Product Data Sheet 638/2HPU

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The engineer's choice



GREEN TECH

638/2HPU

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1 General

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

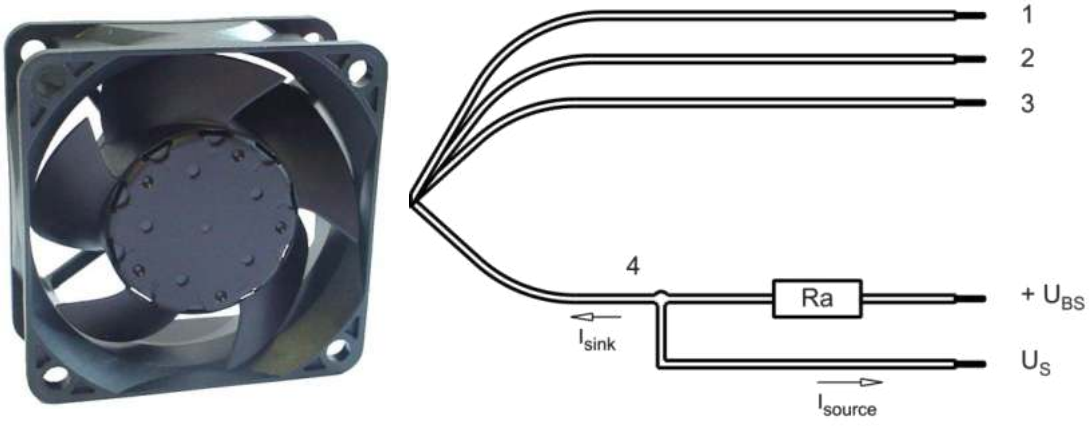
2 Mechanics

2.1 General

Width	60,0 mm	
Height	60,0 mm	
Depth	25,4 mm	
Mass	0,080 kg	
Housing material	Plastic	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	Wire outlet corner: 30 Ncm Remaining corners: 70 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 310 mm +- 10 mm	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 24	1,1 mm
2	blue	- GND	AWG 24	1,1 mm
3	violet	PWM	AWG 24	1,1 mm
4	white	Tacho	AWG 24	1,1 mm

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

3 Operating Data

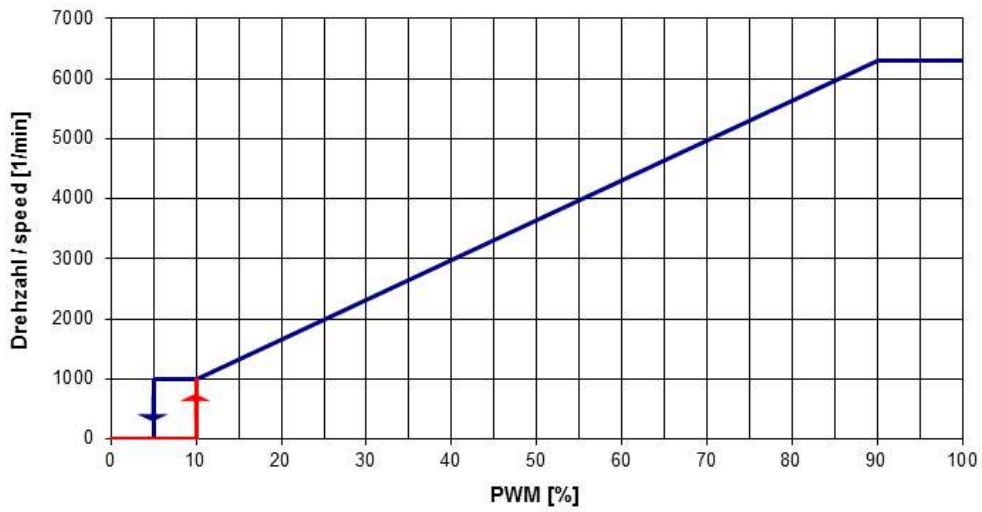
3.1 Electrical Interface - Input

Control input	PWM

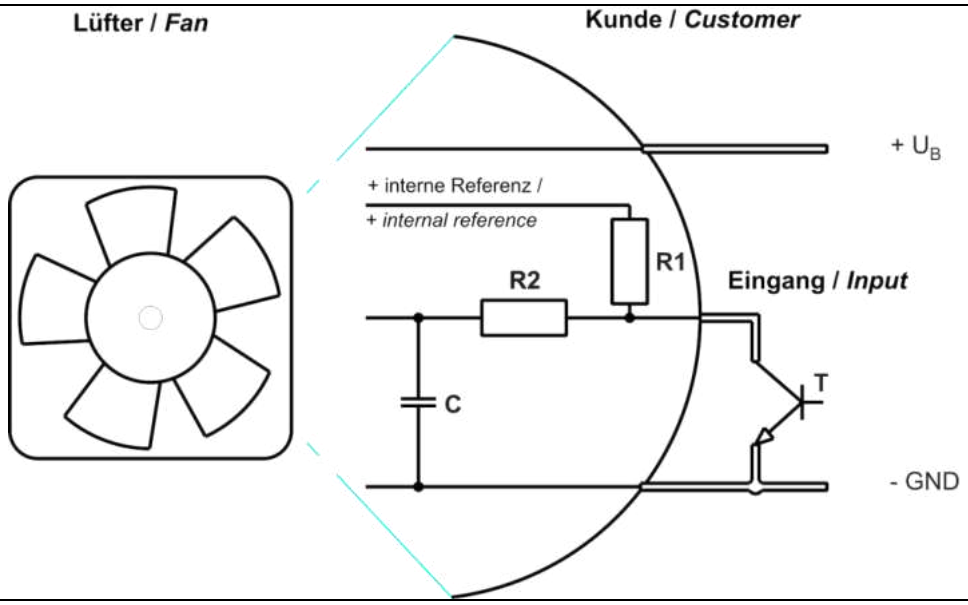
Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 30 kHz

