

Product Data Sheet

9695430233
VWS0143XULCZ
6424/2HP-233

ebmpapst

The engineer's choice



6424/2HP-233

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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	

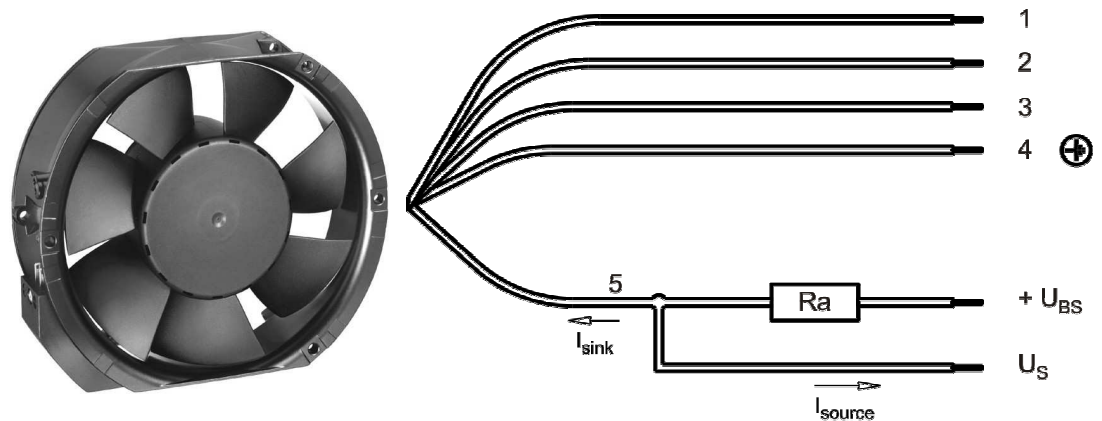
2 Mechanics

2.1 General

Width	150,0 mm	
Depth	51,0 mm	
Diameter	172,0 mm	
Mass	0,760 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges	Wire outlet corner: 260 Ncm Remaining corners: 260 Ncm	
Screw size	ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires - Plug	
Lead wire length	L = 215 mm	
Tolerance		
Plug	See drawing	
Contact	See drawing	



Wire	Color	Operation	Plug connection	Wire size	Insulation diameter
1	red	+ UB	Pin 1	AWG 22	1,7 mm
2	blue	- GND	Pin 4	AWG 22	1,7 mm
3	violet	PWM	Pin 2	AWG 22	1,7 mm
4	green - yellow	ground wire		AWG 22	1,7 mm
5	white	Tacho	Pin 3	AWG 22	1,7 mm

