

Product Data Sheet 2218F/2TDH4PU

ebmpapst

The engineer's choice



2218F/2TDH4PU**INDEX**

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1 General

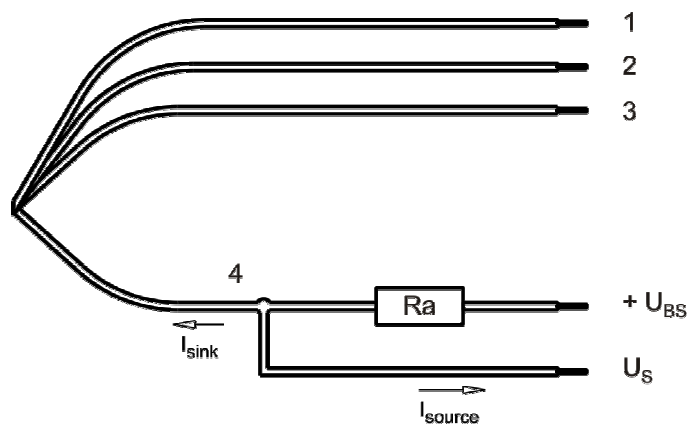
| | | |
|-------------------------------------|-------------------------|--|
| Fan type | Fan | |
| Rotating direction looking at rotor | Counterclockwise | |
| Airflow direction | Air outlet over struts | |
| Bearing system | Stainless steel bearing | |
| Mounting position - shaft | Any | |

2 Mechanics**2.1 General**

| | | |
|-------------------|---------|--|
| Width | 200 mm | |
| Height | 200 mm | |
| Depth | 51,0 mm | |
| Diameter | 220 mm | |
| Mass | 1,0 kg | |
| Housing material | Metal | |
| Impeller material | Plastic | |

2.2 Connections

| | | |
|-----------------------|------------|--|
| Electrical connection | Wires | |
| Lead wire length | L = 400 mm | |
| Tolerance | + - 10 mm | |
| Tube length | S = 10 mm | |
| Tolerance | + - 2,0 mm | |



| Wire | Color | Operation | Wire size | Insulation diameter |
|------|--------|-----------|-----------|---------------------|
| 1 | red | + UB | AWG 20 | 2,05 mm |
| 2 | blue | - GND | AWG 20 | 2,05 mm |
| 3 | violet | PWM | AWG 22 | 1,3 mm |
| 4 | white | Tacho | AWG 22 | 1,3 mm |

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

Lead wire 1 - 2: AWG20 (Insulation diameter 2,05mm)

