

# EC centrifugal fans - RadiPac ATEX

## Version Ø400-Ø630

Edition 2017-07

**ebm**papst

The engineer's choice



# RadiPac: Now complete

The ebm-papst RadiPac EC centrifugal fan series is now complete.

With this catalog, you get the technical documentation for the entire RadiPac family. Some new models have been added and are described briefly below.

## The RadiPac standard

These are the fans in sizes 250 to 1000; sizes 250 and 280 are equipped with impellers made of high-quality, injection-molded composites.

Sizes 310 to 1000 include the high-efficiency aluminum impeller with airfoil blades.

This series is designed for maximum efficiency, efficiency thus far unmatched in this breadth by our competitors.

## RadiPac with active PFC

Sizes 450, 500 and 560 are now available with the new three-phase 3 kW motor with integrated active PFC.

With these products, we can now fulfill the increasingly frequent requests for total harmonic distortion of no more than 5%.

## RadiPacs with new 150 motor

Sizes 450, 500 and 560 have been equipped with the new M3G 150 third-generation (Gen. III) motors. These models have been optimized for minimum installed height for use in tight spaces.

The new RadiPacs stand out with the following features:

- Best overall efficiency
- Comfortable noise level
- Compact design
- Fast availability
- Easy startup with uncomplicated configuration of control electronics
- Finely tuned system with pre-configured motor / control electronics / impeller unit
- Plug & play: fully pre-assembled unit ready to install
- Single source: one contact for everything
- Logistic advantages due to complete unit
- Complete product line without gaps
- No magnets with rare earths

All products in this catalog are grouped together in a collection in our product selection program, FanScout. We can provide you with this collection on request.

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# Atmosphere Explosive.

The European guideline on explosion protection.

## Certified safety.

ebm-papst's ex-protected fans are based on the proven 3 kW GreenTech EC external rotor motor and are tested and certified in line with the European product directive 2014/34/EU. They therefore meet all demands made of devices used in areas at risk of explosion. Our axial and centrifugal ex-protected fans are suitable for equipment group II (explosion-protected areas outside mining) and the gases and vapours substance group in explosion group IIB.

Our ex-protected fans can be used in hazard zones 1 and 2. They therefore correspond to category 2G (ATEX) and have the equipment protection level Gb (EN 60079-0).

As per the ATEX 1999/92/EC operating directive, the facility operator is responsible for the categorisation of hazard zones. The corresponding equipment categorisation is performed by the manufacturer, i. e. ebm-papst.

## ATEX fans:

RadiPac centrifugal fans for use in potentially explosive atmospheres.

These fans are available in sizes 400 to 630.

The combination of high-efficiency EC motor and integrated control electronics for use in potentially explosive atmospheres of Zones 1 and 2 is unique and simplifies the use of fans in such environments for the operator.

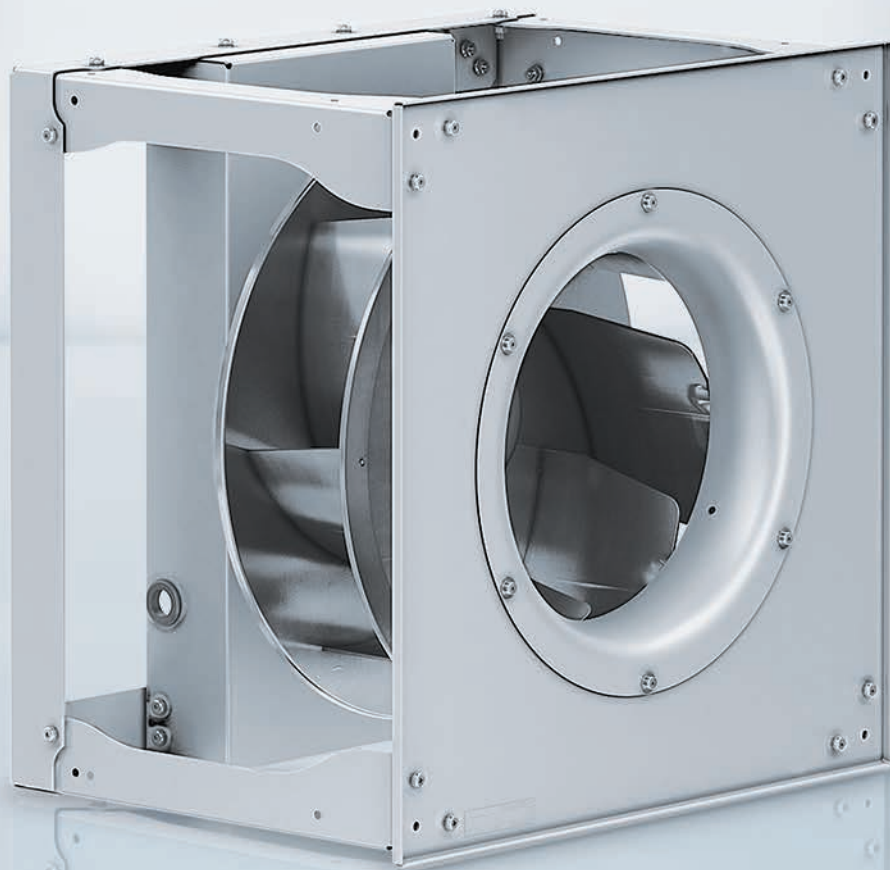


## Ex marking of the ebm-papst fans as per ATEX and EN 60079-0:

|                                             |                                                                                     |                                  | Ignition protection<br>Types                        |                                      |                                      |                 |                                    |                                  | Escape of gases,<br>fog and vapours<br>(e.g. ammonia, methane,<br>ethane, propane, town gas,<br>acrylonitrile, hydrogen<br>sulphide, ethyl ether, acet-<br>aldehyde) |
|---------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------|--------------------------------------|--------------------------------------|-----------------|------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ex marking                                  | Group                                                                               | Equipment category               | Pressure-resistant<br>enclosure<br>Protection level | Increased safety<br>Protection level | Intrinsic safety<br>Protection level | Explosion group | Temperature classes                | Equipment<br>protection<br>level |                                                                                                                                                                      |
| ebm<br>papst                                | 3G<br>Corresponding<br>to Zone 2                                                    |                                  | ic                                                  |                                      |                                      | IIA             | T1<br>T2                           | Gc<br>Increased<br>protection    | Zone 2<br>Hardly ever, rarely                                                                                                                                        |
|                                             |  | II 2G Ex                         | db                                                  | eb                                   | ib                                   | IIB             | T3                                 | Gb                               | Zone 1<br>Occasionally                                                                                                                                               |
|                                             | Required customer<br>specification                                                  |                                  |                                                     |                                      |                                      |                 | Required customer<br>specification |                                  |                                                                                                                                                                      |
| The following requirements are not covered: |                                                                                     |                                  |                                                     |                                      |                                      |                 |                                    |                                  |                                                                                                                                                                      |
| Not available                               | I                                                                                   | 1G<br>Corresponding<br>to Zone 0 | ia                                                  |                                      |                                      | IIC             | T4<br>T5<br>T6                     | Ga<br>Very high<br>protection    | Zone 0<br>Constantly, often                                                                                                                                          |

# EC centrifugal fans – RadiPac

ATEX version, Ø 400 - Ø 630





# EC centrifugal fans – RadiPac

backward curved, Ø 400 - Ø 630 (ATEX version)



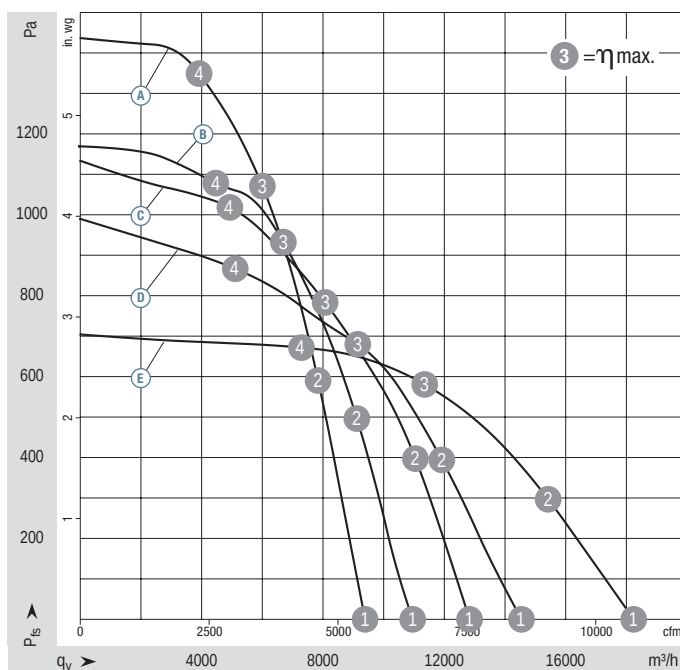
- **Material:** Cube design with inlet ring: Sheet steel, galvanized  
Impeller: Sheet aluminium  
Rotor: Painted black  
Electronics housing: Die-cast aluminium
- **Number of blades:** 7
- **Direction of rotation:** Clockwise viewed toward rotor
- **Degree of protection:** IP 44
- **Insulation class:** "F"
- **Installation position:** Shaft horizontal (base mounting only) or rotor on bottom, rotor on top not allowed
- **Condensation drainage holes:** Rotor side
- **Mode:** Continuous operation (S1)
- **Mounting:** Maintenance-free ball bearings

| Nominal data |            | Curve       | Nominal voltage range | Frequency | Speed <sup>(1)</sup> | Max. Input power <sup>(1)</sup> | Max. Input current <sup>(1)</sup> | Perm. ambient temp. | Weight | Techn. features and connection diagram |
|--------------|------------|-------------|-----------------------|-----------|----------------------|---------------------------------|-----------------------------------|---------------------|--------|----------------------------------------|
| Type         | Motor      | VAC         | Hz                    | rpm       | kW                   | A                               | °C                                | kg                  |        |                                        |
| *3G 400      | M3G 150-FF | Ⓐ 3~380-480 | 50/60                 | 2550      | 3,10                 | 4,70                            | -25...+50                         | 49,4                |        | P. 122 / RP7)                          |
| *3G 450      | M3G 150-FF | Ⓑ 3~380-480 | 50/60                 | 2040      | 2,95                 | 4,50                            | -25...+50                         | 57,5                |        | P. 122 / RP7)                          |
| *3G 500      | M3G 150-FF | Ⓒ 3~380-480 | 50/60                 | 1780      | 2,97                 | 4,50                            | -25...+50                         | 62,5                |        | P. 122 / RP7)                          |
| *3G 560      | M3G 150-IF | Ⓓ 3~380-480 | 50/60                 | 1500      | 2,94                 | 4,50                            | -25...+50                         | 80,8                |        | P. 122 / RP7)                          |
| *3G 630      | M3G 150-NA | Ⓔ 3~380-480 | 50/60                 | 1130      | 2,97                 | 4,60                            | -25...+50                         | 89,3                |        | P. 122 / RP7)                          |

Subject to change

(1) Nominal data at operating point with maximum load and 400 VAC.

## Curves:



Air performance measured according to: ISO 5801, installation category A, with ebm-papst inlet ring without contact protection. Intake-side sound level: L<sub>WA</sub> according to ISO 13347, L<sub>pA</sub> measured at 1 m distance from fan axis. The values given are only applicable under the specified measuring conditions and may differ depending on the installation conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed condition. See Page 126 ff. for detailed information.

|     | n rpm | P <sub>ed</sub> kW | I A  | L <sub>WA</sub> dB(A) |
|-----|-------|--------------------|------|-----------------------|
| Ⓐ ① | 2550  | 2,03               | 3,11 | 92                    |
| Ⓐ ② | 2550  | 2,72               | 4,14 | 88                    |
| Ⓐ ③ | 2550  | 3,10               | 4,70 | 86                    |
| Ⓐ ④ | 2550  | 2,90               | 4,40 | 88                    |
| Ⓑ ① | 2040  | 1,87               | 2,82 | 92                    |
| Ⓑ ② | 2040  | 2,59               | 3,92 | 88                    |
| Ⓑ ③ | 2040  | 2,95               | 4,50 | 86                    |
| Ⓑ ④ | 2040  | 2,60               | 3,93 | 87                    |
| Ⓒ ① | 1780  | 2,01               | 3,03 | 94                    |
| Ⓒ ② | 1780  | 2,64               | 3,95 | 87                    |
| Ⓒ ③ | 1780  | 2,97               | 4,50 | 83                    |
| Ⓒ ④ | 1780  | 2,75               | 4,14 | 85                    |
| Ⓓ ① | 1500  | 1,91               | 2,96 | 93                    |
| Ⓓ ② | 1500  | 2,57               | 3,95 | 89                    |
| Ⓓ ③ | 1500  | 2,94               | 4,50 | 86                    |
| Ⓓ ④ | 1500  | 2,55               | 3,91 | 86                    |
| Ⓔ ① | 1130  | 1,90               | 2,93 | 90                    |
| Ⓔ ② | 1130  | 2,51               | 3,87 | 84                    |
| Ⓔ ③ | 1130  | 2,97               | 4,60 | 83                    |
| Ⓔ ④ | 1130  | 2,54               | 3,93 | 82                    |

- **Technical features:** See connection diagram P. 122
- **EMC:**   Interference emission according to EN 61000-6-4 (industrial environment)  
  Immunity to interference according to EN 61000-6-2 (industrial environment)
- **Touch current:** <= 3,5 mA
- **Terminal box design:** electrical connection via terminal strip
- **Protection class:** I (with customer connection of protective earth)
- **Conformity with standards:** EN 61800-5-1, CE, EN 14986, EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-11
- **Approvals:** II 2G



Weight centrifugal  
module with  
cube design

#### Centrifugal module with cube design

kg

|                  |      |
|------------------|------|
| K3G 400-AQ23 -90 | 49,4 |
| K3G 450-AQ24 -90 | 57,5 |
| K3G 500-AP25 -90 | 62,5 |
| K3G 560-AP23 -90 | 80,8 |
| K3G 630-AP01 -90 | 89,3 |

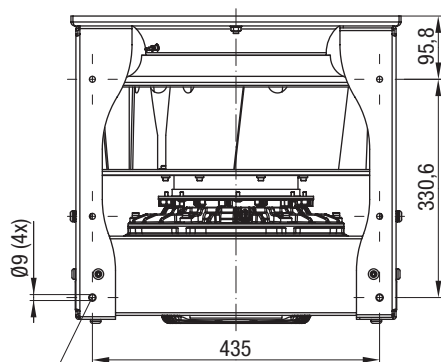


# EC centrifugal fans – RadiPac

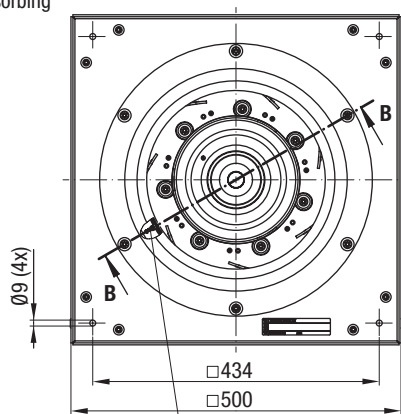
backward curved, Ø 400 (ATEX version)



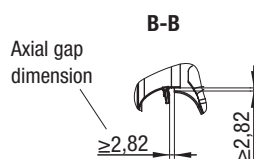
## K3G 400-AQ23-90 (Centrifugal module with cube design)



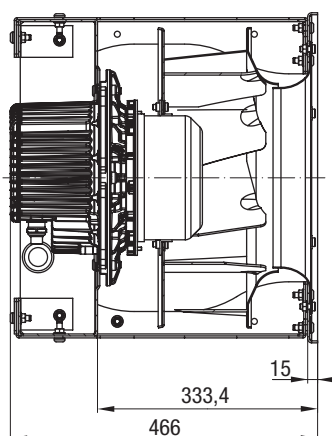
Mounting position for vibration-absorbing elements



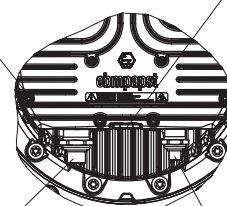
Inlet ring with pressure tap



Radial gap dimension



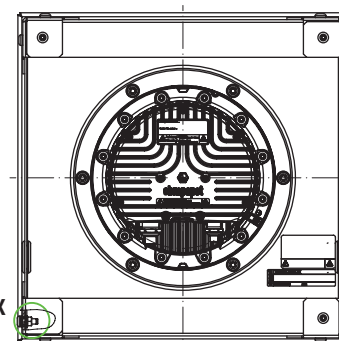
Terminal box cover fastening screws M4 x 20 (7x)  
Tightening torque  $3.5 \pm 0.5$  Nm



Screw plug M20 x 1.5

Cable gland M25 x 1.5: Cable diameter min. 10 mm, max. 16 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable

Cable gland M20 x 1.5: Cable diameter min. 10 mm, max. 14 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable



Ground connection point M8 (functional earthing for dissipation of electrostatic charge, no protective ground), do not unfasten the nut fitted, another nut is used for contacting.

