

## PRF



DE

Anleitungen zu Versand, Montage, Inbetriebnahme und Wartung von Industrieventilatoren für Umgebungen, in denen aggressive Gase/Dämpfe vorhanden sein können

2

GB

Instructions for shipping, mounting, initial operation and maintenance of industrial fans for environments where corrosive gas/vapours may be present

16

SE

Instruktioner för leverans, montering, uppstart och underhåll av industrifläktar för miljöer där frätande gas/ångor kan finnas.

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P

Instruções de embalagem, instalação, arranque e manutenção de ventiladores industriais para ambientes contendo gases/vapores corrosivos.

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## GENERAL INFORMATION

### HAZARD WARNINGS



– Never put your hands, or any other part of your body, into the fan casing.



– Never remove, take off, modify or in any other way interfere with the protective devices.

### LIMITATIONS OF USE

The fan has been designed and built to transport air in the presence of corrosive gas/vapours at temperatures between  $-15\text{C}^{\circ}$  and  $+70\text{C}^{\circ}$ . The concentration limits for transporting corrosive substances are given below.

#### WARNING

THE PRODUCTS IN THIS MANUAL ARE **NOT** SUITABLE FOR USE IN POTENTIALLY EXPLOSIVE (ATEX) ENVIRONMENTS. FOR USE IN POTENTIALLY EXPLOSIVE (ATEX) ENVIRONMENTS, ATEX CERTIFIED FANS OF A SUITABLE CATEGORY FOR THE ZONE CLASSIFIED SHOULD BE PURCHASED FROM SYSTEMAIR GMBH.

Important: The following list has been made to the best of our knowledge and is a recommendation only. The examination of the media to be transported is under the responsibility of the system operator. We do not recommend to select material combinations with a "0" in properties.

The standard casing is manufactured from PE, the standard impeller is manufactured from PP. The material of the impeller is the indicator for the selection.

+ Resistant - Not resistant 0 Partially resistant

CHEMICAL AGENTS		BEHAVIOUR				
REAGENT	CONCENTRATIONS	TEMP °C	PVC	PP	PE	PVDF
Ammonium acetate	All, aqueous	20	+	+	+	+
		40	+	+	+	+
		60	0	+	+	+
Butyl acetate	Technically pure	20	-	+	0	+
Ethyl acetate	Technically pure	20	-	+	+	0
		40		0	0	-
Vinyl acetate	Technically pure	20	-		+	
(Wine) vinegar	Norm. concentrate	20	+	+	+	+
acetone	Technically pure	20	-	+	+	0
Acetic acid	Technically pure	20	0	+	+	+
	Glacial	40	-	+	+	+
		60		0	0	0
Aqueous boric acid	All, aqueous	20	+	+	+	+
		40	+	+	+	+
Hydrobromic acid	50% Aqueous	20	+	+	+	+
Citric acid	10% Aqueous	20	+	+	+	+
		40	+	+	+	+
		60	0	+	+	+
Chloric acid	10% Aqueous	20	+	+	-	+
	20% Aqueous	20	+	0	-	+
Hydrochloric acid	10% Aqueous	20	+	+	+	+
		40	+	+	+	+
		60	0	+	0	+
	up to 30% aqueous	20	+	+	+	+
		40	+	+	0	+
		60	0	+	0	+
	30% aqueous	20	+	+	+	+
		40	+	+	0	+
		60	0	+	-	+
Chromic acid	up to 50% aqueous	20	+	0	0	+
		40	+	-	-	+
Hydrofluoric acid	50% Aqueous	20	+	+	+	+
	70% Aqueous	20	+	+	+	+
Fluosilicic acid	32% aqueous	20	+	+	+	+
Formic acid	up to 50% aqueous	20	+	+	+	+
		40	+	+		+
		60	0	+	0	+

