

Product Data Sheet 6314/2TDHHPU

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**6314/2TDHHPU**

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## 1 General

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

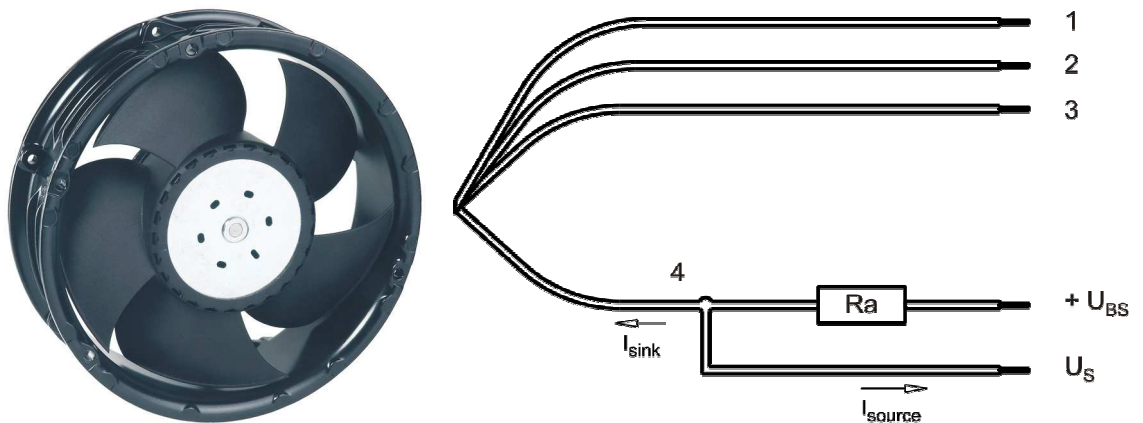
## 2 Mechanics

### 2.1 General

|   |   |  |
|---|---|--|
| Depth   | 51,0 mm   |  |
| Diameter  | 172,0 mm  |  |
| Mass  | 0,875 kg  |  |
| Housing material                                      | Metal   |  |
| Impeller material                                     | Plastic   |  |
| Max. torque when mounted across both mounting flanges | Wire outlet corner: 600 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 = 365 mm  |  |
| Tolerance             | + - 10,0 mm |  |
| Tube length           | S = 10 mm   |  |
| Tolerance             | + - 2,0 mm  |  |



| Wire | Color  | Operation | Wire size | Insulation diameter |
|------|--------|-----------|-----------|---------------------|
| 1    | red    | + UB      | AWG 18    | 2,2 mm              |
| 2    | blue   | - GND     | AWG 18    | 2,2 mm              |
| 3    | violet | PWM       | AWG 22    | 1,7 mm              |
| 4    | white  | Tacho     | AWG 22    | 1,7 mm              |

