

Product Data Sheet 4412FGPR-203

**ebmpapst**

The engineer's choice



4412FGPR-203

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**1 General**

|                                     |                               |  |
|-------------------------------------|-------------------------------|--|
| Fan type                            | Fan                           |  |
| Rotating direction looking at rotor | Counterclockwise - reversible |  |
| Airflow direction                   | Air outlet over struts        |  |
| Bearing system                      | Sleeve bearing                |  |
| Mounting position - shaft           | Any                           |  |

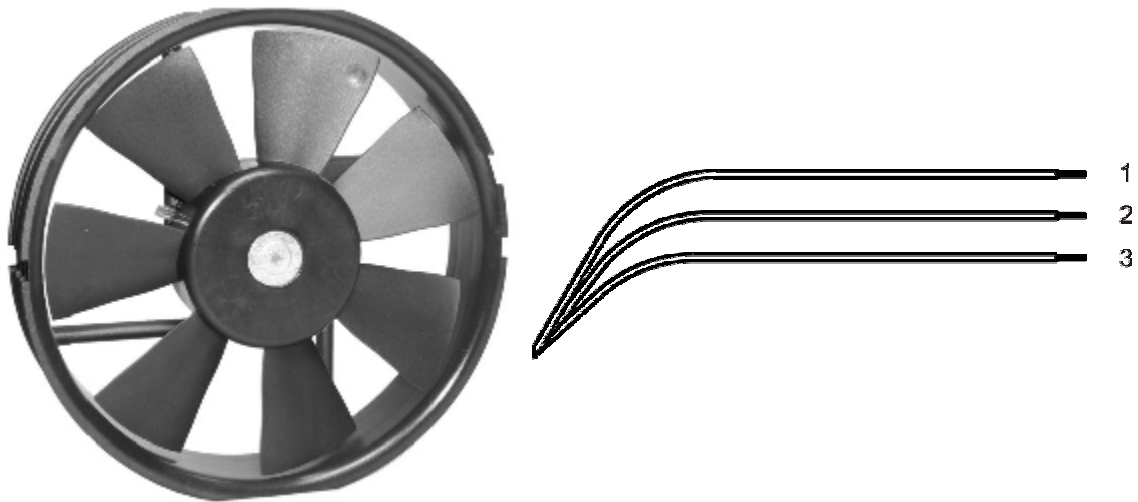
**2 Mechanics**

**2.1 General**

|                   |          |  |
|-------------------|----------|--|
| Depth             | 26,2 mm  |  |
| Diameter          | 127 mm   |  |
| Mass              | 0,175 kg |  |
| Housing material  | Plastic  |  |
| Impeller material | Plastic  |  |

**2.2 Connections**

|                       |            |  |
|-----------------------|------------|--|
| Electrical connection | Wires      |  |
| Lead wire length      | L = 310 mm |  |
| Tolerance             | + - 10 mm  |  |
| Wire size (AWG)       | 24         |  |
| Insulation diameter   | 1,35 mm    |  |



| Wire | Color  | Operation |
|------|--------|-----------|
| 1    | red    | + UB      |
| 2    | blue   | - GND     |
| 3    | violet | PWM       |

### 3 Operating Data

#### 3.1 Electrical Interface - Input

|               |     |
|---------------|-----|
| Control input | PWM |
|---------------|-----|

#### Features

|                 |                |               |
|-----------------|----------------|---------------|
| Input type      | Open collector |               |
| PWM - Frequency |                | 2 kHz - 5 kHz |

|                               |  |
|-------------------------------|--|
| <p><b>Characteristics</b></p> |  |
| <p><b>Schematics</b></p>      |  |

Fan with reversed rotating direction Setpoint: 0% - 50% air outlet over struts / Setpoint: 50% - 100% air intake over struts

### 3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m<sup>3</sup>; Temperature 23°C +/- 3°C; Motor axis horizontal; warm-up time before measuring 5 minutes (unless otherwise specified). In the intake and outlet area should not be any solid obstruction within 0,5 m.

