

EC centrifugal fan - RadiPac

backward-curved, single-intake

ebm-papst Mulfingen GmbH & Co. KG

Bachmühle 2 · D-74673 Mulfingen

Phone +49 7938 81-0

Fax +49 7938 81-110

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	R3G450-PA31-02	
Motor	M3G150-FF	
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	2480
Power consumption	W	4450
Current draw	A	6.8
Min. ambient temperature	°C	-40
Max. ambient temperature	°C	40

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

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

		Actual	Req. 2015			
01 Overall efficiency η_{es}	%	69.3	58.3	09 Power consumption P_{ed}	kW	4.47
02 Measurement category		A		09 Air flow q_v	m ³ /h	8450
03 Efficiency category		Static		09 Pressure increase p_{fs}	Pa	1275
04 Efficiency grade N		73	62	10 Speed (rpm) n	min ⁻¹	2460
05 Variable speed drive		Yes		11 Specific ratio*		1.01

Data obtained at optimum efficiency level.

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

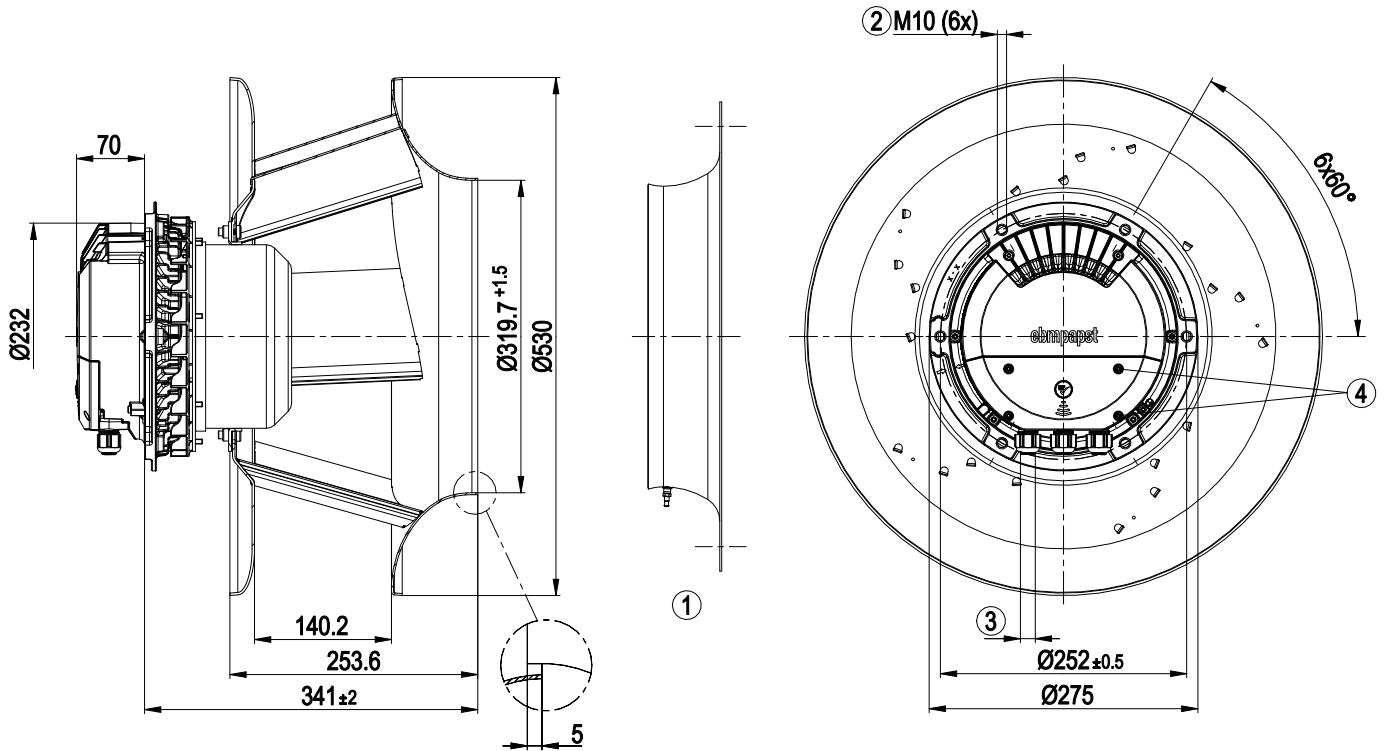
LU-205718

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).

