Climinox

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Technical notice

ModulAir

Installation

Assembly

Maintenance

Safety

Air conditioners of the type:

SF3, SF6, DF3, DF4.5, DF6

For your safety and for your information, it is imperative that you read this notice before installation

Note ***Climinox*** published on 01/01/2011 *(this document can be modified without notice)*

Contents

Technical notice - ModulAir

Introduction

1.1 Designation

Our equipment is intended to fulfil an air treatment function.
It can be implemented only by qualified professionals.
It allows, according to the models, for cooling, heating, humidification, dehumidification, ventilation filtration and air scouring.
Any other use is prohibited.

ModulAir or CirculAir: Stainless steel single or double flow air conditioner

1.2 Manufacturer's information

The machine you have just purchased is designed by Climinox, manufactured under its supervision and bears the CE mark in accordance with current legislation.

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1.3 Liability limitation

Climinox cannot accept any liability if the machine is used with the doors or access hatches open, if the protections are not in place or if the conditions set out in this manual are not met.

Please read this manual carefully before installing and using the machine.
Keep the manual safely so that it can be consulted if necessary.

General points

ModulAir air conditioners are designed for treating air and must not be used for other applications. They allow, according to the models, for cooling, heating, humidification, dehumidification and ventilation.

They can be implemented only by professionals.

Climinox has designed its air conditioners for agricultural purposes. This application field requires meeting a certain number of sanitary criteria, resistance in a corrosive environment and safeties.

ModulAir air conditioners are therefore made from stainless steel AISI 304L (or AISI 316L). The exchange surfaces are smooth, the body does not contain any spaces where grime can be retained. All of the parts of the air conditioner have to be accessible easily, for cleaning or visual inspection of the state of cleanliness. These operations must be performed without tools and without disassembling any screws or nuts (accidentally, one of these elements could escape and end up in food products).

No intervention, on the air conditioner, must be performed without having stopped and secured the installation beforehand.

ModulAir range

ModulAir air conditioners are formed from modular elements. This design makes it possible to provide the machine that responds, exactly, to the precise needs of the premises to be air conditioned. It also makes it possible to upgrade the air conditioner if the needs were to change.

This range is broken down according to the architecture and the number of modules that it comprised of. The coded designation of the air conditioner gives the model of the air conditioner, its size and its options.

Examples: DF4.5 PL - 5F - 2C - 4V380t – (BH-GT) SF6CS- 12F – 3r2.2EL - 2V220m – (RL)

The 1st code provides info on the geometry:

SF3*: Single flow air conditioner (1 blowing direction), 1 stack of layers.* ***SF6****: Double flow air conditioner (1 blowing direction), 2 stacks of layers.* ***DF3****: Double flow air conditioner (2 blowing directions), 2 stacks of layers.* ***DF4.5****: Double flow air conditioner (2 blowing directions), 3 stacks of layers.*

Ending

PL*: Ceiling mount.*

MU*: Wall mount.*

CH*: Frame mounted on the floor.*

The 2nd code provides info on the cooling battery:

n ***F****: The number of rows in the chilled water battery.*

The 3rd code provides info on the heating battery:

*n **C**: The number of rows in the hot water battery.*

*p **EL** v: The electric heating power and the power supply voltage.*

The 4th code provides info on the ventilation:

*n **V** v: The total number of fans and the power supply voltage.*

The 5th code provides info on the options (...) :

***PR**av: gates on the front*

***PR**ar: gates on the rear.*

***PX**ar: panel on the front.*

***PX**ar: panel on the rear.*

***BH**: Humiliation nozzle.*

***RL**: Cleaning ramp.*

***SD**: Direct blowing with grill*

***SG**: Blowing by textile duct.*

Suspension and weight

The structure of the building must be able to support:

- the air conditioner while operating
- the hydraulic connections
- the electrical connections.

The table hereinafter allows you to estimate this constraint.

