

OLIVIERO

START UP AND MAINTENANCE LEAFLET

Direct gas fired Generator

MAKE UP



CE

CONTENTS

N°	Section	Page
1	SAFETY CONSIDERATIONS	3
2	PRE-INSTALLATION	3
3	PRINCIPLES	4
4	SETTING UP	5
5	RIGGING	6
6	ASSEMBLING	7
7	OUTDOOR UNIT	8
8	CONNECTIONS Electrical connection Regulation Gas connection First check of combustion Motor connection	9 9 9 10 10 10
9	OUTDOOR AIR TEMPERATURE < 0°C	11
10	COMMISSIONING	12
11	MAIN DEFAULTS AND CORRECTIONS	13
12	SPARE PARTS	14
13	MAINTENANCE	15
14	EUROPEAN GAS TYPE	16

1. SAFETY CONSIDERATIONS

This unit comply with EU « Electromagnetic compatibility (CEM) » 89/336/CEE, to be incorporated in an installation.

Installation must comply with CEM requirements.

Maintenance and start up operations shall be done by qualified technicians only.

Air handling equipment is designed to provide safe and reliable service when operated within designed specifications. To avoid injury to personnel and damage to equipment or property when operating this equipment, use good judgment and follow safe practices.

The painted panels are covered with plastic film protection. Remove this protection after installation.

Never enter an enclosed fan cabinet or reach into a unit while the fan is running.

Lock open and tag the fan motor power disconnect switch before working on a fan. Take fuses with you and note removal on tag. Electric shock can cause personal injury or death.

Check the assembly and component weights to be sure that the rigging equipment can handle them safely.

Do not open door or remove access panel fasteners until fan is completely stopped. Pressure developed by a moving fan can cause excessive force against the panel which can injure personnel.

Do not work on dampers until their operators are disconnected.

Drain water coil in case of no use, in order to avoid freeze risk in the winter.

Transmit this instruction leaflet to user and insure one copy stays on the unit.

This leaflet is for general use, additional sheets may be added case by case.

Before the first start, check carefully that gas conditions comply with burners instructions (Gas type and pressure).

2. PRE-INSTALLATION

Check items received against packing list. Notify Aircalo of any discrepancy in the 24H.

Do not stack unit components or accessories during storage. Stacking can cause damage.

Chose a dry storage site. Do not store unit on a vibrating surface. Cover entire unit with a tarp or plastic coverall. Extend cover under unit if stored on ground. Secure cover with adequate tiedowns or store indoors. Be sure all coil connections have protective shipping caps.

Each "Make up" unit is designed for specific installation. A general drawing showing dimensions and weight has been supplied prior to delivery together with electrical diagram. If installer has not these drawings in hands before the start of installation operations, he must requires to Aircalo these documents and check all details before installation.

3. PRINCIPLES

The direct gas (natural or propane) fired unit "MAKE UP" are used for industrial area into which a big volume of air extraction is organized. Make up aims to heat the introduction of the air which balance the extractions. The gas consumption is settled into the air flow and therefore, heating efficiency is 100% on PCI. Consequently the installation of Make up units must provide an operating system that allows the burner running only when extractors are also running. The electrical wiring diagram must show this disposal and technicians must check this before start up.

Main technical data

The units are designed for indoor or outdoor installation with cabinets of insulated, double-wall 50 mm outside painted steel RAL 9001 and inside galvanized steel construction (28 kg/m³ Rockwool insulation, class M0). For outdoor use, units are provided with aluminum roofs to be settled by installer. Configuration is horizontal with either standard horizontal discharge or optional vertical discharge. The system is factory assembled and includes a 100 mm high chassis for field installation. The painted panels are protected with plastic film to be removed before Start up.

When Make up are designed as multi-bloc units, a drawing fixed on the blocs shows the configuration and sense of assembling. If installer has any doubt, it is recommended to call our factory for more details and explanations.

The blower section includes a single blower that is statically and dynamically balanced for vibration free operation. A selection of motor and drive packages is available to match application requirements. Motor and drive packages include an IEC style contactor or starter, adjustable motor base, adjustable sheaves, and drive belts.

