

Product Data Sheet

9295420021
VWS0148XULDS
6318/2TDH4P

ebmpapst

The engineer's choice



6318/2TDH4P

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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 | |

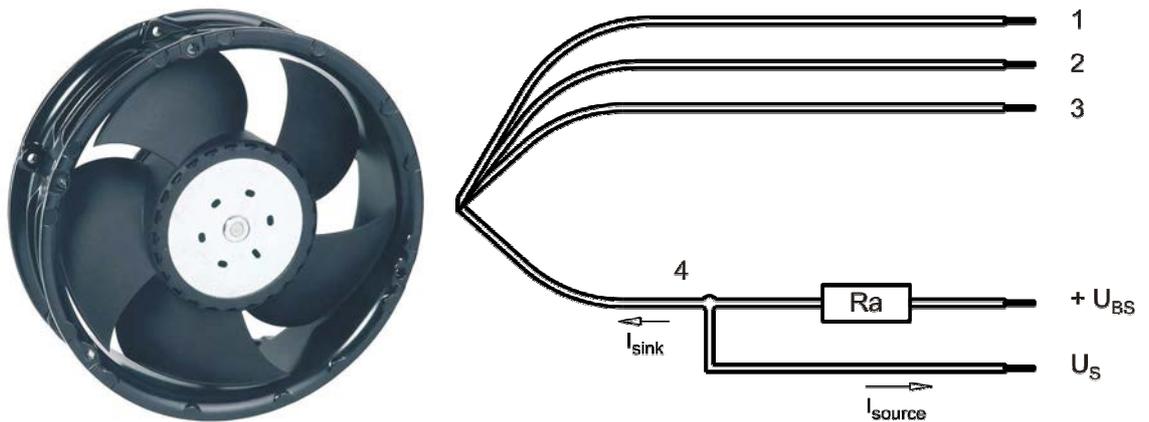
2 Mechanics

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 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.