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

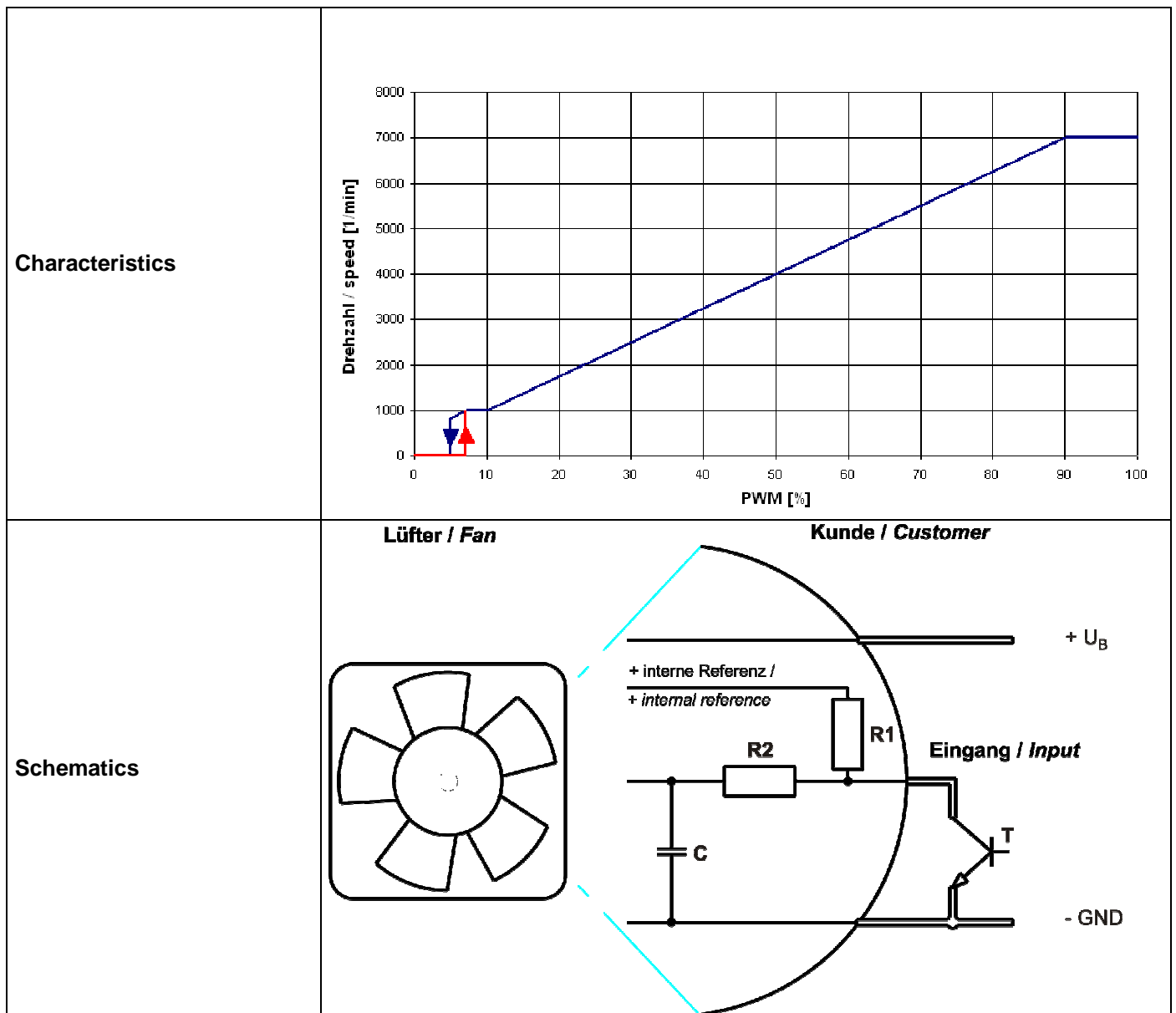
### 3 Operating Data

#### 3.1 Electrical Interface - Input

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

#### Features

|                       |                |                |
|-----------------------|----------------|----------------|
| Input type            | Open collector |                |
| PWM - Frequency       |                | typical: 2 kHz |
| Input frequency range |                | 1 kHz - 20 kHz |



The shown pull-up resistor R1 to the internal reference voltage (+5V) has 4.7kOhm.

**Information to the curve:**

|            |      |  |
|------------|------|--|
| 0% - <=7%  | PWM: | 0 1/min  |
| 7% - 10%   | PWM: | 1.000 1/min (corresponding to min. speed)            |
| 10% - 90%  | PWM: | linear increasing curve                              |
| 90% - 100% | PWM: | 7.000 1/min (corresponding to max. speed)            |
| 7% PWM:    |      | 1.000 1/min (Fan on, coming from 0% PWM)             |
| 7% - 5%    | PWM: | linear decreasing curve (von 100% PWM kommend)       |
| 5% PWM:    |      | 800 1/min or 0 1/min (Fan off, coming from 100% PWM) |

