Product Data Sheet 4112 N/2H6P

ebmpapst

The engineer's choice

GREEN TECH

4112 N/2H6P

INDEX

1 General

Fan type	Fan	
Rotating direction looking at rotor	Clockwise	
Airflow direction	Air intake over struts	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

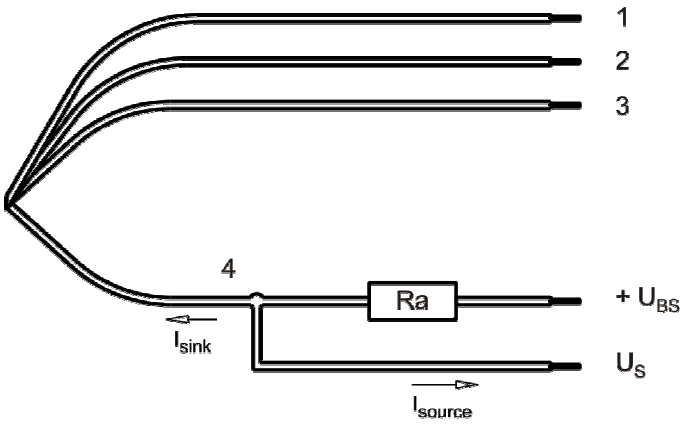
2 Mechanics

2.1 General

Width	119,0 mm	
Height	119,0 mm	
Depth	38,0 mm	
Mass	0,390 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	Wire outlet corner: 420 Ncm Remaining corners: 600 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 310 mm +- 10,0 mm	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 20	2 mm
2	blue	- GND	AWG 20	2 mm
3	violet	PWM	AWG 22	1,7 mm
4	white	Tacho	AWG 22	1,7 mm