Weight of the air condition in lb (excluding accessories)						
	Type	**SF3**	**SF6**	**DF3**	**DF4.5**	**DF6**
A	*Weight of the base unit*	*105.82*	*167.55*	*169.76*	*216.05*	*240.30*
B	*+ weight per fan*	*19.84*	*26.46*	*33.07*	*19.84*	*26.46*
C	*+ weight per battery row*	*33.07*	*60.63*	*60.63*	*88.18*	*115.74*
D	*Weight when empty*	*= A +(n x B) + (n x C)*				
E	*+ water weight per row*	*14.55*	*29.10*	*29.10*	*43.65*	*58.20*
F	*Weight during operation*	*= D +(n x E)*				

The air conditioner must be attached with lock nuts.

This precaution is especially important when the machine is fasted to a sandwich board, in this case it is impossible to lock the nuts. Ordinary nuts risk becoming unscrewed with the vibrations caused by the ventilation.

Electrical power supply

The electrical installation must comply with the safety rules in order to protect people and property.

The frame must absolutely be grounded.

The electrical switchboard, in addition to the disconnectors and thermal protections, has to have a locking by key for the installation, in order to secure the maintenance and upkeep operations.

Environment

The location of the air conditioner must be conceived so as to ensure the distribution of the air and proper operation of the equipment in general. However the safety of maintenance and upkeep personnel must be preserved. The clearances will be sufficient.

Installation & assembly

The installation must be carried out in compliance with basic safety standards.

The Climinox modular design is an advantage for assembly.

The air conditioner, without the handling equipment, is delivered in the form of a Kit that is ready to assemble. It can be assembled to the ceiling, without any handling equipment, in a room that is difficult to access, cluttered with machines or manufacturing lines.

In the case of a ceiling air conditioner, it is necessary to have stable scaffolding that provides the required safeties.

The hydraulic and electrical supplies can be defined on the right or on the left of the machine at the time of assembly.

The various components of the air conditioner are delivered on a pallet. The ventilation module is pre-assembled and forms a unit.

Assemble the air conditioner in the following order:

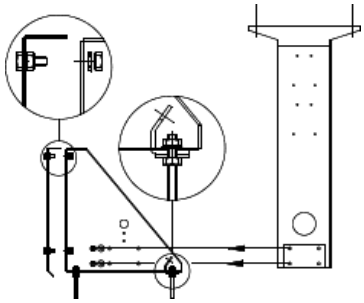
1 - Preparation on the floor

Case with mounting on the ceiling:

Assemble the splashback with the triangular plate and the stand carrier crosspiece.

Fasten the ceiling jambs onto the plates of the machine.

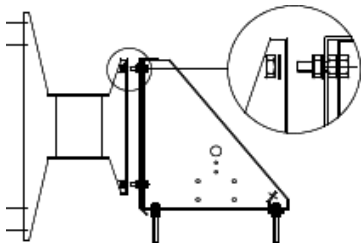
Use ø8 washers and nuts



Case with mounting on the wall:

Assemble the splashback with the triangular plate and the stand carrier crosspiece.

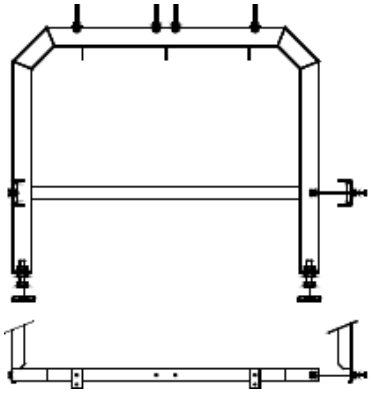
Fasten the wall consoles onto the plates of the machine. Use ø8 washers and nuts



Case with mounting on the floor:

Assemble the frame by fastening the stringers on each side of the end frames.

Use ø8x20 bolts, ø8 washers and nuts.



The support lugs for the gates must be positioned outwards.

2 - Installing the frame:

The frame must then be installed definitively. Complete assembly, before its final destination, would make the unit difficult to handle.

