# Product Data Sheet 4114 N/2H4PU

ebmpapst

The engineer's choice



GREEN TECH

**4114 N/2H4PU**

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## 1 General

| | | |
|---|---|---|
| Fan type | Fan | |
| Rotating direction looking at rotor | Clockwise | |
| Airflow direction | Air intake over struts | |
| Bearing system | Stainless steel bearing | |
| Mounting position - shaft | Any | |

## 2 Mechanics

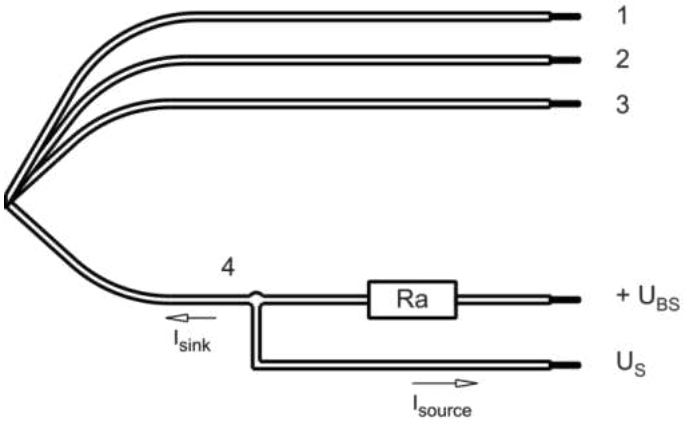
### 2.1 General

| | | |
|---|---|---|
| Width | 119,0 mm | |
| Height | 119,0 mm | |
| Depth | 38,0 mm | |
| Mass | 0,390 kg | |
| Housing material | Metal | |
| Impeller material | Plastic | |

### 2.2 Connections

| | | |
|---|---|---|
| Electrical connection | Wires | |
| Lead wire length<br>Tolerance | L = 310 mm<br>+- 10,0 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