+ Resistant - Not resistant 0 Partially resistant

CHEMICAL AGENTS		BEHAVIOUR					
REAGENT	CONCENTRATIONS	TEMP °C	PVC	PP	PE	PVDF	
Aqueous phosphoric acid	50% Aqueous	20	+	+	+	+	
	85% Aqueous	20	+	+	+	+	
		40	+	+	+	+	
		60	+	0	+	+	
Phthalic acid	Saturated, aqueous	20	+	+	+	+	
		40	0	+	+	+	
Glycolic acid	37% aqueous	20	+	+	+	+	
Lactic acid	10% aqueous	20	+	+	+	+	
		40	0	+	+	+	
Maleic acid	Aqueous, saturated cold	20	+	+	+	+	
Nitric acid	Up to 40% Aqueous	20	+	0	0	+	
		40	+			+	
		60	0	-	-	+	
	65% aqueous	20	0	0	-	+	
		40	0	-	-	+	
	100%	20	-	-	-	-	
Oxalic acid	Aqueous, saturated cold	20	+	+	+	+	
Perchloric acid	10% aqueous	20	+	+	+	+	
		40	+	+	+	+	
		60	0	+	+	+	
	70% aqueous	20	0	+	0	+	
		40		0	-	+	
Hydrogen sulphide	Technically pure	20	+	+	+	+	
Sulphuric acid	Up to 40% Aqueous	20	+	+	+	+	
		40	+	+	+	+	
		60	+	+	+	+	
	Up to 60% Aqueous	20	+	+	+	+	
		40	+	+	+	+	
		60	+	+	+	+	
	Up to 80% Aqueous	20	+	+	+	+	
		40	+	+	+	+	
		60	+	0	0	+	
	90% aqueous	20	+	0	0	+	
		40	+			+	
	96% aqueous	20	+	-	-	+	
		40	+			+	
		60	0			+	
Sulphurous acid	Saturated, aqueous	20	+	+	+	+	
Stearic acid	Technically pure	20	+	+	+	+	
Tartaric acid	All, aqueous	20	+	+	+	+	
Trichloroacetic acid		20	+	+	+	+	
Turpentine	Normal concentr.	20	+	+	0	0	
Benzyl alcohol	Technically pure	20	0	+	+	+	
Ethanol	96% Technically pure	20	+	+	+	+	
		40	+	+	+	+	
		60	0	+	+	+	
Methyl alcohol	All	20	+	+	+	+	
Acetaldehyde	Technically pure	20	-	+	0	-	
Chrome alum	Aqueous Saturated, cold	20	+	+	+	+	

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CHEMICAL AGENTS		BEHAVIOUR				
REAGENT	CONCENTRATIONS	TEMP °C	PVC	PP	PE	PVDF
Ammonia	Technically pure Gaseous	20	+	+	+	+
		40	+	+	+	+
		60	+	+	+	0
Acetic anhydride	Technically pure	20	-	+	+	-
Sulphur dioxide		20	-	-	-	0
Aniline	Technically pure	20	-	0	0	-
Liquid anti-freeze	Technically pure	20	+	+	+	+

CHEMICAL AGENTS		BEHAVIOUR				
REAGENT	CONCENTRATIONS	TEMP °C	PVC	PP	PE	PVDF
Petrol	Traces of lead and aromatics	20	+	+	0	+
		40	+	+		+
		60	+	0	-	+
Potassium bromate	Saturated, aqueous	20	+	+	+	+
Borax	All, aqueous	20	+	+	+	+
Liquid bromine	Technically pure	20	-	-	-	+
Butadiene	Technically pure	20	+	+	+	+
Gaseous butane	Technically pure	20	+	+	+	+
Cyclohexane	Technically pure	20	-	+	+	+
Chlorine	Technically pure	20	0	-	-	+
Chlorobenzene	Technically pure	20	-	0	+	+
Chloroform	Humid 97% gaseous	20	-	-	0	+
Ethylene chloride	Technically pure	20	-	0	0	+
Chloromethane	Technically pure	20	-	0	-	+
Vinyl chloride	Technically pure	20	-			+
dichlorotulene	Technically pure	20	-	-	0	+
Dimethylamine	Technically pure	20	0	+	+	0
1,4-dioxane	Technically pure	20	-	+	0	0
Diethyl phthalate	Technically pure	20	-	0	+	
Ethane	Technically pure	20	+	+	+	+
Ether	Technically pure	20	-	0	+	+
Ethyl benzene	Technically pure	20	-		0	+
Ethylediamine	Technically pure	20	0	+	+	+
Phenol	Up to 10% aqueous	20	+	+	+	+
Dry fluorine	Technically pure	20	0	-	-	-
Ammonium fluoride	50% aqueous	20	+	+	+	+
Formaldehyde	40% aqueous	20	+	+	+	+
Sodium phosphate	Aqueous, saturated, cold	20	+	+	+	+
Phosgene	Technically pure	20	-		0	
Diesel fuel		20	+	+	0	+
Glycerine	Technically pure	20	+	+	+	+
Hydrogen	Technically pure	20	+	+	+	+
Ammonium hydroxide	Aqueous, saturated, cold	20	+	+	+	0
Iodine		20	-	+	+	+
Sodium iodide	Aqueous	20	+	+	+	+
Calcium hypochlorite	Aqueous, saturated, cold	20	+	+	+	+
Sodium hypochlorite	12.5% active chlorine, aqueous	20	+	0	0	0
Isoctane	Technically pure	20	+	+	+	+
Mercury	Pure	20	+	+	+	+
Methane	Technically pure	20	+	+	+	+

