Product Data Sheet 6318/2TDH4PU-046

ebmpapst

The engineer's choice



GREEN TECH

6318/2TDH4PU-046

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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

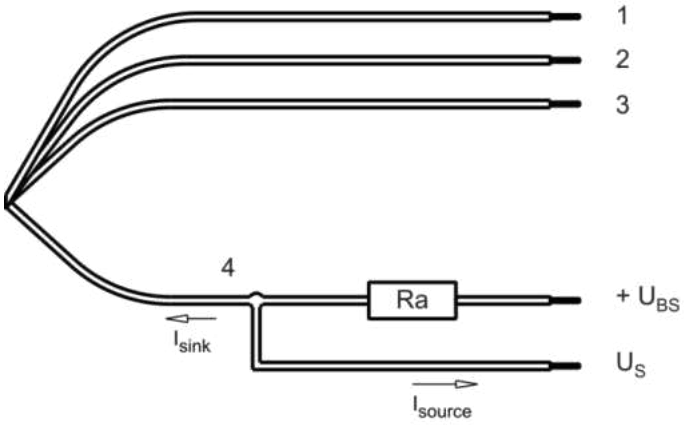
2.1 General

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 = 15 mm +- 5 mm	
Wire size (AWG)	18	
Insulation diameter	1,7 mm	
Electrical connection		
Lead wire length Tolerance	See drawing	
Wire size (AWG)	22	
Insulation diameter	2,2 mm	





Wire	Color	Operation
1	red	+ UB
2	blue	- GND
3	violet	PWM
4	white	Tacho

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

Lead wire 1 - 2: AWG18 (Insulation diameter 2,20 mm)
Lead wire 3 - 4: AWG22 (Insulation diameter 1,70 mm)

