FansCo DataSheet 9595420111

VBS0175XULDS
RER175-42/18/2TDMP

ebmpapst

engineering a better life

RER175-42/18/2TDMP

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	

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

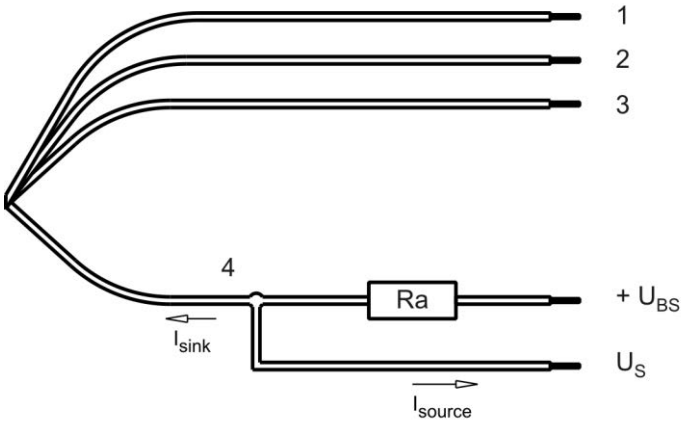
2 Mechanics

2.1 General

Depth	69 mm	
Diameter	175 mm	
Mass	0,844 kg	
Housing material		
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 425 mm +- 10 mm	
Tube length Tolerance	S = 115 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	PWM	AWG 22	1,7 mm
4	white	Tacho	AWG 22	1,7 mm

