



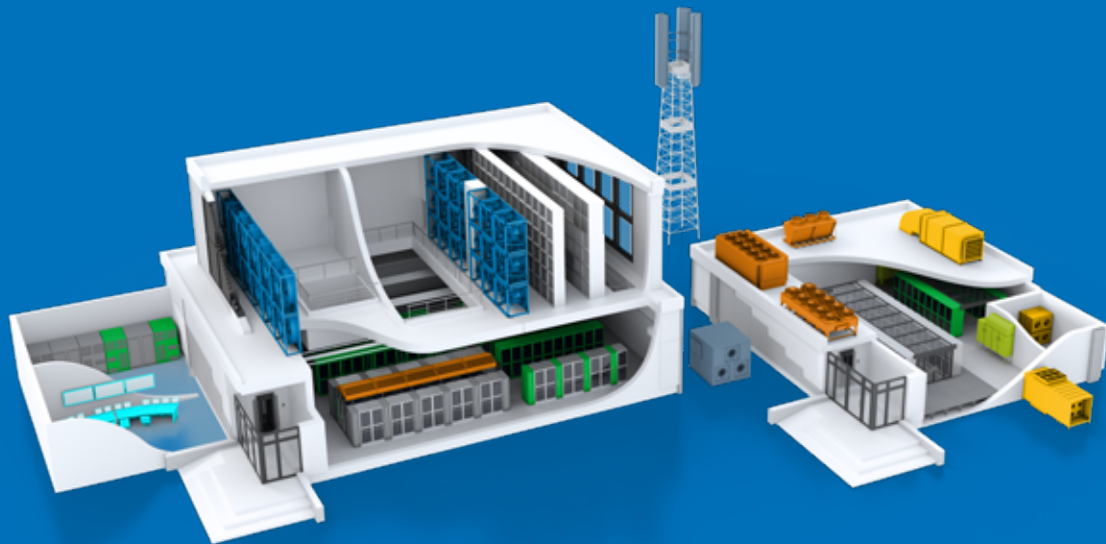
**ebmpapst**

engineering a better life

*Discover ebm-papst*  
**for data centers.**

# Contents

<b>Digitalization and connectivity</b>	<b>4</b>
Visualization	5
Preventive maintenance	6
Predictive maintenance	7
<b>Harmonic minimization</b>	<b>8</b>
External passive filters	8
3-phase active PFC	9
<b>RadiPac</b>	<b>14</b>
<b>Use of EC fans in data centers</b>	<b>16</b>
FanGrid	18
Computer room air handlers (CRAH) and air handling units (AHU)	20
Computer room air conditioning (CRAC)	24
Dry coolers/chillers/condensers/overhead heat exchangers	26
AxiBlade	28
Cooling tower	30
InRow cooling	32
AxiForce	34
AxiTwin	35
Data center infrastructure management	36
MODBUS Display and Control	38
<b>FanScout</b>	<b>40</b>
<b>Engineering a better life</b>	<b>42</b>



# Sustainable solutions *you can count on.*

Work generates heat. So it's no wonder that data centers quickly get too hot. To prevent this, a large proportion of the energy required must be used just on cooling the hardware.

Thank goodness for ebm-papst's highly efficient EC fans, which increase cooling capacity and reduce energy consumption. And because every data center has different requirements, a wide range

individual solutions are possible – from cooling individual rows of servers through to modular designs with high air performance and cooling towers.

Always intelligently networked, of course, for maximum transparency and reliability with lower costs and emissions.

# Digitalization *and connectivity.*

To give you a decisive competitive advantage, we offer you two important pillars. Firstly, the ability to evaluate information in real time. And secondly, access to data and experience gained from over 50 years of motor technology, electronics and aerodynamics. With the help of our intelligent products, we can guide and support you through your digital transformation: from reactive and proactive service to preventive and predictive maintenance!



## 1. Visualization

A constant overview of your data, wherever you are.



## 2. Preventive maintenance

The aim of preventive maintenance is to prevent failures and the associated downtimes. In keeping with Industry 4.0, the fan is equipped with a certain fundamental level of intelligence that enables it to inform the user about the next maintenance work as a preventive measure. In conjunction with optional vibration detection, the preventive maintenance feature ensures that critical vibration velocities can be detected and suppressed. This results in a longer service life for the entire system and consequently a lower TCO.



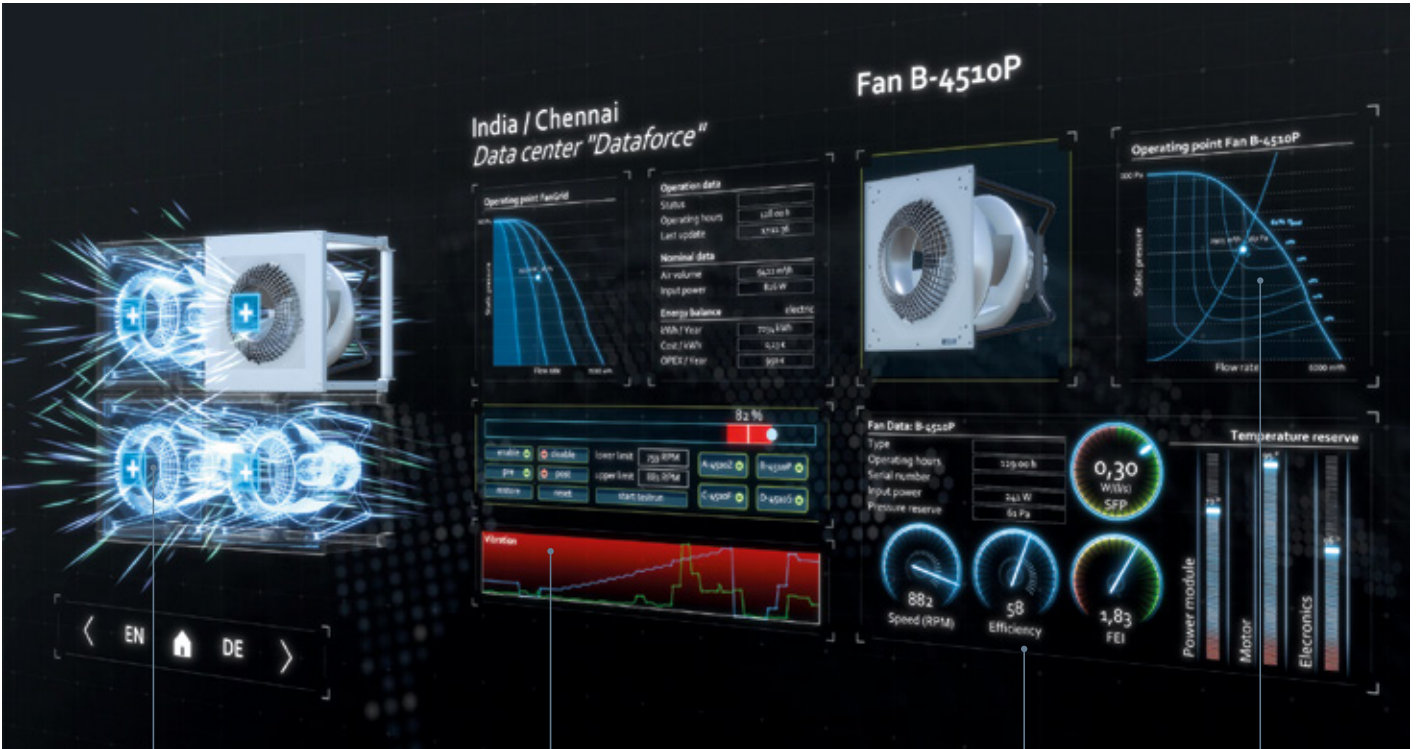
## 3. Predictive maintenance

Predictive maintenance relies on high-precision sensors combined with integrated intelligence to be able to find out exactly about the actual condition of the fan. Based on this data, precise information about the remaining service life is possible depending on the relevant usage behavior.



A constant overview of your data

# Visualization.



## Time savings during commissioning

With the aid of an optional controller, FanGrids can be easily commissioned using auto-addressing and subsequently controlled.

## Standard parameters

The most important fan parameters such as various temperature values, speed, and power consumption are available at any time for further processing.

## Independent control

Controlling the required air flows or pressures precisely – no problem at all with optional sensors!

## Increased operational reliability

**Optional:** Monitoring of vibration velocities using high-precision vibration sensors. Impermissible vibration velocities can be suppressed automatically.



# Preventive maintenance.



## Resonance detection

- + **Increased functionality**
  - Easy condition monitoring
  - Test start-up during initial operation
  - Specification of limit values and suppression of critical speed ranges
- + **Intuitive operation**
  - Full control over all settings and activities
  - Hardware and software from a single supplier
- + **Longer service life and lower maintenance costs**
  - Speed remains in uncritical resonant range
  - Warning and/or shutdown in the event of continuous unbalance

Depending on the installation situation, increased vibration levels may occur in the resonant range in the end device for a variety of reasons. Improper transportation/handling or an imbalance caused by soiling of the impeller may play a role here.

If the fan is operated frequently at excessive vibration levels, the bearings may get damaged and premature failures may occur. Although these vibrations can be measured during commissioning of the system, they cannot be easily eliminated. ebm-papst EC fans can optionally detect these resonances using vibration sensors installed internally and prevent operation in these critical areas. After the commissioning routine has been performed for the first time, the integrated software detects critical vibration velocity ranges and suggests these speed ranges for suppression. If desired, all settings can be adapted manually using MODBUS-RTU.

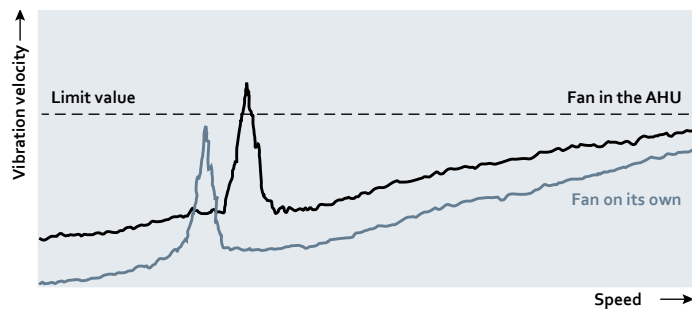


Image 1: Fan installed in end device

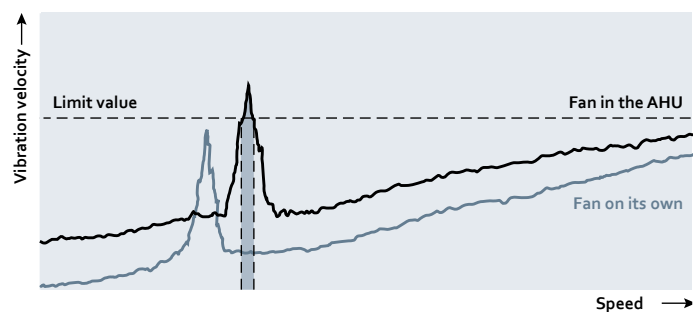


Image 2: Vibration behavior with speed range that has been omitted

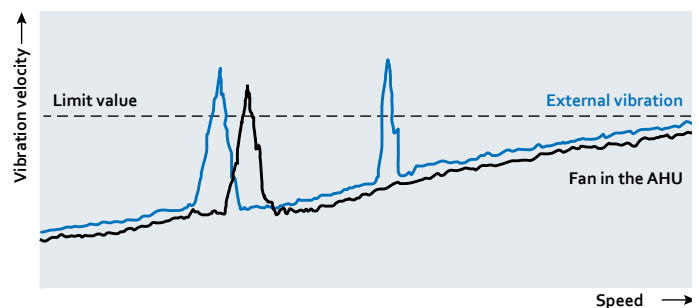


Image 3: Fan in end device with additional external vibration source, e.g. compressor

Would you like to find out more?

Further information can be found at:  
[ebmpapst.com/monitoring](http://ebmpapst.com/monitoring)





# Predictive maintenance.



## Goal:

- Ensuring the availability of critical infrastructures
- Reduction of downtimes due to servicing
- Maximum reliability through effective monitoring

## Implementation:

- Generation, use, and interpretation of sensor data from all relevant fan components
- Sending of an automatic fault message so that service assignments can be planned as required

## The benefits to you:



### Creating transparency

Avoidance of unnecessary downtimes thanks to timely reactions



### Reducing costs

Reduction of maintenance costs to a minimum using improved planning of service assignments



### Minimizing downtimes

Long-term improvement of the quality and performance of the application by analyzing the data

# External passive filters.

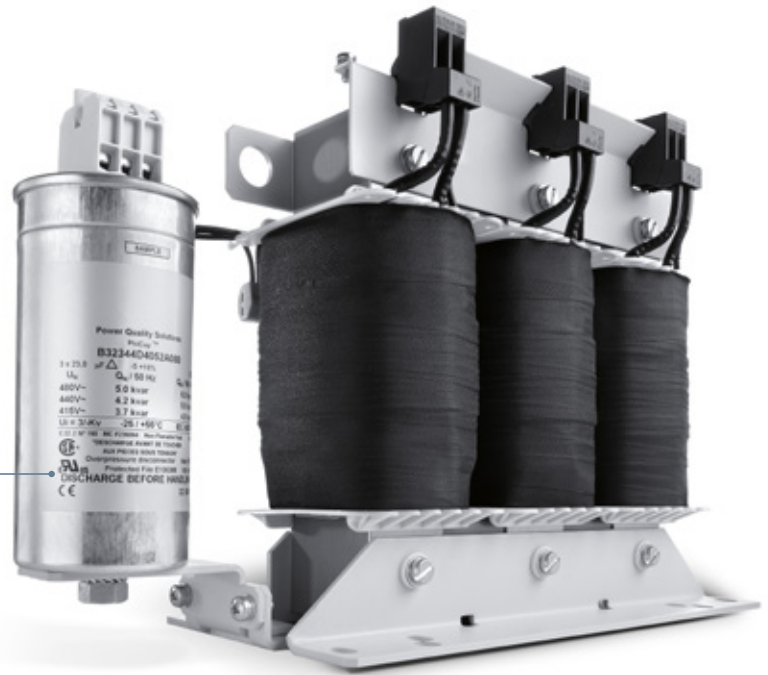
## Passive current harmonics filters

These filters are a cheap solution for reducing current distortion reactive power. However, to ensure smooth operation, they must be matched to the respective variable frequency drive topology. In the field, this can lead to project delays or even failure of individual components for technical reasons. Thanks to cooperation with leading filter manufacturers, ebm-papst can provide predefined passive filters for all electronics in the range from 4 kW to 12 kW.

