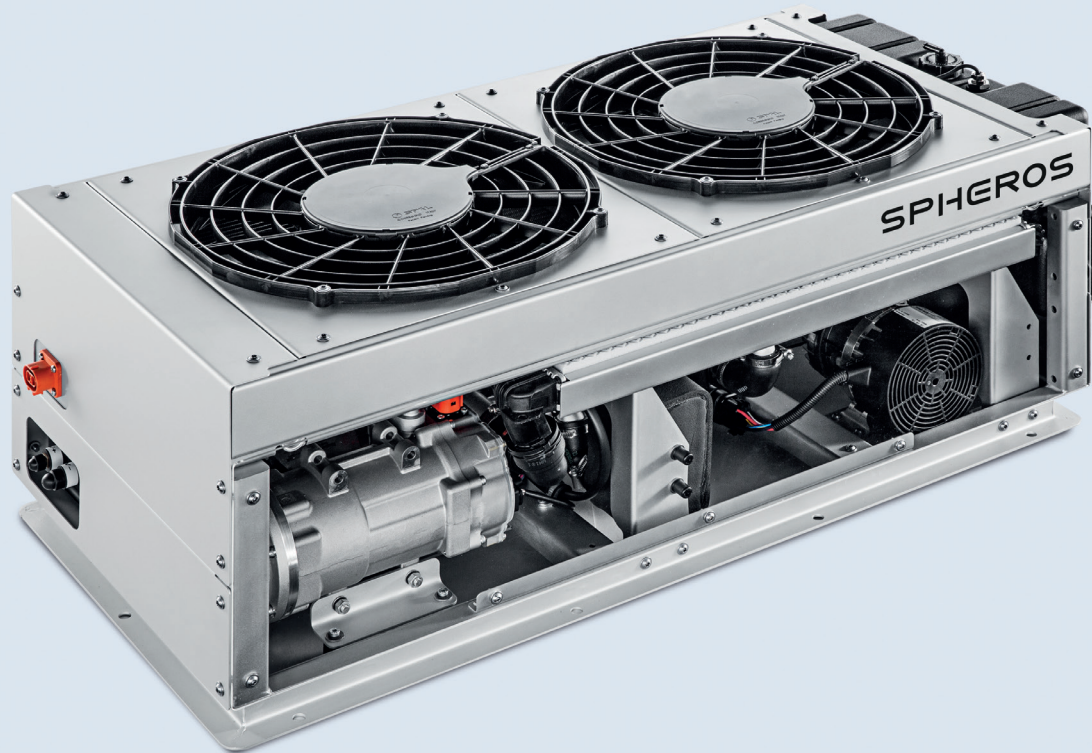


New 10 kW battery cooler

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.



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.

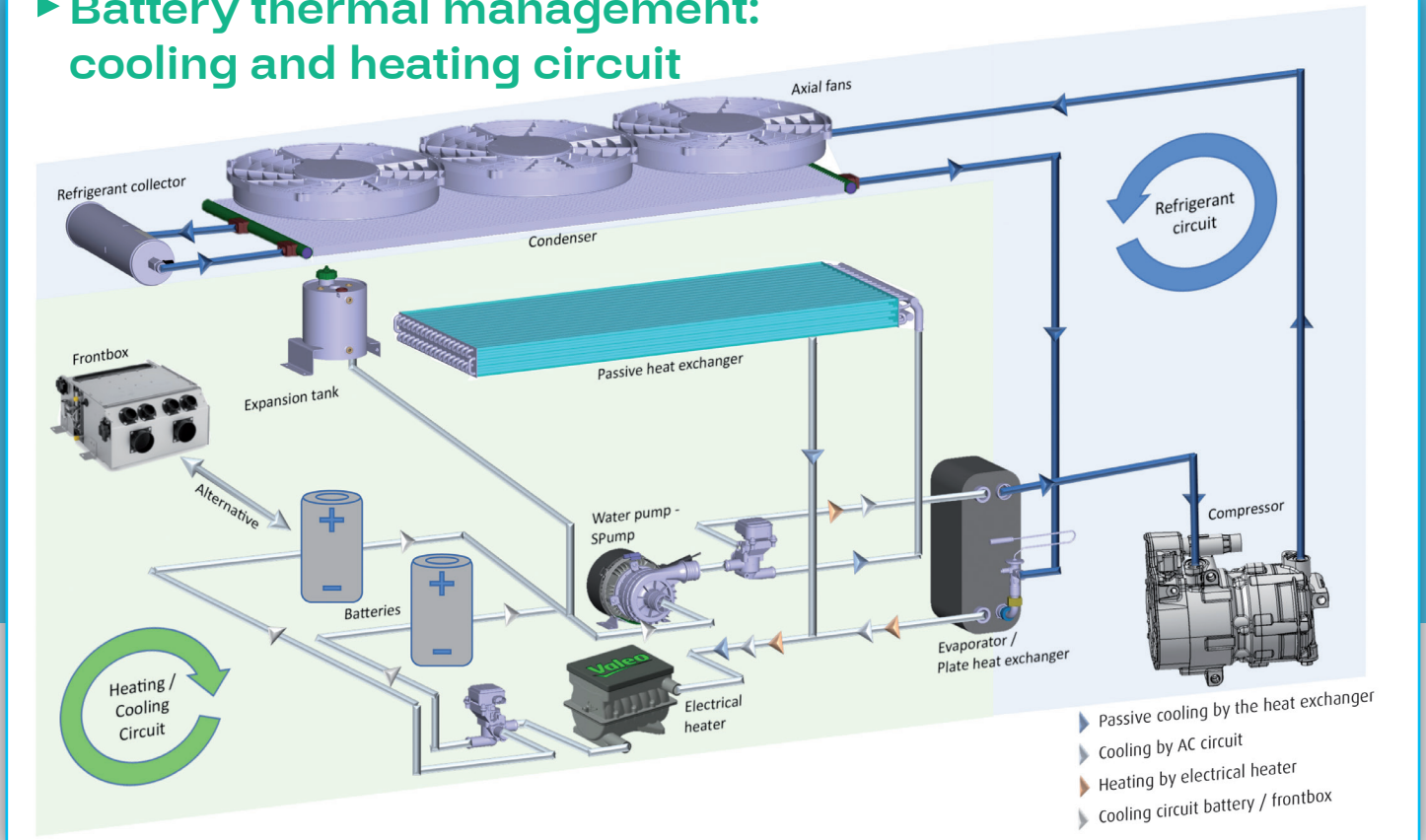
2. If the ambient temperature is too high for passive cooling, the system automatically switches to an **active coolant circuit**.

