

Product Data Sheet

9295416300
VWS0148PULDS
6318 N/2TDHP

ebmpapst

The engineer's choice



6318 N/2TDHP

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1 General

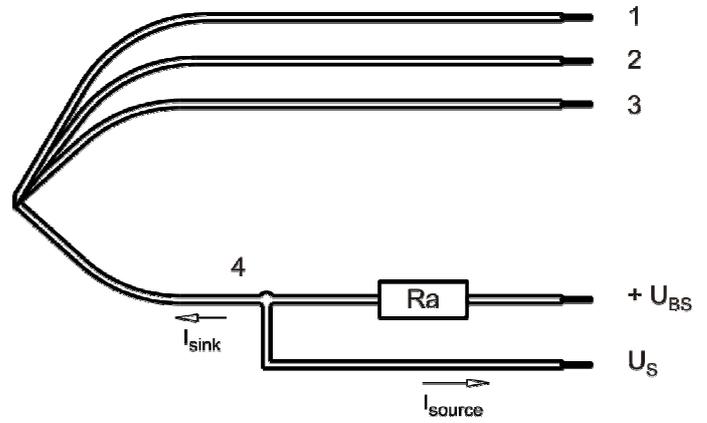
Fan type	Fan	
Rotating direction looking at rotor	Counterclockwise	
Airflow direction	Air outlet over struts	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

2 Mechanics**2.1 General**

Depth	51,0 mm	
Diameter	172,0 mm	
Mass	0,79 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	Wire outlet corner: 440 Ncm Remaining corners: 440 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 20	2,05 mm
2	blue	- GND	AWG 20	2,05 mm
3	violet	PWM	AWG 22	1,70 mm
4	white	Tacho	AWG 22	1,70 mm

