Product Data Sheet 9595414741

VCS0190RULCS

RG190-39/14/2TDMLO

ebmpapst

engineering a better life

RG190-39/14/2TDMLO

INDEX

1 General

Fan type	Blower	
Rotating direction looking at rotor	Clockwise	
Airflow direction	Axial: intake; centrifugal: exhaust	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

Please note:
Sensorless commutation electronic, starting at the first start may not be 100% guaranteed, automatic restart occurs.

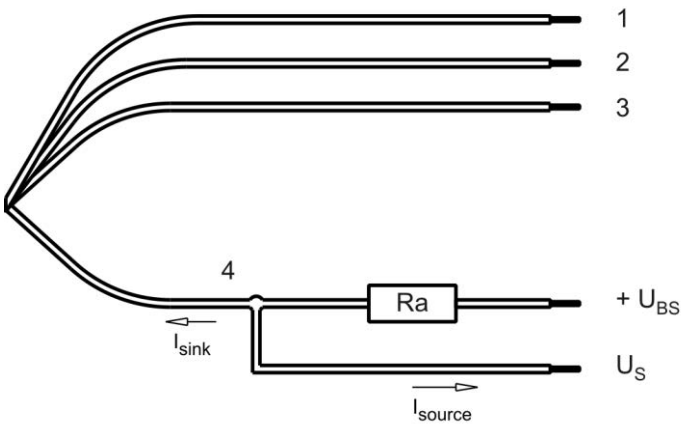
2 Mechanics

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 Tolerance	L = 350 mm +- 10 mm	
Tube length Tolerance	S = 35 mm + 5 mm	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 22	1,7 mm
2	blue	- GND	AWG 22	1,7 mm
3	violet	CTRL	AWG 22	1,7 mm
4	white	Tacho	AWG 22	1,7 mm

