



Axial fans

ebm-papst's axial fans prove their reputation as space-saving wonders by moving air for hot or cold air exchange in a wide variety of devices and systems. Their outstanding features are their small installation depth, low noise level and exceptional efficiency, and are particularly well suited for air flow through heat exchangers.

Furthermore, in the EC version, they become intelligent "energy-saving wonders" for an extremely wide range of applications, primarily in ventilation, air-conditioning and refrigeration technology and the automotive industry.



One principle, countless options

The axial fan, the function of which is similar to a propeller, moves the air axially, parallel to the revolving motor shaft. The ebm-papst external rotor motor is integrated directly into the axial impeller, forming a compact axial fan unit. They are usually installed with wall rings in short or long nozzles.

The extensive ebm-papst product range offers the right solution for each requirement and is classified for a wide variety of applications:

- S series with sickle-shaped blades for high air flow at medium pressure
- K series with especially low noise level – ideally suited for refrigeration plant applications
- A series for high-pressure applications

Design according to requirements

Energy efficiency, controllability and low-noise performance – and all this together with external rotor motors in AC and EC technology: ebm-papst axial fans are optimally matched to customer requirements.

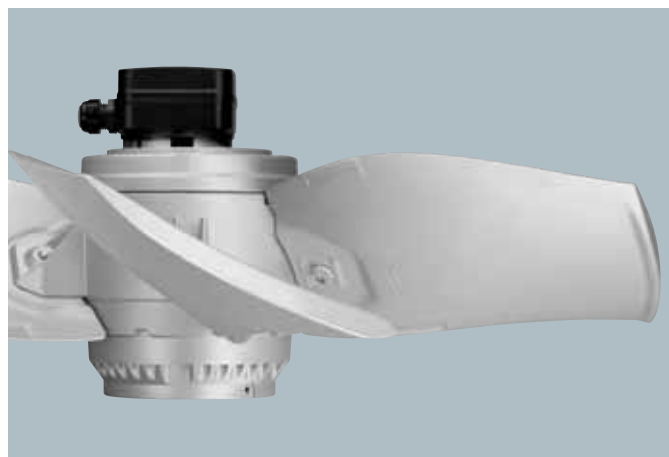
The EC technology (12 VDC to 110 VDC or line-voltage-powered 100 VAC to 480 VAC) with integrated or external electronics enables

precision open and closed-loop control with very high efficiency. The following standard features are available:

tach output, error message, linear or PWM input, temperature or flow rate-dependent control systems or bus-connectable interface.

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Table of content



General information	4
<ul style="list-style-type: none"> – Company profile: ebm-papst – Our key to success – How to use this catalogue – How to find your ebm-papst product – How to order your ebm-papst product 	
AC axial fans, AC diagonal fans	13
AC axial fans, S series	23
AC axial fans, K series	131
AC axial fans, A series	157
EC axial fans, EC diagonal fans	179
EC axial fans, S series	185
Square shaded-pole motors (Q-motor)	301
Energy-saving motors (ESM)	315
EC-SYSTEMS	329
<ul style="list-style-type: none"> – Options – Switch power supplies – External commutation electronics for rail technology – Temperature sensor / control module – Pressure control / selection module for 3 speeds – Interface converter / RS485 repeater – RS485 terminal box / hand-held control terminal – Speed setting – LISA control software / fan control software – HMS controller 	
Accessories	361
<ul style="list-style-type: none"> – Guard grilles, streamers – Wall rings – Connection leads – Accessories for Q-motors and ESM – Terminal boxes, capacitors – Speed setting – Motor protection switch – Star-delta switch / repair switch 	
Technology	391
<ul style="list-style-type: none"> – Technical parameters & scope – Impellers – Motors – Control technology 	
Distributors, agencies and subsidiaries	430

Company profile: ebm-papst

The entire scope of ventilation and drive technology: this is the world of ebm-papst. More than 9,800 people – in Germany and throughout the world – develop, produce and sell our motors and fans. Our global presence and our unique range of products based on a quality standard that surpasses every other have made us what we are: world market leader in motors and fans. Expertly knowing what our customers need and incessantly striving to arrive at the perfect application solution for a wide variety of different industries is what determines our daily work. Those who know us know the high standards we apply to our work and know our creed: to be as close to our customers as possible and to simply be the best in terms of innovation and reliability.



