LENNOX
EMEA

INSTALLATION, OPERATING AND MAINTENANCE

AIR COOLED AND WATER COOLED ROOFTOP PACKAGED UNITS

BALTIC

BAC/BAH

24 - 85 kW

BALTICIV-IOM-1711-E

www.lennoxemea.com

LENNOX

BALTIC

Installation, operating and maintenance

Ref : BALTIC-IOM-1711-E

Original version is the English one. Other versions are translations.

BALTIC

INSTALLATION MANUAL

Safety codes & regulations

THE UNIT MUST BE INSTALLED IN ACCORDANCE WITH LOCAL SAFETY CODES AND REGULATIONS AND CAN ONLY BE USED IN WELL VENTILLATED AREA.
PLEASE READ CAREFULLY THE MANUFACTURER'S INSTRUCTIONS BEFORE STARTING THIS UNIT.

INSPECTIONS AND REQUALIFICATION ACCORDING PRESSURE EQUIPMENT DIRECTIVE MUST FOLLOW THE LOCAL REGULATIONS WHERE THE UNIT IS INSTALLED.

EMC DIRECTIVE COMPLIANCE

WARNING:
This equipment is a "B class" (or "A class" if equipped with EBHO or ERVF option) according EMC Directive. The units meet the following hardest environments standards:
EN 61000-6-3: program for environment residential, commercial and light industry (or EN 61000-6-4 if equipped with EBHO or ERVF option)
EN 61000-6-2: immunity for industrial environments.

In emission devices having a rated current I < 75A:
- The short-circuit ratio Rsce is: 33 (EN 61000-3-12)
- The maximum network impedance authorized Zmax is: 0.30 Ohms (EN 61000-3-11)

The differences between the various machines are only related to the power of the compressors and equipment that there are associated. For conducted and radiated emission and immunity, these differences do not alter the results.

Important note for unit fitted with gas burner:

THIS MANUAL IS ONLY VALID FOR UNITS DISPLAYING THE FOLLOWING CODES:

GB	IR	GR	DA	NO	FI	IS

In case these symbols are not displayed on the unit, please refer to the technical documentation which will eventually detail any modifications required to the installation of the unit in a particular country.
- If machine is including gas burner, minimum clearance around the unit must be at least 8 m to allow a proper gas flue dilution. If not possible, the fresh air intake must be ducted at least 8 m away from the gas burner exhaust.
- The gas burner air intake and exhaust chimney must not be modified or ducted.
- Before commissioning this type of unit, it's mandatory to ensure that the gas distribution system is compatible with the adjustments and settings of the unit.
- Gas module can only be used for outdoor installations.
- Any work on gas module must be carried out by qualified engineer.

F-Gas REGULATION

Operators of refrigeration equipment's must comply with the obligations defined in:
- ***EU Regulation No 517/2014 on fluorinated greenhouse gases***
- ***EC 1005/2009 on substances that deplete the ozone layer***

	Non compliance with these requirements is an offence and liable of financial penalties.
	Moreover, in case of problem it is mandatory to prove to the insurance company that the equipment complies with the F-gas Regulation.

WARRANTY

The warranty of the unit is subject to the warranty definitions as agreed upon in the order.
It is expected that the design and installation of the unit utilises good working practices.
The warranty will be legally null and void if:

- ***Service and maintenance have not been executed in accordance with the regulations; repairs have not been carried out by LENNOX personnel or have been implemented without prior written permission by LENNOX.***
- ***Modifications have been made to the equipment without prior written permission by LENNOX.***
- ***Settings and protections have been modified without prior written permission by LENNOX.***
- ***Non-original or other than the prescribed refrigerants or lubricants are used.***
- ***The equipment has not been installed and/or connected in accordance with the installation instructions.***
- ***The equipment is being used improperly, incorrectly, negligently or not in accordance with its nature and/or purpose.***
- ***A flow protection device is not fitted.***

In these circumstances LENNOX is indemnified from any product liability claims from third parties.
In the event of a warranty claim the machine serial number and LENNOX order number must be quoted.

WARNING - All the technical and technological information contained in this manual, including any drawing and technical descriptions provided by us, remain the property of LENNOX and must not be utilised (except in operation of this product),reproduced, issued to or made available to third parties without the prior written agreement of LENNOX. The technical information and specifications contained in this manual are for reference only. The manufacturer reserves the right to modify these without warning and without obligation to modify equipment already sold.

SAFETY

The safety information contained in this manual is provided as a guide for the safe handling of this installation. LENNOX does not vouch for the completeness of this information and can therefore not accept liability for any possible omissions.
In the roof tops, heat is being transported by a pressurised refrigerant, with changes in pressure and temperature. For air cooled roof tops, fans have been provided to discharge heat into the environment. The protection of operating and maintenance personnel was central in the design of the roof top. Safety features have been included to prevent excessive pressure in the system. Sheet metal parts have been fitted to prevent inadvertent contact with (hot) pipes. For air cooled roof tops, the fans are equipped with protective grids and the electrical control panel is completely touch-proof. This excludes some parts operating at a safe voltage (< 24 Volt). The service panels can only be opened using tools.
The electrical control panel is completely touch-proof. This excludes some parts operating at a safe voltage (< 50 Volt). The service panels can only be opened using tools.

Notwithstanding that the roof tops are equipped with extensive safety and protection features, the utmost care and attention is needed when carrying out operations on the machine. Furthermore, ear protection should be worn when working on or in the vicinity of the roof tops. Operations on the cooling circuit or electrical equipment should be carried out by authorised personnel.

It is essential to follow non exhaustive recommendations hereunder:

- Never work on a unit that is still energized.
- Any manipulation (opening or closing) of a shut-off valve must be carried out by a qualified and authorised engineer. These procedures must be carried out with the unit shut-down.
- Never work on any of the electrical components, until the general power supply to the unit has been cut. During any maintenance operations on the unit, lock the power supply circuit in the open position ahead of the machine. If the work is interrupted, check the lock before resuming the work.
  WARNING: Even if the unit has been switched off, the power circuit remains energized, unless the unit or circuit disconnect switch is open. Refer to the wiring diagram for further details.
- For some units, a separate 220V power supply may exist, check the electrical wiring for more informations
- In case of maintenance operations on fans (grills replacement …) ensure that the power is shut off to avoid automatic restart.
- Before the opening of the refrigerant circuit, check the pressure with manometers or pressure sensors, and purge the circuits.
- Never leave a unit stopped with valves closed on the liquid line, refrigerant could be trapped and the pressure would rise.
- All installation parts must be maintained by the personnel in charge, in order to avoid material deterioration and injuries to people. Faults and leaks must be repaired immediately. The authorized technician must have the responsibility to repair the fault immediately. Each time repairs have been carried out to the unit, the operation of the safety devices must be re-checked.
- Follow guidance and recommendations given in safety and machine standards such as EN378, ISO5149, etc
- Do not use oxygen to purge lines or to pressurize a machine for any purpose. Oxygen gas reacts violently with oil, grease, and other common substances.
- Never exceed the specified maximum operating pressures. Verify the allowable maximum high- and low-side test pressures by checking the instructions in this manual and the pressures given on the unit name plate.
- Do not use air for leak testing. Use only refrigerant or dry nitrogen.
- Do not unweld or flame cut the refrigerant lines or any refrigerant circuit component until all refrigerant (liquid and vapour) has been removed from roof top. Traces of vapour should be displaced with dry air nitrogen. Refrigerant in contact with an open flame produces toxic gases.
- Do not siphon refrigerant
- Avoid spilling liquid refrigerant on skin or splashing it into the eyes. Use safety goggles. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult a doctor.

Safety definition

The rooftops meet the following safety definitions, and is provided with CE markings if applicable (for further information see EU declaration).

- EN 378-2016
- 2006/42/EC “Machine Directive”
- EN-60204-1
- 2014/30/EU “EMC Directive”
- Pressure Equipment Directive 2014/68/EU
- EU 517/2014 F-Gas
- Gas Equipment Directive 2009/142/EC
- 2014/35/EU Low Voltage Directive
- 2011/65/EU RoHS Directive
- 2012/19/EU WEEE
- 2009/125/EC Ecodesign (If applicable)
- EC 1005/2009

WARNING

Warning labels

The roof top is marked with the following warning labels to alert to potential hazards (on or near the potentially hazardous part).

			
High temperatures	Electrical Voltage	Rotating parts	Sharp parts

Regularly check that the warning labels are still in the correct positions on the machine and replace them if necessary.

Warning:

1. **Attention**: The high-pressure safety switches are essential elements which guarantee the system remains within the admissible operating limits. Before switching on the installation, always ensure all electrical connections are correct on these elements which are used to isolate the electrical power supply to the compressor(s) they protect. Carry out a test to ensure the electrical power supply is effectively isolated when the pressure switch attains its set value.
2. In case of installation in a seismic zone or in a zone which may be effected by violent natural occurrences such as storms, tornados, floods, tidal waves, etc…, the installer and/or operator will refer to valid standards and regulations in order to ensure the devices required are available as our units are not designed to operate under such conditions without prior precautions.
3. The equipment is not designed to resist fire. The installation site will therefore have to respect valid standards with regard to protection against fire (emergency instructions, map…).
4. In case of exposure to corrosive external atmospheres or products, the installer and/or operator shall take the necessary precautions to avoid damage to the equipment and will make sure the equipment provided has the necessary and sufficient anti-corrosion protection.
5. To respect a sufficient number of supports for the piping according to their size and weight under operating conditions and to design the piping to avoid a water hammer phenomenon
6. For technical reasons, it is not possible to carry out hydrostatic tests on all our units so leak tests are carried out as a compensatory measure. (The entire circuit is checked using leak detectors). For machines charged with refrigerant, at the end of the test, an HP test is carried out in the factory to make sure the pressure switch is working properly.
7. Before any work is carried out on the refrigeration circuit, the dry air or nitrogen pressure our units are supplied with must be released (For units not charged with refrigerant in the factory.)
8. The emissions of refrigerant via the safety relief valves must be channeled to the exterior of the machine room. The outlet relief valve will have to be sized in compliance with EN13136.
9. Installation and maintenance of these machines must be carried out by personnel qualified to work on refrigeration equipment.
10. All interventions must be carried out in conformity with valid safety regulations (e. g.: NF EN 378), as well as the recommendations indicated on the labels and handbooks provided with the machine. All actions shall be taken to avoid access of unauthorized persons.
11. It is essential that any pipework or other components of the refrigeration circuit hazardous to people because of their surface temperature are insulated or identified.
12. Ensure that the installation zone (room or area) of the machine has restricted access and ensure the good condition of the covering.

The following note must be followed carefully

Main Safety Recommendations

All work on the unit must be carried out by a qualified and authorised employee.

Non-compliance with the following instructions may result in injury or serious accidents.

Work on the unit:
- The unit shall be isolated from the electrical supply by disconnection and locking using the main isolating switch.
- Workers shall wear the appropriate personal protective equipment (helmet, gloves, glasses, etc.).

Work on the electrical system:
- Work on electric components shall be performed with the power off (see below) by employees having valid electrical qualification and authorisation.

Work on the refrigerating circuit(s):
- Monitoring of the pressures, draining and filling of the system under pressure shall be carried out using connections provided for this purpose and suitable equipment.
- To prevent the risk of explosion due to spraying of coolant and oil, the relevant circuit shall be drained and at zero pressure before any disassembly or unbrazing of the refrigerating parts takes place.
- There is a residual risk of pressure build-up by degassing the oil or by heating the exchangers after the circuit has been drained. Zero pressure shall be maintained by venting the drain connection to the atmosphere on the low pressure side.
- The brazing shall be carried out by a qualified brazier. The brazing shall comply with standard NF EN1044 AG107 (minimum 30% silver).

Replacing components:
- Replacement of components shall be carried out using spare parts, or using parts approved by LENNOX.
- Only the refrigerant shown on the manufacturer's nameplate shall be used, to the exclusion of all other products (refrigerant blends, hydrocarbons, etc.).

Transport – Handling- Access:
- Never lift the unit without forklift protections
- Installation of the unit and accessibility must be compliant with the local regulations. Ensure that all access equipments allow maintenance operation in safety (electrical cabinet, main switch, panels, filter, refrigerant circuit…)
- It is strictly forbidden to walk or store equipment or material on top of the rooftop unit
- Equipment designed to withstand transport and handling according to the established protocol (for the handling protocol, please refer to the installation instructions for the relevant product range).
- All unloading operations must be carried out with suitable equipment (crane, forklift truck, etc.).
- When using a forklift truck, you must respect the positions and the direction of handling indicated on the products.
- The equipment must be handled with care to avoid damage to the bodywork, pipework, condenser, etc.

Rooftop installation in heavy wind locations
- The roofcurbs (vertical & horizontal) and rooftops installations are designed to withstand winds up to 80 km/h. Above this limit, it's recommended to take appropriate actions to secure the installation.
- Ensure the fresh air inlet does not face prevailing wind direction.

Filters:
- Do the filters fire classification's choice according to local regulations.

Fan compartment:
- Stop the power before accessing the fan compartment.

Warning: the unit is working under pressure. Never open the panels when the unit is working. Even after shutting down the unit, wait for 2 minutes until the fans are completely stopped before opening any panel.

CAUTION:
In the event of fire, refrigerating circuits can cause an explosion and spray coolant gas and oil.

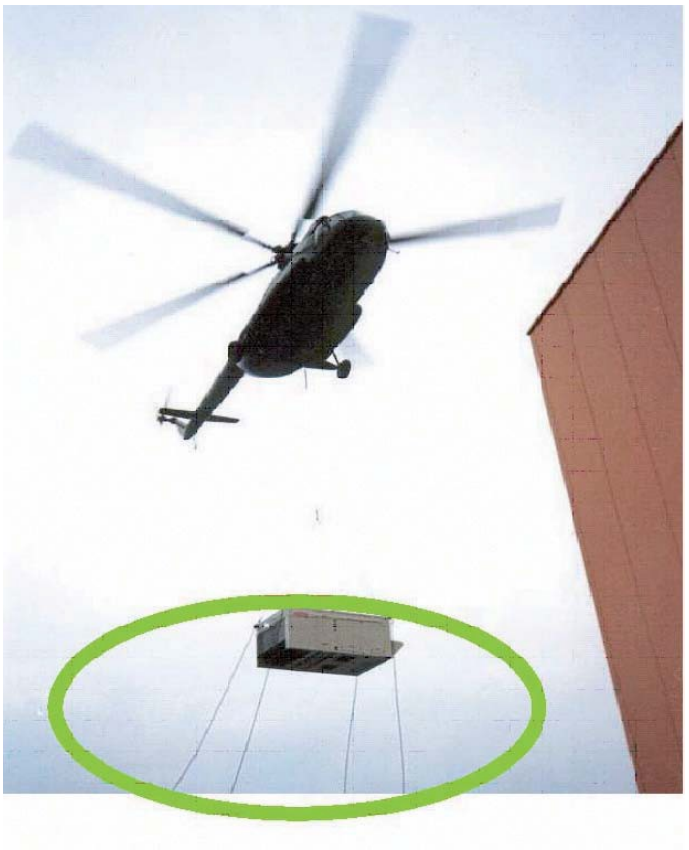
Gas:
- Any work on gas module must be carried out by qualified personnel
- A unit with gas module must be installed in accordance with local safety codes and regulations and can only be used for outdoor installation.

Warning:
- The units are not designed to resist to a fire. The installation site must comply with the standards relating to fire protection.
- In case of installation of the units in an area recognized as being potentially at risk for natural phenomena (tornado, earthquake, tidal wave, lightning...), please follow the standards and regulations, and provide the necessary devices to prevent from these risks.

Mandatory handling devices

MANDATORY HANDLING DEVICES

Handling slings to guide the unit toward the roof curb



Vacuum lifting beam to position the unit

Dimensions and weights

Machine	Length (mm)	Width (mm)	Height (mm)	Width with hood (mm)	Transport lenght (mm)	Transport Width (mm)	Transport Height (mm)
C-box	2283+/-15	2250+/-15	1260+/-15	2683+/-20	2310	2309	1260
D-box	2783+/-15	2250+/-15	1260+/-15	2683+/-20	2810	2309	1260
E-box	3663+/-15	2250+/-15	1260+/-15	2683+/-20	3690	2309	1260

BAH – Air cooled	24	30	38	42	45	52	57	65	75	85
Weight of basic units without any options.	598	600	650	655	847	851	904	914	1134	1136

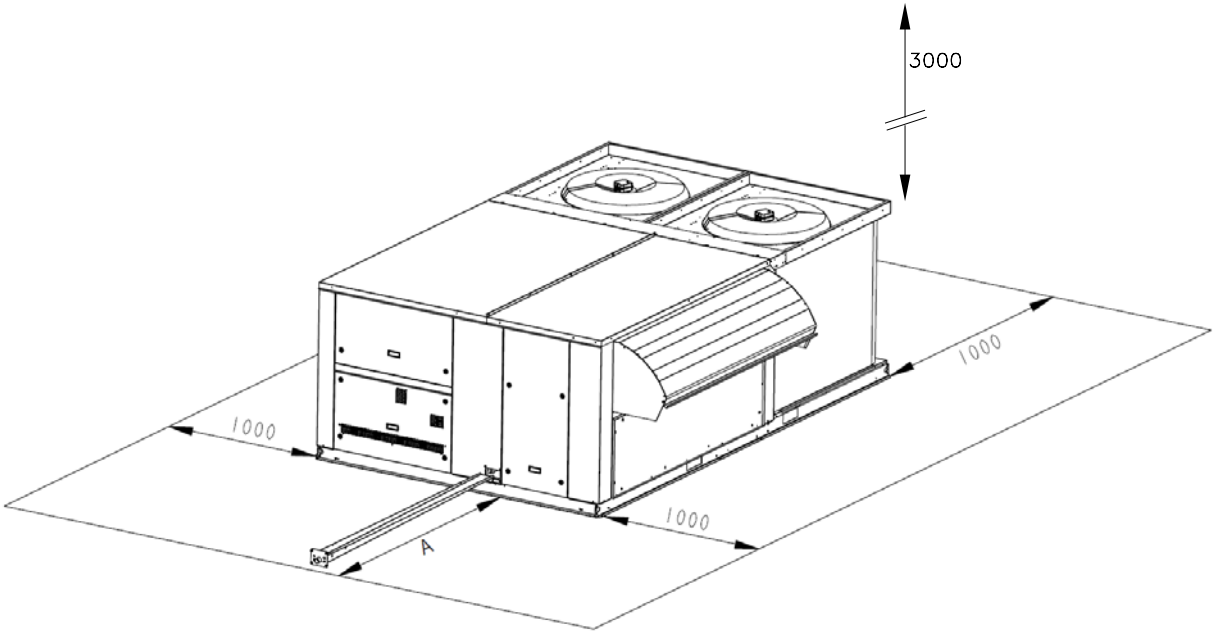
All weights are given in kg (+/- 5%).
Individual weight of a given rooftop is indicated on the rating plate and on the sale's offer

Minimum clearance around the unit installation

Figure below show the required clearances and service access around the unit.

IMPORTANT note for unit clearances

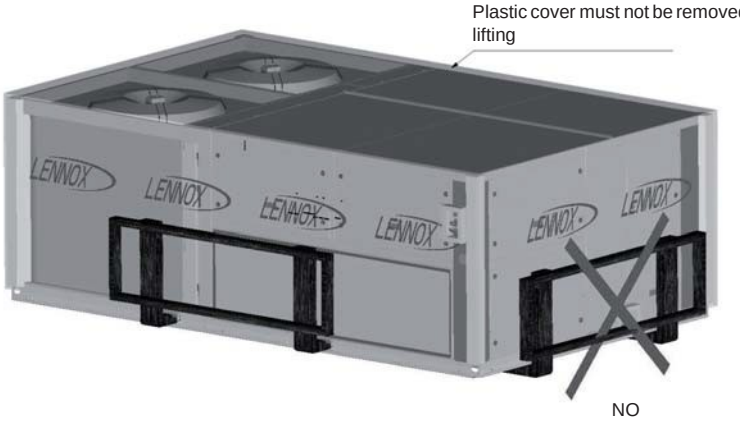
- Ensure the fresh air inlet does not face prevailing wind direction.
- If machine is including gas burner, minimum clearance around the unit must be at least 8 m to allow a proper gas flue dilution. If not possible, the fresh air intake must be ducted at least 8 m away from the gas burner exhaust.
- In case of extraction option, it is recommended to duct fresh air intake.
- An approach ramp must be installed if the unit's installation requirements tell that it's necessary to reach the main switch, the electrical cabinet, the compressor and the ventilation compartment. This recommendation is valid for all type of installations.
- It is also important to respect a minimal clearance of 3 meters above of the unit, to allow a good operation of the outdoor fans.

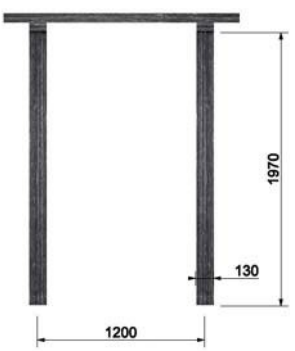


Drain pan clearance (A)	
C Box	1150 mm
D Box	1650 mm
E Box	2150 mm

Fork lifting the unit

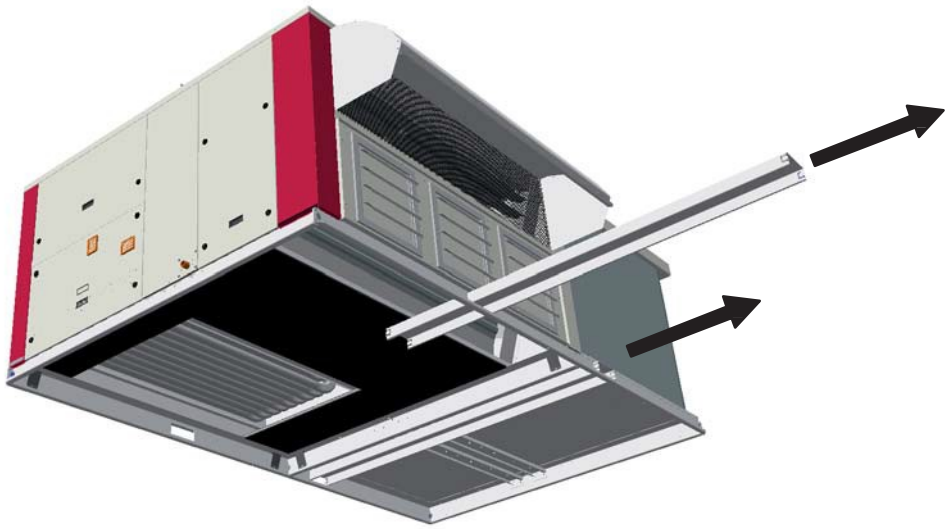
Do not lift the unit by the side (coil end side or drain pan outlet side). This will damage the unit.
Lift the unit on the long side using a forklift with dimensions according to the figure below.
Do not remove the unit plastic cover while lifting.

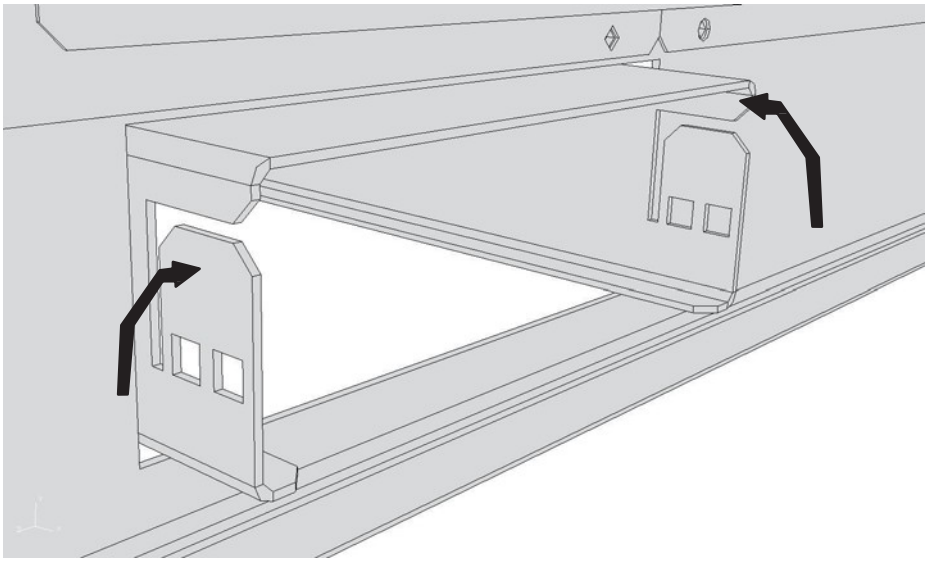




Removing the forklift protection located under the machine

Before installation, remove the forklift protection which is located under machine desk.





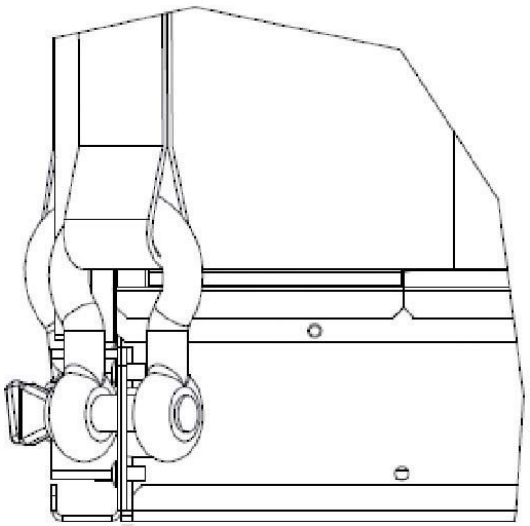
IMPORTANT note about forklift protection removal

Take care not to hurt anybody when removing the forklift rails .
Locate the machine on a safe area while removing the forklift rails from the machine.

Lifting the unit with a crane

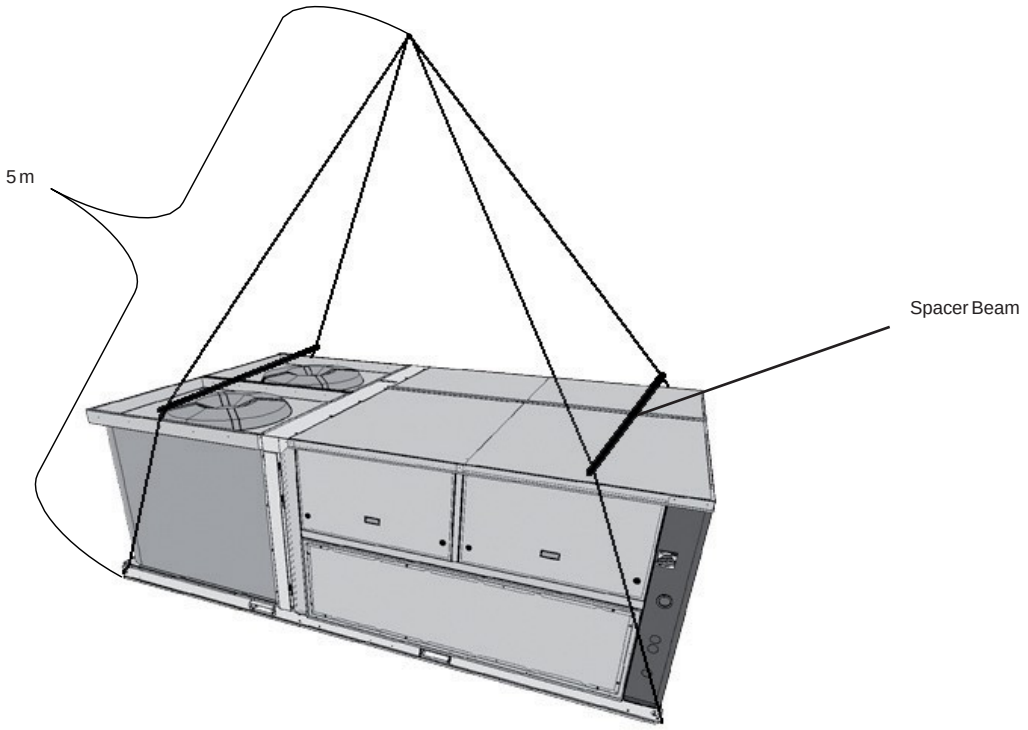
Lifting shackles dimensions

Use lifting shackles on each lifting lug located on each angle of the unit. Maximum diameter of the ring shaft = 20 mm.



