

**Product Data Sheet**

**9295420011**  
VWS0148XULDS  
6314/2TDH4P

**ebmpapst**

The engineer's choice

6314/2TDH4P (9295420011) ebmpapst Datasheet  
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6314/2TDH4P

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1 General

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

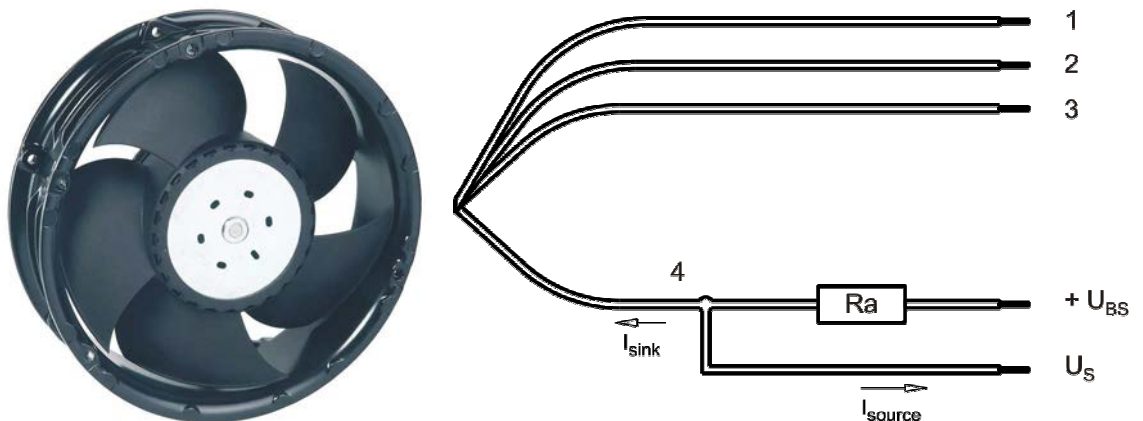
2 Mechanics

2.1 General

Depth	51,0 mm	
Diameter	172,0 mm	
Mass	0,875 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges	Wire outlet corner: 600 Ncm Remaining corners: 600 Ncm	
Screw size	ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires	
Lead wire length	L = 365 mm	
Tolerance	+ - 10,0 mm	
Tube length	S = 10 mm	
Tolerance	+ - 2,0 mm	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 18	2,2 mm
2	blue	- GND	AWG 18	2,2 mm
3	violet	PWM	AWG 22	1,7 mm
4	white	Tacho	AWG 22	1,7 mm