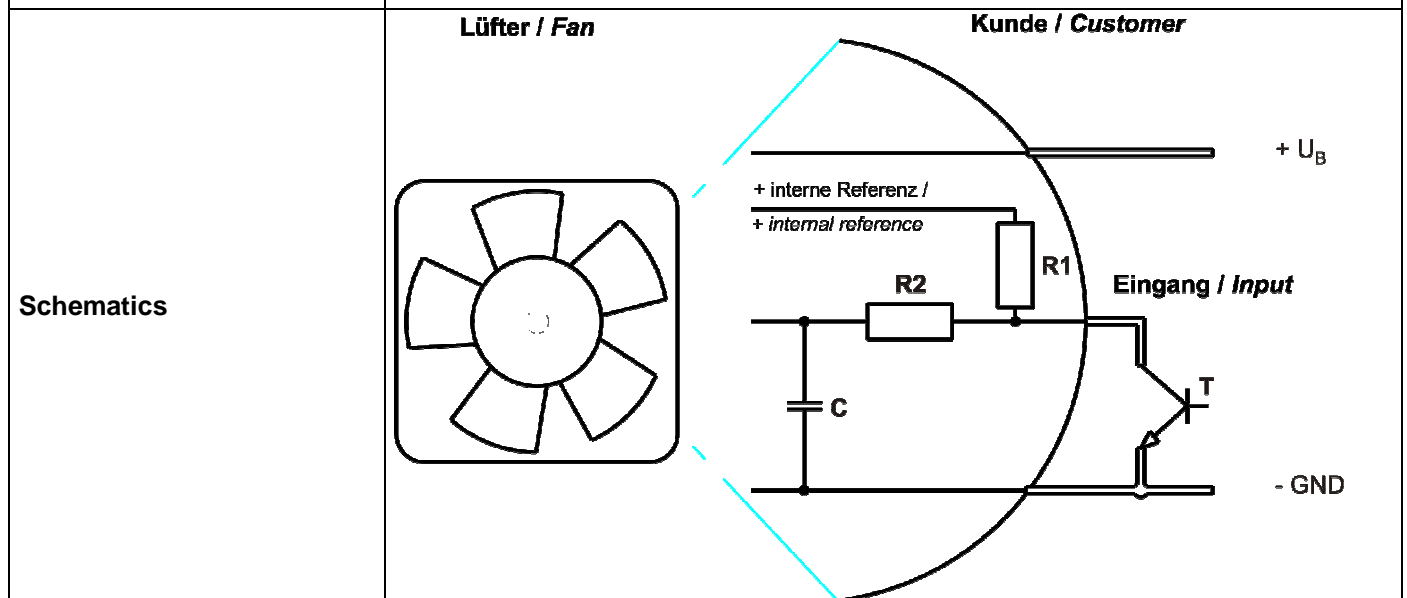
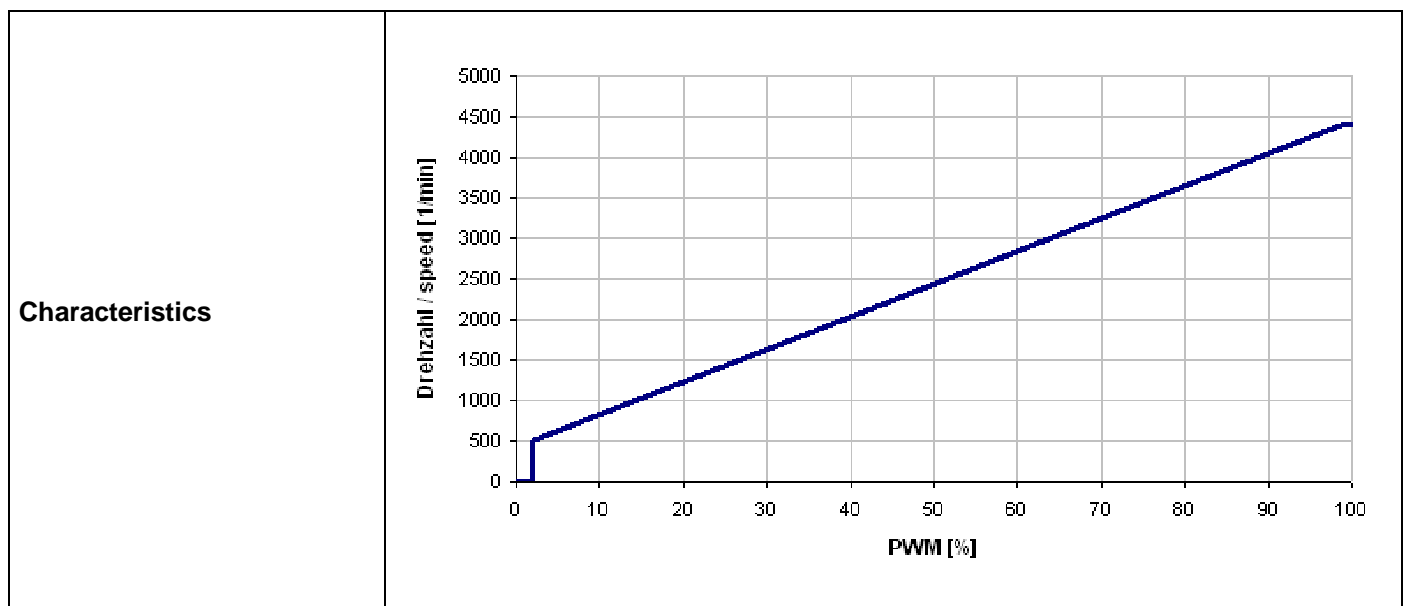
3 Operating Data

