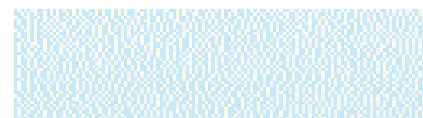


# Automotive

Innovative air-conditioning and drive solutions for passenger cars and commercial vehicles



Realising visions together



# Innovations for the next generation

*Your objectives are ours: more safety,  
economy and environmental tolerance  
(eco-friendliness).*



Innovations for the next generation – that is, has been and will be the ebm-papst maxim. Our special claim lies in our unique ability to combine scientific achievements with our know-how in drive engineering, aerodynamics and electronics to create new and pioneering solutions. Driven by the creativity of each of us, this is a continuously progressing process marked by experience and innovation and safeguarding functionality and competitiveness of future generations of vehicles and cars.

## **A potential beyond compare**

The vehicle of tomorrow is mainly determined by four decisive factors: more safety, more economy, better environmental tolerance (eco-friendliness), and more comfort. As ambitious as these targets are, they can be realised in most cases by using sophisticated electronics and adapting them intelligently into mechanical components. Rising demand for comfort when it comes to functions and to the feeling of well-being, both in passenger cars and in commercial vehicles, offer a wide scope for innovation. This potential is a challenge for manufacturers eager to realise his competitive edge, and also for the system provider, for the developer and designer with his ideas just as well as for the controller interested in economic and financial success.

## **Providing the entire motor system**

With ebm-papst, development and production of motors, fans and blower modules are in one and the same hand. Our components are guaranteed to be exactly adjusted to each other, thus giving you maximum performance while generating a minimum of noise. Just-in-time delivery and logistics are also part of the deal, of course. Trust our first-class service and our proven ability to flexibly respond to the demands of global markets. After all, that is what ebm-papst stands for. In Germany and throughout the world.



### **A potential beyond compare**

*For more than a decade, and thanks to our innovations, we as qualified engineering partner for the automotive industry have contributed quite substantially to make driving more comfortable, less strenuous and a lot safer. Big names in manufacturing passenger cars and commercial vehicles, but also system providers, are customers of ours. Making and keeping them satisfied is the result of cooperation based on partnership and, of course, technically perfect, top-reliable products.*



+ Audi + BHTC + BMW + Bosch + Citroën + Conti Tech + DaimlerChrysler + Delphi + EKB + EvoBus + Fehrer + Fiat + Fischer Automotive + Ford + General Motors + Hella +  
+ Johnson Controls + Karman + Konvektor + Kostal + Lancia + Lear + Magneti Marelli + MAN + Maybach + Neoplan + Opel + Porsche + Preh + Rover + SAIA-burgess + SAS + Seat +  
+ Seeber + Siemens-VDO + Skoda + Steyr Puch + Turin + Valeo + Visteon + VW + Webasto + WET + ZF-LS +

## Partnership in development for mutual benefit

*Electronically and mechanically commutated motor systems for a variety of applications, such as auxiliary drives, servo drives, and x-by-wire functions.*



We endeavour to play an active part in developing vehicle technology: from mechanics on to electronic and then, of course, on to the software. Together with manufacturers and system providers, we develop pioneering solutions based on your specifications and requirements, thus optimally adjusting them to your application.

Integrating intelligently defined platform modules, we also contribute to more economical production. We use all our synergies to speed up development and reduce costs. Such a coordinated approach saves quite a lot of time in getting a vehicle launched on the market.



### **Exemplary: ebm-papst EC technology for BMW**

*The BMW 5 Series, year 2003: the first car which allows you to enjoy the advantages of the electronic steering support without having to forego the sensation of individual, authentic driving. At the core of the revolutionary new BMW is the innovative steering support with its integrated, electronically commutated ebm-papst EC motor.*

### **For those demanding extra-class comfort**

*Vehicle-specific "taker qualities" are prerequisites for all components in the steering support motor: reliable power, safe operation and good dynamics are an absolute must with different driving styles – and all this in an environment which is bound to put maximum strain on all components, namely the bottom part of the vehicle where the components for the steering support are located. For us, this was the challenge to develop an electric motor that, on the one hand, should be powerful enough, run reliably, generate a minimum of torque pulsation and operate at lowest noise level. And, on the other hand, this motor should also be resistant to the enormous changes in temperature, to motor lubricants and to other substances. The challenge was to find solutions not only impressive as to quality, but also easy to realise economically.*

