Product Data Sheet 4114 N/2H8P

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GREEN TECH

4114 N/2H8P

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 Data According ErP Directive 10
3.6 Aerodynamics 11
3.7 Sound Data 12

4 Environment 12

4.1 General 12
4.2 Climatic Requirements 12

5 Safety 13

5.1 Electrical Safety 13
5.2 Approval Tests 13

6 Reliability 14

6.1 General 14

1 General

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

2 Mechanics

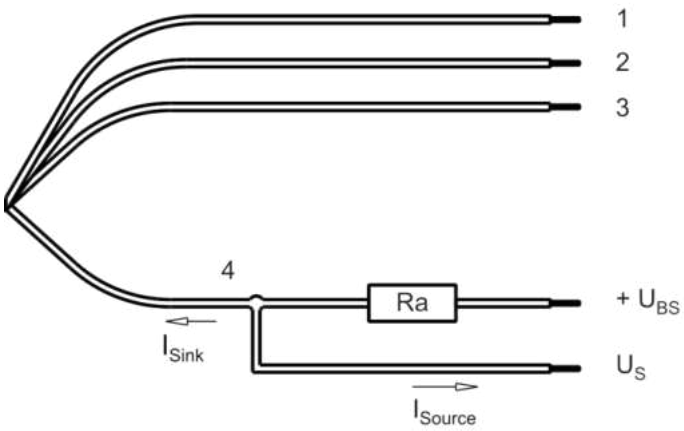
2.1 General

Width	119,0 mm	
Height	119,0 mm	
Depth	38,0 mm	
Mass	0,425 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	Wire outlet corner: 420 Ncm Remaining corners: 600 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 310 mm +- 10,0 mm	
Wire size (AWG)	20 22	
Insulation diameter	1,70 mm 2,05 mm	





Wire	Color	Operation
1	red	+ UB
2	blue	- GND
3	violet	PWM
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 2,05mm)

3 Operating Data

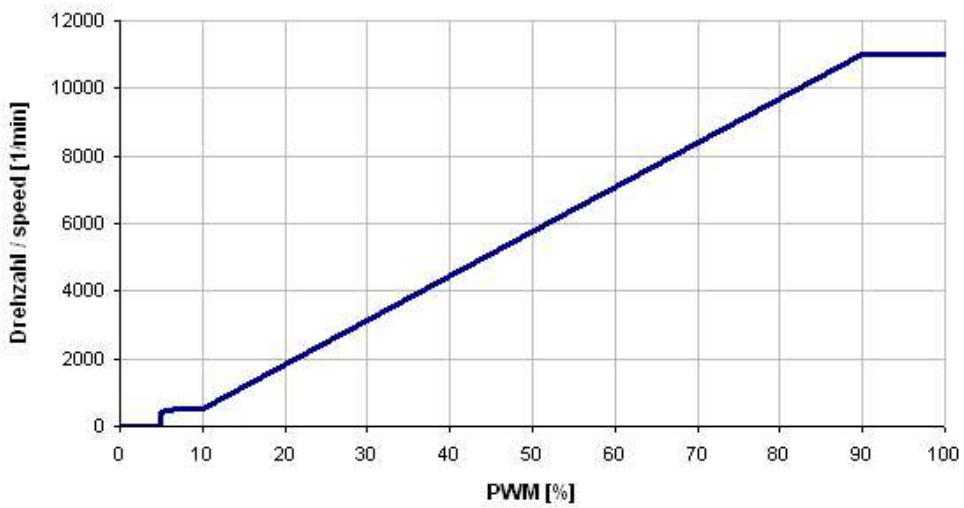
3.1 Operating Data - Electrical Interface - Input

