



The engineer's choice

ebmpapst

5314/2TDHP

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1 General

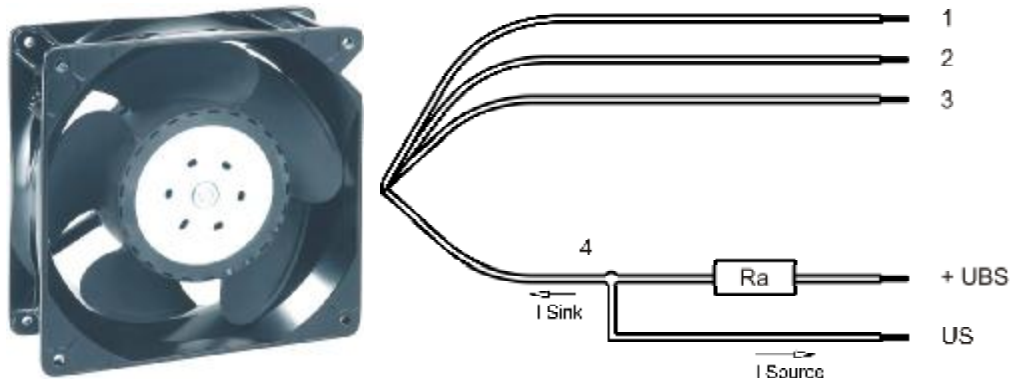
Fan type	Fan	
Rotational direction looking at rotor	counterclockwise	
Airflow direction	Air intake over struts	
Bearing system	Ball bearing	
Mounting position	any	

2 Mechanics**2.1 General**

Width	140,0 mm	
Height	140,0 mm	
Depth	51,0 mm	
Weight	0,900 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges	wire outlet corner: 440 Ncm remaining corners: 600 Ncm	
Screw size	ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires	
Length of lead wire	310 mm	
Tolerance	+/- 10,0 mm	
Length of tube	50 mm	
Tolerance	+/- 2,0 mm	
Wire gauge (AWG)	22	
Insulation diameter	2,05 mm	
Contact	see drawing	



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

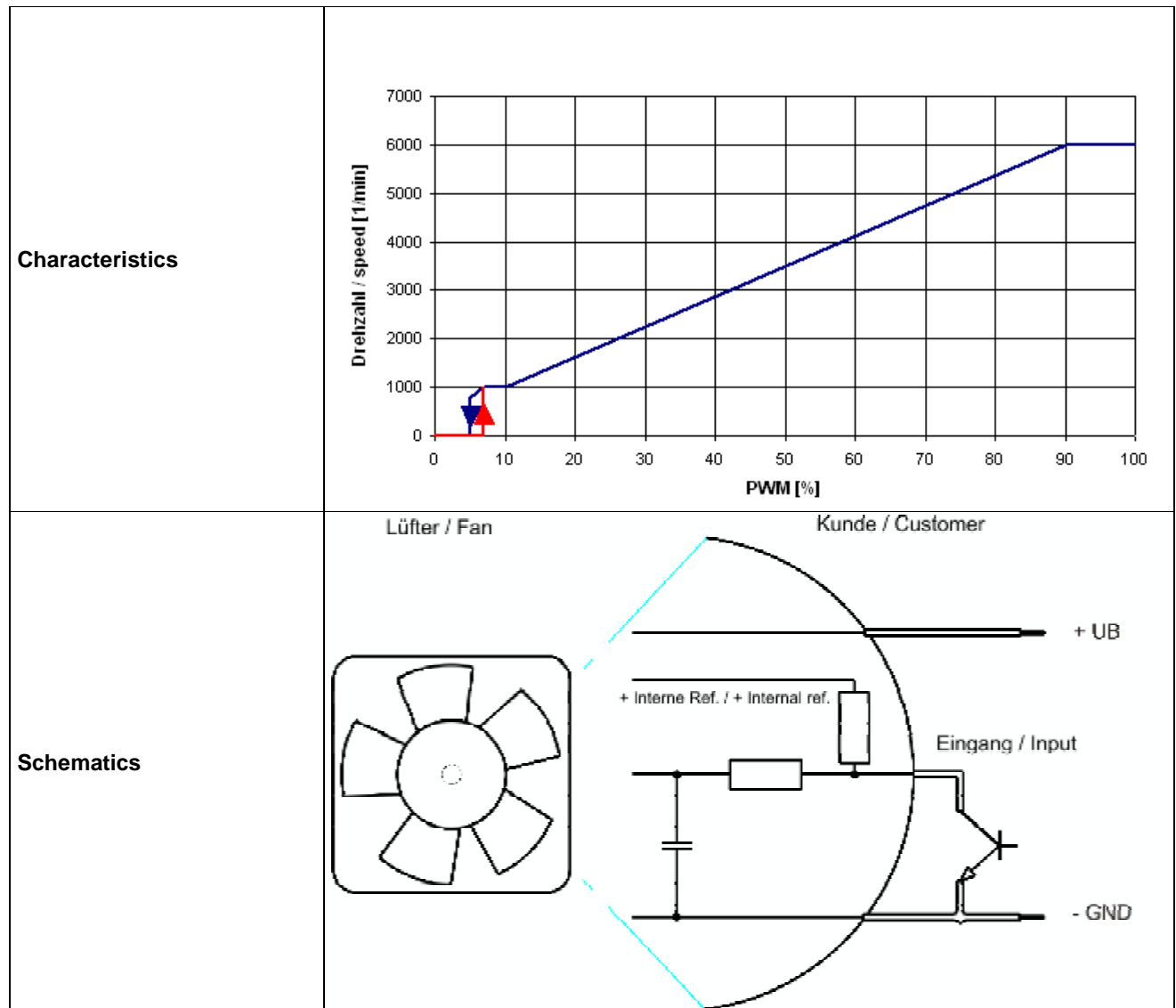
The auxiliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

