

KARTA KATALOGOWA

4114 N/2H8P

Wentylator osiowy kompaktowy DC

Producent: ebm-papst

**Dane znamionowe**

Napięcie znamionowe	24 V DC (16...30 V DC)
Prędkość obrotowa	11000 obr/min
Pobór mocy	130,0 W
Pobór prądu	5500 mA
Wydajność	565 m³/h
Maks. ciśnienie statyczne	1340 Pa
Poziom ciśnienia akustycznego	79 dB(A)
Poziom mocy akustycznej	8,8 B
Temperatura otoczenia	-20...+75 °C

Budowa

Wymiary	119 × 119 × 38 mm
Materiał wirnika	tworzywo sztuczne
Obudowa	metal
Kierunek obrotów	w prawo, patrząc na wirnik
Łożyskowanie	kulkowe
Podłączenie	przewody AWG 20
Trwałość L10 (40 °C)	55000 h
Masa	0,425 kg

Dane na okładce odczytane z karty produktu ebm-papst (oryginał na kolejnych stronach).
Producent zastrzega możliwość zmian.

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The engineer's choice

ebmpapst

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1 General

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

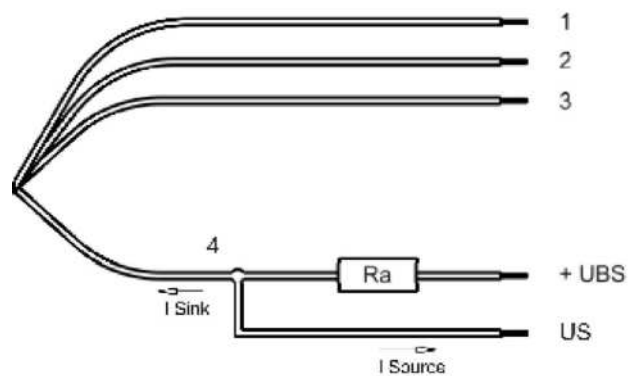
2 Mechanics
2.1 General

Width	119,0 mm	
Height	119,0 mm	
Depth	38,0 mm	
Weight	0,425 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges	wire outlet corner: 420 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	
Wire gauge (AWG)	20 22	
Insulation diameter	1,70 mm 2,05 mm	
Contact	see drawing	

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

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

Lead wire 1 - 2: AWG20
Lead wire 3 - 4: AWG22 (Insulation diameter 2,05mm)

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3 Operating Data

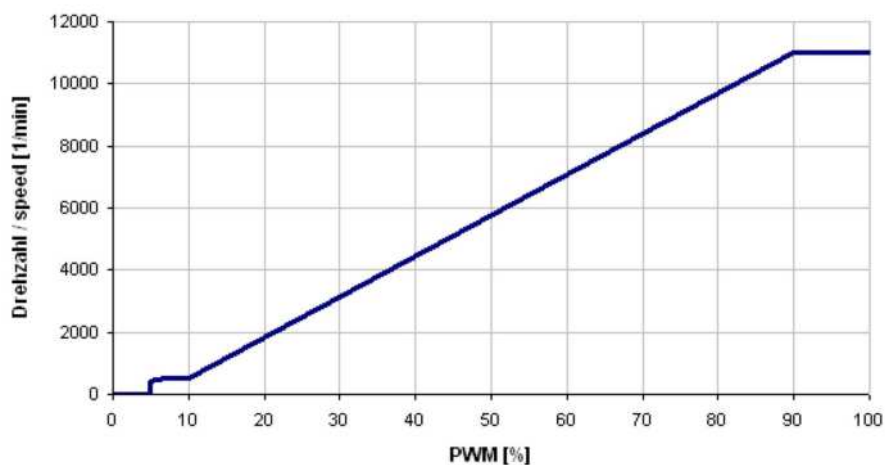
3.1 Operating Data - Electrical Interface - Input

