Product Data Sheet 4412FGPR-203

ebmpapst

The engineer's choice



GREEN TECH

4412FGPR-203

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1 General

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

2 Mechanics

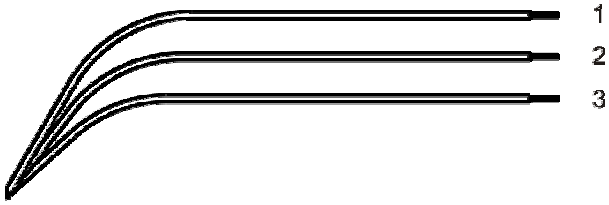
2.1 General

Depth	26,2 mm	
Diameter	127 mm	
Mass	0,175 kg	
Housing material	Plastic	
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 310 mm +- 10 mm	
Wire size (AWG)	24	
Insulation diameter	1,35 mm	





Wire	Color	Operation
1	red	+ UB
2	blue	- GND
3	violet	PWM

3 Operating Data

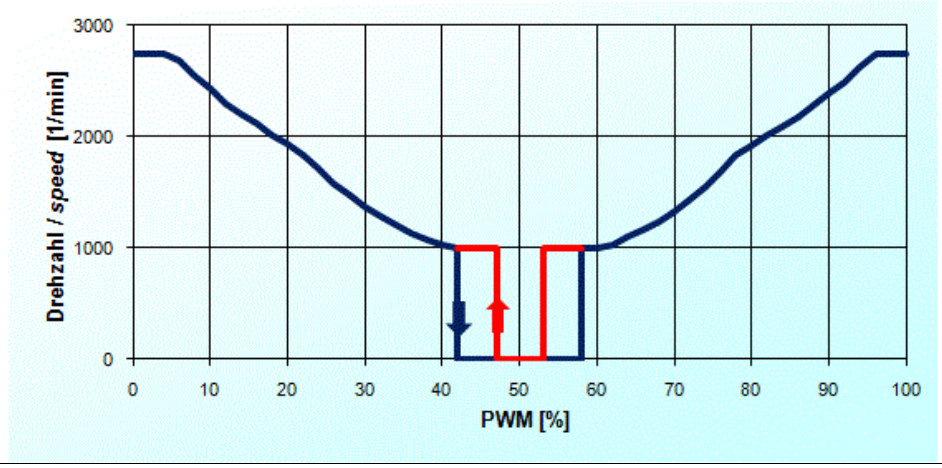
3.1 Electrical Interface - Input

Control input	PWM

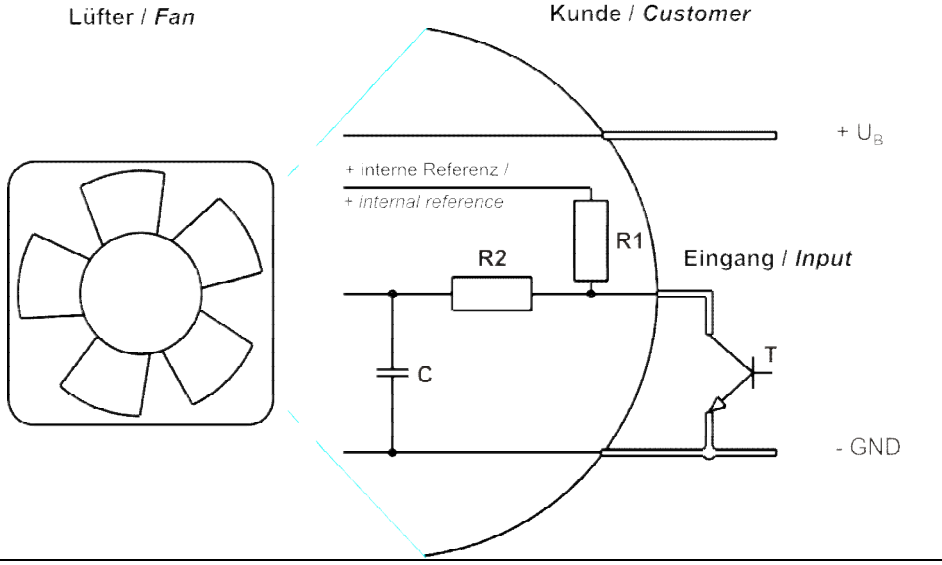
Features

Inpute type	Open collector	
PWM - Frequency		2 kHz - 5 kHz

Characteristics



Schematics



Fan with reversed rotating direction Setpoint: 0% - 50% air outlet over struts / Setpoint: 50% - 100% air intake over struts

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.

