

Product Data Sheet

9695480305

VWS0148PULCZ

6318N/2H3P-305

ebmpapst

The engineer's choice



6318N/2H3P-305

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 9

3.5 Aerodynamics 10

3.6 Sound Data..... 11

4 Environment..... 11

4.1 General..... 11

4.2 Climatic Requirements 11

4.3 EMC 11

5 Safety..... 13

5.1 Electrical Safety 13

5.2 Approval Tests 13

6 Reliability..... 13

6.1 General..... 13

1 General

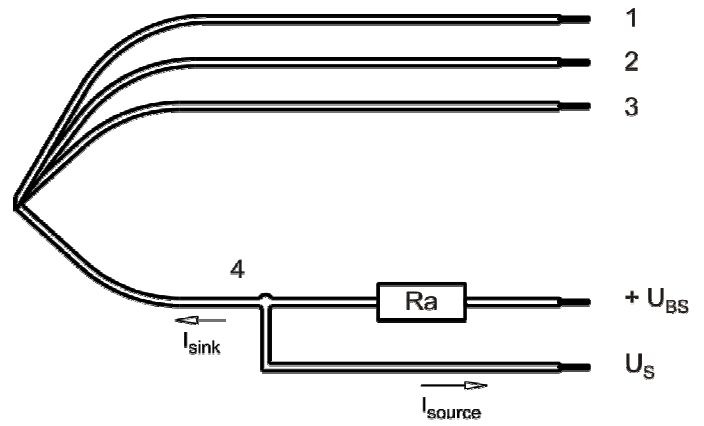
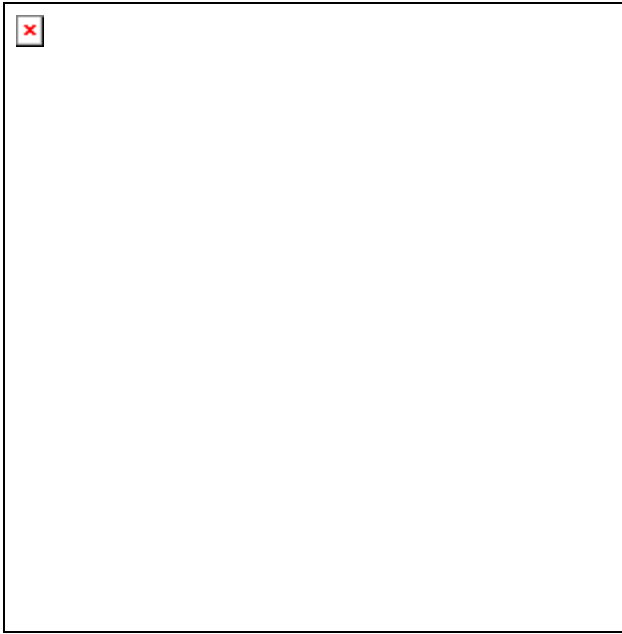
| | | |
|-------------------------------------|------------------------|--|
| Fan type | Fan | |
| Rotating direction looking at rotor | Counterclockwise | |
| Airflow direction | Air outlet over struts | |
| Bearing system | Ball bearing | |
| Mounting position - shaft | Any | |

2 Mechanics**2.1 General**

| | | |
|---|--|--|
| Depth | 51,0 mm | |
| Diameter | 172,0 mm | |
| Mass | 0,750 kg | |
| Housing material | Metal | |
| Impeller material | Plastic | |
| Max. torque when mounted across both mounting flanges Screw size | Wire outlet corner: 600 Ncm Remaining corners: 600 Ncm 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 | + - 5,0 mm | |



| Wire | Color | Operation | Wire size | Insulation diameter |
|------|--------|------------------|-----------|---------------------|
| 1 | red | + UB | AWG 22 | 1,7 mm |
| 2 | blue | - GND | AWG 22 | 1,7 mm |
| 3 | violet | PWM | AWG 24 | 1,55 mm |
| 4 | white | Tacho / FanCheck | AWG 24 | 1,55 mm |

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

Note:

Tacho output and FanCheck output are combined with in a single wire

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 |

| Characteristics | <table border="1" style="margin: 10px auto;"> <caption>Graph Data Points</caption> <thead> <tr> <th>PWM [%]</th> <th>Speed [1/min]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>7</td><td>0</td></tr> <tr><td>7</td><td>500</td></tr> <tr><td>10</td><td>500</td></tr> <tr><td>90</td><td>5000</td></tr> <tr><td>100</td><td>5000</td></tr> </tbody> </table> | PWM [%] | Speed [1/min] | 0 | 0 | 7 | 0 | 7 | 500 | 10 | 500 | 90 | 5000 | 100 | 5000 |
|------------------------|--|---------|---------------|---|---|---|---|---|-----|----|-----|----|------|-----|------|
| PWM [%] | Speed [1/min] | | | | | | | | | | | | | | |
| 0 | 0 | | | | | | | | | | | | | | |
| 7 | 0 | | | | | | | | | | | | | | |
| 7 | 500 | | | | | | | | | | | | | | |
| 10 | 500 | | | | | | | | | | | | | | |
| 90 | 5000 | | | | | | | | | | | | | | |
| 100 | 5000 | | | | | | | | | | | | | | |
| 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: 500 1/min (Start-up, coming from 0% PWM)
- 7% - 10 % PWM: 500 1/min (corresp. to min fan speed)

10% - 90% PWM: Linear increasing curve
90% - 100% PWM: 5.000 1/min (corresp. to max fan speed)

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

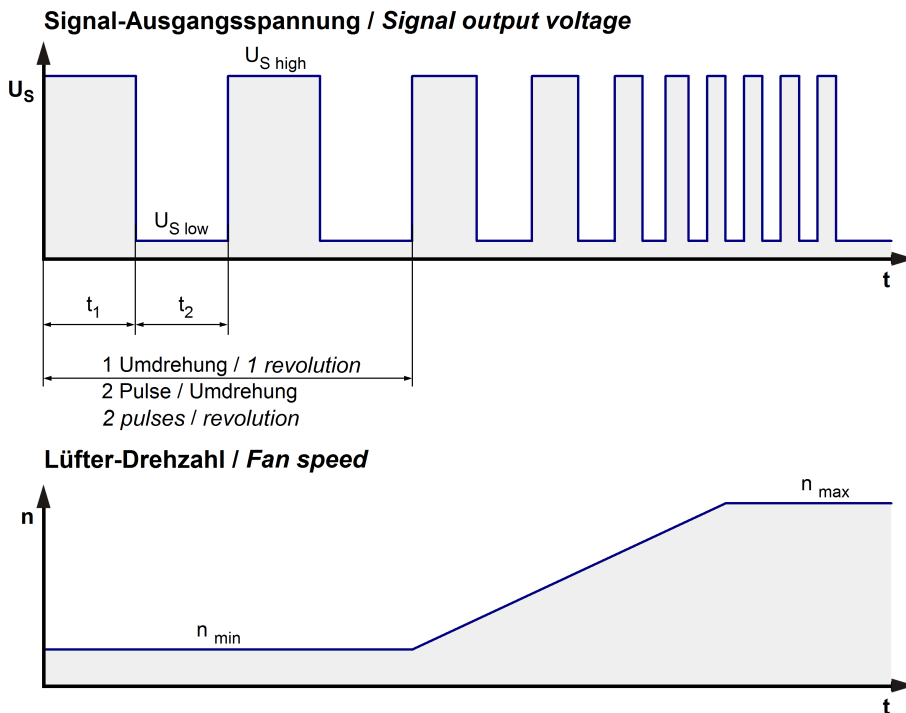
| Name | Condition |
|----------|---------------------|
| PWM 0001 | PWM: 95 %; f: 2 kHz |

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

| Features | Condition | Symbol | Values | | |
|---------------------|----------------|--------|-------------|-------------|-------------|
| Voltage range | | U | 36 V | | 60 V |
| Nominal voltage | | U_N | | 48 V | |
| Power consumption | $\Delta p = 0$ | P | 36 W | 58 W | 58 W |
| Tolerance | PWM 0010 | | +/- 10 % | +/- 10 % | +/- 10 % |
| Current consumption | $\Delta p = 0$ | I | 1.000 mA | 1.200 mA | 970 mA |
| Tolerance | PWM 0010 | | +/- 10 % | +/- 10 % | +/- 10 % |
| Speed | $\Delta p = 0$ | n | 4.300 1/min | 5.000 1/min | 5.000 1/min |
| Tolerance | PWM 0010 | | +/- 10 % | +/- 5 % | +/- 5 % |