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

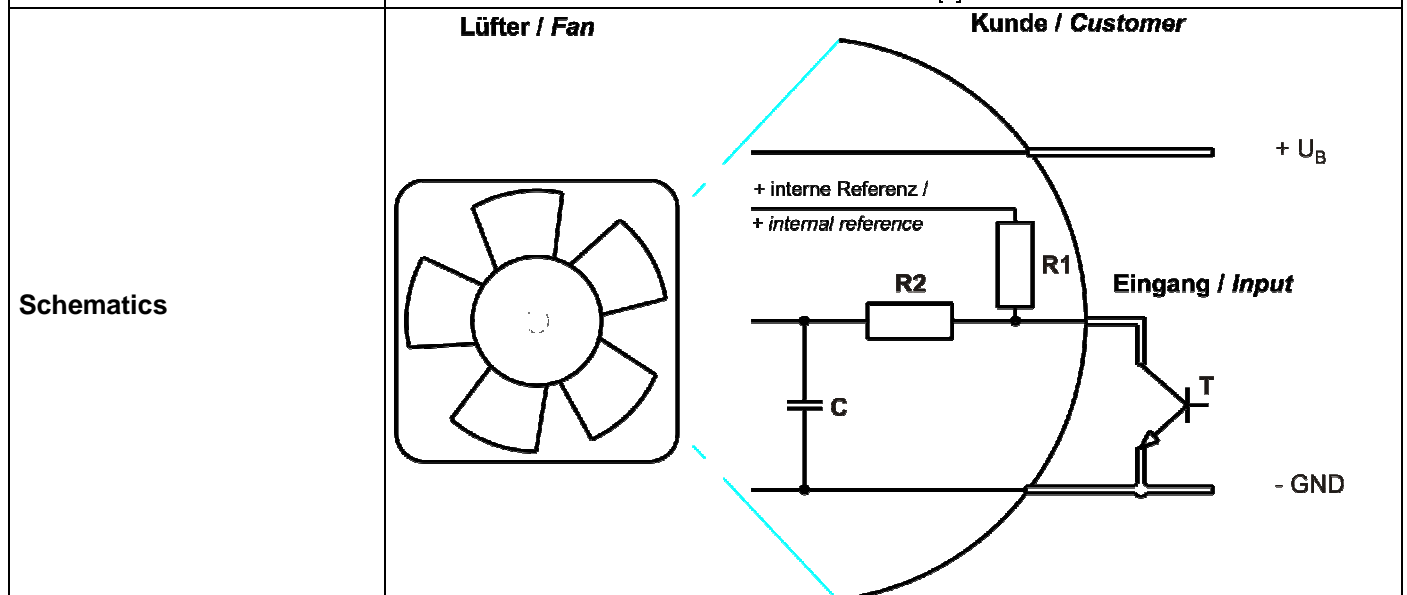
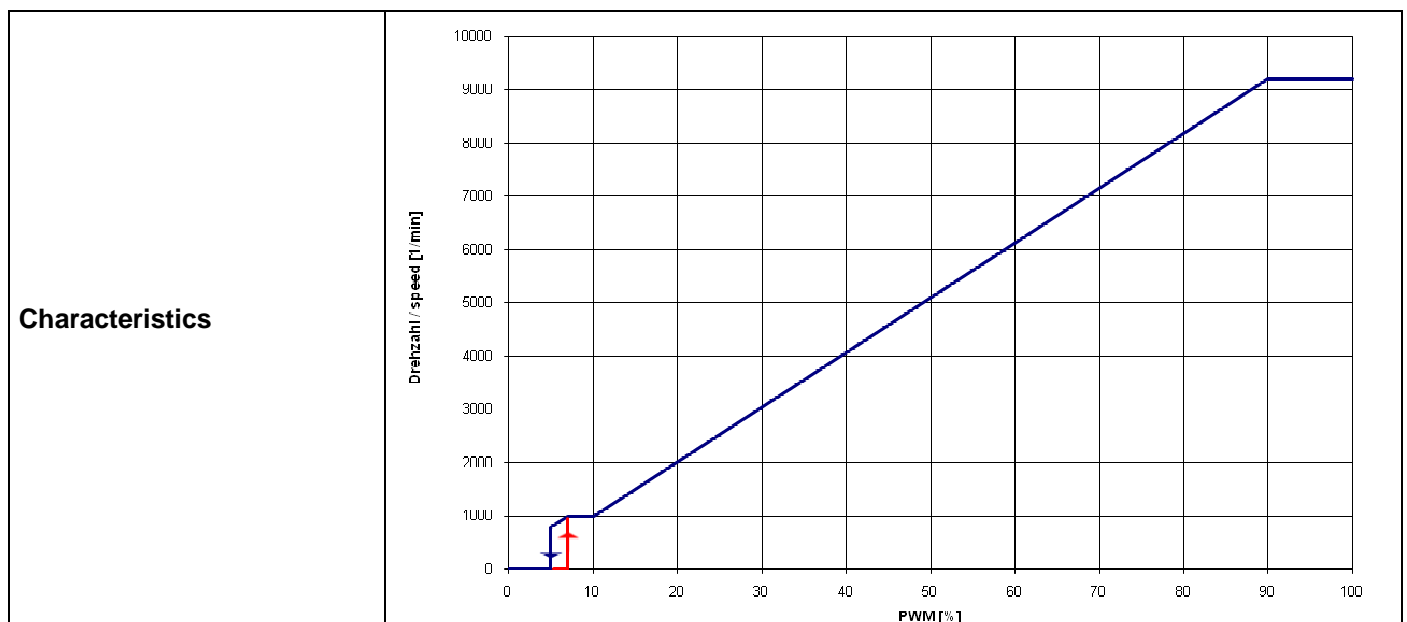
### 3 Operating Data