Δp = 0: corresp. to free air flow (see chapter aerodynamics)
I: corresp. to arithm. mean current value

Name	Condition		
PWM 0001	PWM: <= 5 %;	f: 2 kHz	f: 5 kHz

Rotational direction, looking at Rotor: left (air outlet over struts)

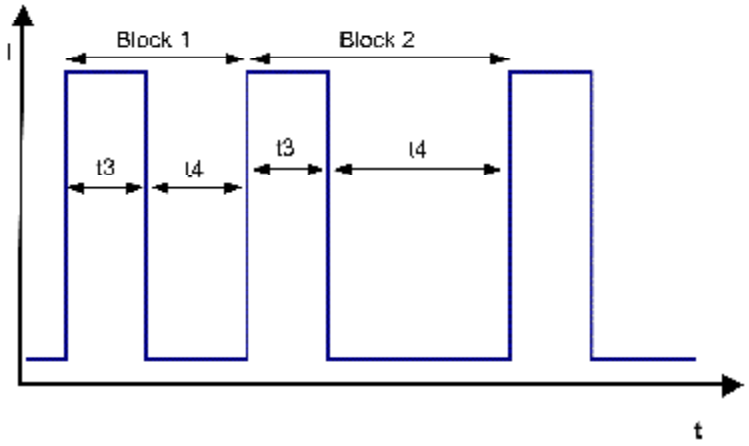
Rotational direction, looking at Rotor: left (air outlet over struts)

Rotational direction, looking at Rotor: right (air intake over struts)
Rotational direction, looking at Rotor: right (air intake over struts)

Features	Condition	Symbol	Values		
Voltage range		U	9,5 V		12,6 V
Nominal voltage		U_N		12,0 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	1,9 W +- 25,0 %	1,9 W +- 25,0 %	2 W +- 25,0 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	200 mA +- 25,0 %	160 mA +- 25,0 %	160 mA +- 25,0 %
Speed Tolerance	Δp = 0 PWM 0010	n	2.750 1/min +- 12,5 %	2.750 1/min +- 4,0 %	2.750 1/min +- 4,0 %
Starting current consumption				920 mA	

