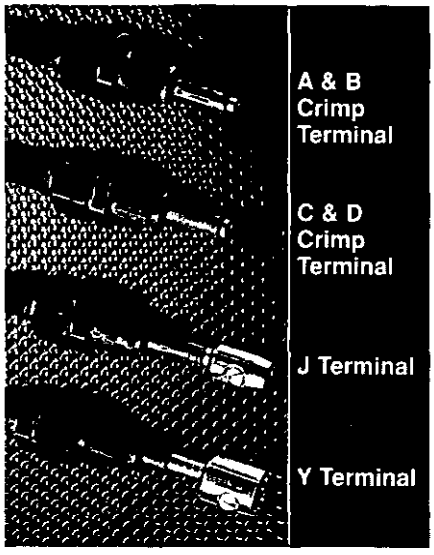
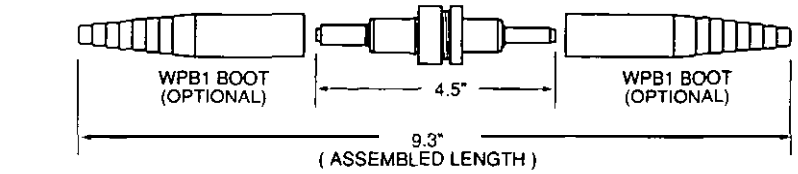
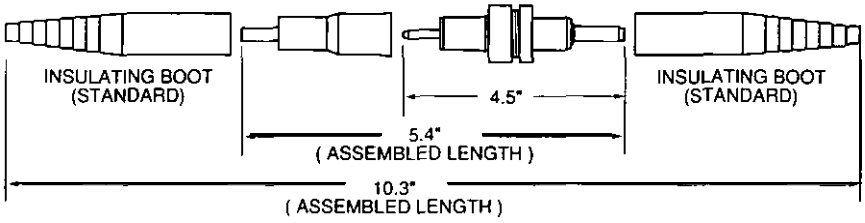
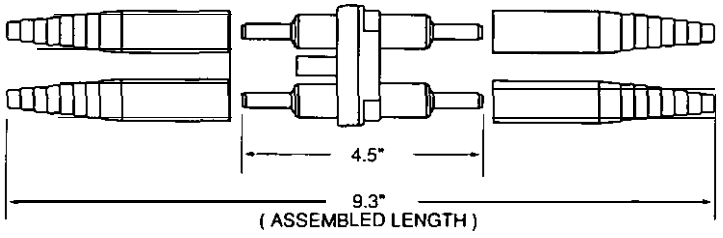
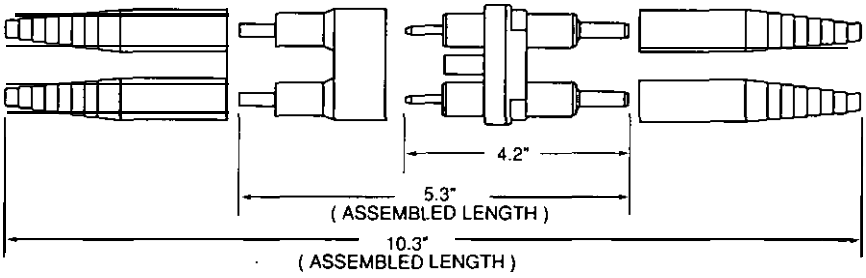










Insulating Boots

Molded from engineering grade thermoplastics, the WPB1 and WPB2 provide a high resistance to corrosive environments and deliver a watertight seal. Boots a"? supplied as standard with all breakaway versions. Weatherproof boots WPB1 and WPB2 can be purchased separately for all "on-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 "on-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

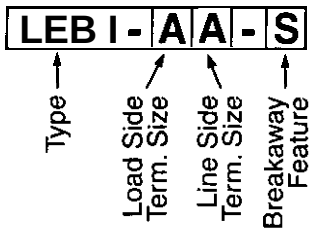
The following crimping tools or equivalents may be used on either the non-breakaway or breakaway watertight in-line fuseholders.

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	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	X X —	X X X	"Y" Type Copper Set-Screw	#12 to #8 #10 to #2	1 1	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

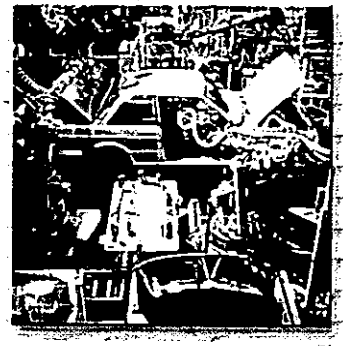
Selection Guide For Double Pole LEX/LEY Fuseholders

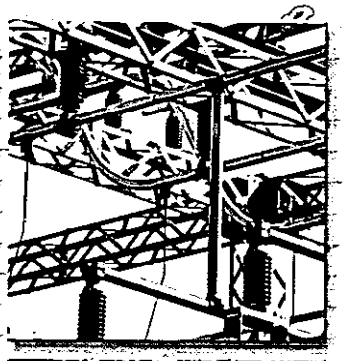
Standard Part No.	Breakaway Part No.	Fuse Type	Load Terminal Selection					Line Terminal Selection				
			Terminal Type	Load Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire	Terminal Type	Line Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire
LEX-AA 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

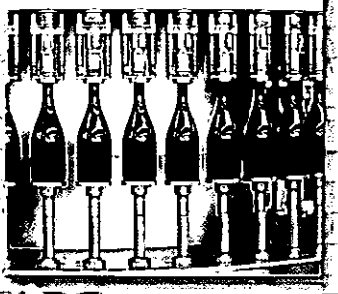
Selection Guide For Solid Neutral LET Fuseholders

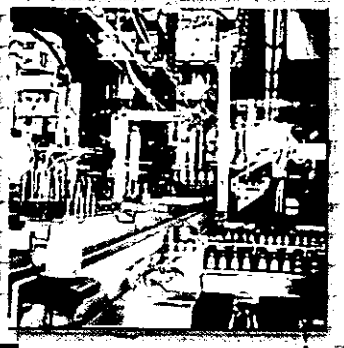
Standard Part No.	Breakaway Part No.	Fuse Type	Load Terminal Selection					Line Terminal Selection				
			Terminal Type	Load Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire	Terminal Type	Line Terminal Wire Size Range	No. of Wires per Terminal	Solid Wire	Stranded Wire
LET-AA	LET-AA-S	Solid Neutral	Copper Crimp	#12 to #8 #12	1 2	X X	X X	Copper Crimp	#12 to #8 #12	1 2	X X	X X
LET-AB	LET-AB-S	Solid Neutral	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
LET-AYC	LET-AYC-S	Solid Neutral	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
LET-BA	LET-BA-S	Solid Neutral	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
LET-BB	LET-BB-S	Solid Neutral	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
LET-BYC	LET-BYC-S	Solid Neutral	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
LET-JJ	LET-JJ-S	Solid Neutral	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
LET-JYC	LET-JYC-S	Solid Neutral	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

