Current limiting and expulsion fuses
2.5–38 kV

Medium voltage power fuses

Powering Business Worldwide

Choices. Experience. Value.

Eaton is the world leader in the design and manufacturing of medium voltage power fuses.

For over 70 years, customers have depended on Eaton as the industry's only full line supplier of both current limiting and expulsion fuses for protection of medium voltage systems. From 2.5 to 38 kV, the Eaton power fuse line meets the needs of every medium voltage application.

More than 2000 styles

Medium voltage power fuses are available to cover all voltages, currents and mounting ratings. Complete overviews of Eaton ratings and styles are shown on the application and selection charts on pages 5 and 7.

Interchangeability

Both replaceable current limiting fuses and expulsion fuses are completely interchangeable with those made by most other manufacturers. Eaton refillable expulsion fuses meet or exceed other suppliers' ratings.

Technology

The double helix construction, an Eaton advancement, extends the range of ratings available for E-rated current limiting fuses. Eaton pioneered the use of boric acid as the interrupting medium in expulsion fuses.

Quality you can trust from Eaton.

Application support

Specializing in medium voltage switchgear components and assemblies, Eaton has focused its knowledge and experience throughout the organization. From design engineers to application engineers, Eaton strives to continually provide the most comprehensive, in-depth customer support.

Certification

All Eaton medium voltage power fuses are thoroughly tested and conform to applicable IEEE®, ANSI® and NEMA® standards. R-rated fuses are UL® Recognized. E-rated and expulsion fuses are component rated in many UL switchgear.

Know-how

Modern facilities provide comprehensive in-house development and testing capabilities. Computer-aided design and manufacturing reduce product development cycles by speeding up the design process.

Quality and reliability

Each fuse is individually inspected at critical points throughout the manufacturing process and tested prior to shipment. With over 70 years of fuse design experience, Eaton is able to provide serviceability and durability for countless applications worldwide.

Lead times

Many styles and ratings are stocked and can be shipped within 24 hours. Nonstock styles can be manufactured and shipped in 20 days or less.

Manufacturing

All Eaton power fuses are manufactured in a modern ISO®-9002 facility that uses the most current manufacturing techniques and equipment.

A full line of current limiting fuses

Eaton current limiting fuses provide energy limiting fault protection for both indoor and outdoor distribution systems.

Available types

Eaton offers two types of current limiting fuses—general-purpose and backup. General-purpose fuses are designed to interrupt low fault currents that cause the element to melt in one hour or less. Backup fuses are designed to be applied in series with another interrupting device capable of interrupting currents below the minimum interrupting current of the fuse. In addition, low voltage limiters are available that are used in combination with the DSL series breaker.

Interruption

Current limiting fuses provide effective limitation of fault magnitude and duration with the added benefit of a quiet and safe operation. At high fault currents, the fuse element instantly melts and loses its energy to the surrounding sand. The sand melts and forms fulgurite, a glass-like substance. The arc voltage increases to approximately twice the system voltage, forcing the current to zero. Interruption is accomplished without noise or discharge. During a low fault, the current melts a solder drop located on the silver element. The element burns back until there is sufficient gap to interrupt the current in a process commonly known as the M-effect.

Application

Eaton offers a wide range of interrupting ratings in single-barrel designs with ratings extended to higher currents in double- and quad-barrel designs. E-rated fuses are available in both long (CLE) and short (HLE) clip center designs. R-rated motor starter fuses are available with an integral hookeye for AMPGARD® switchgear or standard clip style mounting. For potential transformer protection, CLPT fuses are offered in 0.81 and 1.60 inch diameters. CX and CLT fuses are ideally suited for canister applications and are available in a wide variety of ratings. Low voltage limiters are offered in six current classes up to 5000 amperes.

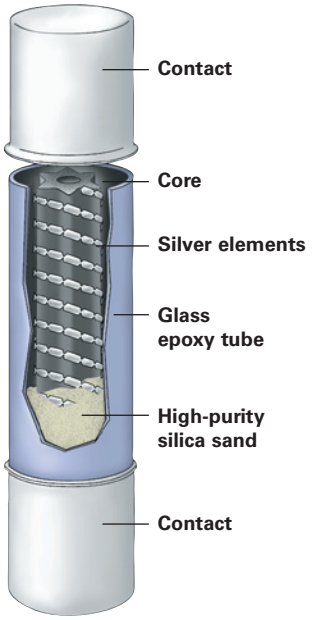
Construction

Precision calibrated elements are designed and manufactured in a variety of materials to provide customers with the most advantageous thermal characteristics. With uniquely designed element constructions for each class, current limiting fuses offer the highest ratings available in the smallest barrel sizes. All components are housed in a fiberglass reinforced resin tube with plated copper contact caps that are magne-formed onto the housing for optimum strength and are filled with high-purity silica sand. Outdoor-style fuses have a protective enamel paint system that covers the fuse tube and a sealing system on the ends of the caps. Blown fuse indication is provided by either a striker pin with triggering force or a pop-up button. A durable label is located on each fuse, which provides ratings and manufacturer information.