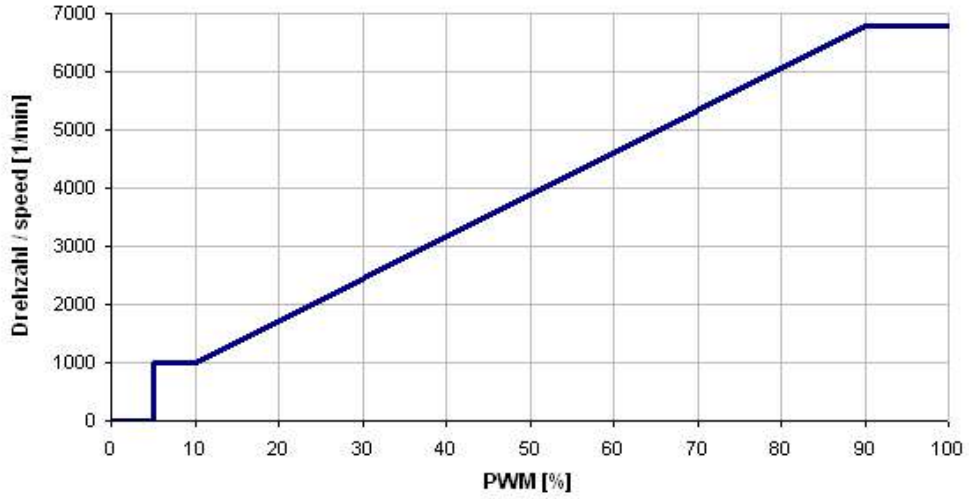
### 3.1 Electrical Interface - Input

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

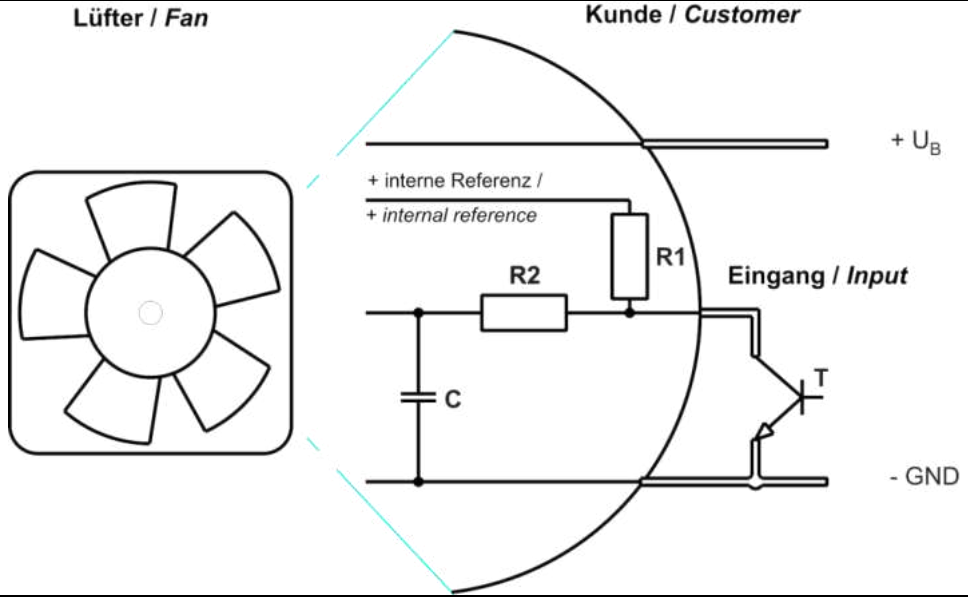
**Features**

| | | |
|---|---|---|
| PWM - Frequency | | 1 kHz - 20 kHz<br>typical: 2 kHz |

**Characteristics**




**Schematics**




**Speed control:** By PWM: 0...100 %. The shown pull-up resistor to the internal reference voltage (+5V) has 4.7kOhm.

**Transistor requirements:** VCE max. >= 12V; Isink max > 5mA; VCEsat < 0,15V

### 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.

Δp = 0: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

| Name | Condition | | |
|---|---|---|---|
| PWM 0001 | PWM: 95 %; f: 2 kHz | | |

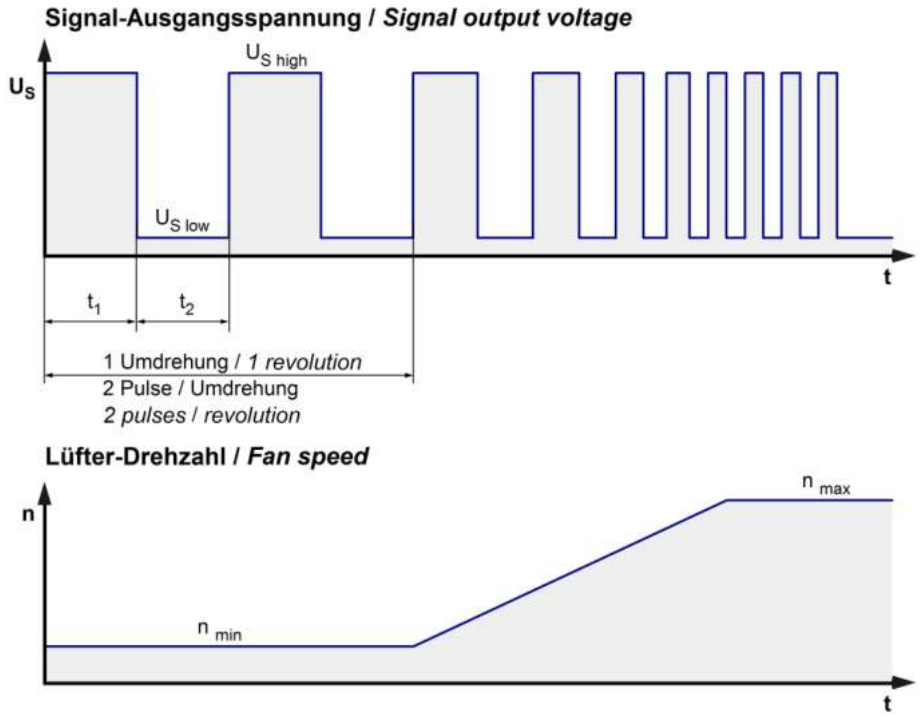
**Note:**
**No inrush current at Unom means:**

The internal electrolytic capacitor 39uF/100V has no resistor or inrush current limitation, essentially the power supply and the type and length of the connecting cable is limiting the Inrush current.

