

# Plastic Fans – Industrial fans for “Aggressive Gases/ Vapours” PRF, PRF EX

GB Installation and Operating Instructions.....2

Document translated from English | - 002



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# Contents

1	General information	5	11	Commissioning	17
1.1	Notice symbols	5	11.1	Safety information	17
1.1.1	Instruction symbols	5	11.2	Preconditions	18
2	Information on the explosion-protection devices	5	11.3	Tests	18
3	Important safety information	6	12	Operation	18
3.1	Personnel	6	12.1	Safety information	18
3.2	Personal protective equipment	7	12.2	Preconditions	18
3.3	5 rules of electrical safety	7	13	Troubleshooting/maintenance/repair	19
4	Warranty	7	13.1	Safety information	19
5	Delivery, transport, storage	7	13.2	Troubleshooting	19
5.1	Safety information	7	13.3	Maintenance	20
5.2	Delivery	7	13.4	Spare parts	21
5.3	Transport	8	14	Cleaning	21
5.3.1	Safety information	8	14.1	Safety information	21
5.4	Storage	8	14.2	Procedure	22
6	Description	9	15	Deinstallation/dismantling	22
6.1	Dimension	9	16	Disposal	22
6.2	Fan and motor data	9	17	Commissioning Report	23
6.3	Chemical components	9	18	EU Declaration of conformity	24
6.4	Minimum air gap	10			
6.5	Intended use	10			
6.6	Incorrect use	10			
7	Name plate and type key	11			
7.1	Ex key (example)	12			
7.2	Marking	13			
8	Accessories	14			
9	Installation	14			
9.1	Safety information	14			
9.2	Preconditions	15			
9.3	Installation variations	15			
9.4	Lightning protection device	15			
10	Electrical connection	16			
10.1	Safety information	16			
10.2	Preconditions	16			
10.3	Connection	16			
10.4	Protective grounding wire	16			
10.5	Residual current circuit breaker	16			
10.6	Protecting the motor	17			
10.7	Variable-speed fans	17			



## 1 General information

### 1.1 Notice 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 Information on the explosion-protection devices



#### Danger

##### Explosion protection!

This warning marks information applying in use of the device in an explosion-capable area. Failure to comply with these contents and instructions leads to loss of explosion protection and can lead to serious injuries and death.



#### Warning

##### Hazard as a result of improper use of the fans.

These operating instructions and the name plate of the fan describe safe use of the EX fans.

- ◆ Read the operating instructions completely and carefully.
- ◆ When used in explosion-capable areas, examine the name plate. Only use type PRF-EX fans.



#### Warning

In order to rule out risks for the employees' health, protective clothing must be worn in explosioncapable areas.

- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.
- ◆ Pay attention to the information shown in the work area concerning personal protective equipment.

**Warning**

With a view to the choice of material, the EX fans fulfil the requirements of standard DIN 14986 (construction of fans for use in explosion-capable areas) as a result of specific protection measures in the area of possible contact surfaces between rotating and stationary components (rotor/admission nozzle). For the rotating part, a safety distance to the admission nozzle is guaranteed. The plant builder is responsible for the selection of the materials for the fixed peripheral parts in fan constructions without protective grids. Only pairs of materials according to standard DIN EN 14986 are to be used.

**Warning**

The statement of the temperature class on the EX name plate (motor) must match the temperature class of the combustible gas which will possibly occur or the motor must have a higher temperature class.

**Danger****Explosion protection**

Transport damage or failure to comply with this information can lead to a loss of explosion protection.

- ◆ In the event of recognisable transport damage, do not put the device into operation and contact the manufacturer.

**Warning**

The effects of lightning strikes must be limited to a hazard-free extent. Alongside protection against the effects of „direct“ lightning strikes, this also includes protection against lightning strikes at a distance from the building. The latter can lead to hazards as a result of excess voltages.

- ◆ Carry out a risk analysis according to DIN VDE 0100, part 443, containing a balance between protection and consequences, taking the probability of the occurrence of excess voltages into account.
- ◆ Protect all devices, protective systems and components by suitable lightning and excess voltage protection measures.

**Warning****Ignition protection class „d“**

If fans are controlled with engines of the „d“ ignition protection class with frequency converter, thermal protection by a PTC resistor in the motor is necessary.

### 3 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.
- ◆ 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.
- ◆ 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.
- ◆ Do not allow children to play with the device.

