

MATERIAL HANDLING



OEM SOLUTIONS
FOR VEHICLE
ELECTRICAL POWER



Littelfuse®

Expertise Applied | Answers Delivered

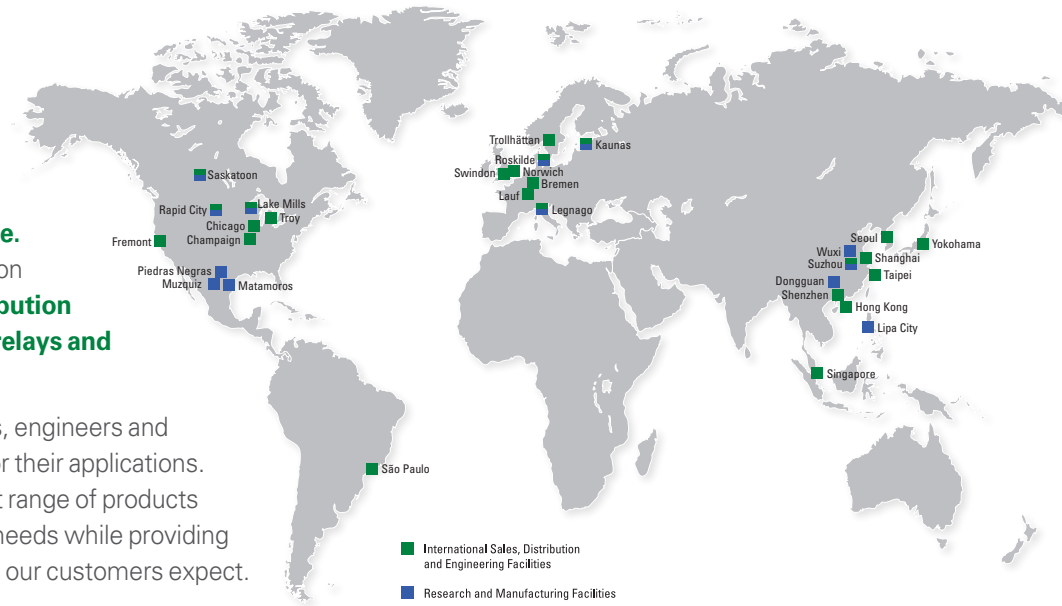


Local Resources for a **GLOBAL** Market

Littelfuse products help protect, control and distribute vehicle electrical power in OEM and aftermarket applications for industries such as **heavy-duty truck, construction and agriculture.**

We offer a broad and reliable selection of **fuses, fuse blocks, power distribution modules, high-current switches, relays and solenoids** to fit your requirements.

For decades, we have helped OEMs, engineers and end-users select the right product for their applications. Today, Littelfuse offers the broadest range of products for protection, sensing, and control needs while providing exceptional service and support that our customers expect.



