

# INSTALLATION, OPERATING AND MAINTENANCE



## **MAXIAIR MXP-HPW & HPWi** **5000 - 13500 m<sup>3</sup>/h**

**HEAT RECOVERY UNIT WITH ENTHALPIC THERMAL WHEEL,  
COMBINED TO HEAT PUMP SYSTEM**

**HPWi : With Inverter compressor**

**MAXIAIR MXP-HPW&HPWi-  
IOM-1905-E**



### Important

Before performing any operation of the machine carefully read, understand and follow all instructions listed in this manual

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## 1. SYMBOLS USED

The machine has been designed and constructed according to the current norms and consequently with mechanical and electrical safety devices designed to protect the operator or user from possible physical damage. Residual risks during use or in some intervention procedures on the device are however present. Such risks can be reduced by carefully following manual procedures, using the suggested individual protection devices and respecting the legal and safety norms in force.

The most important information concerning safety and proper use of the machine are accompanied by some symbols to make them highly visible:

	Warning
	Danger
	Danger risk of electric shock
	Attention only authorised staff
	Prohibition

## 2. WARNINGS AND GENERAL RULES

	This instruction book is an integral part of the appliance and as a consequence must be kept carefully and must ALWAYS accompany the appliance even if transferred to other owners or users or transferred to another plant. If damaged or lost, request another copy from the Manufacturer.
	Repair and maintenance interventions must be carried out by authorised staff or staff qualified according to that envisioned by this book. Do not modify or tamper with the appliance as dangerous situations can be created and the appliance manufacturer will not be liable for any damage caused.
	After having removed the packaging ensure the integrity and completeness of the content. If this is not the case, contact the Company that sold the appliance.
	The appliances must be installed by enabled companies which, at the end of the job issues a declaration of conformity regarding installation to the owner, i.e. in compliance with the Standards in force and the indications supplied in this book.
	Any contractual or extracontractual liability of the Manufacturer is excluded for injury/ damage to persons, animals or objects owing to installation, regulation and maintenance errors or improper use.

## IMPORTANT NOTES

The heat recovery unit is a machine designed and built exclusively to change air in the civil environments, incompatible with toxic and inflammable gases. Therefore it cannot be used in those environments where the air is mixed and/or altered by other gaseous composites and/or solid particles.

The use of the same for different purposes from those envisioned, not conform to that described in this manual, will make any direct and/or indirect liability of the Manufacturer automatically become null and void.

We remind you that the use of products that employ electrical energy and water requires that a number of essential safety rules be followed, including:

	This appliance must not be used by children and unaided disabled persons.
	It is prohibited to touch the appliance when you are barefoot and with parts of the body that are wet or damp.
	It is prohibited to perform any maintenance or cleaning operation before having disconnected the appliance from the mains electricity network, by positioning the plant master switch at «off»
	It is prohibited to modify the safety or adjustment devices without the manufacturer's authorisation and precise instructions
	It is prohibited to pull, detach or twist the electrical cables coming from the unit even if it is disconnected from the electrical mains
	It is prohibited to climb onto the unit, sit on it and/or rest any type of object on it.
	It is prohibited to spray or jet water directly onto the unit.
	It is prohibited to open the doors for accessing the internal parts of the appliance without first having switched off the master switch of the «system».
	It is prohibited to disperse, abandon or leave the packing materials within the reach of children, as they are a potential source of danger

## IMPORTANT NOTES

As our Company is constantly involved in the continuous improvement of its production, aesthetic characteristics and dimensions, technical data, equipment and accessories can be subject to variation. For this reason the manufacturer reserves the right to make any changes without prior notice.

### 3. PRESENTATION OF THE MANUAL

This manual describes the rules for the transportation, the installation, the use and the maintenance of the heat recovery. The user will find everything that is normally useful to know for a correct and safe installation of **MXP-HPW** and **MXP-HPWI** air treatment units.

The non-observance of what is described in this handbook and an inadequate installation of the unit may cause the cancellation of the guarantee that the Manufacturing Company grants on the same one. The Manufacturing Company, moreover, does not answer to possible direct and/or indirect damages due to wrong installation carried out by inexperienced and/or non-authorized staff. At the moment of the purchase, check that the machine is integral and complete. Claims will have to be produced within 8 days from the reception of the goods.

### 4. MXP-HPW / HPWI

**MXP-HPW** and **MXP-HPWI** fresh air handling units are distinguished by twin heat recovery system, by rotative enthalpic recovery and refrigerant reversing cycle, which helps to reduce the installed power. Thanks to scroll compressors (n°1 variable flow inverter driven type + n°1 ON /OFF type on **HPWI** version) and EC motor fans, the purpose of heat loads & ventilation control is always to achieve as the highest system efficiency as the highest reduction of energy consumption and pollutant emissions.

These units, equipped with the needed additional treatment optional systems, may be a stand-alone plant solution or can well integrate central heating/cooling systems, both series and parallel layout.

