Product Data Sheet 6318N/2TDH4P

ebmpapst

The engineer's choice



GREEN TECH

# 6318N/2TDH4P

**INDEX**


**1 General ..... 3**

**2 Mechanics ..... 3**

2.1 General ..... 3
2.2 Connections ..... 3

**3 Operating Data ..... 5**

3.1 Electrical Interface - Input ..... 5
3.2 Electrical Operating Data ..... 6
3.3 Electrical Interface - Output ..... 7
3.4 Electrical Features ..... 8
3.5 Data According ErP Directive ..... 8
3.6 Aerodynamics ..... 9
3.7 Sound Data ..... 10

**4 Environment ..... 10**

4.1 General ..... 10
4.2 Climatic Requirements ..... 10
4.3 Mechanical Requirements ..... 11
4.4 EMC ..... 12

**5 Safety ..... 13**

5.1 Electrical Safety ..... 13
5.2 Approval Tests ..... 13

**6 Reliability ..... 13**

6.1 General ..... 13

## 1 General

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

## 2 Mechanics

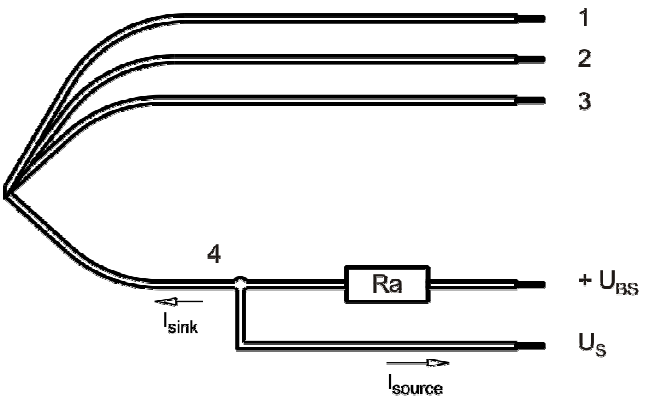
### 2.1 General

| | | |
|---|---|---|
| Depth | 51,0 mm | |
| Diameter | 172,0 mm | |
| Mass | 0,89 kg | |
| Housing material | Metal | |
| Impeller material | Plastic | |
| Max. torque when mounted across both mounting flanges<br>Screw size | Wire outlet corner: 440 Ncm<br>Remaining corners: 440 Ncm<br>ISO 4762 - M4 degreased, without an additional brace and without washer | |

### 2.2 Connections

| | | |
|---|---|---|
| Electrical connection | Wires | |
| Lead wire length<br>Tolerance | L = 365 mm<br>+- 10,0 mm | |
| Tube length<br>Tolerance | S = 10 mm<br>+- 5,0 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 | 1,7 mm |
| 4 | white | Tacho | AWG 22 | 1,7 mm |

The auxilliaries 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 2,05 mm)
Lead wire 3 - 4: AWG22 (Insulation diameter 1,70 mm)

