# Product Data Sheet | RER190-39/18/2TDPR-224



The engineer's choice

ebmpapst

# RER190-39/18/2TDPR-224

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## 1 General

| | | |
|---|---|---|
| Fan type | Blower without chassis | |
| Rotational direction looking at rotor | clockwise | |
| Airflow direction | Air in axially, Air out radially | |
| Bearing system | Ball bearings | |
| Mounting position | any | |

## 2 Mechanics

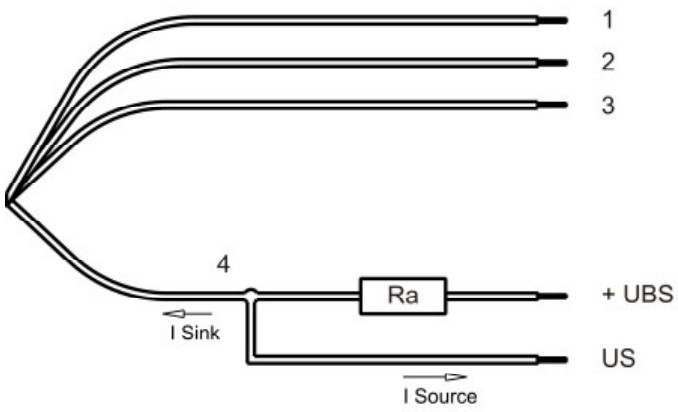
### 2.1 General

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

### 2.2 Connections

| | | |
|---|---|---|
| Electrical connection | Wires - Plug | |
| Length of lead wire<br>Tolerance | see fan drawing # 9595420224 Rev C | |
| Wire gauge (AWG) | 20 22 | |
| Insulation diameter | 2,05mm 1,35mm | |
| Connector / contacts | see fan drawing # 9595420224 Rev C | |






| | Colour | Operation |
|---|---|---|
| Wire 1 | red | + UB |
| Wire 2 | blue | - GND |
| Wire 3 | violet | PWM |
| Wire 4 | white | Tacho |

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

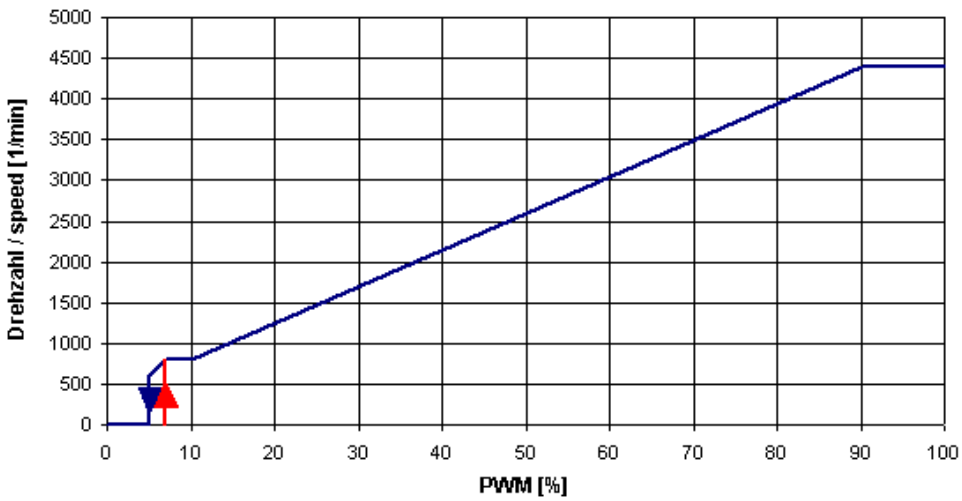
### 3.1 Operating Data - Electrical Interface - Input

