

Product Data Sheet **9595430400**
VBS0225RULFS
RER225-55/18/2TDO

ebmpapst

engineering a better life



RER225-55/18/2TDO

INDEX

1	General	3
2	Mechanics	3
2.1	General	3
2.2	Connections	3
3	Operating Data	5
3.1	Electrical Interface - Input	5
3.2	Electrical Operating Data	7
3.3	Electrical Interface - Output	8
3.4	Electrical Features	9
3.5	Data According ErP Directive	9
3.6	Aerodynamics	10
3.7	Sound Data	11
4	Environment	11
4.1	General	11
4.2	Climatic Requirements	12
5	Safety	13
5.1	Electrical Safety	13
5.2	Approval Tests	13
6	Reliability	13
6.1	General	13

1 General

Fan type	Blower without chassis with intake nozzle	
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."

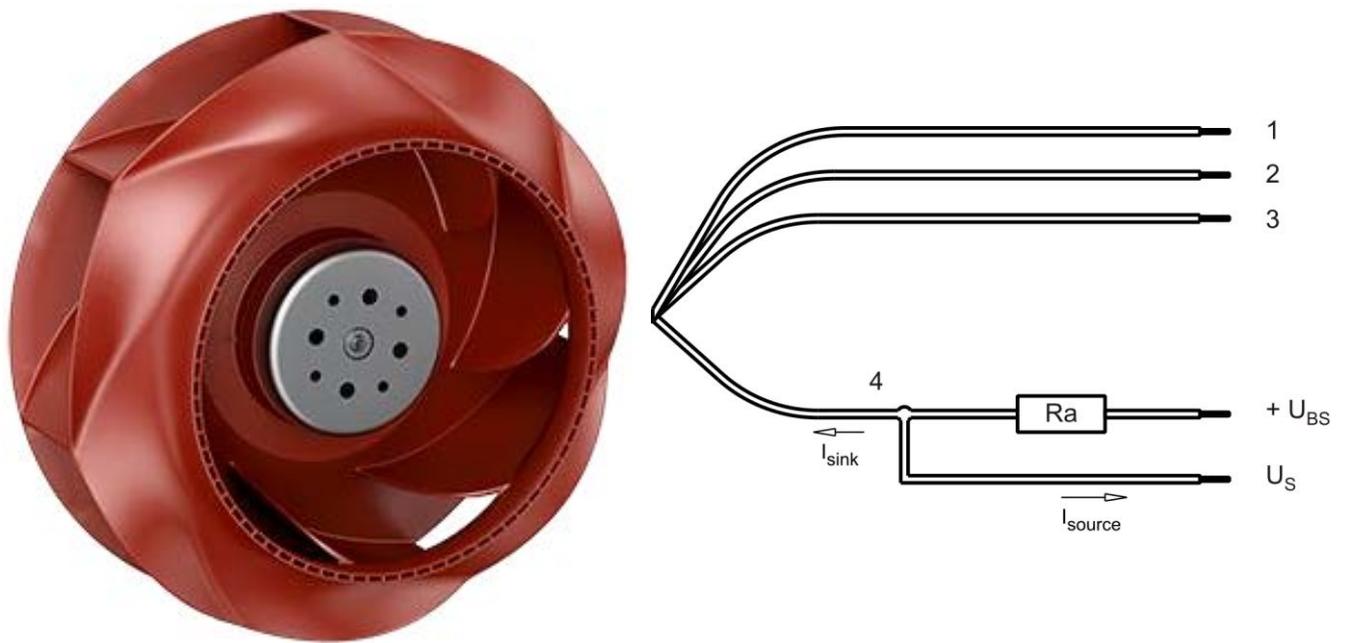
2 Mechanics

2.1 General

Depth	99,0 mm	
Diameter	225,0 mm	
Mass	1,29 kg	
Housing material		
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length	L = 410 mm	
Tolerance	+ - 10,0 mm	
Tube length	S = 120 mm	
Tolerance	+ - 5,0 mm	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 18	2,2 mm
2	blue	- GND	AWG 18	2,2 mm
3	violet	CTRL	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.