These were optimized and tested for use with our EC fans and can be ordered as a complete product. No further designs, tests, approvals, or other field tests are necessary. This eliminates a potential source for project delays, which increases planning reliability.

## External passive filters

- + 5 %–9 % THD(I) at rated output
- + Coordinated for use with ebm-papst EC fans
- + Up to 12 kW per filter
- + All from a single supplier
- + Scalability
- + No project delay



### Apparent solution for reducing apparent power:

To optimize the resulting THD(I) value of a poor or non-adapted filter to the target values of a specification, "solutions" are sometimes offered that only deliver benefits at first glance:

Instead of reducing  $I_{n1}$ , attempts are sometimes made to increase  $I_1$  (for example by connecting additional capacitors in parallel).

$$THDi = \sqrt{\sum_{n=2}^{40} \left(\frac{I_n}{I_1}\right)^2}$$

- Mathematically correct, but not an advantage in practice, as the power factor decreases
- Harmonic minimization added value (see p. 10/11) is lost

## Do you need external passive filter solutions?

We work together with leading filter manufacturers to be able to offer you external passive filters suited to our fans and your application.

You can obtain further information from your personal contact person.



# 3-phase active PFC.

EC fans are used on a large scale to ensure that the heat generated in data centers is dissipated efficiently. In order to avoid over-dimensioning the power supply and to meet the corresponding requirements with regard to current and voltage harmonics, ebm-papst has developed a 3-phase active PFC fan.

3-phase active PFC fan technology from ebm-papst takes the approach of preventing current harmonics from occurring in the first place instead of laboriously filtering them out afterwards with additional components.



## Integrated active PFC

- + THD(I) ≤ 5 % over a broad power range
- + Minimal current harmonics, even in partial-load operation
- + Problem-free parallel connection of multiple fans
- + Perfect interaction of efficient centrifugal fans and electronics with active PFC
- + One product and one supplier
- + No additional wiring work required: "plug & play"
- + Almost ideal power factor of up to 0.998

	Third-party provider passive filter	ebm-papst passive filter	Third-party provider external active filters	ebm-papst integrated active filter
<b>Responsibility for system design</b>	Customer	ebm-papst	Customer	ebm-papst
<b>THD(I) at full load</b>	> 5%	> 5%	< 5%	< 2%
<b>THD(I) at partial load</b>	> 5%	> 5%	> 5%	< 5%*
<b>Plug &amp; play</b>	-	+	-	++
<b>Power consumption per filter</b>	Unknown/not specially designed for EC fans	4–12 kW	min. 60 kW**	up to 3.2 kW
<b>Installation space</b>	--	--	-	+
<b>Wiring work</b>	--	--	-	++
<b>Installation work</b>	-	-	--	++
<b>Delivery and consultation</b>	Third-party provider	ebm-papst	Third-party provider	ebm-papst

\*for almost the entire control range

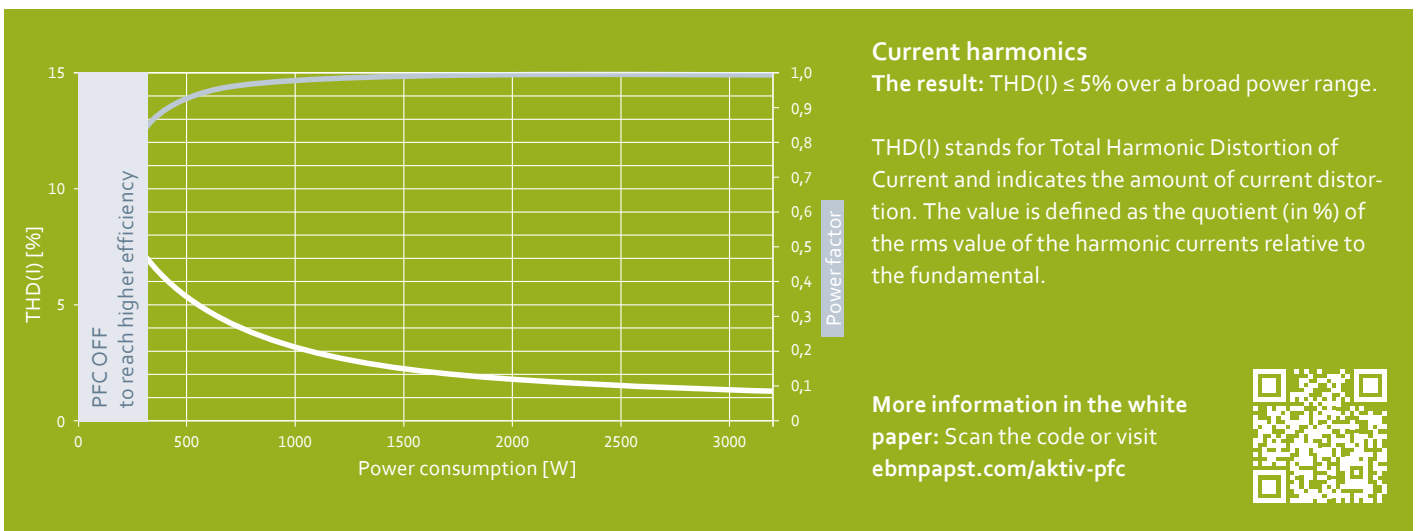
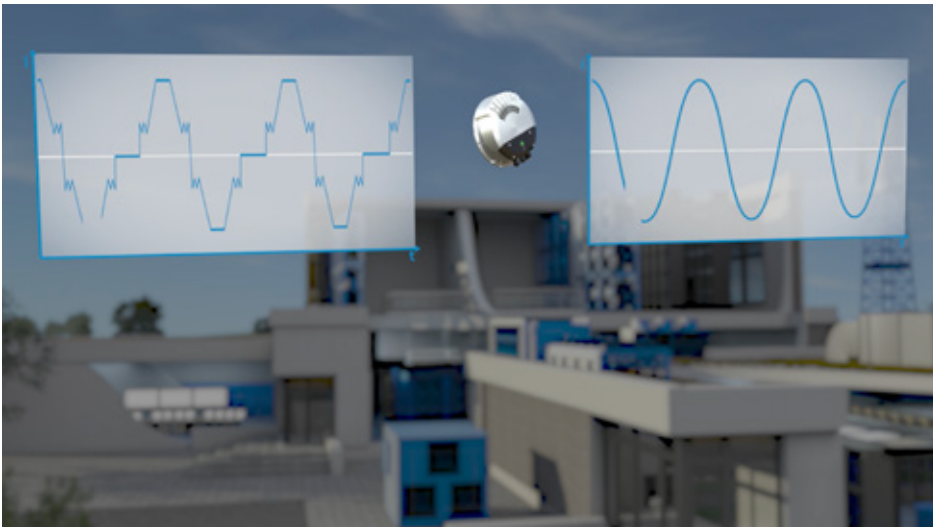
\*\* only suitable for particularly large installations

# Active PFC gets energy into top form.

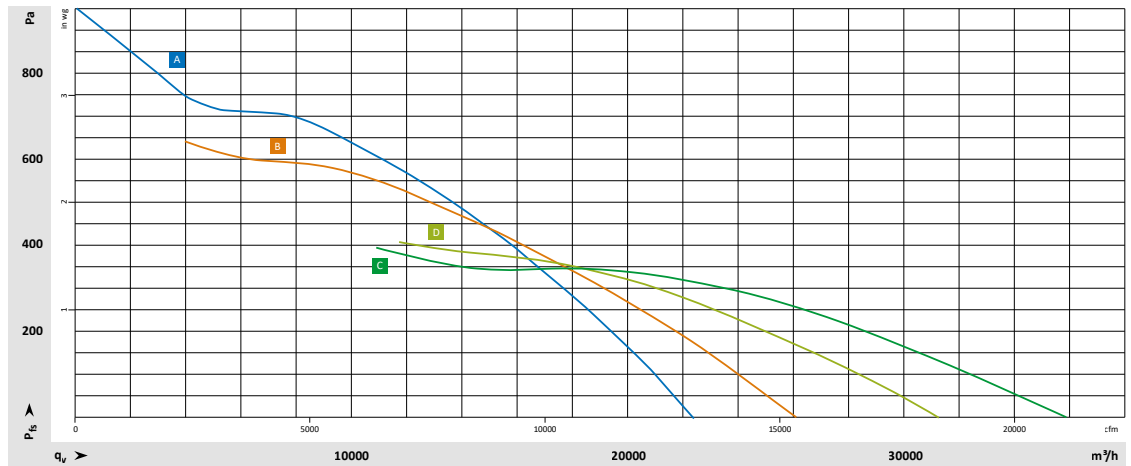
## Minimizing disruptive harmonics

When operating speed-controlled drives, regardless of whether it's an AC/PM motor with variable frequency drive or EC drives, current harmonics are produced in principle. In conjunction with an insufficiently dimensioned power supply, these current harmonics can lead to problems in critical infrastructures. To reduce these current harmonics, appropriate measures must be introduced for the appropriate application.

The good news is that external components are now no longer required. To prevent disruptive harmonics from occurring in the first place, ebm-papst has developed a solution in which the harmonic filter is already integrated: 3-phase active PFC (power factor correction). Infrastructure components for energy and emergency power supply, e.g. transformers or emergency power generators, can be designed to be smaller and thus more cost-effective. This a topic of particular importance in connection with FanGrid applications or precision air-conditioning units in data centers.



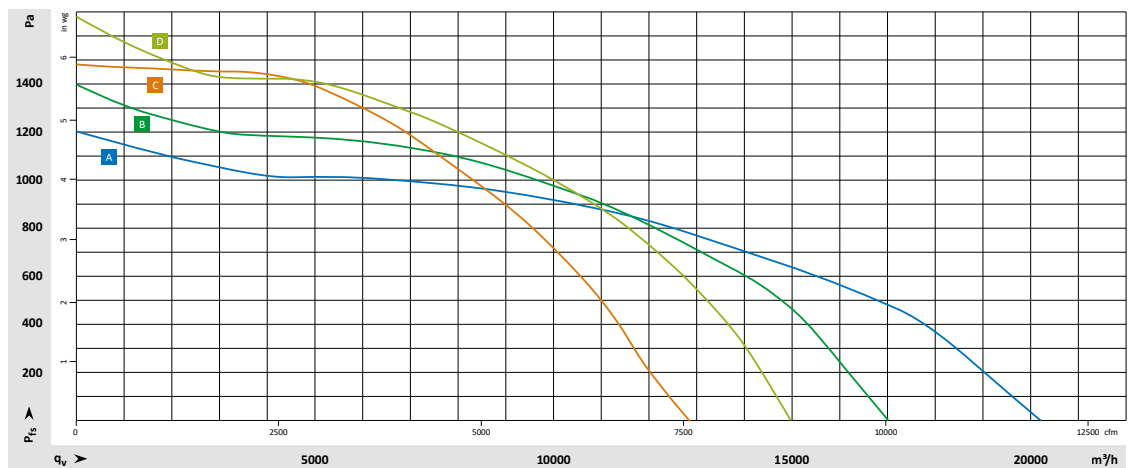
Please get in touch with your ebm-papst representative in case you have higher airflow requirements.



Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption $P_{\text{ed}}$	Input current I	Permitted ambient temperature*
			V AC	Hz	rpm	W	A	°C
<b>A</b>	VWA0910BTTRS	910	3~380-480	50/60	1,100	3,600	5.2	-40 to +40
<b>B</b>	VWA0800BTTPS	800	3~380-480	50/60	1,200	2,850	5.1	-40 to +40
<b>C</b>	VWA0800CTTPS	800	3~380-480	50/60	1,470	3,900	5.6	-40 to +40
<b>D</b>	VWA0910CTTRS	910	3~380-480	50/60	1,190	3,575	5.2	-40 to +40

\*Other temperature ranges and data sheets on request. Subject to change without notice.

Please get in touch with your ebm-papst representative in case you have higher airflow requirements.



Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption $P_{\text{ed}}$	Input current I	Permitted ambient temperature*	Weight
			V AC	Hz	rpm	W	A	°C	kg
<b>A</b>	VBH0500CTTLS	500	3~380-480	50/60	2,450	4,000	5.8	-40 to +40	34
<b>B</b>	VBH0560CTTPS	560	3~380-480	50/60	1,990	4,000	5.8	-40 to +40	42
<b>C</b>	VBH0630CTTPS	630	3~380-480	50/60	1,650	4,000	5.8	-40 to +40	47
<b>D</b>	VBH0450PTTLS	450	3~380-480	50/60	2,320	3,700	5.3	-40 to +40	

\*Other temperature ranges and data sheets on request. Subject to change without notice.

