

RER190-39/18/2TDPR-224 ebmpapst Datasheet FansCo
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RER190-39/18/2TDPR-224

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1 General

Fan type	Blower without chassis	
Rotational direction looking at rotor	clockwise	
Airflow direction	Air in axially, Air out radially	
Bearing system	Ball bearings	
Mounting position	any	

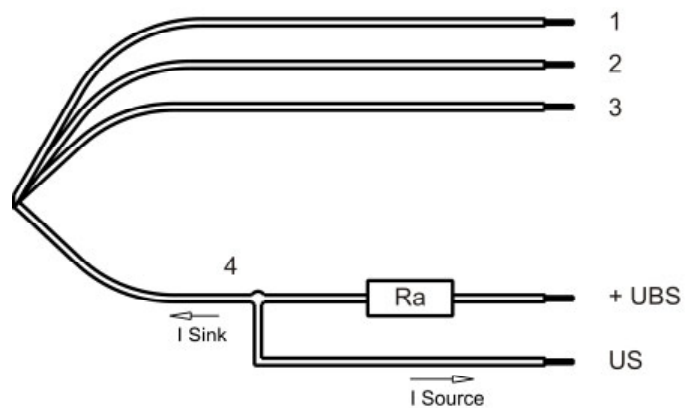
2 Mechanics

2.1 General

Depth	69 mm	
Diameter	190 mm	
Weight	0,870 kg	
Housing material	--	
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires - Plug	
Length of lead wire	see fan drawing # 9595420224 Rev C	
Tolerance		
Wire gauge (AWG)	20 22	
Insulation diameter	2,05mm 1,35mm	
Connector / contacts	see fan drawing # 9595420224 Rev C	



	Colour	Operation
Wire 1	red	+ UB
Wire 2	blue	- GND
Wire 3	violet	PWM
Wire 4	white	Tacho

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

Lead wire 1 - 2: AWG20

Lead wire 3 - 4: AWG22 (Insulation diameter 1,35mm)

3 Operating Data

3.1 Operating Data - Electrical Interface - Input

Control input	PWM
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Features

PWM - Frequency	1 kHz - 10 kHz Typical: 2 kHz
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Characteristics	Drehzahl / speed [1/min] PWM [%]
Schematics	Lüfter / Fan Kunde / Customer + UB + Interne Ref. / + Internal ref. Eingang / Input - GND

Transistor requirements:

$V_{ce \text{ max.}} = < 12 \text{ V}$; $I_{\text{sink max.}} = < 5 \text{ mA}$

$V_{ce \text{ sat.}} = < 0,15 \text{ V}$

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 rpm
7 % - 10% PWM:	800 rpm (corresponding to min. speed)
10 % - 90% PWM:	linear increasing curve
90 % - 100% PWM:	4.400 rpm (corresponding to max. speed)
7 % PWM:	800 rpm (fan on, comming from 0% PWM)
5 % PWM:	600 rpm or 0 rpm (fan 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.

Measurement setup:	Measured between two steel plates
Steel plate:	195 mm x 195 mm
Intake nozzle:	D: 125,5 mm; R: 10 mm
Distance between bottom and top plate:	80 mm
Overlapping impeller / nozzle:	2 mm

$\Delta p = 0$: corresp. to free air flow (see section 3.5)
I: corresp. to arithm. mean current value

Name	Condition
PWM 0001	PWM: 100 %;

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	36,0 V		72,0 V
Nominal voltage	$\Delta p = 0$	U_N		48,0 V	
Power consumption	$\Delta p = 0$	P	88,4 W	148,0 W	155,0 W
Tolerance	PWM 0001		+ - 10,0 %	+ - 10,0 %	+ - 10,0 %
Current consumption	$\Delta p = 0$	I	2.440 mA	3.080 mA	2.150 mA
Tolerance	PWM0001		+ - 10,0 %	+ - 10,0 %	+ - 10,0 %
Speed	$\Delta p = 0$	n	3.720 rpm	4.400 rpm	4.400 rpm
Tolerance	PWM 0001		+ - 10,0 %	+ - 5,0 %	+ - 5,0 %
max. allowed input voltage ripple (within the specified voltage range)			+ - 3 %		
max. allowed input voltage ripple (within the specified voltage range)			>= 50 Hz		

