Product Data Sheet RG160-28/18N/2TDPU-331

ebmpapst

The engineer's choice



GREEN TECH

RG160-28/18N/2TDPU-331

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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	Any	

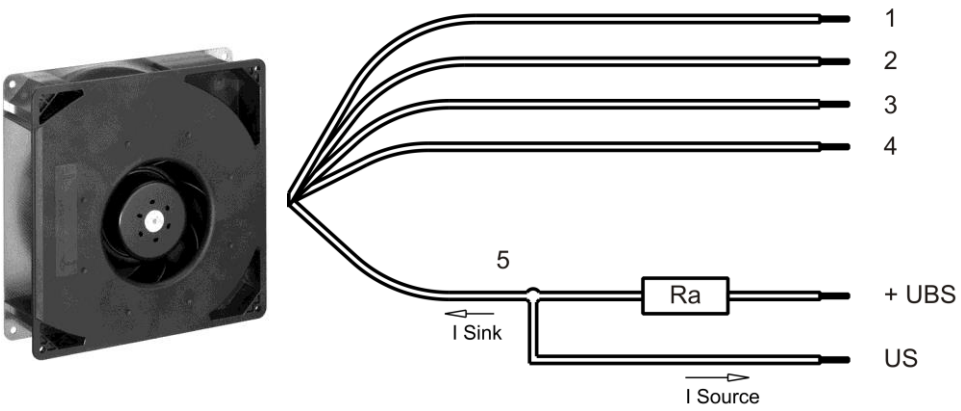
2 Mechanics

2.1 General

Width	220,0 mm	
Height	220,0 mm	
Depth	56,0 mm	
Mass	1,560 kg	
Housing material	Mixed	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges; Metal flange on mounting plate 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 - Plug	
Lead wire length Tolerance	L = 315 mm +- 5,0 mm	
Wire size (AWG)	22	
Insulation diameter	1,35 mm	
Contact	See drawing	



	Colour	Operation
Wire 1	red	+ UB
Wire 2	blue	- GND
Wire 3	violet	PWM
Wire 4	brown	- GND PWM
Wire 5	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

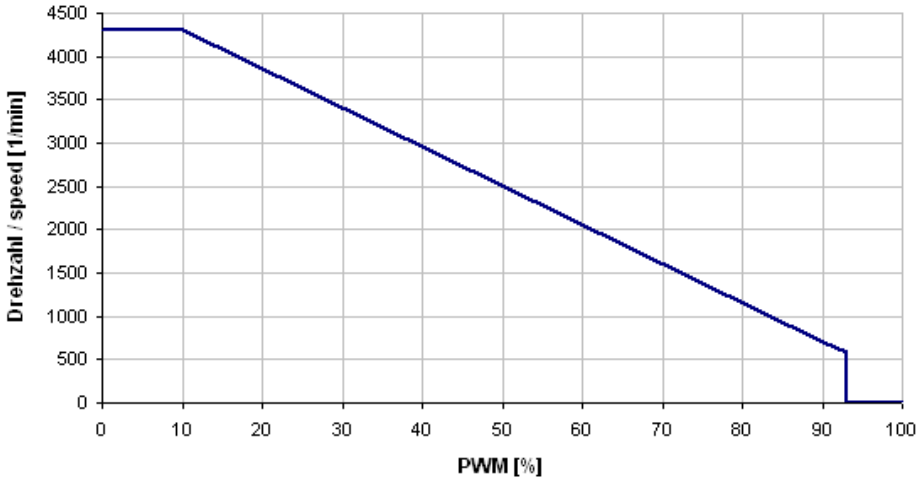
3.1 Operating Data - Electrical Interface - Input

