



The engineer's choice

ebmpapst

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1 General

Fan type	Fan	
Rotational direction looking at rotor	counterclockwise	
Airflow direction	Air outlet over struts	
Bearing system	Ball bearing	
Mounting position	any	

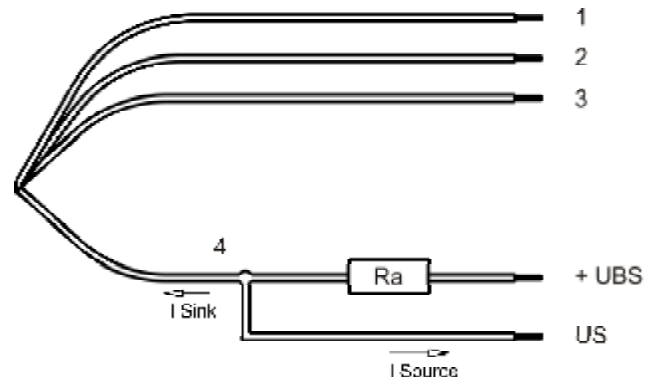
2 Mechanics

2.1 General

Width	40,0 mm	
Height	40,0 mm	
Depth	28,0 mm	
Weight	0,044 kg	
Housing material	Plastic	
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Length of lead wire	310 mm	
Tolerance	+ - 10,0 mm	
Wire gauge (AWG)	28	
Insulation diameter	0,9 mm	
Contact	see drawing	



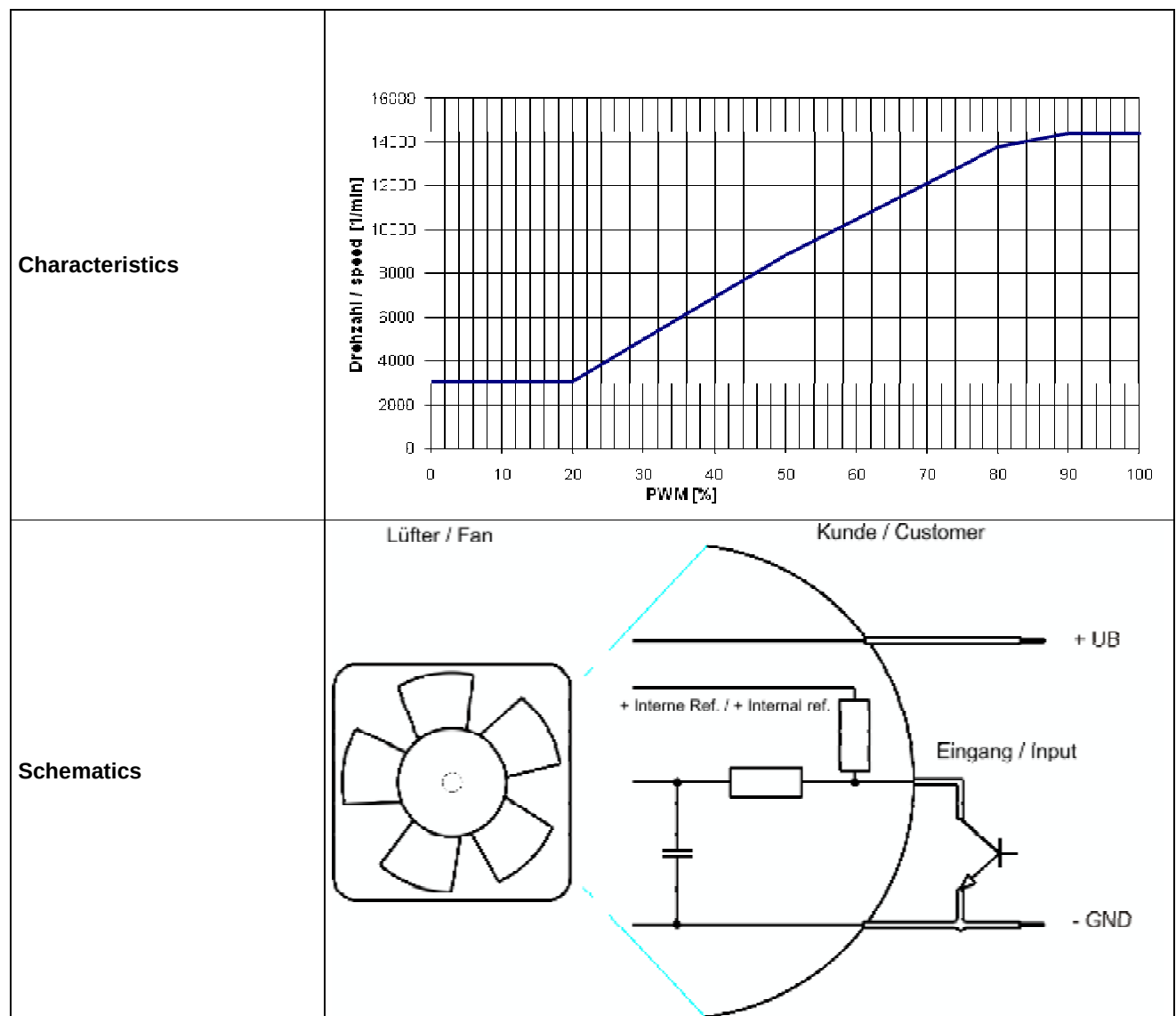
	Colour	Operation
Wire 1	red	+ UB
Wire 2	blue	- GND
Wire 3	violet	PWM
Wire 4	white	Tacho