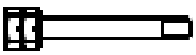
Use ø10 washers and lock nuts to attached the air conditioner to the wall or to the ceiling.

Place the PEHD plates under the feed for a floor mount. Check the level before continuing with the assembly.

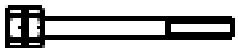
3 - Installation of tubular layers to form the batteries

Use the starting bolts to fasten the first row of layers to the frame.

The short extension bolts to fasten the intermediate rows.



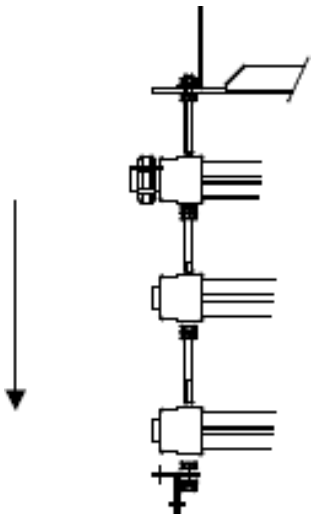
The long extension bolts to fasten the last row.



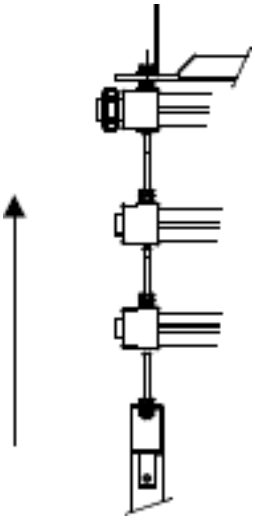
Finally, finish with the crosspiece for attaching the condensate pan.

OR via the ventilation module in the case of a frame model on the floor.

Wall or ceiling mount:



Frame mounted on the floor:



In order to allow for expansion of the layers, the extension bolts have to be tightened moderately.

Only the nuts that tighten the frame, the ventilation module or the attaching crosspiece of the pan have to be locked in order to prevent the unit from becoming unscrewed.

4 - Connections of the layers:

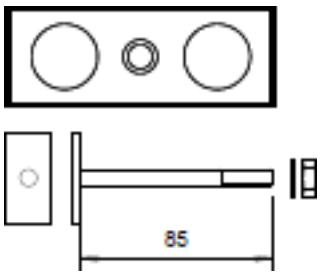
Each installation is unique. To meet the flow rates and load losses, specific to each one, it is necessary to establish a different hydraulic circuit.

A connection diagram is therefore established and provided with each air conditioner, for the application for which it is intended.

The layers are connected together by a system of connectors. Each connector is fastened by a special through-bolt, a washer and a nut. The seal is provided by O-ring seals and retaining rings.

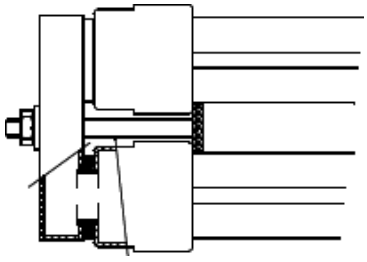
Vertical connections to be used:

- Short connectors
- Ø 8/85 connector bolts
- Ø 8 flat washers and nuts

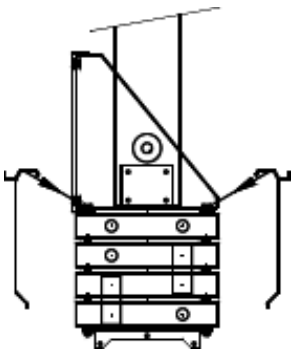


Seal to be used:

- Ø25x5x35 O-ring seals
- Ø 38x1.5 retaining rings

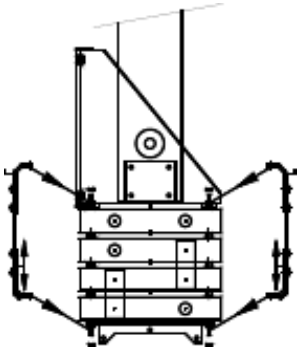


5 - Installation of the façade panels:



If the air conditioner is equipped with single façade panels:

Attach the panels directly to the supports, provided on each side of the air conditioner.



