

Product Data Sheet **9295420015**
VWS0148XULDS
6314/2TDHHP-015

ebmpapst

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1 General

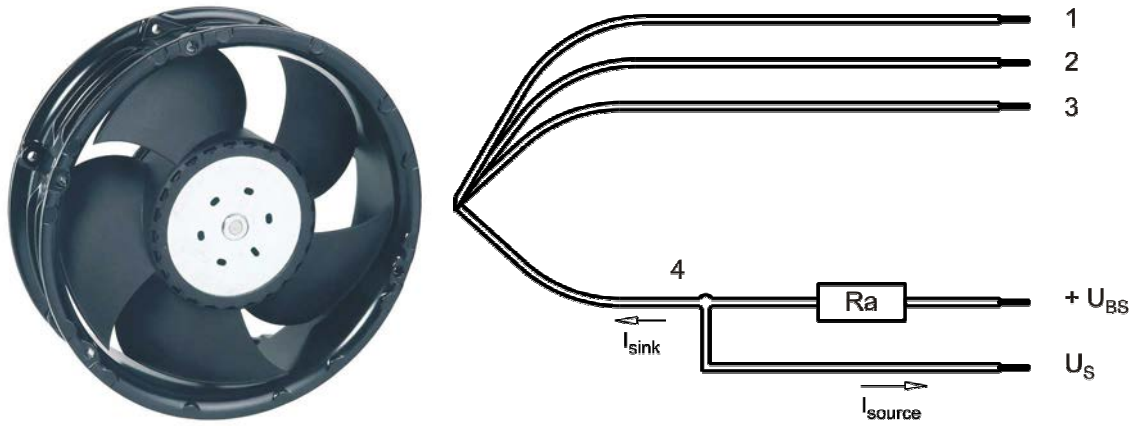
Fan type	Fan	
Rotating direction looking at rotor	Counterclockwise	
Airflow direction	Air outlet over struts	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

2 Mechanics**2.1 General**

Width	160,0 mm	
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 size (AWG)	18 22	
Insulation diameter	1,7 mm 2,2 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.

