

4412F/2GP-187 ebmpapst Datasheet FansCo sales@fansco.com www.fansco.com



The engineer's choice

ebmpapst

4412 F/2GP-187

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1 General

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

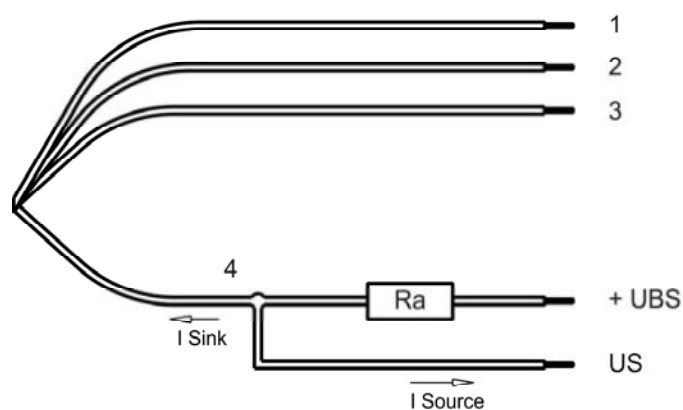
2 Mechanics

2.1 General

Width	119,0 mm	
Height	119,0 mm	
Depth	25,4 mm	
Weight	0,175 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges	wire outlet corner: 40 Ncm remaining corners: 10 Ncm	
Screw size	ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires - Plug	
Length of lead wire	265 mm	
Tolerance	+/- 10,0 mm	
Wire gauge (AWG)	24	
Insulation diameter	1,55 mm	
Contact / Connector	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.

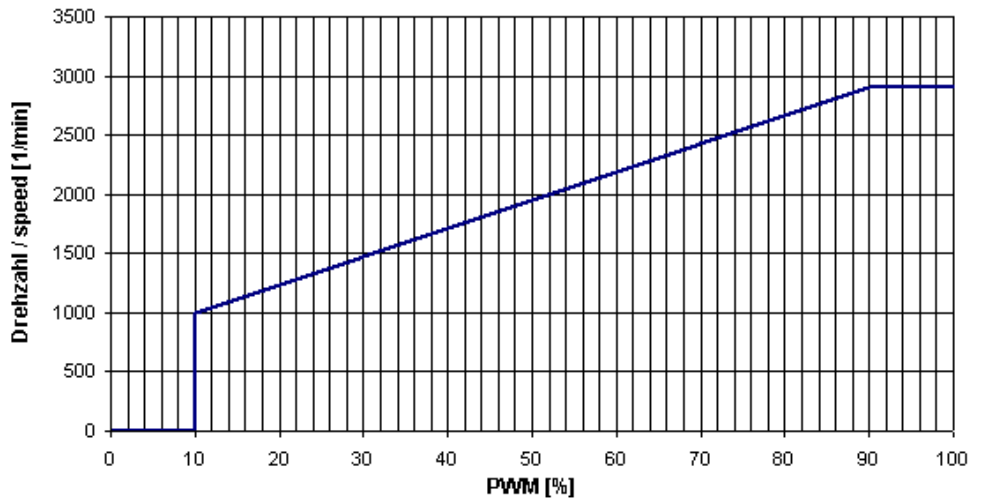
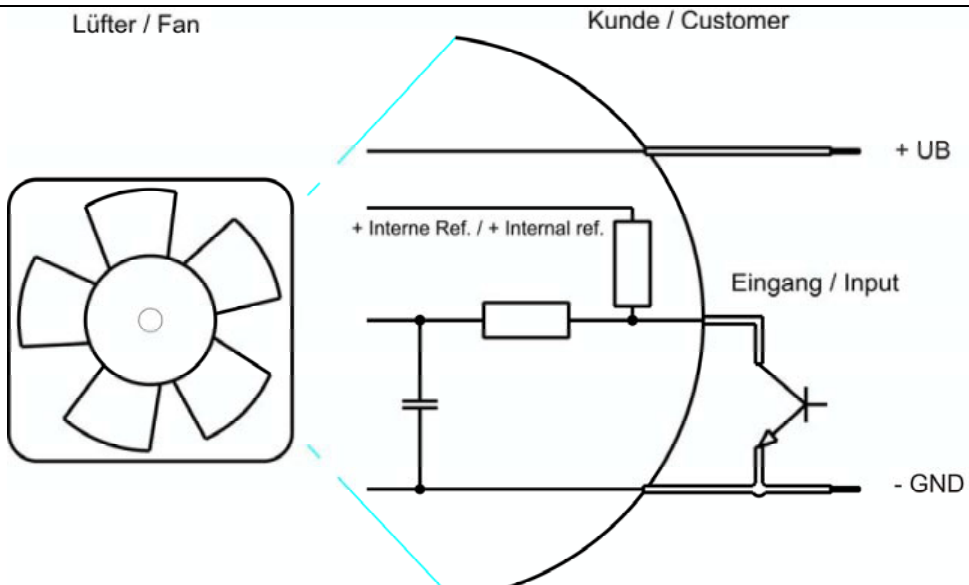
3 Operating Data

