

Installation, Operation and Maintenance Instructions

Plastic Fans — Industrial fans for "Aggressive Gases/ Vapours" PRF, PRF EX



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# 1 Introduction

## 1.1 Intended use

### Indended 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.

### Indended use PRF EX

 The EX fans are not ready-for-use products, but have been designed as components for ventilation equipment, machines

## 1.3 Product overview

### PRF 125-250

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), EN 80079–34.

• The fans are only intended for conveying air or explosioncapable atmospheres of Zone 1, Category 2G, and Zone 2, Category 3G.

## 1.2 Document description

This document contains instructions for installation, operation and maintenance of the product. The procedures must be done by approved personnel only.

Speak to Systemair for more information on how to install the product in different installation locations.



1. Motor

- 2. Flange plate
- 3. Motor disc

- 4. Impeller
- 5. Taper bush
- 6. Housing



- 2. Impeller
- 3. Housing
- 4. Outlet

- 6. Frame
- 7. Vibration damper
- 8. Drain plug

## 1.4 Name plate



- 1. Type designation
- 2. Voltage/ Current/ frequency
- 3. Power
- 4. Enclosure class/ fan impeller speed/ weight
- 5. Certification office/ATEX registration number
- 6. Identification
- 7. Manufacturer Address
- 8. Insulation class
- 9. Production number



1. Type designation

Power

3.

2. Voltage/ Current/ frequency

- 5. Insulation class
- 6. Article number/ production number/ manufacturing date
- 7. Certifications
- 4. Enclosure class/ fan impeller speed/ weight

# 1.5 Type key

# Table 1 type key example

PRF\ 200 \ DV\ EX db

# Table 2 type key

Type key explanation	
PRF	Fan type
	Plastic Fans — Industrial fans for "Aggressive Gases/ Vapours"
200	Flange diameter
DV	Motor type
	• <b>D2</b> — 2poled/controllable by frequency converter/3 phased
	<ul> <li>D4 — 4 poled/controllable by frequency converter/3 phased</li> </ul>
	DV — 4 poled/voltage controllable/3 phased
	<ul> <li>E4 — 4 poled/controllable by frequency converter/1 phased</li> </ul>
	EC — Electronically commutated/1 phased or 3 phased
EX db	Ignition protection class Pressure-proof encapsulation

### Table 3 EX key

CE	0123 TPS 19 ATEX 085751 0005		
CE	CE sign		
0123	Notified office (quality assurance system)		
$\langle Ex \rangle$	Device certified for Ex area		
11	Device group (here: use above ground)		
2G	Device category and classification (G = gas; D = dust)		
Exh	Ignition protection class (constructive safety)		
Ex db	Ignition protection class (pressure-proof encapsulation)		
Ex eb	Ignition protection class (increased safety)		
IIB	Group		
T4	Temperature class		
Gb	EPL Equipment Protection Level		
TPS 19 ATEX 085751 0001 X	ATEX registration number		

# 1.6 Product liability

Systemair is not liable for damages that the product causes in these conditions:

- The product is incorrectly installed, operated or maintained.
- The product is repaired with parts that are not original spare parts from Systemair.
- The product is used together with accessories that are not original accessories from Systemair.
- The product is used without motor protection.

# 2 Safety

# 2.1 Safety definitions

Warnings, cautions and notes are used to point out specially important parts of the manual.



### Warning

If you do not obey these instructions, there is a risk of death or injury.



### Caution

If you do not obey these instructions, there is a risk of damage to the product, other materials or the adjacent area.

### Note:

Information that is necessary in a given situation.

# 2.2 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)

# 2.3 Safety instructions



### Warning

Read the warning instructions that follow before you do work on the product.

- Read this manual and make sure that you understand the instructions before you do work on the product.
- · Obey local conditions and laws.
- The ventilation contractor and the operator are responsible for correct installation and intended use.
- · Keep this manual at the location of the product.
- Do not install or operate the product if it is defective.
- · Do not remove or disconnect safety devices.
- Make sure that you can read all warning signs and labels on the product when it is installed. Replace labels that have damage.
- Only permit approved personnel to work on the product and to be in the adjacent area during all work on the product.
- Make sure that you know how to stop the product quickly in an emergency.
- Use applicable safety devices and personal protective equipment during all work on the product.
- Before you do work on the product, stop the product and wait until the fan impeller stops. Make sure that there is no voltage on the motor terminals.