Control input	PWM

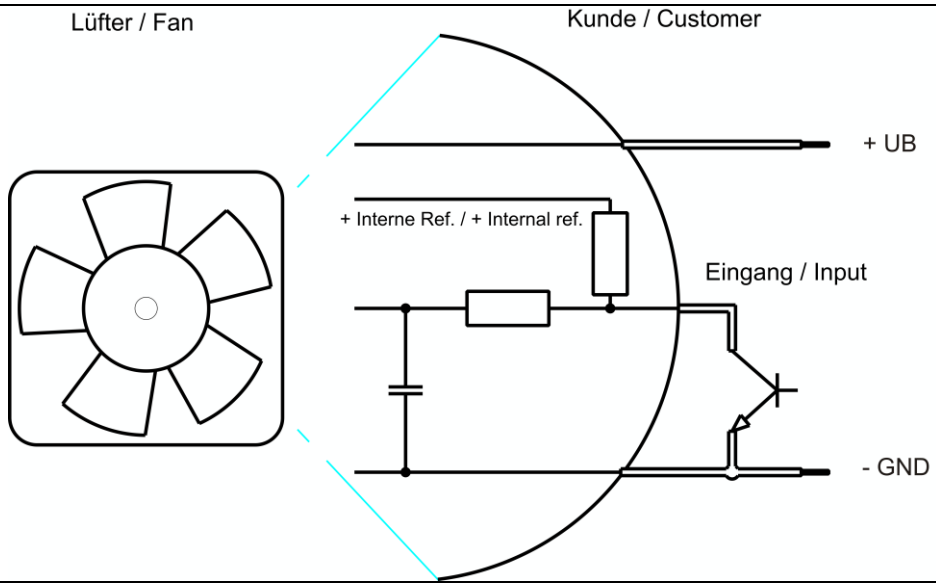
Features

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

Characteristics



Schematics



Speed control:
By pulse width modulation (PWM) 100...0%
Open collector in realation to signal-ground (-GND PWM).
The pull-up resistor to the internal reference voltage (+5V) has a resistance of 4.7kOhm.

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: 0 %;		

**)

To note inrush current @ U nom:

The internal electrolytic capacitor 220uF/63V has an inrush current limitation via P-Ch FET in the GND-Line and is imited to ~5A.

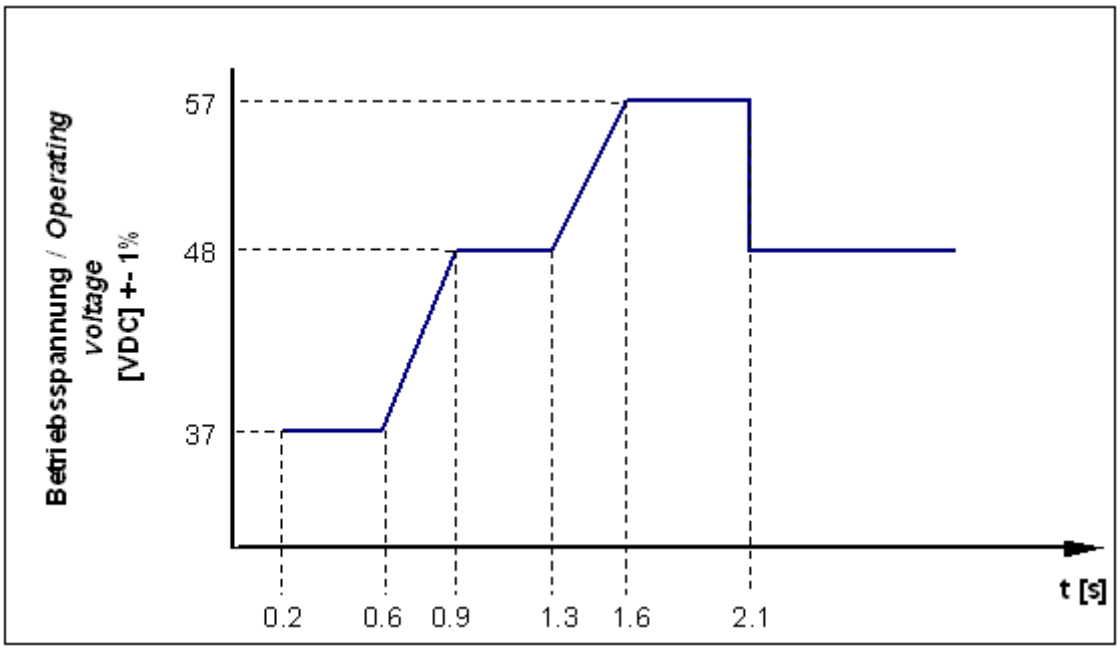
Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	38,4 V		57,6 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	38,4 W +- 17,5 %	59 W +- 12,5 %	54,7 W +- 15,0 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	1.000 mA +- 17,5 %	1.200 mA +- 12,5 %	950 mA +- 15,0 %
Speed Tolerance	Δp = 0 PWM 0010	n	3.850 1/min +- 12,5 %	4.270 1/min +- 7,5 %	4.270 1/min +- 10,0 %