3.3 Electrical Features

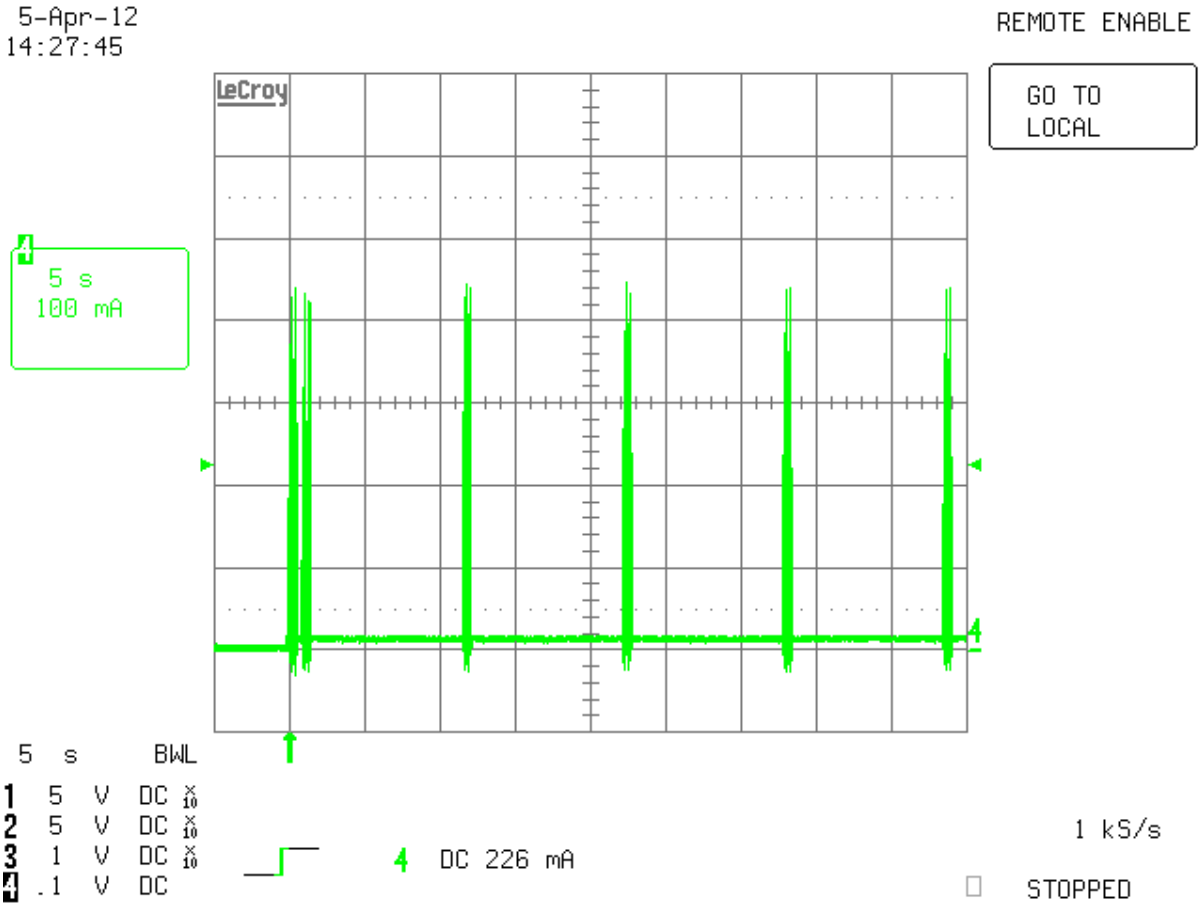
Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	Rectifying diode I_F < 50 uA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 920 mA	

