



Induction fans IV, IV EC

Installation and Operating Instructions

GB

Document in original language | - 003



Get In Touch

 **Call:** [01729 824108](tel:01729824108)
 **Email:** info@puravent.co.uk

Our Address

Puravent, Adremit Limited, 6 County Business Park,
Darlington Road, Northallerton, DL6 2NQ





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 **Email:** info@puravent.co.uk

Our Address

Puravent, Adremit Limited, 6 County Business Park,
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Contents

- 1 General information 1
 - 1.1 Warning symbols 1
 - 1.1.1 Instruction symbols..... 1
- 2 Important safety information 1
 - 2.1 Personnel 1
 - 2.2 Personal protective equipment..... 2
 - 2.3 5 rules of electrical safety 2
- 3 Warranty 2
- 4 Delivery, transport, storage 2
- 5 Description 3
 - 5.1 Intended use 3
 - 5.2 Incorrect use 3
 - 5.3 Technical data 4
 - 5.4 Dimensions 4
- 6 Name plate and type key 5
- 7 Installation 5
- 8 Electrical connection 6
 - 8.1 Protecting the motor..... 7
 - 8.2 Wiring diagram 8
 - 8.3 Variable-speed fans (Frequency converter / EC motor)..... 10
- 9 Commissioning 11
- 10 Operation 11
- 11 Troubleshooting/maintenance/repair 11
- 12 Cleaning..... 14
- 13 Deinstallation/dismantling..... 15
- 14 Disposal 15
- 15 Commissioning Report..... 16

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1 General information

1.1 Warning symbols



Danger

Direct hazard
Failure to comply with this warning will lead directly to death or to serious injury.



Caution

Hazard with a low risk
Failure to comply with this warning may lead to moderate injuries.



Warning

Potential hazard
Failure to comply with this warning may lead to death or serious injury.

Important

Hazard with risk of damage to objects
Failure to comply with this warning will lead to damage to objects.



Note:
Useful information and instructions

1.1.1 Instruction symbols

Instruction

- ◆ Carry out this action
- ◆ (if applicable, further actions)

Instruction with fixed sequence

1. Carry out this action
 2. Carry out this action
3. (if applicable, further actions)

2 Important safety information

Planners, plant builders and operators are responsible for the proper assembly and intended use.

- ◆ Read the operating instructions completely and carefully.
- ◆ Keep the operating instructions and other valid documents, such as the circuit diagram or motor instructions, with the fan. They must always be available at the place of use.
- ◆ Observe and respect local conditions, regulations and laws.
- ◆ Abide by the system-related conditions and requirements of the system manufacturer or plant constructor.
- ◆ Safety elements may not be dismantled, circumvented or deactivated.
- ◆ Only use the fan in a flawless condition.
- ◆ Provide generally prescribed electrical and mechanical protective devices.
- ◆ During installation, electrical connection, commissioning, troubleshooting, and maintenance, secure the location and premises against unauthorised access.
- ◆ Do not circumvent any safety components or put them out of action.
- ◆ Before any work on the fan, test absence of voltage.
Even when the motor is stopped, dangerous voltages may be present on terminals.
- ◆ Keep all the warning signs on the fan complete and in a legible condition.
- ◆ The device is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- ◆ When lifting the device, use suitable lifting gear.
- ◆ Do not allow children to play with the device.

2.1 Personnel

The fan may only be used by qualified, instructed and trained personnel. The persons must know the relevant safety directives in order to recognise and to avoid risks. The individual activities and qualifications can be found in Table 1 *Qualifications*, page 2.

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Table 1 Qualifications

Activities	Qualifications	
Storage, operation, transport, cleaning, disposal	Trained personnel (see following note)	
Electrical connection, commissioning, electrical disconnection	Electrical expert or matching qualification	
Installation, disassembly	Fitter or matching qualification	
Maintenance	Electrical expert or matching qualification	Fitter or matching qualification
Repair	Electrical expert or matching qualification	Fitter or matching qualification
	Smoke extraction fans and EX fans only by agreement with Systemair.	

**Note:**

The operator is responsible for ensuring that personnel are instructed and have understood the contents of the operating instructions. If something is unclear, please contact Systemair or its representative.

