



**4118 NH3P-282**

Customer specification: No

Version: 1.0

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6.1 GENERAL ..... 9

**Special features according to QMH 2-5.4.7 and company standard 1-23.00 have the following definitions:**

"A" : Product features or process parameters which influence the safety of a product or the compliance of legal requirements. (Must not necessary verified and documented 100%. Standards and legal requirements must be considered.)

"FK" : Product features or process parameters which influence the fit and function of a product or which have to be controlled or documented for some other reasons (e.g. Customer requirements).



## 1 General

Fan type	Fan	
Rotational direction looking at rotor	clockwise	FK
Airflow direction	Air intake over struts	FK
Bearing system	Ball bearing	
Lubrication	see sectional drawing of the bearing	
Mounting position	any	
Tolerance		
Balancing grade	6,3	FK
Impeller weight	118,0 g	

## 2 Mechanics

### 2.1 General

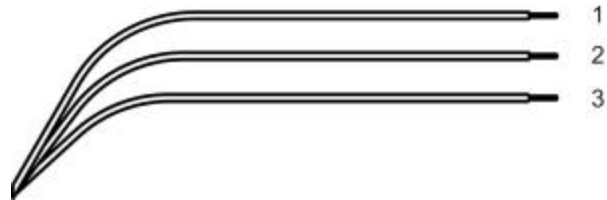
Width	119,0 mm	
Height	119,0 mm	
Depth	38,0 mm	
Diameter	0,0 mm	
Weight	0,390 kg	
Housing material	Metal	
Impeller material	Plastic	

### 2.2 Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	43,0 mm	
Height of the motor	10,5 mm	
Number of phases	1	
Number of windings	1	
Operating mode	Continuous duty	
Insulation material class	E	

## 2.3 Connections

Electrical connection	Wires - Plug	
Length of lead wire	55 mm	
Tolerance	+/- 5,0 mm	
Length of tube		
Tolerance		
Wire gauge (AWG)	22	
Insulation diameter	1,70 mm	
Plug	see drawing	
Contact	see drawing	



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

## 3 Operating Data

### 3.1 Operating Data - Electrical Interface - Input

Control input	PWM
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#### Features

Input type	Open collector	
PWM - Frequency		Typical: 2 kHz

<p><b>Characteristics</b></p>	<table border="1"> <caption>Approximate data points from the fan speed graph</caption> <thead> <tr> <th>PWM [%]</th> <th>Speed [1/min]</th> </tr> </thead> <tbody> <tr><td>0</td><td>1000</td></tr> <tr><td>5</td><td>1000</td></tr> <tr><td>10</td><td>1200</td></tr> <tr><td>20</td><td>1800</td></tr> <tr><td>30</td><td>2400</td></tr> <tr><td>40</td><td>3000</td></tr> <tr><td>50</td><td>3600</td></tr> <tr><td>60</td><td>4200</td></tr> <tr><td>70</td><td>4800</td></tr> <tr><td>80</td><td>5400</td></tr> <tr><td>90</td><td>6000</td></tr> <tr><td>95</td><td>6000</td></tr> <tr><td>100</td><td>6000</td></tr> </tbody> </table>	PWM [%]	Speed [1/min]	0	1000	5	1000	10	1200	20	1800	30	2400	40	3000	50	3600	60	4200	70	4800	80	5400	90	6000	95	6000	100	6000
PWM [%]	Speed [1/min]																												
0	1000																												
5	1000																												
10	1200																												
20	1800																												
30	2400																												
40	3000																												
50	3600																												
60	4200																												
70	4800																												
80	5400																												
90	6000																												
95	6000																												
100	6000																												
<p><b>Schematics</b></p>																													

**Speed Control:** 0... 100% PWM; 5 VDC, 1 mA

**Transistor:** VCE max. = >12V; I sink max >5mA;  
 VCE sat <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 there may 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	36,0 V		60,0 V
Nominal voltage	$\Delta p = 0$	$U_N$		48,0 V	
Power consumption	$\Delta p = 0$	P	13,5 W	24,0 W	24,6 W
Tolerance	PWM 0001		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %
Current consumption	$\Delta p = 0$	I	375 mA	500 mA*)	410 mA
Tolerance	PWM 0001		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %
Speed	$\Delta p = 0$	n	5.100 1/min	6.000 1/min*)	6.000 1/min
Tolerance	PWM 0001		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Starting current consumption				1.300 mA	
Inrush current				60.000 mA	
Typical current curve (A = least and B = largest current curve in a revolution) A and B = neighboring current curves MPE 891001				1,0 <= A B <= 1,3	