#### 3.1 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 7.

**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 Smoke extraction fans and EX fans only by agreement with Systemair.	Fitter or matching qualification

**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.

### 3.2 Personal protective equipment

Wear protective equipment during all work in the vicinity of the fan.

- protective working clothes
- protective working gloves
- goggles
- protective working shoes
- helmet
- hearing protection

### 3.3 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

## 4 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 13.3 *Maintenance*, page 20.

## 5 Delivery, transport, storage

### 5.1 Safety information

**Warning: Risk from rotating fan blades**

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

**Warning: Suspended loads**

- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.
- ◆ Do not walk under suspended loads.
- ◆ Make sure that there is nobody under a suspended load.

### 5.2 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.

**Unpacking****Warning**

**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.
- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.

**5.3 Transport****5.3.1 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.

**5.4 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.

**Important**

**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.

## 6 Description

- Material of the housing: UV resistant PE (PRF-EX from PP)
- Material of the impeller: PP



### Warning

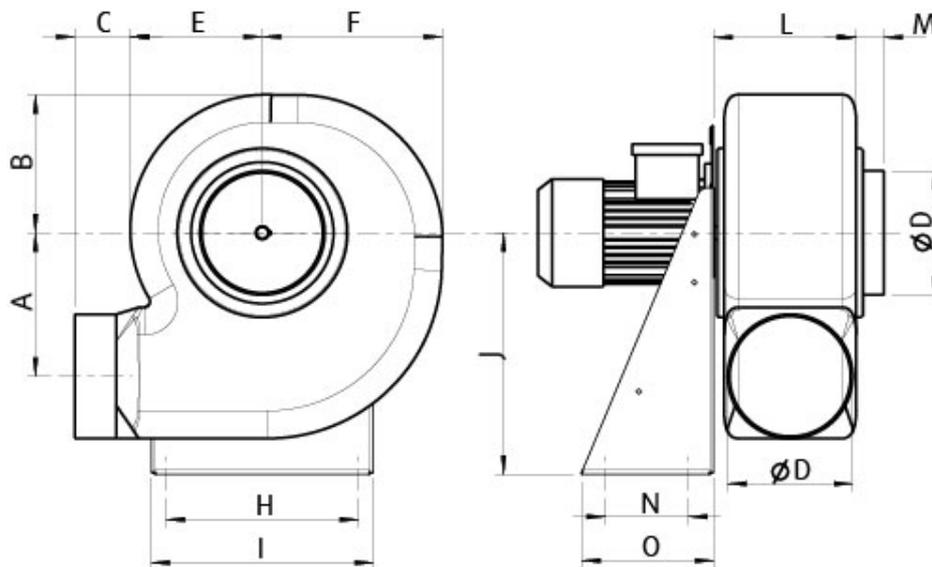
- Examined according to ATEX directive 2014/34/EU
- Antistatic housing

The explosion-protected fans can be used for temperature classes T1 to T4 and have been registered for conveying explosion-capable atmosphere in Zone 1 and 2, category 2G and 3G, with the groups IIA, IIB and IIC (only PRF-EX Ex d).

PRF-EX Ex d possess an IEC norm motor in an Ex d finish which can be controlled via a frequency inverter and has an added-on terminal box in Ex e finish. Motor protection by integrated PTC resistor with connection to a motor protection switching device e.g. U-EK230E.

## 6.1 Dimension

Table 2 Dimensions



[mm]	A	B	C	ØD	E	F	H	I	J	L	M	N	O
PRF, PRF EX 125	142	165	60	125	150	183	200	235	250	115	40	100	140
PRF, PRF EX 160	182	210	80	160	190	237	255	290	310	150	40	100	140
PRF, PRF EX 180	205	230	80	180	205	275	277	320	350	160	40	120	190
PRF, PRF EX 200	227	245	80	200	220	313	320	355	410	170	40	150	230
PRF, PRF EX 250	284	330	80	250	270	380	330	370	495	195	40	170	250

## 6.2 Fan and motor data

- Max. temperature of transported air, max. ambient temperature, sound pressure → see data sheet, available in our online catalogue.
- Voltage, current, enclosure class, weight → see name plate
- The motor data can be found on the name plate of the motor, or in the technical documents of the motor manufacturer.

## 6.3 Chemical components

The standard variants of the plastic used are polyethylene (PE) and polypropylene (PP). As a matter of principle, the rotor material is the indicator for the selection.

