# Product Data Sheet RER190-39/18/2TDO

ebmpapst

The engineer's choice



GREEN TECH

**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

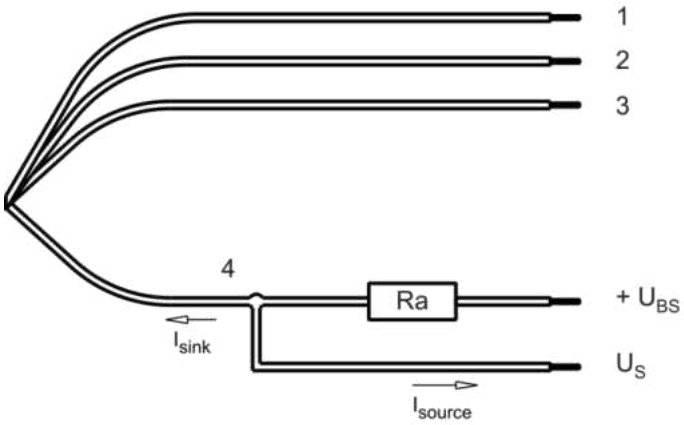
### 2.1 General

| | | |
|---|---|---|
| Depth | 69 mm | |
| Diameter | 190 mm | |
| Mass | 0,870 kg | |
| Housing material | | |
| Impeller material | Plastic | |

### 2.2 Connections

| | | |
|---|---|---|
| Electrical connection | Wires | |
| Lead wire length<br>Tolerance | L = 425 mm<br>+- 10,0 mm | |
| Tube length<br>Tolerance | S = 115 mm<br>+- 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 auxilliaries 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

