1   General

Fan type	Blower	
Rotating direction looking at rotor	Counterclockwise	
Airflow direction	Air in axially, Air out radially	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

2   Mechanics

2.1   General

Width	220 mm	
Height	220 mm	
Depth	56 mm	
Mass	1,320 kg	
Housing material	Mixed	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	Wire outlet corner: 70 Ncm Remaining corners: 70 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2   Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 325 mm +- 10,0 mm	
Tube length Tolerance	S = 25 mm +- 10 mm	
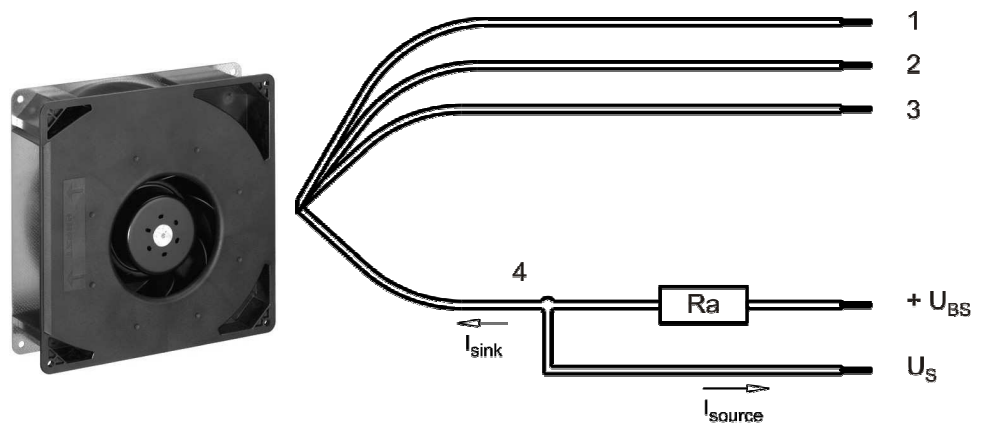
Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 22	1,70 mm
2	blue	- GND	AWG 22	1,70 mm
3	violet	PWM	AWG 22	1,70 mm
4	white	Tacho	AWG 22	1,70 mm