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

3 Operating Data

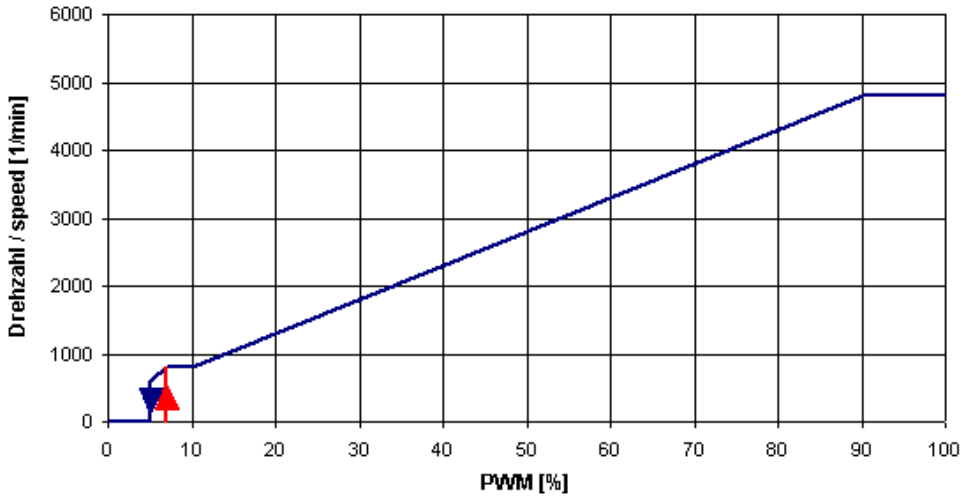
3.1 Electrical Interface - Input

Control input	PWM

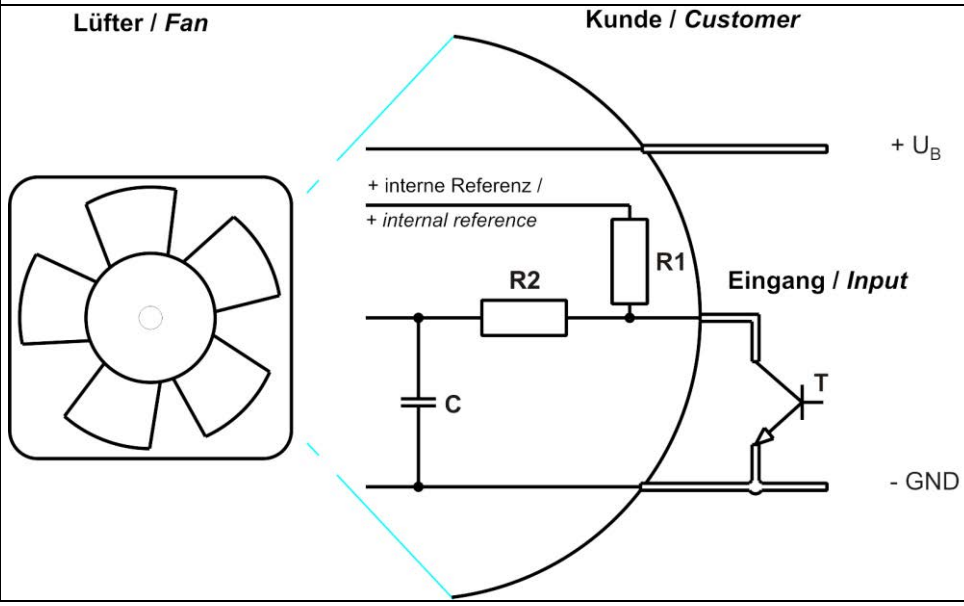
Features

PWM - Frequency		1 kHz - 10 kHz typical: 2 kHz

Characteristics



Schematics



The shown pull-up resistor R1 to the internale reference voltage (+5V) has a resistance of 4.7kOhm.

Transistor requirements:
Vce max.= >12 V; I sink max. = >5 mA; Vce sat.= <0,15 V

Speed control:

By pulse-width modulation (PWM) 0 ... 100%
Frequency = 2 kHz (1 - 10 kHz)

Information to the curve PWM:

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:	4.800 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°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:	207 mm x 207 mm
Intake nozzle:	D: 125,5 mm; R: 10 mm
Distance between bottom and top plate:	79,75 mm
Overlapping impeller / nozzle:	2 mm

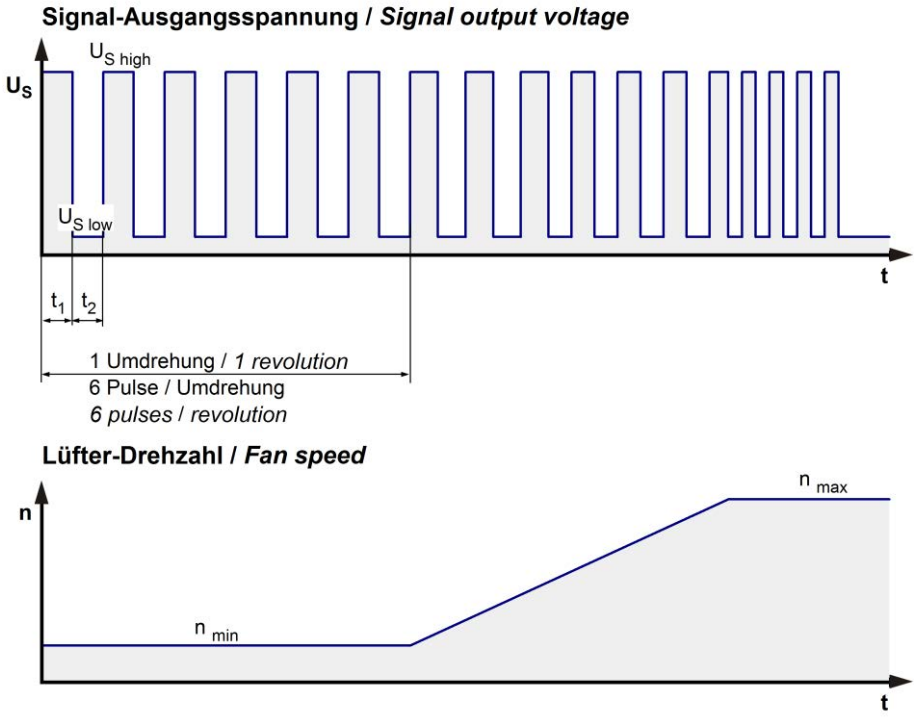
$\Delta p = 0$: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

