Product Data Sheet 8315100380

VWG0138KULCZ
AF172-00380 48V P/2U

ebmpapst

engineering a better life

AF172-00380 48V P/2U

INDEX

1 General

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

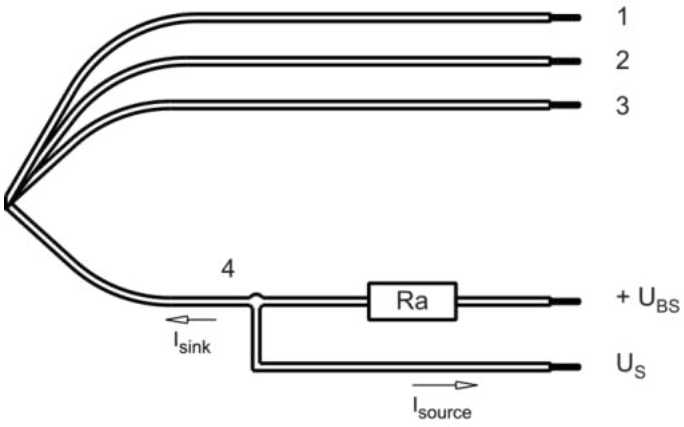
2 Mechanics

2.1 General

Width	150,0 mm	
Depth	51,0 mm	
Diameter	172,0 mm	
Mass	0,86 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	Wire outlet corner: 190 Ncm Remaining corners: 190 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires - Plug	
Lead wire length Tolerance	L = 330 mm +- 10,0 mm	
Tube length Tolerance	S = 15 mm +- 10 mm	
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 2	AWG 22	1,7 mm
3	violet	PWM	Pin 4	AWG 22	1,7 mm
4	white	Tacho	Pin 3	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