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

3 Operating Data

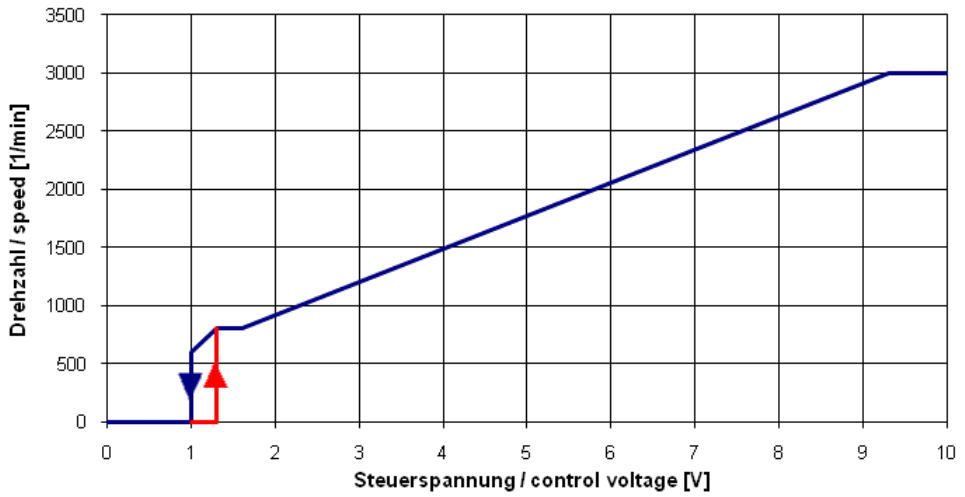
3.1 Electrical Interface - Input

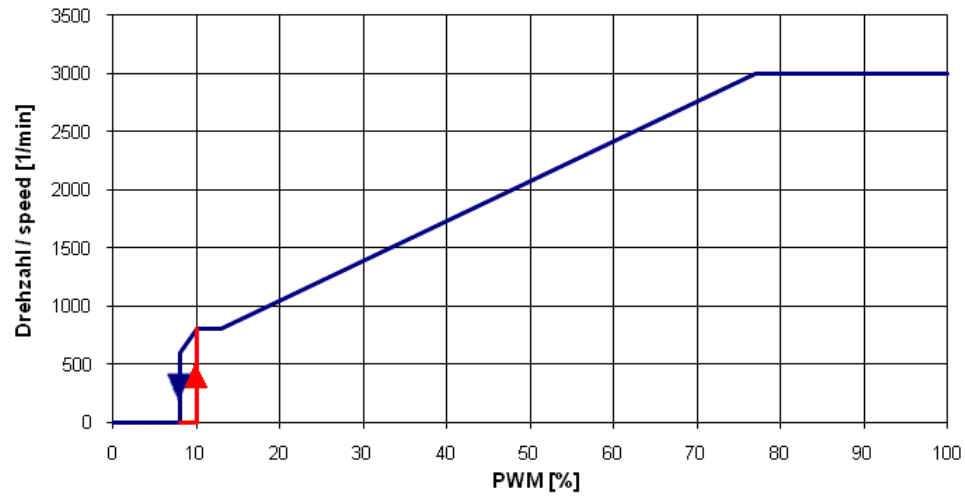
Control input	Analog

Features

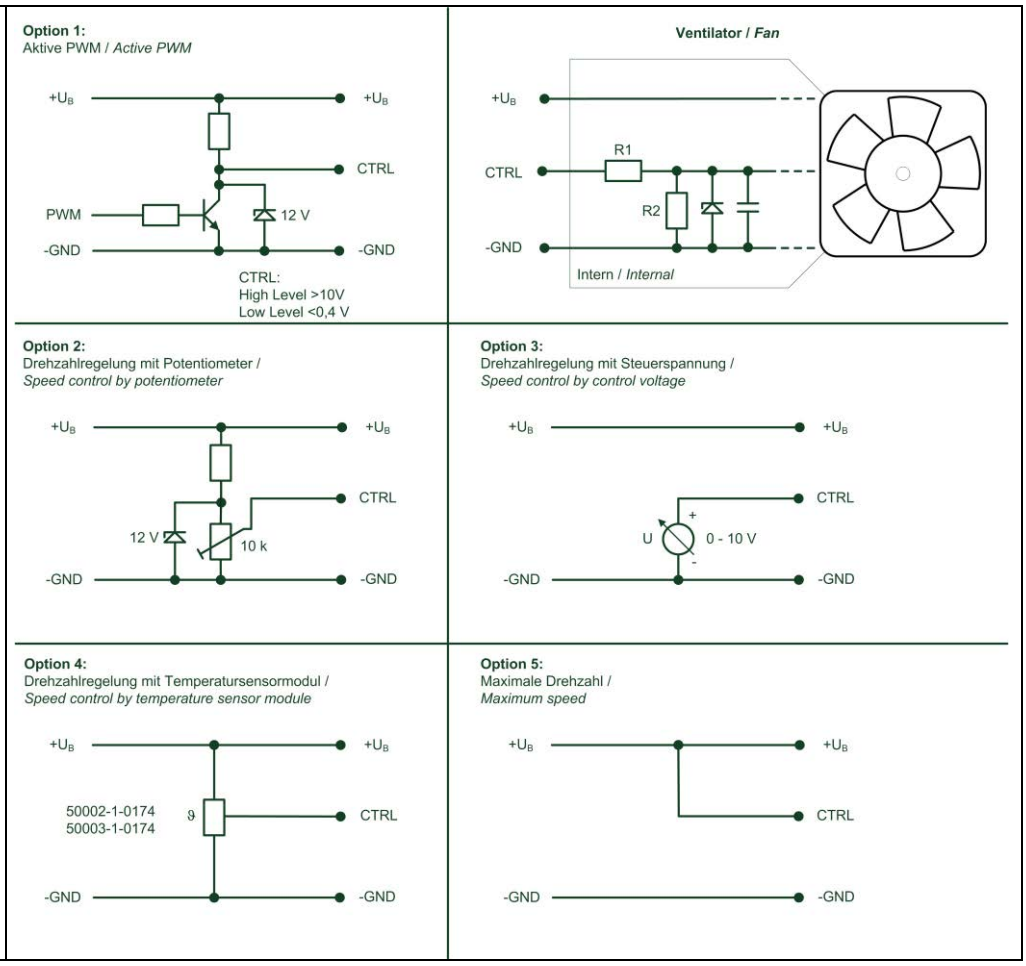
PWM - Frequency		1 kHz - 10 kHz typical: 2 kHz
Input voltage range		0 V - 10 V

Characteristics





Schematics



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, comming from 0% PWM)
10% - 13% PWM:	800 1/min (corresponding to min. speed)
13% - 78% PWM:	linear increasing curve
78% - 100% PWM:	3.000 1/min (corresponding to max. speed)
10% - >8% PWM:	linear decreasing curve (comming from 100% PWM)
8% PWM:	600 1/min or 0 1/min (Fan off, comming 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, comming 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:	3.000 1/min (corresponding to max. speed)
1,3 V - > 1,0 V:	linear decreasing curve (comming from 10 V)
1,0 V:	600 1/min or 0 1/min (Fan off, comming 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/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 chapter aerodynamics)
I: corresp. to arithm. mean current value