Built into the fan is an additional under- and overvoltage control, which switches the power stage and the fan off if the following conditions are reached.
At U <= 29,0 V and / or U >= 74,0 V is n= 0 1/min

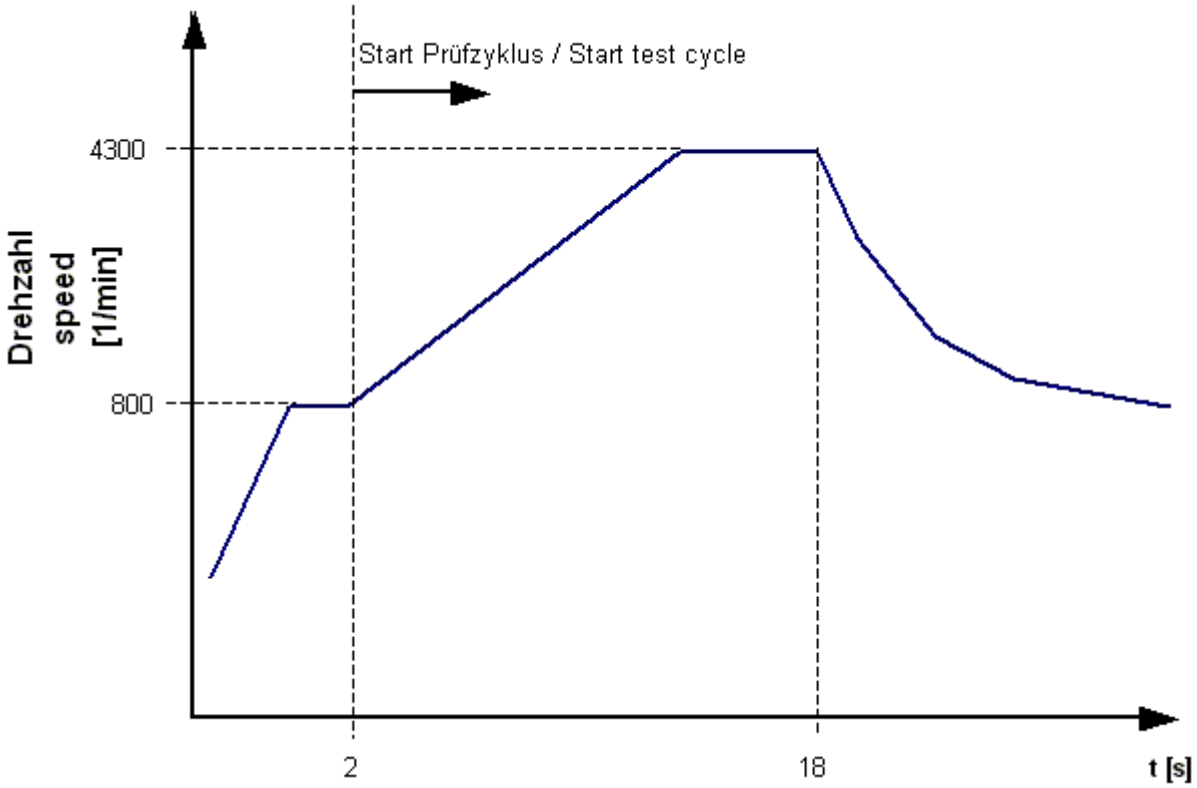
Motor testing

The motor testing relates to a fan, operating with horizontal shaft, at free wir flow. It is possible to run this motor in an uncontrolled state. For some testings the motor may set in a test cycle by connecting to a voltage follower as below mentioned.