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

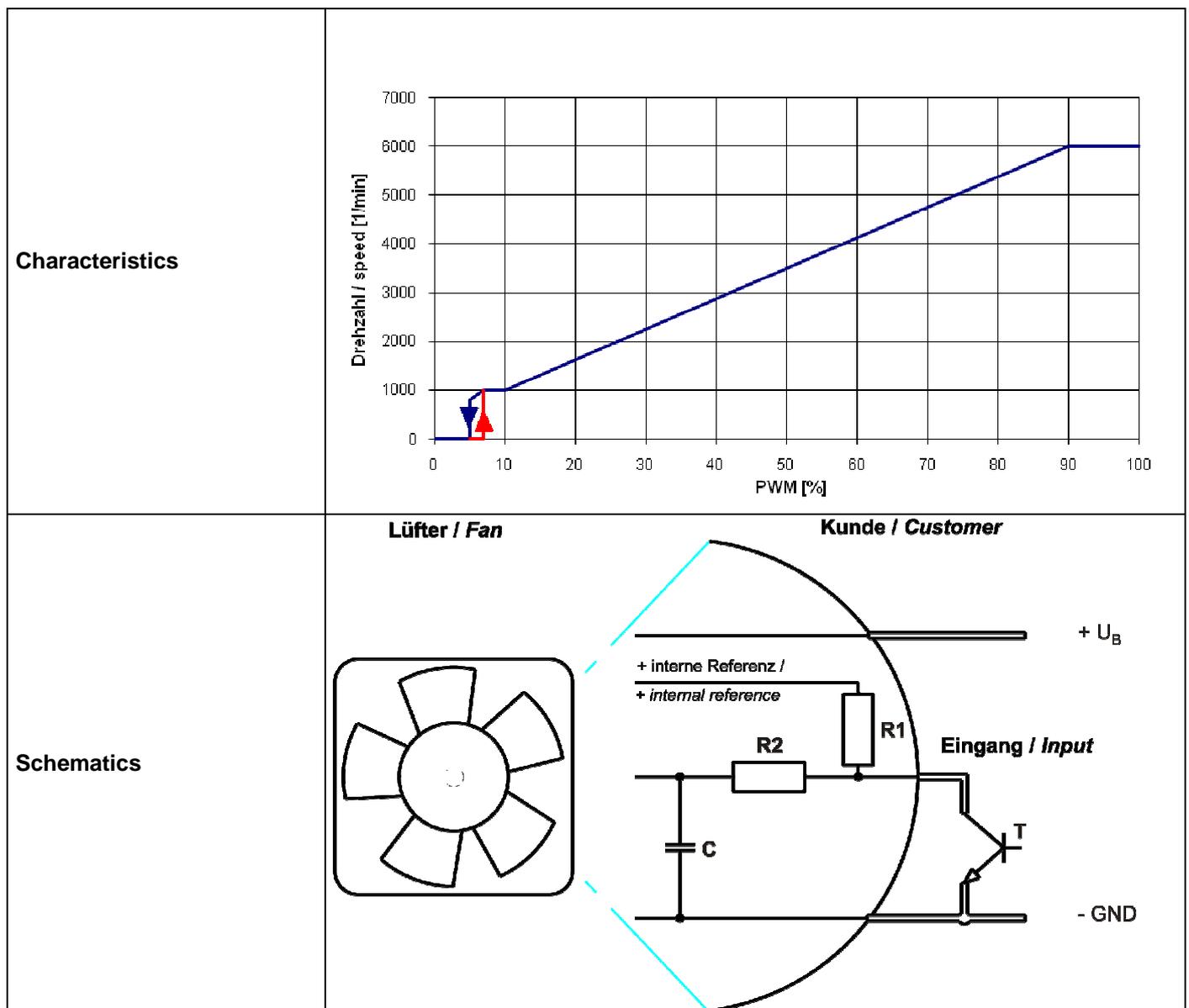
3 Operating Data

3.1 Electrical Interface - Input

Control input	PWM
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Features

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



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: 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: 6.000 1/min (corresp. to max fan speed)
 5% PWM: 800 1/min or 0 1/min (Fan turns off, coming 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

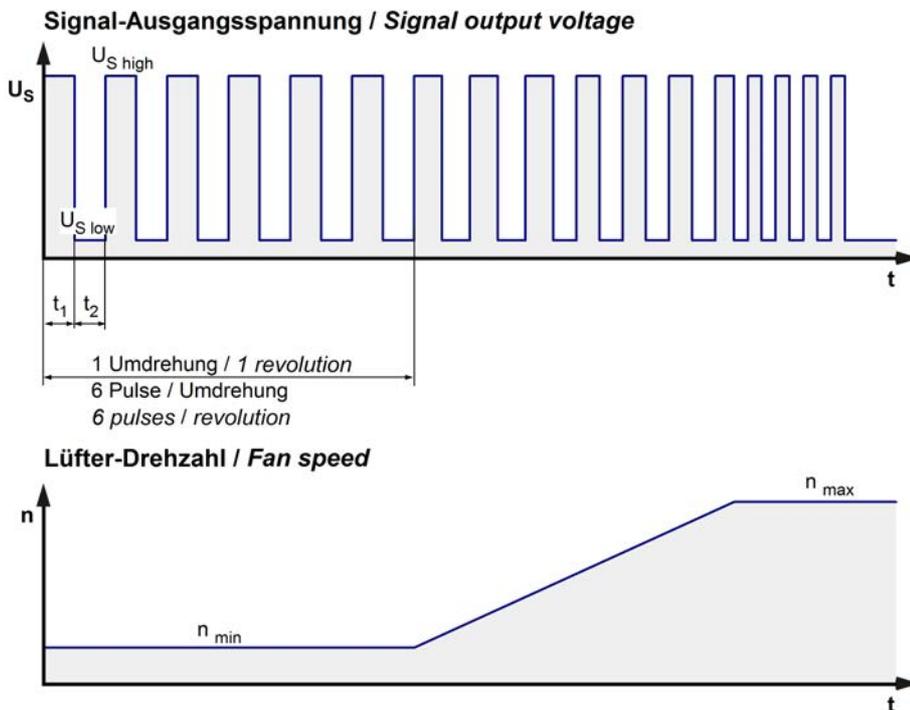
Name	Condition
PWM 0001	PWM: 95 %; f: 2 kHz

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

Features	Condition	Symbol	Values		
Voltage range		U	36 V		60,0 V
Nominal voltage		U _N		48,0 V	
Power consumption	$\Delta p = 0$	P	57 W	93 W	96 W
Tolerance	PWM 0010		+/- 10 %	+/- 10 %	+/- 10 %
Current consumption	$\Delta p = 0$	I	1.580 mA	1.940 mA	2.300 mA
Tolerance	PWM 0010		+/- 10 %	+/- 10 %	+/- 10 %
Speed	$\Delta p = 0$	n	5.050 1/min	6.000 1/min	6.000 1/min
Tolerance	PWM 0010		+/- 5 %	+/- 3 %	+/- 3 %