2.2 Personal protective equipment

- ◆ Wear protective equipment during all work in the vicinity of the fan.
- protective working clothes
 - protective working shoes
 - protective working gloves
 - helmet
 - goggles
 - hearing protection

2.3 5 rules of electrical safety

1. Disconnect (disconnection of the electrical system from live components at all terminals)
2. Prevent reactivation
3. Test absence of voltage
4. Ground and short-circuit
5. Cover or restrict adjacent live parts

3 Warranty

For the assertion of warranty claims, the products must be correctly connected and operated, and used in accordance with the data sheets. Further prerequisites are a completed maintenance plan with no gaps and a commissioning report. Systemair will require these in the case of a warranty claim. The commissioning report is a component of this document. The maintenance plan must be created by the operator, see section Maintenance.

4 Delivery, transport, storage

Safety information

Warning: Risk from rotating fan blades

- ◆ Prevent access by unauthorised persons by safety personnel or access protection.

Warning: Suspended loads

- ◆ Do not walk under suspended loads.
- ◆ Make sure that there is nobody under a suspended load.

Delivery

Each fan leaves our plant in an electrically and mechanically proper condition. We recommend transporting the fan to the installation site in the original packaging.

Checking delivery

- ◆ Check the packaging and the fan for transport damage. Any findings should be noted on the cargo manifest.
- ◆ Check completeness of the delivery.



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Unpacking

When opening the transport packaging, there is a risk of damage from sharp edges, nails, staples, splinters etc.

- ◆ Unpack the fan carefully.
- ◆ Check the fan for obvious transport damage.
- ◆ Only remove the packaging shortly before assembly.

Transport

Safety information

Warning: Electrical or mechanical hazards due to fire, moisture, short circuit or malfunction.

- ◆ Never transport the fan by the connecting wire, terminal box, impeller, protection grille, inlet cone or silencer.
- ◆ In open transport, please make sure that no water can penetrate into the motor or other sensitive parts.
- ◆ We recommend transporting the fan to the installation site in the original packaging.

Caution: If transported without care during loading and unloading, the fan may be damaged.

- ◆ Load and unload the fan carefully.
- ◆ Use hoisting equipment that is suitable for the weight to be hoisted.
- ◆ Observe the transportation arrows on the packaging.
- ◆ Use the fan packaging exclusively as transport protection and not as a lifting aid.

Storage

- ◆ Store the fan in the original packaging in a dry, dust-free location protected against weather.
- ◆ Avoid the effects of extreme heat or cold.

Hazard due to loss of function of the motor bearing

- ◆ Avoid storing for too long (recommendation: max. 1 year).
- ◆ Check that the motor bearing functions properly before installation.

5 Description

The induction fan is equipped with a radial fan with revision switch (optional).

5.1 Intended use

- IV jet fans are intended for installation in underground and above-ground parking structures, to facilitate ventilation and smoke extraction (K), (B), (F).
- For optimum operation, the jet fan must be suspended horizontally from the ceiling in such a position that intake and outlet are unobstructed.

5.2 Incorrect use

Incorrect use refers mainly to using the fan in another way to that described. The following examples are incorrect and hazardous:

- The temperature of the air transported through the fan must not exceed the temperature range stated on the name plate.
- The fan is not suitable for intake of aggressive media or media with a dust content so high that dust deposits on the impeller or fan housing can affect the operation of the fan.
- The fan must not be installed in hazardous areas (areas with a potentially explosive atmosphere).
- The motors cannot be voltage controlled.

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5.3 Technical data

Max. ambient temperature [°C]	Table 2 <i>Temperature types</i> , page 4
Max. temperature of transported air [°C]	Table 2 <i>Temperature types</i> , page 4
Sound pressure [dB]	see data sheet, available in our online catalogue
Voltage, current, frequency, enclosure class, weight	see name plate of the fan
The motor data can be found on the name plate of the motor, or in the technical documents of the motor manufacturer.	

The data on the name plate of the fan apply to "standard air" according to ISO 5801.

