Product Data Sheet 4114N/2H4PU

ebmpapst

Die Wahl der Ingenieure



GREEN TECH

4114N/2H4PU

INDEX

1 General 3

2 Mechanics 3

2.1 General 3
2.2 Connections 3

3 Operating Data 5

3.1 Operating Data - Electrical Interface - Input 5
3.2 Electrical Operating Data 6
3.3 Operating Data - Electrical Interface - Output 7
3.4 Electrical Features 8
3.5 Aerodynamics 10
3.6 Sound Data 11

4 Environment 11

4.1 General 11
4.2 Climatic Requirements*) 11

5 Safety 12

5.1 Electrical Safety 12
5.2 Approval Tests 12

6 Reliability 12

6.1 General 12

1 General

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

2 Mechanics

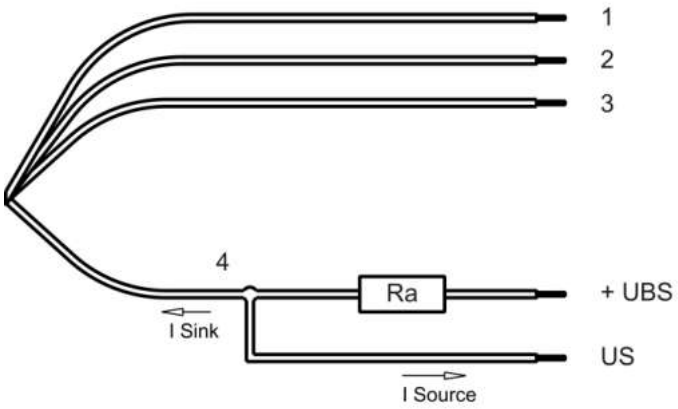
2.1 General

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 Tolerance	L = 310 mm +- 10,0 mm	
Wire size (AWG)	22	
Insulation diameter	1,70 mm	
Contact	See drawing	





	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.

3 Operating Data

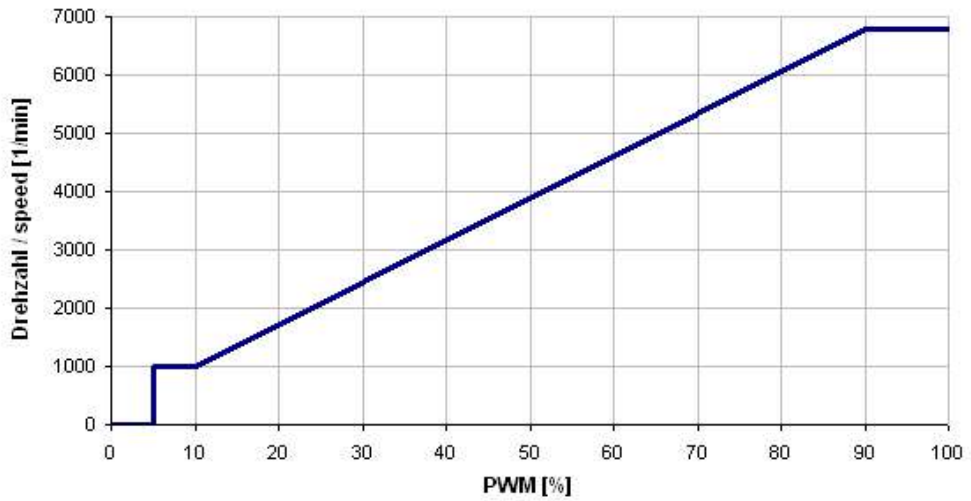
3.1 Operating Data - Electrical Interface - Input