**Transistor requirements:**

V<sub>ce</sub> max. >= 12V; I<sub>sink</sub> max. >=5mA; V<sub>ce</sub> sat. <= 0,15V

**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

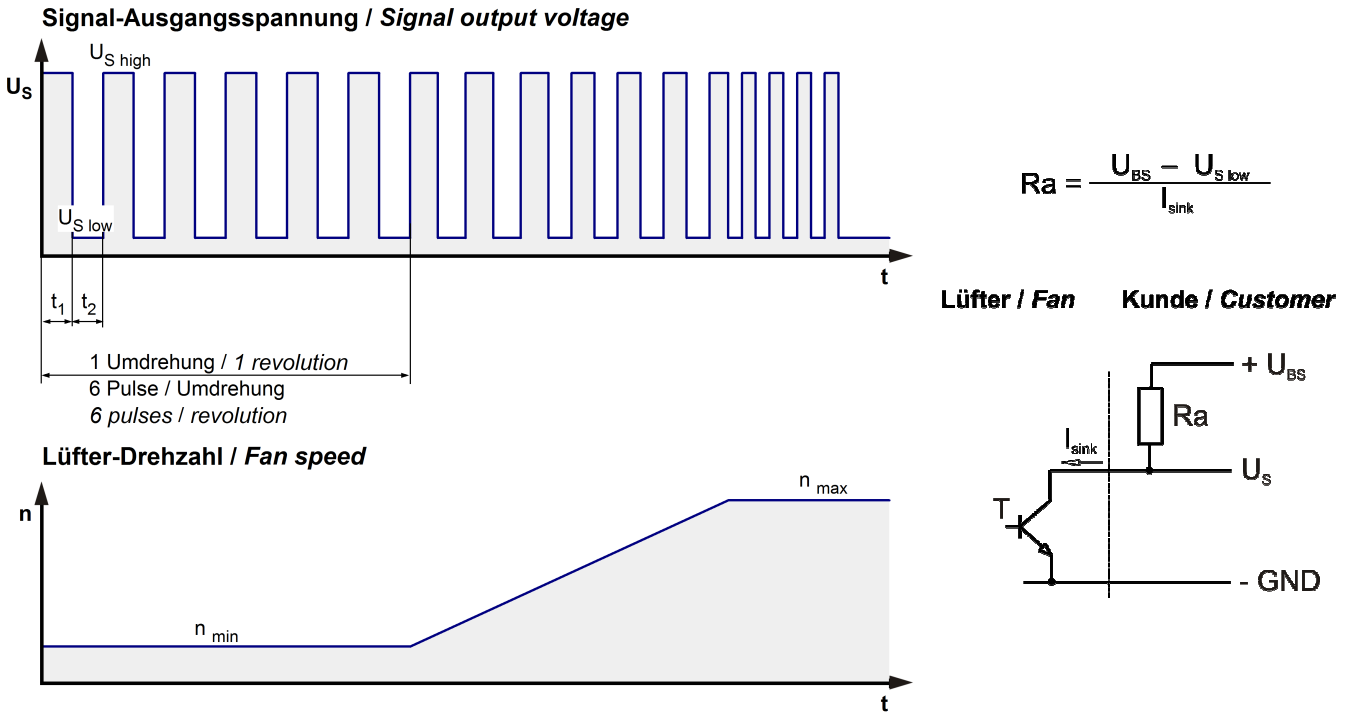
| Name     | Condition           |
|----------|---------------------|
| PWM 0001 | PWM: 95 %; f: 2 kHz |

