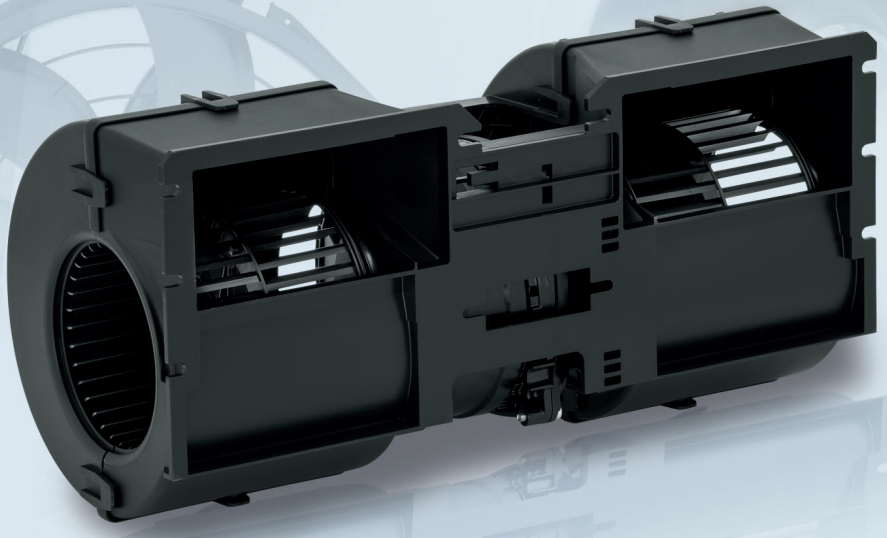
Automotive brushless DC fans for commercial vehicles

version 2014-10

ebmpapst

The engineer's choice



GREEN TECH

Automotive
brushless DC fans for commercial vehicles

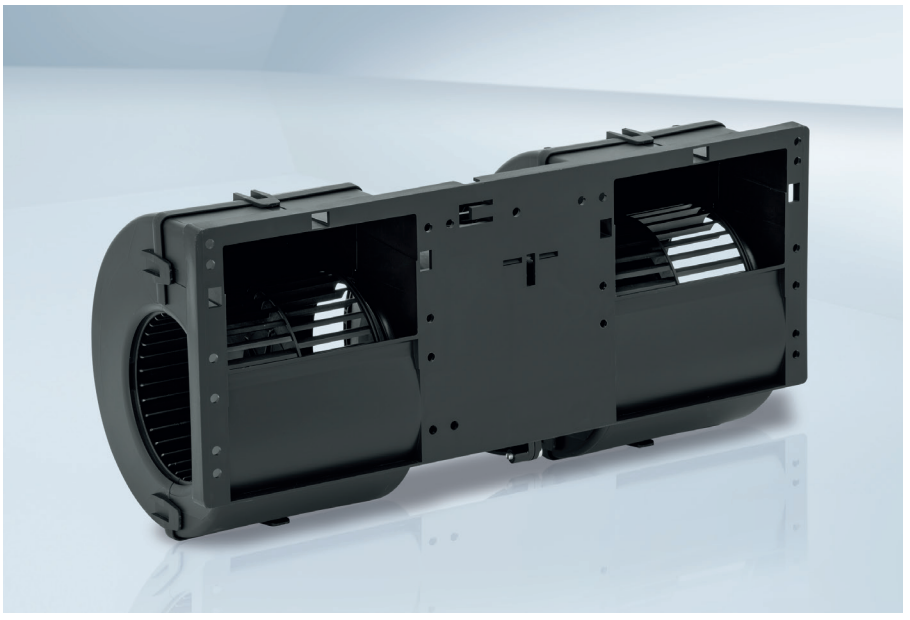
Our automotive brushless DC (BL-DC) axial fans and BL-DC dual centrifugal fans with housing set the trend in commercial vehicle climate control.

They not only fulfil today's increased expectations for comfort, for example in buses, they also work without wear – because they are brushless – for over 40,000 hours.
No extra maintenance, no additional service required.

That is the reliability you expect from ebm-papst.

Advantages and characteristics in a glance

- Over 40,000 operating hours
- Continuous speed control
- High efficiency
- Low noise emission due to aerodynamically optimised impellers
- Increased reliability due to high integration density of the electronics
- Can be retrofitted to existing systems
- Meet the highest EMC requirements
- Control characteristic can be parameterised
- Optimised voltage independence
- Extended temperature range
- Durable ball bearings



EC dual centrifugal blowers: for maximum performance with the smallest installation space; easy to control and extremely quiet.

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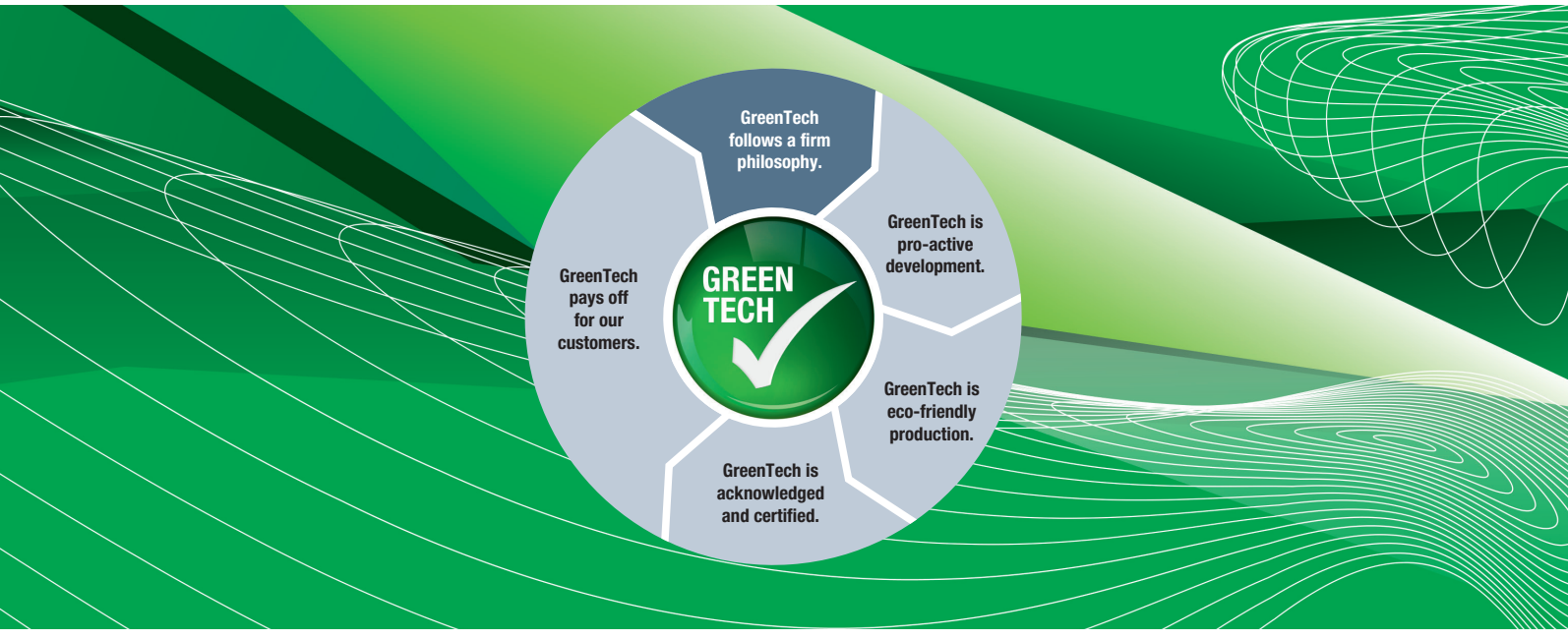
Sustainability is at the centre of our thoughts and actions. Out of conviction!

Eco-friendliness and sustainability have always been at the core of our thoughts and actions. For decades, we have worked according to the simple but strict creed of our co-founder Gerhard Sturm: “Each new product we develop has to be better than the last one in terms of economy and ecology.” GreenTech is the ultimate expression of our corporate philosophy.

GreenTech is pro-active development.
Even in the design phase, the materials and processes we use are optimised for the greatest possible eco-friendliness, energy balance and – wherever possible – recyclability. We continually improve the material and performance of our products, as well as the flow and noise characteristics. At the same time, we significantly reduce energy conumption. Close co-operation with universities and scientific institutes and the professorship we endow in the area of power engineering and regenerative energies allows us to profit from the latest research finings in these fields – and at the same time ensure highly qualified young academics.

GreenTech is eco-friendly production.
GreenTech also stands for maximum energy efficiency in our production processes. There, the intelligent use of industrial waste heat and groundwater cooling, photovoltaics and, of course, our own cooling and ventilation technology are of the utmost importance. Our most modern plant, for instance, consumes 91% less energy than currently specified and required. In this way, our products contribute to protecting the environment, from their origin to their recyclable packaging.



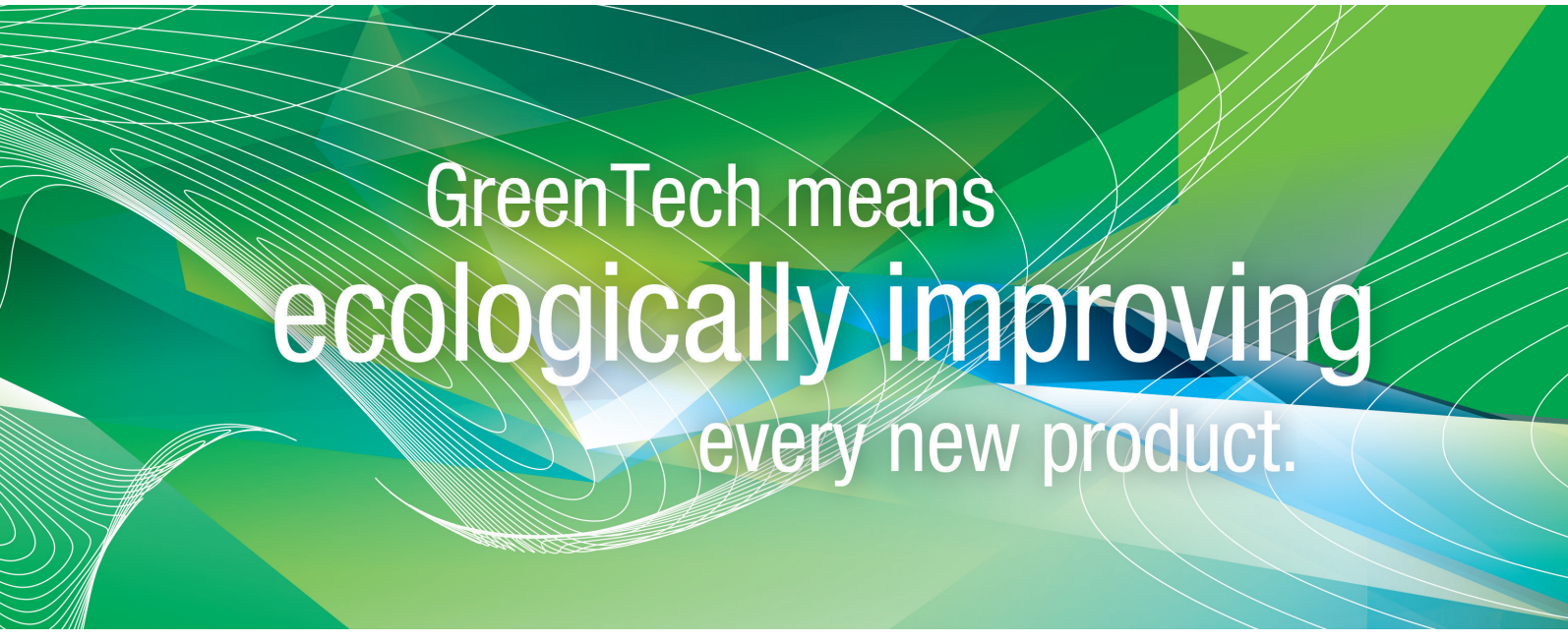
GreenTech is acknowledged and certified.

Every step in our chain of production meets the stringent standards of environmental specialists and the public.

This supports our position as Germany‘s most sustainable company 2013, as does the DEKRA Award 2012 we received in the category “Umwelt – Herausforderung Energiewende / Environment – Challenge: Transition to more sustainable energy systems”, to name only a few of a large number of examples. The environmental advantage gained in the performance of the products developed from our GreenTech philosophy can also be measured in the fulfillment of the most stringent energy and environmental standards. In many instances, our products are already well below the thresholds energy legislation will impose a few years from now – several times over.

Our customers profit from this every day.

The heart of GreenTech is future-oriented EC technology from ebmpapst. The EC technology at the core of our most efficient motors and fans allows efficiency of up to 90%, saves energy at a very high level, significantly extends service life and makes our products maintenance-free. These values pay off not only for the environment, but every cent also pays off for the user! All ebm-papst products – even those for which GreenTech EC technology does not (yet) make sense from an application viewpoint – feature the greatest possible connection of economy and ecology.



Ideas for technological change in commercial vehicles

A comfortable environment in commercial vehicles is by no means just a matter of amenities. Both passenger transportation in buses and coaches along with trucking that is as free of stress and fatigue as possible place high demands on vehicle technology, particularly climate control, ventilation and air-conditioning.

For many years, renowned bus manufacturers have installed air-conditioning systems with brushless and wear-free centrifugal blowers and axial fans from ebm-papst. These products have also come to be used widely for climate control and ventilation of driver's cabs in trucks, tractors and construction equipment as well as in transport refrigeration systems.

A wide variety of climate control system manufacturers rely the experience and excellent skills of ebm-papst in our core competencies of motor development, aerodynamics and electronics.

Meeting high demands with new technology:
In modern commercial vehicles, EC technology has now become the standard. Our new second-generation EC axial fans and EC dual centrifugal blowers set the trend in commercial vehicle climate control around the world. Our EC fans demonstrate their clear superiority even in hot climates and tropical regions, where they have also already proven their excellent performance.
But customers rely on ebm-papst products not only in the area of climate control. Increasingly, EC fans are also finding application in the cooling of heat exchangers in the engine compartment of vehicles.

Fans and blowers:
for commercial vehicle climate control and cooling of individual components.

But ebm-papst offers even more:
If you are ever unable to find a solution with our products, contact us. As a highly competent consultant and practically oriented implementer, we will certainly be able to identify a solution in your case using our in-depth knowledge gained from many applications.

In comparison:
In commutator motors from other manufacturers, the commutator performs the task of distributing current to the coils. The commutator consists of copper segments embedded in an insulating compound. Mechanical springs press the integrated carbon brushes onto the commutator. The friction between these two mechanical components is the weak point of conventional DC motors. After a running time of approximately 5,000 hours, the carbon brushes and the commutator are worn out. As a result, the entire blower needs to be replaced. Furthermore, open loop speed control is possible only with external electronics.

This is not true of brushless DC motors from ebm-papst. An electronic control integrated directly into these motors assumes the task of current distribution. No brushes means no parts to wear out. This increases the operating time of these motors to more than 40,000 hours. As a result, the user not only saves on spare parts and repair costs, but also avoids unproductive downtimes and potential damage to reputation.

EC motors are energy-efficient, since the integrated electronics use continuous closed loop speed control to draw from the vehicle electrical system only the energy actually required. In commercial vehicle applications, it is also important that fans withstand environmental influences wich are constantly fluctuating. Standard products would provide less than satisfactory results in these situations. Therefore, ebm-papst automotive products also feature reliable protection against load dump, reverse polarity, shock and vibration as well as damage from moisture and dirt in a wide temperature range.

This requires exceptional effort when selecting materials and testing the products. We use extreme tests, which we have designed together with market-leading OEMs, based on real-world conditions (such as salt spray fog, vibration and temperature change tests) to ensure the performance of the fans.

In addition to the significantly longer service life, our intelligent EC fans guarantee extended open and closed loop control options. The function of the fans can be determined at any time via a diagnostic output. Moreover, they have an excellent electromagnetic compatibility and operate extremely quietly.

EC dual centrifugal fans with housing

with brushless DC motor **„Premium“**

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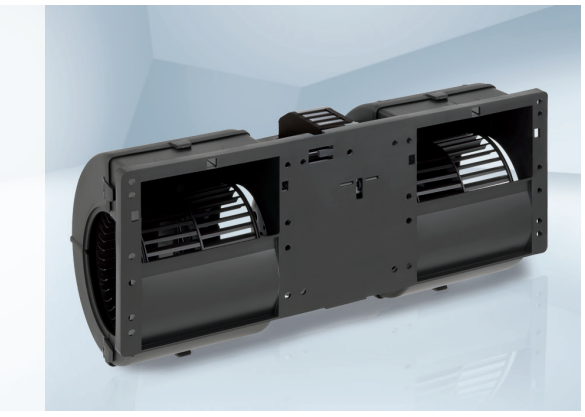
EC dual centrifugal fan

with housing, for automotive applications, Ø 097



- **Material:** Housing: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plasic PA (conforms to UL 94 HB)
- **Type of protection:** IP 24 KM (without plug)
- **Insulation class:** "B" in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings on both sides
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5

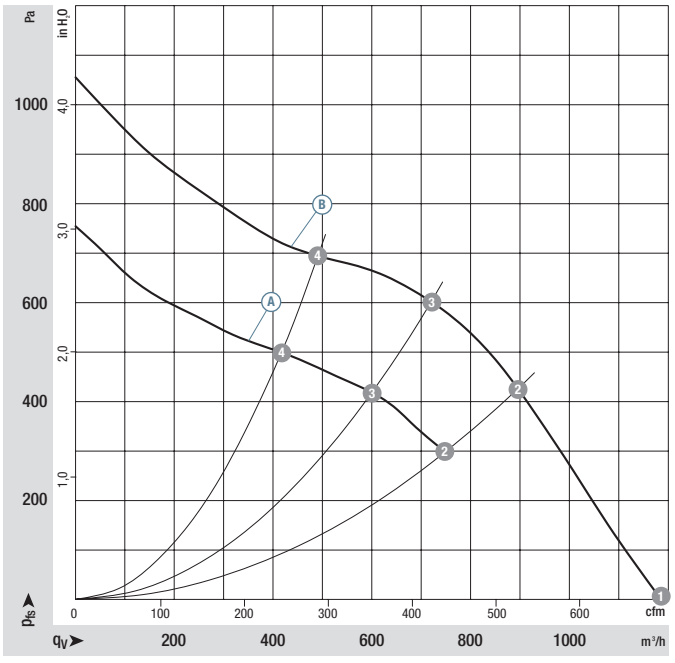
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Min. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
K3G 097-AK32 -42(1)	M3G 074-BF	A	13	9-15	750	3630	195	15,0	300	70	-40..+85(2)	2,3	p. 60 / A)
K3G 097-AK36 -55(1)	M3G 074-BF	B	13	9-15	1180	3740	385	29,5	0	76	-40..+85(2)	2,6	p. 60 / A)

subject to alterations

(1) 12-volt variant (2) at free air not recommended for long-term operation at 85 °C

Curves:



		n rpm	Ped W	I A	LwA dB(A)
A	1	---	---	---	---
A	2	3630	195	15,0	70
A	3	3875	177	13,5	71
A	4	4135	143	11,0	72
B	1	3740	385	29,5	76
B	2	4400	344	26,4	75
B	3	4775	309	23,8	76
B	4	4970	234	18,0	77

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst scroll housing without protection against accidental contact. Suction-side noise levels: Lw_A as per ISO 13347, Lp_A measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

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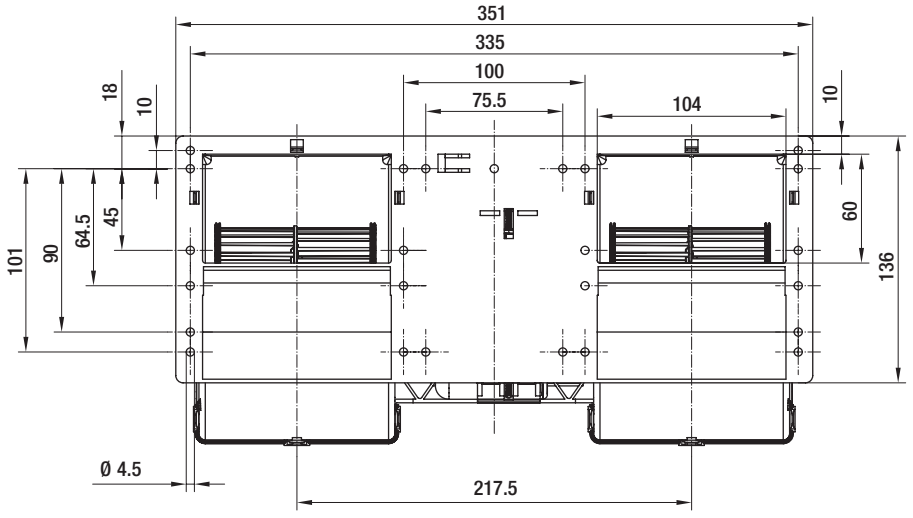
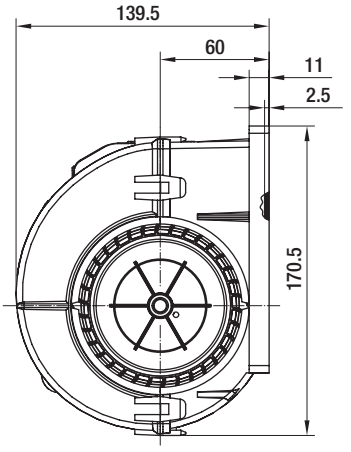
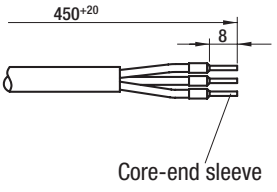




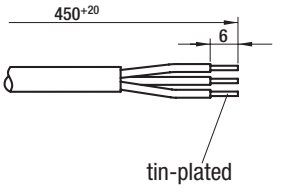
View lead connection:
(K3G097-AK32-42)

UN	black
PWM/LIN	yellow
GND	brown



View lead connection:
(K3G097-AK36-55)

UN	black
PWM/LIN	yellow
GND	brown



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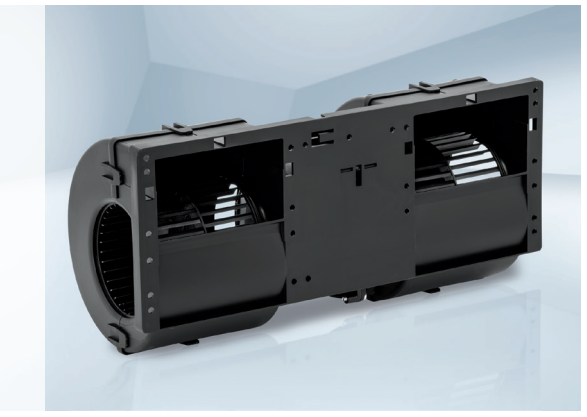
EC dual centrifugal fan

with housing, for automotive applications, Ø 097



- **Material:** Housing: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plasic PA (conforms to UL 94 HB)
- **Type of protection:** IP 24 KM (without plug)
- **Insulation class:** "B" in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings on both sides
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 3

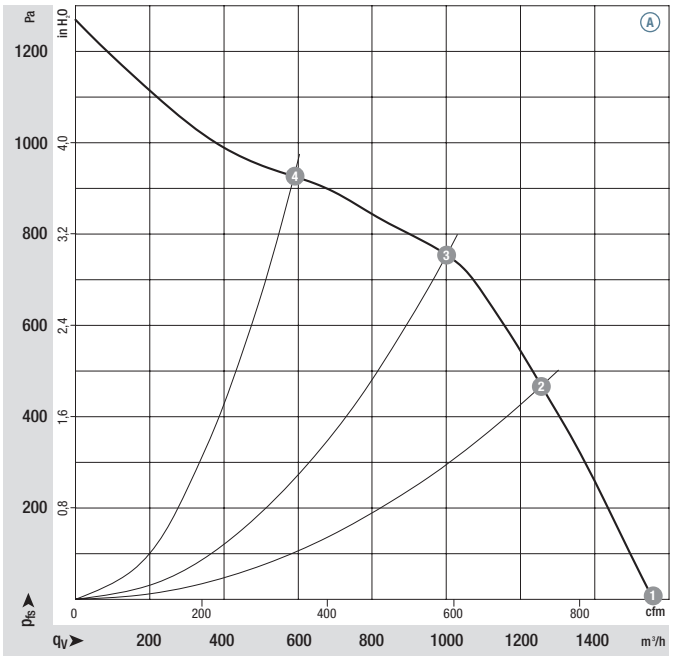
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Min. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
K3G 097-AK68 -85(1)(2)	M3G 074-CF	Ⓐ	26	16-32	1560	4600	690	26,5	0	82	-40..+60(3)	2,4	p. 62 / G)

subject to alterations

(1) 24-volt variant (2) housing/impeller also available in V0 material (3) short-term operation at up to 85 °C possible