### **Powerful drive in any situation**

*Throughout the entire service life, speeds between 0 and 6.000 rpm have to be endured. For unobtrusive steering support, both the sensitive, almost step motorlike operation and the dynamic run-up operation are called for in quick succession in order to master typical parking manoeuvres or to support dynamic drive situations.*

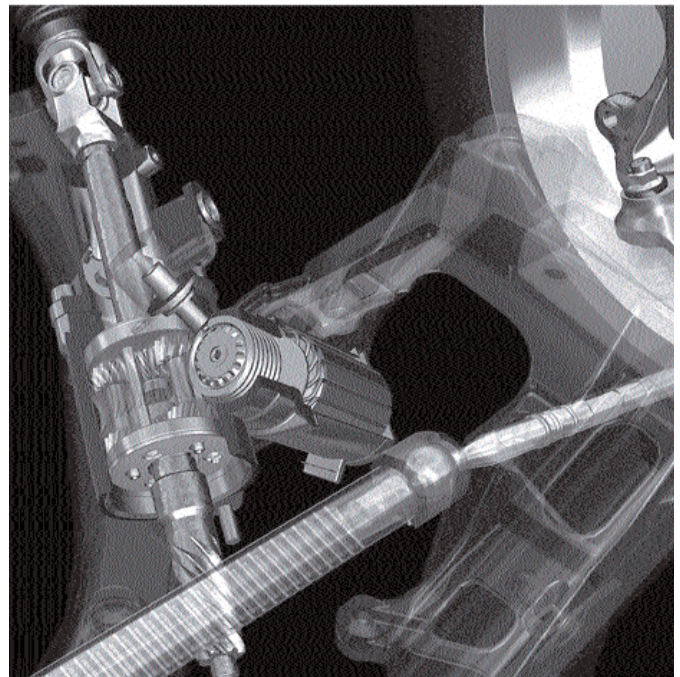
*From mini to maxi:  
Fans and blowers to tackle secondary  
ventilation.*



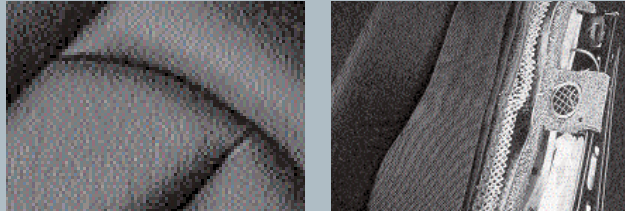
### **EC technology with new perspectives**

For more than 25 years, our perfect and advanced solutions in EC motor engineering and technology have made us market leader. Our expertise is based on the development of thousands of applications in the most diverse of industries, such as IT/telecommunications, air-conditioning and refrigeration or various industrial applications. Many of our products started out as customized solutions and have by now turned into industrial standards.

