

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)
Fan housing with guide vanes

ebm-papst Mulfingen GmbH & Co. KGaA & Co. KG
Bachmühle 2 · D-74673 Mulfingen
Phone +49 7938 81-0
info1@de.fansco.com
www.fansco.com

Limited partnership · Headquarters Mulfingen
Amtsgericht (court of registration) Stuttgart · HRA 590344

General partner Elektrobau Mulfingen GmbH · Headquarters Mulfingen
Amtsgericht (court of registration) Stuttgart · HRB 590142

Nominal data

Type	W3G800-LU21-D1	
Motor	M3G150-IF	
Phase		3~
Nominal voltage	VAC	400
Nominal voltage range	VAC	380 .. 480
Frequency	Hz	50/60
Method of obtaining data		ml
Speed (rpm)	min ⁻¹	1090
Power consumption	W	2650
Current draw	A	4
Max. back pressure	Pa	290
Max. back pressure	in. wg	1.16
Min. ambient temperature	°C	-40
Max. ambient temperature	°C	60

ml = Max. load · me = Max. efficiency · fa = Free air · cs = Customer specification · ce = Customer equipment
Subject to change

Occasional start-up at temperatures between -40 °C and -25 °C is permitted. For continuous operation at ambient temperatures below -25 °C (such as refrigeration applications), a fan design with special low-temperature bearings must be used.

Data according to Commission Regulation (EU) 327/2011 (prEN 17166)

		Actual	Req. 2015			
01 Overall efficiency η_{es}	%	56.4	36.2	09 Power consumption P_{ed}	kW	2.54
02 Measurement category		A		09 Air flow q_v	m³/h	17745
03 Efficiency category		Static		09 Pressure increase p_{fs}	Pa	275
04 Efficiency grade N		60.2	40	10 Speed (rpm) n	min ⁻¹	1090
05 Variable speed drive		Yes		11 Specific ratio*		1.00

Data obtained at optimum efficiency level.

* Specific ratio = $1 + p_{fs} / 100\,000\text{ Pa}$

LU-187913

The efficiency values displayed for achieving conformity with the Ecodesign Regulation EU 327/2011 has been reached with defined air duct components (e.g. inlet rings).
The dimensions must be requested from ebm-papst. If other air conduction geometries are used on the installation side, the ebm-papst evaluation loses its validity/the conformity must be confirmed again.
The product does not fall within the scope of Regulation (EU) 2019/1781 due to the exception specified in Article 2 (2a) (motors completely integrated into a product).

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)

Fan housing with guide vanes

Technical description

Weight	46.55 kg
Size	800 mm
Motor size	150
Rotor surface	Painted black
Electronics housing material	Die-cast aluminum, painted gray
Impeller material	PP plastic
Fan housing material	Sheet steel, galvanized and coated with black plastic (RAL 9005)
Material guide vanes	PP plastic
Guard grille material	Steel, coated with black plastic (RAL 9005)
Internal diffuser material including cover	PP plastic
Number of blades	5
Blade pitch	0°
Airflow direction	V
Direction of rotation	Clockwise, viewed toward rotor
Degree of protection	IP55
Insulation class	"F"
Moisture (F) / Environmental (H) protection class	H2
Ambient temperature note	Occasional start-up at temperatures between -40°C and -25°C is permitted. For continuous operation at ambient temperatures below -25°C (such as refrigeration applications), use must be made of a fan design with special low-temperature bearings.
Max. permitted ambient temp. for motor (transport/storage)	+80 °C
Min. permitted ambient temp. for motor (transport/storage)	-40 °C
Installation position	Shaft horizontal or rotor on bottom; rotor on top on request
Condensation drainage holes	On rotor side
Mode	S1
Motor bearing	Ball bearing
Technical features	- Operation and alarm display with LED - External 15-50 VDC input (parameterization) - Alarm relay - Integrated PI controller - Configurable inputs/outputs (I/O) - MODBUS V6.3 - Motor current limitation - RS-485 MODBUS-RTU - Soft start - Voltage output 3.3-24 VDC, Pmax = 800 mW - Control interface with SELV potential safely disconnected from the mains - Thermal overload protection for electronics/motor - Line undervoltage / phase failure detection
Power Factor Correction (PFC)	Passive (through low-capacitance DC link)
EMC immunity to interference	According to EN 61000-6-2 (industrial environment)
EMC interference emission	According to EN 61000-6-3 (household environment), except EN 61000-3-2 for professionally used equipment with a total rated power greater than 1 kW

