

**422 J/2HP**

Customer specification: No

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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	counterclockwise	<b>FK</b>
Airflow direction	Air outlet over struts	<b>FK</b>
Bearing system	Ball bearing	
Lubrication	see sectional drawing of the bearing	
Mounting position	any	
Tolerance		
Balancing grade	6,3	<b>FK</b>
Impeller weight	14,0 g	

## 2 Mechanics

### 2.1 General

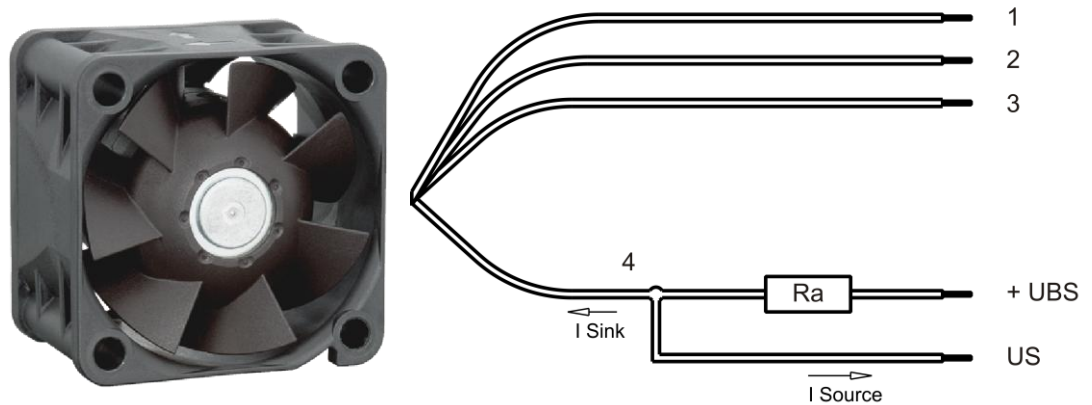
Width	40,0 mm	
Height	40,0 mm	
Depth	28,0 mm	
Diameter	0,0 mm	
Weight	0,045 kg	
Housing material	Plastic	
Impeller material	Plastic	

### 2.2 Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	19,0 mm	
Height of the motor	8,0 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	310 mm	
Tolerance		+/- 10,0 mm
Length of tube	see drawing	
Tolerance		
Wire gauge (AWG)	28	
Insulation diameter	0,9 mm	
Plug	see drawing	
Contact	see drawing	