## 3 Operating Data

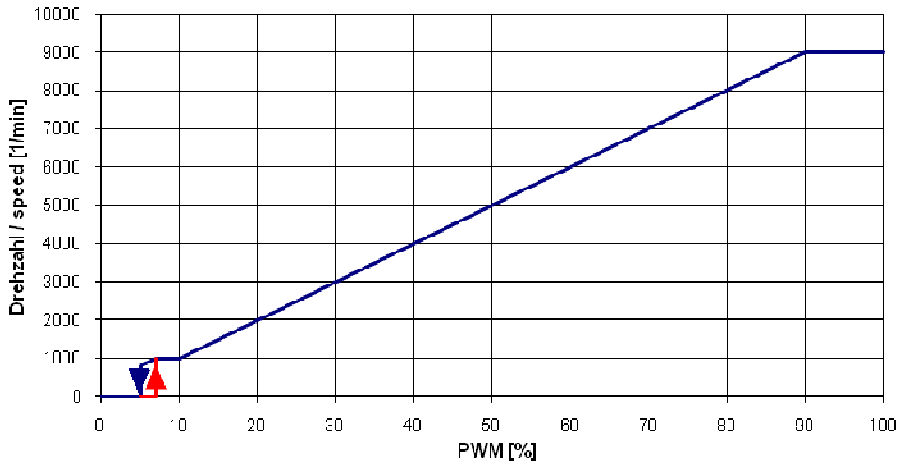
### 3.1 Electrical Interface - Input

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

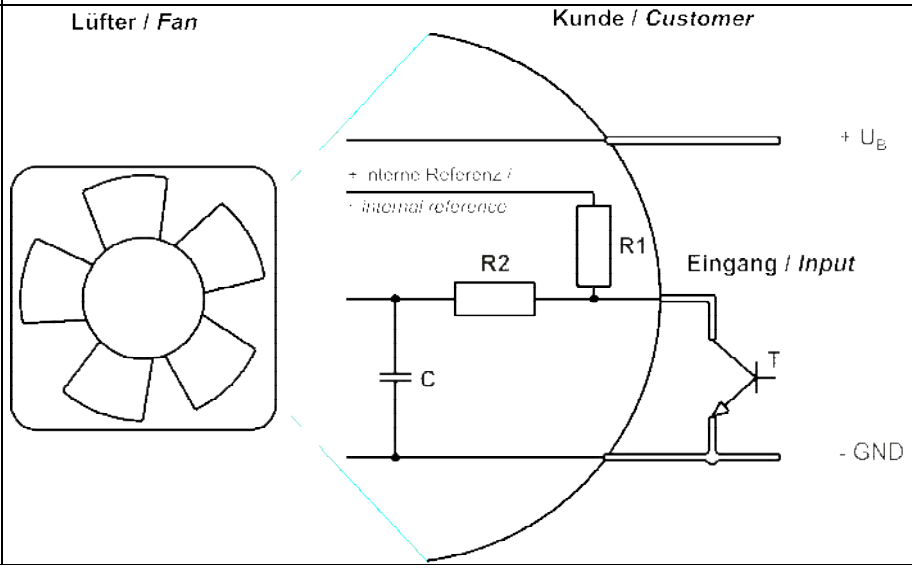
**Features**

| | | |
|---|---|---|
| Inpute type | Open collector | |
| PWM - Frequency | | 1 kHz - 20 kHz<br>typical: 2 kHz |

**Characteristics**




**Schematics**




The shown pull-up resistor to the internal reference voltage (+5V) has 4.7kOhm.

**Information to the curve:**

| | |
|---|---|
| 0% - <=7% PWM: | 0 1/min (Fan off) |
| 7% PWM: | 1.000 1/min (Start-up, comming from 0% PWM) |
| 7% - 10 % PWM: | 1.000 1/min (corresp. to min fan speed) |
| 10% - 90% PWM: | Linear increasing curve |
| 90% - 100% PWM: | 9.000 1/min (corresp. to max fan speed) |
| 5% PWM: | 800 1/min or 0 1/min (Fan turns off, comming from 100% PWM) |

