

DC RadiCal centrifugal fans – the SMART solution.

Efficient and robust.

ebmpapst

The engineer's choice



About ebm-papst.

As a leader in technologies for ventilation and drive engineering, ebm-papst is in demand as an engineering partner in many sectors. With over 15,000 different products, we provide the right solution for just about any challenge. Our fans and drives are reliable, quiet and energy-efficient.



Six reasons that make us the ideal partner:

Our systems expertise. As experts in advanced motor technology, electronics and aerodynamics, we provide system solutions from a single source.

Our spirit of invention. Our 600 engineers and technicians will develop a solution that precisely fits your needs.

Our lead in technology. Our GreenTech EC technology is setting standards worldwide. And our lead is your competitive advantage.

Proximity to our customers. At 57 sales offices worldwide.

Our standard of quality. Our quality management is uncompromising, at every step in every process.

Our sustainable approach. We assume responsibility with our energy-saving products, environmentally-friendly processes, and social commitment.



ebm-papst has been an innovative development partner and technology trendsetter in the field of IT and telecommunications applications for many years. Whether it is a matter of cooling electronics in a corrosive environment with high temperatures or under fluctuating conditions with frequent changes in temperature and humidity: Our solutions can always be relied on to provide safe and efficient operation. This applies even to the most extreme situations, in monsoon regions for example. A robust design, reliability and energy efficiency are the key factors. That's "SMART".

Decades of refrigeration technology experience make ebm-papst ideally equipped to deal with these challenges. Our tried-and-tested product series have proved their outstanding ability to perform complex cooling tasks in thousands of standard and customized solutions. Expertise that has also gone into our RadiCal product range and is predestined to deal with the requirements of electronics cooling.

Application examples:

Base stations permit mobile communication all over the world. ebm-papst fans keep the electronics at a steady low temperature and ensure reliable heat dissipation. This minimizes the risk of component failure and extends the system service life. Our fans have already provided evidence of their reliability under the toughest conditions: Installed in base stations in the tropics, in alpine regions, in deep valleys, at all temperatures and whatever the weather.

For **control cabinets** and **IT hardware** such as network and storage systems, for routers, servers and many other applications – you can always rely on the expertise of the world's most innovative supplier of ventilation, air conditioning and refrigeration technology.

The RadiCal for demanding applications.

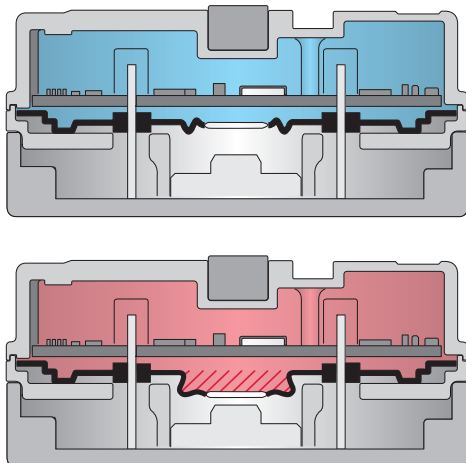
The challenge:

Fans that are directly exposed to ambient influences such as high temperatures, moisture or a corrosive atmosphere have to be protected. This applies particularly to the electronic assemblies. For standard applications it is sufficient to provide the circuit board with moisture-proof impregnation. Other measures are however required for more difficult environments involving rapid changes in temperature or extreme humidity, for example.

The challenge associated with rapid changes in temperature in an enclosure such as an electronics housing is the changing air density: As the temperature drops, the pressure decreases and the (moist) ambient air is drawn into the enclosure. If the temperature then rises, the pressure increases again and the air escapes but leaves the moisture behind. The frequent occurrence of such temperature fluctuations, for example in on/off operation, can cause moisture to accumulate and lead first to corrosion and then to failure of the electronics.

The patented innovation:

A housing with a special patented diaphragm has been developed to provide the electronic components with optimum moisture-proofing. This moving diaphragm instantly compensates for the pressure fluctuations caused by rapid changes in temperature and stops the electronics housing "breathing". The housing is hermetically sealed and has no problem withstanding even highly dynamic changes in temperature between -40°C and up to $+70^{\circ}\text{C}$. The SMART uncompromising solution for every application.