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

| Features            | Condition      | Symbol         | Values      |             |             |
|---------------------|----------------|----------------|-------------|-------------|-------------|
| Voltage range       |                | U              | 16 V        |             | 36 V        |
| Nominal voltage     |                | U <sub>N</sub> |             | 24,0 V      |             |
| Power consumption   | $\Delta p = 0$ | P              | 37 W        | 70 W        | 70 W        |
| Tolerance           | PWM 0010       |                | +/- 10 %    | +/- 10 %    | +/- 10 %    |
| Current consumption | $\Delta p = 0$ | I              | 2.300 mA    | 2.800 mA    | 1.850 mA    |
| Tolerance           | PWM 0010       |                | +/- 10 %    | +/- 10 %    | +/- 10 %    |
| Speed               | $\Delta p = 0$ | n              | 5.750 1/min | 7.000 1/min | 7.000 1/min |
| Tolerance           | PWM 0010       |                | +/- 7,5 %   | +/- 5 %     | +/- 5 %     |

### 3.3 Electrical Interface - Output

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



| Features                  | Note   | Values                        |
|---------------------------|--|-------------------------------|
| Tacho operating voltage   | $U_{BS}$   | $\leq 32\text{ V}$            |
| Tacho signal Low          | $U_{S\ low}$   | $\leq 0,4\text{ V}$           |
| Tacho signal High         | $U_{S\ high}$  | $\leq 32\text{ V}$            |
| 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           | $(6 \times n) / 60$  |                               |
| Tacho isolated from motor | No   |                               |
| Slew rate                 |  | $\Rightarrow 0,5\text{ V/us}$ |

n = revolutions per minute (1/min)

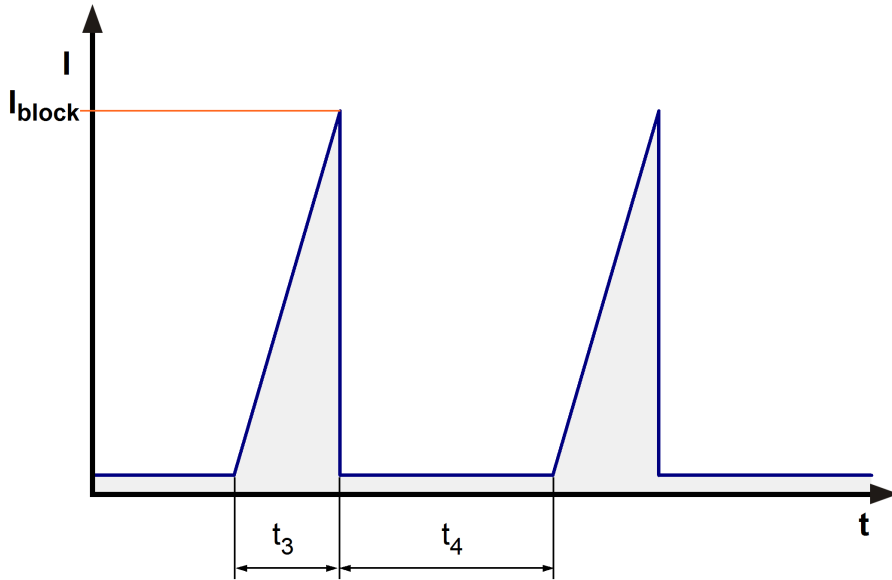
**Please note:**

At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.  
 The tacho signal is only activated after the start-up is completed.

### 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: 4 s / 11,0 s   |  |
| Internal fuse                 | Littelfuse NANO2 > Very Fast-Acting > 451/453 Series<br>10A / 125V (Art.No.: 0451010.MRL) |  |



After 4 unsuccessful start up trys the fan will be turned off for 40 seconds. .