### Note installation position:

only designed for base mounting, shaft horizontal or rotor on bottom; rotor on top on request!

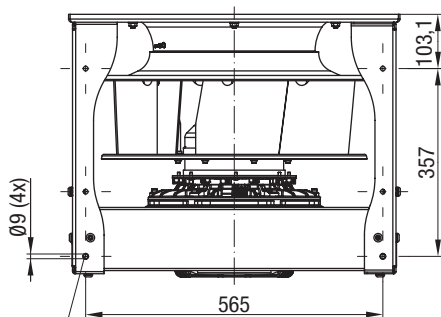


# EC centrifugal fans – RadiPac

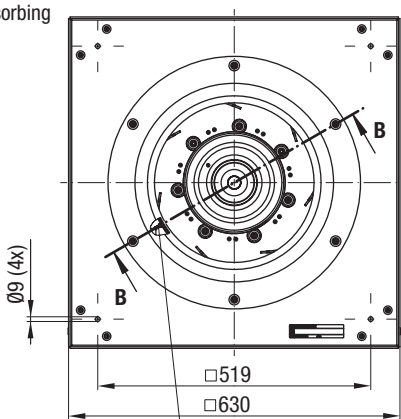
backward curved, Ø 450 (ATEX version)



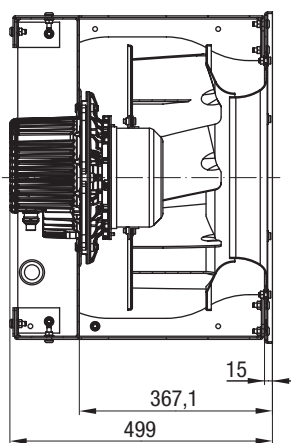
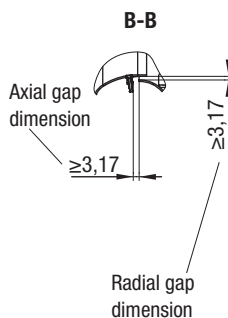
K3G 450-AQ24-90 (Centrifugal module with cube design)



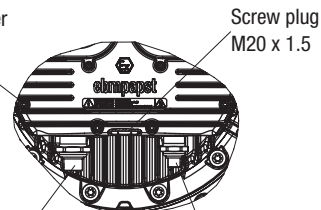
Mounting position for vibration-absorbing elements



Inlet ring with pressure tap

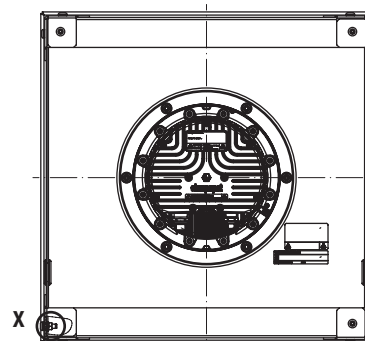


Terminal box cover fastening screws M4 x 20 (7x)  
Tightening torque  $3.5 \pm 0.5$  Nm



Cable gland M25 x 1.5: Cable diameter min. 10 mm, max. 16 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable

Cable gland M20 x 1.5: Cable diameter min. 10 mm, max. 14 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable



Ground connection point M8 (functional earthing for dissipation of electrostatic charge, no protective ground), do not unfasten the nut fitted, another nut is used for contacting.

## Note installation position:

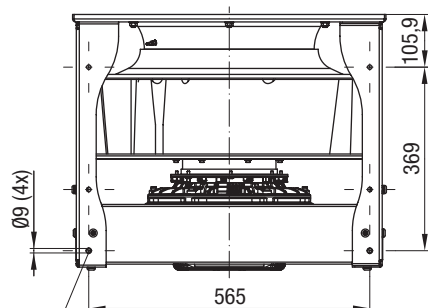
only designed for base mounting, shaft horizontal or rotor on bottom; rotor on top on request!

# EC centrifugal fans – RadiPac

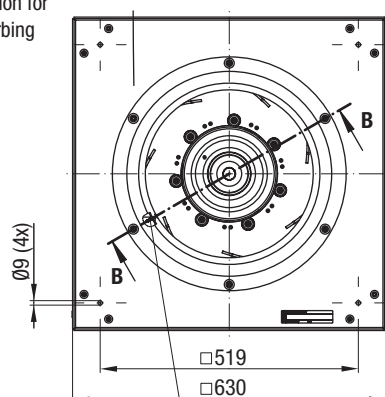
backward curved, Ø 500 (ATEX version)



## K3G 500-AQ25-90 (Centrifugal module with cube design)



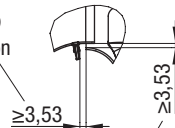
Mounting position for vibration-absorbing elements



Inlet ring with pressure tap

B-B

Axial gap dimension

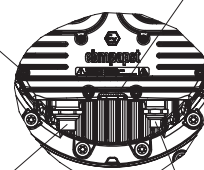


Radial gap dimension



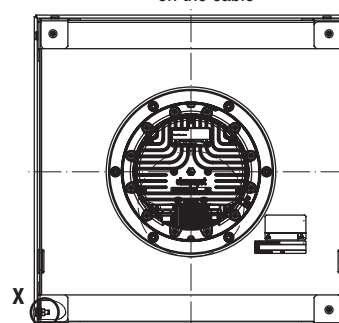
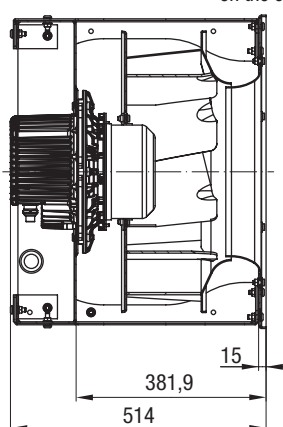
Terminal box cover fastening screws M4 x 20 (7x)  
Tightening torque  $3.5 \pm 0.5$  Nm

Screw plug M20 x 1.5



Cable gland M25 x 1.5: Cable diameter min. 10 mm, max. 16 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable

Cable gland M20 x 1.5: Cable diameter min. 10 mm, max. 14 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable



X

Ground connection point M8 (functional earthing for dissipation of electrostatic charge, no protective ground), do not unfasten the nut fitted, another nut is used for contacting.

### Note installation position:

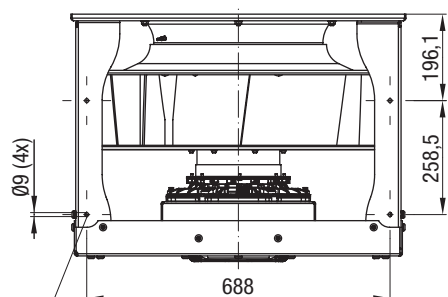
only designed for base mounting, shaft horizontal or rotor on bottom; rotor on top on request!

# EC centrifugal fans – RadiPac

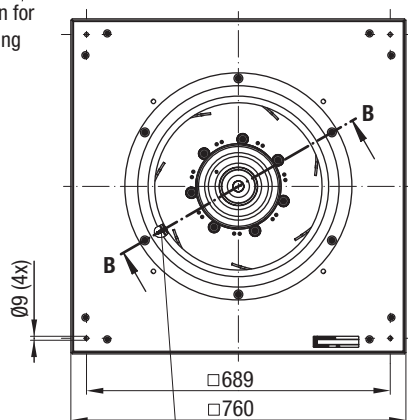
backward curved, Ø 560 (ATEX version)



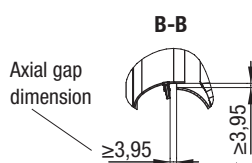
## K3G 560-AP23-90 (Centrifugal module with cube design)



Mounting position for vibration-absorbing elements



Inlet ring with pressure tap



Axial gap dimension

Radial gap dimension

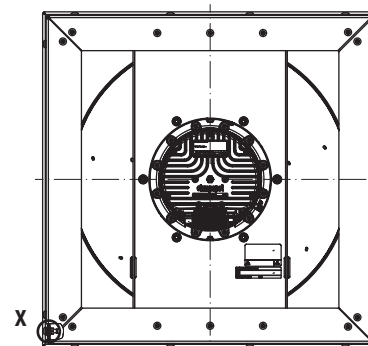
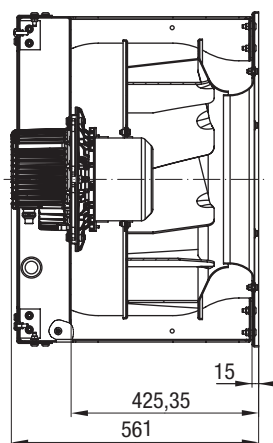
Terminal box cover fastening screws M4 x 20 (7x)  
Tightening torque  $3.5 \pm 0.5$  Nm

Screw plug M20 x 1.5



Cable gland M25 x 1.5: Cable diameter min. 10 mm, max. 16 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable

Cable gland M20 x 1.5: Cable diameter min. 10 mm, max. 14 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending on the cable



Ground connection point M8 (functional earthing for dissipation of electrostatic charge, no protective ground), do not unfasten the nut fitted, another nut is used for contacting.

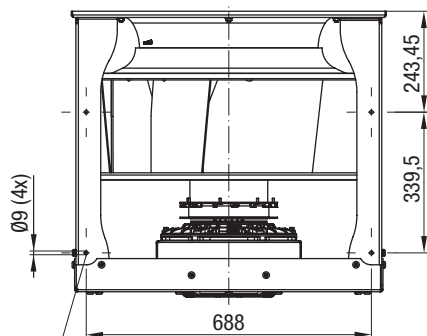
**Note installation position:** shaft horizontal (motor support plate must stand upright) or rotor on bottom; rotor on top on request!

# EC centrifugal fans – RadiPac

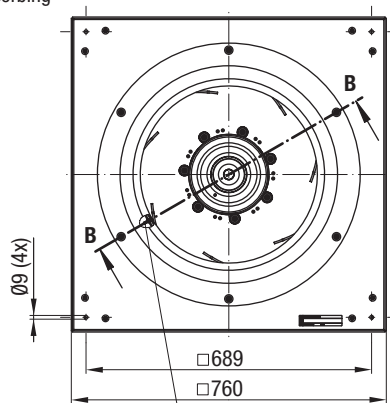
backward curved, Ø 630 (ATEX version)



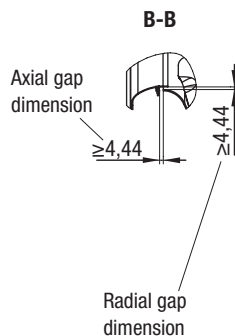
## K3G 630-AP01-90 (Centrifugal module with cube design)



Mounting position for vibration-absorbing elements



Inlet ring with pressure tap



Radial gap dimension

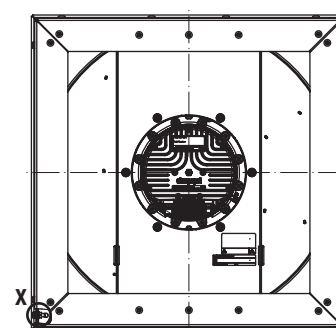
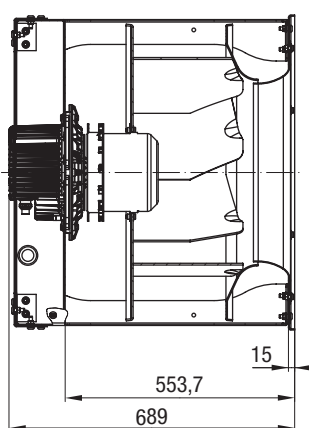
Terminal box cover fastening screws  
M4 x 20 (7x)  
Tightening torque  
 $3.5 \pm 0.5$  Nm

Screw plug  
M20 x 1.5



Cable gland  
M25 x 1.5: Cable diameter  
min. 10 mm, max. 16 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending  
on the cable

Cable gland  
M20 x 1.5: Cable diameter  
min. 10 mm, max. 14 mm  
Tightening torque  $6 \pm 0.6$  Nm  
Approximate value depending  
on the cable



Ground connection point M8 (functional earthing for dissipation of electrostatic charge, no protective ground), do not unfasten the nut fitted, another nut is used for contacting.

**Note installation position:** shaft horizontal (motor support plate must stand upright)  
or rotor on bottom; rotor on top on request!

| Agents | Technology | ATEX version | Compact version | Short version | Ø 1000 | Ø 800 | Ø 710 | Ø 630 | Ø 560 | Ø 500 | Ø 450 | Ø 400 | Ø 355 | Ø 310 | Ø 280 | Ø 250 | Information |
|--------|------------|--------------|-----------------|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|
|--------|------------|--------------|-----------------|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|

# Tender specifications

Fan size 250 to 1000

**Direct-drive single inlet centrifugal fans with backwards-curved high-performance centrifugal impellers with radial diffusers, mounted on a GreenTech EC external rotor motor with integrated control electronics.**

Impeller made of aluminum, with 5 backwards-curved, continuously welded, hollow-profile blades; impeller sizes 250 and 280 made of plastic; flow-optimized inlet ring made of galvanized sheet steel with pressure test nipple.

Motor impeller statically and dynamically balanced on two planes to balancing grade G 6.3 (motor size 200 to balancing grade G 4.0) in accordance with DIN ISO 1940.

GreenTech EC external rotor motor surpasses efficiency class IE4, magnets with no rare earths, maintenance-free ball bearings with long-term lubrication, theoretical nominal service life of at least 40,000 hours of operation.

Soft start, integrated current limitation, extended voltage input 1~200-277 V, 50/60 respectively 3~380-480 V, 50/60 Hz. Fan can be used with all standard power supply networks with unaltered air performance. Integrated electronics, low-noise commutation logic; 100 % open-loop speed control; all fans have an RS485/MODBUS RTU interface, and do not need to be installed with shielded cables. All 1~ types have an integrated active PFC (Power Factor Correction) to reduce disturbing harmonic content. Terminal box made of aluminum/plastic with easily accessible connection area with spring-loaded terminals, environment-resistant cable glands, or with external variable cable (sizes 250 to 280).

