

Product Data Sheet 4114 N/2H4P

ebm**papst**

The engineer's choice



4114 N/2H4P**INDEX**

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1 General

Fan type	Fan	
Rotating direction looking at rotor	Clockwise	
Airflow direction	Air intake over struts	
Bearing system	Stainless steel bearing	
Mounting position - shaft	Any	

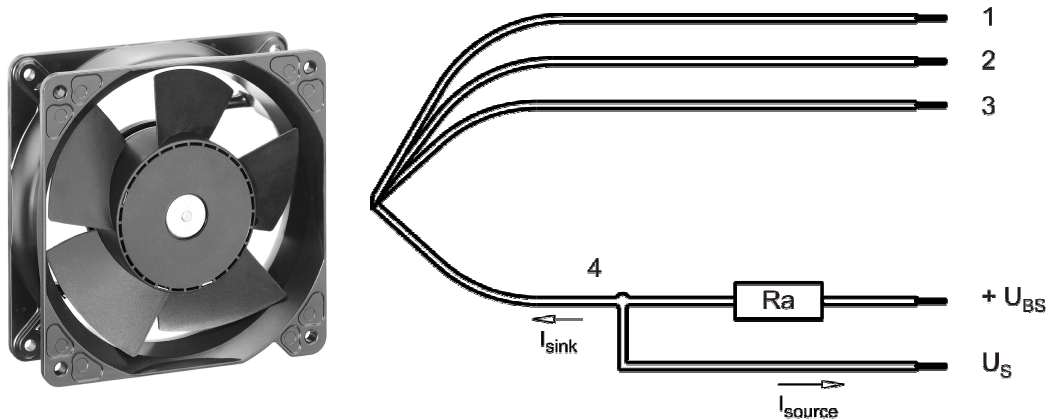
2 Mechanics

2.1 General

Width	119,0 mm	
Height	119,0 mm	
Depth	38,0 mm	
Mass	0,390 kg	
Housing material	Metal	
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length	L = 310 mm	
Tolerance	+/- 10,0 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 auxiliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

3 Operating Data

3.1 Electrical Interface - Input

Control input	PWM
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Features

PWM - Frequency	1 kHz - 20 kHz typical: 2 kHz
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Characteristics	<table border="1"> <caption>Approximate data points from the speed vs. PWM graph</caption> <thead> <tr> <th>PWM [%]</th> <th>Speed [1/min]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>5</td><td>1000</td></tr> <tr><td>10</td><td>1000</td></tr> <tr><td>20</td><td>1800</td></tr> <tr><td>30</td><td>2600</td></tr> <tr><td>40</td><td>3400</td></tr> <tr><td>50</td><td>4200</td></tr> <tr><td>60</td><td>5000</td></tr> <tr><td>70</td><td>5800</td></tr> <tr><td>80</td><td>6600</td></tr> <tr><td>90</td><td>7000</td></tr> <tr><td>100</td><td>7000</td></tr> </tbody> </table>	PWM [%]	Speed [1/min]	0	0	5	1000	10	1000	20	1800	30	2600	40	3400	50	4200	60	5000	70	5800	80	6600	90	7000	100	7000
PWM [%]	Speed [1/min]																										
0	0																										
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60	5000																										
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80	6600																										
90	7000																										
100	7000																										
Schematics	Lüfter / Fan Kunde / Customer																										

Speed control: By PWM: 0...100 %. The shown pull-up resistor to the internal reference voltage (+5V) has 4.7kOhm.

Transistor requirements: VCE max. $\geq$ 12V; Isink max $>$ 5mA; VCEsat $<$ 0,15V

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 chapter aerodynamics)

I: corresp. to arithm. mean current value

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

Note:

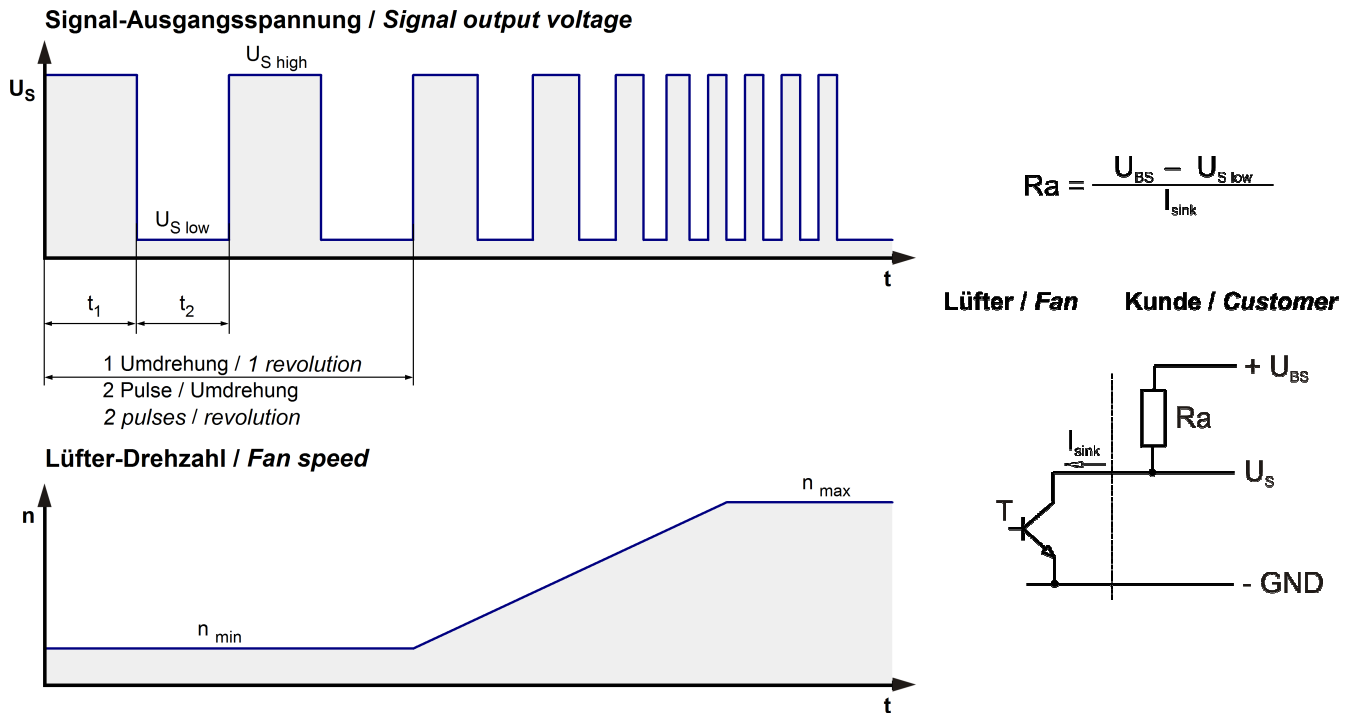
No inrush current at Unom means:

The internal electrolytic capacitor 39uF/100V has no resistor or inrush current limitation, essentially the power supply and the type and length of the connecting cable is limiting the Inrush current.

Features	Condition	Symbol	Values		
Voltage range		U	16 V		30 V
Nominal voltage		U _N		24 V	
Power consumption	$\Delta p = 0$	P	13,3 W	33,5 W	34,2 W
Tolerance	PWM 0010		+/- 15 %	+/- 10 %	+/- 10 %
Current consumption	$\Delta p = 0$	I	830 mA	1.400 mA	1.140 mA
Tolerance	PWM 0010		+/- 15 %	+/- 10 %	+/- 10 %
Speed	$\Delta p = 0$	n	5.100 1/min	6.800 1/min	6.800 1/min
Tolerance	PWM 0010		+/- 10 %	+/- 5 %	+/- 5 %
Starting current consumption				2.200 mA	

3.3 Electrical Interface - Output

Tacho type	/2 (open collector)
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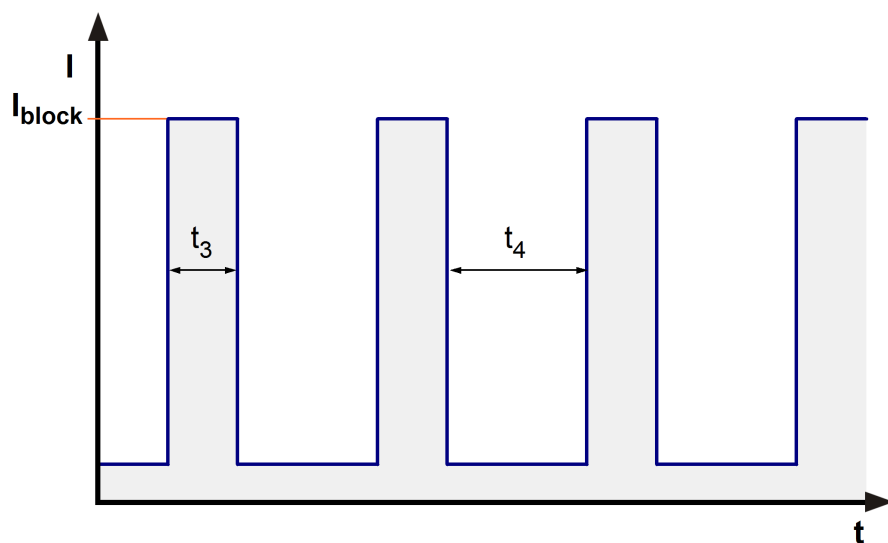