Curves:



		n rpm	P_{ed} W	I A	L_{WA} dB(A)
Ⓐ	1	4600	690	26,5	82
Ⓐ	2	5095	604	23,2	81
Ⓐ	3	5435	526	20,2	81
Ⓐ	4	5720	365	14,0	81

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst scroll housing without protection against accidental contact. Suction-side noise levels: Lw_A as per ISO 13347, Lp_A measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

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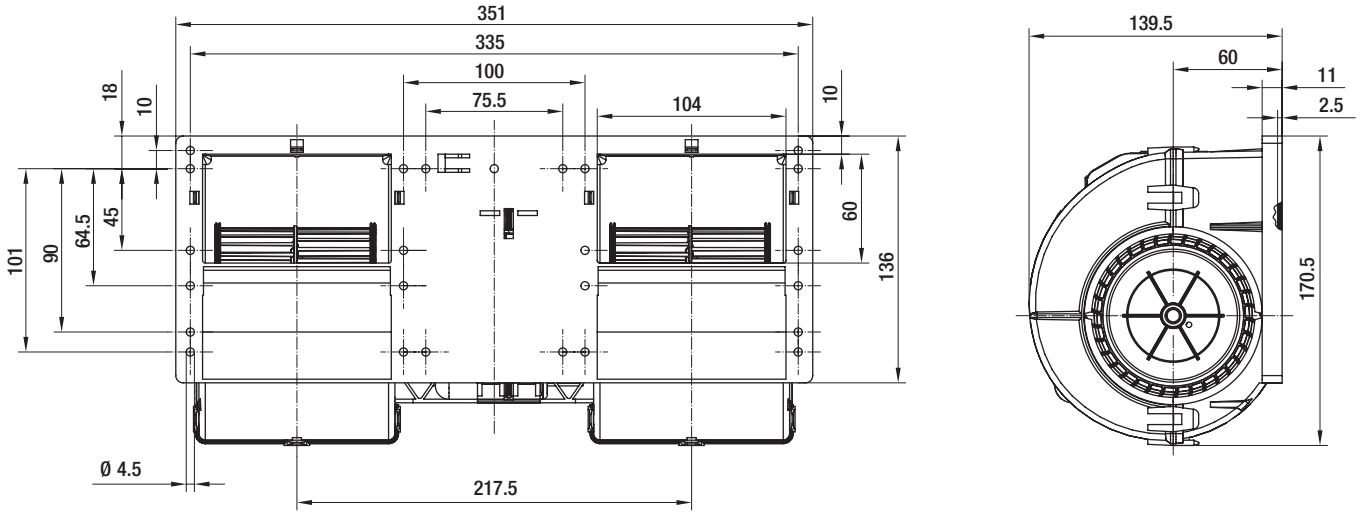
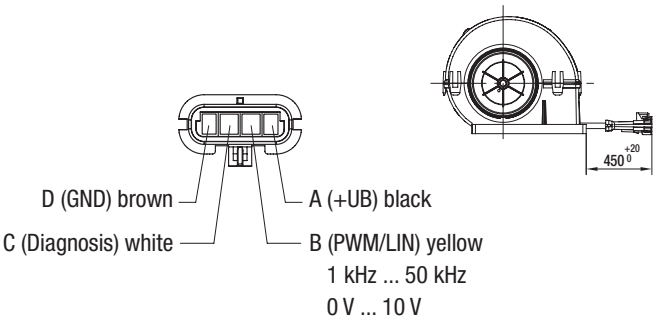


View connector plug

4 pole lead connection (450 mm) with plug Delphi Metri-Pack 280

Socket on customer side:

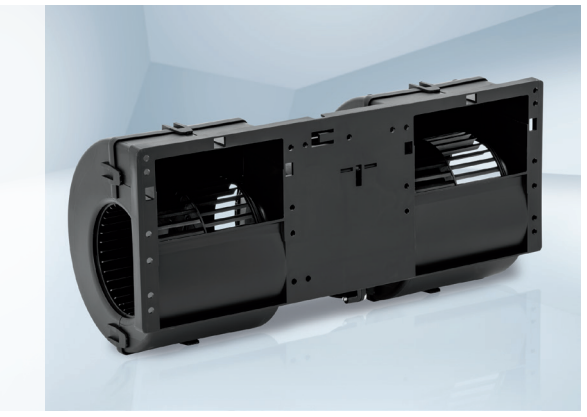
Housing:	Delphi 12129565
Secondary lock:	Delphi 15300016 (TPA lock)
Terminals:	Delphi 12077411
	Delphi 12077413
Seals:	Delphi 15324981
	Delphi 15324985



ErP2015 EXCEEDS THE NORM

EC dual centrifugal fan

with housing, for automotive applications, Ø 097



- **Material:** Housing: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plasic PA (conforms to UL 94 HB)
- **Type of protection:** IP 24 KM
- **Insulation class:** "B" in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings on both sides
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5

Nominal data

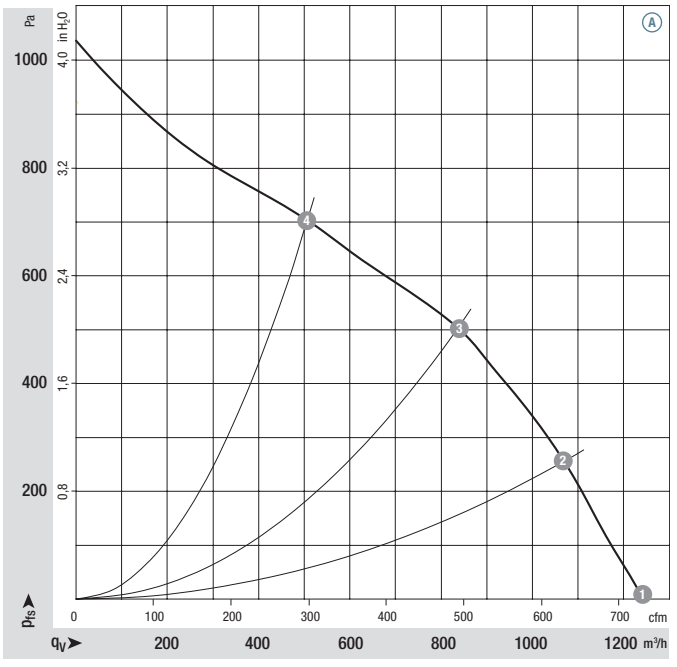
Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Min. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
K3G 097-AF24 -01(1)	M3G 084-BF	Ⓐ	26	16-32	1240	3730	390	15,0	0	83	-40..+85(2)	2,0	p. 61 / D)

subject to alterations

(1) 24-volt variant

(2) over + 70 °C with power derating

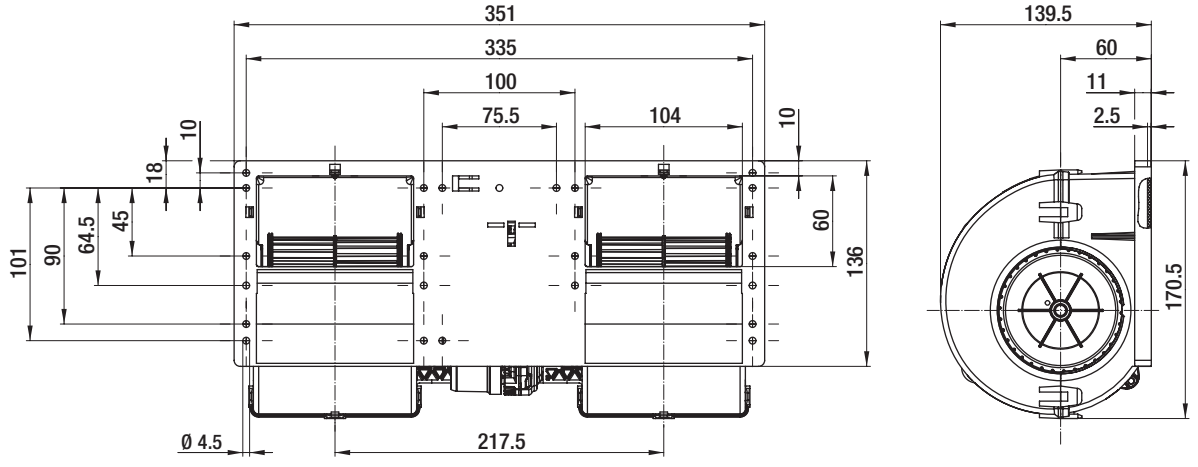
Curves:

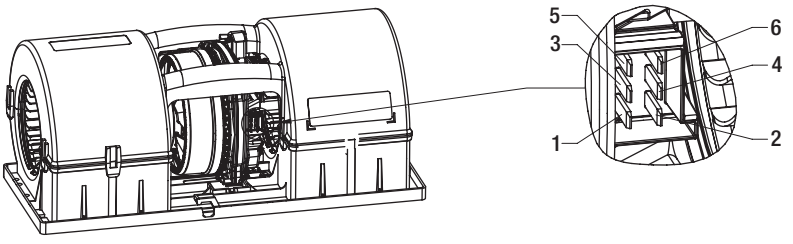


		n rpm	Ped W	I A	LwA dB(A)
Ⓐ	1	3730	390	15,0	83
Ⓐ	2	4125	363	13,9	81
Ⓐ	3	4490	309	11,9	79
Ⓐ	4	4985	245	9,4	80

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst scroll housing without protection against accidental contact. Suction-side noise levels: Lw_A as per ISO 13347, Lp_A measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

ebmpapst





View connector plug

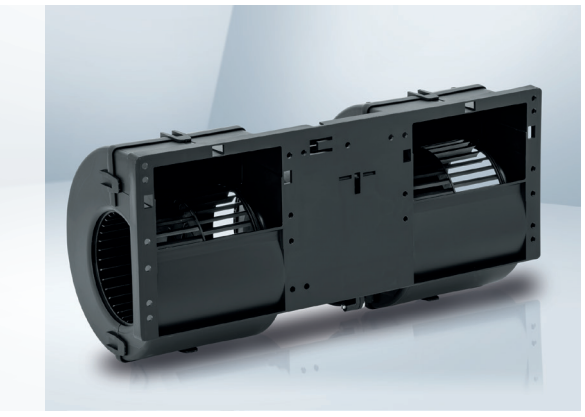
1 = UN
2 = GND
3 = PWM/LIN
4 = INVLIN
5 = ABSENK
6 = Diagnostic output

tyco Junior Power Timer 929505-2, 6-pole,coded.
Mating plug tyco 929504-2 (not included in delivery).
Lead connection (460 mm) with mating plug, Part no. 02001-4-1021 (not included in delivery).

ErP2015 EXCEEDS THE NORM

EC dual centrifugal fan

with housing, for automotive applications, Ø 097



- **Material:** Housing: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plasic PA (conforms to UL 94 HB)
- **Type of protection:** Motor: IP 24 KM, Elektronics: IP 66 / 69 K (customer plug not sealed)
- **Insulation class:** "B" in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings on both sides
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5

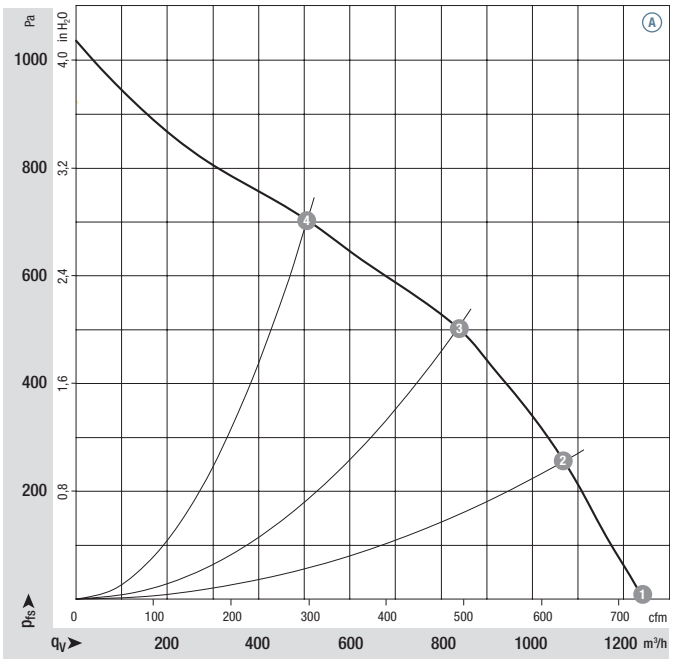
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Min. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
K3G 097-AF25 -06(1)	M3G 084-BF	Ⓐ	26	16-32	1240	3730	390	15,0	0	83	-40..+85(2)	2,0	p. 61 / D)

subject to alterations

(1) 24-volt variant (2) over + 70 °C with power derating

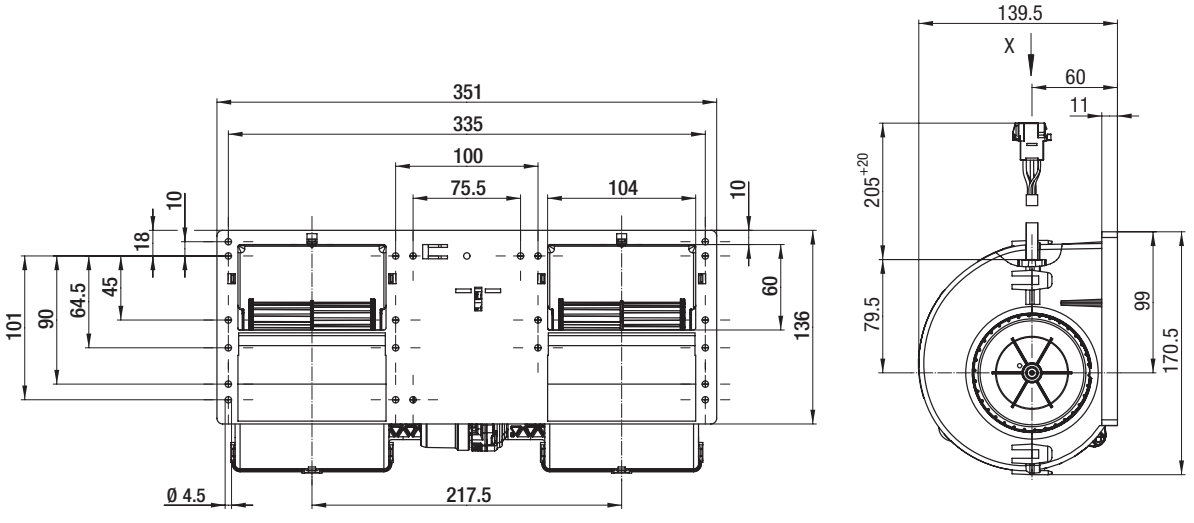
Curves:

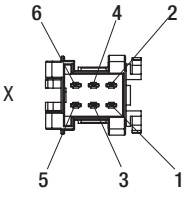


		n rpm	Ped W	I A	LwA dB(A)
Ⓐ	1	3730	390	15,0	83
Ⓐ	2	4125	363	13,9	81
Ⓐ	3	4490	309	11,9	79
Ⓐ	4	4985	245	9,4	80

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst scroll housing without protection against accidental contact. Suction-side noise levels: Lw_A as per ISO 13347, Lp_A measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

ebmpapst





View connector plug

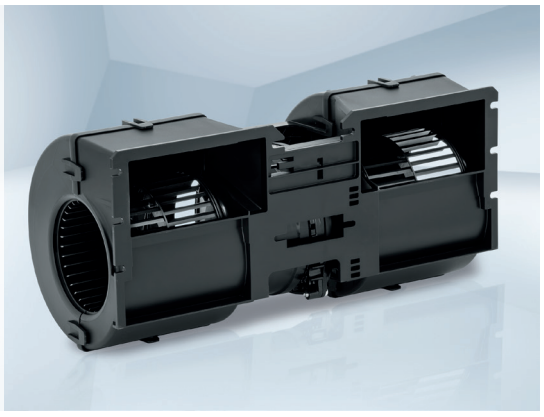
1 = +UB	black
2 = GND	brown
3 = PWM/LIN	yellow
4 = INVLIN	orange
5 = ABSENK	blue
6 = Diagnostic output	white

tyco Junior Power Timer 929505-2, 6-pole,coded.
Mating plug tyco 929504-2 (not included in delivery).
Lead connection (460 mm) with mating plug, Part no. 02001-4-1021 (not included in delivery).

ErP2015 EXCEEDS THE NORM

EC dual centrifugal fan

with housing, for automotive applications, Ø 097



- **Material:** Housing: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plasic PA (conforms to UL 94 HB)
- **Type of protection:** IP 24 KM
- **Insulation class:** "B" in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings on both sides
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5

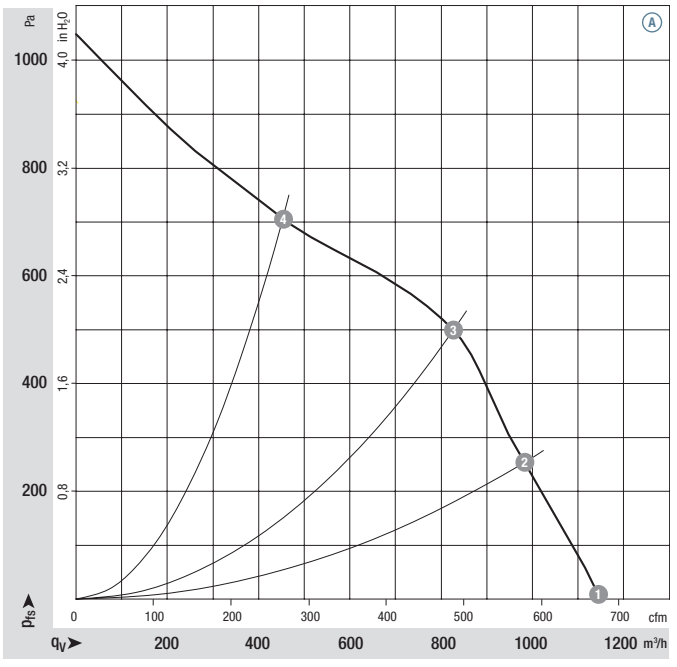
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Min. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
K3G 097-BF24 -01(1)	M3G 084-BF	Ⓐ	26	16-32	1150	3960	375	14,4	0	81	-40..+85(2)	2,0	p. 61 / D)

subject to alterations

(1) 24-volt variant (2) over + 70 °C with power derating

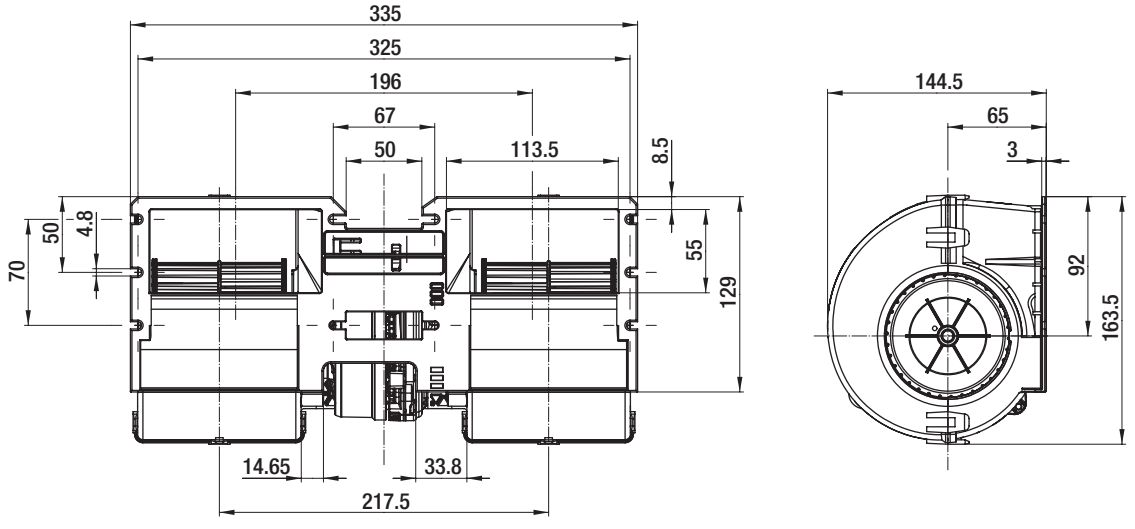
Curves:

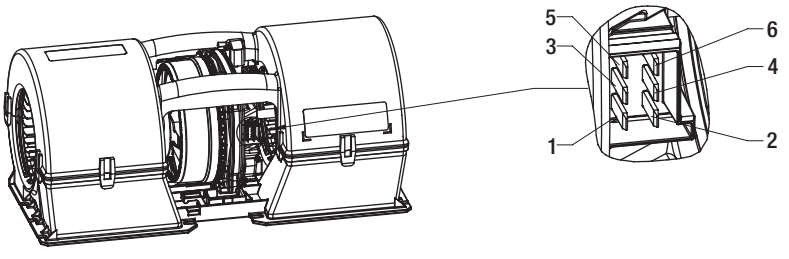


		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3960	375	14,4	81
Ⓐ	2	4265	345	13,3	80
Ⓐ	3	4535	309	11,9	79
Ⓐ	4	5090	223	8,6	81

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst scroll housing without protection against accidental contact. Suction-side noise levels: Lw_A as per ISO 13347, Lp_A measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

ebmpapst





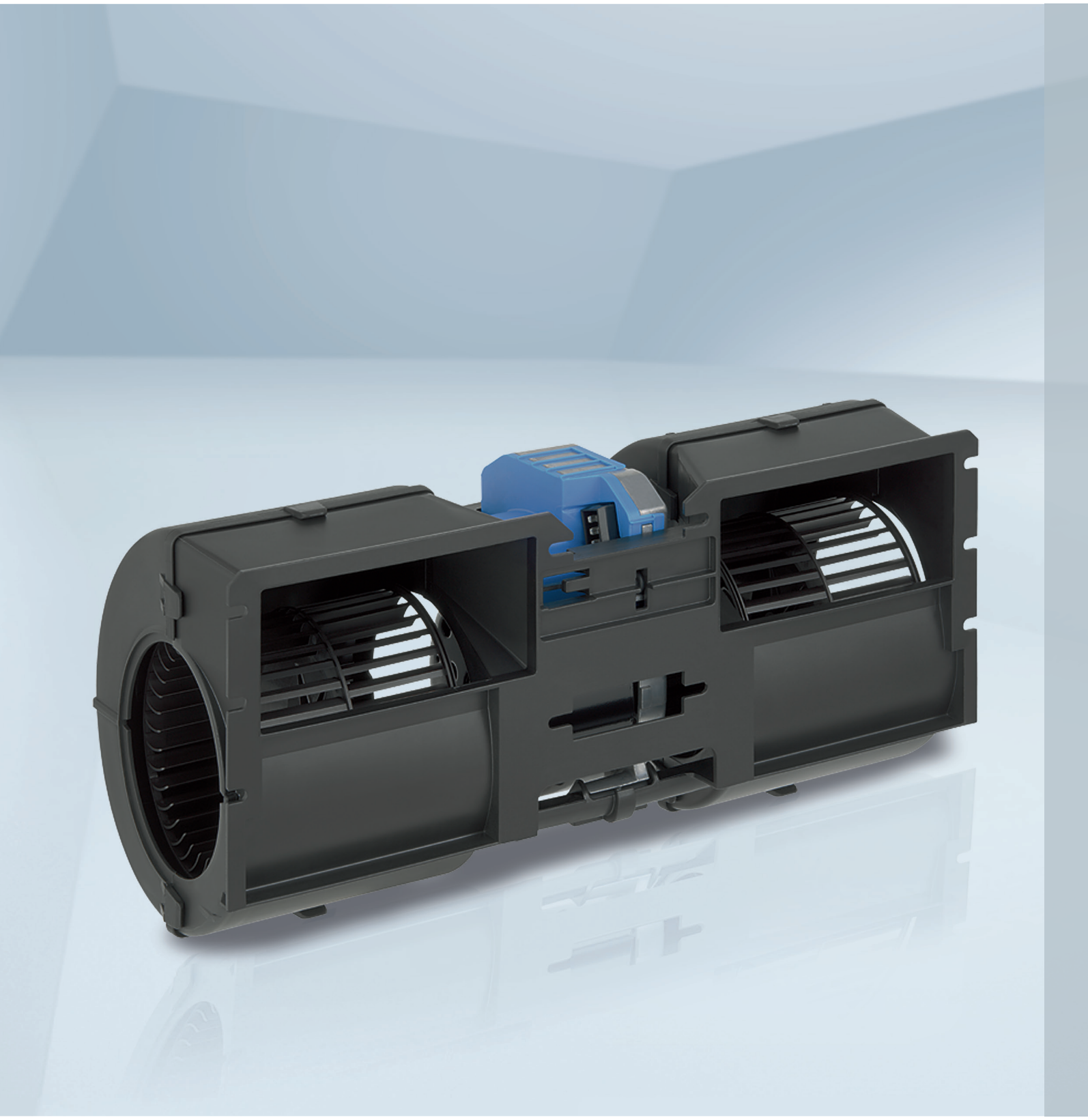
View connector plug

1 = UN
2 = GND
3 = PWM/LIN
4 = INVLIN
5 = ABSENK
6 = Diagnostic output

tyco Junior Power Timer 929505-2, 6-pole,coded.
Mating plug tyco 929504-2 (not included in delivery).
Lead connection (460 mm) with mating plug, Part no. 02001-4-1021 (not included in delivery).