Our headquarters in Mulfingen



*Left:
Our location in St. Georgen
Right:
Our location in Landshut*

Our history – Our drive

Rooted in ebm, PAPST and mvl, the three leading innovators in the development and production of motors and fans, ebm-papst has established itself as the world market leader. Now as ever, our legendary inventive spirit shines through in products that set standards in many segments of industry worldwide. We are proud to say that despite difficult competition, our performance has always been exemplary and outstanding – in business, in our personal relationship with our customers, and of course with respect to technology and engineering. For decades, we have contributed to the world of air technology and drive engineering with small revolutions and large milestones.

To maintain this advantage in skills and knowledge to get maximum quality and thus the highest degree of customer satisfaction, our employees around the world put their passion and dedication to work for you.

Passionately involved in R&D

Our catalogues just list the results of our incessant efforts in R&D: products of highest quality and reliability. After all, it is our passion to constantly try something new and improve what we have. In doing so, we take advantage of the latest development methods and state-of-the-art technology and invest quite heavily in R&D facilities. Best of all, though, we rely on excellently trained and skilled engineers and technicians to be at your service in R&D and Sales & Distribution.

Producing and safeguarding high-quality products and services

This is our promise without any compromise. Whether produced in one of our five factories in Germany or one of our eleven international production sites, our products always have the same high level of quality. This quality control is something you can definitely rely on! And this across all levels of production and throughout all processes: consulting customers, development, material selection through to picking certified, choice suppliers and on to the production of parts and final delivery. On top of this, our products have to pass the most rigorous tests under all realistic operating conditions: continuous stress test, salt spray test, vibration test, or precision noise measuring, just to mention a few. And the product gets

clearance for serial production only after all the desired characteristics have been determined to be just right.

Environmental care is another priority with ebm-papst. This is why we have developed our product line in EC technology, which makes for very low power consumption. Due to our manufacturing philosophy, there is absolute focus on environmental care in production, recycling, waste and waste water disposal.

Global Domestic

In order to be specialist for customised solutions throughout the world, you need strong partners. Global Domestic – i.e. being present all over the world and being a national company in each individual country – is how we have established ourselves in all important markets on this globe with our successful subsidiaries. And so you will always find ebm-papst close to home, speaking your language, and knowing the demands of your markets. Besides, our worldwide production alliance serves as a basis for competitive pricing. Our global services and logistic outlets, i.e. IT networking, safeguard short reaction times and just-in-time delivery.

All our efforts are documented in a comprehensive quality management system, both for products and services. Being certified as complying with the tough requirements of the international standards DIN EN ISO 9001, ISO/TS 16949-2 and of standard DIN EN ISO 14001 is just one seal of approval we have received for our unceasing efforts to provide only the best quality products and services.

Our key to success

Our innovations and technologies keep on turning into new industrial standards. This competitive capability can only be maintained by seeing ventilation as a whole: the interrelationship between, and thus the system of, motor engineering, aerodynamics, and electronics. These are our three core competencies, imminently connected and linked in each of our products. And so we handle air intelligently and quietly and continue to set new standards in drive technology. Our system solutions form the main part of our product range by now. And they will be our main key to success.



Production



Winding machine

Motor engineering, aerodynamics, electronics

Our drive is well known and famous with specialists: our external-rotor motor, which has made us world market leader – quietly, yet powerfully. Being versatile as to integration, it is ideally suited to the most diverse applications. Based on this principle, we here at ebm-papst have developed the widest range of fans and motor types in the world. And for hot or aggressive blower mediums, the internal-rotor motor is the perfect complement.

Still, in drive engineering, certain applications simply require the internal-rotor motor principle, and they are then realised with our motors specifically developed for such cases. Take, for instance, the steering support motor in the automotive field developed as innovation in active steering.

Be it axial or centrifugal fans, centrifugal blowers, compact fans or tangential blowers: we always design fan blades, impeller blades and ducted housings with the specific application in mind. We strive to minimise noise and to optimise efficiency. This is the challenge that we have taken up and which we meet – working away powerfully and quietly.