| | |
|---|---|
| Control input | PWM |

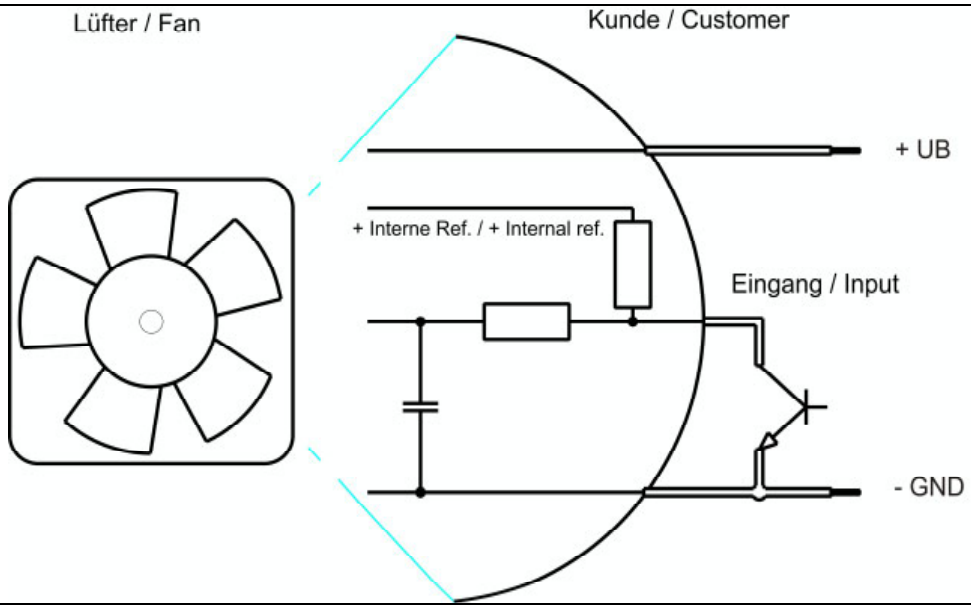
**Features**

| | | |
|---|---|---|
| PWM - Frequency | | 1 kHz - 10 kHz<br>Typical: 2 kHz |

**Characteristics**




**Schematics**




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

**Speed control:**
By Puls width modulation (PWM) 0 ... 100%
Open collector in relation to signal-ground
f = 2kHz +-20%

**Information to the curve:**

| | |
|---|---|
| 0 % - 7% PWM: | 0 rpm |
| 7 % - 10% PWM: | 800 rpm (corresponding to min. speed) |
| 10 % - 90% PWM: | linear increasing curve |
| 90 % - 100% PWM: | 4.400 rpm (corresponding to max. speed) |
| 7 % PWM: | 800 rpm (fan on, comming from 0% PWM) |
| 5 % PWM: | 600 rpm or 0 rpm (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: | 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 section 3.5)
I: corresp. to arithm. mean current value

| **Name** | **Condition** | | |
|---|---|---|---|
| PWM 0001 | PWM: 100 %; | | |