Control input	PWM
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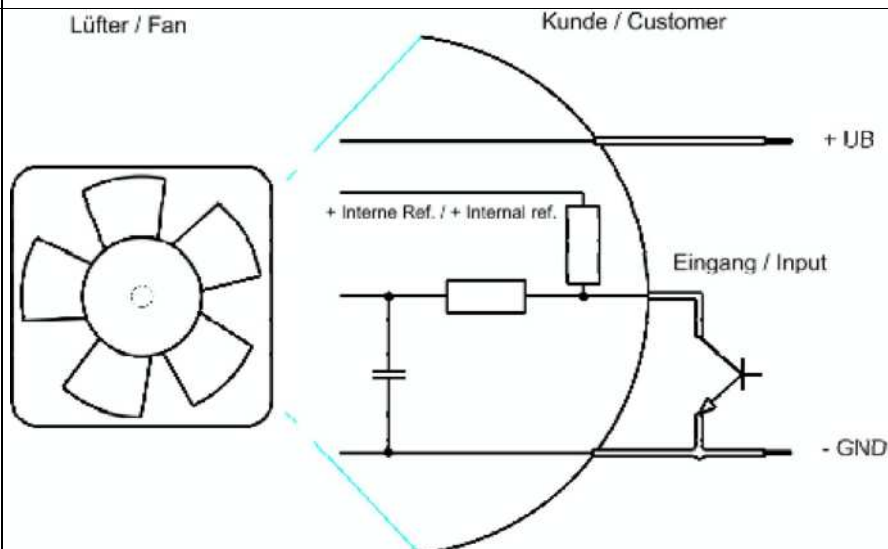
Features

Input type	Open collector	
PWM - Frequency		1 kHz - 20 kHz

Characteristics



Schematics



Speed control:

PWM = 0... 100 %; f = 1... 20 kHz; n = 500... 11.000 1/min.

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Its possible to run the fan by a control voltage of 0... 5 V. (5 V corresponding 100 % PWM).

Please note:

The power supply must be able to "sink" and work together with an internal pull-up resistor (10 kOhm).

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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: 95 %; f: 2 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	16,0 V		30,0 V
Nominal voltage	$\Delta p = 0$	U_N		24,0 V	
Power consumption	$\Delta p = 0$	P	64,0 W	130,0 W	132,0 W
Tolerance	PWM 0001		+/- 12,5 %	+/- 10,0 %	+/- 10,0 %
Current consumption	$\Delta p = 0$	I	4.000 mA	5.500 mA	4.450 mA
Tolerance	PWM 0001		+/- 12,5 %	+/- 10,0 %	+/- 10,0 %
Speed	$\Delta p = 0$	n	8.600 1/min	11.000 1/min	11.000 1/min
Tolerance	PWM 0001		+/- 7,5 %	+/- 7,5 %	+/- 7,5 %

muss noch übersetzt werden

In the fan is an additionally under- and overvoltage control build-in. This switches the power stage and the fan off.
 At U < 13 V and / or U > 35 V is n= 0 1/min

Starting:

At U: > 13 V or U < 34 V is n > 0 1/min

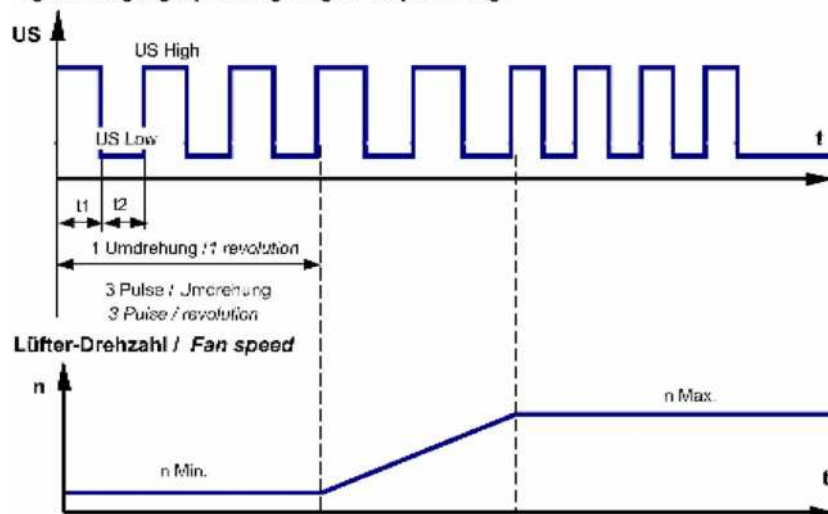
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Name	Condition
PWM 0002	PWM: 9 %, f: 2 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	16,0 V		30,0 V
Nominal voltage	$\Delta p = 0$	U_N		24,0 V	
Power consumption	$\Delta p = 0$	P	0,6 W	0,7 W	0,8 W
Tolerance	PWM 0002		+/- 20,0 %	+/- 20, %	+/- 20,0 %
Current consumption	$\Delta p = 0$	I	39 mA	27 mA	25 mA
Tolerance	PWM 0002		+/- 20,0 %	+/- 20,0 %	+/- 20,0 %
Speed	$\Delta p = 0$	n	500 1/min	500 1/min	500 1/min
Tolerance	PWM 0002		+/- 12,5 %	+/- 12,5 %	+/- 12,5 %