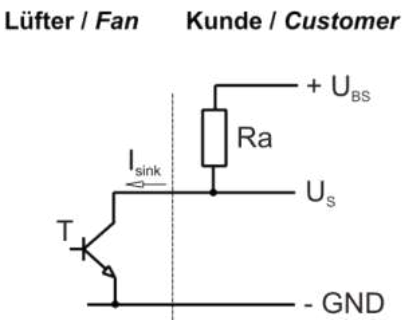
| Features | Condition | Symbol | Values | | |
|---|---|---|---|---|---|
| Voltage range | | U | 16 V | | 30 V |
| Nominal voltage | | $U_N$ | | 24 V | |
| Power consumption<br>Tolerance | Δp = 0<br>PWM 0010 | P | 13,3 W<br>+- 15 % | 33,5 W<br>+- 10 % | 34,2 W<br>+- 10 % |
| Current consumption<br>Tolerance | Δp = 0<br>PWM 0010 | I | 830 mA<br>+- 15 % | 1.400 mA<br>+- 10 % | 1.140 mA<br>+- 10 % |
| Speed<br>Tolerance | Δp = 0<br>PWM 0010 | n | 5.100 1/min<br>+- 10 % | 6.800 1/min<br>+- 5 % | 6.800 1/min<br>+- 5 % |
| Starting current consumption | | | | 2.200 mA | |

### 3.3 Electrical Interface - Output

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




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

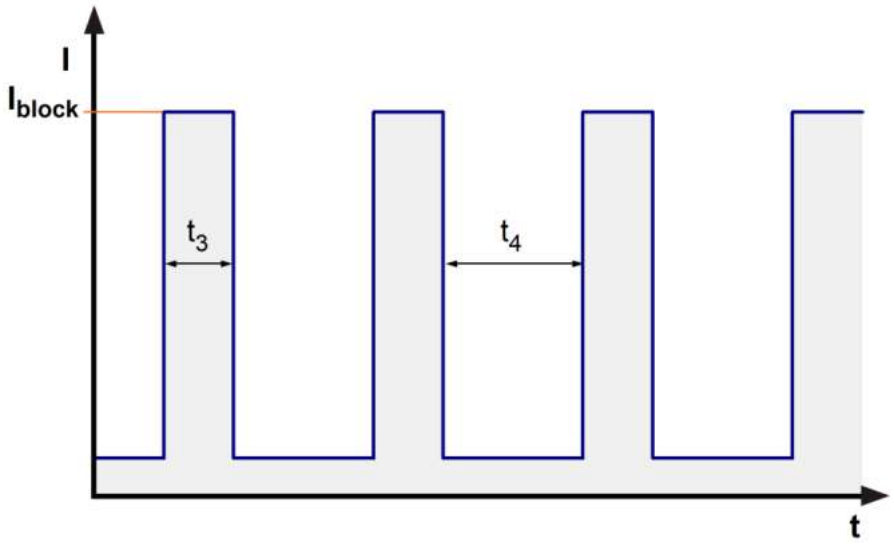



| Features | | Note | Values |
|---|---|---|---|
| Tacho operating voltage | $U_{BS}$ | | <= 30 V |
| Tacho signal Low | $U_{S\,low}$ | I sink: 2 mA | <= 0,4 V |
| Tacho signal High | $U_{S\,high}$ | I source: 0 mA | <=30 V |
| Maximum sink current | $I_{sink}$ | | <= 20 mA |
| External resistor | | External resistor Ra from UBS to US required. All voltages measured to GND. | |
| Tacho frequency | | (2 x n) / 60 | |
| Tacho isolated from motor | | No | |
| Slew rate | | | => 0,5 V/us |

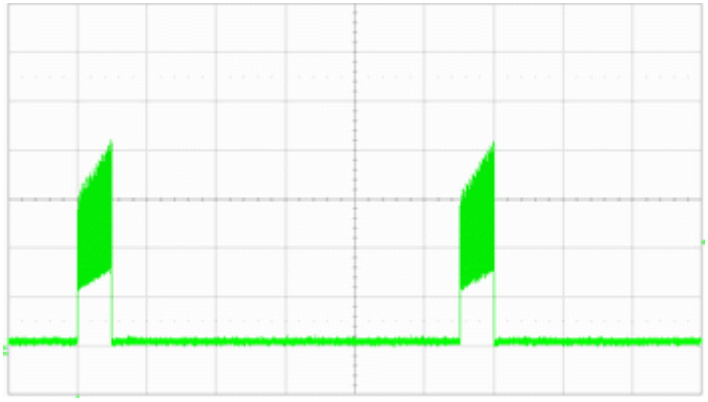
n = revolutions per minute (1/min)

