3212 J/2H4P
9693520184

1 General

Fan type	Fan	
Rotational direction looking at rotor	clockwise	**FK**
Airflow direction	Air outlet over struts	**FK**
Bearing system	Ball bearing	
Mounting position Tolerance	any	

2 Mechanics

2.1 General

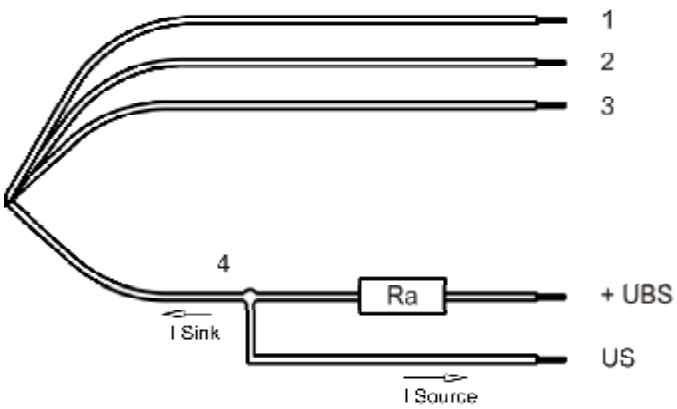
Width	92,0 mm	
Height	92,0 mm	
Depth	38,0 mm	
Diameter	0,0 mm	
Weight	0,290 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	wire outlet corner: 30 Ncm remaining corners: 30 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	35,0 mm	
Height of the motor	15,0 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 Tolerance	310 mm +- 10,0 mm	
Length of tube Tolerance		
Wire gauge (AWG)	22	
Insulation diameter	1,30 mm	
Plug	without	
Contact	without	



	Colour	Operation
Wire 1	red	+ UB
Wire 2	blue	- GND
Wire 3	violet	PWM
Wire 4	white	Tacho

The auxiliary shown on the schematic diagram which are required for the intended use are not part of our delivery.

3 Operating Data

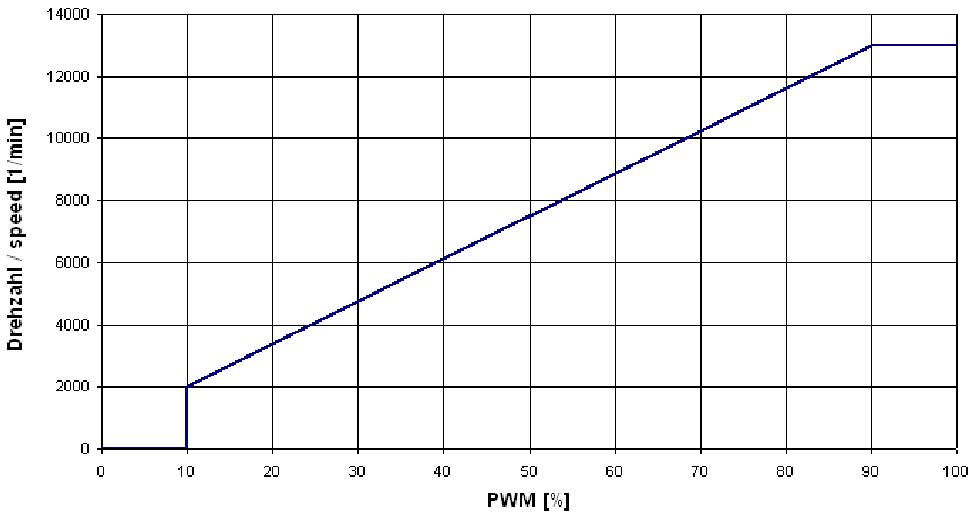
3.1 Operating Data - Electrical Interface - Input