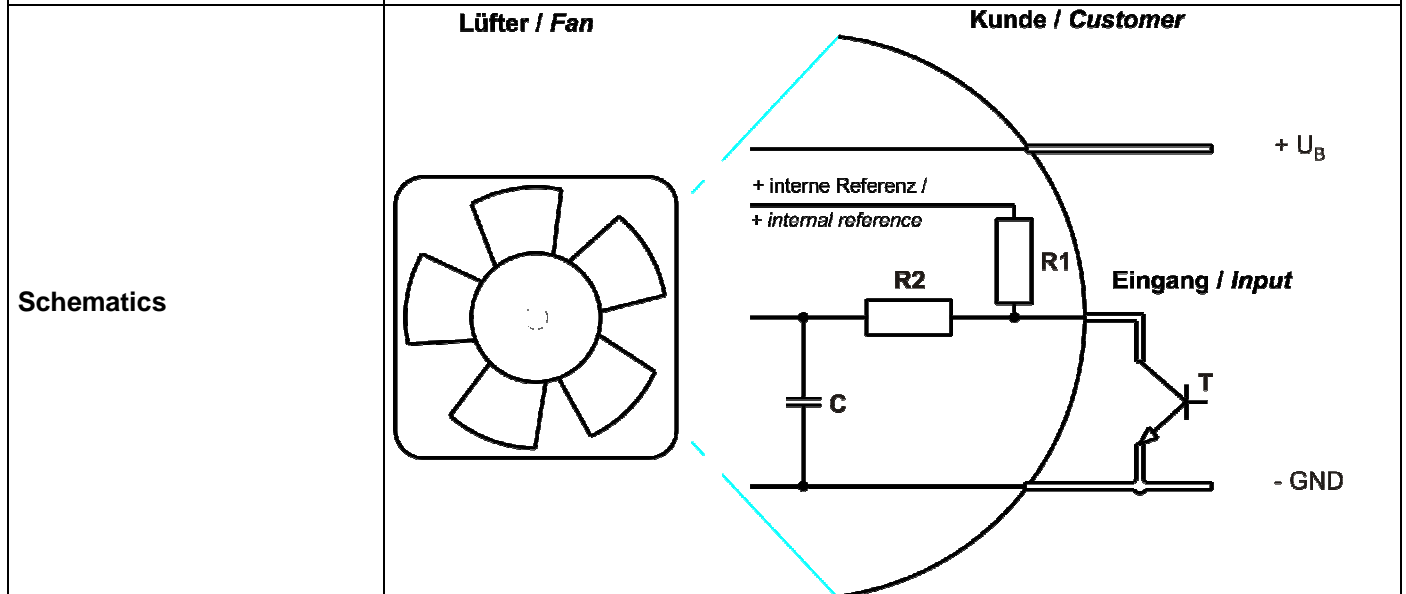
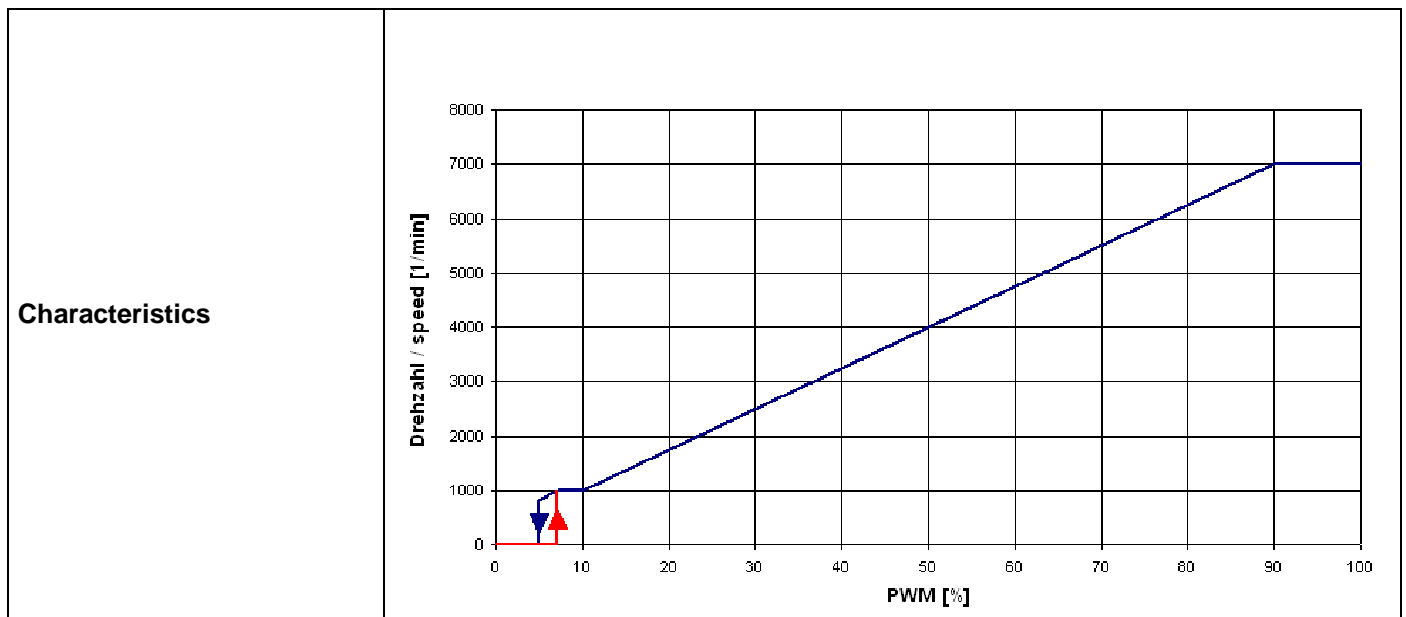
3 Operating Data

3.1 Electrical Interface - Input

Control input	PWM
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Features

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



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

Information to the curve:

0% - <=7%	PWM:	0 1/min
7% - 10%	PWM:	1.000 1/min (corresponding to min. speed)

10% - 90%	PWM:	linear increasing curve
90% - 100%	PWM:	7.000 1/min (corresponding to max. speed)
7% PWM:		1.000 1/min (Fan on, coming from 0% PWM)
7% - 5%	PWM:	linear decreasing curve (von 100% PWM kommend)
5% PWM:		800 1/min or 0 1/min (Fan off, coming from 100% PWM)

Transistor requirements:V_{ce} max. \geq 12V; I_{sink} max. \geq 5mAV_{ce} sat. \leq 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.