Name	**Condition**		
PWM 0001	PWM: 100 %; f: 2 kHz		

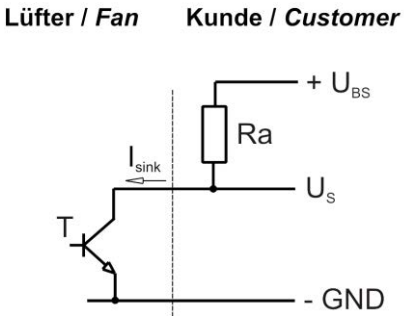
Features	**Condition**	**Symbol**	**Values**		
Voltage range		U	36 V		72 V
Nominal voltage		U_N		48 V	
Power consumption Tolerance	$\Delta p = 0$ PWM 0010	P	64,8 W +- 10 %	106 W +- 10 %	110 W +- 10 %
Current consumption Tolerance	$\Delta p = 0$ PWM0010	I	1.800 mA +- 10 %	2.200 mA +- 10 %	1.530 mA +- 10 %
Speed Tolerance	$\Delta p = 0$ PWM 0010	n	4.000 1/min +- 10 %	4.800 1/min +- 5 %	4.800 1/min +- 5 %

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}		<= 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		(6 x n) / 60	480 Hz @ 4.800 1/min
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

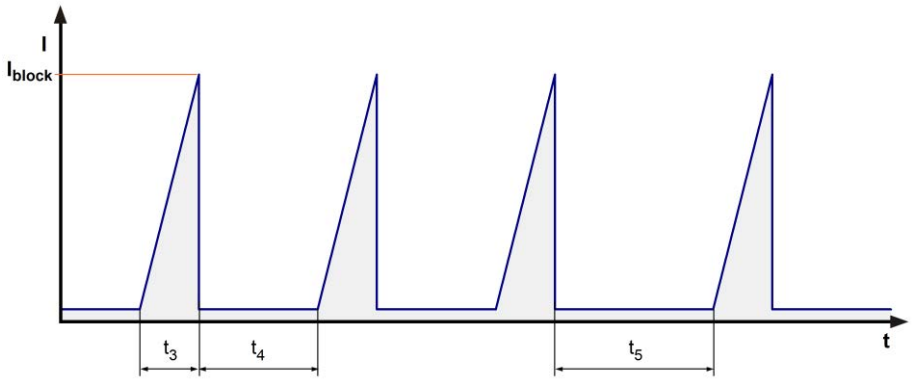
n = revolutions per minute (1/min)

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	P-CH FET I_F <= 5 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 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 > 34 V or < 78 V Fan turns off at U_B < 32 V or > 80 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 / Efficency category	A / static
Speed control	integrated
Specific ratio	1,00463
Target overall efficiency 2015	43,0 %
Overall efficiency	49,2 %
Efficiency grade	62
Power input	154,3 W
Speed	4.730 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

3.6 Aerodynamics

Measurement conditions:

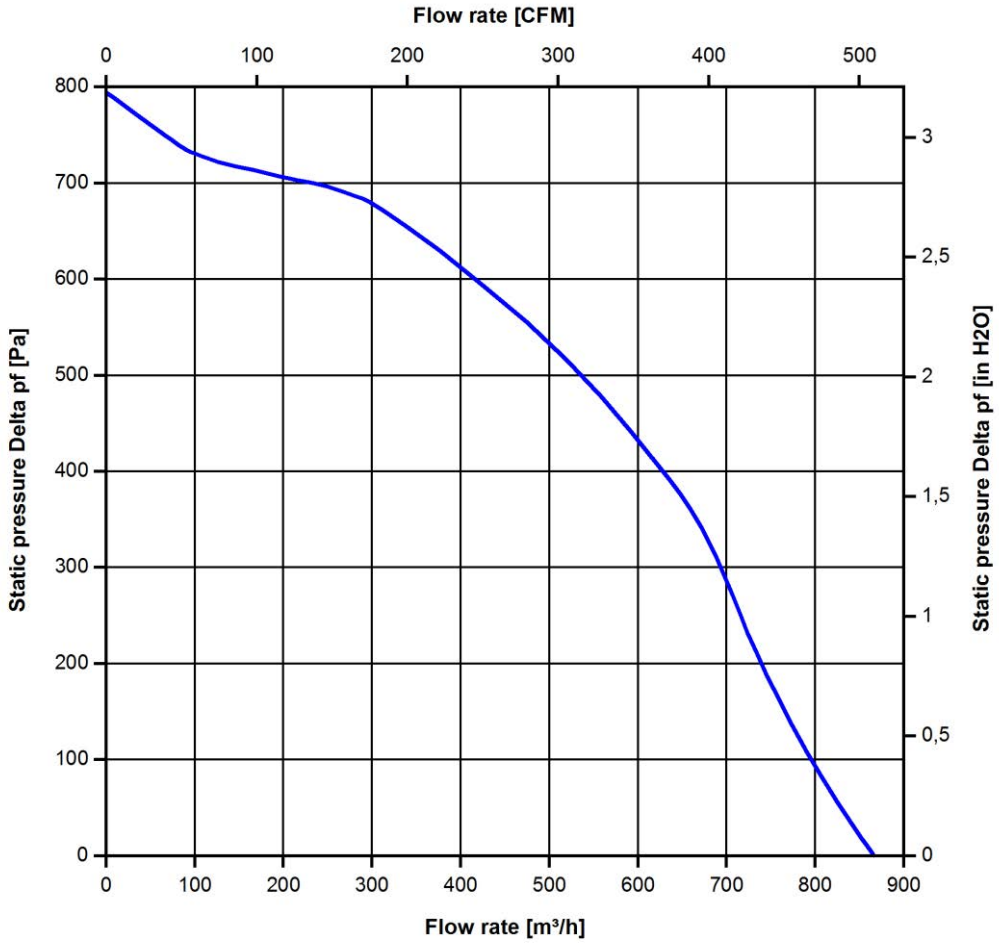
Measured with a double chamber intake rig acc. to DIN EN ISO 5801.
Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C;
In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.
The information is only valid under the specified test conditions and may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