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

3 Operating Data

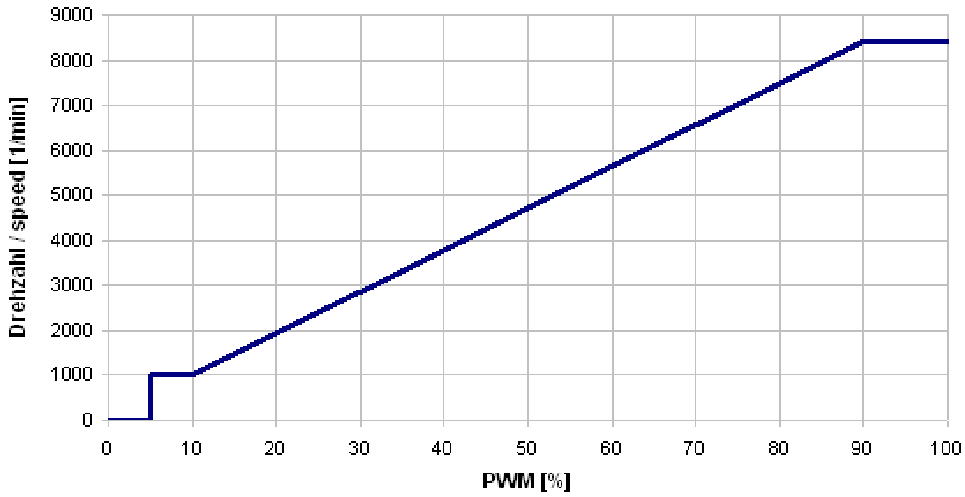
3.1 Electrical Interface - Input

Control input	PWM

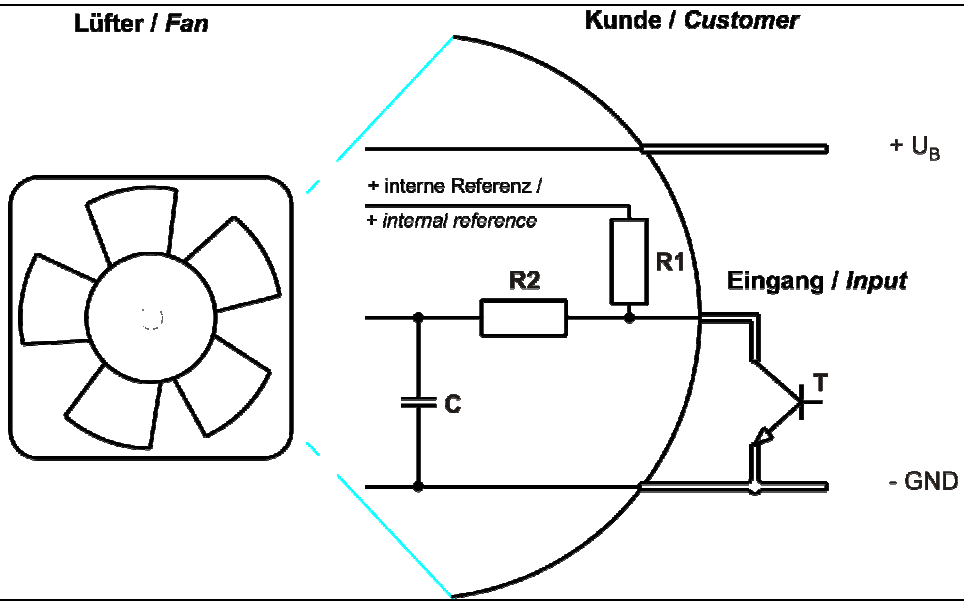
Features

Inpute type	Open collector	
PWM - Frequency		typical: 2 kHz

Characteristics



Schematics



Speed control: 0... 100 % PWM; 2kHz; 5VDC, 1 mA.
Transistor requirement: Vce max. => 12 V; Isink max > 5 mA; 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 should not be any solid obstruction within 0,5 m.

Δp = 0: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

Name	Condition		
PWM 0001	PWM: 100 %; f: 2 kHz		

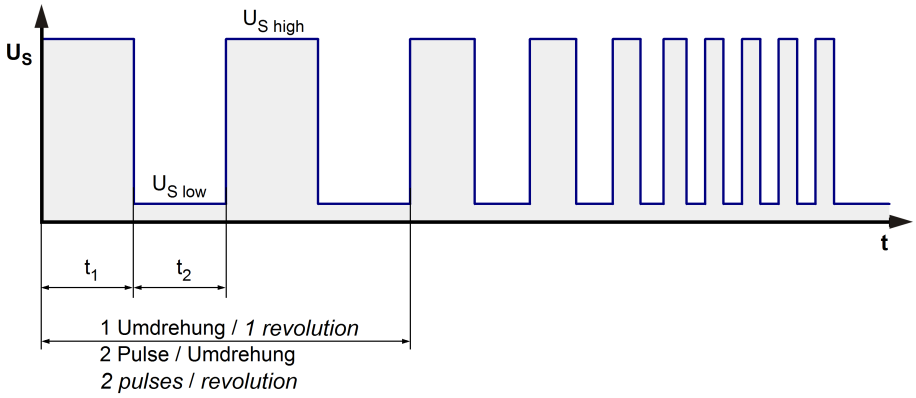
The max. operating voltage of the fan is approved to 15 V!
The power limitation is enabled at an operating voltage of > 14 V.
This becomes noticeable in special situations as a speed decreasing of 10% in realation to the normal operating, e. g. at max. pressure.

Features	Condition	Symbol	Values		
Voltage range		U	9 V		15 V
Nominal voltage		U_N		12 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	42 W +- 15 %	63 W +- 15 %	57,4 W +- 15 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	4.660 mA +- 15 %	5.250 mA +- 15 %	4.100 mA +- 15 %
Speed Tolerance	Δp = 0 PWM 0010	n	7.600 1/min +- 10 %	8.400 1/min +- 10 %	8.400 1/min +- 10 %
Starting current consumption				7.800 mA	

3.3 Electrical Interface - Output

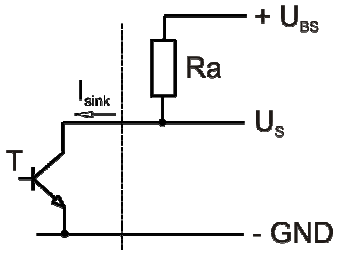
Tacho type	/2 (open collector)