Finally, intelligence will become the decisive factor on all markets in future. After all, only in connection with electronics can drive and air flow – as a system solution – have an optimal effect in a product or application. Interfaces are avoided, and thus potential faults and failures.

Setting new standards with EC technology

Wherever intelligent air handling is required, where energy consumption needs to be reduced and performance has to be maximised, there our EC motors are your reliable answer. They do not waste financial or natural resources. Instead, they boost high efficiency, continuous controllability via analogue or digital inputs, long and maintenance-free service life, and robustness.



Left: Endurance test room

Centre: Shaker

Right: Measurement station



Without any problems, the ebm-papst EC technology allows you to realise networked, bus-linked appliances, to integrate simple or complex controls at low cost and to also realise time and again new, customised and complete solutions. Here, ebm-papst excels as competent development partner, with our experience of more than 25 years and our excellent know-how in R & D and production also being well documented in a few hundred national and international patents. And there is also our ability to listen intently, to pay good attention to our customers and their demands – in order to come up with new and pioneering ideas, such as:

- EC fan units for clean room technology.
As the electronics are integrated and the unit is wired up completely and ready to plug in, there is no need for our customers to waste time and money on laborious wiring work.
- Sensitive EC sensor fans for the automotive industry providing optimal selection of the air-conditioning unit in the car and, combined with booster blowers, individual air-conditioning of each and every passenger seat.
- EC gas blowers with commutation and control electronics including a processor. They are developed in such a way as to make the blower premix the required amount of air with the gas. Aerodynamics with these blowers are adjusted in such a way as to make these blowers ideal for use in very limited space at high back pressure.

How to use this catalogue



The ebm-papst catalogue combines a technical and a product-specific section.

Technical section: General information on how to select and find ebm-papst products for your specific application is found in the chapters "Selection" (p. 10) and "Technical parameters" (p. 392).

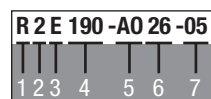
In case you require technical background information on ebm-papst product groups, simply turn to the chapters "Impellers" (p. 396), "Motors" (p.410) and "Control technology" (p. 414).

Product-specific section: The product-specific section is organised according to product diameters, lines, materials and/or design principles.

Headline

The headline indicates which technology (AC or EC), which design (centrifugal, axial, etc.), and which line (e.g. S-Range) the product belongs to. Impeller diameter or other features are also indicated.

Part designation / Type



This key designates and identifies all ebm-papst products and serves as part number:

1) Type

- A - axial fan
- S - axial fan with guard grille
- W - axial fan with wall ring
- V - axial combination
- R - centrifugal fan, single inlet
- G - centrifugal blower, single inlet (with scroll housing)
- B - centrifugal fan, dual inlet
- D - centrifugal blower, dual inlet (with scroll housing)
- K - centrifugal combination
- M - motor
- P - pumps

2) Number of poles (AC) / number of cores (EC)

2-, 4-, 6-, 8- and 12-pole (Z = 12) / 1- and 3-core

3) Motor type

- D - 3-phase motor
- E - single-phase motor with operating capacitor
- G - EC motor
- S - shaded-pole motor
- Q - square shaded-pole motors

4) Impeller diameter in mm

5) Key for mechanical design

6) Key for electrical design

7) Key for mechanical variants

AC centrifugal fans

backward curved, 3-D, Ø 400



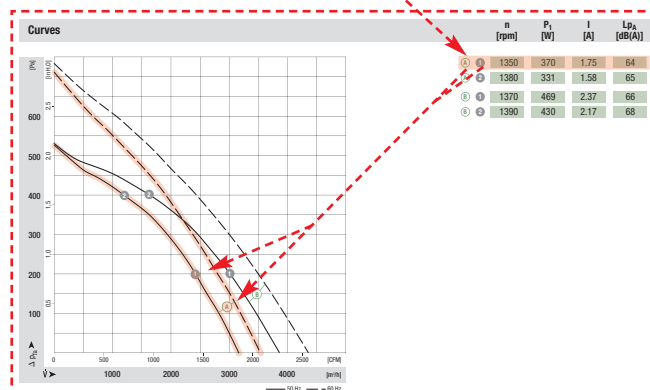
- **Material:** Impeller: Sheet aluminium, joined by tabs
Rotor: Coated in black
- **Number of blades:** 6
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** IP 54 (acc. to EN 60529)
- **Insulation class:** "F"
- **Mounting position:** Any
- **Condensate discharges:** None
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings

Nominal data		Curve	Nominal voltage		Frequency	Speed/rpm ⁽¹⁾	Max. power input ⁽¹⁾	Max. current draw ⁽¹⁾	Capacitor	Perm. amb. temp.	Elect. connection
Type	Motor		VAC	Hz	rpm	W	A	µF/VDB	°C	p. 596 f.	
R4E 400	M4E 094-FA	①	1-4	230	50	1355	375	1.75	8.0/400	-40 to +60	A2a)
		②	1-4	230	60	1480	540	2.40	8.0/400	-40 to +50	
R4E 400	M4E 094-HA	③	1-4	230	50	1370	480	2.40	10.0/450	-40 to +60	A2a)
		④	1-4	230	60	1460	700	3.15	10.0/450	-40 to +50	

⁽¹⁾ Nominal data in operating point with maximum load

subject to alterations

(1) Nominal data in operating point with maximum load



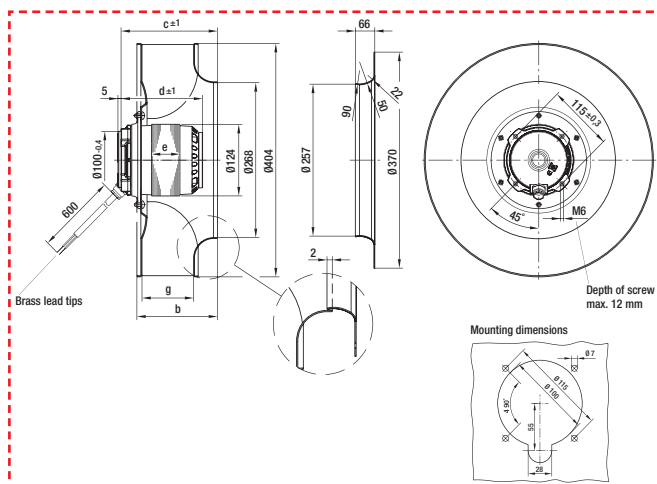
56

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What a product page is made up of (reduced scale - 50%)

- **Motor protection:** Design with thermal overload protector
- **Cable exit:** Diagonal
- **Protection class:** I (acc. to EN 61800-5-1)
- **Product conforming to standard:** CE

Centrifugal fan	kg	b	c	d	e	g	Inlet nozzle (long)
RAE 400-AR05 -06	7.1	141.0	172.0	128.0	50.0	90.0	54476-2-4013
RAE 400-AP17 -06	8.8	164.0	193.0	148.0	70.0	113.0	54476-2-4013



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Inlet nozzle p. 550 Guard grille p. 553 Capacitor p. 560 f. Electric connections p. 596 f.

57

Product description

Depending on the product, information is provided here on the following: material, number of blades, direction of air flow, direction of rotation, system of protection, insulation class, mounting position, condensate discharge holes, mode of operation, design, bearing, technical equipment, EMC, leakage current, motor protection, electrical connection, cable exit, protection class, capacitor, product conforming to standards, approvals and options.

Nominal data

AC products (up to motor size 074) and EC products (DC-fed):

Free-blowing or at minimal backpressure

AC products (from motor size 094) and EC products (AC-fed):

In operating point at maximum load

Graphic rendition of products

All drawings represent the design principle and are not to scale.

Dimensions are either given in the product drawing or, with varying dimensions, in the table of dimensions given above the drawing.

Indication of relevant accessories and additional information

The pages indicated at the bottom refer to the accessories, e.g. inlet nozzles, guard grilles, wall rings, etc. for this particular product, as well as additional information (e. g. the connection diagram).

Curves and operating points

The diagram gives air performance curves pertaining to the product. Refer to the operating point table to the right for information on speed, power consumption, current draw, sound level or sound pressure level and overall efficiency of the impeller.