Voltage graph to start the test cycle



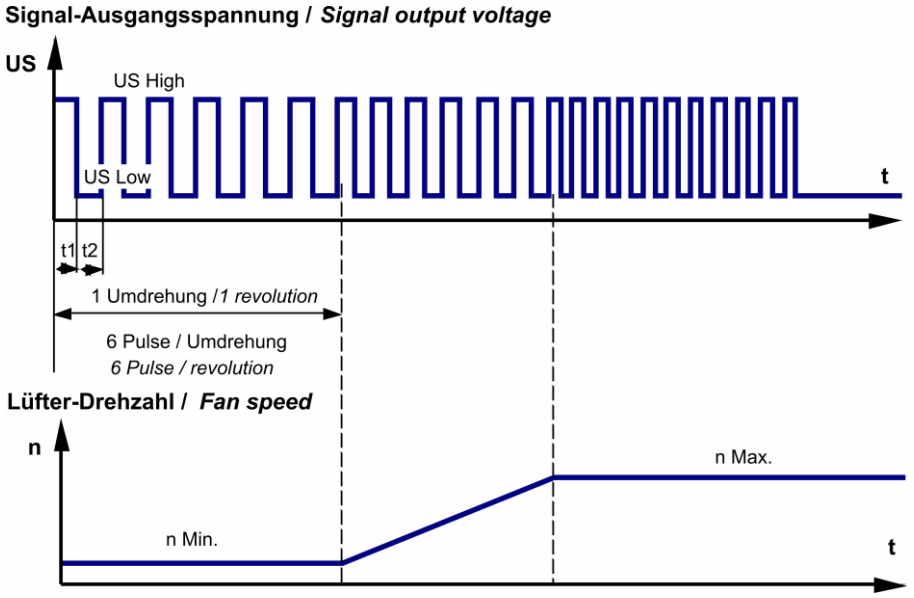
Speed graph after starting the test cycle



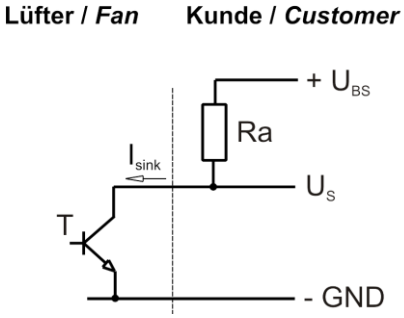
Voltage	48,0 V
Power consumption	66,0 W
Tolerance	+- 15,0 %
Current consumption	1.300 mA
Tolerance	+- 15,0 %
Speed	4.300 1/min
Tolerance	+- 7,5 %

3.3 Operating Data - Electrical Interface - Output

Tacho type	/2 (open collector)