### 3.4 Electrical Features

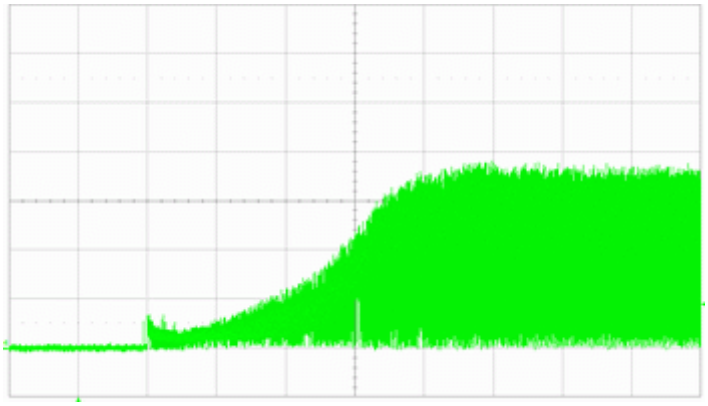
| | | |
|---|---|---|
| Electronic function | Speed-Controlled | |
| Reversed polarity protection<br>Max. residual current at $U_N$ | Rectifying diode<br>$I_F$ <= 10 mA | |
| Locked rotor protection | Auto restart | |
| Locked rotor current at $U_N$ | $I_{block}$ approx. 800 mA | |
| Clock signal at locked rotor | $t_3$ / $t_4$ typical: 0,5 s / 5,0 s | |