## **Version for wall mounting:**

Support bracket, sizes 250 to 560 and 630 to 800 with size 150 motor as ready-to-install support bracket intended for wall mounting. Support bracket made of bent round bar steel or round tube, welded and coated in black. Mounting plate and inlet ring made of sendzimir galvanized sheet steel.

## **Version for floor mounting:**

Cube design, sizes 630 to 1000 with size 200 motor as ready-to-install cube design intended exclusively for floor mounting. Struts made of extruded aluminum sections connected to die-cast corner plates, nozzle plate and inlet ring made of sendzimir galvanized sheet steel, motor mounting plate made of coated sheet steel. This version is not suitable for wall mounting.

Any work required for isolation from structure-borne noise to be performed by the customer. Fan satisfies the applicable EMC guidelines and requirements with regard to circuit feedback (for specific information, see the respective data sheet). Documentation and marking conform to the applicable EU Directives.

Reliable performance data, air performance measurements on intake-side chamber test rig according to ISO 5801 and DIN 24163, noise measurements in anechoic rooms according to DIN EN ISO 3745.

## **Integrated protective devices:**

- Alarm relay with zero-potential change-over contacts (250 V AC/2 A,  $\cos \varphi = 1$ )
- Locked-rotor protection
- Phase failure detection
- Soft start of motors
- Mains under-voltage detection
- Thermal overload protection for electronics and motor
- Short circuit protection

## **Optional:**

- Other and specific requirements on request

**Technical data:**

|                               |                         |                                                  |
|-------------------------------|-------------------------|--------------------------------------------------|
| Fan type                      |                         | = _____ - _____ - _____                          |
| Air flow                      | qV                      | = _____ m <sup>3</sup> /h, cfm                   |
| Stat. pressure increase       | pfs                     | = _____ Pa, in wg                                |
| Stat. overall efficiency      | $\eta_{es}$             | = _____ %                                        |
| Operating speed               | n                       | = _____ rpm                                      |
| Motor type                    |                         | = EC motor                                       |
| Type of control               |                         | = 0-100 % speed control                          |
| Motor efficiency class        |                         | = IE4 equivalent or better                       |
| Total power input             | Ped                     | = _____ kW                                       |
| Specific fan power            | SFP                     | = _____ kW/(m <sup>3</sup> /s)                   |
| Nominal voltage range         | U <sub>N</sub>          | = _____ V                                        |
| Line frequency                | f                       | = 50 / 60 Hz                                     |
| Nominal current               | I <sub>N</sub>          | = _____ A                                        |
| Degree of protection          |                         | = IP54                                           |
| Sound power level             | L <sub>WA</sub> (A, in) | = _____ / L <sub>WA</sub> (A, out) = _____ dB(A) |
| Sound pressure level (at 1 m) | L <sub>pA</sub> (A, in) | = _____ / L <sub>pA</sub> (A, out) = _____ dB(A) |
| Perm. ambient temperature     | T                       | = _____ to _____ °C                              |
| Weight of fan                 | m                       | = _____ kg                                       |



EC centrifugal fans - RadiPac  
Support bracket  
Sizes 250 - 800



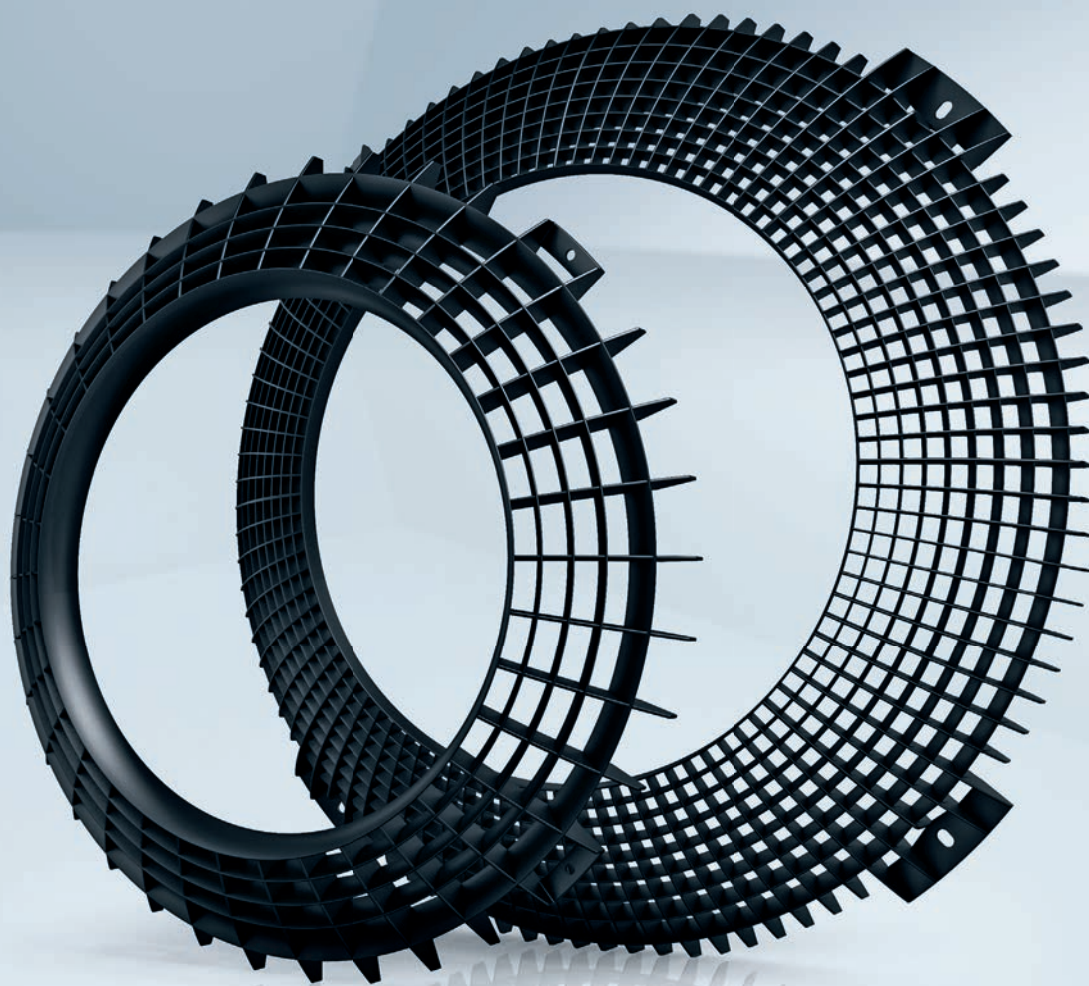
EC centrifugal fans - RadiPac  
Cube design  
Sizes 630 - 1000

Refer to data sheet for dimensions and wiring.





## Accessories



# FlowGrid air inlet grill

Efficient noise reduction

ebm-papst fans are not measured on our own advanced test stands just for their air performance alone. The acoustic behavior of the fans is also examined and the measurement results are included in the technical documentation.

Please note that the measurements are taken under ideal conditions with undisturbed inflow and outflow. If the fans are subsequently installed and used in devices with rather tight spaces, it is to be expected that the noise data provided in the documentation will not be applicable.

In order to minimize the negative impact of the installation situation, ebm-papst offers the FlowGrid air-inlet guard shown here. It is installed on the intake side of the fan and effectively reduces the noise generated by the fan. Particularly annoying, low-frequency noises are reduced efficiently. The level of noise reduction is dependent on the installation situation, which is why no generally applicable data is possible here.



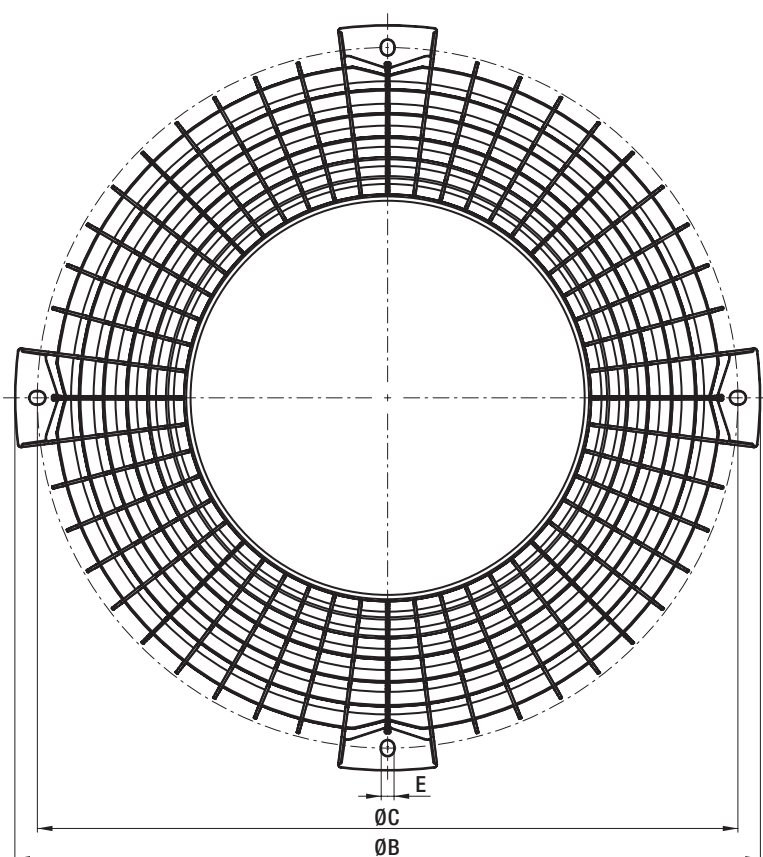
FlowGrid air inlet grill

Dimensions (mm)

| Part number  | Fan size      | ØB  | ØC      | ØE  | S   | H   | N*         |
|--------------|---------------|-----|---------|-----|-----|-----|------------|
| 20280-2-2957 | 250, 280      | 280 | 245-261 | 4,5 | 3,5 | 40  | 2 ± 0,5 Nm |
| 25310-2-2957 | 310           | 315 | 288-292 | 5,5 | 3,5 | 49  | 2 ± 0,5 Nm |
| 00400-2-2957 | 355           | 370 | 334-346 | 4,5 | 3,5 | 56  | 2 ± 0,5 Nm |
| 35505-2-2957 | 400, 450, 500 | 470 | 440     | 9,0 | 3,5 | 71  | 10 ± 2 Nm  |
| 00630-2-2957 | 560, 630      | 580 | 545     | 10  | 3,0 | 90  | 10 ± 2 Nm  |
| 50710-2-2957 | 710           | 666 | 630     | 10  | 3,0 | 106 | 10 ± 2 Nm  |
| 63000-2-2957 | 800           | 785 | 750     | 10  | 3,0 | 125 | 10 ± 2 Nm  |

Subject to change

\* Recommended tightening torque for fastening screws



Would you like  
to find out more?

If you need an  
installation guide  
or more information  
about the dimensions,  
go to:

[www.ebmpapst.com/flowgrid-manual](http://www.ebmpapst.com/flowgrid-manual)

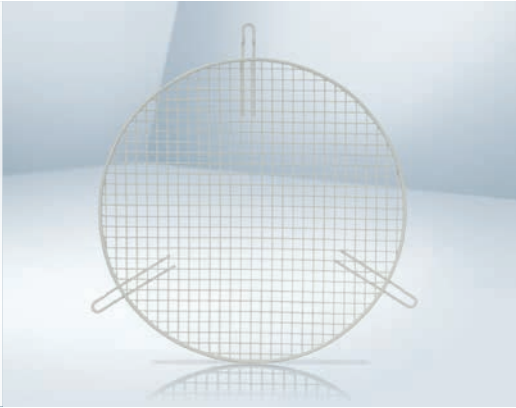
or scan the  
QR code below:



# Intake finger guard

Wire mesh finger guard

- **Material:** Steel wire, phosphated,  
Versions 1 and 2: Painted pebble gray (RAL 7032)  
Versions 3 and 4: Painted light gray (RAL 7035)

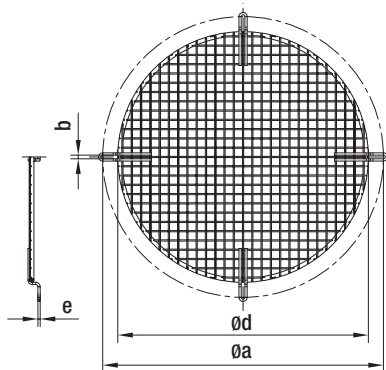


Intake finger guard for backwards-curved centrifugal fans (according to EN ISO 13857)

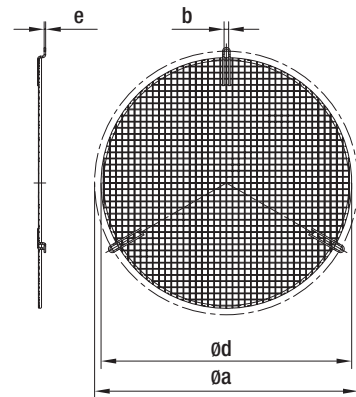
| Part number  | Fan size | Version | a   | b   | d   | e   | Strut division | Dimensions (mm) |
|--------------|----------|---------|-----|-----|-----|-----|----------------|-----------------|
| 79280-2-4039 | 250, 280 | 1       | 280 | 4,5 | 227 | 2,8 | 4 x 90°        |                 |
| 79310-2-4039 | 310      | 1       | 325 | 4,5 | 271 | 2,8 | 4 x 90°        |                 |
| 79355-2-4039 | 355      | 1       | 345 | 4,5 | 308 | 2,8 | 4 x 90°        |                 |
| 79400-2-4039 | 400      | 2       | 390 | 8,5 | 343 | 2,8 | 3 x 120°       |                 |
| 79500-2-4039 | 450, 500 | 2       | 445 | 8,5 | 417 | 2,8 | 3 x 120°       |                 |
| 79560-2-4039 | 560      | 2       | 490 | 8,5 | 466 | 2,8 | 3 x 120°       |                 |
| 79630-2-4039 | 630      | 3       | 600 | 8,5 | 551 | 3,9 | 3 x 120°       |                 |
| 79710-2-4039 | 710, 800 | 3       | 700 | 8,5 | 651 | 3,9 | 3 x 120°       |                 |
| 79900-2-4039 | 1000     | 4       | 850 | 8,5 | 801 | 3,9 | 6 x 60°        |                 |