$\Delta p = 0$: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

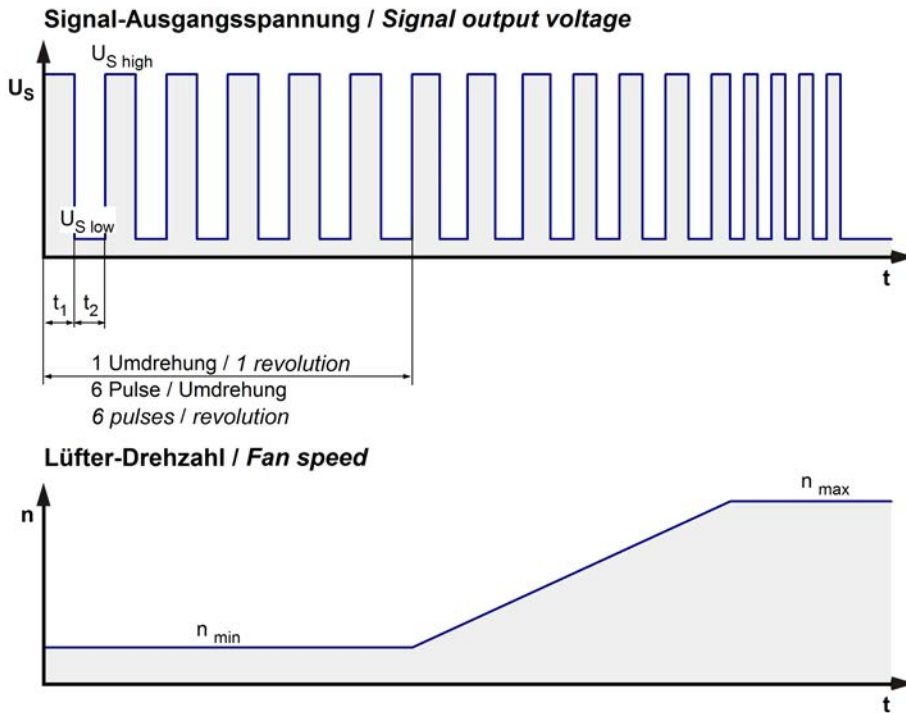
Name	Condition
PWM 0001	PWM: 95 %; f: 2 kHz

>90% PWM; f = 2 kHz or broken lead wire (open control input)

Features	Condition	Symbol	Values		
Voltage range		U	16 V		36 V
Nominal voltage		U _N		24 V	
Power consumption	$\Delta p = 0$	P	37 W	67 W	67,0 W
Tolerance	PWM 0010		+/- 10 %	+/- 10 %	+/- 10 %
Current consumption	$\Delta p = 0$	I	2.300 mA	2.800 mA	1.850 mA
Tolerance	PWM 0010		+/- 10 %	+/- 10 %	+/- 10 %
Speed	$\Delta p = 0$	n	5.750 1/min	7.000 1/min	7.000 1/min
Tolerance	PWM 0010		+/- 7,5 %	+/- 5 %	+/- 5 %

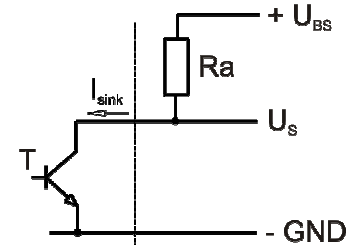
3.3 Electrical Interface - Output

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}	$\leq 60,0\ V$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\ V$
Tacho signal High	$U_{S\ high}$	$60,0\ V$
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)

