DV5218/2NPU-220

Customer specification: Nokia Ariel Flexi
Version: 1.0
Created: 27.01.2010

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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	Mixed-flow 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 Tolerance	any	
Balancing grade	6,3	**FK**
Impeller weight	136,0 g	

2 Mechanics

2.1 General

Width	127,0 mm	
Height	127,0 mm	
Depth	38,0 mm	
Diameter	0,0 mm	
Weight	0,480 kg	
Housing material	Mixed	
Impeller material	Plastic	

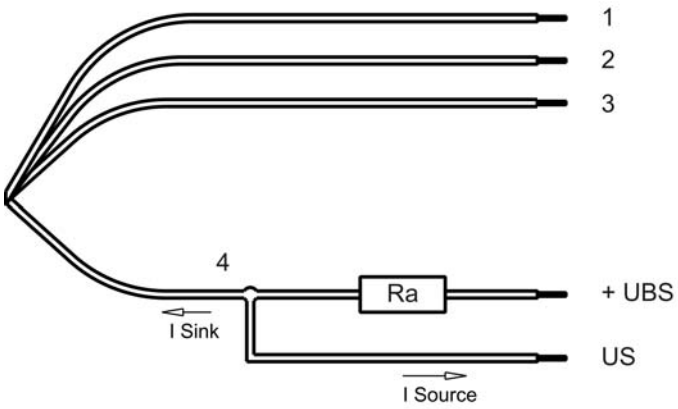
2.2 Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	43,0 mm	
Height of the motor	10,5 mm	
Number of phases	1	
Number of windings	1	
Operating mode	Continuous duty	
Insulation material class	E	

2.3 Connections

Electrical connection	Cable - Plug	
Length of lead wire Tolerance	1.600 mm +- 20,0 mm	
Length of tube Tolerance		
Wire gauge (AWG)	24	
Insulation diameter	1,10 mm	
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.

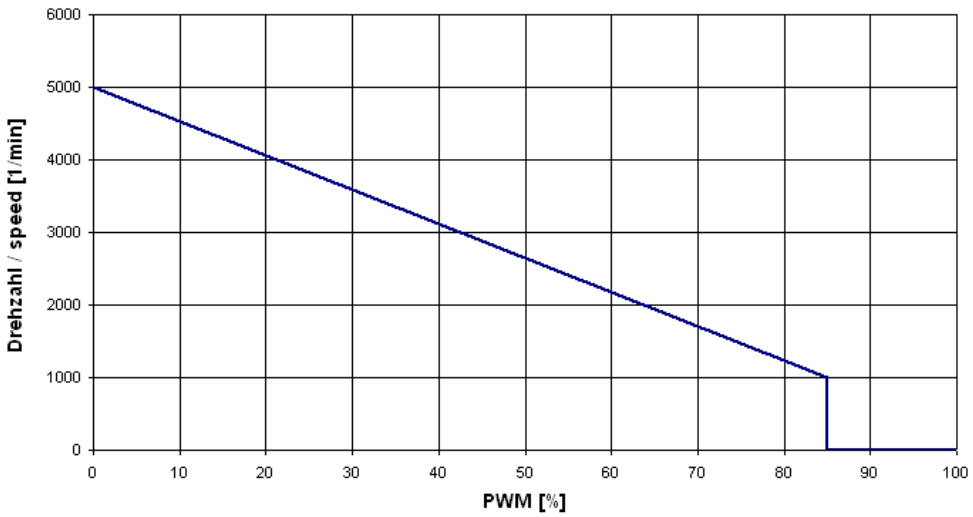
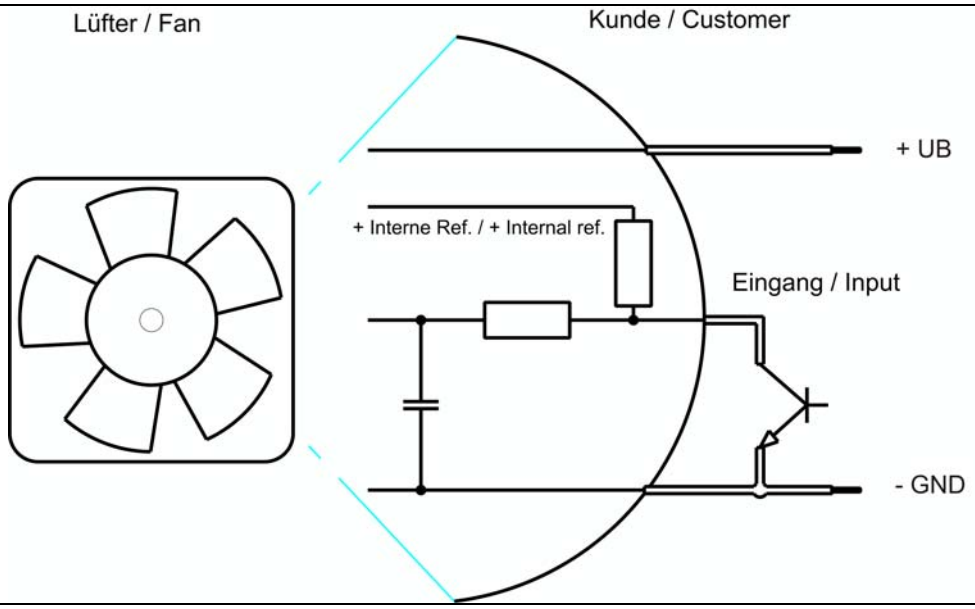
3 Operating Data

