



The engineer's choice

**ebm**papst

**8214 J/2H4P****INDEX**

|          |                                                     |           |
|----------|-----------------------------------------------------|-----------|
| <b>1</b> | <b>General .....</b>                                | <b>3</b>  |
| <b>2</b> | <b>Mechanics .....</b>                              | <b>3</b>  |
| 2.1      | General .....                                       | 3         |
| 2.2      | Connections .....                                   | 3         |
| <b>3</b> | <b>Operating Data .....</b>                         | <b>5</b>  |
| 3.1      | Operating Data - Electrical Interface - Input ..... | 5         |
| 3.2      | Electrical Operating Data .....                     | 6         |
| 3.3      | Operating Data - Electrical Interface -Output ..... | 7         |
| 3.4      | Electrical Features .....                           | 8         |
| 3.5      | Aerodynamic .....                                   | 9         |
| 3.6      | Sound Data .....                                    | 10        |
| <b>4</b> | <b>Environment .....</b>                            | <b>10</b> |
| 4.1      | General .....                                       | 10        |
| 4.2      | Climatic requirements*) .....                       | 10        |
| 4.3      | Mechanical requirements .....                       | 10        |
| <b>5</b> | <b>Safety .....</b>                                 | <b>11</b> |
| 5.1      | Electrical Safety .....                             | 11        |
| 5.2      | Approval Tests .....                                | 11        |
| <b>6</b> | <b>Reliability .....</b>                            | <b>11</b> |
| 6.1      | General .....                                       | 11        |

**1 General**

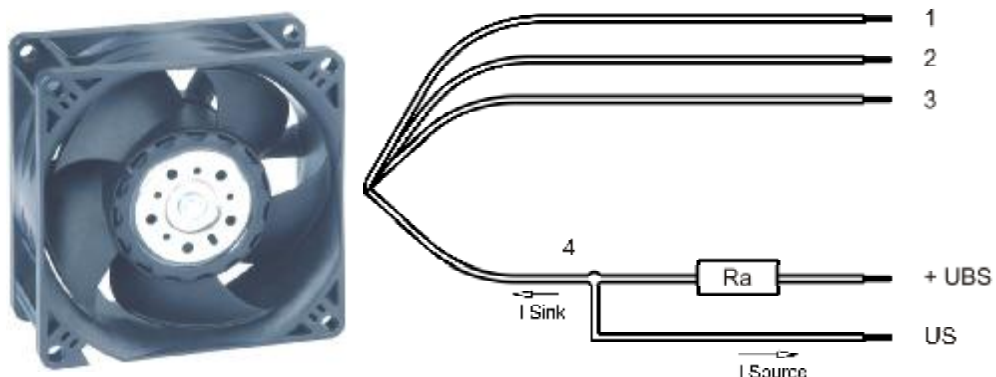
|                                       |                        |  |
|---------------------------------------|------------------------|--|
| Fan type                              | Fan                    |  |
| Rotational direction looking at rotor | counterclockwise       |  |
| Airflow direction                     | Air outlet over struts |  |
| Bearing system                        | Ball bearing           |  |
| Mounting position                     | any                    |  |

**2 Mechanics****2.1 General**

|                                                       |                                                                         |  |
|-------------------------------------------------------|-------------------------------------------------------------------------|--|
| Width                                                 | 80,0 mm                                                                 |  |
| Height                                                | 80,0 mm                                                                 |  |
| Depth                                                 | 38,0 mm                                                                 |  |
| Weight                                                | 0,210 kg                                                                |  |
| Housing material                                      | Plastic                                                                 |  |
| Impeller material                                     | Plastic                                                                 |  |
| Max. torque when mounted across both mounting flanges | wire outlet corner: 50 Ncm<br>remaining corners: 110 Ncm                |  |
| Screw size                                            | ISO 4762 - M4 degreased, without an additional brace and without washer |  |

