

Product Data Sheet RG160-28/12/2NP-211

ebmpapst

The engineer's choice



RG160-28/12/2NP-211

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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	

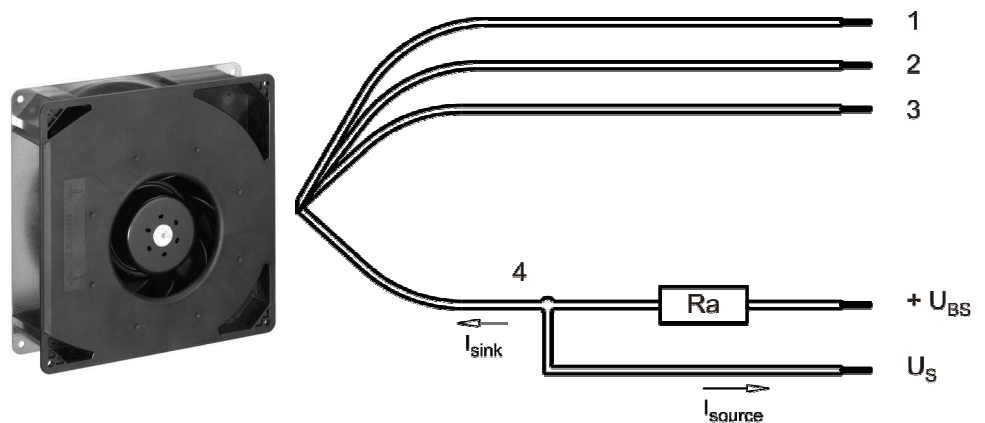
2 Mechanics

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	Wire outlet corner: 70 Ncm Remaining corners: 70 Ncm	
Screw size	ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires	
Lead wire length	L = 325 mm	
Tolerance	+/- 10,0 mm	
Tube length	S = 25 mm	
Tolerance	+/- 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 auxiliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