Lifting belts/straps length

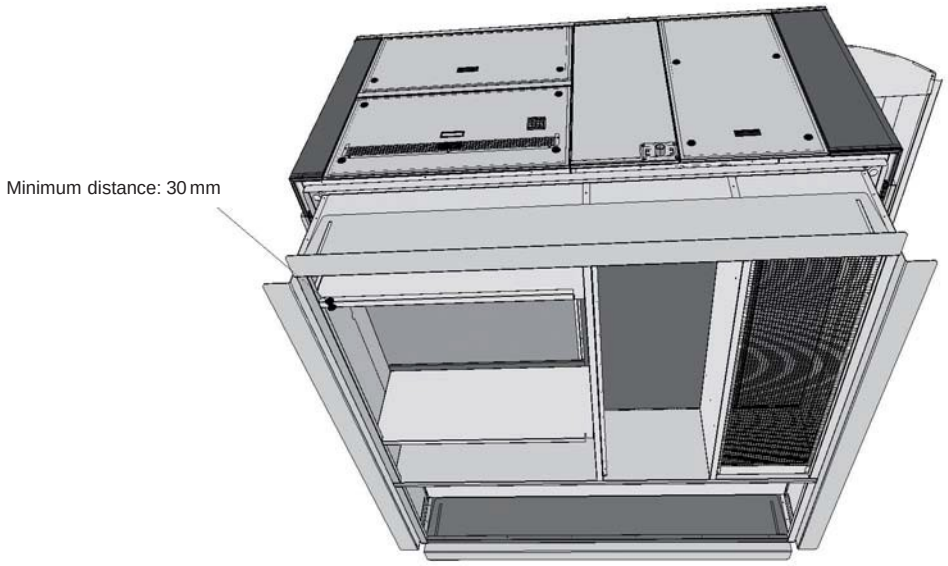
The unit must be lifted using spacing beams to avoid the belts damages to the casing.
Spacing beams must have a length equal to the machine width – i.e 2250 mm.



Lifting the roof curbs

Ducting connection details

The supply and return air ducts can be secured to the 30 mm flanges at the bottom of the roofcurb
Any ducting weight above 100 kg must be fixed independently to other building frames.



On receipt of new equipment please check the following points.
It is the customer's responsibility to ensure that the products are in good working order:

- The exterior has not been damaged in any way.
- The lifting and handling equipment are suitable for the equipment and comply with the specifications of the handling instructions enclosed here-in.
- Accessories ordered for on site installation have been delivered and are in good working order.
- The equipment supplied corresponds to the order and matches the delivery note.

If the product is damaged, exact details must be confirmed in writing by registered post to the shipping company within 48 hours of delivery (working days). A copy of the letter must be addressed to LENNOX and the supplier or distributor for information purposes. Failure to comply will invalidate any claim against the shipping company.

Rating plate

The rating plate provides a complete reference for the model and ensures that the unit corresponds to the model ordered. It states the electrical power consumption of the unit on start-up, its rated power and its supply voltage. The supply voltage must not deviate beyond +/-5 %. The start-up power is the maximum value likely to be achieved for the specified operational voltage. The customer must have a suitable electrical supply. It is therefore important to check whether the supply voltage stated on the unit's rating plate is compatible with that of the mains electrical supply. The rating plate also states:

- year of manufacture
- weight of the unit
- type of refrigerant used + GWP : Global warming potential
- required charge for each circuit
- operating Pressure min/max
- operating Temperature min/max

CE marking : 3 possible cases

- CE
- CE0038
- Absence of CE marking

LENNOX EUROPE MIDDLE-EAST AFRICA
LGL FRANCE S.A.S
ZI Les Meurières
69780 Mions France

Unit type:BAH085M4M
Serial Nr : 290353_1 1/2

	Voltage (V)	Phase (Ph)	Frequency (Hz)	Current (A)	
Elec Supply	400	3	50	Nominal	Starting
Elec Aux.	24	1	50	78,8	165,5

	Min		Max	
	LP	HP	LP	HP
Pressure (PS) (bar)	-1	-1	28	42
Temperature (TS) (°C)	-20	-20	50	110
Storage Temperature (°C)	-30		50	

LP : Low Pressure side / HP : High Pressure side

Nominal Capacity (kW)		Ref Charge (kg)				Dates	
Cooling	Heating	C1	C2	C3	C4	Prod.	Test
83,5	80,1	10,5	10,5	0	0	2017	08/11/2017

Fluid	Fluid Group	Weight (kg) +/-5%
R410A GWP 2088	2	1143

This product is used for Air Conditionning. Contains fluorinated greenhouse gases covered by the Kyoto protocol. Hermetically sealed.

Storage

When units are delivered on site they are not always required immediately and are sometimes put into storage. In the event of medium to long-term storage, we recommend the following procedures:

- Ensure that there is no water in the hydraulic systems.
- Keep the heat exchanger covers in position.
- Keep protective plastic film in position.
- Ensure the electrical panels are closed.
- Keep all items and options supplied in a dry and clean place for future assembly before using the equipment.
- Store the unit on an appropriate place (flat surface).
- Storage temperature must be respected according to the information given on the rating plate

Maintenance key

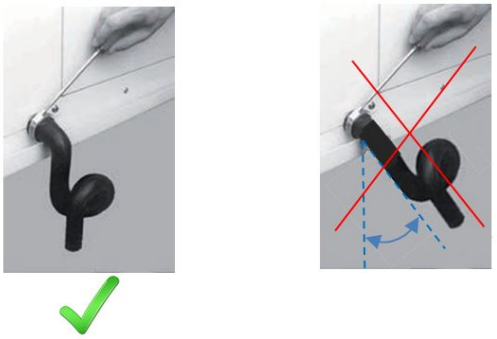
On delivery we recommend that you keep the key which is attached to an eyebolt in a safe and accessible place. This allows you to open the panels for maintenance and installation work.
The locks are ¼ turn + then tighter.

After commissioning, all the panels must be closed and locked.

After any maintenance operation, all the panels must be closed and locked.

Condensate drains

The condensate drains are not assembled when delivered and are stored in the electrical panel with their clamping collars. To assemble them, insert them on the condensate tray outlets and use a screwdriver to tighten the collars. The drains must be installed in vertical position.



Preliminary checks

Before installing the equipment, the following points MUST be checked:

- Have the forklift protections been removed?
- Is there sufficient space for the equipment?
- Is the surface on which the equipment is to be installed sufficiently solid to withstand its weight? A detailed study of the frame must be made beforehand. The surface on which the equipment is to be installed must be flat. (See next paragraph)
- Do the supply and return ductwork openings excessively weaken the structure?
- Are there any obstructing items which could hinder the operation of the equipment?
- Does the electrical power available correspond to the equipment's electrical specifications?
- Is drainage provided for the condensate?
- Is there sufficient access for maintenance?
- Installation of the equipment could require different lifting methods which may vary with each installation (helicopter or crane). Have these been evaluated?
- Ensure that the unit is installed in accordance with the installation instructions and local applicable codes.
- Check to ensure that the refrigerant lines do not rub against the cabinet or against other refrigerant lines.

In general, make sure no obstacles (walls, trees or roof ledges) are obstructing the duct connections or hindering assembly and maintenance access.

Installation requirements

- The surface on which the equipment is to be installed must be clean and free of any obstacles which could hinder the flow of air to the condensers:
- Avoid installing two units side by side or close to each other as this may restrict the airflow to the condensers, and could limit the access for maintenance purposes.
- Uneven surfaces are prohibited. The surface must be flat and respect a maximal flatness of 0.5mm per linear meter (in both directions length and width).
- The surface must support continuously the entire area of the unit/curb (no rubber pad, no spring, no block…).

Before installing a packaged rooftop unit it is important to understand:

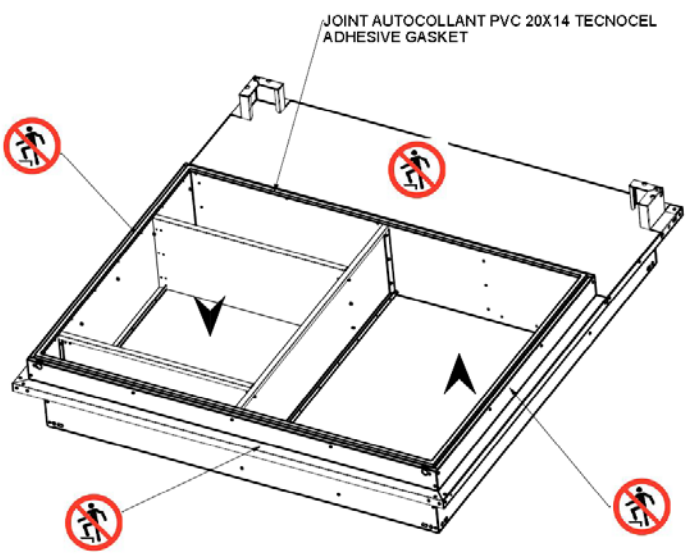
- The direction of prevailing winds
- The direction and position of air flows.
- The external dimensions of the unit and the dimensions of the supply and return air connections.
- The arrangement of the doors and the space required to open them to access the various components.

Connections

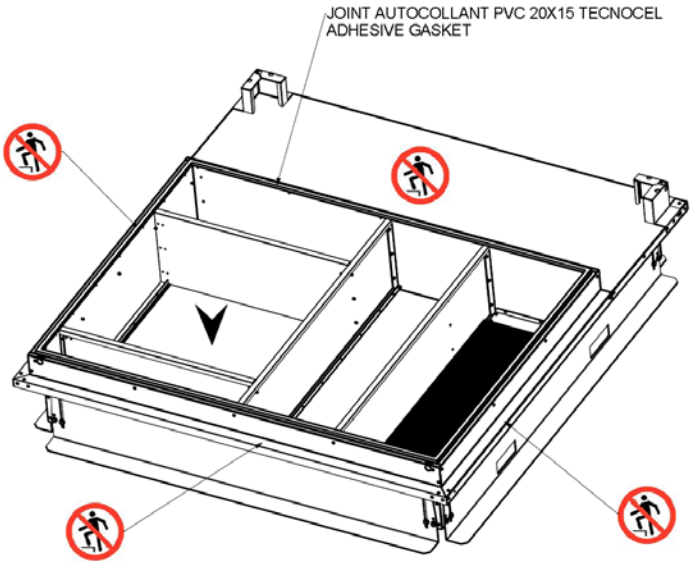
- Ensure that all the pipe-work crossing walls or roofs are secured, sealed and insulated.
- To avoid condensation problems, make sure that all pipes are insulated according to the temperatures of fluids and type of rooms.

NOTE: The packaging protection fitted on the finned surfaces must be removed prior to start up.

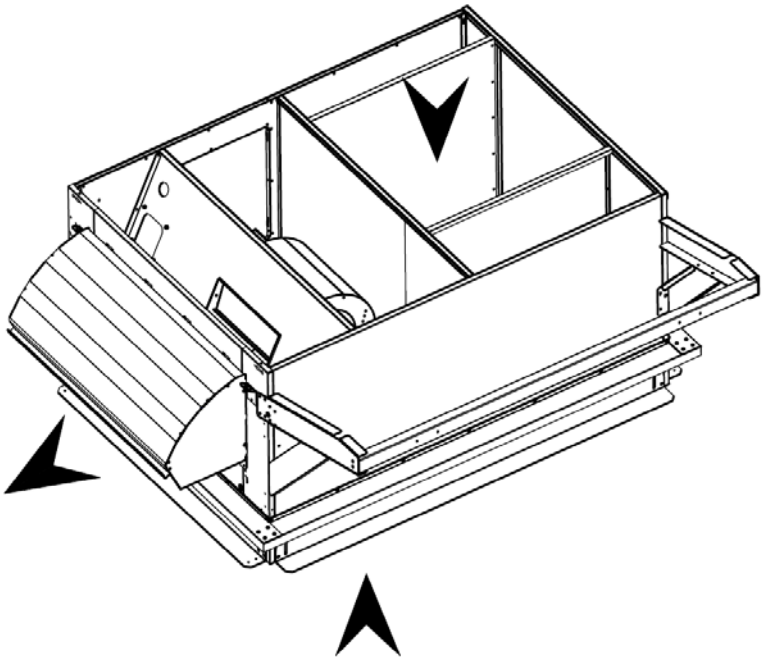
Non adjustable roofcurb



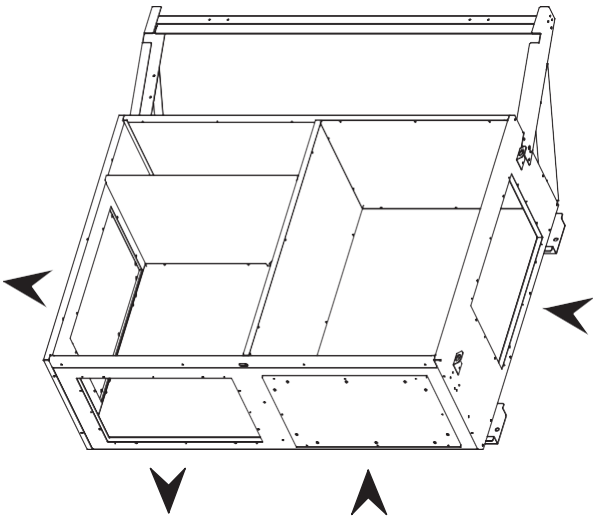
Adjustable roofcurb



Exhaust roofcurb



Multidirectionnal roofcurb



WARNING : all multidirectionnal flowcurb and horizontal extraction flow curb must be secured to the ground using existing fixing holes on the frame.

WARNING : all the roofcurb must be strongly secured to the ground
The contact to the ground must be realized with the entire contact area of the roofcurb (no discontinuous contact).

IMPORTANT NOTE: all the curb must be strongly secured to the ground
The contact to the ground must be realized with the entire contact area of the curb (no discontinuous contact).

Roof opening dimensions

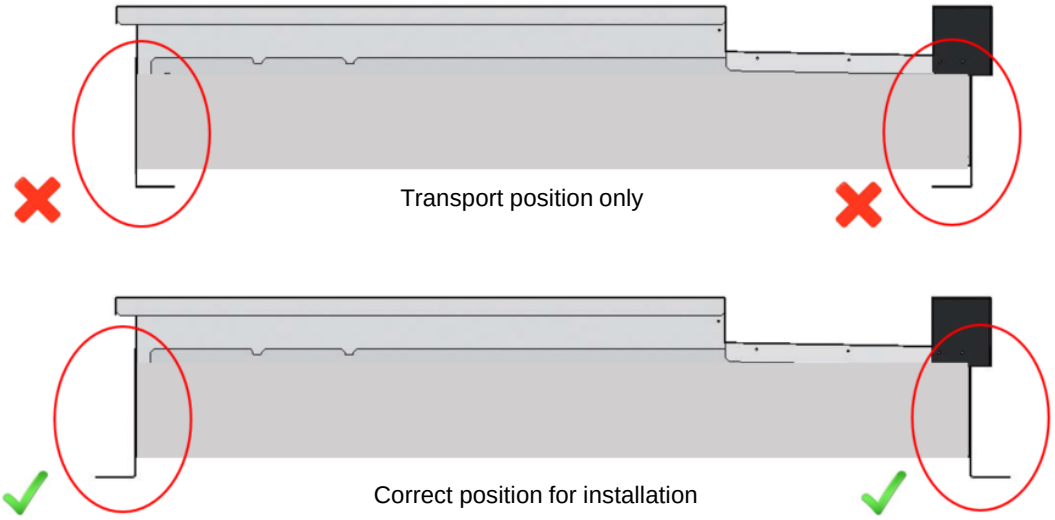
The roof opening dimensions & maximum slope are defined according mechanical drawings.

Sealing checks

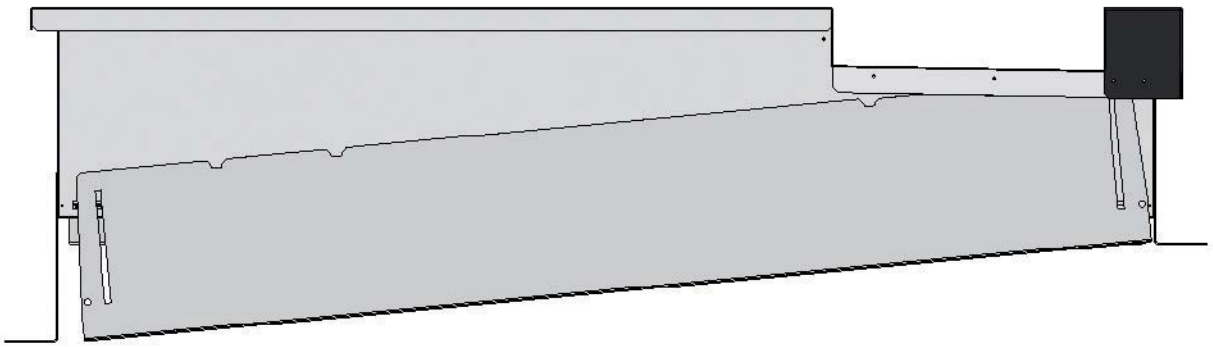
IMPORTANT note: Prior to put the machine on the curbs make sure polyethylene foam is fitted on the curb upper flange side (must be delivered with the curb).
This gasket must be put only on the internal perimeter of the curb

Levelling adjustable roofcurbs

Above all, ensure that all the adjustable returns are facing outward. They could be turned inside-out for transport.



Place the roof mounting frame on the trimmer beam by first lining up the inlet and the outlet opening.

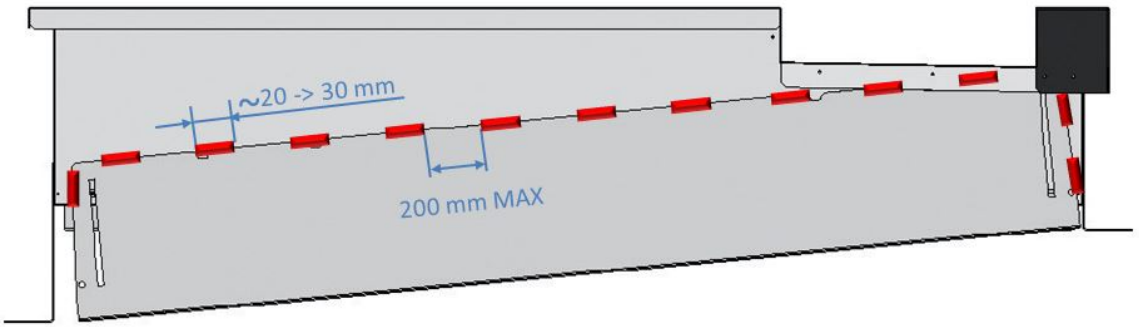


After levelling the frame, secure the adjustable returns on the trimmer.

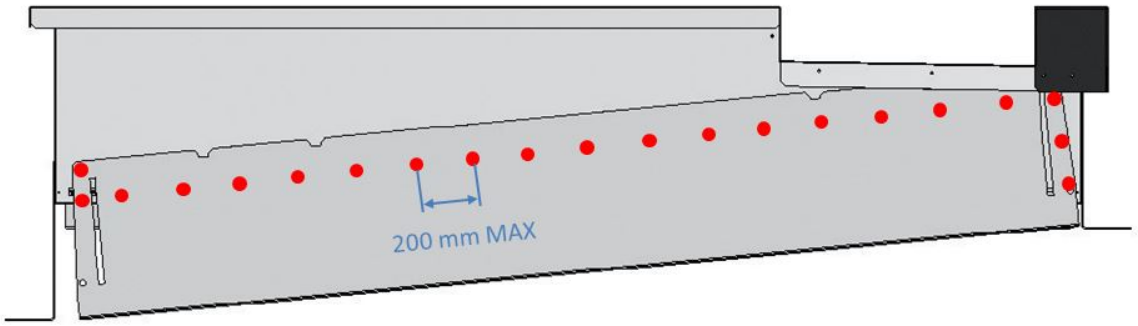
IMPORTANT NOTE: Securing the curb

When the roofcurb is correctly positioned, it is essential to secure the assembly with a disconnected stitched welded seam (20 to 30 mm every 200 mm) or self-taping screws (every 200mm) along the outside.

Example with welded seam

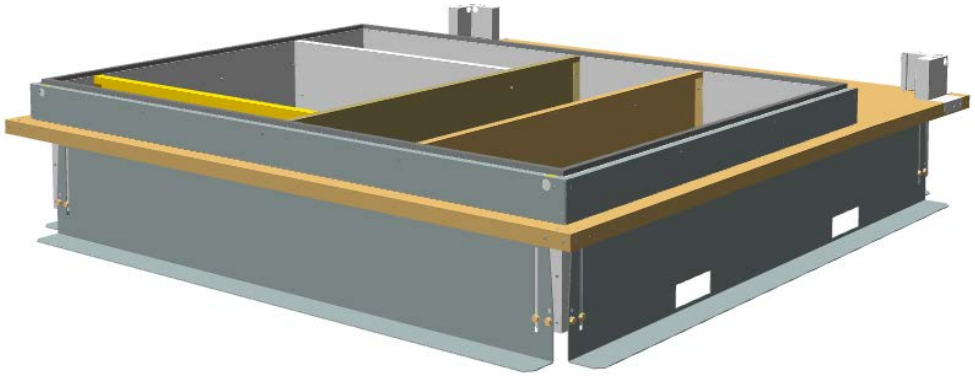


Example with screws



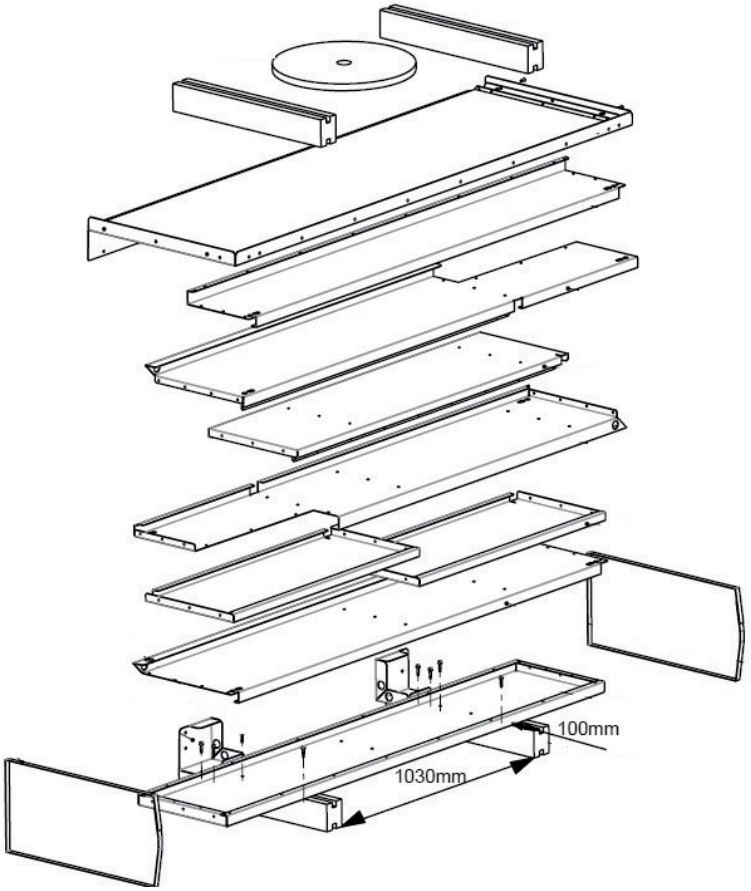
Positioning the rooftop on adjustable roofcurbs

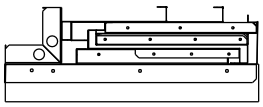
IMPORTANT note: Prior to put the machine, make sure to put a polyethylene gasket on the curb upper flange side (must be delivered in the curb package).
This gasket must be put only on the internal perimeter of the curb

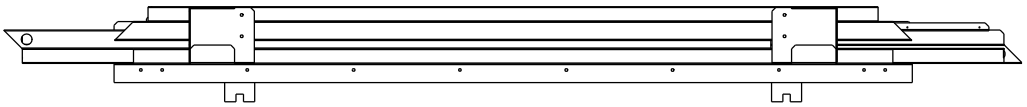


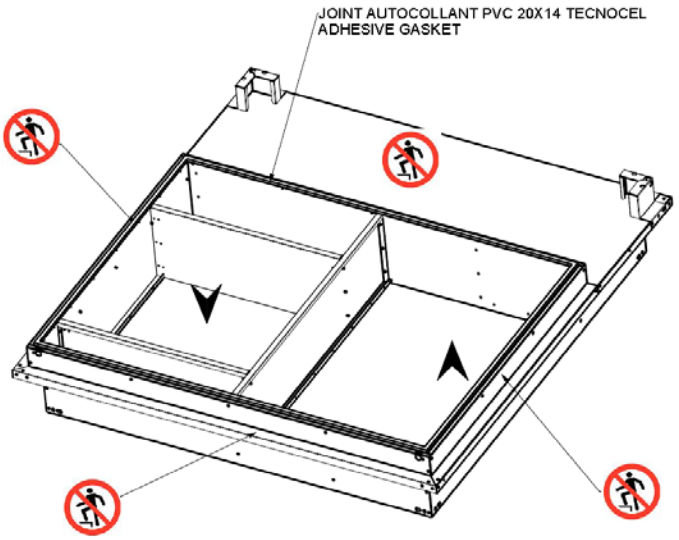
Frame parts packing

Different parts are used in the assembly of this roof mounting frame. There are delivered stacked on a pallet.







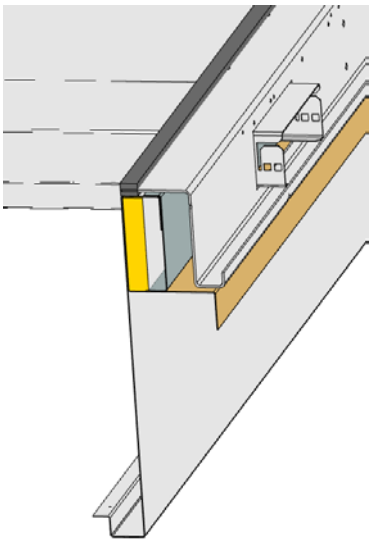


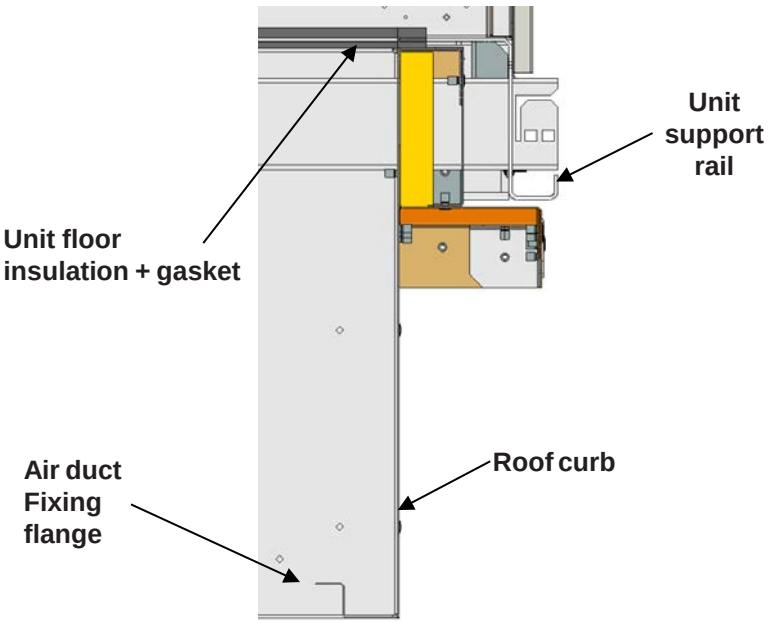
Installation

The roof mounting frame provides support when the units are installed in down-flow configurations.
The non adjustable, non assembled roof mounting frame can be installed directly on decks having adequate structural strength or on roof supports under deck. See drawing for frame dimensions, location of supply and return air opening
NOTE: frame assembly must be installed flat, levelled within 5mm per linear meter in any direction.

Assembly

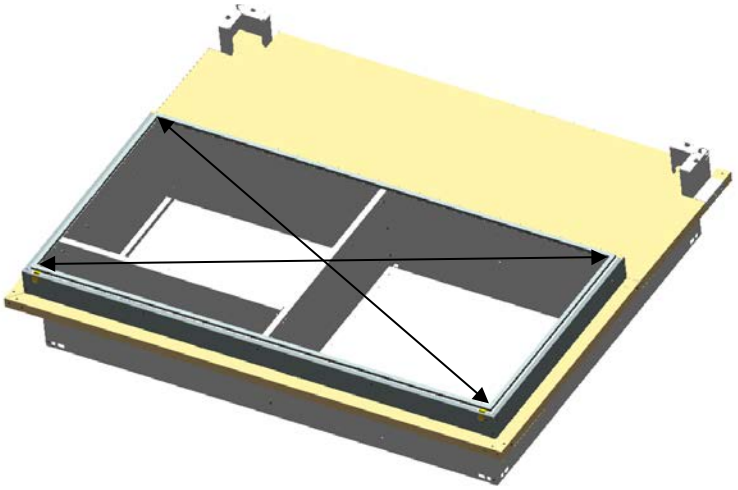
The frame is supplied as a single package and shipped folded down for ease of transport and handling. It is easy field assembled as all parts required are supplied with the frame.





Securing the frame

To ensure proper mating with units, it is mandatory that the roof mounting frame be squared to roof structure as follows:



- With frame positioned levelled in the desired location on roof trusses, tack weld corner of frame.
- Measure frame diagonally from corner to corner as shown above. These Dimensions must be equal in order for the fame to be square.
- It is extremely important to sight frame from all corner to ensure it is not twisted across. Shim frame under any low side. The maximum slope tolerance is 5mm per linear meter in any direction.
- After the frame has been squared, straightened and shimmed, weld or secure the frame to the roof deck.