3.1 Operating Data - Electrical Interface - Input

Control input	PWM
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Features

Input type	Open collector	
PWM - Frequency		2 kHz - 5 kHz

Characteristics	 The graph plots fan speed in 1/min against PWM percentage. The y-axis ranges from 0 to 3500 in increments of 500. The x-axis ranges from 0 to 100 in increments of 10. The curve shows a dead zone at 0% PWM, followed by a linear increase starting at 10% PWM (1000 1/min) and reaching a plateau of approximately 2900 1/min at 90% PWM.
Schematics	 The schematic diagram illustrates the electrical connection between the fan (Lüfter / Fan) and the customer's (Kunde / Customer) control system. It shows the fan's internal reference voltage (+ Interne Ref. / + Internal ref.) and its connection to the input terminal (Eingang / Input) through a resistor and capacitor network. The input terminal is driven by a transistor circuit connected to the power supply (+ UB) and ground (- GND).

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	f: 5 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		12,6 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption	$\Delta p = 0$	P	2,6 W	6,5 W	6,6 W
Tolerance	PWM 0001		+/- 17,5 %	+/- 25,0 %	+/- 25,0 %
Current consumption	$\Delta p = 0$	I	320 mA	540 mA	525 mA
Tolerance	PWM 0001		+/- 17,5 %	+/- 25,0 %	+/- 25,0 %
Speed	$\Delta p = 0$	n	2.260 1/min	2.900 1/min	2.900 1/min
Tolerance	PWM 0001		+/- 12,5 %	+/- 4,0 %	+/- 4,0 %
Starting current consumption				1.200 mA	

