

**Product Data Sheet**

**9595420411**  
VBS0225XULDS  
RER225-63/18/2TDMO

**ebmpapst**

The engineer's choice



RER225-63/18/2TDMO

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1 General

Fan type	Blower without chassis with intake nozzle	
Rotating direction looking at rotor	Clockwise	
Airflow direction	Air in axially, Air out radially	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

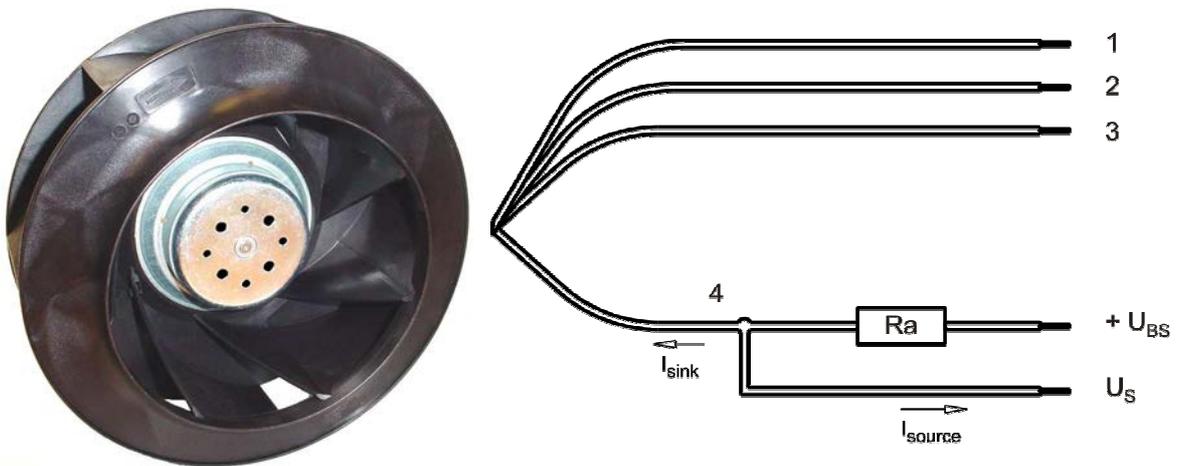
2 Mechanics

2.1 General

Depth	99,0 mm	
Diameter	225,0 mm	
Mass	1,027 kg	
Housing material		
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length	L = 425 mm	
Tolerance	+ - 10,0 mm	
Tube length	S = 135 mm	
Tolerance	+ - 5,0 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	1,30 mm
4	white	Tacho	AWG 22	1,30 mm

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

Wire 1 - 2: AWG20 (Isolationdiameter 2,05mm)  
 Wire 3 - 4: AWG22 (Isolationdiameter 1,35mm)

