Product Data Sheet 4412FN/2HP-195

ebmpapst

Die Wahl der Ingenieure



GREEN TECH

4412FN/2HP-195

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6.1 General 11

1 General

Fan type	Fan	
Rotational direction looking at rotor	counterclockwise	
Airflow direction	Air outlet over struts	
Bearing system	Ball bearing	
Mounting position	any	

2 Mechanics

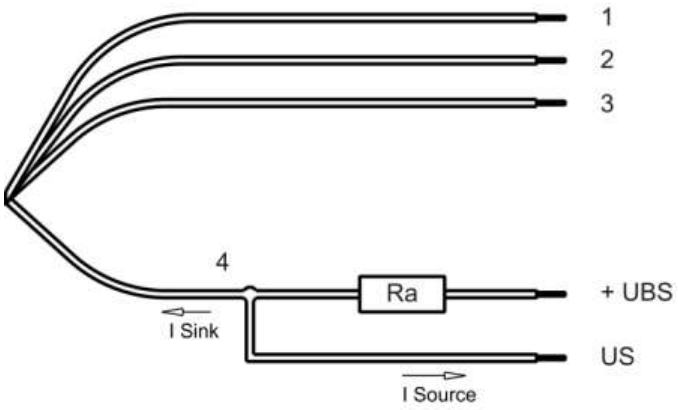
2.1 General

Width	119,0 mm	
Height	119,0 mm	
Depth	25,4 mm	
Weight	0,245 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	wire outlet corner: 110 Ncm remaining corners: 110 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires	
Length of lead wire Tolerance	L = 310 mm +- 10 mm	
Wire gauge (AWG)	22	
Insulation diameter	1,7 mm	
Contact	see drawing	





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

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

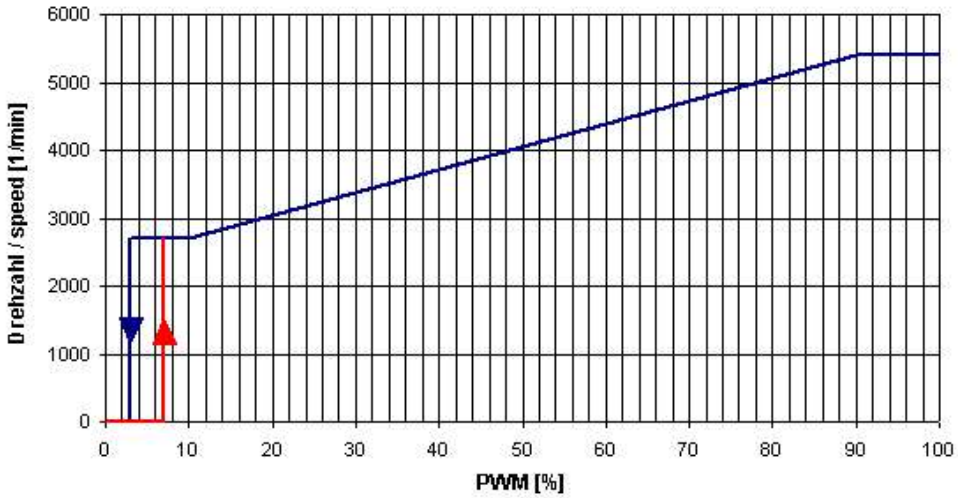
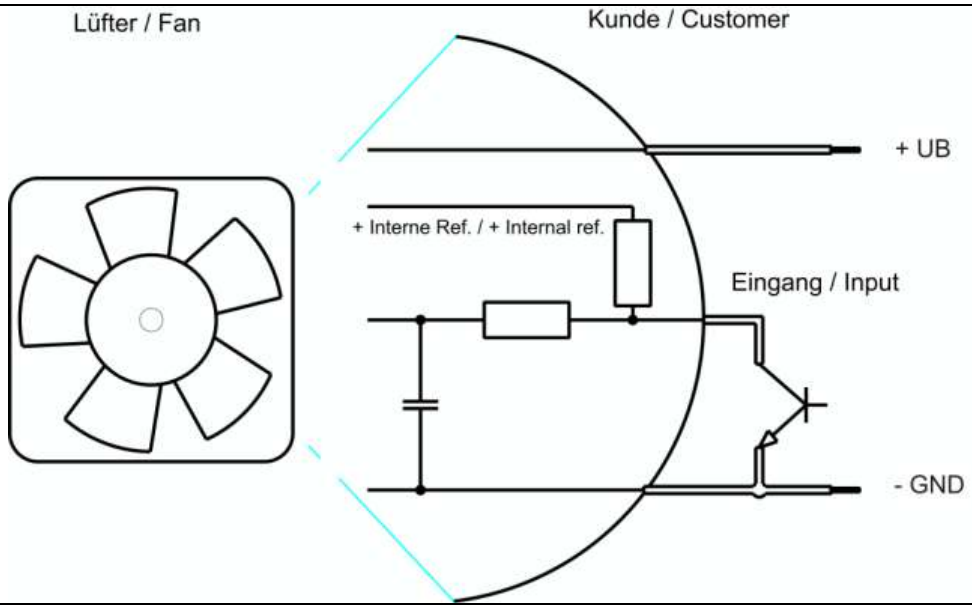
3 Operating Data