Our Market Focus **INDUSTRIES** and Applications



Truck & Bus

- On-Highway
- Severe Duty
- Transit Buses
- Vocational



Construction

- Loaders
- Skid Steers
- Excavators
- Cranes



Agriculture

- Tractors
- Harvesters
- Lawn Turf
- Loaders



Material Handling

- Fork Lifts
- Telehandlers
- Aerial Work Platform
- Pallet Jacks



Municipality

- Emergency
- Waste Trucks
- Fire & Rescue
- Utility

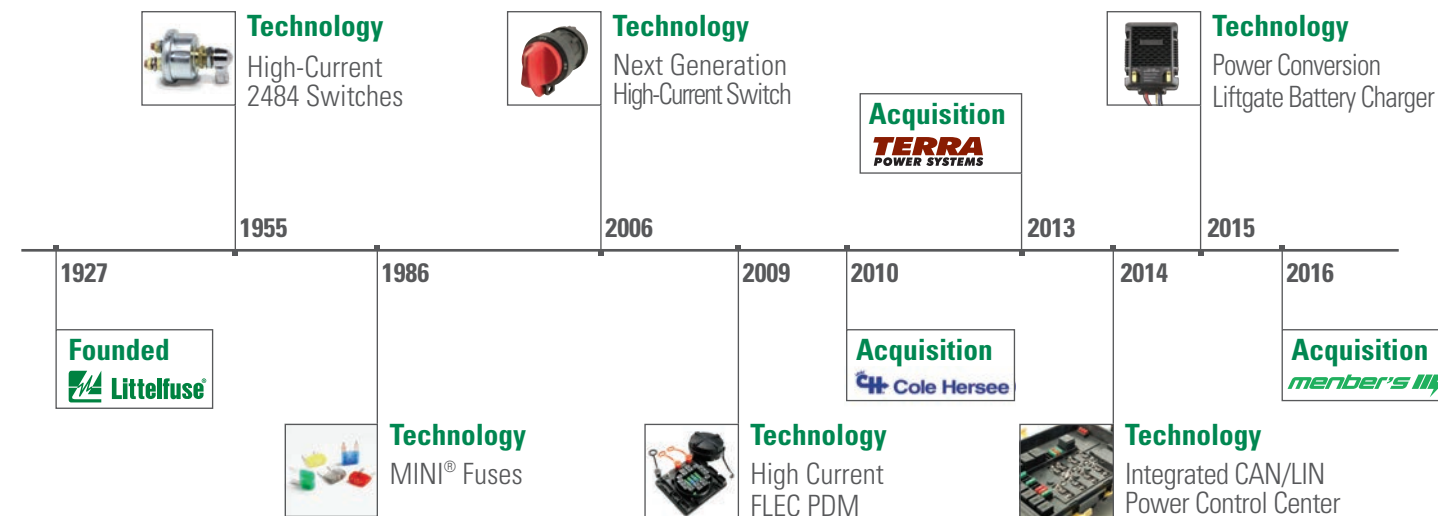


Recreational & Marine

- Golf Carts
- Boats & Marine
- Recreation Vehicles
- ATV & Snowmobiles



Over 85 Years of Electrical Power Expertise



Value Added Electrical System Features

Littelfuse Commercial Vehicle Products help add value to your equipment at every stage of its life cycle. Product safety features help keep end-customers protected from hazards and add unique selling features to your equipment. Engineering expertise allows us to create custom OEM solutions that combine technologies to reduce your system costs. Custom solutions and a passion for durable products helps to minimize vehicle downtime and raise end-customers productivity.

Littelfuse.com/Commercial-Vehicle-OEM



Improve Safety

- Remote Indication & Control
- Built-In Lock-Out/Tag-Out
- Integrated Fusing
- Touch-Safe Features



Reduce Costs

- Combined System Components
- Keyed Harness Connections
- Simplify Installation Features
- Global Supply Base & Production



Minimize Downtime

- AssureLatch™ Technology
- Built-In Cover Tethers
- Self-Diagnostic Features
- Optimized Battery Life





Passionate About Our Products
Delivering results that exceed customer expectations

Developing **NEXT GENERATION** Products and Continuously Improving **TECHNOLOGIES**

Adding Next Generation Features to Proven Product Designs

- Product enhancements set the next generation of industry standards
- Components designed to last the lifetime of the vehicle
- Advanced sealing to eliminate the instance of critical component corrosion
- TPAs (Terminal Position Assurance Locks) give secondary locking protection of the wire leads

Littelfuse.com/HWA20



Why Choose Littelfuse

Littelfuse is the global leader in circuit protection solutions with the broadest spectrum of electrical power technologies. Our Commercial Vehicle Products portfolio provides a total solution to protect, control and distribute vehicle electrical power.

Single Source for Vehicle Electrical Products

Littelfuse offers an extensive commercial vehicle product line and if an off-the-shelf product does not fit your needs we can work with you to develop a customized solution that fits your application.

Product Development and Testing Expertise

Our global team of engineers design innovative solutions, provide customer support and perform product testing to ensure you have the best solution that meets all requirements and regulations.

Global Support Team

Littelfuse has a world-wide team of specialist prepared to support your application needs from conceptual development to continuous quality assurance for the lifetime of your program.