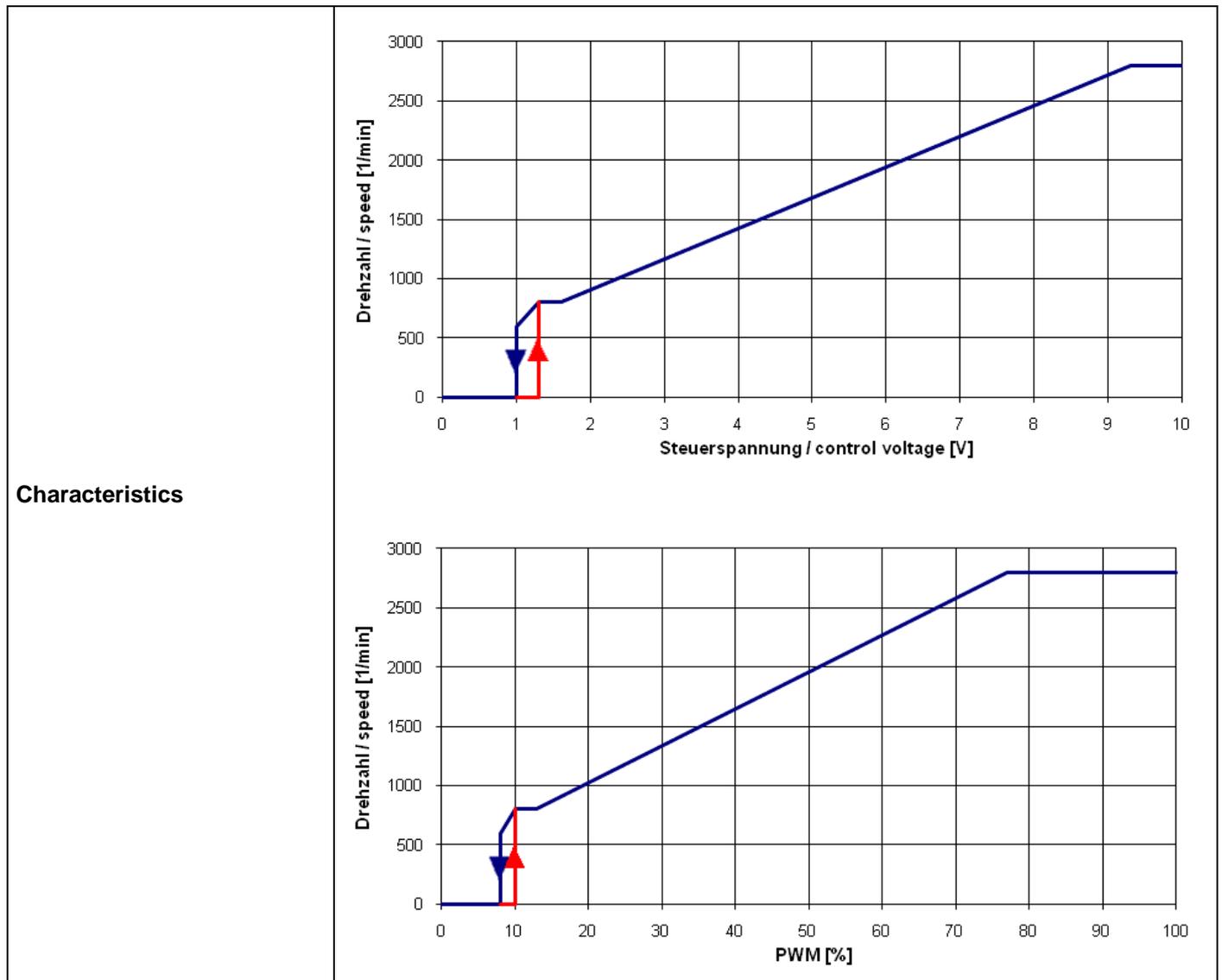
3 Operating Data

3.1 Electrical Interface - Input

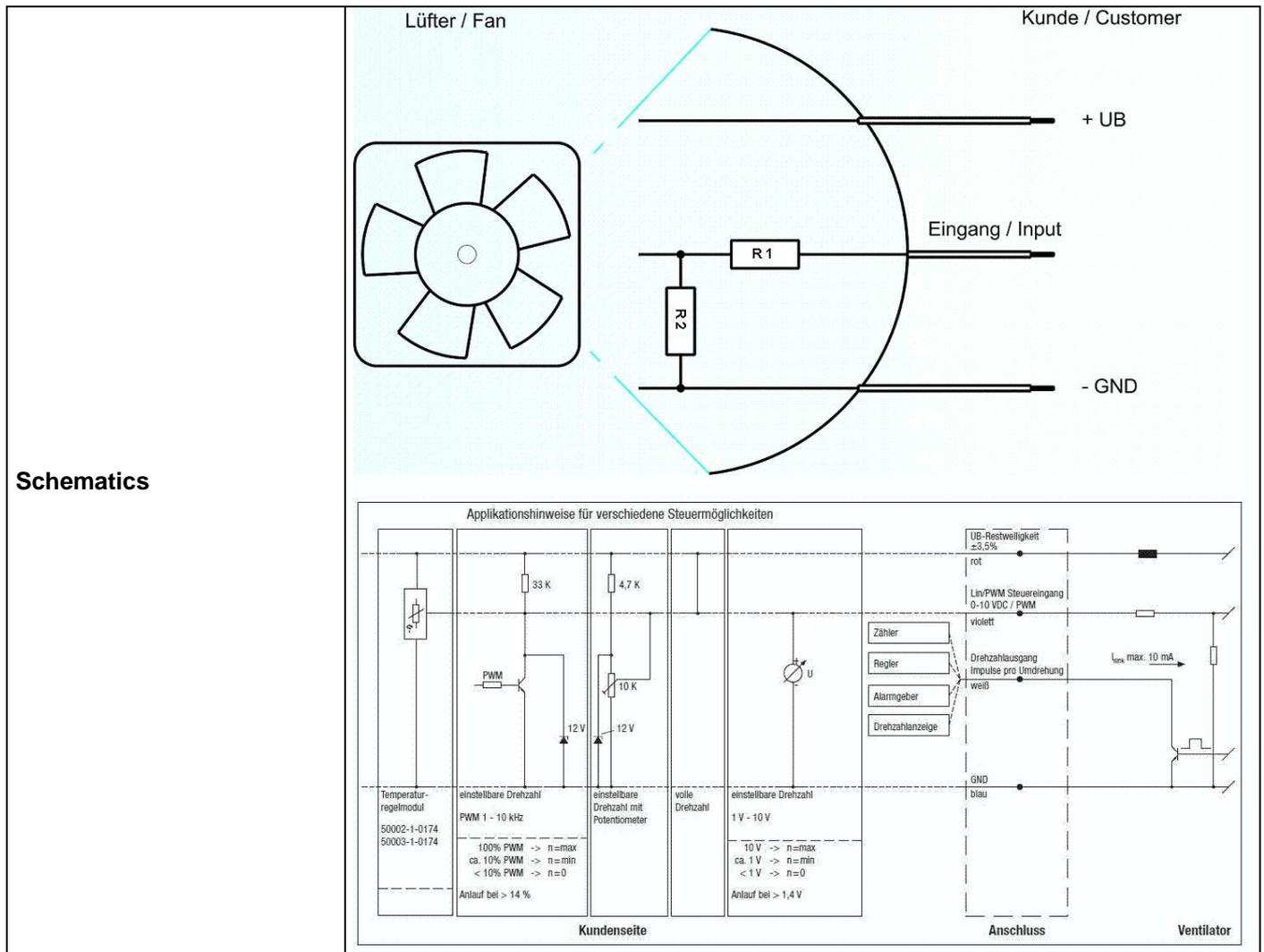
Control input	Analog
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Features

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



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, coming from 0% PWM)
- 10% - 13% PWM: 800 1/min (corresponding to min. speed)
- 13% - 78% PWM: linear increasing curve
- 78% - 100% PWM: 2800 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)