How to select your ebm-papst product



Solutions for ventilation offered by ebm-papst

In the field of ventilation, ebm-papst offers the perfect solution for a vast number of applications. Depending on motor, impeller and control technology, there is almost no limit to the number of possible combinations, thus making sure you can find the best solution for your application.

Criteria for selection

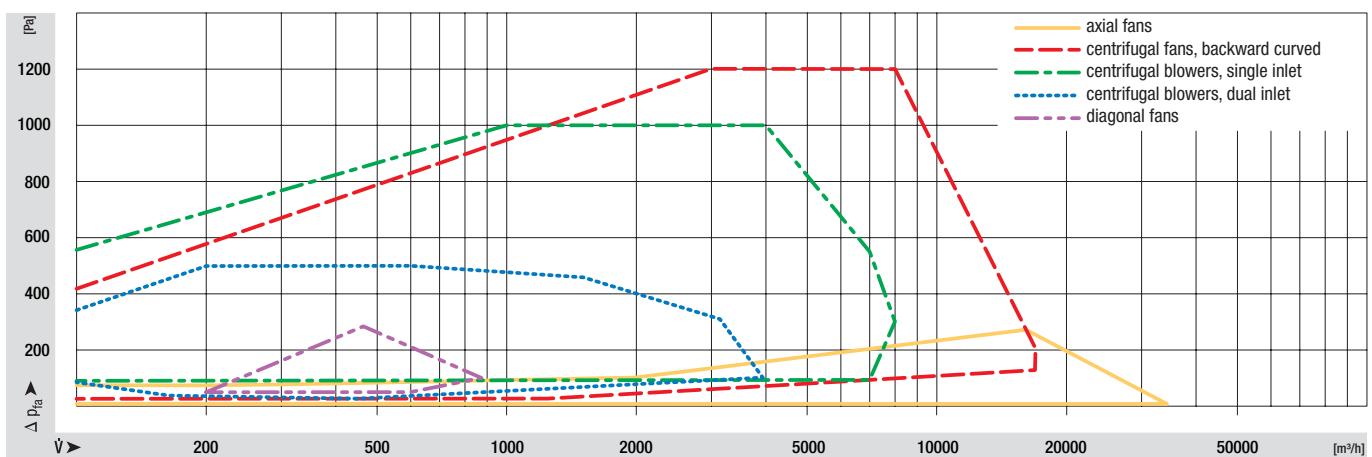
When selecting a fan for a specific application, these parameters play an important role:

- Air flow with given back pressure
- Voltage supply, divided into DC and AC voltage (1~, 3~)
- Noise generation
- Efficiency
- Available mounting space

Selecting a fan

The following diagram shows the range of characteristic curves for the most important fan designs and serves as a helpful tool in preselecting a design on the basis of air flow and back pressure.

Characteristic curves of the various designs



How to order your ebm-papst product



Have you found the suitable ebm-papst product and would like to order it now?

In this case, simply contact your nearest ebm-papst sales office by E-mail, fax or phone.

Don't know exactly which ebm-papst product you need to order?

In this case, simply contact your nearest ebm-papst sales office by E-mail, fax or phone. Our specialists in ventilation and drive technology are always there to help you find the best solution for your specific application.

Using the questions provided in the checklist here as a guideline, you can make sure your ebm-papst contact has all the necessary information to handle your enquiry as efficiently and quickly as possible.

How your ebm-papst product is delivered

In our order confirmation, you will find information on when, how and where to the delivery will be made.

We deliver:

- Ex works (excluding packaging)
- Via freight carrier (we also use postal services for shipments up to 30 kg)

All the other details such as packaging, freight, insurance and customs duty will be settled with your ebm-papst contact prior to the time we issue our order confirmation.

Is there anything else you need to know about your ebm-papst product?

In this case, simply contact your nearest ebm-papst sales office by E-mail, fax or phone. We have the answer to your problem and are always glad to be able to be of assistance.

Using the questions provided in the checklist here as a guideline, you can make sure your ebm-papst contact has all the necessary information to handle your enquiry as efficiently and quickly as possible.

Checklist

- Part designation / type
- Quantity needed
- Field of application
- Ambient conditions (humidity, temperature, climate)
- Impeller diameter
- Air flow
- Back pressure
- Voltage supply

For your nearest sales office, please turn to page 430.