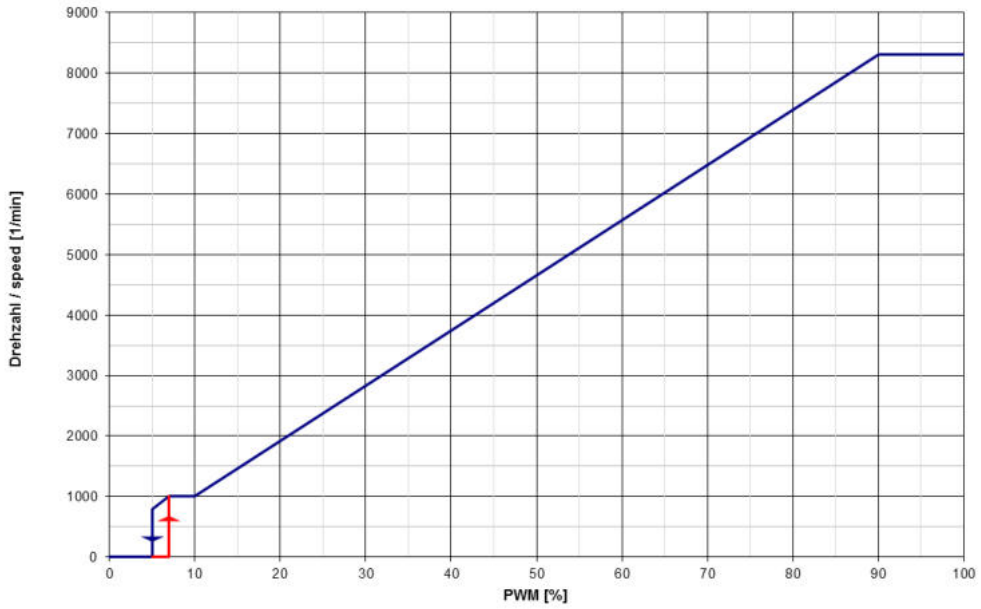
3.1 Electrical Interface - Input

Control input	PWM

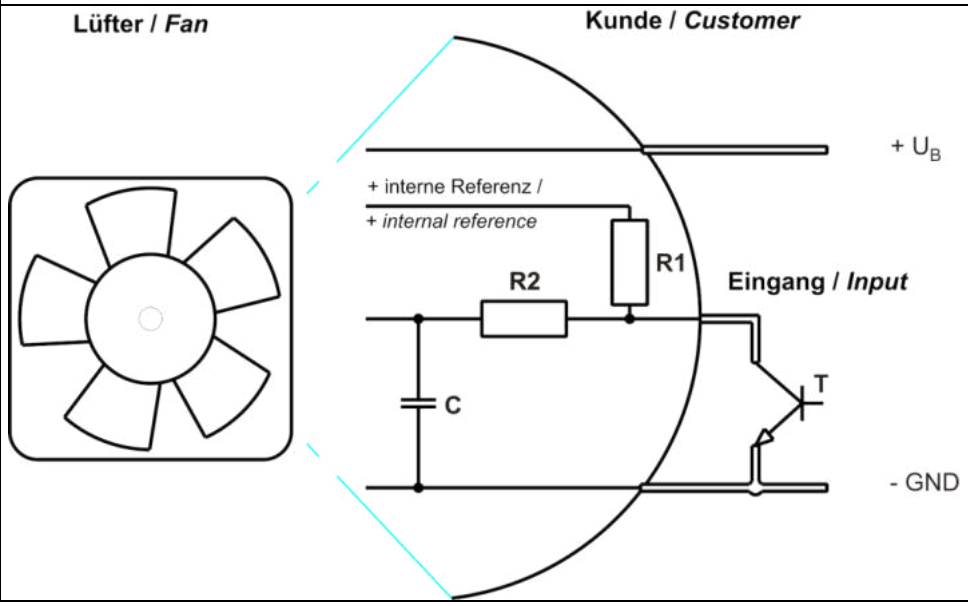
Features

Inpute type	Open collector	
PWM - Frequency		typical: 2 kHz

Characteristics



Schematics



PWM input transistor requirements:
U_{CE}max. => 12 V; I Sink max. > 5 mA; U_{CE}sat. < 0,15 V
Speed control:
By Puls width modulation (PWM) 0 ... 100%

Open collector in relation to signal-ground
f = 2kHz +-20%

Information to the curve:

0% - <=7% PWM:	0 1/min (Fan off)
7% PWM:	1.000 1/min (Start-up, comming from 0% PWM)
7% - 10 % PWM:	1.000 1/min (corresp. to min fan speed)
10% - 90% PWM:	Linear increasing curve
90% - 100% PWM:	8.300 1/min (corresp. to max fan speed)
5% PWM:	800 1/min or 0 1/min (Fan turns off, comming from 100% PWM)

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.

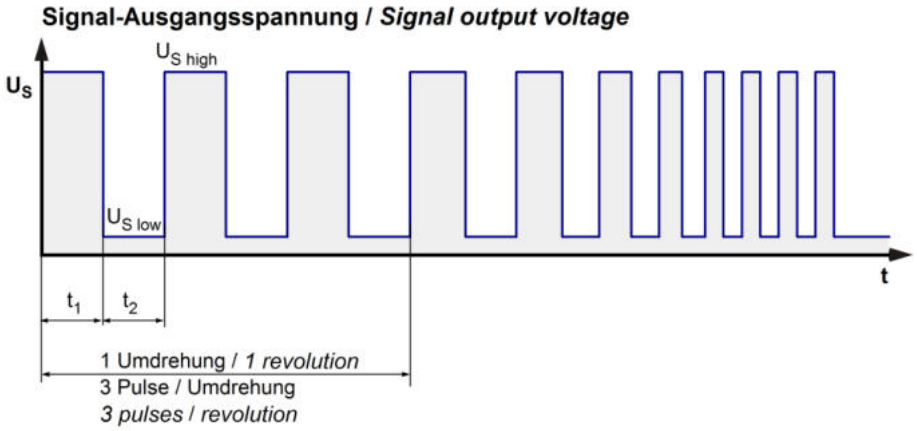
$\Delta p = 0$: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