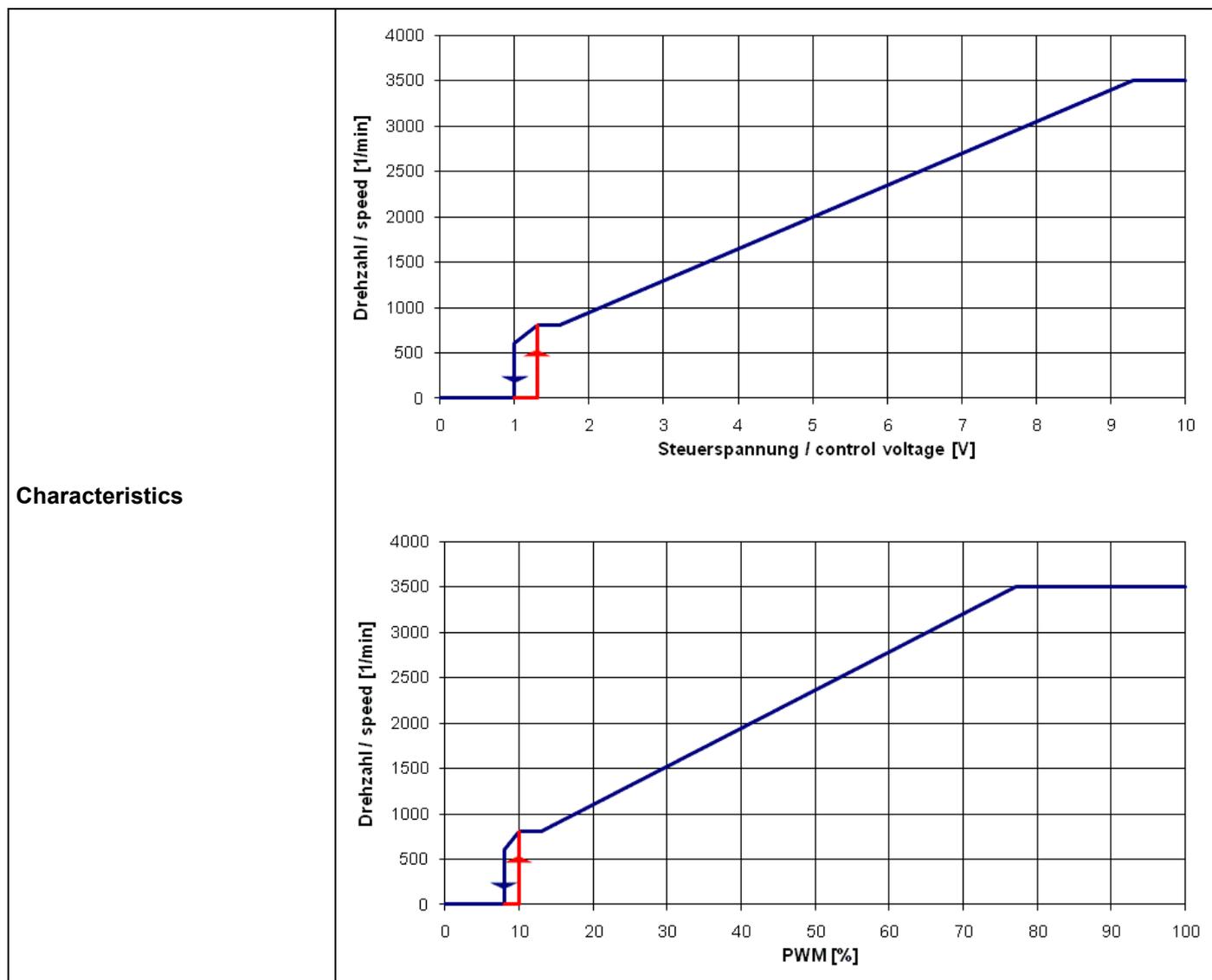
3 Operating Data

3.1 Electrical Interface - Input

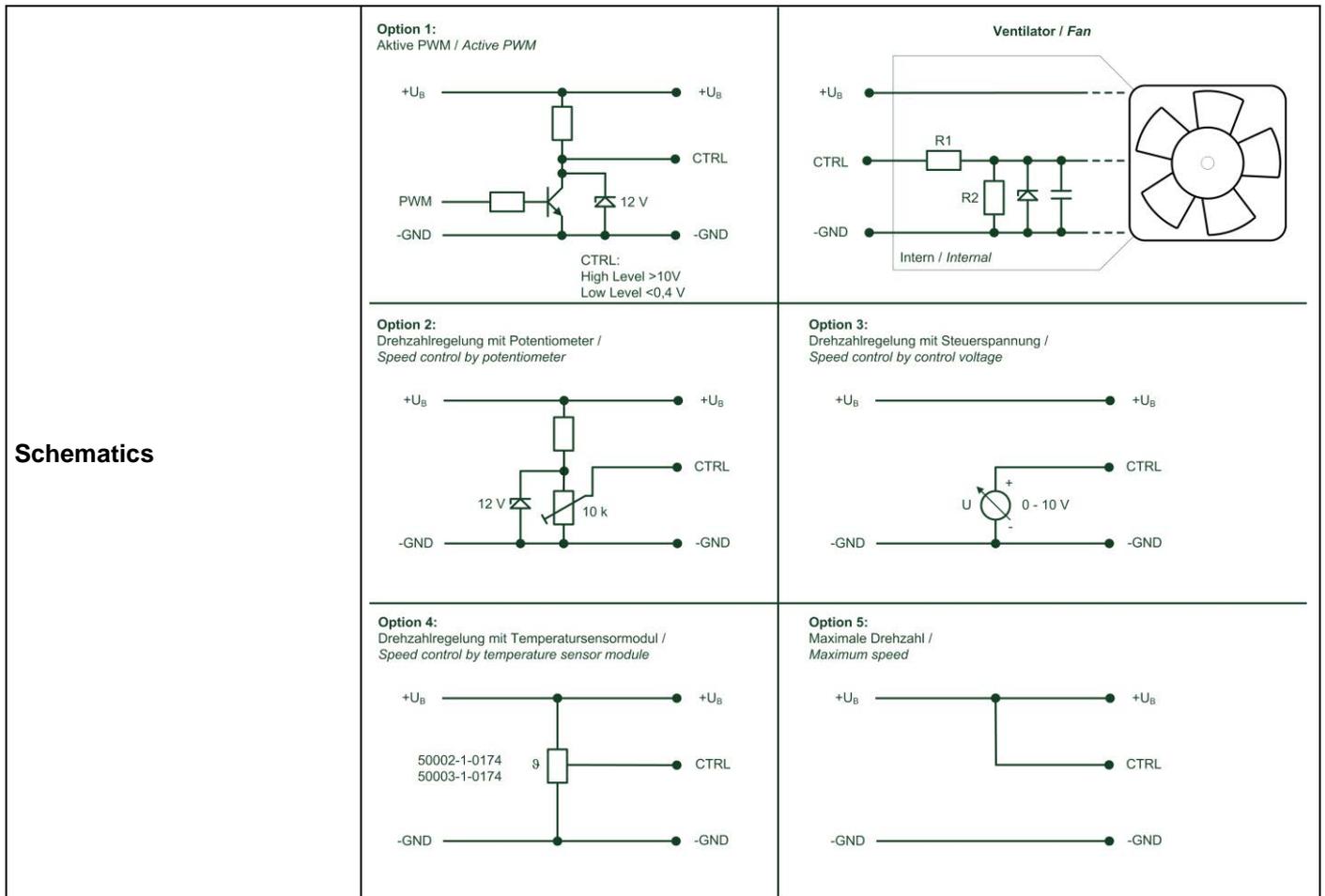
Control input	Analog
---------------	--------

Features

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



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 active 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: 3.500 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:	3.500 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)

The fan have 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.

