

## ebmpapst Datasheet

**9595420220**  
VCS0190RULDS  
RG190-39/18/2TDO

**ebmpapst**

The engineer's choice

RG190-39/18/2TDO (9595420220) ebmpapst Datasheet  
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**RG190-39/18/2TDO**

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**1 General**

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

**Please note:**

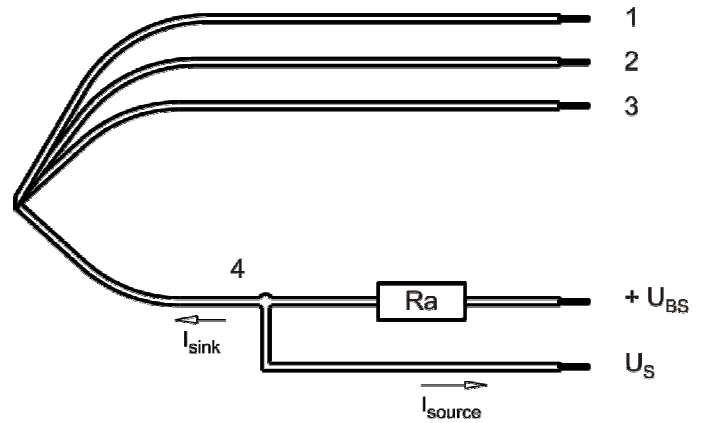
With the presently used software it cannot be guaranteed that the fan will start on the first attempt every time.

**2 Mechanics****2.1 General**

Width	226 mm	
Height	226 mm	
Depth	85,5 mm	
Mass	1,21 kg	
Housing material	Plastic	
Impeller material	Plastic	

**2.2 Connections**

Electrical connection	Wires	
Lead wire length	L = 350 mm	
Tolerance	+ - 10,0 mm	
Tube length	S = 35 mm	
Tolerance	+ - 5 mm	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 20	2,05 mm
2	blue	- GND	AWG 20	2,05 mm
3	violet	CONTR	AWG 22	1,3 mm
4	white	Tacho	AWG 22	1,3 mm