# 3-phase active PFC *from the pioneer.*

## Potential for savings when designing a data center

In order to illustrate the potential for savings due to ebm-papst 3-phase active PFC fans, the costs of the industry standard solution were compared to the costs of the 3-phase active PFC fans when designing a data center. In one case, a data center with an IT load of 3 MW was designed with 220 standard fans for cooling, while in another case, the same quantity of 3-phase active PFC fans was used. On account of higher THDU and THD(I) values with the standard

solution, it was necessary to greatly overdimension the transformer and the emergency power generators in comparison with the 3-phase active PFC fans in order to avoid exceeding the permissible limit value framework for voltage harmonics.

Due to the different design of the data center, it proved possible to achieve significant cost savings. The table below compares the

## Your advantages at a glance

### Maximum efficiency

- + Thanks to active PFC, only the required energy is consumed. This saves money and protects the environment.

### Power factor up to 0.998

- + This means that the ratio of effective power to apparent power is almost ideal.

### Supply stability

- + A low total harmonic distortion of current indicates low current distortion and good voltage quality. At rated output, it is approx. 2%.

### Compliance with legal requirements

- + No additional filters or energy-related components are required.

### Easy parallel connection

- + Several fans can be operated simultaneously.

### Plug & play

- + No additional wiring work required.

### From a single supplier

- + Various fans with active PFC from an experienced supplier. Including perfect interaction between product and electronics.



costs for both solutions. It becomes apparent that the additional expense for the 3-phase active PFC fans is more than offset by being able to downsize the transformers and generators. In the final analysis, this resulted in a total saving of €832,500 corresponding to around 38% lower costs.

**Factors not taken into account in the calculation**

The increased amount of space required for an oversized system and the associated construction costs and, if necessary, rental costs were not taken into account in the calculation. In the case of 3-phase active PFC fans, smaller dimensioning of cables and switchgear is possible. So in real terms the cost savings are even higher!



Article number	Active PFC	Industry standard
<b>System costs</b>	€ 1,417,595	€ 1,417,595
<b>Active PFC fans</b>	+ € 66,000	-
<b>Transformer</b>	+ € 125,000	+ € 187,500
<b>Generator</b>	€ -280,000	+ € 608,000
<b>Total</b>	€ 1,380,595	€ 2,213,095
<b>Saving in €</b>		€ 832,500
<b>Saving in %</b>		37.6%

**Do you need more data on our active PFC fans?**

Further information is available from your personal contact or at: [ebmpapst.com/aktiv-pfc](http://ebmpapst.com/aktiv-pfc)



The Perform version of the RadiPac C

# *Benchmark in terms of efficiency.* **Standard in terms of dimensions.**

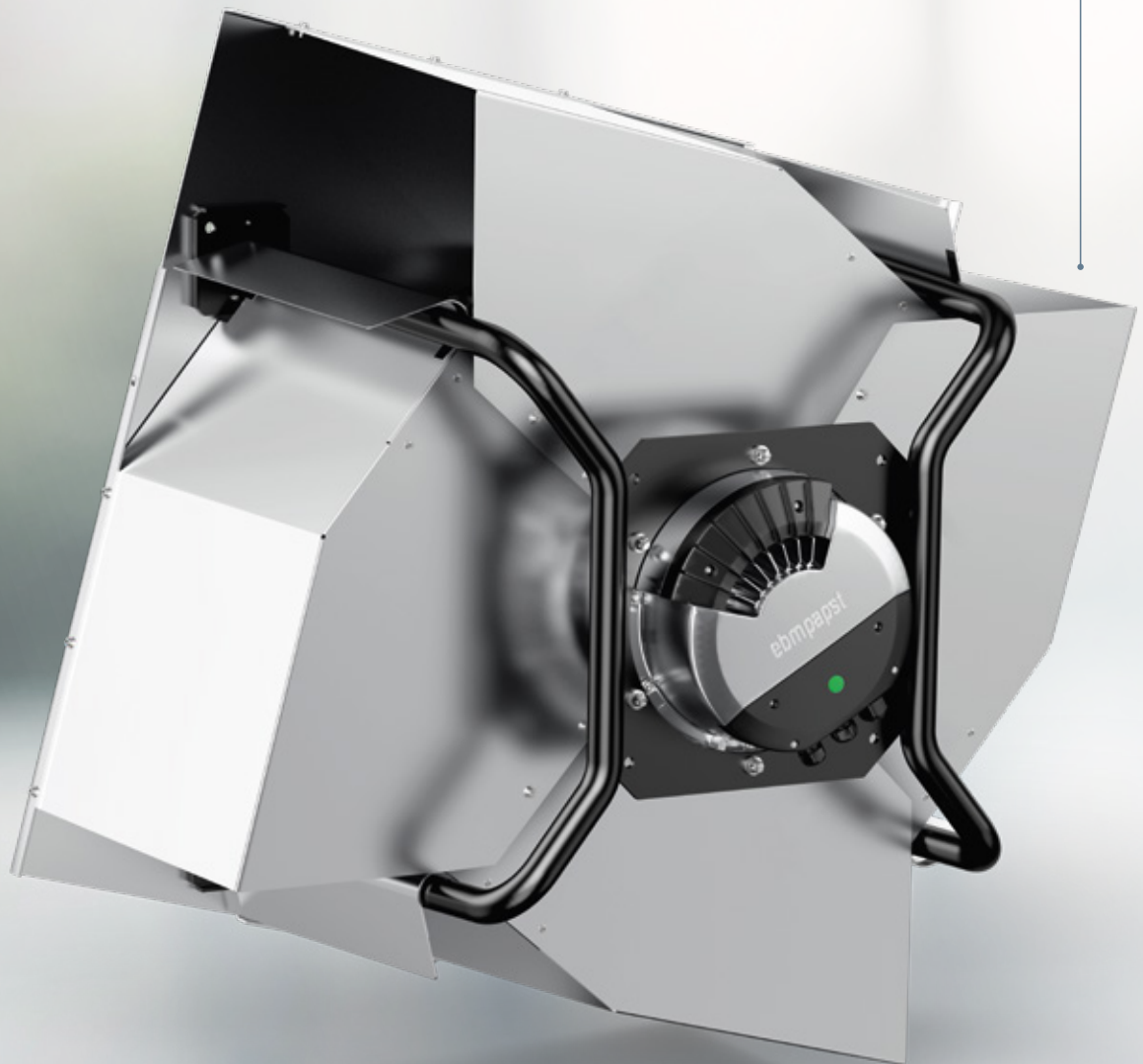
The new RadiPac C Perform owes its name to its outstanding performance and exceptional shape. The "C" stands for the innovative impeller made of high-strength composites and "Perform" for maximum overall efficiency.

The fan is based on the latest RadiPac technology, supplemented by a housing made of four aerodynamically shaped, sendzimir galvanized sheet steel segments designed to further reduce flow losses.

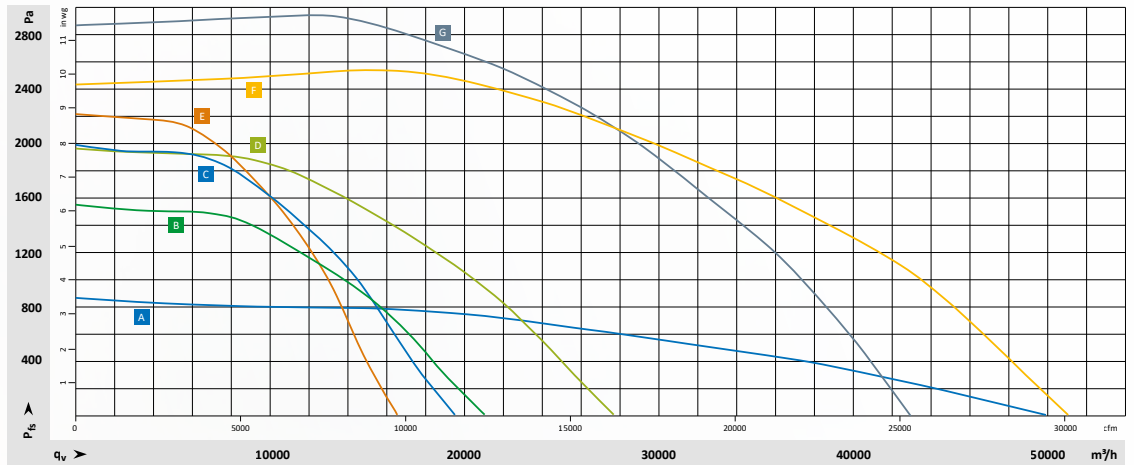
As a result, the RadiPac C Perform achieves an efficiency increase of over 4 percentage points – once again setting the benchmark, no matter which way you spin it.

## Your advantages at a glance

- + Greater efficiency – over 4 percentage points
- + Air flows of up to 20,000 m<sup>3</sup>/h and
- + Pressures of more than 2,000 Pa
- + Unchanged mounting hole pattern
- + New high-performance electronics
- + FlowGrid compatible

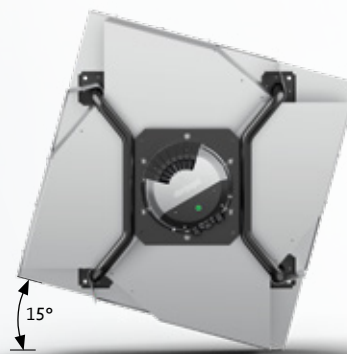
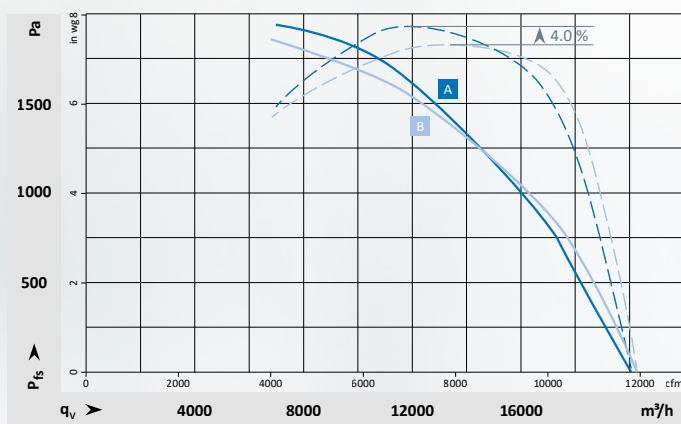


## Characteristic curve map for RadiPac 2 and RadiPac 3



Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption $P_{\text{eid}}$	Input current I	Permitted ambient temperature*
			V AC	Hz	rpm	W	A	°C
A	VBH0450PTTPS	450	3-380-480	50/60	2,800	6,800	10.3	-40 to +40
B	VBH0500PTTRS	500	3-380-480	50/60	2,400	7,000	10.7	-40 to +40
C	VBH0560PTTRS	560	3-380-480	50/60	1,860	5,950	9.2	-40 to +40
D	VBF0630PTVQS	630	3-380-480	50/60	1,950	9,780	15.2	-40 to +40
E	VBF0710XTXNS	710	3-380-480	50/60	2,130	24,000	38.0	-40 to +40
F	VBF0800XTXNS	800	3-380-480	50/60	1,750	24,000	38.5	-40 to +40
G	VBF1000PTVTS	1000	3-380-480	50/60	780	6,800	10.5	-40 to +40

\*Other temperature ranges and data sheets on request. Subject to change without notice.



A RadiPac C Perform



B RadiPac C

### Its performance speaks for itself

Efficiency comparison of RadiPac C and RadiPac C Perform size 560: A significant increase in efficiency has been achieved over a wide performance range.

Would you like to find out more?