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)

Fan housing with guide vanes

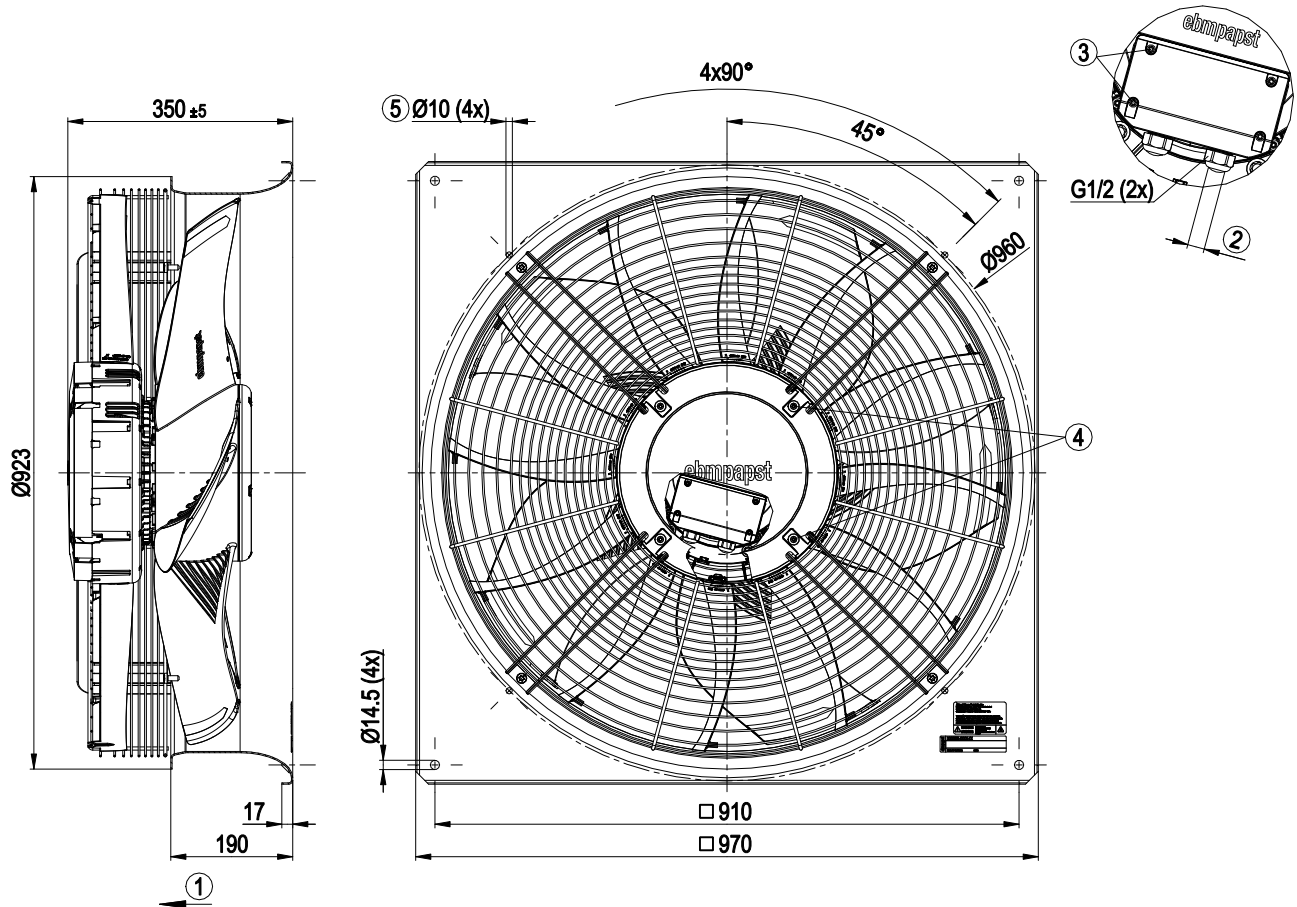
Touch current according to IEC 60990 (measuring circuit Fig. 4, TN system)	<= 3.5 mA
Electrical hookup	Terminal box
Motor protection	Reverse polarity and locked-rotor protection
Protection class assignment	The built-in component has several local protection class assignments. The final protection class is determined by the intended installation.
Conformity with standards	EN 61800-5-1; CE
Approval	EAC; UL 1004-7 + 60730-1; CSA C22.2 No. 77 + CAN/CSA-E60730-1

