8412 N/2GHP

Customer specification: Yes
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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	Sleeve bearing	
Lubrication	see sectional drawing of the bearing	
Mounting position Tolerance	any	
Balancing grade	16	**FK**
Impeller weight	30,3 g	

2 Mechanics

2.1 General

Width	80,0 mm	
Height	80,0 mm	
Depth	25,4 mm	
Diameter	0,0 mm	
Weight	0,095 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	wire outlet corner: 50 Ncm remaining corners: 70 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

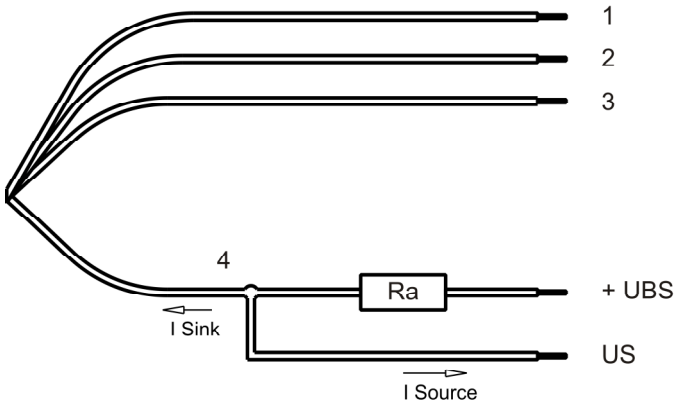
2.2 Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	25,0 mm	
Height of the motor	6,0 mm	
Number of phases	1	
Number of windings	2	
Operating mode	Continuous duty	
Insulation material class	E	

2.3 Connections

Electrical connection	Wires	
Length of lead wire Tolerance	310 mm +- 10,0 mm	
Length of tube Tolerance		
Wire gauge (AWG)	26	
Insulation diameter	1,35 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 auxilliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

3 Operating Data

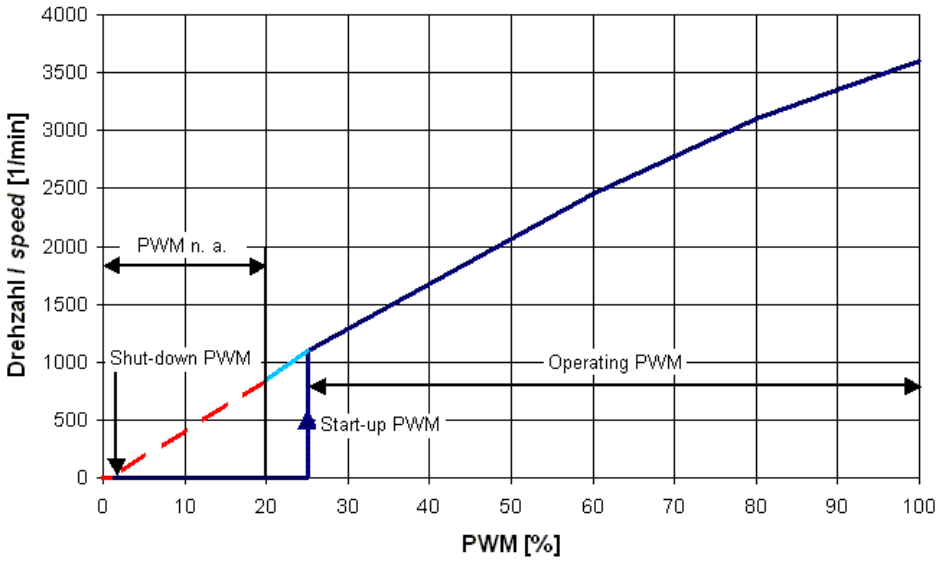
3.1 Operating Data - Electrical Interface - Input