Littelfuse.com/Commercial-Vehicle-OEM



Sealed ZCASE® for Material Handling Battery

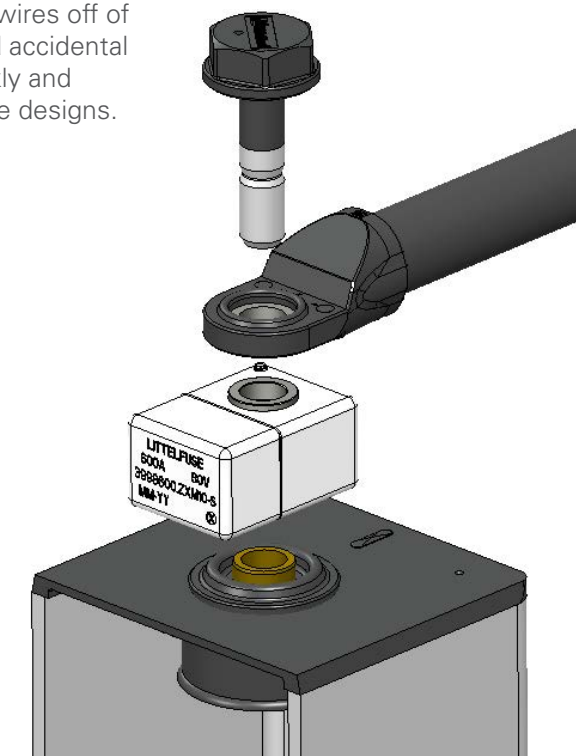
The Sealed M10 ZCASE fuse is designed to mount directly to a standard forklift battery to provide short circuit protection to the highest current circuits powering electric vehicles. Its placement on the battery eliminates the need for any unfused, high-current wires off of the battery—even the battery terminal itself is protected from short circuits and accidental contact. In the event of an electrical fault, the ZCASE style fuse performs quickly and effectively, while also eliminating the false blows seen in legacy high speed fuse designs.

Specifications

Amperage:	600A
Voltage Rating:	80V DC
Fuse Terminal Torque:	18±2Nm
Ingress Protection:	IP67 / IP69K*
Housing:	TPU UL94 V0
Output Connectors:	M10
Special Ratings:	IEC 60079-0 Explosion-Proof*

*Ratings achieved and statements applicable only when used with insulated bolt and a sealed cable lug

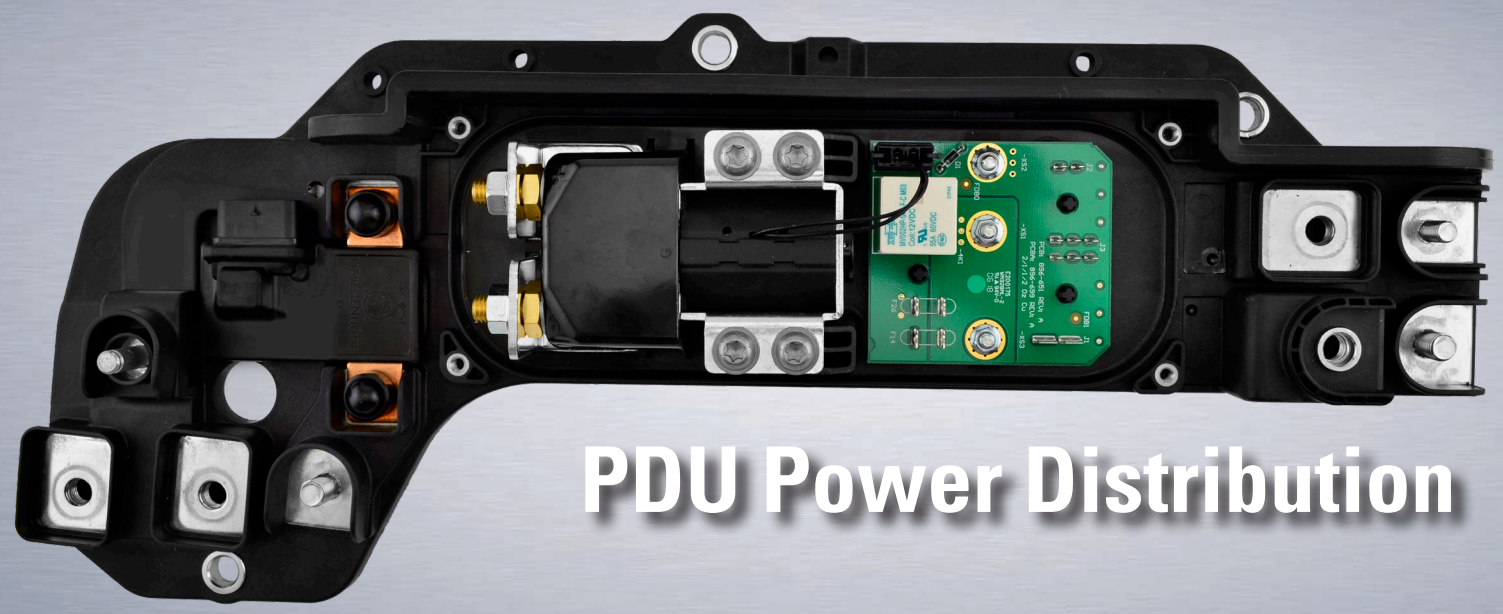
PART NUMBER	DESCRIPTION
3998600.ZXM10-S	Sealed M10 Battery Mount ZCASE Fuse
3998600.ZXM10-SB	Sealed M10 Battery Mount ZCASE Fuse + Insulated M10 Bolt Kit
902-192	Insulated M10 Bolt (Required for Installation/Operation)