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

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

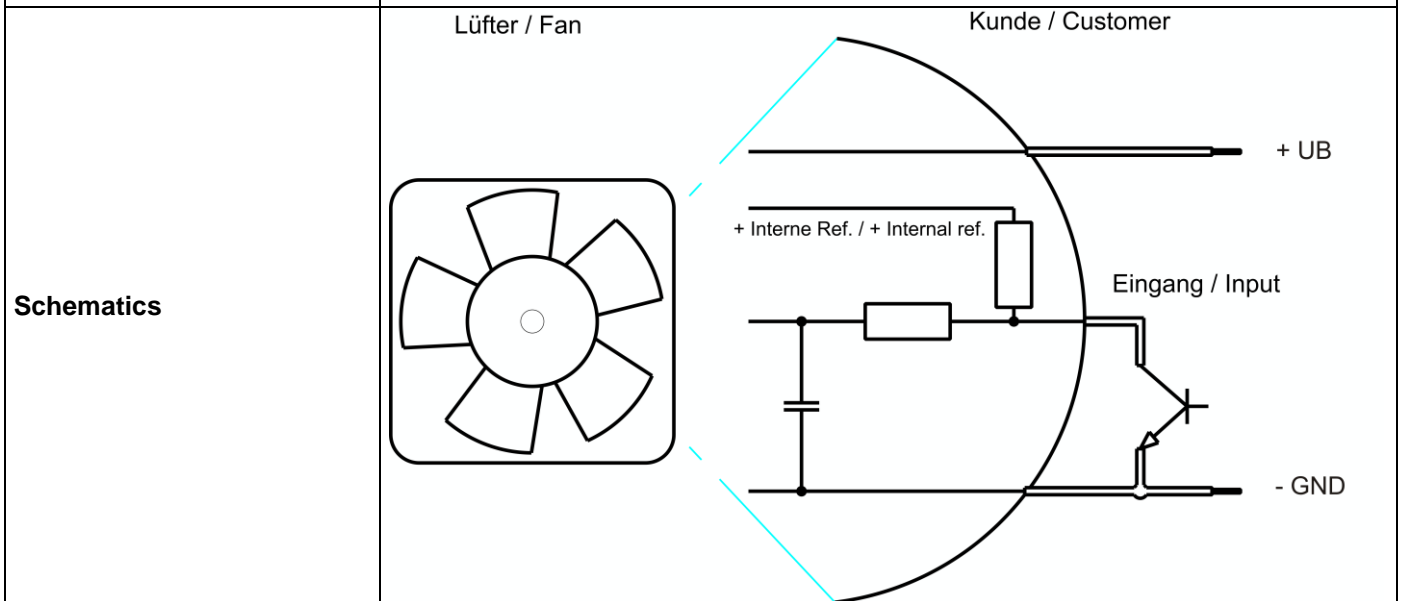
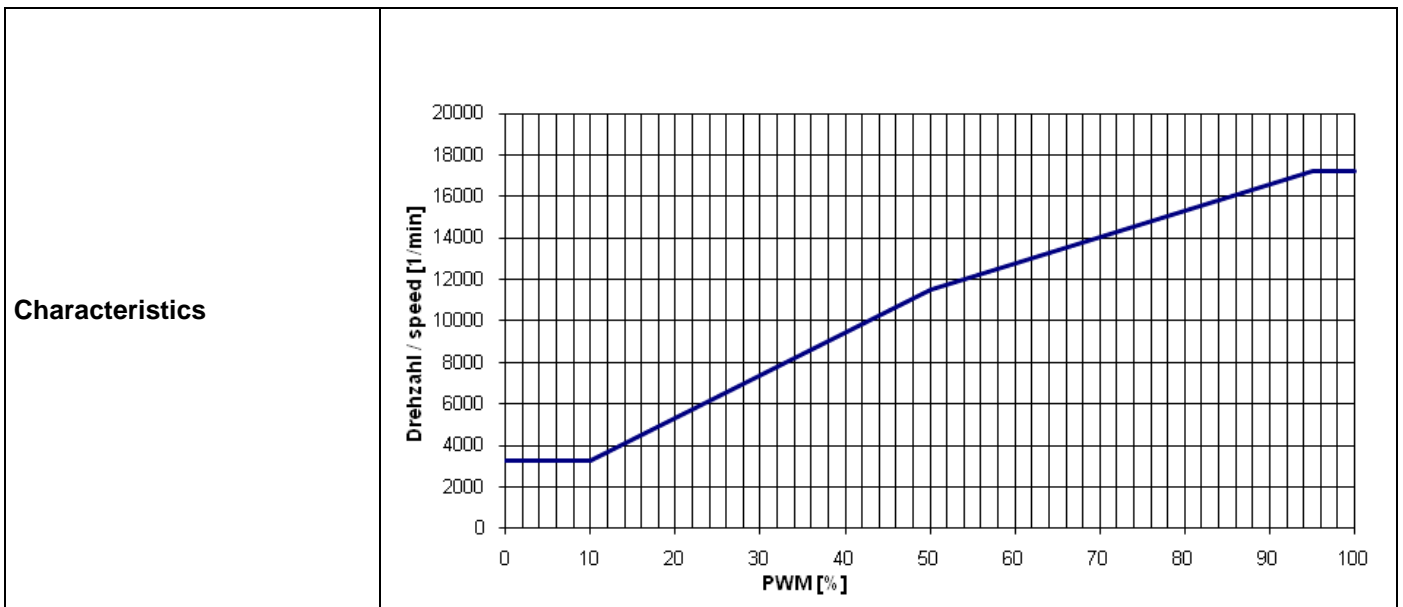
### 3 Operating Data

#### 3.1 Operating Data - Electrical Interface - Input

Control input	PWM
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#### Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 30 kHz Typical: 25 kHz
Max. voltage for logic "Low"		0,2 V
Maximum source current	short circuit current	<= 1 mA



### 3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m<sup>3</sup>; 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.