NOTE: It must be securely fastened to the roof as per local codes and regulations.

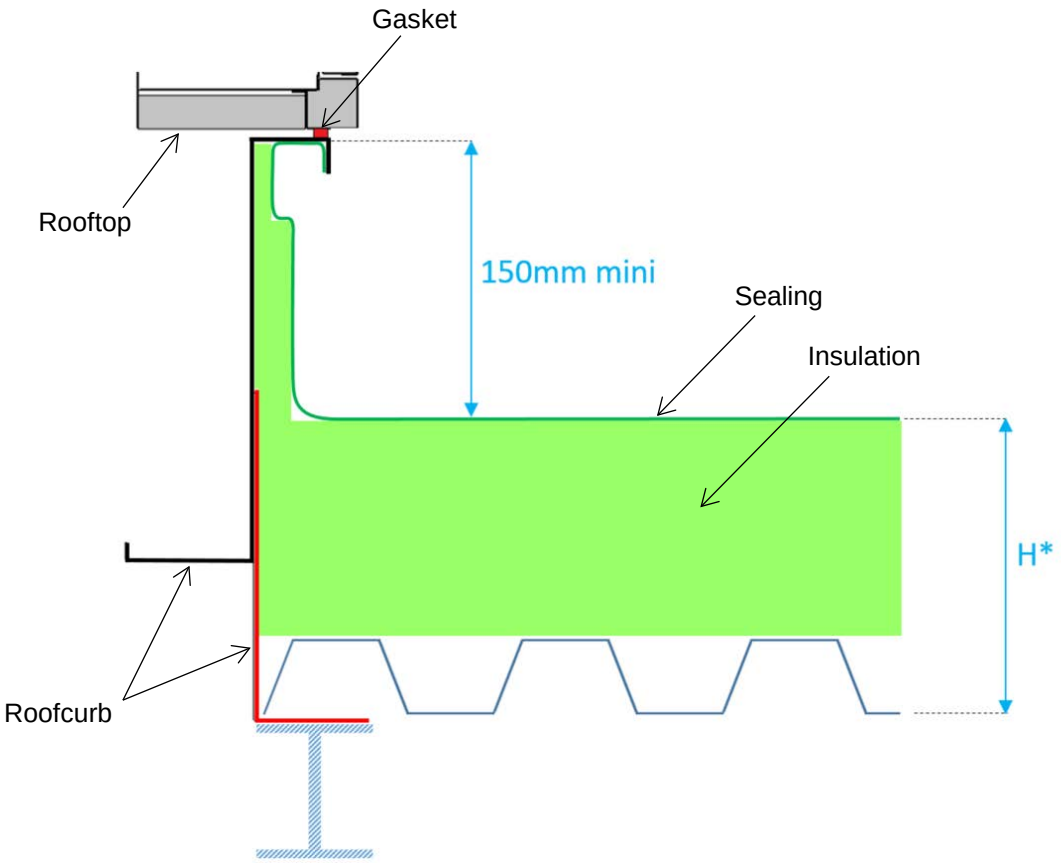
Sealing checks

IMPORTANT NOTE: After assembling the kit curb and prior to put the machine on it, make sure to put a poly-ethylene foam on the curb upper flange side (must be delivered in the curb package).
This gasket must be put only on the external perimeter of the curb

CURBING AND FLASHING

Check that the insulation is continuous, counter flash and seal around the frame as shown.
CAUTION: To be effective, the upstream must end below the drop edge. Where pipes and electrical conduits extend through the roof, flashing must conform to local codes of practice

Before installing the equipment, make sure that seals are not damaged and check that the unit is secured to the mounting frame. Once in position, the bottom of the equipment must be horizontal. The installer must comply with local authority standards and specifications.



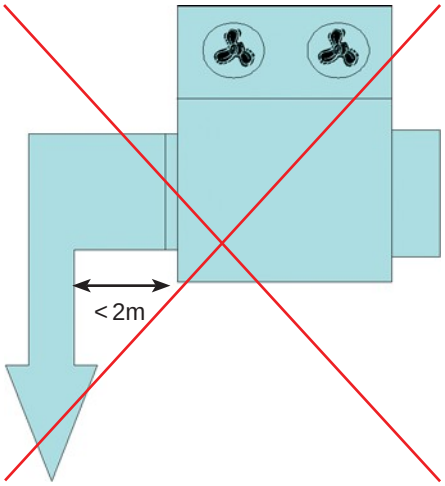
* Check that the roofcurb height is enough to respect a sealing height of 150mm minimum (French DTU 43.3) considering the building specifications : geometry of the roof, material and thickness of the insulations and other protection layers, slope of the roof…).

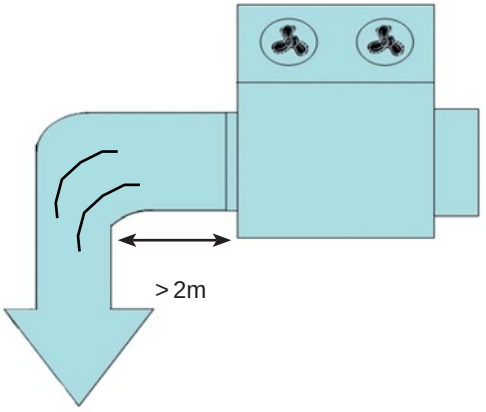
RECOMMENDATIONS FOR DUCTS CONNECTIONS

Some rules must be complied with for the connections between ducts and unit done on site.
Whatever the supply configuration is, respect a minimal duct's length (D) of 2m before any elbow or any duct's diameter change.

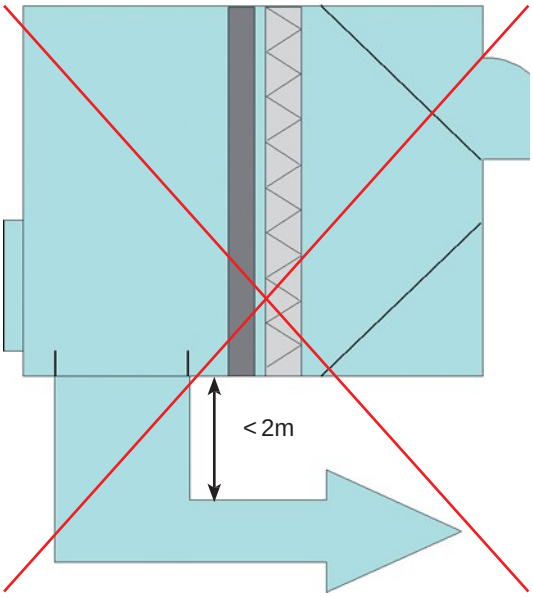
Directional vanes must be fitted inside any elbow fitted in return or supply ductwork closer than 5 meter to the machine connection flanges.

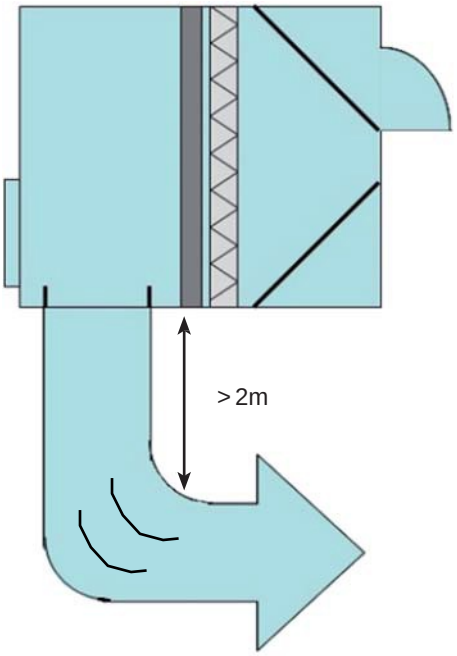
Horizontal supply





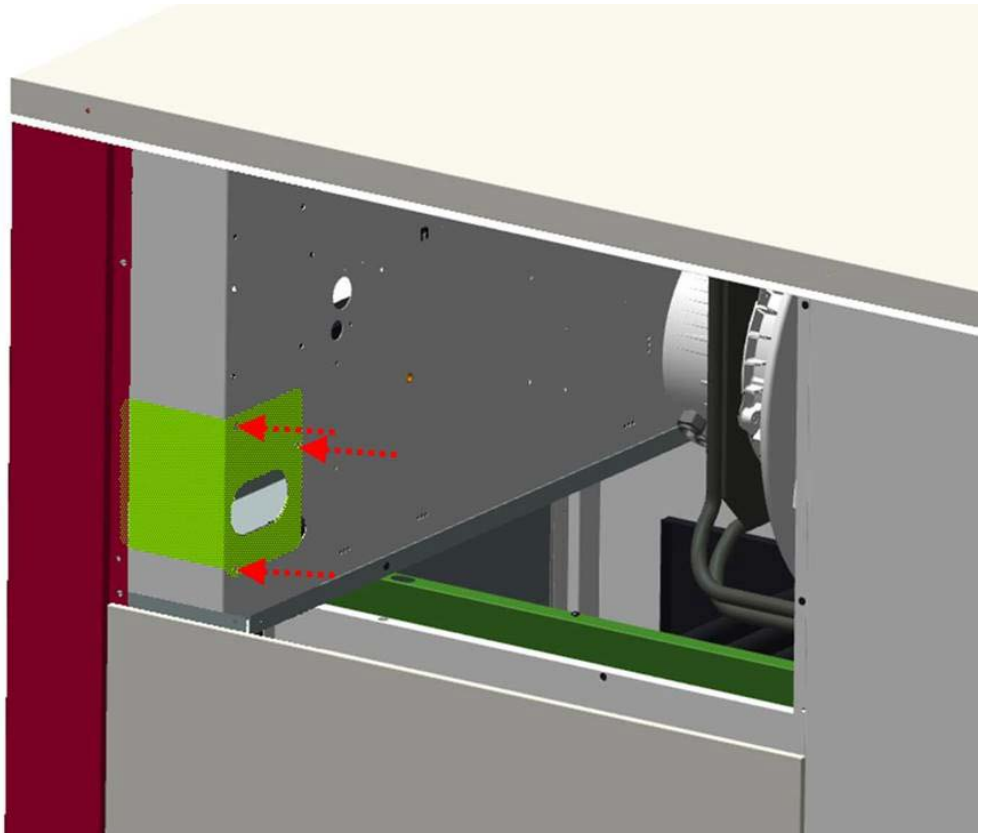
Vertical supply





Accessibility for main switch connection on C-Box (size 24-30-38-42)

In case of full options control panel, the access to connect the power cable to the main switch can be limited. Therefore a removable hatch is available at the back of the control board (accessible from the ventilation panel). When the cable connection is finished, it's important to put the hatch back in its initial position.



WATER SOURCE HEAT PUMP ONLY

Water connections

The water circulating pump will be preferably installed upstream so that the evaporator/condenser will be subjected to positive pressure. Inlet and Outlet water connections are indicated on the certified drawing sent with the unit or shown in the sales brochure.

The water pipes connected to the unit must not transmit any radial or axial force or any vibration to the heat exchangers.

It is important to follow non exhaustive recommendations hereunder:

•Comply with the water inlet and outlet connections shown on the unit.

- Install manual or automatic air purge valves at all high points in the circuit.
- Install a safety valve as well as an expansion tank to maintain the circuit pressure.
- Install thermometers in both the inlet and outlet water connections.
- Install drain connections at all low points to allow the whole circuit to be drained.
- Install stop valves, close to the inlet and outlet water connections and easily accessible for maintenance.
- Use flexible connections to reduce vibrations transmission.
- After testing for leaks, insulate all pipe work, to reduce thermal leaks and to prevent condensation.

•If the external water pipes are in an area, where the ambient temperature is likely to fall below 0°C, insulate the piping and add an electric heater.

- Ensure full earthling continuity

A drainage plug is located at the base of the evaporator. A drainage pipe may be connected to this to enable drainage of evaporator water for service operations or for seasonal shut down.

Connections at the inlet and outlet are Victaulic type.

Water analysis

The water must be analysed; the water circuit installed must include all items necessary for treatment of the water: filters, additives, intermediate exchangers, bleed valves, vents, isolating valves etc... depending on the results of the water analysis.

We do not advise operation of the units with open loops which can cause problems with oxygenation, or operation with untreated ground water.

Use of untreated or improperly treated water can cause deposits of scale, algae and sludge or cause corrosion and erosion. It is advisable to call in a qualified water treatment specialist to determine what kind of treatment will be necessary. The manufacturer cannot accept liability for damage caused by the use of untreated or improperly treated water, salt water or brine.
Here are our non exhaustive recommendations given as an indication:

- No NH4+ ammonium ions in the water, they are very detrimental for copper. <10mg/l
- Cl- Chloride ions are detrimental for copper with a risk of perforations by corrosion by puncture. < 10 mg/l.
- SO42- sulphate ions can cause perforating corrosion.< 30 mg/l.
- No fluoride ions (<0.1 mg/l).
- No Fe2+ and Fe3+ ions with dissolved oxygen. Dissolved iron < 5 mg/l with dissolved oxygen < 5 mg/l. Over those values, it means a corrosion of steel which may generate a corrosion of copper parts under deposite of Fe – this is mainly the case with shell and tube heat exchangers.
- Dissolved silicon: silicon is an acid element of water and can also lead to corrosion risks. Content < 1mg/l.
- Water hardness: TH >2.8 K. Values between 10 and 25 can be recommended. This will facilitate scale deposit that can limit corrosion of copper. TH values that are too high can cause piping blockage over time.
- TAC< 100.
- Dissolved oxygen: Any sudden change in water oxygenation conditions must be avoided. It is as detrimental to deoxygenate the water by mixing it with inert gas as it is to over-oxygenate it by mixing it with pure oxygen. The disturbance of the oxygenation conditions encourages destabilisation of copper hydroxides and enlargement of particles.
- Specific resistance – electric conductivity: the higher the specific resistance, the slower the corrosion tendency. Values above 3000 Ohm/cm are desirable. A neutral environment favours maximum specific resistance values. For electric conductivity values in the order of 200-6000 S/cm can be recommended.
- pH: pH neutral at 20°C (7 < pH < 8)

If the water circuit must be emptied for longer than one month, the complete circuit must be placed under nitrogen charge to avoid any risk of corrosion by differential aeration.

Use of untreated or improperly treated water can cause deposits of scale, algae and sludge or cause corrosion and erosion. It is advisable to call in a qualified water treatment specialist to determine what kind of treatment will be necessary. The manufacturer cannot accept liability for damage caused by the use of untreated or improperly treated water, salt water or brine.
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- No fluoride ions (<0.1 mg/l).
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- pH: pH neutral at 20°C (7 < pH < 8)

If the water circuit must be emptied for longer than one month, the complete circuit must be placed under nitrogen charge to avoid any risk of corrosion by differential aeration.

Antifreeze protection

Use glycol/water solution

ADDITION OF GLYCOL IS THE ONLY EFFICIENT WAY TO PROTECT AGAINST FREEZING
The glycol/water solution must be sufficiently concentrated to ensure proper protection and prevent formation of ice at the lowest outdoor air temperatures expected on an installation. Take precautions when using non-passivated MEG antifreeze solutions (Mono Ethylene Glycol or MPG Mono Propylene Glycol). Corrosion can occur with these antifreeze solutions with oxygen.

Drain the installation

It is important to make sure that manual or automatic air bleeders are installed at all the high points of the water circuit. To enable drainage of the circuit, make sure that drain cocks are installed at all the low points of the circuit. To drain the circuit, the drain cocks must be opened and an air inlet ensured.
Note: air bleeders are not designed to admit air.

FREEZING OF A HEAT EXCHANGER DUE TO COLD WEATHER CONDITIONS IS NOT COVERED BY LENNOX WARRANTY.

Electrolytic corrosion

We would like to draw your attention to the problems of corrosion due to electrolytic corrosion caused by an imbalance between earthing points.

AN EXCHANGER THAT IS PUNCTURED BY ELECTROLYTIC CORROSION IS NOT COVERED BY THE UNIT WARRANTY

Minimum water capacity

The minimum volume of the water circuit must be calculated with the formula here under. If necessary, install a buffer tank. Proper operation of regulating and safety devices can only be ensured if the volume of water is sufficient.

Vt → Minimum water content of the installation

Q → Chiller cooling capacity in kW

N → Number of control steps available in the unit

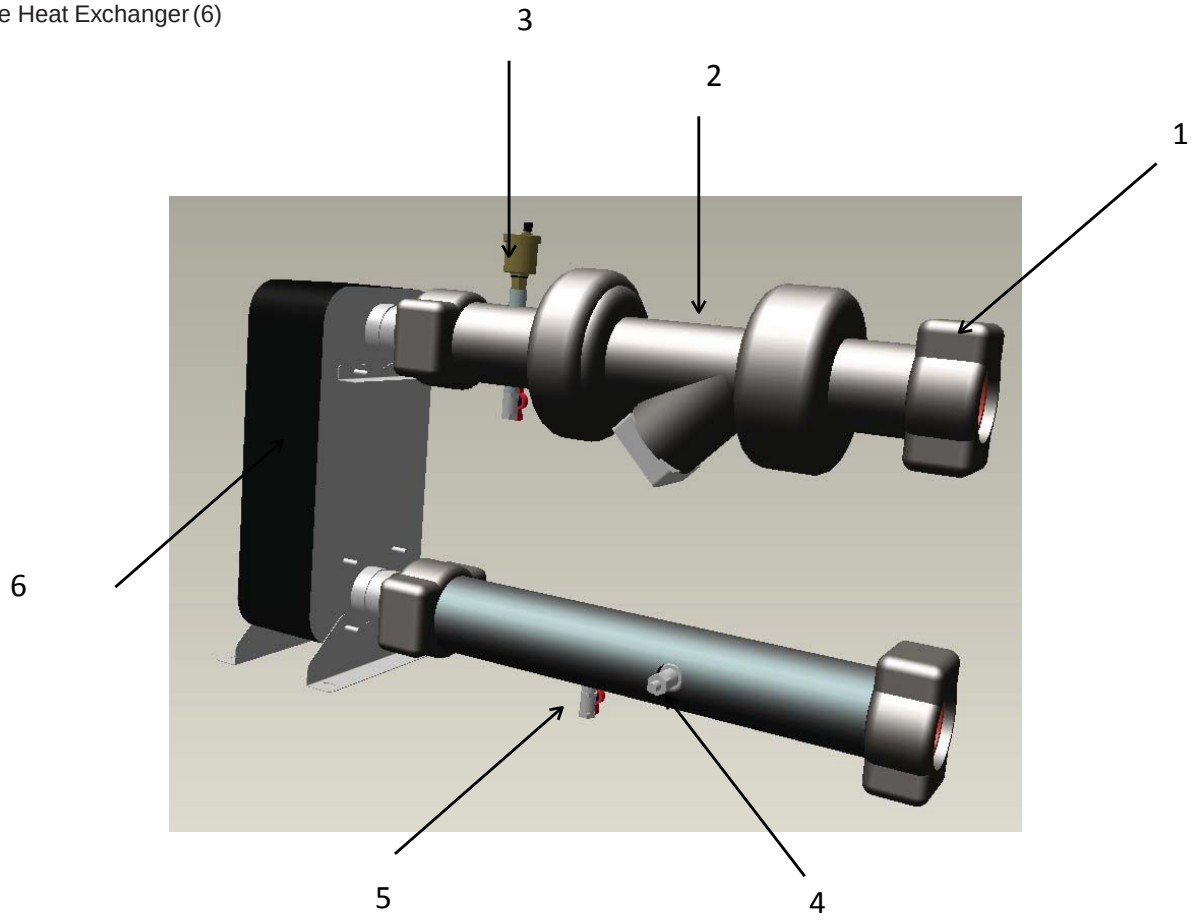
Dt → Maximum acceptable temperature rise (Dt = 6°c for an air conditioning application)

$$Vmini = 86 \times Q / (N \times Dt)$$

Water loop configuration

Figure below indicates all components used as standard :

- the victaulic type connections (1)
- the inlet water filter, (2)
- the automatic airvent, (3)
- the electronic water flow switch, (4)
- the pressure taps and drain valves, (5)
- the Plate Heat Exchanger (6)



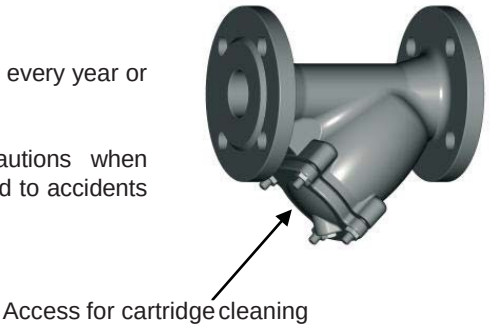
Victaulic connection assembly instruction

Be careful not to roll or pinch the seal when installing the half-shells. This would cause a leak.
1Install the bolts and tighten the nuts by hand on them.
2tighten bolts uniformly passing from one side to the other, until the pads for the bolts are in metal-metal contact. Make sure the shoulders are well engaged in the grooves.
It is imperative to tighten the nuts evenly to avoid pinching the gasket.

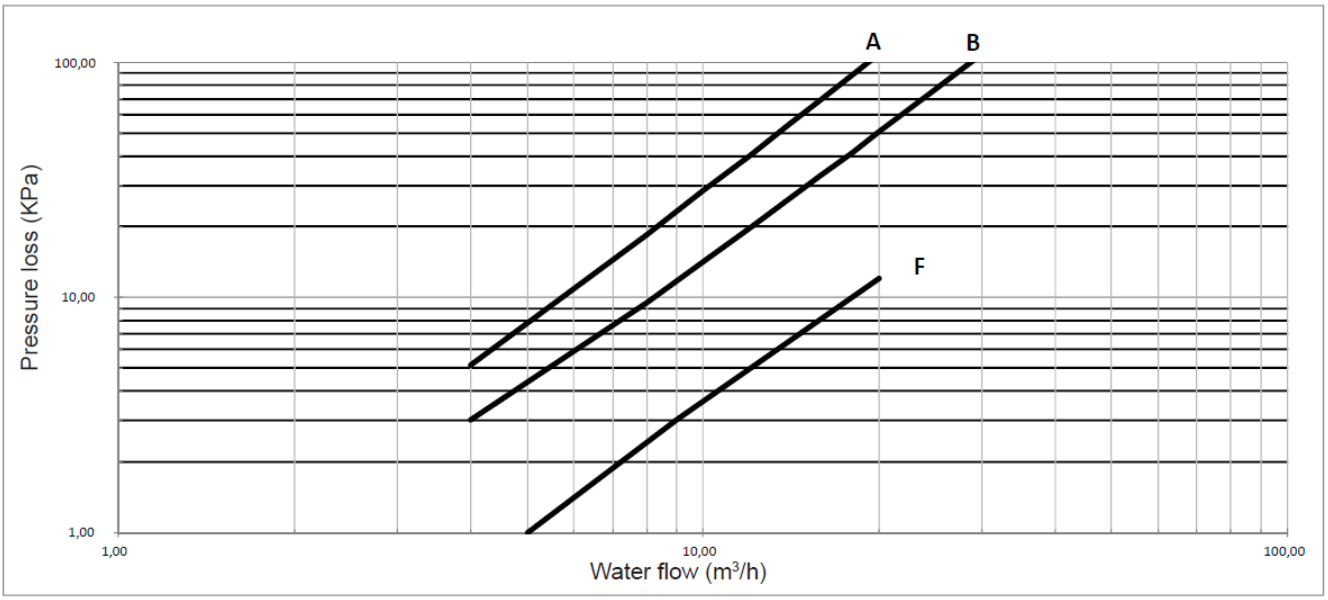
Water filter replacement

It is important that units are serviced regularly by a qualified technician, at least once every year or every 1000 hours of operation.

CAUTION: The water circuit may be pressurised. Observe the usual precautions when depressurising the circuit before opening it. Failure to observe these rules could lead to accidents and cause injury to service personal.



Pressure loss - Plate Heat Exchanger - Water Filter



Unit size	Exchanger Curve	Filter Curve
45	A	F
52	A	F
57	B	F
65	B	F
75	B	F
85	B	F

Heat recovery modules have following interests:

- in winter season and heating mode, the heat in the extract air is exchanged with the fresh air ;
- conversely, in summer season and cooling mode, the heat of the fresh air is transferred to the extract air.

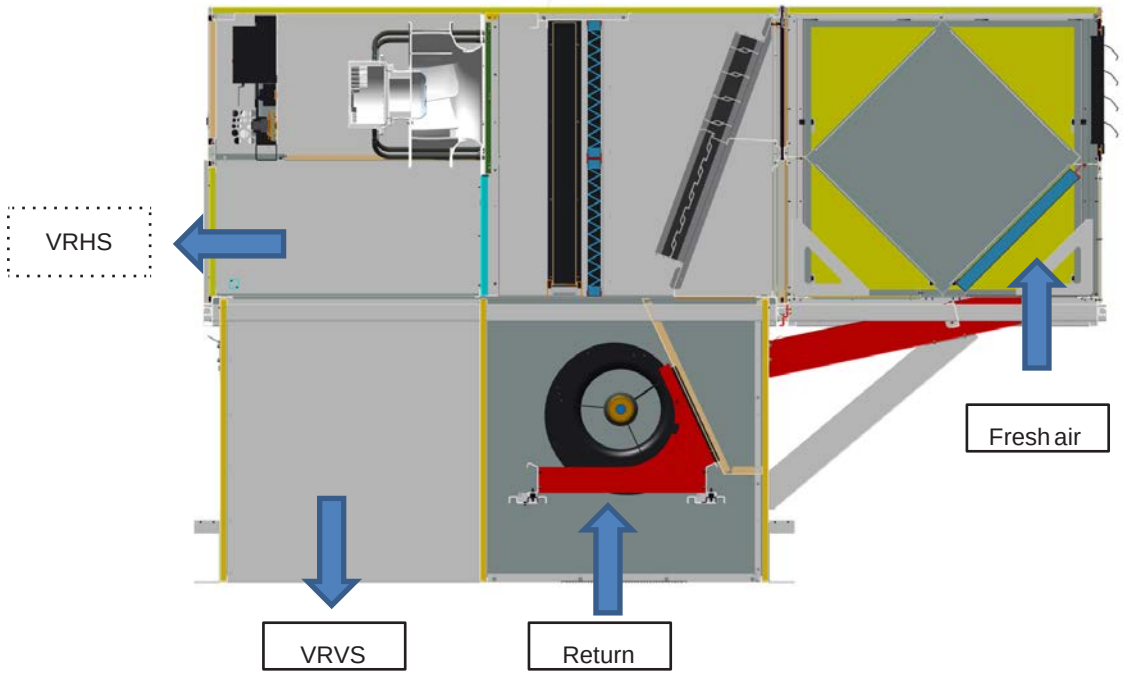
HRMV and HRMH are two plates heat exchanger modules, that differ from each other by their horizontal or vertical configuration.

TRMO is a thermodynamic heat recovery module, included in the machine. Its main interests are:

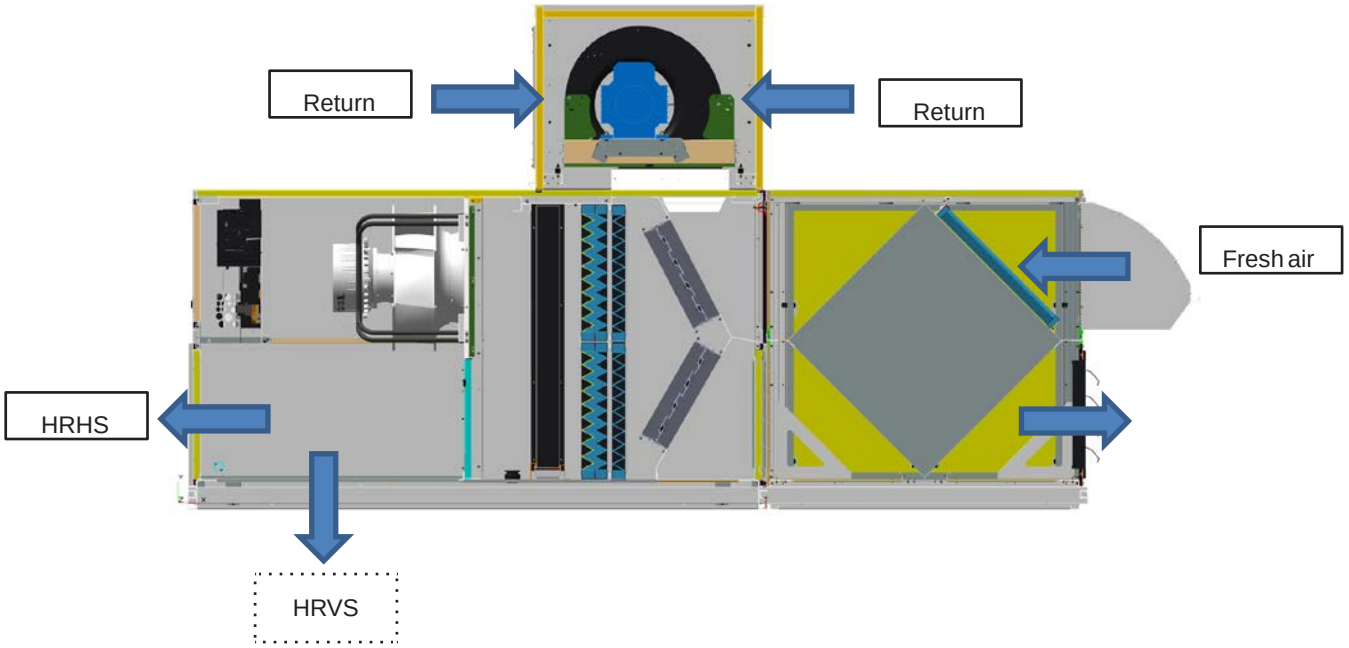
- a variable fresh air rate from 25 to 100%,
- a high COP in winter when pre-heating the fresh air due to a favorable evaporating temperature, especially with high air flow rate;
- a high EER in summer when pre-cooling the fresh air due to a favorable condensing temperature, especially with high air flow rate.