oder:

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: 2800 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 values are measured in the housing!

Fan doesn't have a 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.

Measurement setup:	Measured between two steel plates
Steel plate:	230 mm x 230 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

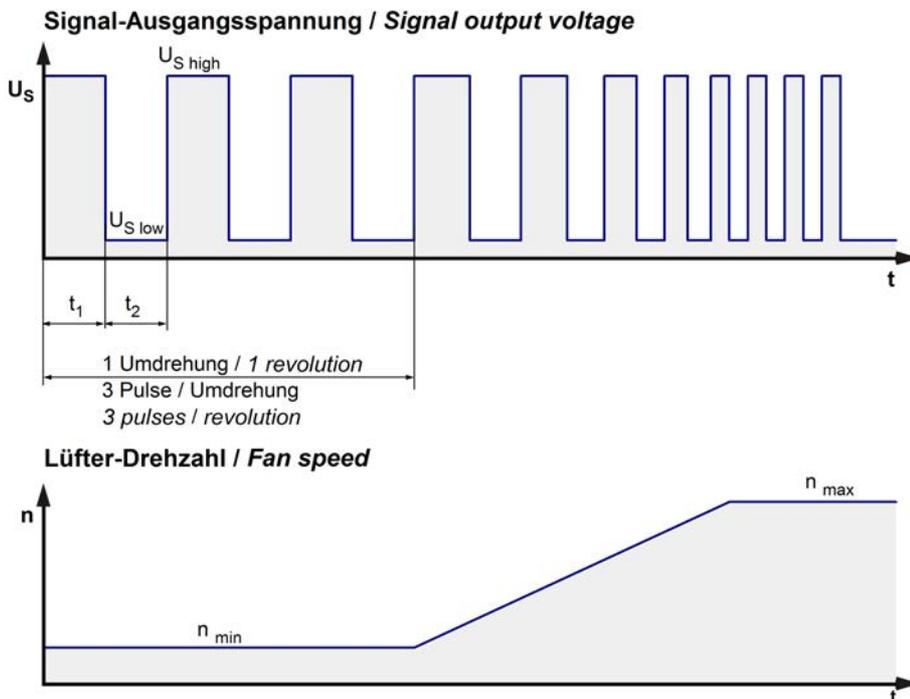
Name	Condition
U Contr. 0001	U Contr.: 10 V