Lead wire 3 - 4: AWG22

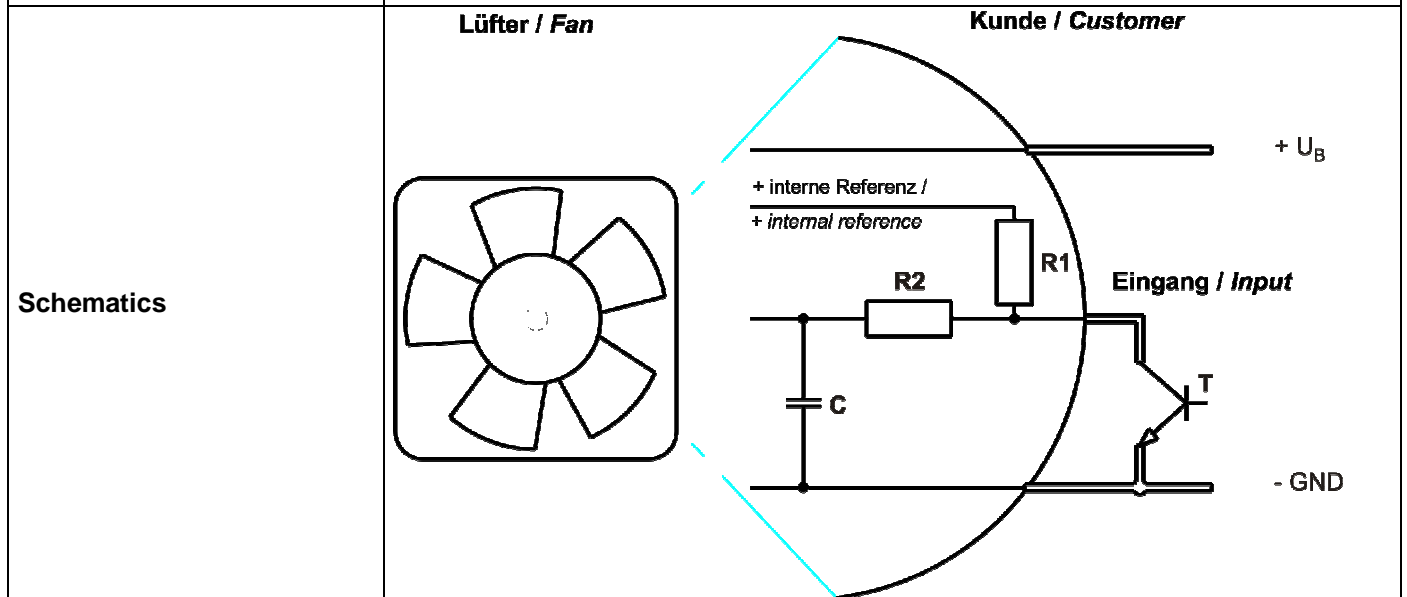
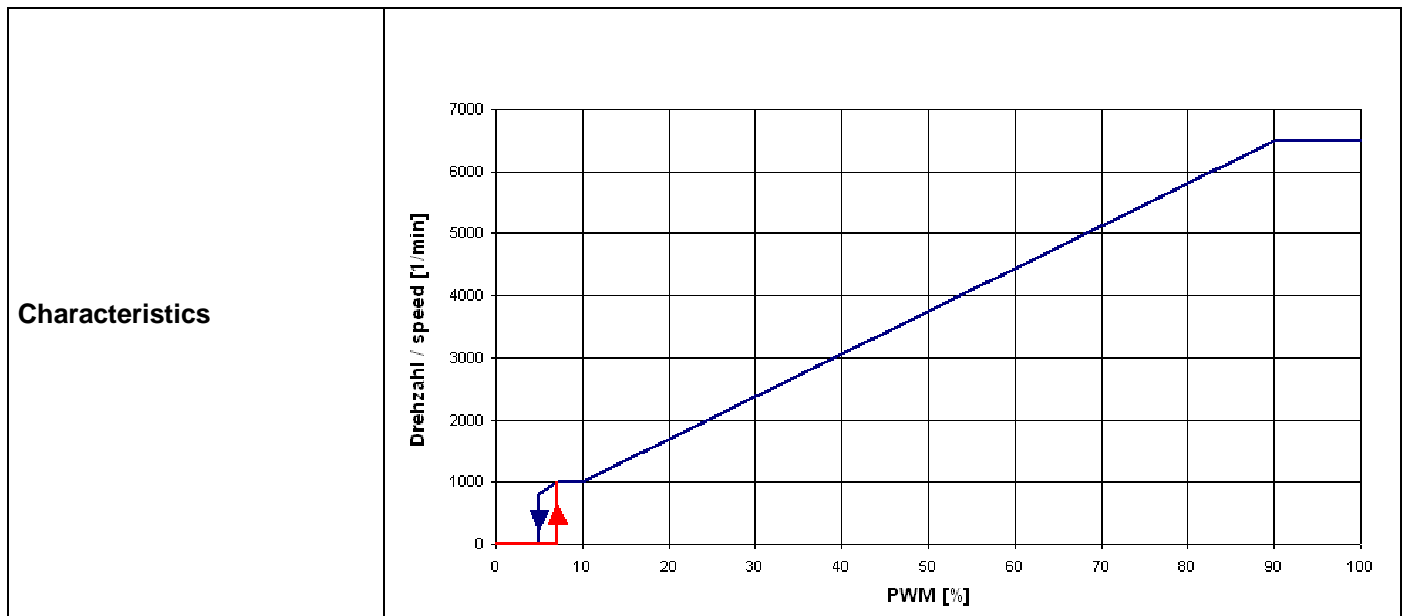
3 Operating Data