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

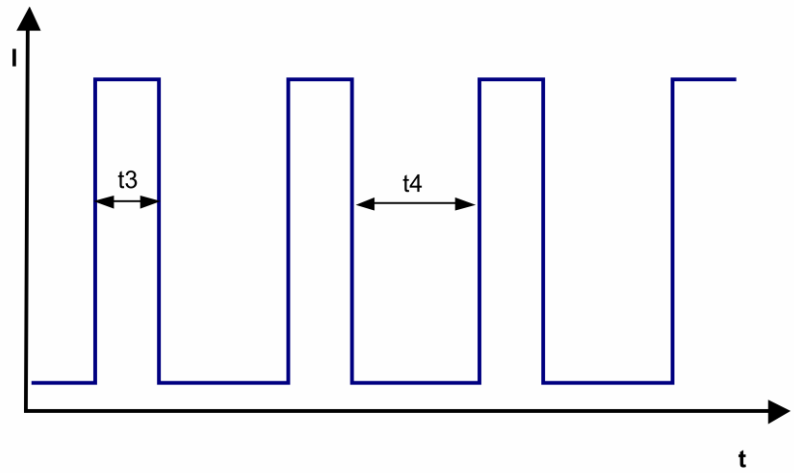


Features	Note	Values
Tacho operating voltage (UBS)		Max.: 40 V
Tacho signal Low	I sink: 2 mA	<= 0,4 V
Tacho signal High	I source: 0 mA	40 V
Maximum sink current		<= 20 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency	(6 x n) / 60	
Tacho isolated from motor	No	
Slew rate		=> 0,5 V/us

Alarm type	None

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at Un	Rectifying diode IF <= 10 mA	
Locked rotor protection	Auto restart	
Locked rotor current at Un		
Clock signal t3/t4 at locked rotor	Typical: 1,0 s / 3,1 s	



Internal Fuse:
Littlefuse NANO2(R) FUSE; Very fast acting 451 Series; 2,5 A (Art.-Nr.: 451025)

