

Product Data Sheet 4118 N/2H3P-344

**ebmpapst**

The engineer's choice



4118 N/2H3P-344

INDEX

<b>1</b>	<b>General .....</b>	<b>3</b>
<b>2</b>	<b>Mechanics .....</b>	<b>3</b>
2.1	General .....	3
2.2	Connections .....	3
<b>3</b>	<b>Operating Data .....</b>	<b>4</b>
3.1	Electrical Interface - Input .....	4
3.2	Electrical Operating Data .....	5
3.3	Electrical Interface - Output .....	6
3.4	Electrical Features .....	7
3.5	Aerodynamics .....	9
3.6	Sound Data .....	10
<b>4</b>	<b>Environment.....</b>	<b>10</b>
4.1	General .....	10
4.2	Climatic Requirements.....	10
<b>5</b>	<b>Safety .....</b>	<b>11</b>
5.1	Electrical Safety .....	11
5.2	Approval Tests .....	11
<b>6</b>	<b>Reliability.....</b>	<b>11</b>
6.1	General .....	11

**1 General**

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

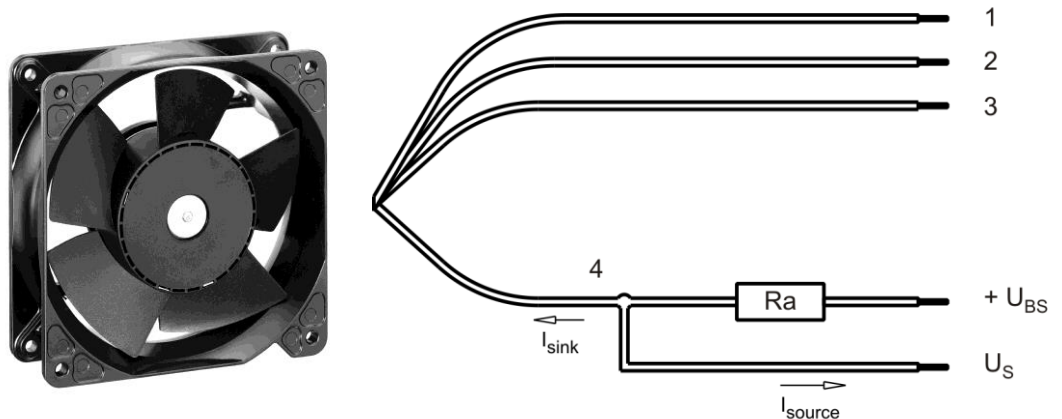
**2 Mechanics**

**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	
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	
Lead wire length	L = 310 mm	
Tolerance	+ - 10,0 mm	
Wire size (AWG)	22	
Insulation diameter	1,70 mm	



Wire	Color	Operation
1	red	+ UB
2	blue	- GND
3	violet	PWM
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 Electrical Interface - Input

Control input	PWM
---------------	-----

#### Features

PWM - Frequency	1 kHz - 20 kHz
-----------------	----------------

<b>Characteristics</b>	<table border="1" style="margin: 10px auto;"> <caption>Graph Data: Drehzahl / speed [1/min] vs PWM [%]</caption> <thead> <tr> <th>PWM [%]</th> <th>Drehzahl / speed [1/min]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>5</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>2000</td></tr> <tr><td>30</td><td>3000</td></tr> <tr><td>40</td><td>4000</td></tr> <tr><td>50</td><td>5000</td></tr> <tr><td>60</td><td>6000</td></tr> <tr><td>70</td><td>6000</td></tr> <tr><td>80</td><td>6000</td></tr> <tr><td>90</td><td>6000</td></tr> <tr><td>100</td><td>6000</td></tr> </tbody> </table>	PWM [%]	Drehzahl / speed [1/min]	0	0	5	0	5	1000	10	1000	20	2000	30	3000	40	4000	50	5000	60	6000	70	6000	80	6000	90	6000	100	6000
PWM [%]	Drehzahl / speed [1/min]																												
0	0																												
5	0																												
5	1000																												
10	1000																												
20	2000																												
30	3000																												
40	4000																												
50	5000																												
60	6000																												
70	6000																												
80	6000																												
90	6000																												
100	6000																												
<b>Schematics</b>	<p style="text-align: center;">Lüfter / Fan      Kunde / Customer</p>																												

The shown pull-up resistor to the internal reference voltage (+5V) has 4.7kOhm.

#### **Speed control:**

By puls width modulation (PWM) 0...100%, f: 1...20 kHz

Open collector in relation to signal-ground.

#### **Transistor requirements:**

Vce max.  $\geq$  12V

Isink max.  $\geq$  5mA

Vce sat.  $\leq$  0,15V

### 3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m<sup>3</sup>; 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.