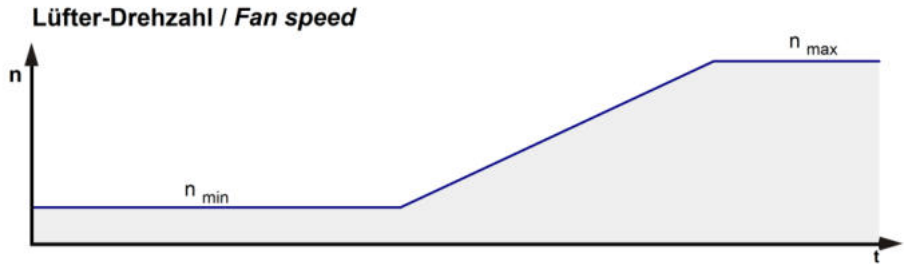
Name	Condition		
PWM 0001	PWM: 100 %;		

Features	Condition	Symbol	Values		
Voltage range		U	36 V		72 V
Nominal voltage		U_N		48 V	
Power consumption Tolerance	$\Delta p = 0$ PWM 0010	P	65 W +- 15 %	98 W +- 15 %	100 W +- 15 %
Current consumption Tolerance	$\Delta p = 0$ PWM 0010	I	1.800 mA +- 15 %	2.050 mA +- 15 %	1.400 mA +- 15 %
Speed Tolerance	$\Delta p = 0$ PWM 0010	n	7.300 1/min +- 10 %	8.300 1/min +- 10 %	8.300 1/min +- 10 %

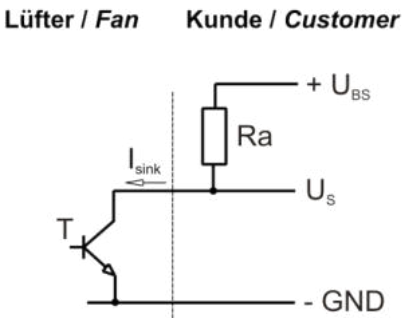
3.3 Electrical Interface - Output

Tacho type	/2 (open collector)





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



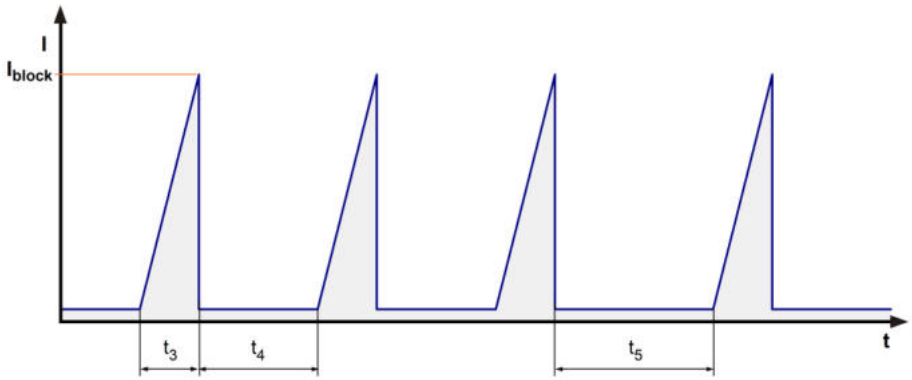
Features		Note	Values
Tacho operating voltage	U_{BS}		<= 60 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<= 0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	
Maximum sink current	I_{sink}		<= 20 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(3 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	Rectifying diode I_F <= 5	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block}	
Clock signal at locked rotor Extended Downtime	t_3 / t_4 typical: 3 s / 10 s t_5: 30 s after 5 start-up tests	
Internal fuse	Littelfuse NANO2 > Very Fast-Acting > 451/453 Series 6,3A / 125V (Art.No.: 045106.3MRL)	
Voltage control *)	Fan turns on at U_B > 14 V or < 33 V Fan turns off at U_B < 12 V or > 35 V	