Characteristics



Schematics



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

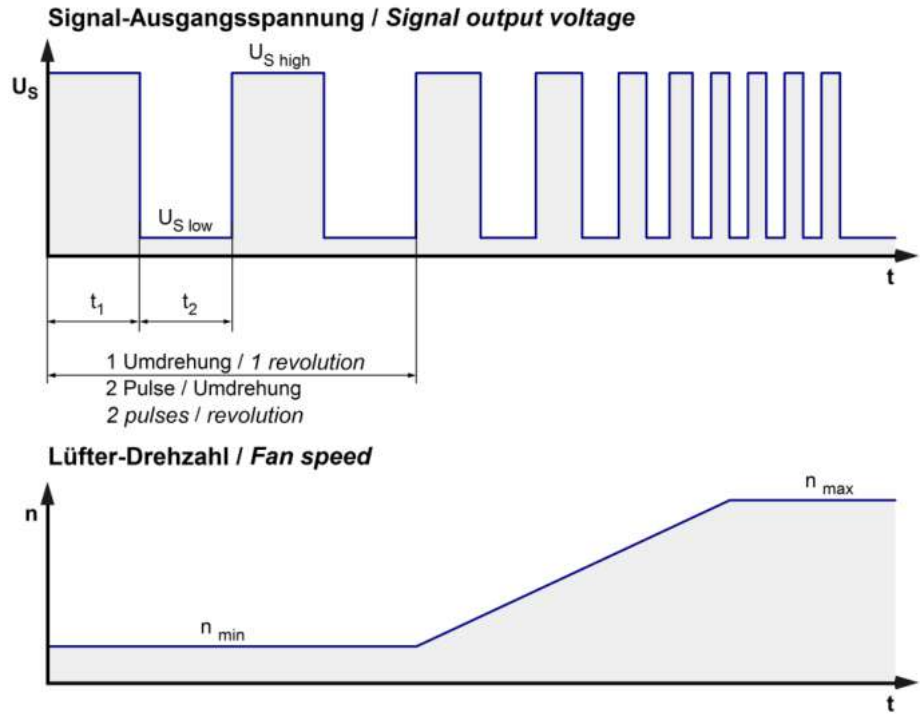
Name	Condition		
PWM 0001	PWM: >= 90 %;		

Startup peakpulse current: Ipmax = 350mA
Startup peakpulse duration: tp = 6 x 1ms

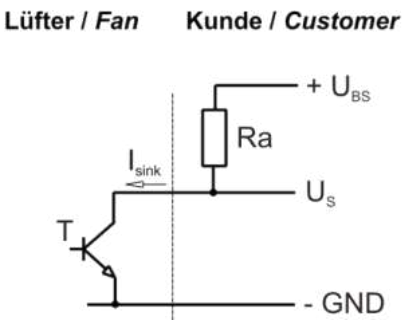
Features	Condition	Symbol	Values		
Voltage range		U	40 V		60 V
Nominal voltage		U_N		48 V	
Power consumption Tolerance	Δp = 0 PWM 0010	P	1,5 W +- 17,5 %	1,8 W +- 17,5 %	2,1 W +- 17,5 %
Current consumption Tolerance	Δp = 0 PWM 0010	I	37 mA +- 17,5 %	38 mA +- 17,5 %	35 mA +- 17,5 %
Speed Tolerance	Δp = 0 PWM 0010	n	5.950 1/min **)	6.300 1/min **)	6.300 1/min **)
Starting current consumption				<= 315 mA	

3.3 Electrical Interface - Output

Tacho type	/2 (open collector)



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

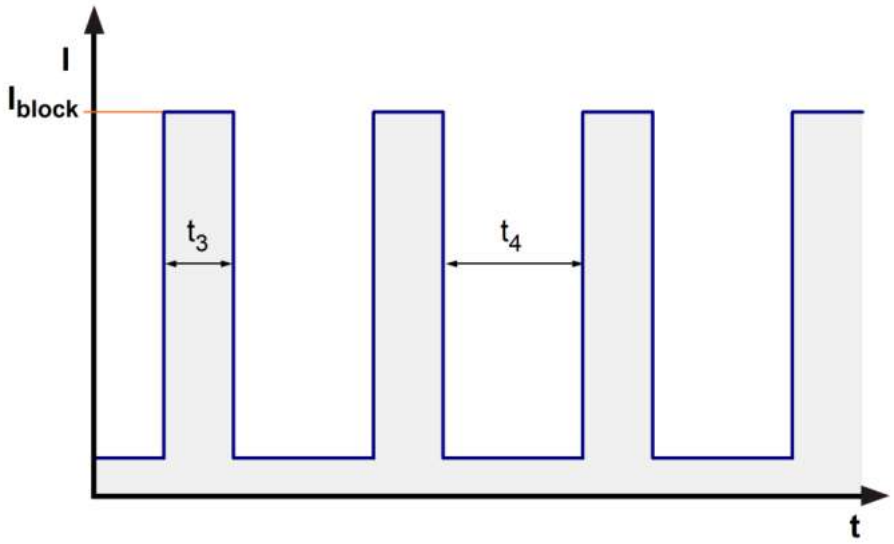


Features		Note	Values
Tacho operating voltage	U_{BS}		<= 60 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<= 0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	<=60 V
Maximum sink current	I_{sink}		4 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(2 x n) / 60	
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

n = revolutions per minute (1/min)

