



Eldre | Ferraz Shawmut | R-Theta

PROTECTION AND OPERATION
DEVICES FOR DC APPLICATIONS

m-fuse[®]

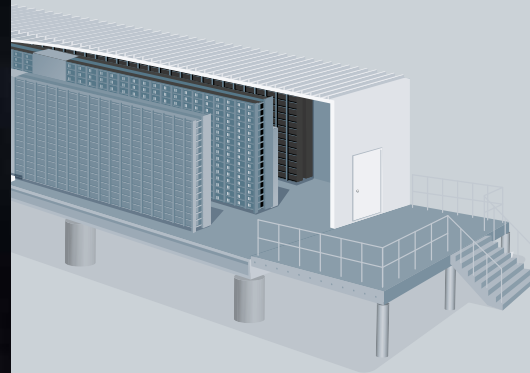
Xp series[®]

EVpack-fuse[®]

Xs series[®]



ESTABLISHING DC
PROTECTION RULES...






MANAGING OPERATION & FAULT CLEARING OF DEMANDING DC CURRENT APPLICATIONS

3 core technologies to manage DC current protection and operation

Mersen offers a wide range of DC over current protection (OCP) solutions based upon incumbent proven technology (DC fuse) enhanced by 2 new disruptive hybrid devices. These 3 product families allows a coverage of the whole DC protection

spectrum , from low to high fault currents, resettable or not, fast to ultra-fast acting, arc-less, low to virtually no power loss, high duty-cycle compliant, over the entire voltage and current DC range.

	MONOLITHIC TECHNOLOGY	HYBRID TECHNOLOGY	
Product range	EVpack-fuse[®] M-fuse[®]	Xs series[®]	Xp series[®]
Core technology	DC-Fuse	Semiconductor + Switch	Pyroswitch + Fuse
Value proposition	Ultra fast-acting fuses (for large fault currents) Cost effective & proven technology DC specific design	Fast-acting operation Close-to-zero conduction loss Fully configurable Resettable Arc-less	Fast-acting operation < 1ms Cost-effective technology Close-to-zero conduction loss Operates for small or large fault current Fully configurable Very compact size High cycling performances High inrush current capabilities
Visuals			

Mersen DC-rated OCP have been specifically developed

Clear both high and low DC fault current

- Fuses have been fully tested in DC conditions to guaranty a fast and reliable protection for large fault currents.
- Hybrid technologies ensure a reliable protection for both small and large fault currents.

Limit or eliminate the impact of severe duty cycles

- e-mobility mission profile is characterized by a sequence of fast battery charge/ discharge following acceleration and breaking regeneration phases.

Decrease power losses to improve system efficiency

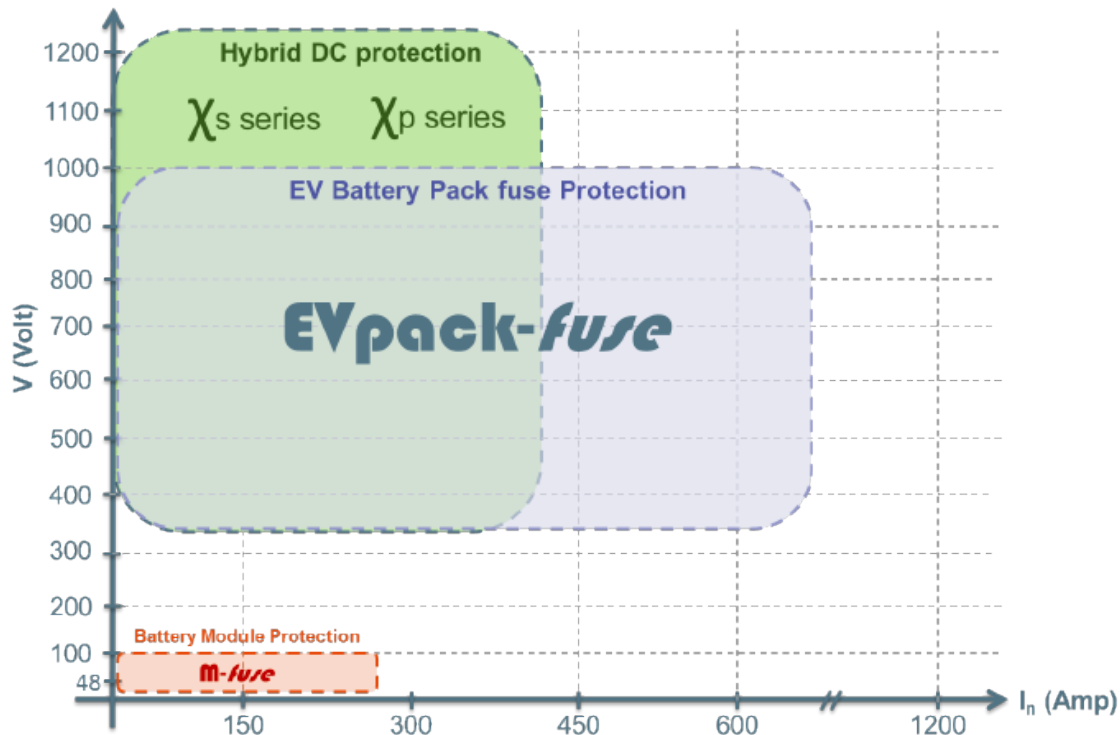
- Battery-powered systems are chasing for any power savings to extend operation time.