Measurement setup:	Measured between two steel plates
Steel plate:	266 mm x 266 mm
Intake nozzle:	D: 146 mm; R: 25 mm
Distance between bottom and top plate:	123,5 mm
Overlapping impeller / nozzle:	2 mm

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

I: corresp. to arithm. mean current value

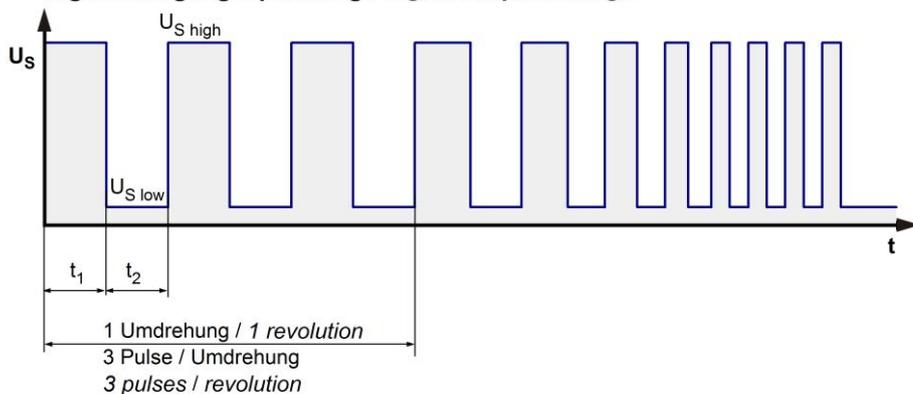
Name	Condition
U Contr. 0001	U Contr.: 10 V

Features	Condition	Symbol	Values		
Voltage range		U	36 V		72 V
Nominal voltage		U_N		48 V	
Power consumption	$\Delta p = 0$	P	123 W	226 W	230 W
Tolerance	U Contr. 0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Current consumption	$\Delta p = 0$	I	3.500 mA	4.700 mA	3.200 mA
Tolerance	U Contr.0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Speed	$\Delta p = 0$	n	2.960 1/min	3.500 1/min	3.500 1/min
Tolerance	U Contr. 0010		+/- 7,5 %	+/- 5,0 %	+/- 5,0 %

3.3 Electrical Interface - Output

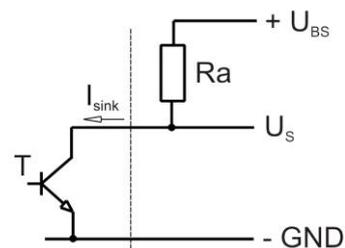
Tacho type	/2 (open collector)
------------	---------------------

Signal-Ausgangsspannung / Signal output voltage

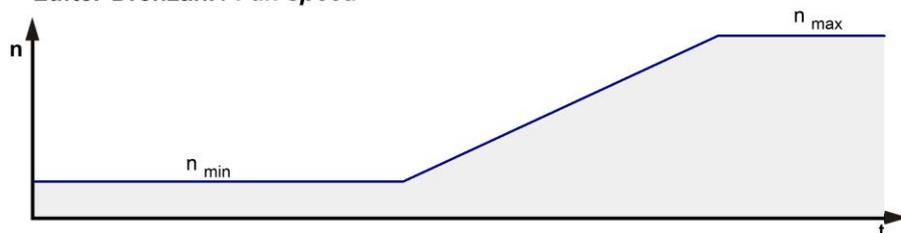


$$R_a = \frac{U_{BS} - U_{S\ low}}{I_{sink}}$$

Lüfter / Fan Kunde / Customer



Lüfter-Drehzahl / Fan speed



Features	Note	Values
Tacho operating voltage	U_{BS}	$\leq 60\text{ V}$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\text{ V}$
Tacho signal High	$U_{S\ high}$	$\leq 60\text{ V}$
Maximum sink current	I_{sink}	20 mA
External resistor	External resistor R_a from U_{BS} to U_S required. All voltages measured to GND.	
Tacho frequency	$(3 \times n) / 60$	175 Hz @ 3.500 1/min
Tacho isolated from motor	No	
Slew rate		$\geq 0,5\text{ V/us}$

n = revolutions per minute (1/min)