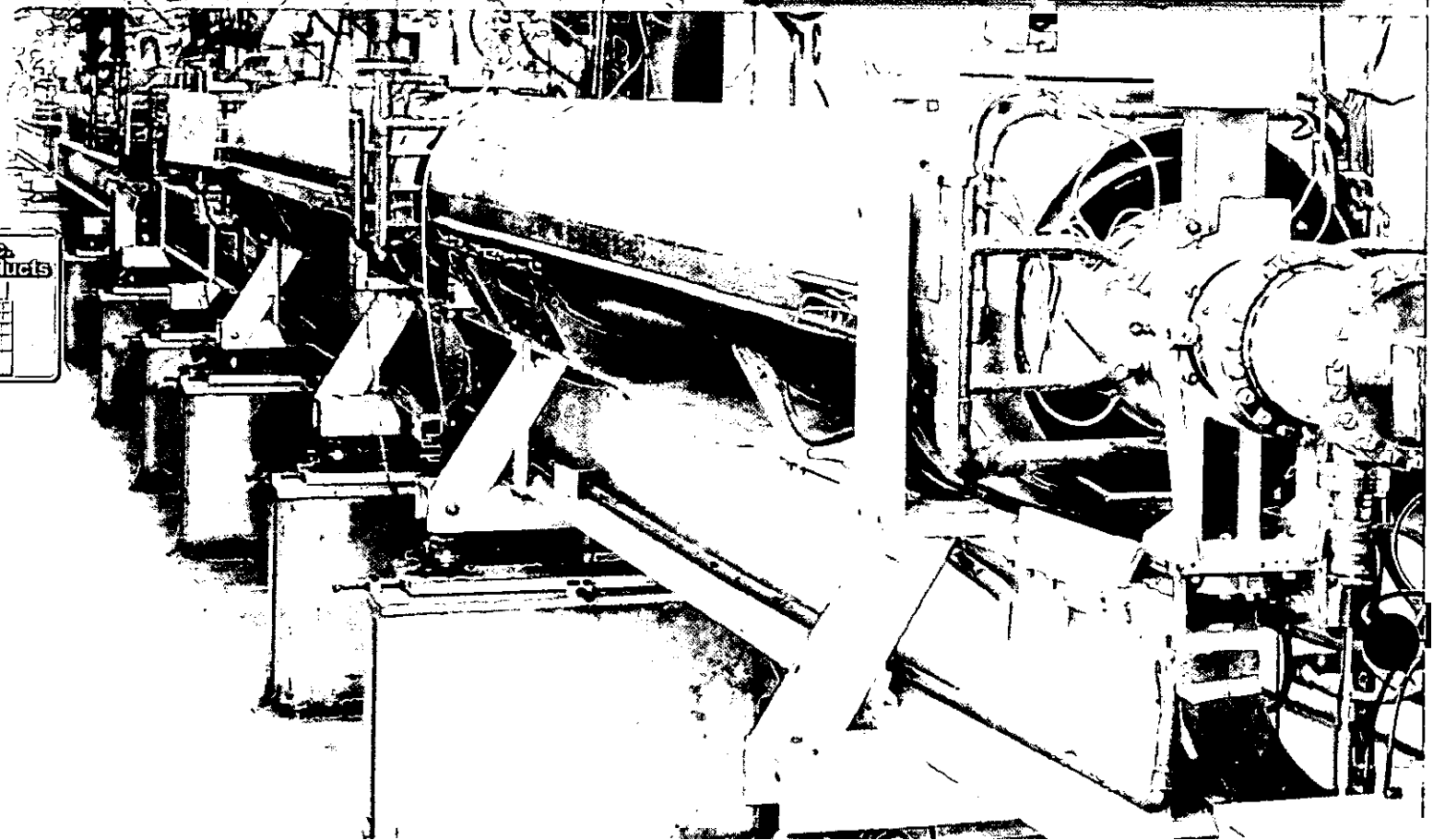
Misc Products











Disconnect Switches

Fusible/Non-fusible

Littelfuse
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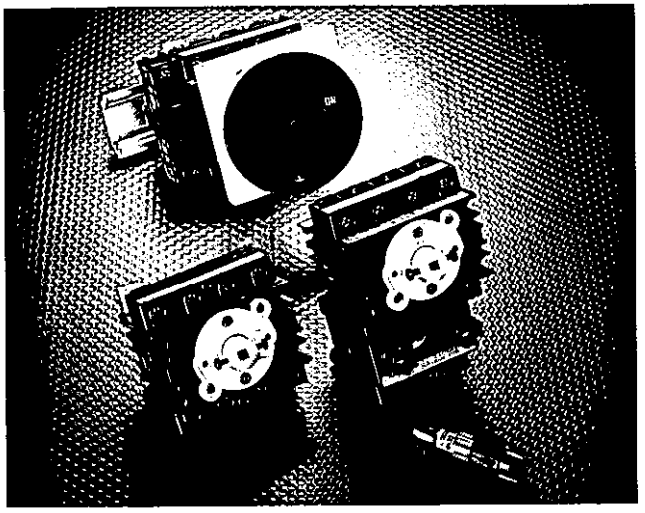


SPECIFICATIONS

Voltage: 600VAC
Interrupting Rating: 10,000 amperes
Required Screw Torque: 16 inch pounds
Ampere Rating: LFFS030CC: 30 Amperes
LFOS040: 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
LFOS040	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.

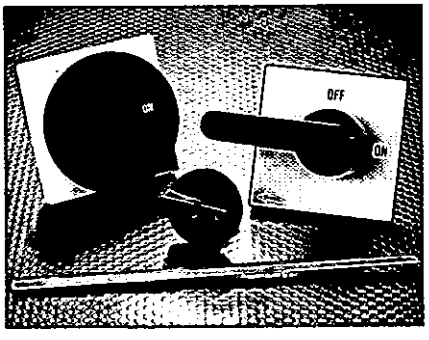
APPLICATIONS

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

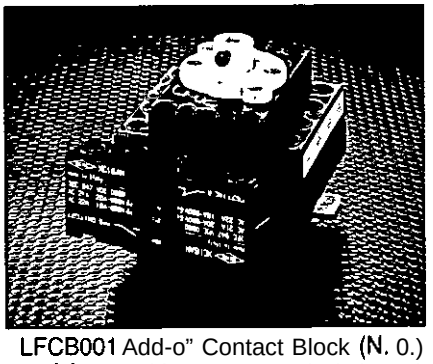
- **Reduce panel costs** -This is the smallest 30A disconnect switch and fuse block on the market. This minimizes panel space, reducing enclosure costs.
- **Minimize wiring time —** Integral Class CC block eliminates the need to install separate fuse blocks (LFFS only).
- **Reduce installation costs —** 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

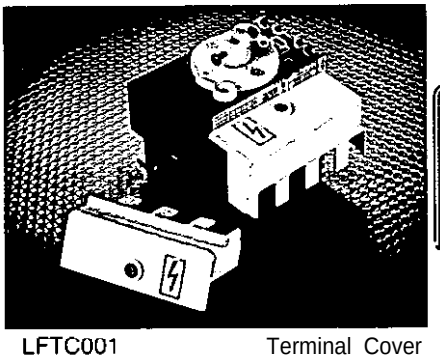


LFRH001*	Red Handle
LFRKOOl *	Red Knob
LFBH001*	Black Handle
LFBK001*	Black Knob
LFBK002**	Black Knob
SHFTO02	Shaft (19.66")
SHFT003	Shaft (11.61')
SHFT005	Shaft (7.76")

* Includes mounting hardware and standard length shaft for enclosures 3.5' through 8" deep.
** Supplied with 2' shaft



LFCB001 Add-o" Contact Block (N. 0.)
LFCB002 Add-on Contact Block (N. C.)
LFPP001 Add-o" Power Pole (N. 0.)
LFPPO02 Add-o" 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. El 36655)
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 M	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, LLNRWLLSRK and KLNWKLSR series fuses.

250 Volt

Part No. (pair)	Fuss Clip	Fuse Case Size
LRU 263 R	60	30
LRU 213 R	100	30
		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
		30
LRU 616 R	100	60
LRU 626 R	200	6"
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

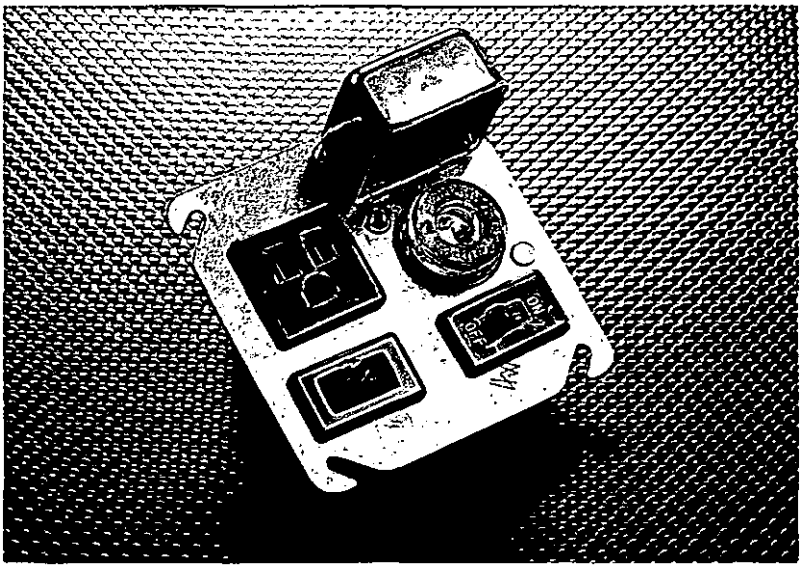
Part No. (pair)	Fuse Clip	Fuse Case Size
LRUJ63	60A	30A
LRUJ13	100A	30A
LRUJ16 *	100A	60A
LRUJ26	200A	60A
LRUJ21	200A	100A
LRUJ41	400A	100A
LRUJ42	400A	200A
LRUJ64	600A	400A

* 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

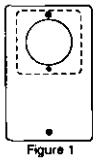
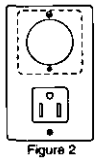
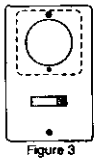
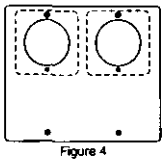
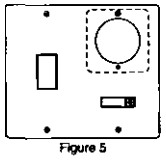
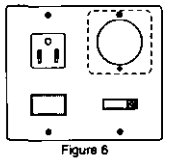
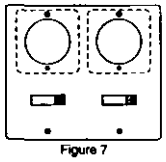
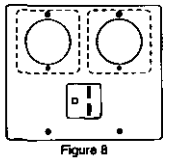
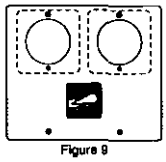
Littelfuse
POWR-GARD™ Products

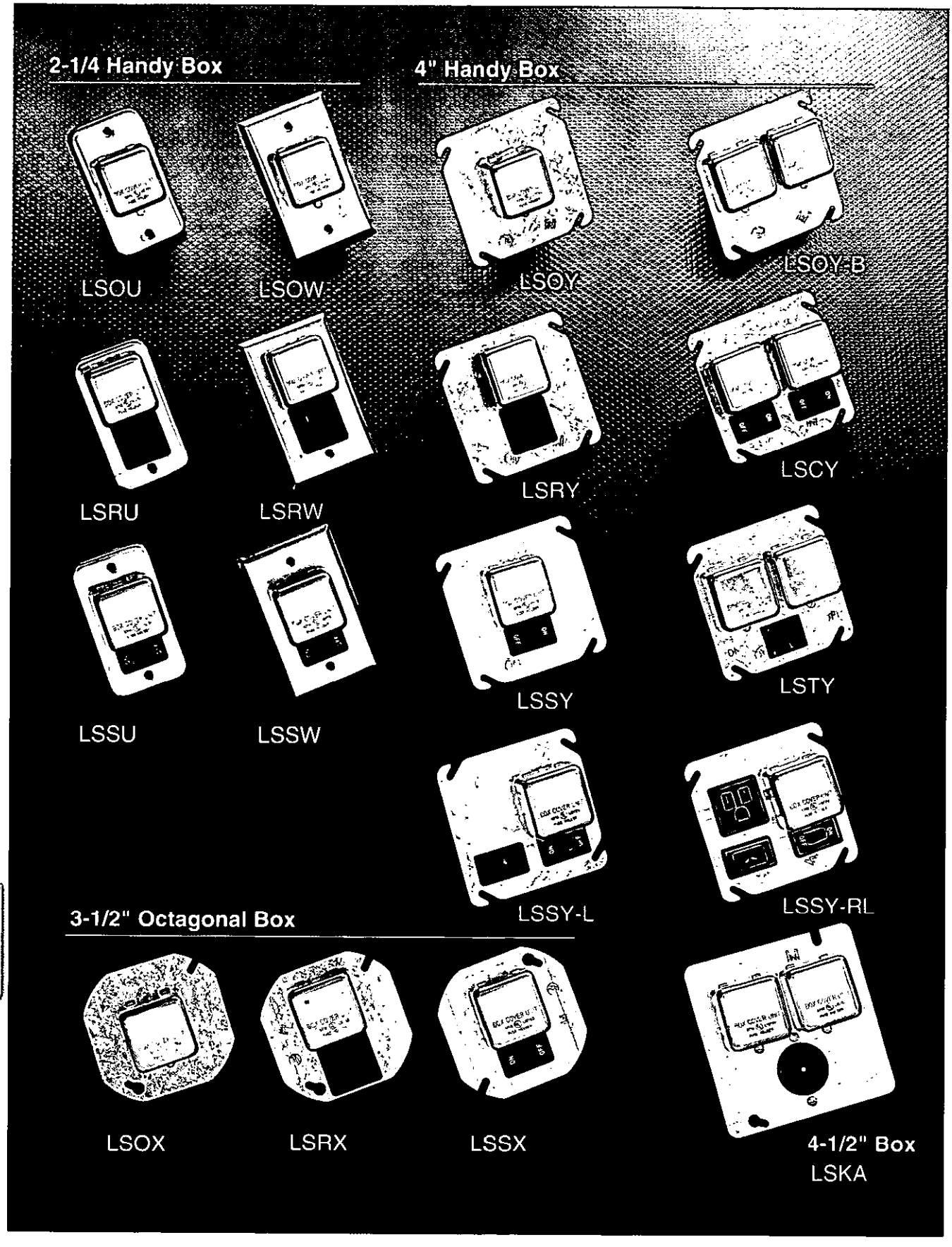


Box cover units provide an economical method of protecting small motors against overcurrent damage. For use with Edison-Base plug fuses (TOO, TLO. WOO) or Type S plug fuses (SOO, SLO) with adapters (SAO).