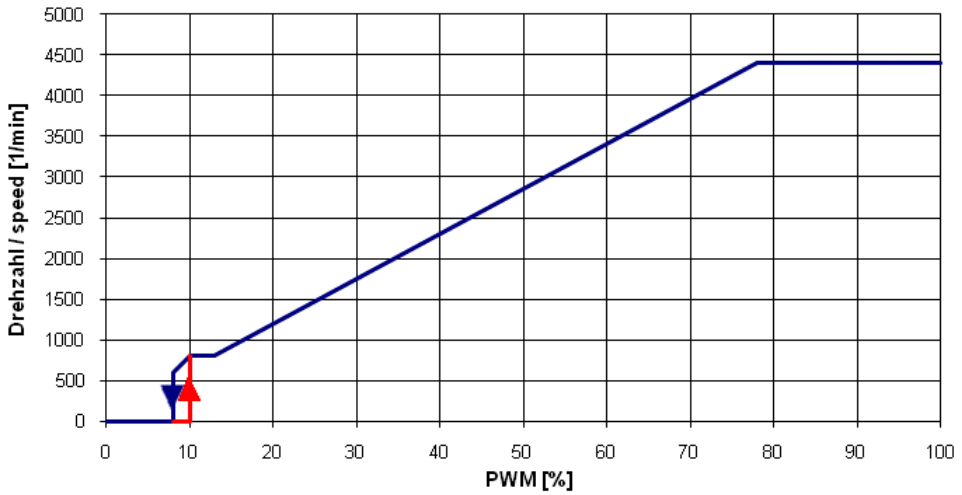
### 3.1 Electrical Interface - Input

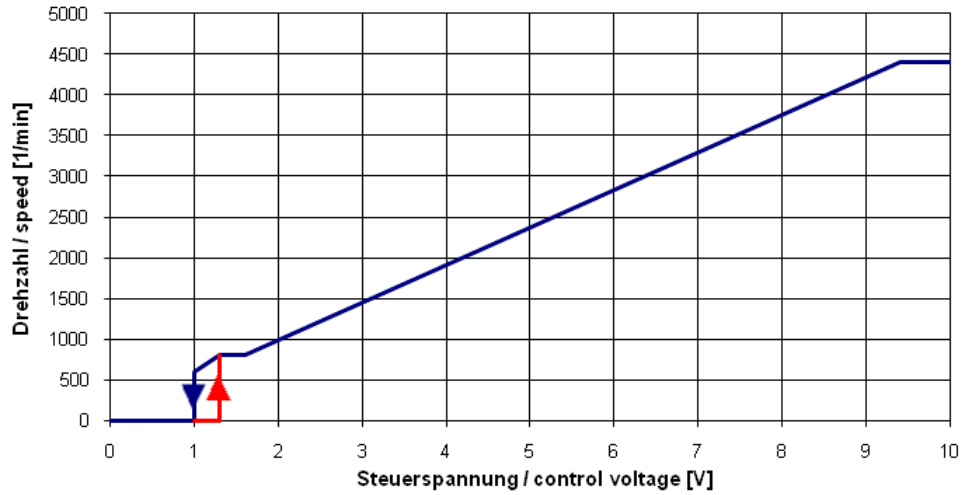
| | |
|---|---|
| Control input | Analog |

**Features**

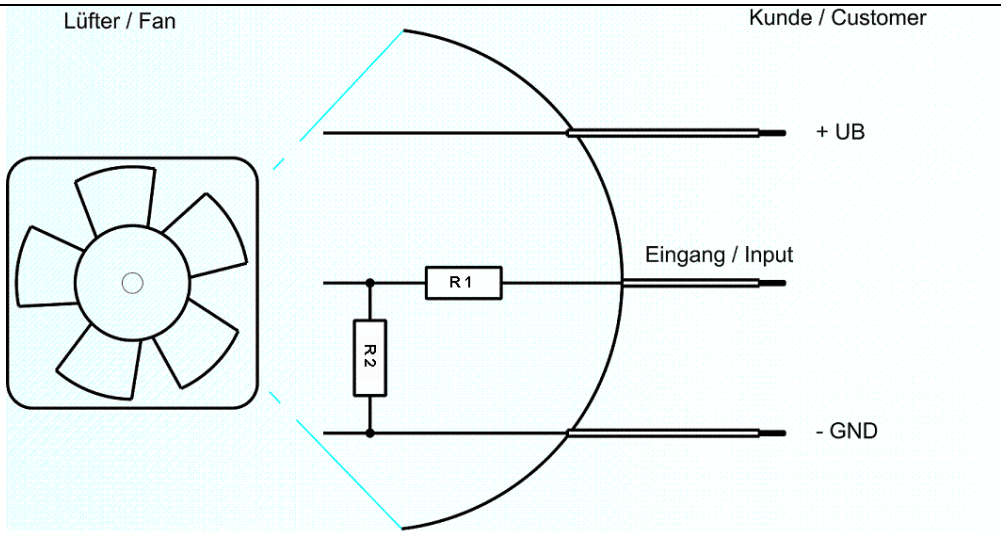
| | | |
|---|---|---|
| PWM - Frequency | | 1 kHz - 10 kHz<br>typical: 2 kHz |
| Input voltage range | | 0 V - 10 V |