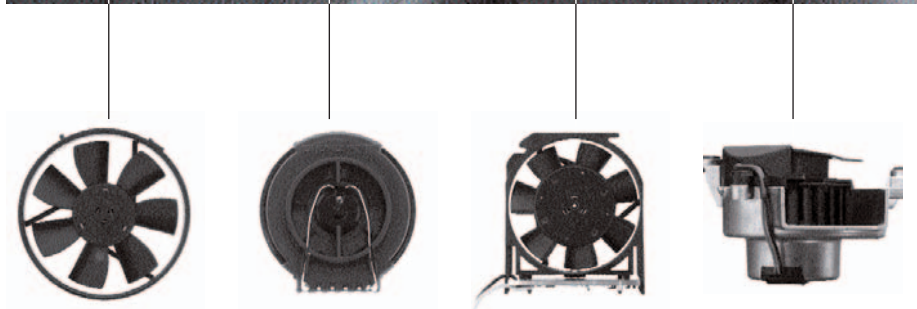
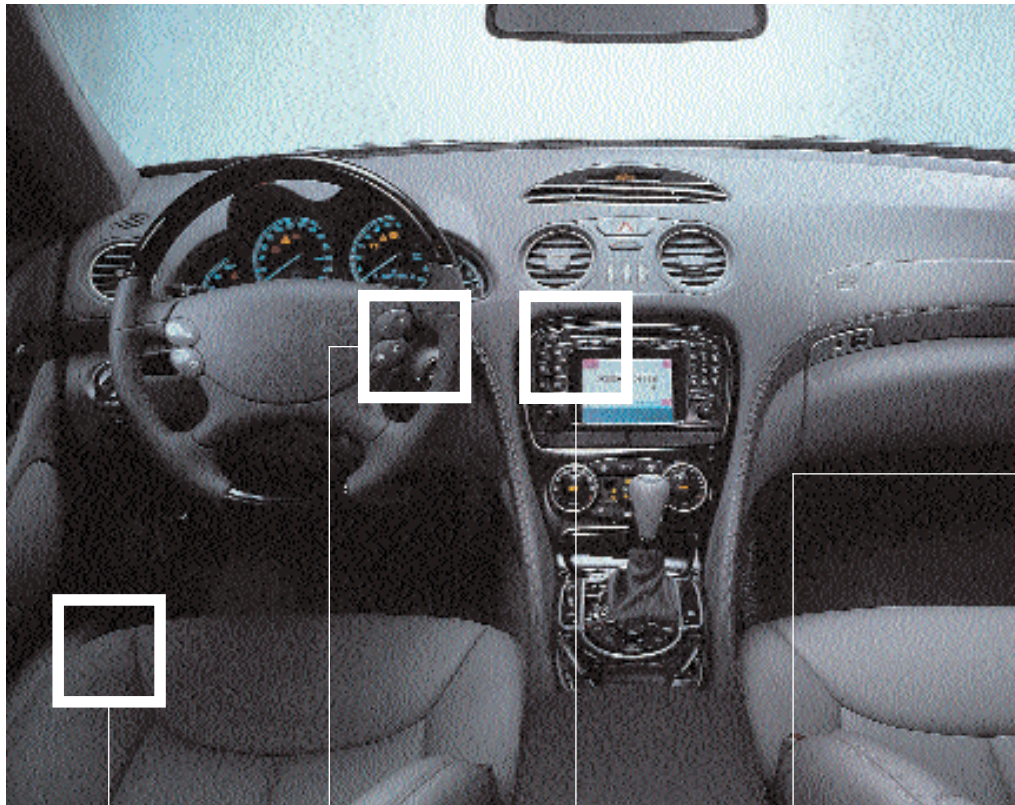
Especially in the automotive field, our EC technology opens up enormous perspectives: replacing hydraulic systems, for all x-by-wire applications, or for intelligent and decentralised drive tasks. In short: This is the ideal answer when it comes to automotive applications with a high demand for energy efficiency, long service life and durability, minimal acoustics and excellent controllability.



# Commitment for the automobile of the future



As we all know from experience, many a technical innovation taxes a driver's patience to the limits. Electromagnetic components for ventilation, air-conditioning and support drives are often noisy and get on one's nerves. In the car of tomorrow, however, all comfort applications run smoothly and quietly. After all, the cooling and drive units developed by ebm-papst simply make driving easier. Automatically, and without you even noticing them in the slightest. Today, high temperatures inside the car have noticeable consequences, result in stress and make you lose your concentration. The car of the future, however, provides you with everything you need to enjoy driving without showing signs of fatigue, as it comes equipped with a comfort package made up of various, individually designed climatic zones. For this, we offer a wide range of tailor-made ventilation and air-conditioning technologies. In some passenger cars, you can even find up to 50 of our products!



Up to 10 miniature fans integrated in seat and backrest make sure you enjoy a maximum and individual driving comfort.

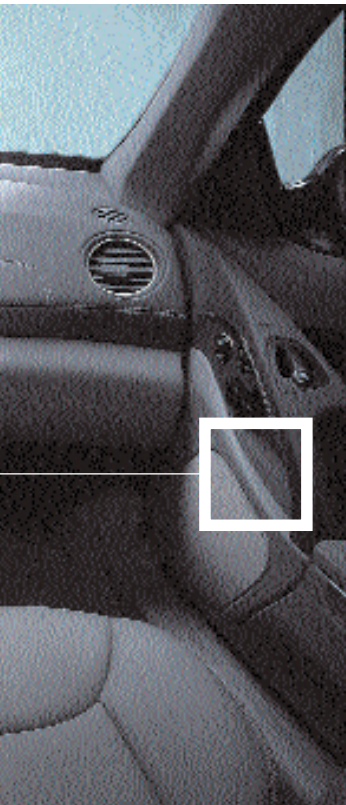
Acting as climate watchdogs in your vehicle, sensitive sensor fans provide optimal control of the air-conditioning system.