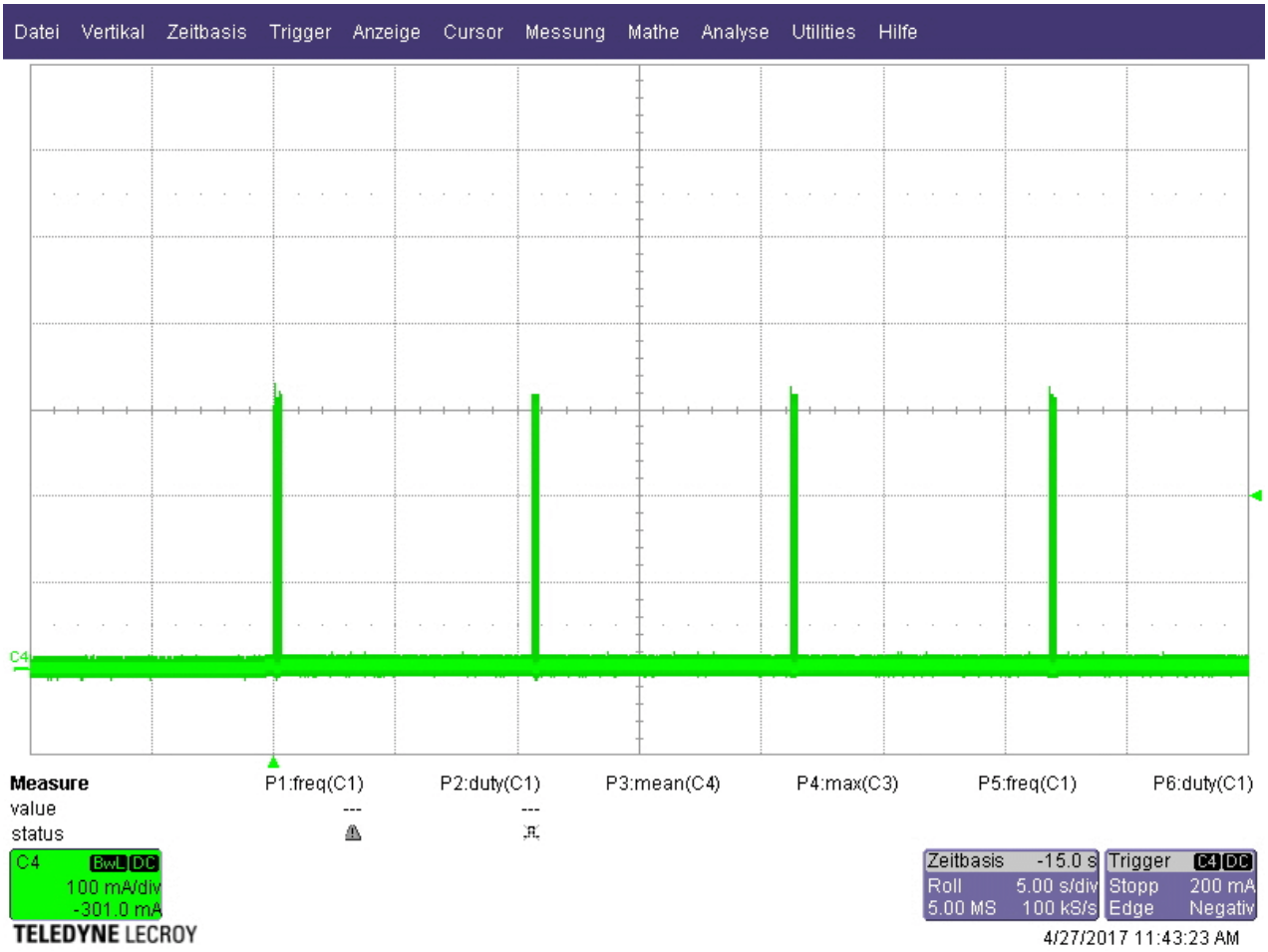
3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	Rectifying diode I_F <= 900 uA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 315 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 0,3 s / 10 s	



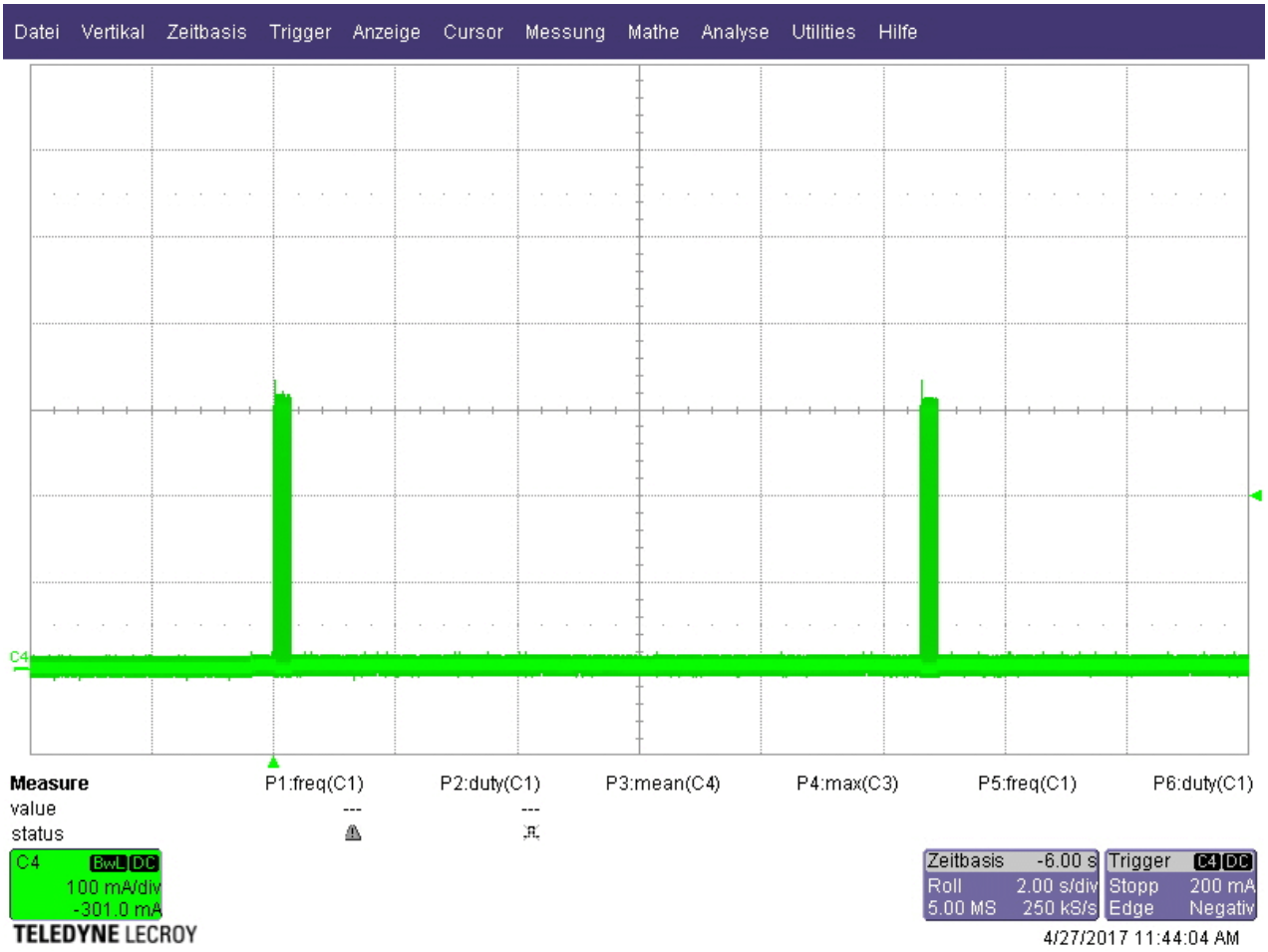
The fan has a special blocking cycle. The behavior of this cycle differs marginally between a blocked rotor when the fan gets started and a blocked rotor during the running operation of the fan. The following figures describe this characteristic.