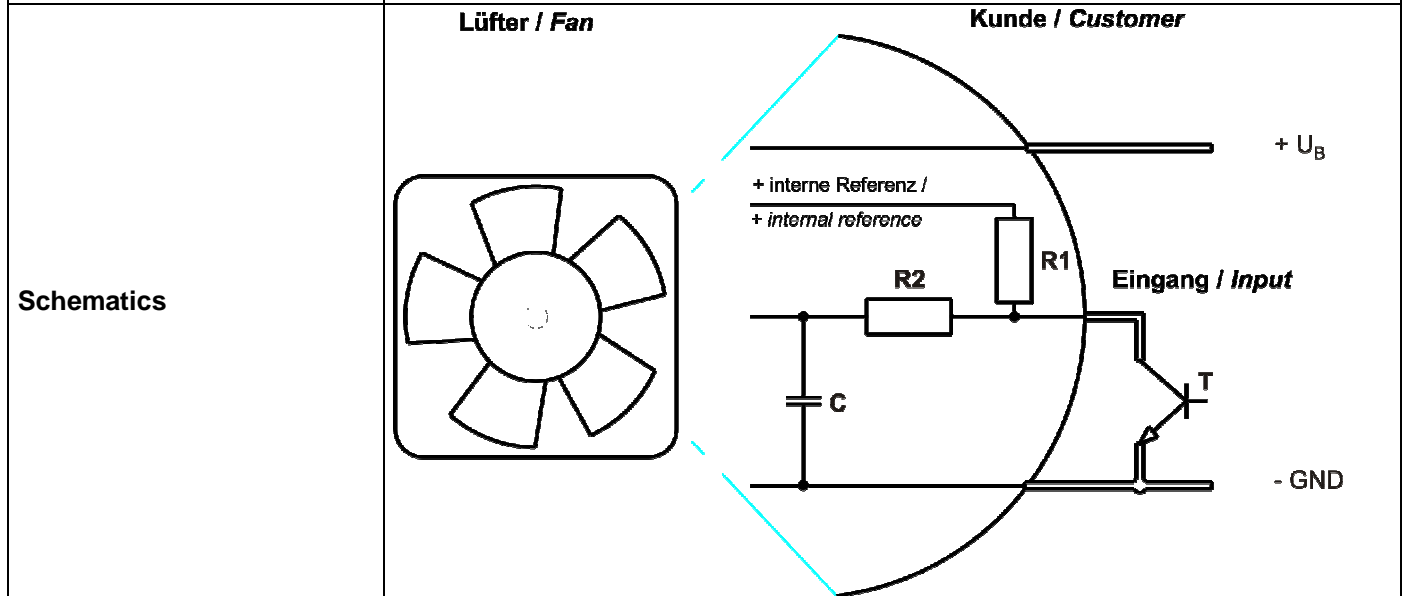
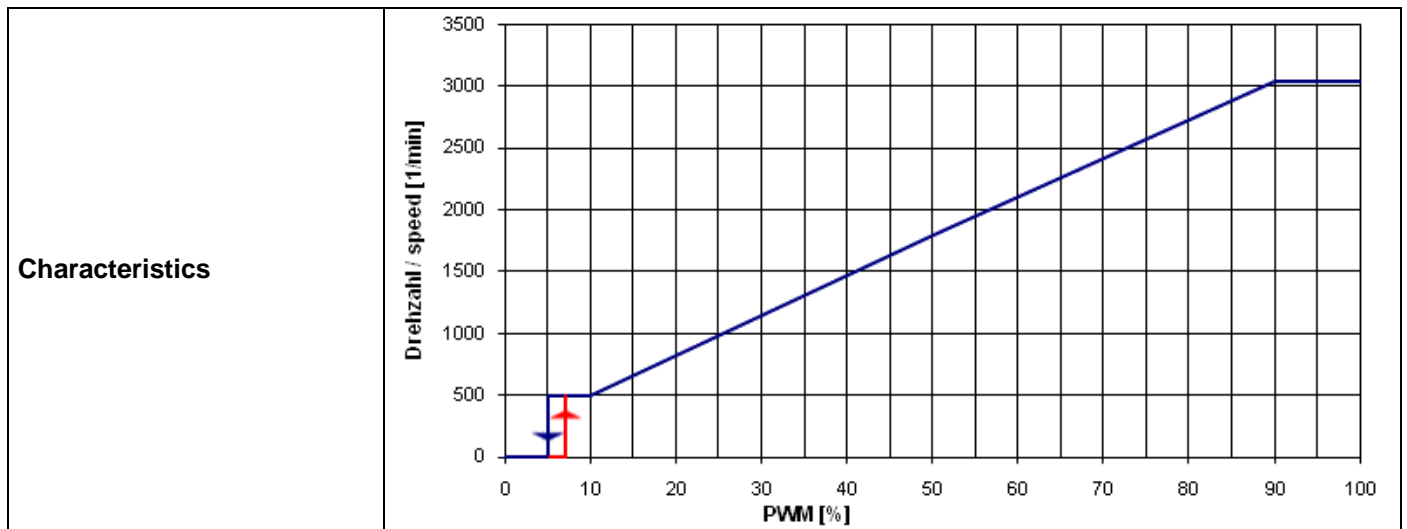
3 Operating Data

3.1 Electrical Interface - Input

Control input	PWM
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Features

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



Transistor requirements: $V_{CEmax.} > 12V$; $I_{sink\ max.} > 5mA$; $V_{CEsat} < 0,15V$

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.

