Product Data Sheet 6318/2TDHHPR-036

ebmpapst

The engineer's choice



GREEN TECH

6318/2TDHHPR-036

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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

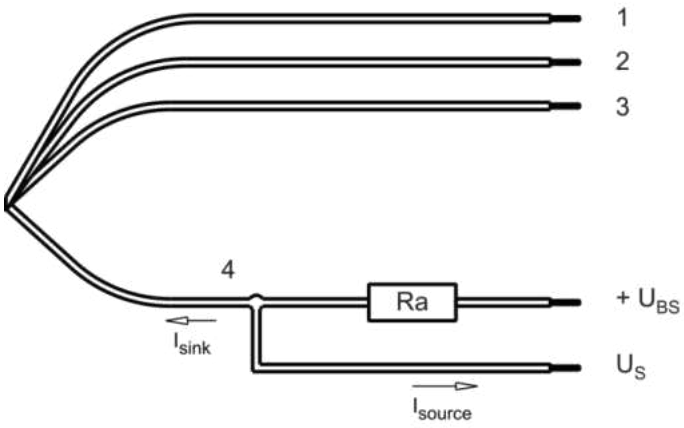
2.1 General

Depth	51,0 mm	
Diameter	172,0 mm	
Mass	0,880 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 - Plug	
Lead wire length Tolerance	L = 340 mm +- 10,0 mm	
Tube length Tolerance	S = 280 mm +- 10 mm	
Plug	See drawing	
Contact	See drawing	





Wire	Color	Operation	Plug connection	Wire size	Insulation diameter
1	red	+ UB	Pin 1	AWG 22	1,7 mm
2	black	- GND	Pin 2	AWG 22	1,7 mm
3	yellow	Tacho	Pin 3	AWG 22	1,7 mm
4	blue	PWM	Pin 4	AWG 22	1,7 mm