**Note:**

The list "COMPATIBILITY WITH CHEMICAL AGENTS" is available in our online catalogue. This list has been produced to the best of our knowledge, all statements without guarantee for correctness. Examination of the media to be transported is a matter for the plant operator. Here, it is merely a question of a recommendation.

## 6.4 Minimum air gap

The following table shows the minimum air gap between the rotor and the housing.

Size	minimum air gap [mm]	Size	minimum air gap [mm]	Size	minimum air gap [mm]
125	2.00	180	3.0	250	4.5
160	2.50	200	3.5		

## 6.5 Intended use

### Intended use PRF and PRF EX

- The fans are intended for installation in ventilation systems.
- The fans are exclusively intended for extract air applications.
- The fans have been developed and built to convey air with the simultaneous presence of corrosive gases/vapours.

### Intended use PRF EX

- The EX fans are not ready-for-use products, but have been designed as components for ventilation equipment, machines and systems. They may only be operated when they have been installed in accordance with their use and safety has been ensured by protective devices pursuant to DIN EN 294 (DIN EN ISO 12100-1).
- The fans are only intended for conveying air or explosion-capable atmospheres of Zone 1, Category 2G, and Zone 2, Category 3G.
- The maximum permissible operating data on the name plate apply for an air density of 1.2 kg/m<sup>3</sup> (sea level) and a max. air humidity of 80%.

## 6.6 Incorrect use

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

### Incorrect use PRF and PRF EX

- Conveying of abrasive, combustible air or air with solid particles.
- Conveying media which attack the materials of the fan (housing, rotor and slip rings of polypropylene).
- Operation without duct system or protection grille
- Operation with the air connections closed

### Incorrect use PRF

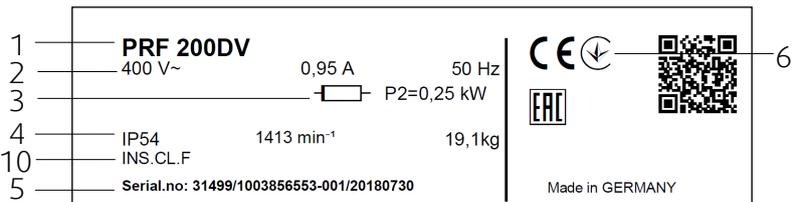
- Conveying of explosive and combustible media

### Incorrect use PRF EX

- The fans are not suited to intake of media containing dust or with a such a dust content that depositing on the blades and on the housing of the fan may influence the operation and the explosion protection of the fan. If there is the risk of such deposits, matching waste air cleaning must be carried out.

## 7 Name plate and type key

- 1 Type designation
- 2 Voltage/current/frequency
- 3 Power
- 4(a/b/c) Enclosure class/fan impeller speed/weight
- 5 Article number/production number/manufacturing date
- 6 Certifications
- 7 Certification office/ATEX registration number
- 8 Identification
- 9 Manufacturer Address
- 10 Insulation class
- 11 Production number



**Table 3 Type key PRF**

PRF	200	DV	-	EX d	<p style="text-align: center;"><b>Ignition protection class</b></p> <p>Pressure-proof encapsulation</p>								
						<table border="1"> <tr> <td>-</td> <td>Not classified (&lt; 0.75KW or PRF EX)</td> </tr> <tr> <td>IE2</td> <td>International efficiency class 2</td> </tr> <tr> <td>IE3</td> <td>International efficiency class 3</td> </tr> </table>	-	Not classified (< 0.75KW or PRF EX)	IE2	International efficiency class 2	IE3	International efficiency class 3	
-	Not classified (< 0.75KW or PRF EX)												
IE2	International efficiency class 2												
IE3	International efficiency class 3												
					<p style="text-align: center;"><b>Motor type</b></p> <table border="1"> <tr> <td>D2</td> <td>2poled/controllable by frequency converter/3 phased</td> </tr> <tr> <td>D4</td> <td>4 poled/controllable by frequency converter/3 phased</td> </tr> <tr> <td>DV</td> <td>4 poled/voltage controllable/3 phased</td> </tr> <tr> <td>E4</td> <td>4 poled/controllable by frequency converter/1 phased</td> </tr> </table>	D2	2poled/controllable by frequency converter/3 phased	D4	4 poled/controllable by frequency converter/3 phased	DV	4 poled/voltage controllable/3 phased	E4	4 poled/controllable by frequency converter/1 phased
D2	2poled/controllable by frequency converter/3 phased												
D4	4 poled/controllable by frequency converter/3 phased												
DV	4 poled/voltage controllable/3 phased												
E4	4 poled/controllable by frequency converter/1 phased												
					<p style="text-align: center;"><b>Flange diameter</b></p>								
					<p style="text-align: center;"><b>Fan type</b></p> <table border="1"> <tr> <td>PRF</td> <td>Plastic Fans – Industrial fans for “Aggressive Gases/Vapours”</td> </tr> </table>	PRF	Plastic Fans – Industrial fans for “Aggressive Gases/Vapours”						
PRF	Plastic Fans – Industrial fans for “Aggressive Gases/Vapours”												