$\Delta p = 0$: corresp. to free air flow (see chapter aerodynamics)

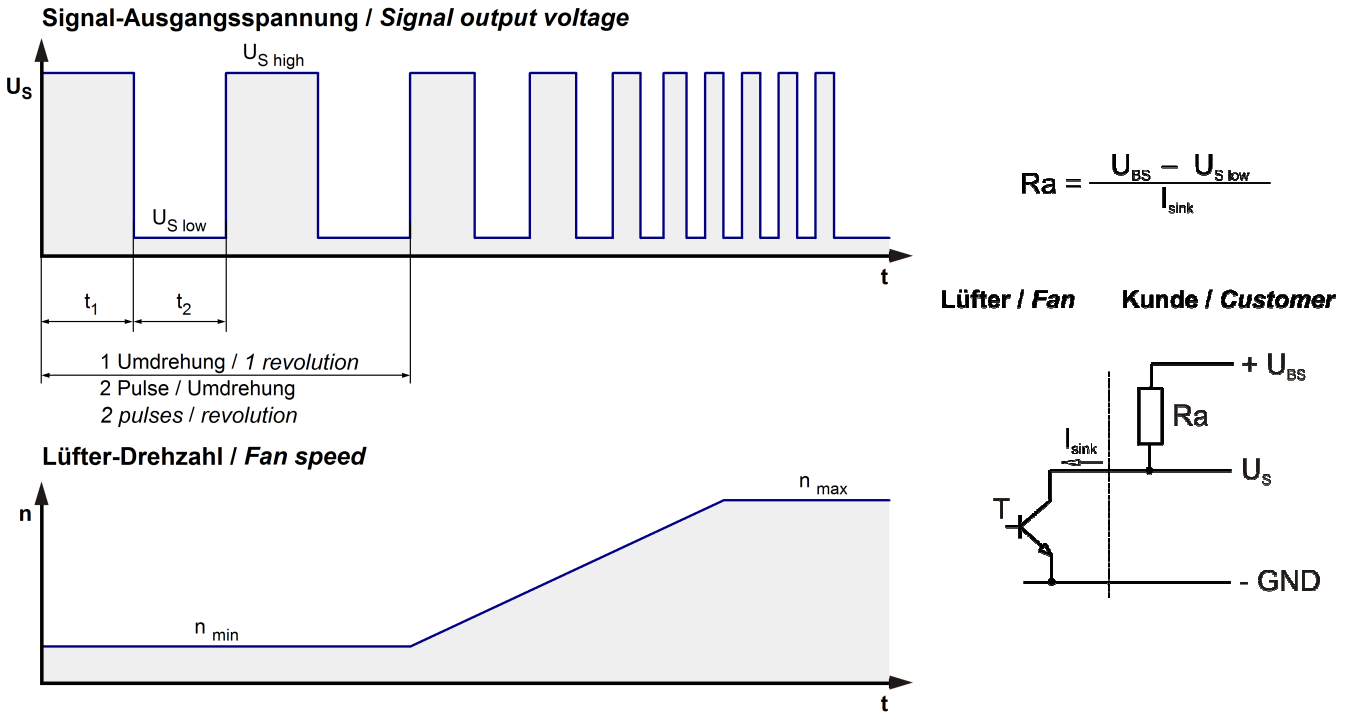
I: corresp. to arithm. mean current value

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)
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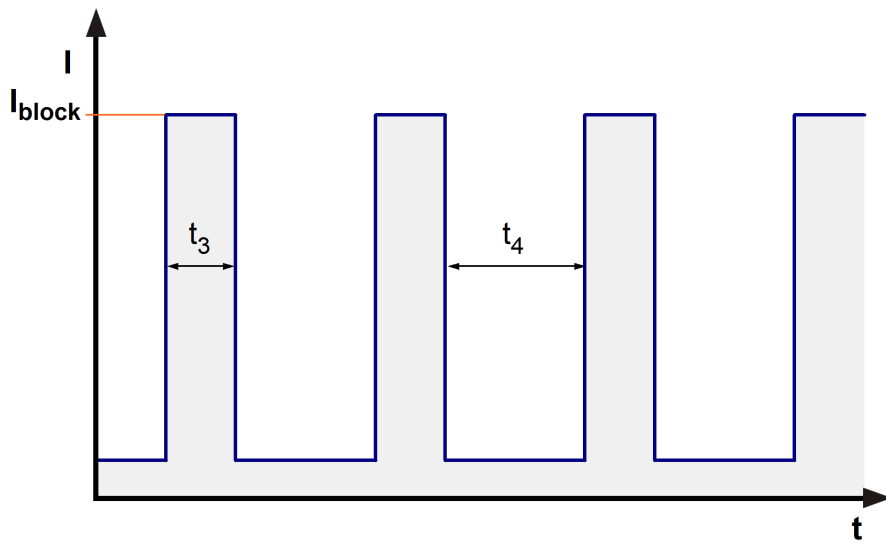