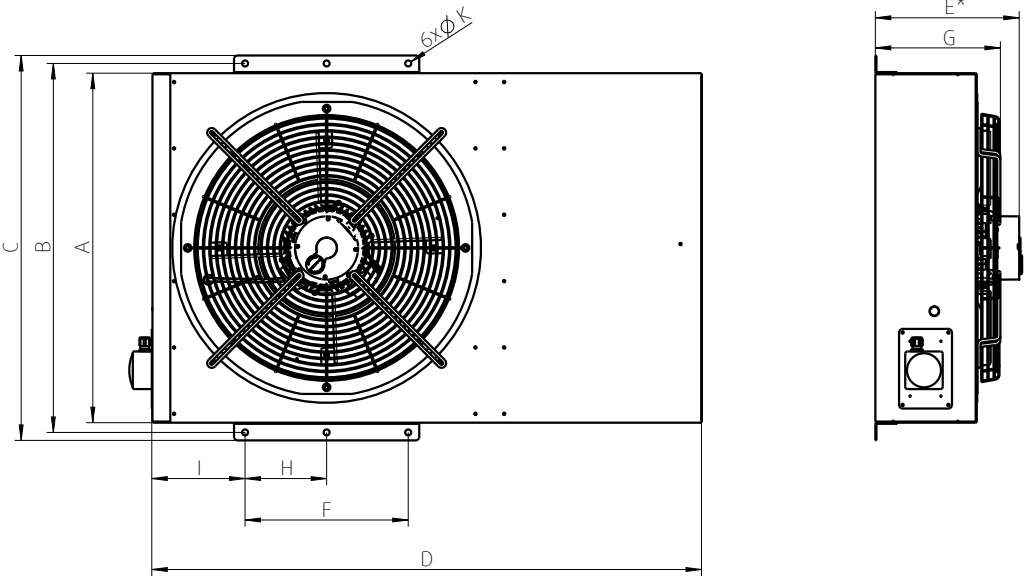
For the temperature resistance of the smoke extraction fans (K), (B), (F), which can also be used to extract CO, please refer to the name plate (e.g. 300°C/120 min).

Table 2 Temperature types

Type	Long-term operation -20°C...55°C	(B) 300°C/ 120 min.	(F) 400°C/ 120 min.
IV...EC	-20 °C...45 °C		
IV	X		
IV...(B)	X	X	
IV...(F)	X		X

5.4 Dimensions

Table 3 Dimensions IV



[mm]	A	B	C	D	G	E*	F	H	I	6 x Ø K
IV 50	790	834	870	1248	283	326	370	185	210	13.5
IV 100	1140	1184	1220	1900	340	-	420	210	430	13.5

* EC motor

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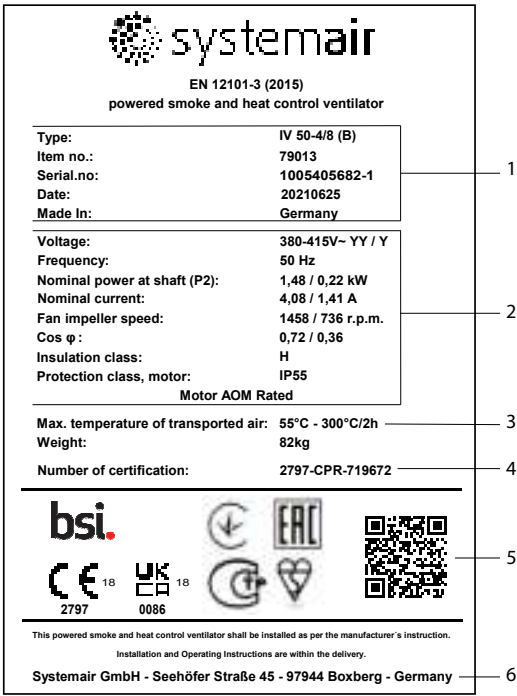


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6 Name plate and type key



- 1 General data
- 2 Technical data
- 3 Temp./Time information/
only listed on smoke
extraction fans
- 4 Certifications and QR-
Codes
- 5 Manufacturer Address

Table 4 Type key

IV	100	-4/6	(-)(K), (B), (F)	
				Temperature- Time information (smoke extraction fan), see Table 2 <i>Temperature types</i> , page 4
				Number of poles
				Thrust [N] For exact data, see online catalogue.
IV				Induction fan
IV...EC				Induction fan equipped with an EC motor

7 Installation

Safety information

- ◆ Observe 2 *Important safety information*, page 1
- ◆ Check the surface before installation for load bearing capacity.
- ◆ Consider all static and dynamic loads when selecting hoisting equipment and fastening components.
- ◆ Provide contact and intake protection and ensure safety distances according to DIN EN ISO13857 and DIN 24167-1.
- ◆ Use installation material with fire resistance classes that meet temperature requirements.

