

Product Data Sheet 6318/2TDHHPR-036

**ebm****papst**

The engineer's choice



**6318/2TDHHPR-036****INDEX**

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**1 General**

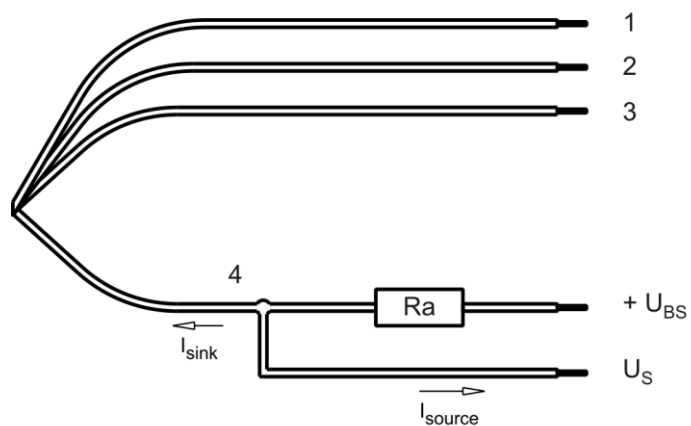
|                                     |                        |  |
|-------------------------------------|------------------------|--|
| Fan type                            | Fan                    |  |
| Rotating direction looking at rotor | Counterclockwise       |  |
| Airflow direction                   | 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                                                                | 0,880 kg                                                                                                                             |  |
| Housing material                                                    | Metal                                                                                                                                |  |
| Impeller material                                                   | Plastic                                                                                                                              |  |
| Max. torque when mounted across both mounting flanges<br>Screw size | Wire outlet corner: 600 Ncm<br>Remaining corners: 600 Ncm<br>ISO 4762 - M4 degreased, without an additional brace and without washer |  |

**2.2 Connections**

|                       |              |  |
|-----------------------|--------------|--|
| Electrical connection | Wires - Plug |  |
| Lead wire length      | L = 340 mm   |  |
| Tolerance             | + - 10,0 mm  |  |
| Tube length           | S = 280 mm   |  |
| Tolerance             | + - 10 mm    |  |
| Plug                  | See drawing  |  |
| Contact               | See drawing  |  |



| Wire | Color  | Operation | Plug connection | Wire size | Insulation diameter |
|------|--------|-----------|-----------------|-----------|---------------------|
| 1    | red    | + UB      | Pin 1           | AWG 22    | 1,7 mm              |
| 2    | black  | - GND     | Pin 2           | AWG 22    | 1,7 mm              |
| 3    | yellow | Tacho     | Pin 3           | AWG 22    | 1,7 mm              |
| 4    | blue   | PWM       | Pin 4           | AWG 22    | 1,7 mm              |

