

MERSEN
Expertise, our source of energy

YOUR ELECTRICAL SYSTEM
IS YOUR LIFELINE

AMP-TRAP 2000® FUSES



IN SHORT, AMP-TRAP 2000 FUSES PROTECT YOUR ASSETS

A lifeline that can be cut by an arc flash can disintegrate. Conductors can vaporize. Bus bars can break. And components like switchgear, MCC buckets and motor starters can be destroyed, bringing your operation to a halt.

That incident can cost your business a million dollars - or more - in liability. Add to that the costs of dealing with injuries and equipment repair, and you're facing a real drain on your profitability.

YOU NEED THE CURRENT-LIMITING PROTECTION OF AMP-TRAP 2000 FUSES

Traditional fuses were designed to protect your electrical system from fire and explosion, and your people from the potential harm of an arc flash.

Mersen's Amp-Trap 2000 current-limiting fuses do more than that. Opening in less than one-quarter cycle at fault currents up to 300kA, Amp-Trap 2000 fuses minimize the let-thru current that flows downstream.

Not only do Amp-Trap 2000 fuses save you from arc flash liability, they minimize the downtime that can diminish your productivity and profits. In short, they protect all your assets.



SHORT CIRCUIT PROTECTION IS JUST THE BEGINNING

In addition to the current-limiting protection that safeguards your equipment, Amp-Trap 2000 fuses offer you:

- **Total system coverage.** The Amp-Trap 2000 family includes Class L, Class J, Class RK1 and Class CC fuses in a wide range of amperages. It's the only one you need to protect your complete low-voltage electrical system, from service entrance equipment to your smallest motors.
- **Reduced inventory.** Because one Amp-Trap 2000 fuse can replace multiple SKUs, you will reduce the number of fuses you use and stock — typically by up to 35%. That means decreased inventory and operating costs, and less time ordering and stocking.
- **Time-delay.** Amp-Trap 2000 fuses withstand high inrush currents from motors and transformers to eliminate nuisance opening. Time-delay also simplifies selection and permits the use of smaller amperage ratings, providing better protection in case of overloads.
- **Easy 2:1 selectivity.** When a fault occurs, a selective system ensures that the fuse closest to the fault opens without affecting fuses in upstream circuits, preventing nuisance shutdowns and “blackouts.” With Amp-Trap 2000, selectivity is achieved between any two fuses in series (above 60 amps) when the ratio of upstream rating to downstream rating is 2-to-1 or greater (see table, page 5).
- **Improved safety.** High-energy arc flashes can create temperatures of 35,000°F and 1,500 pounds per square foot of force. Highly current-limiting Amp-Trap 2000 fuses protect personnel and equipment from these catastrophic effects. And their versatility and rejection-style design help to avoid hazardous misapplications.
- **Tomorrow's protection today.** Current-limiting protection is the wave of the future. By installing Amp-Trap 2000 fuses, you'll protect your equipment today and be ready for more stringent requirements tomorrow.

FIND OPEN FUSES FASTER, WITH SMARTSPOT®

WHENEVER YOU SEE ANY RED IN A SMARTSPOT INDICATOR, YOU KNOW THAT FUSE IS OPEN

Leave it to an innovative fuse company like Mersen to come up with a whole different kind of open-fuse indicator.

Patented SmartSpot is an obvious improvement in indicator fuses — one that helps you find the open fuse quickly and easily, and cut even more costly downtime.

WHAT MAKES SMARTSPOT SO SMART?

Our innovative SmartSpot, designed with advanced materials that work similar to the elements in a fuse, features a unique solid-body design that doesn't compromise the fuse's structural integrity or reliability. When a fuse opens, this material responds to the increased current and immediately turns the SmartSpot indicator from silver to eye-catching red.

And SmartSpot stays red, so you can quickly identify the open fuse with the power off. Just open the panel and scan. Wherever you see any red in a SmartSpot indicator, you know that fuse is open.

Look for SmartSpot on our most widely used Amp-Trap 2000® fuses — Class J and Class RK1, 8 amps and up.