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

### 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;

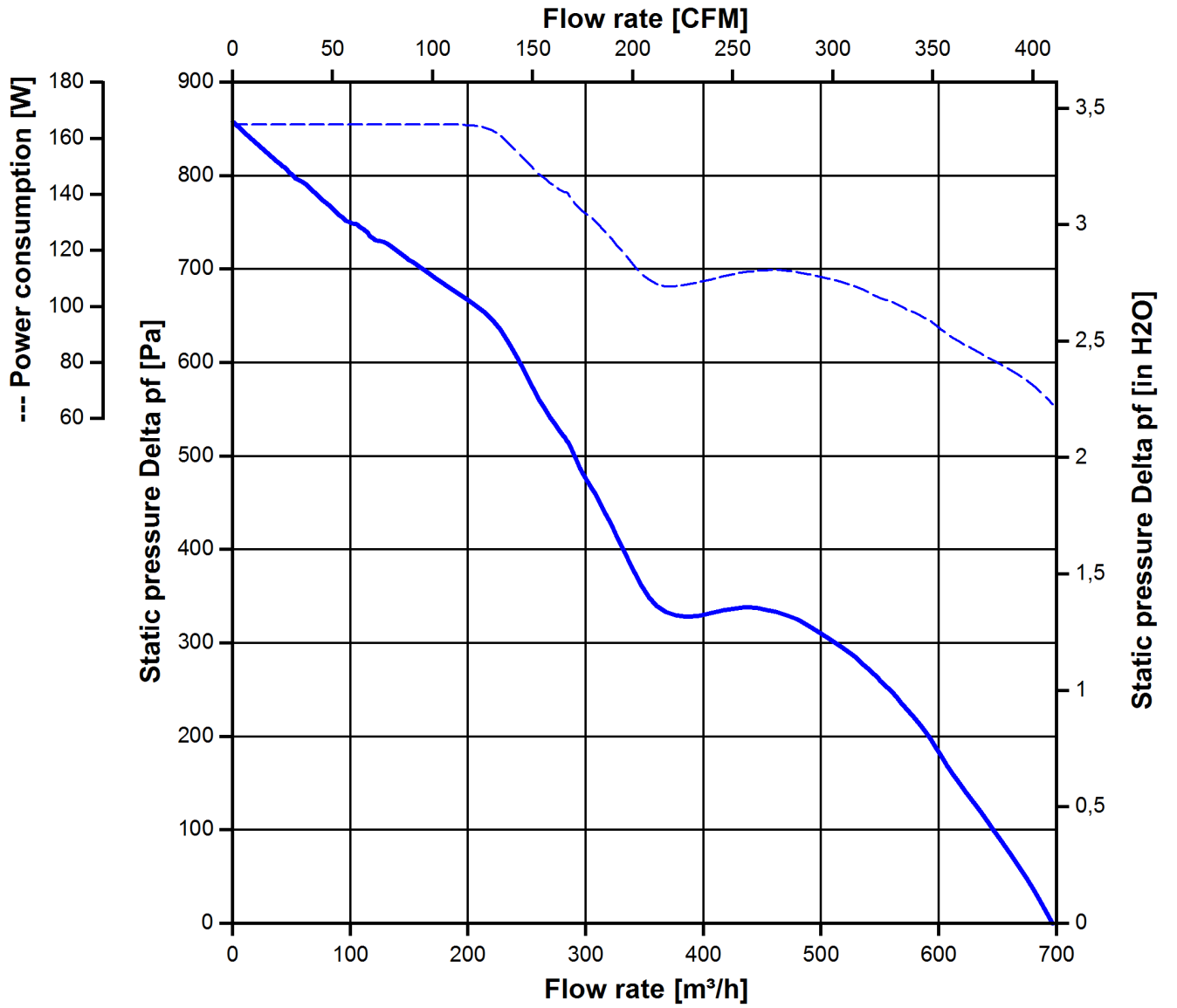
In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.