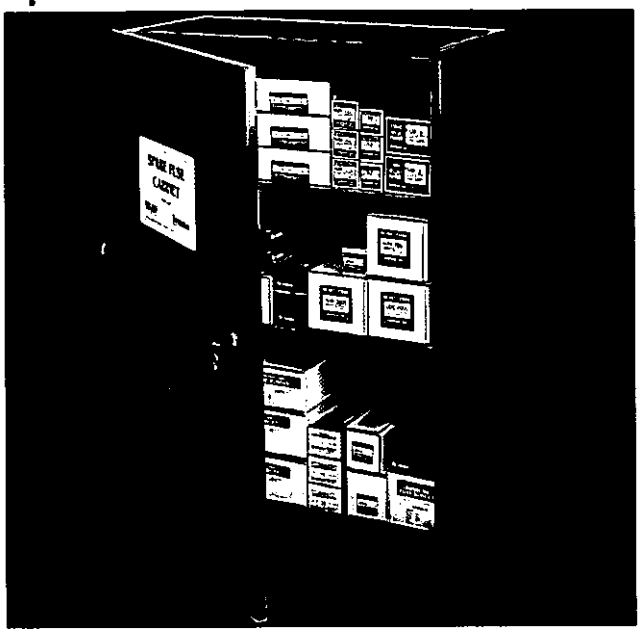
SPECIFICATIONS

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	1	LSOU	One Edison-Base Fuse Holder	**2%"** Handy Box
		LSOW	One Edison-Base Fuse Holder	2%" Switch Box
		LSOX	One Edison-Base Fuse Holder	4" Octagon Box
		LSOY	One Edison-Base Fuse Holder	4" Square Box
 Figure 3  Figure 4	2	LSRU	One Edison-Base Fuse Holder and Grounding Receptacle	**2%"** 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
 Figure 5  Figure 6	3	LSSU	One Edison-Base Fuse Holder and Single Pole Switch	**2%"** Handy Box
		LSSW	One Edison-Base Fuse Holder and Single Pole Switch	2%" 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
 Figure 7  Figure 8	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
 Figure 9	7	LSCY	Two Edison-Base Fuse Holders and Two Single Pole Switches	4" Square Box
	6	LSKA	Two Edison-Base Fuse Holders One 250V Grounding Receptacle	**4 11/16" 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

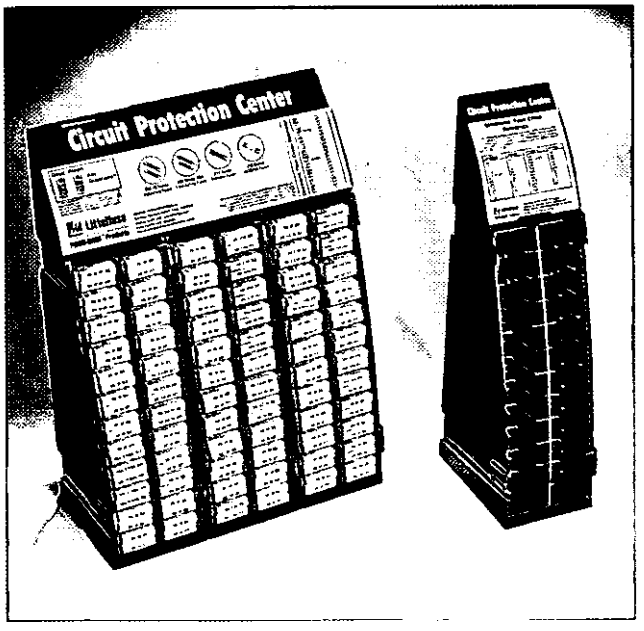


Sturdy steel cabinet holds spare fuses. Cabinet can be locked to prevent unauthorized access and is weather stripped to reduce the accumulation of dust, dirt and moisture. Convenient inventory card located inside door. Measures 30" H x 24" W x 12" D. Keyhole mounting holes 16" on center for easy installation.

ORDERING INFORMATION

Spare Fuse Cabinet: Part No. LSFC
Spare Keys: Part No. LKEY001

NEW 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: FDR001 PG
Linelfuse system number: 0FDR0001ZXPG
Additional Sections: Littelfuse part number: MRS001 PG
Littelfuse system number: 0MRS0001ZXPG

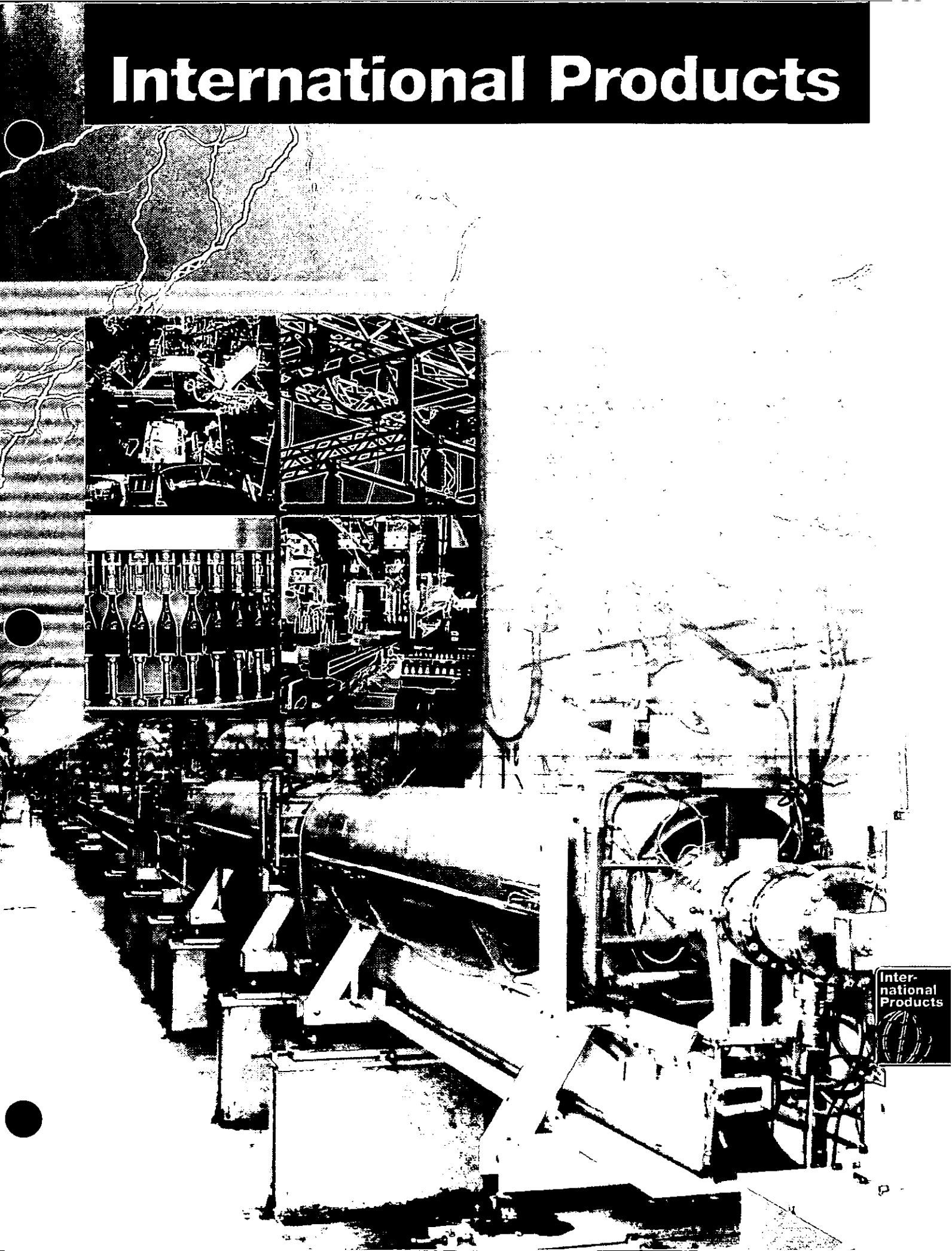
Misc. Products

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 ⅜A	25	314 20A	20	326 10A
25	312 1½A	25	313 1A	25	314 30A		
75	312 2A	50	313 1½A				
25	312 2½A		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				

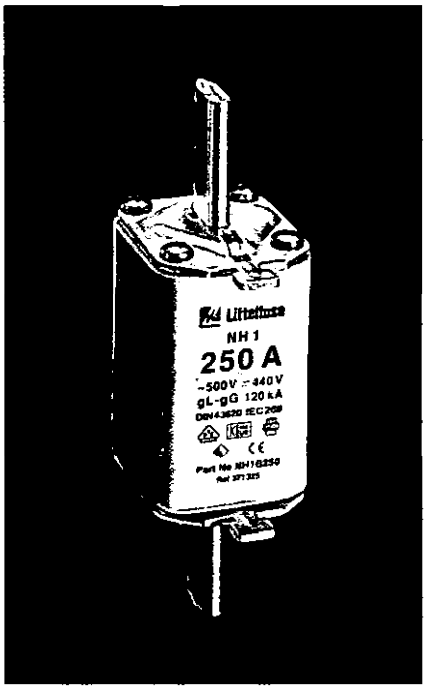

Misc.
Products

International Products



NH Fuse Links

Littelfuse
POWR-GARD™ Products



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 NHOOC to NH3 sizes up to 630 amperes.