3.1 Operating Data - Electrical Interface - Input

Control input	PWM

Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 5 kHz Typical: 2 kHz

Characteristics	
Schematics	

Transistor requirements: VCEmax. >12V; Isink max. >5mA; VCEsat <0,15V

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		

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	13,0 W +- 15,0 %	21,5 W +- 15,0 %	22,2 W +- 15,0 %
Current consumption Tolerance	Δp = 0 PWM 0001	I	360 mA +- 15,0 %	445 mA*) +- 15,0 %	370 mA +- 15,0 %
Speed Tolerance	Δp = 0 PWM 0001	n	4.300 1/min +- 10,0 %	5.000 1/min*) +- 10,0 %	5.000 1/min +- 10,0 %
Starting current consumption				1.500 mA	
Inrush current				60.000 mA	

Name	Condition		
PWM 0002	PWM: 50 %; f: 2 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	5,0 W +- 15,0 %	5,5 W +- 15,0 %	6,3 W +- 12,5 %
Current consumption Tolerance	Δp = 0 PWM 0002	I	140 mA +- 15,0 %	115 mA*) +- 15,0 %	105 mA +- 12,5 %
Speed Tolerance	Δp = 0 PWM 0002	n	2.600 1/min +- 10,0 %	2.600 1/min*) +- 10,0 %	2.600 1/min +- 10,0 %

Name	Condition		
PWM 0003	PWM: 80 %; f: 2 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	1,6 W +- 15,0 %	2,1 W +- 15,0 %	2,4 W +- 15,0 %
Current consumption	Δp = 0	I	45 mA	43 mA*)	40 mA

Tolerance	PWM 0003		+- 15,0 %	+- 15,0 %	+- 15,0 %
Speed Tolerance	Δp = 0 PWM 0003	n	1.200 1/min +- 10 %	1.200 1/min*) +- 10,0 %	1.200 1/min +- 10,0 %

