

422 J/2HP

Customer specification: No

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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	counterclockwise	FK
Airflow direction	Air outlet 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	14,0 g	

2 Mechanics

2.1 General

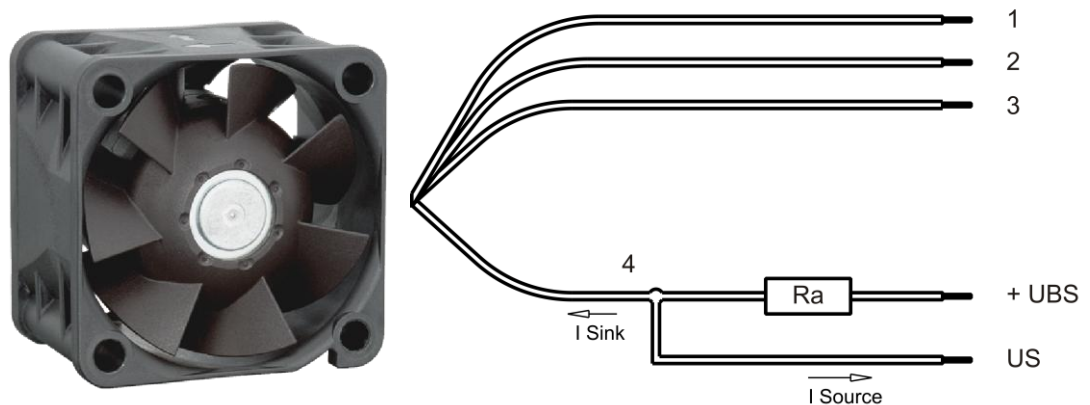
Width	40,0 mm	
Height	40,0 mm	
Depth	28,0 mm	
Diameter	0,0 mm	
Weight	0,045 kg	
Housing material	Plastic	
Impeller material	Plastic	

2.2 Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	19,0 mm	
Height of the motor	8,0 mm	
Number of phases	1	
Number of windings	1	
Operating mode	Continuous duty	
Insulation material class	E	

2.3 Connections

Electrical connection	Wires	
Length of lead wire	310 mm	
Tolerance	+/- 10,0 mm	
Length of tube	see drawing	
Tolerance		
Wire gauge (AWG)	28	
Insulation diameter	0,9 mm	
Plug	see drawing	
Contact	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

Inpute type	Open collector	
PWM - Frequency		1 kHz - 30 kHz Typical: 25 kHz
Max. voltage for logic "Low"		0,2 V
Maximum source current	short circuit current	<= 1 mA

Characteristics	<table border="1"> <caption>Approximate data points from the speed vs PWM graph</caption> <thead> <tr> <th>PWM [%]</th> <th>Drehzahl / speed [1/min]</th> </tr> </thead> <tbody> <tr><td>0</td><td>3000</td></tr> <tr><td>10</td><td>3000</td></tr> <tr><td>20</td><td>5500</td></tr> <tr><td>30</td><td>7500</td></tr> <tr><td>40</td><td>9500</td></tr> <tr><td>50</td><td>11500</td></tr> <tr><td>60</td><td>13000</td></tr> <tr><td>70</td><td>14500</td></tr> <tr><td>80</td><td>15500</td></tr> <tr><td>90</td><td>16500</td></tr> <tr><td>100</td><td>17000</td></tr> </tbody> </table>	PWM [%]	Drehzahl / speed [1/min]	0	3000	10	3000	20	5500	30	7500	40	9500	50	11500	60	13000	70	14500	80	15500	90	16500	100	17000
PWM [%]	Drehzahl / speed [1/min]																								
0	3000																								
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50	11500																								
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70	14500																								
80	15500																								
90	16500																								
100	17000																								
Schematics	Lüfter / Fan Kunde / Customer + UB + Interne Ref. / + Internal ref. Eingang / Input - 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: 25 kHz				
Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		13,8 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption	$\Delta p = 0$	P	3,1 W	6,8 W	8,6 W
Tolerance	PWM 0001		+/- 20,0 %	+/- 15,0 %	+/- 15,0 %
Current consumption	$\Delta p = 0$	I	385 mA	570 mA*)	625 mA
Tolerance	PWM 0001		+/- 20,0 %	+/- 15,0 %	+/- 15,0 %
Speed	$\Delta p = 0$	n	12.900 1/min	17.250 1/min*)	18.700 1/min
Tolerance	PWM 0001		+/- 15,0 %	+/- 10,0 %	+/- 10,0 %
Starting current consumption				<= 1.800 mA	