QUALITY FUSES DESERVE QUALITY BLOCKS AND HOLDERS

You'll find the same quality and reliability of Mersen Amp-Trap 2000 fuses in our extensive line of fuse blocks and holders. Choose from traditional fuse blocks as well as space-saving configurations, and unique features like adder blocks that just snap on to form as many poles as needed.

For our Class J and Class CC fuses, you can also choose the IP20 protection of our popular UltraSafe™ IEC-style finger-safe fuse holders. Compact and modular, they offer flexibility in panel design, the simplicity of DIN-rail mounting, and safe, flick-of-the-finger changeouts.

INNOVATION AND SO MUCH MORE, FROM YOUR CIRCUIT PROTECTION RESOURCE

Amp-Trap 2000, SmartSpot and UltraSafe are just part of an unparalleled range of innovative solutions offered by Mersen.

Our vast product selection also includes semiconductor fuses, high- and low-power disconnect switches, and devices for surge protection and thermal management. And like our industrial fuses, they're all backed by our exceptional applications and technical support, and a distribution network that combines global experience and capabilities with local, customer-first service.

So whatever and wherever your circuit protection needs might be, there is one company that can meet them all.



THE AMP-TRAP 2000 FAMILY - FOR TOTAL SYSTEM PROTECTION



The Amp-Trap 2000 fuse family encompasses a wide range of sizes and current ratings, so it's all you need to bring maximum protection to your electrical system.

Choose Amp-Trap 2000 Class L fuses for your service entrance. Compact Class J fuses (and their smaller, less costly fused switches) for new installations. Class RK1 fuses to upgrade your existing circuit protection. And Class CC fuses for your smallest motors and transformers.

In addition to their high current-limiting ability, Amp-Trap 2000 fuses feature:

- Time-delay, to handle inrush currents from motor starters and transformers without nuisance opening.
- Easy 2:1 selectivity that helps avoid nuisance shutdowns and blackouts.
- Long-lasting metal-embossed dates and catalog numbers for easy traceability and preventive maintenance.
- A fiberglass body that provides dimensional stability in harsh industrial environments.
- An instantly recognizable, bright orange label.

With Amp-Trap 2000 fuses, you'll be assured of the best protection — upstream and downstream.

CLASS L, A4BQ FUSES - SAFETY WHERE YOUR CIRCUIT STARTS

Safeguard your circuits at the point of power entry with the best possible protection — Amp-Trap 2000 A4BQ fuses. They provide a minimum time-delay of 4 seconds at 500% of their rated current to handle harmless inrush currents, plus they're 20% more current-limiting than any other Class L fuse. That means optimal overcurrent protection for service entrances, large motors, feeders and other circuits.

A4BQ ratings range from 601 to 6000 amperes, 600V AC, 300kA I.R., and an exclusive 500V DC, 100kA I.R., through 3000A.

Features

- Fastest operation under short circuit conditions
- Most current-limiting for lowest peak let-thru current
- Replaces all older Class L fuses
- Pure silver links for long fuse life
- AC and DC ratings
- High-grade silica filler for fast arc quenching

Applications

- Mains and feeders
- Large motors
- Lighting, heating and general loads
- Power circuit breaker backup
- UPS DC links, battery disconnects and other DC applications

Application notes

- Mains and feeders — Can size at 100% of expected full load, unless equipment manufacturers specify otherwise.
- Motor starters — Consult your motor control manufacturer's recommendations.
- Lighting, heating and general loads — Can size at 100% to 125%, depending on load make-up.
- Transformers — Due to the high inrush currents that can be experienced with transformers, size fuse to carry 12 times transformer full load for 0.1 second and 25 times full load for 0.01 second.

THE AMP-TRAP 2000 FAMILY - FOR TOTAL SYSTEM PROTECTION

CLASS J, AJT FUSES - COMPACT FUSES, BIG PROTECTION

The most current-limiting UL-class fuse, Mersen's AJT provides optimal performance, prevents interchangeability with old fuses, and saves valuable panel space. So you can use smaller, more economical fuse blocks and IEC contactors to provide superior protection for dedicated or combined motor, lighting, heating and transformer loads.

