Product Data Sheet 6318/2TDH4P-021

ebmpapst

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GREEN TECH

6318/2TDH4P-021

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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	

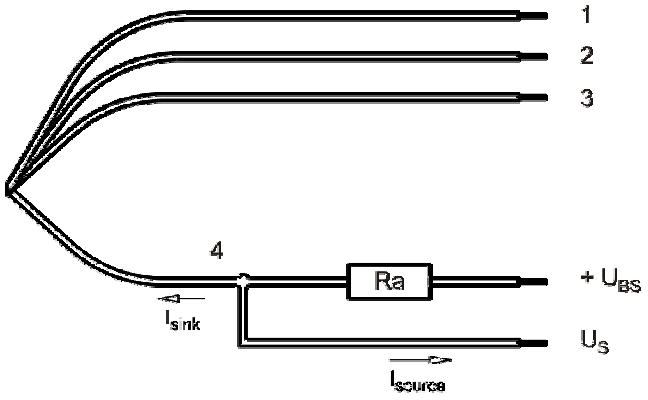
2 Mechanics

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 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 Tolerance	L = 365 mm +- 10,0 mm	
Tube length Tolerance	S = 10 mm +- 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 auxilliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

3 Operating Data

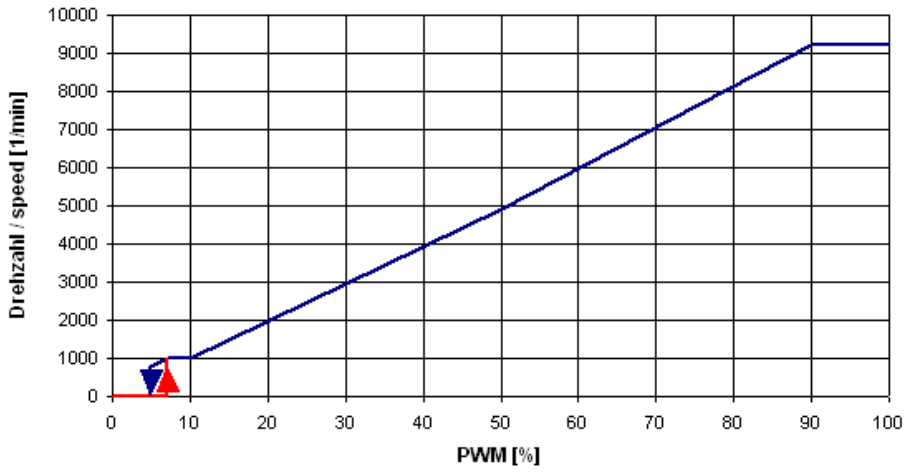
3.1 Electrical Interface - Input

Control input	PWM

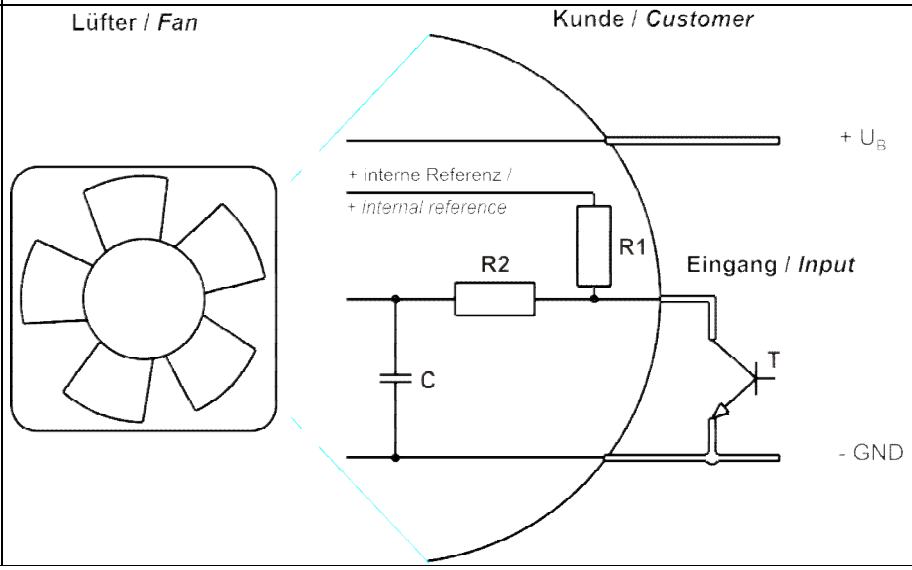
Features

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

Characteristics



Schematics



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. >= 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.

