3218 J/2NPU-194

Customer specification: Nokia
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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	clockwise	**FK**
Airflow direction	Air outlet over struts	**FK**
Bearing system	Ball bearing	
Lubrication	see sectional drawing of the bearing	
Mounting position Tolerance	any	
Balancing grade	6,3	**FK**
Impeller weight	96,0 g	

2 Mechanics

2.1 General

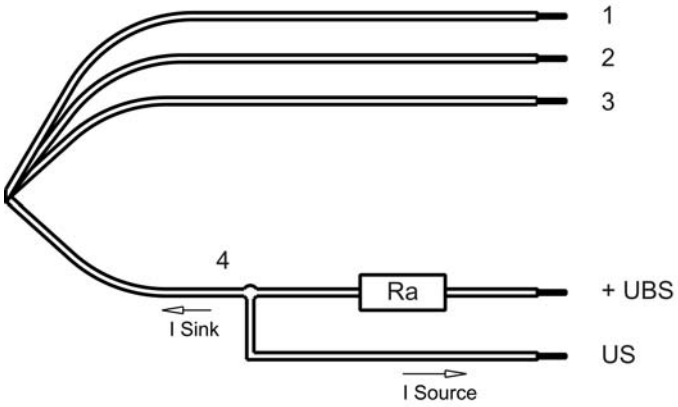
Width	92,0 mm	
Height	92,0 mm	
Depth	38,0 mm	
Diameter	0,0 mm	
Weight	0,235 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	wire outlet corner: 30 Ncm remaining corners: 30 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Motor

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

2.3 Connections

Electrical connection	Cable	
Length of lead wire Tolerance		
Length of tube Tolerance		
Wire gauge (AWG)		
Insulation diameter		
Plug	see drawing	
Contact	see drawing	



	Colour	Operation
Wire 1	red	+ UB
Wire 2	black	- GND
Wire 3	brown	PWM
Wire 4	orange	Tacho

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

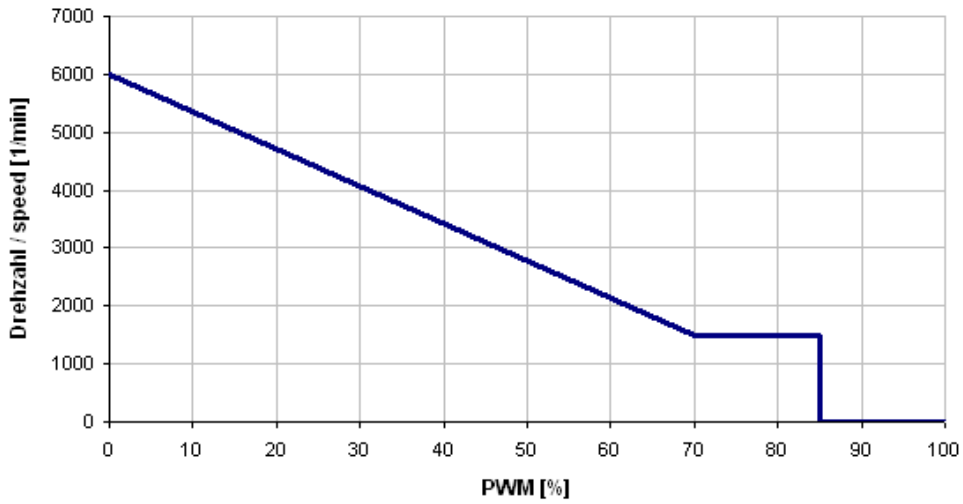
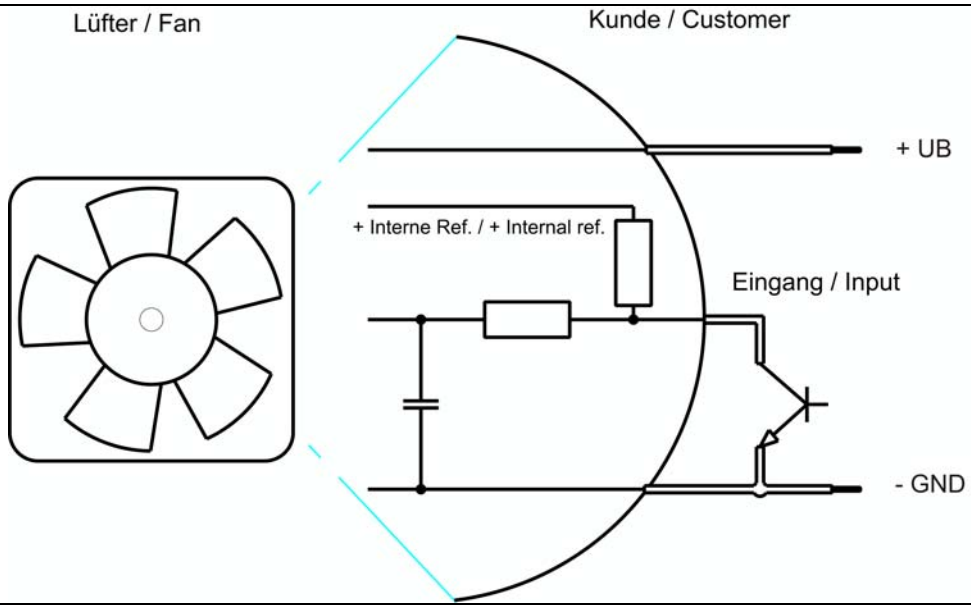
3 Operating Data