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)

Fan housing with guide vanes

Product drawing



1	Airflow direction "V"
2	Cable diameter min. 6 mm, max. 12 mm, tightening torque 4 ± 0.6 Nm
3	Tightening torque 3.5 ± 0.5 Nm
4	Tightening torque 3 ± 0.3 Nm
5	Mounting holes for FlowGrid

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)

Fan housing with guide vanes

Mounting dimensions



Diameter of the necessary recess for mounting the fan housing in the end device

BG630: D = $\varnothing$ 785 mm

BG710: D = $\varnothing$ 830 mm

BG800: D = $\varnothing$ 950 mm

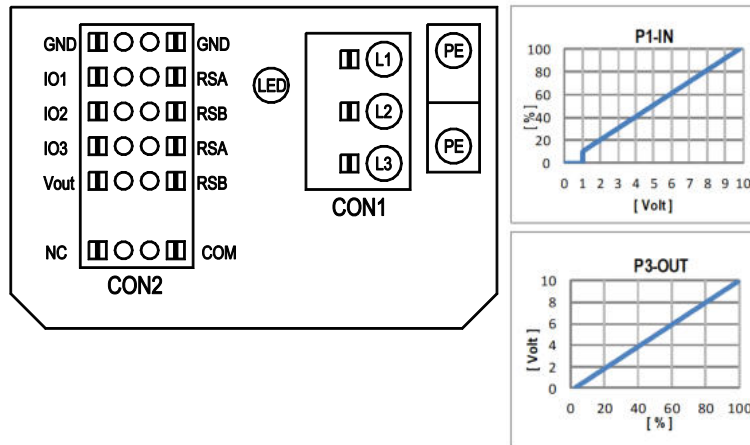
BG910: D = $\varnothing$ 1050 mm

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)

Fan housing with guide vanes

Connection diagram



No.	Conn.	Designation	Function/assignment
	CON1	L1, L2, L3	Power supply, phase, see nameplate for voltage range
	PE	PE	Protective earth
	CON2	RSA	RS485 interface for MODBUS, RSA; SELV
	CON2	RSB	RS485 interface for MODBUS, RSB; SELV
	CON2	GND	Reference ground for control interface, SELV
	CON2	IO1	Function parameterizable (see "Optional interface functions" table) Factory setting: Digital input - high active, function: Disable input, SELV - inactive: Pin open or applied voltage < 1.5 VDC - active: applied voltage 3.5-50 VDC Reset function: Triggering of error reset on change of state from "enabled" to "disabled"
	CON2	IO2	Function parameterizable (see "Optional interface functions" table) Factory setting: Analog input 0-10 V / PWM, Ri=100 kΩ, function: Set value Characteristic curve parameterizable (see input characteristic curve P1-IN), SELV
	CON2	IO3	Function parameterizable (see "Optional interface functions" table) Factory setting: Analog output 0-10 V, max. 5 mA, function: Fan modulation level Characteristic curve parameterizable (see output characteristic curve P3-OUT), SELV
	CON2	Vout	Voltage output 3.3-24 VDC ±5%, Pmax=800 mW, voltage parameterizable Factory setting: 10 VDC short-circuit-proof, supply for external devices, SELV alternatively: 15-50 VDC input for parameterization via MODBUS without line voltage
	CON2	COM	Status relay, floating status contact, common connection, contact rating 250 VAC / 2 A (AC1) / min. 10 mA, reinforced insulation on supply side and on control interface side
	CON2	NC	Status relay, floating status contact, break for failure
		LED	green: status = good, ready for operation orange: status = warning red: status = failure
		P1-IN	Input characteristic curve
		P3-OUT	Output characteristic curve