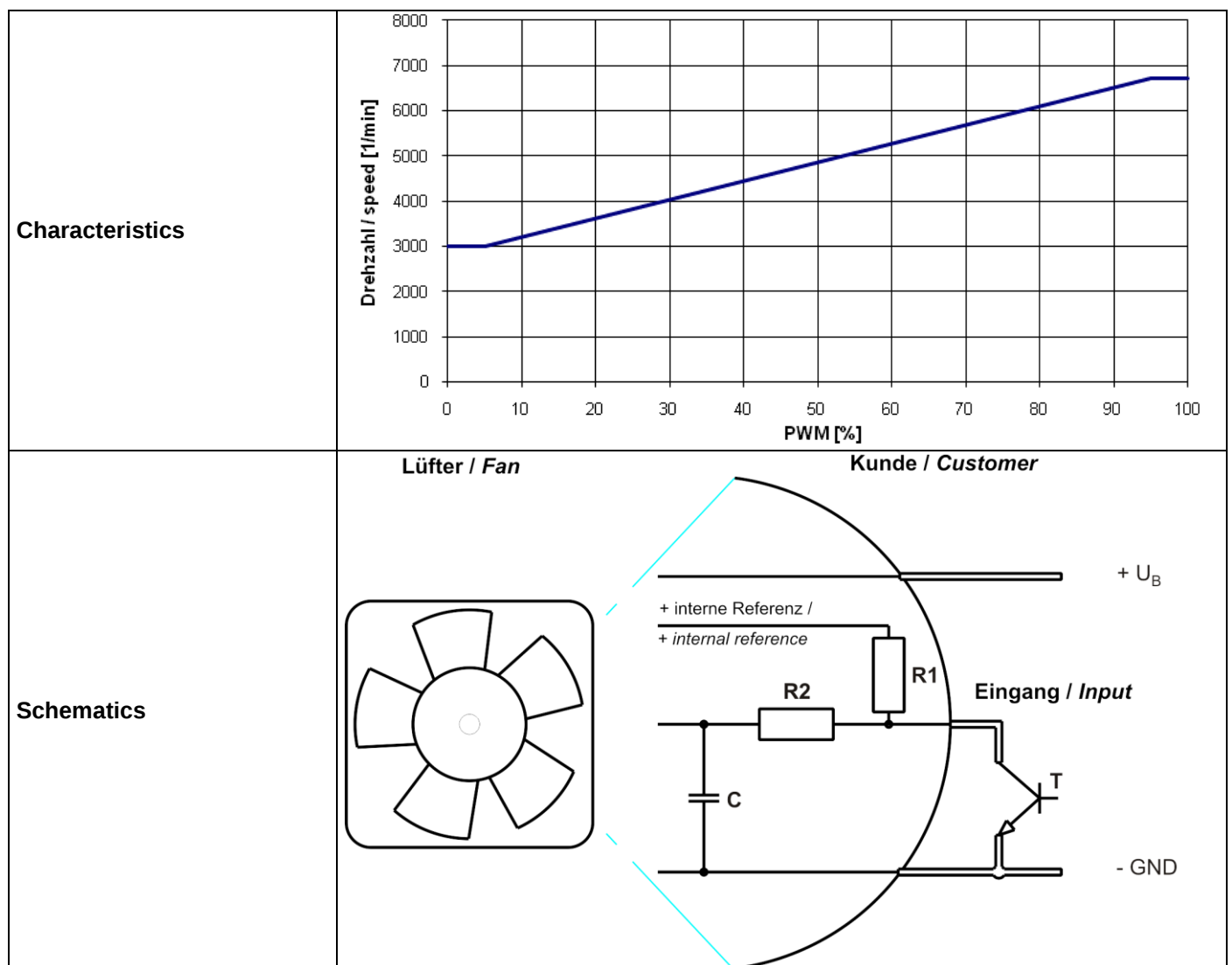
### 3 Operating Data

#### 3.1 Electrical Interface - Input

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

#### Features

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



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

#### Information to the curve:

|                  |                                           |
|------------------|-------------------------------------------|
| 0 % - 5% PWM:    | 3.000 1/min (corresponding to min. speed) |
| 5 % - 95% PWM:   | linear increasing curve                   |
| 95 % - 100% PWM: | 6.700 1/min (corresponding to max. speed) |

**Transistor requirements:**Vce max.  $\geq 12\text{V}$ ; Isink max.  $\geq 5\text{mA}$ Vce sat.  $\leq 0,15\text{V}$ **3.2 Electrical Operating Data**

Measurement conditions: Normal air density =  $1,2\text{ kg/m}^3$ ; Temperature  $23^\circ\text{C} \pm 3^\circ\text{C}$ ; 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  $0,5\text{ m}$ .

$\Delta p = 0$ : corresp. to free air flow (see chapter aerodynamics)