Technical description

Size	450 mm
Motor size	150
Rotor surface	Painted black
Electronics housing material	Die-cast aluminum
Impeller material	Sheet aluminum
Number of blades	5
Direction of rotation	Clockwise, viewed toward rotor
Degree of protection	IP55
Insulation class	"F"
Moisture (F) / Environmental (H) protection class	H1
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
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	I; If a protective earth is connected. 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	CSA C22.2 No. 77 + CAN/CSA-E60730-1; EAC; UL 1004-7 + 60730-1

Product drawing



(The tightening torque is designed for PVC cables. If the cable materials are different, the tightening torque may have to be adjusted)

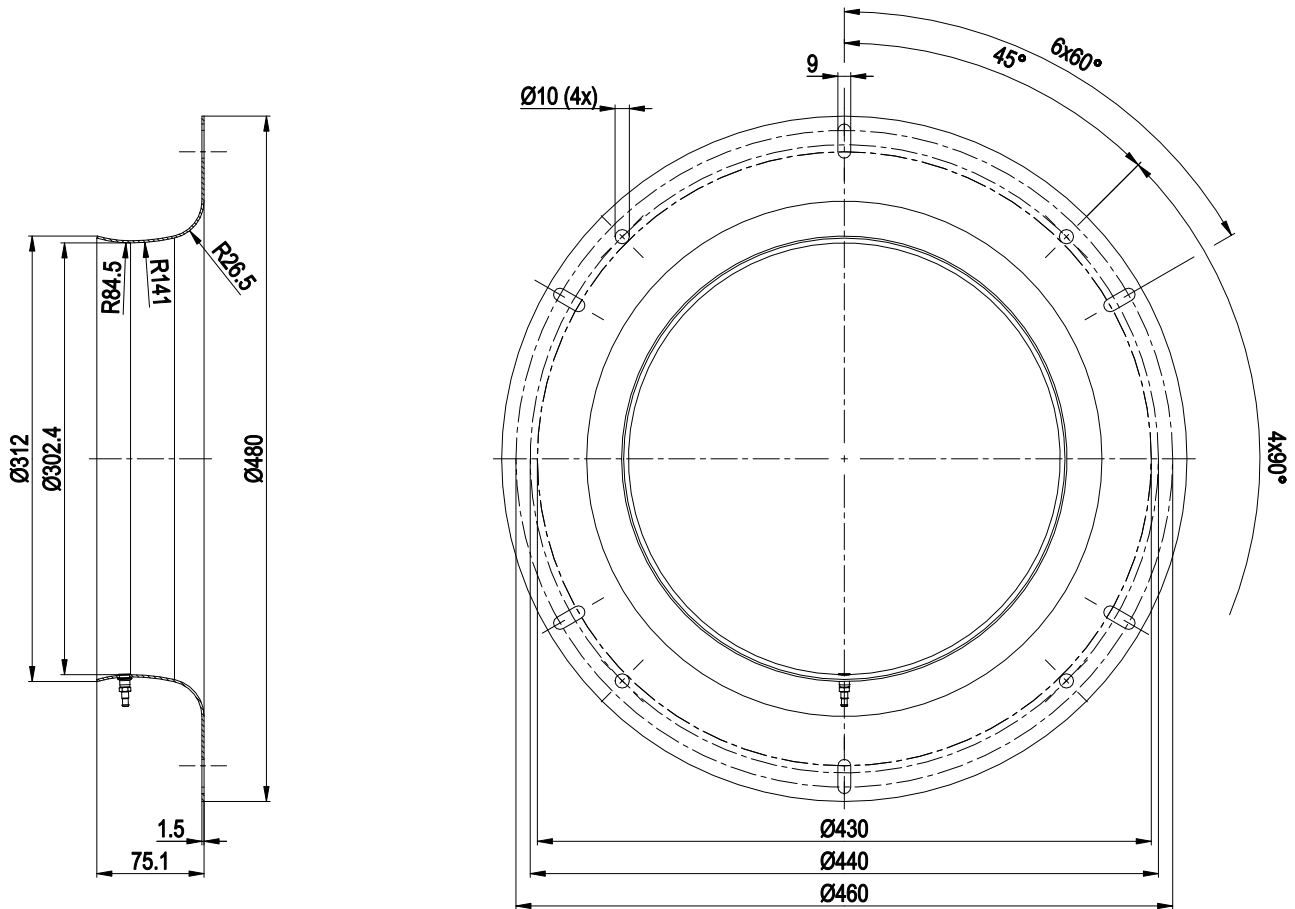
4 Tightening torque 1.5 ± 0.2 Nm

1 Accessory part: Inlet ring 45075-2-4013 with pressure tap (k-factor: 240) not included in scope of delivery

2 Max. clearance for screw 20 mm

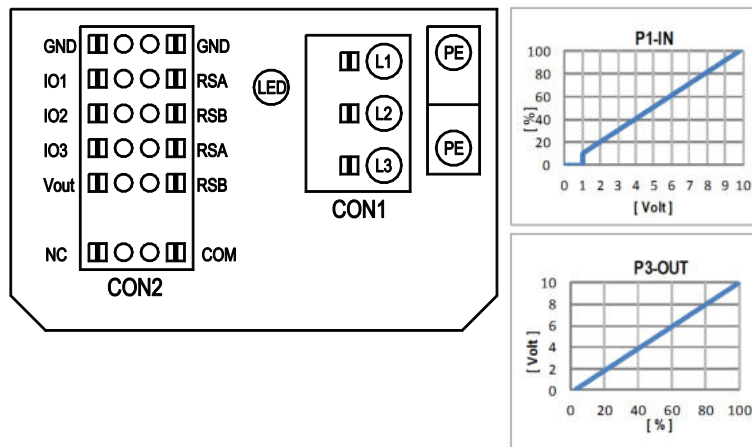
3 Cable diameter min. 4 mm, max. 10 mm, tightening torque 4 ± 0.6 Nm

Accessory part



Inlet ring 45075-2-4013 with pressure tap (k-factor: 240)

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

Terminal/plug assignment

		configurable IO functions: normal / inverse	MODBUS Register for IO mode configuration	electrical specification		configurable IO mode		CON2									
						CON2											
IO1	○ Din1 (active high): digital input	active: applied voltage 3.5-50VDC, SELV not active: pin open or applied voltage < 1,5VDC	D158 [0]	○	○	switch: fan enable / disable	(selected directly via IO mode)	signal: tach out	signal: diagnostics out	signal: fan modulation level %	signal: actual speed	D130 [1]	D130 [2]	D130 [5]	D130 [1]	D00C [1]	D130 [4]
	○ Ain1 0-10V/PWM: analog input	RI = 100K, characteristic curve parameterizable, $f_{PWM} = 1k..10kHz$, SELV	D158 [2]	○	○	switch: set value source	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	○ Tach out (open collector output)	Umax = 50VDC, Imax = 20mA SELV	D158 [5]	○	○	switch: parameter set: #1 / #2	(selected directly via IO mode)	source: sensor value	source: set value	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]	D16A [...]	(selected directly via IO mode)	signal: tach out
	○ Diagnostics out (open collector output)	Umax = 50VDC, Imax = 20mA SELV	D158 [6]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