Plus their time-delay characteristic allows for use in a wide range of applications. Rated from 1 to 600 amperes, 600V AC, 300kA I.R., and 500V DC, 100kA I.R., listed to UL 248-8, they're the right fuses for any new installation.

Features

- Most current-limiting UL-class fuses
- Timesaving SmartSpot indicator
- Unique dimensions prevent misapplications
- Optional mechanical indicator available on 70A to 600A

Applications

- Motor circuits
- Mains and feeders
- Branch circuits
- Lighting, heating and general loads

- Transformers and control panels
- Circuit breaker backup
- Bus duct
- Load centers

Application notes

- **Mains and feeders** — Can size at 125% of load for NEC and CEC code compliance.
- **Motor starters** — For typical starting duty and optimal coordination, fuse rating should not exceed 150% of motor FLA. Where “no-damage” tests have been conducted, follow the control gear manufacturer’s fuse ampere rating recommendations.
- **Lighting, heating and general loads** — Can size at 125% of combined load for NEC and CEC code compliance.
- **Transformers** — Due to the high inrush currents that can be experienced with transformers, size fuse to carry 12 times transformer full load for 0.1 second and 25 times full load for 0.01 second.



EASY SYSTEM CODE COMPLIANCE

When a fault occurs, a selective system eliminates power outages and costly downtime in those parts of the system not directly affected by the fault, permitting compliance with NEC 620.62, 517.26, 700.27, and 701.18.

In a properly designed selective system, the required minimum melting energy of the main fuse must be greater than the total clearing energy required to open the branch fuse. Under fault conditions, the branch fuse will then open without damaging the main fuse.

Amp-Trap 2000 makes system selectivity simple. Just follow the ratios shown in the chart at right.

Branch Fuse	Main Fuse			
	A4BQ	AJT	A2D	A6D
A4BQ	2:1	-	-	-
AJT 50A & up	2:1	2:1	2:1	2:1
AJT 30A-45A	-	2.5:1	-	2:1
A2D-R 60A & up	2:1	2:1	2:1	-
A2D-R 30A-50A	-	3:1	2:1	-
A6D-R 65A & up	2:1	2:1	-	2:1
A6D-R 30A-60A	-	2:1	-	2:1

Amp-Trap 2000 makes fuse coordination easy. Selectivity is achieved between any two Amp-Trap 2000 fuses in series (above a 60A rating) where the ratio of the upstream fuse ampere rating to the downstream fuse ampere rating is 2-to-1 or greater.

THE AMP-TRAP 2000 FAMILY - FOR TOTAL SYSTEM PROTECTION

CLASS RK1, A2D-R AND A6D-R FUSES - UPGRADE TO ADVANCED TECHNOLOGY

Significantly more current-limiting than Class RK5, K and H fuses, Mersen's A2D-R and A6D-R fuses are ideal for upgrading your existing feeder and branch circuits to arc flash category "O". They also offer plenty of application flexibility, with ratings from 1/10A to 600A (250V or 600V), 300kA I.R.

Features

- Highly current-limiting to achieve HRC "O"
- Timesaving SmartSpot indicator
- Brass end caps (blade style) for cooler operation and superior performance
- Rejection-style design

Applications

- Motors
- Safety switches
- Transformers
- Branch circuit protection
- Disconnects
- Control panels
- General-purpose circuits



Application notes

Mains and feeders — Can size at 125% of load for NEC and CEC code compliance.

Motor starters — For typical starting duty and optimal coordination, fuse rating should not exceed 150% of motor FLA. Where "no damage" tests have been conducted, follow the control gear manufacturer's fuse ampere rating recommendations.

Lighting, heating and general loads — Can size at 125% of combined load for NEC and CEC code compliance.

Transformers — Due to the high inrush currents that can be experienced with transformers, size fuse to carry 12 times transformer full load for 0.1 second and 25 times full load for 0.01 second.