3.1 Operating Data - Electrical Interface - Input

Control input	PWM

Features

Inpute type	Open collector	
PWM - Frequency		2 kHz - 5 kHz

Characteristics	
Schematics	

Speed control:
0... 100 % PWM; f: 2... 5 kHz; open collector

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 section 3.5)
I: corresp. to arithm. mean current value

Name	Condition		
PWM 0001	PWM: 90 %;	f: 2 kHz	f: 5 kHz

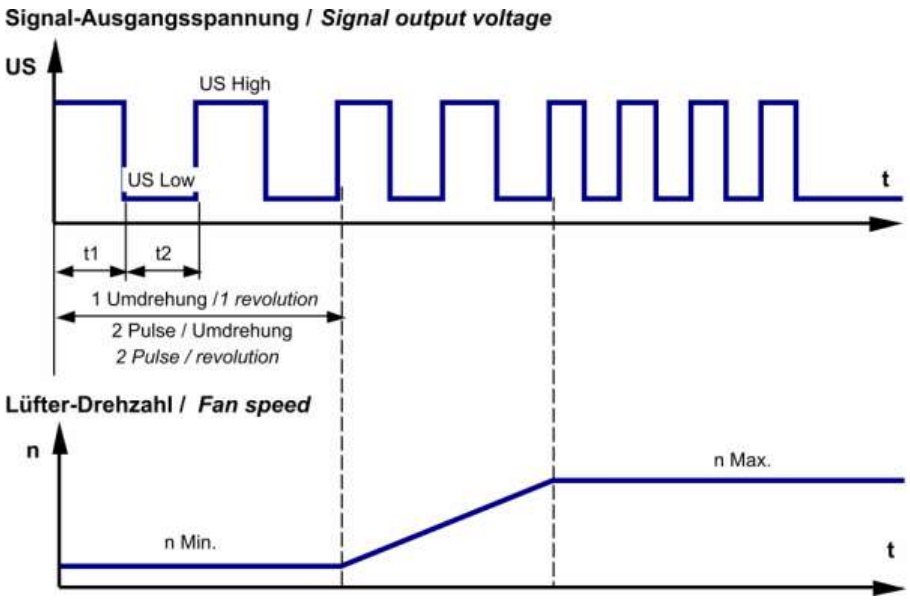
Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	9,0 V		13,2 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption Tolerance	$\Delta p = 0$ PWM 0001	P	6,6 W +- 17,5 %	12,0 W +- 25,0 %	13,7 W +- 25,0 %
Current consumption Tolerance	$\Delta p = 0$ PWM 0001	I	730 mA +- 17,5 %	1.000 mA +- 25,0 %	1.040 mA +- 25,0 %
Speed Tolerance	$\Delta p = 0$ PWM 0001	n	4.150 1/min +- 12,5 %	5.400 1/min +- 5,0 %	5.400 1/min +- 25,0 %
Starting current consumption				5.200 mA	