- If the maintenance is not correctly and regularly done, there is risk of injury and damage to the product.
- Only do the maintenance as given in this manual. Speak to Systemair technical support if other servicing is necessary.
- · Always use spare parts from Systemair.
- Sound levels exceeding 70 dB(A) may occur depending on model and size. Visit www.systemair.com for more detailed information about your product.
- The product 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.

## 2.4 Information on the explosionprotection devices



### Warning

**Explosion protection!** 

This warning marks information which applies if the device is used in a potentially explosive atmosphere. Failure to comply with this information will result in loss of explosion protection and may lead to serious injury or death.

### Warning

# Hazard resulting from improper use of the fans.

These operating instructions and the fan name plate describe how to use the EXfans safely.

- Read the operating instructions completely and carefully.
- If used in potentially explosive atmospheres, examine the name plate. Only use EX fans.

## Warning

Protective clothing must be worn in potentially explosive atmospheres to reduce the risks to employee health.

- Wear protective equipment during all work in the vicinity of the fan.
- Comply with the information on personal protective equipment displayed in the work area.



## Warning

Regarding the choice of material, the EXfans fulfil the requirements of Standard DIN 14986, because of specific protection measures in areas of potential contact between rotating and stationary components. A safety clearance to the intake nozzle is guaranteed for the rotating part. The plant builder is responsible for selecting the materials for the fixed peripheral parts for fan designs without protective grids. Only pairs of materials according to Standard DIN EN 14986 are to be used.



## Warning

Warning

The temperature class stated on the EXname plate (motor) must match the temperature class of the combustible gas which may occur.



### Explosion protection

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

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



### Warning

The effects of lightning strikes must be limited so that hazards are prevented. In addition to 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 resulting from excess voltage.

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



### Warning

Ignition protection class "db "

If fans are controlled using motors with a "db" ignition protection class with a frequency converter, then thermal protection via a PTC resistor in the motor is required.

# 2.5 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.

## 2.6 Personal protective equipment

Use personal protective equipment during all work on the product.

- Approved eye protection
- · Approved protective helmet
- Approved hearing protection
- · Approved protective gloves
- · Approved protective shoes
- Approved work clothing

## 2.7 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 Transportation and storage



### Warning

Make sure that the product does not become damaged or wet during transportation. A damaged or wet product can cause fire or electric shock.

- Before you move the product to the installation location, examine the packaging for damages.
- Do not move the product by the cables, terminal box, fan impeller, protection grille, inlet cone or silencer.
- If lifting equipment is used, make sure that the lifting equipment can hold the weight of the product. Refer to the name plate for information. Do not lift the product by the packaging.



### Warning

Do not walk below a lifted product.

- Keep the correct side of the packaging up during transportation. Refer to the arrows on the packaging.
- · Load and unload the product carefully.
- Keep the product in a dry and clean location during storage. Make sure that the ambient temperature during storage is between 0 and +30 °C. A stable ambient temperature prevents damage from condensation.
- · Keep the product in storage for maximum 1 year.

# 4 Marking

Table 4 Table 10 Marking

Designation			Marking
Device group II	Classification		All areas with explosion-capable atmosphere apart from mining, underground and above ground in cases of mien damp.
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 explosioncapable atmosphere of gases, vapours, mists is to be expected. Increased safety, Ex eb.
	"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	"h"	Constructive safety	DIN EN ISO 80079-37:2016
Ignition protection class electrical	"db"	Pressureproof encapsulation db	Motor: Pressure-proof encapsulation
	"eb"	Increased safety, Ex eb	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	П	IIA	Propane
		IIB	Ethylene
		IIC	Hydrogen (H2)
Temperature class	T1	450 °C	I: Methane
			IIA: Acetone, ammoniac, methane, methanol, propane, toluene
			IIB: Town gas
			IIC: Hydrogen (H2)
	Т2	300 °C	IIA: Ethyl alcohol, n-butane
			IIB: Ethylene
			IIC: Acetylene
	ТЗ	200 °C	IIA: Otto fuels, diesel fuels, heating oils
			IIB: Hydrogen sulphide
	T4	135°C	IIA: Acetaldehyde, ethyl ether
	Т5	100°C	There is no gas in this class

Designation Marking				
	T6 85°C		Carbon disulphide	
EPL Equipment Protection Level	Gb		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.	

