4418/2HHPU-186

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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).

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	
Balancing grade	16,0	**FK**
Impeller weight	118,0 g	

Mechanics

General

Width	119,0 mm	
Height	119,0 mm	
Depth	38,0 mm	
Diameter	0,0 mm	
Weight	0,270 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	wire outlet corner: 80 Ncm remaining corners: 80 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

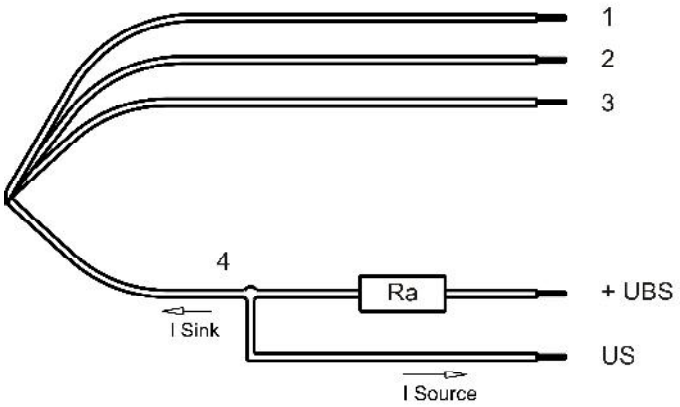
Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	35,0 mm	
Height of the motor	10,0 mm	
Number of phases	1	
Number of windings	2	
Operating mode	Continuous duty	
Insulation material class	E	

Connections

Electrical connection	Wires	
Length of lead wire Tolerance	310 mm +- 10,0 mm	
Length of tube Tolerance	--	
Wire gauge (AWG)	24	
Insulation diameter	1,10 mm	
Plug	no	
Contact	no	





	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.

Operating Data

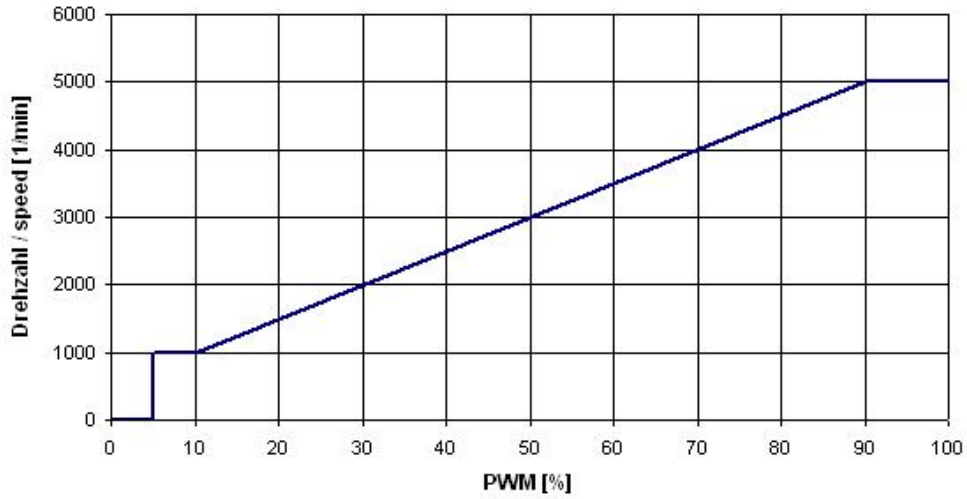
Operating Data - Electrical Interface - Input

Control input	PWM

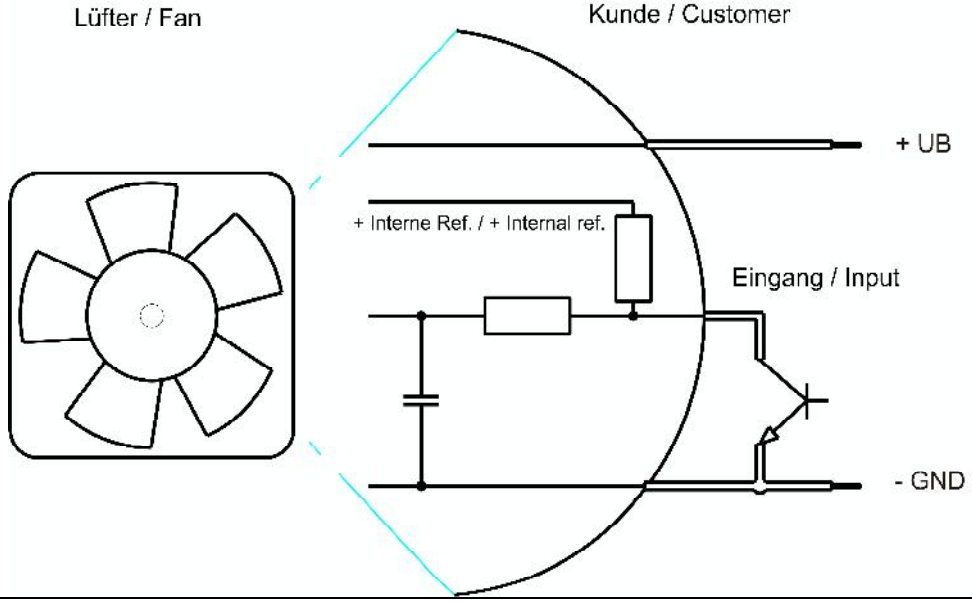
Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 10 kHz