3 Operating Data

3.1 Operating Data - Electrical Interface - Input

Control input	PWM
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Features



Speed control:

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

Information to the curve:

0 % - 7% PWM:	0 1/min	
7 % PWM:		1.000 1/min (Fan on, coming from 0% PWM)
7 % - 10% PWM:	1.000 1/min (corresponding to min. speed)	
10 % - 90% PWM:	linear increasing curve	
90 % - 100% PWM:	6.000 1/min (corresponding to max. speed)	
7 % - 5 % PWM:	linear decreasing curve (coming from 100% PWM)	
5 % PWM:		800 1/min or 0 1/min (Fan off, coming 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.

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

Name	Condition
PWM 0001	PWM: 100 %; f: 2 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	16,0 V		36,0 V
Nominal voltage	$\Delta p = 0$	U_N		24,0 V	
Power consumption	$\Delta p = 0$	P	24,5 W	41,8 W	43,2 W
Tolerance	PWM 0001		+/- 17,5 %	+/- 15,0 %	+/- 15,0 %
Current consumption	$\Delta p = 0$	I	1.530 mA	1.740 mA	1.200 mA
Tolerance	PWM 0001		+/- 17,5 %	+/- 15,0 %	+/- 15,0 %
Speed	$\Delta p = 0$	n	4.950 1/min	6.000 1/min	6.000 1/min
Tolerance	PWM 0001		+/- 15,0 %	+/- 5,0 %	+/- 5,0 %

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

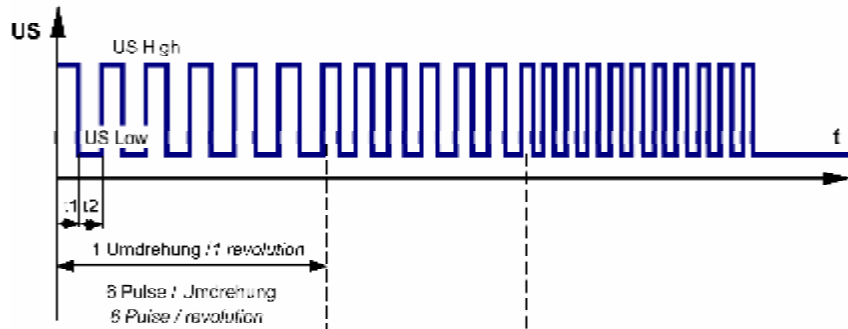
Name	Condition		
PWM 0002	PWM: 50 %; f: 2 kHz		