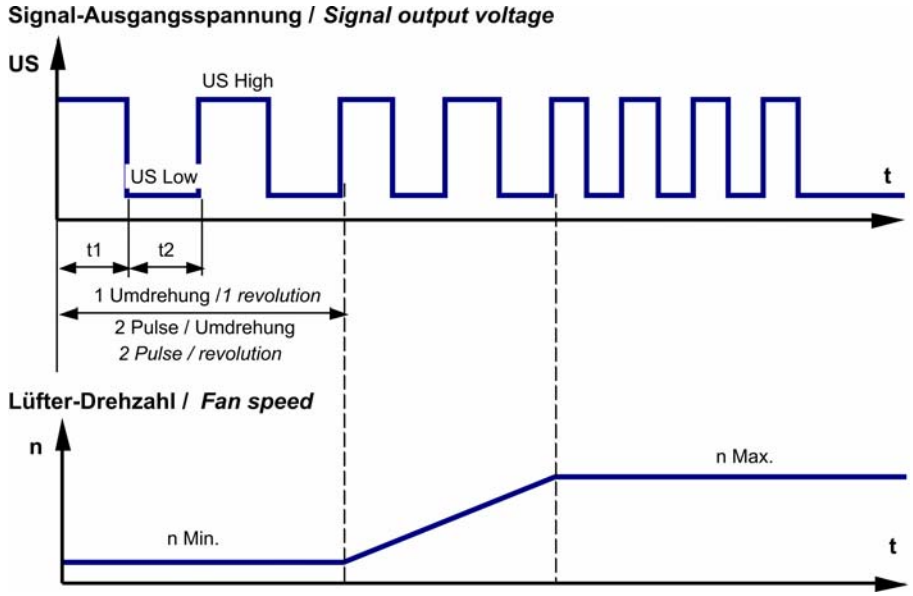
Name	**Condition**		
PWM 0004	PWM: 100 %; f: 2 kHz		

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 0004	P	<= 1,0 W	<= 1,5 W	<= 1,8 W
Current consumption Tolerance	Δp = 0 PWM 0004	I	<= 30 mA	<= 30 mA*)	<= 30 mA
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)



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

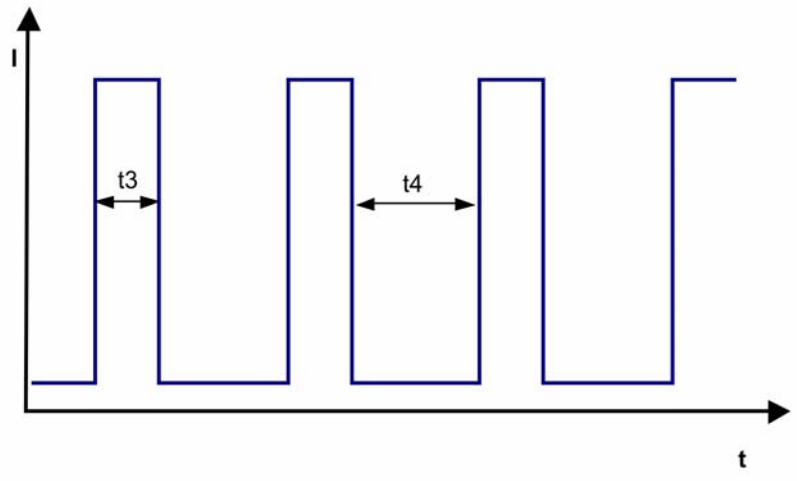
Features	Note	Values
Tacho operating voltage (UBS)		<= 60 V
Tacho signal Low *)	I sink: 2 mA	<= 0,4 V
Tacho signal High *)	I source: 0 mA	60 V
Maximum sink current		<= 20 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	(2 x n) / 60	
Tacho isolated from motor	No	
Slew rate of the tacho output voltage		=> 0,5 V/us