## 7.1 Ex key (example)

CE	0123		II 2G c Ex de IIC T4 Gb / TPS 17 ATEX 85751 004 X
CE	CE sign		
0123	Notified office (quality assurance system)		
	Device certified for Ex area		
II	Device group (here: use above ground)		
2G	Device category and classification (G = gas; D = dust)		
c	Ignition protection class (constructive safety)		
Ex d	Ignition protection class (pressure-proof encapsulation)		
Ex e	Ignition protection class (increased safety)		
IIC	Group		
T4	Temperature class		
Gb	EPL Equipment Protection Level		
TPS 17 ATEX 85751 004 X	ATEX registration number		

## 7.2 Marking

	Designation		Marking	
		Device group II	Classification	
	Device category/ classification	„2G“	2	Category 2 / Zone 1 / high safety / Devices of this category are intended for use in areas in which occasional occurrence of an explosion-capable atmosphere of gases, vapours, mists is to be expected. Increased safety, Ex e.
		„3G“	3	Category 3 / Zone 2 / normal safety / Devices of this category are intended for use in areas in which occurrence of an explosion-capable atmosphere of gases, vapours, mists is not to be expected, but if it does occur then in all probability only rarely and for a short period of time.
			G	Gases / Vapours / Mists
	Ignition protection class mechanical	„c“	Constructive safety	EN 13463-5
	Ignition protection class electrical	„d“	Pressure-proof encapsulation d	Motor: Pressure-proof encapsulation
		„e“	Increased safety, Ex e	Terminal box: Occurrence of sparks, light arc or inadmissible temperatures which could act as sources of ignition is prevented by additional measures and an increased degree of safety.
	Group	II	IIA	Propane
			IIB	Ethylene
			IIC	Hydrogen
	Temperature class	T1	450 °C	I: Methane
				IIA: Acetone, ammoniac, methane, methanol, propane, toluene
				IIB: Town gas
				IIC: Hydrogen
		T2	300 °C	IIA: Ethyl alcohol, n-butane
IIB: Ethylene				
IIC: Acetylene				
	T3	200 °C	IIA: Otto fuels, diesel fuels, heating oils	
			IIB: Hydrogen sulphide	
	T4	135 °C	IIA: Acetaldehyde, ethyl ether	

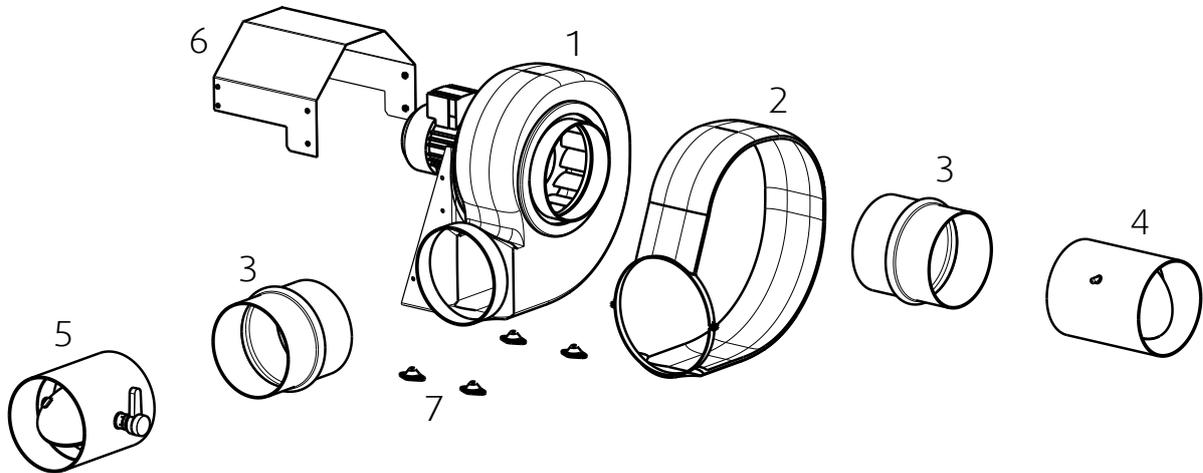
## 8 Accessories



### Note:

For details of the accessories, please check our online catalog or contact Systemair.