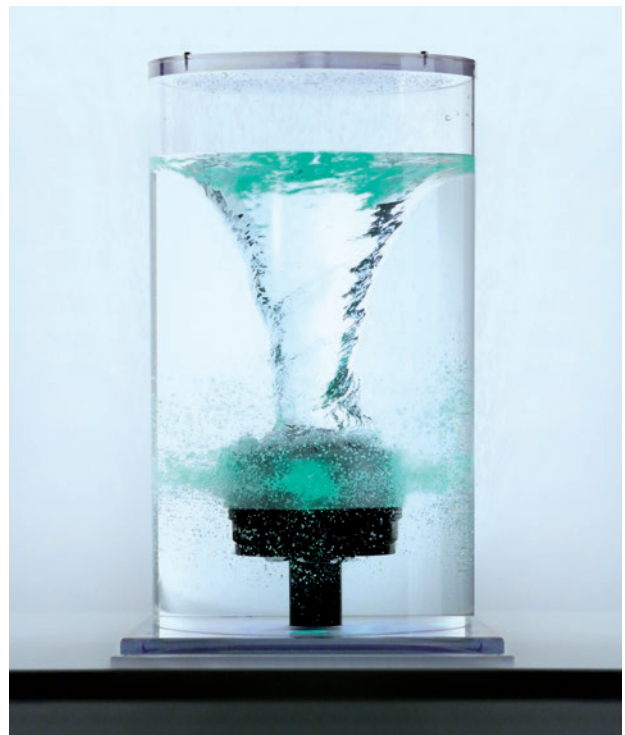
At a glance:

- Air flow up to $1,800\text{ m}^3/\text{h}$
- Pressure increase up to 800 Pa
- Patented diaphragm technology
- UL approval
- Compact design
- Robust, light, reliable
- Plug & play
- Long service life and maintenance-free
- Infinitely variable speed control



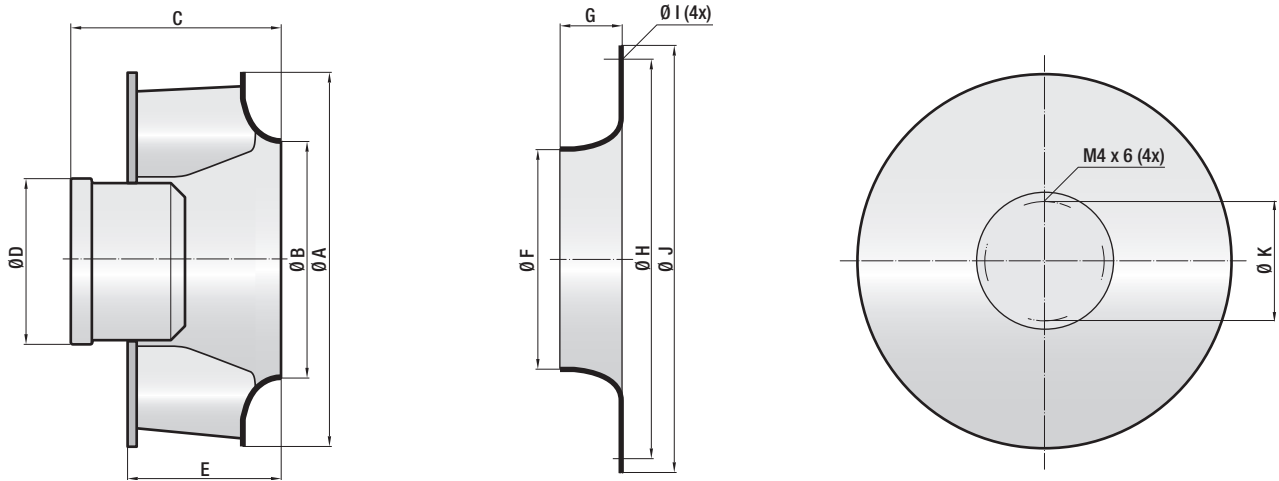
The acid test:

This new technology has been extensively tested with respect to all relevant influences such as moisture, temperature fluctuations and salt spray. An unusual experimental set-up was used to conduct a particularly tough test: Completely submerged in water, the motor unit operated for 1,700 hours – without even the slightest cause for complaint. So even monsoon rain no longer presents a problem. Mission accomplished!