3 Operating Data

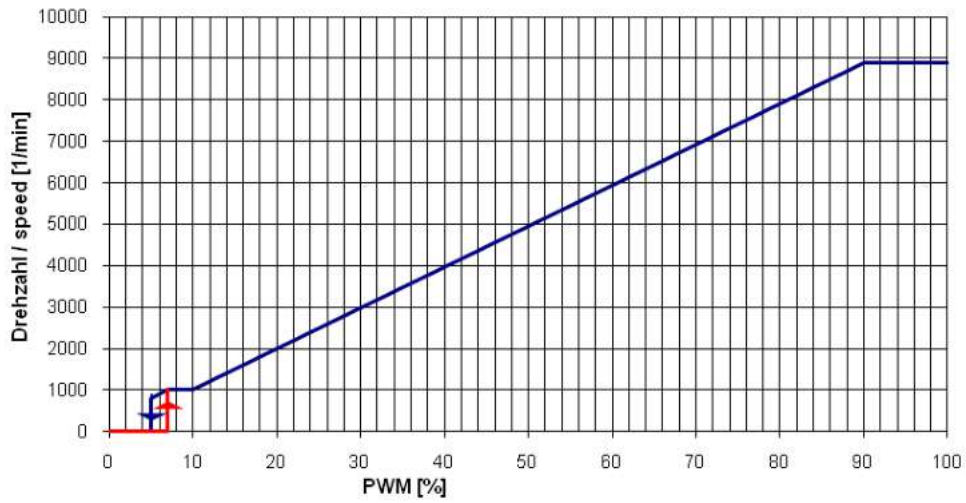
3.1 Electrical Interface - Input

Control input	PWM

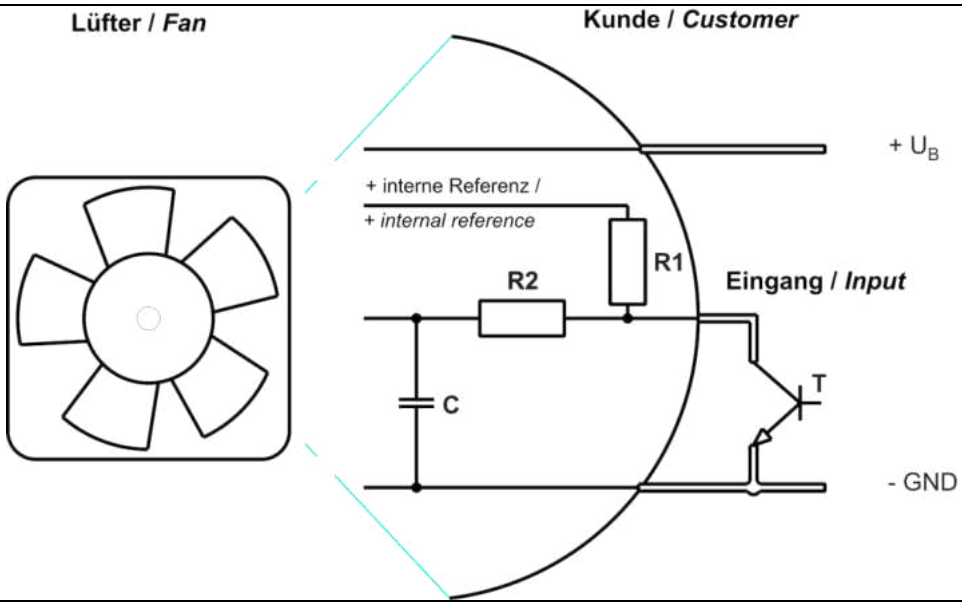
Features

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

Characteristics



Schematics



The shown pull-up resistor 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: 8.900 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 section 3.5)
I: corresp. to arithm. mean current value

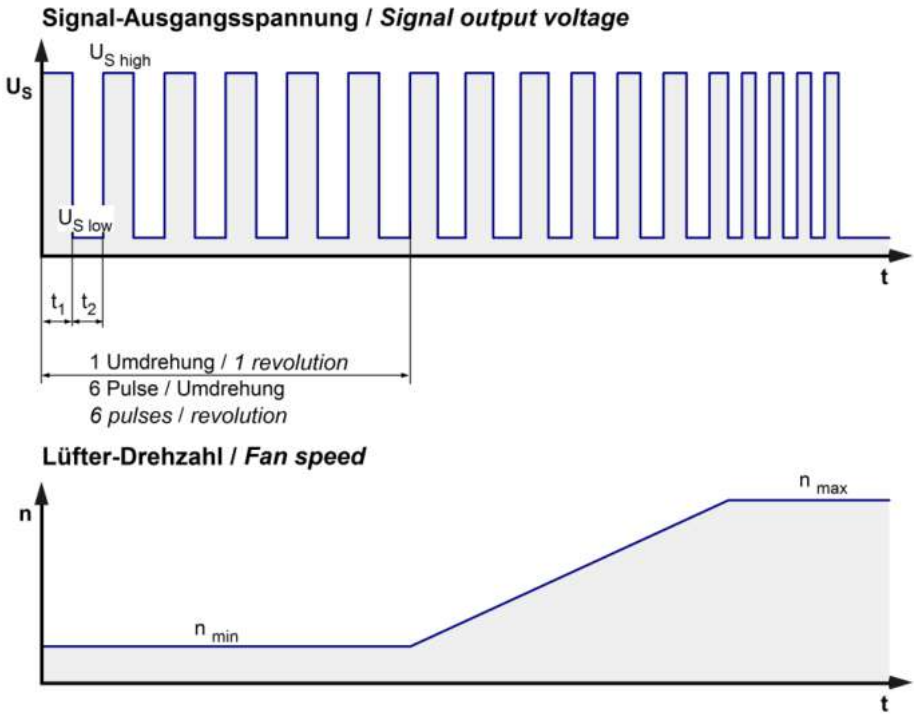
Name	Condition		
PWM 0001	PWM: 95 %; f: 2 kHz		

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

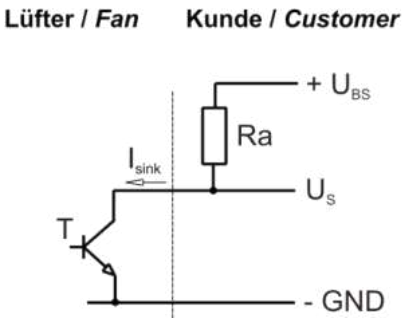
Features	Condition	Symbol	Values		
Voltage range		U	36 V		72,0 V
Nominal voltage		U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	79 W +- 10 %	140 W +- 10 %	144 W +- 10 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	2.200 mA +- 10 %	2.900 mA +- 10 %	2.000 mA +- 10 %
Speed Tolerance	Δp = 0 PWM 0010	n	7.500 1/min +- 10 %	8.900 1/min +- 5 %	8.900 1/min +- 10 %

3.3 Electrical Interface - Output

Tacho type	/2 (open collector)