3 Operating Data

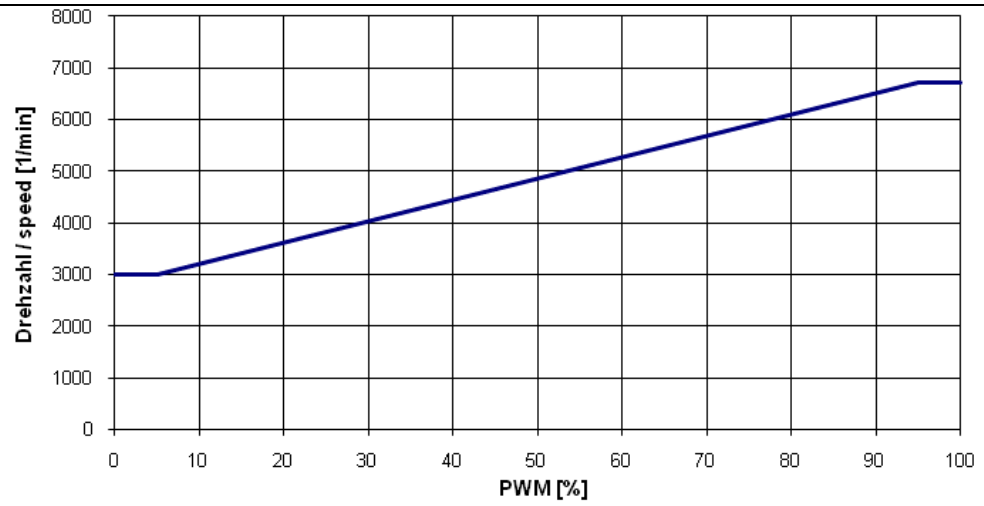
3.1 Electrical Interface - Input

Control input	PWM

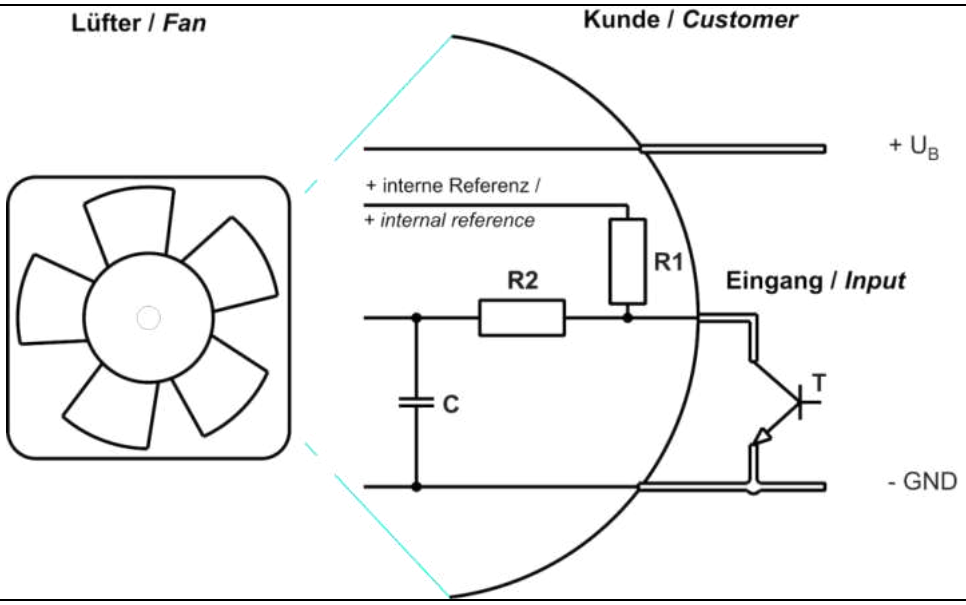
Features

Inpute type	Open collector	
PWM - Frequency		typical: 2 kHz
Input frequency range		1 kHz - 10 kHz

Characteristics



Schematics



The shown pull-up resistor R1 to the internal reference voltage (+5V) has 4.7kOhm.

Information to the curve:

0 % - 5% PWM: 3.000 1/min (corresponding to min. speed)
5 % - 95% PWM: linear increasing curve
95 % - 100% PWM: 6.700 1/min (corresponding to max. speed)

Transistor requirements:
Vce max. >= 12V; Isink max. >=5mA
Vce sat. <= 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

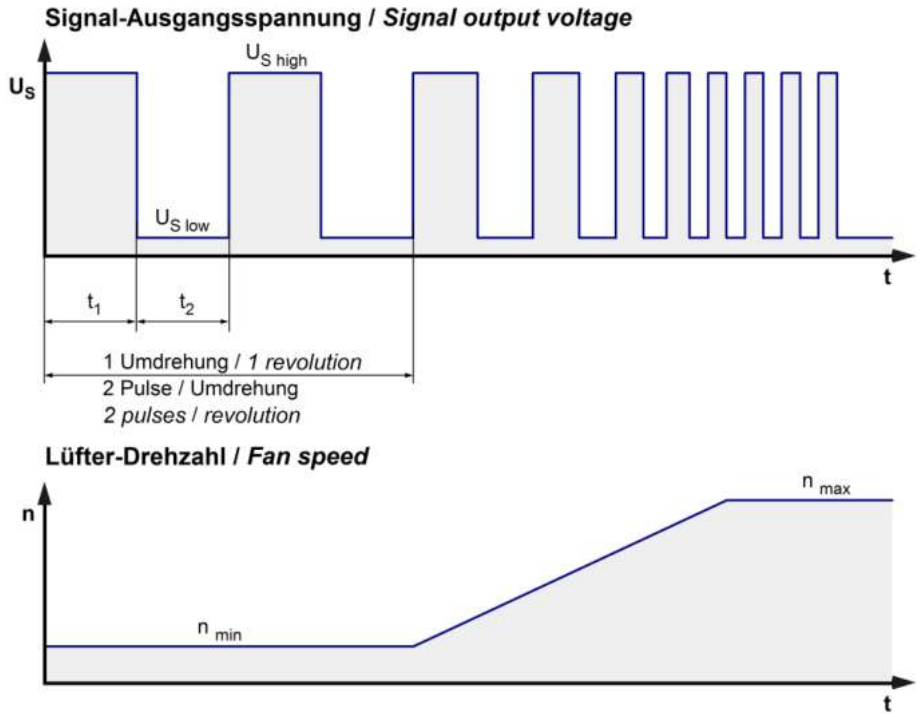
Name	Condition		
PWM 0001	PWM: 97 %; f: 2 kHz		

