INDUSTRIALTECHNOLOGY.CO.UK
26 Aprile 2021
https://www.industrialtechnology.co.uk/search--innovation-in-the-thermal-management-of-lithium-batteries.html

INNOVATION IN THE THERMAL MANAGEMENT OF LITHIUM BATTERIES

A combined coil and connector has been developed according to the strictest design criteria to work under the bonnet of hybrid and electric vehicles, regulating the cooling circuits of their lithium batteries.

The ultra-compact solution developed by Atam, guarantees cutting-edge performance to the main devices responsible for under the bonnet thermal management such as the chiller, refrigerant pump and shut-off valves.

The quest for improved hybrid and electric vehicle performance inevitably includes the use of increasingly high-performance batteries capable of quickly and reliably providing the necessary operating energy. Improper management of the main component on this type of vehicle would lead to high maintenance costs and the risk of fire due to the flammable elements contained in the batteries.

In fact, in order to function efficiently over long periods, the batteries of hybrid and electric cars must be able to maintain an optimal temperature, as constant as possible in a range between +20 °C and -40 °C, regardless of the outside temperature. Excessively high temperatures affect the useful life of the battery pack while excessively low temperatures lead to a drop in performance. The battery decay process, measured in charge cycles and residual capacity, can be improved with optimal thermal management based on increasingly sophisticated control logic and actions.

The efficiency of the cooling devices depends heavily on integrated functional circuits regulated by coils and connectors with specific technical characteristics, which should also minimise space requirements.

Construction technique

Atam's ultra-compact solution is offered with different electrical parameters and types of connection to satisfy all motor types. The 22 mm coil and the overall dimensions of the winding are specifically designed to ensure all the force, linked to the number of turns, and the tolerance necessary, to adjust the valve. Space optimisation also exploits the geometry of the connector with the terminals encapsulated in the coil to form a single body. The mating between the connector and the coil can also be considered a critical area, where humidity and dirt can create sealing problems.

Atam offers an IP69K degree of protection thanks to the class H materials used for encapsulation, which have demonstrated optimal resistance to cracking and material failure, that may otherwise lead to the damage of internal circuits.

The choice of materials has for some time been the subject of careful studies by the Atam testing laboratory which constantly works towards research and development of new, high performance, robust materials. This laboratory has recently been equipped with a new double compartment climatic chamber allowing heat adjustment between +50/+220°C and cold adjustment between -80°C and +100°C, which is capable of subjecting the samples to sudden thermal shocks in just 10 seconds, simulating the most severe field operating conditions.

The new equipment, in addition to testing and validating different types of materials, is essential for collecting data relating to the different production stages based on the most rigid criteria or specific customer requests.

Atam has been producing encapsulated coils and connectors for 50 years and it is the joint and continuous development of the two complementary product lines, also made possible by a latest generation test laboratory, which allows it to simulate their combined use, in a wide range of conditions. This vast experience enables it to offer customers integrated solutions, optimal in terms of reliability, quality, space saving and convenience.

Atam is known for its custom-made products, which today represent 70% of all its production, conceived from scratch or adapted to the specific needs of the customer starting from standard products.

In addition, the company offers the market a wide and complete range of off-the shelf products intended for the most varied applications.

ATAM (UK) Ltd