EC dual centrifugal fans with housing

with brushless DC motor **„Basic“**



ErP2015 EXCEEDS THE NORM

EC dual centrifugal fan

with housing, for automotive applications, Ø 097

- **Material:** Housing: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plasic PA (conforms to UL 94 HB)
- **Type of protection:** IP 24 KM (without plug)
- **Insulation class:** "B" in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings on both sides
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** e1 approval according to 2006/28/EG

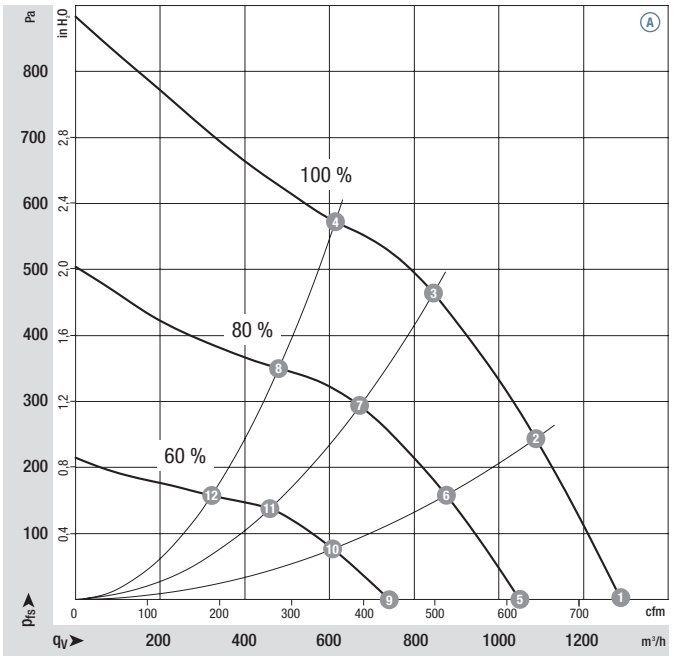
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Min. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
K3G 097-AK34 -65(1)	M3G 074-CF	Ⓐ	26	16-32	1290	3830	394	15,2	0	79	-40..+85(2)	2,0	p. 62 / F)

subject to alterations

(1) 24-volt variant (2) at free air not recommended for long-term operation at 85 °C

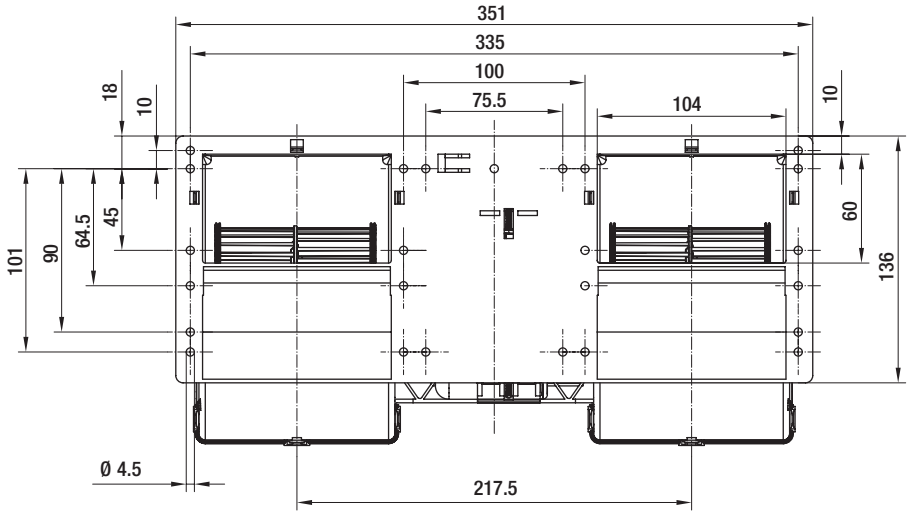
Curves:

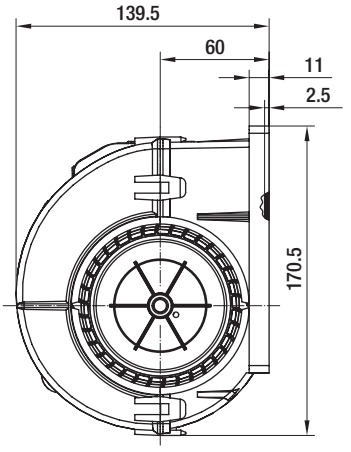


		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3830	394	15,2	79
Ⓐ	2	4100	347	13,3	76
Ⓐ	3	4380	285	10,9	75
Ⓐ	4	4630	238	9,1	75
Ⓐ	5	3150	215	8,3	75
Ⓐ	6	3330	185	7,1	72
Ⓐ	7	3510	149	5,7	70
Ⓐ	8	3660	120	4,6	69
Ⓐ	9	2240	79	3,1	66
Ⓐ	10	2340	67	2,6	66
Ⓐ	11	2430	53	2,0	61
Ⓐ	12	2460	43	1,7	60

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst scroll housing without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

ebmpapst



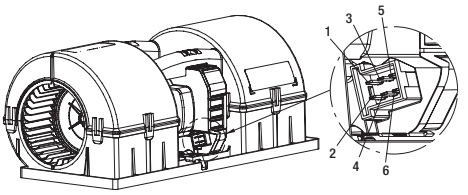


Speed setting

Pin	5	4	3	
60%	H	NC	NC	
80%	NC	H	NC	NC = not assigned
100%	NC	NC	H	H = UN (26 V)

View connector plug

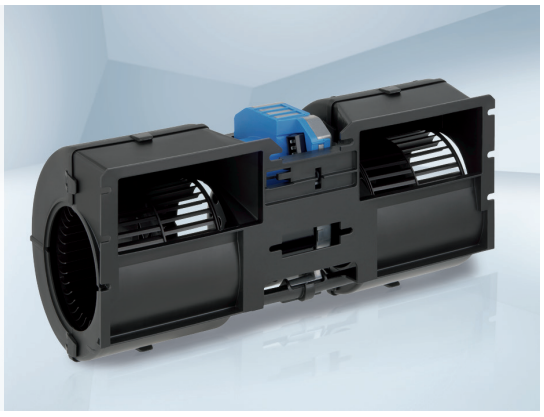
1 = + UB
2 = GND
3 = PWM/LIN, 100 % Speed
4 = 80 % Speed
5 = 60 % Speed
6 = NC (not assigned)
tyco Junior Power Timer 929505-2, 6-pole,coded.
Mating plug tyco 929504-2 (not included in delivery).
Lead connection (460 mm) with mating plug, Part no. 02001-4-1021 (not included in delivery).



ErP2015 EXCEEDS THE NORM

EC dual centrifugal fan

with housing, for automotive applications, Ø 097



- **Material:** Housing: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plasic PA (conforms to UL 94 HB)
- **Type of protection:** IP 24 KM (without plug)
- **Insulation class:** "B" in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings on both sides
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** e1 approval according to 2006/28/EG

Nominal data

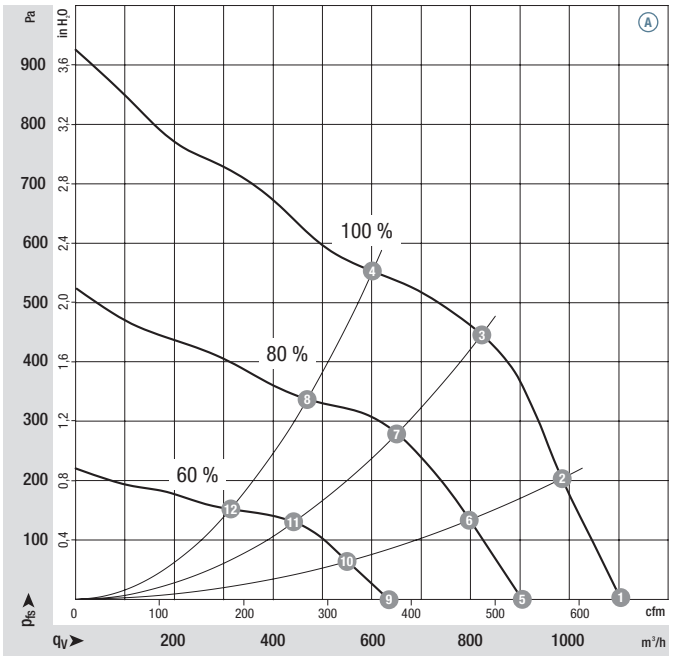
Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Min. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
K3G 097-BK34 -65(1)	M3G 074-CF	Ⓐ	26	16-32	1110	4040	344	13,3	0	77	-40..+85(2)	2,0	p. 62 / F)

subject to alterations

(1) 24-volt variant

(2) at free air not recommended for long-term operation at 85 °C

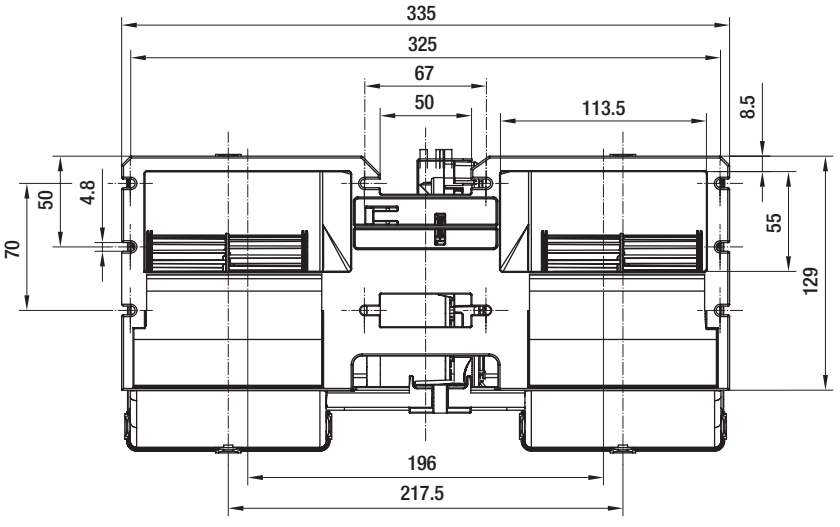
Curves:

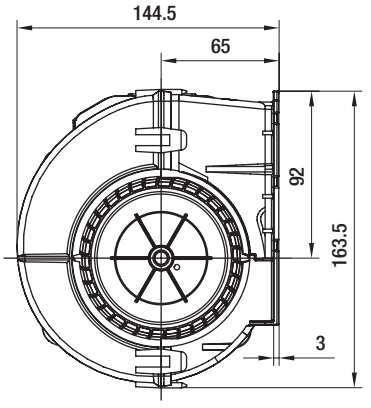


		n rpm	Ped W	I A	LwA dB(A)
Ⓐ	1	4040	344	13,3	77
Ⓐ	2	4210	325	12,5	76
Ⓐ	3	4380	279	10,6	75
Ⓐ	4	4630	242	9,2	75
Ⓐ	5	3310	186	7,2	73
Ⓐ	6	3390	171	6,6	71
Ⓐ	7	3520	145	5,5	70
Ⓐ	8	3650	121	4,6	69
Ⓐ	9	2330	67	2,6	64
Ⓐ	10	2360	62	2,4	62
Ⓐ	11	2410	53	2,0	61
Ⓐ	12	2480	42	1,6	60

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst scroll housing without protection against accidental contact. Suction-side noise levels: Lw_A as per ISO 13347, Lp_A measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

ebmpapst





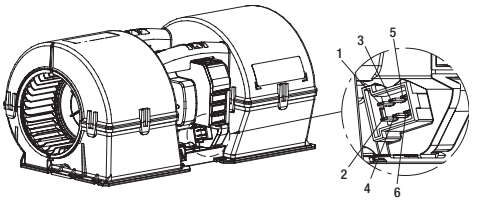
Speed setting

Pin	5	4	3	
60%	H	NC	NC	
80%	NC	H	NC	NC = not assigned
100%	NC	NC	H	H = UN (26 V)

View connector plug

1 = + UB
2 = GND
3 = PWM/LIN, 100 % Speed
4 = 80 % Speed
5 = 60 % Speed
6 = NC (not assigned)

tyco Junior Power Timer 929505-2, 6-pole,coded.
Mating plug tyco 929504-2 (not included in delivery).
Lead connection (460 mm) with mating plug, Part no. 02001-4-1021 (not included in delivery).



EC axial fans

with brushless DC motor **„Premium & Power“**

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 280

- **Material:** Wall ring: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plastic PBT, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** IP 24 KM
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5

Nominal data

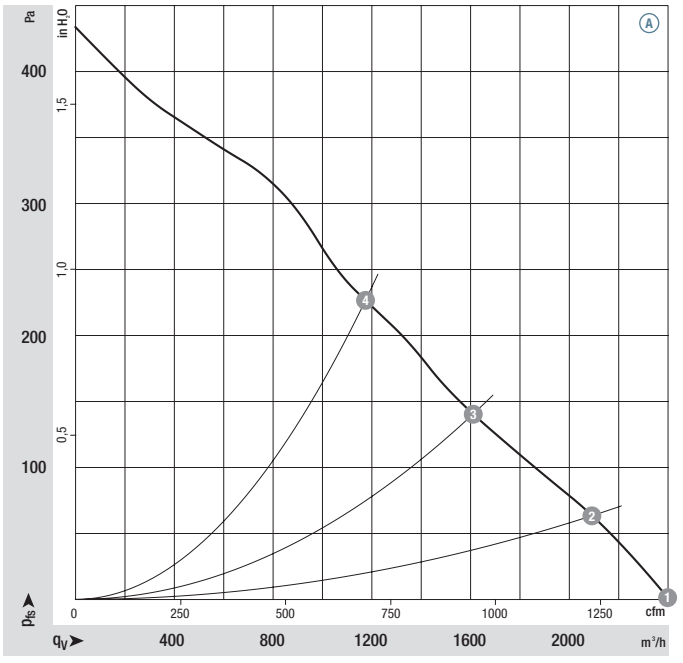
Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 280-EQ20 -43(1)	M3G 074-CF	Ⓐ	26	16-32	2400	3100	200	7,5	---	79	-40..+85(2)	2,4	p. 63 / H)

subject to alterations

(1) 24-volt variant

(2) at free air not recommended for long-term operation at 85 °C

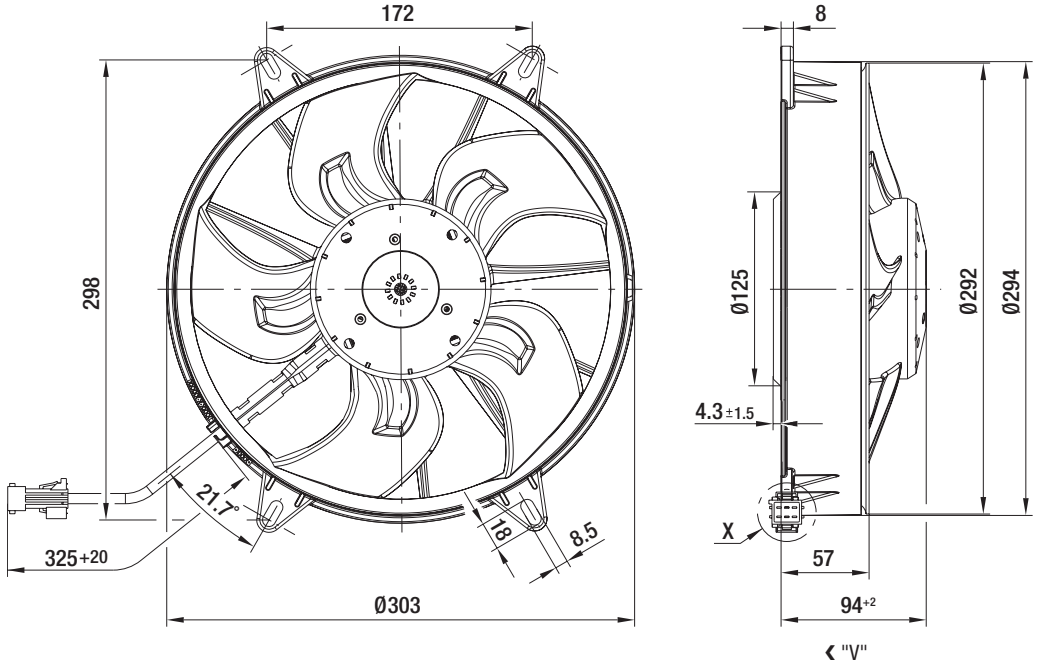
Curves:



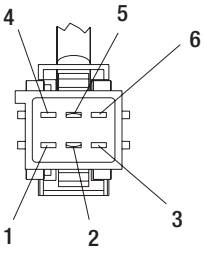
		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3100	200	7,5	79
Ⓐ	2	3085	197	7,6	79
Ⓐ	3	3090	192	7,3	81
Ⓐ	4	3105	213	8,2	83

Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!

For detailed information see page 68 ff.



Mating plug on customer side:
Housing: AMP 1-963212-1
Plug contactors:
2,5 mm AMP 929938-1 (2x)
0,75 mm AMP 929930-3 (4x)
Seals: 828905-1 (2x)
828904-1 (4x)



View X

1 = UN	black
2 = GND	brown
3 = PWM/LIN	yellow
4 = INVLIN	orange
5 = ABSENK	blue
6 = Diagnostic output	white

AMP Junior Power Timer, 6-pole,coded;
Lead connection (460 mm) with mating plug
Part no. 02002-4-1021 (not included in delivery)

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 300

- **Material:** Wall ring: plastic PA, coloured black (conforms to UL 94 HB)
  Impeller: plastic PA, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Electronics: IP 66 / 69 K
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5
- **Qualified to:** DIN ISO 16750

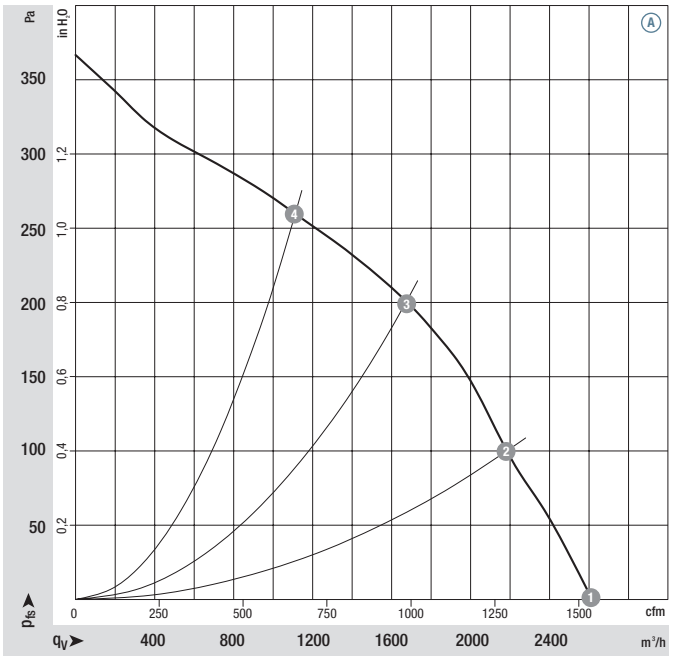
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 300-BV12 -41(1)	M3G 084-BF	Ⓐ	13	9-16	2610	3200	220	16,7	---	83	-40..+105(2)	2,0	p. 63 / K)

subject to alterations

(1) 12-volt variant (2) over + 85 °C with power derating

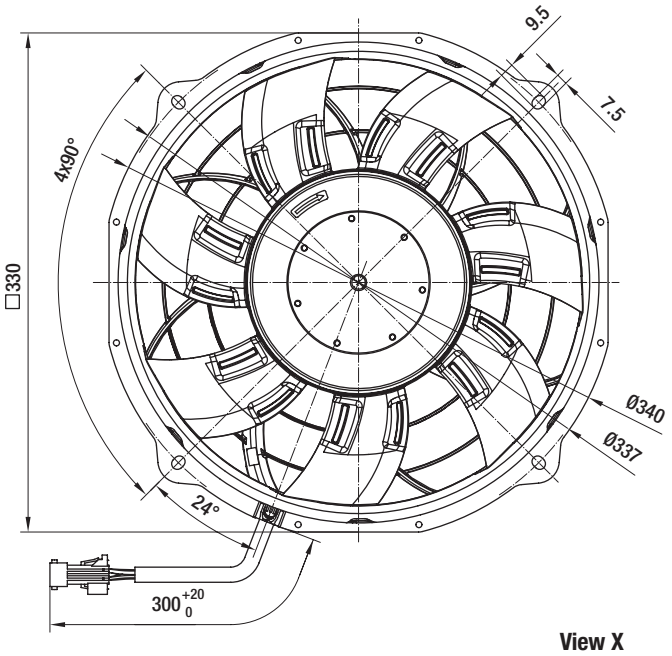
Curves:

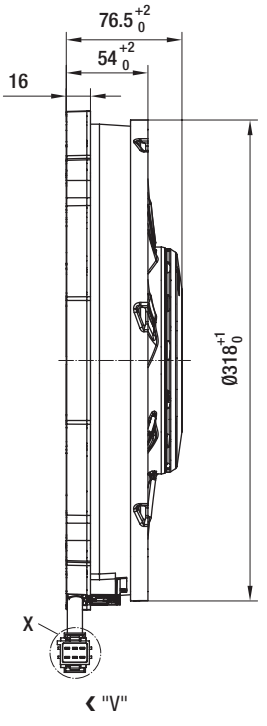


		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3200	220	16,7	83
Ⓐ	2	3140	235	18,1	82
Ⓐ	3	2960	247	18,9	80
Ⓐ	4	2840	248	19,0	82

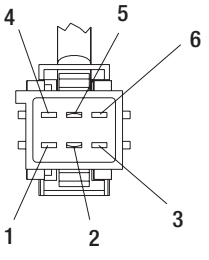
Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!
For detailed information see page 68 ff.

ebmpapst





Mating plug on customer side:
Housing: AMP 1-963212-1
Plug contactors:
2,5 mm AMP 929938-1 (2x)
0,75 mm AMP 929930-3 (4x)
Seals: 828905-1 (2x)
828904-1 (4x)



View X

1 = + UB	black	
2 = GND	brown	
3 = PWM/LIN*	yellow	*optionally LIN-BUS
4 = NC	(not assigned)	
5 = ABSENK	blue	
6 = Diagnostic output	white	

AMP Junior Power Timer, 6-pole,coded;
Lead connection (460 mm) with mating plug
Part no. 02002-4-1021 (not included in delivery)

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 300

- **Material:** Wall ring: plastic PA, coloured black (conforms to UL 94 HB)
  Impeller: plastic PA, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Electronics: IP 66 / 69 K
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5
- **Qualified to:** DIN ISO 16750