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



3.5 Data According ErP Directive

Installation / Efficency category	A / static
Speed control	integrated
Specific ratio	1,00612
Target overall efficiency 2015	28,7 %
Overall efficiency	48,2 %
Efficiency grade	40
Power input	165 W
Speed	8.300 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

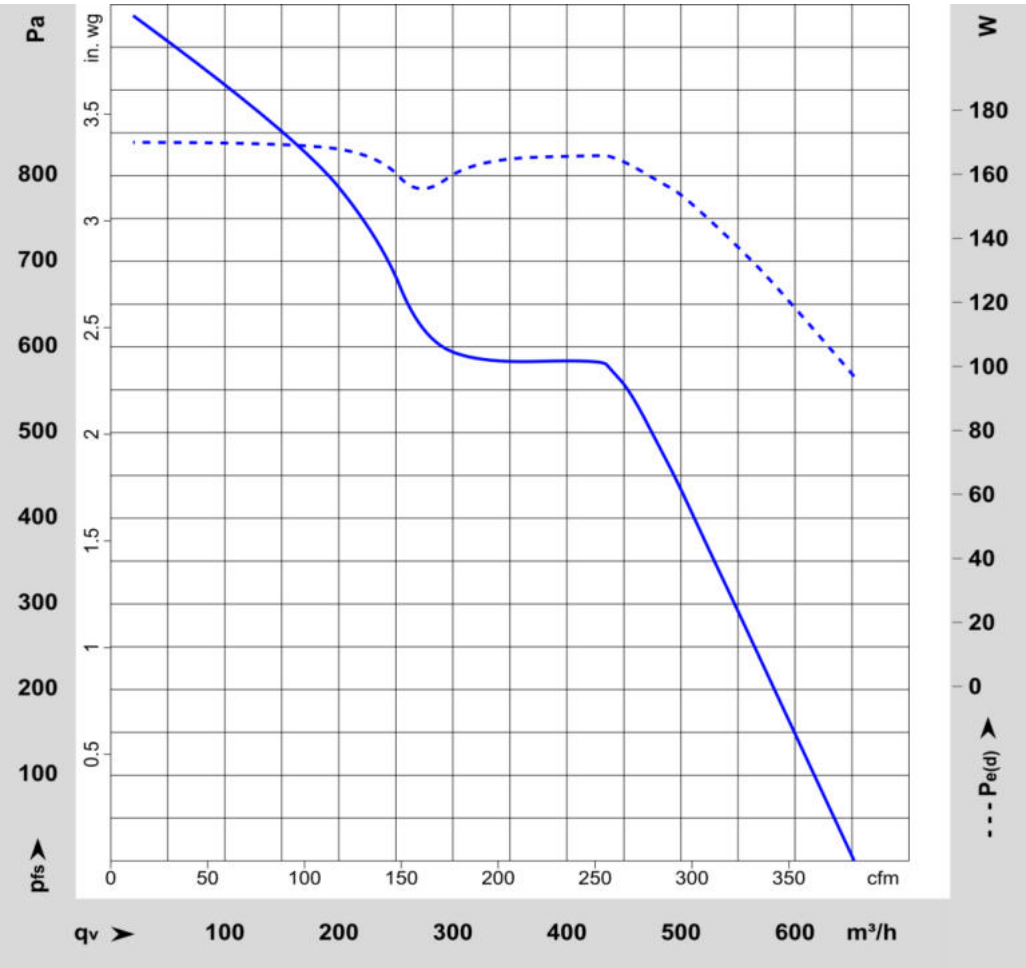
3.6 Aerodynamics

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

8.300 1/min at free air flow	PWM 100 %;		

Max. free-air flow (Δp = 0 / V̇ = max.)	650 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	980 Pa	