>95% PWM; f = 2 kHz or broken lead wire (open control input)

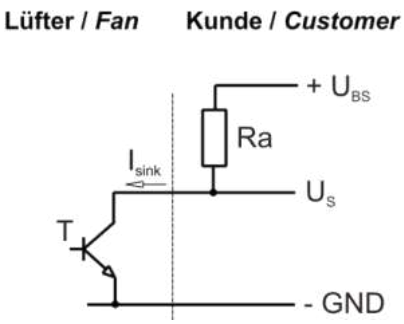
Features	Condition	Symbol	Values		
Voltage range		U	36 V		72 V
Nominal voltage		U_N		48 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	66 W +- 10 %	127 W +- 10 %	124 W +- 10 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	1.830 mA +- 10 %	2.650 mA +- 10 %	1.720 mA +- 10 %
Speed Tolerance	Δp = 0 PWM 0010	n	5.450 1/min +- 7,5 %	6.700 1/min +- 5 %	6.700 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}		<= 60,0 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		(2 x n) / 60	223 Hz @ 6.700 1/min
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

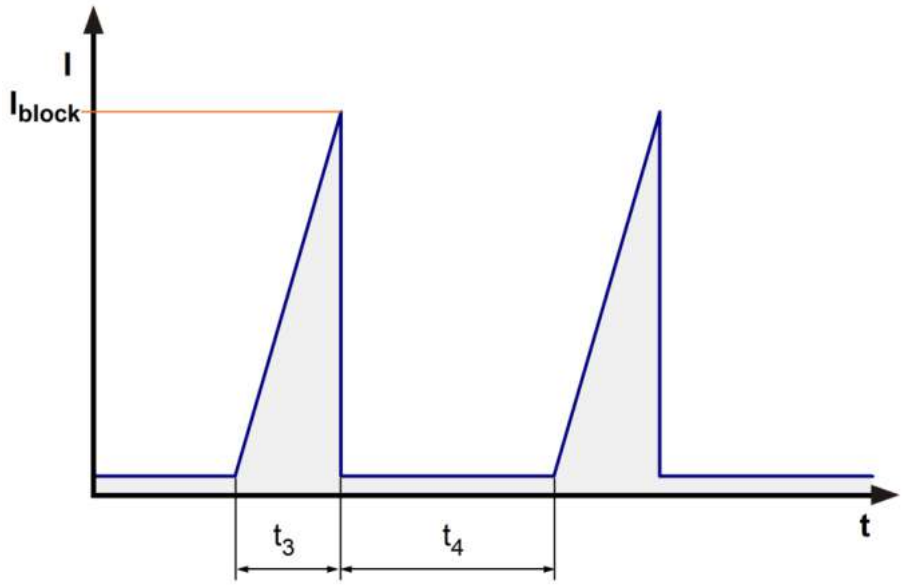
n = revolutions per minute (1/min)

Please note:
At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.
The tacho signal is only activated after the start-up is completed.

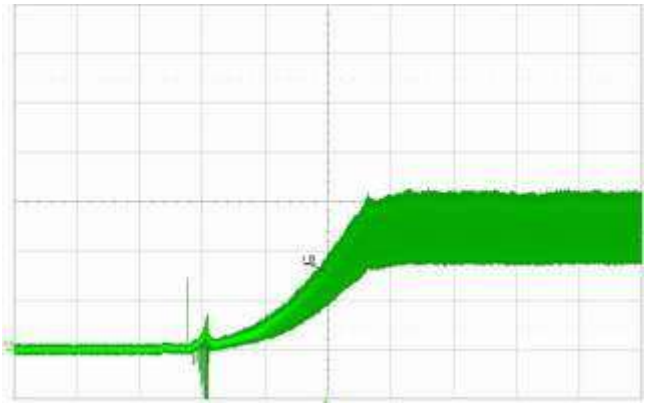
3.4 Electrical Features

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} approx. 1.700 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 6 s / 10 s	
Internal fuse	Littelfuse NANO2 > Very Fast-Acting > 451/453 Series 6,3A / 125V (Art.No.: 045106.3MRL)	
Voltage control *)	Fan turns on at U_B > 33 V or < 78 V Fan turns off at U_B < 31 V or > 80 V	

