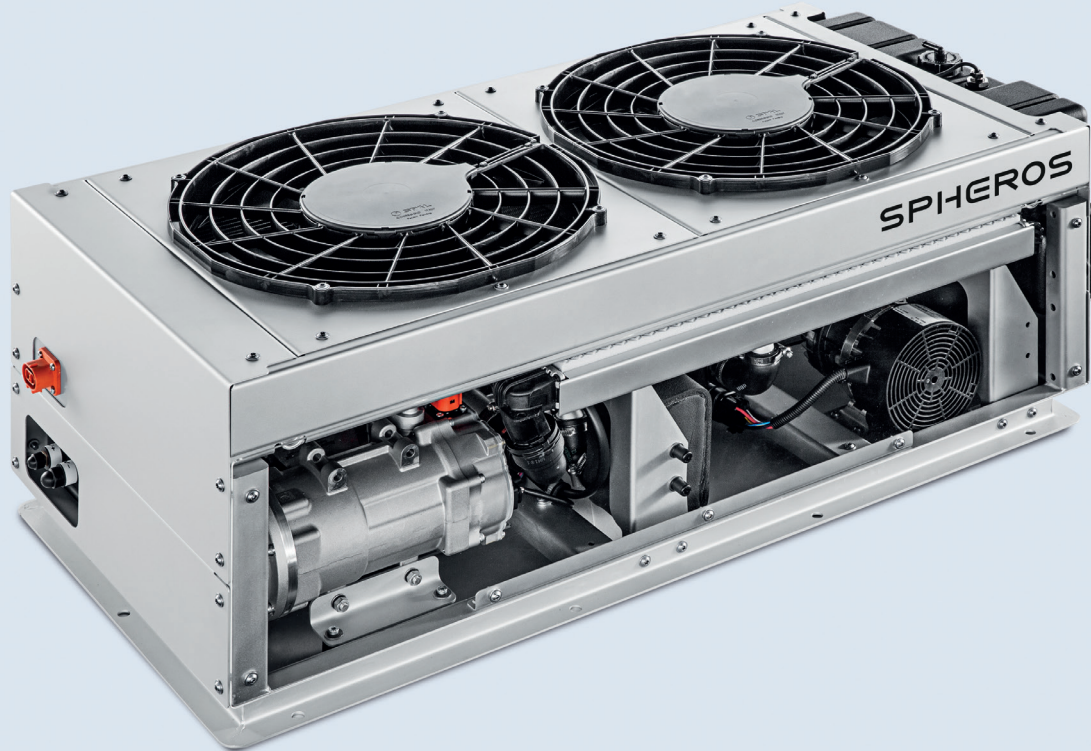


New 10 kW battery cooler

E-COOLER BTM / BCS



For the battery comfort zone

The fast growing electrification of mobility – particularly in public transport – requires high-performance mobile energy storage systems that enhance travel comfort.

With E-Cooler Spheros has introduced a range of battery temperature management models with a maximum cooling capacity of 10 kW, offering an optimal solution for a wide range of applications. Depending on the requirement, the E-Cooler protects the battery from overheating during charging and discharging, cools it while driving at higher outside temperatures and heavy loads.

An additional heating function even warms up the sensitive batteries if necessary to restore the optimum temperature range.

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If the battery is not in its comfort zone over an extended period, its efficiency and service life will be significantly reduced.

The battery can be seen as the core element of electric drives. For optimum use of its energy prior to and during operation, its temperature must be maintained within a narrowly defined range. Optimum thermal management of Li-ion batteries ensures their chargeability and performance and thus reliable driving.

► Spheros is familiar with the comfort zone of batteries

For many years Valeo has been concerned with the subject of battery temperature management. Several customer projects and broad experience in the market provide the basis for diversification. Besides the fieldtested 5 kW version, Spheros has now developed new 10 kW BTM versions – an optimum solution for an even broader field of application and boosted power even at higher outside temperatures.

The E-Cooler relieves the battery from overheating during the charging and discharging process or cools it during the journey at higher outside temperatures.

The E-Cooler also assumes a heating function and warms up the sensitive Li-ion batteries when needed, in order to restore the optimum temperature range.