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. 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:

|   |                    |                       |  |
|---|--------------------|-----------------------|--|
| 7.000 1/min at free air flow                                    | PWM 95 %; f: 2 kHz |                       |  |
| Max. free-air flow ( $\Delta p = 0 / \dot{V} = \text{max.}$ )   |                    | 697 m <sup>3</sup> /h |  |
| Max. static pressure ( $\Delta p = \text{max.} / \dot{V} = 0$ ) |                    | 860 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:

|                              |                    |  |  |
|------------------------------|--------------------|--|--|
| 7.000 1/min at free air flow | PWM 95 %; f: 2 kHz |  |  |
|------------------------------|--------------------|--|--|

|   |                               |  |
|---|-------------------------------|--|
| Optimal operating point   | 680 m <sup>3</sup> /h @ 35 Pa |  |
| Sound power level at the optimal operating point                | 8 bel(A)                      |  |
| Sound pressure level at free air flow, measured in rubber bands | 68 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

|                                |   |  |
|--------------------------------|---|--|
| IP-protection type (certified) | IP 68 (for fan only, not for connector if applicable) **)   |  |
| 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 |  |
| 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.

\*\*\*) The specification of the IP protection refers to the conditions mentioned in certification of the fan. The above mentioned short description of the protection scope is not final. For detailed information of the respective protection scope and definitions, see certification as well as DIN EN 60529 (protection by housings) and ISO 20653 (for vehicles) with the letter K.

#### **Short description of the IP-protection type:**

Solid particle Protection: Dust tight.

Protection against deliberate contact: Protected against contact to hazardous parts with a wire.

Protection against water: The fan test according to IP68 (Based on IEC 60529), is conducted in non-operating mode. The fan is tested by a complete immersion in water for a period of 2h at a water-level of 1,2m. Electrical connections are not immersed since they are customer specific.

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

#### 4.3 EMC

|                        |   |
|------------------------|---|
| <b>Kind</b>            | <b>Radiated Emission; 30 MHz - 1000 MHz</b> |
| Accordinging           | DIN EN 55032:2016-02                        |
| Check accuracy / Limit | Class A                                     |
| Result                 | Below limit Class B                         |

|                        |  |
|------------------------|--|
| <b>Kind</b>            | <b>Electrostatic Discharge Immunity Test</b>   |
| Accordinging           | DIN EN 61000-4-2:2001-12   |
| Check 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. |

|                        |  |
|------------------------|--|
| <b>Kind</b>            | <b>Electromagnetic Field Immunity Test</b>   |
| Accordinging           | DIN EN 61000-4-3:2006-12   |
| Check accuracy / Limit | 10 V/m; 80 - 1000 MHz; AM; m = 0,8; f = 1 kHz; 1%; t = 3 s                                 |
| Result                 | A: The monitored function operates as designed during and after exposure to a disturbance. |

|                        |  |
|------------------------|--|
| <b>Kind</b>            | <b>Electrical Fast Transient / Burst Immunity Test</b>                                     |
| Accordinging           | DIN EN 61000-4-4:2005-07   |
| Check accuracy / Limit | +/- 2 kV on Power Lines; Coupling: POS, NEG, {PE}, ALL, 5 kHz and 100 kHz; 1 min           |
| Result                 | A: The monitored function operates as designed during and after exposure to a disturbance. |

|                        |  |
|------------------------|--|
| <b>Kind</b>            | <b>Immunity to Conducted Disturbances, Induced by RF-Fields</b>                            |
| Accordinging           | DIN EN 61000-4-6:2001-12   |
| Check accuracy / Limit | 10 V <sub>rms</sub> ; 150 kHz - 80 MHz; m = 0,8; f = 1 kHz; 1%; t = 3 s                    |
| 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. | 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.  | 850 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 / 1,2 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  |