**Table 4 Accessories**



1	PRF, PRF EX	Fan	5	VKA-P	Adjust. damper
2	VP	Splinter protection	6	WSD	Weather roof KIT
3	ASS-P	Flexible connection	7	SD	Vibration damper
4	VKS-P	Gravity shutter			

## 9 Installation

### 9.1 Safety information

**Warning: Danger from falling fan or fan parts.**

- ◆ Check the surface before installation for load bearing capacity.
- ◆ Consider all static and dynamic loads when selecting hoisting equipment and fastening components.

#### General safety information

- ◆ Fans installed in areas where personnel access regularly must be equipped with a splinter guard, please contact Systemair.
- ◆ Installation may only be carried out by adequately qualified persons, details see Table 1 *Qualifications*, page 7.
- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.
- ◆ Abide by the system-related conditions and requirements of the system manufacturer or plant constructor.
- ◆ Do not dismantle or circumvent safety elements, or put them out of function.
- ◆ Move the rotor of the fan by hand before you install it in order to check that it moves freely.
- ◆ Provide contact and intake protection and ensure safety distances according to DIN EN ISO13857 and DIN 24167-1.
- ◆ Prevent the possibility of foreign bodies being drawn in.
- ◆ To reduce transmission of vibration to the duct system, we recommend flexible connections from our accessory range, see chapter Accessories.
- ◆ The materials the fan is made of have to be compatible to the transported media.
- ◆ Pay attention to the safety data sheet of the chemical substances transported with the fan.

## 9.2 Preconditions

- ◆ Ensure that the fan and all its components are undamaged.
- ◆ Ensure that there is enough space to install the fan.
- ◆ Protect against dust and moisture when installing.
- ◆ Ensure that the information on the name plates (fan and motor) matches up with the operating conditions.
- ◆ Fit the fans in such a way that there is sufficient access for troubleshooting, maintenance and repair.
- ◆ If harmful or hazardous products are transported, check the general condition of the fan before opening.



### Danger

#### Hazard of explosion of an ignition-capable atmosphere!

- ◆ Seal the system carefully.
- ◆ Install accessory parts correctly.
- ◆ The housing must be protected from impact by shock, if necessary using splinter protection (accessory)!

**Aluminothermic Reaction** - At high air speeds, in combination with aluminium, rust particles may lead to an aluminothermic reaction which, in the worst case, can trigger the ignition of an explosive atmosphere. Upstream or downstream components, or those which lie directly in the air flow, must not have any unprotected aluminium or steel surfaces. Surface protection is required which at least fulfils the cross-cut test classification 2 / DIN EN ISO 2409, in order to prevent an aluminothermic reaction. Steel with an electro-galvanised or hot-dip galvanised surface is not critical. However, care must be taken that appropriate protection is also applied to the cut edges.

### Important

#### Damage to the bearings or other parts of the fan can occur.

- ◆ Do not place a duct bend directly before or after the fan!
- ◆ Ensure a smooth and constant air flow to the device. Ensure a free exhaust. See Fig. 1 *Straight ducts*, page 15.

- Rectangular duct system: **D** = Hydraulic diameter
- Round duct system: **D** = Nominal diameter

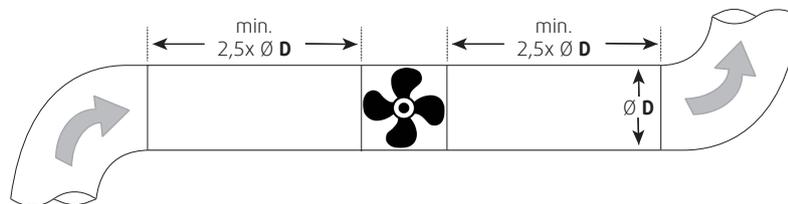


Fig. 1 Straight ducts

## 9.3 Installation variations

The installation is possible in any mounting position.

## 9.4 Lightning protection device

- ◆ If the risk assessment shows that there is the risk of an atmospheric discharge, lightning protection measures must be taken. For reasons of operational safety, provide for a suitable lightning protection system according to country specific directives (e.g. DIN VDE 0185).