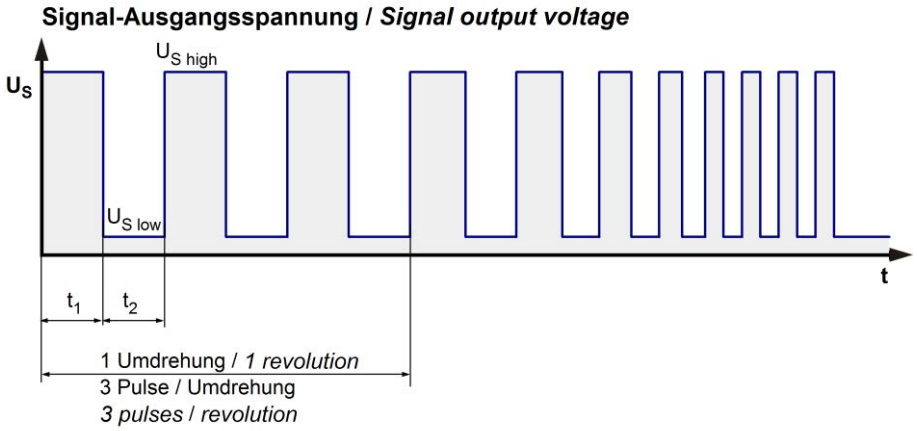
Name	Condition		
U Contr. 0001	U Contr.: 10 V		

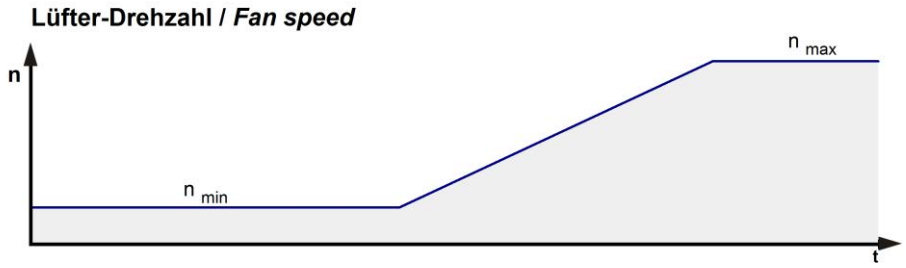
The data at 5V are no FK features and need not be tested.

Features	Condition	Symbol	Values		
Voltage range		U	16 V		30 V
Nominal voltage		U_N		24 V	
Power consumption Tolerance	Δp = 0 U Contr. 0010	P	28 W +- 10 %	55 W +- 10,0 %	56 W +- 10,0 %
Current consumption Tolerance	Δp = 0 U Contr. 0010	I	1.770 mA +- 10,0 %	2.300 mA +- 10,0 %	1.870 mA +- 10,0 %
Speed Tolerance	Δp = 0 U Contr. 0010	n	2.400 1/min +- 10,0 %	3.000 1/min +- 5,0 %	3.000 1/min +- 5,0 %
Starting current consumption				2.800 mA	

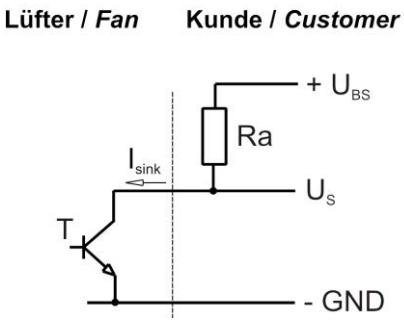
3.3 Electrical Interface - Output

Tacho type	/2 (open collector)





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



Features		Note	Values
Tacho operating voltage	U_{BS}		<= 30 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<= 0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	<=30 V
Maximum sink current	I_{sink}		<= 20 mA
Maximum source current			0 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(3 x n) / 60	150 Hz @ 3.000 1/min
Tacho isolated from motor		No	
Slew rate			>= 0,5 V/us