Name	Condition		
PWM 0002	PWM: 10 %;	f: 2 kHz	f: 5 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	9,0 V		13,2 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption Tolerance	$\Delta p = 0$ PWM 0002	P	3,0 W +- 25,0 %	4,0 W +- 25,0 %	4,4 W +- 25,0 %
Current consumption Tolerance	$\Delta p = 0$ PWM 0002	I	333 mA +- 25,0 %	333 mA +- 25,0 %	333 mA +- 25,0 %
Speed Tolerance	$\Delta p = 0$ PWM 0002	n	2.700 1/min +- 5,0 %	2.700 1/min +- 5,0 %	2.700 1/min +- 5,0 %

3.3 Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)



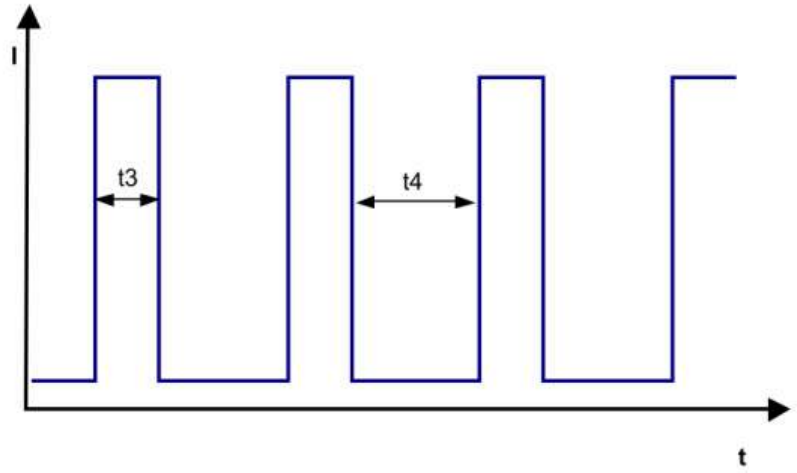
$$Ra = \frac{UBS - US\ Low}{I\ Sink}$$

Features	Note	Values
Tacho operating voltage (UBS)		<= 30,0 V
Tacho signal Low	I sink: 2 mA	<= 0,4 V
Tacho signal High	I source: 0 mA	30,0 V
Maximum sink current		<= 4 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency	(2 x n) / 60	
Tacho isolated from motor	No	
Slew rate		=> 0,5 V/us

Alarm type	None

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at Un	Rectifying diode IF <= 100 uA	
Locked rotor protection	Auto restart	
Locked rotor current at Un		
Clock signal t3/t4 at locked rotor	Typical: 0,4 s / 20,0 s	