IO2	○ Din2 (active high): digital input	active: applied voltage 3.5-50VDC, SELV not active: pin open or applied voltage < 1,5VDC	D159 [0]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	○ Ain2 0-10V/PWM: analog input	RI = 100K, characteristic curve parameterizable, $f_{PWM} = 1k..10kHz$, SELV	D159 [2]	○	○	switch: parameter set: #1 / #2	(selected directly via IO mode)	source: sensor value	source: set value	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]	D16A [...]	(selected directly via IO mode)	signal: tach out
	○ Ain2 4-20mA: analog input	RI = 125R, characteristic curve parameterizable, SELV	D159 [3]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	○ Din3 (active high): digital input	active: applied voltage 3.5-50VDC, SELV not active: pin open or applied voltage < 1,5VDC	D15A [0]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
IO3	○ Din3 (active low): digital input	active: applied voltage < 1,5VDC, SELV not active: pin open or applied voltage 3.5-50VDC	D15A [1]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	○ PWMMin3: digital input, idle level high	PWM = 40Hz - 10kHz, characteristics parameterizable active: pin open or applied voltage 3.5-50VDC	D15A [7]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	○ PWMMin3: digital input, idle level low	not active: applied voltage < 1,5VDC, SELV 40Hz - 10kHz, characteristics parameterizable	D15A [8]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	○ Aout3 0-10V: analog output	active: applied voltage 3.5-50VDC not active: pin open or applied voltage < 1,5VDC, SELV	D15A [4]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
RSA RSB	○ Tacho out (pulses), analog output	function parameterizable, max. 5mA max output frequency 300Hz SELV	D15A [5]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	○ Diagnostics out (pulses)	0-10V/max. 5mA max output frequency 300Hz SELV	D15A [6]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
		0-10V/max. 5mA max output frequency 300Hz SELV		○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
		MODBUS RTU, specification V6.3, SELV		○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
Vout	voltage output	voltage parameterizable 3.3..24VDC +/- 5%, Pmax=800mW, short-circuit-proof, supply for external devices, SELV	D16E [...]	○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]
	alternatively: Input auxiliary power supply for parameterization via RS485/MODBUS RTU without line voltage	15..50VDC		○	○	switch: fan enable / disable	(selected directly via IO mode)	switch: control function: heating (pos.) cooling (neg.)	switch: direction of rotation: cw / ccw	D16C [...]	D16A [...]	D148 [...]	D147 [...]	D104 [...]	D12E [...]	D148 [...]	D16C [...]

