

Product Data Sheet RER190-39/18/2TDO

ebmpapst

The engineer's choice



RER190-39/18/2TDO

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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 | |

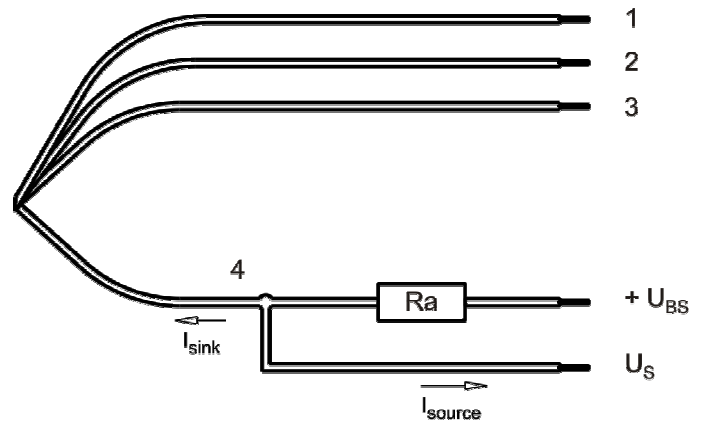
2 Mechanics

2.1 General

| | | |
|-------------------|----------|--|
| Depth | 69 mm | |
| Diameter | 190 mm | |
| Mass | 0,870 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 = 115 mm | |
| Tolerance | +/- 5 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 20 | 2,05 mm |
| 4 | white | Tacho | AWG 20 | 2,05 mm |

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

Lead wire 1 - 2: AWG20

Lead wire 3 - 4: AWG22 (Insulation diameter 1,35mm)

3 Operating Data

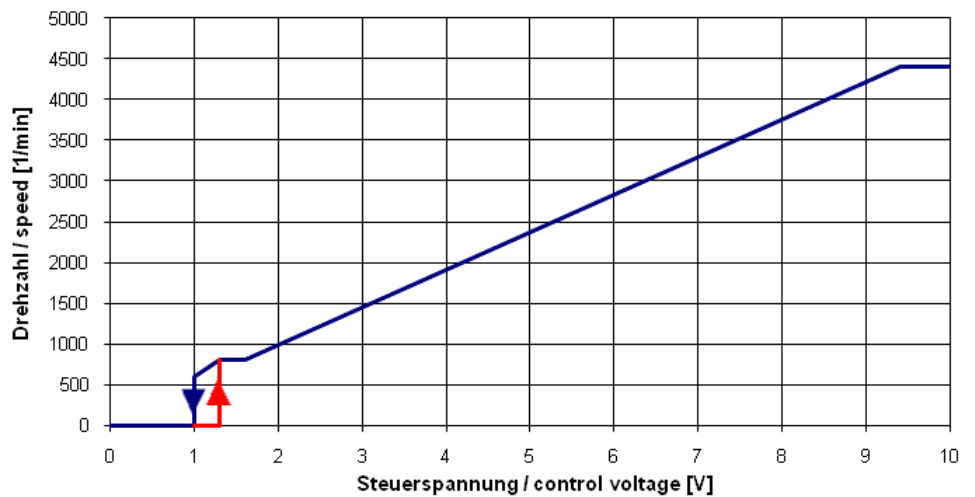
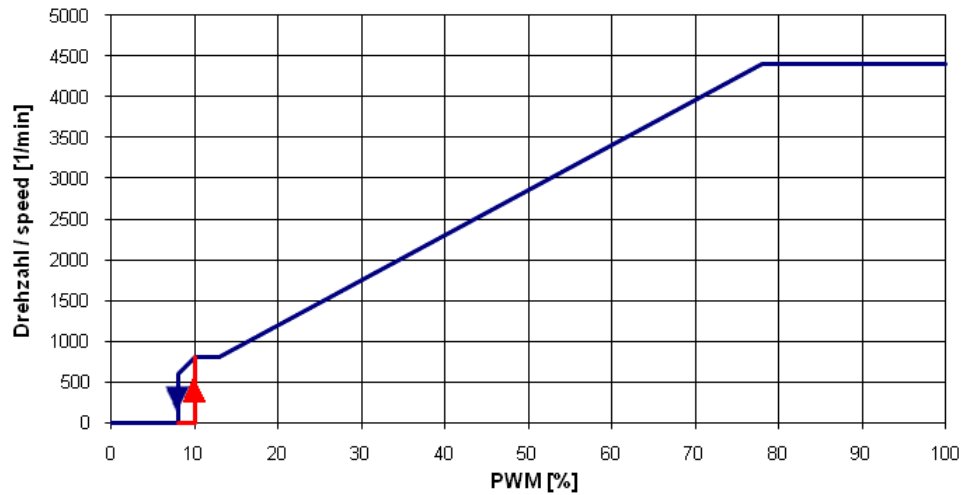
3.1 Electrical Interface - Input