I: corresp. to arithm. mean current value

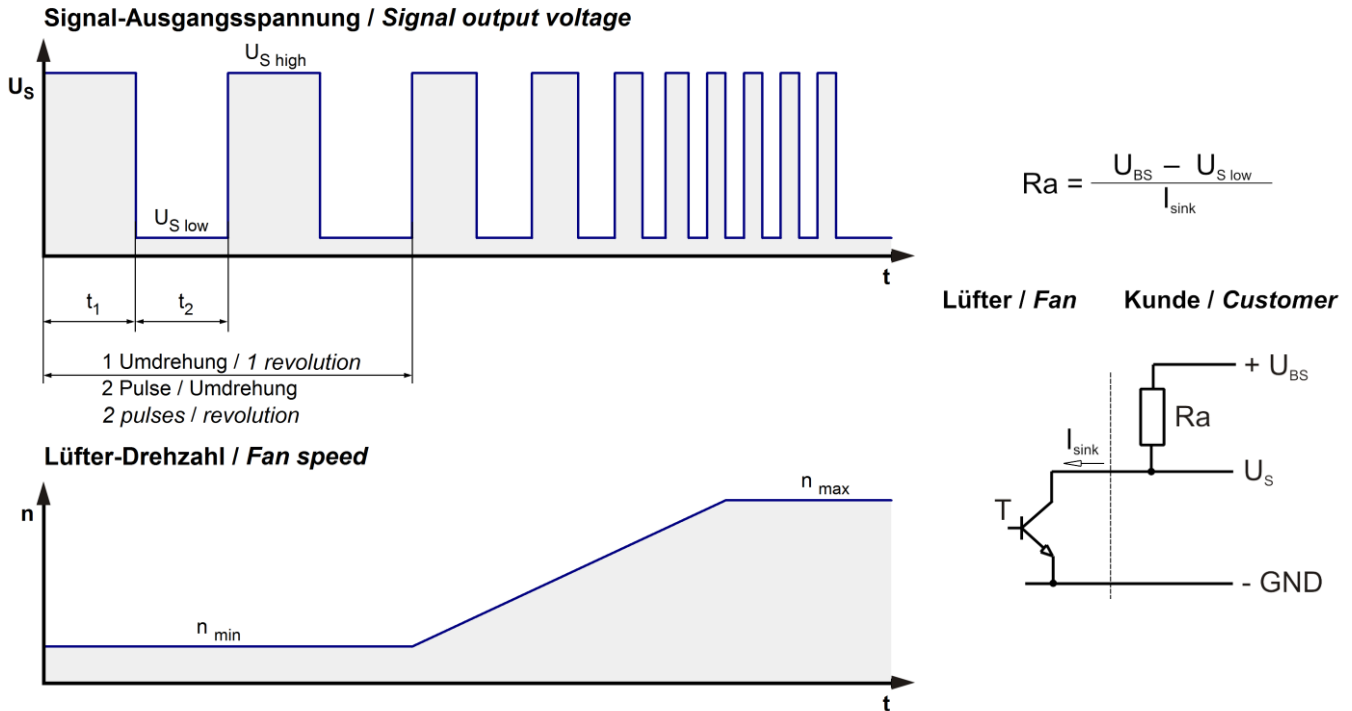
| Name     | Condition           |
|----------|---------------------|
| PWM 0001 | PWM: 97 %; f: 2 kHz |

>95% PWM; f = 2 kHz or broken lead wire (open control input)

| Features            | Condition      | Symbol | Values      |             |             |
|---------------------|----------------|--------|-------------|-------------|-------------|
| Voltage range       |                | U      | 36 V        |             | 72 V        |
| Nominal voltage     |                | $U_N$  |             | 48 V        |             |
| Power consumption   | $\Delta p = 0$ | P      | 66 W        | 127 W       | 124 W       |
| Tolerance           | PWM 0010       |        | $\pm 10\%$  | $\pm 10\%$  | $\pm 10\%$  |
| Current consumption | $\Delta p = 0$ | I      | 1.830 mA    | 2.650 mA    | 1.720 mA    |
| Tolerance           | PWM 0010       |        | $\pm 10\%$  | $\pm 10\%$  | $\pm 10\%$  |
| Speed               | $\Delta p = 0$ | n      | 5.450 1/min | 6.700 1/min | 6.700 1/min |
| Tolerance           | PWM 0010       |        | $\pm 7,5\%$ | $\pm 5\%$   | $\pm 5\%$   |