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



Spheros E-Cooler 50 kW: experienced and field-proven, more than 5000 units sold.

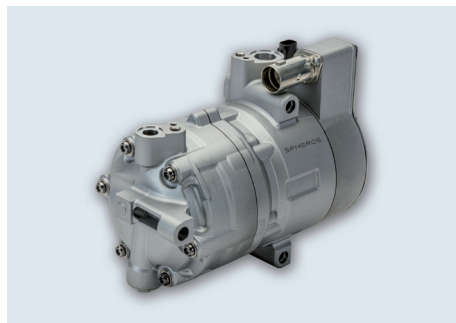
► Battery thermal management: cooling and heating circuit



► 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



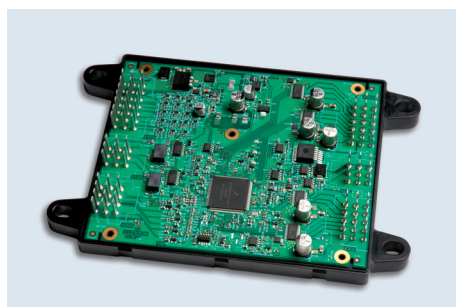
Electric compressor EDC

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.

HIGHLIGHTS

Technology

BTM: Standalone solution with active and passive cooling, heating circuit as well integrated water circuit with coolant pump, needed valves and expansion tank

BCS: Battery cooling system

- Integrated control unit with intelligent working algorithm
- Integrated water sensor for controlling the unit to reach and keep the desired water outlet temperature
- CAN-bus connection to the vehicle
- 24 V fan, 600V EDC

- Modular design enables individual adaptation in terms of performance, switch-off temperature



Low life-cycle-costs

- Energy-optimized operation of the BTMS / BCS extends range of the bus -> Control of compressor and fan according to the required minimum demand -> Device always starts with passive cooling to save energy and is automatically switched to active cooling or heating mode if required
- Very strong passive cooling performance

- > 10 kW at dT of 15K
- > 3 kW at dT of 5K
- The extended use of passive cooling will increase the service life of the EDC
- Pure 24 V technology at E-Cooler 50 version: easy service



Safety

- Safe operation of the battery is guaranteed within a narrowly defined temperature range -> The way the battery is conditioned therefore has a positive effect on the vehicle's range



TECHNICAL DATA

	E-Cooler 100 BTM	E-Cooler 100T BTM	E-Cooler 50 BCS
Maximum cooling capacity (kW) at: outside temperature (°C) of coolant outlet (°C) of coolant flow (l/h)	10 (9) 44 (approx. 50) 35 approx. 3,000	10 (12) 55 (44) 35 approx. 3,000	6 (approx. 5 kW) 44 35 (25 °C) 1,000
Maximum power consumption (compressor / fan)	compressor 10,5 A at 800 V fan 21 A at 28.5 V	compressor 15 A at 800 V fan 31 A at 28.5 V	75 A
Maximum weight depending on design (kg) w/o coolant-carrying components	75	115	60
Voltage (V) (compressor / fan)	650 / 24	650 / 24	24 / 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
Coolant Filling capacity (kg)	R134a approx. 1.5	R134a approx. 1.7	R134a
	active and passive cooling, heating water circuit, water pump, valves, expansion tank, control unit		active and passive cooling, control unit
	in production	on demand	in production

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