3.1 Electrical Interface - Input

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

Features

| | | |
|-----------------|----------------|----------------------------------|
| Input type | Open collector | |
| PWM - Frequency | | 1 kHz - 10 kHz typical: 2 kHz |



Transistor requirements:

$V_{ce\ max.} \geq 12V$; $I_{s\ sink\ max.} \geq 5mA$

$V_{ce\ sat.} \leq 0,15V$

Information to the curve:

| | |
|------------------|---|
| 0 % - <7% PWM: | 0 1/min |
| 7 % PWM: | 1.000 1/min (Fan on, comming from 0% PWM) |
| 7 % - 10% PWM: | 1.000 1/min (corresponding to min. speed) |
| 10 % - 90% PWM: | linear increasing curve |
| 90 % - 100% PWM: | 6.500 1/min (corresponding to max. speed) |
| 7 % - >5 % PWM: | linear decreasing curve (comming from 100% PWM) |
| 5 % PWM: | 800 1/min or 0 1/min (Fan off, comming from 100% PWM) |

3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m³; 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.

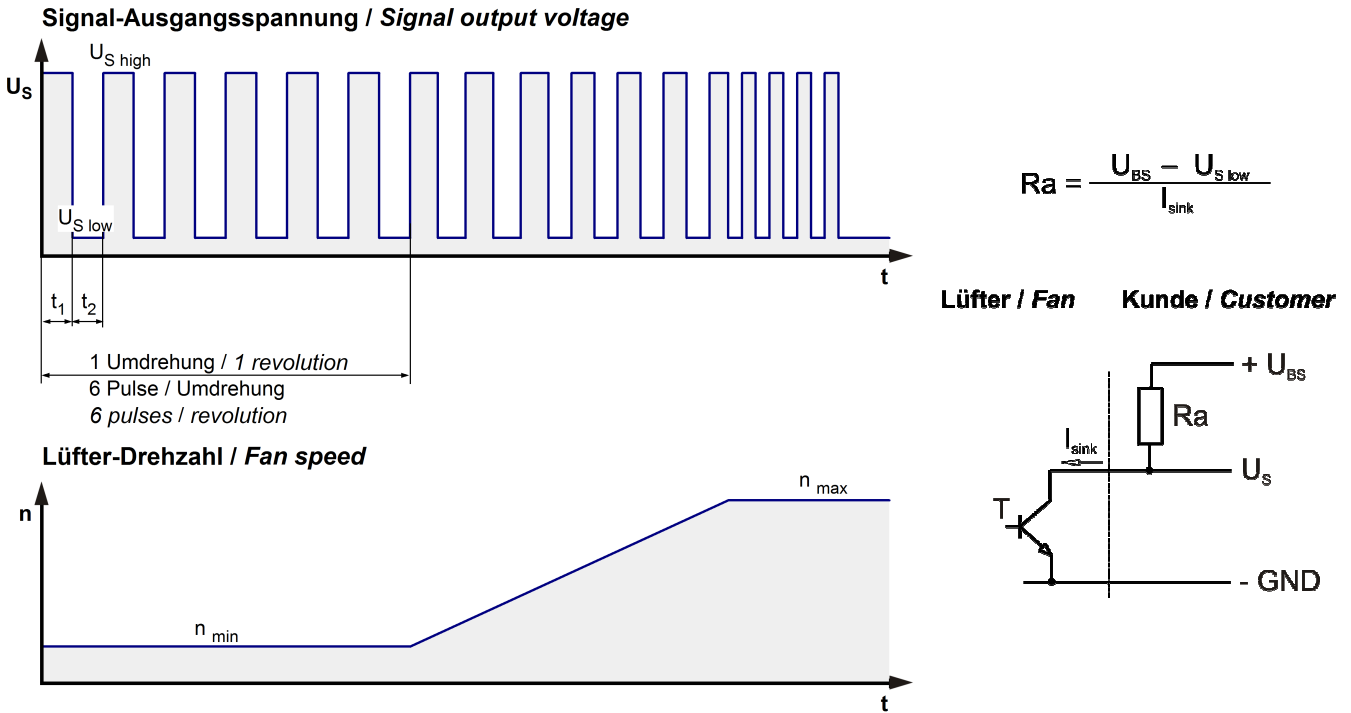
$\Delta p = 0$: corresp. to free air flow (see chapter aerodynamics)
 I: corresp. to arithm. mean current value