## 10 Electrical connection

### 10.1 Safety information



#### Danger

##### Hazard of explosion of an ignition-capable gas/air atmosphere!

If the wire ends which have not been connected are fitted to the external current circuits within the explosion-capable area,

- ◆ a connection box selected to match this area with its own certification and explosion-protection identification must be used.
- ◆ the electrical data, information on temperature monitoring and on admissible operation with part voltage, if applicable, can be seen from the data sheet in question.

##### Protection against explosions in general:

- ◆ Always ensure potential compensation.
- ◆ Earth at the planned earthing point.

#### Warning: Danger from electrical voltage!

- ◆ Observe the 5 rules of electrical safety, see 3.3 *5 rules of electrical safety*, page 7.
- ◆ Prevent the ingress of water into the connection box.
- ◆ Electrical connection may only be carried out by adequately qualified persons, details see Table 1 *Qualifications*, page 7.
- ◆ Observe and respect local conditions, regulations and laws.
- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.

#### Warning: Danger due to electrostatic influence on medical implants (e.g. cardiac pacemaker)!

- ◆ Persons with medical implants (e.g. cardiac pacemaker) should keep enough distance to the fan.

### 10.2 Preconditions

- ◆ Abide by the system-related conditions and requirements of the system manufacturer or plant constructor.
- ◆ Safety elements may not be dismantled, circumvented or deactivated.
- ◆ Install a circuit breaker in the permanent electrical installation, with a contact opening of at least 3 mm at each pole.
- ◆ Potentially, the fans may become charged with static electricity. If this represents a risk, please contact Systemair.

### 10.3 Connection

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>◆ Check if the data on the nameplate matches the connection data.</li> <li>◆ Complete the electrical connection according to the circuit diagram.</li> <li>◆ Lay the connection cables in the terminal box in such a way that allows the cover of the terminal box to be closed without resistance.</li> <li>◆ Use all of the locking screws.</li> </ul> | <ul style="list-style-type: none"> <li>◆ Insert the screws by hand to avoid damaging the thread.</li> <li>◆ Tighten all glands well in order to guarantee protection class IP.</li> <li>◆ Screw the lid of the terminal box/inspection switch evenly tight.</li> <li>◆ Connect the cable end in a dry environment.</li> </ul> |
|---|---|

### 10.4 Protective grounding wire

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

### 10.5 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).

## 10.6 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!

## 10.7 Variable-speed fans



### Warning

Resonant frequencies may result in increased vibration in certain speed ranges. These vibrations may destroy components.

- ◆ Only operate the fan outside these speed ranges.
- ◆ Skip over these speed ranges.
- ◆ Pass through these speed ranges so quickly that any vibration cannot exceed the admissible resonant frequency values.
- ◆ Observe the operating instructions of the frequency converter.



### Caution

#### Damage as a result of incorrect commissioning 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.
- ◆ Avoid running the fan via the frequency converter below 10 Hz.
- ◆ Heating of the motor due to use of a variable frequency drive must be checked in the application by the customer.
- ◆ Never exceed the maximum impeller rotation speed indicated on the name plate of the fan.

## 11 Commissioning

The system operator is responsible for the correct operation of the fan and/or the system!

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

It is recommended to fill out the commissioning report 17 *Commissioning Report*, page 23.

### 11.1 Safety information

- ◆ Commissioning may only be carried out by adequately qualified persons, details see Table 1 *Qualifications*, page 7.
- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.
- ◆ Pay attention to the safety data sheet of the chemical substances transported with the fan.



### Warning

- ◆ Comply with fundamental information in the commissioning of the EX fan:
  - DGUV 113-001 (explosion protection rules (EX-RL))
  - TRGS 727 (Avoiding ignition hazards due to electrostatic charges).

## 11.2 Preconditions

- ◆ Installation and electrical connection have been correctly performed.
- ◆ Residual material from installation and foreign objects have been removed from the fan and ducts.
- ◆ Inlet and outlet are free.
- ◆ Safety devices have been fitted.
- ◆ Ground cable is connected.
- ◆ Cable glands are tight.
- ◆ Nominal current (from the name plate) is not exceeded.
- ◆ Data on the name plate corresponds with the connection data.
- ◆ For EX fans, check whether the minimum air gap between the rotor and the housing matches the value stated in 6.4 *Minimum air gap*, page 10

## 11.3 Tests

- ◆ Before switching the fan on, check for externally visible damage and ensure that the protective equipment functions properly.
1. Switch the fan on.
  2. Checks:
    - ◆ Direction of rotation/conveyance. The direction of rotation always applies looking at the impeller.
      - The direction of rotation is best observed just before the fan stops.
    - ◆ Smooth running (any vibrations and noise)
    - ◆ Current consumption
      - ◆ Compare the current consumption with the nominal consumption on the name plate.
    - ◆ Tightness of all connections
  3. Switch the fan off.