3.1 Electrical Interface - Input

Control input	PWM
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Features

Input type	Open collector	
PWM - Frequency		1 kHz - 10 kHz typical: 2 kHz



PWM input transistor requirements:
 $U_{CEmax.} \Rightarrow 12\text{ V}$; $I_{Sink\ max.} > 5\text{ mA}$; $U_{CEsat.} < 0,15\text{ V}$

Speed control:

0... 100% PWM; f: 2 kHz; open collector
 Alternatively: Resistor to GND (33 mW) 0... ∞ kOhm

Without input signal fan is running at maximum Speed.
Internal pullup resistor 4k7 to 5V.

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: 100 %;

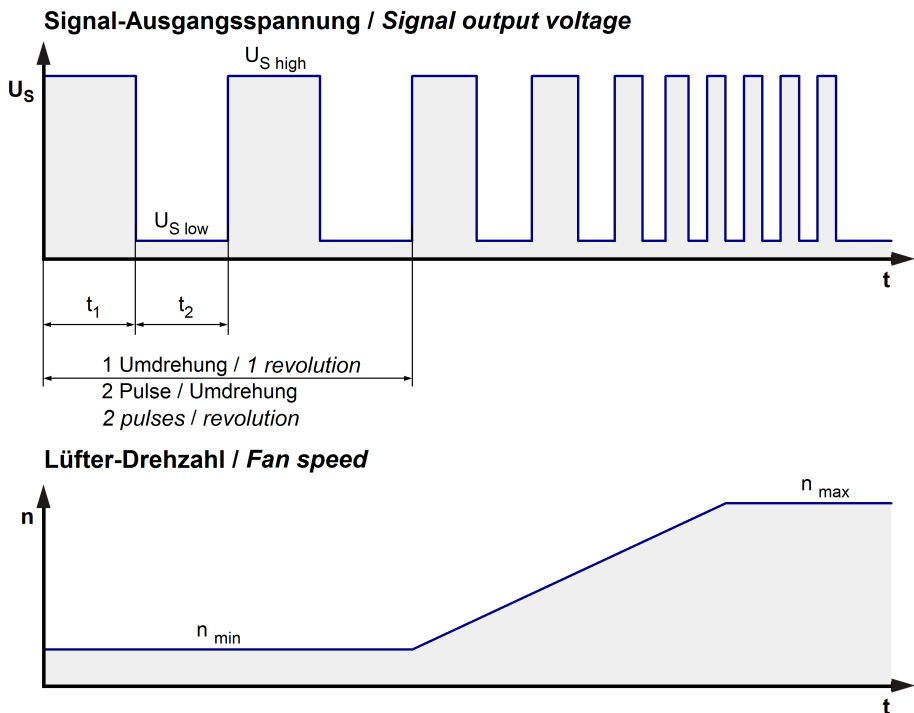
Note:

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

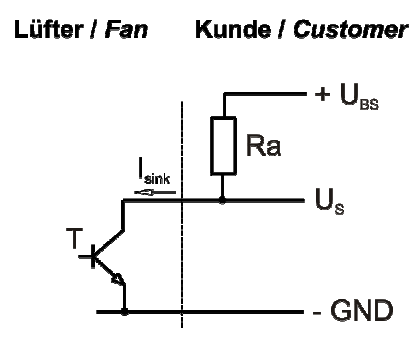
Features	Condition	Symbol	Values		
Voltage range		U	12,0 V		28,0 V
Nominal voltage		U _N		24,0 V	
Power consumption	$\Delta p = 0$	P	8,0 W	30 W	34,0 W
Tolerance	PWM 0010		+/- 15,0 %	+/- 12,0 %	+/- 10,0 %
Current consumption	$\Delta p = 0$	I	660 mA	1.250 mA	1.200 mA
Tolerance	PWM 0010		+/- 15,0 %	+/- 12,0 %	+/- 10,0 %
Speed	$\Delta p = 0$	n	2.500 1/min	4.400 1/min	4.400 1/min
Tolerance	PWM 0010		+/- 15,0 %	+/- 12,0 %	+/- 10,0 %
Starting current consumption				4.000 mA	