$\Delta p = 0$ : corresp. to free air flow (see chapter aerodynamics)  
 I: corresp. to arithm. mean current value

| Name     | Condition    |          |          |
|----------|--------------|----------|----------|
| PWM 0001 | PWM: <= 5 %; | f: 2 kHz | f: 5 kHz |

**Rotational direction, looking at Rotor: left (air outlet over struts)**

Rotational direction, looking at Rotor: left (air outlet over struts)

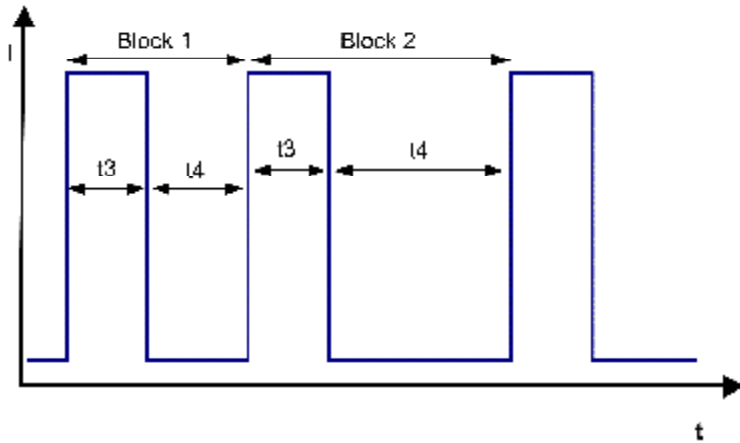
Rotational direction, looking at Rotor: right (air intake over struts)

Rotational direction, looking at Rotor: right (air intake over struts)

| Features                     | Condition      | Symbol         | Values      |             |             |
|------------------------------|----------------|----------------|-------------|-------------|-------------|
| Voltage range                |                | U              | 9,5 V       |             | 12,6 V      |
| Nominal voltage              |                | U <sub>N</sub> |             | 12,0 V      |             |
| Power consumption            | $\Delta p = 0$ | P              | 1,9 W       | 1,9 W       | 2 W         |
| Tolerance                    | PWM 0010       |                | +/- 25,0 %  | +/- 25,0 %  | +/- 25,0 %  |
| Current consumption          | $\Delta p = 0$ | I              | 200 mA      | 160 mA      | 160 mA      |
| Tolerance                    | PWM 0010       |                | +/- 25,0 %  | +/- 25,0 %  | +/- 25,0 %  |
| Speed                        | $\Delta p = 0$ | n              | 2.750 1/min | 2.750 1/min | 2.750 1/min |
| Tolerance                    | PWM 0010       |                | +/- 12,5 %  | +/- 4,0 %   | +/- 4,0 %   |
| Starting current consumption |                |                |             | 920 mA      |             |

### 3.3 Electrical Features

|   |                                   |  |
|---|-----------------------------------|--|
| Electronic function                     | Speed-Controlled                  |  |
| Reversed polarity protection            | Rectifying diode                  |  |
| Max. residual current at U <sub>N</sub> | I <sub>F</sub> < 50 uA            |  |
| Locked rotor protection                 | Auto restart                      |  |
| Locked rotor current at U <sub>N</sub>  | I <sub>block</sub> approx. 920 mA |  |



Special locked rotor protection: Block1:  $t_3 / t_4 = 0,6 \text{ s} / 0,3 \text{ s}$ ; Block2: locked rotor protection  $t_3 / t_4 = 0,6 \text{ s} / 10 \text{ s}$