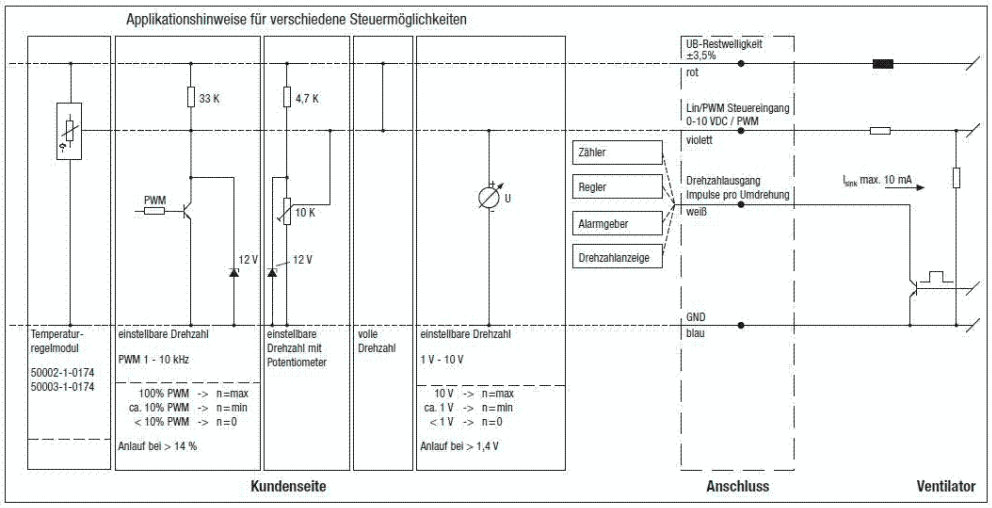
**Characteristics**



**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: | 4.400 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: | 4.400 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!**

### 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 |

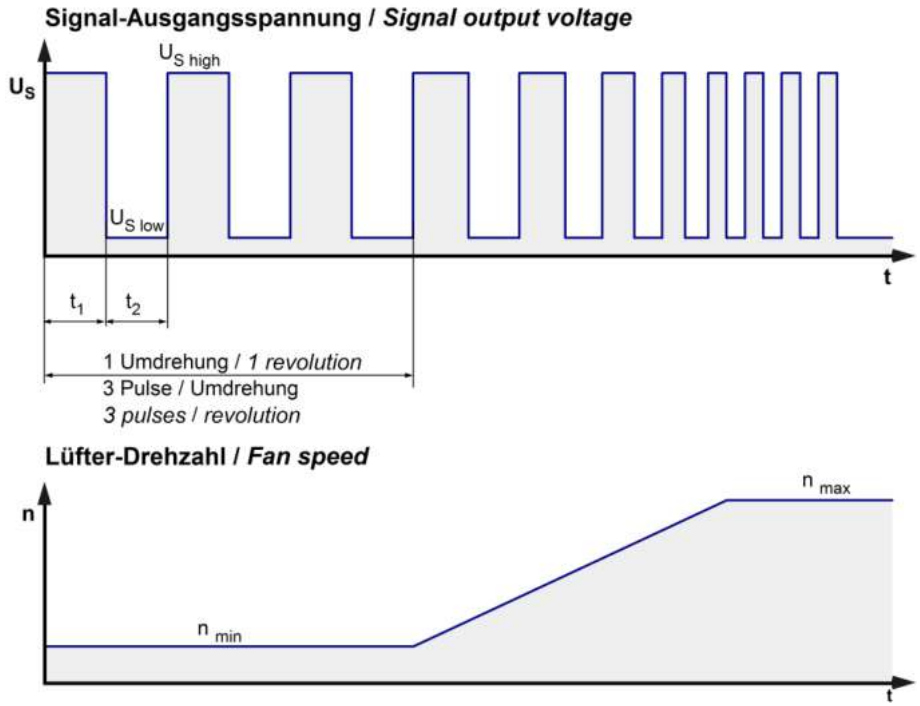
$\Delta p = 0$: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

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

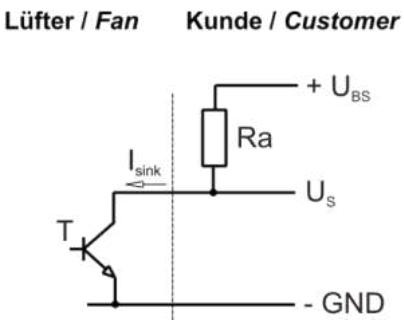
| **Features** | **Condition** | **Symbol** | **Values** | | |
|---|---|---|---|---|---|
| Voltage range | | U | 36,0 V | | 72,0 V |
| Nominal voltage | | $U_N$ | | 48,0 V | |
| Power consumption<br>Tolerance | $\Delta p = 0$<br>U Contr. 0010 | P | 86,4 W<br>+- 10,0 % | 154 W<br>+- 10,0 % | 154 W<br>+-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

