Product Data Sheet RER175-42/18/2TDMLO

ebmpapst

The engineer's choice

GREEN TECH

RER175-42/18/2TDMLO

INDEX

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	

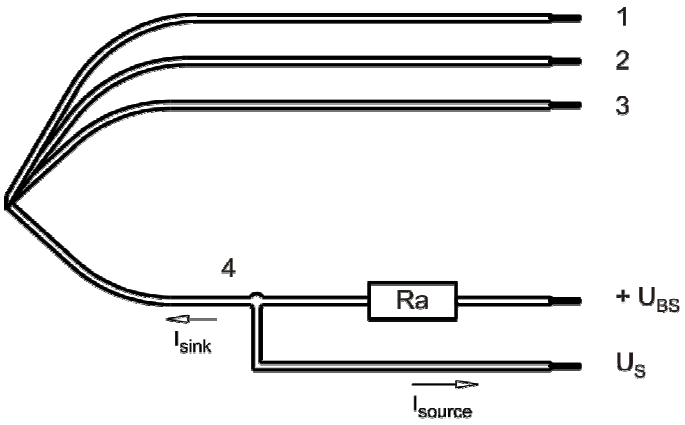
2 Mechanics

2.1 General

Depth	69 mm	
Diameter	175 mm	
Mass	0,775 kg	
Housing material		
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires - Plug	
Lead wire length Tolerance	L = 425 mm +- 10 mm	
Tube length Tolerance	S = 115 mm +- 5,0 mm	
Plug	See drawing	
Contact	See drawing	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 22	1,35 mm
2	blue	- GND	AWG 22	1,35 mm
3	violet	PWM	AWG 22	1,35 mm
4	white	Tacho	AWG 22	1,35 mm