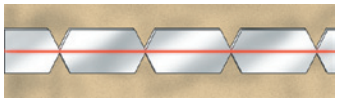
Mountings

Eaton current limiting fuses are available in standard industry mounting sizes. Fuse mountings are available in either disconnect or nondisconnect designs. Mountings include the base, a porcelain or glass polyester insulator and live parts. Live parts, fuse clips and end fittings are also available separately. All Eaton current limiting fuses and mountings are easy to install and operate.

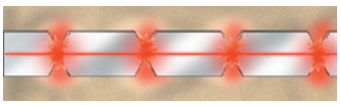
CL fuse construction



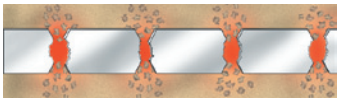
CL fuse operation



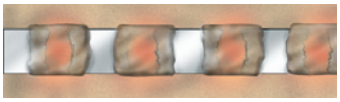
Element melts, forming multiple arcs



Heat melts the sand



Sand absorbs the heat



Arc is extinguished and forced to zero

Current limiting fuse available ratings

Description	Type/ Voltage	Ampere Rating	Interrupting Symmetrical kA Rating	Dimensions in Inches Diameter	Length	Clip Center
• E-rated	**CLE-C**					
• Indoor and outdoor enclosure	2.75 kV	15E–25E	50	2.00	9.50	8.10
• Disconnect and nondisconnect mountings	5.5 kV	15E–25E	50	2.00	12.90	11.50
	8.3 kV	15E–25E	50	2.00	15.50	14.00
• Live parts	15.5 kV	15E–25E	31	2.00	21.50	20.00
	CL-D					
	2.75 kV	10E–450E	50	3.00	10.90	7.00
	5.5 kV	10E–450E	63	3.00	17.90	14.00
	8.3 kV	10E–350E	50	3.00	17.90	14.00
	15.5 kV	10E–300E	63	3.00	23.90	20.00
	CLE-F					
	5.5 kV	600E–1350A	31	4.00	17.90	—
	HLE/AHLE					
	5.5 kV	10E–450A	63	3.00	15.90	12.00
	8.3 kV	10E–350E	50	3.00	15.90	12.00
	15.5 kV	10E–250E	63	3.00	18.90	15.00
• E-rated	**NCLPT**					
• Indoor enclosure	2.475 kV	.25E–5E	63	.81	4.50	4.00
• Disconnect and nondisconnect mountings	5.5 kV	.25E–4E	63	.81	5.60	5.00
	8.3 kV	2E and 4E	50	.81	8.00	7.40
• Live parts	**CLPT**					
	5.5 kV	.5E–10E	80	1.60	9.50	8.20
	8.3 kV	.5E–10E	50	1.60	12.90	11.50
	15.5 kV	.5E–1.5E	80	1.60	13.00	11.50
	15.5 kV	.5E–10E	80	1.60	17.50	16.20
	25.5 kV	.5E–1E	44	1.60	17.50	16.20
	38 kV	.5E	44	1.60	18.60	17.10
• R-rated	**CLS/ACLS**					
• Indoor enclosure	2.75 kV	2R–24R	50	3.00	10.90	7.00
• Disconnect and nondisconnect mountings	5.5 kV	2R–24R	50	3.00	15.90	12.00
	8.3 kV	2R–24R	50	3.00	15.90	12.00
• Live parts	**CLS70**					
	5.1 kV	2R–44R	50	4.00	16.00	—
• C-rated	**CX**					
• Indoor enclosure	5.5 kV	10C–20C	50	1.10	10.00	11.50
• Disconnect and nondisconnect mountings	5.5 kV	21C–75C	50	2.00	10.00	11.50
	8.3 kV	10C–15C	50	1.10	10.00	11.50
	8.3 kV	18C–40C	50	2.00	10.00	11.50
• Live parts	15.5 kV	4C–40C	50	2.00	14.30	13.40
	CXN					
	8.3 kV	60C and 100C	50	3.00	18.80	14.50
	8.3 kV	125C–300C	50	4.00	18.80	14.50
	15.5 kV	45C–60C	50	3.00	18.80	14.50
	15.5 kV	75C–175C	50	4.00	18.80	14.50
• General purpose	**CLT**					
• Canister	2.75 kV	5–150A	25	1.50	9.75	8.20
	5.5 kV	8–60A	25	1.50	9.75	8.20
	8.3 kV	5–45A	25	1.50	9.75	8.20
	15.5 kV	4–30A	25	2.30	9.75	8.20
• Limiters	**DSL**					
• Indoor enclosure	600V	150–800A	200	2.50	5.80	4.75
	600V	12–2 kA	200	3.00	5.80	4.75
	600V	.8–2 kA	200	3.50	5.80	4.75
	600V	2.5 and 3 kA	200	4.50	5.80	4.75
	600V	2.5–4 kA	200	5.00	5.80	4.75
	600V	2.5–5 kA	200	6.20	5.80	4.75