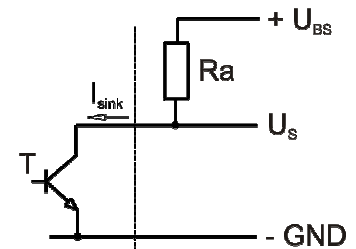
3.3 Electrical Interface - Output

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



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

Lüfter / Fan Kunde / Customer



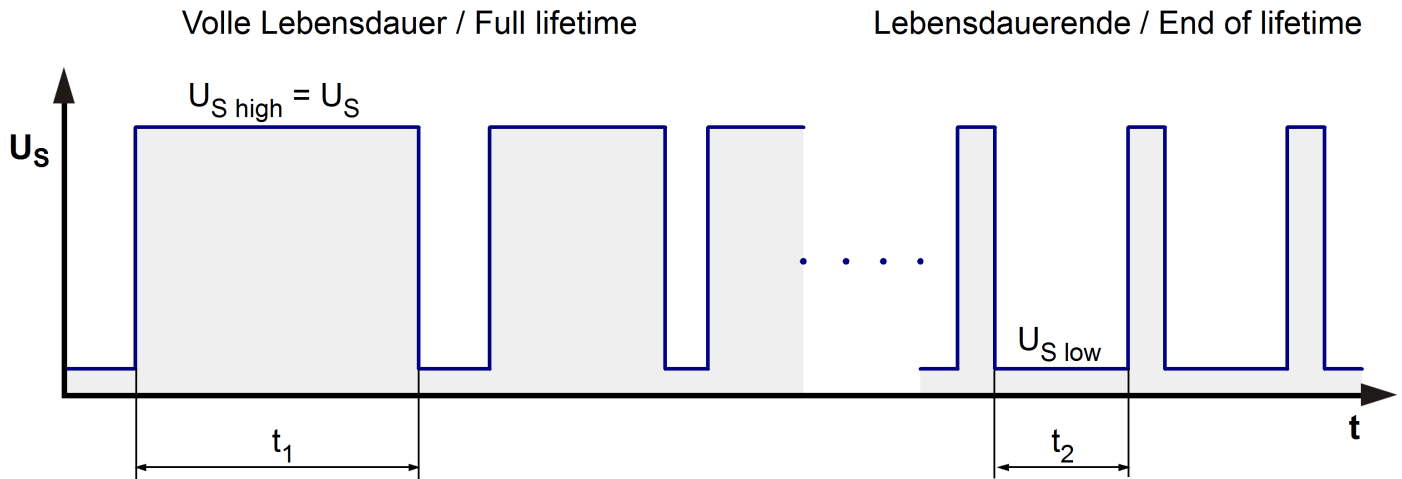
| Features | Note | Values |
|---------------------------|--|----------------------------|
| Tacho operating voltage | U_{BS} | $\leq 60\ V$ |
| Tacho signal Low | $U_{S\ low}$ | $\leq 0,4\ V$ |
| Tacho signal High | $U_{S\ high}$ | $60\ V$ |
| Maximum sink current | I_{sink} | $\leq 20\ mA$ |
| External resistor | External resistor R_a from U_{BS} to U_S required. All voltages measured to GND. | |
| Tacho frequency | $(2 \times n) / 60$ | $167\ Hz$ |
| Tacho isolated from motor | No | |
| Slew rate | | $\Rightarrow 0,5\ V/\mu s$ |

n = revolutions per minute (1/min)

FanCheck - Output of remaining service life

| | |
|----------------------------------|--|
| FanCheck type | Combined with tachometer |
| Output of remaining service life | Pulse width modulated remaining service life |