Signal-Ausgangsspannung / *Signal output voltage*

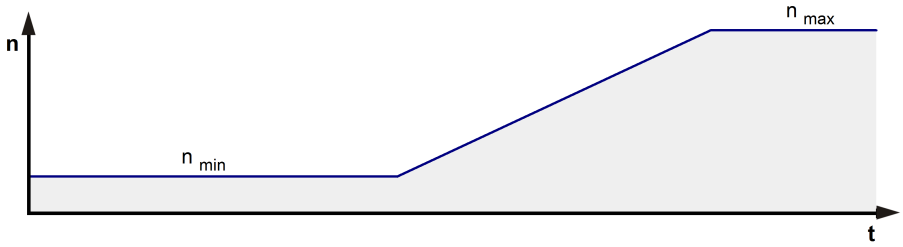


$$Ra = \frac{U_{BS} - U_{S\,low}}{I_{sink}}$$

Lüfter / *Fan* **Kunde / *Customer***



Lüfter-Drehzahl / *Fan speed*

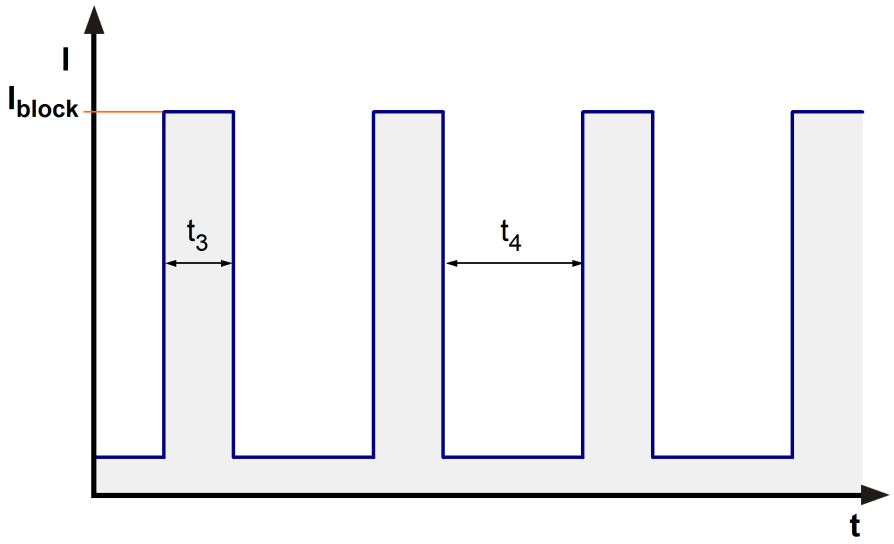


Features		**Note**	**Values**
Tacho operating voltage	U_{BS}		Min.: 5 V Max.: 60 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<= 0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	60 V
Maximum sink current	I_{sink}		<= 10 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(2 x n) / 60	
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

n = revolutions per minute (1/min)

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	P-CH FET I_F <= 10 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 3.500 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 0,5 s / 5,0 s	



Internal fuse: Liffelfuse NANO2R FUSE
Very Fast-Acting 451 Series
12 A (Art. No. 451012)