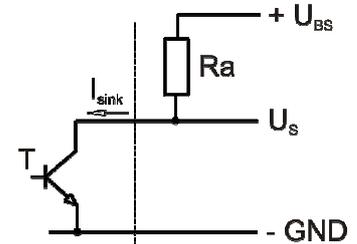
3.3 Electrical Interface - Output

Tacho type	/2 (open collector)
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$$R_a = \frac{U_{BS} - U_{S\ low}}{I_{sink}}$$

Lüfter / Fan Kunde / Customer

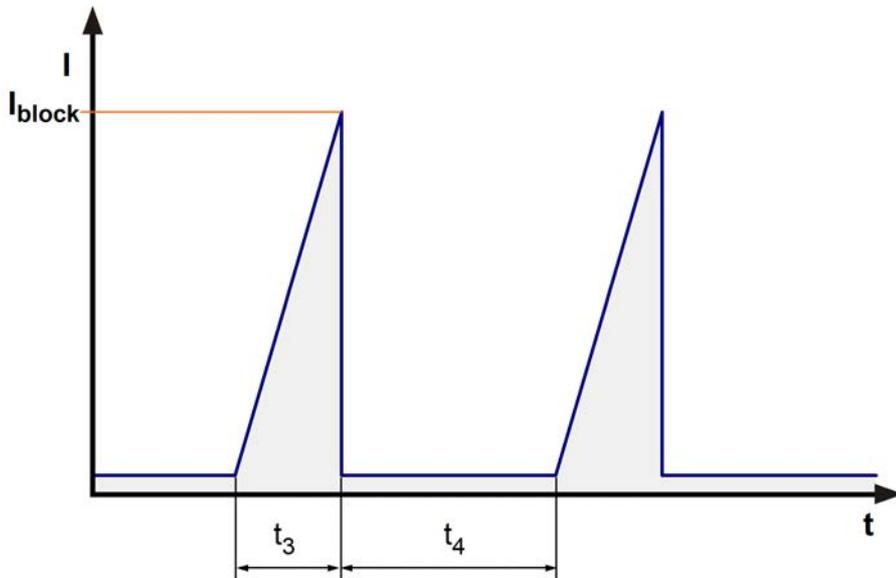


Features	Note	Values
Tacho operating voltage	U_{BS}	$\leq 60\ V$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\ V$
Tacho signal High	$U_{S\ high}$	$60,0\ V$
Maximum sink current	I_{sink}	$\leq 20\ mA$
External resistor	External resistor R_a from U_{BS} to U_s required. All voltages measured to GND.	
Tacho frequency	$(6 \times n) / 60$	$600\ Hz @ 6.000\ 1/min$
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	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. 1.000 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 6 s / 10 s	