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	16,0 V		36,0 V
Nominal voltage	$\Delta p = 0$	U_N		24,0 V	
Power consumption	$\Delta p = 0$	P	9,6 W	10,1 W	10,8 W
Tolerance	PWM 0002		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %
Current consumption	$\Delta p = 0$	I	600 mA	420 mA	300 mA
Tolerance	PWM 0002		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %
Speed	$\Delta p = 0$	n	3.430 1/min	3.430 1/min	3.430 1/min
Tolerance	PWM 0002		+/- 5,0 %	+/- 5,0 %	+/- 5,0 %

3.3 Operating Data - Electrical Interface -Output

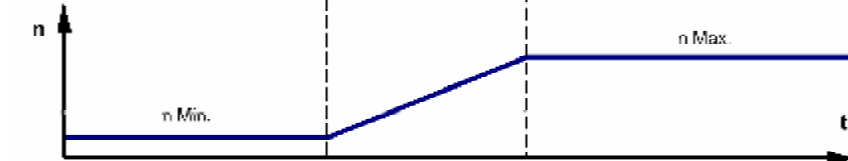
Tacho type	/2 (Open collector)
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Signal-Ausgangsspannung / Signal output voltage



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

Lüfter-Drehzahl / Fan speed



Features	Note	Values
Tacho operating voltage (UBS)		$\leq 60,0 \text{ V}$
Tacho signal Low	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High	I source: 0 mA	60,0 V
Maximum sink current		$\leq 20 \text{ mA}$
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency	$(6 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5 \text{ V/us}$

Please note:

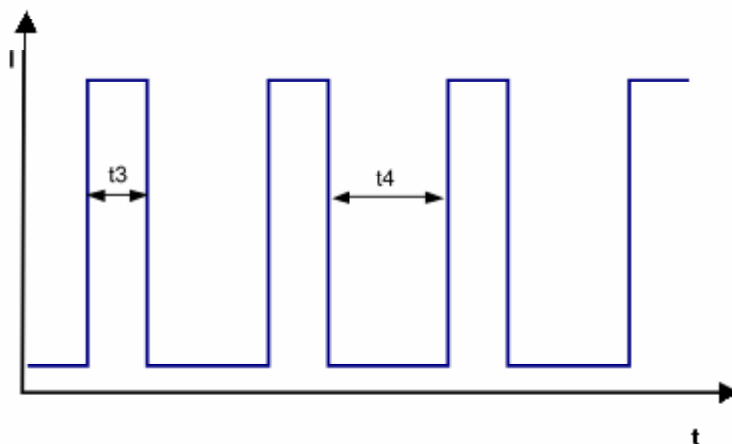
At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.

The tacho signal is only activated after the start-up is completed.

Alarm type	None
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3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	P-CH FET	
Max. residual current at Un	IF $\leq 100 \text{ uA}$	
Locked rotor protection	Auto restart	
Locked rotor current at Un		
Clock signal t3/t4 at locked rotor	Typical: 1,5 s / 10,0 s t3: 1,0 s... 5,0 s t4: 9,5 s... 10,5 s	