Control input	PWM

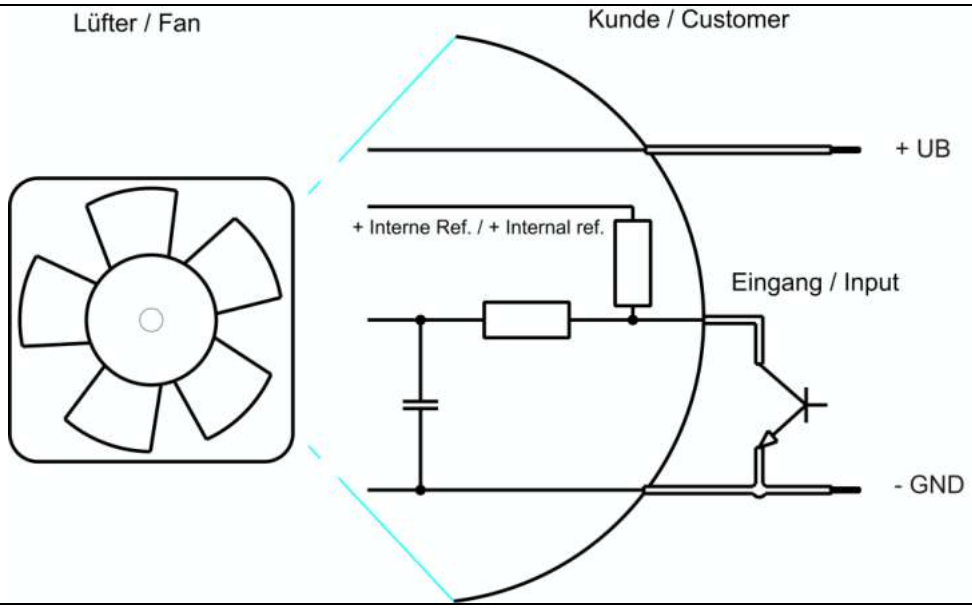
Features

PWM - Frequency		1 kHz - 20 kHz 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 section 3.5)
I:	corresp. to arithm. mean current value

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

Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	16,0 V		30,0 V
Nominal voltage	Δp = 0	U_N		24,0 V	
Power consumption Tolerance	Δp = 0 PWM 0001	P	13,3 W +- 15,0 %	33,1 W +- 10,0 %	34,2 W +- 10,0 %
Current consumption Tolerance	Δp = 0 PWM 0001	I	830 mA +- 15,0 %	1.380 mA +- 10,0 %	1.140 mA +- 10,0 %
Speed Tolerance	Δp = 0 PWM 0001	n	5.100 1/min +- 10,0 %	6.800 1/min +- 5,0 %	6.800 1/min +- 5,0 %
Starting current consumption				2.200 mA	

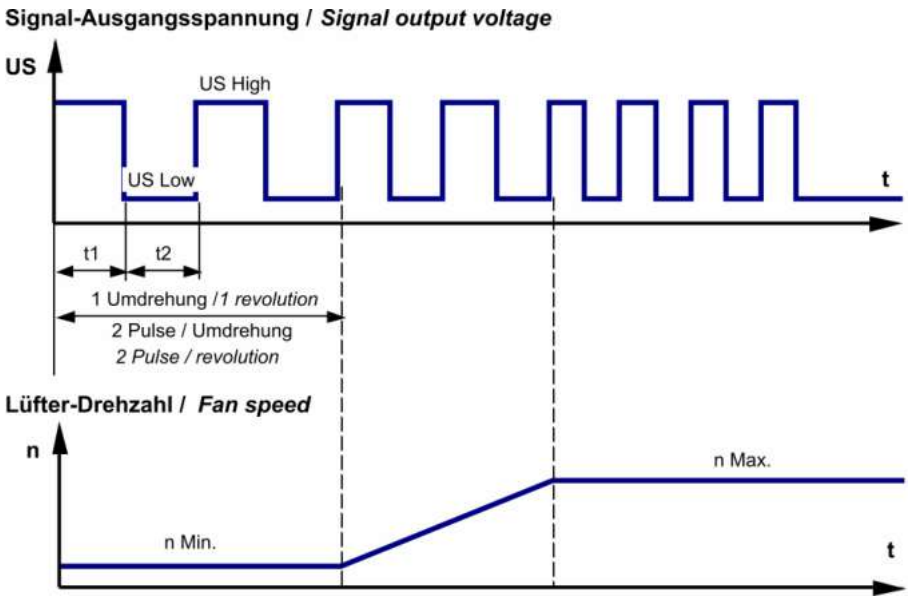
Note:
No inrush current at Unom means:
The internal electrolytic capacitor 39uF/100V has no resistor or inrush current limitation, essentially the power supply and the type and length of the connecting cable is limiting the Inrush current.