**2.2 Connections**

|                       |             |  |
|-----------------------|-------------|--|
| Electrical connection | Wires       |  |
| Length of lead wire   | 310 mm      |  |
| Tolerance             | + - 10,0 mm |  |
| Wire gauge (AWG)      | 22          |  |
| Insulation diameter   | 1,30 mm     |  |
| Contact               | see drawing |  |



|        | Colour | Operation |
|--------|--------|-----------|
| Wire 1 | red    | + UB      |
| Wire 2 | blue   | - GND     |
| Wire 3 | violet | PWM       |
| Wire 4 | white  | Tacho     |

The auxiliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

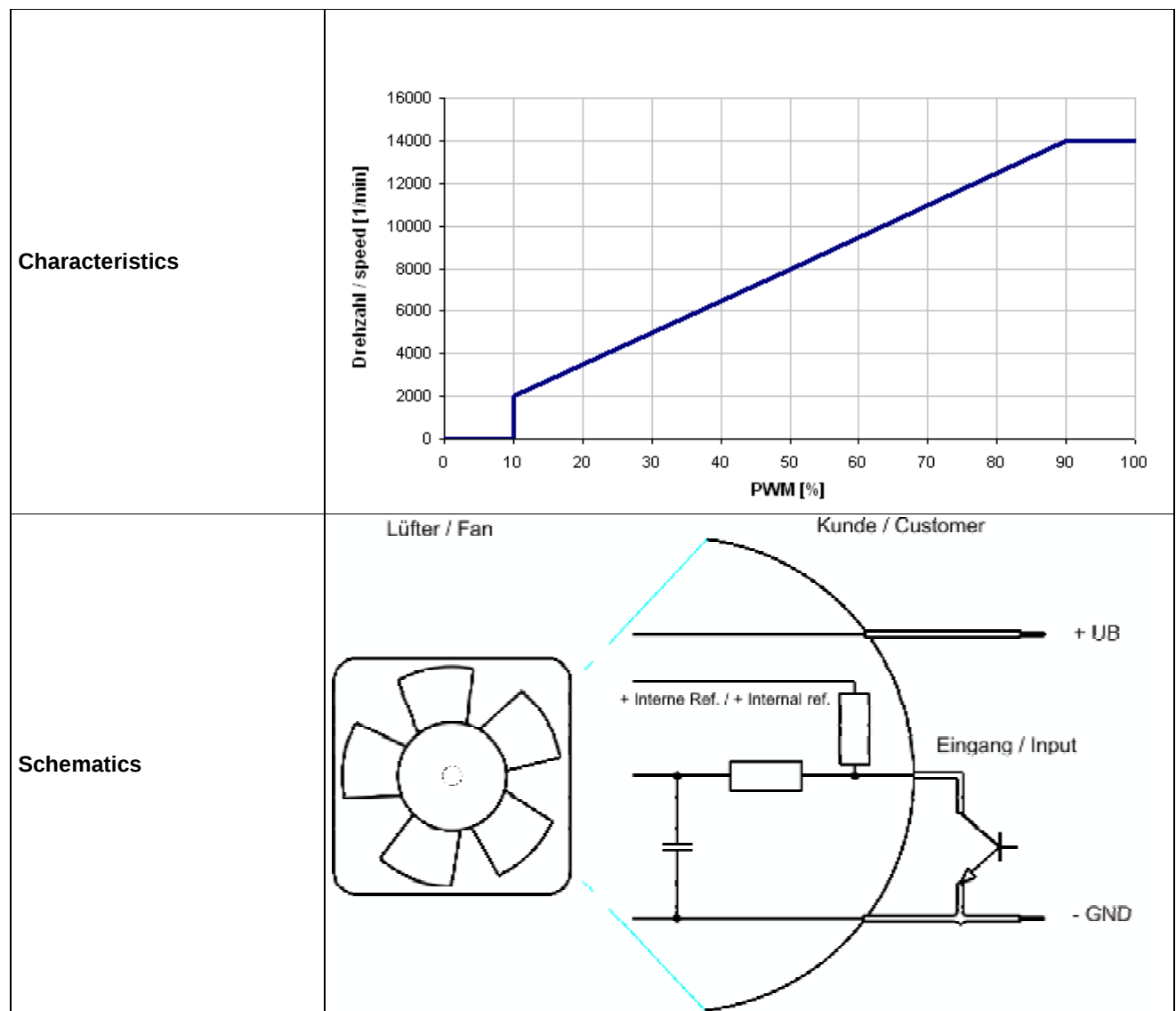
### 3 Operating Data

#### 3.1 Operating Data - Electrical Interface - Input

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

##### Features

|                 |                |               |
|-----------------|----------------|---------------|
| Input type      | Open collector |               |
| PWM - Frequency |                | 1 kHz - 5 kHz |



Speed controll: 0... 100 %, PWM-Low < 0,2 V

### 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 section 3.5)  
 I: corresp. to arithm. mean current value

| Name     | Condition   |          |          |
|----------|-------------|----------|----------|
| PWM 0001 | PWM: 100 %; | f: 1 kHz | f: 5 kHz |