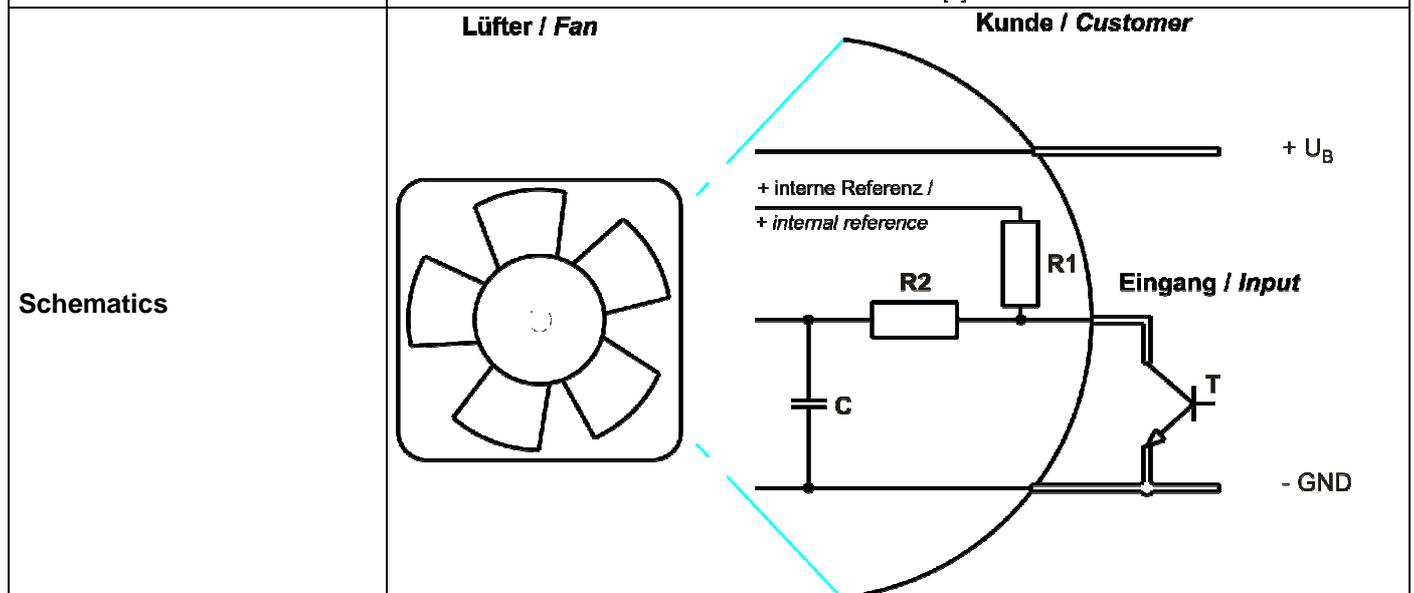
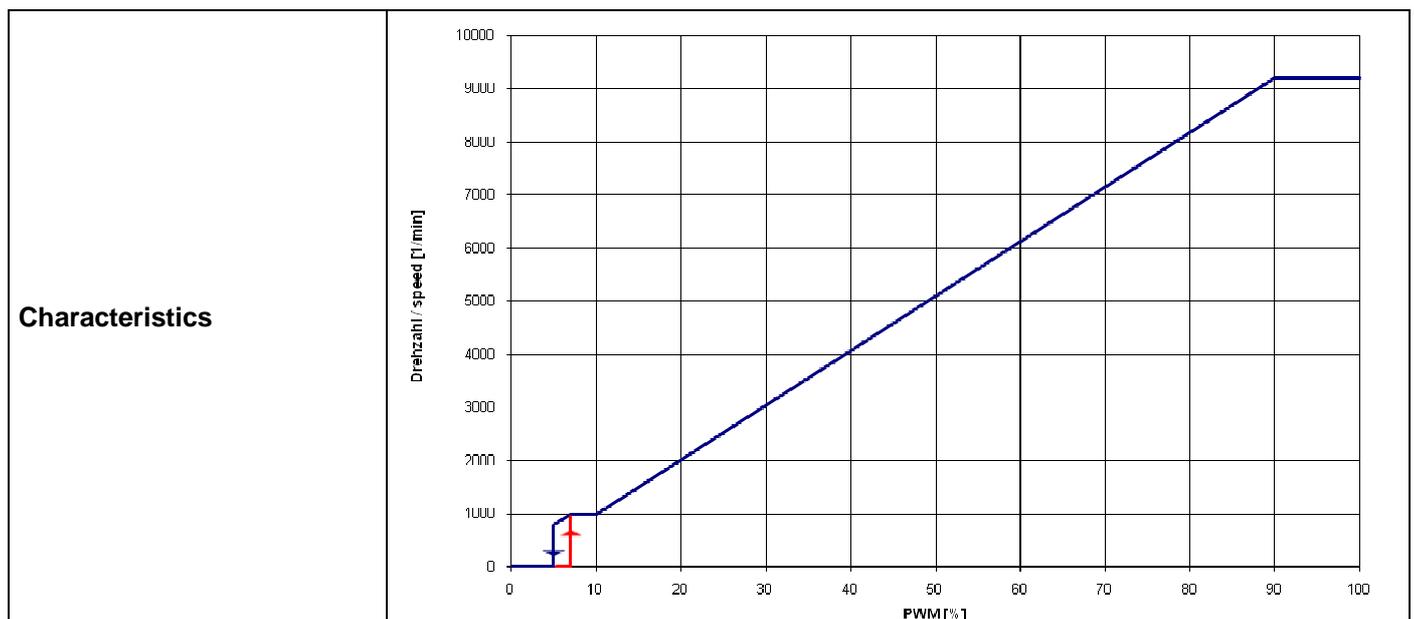
3 Operating Data

3.1 Electrical Interface - Input

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

Features

| | | |
|-----------------|----------------|----------------------------------|
| Input type | Open collector | |
| PWM - Frequency | | 1 kHz - 20 kHz typical: 2 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 (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: | 9.200 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. \geq 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.