# 5 Installation

# 5.1 To do before the installation of the product

- Make sure that you have the necessary installation accessories:
  - Refer to 9.7 Accessory overview for an overview of the accessories.
  - If you install the product outdoors, it is necessary to install a weather protection roof.
  - To decrease vibrations transmitted from the product to the duct system, Systemair recommends to install vibration dampers, fast clamps or flexible connections.
  - If you install the product with free suction or free discharge, it is necessary to install a protection grille.
     Make sure that the safety distance agrees with the standard ISO 12499.
- Use installation material with fire resistance rating for the installation location.
- Examine the packaging for transportation damage and remove the packaging from the product carefully.
- Examine the product and all components for damage.
- Make sure that the motor effect and the fan performance agrees with the expectations at the installation location.
- Make sure that the information on the name plate and the motor name plate agrees with the operation conditions.
- Install the product in a location where there is space for commissioning, troubleshooting and maintenance.
- Make sure that the installation location is clean and dry, for full safety during electrical work.
- Make sure that the installation surface has sufficient capacity to hold the weight of the product.
- Refer to the airflow direction arrows on the name plate or on the product to install the product in the correct position.
- Make sure that all cable glands are tight against the cables to prevent leaks.

# 5.2 To install the product



### Warning

Danger from falling fan or fan parts.

- a. Measure the distance (A) between the product and the duct bend.
- b. Make sure that the distance (A) is a minimum of 2.5 x the diameter (B) of the duct system. For circular ducts, (B) is the nominal diameter. For rectangular ducts, (B) is the hydraulic diameter.



### Warning

Risk of ignition of a potentially explosive atmosphere!

- · Seal the system carefully.
- Install accessory parts correctly.
- The housing must be protected from shock impacts, using splinter protection if necessary (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. To prevent an aluminothermic reaction, surface protection is required which at least fulfils the cross-cut test classification 2 / DIN EN ISO 2409. 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.

# 5.3 Test the motor windings

Test the motor windings:

- Measure the insulation resistance of each motor winding against grounding at 500 V DC. The insulation resistance must be > 10 mΩ.
- Bear in mind that parts of the impeller may protrude out of the fan housing.
- Tightening torques of screw-type connections according to DIN 13.
- If the motor has drain plugs, remove them to allow any moisture to drain and replace them when the motor windingsare suitably dry.
- 2. Dry the motor in a warm dry airflow (typically 40 degrees Celsius).
- 3. Measure the insulation resistance of each motor winding against grouding at 500 V DC.
- 4. Repeat the aforementioned steps until the measurement outcome > 10 m $\Omega$ .

# 6 Electrical connection

Safety information

### Warning

Danger from electrical voltage.

- Observe the 2.7 5 rules of electrical safety.
- Prevent the ingress of water into the connection box.
- Electrical connection may only be carried out by adequately qualified persons.

# 6.1 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).

# 6.2 To connect the product to the power supply

- Complete the electrical connection for the motor. Refer to the motor wiring diagram that is included with the product.
- Make sure that the cross section of the protective earthing is equal to or larger than the cross section of the phase conductor.
- Install a circuit breaker in the permanent electrical installation, with a contact opening of a minimum 3 mm at each pole.
- If a residual current device (RCD) is installed, make sure that it is an all-current sensitive RCD. 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).
- · Use all of the locking screws.
- Insert the screws by hand to avoid damaging the thread.
- Tighten all glands well in order to guarantee protection class IP.
- Screw the lid of the terminal box/inspection switch evenly tight.
- Connect the cable end in a dry environment!

# 6.3 Frequency converter (if used)

Important note for PRF EX 75 - fan can't be used for inverter duty. To be driven by an inverter the motors must be tested with a precise type of inverter and certified for that type.

# Risk from resonant frequencies when using frequency converter.

- · 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.
- Observe the operating instructions of the frequency converter.

#### 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.

#### Operation of the frequency converter

- The rated electrical motor data indicated on the nameplate must not be exceeded during converter operation.
- Operation at frequencies below 10Hz and above 60Hz must be avoided.
- Smoke extract axial fans should be operated at maximum mains frequency. If the mains frequency is to be exceeded in individual cases, please contact Systemair in advance.
- Starting time: min. 60 sec.