**Transistor Requirements:**

VCE max. >= 12V
Isink max > 5mA
VCEsat < 0,15V

### 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.

Δp = 0: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

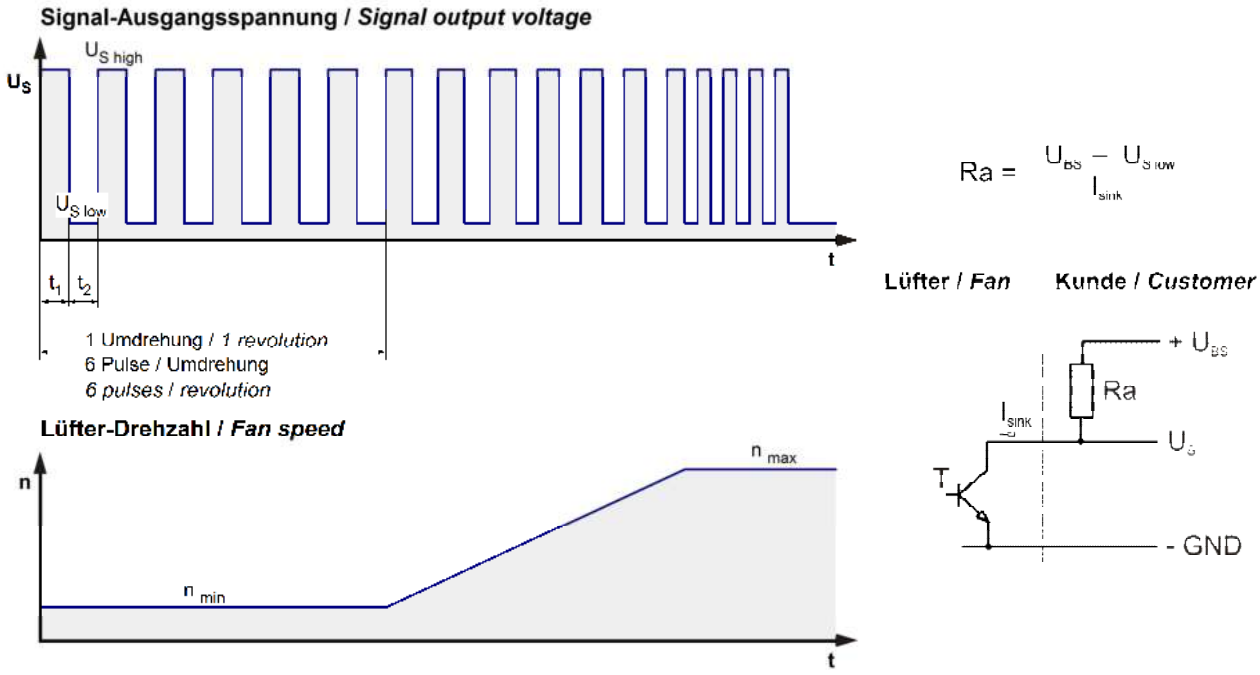
| Name | Condition | | |
|---|---|---|---|
| PWM 0001 | PWM: 95 %; f: 2 kHz | | |

**>90% PWM; f = 2 kHz or broken lead wire (open control input)**

| Features | Condition | Symbol | Values | | |
|---|---|---|---|---|---|
| Voltage range | | U | 36 V | | 72,0 V |
| Nominal voltage | | $U_N$ | | 48,0 V | |
| Power consumption<br>Tolerance | Δp = 0<br>PWM 0010 | P | 175 W<br>+- 10 % | 275 W<br>+- 10 % | 285 W<br>+- 10 % |
| Current consumption<br>Tolerance | Δp = 0<br>PWM 0010 | I | 4.850 mA<br>+- 10 % | 5.700 mA<br>+- 10 % | 4.000 mA<br>+- 10 % |
| Speed<br>Tolerance | Δp = 0<br>PWM 0010 | n | 7.600 1/min<br>+- 5 % | 9.000 1/min<br>+- 3 % | 9.000 1/min<br>+- 3 % |