1. Blocked rotor at the start of the fan


Datei Vertikal Zeitbasis Trigger Anzeige Cursor Messung Mathe Analyse Utilities Hilfe
C4
Measure
value
status
P1:freq(C1)

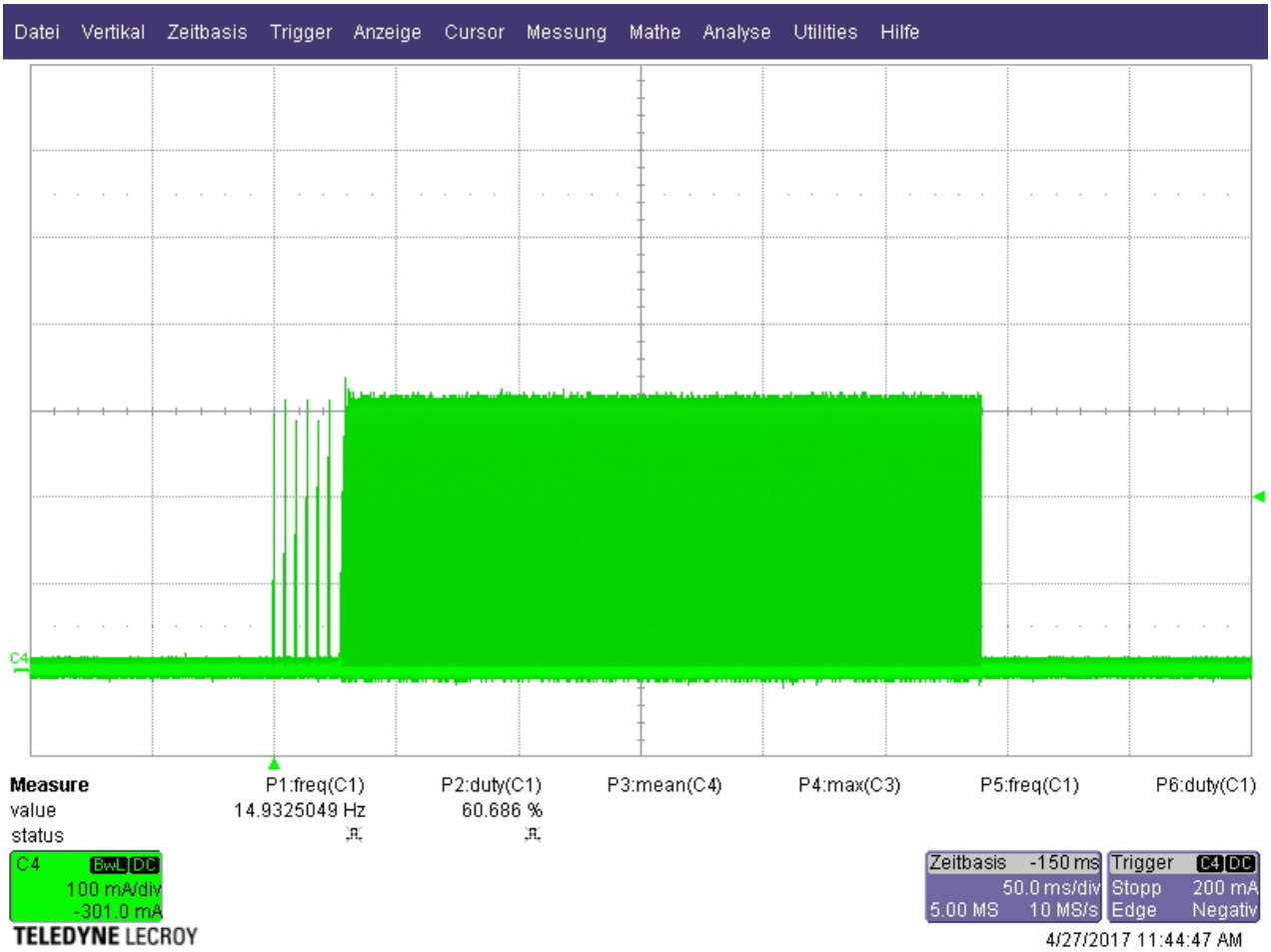
P2:duty(C1)

P3:mean(C4)
P4:max(C3)
P5:freq(C1)
P6:duty(C1)
C4 BwL DC
100 mA/div
-301.0 mA
TELEDYNE LECROY
Zeitbasis -15.0 s
Roll 5.00 s/div
5.00 MS 100 kS/s
Trigger C4 DC
Stopp 200 mA
Edge Negativ
4/27/2017 11:43:23 AM