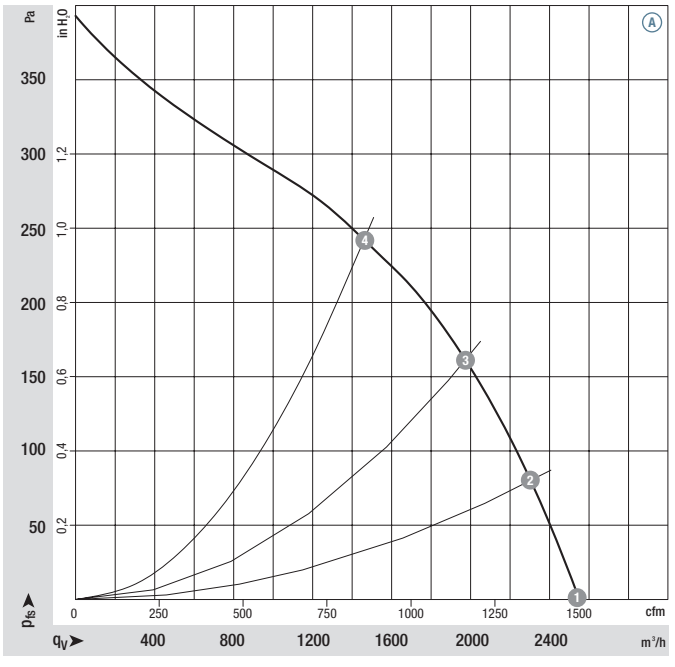
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m³/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 300-BV24 -01(1)	M3G 084-BF	Ⓐ	26	16-32	2570	3160	205	7,90	---	82	-40..+110(2)	2,0	p. 61 / D)

subject to alterations

(1) 24-volt variant (2) over + 95 °C with power derating

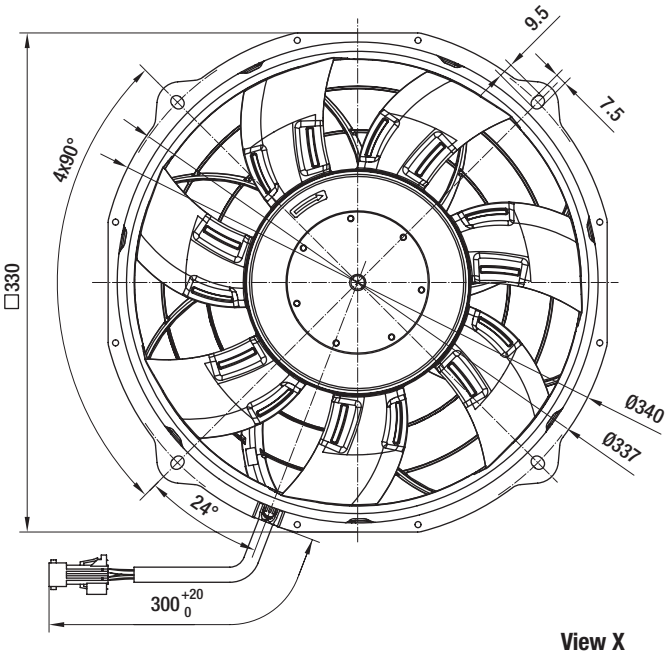
Curves:

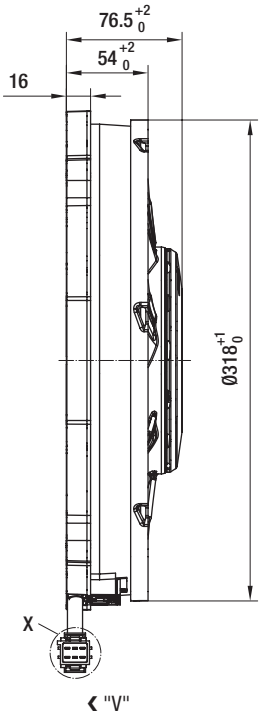


		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3160	205	7,90	82
Ⓐ	2	3150	216	7,30	82
Ⓐ	3	3085	240	9,20	81
Ⓐ	4	2965	244	9,40	80

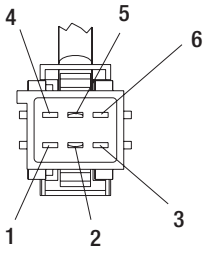
Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!
For detailed information see page 68 ff.

ebmpapst





Mating plug on customer side:
Housing: AMP 1-963212-1
Plug contactors:
2,5 mm AMP 929938-1 (2x)
0,75 mm AMP 929930-3 (4x)
Seals: 828905-1 (2x)
828904-1 (4x)



View X

1 = + UB	black	
2 = GND	brown	
3 = PWM/LIN*	yellow	*optionally LIN-BUS
4 = INVLIN	orange	
5 = ABSENK	bue	
6 = Diagnostic output	white	

AMP Junior Power Timer, 6-pole,coded;
Lead connection (460 mm) with mating plug
Part no. 02002-4-1021 (not included in delivery)

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 300

- **Material:** Wall ring: plastic PA, coloured black (conforms to UL 94 HB)
  Impeller: plastic PA, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Electronics: IP 66 / 69 K
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5
- **Qualified to:** DIN ISO 16750

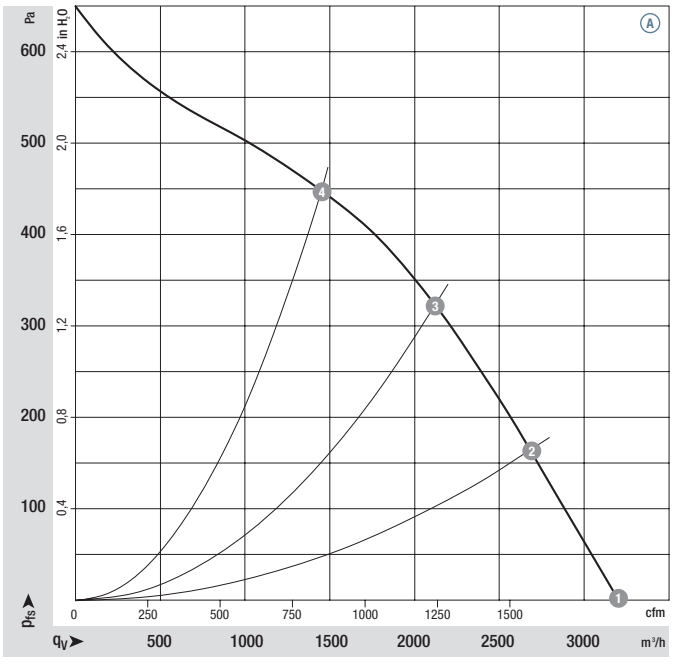
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m³/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 300-BV25 -21(1)	M3G 084-BF	Ⓐ	26	16-32	3225	3940	380	14,6	---	87	-40..+110(2)	2,0	p. 61 / D)

subject to alterations

(1) 24-volt variant (2) over + 85 °C with power derating

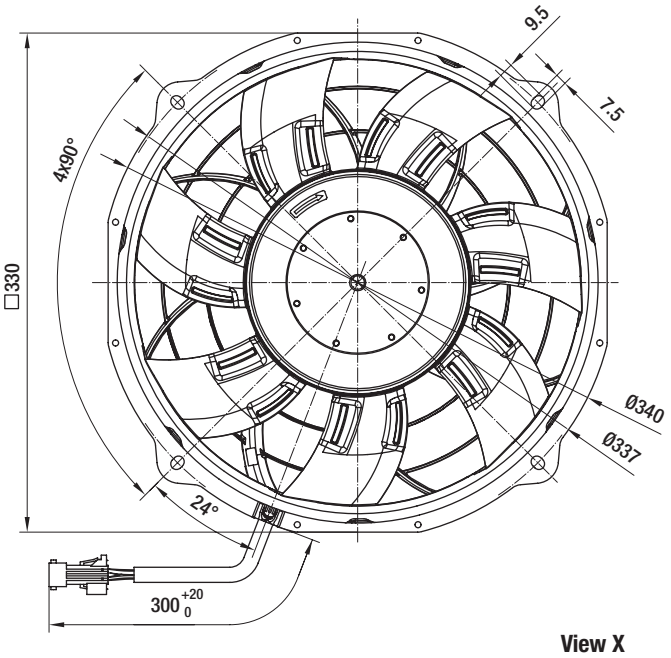
Curves:

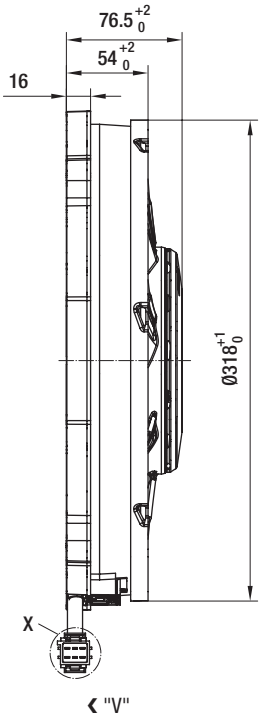


	n rpm	Ped W	I A	LwA dB(A)
Ⓐ 1	3940	380	14,6	87
Ⓐ 2	3815	408	15,7	87
Ⓐ 3	3715	462	17,7	85
Ⓐ 4	3630	495	19,0	88

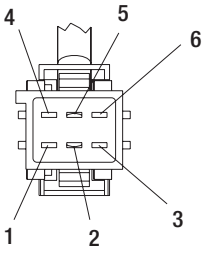
Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!
For detailed information see page 68 ff.

ebmpapst





Mating plug on customer side:
Housing: AMP 1-963212-1
Plug contactors:
2,5 mm AMP 929938-1 (2x)
0,75 mm AMP 929930-3 (4x)
Seals: 828905-1 (2x)
828904-1 (4x)



View X

1 = + UB	black	
2 = GND	brown	
3 = PWM/LIN*	yellow	*optionally LIN-BUS
4 = INVLIN	orange	
5 = ABSENK	blue	
6 = Diagnostic output	white	

AMP Junior Power Timer, 6-pole,coded;
Lead connection (460 mm) with mating plug
Part no. 02002-4-1021 (not included in delivery)

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 300

- **Material:** Wall ring: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plastic PBT, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "A" (sucking over stator)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** IP 24 KM
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5

Nominal data

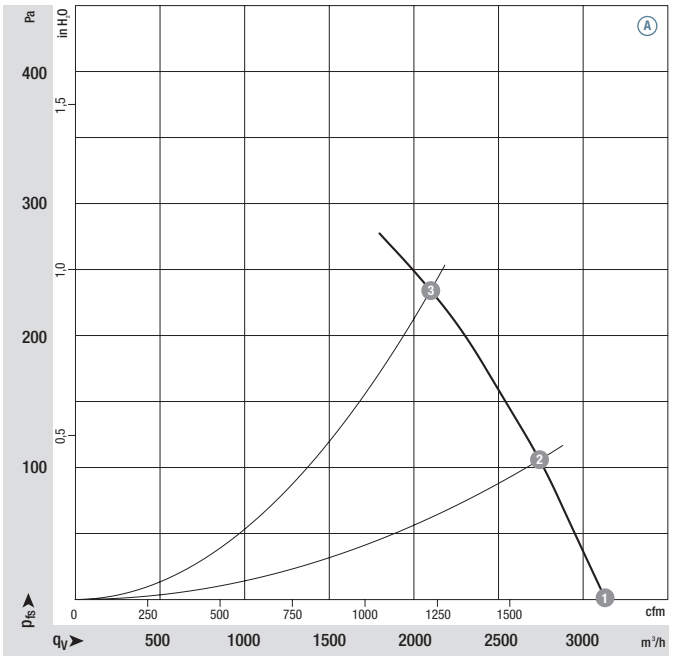
Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m³/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 300-ER38 -45(1)	M3G 074-CF	Ⓐ	27,5	16-32	3135	3320	335	12,2	275	94	-40..+85(2)	2,5	p. 61 / C)

subject to alterations

(1) 24-volt variant

(2) at free air not recommended for long-term operation at 85 °C

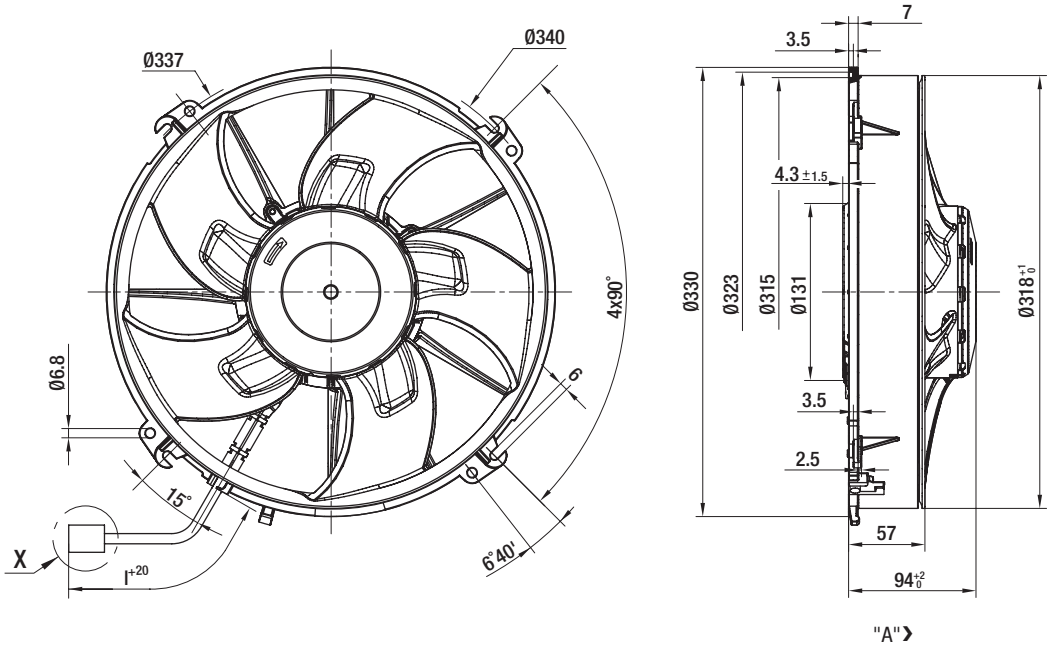
Curves:



		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3320	335	12,2	94
Ⓐ	2	3295	354	12,8	92
Ⓐ	3	3255	367	13,3	93

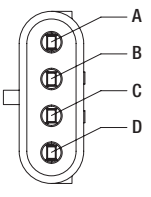
Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!

For detailed information see page 68 ff.



Mating plug on customer side:

Housing:	Packard 12015797
Plug contactors:	Packard 12089188
	Packard 12124580
Seals:	Packard 15324982
	Packard 15324983



View X

A = UN	red
B = LIN	blue
C = CGND	white
D = GND	black

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 385

- **Material:** Wall ring: plastic PA, coloured black (conforms to UL 94 HB)
  Impeller: plastic PA, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Electronics: IP 66 / 69 K
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5
- **Qualified to:** DIN ISO 16750

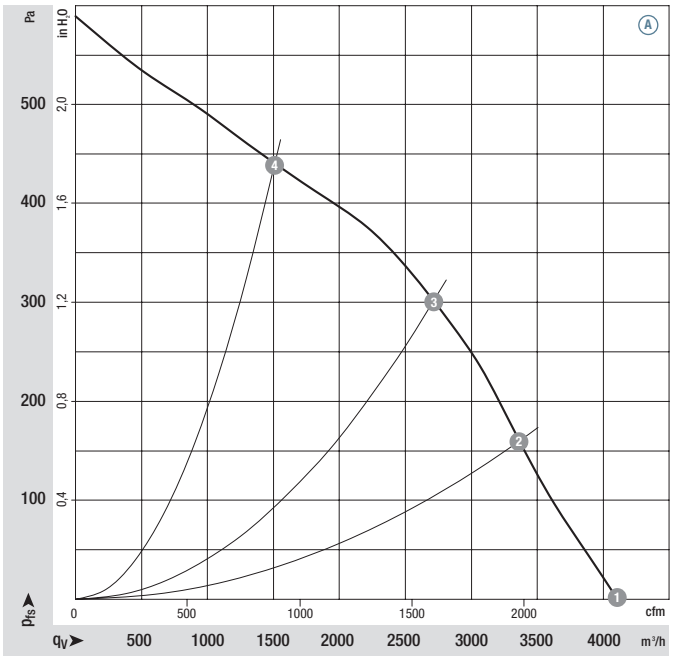
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m^3/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 385-CT53 -61(1)	M3G 084-CF	Ⓐ	13	9-16	4110	3100	445	34,0	---	89	-40..+105(2)	3,3	p. 60 / L)

subject to alterations

(1) 12-volt variant (2) over + 70 °C with power derating

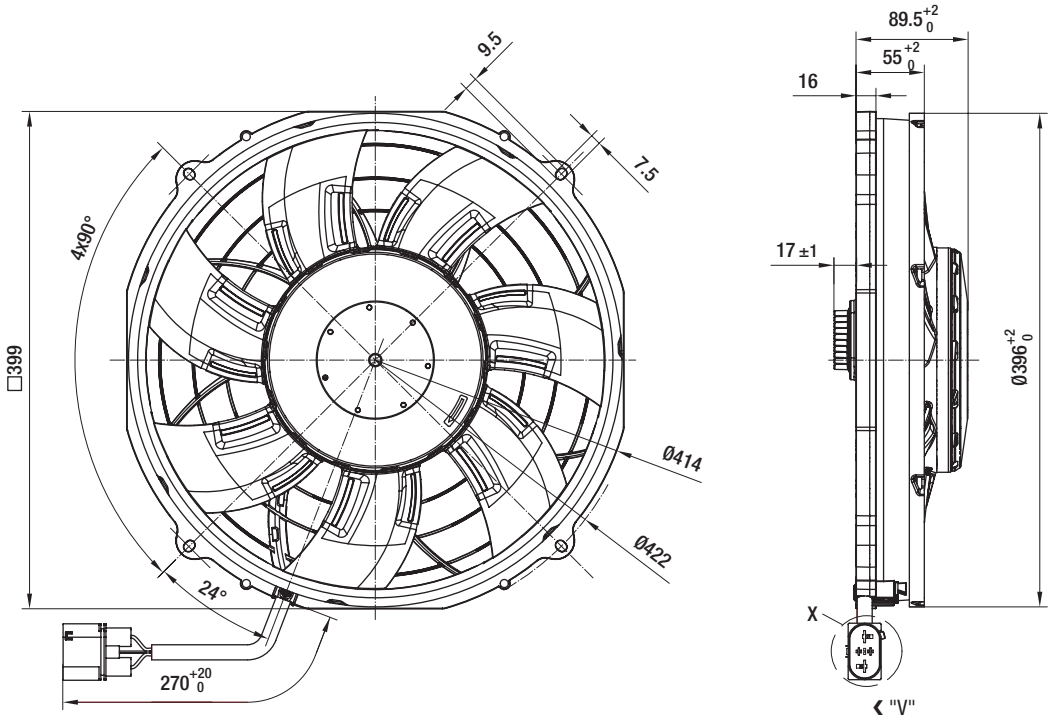
Curves:



		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3100	445	34,0	89
Ⓐ	2	3000	487	37,6	89
Ⓐ	3	2930	544	41,9	87
Ⓐ	4	2815	590	45,6	89

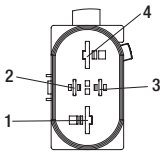
Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!
For detailed information see page 68 ff.

ebmpapst



Mating plug on customer side:

Housing:		FCI 30432101
Plug contactors:	9,5 mm	FCI 60070461
	4,8 mm	FCI 60040431
Seals:		FCI 60993301
		FCI 60992607



View X

1 = + UB	black	
2 = Diagnostic output	white	
3 = PWM/LIN*	yellow	* optionally LIN-BUS
4 = GND	brown	

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 385

- **Material:** Wall ring: plastic PA, coloured black (conforms to UL 94 HB)
  Impeller: plastic PA, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Electronics: IP 66 / 69 K
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5
- **Qualified to:** DIN ISO 16750

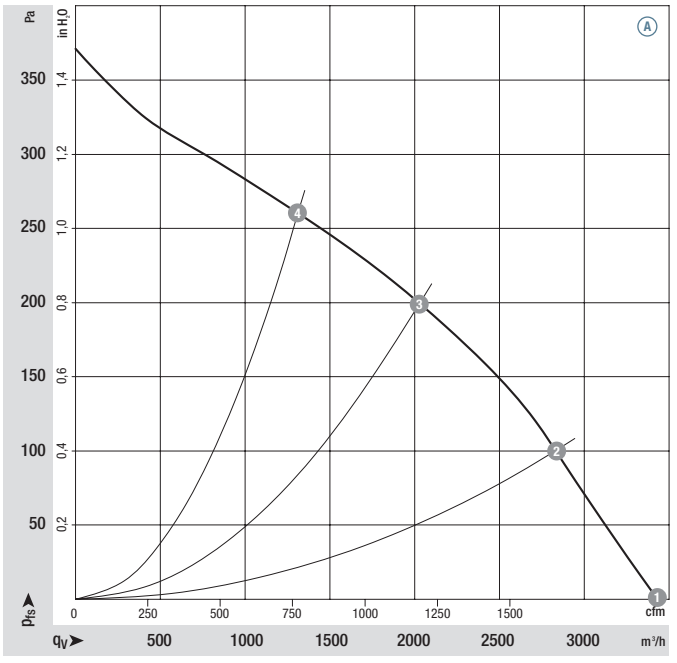
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m³/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 385-BV44 -01(1)	M3G 084-BF	Ⓐ	26	16-32	3425	2600	260	10,0	---	84	-40..+110(2)	2,7	p. 61 / D)

subject to alterations

(1) 24-volt variant (2) over + 95 °C with power derating

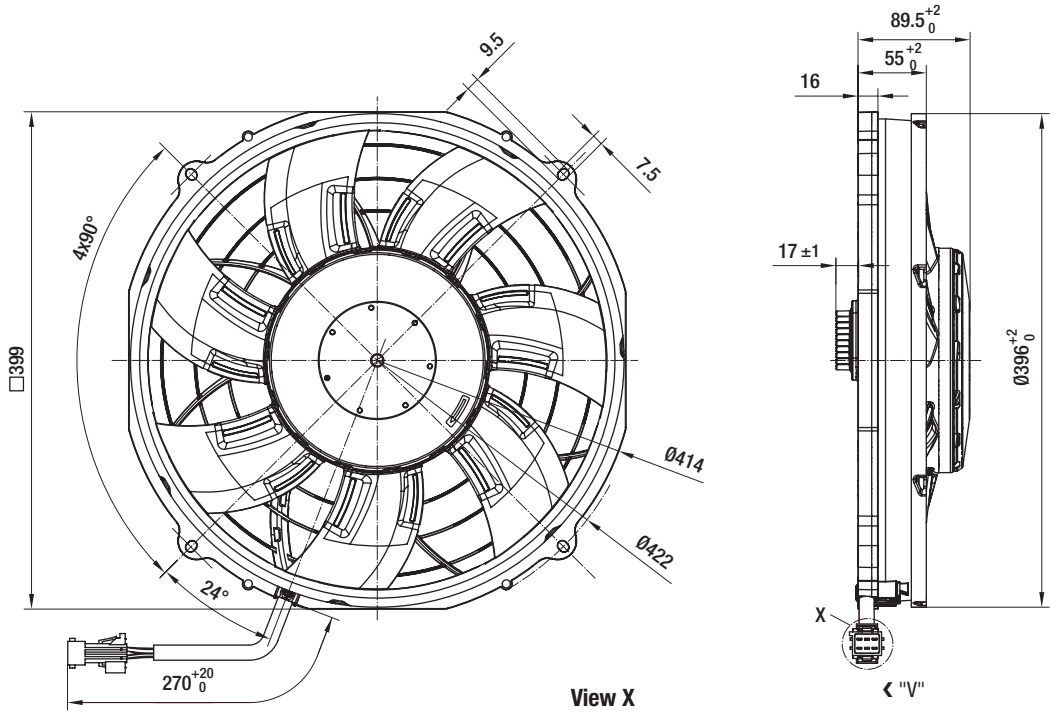
Curves:



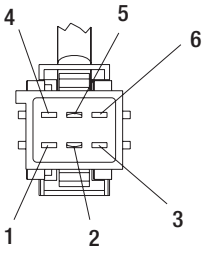
		n rpm	Ped W	I A	LwA dB(A)
Ⓐ	1	2600	260	10,0	84
Ⓐ	2	2505	272	10,5	83
Ⓐ	3	2325	273	10,5	81
Ⓐ	4	2215	274	10,5	82

Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!
For detailed information see page 68 ff.

ebmpapst



Mating plug on customer side:
Housing: AMP 1-963212-1
Plug contactors:
2,5 mm AMP 929938-1 (2x)
0,75 mm AMP 929930-3 (4x)
Seals: 828905-1 (2x)
828904-1 (4x)