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

Internal Fuse: Littelfuse Nano2 Fuse Very Fast-Acting 451/453 Series 5A / 75V

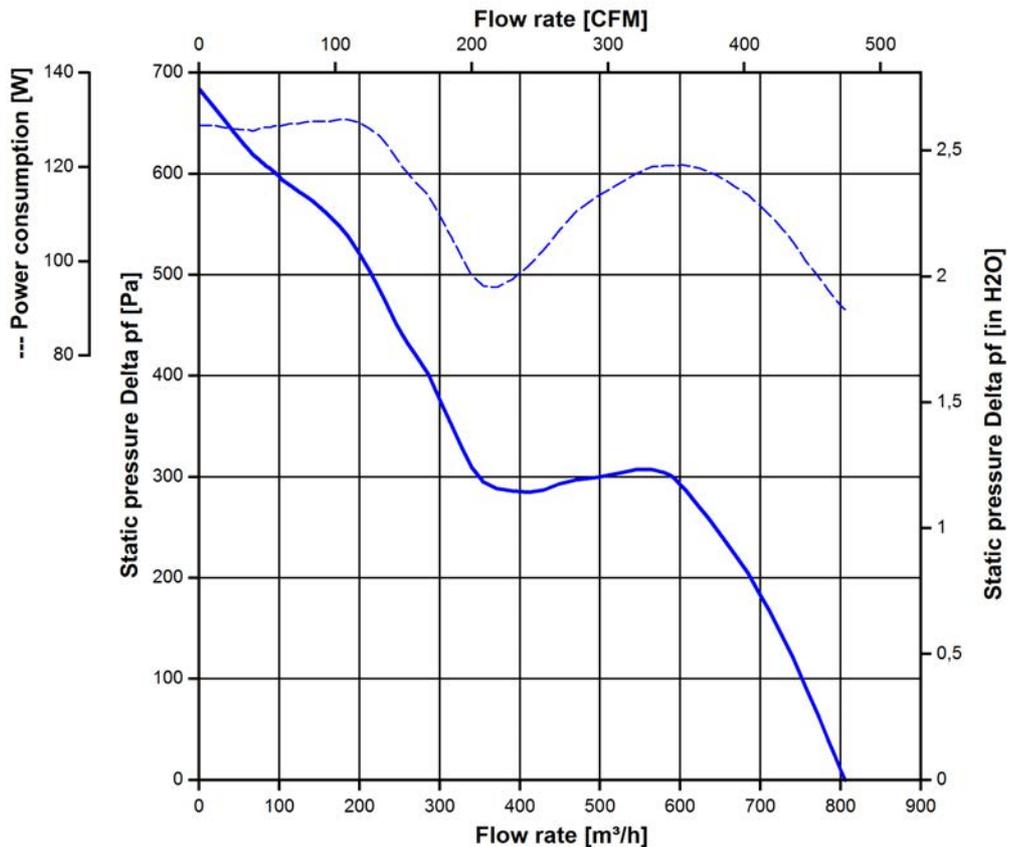
3.5 Aerodynamics

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. 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:

6.000 1/min at free air flow	PWM 95 %; f: 2 kHz		
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Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$)	805 m ³ /h	
Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$)	684 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:

6.000 1/min at free air flow	PWM 95 %; f: 2 kHz		
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Optimal operating point	680 m ³ /h @ 168 Pa		
Sound power level at the optimal operating point	7,8 bel(A)		
Sound pressure level at free air flow, measured in rubber bands	71 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.

4.3 Mechanical Requirements

severity level	Vibration (sinusoidal)	
1 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) 0,075 mm / 10-58, 58-10 Hz 1 G / 58-500-58 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

