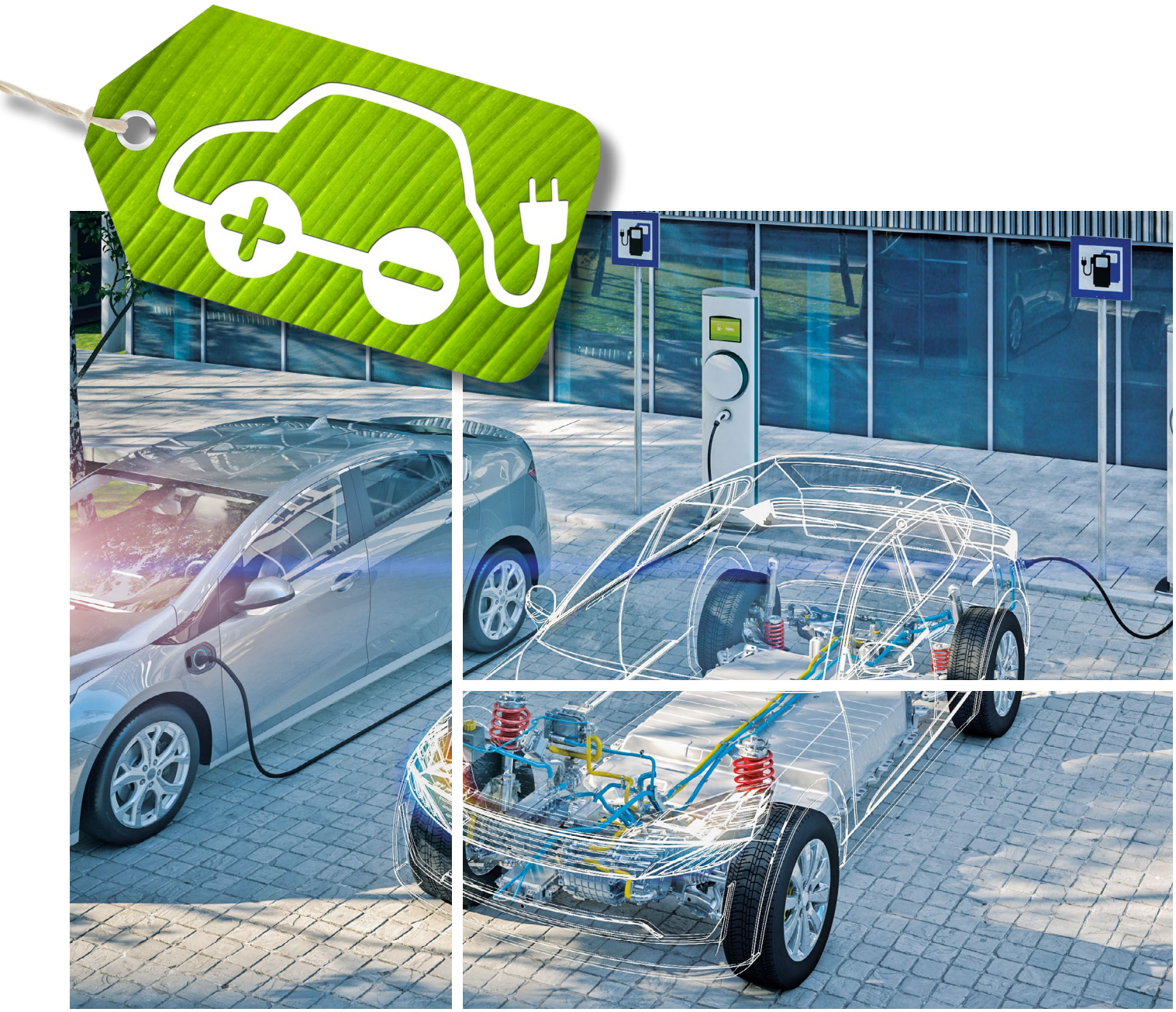
CONNECTIVITY SOLUTIONS FOR BATTERY MANAGEMENT ELECTRONICS

Based on the NanoMQS Miniaturized Connector System



In the same way that the internal combustion engine (ICE) was considered the heart of the traditional motor vehicle, the battery is considered the heart of electric vehicles (EVs), with battery technology at the forefront of innovation.

The key driver of battery technology development is range. However, at the same time engineers at OEMs and battery manufacturers need to offer designs that optimize power-to-weight/ size performance whilst also maintaining the highest levels of safety.

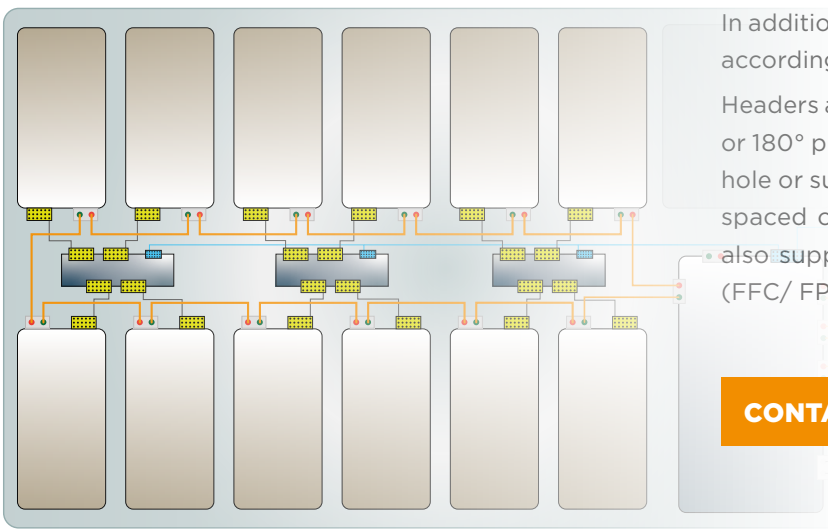
Battery Management Systems

A battery management system (BMS) is the electronic system that manages the battery pack and the cells within. Its purpose is to protect the battery from operating outside its safe limits by monitoring its state; including voltage, temperature, state-of-charge and current and coolant flow. It processes collected data, communicating it to the elements that balance or control its environment.