**100% PWM; f = 2 kHz or broken lead wire (open control input)**

Features	Condition	Symbol	Values		
Voltage range		U	36 V		72 V
Nominal voltage		$U_N$		48 V	
Power consumption	$\Delta p = 0$	P	94 W	108 W	105 W
Tolerance	U Contr. 0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Current consumption	$\Delta p = 0$	I	2.600 mA	2.250 mA	1.460 mA
Tolerance	U Contr.0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Speed	$\Delta p = 0$	n	2.750 1/min	2.800 1/min	2.800 1/min
Tolerance	U Contr. 0010		+/- 7,5 %	+/- 7,5 %	+/- 7,5 %

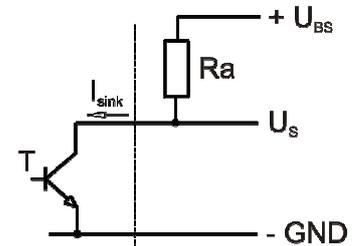
### 3.3 Electrical Interface - Output

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	$(3 \times n) / 60$	140 Hz
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5\ V/\mu s$

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

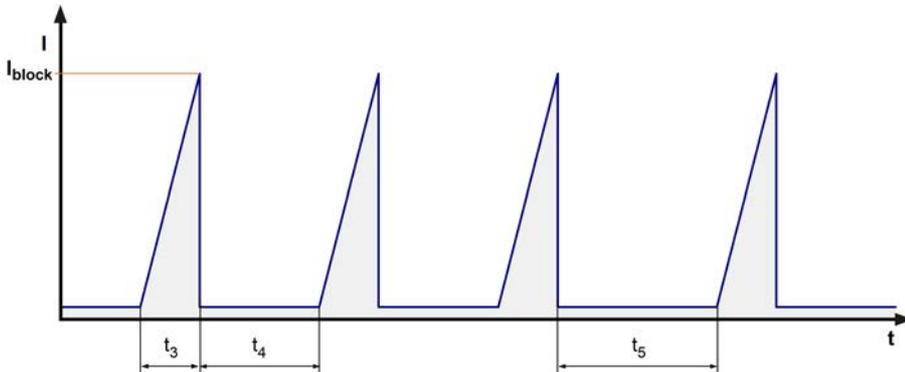
**Please note:**

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. 3.000 mA	
Clock signal at locked rotor	$t_3 / t_4$ typical: 4 s / 10,0 s	



Locked rotor signal  $t_5$ :

After 2 failed start-ups there is an extended timeout of 50 s.

3.5 Data According ErP Directive

Installation / Efficiency category	A / static
Speed control	integrated
Specific ratio	1,00342
Target overall efficiency 2015	43,1 %
Overall efficiency	49,2 %
Efficiency grade	62
Power input	158 W
Speed	2.710 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