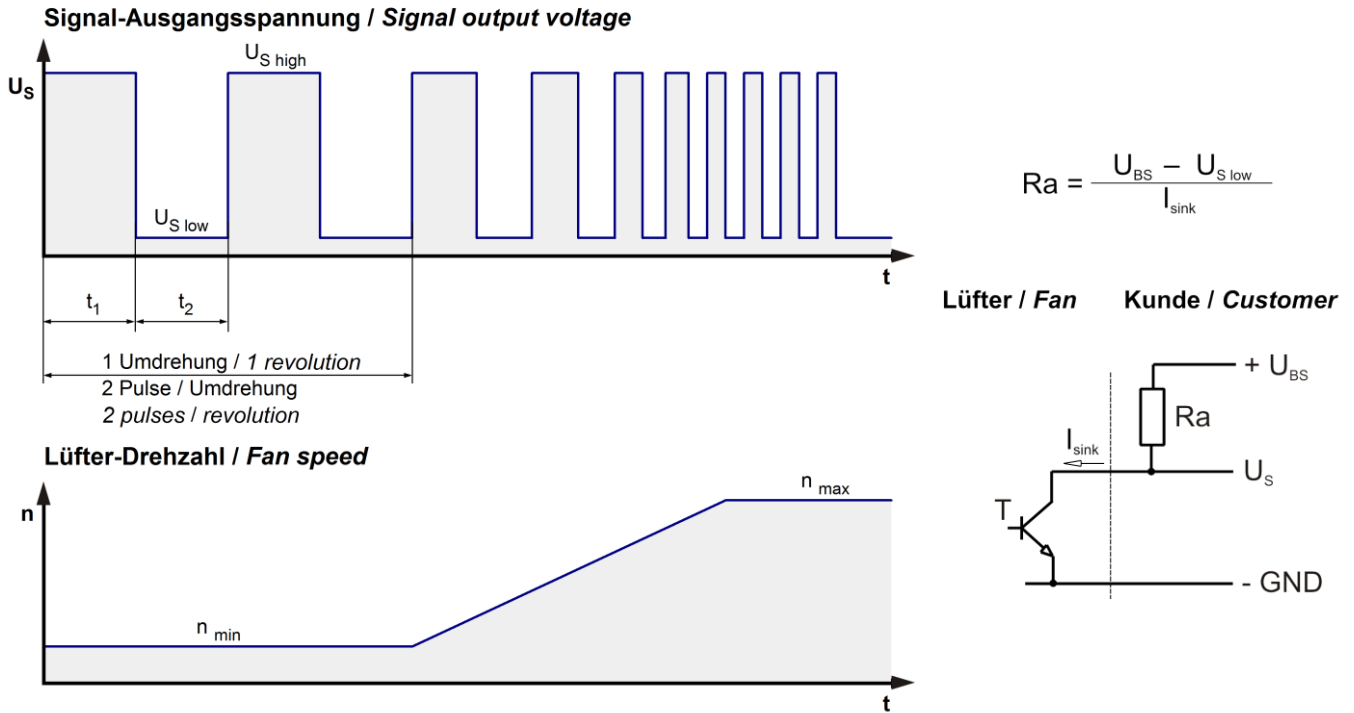
$\Delta p = 0$ : corresp. to free air flow (see section 3.5)  
 I: corresp. to arithm. mean current value

Name	Condition
PWM 0001	PWM: > 90 %; f: 2 kHz

Features	Condition	Symbol	Values		
Voltage range		U	36 V		60 V
Nominal voltage		$U_N$		48 V	
Power consumption	$\Delta p = 0$	P	19,6 W	24 W	27,5 W
Tolerance	PWM 0010		+/- 15 %	+/- 10 %	+/- 10 %
Current consumption	$\Delta p = 0$	I	545 mA	500 mA	460 mA
Tolerance	PWM 0010		+/- 15 %	+/- 10 %	+/- 10 %
Speed	$\Delta p = 0$	n	5.800 1/min	6.000 1/min	6.000 1/min
Tolerance	PWM 0010		+/- 7,5 %	+/- 5 %	+/- 5 %
Starting current consumption				2.200 mA	