3.7 Sound Data

Measurement conditions:	Sound pressure level: 1 meter distance between microphone and the air intake. Sound power level: According to ISO 13347-3. Measured in a semianechoic chamber with a background noise level of Lp(A) < 5 dB(A) For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

8.300 1/min at free air flow	PWM 100 %;		

Optimal operating point	545 m3/h @ 295 Pa	
Sound power level at the optimal operating point	8,1 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	70 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	60 °C	
Min. permitted storage temperature TL min.	-40 °C	
Max. permitted storage temperature TL max.	80 °C	

4.2 Climatic Requirements

Humidity requirements	humid temperature, cyclic; according to DIN EN 60068-2-38, 10 cycle and condensation water check; according to DIN EN ISO 6270-2, 14 days	
Water exposure	Splash water check IPX4; according to DIN EN 60529 VDE 0470, not certified	
Dust requirements	Dust check IP5X; according to DIN EN 60529 VDE 0470, not certified	
Salt fog requirements	Salt fog, cylic, in operation; according to DIN EN 60068-2-52; 10 cycles	

Permitted application area:
The product is for the use in open and unsheltered areas. Direct exposure to water as well as saline ambient conditions are allowed provided that this does not prevent the normal operation.

Pollution degree 4 (according DIN EN 60664-1)
It occurs permanent conductivity caused by conductive dust, rain or moisture.

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	**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.

Kind	**Electromagnetic Field Immunity Test**
According	DIN EN 61000-4-3:2006-12
Ceck accuracy / Limit	10 V/m; 80 - 1000 MHz; AM; m = 0,8; f = 1 kHz; 1%; t = 3 s
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	**Electrical Fast Transient / Burst Immunity Test**
According	DIN EN 61000-4-4:2005-07
Ceck accuracy / Limit	+/- 2 kV on Power Lines; Coupling: POS, NEG, {PE}, ALL, 5 kHz and 100 kHz; 1 min
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	**Immunity to Conducted Disturbances, Induced by RF-Fields**
According	DIN EN 61000-4-6:2001-12
Ceck accuracy / Limit	10 Vrms; 150 kHz - 80 MHz; AM; m = 0,8; f = 1 kHz; 1%; t = 3 s
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 62368 and DIN EN 60335 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. 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°C measured with U=500 VDC for 1 min.	RI > 10 MOhm	
Clearance / creepage distance	1,0 mm / 1,5 mm	
Protection class	I	

