

Product Data Sheet 5318/2TDH4PR

**ebm****papst**

The engineer's choice



**5318/2TDH4PR****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>4</b>  |
| 3.1      | Electrical Interface - Input .....  | 4         |
| 3.2      | Electrical Operating Data .....     | 5         |
| 3.3      | Electrical Interface - Output ..... | 6         |
| 3.4      | Electrical Features .....           | 6         |
| 3.5      | Aerodynamics .....                  | 8         |
| 3.6      | Sound Data .....                    | 10        |
| <b>4</b> | <b>Environment .....</b>            | <b>10</b> |
| 4.1      | General .....                       | 10        |
| 4.2      | Climatic 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                    |  |
| Rotating direction looking at rotor | Counterclockwise       |  |
| Airflow direction                   | Air intake over struts |  |
| Bearing system                      | Ball bearing           |  |
| Mounting position - shaft           | Any                    |  |

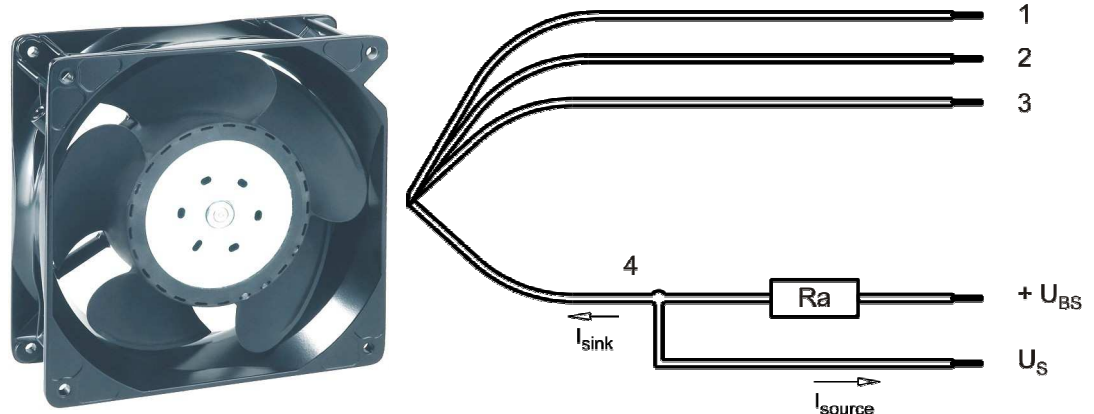
## 2 Mechanics

### 2.1 General

|                                                       |                                                                         |  |
|-------------------------------------------------------|-------------------------------------------------------------------------|--|
| Width                                                 | 140,0 mm                                                                |  |
| Height                                                | 140,0 mm                                                                |  |
| Depth                                                 | 51,0 mm                                                                 |  |
| Mass                                                  | 0,930 kg                                                                |  |
| Housing material                                      | Metal                                                                   |  |
| Impeller material                                     | Plastic                                                                 |  |
| Max. torque when mounted across both mounting flanges | Wire outlet corner: 440 Ncm<br>Remaining corners: 600 Ncm               |  |
| Screw size                                            | ISO 4762 - M4 degreased, without an additional brace and without washer |  |

### 2.2 Connections

|                       |             |  |
|-----------------------|-------------|--|
| Electrical connection | Wires       |  |
| Lead wire length      | L = 310 mm  |  |
| Tolerance             | +/- 10,0 mm |  |
| Wire size (AWG)       | 20          |  |
| Insulation diameter   | 2,05 mm     |  |



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

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

#### Features

|                 |                                                                                                                                                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Characteristics | <p>Drehzahl / speed [1/min]</p> <p>PWM [%]</p>                                                                                                                                                                     |
| Schematics      | <p><b>Lüfter / Fan</b></p> <p><b>Kunde / Customer</b></p> <p>+ <math>U_B</math></p> <p>+ interne Referenz /<br/>+ internal reference</p> <p>R2</p> <p>R1</p> <p>Eingang / Input</p> <p>C</p> <p>T</p> <p>- GND</p> |