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Preconditions

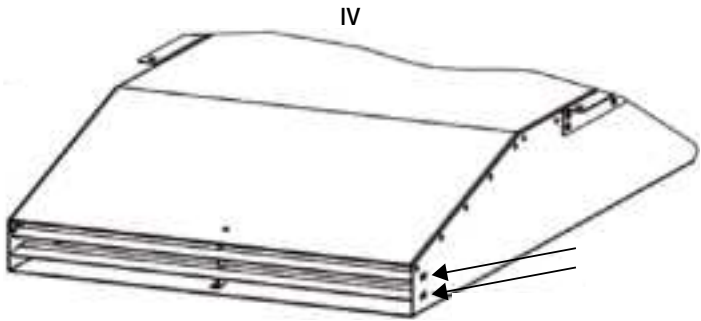
- ◆ Ensure that the fan and all its components are undamaged.
- ◆ Fit the fans in such a way that there is sufficient access for installation, troubleshooting, maintenance and repair.
- ◆ Protect against dust and moisture when installing.
- ◆ Ensure that the information on the name plates (fan and motor) matches up with the operating conditions.
- ◆ A warning sign must be attached close to the air outlet, stating that the air outlet must not be covered.
- ◆ Fit the fans in such a way that there is sufficient access for troubleshooting, maintenance and repair.

Installation positions

Always install in a horizontal position.

Deflector

- ◆ Position the deflector fins so that after fastening the jet fan to the ceiling, the air flow is directed downwards at a 10° angle. It may be possible to readjust the fans afterwards depending on the structures located in the immediate vicinity, such as girders.



Position the fins to specified angle and secure them with 4.2 x 13 self-drilling screws.

Vibration dampers

Important

Risk of damage to the fan due to incorrect vibration dampers

- ◆ Use the vibration dampers suitable for the respective weight.
- ◆ Use the vibration dampers with fire resistance classes that match the respective application.

8 Electrical connection

Safety information

- ◆ Observe 2 *Important safety information*, page 1
- ◆ Prevent the ingress of water into the connection box.

Connection

- ◆ Check if the data on the nameplate matches the connection data.
- ◆ Complete the electrical connection according to the circuit diagram.
- ◆ Fans with EC- motors must be switched on/off via the control input.
- ◆ Connect the cable end in a dry environment.
- ◆ Install a circuit breaker in the permanent electrical installation, with a contact opening of at least 3 mm at each pole.

Protective grounding wire

The protective grounding must have a cross-section equal to or greater than that of the phase conductor.

Residual current circuit breaker

All-current-sensitive residual current circuit breakers are required for use in alternating-current systems with 50/60 Hz, in combination with electronic devices such as EC motors, frequency converters or uninterruptible power supplies (UPS).



8.1 Protecting the motor

Important

- Damage to motor due to overcurrent, overload or short circuit.
- ◆ Lead-out temperature monitors must be integrated in the control circuit in such a way that, if a fault occurs, the motor cannot switch on again automatically after it has cooled down.
 - ◆ Motor lines and temperature monitor lines should be laid separately on principle.
 - ◆ Without thermal protection: Use a motor protection switch!



Note: In fans equipped with an EC motor, there is no additional motor protection needed. The motor protection is integrated in the electronics of the motor.

Important

- Damage to motor due to over temperature.
- ◆ To avoid too many starts and stops a falling delay time of minimum 5 minutes has to be realized in the control circuit.

Table 5 Motor protection

Type	Motor protection	Thermal protection, standard	Speed regulation
IV...	By customer	PTC	Possible via frequency converter
IV...(B) IV...(F)	By customer- must be bypassed in case of fire	without (PTC optional)	Possible via frequency converter

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8.2 Wiring diagram

IV

Important

Wrong connection can damage or destroy the motor.
◆ Use the information on the nameplate to select the correct connection diagram.