Δp = 0: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

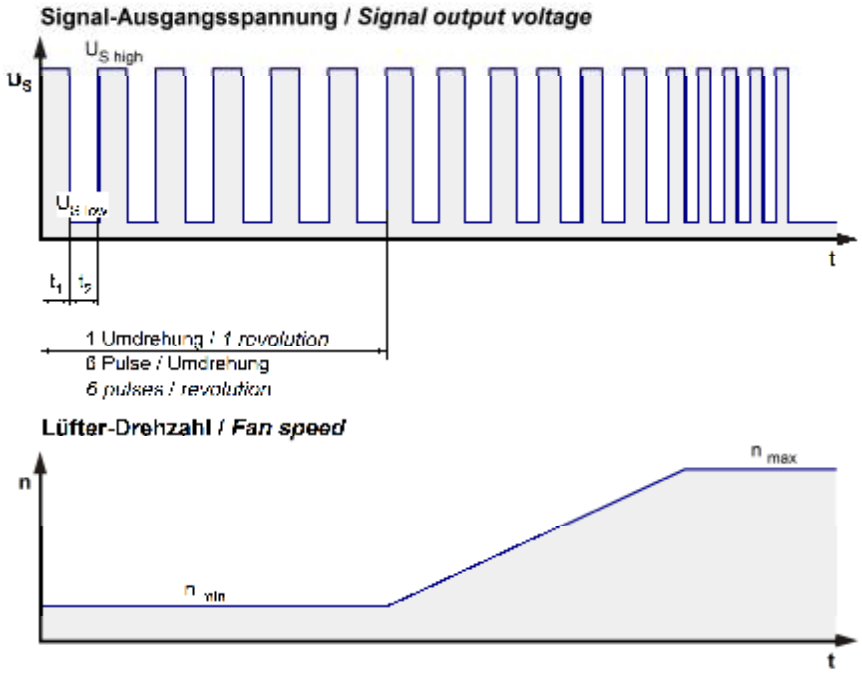
Name	Condition		
PWM 0001	PWM: 95 %; f: 2 kHz		

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

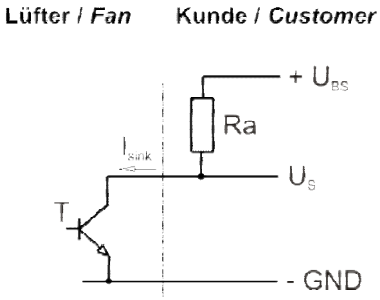
Features	Condition	Symbol	Values		
Voltage range		U	36 V		72 V
Nominal voltage		U_N		48 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	106 W +- 10 %	150 W +- 10 %	160 W +- 10 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	3.000 mA +- 10 %	3.100 mA +- 10 %	2.200 mA +- 10 %
Speed Tolerance	Δp = 0 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)



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



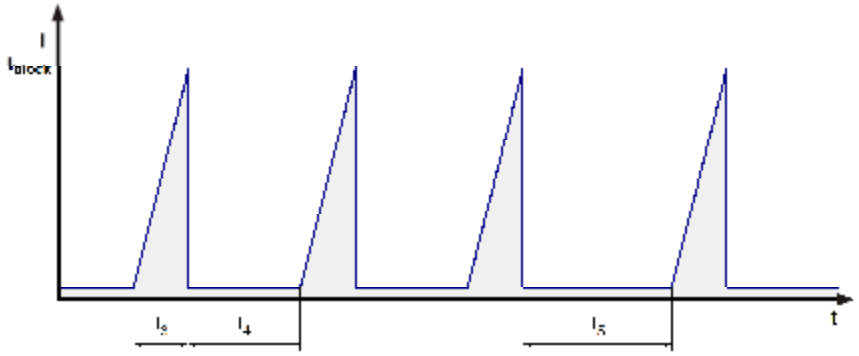
Features		Note	Values
Tacho operating voltage	U_{BS}		<= 60 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<=0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	<=60 V
Maximum sink current	I_{sink}		<= 20 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(6 x n) / 60	920 Hz @ 9.200 1/min
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

n = revolutions per minute (1/min)