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

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	36,0 V		60,0 V
Nominal voltage	$\Delta p = 0$	$U_N$		48,0 V	
Power consumption	$\Delta p = 0$	P	6,1 W	7,0 W	7,5 W
Tolerance	PWM 0002		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %
Current consumption	$\Delta p = 0$	I	170 mA	145 mA*)	125 mA
Tolerance	PWM 0002		+/- 15,0 %	+/- 15,0 %	+/- 15,0 %
Speed	$\Delta p = 0$	n	3.500 1/min	3.500 1/min*)	3.500 1/min
Tolerance	PWM 0002		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %

Name	Condition
PWM 0003	PWM: 0 %; f: 2 kHz

Features	Condition	Symbol	Values		
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Voltage range	$\Delta p = 0$	U	36 V		60,0 V
Nominal voltage	$\Delta p = 0$	$U_N$		48,0 V	
Power consumption	$\Delta p = 0$	P	< 1,3 W	< 1,7 W	< 2,1 W
Tolerance	PWM 0003				
Current consumption	$\Delta p = 0$	I	< 35 mA	< 35 mA*)	< 35 mA
Tolerance	PWM 0003				
Speed	$\Delta p = 0$	n	1.000 1/min +- 10,0 %	1.000 1/min*) +- 10,0 %	1.000 1/min +- 10,0 %
Tolerance	PWM 0003				

\*) Attention: Marked values are "FK" features

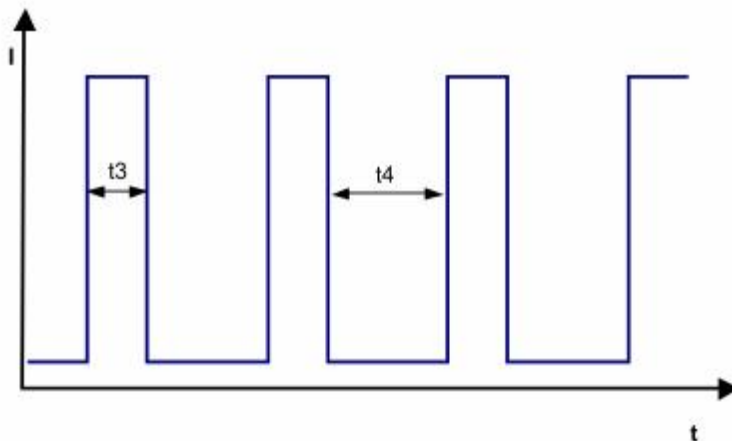
### 3.3 Operating Data - Electrical Interface -Output