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)
Fan housing with guide vanes

Terminal/plug assignment

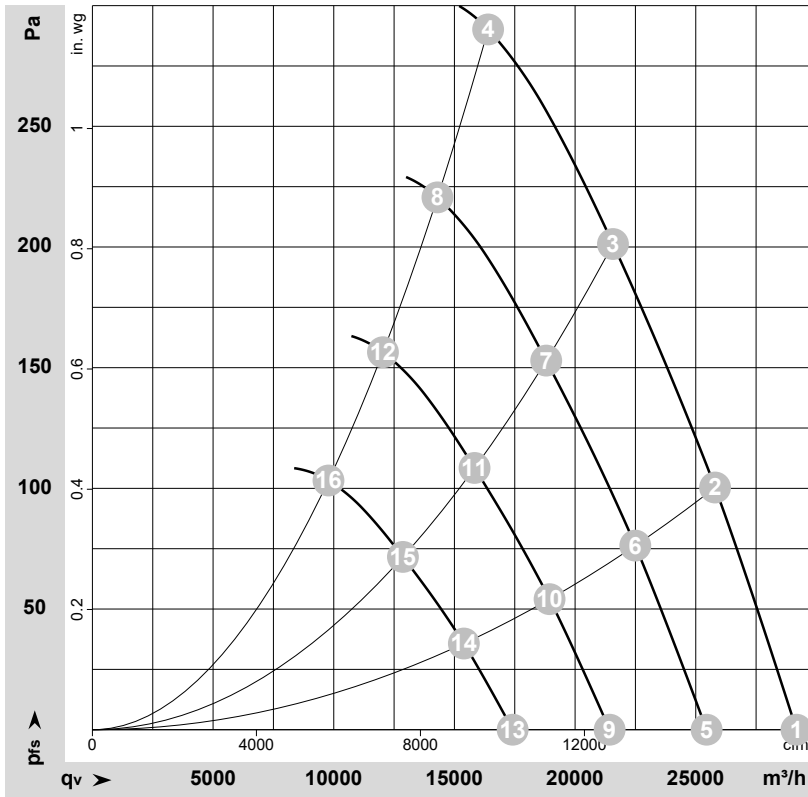
○ configurable option		configurable IO functions: normal / inverse		electrical specification		MODBUS Register for IO mode configuration		OUTPUT																													
CON2								configurable IO mode		D158 [0]		D158 [2]		D158 [5]		D158 [6]		D159 [0]		D159 [2]		D159 [3]		D15A [0]		D15A [1]		D15A [7]		D15A [8]		D15A [4]		D15A [5]		D15A [6]	
IO1		○ Din1 (active high): digital input		active: applied voltage 3.5-50VDC, SELV not active: pin open or applied voltage < 1.5VDC		RI = 100K, characteristic curve parameterizable, f _{PWM} = 1k..10KHz, SELV U _{max} = 50VDC, I _{max} = 20mA, SELV U _{max} = 50VDC, I _{max} = 20mA, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○		○	
IO2		○ Din2 (active high): digital input		active: applied voltage 3.5-50VDC, SELV not active: pin open or applied voltage < 1.5VDC		RI = 100K, characteristic curve parameterizable, f _{PWM} = 1k..10KHz, SELV RI = 125R, characteristic curve parameterizable, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Din3 (active high): digital input		active: applied voltage 3.5-50VDC, SELV not active: pin open or applied voltage < 1.5VDC		active: applied voltage < 1.5VDC, SELV not active: pin open or applied voltage < 1.5VDC		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ PWMIn3: digital input, idle level high		Pulse width modulation (PWM) = 40Hz - 10KHz, characteristics parameterizable active: pin open or applied voltage 3.5-50VDC not active: applied voltage < 1.5VDC, SELV		active: pin open or applied voltage 3.5-50VDC not active: applied voltage < 1.5VDC, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ PWMIn3: digital input, idle level low		40Hz - 10KHz, characteristics parameterizable active: applied voltage 3.5-50VDC not active: pin open or applied voltage < 1.5VDC, SELV		function parameterizable, max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Aout3 0-10V: analog output		function parameterizable, max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV		0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Tacho out (pulses), analog output		0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV		0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV 0-10V max. 5mA max output frequency 300Hz, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)		MODBUS RTU, specification V6.3, SELV		MODBUS RTU, specification V6.3, SELV		○		○		○		○		○		○		○		○		○		○		○		○		○		○			
IO3		○ Diagnostics out (pulses)</																																			