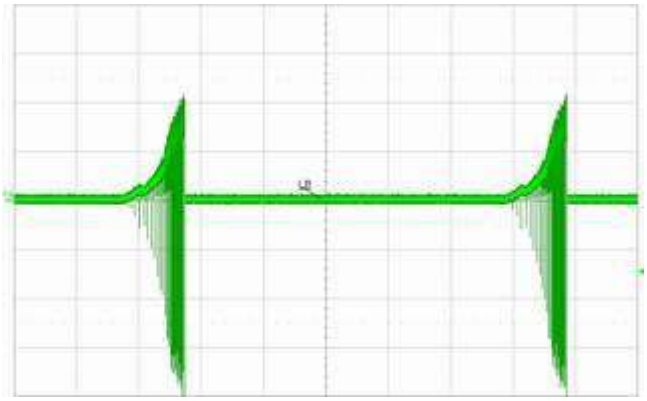
*) This fan has an undervoltage and overvoltage control circuit integrated which turns the motor off if the voltage is out of range.



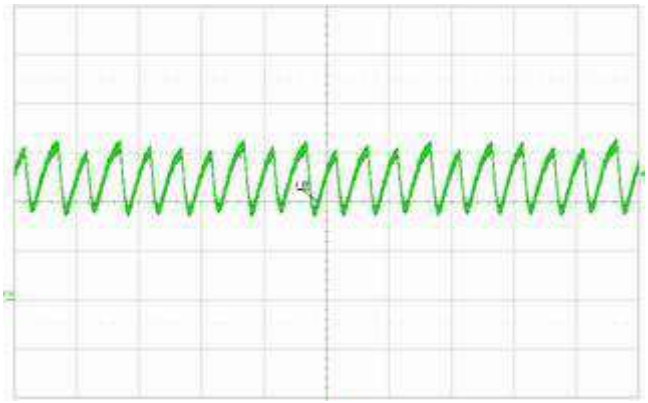
This fan has a startup delay of 2 seconds after applying supply voltage.



Start-up current at UB=48V; I=1A/div, t=5s/div



Locked rotor current at UB=48V; I=500mA/div, t=2s/div



Running current at UB=48V; 6.700 1/min; I=1A/div, t=1ms/div

3.5 Data According ErP Directive

Installation / Efficency category	A / static
Speed control	integrated
Specific ratio	1,00354
Target overall efficiency 2015	28,4 %
Overall efficiency	42,4 %
Efficiency grade	40
Power input	147 W
Speed	6.719 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