Features	Note	Values
Tacho operating voltage	U_{BS}	$\leq 40,0\ V$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\ V$
Tacho signal High	$U_{S\ high}$	$\leq 40\ V$
Maximum sink current	I_{sink}	$\leq 10\ mA$
External resistor	External resistor R_a from U_{BS} to U_S required. All voltages measured to GND.	
Tacho frequency	$(2 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5\ V/\mu s$

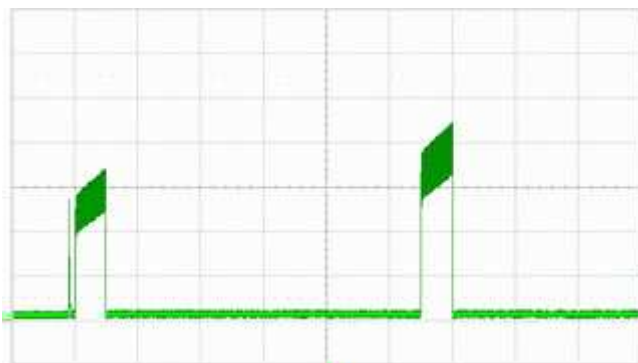
n = revolutions per minute (1/min)

3.4 Electrical Features

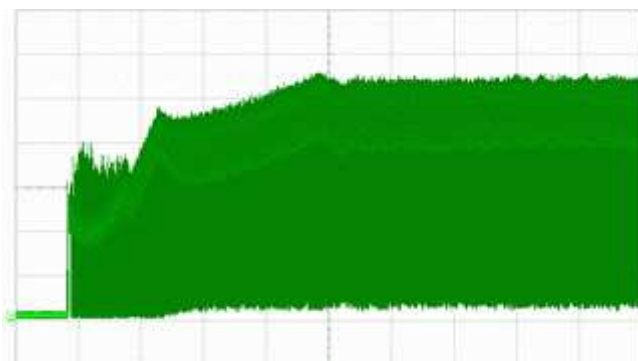
Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	
Max. residual current at U_N	$I_F \leq 10\ mA$	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 2.300 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 0,5 s / 5,0 s	



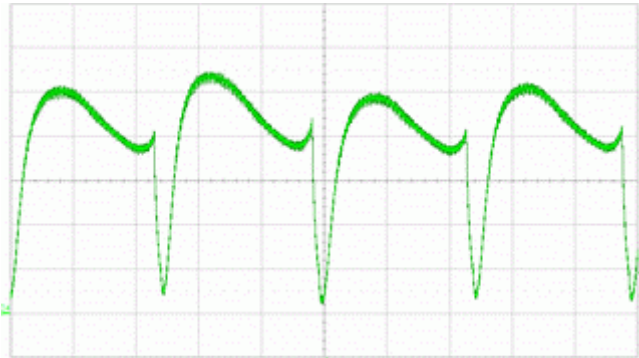
The locked rotor current is denoted as peak-current at nominal voltage.