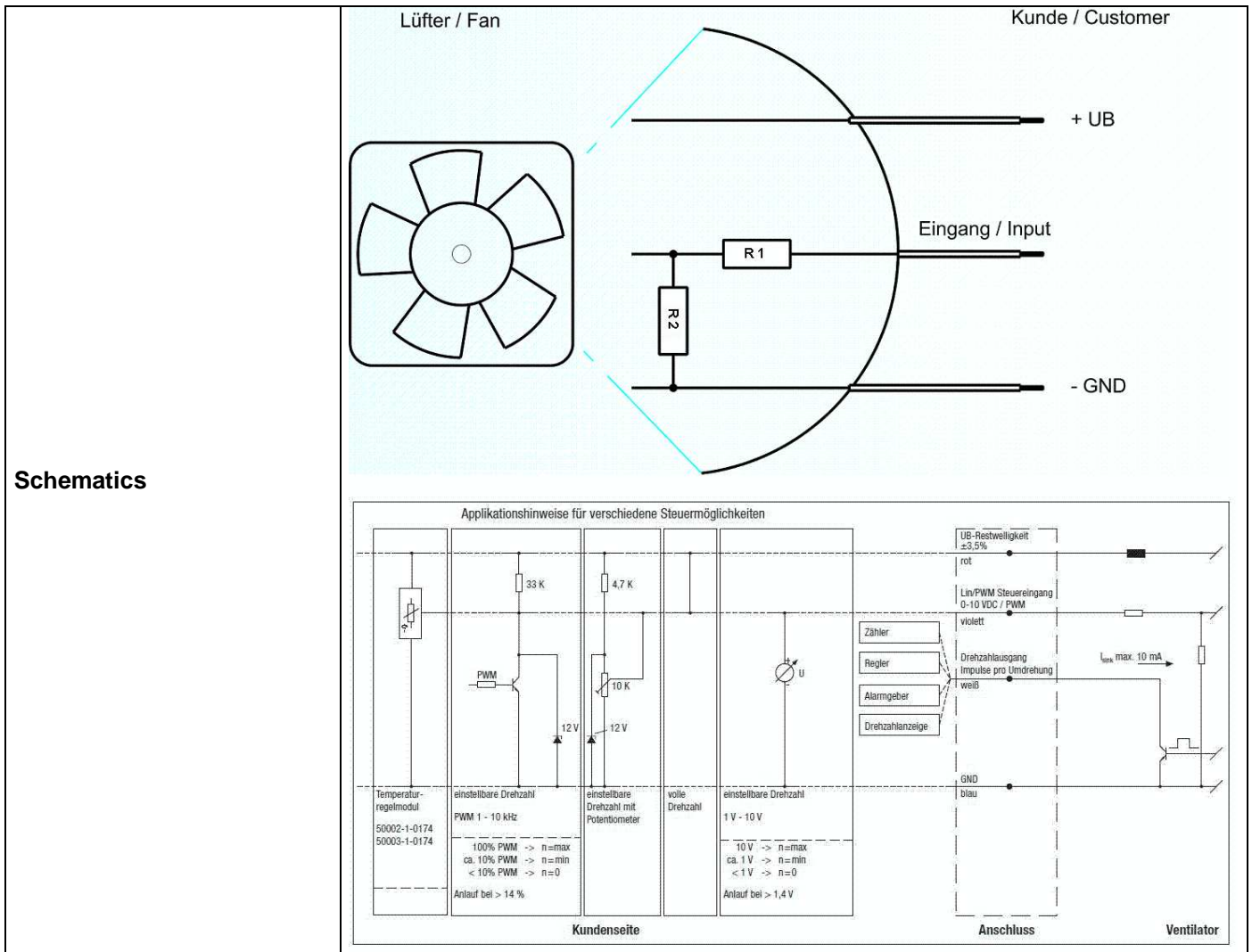
| | |
|---------------|--------|
| Control input | Analog |
|---------------|--------|