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

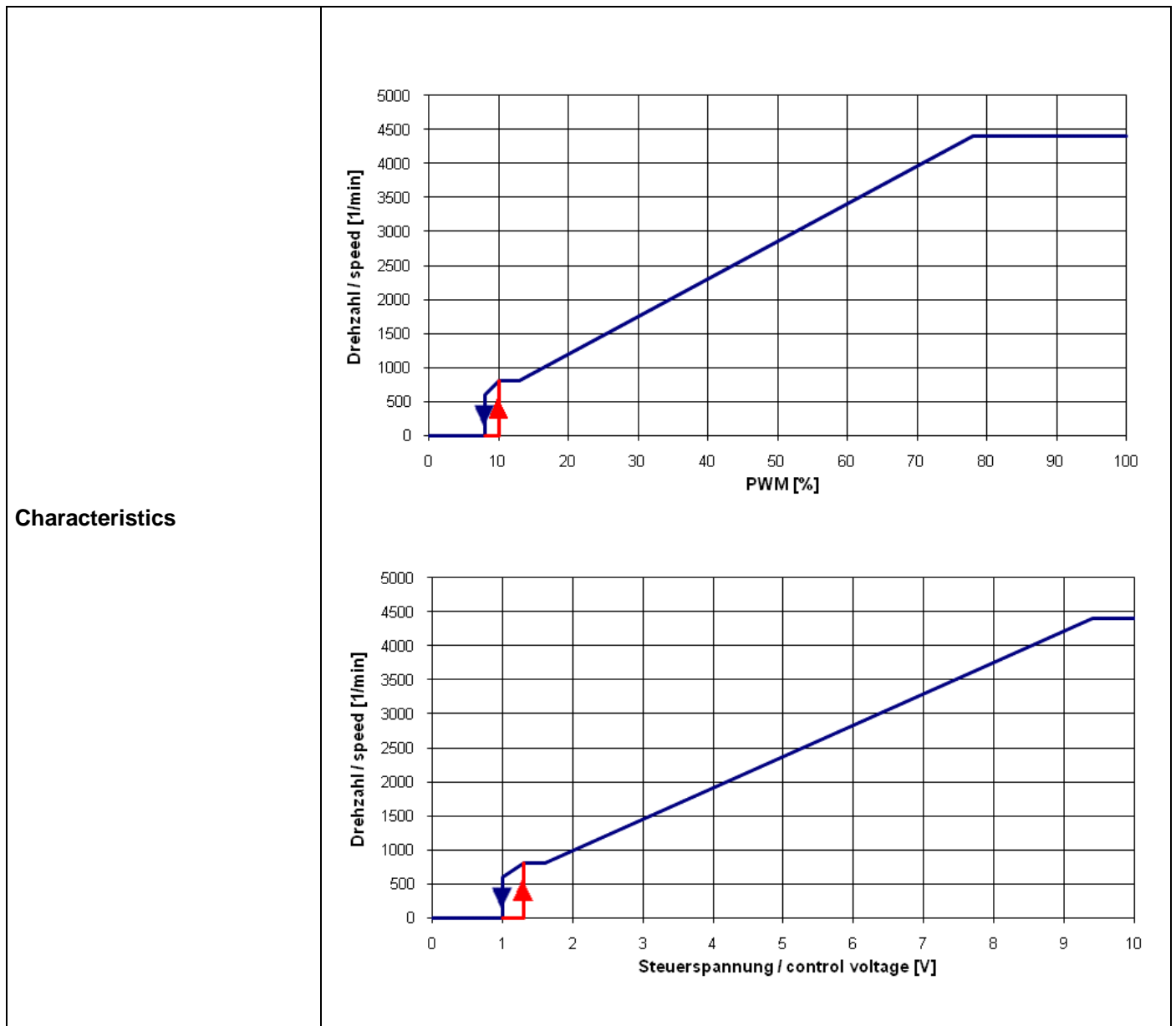
3 Operating Data

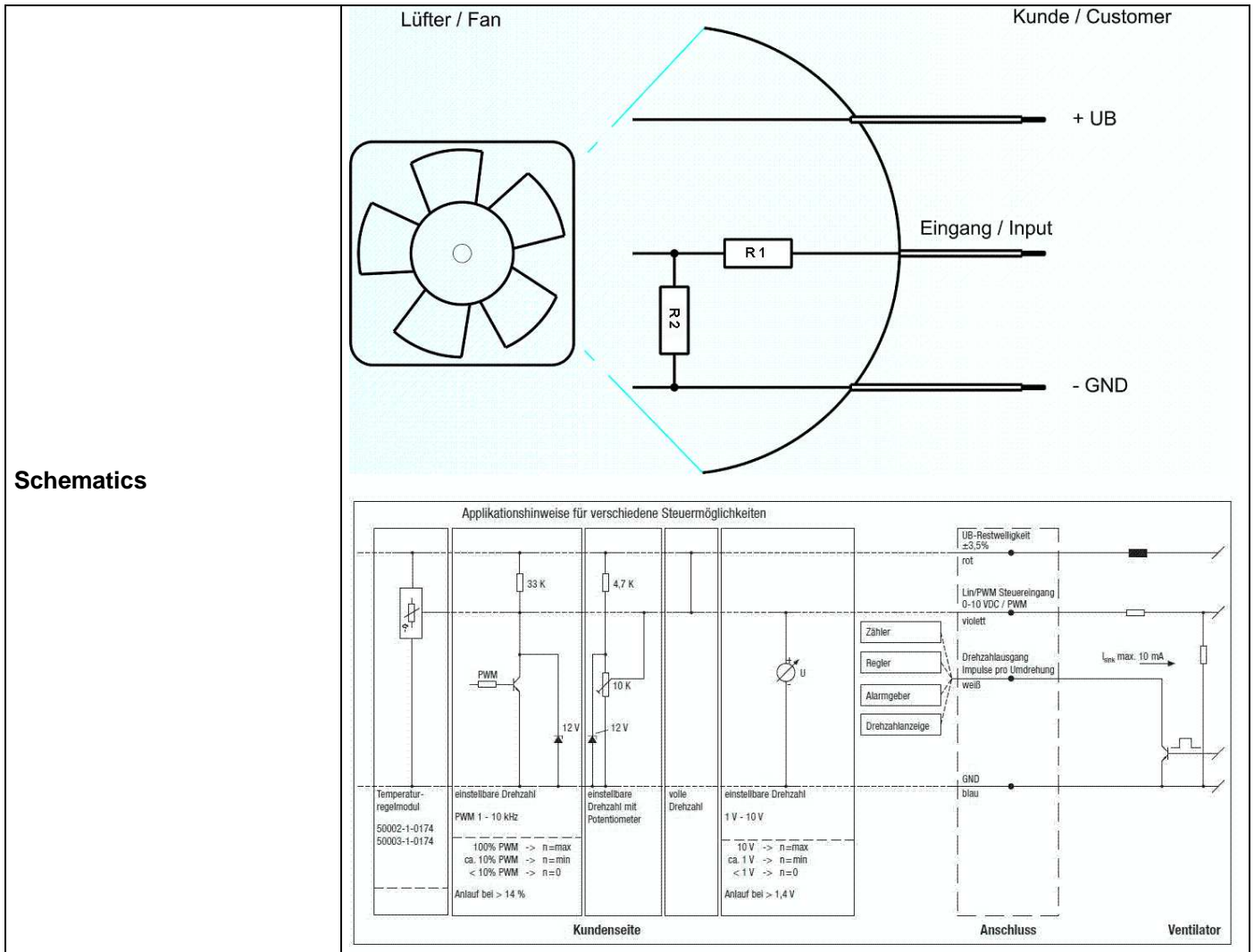
3.1 Electrical Interface - Input

Control input	Analog
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Features

PWM - Frequency	1 kHz - 10 kHz typical: 2 kHz
Input voltage range	0 V - 10 V





**Input voltage divider:**

R1 = 47 kOhm

R2 = 36 kOhm

For protection: There is parallel to R2 a 5,1 V Z-Diode

**Speed control:**

By pulse-width modulation (PWM) 0 ... 100%  
with switching transistor in emitter circuit and collector resistance to 12 V  
Frequency = 2 kHz (1 - 10 kHz)

**Information to the curve PWM:**

- 0% - <10% PWM: 0 1/min
- 10% PWM: 800 1/min (Fan on, coming from 0% PWM)
- 10% - 13% PWM: 800 1/min (corresponding to min. speed)
- 13% - 78% PWM: linear increasing curve
- 78% - 100% PWM: 4.400 1/min (corresponding to max. speed)