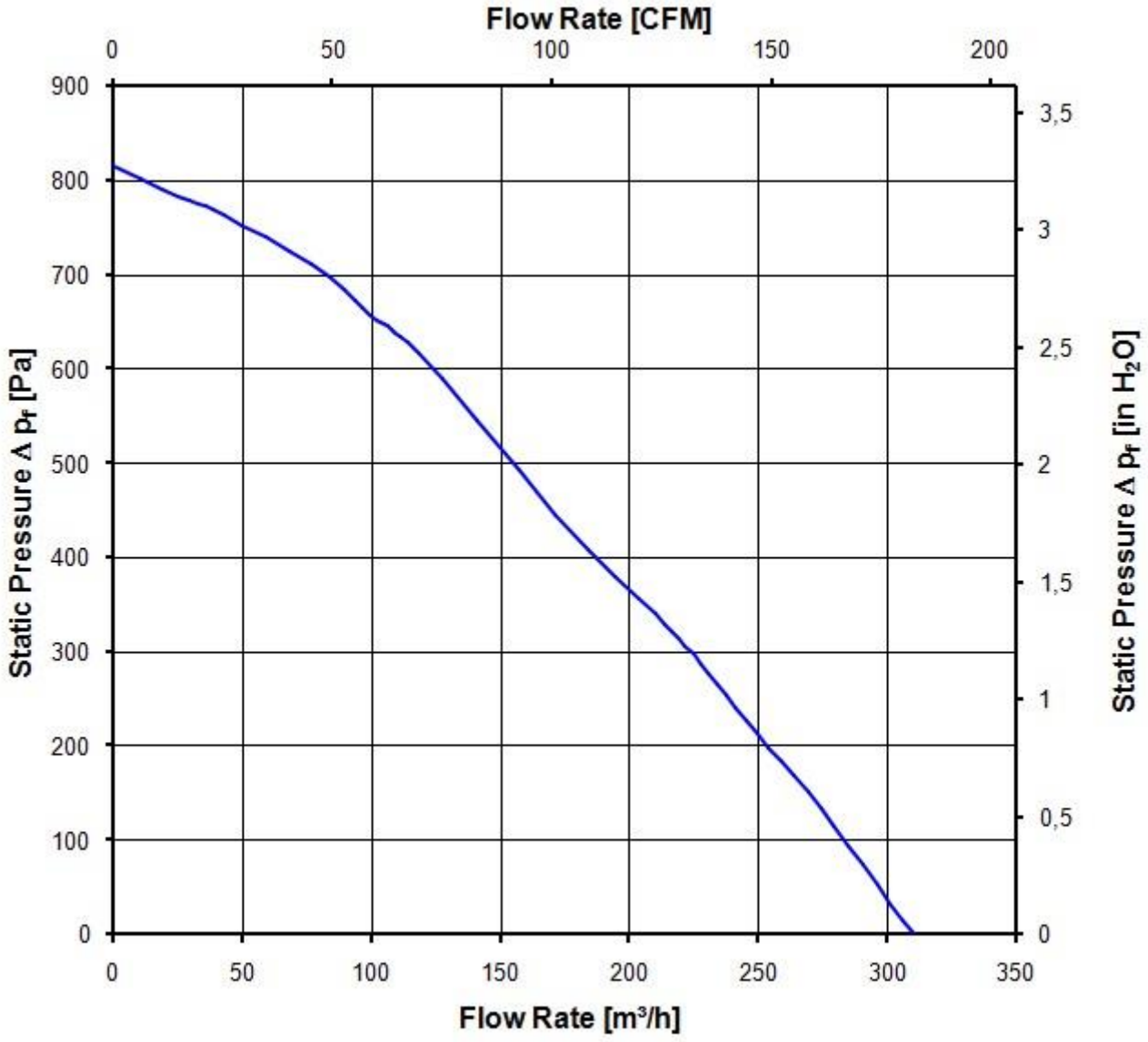
3.5 Aerodynamics

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. 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:

4.270 1/min at free air flow	PWM 0 %;		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	310,0 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	810 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:

4.270 1/min at free air flow	PWM 0 %	PWM min.:	PWM max.:

Optimal operating point	188,0 m3/h @ 356 Pa	
Sound power level at the optimal operating point	7,5 bel(A)	
Sound pressure level at free air flow, measured in rubber bands		

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*)

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	None	

*) Permittet application area:
The product is for the use in partial sheltered rooms or open, roofed areas. Direct exposure to water is allowed provided that this does not prevent the normal operation. Saline ambient conditions must be avoided.

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.	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	No
CSA	Canadian Standards Association	No
CCC	China Compulsory Certification	Yes / GB 12350 Safety Requirements for small Power Motors