Motors may never actually have to run under water, but we put them to the test anyway: 1,700 hours of trouble-free continuous operation. Test passed with flying colors!

Efficiency in a new dimension.



With DC RadiCal centrifugal fans, the external rotor motor is integrated into the impeller. Their compact design makes them suitable for even the most constricted installation spaces. The impeller forms a perfectly functioning unit together with the aerodynamically adapted inlet ring. Installation and connection could not be easier thanks to the plug & play concept.

Fan size	A	B	C	D	E	F	G	H	Ø I (4x)	J	K
190	190	133	69	88	63	126	14	158	4.5	170	58
220	220	161	71	88	64	155	21	242	5.5	252	58
								245	4.3		
225	225	154	94	88	88	146	28	210	4.5	223	58
250	250	173	92	88	85	165	31	240	4.5	255	58
280	294	188	138	88	127	177	46	260	4.5	280	58

All dimensions in mm. Data sheets available upon request. Data is subject to change without notice at ebm-papst discretion.

The best possible conditions for your project.

Top performance is not just the trademark of our fans but also of our engineers – right from the project planning phase. Simply contact us at an early stage to get the best out of your application.

The latest tender documents for our products are already available for you to study. Just download them online:

www.ebmpapst.com/dc-radical

or use the following QR code:



Ideal concept. Robust product.



Cable connection

- + **Simple connection**
 - Prefabricated cable
 - Different cable length available as an option
 - Wire end with wire-end ferrule
- + **Robust design**
 - Plug with efficient seal
 - Ingress of water not possible
 - UV-resistant



Electronics

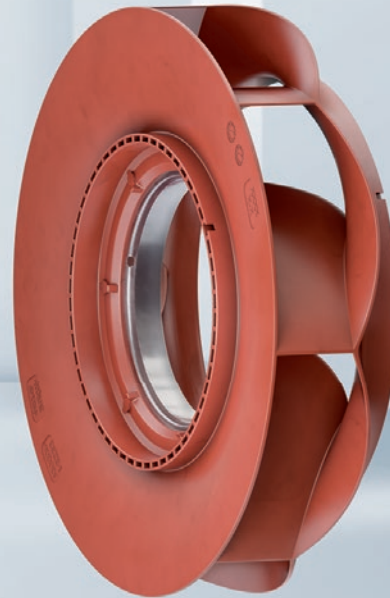
- + **Simple commissioning**
 - No adjustment effort as motor and control electronics come as a complete package
- + **Safe operation**
 - Reverse polarity protection
 - Integrated locked rotor and thermal overload protection
 - Safe shutdown in the event of locked rotor
 - Optional speed and alarm output
 - Electronics with degree of protection IP69K
 - Overvoltage protection
- + **Flexible open loop control**
 - Infinitely variable speed control
 - Control signal 0–10 V DC/PWM
 - Open collector speed signal



Sealing element with diaphragm

- + **Safe operation**
 - Specially developed elastic diaphragm protects electronic components
 - Hermetically sealed system
 - Continuous compensation for great and highly dynamic temperature fluctuations





GreenTech DC motor

- + Economical operation**
 - Efficient part load operation thanks to optimized commutation
- + Maintenance-free operation**
 - Long service intervals through the use of maintenance-free ball bearings
 - Brushless commutation
- + Safe operation**
 - UL 507 Standard
 - Designed for continuous operation S1
 - Motor with degree of protection IP24
- + Sustainable design**
 - Magnets without rare earth elements
- + Low sound emission level**
 - Commutation and the stator design ensure low-noise magnetization of the main field
 - High, acoustically imperceptible cycle frequency
 - Optimized actuation and adapted stator design



Impeller

- + High static efficiency**
 - Aerodynamically optimized blade channel
- + Low sound emission level**
 - Optimized blade pass noise
- + Minimal vibration**
 - Dynamic balancing of the impeller rotor unit
- + Unrivalled compactness**
 - The impeller is mounted directly on the rotor of the motor