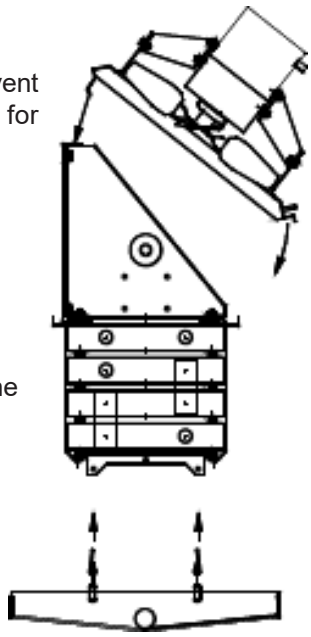
If the air conditioner is equipped with opening gates:

- Loosen the lower hinge in order to make it slide.

- Attach the gate via the upper hinge, adjust the lower hinge by raising it and tightening the nuts on the façade.

- Close the hinge axes with lock nuts.

6 - Installation of the ventilation panels and of the condensate pan:



The ventilation panels pivot and can be removed. In order to prevent accidental detaching, they are provided with profiled fastening lugs that allow for escapement only in a given angle.

Installation requires:

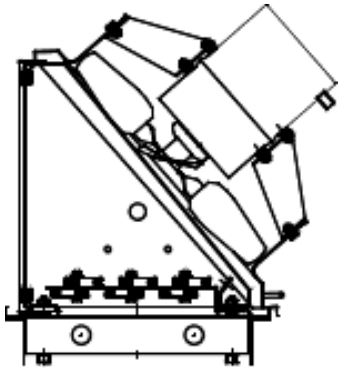
1. presenting the panel slightly tilted
2. inserting the top hooks in the hooking slots
3. folding back

The pan for recovering the condensation water is then suspended under the air conditioner.

7 - Options:

Electric heating

Heating can be provided by a battery of electrical resistances.



This battery is integrated into the ventilation module.

An air conditioner is subjected to constant variations in temperature. This inexorably induces deposits of humidity in the connection boxes.

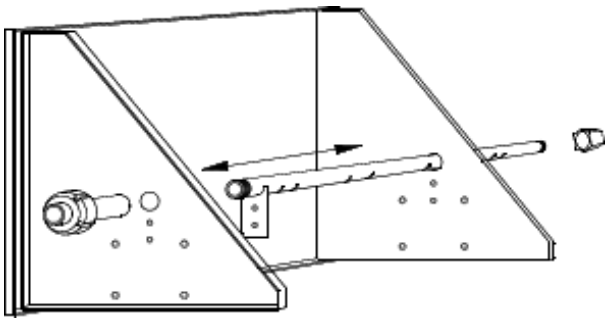
In order to prevent this phenomena the connections have to be offset. For this purpose, each resistance is provided with a 3-metre power cord.

Reminder: it is imperative to connect the frame of the air conditioner to the electrical installation's ground.

Cleaning ramp

An automatic cleaning ramp can be mounted in the air conditioner, even later.

Installation is done from the inside of the ventilation module.



Humidification

The humiliation nozzle is an ultrasound atomizer. These atomizers spray the water as micro-droplets, similar to fog.

Installation and the adjustments require special attention:

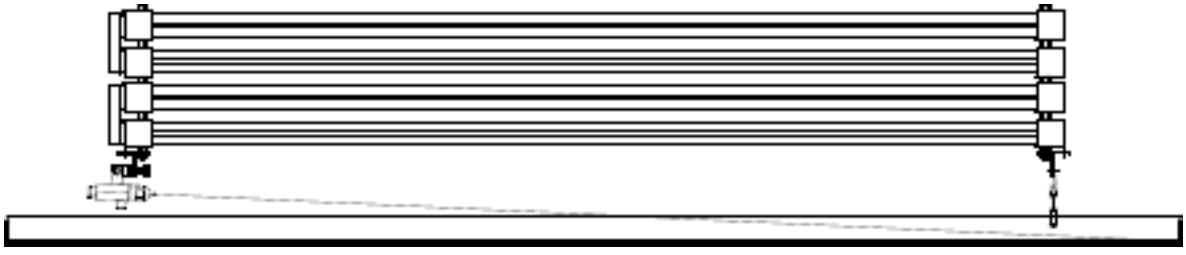
- A stream directed towards a smooth wall would thrust the fog and form drops of water again.
The effects of the spraying and fogging would then be cancelled.

- The stream produced has to be a fog, not a simple spray. Simple droplets that are sprayed, but not fogged, are not absorbed by the air.

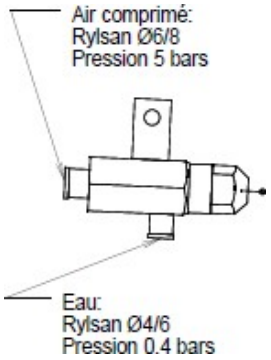
Installation

The humiliation nozzle is fastened, under the cold battery, to the pan support crosspiece.

The stream must not be directed towards the battery or the wall of the condensate pan. It has to be axed towards the opposite corner of the pan.



Adjustment



According to the pressures for the air and water adjustment, the quality of the fogging can be substantially altered.

It is important to comply, precisely with the following pressures:

- Air: **5 bar** minimum

- Water: **0.4 bar** maximum

In light of the low water pressure, the pressure head is to be taken into consideration:

A difference of 39.37 inches in height between the level of the control pressure gauge and the level of the nozzle is equal to a pressure difference of 0.1 bar.

- ***If the pressure gauge is placed at the level of the nozzle, no correction.***

- ***If the pressure gauge is placed above the nozzle, subtract 0.1 bar per 39.37 inches.***

- ***If the pressure gauge is placed below the nozzle, add 0.1 per 39.37 inches.***

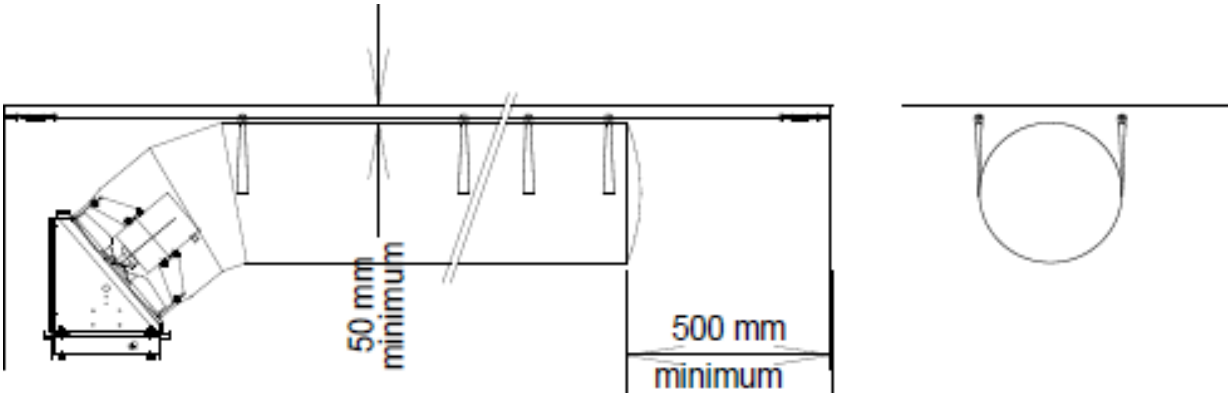
Blowing duct

As standard, ModulAir air conditioners are provided with a blowing grill, placed each fan. This grill protects the fan propeller and limits the turbulence of the air stream projected. The combined effects of the angle of the fan, the tubular rings of the directive grill and the bearing capacity of the ceiling, provide an even distribution of the blown air.