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
Input type	Open collector	
PWM - Frequency		1 kHz - 30 kHz Typical: 25 kHz
Max. voltage for logic "Low"		0,2 V
Maximum source current	short circuit current	$\leq 1 \text{ mA}$



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	8,0 V		13,8 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption	$\Delta p = 0$	P	3,4 W	7,9 W	10,5 W
Tolerance	PWM 0001		+/- 17,5 %	+/- 12,5 %	+/- 15 %
Current consumption	$\Delta p = 0$	I	420 mA	660 mA	760 mA
Tolerance	PWM 0001		+/- 17,5 %	+/- 12,5 %	+/- 15 %
Speed	$\Delta p = 0$	n	10.750 1/min	14.400 1/min	15.250 1/min
Tolerance	PWM 0001		+/- 12,5 %	+/- 7,5 %	+/- 10 %
Starting current consumption				1.000 mA	

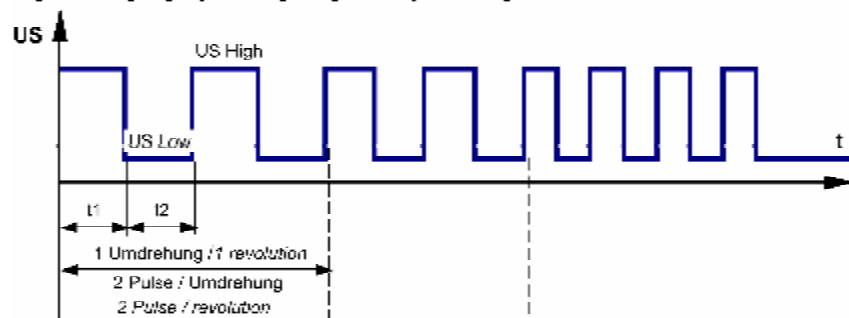
Name	Condition
PWM 0002	PWM: 50 %; f: 25 kHz

Features	Condition	Symbol	Values
Voltage range	$\Delta p = 0$	U	13,8 V
Nominal voltage	$\Delta p = 0$	U_N	12,0 V
Power consumption	$\Delta p = 0$	P	2,2 W +/- 15,0 %
Tolerance	PWM 0002		
Current consumption	$\Delta p = 0$	I	180 mA +/- 15 %
Tolerance	PWM 0002		
Speed	$\Delta p = 0$	n	8.850 1/min +/- 10 %
Tolerance	PWM 0002		