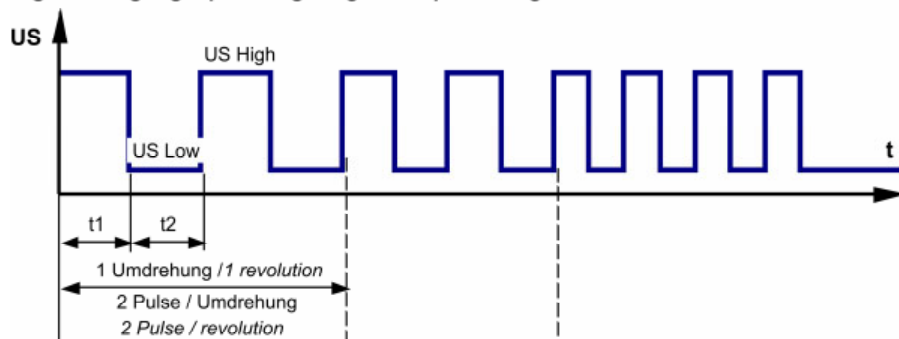
Name	Condition		
PWM 0002	PWM: 50 %;		

Features	Condition	Symbol	Values		
Voltage range	$\Delta p = 0$	U	36,0 V		72,0 V
Nominal voltage	$\Delta p = 0$	U_N		48,0 V	
Power consumption	$\Delta p = 0$	P	31 W	31 W	33 W
Tolerance	PWM 0002		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Current consumption	$\Delta p = 0$	I	880 mA	650 mA	460 mA
Tolerance	PWM 0002		+/- 10,0 %	+/- 10,0 %	+/- 10,0 %
Speed	$\Delta p = 0$	n	2.600 rpm	2.600 rpm	2.600 rpm
Tolerance	PWM 0002		+/- 5,0 %	+/- 5,0 %	+/- 5,0 %

3.3 Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)
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Signal-Ausgangsspannung / Signal output voltage



$$R_a = \frac{U_{BS} - U_{S \text{ Low}}}{I_{\text{Sink}}}$$

Lüfter-Drehzahl / Fan speed



Features	Note	Values
Tacho operating voltage (UBS)		$\leq 60,0 \text{ V}$
Tacho signal Low	I sink: 2 mA	$\leq 0,4 \text{ V}$
Tacho signal High	I source: 0 mA	$\leq 60,0 \text{ V}$
Maximum sink current		$\leq 20 \text{ mA}$
External resistor	External resistor R_a from UBS to US required. All voltages measured to GND.	
Tacho frequency	$(2 \times n) / 60$	147 Hz
Tacho isolated from motor	No	
Slew rate		$\Rightarrow 0,5 \text{ V/us}$

Please note:

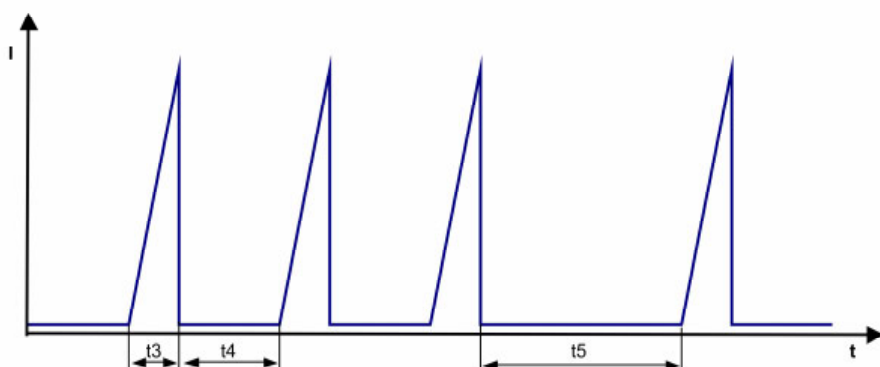
At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.

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

Alarm type	None
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3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection	P-CH FET	
Max. residual current at U_n	IF $\leq 5 \text{ mA}$	
Locked rotor protection	Auto restart	
Locked rotor current at U_n	approx. 1.700 mA	
Clock signal t3/t4 at locked rotor	Typical: 4,6 s / 10,0 s	



Locked rotor signal t5:

After 4 failed start-ups there is an extended timeout of 40,0s.