Further information can be found at: [ebmpapst.com/radipac](http://ebmpapst.com/radipac)



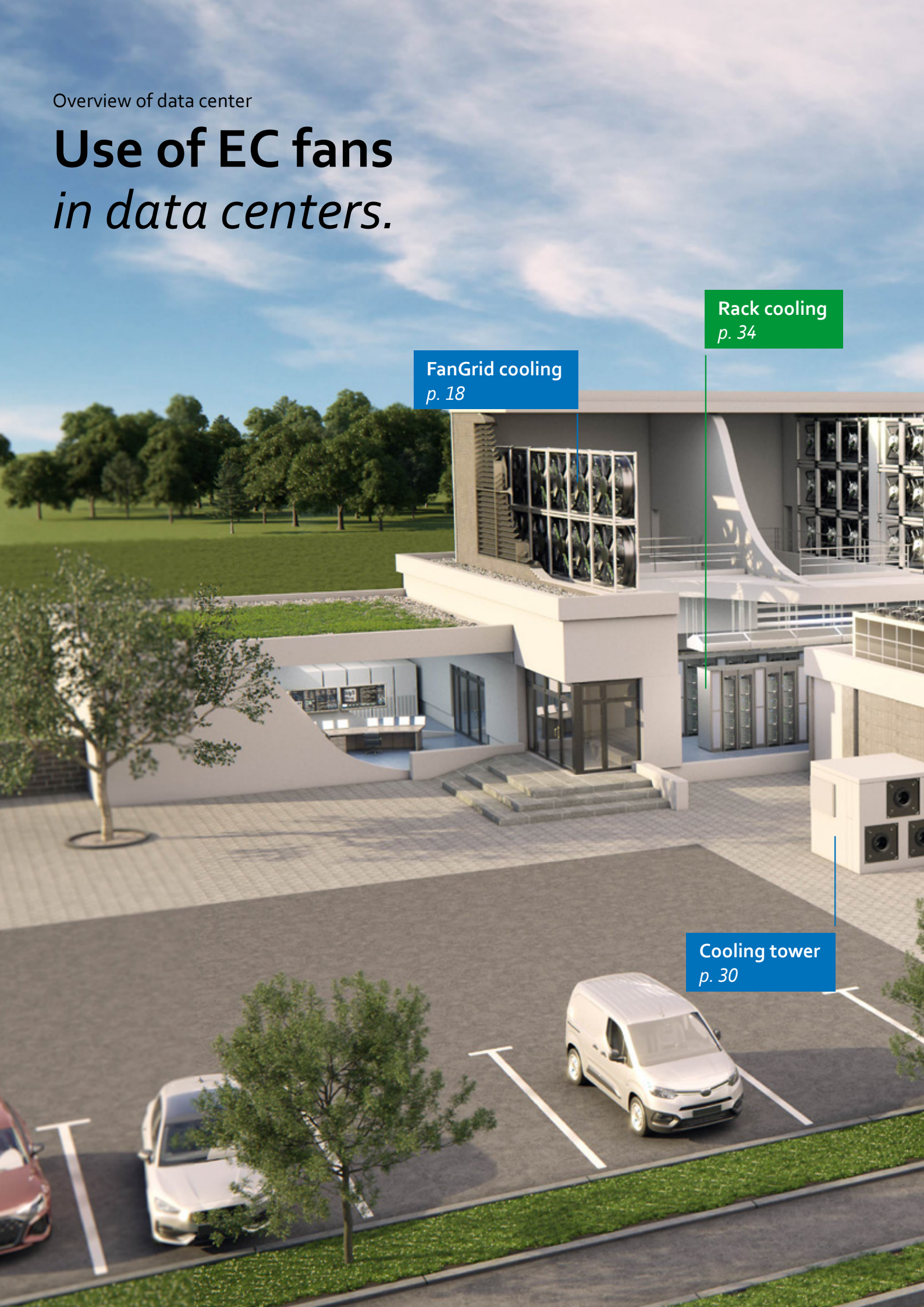
Overview of data center

# Use of EC fans *in data centers.*

Rack cooling  
*p. 34*

FanGrid cooling  
*p. 18*

Cooling tower  
*p. 30*





Base station  
p. 34

Computer room air conditioning (CRAC)  
p. 24

V-shape chiller  
p. 26

Indoor air handling units (AHU)  
p. 20

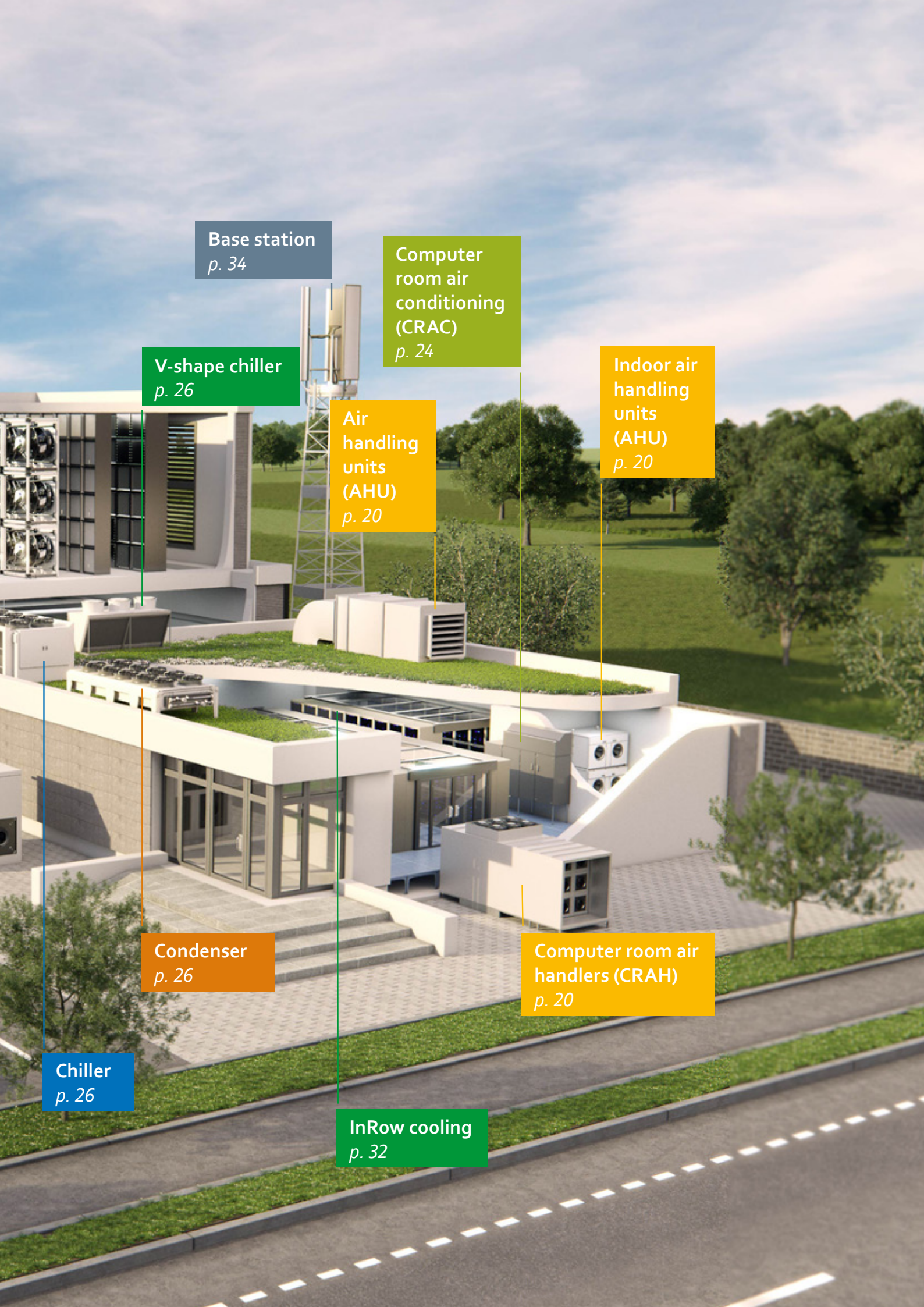
Air handling units (AHU)  
p. 20

Condenser  
p. 26

Computer room air handlers (CRAH)  
p. 20

Chiller  
p. 26

InRow cooling  
p. 32



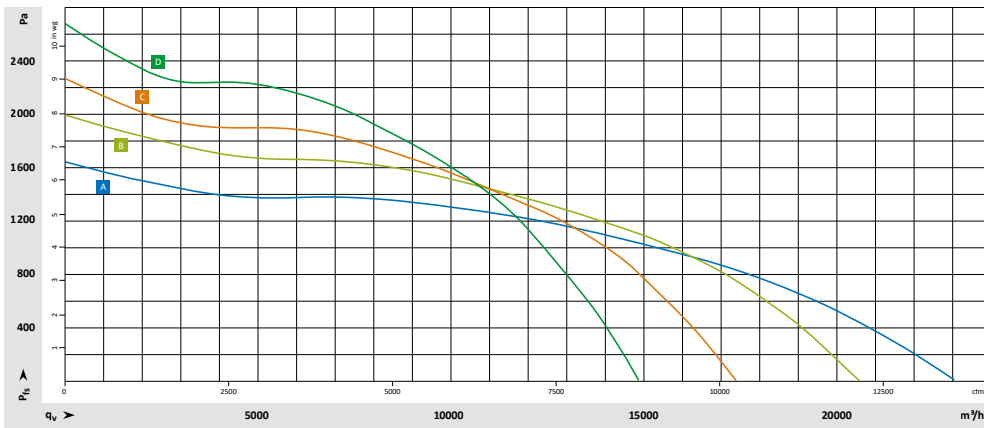
# Modular solutions for high air performance levels.

These days, ventilation technology has moved beyond using large individual fans to generate high air performance levels and is moving increasingly towards leveraging several centrifugal and axial panel fans that operate in parallel inside "FanGrids". This type of arrangement is very flexible and efficient. The redundancy also ensures high operational reliability: if one fan fails, the other fans compensate for the lacking air volume. The GreenTech EC fans used by ebm-papst also help to significantly reduce operating costs.

An important factor that tends to be overlooked in practice is the risk of installation losses. If fans are installed too closely together, they tend to influence one another. The rule of thumb is that the greater the volume of air that the fan has to convey, the further apart the fans should be.

The dimensions of the FanGrid module with cube design are very generous and large enough to prevent installation losses. The following applies when operating several fans in parallel: the sum of the air flows from the individual fans equals the total air flow desired.

Characteristic curve map for FanGrid



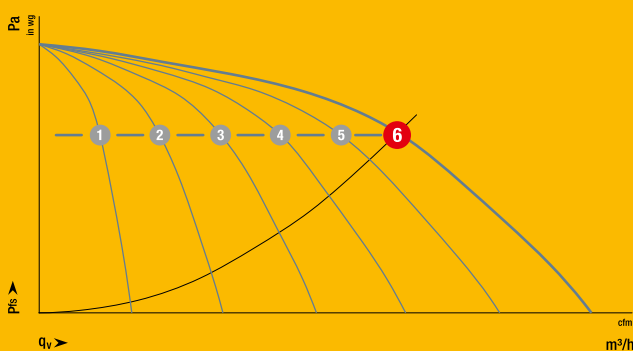
Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption $P_{ed}$	Input current I	Permitted ambient temperature <sup>x</sup>
			V AC	Hz	rpm	W	A	°C
A	VBF0450CTTPS	450	3-380-480	50/60	3,430	6,300	9.9	-40 to +40
B	VBF0500CTTRS	500	3-380-480	50/60	2,840	6,210	9.6	-40 to +40
C	VBF0560CTTRS	560	3-380-480	50/60	2,370	6,500	10.0	-40 to +40
D	VBF0630CTTRS	630	3-380-480	50/60	1,910	5,850	9.0	-40 to +40

\* Other temperature ranges and data sheets on request. Subject to change without notice.



## Parallel operation of several fans

In FanGrids, multiple small fans operate in parallel, rather than having one large fan. This provides redundancy, ensuring fail-safe operation. What's more, multiple, adjustable fans can adapt more easily to the actual air performance that is required, meaning that they increase the efficiency levels at every operating point. As optimum design is particularly important when planning FanGrids, ebm-papst is always pleased to offer customers the appropriate assistance.



### Preventive maintenance

These fans are optionally also available with preventive maintenance functions (p. 6). If you have any questions, please contact your ebm-papst contact person.



### Predictive maintenance

These fans are optionally also available with predictive maintenance functions (p. 7). If you have any questions, please contact your ebm-papst contact person.

Would you like to  
find out more?

Further information can be found at:  
[ebmpapst.com/modularity](http://ebmpapst.com/modularity)



# Top performance under all circumstances.

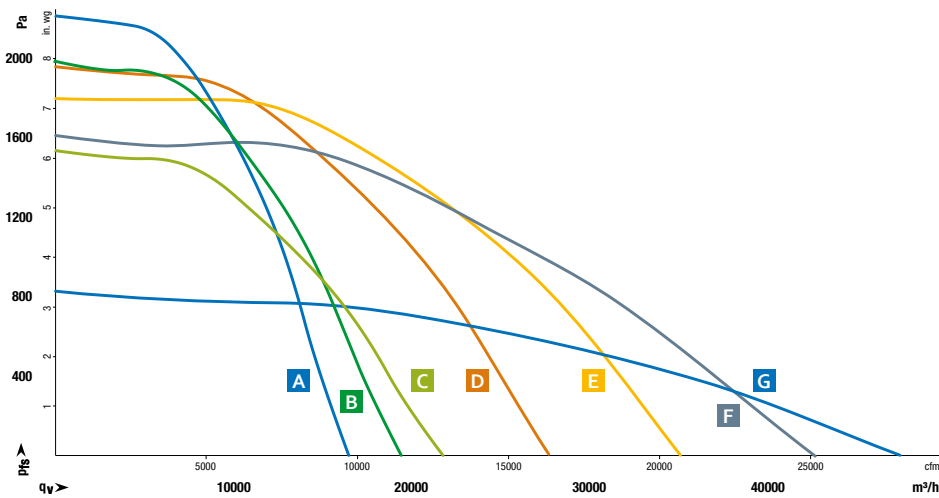
## Planning reliability for equipment manufacturers

The real installation situation in CRAHs and AHUs was included in the development of RadiPac fans. In particular, we optimized the impeller's outflow characteristics and reduced the deflection losses in the air handling unit. Thanks to a wide optimum efficiency range and a high static overall efficiency level, the fans operate with low power consumption in a wide range of operating ranges.

## The advantages of fans from ebm-papst in CRAHs and AHUs:

- High power density
- Unrivalled compactness
- Perfectly coordinated components
- High efficiency thanks to enhanced ventilation technology and new EC motors
- Extremely quiet operation thanks to optimized flow through the impeller
- With infinitely variable control
- Compliance with ErP specifications

Characteristic curve map for RadiPac



As the impeller, motor, and electronics are optimally matched, the highest static overall efficiency levels on the market are achieved.

Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption $P_{ed}$	Input current I	Permitted ambient temperature	Weight
			V AC	Hz	rpm	W	A	°C	kg
A	K3G 450-PB29-L1	450	3-380-480	50/60	2,800	6,800	10.3	-40 to +40	49
B	K3G 500-PC16-L1	500	3-380-480	50/60	2,400	7,000	10.7	-40 to +40	50
C	K3G 560-PC10-L1	560	3-380-480	50/60	1,860	5,950	9.2	-40 to +40	65
D	K3G 630-PW04-01	630	3-380-480	50/60	1,950	9,780	15.2	-40 to +40	115
E	K3G 710-PW06-01	710	3-380-480	50/60	1,680	11,450	17.7	-40 to +40	154
F	K3G 800-PW07-01	800	3-380-480	50/60	1,370	11,300	17.5	-40 to +40	158
G	K3G A00-PV03-01	1000	3-380-480	50/60	750	6,340	9.8	-40 to +40	169

\* Other temperature ranges and data sheets on request. Subject to change.

**Preventive maintenance**  
These fans are optionally also available with preventive maintenance functions (p. 6).  
If you have any questions, please contact your ebm-papst contact person.

**Predictive maintenance**  
These fans are optionally also available with predictive maintenance functions (p. 7).  
If you have any questions, please contact your ebm-papst contact person.



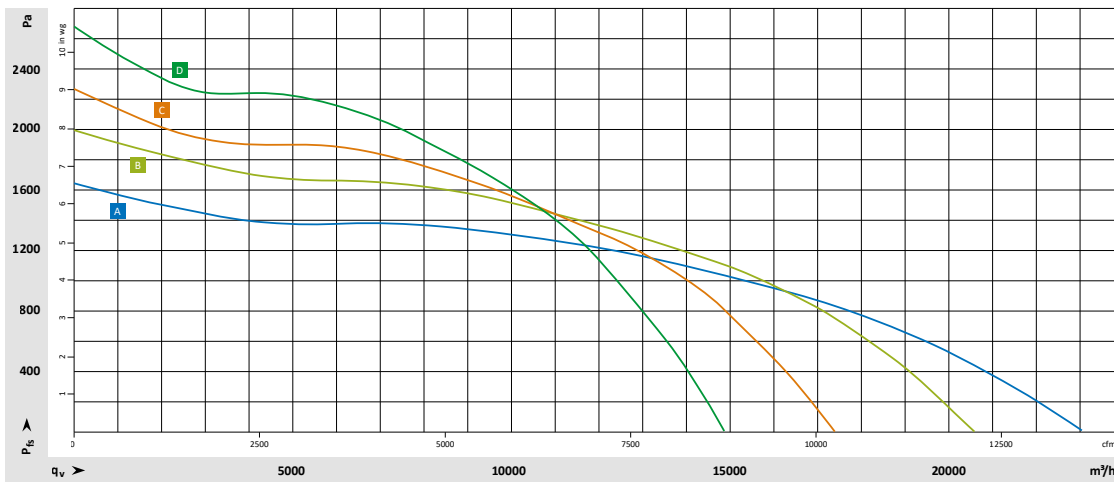
### System concept instead of individual components

The RadiPac product range for use in air handling units contains not just the high-performance impeller with inlet ring, the GreenTech EC motor, and the control electronics, but also mechanical components.

This creates a compact fan unit that is available to the user in a ready-for-installation manner. In contrast to other solutions such as those with asynchronous or PM motors, users don't have to deal with the individual components. This means that the motor, variable frequency drive and impeller do not have to be procured, installed, connected or coordinated individually. With the certified product selector, the operating conditions to be expected in the specific

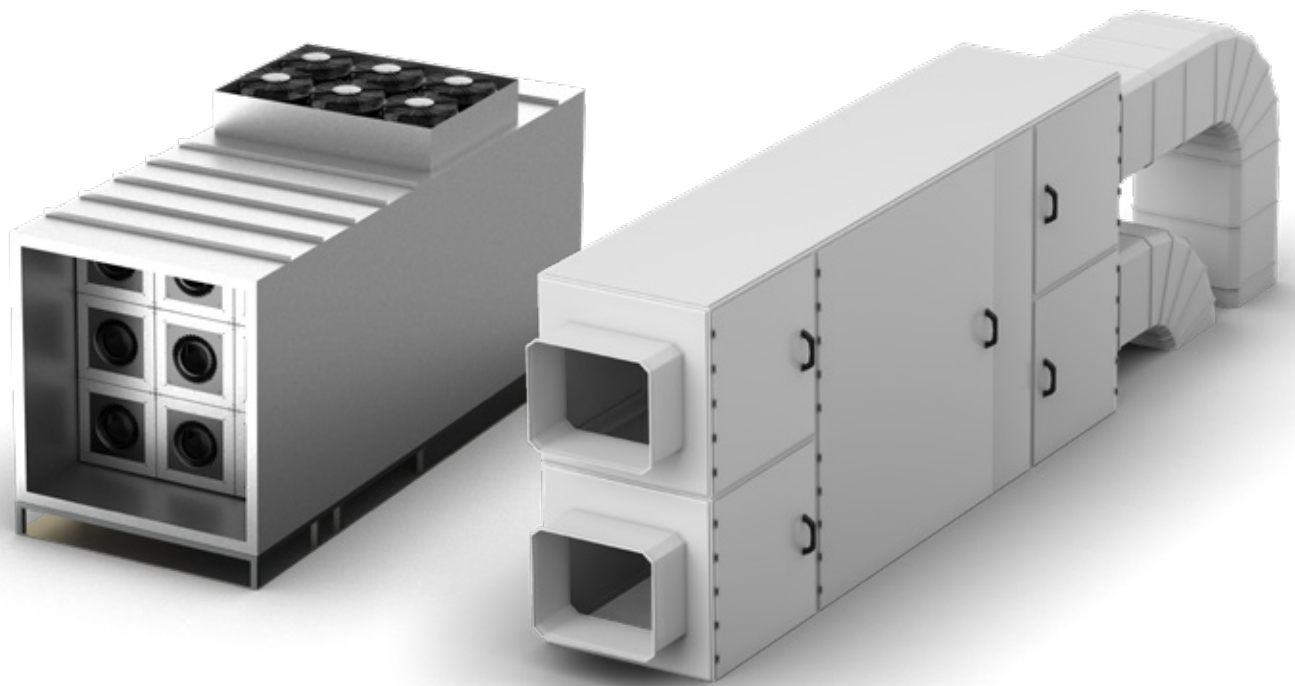
application can be represented in a realistic manner. This is because the measured performance data of the fan forms the database stored for selection. The corresponding measurements were taken on a TÜV-certified aeroacoustic fan test bench, which enables the performance data and noise values to be recorded at the same time.

Characteristic curve map for RadiPac 3C



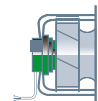
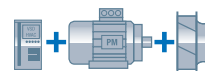
Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption P <sub>red</sub>	Input current I	Permitted ambient temperature*
			V AC	Hz	rpm	W	A	°C
A	VBH0450CTTPS	450	3~380-480	50/60	3,430	6,300	9.9	-40 to +40
B	VBH0500CTTRS	500	3~380-480	50/60	2,840	6,210	9.6	-40 to +40
C	VBH0560CTTRS	560	3~380-480	50/60	2,370	6,500	10	-40 to +40
D	VBH0630CTTRS	630	3~380-480	50/60	1,910	5,850	9.0	-40 to +40

\* Other temperature ranges and data sheets on request. Subject to change without notice.



AC fan with VFD/PM fan with VFD

ebm-papst EC fan



Shielded cables	Shielded cables are required to comply with the legally prescribed limit values for interference emission.
Grounding	The motor and RCD components must be grounded centrally to comply with legal EMC regulations.
Motor protection	An additional circuit breaker for the motor is always required.
Sinusoidal filter	In order to protect the motor windings and bearings against the effects of high-frequency interferences, appropriate filters must be used (all-pole sinusoidal filters). These interferences are generated in the power electronics in conjunction with the cable lengths.
VFD	Today, AC and PM fans are often controlled using variable frequency drives. However, the operation of variable frequency drives makes things more complex. The variable frequency drive must be coordinated to the fan. When creating a cost calculation, do not overlook the complexity of coordinating components with one another.



**The best solution is the systematic approach:**

The motor winding design is perfectly coordinated to the integrated commutation and control electronics, as well as aerodynamics. The system as a unit complies with the required guidelines, standards, and approvals. Additional components such as a VFD, electronic filters, shielded cables between VFD and fan, and external motor circuit switches are not required.

# Steady conditions *protect valuable data.*

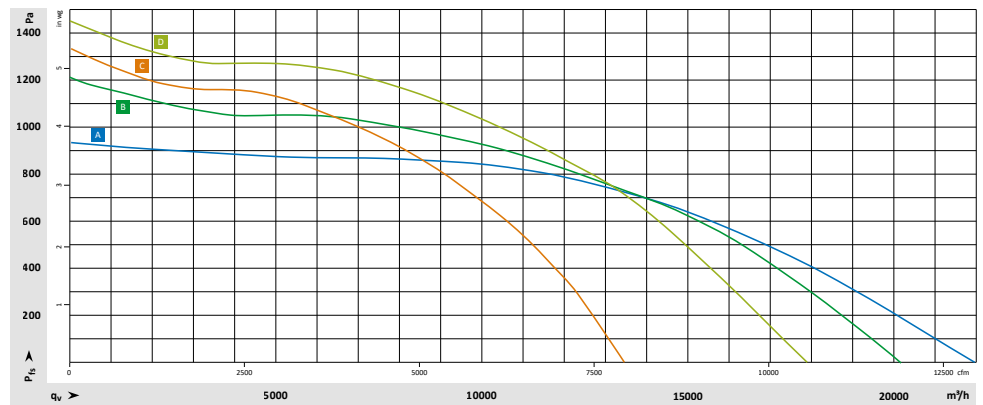


An indispensable part of precision air-conditioning units: centrifugal fans such as the RadiCal. It has been optimized specifically to ensure that air is conveyed efficiently through these precision air-conditioning units in continuous operation. With the same compact size, it delivers significantly higher air performance than its predecessor, permitting optimum use of the limited space available in precision air-conditioning units – with considerably better efficiency and acoustics.

**Your advantages at a glance**

- Overall efficiency optimized to the application
- Compact dimensions
- Very low noise emissions
- Fast availability
- 3-phase active PFC version available as an option
- Resonance detection optionally available

Characteristic curve map for CRAC



*ebm-papst centrifugal fans:  
benchmark in precision air conditioning.*

Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption P <sub>ed</sub>	Input current I	Permitted ambient temperature*
			V AC	Hz	rpm	W	A	°C
A	VBS0500CTRNS	500	3-380-480	50/60	2,240	4,250	4.7	-40 to +40
B	VBS0560CTTPS	560	3-380-480	50/60	2,080	3,900	6.4	-40 to +40
C	VBS0630CTTPS	630	3-380-480	50/60	1,670	4,050	6.0	-40 to +40
D	R3G630FC0403	630	3-380-480	50/60	1,470	4,050	6.1	-40 to +40

\* Other temperature ranges and data sheets on request. Subject to change without notice.

**Preventive maintenance**  
These fans are optionally also available with preventive maintenance functions (p. 6).  
If you have any questions, please contact your ebm-papst contact person.

**Predictive maintenance**  
These fans are optionally also available with predictive maintenance functions (p. 7).  
If you have any questions, please contact your ebm-papst contact person.





## Resonance detection

- + Unbeatably compact**
  - Impeller mounted directly on motor rotor
- + High efficiency**
  - Profiled blade geometry for maximum efficiency
  - Low copper and iron losses
  - Synchronous running prevents slip losses
  - No magnetic hysteresis losses in the rotor through the use of permanent magnets
- + Quiet operation**
  - Aerodynamically optimized air flow for reduced noise
  - Economical operation
  - Optimized commutation enables partial-load operation down to 1:10
  - High efficiency even in partial-load operation
- + Low noise emissions**
  - Commutation and stator design ensure low-noise magnetization of the main field
  - High, acoustically imperceptible cycle frequency
- + Long service life**
  - Maintenance-free bearings
  - Brushless commutation
- + Safe operation**
  - Insulated bearing system to prevent bearing currents

Depending on requirements, you can choose from a wide range of highly efficient centrifugal fans:

Would you like to find out more about our centrifugal fans?  
[ebmpapst.com/centrifugal-fans](http://ebmpapst.com/centrifugal-fans)

Dry coolers/chillers/condensers/overhead heat exchangers

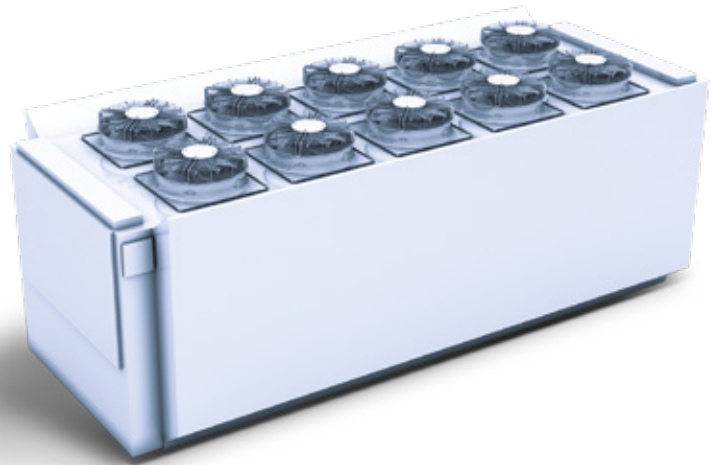
# Cold in package form.

