



Battery configuration switch (BCS)

Reduce complexity, maximize performance

The growth of the electrical vehicle (EV) market has brought an increasing demand for improved performance and faster charging. As OEMs adapt to these needs by transitioning from 400V to 800V batteries, they face a new challenge. Much of the public EV charging infrastructure is built to support 400V EVs. Without additional, sometimes costly equipment, 800V EVs are not able to use these chargers.

Eaton's Battery configuration switch (BCS), developed in cooperation with Munich Electrification, solves this challenge in one innovative device that is integrated into the battery pack. Designed for passenger and light duty commercial vehicle applications, the **BCS** is a bi-stable device that safely and efficiently transitions pack voltage between 400- and 800- volts, enabling EVs to charge at a different voltage than vehicle operation.

Features & Benefits

- Enables electric vehicles to charge at a different voltage than vehicle operation with maximum performance on all DC charging infrastructures
- Designed for automotive, light commercial vehicle and UTV applications
- 500A continuous current without cooling possible
- Switch series to parallel configurations in <500 ms
- Alternately replaces three single pole contactors for voltage reconfiguration
- Stable positions in loss of KL30C cases
- No power consumed in coil during operation allowing for increased efficiency

Key differentiators

- **Reduced complexity** – Enables the reduction of up to 12 components in a Battery disconnect unit (BDU), simplifying the system and streamlining packaging and assembly
- **Reliable safety** – Rotational motion creates a mechanical interlock that prevents an accidental short circuit condition
- **Optimized charging** – Can eliminate a buck/boost converter on 800V EVs, allowing the battery to draw maximum current even at a 400V DCFC charger
- **Enhanced efficiency** – Maintains a stable position with no low voltage hold current, eliminating parasitic loss, improving vehicle efficiency and ensuring functionality and safety even if low voltage power is lost
- **Quicker startup time** – Due to its bi-stable nature, the BCS's desired configuration can be pre-selected at startup or left from last shutdown. The BCS can also offers a disconnect position for maximum safety during shutdown

