Product Data Sheet

9594314005
VBS0120XUJCS
RER120-26/18/2TDMP-005

ebmpapst
The engineer's choice

GREEN TECH

RER120-26/18/2TDMP-005

INDEX

1 General

Fan type	Blower without chassis with intake nozzle	
Rotating direction looking at rotor	Clockwise	
Airflow direction	Air in axially, Air out radially	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

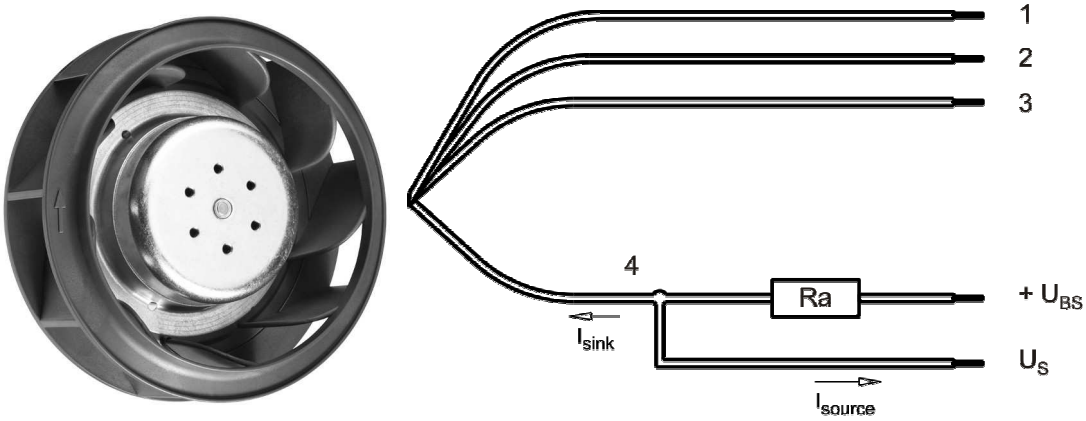
2 Mechanics

2.1 General

Depth	54,0 mm	
Diameter	120,0 mm	
Mass	0,430 kg	
Housing material		
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 310 mm +- 10,0 mm	
Tube length Tolerance	S = 65 mm +- 5,0 mm	



Wire	Color	Operation	Wire size	Insulation diameter
1	red	+ UB	AWG 22	1,70 mm
2	blue	- GND	AWG 22	1,70 mm
3	violet	PWM	AWG 22	1,70 mm
4	white	Tacho	AWG 22	1,70 mm