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 ($I = 0,5A/div$; $t = 2ms/div$)

Internal Fuse:

LITTELFUSE NANO2(R) FUSE; Very fast acting 451 Series; 5 A (Art.-Nr.: 451005.MR)

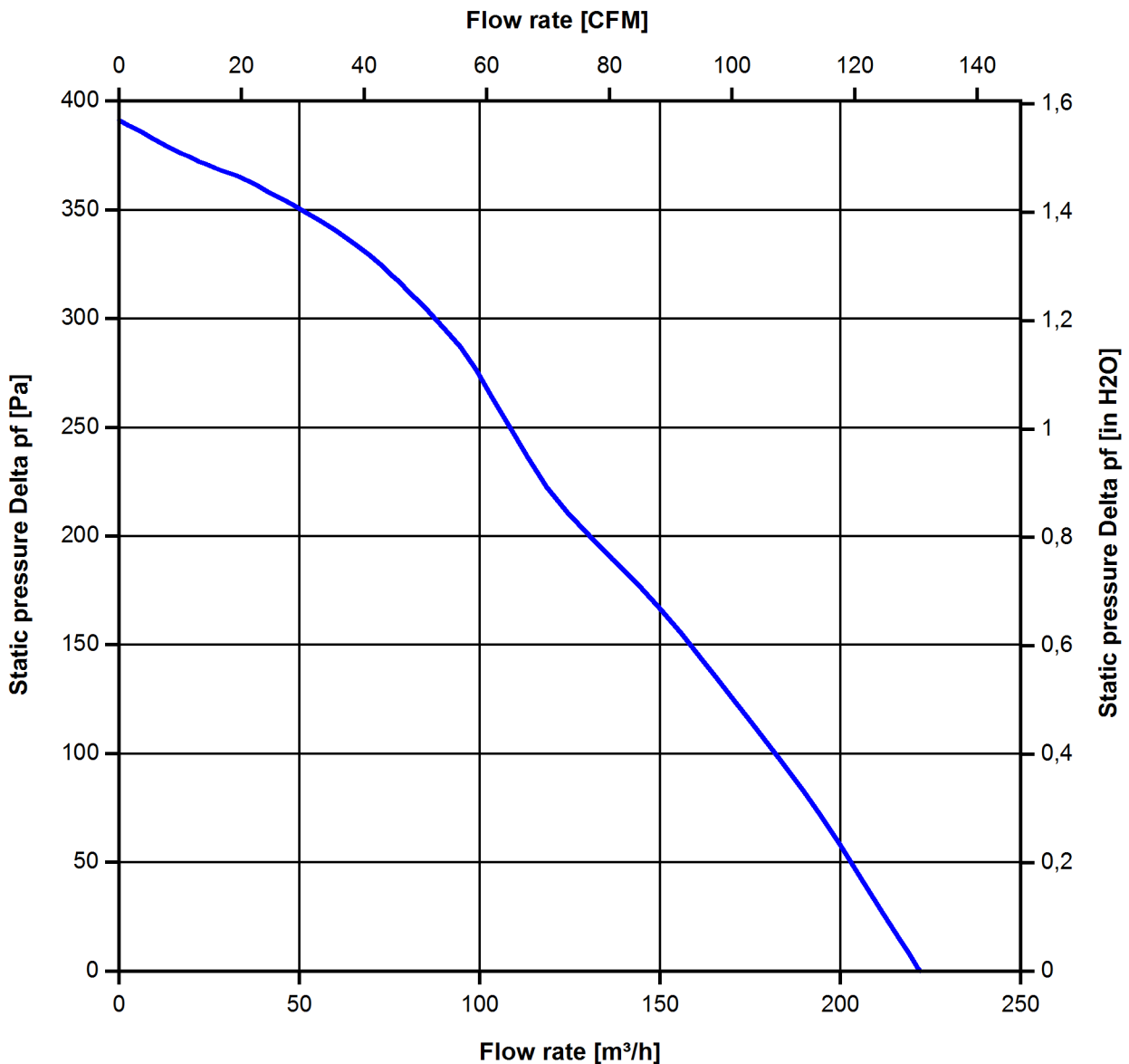
3.5 Aerodynamics

Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801.
 Normal air density = 1,2 kg/m³; Temperature 23°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:

3.040 1/min at free air flow	PWM 95 %; f: 2 kHz		
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Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$)	222 m ³ /h	
Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$)	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 $L_p(A) < 5 \text{ dB(A)}$
 For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

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

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°C. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Min.	
B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	850 VDC / 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	