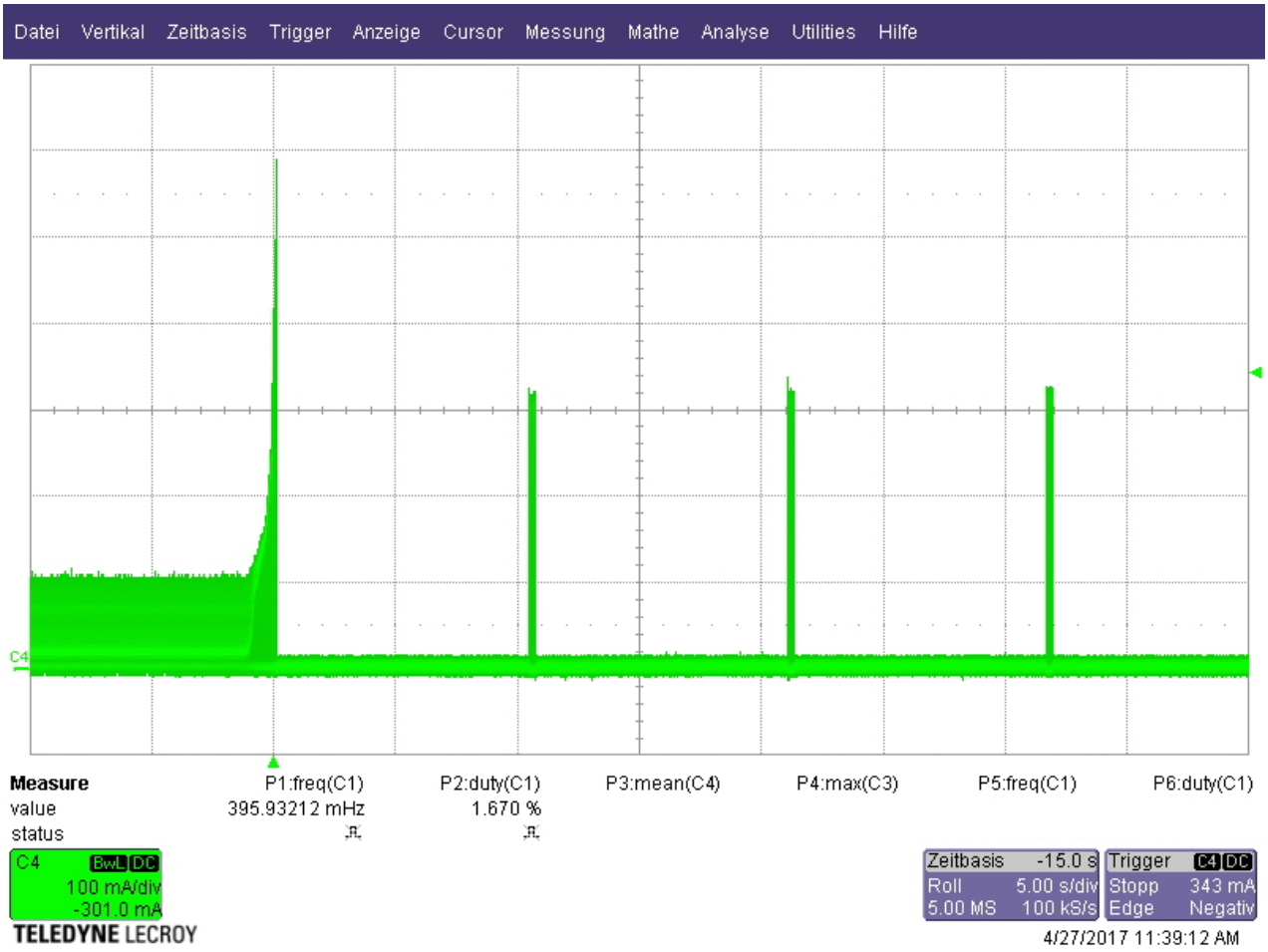

Datei Vertikal Zeitbasis Trigger Anzeige Cursor Messung Mathe Analyse Utilities Hilfe
C4
Measure
value
status
P1:freq(C1)

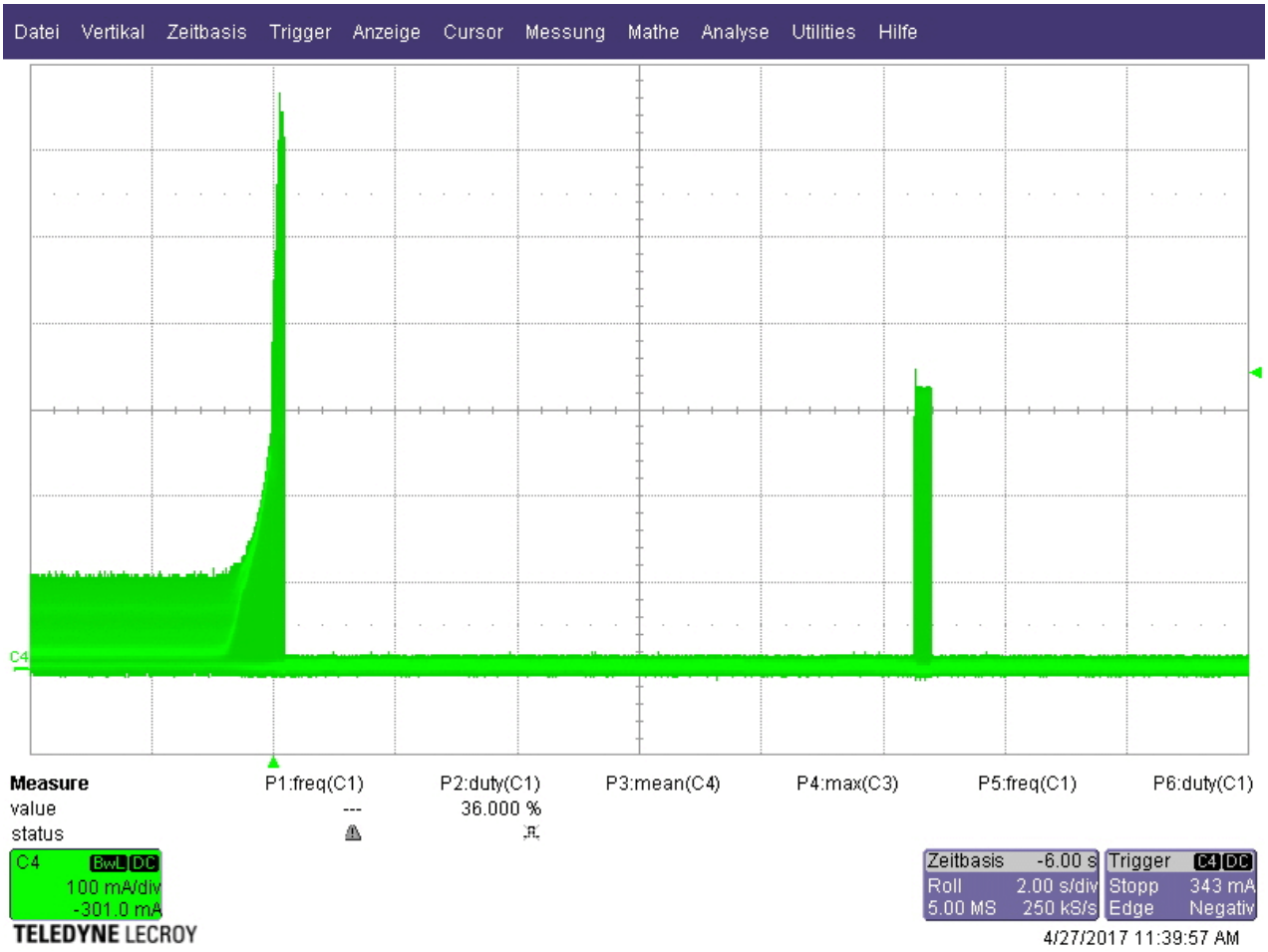
P2:duty(C1)

P3:mean(C4)
P4:max(C3)
P5:freq(C1)
P6:duty(C1)
C4 BwL DC
100 mA/div
-301.0 mA
TELEDYNE LECROY
Zeitbasis -6.00 s
Roll 2.00 s/div
5.00 MS 250 kS/s
Trigger C4 DC
Stopp 200 mA
Edge Negativ
4/27/2017 11:44:04 AM