SPECIFICATIONS

Standards: DIN 43.620, IEC 269-2-I

Approvals: VDE

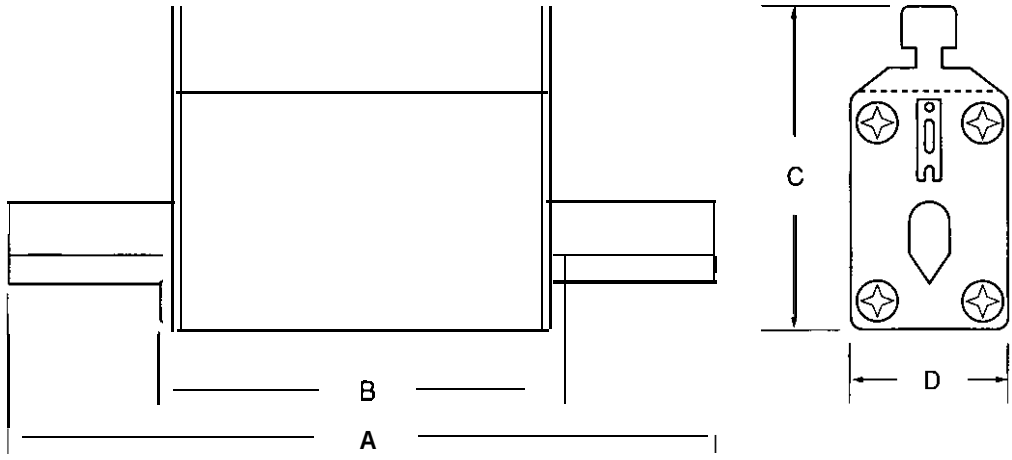
Example part number: *NH1CG25* (size. characteristic and amperage)

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
	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

International Products

NH FUSE LINK DIMENSIONS



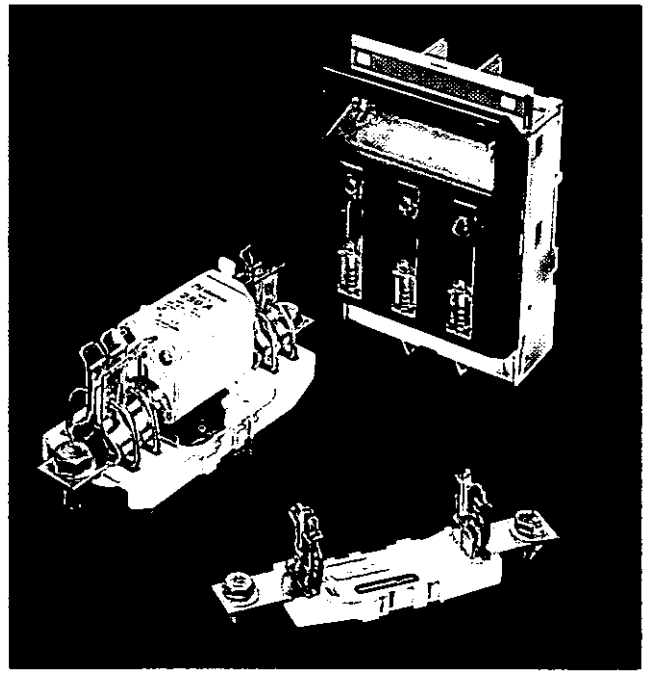
Size	Current Range	Dimensions (mm)			
		A	B	C	D
00C	2-100A	78.00	54.00	51.30	20.00
00	2-160A	78.00	54.00	56.40	30.00
0	2-160A	123.95	70.11	53.34	30.00
1C	25-160A	135.00	75.00	56.40	30.00
1	63-250A	135.00	75.00	64.30	40.00
2C	40-250A	150.00	75.00	64.26	40.00
2	125-400A	150.00	75.00	74.20	50.00
3C	315-400A	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

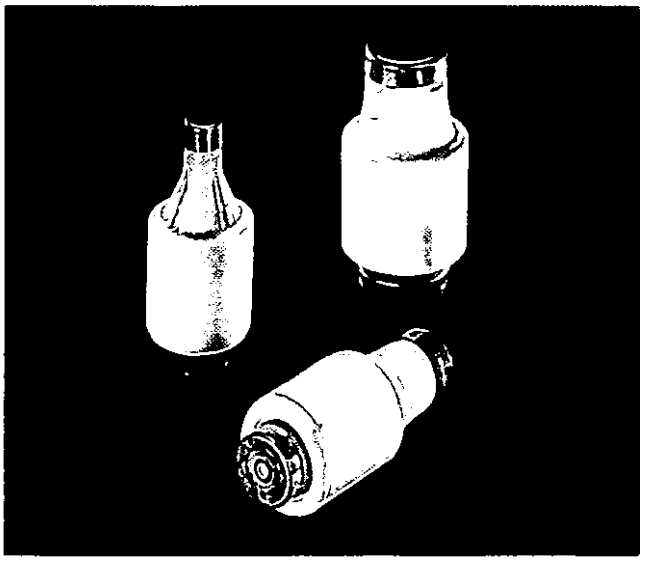
All disconnects are 3 pole.

Contact factory for dimensional information.

International Products

Diazed/Neozed Fuses

Littelfuse
POWR-GARD™ Products



Littelfuse last-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

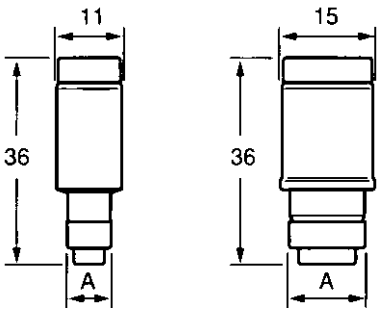
Approvals: VDE

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

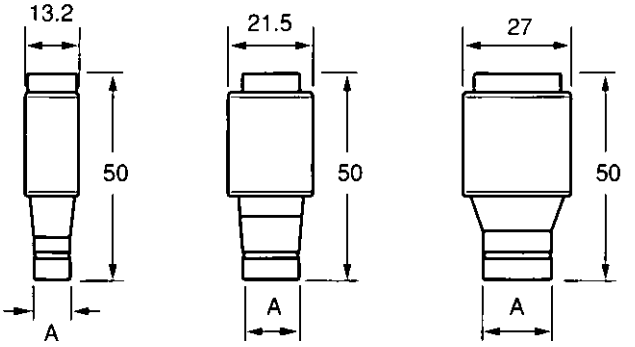
All Diazed and Neozed fuses incorporate a blown fuse indicator.

Neozed Fuses



D01 D02

Diazed Fuses



DI DII DIII

All dimensions are in "mm".

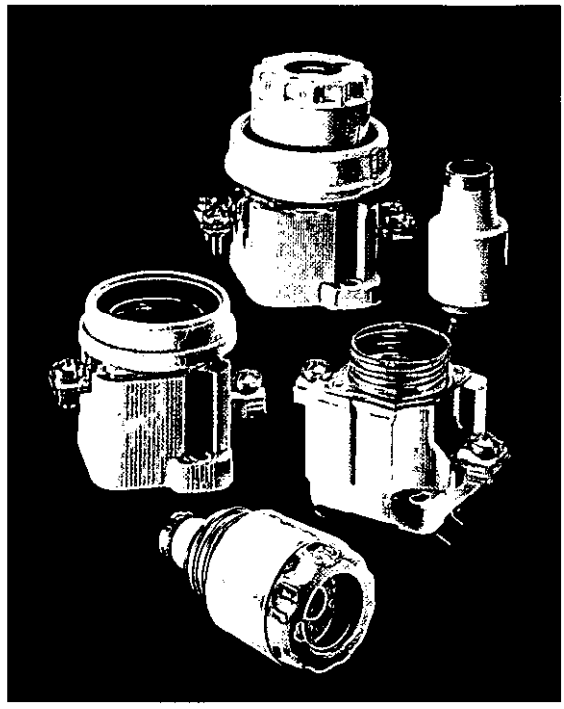
Amperage	Color	DIAZED FUSES gL-gG DI	gL-gG DII	gL-gG DIII	aM DI	aM DII	aM DIII	DIM. A (mm)	NEOZED FUSES gL-gG D01	gL-gG D02	DIM. A (mm
2	Pink	DZ16F2	DZ27F2	—	DZ16T2	DZ27T2	—	6	D0Z14G2	—	7.3
4	Brown	DZ16F4	DZ27F4	—	DZ16T4	DZ27T4	—	6	D0Z14G4	—	7.3
6	Green	DZ16F6	DZ27F6	—	DZ16T6	DZ27T6	—	6	D0Z14G6	—	7.3
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 Si	mm)	16	27	33	16	27	33	—	14	18	—

Inter-national Products

Diazed/Neozed Fuses

Littelfuse
POWR-GARD™ Products

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.