3.5 Aerodynamic

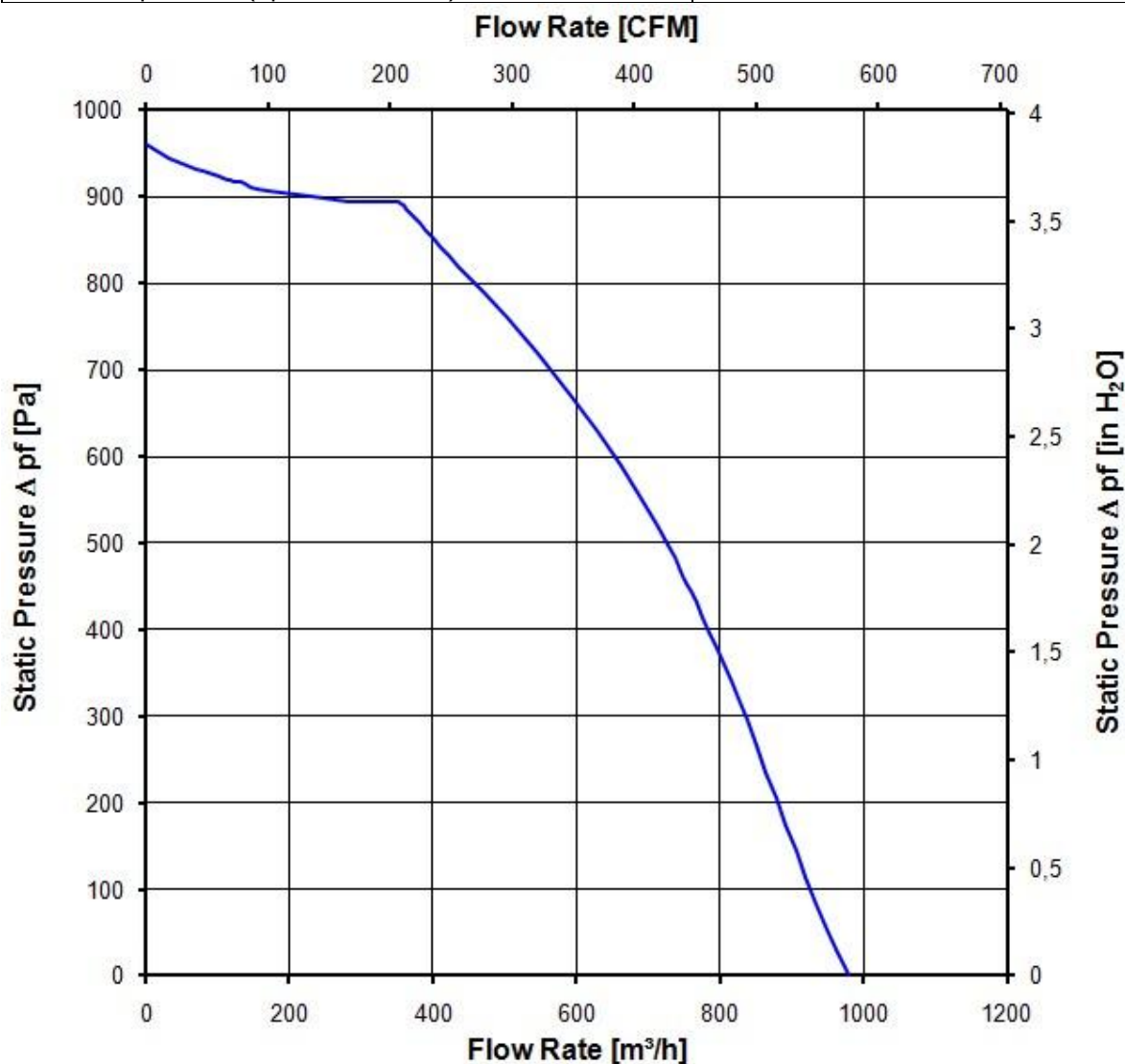
Measurement conditions: Measured with a double chamber intake rig acc. to DIN EN ISO 5801.
Normal air density = 1,2 kg/m³; Temperature 23°C +/- 3°C;
In the intake and outlet area should not be any solid obstruction within 0,5 m.