Tacho type	None
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Alarm type	None
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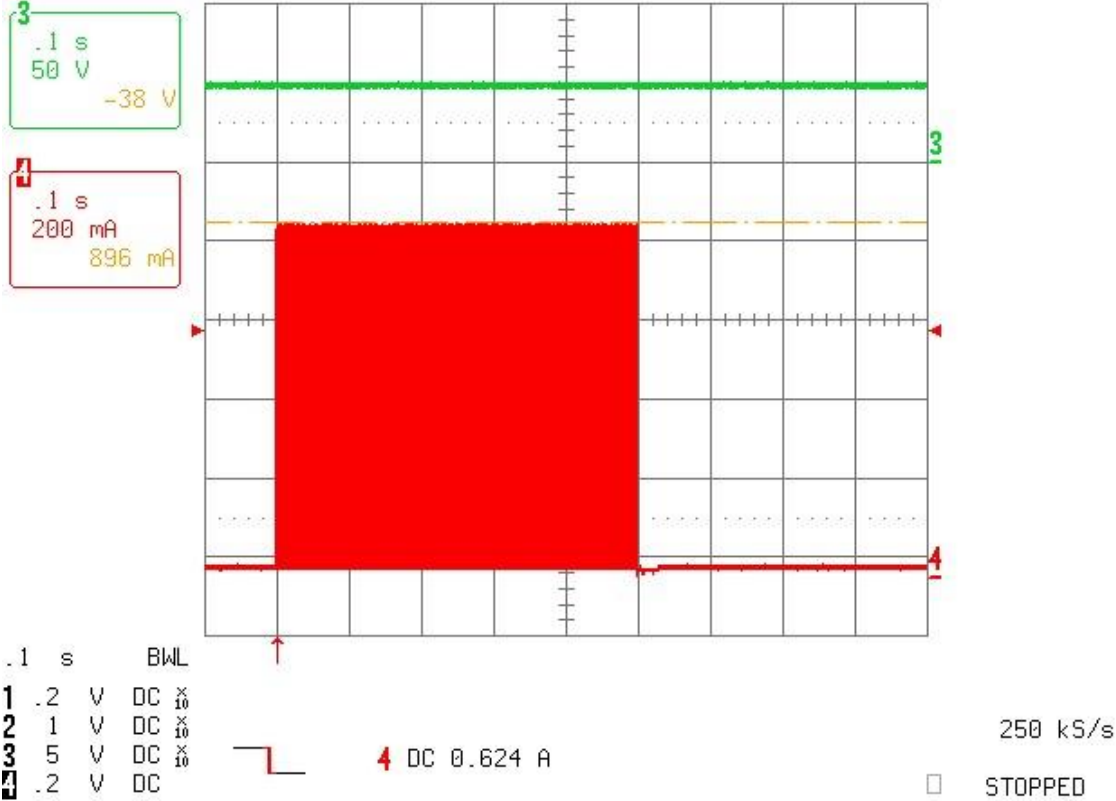
### 3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	Polarity protected diode	<b>A</b>
Max. residual current at $U_N$	$I_F \leq 10 \text{ mA}$	
Locked rotor protection	Electronically restart	<b>A</b>
Locked rotor current at $U_N$	approx. 950 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,5 s / 5,0 s t3: 0,4 s... 0,6 s t4: 4,8 s... 5,2 s	



**Internal Safty:** Littlefuse NANO2(R) FUSE; Very fast acting 451 Series; 4 A (Art.-Nr.: 451004)

23-Sep-08  
 10:14:19



### 3.5 Aerodynamic

Measurement conditions: Measured with a double chamber intake rig acc. to DIN 24163 Part 3.  
 Normal air density = 1,2 kg/m<sup>3</sup>; Temperature 23°C +/- 3°C;  
 In the intake and outlet area there may 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		
Max. free-air flow ( $\Delta p = 0 / \dot{V} = \max.$ )		310,0 m <sup>3</sup> /h	FK
Max. static pressure ( $\Delta p = \max. / \dot{V} = 0$ )		310 Pa	FK

### 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:

6.000 1/min at free air	PWM 100 %; f: 2 kHz	PWM min.:	PWM max.:
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flow		
Optimal operating point	240,0 m3/h @ 107,0 Pa	
Sound power level at the optimal operating point	7,1 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	64,0 dB(A)	

#### 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 \*)

\*) Permitted application area:

The product is for the use in sheltered rooms with controlled temperature and controlled humidity. Directly exposure to water must be avoid.

##### 4.3 Mechanical requirements

not specified

##### 4.4 EMC

not specified





## 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.	<b>A</b>
Insulation 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 / 1,5 mm	
Protection class	III	

### 5.2 Approval Tests

CE	Yes
UL	Yes / UL507, Electric Fans
VDE	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment - Part 1 Safety - Connection to a SELV circuit.
CSA	Yes / C22.2 No. 113-M1984 Fans and Ventilators
CCC	No

The approval tests are observed to:  
U approval max.:60,0 V @ TU approval max.: 65,0 °C

## 6 Reliability

### 6.1 General

Life expectancy L10 at TU = 20 °C		
Life expectancy L10 at TU = 40 °C	65.000 h	
Life expectancy L10 at TU = 60 °C		
Life expectancy L10 at TU max.	37.500 h	
Life expectancy L15 at TU = 45 °C		
Life expectancy L10 Delta (40 °C)	132.500 h	