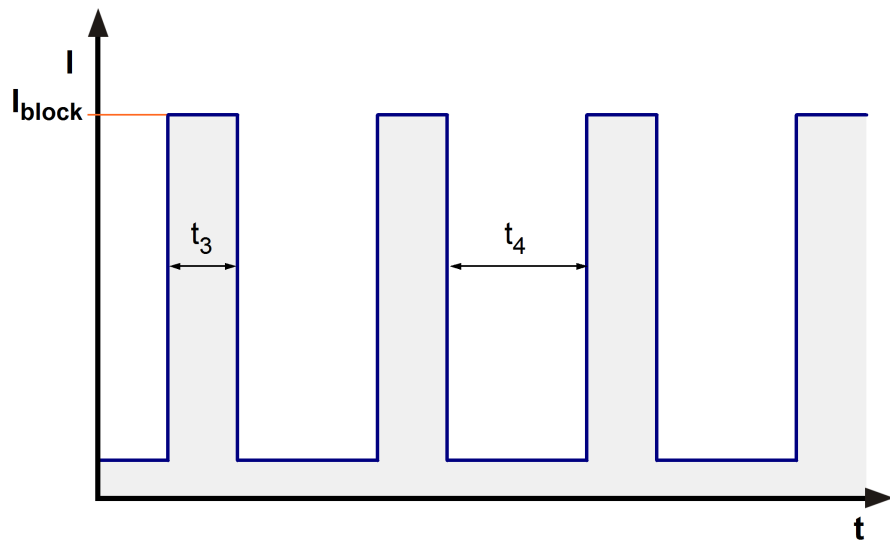
Signal-Ausgangsspannung / Signal output voltage



| | | |
|--|---------------------|-----------|
| Duty cycle at maximum service life | 90 % | FK |
| Duty cycle at end of service life | 10 % | |
| Duty cycle tolerance | 1 % | |
| Frequency | $(2 \times n) / 60$ | FK |
| Evaluation criterion of service life | L10 | |
| Operating condition (cleanliness factor) | Clean environment | |

3.4 Electrical Features

| | | |
|--------------------------------|-------------------------------------|--|
| Electronic function | Speed-Controlled | |
| Reversed polarity protection | Rectifying diode | |
| 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. 1.300 mA | |
| Clock signal at locked rotor | t_3 / t_4 typical: 0,5 s / 10,0 s | |