Measurement setup:	Measured between two steel plates
Steel plate:	195 mm x 195 mm
Intake nozzle:	D: 125,5 mm; R: 10 mm
Distance between bottom and top plate:	80 mm
Overlapping impeller / nozzle:	2 mm

a.) Operation condition:

4.400 rpm at free air flow	PWM 100 %		
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Max. free-air flow ($\Delta p = 0$ / $\dot{V} = \max.$)	980,0 m ³ /h	
Max. static pressure ($\Delta p = \max.$ / $\dot{V} = 0$)	960 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 section 3.5

a.) Operation condition:

4.400 rpm at free air flow	PWM 100 %		
Optimal operating point	640,0 m ³ /h @ 550 Pa		
Sound power level at the optimal operating point	8,0 bel(A)		

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	65 °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	
Radiation exposure	None	
Dust requirements	Dust check; according to DIN EN 60068-2-68, 6g/m ² d, 1 day	
Salt fog requirements	None	
Harmful gas requirements	None	

*) Permitted application area:

The product is for the use in sheltered rooms with limited controlled temperature. Occasionally condensed water is allowed. Directly exposure to water must be avoid. Saline ambient conditions must be avoid.

Pollution degree 2 (according DIN EN 60664-1)

It occurs only non-conductive pollution. Occasionally, temporary conductivity caused by condensation occurs.

4.3 Mechanical requirements

See fan drawing # 9595420224 Rev C.

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.	1000 VAC / 1 Min. 1000 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	
Air and leakage distances	1,0 mm / 1,5 mm	
Protection class	I	

5.2 Approval Tests

CE	Yes
UL (approved at UL testhouse)	Yes
UL (approved at CSA testhouse)	Yes / UL audited by CSA according to UL507, Electric Fans
VDE	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment - Part 1 Safety - Connection to a SELV circuit.
CSA	Yes / C22.2 No. 113-M1984 Fans and Ventilators
CCC	Yes

The approval tests are observed to:

Maximal permitted operating voltage (see section 3.1) and max. permitted ambient temperature TU max.