A great variety of axial and radial fans ensure powerful, effective and reliable cooling of demanding vehicle electronics.

Booster blowers provide individual air-conditioning comfort on each and every seat.

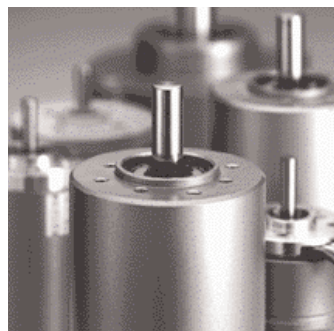
**Exemplary: ebm-papst seat ventilation for DaimlerChrysler**

*In cooperation with DaimlerChrysler, ebm-papst developed the first seat ventilation in cars for their S class in 1998: miniature fans with diameters of only 40 mm are integrated in backrest and seat and provide a pleasant and comfortable seat climate that is easily adjusted to individual demand as the fans feature intelligent controllability. Due to their proven and brushless EC motors, the fans offer long service life and durability, robustness and absolutely low noise levels. Small wonder, then, that these “climate dwarfs” established themselves in no time at all both in top class passenger cars and also in mid-range cars in 1998. Today, they are the new standard in commercial vehicles and construction machines.*



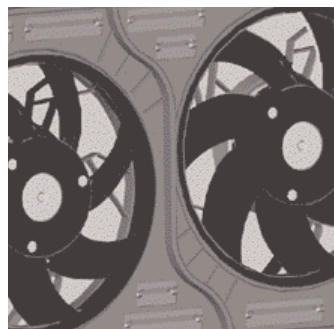
**Quiet and powerful:  
Components for air-handling**

Apart from electric motors, ebm-papst also produce components for heat treatment and air-handling. These are fans and small blowers supplying optimal cooling for electronics in various places in the vehicle. Or they are sensor fans used to select air-conditioning units, or they are booster blowers for individual air-conditioning of passenger seats, and many more. Globally protected our fan design is of compact build and offers high efficiency and extremely favourable acoustics.



**Compact and comfortable:  
Drives satisfying all demands**

Drives not only supply the car driver with additional comfort, they also provide a higher level of safety. Possible applications know no bounds; at the touch of a finger, activating comfort functions and supporting basic motor car functions. The ever higher integration of the electronics makes drive components ever more powerful and efficient. As electronic functions are directly integrated in the electric motor, functional safety, power dosing and operating comfort get constantly optimised.



**Top performances for motor cooling**

EC technology is the key to totally new perspectives in motor cooling: top performances at minimal mounting space. Optimal controllability of ventilation. Maximum and top service life, highest efficiency: ebm-papst technologies and ideas could soon successfully transform your latest model!



Climatic comfort in commercial vehicles is anything but a mere question of convenience. Both the transport of passengers in busses and coaches and the driving of a truck without stress and fatigue place high demands on vehicle technology, especially on air-conditioning, ventilation, and heating.

For many years, ebm-papst fans provide a maximum of comfort for driver and passengers as integrated part of air-conditioning units in busses or in air-conditioning and ventilation units in truck driver cabins. Numerous manufacturers of air-conditioning units count on our expertise and our excellent know-how in ventilation technology and drive engineering.



**Fans and blowers:**  
for air-conditioning of individual  
components in commercial vehicles.

**Meeting higher demands with new technologies**

As the saying goes: there is nothing that cannot be improved upon! And so, the high-quality bus, coach or truck is increasingly equipped with EC technology. As experts in this field, we are yet again among the pioneers!

With our new products, the EC axial fans and the EC twin-radial blower unit, we are leading the way in the air-conditioning of commercial vehicles. These new products replace the collector motors so far almost exclusively used in air-conditioning units and meet the higher demand in comfort and convenience. And they also achieve 25,000 hours in service life, compared to the mere 3,000 to 6,000 hours conventional collector motors have.