Name	Condition		
PWM 0002	PWM: 50 %;	f: 2 kHz	f: 5 kHz

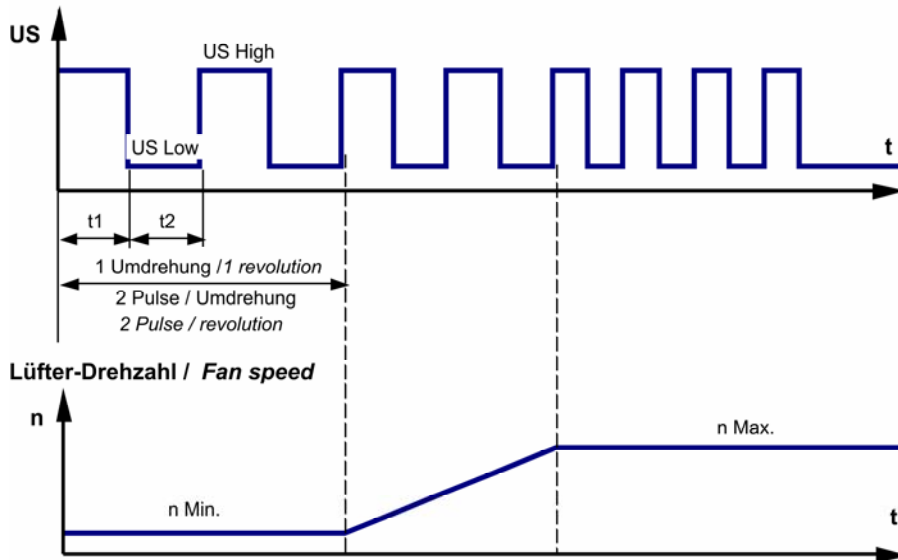
Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		12,6 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption	$\Delta p = 0$	P	2,0 W	2,9 W	3,1 W
Tolerance	PWM 0002		+/- 25,0 %	+/- 25,0 %	+/- 25,0 %
Current consumption	$\Delta p = 0$	I	255 mA	245 mA	245 mA
Tolerance	PWM 0002		+/- 25,0 %	+/- 25,0 %	+/- 25,0 %
Speed	$\Delta p = 0$	n	1.940 1/min	1.940 1/min	1.940 1/min
Tolerance	PWM 0002		+/- 4,0 %	+/- 4,0 %	+/- 4,0 %

3.3 Operating Data - Electrical Interface -Output

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

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

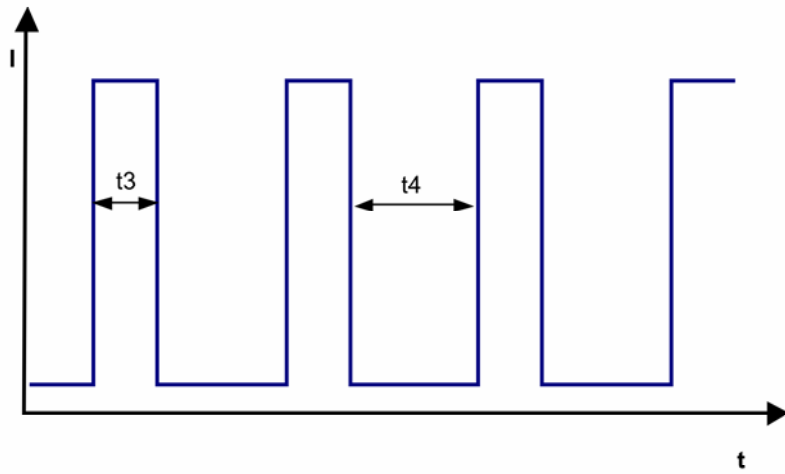


Features	Note	Values
Tacho operating voltage (UBS)		$\leq 60 \text{ V}$
Tacho signal Low	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High	I source: 0 mA	$\leq 60 \text{ V}$
Maximum sink current		$\leq 4 \text{ mA}$
External resistor	External resistor R_a from UBS to US required. All voltages measured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

Alarm type	None
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3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	
Max. residual current at Un	IF $\leq 100 \text{ uA}$	
Locked rotor protection	Auto restart	
Locked rotor current at Un	approx. 1.200 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,25 s / 10 s	