Control input	PWM

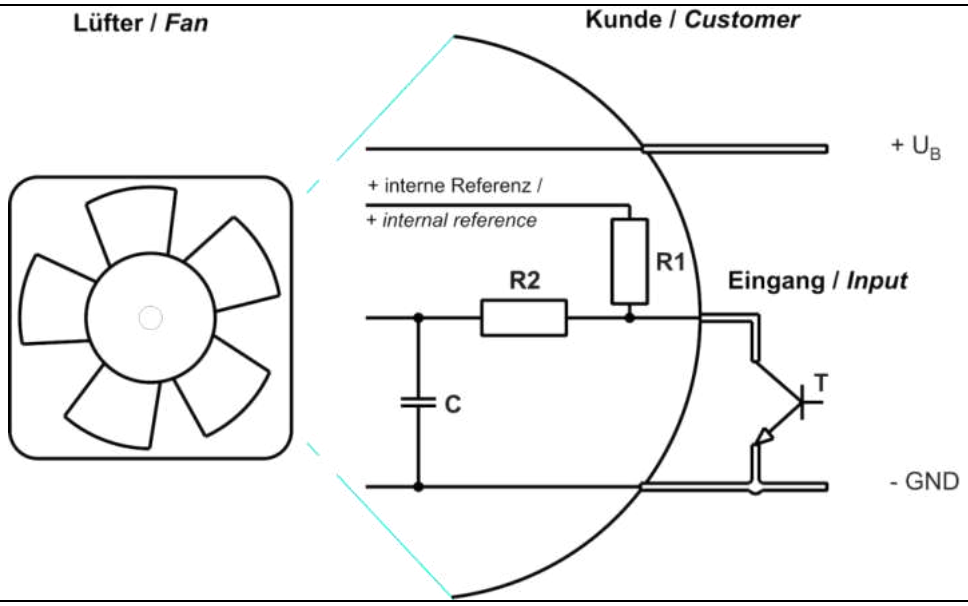
Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 20 kHz

Characteristics



Schematics



Speed control:

PWM = 0...100 %; f = 1...20 kHz; n = 500...11.000 1/min.

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

Alternatively to the PWM signal the fan can be controlled by an analog control signal of 0...5 V (5 V corresponds to 100 % PWM)
It must be ensured that the power supply is "sink-able" and can operate with the internal pull-up resistor.
The shown pull-up resistor to the internal reference voltage (+5V) has 10kOhm.

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		

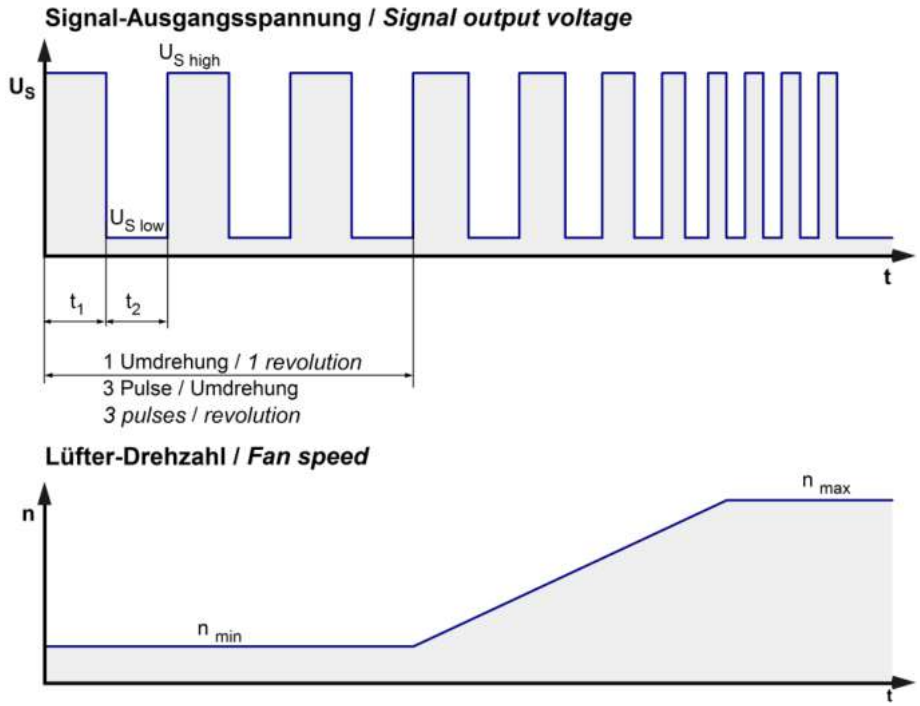
Attention!
The inrush current depends on the capacitor and the resistance of the wires. When using an external capacitor the inrush current rises accordingly. The integrated capacitor has 270uF.

muss noch übersetzt werden

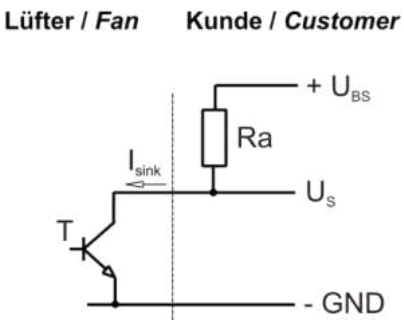
Features	Condition	Symbol	Values		
Voltage range		U	16 V		30 V
Nominal voltage		U_N		24 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	60 W +- 12,5 %	120 W +- 10 %	132,0 W +- 10 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	3.750 mA +- 12,5 %	5.000 mA +- 10 %	4.450 mA +- 10 %
Speed Tolerance	Δp = 0 PWM 0010	n	8.500 1/min +- 7,5 %	11.000 1/min +- 7,5 %	11.000 1/min +- 7,5 %

3.3 Operating Data - 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 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 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	
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

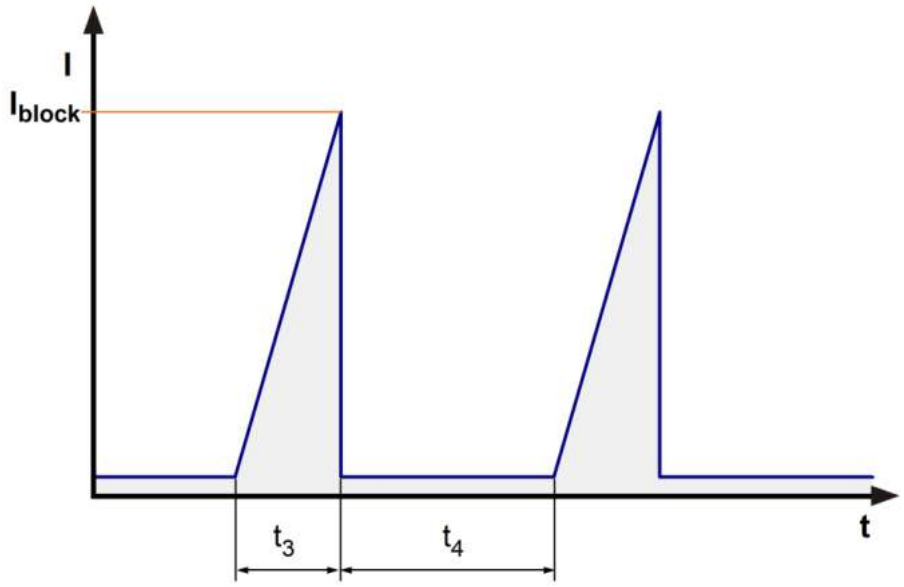
n = revolutions per minute (1/min)

Note to the tacho frequency: 3 pulses per revolution.

When the fan starts up or the rotor is locked the tacho is off. After a successful start-up the tacho output signal turns on.

3.4 Electrical Features

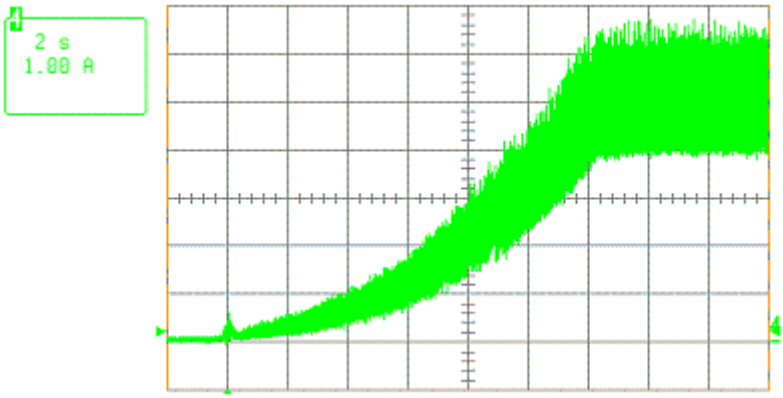
Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	N-CH FET I_F <= 1 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 2.000 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 1,7 s / 5,0 s	



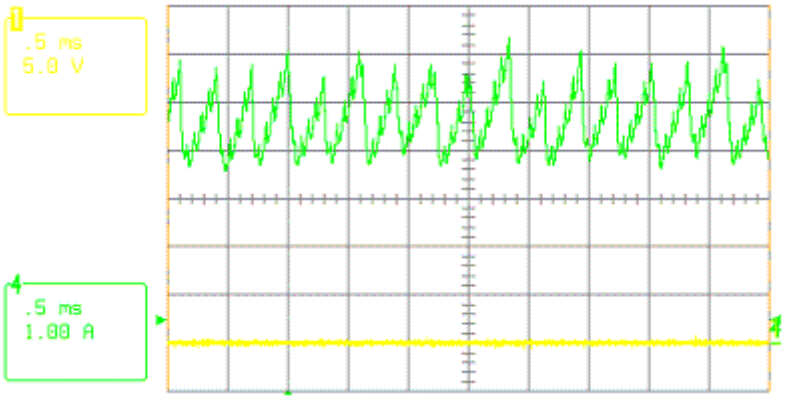
After 5 failed start-ups there is an extended timeout of 30 s.

When several fans are operated together (in a fan tray) and one fan starts after the other and the starting current is eventually limited, it can happen that the not yet operated fan is driven in reverse by the counter pressure. This can lead to a failure of the first start-up. The fan detects this and makes another start with an increased current.

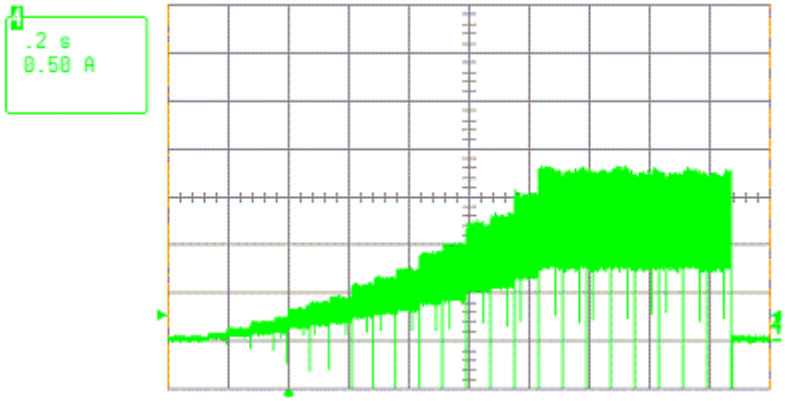
The locked rotor current is denoted as peak-current at nominal voltage.



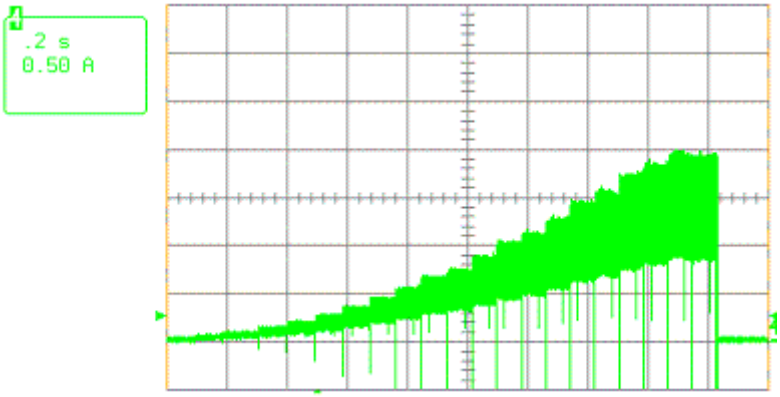
Startup current @ 24V, 0 - 11000 rpm



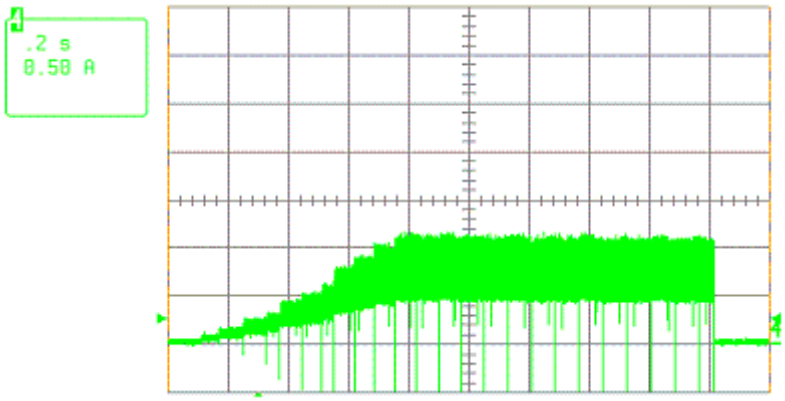
Running current @ 24V, free blowing, 11000 rpm



Locked rotor current @ 24V



Locked rotor current @ 16V



Locked rotor current @ 30V

Internal Fuse:

Littelfuse Nano2 Fuse
Very Fast-Acting 451/453 Series
10A / 125V (0451010.MRL)

3.5 Data According ErP Directive

Installation / Efficency category	A / static
Speed control	integrated
Specific ratio	1,00500
Target overall efficiency 2015	28,4 %
Overall efficiency	38,9 %
Efficiency grade	40
Power input	147,5 W
Speed	11.000 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

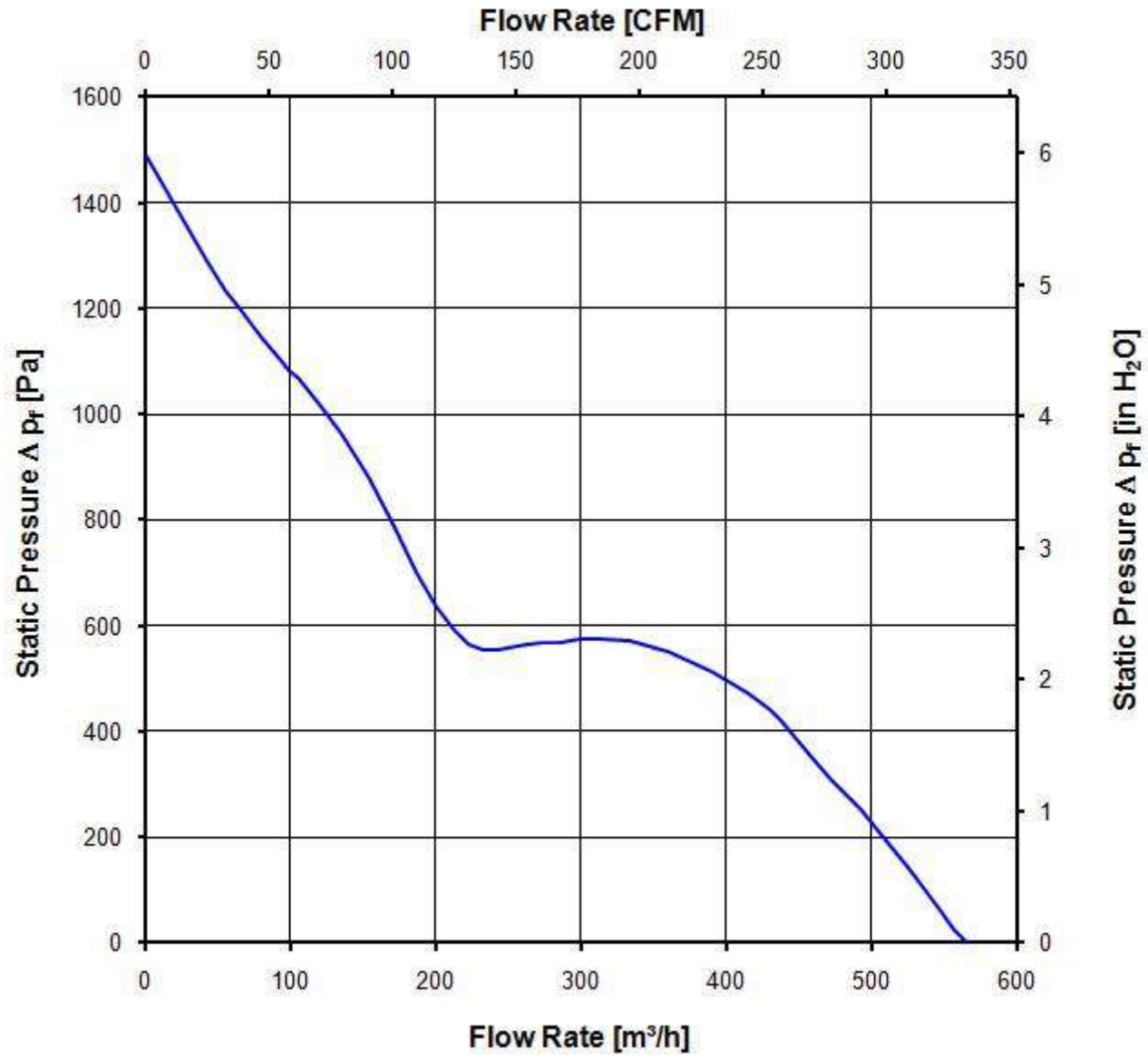
3.6 Aerodynamics

Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. 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:

11.000 1/min at free air flow	PWM 95 %; f: 2 kHz		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	565 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	1.340 Pa	



3.7 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:

11.000 1/min at free air flow	PWM 95 %; f: 2 kHz	PWM min.:	PWM max.:

Optimal operating point	390 m3/h @ 485 Pa	
Sound power level at the optimal operating point	8,8 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	79,0 dB(A)	

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 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.

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	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	Not applicable

The approval tests are observed to:
U approval max.:30,0 V @ TU approval max.: 75,0 °C