+ Resistant   - Not resistant   0 Partially resistant

CHEMICAL AGENTS		BEHAVIOUR				
REAGENT	CONCENTRATIONS	TEMP °C	PVC	PP	PE	PVDF
Methyl hexyl ketone	Technically pure	20	-	+	+	0
Naphta		20	+	0	0	+
		40	0	-	-	+
Naphtalene	Technically pure		-	+	+	+
Ammonium nitrate	10% aqueous	20	+	+	+	+
Sodium nitrate	Aqueous, saturated, cold	20	+	+	+	+
Nitrotoluene	Technically pure	20	-	+	+	+
Oleum	10% SO <sub>2</sub>	20	-	-	-	-
Lubricant oils		20	+	+	0	+
Olive oil		20	+	+	+	+
Paraffin oil		20	+	+	+	+
Silicon oil		20	+	+	+	+
Sodium oxalate	Aqueous, saturated, cold	20	+	+	+	+
Ethylene oxide	Technically pure	20	-	-	0	+
Oxygen	Technically pure	20	+	+	+	+
		60	0	0	0	+
Ozone	In the air up to 2%	20	+	0	0	+
Perchloroethylene	Technically pure	20	-	0	0	+
Potassium permanganate	Aqueous, saturated, cold	20	+	+	+	+
Hydrogen peroxide	20% aqueous	20		+	+	+
		40		+	+	+
		60		+	0	+
	90% aqueous	20		+	-	+
Petroleum	Technically pure	20	+	+	+	+
		40	+	+	0	+
		60		0	0	+
Propane	Technically pure liquid	20	+	+	+	+
Sodium silicate	All, aqueous	20	+	+	+	+
Caustic soda	50% aqueous	20	+	+	+	0
		40		+	+	0
		60		+	+	0
Ammonium sulphate	10% aqueous	20	+	+	+	0
		40		+	+	0
		60		+	+	0
Ammonium sulphate	10% aqueous	20	+	+	+	+
Tetrachloroethane	Technically pure	20	-	0	0	+
Lead tetraethyl	Technically pure	20	+	+	+	+
Tetrahydrofuran	Technically pure	20	-	0	-	0
Toluene	Technically pure	20	-	0	0	+
Trichloroethane	Technically pure	20	-	0	0	+
Trichloroethylene	Technically pure	20	-	-	0	+
Triethanolamine	Technically pure	20	0	+	+	+
Urea	Up to 30% aqueous	20	+	+	+	+
Vaseline	Technically pure	20	0	0	+	+
Xylene	Technically pure	20	-	-	-	+
Sulphur	Technically pure	20	0	+	+	+

## **DESCRIPTION OF ACCESSORIES**

The following accessories are available for the fan on request:

- Antivibration joints: reduce vibration which could be transmitted to the ventilation ducts
- Shock absorbers: reduce vibration which could be transmitted to the fan base.
- Butterfly valves: regulate the airflow in the ducts.
- Ducts: used to connect the fan to the system.
- Condensation plug: discharges condensation forming inside the casing.
- Bends and reductions: join stretches of ductwork together.

## **DESCRIPTION OF SAFETY DEVICES**

The fan has no active safety devices because it is designed to be part of a system which regulates its power supply and function.

## **ENVIRONMENTAL LIMITS**

The fan may be installed in an environment at a temperature of between 20C° and +40C° at an altitude of no more than 1000 metres above sea level.

## **POSSIBLE HAZARDS**

The fan must be transported as it is, without dismantling or removing any of its parts; it is therefore heavy and may have sharp protuberances.

The fan must be thoroughly cleaned prior to transportation in order to ensure that while it is being lifted no detritus will fall out of or off it.

## **RECOMMENDED PRECAUTIONS**



- WARNING: always wear adequate protective clothing.



- WARNING: follow all the instructions given in this chapter.



- WARNING: verify that the weightlifting equipment used can bear the declared weight in the enclosed catalogue.



- Do not approach the fan under any circumstances until it is resting on the ground and the weightlifting equipment is inactive.