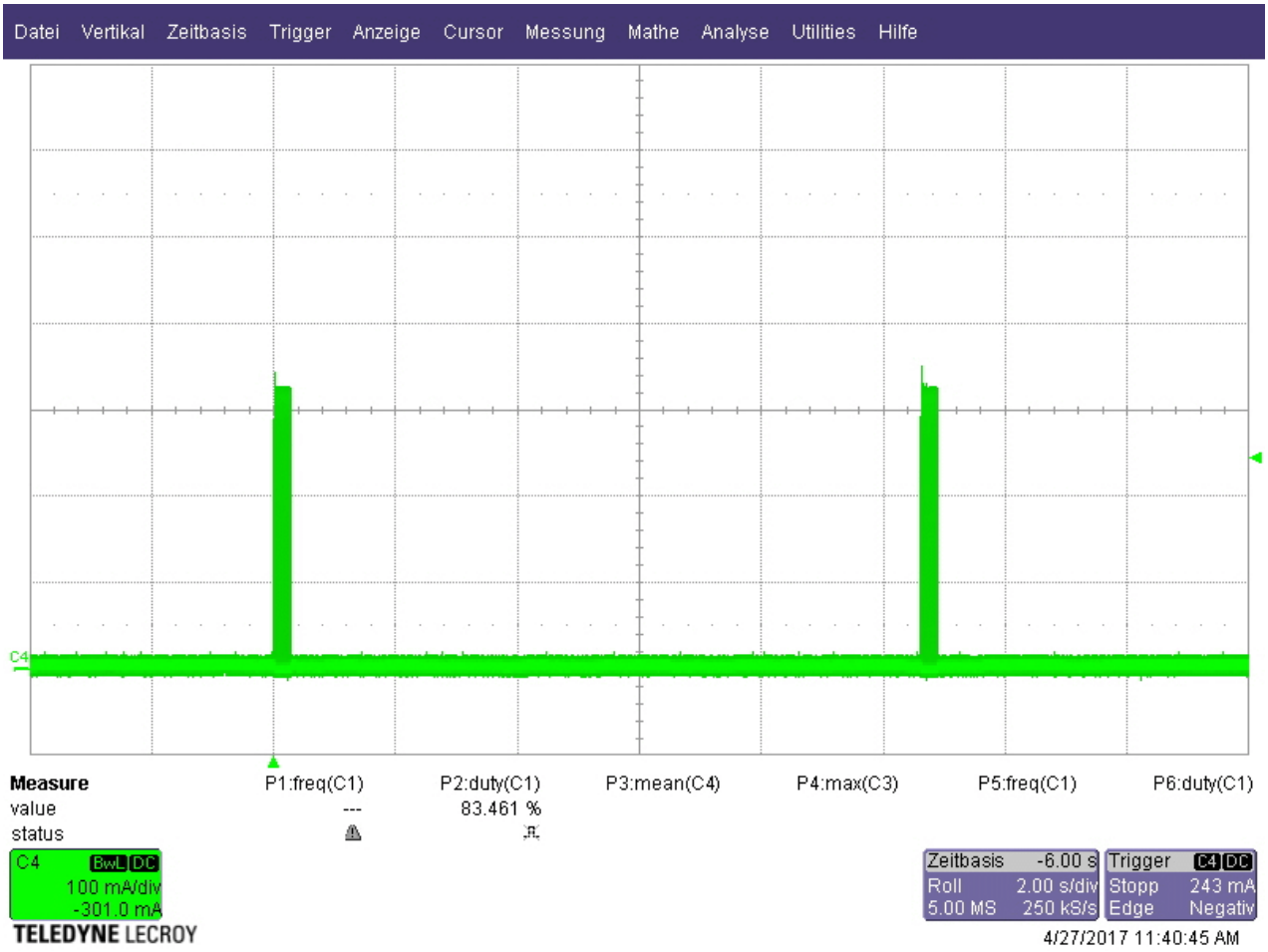


2. Blocked rotor after the normal operation of the fan

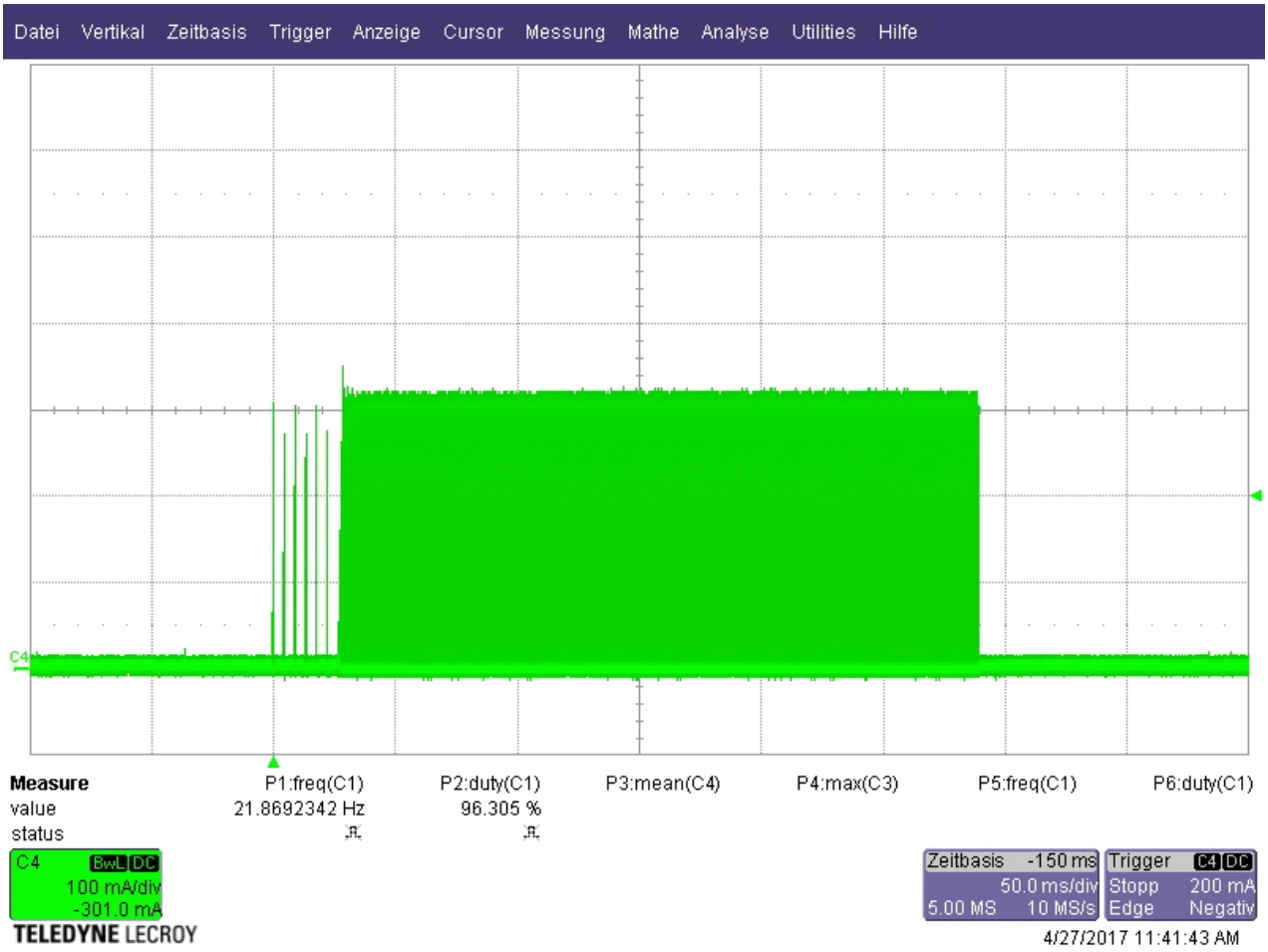

Datei Vertikal Zeitbasis Trigger Anzeige Cursor Messung Mathe Analyse Utilities Hilfe
C4
Measure
value
status
P1:freq(C1)
395.93212 mHz
P2:duty(C1)
1.670 %
P3:mean(C4)
P4:max(C3)
P5:freq(C1)
P6:duty(C1)
C4 BwL DC
100 mA/div
-301.0 mA
TELEDYNE LECROY
Zeitbasis -15.0 s
Roll 5.00 s/div
5.00 MS 100 kS/s
Trigger C4 DC
Stopp 343 mA
Edge Negativ
4/27/2017 11:39:12 AM


Datei Vertikal Zeitbasis Trigger Anzeige Cursor Messung Mathe Analyse Utilities Hilfe
C4
Measure
P1:freq(C1)
P2:duty(C1)
P3:mean(C4)
P4:max(C3)
P5:freq(C1)
P6:duty(C1)
value

36.000 %
status
C4 BwL DC
100 mA/div
-301.0 mA
TELEDYNE LECROY
Zeitbasis -6.00 s
Roll 2.00 s/div