- 10% - >8% PWM: linear decreasing curve (coming from 100% PWM)
- 8% PWM: 600 1/min or 0 1/min (Fan off, coming from 100% PWM)

or:

**Speed control:**

By analog voltage 0 - 10 V

Information to the curve analog:

0 V - < 1,3 V:	0 1/min
1,3 V:	800 1/min (Fan on, coming from von 0 V)
1,3 V - 1,6 V:	800 1/min (corresponding to min. speed)
1,6 V - 9,4 V:	linear increasing curve
9,4 V - 10 V:	4.400 1/min (corresponding to max. speed)
1,3 V - > 1,0 V:	linear decreasing curve (coming from 10 V)
1,0 V:	600 1/min or 0 1/min (Fan off, coming from 10 V)

**All measurement values are measured in the housing!**

**Fan has no sensor break detection!**

### 3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m<sup>3</sup>; 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.

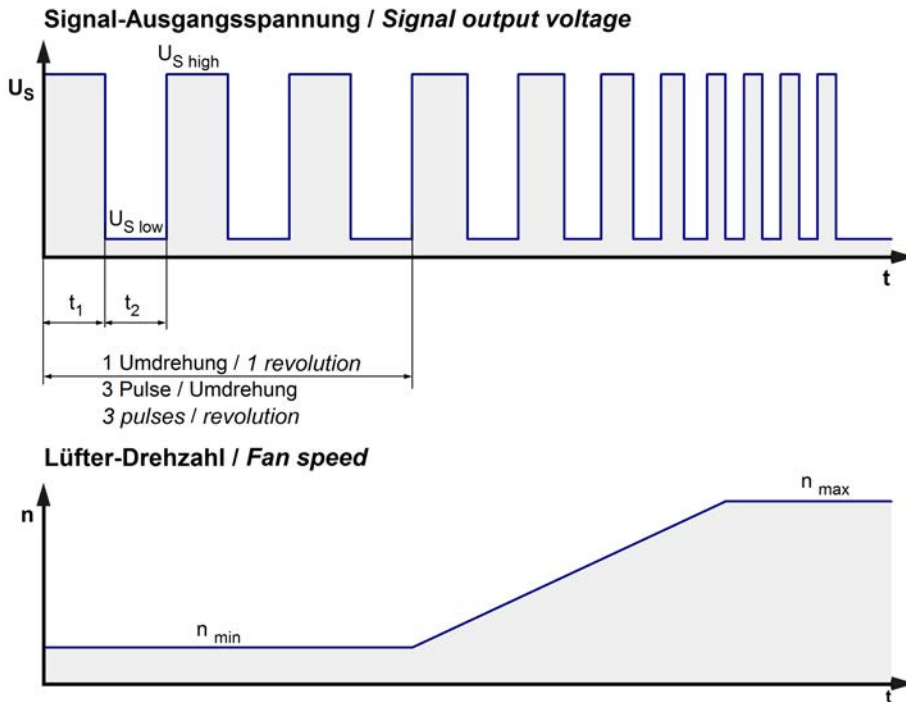
$\Delta p = 0$ : corresp. to free air flow (see chapter aerodynamics)  
I: corresp. to arithm. mean current value