Measurement setup:	Measured between two steel plates
Steel plate:	207 mm x 207 mm
Intake nozzle:	D: 125,5 mm; R: 10 mm
Distance between bottom and top plate:	79,75 mm
Overlapping impeller / nozzle:	2 mm

a.) Operation condition:

4.800 1/min at free air flow	PWM 100 %; f: 2 kHz		

Max. free-air flow (Δp = 0 / V̇ = max.)	865 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	795 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 Lp(A) < 5 dB(A) For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

4.800 1/min at free air flow	PWM 100 %; f: 2 kHz		

Optimal operating point	660 m3/h @ 330 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.

4.3 EMC

Kind	**Radiated Emission; 30 MHz - 1000 MHz (with PE)**
According	DIN EN 55032:2016-02
Ceck accuracy / Limit	Class B
Result	Below limit Class B

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.

Kind	**Electromagnetic Field Immunity Test**
According	DIN EN 61000-4-3:2006-12
Ceck accuracy / Limit	10 V/m; 80 - 1000 MHz; AM; m = 0,8; f = 1 kHz; 1%; t = 3 s
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	**Electrical Fast Transient / Burst Immunity Test**
According	DIN EN 61000-4-4:2005-07
Ceck accuracy / Limit	+/- 2 kV on Power Lines; Coupling: POS, NEG, {PE}, ALL, 5 kHz and 100 kHz; 1 min
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	**Immunity to Conducted Disturbances, Induced by RF-Fields**
According	DIN EN 61000-4-6:2001-12
Ceck accuracy / Limit	10 Vrms; 150 kHz - 80 MHz; AM; m = 0,8; f = 1 kHz; 1%; t = 3 s
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 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	