Subject to change

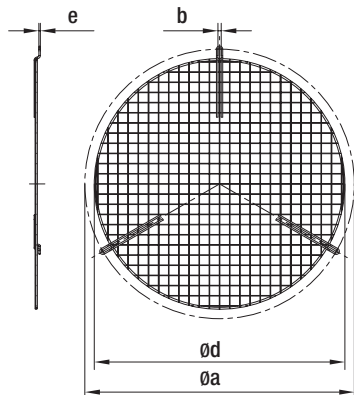
Version 1



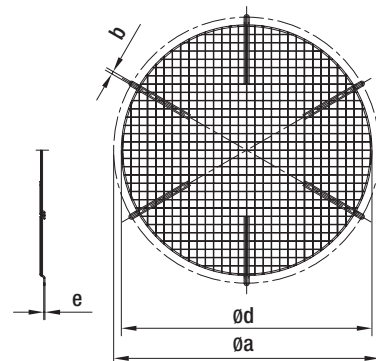
Version 2



Version 3



Version 4



# Inlet rings

With / without measuring device

– **Material:** Galvanized sheet steel



Inlet rings with / without measuring device to determine the air flow for backwards-curved centrifugal fans

| Part number                                                                             | Fan size      | Dimensions / drawing |
|-----------------------------------------------------------------------------------------|---------------|----------------------|
| 96350-2-4013 <sup>(1)</sup> / 96355-2-4013 <sup>(2)</sup> / 96345-2-4013 <sup>(3)</sup> | 250           | siehe Seite 107      |
| 28000-2-4013 <sup>(1)</sup> / 28004-2-4013 <sup>(2)</sup> / 28003-2-4013 <sup>(3)</sup> | 280           | siehe Seite 107      |
| 28070-2-4013 <sup>(1)</sup> / 28075-2-4013 <sup>(2)</sup> / 28080-2-4013 <sup>(3)</sup> | 280 (compact) | siehe Seite 88-89    |
| 31470-2-4013 <sup>(1)</sup> / 31475-2-4013 <sup>(2)</sup> / 31480-2-4013 <sup>(3)</sup> | 310           | siehe Seite 107      |
| 35670-2-4013 <sup>(1)</sup> / 35675-2-4013 <sup>(2)</sup> / 35680-2-4013 <sup>(3)</sup> | 355           | siehe Seite 107      |
| 40073-2-4013 <sup>(1)</sup> / 40078-2-4013 <sup>(2)</sup> / 40083-2-4013 <sup>(3)</sup> | 400           | siehe Seite 107      |
| 45070-2-4013 <sup>(1)</sup> / 45075-2-4013 <sup>(2)</sup> / 45080-2-4013 <sup>(3)</sup> | 450           | siehe Seite 107      |
| 63072-2-4013 <sup>(1)</sup> / 64025-2-4013 <sup>(2)</sup> / 64002-2-4013 <sup>(3)</sup> | 500           | siehe Seite 108      |
| 63071-2-4013 <sup>(1)</sup> / 64030-2-4013 <sup>(2)</sup> / 64001-2-4013 <sup>(3)</sup> | 560           | siehe Seite 108      |
| 63070-2-4013 <sup>(1)</sup> / 64040-2-4013 <sup>(2)</sup> / 64000-2-4013 <sup>(3)</sup> | 630           | siehe Seite 109      |
| 71070-2-4013 <sup>(1)</sup> / 71075-2-4013 <sup>(2)</sup> / 71080-2-4013 <sup>(3)</sup> | 710           | siehe Seite 109      |
| 80070-2-4013 <sup>(1)</sup> / 80075-2-4013 <sup>(2)</sup> / 80080-2-4013 <sup>(3)</sup> | 800           | siehe Seite 109      |

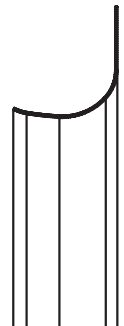
Subject to change

<sup>(1)</sup> Without measuring device

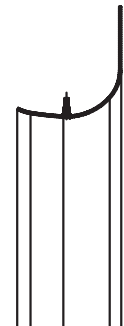
<sup>(2)</sup> With one pressure tap

<sup>(3)</sup> With piezometer

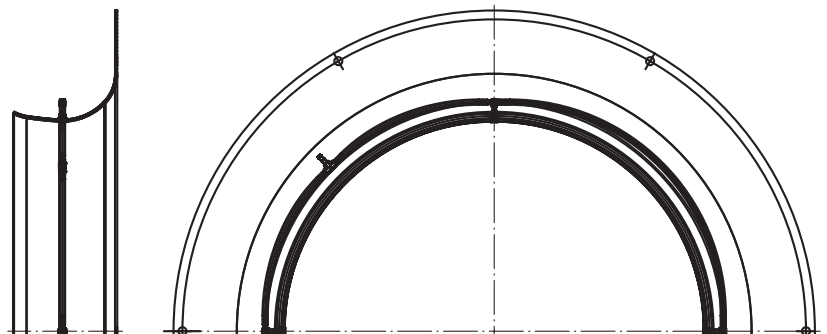
(1) Without measuring device:



(2) With one pressure tap:



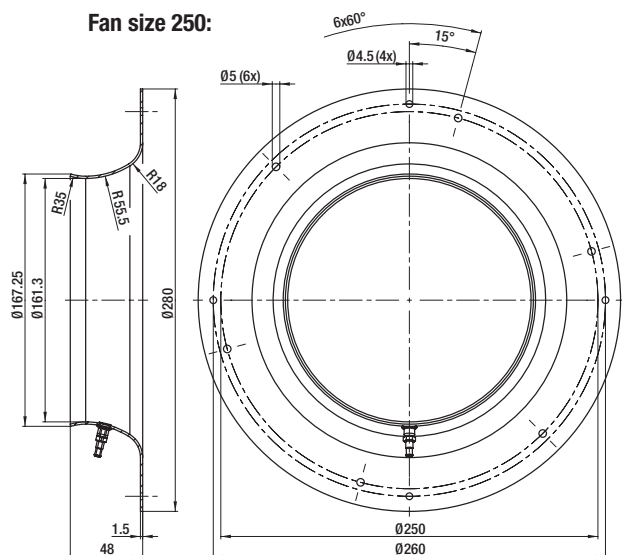
(3) With piezometer:



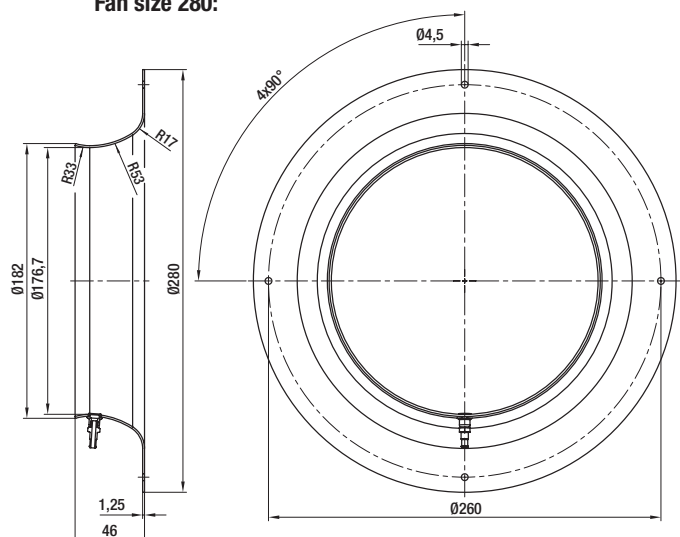
# Inlet rings

Dimensioned drawings with one pressure tap

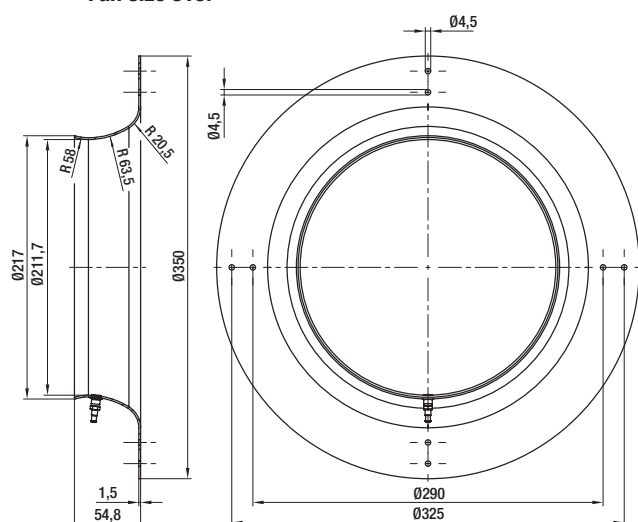
Fan size 250:



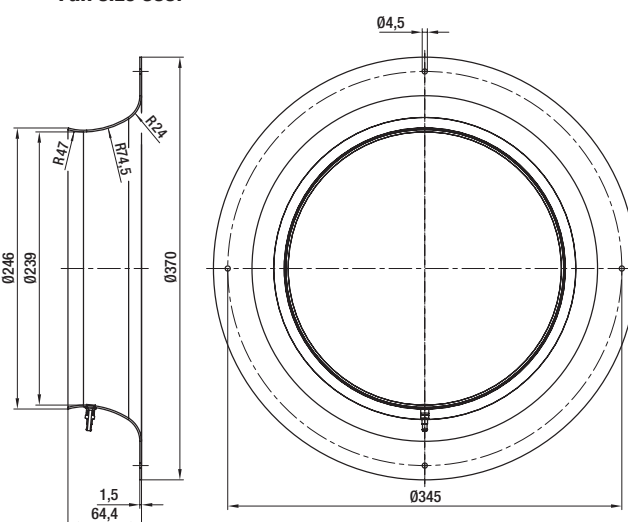
Fan size 280:



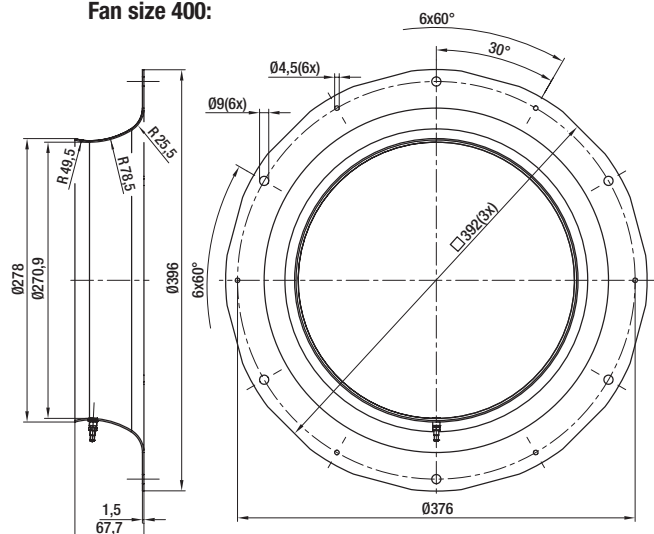
Fan size 310:



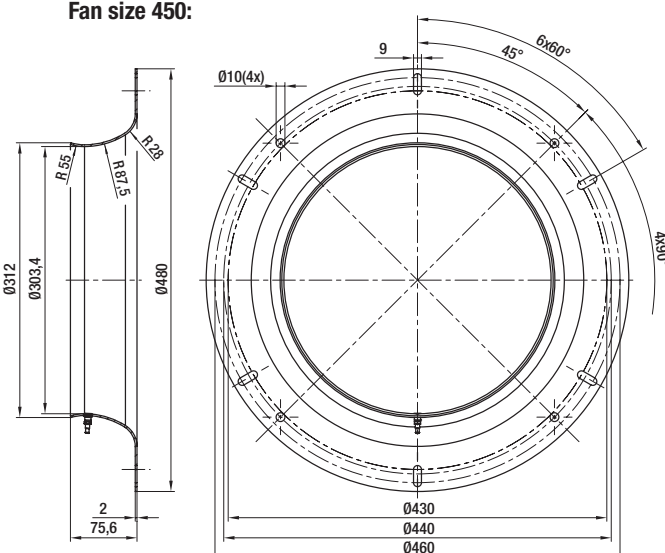
Fan size 355:



Fan size 400:



Fan size 450:

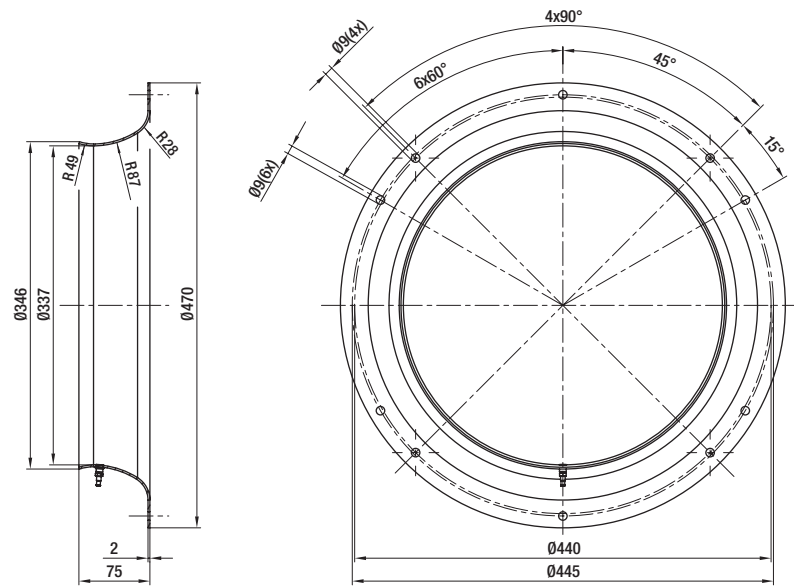




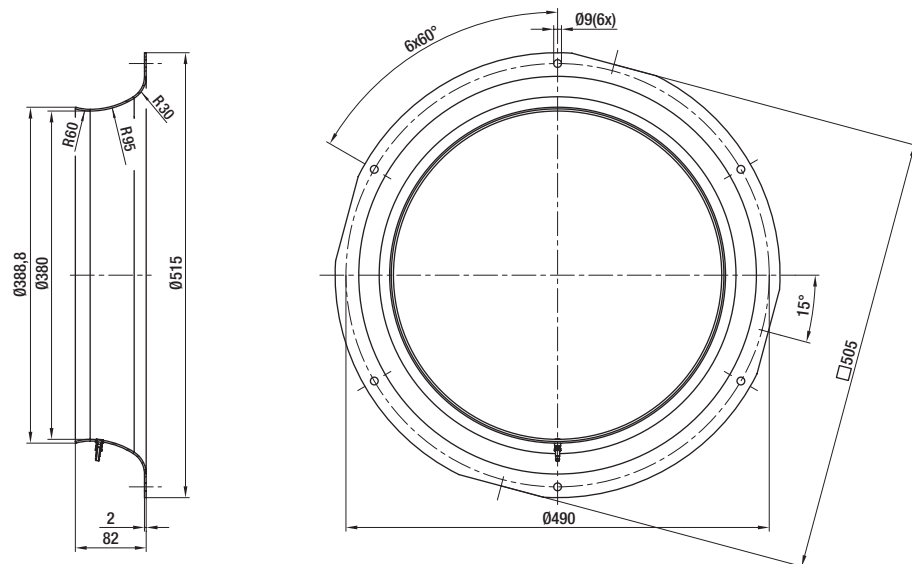
# Inlet rings

Dimensioned drawings with one pressure tap

Fan size 500:



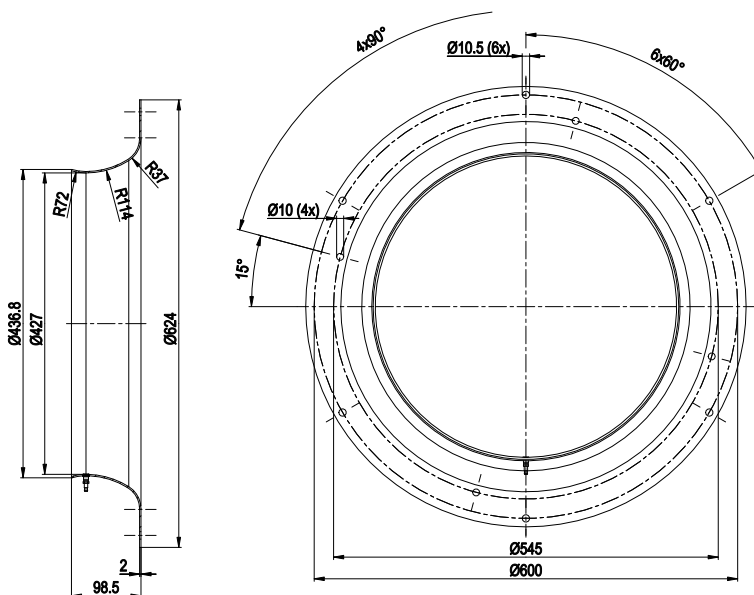
Fan size 560:



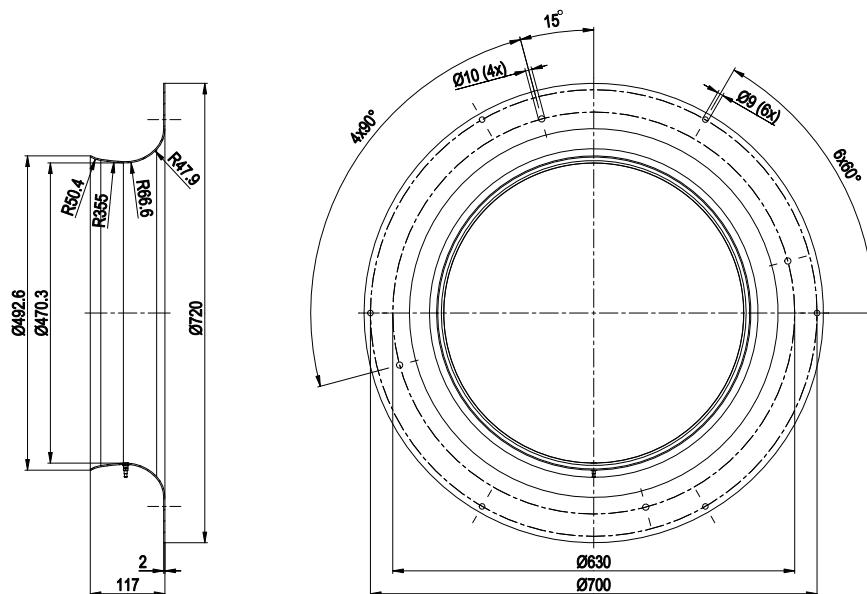
# Inlet rings

Dimensioned drawings with one pressure tap

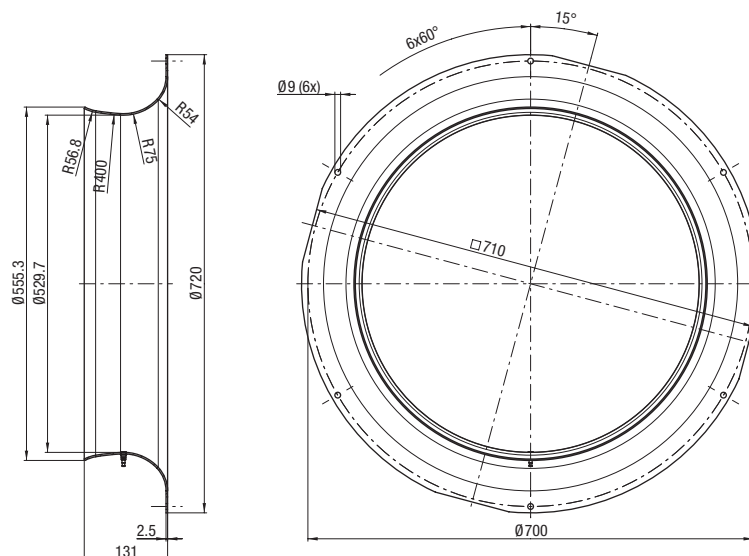
Fan size 630:



Fan size 710:



Fan size 800:

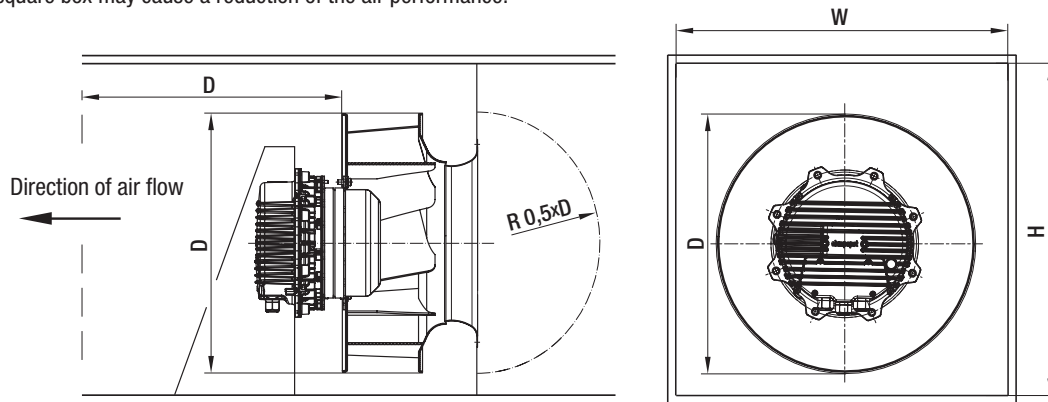




# Effects of installation space

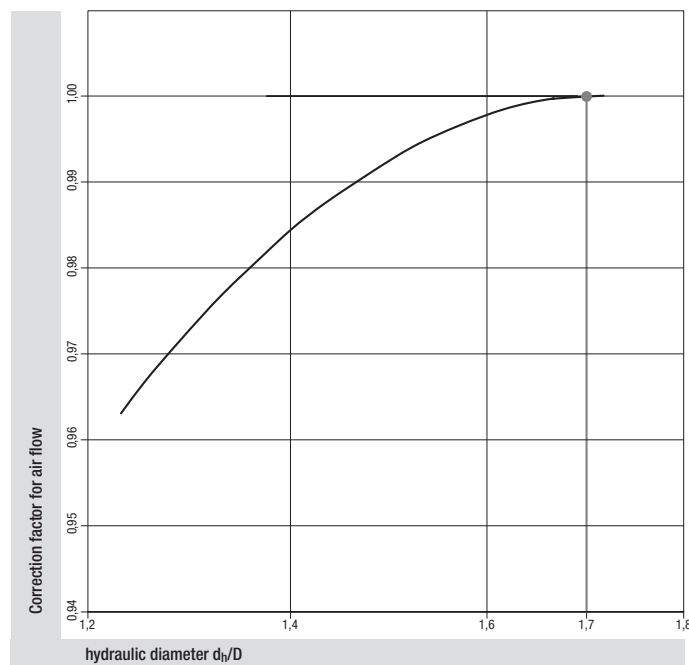
## Effects of installation space:

Installation in a square box may cause a reduction of the air performance.



$d_h$  = Hydraulic diameter  
 Formula:  $d_h = 2 \times W \times H / (W + H)$   
 W = Width of the box  
 H = Height of the box  
 D = Outside diameter of the fan

## Correction values for the air flow Fan size 250 - 1000:



The correction values shown here were determined from an extensive series of measurements taken on our own internal chamber test rig.

Here, square and rectangular outflow cross sections were considered.

This is why the hydraulic diameter was used to determine the correction values.

The new RadiPac fans are known to be less vulnerable to tight installation situations.

For square cross sections that are greater than 1.7 x the impeller diameter, no deduction has to be applied to the catalog curves.

# Air flow measurement

## Air flow measurement:

The differential pressure method compares the static pressure upstream of the inlet ring with the static pressure in the inlet ring.

The air flow can be calculated from the differential pressure (between the static pressures) according to the following equation:

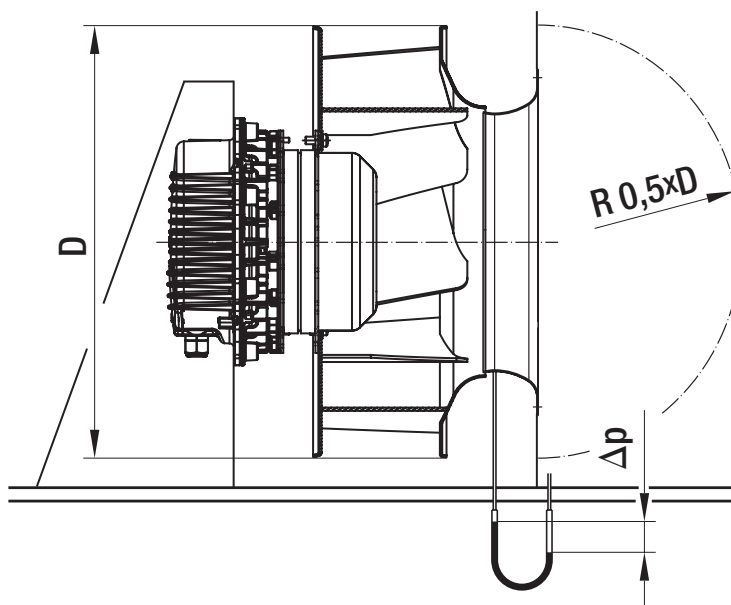
$$q_V = k \cdot \sqrt{\Delta p} \quad q_V \text{ in [m}^3/\text{h] and } \Delta p \text{ in [Pa]}$$

If the air flow is to be regulated to remain constant, the inlet pressure must be kept constant:

$$\Delta p = q_V^2 : k^2$$

k takes into account the specific properties of the inlet ring.

The pressure is tapped at 1 (4) point(s) on the circumference of the inlet ring. The customer connection consists of a built-in T-shaped hose fitting. The hose fitting is suitable for pneumatic hoses with an inside diameter of 4 mm.



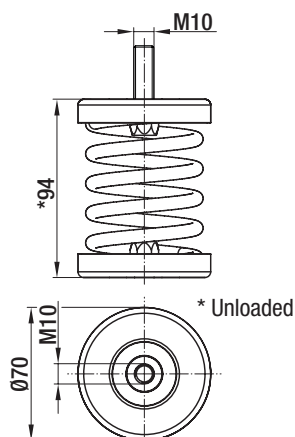
### k-factors: (for RadiPac inlet rings)

| Fan size | 250 | 280 | 310 | 355 | 400 | 450 | 500 |
|----------|-----|-----|-----|-----|-----|-----|-----|
| k-factor | 76  | 77  | 116 | 148 | 188 | 240 | 281 |

| Fan size | 560 | 630 | 710 | 800 | 1000 |
|----------|-----|-----|-----|-----|------|
| k-factor | 348 | 438 | 545 | 695 | 1200 |

# Vibration absorbers



- **Packaging:** Part numbers refer to one set consisting of 4x spring elements each.

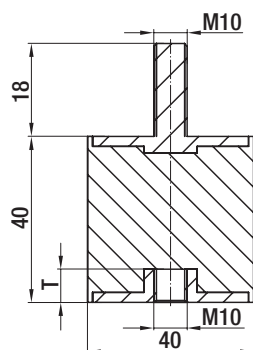
Supplied in a box.

- **For further information, see:**  
Installation instructions no.: 45014-4-8670

## Vibration absorbers (steel)

| Part number (set) | Type            | Minimum speed (rpm) | Deflection (mm) |
|-------------------|-----------------|---------------------|-----------------|
| 11064-4-5142      | K3G 630-PV04-01 | 510                 | 7,5             |
| 11065-4-5142      | K3G 630-PW04-01 | 570                 | 5,9             |
| 11065-4-5142      | K3G 710-PV05-01 | 530                 | 6,5             |
| 11065-4-5142      | K3G 710-PW06-01 | 490                 | 7,8             |
| 11065-4-5142      | K3G 800-PV13-01 | 500                 | 7,4             |
| 11065-4-5142      | K3G 800-PW07-01 | 480                 | 8,0             |
| 11064-4-5142      | K3G A00-PV03-01 | 370                 | 13,8            |

Subject to change



- **Packaging:** Part numbers refer to one set consisting of 4x rubber buffers, washers, and nuts each.

Supplied in a box.

- **For further information, see:**  
Installation instructions no.: 45014-4-8670

## Vibration absorbers (rubber)

| Part number (set) | Type            | Minimum speed (rpm) | Deflection (mm) |
|-------------------|-----------------|---------------------|-----------------|
| 10005-4-5164      | K3G 630-PV04-01 | 790                 | 2,1             |
| 10005-4-5164      | K3G 630-PW04-01 | 725                 | 2,5             |
| 10005-4-5164      | K3G 710-PV05-01 | 701                 | 2,6             |
| 10005-4-5164      | K3G 710-PW06-01 | 629                 | 3,3             |
| 10005-4-5164      | K3G 800-PV13-01 | 656                 | 3,1             |
| 10005-4-5164      | K3G 800-PW07-01 | 620                 | 3,4             |
| 10008-4-5164      | K3G A00-PV03-01 | 496                 | 5,3             |

Subject to change

## Attention:

The vibration absorbers recommended by ebm-papst are available in a set of 4 pieces. The vibration absorbers are perfectly matched to their intended fans and the specified minimum speed. The installation and operation of several fans on one set of spring elements is not allowed. During start-up, the fan has to pass through the speed range corresponding to the resonance frequency (below the minimum speed). The vibrations caused by the fan's residual imbalance are strongest within this speed range. This speed range must be passed through as quickly as possible to avoid damage to the fan. Operation below, close to or at the resonance frequency will destroy the fan!

When the fan is being operated, take care to ensure that the fan's speed does not go below the specified minimum speed. This will prevent the fan from being operated continuously near the resonance frequency. The specified minimum speed is always for an individual fan without any influences from the system it is installed in.

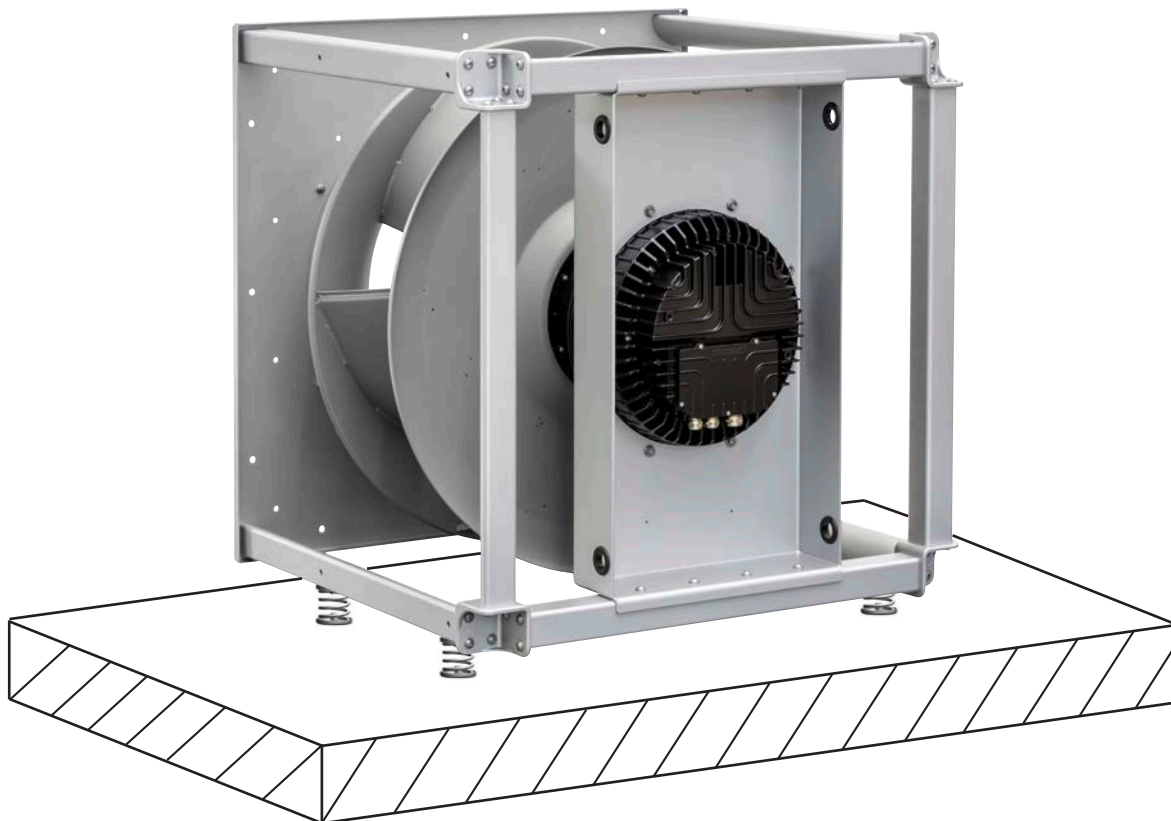
The configuration of the unit in which the fan is installed can have a strong influence on the fan's vibration characteristics, so a vibration test always has to be performed after the fan has been installed. The fan's vibration characteristics must be tested under all relevant operating conditions (such as speed, back pressure, systemic fluctuations in back pressure) – when installed and in interaction with the complete system.