Star / Delta "1" – Δ "2" – Y "3" – Thermal motor protection optional	Star / Delta "1" – Δ "2" – Y "3" – Thermal motor protection optional
Two separete windings "1" – Y "2" – Y "3" – Thermal motor protection optional	Dahlander "1" – Y "2" – YY "3" – Thermal motor protection optional

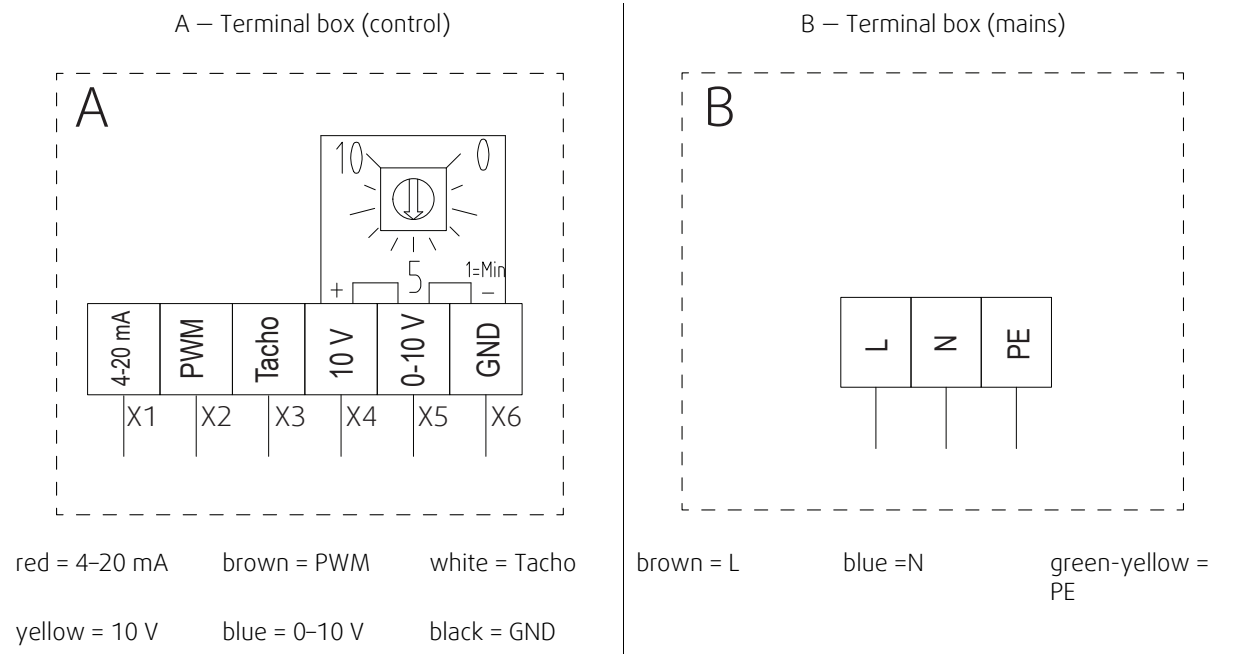


IV...EC

Important

External voltage can damage or destroy the motor.
◆ Do not apply any external voltage which is not specified in this manual to the terminals.

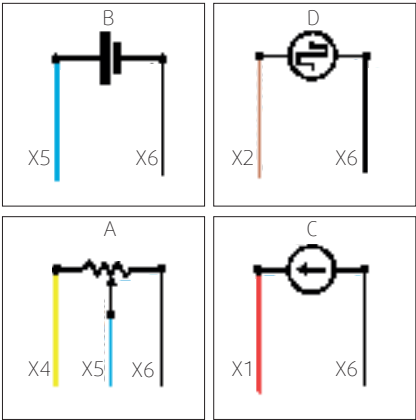
Terminal box



Note:

- Only one of the following control possibilities (A, B, C, D) can be used at the same time.
- The potentiometer must be disconnected if the fan should be controlled by other accessories.
- The fan will stop if imposed signals are lower than 2 V DC, 4 mA or 10 %.

A	Potentiometer (factory setting)	DC voltage input
	B	DC voltage source
	C	DC current source
	D	PWM source
X1	Red	DC current [4 – 20 mA]
X2	Brown	PWM- signal input with 80 Hz and voltage 10 to 24 Vpk The motor speed can be set via the duty cycle. When the duty cycle is changed from 10 to 95% the motor changes speed from 0% to 100% of the maximal speed.
X3	White	Tacho (details, see below)
X4	Yellow	10 V DC [max. 25 mW or 2.5 mA]
X5	Blue	DC voltage [2 – 10 V]
X6	Black	Common (Ground)