Product Development & Engineering

resources to meet your project goals on time and on budget



PDU Power Distribution

Business Excellence from Concept to Completion

Leading vehicle OEMs look to Littelfuse Commercial Vehicle Products for answers to their Power Distribution, Protection and Control needs. Our innovation, technical expertise and product offerings enable us to provide comprehensive solutions for customer's unique applications. That is the value you can expect from Littelfuse.



Listening & Understanding

- Listen to customer to understand goals
- Review warranty and areas targeted for improvement
- Visit factory to understand customer manufacturing
- Employ APQP design methodology

Design & Prototyping

- Leverage extensive Littelfuse technology portfolio
- Reduce system costs and increase performance
- 3D, mechanical and electrical designs for customer review
- Concept prototyping with 3D prototyped circuits

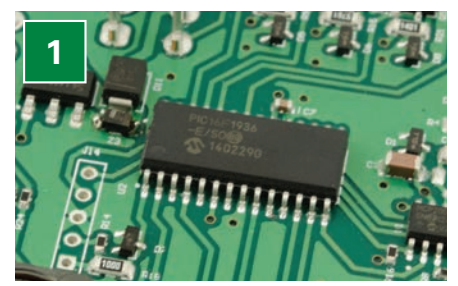
Development & Validation

- Design for manufacturing and cost-based engineering
- Design verification including FMEA, thermal and RF analysis
- Review of early builds with OEM team and field trials
- Production product and process validation

Deliver On Time & Budget

- PPAP product delivered
- Global distribution and support of OEM supply chain
- On-site support for customer's start of production
- Formal post product-launch review for lessons learned and continuous improvements

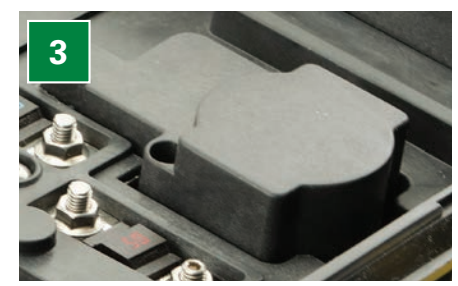
Products Designed for Your Industry Leading Equipment



Smart Control: Integrated CAN / LIN Interface
Support CAN (J1939) or LIN interfaces for message based interfaces and diagnostics.



High Current Performance
Expertise in design and production of robust high current electrical systems.



Integrated High-Current Relay
Eliminate cost and liability of connecting external high current relays for power control.



Combine High and Low Current Fuses and Relays
Reduce extra modules by combining high and low current circuits into a single module.



AssureLatch™ Technology
Rugged, sealed enclosures with positive latching provides confidence that module is completely closed.



Robust Connections for High Power Input and Output
Best in class connection systems for sealed, efficient and safe power transfer.