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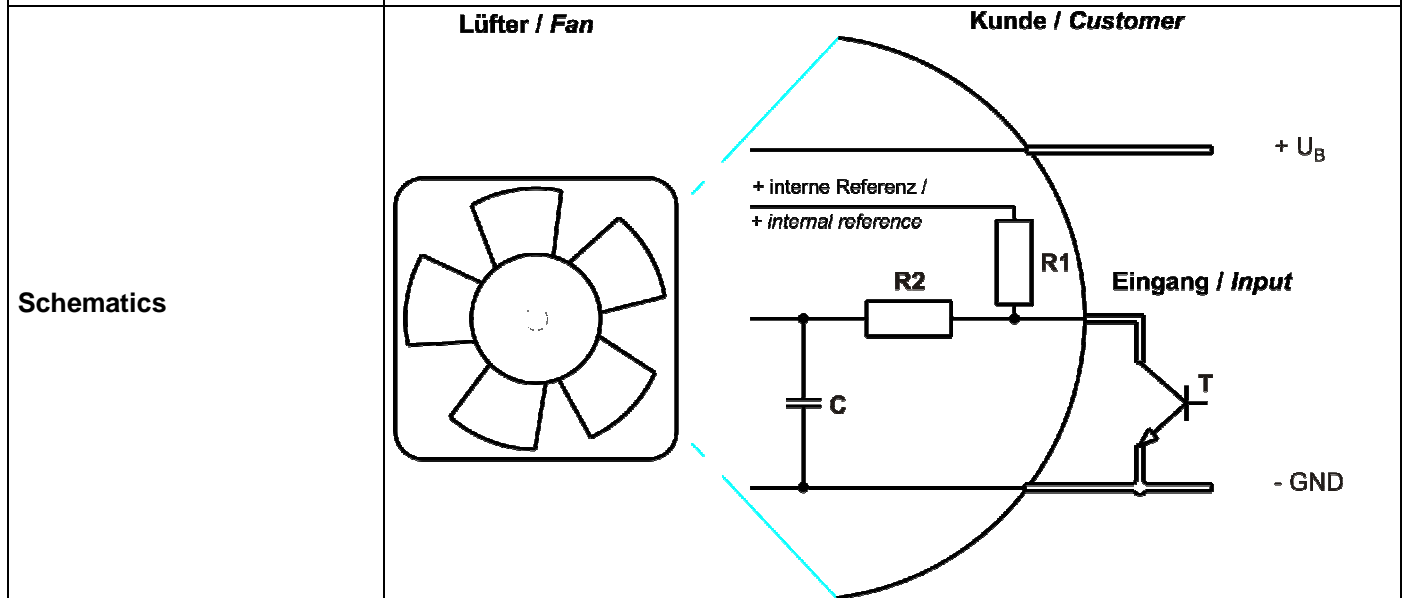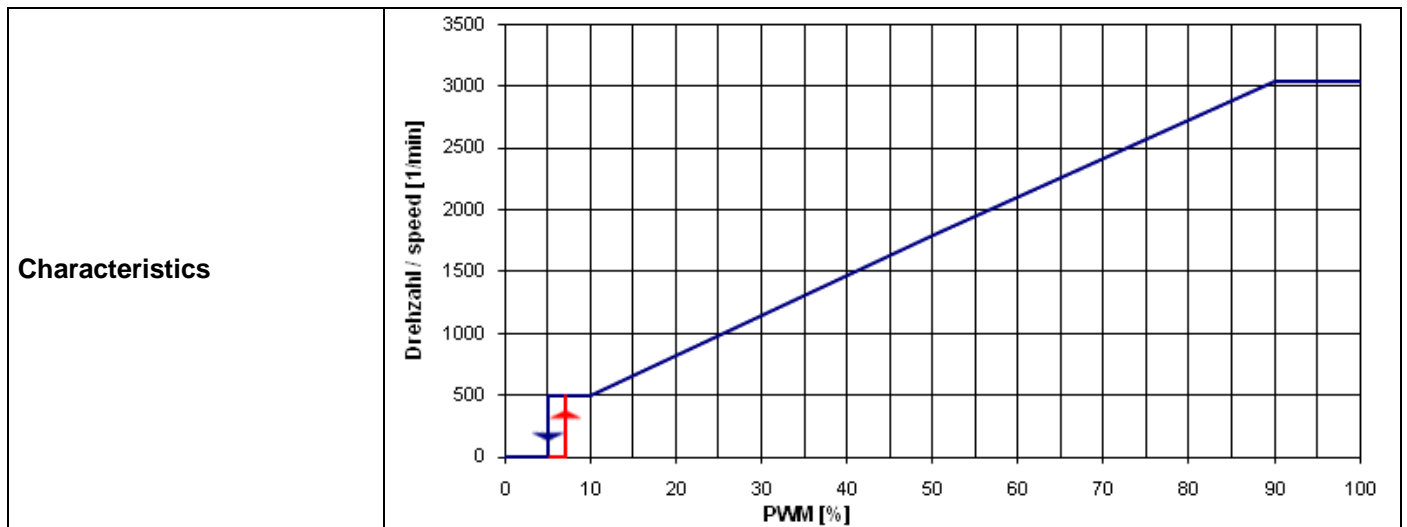
3   Operating Data

3.1   Electrical Interface - Input

Control input	PWM

Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 25 kHz typical: 2 kHz

Characteristics	
Schematics	

Transistor requirements: VCEmax. >12V; Isink max. >5mA; VCEsat <0,15V

3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m3; Temperature 23℃ +/ - 3℃; 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.