Depending on the situation, the batteries can be temperature controlled in three different ways:

1. If the outside temperature is low enough, **passive cooling** is possible. The system “uses” the slightly lower outside temperature for energy-saving battery cooling.

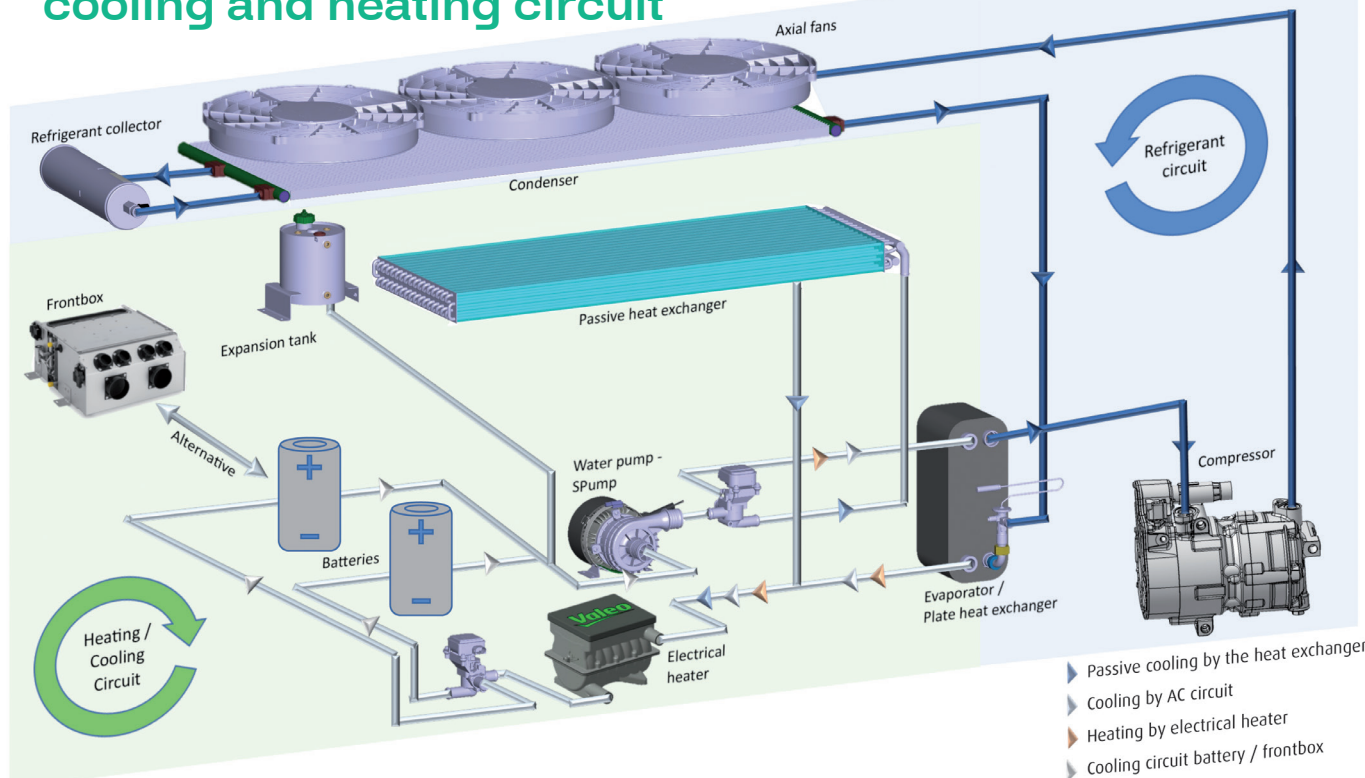
2. If the ambient temperature is too high for passive cooling, the system automatically switches to an **active coolant circuit**.

3. If energy is needed for heating the batteries, the electric heater feeds the necessary heat to the **heating circuit**.



Spheros E-Cooler 5 kW: experienced and field-proven, more than 4000 units sold.