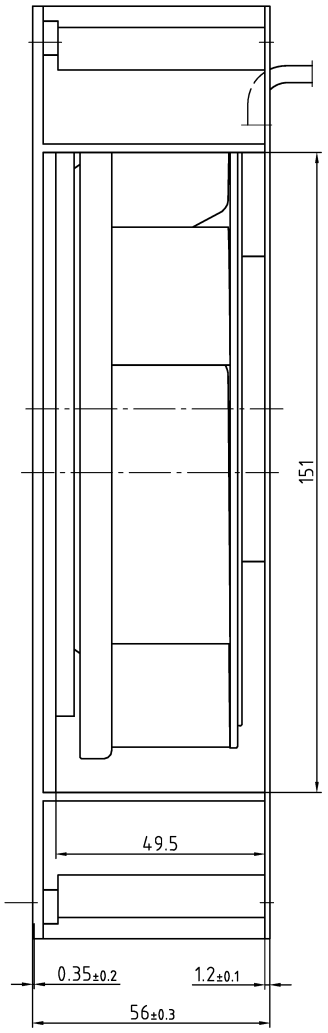
6 Reliability

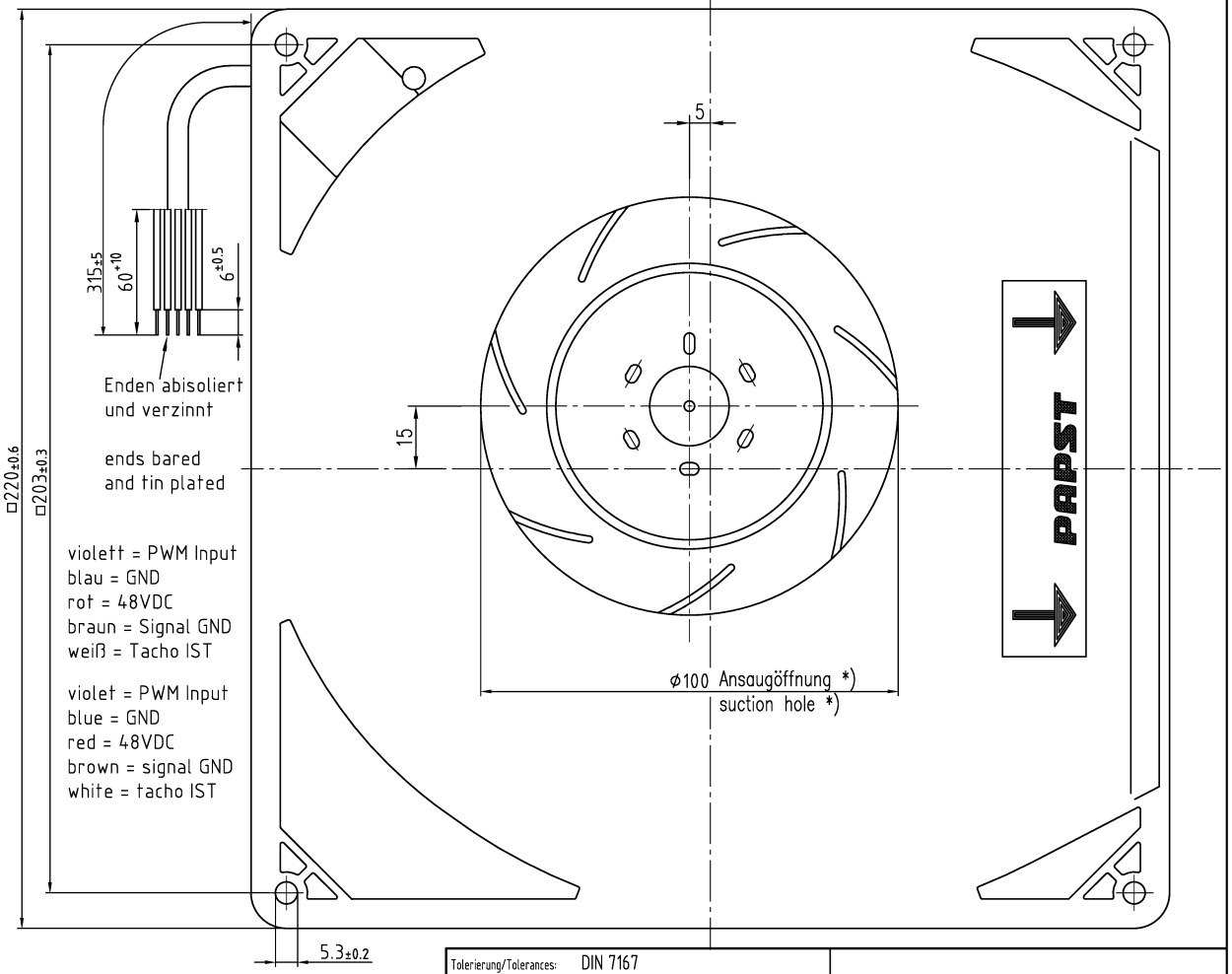
6.1 General

Life expectancy L10 at TU = 40 °C	55.000 h	

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Schutzvermerk nach DIN ISO 16016 beachten/
Refer to protection notice DIN ISO 16016!





Axialspiel: mit Feder spielfrei verspannt.
without axial clearance by a pre-loaded spring

*) Öffnung f. Montagewand ≥ 115
*) Opening for mounting plate ≥ 115

Tolerierung/Tolerances: DIN 7167 Allgemeintoleranzen/ Gen. tolerances: DIN ISO 2768-mK-E				
	Datum/Date	Name/Name	ebmpapst	Artikel/ Title: radial - blow fan
Bearb./Drawn:				Massstab/scale
	Index/Index	Aend.-Nr./Change-No.		Zchg.-Nr./ Dwg.-No.:
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