# Commissioning



7

### Caution

- If strong vibrations occur during commissioning, immediately increase or decrease the fan speed until the vibrations are decreased. Continuous strong vibrations can cause damage to components.
- Do not increase the fan speed to a higher rpm value than the maximum value that is given on the name plate.

The commissioning report is found at www.systemair.com.

# 7.1 To do before the commissioning

- Make sure that the installation and electrical connection are correctly done.
- · Visually examine the product and accessories for damage.
- Make sure that the safety devices are correctly installed.
- Make sure that there are no blockages in the air inlet and the air outlet.
- Make sure that installation material and unwanted objects are removed from the product and the ducts.

## 7.2 To do the commissioning

- 1 Set the installed safety switch in the OFF position.
- 2 If it is possible to get access to the fan impeller, do the steps that follows:
  - a. If it is necessary, remove parts of the installation.
  - b. Turn the fan impeller by hand and make sure that it turn easily.
  - c. Record the result in the commissioning report.
- **3** Make sure to turn the product in a direction that agrees with the related arrow on the product.
  - a. Record the result in the commissioning report.
- 4 If you removed parts of the installation to get access to the fan impeller, install the removed parts again.
- 5 Set the installed safety switch in the ON position.
- 6 Start the product.
- 7 Set the minimum operation speed.
- 8 Increase the operation speed gradually to the maximum operation speed.
  - a. Examine the vibrations in the casing and the bearing areas at all speed levels.
  - b. Make sure that the vibrations agree with the specifications in ISO 14694.
  - c. Make sure that none of the speed levels cause unwanted noise in the product.
  - d. Record the result in the commissioning report.
- 9 Record the necessary data in the commissioning report.

# 8 Operation



### Caution

EC motors must be set to ON/OFF via the control input. To stop the product via mains supply decreases the life time of the motor. Systemair recommends to install external speed controller for easy access to control the input signal.

# 8.1 Safety information



### Warning

Risk of ignition of a potentially explosive gas/air atmosphere! When commissioning the EX fan, the fundamental information from DGUV 113-001 (explosion protection rules (EX-RL)) and TRGS 727 (avoidance of risk of ignition as a result of electrostatic charges) must be known.

- Do not open or tip the fan if an explosive atmosphere exists.
- The fan may only be operated by adequately qualified persons.

#### Important:

Damage to the fan because of condensation water.

Ensure regular switch-on time of 2 hours per week

- Only use the fan in accordance with the operating instructions and the operating instructions for the motor.
- The EX fans have been admitted for S1 continuous operation.
- Observe the safety data sheet for the chemical substances that are 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 (avoidance of risk of ignition as a result of electrostatic charges).
- Observe and respect local conditions, regulations and laws.

# 8.2 To start a product with an EC motor

- 1 Make sure that the 0–10 V signal is set to "0" with the speed controller.
- 2 Set the installed safety switch in the ON position and wait 5 seconds.
- **3** Adjust the fan speed with the 0–10 V signal speed controller. If an external speed controller is not installed, adjust the fan speed directly with the integrated potentiometer.

# 8.3 To start a product with an AC motor

- 1 Set the installed safety switch in the ON position.
- 2 Install the external speed controller. Refer to the instruction manual for the installed speed controller.

# 8.4 To stop the product

- 1 Set the installed speed controller in the OFF position. Refer to the instruction manual for the installed speed controller.
- 2 Set the installed safety switch in the OFF position.

# 8.5 To stop the product in an emergency

· Set the installed safety switch in the OFF position.

## 9 Maintenance



### Warning

Set the installed safety switch in the OFF position before you do the maintenance unless the instructions tell you differently. Make sure that the safety switch is not accidentally set in the ON position.

## 9.1 Maintenance schedule

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 "Maintenance tasks" 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:

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

The intervals are calculated from continuous operation of the product.

Maintenance tasks		Usual operation conditions		Unusual operation conditions. <sup>1</sup>	
	Each 6 months	Each year	Each 3 months	Each 6 months	Each year
Visually examine the product and its components for damage, corrosion and dirt.		х		х	
Examine the fan impeller for damage and imbalance.		х		х	
Clean the product and the ventilation system.	х		х		
Do a check of all fasteners and make sure that they are fully tightened.		х			Х
Make sure that the product and its components are correctly operated.	х			х	
Measure the power consumption and compare the result with the information on the name plate.		х		х	
If vibration dampers are installed, make sure that they operate correctly and examine them for damage and corrosion.		х			Х
Make sure that the electrical protective equipment and the me- chanical protective equipment operates correctly.		х			Х
Make sure that you can read the name plates of the product.		Х		х	
Examine all cable connections for damage. Make sure that the cable glands are tight against the cables.		х			Х
If flexible connections are installed, examine them for damage.	х			х	

1. The unusual operation conditions are classified as follows: If a stable ambient temperature is higher than 30 °C or lower than -10° C, if the temperature changes are large or if very contaminated air is transported.