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	

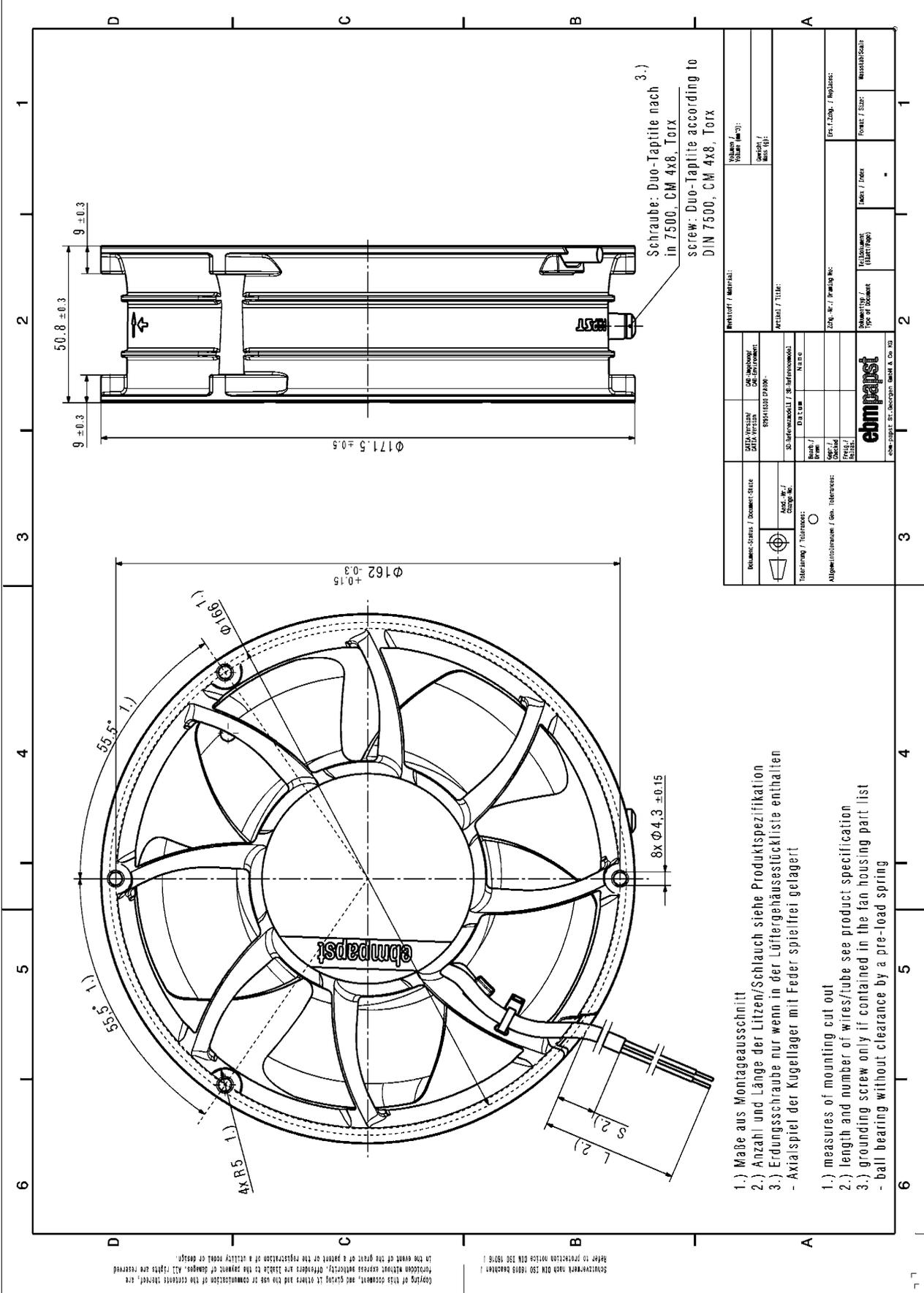
5.2 Approval Tests

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	75.000 h	
Life expectancy L10 at TU max.	37.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	127.500 h	



Schraube: Duo-Taprite nach 3.)
 in 7500, CM 4x8, Torx
 screw: Duo-Taprite according to
 DIN 7500, CM 4x8, Torx

- 1.) Maße aus Montageausschnitt
 - 2.) Anzahl und Länge der Litzen/Schlauch siehe Produktspezifikation
 - 3.) Erdungsschraube nur wenn in der Lüftergehäusesückliste enthalten
 - Axialspiel der Kugellager mit Feder spielfrei gelagert
- 1.) measures of mounting cut out
 - 2.) length and 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 State Approved / Freigegeben Change No. / Änderung Nr.		CAD / Version / DATE / Version / Date / Environment 89911530 / 01000		Inventor / Material: Name / Name Position / Position		Values / Values (mm³): Density / Dichte / Mass (g) Form / Size / Mass (kg)	
Tolerancing / Tolerances: H7/g6 H8/g7 H9/g8 H10/g9 H11/d9 H12/d10 H13/d11 H14/d12 H15/d13 H16/d14 H17/d15 H18/d16 H19/d17 H20/d18 H21/d19 H22/d20 H23/d21 H24/d22 H25/d23 H26/d24 H27/d25 H28/d26 H29/d27 H30/d28 H31/d29 H32/d30 H33/d31 H34/d32 H35/d33 H36/d34 H37/d35 H38/d36 H39/d37 H40/d38 H41/d39 H42/d40 H43/d41 H44/d42 H45/d43 H46/d44 H47/d45 H48/d46 H49/d47 H50/d48 H51/d49 H52/d50 H53/d51 H54/d52 H55/d53 H56/d54 H57/d55 H58/d56 H59/d57 H60/d58 H61/d59 H62/d60 H63/d61 H64/d62 H65/d63 H66/d64 H67/d65 H68/d66 H69/d67 H70/d68 H71/d69 H72/d70 H73/d71 H74/d72 H75/d73 H76/d74 H77/d75 H78/d76 H79/d77 H80/d78 H81/d79 H82/d80 H83/d81 H84/d82 H85/d83 H86/d84 H87/d85 H88/d86 H89/d87 H90/d88 H91/d89 H92/d90 H93/d91 H94/d92 H95/d93 H96/d94 H97/d95 H98/d96 H99/d97 H100/d98		ID: Referenzmodell / ID: Referenzmodell Name / Name		Artikel / Title: 200g, Nr. / Packing No.		ERS / Zeich. / Revision: Form / Size / Mass (kg)	
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