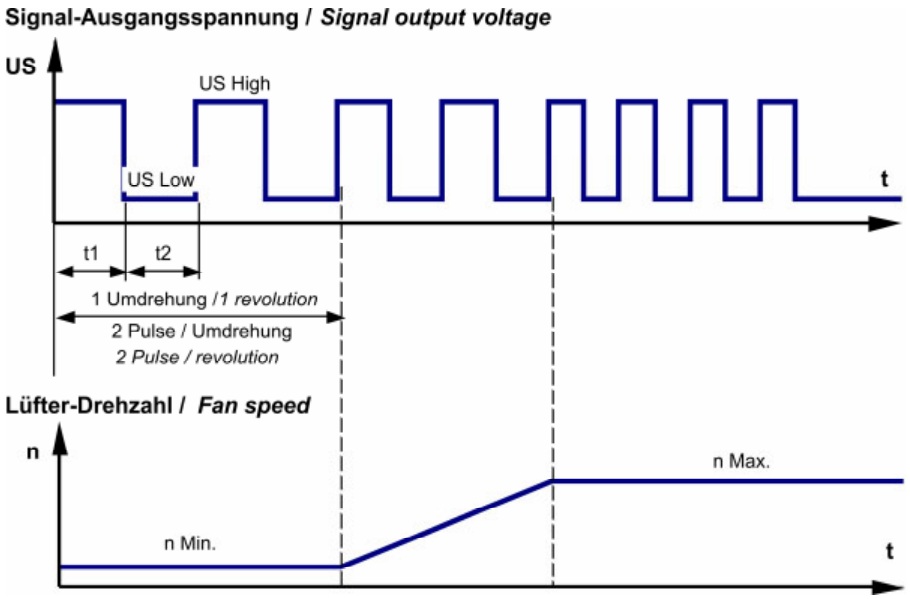
| **Features** | **Condition** | **Symbol** | **Values** | | |
|---|---|---|---|---|---|
| Voltage range | $\Delta p = 0$ | U | 36,0 V | | 72,0 V |
| Nominal voltage | $\Delta p = 0$ | $U_N$ | | 48,0 V | |
| Power consumption<br>Tolerance | $\Delta p = 0$<br>PWM 0001 | P | 88,4 W<br>+- 10,0 % | 148,0 W<br>+- 10,0 % | 155,0 W<br>+- 10,0 % |
| Current consumption<br>Tolerance | $\Delta p = 0$<br>PWM0001 | I | 2.440 mA<br>+- 10,0 % | 3.080 mA<br>+- 10,0 % | 2.150 mA<br>+- 10,0 % |
| Speed<br>Tolerance | $\Delta p = 0$<br>PWM 0001 | n | 3.720 rpm<br>+- 10,0 % | 4.400 rpm<br>+- 5,0 % | 4.400 rpm<br>+- 5,0 % |
| max. allowed input voltage ripple (within the specified voltage range) | | | +- 3 % | | |
| max. allowed input voltage ripple (within the specified voltage range) | | | >= 50 Hz | | |

| Name | Condition | | |
|---|---|---|---|
| PWM 0002 | PWM: 50 %; | | |

| Features | Condition | Symbol | Values | | |
|---|---|---|---|---|---|
| Voltage range | Δp = 0 | U | 36,0 V | | 72,0 V |
| Nominal voltage | Δp = 0 | $U_N$ | | 48,0 V | |
| Power consumption<br>Tolerance | Δp = 0<br>PWM 0002 | P | 31 W<br>+- 10,0 % | 31 W<br>+- 10,0 % | 33 W<br>+- 10,0 % |
| Current consumption<br>Tolerance | Δp = 0<br>PWM 0002 | I | 880 mA<br>+- 10,0 % | 650 mA<br>+- 10,0 % | 460 mA<br>+- 10,0 % |
| Speed<br>Tolerance | Δp = 0<br>PWM 0002 | n | 2.600 rpm<br>+- 5,0 % | 2.600 rpm<br>+- 5,0 % | 2.600 rpm<br>+- 5,0 % |

### 3.3 Operating Data - Electrical Interface -Output

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




$$Ra = \frac{UBS - US\ Low}{I\ Sink}$$

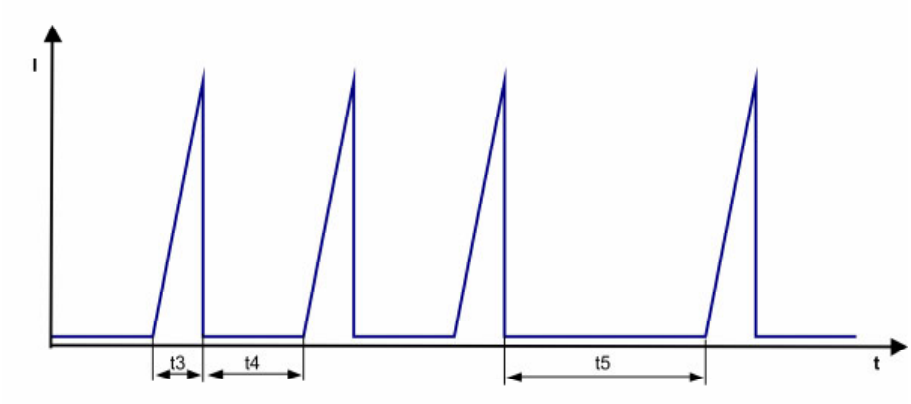
| Features | Note | Values |
|---|---|---|
| Tacho operating voltage (UBS) | | <= 60,0 V |
| Tacho signal Low | I sink: 2 mA | <= 0,4 V |
| Tacho signal High | I source: 0 mA | <= 60,0 V |
| Maximum sink current | | <= 20 mA |
| External resistor | External resistor Ra from UBS to US required. All voltages measured to GND. | |
| Tacho frequency | (2 x n) / 60 | 147 Hz |
| Tacho isolated from motor | No | |
| Slew rate | | => 0,5 V/us |