5.00 MS 250 kS/s
Trigger C4 DC
Stopp 343 mA
Edge Negativ
4/27/2017 11:39:57 AM


Datei Vertikal Zeitbasis Trigger Anzeige Cursor Messung Mathe Analyse Utilities Hilfe
C4
Measure
value
status
P1:freq(C1)

P2:duty(C1)
83.461 %
P3:mean(C4)
P4:max(C3)
P5:freq(C1)
P6:duty(C1)
C4 BwL DC
100 mA/div
-301.0 mA
TELEDYNE LECROY
Zeitbasis -6.00 s
Roll 2.00 s/div
5.00 MS 250 kS/s
Trigger C4 DC
Stopp 243 mA
Edge Negativ
4/27/2017 11:40:45 AM


Datei Vertikal Zeitbasis Trigger Anzeige Cursor Messung Mathe Analyse Utilities Hilfe
C4
Measure
value
status
P1:freq(C1)
21.8692342 Hz
P2:duty(C1)
96.305 %
P3:mean(C4)
P4:max(C3)
P5:freq(C1)
P6:duty(C1)
C4 BwL DC
100 mA/div
-301.0 mA
TELEDYNE LECROY
Zeitbasis -150 ms
50.0 ms/div
5.00 MS 10 MS/s
Trigger C4 DC
Stopp 200 mA
Edge Negativ
4/27/2017 11:41:43 AM