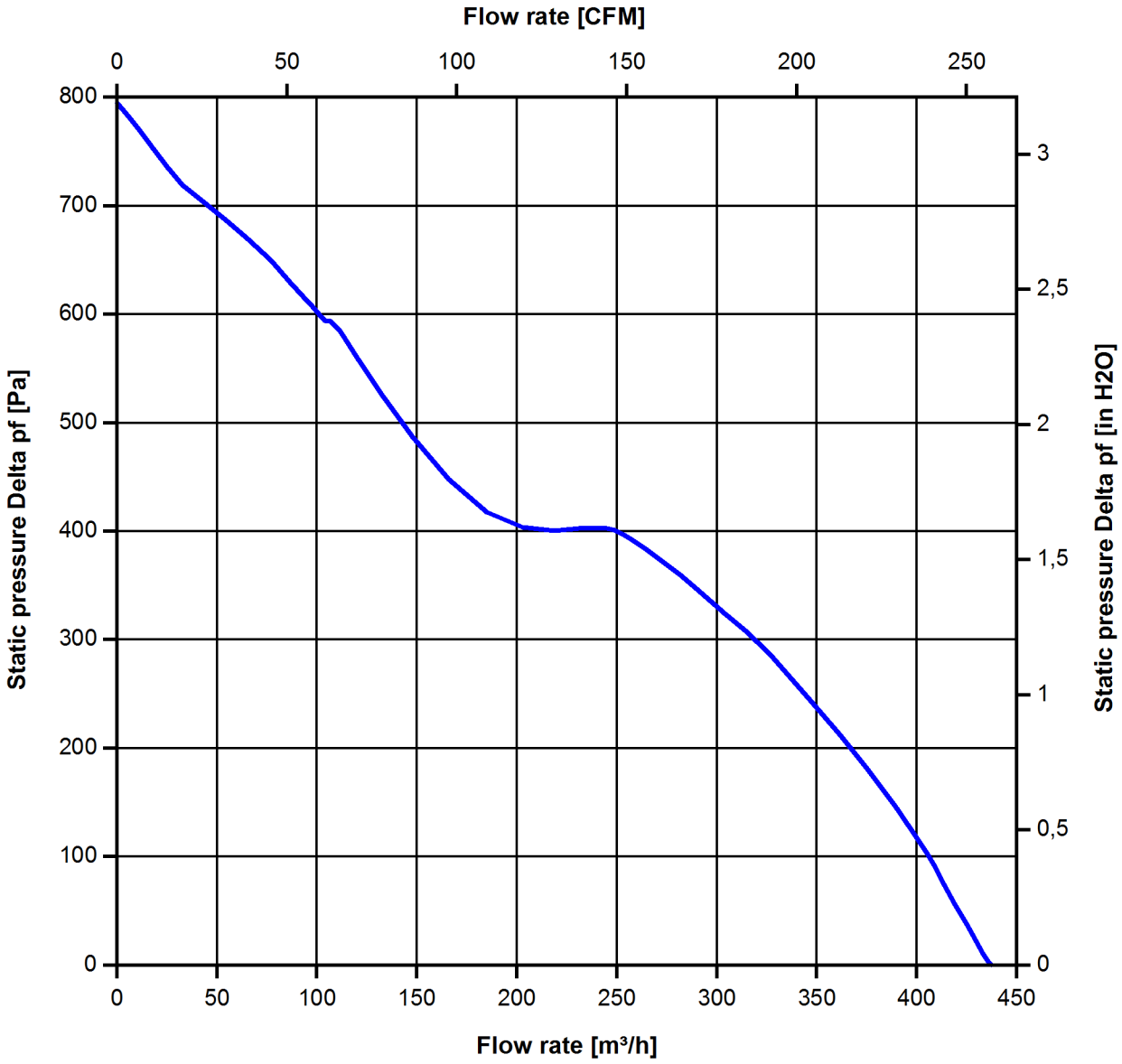
3.5 Aerodynamics

Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m3; Temperature 23℃ +/ - 3℃; In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal. The information is only valid under the specified test conditions and may be changed by the installation conditions. If there are deviations from the standard test conditions, the characteristic values must be checked under the installed conditions.

a.) Operation condition:

8.400 1/min at free air flow	PWM 100 %; f: 2 kHz		

Max. free-air flow (Δp = 0 / V̇ = max.)	440,0 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	795 Pa	



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 chapter aerodynamics.

a.) Operation condition:

8.400 1/min at free air flow	PWM 100 %; f: 2 kHz		

Optimal operating point	335,0 m3/h @ 242 Pa	
Sound power level at the optimal operating point	8,1 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	73,0 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	65 °C	
Min. permitted storage temperature TL min.	-40 °C	
Max. permitted storage temperature TL max.	80 °C	

4.2 Climatic Requirements

Humidity requirements	humid heat, constant; according to DIN EN 60068-2-78, 14 days	
Water exposure	None	
Dust requirements	None	
Salt fog requirements	None	

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

Pollution degree 1 (according DIN EN 60664-1)
There is either no pollution or it occurs only dry, non-conductive pollution. The pollution has no negative impact.

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

4.3 EMC

Kind	**Radiated Emission; 30 MHz - 1000 MHz**
According	DIN EN 55032:2016-02
Ceck accuracy / Limit	Class B
Result	Below limit Class B

Kind	Electrostatic Discharge Immunity Test
According	DIN EN 61000-4-2:2001-12
Ceck accuracy / Limit	Contact Discharge +/- 4 kV; Air Discharge +/- 8 kV
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

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℃. 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. 850 VDC / 1 Sec.	
Isolation resistance Measuring conditions: After 48h of storage at 95% R.H. and 25℃ measured with U=500 VDC for 1 min.	RI > 10 MOhm	
Clearance / creepage distance	1,0 mm / 1,2 mm	
Protection class	III	

