

# FUSING LITHIUMPRO ENERGY - DROP-IN-REPLACEMENT BATTERIES - USING AN MRBF FUSE

SMARTCOMM  
SERIES

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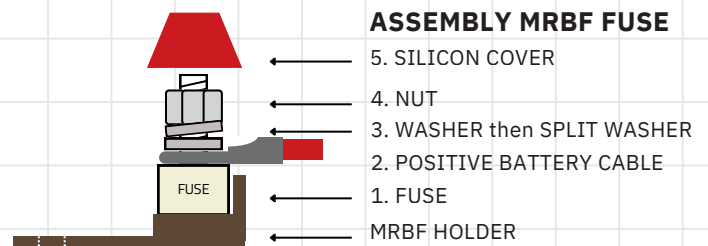
MRBF fuses are suitable for use with ULTRAVOLT, ARCTICXTREME & SEATBASE MODELS.

**FUSES** protect wiring – not the devices connected to them. When replacing lead-acid batteries with LithiumPro (LiFePO<sub>4</sub>) batteries, the installation of correctly rated primary battery fuse is **mandatory**. The primary fuse plays a critical safety role by protecting the battery cables from catastrophic short-circuit events. Unlike lead-acid batteries, LiFePO<sub>4</sub> batteries have extremely low internal resistance. In a dead-short scenario the battery can release many thousands of amps almost instantaneously. Without adequate fuse protection, such faults can rapidly overheat or vaporise cables, damage downstream systems and present a serious fire risk. For this reason, the primary fuse must be fast-acting and have a suitable Ampere Interrupt Capacity (AIC), enabling it to safely and cleanly interrupt the circuit under high-fault-current conditions. LithiumPro Energy recommends the use of Marine Rated Battery Fuses (MRBF) for our 'Drop-In-Replacement' range. MRBF's are tested and rated to protect fault currents up to 10,000A at 14vdc and are available in load rating from 30-300A, making them suitable for most vehicle and marine installations. For safety, reliability and regulatory compliance, only use reputable fuses from reputable manufacturers such as Blue Sea, Bussmann, Littelfuse, Mersen or Siemens with AIC rating of  $\geq 10,000A$ . Never substitute with low cost fuse alternatives from market places. These may fail to interrupt high fault currents safely. Whilst LithiumPro batteries incorporate advanced Battery Management Systems (BMS) designed to protect against various faults conditions, the BMS must not be relied upon as sole means of short circuit protection. There is no substitute for a correctly specified mechanical fuse in any safe system design.

**INSTALLATION:** When installing a drop-in-replacement with no wiring upgrades, first determine the existing fuse rating of the inline fuse on the main battery positive cable that supplies PSU and then install an MRBF rated fuse of approximately double that rating directly to the positive battery terminal. (ie. if the manufacturers inline fuse is rated at 40A install a MRBF/ANL fuse should be rated at 80A.) **NOTE:** If motor movers are installed then fuse rating needs to be adjusted to allow for peak motor loads to prevent nuisance trips. For example single axle movers 200A twin axle mover 300A. Fuses can be ordered [HERE](#) *Contact Lithium Pro Energy should you require any further information on fusing.*

In height restricted installations where an MRBF fuse cannot be used, then ANL fuses, with an AIC rating of 6000A can be used. Ensure ANL fuse is positioned as close to the positive terminal as practical and never more than 300mm away. When installing batteries in a parallel configuration for increased capacity, it is essential to fuse each battery individually.

**CABLING SELECTION:** To verify CSA of your cable check spec printed on cable. (Always consult vehicle manufacturer if you are unsure of the cable specification or the current demands of your electrical system.) Only use new multi-stranded copper cable rated to ISO 6722-1 Class B (105°C) FLRY-B. Calculate the permissible voltage drop of  $\leq 3\%$  at full load. If installing new chargers use 25mm<sup>2</sup> cable from battery to new busbars subject total current carrying capacity of chargers. For 2-3kW Inverters follow manufacturers guidelines for cable and fusing requirements.