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

3 Operating Data

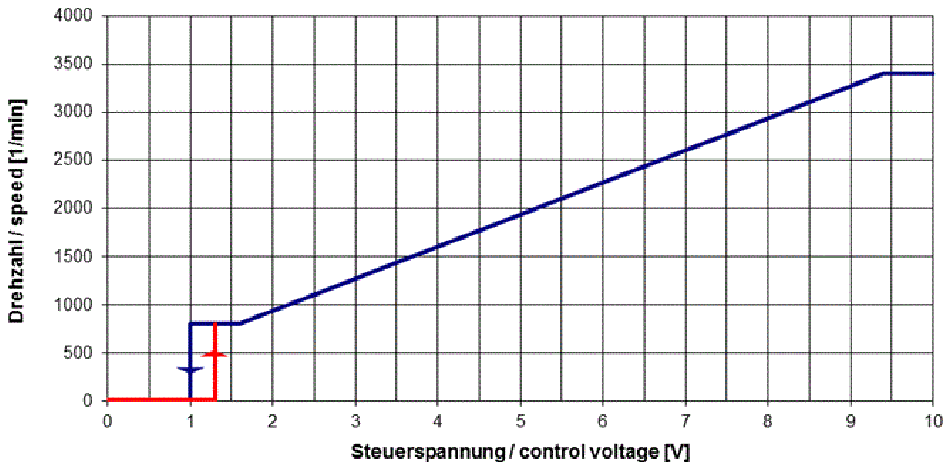
3.1 Electrical Interface - Input

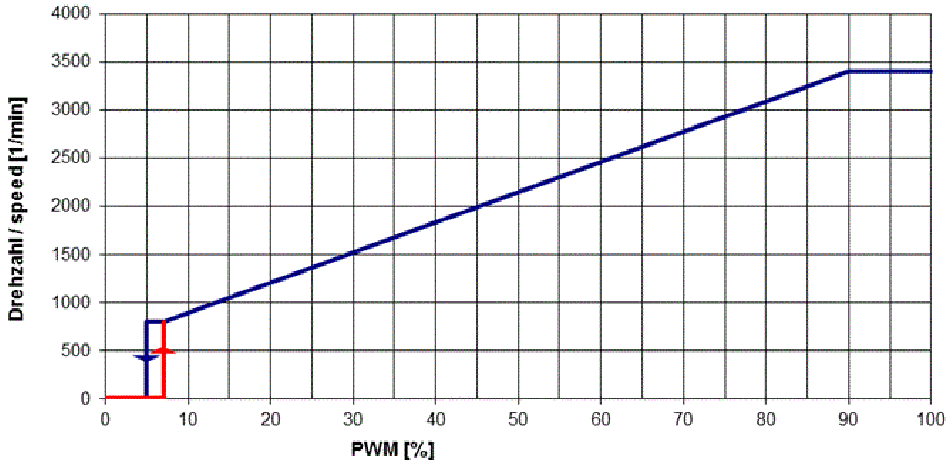
Control input	Analog

Features

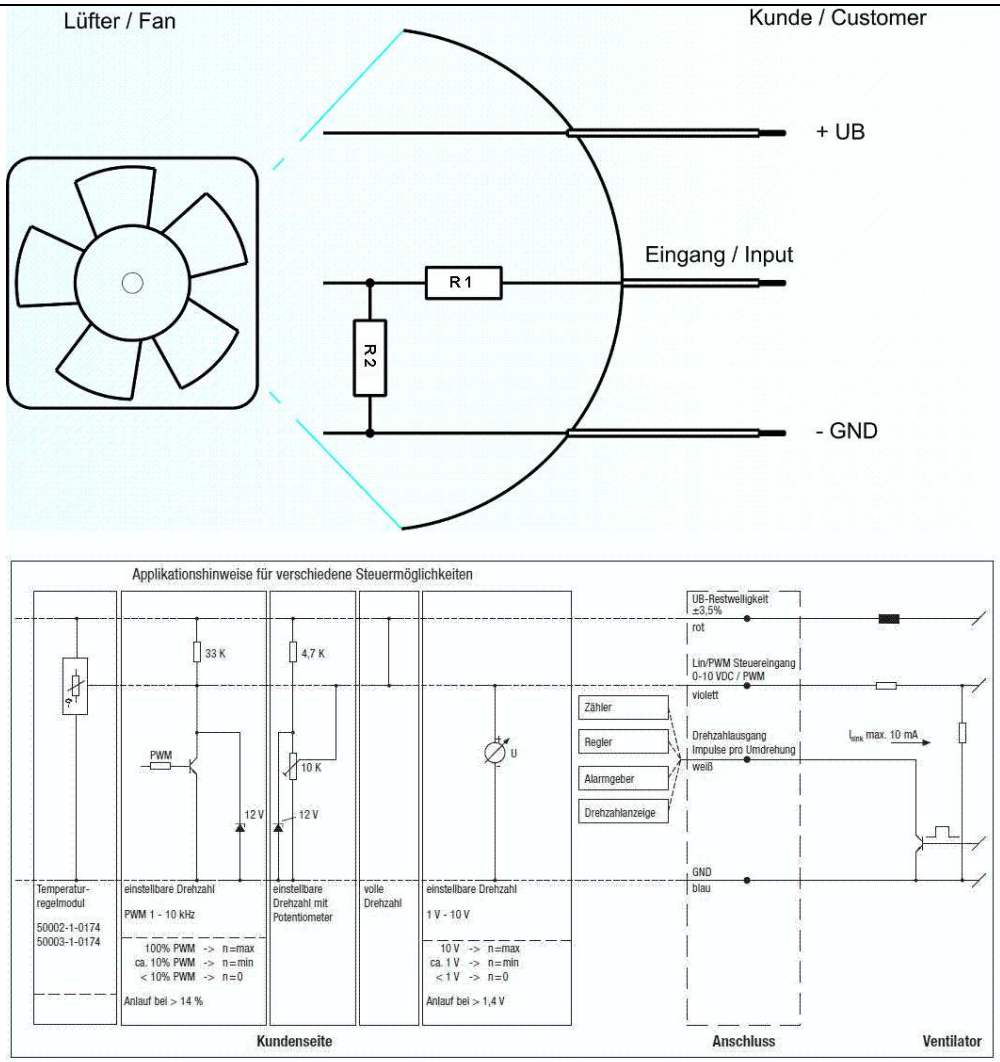
PWM - Frequency		1 kHz - 10 kHz typical: 2 kHz
Input voltage range		0 V - 10 V

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:	3.400 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:	3.400 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)

The fan have no sensor break detection!
Information to the curve:

0 % - 7% PWM:	0 1/min
7 % PWM:	800 1/min (Fan on, comming from 0% PWM)
7 % - 10% PWM:	800 1/min (corresponding to min. speed)
10 % - 90% PWM:	linear increasing curve
90 % - 100% PWM:	3.400 1/min (corresponding to max. speed)
7 % - 5 % PWM:	linear decreasing curve (comming from 100% PWM)
5 % PWM:	600 1/min or 0 1/min (Fan off, comming from 100% PWM)