View X

1 = + UB	black	
2 = GND	brown	
3 = PWM/LIN*	yellow	*optionally LIN-BUS
4 = INVLIN	orange	
5 = ABSENK	bue	
6 = Diagnostic output	white	

AMP Junior Power Timer, 6-pole,coded;
Lead connection (460 mm) with mating plug
Part no. 02002-4-1021 (not included in delivery)

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 385

- **Material:** Wall ring: plastic PA, coloured black (conforms to UL 94 HB)
  Impeller: plastic PA, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Electronics: IP 66 / 69 K
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Overtemperature protection, reverse polarity and locked-rotor protection, load dump protection, under-voltage detection
- **EMC requirements:** VDE 0879-2, interference suppression grade 5
- **Qualified to:** DIN ISO 16750

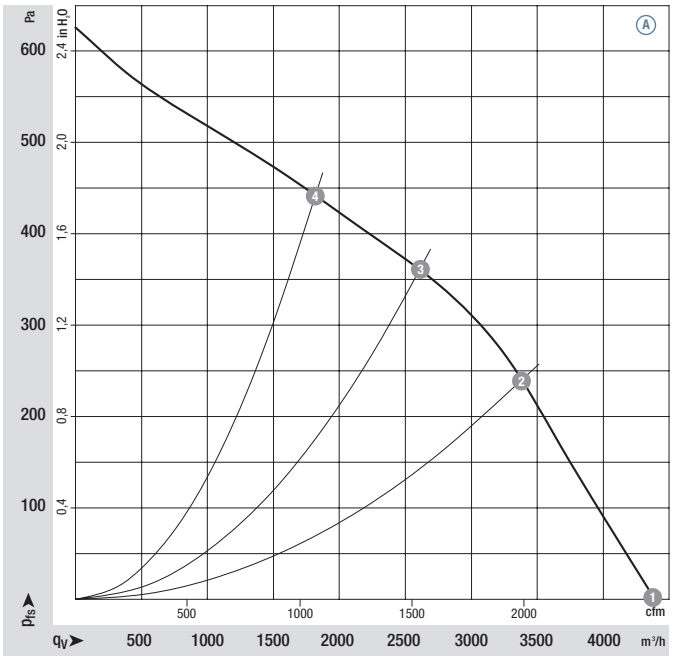
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m³/h	rpm	W	A	Pa	dB(A)	°C	kg	
W3G 385-CT65 -21(1)	M3G 084-CF	Ⓐ	26	16-32	4375	3300	525	20,0	---	90	-40..+110(2)	3,1	p. 60 / L)

subject to alterations

(1) 24-volt variant (2) over + 85 °C with power derating

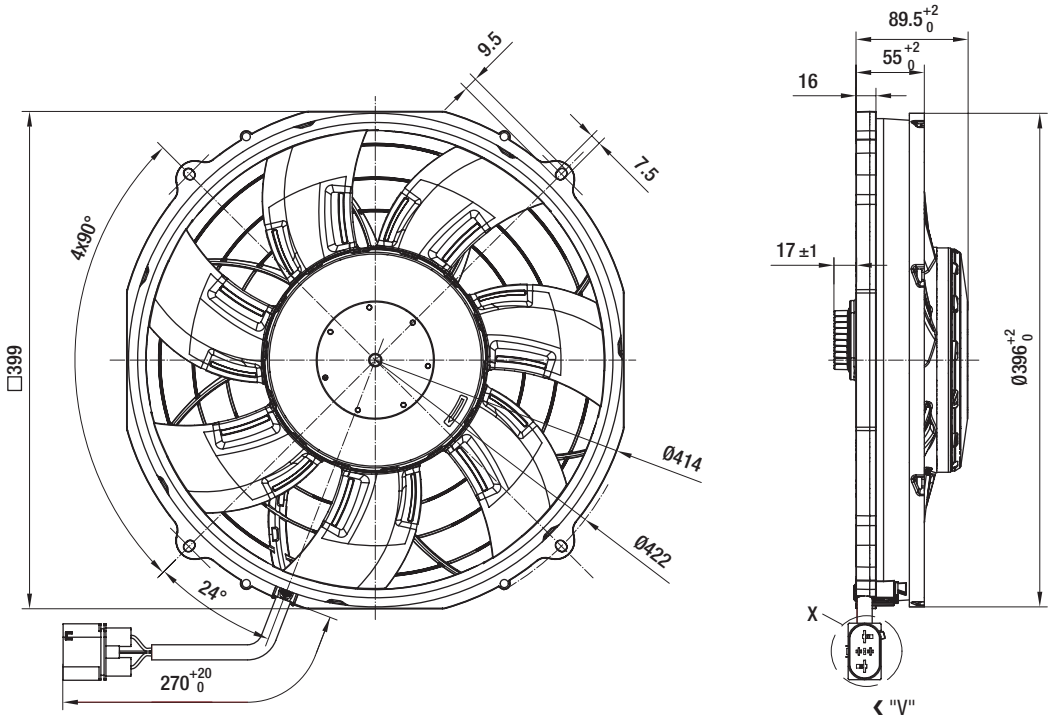
Curves:



		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	3300	525	20,0	90
Ⓐ	2	3180	615	23,7	89
Ⓐ	3	3050	610	23,5	88
Ⓐ	4	2920	610	23,6	88

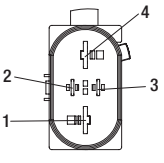
Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!
For detailed information see page 68 ff.

ebmpapst



Mating plug on customer side:

Housing:		FCI 30432101
Plug contactors:	9,5 mm	FCI 60070461
	4,8 mm	FCI 60040431
Seals:		FCI 60993301
		FCI 60992607



View X

1 = + UB	black	
2 = Diagnostic output	white	
3 = PWM/LIN*	yellow	* optionally LIN-BUS
4 = GND	brown	

EC axial fans

with brushless DC motor **„Basic“**

ErP2015 EXCEEDS THE NORM

EC axial fan

for automotive applications, Ø 300

- **Material:** Wall ring: plastic PP, coloured black (conforms to UL 94 HB)
  Impeller: plastic PA, coloured black (conforms to UL 94 HB)
- **Direction of air flow:** "V" (sucking over rotor)
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Electronics: IP 66 / 69 K
- **Insulation class:** „B“ in accordance with EN 60335-1
- **Mounting position:** Any
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Locked-rotor protection
- **EMC requirements:** ECE R10 Rev. 3
- **Approval:** E1

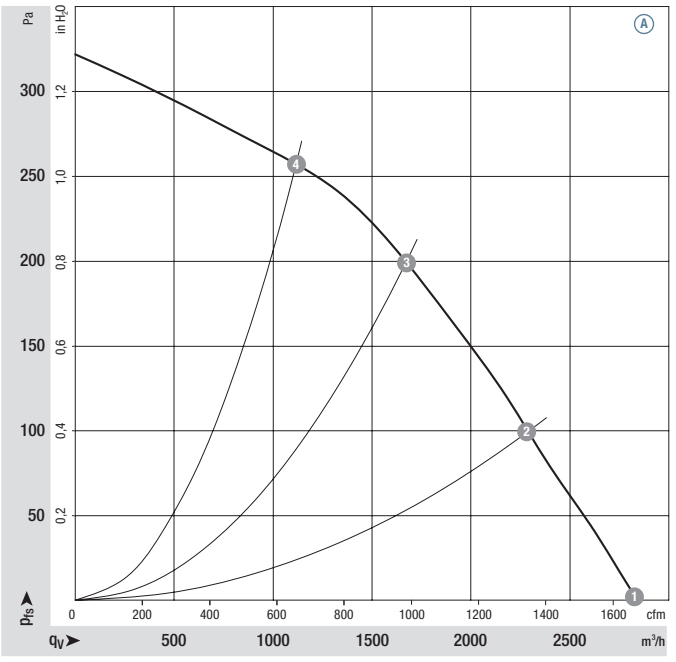
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Max. back pressure	Sound power level	Perm. amb. temp.	Mass	Electr. connection
			VDC	VDC	m³/h	rpm	W	A	Pa	dB(A)	°C	kg	
W1G 300-EC24 -01(1)	M1G 074-CF	Ⓐ	26	18-32	2840	3100	250	9,60	---	81	-40..+85(2)	2,6	p. 64 / M)

subject to alterations

(1) 24-volt variant (2) over + 70 °C with power derating

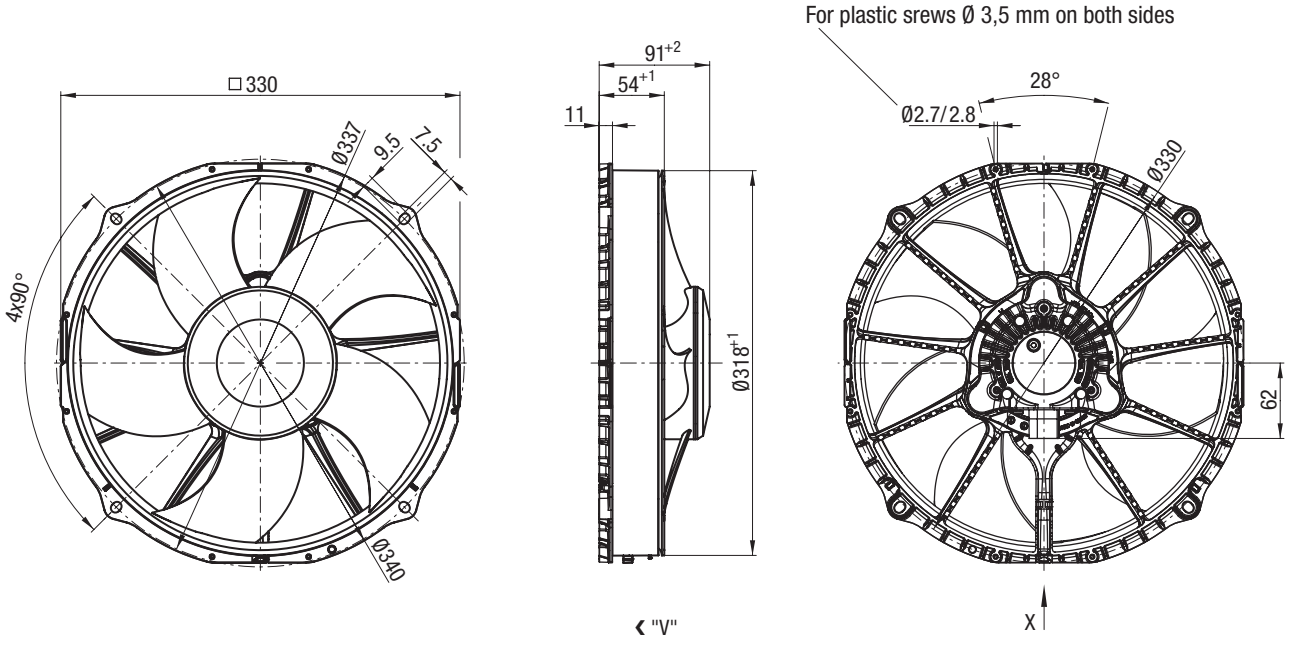
Curves:



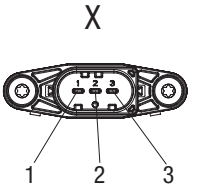
	n rpm	Ped W	I A	LWA dB(A)
Ⓐ 1	3100	250	9,60	81
Ⓐ 2	2985	247	9,47	83
Ⓐ 3	2945	246	9,45	83
Ⓐ 4	2800	242	9,29	83

Air performance measured as per: ISO 5801, Installation category A, without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted!
For detailed information see page 68 ff.

ebmpapst



Connection plug: TE MCP 2.8, 3-pole,coded
Housing: TE MCP 2.8 :1-1718627-1
Plug contactors: 2,8 mm TE 1241388-1 and TE 1241396-1
Seals: 1,2-2,1mm TE 963294-1 and 2,7-3,0 mm TE 963292-1
Lead connection 02020-4-1021 with mating plug not included in delivery.



View X
1 = + UB
2 = 0-10 V
3 = GND

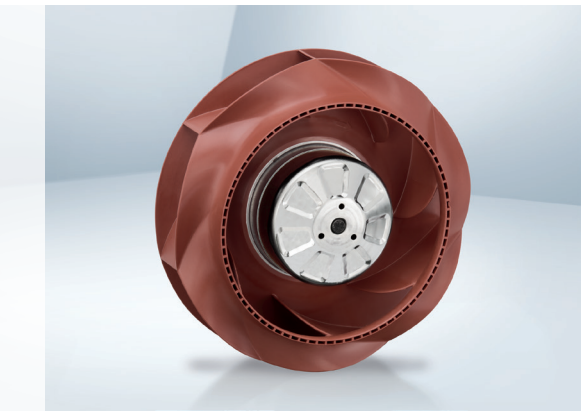
EC centrifugal fans - RadiCal

backward curved, with brushless DC motor

ErP2015 EXCEEDS THE NORM

EC centrifugal fan – RadiCal

backward curved, for automotive applications, Ø 220



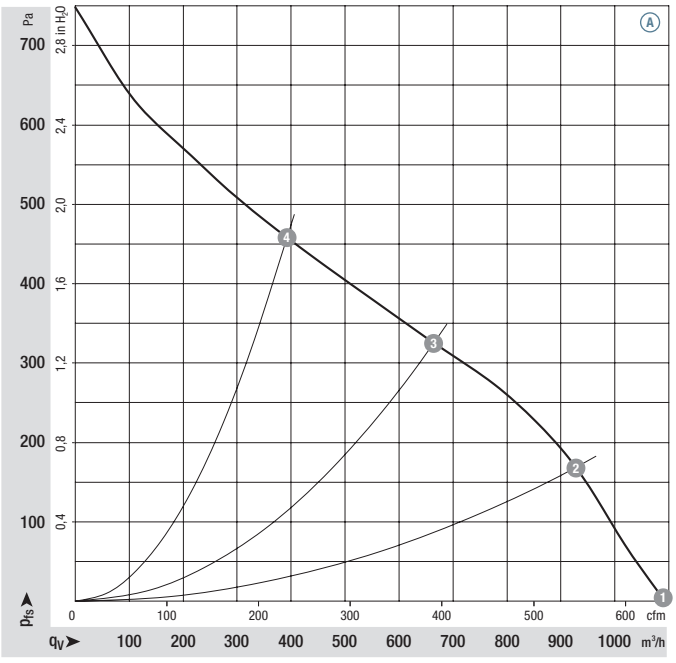
- **Material:** Impeller: Plastic PA, fibreglass-reinforced
  Rotor: Galvanised
  Electronics housing: Die-cast aluminium, coated in black
- **Number of blades:** 7
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Elektronics: IP 66 / 69 K
- **Insulation class:** "B"
- **Mounting position:** Shaft horizontal or rotor on bottom, rotor on top on request
- **Condensate discharges:** Rotor-side
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Locked-rotor protection
- **Approval:** EAC

Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Sound power level	Perm. amb. temp.	Mass	Technical features and electr. connection
			VDC	VDC	m^3/h	rpm	W	A	dB(A)	°C	kg	
R1G 220-RD87 -02	M1G 074-BF	Ⓐ	24	16-28	1090	3130	120	6,5	78	-40..+60	1,5	p. 66 / N)

subject to alterations

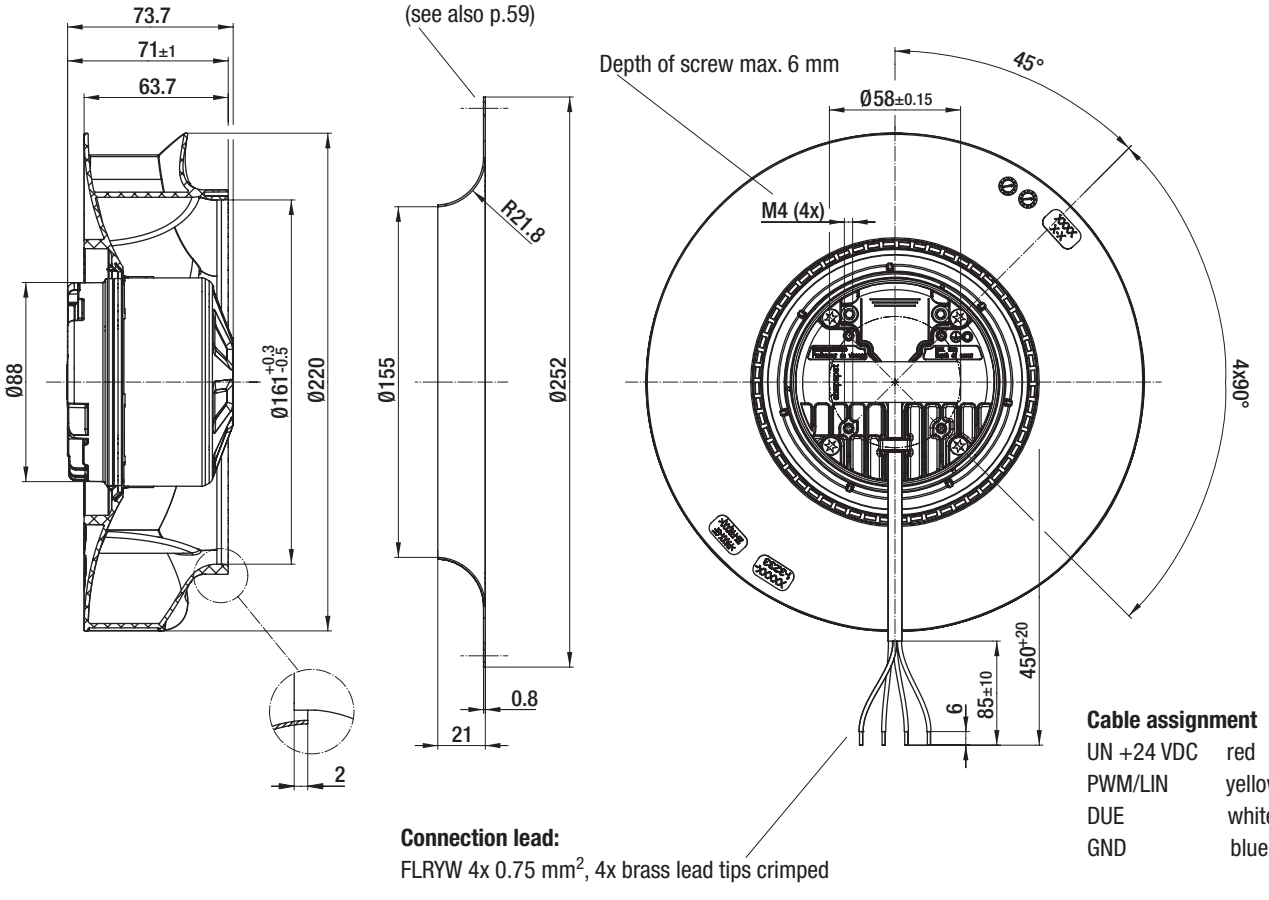
Curves:



		n rpm	P_{ed} W	I A	L_{WA} dB(A)
Ⓐ	1	3130	120	6,50	78
Ⓐ	2	3065	124	6,69	75
Ⓐ	3	2965	125	6,93	70
Ⓐ	4	3060	123	6,69	73

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst inlet nozzle and without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

Accesory part:
Inlet nozzle 09609-2-4013,
not included in the standard scope of delivery.
(see also p.59)



Cable assignment

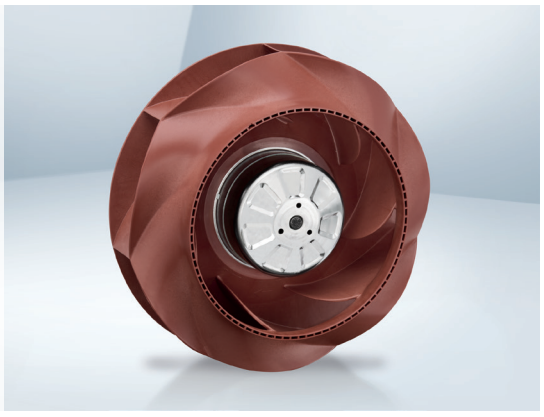
UN +24 VDC	red
PWM/LIN	yellow
DUE	white
GND	blue

Connection lead:
FLRYW 4x 0.75 mm^2, 4x brass lead tips crimped

ErP2015 EXCEEDS THE NORM

EC centrifugal fan – RadiCal

backward curved, for automotive applications, Ø 250



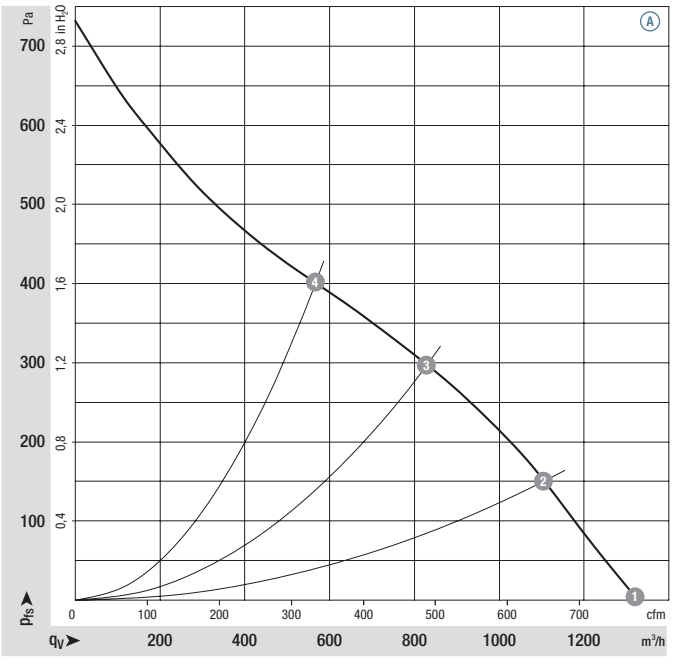
- **Material:** Impeller: Plastic PA, fibreglass-reinforced
  Rotor: Galvanised
  Electronics housing: Die-cast aluminium, coated in black
- **Number of blades:** 7
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Elektronics: IP 66 / 69 K
- **Insulation class:** "B"
- **Mounting position:** Shaft horizontal or rotor on bottom, rotor on top on request
- **Condensate discharges:** Rotor-side
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings
- **Motor protection:** Locked-rotor protection
- **Approval:** EAC

Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Sound power level	Perm. amb. temp.	Mass	Technical features and electr. connection
			VDC	VDC	m^3/h	rpm	W	A	dB(A)	°C	kg	
R1G 250-RC75 -02	M1G 074-CF	Ⓐ	24	16-28	1325	2550	130	7,1	76	-25..+60	1,5	p. 66 / N)

subject to alterations

Curves:



		n rpm	Ped W	I A	LWA dB(A)
Ⓐ	1	2550	130	7,10	76
Ⓐ	2	2445	131	7,45	72
Ⓐ	3	2370	134	7,73	69
Ⓐ	4	2410	132	7,59	70

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst inlet nozzle and without protection against accidental contact. Suction-side noise levels: Lw_A as per ISO 13347, Lp_A measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

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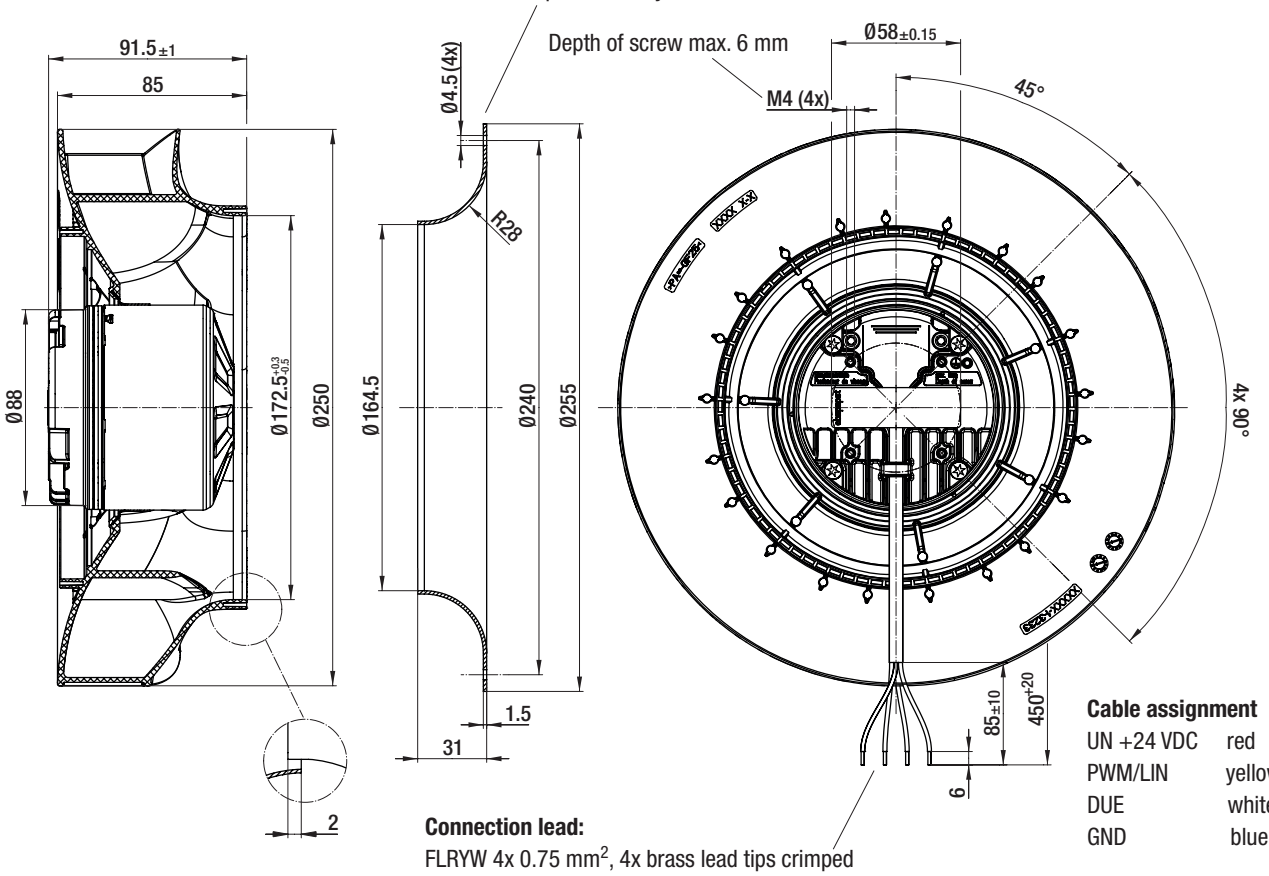
Accesory part:
Inlet nozzle 96359-2-4013,
not included in the standard scope of delivery.



