



The engineer's choice

ebmpapst

RLF35-8/14N/2P-115

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1 General

Fan type	Blower	
Rotational direction looking at rotor	counterclockwise	
Airflow direction	Air in axially, Air out radially	
Bearing system	Ball bearing	
Mounting position	any	

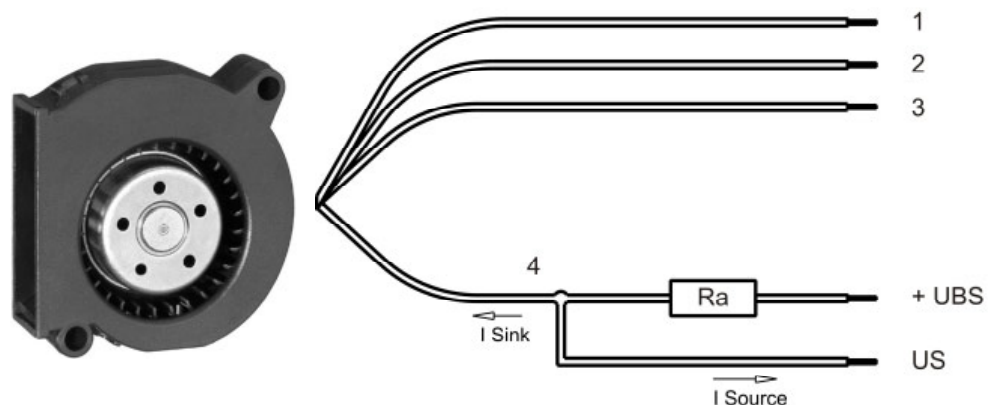
2 Mechanics

2.1 General

Width	51,0 mm	
Height	51,0 mm	
Depth	15,0 mm	
Weight	0,036 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges	wire outlet corner: 100 Ncm remaining corners: 100 Ncm	
Screw size	ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires - Plug	
Length of lead wire	L = 310 mm	
Tolerance	+/- 10,0 mm	
Wire gauge (AWG)	26	
Insulation diameter	1,35 mm	
Contact	see drawing	



	Colour	Operation
Wire 1	red	+ UB
Wire 2	blue	- GND
Wire 3	violet	PWM
Wire 4	white	Tacho

The auxiliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

3 Operating Data

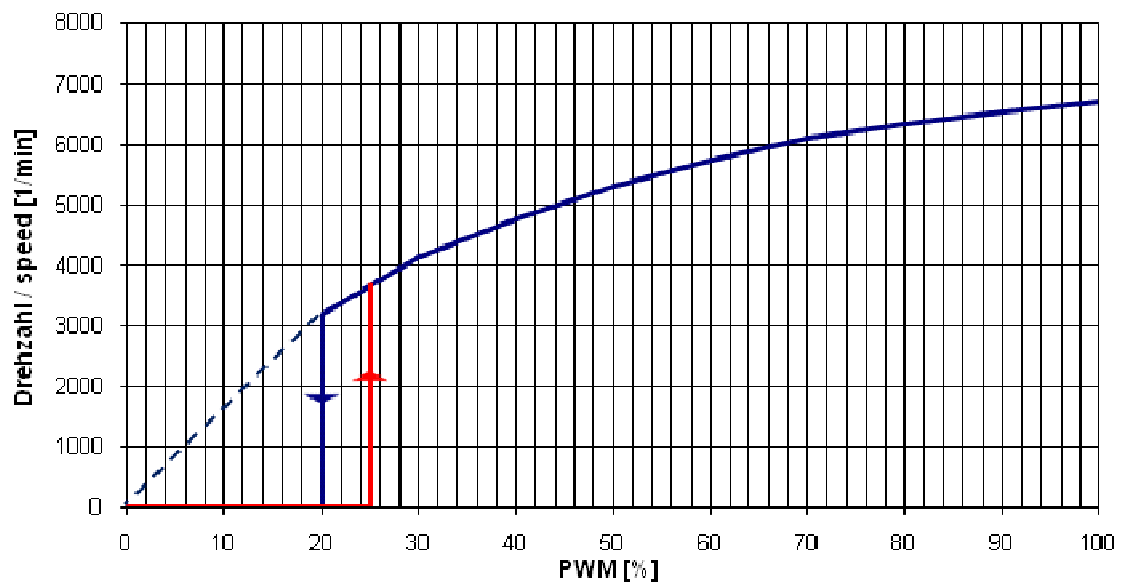
3.1 Operating Data - Electrical Interface - Input