Name	Condition		
PWM 0002	PWM: 8 %; f: 2 kHz		

Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	16,0 V		30,0 V
Nominal voltage	Δp = 0	U_N		24,0 V	
Power consumption Tolerance	Δp = 0 PWM 0002	P	0,64 W +- 20,0 %	0,77 W +- 20,0 %	0,93 W +- 20,0 %
Current consumption Tolerance	Δp = 0 PWM 0002	I	40 mA +- 20,0 %	32 mA +- 20,0 %	31 mA +- 20,0 %
Speed Tolerance	Δp = 0 PWM 0002	n	1.000 1/min +- 10,0 %	1.000 1/min +- 10,0 %	1.000 1/min +- 10,0 %

3.3 Operating Data - Electrical Interface - Output

Tacho type	/2 (open collector)



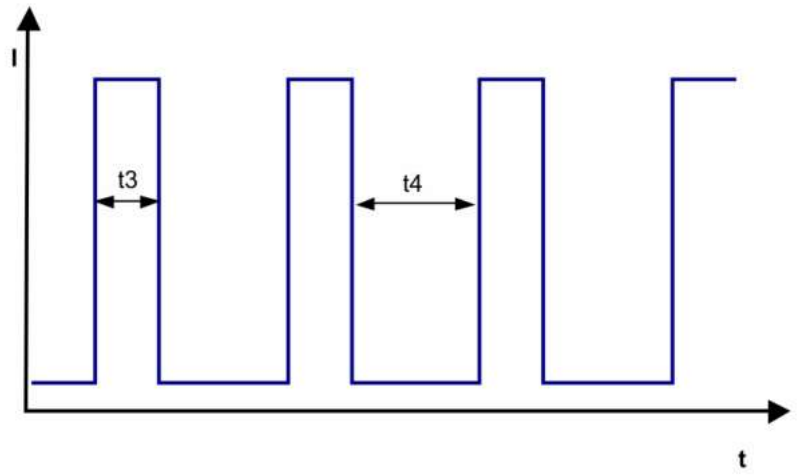
$$Ra = \frac{UBS - US\ Low}{I\ Sink}$$

Features	Note	Values
Tacho operating voltage (UBS)		<= 30 V
Tacho signal Low	I sink: 2 mA	<= 0,4 V
Tacho signal High	I source: 0 mA	<= 30 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	
Tacho isolated from motor	No	
Slew rate		=> 0,5 V/us

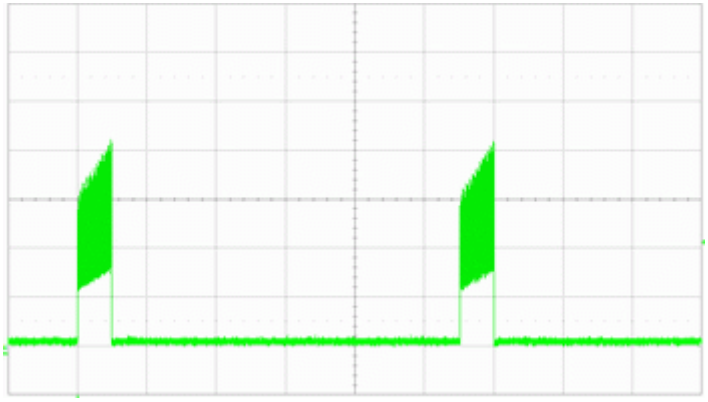
Alarm type	None

3.4 Electrical Features

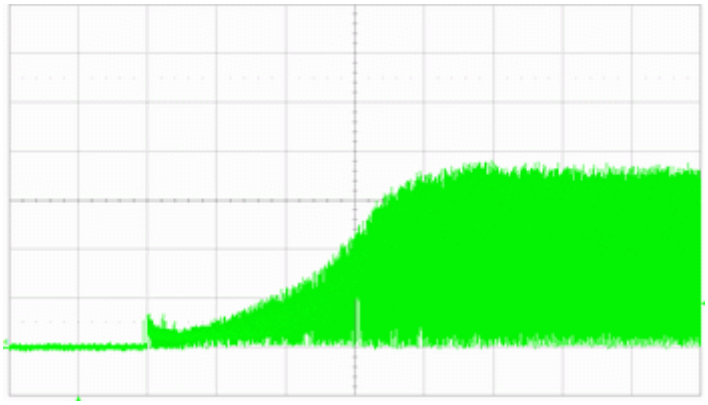
Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at Un	Rectifying diode IF <= 10 mA	
Locked rotor protection	Auto restart	
Locked rotor current at Un	approx. 800 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,5 s / 5,0 s t3: 0,4 s... 0,6 s t4: 4,8 s... 5,2 s	



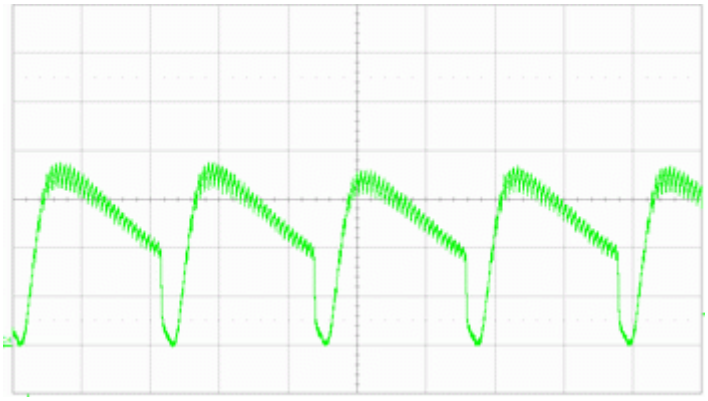
Locked rotor current measured as peak current.



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)

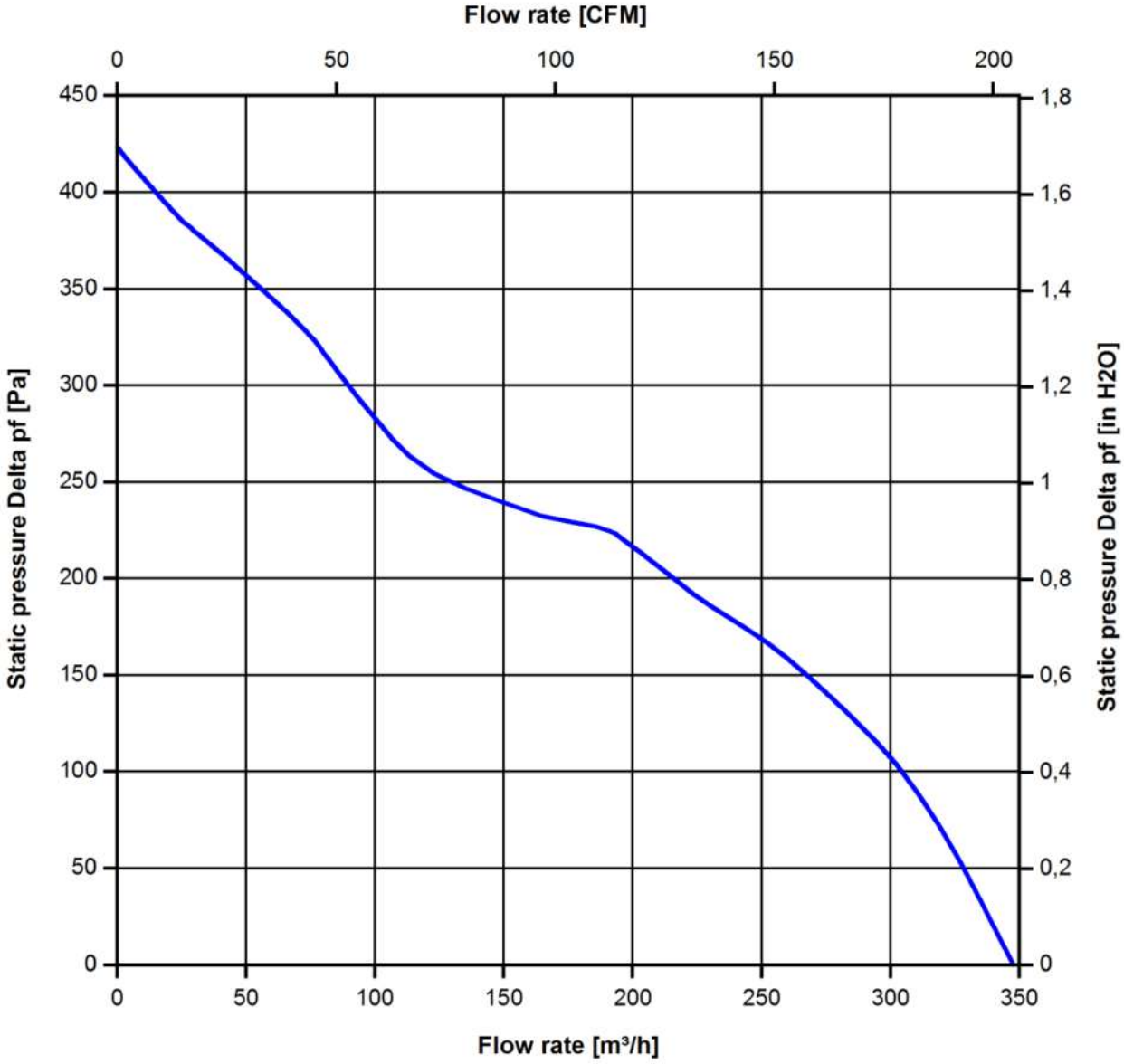
3.5 Aerodynamics

Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. 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. 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 / V̇ = max.)	350,0 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	425 Pa	



3.6 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 Lp(A) < 5 dB(A) For further measurement conditions see section 3.5

a.) Operation condition:

6.800 1/min at free air flow	67 dB(A) sound pressure

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	tbd	

*) Permittet 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.