3.3 Electrical Interface - Output

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

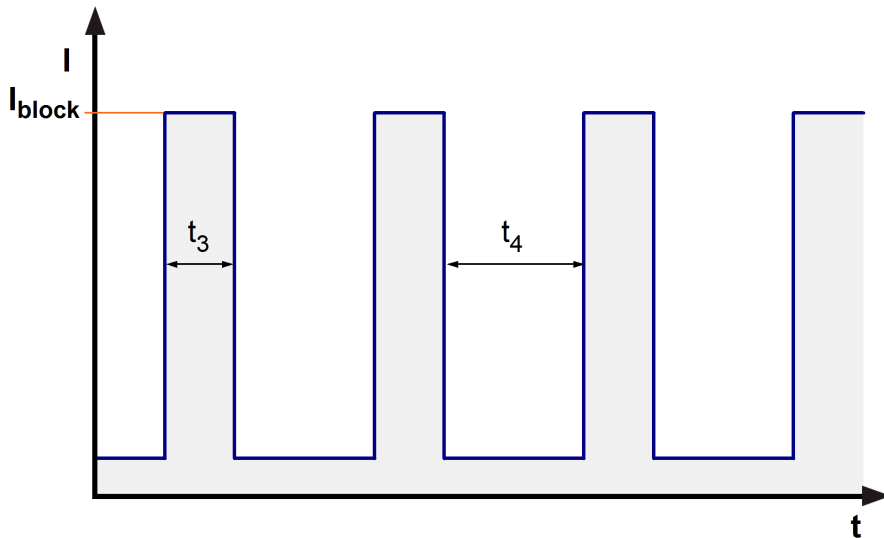


Features	Note	Values
Tacho operating voltage	U_{BS}	$\leq 60\ V$
Tacho signal Low	$U_{S\ low}$	$\leq 0,4\ V$
Tacho signal High	$U_{S\ high}$	$\leq 60\ V$
Maximum sink current	I_{sink}	$\leq 20\ mA$
External resistor	External resistor R_a from U_{BS} to U_s required. All voltages measured to GND.	
Tacho frequency	$(2 \times n) / 60$	
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5\ V/\mu s$

n = revolutions per minute (1/min)