Name	Condition
U Contr. 0001	U Contr.: 10,0 V

Features	Condition	Symbol	Values		
Voltage range		U	36 V		72 V
Nominal voltage		$U_N$		48 V	
Power consumption	$\Delta p = 0$	P	83 W	140 W	149 W
Tolerance	U Contr. 0010		+/- 10 %	+/- 10,0 %	+/- 10,0 %
Current consumption	$\Delta p = 0$	I	2.350 mA	2.950 mA	2.070 mA
Tolerance	U Contr. 0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Speed	$\Delta p = 0$	n	3.720 1/min	4.400 1/min	4.400 1/min
Tolerance	U Contr. 0010		+/- 10,0 %	+/- 5,0 %	+/- 5,0 %
Starting current consumption				3.600 mA	

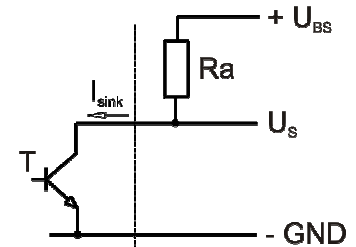
3.3 Electrical Interface - Output

Tacho type	/2 (open collector)
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$$R_a = \frac{U_{BS} - U_{S\ low}}{I_{sink}}$$

Lüfter / Fan      Kunde / Customer



Features	Note	Values
Tacho operating voltage	$U_{BS}$	$\leq 60,0\ V$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\ V$
Tacho signal High	$U_{S\ high}$	$\leq 60,0\ V$
Maximum sink current	$I_{sink}$	$\leq 20\ mA$
Maximum source current		$0\ mA$
External resistor	External resistor $R_a$ from $U_{BS}$ to $U_S$ required. All voltages measured to GND.	
Tacho frequency	$(3 \times n) / 60$	220 Hz
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5\ V/\mu s$

$n$  = revolutions per minute (1/min)

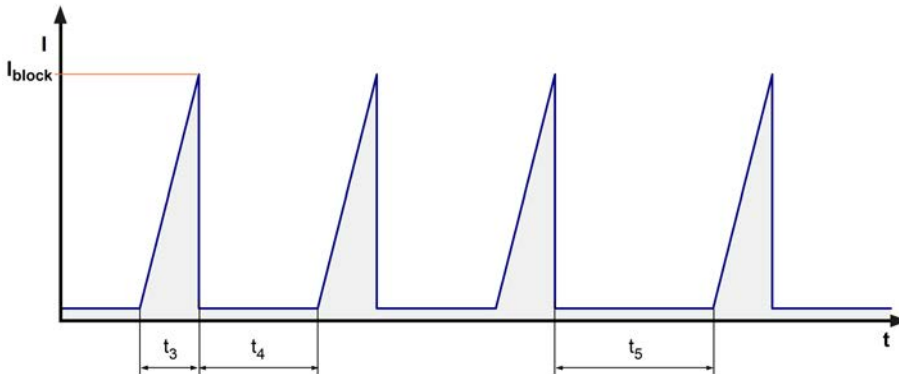
**Please note:**

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	P-CH FET	
Max. residual current at $U_N$	$I_F \leq 5 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at $U_N$	$I_{\text{block}}$ approx. 1.700 mA	
Lock signal at locked rotor	$t_3 / t_4$ typical: 4,6 s / 10,0 s	



#### Locked rotor signal $t_5$ :

After 4 failed start-ups there is an extended timeout of 40,0s.

### 3.5 Data According ErP Directive

Installation / Efficiency category	A / static
Speed control	integrated
Specific ratio	1,00573
Target overall efficiency 2015	42,6 %
Overall efficiency	53,6 %
Efficiency grade	61
Power input	178,4 W
Speed	4.340 1/min

All values measured in optimum energy efficiency point.