#### 3.1 Electrical Interface - Input

Control input	PWM
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#### Features

Input type	Open collector	
PWM - Frequency		1 kHz - 20 kHz typical: 2 kHz



The shown pull-up resistor R1 to the internal reference voltage (+5V) has 4.7kOhm.

**Transistor Requirements:**

VCE max.  $\geq$  12V; Isink max  $>$  5mA; VCEsat  $<$  0,15V

**Information to the curve:**

0% - <=7% PWM:	0 1/min (Fan off)
7% PWM:	1.000 1/min (Start-up, coming from 0% PWM)
7% - 10 % PWM:	1.000 1/min (corresp. to min fan speed)
10% - 90% PWM:	Linear increasing curve
90% - 100% PWM:	9.200 1/min (corresp. to max fan speed)
5% PWM:	800 1/min or 0 1/min (Fan turns off, coming from 100% PWM)

**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 chapter aerodynamics)  
I: corresp. to arithm. mean current value

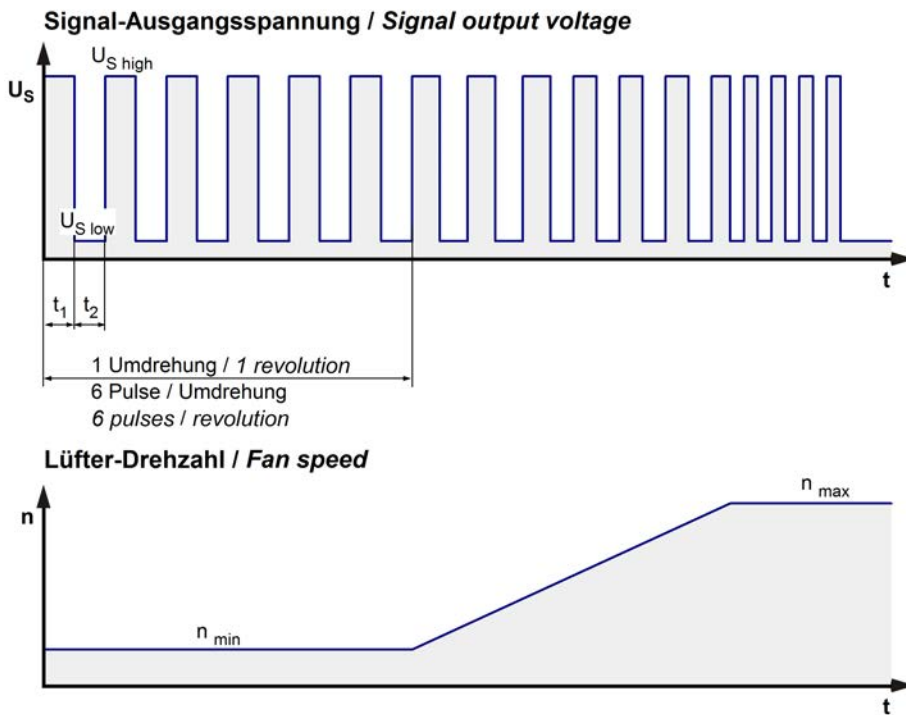
Name	Condition
PWM 0001	PWM: 95 %; f: 2 kHz

>90% PWM or broken lead wire (open control input)