5.2 Approval Tests

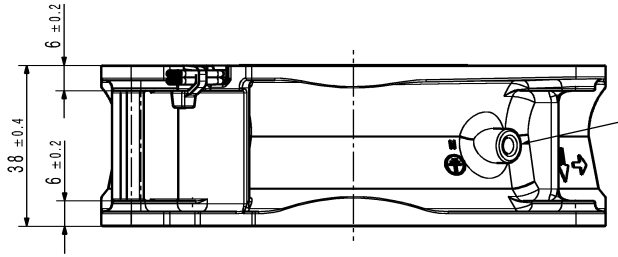
CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans
VDE	Association for Electrical, Electronic and Information Technologies	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Canadian Standards Association	Yes / C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Not applicable

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 ℃	60.000 h	
Life expectancy L10 at TU max.	32.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 ℃	102. 500 h	

Schutzvermerk nach DIN ISO 16016 beachten!
Refer to protection notice DIN ISO 16016 !



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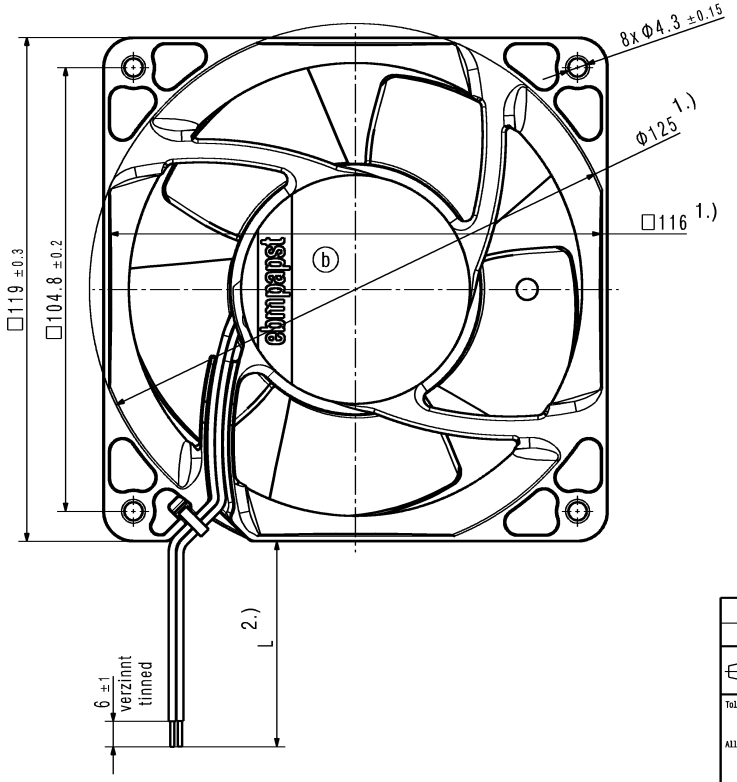
Schraube: Duo-Taptite, DIN 7500, CM 4x8, Torx,
nur wenn in Unterstückliste enthalten.

Screw: Duo-Taptite, DIN 7500, CM 4x8, Torx,
installed only if contained in sub-bill of material.



1.) Maße für Montageausschnitt.
2.) Anzahl und Länge der Litzen siehe Produktspezifikation.
- Axialspiel der Kugellager mit Feder spielfrei verspannt.

1.) Measures for mounting cut-out.
2.) Length and number of wires see design specification.
- Ball bearings without axial clearance by a pre-loaded spring.

Dokument-Status / Document-State	CATIA-Version/ CATIA-Version	CAD-Umgebung/ CAD-Environment	Werkstoff / Material:	Volumen / Volume (mm^3):	
Aend.-Nr./ Change-No.	96943000243 CPR0000			Gewicht / Mass (g):	
Tolerierung / Tolerances: ○	3D-Referenzmodell / 3D-Referencemodel		Artikel / Title:		
	Datum	Name			
Bearb./ Drawn					
Allgemeintoleranzen / Gen. Tolerances: Gepr./ Checked			Zchg.-Nr./ Drawing No:	Ers.f.Zchg. / Replaces:	
Freig./ Release.					
ebmpapst			Dokumenttyp / Type of Document	Teildokument (Blatt/Page)	Index / Index: B
ebm-papst St.Georgen GmbH & Co KG				Format / Size:	Massstab/Scale