3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m3; Temperature 23℃ +/ - 3℃; 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:	180 mm x 180 mm
Intake nozzle:	D: 125,5 mm; R: 10 mm
Distance between bottom and top plate:	80 mm
Overlapping impeller / nozzle:	2 mm

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

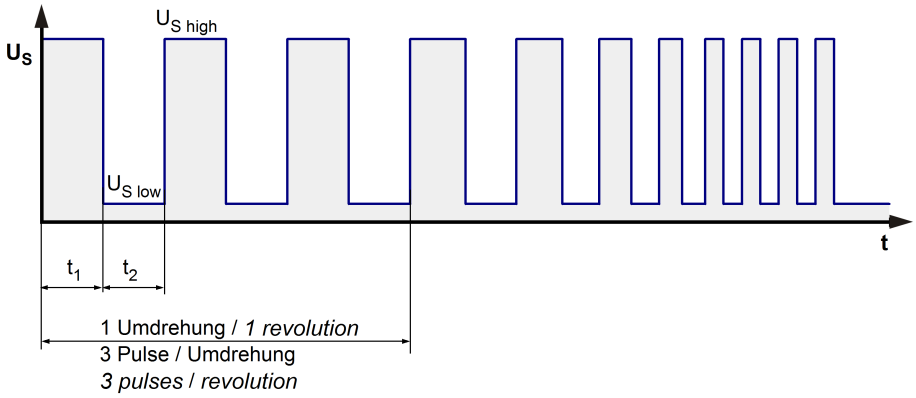
Name	**Condition**		
U Contr. 0001	U Contr.: 10,0 V		

Features	**Condition**	**Symbol**	**Values**		
Voltage range		U	36 V		57,0 V
Nominal voltage		U_N		48,0 V	
Power consumption Tolerance	$\Delta p = 0$ U Contr. 0010	P	47 W +- 10,0 %	46 W +- 10,0 %	51 W +- 10,0 %
Current consumption Tolerance	$\Delta p = 0$ U Contr.0010	I	1.300 mA +- 10,0 %	950 mA +- 10,0 %	900 mA +- 10,0 %
Speed Tolerance	$\Delta p = 0$ U Contr. 0010	n	3.400 1/min +- 10,0 %	3.400 1/min +- 10,0 %	3.400 1/min +- 10,0 %

3.3 Electrical Interface - Output

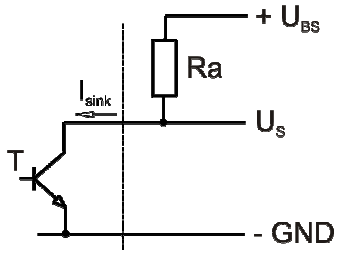
Tacho type	/2 (open collector)

Signal-Ausgangsspannung / *Signal output voltage*

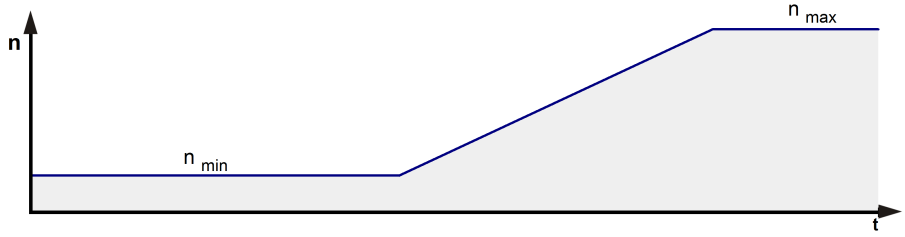


$$Ra = \frac{U_{BS} - U_{S\,low}}{I_{sink}}$$

Lüfter / *Fan* **Kunde / *Customer***



Lüfter-Drehzahl / *Fan speed*



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

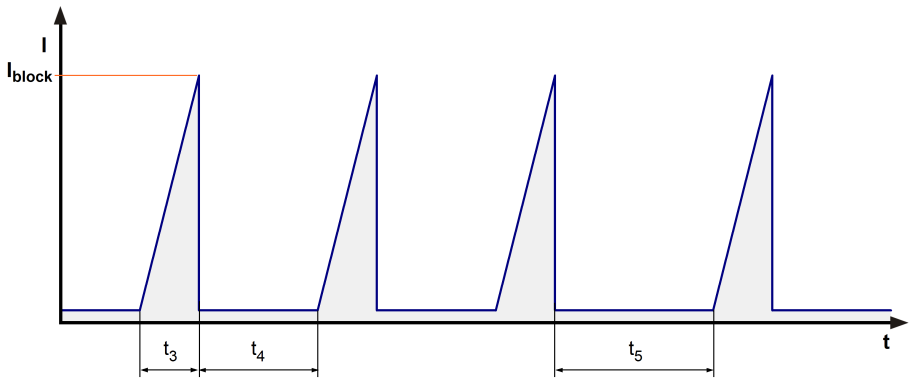
n = revolutions per minute (1/min)