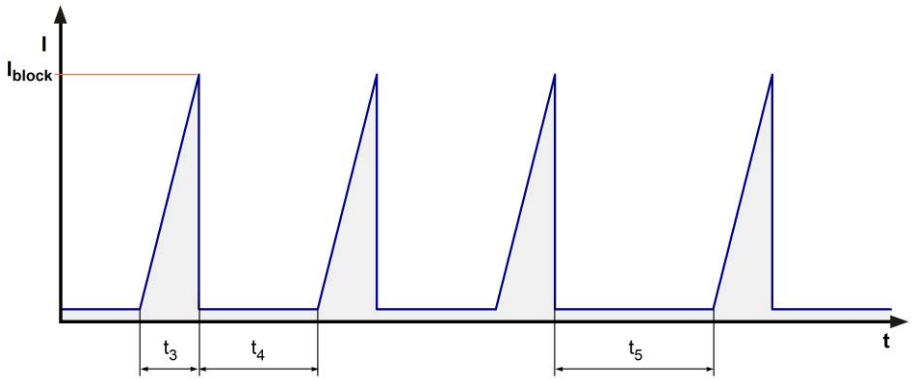
n = revolutions per minute (1/min)

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 Max. residual current at U_N	Rectifying diode I_F <= 5 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 2.500 mA	
Clock signal at locked rotor Extended Downtime	t_3 / t_4 typical: 9,4 s / 10,0 s t_5: 40 s after 4 start-up tests	
Internal fuse	Littelfuse NANO2 > Very Fast-Acting > 451/453 Series 6,3A / 125V (Art.No.: 045106.3MRL)	
Voltage control *)	Fan turns on at U_B > 13 V or < 34 V Fan turns off at U_B < 12 V or > 35 V	

*) This fan has an undervoltage and overvoltage control circuit integrated which turns the motor off if the voltage is out of range.



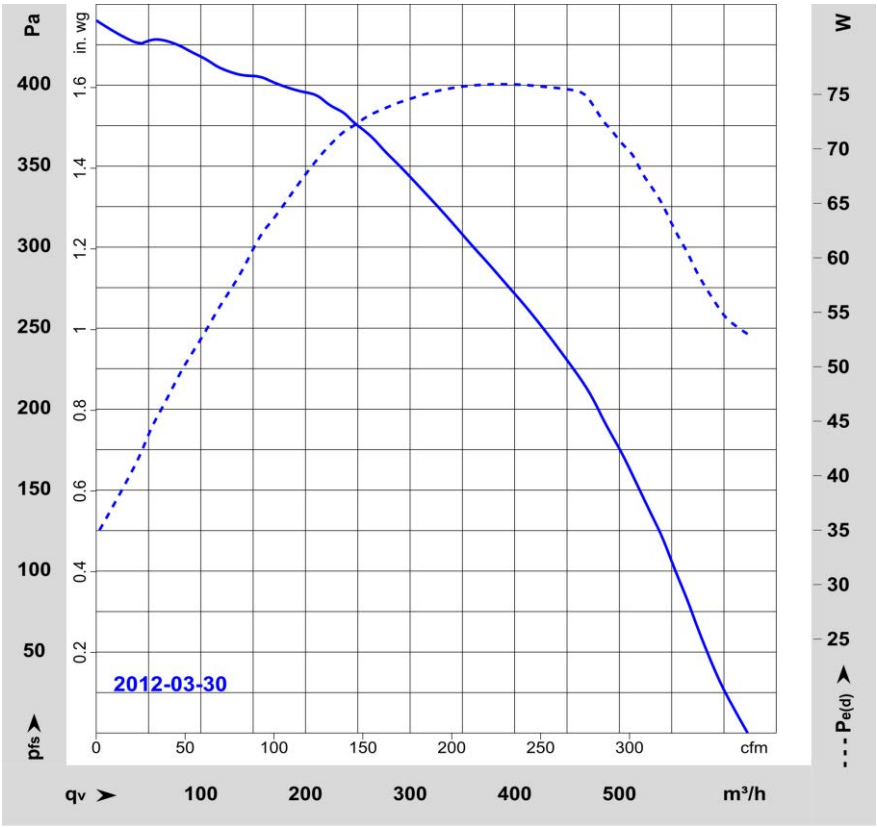
3.5 Aerodynamics

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. Power consumption of the fan motor when operating at normal voltage is shown. Depending on the operating conditions of the application, the power input may be higher.

a.) Operation condition:

3.000 1/min at free air flow	U Contr. 10 V		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	620 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	440 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 semianechoic chamber with a background noise level of Lp(A) < 5 dB(A) For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

3.000 1/min at free air flow	U Contr. 10 V		

Optimal operating point	480 m3/h @ 200 Pa	
Sound power level at the optimal operating point	7,3 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.	60 °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.	500 VAC / 1 Min. 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	