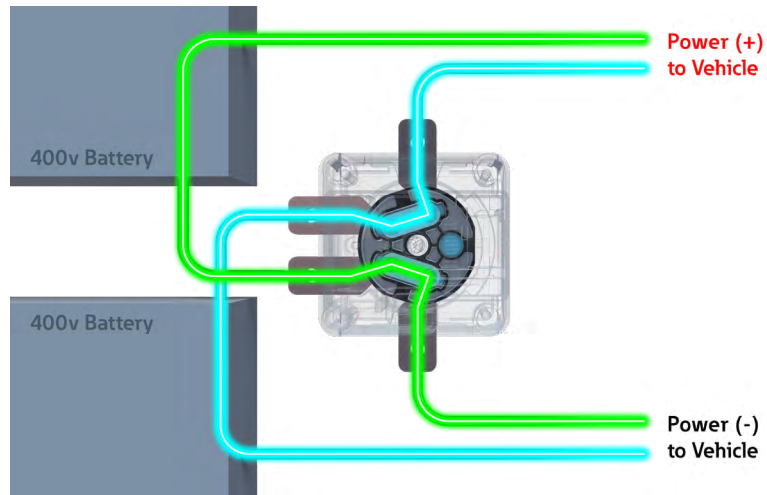


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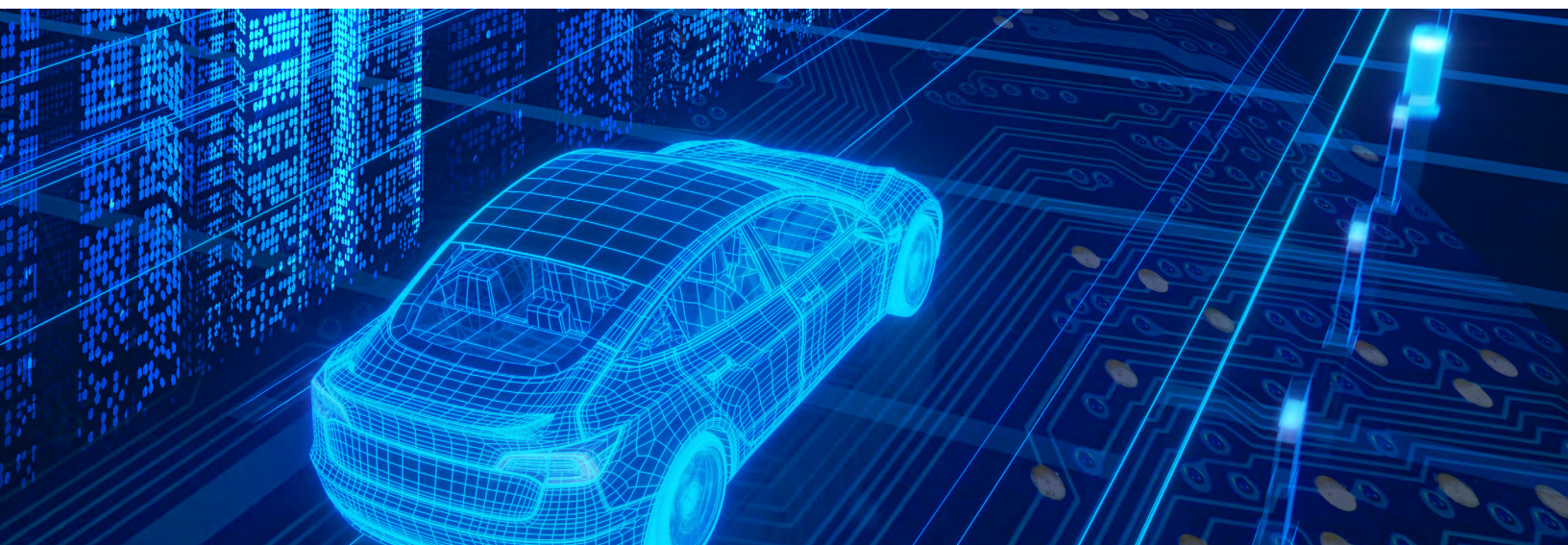
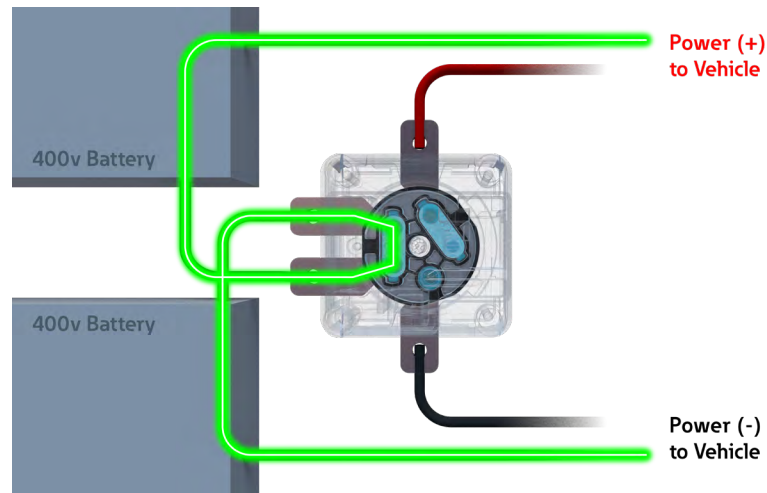
Powering Business Worldwide

Change battery pack configuraion and voltage with a single component

400V configuration (parallel)



800V configuration (series)

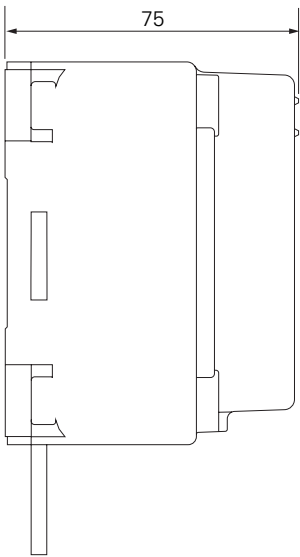
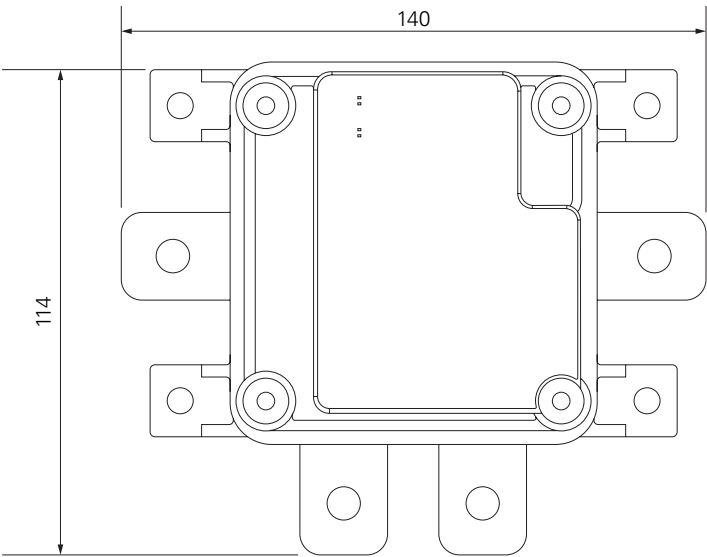


Battery configuration switch specifications



	2-state	3-state	Notes
Configuration			
Parallel (400V)	X	X	
Series (800V)	X	X	
Disconnect		X	
Contact Resistance 800V	<100 µOhm	<100 µOhm	
Contact Resistance 400V	<100 µOhm per string	<100 µOhm per string	
Current Carrying	500A without external cooling	500A without external cooling	Higher current can be achieved with liquid cooling
Make and Break Current	Max 50A	Max 50A	400V strings must be balanced to limit inrush current
Control for reconfiguration	7W for 0.5s	CTRL Signal ON (12V)	The reconfiguration is bi-stable. It requires a pulse to change direction
Dimensions / Weight	140mm x 114mm x 75mm / 658g	140mm x 114mm x 75mm / 658g	

Battery configuration switch drawings



Learn more at [Eaton.com/eMobility](https://www.eaton.com/eMobility)