Features	Condition	Symbol	Values
Voltage range		U	
Nominal voltage		$U_N$	24,0 V
Power consumption	$\Delta p = 0$	P	150 W
Tolerance	PWM 0010		
Current consumption	$\Delta p = 0$	I	6.300 mA
Tolerance	PWM 0010		
Speed	$\Delta p = 0$	n	9.200 1/min
Tolerance	PWM 0010		

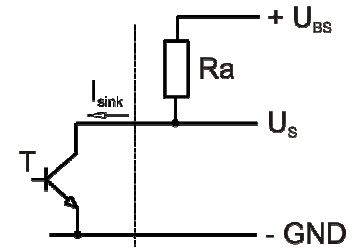
3.3 Electrical Interface - Output

Tacho type	/2 (open collector)
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$$R_a = \frac{U_{BS} - U_{S\ low}}{I_{sink}}$$

Lüfter / Fan      Kunde / Customer



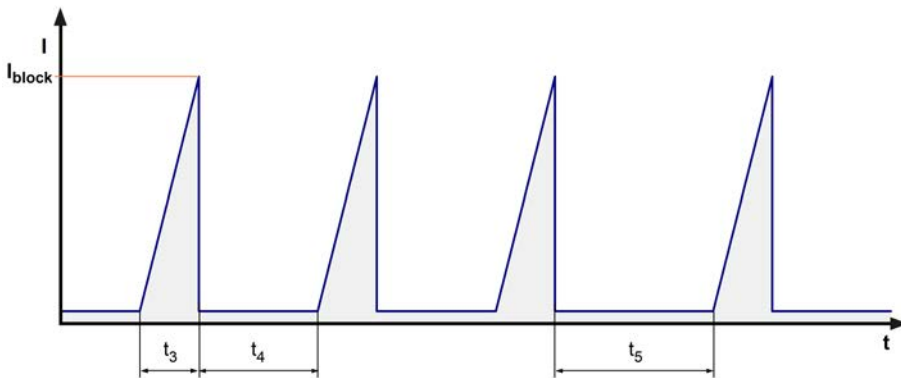
Features	Note	Values
Tacho operating voltage	$U_{BS}$	$\leq 60\ V$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\ V$
Tacho signal High	$U_{S\ high}$	$\leq 60,0\ V$
Maximum sink current	$I_{sink}$	$\leq 20\ mA$
External resistor	External resistor $R_a$ from $U_{BS}$ to $U_s$ required. All voltages measured to GND.	
Tacho frequency	$(6 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5\ V/\mu s$

n = revolutions per minute (1/min)

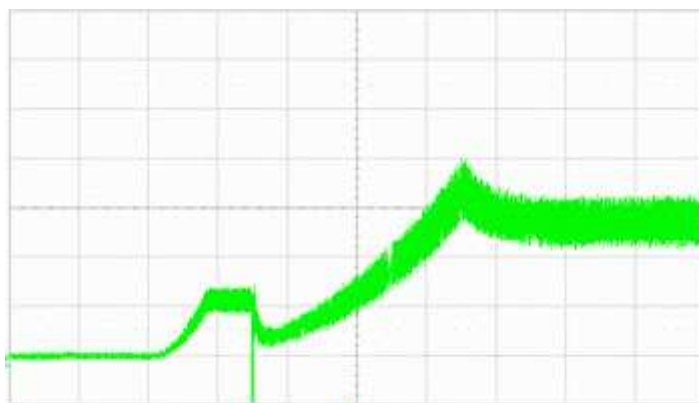
### 3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	P-CH FET	
Max. residual current at $U_N$	$I_F \leq 5 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at $U_N$	$I_{\text{block}}$ approx. 6.000 mA	
Clock signal at locked rotor	$t_3 / t_4$ typical: 5 s / 10 s	
Extended Downtime	$t_5$ : 40 s after 4 start-up tests	
Internal fuse	Littelfuse NANO2 > Very Fast-Acting > 451/453 Series 15A / 75V (Art.No.: 0451015.MRL)	
Voltage control *)	Fan turns on at $U_B > 14 \text{ V}$ or $< 40 \text{ V}$ Fan turns off at $U_B < 13 \text{ V}$ or $> 42 \text{ V}$	