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

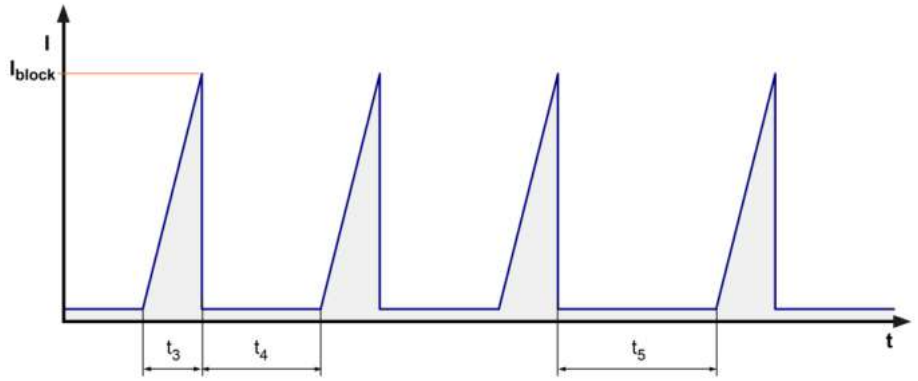


Features		Note	Values
Tacho operating voltage	U_{BS}		<= 60 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<=0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	60,0 V
Maximum sink current	I_{sink}		<= 20 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.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

n = revolutions per minute (1/min)

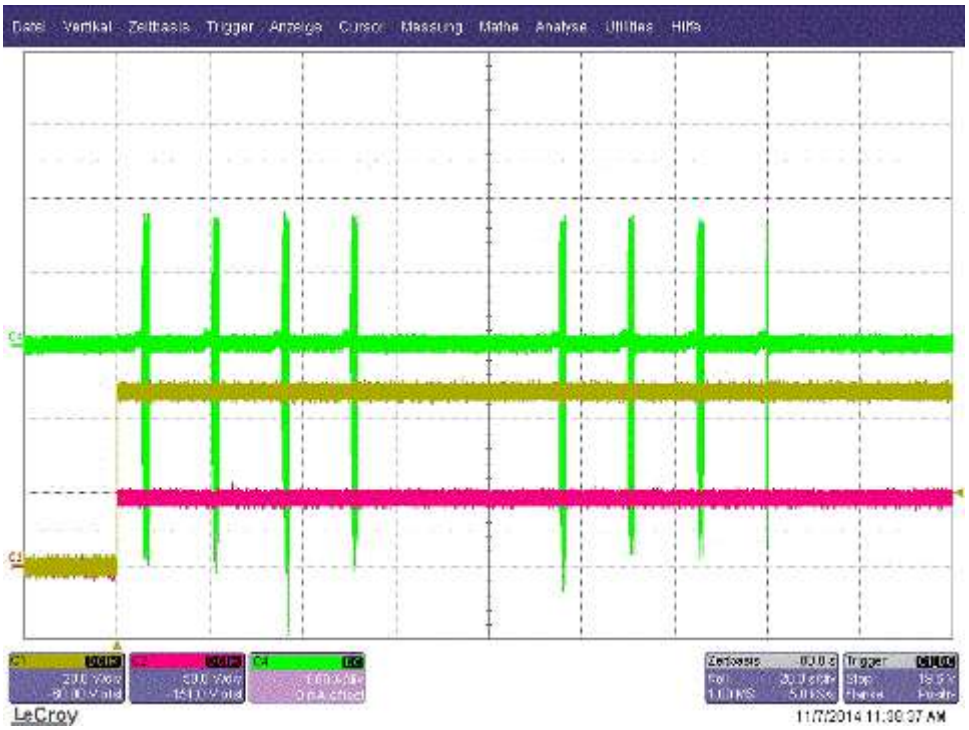
3.4 Electrical Features

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	t_3 / t_4 typical: 1,5 s / 10,0 s	



Locked rotor signal t5:

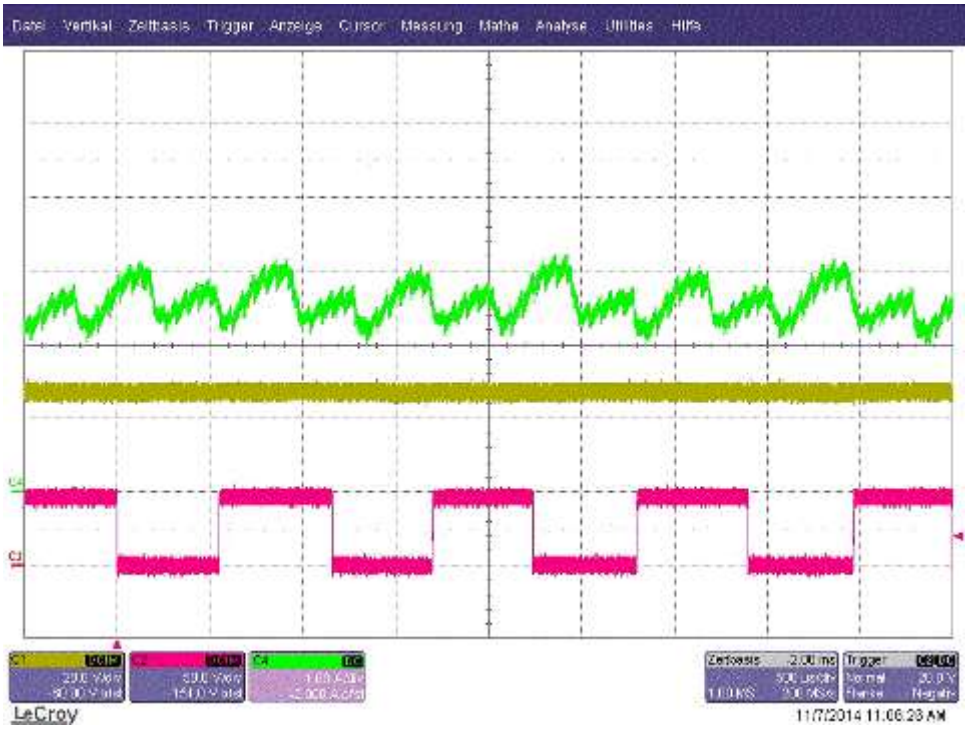
After 4 failed start-ups there is an extended timeout of 40 s.



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



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



Internal Fuse:

Littelfuse Nano2 Fuse
Very Fast-Acting 451/453 Series
10A / 125V

3.5 Data According ErP Directive

Installation / Efficency category	A / static
Speed control	integrated
Specific ratio	1,00485
Target overall efficiency 2015	29,2 %
Overall efficiency	45,1 %
Efficiency grade	40
Power input	198 W
Speed	8.860 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