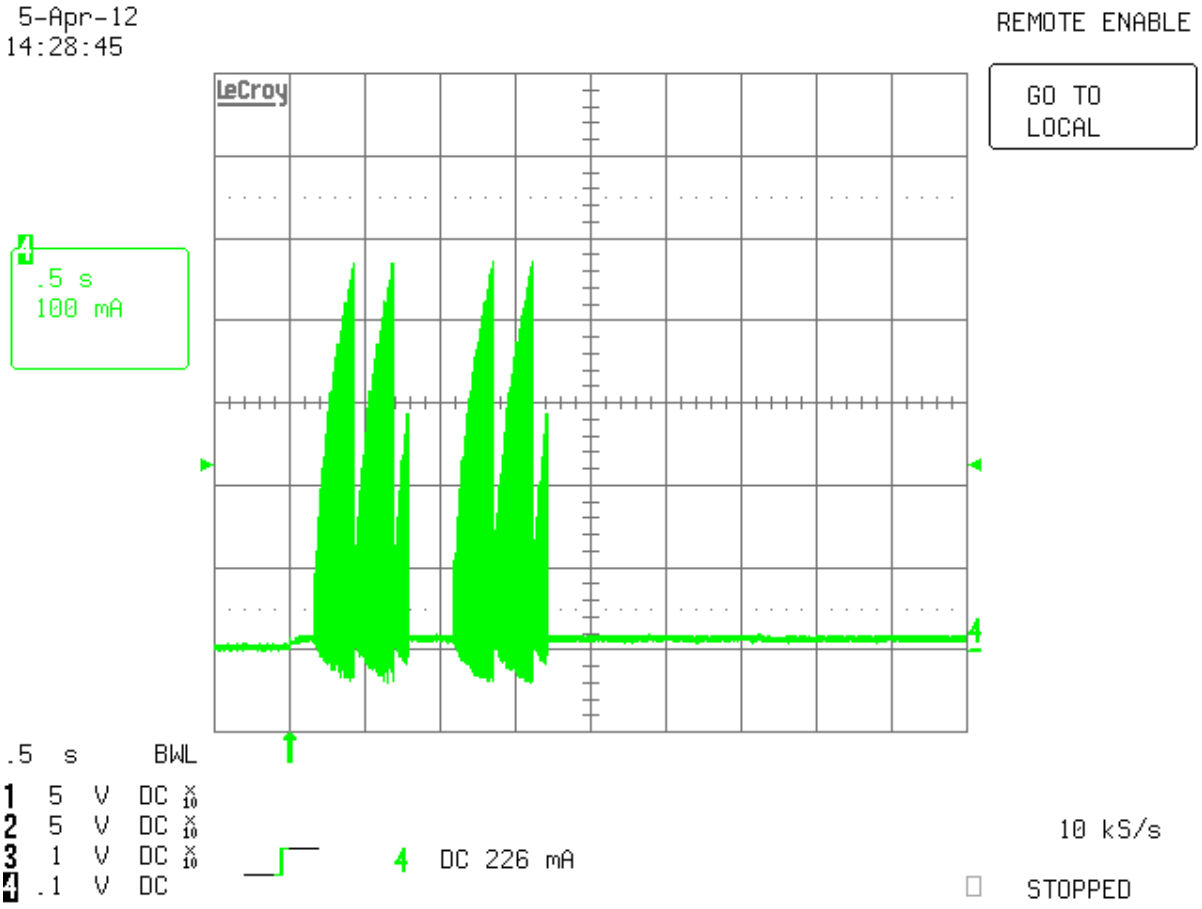


Special locked rotor protection: Block1: t3 / t4 = 0,6 s / 0,3 s; Block2: locked rotor protection t3 / t4 = 0,6 s / 10 s

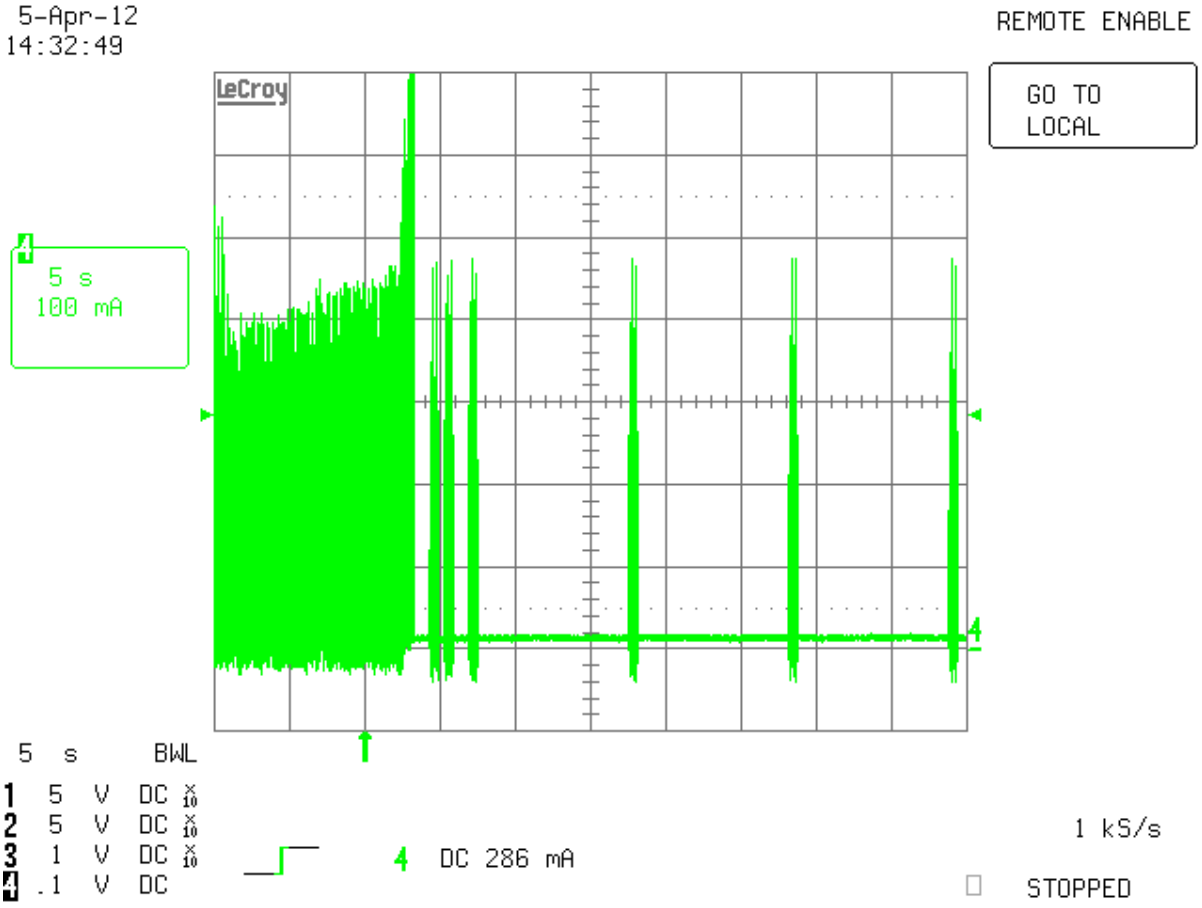
The fan has a two constant blocking cycle. The behavior of this cycle differs marginally between a blocked rotor when the fan gets started and a blocked rotor during the running operation of the fan. The following figures describe this characteristic.