Control input	PWM

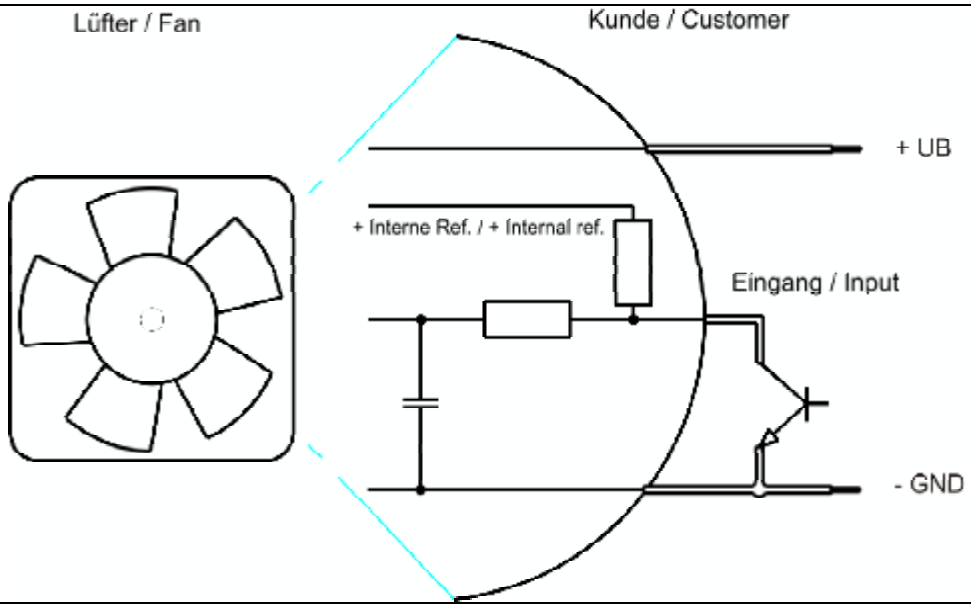
Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 5 kHz

Characteristics



Schematics



Speed control: 0...100 % PWM; f: 1...5 kHz; open collector PWM-Low <0,2 V

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 there may 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: 1 kHz	f: 5 kHz

Features	**Condition**	**Symbol**	**Values**		
Voltage range	Δp = 0	U	6,0 V		13,8 V
Nominal voltage	Δp = 0	U_N		12,0 V	
Power consumption Tolerance	Δp = 0 PWM 0001	P	11,0 W +- 17,5 %	50,0 W +- 17,5 %	56,0 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0001	I	1.900 mA +- 17,5 %	4.200 mA*) +- 17,5 %	4.100 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0001	n	7.500 1/min +- 12,5 %	13.000 1/min*) +- 7,5 %	13.000 1/min +- 3,0 %
Starting current consumption				14.500 mA	
Inrush current				19.500 mA	

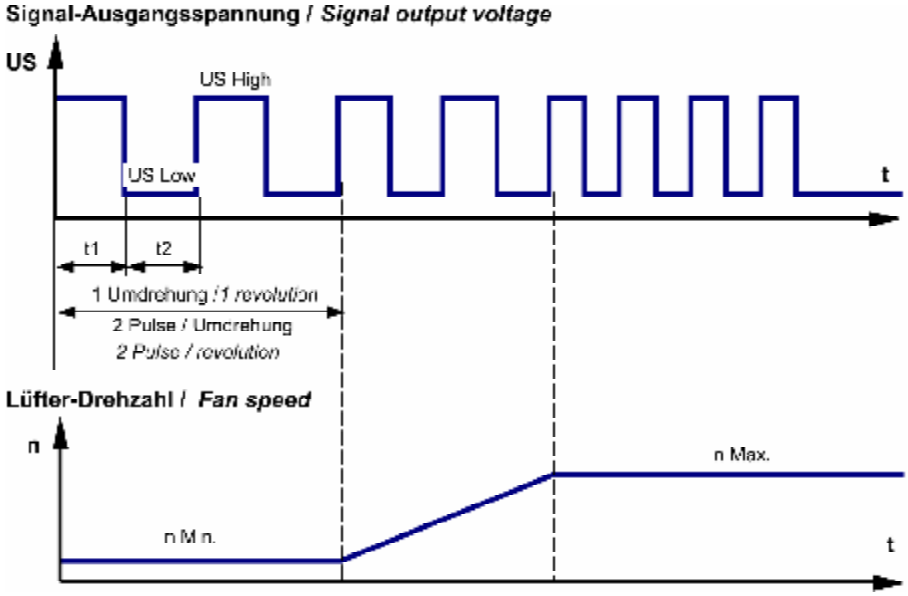
Name	**Condition**		
PWM 0002	PWM: 50 %;	f: 1 kHz	f: 5 kHz