### 3.3 Electrical Interface - Output

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




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



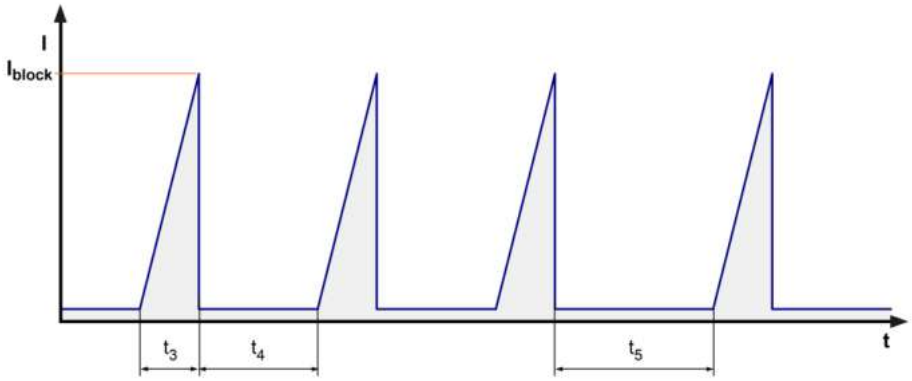

| Features | | Note | Values |
|---|---|---|---|
| Tacho operating voltage | $U_{BS}$ | | <= 60,0 V |
| Tacho signal Low | $U_{S\,low}$ | I sink: 2 mA | <= 0,4 V |
| Tacho signal High | $U_{S\,high}$ | I source: 0 mA | <=60,0 V |
| Maximum sink current | $I_{sink}$ | | <= 20 mA |
| External resistor | | External resistor Ra from UBS to US required. All voltages measured to GND. | |
| Tacho frequency | | (3 x n) / 60 | 220 Hz |
| 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<br>Max. residual current at $U_N$ | P-CH FET<br>$I_F$ <= 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 / Efficency 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