The direct-fired burner is cast iron with drilled ports. The pilot and flame monitoring device is an electronic ignition system and flame supervision with 100% lockout. Burner firing rate is modulated with ratio 1:20, by a temperature selector and sensor to maintain the desired discharge air temperature.

The gas train includes main and pilot gas shutoff valves, a manual shutoff leak-test valve, a pilot regulator, a pilot solenoid valve, and either dual solenoid valves or fluid power valves, depending on the application requirements that determine gas train selection.

Additional accessories may be supplied. The various components instructions manuals are supplied together with this leaflet. In case of lack, please ask our factory.

4. SETTING UP

“Make up” air units are heavy and voluminous. The setting up must be studied in advance. In particular it is necessary to control the support WEIGHT ability.

It is recommended to settle “Make up” unit in a dedicated room.

In the case of roof installation, check the extreme wind speed known on the site. Eventually insure a special air unit roof fastening.

For areas where snow is plentiful, the unit must be settled high enough to prevent any obstruction of the inlet canopy. The installer shall orient the unit opposite to the dominant wind direction in order to reduce the risk of snow entrance in the unit. User must check that snow cannot enter the unit in extreme conditions.

Provide adequate space for unit service access (fan shaft removal, filter removal, motor access, damper linkage access, etc.)

Usually space clearance is arranged on 1 side only. However, it is possible to arrange clearance on both side, as the panel at back is removable.

It is recommended to settle on the service face all components like actuators, electrical panels, valves ...

Components of the “Make up” air units have to be assembled on site according the dimensional and general drawing supplied with the equipment.

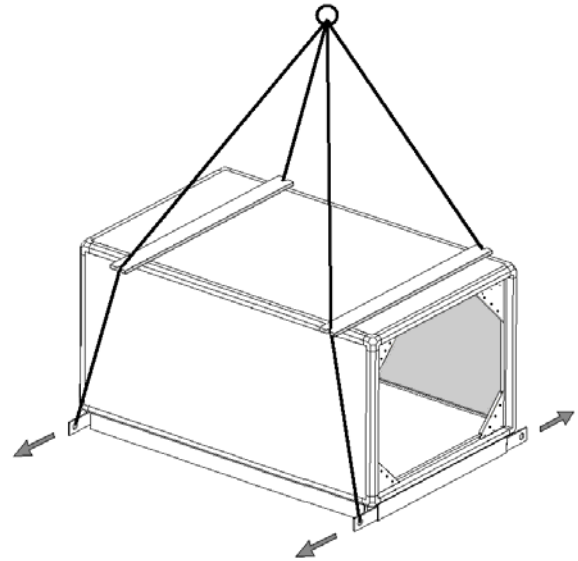
When several units are delivered at the same place and same time, it is essential to clarify the components belonging to each unit before assembling. In many cases, the components can fit together, but the performances are different from unit to another.

Check also the direction of assembling (i.e. the air flow direction can guide the orientation of each component).

5. RIGGING

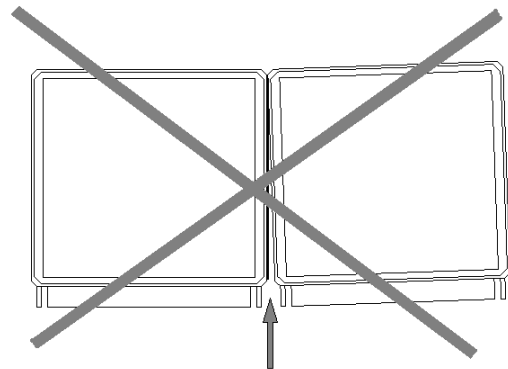
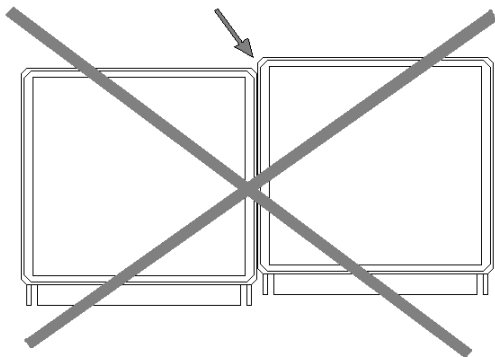
“Make up” units can be rigged by means of the lifting brackets on bottom of unit. Components are shipped fully assembled. Do not remove shipping skids or protective covering until unit is ready for final placement. Use slings and spreader bars as applicable to lift unit. Do not remove protective caps from coil piping connections until ready to connect piping. Do not remove protective cover or grease from fan shaft until ready to install sheave. Lay rigid temporary protection such as plywood walkways in unit to prevent damage to insulation or bottom panel during installation.