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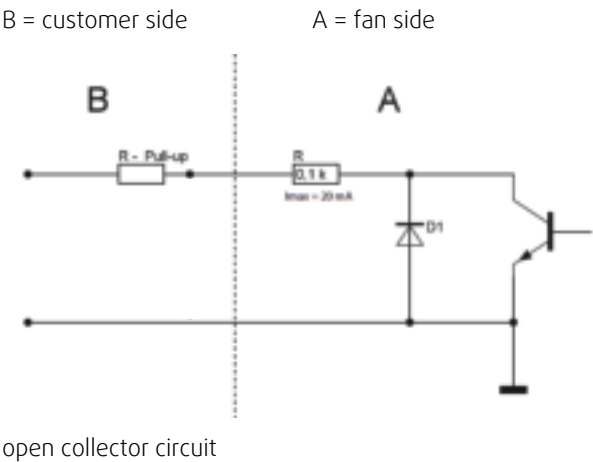


Control output reference (tacho)

Important

The applied voltage and the value of the pull-up resistor must be selected that the current does not exceed 20 mA.

Frequency = speed (rpm) * 0,6015
Example:
669 Hz / 0,6015 = 1112,21 rpm
-> 36 impulse / revolution



8.3 Variable-speed fans (Frequency converter / EC motor)

Risk from resonant frequencies.

- ◆ Only operate the fan outside these speed ranges.
- ◆ Pass through these speed ranges so quickly that any vibration cannot exceed the admissible resonant frequency values.
- ◆ For variable-speed fans, use a permanent vibration monitoring for long-term safe operation.

Operation of the frequency converter

- ◆ Heating of the motor due to use of a variable frequency drive must be checked in the application by the customer.
- ◆ Avoid running the fan via the frequency converter below 10 Hz.
- ◆ Starting time: min. 60 sec.

Commissioning of the frequency converter

- ◆ Observe the operating instructions of the frequency converter.
- ◆ Install the fan and frequency converter as near as possible to one another.
- ◆ Use shielded cables.
- ◆ All components (fan, frequency converter and motor) must be grounded.
- ◆ We recommend using all-pole sinus filters.
- ◆ Never exceed the maximum impeller rotation speed indicated on the name plate of the fan.



9 Commissioning

Warranty claims can only be made if commissioning work is carried out correctly and written evidence thereof is provided.

Safety information

- ◆ Observe 2 Important safety information, page 1

Preconditions

- ◆ Installation and electrical connection have been correctly performed.
- ◆ Before switching the fan on, check for externally visible damage and ensure that the protective equipment functions properly.
- ◆ Inlet and outlet are free.
- ◆ Cable glands are tight.
- ◆ Safety devices have been fitted.

Commissioning of speed-controlled fans

Check the fan for vibrations at all normal operation speeds during commissioning. Determine and evaluate vibrations on the housing and bearing areas in accordance with DIN ISO 14694 depending on motor power and positioning.

Measurable vibration velocities depend e.g. on following factors:

- positioning
- bottom section/foundation state
- flow conditions

The working point of the fan, as well as used external devices and accessories, also influence the running characteristics.

Tests

Do the tests requested in the commissioning report (15 Commissioning Report, page 16)

10 Operation

Safety information

- ◆ Observe 2 Important safety information, page 1

11 Troubleshooting/maintenance/repair

Safety information

- ◆ Observe 2 Important safety information, page 1

Troubleshooting

Problem	Possible causes	Remedy
Fan does not run smoothly	Impeller imbalance	Rebalancing by a specialist company if possible, otherwise contact Systemair.
	Soiling on the impeller	Clean carefully, rebalance
	Impeller rotates in wrong direction.	AC motor Change direction of rotation (swap two phases in case of a 3- phase motor).
		EC motor Contact Systemair
	Deformation of impeller due to excessive temperature.	Ensure that the temperature does not exceed the certified value/Install new impeller.
	Vibrations, oscillations	Check the installation of the fan.
	Fan operation in resonant frequency range	Consider chapter 8.3 Variable-speed fans (Frequency converter / EC motor), page 10