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

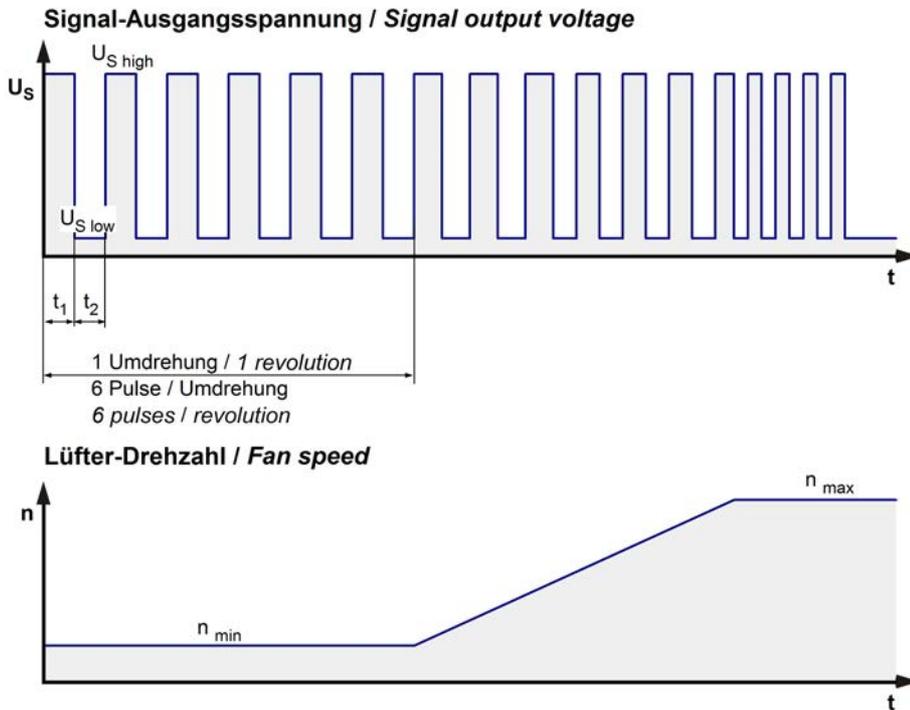
| Name | Condition |
|----------|---------------------|
| PWM 0001 | PWM: 95 %; f: 2 kHz |

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

| Features | Condition | Symbol | Values | | |
|----------------------------------|----------------------------|----------------|--------------------------|------------------------|------------------------|
| Voltage range | | U | 36 V | | 72 V |
| Nominal voltage | | U _N | | 48 V | |
| Power consumption Tolerance | $\Delta p = 0$ PWM 0010 | P | 106 W +/- 10 % | 150 W +/- 10 % | 160 W +/- 10 % |
| Current consumption Tolerance | $\Delta p = 0$ PWM 0010 | I | 3.000 mA +/- 10 % | 3.100 mA +/- 10 % | 2.200 mA +/- 10 % |
| Speed Tolerance | $\Delta p = 0$ PWM 0010 | n | 8.300 1/min +/- 7,5 % | 9.200 1/min +/- 5 % | 9.200 1/min +/- 5 % |