#### Speed control:

By Puls width modulation (PWM) 0 ... 100%

Open collector in relation to signal-ground

$f = 2\text{kHz} \pm 20\%$

#### Information to the curve:

0 % - 7 % PWM: 0 1/min

7 % PWM: 1.000 1/min (Fan on, coming from 0% PWM)

|                  |                                                       |
|------------------|-------------------------------------------------------|
| 7 % - 10% PWM:   | 1.000 1/min (corresponding to min. speed)             |
| 10 % - 90% PWM:  | linear increasing curve                               |
| 90 % - 100% PWM: | 6.000 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/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

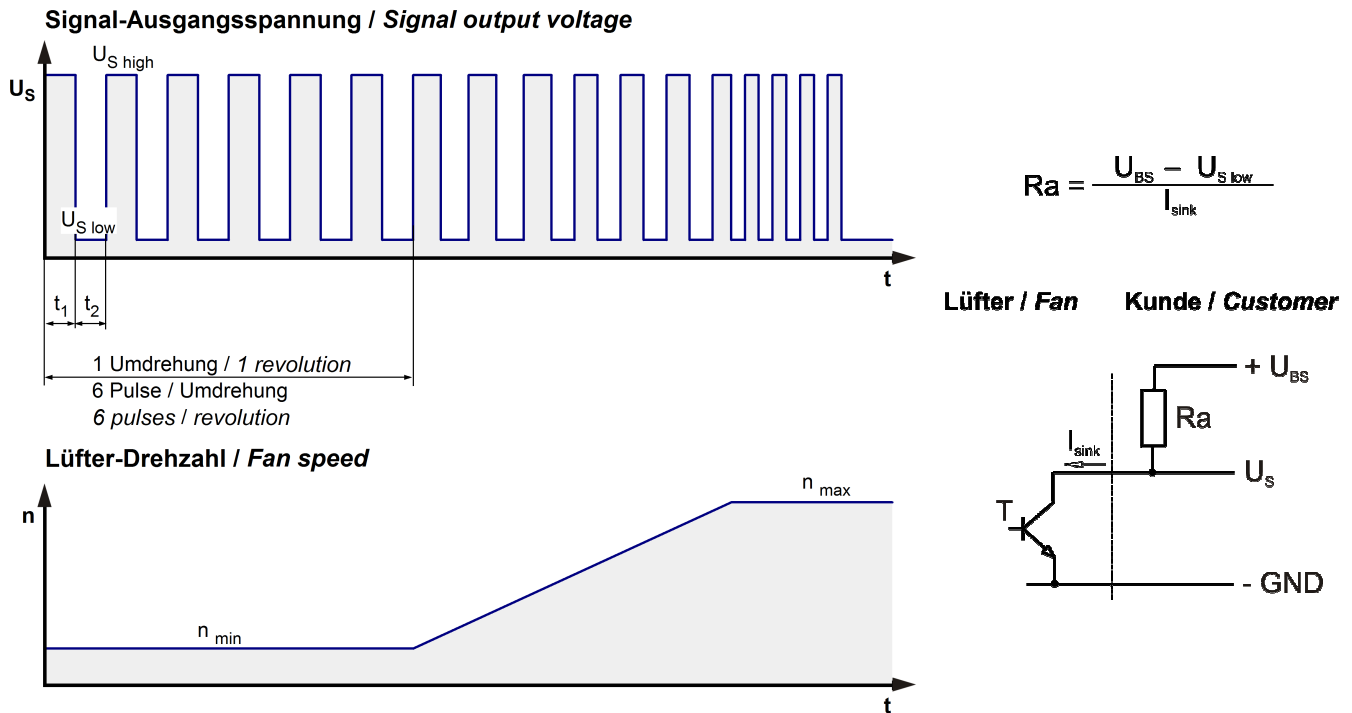
| Name     | Condition            |
|----------|----------------------|
| PWM 0001 | PWM: 100 %; f: 2 kHz |

**100% 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 <sub>N</sub> |             | 48,0 V      |             |
| Power consumption   | $\Delta p = 0$ | P              | 130 W       | 144 W       | 165 W       |
| Tolerance           | PWM 0010       |                | +/- 15 %    | +/- 10,0 %  | +/- 15 %    |
| Current consumption | $\Delta p = 0$ | I              | 3.600 mA    | 3.000 mA    | 2.300 mA    |
| Tolerance           | PWM 0010       |                | +/- 15 %    | +/- 10,0 %  | +/- 15 %    |
| Speed               | $\Delta p = 0$ | n              | 8.700 1/min | 9.200 1/min | 9.200 1/min |
| Tolerance           | PWM 0010       |                | +/- 10,0 %  | +/- 10,0 %  | +/- 10,0 %  |