### 3.3 Electrical Interface - Output

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

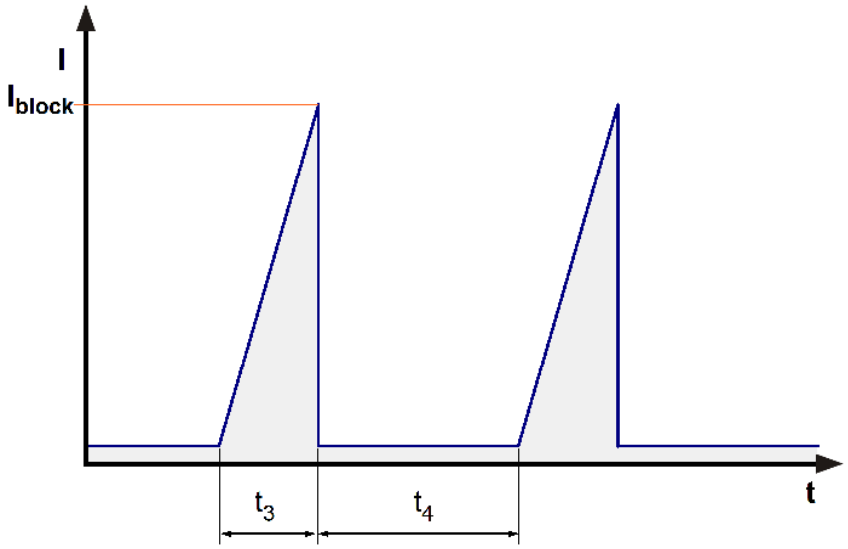



| Features | | Note | Values |
|---|---|---|---|
| Tacho operating voltage | $U_{BS}$ | | <= 60 V |
| Tacho signal Low | $U_{S\ low}$ | I sink: 2 mA | <=0,4 V |
| Tacho signal High | $U_{S\ high}$ | I source: 0 mA | 60,0 V |
| Maximum sink current | $I_{sink}$ | | <= 20 mA |
| External resistor | | External resistor Ra from UBS to US required. All voltages measured to GND. | |
| Tacho frequency | | (6 x n) / 60 | 900 Hz |
| Tacho isolated from motor | | No | |
| Slew rate | | | => 0,5 V/us |

n = revolutions per minute (1/min)

### 3.4 Electrical Features

| | | |
|---|---|---|
| Electronic function | Speed-Controlled | |
| Reversed polarity protection<br>Max. residual current at $U_N$ | N-CH FET<br>$I_F$ <= 5 mA | |
| Locked rotor protection | Auto restart | |
| Locked rotor current at $U_N$ | $I_{block}$ approx. 1.700 mA | |
| Clock signal at locked rotor | $t_3$ / $t_4$ typical: 5 s / 10,0 s | |




This fan has a startup delay of 2 seconds after applying supply voltage.

Internal Fuse: Littelfuse Nano2 Fuse Very Fast-Acting 451/453 Series 12A / 75V

### 3.5 Data According ErP Directive

| | |
|---|---|
| Installation / Efficency category | A / static |
| Speed control | integrated |
| Specific ratio | 1,00655 |
| Target overall efficiency 2015 | 30,6 % |
| Overall efficiency | 49,3 % |
| Efficiency grade | 40 |
| Power input | 329 W |
| Speed | 8.920 1/min |

All values measured in optimum energy efficiency point.