1 bar kit per complete unit. Kit is to be used for each component.
Slide the bars approx. 15 cm out of the frame.
Set the slings securely.



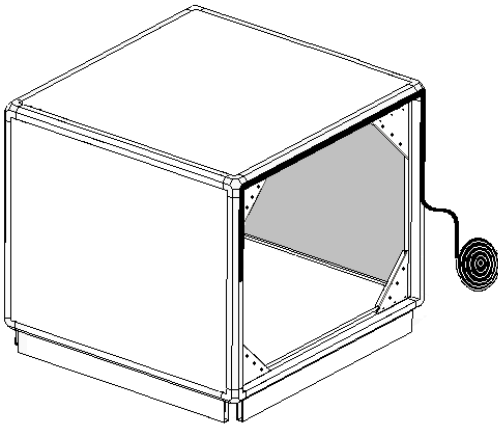
Do not lift unit by coil connections or headers.

Units must be installed on a flat floor.
Check components are correctly aligned, in order to avoid any leakage.



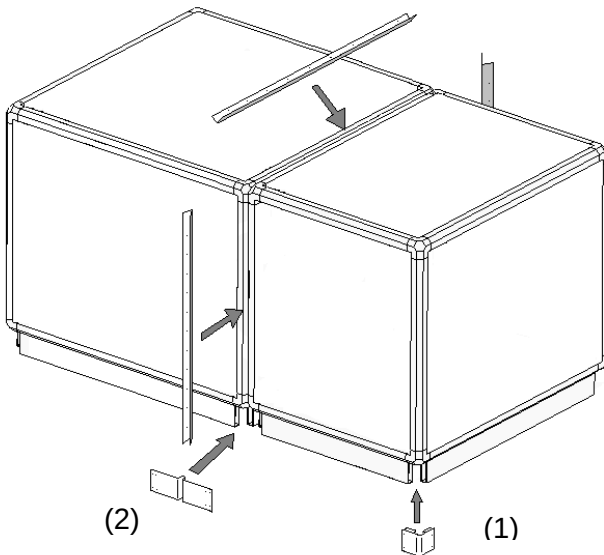
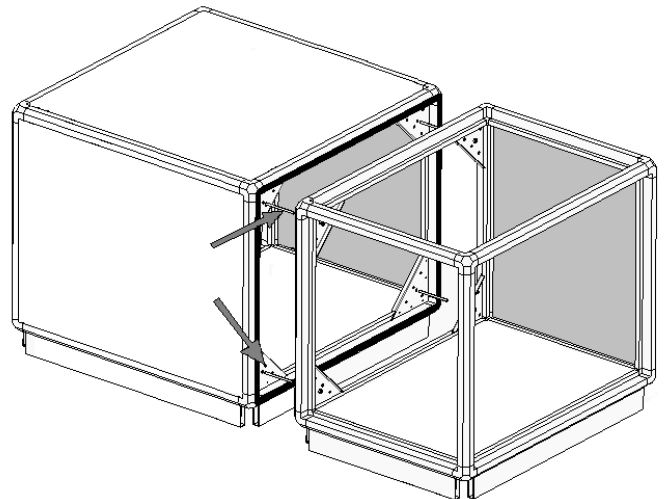
6. ASSEMBLING

Assembling of air unit components must be done from one end to the other (preferably from suction to discharge).



Except if unit is a one only component, stick the supplied black strip join on the aluminium profile.

When access is possible into the component (through door or access panel), the components must be coupled with bolt and screws at corners.



If internal access is impossible, then the components must be carefully placed side by side in order to squeeze regularly the black strip join all around the coupling faces.

The components will be linked together with 3 supplied external braces. Screw directly on the aluminum profile.