THE AMP-TRAP 2000 FAMILY - FOR TOTAL SYSTEM PROTECTION

CLASS CC, ATQR FUSES - OPTIMAL TRANSFORMER PROTECTION IN THE SMALLEST PACKAGE

ATQR Class CC fuses provide the time-delay needed to handle the high in-rush currents of control transformers, solenoids, and similar inductive loads. They're available in 1/10A to 30A, 600V 600VAC, 200kA I.R.

Features

- Highly current-limiting
- Rejection-style design
- Special time-delay characteristics for transformer loads
- Applications
- Control transformers
- Solenoids
- Inductive loads
- Branch circuit protection

Application notes

- Control transformers, solenoids and similar inductive loads — For control transformers 600V AC or less with ratings up to 2000VA. ATQR fuses are designed to handle 40 times the transformer's primary full load amperes for 0.01 second.

Lighting, heating and general loads — Can size at 125% of combined load for NEC and CEC code compliance.



CLASS CC, ATDR FUSES - THE BEST SMALL-MOTOR PROTECTION

Choose our highly current-limiting ATDR fuses when you need maximum fault protection for sensitive branch circuit components and small motors. They deliver the best time-delay characteristics and exceptional cycling ability for frequent motor starts and stops without nuisance opening. They're available in 1/4A to 30A, 600VAC, 200kA I.R.

Features

- Highly current-limiting
- Best time-delay characteristics in a Class CC fuse
- Exceptional cycling ability for frequent motor stops and starts
- Rejection-style design

Applications

- Small motors
- Contactors
- Branch circuit protection

Application notes

- Motor starters — For typical starting duty. Where "no damage" tests have been conducted, follow the control gear manufacturer's fuse ampere rating recommendations.
- Lighting, heating and general loads — Can size at 125% of combined load for NEC and CEC code compliance.



SUGGESTED FUSE SPECIFICATIONS

1.0 GENERAL

The electrical contractor shall furnish and install a complete set of fuses for all fusible equipment on the job as specified by the electrical drawings. Final tests and inspection shall be made prior to energizing the equipment. This shall include tightening all electrical connections and inspecting all ground conductors. Fuses shall be as follows.

2.0 MAINS, FEEDERS AND BRANCH CIRCUITS

A. Fused circuits rated 601 amperes and above shall be protected by current-limiting Mersen (formerly Ferraz Shawmut) Amp-Trap 2000® Class L A4BQ fuses. Fuses shall be time-delay and shall hold 500% of rated current for a minimum of 4 seconds, clear 20 times rated current in .01 seconds or less and be UL listed and CSA certified with an interrupting rating of 200,000 RMS symmetrical amperes.

B. Fused circuits rated 600 amperes or less shall be protected by current-limiting Mersen Amp-Trap 2000 Class RK1 time-delay A2D-R (250V) or A6D-R (600V) or Class J time-delay AJT (600V) fuses. Fuses rated 8 amperes and above shall have the SmartSpot® visual blown fuse indicator. No holes are permitted in the fuse body for the indicator function. Fuses shall hold 500% of rated current for a minimum of 10 seconds (30A, 250V Class RK1 case size shall be a minimum of 8 seconds) and shall be UL listed and CSA certified with an interrupting rating of 200,000 RMS symmetrical amperes.

C. Metal end caps of fuses rated 61 through 600 amperes shall be electrically connected to the fuse blades to facilitate safe voltage testing during OSHA required LOTO (Lock-Out / Tag-Out) procedures.

3.0 MOTORS AND MOTOR CONTROLLERS

A. Motor Protection; All individual motor circuits shall be protected by Mersen Class RK1, Class J, or Class L time-delay fuses.

- Motors less than 10 H.P. - Mersen Amp-Trap 2000 Class CC ATDR fuses (600V) may be used on motors rated less than 10 H.P. at 480VAC and rated less than 5 H.P. at 240VAC. Fuse holders for Class CC fuses shall include visual blown fuse indication.

Fuse sizes for motor protection shall be chosen from tables published by Mersen for the appropriate fuse. Heavy load and maximum fuse ratings are also shown for applications where typical ratings are not sufficient for the starting current of the motor.