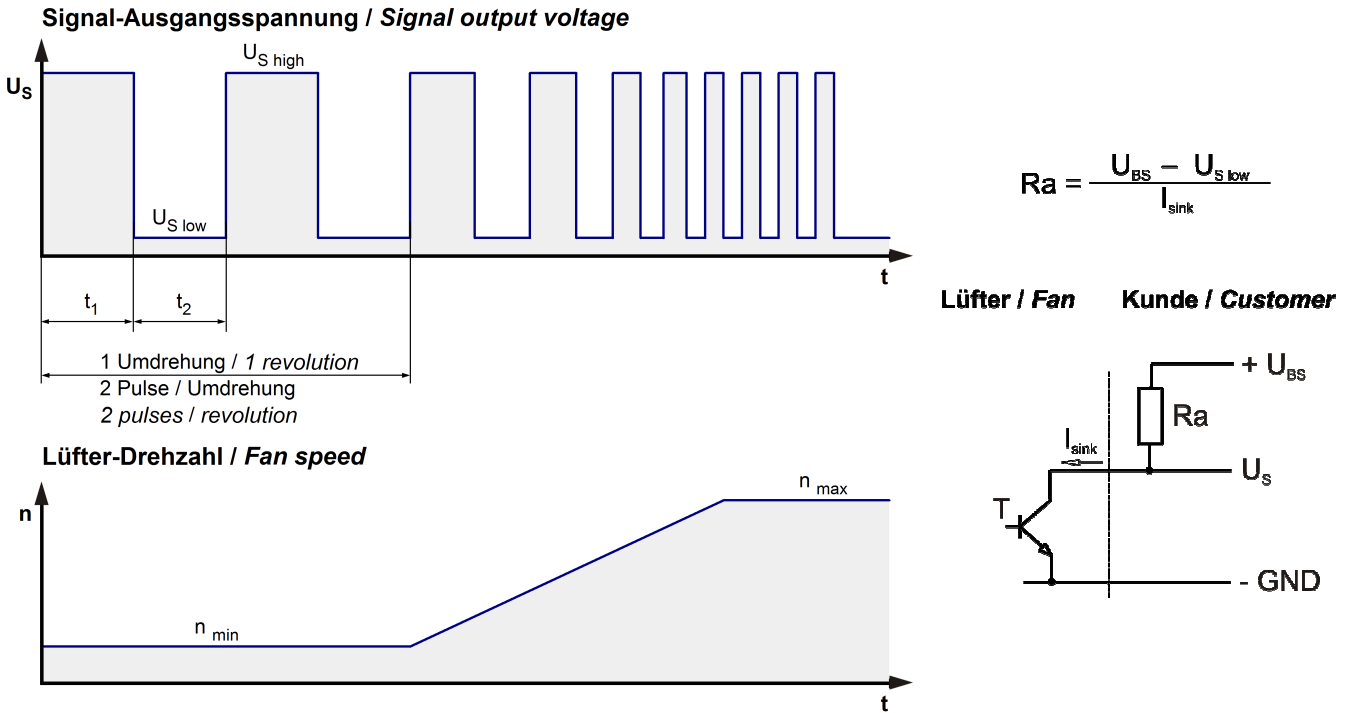$\Delta p = 0$: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

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

Features	Condition	Symbol	Values		
Voltage range		U	8 V		15,0 V
Nominal voltage		U_N		12,0 V	
Power consumption	$\Delta p = 0$	P	10,5 W	27,0 W	27,5 W
Tolerance	PWM 0010		+- 15 %	+- 10,0 %	+- 10,0 %
Current consumption	$\Delta p = 0$	I	1.300 mA	2.300 mA	1.850 mA
Tolerance	PWM 0010		+- 15,0 %	+- 10,0 %	+- 10,0 %
Speed	$\Delta p = 0$	n	2.170 1/min	3.040 1/min	3.040 1/min
Tolerance	PWM 0010		+- 7,5 %	+- 5,0 %	+- 5,0 %
Starting current consumption				< 2.500 mA	

3.3 Electrical Interface - Output

Tacho type	/2 (open collector)

Signal-Ausgangsspannung / *Signal output voltage*

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

1 Umdrehung / *1 revolution*
2 Pulse / Umdrehung
2 pulses / revolution

Lüfter-Drehzahl / *Fan speed*

Lüfter / *Fan*   **Kunde /** *Customer*

Features		Note	Values
Tacho operating voltage	U_{BS}		<= 40,0 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<= 0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	<=40 V
Maximum sink current	I_{sink}		<= 10 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

n = revolutions per minute (1/min)

