Product Data Sheet RER140-22/14N/2TDP

ebmpapst

The engineer's choice



GREEN TECH

RER140-22/14N/2TDP

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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

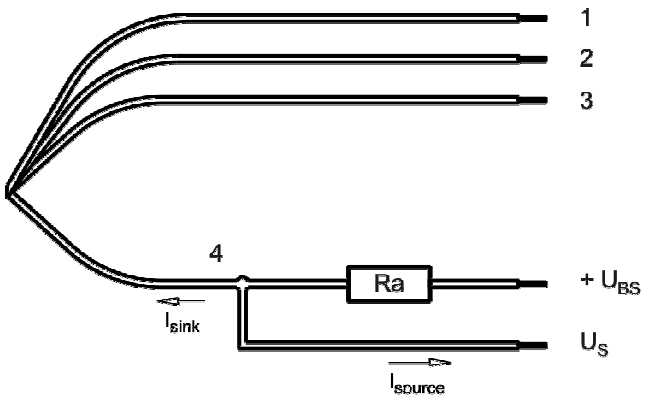
2.1 General

Depth	42,4 mm	
Diameter	140,0 mm	
Mass	0,36 kg	
Housing material		
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 425 mm +- 10 mm	
Tube length Tolerance	S = 75 mm +- 5 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.

Wire 1 - 2: AWG22
Wire 3 - 4: AWG22 (Insulationdiameter 1,35mm)

3 Operating Data

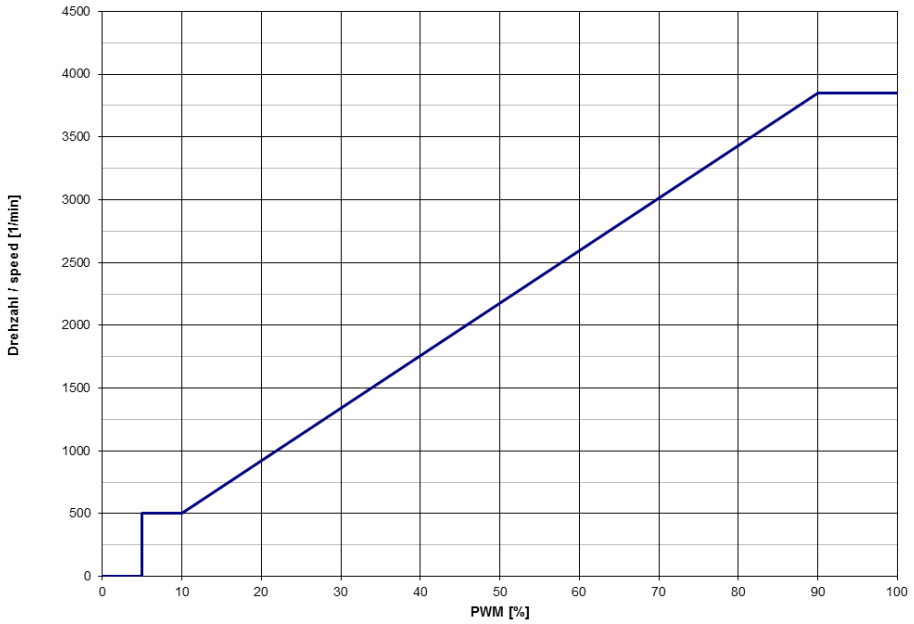
3.1 Electrical Interface - Input

Control input	PWM

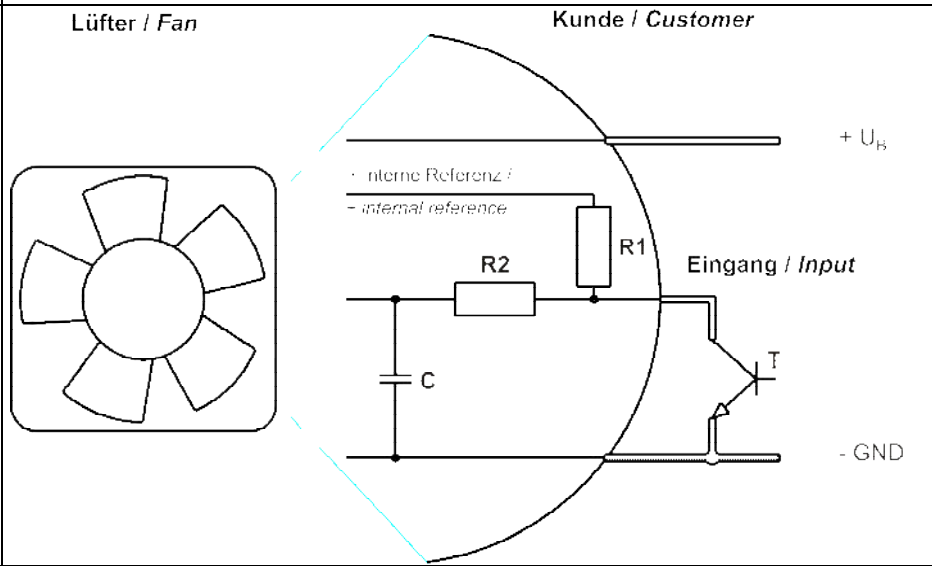
Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 10 kHz typical: 2 kHz