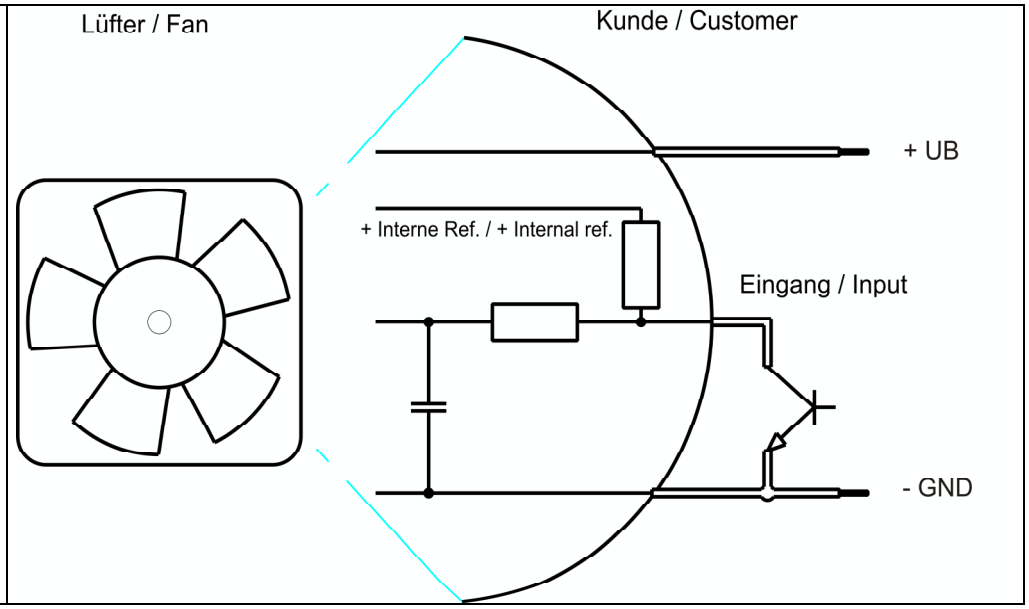
Control input	PWM

Features

Inpute type	Open collector / TTL	
PWM - Frequency		21 kHz - 28 kHz Typical: 25 kHz
Max. voltage for logic "Low"		0,8 V
Max. voltage for logic "High"	Open circuit voltage	5,25 V
Maximum source current	short circuit current	<= 5 mA
4 wire startup condition	PWM duty cycle	> 25 %
4 wire operation condition after startup	PWM duty cycle	20 % - 100 %
Shutdown condition	PWM duty cycle	< 1 %
Typical time until warm restart	After shutdown by PWM	~ 1,2 s

Characteristics



Schematics	

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.

Δp = 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	Δp = 0	U	10,8 V		13,2 V
Nominal voltage	Δp = 0	U_N		12,0 V	
Power consumption Tolerance	Δp = 0 PWM 0001	P	2,4 W +- 17,5 %	3,0 W +- 12,5 %	3,7 W +- 15,0 %
Current consumption Tolerance	Δp = 0 PWM 0001	I	220 mA +- 17,5 %	250 mA*) +- 12,5 %	280 mA +- 15,0 %
Speed Tolerance	Δp = 0 PWM 0001	n	3.350 1/min +- 12,5 %	3.600 1/min*) +- 7,5 %	3.900 1/min +- 10,0 %
Starting current consumption				335 mA	

Name	**Condition**		
PWM 0002	PWM: 50 %; f: 25 kHz		

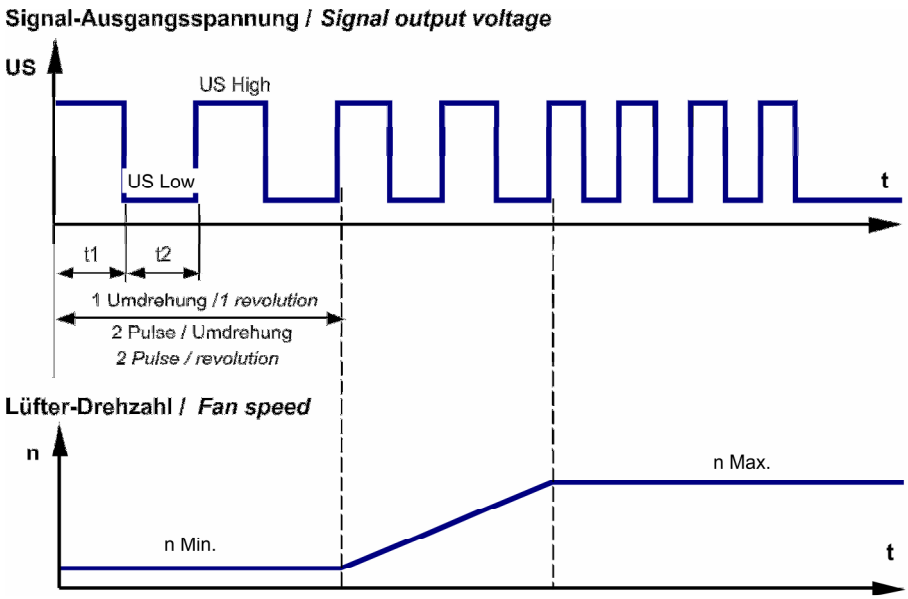
Features	**Condition**	**Symbol**	**Values**		
Voltage range	Δp = 0	U	10,8 V		13,2 V
Nominal voltage	Δp = 0	U_N		12,0 V	
Power consumption	Δp = 0	P	0,7 W	0,9 W	1,1 W