Features

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

Characteristics





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: 4.400 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: | 4.400 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: | 195 mm x 195 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)

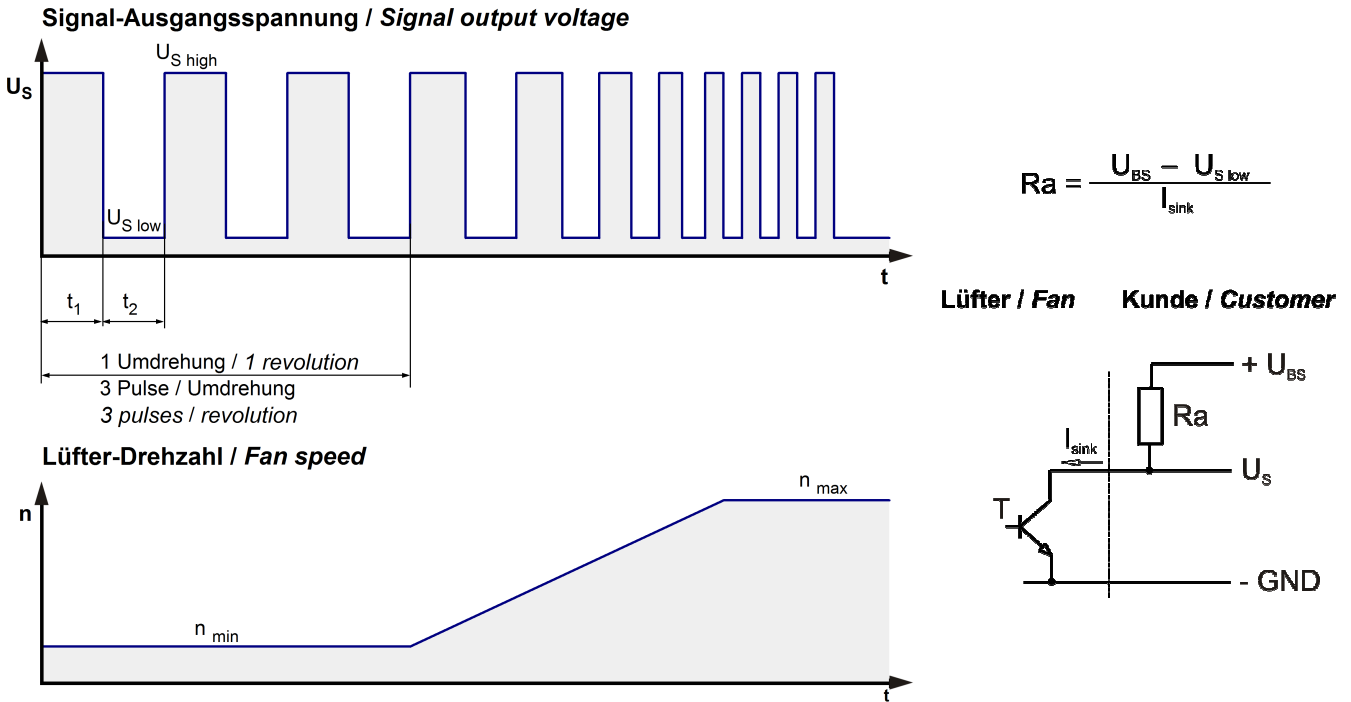
I: corresp. to arithm. mean current value

| Name | Condition |
|---------------|------------------|
| U Contr. 0001 | U Contr.: 10,0 V |

| Features | Condition | Symbol | Values | | |
|---------------------|----------------|--------|-------------|-------------|-------------|
| Voltage range | | U | 36,0 V | | 72,0 V |
| Nominal voltage | | U_N | | 48,0 V | |
| Power consumption | $\Delta p = 0$ | P | 86,4 W | 154 W | 154 W |
| Tolerance | U Contr. 0010 | | +/- 10,0 % | +/- 10,0 % | +/- 10,0 % |
| Current consumption | $\Delta p = 0$ | I | 2.400 mA | 3.200 mA | 2.180 mA |
| Tolerance | U Contr.0010 | | +/- 10,0 % | +/- 10,0 % | +/- 10,0 % |
| Speed | $\Delta p = 0$ | n | 3.700 1/min | 4.400 1/min | 4.400 1/min |
| Tolerance | U Contr. 0010 | | +/- 10,0 % | +/- 5,0 % | +/- 5,0 % |