### 3.3 Electrical Interface - Output

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



| Features                  | Note                                                                                   | Values                  |
|---------------------------|----------------------------------------------------------------------------------------|-------------------------|
| Tacho operating voltage   | $U_{BS}$                                                                               | $\leq 60,0 \text{ V}$   |
| Tacho signal Low          | $U_{S \text{ low}}$                                                                    | $\leq 0,4 \text{ V}$    |
| Tacho signal High         | $U_{S \text{ high}}$                                                                   | $\leq 60,0 \text{ V}$   |
| Maximum sink current      | $I_{\text{sink}}$                                                                      | $\leq 20 \text{ mA}$    |
| External resistor         | External resistor $R_a$ from $U_{BS}$ to $U_S$ required. All voltages measured to GND. |                         |
| Tacho frequency           | $(2 \times n) / 60$                                                                    | 223 Hz @ 6.700 1/min    |
| Tacho isolated from motor | No                                                                                     |                         |
| Slew rate                 |                                                                                        | $\geq 0,5 \text{ V/us}$ |

$n$  = revolutions per minute (1/min)

#### Please note:

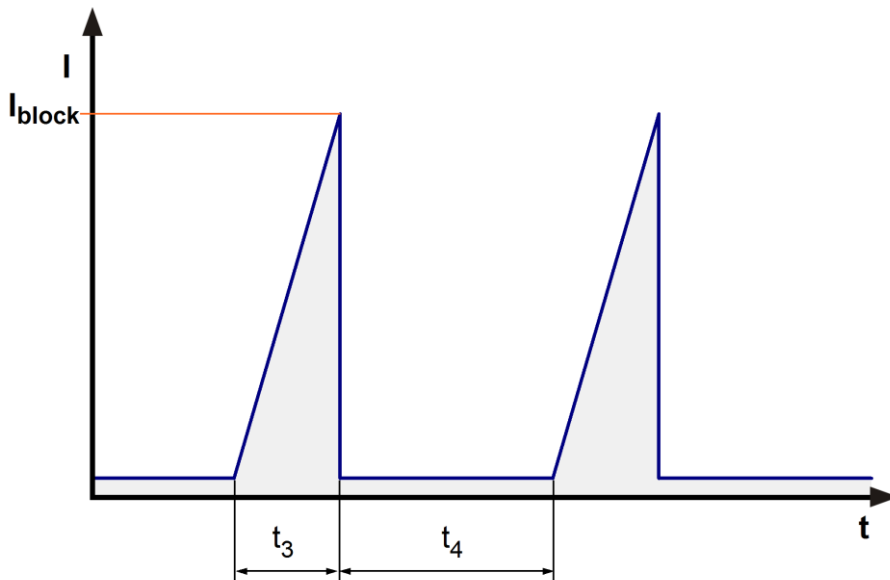
At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.

The tacho signal is only activated after the start-up is completed.

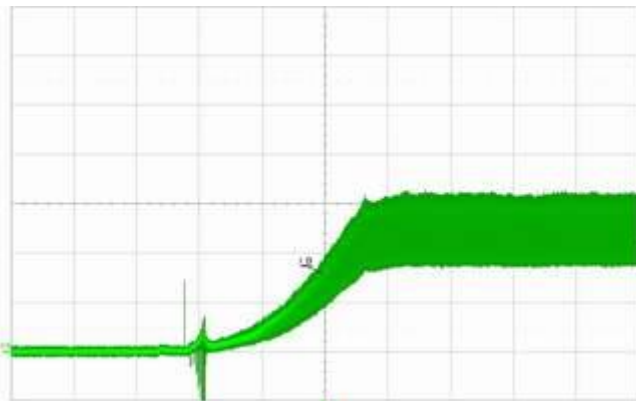
### 3.4 Electrical Features

|                                |                                                                                                                       |  |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|--|
| 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 $U_N$  | $I_{\text{block}}$ approx. 1.700 mA                                                                                   |  |
| Clock signal at locked rotor   | $t_3 / t_4$ typical: 6 s / 10 s                                                                                       |  |
| Internal fuse                  | Littelfuse NANO2 > Very Fast-Acting > 451/453 Series<br>6,3A / 125V (Art.No.: 045106.3MRL)                            |  |
| Voltage control *)             | Fan turns on at $U_B > 33 \text{ V}$ or $< 78 \text{ V}$<br>Fan turns off at $U_B < 31 \text{ V}$ or $> 80 \text{ V}$ |  |