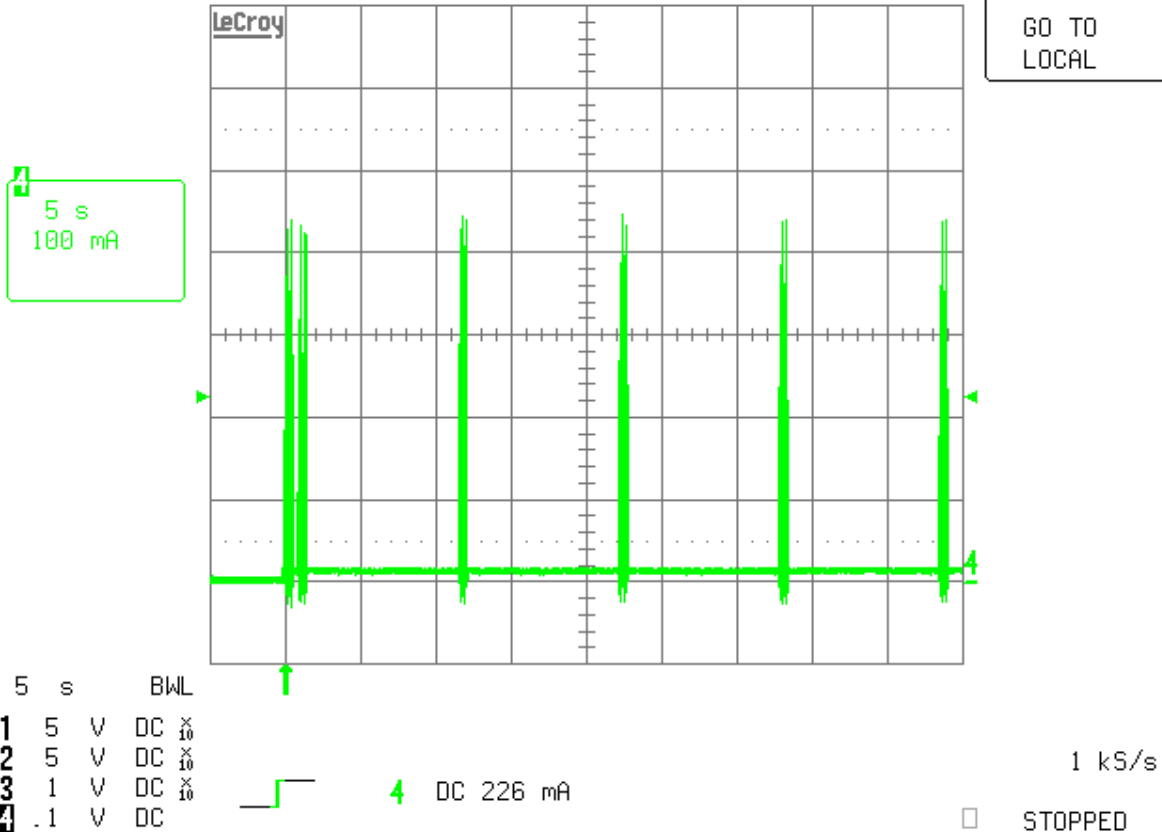
The fan has a two constant blocking cycle. The behavior of this cycle differs marginally between a blocked rotor when the fan gets started and a blocked rotor during the running operation of the fan. The following figures describe this characteristic.