Features	Note	Values
Tacho operating voltage	U_{BS}	$\leq 30\text{ V}$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\text{ V}$
Tacho signal High	$U_{S\ high}$	$\leq 30\text{ V}$
Maximum sink current	I_{sink}	$\leq 20\text{ mA}$
External resistor	External resistor R_a from U_{BS} to U_S required. All voltages measured to GND.	
Tacho frequency	$(2 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\geq 0,5\text{ V/us}$

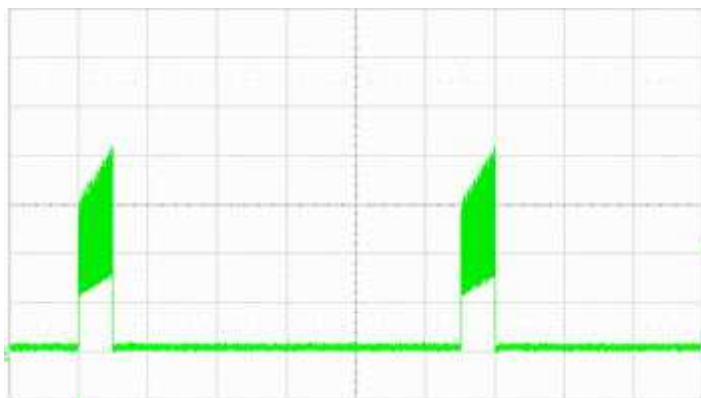
n = revolutions per minute (1/min)

3.4 Electrical Features

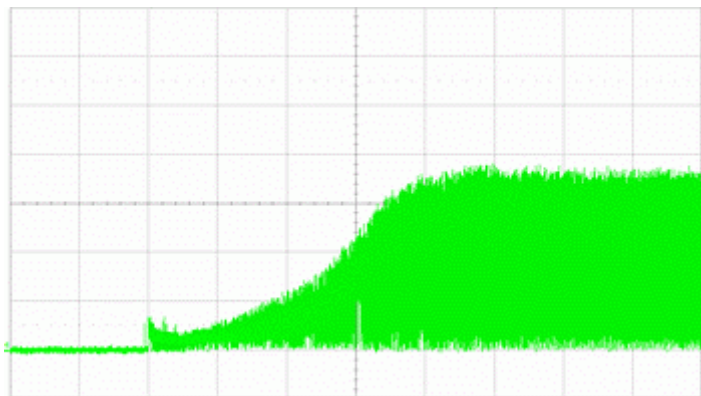
Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	
Max. residual current at U_N	$I_F \leq 10\text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 800 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 0,5 s / 5,0 s	



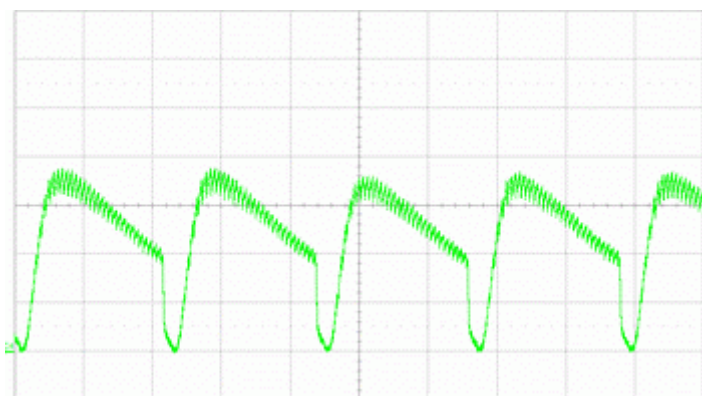
Locked rotor current measured as peak current.