Name	Condition				
PWM 0002	PWM: 50 %; f: 25 kHz				
Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		13,8 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption	$\Delta p = 0$	P	1,2 W	2,5 W	3,5 W
Tolerance	PWM 0002		+/- 30,0 %	+/- 25,0 %	+/- 25,0 %
Current consumption	$\Delta p = 0$	I	145 mA	210 mA*)	250 mA
Tolerance	PWM 0002		+/- 30,0 %	+/- 25,0 %	+/- 25,0 %
Speed	$\Delta p = 0$	n	7.350 1/min	11.500 1/min*)	13.000 1/min
Tolerance	PWM 0002		+/- 25,0 %	+/- 20 %	+/- 20,0 %

Name	Condition				
PWM 0003	PWM: 0 %; f: 25 kHz				
Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		13,8 V
Nominal voltage	$\Delta p = 0$	U_N		12,0 V	
Power consumption	$\Delta p = 0$	P	0,3 W	0,6 W	0,8 W
Tolerance			+/- 30,0 %	+/- 25,0 %	+/- 25,0 %

	PWM 0003				
Current consumption	$\Delta p = 0$	I	37 mA	48 mA*)	55 mA
Tolerance	PWM 0003		+/- 30,0 %	+/- 25,0 %	+/- 25,0 %
Speed	$\Delta p = 0$	n	1.450 1/min	3.250 1/min*)	4.000 1/min
Tolerance	PWM 0003		+/- 25,0 %	+/- 20,0 %	+/- 20,0 %

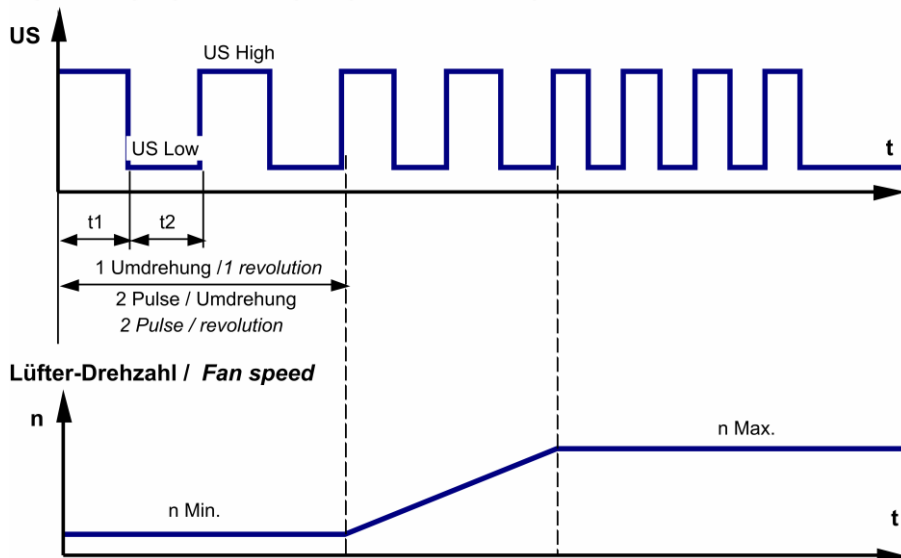
*) Attention: Marked values are "FK" features