| Features                     | Condition      | Symbol | Values      |              |              |
|------------------------------|----------------|--------|-------------|--------------|--------------|
| Voltage range                | $\Delta p = 0$ | U      | 12,0 V      |              | 27,6 V       |
| Nominal voltage              | $\Delta p = 0$ | $U_N$  |             | 24,0 V       |              |
| Power consumption            | $\Delta p = 0$ | P      | 8,8 W       | 38,0 W       | 39,0 W       |
| Tolerance                    | PWM 0001       |        | +/- 17,5 %  | +/- 17,5 %   | +/- 25,0 %   |
| Current consumption          | $\Delta p = 0$ | I      | 750 mA      | 1.600 mA     | 1.400 mA     |
| Tolerance                    | PWM 0001       |        | +/- 17,5 %  | +/- 17,5 %   | +/- 25,0 %   |
| Speed                        | $\Delta p = 0$ | n      | 8.500 1/min | 14.000 1/min | 14.000 1/min |
| Tolerance                    | PWM 0001       |        | +/- 12,5 %  | +/- 7,5 %    | +/- 3,0 %    |
| Starting current consumption |                |        |             | 6.000 mA     |              |
| Inrush current               |                |        |             | 29.000 mA    |              |

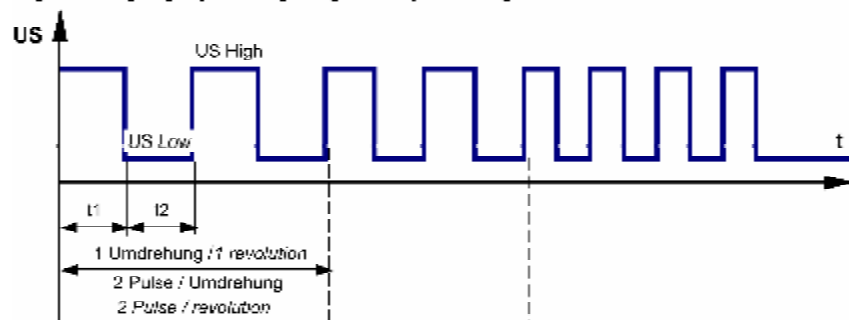
| Name     | Condition  |          |          |
|----------|------------|----------|----------|
| PWM 0002 | PWM: 50 %; | f: 1 kHz | f: 5 kHz |