6 Reliability

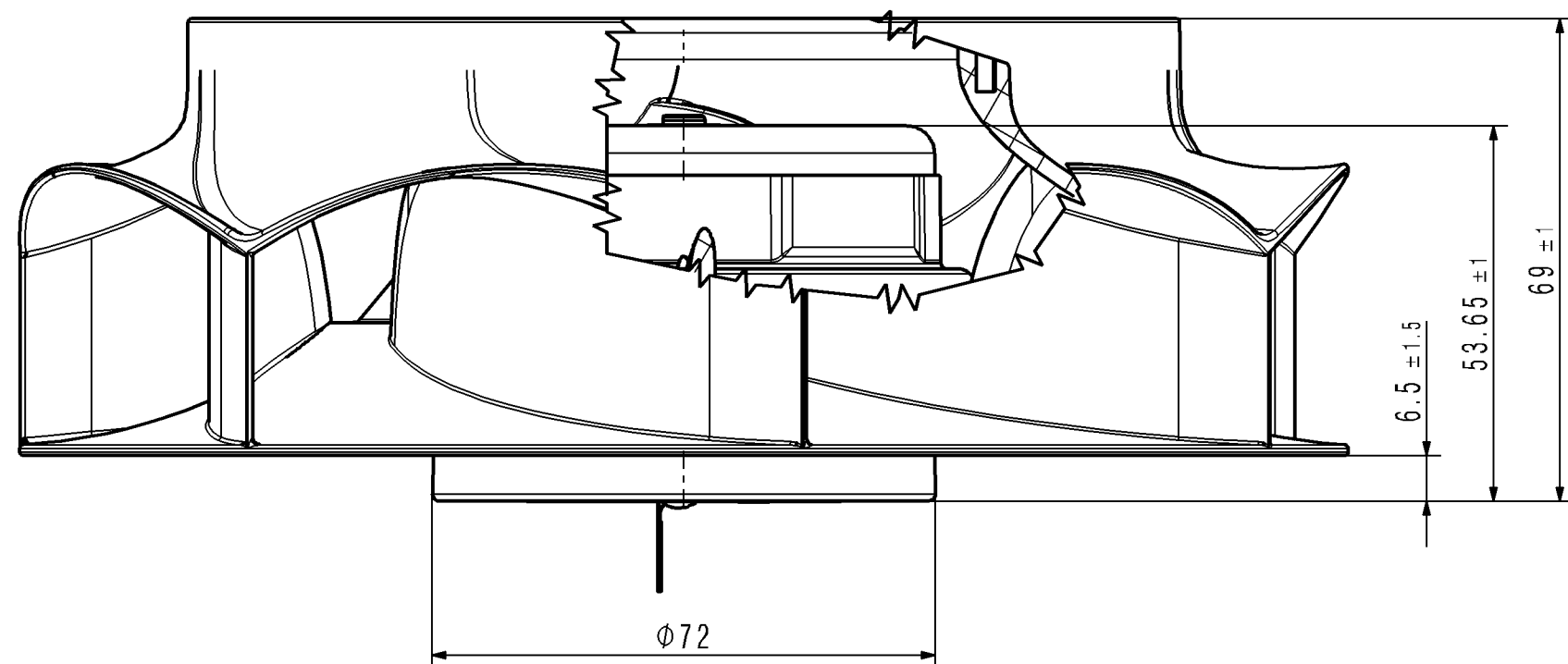
6.1 General

Life expectancy L10 at TU = 40 °C	60.000 h	
Life expectancy L10 at TU max.	32.500 h	
Life expectancy L10 delta (40 °C)	115.000 h	

