



S E R V I C E

## PROGRAMME OVERVIEW



PRODUCTS FOR HYBRID VEHICLES

# OUR RANGE FOR HYBRID VEHICLES

With the range for hybrid vehicles, Behr Hella Service is supporting the technologies of tomorrow as a supplier of first-rate quality - and you as a consistently reliable partner.

Manufacturer	MERCEDES-BENZ
Model	ML450 [USA variant]
Year of manufacture	from 01 / 2010
<b>Radiator</b> OE*	<b>8MK 376 749-801</b> A1645000400
<b>Battery cooler</b> OE*	<b>8MK 376 749-811</b> A1645001003

Manufacturer	Volkswagen
Model	TOUAREG (7P5)
Year of manufacture	from 01 / 2010
<b>Radiator</b> OE*	<b>8MK 376 756-341</b> 7P0121253A <b>8MK 376 756-381</b> 7P0121212A <b>8MK 376 756-391</b> 7P0121212
<b>Oil cooler, automatic transmission</b> OE*	<b>8MO 376 756-361</b> 7P0317019

Manufacturer	BMW
Model	7-series (F01, F02, F03, F04)
Year of manufacture	from 10 / 2008
<b>Fan control unit</b> OE*	<b>5HL 351 321-541</b> 64119153807 64119179413 64119203323 64119220847 <b>5HL 351 321-671</b> 64119226780
<b>Evaporator</b> OE*	<b>8FV 351 331-141</b> 64119237501 <b>8FV 351 331-151</b> 64119237502

Manufacturer	PORSCHE
Model	CAYENNE
Year of manufacture	from 06 / 2010
<b>Radiator</b> OE*	<b>8MK 376 756-341</b> 95810613210 <b>8MK 376 756-381</b> 95810621210 <b>8MK 376 756-391</b> 95810621200
<b>Oil cooler, automatic transmission</b> OE*	<b>8MO 376 756-361</b> 95830701500
<b>Oil cooler, steering system</b> OE*	<b>8MO 376 756-371</b> 95834706900



Battery cooler

Manufacturer	HONDA	
Model	CIVIC VIII saloon (FD)	INSIGHT (ZE)
Year of manufacture	from 09 / 2005	04 / 2000 – 12 / 2006
Interior fan OE*		<b>8EW 009 143-401</b> 79310SR3A01
Condenser OE*	<b>8FC 351 303-641</b> 80110SMGE01 80110SMGE02	

Manufacturer	PEUGEOT
Model	3008
Year of manufacture	from 06 / 2009
Expansion valve OE*	<b>8UW 351 234-421</b> 6461N0

Manufacturer	TOYOTA			
Model	PREVIA (ACR3)	PRIUS (ZVW30)	PRIUS Liftback	PRIUS saloon (NHW11)
Year of manufacture	from 06 / 2000	from 01 / 2009	from 08 / 2003	05 / 2000 – 01 / 2004
Electrically driven a/c compressor OE*		<b>8FK 351 342-001</b> 8837047030 8837047031		
Condenser OE*	<b>8FC 351 304-341</b> 8846042100	<b>8FC 351 310-201</b> 8846047150	<b>8FC 351 304-781</b> 8845047020	
Filter dryer OE*				<b>8FT 351 197-701</b> 8847447010
Pressure switch OE*				<b>6ZL 351 028-281</b> 8864560030

For further distinction, please observe OE numbers\*, information from Behr Hella Service catalogues, TecDoc and manufacturers' specifications. This list does not claim to be complete or correct. \*OE numbers are used exclusively for comparative purposes

## SPECIALLY DEVELOPED SOLUTIONS – FOR THE REQUIREMENTS OF TOMORROW

### **Prepared for the future. Now more than ever.**

Increasing focus is being placed on the drive concepts of hybrid and electric vehicles. A development that the Behr Hella Service has recognised and actively incorporated in its own future concept. This ensures that our range fully meets the requirements of our customers and without any unnecessary time delays - and in the expected first-class quality. This is how we have deserved the reputation as THE thermal management experts for cars, commercial vehicles and transporters. And this is precisely how we will continue to operate in the future.

### **Bespoke thermal management. What else?**

The hybrid technology in vehicles has a direct influence on the air conditioning and engine cooling, in short: the thermal management. With a separate BEHR battery cooler as well as an electrically-driven coolant compressor, the first products designed specifically for hybrid technology have taken their place in our range.