1. Blocked rotor at the start of the fan

5-Apr-12  
14:27:45

REMOTE ENABLE

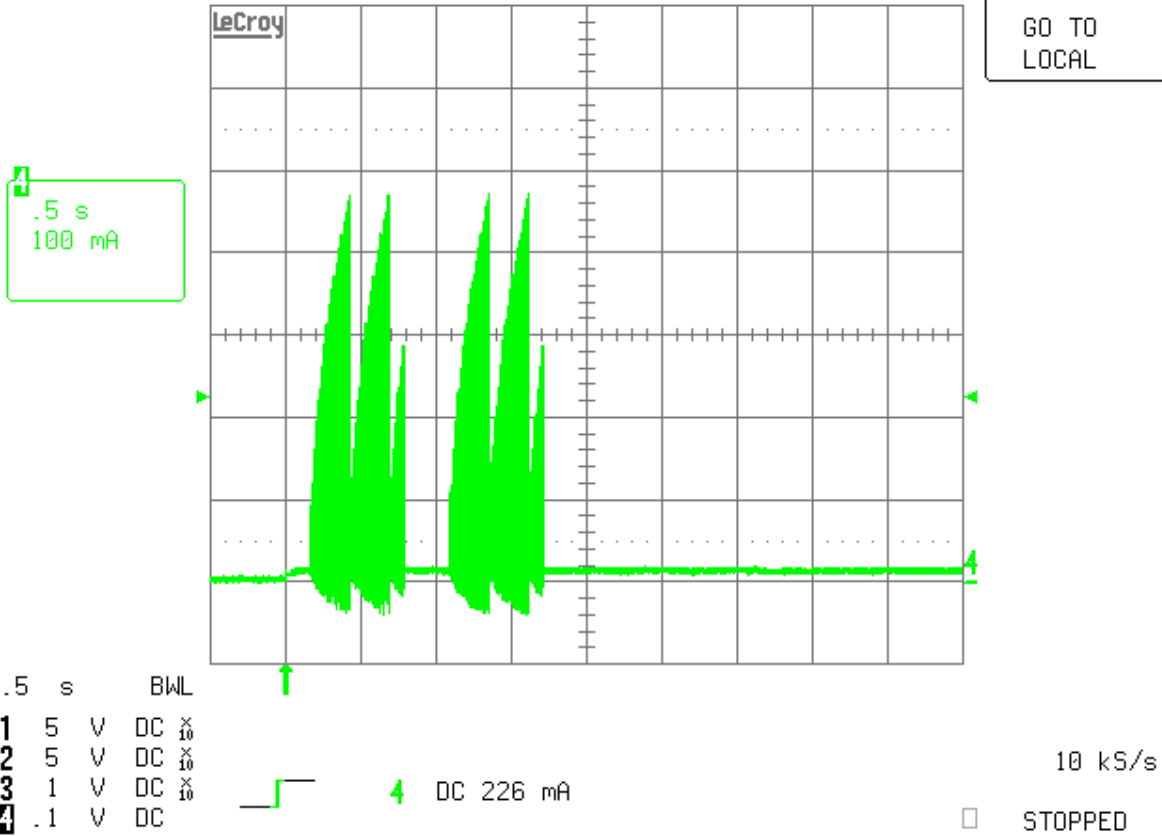
GO TO LOCAL



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GO TO LOCAL

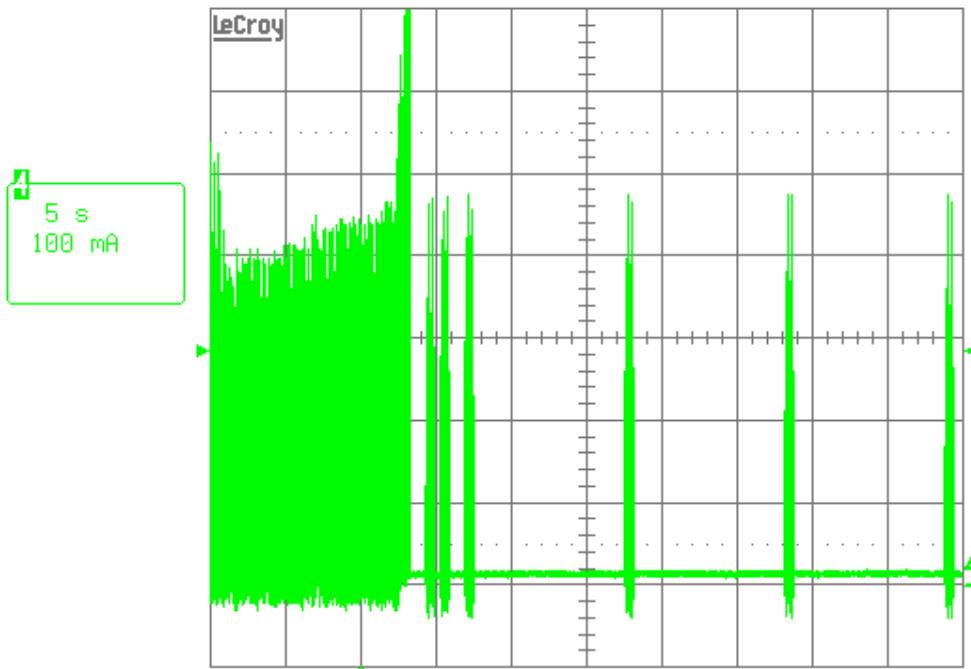


2. Blocked rotor after the normal operation of the fan  
The internal software measures if the fan has been blocked. In this case the second current pulse starts 1 sec later then in case 1.