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. B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Min. 500 VAC / 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	

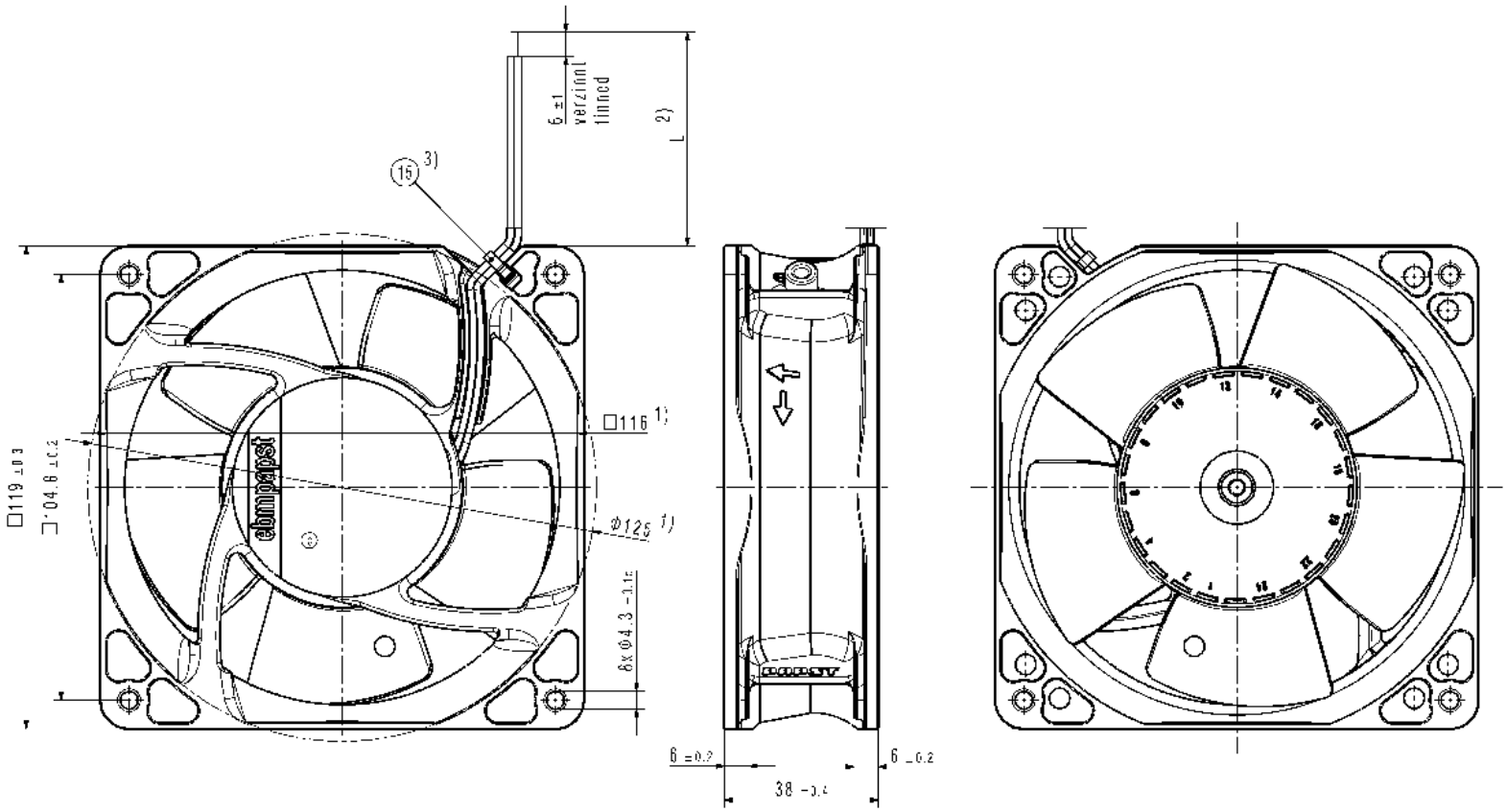
5.2 Approval Tests

CE	EC Declaration of Conformity	Appliled for
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Applied for
VDE	Association for Electrical, Electronic and Information Technologies	Applied for
CSA	Canadian Standards Association	Applied for
CCC	China Compulsory Certification	No

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 IPC (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.

ebmpapst