### 3.3 Electrical Interface - Output

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

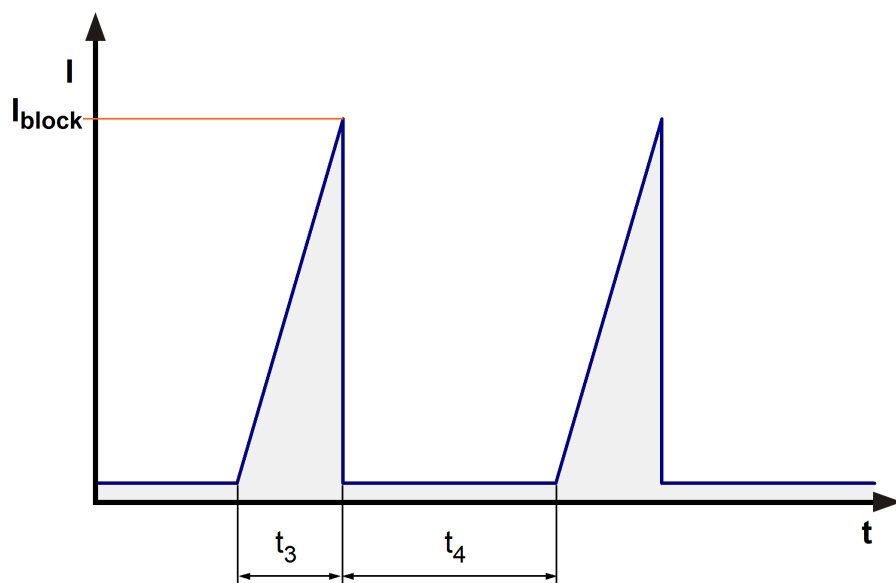


| Features                  | Note                                                                                   | Values                            |
|---------------------------|----------------------------------------------------------------------------------------|-----------------------------------|
| Tacho operating voltage   | $U_{BS}$                                                                               | Min.: 4,0 V    Max.: 60,0 V       |
| Tacho signal Low          | $U_{s\ low}$                                                                           | $I_{sink}$ : 2 mA<br>$\leq 0,4$ V |
| Tacho signal High         | $U_{s\ high}$                                                                          | $I_{source}$ : 0 mA               |
| Maximum sink current      | $I_{sink}$                                                                             | $\leq 20$ mA                      |
| External resistor         | External resistor $R_a$ from $U_{BS}$ to $U_s$ required. All voltages measured to GND. |                                   |
| Tacho frequency           | $(6 \times n) / 60$                                                                    |                                   |
| Tacho isolated from motor | No                                                                                     |                                   |
| Slew rate                 |                                                                                        | $\Rightarrow 0,5$ 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 $U_N$ | $I_F \leq 5$ mA                     |  |
| Locked rotor protection        | Auto restart                        |  |
| Locked rotor current at $U_N$  | $I_{block}$                         |  |
| Clock signal at locked rotor   | $t_3 / t_4$ typical: 1,0 s / 10,0 s |  |