# 9.2 To clean the product



### Caution

- Do not clean the product with a highpressure washer.
- Do not clean the product with steel brushes or sharp objects.
- Do not bend the fan impeller blades.
- Be careful not to move the balance weights on the fan impeller.

- Remove dirt from the fan and the duct.
- If access to the fan impeller is possible, clean the fan impeller with a moist cloth or soft brush.

## 9.3 Spare parts

- When you send an order for spare parts, include the serial number of the product. The serial number is found on the name plate.
- For more information about spare parts, contact technical support.

- Always use spare parts from Systemair.
- To find spare parts, refer to the scannable code on the name plate.

### Note:

Reparation or replacement of components is not permitted on EX fans.

# 9.4 Troubleshooting



### Warning

### 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 nonrelevant 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!
- After repair, the fan/system must be subjected to an inspection in accordance with local conditions, regulations and laws (in Germany: §14 Abs 6 der BetrSichV Industrial Safety Regulation). This does not apply to repairs carried out by the manufacturer

### Note:

If you cannot find a solution to your problem in this section, speak to Systemair technical support.

Problem	Cause	Solution	
	The fan impeller is not correctly balanced.	Speak to Systemair technical support.	
	There is dirt on the fan impeller.	Clean the fan impeller carefully. Refer to 9.2 To clean the product.	
	The fan impeller has damages or defor- mations because the transported air contains aggressive media.	Speak to Systemair technical support.	
The product does not approte emosthly	The fan impeller does not turn in the correct direction.	Make sure that the electrical connection is correctly done.	
The product does not operate smoothly.	The fan impeller has deformations be- cause of too high temperatures.	<ul> <li>Replace the fan impeller.</li> <li>Make sure that the temperature of the transported air is not higher than the value on the name plate.</li> </ul>	
	There are unusually strong vibrations in the product or the duct system.	Make sure that the product is correctly installed. Do a check of the duct system.	
	The product is operated in a resonant frequency range.	Increase or decrease the fan speed un- til the product operates smoothly. Refer to 7 Commissioning.	
	The fan impeller does not turn in the correct direction.	Make sure that the electrical connection is correctly done.	
	The electrical connection is not cor- rectly done.	Make sure that the electrical connection agrees with the wiring diagrams.	
	The air pressure is too low because of incorrect installation.	Do the necessary changes in the duct system and installed components to in- crease the air pressure. Refer to 7 Commissioning.	
The air output is not sufficient	The spring return damper on outdoor or exhaust duct is closed or not fully open.	Adjust the spring return damper.	
	There is blockage in the air inlet or the duct system.	Remove the blockage.	
	The product is not applicable for the in- stallation location.	Make sure that the product is applicable for the installation location.	
	The motor power is decreased because of too high temperature in the motor.	<ul> <li>Do a check of the ambient temperature.</li> </ul>	
	<b>Note:</b> This is applicable for EC motors only.	<ul> <li>Make sure that the space around the motor is sufficient to keep the tem- perature down.</li> </ul>	
There is unusual noise when the prod- uct starts or operates.	There is strain in the connections of the duct system.	Loosen the connections, align the parts of the duct system correctly and tighten the connections.	