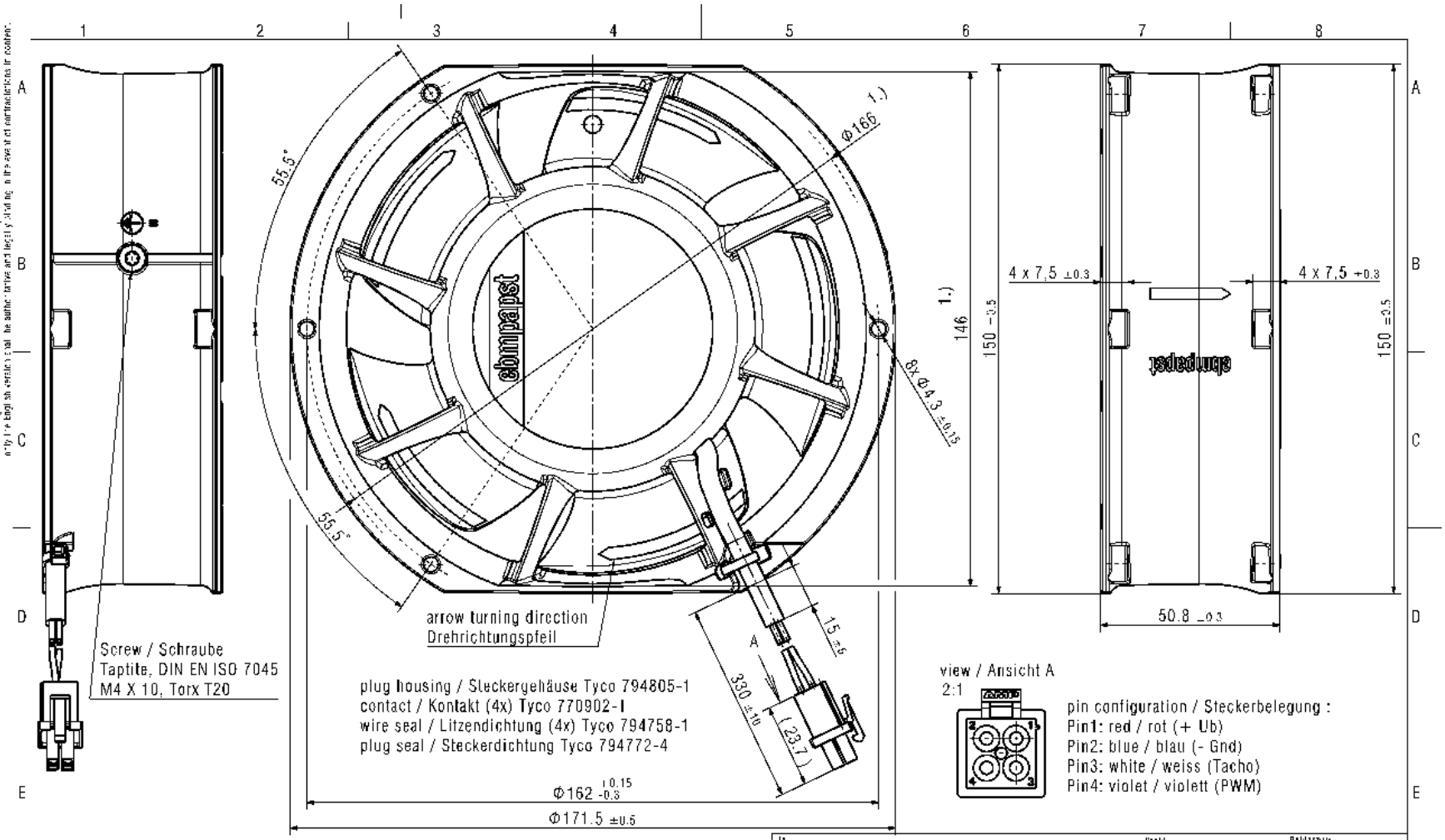
5.2 Approval Tests

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 62368 - Audio/video, information and communication technology equipment
CSA	Canadian Standards Association	Yes / CSA audited by UL according to C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Yes / GB 12350 Safety Requirements for small Power Motors

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	70.000 h	
Life expectancy L10 at TU max.	35.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	117.500 h	


55.5°
55.5°
Φ166
1.)
146
8x Φ4.3 ±0.15
150 -0.5
4 x 7,5 ±0.3
4 x 7,5 ±0.3
150 ±0.5
50.8 -0.3
arrow turning direction
Drehrichtungspfeil
15 ±5
A
330 ±10
(23.7)
Φ162 -0.3 +0.15
Φ171.5 ±0.5
Screw / Schraube
Taptite, DIN EN ISO 7045
M4 X 10, Torx T20
plug housing / Steckergehäuse Tyco 794805-1
contact / Kontakt (4x) Tyco 770902-1
wire seal / Litzendichtung (4x) Tyco 794758-1
plug seal / Steckerdichtung Tyco 794772-4
view / Ansicht A
2:1
pin configuration / Steckerbelegung :
Pin1: red / rot (+ Ub)
Pin2: blue / blau (- Gnd)
Pin3: white / weiss (Tacho)
Pin4: violet / violett (PWM)
1.) measures of mounting cut out
- ball bearing without clearance by a pre-load spring
1.) Maße aus Montageausschnitt
- Axialspiel der Kugellager mit Feder spielfrei verspannt
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