However certain applications or configurations require the use of a textile duct.

This duct is connected to the ferrule of the fan and replaces the grill.

A textile duct is fragile to friction. During installation, make sure that it is perfectly free on the suspension cables, that it does not chafe against a wall or any obstacle and that it does not nip at the end of thereof. Otherwise there will be premature wear and the duct will be torn.



8 - Accessories:

Psychrometer

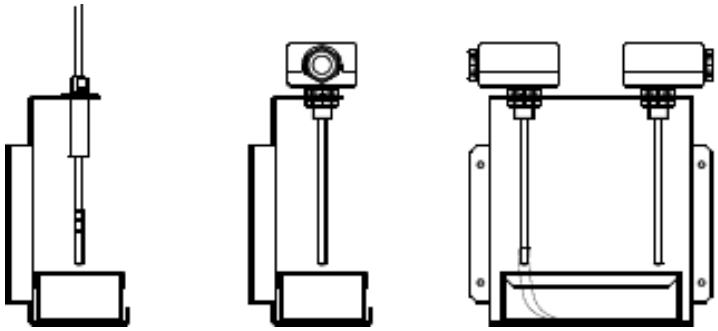
Controlling and regulating the hygrometry are delicate, especially when approaching humid saturation of the air. The quality of the measurement is essential in order to obtain a safe and reliable adjustment.

Climinox provides psychrometer wall supports. The support is separated from the wall in order to protect the sensors from the radiating effect of the wall. They have a substantial reservoir of water.

To obtain a stable regulation, the values measured have to be representative of the ambiance of the premises to be air conditioned. The probes must under no circumstances be influenced by the air blown from the air conditioner (which would have the effect of defeating the regulation).

The psychrometer must therefore be positioned on a wall that it close to the air conditioner's air intake.

Climinox psychrometers can receive wired sensors or thimble sensors.



Maintenance & safety

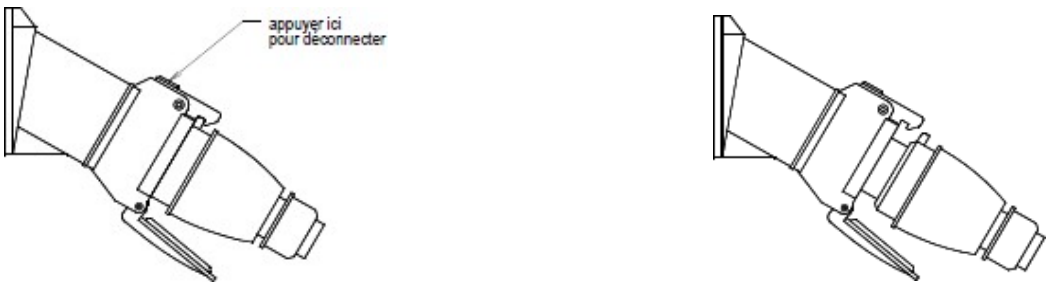
The personnel authorised to intervene on the air conditioner must have been informed of the safety rules to be complied with and the prescriptions stipulated in this notice.

If the air conditioner is at a height, use stable scaffolding provided with guard rails.

Before approaching the air conditioner, the person intervening must ensure that the installation has been stopped and secured at the electrical control switchboard. The installation may appear to be stopped, but the automatic device can at any time start ventilation again.

To guarantee safety, the fans are powered by power outlets allowing for a load discharge.

Connected socket **Disconnected socket**



The disconnection of fans is prior to any intervention on the air conditioner.

The person intervening must also ensure that the heating batteries are cool enough.

Upkeep

Climinox air conditioners are designed to be washed with a high-pressure hose.

- Prewash with clean water.
- Spray the detergent, with a foam gun. (the PH of the solution must be suitable for stainless steel),
- Rinse with plenty of clean water.