Characteristics



Schematics



Speed control:
By Puls width modulation (PWM) 0 ... 100%
Open collector in relation to signal-ground. PWM frequency f: 1 -10 kHz

Information to the curve:
0 % - 5% PWM: 0 1/min
5 % - 10% PWM: 1.000 1/min (corresponding to min. speed)
10 % - 90% PWM: linear increasing curve
90 % - 100% PWM: 5.000 1/min (corresponding to max. speed)

Hysteresis: 3%

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: 1 kHz	f: 10 kHz

Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	36,0 V		60,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0001	P	7,1 W +- 17,5 %	13,0 W +- 25,0 %	13,5 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0001	I	196 mA +- 17,5 %	270 mA*) +- 25,0 %	225 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0001	n	4.120 1/min +- 12,5 %	5.000 1/min*) +- 4,0 %	5.000 1/min +- 4,0 %
Start-up current				1.200 mA	

Name	Condition		
PWM 0002	PWM: 50 %;	f: 1 kHz	f: 10 kHz

Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	36,0 V		60,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0002	P	3,1 W +- 25,0 %	3,5 W +- 25,0 %	4,0 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0002	I	87 mA +- 25,0 %	73 mA*) +- 25,0 %	66 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0002	n	2.870 1/min **)	2.870 1/min*) **)	2.870 1/min **)

Name	Condition		
PWM 0003	PWM: 10 %;	f: 1 kHz	f: 10 kHz

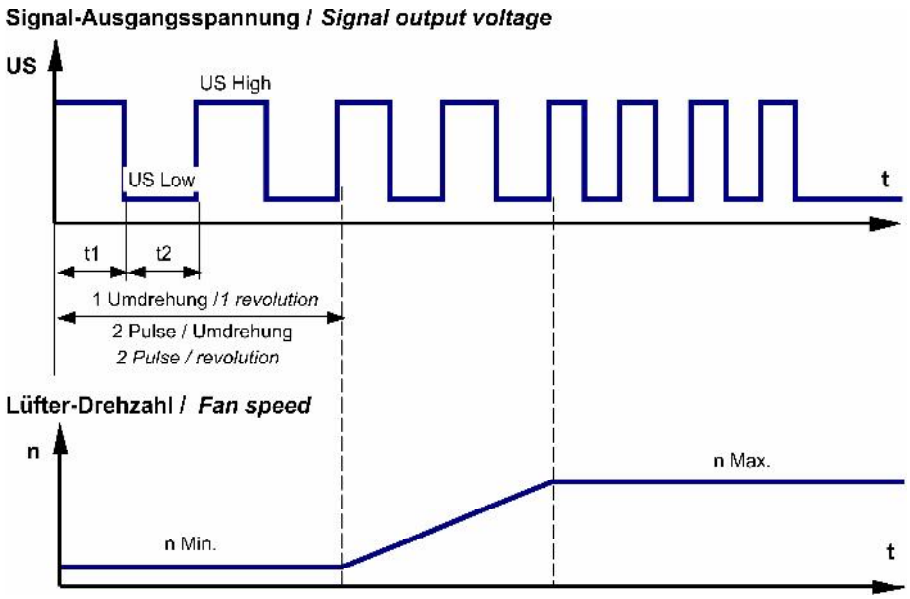
Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	36,0 V		60,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0003	P	0,8 W +- 25,0 %	1,1 W +- 25,0 %	1,4 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0003	I	23 mA +- 25,0 %	23 mA*) +- 25,0 %	23 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0003	n	1.000 1/min **)	1.000 1/min*) **)	1.000 1/min **)

*) Attention: Marked values are "FK" features

) ***Vario Pro:*	Unless otherwise specified in the table a general fan speed tolerance applies, relating to the maximum value of the required characteristic curve. Tolerance:+- 4,0 %

Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)