Features	**Condition**	**Symbol**	**Values**		
Voltage range	Δp = 0	U	6,0 V		13,8 V
Nominal voltage	Δp = 0	U_N		12,0 V	
Power consumption Tolerance	Δp = 0 PWM 0002	P	9,0 W +- 17,5 %	12,0 W +- 25,0 %	12,0 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0002	I	1.500 mA +- 17,5 %	1.000 mA*) +- 25,0 %	870 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0002	n	7.000 1/min +- 12,5 %	7.500 1/min*) +- 5,0 %	7.500 1/min +- 5,0 %

*) Attention: Marked values are "FK" features

3.3 Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)



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

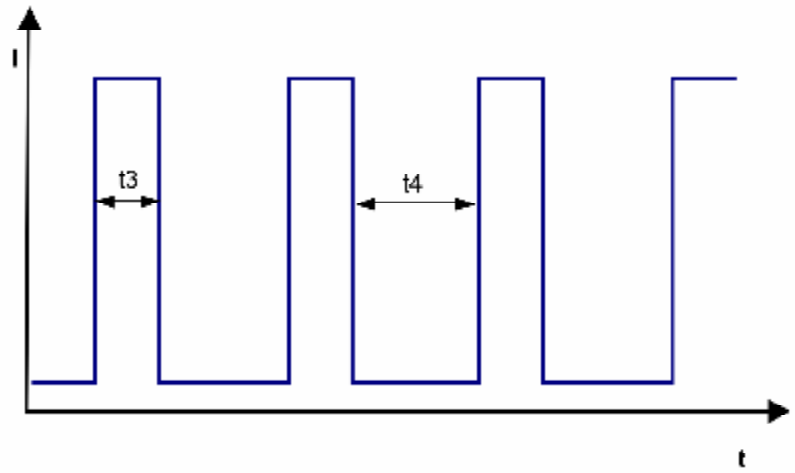
Features	Note	Values
Tacho operating voltage (UBS)		<= 60 V
Tacho signal Low *)	I sink: 2 mA	<= 0,4 V
Tacho signal High *)	I source: 0 mA	<= 60 V
Maximum sink current		<= 4 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	(2 x n) / 60	
Tacho isolated from motor	No	
Slew rate of the tacho output voltage		=> 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	Polarity protected diode IF <= 450 uA	**A**
Locked rotor protection	Electronically restart	**A**
Locked rotor current at Un	approx. 14.500 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,5 s / 10 s	



3.5 Aerodynamic

Measurement conditions:	Measured with a double chamber intake rig acc. to DIN 24163 Part 3. Normal air density = 1,2 kg/m3; 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:

13.000 1/min at free air flow	PWM 100 %;	f: 1 kHz	f: 5 kHz

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	285,0 m3/h	**FK**
Max. static pressure (Δp = max. / $\dot{V}$ =0)	710 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:

13.000 1/min at free air flow	PWM 100 %	PWM min.: ; f: 1 kHz	PWM max.:; f: 5 kHz

Optimal operating point	190,0 m3/h @ 374,0 Pa	
Sound power level at the optimal operating point	8,0 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	76,0 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

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

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.	**A**
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 / 1,2 mm	
Protection class	III	

5.2 Approval Tests

CE	No
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.:12,0 V @ TU approval max.: 70 °C

6 Reliability

6.1 General

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