Characteristics



Schematics



Speed control:

By Puls width modulation (PWM) 0 ... 100%
Open collector in relation to signal-ground
f = 2kHz +-20%

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

Information to the curve:

0 % - 5% PWM:	0 1/min
5 % - 10% PWM:	500 1/min (corresponding to min. speed)
10 % - 90% PWM:	linear increasing curve
90 % - 100% PWM:	3.850 1/min (corresponding to max. speed)
5 % PWM:	500 1/min bzw. 0 1/min (Fan off, comming from 100% PWM)

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.

Measurement setup:	Measured between two steel plates
Steel plate:	180 mm x 180 mm
Intake nozzle:	D: 94 mm; R: 16 mm
Distance between bottom and top plate:	60,6 mm
Overlapping impeller / nozzle:	0,3 mm

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

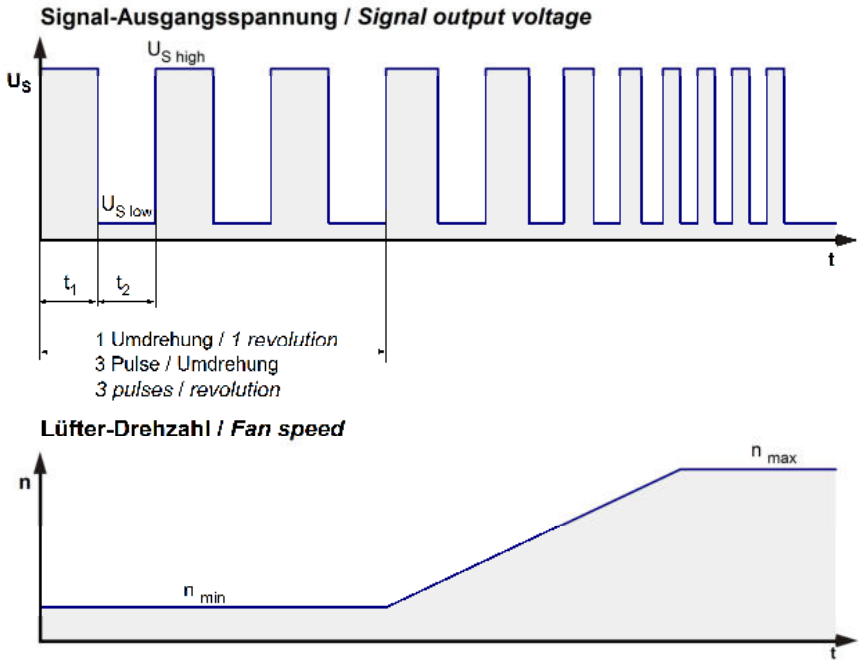
Name	**Condition**		
PWM 0001	PWM: 95 %; f: = 2 kHz		

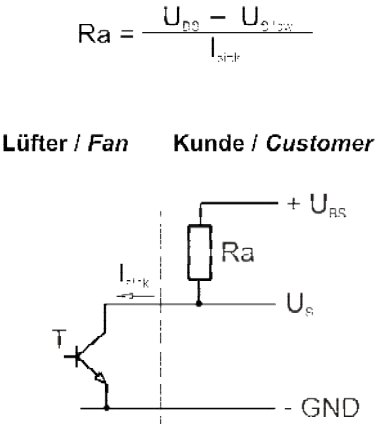
100% PWM; f = 2 kHz or broken lead wire (open control input)

Features	**Condition**	**Symbol**	**Values**		
Voltage range		U	20,0 V		28,0 V
Nominal voltage		U_N		24,0 V	
Power consumption Tolerance	$\Delta p = 0$ PWM 0010	P	24 W +- 10,0 %	34 W +- 10,0 %	34 W +- 10,0 %
Current consumption Tolerance	$\Delta p = 0$ PWM0010	I	1.200 mA +- 10,0 %	1.400 mA +- 10,0 %	1.200 mA +- 10,0 %
Speed Tolerance	$\Delta p = 0$ PWM 0010	n	3.450 1/min +- 10,0 %	3.850 1/min +- 7,5 %	3.850 1/min +- 7,5 %