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Air output of fan too low	Impeller rotates in wrong direction.	AC motor Change direction of rotation (swap two phases in case of a 3- phase motor).
		EC motor Contact Systemair
	Wrong wiring configuration (e. g. Y instead of Delta).	Check and possibly correct the wiring configuration.
Grinding sounds when starting or operating the fan	Mechanical blockage	Contact Systemair
Thermal contacts/ resistors have triggered	Impeller rotates in wrong direction.	Change direction of rotation (swap two phases in case of a 3- phase motor).
	Missing phase	In case of a 3 phase standard motor (not EC), check if all 3 phase are present.
	Motor overheated	Check the cooling impeller (if used), measure the motor winding (if possible) / contact Systemair.
	Wrong wiring configuration (e. g. Y instead of Delta).	Check and possibly correct the wiring configuration.
	Motor blocked	Contact Systemair
Fan does not reach nominal speed	Defective motor winding	Check the winding by resistance measurement (if possible). Contact Systemair
	Control units (if used) such as frequency converter or transformer are set incorrectly.	Correct the settings of the control units.
	Wrong wiring configuration.	Check and possibly correct the wiring configuration.
	Mechanical blockage	Remove the blockage.
Motor does not rotate	Faulty supply voltage	Check the supply voltage, re-establish the voltage supply.
	Faulty connection	Disconnect from the power supply, correct the connection, see circuit diagram.
	Temperature monitor has responded.	Allow the motor to cool down, find and resolve the cause of the fault.
Electronics/motor overheated	Insufficient cooling	Improve cooling.
	Overloaded motor	Check if the correct fan is used for your application.
	Ambient temperature too high	Check if the correct fan is used for your application.

The motors of the IV...EC have a LED in the opening on the back side that indicates the solution status to help in the fault diagnostics:

Blinking periods / status	Condition	ON time [sec]	OFF time [sec]	Wait / interval time (off) [sec]
ON	Fan is running Speed bigger than zero	-	-	
OFF	Fan is stopped Speed equals zero			
	 Warning The LED in OFF condition doesn't mean that there is no power supply to the drive. Observe 2.3 5 rules of electrical safety, page 2	-	-	
2	Under voltage	0.1	0.1	-
3	Overload / over current	0.25	0.25	2



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6	Overvoltage	0.25	0.25	2
9	Communication timeout Failure in the drive to motor communication.	0.25	0.25	2
10	Watchdog timeout Failure in the drive processor (Software)	0.25	0.25	2
11	Locked rotor	0.25	0.25	2



Note:
For all other damage/defects, please contact Systemair. Defective safety-relevant fans (for Ex and smoke extraction applications) must be replaced completely.

Maintenance

Warranty claims can only be made if maintenance work is carried out correctly and written evidence thereof is provided.

We recommend regular maintenance intervals to ensure continuous fan operation. These maintenance intervals are specified in the "Activities" table below. In addition, the operator must carry out follow-up activities such as cleaning, replacing defective components or other corrective measures. For traceability reasons, a maintenance plan must be created which documents the work carried out. This must be created by the operator. If the operating conditions are "extreme", the maintenance intervals must be reduced so that maintenance is carried out more frequently. Examples of extreme operating conditions:

- Fan unit in rare use (less than once a month)
- Fan used for emergency operation
- Durable ambient temperature > 40 °C or < -10 °C

Table 6 Activities

Activity	Normal operating conditions		Extreme operating conditions	
	Every six months	Annually	Quarterly	Every six months
Check the fan and its components for visible damage, corrosion and contamination.		X		X
Check the impeller for damage and imbalance.		X		X
Clean the fan/ventilation system (see 12 <i>Cleaning</i> , page 14).	X		X	
Check the screwed connections for damages/defects and check that they are firmly seated.		X	See normal operating conditions	
Check the fan intake is free from contamination.		X		X
Check the current consumption and compare this with the rated data.		X		X
Check the vibration dampers (if used) are working correctly and check for visible damage and corrosion.		X	See normal operating conditions	
Check the electrical and mechanical protective equipment is working correctly.		X	See normal operating conditions	
Check the fan's rating plate is legible.		X		X
Check the connection clamps and screwed cable connections for damage/defects, and check that they are firmly seated.		X	See normal operating conditions	

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Table 7 Activities for fans used for emergency operation.

Check (if present)	Activity	Every six months
Operational readiness of the fan unit	Allow the fan to run for 1 hour	X
Operational readiness of the emergency system	Allow the "emergency" system to run for 15 minutes	X
Function of the "emergency" control	Test whether the "emergency" control effectively bridges all the other controls and switches	X

Spare parts

- ◆ Use original spare parts from Systemair only.
- ◆ When ordering spare parts, please specify the serial number of the fan. This can be found on the name plate.

