

Get Your Fuses From Us!

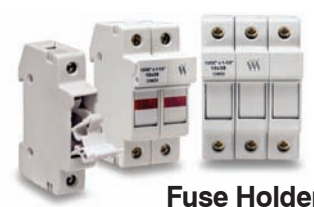
AutomationDirect has teamed up with Edison Fuse, a subsidiary of Cooper Industries, the worldwide leader in circuit protection, to offer the Edison line of fuses and fuse holders. Cooper Industries is a \$4.1B corporation with seven electrical products divisions, including two fuse brands. The Edison Fuse products are industry-standard fuses that are designed using the highest quality materials and manufacturing methods. All Edison fuses can be directly cross referenced and used as replacements for other name-brand fuses such as Littelfuse, Ferraz, Siemens, and many more. Our fuse manufacturer cross reference list is at the end of this section.

How can AutomationDirect sell at these prices?

We have removed much of the overhead cost incurred by conventional local distributors, and provide products directly from the manufacturer to our customers. As with all AutomationDirect products, we can offer fuses at low prices because we buy in high volume and operate with super internal efficiency. We constantly strive to refine our teams and fine-tune our procedures, ultimately resulting in savings to you, our customers.



Fuses



Fuse Holders



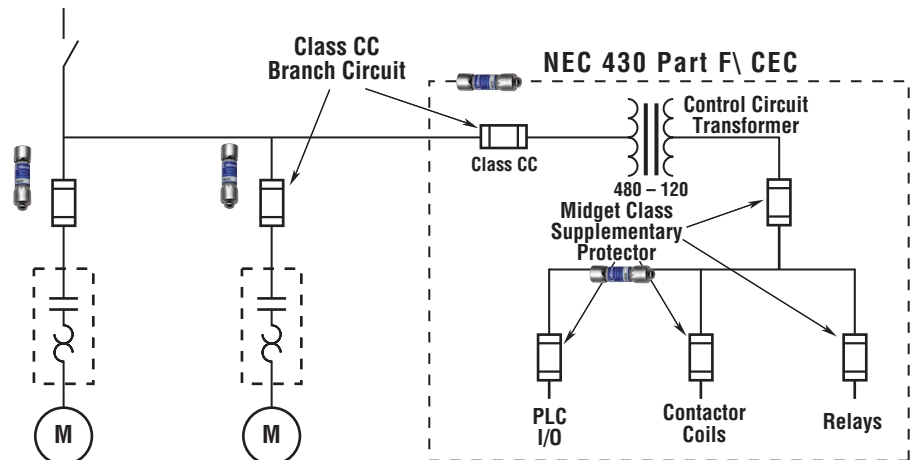
Fuse Blocks

Where to Use a Fuse

Fuses can be used for a variety of over-current and overload applications. They can be used to protect transformers, motors, DC power supplies, lighting circuits, contactors, relays and other industrial and commercial electrical equipment and conductors.

AutomationDirect is pleased to carry the most popular Current Limiting and General Purpose fuses for industrial control applications. The current limiting fuses, frequently used in applications for motor branch circuit protection, are available in both time-delay and fast-acting models. Because of their superior current limiting performance, these current limiting products are sometimes regarded as an upgrade to the general purpose fuses. In addition, the current limiting line is recognized for NEC branch circuit protection and Type 2 coordinated applications for IEC or NEMA starters/contactors. Where adherence to extensive

current limiting codes is not required, the Class M general purpose midget fuses are a great low-cost solution for both time-delay and fast-acting protection. And, we've not forgotten the accessories you need: several fuse holder and fuse blocks are available in a variety of 1, 2, and 3-pole form factors.



10 Great Reasons to Use a Fuse...

Why use a fuse?

Fuses offer a safe and economical solution for overcurrent protection of both conductors and components. Fuses can help make your control systems meet the new UL and NEC codes.

1 Safety

Overcurrent protective devices that have tripped are often reset without first investigating the cause of the fault. Electromechanical devices may not have the reserve capacity to open safely when a second or third fault occurs. When a fuse opens it is replaced with a new fuse, so the protection level is not degraded by previous faults. Our current limiting fuses meet the new UL and NEC codes.