## INSTALLATION

### INSTALLING THE FAN

#### REQUIRED LEVEL OF EXPERTISE

Basic understanding of masonry and skills.

#### RECOMMENDED PRECAUTIONS



– WARNING: follow the steps illustrated in this section accurately.



– WARNING: always wear adequate protective clothing.



– WARNING: always employ a qualified electrician to install the electrical components and wiring.



– WARNING: before wiring the fan ensure that the impeller is beyond the reach of people's arms. If it is not install a protection grill and connect it to the supply and exhaust ducts.

#### PROCEDURE

1. Transport the packaged fan to its installation location, remove packaging.
2. Identify the anchoring screws exact position using the fan.
3. Drill the necessary holes.
4. Align the fan housing's drilled holes with those on the base.
5. Fix the structure to the base using pressure plugs or bolts depending on whether the base is in iron or cement. Install shock absorbers if available.
6. Connect the supply and exhaust ducts.
7. Install fixed protection barriers in order to render the fan inaccessible under normal operating conditions.
8. If available install the condensation drain plug at the base of the casing to drain condensation. Organise a system to channel and collect condensation.
9. Install protection grills to avoid contact with the fan.

#### WIRING TO THE MAINS

This should be carried out once the fan is in the final position; the qualified electrician doing the wiring shall follow the instructions in the technical electrical documentation enclosed in the terminal block of the electric motor.

#### Operation with speed controllers

The admissible type of speed controller can be taken from the documentation. We recommend to use the Systemair range RTRE and RTRD, in case speed control by transformer is chosen. All motors which are speed controllable by reduction of voltage are equipped with motor protection by thermal contacts. Three phase motors shown as speed controllable can be operated with frequency inverters. The frequency inverter has to be equipped with an all pole sine filter (earth/earth and earth/phase). Three phase motors shown as single speed motors can be operated with standard frequency inverters. All single speed three phase motors are equipped with a cold conductor for motor protection.

#### Warranty

The Systemair warranty covers the complete unit and only those components supplied by Systemair. Components which have been added at site and have a negative influence on the fan invalidate the warranty for the complete fan. Systemair reserves the right in case of a warranty claim to have the concentrations of chemicals being verified by an independent third party surveyor.

## MAINTENANCE

### *REQUIRED LEVEL OF EXPERTISE*

CODE	DESCRIPTION
1	Authorised manufacturer's personnel only.
2	Customer's personnel with technical training.
3	Customer's personnel with technical training who have been trained for the specific maintenance involved.

### *PREVENTIVE MEASURES*



WARNING: place several visible "maintenance" placards around the area.



WARNING: wear protective gloves which are adequate to deal with the presence of gas/vapours and any deposits.



WARNING: wear adequate protective clothing.



WARNING: follow the instructions contained in the present manual.



WARNING: in order to see the internal part of the casing better use a portable auxiliary lamp with a protected light bulb.



WARNING: before carrying out maintenance ensure that the electrical supply to the fan has been interrupted and secured against re-starting.

### *PROCEDURE*

The following tables show:

- Maintenance description.
- Level of expertise required.
- Maintenance schedule.

OPERATION	SPEC.	SCHEDULING OR CRITERIA
Replacement of electric motor bearings and gear support, if installed.	1	30,000 hours



WARNING: This operation may only be carried out by personnel authorised by the manufacturer.

## REPAIRS

### **REQUIRED LEVEL OF EXPERTISE**

CODE	DESCRIPTION
1	Authorised manufacturer's personnel only.
2	Customer's personnel with technical training.
3	Customer's personnel with technical training who have been trained for the specific maintenance involved.

### **PREVENTIVE MEASURES**



– WARNING: place several visible “REPAIRS” placards around the area before carrying out repairs.



– WARNING: wear adequate protective clothing.