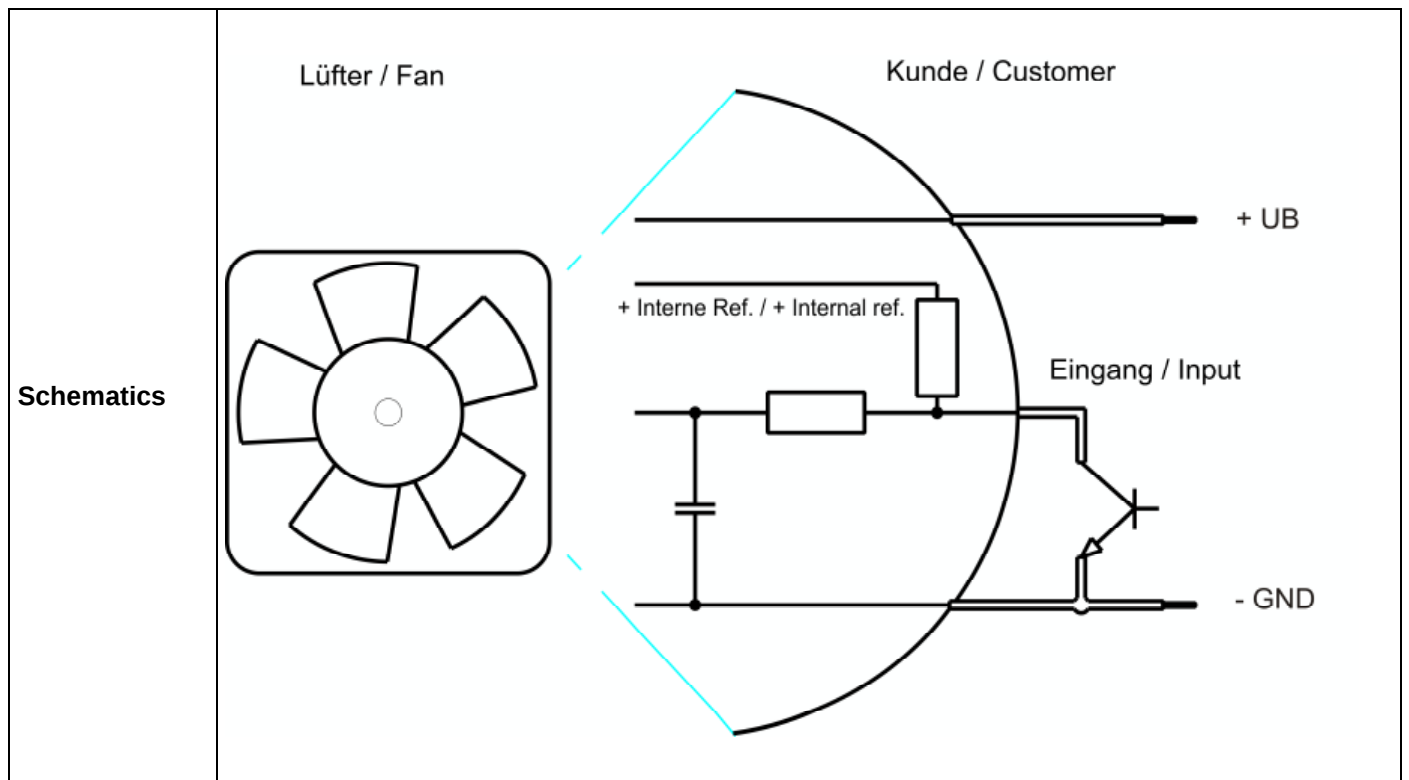
Control input	PWM
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Features

Input type	Open collector / TTL	
PWM - Frequency		21 kHz - 28 kHz Typical: 25 kHz
Max. voltage for logic "Low"		0,8 V
Max. voltage for logic "High"	Open circuit voltage	5,25 V
Maximum source current	short circuit current	≤ 5 mA
4 wire startup condition	PWM duty cycle	> 25 %
4 wire operation condition after startup	PWM duty cycle	20 % - 100 %
Shutdown condition	PWM duty cycle	< 1 %
Typical time until warm restart	After shutdown by PWM	$\sim 1,2$ s

Characteristics





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.