2 Cost effective

Fuses typically are the most cost effective means of providing overcurrent protection. This is especially true where high fault currents exist or where small components such as Control Transformers (CPTs) or DC power supplies need protection.

3 High interrupting rating

With most low voltage current limiting fuses (≤ 600 volts) having a 200,000 amp interrupting rating, you are not paying a high premium for a high interrupting capacity. Our current limiting fuses meet the new UL and NEC codes.

4 Reliability

Fuses have no moving parts to wear out or become contaminated by dust or oil.

5 North American standards

Tri-National Standards specify fuse performance and maximum allowable fuse I^p and $I^2 t$ let-thru values.

6 Component protection

The high current limiting action of a fuse minimizes or eliminates component damage.

7 Extended protection

Devices with low interrupting ratings are often rendered obsolete by service upgrades or increases in available fault current. New NEC and UL standards are causing the need for potentially expensive system upgrades to non-fused systems.

8 Selectivity

Fuses can be easily coordinated to provide selectivity under both overload and short circuit conditions.

9 Minimal maintenance

Fuses do not require periodic recalibration as do some electromechanical overcurrent protective devices.

10 Long life

As a fuse ages, the speed of response will not slow down or change. A fuse's ability to provide protection will not be adversely affected by the passing of time.

...plus the Best Reason of All - Our Price!

AutomationDirect has secured incredible pricing for all our fuses, fuse holders and fuse blocks, and can pass those savings on to you. Many items are priced well below industry list prices, making fuse protection a beneficial and affordable option for almost every electrical device.

CHECK OUT OUR PRICES

Fuses	AutomationDirect Price/Part Number	VS.	Littlefuse Price/Part Number
Midget Class M fast-acting 5A, 600 VAC	\$3.40 MCL5		\$11.47 KLK005
Class CC current limiting time-delay 10A, 600 VAC	\$4.50 HCTR10		\$12.05 KLDR010
Midget Class M time-delay 2A, 250 VAC	\$1.47 MEN2		\$4.25 FLM002
Class CC current limiting time-delay 20A, 600 VAC	\$4.35 EDCC20		\$14.35 CCMR20

(Sold in packages, prices shown are per piece) All fuses are 13/32" x 1-1/2".

All prices are U.S. list prices. AutomationDirect prices are April 2006 prices. Prices and specifications may vary by dealer. Littlefuse prices are from <http://www.newark.com> 3/7/06. All product names, trademarks, and registered trademarks not owned by AutomationDirect are the property of their respective manufacturers. AutomationDirect disclaims any proprietary interest in the marks and names of others. Prices subject to change without notice.

Fuse Construction and Operation

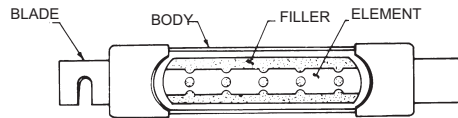
The typical fuse consists of an element which is surrounded by a filler and enclosed by the fuse body. The element is welded or soldered to the fuse contacts (blades or ferrules).

The element is a calibrated conductor. Its configuration, mass and the materials employed are selected to achieve the desired electrical and thermal characteristics. The element provides the current path through the fuse. It generates heat at a rate dependent on its resistance and the load current.

The heat generated by the element is absorbed by the filler and passed through the fuse body to the surrounding air. The filler material, such as quartz sand, provides effective heat transfer and allows for the small element cross-section typical in modern fuses. The effective heat transfer allows the fuse to carry harmless overloads. The small element cross section melts

quickly under short-circuit conditions. The filler also aids fuse performance by absorbing arc energy when the fuse clears an overload or short circuit.

When a sustained overload occurs, the element will generate heat at a faster rate than the heat can be passed to the filler. If



the overload persists, the element will reach its melting point and open. Increasing the applied current will heat the element faster and cause the fuse to open sooner. Thus, fuses have an inverse time current characteristic: that is, the greater the overcurrent, the less time required for the fuse to open the circuit.