### **PROCEDURE**

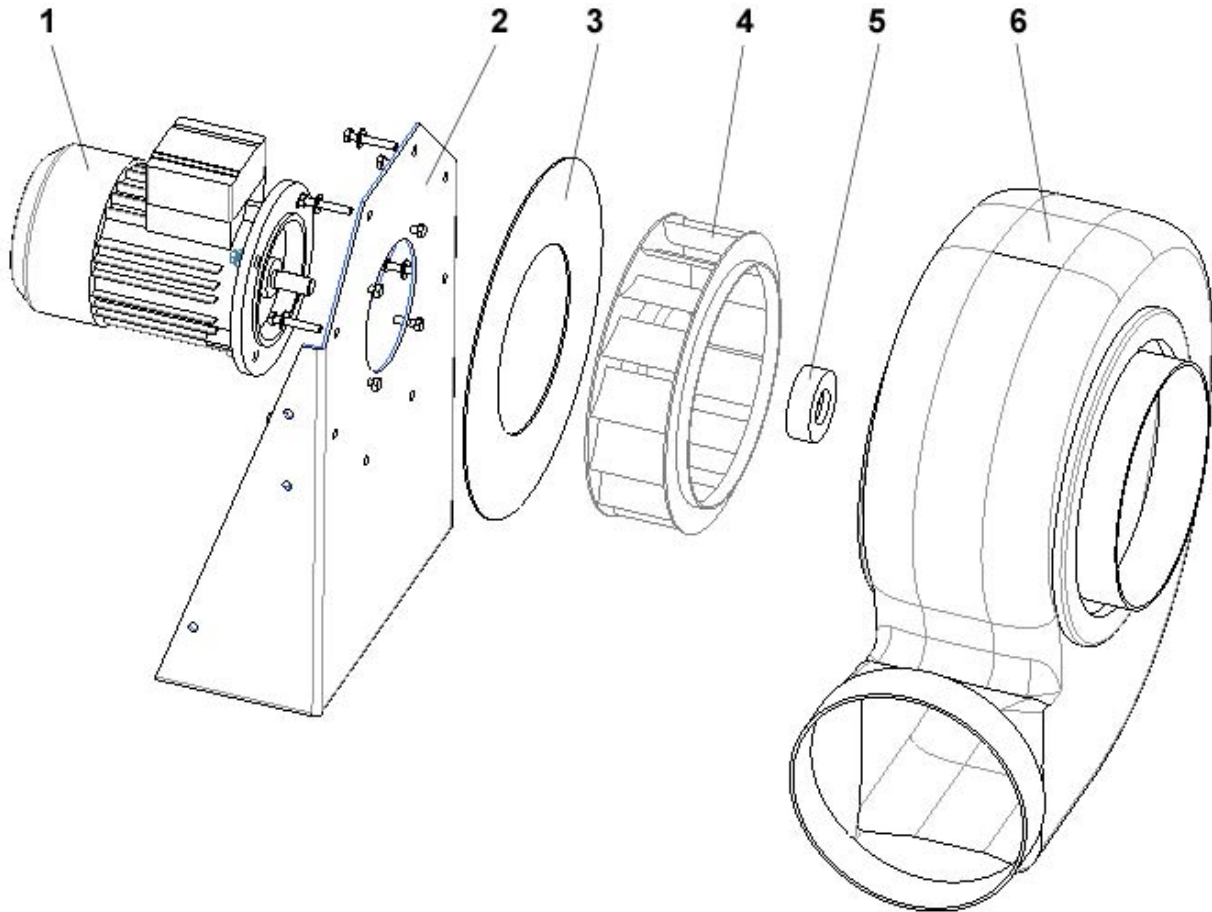
The following table shows:

- A description of the problem – the commonest malfunction symptoms;
- Possible causes of damage;
- Proposed solutions;
- Who should intervene.

SYMPTOMS	CAUSE	SOLUTIONS	SPEC
<b>Reduced air volume (at normal rotation speed)</b>	Ducts clogged and/or inlets blocked	Clean ducts and cones, check inlet positioning	2
	Inverted rotation	Check connection sense on the electric motors terminal block	2
	Impeller clogged	Clean impeller through the dedicated hatch when the fan is not connected	2
	Insufficient rotation speed	Check power supply tension and connections to the terminal motor block	2
<b>Excessive air volume</b>	Rotation speed	Clean ducts and cones, check inlet positioning.	2
		Check rotation direction; check any particular conditions of turbulence in the inlet; check motor rotation speed, power supply tension, winding problems.	2
<b>Insufficient pressure</b>	Air leak in the conductor system or faulty/badly installed components, or bypass register not perfectly shut.	Check the system and replace faulty components.	2
	Rotation speed too low	Clean pipes and cones, check register position.	2
	Inverted rotation	Check wiring.	2
	Impeller partially blocked and/or damaged	Check impeller condition and installation.	2