The BMS is critical to the optimum performance and safety of the battery which means it must operate with a high degree of accuracy and reliability and must be of highly robust construction. However, it must also be compact and lightweight, adding the least possible bulk to the overall battery pack geometry.

The Role of Connectivity

Electronics connectivity technology is a key enabler of the battery management system. Its role is to transfer signals from monitoring technology, such as current and temperature sensors, within the cells to processing units (cell management controllers) and in turn, communicate that data to the Battery Management Controller where it is acted upon.



Connectivity Requirements

BMS electronics require highly compact, yet flexible connector systems. Given that the ratio between battery cells and cell controllers vary according to battery design, connector systems must have the flexibility to accommodate multiple connector configuration permutations. Connectors should also support flat and flexible cables that can be routed around compact and complex battery geometries.

In addition, the connector system requires a safe “creepage” and clearance distance between the pins, ensuring no risk of failure from short circuits caused by dust pollution or arcing.

As battery modules are supplied as sealed components, manufacturers must be assured that all the internal connectors meet the strict specifications (e.g. LV214) for automotive grade robustness and reliability.

Connectivity Solutions for Battery Management Systems

TE Connectivity (TE) offers a range of automotive-grade solutions for electric vehicle battery management systems. Based on NanoMQS miniaturized interconnection system for 0.5 mm blade sizes, TE Connectivity can offer plugs and headers in multiple configurations for highly compact board-to-board and board-to-device connections within battery management system applications.

LV214 compliant, NanoMQS is vibration resistant up to SG4 and operates in temperatures up to 170° C. It’s range of housings include a variant with “click-audible” connector position assurance to ensure secure mating. The header system is highly compact but at the same time, supports a pitch of 1.8 mm providing necessary “creepage’ distance between pins.

In addition, other pin pitch variations can be made available according to specific battery design requirements.

Headers are available in one or two-row versions with a 90° or 180° pin orientation. Board mounting comes in through-hole or surface mounted (SMD) variations. Highly suited to spaced constrained battery pack geometries, NanoMQS also supports the latest flat and flexible/ printed cables (FFC/ FPC).

CONTACT US FOR MORE INFORMATION

NanoMQS Miniaturized Automotive Interconnection System

Dimensions

- 1.8 mm pin-to-pin pitch
  (other variants available on request)
- 0.13 mm^2 to 0.35 mm^2 wire range
- Mating for 0.5 mm x 0.4 mm blade size
- Available for flat flexible / printed cables (FFC/FPC)

Performance

- Current capacity: 3A (90° C)
- Max. temperature 170° C (Ag)
- SG4 vibration Grade (Ag)
- LV214 compliant

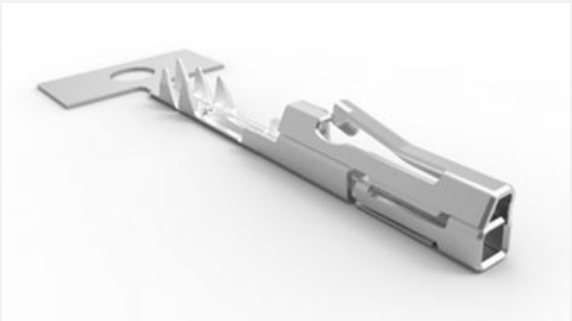
Mating Security

- Locking lance design
- Primary and secondary contact - locking
- Click-audible connector position assurance (CPA)

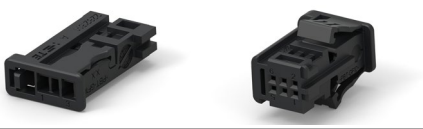
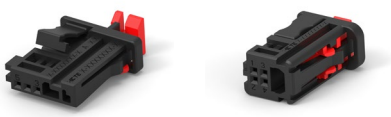
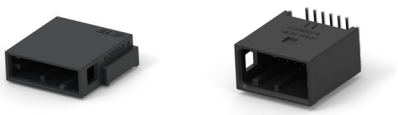
Board Mounting

- SMD / Through-hole mounting
- 1 or 2 rows
- 90° / 180° pin orientation

NanoMQS Terminal



NanoMQS Terminal (FFC)

	Type	No of Positions
	Plug for Flat and Flexible Cables	8, 20, 32 pos (2-row)
	Plug without CPA (top-latch)	8, 12, 20 and 32 pos (2-row)
	Plug without CPA (side-latch)	2-9 pos (1-row) 4-20 pos (2-row)
	Plug with CPA (side-latch)	2-9 pos (1-row) 4-20 pos (2-row)
	Header (THT-type)	4, 6, 8, 10, 12, 20, 32 pos (2-row) 90°/180°
	Header (SMT-type)	2-11 pos (1-row) 90° / 180° 4-22 pos (2-row) 90°/180°

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