3.3 Electrical Interface - Output

Tacho type	/2 (open collector)





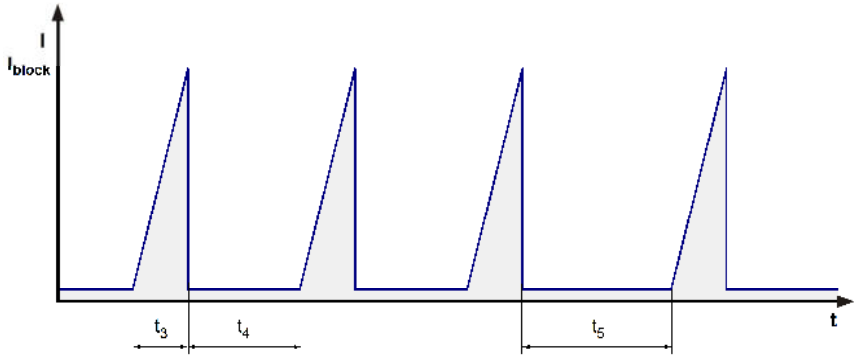
Features		Note	Values
Tacho operating voltage	U_{BS}		<= 30,0 V
Tacho signal Low	$U_{S\ low}$	I sink: 2 mA	<= 0,4 V
Tacho signal High	$U_{S\ high}$	I source: 0 mA	<=30,0 V
Maximum sink current	I_{sink}		<= 20 mA
Maximum source current			0 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(3 x n) / 60	195 Hz
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 Max. residual current at U_N	N-CH FET I_F <= 5 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 200 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 3,6 s / 9,4 s	
Voltage control *)	Fan turns on at U_B > 19,3 V or < 29,3 V Fan turns off at U_B < 18,7 V or > 30,5 V	

*) This fan has an undervoltage and overvoltage control circuit integrated which turns the motor off if the voltage is out of range.



Internal Fuse:

Littelfuse Nano$_c$ Fuse
452/454 Series
2.5A / 125V /Träge / SMD

3.5 Aerodynamics

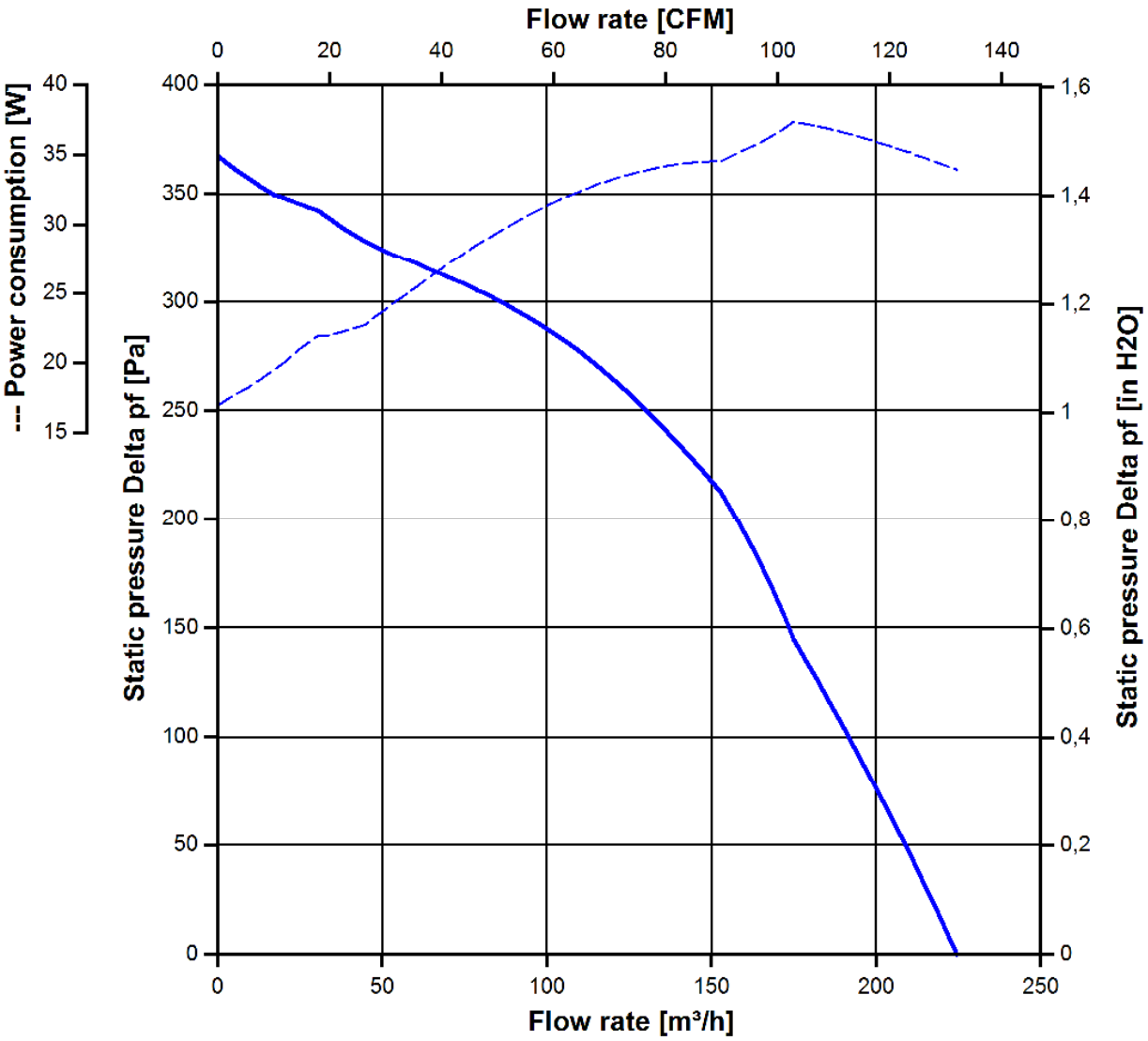
Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C; In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal. The information is only valid under the specified 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. Power consumption of the fan motor when operating at normal voltage is shown. Depending on the operating conditions of the application, the power input may be higher.