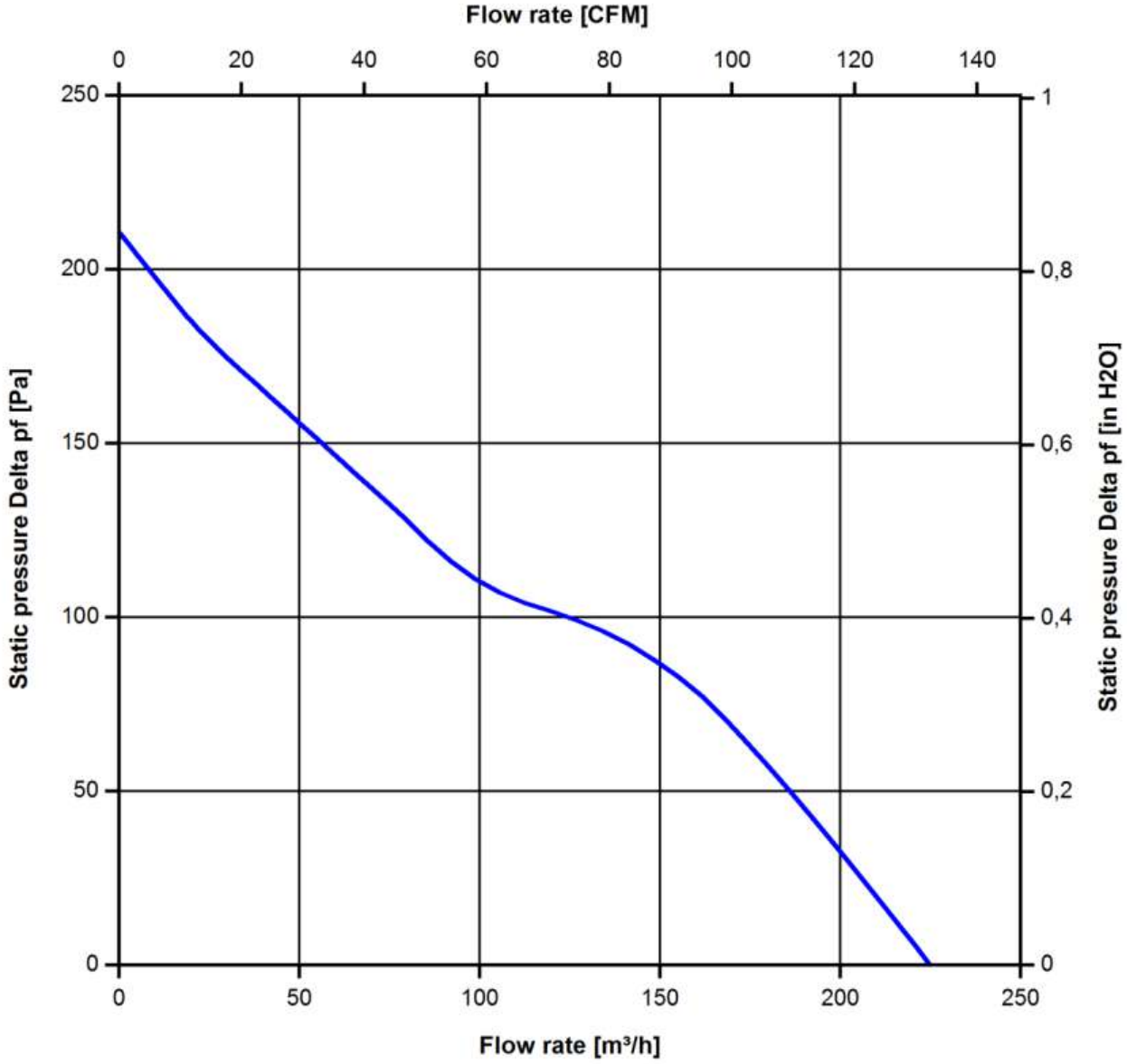
3.5 Aerodynamic

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.

a.) Operation condition:

5.400 1/min at free air flow	PWM 90 %;	f: 2 kHz	f: 5 kHz

Max. free-air flow (Δp = 0 / V̇ = max.)	225,0 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	210 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 Lp(A) < 5 dB(A) For further measurement conditions see section 3.5

a.) Operation condition:

5.400 1/min at free air flow	PWM 90 %	PWM min.: ; f: 2 kHz	PWM max.:; f: 5 kHz

Optimal operating point	162,0 m3/h @ 71 Pa	
Sound power level at the optimal operating point	6,4 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	55,0 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	

*) Permittet 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.

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.	500 VAC / 1 Min. 500 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 / 1,2 mm	
Protection class	III	