3.3 Operating Data - Electrical Interface -Output

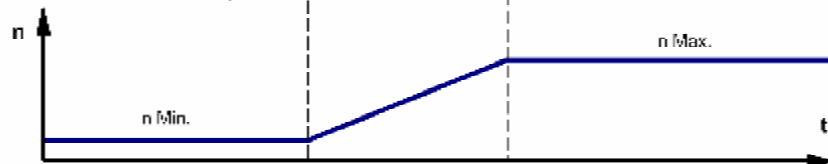
Tacho type	/2 (Open collector)
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Signal-Ausgangsspannung / Signal output voltage



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

Lüfter-Drehzahl / Fan speed

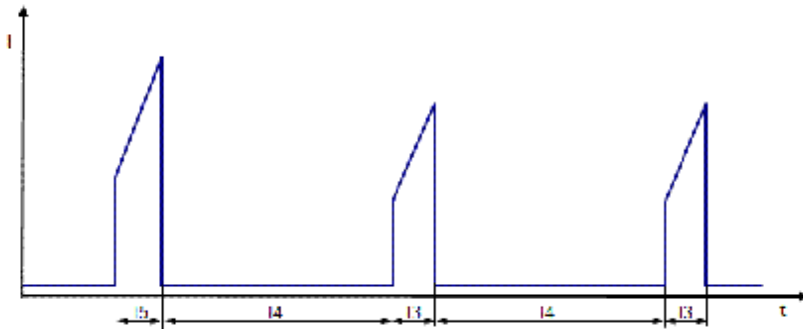


Features	Note	Values
Tacho operating voltage (UBS)		$\leq 15 \text{ V}$
Tacho signal Low	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High	I source: 0 mA	15 V
Maximum sink current		$\leq 4 \text{ mA}$
External resistor	External resistor R_a from UBS to US required. All voltages measured to GND.	
Tacho frequency	$(2 \times n) / 60$	480 Hz
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	$I_F \leq 5 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at U_n	approx. 1.000 mA	
Clock signal t_3/t_4 at locked rotor	Typical: 0,45 s / 4,5 s t_3 : 0,25 s... 0,75 s t_4 : 2,5 s... 7,5 s	