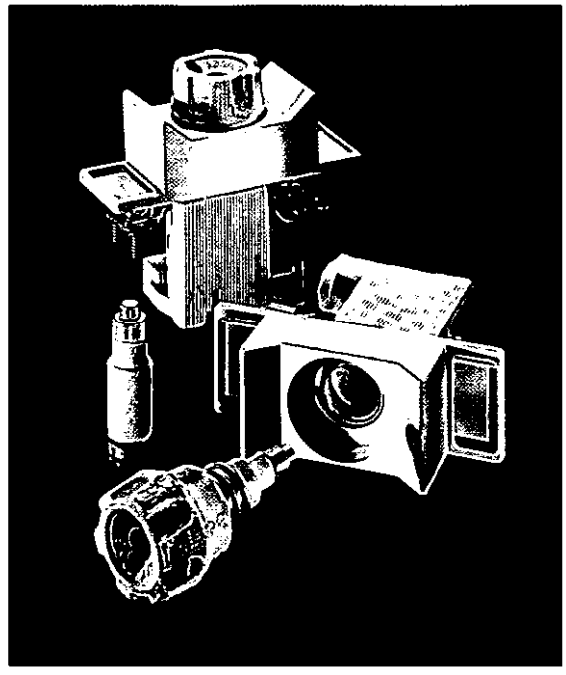


FUSE BASES

Part No.	Fuse Type	Base Size (mm)	Mounting Type
DZB27S	DZ	27	Screw
DZB27DR	DZ	27	Din Rail
DZB33S	DZ	33	Screw
DZB33DR	DZ	33	Din Rail
D0ZB14S	D0Z	14	Screw
D0ZB14DR	D0Z	14	Din Rail
D0ZB18S	D0Z	18	Screw
D0ZB18DR	D0Z	18	Din Rail

FUSE CARRIERS

Part No.	Fuse Type	Base Size (mm)
DZC27	DZ	27
DZC33	DZ	33
D0ZC14	D0Z	14
D0ZC18	D0Z	18



GAUGE RINGS

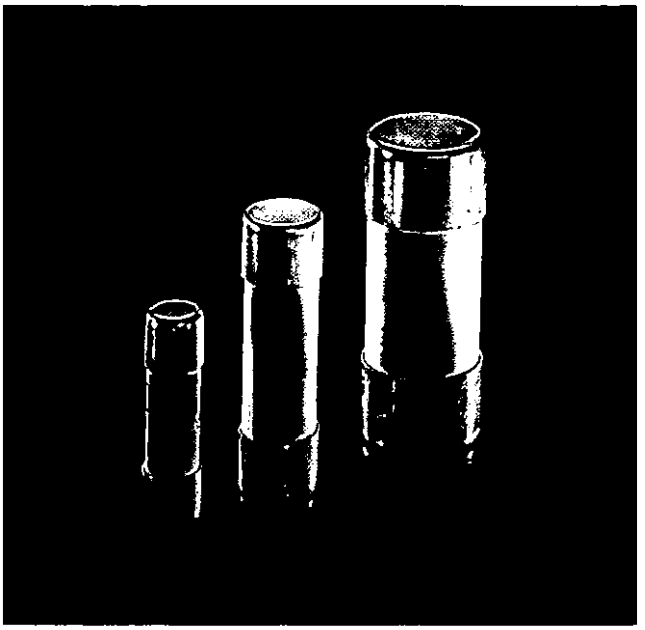
Amp Rating.	Color	DZ	DZ	D0Z	D0Z
2	Pink	DZ27PK	—	D0Z14PK	D0Z18PK
4	Brown	DZ27BR	—	D0Z14BR	D0Z18BR
6	Green	DZ27GN	—	D0Z14GN	D0Z18GN
10	Red	DZ27RD	—	D0Z14RD	D0Z18RD
16	Grey	DZ27GY	—	—	D0Z18GY
20	Blue	DZ27BE	—	—	D0Z18BE
25	Yellow	DZ27YW	—	—	D0Z18YW
35	Black	—	DZ33BK	—	D0Z18BK
50	White	—	DZ33WE	—	D0Z18WE
63	Copper	—	DZ33CR	—	—

Contact factory for dimensional information.

International Products

Cylindrical Fuses

Littelfuse
POWR-GARD™ Products



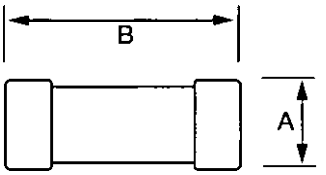
Littelfuse fast-acting (gL-gG) fuses are used for the protection of cables against short circuits. Time-lag (aM) fuses are used for protection of motors.

SPECIFICATIONS

Standards: IEC 269-Z-I

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



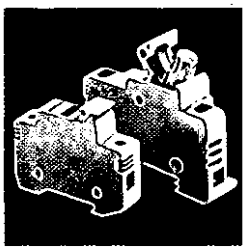
Amperage	gL-gG 10X38	gL-gG 14X51	gL-gG 22X58	aM 10X38	aM 14X51	aM 22X58
0.5	CY10X38G.5	—	—	CY10X38M.5	—	—
1	CY10X38G1	—	—	CY10X38M1	—	—
2	CY10X38G2	CY14X51G2	—	CY10X38M2	CY14X51M2	—
4	CY10X38G4	CY14X51G4	—	CY10X38M4	CY14X51M4	—
6	CY10X38G6	CY14X51G6	—	CY10X38M6	CY14X51M6	—
8	CY10X38G8	CY14X51G8	—	CY10X38M8	CY14X51M8	—
10	CY10X38C10	CY14X51G10	—	CY10X38M10	CY14X51M10	—
12	CY10X38G12	CY14X51G12	—	CY10X38M12	CY14X51M12	—
16	CY10X38G16	CY14X51G16	CY22X58G16	CY10X38M16	CY14X51M16	CY22X58M16
20	CY10X38G20	CY14X51G20	CY22X58G20	CY10X38M20	CY14X51M20	CY22X58M20
25	CY10X38C25	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
Dimensions (mm) 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

• Indicating
NOTE: All fuseholders are DIN-Rail mountable.

Contact factory for dimensional information.



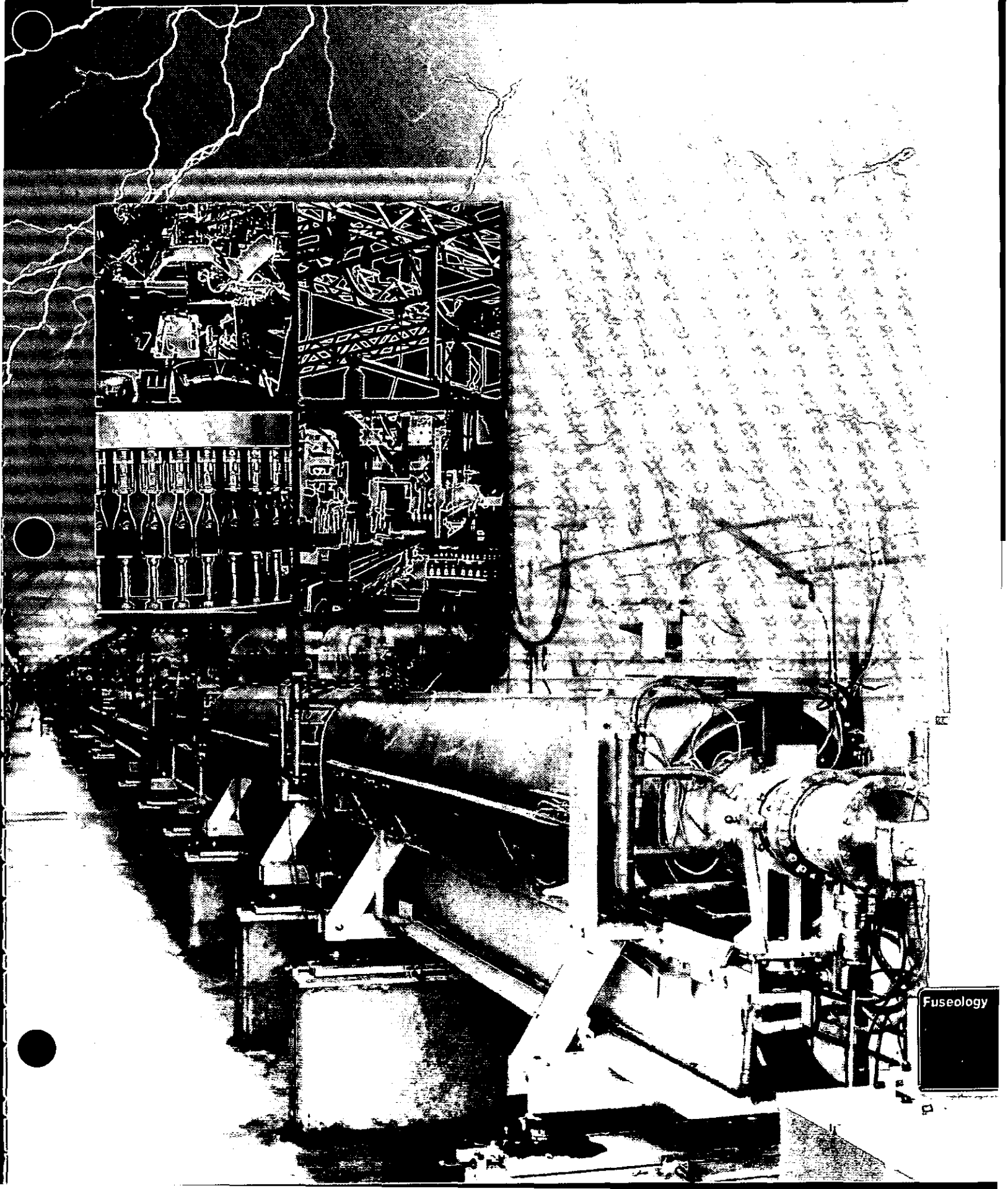
MULTI-POLE ASSEMBLY KIT

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

Inter-national Products

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 (l-800-832-3873).

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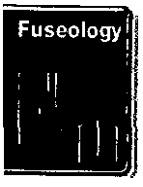


Definition of Terms Frequently Used When Selecting Overcurrent Protection

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't:

See Ampere-Squared-Seconds (I^2t).

Arcing-fault:

A short circuit that arcs at the point of fault. The arc impedance (resistance) tends to reduce the short-circuit current. Arcing faults may turn into bolted faults by welding of the faulted components. Arcing faults may be phase-to phase or phase-to-ground.

Arcing Time (See Figure 1):

The time between the melting of a fuse link, or parting of circuit breaker contacts, until the overcurrent is interrupted.

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.

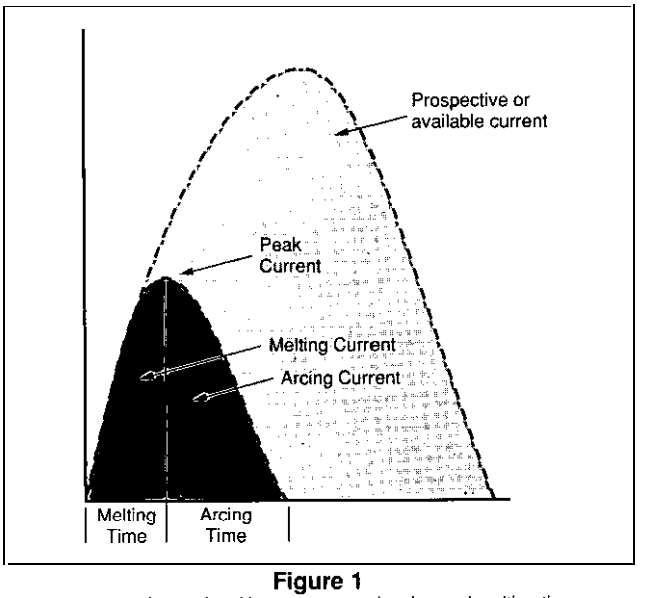


Figure 1
Showing arcing and melting currents and arcing and melting times.