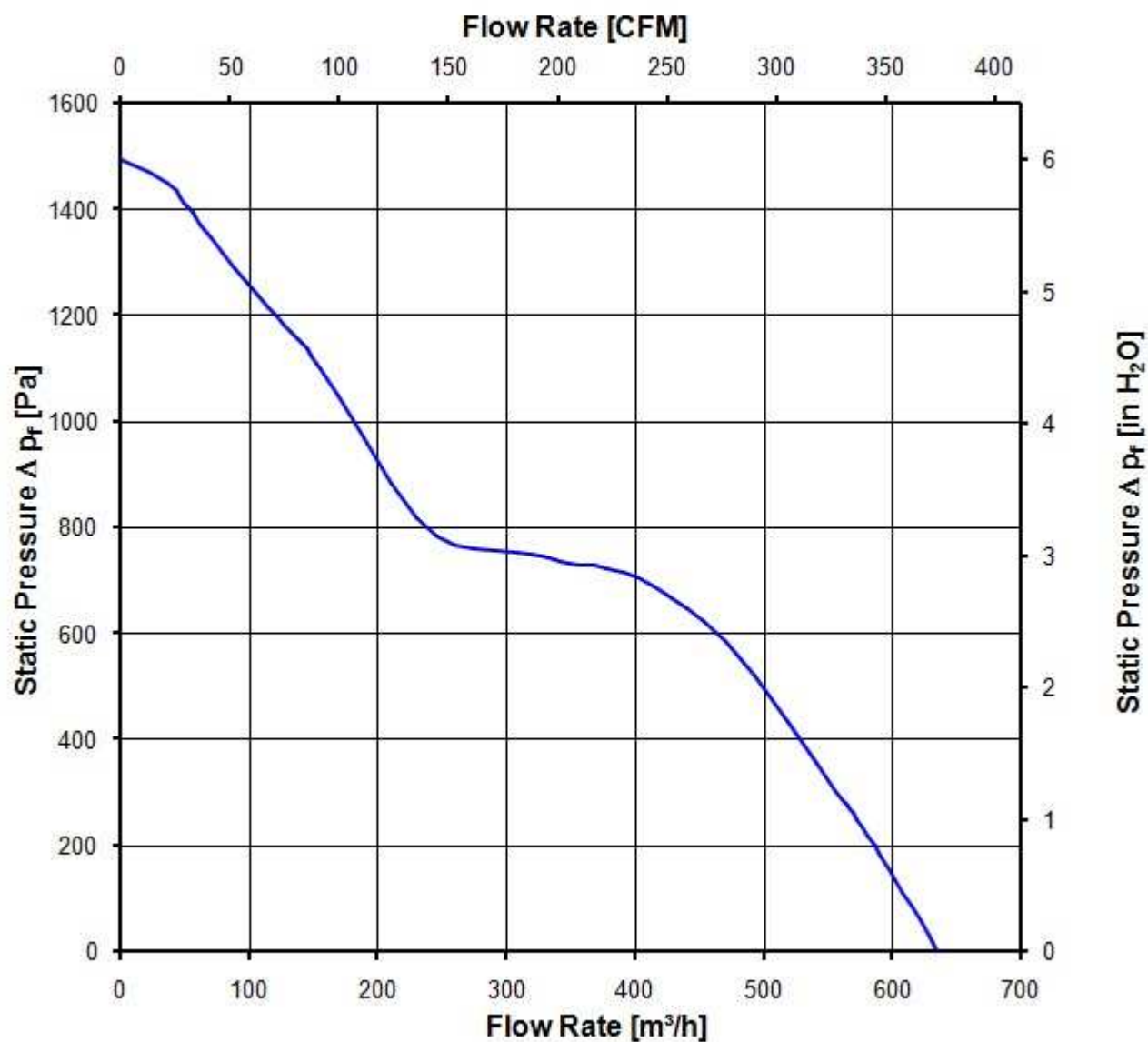


### 3.5 Aerodynamics

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:

|                                                             |                         |  |  |
|-------------------------------------------------------------|-------------------------|--|--|
| 9.200 1/min at free air flow                                | PWM 100 %; f: 2 kHz     |  |  |
| Max. free-air flow ( $\Delta p = 0$ / $\dot{V} = \max.$ )   | 630,0 m <sup>3</sup> /h |  |  |
| Max. static pressure ( $\Delta p = \max.$ / $\dot{V} = 0$ ) | 1.500 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 chapter aerodynamics.

a.) Operation condition:

|                              |                     |  |  |
|------------------------------|---------------------|--|--|
| 9.200 1/min at free air flow | PWM 100 %; f: 2 kHz |  |  |
|------------------------------|---------------------|--|--|

|                                                                 |                                  |  |
|-----------------------------------------------------------------|----------------------------------|--|
| Optimal operating point                                         | 320,0 m <sup>3</sup> /h @ 670 Pa |  |
| Sound power level at the optimal operating point                | 8,8 bel(A)                       |  |
| Sound pressure level at free air flow, measured in rubber bands | 79,0 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, 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.<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>1700 VDC / 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                                        | No                                                                            |
| EAC | Eurasian Conformity                                                 | Yes                                                                           |
| UL  | Underwriters Laboratories                                           | Yes / UL audited by CSA according to 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                     |

