

## Cooling concepts for electromobility

# Efficient fans and drives for quick-charge stations

Range and charging times are important parameters for electric vehicles. The storage and use of electrical energy generates heat losses that must be dissipated. This means that the quick-charge station itself, its power electronics, charging cable, and any buffer storage units that may be present need high-performance cooling concepts that can be easily integrated and operate reliably over a long period of time, even under sometimes very harsh ambient conditions.

### Efficient heat dissipation

ebm-papst now offers efficient cooling solutions for all aspects of electromobility, including a variety of compact fans for electronics and switch cabinet cooling as well as powerful drives with integrated K4 control electronics for media-based cooling pumps. These are necessary for supplying the cooling circuits. Thanks to its high power density, the ECI-63.20-K4 internal rotor motor is typically used as a pump drive for charging cable cooling in the level 3 range with charging currents of up to 500 A. With variants in the 180 to 370 W power range, the compact drive covers a wide range of applications. The speed-torque-controlled external rotor motors in the VDC-49.15-K4 series, on the other hand, also allow conclusions to be drawn about pressure and coolant flow. This means additional sensors are not required in the application, which has a positive effect on the system control of the charging station.

### Fans for different applications

The interior of a quick-charge station, its power electronics and cooling circuits are usually cooled with air. Depending on requirements, the fans in the AxiEco and AxiForce series, for example, can be used for this purpose. The AxiEco offers impressive performance and efficiency in a compact installation space, enabling the design engineer to optimize the design of the application. With a diameter of 200 mm, this fan delivers an air flow of 1,820 m<sup>3</sup>/h. The speed can be adjusted to the required cooling capacity using a PWM or analog signal. This also allows the operating noise to be reduced to a minimum. AxiForce compact fans are well suited for applications with high back pressure. In sizes 80, 120 and 172 mm, they achieve pressures of up to 1,200 Pa and air flow rates of up to 650 m<sup>3</sup>/h. These fans have a steep air performance curve such as is required for cooling in densely packed quick-charge stations. There is also a particularly environment-resistant version with encapsulated electronics in protection class IP68, which is dustproof, protected against powerful water jets, and has successfully passed the salt spray test. As an option, these are available with ATEX certification in accordance with DIN EN 60079-7, Group IIC, T4. These features make the AxiForce series ideally suited for use in charging infrastructure, as well as in battery storage systems and switch cabinet cooling.

Pascal Schöpf  
Trade Press Coordinator  
Phone: +49 7938 81-7006  
Pascal.Schoepf@de.ebmpapst.com

Corinna Schittenhelm  
Trade Press Coordinator  
Phone: +49 7938 81-8125  
Corinna.Schittenhelm@de.ebmpapst.com

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Press Relations contact  
ebm-papst Group  
Phone +49 7938 81-7105

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Fig. 1: Efficient ECI-63 pump drive for cooling charging cables.



Fig. 2: Centrifugal, axial and diagonal fans for a wide variety of cooling solutions relating to electromobility.

Images 1 and 2: ebm-papst  
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### About ebm-papst

The ebm-papst Group, a family-run company headquartered in Mulfingen/Germany, is the world's leading manufacturer of fans and drives. Since the technology company was founded in 1963, it has continuously set the global industry standard with its core competences in motor technology, electronics, digitization and aerodynamics. With over 20,000 products in its portfolio, ebm-papst provides the best energy-efficient, intelligent solution for virtually every ventilation or drive-engineering task. In fiscal year 2021/22, the "hidden champion" generated revenues of € 2,288 billion. The group employs roughly 15,000 people at 29 production sites (in Germany, China and the USA, to name but a few) and in 51 sales offices worldwide. ebm-papst sets the benchmark with their fan and drive solutions which are used in almost all industries, such as ventilation, air conditioning and refrigeration, heating, automotive, information technology, mechanical engineering, household appliances, intralogistics and medical engineering.

Pascal Schöpf  
Trade Press Coordinator  
Phone: +49 7938 81-7006  
[Pascal.Schoepf@de.ebmpapst.com](mailto:Pascal.Schoepf@de.ebmpapst.com)

Corinna Schittenhelm  
Trade Press Coordinator  
Phone: +49 7938 81-8125  
[Corinna.Schittenhelm@de.ebmpapst.com](mailto:Corinna.Schittenhelm@de.ebmpapst.com)

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Press Relations contact  
ebm-papst Group  
Phone +49 7938 81-7105

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