**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.

| | |
|---|---|
| Alarm type | None |

### 3.4 Electrical Features

| | | |
|---|---|---|
| Electronic function | Speed-Controlled | |
| Reversed polarity protection<br>Max. residual current at Un | P-CH FET<br>IF <= 5 mA | |
| Locked rotor protection | Auto restart | |
| Locked rotor current at Un | approx. 1.700 mA | |
| Clock signal t3/t4 at locked rotor | 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 Aerodynamic

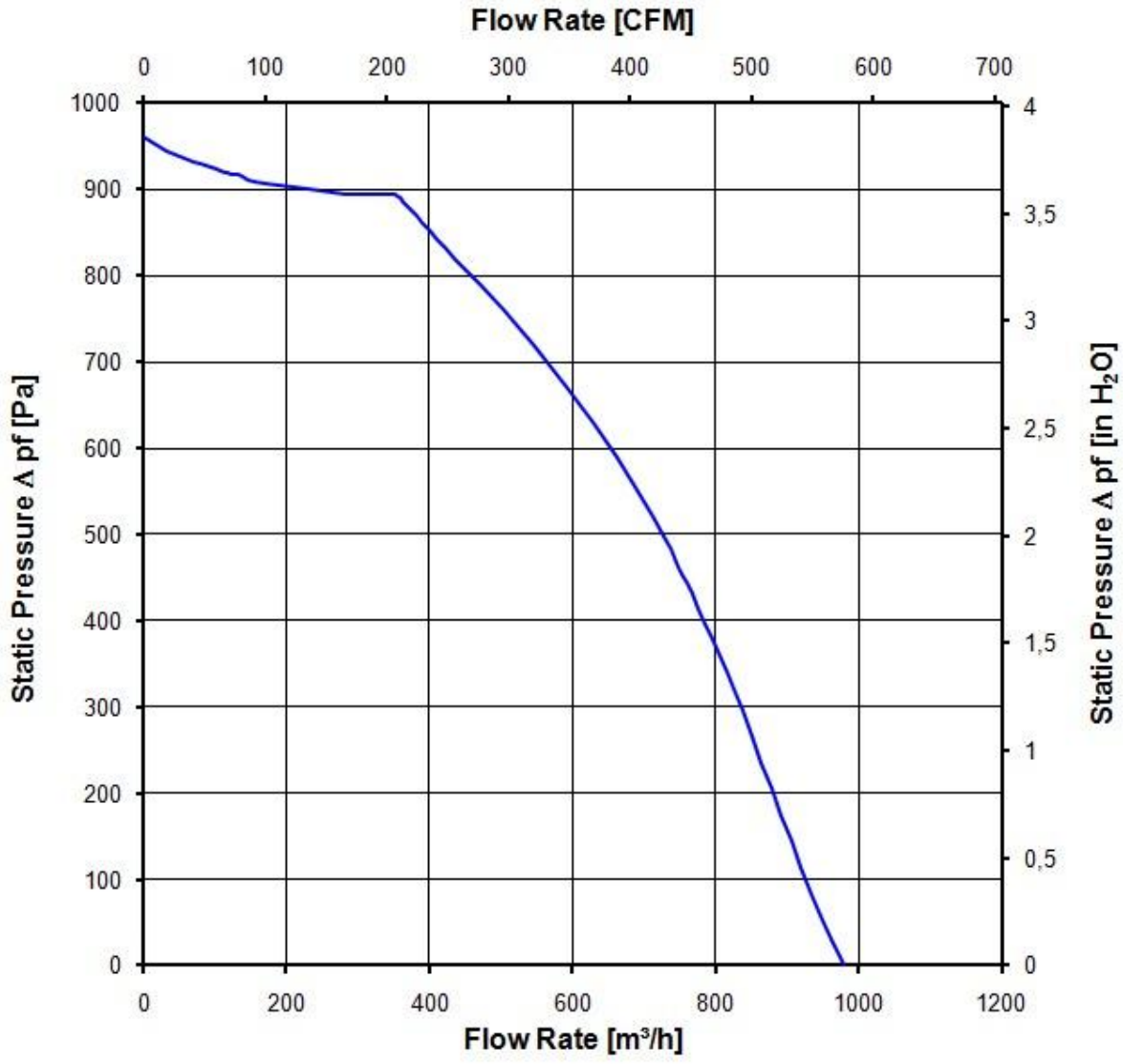
| | |
|---|---|
| Measurement conditions: | Measured with a double chamber intake rig acc. to DIN EN ISO 5801.<br>Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C;<br>In the intake and outlet area should not be any solid obstruction within 0,5 m. |