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

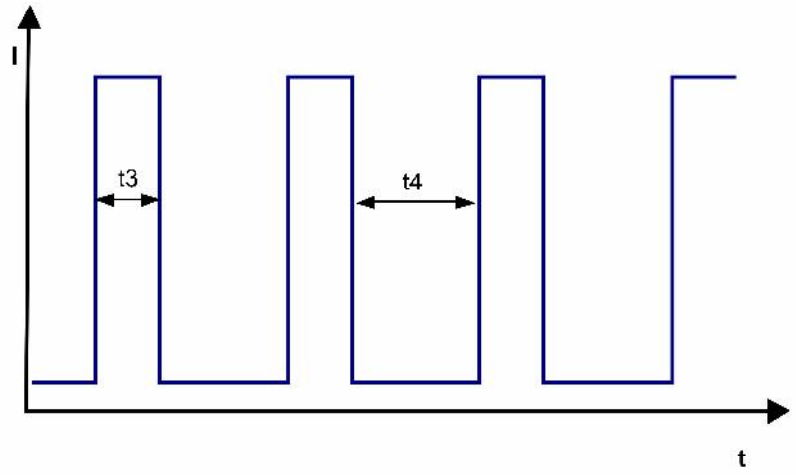
Features	Note	Values
Tacho operating voltage (UBS)		<= 60 V
Tacho signal Low *)	I sink: 2 mA	<= 0,4 V
Tacho signal High *)	I source: 0 mA	60 V
Maximum sink current		<= 4 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	(2 x n) / 60	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

*) Attention: Marked values are "FK" features

Alarm type	None

Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at Un	Rectifying diode IF <= 50 uA	**A**
Locked rotor protection	Auto restart	**A**
Locked rotor current at Un	approx. 1.200 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,25 s / 20,0 s	



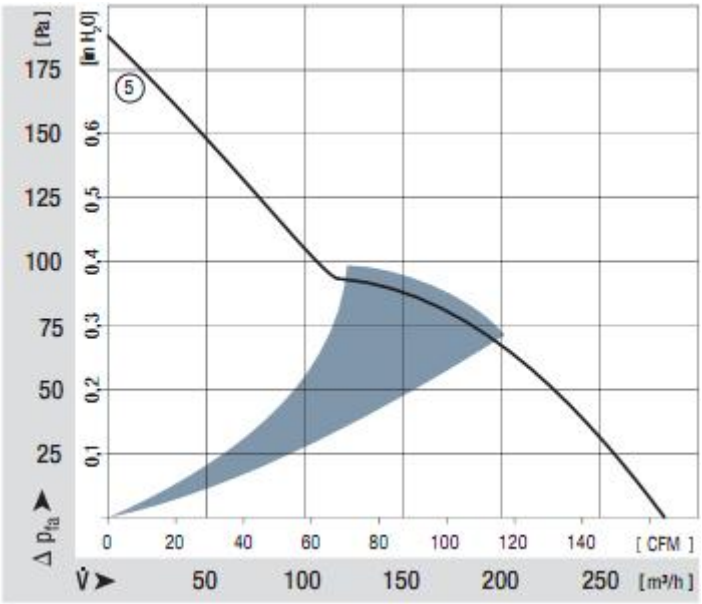
Aerodynamic

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:

5.000 1/min at free air flow	PWM 100 %;	f: 1 kHz	f: 10 kHz

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	285,0 m3/h **(curve 5)**	**FK**
Max. static pressure (Δp = max. / $\dot{V}$ =0)	190 Pa **(curve 5)**	**FK**



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:

5.000 1/min at free air flow	PWM 100 %	PWM min.: ; f: 1 kHz	PWM max.:; f: 10 kHz

Optimal operating point	170,0 m3/h @ 81 Pa	
Sound power level at the optimal operating point	6,4 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	55,0 dB(A)	

Environment

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	

Climatic requirements*)

Humidity requirements	humid temperature, cyclic; according to DIN EN 60068-2-38, 10 cycle and condensation water check; according to DIN EN ISO 6270-2, 14 days	
Water exposure	Splash water check IPX4; according to DIN EN 60529 VDE 0470, not certified	
Radiation exposure	Solar radiation; according to DIN EN 60068-2-5	
Dust requirements	Dust check IP5X; according to DIN EN 60529 VDE 0470, not certified	
Salt fog requirements	salt fog, cyclic, in operation; according to DIN EN 60068-2-52, 3 cycle	
Harmful gas requirements	Mixed gas corrosion test; according to DIN EN 60068-2-60	

*) Permittet application area:
The product is for the use in open and unsheltered areas. Directly exposure to water as well as saline ambient conditions are allowed in so far as this doesn´t prevent the normal operation.

Pollution degree 3 (according DIN EN 60664-1)
It occurs conductive pollution or dry non-conductive pollution occurs that becomes conductive due to condensation.

Mechanical requirements

See drawing # 9293510500.

Safety

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**
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 / 1,5 mm	
Protection class	III	

Approval Tests

CE	Yes
UL	Yes / UL audited by CSA according to 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	Yes / GB 12350-2000 Safety Requirements for small Power Motors

The approval tests are observed to:
U approval max.:60,0 V @ TU approval max.: 70,0 °C

Reliability

General

Service Life L10 at TU = 40 °C	50.000 h	
Service Life L10 at TU max.	25.000 h	
Life expectancy L10 Delta (40 °C)	100.000 h	