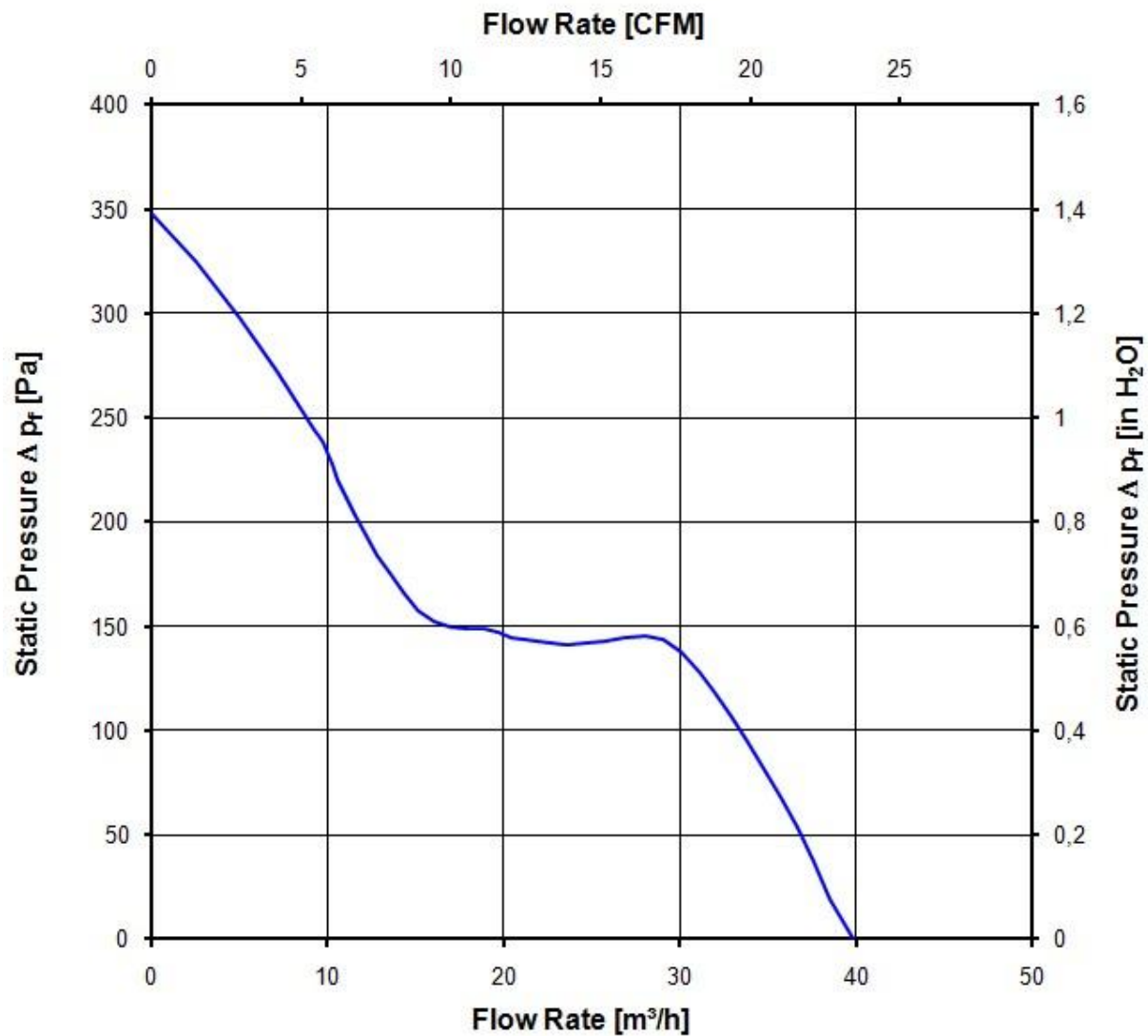
First pulse t_5 typical 0.7s (0.5 .. 1.0s) followed by t_4 .
Afterwards cyclical t_3/t_4 .

3.5 Aerodynamic

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.

a.) Operation condition:

14.400 1/min at free air flow	PWM 100 %; f: 25 kHz		
14.400 1/min at free air flow			
Max. free-air flow ($\Delta p = 0$ / $\dot{V} = \text{max.}$)		40,0 m ³ /h	
Max. static pressure ($\Delta p = \text{max.}$ / $\dot{V} = 0$)		350 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:

14.400 1/min at free air flow	PWM 100 %; f: 25 kHz	PWM min.:	PWM max.:
14.400 1/min at free air flow			

Optimal operating point	30,0 m ³ /h @ 121 Pa	
Sound power level at the optimal operating point	6,9 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	58,0 dB(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.	80 °C	

4.2 Climatic requirements*)

Humidity requirements	humid heat, constant; according to DIN EN 60068-2-78, 14 days	
Water exposure	None	
Radiation exposure	None	
Dust requirements	None	
Salt fog requirements	None	
Harmful gas 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.

Mechanical requirements

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.	Not applicable Not applicable	
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	
Air and leakage distances	0,5 mm / 1,2 mm	
Protection class	III	

for functional security Test at 200 VAC / 1sec

5.2 Approval Tests

CE	No
UL	No
VDE	No
CSA	No
CCC	No

The approval tests are observed to:

Maximal permitted operating voltage (see section 3.1) and max. permitted ambient temperature TU max.

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 Delta (40 °C)	120.000 h	