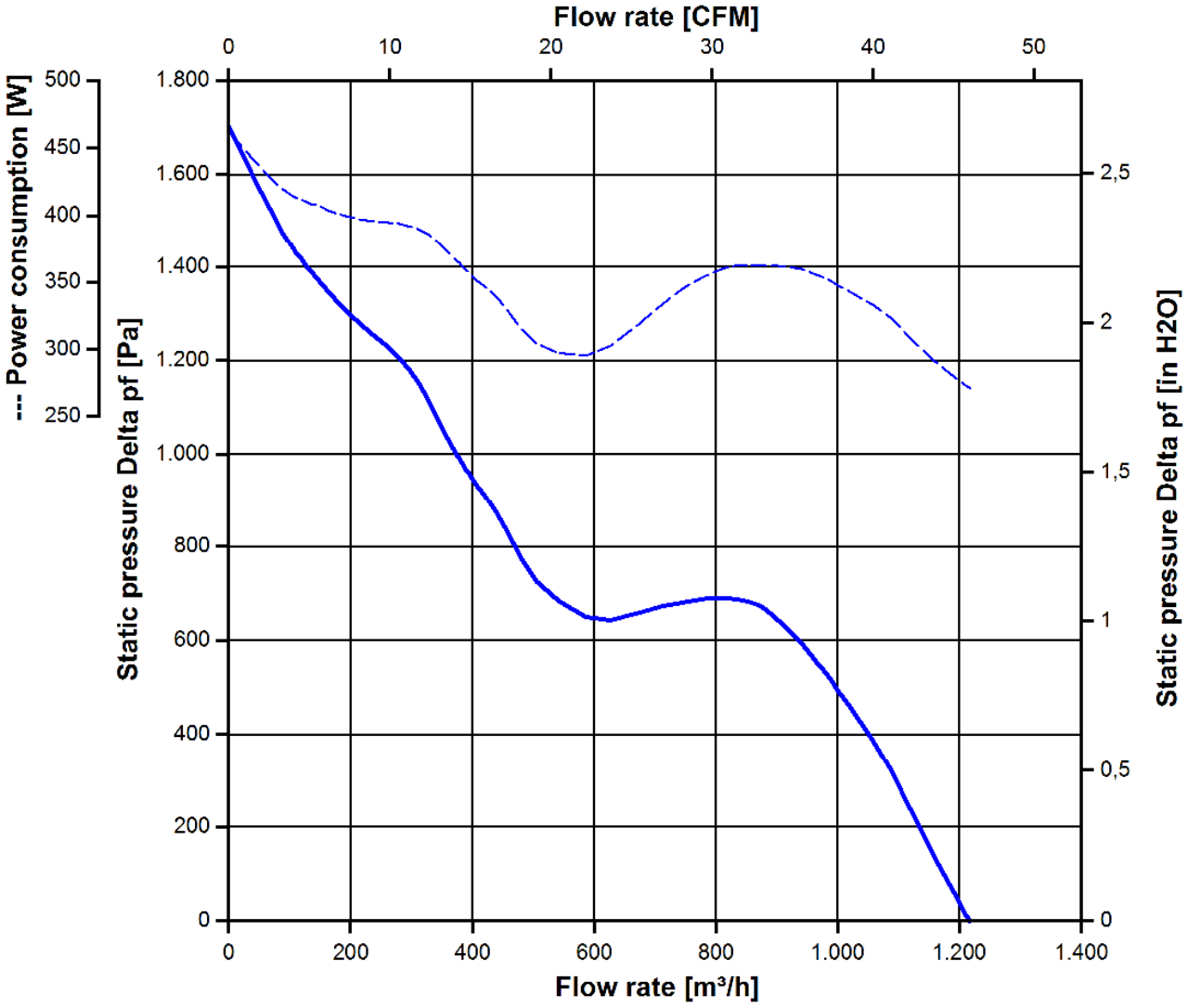
### 3.6 Aerodynamics

| | |
|---|---|
| Measurement conditions: | Measured with a double chamber intake rig acc. to DIN EN ISO 5801.<br>Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C;<br>In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.<br>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:

| | | | |
|---|---|---|---|
| 9.000 1/min at free air flow | PWM 95 %; f: 2 kHz | | |

| | | |
|---|---|---|
| Max. free-air flow (Δp = 0 / V̇ = max.) | 1.217 m3/h | |
| Max. static pressure (Δp = max. / V̇ =0) | 1.700 Pa | |



### 3.7 Sound Data

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

a.) Operation condition:

| | | | |
|---|---|---|---|
| 9.000 1/min at free air flow | PWM 95 %; f: 2 kHz | | |

| | | |
|---|---|---|
| Optimal operating point | 980 m3/h @ 469 Pa | |
| Sound power level at the optimal operating point | 8,8 bel(A) | |
| Sound pressure level at free air flow, measured in rubber bands | 80 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 heat, constant; according to DIN EN 60068-2-78, 14 days | |
| Water exposure | None | |
| Dust requirements | None | |
| Salt fog 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.