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14:32:49

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GO TO LOCAL



|   | 5 s  | BWL            |
|---|------|----------------|
| 1 | 5 V  | DC $\times 10$ |
| 2 | 5 V  | DC $\times 10$ |
| 3 | 1 V  | DC $\times 10$ |
| 4 | .1 V | DC             |



4 DC 286 mA

1 kS/s

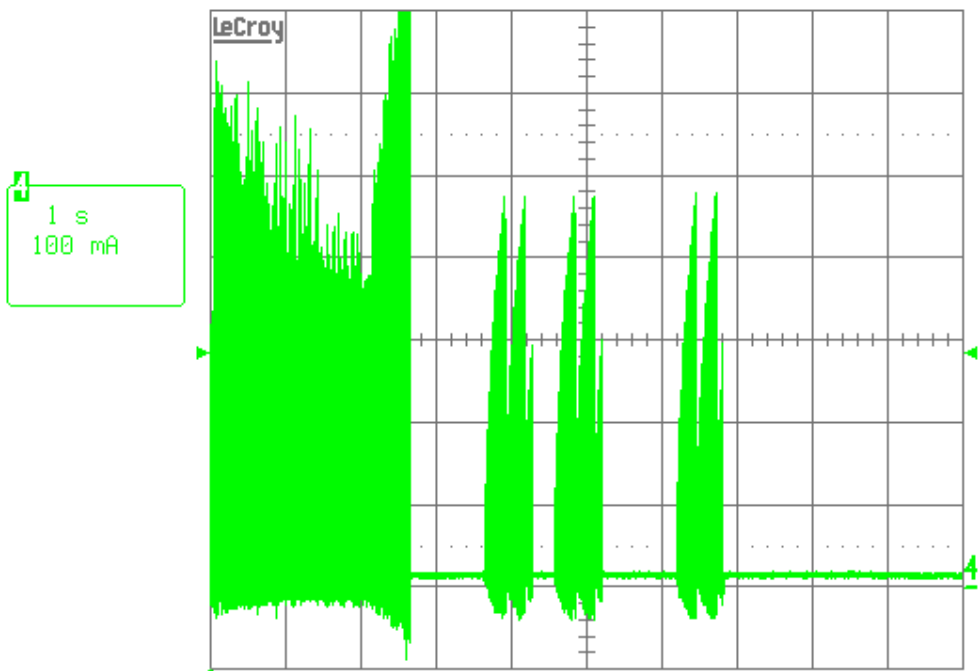
STOPPED



5-Apr-12  
14:34:45

REMOTE ENABLE

GO TO LOCAL



|   | 1  | s | BWL            |
|---|----|---|----------------|
| 1 | 5  | V | DC $\times 10$ |
| 2 | 5  | V | DC $\times 10$ |
| 3 | 1  | V | DC $\times 10$ |
| 4 | .1 | V | DC             |



4 DC 286 mA

5 kS/s

STOPPED

### 3.4 Aerodynamics

Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801.  
 Normal air density = 1,2 kg/m<sup>3</sup>; Temperature 23°C +/- 3°C;  
 In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.  
 The information is only valid under the specified test conditions and may be changed by the installation conditions. If there are deviations from the standard test conditions, the characteristic values must be checked under the installed conditions.

a.) Operation condition:

|                              |             |          |          |
|------------------------------|-------------|----------|----------|
| 2.750 1/min at free air flow | PWM <= 5 %; | f: 2 kHz | f: 5 kHz |
|------------------------------|-------------|----------|----------|

|   |                         |  |
|---|-------------------------|--|
| Max. free-air flow ( $\Delta p = 0 / \dot{V} = \text{max.}$ )   | 120,0 m <sup>3</sup> /h |  |
| Max. static pressure ( $\Delta p = \text{max.} / \dot{V} = 0$ ) | 64 Pa                   |  |