| | |
|---|---|
| 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 rpm at free air flow | PWM 100 % | | |

| | | |
|---|---|---|
| Max. free-air flow (Δp = 0 / V̇ = max.) | 980,0 m3/h | |
| Max. static pressure (Δp = max. / V̇ =0) | 960 Pa | |



### 3.6 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 section 3.5 |

a.) Operation condition:

| | | | |
|---|---|---|---|
| 4.400 rpm at free air flow | PWM 100 % | | |

| | | |
|---|---|---|
| Optimal operating point | 640,0 m3/h @ 550 Pa | |
| Sound power level at the optimal operating point | 8,0 bel(A) | |

## 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, cyclic; according to DIN EN 60068-2-30, 6 cycle | |
| Water exposure | None | |
| Radiation exposure | None | |
| Dust requirements | Dust check; according to DIN EN 60068-2-68, 6g/m2d, 1 day | |
| Salt fog requirements | None | |
| Harmful gas requirements | None | |

*) Permittet application area:
The product is for the use in sheltered rooms with limited controlled temperature. Occasionally condensed water is allowed. Directly exposure to water must be avoid. Saline ambient conditions must be avoid.

Pollution degree 2 (according DIN EN 60664-1)
It occurs only non-conductive pollution. Occassionally, temporary conductivity caused by condensation occurs.

### 4.3 Mechanical requirements

See fan drawing # 9595420224 Rev C.

## 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 | |
| Air and leakage distances | 1,0 mm / 1,5 mm | |
| Protection class | I | |

### 5.2 Approval Tests

| | |
|---|---|
| CE | Yes |
| UL (approved at UL testhouse) | Yes |
| UL (approved at CSA testhouse) | Yes / UL audited by CSA according to UL507, Electric Fans |
| VDE | Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment - Part 1 Safety - Connection to a SELV circuit. |
| CSA | Yes / C22.2 No. 113-M1984 Fans and Ventilators |
| CCC | Yes |

The approval tests are observed to:
Maximal permitted operating voltage (see section 3.1) and max. permitted ambient temperature TU max.