B. Motor Controllers: IEC style and NEMA style motor controllers shall be protected from short circuits by Mersen Amp-Trap 2000 time-delay fuses. Controllers and fuses shall be coordinated for Type 2 protection of the motor controllers based upon the motor controller manufacturer's published recommendations. The fuses shall be Class RK1 A2D-R (250V) or A6D-R (600V) or Class J AJT (600V), Class CC ATDR (600V) or Class L A4BQ (600V).

C. AC and DC Variable Speed Drives: AC and DC variable speed drives not internally protected by high speed fuses shall be provided branch circuit protection by Mersen High Speed Class J HSJ (600V) fuses. Mersen Class J time-delay AJT (600V) fuses are an acceptable alternative to the HSJ in by-pass applications.

D. Motor Control Centers: To minimize arc flash incident energy, MCC's shall have fusible mains and maximum fuse ratings shall be as follows:

- Class L A4BQ1200 for bolted fault currents greater than 40,000A
- Class L A4BQ800 for bolted fault currents greater than 16,000A
- Class J AJT600 for bolted fault currents greater than 14,000A
- Class J AJT400 for bolted fault currents greater than 5,000A

SUGGESTED FUSE SPECIFICATIONS

Unit inserts (buckets) shall be fusible and protected by current-limiting Mersen Class J time-delay AJT (600V) or Class RK1 time-delay A2D-R (250V) / A6D-R (600V) fuses selected for Type 2 protection of the motor controllers based upon the motor controller manufacturers published recommendations.

4.0 OTHER EQUIPMENT

A. Lighting and control circuits rated 600VAC and less shall be protected by Mersen Amp-Trap 2000 Class CC time-delay ATDR (600V) or ATQR (600V) fuses, sized according to the electrical drawings.

B. Switchboards, panel boards, and load centers shall utilize fully rated and Listed components. Series rated overcurrent protective devices are not acceptable.

5.0 LABELING

Industrial control panel labels shall include a SCCR (short circuit current rating) and shall specify the overcurrent protection device upon which this rating is based as per the National Electrical Code article 409.110(3).

Switchboards, panelboards, industrial control panels, and motor control centers shall include a label warning qualified personnel of the potential arc flash hazard. The label shall be visible with equipment door closed.

6.0 SPARES

Spare fuses amounting to 10% (minimum three) of each type and rating shall be supplied by the electrical contractor. These shall be turned over to the owner upon project completion. Fuses shall be contained and cataloged within the appropriate number of spare fuse cabinets (no less than one), located per project drawings. Spare fuse cabinets shall be equipped with a key lock handle, be dedicated for storage of spare fuses and shall be GSFC, as supplied by Mersen.

7.0 EXECUTION

A. To prevent mechanical damage to fuses; main, feeder, and branch circuit fuses are to be removed from equipment during transit and re-installed when equipment is to be energized.

B. As installed drawings, showing actual fuses installed, shall be submitted to the engineer after completion of the job.

C. Fuse holders capable of accepting Class H or K fuses are not acceptable.

8.0 SUBSTITUTION

Fuse sizes indicated on drawings are based on Mersen Amp-Trap 2000 fuse performance and selectivity ratios. Alternative submittals to furnish materials other than those specified, shall be submitted to the engineer in writing two weeks prior to bid date, along with short circuit, selective coordination, and arc flash hazard studies.

Performance of any fuses submitted for substitution shall have:

1) Indication integral with the fuse so that it indicates the voltage transient when the fuse is opened. This is a relative measure of how severe the fault was and gives information to the maintenance people to make them more efficient. No holes are permitted in the fuse body for the installation of indicators.

2) Only the listed UL categories must be used, in order to reduce the possibility of arc flash injuries. Class K5 and Class H are prohibited and could cause major liability should an arc flash occur.

3) All end-caps of fuses must be electrically connected to the fuse blades to prevent misreading of electrical testers during the required OSHA LOTO (Lock-Out / Tag-Out) procedures. Misreading on the LOTO final voltage check could cause hazardous shock.



MERSEN IS A GLOBAL EXPERT
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