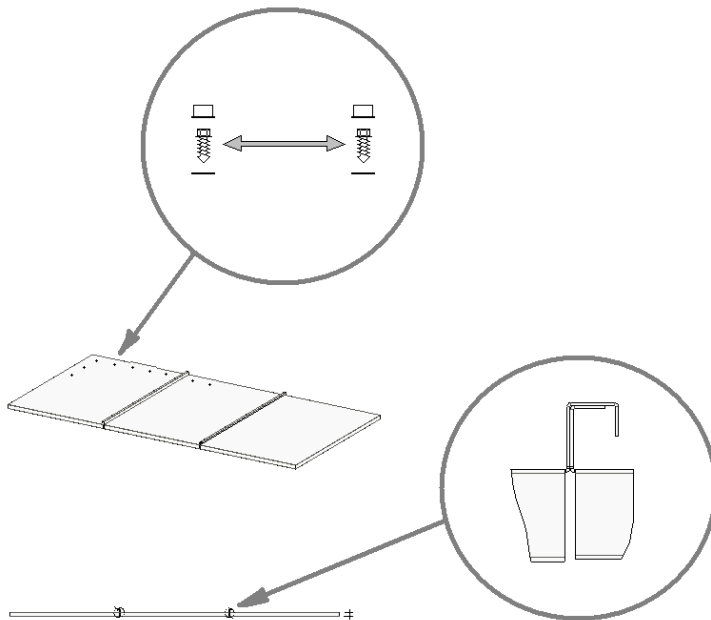
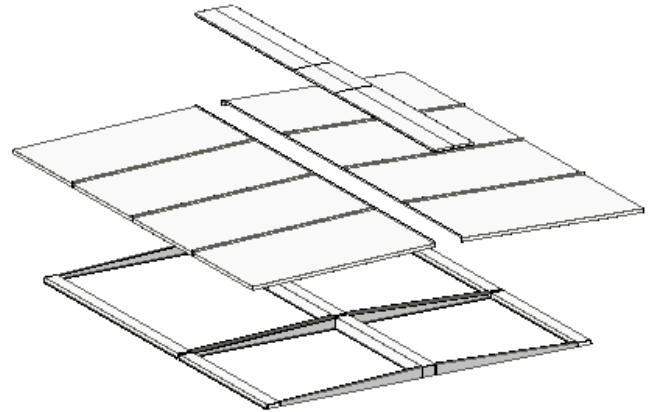


When square & cap option is supplied, fit the caps directly on aluminium frame once all components are assembled.

7. OUTDOOR UNITS

The units for external use are supplied with roof delivered as kit, to be assembled on site. Roof can be fitted only when the air unit components are completed all together.

One slope roofs are horizontal. Water can stay on it without any risk of corrosion or infiltration. Two slopes roofs are delivered with ridgepole arrangement in order to make the roof tilt on both side. Ridgepole is normally assembled at factory.



Fill with silicon all roof plates interlocking.

The roof plates have to be fitted into each other starting from one end of the air unit.

Insure approx. 200 mm extension over the air unit edges. Use self drilling screws and seal plate. Screw directly on the aluminium profile all around the unit. Space between 2 screws : 200 mm max. Eventually less if the wind on the site is strong. Check the roof is firmly fitted and able to face the wind forces. If supplied, fit the white screw caps on the screws head.

Take off the plastic film protection when roof assembling has been achieved.

If air handling unit has inlet and or outlet through the bottom face, the unit must be heightened (see local regulation).

NOTE : When unit are outside, it is necessary to prevent any risk of freeze on water coils. (i.e. use actuated damper – see below).

8. CONNECTIONS

Conventional colors of pipe is as follow :

* Air	Blue
* Gas	Yellow
* Oil	Brown

NOTE : Conventional pipes color may differ from one country to another.

8.1- Electrical connections :

« Make up » units are delivered with pre-assembled electrical panel. All accessories of gas control and safety are connected in our factory.

Any modification of our approved electrical wiring diagram (supplied with this unit) can not be done without formal written approval from our Technical Dept. Unless this official agreement would be given, the responsibility of Aircalo would not be involved.

Nominal voltage can be 230V or 400V TRI without neutral, or 400V TRI with neutral. The nameplate and the wiring diagram supplied are showing the tension to be connected with. In any case of doubt, please contact our factory.