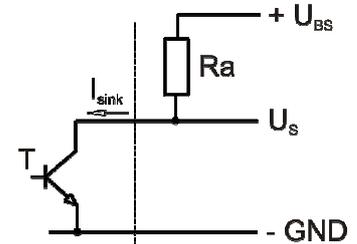
3.3 Electrical Interface - Output

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



$$R_a = \frac{U_{BS} - U_{S\ low}}{I_{sink}}$$

Lüfter / Fan Kunde / Customer



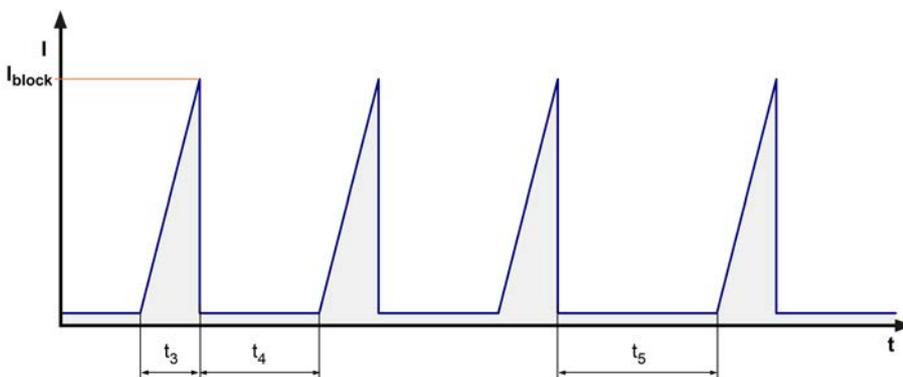
| Features | Note | Values |
|---------------------------|--|----------------------------|
| Tacho operating voltage | U_{BS} | $\leq 60\ V$ |
| Tacho signal Low | $U_{S\ low}$ | $\leq 0,4\ V$ |
| Tacho signal High | $U_{S\ high}$ | $\leq 60\ V$ |
| Maximum sink current | I_{sink} | $\leq 20\ mA$ |
| External resistor | External resistor R_a from U_{BS} to U_S required. All voltages measured to GND. | |
| Tacho frequency | $(6 \times n) / 60$ | 920 Hz @ 9.200 1/min |
| Tacho isolated from motor | No | |
| Slew rate | | $\Rightarrow 0,5\ V/\mu s$ |

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} | |
| Clock signal at locked rotor Extended Downtime | t_3 / t_4 typical: 1,5 s / 10,0 s t_5 : 40 s after 4 start-up tests | |
| Internal fuse | Littelfuse NANO2 > Very Fast-Acting > 451/453 Series 10A / 125V (Art.No.: 0451010.MRL) | |
| Voltage control *) | Fan turns on at $U_B > 32 \text{ V}$ or $< 76 \text{ V}$ Fan turns off at $U_B < 30 \text{ V}$ or $> 78 \text{ V}$ | |

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

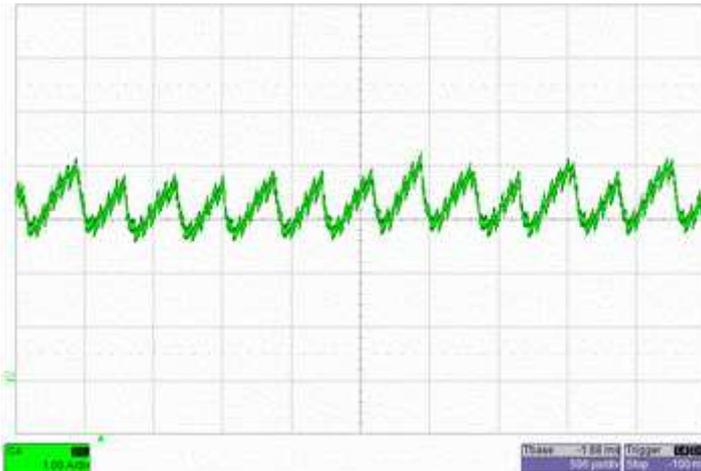


First locked rotor off time T4 is reduced to 3 seconds.