## 6 Reliability

### 6.1 General

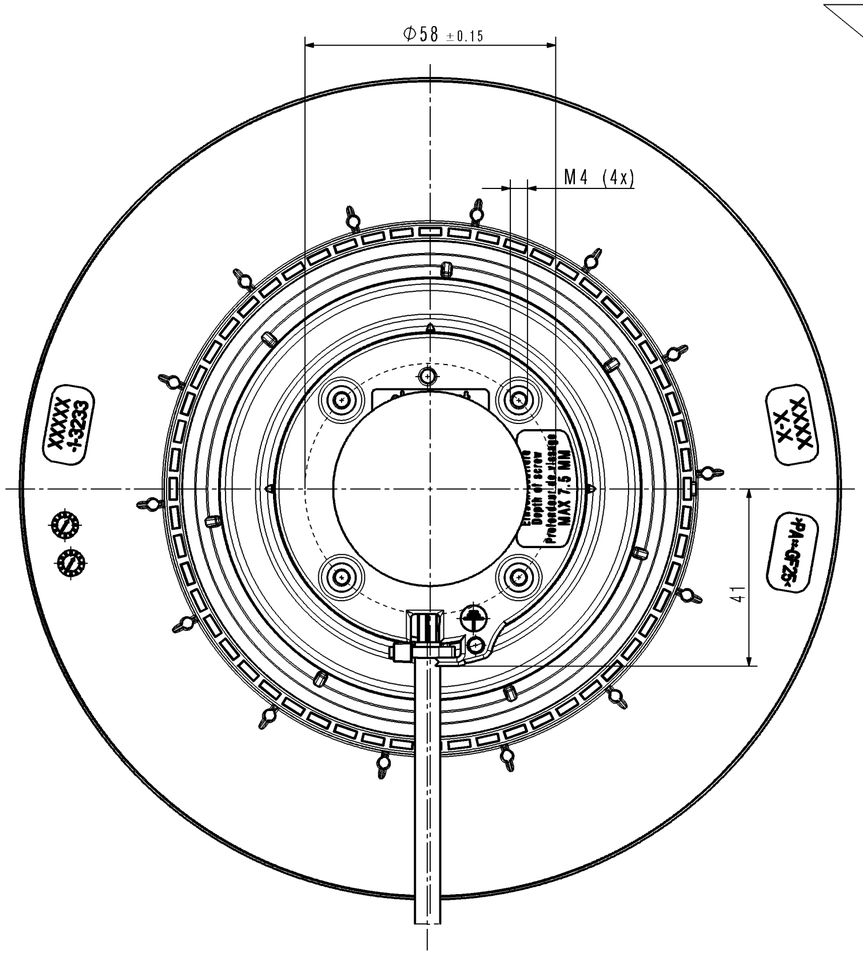
| | | |
|---|---|---|
| Life expectancy L10 at TU = 40 °C | 60.000 h | |
| Life expectancy L10 at TU max. | 32.500 h | |
| Life expectancy L10 delta (40 °C) | 115.000 h | |

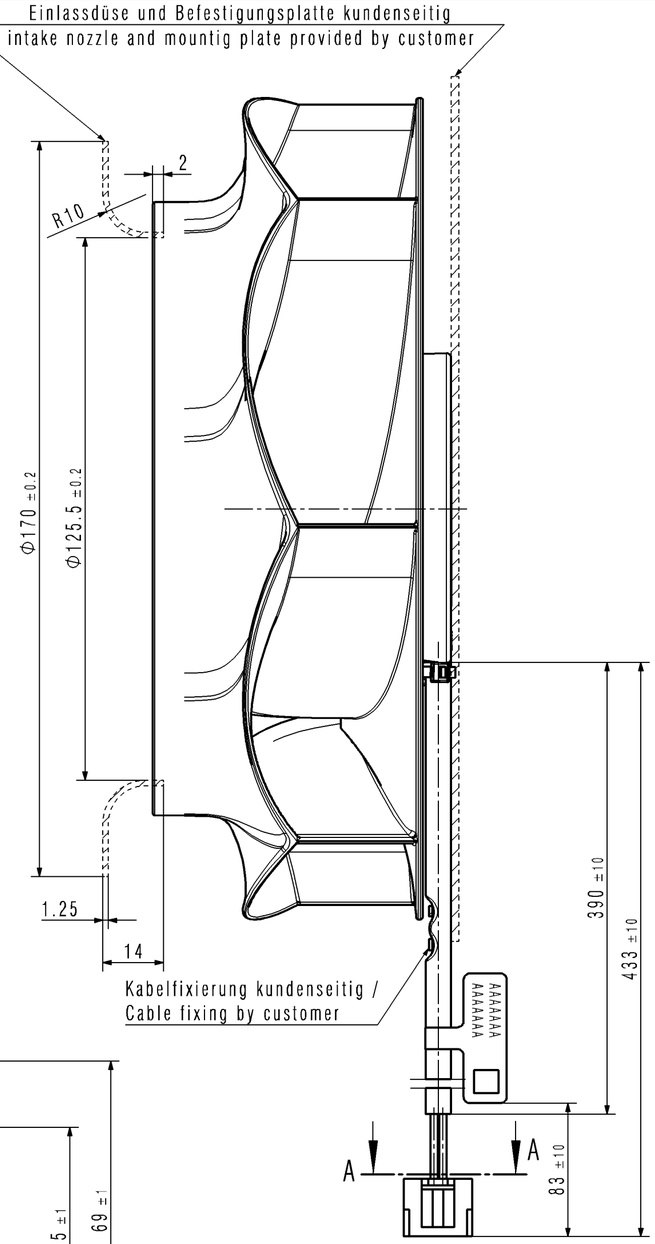
### 6.2 ABB Temperature Map (25% each of: 20°C – 30°C – 40°C – 50°C)