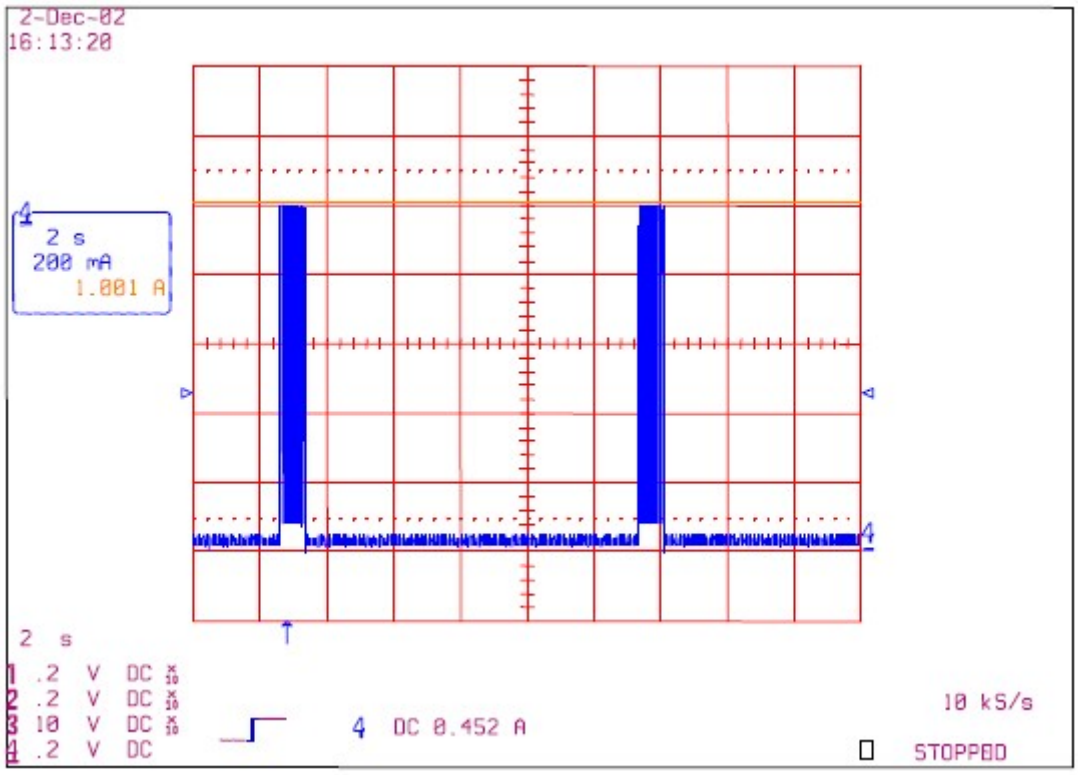
*) Attention: Marked values are "FK" features

Alarm type	None

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at Un	Polarity protected diode IF <= 10 mA	**A**
Locked rotor protection	Electronically restart	**A**
Locked rotor current at Un	approx. 1.200 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,5 s / 5,0 s t3: 0,4 s... 0,6 s t4: 4,8 s... 5,2 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:

5.000 1/min at free air flow	PWM 0 %; f: 2 kHz		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	270,0 m3/h	**FK**
Max. static pressure (Δp = max. / $\dot{V}$ =0)	245 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:

5.000 1/min at free air flow	PWM 0 %; f: 2 kHz	PWM min.:	PWM max.:

Optimal operating point	190,0 m3/h @ 96,0 Pa	
Sound power level at the optimal operating point	6,4 bel(A)	

Sound pressure level at free air flow, measured in rubber bands	56,0 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-33 °C	
Max. permitted ambient temperature TU max.	75 °C	
Min. permitted storage temperature TL min.	-40 °C	
Max. permitted storage temperature TL max.	80 °C	