Problem	Cause	Solution
	The fan impeller does not turn in the correct direction.	Make sure that the electrical connection is correctly done.
	A phase loss occurred.	If the motor is a 3-phase motor, make sure that no phase is missing.
		Note:
		This is not applicable for EC motors.
	The motor is overheated.	<ul> <li>Do a check of the motor cooling impeller.</li> </ul>
Thermal contacts, PTC or resistors are released.		<ul> <li>If it is possible, measure the resist- ance to do a check of the motor winding.</li> </ul>
	The capacitor is not connected or not correctly connected.	Connect the capacitor correctly. Refer to the included motor wiring diagram.
	Note:	
	This is not applicable for EC motors or 3–phase AC motors.	
	There is blockage in the motor.	Speak to Systemair technical support.
	Defective motor winding.	If it is possible, measure the resistance to do a check of the motor winding.
	The speed control is not correctly set.	Set the speed control correctly.
The fan speed does not get the nominal value.	The fan impeller cannot turn freely be- cause of mechanical blockage.	Remove the blockage.
	Phase loss occurs.	If the motor is a 3-phase motor, make sure that no phase is missing.
	A component in the power supply is defective.	Do a check of the power supply. Re- place defective components and con- nect the power supply again.
<b>T</b> he mark of the second state	The electrical connection is not cor- rectly done.	Make sure that the electrical connection agrees with the wiring diagrams.
The motor does not rotate.	The motor protection is released be- cause the motor is overheated.	Let the motor become cool. Reset the motor protection. Find the cause of the overheated motor.
	A phase loss occurred.	If the motor is a 3-phase motor, make sure that no phase is missing.
	The motor is overloaded or the ambient temperature is too high.	Let the motor become cool. Reset the motor protection. Find the cause of the overheated motor.
The electronic components or the motor	The motor is overloaded.	Make sure that the product is applicable for the installation location.
is overheated.	The ambient temperature is too high.	Make sure that the product is applicable for the installation location.
	The cooling of the product is not sufficient.	Make sure that the space around the motor is sufficient to keep the tempera- ture down.

## 9.5 Disposal

The product follows the WEEE directive. This symbol on the product or the packaging of the product shows that this product is not domestic waste. The product must be recycled at an approved disposal location for electrical and electronic equipment.



# 9.5.1 To disassemble and discard the parts of the product

1 Disconnect and disassemble the product in the opposite sequence of electrical connection and installation.

## 9.7 Accessory overview

### Note:

- 2 Recycle the product parts and the packaging at an applicable disposal location.
- 3 Obey the local and national requirements for disposal.

## 9.6 Warranty

For warranty claims, send a written maintenance plan and the commissioning report to Systemair. The warranty is only applicable for these conditions:

- · The product is correctly installed and operated.
- Motor protection is used.
- The instructions in the data sheets are obeyed.
- Maintenance instructions are obeyed.
- The product is operated for a minimum of 1 hour each month.

The selection of accessories shown are not supplied with the product. For more information and other available accessories, refer to www.systemair.com or speak to Systemair technical support.



- VP: Splinter protection included in sizes PRF 355–500 ; PRF EX;PRF EC; except PRF EX 75
- PRF EX;PRF EC; except PRF EX 75
- 3. Ass-P: Flexible connection for PRF125–250
- 4. VKS-P: Gravity shutter for PRF 125–250
- 5. VKA-P: Adjust. damper for PRF 125–250
- 6. WSD: Weather roof KIT for PRF 125–250
- 7. SD: Vibration damper

- Drain plug included in sizesPRF355–500; PRF EC; PRF EX; except PRF EX 75
- WSD: Weather roof KIT for PRF355–500; PRF EC; PRF EX
- 10. ASS-P: Flexible connection for PRF355–500; PRF EC; PRF EX
- 11. VKA-P: Adjust. damper from for PRF355–500; PRF EC; PRF EX

# 9.8 Technical data

## 9.8.1 Technical data overview

Max. ambient temperature [°C]	see data sheet, available in our online catalogue.
Max. temperature of transported air [°C]	see data sheet, available in our online catalogue.
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.

Fan	DN	housing material - UV resistant	housing material - UV resistant
PRF	125–250	PE	PP
PRF	355–500	PEs	PPs
PRF EC	125–250	PEs	PPs
PRF EX	125–500	PE-el	PP-el

## 9.8.2 Minumum air gap

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

### Table 5 PRF

Size	minimum air gap [mm]
125	2.0
160	2.5
180	3.0
200	3.5
250	4.5

### Table 6 PRF 355–500, PRF EC and PRF EX

Size	minimum air gap [mm]
125	3
160	3
180	3
200	3
250	3
315	3
355	3
400	3
450	3
500	3

### 9.8.3 Chemical components

The standard plastic types used are polyethylene (PE, PEs) and polypropylene (PP, PPs). 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, but we cannot guarantee the correctness of all statements. Examination of the media to be transported is a matter for the plant operator. Here, it is merely a question of a recommendation.

