

## High voltage PTC heaters

High voltage PTC heaters are interior heating systems for electrically powered vehicles that are independent of a drive system.

### Function

While internal combustion engines give off their waste heat to the heating system, because of their high level of efficiency electric drives emit hardly any heat losses: in plug-in hybrids, electric vehicles with range extender and pure electric vehicles, the waste heat generated by the drive system in electric driving mode is not sufficient for heating the vehicle interior. Heating systems are therefore necessary to be able to heat electric vehicles at low external temperatures. However, these are additional energy consumers that can consume a significant proportion of the energy stored in the battery. This is a particular problem in winter, especially as batteries lose capacity anyway in cold conditions. Every additional degree of internal temperature has a direct impact on the range.

Electric auxiliary heaters, such as the high voltage PTC heater, represent a compact solution for interior heating of electric vehicles. It is a heating system with a capacity of up to 7 kW that operates independently of the drive system and is integrated into the ventilation system.

PTC heating elements are fitted directly in the air supply lines close to the air outlets. They function in a similar way to a hair dryer. The air taken in by the interior air blower is heated as it flows past the heating elements and then flows back into the interior.

Energy efficient heating solutions for the interior primarily use a heat pump and only call on the electric auxiliary heater when exceptionally high or rapid heating is required. With this combination, up to 20% range can be gained at an external temperature of 0°C.

The logo for MAHLE, consisting of the word "MAHLE" in a bold, blue, sans-serif font.The logo for BORGWARNER, consisting of the word "BORGWARNER" in a black, sans-serif font.The logo for Valeo, consisting of the word "Valeo" in a green, sans-serif font with a blue swoosh underneath.



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