A full line of expulsion fuses

Eaton expulsion fuses provide full-range fault protection for both indoor and outdoor, medium voltage distribution systems. With a wide variety of E and K ratings, Eaton expulsion fuses provide the highest interrupting capabilities in their class. They are available in both standard and time lag.

Available types

Two types of expulsion fuses are available—refillable and replaceable. The refillable RBA fuse is easy to recharge, and it allows the reuse of components by refitting with a new refill, making it ready to reinstall. RBA fuse assemblies and refills are available in three constructions—200, 400 and 800 amperes—to suit a variety of system requirements. The replaceable DBU style fuse is rated 200 amperes, and is removed from its end fittings and discarded after it has operated. RBA fuses provide higher ratings while DBU fuses offer lower installed costs where lower fault currents are encountered. DBU fuses are designed to be interchangeable with other manufacturers' fuses. Refills for some DBA and BA fuses continue to be offered for replacement.

Interruption

Eaton expulsion fuses use the proven performance of boric acid to create the deionizing action needed to interrupt the current. Fault interruption is achieved by the action of an arcing rod and a charged spring, elongating the arc through a boric acid chamber upon release by the fuse element. At high temperatures, boric acid decomposes and produces a blast of water vapor and inert boric anhydride, extinguishing the arc. This enables the fuse to interrupt short circuits within one-half cycle and prevents the arc from restriking after a current zero. After interruption, the gases are expelled from the bottom of the fuse.

Application

RBA and DBU fuses can be used indoors when fitted with a suppressor to moderate the exhaust discharge. Two types of suppressors can be fitted for RBA fuses. Either a discharge filter that limits the exhaust without affecting the interrupting rating or a condenser that fully restricts the exhaust, but decreases the ratings slightly. An indicator RBA fuse is available featuring an internal fluorescent target visible through a transparent holder. The RDB fuse is a weatherproof design, ideally suited for outdoor applications. Enamel paint and sealed contacts protect the fuse holder against weather. This fuse uses the same refill unit as an RBA fuse but is designed for dropout operation. This is accomplished through the use of an ejector spring that forces the fuse to swing outward to the dropout position. The DBU fuse is designed so that it can be used either indoors or outdoors.

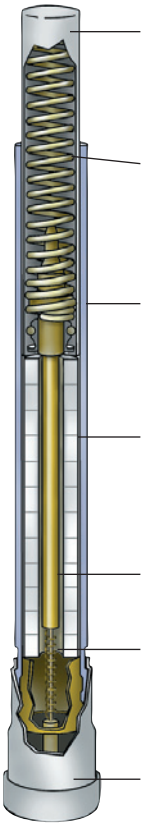
Construction

Eaton expulsion fuses use pure silver for the element construction. The components are housed in a fiberglass reinforced resin tube with plated copper contacts. The RBA fuse uses a flexible copper wire to shunt the spring and to connect the arcing rod to the upper contact. On the DBU fuse, positive contact is maintained between the arcing rod and the contact with a sliding tulip contact. A durable weatherproof label is located on each fuse and provides ratings with manufacturer information.

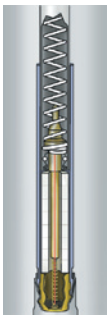
Mountings

Mountings are available for RBA and RDB fuses in disconnect, nondisconnect or dropout styles. Mountings include the base, porcelain or glass polyester insulators and live parts. The assembly allows the fuse to be rigidly positioned in the equipment. Live parts or the current-carrying components above the insulator are available to complete an assembly. Eaton expulsion fuses are easy to install and operate.