| Name | Condition |
|----------|----------------------|
| PWM 0001 | PWM: 100 %; f: 2 kHz |

| Features | Condition | Symbol | Values | | |
|---------------------|----------------|----------------|-------------|-------------|-------------|
| | | | | | |
| Voltage range | | U | 36 V | | 72 V |
| Nominal voltage | | U _N | | 48 V | |
| Power consumption | $\Delta p = 0$ | P | 81 W | 103 W | 108 W |
| Tolerance | PWM 0010 | | +/- 12 % | +/- 10 % | +/- 10 % |
| Current consumption | $\Delta p = 0$ | I | 2.250 mA | 2.150 mA | 1.500 mA |
| Tolerance | PWM 0010 | | +/- 12 % | +/- 10 % | +/- 10 % |
| Speed | $\Delta p = 0$ | n | 6.000 1/min | 6.500 1/min | 6.500 1/min |
| Tolerance | PWM 0010 | | +/- 5 % | +/- 3 % | +/- 3 % |

3.3 Electrical Interface - Output

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

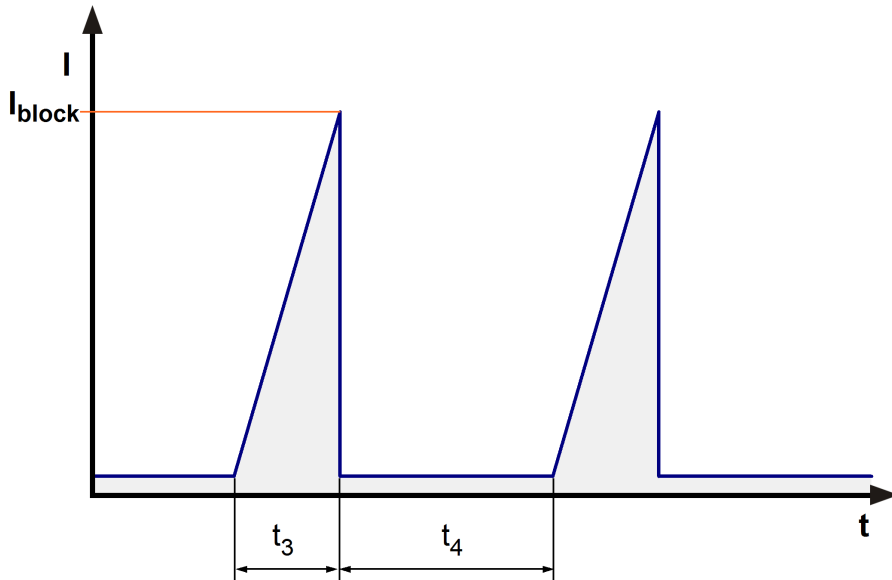


| Features | Note | Values |
|---------------------------|--|-------------------------------|
| Tacho operating voltage | U_{BS} | $\leq 60\text{ V}$ |
| Tacho signal Low | $U_{S\ low}$ | $\leq 0,4\text{ V}$ |
| Tacho signal High | $U_{S\ high}$ | $\leq 60\text{ V}$ |
| Maximum sink current | I_{sink} | $\leq 20\text{ mA}$ |
| External resistor | External resistor R_a from U_{BS} to U_S required. All voltages measured to GND. | |
| Tacho frequency | $(6 \times n) / 60$ | 650 Hz |
| Tacho isolated from motor | No | |
| Slew rate | | $\Rightarrow 0,5\text{ V/us}$ |

n = revolutions per minute (1/min)