3.1 Operating Data - Electrical Interface - Input

Control input	PWM

Features

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

Characteristics	
Schematics	

Speed control: 0... 100 % PWM; open collector 2... 5 kHz

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: 0 %;	f: 2 kHz	f: 5 kHz

Features	**Condition**	**Symbol**	**Values**		
Voltage range	Δp = 0	U	40,0 V		57,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0001	P	6,8 W +- 17,5 %	7,7 W +- 17,5 %	7,8 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0001	I	170 mA +- 17,5 %	160 mA*) +- 17,5 %	136 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0001	n	6.000 1/min +- 12,5 %	6.000 1/min*) +- 5,0 %	6.000 1/min +- 5,0 %
Starting current consumption				900 mA	

Name	**Condition**		
PWM 0002	PWM: 60 %;	f: 2 kHz	f: 5 kHz

Features	**Condition**	**Symbol**	**Values**		
Voltage range	Δp = 0	U	40,0 V		57,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0002	P	1,4 W +- 17,5 %	1,6 W +- 17,5 %	1,8 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0002	I	35 mA +- 17,5 %	33 mA*) +- 17,5 %	31 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0002	n	2.260 1/min +- 12,5 %	2.260 1/min*) +- 5,0 %	2.260 1/min +- 5,0 %

Name	**Condition**		
PWM 0003	PWM: 85 %;	f: 2 kHz	f: 5 kHz

Features	**Condition**	**Symbol**	**Values**		
Voltage range	Δp = 0	U	40,0 V		57,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0003	P	0,9 W +- 17,5 %	1,1 W +- 17,5 %	1,2 W +- 25,0 %
Current consumption Tolerance	Δp = 0	I	24 mA +- 17,5 %	23 mA*) +- 17,5 %	22 mA +- 25,0 %

	PWM 0003				
Speed Tolerance	Δp = 0 PWM 0003	n	1.500 1/min +- 12,5 %	1.500 1/min*) +- 5,0 %	1.500 1/min +- 5,0 %

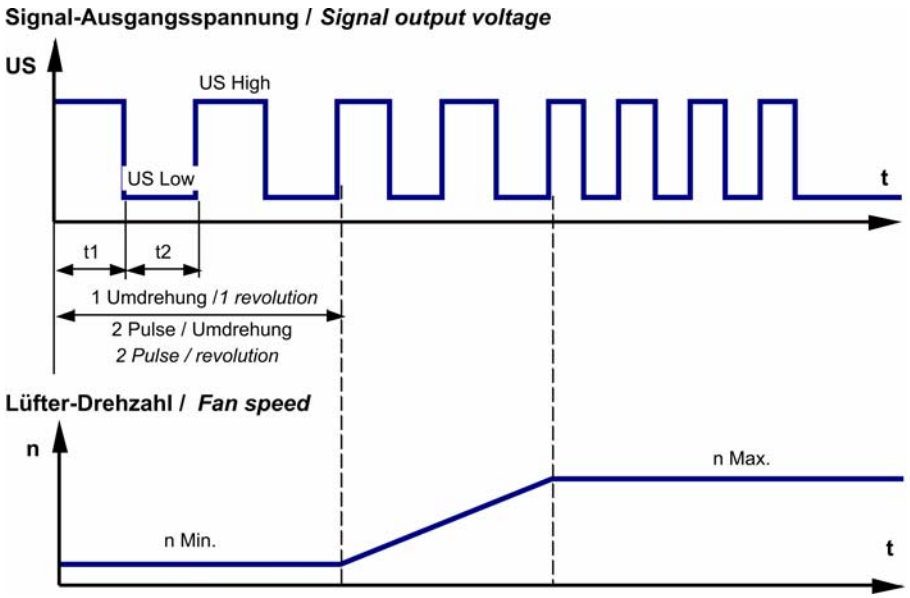
Name	**Condition**		
PWM 0004	PWM: 100 %;	f: 2 kHz	f: 5 kHz

