

Product Data Sheet REF100-11/14/2U

ebmpapst

The engineer's choice



REF100-11/14/2U

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1 General

| | | |
|-------------------------------------|--|--|
| Fan type | Blower without chassis without intake nozzle | |
| Rotating direction looking at rotor | Clockwise | |
| Airflow direction | Air in axially, Air out radially | |
| Bearing system | Ball bearing | |
| Mounting position - shaft | Any | |

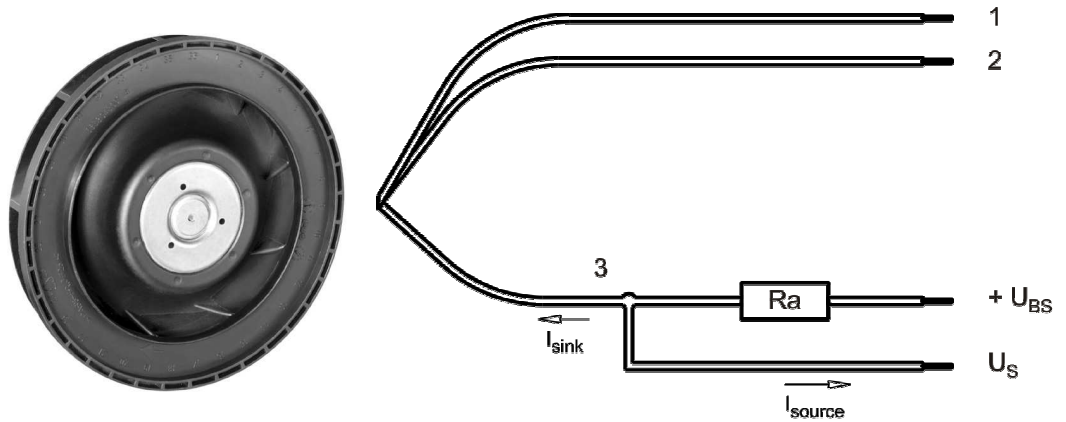
2 Mechanics

2.1 General

| | | |
|-------------------|----------|--|
| Depth | 25,0 mm | |
| Diameter | 104,0 mm | |
| Mass | 0,200 kg | |
| Housing material | | |
| Impeller material | Plastic | |

2.2 Connections

| | | |
|-----------------------|-------------|--|
| Electrical connection | Wires | |
| Lead wire length | L = 325 mm | |
| Tolerance | +/- 10,0 mm | |



| Wire | Color | Operation | Wire size | Insulation diameter |
|------|-------|-----------|-----------|---------------------|
| 1 | red | + UB | AWG 22 | 1,70 mm |
| 2 | blue | - GND | AWG 22 | 1,70 mm |
| 3 | white | Tacho | AWG 22 | 1,70 mm |

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

3 Operating Data

3.1 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.

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

| Features | Condition | Symbol | Values | | |
|------------------------------|----------------|----------------|-------------|-------------|-------------|
| Voltage range | | U | 16 V | | 30,0 V |
| Nominal voltage | | U _N | | 24,0 V | |
| Power consumption | $\Delta p = 0$ | P | 3,3 W | 7,4 W | 11,9 W |
| Tolerance | 0010 | | +/- 17,5 % | +/- 12,5 % | +/- 15,0 % |
| Current consumption | $\Delta p = 0$ | I | 205 mA | 310 mA | 395 mA |
| Tolerance | 0010 | | +/- 17,5 % | +/- 12,5 % | +/- 15,0 % |
| Speed | $\Delta p = 0$ | n | 3.750 1/min | 5.400 1/min | 6.050 1/min |
| Tolerance | 0010 | | +/- 12,5 % | +/- 7,5 % | +/- 10,0 % |
| Starting current consumption | | | | <= 1.050 mA | |

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.

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

3.2 Electrical Interface - Output

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



| Features | Note | Values |
|---------------------------|---|-------------------------|
| Tacho operating voltage | U_{BS} | $\leq 30,0\ V$ |
| Tacho signal Low | $U_{S\ low}$ | $\leq 0,4\ V$ |
| Tacho signal High | $U_{S\ high}$ | $30,0\ V$ |
| Maximum sink current | I_{sink} | $\leq 4\ mA$ |
| External resistor | External resistor Ra from UBS to US required. All voltages measured to GND. | |
| Tacho frequency | $(2 \times n) / 60$ | |
| Tacho isolated from motor | No | |
| Slew rate | | $\Rightarrow 0,5\ V/us$ |

n = revolutions per minute (1/min)

3.3 Electrical Features

| | | |
|--------------------------------|--|--|
| Electronic function | None | |
| Reversed polarity protection | Rectifying diode | |
| Max. residual current at U_N | $I_F \leq 10\ mA$ | |
| Locked rotor protection | Auto restart | |
| Locked rotor current at U_N | I_{block} approx. $1.050\ mA$ | |
| Clock signal at locked rotor | t_3 / t_4 typical: $0,3\ s / 8,2\ s$ | |



3.4 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;