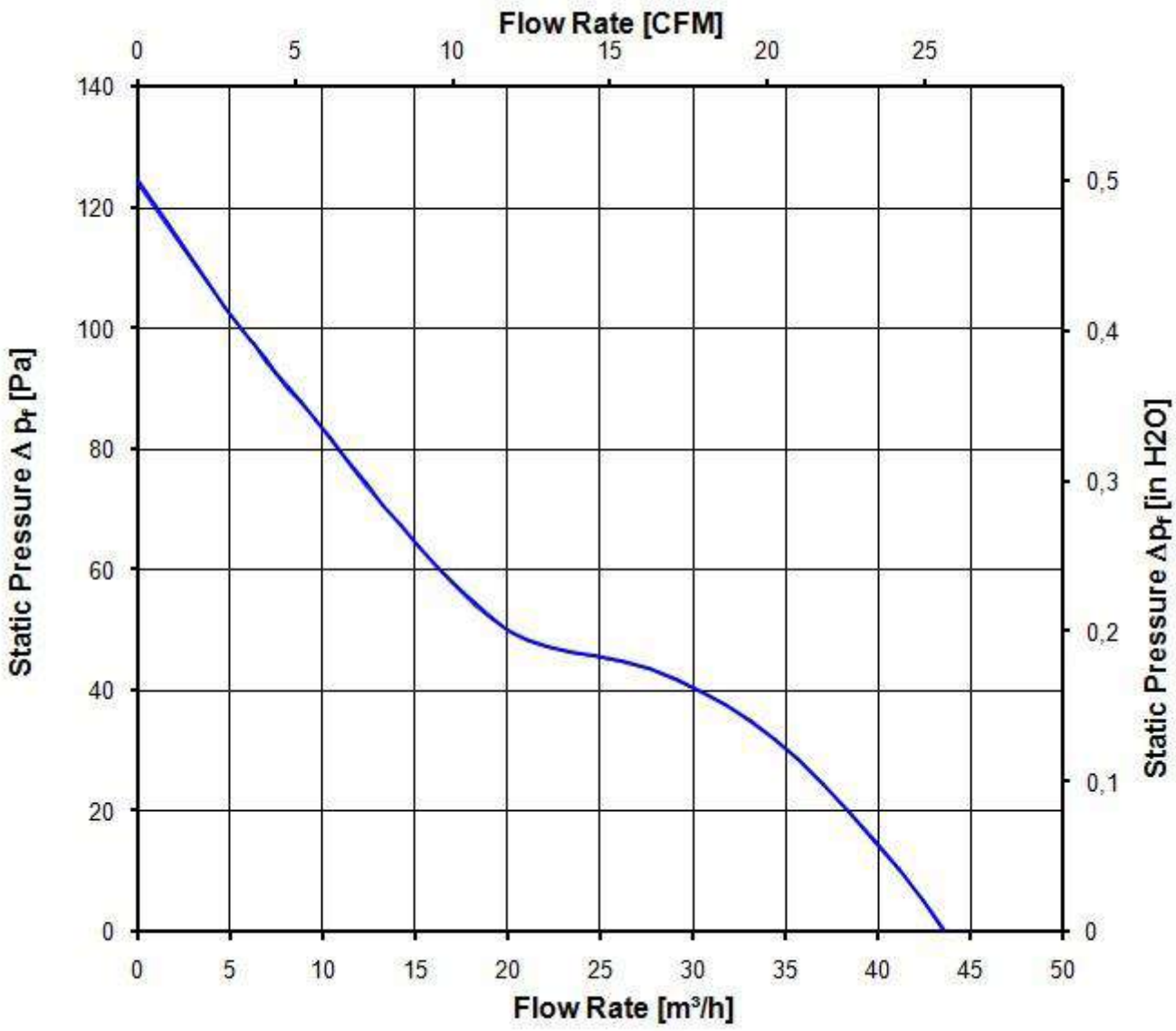
3.5 Aerodynamics

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:

6.300 1/min at free air flow	PWM >= 90 %;		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	44,0 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	125 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 Lp(A) < 5 dB(A) For further measurement conditions see chapter aerodynamics.

a.) Operation condition:

6.300 1/min at free air flow	PWM >= 90 %;		

Optimal operating point	41 m3/h @ 10 Pa	
Sound power level at the optimal operating point	5,4 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	35 dB(A)	

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-40 °C	
Max. permitted ambient temperature TU max.	70 °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. 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 / 1,5 mm	
Protection class	III	

5.2 Approval Tests

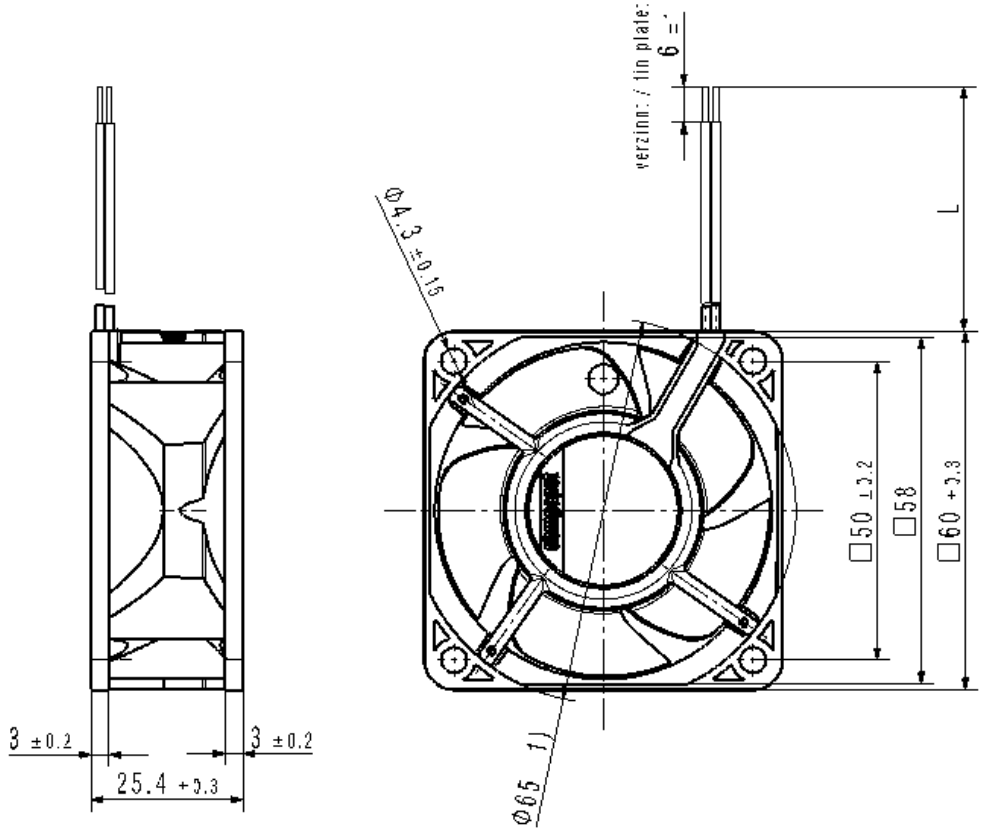
CE	EC Declaration of Conformity	Yes
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	No
VDE	Association for Electrical, Electronic and Information Technologies	No
CSA	Canadian Standards Association	No
CCC	China Compulsory Certification	Not applicable

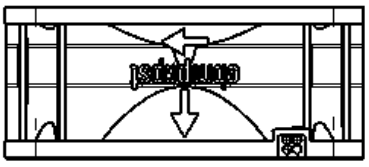
6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	85.000 h	
Life expectancy L10 at TU max.	42.500 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	142.500 h	

Anzahl und Länge der Litzen siehe BV - Blatt 1
length and number of wires see design specification page 1





1) Maße fuer Montageward / measures for mounting plate
Axia spie be Kugel agerung (K): 0 (mi: Federausgleich) /
by ballbearing (K): 0 (by pre-loaded spring)

Ä4-Status/State	Aend.-Nr./ Change No.	CATIA-System-Version/ CATIA-System-Version	CAD-Umgebung/ CAD-Environment	Werkstoff / Material:	Volumen / Volume (cm^3):
					Gewicht / Mass (g):
	92325380C* GFRI00-			Artikel / Title:	
	3D Referenzmodell / 3D Referenzmodel				
Tolerierung / Tolerances:		Datum	Name		
	Gesch./ Drawn				
Allgemeintoleranzen / Gen. Tolerances:	Gepr./ Checked			Zchg.-Nr./ Drawing No:	Ers.f.Zchg. / Replaces:
	Freig./ Release				
ebmpapst				Dok.-Art/Typ/ Type of Document	Teildok.-Nr./ (Blatt/Page)
ebm-papst St.Georgen GmbH & Co KG				Index / Index	Format / Size:
					Maßstab/Scale

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