For those reasons, TRMO will be more suitable than HRMV/HRMH in areas where the difference between indoor temperature and outdoor temperature is low. For example, in Mediterranean areas, where winter temperatures are not very cold or summer temperatures are not very high.

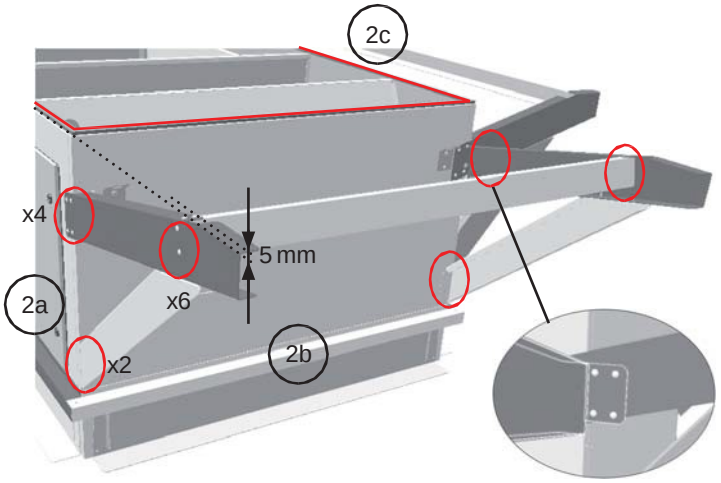
VERTICAL FLOW EXHAUST ROOFCURB + VERTICAL HEAT RECOVERY MODULE



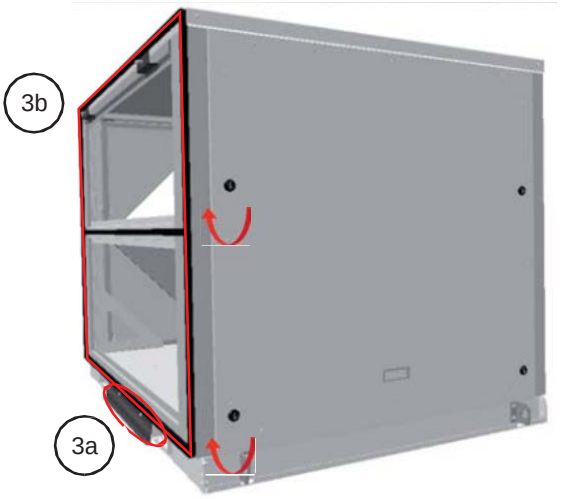
HORIZONTAL EXTRACTION BOX + HORIZONTAL HEAT RECOVERY MODULE



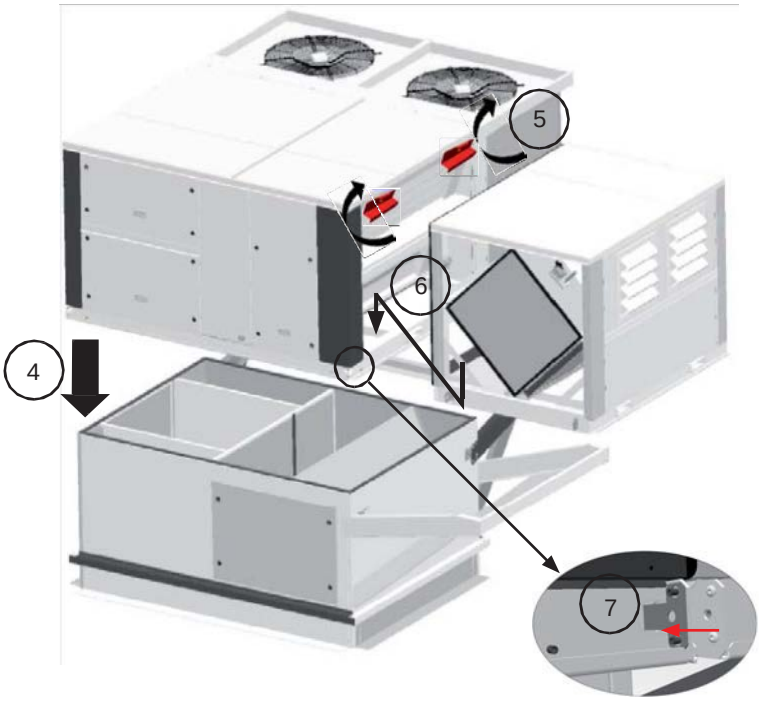
VRHS	Vertical return - Horizontal supply
VRVS	Vertical return - Vertical supply
HRHS	Horizontal return - Horizontal supply
HRVS	Horizontal return - Vertical supply



1. Install the flowcurb according to previous section.
2. Before installing the rooftop:
   a. Fix the brackets (5 pieces) on the curb by 24 screws (6x16 mm);
   b. ADJUST the position of the attachment bracket so that it is 5 mm above the support surface (without the foam);
   c. Install the foam (25x10 mm) on the upper part of the flowcurb.

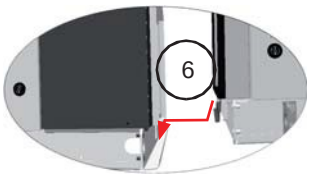


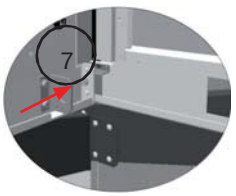
3. a. Fix the lower mounting bar of the heat recovery module using 4 screws (6x16 mm) and remove the side doors;
   b. Make sure that the foam is not damaged (20x15 mm).
4. Install the rooftop and remove the lifting covers.



5. Place the two upper mounting bars through the two top slots.
6. Install the heat recovery module on the bracket by taking care to position properly the lower mounting bar.

Don't forget to remove the lifting covers from the module.



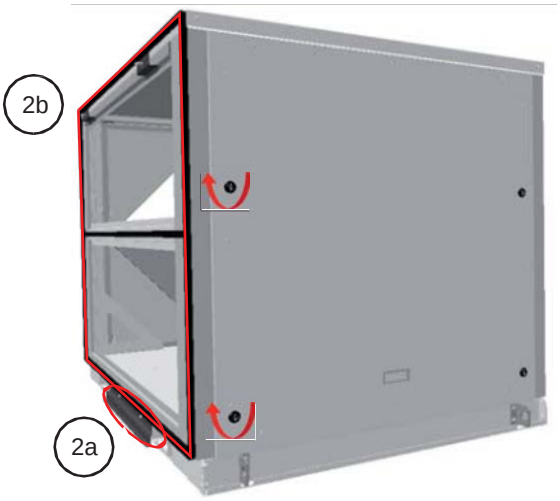


Detail A

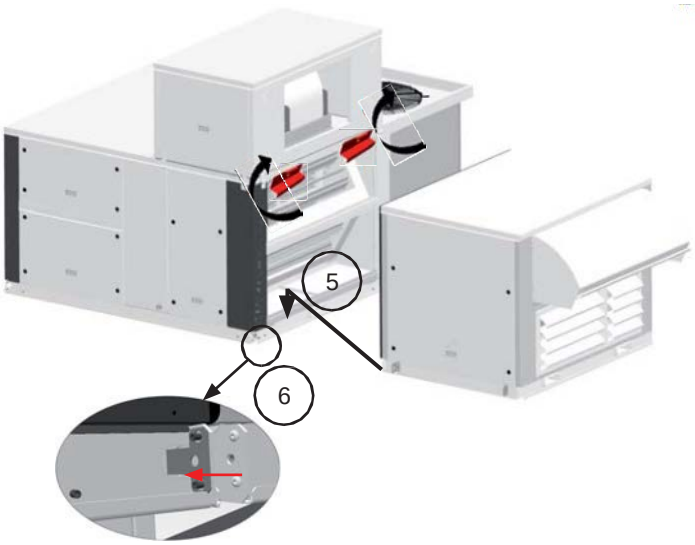
7. Slide the 'T' plate into the lifting lug and place the bolt through it. On the opposite side, place also the bolt (detail A).

Detail B

8. Finally tighten the heat recovery module with the 4 bolts 8x60mm to compress the foam (2 bolts on the upper mounting bars (detail B) and the 2 bolts placed in step 7).

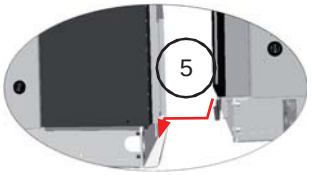


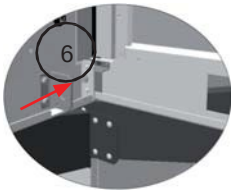
1. Make sure that the support surface enables to install the rooftop and the heat recovery module perfectly horizontal.
2. a. Fix the lower mounting bar of the heat recovery module using 4 screws (6x16 mm) and remove the side doors;
   b. Make sure that the foam is not damaged (20x15 mm).
3. Install the rooftop and remove the lifting covers.
4. Place the two upper mounting bars through the two top slots.



5. Install the heat recovery module by taking care to position properly the lower mounting bar.

Don't forget to remove the lifting covers from the module.





Detail A

6. Slide the 'T' plate into the lifting lug and place the bolt through it. On the opposite side, place also the bolt (detail A).

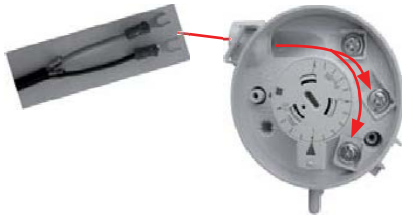
Detail B

7. Finally tighten the heat recovery module with the 4 bolts 8x60mm to compress the foam (2 bolts on the upper mounting bars (detail B) and the 2 bolts placed in step 6).

PLATE HEAT ELECTRICAL CONNECTIONS

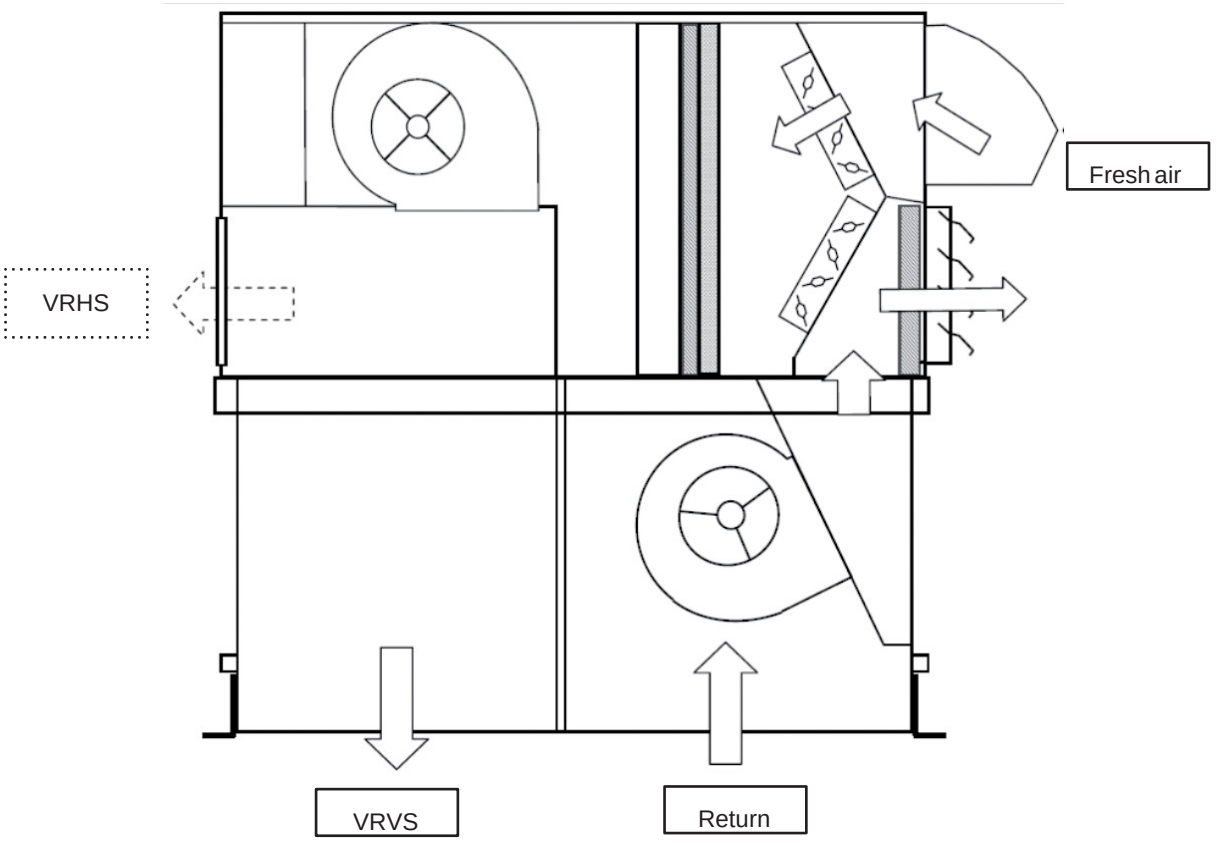
Two components have to be connected in the space between the plate heat exchanger and the economizer:

- For the air pressostat, connect and tighten the 2 spade-tips on terminal 1 and 3 (no polarity) :

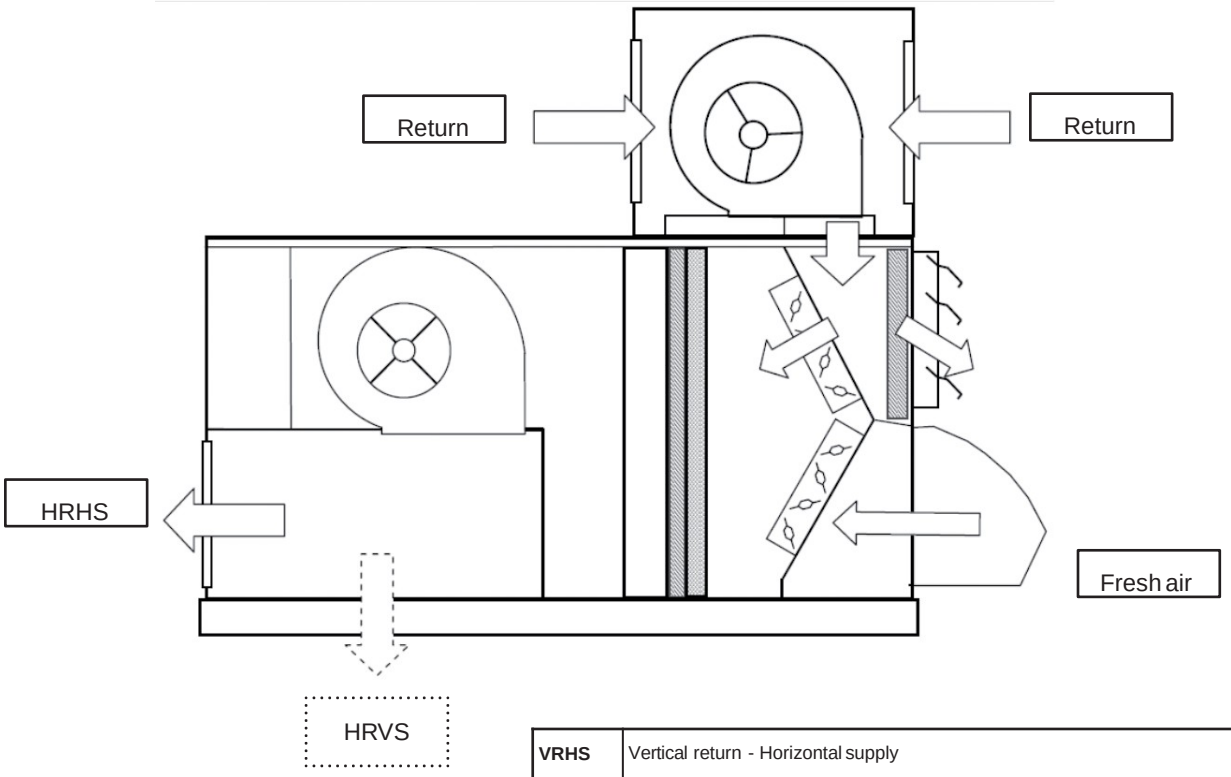


- For the actuator, assembly the two parts of the connector:

VERTICAL FLOW EXHAUST ROOFCURB + THERMODYNAMIC HEAT RECOVERY MODULE



HORIZONTAL EXTRACTION BOX + THERMODYNAMIC HEAT RECOVERY MODULE



VRHS	Vertical return - Horizontal supply
VRVS	Vertical return - Vertical supply
HRHS	Horizontal return - Horizontal supply
HRVS	Horizontal return - Vertical supply

1. REFRIGERATION CIRCUIT

Frigorific components access:
Compressor is located in the fix condenser part. Its access for electrical checking and pressure taps (HP and LP) is made through the screwed access door behind the hinged coil.

4-way valve, thermostatic expansion valve, dryer, and sensors are located on the e-Drive™ supply compartment.

Electrical components:
- For D and E-box, specific TRMO components are located in the electrical box.
- For C-box, specific TRMO components are located on the back of the electrical box, and can be accessible from the supply e-Drive™ compartment.

2. COMMISSIONING

Electrical connections:
- All wire connections are factory made.

Starting up:
- CLIMATIC™ configuration:
  - Power the unit
  - Check the configuration of the CLIMATIC™ with the DS in expert mode.
- Flow rate settings:
  Make sure that both supply and exhaust air flow are balanced. See section EBHO or ERVF. Balancing is correctly set if:
  - with Test = '**B.Nom 100%**': at 100% fresh air, set the exhaust Flow 3864 = supply flow 3333;
  - then switch Test = '**B.Nom 0%**':
    1. reduce coefficient 3866 until the louvers are closed;
    2. then if the flow (supply and exhaust) is far from the previous flow settings, set coefficient 3335;
    3. finally, repeat step 1 and 2 to obtain a constant flow whatever the fresh air mode.
  - same settings have to be realized for reduced flow - 3334 and 3865.

WARNING! During the settings, wait until the economizer is fully closed or opened, since it takes 1-2 minutes to switch.

- Start the TRMO circuit (circuit 3): switch Test=**'C3--Cool'**
  - check the sense of rotation of the circuit 3 compressor;
  - check frigorific values (HP, LP, overheating and subcooling).
- Repeat the last operations with Test=**'C3--Heat'**

3. SERVICE DIAGNOSTIC

Refrigeration

Fault	Possible causes and symptoms	Solution
Low LP and LP cut out	Alarm 317: main frigorific issue	Lack of charge, obstructed components
	Alarm 327: too low LP	Freezing: wait that coil is defrosted by exhaust air; Air flow too low on evaporating side (too low speed rate / fouled filter or coil).
HP problem and HP cut out	Incorrect airflow rates	Check fan (exhaust or supply) function of the mode (Amps) and also filter.
	Refrigerant charge too high	Check the refrigerant charge load according to the refrigerant load table.
See also frigorific diagnostic of BALTIC™ section 'Refrigeration'.		

Indoor or exhaust fan blower:
For both indoor supply fan and exhaust fan, same faults, causes and solutions are expected. See diagnostic of 'Indoor fan blower'.

1. CONFIGURATION

Configuration of CLIMATIC™ with the DS in expert mode for TRMO (with a modulating exhaust fan):

3813 RECOV. = Comp. for TRMO
3815 EXHAUST = Modulate for both ERVF & EBHO
3816 KIT
3817 Motor
3818 Fan
} to be checked function of your need

2. USE

Protection:

- Operating envelop Protection: compressor stopped during 6 minutes.
  - **328**: min HP = 20.5°C condensation;
  - **329**: max HP = 62°C condensation;
  - **319**: min LP = between -24.5°C and 1.6°C (function of the condensation temperature) during 5 min => freezing or air flow on evaporator issue;
  - **327**: max LP = 26°C.
  - **317**: limit LP -27°C during 120 sec => frigorific failure (lack of refrigerant /closed components)
- Anti freezing Protection consist in defrosting the exhaust coil in heating mode with the extract air.

Control

- No specific parameters have to be set for TRMO control.
- Operation:
  - TRMO runs if there is heating or cooling needs;
  - above 50% fresh air, TRMO compressor has priority to start;
  - under 15°C return or under 20% fresh air, TRMO compressor is not authorized to start.

BALTIC

SERVICE MANUAL

The components are located inside the units or in a separate box and must be installed by a qualified engineer.
Note: In case of plate heat exchangers it is mandatory that a filter is installed at exchanger unit entrance.

These filters must remove all particles with a diameter greater than 1 mm.

OPERATING LIMITS

Prior to any operation, please checks the operation limits of the unit These tables will give you all necessary information concerning the operating envelop of the unit.

WARNING: It is very important ensure the units operate well inside these envelopes.

Air Cooled Baltic™

	Size	24	30	38	42	45	52	57	65	75	85
Cooling Mode Operating Limits											
Max. outdoor temp. at indoor 27°C DB/ 19°C WB	°C	48	46	46	45	48	46	46	46	48	48
Max outdoor temp with unloading	°C	no	50	50	50	no	50	50	50	50	50
Min. outdoor temp. at indoor 20°C DB	°C	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Max. entering indoor coil temp. at outdoor 38°C DB	°C	35	35	35	35	35	35	35	35	35	35
Min. entering indoor coil temp. at outdoor 35°C DB	°C	18	18	18	18	18	18	18	18	18	18
Heat Pump Mode Operating Limits											
Min. outdoor temp. at indoor 20°C DB (8)	°C	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
Min. entering indoor coil temp. at outdoor 7°C DB	°C	5	5	5	5	5	5	5	5	5	5

Water Cooled Baltic™

		45	52	57	65	75	85
Cooling Mode Operating Limits							
Max. inlet water temp at indoor 27°C DB/ 19°C WB	°C	46	46	46	46	46	46
Max. inlet water temp with unloading	°C	48	48	48	48	48	48
Min. inlet water temp. at indoor 20°C DB	°C	25	25	25	25	25	25
Max. inlet water temp 100% fresh air at outdoor 35°C	°C	38	38	38	38	38	38
Heat Pump Mode Operating Limits							
Min. inlet glycoled water temp. at indoor 20°C DB	°C	-15	-15	-15	-15	-15	-15
Min outdoor temp with unloading	°C	-17	-17	-17	-17	-17	-17
Min. entering indoor coil temp. at outdoor 7°C DB	°C	7	7	7	7	7	7

WARNING: commissioning must only be carried out by trained refrigeration engineers whom qualification certificates are compliant with the local regulation

Before turning on the power

WARNING: ensure that the power supply includes 3 phases with no neutral

Ensure that the power supply between the building and the unit meets local authority standards and that the cable specification satisfies the start-up and operating conditions displayed on the name plate.

Wire connection tightness checks

WARNING: check the wire connection tightness

Check the following wire connections for tightness:
- Main switch connections,
- Mains wires linked to the contactors and circuit breakers
- Cables in the 24V control supply circuit.

WATER LOOP CHECK LIST BEFORE START-UP

Check that all drain and purge plugs are in place and well tightened prior to fill the installation with water or brine. Before proceeding with start-up, even for a test of short duration, check the following points, after having made sure that all the valves on the refrigeration circuit are fully open (discharge valves and liquid valves).

- The liquid pump(s) and other apparatus interlocked with the unit (coils, air handling units, dry coolers, cooling towers, terminals such as fan coil units, etc.) are in working order as required by the installation and according to their own specific requirements. Place all water valves and refrigerant valves in their operating positions and start the water circulating pumps.
- the condenser water circuit must be ready to operate, filled with water, pressure tested, bled, filter cleaned after 2 hours of operation of the water pump.
- start the pump(s) check the flow of liquid to be cooled through the heat exchangers: note the inlet and outlet water pressures, and, using the pressure drop curves, calculate liquid flow by applying the following formula:

$$\text{Actual flow}$$
$$Q = Q1 \times \sqrt{(P2/P1)}$$

Where
P2 = pressure drop measured on site
P1 = pressure drop published by LENNOX for a liquid fl ow of Q1
Q1 = nominal flow
Q = real flow

Adjust the condenser circuit water flows (via regulating valves, pump speed position..) to come close to the designed conditions (LENNOX software).

OIL CHARGE

All units are delivered with a complete oil charge, and there is no need to add any oil before start up or afterwards. Overcharging with oil can cause serious problems on an installation, particularly for the compressors.

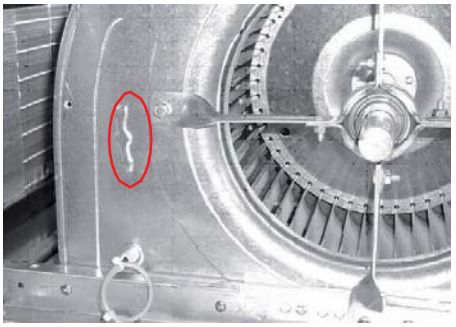
Oil Recommendation for LENNOX Roof Tops			
Refrigerant	**Compressor type**	**Brand**	**Oil Type**
R410a	Scroll	Lennox	ICI EMKARATE RL32-3MAF or for refill MOBIL EAL Arctic22CC

Powering the unit

Power up the unit by closing the isolator switch (if fitted).
At this point the blower should start unless the CLIMATIC™ does not energise the contactor. Once the fan is running, check the rotation direction. Refer to the rotation arrow located on the fan.
The fans and compressors direction of rotation is checked during the end of line test. They should therefore all turn in either the right or wrong direction.

WARNING: a compressor rotating in the wrong direction will fail shortly.

If the fan turns in the wrong direction (the right direction is shown below), disconnect the main power supply to the machine at the building's mains switch, reverse two phases and repeat the above procedure.
Close all circuit breakers and power up the unit.
If now only one of the components rotates in the wrong direction, disconnect the power supply at the machine's isolator switch (if fitted) and reverse two of the component's phases on the terminal within the electrical panel.
Check the current drawn against the rated values, in particular on the supply fan.
If the readings on the fan are outside the specified limits, this usually indicates excessive air flow which will affect the life expectancy. In this case reduce rpm using eDrive™.



While starting the unit, fill in the check list sheet of this manual to be sure that the unit correctly installed and ready to operate.

- Check the current values per phase on each fan motor.
- Check the current values per phase on each compressor motor.
- Check suction and discharge pressures and compressor suction temperature.
- Check chilled liquid entering and leaving temperatures if water cooled unit
- Check outdoor air temperature and indoor temperature
- Check liquid refrigerant temperature at the condenser outlet.
- Check if DAD is ON.

These verifications should be made as quickly as possible with a stable cooling load, i.e. the cooling load of the installation should be the same as the capacity developed by the unit. Measurements taken without heeding this condition will result in unusable and probably wrong values.
These verifications can only be made once the proper operation of all safety devices and unit controls has been established.

Check if the customer's air ducts are open to be sure the unit is not running with ducts closed. In addition it is needed to check if the airflow and available static pressure are in accordance with the unit.