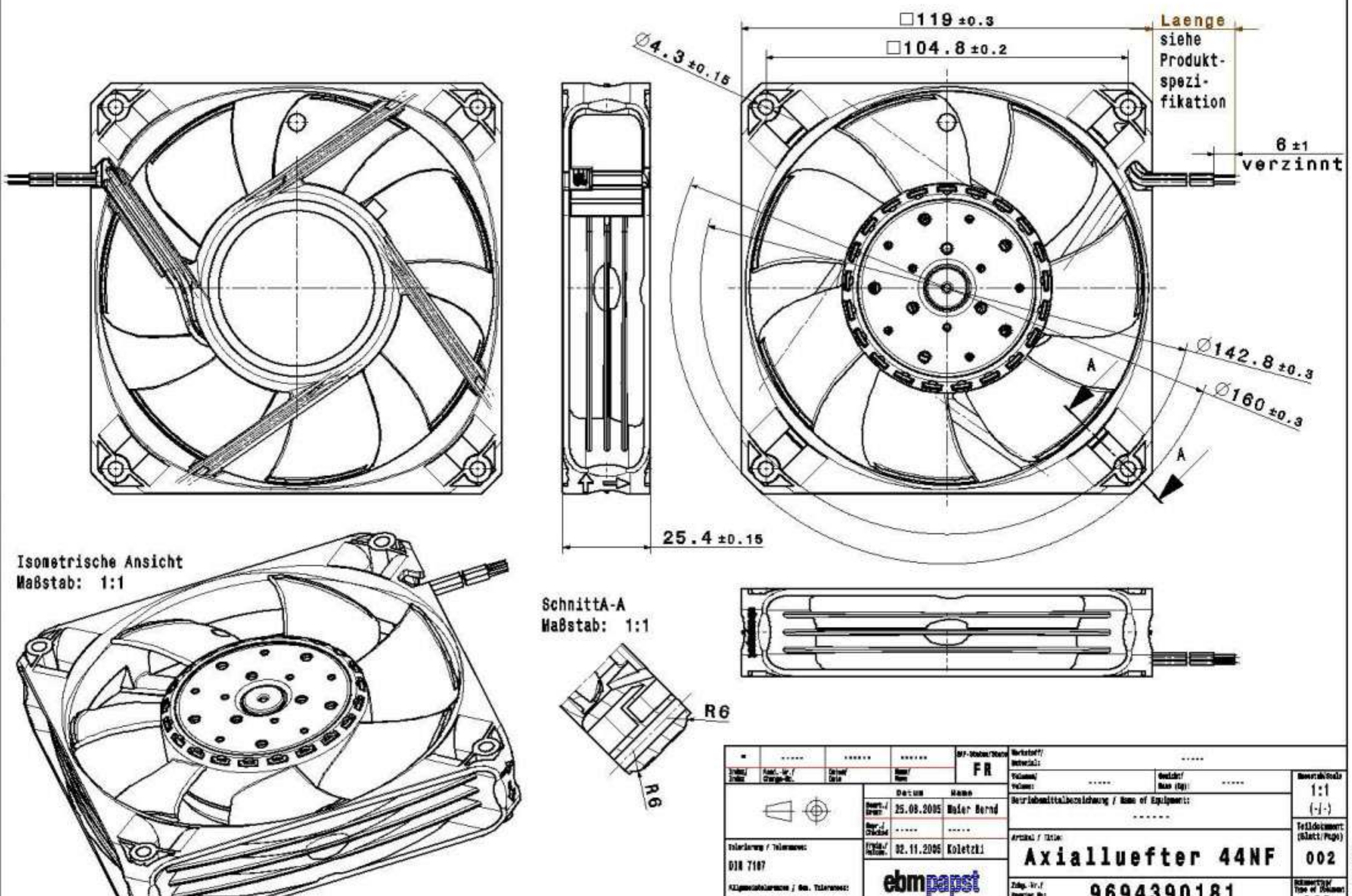
5.2 Approval Tests

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	No

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	60.000 h	
Life expectancy L10 at TU max.	30.000 h	
Life expectancy L10 IPC (40 °C)	102.500 h	



Datum	Name
Bearb./Drawn: 25.08.2005	Maier Bernd
Gepr./Checked: -----	-----
Freig./Releas.: 02.11.2006	Koletzki

Status: FR

Werkstoff/Material: -----

Volumen/Volume: -----

Gewicht/Mass (kg): -----

Maßstab/Scale: 1:1 (-/-)

Betriebsmittelbezeichnung / Name of Equipment: ------

Tolerierung / Tolerances: DIN 7167

Allgemeintoleranzen / Gen. Tolerances: DIN ISO 2768 mK-E

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