Please note:

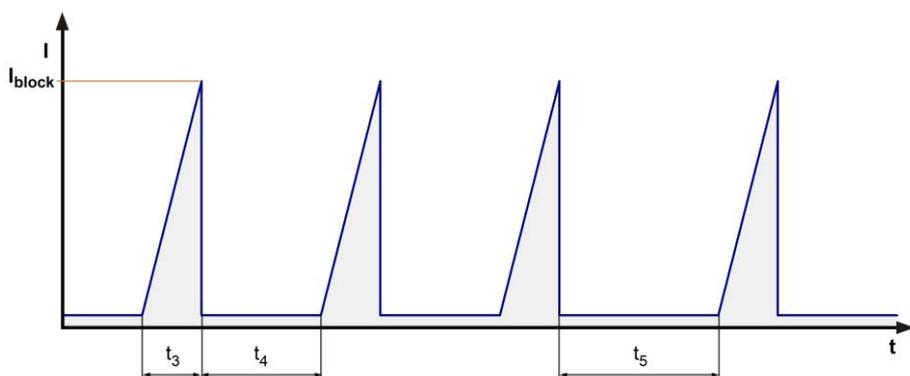
At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.

The tacho signal is only activated after the start-up is completed.

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	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_{block} approx. 2.000 mA	
Clock signal at locked rotor Extended Downtime	t_3 / t_4 typical: 7,2 s / 10,0 s t_5 : 50 s after 2 start-up tests	
Internal fuse	Littelfuse NANO2 > Very Fast-Acting > 451/453 Series 10A / 125V (Art.No.: 0451010.MRL)	
Voltage control *)	Fan turns on at $U_B > 34 \text{ V}$ or $< 78 \text{ V}$ Fan turns off at $U_B < 32 \text{ V}$ or $> 80 \text{ V}$	

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



3.5 Data According ErP Directive

Installation / Efficiency category	A / static
Speed control	integrated
Specific ratio	1,00640
Target overall efficiency 2015	45,6 %
Overall efficiency	59,4 %
Efficiency grade	62
Power input	273,8 W
Speed	3.450 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

3.6 Aerodynamics

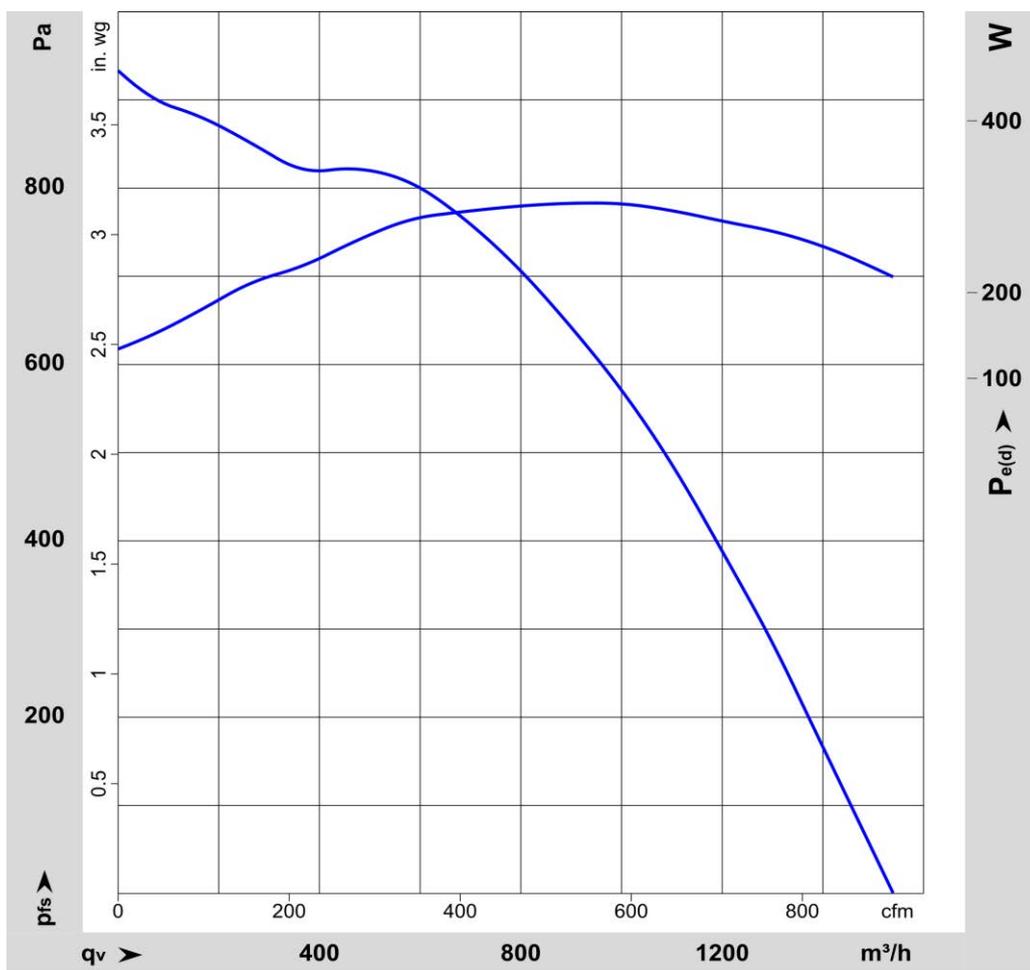
Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m³; Temperature 23°C +/- 3°C; In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal. The information is only valid under the specified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