CLIMATIC™ configuration

Settings

1. Supply Air-flow adjustement (depending on customer requirements)

a. 3333 = nominal air flow / pressure
b. 3334 = reduced air flow / pressure
c. 3332 = Manual/Automatic
d. 3331 = Nominal/DeadZone/PartLoad/Pressure

2. Exhaust Air-flow adjustement (optional)

a. 3864 = nominal air flow
b. 3865 = reduced air flow

3. Scheduling (depending on customer requirements)

a. Zones & Modes (Night/Day/Day I/ DayII)
b. Setpoints per mode

4. Regulation temperature probe selection

a. Select the regulation probe (DC, Return, Customer, etc.) in the Room Temp. Config screen

5. Regulation humidity sensor selection (optional)

a. Select the regulation sensor (Remote, Customer) in the Room Hum. Config screen

6. Outside temperature probe selection

a. Select the outdoor temp probe (Unit, Customer) in the Outside Temp. Config screen

7. Outside humidity sensor selection (optional)

a. Select the outdoor hum sensor (Unit, Customer) in the Outside Hum. Config screen

8. Air quality sensor selection (optional)

a. Select the air quality CO2 sensor (Remote, Customer) in the CO2 Config screen

9. Remote display configuration

a. 3151 = DC simple / DC full / DM

10. Minimum fresh air

a. 3121 = minimum opening %

Check:

1. Air-flow Vs Damper

a. Test B.Nom100% :
- i. adjust the blower speed % (3333) to get the required air-flow
- ii. adjust the exhaust speed % (3864) to get the required air-flow

b. Test B.Nom0%:
- i. adjust the damper compensation (3335) to maintain the required air-flow even with damper fully closed
- ii. adjust the damper compensation (3366) to maintain the required air-flow even with damper fully closed

2. Filter safety thresholds

a. Test B.Nom100% and Test B.Nom0% : read filter ΔP (3442) and adjust the bigger measure multiplied by 2.5 at threshold 3345

3. Frigorific circuit tests

a. Cooling mode
- i. Test C---Cool: (if variable speed compressor option, set speed value)
  1. Check circuit pressures and temperatures
  2. Check electrical consumptions

b. Heating mode
- i. Test C---Heat: (if variable speed compressor option, set speed value)
  1. Check circuit pressures and temperatures
  2. Check electrical consumptions

4. Unit option tests

a. Electrical Auxiliary heaters (Test H1-1 Full)
- i. Check supply temperature
- ii. Check electrical consumption

b. Hot Water Auxiliary heaters (Test H1-1 Full)
- i. Check supply temperature ii. Check valve opening

c. Gas burner heaters (Test H1-1 Full)
- i. Refer to gas burner chapter

d. Electrical Fresh-air pre-heaters (Test H2-1 Full)
- i. Check supply temperature
- ii. Check electrical consumption

e. Hot water eRecovery heaters (Test H2-1 Full)
- i. Check supply temperature ii. Check valve opening

f. TRMO
- i. Test C3---Cool:
  1. Check circuit pressures and temperatures
  2. Check electrical consumptions
- ii. Test C3---Heat:
  1. Check circuit pressures and temperatures
  2. Check electrical consumptions

WARNING! During the settings, wait until the economizer is fully closed or opened, since it takes 1-2 minutes to switch.

5. Advanced regulation optimization

a. Compressor ΔT
- i. Cooling.
  1. Test C1c1 Cool: read │Mix-Supply| temp and adjust compressor stage ΔT at menu 3434
- ii. Heating.
  1. Test C1c1 Heat: read │Mix-Supply| temp and adjust compressor stage ΔT at menu 3444

b. Auxiliary Heaters ΔT (Gas burner or electrical)
- i. Heating.
  1. Test H1-1: read │Mix-Supply| temp and adjust heaters stage ΔT at menu 3734

c. Staging sequence (compressor/electrical/water/burners)
- i. Aux Heaters Priority 3731= Never/ Always /OutTemp
- ii. Pre Heaters Priority 3736= First/Last

d. Dynamic setpoint
- i. 3225= ΔT between customer set point and outdoor temperature

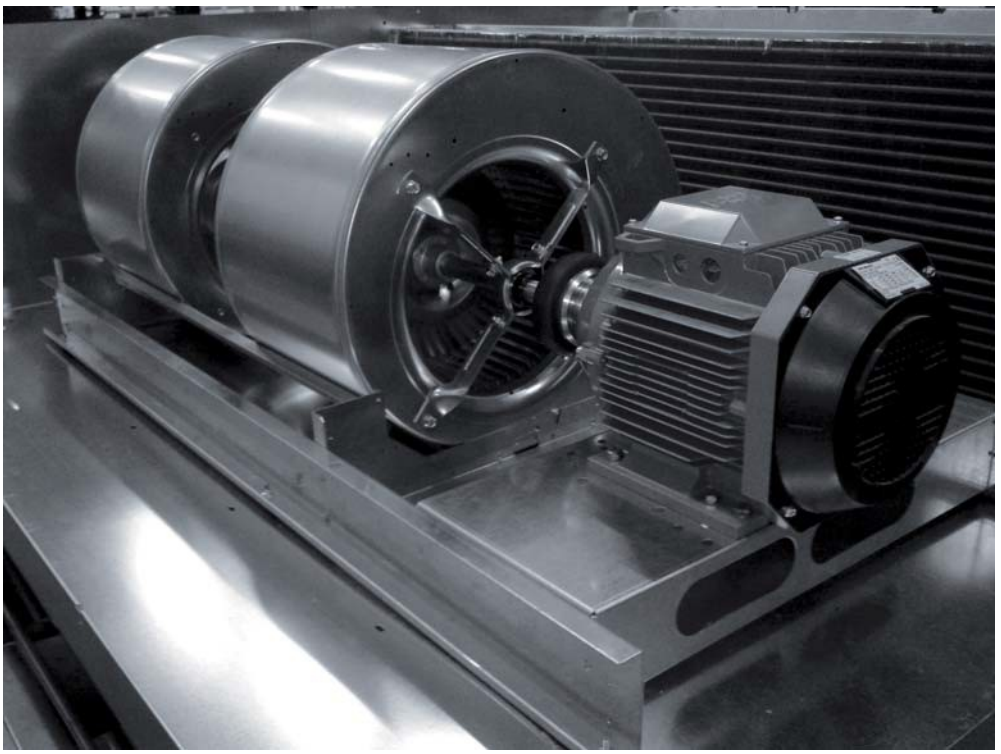
e. Fine temperature control
- i. Smooth 3231= No/ DeadZone/Comfort

6. Leak Detection

a. Cooling
- i. Test C1--Cool: read Subcooling and adjust 3437
- ii. Test C2--Cool: read Subcooling and adjust 3438

b. Heating
- i. Test C1--Heat: read Subcooling and adjust 3447
- ii. Test C2--Heat: read Subcooling and adjust 3448

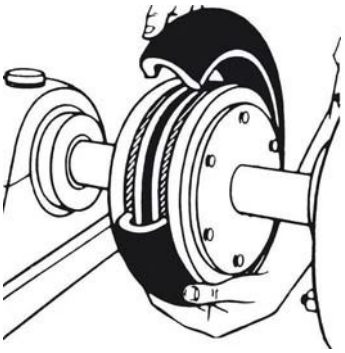
Once all the settings have been adjusted, the list of parameters must be downloaded (Wizard tool), stored and signed by the customer.

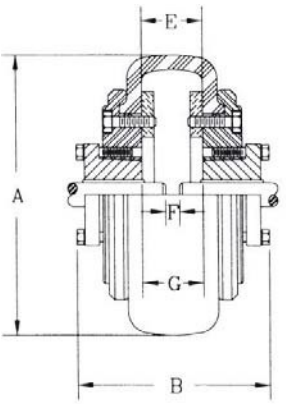


eDrive™ assembly instructions & specification (AC version)

The flexible elastomeric tire is removable without removing the plates The material is natural rubber
Temperature range from -42°C to + 82°C

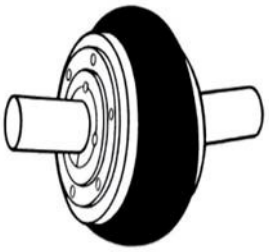
Easy to assemble



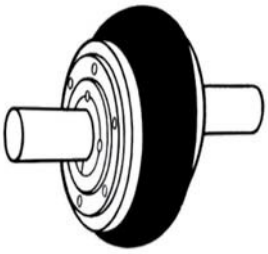


eDrive™ mounting (AC version)

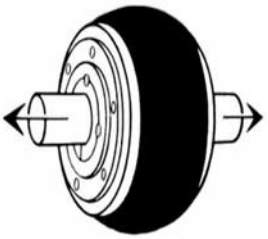
eDrive™ assembly is designed to have no adjustment to be made inside the machine
In case of vertical misalignment one could use metallic washer located under the motor to adjust height



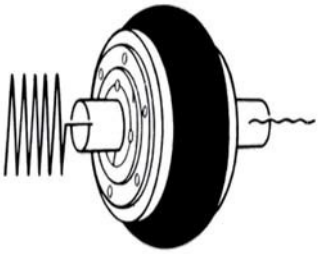
Max angular misalignment 4°



Max radial misalignment 3mm



Max axial range 8 mm



Vibration absorbtion

eDrive™ coupling dimensions (AC version)

				Coupling			
Machine size	Motor size kW	Motor shaft diameter mm	Fan shaft diameter mm	Coupling reference	Coupling type PP	Motor moteur bushing ref	Fan taper Ref
C box	1,5	24	25	PV40	2 x Taper lock bushing	28-20 al24	28-20 al25
C box	2,2	28	25	PV40	2 x Taper lock bushing	28-20 al28	28-20 al25
C box	3	28	25	PV40	2 x Taper lock bushing	28-20 al28	28-20 al25
C box	4	28	25	PV40	2 x Taper lock bushing	28-20 al28	28-20 al25
C box	5,5	38	25	PV60	2 x Taper lock bushing	40-25 a38	40-25 al25
D box	2,2	28	30	PV50	1 Taper lock bushing + D30	30-25 al28	30-25 al30
D box	3	28	30	PV50	1 Taper lock bushing + D30	30-25 al28	30-25 al30
D box	4	28	30	PV50	1 Taper lock bushing + D30	30-25 al28	30-25 al30
D&E box	5,5 to 7,5	38	30	PVP50	1 Taper lock bushing + D38		30-25 al30
E box	9 to 11	38	40	PV 60	2 x Taper lock bushing	40-25 al 38	40-25 al 40

eDrive™ airflow reading

eDrive is controling the airflow within the operating range of each kit.
For AC fans airflow rate calculation inputs are rpm and power absorbed output read on the inverter variable bus, while on EC fans it's based on supply pressure reading.

eDrive™ is protecting the fan & motor against over-speed & over-amps (AC version)

eDrive™ is designed to keep motor and fan in its available operating range thanks to the kit configuration selected in CLIMATIC™ control. The CLIMATIC™ control is limiting rpm & absorbed power. The table below shows the operating ranges per box and kit size.

eDrive™ unit operating ranges (AC version)

Box	Fan type	Motor kW	Efficiency	Kit	Comment	rpm min	rpm max	Qv min	Qv max	Imax
C Box BAH BAC	AT 15-11 S	1,5	0,80	K1		553	962	3600	4800	3,6
	AT 15-11 S	2	0,83	K2		610	1170	3750	6000	4,9
	AT 15-11 S	3	0,85	K3		697	1330	4500	7050	6,6
	AT 15-11 S	4	0,85	K4		78	1371	5550	8250	8,4
	AT 15-11 S	5,5	0,87	K5		882	1417	7200	8400	12,2
D Box BAH BAC	ADH 355 L	2,2	0,83	K1		581	939	5500	6900	4,9
	ADH 355 L	3	0,85	K2		660	1208	5500	8300	6,6
	ADH 355 L	4	0,85	K3		738	1396	6100	9700	8,4
	ADH 355 L	5,5	0,87	K4		823	1439	7100	11500	12,2
	ADH 355 L	7,5	0,88	K5		938	1501	9500	13100	16,3
E Box BAH BAC	AT 15-11 G2L	5,5	0,87	K1	Fan shaft D30	648	1302	10000	13500	12,2
	AT 15-11 G2L	7,5	0,88	K2	Fan shaft D30	774	1385	10000	16000	16,3
	AT 15-11 G2L	9	0,88	K3	Fan shaft D40	880	1378	10000	17750	17,6
	AT 15-11 G2L	9	0,88	K4	Fan shaft D30	880	1417	10000	19000	17,6
	AT 15-11 G2L	11	0,89	K5	Fan shaft D40	911	1417	10000	19000	23

Gas unit eDrive™ operating ranges (AC version)

Box	Fan type	Motor kW	Efficiency	Kit	Comment	rpm min	rpm max	Qv min	Qv max	Imax
C Box BAH BAC	AT 15-11 S	1,5	0,80	K1		592	949	3600	4650	3,6
	AT 15-11 S	2	0,83	K2		690	1155	3750	5700	4,9
	AT 15-11 S	3	0,85	K3		788	1386	4500	6900	6,6
	AT 15-11 S	4	0,85	K4		907	1449	5400	7950	8,4
	AT 15-11 S	5,5	0,87	K5		1015	1533	6750	8400	12,2
D Box BAH BAC	ADH 355 L	2,2	0,83	K1	ADHE 355	651	929	5500	6500	4,9
	ADH 355 L	3	0,85	K2	ADHE 355	727	1206	5500	7900	6,6
	ADH 355 L	4	0,85	K3	ADHE 355	826	1409	6100	9300	8,4
	ADH 355 L	5,5	0,87	K4	ADHE 355	930	1499	7100	11100	12,2
	ADH 355 L	7,5	0,88	K5	ADHE 355	1070	1578	8700	13100	16,3
E Box BAH BAC	AT 15-11 G2L	5,5	0,87	K1	Axe D30	760	1310	10000	13000	12,2
	AT 15-11 G2L	7,5	0,88	K2	Axe D30	898	1431	10000	15250	16,3
	AT 15-11 G2L	9	0,88	K3	Axe D30	994	1476	10000	17250	17,6
	AT 15-11 G2L	9	0,88	K4	Axe D30	994	1476	10000	17250	17,6
	AT 15-11 G2L	11	0,89	K5	Axe D30	1072	1525	10000	19000	23

eDrive™ fan inverter configuration (AC version)

eDrive™ Inverter configuration is prepared in the factory to communicate with CLIMATIC™ & to be configured specifically for the customer machine.
eDrive™ Fan inverter parameters are configured via the CLIMATIC™ unit configuration.
This configuration is selecting the proper parameters to run eDrive™ in its operating range depending on fan type & motor size.

If ever, the Inverter loose fan control (No Fan or Wrong fan speed & Compressor or Heating stay on), one may check the Inverter configuration as below:

“0.0” will be displayed in this case on the Inverter instead of the regular “0” or “xxx” rpm
Switch to unlock mode:
F700 = 0
F732 = 0

On Inverter, set the TYP parameter to 3 value. (reinitialize the Inverter to the default values) then configure the following setpoints:

F800=1
F801=0
F802=11
F803=0
Then switch OFF the whole machine & then switch ON.

Then the CLIMATIC™ is going to send all the proper machine configuration to Inverter (motor size, fan type, Imax, safety parameters) .

Installing

The fresh air hood has to be opened and secured during commissioning.
The 3 parts of the fresh air hood have to be assembled thanks to self taping screws delivered in the spare part box
Check the proper position of the black seal on the top of the hood cover.

Wind direction

The prevailing wind has to be taken into account while choosing the machine position on the building roof.
It's highly recommended to avoid putting the fresh air hood in the prevailing wind direction to avoid water ingress risks.
If this is not possible please contact us to require specific water droplet strainer in the hood section.

WARNING: the fresh air hood cover can hurt your head if you don't pay attention while turning around the unit.

Filter replacement

After opening the filter access panel, lift the filter retaining log. The filters can then be removed and replaced easily by sliding the dirty filters out and clean ones in.

The CLIMATIC™ controller can monitor the pressure drop across the filter
The following set points can be adjusted depeding on the installation.

- "Airflow" in page **3343** = 25Pa by default
- "No filter " in page **3344** = 50Pa by default
- "Dirty Filter" in page **3345** = 250Pa by default

The actual pressure drop measured accross the coil can be read on the CLIMATIC™ Display in menu **3342**.

The following faults may be identified

- Fault code **001** AIRFLOW FAILURE, if measured ΔP across the filter and coil is below the value set in page **3343**
- Fault code **004** DIRTY FILTERS, if measured ΔP across the filter and coil is above the value set in page **3344**
- Fault code **005** MISSING FILTERS, if measured ΔP across the filter and coil is below the value set in page **3345.**

Electronic expansion valve

2 electronic valves types are fitted on BALTIC™: E2V & E3V

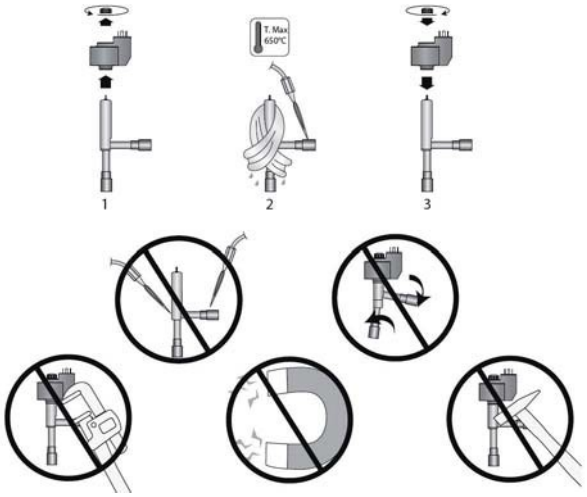
	Cbox				Dbox					Ebox
Model designation	24	30	38	42	45	52	57	65	75	85
Reference	E2V30	E2V30	E2V30	E3V45	E2V30	E2V30	E2V30	E2V30	E2V30	E3V45

EEV adjustments

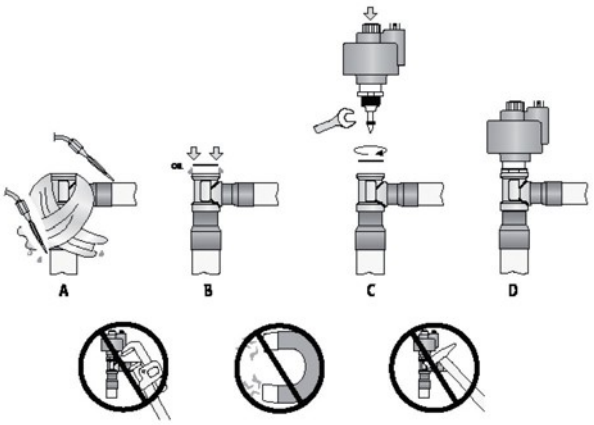
EEV allows the control of superheat in biflow operation (see CLIMATIC™ sections).

E2V welding instructions

Electronic expansion valves are sensitive to dust – strainers must be used in case of replacing.

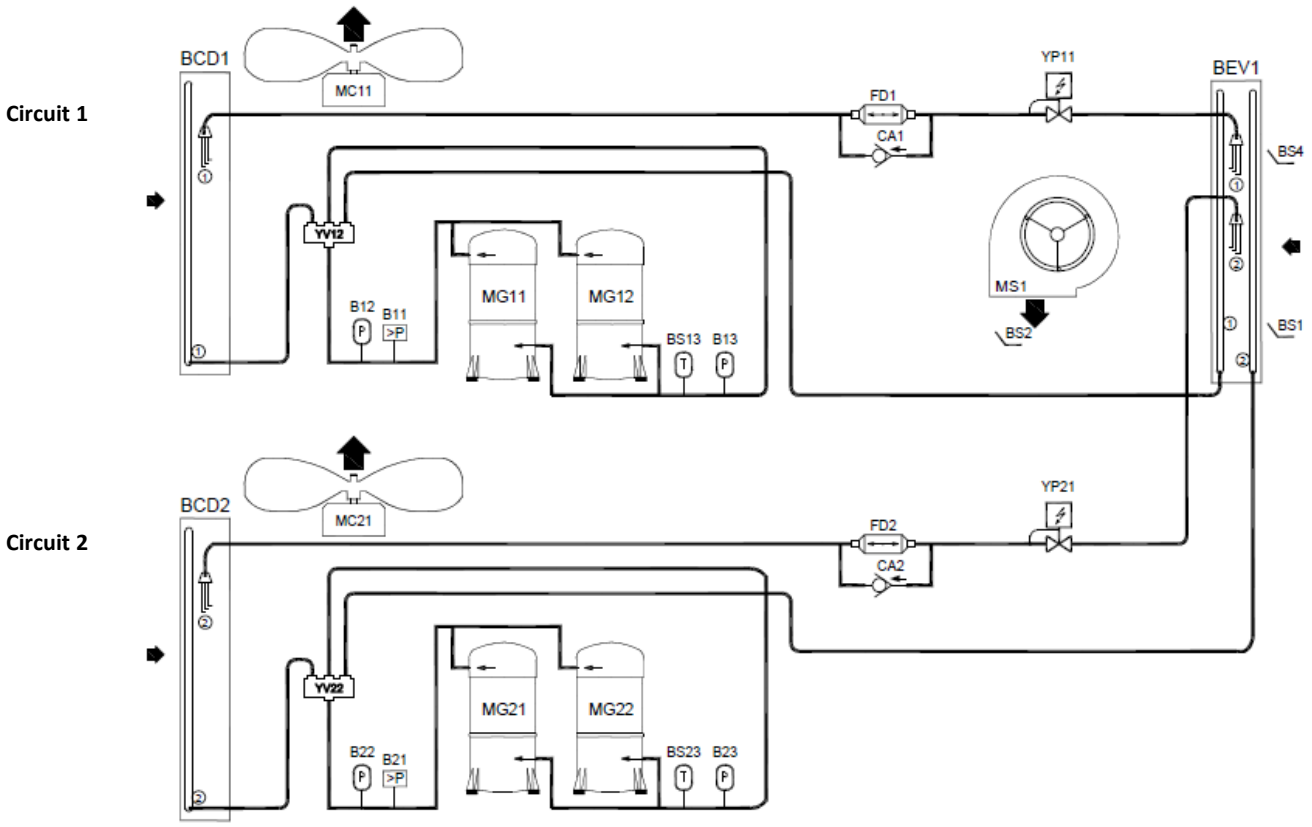


E3V welding instructions



Generic refrigerant sketch

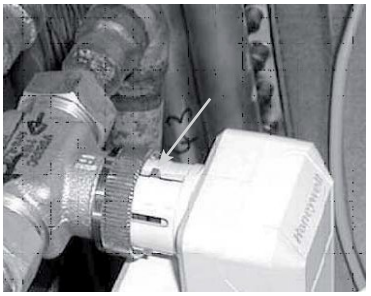
Depending on the unit size or the selected options, the number of circuits and compressors can change.
Some connection valve (Schrader type) are available to load/unload the circuit.



BEV-	Indoor coil
BS-	Temperature sensor
YP-	Expansion valve
CA-	Check valve
FD-	Filter dryer
BCD-	Outdoor coil
B-	Low/High pressure switch
YV-	Cycle reversal valve
MG-	Compressor

Hot water coils

The hot water coil is fitted with a three way proportional valve . Two spanners must be used to tighten the connections. One spanner must maintain the valve body when connecting the pipe-work to the main. Failure to do so may damage the pipes joints and invalidates the warranty.



Filling up and starting the system

- Adjust the control for Heating by reducing the simulated ambient temperature down to 10°C
- Check that the red indicators located under the valve actuator are moving correctly with the signal.(Arrow on the picture)
- Fill the hydraulic system and bleed the coil using the air vents. Check incoming hot water flow rate.
- Check the various connections for possible leaks

Maximum working pressure:	8 Bars
Maximum working temperature:	110 °C

Freeze protection

Check the hydraulic system contains glycol for protection against freezing. Glycol is the only effective protection against freezing. The antifreeze must protect the unit against freezing under winter conditions.

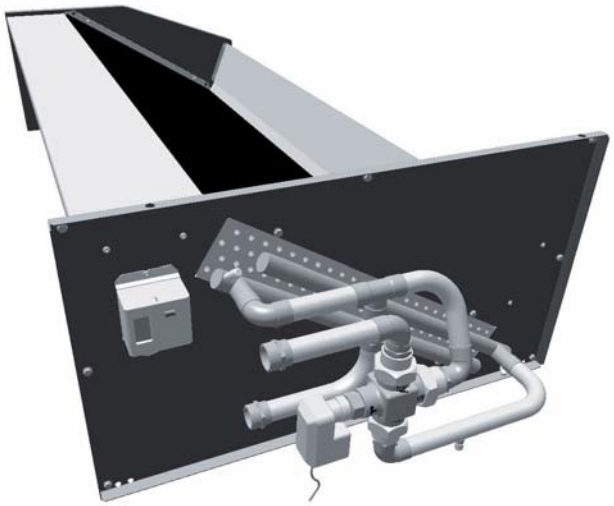
Warning: glycol based fluids may produce corrosive agents when mixed with air.

Drain the installation

You must ensure that the manual or automatic air vents have been installed on all high points in the system. In order to drain the system, check that all the drain valves have been installed on all low points of the system.
Heating hot water coils frozen due to low ambient conditions are not covered by the warranty.

Electrolytic corrosion

Attention is drawn to the corrosion problems resulting from electrolytic reaction created by unbalanced earth connections. Any coil damaged by electrolytic corrosion is not covered by the warranty.

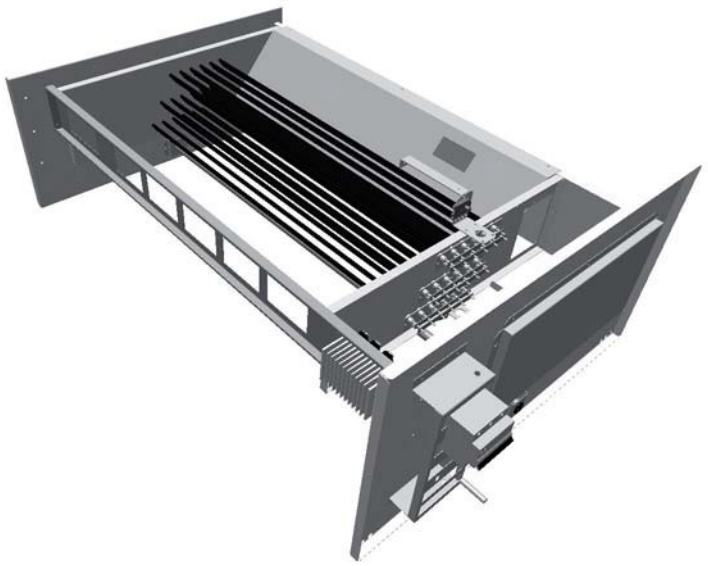


Electric heater

WARNING: electric heater is connected heater to mains power – risk of electrical shock – switch off the unit prior to open this section

The BALTIC™ electric heaters are stand alone options which are fitted in the heating section of the unit. As for the hot water coil or the gas burner this option slides into the heating compartment located under the supply fan.
In order to reduce the pressure drops the airflow is ducted around the shielded resistances. The resistances are made smooth stainless steel tubes with a capacity of 6W/cm^2.
It is protected as standard, against overheat via a high temperature overload protection set at 98°C and located less than 150mm after the heater itself.
There are two sizes available for each size of unit:
S: Standard heat
H: High heat
The standard heat electric heaters are staged control with 50% or 100%. The high heat version is controlled through a fully modulating triac.

	380V		400V		415V	
Module size (kW)	Current (A)	Cap (kW)	Current (A)	Cap (kW)	Current (A)	Cap (kW)
12	16,3	10,8	17,0	11,8	17,8	12,8
24	32,6	21,5	34,0	23,5	35,6	25,6
27	36.7	24.3	38.3	26.6	40.1	28.8
36	48,9	32,3	51,1	35,3	53,3	38,4
45	61.1	40.5	63.8	44.3	66.8	48.0
48	65,2	43,0	68,1	47,0	71,1	51,3
54	73,4	48,4	76,6	52,9	80,0	57,7



Electrical preheater

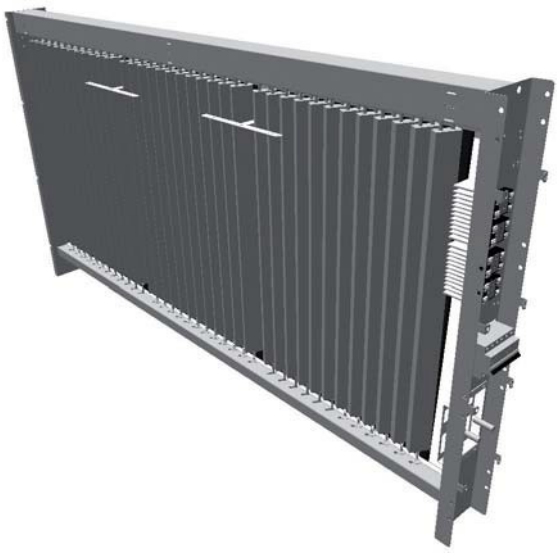
WARNING: electric pre-heater is connected heater to main power – risk of electrical Shock – switch off the unit prior to open this section

Pre-heater is running only with high fresh air rate under low outdoor ambient temperature (see setpoint in CLIMATIC™ section).

A metallic filter is installed between air filter & electrical resistance to protect against heat radiations.

WARNING: electric pre-heater metallic filter must not be plugged by dust

	Amps per model size	C BOX				D BOX				E BOX	
		24	30	38	42	45	52	57	65	75	85
Size S / H	S 18 kW	26	26	26	26						
	S 24 kW					35	35	35	35		
	S 36 kW									52	52
	H 36 kW	52	52	52	52						
	H 48 kW					69	69	69	69		
	H 72 kW									104	104



Preliminary checks before start-up

Note:

Any work on the gas system must be carried out by qualified personnel.
This unit must be installed in accordance with local safety codes and regulations and can only be used in planed installation conditions for outdoor.
Please read carefully the manufacturer's instructions before starting a unit.
Before commissioning a unit with gas burner, it is mandatory to ensure that the gas distribution system (type of gas, available pressure…) is compatible with the adjustment and settings of the unit.
The gas module safety chain must be checked by a professional before start-up of the product.

Check access and clearance around the unit

- make sure one can move freely around the unit.
- a minimum one-meter clearance must be left in front of the burnt gas exhaust flue.
- combustion air inlet and burnt gas exhaust(s) must not be obstructed in any way.