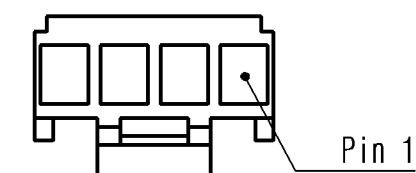
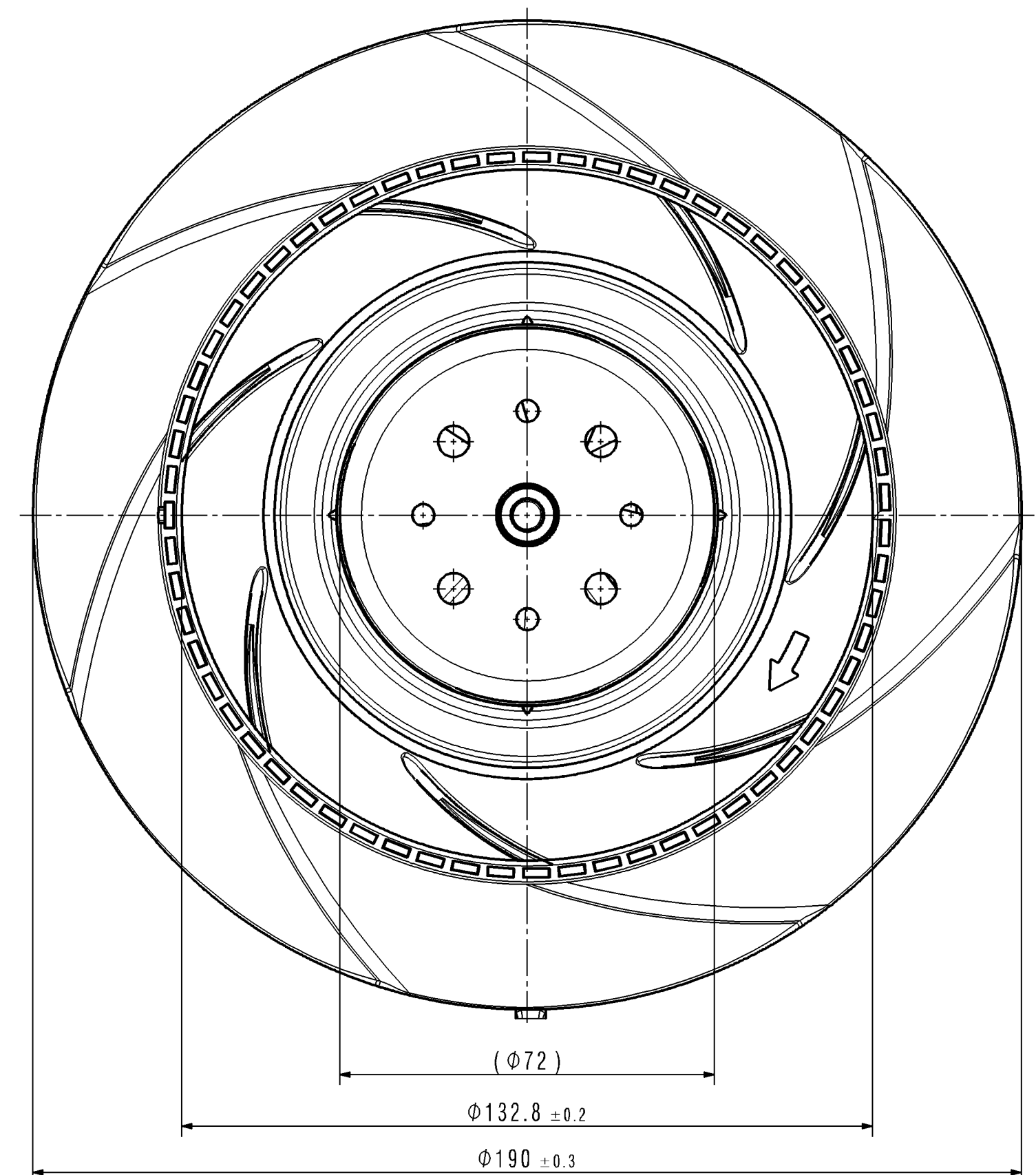
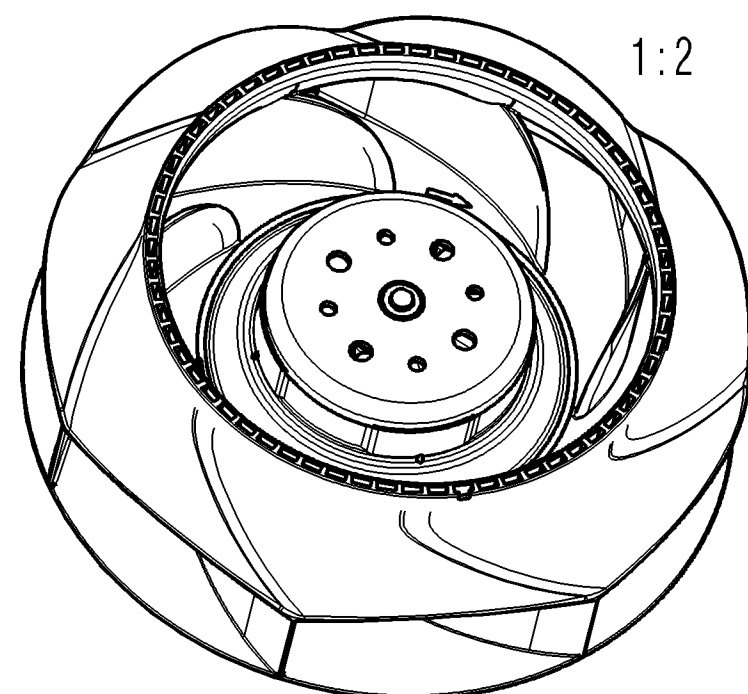
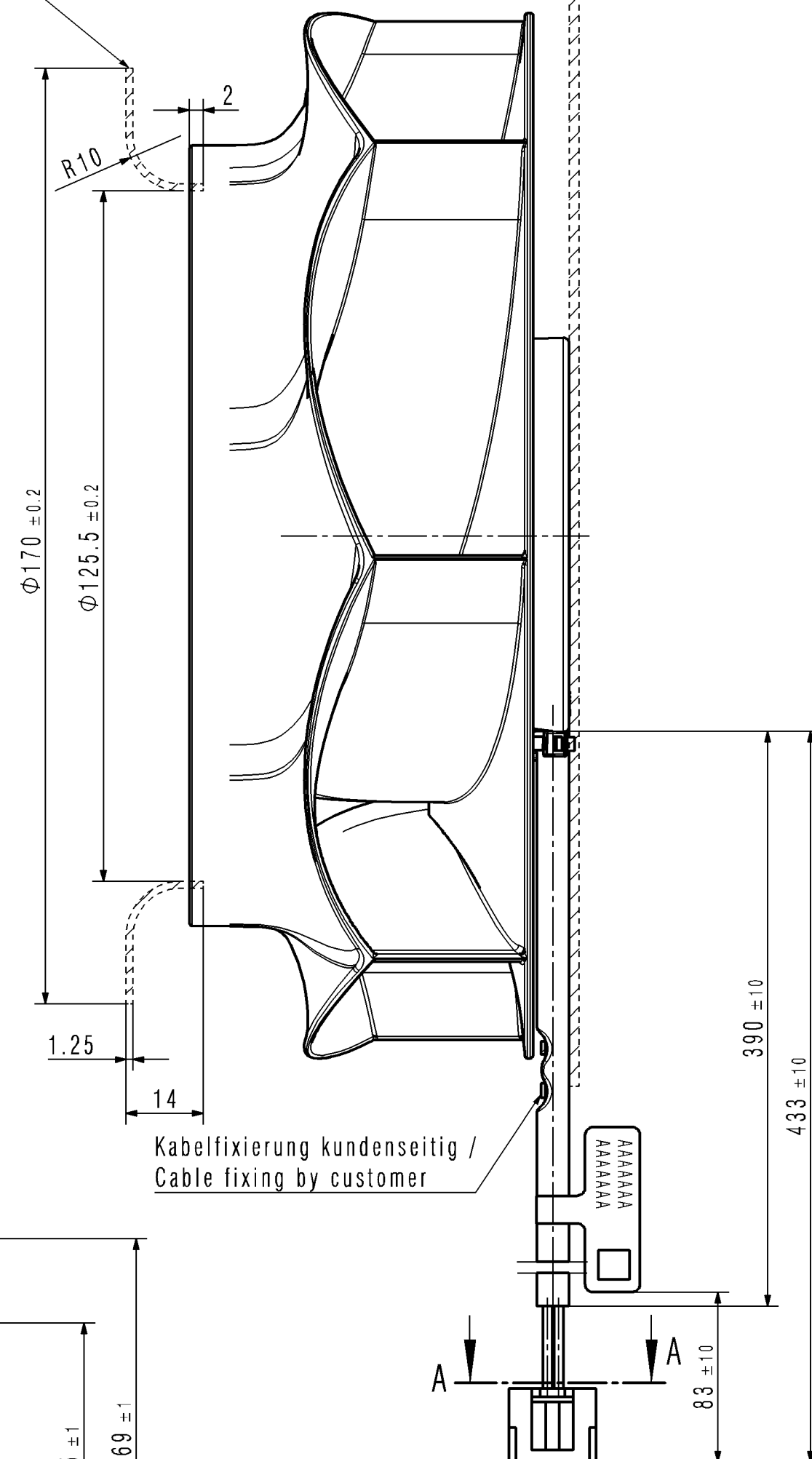
6.2 ABB Temperature Map (25% each of: 20°C – 30°C – 40°C – 50°C)