The maximum vibration severity may not exceed 3.5 mm/s, measured at the motor's fastening pitch circle on the motor support plate in the direction of and perpendicular to the motor's axis of rotation.

Even when the vibration absorbers recommended by ebm-papst are used, their effectiveness must be tested in the application. If vibration absorbers other than those specified are used, tests must be performed to determine how the resonance frequency, and thus the operating requirements, change.

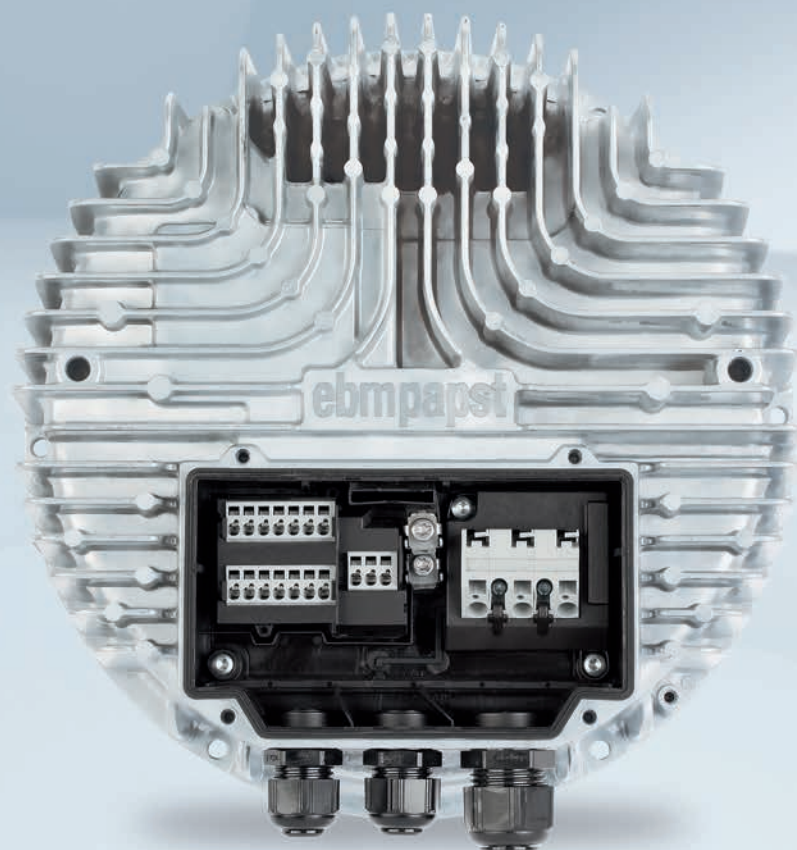
## Installation example:

Floor-mounted, shaft horizontal





# Connection diagrams

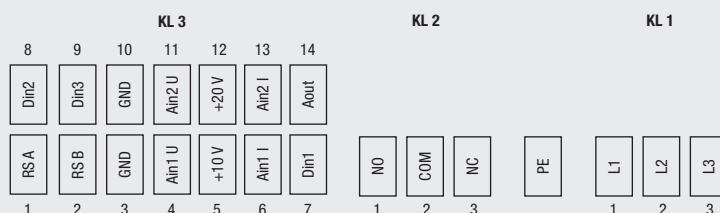


# Connection diagram: RP1)

M3G112 & M3G150 & M3G200, 3~

## Technical features:

- Control input 0-10 VDC / PWM
- Output 10 VDC (+10 %) max. 10 mA
- Output 20 VDC (+/-20 %) max. 50 mA
- Output for slave 0-10 V max. 5 mA
- Input for sensor 0-10 V or 4-20 mA
- Operation and fault indicator
- Integrated PI controller
- Locked-rotor protection / Soft start / Motor current limitation
- RS 485 MODBUS-RTU / Alarm relay
- PFC, passive (standard) or PFC, active (see product-specific catalog page)
- Thermal overload protection for electronics/motor
- Undervoltage/phase failure detection
- Control interface with SELV potential safely disconnected from supply
- External enable input/External 24 V input (parameterization)



| Terminal | Pin  | Connection  | Assignment/function                                                                                                                                                                                                                                                                                           |
|----------|------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KL1      | 1    | L1          | Power supply, phase, see nameplate for voltage range                                                                                                                                                                                                                                                          |
|          | 2    | L2          | Power supply, phase, see nameplate for voltage range                                                                                                                                                                                                                                                          |
|          | 3    | L3          | Power supply, phase, see nameplate for voltage range                                                                                                                                                                                                                                                          |
| PE       |      | PE          | Protective earth                                                                                                                                                                                                                                                                                              |
| KL2      | 1    | NO          | Status relay, floating status contact, option 1: break for failure, option 2: break for run monitoring error message                                                                                                                                                                                          |
|          | 2    | COM         | Status relay, floating status contact, common connection, contact rating 250 VAC / 2 A (AC1) min. 10 mA, reinforced insulation on supply side and on control interface side                                                                                                                                   |
|          | 3    | NC          | Status relay, floating status contact, option 1: make for failure, option 2: make for run monitoring error message                                                                                                                                                                                            |
| KL3      | 1    | RSA         | RS-485 interface for MODBUS RSA, SELV                                                                                                                                                                                                                                                                         |
|          | 2    | RSB         | RS-485 interface for MODBUS RSB, SELV                                                                                                                                                                                                                                                                         |
|          | 3/10 | GND         | Reference ground for control interface, SELV                                                                                                                                                                                                                                                                  |
|          | 4    | Ain1 U /PWM | Analog input 1 (set value); 0-10 V; Ri= 100 kΩ; adjustable curve; only for use as alternative to input Ain1 I, SELV                                                                                                                                                                                           |
|          | 5    | +10 V       | Voltage output, power supply for external devices (e.g. potentiometers), SELV                                                                                                                                                                                                                                 |
|          | 6    | Ain1 I      | Analog input 1 (set value); 4-20 mA; Ri= 100 Ω; adjustable curve; only for use as alternative to input Ain1 U, SELV                                                                                                                                                                                           |
|          | 7    | Din1        | Digital input 1: Enable electronics; Enable: Pin open or applied voltage 5...50 VDC; Disable: Bridge to GND or applied voltage < 1 VDC; Reset function: Triggering of software reset after level change to < 1VDC, SELV                                                                                       |
|          | 8    | Din2        | Digital input 2: Switching parameter sets 1/2, according to EEPROM setting, the valid/used parameter set can be selected via bus or via digital input Din2. Parameter set 1: Pin open or applied voltage 5-50 VDC; Parameter set 2: Bridge to GND or applied voltage < 1 VDC, SELV                            |
|          | 9    | Din3        | Digital input 3: Direction of action of integrated controller; According to EEPROM setting, the direction of action of the integrated controller can be selected as normal/inverse via bus or digital input; Normal: Pin open or applied voltage 5...50 VDC; Inverse: Bridge or applied voltage < 1 VDC, SELV |
|          | 11   | Ain2 U      | Analog input 2; Measured value 0-10 V; Ri= 100 kΩ; adjustable curve; only for use as alternative to input Ain2 I, SELV                                                                                                                                                                                        |
|          | 12   | +20 V       | Voltage output, power supply for external devices (e.g. sensors), SELV                                                                                                                                                                                                                                        |
|          | 13   | Ain2 I      | Analog input 2; Measured value 4-20 mA; Ri= 100 Ω; adjustable curve; only for use as alternative to input Ain2 U, SELV                                                                                                                                                                                        |
|          | 14   | Aout        | Analog output 0-10 V; max. 5 mA; output of current motor modulation level/current motor speed. Adjustable curve, SELV                                                                                                                                                                                         |

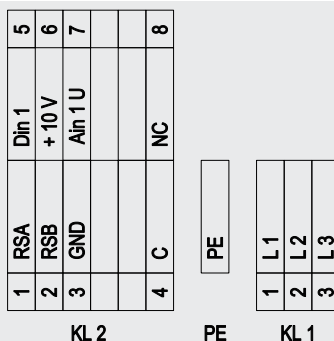


# Connection diagram: RP2)

M3G150, 3~

## Technical features:

- Control input 0-10 VDC / PWM
- Output 10 VDC max. 10 mA
- RS 485 MODBUS-RTU / PFC, passive
- Thermal overload protection for electronics/motor
- Locked-rotor protection / Soft start
- Operation and fault indicator
- Integrated PI controller
- Motor current limitation / Alarm relay
- Undervoltage/phase failure detection
- Control interface with SELV potential safely disconnected from supply
- External enable input / External 24 V input (parameterization)



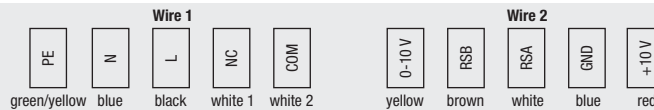
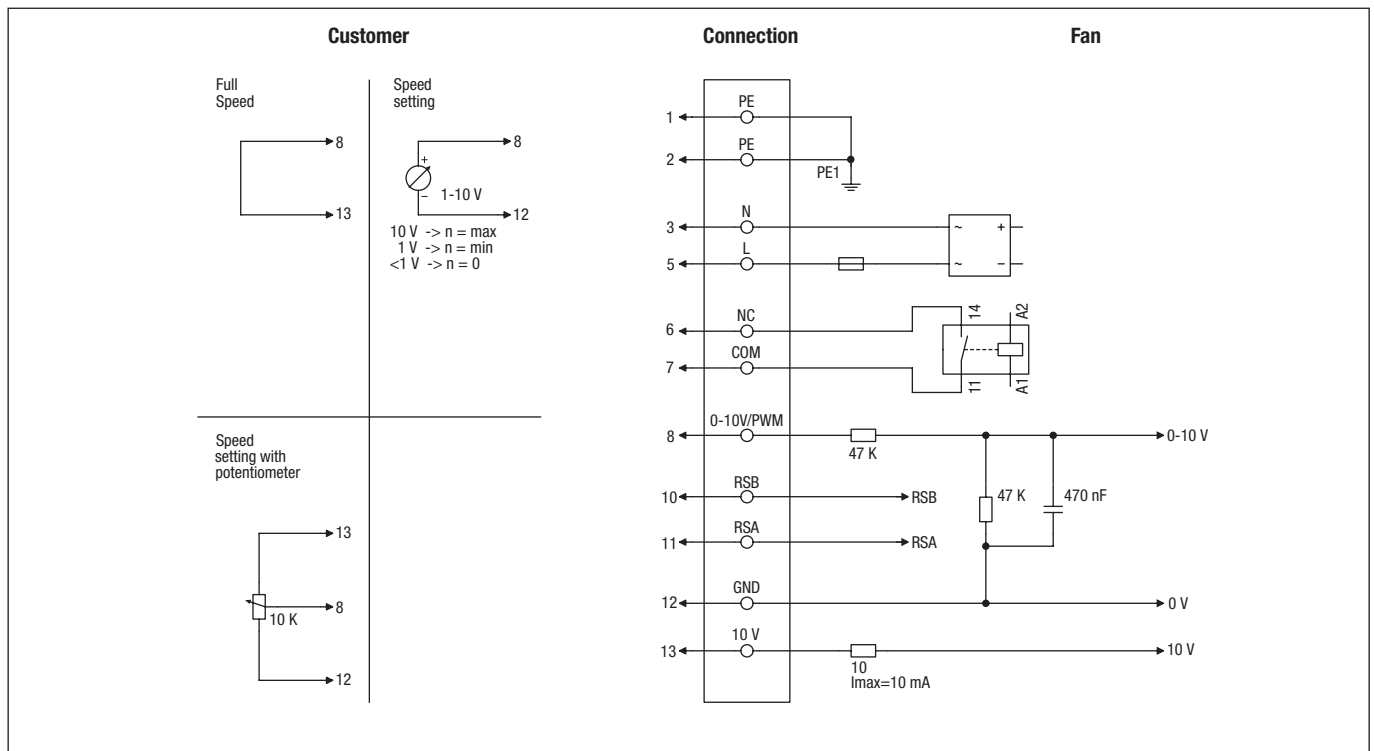
| Terminal | Pin | Connection | Assignment/function                                                                                                                                                                                                     |
|----------|-----|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KL1      | 1   | L1         | Power supply, phase, see nameplate for voltage range                                                                                                                                                                    |
|          | 2   | L2         | Power supply, phase, see nameplate for voltage range                                                                                                                                                                    |
|          | 3   | L3         | Power supply, phase, see nameplate for voltage range                                                                                                                                                                    |
| PE       |     | PE         | Protective earth                                                                                                                                                                                                        |
| KL2      | 1   | RSA        | RS-485 interface for MODBUS RSA, SELV                                                                                                                                                                                   |
|          | 2   | RSB        | RS-485 interface for MODBUS RSB, SELV                                                                                                                                                                                   |
|          | 3   | GND        | Reference ground for control interface; SELV                                                                                                                                                                            |
|          | 4   | C          | Status relay, floating status contact, contact rating 250 VAC / 2 A (AC1) min. 10 mA, reinforced insulation on supply side and on control interface side                                                                |
|          | 5   | DIN1       | Digital input 1 enable electronics,<br>enable: pin open or applied voltage 5-50 VDC<br>disable: bridge to GND or applied voltage < 1 VDC<br>reset function: triggers software reset after a level change to < 1 V; SELV |
|          | 6   | +10 V      | Voltage output, power supply for external devices (e.g. potentiometers), SELV<br>or: +24 VDC input for parameter setting via MODBUS without line voltage                                                                |
|          | 7   | Ain1 U     | Analog input 1 (set value) 0-10 V, Ri = 100 kΩ, adjustable curve; SELV                                                                                                                                                  |
|          | 8   | NC         | Status relay, floating status contact, break for failure                                                                                                                                                                |

# Connection diagram: RP3)

M3G084, 1~

## Technical features:

- Control input 0-10 VDC / PWM
- Output 10 VDC max. 10 mA
- Operation and fault indicator
- Alarm relay
- Locked-rotor protection, Soft start
- Power limiter
- PFC, active
- Motor current limitation
- RS 485 MODBUS-RTU
- Thermal overload protection for electronics/motor
- Undervoltage
- Control interface with SELV potential safely disconnected from supply