| Features            | Condition      | Symbol | Values      |             |             |
|---------------------|----------------|--------|-------------|-------------|-------------|
| Voltage range       | $\Delta p = 0$ | U      | 12,0 V      |             | 27,6 V      |
| Nominal voltage     | $\Delta p = 0$ | $U_N$  |             | 24,0 V      |             |
| Power consumption   | $\Delta p = 0$ | P      | 7,1 W       | 8,5 W       | 9,4 W       |
| Tolerance           | PWM 0002       |        | +/- 17,5 %  | +/- 25,0 %  | +/- 25,0 %  |
| Current consumption | $\Delta p = 0$ | I      | 600 mA      | 355 mA      | 340 mA      |
| Tolerance           | PWM 0002       |        | +/- 17,5 %  | +/- 25,0 %  | +/- 25,0 %  |
| Speed               | $\Delta p = 0$ | n      | 7.700 1/min | 8.000 1/min | 8.000 1/min |
| Tolerance           | PWM 0002       |        | +/- 12,5 %  | +/- 5,0 %   | +/- 5,0 %   |

### 3.3 Operating Data - Electrical Interface -Output

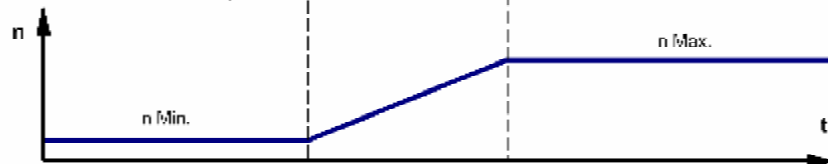
|            |                     |
|------------|---------------------|
| Tacho type | /2 (Open collector) |
|------------|---------------------|

Signal-Ausgangsspannung / Signal output voltage



$$R_a = \frac{U_{BS} - U_{S \text{ Low}}}{I_{\text{Sink}}}$$

Lüfter-Drehzahl / Fan speed



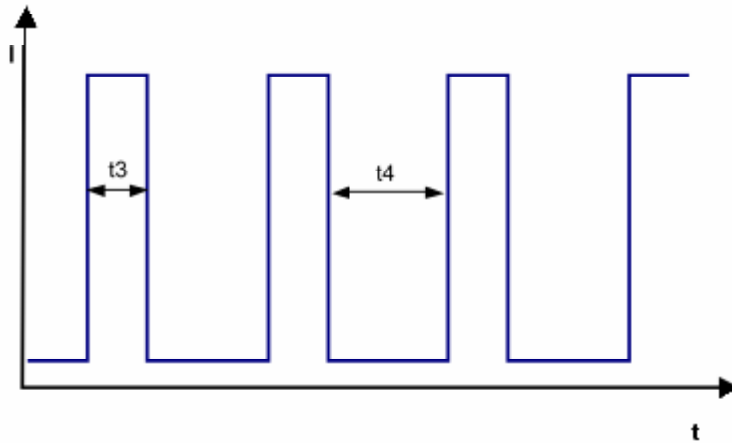
| Features                      | Note                                                                           | Values                         |
|-------------------------------|--------------------------------------------------------------------------------|--------------------------------|
| Tacho operating voltage (UBS) |                                                                                | $\leq 60,0 \text{ V}$          |
| Tacho signal Low              | I sink: 2 mA                                                                   | $\leq 0,4 \text{ V}$           |
| Tacho signal High             | I source: 0 mA                                                                 | $\leq 60,0 \text{ V}$          |
| Maximum sink current          |                                                                                | $\leq 4 \text{ mA}$            |
| External resistor             | External resistor $R_a$ from UBS to US required. All voltages measured to GND. |                                |
| Tacho frequency               | $(2 \times n) / 60$                                                            |                                |
| Tacho isolated from motor     | No                                                                             |                                |
| Slew rate                     |                                                                                | $\Rightarrow 0,5 \text{ V/us}$ |

|            |      |
|------------|------|
| Alarm type | None |
|------------|------|