$\Delta p = 0$ : corresp. to free air flow (see section 3.5)

I: corresp. to arithm. mean current value

Name	Condition
PWM 0001	PWM: 100 %; f: 25 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		13,8 V
Nominal voltage	$\Delta p = 0$	$U_N$		12,0 V	
Power consumption	$\Delta p = 0$	P	3,1 W	6,8 W	8,6 W
Tolerance	PWM 0001		+/- 20,0 %	+/- 15,0 %	+/- 15,0 %
Current consumption	$\Delta p = 0$	I	385 mA	570 mA*)	625 mA
Tolerance	PWM 0001		+/- 20,0 %	+/- 15,0 %	+/- 15,0 %
Speed	$\Delta p = 0$	n	12.900 1/min	17.250 1/min*)	18.700 1/min
Tolerance	PWM 0001		+/- 15,0 %	+/- 10,0 %	+/- 10,0 %
Starting current consumption				<= 1.800 mA	

Name	Condition
PWM 0002	PWM: 50 %; f: 25 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		13,8 V
Nominal voltage	$\Delta p = 0$	$U_N$		12,0 V	
Power consumption	$\Delta p = 0$	P	1,2 W	2,5 W	3,5 W
Tolerance	PWM 0002		+/- 30,0 %	+/- 25,0 %	+/- 25,0 %
Current consumption	$\Delta p = 0$	I	145 mA	210 mA*)	250 mA
Tolerance	PWM 0002		+/- 30,0 %	+/- 25,0 %	+/- 25,0 %
Speed	$\Delta p = 0$	n	7.350 1/min	11.500 1/min*)	13.000 1/min
Tolerance	PWM 0002		+/- 25,0 %	+/- 20 %	+/- 20,0 %

Name	Condition
PWM 0003	PWM: 0 %; f: 25 kHz

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	8,0 V		13,8 V
Nominal voltage	$\Delta p = 0$	$U_N$		12,0 V	
Power consumption	$\Delta p = 0$	P	0,3 W	0,6 W	0,8 W
Tolerance			+/- 30,0 %	+/- 25,0 %	+/- 25,0 %

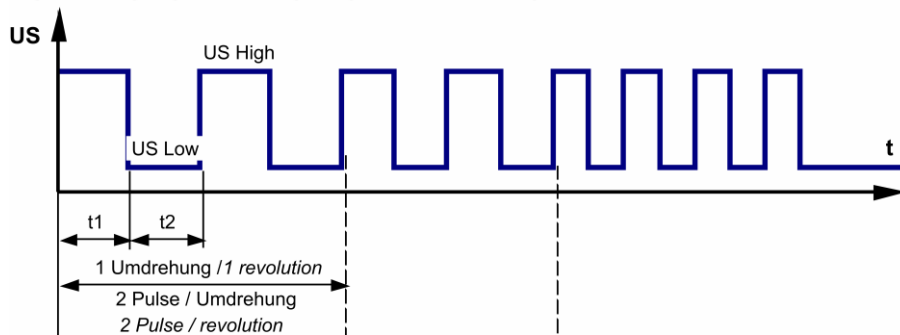
	PWM 0003				
Current consumption	$\Delta p = 0$	I	37 mA	48 mA*)	55 mA
Tolerance	PWM 0003		+/- 30,0 %	+/- 25,0 %	+/- 25,0 %
Speed	$\Delta p = 0$	n	1.450 1/min	3.250 1/min*)	4.000 1/min
Tolerance	PWM 0003		+/- 25,0 %	+/- 20,0 %	+/- 20,0 %

\*) Attention: Marked values are "FK" features

### 3.3 Operating Data - Electrical Interface -Output

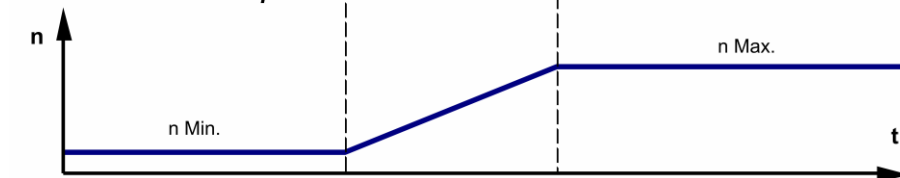
Tacho type	/2 (Open collector)
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Signal-Ausgangsspannung / Signal output voltage