Measurement setup:	Measured between two steel plates
Steel plate:	180 mm x 180 mm
Intake nozzle:	D: 94 mm; R: 16 mm
Distance between bottom and top plate:	60,6 mm
Overlapping impeller / nozzle:	0,3 mm

a.) Operation condition:

3.850 1/min at free air flow	PWM 95 %; f: = 2 kHz		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	225 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	365 Pa	


Flow rate [CFM]
0
20
40
60
80
100
120
140
--- Power consumption [W]
40
35
30
25
20
15
Static pressure Delta pf [Pa]
400
350
300
250
200
150
100
50
0
Static pressure Delta pf [in H2O]
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
0
50
100
150
200
250
Flow rate [m³/h]

3.6 Sound Data

Measurement conditions:	Sound pressure level: 1 meter distance between microphone and the air intake. Sound power level: According 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 chapter aerodynamics.

a.) Operation condition:

3.850 1/min at free air flow	PWM 95 %; f: = 2 kHz		

Optimal operating point	135 m3/h @ 240 Pa	
Sound power level at the optimal operating point	6,9 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.	65 °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.

4.3 EMC

Kind	**Electrostatic Discharge Immunity Test**
According	DIN EN 61000-4-2:2001-12
Ceck accuracy / Limit	Contact Discharge +/- 4 kV; Air Discharge +/- 8 kV
Result	B: The monitored function may deviate from designed performance to a specified level during exposure to a disturbance or revert to a fail safe mode or operation, but shall return to normal operation after the disturbance is removed.

Kind	Electromagnetic Field Immunity Test
According	DIN EN 61000-4-3:2006-12
Ceck accuracy / Limit	10 V/m; 80 - 1000 MHz; AM; m = 0,8; f = 1 kHz; 1%; t = 3 s
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	Electrical Fast Transient / Burst Immunity Test
According	DIN EN 61000-4-4:2005-07
Ceck accuracy / Limit	+/- 2 kV on Power Lines; Coupling: POS, NEG, {PE}, ALL, 5 kHz and 100 kHz; 1 min
Result	B: The monitored function may deviate from designed performance to a specified level during exposure to a disturbance or revert to a fail safe mode or operation, but shall return to normal operation after the disturbance is removed.