Connection lead:
FLRYW 4x 0.75 mm^2, 4x brass lead tips crimped

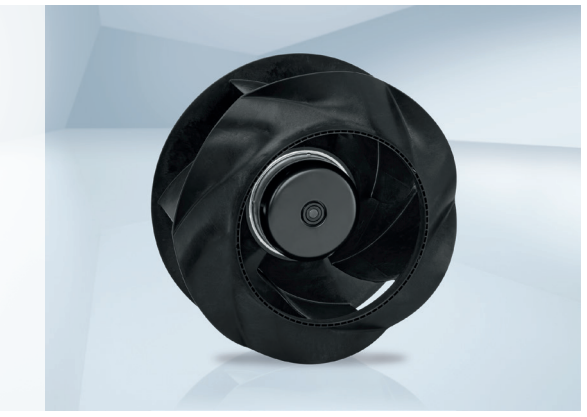
Cable assignment

UN +24 VDC	red
PWM/LIN	yellow
DUE	white
GND	blue

ErP2015 EXCEEDS THE NORM

EC centrifugal fan – RadiCal

backward curved, for automotive applications, Ø 280



- **Material:** Impeller: plastic PA UL94 V0, black, conforms to EN 45545-2 (HL3)
  Rotor: coated in black
  Electronics housing: Die-cast aluminium, coated in black
- **Number of blades:** 5
- **Direction of rotation:** Clockwise, seen on rotor
- **Type of protection:** Motor: IP 24 KM, Elektronics: IP 66 / 69 K
- **Insulation class:** "B"
- **Mounting position:** Any
- **Condensate discharges:** Rotor-side
- **Mode of operation:** Continuous operation (S1)
- **Bearings:** Maintenance-free ball bearings

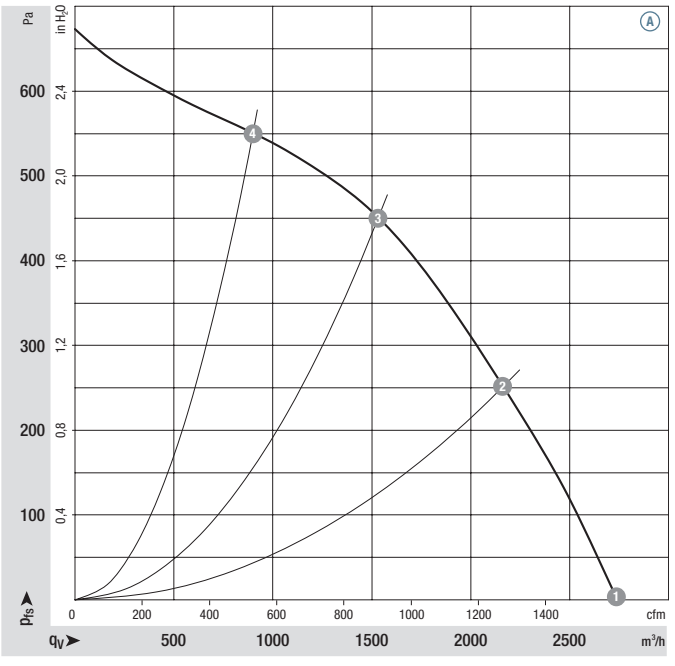
Nominal data

Type	Motor	Curve	Nominal voltage	Nominal voltage range	Air flow	Speed/rpm	Input power	Input current	Sound power level	Perm. amb. temp.	Mass	Technical features and electr. connection
			VDC	VDC	m^3/h	rpm	W	A	dB(A)	°C	kg	
R3G 280-RU26 -81(1)	M3G 084-CF	Ⓐ	26	16-32	2740	2350	252	10,5	80	-40..+60	3,0	p. 65 / P)

subject to alterations

(1) 24-volt variant (also possible as 12-volt variant)

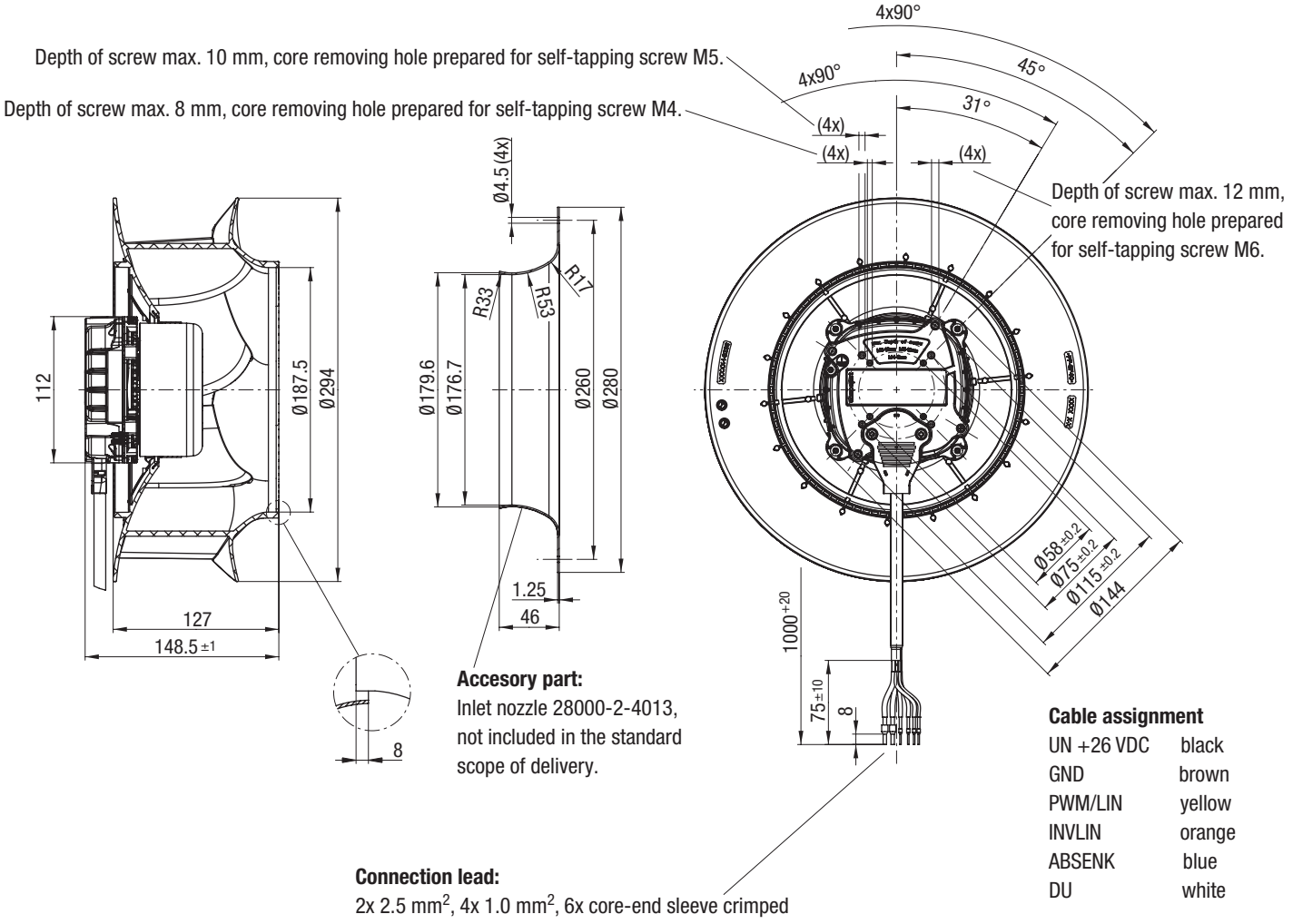
Curves:



		n rpm	P_{ed} W	I A	L_{WA} dB(A)
Ⓐ	1	2350	252	10,5	80
Ⓐ	2	2280	298	12,4	75
Ⓐ	3	2265	309	12,9	73
Ⓐ	4	2305	278	11,6	74

Air performance measured as per: ISO 5801, Installation category A, with ebm-papst inlet nozzle and without protection against accidental contact. Suction-side noise levels: L_{WA} as per ISO 13347, L_{pA} measured at 1 m distance to fan axis. The acoustic values given are only valid under the measurment conditions listed and may vary depending on the installation situation. With any deviation to the standard setup, the specific values have to be checked and reviewed once installed or fitted! For detailed information see page 68 ff.

– **Technical features:** See electrical connections p. 65
– **Cable exit:** Lateral
– **Protection class:** III
– **Approvals:** EAC, E1



Accesory part:
Inlet nozzle 28000-2-4013, not included in the standard scope of delivery.

Connection lead:
2x 2.5 mm², 4x 1.0 mm², 6x core-end sleeve crimped

Cable assignment

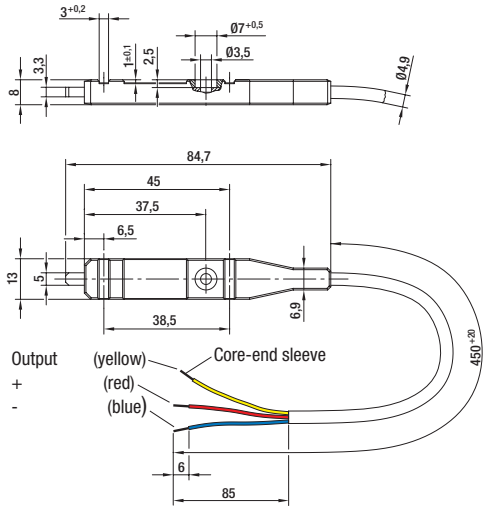
UN +26 VDC	black
GND	brown
PWM/LIN	yellow
INVLIN	orange
ABSENK	blue
DU	white

Temperature control module

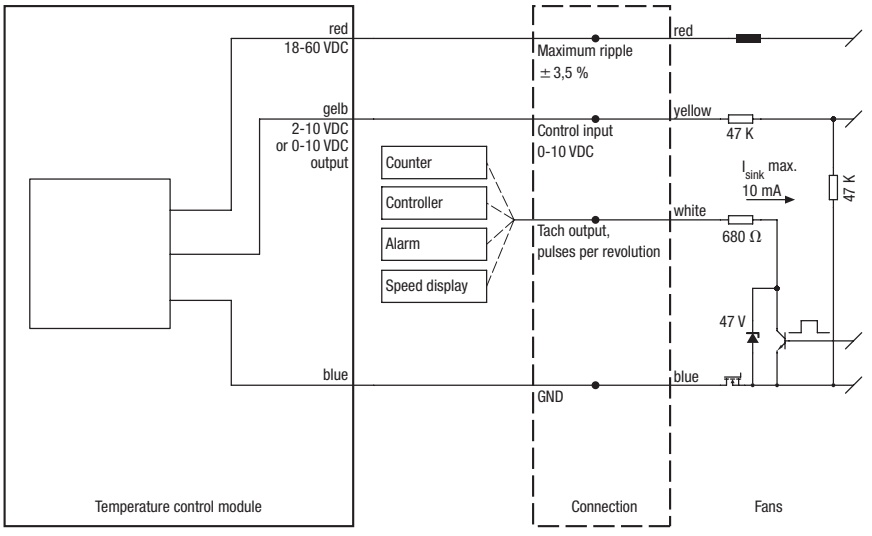
– **Type of protection:** IP 42

Nominal data	Nominal voltage	Current draw	Output voltage	Output current	Output impedance	Temperature control range	Mass
Part no.	**VDC**	**mA**	**VDC**	**mA**	**kΩ**	**°C**	**kg**
50002-1-0174	18-60	10	2-10	0,1	6,8	+30..+55	0,02
50003-1-0174	18-60	10	0-10	0,1	6,8	+10..+45	0,02

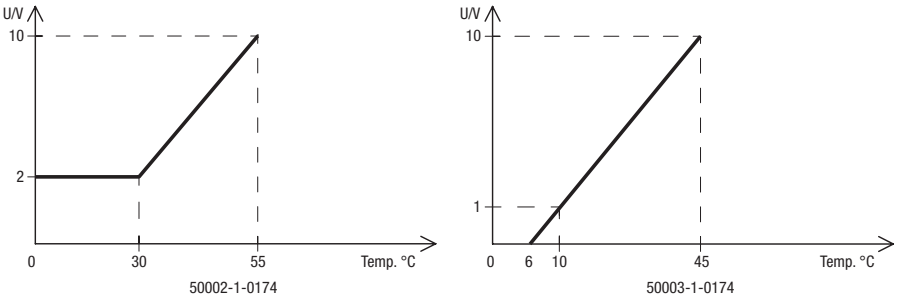
subject to alterations



– **Electr. connection:**



– **Control function:** Both designs have “cooling” as control function



Tolerance ± 3 K

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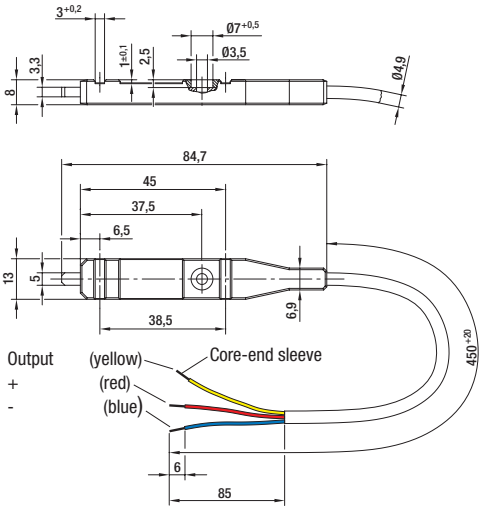
Temperature sensor

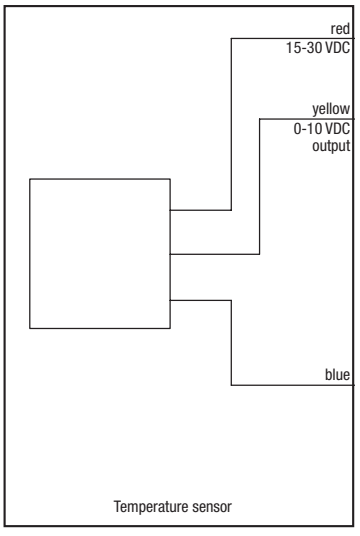
– **Type of protection:** IP 42

Nominal data	Nominal voltage	Current draw	Output voltage	Output current	Output impedance	Temperature control range	Mass
Part no.	**VDC**	**mA**	**VDC**	**mA**	**kΩ**	**°C**	**kg**
50005-1-0174	15-30	10	0-10	1,0	1,1	-20..+80	0,02

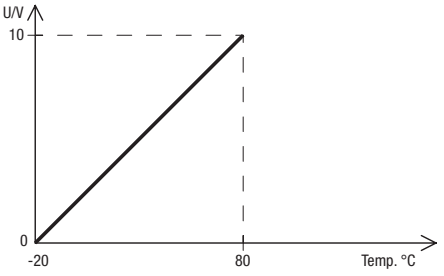
subject to alterations

– **Electr. connection:**



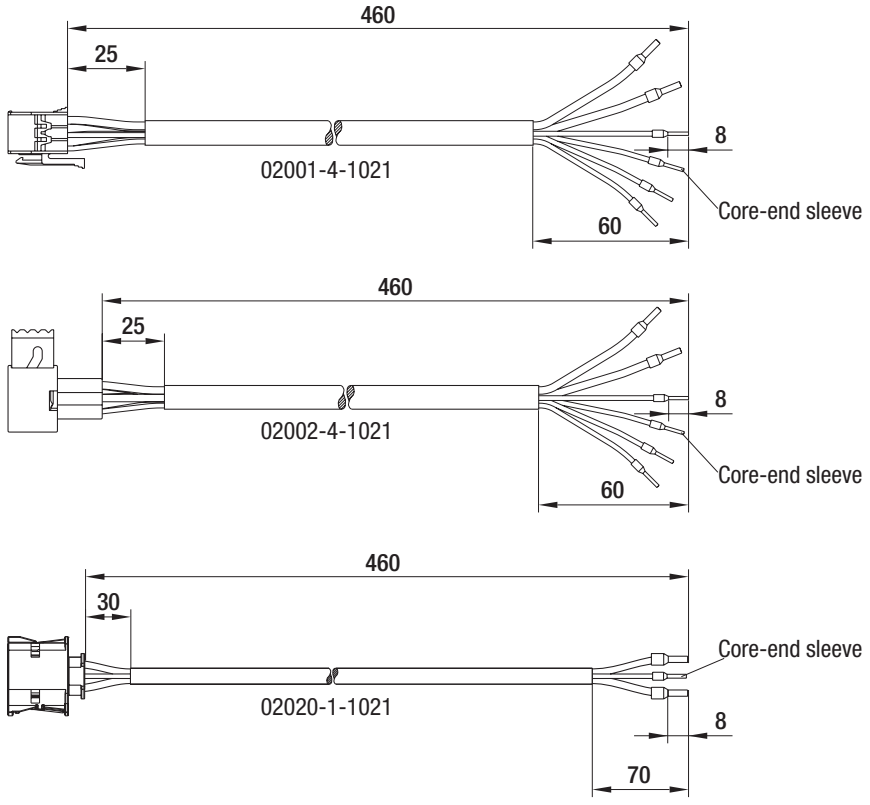


– **Output voltage depending on temperature:**



Tolerance ± 3 K

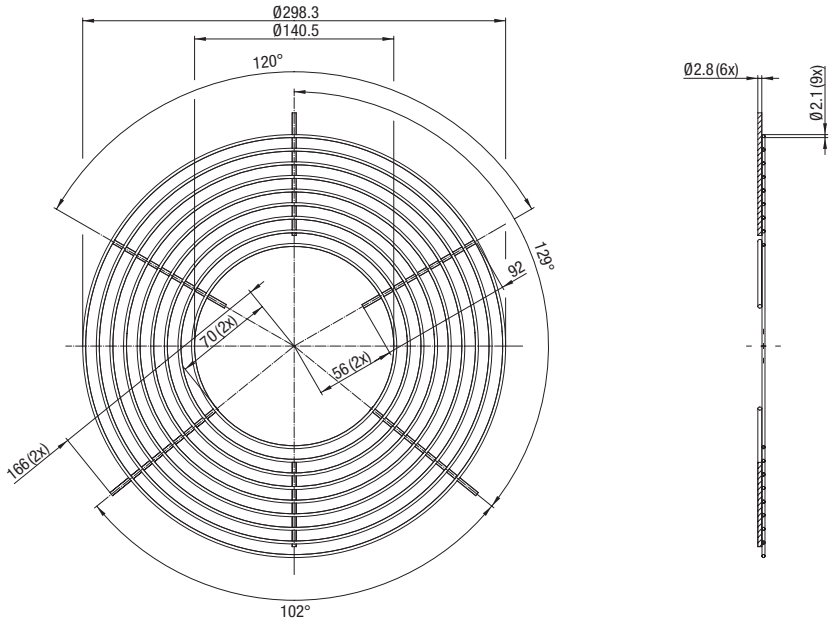
Connection leads



Connection leads

Part no.	Application
02001-4-1021	EC dual centrifugal fan with housing
02002-4-1021	EC axial fan
02020-1-1021	W1G 300-EC24-01

