Meat&Doria **20288**
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FOCUS
Electric **water pumps**

What they are

Vehicle thermal management is a key component in modern vehicles. Electric pumps provide **optimal control of heat flows in the vehicle** and **improve the durability, efficiency, and performance of electric vehicles**.

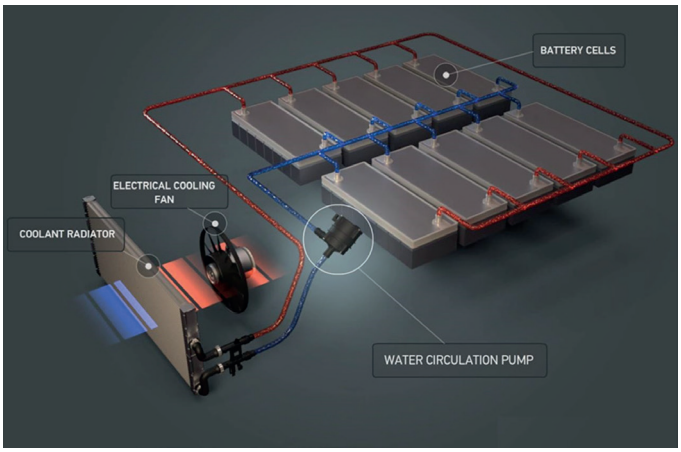
Their purpose, therefore, is to ensure that parts and components such as engines or batteries can operate in their optimal temperature range and that the interior of the vehicle can be climate-controlled according to individual needs.

How they work

Electric coolant pumps with integrated electronic control are continuously powered based on the required cooling capacity. These pumps can function as **main**, **bypass**, or **circulation pumps**, providing flexible and efficient thermal management. They are designed to operate independently of the engine, adjusting their performance based on demand to ensure optimal cooling at all times.

After a cold start, the electric pump initially prevents coolant from circulating, allowing the engine to reach its operating temperature more quickly.

Even at idle speed or with the engine off, it can provide sufficient cooling power as it is not dependent on the engine's RPM.



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This engine cooling system minimizes power consumption by **reducing friction losses**, which in turn lowers fuel consumption. As a result, it contributes to a **decrease in emissions**, making modern cooling systems more environmentally friendly and efficient.

The electric motor of the coolant pump is cooled by the coolant itself. Continuous temperature regulation is achieved through a pulse-width modulation (PWM) signal, a technology that **adjusts the circulating coolant volume based on real-time demand**. This method allows for precise control, independent of engine speed, while maintaining a consistent coolant temperature across the entire system.

Depending on the type of drive (internal combustion engine, hybrid, or electric) and system, **one or more pumps can be installed** inside the vehicle.

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Possible uses

Electric coolant pumps have many areas of applications:

- **Engine cooling**
- **Exhaust gas recirculation cooling**
- **Gearbox cooling**
- **Cooling of the various auxiliary traction systems**
- **Supercharger air cooling**
- **Traction and accumulator cooling in hybrid and electric vehicles**

Reasons for replacement

- **Noise issues**
- **Coolant leakage**
- **Insufficient cooling or overheating of the engine**