$$R_a = \frac{U_{BS} - U_{S \text{ Low}}}{I_{\text{Sink}}}$$

Lüfter-Drehzahl / Fan speed



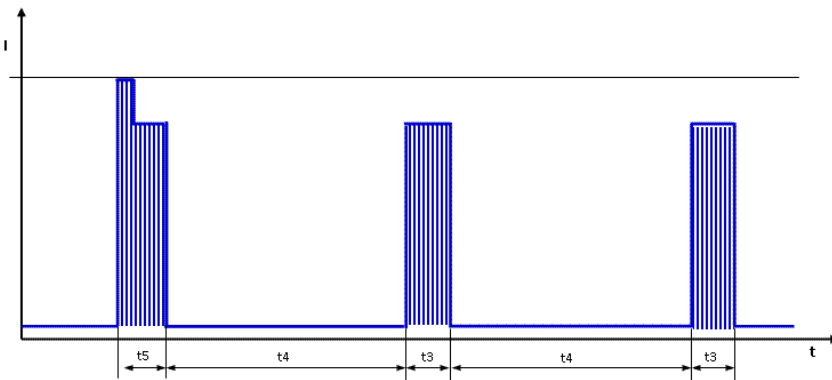
Features	Note	Values
Tacho operating voltage (UBS)		$\leq 15 \text{ V}$
Tacho signal Low *)	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High *)	I source: 0 mA	15 V
Maximum sink current		$\leq 4 \text{ mA}$
External resistor	External resistor $R_a$ from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	$(2 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5 \text{ V/us}$

\*) Attention: Marked values are "FK" features

Alarm type	None
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### 3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	<b>A</b>
Max. residual current at Un	IF <= 5 mA	
Locked rotor protection	Auto restart	<b>A</b>
Locked rotor current at Un	approx. 1.650 mA	
Clock signal t3/t4 at locked rotor	Typical: 0,45 s / 4,5 s t3: 0,25 s... 0,75 s t4: 2,5 s... 7,5 s	



First pulse  $t_5$  typical 0.7s (0.5 .. 1.0s) followed by  $t_4$ . Afterwards cyclical  $t_3/t_4$ .