3.3 Electrical Interface - Output

Tacho type	/2 (open collector)
------------	---------------------

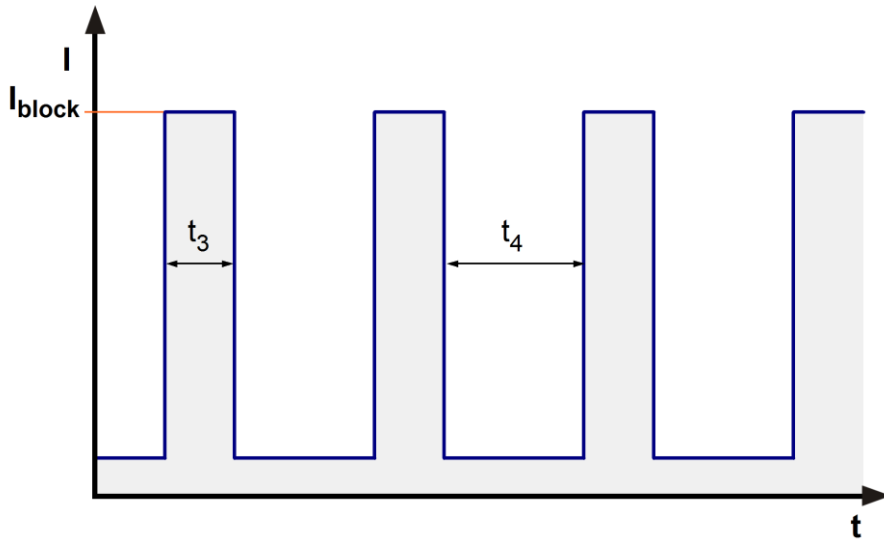


Features	Note	Values
Tacho operating voltage	$U_{BS}$	$\leq 60\text{ V}$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\text{ V}$
Tacho signal High	$U_{S\ high}$	$\leq 60\text{ V}$
Maximum sink current	$I_{sink}$	$\leq 20\text{ mA}$
External resistor	External resistor Ra from UBS to US required. All voltages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

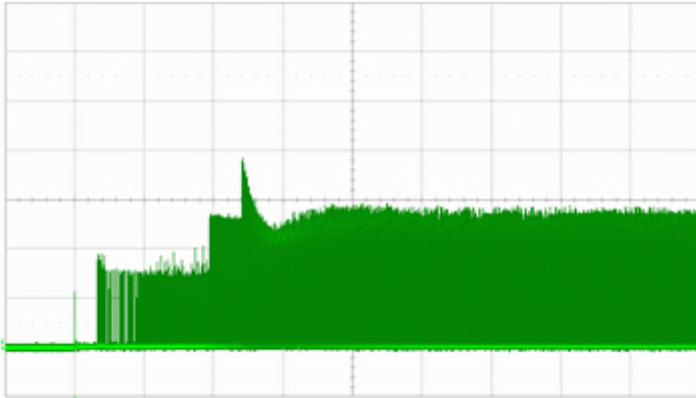
n = revolutions per minute (1/min)

### 3.4 Electrical Features

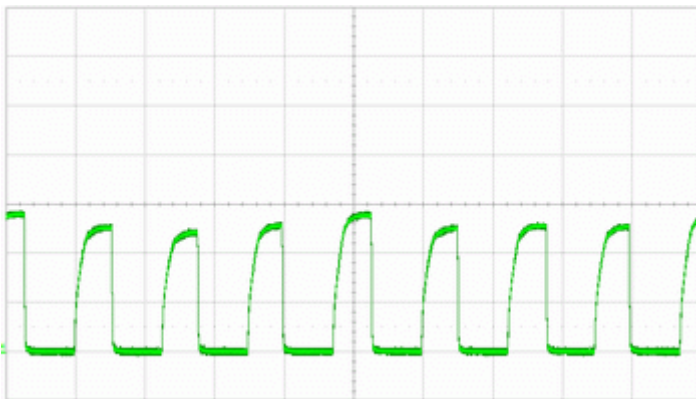
Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	
Max. residual current at $U_N$	$I_F \leq 10 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at $U_N$	$I_{\text{block}}$ approx. 300 mA	
Clock signal at locked rotor	$t_3 / t_4$ typical: 0,5 s / 5,0 s	



Locked rotor current @ 48 V ( $I = 200\text{mA/div}$  ;  $t = 1\text{s/div}$ )



Start-up current @ 48 V (I = 500mA/div ; t = 1s/div)



Running current @ 48 V (I = 500mA/div ; t = 2ms/div)

**Internal Fuse:**

Littelfuse Nano2 Fuse  
Very Fast-Acting 451/453 Series  
4A / 125V (0451004.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/m<sup>3</sup>; 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:

6.000 1/min at free air flow	PWM > 90 %; f: 2 kHz		
Max. free-air flow ( $\Delta p = 0 / \dot{V} = \max.$ )		350,0 m <sup>3</sup> /h	
Max. static pressure ( $\Delta p = \max. / \dot{V} = 0$ )		360 Pa	

b.) Operation condition:

1.000 1/min at free air flow	PWM 8 %; f: 2 kHz		
Max. free-air flow ( $\Delta p = 0 / \dot{V} = \max.$ )		129,0 m <sup>3</sup> /h	
Max. static pressure ( $\Delta p = \max. / \dot{V} = 0$ )		45 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 > 90 %; f: 2 kHz	PWM min.:	PWM max.:
------------------------------	----------------------	-----------	-----------

Optimal operating point	250,0 m3/h @ 140 Pa	
Sound power level at the optimal operating point	7,4 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	67,0 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	
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.	500 VAC / 1 Min.	
B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	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 / 1,5 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	Yes / GB 12350 Safety Requirements for small Power Motors

**6 Reliability**

**6.1 General**

Life expectancy L10 at TU = 40 °C	65.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	110.000 h	