3.4 Electrical Features

| | | |
|--------------------------------|-------------------------------------|--|
| Electronic function | Speed-Controlled | |
| Reversed polarity protection | P-CH FET | |
| Max. residual current at U_N | $I_F \leq 5\text{ mA}$ | |
| Locked rotor protection | Auto restart | |
| Locked rotor current at U_N | I_{block} approx. 2.000 mA | |
| Clock signal at locked rotor | t_3 / t_4 typical: 3,0 s / 10,0 s | |



3.5 Data According ErP Directive

| | |
|------------------------------------|-------------|
| Installation / Efficiency category | A / static |
| Speed control | integrated |
| Specific ratio | 1,00361 |
| Target overall efficiency 2015 | 29,0 % |
| Overall efficiency | 53,6 % |
| Efficiency grade | 40 |
| Power input | 179 W |
| Speed | 6.476 1/min |

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

3.6 Aerodynamics

Measurement conditions:

Measured with a double chamber intake rig acc. to DIN EN ISO 5801.

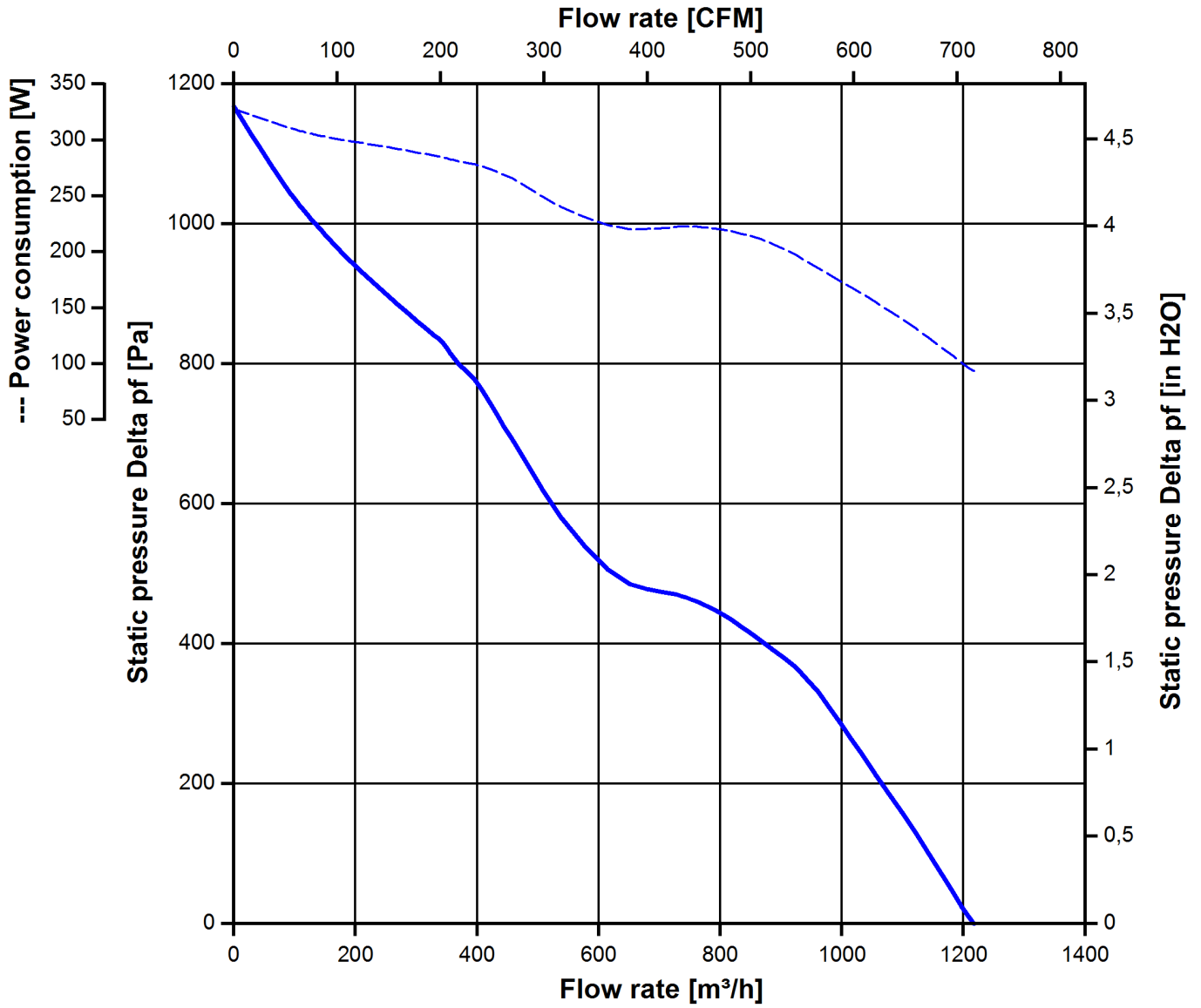
Normal air density = 1,2 kg/m³; Temperature 23°C +/- 3°C;