SYMPTOMS	CAUSE	SOLUTIONS	SPEC
<b>Reduced performance after a period of correct function</b>	Leak in the fan casing seal and/or leak in the inlet/outlet ducts	Replace seal and check ducting.	2
<b>Start up problems</b>	Excess power absorption	Check rotation direction; check any turbulence conditions in inlet; check motor running speed, power supply tension and winding problems.	2
	Reduced power supply tension	Check data on the motor plate	2
<b>Excessive noise</b>	High number of rpms needed to obtain the required performance	Use soundproofing and/or silencers; opt for a larger fan with equal performance or a fan with a minor peripheral speed	2
	Faulty bearings	Check wear and tear on bearings (especially sealed bearings)	2
	Poorly balanced impeller or impeller knocking against the casing	Check impeller balance	2
<b>Vibration</b>	Poorly balanced rotating parts	Check balancing again	2
	Unsuitable base	Add weights to the base to increase stability	2

**SPARE PARTS TABLE**



- |          |                           |          |                       |
|----------|---------------------------|----------|-----------------------|
| <b>1</b> | <b>MOTOR</b>              | <b>4</b> | <b>WHEEL</b>          |
| <b>2</b> | <b>MOTOR SUPPORT</b>      | <b>5</b> | <b>OGIVE</b>          |
| <b>3</b> | <b>DISK MOTOR SUPPORT</b> | <b>6</b> | <b>VOLUTE MOULDED</b> |



- **WARNING:** always use original spare parts from the manufacturer. Indicate clearly the ID number of the part required and the type of fan.

## **CLEANING**

### ***REQUIRED LEVEL OF EXPERTISE***

Expert worker with machinery experience and safety training.

### ***HAZARD WARNINGS***

The only risks which may occur come from not following the instructions contained in the manual or not wearing adequate safety clothing.

### ***PREVENTIVE MEASURES***

Turn off the electric power supply.  
Drain off condensation in the hood.

### ***RECOMMENDED PRODUCTS***

Use compressed air alone if the fan is used to transport air in the presence of gas/vapours which do not contain suspended particles.

If the fan is used in an environment with vapours from special chemical substances consult the chemicals safety data sheets to see which cleaning products they recommend.

### ***PROCEDURE***

1. Stop the fan and cut the electrical power supply off.
2. Access the casing by dismantling it as described in section assembly and dismantling.
3. Clean the parts of the casing and the impeller using compressed air or the specific products recommended for air in the presence of gas/vapours.
4. Reassemble the casing as described in section assembly and dismantling.
5. Restart the fan if necessary.

## **DISMANTLING**

### ***HAZARD WARNINGS***

Mainly due to the fact that some parts of the fan are heavy.

### ***PARTS, ELEMENTS, AND SUBSTANCES THAT REQUIRE SPECIAL PROCEDURES***

All fan parts should be correctly disposed of.

Each part, component or group of components should be grouped together by type.

Procedures and equipment used must conform to legislation current at the time of dismantling.

## ASSEMBLY AND DISMANTLING

### **REQUIRED LEVEL OF EXPERTISE**

The operations described in the present section are referred to in several other sections of the manual. The level of expertise required is specified at the beginning of each appropriate reference section.

### **RECOMMENDED PRECAUTIONS**



- WARNING: follow the instructions detailed in this section.



- WARNING: wear adequate protective clothing.

### **PROCEDURE**

#### DISMANTLING

1. Turn the fan off and cut off the electrical power supply.
2. Detach the fans inlet and outlet ducts.
3. Unscrew the bolts which anchor the casing to the base structure and place the casing on the ground.
4. Unscrew the bolt which anchors the impeller to the electric motor shaft.
5. Remove the impeller and place it on the ground.
6. Unscrew the bolts which anchor the electric motor and place the motor on the ground.

#### ASSEMBLY

1. Screw in the bolts that anchor the electric motor.
2. Assemble the impeller on the electric motor shaft.
3. Screw in the bolts that anchor the impeller to the electric motor shaft.
4. Screw in the bolts that anchor the casing to the base structure.
5. Attach the fans inlet and outlet ducts.

## REMOVAL FROM COMMISSION

### **REQUIRED LEVEL OF EXPERTISE**

Basic understanding of masonry and skills, with a copy of this section of the manual authorised by their employer who guarantees their correct training.

### **RECOMMENDED PRECAUTIONS**



- WARNING: follow the instructions detailed in this section.



- WARNING: wear adequate protective clothing.

### **PROCEDURE**

1. Turn the fan off.
2. Detach the electrical power supply lines from the motor.
3. Cover the metal parts with a light coat of oil to prevent oxidization.
4. Cover the fan with a nylon dust sheet.