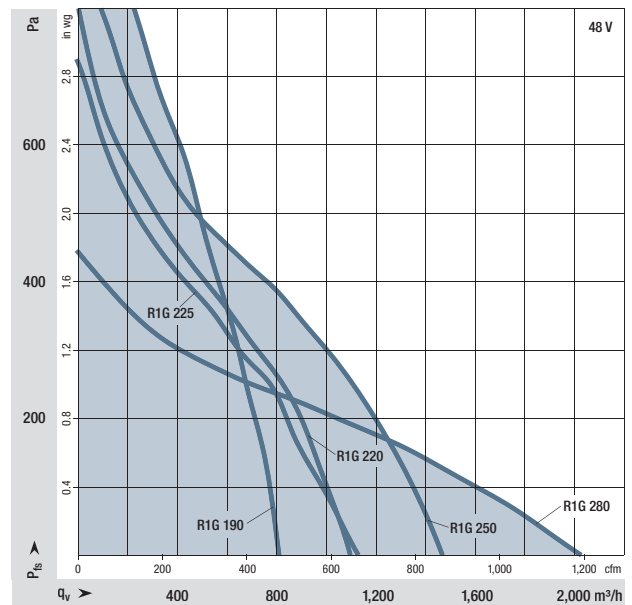


Top performance in figures.

Fan power measurements are carried out on state-of-the-art chamber test rigs. The entire fan unit, consisting of motor, control electronics and impeller, is measured in various load states. This ensures that we obtain reliable data, and that you can count on these values being reached when selecting a fan. And so there is no chance of any nasty surprises when starting up the fans.

The measured data forms the basis for our design program, which is available on request. This software can be used to calculate the expected operating costs or to perform lifecycle cost analyses.

Air performance range



Nominal data of fans			Nominal voltage	Nominal voltage range	Speed	Max. input power	Max. input current	Perm. ambient temperature*	Weight
Article number	Article number Inlet ring	Motor	VDC	VDC	rpm	W	A	°C	kg
R1G 190-RD04-02	09576-2-4013	M1G074-BF	12	8–16	3,180	60	5.7	–40...+70	1.4
R1G 190-RD59-02	09576-2-4013	M1G074-BF	24	16–28	4,120	130	7.0	–40...+60	1.4
R1G 190-RD06-02	09576-2-4013	M1G074-BF	48	36–57	4,450	155	4.5	–40...+60	1.4
R1G 220-RD04-02	09609-2-4013	M1G074-BF	12	8–16	2,720	87	8.4	–40...+60	1.5
R1G 220-RD87-02	09609-2-4013	M1G074-BF	24	16–28	3,030	112	6.3	–40...+60	1.5
R1G 220-RD08-02	09609-2-4013	M1G074-BF	48	36–57	3,200	127	3.8	–40...+60	1.5
R1G 225-RD61-02	96358-2-4013	M1G074-BF	12	8–16	2,350	80	7.9	–40...+60	1.6
R1G 225-RD10-02	96358-2-4013	M1G074-BF	24	16–28	2,600	105	6.2	–40...+60	1.6
R1G 225-RD02-02	96358-2-4013	M1G074-BF	48	36–57	2,640	110	3.2	–40...+60	1.6
R1G 250-RC67-02	96359-2-4013	M1G074-CF	12	8–16	2,000	65	6.4	–40...+70	2.0
R1G 250-RC75-02	96359-2-4013	M1G074-CF	24	16–28	2,550	130	7.1	–40...+60	2.0
R1G 250-RC71-02	96359-2-4013	M1G074-CF	48	36–57	2,790	160	4.9	–40...+60	2.0
R1G 280-RC77-02	28000-2-4013	M1G074-CF	12	8–16	1,490	71	7.1	–40...+60	2.3
R1G 280-RC79-02	28000-2-4013	M1G074-CF	24	16–28	1,660	92	4.9	–40...+60	2.3
R1G 280-RC81-02	28000-2-4013	M1G074-CF	48	36–57	1,710	100	3.0	–40...+60	2.3

Data sheets available upon request. Data is subject to change without notice at ebm-papst discretion. An inlet ring can be ordered as an optional extra.
 *Note: Occasional starting at temperatures between –40 °C and –25 °C is permitted. For continuous operation at temperatures below –25 °C (in refrigeration applications for example), we recommend our fan design with special low-temperature bearings.

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