## 12 Operation

### 12.1 Safety information



#### Danger

##### Hazard of explosion of an ignition-capable gas/air atmosphere!

When commissioning the EX fan, the fundamental information from DGUV 113-001 (explosion protection rules (EX-RL)) and TRGS 727 (Avoiding ignition hazards due to electrostatic charges) must be known.

#### Warning: Hazard from electrical voltage or moving components.

- ◆ The device may only be operated by adequately qualified persons, details see Table 1 *Qualifications*, page 7.
- ◆ Abide by the system-related conditions and requirements of the system manufacturer or plant constructor.

#### Warning: Risk by careless use of aggressive media.

Careless use of aggressive media can lead to very severe injuries.

- ◆ Pay attention to the safety data sheet of the chemical substances transported with the fan.

### 12.2 Preconditions

- ◆ Ensure access only to persons who can safely handle the device.
- ◆ Only use the fan in accordance with the operating instructions and the operating instructions for the motor.
- ◆ Do not dismantle or circumvent safety elements, or put them out of function.
- ◆ The EX fans have been admitted for S1 continuous operation.

## 13 Troubleshooting/maintenance/repair

### 13.1 Safety information

- ◆ Troubleshooting/maintenance/repair may only be carried out by adequately qualified persons, details see Table 1 *Qualifications*, page 7.
- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.
- ◆ Observe the 5 rules of electrical safety, see 3.3 *5 rules of electrical safety*, page 7.
- ◆ Abide by the system-related conditions and requirements of the system manufacturer or plant constructor.
- ◆ The impeller must be at a standstill.
- ◆ Pay attention to the safety data sheet of the chemical substances transported with the fan.



#### Danger

##### Loss of explosion protection

- The manufacturer must always be consulted before any maintenance or repair work is carried out! Repairs should preferably always be carried out by the manufacturer! Exceptions can be made for non-relevant components such as terminal boxes, screwed cable connections, etc. These can also be dealt with on-site by the operator's qualified staff (authorised personnel). Non-compliance will result in the ATEX certification being revoked!
- For ATEX-certified products, the repair or replacement of fan components is expressly only permitted after consultation with the manufacturer and only if the manufacturer's original parts are used!

### 13.2 Troubleshooting

**Table 5 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
	Material decomposition on the impeller due to aggressive material conveyed.	Contact Systemair
	Impeller rotates in wrong direction.	Change direction of rotation if possible, otherwise 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/check the duct system, see 9 <i>Installation</i> , page 14.
Air output of fan too low	Impeller rotates in wrong direction.	Change direction of rotation if possible, otherwise contact Systemair.
	Wrong wiring configuration (e.g. Y instead of Delta).	Check and possibly correct the wiring configuration.
	Pressure losses too high.	Optimize the line routing.
	Flow regulators not or only partly open.	Check opening position on site.
	Intake or pressure ducts are blocked.	Remove the blockage.
Grinding sounds when starting or operating the fan	Check if the duct connections of the fan are strained.	Loosen the duct connections and realign it.

## Troubleshooting cont'd

	Impeller rotates in wrong direction.	Change direction of rotation if possible, otherwise contact Systemair.
Thermal contacts/resistors have triggered	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.
	Motor blocked	Contact Systemair
Fan does not reach nominal speed	Defective motor winding	Contact Systemair
	Improperly aligned drive motor	Contact Systemair
	Control units (if used) such as frequency converter or transformer are set incorrectly.	Correct the settings of the control units.
	Mechanical blockage	Remove the blockage.
	Frozen condensate blocking the impeller	Thaw and drain the condensate
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.