Supply network pipe sizing

Male threaded connection for gas burner: 3/4"

Check that the gas supply line can provide the burners with the pressure and the gas flow rate necessary to provide the heating nominal output.

Number of male threaded connections (3/4")

Unit size	24	30	38	42	45	52	57	65	75	85
S power	1	1	1	1	1	1	1	1	1	1
H power	1	1	1	1	1	1	1	1	2	2

Gas flow - m^3/h (for G20 at 20 mbar and 15°C)

Unit size	24	30	38	42	45	52	57	65	75	85
S power	1,9				3,2				5,7	
H power	4,5				5,7				11,5	

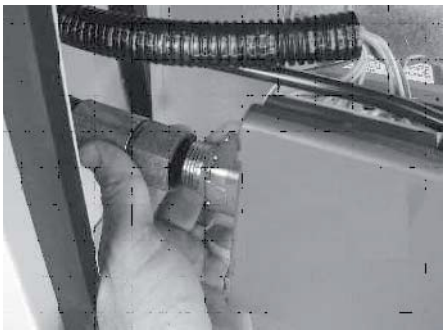
For modulating gas we have just H power for C, D & E-box

- the gas supply of a rooftop gas unit must be realized according to sound engineering practice and the local safety codes and rules.
- in any case the diameter of pipe-work connected to each rooftop must not be smaller than the diameter of the connection on the rooftop unit.
- make sure that a shut-off isolation valve has been installed before each rooftop.
- check the supply voltage to the exit of the power supply's transformer t3 of the burner: it must be between 220 and 240v.

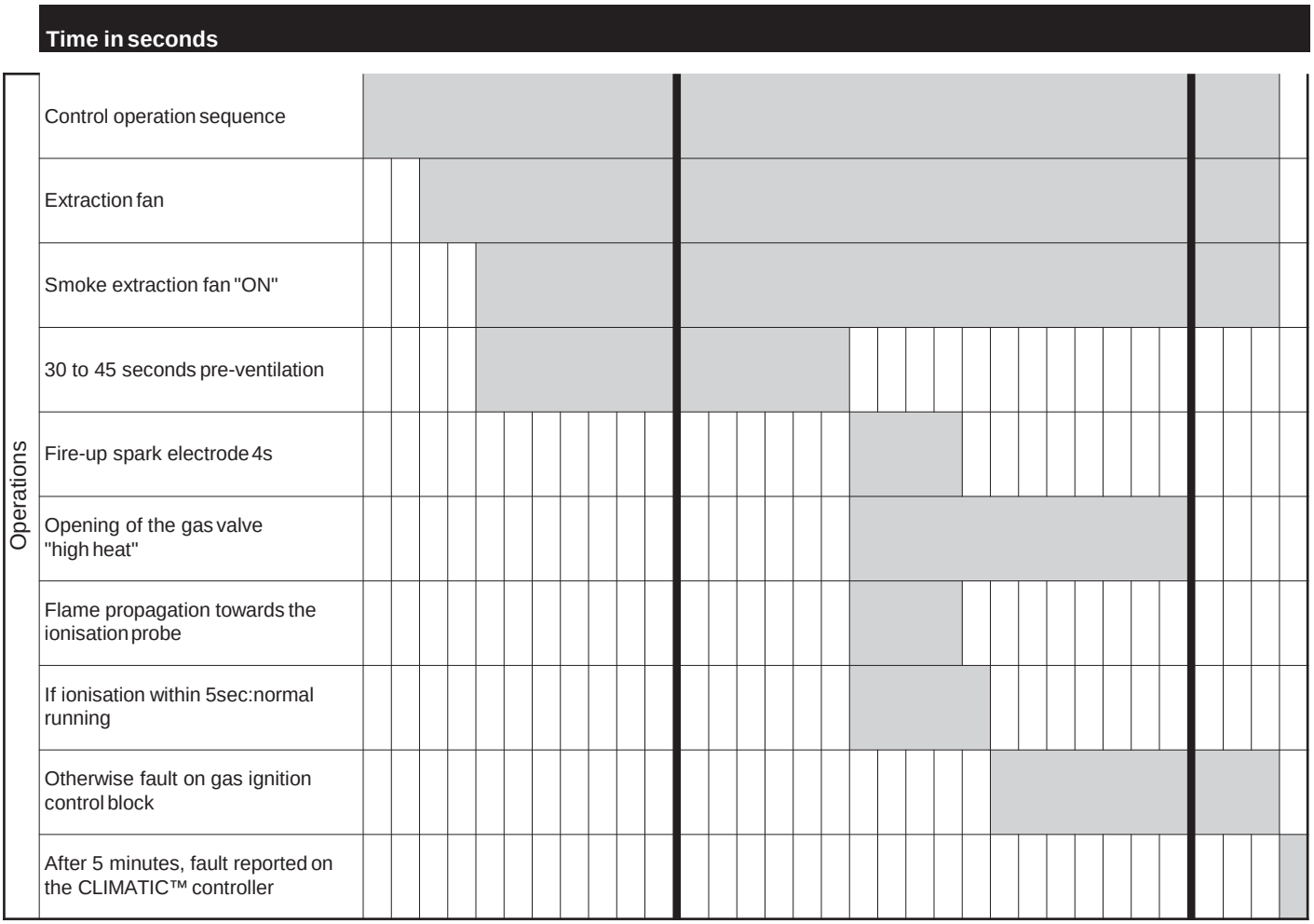
Starting up the gas burner

Purge the pipe-work near the connection on the ignition control valve for a few seconds.

- check that the unit's treatment "fan" blower is running.
- set the control to "on" this will priorities the gas burner.
- increase the set temperature (room set point temperature) to a temperature higher than the actual room temperature.



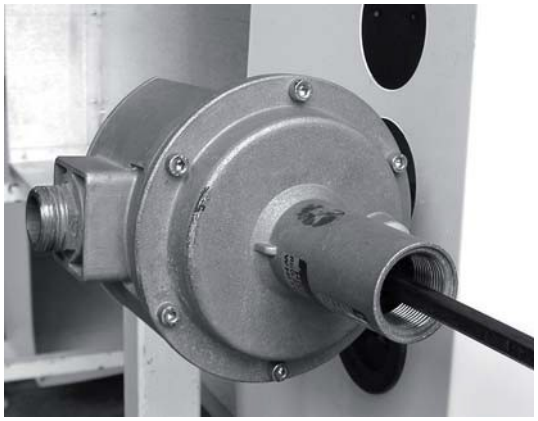
Standard start-up chronology



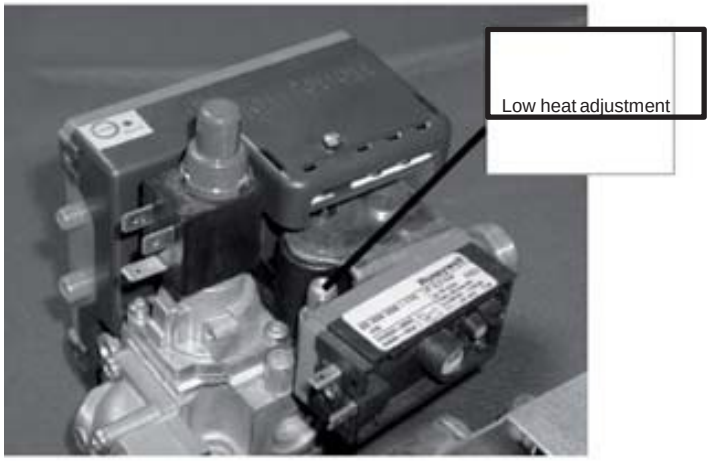
If incorrect sequence, refer to the fault analysis table to identify the problem.

Pressure adjustments on Honeywell pressure regulating valve type vk 4105 g

Pressure regulator adjustment with 300mbar gas supply:



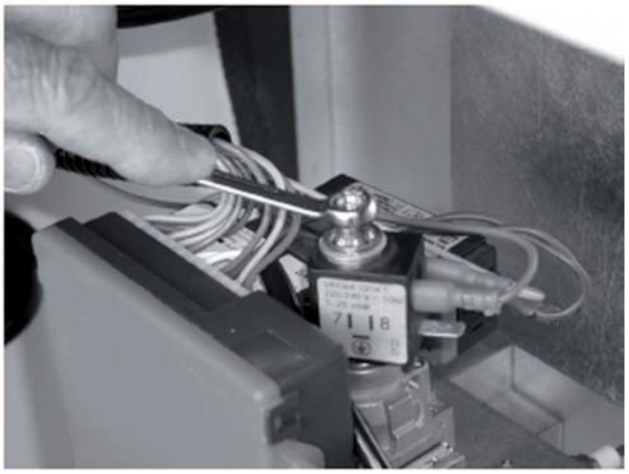
- the burner must run in high heat mode for this check.
- place the tube of the “accurate” manometer on the inlet pressure port of the gas regulating valve after having loosened the screw by one turn



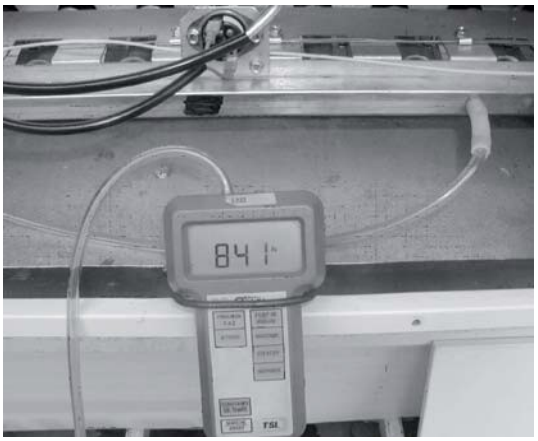
- Check and adjust if necessary the valve inlet pressure to 20 mbar (G20) or 25 mbar for groningue (G25) or 37 mbar for propane (G31). After gas burner ignition.

High heat injection pressure checks

- place the tube of the “accurate” manometer to the out port on the gas injector support bar after having loosened the screw by one turn.

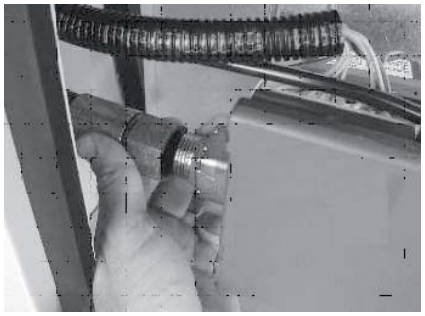


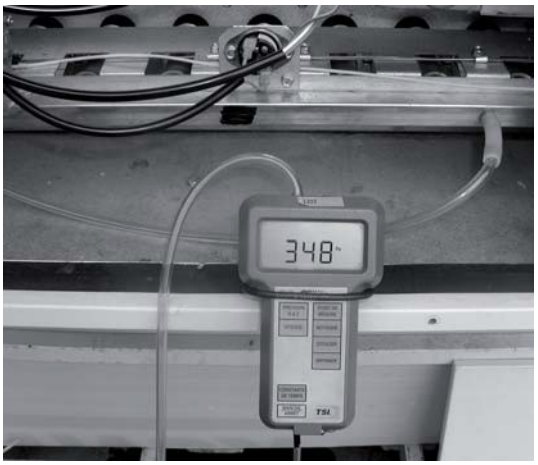
Check and adjust if necessary the valve outlet pressure to 8,4 mbar (G20) / 12,3 mbar for groningue (G25) & 31,4 mbar for propane (G31)



Low heat injection pressure checks

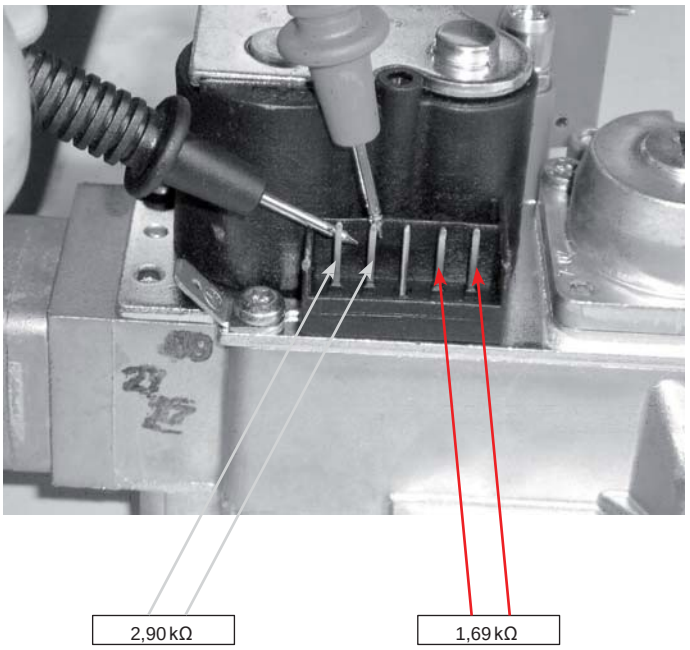
- switch the control to low heat
- check and adjust if necessary the outlet pressure to 3,5 mbar (G20) or 5 mbar for groningue(G25) & 14 mbar for propane (G31)





- after the adjustment of the low heat, re-verify the high heat
- re-position the stoppers and close the pressure ports

Valve electrical control



- check these values with an ohmmeter.

Pressure adjustments table for each type of gas (mbar)

Category	Supply pressure	Low heat injection min,	High heat injection
G20	20,0 +/- 1	3,5 +/- 0,1	8,4 +/- 0,2
G25 (groningue)	25,0 +/- 1,3	5,0 +/- 0,1	12,3 +/- 0,2
G31 (GPL)	37,0 +/- 1,9	14,0 +/- 0,3	31,4 +/- 0,6

Burner safety checks

Smoke extractor pressure switch test

- with the gas burner running, disconnect the flexible tube fitted to the pressure taping on the pressure switch.
- the flame must disappear and the extraction fan must carry on running.
- however, no fault will be displayed (gas ignition control block or CLIMATIC™).

- after reconnecting of the tube, the burner will restart after a period of 30 to 45 seconds pre-ventilation.

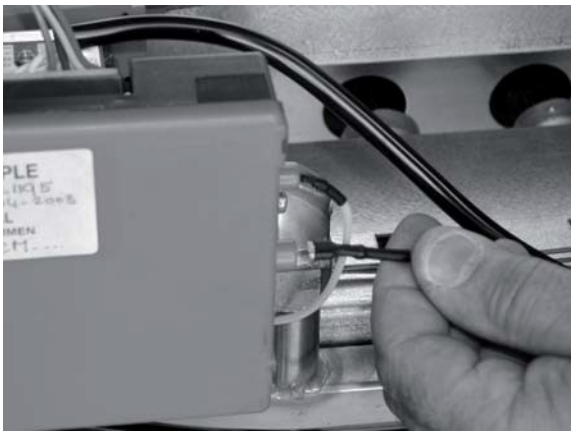
Gas pressure switch test

- with the gas burner running, close the shut off valve located before the rooftop.

- the burner stops completely.
- however, no fault light will be displayed on the gas ignition control block. After 6 minutes, the CLIMATIC™ will display a fault.
- reset the CLIMATIC™.

Ionisation probe test

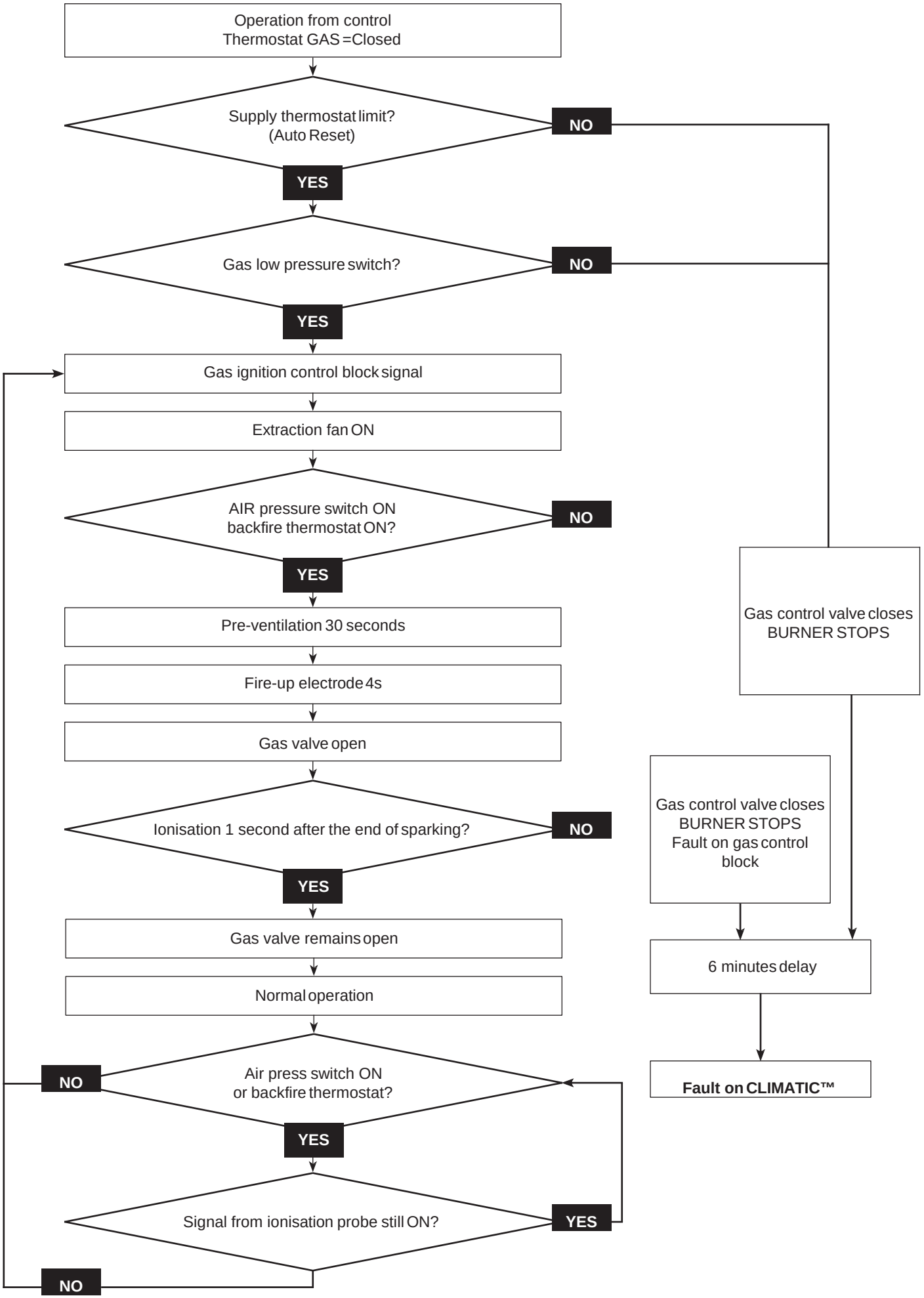
- with the gas burner running, disconnect the terminal plug coming from the ionisation probe to the gas ignition control box.



- the flame disappears
- the fan is still running and attempting to restart the burner (restart cycle 30 to 45 seconds).
- if the ignition probe is not reconnected at the end of the ignition sequence the burner will stop completely.
- the fault light on the gas ignition control block is on.
- manually reset the gas ignition control block to eliminate the fault

In case of problems refer to the start up sequence flowchart next page

Gas burner fire-up sequence



Gas burner troubleshouting

If faults reported on CLIMATIC™
- reset the CLIMATIC™.
- check voltage: 230V after circuit breaker.
- check gas isolation shut-off valves are open.
- check gas pressure at the inlet of the gas valves. It must be >20 mbar when the burners shut down.
- adjust the set points to priorities the burner. Increase the value of the room temperature set point to a temperature higher than actual room temperature.

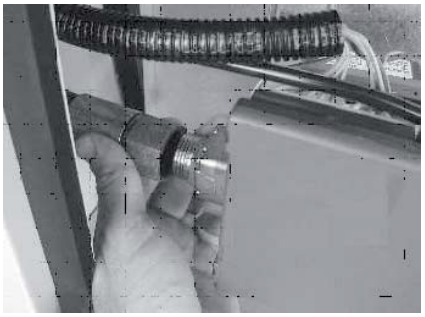
Diagnostic table baltic gas burner

Stage	Normal operation	Possible fault	Action	Possible solution
Heating requested	Green, yellow & red l.e.d. ON	All l.e.d. OFF → fault on the blower thermostat	Check connections on the blower thermostat.	Replace thermostat
		Yellow & red l.e.d. OFF → lack of gas supply	Check valve's opening & supply pressure	Restore gas supply
		Red l.e.d. OFF → fault on the superheat thermostat on the gas burner support bar	Check thermostat's operation after manual reset	Replace thermostat
L.e.d on	Extraction fans are running	After 10 seconds safety shutdown by the ignition control block	Check connections of the control block on the gas valve Check impedance of electro valve's coils: (1) = 2.90kΩ; (2) = 1.69kΩ	repositioning of the control block on the valve Replace valve
		Nothing happens	Check the free movement of the fan wheel Check electrical connection on the gas ignition control block and on ef connection board Check the fan supply voltage	Replace fan Replace ef connection board if necessary
Extraction fan is on	After 30 to 45 seconds: pre-ventilation the fire-up electrode should spark.	Continuous ventilation without sparks from fire-up electrode	Check the fire-up electrode Check the pressure drop at the pressure switch: it must be higher than 165 pa +check the good operation of the pressure switch using an ohmmeter and by artificially creating a depression in the tube.	Re-position the pressure switch tube. Change the pressure switch.
Continuous ventilation and sparks from fire up electrode.	After a few seconds the gas burner fires-up	After 4 seconds the gas burner still not operating and safety shutdown by the ignition control block.	Check injection pressure during start-up (value for high heat) Remove the control box from the gas block.	Remove the air from the gas pipe-work Adjust the injection pressure to high heat value. Change the control box if the gas valve is ok.
		Within 4 seconds the gas burner fires-up but safety shutdown from the ignition control block.	Check the position and connection of the ionisation probe. It must not be earthed (230v). Check that r.c circuit of the gas burner's transformer is well connected to the neutral polarity Measure the ionisation current: it must be higher than 1.5 microamps. Check the type of gas.	Check the whole electrical supply. Adjust the supply and injection pressure if gas is different from natural gas g20 :(g25 gas of groningue for example).

Disassembling the gas burner for maintenance purposes

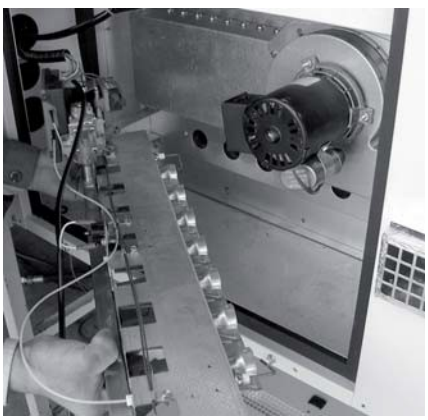
Preliminary safety recommendations

- isolate the unit using the main isolator switch.
- close off the isolating gas valve located before the unit.
- disconnect the pipe-work. Do not discard the seals.



Disassembling the gas «burner support bar»

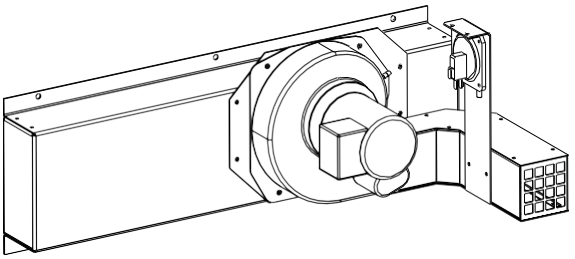
- disconnect the electrical connector on the electric connection board BG50
- remove the two screws which hold the gas bar in place
- carefully remove the gas « burner support bar » avoiding any damages to the electrodes.



Disassembling the flue

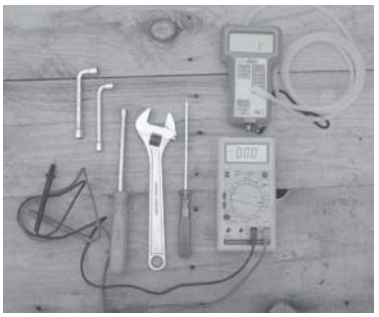
- electrically disconnect the fan and remove the screws holding it in place.
- take care not to loose any cage nuts in the smoke box.

Attention: check the correct position of the pressure tube used by the extraction pressure switch.

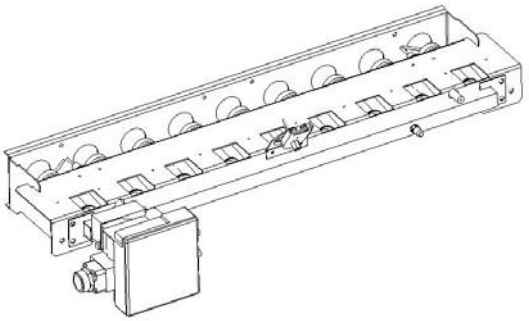


Required equipment list for maintenance adjustment and start-up

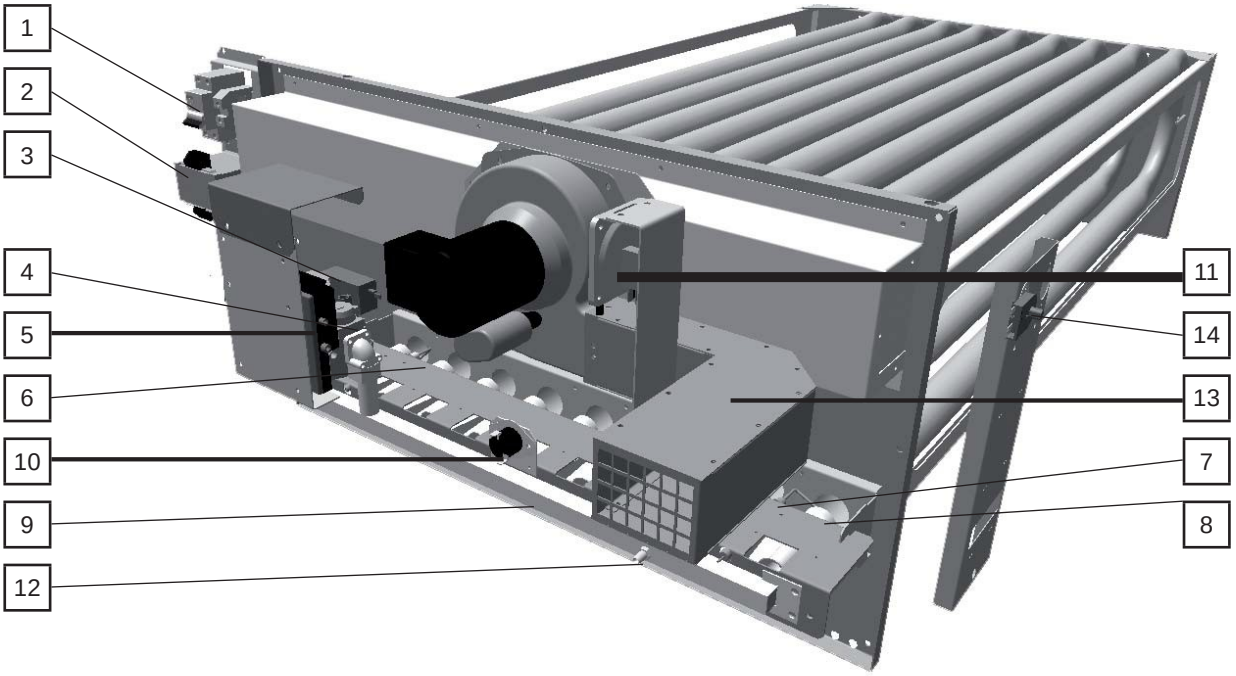
- an accurate manometer from 0 to 3500 pa (0 to 350 mbar): 0,1% full scale.
- a multimeter with ohmmeter and micro-amps scale
- an adjustable spanner
- tube spanner set: 8, 9, 10, and 13.
- flat screwdrivers diameter 3 and 4, fillips n°1
- vacuum cleaner
- paint brush



Gas burner support bar



Gas module

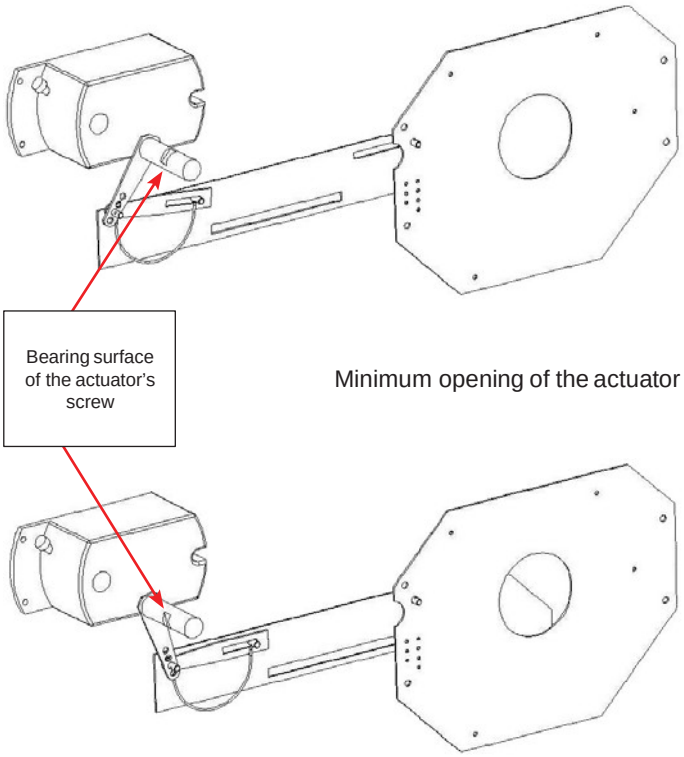


1.	Circuit breaker
2.	Transformer 400/230V
3.	Minimum gas pressure switch and inlet pressure plug
4.	Gas valve and solenoid
5.	Gas ignition control block and BG50 connection board
6.	Ignition electrode
7.	Ionisation probe
8.	Gas inshot burner
9.	Gas injectors support bar
10.	Backfire thermostat
11.	Air pressure switch
12.	Outlet pressure plug
13.	Smoke exhaust chimney
14.	Supply safety thermostat

Modulating gas (under patent inpi mai 2004)

The actuator

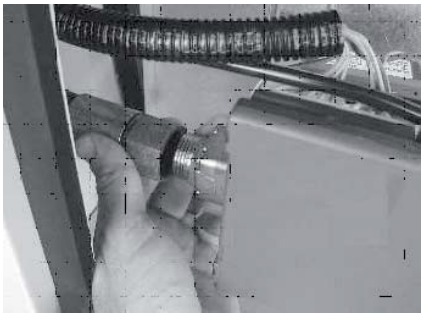
The actuator receives an information 0-10v from the regulation for the positioning of the air shutter; then the actuator transmits its position to the printed-board which will order the valve.