Our electrical panels are always supplied with an electronic transformer. The control is usually under 230 V MONO.

Before start up :

- 1 – Check that voltage available complies with voltage indicated on wiring diagram and nameplate.
- 2 – Check that motors are correctly connected according the nominal voltage.
- 3 – Check earth connection.
- 4 – Never modify the connections into the control panel without our formal agreement
- 5 – Never touch the transformer during operation.

NOTE : The transformer is specific for our « Make up » unit, do not connect any other accessory.

Then, start the unit :

- 6 - Check the motors (and fan) run in correct direction (follow indication on fan).

8.2 – Regulation :

Temperature regulation is defined according specifications agreed case by case. Please refer to specifications. A specific instruction is supplied attached.

In any case the regulation can be adjusted on site. Pre-installation done in our factory can be modified.

Various sensors and thermostats that are not integrated into the « Make up » units must be fitted and connected (in the hall, in the suction duct, outside ... etc) by installer technician. Temperature gauge must be located where average temperature is representative. For temperature and/or pressure sensor into duct, it is recommended to settle the sensor in linear portion (minimum 1 m from elbow), and at the center of the air flow.

8.3 – Gas connections :

« Make up » units are delivered with the gas train completed according European standard for relevant gas equipment (90/396/CEE).

Gas supply must comply with indications of the unit nameplate: Type of gas and pressure. Installer shall check the actual pressure at the entrance of the gas train when the unit is running at maximum capacity.

The gas pipe must not be flexible, it must be of steel or copper and includes a valve fitted out of the « Make up ». The shut off valve must be open and closed slowly.

The gas pipe and the valve must be designed to be able to fill in the burner without any trouble for maximum consumption required. Gas must be filtered acc. local regulations.

The gas pipe must be settled between 0.10 m and 1.70 m of the floor and be free for access.

The gas pipe must be provided with a manometer or at least a pressure connection, located between the gas inlet valve and the gas train. An exhaust screw must be provided also (generally at the same place than gas inlet pressure gauge).

Any modification of gas type, pressure and or adjustment must be done by a qualified installer and be previously formally agreed by Aircalo.

8.4 – First check of combustion

NOTE : In France this operation is done by Aircalo. For foreign countries, Aircalo can send technician on site for start up and combustion check at extra cost – recommended.

Combustion check must be done in the outlet air duct. Contents limits :

CO < 10 PPM (check this value comply with local regulations)

CO₂ < 2500 PPM (check this value comply with local regulations)

CO and CO₂ contents analyze are to be done at both minimum and maximum capacity of the burner. Results must be written in technical sheet to be given to the customer and copy must be includes in the technical manual that stay onboard.

8.5 – Motor connection

This is usually done in our factory. When “Make up” units are multi bloc, motor connection shall be done by installer. In this case, please refer to the start up and maintenance leaflet of E-motor manufacturer supplied with this unit (carefully choose cable diam. acc. power, length, starting arrangements ... etc and follow electrical connection instructions).

If unit is supplied with air inlet damper, check fan can be started only if damper is previously open.

At start up, check fan rotation direction. Absorbed intensity can not exceed intensity stamped on motor.

NOTE : Factory-supplied drives are pre-aligned and tensioned, however, we recommend that you check the belt tension and alignment before starting the unit. Always check the drive alignment after adjusting belt tension.

Make sure that fan shafts and motor shafts are parallel and level. The most common causes of misalignment are nonparallel shafts and improperly located sheaves. Where shafts are not parallel, belts on one side are drawn tighter and pull more than their share of the load. As a result, these belts wear out faster, requiring the entire set to be replaced before it has given maximum service.

9. OUTDOOR AIR TEMPERATURE < 0°C

« Make up » units are designed and delivered with the filters at the air flow inlet (in the cold outside air flow, upstream to the burner).

When outside temperature falls under – 10°C durably, the humidity of air is solidified and may step by step obstruct the filters. As a first effect, the unit can have default due to the lack of air. A second effect can be also that when temperature climbs above 0°C, the ice will melt and the water will flow on the floor of the unit. This can damage the equipment and the environment.