Hybrids offer a reliable and robust alternative to DC relays, DC contactors, DC switches...




- These technologies offer very limited performance at high DC voltage conditions.
- Limited to no offer of high durability > 500VDC.

A COMPLETE RANGE COVERING FULL DC SPECTRUM

Typical Current-Voltage usage:

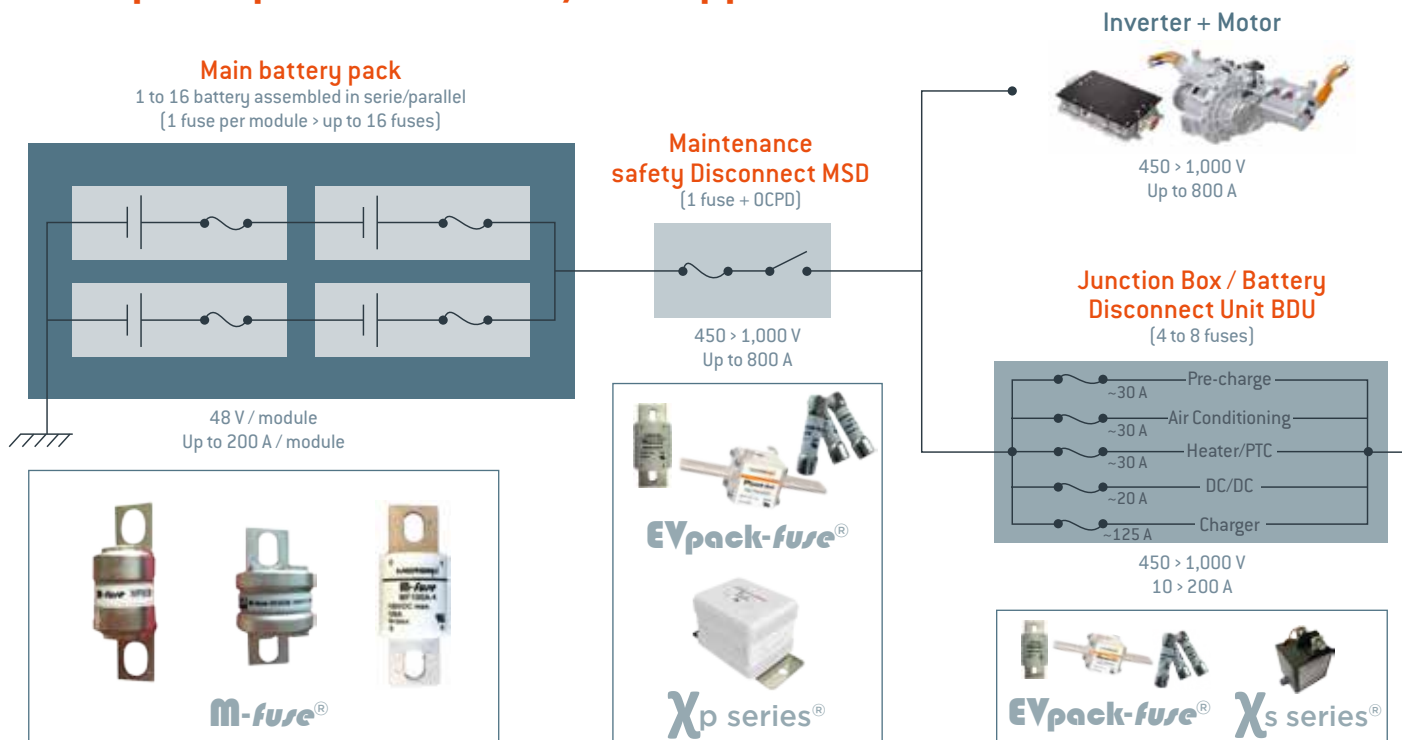


DC OCP product line-up comparison table:

Family	MONOLITHIC TECHNOLOGY		HYBRID TECHNOLOGY	
	DC-Fuse	Semiconductor + Switch	Pyroswitch + Fuse	
Product range	 <p>EVpack-fuse[®] m-fuse[®]</p>	 <p>χ_s series[®]</p>	 <p>χ_p series[®]</p>	
Resettable	No	Yes	No	
Time to clear high fault current	Excellent, 10 of μS	Good, 100's of μS	Good, 100's of μS	
Time to clear low fault current	Slow to melt 10's of seconds	Excellent Down to 100's of μS	Excellent Down to 100's of μS	
Cycling performance	Application dependent	Good	Excellent	
Conduction losses	80W (400A)	12W (200A)	20W (400A)	
Tunable Time-Current curve	Limited	Yes	Yes	
Self-powered	Yes	No	Possible	

APPLICATION SPECIFIC

Example of product fit in EV/HEV applications:



Example of product fit in Electrical Energy Storage applications:

