

## 1 General

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

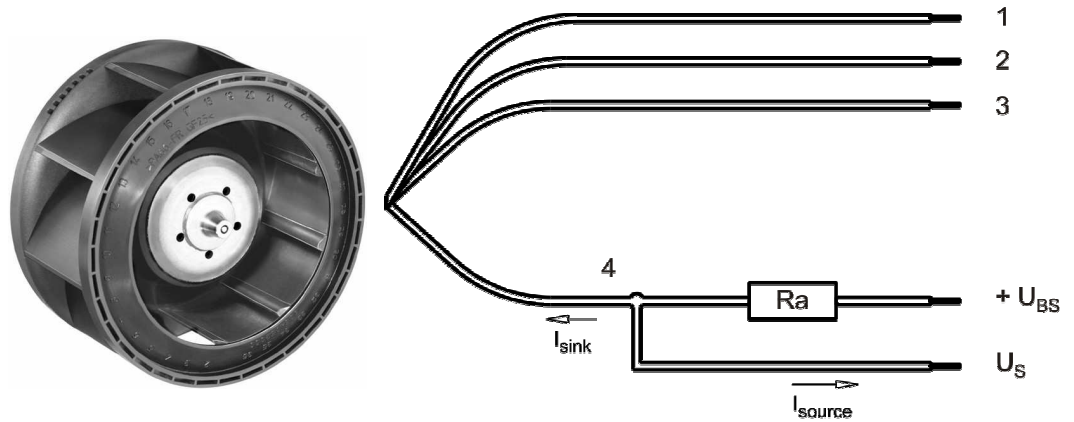
## 2 Mechanics

### 2.1 General

Depth	36,0 mm	
Diameter	101,0 mm	
Mass	0,300 kg	
Housing material		
Impeller material	Plastic	

### 2.2 Connections

Electrical connection	Wires	
Lead wire length	L = 310 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	violet	PWM	AWG 22	1,70 mm
4	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.

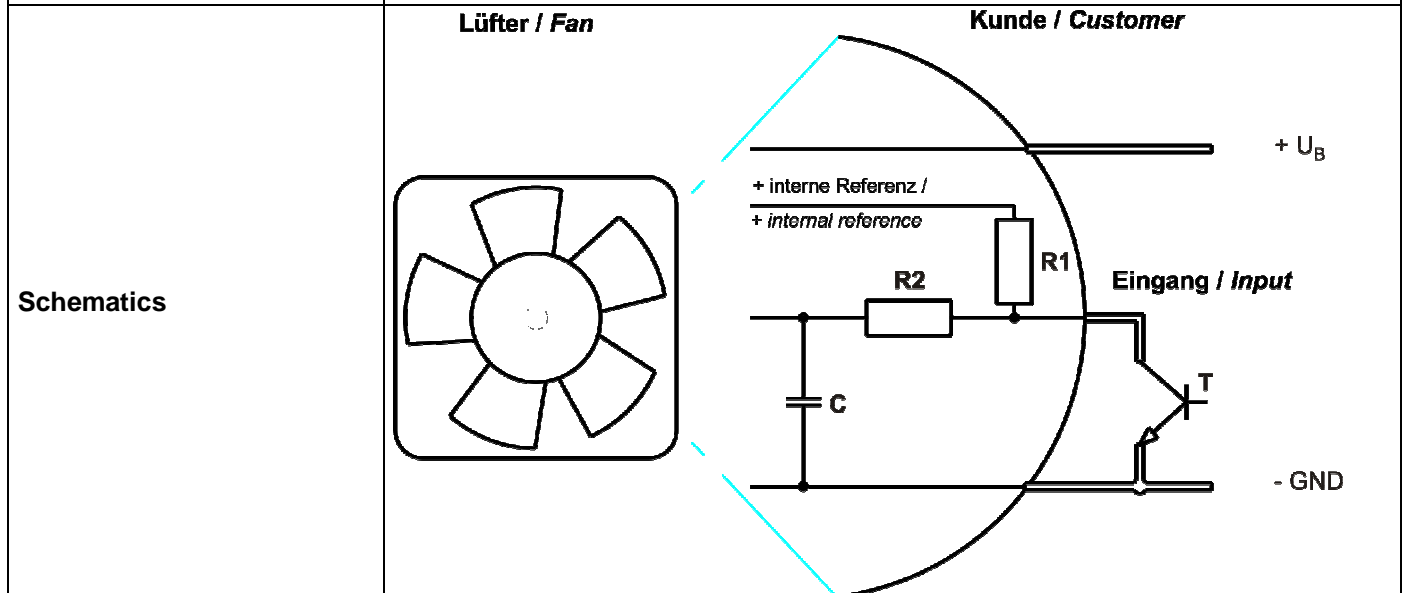
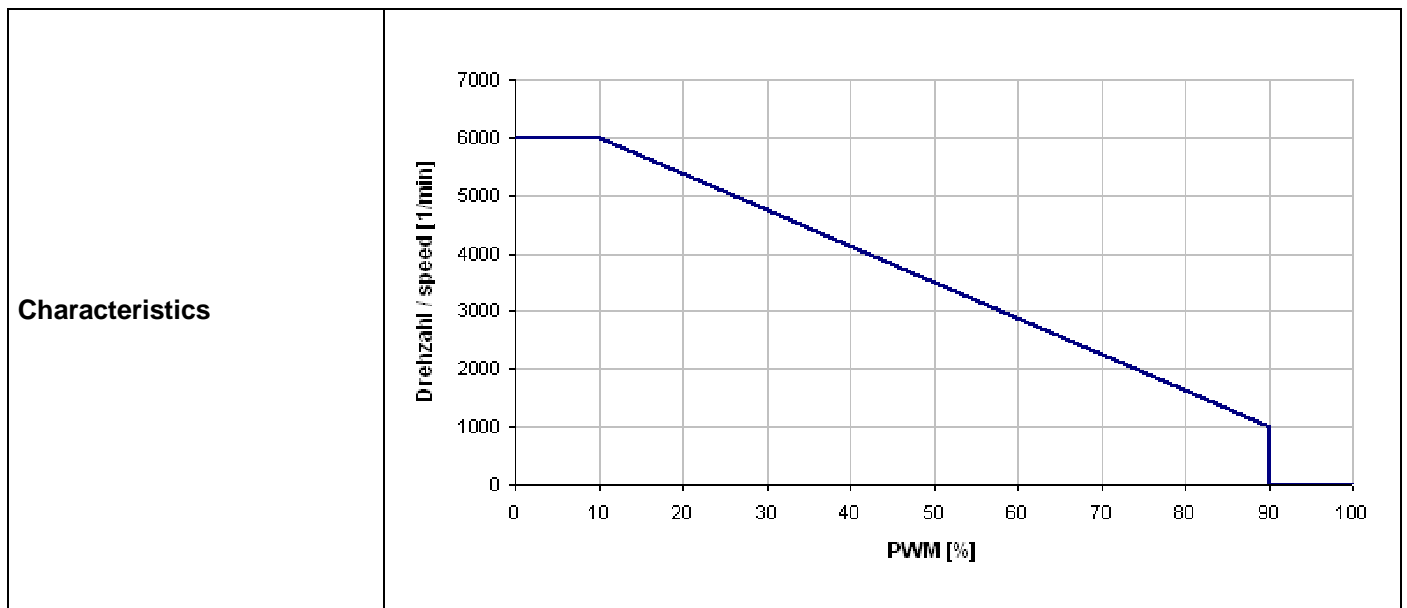
### 3 Operating Data

#### 3.1 Electrical Interface - Input

Control input	PWM
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#### Features

PWM - Frequency	10 kHz - 20 kHz
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#### Speed control:

0...100 %PWM; f: 10... 20 kHz

PWM - Low < 1 V

PWM - High > 9V and < 10 V

### 3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m<sup>3</sup>; 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:	148 mm x 148 mm
Intake nozzle:	D: 66 mm; R: 7 mm
Distance between bottom and top plate:	
Overlapping impeller / nozzle:	1 mm

$\Delta p = 0$ : corresp. to free air flow (see chapter aerodynamics)

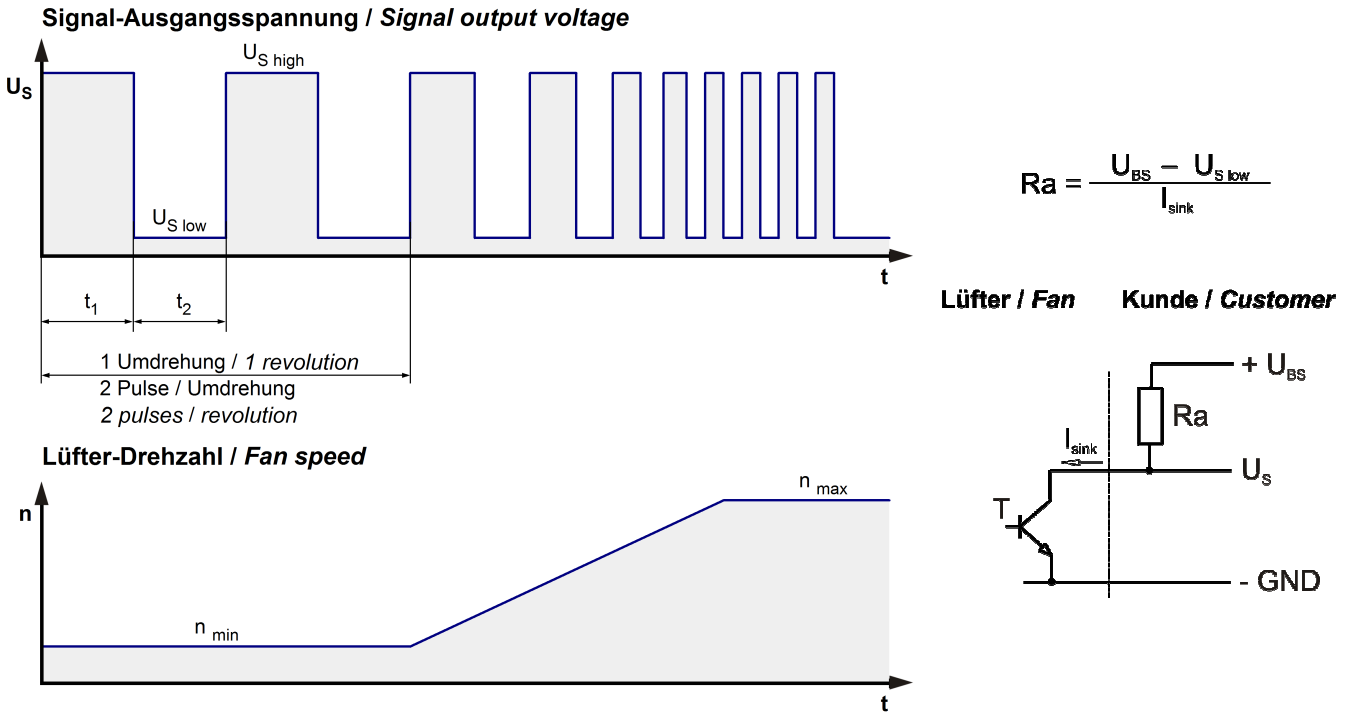
I: corresp. to arithm. mean current value

Name	Condition		
PWM 0001	PWM: 0 %;	f: 10 kHz	f: 20 kHz

Features	Condition	Symbol	Values		
Voltage range		U	9 V		13,6 V
Nominal voltage		$U_N$		12,0 V	
Power consumption	$\Delta p = 0$	P	9,9 W	21 W	28,3 W
Tolerance	PWM 0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Current consumption	$\Delta p = 0$	I	1.100 mA	1.700 mA	2.050 mA
Tolerance	PWM0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Speed	$\Delta p = 0$	n	4.550 1/min	6.000 1/min	6.600 1/min
Tolerance	PWM 0010		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %

### 3.3 Electrical Interface - Output

Tacho type	/2 (open collector)
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Features	Note	Values
Tacho operating voltage	U <sub>BS</sub>	Min.: 5,0 V    Max.: 30,0 V
Tacho signal Low	U <sub>S low</sub>	I sink: 2 mA <=0,3 V
Tacho signal High	U <sub>S high</sub>	I source: 1 mA 30,0 V
Maximum sink current	I <sub>sink</sub>	<= 4 mA
External resistor	External resistor Ra from U <sub>BS</sub> to U <sub>S</sub> 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	Rectifying diode	
Max. residual current at U <sub>N</sub>	I <sub>F</sub> <= 100 uA	
Locked rotor protection	Auto restart	
Locked rotor current at U <sub>N</sub>	I <sub>block</sub> approx. 3.300 mA	
Clock signal at locked rotor	t <sub>3</sub> / t <sub>4</sub> typical: 0,5 s / 19,5 s	



### 3.5 Aerodynamics

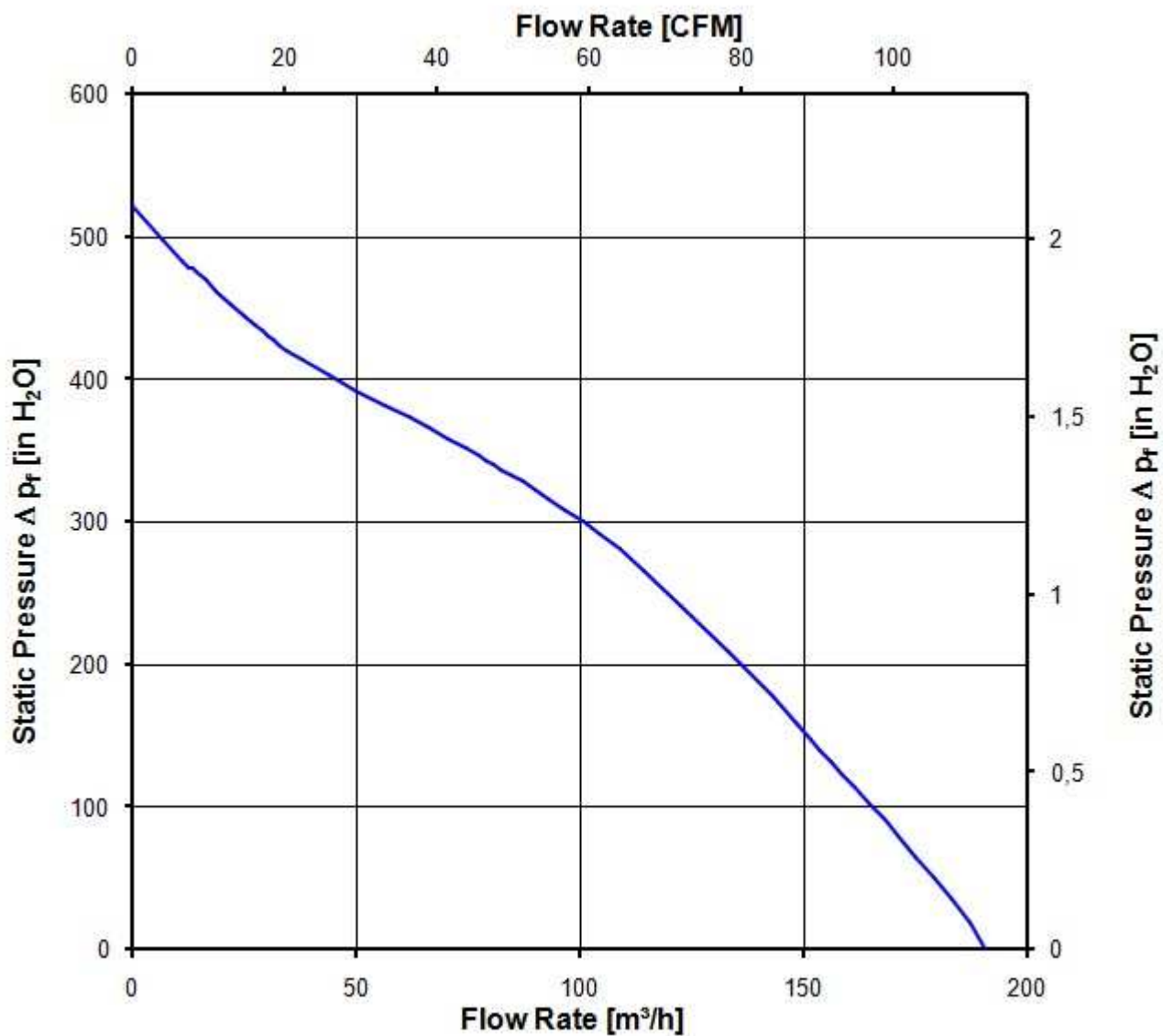
Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801.  
 Normal air density = 1,2 kg/m<sup>3</sup>; Temperature 23°C +/- 3°C;  
 In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.  
 The information is only valid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

Measurement setup:	Measured between two steel plates
Steel plate:	148 mm x 148 mm
Intake nozzle:	D: 66 mm; R: 7 mm
Distance between bottom and top plate:	
Overlapping impeller / nozzle:	1 mm

a.) Operation condition:

6.000 1/min at free air flow	PWM 0 %;	f: 10 kHz	f: 20 kHz
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Max. free-air flow ( $\Delta p = 0 / \dot{V} = \max.$ )	190,0 m <sup>3</sup> /h	
Max. static pressure ( $\Delta p = \max. / \dot{V} = 0$ )	530 Pa	
at free air flow		
at free air flow		



### 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  $L_p(A) < 5 \text{ dB(A)}$   
 For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

6.000 1/min at free air flow	PWM 0 %;	f: 10 kHz	f: 20 kHz
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Optimal operating point	85,0 m3/h @ 300 Pa	
Sound power level at the optimal operating point	7,3 bel(A)	
Sound pressure level at free air flow, measured in rubber bands		
at free air flow		
at free air flow		

## 4 Environment

### 4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	70 °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	
Dust requirements	Dust check; according to DIN EN 60068-2-68, 6g/m2d, 1 day	
Salt fog requirements	None	

Permitted application area:

The product is for the use in sheltered rooms with limited controlled temperature. Occasionally condensed water is allowed. Direct exposure to water must be avoided. Saline ambient conditions must be avoided.

Pollution degree 2 (according DIN EN 60664-1)

It occurs only non-conductive pollution. Occasionally, temporary conductivity caused by condensation occurs.

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	No
CSA	Canadian Standards Association	Yes / CSA audited by UL according to C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Not applicable

## 6 Reliability

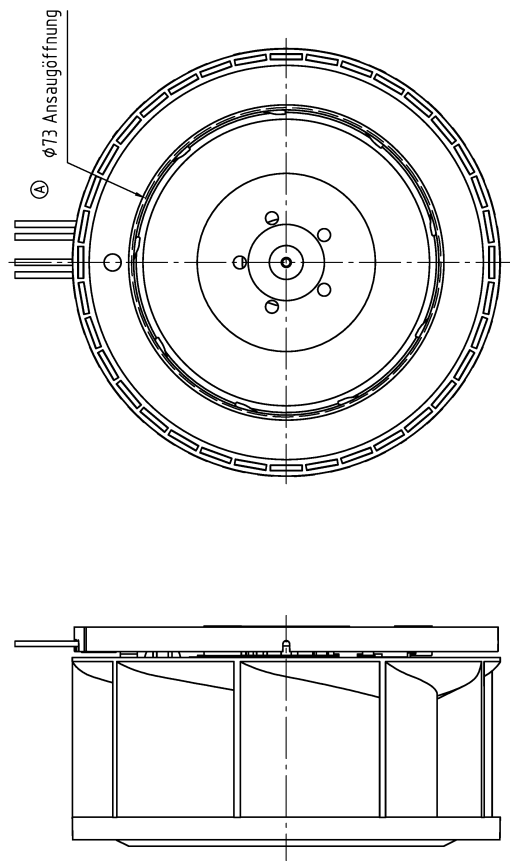
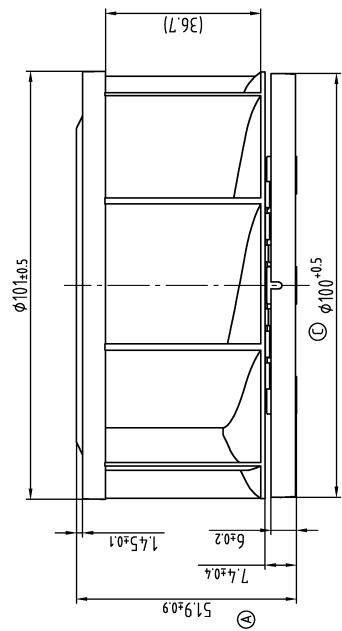
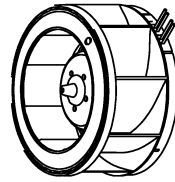
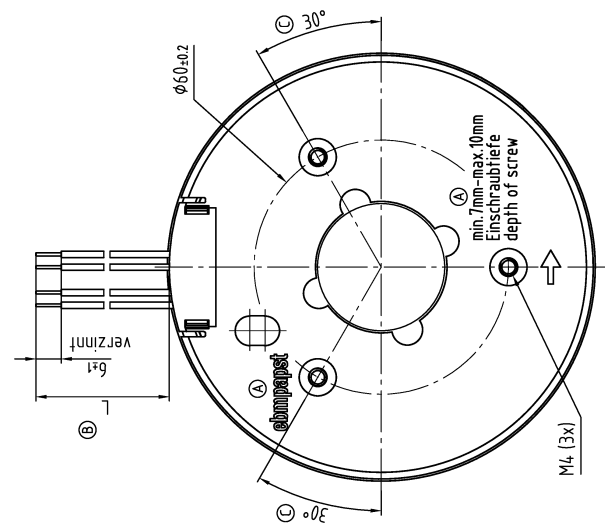
### 6.1 General

Life expectancy L10 at TU = 40 °C	60.000 h	
Life expectancy L10 at TU max.	30.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	102.500 h	

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Schutzmerk nach DIN ISO 1676 beachten!  
Refer to protection notice DIN ISO 1676!

Ⓑ Länge L und Anzahl der Litzen siehe Spezifikation



SW-Stand/Date	Rev. Nr./Change No.	Artik./System-Nr./Name/Part No.	ebmpapst CAP-Technologie/ CAT-Engineering	Werkstoff/Material	Volumen/Volume (mm <sup>3</sup> ): Gewicht/Mass (g):
		Bezieh./Parent/Checked	Name/Name		Ⓐ
		Fertig./Released	Artikel/Title		
Toleranzen/Tolerances		Zchg.-Nr./Drawing-No.			
Allgemeintoleranzen/gen. tolerances		Formel/Size			
		ebmpapst		Material	
		ebm-papst St. Georgen GmbH & Co. KG		Formel/Size	
		Teilname/Part/Part		Material	
				Material/Size	