Life expectancy L10 at OP ~ 700m3/h @ 400-450Pa	87.500 h	
Life expectancy L5 at OP ~ 700m3/h @ 400-450Pa	70.000 h	
Life expectancy L3 at OP ~ 700m3/h @ 400-450Pa	52.500 h	

Schutzvermerk nach DIN ISO 16016 beachten!
Refer to protection notice DIN ISO 16016!



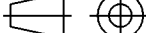
Einlassdüse und Befestigungsplatte kundenseitig intake nozzle and mountig plate provided by customer



A-A
2:1

Steckergehäuse
plug housing
J.S.T. VHR-4N
Kontakt / contact
J.S.T. SVH-21T-P1.1

Pin	Pin Belegung pin configuration	
1	rot / red	+ UB
2	bau / blue	-GND
3	weiß / white	Tacho
4	violett / violet	PWM

FR		122378		V5819		PAPST		Werkstoff / Material: -		Volumen / Volume (mm³):	
SAP-Status/State		Aend.-Nr. / Change-No.		CATIA-Version/ CATIA-System-Version		CAD-Umgebung / CAD-Environment				Gewicht / Mass (g):	
				95942022 CFF000 - 4222410589 CFA001 -							
				3D-Referenzmodell / 3D-Referenzmodell							
Tolerierung / Tolerances:				Datum		Name		Artikel / Title:			
Size ISO 14405 				Bearb. / Drawn		22.07.2013 LAUFER		Radialgebläse RER190-39			
Allgemeintoleranzen / Gen. Tolerances:				Bearb. / Checked		24.07.2013 LAUFER		Radial Blower			
DIN ISO 2768-mK				Freig. / Released		30.07.2013 KIENINGER		Zchg.-Nr. / Drawing No:		Ers.f.Zchg. / Replaces:	
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