5 Safety

5.1 Electrical Safety

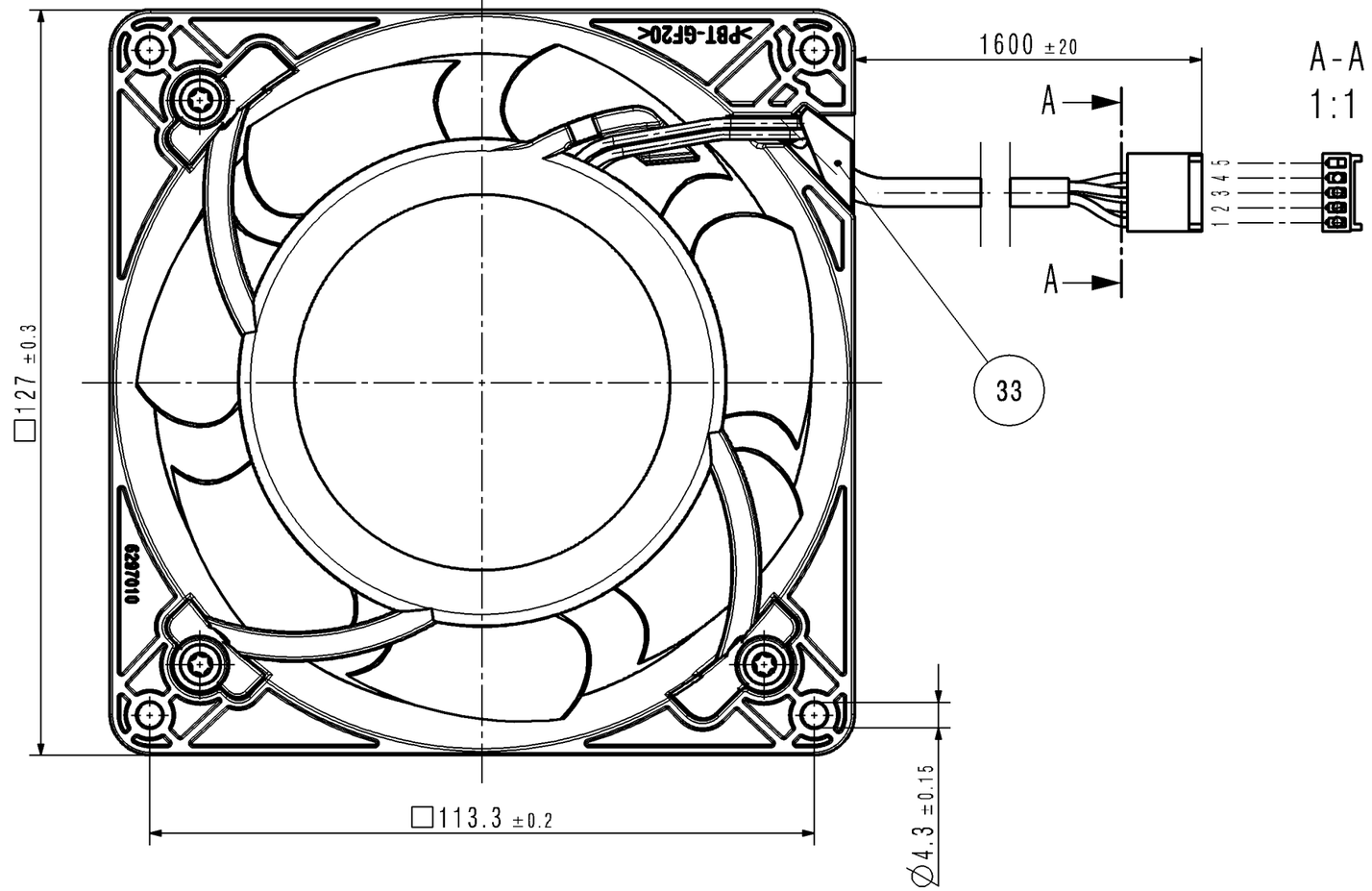
Dielectric strength DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700) A.) Type test Measuring conditions: After 48h of storage at 95% R.H. and 25°C. No arcing or breakdown is allowed! All connections together to ground. B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown 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	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