Tolerance	PWM 0002		+- 17,5 %	+- 15,0 %	+- 15,0 %
Current consumption Tolerance	Δp = 0 PWM 0002	I	65 mA +- 17,5 %	75 mA*) +- 15,0 %	80 mA +- 15,0 %
Speed Tolerance	Δp = 0 PWM 0002	n	1.750 1/min +- 12,5 %	1.950 1/min*) +- 10,0 %	2.200 1/min +- 10,0 %

*) Attention: Marked values are "FK" features

3.3 Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)



$$Ra = \frac{UBS - US\ Low}{I\ Sink}$$

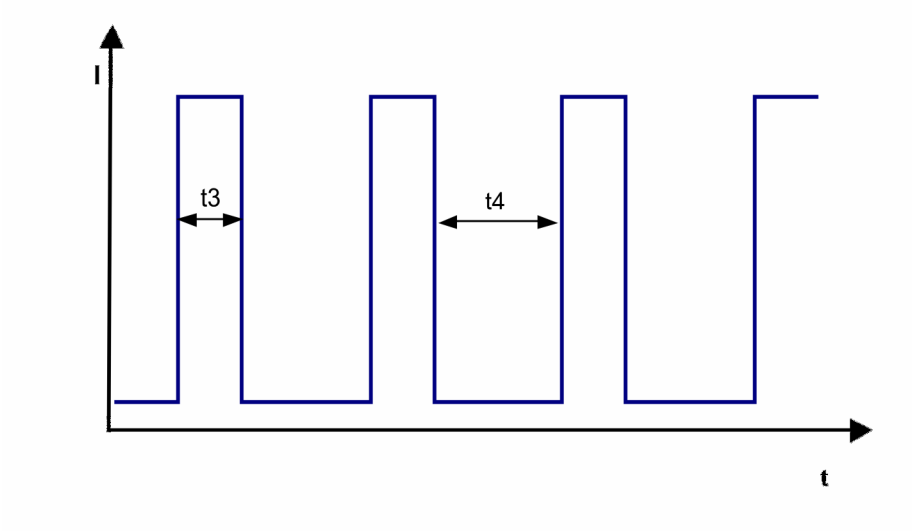
Features	Note	Values
Tacho operating voltage (UBS)		<= 28 V
Tacho signal Low *)	I sink: 2 mA	<= 0,4 V
Tacho signal High *)	I source: 0 mA	28 V
Maximum sink current		<= 4 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	(2 x n) / 60	120 Hz
Tacho isolated from motor	No	
Slew rate		=> 0,5 V/us

*) Attention: Marked values are "FK" features

Alarm type	None

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at Un	Rectifying diode IF <= 8 mA	**A**
Locked rotor protection	Auto restart	**A**
Locked rotor current at Un	approx. 335 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,27 s / 1,2 s t3: 0,11 s... 0,67 s t4: 0,41 s... 3,8 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:

3.600 1/min at free air flow	PWM 100 %; f: 25 kHz		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	74,0 m3/h	**FK**
Max. static pressure (Δp = max. / $\dot{V}$ =0)	48 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:

3.600 1/min at free air flow	PWM 100 %; f: 25 kHz	PWM min.:	PWM max.:

Optimal operating point	64,0 m3/h @ 10,0 Pa	
Sound power level at the optimal operating point	5,0 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	37,0 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	0 °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*)

*) Permittet application area:
The product is intended for use in sheltered rooms with controlled temperature and controlled humidity. Directly exposure to water must be avoided.

4.3 Mechanical requirements

Please require severity levels and specification parameters from the responsible development departments

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.	Not applicable Not applicable	**A**
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

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	70.000 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 Delta (40 °C)	140.000 h	

6.2 Additional Data

not specified