## More power, more efficiency, more potential applications

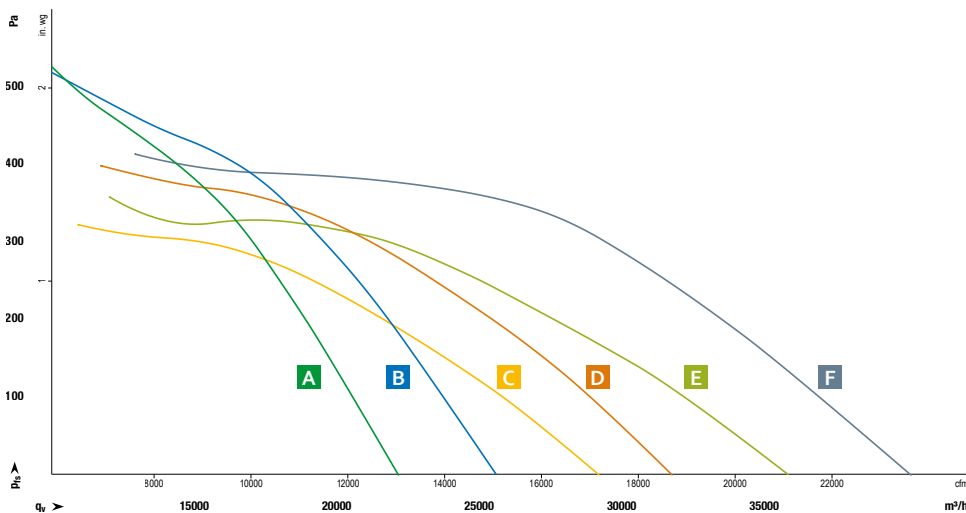
The innovative AxiBlade range is the benchmark for large axial panel fans when it comes to energy efficiency and noise characteristics.

## The advantages of fans from ebm-papst in condensers and chillers

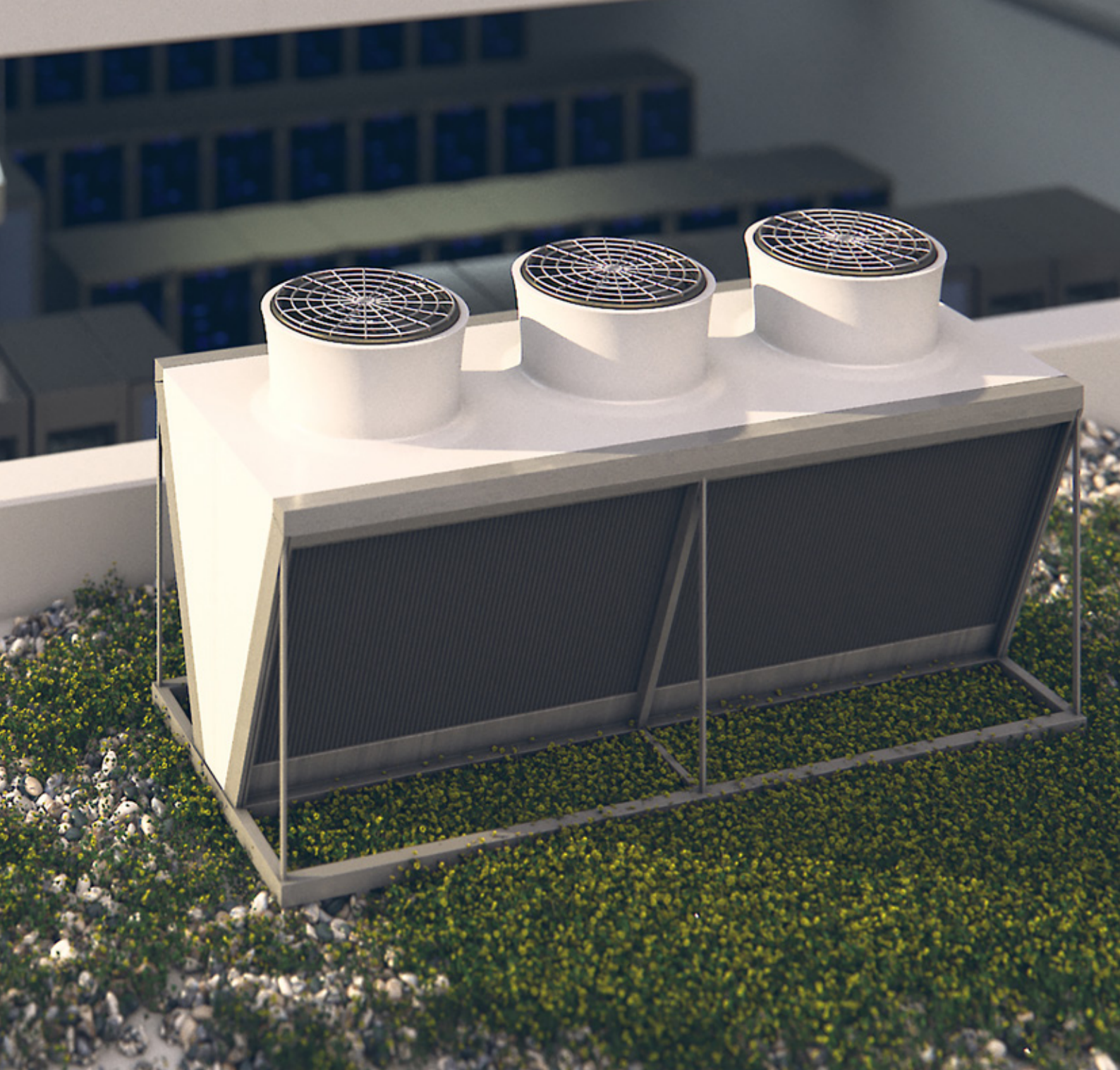
- Maximum efficiency and power density in a compact installation space
- Benchmark in terms of noise characteristics
- Aerodynamically perfected complete system
- Robust design for outdoor use
- Long service life



Characteristics curve map for AxiBlade



*The unique modular concept of the new AxiBlade guarantees it works optimally at every operating point – with the highest static overall efficiency on the market and up to 8 dB(A) lower noise emissions compared to the predecessor product. This means far greater efficiency and power density with the same installation space for every application. Say Yes! to the new benchmark in air conditioning and refrigeration.*



Characteristic curve

Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption P <sub>ed</sub>	Input current I	Permitted ambient temperature*	Weight	
		V AC	Hz	rpm	W	A	°C	kg	
<b>A</b>	W3G 630-NU33-03	630	3-380-480	50/60	1,800	3,600	5.5	-40 to +60	39
<b>B</b>	W3G 710-NU31-03	710	3-380-480	50/60	1,680	3,800	5.8	-40 to +60	40
<b>C</b>	W3G 800-LU21-03	800	3-380-480	50/60	1,090	2,650	4.0	-40 to +60	47
<b>D</b>	W3G 800-LV05-03	800	3-380-480	50/60	1,190	3,500	5.3	-40 to +60	51
<b>E</b>	W3G 910-LV12-03	910	3-380-480	50/60	1,070	3,250	5.0	-40 to +60	55
<b>F</b>	W3G 910-OV04-E1	910	3-380-480	50/60	1,190	4,400	6.7	-40 to +45	57

\* Other temperature ranges and data sheets on request. Subject to change without notice



**Preventive maintenance**

These fans are optionally also available with preventive maintenance functions (p. 6). If you have any questions, please contact your ebm-papst contact person.



**Predictive maintenance**

These fans are optionally also available with predictive maintenance functions (p. 7). If you have any questions, please contact your ebm-papst contact person.

# AxiBlade:

## *Your ebm-papst solution.*

### **Maximum flexibility**

AxiBlade fans specially developed for the data center sector can be installed on both the intake and outlet side as an option.

For all applications, the AxiBlade series's modular system provides the ideal efficiency and noise levels for meeting your requirements. Depending on the application and back pressure in question, it is possible to combine different drives as well as innovative peripheral components, such as diffusers or the FlowGrid air-inlet guard.

You can contact us regarding your special requirements at any time and we will work with you to develop a solution!



### **High efficiency**

- + Profiled blade geometry and winglets for maximum efficiency

### **Quiet operation**

- + Aerodynamically optimized shape for noise reduction

### **Optimized aerodynamics**

- + Optimized inlet ring for maximum efficiency and quiet operation



## Universally deployable

- + For use with 50- and 60-Hz grids
- + Worldwide voltage variants and grid forms

## Robust design

- + Durable, corrosion-resistant, sendzimir galvanized and coated sheet steel for the most demanding requirements

## Top energy efficiency

- + High efficiency
- + High power density
- + Optimized heat management for low self-heating

## Long service life

- + Very long service life through no-maintenance ball bearing, brushless commutation and minimum self-heating

## AxiBlade – the right solution for every requirement.

Maximum flexibility and modularity with regard to the product design, in order to guarantee the best possible performance in the end device at all times.



# More efficiency *with EC technology.*

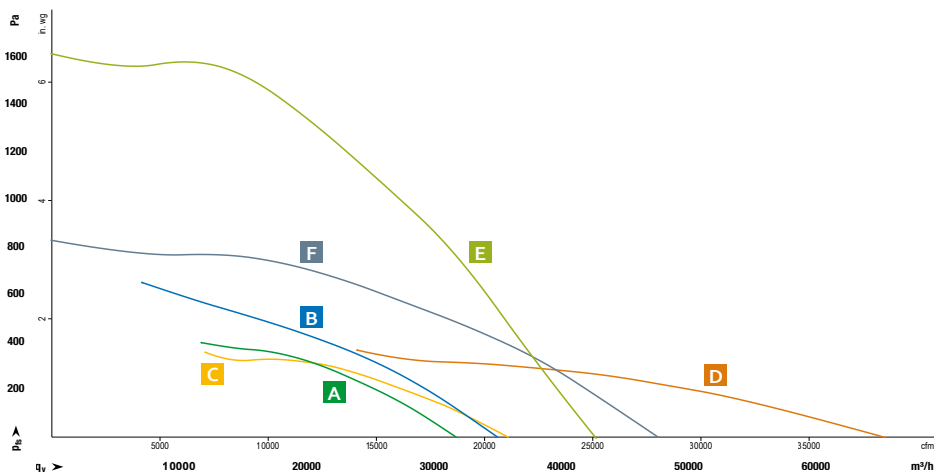
## The effective answer to exacting demands

Fans are among the most important key components of cooling towers. They play a crucial role in effectively dissipating the heat generated by cooling the data center to the ambient air and thus guarantee a pleasant climate.

## The advantages of fans from ebm-papst in cooling towers

- Can be used even in the toughest environmental conditions, such as high humidity and rapid changes in temperature
- Robust design with sophisticated system technology
- Quiet operation with high air flows
- Maximum efficiency values
- Long service life
- Can be used in both exhaust and intake operation

Characteristic curve map for RadiCal



*The latest generation of centrifugal and axial panel fans improved the efficiency and air performance considerably again compared to existing systems.*

Characteristic curve	Type	Size mm	Nominal voltage range V AC	Frequency Hz	Speed n rpm	Power consumption $P_{ed}$ W	Input current I A	Permitted ambient temperature* °C	Weight kg	
A	axial	W3G 800-LV05-36	800	3-380-480	50/60	1,190	3,500	5.3	-40...+60	52
B	axial	W3G 800-FL10-36	800	3-380-480	50/60	2,100	5,300	8.1	-40...+50	51
C	axial	W3G 910-LV12-36	910	3-380-480	50/60	1,070	3,250	5.0	-40...+60	56
D	axial	W3G Z50-EF10-36	1,250	3-380-480	50/60	840	6,000	9.3	-40...+60	193
E	centrifugal	K3G 800-PW07-35	800	3-380-480	50/60	1,370	11,300	17.5	-25...+40	157
F	centrifugal	K3G A00-PV03-35	1,000	3-380-480	50/60	750	6,340	9.8	-40...+40	168

\* Other temperature ranges and data sheets on request. Subject to change without notice.

**Preventive maintenance**  
These fans are optionally also available with preventive maintenance functions (p. 6).  
If you have any questions, please contact your ebm-papst contact person.

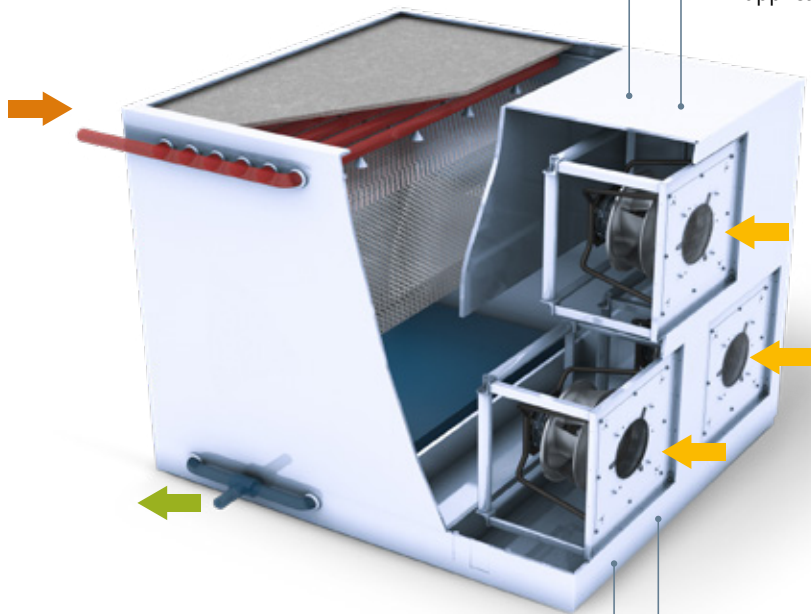
**Predictive maintenance**  
These fans are optionally also available with predictive maintenance functions (p. 7).  
If you have any questions, please contact your ebm-papst contact person.