The simplest way to solve this matter is to take off the filters temporarily, for the period of very cold outside air. But, if the final user process cannot accept no filters, it is recommended to add filters at the outlet of the “Make up” unit. This additional casing can be design and produce at extra cost by Aircalo.

It is also possible to add electrical heaters upstream to the filters (not recommended).

Notes :

For areas where snow is plentiful, the unit must be settled high enough to prevent any obstruction of the inlet canopy. The installer shall orient the unit opposite to the dominant wind direction in order to reduce the risk of snow entrance in the unit. User must check that snow cannot enter the unit in extreme conditions.

10. COMMISSIONING

- Supply the unit with electricity
- Supply the unit with gas (only after electricity has been switch on)
- Set the ambient thermostat for heating requirement
- Start the fan (activate the control panel switch « FAN »)
- Start the burner (activate the control panel switch « BURNER »)
- Adjust the flame according to the burner manufacturer instructions (attached to this manual)

When the unit has been delivered with optional Local/Distance control panel these operations can be done directly on the general control panel onboard or from the distance control panel. Just activate the switch "LOCAL/DISTANCE" accordingly.

"Make up" units are always controlled together with the control of the air extractors, in order to cancel any risk of excess of fumes concentration into the building. The installer must check that when extractors are off, the burner cannot start and/or a safety device force the switch off.

Aircalo strongly recommend that the start of extractors and "Make up" is done automatically simultaneously and not with separate hand switch.

For noise reduction and/or vibration anti-propagation, Aircalo recommend the use of flexible duct connectors (to be fitted between the air duct and the "Make up" unit. Accessory is available as option at extra cost.

OVER TEMPERATURE PROTECTION

According to the European regulation ref. 90/396/CEE, the « Make up » units are delivered with factory-installed manual reset thermal cutout for over-temperature protection.

This safety device switch off automatically the gas inlet if the air temperature at the outlet of the unit exceeds 60°C. This should not occur provided that Airstat operate normally and/or Airstat has not been fitted above 60°C.

In any case of over temperature release, it is necessary to carefully check the reason(s), When the trouble has been identified and corrected the installer can reset the Over Temperature Protection manually.

11. MAIN DEFAULTS & CORRECTIONS

Note :

Any default need to be reset manually at the main control panel.

For questions or investigations, please contact our factory sav@aircalo.fr with reference of the "Make up" unit serial number and indications of default.

Flamme

Default :	Possible explanations :
Low gas pressure (mini gas)	- gas pressure regulator damaged - shut-off gas valve closed - gas filter dirty - « mini gas » pressure gauge damaged - « mini gas » pressure gauge badly adjusted
High gas pressure (maxi gas)	- gas pressure regulator damaged - « maxi gas » pressure gauge damaged - « maxi gas » pressure gauge badly adjusted
Combustion air pressure (combustion air pressure gauge)	- combustion fan is blocked or damaged - combustion fan badly adjusted - combustion fan air pressure gauge is damaged - combustion air pressure gauge pipe is sealed
Ignition flame (veilleuse)	- butterfly valve switch can not turn off (damaged)
Flame default : flame appears not directly in contact with the burner	• lack of air at the origin of the flame • excess of gas at the origin of the flame • short circuit between the electrode and the burner • dirty electrode • electrical electrode connection • safety box damaged • lack of combustion air – check the combustion air fan • Maximum capacity of the burner oversized

High temperature (Limit)	- damaged thermostat - air flow is not sufficient - inlet air is too hot - temperature sensor is damaged - adjustment of high temperature thermostat (Limit) is too low.
Low air flow pressure (air pressure gauge in the duct)	- air flow pressure gauge is damaged - air flow pressure gauge is badly adjusted - air flow pressure gauge pipe is sealed - inlet of main fan is obstructed or fan is blocked - burner is obstructed or dirty - filters are dirty - tension of belts is bad - transmission (belts & pulley) is damaged - motor is off (check motor thermal protection)
Others	- air extractors are not running

Option flame control with U.V. sensor

Default :	Possible explanations :
UV sensor current is too low	- U.V. being old or damaged, replace the bulb or the complete sensor - the sensor pipe is not enough ventilated and fumes may enter the pipe and disturb the U.V. radiation - rubber seal between the sensor and the pipe is missing

12. SPARE PARTS

Parts number, codification and designation are identified on supply to our factory (sav@aircalo.fr) of serial number stamped on the air unit identification plate.