3.3 Operating Data - Electrical Interface -Output

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

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



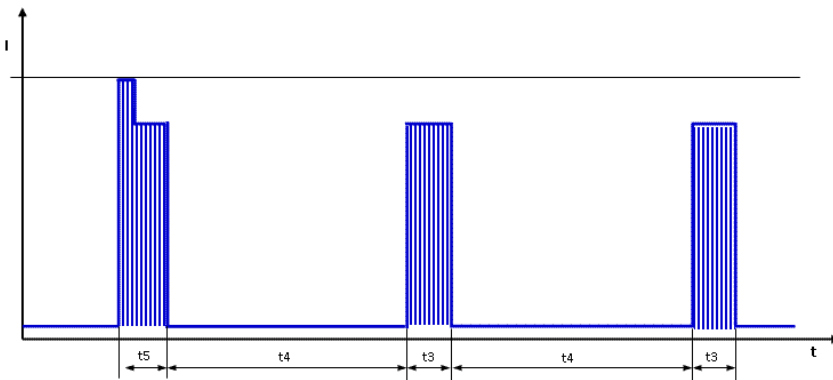
Features	Note	Values
Tacho operating voltage (UBS)		$\leq 15 \text{ V}$
Tacho signal Low *)	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High *)	I source: 0 mA	15 V
Maximum sink current		$\leq 4 \text{ mA}$
External resistor	External resistor R_a from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	$(2 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5 \text{ V/us}$

*) Attention: Marked values are "FK" features

Alarm type	None
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3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	A
Max. residual current at U_n	$I_F \leq 5 \text{ mA}$	
Locked rotor protection	Auto restart	A
Locked rotor current at U_n	approx. 1.650 mA	
Clock signal t_3/t_4 at locked rotor	Typical: 0,45 s / 4,5 s t_3 : 0,25 s... 0,75 s t_4 : 2,5 s... 7,5 s	



First pulse t_5 typical 0.7s (0.5 .. 1.0s) followed by t_4 . Afterwards cyclical t_3/t_4 .