This characteristic is desirable because it parallels the characteristics of conductors, motors, transformers, and other electrical apparatus. These components can carry low-level overloads for relatively long periods without damage. However, under high-current conditions, damage can occur quickly. Because of its inverse time current characteristic, a properly applied fuse can provide effective protection over a broad current range, from low-level overloads to high-level short circuits.

How to Talk Fuses

Commonly used terms

I^2t (Ampere Squared seconds): A measure of the thermal energy associated with current flow. I^2t is equal to $(I_{RMS})^2 \times t$, where t is the duration of current flow in seconds.

Clearing I^2t : The total I^2t passed by a fuse as the fuse clears a fault, with t being equal to the time elapsed from the initiation of the fault to the instant the fault has been cleared.

Melting I^2t : The minimum I^2t required to melt the fuse element.

Ampere Rating: The continuous current carrying capability of a fuse under defined laboratory conditions. The ampere rating is marked on each fuse.

Available Fault Current: The maximum short-circuit current that can flow in an unprotected circuit

Coordination: The use of overcurrent protective devices that will isolate only that portion of an electrical system that has been overloaded or faulted.

Current-Limiting Range: The available fault currents a fuse will clear in less than $\frac{1}{2}$ cycle, thus limiting the actual magnitude of current flow.

Element: A calibrated conductor inside a fuse that melts when subjected to excessive current. The element is enclosed by the fuse body and may be surrounded by an arc-quenching medium such as silica sand. The element is sometimes referred to as a link.

Fast-Acting Fuse: This is a fuse with no intentional time-delay designed into the overload range. It is sometimes referred to as a "single-element fuse" or "non-delay fuse."

Fault Current: Short-circuit current that flows partially or entirely outside the intended normal load current path of a circuit component. Values may be from hundreds to many thousands of amperes.

Ferrule: The cylindrical brass, bronze or copper mounting terminals of fuses with amp ratings up to 60 amperes. The cylindrical terminals at each end of a fuse fit into fuse clips.

Current-limiting Fuse: A fuse that meets the following three conditions:

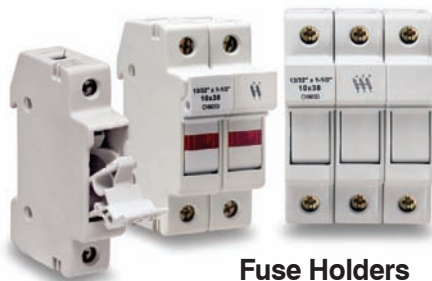
1. Interrupts all available overcurrents within its interrupt rating.
2. Within its current limiting range, limits the clearing time at rated voltage to an interval equal to, or less than, the first major or symmetrical current loop duration.
3. Limits peak let-through current to a value less than the available peak current.

Our Most Popular Fuses

Below is a table of our most popular fuses, fuse blocks, and fuse holders. These are the fuse products that our customers select most often.