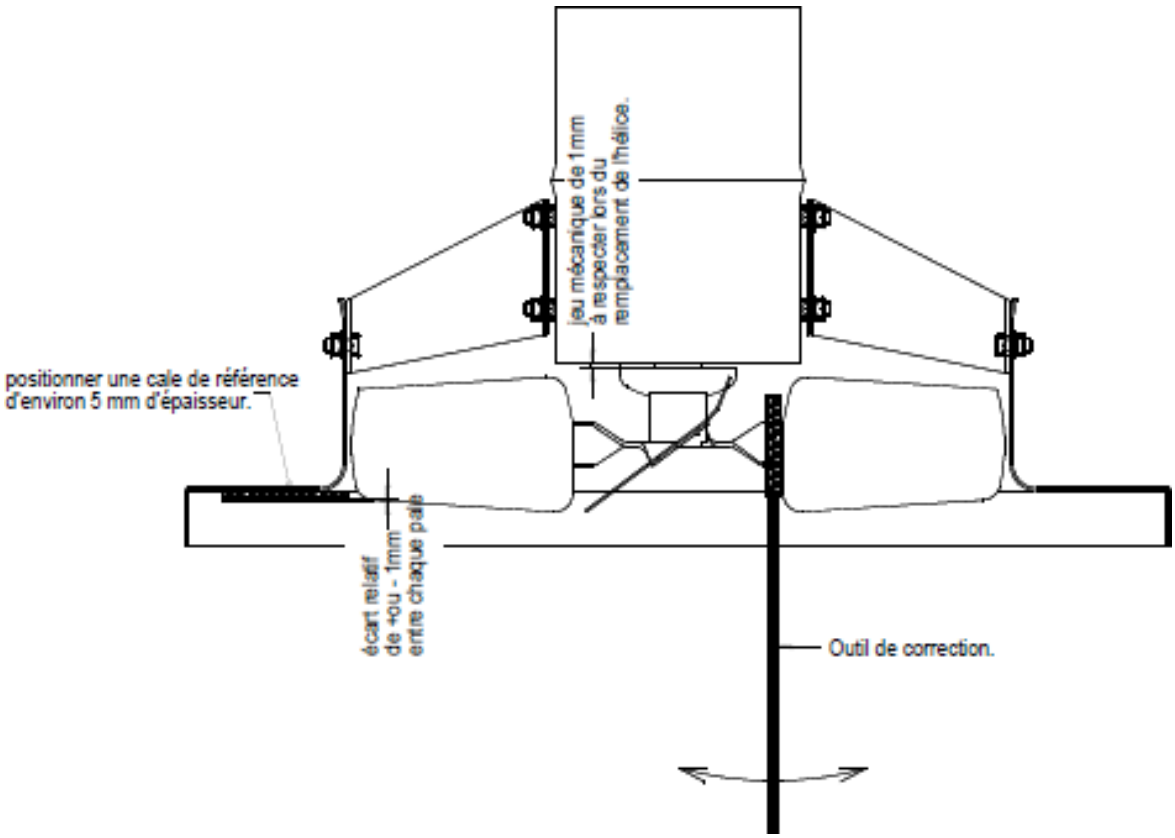
- Do not use Chlorine
- Or any abrasive sponges. Scratches retain contaminating grime.

Maintenance

Periodically check the current consumed and the mechanical condition of the fans.

Vibrations can appear. The latter can be caused by the wear of the bearings or a propeller imbalance.

A propeller can have been concealed during the upkeep operations. The propeller is checked according to the following diagram:



EC declaration of conformity

The Company ***Climinox***
Z.A. Rue St Eloi
61 100 Saint des Groseillers – France

declares, hereinafter, that the: ***ModulAir***

Air conditioner of the type: ***SF3, SF6, DF3, DF4.5, DF6***

was designed and manufactured in accordance with:
Machine Directive 2006/42/EC

A technical notice for the installation, mounting, maintenance and safety was drawn up for this purpose.

Done at: ***Saint Georges des Groseillers***
On: ***01 January 2011***

The Manager:
Samuel Droullon

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