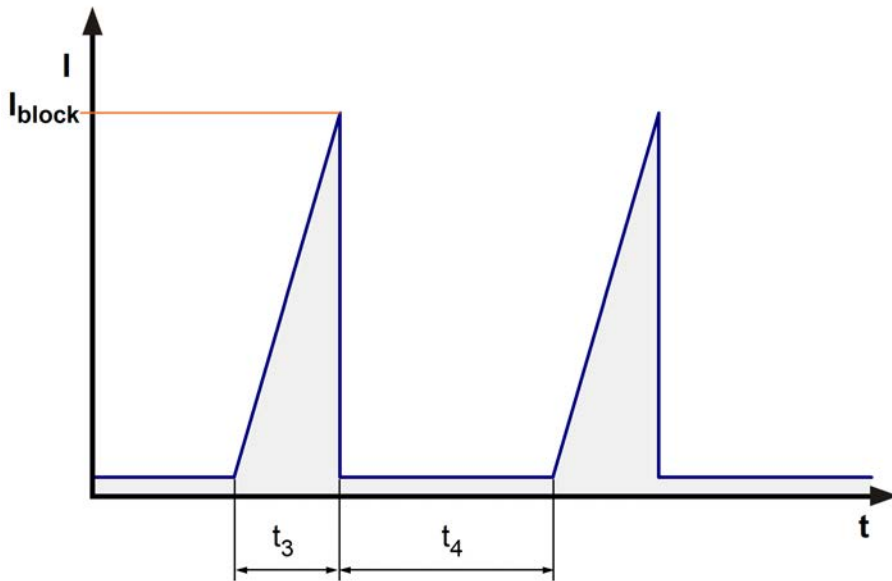
Please note:

At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.

The tacho signal is only activated after the start-up is completed.

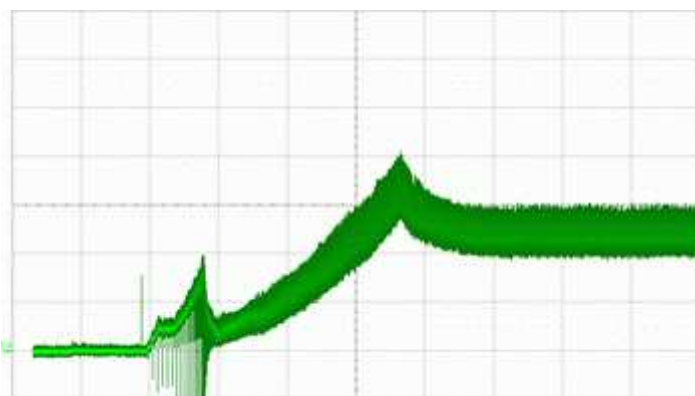
3.4 Electrical Features

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_{block}	
Clock signal at locked rotor	t_3 / t_4 typical: 3 s / 10,0 s	

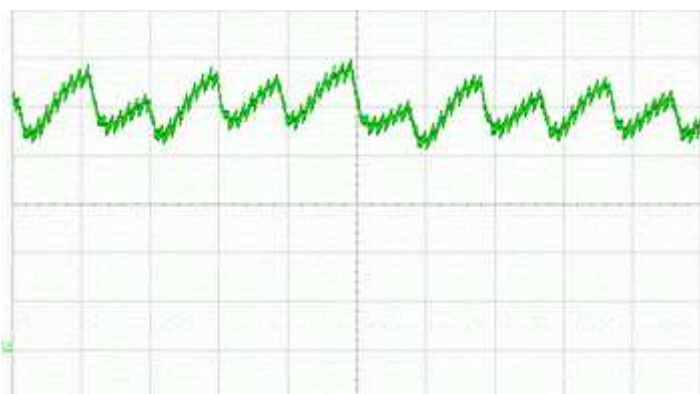


First locked rotor off time is reduced to 3 seconds.
 After 4 unsuccessful start up tries the fan will be turned off for 40 seconds. .