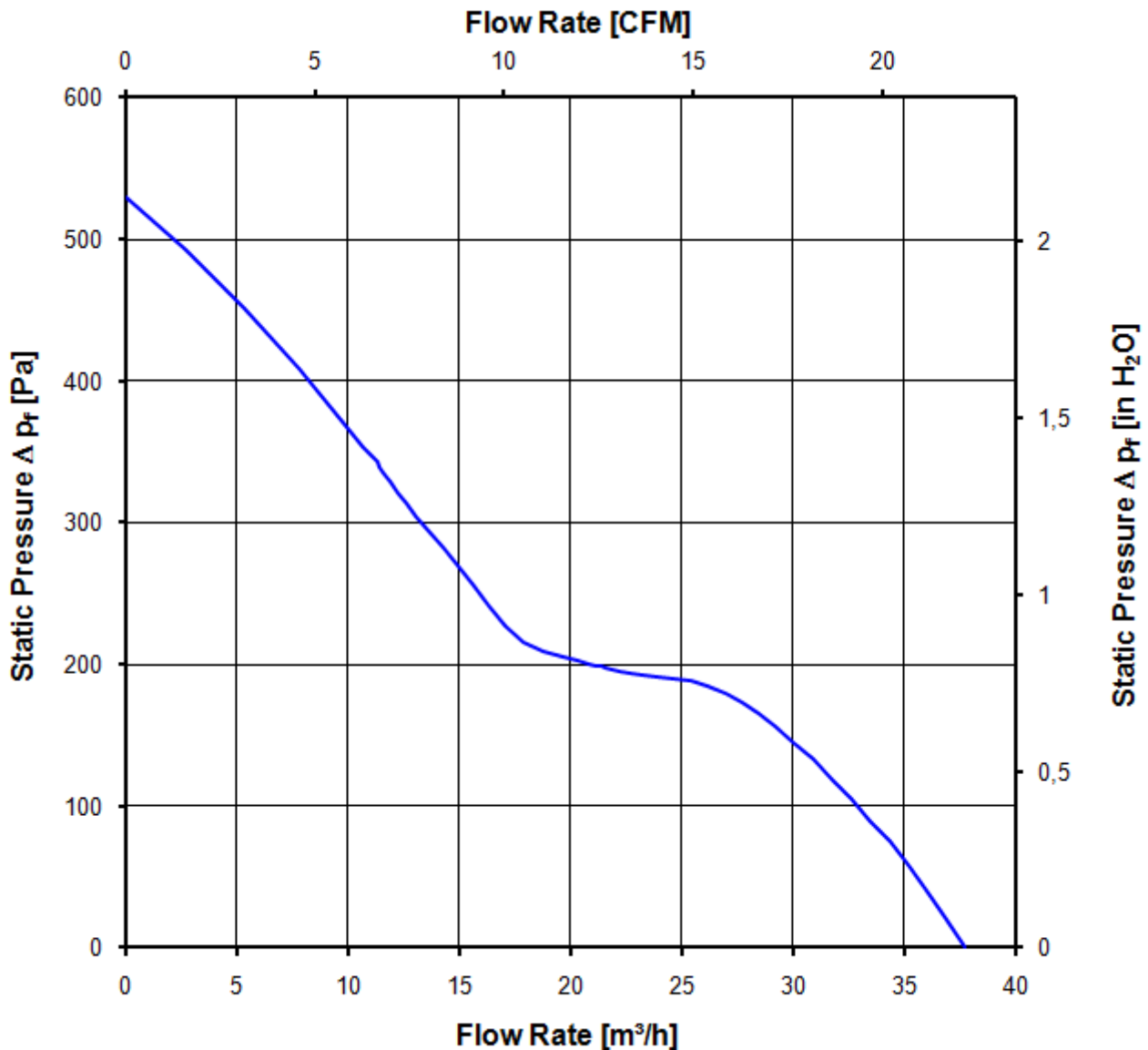
3.5 Aerodynamic

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:

17.250 1/min at free air flow	PWM 100 %; f: 25 kHz		
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Max. free-air flow ($\Delta p = 0$ / $\dot{V} = \text{max.}$)	38,0 m ³ /h	FK
Max. static pressure ($\Delta p = \text{max.}$ / $\dot{V} = 0$)	530 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 $L_p(A) < 5$ dB(A)
For further measurement conditions see section 3.5

a.) Operation condition:

17.250 1/min at free air flow	PWM 100 %; f: 25 kHz	PWM min.:	PWM max.:
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Optimal operating point	26,0 m³/h @ 164 Pa	
Sound power level at the optimal operating point	6,6 bel(A)	

Sound pressure level at free air flow, measured in rubber bands	54,0 dB(A)	
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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	
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.

4.3 Mechanical requirements

severity level	stationary use		
1	storage / transportation	Random vibration not in use IEC 60068-2-64 Frequency range / ASD G_{RMS} Axes of vibration Test duration	Random vibration 5 - 20 Hz : $1,0 \text{ m}^2 / \text{s}^3$ 20 - 500 Hz : - 3 dB / Oct 0,91 G 3 3 x 30 min
	storage / transportation	Bump not in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	Bump half sine 18 G 6 ms 100 in each direction 600
	stationary use	Random vibration in use IEC 60068-2-64 Frequency range / ASD G_{RMS} Axes of vibration Test duration	Random vibration 5 - 10 Hz : +6 dB / Oct 10 - 50 Hz : $1,0 \text{ m}^2 / \text{s}^3$ 50 - 200 Hz : - 6 dB / Oct 0,65 G 3 3 x 30 min
	stationary use	Bump in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	Bump half sine 5 G 11 ms 100 in each direction 600

4.4 EMC

not specified

5 Safety

5.1 Electrical Safety

Dielectric strength DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700)		
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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.	A
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	
Air and leakage distances		
Protection class	III	

5.2 Approval Tests

CE	Yes
UL	No
VDE	No
CSA	No
CCC	No

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	60.000 h	
Life expectancy L10 at TU max.	30.000 h	
Life expectancy L10 Delta (40 °C)	120.000 h	

6.2 Additional Data

not specified

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