3.3 Electrical Interface - Output

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



| 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} | $\leq 20\ mA$ |
| External resistor | External resistor Ra from UBS to US required. All voltages measured to GND. | |
| Tacho frequency | $(3 \times n) / 60$ | 220 Hz |
| Tacho isolated from motor | No | |
| Slew rate | | $\Rightarrow 0,5\ V/us$ |

n = revolutions per minute (1/min)

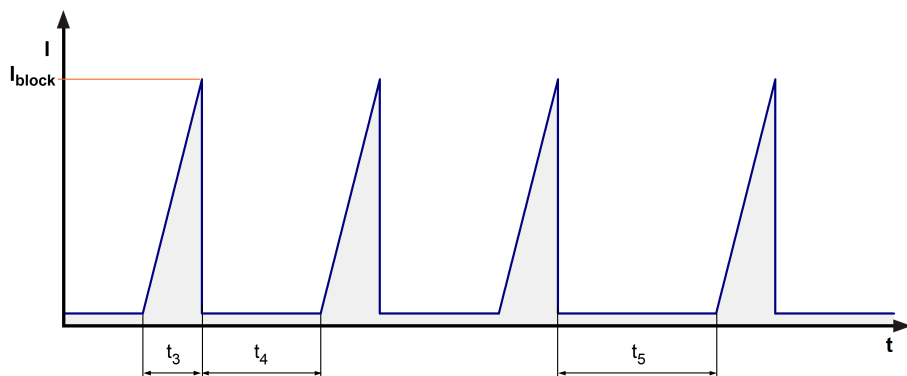
Please note:

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 | P-CH FET | |
| Max. residual current at U_N | $I_F \leq 5\ mA$ | |

| | | |
|-------------------------------|-------------------------------------|--|
| Locked rotor protection | Auto restart | |
| Locked rotor current at U_N | I_{block} approx. 1.700 mA | |
| Clock signal at locked rotor | t_3 / t_4 typical: 4,6 s / 10,0 s | |



Locked rotor signal t5:

After 4 failed start-ups there is an extended timeout of 40,0s.

3.5 Data According ErP Directive

| | |
|------------------------------------|-------------|
| Installation / Efficiency category | A / static |
| Speed control | integrated |
| Specific ratio | 1,00656 |
| Target overall efficiency 2015 | 44,1 % |
| Overall efficiency | 56,8 % |
| Efficiency grade | 62 |
| Power input | 197,1 W |
| Speed | 4.400 1/min |