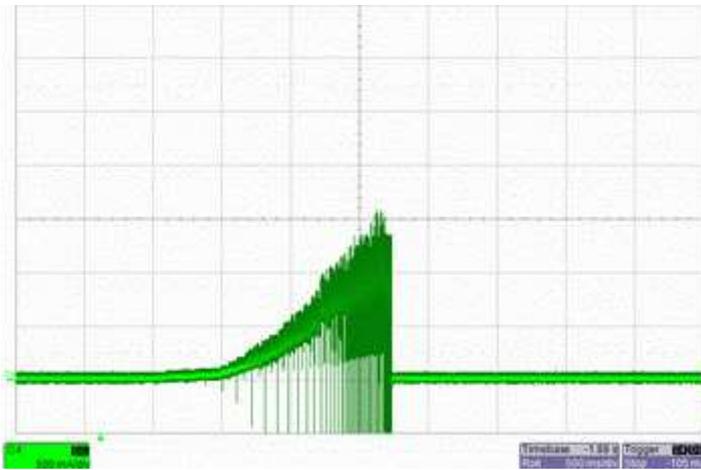
This fan has a startup delay of 2 seconds after applying supply voltage.



Start-up current @ 48 V (I = 1A/div ; t = 2s/div)



Running current @ 48 V (I = 1A/div ; t = 500us/div)



Locked rotor current @ 48 V (I = 500mA/div ; t = 500ms/div)

3.5 Data According ErP Directive

| | |
|------------------------------------|-------------|
| Installation / Efficiency category | A / static |
| Speed control | integrated |
| Specific ratio | 1,00569 |
| Target overall efficiency 2015 | 29,8 % |
| Overall efficiency | 42,9 % |
| Efficiency grade | 40 |
| Power input | 245 W |
| Speed | 9.360 1/min |

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

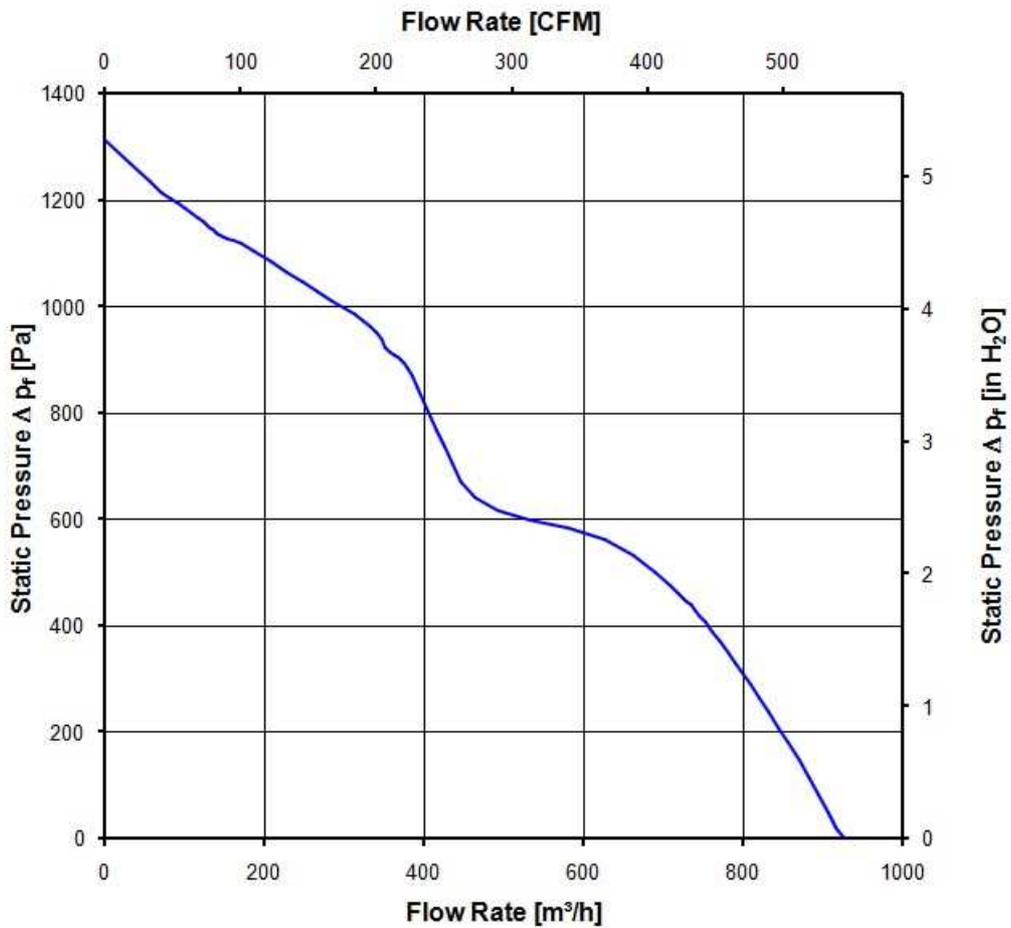
3.6 Aerodynamics

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.