### 3.4 Electrical Features

|                                        |                           |  |
|----------------------------------------|---------------------------|--|
| Electronic function                    | Speed-Controlled          |  |
| Reversed polarity protection           | Rectifying diode          |  |
| Max. residual current at $U_n$         | $I_F \leq 150 \text{ uA}$ |  |
| Locked rotor protection                | Auto restart              |  |
| Locked rotor current at $U_n$          | approx. 6.000 mA          |  |
| Clock signal $t_3/t_4$ at locked rotor | Typical: 0,5 s / 10,0 s   |  |



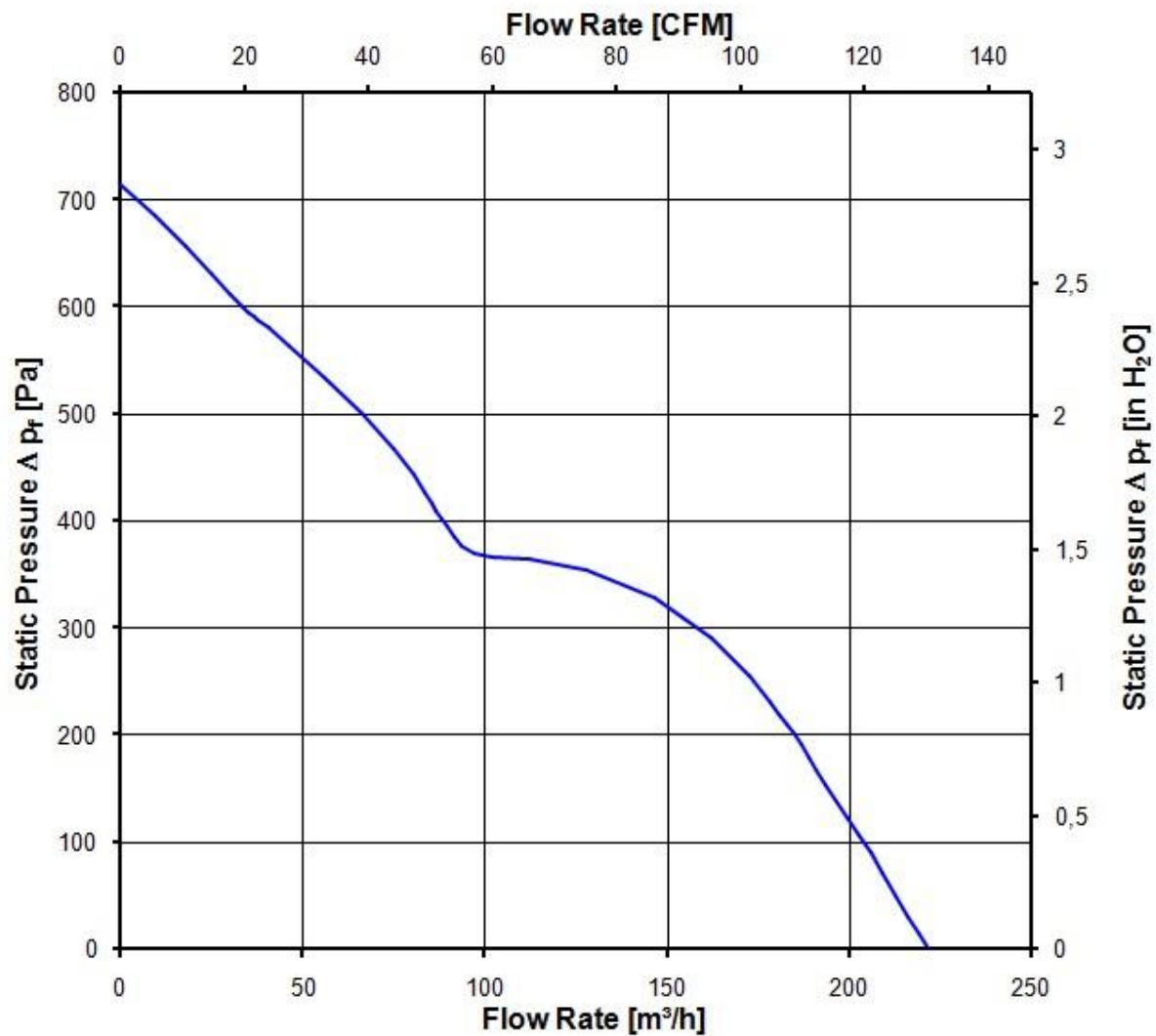
### 3.5 Aerodynamic

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.