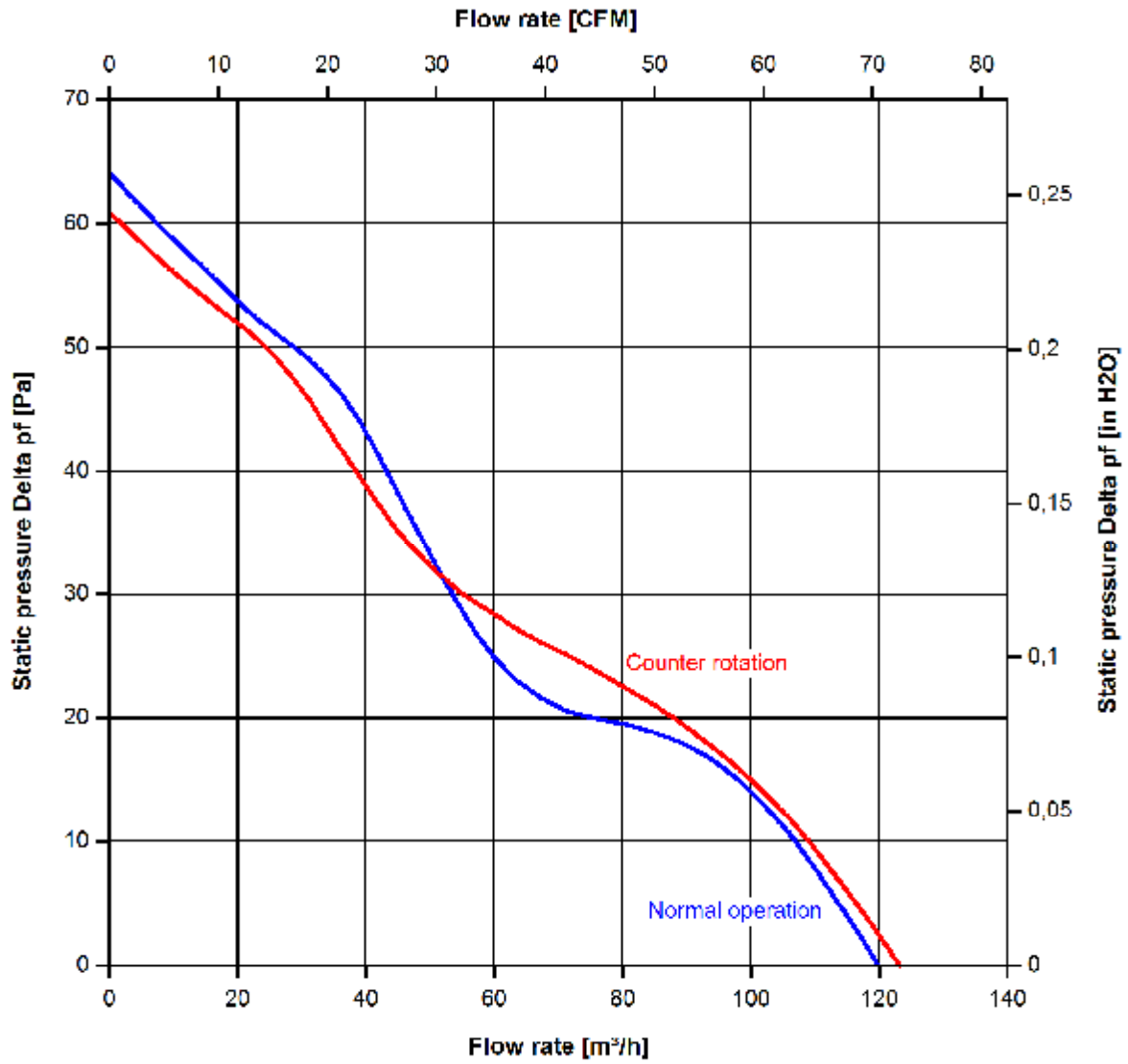
#### Rotation in normal direction.

b.) Operation condition:

|                              |           |          |          |
|------------------------------|-----------|----------|----------|
| 1.000 1/min at free air flow | PWM 43 %; | f: 2 kHz | f: 5 kHz |
|------------------------------|-----------|----------|----------|

|   |                         |  |
|---|-------------------------|--|
| Max. free-air flow ( $\Delta p = 0 / \dot{V} = \text{max.}$ )   | 123,0 m <sup>3</sup> /h |  |
| Max. static pressure ( $\Delta p = \text{max.} / \dot{V} = 0$ ) | 61 Pa                   |  |