### 4.3 Mechanical Requirements

| severity level | Vibration (sinusoidal) | |
|---|---|---|
| 1 G | Vibration (sinusoidal) in use<br>IEC 60068-2-6<br>Displacement / frequency range<br>Acceleration / frequency range<br>Sweep rate<br>Sweep cycles<br>Duration<br>Axes of vibration | <br>Vibration (sinusoidal)<br>0,075 mm / 10-58, 58-10 Hz<br>1 G / 58-500-58 Hz<br>1 Oct./min<br>10<br>2 hrs.<br>3 |

| severity level | stationary use | | |
|---|---|---|---|
| 1 | storage / transportation | Random vibration not in use<br>IEC 60068-2-64<br>Frequency range / ASD<br><br>$G_{RMS}$<br>Axes of vibration<br>Test duration | <br>Random vibration<br>5 - 20 Hz : 1,0 m² / s³<br>20 - 500 Hz : - 3 dB / Oct<br>0,91 G<br>3<br>3 x 5 h |
| | storage / transportation | Bump not in use<br>IEC 60068-2-29<br>Shock spectrum<br>Acceleration<br>Duration<br>Number of bumps (+X, -X, -Y, +Y, -Z, +Z)<br>Total bumps | <br>Bump<br>half sine<br>18 G<br>6 ms<br>100 in each direction<br>600 |
| | stationary use | Random vibration in use<br>IEC 60068-2-64<br>Frequency range / ASD<br><br><br>$G_{RMS}$<br>Axes of vibration<br>Test duration | <br>Random vibration<br>5 - 20 Hz : 2,0 $m^2$ / $s^3$<br>20- 150 Hz : - 3 dB / Oct<br>0,83 G<br>3<br>3 x 5 h |
| | stationary use | Bump in use<br>IEC 60068-2-29<br>Shock spectrum<br>Acceleration<br>Duration<br>Number of bumps (+X, -X, -Y, +Y, -Z, +Z)<br>Total bumps | <br>Bump<br>half sine<br>5 G<br>11 ms<br>100 in each direction<br>600 |

| severity level | Railroad application | |
|---|---|---|
| 1<br>IEC 61373<br>Category 1<br>Class B | Random vibration in use<br>IEC 60068-2-64<br>Frequency range / ASD<br><br><br><br>$G_{RMS}$<br>Axes of vibration<br>Test duration | <br><br>Random vibration<br>5 - 20 Hz : 2,0 $m^2$ / $s^3$<br>20- 150 Hz : - 3 dB / Oct<br>0,83 G<br>3<br>3 x 5 h |
| | Shock in use<br>IEC 60068-2-27<br>Shock spectrum<br>Acceleration<br>Duration<br>Number of bumps (+X, -X, -Y, +Y, -Z, +Z)<br>Total bumps | <br>Shock<br>half sine<br>7 G<br>18 ms<br>10 in each direction<br>60 |

### 4.4 EMC

| **Kind** | **Radiated Emission; 30 MHz - 1000 MHz** |
|---|---|
| According | DIN EN 55022:2007-04 |
| Ceck accuracy / Limit | Class B |
| Result | Below limit Class B |

| **Kind** | **Electrostatic Discharge Immunity Test** |
|---|---|
| According | DIN EN 61000-4-2:2001-12 |
| Ceck accuracy / Limit | Contact Discharge +/- 4 kV; Air Discharge +/- 8 kV |
| Result | A: The monitored function operates as designed during and after exposure to a disturbance. |

# 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. | 1000 VAC / 1 Min.<br><br>1000 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 / 1,5 mm | |
| Protection class | I | |