$\Delta p = 0$: corresp. to free air flow (see section 3.5)
 I: corresp. to arithm. mean current value

Name	Condition
PWM 0001	PWM: 100 %; f: 25 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	14,0 V		28,0 V
Nominal voltage	$\Delta p = 0$	U_N		24,0 V	
Power consumption	$\Delta p = 0$	P	1,4 W	4,2 W	5,6 W
Tolerance	PWM 0001		+/- 17,5 %	+/- 12,5 %	+/- 17,5 %
Current consumption	$\Delta p = 0$	I	100 mA	173 mA	200 mA
Tolerance	PWM 0001		+/- 17,5 %	+/- 12,5 %	+/- 17,5 %
Speed	$\Delta p = 0$	n	4.880 rpm	6.700 rpm	7.670 rpm
Tolerance	PWM 0001		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %
Starting current consumption				330 mA	

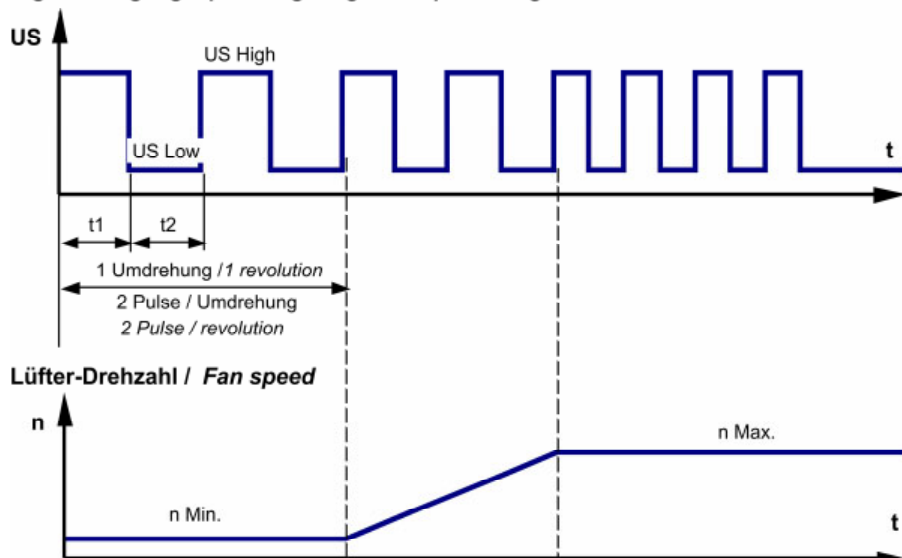
Name	Condition		
PWM 0002	PWM: 50 %; f: 25 kHz		

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	14,0 V		28,0 V
Nominal voltage	$\Delta p = 0$	U_N		24,0 V	
Power consumption	$\Delta p = 0$	P	0,6 W	1,9 W	2,8 W
Tolerance	PWM 0002		+/- 17,5 %	+/- 12,5 %	+/- 17,5 %
Current consumption	$\Delta p = 0$	I	43 mA	80 mA	100 mA
Tolerance	PWM 0002		+/- 17,5 %	+/- 12,5 %	+/- 17,5 %
Speed	$\Delta p = 0$	n	3.300 rpm	5.420 rpm	6.090 rpm
Tolerance	PWM 0002		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %

3.3 Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)
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Signal-Ausgangsspannung / Signal output voltage



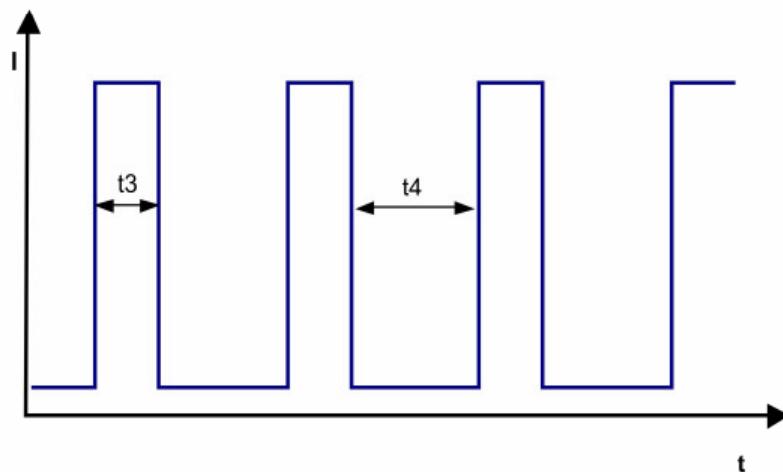
$$R_a = \frac{U_{BS} - U_{S\ Low}}{I_{Sink}}$$