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	Rectifying diode I_F <= 10 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 2.300 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 0,5 s / 5,0 s	
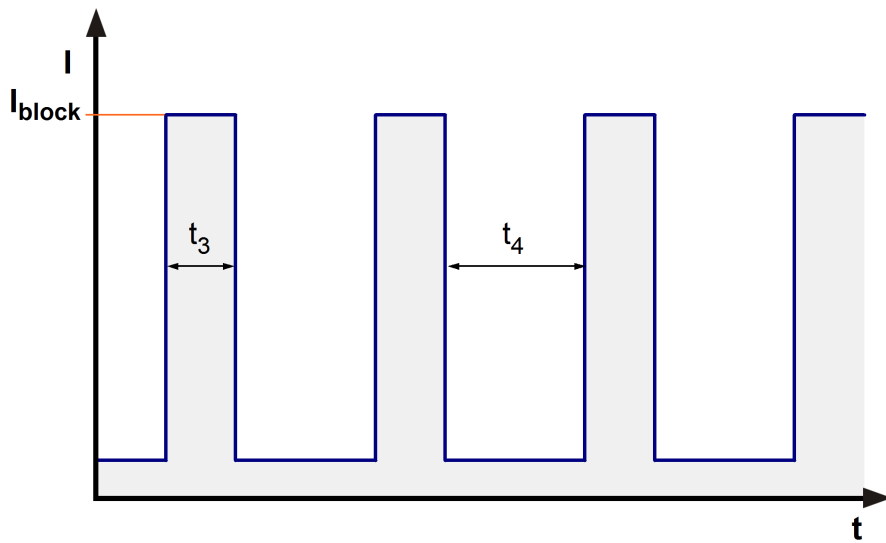
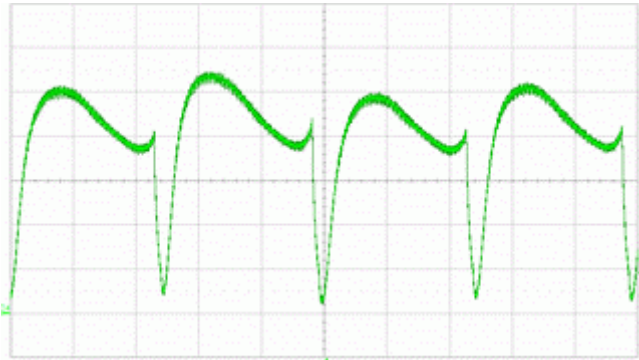The locked rotor current is denoted as peak-current at nominal voltage.
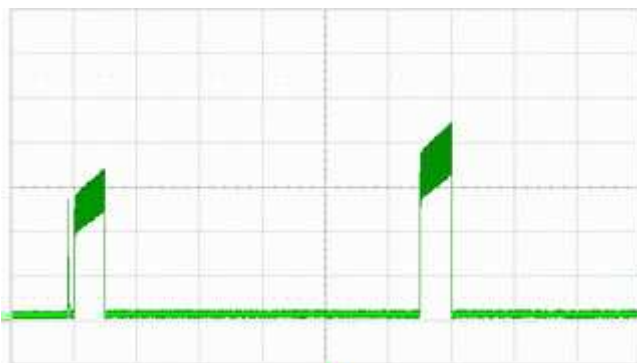
Locked rotor current @ 12V (I = 0,5A/div ; t = 1s/div)
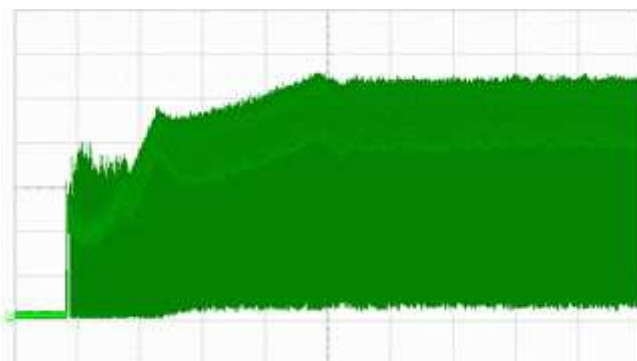
Start-up current @ 12V (I = 0,5A/div ; t = 5s/div)

Running current @ 12V (I = 0,5A/div ; t = 2ms/div)

<u>**Internal Fuse:**</u>
LITTELFUSE NANO2(R) FUSE; Very fast acting 451 Series; 5 A (Art.-Nr.: 451005.MR

