

In-cab thermal management for EVs

WITH ITS THERMAL MANAGEMENT SOLUTIONS, SIROCO IS MEETING THE DUAL CHALLENGE OF SAVING BATTERY POWER WHILE ENSURING THERMAL COMFORT INSIDE THE CAB

▷ For several years now, electromobility of off-highway vehicles has raised thermal challenges, leading to a more precise approach of cab temperature and battery use. In this context, Siroco, as a recognised expert in thermal management for industrial vehicles, supports the world's leading equipment manufacturers in the electrical conversion of their thermal systems, and expands its e-mobility offer with high-quality and high-performance solutions easy to integrate in cab.

An advanced TMS

Siroco focuses on the challenges of e-mobility and helps its customers to make sustainable transitions through new skills and a wide range of standard and specific solutions for electromobility, one of these solutions is the thermal management system (TMS). “The TMS centralises and coordinates the heating and cooling of all the vehicle’s components by centralising the use of heat. A single system recovers and distributes the calories. This way, the available thermal power is allocated according to the needs of each component, thereby extending their lifespan,” says Sébastien Perraud, research and development engineer at Siroco.

The TMS to be integrated into the vehicle must manage thermal comfort through hot or cold conditioning and cabin ventilation, as well as ensuring that the battery, drivetrain and its controller remain within their optimum temperature range. To achieve this, Siroco sizes the cab heating and air conditioning components (refrigeration cycle, hot and cold loop), sizes the components of the hot and cold glycol circuits and defines the operating strategy according to the desired use, in economy mode or full power. A single system manages everything, offering a maximum heating and cooling capacity of 5kW. In terms of controls, the CAN HVAC controller remains the brain of the system. Compact and flexible, it integrates real-time intelligence to control ventilation, heating, air conditioning and cooling of the powertrain and optimises energy consumption. This combination of heat exchanger and intelligent electrical components puts Siroco at the forefront of the electric transition of thermal-engine vehicles.



Thanks to the centralisation of the use of calories, the thermodynamic group of the thermal management system coordinates the heating/cooling of vehicle components

Energy efficient solutions

Siroco provides industrial vehicle manufacturers with an ecosystem of essential electric solutions to meet ecological challenges. Designed for 24V to 800V vehicles with limited space, the E-Duo Top electric rooftop unit is available in electric heating and air-conditioning (E-HVAC) version and in electric air-conditioning (E-VAC) version, offering a cooling capacity of 4.5kW and a heating capacity of 2.5kW. The E-Duo Top is also

available in heat pump version. “Our aim is to maximise the efficiency of the heating and air-conditioning system while reducing power draw. We are optimising electricity consumption and increasing the efficiency of the refrigeration system by using the principle of reversible air conditioning. Fresh air is circulated in the cabin via the evaporator located inside the vehicle, which recovers the heat from inside the cabin and rejects it outside via the condenser,” explains Perraud.

For small-cabin engines looking for standard rooftop units, the Solano Top is available in electric (E-HVAC) and thermal (HVAC) versions. Available in 48V and 80V, the electric version offers a cooling capacity of 5kW, a heating capacity of 2.3kW and a nominal air flow rate of 350m³/h for an electrical capacity of 160W. To ease the set-up, the Solano Top comes with its own ceiling light and integrated or remote control which can also be used with the E-Duo Top.

Ideal for small cabs, the E-Duo 12V-24V is a plug and play condenser/compressor unit to couple with an air-conditioning or heating/air-conditioning unit to install on the roof or at the rear of the cabin. Compressor voltages range from 12V to 96V, cooling capacities of

between 2kW and 4.3kW and compressor capacities of 18cc, 24cc and 27cc.

The Stand Up II M is a vertical electric heating and air-conditioning (EHVAC) unit for small and medium-sized machines. The Stand Up II M is easy to install inside the cab. It offers a cooling capacity of 3kW and a heating capacity of 2kW for an air flow rate of 224m³/h. The Stand Up II M is also available in HVAC version, offering a cooling capacity of 3kW, a heating capacity of 4.6kW and an air flow rate of 242m³/h.

The E-Sanoa is an ultra-modular unit covering all needs: EHVAC, HVAC, AC, EHV, HV. The EHVAC version offers 4kW cooling capacity, 2.7kW heating capacity and a nominal air flow rate of 420m³/h

Simulation

Siroco is not only strengthening its electrical ranges. The thermal expert is adding another string to its bow with Simulink software. This new tool can be used to model a thermal system using Simscape and to optimise component sizing and control logic.

Thermal management of EVs and electronic air conditioning is a game changer for off-road vehicles. Siroco is maintaining its position as a recognised thermal expert by consolidating its technical and technological progress and pursuing its development in the growing e-mobility sector. **ivt**

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