6 Reliability

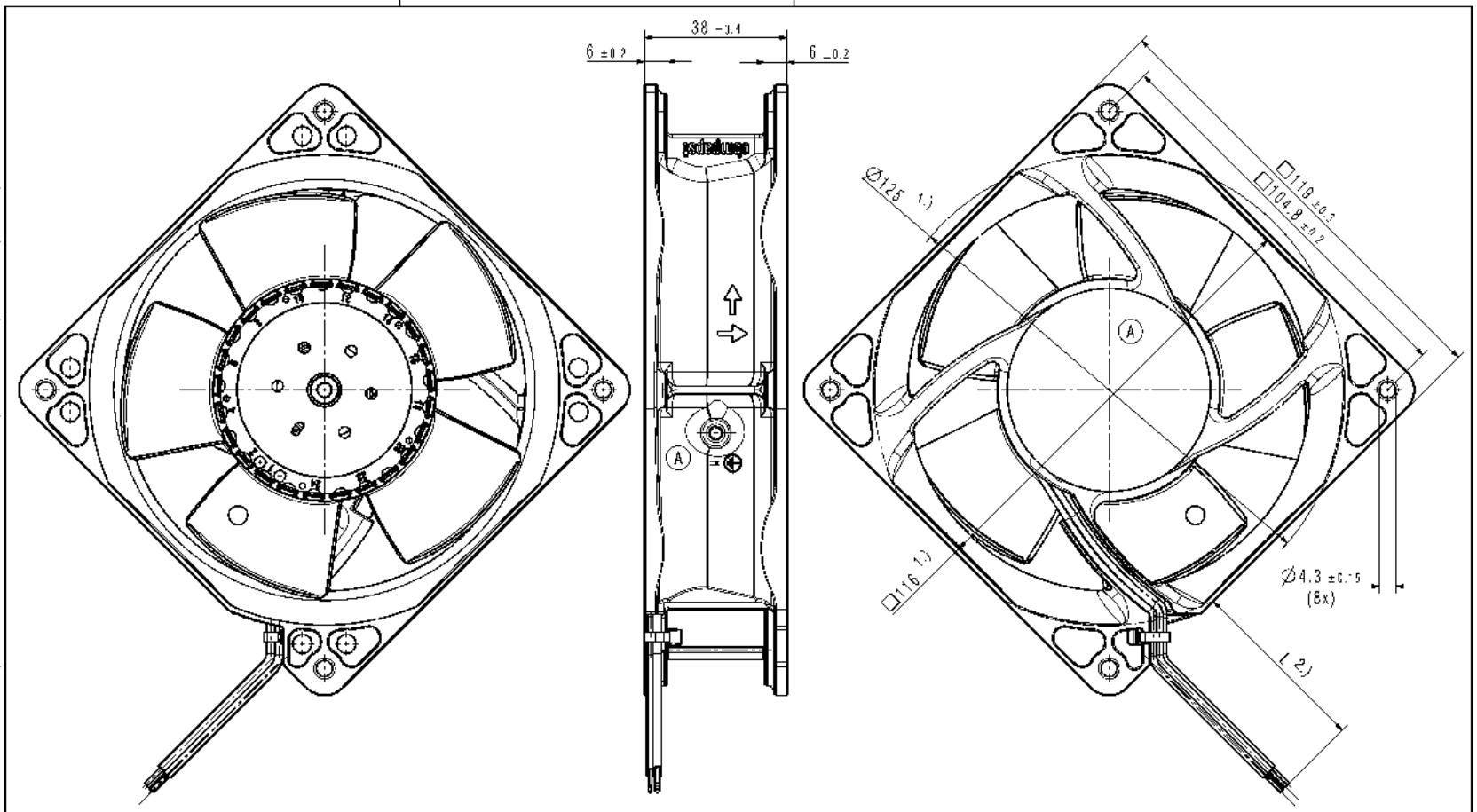
6.1 General

Attention!
In order to achieve the specified life time figure, it is necessary to connect an external capacitor.

Complexity, connection, components and configuration must be checked at the project.

As a basis a capacitor of 220... 1000 uF to the supply voltage between plus and minus can be used. Max. lead length between fan and capacitor: 300 mm.

Life expectancy L10 at TU = 40 °C	55.000 h	
Life expectancy L10 at TU max.	22.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	92.500 h	



1.) Maße für Montageausschnitt
2.) Anzahl und Länge der Litzen siehe BV - Blatt 1
- Axialspiel der Kugellager mit Feder spielfrei verspannt

1.) measures for mounting cut-out
2.) length and number of wires see design specification page **1**
- ball bearing without axial clearance by a pre-loaded spring

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