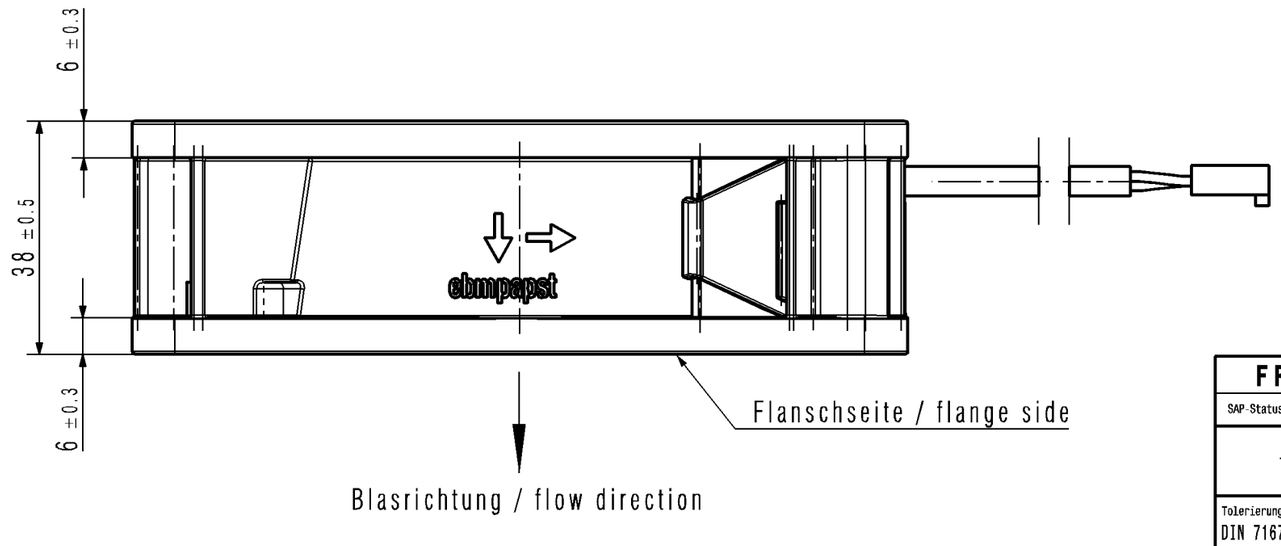
The approval tests are observed to:
U approval max.:60,0 V @ TU approval max.: 75,0 °C



Steckerbelegung PIN configuration	Litzenfarbe wire colour
PIN 1 (+)	rot / red
PIN 2 (-)	schwarz / black
PIN 3 (PWM input)	braun / brown
PIN 4 (RPM output)	orange / orange
PIN 5 (frei / free)	----- / -----

Steckergehäuse / plug housing:
Molex: P/N 22-01-3057

Kontakt / contact:
Molex: P/N 08-55-0101



1.) Maß für Montagewand
- Axialspiel der Kugellager mit Feder spielfrei verspannt

1.) dimension for mounting cut-out
- ball bearings without axial clearance by a pre- loaded spring

FR	115525	V5R16	PAPST
SAP-Status/State	Aend.-Nr./ Change-No.	CATIA-System-Version/ CATIA-System-Version	CAD-Umgebung/ CAD-Environment

	Datum	Name
Bearb./ Drawn	05.06.2009	FLEIG AR
Gepr./ Checked	26.06.2009	SEIDLER
Freig./ Releas.	26.06.2009	SEIDLER

Tolerierung / Tolerances:
DIN 7167

Allgemeintoleranzen / Gen. Tolerances:
DIN ISO 2768-mK-E

ebmpapst

ebm-papst St.Georgen GmbH & Co KG

Werkstoff / Material:

Volumen / Volume (mm^3):

Gewicht / Mass (g):

Artikel / Title:
Diagonal- Lüfter
diagonal fan

Zchg.-Nr./ Drawing No:
9694340220

Ers.f.Zchg. / Replaces:

Dokumenttyp / Type of Document	Teildokument (Blatt/Page)	Index / Index	Format / Size:	Massstab/Scale
C2D	002	A	A3	1:1

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