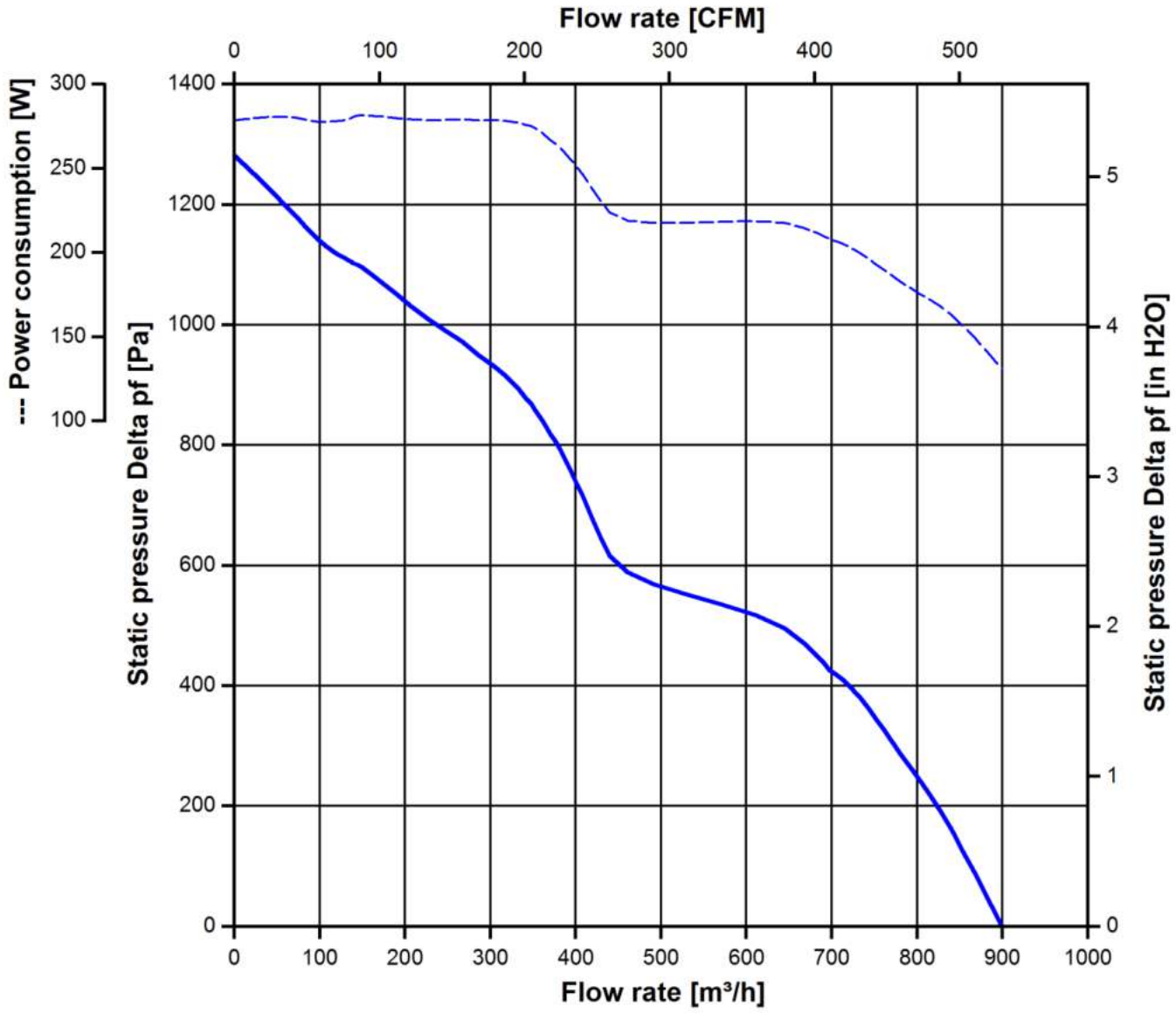
3.6 Aerodynamics

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. 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:

8.900 1/min at free air flow	PWM 95 %; f: 2 kHz		

Max. free-air flow (Δp = 0 / V̇ = max.)	900,0 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	1.280 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 section 3.5

a.) Operation condition:

8.900 1/min at free air flow	PWM 95 %; f: 2 kHz	PWM min.:	PWM max.:

Optimal operating point	863,0 m3/h @ 83 Pa	
Sound power level at the optimal operating point	8,7 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.	60 °C	
Min. permitted storage temperature TL min.	-40 °C	
Max. permitted storage temperature TL max.	80 °C	

4.2 Climatic Requirements

IP-protection type (certified)	IP 68 (for fan only, not for connector if applicable) **)	
Humidity requirements	humid temperature, cyclic; according to DIN EN 60068-2-38, 10 cycle and condensation water check; according to DIN EN ISO 6270-2, 14 days	
Salt fog requirements	salt fog, cyclic, in operation; according to DIN EN 60068-2-52, 3 cycle	

Permitted application area:
The product is for the use in open and unsheltered areas. Direct exposure to water as well as saline ambient conditions are allowed provided that this does not prevent the normal operation.

Pollution degree 3 (according DIN EN 60664-1)
It occurs conductive pollution or dry non-conductive pollution which becomes conductive due to condensation.

**) The specification of the IP protection refers to the conditions mentioned in certification of the fan. The above mentioned short description of the protection scope is not final. For detailed information of the respective protection scope and definitions, see certification as well as DIN EN 60529 (protection by housings) and ISO 20653 (for vehicles) with the letter K.

Short description of the IP-protection type:
Solid particle Protection: Dust tight.
Protection against deliberate contact: Protected against contact to hazardous parts with a wire.

Protection against water: The fan test according to IP68 (Based on IEC 60529), is conducted in non-operating mode. The fan is tested by a complete immersion in water for a period of 2h at a water-level of 1,2m. Electrical connections are not immersed since they are customer specific.