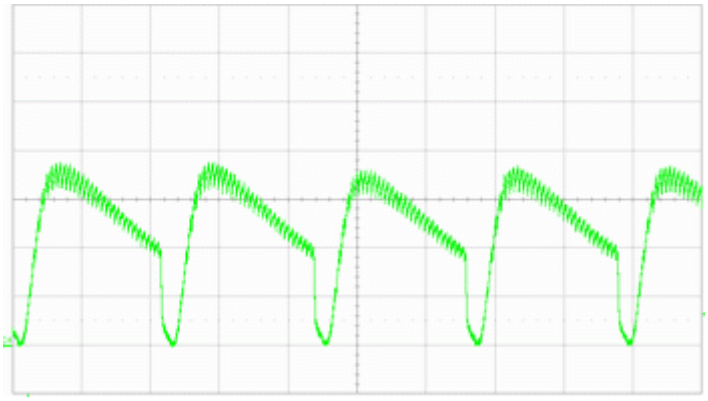

**Locked rotor current measured as peak current.**



**Locked rotor current @ 24 V (I = 200mA/div ; t = 1s/div)**



**Start-up current @ 24 V (I = 500mA/div ; t = 2s/div)**



**Running current @ 24 V (I = 500mA/div ; t = 1ms/div)**

**Internal Fuse:**
Littelfuse NANO2(R) FUSE; Very fast acting 451 Series; 3 A (Art.-No.: 451003.MRL)

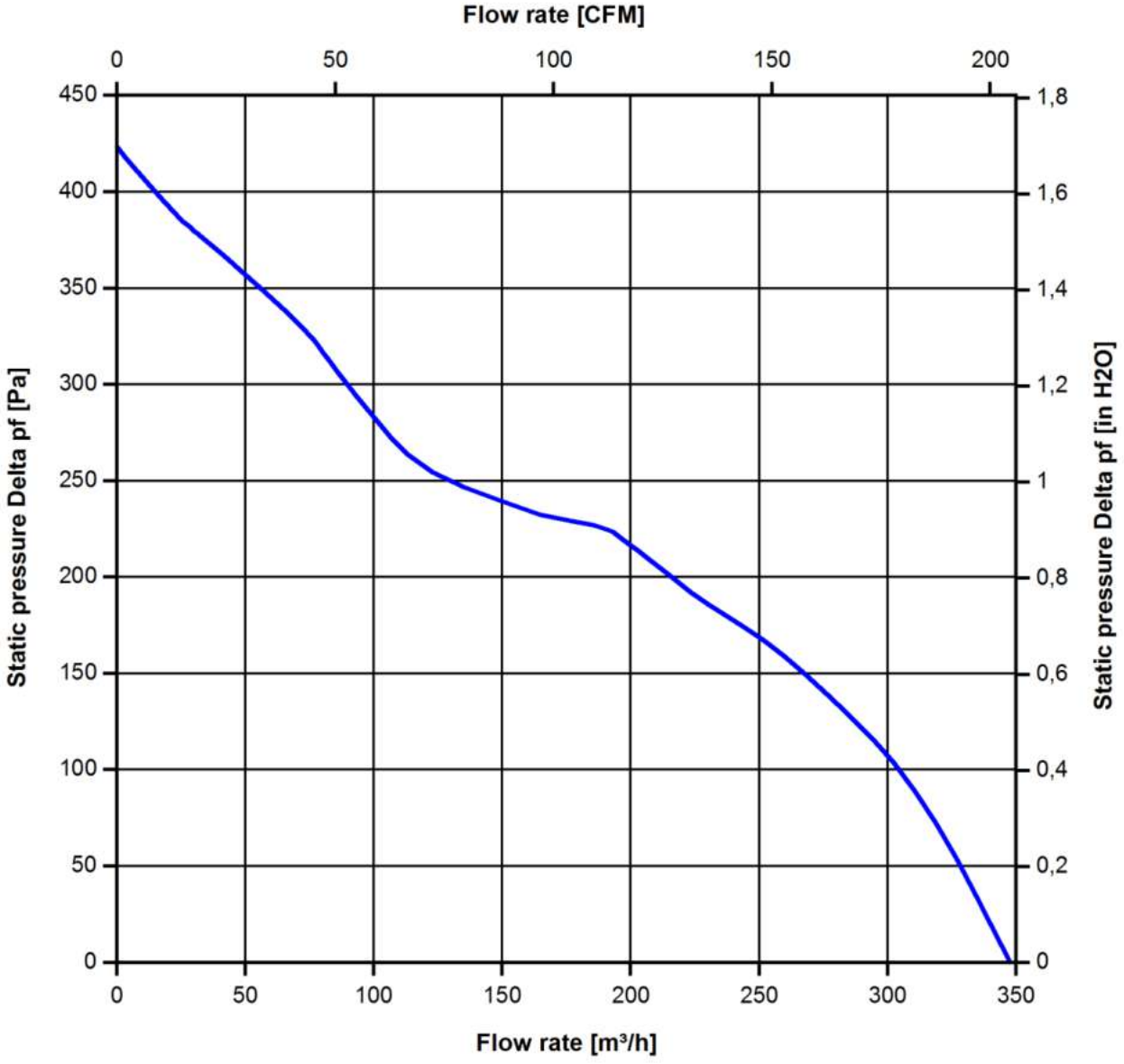
### 3.5 Aerodynamics

| | |
|---|---|
| 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. |

a.) Operation condition:

| | | | |
|---|---|---|---|
| 6.800 1/min at free air flow | PWM 95 %; f: 2 kHz | | |

| | | |
|---|---|---|
| Max. free-air flow (Δp = 0 / $\dot{V}$ = max.) | 350 m3/h | |
| Max. static pressure (Δp = max. / $\dot{V}$ =0) | 425 Pa | |



### 3.6 Sound Data

| | |
|---|---|
| Measurement conditions: | Sound pressure level: 1 meter distance between microphone and the air intake.<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:

| | | | |
|---|---|---|---|
| 6.800 1/min at free air flow | PWM 95 %; f: 2 kHz | | |

## 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

| | | |
|---|---|---|
| IP-protection type (certified) | IP 68 (for fan only, not for connector if applicable) **) | |
| 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 | |
| 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.

**) The specification of the IP protection refers to the conditions mentioned in certification of the fan. The above mentioned short description of the protection scope is not final. For detailed information of the respective protection scope and definitions, see certification as well as DIN EN 60529 (protection by housings) and ISO 20653 (for vehicles) with the letter K.

**Short description of the IP-protection type:**
Solid particle Protection: Dust tight.
Protection against deliberate contact: Protected against contact to hazardous parts with a wire.
Protection against water: The fan test according to IP68 (Based on IEC 60529), is conducted in non-operating mode. The fan is tested by a complete immersion in water for a period of 2h at a water-level of 1,2m. Electrical connections are not immersed since they are customer specific.