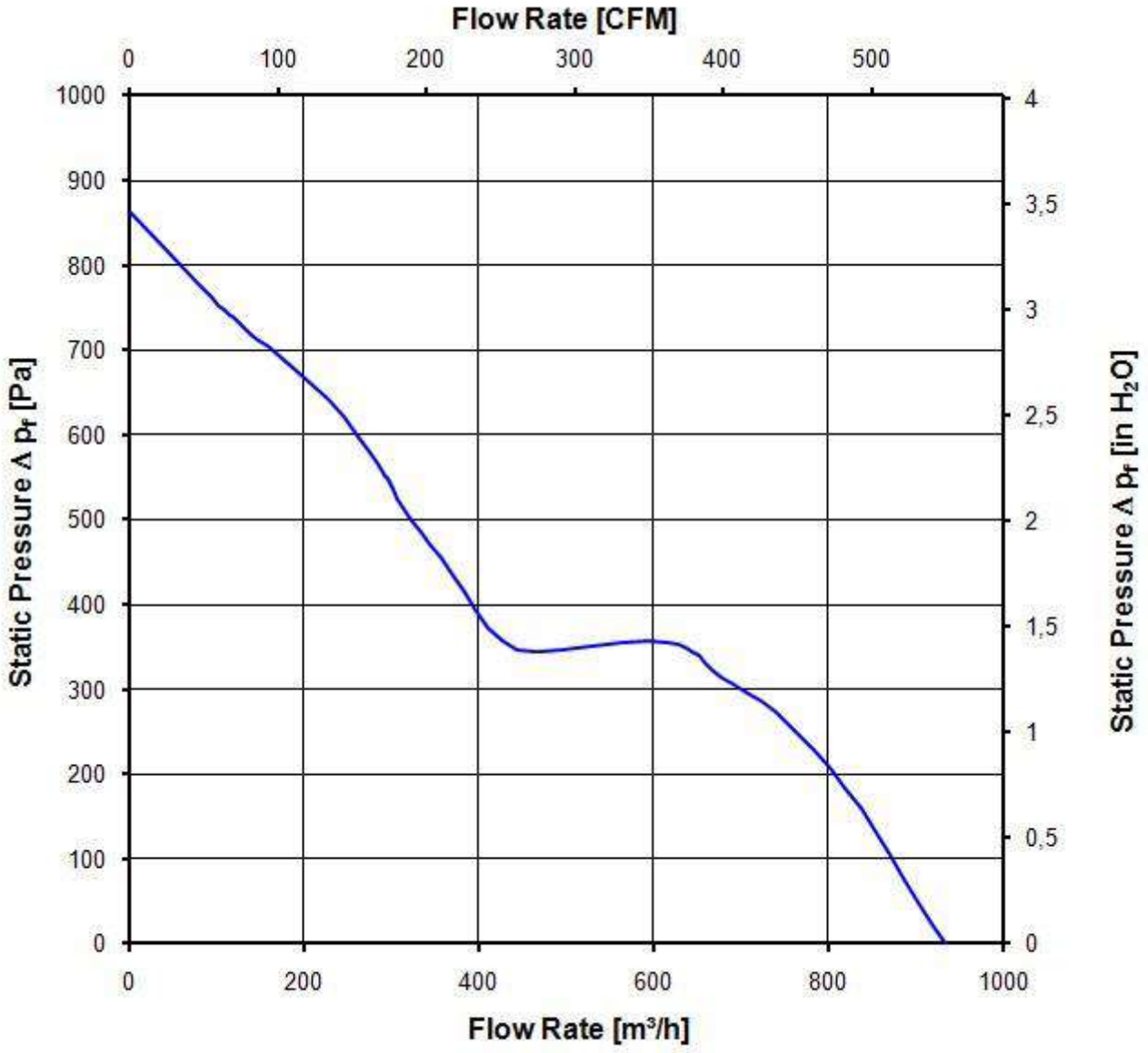
3.6 Aerodynamics

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:

6.700 1/min at free air flow	PWM 97 %; f: 2 kHz		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	930 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	860 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:

6.700 1/min at free air flow	PWM 97 %; f: 2 kHz		

Optimal operating point	800 m3/h @ 184 Pa	
Sound power level at the optimal operating point	8,2 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.	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, cyclic; according to DIN EN 60068-2-30, 6 cycle	
Water exposure	None	
Dust requirements	Dust check; according to DIN EN 60068-2-68, 6g/m2d, 1 day	
Salt fog requirements	None	

Permitted application area:
The product is for the use in sheltered rooms with limited controlled temperature. Occasionally condensed water is allowed. Direct exposure to water must be avoided. Saline ambient conditions must be avoided.

Pollution degree 2 (according DIN EN 60664-1)
It occurs only non-conductive pollution. Occassionally, temporary conductivity caused by condensation occurs.