3.4 Electrical Features

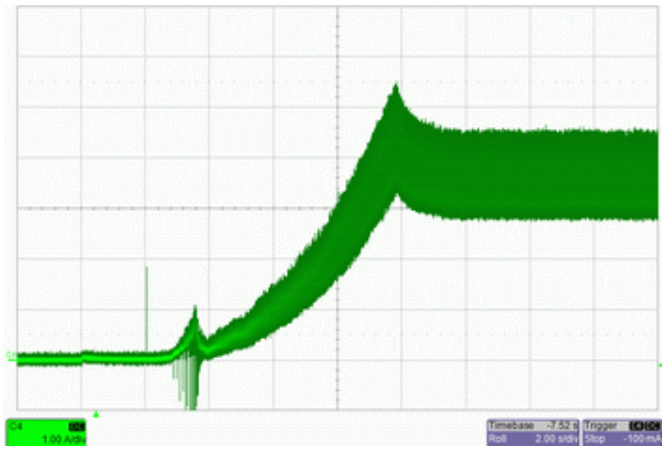
Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	P-CH FET I_F <= 5 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block}	
Clock signal at locked rotor Extended Downtime	t_3 / t_4 typical: 1,5 s / 10,0 s t_5: 40 s after 4 start-up 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 V or < 76 V Fan turns off at U_B < 30 V or > 78 V	

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

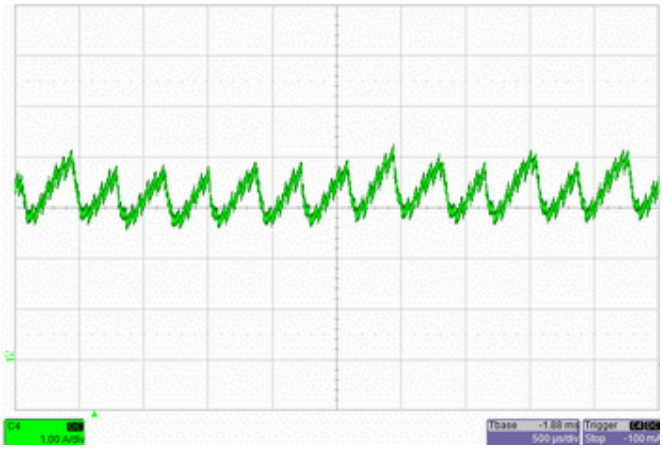


First locked rotor off time T4 is reduced to 3 seconds.

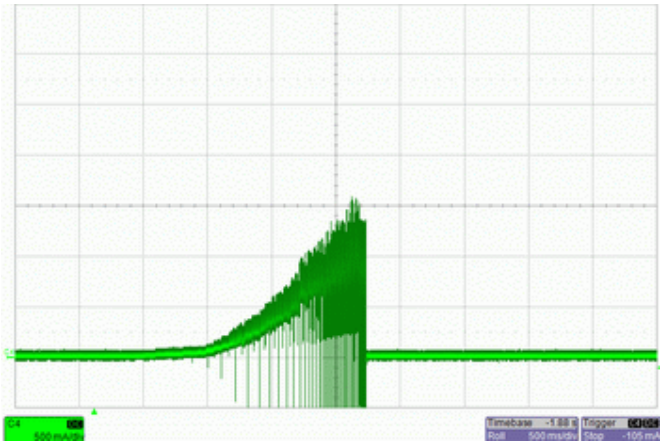
This fan has a startup delay of 2 seconds after applying supply voltage.



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 / Efficency 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.