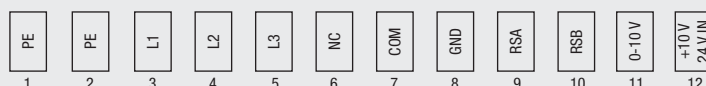
| Wire | No.  | Connection          | Color      | Assignment/function                                                                                                                                                       |
|------|------|---------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | 1, 2 | PE                  | green/yel. | Protective earth                                                                                                                                                          |
| 1    | 3    | N                   | blue       | Power supply, neutral conductor, voltage range see nameplate                                                                                                              |
| 1    | 5    | L                   | black      | Power supply, phase, voltage range see nameplate                                                                                                                          |
| 1    | 6    | NC                  | white 1    | Status relay, floating status contact, break for failure                                                                                                                  |
| 1    | 7    | COM                 | white 2    | Status relay, floating status contact, contact rating 250 VAC / 2 A (AC1) min. 10 mA, basic insulation on supply side and reinforced insulation on control interface side |
| 2    | 8    | 0-10 V / PWM        | yellow     | Control input 0-10 V or PWM, impedance 100 kΩ, SELV, adjustable curve                                                                                                     |
| 2    | 10   | RSB                 | brown      | RS485 interface for MODBUS, RSB, SELV                                                                                                                                     |
| 2    | 11   | RSA                 | white      | RS485 interface for MODBUS, RSA, SELV                                                                                                                                     |
| 2    | 12   | GND                 | blue       | Reference ground for control interface, SELV                                                                                                                              |
| 2    | 13   | + 10 V / max. 10 mA | red        | Voltage output, power supply for ext. devices (e.g. potentiometer), SELV                                                                                                  |

# Connection diagram: RP4)

M3G084 & M3G112, 3~

## Technical features:

- Control input 0-10 VDC / PWM
- Output 10 VDC max. 10 mA
- Operation and fault indicator
- Integrated PI controller
- Alarm relay
- Locked-rotor protection, Soft start
- PFC, passive
- Motor current limitation
- RS 485 MODBUS-RTU
- Thermal overload protection for electronics/motor
- Undervoltage/phase failure detection
- External 24 V input (parameterization)
- Control interface with SELV potential safely disconnected from supply



| No.  | Connection   | Assignment/function                                                                                                                                                       |
|------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1, 2 | PE           | Protective earth                                                                                                                                                          |
| 3    | L1           | Power supply, phase, see nameplate for voltage range                                                                                                                      |
| 4    | L2           | Power supply, phase, see nameplate for voltage range                                                                                                                      |
| 5    | L3           | Power supply, phase, see nameplate for voltage range                                                                                                                      |
| 6    | NC           | Status relay, floating status contact, break for failure                                                                                                                  |
| 7    | COM          | Status relay, floating status contact, contact rating 250 VAC / 2 A (AC1) min. 10 mA, basic insulation on supply side and reinforced insulation on control interface side |
| 8    | GND          | Reference ground for control interface, SELV                                                                                                                              |
| 9    | RSA          | RS-485 interface for MODBUS RSA, SELV                                                                                                                                     |
| 10   | RSB          | RS-485 interface for MODBUS RSB, SELV                                                                                                                                     |
| 11   | 0-10 V / PWM | Control input 0-10 V or PWM, impedance 100 kΩ, SELV, adjustable curve                                                                                                     |
| 12   | +10 V        | Voltage output, power supply for external devices (e.g. potentiometers), SELV<br>or: +24 VDC input for parameter setting via MODBUS without line voltage                  |

# Connection diagram: RP5)

M3G084, 3~

## Technical features:

- Control input 0-10 VDC / PWM
- Input for sensor 0-10 V or 4-20 mA
- Output for slave 0-10 V max. 3 mA
- Output 20 VDC (+25 %/-10 %) max. 50 mA
- Output 10 VDC (+/-3 %) max. 10 mA
- Integrated PI controller
- PFC, passive
- Motor current limitation, Alarm relay
- RS 485 MODBUS-RTU
- Thermal overload protection for electronics/motor
- Undervoltage/phase failure detection
- Locked-rotor protection, Soft start
- External 24 V input (parameterization)
- Control interface with SELV potential safely disconnected from supply



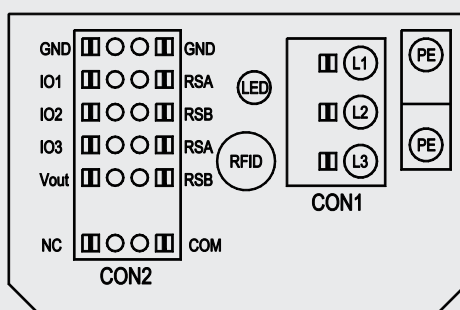
| Terminal | Connection   | Assignment/function                                                                                                                                                         |
|----------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PE       | PE           | Protective earth                                                                                                                                                            |
| KL1      | L3           | Power supply, phase, see nameplate for voltage range                                                                                                                        |
|          | L2           | Power supply, phase, see nameplate for voltage range                                                                                                                        |
|          | L1           | Power supply, phase, see nameplate for voltage range                                                                                                                        |
| KL2      | NC           | Status relay, floating status contact, option 1: break for failure, option 2: break for run monitoring error message                                                        |
|          | COM          | Status relay, floating status contact, common connection, contact rating 250 VAC / 2 A (AC1) min. 10 mA, reinforced insulation on supply side and on control interface side |
|          | NO           | Status relay, floating status contact, option 1: make for failure, option 2: make for run monitoring error message                                                          |
| KL3      | OUT          | Analogue output 0-10 VDC max. 3 mA, SELV;<br>Output of the actual motor duty cycle (PWM): 1 V corresponds to 10 % PWM, 10 V correspond to 100 % PWM.                        |
|          | GND          | Reference ground for control interface, SELV                                                                                                                                |
|          | 0-10 V / PWM | Control input/current sensor value input 0-10 VDC, (impedance 100 kΩ), only for use as alternative to input 4-20 mA, SELV                                                   |
|          | +10 V        | Voltage output, power supply for external devices (e.g. potentiometers), SELV                                                                                               |
|          | +20 V        | Voltage output, power supply for external devices (e.g. sensors), SELV<br>or: +24 VDC input for parameter setting via MODBUS without line voltage                           |
|          | 4-20 mA      | Control input/current sensor value input 4-20 mA, (Impedanz 100 Ω), only for use as alternative to input 0-10 V, SELV                                                       |
|          | 0-10 V / PWM | Control input/current sensor value input 0-10 VDC, (Impedanz 100 kΩ), only for use as alternative to input 4-20 mA, SELV                                                    |
|          | GND          | Reference ground for control interface, SELV                                                                                                                                |
|          | RSB          | RS-485 interface for MODBUS RSB, SELV                                                                                                                                       |
|          | RSA          | RS-485 interface for MODBUS RSA, SELV                                                                                                                                       |
|          | RSB          | RS-485 interface for MODBUS RSB, SELV                                                                                                                                       |
|          | RSA          | RS-485 interface for MODBUS RSA, SELV                                                                                                                                       |

# Connection diagram: RP6)

M3G150, 3~

## Technische Ausstattung:

- Configurable inputs/outputs (I/O)
- RFID - ISO 15693 compatible
- Operation and alarm display with LED
- Integrated PI controller
- Locked-rotor protection
- Motor current limitation / Alarm relay
- Soft start
- Voltage output 3.3-24 VDC, Pmax = 800 mW
- RS 485 MODBUS-RTU / MODBUS V6
- Thermal overload protection for electronics/motor
- Undervoltage/phase failure detection
- Control interface with SELV potential safely disconnected from supply
- External 15-50 VDC input (parameterization)



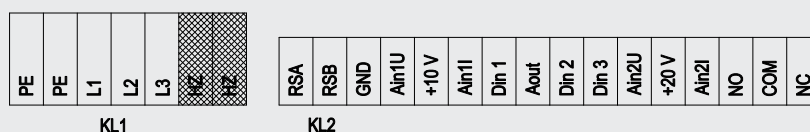
| No.  | Connection | Assignment/function                                                                                                                                                                                                                             |
|------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CON1 | L1, L2, L3 | Power supply, phase, see nameplate for voltage range                                                                                                                                                                                            |
| PE   | PE         | Protective earth                                                                                                                                                                                                                                |
| CON2 | RSA        | RS-485 interface for MODBUS RSA, SELV                                                                                                                                                                                                           |
| CON2 | RSB        | RS-485 interface for MODBUS RSB, SELV                                                                                                                                                                                                           |
| CON2 | GND        | Reference ground for control interface, SELV                                                                                                                                                                                                    |
| CON2 | IO1        | IN2: Digital input - positive logic (factory setting: Enable) function parameterizable, SELV<br>- normal: Pin open or applied voltage < 1.5 VDC<br>- inverse: applied voltage 3.5-50 VDC                                                        |
| CON2 | IO2        | IN1: Analog input 0-10 V<br>0-10 V, Ri=100 K, parameterizable as set value or measured value (factory setting: set value) characteristic curve parameterizable, SELV                                                                            |
| CON2 | IO3        | OUT1: Analog output 0-10 V<br>0-10 V, max 5 mA, function parameterizable (factory setting: modulation level)<br>max output frequency 300 Hz, SELV                                                                                               |
| CON2 | Vout       | Voltage output 3.3-24 VDC +/-5%, Pmax=800 mW, voltage parameterizable (factory setting: 10 VDC)<br>short-circuitproof, supply for external devices, SELV<br>alternatively: 15-50 VDC input for parameterization via Modbus without line voltage |
| CON2 | COM        | Status relay, floating status contact, contact rating 250 VAC / 2 A (AC1) min. 10 mA, reinforced insulation on supply side and on control interface side                                                                                        |
| CON2 | NC         | Status relay, floating status contact, option 1: break for failure, option 2: break for run monitoring error message                                                                                                                            |

# Connection diagram: RP7)

M3G150, 3~

## Technical features:

- Control input 0-10 VDC / PWM
- Output 10 VDC max. 10 mA
- Output 20 VDC max. 50 mA
- Output for slave 0-10 V
- Input for sensor 0-10 V or 4-20 mA
- Operation and fault indicator
- Integrated PI controller
- Alarm relay
- Locked-rotor protection / Soft start
- Motor current limitation
- RS 485 MODBUS-RTU / PFC, passive
- Thermal overload protection for electronics/motor
- Undervoltage/phase failure detection
- External enable input / External 24 V input (parameterization)



Shaded => terminals not used

| Terminal | Connection | Assignment/function                                                                                                                                                                                                                                                                                                  |
|----------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KL1      | PE         | Protective earth                                                                                                                                                                                                                                                                                                     |
|          | L1         | Power supply, phase, see nameplate for voltage range                                                                                                                                                                                                                                                                 |
|          | L2         | Power supply, phase, see nameplate for voltage range                                                                                                                                                                                                                                                                 |
|          | L3         | Power supply, phase, see nameplate for voltage range                                                                                                                                                                                                                                                                 |
|          | HZ         | not used (optional: internal heating element)                                                                                                                                                                                                                                                                        |
| KL2      | RSA        | RS-485 interface for MODBUS RSA, SELV                                                                                                                                                                                                                                                                                |
|          | RSB        | RS-485 interface for MODBUS RSB, SELV                                                                                                                                                                                                                                                                                |
|          | GND        | Reference ground for control interface (SELV)                                                                                                                                                                                                                                                                        |
|          | Ain1 U     | Analog input 1, set value: 0-10 V, Ri = 100 kΩ, adjustable curve, only usable as alternative to input Ain1I; SELV                                                                                                                                                                                                    |
|          | +10 V      | Voltage output, power supply for external devices (e.g. potentiometers), SELV                                                                                                                                                                                                                                        |
|          | Ain1 I     | Analog input 1, set value: 4-20 mA, Ri = 100 Ω, adjustable curve, only usable as alternative to input Ain1U; SELV                                                                                                                                                                                                    |
|          | Din 1      | Digital input 1: enable electronics, enable: pin open or applied voltage 5-50 VDC<br>disable: bridge to GND or applied voltage < 1 VDC<br>reset function: triggers software reset after a level change to < 1 VDC; SELV                                                                                              |
|          | Aout       | Analog output 0-10 VDC, max. 5 mA, output of current motor modulation level / motor speed adjustable curve; SELV                                                                                                                                                                                                     |
|          | Din 2      | Digital input 2: Switching parameter sets 1/2, according to EEPROM setting, the valid or used parameter set can be selected via bus or via digital input DIN2.<br>Parameter set 1: pin open or applied voltage 5-50 VDC<br>Parameter set 2: bridge to GND or applied voltage < 1 VDC; SELV                           |
|          | Din 3      | Digital input 3: Direction of action of integrated controller, according to EEPROM setting, the direction of action of the integrated controller can be selected as normal/inverse via bus or digital input<br>Normal: Pin open or applied voltage 5-50 VDC; Inverse: Bridge to GND or applied voltage < 1 VDC; SELV |
|          | Ain2 U     | Analog input 2, measured value: 0-10 V, Ri = 100 kΩ, adjustable curve, only usable as alternative to input Ain2 I; SELV                                                                                                                                                                                              |
|          | +20 V      | Voltage output, power supply for external devices (e.g. sensors), SELV<br>or: +24 VDC input for parameter setting via MODBUS without line voltage                                                                                                                                                                    |
|          | Ain2 I     | Analog input 2, measured value: 4-20 mA, Ri = 100 Ω, adjustable curve, only usable as alternative to input Ain2 U; SELV                                                                                                                                                                                              |
|          | NO         | Status relay, floating status contact, option 1: make for failure, option 2: make for run monitoring error message                                                                                                                                                                                                   |
|          | COM        | Status relay, floating status contact, common connection, contact rating 250 VAC / 2 A (AC1) min. 10 mA, reinforced insulation on supply side and on control interface side                                                                                                                                          |
|          | NC         | Status relay, floating status contact, option 1: break for failure, option 2: break for run monitoring error message                                                                                                                                                                                                 |

| Agents | Technology | ATEX version | Compact version | Short version | Ø 1000 | Ø 800 | Ø 710 | Ø 630 | Ø 560 | Ø 500 | Ø 450 | Ø 400 | Ø 355 | Ø 310 | Ø 280 | Ø 250 | Information |
|--------|------------|--------------|-----------------|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|
|--------|------------|--------------|-----------------|---------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|



# ebm-papst FanScout

Click your way to the ideal RadiPac





With the FanScout selection software from ebm-papst, you can quickly and easily find the ideal product for your exact requirements from our extensive product range.

Fans operated in parallel, so-called FanGrids, are also included in the selection.

The software can be easily integrated into your device configuration program using the DLL interface.

Since our software is based on real measured values, the data you get with ebm-papst FanScout will always be absolutely reliable and above all extremely accurate.