EC axial panel fan - AxiBlade

sickle-shaped blades (S series)

Fan housing with guide vanes

Curves: Air performance 50 Hz



$$\rho = 1.15 \text{ kg/m}^3 \pm 2 \%$$

Measurement: LU-187913-1
Date: 2017-08-02
Housing: 15863-2-4037

Air performance measured according to ISO 5801 installation category A. For detailed information on the measurement setup, contact ebm-papst. Intake sound level: Sound power level according to ISO 13347 / sound pressure level measured at 1 m distance from fan axis. The values given are valid under the specified measuring conditions and may vary due to conditions of installation. For deviations from the standard configuration, the parameters have to be checked on the installed unit.

Measured values

	Wired	U	f	n	P _{ed}	I	LpA _{in}	LwA _{in}	LwA _{out}	q _v	p _{fs}	q _v	p _{fs}
		V	Hz	min ⁻¹	W	A	dB(A)	dB(A)	dB(A)	m ³ /h	Pa	cfm	in. wg
1	3~	400	50	1090	1835	2.89	72	80	82	29175	0	17170	0.00
2	3~	400	50	1090	2188	3.41	71	79	80	25800	100	15185	0.40
3	3~	400	50	1090	2454	3.80	74	82	82	21570	200	12695	0.80
4	3~	400	50	1090	2650	4.00	83	91	91	16395	290	9650	1.16
5	3~	400	50	950	1218	1.92	69	76	79	25450	0	14980	0.00
6	3~	400	50	950	1450	2.26	67	75	77	22495	77	13240	0.31
7	3~	400	50	950	1625	2.52	71	78	78	18805	153	11070	0.61
8	3~	400	50	950	1724	2.67	80	87	88	14295	221	8415	0.89
9	3~	400	50	800	727	1.15	64	72	74	21430	0	12615	0.00
10	3~	400	50	800	866	1.35	63	71	72	18945	54	11150	0.22
11	3~	400	50	800	970	1.50	67	74	74	15835	109	9320	0.44
12	3~	400	50	800	1030	1.59	75	83	83	12040	156	7085	0.63
13	3~	400	50	650	390	0.62	59	67	69	17415	0	10250	0.00
14	3~	400	50	650	464	0.72	58	66	67	15390	36	9060	0.14
15	3~	400	50	650	520	0.81	61	69	69	12865	72	7575	0.29
16	3~	400	50	650	552	0.85	70	78	78	9780	103	5755	0.41

Wired = Wiring · U = Voltage · f = Frequency · n = Speed (rpm) · P_{ed} = Power consumption · I = Current draw · LpA_{in} = Sound pressure level intake side · LwA_{in} = Sound power level intake side
LwA_{out} = Sound power level outlet side · q_v = Air flow · p_{fs} = Pressure increase