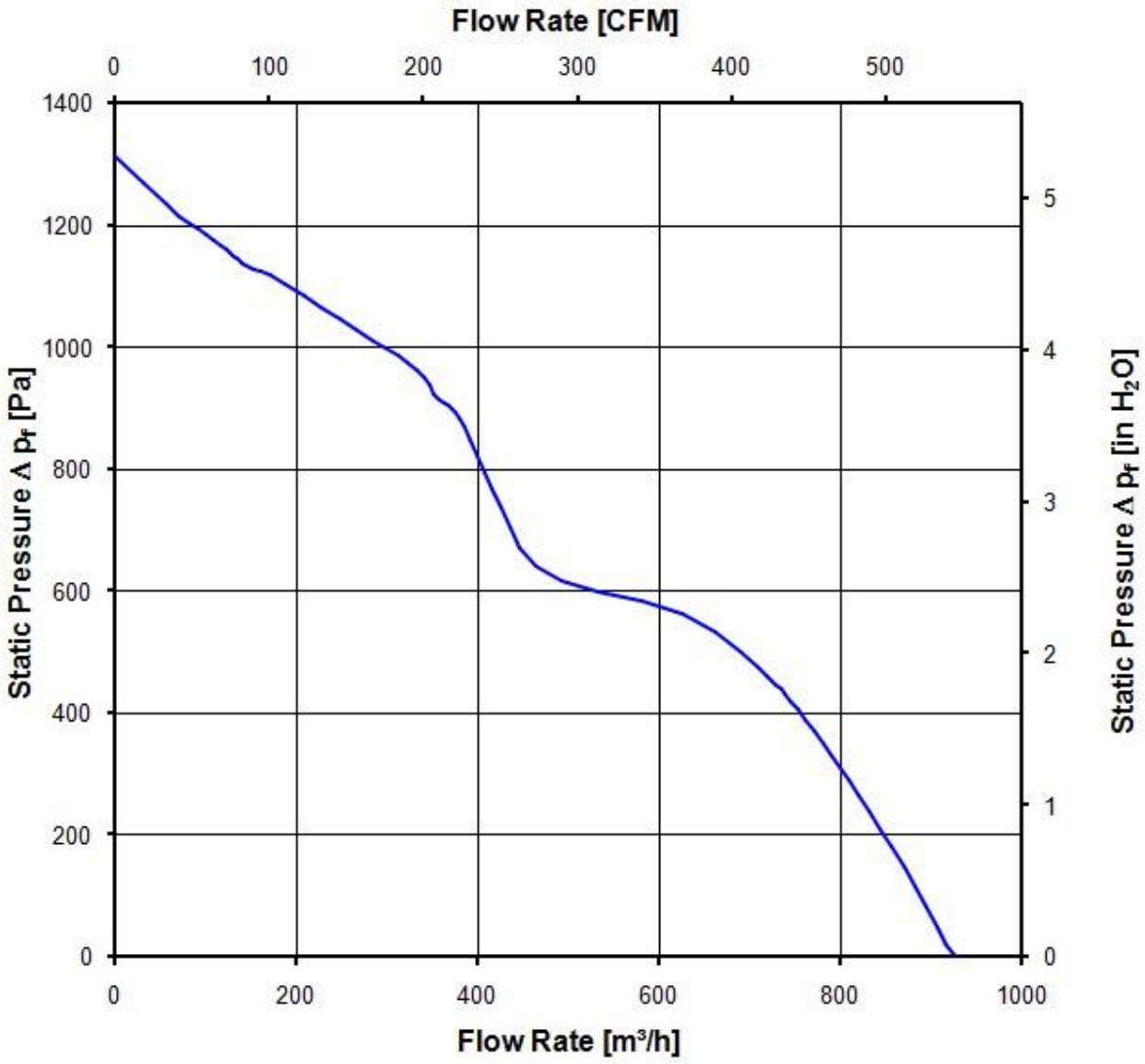
3.6 Aerodynamics

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 (Δp = 0 / $\dot{V}$ = max.)	930 m3/h	
Max. static pressure (Δp = 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 Lp(A) < 5 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 m3/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	 Vibration (sinusoidal) 0,035 mm / 10-60, 60-10 Hz 0,5 G / 60-500-60 Hz 1 Oct./min 10

	Duration Axes of vibration	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 Class B	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
	Shock in use IEC 60068-2-27 Shock spectrum Acceleration Duration	 Shock half sine 7 G 18 ms

	Number of bumps (+X, -X, -Y, +Y, -Z, +Z)	10 in each direction
	Total bumps	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. B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	1000 VAC / 1 Min. 1000 VAC / 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	