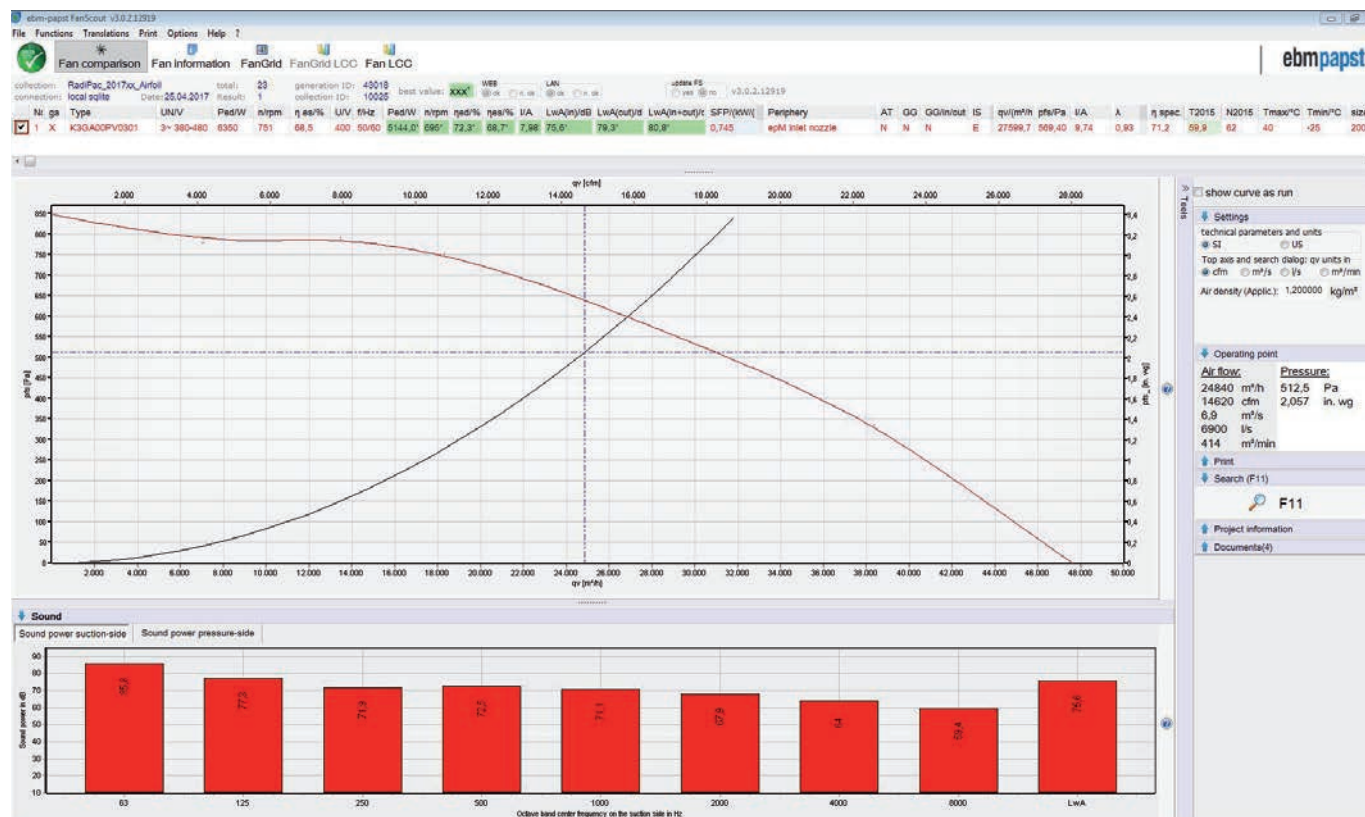
This has been confirmed by TÜV SÜD, the German technical service organization. It assigned the accuracy of FanScout's calculations in comparison with real measurements to the highest class.

In a short time, not only can you find the best solution for your use case, you can also simulate various operating scenarios that take the fans' operating points, operating times and space requirements into account to provide you with an estimate of annual energy consumption.

To make the decision even easier for you, ebm-papst FanScout also takes life cycle costs into account: the purchase price and the operating and service costs.

ebm-papst FanScout is available to our customers only.

Please contact your ebm-papst representative or call us at +49 7938 81-0.



# Technical parameters and scope

## High standards for all ebm-papst products

*At ebm-papst we are always looking to improve our products to be able to offer customers just what they need for their particular requirements. Careful monitoring of the market enables us to constantly incorporate enhancements into our products. As shown by the technical parameters listed below, you can always be sure of finding the right solution from ebm-papst for whatever application you may have in mind.*

### General performance parameters

Any deviations from the technical data and technical parameters described here are given in the product-specific data sheet.

### Degree of protection

The degree of protection is specified in the product-specific data sheets.

### Insulation class

The insulation class is specified in the product-specific data sheets.

### Installation position

The installation position is specified in the product-specific data sheets.

### Condensation drainage holes

Information on condensation drainage holes is provided in the product-specific data sheets.

### Mode of operation

The mode of operation is specified in the product-specific data sheets.

### Protection class

The protection class is specified in the product-specific data sheets.

### Service life

The service life of ebm-papst products depends on two main factors:

- The service life of the insulation system
- The service life of the bearing system

The service life of the insulation system is essentially governed by the voltage level, the temperature and the ambient conditions such as humidity and condensation.

The service life of the bearing system is primarily governed by the thermal load on the bearings. For the majority of our products we use maintenance-free ball bearings which can be fitted in any installation position. Sleeve bearings can alternatively be employed, as described in the product-specific data sheets.

As a rough guide (depending on the general conditions), the ball bearings have a life expectancy L10 of approx. 40,000 hours of operation at an ambient temperature of 40 °C.

We will gladly provide you with a life expectancy calculation based on your specific usage conditions.

### Motor protection/thermal protection

Information on motor protection and thermal protection is provided in the product-specific data sheets.

The following protection methods are provided depending on the type of motor and area of application:

- Thermal overload protector, in-circuit or external
- PTC with electronic diagnostics
- Impedance protection
- Thermal overload protector with electronic diagnostics
- Current limitation via electronics

If use is made of an external thermal overload protector, a commercially available tripping unit must be connected by the customer for shut-off.

Motor protection conforming to the applicable standard must be fitted for products not provided with a built-in thermal overload protector and not protected against improper use.

### Mechanical strain/performance parameters

All ebm-papst products are subjected to comprehensive testing in conformity with the normative specifications and also incorporating the extensive experience of ebm-papst.



### Vibration testing

Vibration testing is performed as follows:

- Vibration test in operation according to DIN IEC 68 Part 2-6
- Vibration test at standstill according to DIN IEC 68 Part 2-6

### Shock load

Shock load testing is performed as follows:

- Shock load according to DIN IEC 68 Part 2-27

### Balancing grade

Balancing grade testing is performed as follows:

- Residual imbalance according to DIN ISO 1940
- Standard balancing quality level G 6.3

Should your particular application require a higher level of balancing, please contact us and specify the details in your order.

### Chemical and physical strain/performance parameters

Please consult your ebm-papst contact for any questions regarding chemical and physical strain.

### Areas of use, industries & applications

Our products are used in a variety of industries and for numerous applications:

Ventilation, air conditioning and refrigeration technology, clean room technology, automotive and railway engineering, medical and laboratory technology, electronics, computer and office systems, telecommunications, household appliances, heating systems, machinery and installations, drive engineering.

Our products are not intended for use in the aerospace industry!

### Legal and normative specifications

The products described in this catalog are developed and manufactured in accordance with the standards applying to the particular product and, if known, in accordance with the conditions of the particular area of application.

### Standards

Information on standards is provided in the product-specific data sheets.

### EMC

Information on EMC standards is provided in the product-specific data sheets.

Compliance with EMC standards has to be assessed on the final product, as EMC properties may change under different installation conditions.

### Touch current

Information on touch current is provided in the product-specific data sheets.

Measurement is performed according to IEC 60990.

### Approvals

Please contact us if you require a specific type of approval (VDE, UL, GOST, CCC, CSA, etc.) for your ebm-papst product.

Most of our products can be supplied with the applicable approval.

Information on existing approvals is provided in the product-specific data sheets.

### Air performance measurements

All air performance measurements are conducted on intake-side chamber test rigs conforming to the requirements of ISO 5801 and DIN 24163. The fans under test are attached to the measuring chamber with free air intake and exhaust (installation category A) and operated at nominal voltage, with alternating current also at nominal frequency, without any additional attachments such as a guard grill.

As required by the standards, the air performance curves shown are referenced to an air density of  $1.15 \text{ kg/m}^3$ .

# Technical parameters and scope



## Air and sound measurement conditions

Measurements on ebm-papst products are taken under the following conditions:

- Axial and diagonal fans in airflow direction “V” in full nozzle without guard grill
- Backward-curved centrifugal fans, free-running with inlet ring
- Forward-curved single and dual-inlet centrifugal fans with housing
- Backward-curved dual-inlet centrifugal fans with housing

## Sound measurements

All sound measurements are taken in anechoic rooms with reverberant floor. ebm-papst acoustic test chambers meet the requirements of accuracy class 1 as per DIN EN ISO 3745. For sound measurement, the fans being tested are positioned in a reverberant wall and operated at nominal voltage, with alternating current also at nominal frequency, without any additional attachments such as a guard grill.

## Sound pressure and sound power level

All acoustic values are determined in accordance with ISO 13347, DIN 45635 and ISO 3744/3745 as per accuracy class 2 and given in A-rated form.

For measurement of the sound pressure level  $L_p$  the microphone is located on the intake side of the fan being tested, generally at a distance of 1 m on the fan axis.

For measurement of the sound power level  $L_W$  10 microphones are distributed over an enveloping surface on the intake side of the fan being tested (see graphic). The measured sound power level can be roughly calculated from the sound pressure level by adding 7 dB.

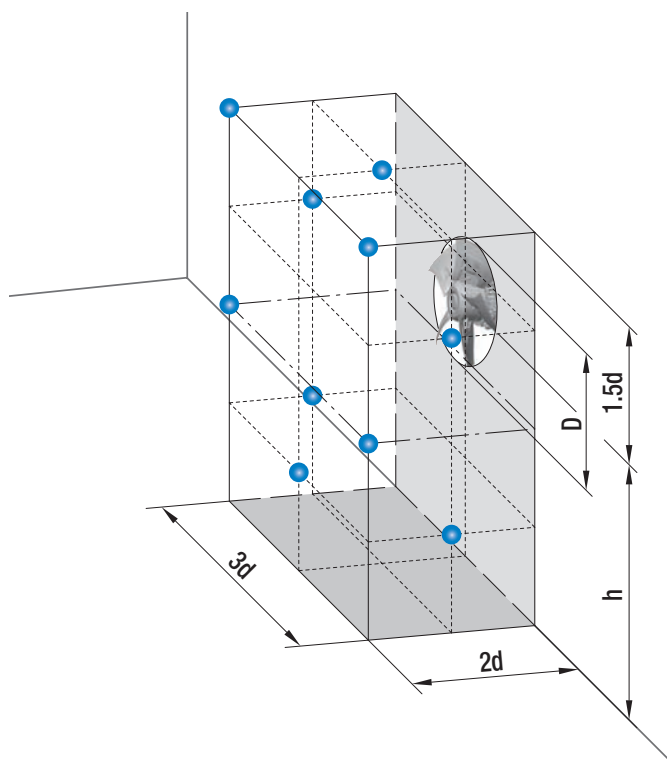
Measurement set-up according to ISO 13347-3 and DIN 45635-38:

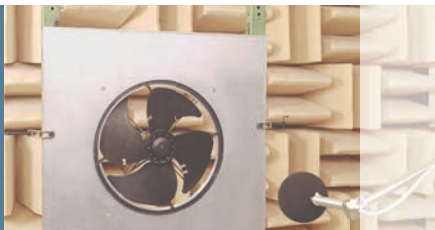
- 10 measuring points

$d \geq D$

$h = 1.5d \dots 4.5d$

Measurement area  $S = 6d^2 + 7d(h + 1.5d)$

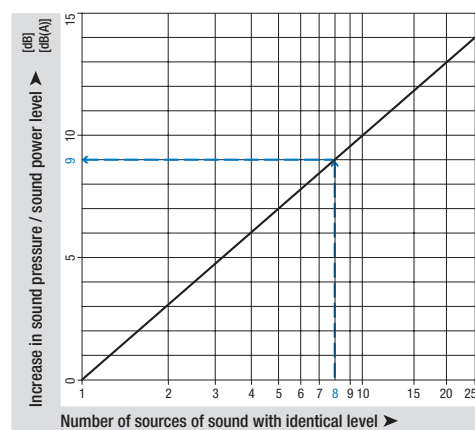




### Cumulative level of several sound sources with the same level

The addition of 2 sound sources with the same level produces a level increase of approx. 3 dB. The noise characteristics of several identical fans can be predicted on the basis of the sound values specified in the data sheet. This is shown in the adjacent graph.

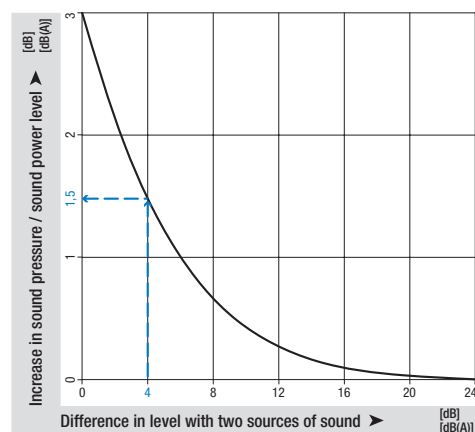
Example: There are 8 axial fans A3G800 on a condenser. According to the data sheet, the sound pressure level of one fan is 75 dB(A). The level increase determined from the graph is 9 dB. This means that a total level of 84 dB(A) is to be expected for the installation.



### Cumulative level of two sound sources with different levels

The noise characteristics of two different fans can be predicted on the basis of the sound values specified in the data sheet. This is shown in the adjacent graph.

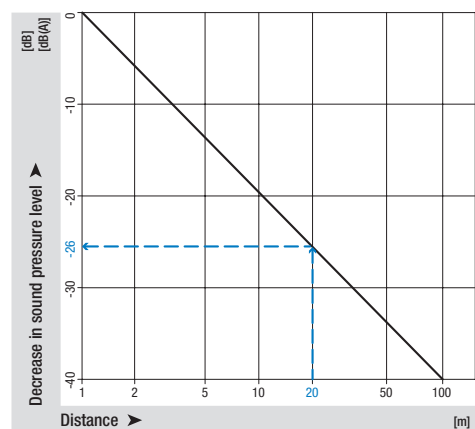
Example: In a ventilation unit, there is one axial fan A3G800 with a sound pressure level of 75 dB(A) at the point of operation and one axial fan A3G710 with 71 dB(A). The difference in level is 4 dB. The level increase of approx. 1.5 dB can now be read off the graph. This means that a total level of 76.5 dB(A) is to be expected for the unit.



### Distance laws

The sound power level is not governed by the distance from the noise source. By contrast, the sound pressure level decreases with increasing distance from the sound source. The adjacent graph shows the decrease in level under far field conditions. Far field conditions apply if there is a considerable distance between the microphone and the fan in relation to the fan diameter and the wavelength under consideration. On account of the complexity of the topic, literature should be consulted for more detailed information on far fields. The level in the far field decreases by 6 dB each time the distance is doubled. Different relationships apply in the near field of the fan and the level may decrease to a far lesser extent. The following example only applies to far field conditions and may vary considerably as a result of installation effects:

For an axial fan A3G300, a sound pressure level of 65 dB(A) was measured at a distance of 1 m. From the adjacent graph, this would yield a reduction of 26 dB at a distance of 20 m, i.e. a sound pressure level of 39 dB(A).



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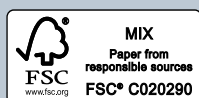
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