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

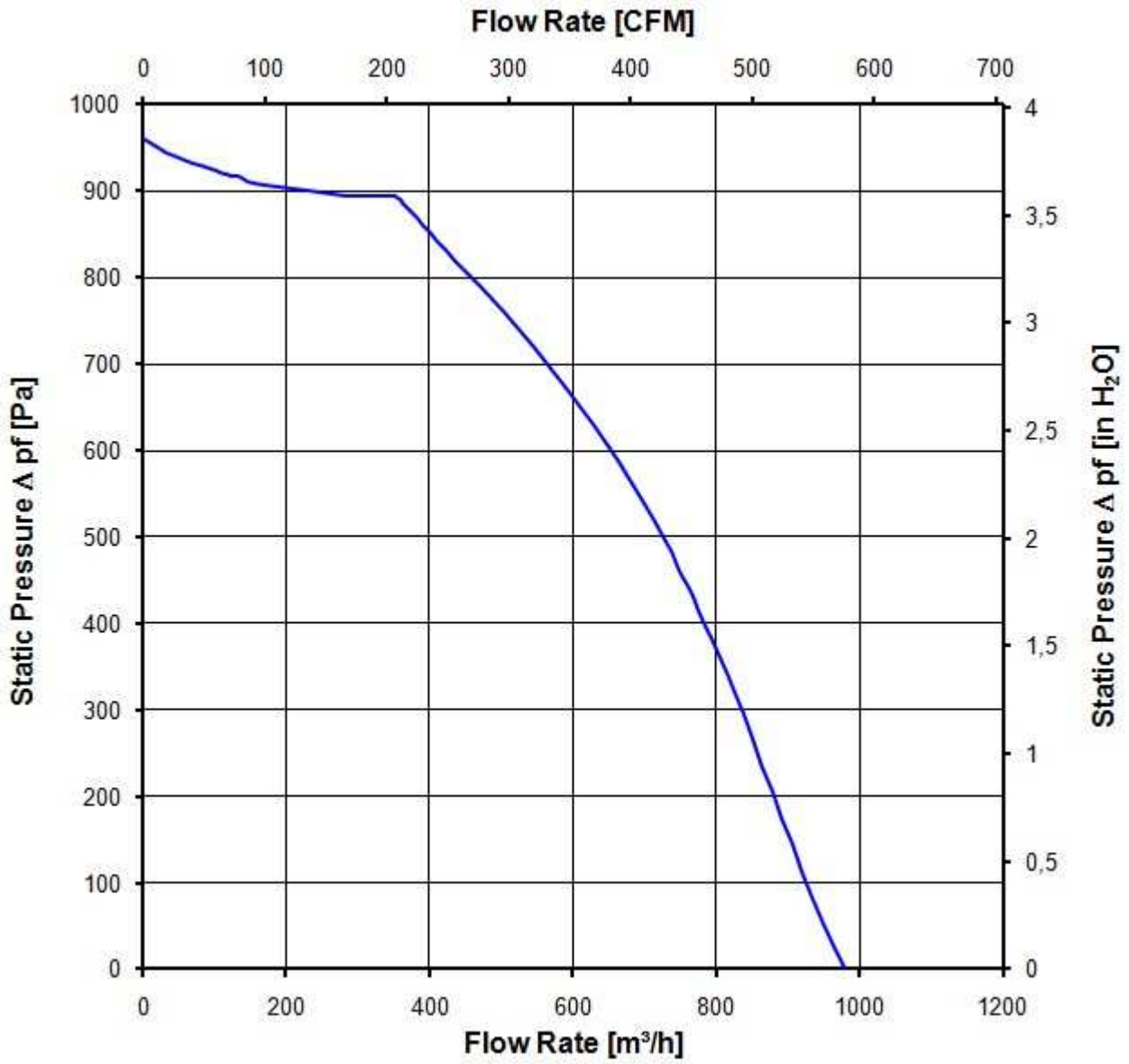
3.6 Aerodynamics

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: | 195 mm x 195 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:

| | | | |
|-----------------------------------------------------------|-------------------------|--|--|
| 4.400 1/min at free air flow | U Contr. 10,0 V | | |
| Max. free-air flow ($\Delta p = 0 / \dot{V} = \max.$) | 980,0 m ³ /h | | |
| Max. static pressure ($\Delta p = \max. / \dot{V} = 0$) | 960 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 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:

| | | | |
|-----------------------------------------------------------------|----------------------------------|--|--|
| 4.400 1/min at free air flow | U Contr. 10,0 V | | |
| Optimal operating point | 640,0 m ³ /h @ 550 Pa | | |
| Sound power level at the optimal operating point | 8,0 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 | Electrostatic Discharge Immunity Test |
| According | DIN EN 61000-4-2:2001-12 |
| Check 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°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 | |