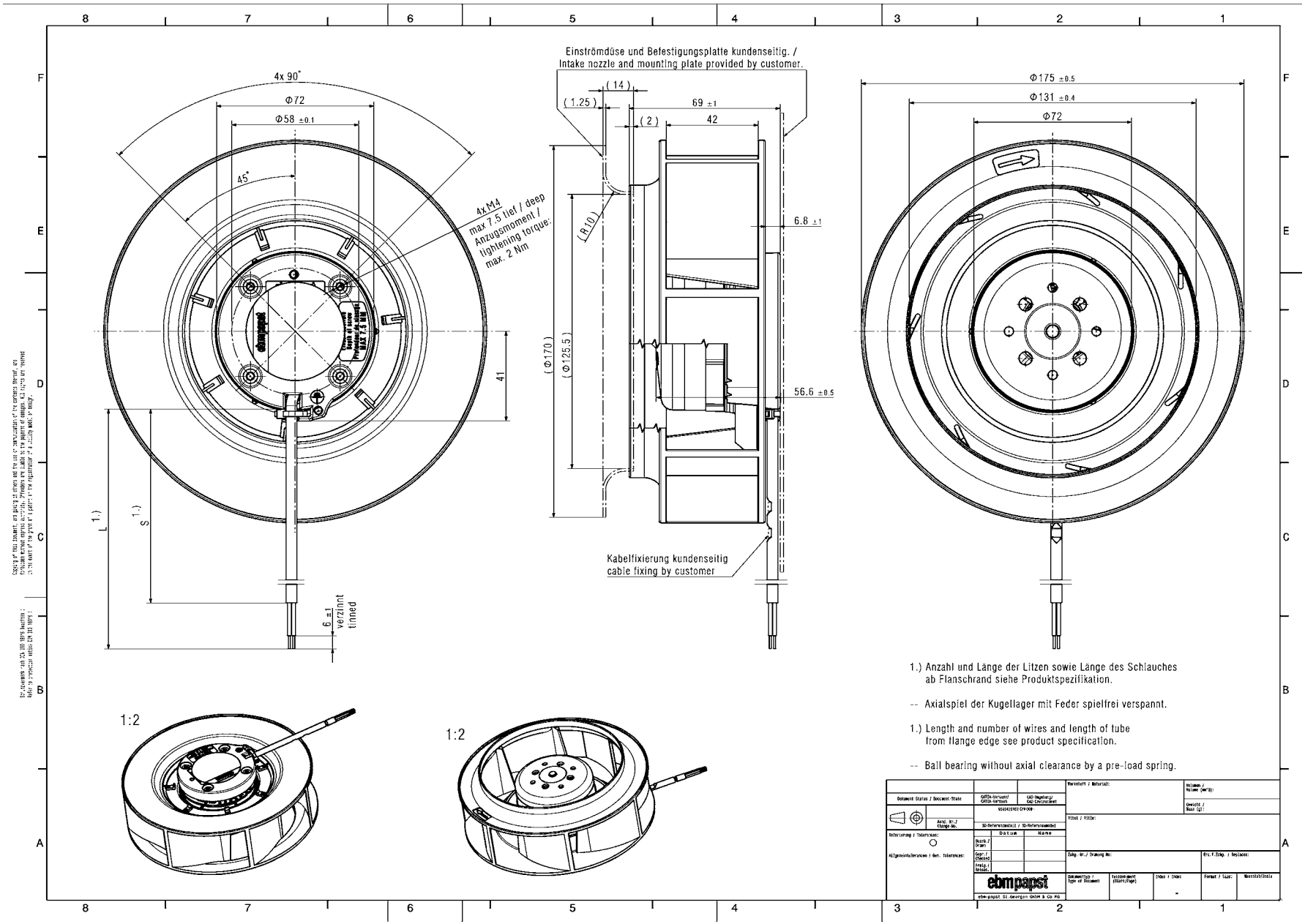
5.2 Approval Tests

CE	EC Declaration of Conformity	Yes
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	Yes / GB 12350 Safety Requirements for small Power Motors

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	70.000 h	
Life expectancy L10 at TU max.	40.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	117.500 h	


Einströmdüse und Befestigungsplatte kundenseitig. /
Intake nozzle and mounting plate provided by customer.
4x 90°
Φ72
Φ58 ±0.1
45°
4x M4
max 7.5 tief / deep
Anzugsmoment /
tightening torque:
max. 2 Nm
(14)
(1.25)
69 ±1
(2)
42
(R10)
6.8 ±1
(Φ170)
(Φ125.5)
56.6 ±0.5
41
L 1.)
S 1.)
6 ±1
verzinnt
tinned
Kabelfixierung kundenseitig
cable fixing by customer
Φ175 ±0.5
Φ131 ±0.4
Φ72
1:2
1:2
1.) Anzahl und Länge der Litzen sowie Länge des Schlauches
ab Flanschrand siehe Produktspezifikation.
-- Axialspiel der Kugellager mit Feder spielfrei verspannt.
1.) Length and number of wires and length of tube
from flange edge see product specification.
-- Ball bearing without axial clearance by a pre-load spring.
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