#### Counter rotation.



### 3.5 Sound Data

Measurement conditions: Sound pressure level: 1 meter distance between microphone and the air intake.  
 Sound power level: Acc. to DIN 45635 part 38 (ISO 10302) Sound power level: Acc. to DIN 45635 part 38 (ISO 10302)  
 Measured in a semianchoic chamber with a background noise level of  $L_p(A) < 5 \text{ dB(A)}$   
 For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

|                              |                   |          |          |
|------------------------------|-------------------|----------|----------|
| 2.750 1/min at free air flow | PWM $\leq 5 \%$ ; | f: 2 kHz | f: 5 kHz |
|------------------------------|-------------------|----------|----------|

|   |                                |  |
|---|--------------------------------|--|
| Optimal operating point   | 94,0 m <sup>3</sup> /h @ 15 Pa |  |
| Sound power level at the optimal operating point                | 4,9 bel(A)                     |  |
| Sound pressure level at free air flow, measured in rubber bands | 33,0 dB(A)                     |  |

b.) Operation condition:

|                              |           |          |          |
|------------------------------|-----------|----------|----------|
| 1.000 1/min at free air flow | PWM 43 %; | f: 2 kHz | f: 5 kHz |
|------------------------------|-----------|----------|----------|

|   |                                |  |
|---|--------------------------------|--|
| Optimal operating point   | 94,0 m <sup>3</sup> /h @ 17 Pa |  |
| Sound power level at the optimal operating point                | 5,7 bel(A)                     |  |
| Sound pressure level at free air flow, measured in rubber bands | 45,0 dB(A)                     |  |

## 4 Environment

### 4.1 General

|  |        |  |
|--|--------|--|
| Min. permitted ambient temperature TU min. | -20 °C |  |
| Max. permitted ambient temperature TU max. | 60 °C  |  |
| Min. permitted storage temperature TL min. | -40 °C |  |
| Max. permitted storage temperature TL max. | 80 °C  |  |

### 4.2 Climatic Requirements

|                       |  |  |
|-----------------------|--|--|
| Humidity requirements | humid heat, cyclic; according to DIN EN 60068-2-30, 6 cycle            |  |
| Water exposure        | None   |  |
| Dust requirements     | Dust check; according to DIN EN 60068-2-68, 6g/m <sup>2</sup> d, 1 day |  |
| Salt fog requirements | None   |  |

Permitted application area:

The product is for the use in sheltered rooms with limited controlled temperature. Occasionally condensed water is allowed. Direct exposure to water must be avoided. Saline ambient conditions must be avoided.

Pollution degree 2 (according DIN EN 60664-1)

It occurs only non-conductive pollution. Occasionally, temporary conductivity caused by condensation occurs.

Please require severity levels and specification parameters from the responsible development departments.

## 5 Safety

### 5.1 Electrical Safety

|  |                  |  |
|--|------------------|--|
| Dielectric strength<br>DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700)<br>A.) Type test<br>Measuring conditions: After 48h of storage at 95% R.H. and 25°C.<br>No arcing or breakdown is allowed!<br>All connections together to ground. | 500 VAC / 1 Min. |  |
| B.) Routine test<br>Measuring conditions: At indoor climate.<br>No arcing or breakdown is allowed!<br>All connections together to ground.  | 500 VAC / 1 Sec. |  |
| Isolation resistance<br>Measuring conditions: After 48h of storage at 95% R.H. and 25°C measured with U=500 VDC for 1 min.   | RI > 10 MOhm     |  |
| Clearance / creepage distance  | 1,0 mm / 1,2 mm  |  |
| Protection class   | III              |  |

