Technical information

Air-conditioning high-voltage compressors

General Information

Vehicles with full-hybrid technology use high-voltage compressors that are not dependent on the running of the combustion engine.
This makes for more comfort when it comes to the air-conditioning in such vehicles. A vehicle's interior that has become overheated can now be cooled down to the desired temperature before the start of any journey simply by using a remote control. This stationary cooling process can only be brought about if sufficient battery capacity is available.
The compressor is controlled with the lowest possible output with the necessary air-conditioning requirements being taken into account. In the high-volt compressors used today, the power is regulated by adjusting the rotary speed in steps of 50 min-1. It is therefore not necessary to have an internal power control.

The high-voltage compressor

Function

In contrast to the swash plate principle, which is primarily used in the belt-driven compressor field, the high-voltage compressors use the scroll principle to compress the refrigerant.
The benefits are that the weight is reduced by approximately 20% and there is a reduction in the cylinder capacity of the same amount whilst the output remains identical.
In order to generate the right amount of torque for the drive of the electric compressor, a DC voltage of over 200 Volt is used.

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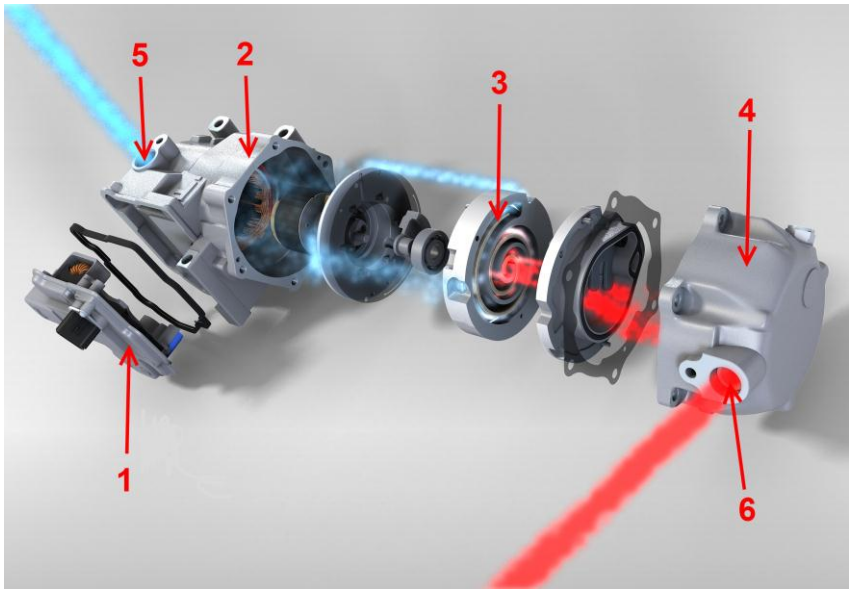

1: Inverter and control unit

2: Electric motor unit

3: Scroll compressor unit

4: Compressor housing

5: Low pressure connection

6: High pressure connection

Specialist expertise

Further staff training is required for the repairing of hybrid vehicles! Permanent further training is imperative for people who service and repair the complex thermal management systems found in hybrid vehicles. In Germany, for example, those employees who work on such high-voltage systems are obliged to attend an additional 2-day course in order to qualify as an "Electrician for High-Voltage Systems".
This course teaches the employee to recognize the risks when working on systems of this kind and also how to switch off all the currrent to the system for the duration of the work. It is prohibited for people who have not attended specific training courses to work on high-voltage systems.

Maintenance of hybrid vehicles

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Also tasks dealing with general services and repairs (such as work on exhaust systems, tyres, shock absorbers, oil changes and the changing of tyres, etc.) may only be carried out by employees who have attended the "Electrician for High-Voltage Systems" course in order to learn about the risks associated with these high-voltage systems. It is also imperative that tools are used which comply with the specifications provided by the manufacturer of the hybrid vehicle! During the air-conditioning check and service, steps must be taken to ensure that the electric air-conditioning compressors are not lubricated with standard PAG oils as these do not have the necessary insulation properties. Therefore, POE oil or a special type of PAG oil is normally used as these have the required properties. Consequently, air-conditioning service units with an internal rinsing function and a separate fresh oil reservoir are to be used for the air-conditioning check and service in hybrid vehicles. This then ensures that any mixing of the various types of fresh oil is prevented.