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

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

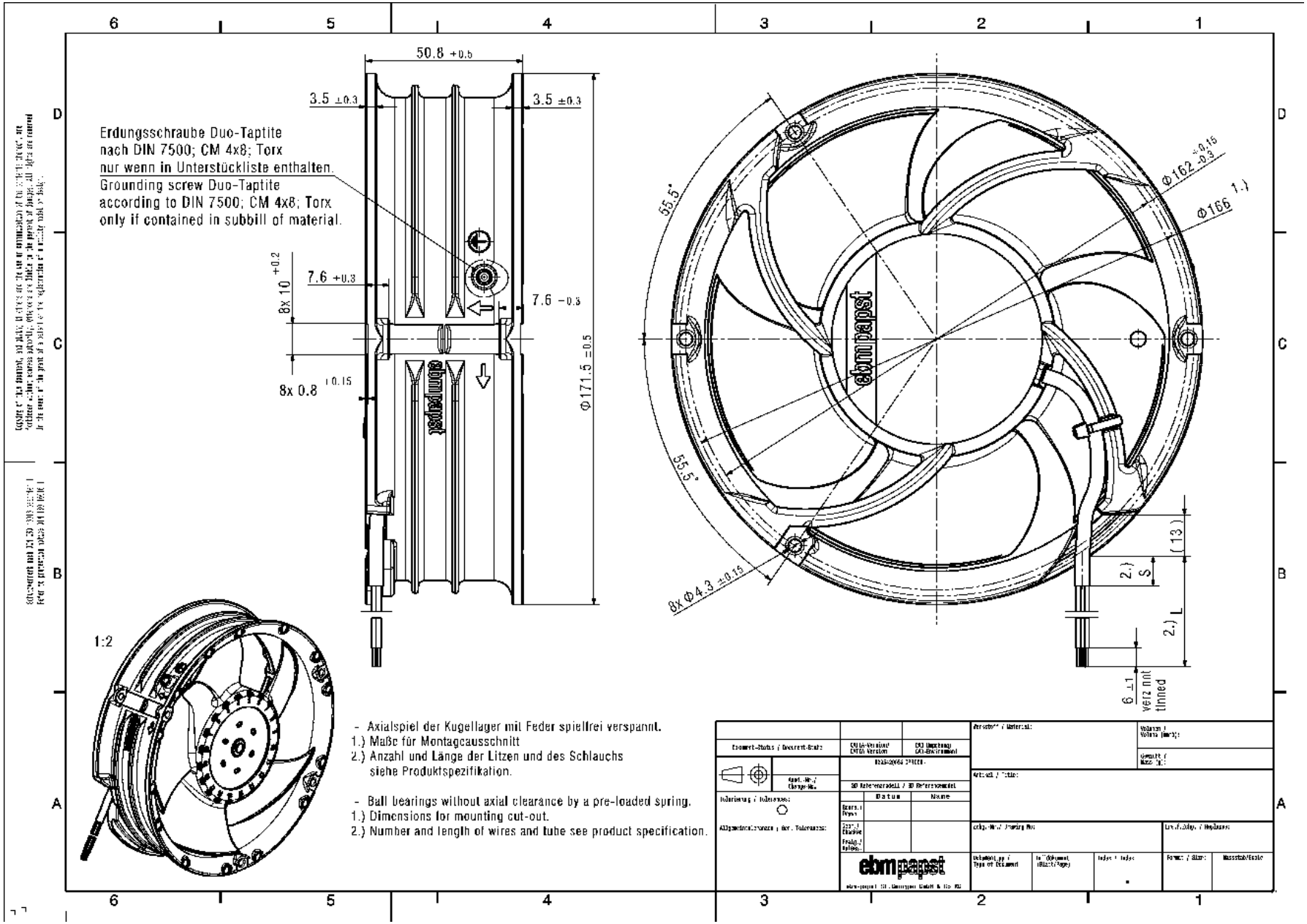
CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans
VDE	Association for Electrical, Electronic and Information Technologies	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Canadian Standards Association	Yes / C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Yes / GB 12350 Safety Requirements for small Power Motors

The approval tests are observed to:
U approval max.:72 V @ TU approval max.: 60 °C

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	52.500 h	
Life expectancy L10 at TU max.	32.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	87.500 h	


50.8 +0.5
3.5 ±0.3
3.5 ±0.3
Erdungsschraube Duo-Taptite
nach DIN 7500; CM 4x8; Torx
nur wenn in Unterstückliste enthalten.
Grounding screw Duo-Taptite
according to DIN 7500; CM 4x8; Torx
only if contained in subbill of material.
8x 10 +0.2
7.6 +0.3
7.6 −0.3
8x 0.8 +0.15
Φ171.5 ±0.5
ebmpapst
55.5°
55.5°
Φ162 +0.15 −0.3
Φ165 1.)
8x Φ4.3 ±0.15
2.) S
(13)
2.) L
6 ±1
verz nit
tinned
1:2
- Axialspiel der Kugellager mit Feder spielfrei verspannt.
1.) Maße für Montageausschnitt
2.) Anzahl und Länge der Litzen und des Schlauchs
siehe Produktspezifikation.
- Ball bearings without axial clearance by a pre-loaded spring.
1.) Dimensions for mounting cut-out.
2.) Number and length of wires and tube see product specification.
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