Locked rotor current @ 24 V ($I = 200\text{mA/div}$; $t = 1\text{s/div}$)



Start-up current @ 24 V ($I = 500\text{mA/div}$; $t = 2\text{s/div}$)



Running current @ 24 V (I = 500mA/div ; t = 1ms/div)

Internal Fuse:

Littelfuse NANO2(R) FUSE; Very fast acting 451 Series; 3 A (Art.-No.: 451003.MRL)

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;

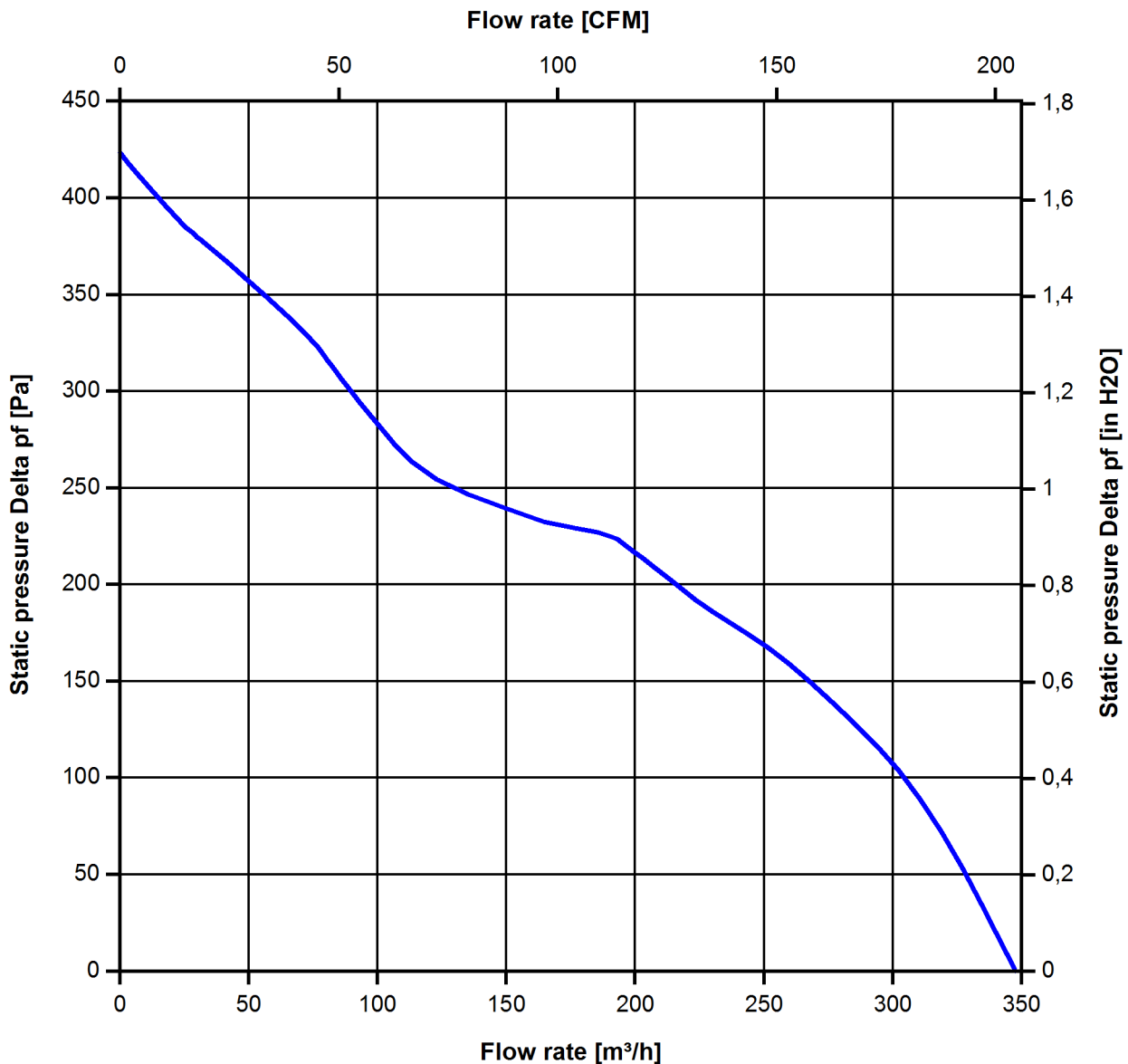
In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.

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.

a.) Operation condition:

6.800 1/min at free air flow	PWM 95 %; f: 2 kHz		
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Max. free-air flow ($\Delta p = 0$ / $\dot{V} = \text{max.}$)	350 m ³ /h	
Max. static pressure ($\Delta p = \text{max.}$ / $\dot{V} = 0$)	425 Pa	



3.6 Sound Data

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

Measured in a semianchoic chamber with a background noise level of $L_p(A) < 5 \text{ dB(A)}$
For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

6.800 1/min at free air flow	PWM 95 %; f: 2 kHz		
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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.

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 / 1,2 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	62.500 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	105.000 h	