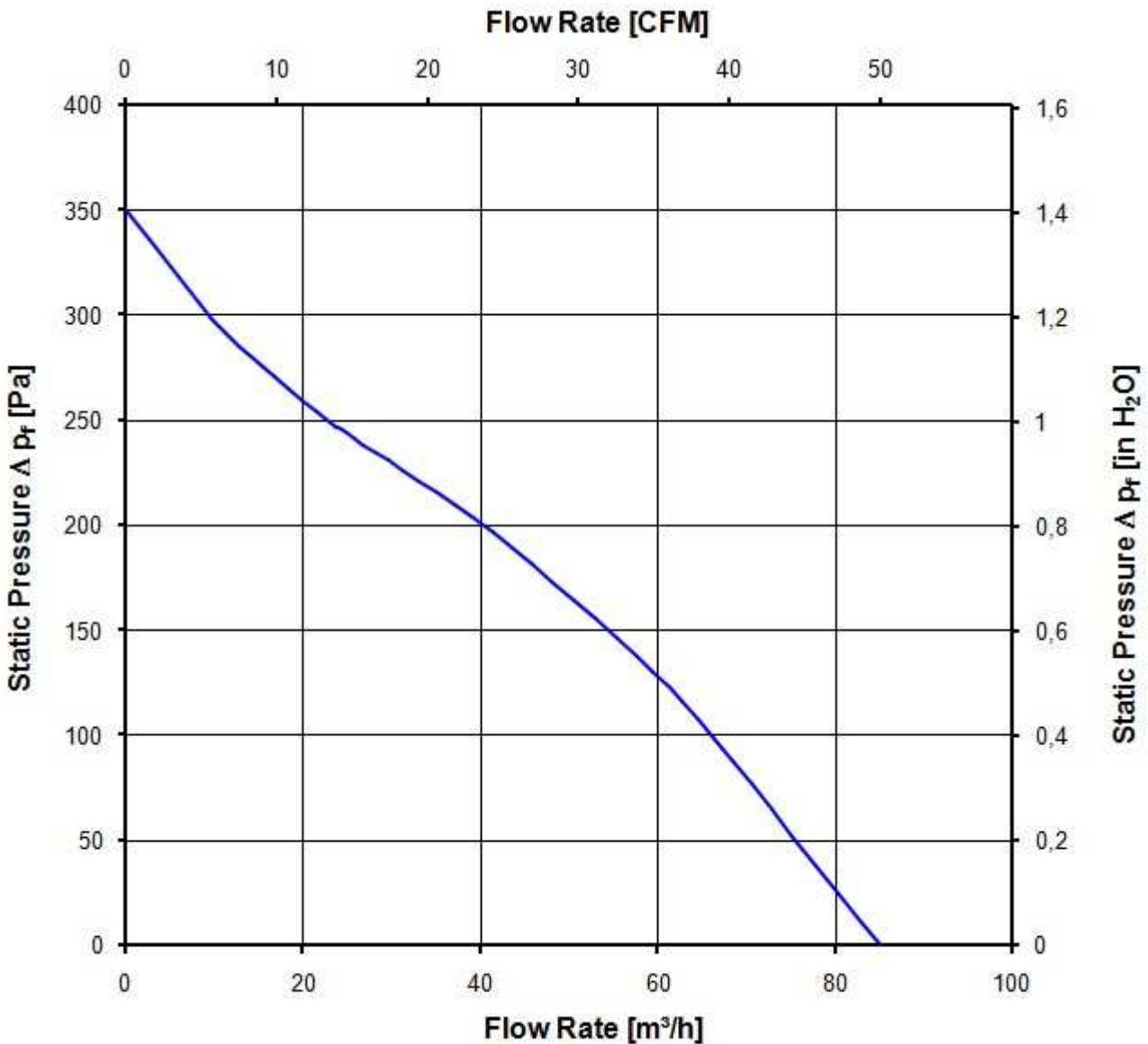
In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.

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.

a.) Operation condition:

5.400 1/min at free air flow

| | | |
|---|------------------------|--|
| Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$) | 86,0 m ³ /h | |
| Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$) | 350 Pa | |



3.5 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:

| | | |
|---|---------------------------------|--|
| 5.400 1/min at free air flow | | |
| Optimal operating point | 44,0 m ³ /h @ 164 Pa | |
| Sound power level at the optimal operating point | 6,3 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 °C | |
| Max. permitted ambient temperature TU max. | 75 °C | |
| Min. permitted storage temperature TL min. | -40 °C | |
| Max. permitted storage temperature TL max. | 80 °C | |

4.2 Climatic Requirements

| | | |
|-----------------------|---|--|
| Humidity requirements | humid temperature, cyclic; according to DIN EN 60068-2-38, 10 cycle and condensation water check; according to DIN EN ISO 6270-2, 14 days | |
| Water exposure | Splash water check IPX4; according to DIN EN 60529 VDE 0470, not certified | |
| Dust requirements | Dust check IP5X; according to DIN EN 60529 VDE 0470, not certified | |
| Salt fog requirements | None | |

Permitted application area:

The product is for the use in partial sheltered rooms or open, roofed areas. Direct exposure to water is allowed provided that this does not prevent the normal operation. Saline ambient conditions must be avoided.