a.) Operation condition:

|                               |            |          |          |
|-------------------------------|------------|----------|----------|
| 14.000 1/min at free air flow | PWM 100 %; | f: 1 kHz | f: 5 kHz |
|-------------------------------|------------|----------|----------|

|                                                                   |                         |  |
|-------------------------------------------------------------------|-------------------------|--|
| Max. free-air flow ( $\Delta p = 0$ / $\dot{V} = \text{max.}$ )   | 220,0 m <sup>3</sup> /h |  |
| Max. static pressure ( $\Delta p = \text{max.}$ / $\dot{V} = 0$ ) | 710 Pa                  |  |



### 3.6 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)  
 Measured in a semianchoic chamber with a background noise level of  $L_p(A) < 5 \text{ dB(A)}$   
 For further measurement conditions see section 3.5

a.) Operation condition:

|                               |           |                      |                     |
|-------------------------------|-----------|----------------------|---------------------|
| 14.000 1/min at free air flow | PWM 100 % | PWM min.: ; f: 1 kHz | PWM max.:; f: 5 kHz |
|-------------------------------|-----------|----------------------|---------------------|

|                                                                 |                     |  |
|-----------------------------------------------------------------|---------------------|--|
| Optimal operating point                                         | 135,0 m3/h @ 330 Pa |  |
| Sound power level at the optimal operating point                | 8,0 bel(A)          |  |
| Sound pressure level at free air flow, measured in rubber bands | 71,0 dB(A)          |  |

## 4 Environment

### 4.1 General

|                                            |        |  |
|--------------------------------------------|--------|--|
| Min. permitted ambient temperature TU min. | -20 °C |  |
| Max. permitted ambient temperature TU max. | 70 °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, constant; according to DIN EN 60068-2-78, 14 days |  |
| Water exposure           | None                                                          |  |
| Radiation exposure       | None                                                          |  |
| Dust requirements        | None                                                          |  |
| Salt fog requirements    | None                                                          |  |
| Harmful gas requirements | None                                                          |  |

\*) Permitted application area:

The product is intended for use in sheltered rooms with controlled temperature and controlled humidity. Directly exposure to water must be avoided.

Pollution degree 1 (according DIN EN 60664-1)

There is either no pollution or it occurs only dry, non-conductive pollution. The pollution has no negative impact.

### **Mechanical requirements**

## 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.<br>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 Min.<br><br>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                             |  |
| Air and leakage distances                                                                                                                                                                                                                                                                                                                                                                 | 1,0 mm / 1,2 mm                          |  |
| Protection class                                                                                                                                                                                                                                                                                                                                                                          | III                                      |  |

### 5.2 Approval Tests

|     |                                                                               |
|-----|-------------------------------------------------------------------------------|
| CE  | No                                                                            |
| UL  | Yes / UL507, Electric Fans                                                    |
| VDE | Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment |
| CSA | Yes / C22.2 No. 113 Fans and Ventilators                                      |
| CCC | No                                                                            |

The approval tests are observed to:

U approval max.: 26,4 V @ TU approval max.: 70,0 °C

## 6 Reliability

### 6.1 General

|                                   |           |  |
|-----------------------------------|-----------|--|
| Life expectancy L10 at TU = 40 °C | 50.000 h  |  |
| Life expectancy L10 at TU max.    | 25.000 h  |  |
| Life expectancy L10 Delta (40 °C) | 100.000 h |  |