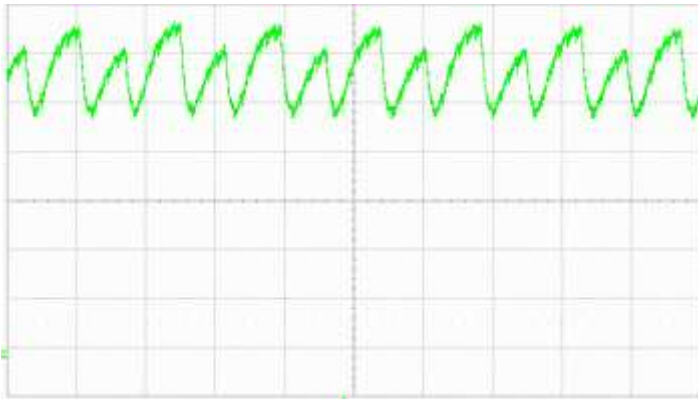
\*) This fan has an undervoltage and overvoltage control circuit integrated which turns the motor off if the voltage is out of range.



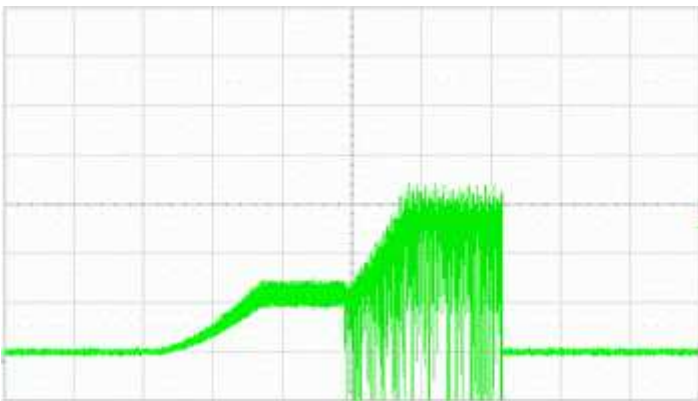
This fan has a startup delay of 2 seconds after applying supply voltage.



Start-up current @ 24 V ( $I = 2\text{A/div}$  ;  $t = 2\text{s/div}$ )



Running current @ 24 V (I = 1A/div ; t = 500us/div)



Locked rotor current @ 24 V (I = 2A/div ; t = 1s/div)

### 3.5 Data According ErP Directive

Installation / Efficiency category	A / static
Speed control	integrated
Specific ratio	1,00467
Target overall efficiency 2015	29,6 %
Overall efficiency	41,0 %
Efficiency grade	40
Power input	224 W
Speed	9.040 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