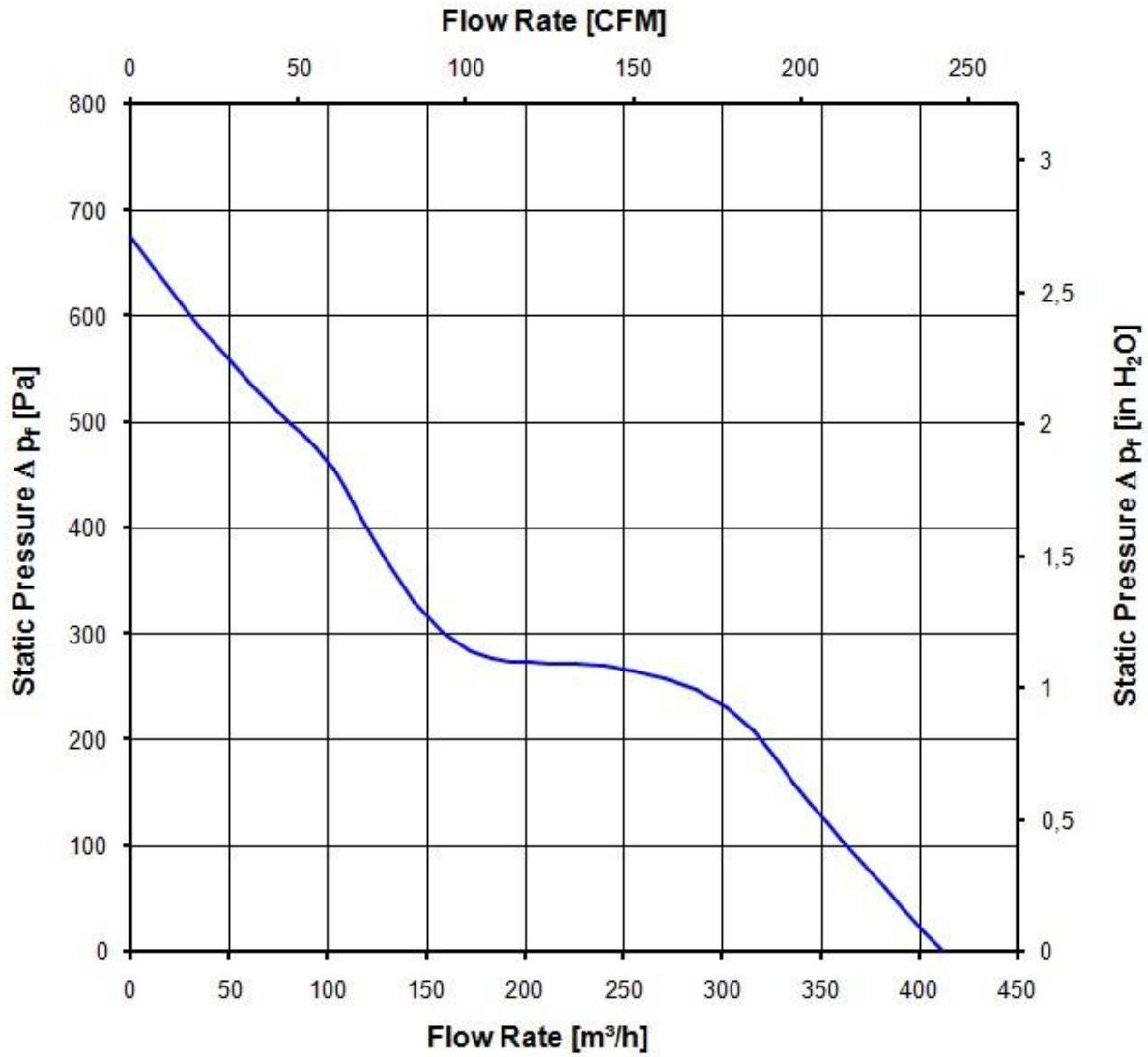
3.5 Aerodynamic

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:

6.000 1/min at free air flow	PWM 100 %; f: 2 kHz		
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Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$)	410,0 m ³ /h	
Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$)	675 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:

6.000 1/min at free air flow	PWM 100 %; f: 2 kHz	PWM min.:	PWM max.:
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Optimal operating point	255,0 m ³ /h @ 244 Pa	
Sound power level at the optimal operating point	7,7 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	70,0 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.	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	
Air and leakage distances	1,0 mm / 1,2 mm	
Protection class	III	

5.2 Approval Tests

CE	No
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

The approval tests are observed to:

U approval max.: 36,0 V @ TU approval max.: 70,0 °C

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	70.000 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 Delta (40 °C)	140.000 h	