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. 2.200 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 7 s / 10,0 s	

Internal fuse	Littelfuse NANO2 > Very Fast-Acting > 451/453 Series 2,5A / 125V (Art.No.: 045102.5MRL)	
Voltage control *)	Fan turns on at U_B > 32 V or < 66 V Fan turns off at U_B < 30 V or > 68 V	

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



Locked rotor signal t5: 40.0 s

After 4 failed start-ups of t3 to t4 there is an extended timeout t5 of 40s.

3.5 Aerodynamics

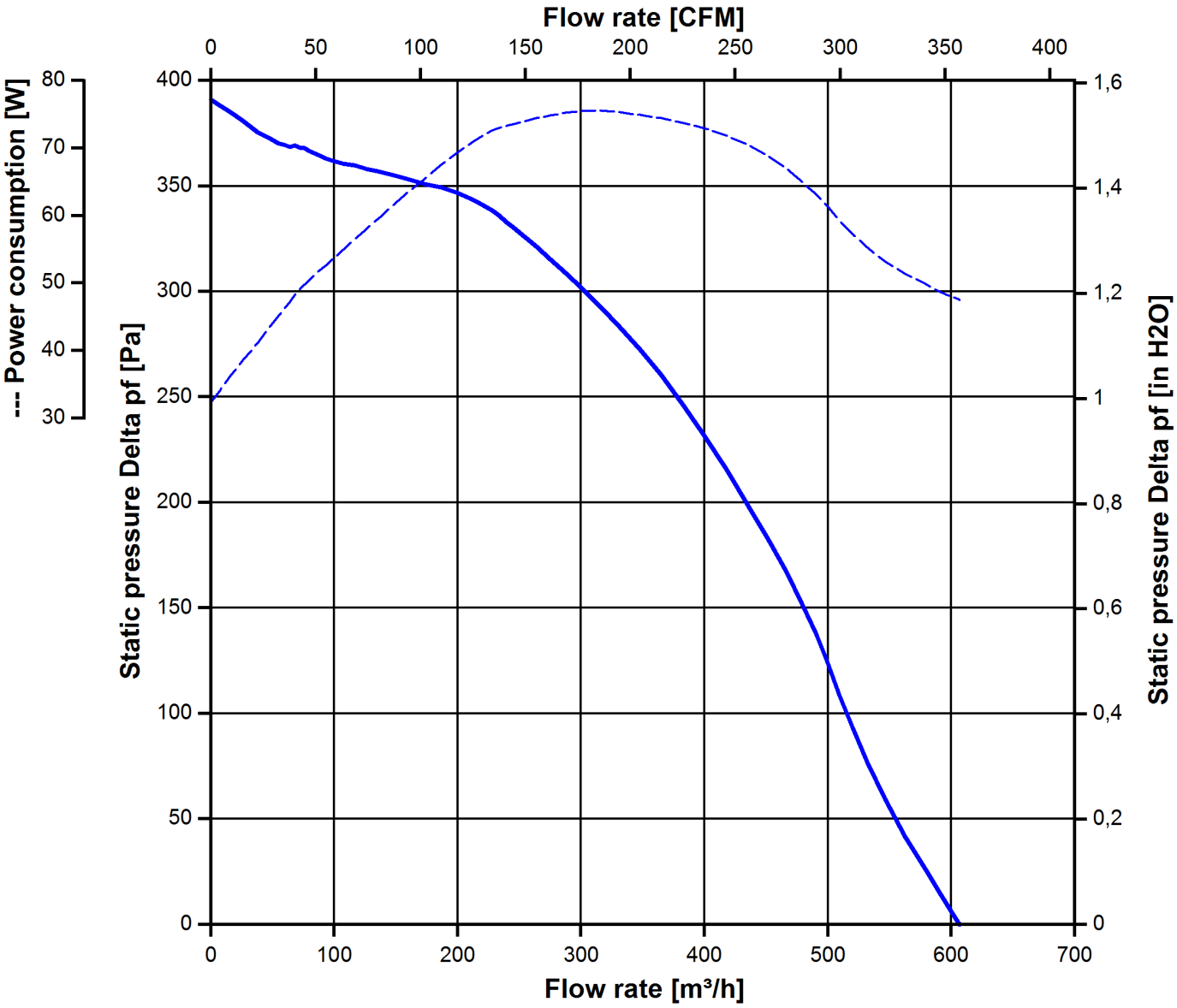
Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m3; Temperature 23℃ +/ - 3℃; In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal. The information is only valid under the specified 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:	180 mm x 180 mm
Intake nozzle:	D: 125,5 mm; R: 10 mm
Distance between bottom and top plate:	80 mm
Overlapping impeller / nozzle:	2 mm