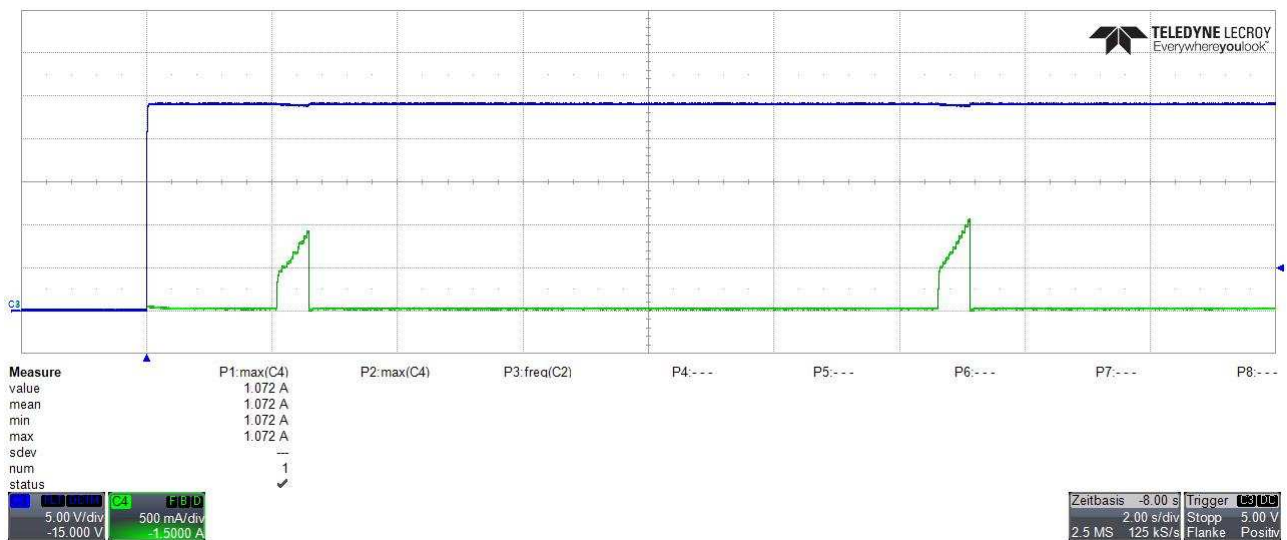
3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	Rectifying diode	
Max. residual current at U_N	$I_F \leq 10 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 1.100 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 0,5 s / 10 s	



Internal Fuse:

Littlefuse NANO2(R) FUSE; Very fast acting 451 Series; 4,0 A (Art.-Nr.: 451004)



3.5 Aerodynamics

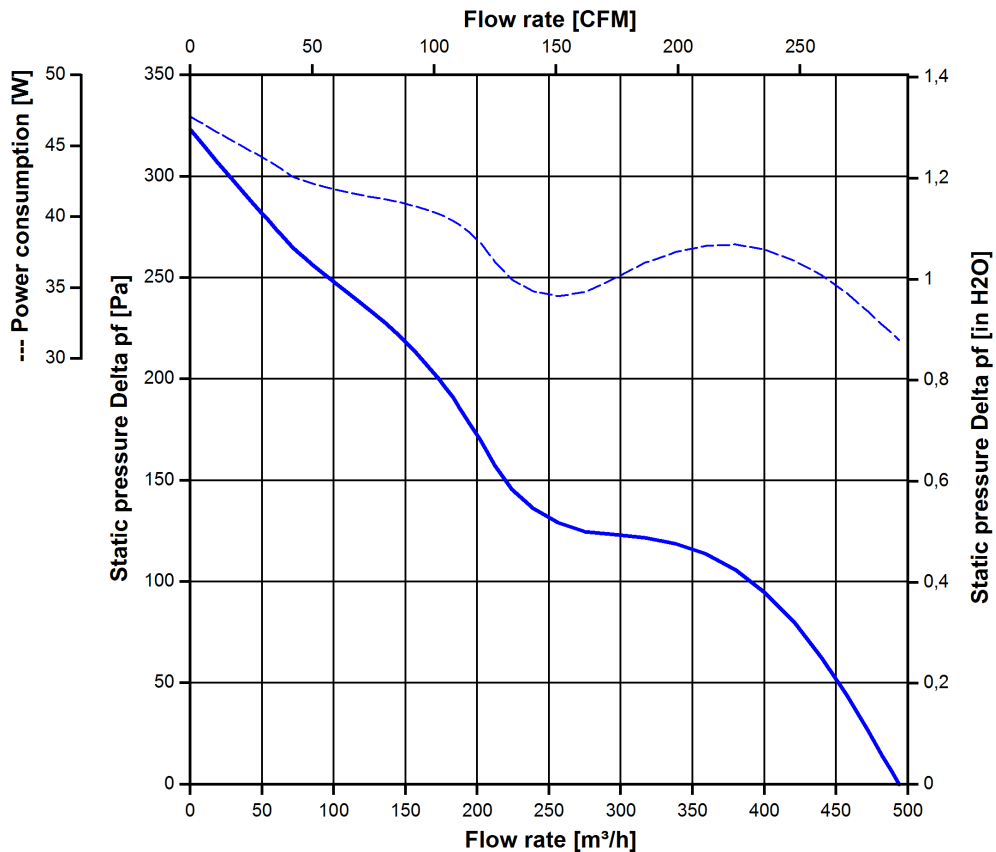
Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m³; Temperature 23°C +/- 3°C; In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.