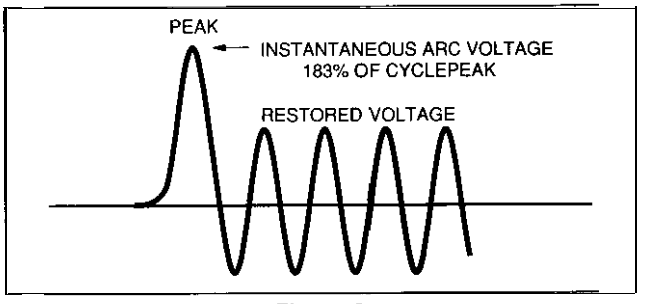


Figure 2

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.

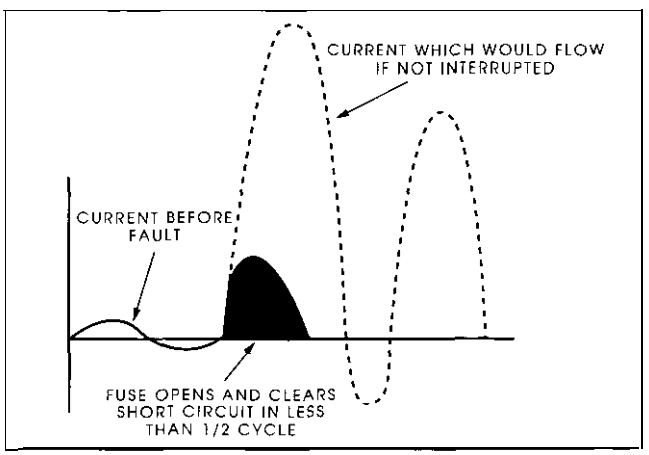


Figure 3

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 70.1993, National Electrical Code", Copyright 1992, National Fire Protection Association, Quincy, MA 02269.

Sections of the 1993 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 an? cautioned that not all authorities have adopted the 1993 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 currant is within its current limiting range.

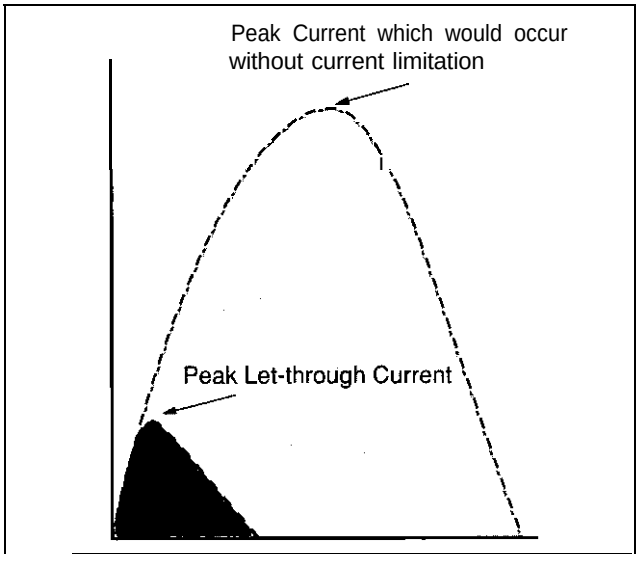


Figure 4

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 0.65 power factor (65%). 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):

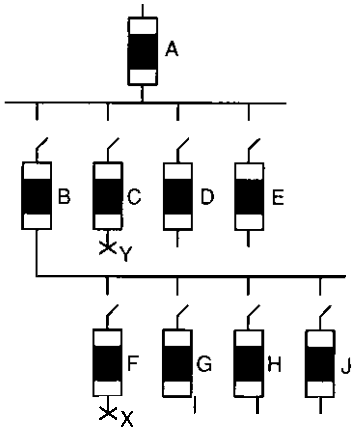
A renewable fuse's current-carrying part that is replaced lo restore the fuse lo a functional condition after the link opens due lo an overcurrent condition.

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.



In a selective system:
For a fault at "X" only fuse "F" will open.
For a fault at "Y" only fuse "C" will open.

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.

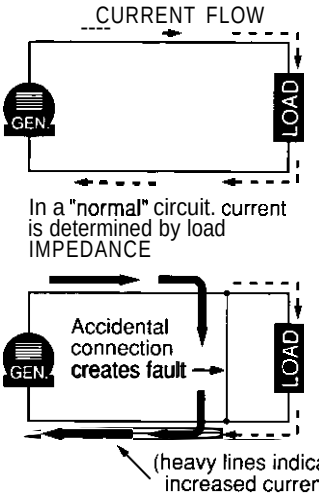


Figure 6

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 Currant' and "Asymmetrical Current" describe an AC wave's symmetry around the zero axis. The current is symmetrical when the peak currants 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.

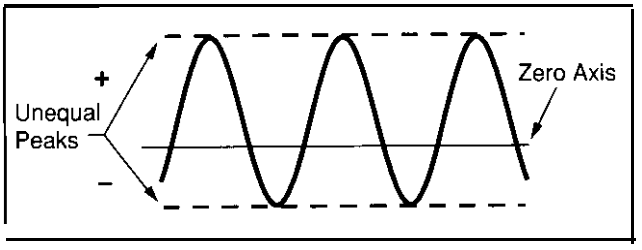


Figure 7
Asymmetrical Current

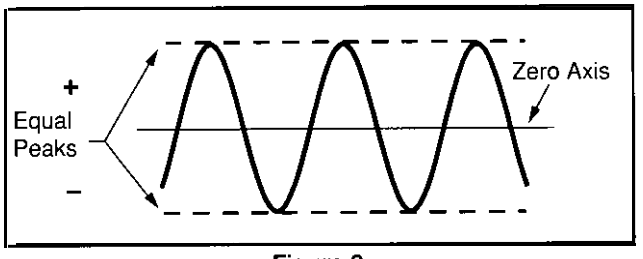


Figure 8
Symmetrical Current

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 (160 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.

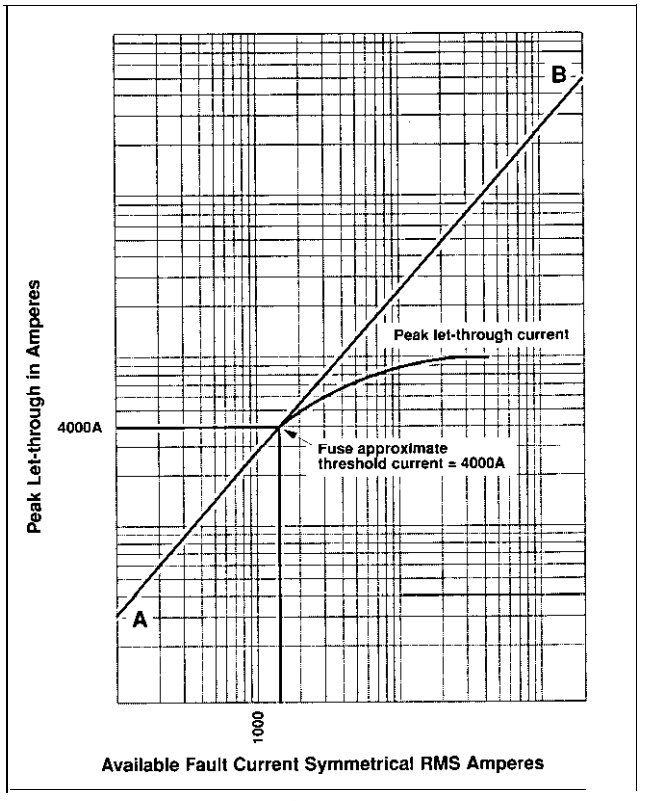


Figure 9

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.

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 (I-800-832-3873). Definitions of terms used in this section are located in the preceding section.

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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.

Fuseology

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 (480110 = 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, 4801277 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 11 O-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

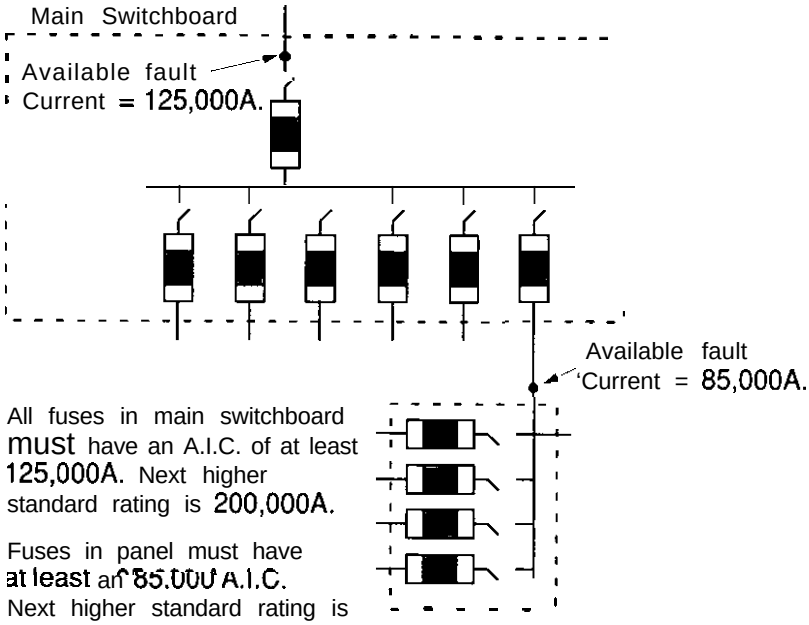

Figure 10

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: '3OOkA (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.