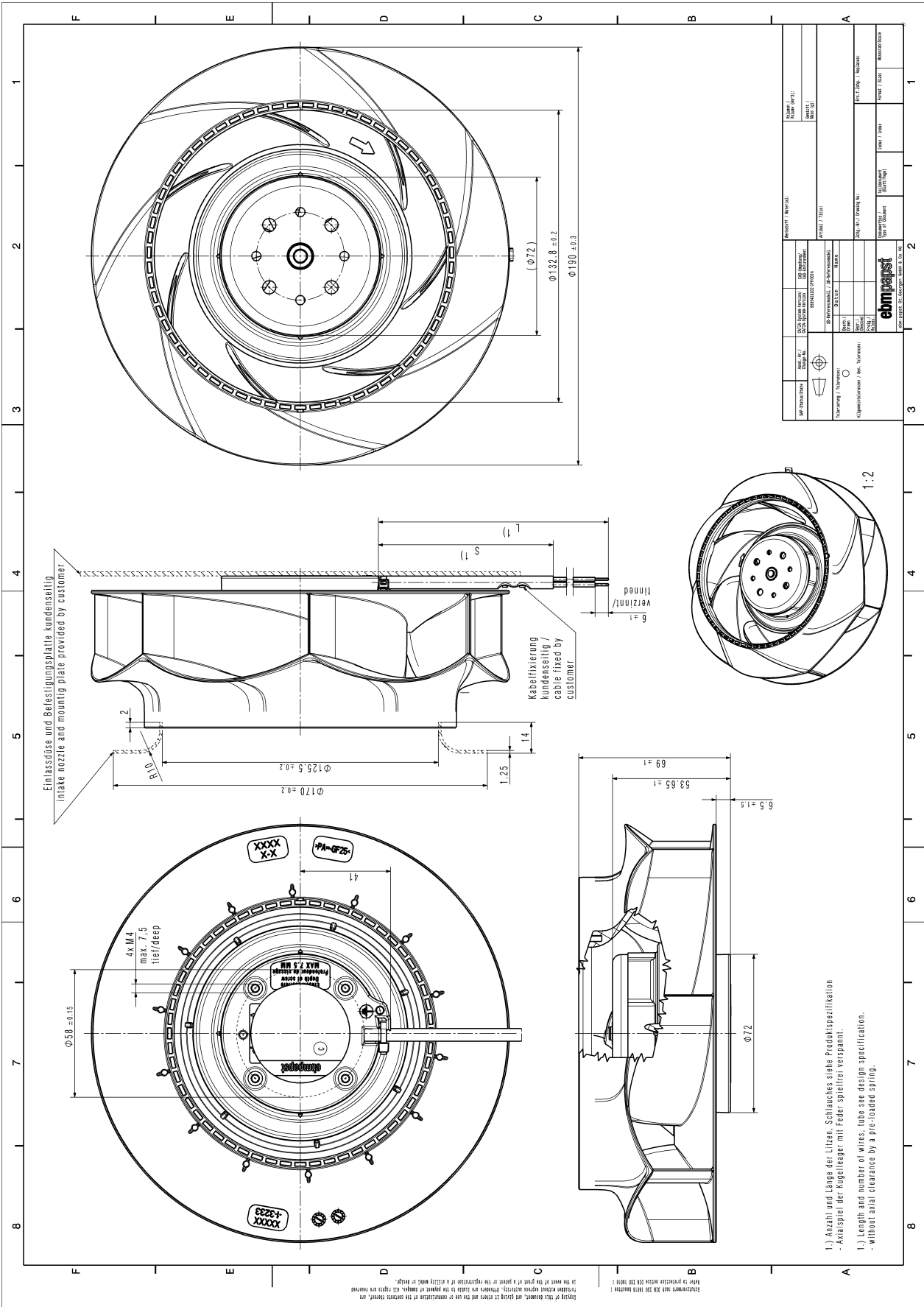
5.2 Approval Tests

| | | |
|-----|---------------------------------------------------------------------|-------------------------------------------------------------------------------|
| CE | EC Declaration of Conformity | No |
| 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 |

6 Reliability

6.1 General

| | | |
|----------------------------------------------------|-----------|--|
| Life expectancy L10 at TU = 40 °C | 40.000 h | |
| Life expectancy L10 at TU max. | 22.500 h | |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 67.5 00 h | |



1.) Anzahl und Länge der Litzen, Schlauches siehe Produktspezifikation
 - Anzahl der Kugellager mit Feder spielfrei verspannt.
 1.) Length and number of wires, tube see design specification.
 - without axial clearance by a pre-loaded spring.

Abbildung ist ohne Gewähr, nur gültig für Zeichnung und kein Bestandteil der Konstruktion.
 Problem without express warranty, drawing not valid for payment of damages, all rights are reserved.
 Drawing is provided without warranty, drawing is not valid for payment of damages, all rights are reserved.