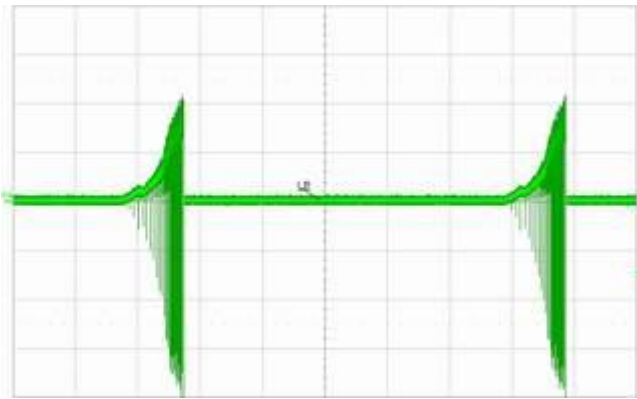
\*) This fan has an undervoltage and overvoltage control circuit integrated which turns the motor off if the voltage is out of range.



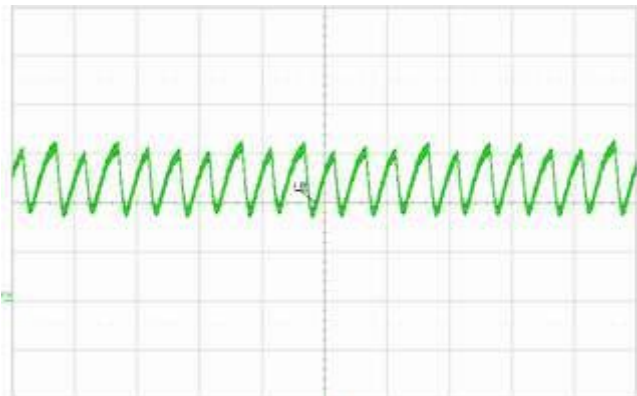
This fan has a startup delay of 2 seconds after applying supply voltage.



Start-up current at  $U_B=48\text{V}$ ;  $I=1\text{A/div}$ ,  $t=5\text{s/div}$



Locked rotor current at UB=48V; I=500mA/div, t=2s/div



Running current at UB=48V; 6.700 1/min; I=1A/div, t=1ms/div

### 3.5 Data According ErP Directive

|                                    |             |
|------------------------------------|-------------|
| Installation / Efficiency category | A / static  |
| Speed control                      | integrated  |
| Specific ratio                     | 1,00354     |
| Target overall efficiency 2015     | 28,4 %      |
| Overall efficiency                 | 42,4 %      |
| Efficiency grade                   | 40          |
| Power input                        | 147 W       |
| Speed                              | 6.719 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/m<sup>3</sup>; Temperature 23°C +/- 3°C;