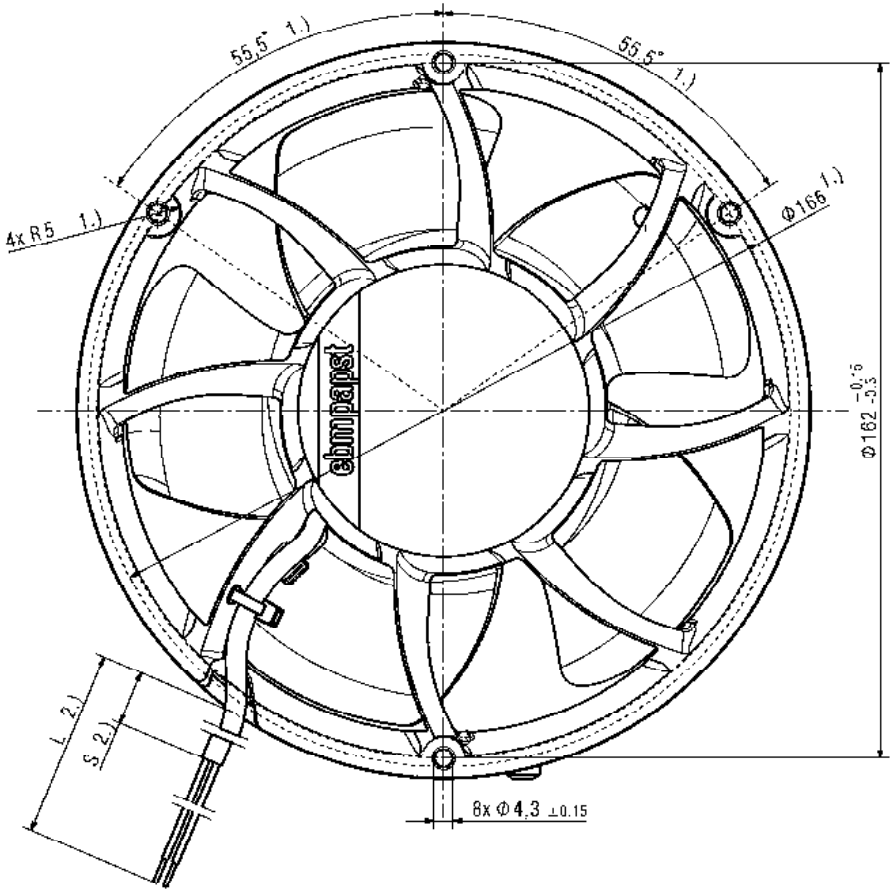
## 5.2 Approval Tests

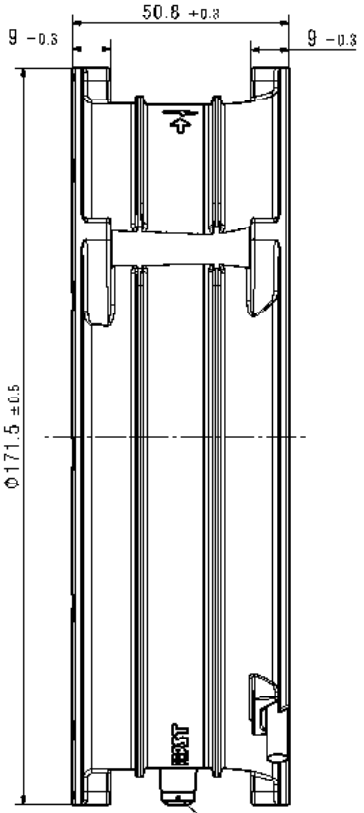
| | | |
|---|---|---|
| CE | EC Declaration of Conformity | Yes |
| EAC | Eurasian Conformity | Yes |
| UL | Underwriters Laboratories | Yes / UL507, Electric Fans |
| VDE | Association for Electrical, Electronic and Information Technologies | Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment |
| CSA | Canadian Standards Association | Yes / C22.2 No. 113 Fans and Ventilators |
| CCC | China Compulsory Certification | Yes / GB 12350 Safety Requirements for small Power Motors |

# 6 Reliability

## 6.1 General

| | | |
|---|---|---|
| Life expectancy L10 at TU = 40 °C | 45.000 h | |
| Life expectancy L10 at TU max. | 25.000 h | |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 75.000 h | |




1.) Maße aus Montageausschnitt
2.) Anzahl und Länge der Litzen/Schlauch siehe Produktspezifikation
3.) Erdungsschraube nur wenn in der Lüftergehäusestückliste enthalten
- Axialspiel der Kugellager mit Feder spielfrei gelagert

1.) measures of mounting cut out
2.) length and number of wires/tube see product specification
3.) grounding screw only if contained in the fan housing part list
- ball bearing without clearance by a pre-load spring

ebmpapst St. Georgen GmbH & Co. KG