## INSTALLATION TYPE:

### HEIGHT RESTRICTED LOCATIONS (MRBF KIT - REQUIRED)

If there is a height restriction - ie it is being installed under a seat base or under the floor then the MRBF fuse needs to be order as a KIT which comes with a terminal clamp with an M10 post for the MRBF fuse to be connected to in the inverted position as show below. Using the terminal clamp enables the fuse holder to be orientated into may different positions to suit your application.

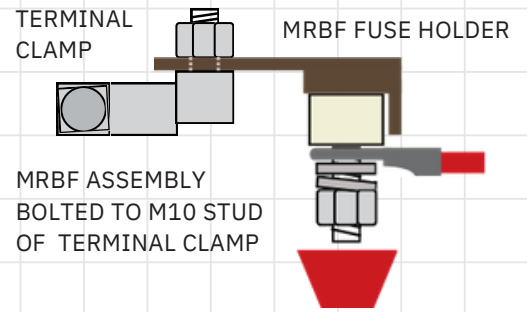
### NON-HEIGHT RESTRICTED LOCATIONS (MRBF FUSE - REQUIRED)

If the battery is to be installed into a place where there is no height restrictions then the MRBF fuse can be ordered on its own without the need for the terminal clamp. The Fuse can be bolted directly to the POSITIVE terminal with the M8 bolt provided.

## HEIGHT RESTRICTED LOCATIONS

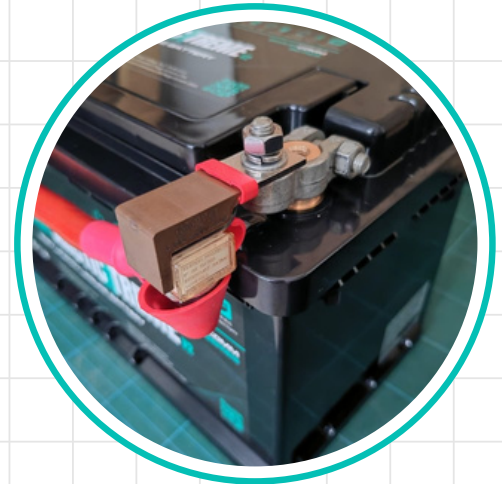


## MRFB & TERMINAL CLAMP ASSEMBLY

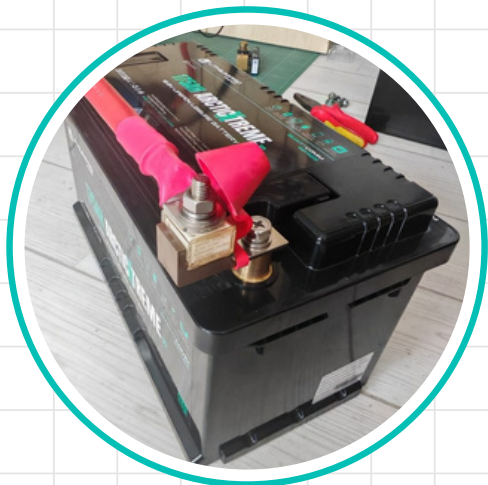


### ASSEMBLY INSTRUCTIONS

1. Connect the positive cable to the MRBF fuse in the precise order listed above. Ensuring the silicon protection cover is in place.
2. Place battery terminal clamp with M10 stud onto positive terminal of battery & secure to battery (12-14nm torque). Remove M10 nut & washer.
3. Take the MRBF assembly and turn upside down (invert) and lay on top of the M10 stud on the battery clamp. Replace washer, split washer & M10 nut. Tighten M10 nut to torque of 12-14nm. Replace insulated terminal cover.
4. **WARNING:** NEVER connect loads via the M10 stud as these will not be protected.
5. **IMPORTANT:** Ensure battery is securely fastened in position and cannot slide or move in any direction.