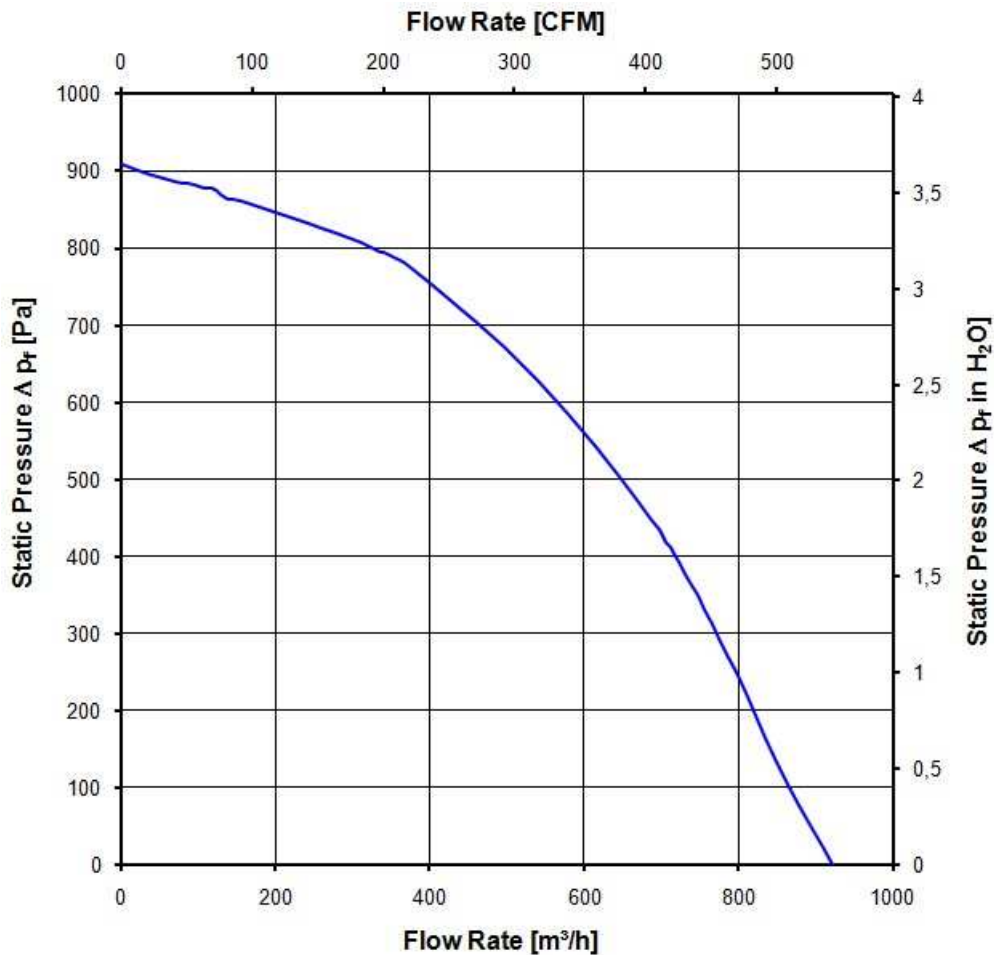
Productiondatecode is printed on the fan label.

### 3.6 Aerodynamics

Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801.  
Normal air density = 1,2 kg/m<sup>3</sup>; 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:

4.400 1/min at free air flow	U Contr. 10,0 V		
Max. free-air flow ( $\Delta p = 0 / \dot{V} = \text{max.}$ )		920,0 m <sup>3</sup> /h	
Max. static pressure ( $\Delta p = \text{max.} / \dot{V} = 0$ )		910 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 semianechoic chamber with a background noise level of  $L_p(A) < 5 \text{ dB(A)}$   
For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

4.400 1/min at free air flow	U Contr. 10,0 V		
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Optimal operating point	505,0 m <sup>3</sup> /h @ 624 Pa	
Sound power level at the optimal operating point	8,1 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.	65 °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 62368 and DIN EN 60335 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.  1700 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 / 1,5 mm	
Protection class	I	