Fuse



Fuse Holders

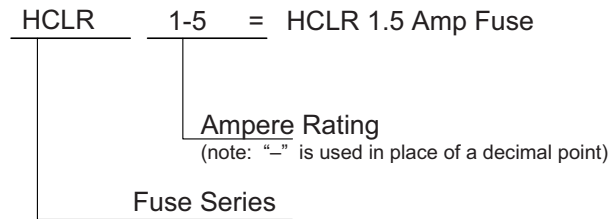


Fuse Block

Part Number	Description	Applications
MCL5	MCL Midget Class fast-acting fuse, 5 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	<i>Control circuits, lighting and electronic equipment that requires high interrupt ratings and fast-acting response</i>
MCL10	MCL Midget Class fast-acting fuse, 10 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
MCL15	MCL Midget Class fast-acting fuse, 15 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
MCL30	MCL Midget Class fast-acting fuse, 30 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
HCTR-5	HCTR Class CC current limiting time-delay fuse, 0.5 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	<i>Primary protection for control power transformers</i>
HCTR1	HCTR Class CC current limiting time-delay fuse, 1 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
HCTR2	HCTR Class CC current limiting time-delay fuse, 2 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
HCTR5	HCTR Class CC current limiting time-delay fuse, 5 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
HCTR10	HCTR Class CC current limiting time-delay fuse, 10 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	<i>Supplemental protection for small motors, transformers, solenoids and other high-inrush electronic circuits that require time-delay protection.</i>
MEN1	MEN Midget Class time-delay fuse, 1 A, 250 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
MEN5	MEN Midget Class time-delay fuse, 5 A, 250 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
MEN10	MEN Midget Class time-delay fuse, 10 A, 250 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
MEN15	MEN Midget Class time-delay fuse, 15 A, 250 VAC, 13/32" x 1-1/2", 10-fuses per pack.	<i>Specifically designed for motor protection, provides excellent current limiting capabilities. Recognized for NEC branch circuit protection and Type 2 coordinated applications for IEC or NEMA starters/contactors.</i>
EDCC10	EDCC Class CC current limiting time-delay fuse, 10 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
EDCC15	EDCC Class CC current limiting time-delay fuse, 15 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
EDCC20	EDCC Class CC current limiting time-delay fuse, 20 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
HCLR10	HCLR Class CC current limiting fast-acting fuse, 10 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	<i>Best applied for resistive heating and lighting loads. Fast-acting design responds quickly to both overload and short-circuit protection.</i>
HCLR15	HCLR Class CC current limiting fast-acting fuse, 15 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
HCLR20	HCLR Class CC current limiting fast-acting fuse, 20 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
HCLR30	HCLR Class CC current limiting fast-acting fuse, 30 A, 600 VAC, 13/32" x 1-1/2", 10-fuses per pack.	
CHCC1DI	Fuse holder, with indicator, for CC Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, one pole, DIN rail mount, 12-holders per pack.	
CHCC1D	Fuse holder, non-indicating, for CC Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, one pole, DIN rail mount, 12-holders per pack.	
CHCC3DI	Fuse holder, with indicator, for CC Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, three pole, DIN rail mount, 4-holders per pack.	
CHM1DI	Fuse holder, with indicator, for Midget Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, one pole, DIN rail mount, 12-holders per pack.	
CHM1D	Fuse holder, non-indicating, for Midget Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, one pole, DIN rail mount, 12-holders per pack.	
CHM2D	Fuse holder, non-indicating, for Midget Class 13/32" x 1-1/2" fuses, 30A, 600VAC, 18-8 AWG, two pole, DIN rail mount, 6-holders per pack.	
BC6031PQ	Fuse block, for CC Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, 1 pole, panel mount, pressure plate with quick connect terminals, 10-blocks per pack.	
BC6032PQ	Fuse block, for CC Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, 2 pole, panel mount, pressure plate with quick connect terminals, 8-blocks per pack.	
BM6032PQ	Fuse block, for Midget Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, 2 pole, panel mount, pressure plate with quick connect terminals, 8-blocks per pack.	
BM6033PQ	Fuse block, for Midget Class 13/32" x 1-1/2" fuses, 30 A, 600 VAC, 18-8 AWG, 3 pole, panel mount, pressure plate with quick connect terminals, 6-blocks per pack.	

Edison Fuses – Selection Guide

Part Numbering System



Line Overview

The Edison family of fuses, fuse blocks and fuse holders is divided into two classes:

1. Current Limiting: Class CC, Class J, Class RK
2. General Purpose: Class M Midget and Small Dimension

The fuse selection guide below is a general summary of the specifications included for each fuse type. This selection guide does not include the many variables that can exist for specific situations such as local codes, unusual temperature, or other operating conditions. When selecting fuses, be sure to comply with any applicable PUBLIC SAFETY standards that apply to Overcurrent Protection Devices (OPD).