Features	**Condition**	**Symbol**	**Values**		
Voltage range	Δp = 0	U	40,0 V		57,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0004	P	0,3 W +- 17,5 %	0,4 W +- 17,5 %	0,5 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0004	I	8 mA +- 17,5 %	8 mA*) +- 17,5 %	9 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0004	n	0 1/min	0 1/min*)	0 1/min

*) Attention: Marked values are "FK" features

3.3 Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)



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

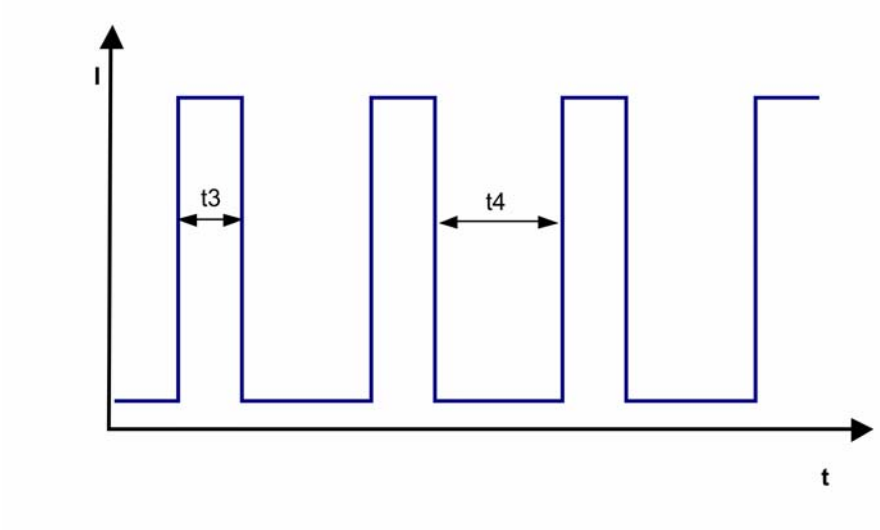
Features	Note	Values
Tacho operating voltage (UBS)		<= 60,0 V
Tacho signal Low *)	I sink: 2 mA	<= 0,4 V
Tacho signal High *)	I source: 0 mA	<= 60,0 V
Maximum sink current		<= 4 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	(2 x n) / 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 <= 100 uA	**A**
Locked rotor protection	Electronically restart	**A**
Locked rotor current at Un	approx. 500 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,7 s / 20,0 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:

6.000 1/min at free air flow	PWM 0 %;	f: 2 kHz	f: 5 kHz

Max. free-air flow (Δp = 0 / V̇ = max.)	123,0 m3/h	**FK**
Max. static pressure (Δp = max. / V̇ =0)	235 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:

6.000 1/min at free air flow	PWM 0 %	PWM min.: ; f: 2 kHz	PWM max.:; f: 5 kHz

Optimal operating point	98,0 m3/h @ 62,0 Pa	
Sound power level at the optimal operating point	6,1 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	51,0 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-35 °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 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.

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 / 1,5 mm	
Protection class	III	

5.2 Approval Tests

CE	Yes
UL	Yes / UL507, Electric Fans
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.

6 Reliability

6.1 General

Life expectancy L10 at TU = 20 °C		
Life expectancy L10 at TU = 40 °C	70.000 h	
Life expectancy L10 at TU = 60 °C		
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L15 at TU = 45 °C		
Life expectancy L10 Delta (40 °C)	140.000 h	