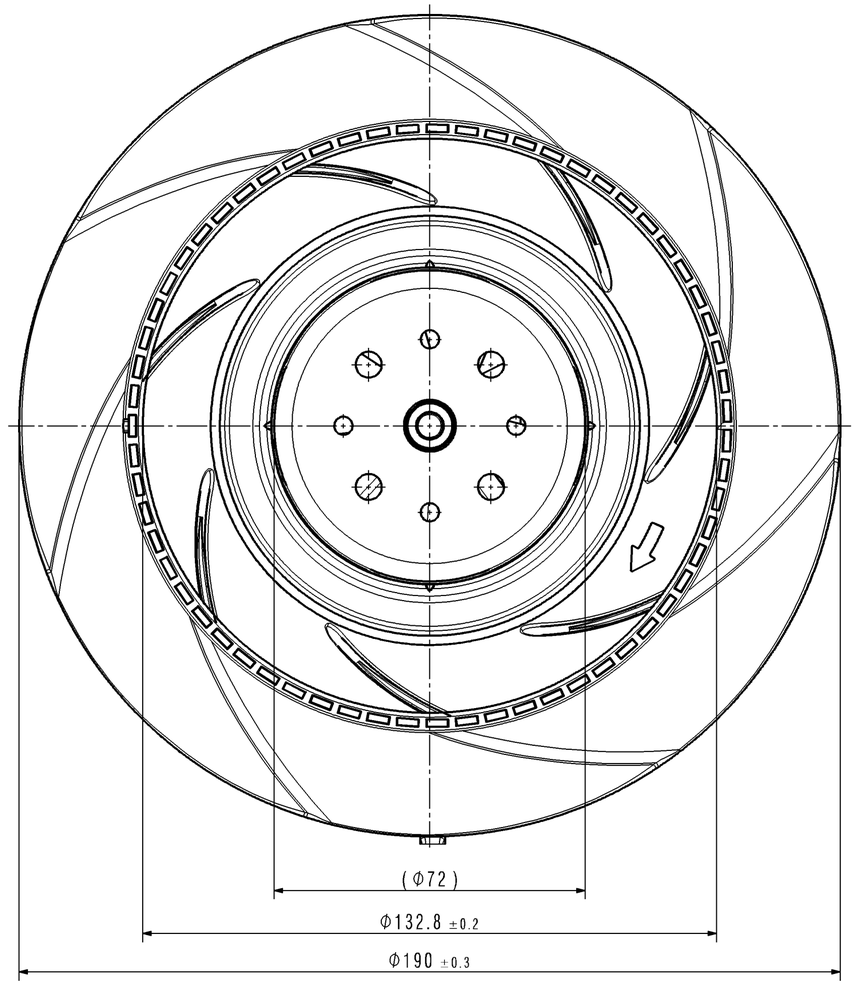
| | | |
|---|---|---|
| Life expectancy L10 at OP ~ 700m3/h @ 400-450Pa | 87.500 h | |
| Life expectancy L5 at OP ~ 700m3/h @ 400-450Pa | 70.000 h | |
| Life expectancy L3 at OP ~ 700m3/h @ 400-450Pa | 52.500 h | |