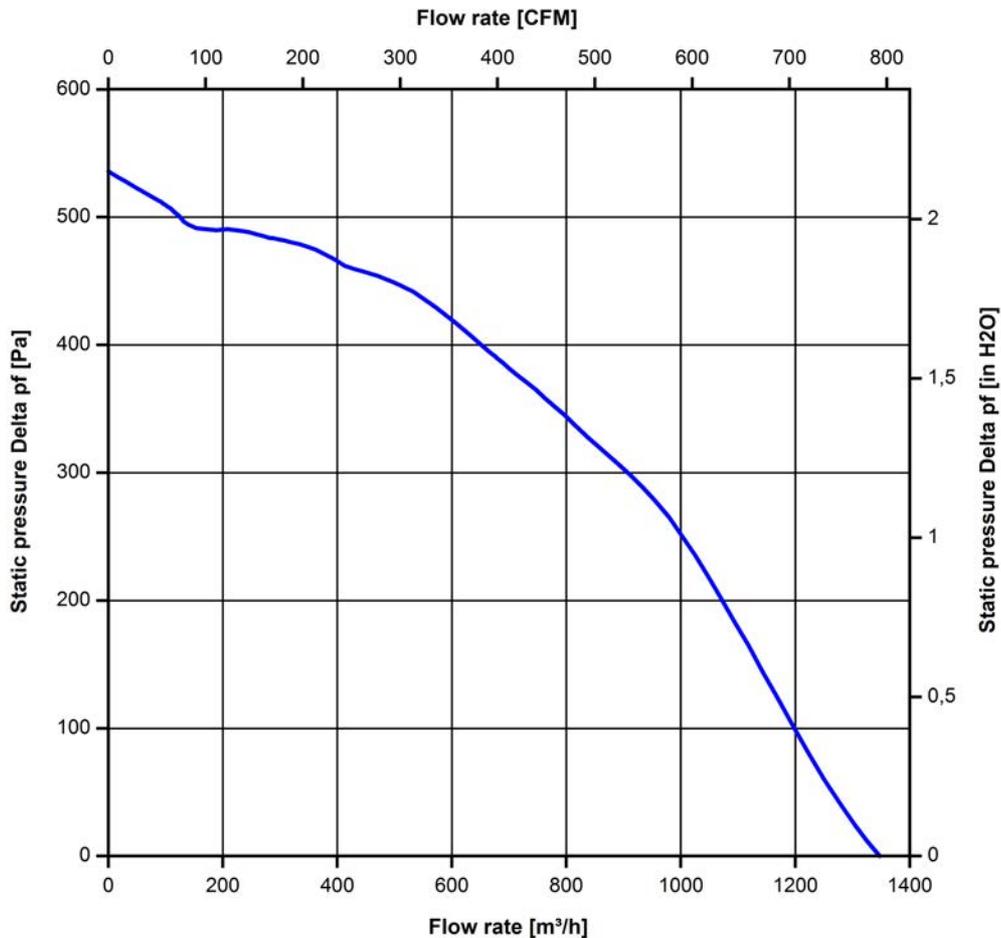
3.6 Aerodynamics

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.

Measurement setup:	Measured between two steel plates
Steel plate:	230 mm x 230 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:

2.800 1/min at free air flow	U Contr. 10 V		
Max. free-air flow ( $\Delta p = 0 / \dot{V} = \text{max.}$ )		1.340,0 m <sup>3</sup> /h	
Max. static pressure ( $\Delta p = \text{max.} / \dot{V} = 0$ )		535 Pa	



### 3.7 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:

2.800 1/min at free air flow	U Contr. 10 V		
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## 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 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.	1000 VAC / 1 Min.	
B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	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
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 60950 (VDE 0805) - Information 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