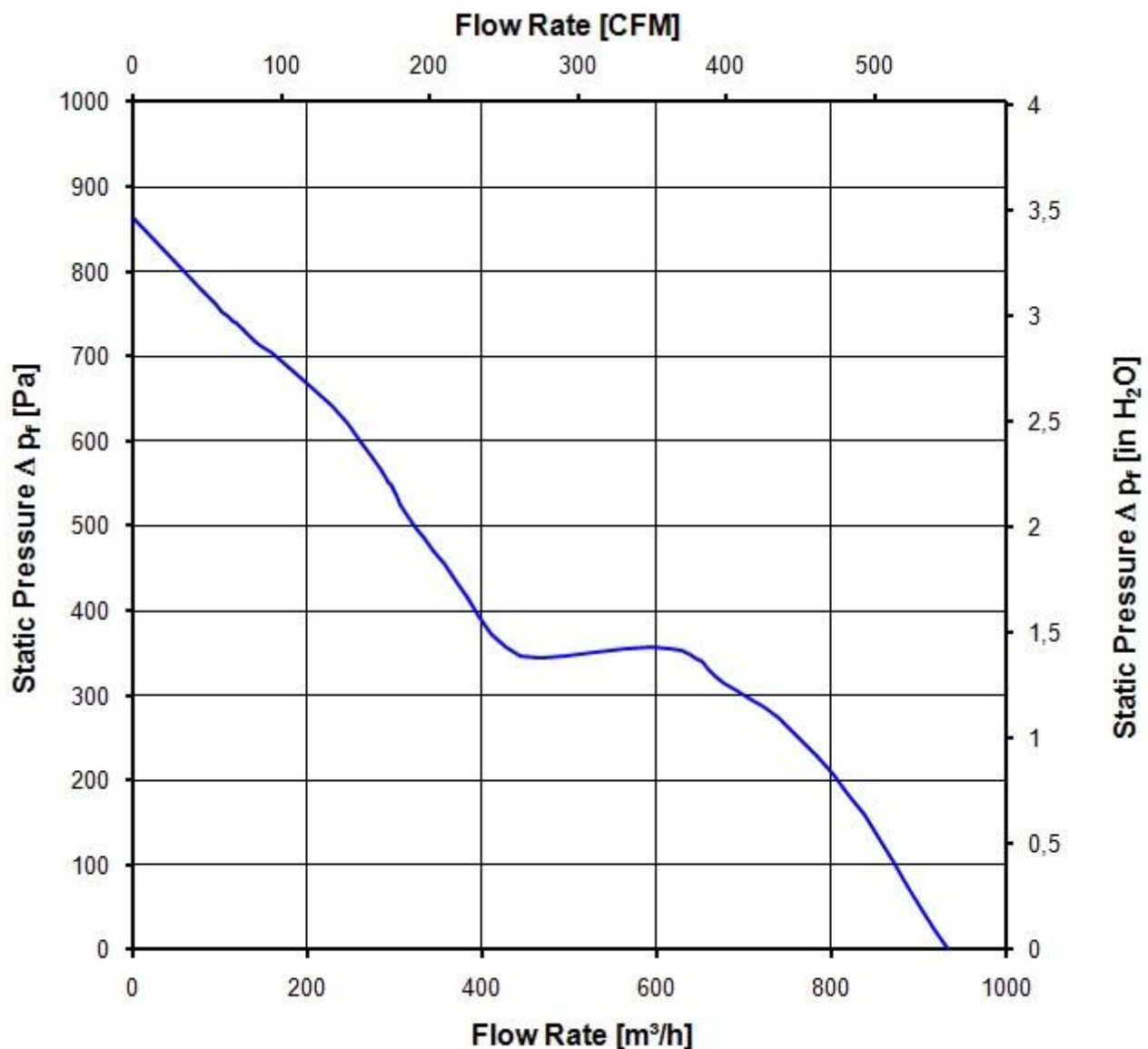
In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.

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:

|                              |                    |  |  |
|------------------------------|--------------------|--|--|
| 6.700 1/min at free air flow | PWM 97 %; f: 2 kHz |  |  |
|------------------------------|--------------------|--|--|

|                                                                   |                       |  |
|-------------------------------------------------------------------|-----------------------|--|
| Max. free-air flow ( $\Delta p = 0$ / $\dot{V} = \text{max.}$ )   | 930 m <sup>3</sup> /h |  |
| Max. static pressure ( $\Delta p = \text{max.}$ / $\dot{V} = 0$ ) | 860 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:

|                              |                    |  |  |
|------------------------------|--------------------|--|--|
| 6.700 1/min at free air flow | PWM 97 %; f: 2 kHz |  |  |
|------------------------------|--------------------|--|--|

|                                                                 |                                |  |
|-----------------------------------------------------------------|--------------------------------|--|
| Optimal operating point                                         | 800 m <sup>3</sup> /h @ 184 Pa |  |
| Sound power level at the optimal operating point                | 8,2 bel(A)                     |  |
| Sound pressure level at free air flow, measured in rubber bands | 73,0 dB(A)                     |  |

## 4 Environment

### 4.1 General

|                                            |        |  |
|--------------------------------------------|--------|--|
| Min. permitted ambient temperature TU min. | -20 °C |  |
| Max. permitted ambient temperature TU max. | 75 °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/m2d, 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.

### 4.3 EMC

|                        |                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------|
| <b>Kind</b>            | <b>Electrostatic Discharge Immunity Test</b>                                               |
| According              | 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. |

## 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. | 1000 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.                                                                                                    | 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                  | 62.500 h  |  |
| Life expectancy L10 at TU max.                     | 32.500 h  |  |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 105.000 h |  |

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Electromechanik nach DIN EN ISO 9001:2015  
Bewertung in Prozenten der Anzahl der Fehler