Expulsion fuse construction



Expulsion fuse operation



Element melts

Rod withdraws, elongating arc and vaporizing boric acid

Vapor quenches arc at first current zero

Expulsion fuse available ratings

Description	Type/ Voltage	Ampere Standard E	Ampere Time Lag E	Interrupting Symmetrical kA Rating	Dimensions in Inches Diameter	Length
RBA	***RBA2***					
• E-rated	8.3 kV	10E–200E	20E–200E	16.6	1.60	18.80
• Refillable	15.5 kV	10E–200E	20E–200E	14.4	1.60	22.20
• Indoor enclosure	25.5 kV	10E–200E	20E–200E	10.5	1.60	26.80
• Disconnect and nondisconnect mountings	38 kV	10E–200E	20E–200E	6.9	1.60	33.80
• Live parts	**RBA4**					
	8.3 kV	.5E–400E	20E–400E	29.4	2.20	20.00
	15.5 kV	.5E–400E	20E–400E	29.4	2.20	23.40
	25.5 kV	.5E–300E	20E–400E	21	2.20	28.00
	38 kV	.5E–300E	20E–300E	16.8	2.20	35.00
	RBA8					
	8.3 kV	450E–720E	450E–720E	29.4	2.20	20.00
	15.5 kV	450E–720E	450E–720E	29.4	2.20	23.40
	25.5 kV	450E and 540E	450E–540E	21	2.20	28.00
	38 kV	450E and 540E	450E–540E	16.8	2.20	35.00
RDB	**RDB2**					
• E-rated	8.3 kV	10E–200E	20E–200E	16.6	1.60	18.80
• Refillable	15.5 kV	10E–200E	20E–200E	14.4	1.60	22.20
• Outdoor	25.5 kV	10E–200E	20E–200E	10.5	1.60	26.80
• Dropout mounting	38 kV	10E–200E	20E–200E	6.9	1.60	33.80
• Live parts	**RDB4**					
	8.3 kV	.5E–400E	20E–400E	29.4	2.20	20.00
	15.5 kV	.5E–400E	20E–400E	29.4	2.20	23.40
	25.5 kV	.5E–300E	20E–300E	21	2.20	28.00
	38 kV	.5E–300E	20E–300E	16.8	2.20	35.00
	RDB8					
	8.3 kV	450E–720E	450E–720E	29.4	2.20	20.00
	15.5 kV	450E–720E	450E–720E	29.4	2.20	23.40
	25.5 kV	450E–540E	450E and 540E	21	2.20	28.00
	38 kV	450E–540E	450E and 540E	16.8	2.20	35.00
DBU	**DBU**	**Slow E**	**Standard K**			
• E-rated	17 kV	15E–200E	1k–200K	14	1.20	19.10
• Replaceable	27 kV	15E–200E	1k–200K	12.5	1.20	22.60
• Indoor/outdoor	38 kV	15E–200E	1k–200K	10	1.20	28.40
• Refills only						
DBA	**DBA-1**					
• E-rated	8.3 kV	.5E–200E	—	6.3	1.50	13.50
• Replaceable	15.5 kV	.5E–200E	—	6.3	1.50	17.00
• Outdoor	25 kV	.5E–200E	—	6.3	1.50	21.50
• Refills only	38 kV	.5E–200E	—	5	1.50	28.50
	48 kV	.5E–200E	—	4	1.50	34.00
	72 kV	.5E–200E	—	2.5	1.50	43.90
	DBA-2					
	38 kV	.5E–200E	—	12.5	2.50	30.00
	48 kV	.5E–200E	—	12.5	2.50	33.00
	72 kV	.5E–200E	—	10	2.50	44.00
	92 kV	3E–200E	—	6.3	2.50	52.00
	121 kV	3E–200E	—	5	2.50	62.00
	145 kV	3E–200E	—	4	2.50	72.00
BA	***BA2***					
• E-rated	8.3 kV	.5E–200E	—	16	—	—
• Refillable	15.5 kV	.5E–200E	—	12.5	—	—
• Indoor/outdoor	***BA4***					
• Refills only	8.3 kV	.5E–200E	—	16	—	—
	15.5 kV	.5E–200E	—	12.5	—	—

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges.

Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority. For more information, **visit www.eaton.com/electrical.**

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