Variable-speed fans

Important

The fan may be destroyed due to unpermitted frequencies.

- ◆ Pay particular attention to damage from vibrations.
- ◆ After commissioning, start with shorter maintenance intervals.
- ◆ If no damage occurs, adjust the maintenance intervals up to the those stated in the operating instructions.
- ◆ Responsibility for gradual adaptation is with the system operator.

Overhaul/further maintenance

Pay attention to the safety references and preconditions as in normal maintenance. For the following activities and functions, contact Systemair:

- complete overhaul of motors
- replacement of bearings
- re-winding of motors
- monitoring of condition
- vibration analysis

After 20,000 hours of operation or 5 years of normal operation

- ◆ Check the condition of the shaft sealing rings and shaft bearings and take action if necessary.

After 30,000 to 40,000 hours of operation

- ◆ The bearings must be replaced at the end of the grease service life (about 30,000 to 40,000 h in standard applications).

Work before switching on again

- ◆ Attach all the safety and protective devices tightly and securely.
- ◆ Remove all the devices with which you have blocked the rotor.
- ◆ Remove all assembly residues and foreign bodies from the area around the fan unit.

12 Cleaning

Safety information

- ◆ Observe 2 Important safety information, page 1

Procedure

Keeping the fan clean extends its service life.

- Do not use steel brushes or sharp-edged objects.
- Do not use a high-pressure cleaner (steam jet cleaner) under any circumstances.
- Do not bend the fan blades when cleaning.



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13 Deinstallation/dismantling

Deinstall and dismantle the fan in reverse order of installation and electrical connection.

14 Disposal

- ◆ Ensure material is recycled. Observe national regulations.
- ◆ The device and the transport packaging are predominantly made from recyclable raw materials.
- ◆ Disassemble the fan into its components.
- ◆ Separate the parts according to:
 - reusable material
 - material groups to be disposed of (metal, plastics, electrical parts, etc.)

Get In Touch

 **Call:** [01729 824108](tel:01729824108)

 **Email:** info@puravent.co.uk

Our Address

Puravent, Adremit Limited, 6 County Business Park,
Darlington Road, Northallerton, DL6 2NQ



15 Commissioning Report

Warranty claims can only be made if commissioning work is carried out correctly and written evidence thereof is provided.

Fan

Description:

Article no.:

Manufacturing order no.:

Installer

Company:

Contact person:

Company address:

Tel. no.:

Email:

Operator (Place of installation)

Company:

Contact person:

Company address:

Tel. no.:

Email:

Type of connection

Yes

No

Directly to mains

☐

☐

0-10 V signal (EC motor)

☐

☐

via contactor control

☐

☐

Transformer

☐

☐

Frequency converter

☐

☐

Sinus filter

☐

☐

Shielded cables

☐

☐

Motor protection

Yes

No

Motor protection switch or motor protection relay

☐

☐

PTC resistor

☐

☐

Resistance value [Ω]:

Thermal contact

☐

☐

Electrical motor protection

☐

☐

Others:

Functional check

Yes

No

Impeller easily rotatable (by hand)

☐

☐

Rotation direction acc. to directional arrow

☐

☐

Smooth running without unusual noise/
vibrations

☐

☐

Nominal data - Fan (name plate on fan housing)

Voltage [V]:

Current [A]:

Frequency [Hz]:

Power [kW]:

Fan impeller speed [rpm]:

Measured data at commissioning

Voltage [V]:

Temp. of transported air [°C]:



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Current L1 [A]*:	Fan impeller speed [rpm]:
Current L2 [A]:	<i>"Air volume", "Differential pressure" not necessary for jet fans</i>
	Air volume [m3/s]:
Current L3 [A]:	Differential pressure [Pa]*:
*For single-phase fans, fill in line "Current L1 [A]"	*Δ- Pressure between suction-side and discharge of the fan

If an air flow measurement is not possible, this value can be calculated using the following formula:

	X	=	
Duct cross-section [m²]	Flow speed [m/s] Grille measurement acc. to VDI 2044		Air volume [m³/s]:

	Yes	No
Commissioning of the fan successful?	☐	☐

Date, installer's signature

Date, operator's signature

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Systemair GmbH
Seehöfer Str. 45
97944 Boxberg
Germany

Tel.: +49 (0)7930/9272-0
Fax: +49 (0)7930/9273-92

info@systemair.de
www.systemair.de

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