

SOLUTIONS TECH BRIEF

Technical solutions on circuit protection from Littelfuse, Inc.

Brief No. 98-003

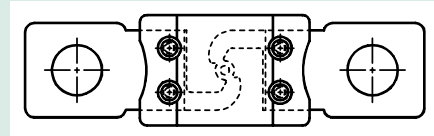
Specifying MEGA® Fuse in High Current Applications

The MEGA® Fuse from Littelfuse is the industry standard for high current automotive protection. It is available in current ratings of 80, 100, 125, 150, 175, 200, 225, 250 and 500 amperes at 32 volts. The fuse's bolt-down design makes it effective for high current automotive applications and facilitates easy installation and replacement. Designed and patented by Littelfuse, the MEGA Fuse was introduced in 1991 to provide a higher amperage fuse with a reliable bolt-down connection to replace fusible links.

The MEGA Fuse's function is to protect heavy gauge wire from thermal damage caused by current overloads, when a device is drawing more current than the wire can handle, and short circuits caused by a fault in the wiring system. It is designed to open non-destructively and allow for ease of replacement. The MEGA Fuse is also engineered for time delay (slow-blow) to allow high inrush currents without opening the fuse.

The MEGA Fuse is designed for most high current automotive applications. MEGA Fuse's most popular application is in higher current main circuits, protecting the main feed from the battery or alternator. In many contemporary automobile designs, the alternator is not located near the battery or power distribution center and a long cable must run between these devices. The MEGA Fuse protects this cable, providing damage control and increased safety. Similarly, MEGA Fuse can protect cables to remotely mounted batteries.

The MEGA Fuse is the recommended battery cable protection option for any automobile. It can also be used in a wide range of applications where high current protection is vital, protecting heavy gauge cables serving special equipment options such as snow plows, agricultural and construction equipment, or high current accessories. Vehicles with high current applications may include heavy-duty trucks, off-road vehicles and high-performance race cars.



Replacing Fusible Links with MEGA® Fuse

Designed to replace certain sizes of fusible links in high current applications, the MEGA Fuse provides an alternative with better safety, performance and efficiency. The following are the main reasons to replace fusible links with MEGA Fuses in your high current applications.

Predictability – MEGA Fuse has very predictable opening characteristics, with a very tight tolerance. This predictability makes the MEGA Fuse easier for engineers to design in because they are working with a more precise product. Fusible links are relatively unpredictable and may open under a wider range of currents.

Safety – Fusible links have unpredictable opening characteristics that can cause safety hazards – melting, spitting molten material and causing thermal incidents. The MEGA Fuse is designed for safety and causes no hazards when opening.

Serviceability – The MEGA Fuse is easier to replace, simply bolted in for a quick and reliable connection. A fusible link must be welded or soldered in and must be cut out to be removed, taking significantly more effort while providing significantly less reliability.

Selection – The MEGA Fuse offers a greater range of current ratings to work with, from 80A-500A, while fusible links come in only a few wire gauges.

Manufacturing of the MEGA® Fuse

The MEGA® Fuse is manufactured within Littelfuse's world-class quality assurance standards. The body is molded from a high temperature thermoplastic, well-suited for under-the-hood environments that may expose the fuse to high temperatures as well as corrosive chemicals such as fuel, brake fluid, battery acid and antifreeze.

The bolt-down design of the MEGA Fuse with copper terminals guarantees a reliable, low-resistance connection. With this design, you can maintain significantly more pressure than a blade contact. Higher pressure assures less resistance. The bolts also help maintain the connection during vibrations that may shake another type of device loose.

The addition of fuse body rivets makes the MEGA Fuse an even more reliable high current fuse. The riveted construction ensures body strength, keeping the fuses from breaking apart in extremely high temperatures and other harsh conditions.

Littelfuse's unique manufacturing processes such as Diffusion Pill Technology and Skiving provide greater control over the quality of the MEGA Fuse.

Diffusion Pill Technology – The MEGA Fuse's slow-blow characteristics are made possible by a manufacturing process called Diffusion Pill Technology which allows for low energy dissipation coupled with desired time delay by introducing a small tin pellet to lower the melt temperature.

Skiving – Littelfuse precisely controls the thickness of the element by skiving the material in a single continuous coil which the elements are then stamped from. Skiving enables the production of a reliable, one-piece component with little characteristic variation. For more information on Skiving, ask your Littelfuse representative for a copy of the SOLUTIONS TECH BRIEF on the Skiving Operation (Form No. OE913).

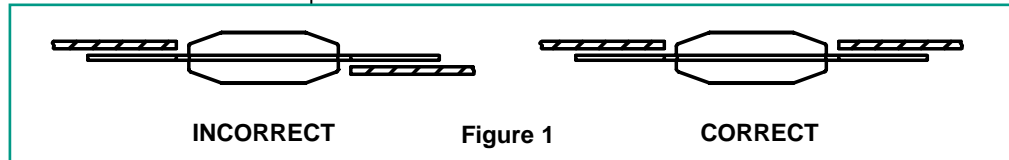
MEGA Fuseholder

The specially-designed MEGA Fuseholder enhances the fuse's circuit protection abilities. Littelfuse developed the MEGA Fuseholder for maximum versatility, available as a single or dual fuseholder. The fuseholder also enables multiple stacked units with busbar interconnect so several units can be connected to the power source through one common input.

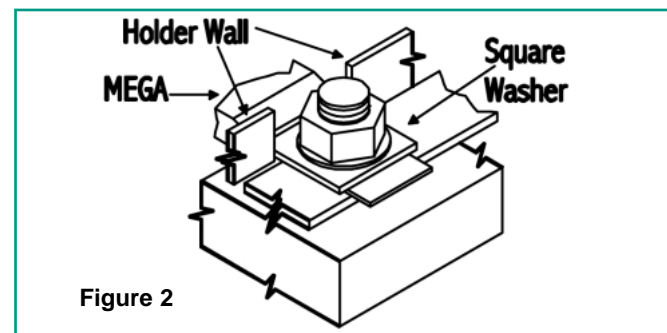
Installation Guidelines

Please adhere to the following installation guidelines for the MEGA Fuse:

- The fuse should be **mechanically isolated** in its own fuseholder. Although the MEGA Fuse was designed with strengthened body integrity, it should not be treated as a structural member.
- The fuse is designed for use with **bolt-down attachments**.
- The bolts must be **mechanically stable**, minimizing exposure to vibration.
- The **bolts should be rigid**, not allowing the fuse to twist.



- The fuse should be installed so both **terminals are coplanar** (see figure 1). Proper placement of the cable shoes is vital. Littelfuse recommends that both cable shoes be placed across the same side of the fuse terminals.
- **Rotation of the cable shoes should be limited.** The action of a rotating shoe can impose a rotational force to the fuse element, placing unnecessary stress on the fuse. One solution is to use a washer that will transfer the force to the mounting base walls instead of to the fuse (see figure 2). Littelfuse's MEGA Fuseholder solves this challenge by trapping the cable shoe between two upright bosses.



- Cables used with the MEGA Fuse should also be **secured as close to the holder as possible**, keeping unwanted oscillations from developing in long cable lengths and acting as a strain relief for the fuse and holder assembly.
- The SAE Automotive Handbook recommends that the minimum one must stretch a bolt in order for it to remain tight is 70% of the bolt's yield strength. The actual torque value will vary with the material of the bolt and surface plating but it will be significant. In general, **torque values from 12 to 18 N-m** (105 to 158 inch-Pounds) can be applied to maintain electrical connection.



Littelfuse®

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