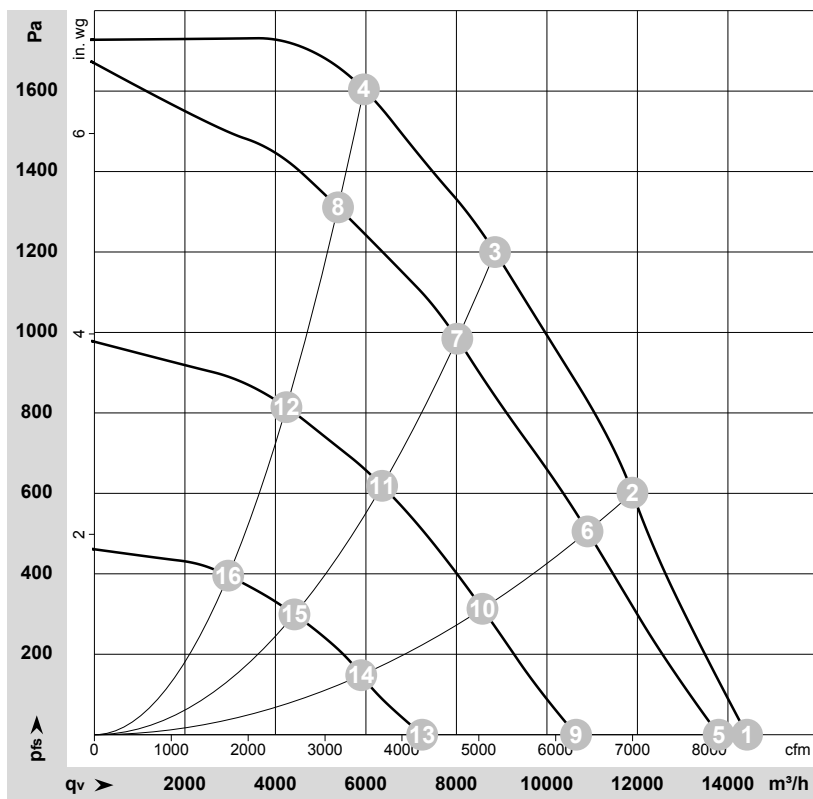
○ configurable option

For further information and additional functions see EC Control Software, Fan-Set-App, or MODBUS Parameter Specification V6.3

○ configurable option

For further information and additional functions see EC Control Software, Fan-Set-App, or MODBUS Parameter Specification V6.3

Curves: Air performance 50 Hz



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

Measurement: LU-205718-1
Date: 2020-03-20
Nozzle: 45070-2-4013

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	2480	2773	4.26	92	99	99	14420	0	8490	0.00
2	3~	400	50	2480	3895	5.93	84	91	94	11890	600	7000	2.41
3	3~	400	50	2480	4450	6.80	79	85	91	8855	1200	5210	4.82
4	3~	400	50	2480	4450	6.80	83	89	94	5955	1600	3505	6.42
5	3~	400	50	2375	2428	3.75	90	97	98	13795	0	8120	0.00
6	3~	400	50	2280	2996	4.59	82	89	92	10895	505	6415	2.03
7	3~	400	50	2225	3292	5.04	76	83	88	8020	985	4720	3.95
8	3~	400	50	2235	3248	4.97	80	86	91	5385	1312	3170	5.27
9	3~	400	50	1840	1170	1.93	83	90	92	10645	0	6265	0.00
10	3~	400	50	1790	1462	2.34	75	83	86	8575	313	5050	1.26
11	3~	400	50	1765	1654	2.62	71	78	84	6360	619	3740	2.49
12	3~	400	50	1765	1620	2.57	73	81	86	4245	817	2495	3.28
13	3~	400	50	1260	424	0.92	72	80	83	7245	0	4265	0.00
14	3~	400	50	1240	530	1.07	65	73	77	5895	148	3470	0.59
15	3~	400	50	1230	603	1.17	62	69	74	4420	299	2600	1.20
16	3~	400	50	1230	589	1.15	64	71	77	2955	396	1740	1.59

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