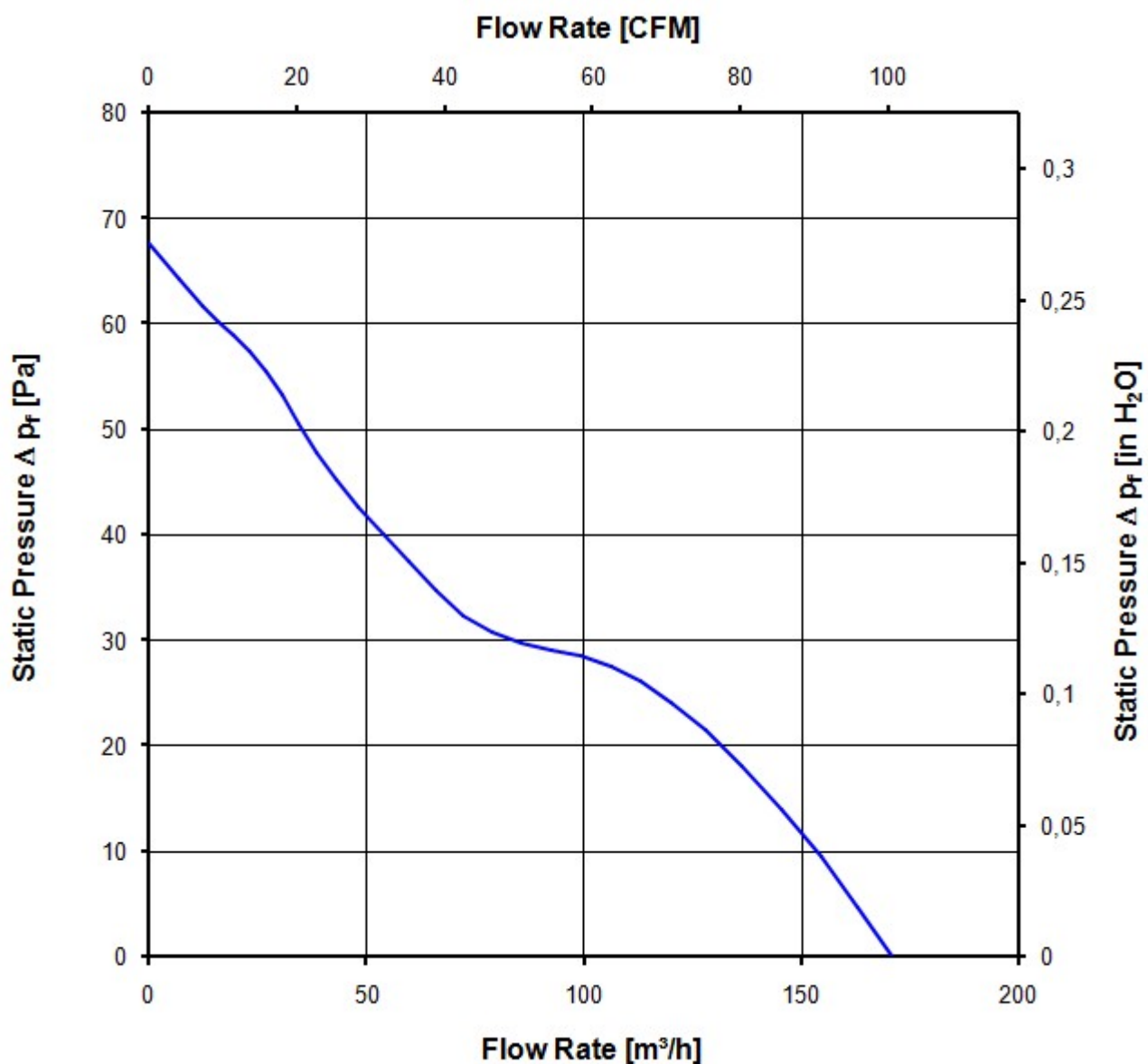
3.5 Aerodynamic

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:

2.900 1/min at free air flow	PWM 100 %;	f: 2 kHz	f: 5 kHz
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Max. free-air flow ($\Delta p = 0$ / $\dot{V} = \text{max.}$)	168,0 m ³ /h	
Max. static pressure ($\Delta p = \text{max.}$ / $\dot{V} = 0$)	67 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:

2.900 1/min at free air flow	PWM 100 %	PWM min.: ; f: 2 kHz	PWM max.:; f: 5 kHz
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Optimal operating point	124,0 m ³ /h @ 19 Pa	
Sound power level at the optimal operating point	5,4 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	43,0 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	60 °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.

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	Yes
UL	No
VDE	No
CSA	No
CCC	No

The approval tests are observed to:

Maximal permitted operating voltage (see section 3.1) and max. permitted ambient temperature TU max.