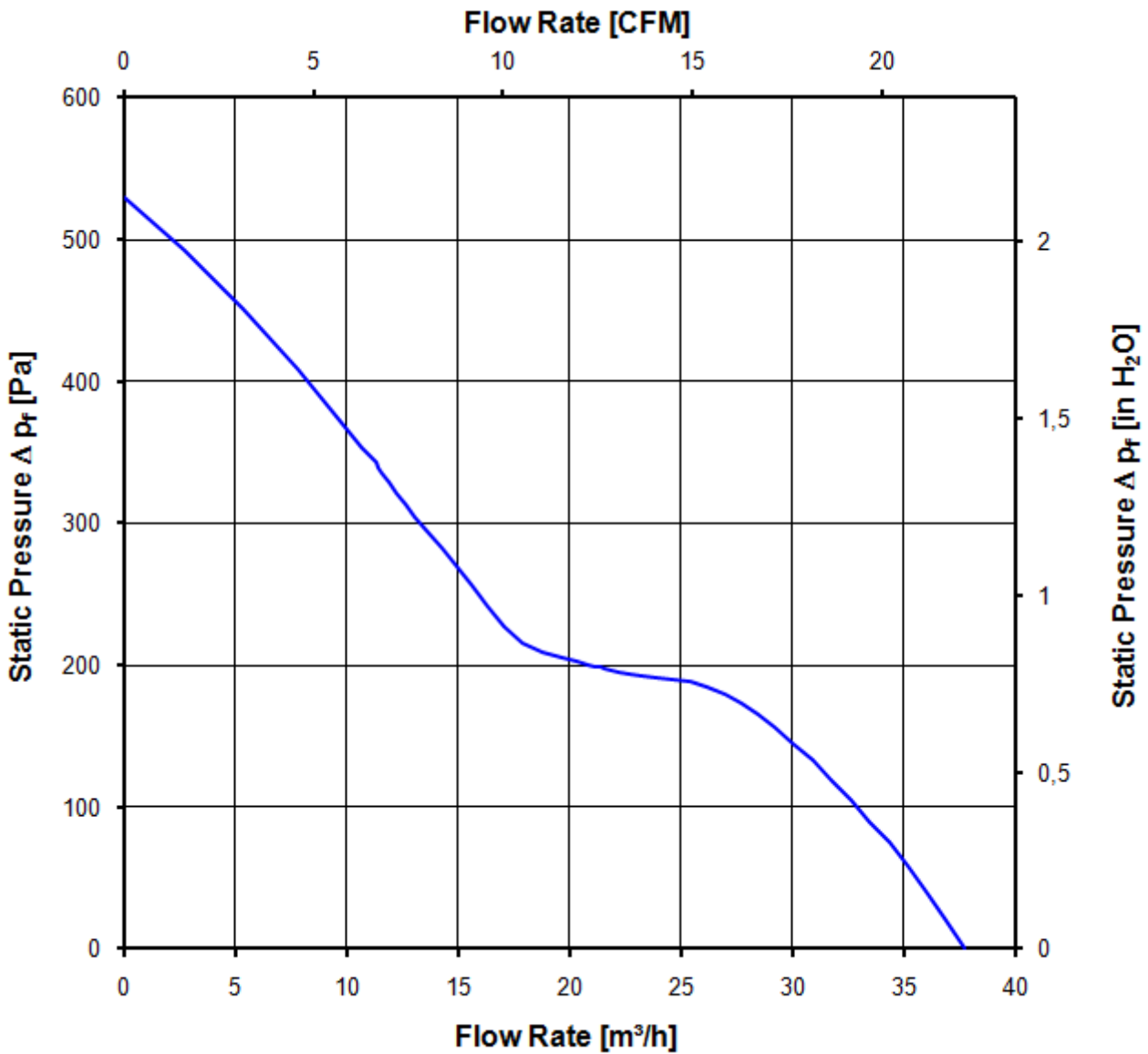
### 3.5 Aerodynamic

Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801.  
Normal air density = 1,2 kg/m<sup>3</sup>; Temperature 23°C +/- 3°C;  
In the intake and outlet area should not be any solid obstruction within 0,5 m.

a.) Operation condition:

17.250 1/min at free air flow	PWM 100 %; f: 25 kHz	
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Max. free-air flow ( $\Delta p = 0 / \dot{V} = \text{max.}$ )	38,0 m <sup>3</sup> /h	<b>FK</b>
Max. static pressure ( $\Delta p = \text{max.} / \dot{V} = 0$ )	530 Pa	<b>FK</b>



### 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  $L_p(A) < 5$  dB(A)  
 For further measurement conditions see section 3.5

a.) Operation condition:

17.250 1/min at free air flow	PWM 100 %; f: 25 kHz	PWM min.:	PWM max.:
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Optimal operating point	26,0 m3/h @ 164 Pa	
Sound power level at the optimal operating point	6,6 bel(A)	



Sound pressure level at free air flow, measured in rubber bands	54,0 dB(A)	
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#### 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\*)

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

### 4.3 Mechanical requirements

severity level	stationary use		
1	storage / transportation	Random vibration not in use IEC 60068-2-64 Frequency range / ASD  $G_{RMS}$ Axes of vibration Test duration	Random vibration 5 - 20 Hz : $1,0 \text{ m}^2 / \text{s}^3$ 20 - 500 Hz : - 3 dB / Oct 0,91 G 3 3 x 30 min
	storage / transportation	Bump not in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	Bump half sine 18 G 6 ms 100 in each direction 600
	stationary use	Random vibration in use IEC 60068-2-64 Frequency range / ASD  $G_{RMS}$ Axes of vibration Test duration	Random vibration 5 - 10 Hz : +6 dB / Oct 10 - 50 Hz : $1,0 \text{ m}^2 / \text{s}^3$ 50 - 200 Hz : - 6 dB / Oct 0,65 G 3 3 x 30 min
	stationary use	Bump in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	Bump half sine 5 G 11 ms 100 in each direction 600

### 4.4 EMC

not specified

### 5 Safety

#### 5.1 Electrical Safety

Dielectric strength DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700)		
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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.	500 VAC / 1 Min.	A
B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Sec.	
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		
Protection class	III	

## 5.2 Approval Tests

CE	Yes
UL	No
VDE	No
CSA	No
CCC	No

## 6 Reliability

### 6.1 General

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

### 6.2 Additional Data

not specified

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