3.5   Aerodynamics

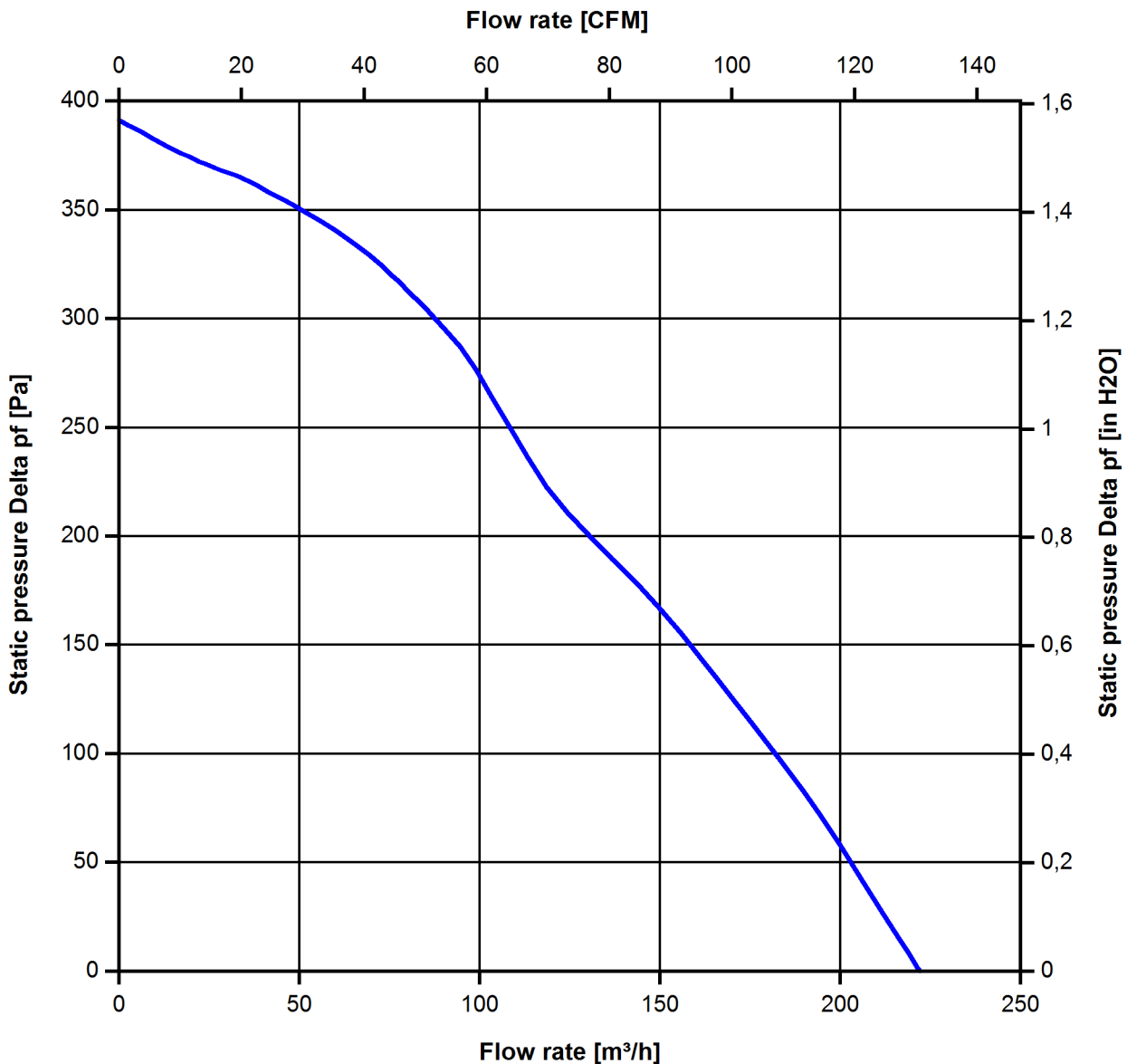| Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m3; Temperature 23℃ +/ - 3℃; In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal. The information is only valid under the specified 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:

3.040 1/min at free air flow	PWM 95 %; f: 2 kHz		

Max. free-air flow (Δp = 0 / V̇ = max.)	222 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	390 Pa	

3.6   Sound Data

Measurement conditions:	Sound pressure level: 1 meter distance between microphone and the air intake.
	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:

3.040 1/min at free air flow	PWM 95 %; f: 2 kHz		

4   Environment

4.1   General

Min. permitted ambient temperature TU min.	-20 ℃	
Max. permitted ambient temperature TU max.	70 ℃	
Min. permitted storage temperature TL min.	-40 ℃	
Max. permitted storage temperature TL max.	80 ℃	

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.