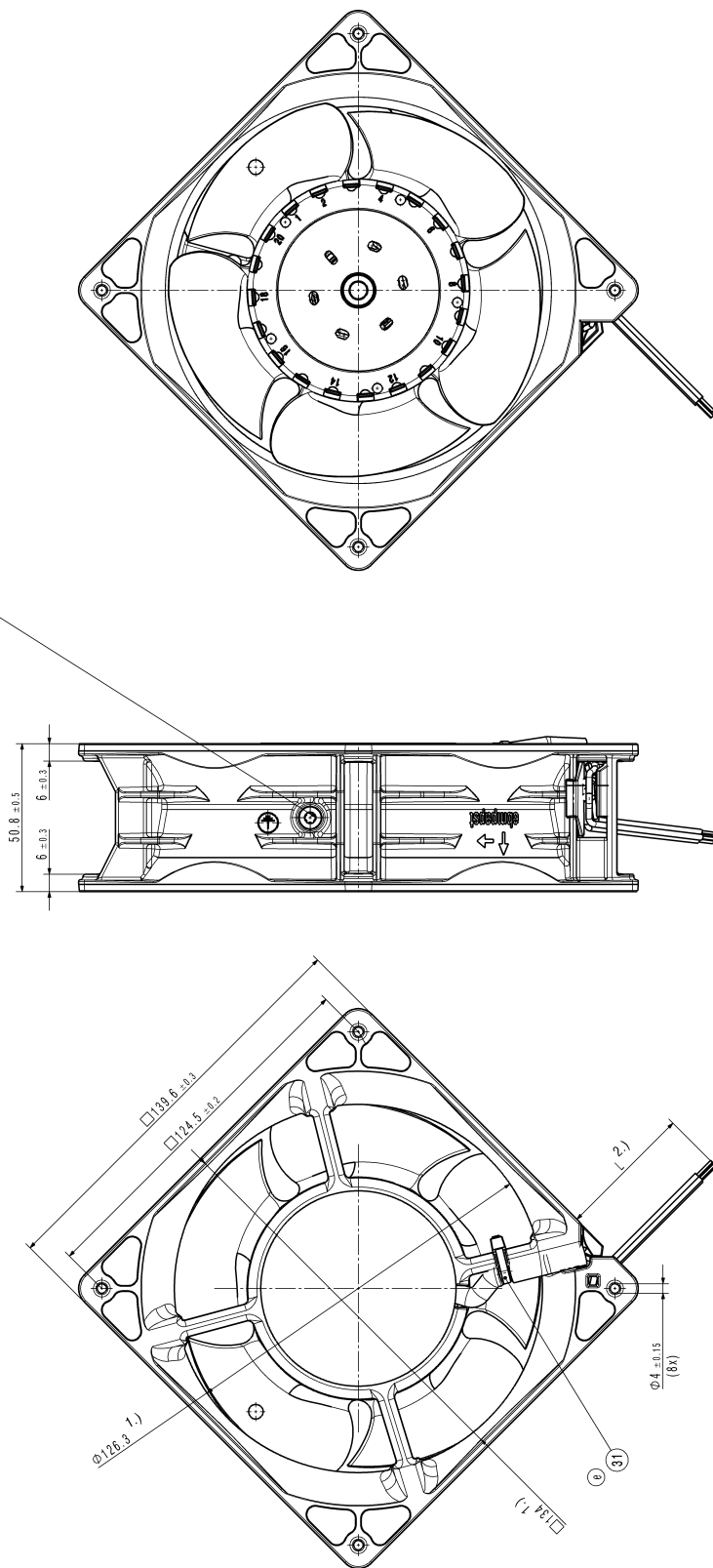
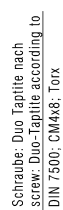
The approval tests are observed to:

U approval max.: 72,0 V @ TU approval max.: 65,0 °C

## 6 Reliability

### 6.1 General

|                                                    |           |  |
|----------------------------------------------------|-----------|--|
| Life expectancy L10 at TU = 40 °C                  | 57.500 h  |  |
| Life expectancy L10 at TU max.                     | 32.500 h  |  |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 97.5 00 h |  |



- 1.) Maße des Montageausschnitts  
2.) Anzahl und Länge der Litzen siehe Produktspezifikation  
- Axialspiel der Kugellager mit Feder spielfrei gelagert
- 1.) measures of mounting cut out  
2.) length an number of wires see product specification  
- ball bearing without clearance by a pre-load spring

[illegible]