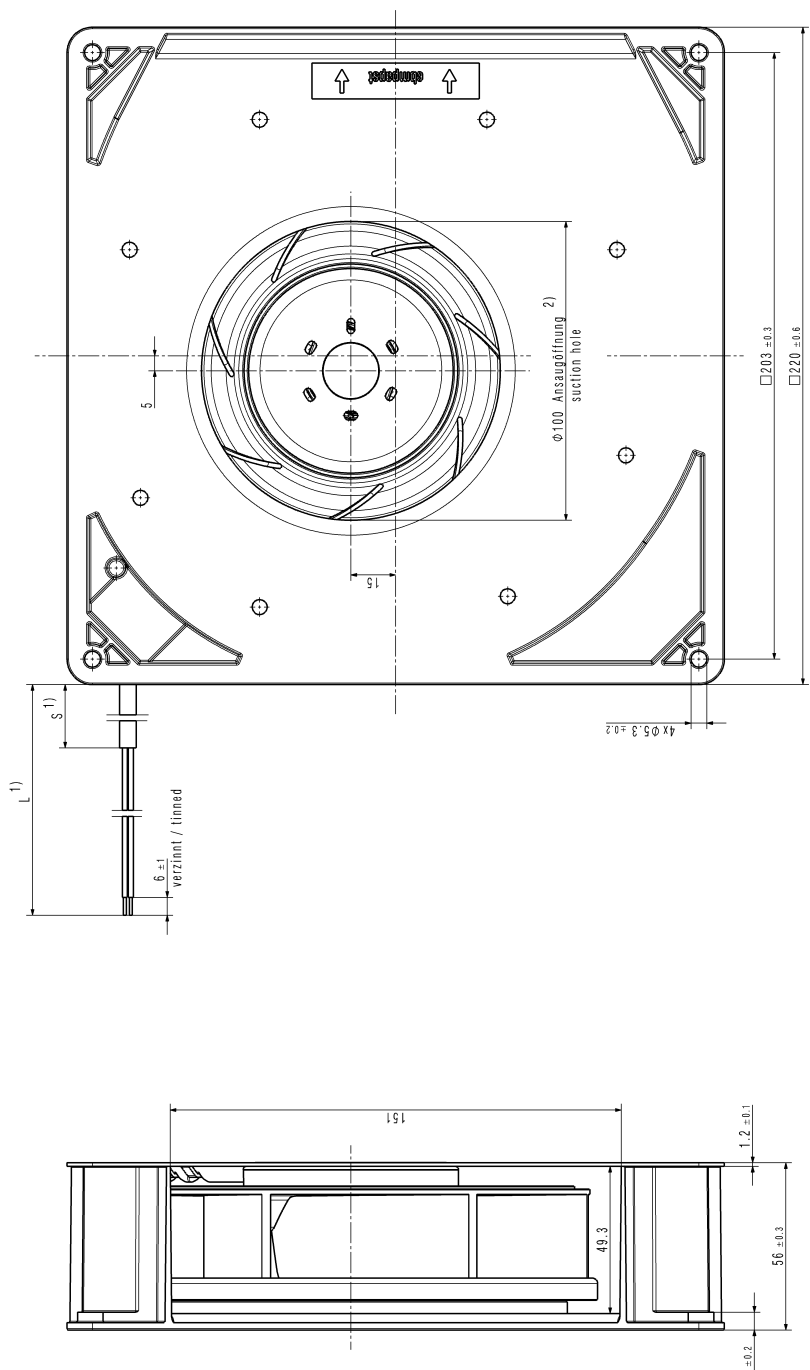
5.2 Approval Tests

CE	EC Declaration of Conformity	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 °C	75.000 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	127.500 h	



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

3P. Produktcode 3P. Part No. 3P. Zeichnungs-Nr. 3P. Drawing No.	3P. Produktname 3P. Product Name	3P. Hersteller 3P. Manufacturer	3P. Material 3P. Material	3P. Lagerort 3P. Warehouse
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