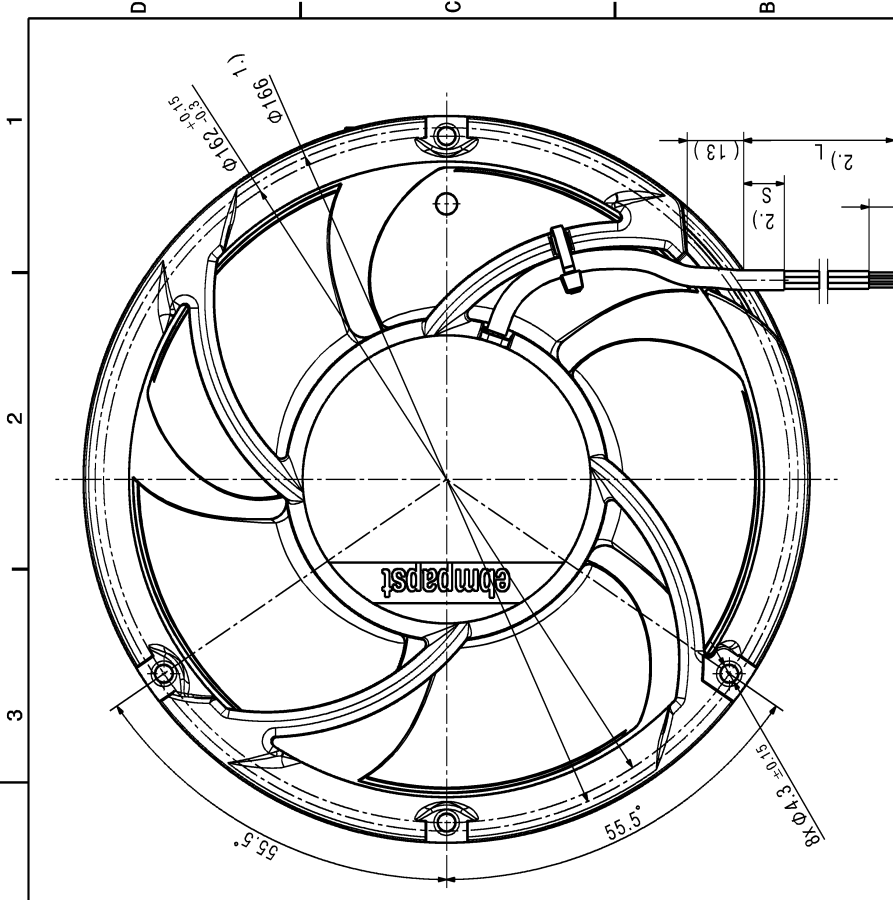
The approval tests are observed to:

U approval max.: 36,0 V @ TU approval max.: 65 °C

## 6 Reliability

### 6.1 General

|  |           |  |
|--|-----------|--|
| Life expectancy L10 at TU = 40 °C                  | 62.500 h  |  |
| Life expectancy L10 at TU max.                     | 35.000 h  |  |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 105.000 h |  |



Erdungsschraube Duo-Tapflite nach DIN 7500; CM 4x8; Torx nur wenn in Unterstückliste enthalten. Grounding screw Duo-Tapflite according to DIN 7500; CM 4x8; Torx only if contained in subbill of material.

- Axialspiel der Kugellager mit Feder spielfrei verspannt.
- 1.) Maße für Montageausschnitt
- 2.) Anzahl und Länge der Litzen und des Schlauchs siehe Produktspezifikation.
- Ball bearings without axial clearance by a pre-loaded spring.
- 1.) Dimensions for mounting cut-out.
- 2.) Number and length of wires and tube see product specification.

|  |   |   |  |
|--|---|---|--|
| Dokument Status / Document Status<br>Approved / Geprüft<br>Change No. / Änderung Nr. | CAD-Modell / CAD-Environment<br>3D-Referenzmodell / 3D-Referenzmodell<br>Name / Name<br>Date / Datum<br>Drawn / Gezeichnet<br>Checked / Geprüft<br>Date / Datum | Hersteller / Material:<br>Volumen / Volume (l) (m³):<br>Gewicht / Mass (g):   | Artikel / Title:<br>Zeich. Nr. / Drawing No.:<br>Ers. / Zeich. / Revision:<br>Dokument / Blatt / Page:<br>Index / Index:<br>Formel / Size:<br>Messstab / Scale |
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