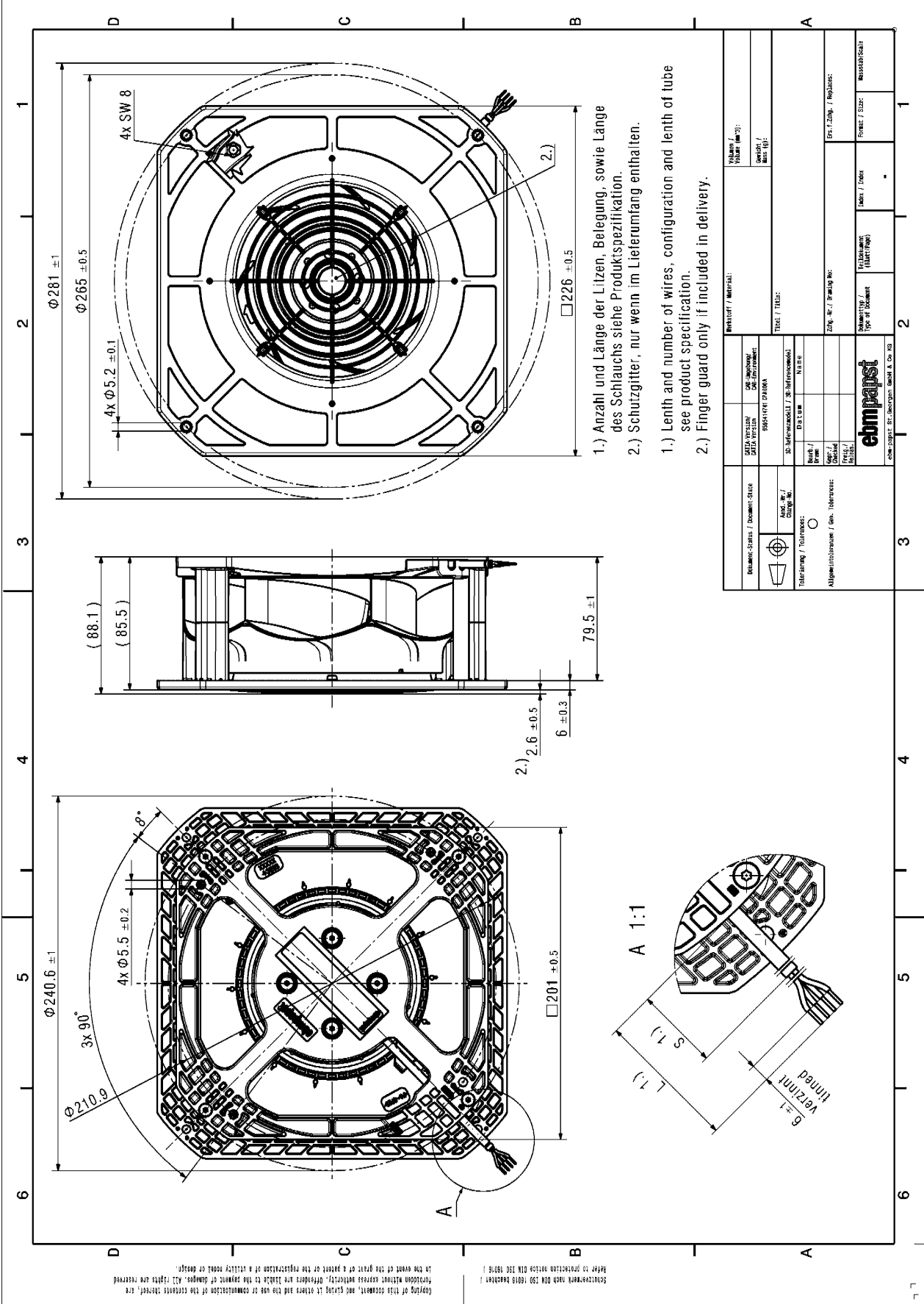
### 5.2 Approval Tests

CE	EC Declaration of Conformity	No
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans E38324
VDE	Association for Electrical, Electronic and Information Technologies	Yes / Approval acc. to EN 62368 - Audio/video, information and communication 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	40.000 h	
Life expectancy L10 at TU max.	22.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	67.5 00 h	



- 1.) Anzahl und Länge der Litzen, Belegung, sowie Länge des Schlauchs siehe Produktspezifikation.  
 2.) Schutzgitter, nur wenn im Lieferumfang enthalten.
- 1.) Lenth and number of wires, configuration and lenth of tube see product specification.  
 2.) Finger guard only if included in delivery.

Dokument Status / Document Status CAD / Version / DATE / Version / CAD / Environment 9595422020		Hersteller / Material: Values / Material (Mat. 3): Gewicht / Mass (G):	
Titel / Title: ID: Referenzmodell / ID: Reference Model Name / Name Part / Part Order / Order Date / Date Drawn / Drawn Checked / Checked Title / Title		ERS / Zeich. / Reference: Formel / Size: Material / Material	
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