Entire Vehicle **ELECTRICAL POWER** Expertise

Littelfuse manufactures products for your entire vehicle electrical system with components that help distribute, protect and control vehicle power. Review this schematic to learn how you can streamline your design and sourcing requirements.

7 Active/Passive Electronics and Power Semi-Conductors

1 Sealed and Unsealed Fuses and Fuse Holders

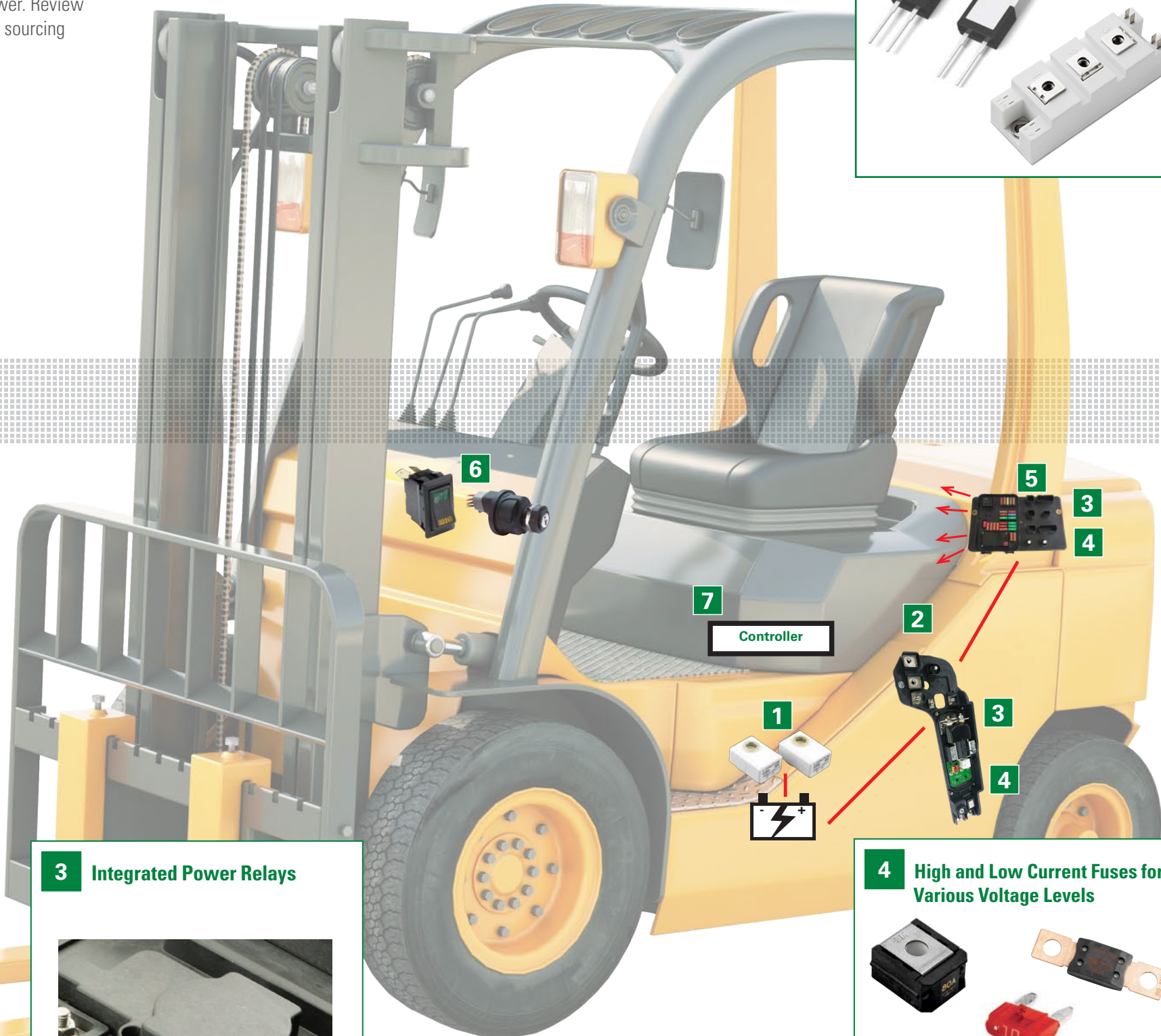
6 Ignition, Rocker, Toggle, and Momentary Switches