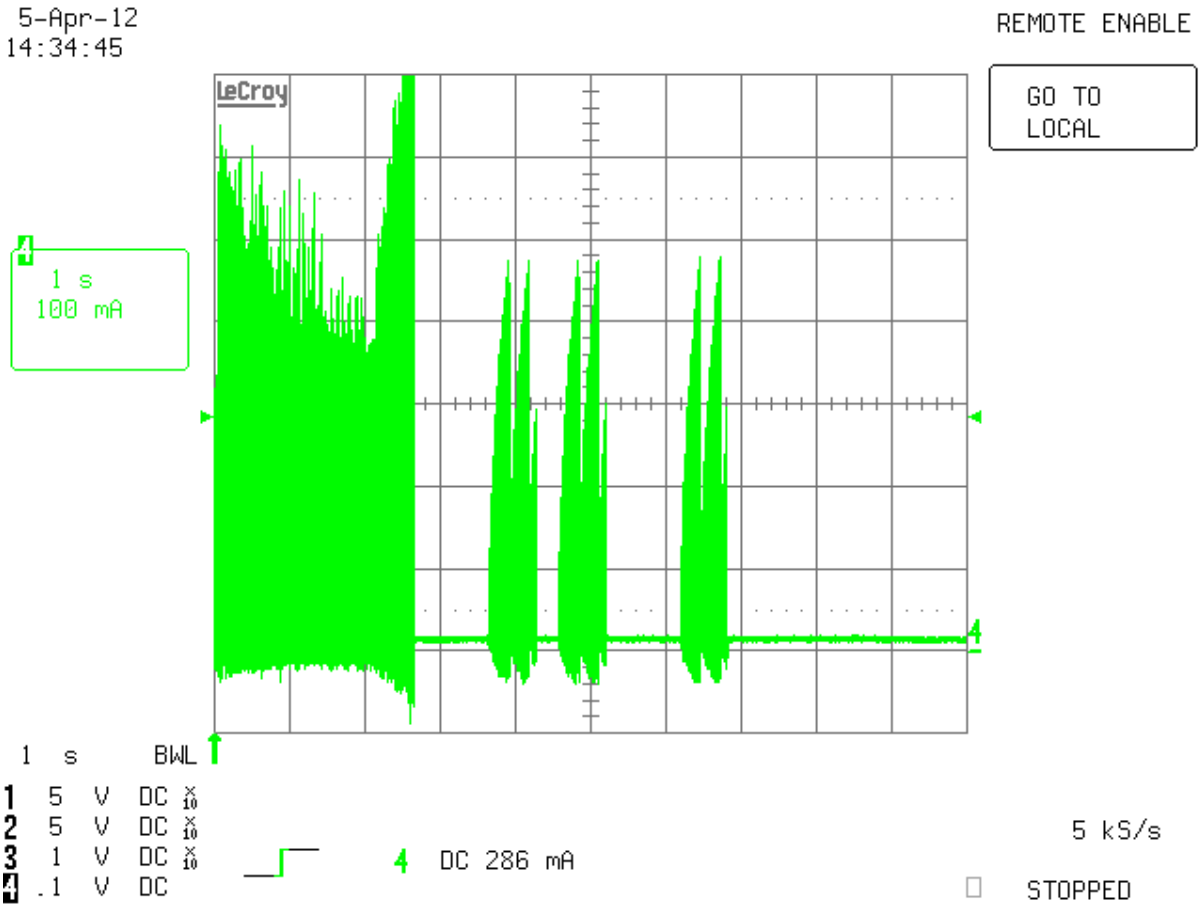
1. Blocked rotor at the start of the fan