The models of **MXP-HPW** and **MXP-HPWI** series can be fitted with a ionization system of the air called **BIOXIGEN®**. This system, unique in his type, makes the air and surfaces of the machine, of the ducts and of the bordering rooms healthy and good smelling.



## 5. GENERAL CHARACTERISTICS



### 5.1 General characteristics

- Frame made from extruded Anticorodal 63 aluminium alloy bars, connected by 3-way reinforced nylon joints
- Sandwich panels, 48 mm thickness, galvanized sheet metal inner skin and precoated (RAL 9002) sheet metal outer skin; 45 kg/m<sup>3</sup> density foamed polyurethane as heat and sound insulation
- Filtering sections at both air intakes and already fitted with pressure switch, complete with 98 mm thickness ISO 16890 ePM10 50% (G4 EN 779) efficiency cell prefilters and (on fresh air intake); ISO 16890 ePM1 50% (F7 EN 779) efficiency rigid bag filters, extractable from side removable panels.
- EC motor direct driven backward curved plug fans; speed control electronics already fitted in the motor
- First step of energy recovery by enthalpic rotative high efficiency heat recovery, with hygroscopic surface (molecular sieve), already equipped with thermal by-pass management by switching off the wheel, for free-cooling / heating mode
- Second step of energy recovery (dynamic type) by air-to-air R410A heat pump system composed of two electric driven scroll compressors (each on/off controlled), evaporating and condensating reversible Cu/Al finned coils, electronic expansion valves, liquid receivers, 4-way reversible valves, high and low pressure switches, biflow freon filters, liquid indicators; single variable flow inverter driven scroll compressor as an option in place of standard ones
- Built-in electric box to control power loads, NTC temperature sensors on both air circuits, electronic controller to control room temperature (supply temperature in case of variable flow compressor), free-cooling, heating/cooling mode and defrost cycles; on board control panel.

With SCMB option, Modbus RTU protocol for Building Management System

## 5.2 Unit Technical Data

MODEL		350	500	700	1000	1350
Nominal air flow rate	m <sup>3</sup> /h	3500	5000	7000	10000	13500
Nominal external static pressure	Pa	400	400	400	400	400
Maximum external static pressure	Pa	530	590	620	590	530
Sound pressure level (1)	dB (A)	60	62	63	62	66
<b>OPERATING LIMITS</b>		<b>350</b>	<b>500</b>	<b>700</b>	<b>1000</b>	<b>1350</b>
Winter operating limits standard version (2)	°C / %	⚙	Min -10° C OUT & Min 19°C 50% IN			
Winter operating limits with RMS option (2)		⚙	Min -15° C OUT & Min 19°C 50% IN			
Summer operating limits standard version (2)		❄	Max 38°C 50% OUT & Max 27°C IN			
Airflow change range	HPW	± 10%				
	HPWI	- 30% ... +10%				
<b>UNIT ELECTRICAL FEATURES</b>		<b>350</b>	<b>500</b>	<b>700</b>	<b>1000</b>	<b>1350</b>
Electrical supply	V/ph/Hz	400 / 3+N / 50				
Max input power	kW	10	14	20	27	38
Full load amperage	A	16	22	32	43	61
<b>HEATING CAPACITIES (3)</b>		<b>350</b>	<b>500</b>	<b>700</b>	<b>1000</b>	<b>1350</b>
Static recovery efficiency	%	81.9	79.4	76.9	78	78.7
Total heating capacity	kW	47.4	66,2	94.7	134.2	189.6
Heat pump capacity	kW	13.2	19.3	31.3	42,5	64.4
Unit COP (4)	W/W	13.9	11.9	10.4	11.5	11.3
Supply air temperature	°C	28	28	29	27	30
<b>COOLING CAPACITIES (5)</b>		<b>350</b>	<b>500</b>	<b>700</b>	<b>1000</b>	<b>1350</b>
Static recovery efficiency	%	81.5	78.9	76.7	77.5	78.2
Total cooling capacity	kW	26.3	34.6	53.4	74.9	98.4
Cooling capacity	kW	16.4	22.2	36.5	51.4	65.7
Unit EER (4)	W/W	6.3	5.4	5.1	5.6	5.4
Supply air temperature	°C	18	19	18	19	18
<b>REFRIGERANT CIRCUIT</b>		<b>350</b>	<b>500</b>	<b>700</b>	<b>1000</b>	<b>1350</b>
Refrigerant - GWP		R410A - 2088				
Compressors - circuits number		2 - 2	2 - 2	2 - 2	2 - 2	2 - 2
Refrigerant filling	kg					
CO <sub>2</sub> equivalent	Ton					