Fuseology

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® IDSR 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 (112 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 LLNRWLLSRK 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

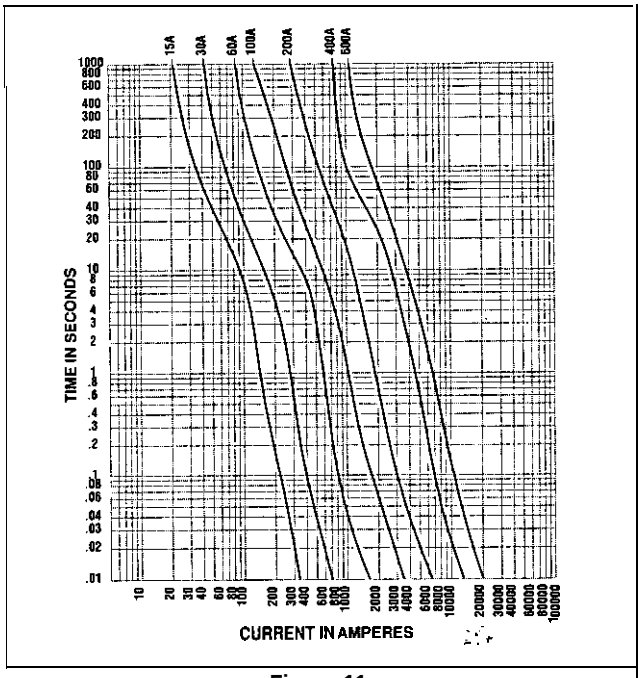

Figure 11

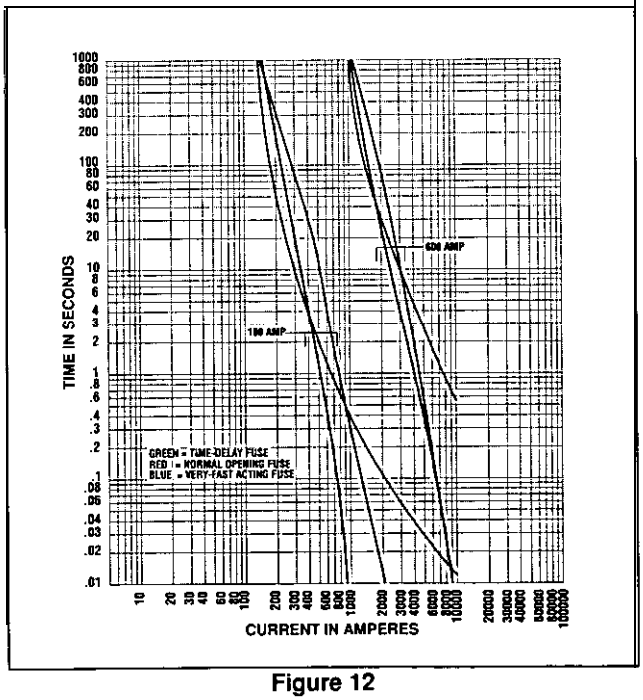

Figure 12

POWR-GARD® dual-element, time-delay, LLSRK series RK1, fuses; Littelfuse NLS series fuses and Linelfuse 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 sees.	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.	20.01 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 11100 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.

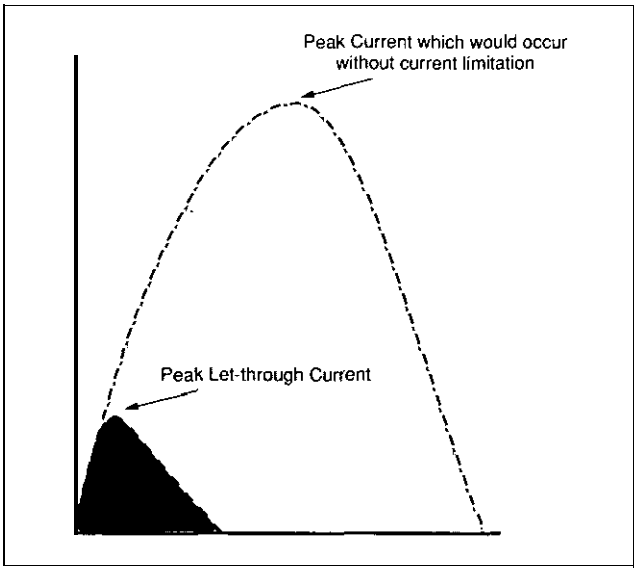

Figure 13
current limiting effect of fuses

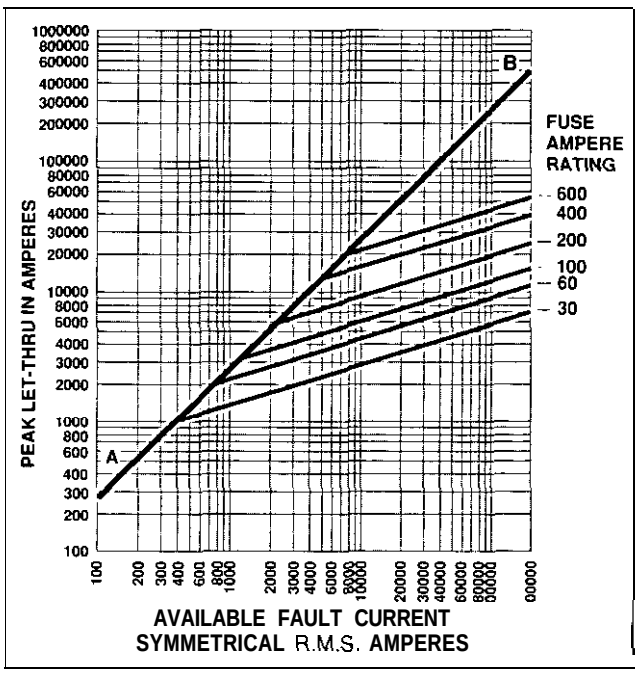

Figure 14
Peak Let-through Charts

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 16,000 amps.

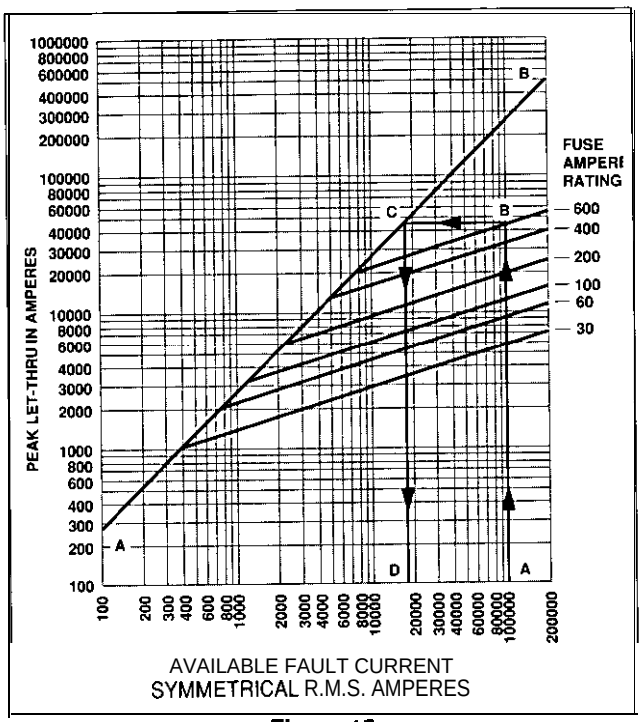

Figure 15

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. The last paragraph of National Electrical Code (NEC) Section 240-83(c) states:

> "If 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, this additional series combination interrupting rating shall be marked on the end use equipment, such as switchboards and panelboards."

NEC Section 11 0-22 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 'Caution Series Rated System _____ A Available. Identified Replacement Component Required']

UL Listed fuse-to-&it 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), and request the Technical Bulletin on "Protecting Molded Case Breakers with Current-limiting Fuses."

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 every-thing, 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 RKI fuses, POWR-PRO" IDSR 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. IDSR 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" LLNRWLLSRK 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.

Fuses for Supplementary Overcurrent Protection

Standards: UL Standard 248 (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, 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 (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: WOO, TOO, TLO
Type S: SOO, SLO
Type S Adapters: SAO

CLASS H

Standards: UL Standard 248 (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)

lime 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

able 4

NEMA Code Leter	Locked Rotor KVA Per Hrspwr.	Maximum Locked Single Phase 115v	Single Phase 230v	or Amps for NEMA Code Letter Motors Three Phase 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	6.7	4.5
E	4.99	43.4	21.7	14.4	12.5	8.3	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	17.6	8.9	7.1
J		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	66.9	43.5	28.9	25.1	12.8	10.0
M	11.19	97.4	48.7	32.3	28.1	14.1	11.2
N	12.49	108.7	64.3	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	46.2	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 60% 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 60% 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 ZOO-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.

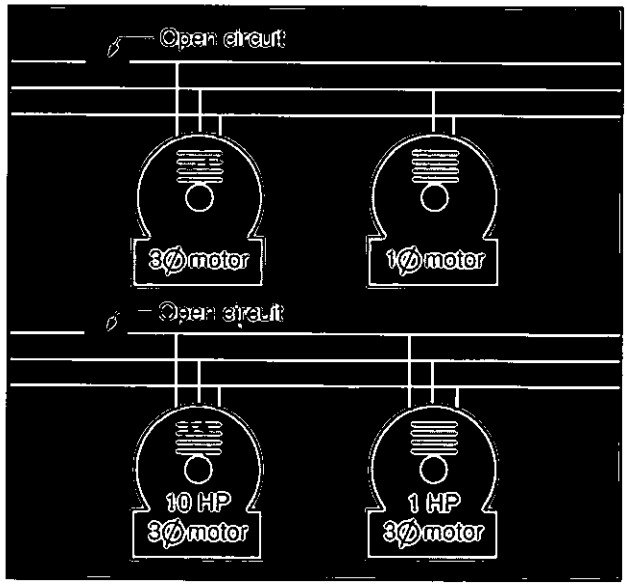

Figure 18

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 2 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 S ed

Number of Poles	Synchronous Speed (RPM)	Typical Full Load Speed range (RPM)
2	3600	3450 – 3500
4	1800	1710 – 1760
8	900	655 – 880
12	600	520-610

Motor Running Current:

Full Load Amperes (FLA or F.L.A.): A motor's rated full load amps (full toad 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-toad 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 toad 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** 3 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.

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 430-152** 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 132 – 134 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.