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. Power consumption of the fan motor when operating at normal voltage is shown. Depending on the operating conditions of the application, the power input may be higher.

a.) Operation condition:

4.400 1/min at free air flow	PWM 100 %;		
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Max. free-air flow ($\Delta p = 0 / \dot{V} = \text{max.}$)	490,0 m ³ /h	
Max. static pressure ($\Delta p = \text{max.} / \dot{V} = 0$)	320 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:

4.400 1/min at free air flow	PWM 100 %;		
------------------------------	------------	--	--

Optimal operating point	375,0 m ³ /h @ 95 Pa	
Sound power level at the optimal operating point	7,3 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	63,0 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	55 °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.	Not applicable	
B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	Not applicable	
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	

Dielectric strength customer demand

A.) Type test 2850 VDC / 1 Min.

Measuring conditions: At indoor climate.

No arcing or breakdown is allowed!

All connections together to ground.

B.) Routine test 2850 VDC / 1 Sec. **(A-Feature = 100% Test)**

Measuring conditions: At indoor climate.

No arcing or breakdown is allowed!

All connections together to ground.

Earth connection (A-Feature = 100% Test)

Resistance ≤ 0.1 Ohm

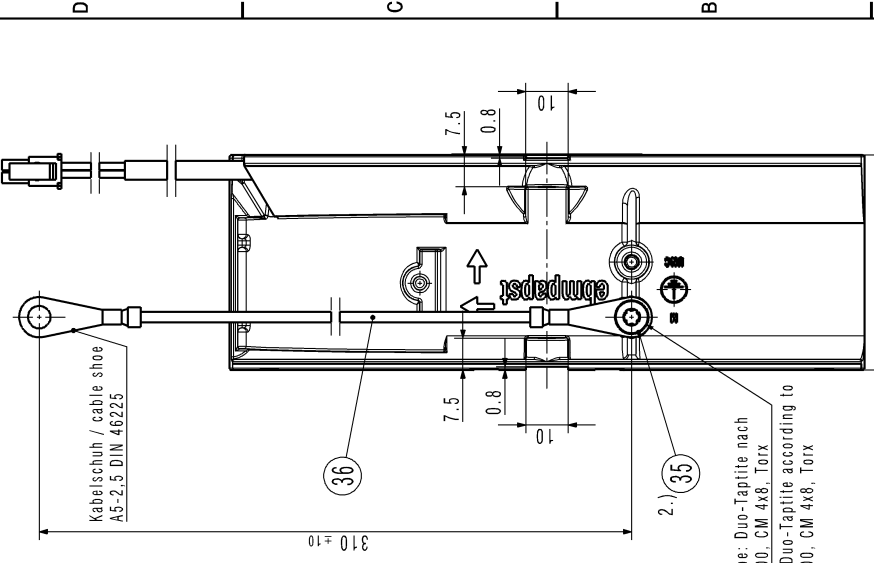
(12 V DC- or AC-voltage, max. 25 A, indoor climate)

5.2 Approval Tests

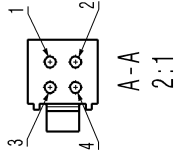
CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans E38324
VDE	Association for Electrical, Electronic and Information Technologies	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Canadian Standards Association	Yes / C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Not applicable

6 Reliability**6.1 General**

Life expectancy L10 at TU = 40 °C	67.500 h	
Life expectancy L10 at TU max.	47.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	115.000 h	