Kind	Immunity to Conducted Disturbances, Induced by RF-Fields
According	DIN EN 61000-4-6:2001-12
Ceck accuracy / Limit	10 Vrms; 150 kHz - 80 MHz; m = 0,8; f = 1 kHz; 1%; t = 3 s
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

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. 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 / 1,5 mm	
Protection class	III	

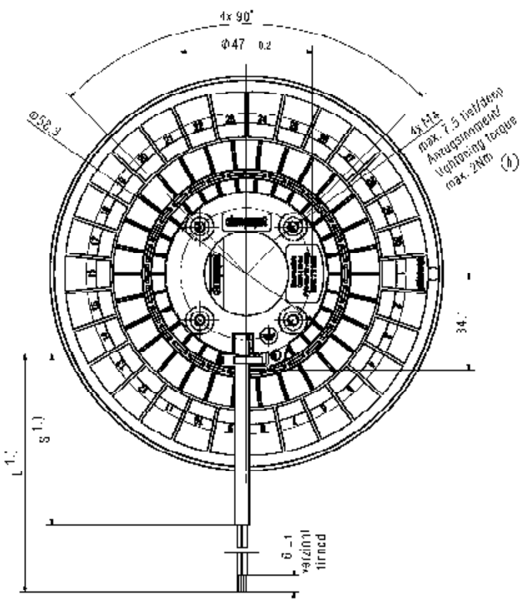
5.2 Approval Tests

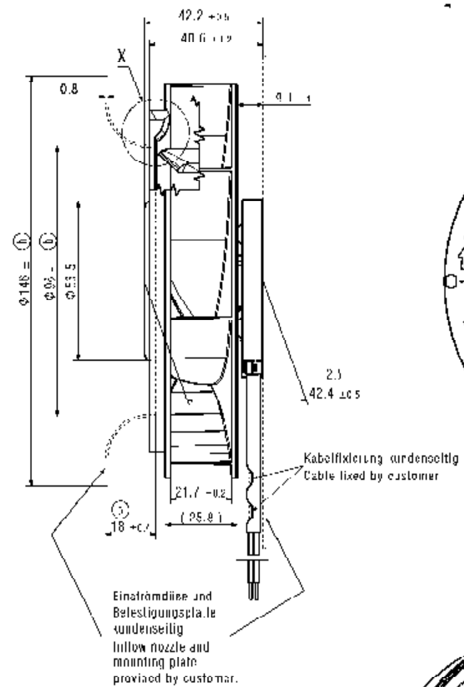
CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans
VDE	Association for Electrical, Electronic and Information Technologies	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Canadian Standards Association	Yes / C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Not applicable

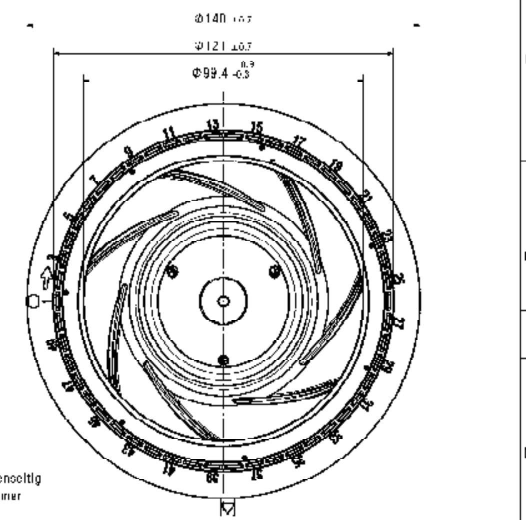
6 Reliability

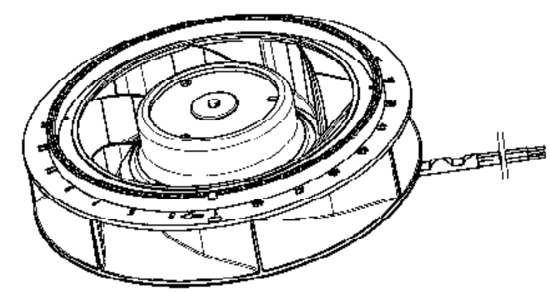
6.1 General

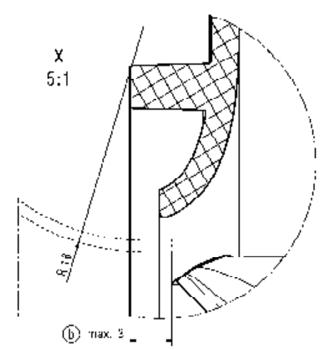
Life expectancy L10 at TU = 40 °C	55.000 h	
Life expectancy L10 at TU max.	30.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	92.500 h	











1.) Länge und Anzahl der Litzen sowie Länge des Schlauchs siehe Produktspezifikation
2.) Gesamthöhe des Lüfters bis Wellenende
Axialspiel der Kugellager mit Feder spielfrei verspannt

1.) length and number of wires and length of tube see product specification
2.) total height of blower unto end of shaft
– ball bearings without clearance by a pre-loaded spring