## 9.8.4 Product dimensions

### Note:

If the unit of measure is not specified, the dimensions are given in millimetres.

### PRF 125-250



### Table 7 PRF

[mm]	PRF 125	PRF 160	PRF 180	PRF 200	PRF 250
A	142	183	208	230	290
В	187	228	274	310	380
С	40	40	40	40	40
D	125	160	180	200	250
E	120	153	160	170	194
F	150	188	204	220	265
G	60	60	60	60	80
Н	250	310	350	410	495
I	165	210	230	245	330
L	197	221	230	221	340
Q	140	140	190	230	250
R	235	290	316	355	365

![](_page_23_Figure_1.jpeg)

## Table 8 PRF AC

[mm]	PRF AC 355	PRF AC 450	PRF AC 500	PRF AC 500 60Hz
А	1025	12774	1435	1435
В	435	539	607	607
С	411	510	576	576
D	355	450	500	500
E	376	478	530	530
F	410	512	564	564
G	595	730	820	820
н	1036	1267	1403	1403
I	30	30	30	30
J	30	40	40	40

# Table 8 PRF AC (continued)

[mm]	PRF AC 355	PRF AC 450	PRF AC 500	PRF AC 500 60Hz
K <sup>1</sup>	817	909	1042	1116
L	267	311	339	336
M and R	150	150	150	150
Ν	655	814	893	893
0	745	894	973	973
Р	829	975	1057	1054
Q	40	40	40	40

1. Depending on motor brand

### Table 9 PRF EC

[mm]	PRF EC 125	PRF EC 160	PRF EC 180	PRF EC 200	PRF EC 250
A	367	456	519	579	729
В	156	193	219	244	311
с	149	183	210	235	291
D	125	160	180	200	250
E	244	290	314	334	400
F	274	326	350	370	436
G	238	280	310	342	415
н	435	508	560	613	733
I	15	30	30	30	30
J	20	30	30	30	30
K1	421	457	540	555	605
L	121	138	156	164	188
M and R	130	150	150	155	155
Ν	248	290	314	334	400
0	298	340	364	384	450
Р	420	479	520	548	640
Q	25	25	25	25	25

1. Depending on motor brand

## Table 10 PRF EX

[mm]	PRF EX 75	PRF EX 125	PRF EX 160	PRF EX 180	PRF EX 200	PRF EX 250	PRF EX 315	PRF EX 400	PRF EX 500
A	211	370	460	521	583	730	907	1135	1435
В	88	156	193	219	245	311	385	481	607
С	86	149	183	210	235	291	362	454	576
D	75	125	160	180	200	250	315	400	500
E	174	244	290	314	334	400	424	412	530
F	200	274	326	350	370	430	460	446	564

[mm]	PRF EX 75	PRF EX 125	PRF EX 160	PRF EX 180	PRF EX 200	PRF EX 250	PRF EX 315	PRF EX 400	PRF EX 500
G	193	238	280	309	342	415	510	650	820
н	326	536	623	663	727	844	896	1132	1403
1	15	15	30	30	30	30	30	40	30
J	20	20	30	30	30	30	30	30	40
K <sup>1</sup>	322	410	472	497	552	665	707	847	1032
L	86	121	138	156	164	189	242	286	336
M and R	95	130	150	150	155	155	150	150	150
N	130	248	290	314	319	400	424	723	893
0	160	298	340	364	384	450	474	803	973
Р	300	420	439	474	548	641	717	884	1054
Q	15	25	25	25	25	25	25	40	40

### Table 10 PRF EX (continued)

1. Depending on motor brand

# 9.9 Wiring diagram

### Important

Wrong connection can damage or destroy the motor

![](_page_25_Picture_6.jpeg)

## Caution

The motor circuit diagram is on the motor nameplate. Check the nameplate before installation or maintenance to ensure correct connection information. If the nameplate is not readable or if you need more information, contact the manufacturer or technical support.