a.) Operation condition:

| | | | |
|------------------------------|--------------------|--|--|
| 9.200 1/min at free air flow | PWM 95 %; f: 2 kHz | | |
|------------------------------|--------------------|--|--|

| | | |
|---|-----------------------|--|
| Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$) | 930 m ³ /h | |
| Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$) | 1.310 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:

| | | | |
|------------------------------|--------------------|--|--|
| 9.200 1/min at free air flow | PWM 95 %; f: 2 kHz | | |
|------------------------------|--------------------|--|--|

| | | | |
|---|-------------------------------|--|--|
| Optimal operating point | 910 m ³ /h @ 34 Pa | | |
| Sound power level at the optimal operating point | 8,6 bel(A) | | |
| Sound pressure level at free air flow, measured in rubber bands | 75,0 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, 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) | |
| 0,5 G | Vibration (sinusoidal) in use IEC 60068-2-6 Displacement / frequency range Acceleration / frequency range Sweep rate Sweep cycles Duration Axes of vibration | Vibration (sinusoidal) 0,035 mm / 10-60, 60-10 Hz 0,5 G / 60-500-60 Hz 1 Oct./min 10 2 hrs. 3 |

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

| | | |
|------------------------------|--|---|
| severity level | Railroad application | |
| 1 IEC 61373 Category 1 | Random vibration in use IEC 60068-2-64 Frequency range / ASD | Random vibration 5 - 20 Hz : 2,0 m ² / s ³ |

| | | |
|---------|---|--|
| Class B | G _{RMS} Axes of vibration Test duration | 20- 150 Hz : - 3 dB / Oct 0,83 G 3 3 x 5 h |
| | Shock in use IEC 60068-2-27 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps | Shock half sine 7 G 18 ms 10 in each direction 60 |

Notice:

In the case of external excitation, noise may increase due to resonance vibrations. Under this conditions the fan should not be operated in the resonance range.