2 Master Power Distribution Units

3 Integrated Power Relays

5 Fuse and Relay Centers

4 High and Low Current Fuses for Various Voltage Levels



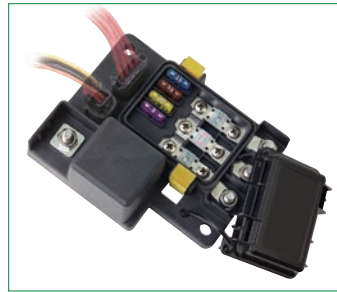
Power Distribution Modules and Fuse Holders

Littelfuse manufactures Power Distribution Modules (PDM) that feature multiple electrical outputs, accept many fuses & plug-in style relays, and allow for custom configuration. Learn more at: Littelfuse.com/Power-Distribution-Modules



Configurable Electrical Centers with Bussing

- Various size and form factors
- Customizable PCB circuits
- Supports fuses, relays, diodes and CAN communication
- Various connector interfaces in a sealed enclosure



High Current Power Control Centers

- Available with high current power relay
- Contains a mixture of high and low current fuses in sealed enclosure



Hard Wired Boxes for Fuses and Relays

- Various size and form factors
- Accepts plug-in fuses, relays and diodes
- Rear fed wire connectors in a sealed enclosure



High Current Distribution Modules

- Sealed In-Line Power Distribution Modules
- Multiple fuse positions
- Internal high current bussing



Bolt-Down Fuse Holders

Available for most automotive style fuse designs in sealed and partially sealed designs to meet your application specifications.



In-Line Fuse Holders

Available in off-the-shelf configurations or with custom wire colors, lengths, gauge size or pre-loaded circuit protection.

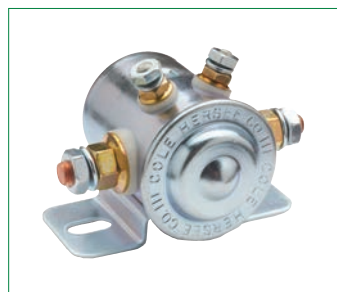
Relays and Solenoids

Littelfuse relays and solenoids are used for remote switching of electrical currents from 20 to 600A and are available as bi-stable relays, steel body solenoids, solid state relays, plug-in relays and more. Learn more at: Littelfuse.com/Solenoids-Relays



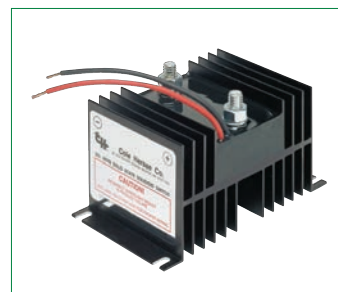
Bi-Stable Relays

- No continuous power draw
- Supports high-current continuous duty or intermittent duty loads
- Rugged, sealed enclosures



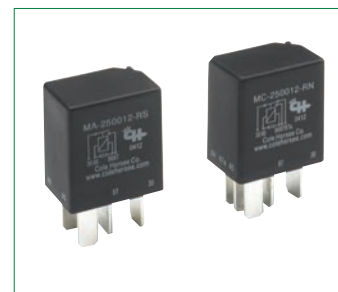
Standard Solenoids

- Steel body, sealed PVC coated or plastic body designs
- Continuous duty and intermittent duty styles
- SPST, SPDT and DPST circuitry available



Solid State Relays

- Reliable in harsh environments with excessive vibration
- High on/off cycle count
- Remote status LEDs available



ISO Plug-In Relays

- General purpose relays
- Multiple size, form, voltage, sealing and mounting options
- Ideal for Littelfuse HWB product assemblies

High Current Battery Disconnect Switches & Low Current Switches

Littelfuse manufactures high and low current switches in many form factors to fit numerous applications. To view the complete catalog or product specifications visit: Littelfuse.com/Switches



Single-Pole Battery Disconnect Switches

- 300 A high-amp capacity
- Integrated lock-out tag-out
- IP ratings for water and dust



Double-Pole Switches

- 500 A high-amp continuous current
- Disconnect two circuits (12/24 or +Vdc/GND) simultaneously
- IP ratings for water and dust