a.) Operation condition:

3.400 1/min at free air flow	U Contr. 10,0 V		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	605 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	390 Pa	


Flow rate [CFM]
0
50
100
150
200
250
300
350
400
--- Power consumption [W]
80
70
60
50
40
30
Static pressure Delta pf [Pa]
400
350
300
250
200
150
100
50
0
Static pressure Delta pf [in H2O]
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
0
100
200
300
400
500
600
700
Flow rate [m³/h]

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 chapter aerodynamics.

a.) Operation condition:

3.400 1/min at free air flow	U Contr. 10,0 V		

Optimal operating point	435 m3/h @ 198 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 ℃	
Max. permitted ambient temperature TU max.	65 ℃	
Min. permitted storage temperature TL min.	-40 ℃	
Max. permitted storage temperature TL max.	80 ℃	

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.

4.3 Mechanical Requirements

severity level	Vibration (sinusoidal)	
2 G	Vibration (sinusoidal) in use IEC 60068-2-6 Displacement / frequency range Acceleration / frequency range Sweep rate Sweep cycles Duration	 Vibration (sinusoidal) 0,15 mm / 10-58, 58-10 Hz 2 G / 58-500-58 Hz 1 Oct./min 10 2 hrs.

	Axes of vibration	3

severity level	stationary use		
1	storage / transportation	Random vibration not in use IEC 60068-2-64 Frequency range / ASD G_{RMS} Axes of vibration Test duration	 Random vibration 5 - 20 Hz : 1,0 m^2 / s^3 20 - 500 Hz : - 3 dB / Oct 0,91 G 3 3 x 5 h
	storage / transportation	Bump not in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	 Bump half sine 18 G 6 ms 100 in each direction 600
	stationary use	Random vibration in use IEC 60068-2-64 Frequency range / ASD G_{RMS} Axes of vibration Test duration	 Random vibration 5 - 20 Hz : 2,0 m^2 / s^3 20- 150 Hz : - 3 dB / Oct 0,83 G 3 3 x 5 h
	stationary use	Bump in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	 Bump half sine 5 G 11 ms 100 in each direction 600

4.4 EMC

Kind	**Electrostatic Discharge Immunity Test**
According	DIN EN 61000-4-2:2001-12
Ceck accuracy / Limit	Contact Discharge +/- 4 kV; Air Discharge +/- 8 kV
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

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℃. 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℃ measured with U=500 VDC for 1 min.	RI > 10 MOhm	
Clearance / creepage distance	1,0 mm / 1,5 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	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.:57,0 V @ TU approval max.: 65,0 ℃

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 ℃	72.500 h	
Life expectancy L10 at TU max.	40.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 ℃	122. 500 h	

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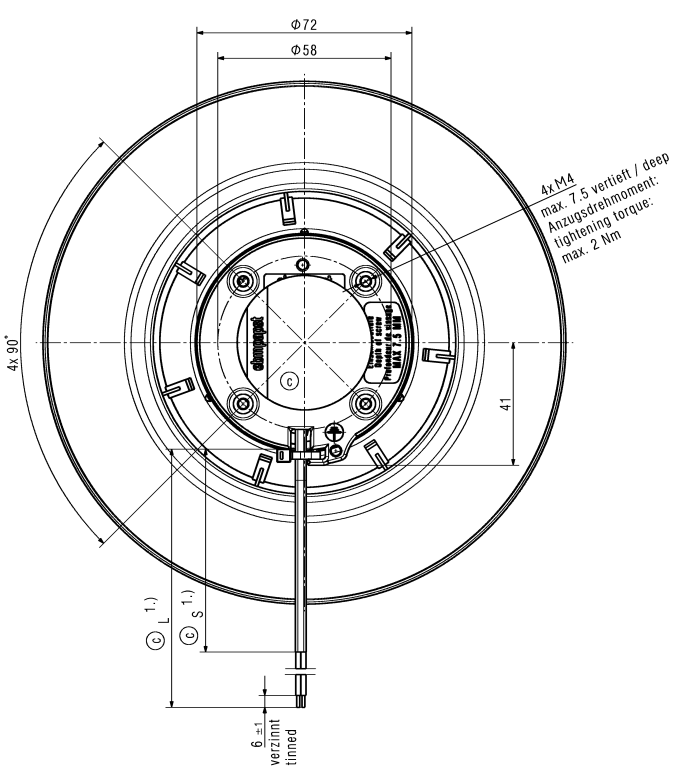