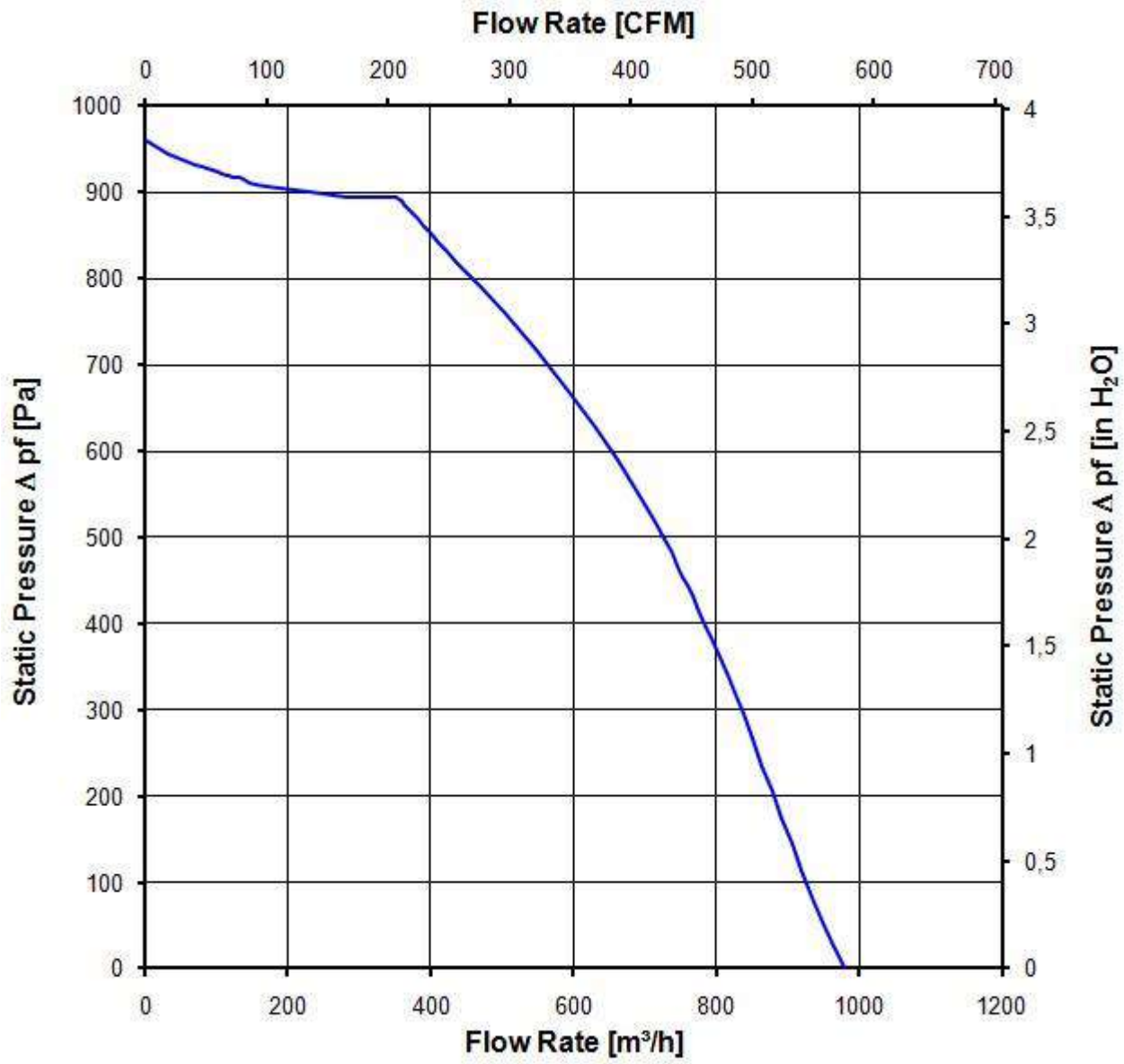
| | |
|---|---|
| Measurement conditions: | Measured with a double chamber intake rig acc. to DIN EN ISO 5801.<br>Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C;<br>In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.<br>The information is 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 m3/h | |
| Max. static pressure ($\Delta p$ = max. / $\dot{V}$ =0) | 960 Pa | |


Flow Rate [CFM]
0
100
200
300
400
500
600
700
1000
900
800
700
600
500
400
300
200
100
0
4
3,5
3
2,5
2
1,5
1
0,5
0
Static Pressure Δ pf [Pa]
Static Pressure Δ pf [in H2O]
0
200
400
600
800
1000
1200
Flow Rate [m³/h]

### 3.7 Sound Data

| | |
|---|---|
| Measurement conditions: | Sound pressure level: 1 meter distance between microphone and the air intake.<br>Sound power level: Acc. to DIN 45635 part 38 (ISO 10302)<br>Measured in a semianchoic chamber with a background noise level of Lp(A) < 5 dB(A)<br>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 m3/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 |
| 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<br>DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700)<br>A.) Type test<br>Measuring conditions: After 48h of storage at 95% R.H. and 25°C.<br>No arcing or breakdown is allowed!<br>All connections together to ground.<br>B.) Routine test<br>Measuring conditions: At indoor climate.<br>No arcing or breakdown is allowed!<br>All connections together to ground. | 1000 VAC / 1 Min.<br><br>1000 VAC / 1 Sec. | |
| Isolation resistance<br>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 | |