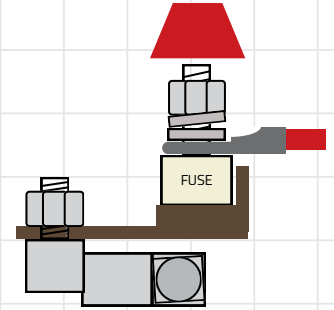
## NON-HEIGHT RESTRICTED LOCATIONS



### ASSEMBLY INSTRUCTIONS

1. Place the MRBF assembly on the positive terminal and bolt down with the M8 bolt provided. Torque to 12-14nm
2. Connect the positive cable to the MRBF fuse in the precise order listed above.
3. Replace washer, split washer & M10 nut. Tighten M10 nut to torque of 12-14nm. Replace insulated terminal cover.
4. **WARNING:** NEVER connect loads via the M10 stud as these will not be protected.
5. **IMPORTANT:** Ensure battery is securely fastened in position and cannot slide or move in any direction.

## CARAVAN BATTERY BOX LOCATION

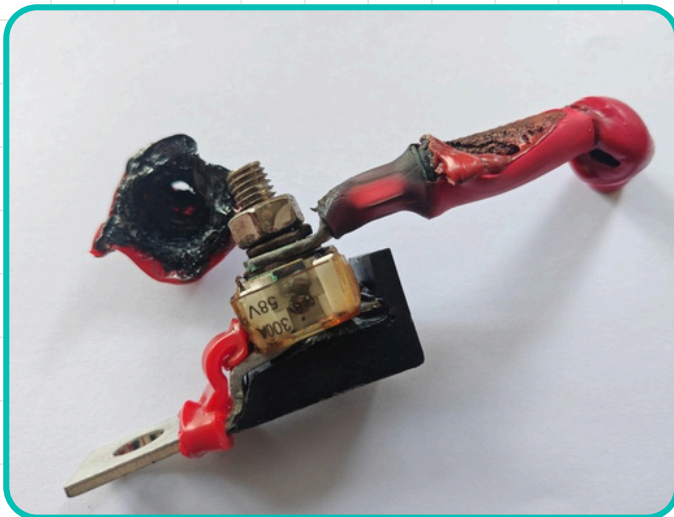


MRBF ASSEMBLY BOLTED TO M10 STUD OF TERMINAL CLAMP

### ASSEMBLY INSTRUCTIONS

1. Place the terminal clamp onto the positive terminal and tighten to a torque of 12-14nm. Ensure the clamping end of the terminal is facing you to enable easy access to tighten.
2. Place the MRBF assembly on the M10 post of the terminal clamp and secure with M10 nut provided. Tighten to a torque of 12-14nm
3. Slide the MRBF fuse onto the threaded fuse pole in the precise order FUSE>CABLE LUG>WASHER>SPLIT WASHER>NUT
4. Tighten M8 nut to torque of 12-14nm. Replace insulated terminal cover.
5. **WARNING:** NEVER connect loads via the M10 stud as these will not be protected
6. **IMPORTANT:** Ensure battery is securely fastened in position and cannot slide or move in any direction.

**For SAFETY,** reliability and regulatory compliance, only use reputable fuses from reputable manufacturers such as Blue Sea, Bussmann, Littelfuse, Mersen or Siemens with AIC rating of  $\geq 10,000A$  for small capacity lithium. Never substitute with low cost fuse alternatives from market places. These may fail to interrupt high fault currents safely as shown in counterfeit examples below.



### DISCLAIMER:

This installation guide is provided for informational purposes only to assist with the installation of LithiumPro batteries. All installations must be carried out, checked, and certified by a competent and qualified electrician in accordance with the applicable regulations and safety standards. Installers should carefully follow manufacturers installation manuals provided to ensure proper integration and compliance. LithiumPro Energy assumes no responsibility for damage, injury, or non-compliance resulting from improper installation or use of this guide.