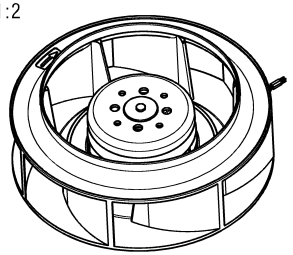

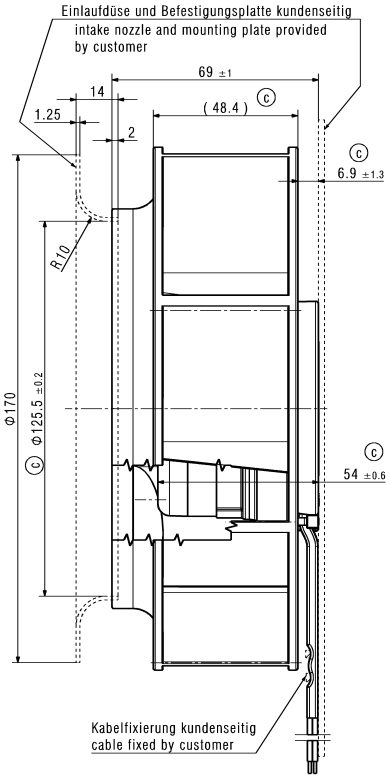

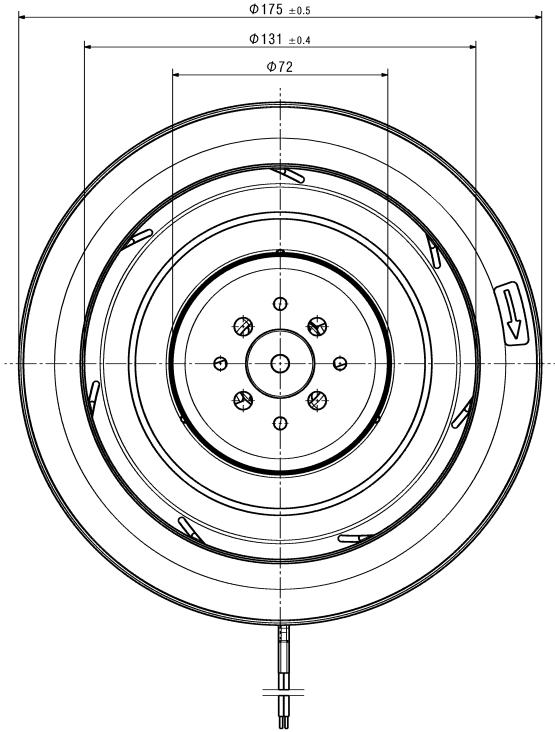

- Axialspiel der Kugellager mit Feder spielfrei verspannt
1.) Anzahl und Länge der Litzen sowie Länge des Schlauchs siehe Produktspezifikation

- ball bearings without axial clearance by a pre-load spring
1.) length and number of wires and length of tube see product specification

Dokument-Status / Document-State	CATIA-Version/ CATIA-Version	CAD-Umgebung/ CAD-Environment	Werkstoff / Material:
Aend.-Nr./ Change-No.	9585414000 GPR:0000		Volumen / Volume (dm³): Gewicht / Mass (g):
Tolerierung / Tolerances:	3D-Referenzmodell / 3D-Referenzmodell		Artikel / Title:
Allgemeintoleranzen / Gen. Tolerances:	Datum / Name		Zchg.-Nr./ Drawing No: Ers.f.Zchg. / Replaces:
Bearb./ Drawn			
Gepr./ Checked			
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