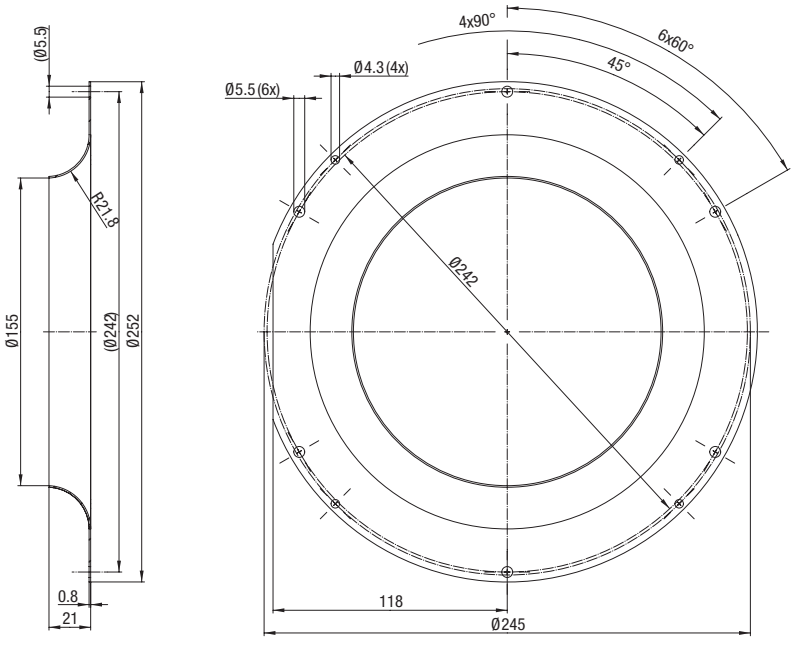
subject to alterations



Guard grille

Part no.	Application
18600-2-4039	W1G 300-EC24-01

subject to alterations



Inlet nozzle*

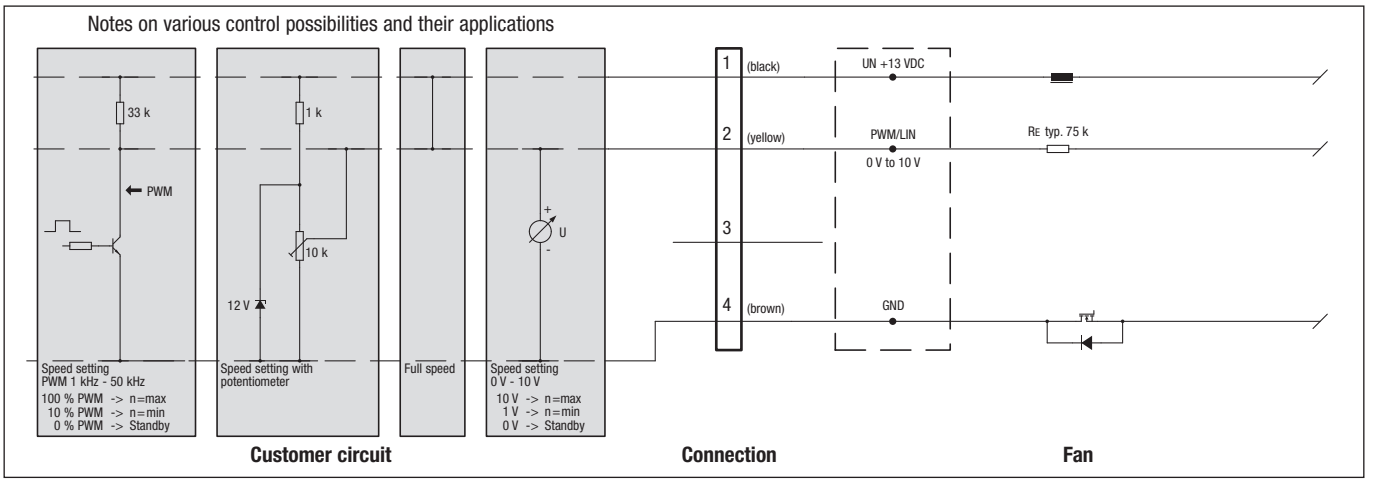
Part no.	Application
09609-2-4013	R1G 220-RD87-02

subject to alterations

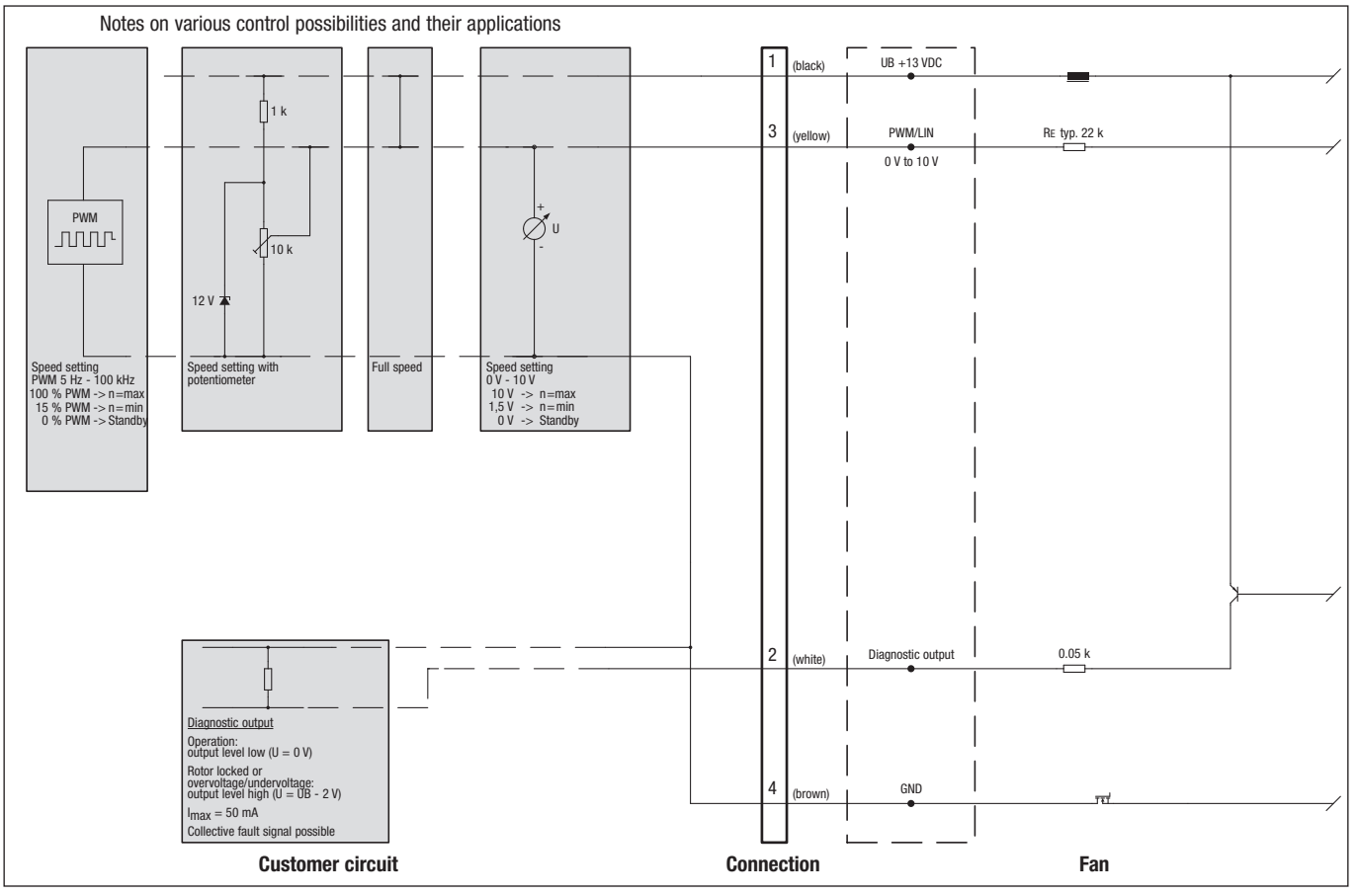
*The inlet nozzles from R1G 250 and R1G 280 are dimensioned on the respective product pages.

Electrical connections automotive

Electrical connection A) : 13 VDC (EC dual centrifugal fan with housing „Premium“)



Electrical connection L) : 13/26 VDC (EC axial fan „Power“)



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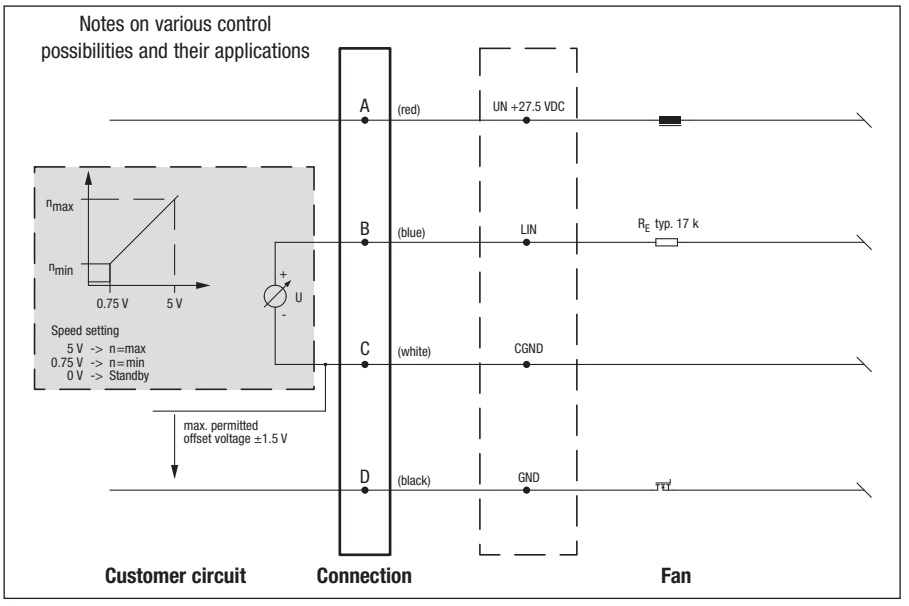
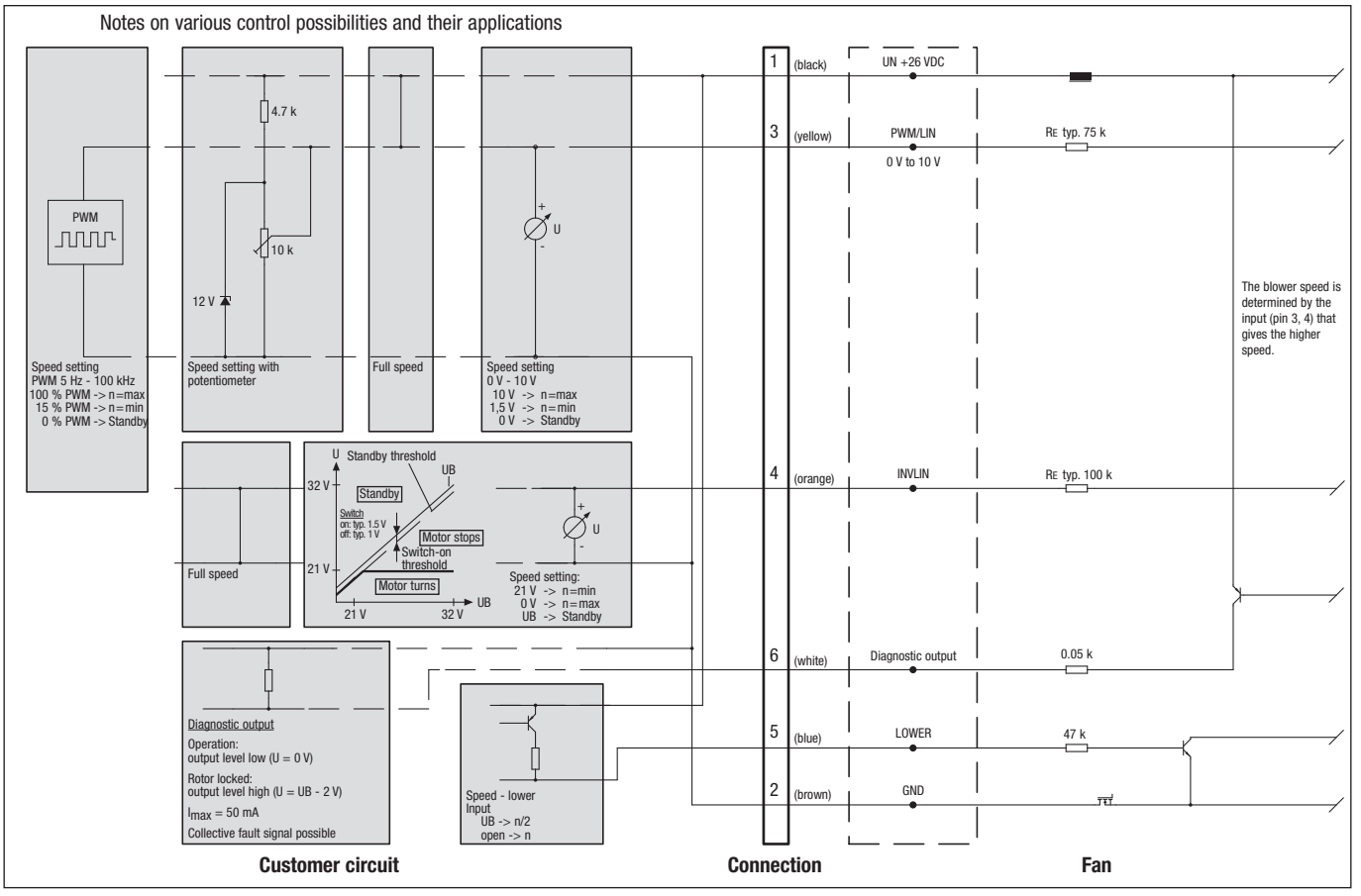
Electrical connection C) : 27,5 VDC

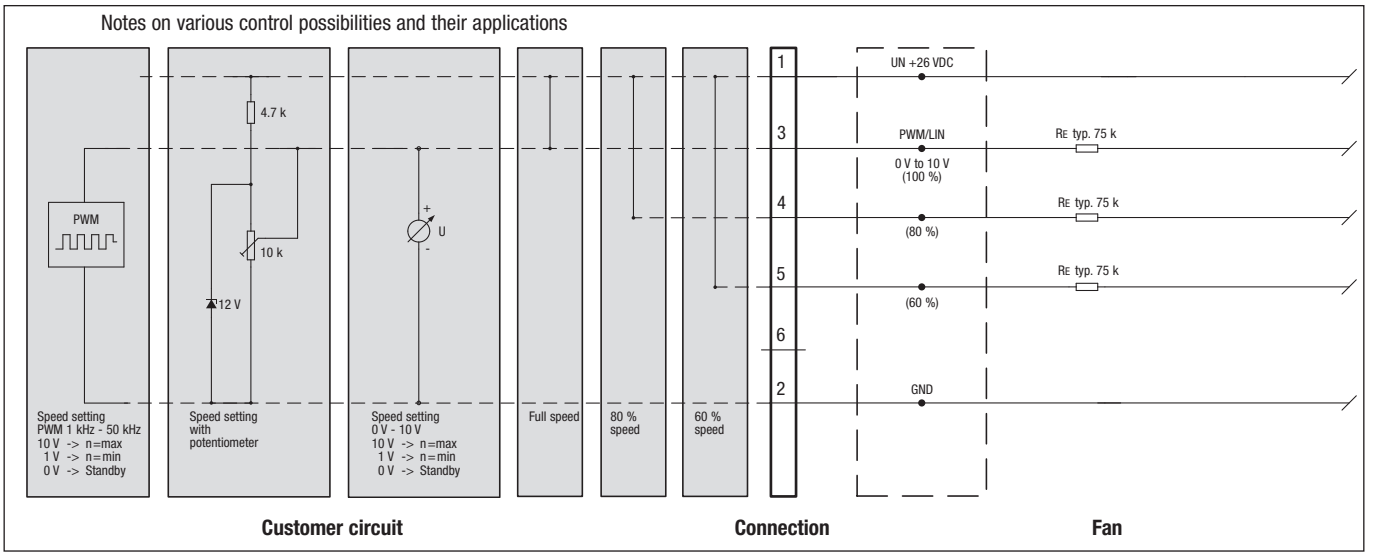


Electrical connection D) : 26 VDC

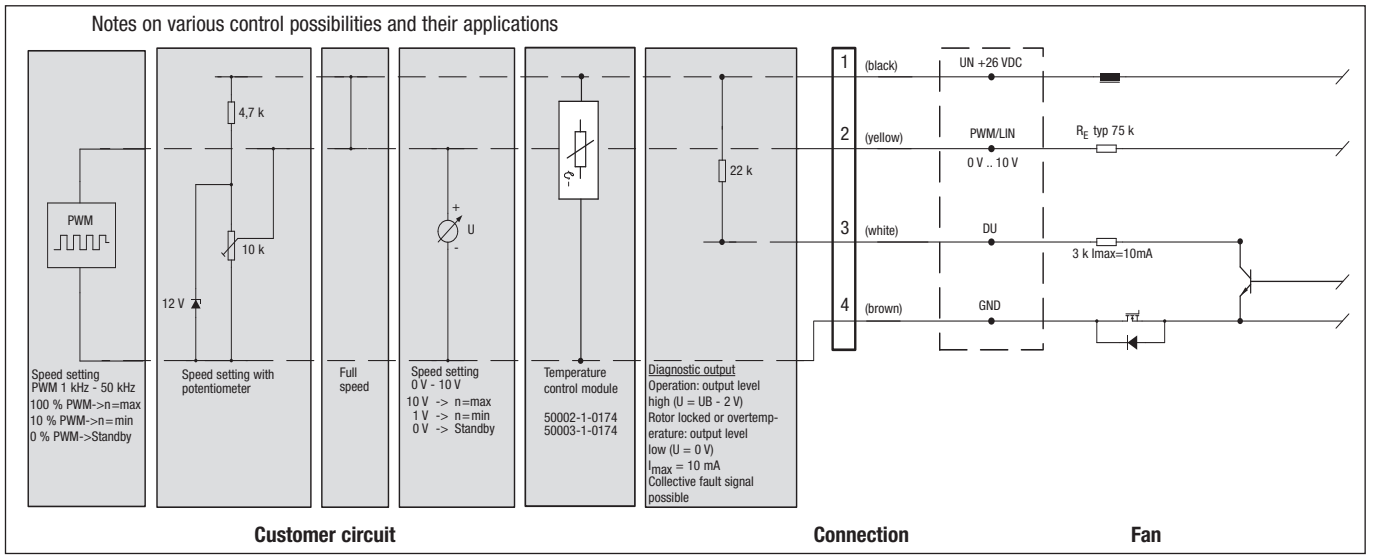


Electrical connections automotive

Electrical connection F) : 26 VDC (EC dual centrifugal fan with housing „Basic“)



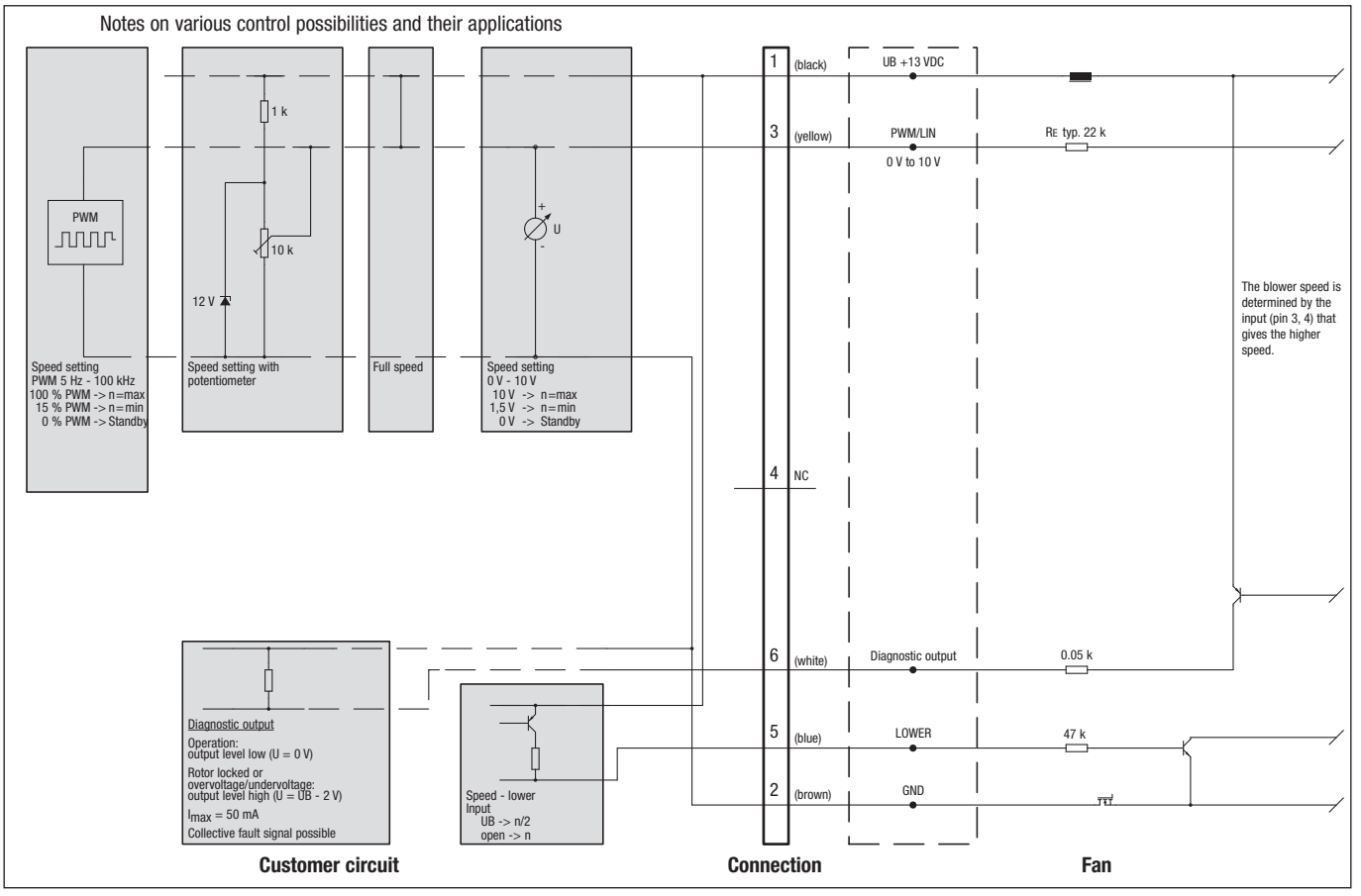
Electrical connection G) : 26 VDC (EC dual centrifugal fan with housing „Premium“)



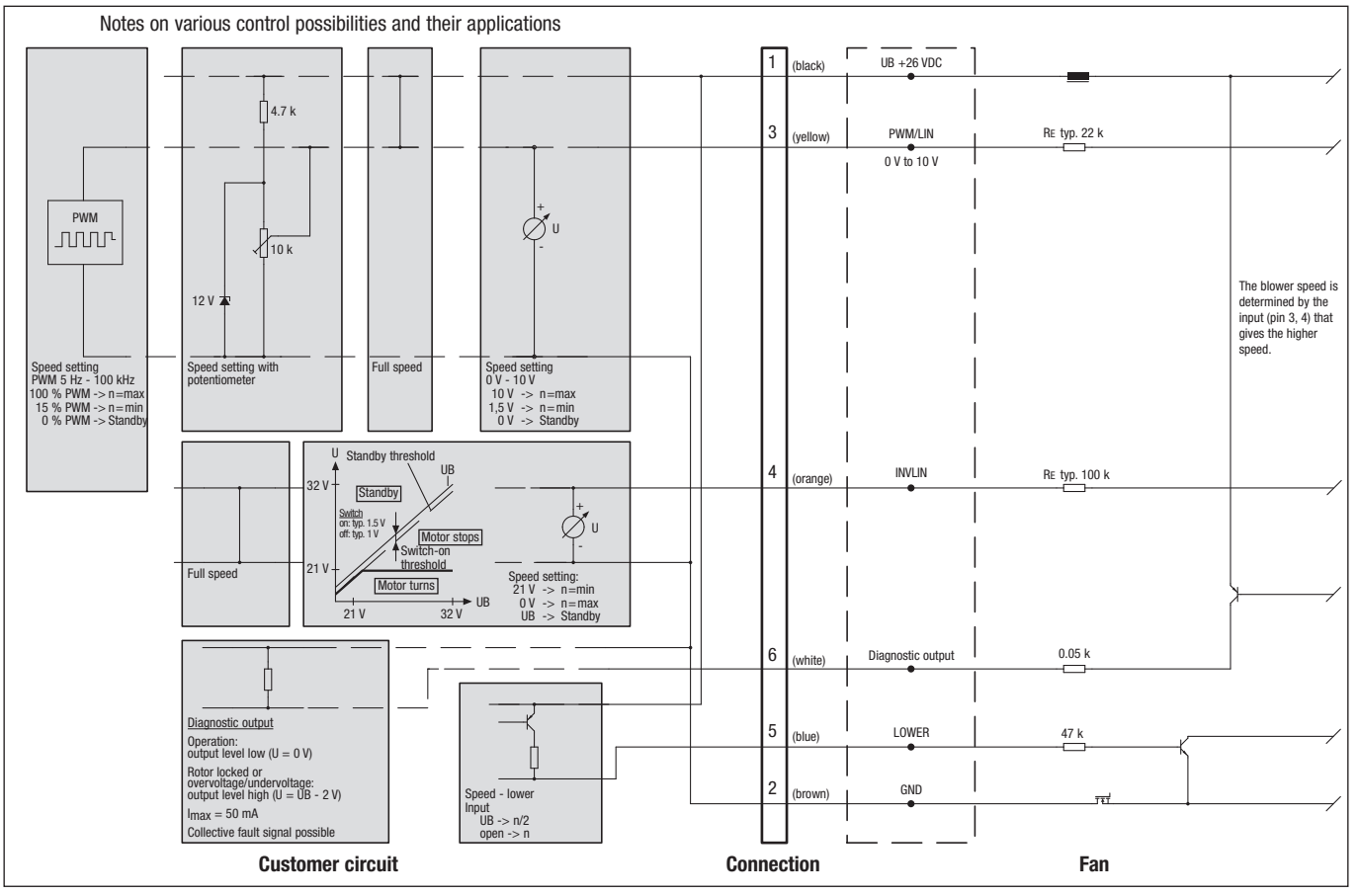
ebmpapst

Electrical connections automotive

Electrical connection K) : 13 VDC (EC axial fan „Premium“)