Features	Note	Values
Tacho operating voltage (UBS)		$\leq 28,0 \text{ V}$
Tacho signal Low	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High	I source: 0 mA	28,0 V
Maximum sink current		$\leq 4 \text{ mA}$
External resistor	External resistor R_a from UBS to US required. All voltages measured to GND.	
Tacho frequency	$(2 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5 \text{ V/us}$

Alarm type	None
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3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	
Max. residual current at U_n	$I_F \leq 10 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at U_n	approx. 330 mA	
Clock signal t_3/t_4 at locked rotor	Typical: 0,5 s / 2,8 s	



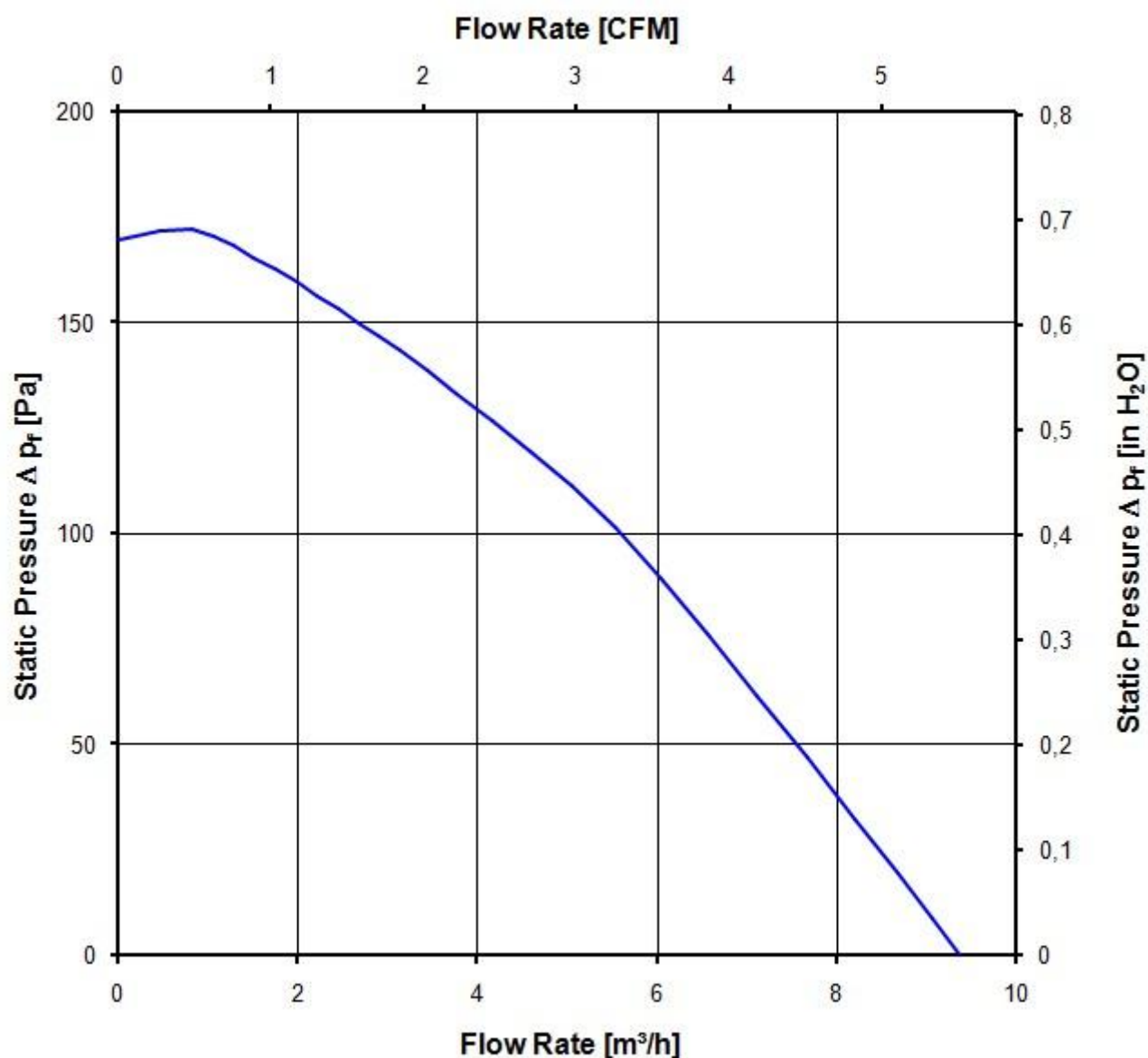
3.5 Aerodynamic

Measurement
conditions:

Measured with a double chamber intake rig.
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:

6.700 rpm at free air flow	PWM 100 %; f: 25 kHz		
Max. free-air flow ($\Delta p = 0$ / $\dot{V} = \text{max.}$)	9,6 m ³ /h		
Max. static pressure ($\Delta p = \text{max.}$ / $\dot{V} = 0$)	170 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 $L_p(A) < 5 \text{ dB(A)}$
 For further measurement conditions see section 3.5

a.) Operation condition:

6.700 rpm at free air flow	PWM 100 %; f: 25 kHz	PWM min.:	PWM max.:
Optimal operating point	7,0 m ³ /h @ 60 Pa		
Sound power level at the optimal operating point	5,5 bel(A)		

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.	85 °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.

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

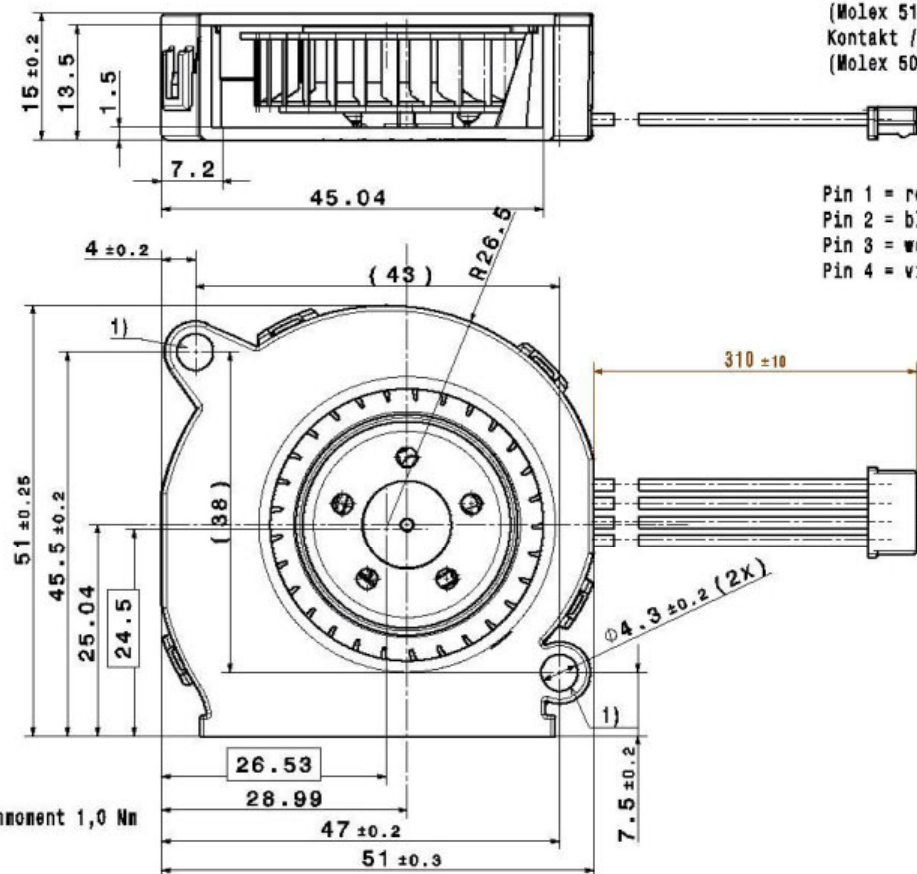
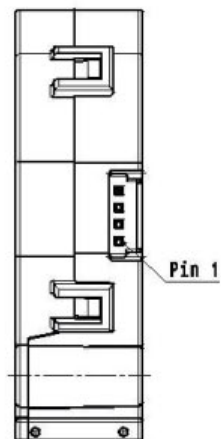
CE	Yes
UL	Yes / UL audited by CSA according to UL507, Electric Fans
VDE	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Yes / C22.2 No. 113 Fans and Ventilators
CCC	No

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 IPC (40 °C)	102.500 h	

I think they are being withheld to deny



Pin 1 = rot/red (UB)
Pin 2 = blau/blue (GND)
Pin 3 = weiß/white (Tacho)
Pin 4 = violett/violet (PWM)

[illegible]