Check position and operation of the actuator

Starting up the gas burner

Purge the pipe-work near the connection on the ignition control valve for a few seconds.

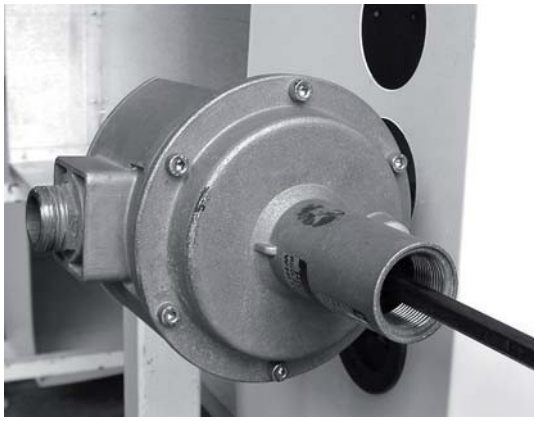


- check that the unit's treatment fan blower is running.
- set the control to “on” this will priorities the gas burner.
- increase the set temperature (room set point temperature) to a temperature higher than the actual room temperature.

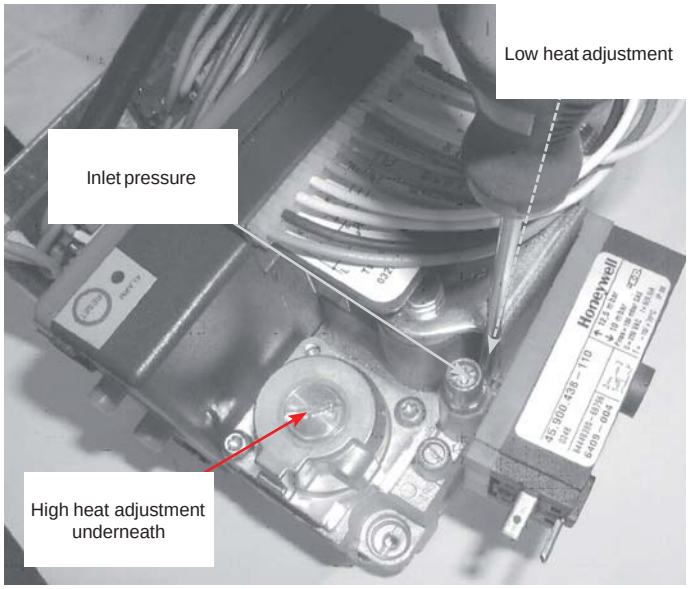
The start of the gas burner must be done at ***high heat injection.***

Pressure adjustments on honeywell pressure regulating valve type vk 4105 g

Pressure regulator adjustment with 300 mbar gas supply:



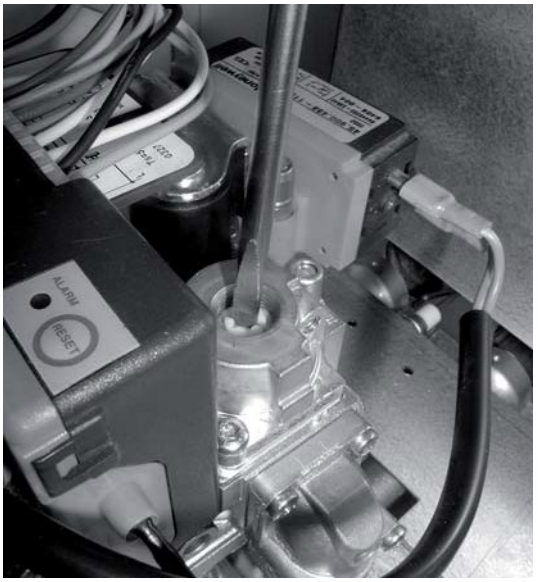
- the burner must run in high heat mode for this check.
- place the tube of the “accurate” manometer on the inlet pressure port of the gas regulating valve after having loosened the screw by one turn



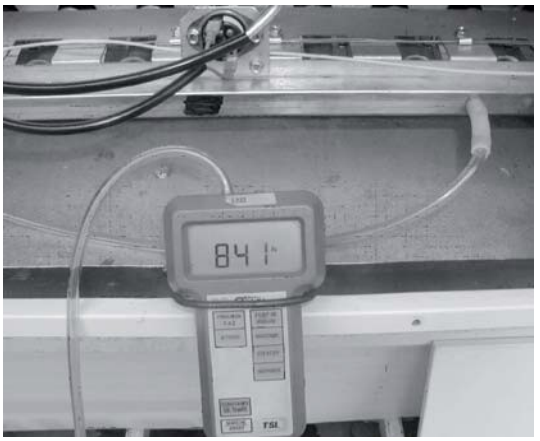
- Check and adjust if necessary the valve inlet pressure to 20 mbar (G20) (or 25 mbar for G25) after gas burner ignition

High heat injection pressure checks

- place the tube of the “accurate” manometer to the out port on the gas injector support bar after having loosened the screw by one turn.

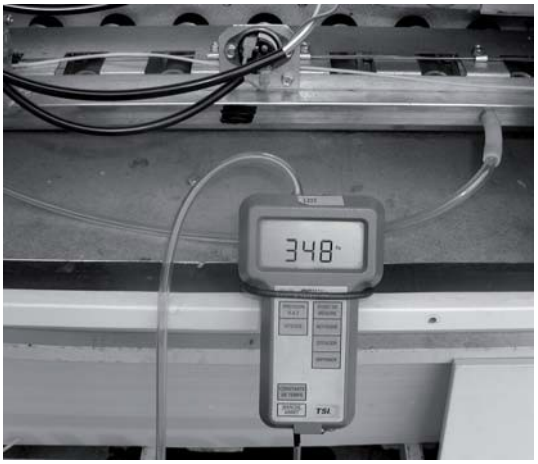


Check and adjust if necessary the valve outlet pressure to 8,4 mbar (G20) (or 12,3 mbar for G25)



Low heat injection pressure checks

- switch the control to low heat
- check and adjust if necessary the outlet pressure to 1,5 mbar minimum (G20) (or 2.25 mbar for G25)
- after the adjustment of the low heat, re-verify the high heat
- re-position the stoppers and close the pressure ports.

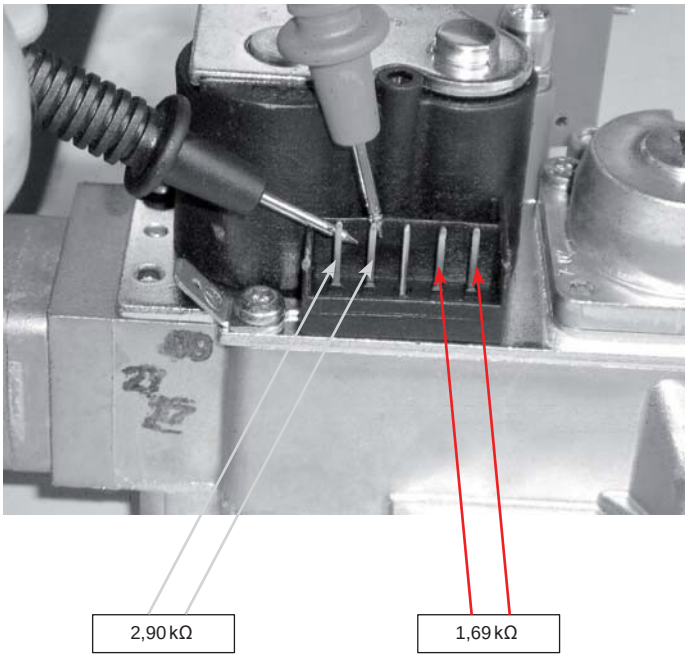


- after the adjustment of the low heat, re-verify the high heat
- re-position the stoppers and close the pressure ports.

Pressure adjustments table for each type of gas (mbar)

Category	Supply pressure	Low heat injection mini.	High heat injection
G20	20,0 +/- 1	1,5 +/- 0,03	8,4 +/- 0,2
G25	25,0 +/- 1,3	2,25 +/- 0,05	12,3 +/- 0,2
G31	NA	NA	NA

Valve electrical control



- check these values with an ohmmeter.

Burner safety checks

Idem non-modulating gas burner

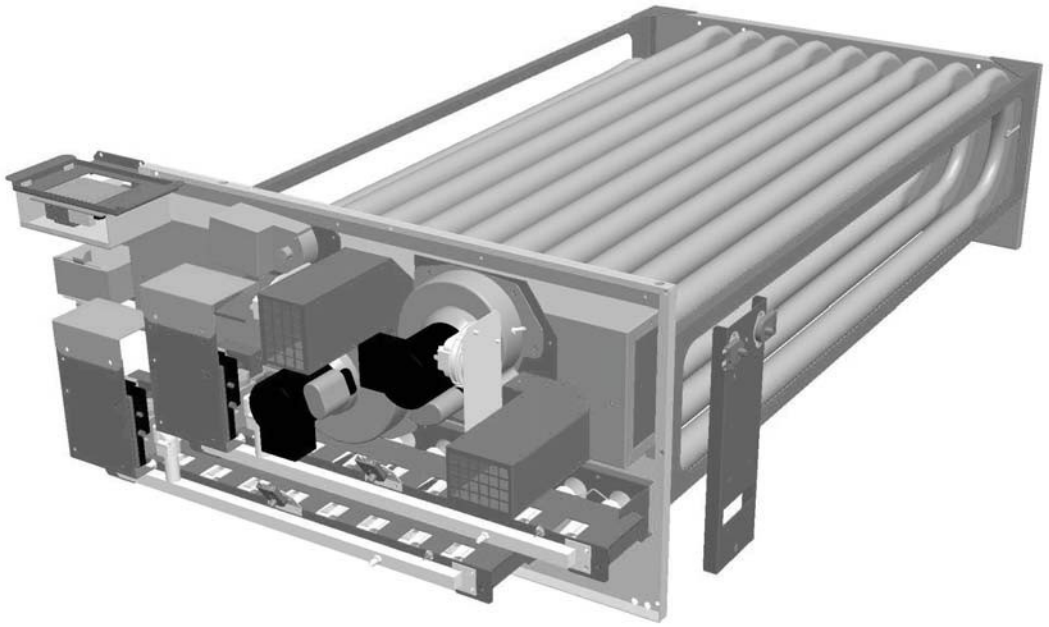
Gas burner troubleshouting

Idem non-modulating gas burner.
If the valve's flow is not correct, check the operation of the actuator and of the mechanical assembly.
→ Replace the actuator if necessary

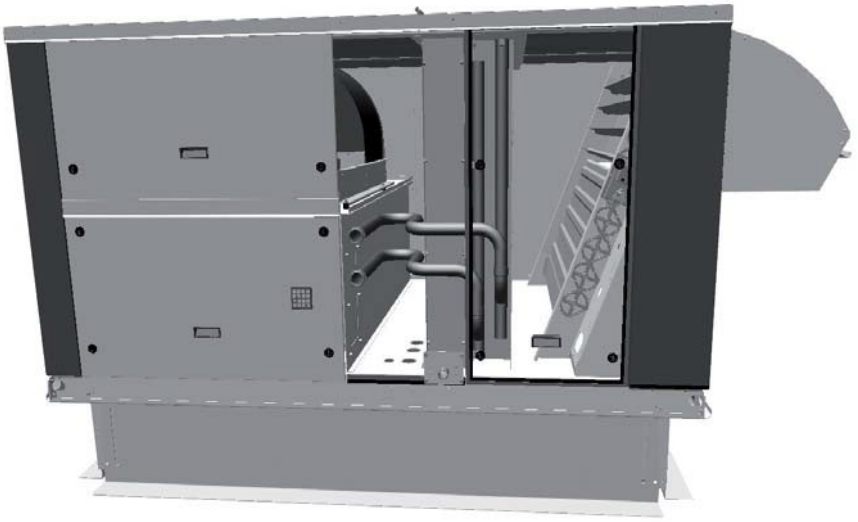
Disassembling of gas burner for maintenance purposes

Idem non-modulating gas burner

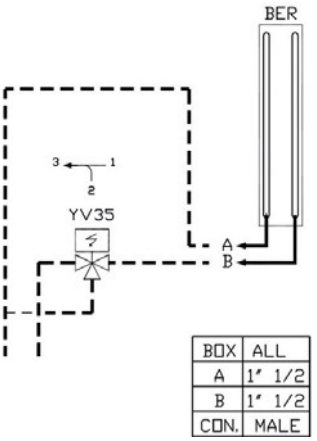
Modulating gas



Heat recovery water coil is delivered with a loose 3 ways valve inside carton to be assembled on site by installer.



The freeze protection is made via fresh damper safeties nevertheless for a full freezing protection has to be done using glycoled water



Refrigeration

Fault	Possible cause and symptoms	Solution
LP problems and LP cut outs	Refrigerant charge too low	Measure the superheat and sub-cooling: Good if 5°c<sc<10°c and 5°c<sh<10°c Bad if sc>10°c and sh too low Check superheat adjustment and charge unit (a leak check must be carried out)
	In heat pump mode the temperature difference between t outdoor and tevap. (dew) is too high 5°c < delta t < 10°c excellent 10°c < delta t < 15°c acceptable 15°c < delta t < 25°c too high	If too high check the coils are clean or check coil internal pressure drop between the liquid line and the suction line Good if < 3bar Too high if > 3bar (coil blocked)
	Refrigeration circuit blocked in distribution	Stop the fan and create icing of the coil. Check all circuits freeze evenly across the whole surface of the coil If some parts of the coil do not freeze this could indicate a problem with the distribution
	Liquid line drier blocked. High temperature difference between inlet and outlet of the drier	Change filter drier
	Contaminant in the expansion valve	Attempt to free the valve adjusting element by freezing the valve and then heating the thermostatic element. Replace the valve if necessary
	Expansion valve not adjusted properly	Adjust the expansion valve
	Ice plug in the expansion valve.	Heat the main body of the valve. If the LP increases and then decreases gradually, empty the circuit and replace the drier.
	Incorrect insulation of the thermostatic bulb of the expansion valve	Superheat too low: adjust superheat Move the thermostatic element along the pipe Insulate the thermostatic element of the valve
	Low pressure switch cut out point too high	Check the cut out pressure of the low pressure switch: it must be 0,7+/- 0,2bar and must closes at 2,24 +/- 0,2 bar
	LP cut out due to not enough defrost on heat pumps	Adjust the CLIMATIC™ settings to extend the defrost cycles or shorten the time between defrosts
HP problems and HP cut outs	Incorrect airflow rates	Heat pump mode: check the filter before the indoor coil measure and estimate the airflow rate increase the speed of the fan Cooling mode: check the condenser fan (amps)
	Moisture or contaminants in the system	Summer operation Several hours after the unit has stopped, check the correspondence between the measured pressure and the outdoor temperature

Refrigeration

Fault	Possible cause and symptoms	Solution
HP problems and HP cut outs	Moisture or contaminants in the system	If the circuit pressure is higher (<1 bar) than the saturated pressure corresponding to the measured outdoor temperature, there is possibility that some contaminants are present in the system. Reclaim the refrigerant, and vacuum the circuit (ensure very low and slow vacuum for R410A) Recharge the unit
	Condenser coil is obstructed	Check the condenser coil and clean is necessary
	Recycled hot air	Check clearance around the condenser
Strong variations of pressure (2 to 3 bar) expansion valve "hunting"	Incorrect adjustment of the expansion valve Low refrigerant charge Filter drier obstructed with gas bubbles at the expansion valve inlet Moisture in the system	Refer to LP problems and LP cut out section
Very high discharge temperature, High amps measured at compressor	Very high superheat, very hot compressor	Reduce the superheat on the electronic valve. Check the pressure drop on the filter drier in the suction line
	Four way reversing valve possibly blocked, abnormal noise from the valve, low LP and increasing HP	Check operation of the valve by going through cycle inversions. Change if necessary. Refer to LP problems

Indoor fan blower

Fault	Possible cause and symptoms	Solution
High amps on action fan motor	Pressure drop in the ducting installation too low.	Reduce the rotation speed of the fan Read the airflow and pressure and compare with the specification from customer.
High amps on reaction fan motor	Pressure drop in the ducting installation too high.	Reduce the rotation speed of the fan Read the airflow and pressure and compare with the specification from customer.
Unstable running and high vibration	Fan jumping from one operating point to the other	Change rotation speed of the fan.

Outdoor axial fan

Fault	Possible cause and symptoms	Solution
Heat pump mode: circuit breaker open	High amps due to a low voltage from the main supply	Check the voltage drop when all components are running. Change the circuit breaker for one with a higher rating.
	High amps due to freezing of the coil	Check the adjustable amps on the motor starter. Adjust the defrost cycle set points.
	FLEXY™: water ingress in the motor connection box.	Change the component

Electric heater

Fault	Possible cause and symptoms	Solution
High temperature trip out on electric heater	Low airflow rate	Measure and estimate the airflow and pressure and compare with the specification from customer.
	Incorrect position of the klixon	Check that the klixon, is positioned in the airflow, relocate klixon if necessary Check that there is no heat transfer from the klixon support.

Water leaks

Fault	Possible cause and symptoms	Solution
Water found in the ventilation section	Cooling mode: water carried away from the coil because of excessive airflow and speed on the coil.	Estimate the airflow rate and check the speed is lower than 2,8 m/s
	Low air pressure in the compartment due to a high airflow rate or a high pressure drop before the fan	Check filter Reduce airflow rate
	Check seals around the ventilation section.	Check the door seal Check for the presence of silicone seals in the corners of the door and at the bottom of the refrigeration section bulkhead.
Water ingress in the filter compartment	Water ingress through a leaking fresh air hood or when running 100% fresh air	Check the seals and flanges in the fresh air hood Reduce the airflow rate if necessary

CLIMATIC™ Displays

Fault	Possible cause and symptoms	Solution
Nothing is written on the screen but it's enlightened	Idem	Press on the three right-hand side's buttons at the same time during a few seconds then reconfigure display address setting at 32.
Nothing occurs on the unit or an option disappeared	Possible problem of units' configuration	Check the instructions from 3811 to 3833 and reconfigure options if necessary.
The message "no link" appears	Problem of addresses' recognition	Disconnect the DS from the unit and then reconnect it.
All the units are extinct	Problem main board plan addressing	Disconnect then re-plug; disconnect each unit from the others then change all the plan addresses

Type	Code	Designation
Ventilation	**4910018R**	VENTILATEUR AT 15-11 SS D25
Ventilation	**4910022X**	VENTILATEUR 230/1/50 HZ
Ventilation	**4910080H**	VENTILATEUR AT 15-11 G2L D30
Ventilation	**4910090X**	VENTILATEUR ADHE 355 L D30
Ventilation	**4910102R**	VENTILATEUR PLUGFAN+VIROLE
Ventilation	**4910104V**	VENTILATEUR PLUGFAN+VIROLE
Ventilation	**4921047L**	VIROLE PLASTIQUE POUR EBM-450
Ventilation	**4921121V**	MOTO VENTIL TRI 400V 2V. D=450
Ventilation	**4921160A**	MOTO VENTIL TRI 400V 1V. D=630
Ventilation	**4921161E**	MOTO VENTIL TRI 400V 1V. D=710
Ventilation	**4921162F**	MOTO VENTIL TRI 400V 1V. D=800
Ventilation	**4921170R**	MOTO VENTIL TRI 400V 2V. D=630
Ventilation	**4921171T**	MOTO VENTIL TRI 400V 2V. D=710
Ventilation	**4921172V**	MOTO VENTIL TRI 400V 2V. D=800
Ventilation	**4950035P**	MOYEU FONTE 28-20 ALESAGE 25
Ventilation	**4950040X**	MOYEU FONTE 28-20 ALESAGE 24
Ventilation	**4950044E**	MOYEU FONTE 40-25 ALESAGE 25
Ventilation	**4950046H**	MOYEU FONTE 40-25 ALESAGE 38
Ventilation	**4950053R**	MOYEU FONTE 30-25 ALESAGE 25
Ventilation	**4950054T**	MOYEU FONTE 30-25 ALESAGE 28
Ventilation	**4950238N**	MOYEU FONTE 30-25 ALESAGE 30
Ventilation	**4950266F**	MOYEU FONTE 40-25 ALESAGE 30
Ventilation	**4950761J**	ROUE PNEUMABLOC PV40 H
Ventilation	**4950762K**	ROUE PNEUMABLOC PV50 H
Ventilation	**4950763L**	ROUE PNEUMABLOC PV60 H
Ventilation	**4950764M**	PNEU PNEUMABLOC P40
Ventilation	**4950765N**	PNEU PNEUMABLOC P50
Ventilation	**4950766P**	PNEU PNEUMABLOC P60

Type	Code	Designation
Moteur	**4521802L**	MOT IP55 F.B3 1.5KW PTO 4P IE2
Moteur	**4521806R**	MOT IP55 F.B3 2.2KW PTO 4P IE2
Moteur	**4521807T**	MOT IP55 F.B3 3.0KW PTO 4P IE2
Moteur	**4521808V**	MOT IP55 F.B3 4.0KW PTO 4P IE2
Moteur	**4521809W**	MOT IP55 F.B3 5.5KW PTO 4P IE2
Moteur	**4521811Y**	MOT IP55 F.B3 7.5KW PTO 4P IE2
Moteur	**4521813A**	MOT IP55 F.B3 9.2KW PTO 4P IE2
Moteur	**4521822P**	MOT IP55 F.B3 11.KW PTO 4P IE2
Coils	**4310488F**	BAT 4N40T1000 1.81 20V C-BOX
Coils	**4310490J**	BAT 4N40T1500 1.81 16+10V D-B
Coils	**4310491K**	BAT 4N40T2000 1.81 2X13V E-BOX
Coils	**4310494N**	BAT 2N40T0883 2.12 20V C-BOX
Coils	**4310495P**	BAT 2N40T1383 2.12 20V D-BOX
Coils	**4310496R**	BAT 2N40T1883 2.12 38V E-BOX
Coils	**4310501Y**	BAT 3N40T1000 1.81 12V C-BOX
Coils	**4310505F**	BAT 3N24T0750 3.17 12V C-BOX
Coils	**4310506H**	BAT 3N24T1225 3.17 18V D-BOX
Coils	**4310507J**	BAT 4N24T1725 3.17 24V E-BOX
Coils	**4310508K**	BAT 1N38T0970 2.12 4V TRMO-C.
Coils	**4310509L**	BAT 1N38T1470 2.12 6V TRMO-D.
Coils	**4310510M**	BAT 1N38T1970 2.12 4V TRMO-E.
Coils	**4310511N**	BAT 3N20T0885 2.12 5V TRMO-C.
Coils	**4310512P**	BAT 3N20T1385 2.12 5V TRMO-D.
Coils	**4310513R**	BAT 3N20T1885 2.12 6V TRMO-E.
Coils	**4350489H**	BAT 3N40T1818 1.58 10V C-D-BOX
Coils	**4350492L**	BAT 3N40T2198 1.58 12V E-BOX
Coils	**4350493M**	BAT 3N40T2198 1.58 12V E-BOX
Coils	**4350499W**	BAT 2N40T1841 1.58 7V C-D-BOX
Coils	**4940025V**	VOLET SURPRESSION 397X415 CONJ
Coils	**4940026W**	VOLET SURPRESSION 750X415 CONJ
Coils	**79102834**	U FIXATION PLAQUE BATTERIE

Type	Code	Designation
Liquid receiver	**4320047M**	RESERVE LIQUIDE VERT. DE 2.4L
Liquid receiver	**4320048N**	RESERVE LIQUIDE VERT. DE 3.0L
Refrigeration	**4720001F**	CLAPET DE RETENUE 1/2"
Refrigeration	**4720002H**	CLAPET DE RETENUE 5/8"
Refrigeration	**4720905K**	DESHYDRATEUR BI-FLOW 5/8"
Refrigeration	**4720907M**	DESHYDRATEUR A SOUDER 5/8"
Refrigeration	**4720931X**	CABLE CONNECTEUR 3M E2V-E3V U.
Refrigeration	**4720944R**	DETENDEUR ERZE-4-GA 3/8"X1/2"
Refrigeration	**4720945T**	DETENDEUR ERZE-6-GA 1/2"X5/8"
Refrigeration	**4720964W**	VANNE DET.ELECTRO - CORPS E2V
Refrigeration	**4720965X**	VANNE DET.ELECTRO - CORPS E3V
Refrigeration	**4720969E**	VANNE DET.ELECTRO - BOBINE E2V
Refrigeration	**4720971H**	VANNE DET.ELECTRO - BOBINE E3V
4 way valve	**4740100M**	VANNE 4 VOIES 5/8"
4 way valve	**4740103R**	BOBINE ELECTROVANNE 24V
4 way valve	**4740146E**	VOLET 750X412 C-BOX BA3 EBHO
4 way valve	**4740150L**	VOLET 750X891 C-BOX BA3
4 way valve	**4740151M**	VOLET 1250X891 D-BOX BA3
4 way valve	**4740152N**	VOLET 1750X891 E-BOX BA3
4 way valve	**4740165J**	BOBINE ELECTROVANNE 24V
4 way valve	**4740169N**	VANNE 4 VOIES 7/8" - 1"1/8
4 way valve	**4740170P**	VOLET 1750X417 F-BOX FA1
4 way valve	**4740175X**	VOLET 1250X417 D-BOX BA3 EBHO
Compressor	**4220449V**	COMPRESSEUR ZP72KCE TRI+BRASE
Compressor	**4220450X**	COMPRESSEUR ZP83KCE TRI+BRASE
Compressor	**4220452A**	AMORTISSEURS ZP54-72-83 TANDEM
Compressor	**4220476K**	COMPRESSEUR ZP54KSE TRI+BRASE
Filter	**4960128J**	FILTRE 530X500X50 EU3 CAMPLANS
Filter	**4960129K**	FILTRE 530X500X50 EU4 AR300
Filter	**4960130L**	FILTRE 530X500X98 EU7 GP10
Filter	**4960132N**	FILTRE METAL EP=10 850 X 455
Filter	**4960134R**	FILTRE 530X500X50 EU4 RECHARG.