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. Power consumption of the fan motor when operating at normal voltage is shown. Depending on the operating conditions of the application, the power input may be higher.

a.) Operation condition:

| | | | |
|---|---------------------|---------------------------|--|
| 6.500 1/min at free air flow | PWM 100 %; f: 2 kHz | | |
| Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$) | | 1.220,0 m ³ /h | |
| Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$) | | 1.170 Pa | |



3.7 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 chapter aerodynamics.

a.) Operation condition:

| | | | |
|------------------------------|---------------------|--|--|
| 6.500 1/min at free air flow | PWM 100 %; f: 2 kHz | | |
|------------------------------|---------------------|--|--|

| | | |
|---|---------------------------------|--|
| Optimal operating point | 1.200 m ³ /h @ 44 Pa | |
| Sound power level at the optimal operating point | 8,2 bel(A) | |
| Sound pressure level at free air flow, measured in rubber bands | 74 dB(A) | |

4 Environment

4.1 General

| | | |
|--|--------|--|
| Min. permitted ambient temperature TU min. | -20 °C | |
| Max. permitted ambient temperature TU max. | 65 °C | |
| Min. permitted storage temperature TL min. | -40 °C | |
| Max. permitted storage temperature TL max. | 80 °C | |

4.2 Climatic Requirements

| | | |
|-----------------------|---|--|
| Humidity requirements | humid temperature, cyclic; according to DIN EN 60068-2-38, 10 cycle and condensation water check; according to DIN EN ISO 6270-2, 14 days | |
| Water exposure | Splash water check IPX4; according to DIN EN 60529 VDE 0470, not certified | |
| Dust requirements | Dust check IP5X; according to DIN EN 60529 VDE 0470, not certified | |
| Salt fog requirements | None | |

Permitted application area:

The product is for the use in partial sheltered rooms or open, roofed areas. Direct exposure to water is allowed provided that this does not prevent the normal operation. Saline ambient conditions must be avoided.

Pollution degree 3 (according DIN EN 60664-1)

It occurs conductive pollution or dry non-conductive pollution which becomes conductive due to condensation.

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

5 Safety

5.1 Electrical Safety

| | | |
|--|-------------------|--|
| Dielectric strength DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700) A.) Type test Measuring conditions: After 48h of storage at 95% R.H. and 25°C. No arcing or breakdown is allowed! All connections together to ground. | 1000 VAC / 1 Min. | |
| B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground. | 1700 VDC / 1 Sec. | |
| Isolation resistance 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 / 1,5 mm | |
| Protection class | I | |

5.2 Approval Tests

| | | |
|-----|---|---|
| CE | EC Declaration of Conformity | No |
| 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 | Yes / GB 12350 Safety Requirements for small Power Motors |

6 Reliability

6.1 General

| | | |
|--|-----------|--|
| Life expectancy L10 at TU = 40 °C | 70.000 h | |
| Life expectancy L10 at TU max. | 40.000 h | |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 117.500 h | |