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

3 Operating Data

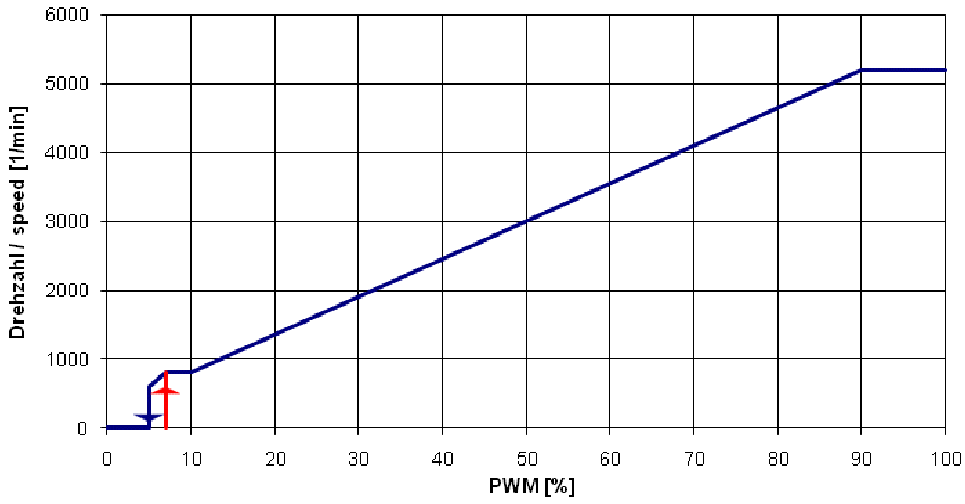
3.1 Electrical Interface - Input

Control input	PWM

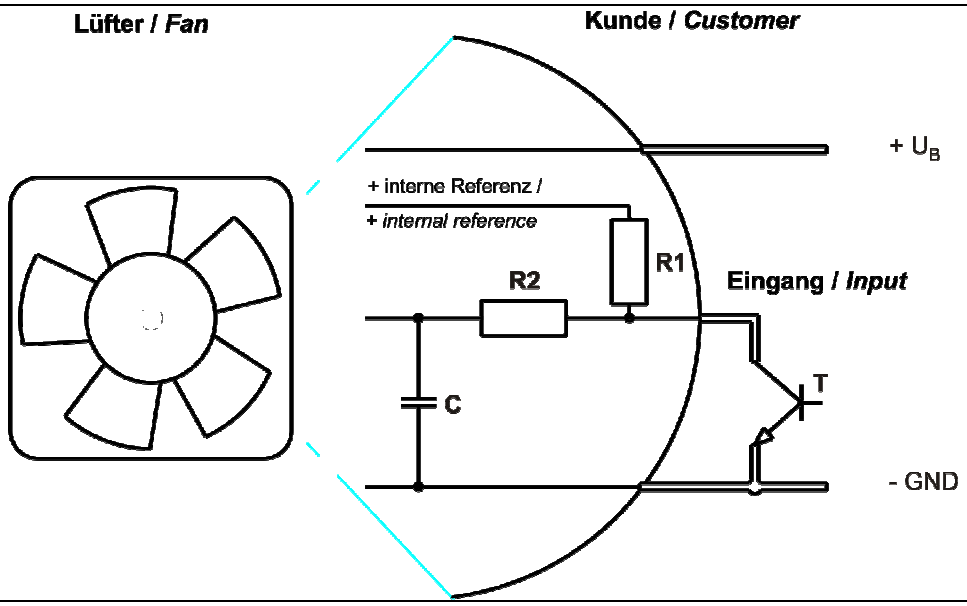
Features

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

Characteristics



Schematics



Speed control:
By Puls width modulation (PWM) 0 ... 100%
Open collector in relation to signal-ground

Information to the curve:

0 % - 7% PWM: 0 1/min
7 % - 10% PWM: 800 1/min (corresponding to min. speed)
10 % - 90% PWM: linear increasing curve
90 % - 100% PWM: 5.200 1/min (corresponding to max. speed)
7 % PWM: 800 1/min (Fan on, comming from 0% PWM)
5 % PWM: 600 1/min bzw. 0 1/min (Fan off, comming from 100% PWM)

3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m3; Temperature 23℃ +/ - 3℃; 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:	140 mm x 140 mm
Intake nozzle:	D: 96 mm; R: 16 mm
Distance between bottom and top plate:	70 mm
Overlapping impeller / nozzle:	2 mm

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

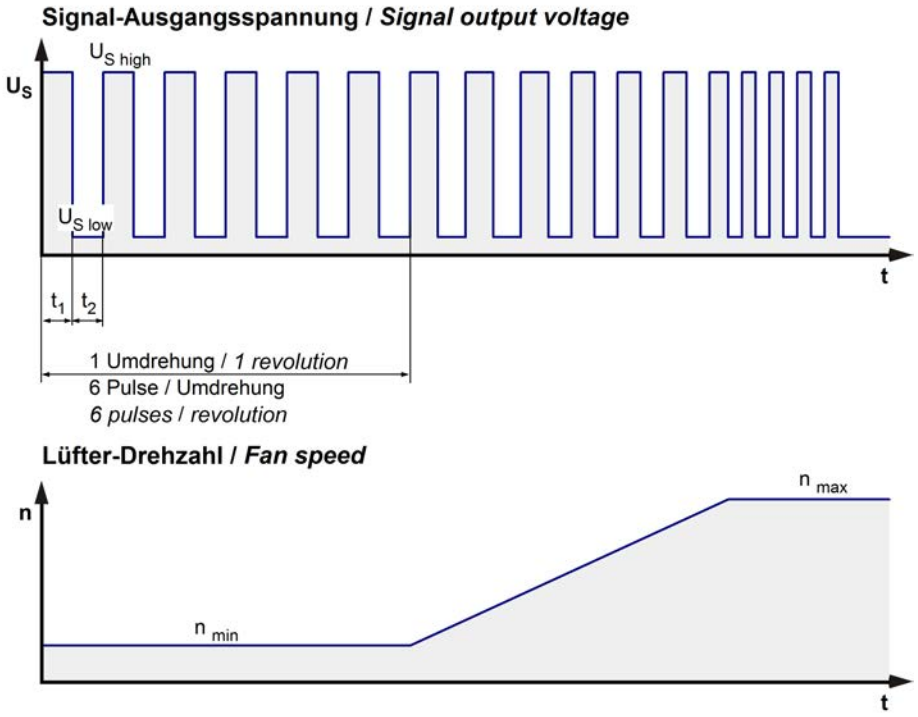
Name	**Condition**		
PWM 0001	PWM: 100 %; f: = 2 kHz		