Edison Fuses Selection Guide and General Specifications								
Description	Current Limiting Class J		Current Limiting Class RK5		Current Limiting Class RK1		Current Limiting Class CC	
Fuse Type	Time-Delay		Time-Delay				Fast-Acting	Time-Delay
Part Number	JDL	ECNR	ECSR	LENRK	LESRK	HCLR	HCTR	EDCC
Voltage Rating	600 VAC	250 VAC	600 VAC	250 VAC	600 VAC	600 VAC	600 VAC	600 VAC
Ampere Rating	1 to 200	1 to 200	3 to 200	10 to 100	5 to 200	0.5 to 30	0.25 to 30	0.5 to 30
Interrupting Rating	200,000 RMS Symmetrical Amps							
Current Limiting	Class J		Class RK5		Class RK1		Class CC	
Agency Approvals	UL Listed, Class J, Guide JDDZ, File E162363 CSA Certified HRCI-J per C22.2, No. 248.8		UL Listed, Class RK, Guide JDDZ, File E162363 CSA Certified HRCI-R per C22.2, No. 248.12			UL Listed to 248.4, Class CC, Guide JDDZ, File E162363, CSA certified HRCI-MISC per C22.2 No. 248.4		
Dimensions	See product specification pages.			See product specification pages.			ferrule (in): 13/32, length (in): 1-1/2	

Edison Fuses Selection Guide and General Specifications													
Description	General Purpose - Midget Class				General Purpose - Small Dimension Electronic								
Fuse Type	Fast-Acting		Time-Delay		Fast-Acting Ceramic	Fast-Acting Glass		Medium Time-Delay Glass	Time-Delay Ceramic	Time-Delay Glass	Fast-Acting Glass	Time-Delay Glass	
Part Number	MCL	MOL	MEQ	MEN	ABC	AGC	GMA	GMC	MDA	MDL	S500	S506	
Voltage Rating	600 VAC	250 VAC	500 VAC	250 VAC	250 VAC (0.5 to 20A) 125VAC (25 to 30A) 125VDC	250VAC (0.1 to 10A) 32VAC (15 to 30A)	250VAC (0.063 - 3A) 125VAC (4 - 15A)	250VAC (0.5 - 3A) 125VAC (4 - 10A)	250VAC 125VDC (20A)	250VAC (0.0625 to 8A) 32VAC (10 to 20A)	250VAC	250VAC	
Ampere Rating	0.5 to 50	0.5 to 30	0.25 to 30	0.5 to 30	0.5 to 30	0.10 to 30	0.063 to 15	0.5 to 10	0.5 to 20	0.0625 to 20	0.5 to 10	0.25 to 6.3	
Interrupting Rating	100,000 RMS Amps	10,000 RMS Amps			See specifications table on product pages								
Current Limiting	N/A				N/A								
Agency Approvals	UL Listed to 248.14, File E162443, CSA Cert. C22.2 Part 59.2, LR 700489				UL Listed standard 248-14 UL Listed Guide and File nos. (ABC 0.25-20 A): (AGC 1/100-10 A) JDYX and E19180 UL Recognition Guide and File nos. (ABC 20-30A): (AGC 11-30) JDYX2 and E19180 CSA Certification Record No: 053787 C 000 and Class No: 1422 01 and 1422 30			Designed to UL/CSA 248-14 UL Listed, Guide JDYX, File E19180 63mA-6A UL Recognition, Guide JDYX2, File E19180, 7A-15A CSA Certified, File 053787 C 000, 63mA-6A Class 1422-01,		UL Listed standard 248-14 UL Listed Card: MDA 2/10-20A, MDL 1/16-8A (Guide JDYX, File E19180) UL Recognized Card: MDA 25-30A MDL 9-30A (Guide JDYX2, File E19180) CSA Certification Card: MDA 2/10-15A (Class No. 1422-01)		UL Recognized Guide JDYX2, File E19180 Semko Approval VDE Approval BSI Approval IMQ Approval RoHS compliant	
Dimensions	ferrule (in): 13/32 length (in): 1-1/2				1/4" x 1-1/4", (6.3mm x 32mm)			0.197" x 0.788" (5mm x 20mm)		1/4" x 1-1/4", (6.3mm x 32mm)		0.197" x 0.788" (5mm x 20mm)	