3.3 Operating Data - Electrical Interface -Output

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


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

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Features	Note	Values
Tacho operating voltage (UBS)		$\leq 60 \text{ V}$
Tacho signal Low	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High	I source: 0 mA	$\leq 60 \text{ V}$
Maximum sink current		$\leq 20 \text{ mA}$
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency	$(3 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5 \text{ V/us}$

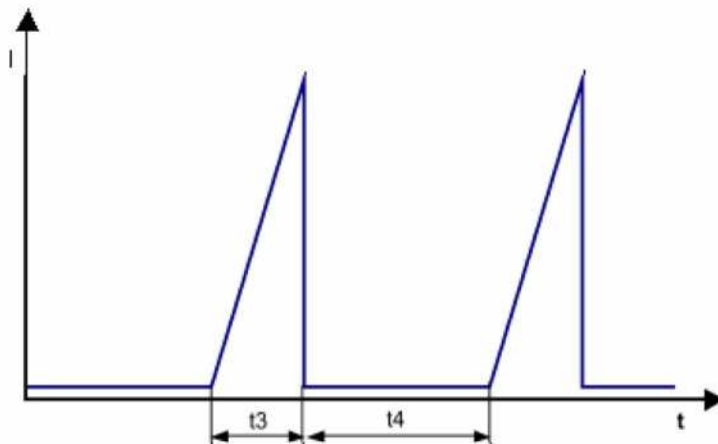
Note to the tacho frequency: 3 Pulse per revolution!

When the fan start up or the rotor is locked the tacho is off. When the fan works normally the tacho signal output switch on.

Alarm type	None
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3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	N-CH FET	
Max. residual current at Un	IF $\leq 1 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at Un	approx. 2.000 mA	
Clock signal t3/t4 at locked rotor	Typical: 1,7 s / 5,0 s t3: 1,6 s... 1,8 s t4: 4,8 s... 5,2 s	



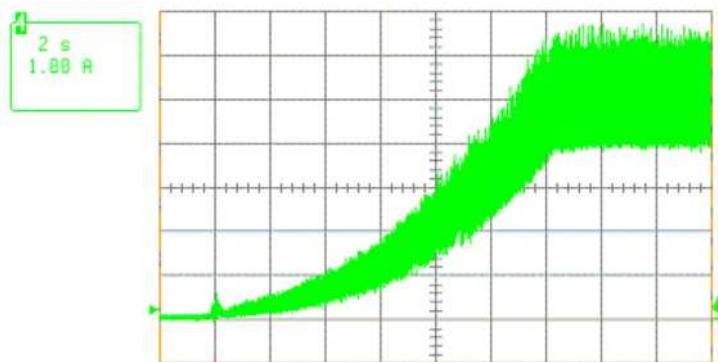
After 5 failed start-ups there is an extended timeout of 30 s.

When several fans are operated together (in a fan tray) and one fan starts after the other and the starting current is

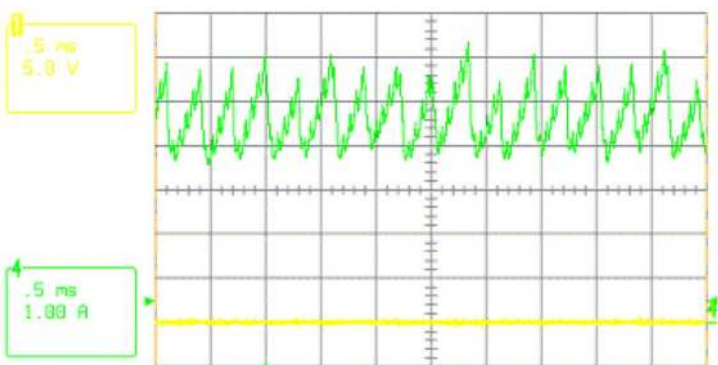
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eventually limited, it can happen that the not yet operated fan is driven in reverse by the counter pressure. This can lead to a failure of the first start-up. The fan detects this and makes another start with an increased current.