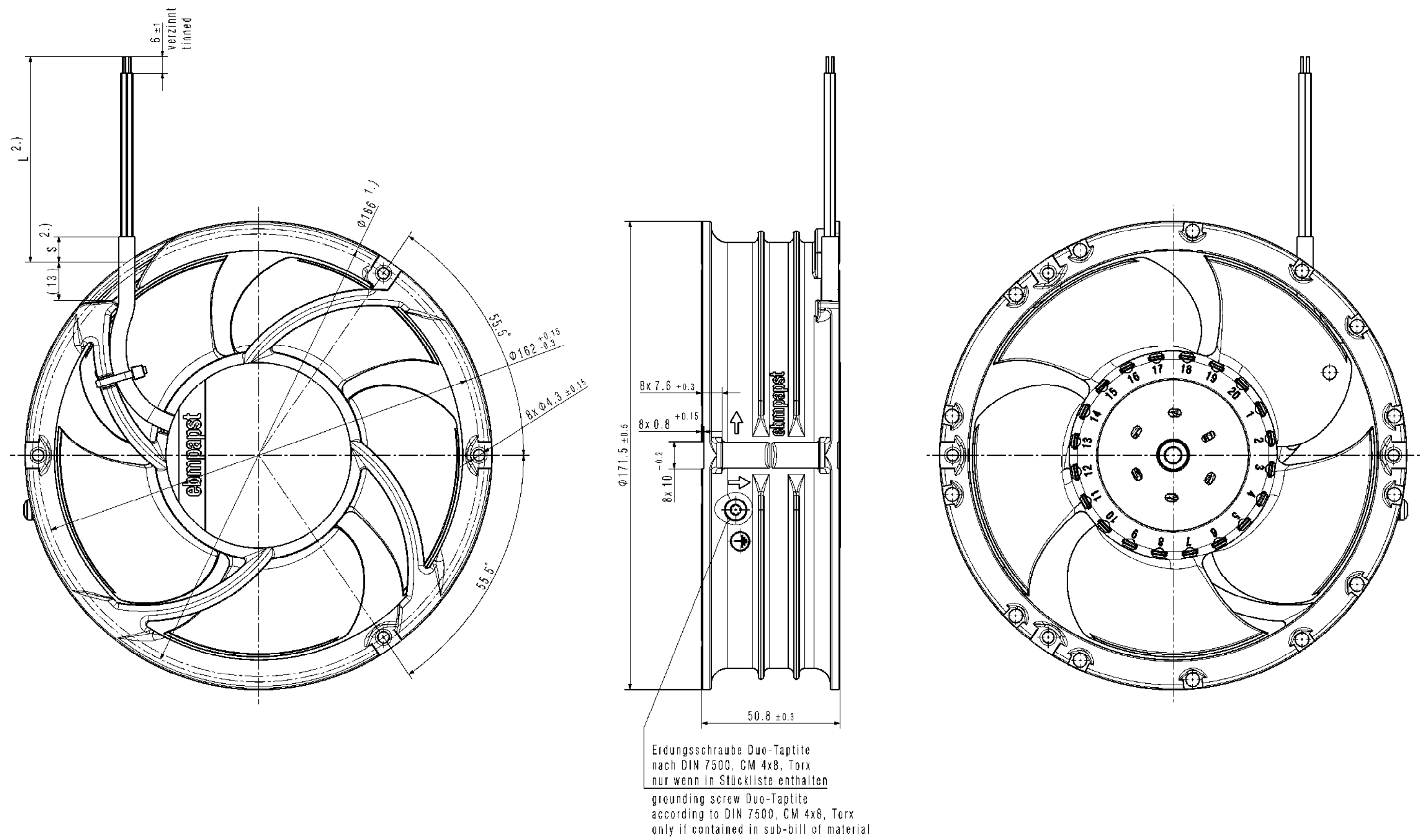
5.2 Approval Tests

CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans
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	87.500 h	



1.) Maße für Montageausschnitt
2.) Anzahl und Länge der Litzen sowie Länge des Schlauch siehe Produktspezifikation

- Axialspiel der Kugellager mit Feder spielfrei gelagert

1.) measures for mounting cut out.
2.) length and number of wires and length of tube see product specification.

- ball bearing without clearance by a pre-load spring.

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