

MITIGATING THE HAZARDS OF ARC FLASH

SOLUTIONS GUIDE

Fuses for mitigating arc flash hazards



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Mitigating the Hazards of Arc Flash

It's your responsibility to protect workers from arc flash hazards.



The explosive energies released during an arc flash — intense heat, thermoacoustic shock wave, molten metal, shrapnel, blinding light, toxic smoke — can cause severe, often fatal, injuries to workers even several feet away.

Beyond this cost to human life is the financial cost to industry, which can easily exceed \$1 million per occurrence in medical expenses, equipment replacement, and downtime, in addition to significant fines.

OSHA uses the requirements of NFPA 70E to judge whether an employer “acted reasonably” in protecting its workers from arc flash hazards.

That means arc flash hazard mitigation is not only a moral obligation, but a financial and legal responsibility. And one of the simplest, most cost-effective ways to do it is to use current-limiting fuses.

Recommended fuses: Amp-Trap 2000®

The fuses we recommend for reducing arc flash energies are UL Listed branch circuit fuses with the highest degree of current limitation. This feature, which isolates a faulted circuit before the fault current reaches its maximum value, enables these fuses to:

- Limit the total energy delivered to an arcing fault.
- Limit thermal and mechanical stresses created by the fault current.
- Reduce both the magnitude and the duration of the fault current.
- Be easily coordinated in both the overload and short circuit regions.

In laboratory tests, Mersen's Amp-Trap 2000 A6D, A4BQ and AJT fuses have generated excellent results, limiting the energy delivered to arc faults to very low values for fault currents within their current-limiting range.

Because this energy reduction reduces the amount of heat generated, the use of these fuses typically minimizes the level of personal protective equipment (PPE) required, allowing personnel to work more easily, efficiently and safely.

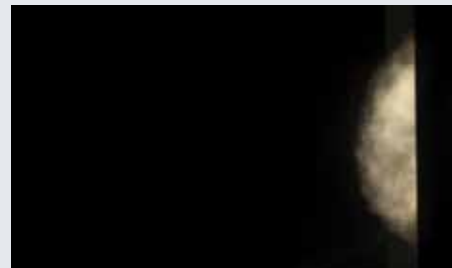
To see the dramatic reduction in incident energy levels possible with Amp-Trap 2000 fuses, visit the Arc Flash Info Center™ at ep-us.mersen.com/arcflash and use our Arc Flash Calculator.

Before and After: Reducing arc flash energies with current-limiting fuses

In the photo below, a 22.8kA fault current is delivered to a circuit protected by a circuit breaker with a clearing time of 6 cycles. The resulting incident energy measured at 18” from the conductors was 8.14 cal/cm² making Category 3 the minimum PPE required.



These photos, taken from high-speed digital video shot in our high-power test lab, illustrate the significant reduction in arc flash energies possible with current-limiting fuses. To see the entire test sequence, visit our website at: ep-us.mersen.com/arcflash.



In the above photo, Mersen's Amp-Trap 2000® A6D600R fuse interrupts the 22.8kA fault before the arc can fully develop, limiting the incident energy measured at 18” from the conductors to 0.25 cal/cm² and the minimum PPE required to Category 0.

Recommended fuses: Amp-Trap 2000® - Continued

Amp-Trap 2000® AJT, Class J Fuses

The ideal choice for new applications of 600A and less, AJT fuses offer excellent current-limiting performance for short circuits and time delay for overloads, as well as:

- **The best degree of arc energy mitigation.** When applied properly for expected arc fault currents, these fuses can reduce incident energies at a working distance of 18" to less than 0.25 calorie/cm².
- **Unique Class J dimensions.** Interchanging fuse classes can lead to compromised protection and coordination. Non-interchangeable Class J dimensions eliminate this problem.
- **Type "2" protection for motor starters.** The AJT has been certified by starter manufacturers to provide Type "2" No-Damage short-circuit protection for NEMA and IEC starters.
- **Ability to be used as a cable protector.** The blades on the AJT (70A – 600A) are designed to accept lugs and can be installed as cable limiters — a feature to consider in special situations where current limitation might otherwise be impossible.



Amp-Trap 2000® A4BQ, Class L Fuses

Designed for applications over 600A, Mersen A4BQ fuses have an interrupting rating of 300kA and a unique design that delivers excellent performance in arc flash situations. They offer:

- **The best degree of arc energy mitigation.** Lower current-limiting thresholds and let-thru energies are key features of the A4BQ line. When fuses up to 1600A are applied properly for expected arc fault currents, incident energies at a working distance of 18" can be reduced to Category 0 PPE levels.
- **Easier system coordination.** Combine A4BQ fuses with other Amp-Trap 2000 fuse classes, and you can ensure a fully coordinated system by sizing upstream fuses at only twice the ampere rating.
- **Easy downsizing.** Feeder fuses often have larger ampere ratings than are needed. Downsizing should be considered when it would lead to substantial incident energy reduction with the hole pattern in its blade. Any A4BQ can be downsized to 100A without reducer hardware.



Amp-Trap 2000® A6D or A6D-R, Class RK1 Fuses

The ideal choice for upgrading existing applications of 600A and less, A6D fuses offer excellent current-limiting performance for short circuits, time delay for overloads, and the same dimensions as Class H, Class K and Class RK5 fuses. They also deliver:

- **The best degree of arc energy mitigation.** When applied properly for expected arc fault currents, A6D fuses can reduce incident energies at a working distance of 18" to less than 0.25 calorie/cm².
- **Easy upgrade to Class RK1 protection.** With the same overall dimensions as Class RK5, Class K and Class H fuses, our A6D fuses make upgrading a simple change that can dramatically reduce incident energies. Streamline your inventory and train your workers in circuit protection safety. Access our **Fuse Control™ Program** today for comprehensive inventory analysis and upgrade services. To learn more visit: ep-us.mersen.com/fusecontrol.
- **Type "2" protection for motor starters.** The A6D has been certified by starter manufacturers to provide Type "2" No-Damage short-circuit protection for NEMA starters.



Learn More About Arc Flash Hazard Protection

Mersen offers other ways to improve electrical safety and reliability. To learn more about our finger-safe devices, customized circuit protection safety training, and inventory analysis and upgrade services, visit the Arc Flash Info Center at ep-us.mersen.com/arcflash. Or contact our technical services department at technicalservices.nby@mersen.com.





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A GLOBAL PLAYER

Since its foundation in 1892, MERSEN has built an international reputation by creating subsidiaries on all continents. Today with industrial and commercial plants scattered in more than 30 countries, agencies

and representatives in more than 70 countries and 250 commercial contacts throughout the world, MERSEN offers its customers everywhere reliable, high technology products and services backed by its expert technicians.

Mersen U.S.A.
 374 Merrimac Street
 Newburyport, MA 01950
 U.S.A.
 T : 978 462 6662
 F : 978 462 0181

Mersen FRANCE
 15 Rue Jacques de Vaucanson
 F-69720 Saint Bonnet de Mure
 France
 T : +33 (0)4 72 22 66 11
 F : +33 (0)4 72 22 67 13

Mersen TORONTO
 88 Horner Avenue
 Toronto, Ontario
 Canada M8Z 5Y3
 T : 416 252 9371
 F : 416 252 6572

Mersen SHANGHAI
 No.55-A6. Shu Shan Road
 Songjiang 201611
 Shanghai
 Tel: +8621 67602388