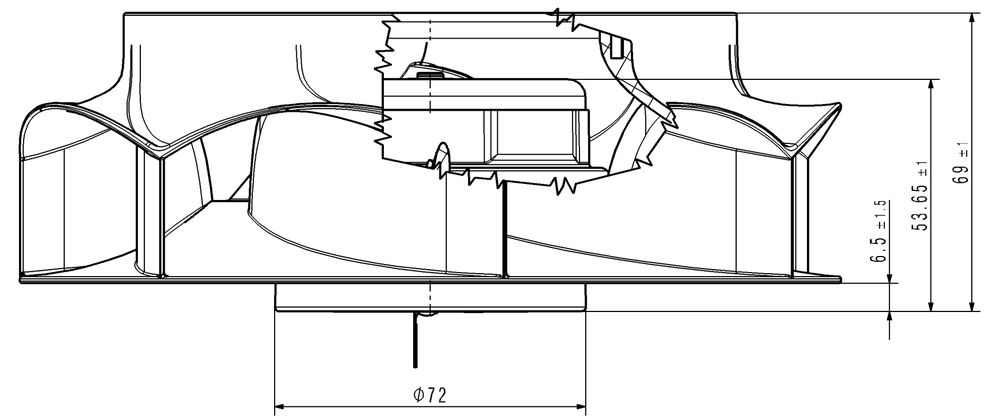
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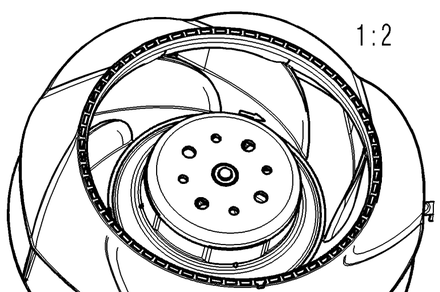
Schutzvermerk nach DIN ISO 16016 beachten!
Refer to protection notice DIN ISO 16016!

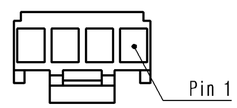



A-A
2:1

Steckergehäuse
plug housing
J.S.T. VHR-4N
Kontakt / contact
J.S.T. SVH-21T-P1.1

| Pin | Pin Belegung pin configuration | |
|---|---|---|
| 1 | rot / red | + UB |
| 2 | bau / blue | -GND |
| 3 | weiß / white | Tacho |
| 4 | violett / violet | PWM |

--- Axialspiel der Kugellaeger mit Feder spielfrei verspannt.

--- without axial clearance by a pre-loaded spring.

| | | | |
|---|---|---|---|
| FR | 122378 | V5R19 | PAPST |
| SAP-Status/State | Aend.-Nr./ Change-No. | CATIA-System-Version/ CATIA-System-Version | CAD-Umgebung/ CAD-Environment |

9595420020 CFR000 -
42222010588 CPA001 -

3D-Referenzmodell / 3D-Referencemodel

Tolerierung / Tolerances:
Size ISO 14405 Ⓔ

Allgemeintoleranzen / Gen. Tolerances:
DIN ISO 2768-mK

| | Datum | Name |
|---|---|---|
| Bearb./ Drawn | 22.07.2013 | LAUFER |
| Gepr./ Checked | 24.07.2013 | LAUFER |
| Freig./ Releas. | 30.07.2013 | KIENINGER |

ebmpapst
ebm-papst St.Georgen GmbH & Co KG

Werkstoff / Material:
-

Volumen / Volume (mm^3):

Gewicht / Mass (g):

Artikel / Title:
**Radialgebläse RER190-39**
**Radial Blower**

Zchg.-Nr./ Drawing No:
**9595420224**

Ers.f.Zchg. / Replaces:

| Dokumenttyp / Type of Document | Teildokument (Blatt/Page) | Index / Index | Format / Size: | Massstab/Scale |
|---|---|---|---|---|
| C2D | 002 | C | A2 | 1:1 |

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