High-voltage compressor



Scroll compressor



High-voltage motor



## INTERIOR AIR CONDITIONING. HIGH PERFORMANCE

Vehicles with full hybrid technology are being equipped with electric high-voltage compressors instead of mechanically-driven compressors. The interior air conditioning is therefore no longer dependent on the engine operation and this increases comfort: The compressor can be controlled remotely, enabling the interior to be brought to the desired temperature before setting out on a journey.

### Cooling

The stationary cooling depends on the available battery capacity. In doing so, whilst taking into consideration the requirements for the air conditioning, the compressor is always operated with the smallest possible output. The power is controlled by adapting the speed accordingly in stages of 50 min<sup>-1</sup>. It is therefore not necessary to have an internal power control.

The scrolling principle for compressing the coolant saves around 20% weight and cylinder capacity with identical performance compared with the swashplate principle that is primarily used in belt-driven compressors.

### Heating

In full hybrid vehicles, the combustion engine is switched off during the electrical driving. The prevailing residual heat in the water circuit is sufficient to heat the interior only for a short period of time. The electrical PTC heating elements are then brought in and these undertake the heating function. The operation is similar to that of a hair dryer: the air that is taken from the interior fan is heated up as it flows past the heating elements and then passes into the interior.

# ESSENTIAL FOR HYBRID VEHICLES: OPTIMUM BATTERY TEMPERATURE MANAGEMENT

## Always have a warm heart

The battery represents the heart of a hybrid vehicle. It must provide the necessary, considerable drive energy quickly and reliably. The following applies to nickel metal hybrids as well as to the now increasingly implemented lithium ion high-voltage batteries: For optimum performance it is imperative that the batteries are operated within a specific temperature window.

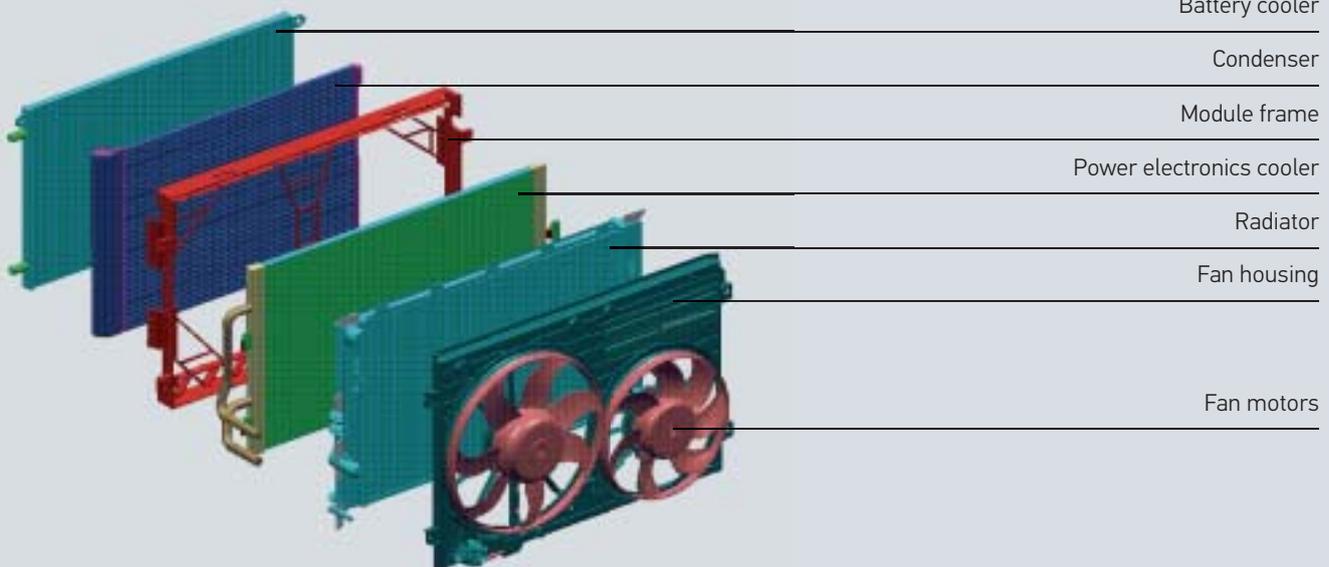
## Hot and cold facts

The consequences of incorrect tempering are considerable. The service life reduces as of an operating temperature of +40 °C, while efficiency and performance suffers below -10 °C. Added to this is the fact that the temperature difference between the individual cells must not exceed 5° - 10° Kelvin / Celsius.