2. Blocked rotor after the normal operation of the fan
The internal software measures if the fan has been blocked. In this case the second current pulse starts 1 sec later then in case 1.


5-Apr-12
14:32:49
REMOTE ENABLE
GO TO
LOCAL
LeCroy
5 s
100 mA
5 s BWL
1 5 V DC
2 5 V DC
3 1 V DC
4 .1 V DC
4 DC 286 mA
1 kS/s
STOPPED


5-Apr-12
14:34:45
REMOTE ENABLE
GO TO
LOCAL
LeCroy
1 s
100 mA
1 s BWL
1 5 V DC
2 5 V DC
3 1 V DC
4 .1 V DC
4 DC 286 mA
5 kS/s
STOPPED

3.4 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:

2.750 1/min at free air flow	PWM <= 5 %;	f: 2 kHz	f: 5 kHz

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	120,0 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	64 Pa	

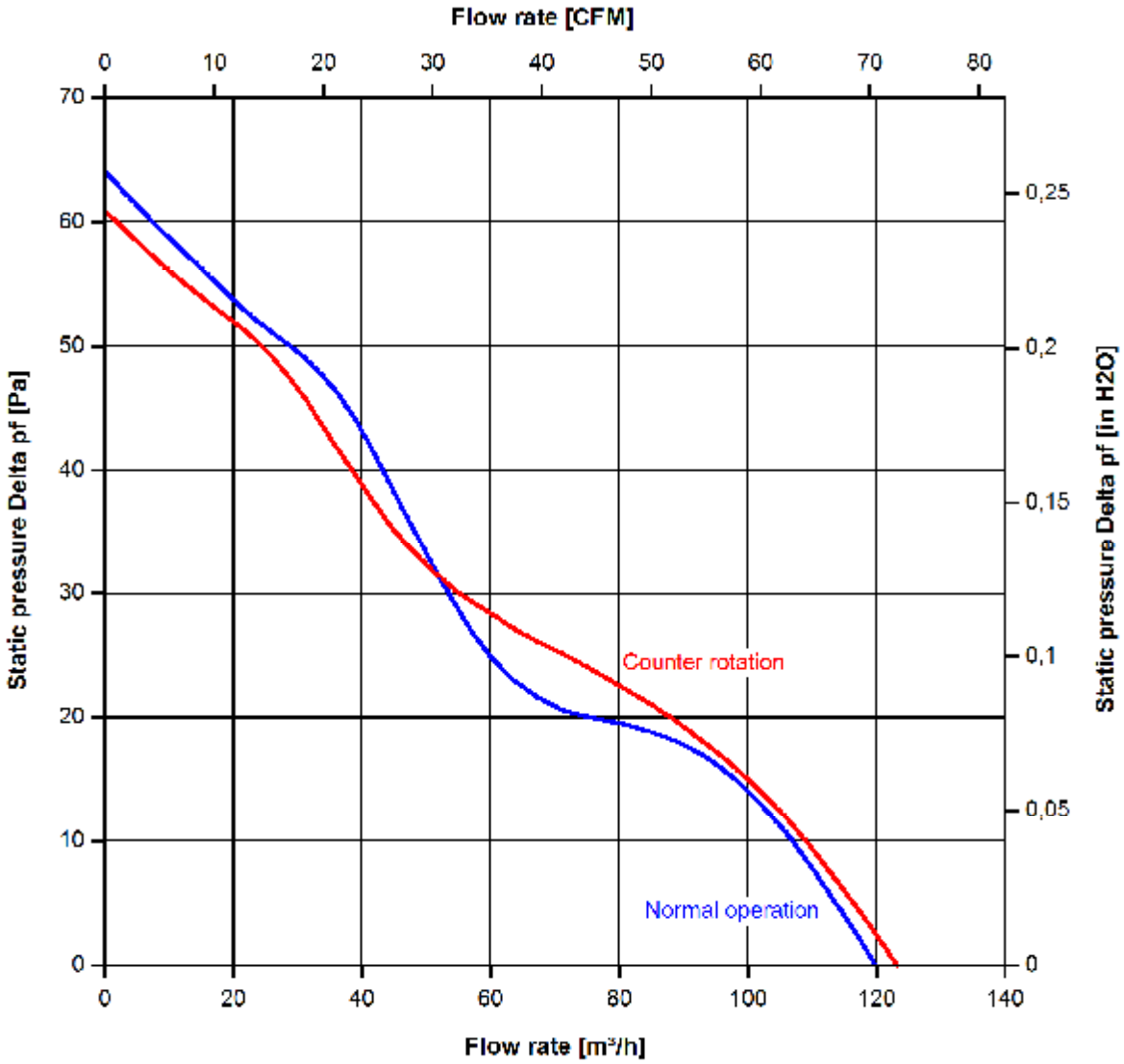
Rotation in normal direction.