# **10 EU Declaration of Conformity PRF**

We, the manufacturer

Company	Systemair GmbH
Address	Seehöfer Straße 45 97944 Boxberg Germany

declare under our sole responsibility that the product

Product designation	Plastic Fans- Industrial fans for "Aggressive Gases/ Vapours"
Type/Model	PRF 125– 500; PRF 125– 250 EC
Identification	Serial numbers dating from 2024 and onwards

fulfils all relevant provisions of the

Machinery Directive	2006/42/EC DIN EN ISO 12100:2011–03 + AC 2013–08 Safety of machinery - General principles for design Risk assessment and risk reduction DIN EN 60204-1:2019-06 Safety of machinery - Electrical equipment of machines - Part 1: General requirements
Directive Electromagnetic Compatibility (EMC)	2014/30/EU DIN EN IEC 61000-6-2:2019-11 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards- Immunity standard for industrial environments DIN EN IEC 61000-6-4:2020-09 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
RoHS Directive	2011/65/EU; 2015/863/EU DIN EN IEC 63000: 2019–05 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
Ecodesign Regulation	<b>2024/1781/EU</b> 327/2011/EU Requirements for fans above 125W, Exception: Article 1 (3) iv) in toxic, highly corrosive environments

Person authorized to compile the technical file:

j.V. M. flow-og if

Matthias Hennegriff CE Representative

This declaration relates exclusively to the machinery in the state in which it was placed on the market and excludes components which are added or operations carried out subsequently by the final user. Boxberg, Germany 2024-11-04

fund Meum

Kurt Maurer Managing Director

# 11 EU Declaration of Conformity PRF-EX

We, the manufacturer

Company	Systemair GmbH
Address	Seehöfer Straße 45 97944 Boxberg Germany

declare under our sole responsibility that the product

Product designation	PRF-EX, Fans for explosion-hazardous areas
Identification	Serial numbers dating from 2023 and onwards

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:

EU directives:	2006/42/EG, Machinery directive
	2014/34/EU, ATEX- directive
	2014/30/EU, Directive electromagnetic compatibility (EMC)
	2011/65/EU, RoHS directive

fulfils all relevant provisions of the

Harmonized standards:	DIN EN 14986:2017-04 Design of fans working in potentially explosive atmospheres; German version EN 14986:2017 DIN EN ISO 80079-36:2016-12
	Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements (ISO 80079-36:2016); German version EN ISO 80079-36:2016
	DIN EN ISO 80079-37:2016-12
	Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non- electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k" (ISO 80079-37:2016); German version EN ISO 80079-37:2016
	<b>DIN EN 1127-1:2019-10</b> , Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology
	<b>DIN EN 60079-1:2015-04 + AC:2019-01</b> , Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
	DIN EN IEC 60079-0 + AC1:2021-04
	Explosive atmospheres- Part 0: Equipment- General requirements (IEC 60079–0:2017/ COR1:2020)

Person authorized to compile the technical file:

i.V. H. fanga

Matthias Hennegriff CE Compliance Officer

Marco H

i.A. Marco Ruf ATEX Representative

This declaration relates exclusively to the machinery in the state in which it was placed on the market and excludes components which are added or operations carried out subsequently by the final user. Boxberg, Germany 2023-12-04

# 12 UKCA Declaration of Conformity

We, the manufacturer

Company	Systemair GmbH
Address	Seehöfer Straße 45 97944 Boxberg Germany

declare under our sole responsibility that the product

Product designation	Plastic Fans- Industrial fans for "Aggressive Gases/ Vapours"
Type/Model	PRF 125– 500; PRF 125– 250 EC
Identification	Serial numbers dating from 2024 and onwards

fulfils all relevant provisions of the

Supply of Machinery (Safety) Regulations 2008	2006/42/EC DIN EN ISO 12100:2011–03 + AC 2013–08 Safety of machinery - General principles for design Risk assessment and risk reduction DIN EN 60204-1:2019-06 Safety of machinery - Electrical equipment of machines - Part 1: General requirements
Electromagnetic Compatibility Regulations 2016	2014/30/EU DIN EN IEC 61000-6-2:2019-11 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards- Immunity standard for industrial environments DIN EN IEC 61000-6-4:2020-09 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
The Ecodesign for energy Related Products Regulations 2010	<b>2024/1781/EU</b> 327/2011/EU Requirements for fans above 125W, Exception: Article 1 (3) iv) in toxic, highly corrosive environments

Person authorized to compile the technical file:

i.V. H. fornog if

Matthias Hennegriff CE Representative

This declaration relates exclusively to the machinery in the state in which it was placed on the market and excludes components which are added or operations carried out subsequently by the final user. Boxberg, Germany 2024-11-04

for Meum

Kurt Maurer Managing Director

![](_page_29_Picture_0.jpeg)

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