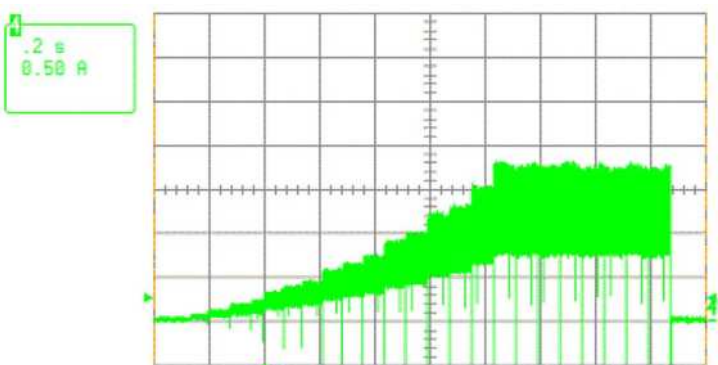
The locked rotor current is denoted as peak-current at nominal voltage.



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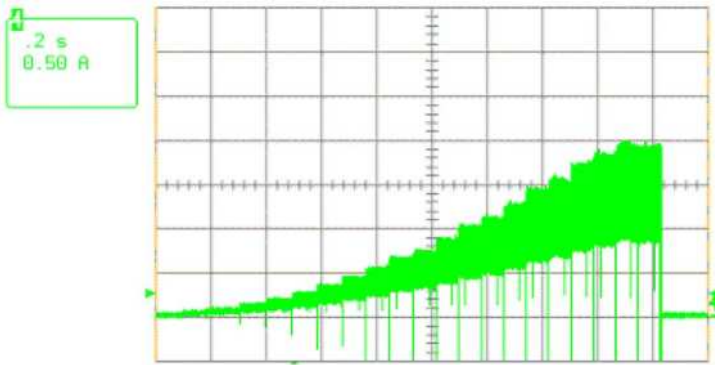


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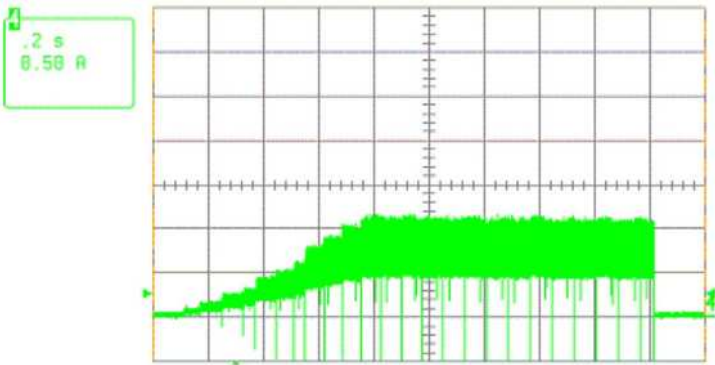


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3.5 Aerodynamic

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:

11.000 1/min at free air flow	PWM 95 %; f: 2 kHz		
Max. free-air flow ($\Delta p = 0$ / $\dot{V} = \max.$)	565,0 m ³ /h		
Max. static pressure ($\Delta p = \max.$ / $\dot{V} = 0$)	1.340 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 Lp(A) < 5 dB(A)
 For further measurement conditions see section 3.5

a.) Operation condition:

11.000 1/min at free air flow	PWM 95 %; f: 2 kHz	PWM min.:	PWM max.:
Optimal operating point	390,0 m ³ /h @ 485 Pa		
Sound power level at the optimal operating point	8,8 bel(A)		
Sound pressure level at free air flow, measured in rubber bands	79,0 dB(A)		

4 Environment
4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	75 °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	

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*) 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**

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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 / UL507, Electric Fans
VDE	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Yes / C22.2 No. 113-M1984 Fans and Ventilators
CCC	No

The approval tests are observed to:

U approval max.: 30,0 V @ TU approval max.: 75,0 °C

6 Reliability
6.1 General
Attention!

In order to achieve the specified life time figure, it is necessary to connect an external capacitor.

Complexity, connection, components and configuration must be checked at the project.

As a basis a capacitor of 220... 1000 uF to the supply voltage between plus and minus can be used. Max. lead length between fan and capacitor: 300 mm.

Life expectancy L10 at TU = 40 °C	55.000 h	
Life expectancy L10 at TU max.	22.500 h	
Life expectancy L10 Delta (40 °C)	110.000 h	