Type	Code	Designation
Electrical components	4410650A	CONTACTEUR 9A 1 F+1 O A VIS
Electrical components	4410652F	CONTACTEUR 18A 1 F+1 O A VIS
Electrical components	4410653H	CONTACTEUR 25A 1 F+1 O A VIS
Electrical components	4410885X	CONTACTEUR K 9A 24V
Electrical components	4411010H	CONTACT ADDITIF 2F - LC1K
Electrical components	4411029K	CONTACTEUR 40A 1 F+1 O 24V
Electrical components	4411030L	CONTACTEUR 50A 1 F+1 O 24V
Electrical components	4411051R	RELAIS CONTROL RESEAUX TRI
Electrical components	4411059E	TRANSFO INTENSITE TI400/5A
Electrical components	4411066N	TRANSFO INTENSITE TI200/5A
Electrical components	4411067P	TRANSFO INTENSITE TI250/5A
Electrical components	4411074Z	PEIGNE C60 TRI PAS 24
Electrical components	4411103T	COMPTEUR ENERGIE IEM3250 (BUS)
Electrical components	4411105X	FLASQUE PEIGNE ACTI9 3P
Transformer	4430125R	TRANSFORMATEUR 160VA 400V/230V
Transformer	4430131Z	TRANSFORMATEUR 88VA PRIM:400V
Part	4880100V	PATIN DE GLISSEMENT BATT UF
Plate HX	4380416P	ECHANG.A PLAQUES ACH230DQ054HG
Plate HX	4380425E	ECHANG.A PLAQUES ACH230DQ082HG
Switch	4730050J	CONTROLEUR DEBIT COMPACT
Switch	4730051K	CONNECTEUR 5M POUR CONTROLEUR
Switch	4730093W	THERMOSTAT SECURITE INCENDIE
Switch	4730097A	PRESSOSTAT DIFF. AIR PROPORTI.
Switch	4730184H	PRESSOSTAT HP 42.0 BARS OFF
Switch	4730191P	CAPTEUR DIFF. AIR 0-30MBAR.
Switch	4730192R	CAPTEUR DIFF. AIR 0-10MBAR.
Control	4770213W	CAPTR.PRESS. 4/20MA -1/20 BARS
Control	4770217A	CAPTR.PRESS. 4/20MA -1/45 BARS
Control	4770219F	CAPTR.PRESS. 0/5V -1/20 BARS
Control	4770609E	CABLE AFFICHEURS POUR CL50-60
Control	4770613K	SONDE D'AMBIANCE CLIMATIC 50
Control	4770623Y	CONNECTEUR MULTI AFFICH DT50
Control	4770629J	INTERFACE ECHELON SANS PROGRAM
Control	4770633N	CARTE GAZ MODULANT
Control	4770634P	CARTE GAZ BG50
Control	4770643E	CARTE BACNET RS485
Control	4770644L	CARTE BACNET ETHERNET
Control	4770692Z	CABLE AFFICHEURS POUR CL50-60
Control	4770703R	AFFICHEUR CLIENT DC60 24V T°
Control	4770705V	CARTE COMMUNICAT.RS485 CLIM 60
Control	4770715K	AFFICHEUR MAINTENANCE DS60
Control	4770716L	AFFICHEUR MULTI-ROOFTOP DM60

Type	Code	Designation
Control	4770613K	SONDE D'AMBIANCE CLIMATIC 50
Control	4770623Y	CONNECTEUR MULTI AFFICH DT50
Control	4770629J	INTERFACE ECHELON SANS PROGRAM
Control	4770633N	CARTE GAZ MODULANT
Control	4770634P	CARTE GAZ BG50
Control	4770643E	CARTE BACNET RS485
Control	4770644L	CARTE BACNET ETHERNET
Control	4770692Z	CABLE AFFICHEURS POUR CL50-60
Control	4770703R	AFFICHEUR CLIENT DC60 24V T°
Control	4770705V	CARTE COMMUNICAT.RS485 CLIM 60
Control	4770715K	AFFICHEUR MAINTENANCE DS60
Control	4770716L	AFFICHEUR MULTI-ROOFTOP DM60
Control	4770720R	SONDE NTC [-50+105]°C 3 METRE
Control	4770721T	SONDE NTC [-50+105]°C 7 METRE
Control	4770725Y	SONDE HYGRO.-TEMP. DE GAINE
Control	4770728E	CARTE REGULATEUR E-CLI+MEDIUM
Control	4770729F	CONNECTEURS POUR E-CLI+MEDIUM
Control	4770730H	CARTE EXTENSION E-BE C.PCOE
Control	4770731J	CONNECTEURS POUR E-BE C.PCOE
Control	4770738T	INTERFACE DE COM.LENNOX ONEWEB
Control	4780232F	INSHOT GAS BURNER (BRULEUR)
Control	4780415Y	THERMOSTAT ANTIGEL-30/+15 AUTO
Control	4780417A	VARIATEUR FREQUENCE 2.2KW
Control	4780418E	VARIATEUR FREQUENCE 4.0KW
Control	4780419F	VARIATEUR FREQUENCE 7.5KW
Control	4780421J	VARIATEUR FREQUENCE 11.KW
Control	4780425N	VARIATEUR FREQUENCE 5.5KW
Control	4780466Y	THERMOSTAT SECURITE AUTO 98°C
Control	4780467Z	THERMOSTAT SECU.REARM.MANUEL
Control	4780469E	VARIATEUR FREQUENCE 1.5KW
Control	4780470F	VARIATEUR FREQUENCE 3.0KW
Control	4780956V	SONDE HYGIENE AIR CO2 HUM.MBUS
Control	4781250A	SERVO-MOTEUR VANNE 0/10V 5833
Control	4781252F	VANNE 3V DN20 KVS 4
Control	4781253H	VANNE 3V DN25 KVS 10
Control	4781254J	VANNE 3V DN32 KVS 16
Control	4781255K	VANNE 3V DN40 KVS 25
Control	4781256L	RACCORD V3V DN25 FEMELLE
Control	4781257M	RACCORD V3V DN32 FEMELLE
Control	4781258N	RACCORD V3V DN40 FEMELLE
Control	4781277R	SERVO-MOTEUR 24V SM5 5NM
Control	4781286T	SERVO-MOTEUR 24V 0-10V 10NM
Control	4781290L	DETECTEUR DAD NON SECOURU
Control	4781292N	SOCLE DETECTEUR DE FUMEE
Control	4781293P	DETECTEUR OPTIQUE DE FUMEE
Control	4781300Z	RELAIS STATIQUE 50A 400V
Control	4781301A	RELAIS STATIQUE 75A 400V
Control	4781302E	RELAIS STATIQUE 100A 400V
Control	4781303F	DISSIPATEUR THERMIQUE 0.7°/W
Control	4781305J	VANNE GAZ HONEYWELL 220/240V
Control	4781306M	BOITIER DE CONTROLE DE FLAMME
Control	4781307N	REGULATEUR HIGH-LOW 4-37 MBAR
Control	4781309R	PRESSOSTAT GAZ (GAZ NAT-PROP)
Control	4781311V	BRIDE DROITE AVEC JOINT ET VIS
Control	4781312W	BRIDE COUDEE AVEC JOINT ET VIS
Control	4781313X	COUVERCLE BOITIER CTRL FLAMME
Control	4781317F	DETENDEUR HONEYWELL 10-30 MBAR
Control	4781337K	AXE SERVO MOTEUR GAZ MODULANT
Control	4781338L	AXE BOISSEAU BIELLES GAZ MODUL
Control	4781360N	VANNE GAZ MODULANTE 220/240V
Control	4781361P	PRESSOSTAT AIR (BRULEUR GAZ)
Control	4781363T	CLIP FIX. PRESSOS.4781361T-62R

Terms and conditions

In the absence of any other written agreement, the guarantee shall only apply to design faults which occur within a 12 month period (warranty period).

The warranty period starts on the date of commissioning and at the latest six months after the delivery of the Rooftop.

Anti-corrosion warranty

10 year warranty terms and conditions for corrosion to the Rooftop casing:

LENNOX shall guarantee the casing of its Rooftop units manufactured against corrosion for 10 years commencing from the date of delivery of the material.

The warranty shall not apply in the following cases:

1. If the corrosion of the casing is caused by external damage to the protective layer such as scratches, projections, abrasion, impacts etc...
2. If the casing is not kept continually clean in the course of maintenance work or by a specialist company,
3. If the casing is not cleaned and maintained in accordance with regulations,
4. If the Rooftop units are installed on a site or in an environment which is known to be corrosive, unless a special protective coating has been applied by the owner for these applications, which has been recommended by a competent body not linked to the owner and after carrying out a study of the site.
5. Nevertheless the LENNOX coating is highly resistant to corrosion, the warranty will not be applied for rooftop installed at less than 1000 m away from the sea

Note: With the exception of the casing, the rest of the machine is covered by the warranty of our general terms of sale.

Do not confuse the warranty with maintenance

The warranty will only apply if a maintenance contract has been signed, starting from the date of commissioning, and if the maintenance contract has actually been performed
The maintenance contract must be made with a specialist, competent company.

The sole effect of any repair, modification or replacement of an item during the warranty period must be to extend the material's warranty period.

Maintenance must be carried out in accordance with regulations.

If a spare part is supplied after the expiry of the warranty period, it shall be guaranteed for a period equal to the initial warranty period and will be subject to the same conditions.

We recommend for a contract four inspections per year (every three months), before the start of each season, in order to check the operation of the equipment in the various operating modes.

Lifetime of the equipment

The refrigerating system is designed for a lifetime of at least 10 years if the safety and maintenance instructions are strictly respected.
The lifetime of the equipment may be renewed if the periodic requalification certificate is validated by the expert (authorized body or DREAL)

Disposal of the equipment

Equipment shut-down and recuperation of oil and coolant must be carried out by qualified personnel conform to the recommendations of standard NF EN 378.
All elements in the refrigeration system such as refrigerant, oil, coolant, filters, dryers and insulating materials must be recuperated, re-used and/or disposed of in a correct manner (see NF EN 378 part 4). No materials may be discarded into the environment.

Rooftops are generally placed on the roof but can also be installed in technical rooms. These units are very robust but a minimum regular maintenance is required. Some moving parts in the units can suffer from wear and tear and must be checked regularly (belts). Other parts can get clogged by dirt carried in the air (filters) and must be cleaned or replaced.

These units are designed to produce cooled or heated air through the use of a refrigeration vapour compression system, it is therefore imperative to monitor the refrigeration circuit operating pressures and check the pipe-work for leaks.

The table below, details a possible maintenance plan, including the operations to be carried out and the periodicity at which they must be accomplished. It is recommended to follow such a plan to keep a rooftop unit in good working order. Regular maintenance of your rooftop will extend its operating life and reduce operating faults

Symbols and Legend :

X Operation which can be carried out by on-site maintenance technicians.

◆ Operation which must be carried out by qualified refrigeration personnel, trained to operate on this type of equipment.

Note:

- Times are given for information purpose only and may vary depending on the unit size and type of installation.
- Coil cleaning must be carried out by qualified personnel using appropriate methods that won't damage the fins or the tubes.
- It is recommended to keep a minimum stock of common replacement parts in order to be able to carry out regular maintenance operations (i.e. filters). You can contact your local LENNOX representative which can assist you in establishing a parts list for each type of equipment.
- The access ports to the refrigeration circuits MUST be leak checked every time gauges are connected to the service ports.

Task	Operating mode	Monthly	+ Quarterly	+ Half Yearly
Clean or replace filters: Disposable, or metal frame.	Replace filters with new ones if disposable. Vacuum clean or blow the dirt. Wash and dry carefully. Replace Filter if necessary by an original Lennox filter. Blocked filter will reduce the performance of the unit. THE UNIT SHOULD NEVER BE OPERATED WITHOUT FILTERS	●		
Visual check of the oil level (applicable for units equipped with sight glass) and check the oil for acidity on the refrigerant circuits	Visually check the oil level through the sight glass on the side of the compressor casing Test the oil every 3 years and after each intervention on the refrigerant circuit	●		
Clean condensate drain, indoor coils and outdoor coils (following local regulations)	It's mandatory to clean the external coils, according to the environment where the unit is located, the frequency of the cleaning varies from once in a month to minimum twice in a year**.** The performance and the sustainability of the machine is based on the perfect heat exchange. The use of a neutral pH cleaning product is mandatory. (WARNING: Fins and copper tubes are very fragile! Any damage WILL reduce the performances of the unit).	▌	▌	▌
Check condenser fans	Check the rotation of the fan (free rotation, detection of vibrations or bearing noises) Check for the Amps consumed on all three phases; compare it with the nominal value given in the electrical wiring diagram. Check the status of the fan blades and its protections.		▌	
Check for the Amps consumed	Check for the Amps consumed on all three phases; compare with the nominal value given in the electrical wiring diagram.		▌	
Check Smoke detector	Start the unit. Trigger the smoke detector with an aerosol tester. Reset unit and control.		▌	
Check CLIMATIC™ control, set-points and variables	Refer to the commissioning sheet; Check all set points are set according to this document.		▌	
Check refrigeration system for proper functioning	Retrieve/Check the values of Overheating and subcooling		▌	
Check clock settings	Check the time and date of the control		●	
Check the position and tightness of refrigeration components	Check systematically all connections and fixings on the refrigeration circuit. Check for oil traces, eventually a leak test should be conducted. Check operating pressures correspond to the ones, indicated on the commissioning sheet		▌	
Check three way valve on HWC (If applicable)	Increase room set-point 10°C above the actual room temperature. Check operation of the piston. It must move away from the valve head. Reset the control.		▌	
Check the position of the crankcase heaters (around the compressor) and the proper functioning of it	Check the well fixation of the crankcase heaters, if it is tight enough And check the crankcase heaters overall working.		●	
Check defrost cycle with 4-way valve inversion.	Switch the unit to heat pump mode. Change the set point to obtain the standard defrost mode and reduce the cycle time to the min value. Check the operation of the defrost cycle.		▌	
Check overall working of the flow controller (only for rooftops with water condensation function)	Cut-off the compressors, stop the water circulation, then start the unit, wait for the water flow failing signal in the controller.		▌	
Check the water flow (only for rooftops with water condensation function)	Measure the water flow and compare it to the initial value set in the command selection		▌	
Check the plug fans (freewheel)	Check the rotation of the fan (free rotation, detection of vibration or bearing noises) Check for the Amps consumed on all three phases; compare with the nominal value given in the electrical wiring diagram.			●
Check the axial extractor fan (if the unit is equipped with)	Check the rotation of the fan (free rotation, detection of vibration or bearing noises) Check for the Amps consumed on all three phases; compare with the nominal value given in the electrical wiring diagram.			▌
Check the well working of the energy recovering wheels	Check the rotation of the wheel; Check the strap tension; Replace the components in case of malfunctioning			▌
Check Airflow rate safety switch (if equipped).	Shut down supply fan. The fault must be detected within 5 seconds.			●

Task	Operating mode	Monthly	+ Quarterly	+ Half Yearly
Check freeze protection on HWC (if applicable)	Test antifreeze function (leakage rate, frost protection thermostat)			▌
Check economizer actuator operation	Check all fixings and transmission. Stop the unit using the control. The fresh air damper must close. Start the unit, the fresh air damper should open. Make a forced opening and closure of the motorized dampers.			▌
Check tightness of all electrical connections	Power down the unit and check and tighten all screws, terminal and electric connections (including the terminal boxes) When turning on the unit, check the deterioration of the electrical components with a thermal camera, with the unit working at 100% of its power.			▌
Check HP / LP safety switches	Install a pressure gauge HP / LP and check if the safety switches overall working.			▌
Check the value of the analog sensors	Install the pressure gauge calibrated to check the analog sensors. Install a thermometer calibrated to control the sensors.			▌
Check the position of all sensors	Check the good positioning and the fixation of all sensors.			●
Check and clean if necessary all fresh air grids	Check the fresh air grilles (if fitted). If dirty or damaged, remove them from unit and clean with high pressure water cleaner. Refit on unit once clean and dry.			●
Check electric heater element for excessive corrosion	Turn off the unit; Pull the electric heater out of the heater module box and check the resistances of traces of corrosion; Replace resistance as required;			▌
Check anti-vibration mountings, for wear and tear.	Visually check anti-vibration mountings on compressors and centrifugal fan. Replace if damaged.			●
Check Glycol concentration in the HWC circuit and/or in the water condenser circuits	Check the glycol concentration in the pressurized water circuit. (a concentration of 30% gives a protection down to approx.. -15°C) check the circuit pressure			▌
Gas burner module check for corrosion	Pull out the burner to access the tubes (refer to Gas burner section in the IOM)			▌
Sweeping and cleaning the gas burner	Clean the in-shot burners and the blower wheel lightly with a brush. Sweep the flue and flue box. Wipe-off the dust from the housing of the motor. Clean combustion air inlet louvers Pull-out baffles from the tubes, sweep the tubes CHECK FLUE BOX GASKET			▌
Gas supply pressures / connections checks	Refer to Gas burner section in the IOM for details			▌
Check the gas regulation valve settings	Refer to Gas burner section in the IOM for details			▌
Check gas burner safety switches	Refer to Gas burner section in the IOM for details			▌
Check the ignition electrode and the ionization probes	Refer to Gas burner section in the IOM for details			▌
Check gas fume combustion levels	Do a combustion analysis. Refer to local regulation if it exists			▌
Check casing and equipment corrosion	To treat and neutralize eventual rust spots			●
Check the water tightness of the unit and it's accessories	Verify the gaskets, if cracked or ripped, repair them or replace them.			●
Check the doors gasket	Verify the gaskets; if cracked, ripped or discontinuous in these cases replace them.			●
Check the water tightness of the water circuit (only for Rooftops with water condenser)	Check for water leaks and repair if it's needed.			●
Check and clean the water filter (only for Rooftops with water condenser)	**ATTENTION**: The water circuit can be under pressure. Follow the usual precautions when depressurizing the circuit before opening. Ignoring these rules can lead to accidents and cause injury to the personal.			▌

Site details		Controller	
Site		Model	
Unit Ref		Serial No	
Installer		Refrigerant	

(1) ROOF INSTALLATION

Sufficient Access OK	Condensate drain fitted	Roofcurb
Yes ☐ No ☐	Yes ☐ No ☐	OK ☐ Not OK ☐

(2) CONNECTIONS CHECK

Phase check	Voltage between Phases	1/2	2/3	1/3
Yes ☐ No ☐				

(3) CLIMATIC™ CONFIGURATION CHECK

CLIMATIC™ Configured according to the options and specifications
Yes ☐ No ☐

(4) SUPPLY BLOWER SECTION

Type		N°1		N°2	
Power displayed on plate	kW				
Voltage displayed on plate	V				
Current displayed on plate	A				
Fan type		Forward ☐	Backward ☐	Forward ☐	Backward ☐
Displayed coupling ref	mm				
Alignment checked		Yes ☐	No ☐	Yes ☐	No ☐
Fan speed	rpm				
Averaged measured amps	A				
Shaft mechanical mower (Refer to airflow balancing)	W				
Operating point checked		Yes ☐	No ☐	Yes ☐	No ☐
Read airflow	m^3/h				

(5) AIRFLOW PRESSURE SENSOR CHECK

Measured pressure drop		Set points adjusted		
		Yes ☐	No ☐	
	mBar	If yes enter new values		
		3410:	3411:	3412:

(6) EXTERNAL SENSOR CHECKS

Check electrical connections	Yes ☐	No ☐	Check and record temp. in menu 2110	Yes ☐	No ☐
			100% Fresh Air	100% return Air	
Supply temperature			°C	°C	
Return temperature			°C	°C	
Outdoor temperature			°C	°C	

(7) MIXING AIR DAMPERS CHECKS

Dampers open & close freely		% Minimum FA	Power exhaust checked ☐		Enthalpy sensor(s) checked ☐	
Yes ☐	No ☐	%	Yes	No ☐	Yes	No ☐

(8) REFRIGERATION SECTION

Outdoor fan motor current				Check rotation		Compressor voltage
Motor 1	L1: A	L2: A	L3: A	Yes □	No □	
Motor 2	L1: A	L2: A	L3: A	Yes □	No □	
Motor 3	L1: A	L2: A	L3: A	Yes □	No □	Comp1: V
Motor 4	L1: A	L2: A	L3: A	Yes □	No □	Comp1: V
Motor 5	L1: A	L2: A	L3: A	Yes □	No □	Comp3: V
Motor 6	L1: A	L2: A	L3: A	Yes □	No □	Comp4: V

Compressor amps - COOLING				Pressures & temperatures			
				Temperatures		Pressures	
	Phase 1	Phase 2	Phase 3	Suction	Disch	LP	HP
Comp1	A	A	A	°C	°C	Bar	Bar
Comp2	A	A	A	°C	°C	Bar	Bar
Comp3	A	A	A	°C	°C	Bar	Bar
Comp4	A	A	A	°C	°C	Bar	Bar
Check Reversing valves		Valve 1:	Yes □	No □	Valve 3:	Yes □	No □
		Valve 2:	Yes □	No □	Valve 4:	Yes □	No □

Compressor amps - HEATING				Pressures & temperatures			
				Temperatures		Pressures	
	Phase 1	Phase 2	Phase 3	Suction	Disch	LP	HP
Comp1	A	A	A	°C	°C	Bar	Bar
Comp2	A	A	A	°C	°C	Bar	Bar
Comp3	A	A	A	°C	°C	Bar	Bar
Comp4	A	A	A	°C	°C	Bar	Bar
HP cut out:			Bar	LP cut out:			Bar
Refrigerant charge				C1: kg	C2: kg	C3: kg	C4: kg

(9) ELECTRIC HEATER SECTION

Type			Serial No		
AMPS 1st stage (BALTIC™)			AMPS 2nd stage (BALTIC™)		
1	2	3	1	2	3

(10) HOT WATER COIL SECTION

Check Three Way Valve Movement
Yes □ No □

(11) GAS HEATING SECTION

Gas Burner N°1:				Gas Burner N°2:			
Size:	Valve type:			Size:	Valve type:		
Pipe size:	Gas type: G			Pipe size:	Gas type: G		
Line press:	Drop test			Line press:	Drop test		
	Yes □	No □			Yes □	No □	
Check manifold pressure:				Check manifold pressure:			
High fire	Low fire			High fire	Low fire		
Pressure cut out airflow press switch		mBar/Pa		Pressure cut out airflow press switch		mBar/Pa	
Motor amps: A	Flue temp: °C	CO_2%: %	CO ppm: %	Motor amps: A	Flue temp: °C	CO_2%: %	CO ppm: %

(12 REMOTE CONTROL BMS CHECK

Type:	Sensor type:	Interconnect wiring checked:	
		Yes □	No □

General information

Site name:	Serial Number:	
Site address:		
Site operator:		
Cooling load :		
Refrigerant type:	Refrigerant quantity (kg)	
Unit manufacturer	Year of installation	

Refrigerant additions

Date	Engineer	Quantity (kg)	Reason for addition

Refrigerant removal

Date	Engineer	Quantity (kg)	Reason for removal

Leak tests (part 1)

Date	Engineer	Test Result	Follow up action required

Leak tests (part 2)

Date	Engineer	Test Result	Follow up Action Required

Follow up actions

Date	Engineer	Related to test dated	Action taken

Testing of automatic leak detection system (if fitted)

Date	Engineer	Test result	Comments

BALTIC
CERTIFICATES

Certificates are given for information only.
To get the uptodate certificates, please contact your local LENNOX reprensentative.

CERTIgaz

Surveillance
Surveillance

APPROBATION DE SYSTEME D'ASSURANCE QUALITE
(APPROVAL OF QUALITY SYSTEM)

ASSURANCE DE LA QUALITE DE FABRICATION
(GUARANTEE OF PRODUCTION QUALITY)

(paragraphe 3 – Annexe II de la directive 2009/142/CE Appareils à gaz)
(paragraph 3 – Annex II of the Gas appliances directive 2009/142/EC)

Numéro : A.Q.F. 0293 (rév.1)
Number :

CERTIGAZ, après examen et évaluation du système d'assurance qualité mis en place par :
CERTIGAZ, after inspection and evaluation of the quality system applied by:

LENNOX EMEA
2 rue Lavoisier
ZI de Longvic
BP 60
21602- LONGVIC

- **dans son usine de :** **Même adresse**
  in its factory located in :
- **pour la fabrication des appareils :** **Modules de chauffage gaz pour climatiseur de toiture**
  for production of the appliances : *(gas air heater unit for roof top)*
- **en conformité respectivement avec les types décrits dans les certificats :**
  respectively in conformity with types described in certificates :

1312BL3276 – 1312BO3925

approuve ce système.
approves this system.

La validité de cette approbation est de 18 mois à compter de la date du dernier audit réalisé 12 octobre 2017, sous réserve de contrôles.

 1/1

Le Directeur Général

Neuilly, le 26 octobre 2017

Vincent DELARUE

cofrac
CERTIFICATION DE PRODUITS ET SERVICES
Accréditation
N°5-0512
Portée disponible sur www.cofrac.fr

CE 1312

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CE

DECLARATION DE CONFORMITE UE
EU CONFORMITY DECLARATION

LGL France SAS - ZI Les Meurières - 69780 Mions – France

La société soussignée certifie sous sa seule responsabilité que les fabrications de roof top (ensembles sous pression) désignés par les types suivants :
The company hereby declare, under its own responsibility, that roof top (pressure equipment constituting the assembly) which are designated by:

Gamme / Range: BALTIC
Type / Type: Xxxxxxxxxxx
N° d'affaire / Project Number : Xxxxxxxx

Qui contiennent des fluides frigorigènes classés en groupe 2 (R407C ou R410A),
Which are containing refrigerating fluids classified in group 2 (R407C or R410A),

1. Sont conformes aux dispositions de la Directive « Equipements sous pression », 2014/68/UE
Is in compliance with the requirements of « Under pressure equipments » directive, 2014/68/EU:

Classification : « Article 4.3 » / *Classification : « Article 4.3 »*

2. Sont conformes aux dispositions de la Norme EN378-2016
Are in compliance with the requirements of EN378-2016

3. La déclaration est conforme à la législation d'harmonisation de l'Union
The declaration is in conformity with the relevant Union harmonisation legislation

4. Sont conformes aux dispositions de la Réglementation - Are in compliance with the requirements of
   - UE 517/2014 « F-gaz », relatif aux gaz à effet de serre fluorés - EU 517/2014 « F-gas », on fluorinated green-house gases.
   - CE 1005/2009 relatif à des substances qui appauvrissent la couche d'ozone - EC 1005/2009 on substances that deplete the ozone layer
5. Sont conformes aux dispositions de la directive - *Are in compliance with the requirements of*
   - « Machines », 2006/42/CE - *« Machinery », 2006/42/EC*
   - « CEM», 2014/30/UE - *« EMC », 2014/30/EU*
   - « Basse Tension »2014/35/UE, *« Low voltage », 2014/35/EU*
   - « RoHS », 2011/65/UE, *« RoHS », 2011/65/EU*
   - « DEEE », 2012/19/UE, *« WEEE », 2012/19/EU*
   - « Ecoconception », 2009/125/CE, *« Ecodesign », 2009/125/EC*

   - « Appareils à gaz », 2009/142/CE - *« Gas machines », 2009/142/EC*
     Validé par l'organisme notifié */ validated by notified body : CERTIGAZ CE1312*
     62 rue de Courcelles - F75008 PARIS

Signé par et au nom de / Signed for and on behalf of : **LGL France SAS**

Date : XX/XX/XXXX

Xxxxxx Xxxxxxx
Directeur Qualité Europe
European Quality Director

Nom de la personne autorisé à constituer le dossier technique:
Name of the person authorized to establish the technical file:

Nom / *Name*: Xxxxxx Xxxxxxx
Directeur R&D HVAC & Réfrigération EMEA
Engineering Director HVAC & Refrigeration EMEA
Adresse / *Address* : LGL France SAS, ZI les Meurières, 69780 Mions, France

Information requirements for heat pumps (EU 2016/2281)

Model:	XXXXXX
Outdoor side heat exchanger of heat pump:	Air
Indoor side heat exchanger of heat pump:	Air
Equipped with a supplementary heater:	No
Driver of compressor:	Electric motor

Parameters declared for the average heating season, parameters for the warmer and colder heating seasons are optional.

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	$P_{rated,h}$		kW	**Seasonal space heating energy efficiency**	$\eta_{s,h}$		%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j				Declared coefficient of performance for part load at given outdoor temperatures T_j			
$T_j = -7$ °C	Pdh		kW	$T_j = -7$ °C	COP_d		–
$T_j = +2$ °C	Pdh		kW	$T_j = +2$ °C	COP_d		–
$T_j = +7$ °C	Pdh		kW	$T_j = +7$ °C	COP_d		–
$T_j = +12$ °C	Pdh		kW	$T_j = +12$ °C	COP_d		–
T_{biv} = bivalent temperature	Pdh		kW	T_{biv} = bivalent temperature	COP_d		–
T_{OL} = operation limit	Pdh		kW	T_{OL} = operation limit	COP_d		–
For air-to-water heat pumps: $T_j = -15$°C (if $T_{OL} < -20$ °C)	Pdh	—	kW	For water-to-air heat pumps: $T_j = -15$°C (if $T_{OL} < -20$ °C)	COP_d	—	–
Bivalent temperature	T_{biv}		°C	For water-to-air heat pumps: Operation limit temperature	T_{OL}	—	°C
Degradation coefficient (**)	C_{dh}	0.25	—				
Power consumption in modes other than 'active mode'				**Supplementary heater**			
Off mode	P_{OFF}		kW	Back-up heating capacity (*)	elbu		kW
Thermostat-off mode	P_{TO}		kW	Type of energy input		-	
Crankcase heater mode	P_{CK}		kW	Standby mode	P_{SB}		kW

Other items

Capacity control	staged			For air-to-air heat pumps: air flow rate, outdoor measured	—		m^3/h
Sound power level, indoor/outdoor measured	L_{WA}	/	dB(A)	For water/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	—	—	m^3/h
Emissions of nitrogen oxides (if applicable)	NO_x(***)	—	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO_2 eq (100 years)				
Contact details	Lennox EMEA - ZI Les Meurières - BP71 - 69780 MIONS - FRANCE						

(*)

(**) If C_{dh} is not determined by measurement then the default degradation coefficient of heat pumps shall be 0,25.

(***) From 26 September 2018.

Where information relates to multi-split heat pumps, the test result and performance data may be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.

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