13. MAINTENANCE

Monthly

- a) Clean filters (replace 2 times / year or more).

Quarter

- a) Check and clean gas filter.
- b) Grease fill fan and motor bearings acc. Manufacturer instructions.
- c) Check belts and pulley estate and tighten (see below).
- d) Check electrical connections

Yearly (Additionally to previous controls)

- a) Check general aspect of the whole air unit externally as well as internally (corrosion) and clean all parts and especially the burner.
- b) Check damper, adjust open/close position. (Do not grease the damper bearing when material is nylon).
- c) Check correct running of safety devices
- d) Check the condensate drain and condensate trolley contents (if any)
- e) Clean the fan rotor.

After any maintenance operation, it is necessary to :

- Open slowly the inlet gas valve
- Check gas pressure
- Electrical switch on
- Check voltage
- Check fan runs
- Check burner runs

FAN - MOTOR - DRIVE

Electric motors are supplied with life greased ball bearings.

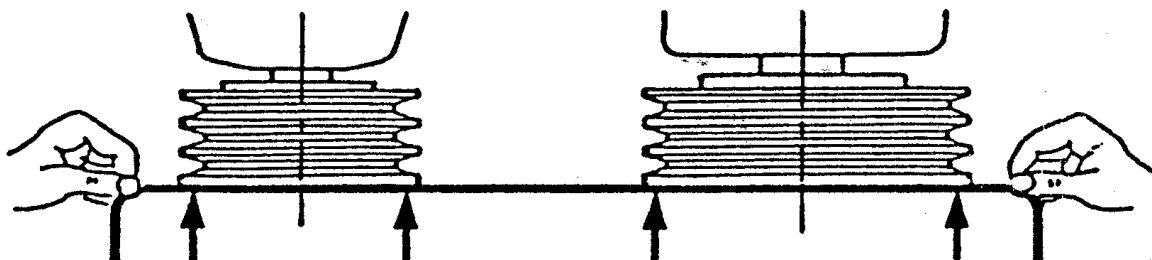
R Type fan are supplied with life greased ball bearings.

F Type fans have to be grease filled every 20 000 Hours

Belt & Pulleys

When installing or replacing belts, always use a complete set of new belts. Mixing old and new belts will result in the premature wear or breakage of the newer belts.

1. Always adjust the motor position so that V-belts can be installed without stretching over grooves. Forcing belts can result in uneven stretching and a mismatched set of belts.
2. Tighten belts by turning motor-adjusting jackscrews. Turn each jackscrew an equal number of turns.
3. Equalize belt slack so that it is on the same side of belt for all belts. Failure to do so may result in uneven belt stretching.



14. EUROPEAN GAS TYPES

COUNTRY	CATEGORY	GAS	PRESSURE
France	II2Esi3P	G20, G25, G31	20 mbars to 4 bar
Austria	I2H	G20	20 mbars to 4 bar
Belgium	I2E(S)B et I3P	G20, G25, G31	20 mbars to 4 bar
Denmark	I2H	G20	20 mbars to 4 bar
Spain	II2H3P	G20, G31	20 mbars to 4 bar
Finland	I2H	G20	20 mbars to 4 bar
Eire	II2H3P	G20, G31	20 mbars to 4 bar
Italy	II2H3P	G20, G31	20 mbars to 4 bar
Luxembourg	II2Esi3P	G20, G25, G31	20 mbars to 4 bar
Netherlands	II2L3P	G25, G31	20 mbars to 4 bar
Portugal	II2H3P	G20, G31	20 mbars to 4 bar
UK	II2H3P	G20, G31	20 mbars to 4 bar
Sweedeen	I2H	G20	20 mbars to 4 bar
Switzerland	II2H3P	G20, G31	20 mbars to 4 bar

Adjustments done in our factory are stamped on the nameplate of the unit.



M 17-03-13

14 Avenue Cassiopée
33160 Saint Médard en Jalles
Tel : 05 56 70 14 00 - Fax : 05 56 70 14 09
www.aircalo.fr