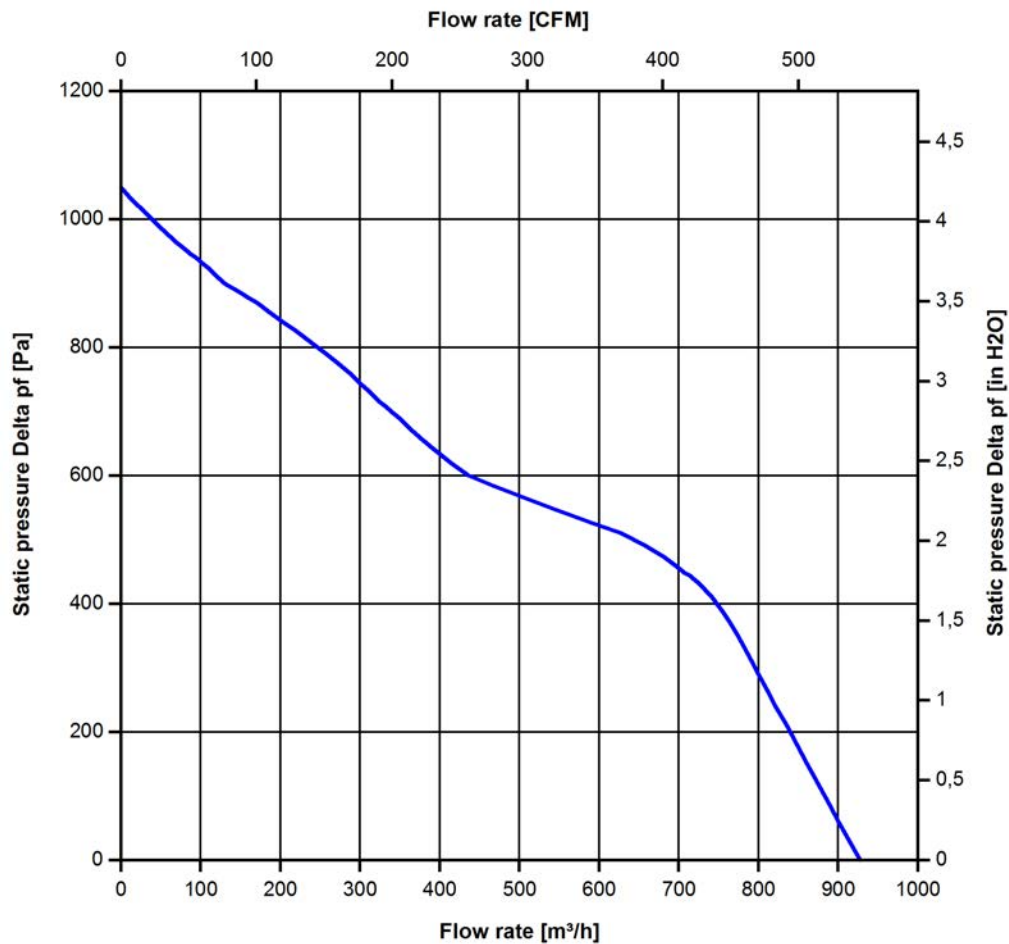
3.6 Aerodynamics

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. 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:

9.200 1/min at free air flow	PWM 95 %; f: 2 kHz		
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Max. free-air flow ( $\Delta p = 0 / \dot{V} = \text{max.}$ )	927 m <sup>3</sup> /h	
Max. static pressure ( $\Delta p = \text{max.} / \dot{V} = 0$ )	1.050 Pa	



### 3.7 Sound Data

Measurement conditions: Sound pressure level: 1 meter distance between microphone and the air intake.

Measured in a semianchoic chamber with a background noise level of  $L_p(A) < 5 \text{ dB(A)}$   
For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

9.200 1/min at free air flow	PWM 95 %; f: 2 kHz		
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## 4 Environment

### 4.1 General

Min. permitted ambient temperature TU min.	-20 °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	

### 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

<b>Kind</b>	<b>Radiated Emission; 30 MHz - 1000 MHz</b>
According	DIN EN 55032:2016-02
Check accuracy / Limit	Class B
Result	Below limit Class B

<b>Kind</b>	<b>Electrostatic Discharge Immunity Test</b>
According	DIN EN 61000-4-2:2001-12
Check 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°C. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Min.	
B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	850 VDC / 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	
Clearance / creepage distance	1,0 mm / 1,5 mm	
Protection class	I	

### 5.2 Approval Tests

CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans E38324
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

The approval tests are observed to:

U approval max.: 72,0 V @ TU approval max.: 75,0 °C

## 6 Reliability

### 6.1 General

Life expectancy L10 at TU = 40 °C	52.500 h	
Life expectancy L10 at TU max.	20.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	87.5 00 h	