### Note:

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

## 13.3 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:

- Ambient temperature > 35 °C or < 5 °C, or temperature fluctuations > 20 K
- Use in an explosion capable area

**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 14 <i>Cleaning</i> , page 21).	X		X	

**Activities cont'd**

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 that the fan and its components are being used correctly.	X		See normal operating conditions
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
Check the flexible connectors for damage.	X		See normal operating conditions



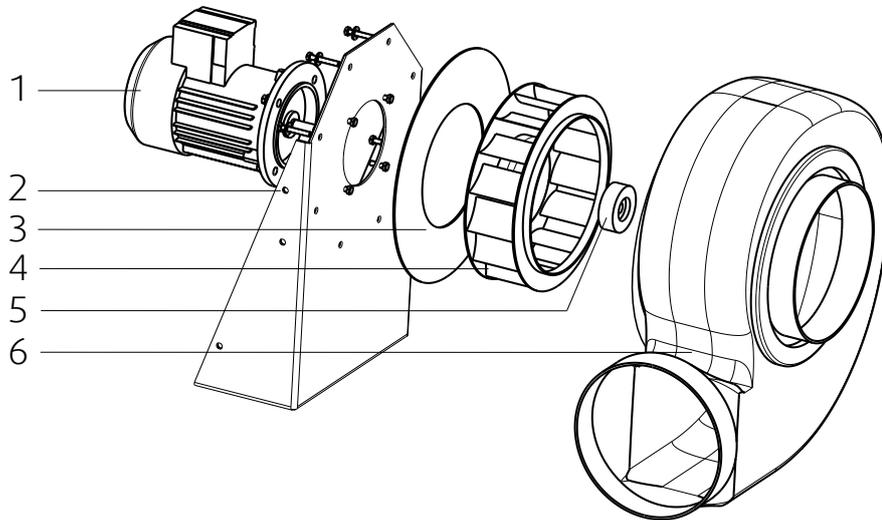
**Note:**

For all other damage/defects, please contact Systemair.

**13.4 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.

- 1 Motor
- 2 Flange plate
- 3 Motor disc
- 4 Impeller
- 5 Taper bush
- 6 Housing



**14 Cleaning**

**14.1 Safety information**

- ◆ Cleaning may only be carried out by adequately qualified persons, details see Table 1 *Qualifications*, page 7.
- ◆ Wear protective equipment during all work in the vicinity of the fan, details see 3.2 *Personal protective equipment*, page 7.
- ◆ Observe the 5 rules of electrical safety, see 3.3 *5 rules of electrical safety*, page 7.
- ◆ The impeller must be at a standstill.
- ◆ Pay attention to the safety data sheet of the chemical substances transported with the fan.

## 14.2 Procedure

### Important

#### Keeping the fan clean extends its service life.

- ◆ Drain condensation off
- ◆ Only use compressed air if the fan is used for conveying air in the presence of gases/vapours without hovering particles.
- ◆ If the fan is used in an environment with vapours of specific chemical substances, get information from the chemical safety data sheet with a view to the recommended cleaning products.
- ◆ Install a filter monitor.
- ◆ 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.
- ◆ When cleaning the impeller, pay attention to balance weights that have been positioned
- ◆ Keep the airways of the fan clear and clean them if necessary with a brush.

## 15 Deinstallation/dismantling

- ◆ Pay attention to the safety data sheet of the chemical substances transported with the fan.
- Deinstall and dismantle the fan in reverse order of installation and electrical connection.

## 16 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.)

## 17 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 [ $\Omega$ ]:

Thermal contact

Electrical motor protection

Others:

### Functional check

Yes No

Impeller easily rotatable (by hand)

Rotation direction acc. to directional arrow

### 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 [ $^{\circ}$ C]:

Current L1 [A]\*:

Fan impeller speed [rpm]:

Current L2 [A]:

Air volume [m<sup>3</sup>/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:

$$\frac{\text{Duct cross-section [m}^2\text{]}}{\text{Flow speed [m/s]}} \times \text{Grille measurement acc. to VDI 2044} = \text{Air volume [m}^3\text{/s]:}$$

	Yes	No
Commissioning of the fan successful?	<input type="checkbox"/>	<input type="checkbox"/>

Date, installer's signature

Date, operator's signature

## 18 EU Declaration of conformity

**The manufacturer:** Systemair GmbH  
Seehöfer Straße 45  
97944 Boxberg  
Germany

**Product designation:** PRF

**Type designation:** PRF, PRF EC

**Since year of manufacture:** 2018

The manufacturer declares that the above mentioned products in their design and construction and the version marketed by us complies with the harmonization legislation listed below:

<b>EU directives:</b>	2006/42/EC	Machinery directive
	2014/30/EU	Directive electromagnetic compatibility (EMC)
	2011/65/EU	RoHS directive

The EU Declaration of conformity of the PRF-EX fan is also attached to the delivery as a separate document.





[www.systemair.com](http://www.systemair.com)