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

5   Safety

5.1   Electrical Safety

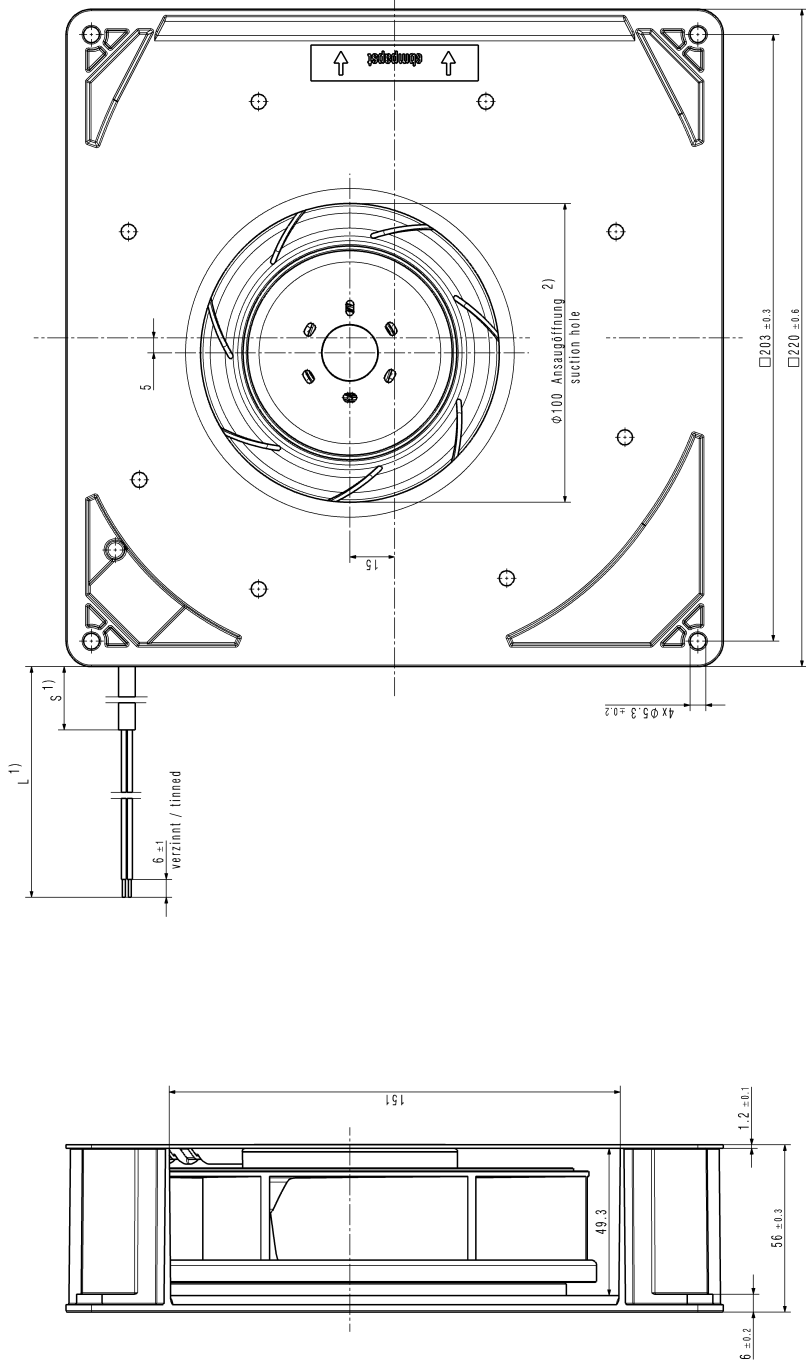|		
Dielectric strength DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700) A.) Type test Measuring conditions: After 48h of storage at 95% R.H. and 25℃. No arcing or breakdown is allowed! All connections together to ground. B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Min. 850 VDC / 1 Sec.	
Isolation resistance Measuring conditions: After 48h of storage at 95% R.H. and 25℃ 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	No
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	No
VDE	Association for Electrical, Electronic and Information Technologies	No
CSA	Canadian Standards Association	No
CCC	China Compulsory Certification	Not applicable

6   Reliability

6.1   General

Life expectancy L10 at TU = 40 ℃	75.000 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 ℃	127. 500 h	

Φ100 Ansaugöffnung
suction hole 2)

□203 ±0.3
□220 ±0.6

4x Φ5.3 ±0.2

5

15

S 1)

L 1)

6 ±1
verzinnt / tinned

151

49.3

56 ±0.3

1.2 ±0.1

6 ±0.2

1) Anzahl und Länge der Litzen sowie Länge des Schlauches ab Flanschrand siehe Produktspezifikation
2) Öffnung für Montagewand >= 115mm

- Axialspiel mit Feder spielfrei verspannt

1) length and number of wires and length of tube from flange edge see design specification
2) opening for mounting plate >= 115mm

- without axial clearance by a pre-loaded spring

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