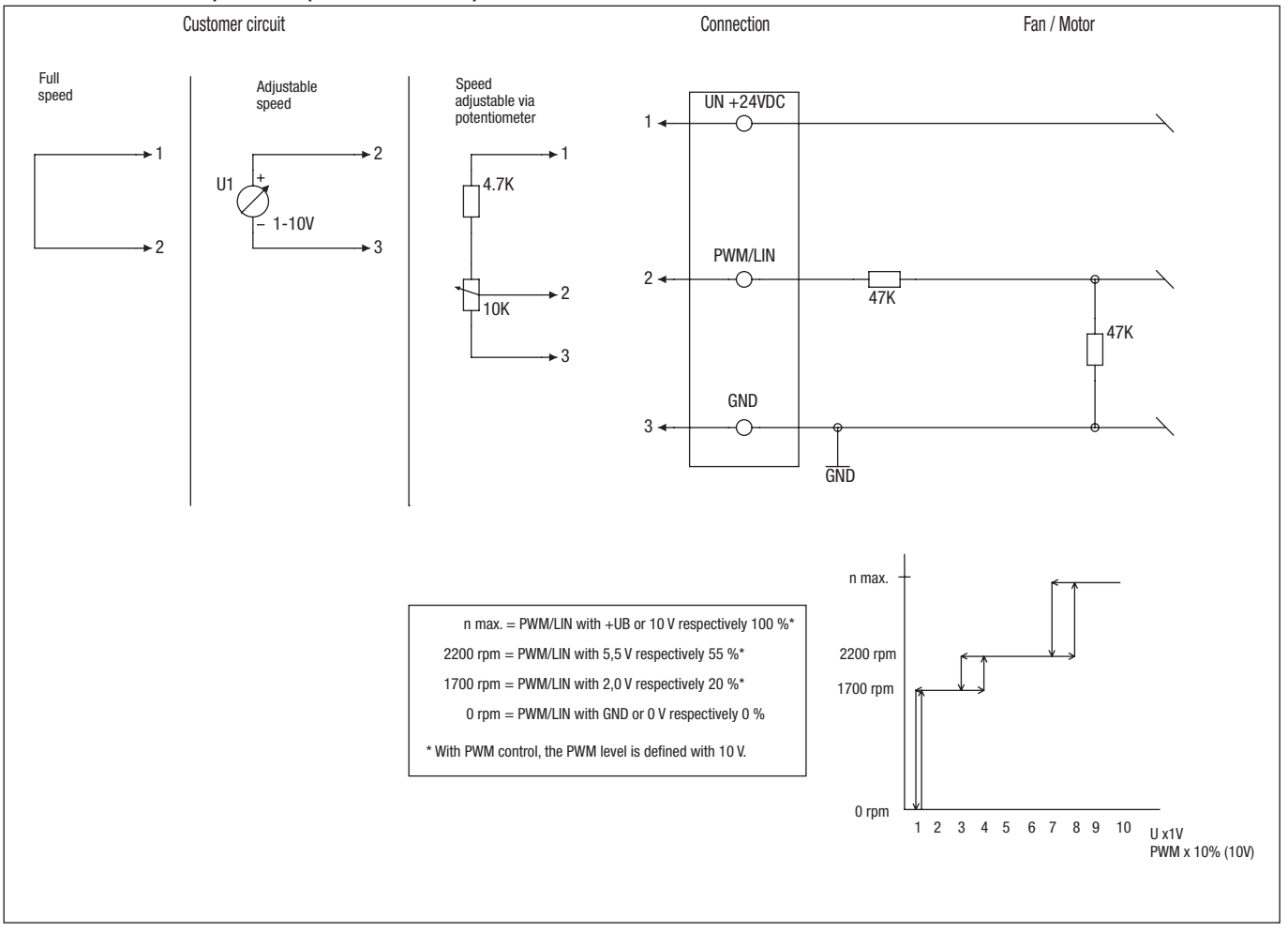
Electrical connection H) : 26 VDC (EC axial fan „Premium/Power“)



Electrical connections automotive

Technical features:
- Control input 0-10 VDC
- Line undervoltage detection
- Locked-rotor protection
- Soft start
- Over-temperature protected electronics
- Motor current limit
- Overvoltage detection

Electrical connection M) : 26 VDC (W1G 300-EC24-01)



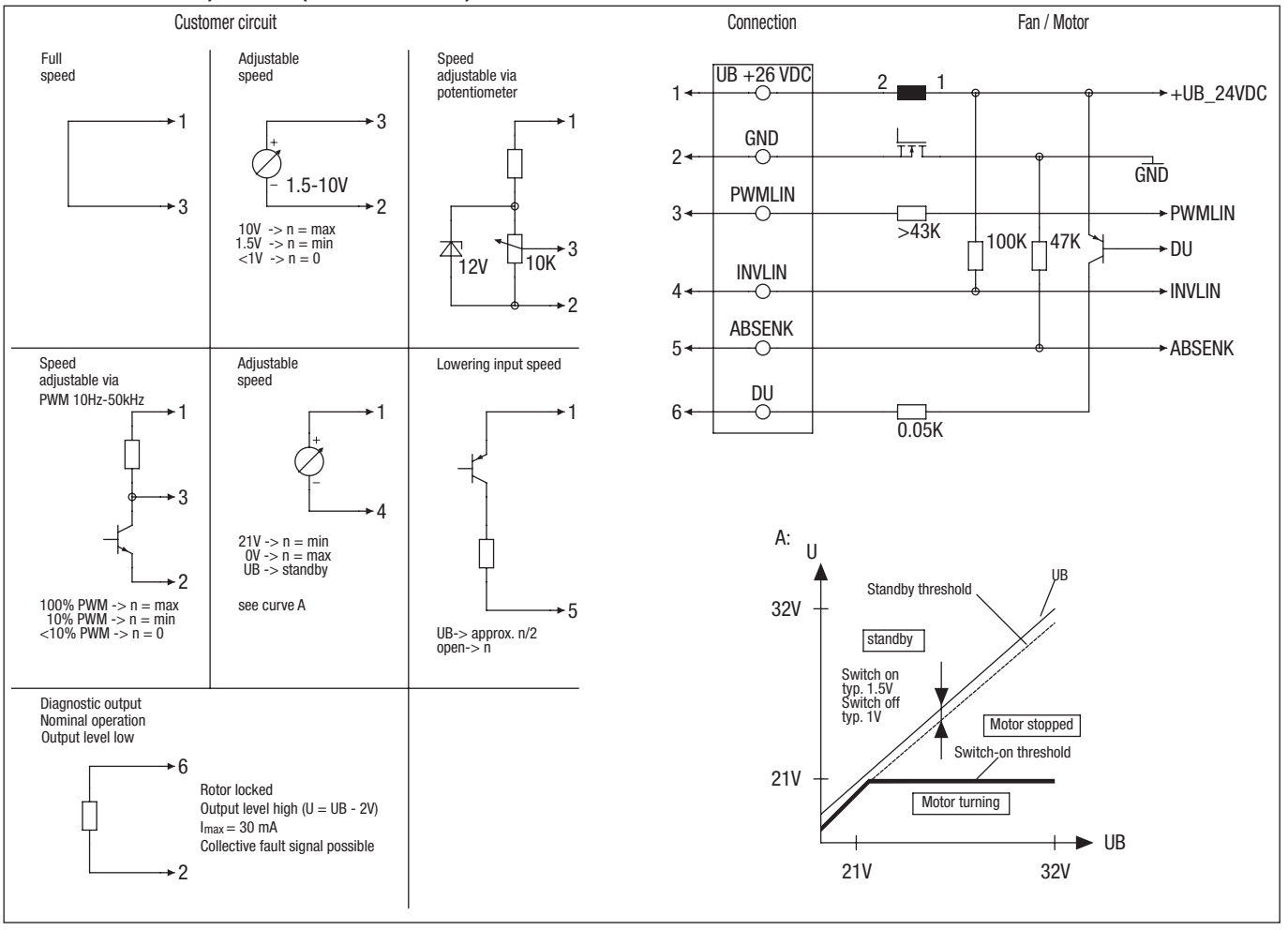
Connection	Designation	Assignment / function
1	UB +24 VDC	Power supply 24 VDC, maximum ripple 3,5 %
2	PWM/LIN	Analogue voltage control input 0-10 V or PWM
3	GND	Reference ground

Electrical connections automotive

Technical features:

- Control input 0-10 VDC / PWM
- Lowering input
- INVLIN (control input, inverse linear)
- Fault output (high-side switch max. 30mA)
- Line undervoltage detection
- Output limit
- Reverse polarity and locked-rotor protection
- Soft start
- Over-temperature protected electronics
- Motor current limit
- Overvoltage detection
- Temperature derating
- Load dump (58V)

Electrical connection P) : 26 VDC (R3G 280-RU26-81)



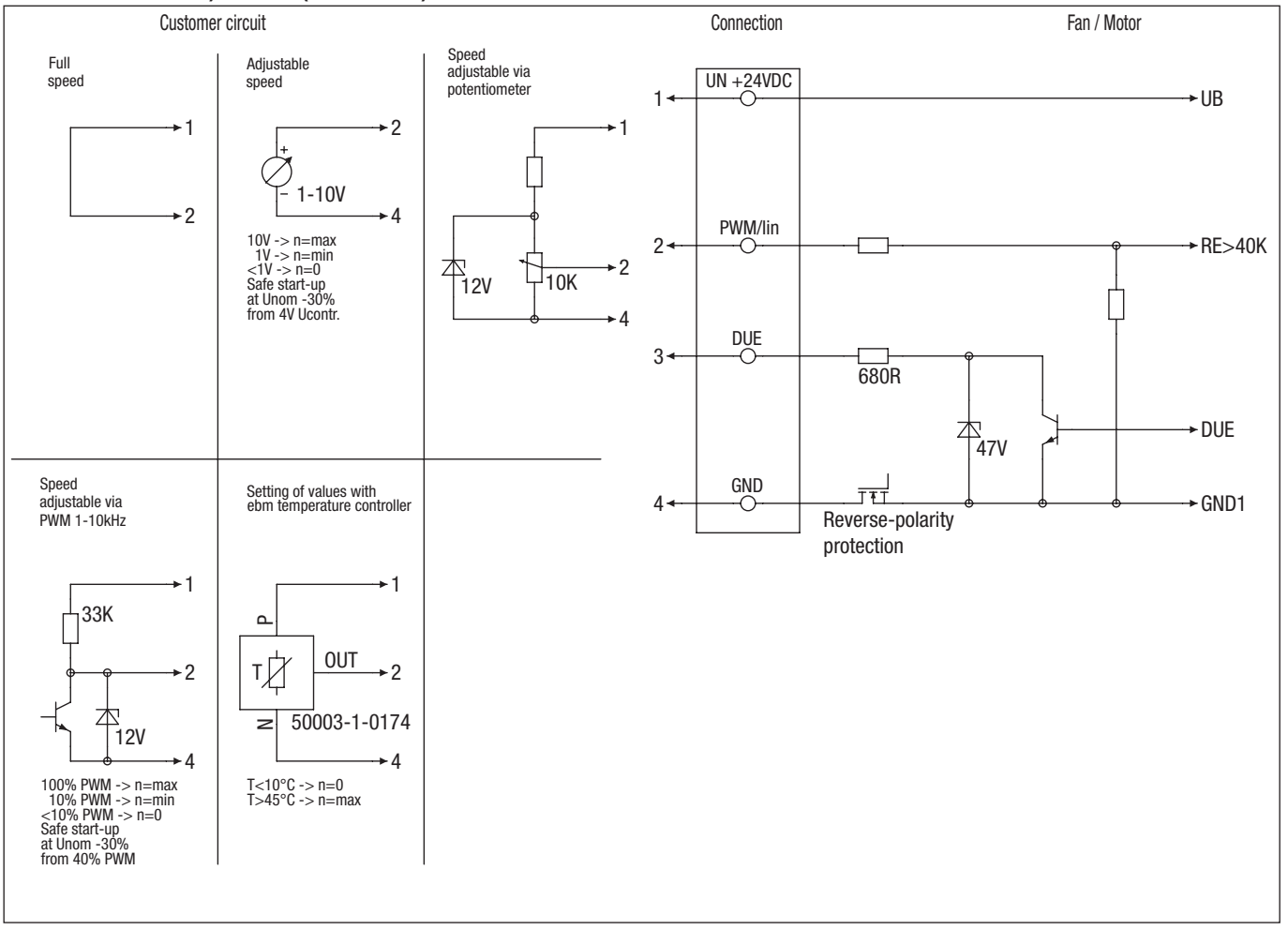
Connection	Designation	Colour	Assignment / function
1	UB +26 VDC	black	Power supply 26 VDC
2	GND	brown	Power supply GND, reference ground
3	PWMLIN	yellow	Analogue voltage control input 0-10 V or PWM
4	INVLIN	orange	Control input, inverse linear
5	ABSENK	blue	Lowering input
6	DU	white	Diagnostic output

Electrical connections automotive

Technical features:

- Control input 0-10 VDC / PWM
- Tach output
- Reverse polarity and locked-rotor protection
- Soft start
- Motor current limit
- Temperature derating

Electrical connection N) : 24 VDC (R1G 220/250)



Connection	Designation	Colour	Assignment / function
1	UB +24 VDC	red	Power supply 24 VDC, maximum ripple 3,5 %
2	PWM/LIN	yellow	Control input Re > 40 K
3	DUE	white	Speed monitoring output, 3 pulses per revolution, Isink max. = 10 mA
4	GND	blue	Reference ground

Technical parameters & scope

High standards for all ebm-papst products
Here at ebm-papst, we constantly strive to further improve our products in order to be able to offer you the best possible product for your application. Careful monitoring of the market ensures that technical innovations are reflected in the improvements of our products. Based on the technical parameters listed below and the ambience you want our product to operate in, we here at ebm-papst can always work out the best solution for your specific application.

General performance parameters
Any deviations from the technical data and parameters described here are listed on the product-specific data sheet.

Type of protection
The type of protection is specified in the product-specific data sheets.

Insulation class
The insulation class is specified in the product-specific data sheets.

Mounting position
The mounting position is specified in the product-specific data sheets.

Condensate discharge holes
Information on the condensate discharge holes is provided in the product-specific data sheets.

Mode of operation
The mode of operation is specified in the product-specific data sheets.

Protection class
The protection class is specified in the product-specific data sheets.

Service life
The service life of ebm-papst automotive products depends on:
– The service life of the bearing system

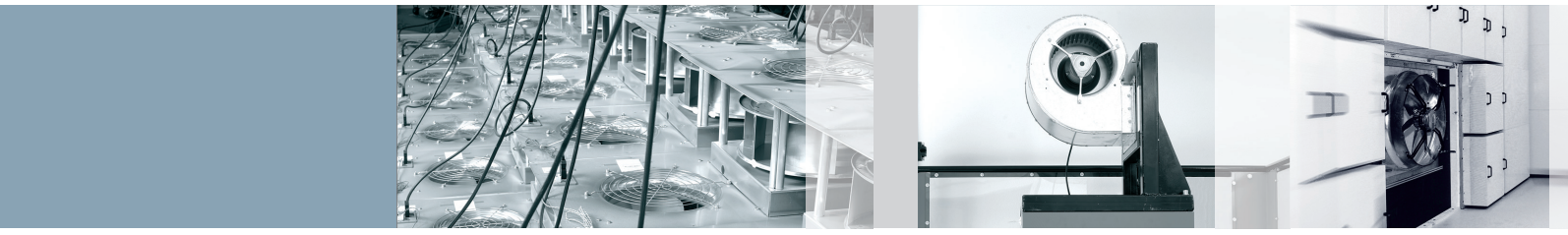
The service life of the bearing system depends mainly on the thermal load on the bearing.
The majority of our products use maintenance-free ball bearings for any mounting position possible.

The service life L10 of the ball bearings can be taken as approx. 40,000 operating hours at an ambient temperature of 40 °C, yet this estimate can vary according to the actual ambient conditions.

We will gladly provide you with a lifetime calculation taking into account your specific operating conditions.

Motor protection / thermal protection
Information on motor protection and thermal protection is provided in the product-specific data sheets.

Depending on motor type and field of application, the following protective features are realised:
– Thermal overload protection (TOP), in-circuit
– PTC/NTC with electronic diagnostics
– Current limitation via electronics



Mechanical strain / performance parameters
All ebm-papst products are subjected to comprehensive tests complying with the normative specifications. In addition to this, the tests also reflect the vast experience and expertise of ebm-papst.

Vibration test
Vibration tests are carried out in compliance with
– Vibration test in operation according to DIN IEC 68, parts 2-6
– Vibration test at standstill according to DIN IEC 68, parts 2-6

Shock load
Shock load tests are carried out in compliance with
– Shock load according to DIN IEC 68, parts 2-27

Balancing quality
Testing the balancing quality is carried out in compliance with
– Residual imbalance according to DIN ISO 1940
– Standard balancing quality level G 6.3
Should you require a higher balancing quality level for your specific application, please let us know and specify this when ordering your product.

Chemo-physical strain / performance parameters
Should you have questions about chemo-physical strain, please direct them to your ebm-papst contact.

Fields of application, industries and applications
Our products are used in various industries and applications:
Ventilation, air-conditioning and refrigeration technology, clean room technology, automotive and rail technology, medical and laboratory technology, electronics, computer and office technology, telecommunications, household appliances, heating, machines and plants, drive engineering.
Our products are not designed for use in the aviation and aerospace industry!

Legal and normative directives
The products described in this catalogue are designed, developed and produced in keeping with the standards in place for the relevant product and, if known, the conditions governing the relevant fields of application.

Standards
Information on standards is provided in the product-specific data sheets.

EMC
Information on EMC standards is provided in the product-specific data sheets.
Complying with the EMC standards has to be established on the final appliance, as different mounting situations can result in changed EMC properties.

Approvals
In case you require a specific approval for your ebm-papst automotive product (e1, UL, etc.) please let us know.
Most of our products can be supplied with the relevant approval.
Information on existing approvals is provided in the product-specific data sheets.

Air performance measurements
All air performance measurements are carried out on suction side and on chamber test beds conforming to the specifications as per ISO 5801 and DIN 24163. The fans under test are installed in the measuring chamber at free air intake and exhaust (installation category A) and are operated at nominal voltage, with AC also at nominal frequency, and without any additional components such as guard grilles.
As required by the standard, the air performance curves correspond to an air density of 1,2 kg/m^3.

Technical parameters & scope

Measurement conditions for air and noise measurement

ebm-papst products are measured under the following conditions:

– Axial and diagonal fans in direction of rotation “V” in full nozzle and without guard grille
– Backward curved centrifugal fans, free-running and with inlet nozzle
– Forward curved single and dual inlet centrifugal fans with housing

Noise measurements

All noise measurements are carried out in low-reflective test rooms with reverberant floor. Thus the ebm-papst acoustic test chambers meet the requirements of precision class 1 according to DIN EN ISO 3745. For noise measurement, the fans being tested are placed in a reverberant wall and operated at nominal voltage (for AC, also at nominal frequency) without additional attachments such as the guard grille.

Sound pressure level and sound level

All acoustic values are established according to ISO 13347, DIN 45635 and ISO 3744/3745 to accuracy class 2 and given in A-rated form.

When the sound pressure level (L_p) is measured, the microphone is on the intake side of the fan being tested, usually at a distance of 1 m on the fan axis.

To measure the sound power level (L_W), 10 microphones are distributed over an enveloping surface on the intake side of the fan being tested (see graphic). The sound power level measured can be roughly calculated from the sound pressure level by adding 7 dB.

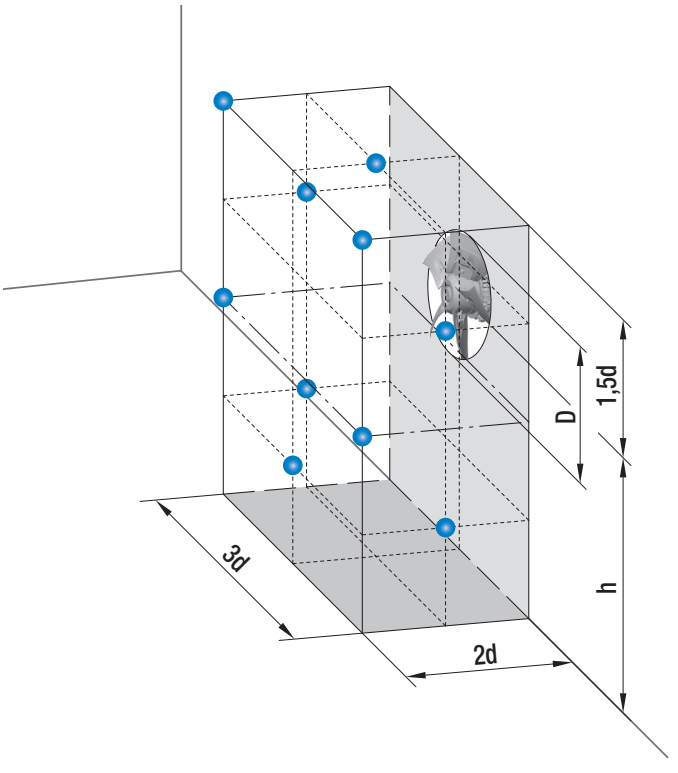
Measuring configuration as per ISO 13347-3 respectively DIN 45635-38:

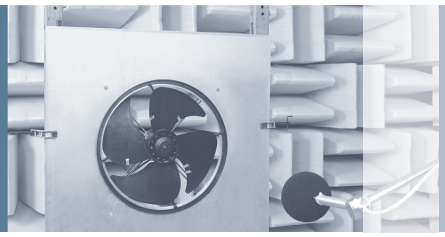
● 10 measuring points

$d \geq D$

$h = 1{,}5d \ldots 4{,}5d$

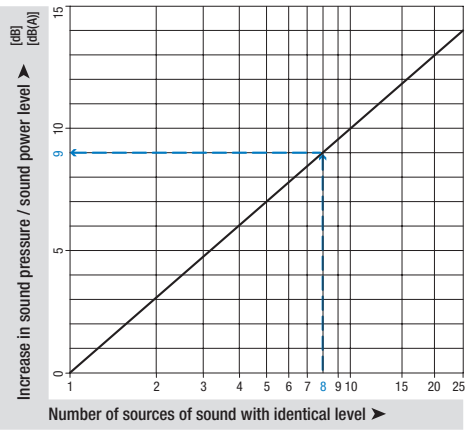
Measurement area $S = 6d^2 + 7d\,(h + 1{,}5d)$





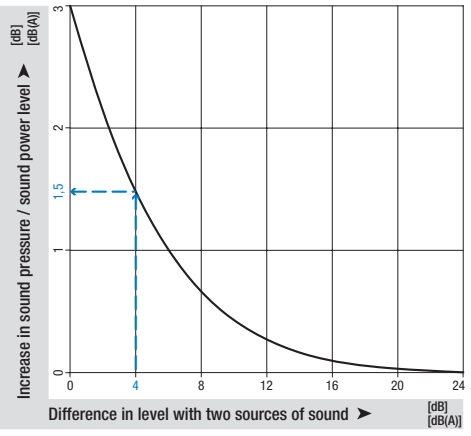
Combined level of multiple same-level sound sources

Adding 2 noise sources with the same level results in a level increase of approx. 3 dB.
The noise characteristics of multiple identical fans can be determined in advance based on the noise values specified in the data sheet. This is shown in the diagram opposite.
Example: 8 A3G800 axial fans are on a condenser. According to the data sheet, the sound pressure level of a fan is approximately 75 dB(A). The level increase measured from the diagram is 9 dB. Thus the overall sound level of the installation can be expected to be 84 dB(A).



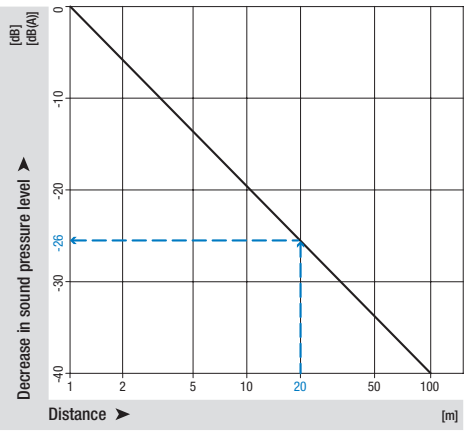
Combined level of two different-level sound sources

The acoustic performance of two different fans can be predetermined based on the sound levels given in the data sheet. This is shown in the diagram opposite.
Example: There is an axial fan A3G800 with a sound pressure level of 75 dB(A) at the operating point and an axial fan A3G710 with 71 dB(A) in a ventilation unit. The level difference is 4 dB.
The level increase can now be read in the diagram as approx. 1.5 dB. This means that the overall sound level of the unit can be expected to be 76.5 dB(A).



Distance laws

Sound power level is independent of distance to the sound source. In contrast to this, sound pressure level decreases the further away the noise source is. The adjacent diagram shows the decrease in level under far sound field conditions. Far sound field conditions apply whenever the distance between microphone and fan is big when compared to fan diameter and wavelength to be considered. For more information on far sound field, please consult the relevant literature on this complex topic. Per doubling of distance, the level in the far sound field decreases by 6 dB. In the near field of the fan, other correlations apply and the decrease in levels can be considerably smaller. The following example only applies to far sound field conditions and can vary strongly depending on the installation effects:
With an axial fan A3G300, a sound pressure level of 65 dB(A) was measured at a distance of 1 m. According to the adjacent diagram, at a distance of 20 m we would get a reduction by 26 dB, i.e. a sound pressure level of 39 dB(A).



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