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,

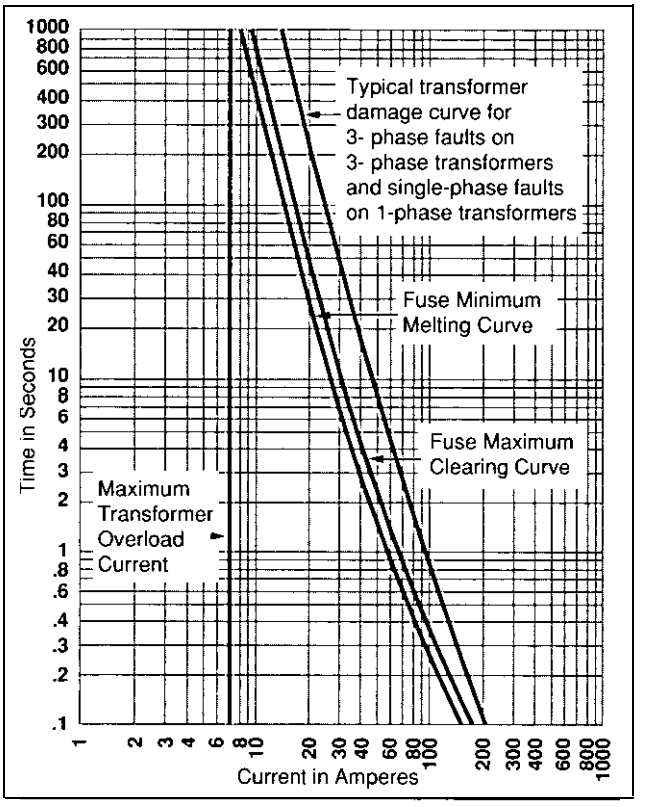

Figure 22

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.

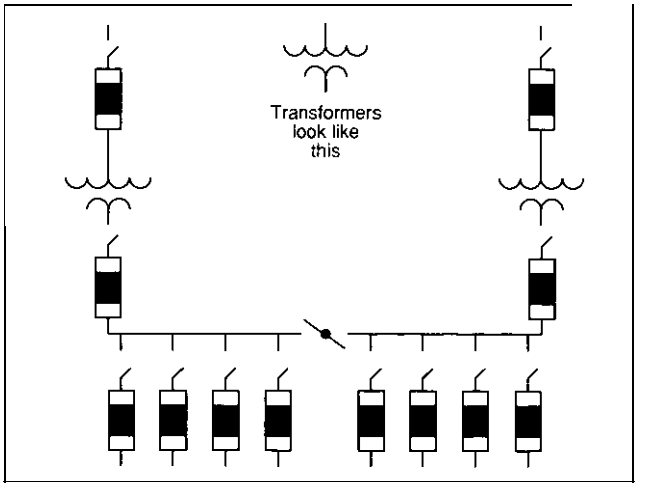

Figure 23

NEC Table 450-3(a)(1).
Transformers over 600 Volts

Transformer Rated Impedance	Maximum Setting or Rating for Overcurrent Device				
	Primary		Secondary		
	Over 600 Volts		Over 600 Volts		600 Volts or Below
	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 sening 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

Transformer Rated Impedance	Maximum Rating or Setting for Overcurrent Device				
	Primary		Secondary		
	Over 600 Volts		Over 600 Volts		600 Volts or Below
	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 roost 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.

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	- -	2.8	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		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 430-152 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.

Condensed Cross Reference

Power/Electronic Fuses

Littelfuse
POWR-GARD™ Products

This cross reference covers most popular fuses for which there is a similar Littelfuse standard item. Furnished for your convenience, it is meant to serve as a guide only for product selection. We suggest you check all applicable specifications before making substitutions. For special applications, consult the factory.

For more complete information, and for fuse block and medium voltage fuse cross referencing, send for Cross Reference Booklet EC501 or call MOO-TEC-FUSE (i-800-832-3873).

COMPETITION	LITTELFUSE	COMPETITION	LITTELFUSE	COMPETITION	LITTELFUSE	COMPETITION	LITTELFUSE
10KOTN	NLN	CLL	KLLU or KLPC	JHC	JTD_ID	NCLR	KLNR
10KOTS	NLS	CLU	KLLU or KLPC	JJN	JLLN	NON	NLN
50KOTN	NLN	CM	BLF	JJS	JLLS	NOS	NLS
50KOTS	NLS	CMF	BLN	JKS	JLS	NRN	NLN
A	251	CNM	FLM	KAA	L15S	NRN (15-60A)	NLKP
A013F	L15S	CNQ	FLQ	KAB	L25S	NRS	NLS
A015F	L15S	CRN-R	FLNR_ID (note 4)	KAC	KLC	OT	NLN
A015R	L15S	CRS-R	FLSR_ID	KBH	L50S	OTM	BLF or BLN
A025F	L25S	CSF13X	L15S	KLM	KLKD	OTN	NLN
A050F	L50S	CSF25X	L25S (AC only)	KLMR	CCMR	OTS	NLS
A060F	L60S	CSF50P	L50S	KLU	KLLU or KLPC	REN	RLN
A060URL	KLK	CSF60C	KLC (AC only)	KN	KLNR	RES	RLS
A070F	L70S	CSF60X	L60S (AC only)	KON	NLN	RF	RLN
A13X	L15S	CSF70P	L70S	KOS	NLS	RFA	L15S
A25X	L25S (AC only)	CTN-R	KLNR	KRPC (SP)	KLPC	RFC	KLC
A2D-R	LLNRK	CTS-R	KLSR	KRPC-L	KLPC	RFL (750V)	L70S (700V)
A2K-R	KLNR	EBS	BLS	KS	KLSR	RFN (Gould)	RLN
A3T	JLLN	ECNR	FLNR_ID (note 4)	KTK	KLK	RFS (Gould)	RLS
A4BQ	KLPC	ECSR	FLSR_ID	KTKR	KLKR	RFV	L50S
A4BT	KLLU or KLPC	ELN	LKN	KTNR	KLNR	RHN	KLNR
A4BY	KLPC or KLLU	ELS	LKS	KTSR	KLSR	RHS	KLSR
A4J	JLS	ERN	RLN	KTU	KLPC	RLN (Gould)	LKN
A50P (type 1 & 4)	L50S	ERS	RLS	L	KLLU or KLPC	RLS (Gould)	LKS
A60X	L60S	FNA	FLA	LCL	KLPC or KLLU	S	SOO
A6D-R	LLSRK_ID	FNB	235	LCU	KLPC or KLLU	SA	SAO
A6K-R	KLSR	FNM	FLM	LENRK	LLNRK	SC	SLC
A6T	JLLS	FNQ	FLQ	LESRK	LLSRK_ID	SCLR	KLSR
A70P	L70S	FNQ-R	KLDR	LKN	LKN	SEC	SLC
ACK	CCK	FRN-R	FLNR_ID (note 4)	LKS	LKS	SF13X	L15S
AG	SLC	FRS-R	FLSR_ID	LKU	KLLU	SF25X	L25S
AGA	301	FWA (note 3)	L15S	LONRK	LLNRK	SF50P	L50S
AGC	312	FWH (note 3)	L50S	LOSRK	LLSRK_ID	SF60X	L60S
AGU (1-30A)	BLN	FWP (note 2)	L70S	LPCC	CCMR	SF70P	L70S
AGW	303 (note 1)	FWX (note 2)	L25S	LPJ (SP)	JTD_ID	SFE	307 (SFE)
AGX (1/500-1/10A)	361	GDA	216	LPNRK (SP)	LLNRK	SL	SLO
AGX (1/8-30A)	362	GDB	217	LPSRK (SP)	LLSRK_ID	T	TOO
AJT	JTD_ID	GDC	218	MCL	KLK	TJN	JLLN
ANL	CNL	GDL	313	MDA	326	TJS	JLLS
ANN	CNN	GEB	LEB	MDL	313	TL	TLO
ATC	ATO (257)	GEBN	LET	MDQ	313	TR	FLNR_ID (note
AT-DE	FLNR_ID (note 4)	GFA	251	MDV	315	TRM	FLM
ATDR	CCMR	GFN	FLA	MDX	313	TRN-R	FLNR_ID (note
ATM	KLK	GGC	312	MEN	FLM	TRS	FLSR_ID
ATMR	KLKR	GGM	235	MEQ	FLQ	TRS-R	FLSR_ID
ATQ	FLQ	GGX (1/500-1/10A)	361	MID	FLA	W	WOO
ATQR	KLDR	GGX (1/8-30A)	362	MOF	BLN	XL25X	L25S
AX	401	GLR	LGR	MOL	BLF	XL50F	L50S (note 2)
AXRAD	252	GMT	401	MTH	312	XL70F	L70S (note 2)
BAF	BLF	HCLR	KLKR				
BAN	BLN	HCTR	KLDR				
BBS	BLS	HEB	LEB				
CGL (2-100A)	2CO	HET	LET				
CGL (125-600A)	2CC	HLR	LHR				
CJ	JLS	J	JLS				
CJS	JLS	JDL	JTD_ID				
CLF	KLPC or KLLU	JFL	JLS				

1) Use #30707.5 to replace AGW 7.5 Amp
2) Check specific mounting dimensions before substituting.
3) Check fuse characteristics and mounting dimensions for specific application before substituting.
4) For 1/10 - 30 amperes, order non-indicating FLNR series fuses.

Remember a fuse may be used in circuits where the fuse's voltage rating is equal to or greater than the circuit voltage, unless otherwise stated on the fuse. For example, the FLSR_ID indicating fuse has a voltage rating of 75-600 volts. This fuse can be used on 600 volts, 480 volts, 250 volts, 125 volts, or 75 volts. Never use a fuse in a circuit having higher rated voltage than the fuse.

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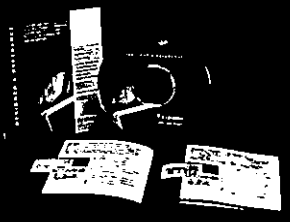

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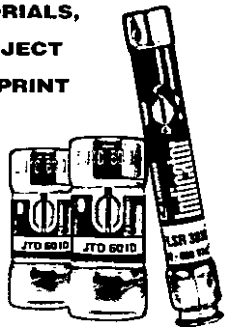

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