100% PWM or broken lead wire (open control input)
The data at 50%PWM are no FK features and need not be tested.

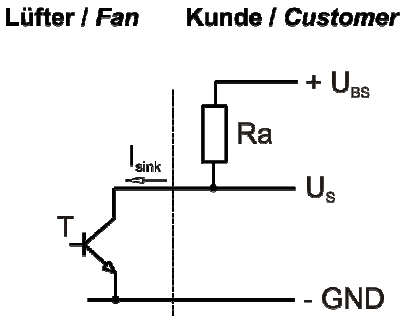
Features	**Condition**	**Symbol**	**Values**		
Voltage range		U	36 V		60 V
Nominal voltage		U_N		48 V	
Power consumption Tolerance	$\Delta p = 0$ PWM 0010	P	40 W +- 10,0 %	53 W +- 10,0 %	52 W +- 10,0 %
Current consumption Tolerance	$\Delta p = 0$ PWM0010	I	1.100 mA +- 10,0 %	1.100 mA +- 10,0 %	860 mA +- 10,0 %
Speed Tolerance	$\Delta p = 0$ PWM 0010	n	4.780 1/min +- 5 %	5.200 1/min +- 5 %	5.200 1/min +- 5 %

3.3 Electrical Interface - Output

Tacho type	/2 (open collector)



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



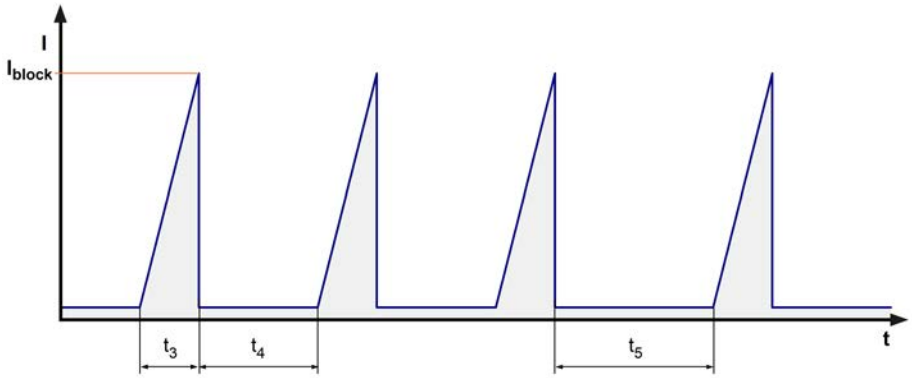
Features		Note	Values
Tacho operating voltage	U_{BS}		<= 60,0 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<=0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	<=60,0 V
Maximum sink current	I_{sink}		<= 20 mA
Maximum source current			0 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(6 x n) / 60	
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

n = revolutions per minute (1/min)

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.