b.) Operation condition:

1.000 1/min at free air flow	PWM 43 %;	f: 2 kHz	f: 5 kHz

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	123,0 m3/h	
Max. static pressure(Δp = max. / $\dot{V}$ =0)	61 Pa	

Counter rotation.


Flow rate [CFM]
0
10
20
30
40
50
60
70
80
Static pressure Delta pf [Pa]
70
60
50
40
30
20
10
0
Static pressure Delta pf [in H2O]
0,25
0,2
0,15
0,1
0,05
0
Counter rotation
Normal operation
0
20
40
60
80
100
120
140
Flow rate [m³/h]

3.5 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)Sound power level: Acc. to DIN 45635 part 38 (ISO 10302) Measured in a semianchoic chamber with a background noise level of Lp(A) < 5 dB(A) For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

2.750 1/min at free air flow	PWM <= 5 %;	f: 2 kHz	f: 5 kHz

Optimal operating point	94,0 m3/h @ 15 Pa	
Sound power level at the optimal operating point	4,9 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	33,0 dB(A)	

b.) Operation condition:

1.000 1/min at free air flow	PWM 43 %;	f: 2 kHz	f: 5 kHz

Optimal operating point	94,0 m3/h @ 17 Pa	
Sound power level at the optimal operating point	5,7 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	45,0 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 heat, cyclic; according to DIN EN 60068-2-30, 6 cycle	
Water exposure	None	
Dust requirements	Dust check; according to DIN EN 60068-2-68, 6g/m2d, 1 day	
Salt fog requirements	None	

Permitted application area:
The product is for the use in sheltered rooms with limited controlled temperature. Occasionally condensed water is allowed. Direct exposure to water must be avoided. Saline ambient conditions must be avoided.

Pollution degree 2 (according DIN EN 60664-1)
It occurs only non-conductive pollution. Occassionally, temporary conductivity caused by condensation occurs.

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. B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Min. 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	
Clearance / creepage distance	1,0 mm / 1,2 mm	
Protection class	III	