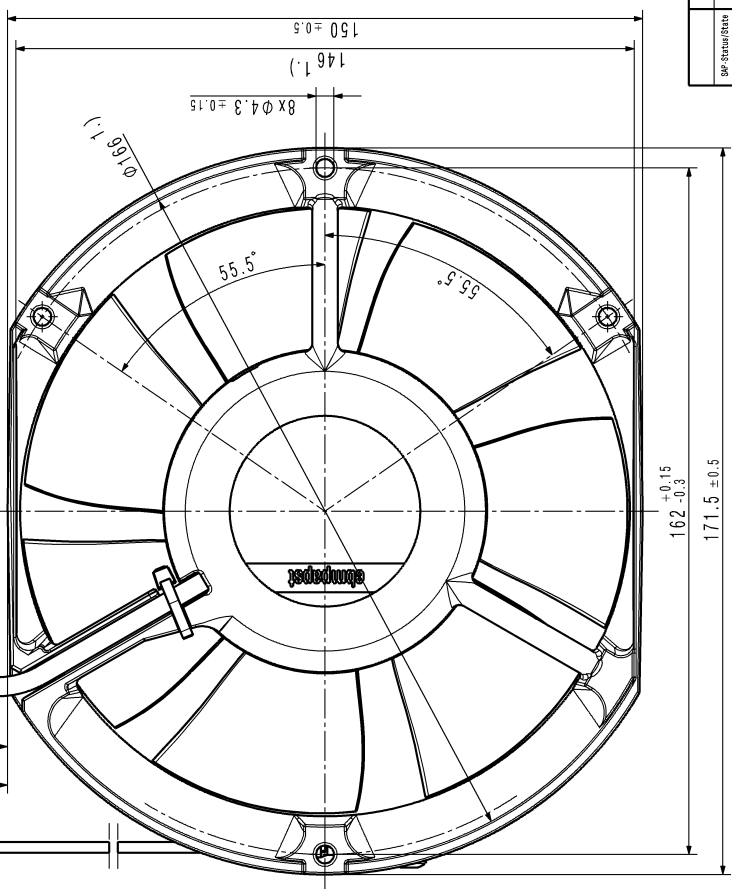
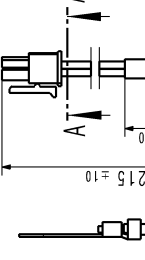


PIN	Steckerbelegung / pin configuration
1	rot / red (+24 V)
2	violett / violet (PWM)
3	weiß / white (Tacho)
4	blau / blue (GND)



Steckergehäuse / plug housing
Molex 43025-0400

Kontakte / contacts
Molex 43030-0003



- 1.) Maße für Montageausschnitt
 - 2.) Zahnscheibe Pos. 35 zwischen Lüftergehäuse und Kabelschuh montiert.
- Axialspiel der Kugellager mit Feder spielfrei gelagert
- 1.) measures for mounting cut out
 - 2.) toothed washer pos. 35 is mounted between fan housing and cable shoe
- ball bearing without clearance by a pre-load spring

Art.Nr. / change no.	CAD-Modell / CAD-Environment	Material / Material	Volumen / Volume (cm ³)
88840225 3010A 43025-0400	CATIA	3010A	Gewicht / Weight (g)
Datum	Name	Artikel / Title	Masse (g)
08.07.2010	M. Müller	3010A	ERS / Zeich. / Revision:
08.07.2010	M. Müller	3010A	Formst. / Form: / Size:
08.07.2010	M. Müller	3010A	Zeich. Nr. / Drawing No.
08.07.2010	M. Müller	3010A	Dokument / Type of Document
08.07.2010	M. Müller	3010A	Index / Index
08.07.2010	M. Müller	3010A	Teilenummer / Part Number
08.07.2010	M. Müller	3010A	Massstab / Scale
08.07.2010	M. Müller	3010A	3010A

Skizzenwerk nach DIN 150 1810 beachten!
Refer to production notes DIN 150 1810!
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