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

## 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. | 500 VAC / 1 Min.<br><br>850 VDC / 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 / 1,2 mm | |
| Protection class | III | |

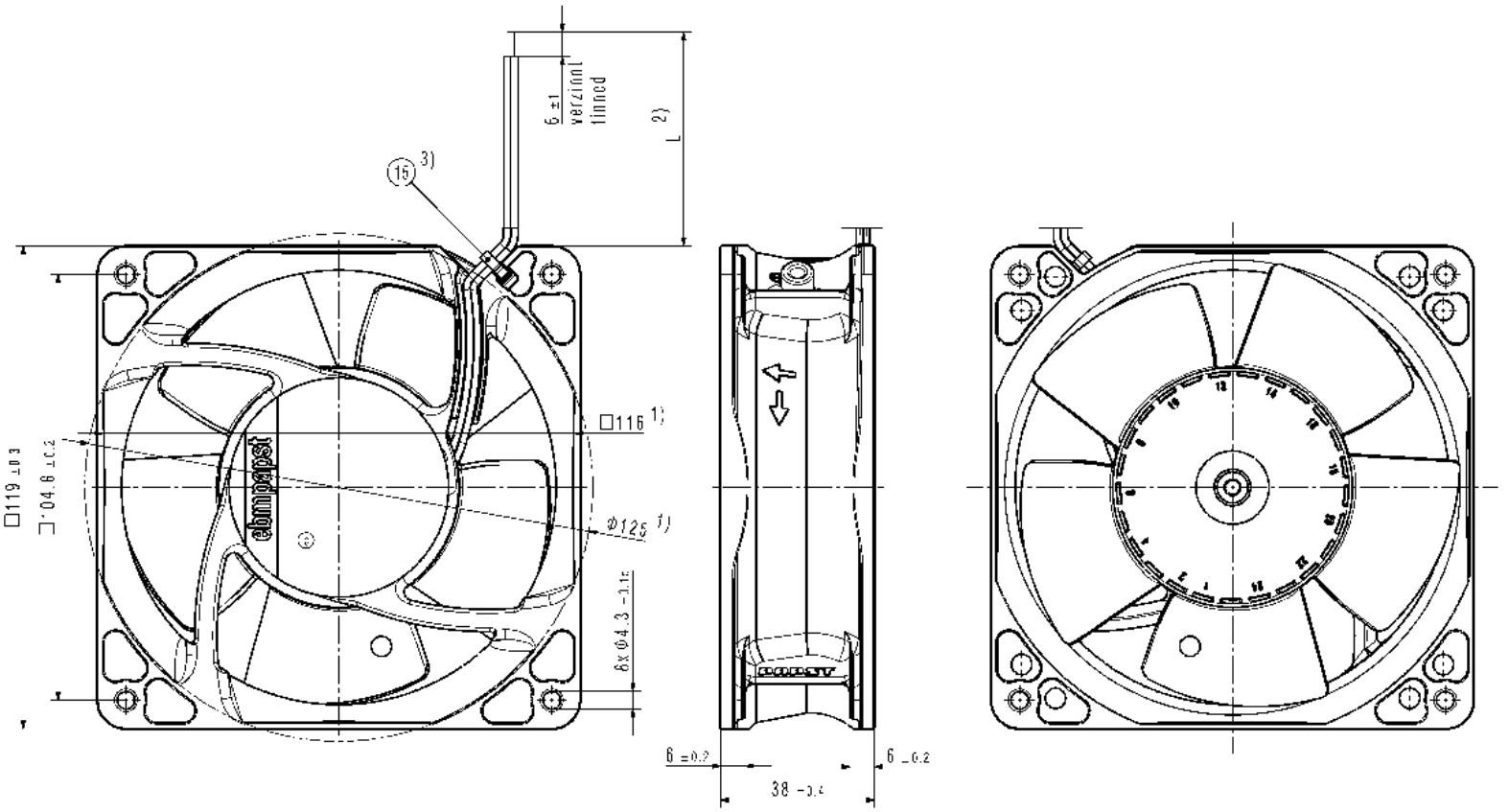
### 5.2 Approval Tests

| | | |
|---|---|---|
| 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 |

## 6 Reliability

### 6.1 General

| | | |
|---|---|---|
| Life expectancy L10 at TU = 40 °C | 62.500 h | |
| Life expectancy L10 at TU max. | 35.000 h | |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 105.000 h | |




1) Maße für Montageausschnitt
2) Anzahl und Länge der Litzen siehe Produktspezifikation.
3) nur wenn in Stückliste enthalten
- Axialspiel der Kugellager mit Feder spielfrei verspannt.

1) Measures for mounting cut-out.
2) Length and number of wires see product specification.
3) Only if enclosed in the bill of material.
- Ball bearing without axial clearance by a pre-loaded spring.

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