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

Internal Fuse: Littelfuse Nano2 Fuse Very Fast-Acting 451/453 Series 3,5A / 125V

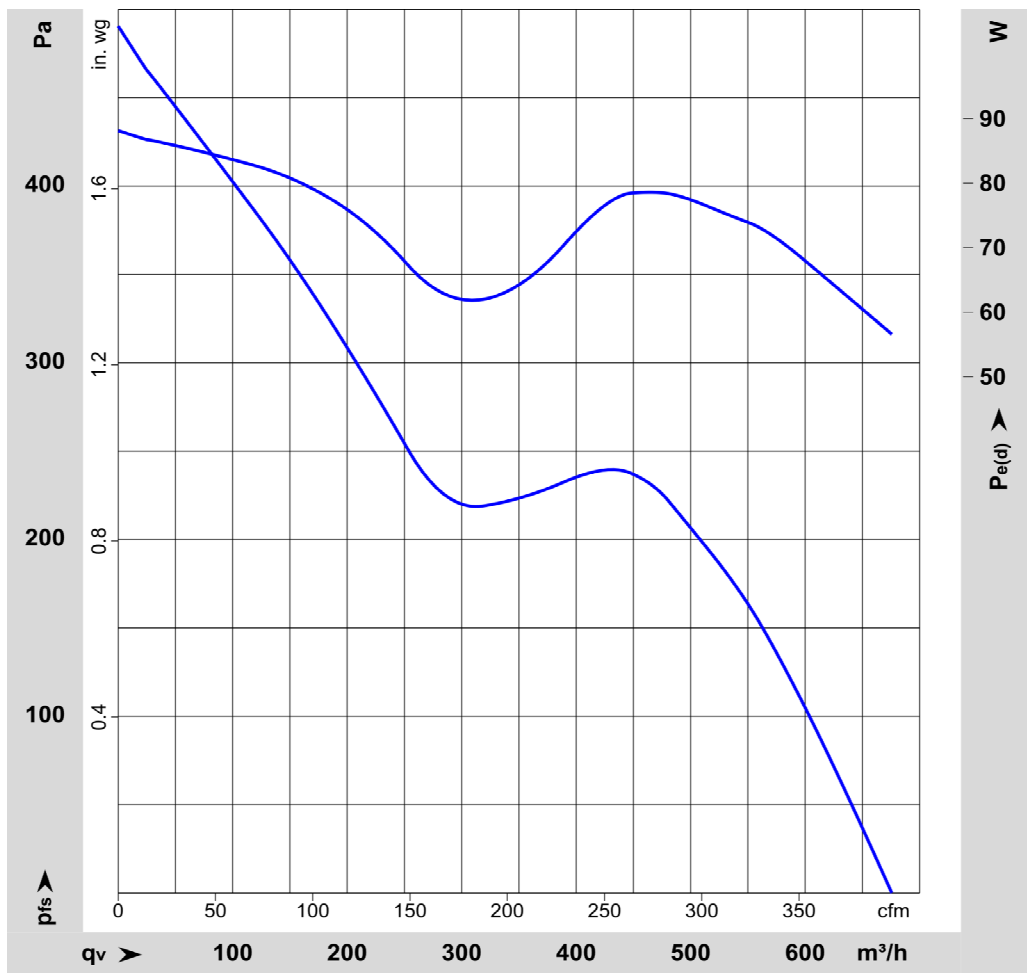
3.5 Aerodynamics

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:

| | | | |
|------------------------------|--------------------|--|--|
| 5.000 1/min at free air flow | PWM 95 %; f: 2 kHz | | |
|------------------------------|--------------------|--|--|

| | | |
|---|-----------------------|--|
| Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$) | 675 m ³ /h | |
| Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$) | 490 Pa | |



3.6 Sound Data

Measurement conditions: Sound pressure level: 1 meter distance between microphone and the air intake.
Sound power level: According to ISO 13347-3.
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:

| | | | |
|------------------------------|--------------------|--|--|
| 5.000 1/min at free air flow | PWM 95 %; f: 2 kHz | | |
|------------------------------|--------------------|--|--|

| | | | |
|---|--------------------------------|--|--|
| Optimal operating point | 467 m ³ /h @ 230 Pa | | |
| Sound power level at the optimal operating point | 7,5 bel(A) | | |
| Sound pressure level at free air flow, measured in rubber bands | 66 dB(A) | | |

4 Environment

4.1 General

| | | | |
|--|--------|--|--|
| Min. permitted ambient temperature TU min. | -20 °C | | |
| Max. permitted ambient temperature TU max. | 70 °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.

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

4.3 EMC

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

| Kind | Electrostatic Discharge Immunity Test |
|------------------------|--|
| Accordinging | DIN EN 61000-4-2:2001-12 |
| Check accuracy / Limit | Contact Discharge +/- 4 kV; Air Discharge +/- 8 kV |
| Result | B: The monitored function may deviate from designed performance to a specified level during exposure to a disturbance or revert to a fail safe mode or operation, but shall return to normal operation after the disturbance is removed. |

| Kind | Electromagnetic Field Immunity Test |
|------------------------|--|
| 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. |

| Kind | Electrical Fast Transient / Burst Immunity Test |
|------------------------|--|
| 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 | B: The monitored function may deviate from designed performance to a specified level during exposure to a disturbance or revert to a fail safe mode or operation, but shall return to normal operation after the disturbance is removed. |

| Kind | Immunity to Conducted Disturbances, Induced by RF-Fields |
|------------------------|--|
| Accordinging | DIN EN 61000-4-6:2001-12 |
| Check accuracy / Limit | 10 Vrms; 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 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 | |