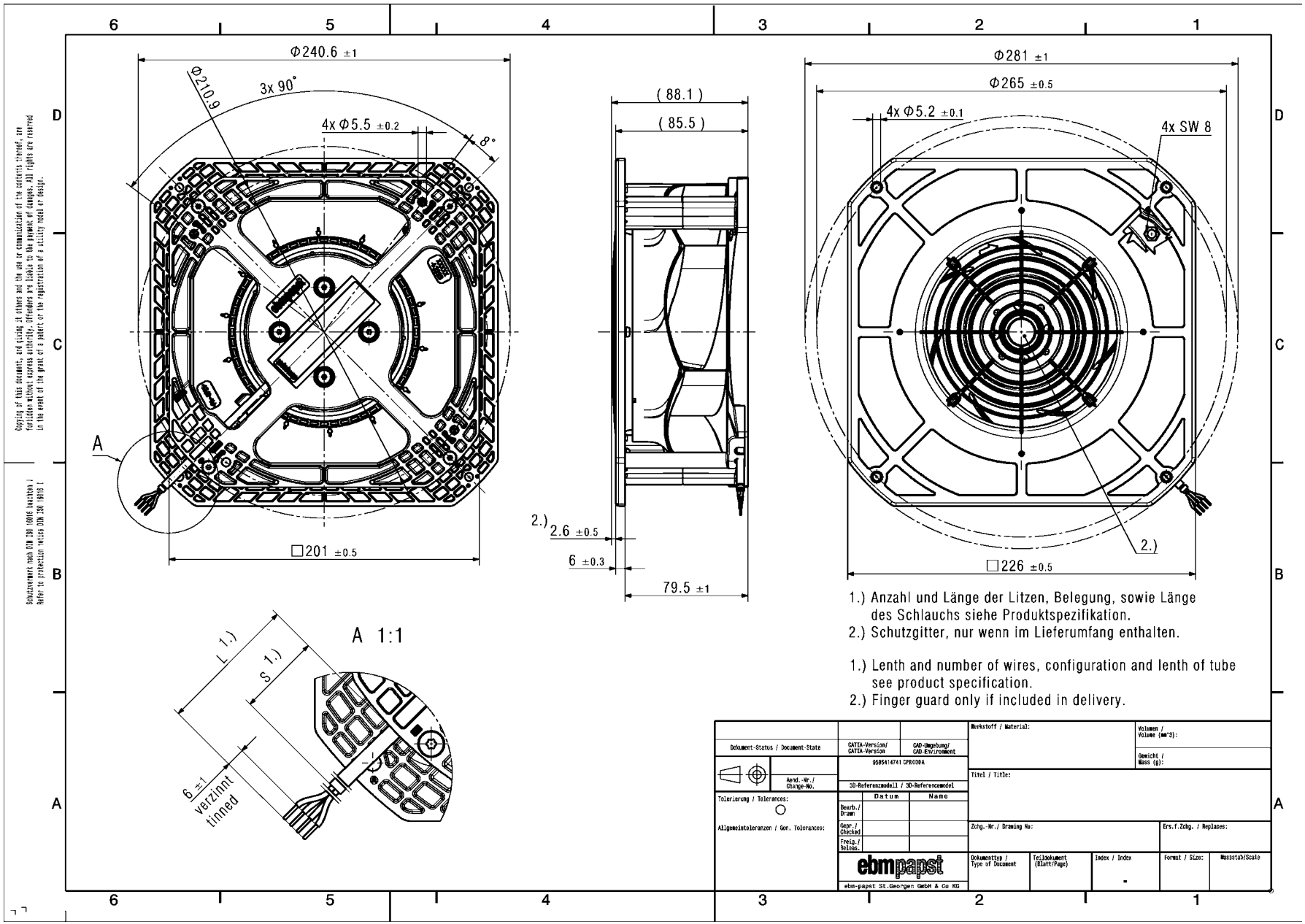
5.2 Approval Tests

CE	EC Declaration of Conformity	Yes
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 / CSA audited by UL according to C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Not applicable

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	55.000 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	92.500 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-State	CATIA-Version/ CATIA-Version	CAD-Umgebung/ CAD-Environment	Werkstoff / Material:	Volumen / Volume (mm^3):	
Aend.-Nr./ Change-No.	9595414741 CPR00A			Gewicht / Mass (g):	
	3D-Referenzmodell / 3D-Referencemodel		Titel / Title:		
Tolerierung / Tolerances:	Datum	Name			
Bearb./ Drawn					
Allgemeintoleranzen / Gen. Tolerances:	Gepr./ Checked		Zchg.-Nr./ Drawing No:	Ers.f.Zchg. / Replaces:	
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Schutzvermerk nach DIN 34 1906 beachten! Refer to protection notice DIN 34 1906!