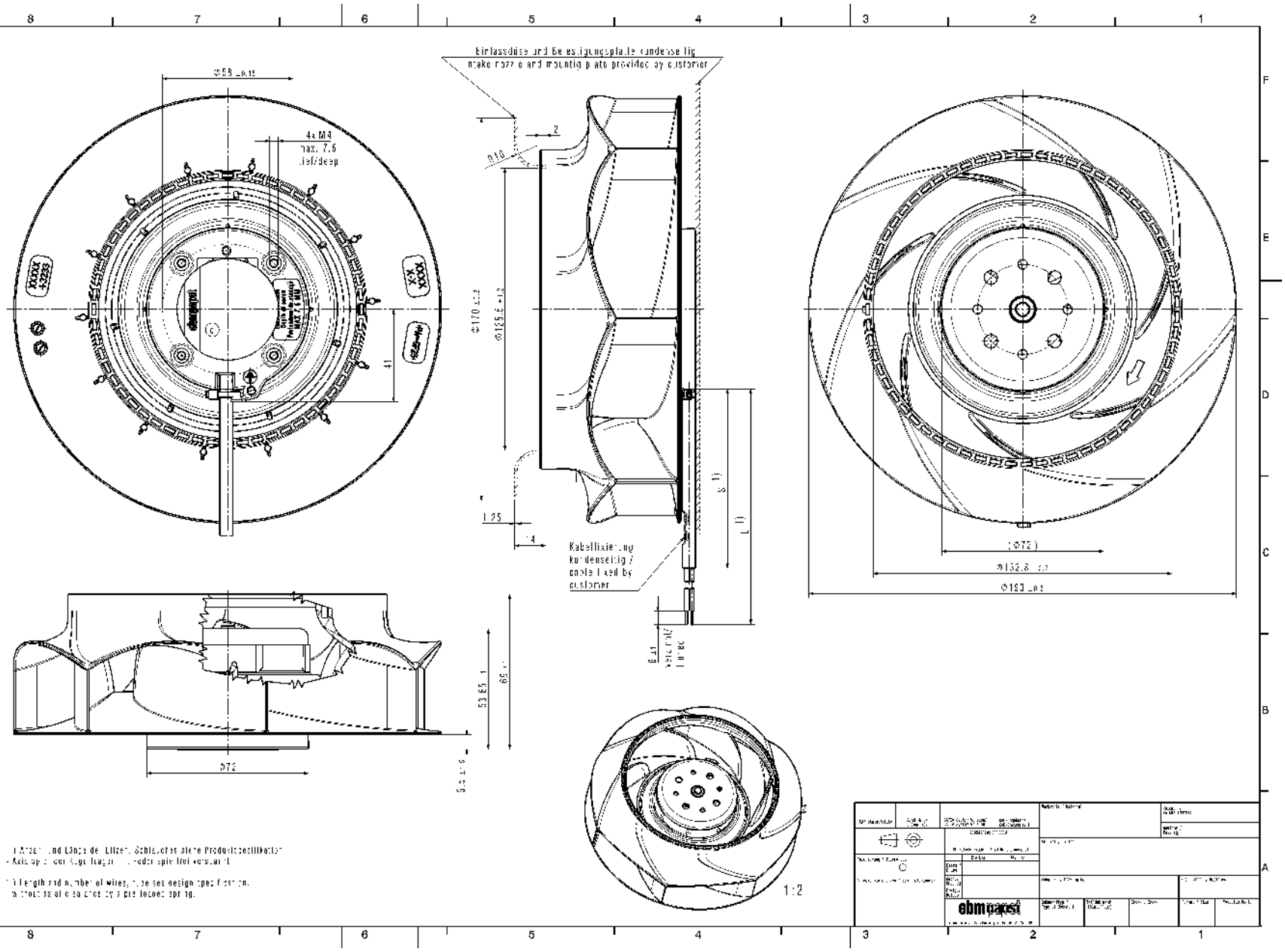
## 5.2 Approval Tests

| | | |
|---|---|---|
| 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 | 67.500 h | |


Einlassdüse und Befestigungsplatte kundenseitig
make nozzle and mounting plate provided by customer
4x M4
max. 7.5
deep
41
2
10
1.25
4
Kabelführung
kundenseitig /
cable routing
by customer
1:2
ebmpapst