This critical upper limit is quickly reached especially in the case of brief peak loads coupled with high surges like that of recuperation and boosting. Particularly in the summer months. The consequence of exceeding the temperature is a faster ageing and therefore an early failure of the battery.

Vehicle manufacturers aim for a calculated battery service life as that "of a car life", i.e. around 8 to 10 years. An early onset of the ageing process can only be conquered by using the appropriate temperature management.

## Cooling components



### More information? This way please ...

Find out more about the cutting-edge solutions from Behr Hella Service - from the "Thermal Management" brochure as well as in the know-how tool.

### Capacity giant

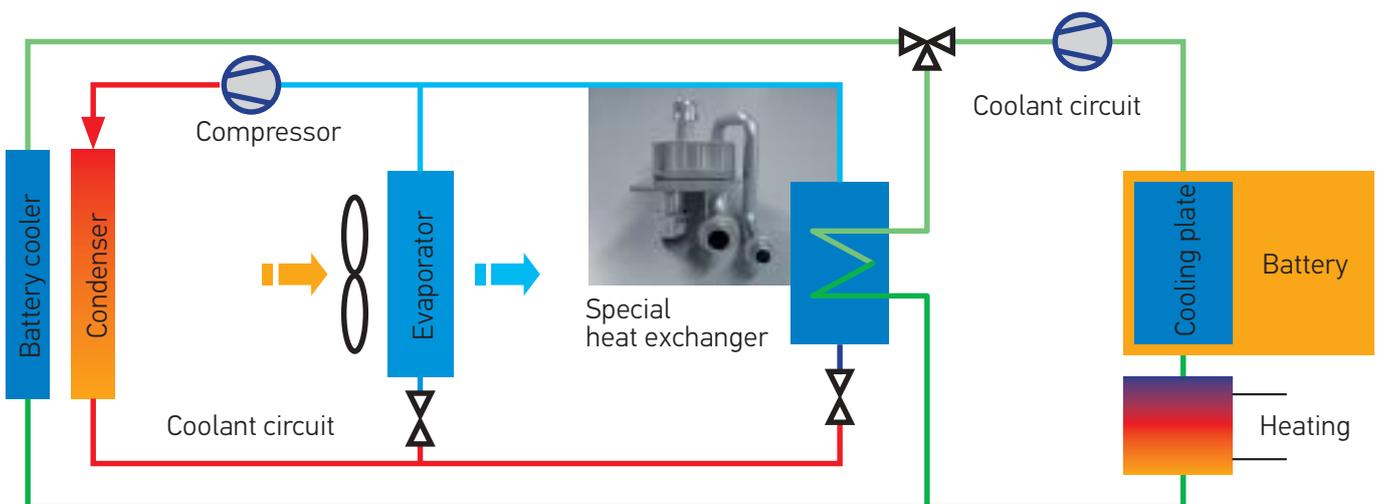
Correct tempering plays a particularly important role in the case of batteries with a greater capacity. Therefore, at low temperatures it is necessary to provide additional heating for the battery in order to reach the ideal temperature range. It is only in this area that a sufficient range can be achieved in the "Electric Driving" mode. To make this possible, the battery is incorporated in a secondary circuit that ensures the ideal operating temperature of between 15° C and 30° C is maintained.

### Battery temperature management for batteries with a greater capacity

Coolant made up of water and glycol (green circuit) flows through a cooling plate that is built in to the battery block. If the temperature falls, the coolant can be heated quickly by means of a heater so as to reach the ideal temperature. If, however, the

temperature rises during the use of the hybrid functions, the heating is switched off. The battery cooler uses air flow in the front of the vehicle to execute the rest of the cooling. If required, this secondary circuit can also be re-cooled by the coolant circuit of the vehicle's air-conditioning system.

If, in the case of high external temperatures, cooling via the battery cooler is insufficient, the coolant flows through a special heat exchanger that serves as a virtual link between the vehicle's air-conditioning system and the secondary circuit. Here, heat can be transmitted in a very compact manner and with a high power density from the secondary circuit and to the coolant, where it is then evaporated. This guarantees that the battery will be operated in the optimum temperature window for the respective efficiency.





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