Measurement setup:	Measured between two steel plates
Steel plate:	266 mm x 266 mm
Intake nozzle:	D: 146 mm; R: 25 mm
Distance between bottom and top plate:	123,5 mm
Overlapping impeller / nozzle:	2 mm

a.) Operation condition:

3.500 1/min at free air flow	U Contr. 10 V		
------------------------------	---------------	--	--

Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$)	1.540 m ³ /h	
Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$)	935 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:

3.500 1/min at free air flow	U Contr. 10 V		
------------------------------	---------------	--	--

Optimal operating point	1.002 m ³ /h @ 570 Pa	
Sound power level at the optimal operating point	8 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.	55 °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

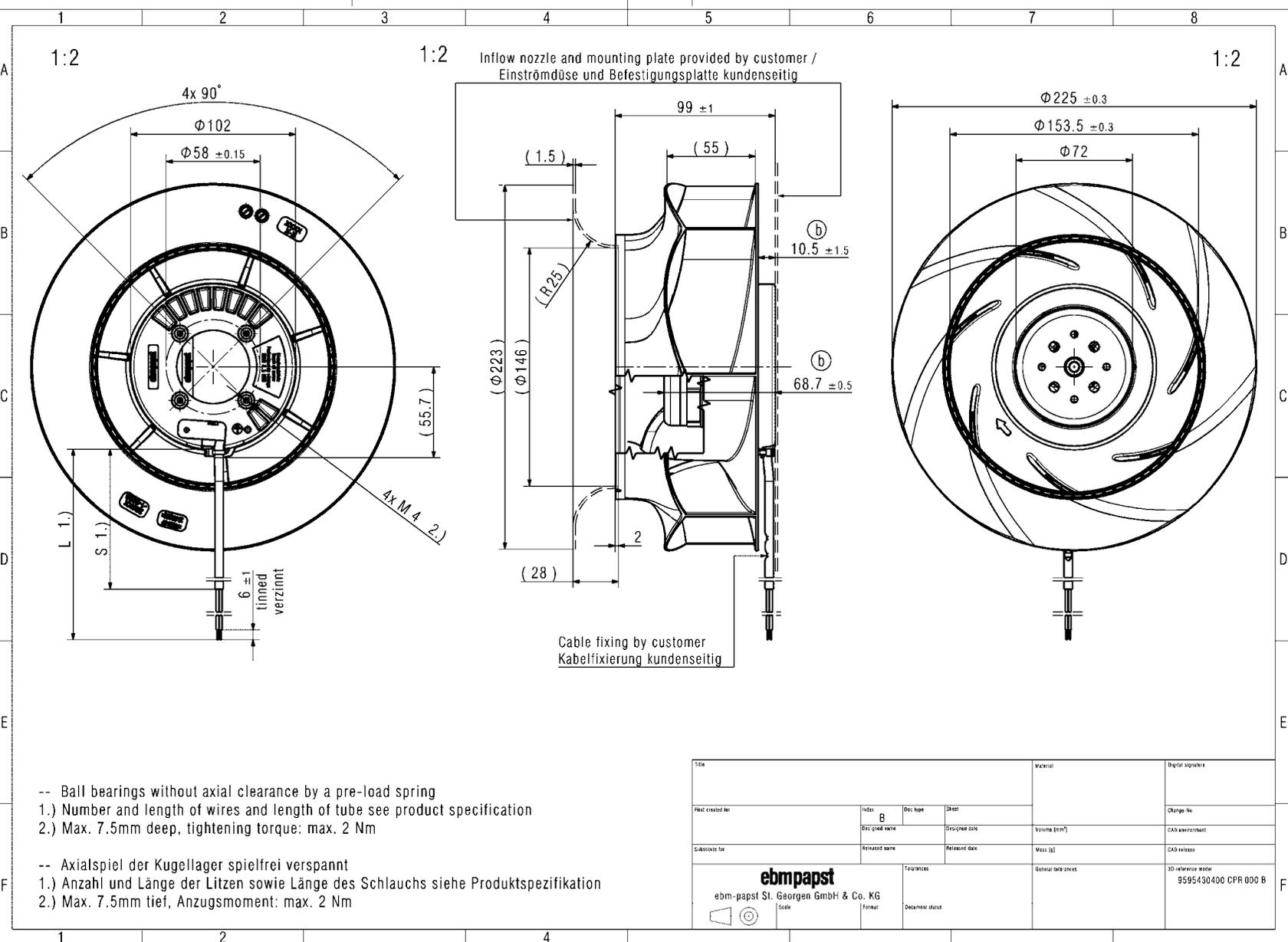
CE	EC Declaration of Conformity	Yes
UKCA	UK Conformity Assessed	Not applicable
EAC	Eurasian Conformity	Yes
America	UL - Underwriters Laboratories	Yes / UL507, Electric Fans E38324
Europe	VDE - Association for Electrical or UL - Underwriters Laboratories or comparable	Yes / Approval acc. to EN 62368 - Audio/video, information and communication technology equipment
Canada	UL - Underwriters Laboratories or CSA - Canadian Standards Association	Yes / CSA audited by UL according to C22.2 No. 113 Fans and Ventilators
China	CCC - China Compulsory Certification or CQC - China Quality Certification	Yes / GB 12350 Safety Requirements for small Power Motors

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	50.000 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	85.000 h	

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization is prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design. Refer to protection notice ISO 16016! Note: in case of multilingual information in this document and in the applicable documents referred to in this document, only the English version shall be authoritative and legally binding in the event of contradictions in content.



- Ball bearings without axial clearance by a pre-load spring
- 1.) Number and length of wires and length of tube see product specification
- 2.) Max. 7.5mm deep, tightening torque: max. 2 Nm

- Axialspiel der Kugellager spielfrei verspannt
- 1.) Anzahl und Länge der Litzen sowie Länge des Schlauchs siehe Produktspezifikation
- 2.) Max. 7.5mm tief, Anzugsmoment: max. 2 Nm

Title				Material		Digital signature	
Part created for		Index	Doc. type	Sheet	Change-No.		
		B					
Doc. grid name		Design lead name		Volume [liters]	CAD environment		
Substrate for		Released name	Released date	Mass [kg]	CAD release		
 ebmpapst ebm-papst St. Georgen GmbH & Co. KG		Tolerances		General tab sizes		3D-reference model	
		Scale		Document status		9595430400 CPR 000 B	