Pollution degree 3 (according DIN EN 60664-1)

It occurs conductive pollution or dry non-conductive pollution which becomes conductive due to condensation.

Please require severity levels and specification parameters from the responsible development departments.

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. | 500 VAC / 1 Min. | |
| B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground. | 850 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 / 1,2 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 | Not applicable |

The approval tests are observed to:

U approval max.: 30,0 V @ TU approval max.: 75,0 °C

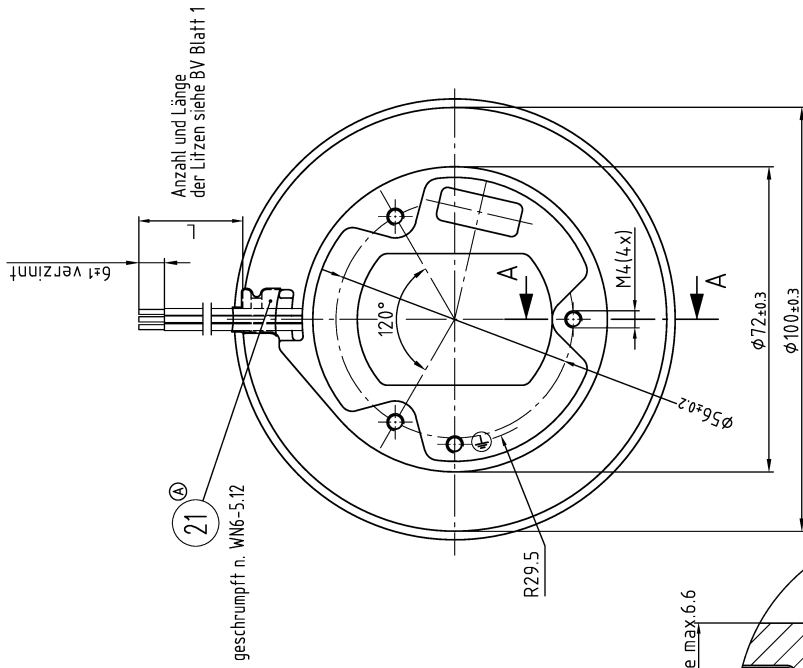
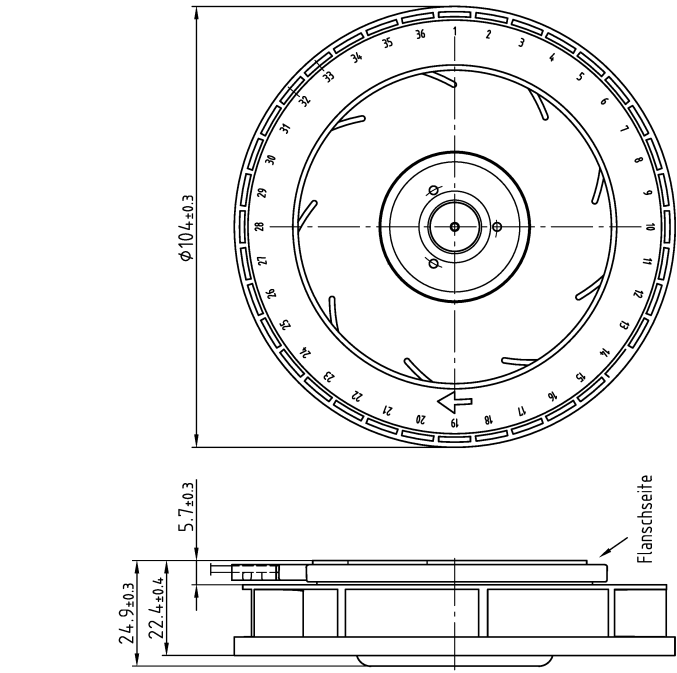
6 Reliability

6.1 General

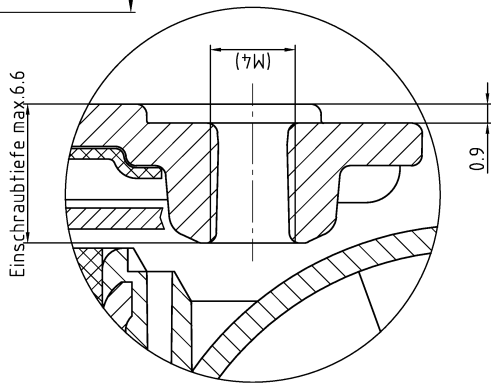
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|--|-----------|--|
| Life expectancy L10 at TU = 40 °C | 80.000 h | |
| Life expectancy L10 at TU max. | 32.500 h | |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 135.000 h | |

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Schutzmerk nach DIN ISO 16016 beachten



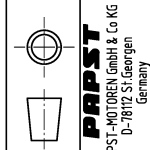
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Axienspiel bei
- Kugellagerung (K): 0 (mit Federausgleich)

Tolerierung: DIN 7167
Allgemeintoleranzen: DIN ISO 2768-mK

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