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

4.3 EMC

Kind	**Electrostatic Discharge Immunity Test**
According	DIN EN 61000-4-2:2001-12
Ceck accuracy / Limit	Contact Discharge +/- 4 kV; Air Discharge +/- 8 kV
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. 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	

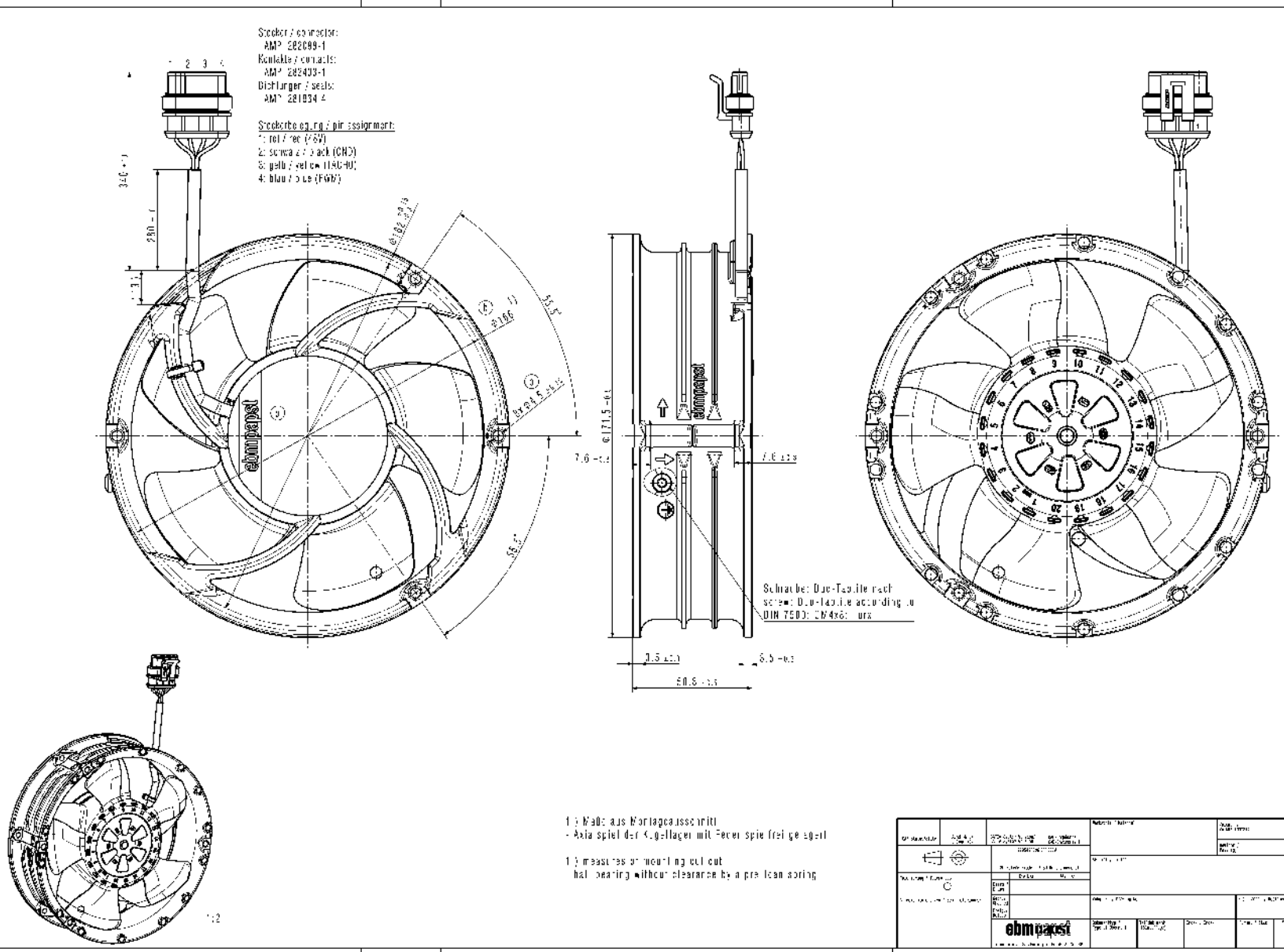
5.2 Approval Tests

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	62.500 h	
Life expectancy L10 at TU max.	32.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	105.000 h	



1) Maße aus Montageausschnitt
- Axialspiel der Kugellager mit Federspielfreigestellt

1) measures of mounting cut out
ball bearing without clearance by a pre-load spring