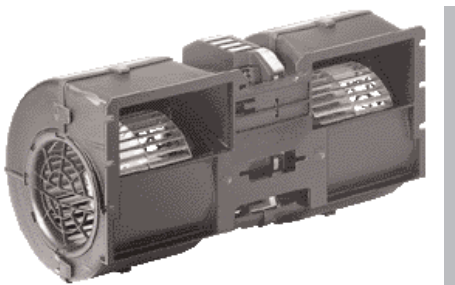
This obvious and drastic prolonging of maintenance intervals is an argument not only bus operators find convincing. It is an appealing argument also when it comes to exporting commercial vehicles to hot countries! And so our EC fans, integrated in busses, have been already submitted to rigorous life tests under extreme conditions in Asia and South Africa, passing them with flying colours!



**Even retrofitting isn't a problem!**

Apart from their significantly increased service life, our intelligent EC fans have a wider range of open and closed loop control options to offer. On top of this, they have a far lower current draw than conventional motors, have excellent electromagnetic compatibility to boost and operate at extremely low noise levels.

As they have standardised dimensions, even retrofitting does not pose a problem at all. And we gladly welcome the chance to cooperate with you in replacing the old technology in your existing compact air-conditioning units as economically as possible (and in keeping with the space limitations) by this new technology.



**EC twin-radial blower unit:**  
for top performance in minimal mounting space;  
well controllable and extremely quiet.

# Quality is our programme, being close to you is our philosophy



There is nothing to replace quality, except quality. And so we determine and evaluate each application in cooperation with our customers to establish technical, logistic and economical specifications and then translate this into products which are simply and convincingly good! Meeting the international standards **DIN EN ISO 9001, ISO/TS 16949, VDA 6.1, QS 9000**, and cooperating with all larger automobile manufacturers just testify to the correctness of our outstanding quality management.

Our guidelines to avoid faults, to continuous improvement and to comprehensive quality further optimise the life cycle of our products – procedures and processes are designed to even exceed many of the quality standards.

## **Global domestic:**

### **Speaking the same language as our customers – throughout the world**

Being close to our customers in absolutely all respects and speaking their language – this is what we aim for and what our company philosophy is about. And this is why ebm-papst is globally present with factories, subsidiaries, divisions, agencies and affiliate companies. International cooperation with the automotive industry makes for decisive action and economic processes in development. We think and act across borders to simply get things moving for you!

## Our product range: ventilation and drive solutions for passenger cars and commercial vehicles

<b>Cooling of electronics</b>	Products:	Radial and axial fans
	Air flow:	10 to 250 m <sup>3</sup> /h
	Pressure:	up to 150 Pa
	Nominal voltage:	12, 24 and 42 VDC
	Applications:	Numerous solutions in the cooling of electronics, e.g. cooling of motor control units, infotainment and central electronics
<b>Air-conditioning control</b>	Products:	Radial fans in plug-in or stand-alone design
	Air flow:	6 to 20 l/min
	Nominal voltage:	12 and 24 VDC
	Applications:	Air-conditioning controls, miniature blowers for active ventilation of temperature sensors
<b>Secondary cooling</b>	Products:	Booster blowers (relais blowers), axial and radial fans
	Air flow:	50 m <sup>3</sup> /h
	Pressure:	150 Pa
	Nominal voltage	12 and 24 VDC
	Applications:	Air-conditioning and air moving, cooling of electronics in vehicles
<b>Seat ventilation</b>	Products:	Various fan systems in axial or radial design – ready-to-install fan units in different sizes – with external control electronics
	Applications:	Seat ventilation; integration in back rests or seats
<b>Auxiliary drives</b>	Products:	Electronically commutated servomotors or steering support motors; auxiliary drives in EC technology
	Applications:	Durable and dynamic DC motors for x-by-wire drive tasks or as electronic servomotors for steering and braking functions
<b>Radiator cooling</b>	Products:	EC radiator fan for vehicles – flat design, efficient, quiet, 600 – 1,000 W
	Applications:	Passenger cars and minivans
<b>Air-conditioning/Ventilation</b>	Products:	EC axial fans and twin-radial blower units with long service life and low current draw
	Applications:	Air-conditioning units in busses as well as heating, ventilation, and air-conditioning of driver cabins (busses, trucks, tractors)

**For further details, take a look at this info material:**

- *Company profile/Facts and data*
- *Our products*

We hope this information on our capacities in the automotive field has been interesting to read for you. Is there a new project, perhaps even a vision, involving motors and fans you would like to see realised? Why not get together with us and discuss what is possible with ebm-papst?

We are always there to help you!

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