5.2 Approval Tests

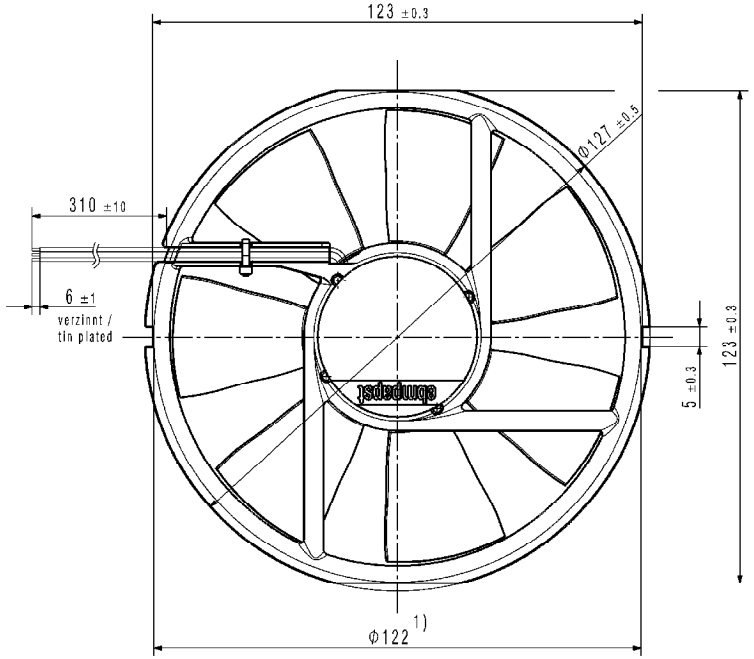
CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans
VDE	Association for Electrical, Electronic and Information Technologies	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Canadian Standards Association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

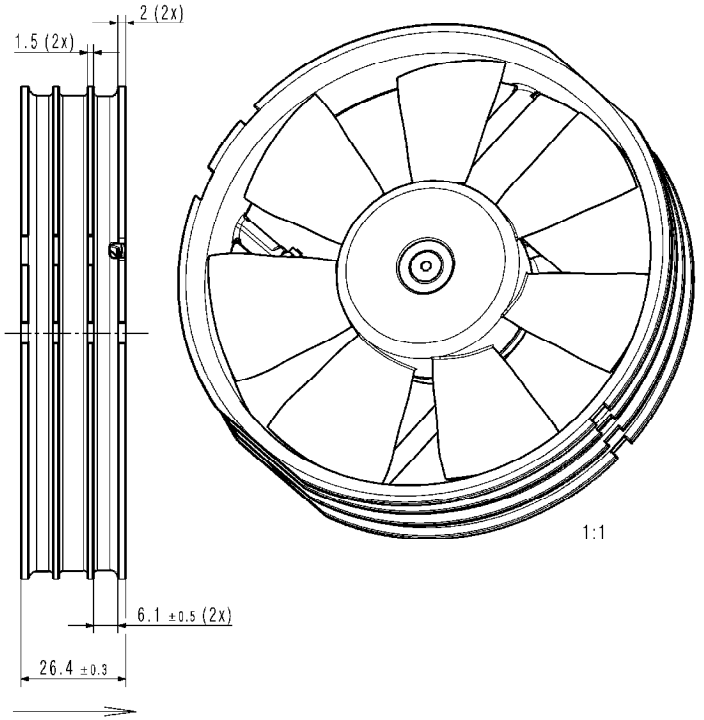
6 Reliability

6.1 General

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Refer to protection notice DIN 34 !





Hauptförderrichtung (umkehrbar) /
Main direction of flow (reversible)

- Axialspiel bei Kugellagerung (K): 0 (mit Federausgleich)
- Axialspiel bei Gleitlagerung (G): 0.1-0.6
1) Maß für Montagewand

- Axial celarance with ball bearings (K): 0 (with spring compensation)
- Axial celarance with sleeve bearing (G): 0,1-0,6
1) Dimension for mounting wall

SAP-Status/State	Aend.-Nr./ Change-No.	CATIA-System-Version/ CATIA-System-Version	CAD-Umgebung/ CAD-Environment	Werkstoff / Material:	Volumen / Volume (mm^3):
		9655600199 GPR000 -			Gewicht / Mass (g):
		3D-Referenzmodell / 3D-Reference model		Artikel / Title:	
Tolerierung / Tolerances:		Datum	Name		
		Bearb./ Drawn			
Allgemeintoleranzen / Gen. Tolerances:		Gepr./ Checked		Zchg.-Nr./ Drawing No:	Ers.f.Zchg. / Replaces:
		Freig./ Releas.			
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