## Withstands the toughest mechanical stresses

Shock testing is carried out during development primarily in accordance with DIN EN 60068-2-27 and DIN EN 60068-2-29, whereas vibration testing is mainly based on DIN EN 600-2-64 and DIN EN 61373.

## Maximum corrosion resistance

Long-term internal tests form the basis for protecting all device components against corrosion. Our fans have to be able to withstand long periods in highly corrosive environments before they are intended for use in cooling tower applications.



## Highly accelerated life test (HALT)

Under test conditions in a temperature range from -100 °C to +200 °C, with an increase of 70 K/min and a simultaneous vibration load of up to 50 g RMS, the HALT detects weak points during the development phase. As a result, these weak points are all identified and eliminated before the market launch.

## Temperature cycling rain test

The fans are directly exposed to water and temperatures of -10°C to +60°C over a period of many months.

### Outstanding quality

Once a fan solution has successfully passed all the intensive checks, it is given H2+C environmental classification by ebm-papst. Alongside the great reliability, robustness and efficiency of the products, this is the best indication that the devices are excellently designed and ideally suited to long-term operation in cooling towers.

Would you like to  
find out more?

Further information can be found at:  
[ebmpapst.com/kuehlturm](http://ebmpapst.com/kuehlturm)



# More performance without compromises.

## Keep cool, big data

As with an axial compact fan, the DiaForce size 120 also draws in and blows out air in an axial direction. Compared to a centrifugal fan, this design is advantageous when integrating it into the application. But the real revolutionary part happens between the intake and outlet, more specifically in the unique geometry of the impeller and housing.

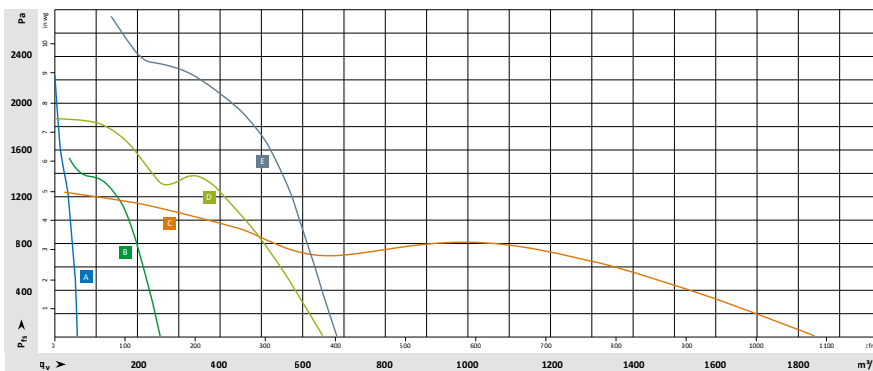
## Your advantages at a glance

- More pressure thanks to diagonal characteristics
- Less noise thanks to aerodynamic optimization
- With integrated FanCheck diagnostic tool as an option



Nominal data	Air flow*	Air flow*	Nominal voltage	Voltage range	Sintec sleeve bearings/ball bearings	Power consumption*	Nominal speed*	Perm. temperature range
Type	m <sup>3</sup> /h	cfm	VDC	VDC	■/■	W	rpm	°C
VKC0120DULDS	680	400	48	36 to 60	■	395	17,200	-20 to +70

\* Values in free air mode.  
Data sheets on request. Subject to change without notice.



The technical data given is based on sample measurements and may differ from the final series product.

Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption P <sub>eid</sub>	Input current I	Permitted ambient temperature*
			VDC	Hz	rpm	W	A	°C
<b>A</b>	VWJK100TKGRS	100	48	50/60	11,000	140	2.9	-40 to +70
<b>B</b>	VKCH040DHDGS	40	12	50/60	40,000	28.5	2.4	-20 to +70
<b>C</b>	VKCL080DHFMS	80	12	50/60	21,500	72	6.0	-20 to +70
<b>D</b>	VKCK119DKLSS	120	48	50/60	17,200	450	9.4	-25 to +70
<b>E</b>	VWLH200CKLXS	200	48	50/60	7,000	348	7.3	-20 to +60

\* Other temperature ranges and data sheets on request. Subject to change without notice.



### At last, more performance without compromises

With the new DiaForce, you can improve your system performance while still satisfying all standards such as NEBS, OSHA, ANSI and ETSI.

### Innovative high-performance impeller

- + High pressure increase
- + Low noise emissions
- + High efficiency

### GreenTech DC motor

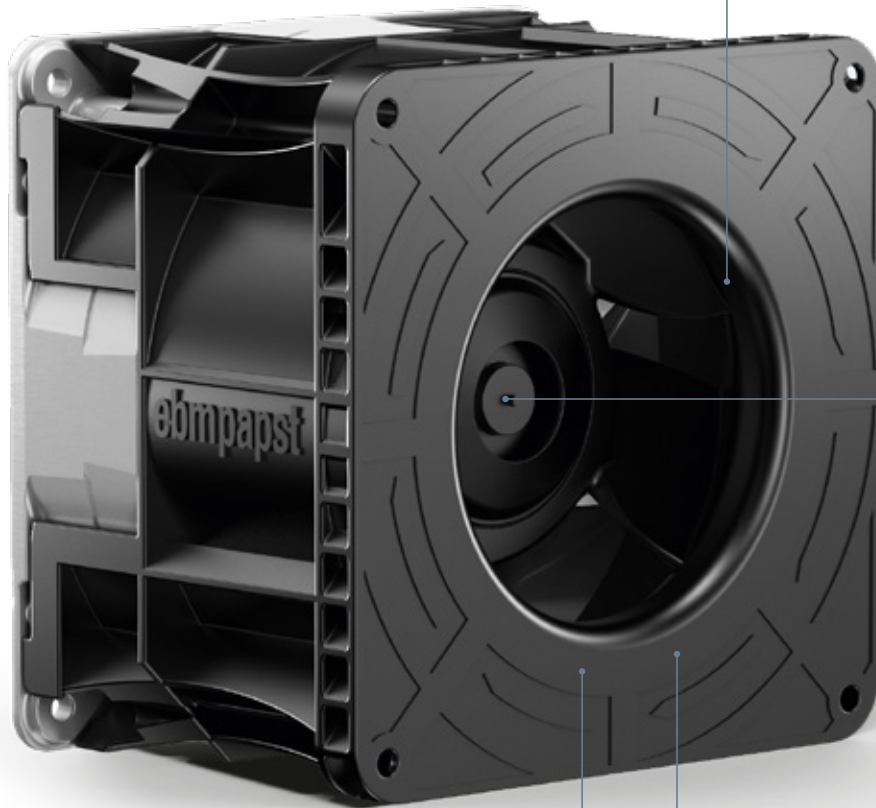
- + Unrivalled compactness and strength
- + Reliable operation
- + Low vibration
- + Sustainable design

### Flow-optimized housing

- + Powerful
- + Noise reduction
- + Simple installation

### Electronics and interfaces

- + Safe operation thanks to locked-rotor protection
- + Speed control with multi-option control input



### Would you like to find out more?

We would be happy to assist you:  
Bernhard Thürmer  
Tel. +49 7724 81-1226  
[Bernhard.thuermer@de.ebmpapst.com](mailto:Bernhard.thuermer@de.ebmpapst.com)

Server rack, 19-inch rack cooling and base station

# AxiForce: *The multi-tool for your application.*

Our new AxiForce series delivers impressive performance, efficiency and many functions that allow you the greatest possible freedom and flexibility in your daily work.

Powerful, robust, flexible, efficient, and quiet. This is what AxiForce stands for. The AxiForce is available in sizes 80, 120, and 172.

Optionally, the Go/NoGo alarm and a speed limit alarm are available across the assemblies. Temperature sensors for speed control, an analog control input, salt spray resistance, and optional IP protection up to IP68 are also available. The AxiForce has various approvals including UL507, CSA 22.2, VDE, and CCC.

## Your advantages at a glance

### Performance

- + Noise advantage
- + Steep air performance curve
- + Benchmark
- + Maximum efficiency

### Technology

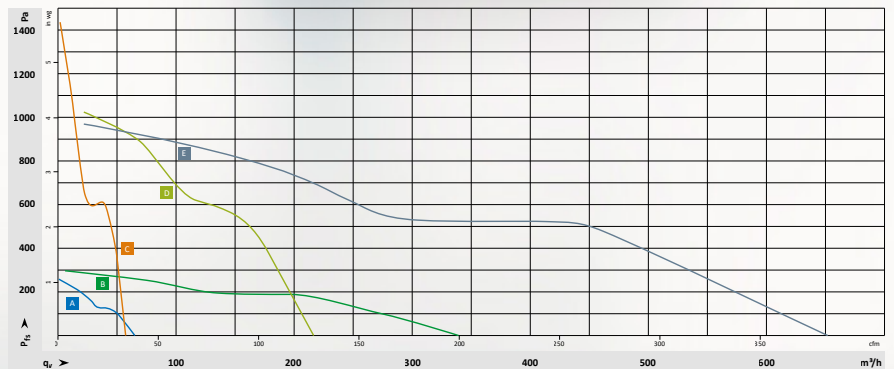
- + New aerodynamic design of housing and fan impeller
- + The latest powerful and efficient motor technology
- + Powerful electronics

### Flexibility

- + Speed signal
- + Go/NoGo alarm
- + Alarm with speed limit
- + Control inputs
- + Salt spray protection
- + Degree of protection up to IP68



Characteristic curve map for server rack



*The technical data given is based on sample measurements and may differ from the final series product.*

Characteristic curve	Type	Size	Nominal voltage range	Frequency	Speed n	Power consumption	Permitted ambient temperature*	Weight
			VDC	Hz	rpm	W	°C	kg
A	VWCE040KHDGS	40	12	50/60	27,000	17	-20 to +70	
B	VWCE040KHDGS	40	12	50/60	27,000	23	-20 to +70	0.048
C	VWCF080KKFMS	80	48	50/60	16,500	94	-20 to +75	0.2
D	VWCF120KKJPS	120	12	50/60	6,500	35	-20 to +70	0.3
E	VWLG150KKLSS	172	48	50/60	8,300	170	-20 to +70	0.9

\* Other temperature ranges and data sheets on request. Subject to change without notice.

Server rack, 19-inch rack cooling and base station

# AxiTwin: *Specialist* in 19-inch racks.

The AxiTwin was specially developed for 19-inch racks, making it the best choice for this application.

In the AxiTwin, two individual fans connected to a spacer ring work together by rotating in opposite directions. This enables the rear

fan to convert the residual swirl from the front fan into air flow particularly efficiently and increases efficiency compared to individual solutions. As a result, the solution offers a high level of efficiency with minimum space requirements.

## Your advantages at a glance

### Electronic functions

- + Open-collector speed signal
- + PWM control input

### Technology

- + Completely new design
- + Counter-rotating impellers
- + 2 independent drives / redundancy

### Flexibility

- + Speed signal
- + Go/NoGo alarm
- + Alarm with speed limit
- + Analog control input
- + Humidity protection



## Would you like to find out more?

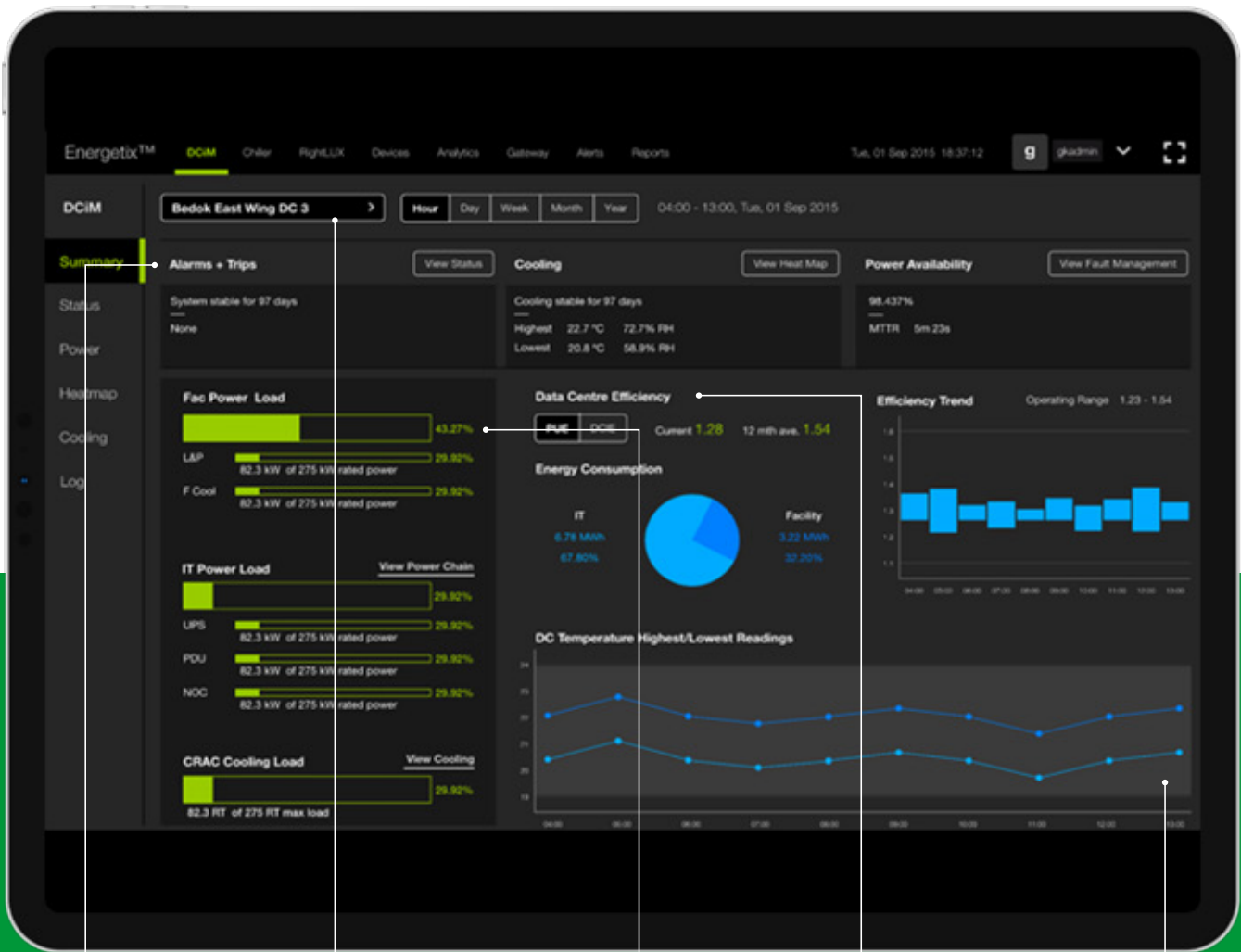
We would be happy to assist you:  
Christian Stern  
Tel. +49 7724 81-1725  
[stern.christian@de.ebmpapst.com](mailto:stern.christian@de.ebmpapst.com)

Data center infrastructure management (DCIM).