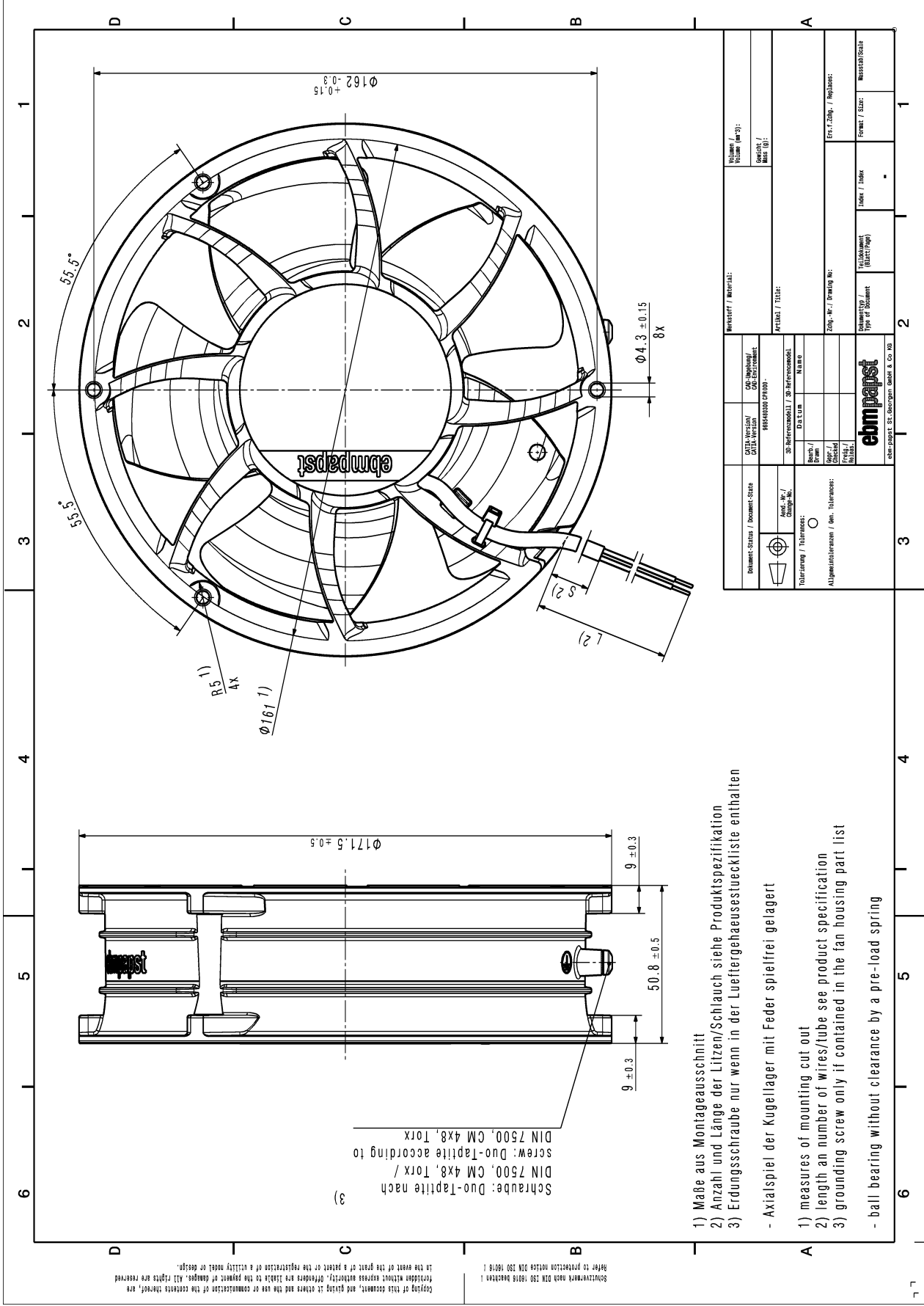
5.2 Approval Tests

| | | |
|-----|---|---|
| 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 | 77.500 h | |
| Life expectancy L10 at TU max. | 40.000 h | |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 130.000 h | |




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Stückzeichnung nach DIN ISO 19018/1818 beachten!

Schraube: Duo-Tapfite nach
DIN 7500, CM 4x8, Torx /
3) Tapfite according to
DIN 7500, CM 4x8, Torx

- A) 1) Maße aus Montageausschnitt
2) Anzahl und Länge der Litzen/Schlauch siehe Produktspezifikation
3) Erdungsschraube nur wenn in der Lufteingehäusestueckliste enthalten
- Axialspiel der Kugellager mit Feder spielfrei; gelagert
- B) 1) measures of mounting cut out
2) length an 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

| | | | |
|---|--------------------------------|-----------------------------------|------------------------------|
| Document Status / Document-Status | CDTA-Version / CDTA-Version | Minivert / Material: | Volume / Volume (litres) |
| Art-Nr. / Change- Nr. | 88849989 07000 | Art-Nr. / Title: | Quantity / Mass (kg) |
| Abw. Nr. / Change- Nr. | Datum | Abw. Nr. / Drawing No. | Err. / Zeich. / Revision: |
| Tabularung / Tolerances: | Name | Dokumenttyp / Type of Document | Index / Index |
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