Ignition Switches

- Broad range of voltages and actuators
- Available with terminal or connector terminations
- IP ratings for water and dust



Low Current Switches

- Provide circuit control for various applications
- Rockers with or without LEDs
- Toggles in many configurations
- Rotary style for headlights

Battery Management and Power Conversion

Littelfuse battery management provides methods of conserving starting power, protecting against over-discharge, combining power from two battery banks, and protecting auxiliary equipment. Learn more: Littelfuse.com/Battery-Management



Liftgate Battery Charger

- Charges liftgate batteries rapidly and safely
- Harness kits available to minimize installation time



Heavy Duty Time Delay Bi-Stable Relay

- Disconnects the battery from the electrical system
- Programmable delay time and service state management



Battery Isolators

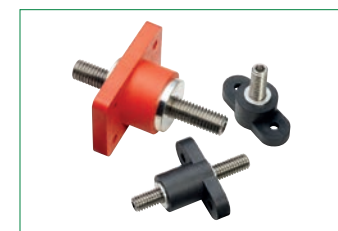
- Prevents loads on an auxiliary battery from draining the starting battery
- Available in a multitude of forms to fit many applications



Flex-Mod

- Series of modules in compact, sealed and rugged housing
- Models available as a battery disconnect, isolator, timer and controller

Junction Blocks, Wiring Devices and Accessories



Junction Blocks

Available in non-feed-thru or feed-thru designs in various thread sizes and lengths



Connectors & Plugs

Rugged designs stand up to harsh, heavy-duty conditions



LED Pilot Lights

Solid-state LED designs available in multiple body and color types



Busbars & Terminal Blocks

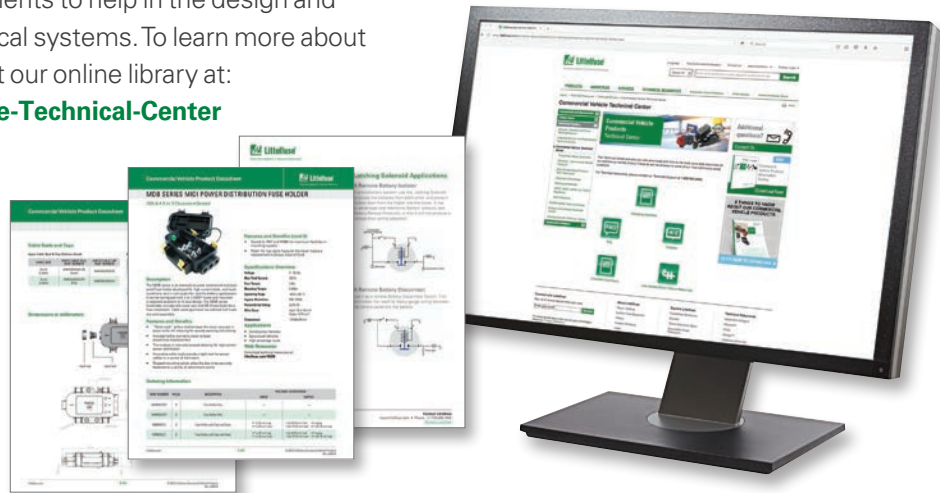
Multiple ganged options or styles with separate individual studs

Need **MORE INFORMATION** about Commercial Vehicle Products?

Littelfuse publishes technical documents to help in the design and selection of products for your electrical systems. To learn more about a specific product or application, visit our online library at:

Littelfuse.com/Commercial-Vehicle-Technical-Center

- Extended Datasheets
- Application Notes
- CAD Drawings
- 2D Outlines
- 3D Models
- Glossary
- FAQ



Littelfuse.com/Catalogs

Littelfuse offers digital and printed catalogs, to request a copy, please contact Littelfuse or download the digital version on our website.

Our product catalogs feature circuit protection, power control and sensing products for OEM and aftermarket applications.

- Commercial Vehicle Aftermarket Catalog
- Automotive Passenger Car Catalog
- Automotive Fuse & Fuse Holder Selection Guide

Littelfuse.com/ContactUs

Contact Littelfuse support or find a local representative or distributor.