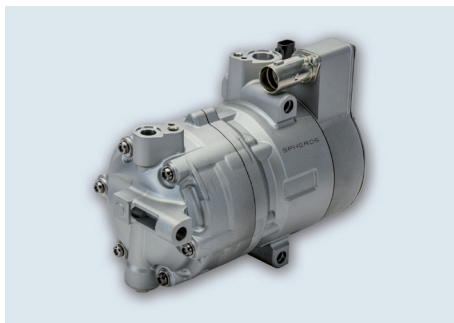
► Battery thermal management: cooling and heating circuit



► Perfectly engineered components for a long-lived overall system

Our many years of system experience as an air conditioning specialist for passenger vehicles enables us to devise tailored all-in-one solutions in which the individual components determine the whole. We ourselves specify the requirements to be placed on the components, developing and manufacturing them to a high degree of precision and thereby achieving an efficient overall system with a long service life.

Perfectly matched – adjustable – reliable



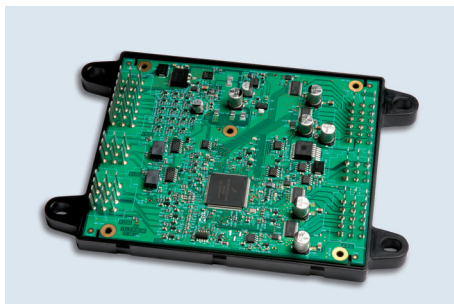
Electric compressor EDC

adjustable, integrated frequency inverter, robust, extremely lightweight, smooth running.



Powerful SPump

specially developed for use in electromobility and battery cooling (high counter-pressure), long life (magnetically coupled, brushless), CAN interface.



Intelligent central unit SU020

for fully automatic **control** of Spheros HVAC components and integration into the vehicle via CAN interface.



High voltage Thermo HV heater

compact dimensions, suitable for a broad voltage range, adjustable up to 875 V, CAN interface.

E-COOLER 5KW / 10KW



HIGHLIGHTS

BCS: Standalone solution with active (optional passive) cooling circuit in the basic version.

BTM: Active / Passive cooling circuit, water circuit, electrical heater and expansion tank.

- Modular deployment, high flexibility depending on vehicle geometry
- Integrated controls
- CAN-bus connection to the vehicle



Low life-cycle costs

- Energy-optimised operation
 - demand-based control of compressor and fan
 - automatic switching between passive cooling and active coolant circuit
- Pure 24 V technology at 5 kW version: easy service



Safety

- Safe operation of the battery is only guaranteed within a narrow temperature frame
→ battery cooling thus has an impact on the range of the vehicle



TECHNICAL DATA

| | E-Cooler 100 BTM | E-Cooler 100T BTM | E-Cooler 50 BCS | E-Cooler 100 BCS |
|--|--|---|---|---|
| Maximum cooling capacity (kW) at: outside temperature (°C) of coolant outlet (°C) of coolant flow (l/h) | 10 (8) 44 (approx. 50) 35 approx. 2,000 | 10 (12) 55 (44) 35 approx. 2,000 | 5 (approx. 6 kW) 44 25 (35 °C) 1,000 | 10 44 35 2,000 |
| Maximum power consumption (compressor / fan) | compressor 5 A at 800 V fan 21 A at 28.5 V | compressor 5 A at 800 V fan 31 A at 28.5 V | 75 A | 5 A / 18 A |
| Maximum weight depending on design (kg) w/o coolant-carrying components | 85 | 115 | 60 | 55 |
| Voltage (V) (compressor / fan) | 650 / 24 | 650 / 24 | 24 / 24 | 650 / 24 |
| Dimensions L x W x H (mm) | appr. 1,200 x 511 x 350* | appr. 1,700 x 511 x 350* | 980 x 670 x 310 | 780 x 400 x 375 |
| Coolant Filling capacity (kg) | approx. 1.5 | R134a approx. 1.7 | R134a | R134a R134a |
| | | | active and passive cooling substation | cooling only expansion tank, water pump, substation |
| | SOP Q1/2024 | on demand | | SOP Q3/2023 |

Contains fluorinated greenhouse gases. Dimensions depend on the final power requirement and the outside temperature. Weight depend on design