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



Start-up current @ 24 V ($I = 1\text{A/div}$; $t = 2\text{s/div}$)



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



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

Internal Fuse:

Littelfuse Nano2 Fuse
Very Fast-Acting 451/453 Series
12A / 65V

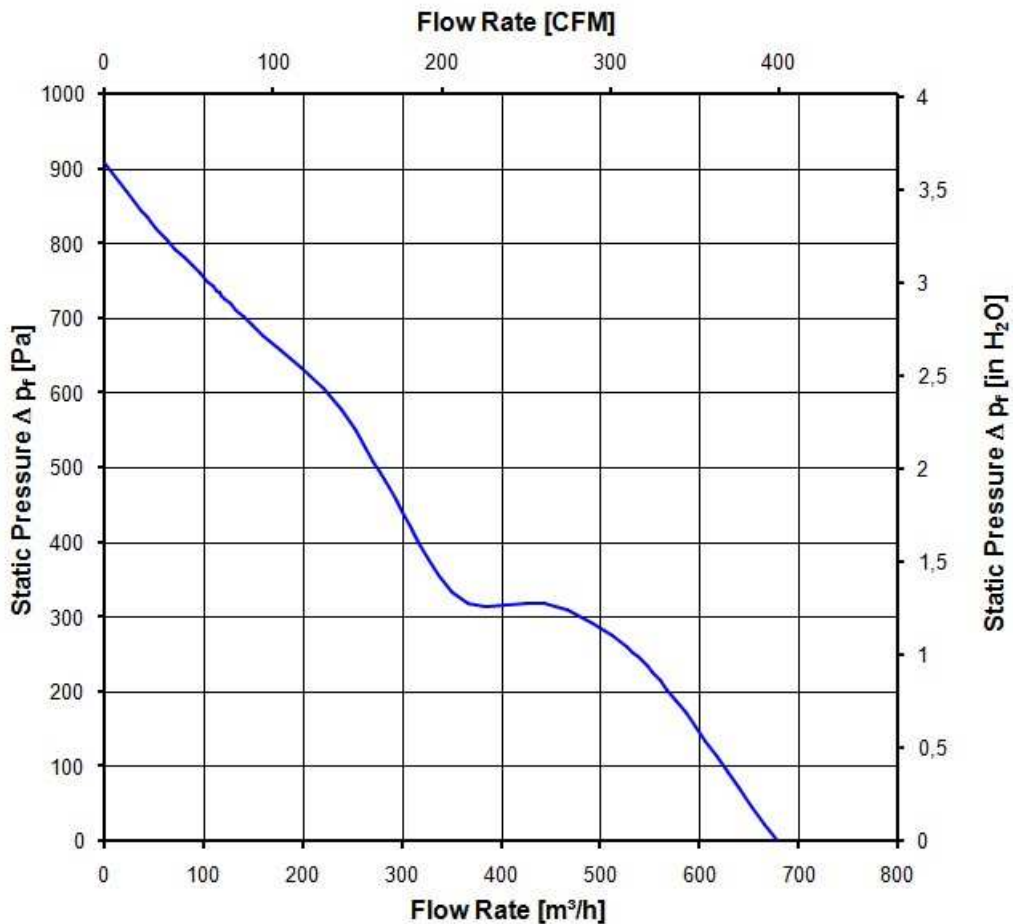
3.5 Aerodynamics

Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801.
Normal air density = 1,2 kg/m³; Temperature 23°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:

7.000 1/min at free air flow	PWM 95 %; f: 2 kHz		
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Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$)	680,0 m ³ /h	
Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$)	910 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 $L_p(A) < 5 \text{ dB(A)}$
For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

7.000 1/min at free air flow	PWM 95 %; f: 2 kHz		
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Optimal operating point	670,0 m ³ /h @ 20 Pa		
Sound power level at the optimal operating point	7,9 bel(A)		
Sound pressure level at free air flow, measured in rubber bands	69,0 dB(A)		

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.

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 / 1,2 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 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.:36,0 V @ TU approval max.: 70,0 °C

6 Reliability**6.1 General**

Life expectancy L10 at TU = 40 °C	62.500 h	
Life expectancy L10 at TU max.	30.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	105.000 h	