# Optimize your building *with data.*

## FlexiConnect

FlexiConnect can be used to display and control data such as capacity utilization, status messages, or current consumption in real time. Connected sensors make it possible to increase energy efficiency, reduce CO<sub>2</sub> emissions and thus make a contribution to sustainability.



Rapid switching between sites

PUE (power usage effectiveness)

Important status messages at a glance

Load distributions at a glance

Time profiles for adjusted measured values



## Example process for a project:

- 1. You send us an inquiry**
  - We discuss your requirements and objectives together. (What should be presented?)
  - An inventory is then carried out:
    - What hardware is available?
    - Is additional hardware required and can it be installed without any problems?
    - Is a list of data points available for each device?
    - Are building and electrical plans available? (Where should which hardware be installed?)
    - Complete overview of all data points is created.
- 2. Hardware procurement/configuration**
  - Hardware is configured and/or new hardware adapted.
  - The “digital twin” is set up based on the requirements and objectives and the necessary users are created.
- 3. Rollout**
  - The configured hardware is sent to you, distributed based on the previously defined sites, and connected.
  - Remote functional test of components
  - Training of key users

## Your benefits

### Reduction in energy costs

Energy savings of up to 20% due to effective operation of data centers with real-time information and data analyses.

### Central management

Manage several data centers or IT server rooms via a single web application.

### Modular and scalable

Scaling from one server room to data centers at several locations is no problem.

### Data analysis

Gain strategic insights into data center operation through the use of (meta)data.

### Hardware agnostic

Many protocol standards can be easily integrated (Modbus (TCP), BACnet, EnOcean, LoRaWAN, REST).

### Machine learning/artificial intelligence

Optional AI to further advance data centers with extremely low energy efficiency.

### Improved productivity

Provision of relevant and prompt information for various user groups via mobile devices, web, and dashboards; access controls enable different user groups to view different data.

# Control *made easy!*

MODBUS Display & Control, or MDC for short, not only displays its own operating state but also the connected fans' operating states. It is operated and parameterized using its keyboard. The device also has two RS485 interfaces.

While the RS485 MODBUS master interface communicates with fans compatible with ebm-papst MODBUS, the slave RS485 establishes a connection with a higher-level external system, such as the building management system (BMS).



## MODBUS Display & Control

Article number		CCC000AH0101 (CN1116)
Permitted ambient temperature	°C	-20 to 60
Power supply (nominal)	VDC	10–24 V
Max. humidity	% RH	90
Width	mm	123
Length	mm	132
Height	mm	27
Weight	g	204

MDC provides auto-addressing for easy installation and commissioning, and supports four different operating modes:

### Monitor mode

Displays MODBUS data from fans, such as speed, power, motor temperature, temperature of the electronics, set value in percent, operating hours, and warnings.

### Monitor and Control mode

Displays the same as Monitor mode plus 0–100 % fan speed control with one or a combination of the following:

- 0–10 V control signal input
- BMS system connected to the RS485 slave
- MDC keyboard

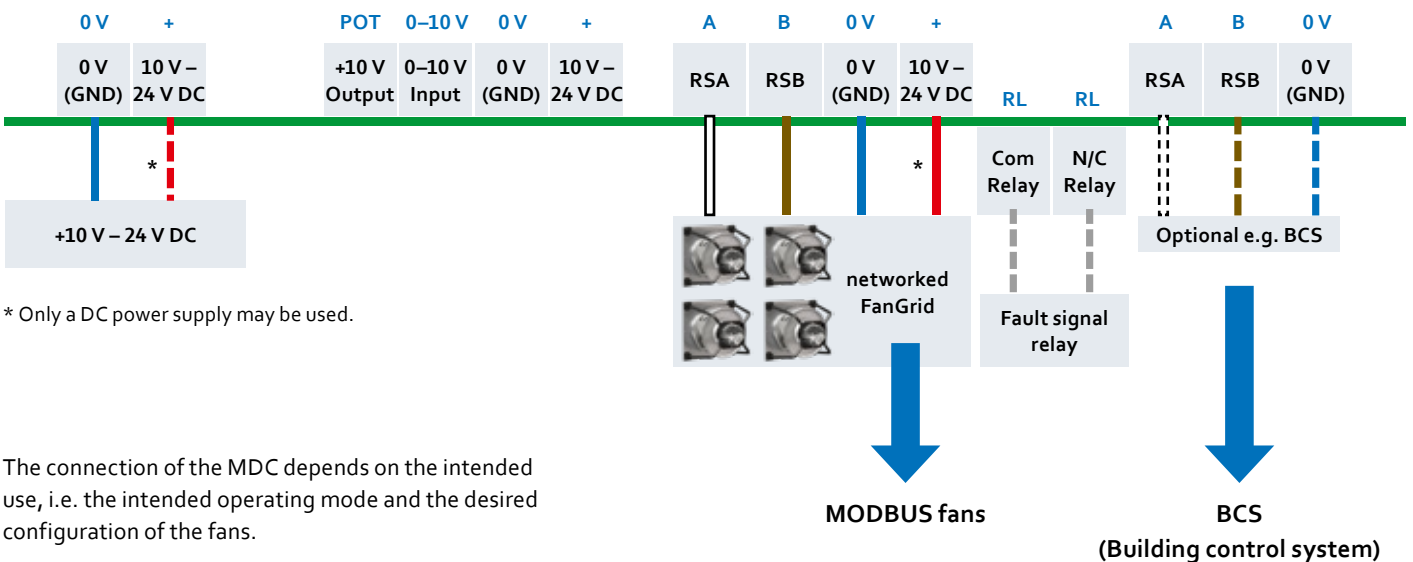
### Constant Volume/Constant Pressure Control mode

Displays the same as Monitor mode, but requires an external 0–10 V differential pressure sensor to maintain a constant volume or constant pressure. The set value requirement is specified using the keyboard or via the RS485 slave port.

### MODBUS Relay mode

Here, the MDC becomes a pure messenger between the fans and a BMS system. This enables direct access to all MODBUS registers on all connected fans.

Only with MODBUS Display & Control is the group connection of the FanGrids complete and you have full control.





New, now as a browser version!

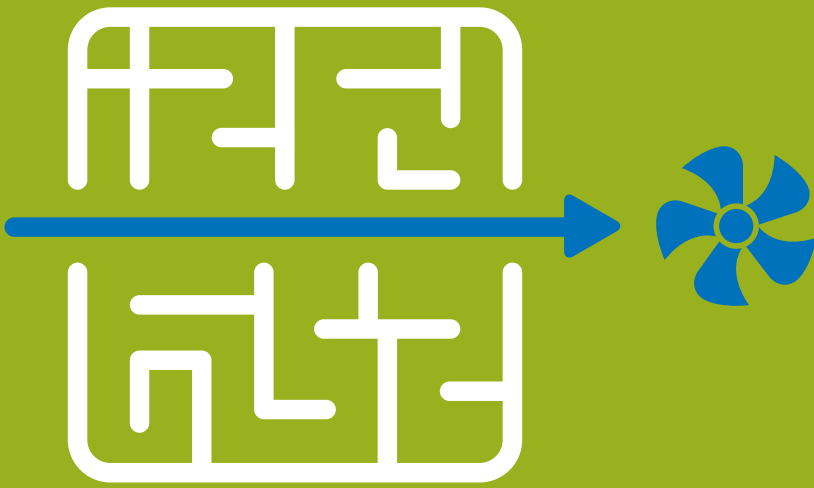
With FanScout, your complex search for the right fan solution will have a quick and happy ending. Because as soon as you open FanScout, you are already practically where you want to be. All you need for the perfect result are the requirements of your application – for example, air flow, static pressure, and the planned operating time.

FanScout then guides you through an overview of the best possible fan and FanGrid solutions, which you can compare with each other clearly and intuitively. And to make your decision even easier, FanScout also takes life cycle costs into account – from acquisition to operation and service. This saves you time and helps you to find out all about the right fan.

**The most important functions at a glance:**

- Compare product data at a glance and find the best fan or FanGrid solution quickly and easily
- Results can be filtered by operating point, nominal data, dimensions and other parameters
- Direct comparison of air performance curves and sound power diagrams
- Calculate life cycle costs via energy, product and installation costs
- Sustainability analysis based on CO<sub>2</sub> emissions
- Expert mode with efficiency curves, FEI or iso line
- Operating instructions and data sheets available for direct download
- Browser-based software without time-consuming installation or updates





# *The simplest way to the best result.*

*With FanScout from ebm-papst.*


## **Precise data. Better decisions.**

With ebm-papst FanScout, you get reliable and highly accurate data because our software is based on real measured values. Not only is the performance of the individual fan components measured but also that of the fan as a complete system.

Validation measurements have shown that the FanScout does not exaggerate when stating the efficiency. For this purpose, 15 reference points were selected for the measured fans and recorded on the certified chamber test rig. Comparing the measured air performance data with the data from FanScout shows that the calculated values

from FanScout are almost identical to those measured under real conditions. And this means that ebm-papst fans as delivered tend to have an even higher efficiency than shown in FanScout. This gives you real certainty in the planning process.

Further information and contact  
details can be found at:  
[ebmpapst.com/fanscout](http://ebmpapst.com/fanscout)



*What Engineering  
a better life means  
to us.*

## Who we are.

We lead air technology into the next generation: with innovative hardware and software solutions that are always more powerful, compact, efficient and sustainable than their predecessors. Over the years, this has made us the world's leading manufacturer for fans and drives and helps reduce the carbon footprint in our customers' applications.

Digitalization and the associated networking of intelligent components and systems play a central role for us. In this way, we create a holistic link between sustainability and digitalization and enable the responsible use of resources through intelligent solutions of the highest efficiency.

## What drives us.

But our consistent pursuit of efficiency and progress has even deeper roots. After all, there is something that excites us even more than our market position. It is the deep awareness that, with our solutions, such as the data center, we are making the lives of many people around the globe more pleasant, safer and thus better. Therefore, the central driving force in all our thoughts and actions is Engineering a better life. It is the reason why it is worthwhile for us to get up every day and do our best.

More about this at [ebmpapst.com/aboutus](https://www.ebmpapst.com/aboutus)

## What you get out of it.

- 1. Technological edge.**  
With our EC technology, we combine the highest energy efficiency with the advantages of IoT and digital networking.
- 2. Our sustainable approach.**  
We take our responsibility seriously with energy-saving products, environmentally-friendly processes and through social engagement.
- 3. System expertise.**  
As experts in advanced motor technology, electronics and aerodynamics, we provide perfect system solutions from a single source.
- 4. The ebm-papst spirit of invention.**  
Over 800 engineers and technicians will develop a solution that precisely fits your needs.
- 5. Personal proximity to you.**  
With numerous sales locations worldwide, we create a glocal presence that ensures fast response times. We always consider the complete process and put the customer at the center.
- 6. Our standard of quality.**  
Our quality management is uncompromising, at every step and in every process.

# And what are you planning?

Let's find out together how we can support you as effectively as possible.

+49 7938 81-0  
info@de.ebmpapst.com

[ebmpapst.com/datacenter](https://ebmpapst.com/datacenter)

**ebmpapst**

engineering a better life

**ebm-papst**  
Mulfingen GmbH & Co. KG

Bachmühle 2  
74673 Mulfingen  
Germany  
Phone +49 7938 81-0  
Fax +49 7938 81-110  
info1@de.ebmpapst.com

**ebm-papst**  
St. Georgen GmbH & Co. KG

Hermann-Papst-Strasse 1  
78112 St. Georgen  
Germany  
Phone +49 7724 81-0  
Fax +49 7724 81-1309  
info2@de.ebmpapst.com