### 5.2 Approval Tests

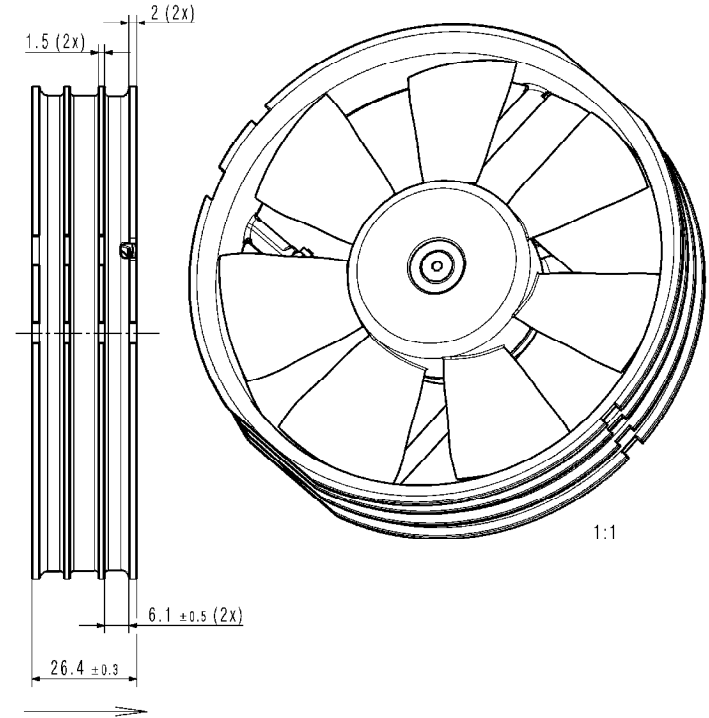
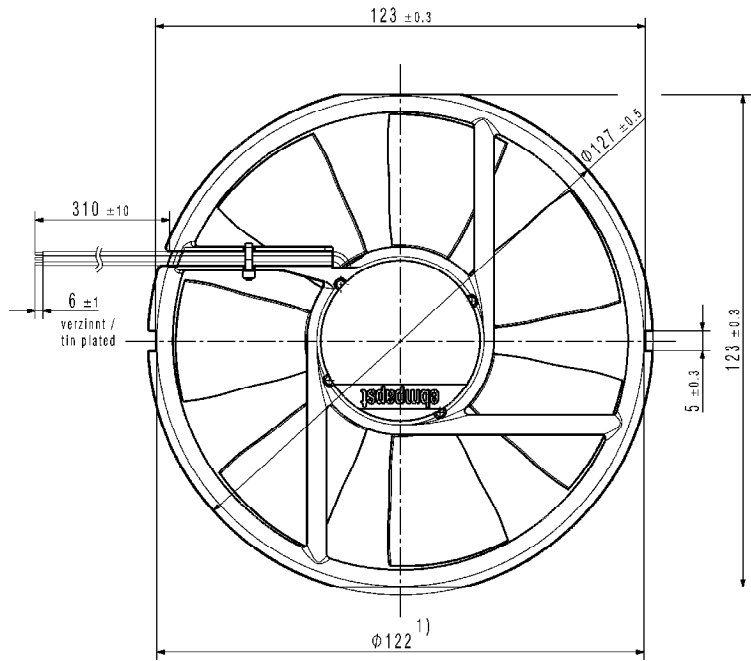
|     |   |   |
|-----|---|---|
| CE  | EC Declaration of Conformity  | Yes   |
| EAC | Eurasian Conformity   | Yes   |
| UL  | Underwriters Laboratories   | Yes / UL507, Electric Fans  |
| VDE | Association for Electrical, Electronic and Information Technologies | Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment |
| CSA | Canadian Standards Association                                      | Yes / C22.2 No. 113 Fans and Ventilators                                      |
| CCC | China Compulsory Certification                                      | Not applicable  |

## 6 Reliability

### 6.1 General

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Schwermetalle nach DIN EN 12000 beschränkt!  
Refer to pre-qualified model EN 12000-1



Hauptförderichtung (umkehrbar) /  
Main direction of flow (reversible)

- Axialspiel bei Kugellagerung (K): 0 (mit Federausgleich)
- Axialspiel bei Gleitlagerung (G): 0,1-0,6
- 1) MaB für Montagewand
- Axial clearance with ball bearings (K): 0 (with spring compensation)
- Axial clearance with sleeve bearing (G): 0,1-0,6
- 1) Dimension for mounting wall

|  |  |  |  |
|--|--|--|--|
| SAP-Status/Status<br>Art.-Nr. / Charge No.<br>CATA-System-Version / CATA-System-Version<br>CAD-Umgebung / CAD-Umfeldpunkt<br>BES600199 CPM000            |  | Werkstoff / Material:<br>Volumen / Volume (cm³):<br>Gewicht / Mass (kg):                                 |  |
| 3D-Referenzcode1 / 3D-Referenzcode2<br>Datum<br>Name   |  | Artikel / Title:<br>Zeich.-Nr. / Drawing No.:<br>Erg.-f.Zeich. / Replaces:                               |  |
| Tolerierung / Tolerances:<br>Allgemeintoleranzen / Gen. Tolerances:<br>Maß / Dimension<br>Form / Shape<br>Fertigung / Production<br>Toleranz / Tolerance |  | Zeichentyp / Type of Document<br>Blatt / Page<br>Index / Index<br>Format / Size:<br>Maßstab / Scale: 1:2 |  |
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