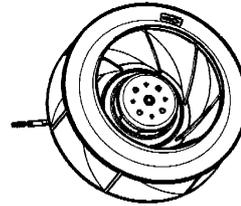
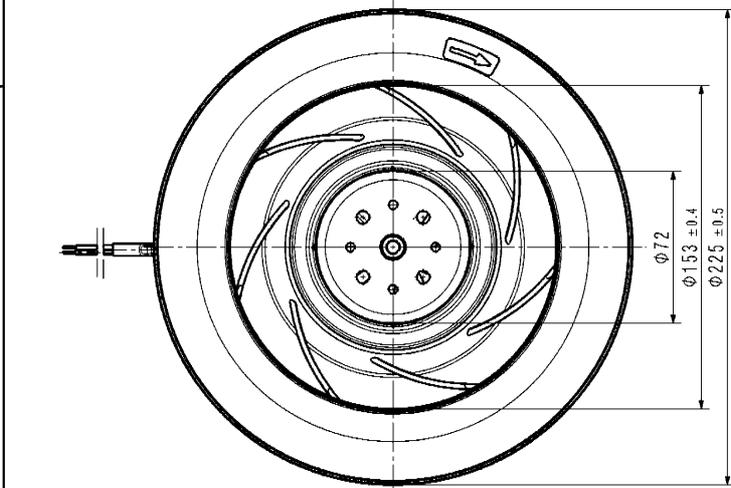
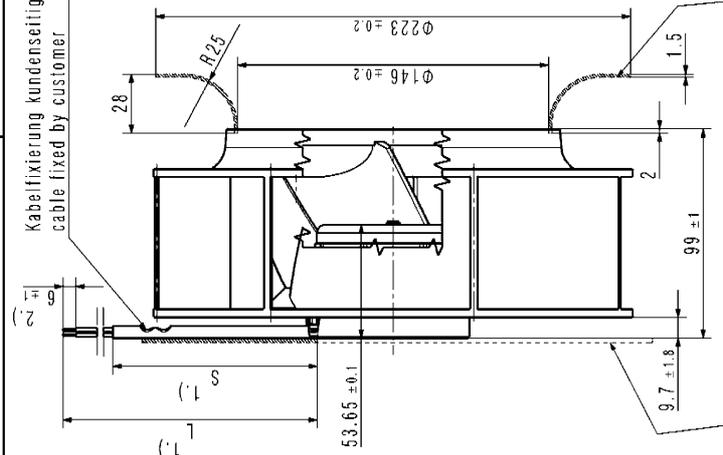
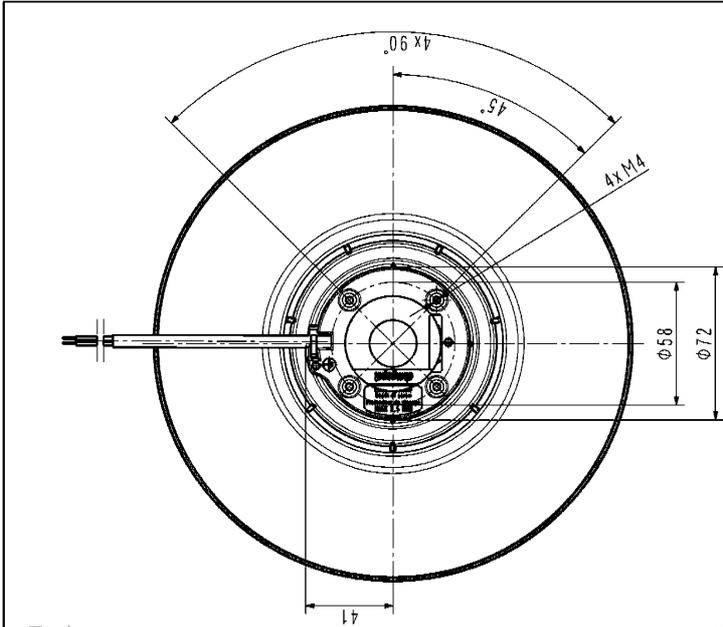
The approval tests are observed to:

U approval max.: 72,0 V @ TU approval max.: 50 °C

## 6 Reliability

### 6.1 General

Life expectancy L10 at TU = 40 °C	55.000 h	
Life expectancy L10 at TU max.	40.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	92.5 00 h	



- Axialspiel der Kugellager mit Feder spielfrei verspannt.
- 1) Wenn nötig, Litzen auf Maß gekürzt. Anzahl und Länge der Litzen sowie Länge des Schlauches ab Flanschrand siehe Produktspezifikation.
- 2) verzinkt
- Ball bearing without axial clearance by a pre-loaded spring.
- 1) If required, cut wires to length. Length and number of wires and length of tube from flange edge see design specification.
- 2) tinned

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SP-Statusseite	Ansatz-/Change No.	CAD-System-Version / DATE-System-Version	CAD-Mechanism / CAD-Entwickler	Minivert / Material:	Volumen / Anzahl (WP) / 424, 973, 512
			RESEARCH PROOF	Artikel / Title:	Genoss / Mass (g) / 0,443
Tolerierung / Tolerances:	ISO-Referenzmaß / ISO-Referenzmaß	Dr. Datum	Name	2D-Dr. Nr. / Zeichens. Nr.	Erst / Zeich. / Revidiert:
Abgemessen / gem. / tolerances:	Druck / checked			Druck / Date	Formel / Size:
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