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	N-CH FET I_F <= 5 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 1.000 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 4,6 s / 10,0 s	



Locked rotor signal t5:

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

Internal Fuse:
Littelfuse NANO2(R) FUSE; Very fast acting 451 Series; 2,5 A

3.5 Aerodynamics

Measurement conditions:

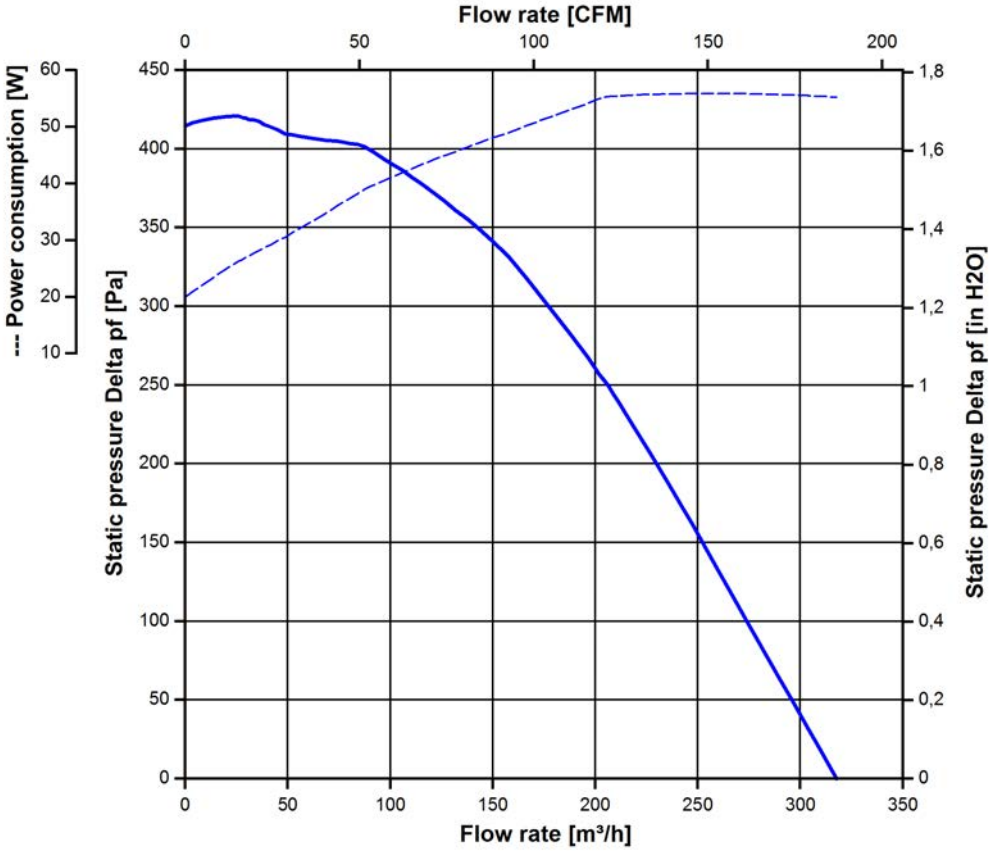
Measured with a double chamber intake rig acc. to DIN EN ISO 5801.
Normal air density = 1,2 kg/m3; Temperature 23℃ +/ - 3℃;
In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.
The information is only valid under the specified test conditions and may 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.

Measurement setup:	Measured between two steel plates
Steel plate:	140 mm x 140 mm
Intake nozzle:	D: 96 mm; R: 16 mm
Distance between bottom and top plate:	70 mm
Overlapping impeller / nozzle:	2 mm

a.) Operation condition:

5.200 1/min at free air flow	PWM 100 %; f: = 2 kHz		

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	318,0 m3/h	
Max. static pressure (Δp = max. / $\dot{V}$ =0)	415 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:

5.200 1/min at free air flow	PWM 100 %; f: = 2 kHz		

Optimal operating point	0,0 m3/h @ 386 Pa	
Sound power level at the optimal operating point	7,8 bel(A)	
Sound pressure level at free air flow, measured in rubber bands		

4 Environment

4.1 General

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

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℃. 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℃ 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	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	Yes / GB 12350 Safety Requirements for small Power Motors

The approval tests are observed to:
U approval max.:60 V @ TU approval max.: 60 ℃

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 ℃	65.000 h	
Life expectancy L10 at TU = 60 ℃	40.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 ℃	110. 000 h