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 | |

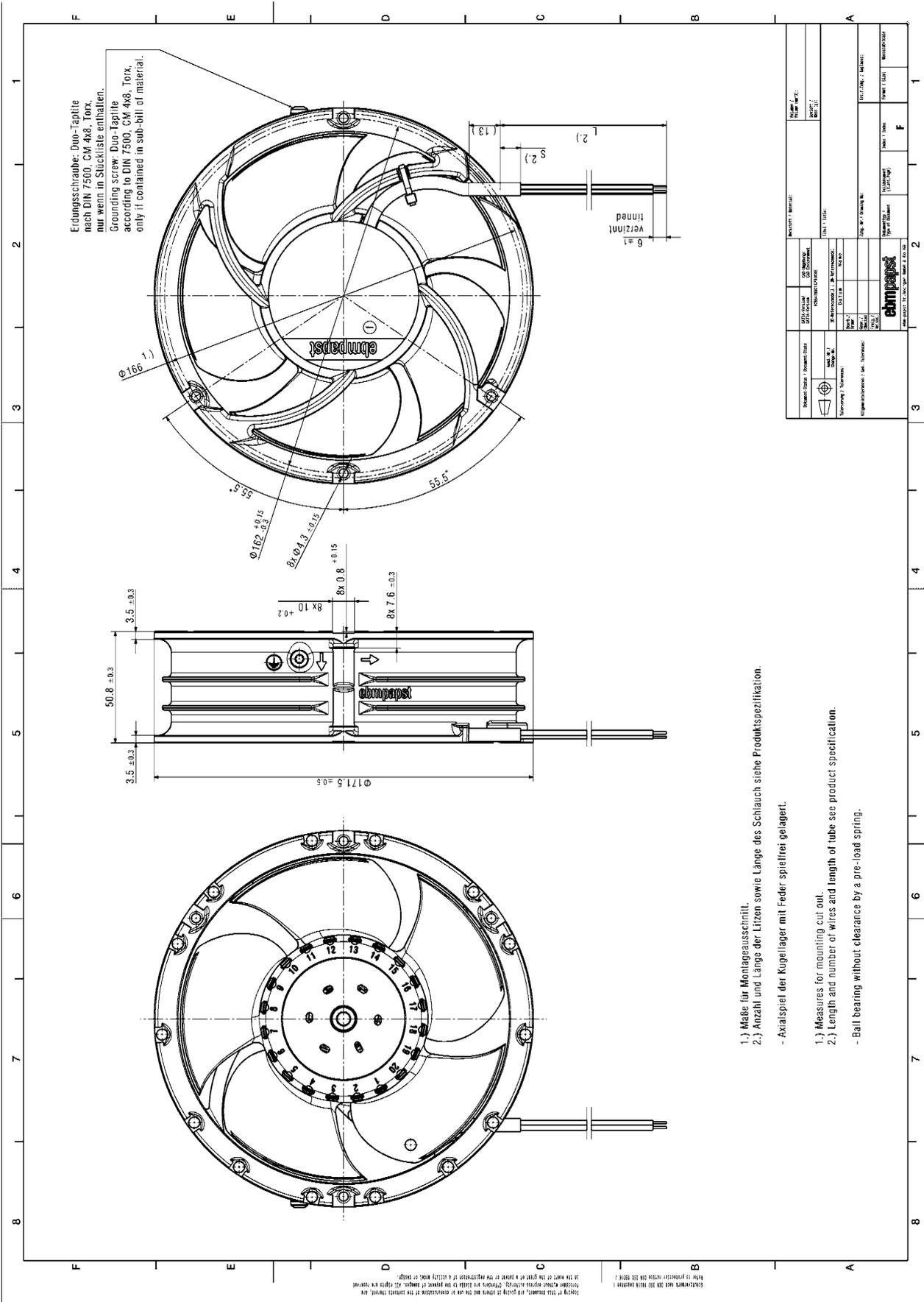
5.2 Approval Tests

| | | |
|-----|---|---|
| CE | EC Declaration of Conformity | Yes |
| EAC | Eurasian Conformity | Yes |
| UL | Underwriters Laboratories | Yes / UL507, Electric Fans E38324 |
| 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 | 52.500 h | |
| Life expectancy L10 at TU max. | 20.000 h | |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 87.5 00 h | |



Erdungsschraube: Duo-Tapitie
 nach DIN 7500, CW 4x8, Torx,
 nur wenn in Stückliste enthalten.
 Grounding screw: Duo-Tapitie
 according to DIN 7500, CW 4x8, Torx,
 only if contained in sub-bill of material.

| | | | |
|---|--|---|--|
| ebmpapst Fans & Ventilatoren Fans and Blowers Ventilatoren und Gebläse Fans and Blowers | | ebmpapst Fans & Ventilatoren Fans and Blowers Ventilatoren und Gebläse Fans and Blowers | |
| Produkt / Product 6318/2TDH4P(9295420021) | | Produkt / Product 6318/2TDH4P(9295420021) | |
| Zeichnung / Drawing 6318/2TDH4P(9295420021) | | Zeichnung / Drawing 6318/2TDH4P(9295420021) | |
| Maßstab / Scale 1:1 | | Maßstab / Scale 1:1 | |
| Datum / Date 2023-08-15 | | Datum / Date 2023-08-15 | |
| Gezeichnet / Drawn J. Müller | | Gezeichnet / Drawn J. Müller | |
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