(1) fresh air/supply air circuit

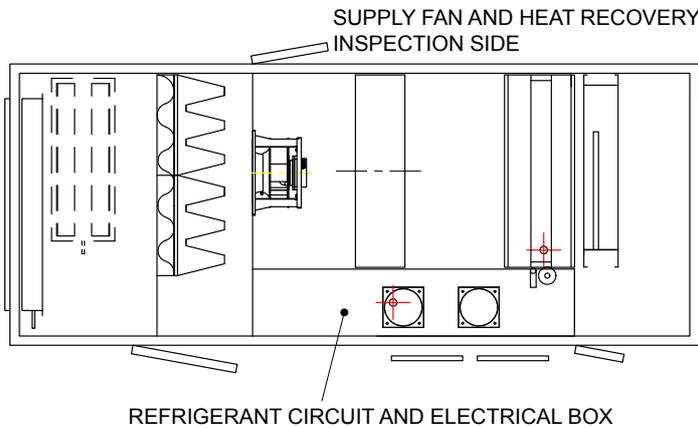
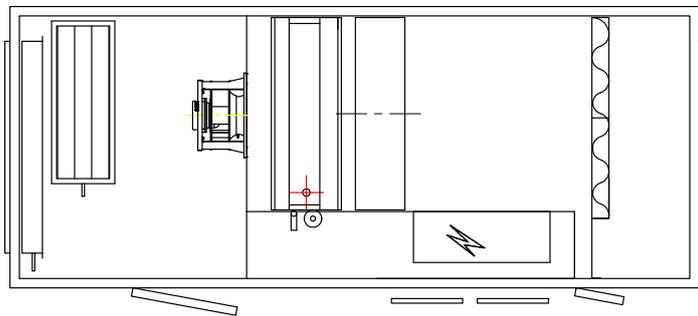
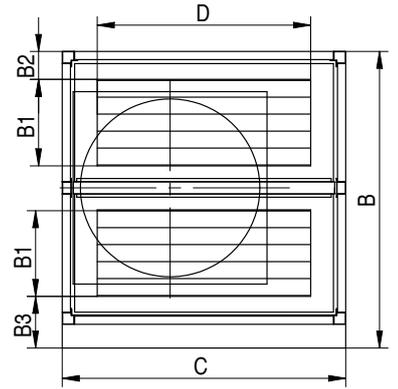
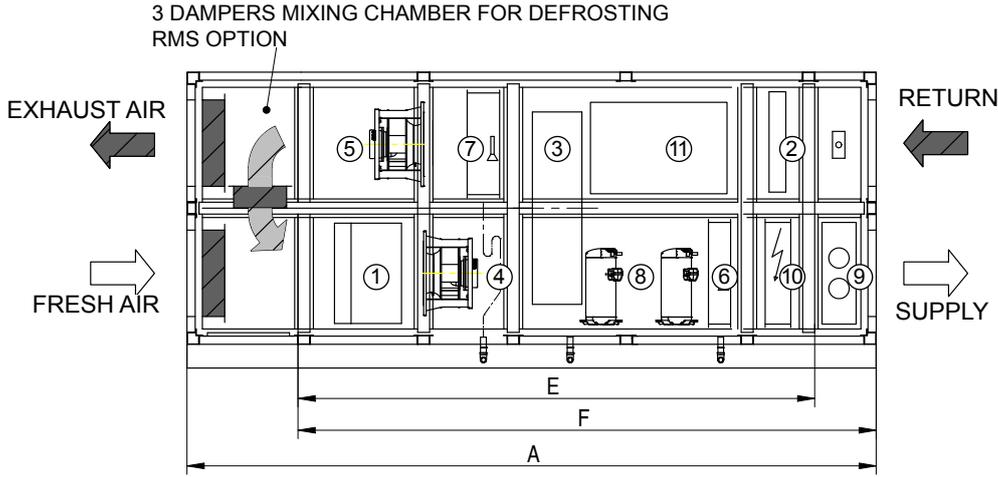
(2) return air/exhaust air circuit

(3) winter mode (outside -5°C 80% RH, inside 20°C 50% RH)

(4) summer mode (outside 32°C 50% RH, inside 26°C 50% RH)

(5) fans and adiabatic pump absorbed power included

**5.3 Configuration, dimensions and weights**



KEY	
1	Pre-filter and fine filter on fresh air
2	Filter on return air intake
3	Thermal wheel heat recovery
4	Supply fan
5	Exhaust fan
6	Condenser-evaporator
7	Evaporator-condenser
8	Compressor
9	Bioxygen module
10	Electric or water additional heater
11	Built-in electrical board

**Important**

“F” dimension is the standard unit length; “A” dimension is the unit length with RMS option.

MODEL		350	500	700	1000	1350
<b>A</b>	mm	3935	4035	4035	4235	4235
<b>B</b>	mm	1550	1750	1850	2150	2450
<b>B1</b>	mm	410	510	510	710	810
<b>B2</b>	mm	165	165	165	165	165
<b>B3</b>	mm	305	305	305	305	305
<b>C</b>	mm	1660	1660	2000	2190	2390
<b>D</b>	mm	1070	1250	1250	1700	2000
<b>E</b>	mm	3025	3025	3025	3225	3225
<b>F</b>	mm	3385	3385	3385	3585	3585
<b>Weight</b>	kg	1400	1550	1900	2200	2500
<b>Ø S</b>	in	1" M	1" M	1" ¼ M	1" ¼ M	1" ¼ M

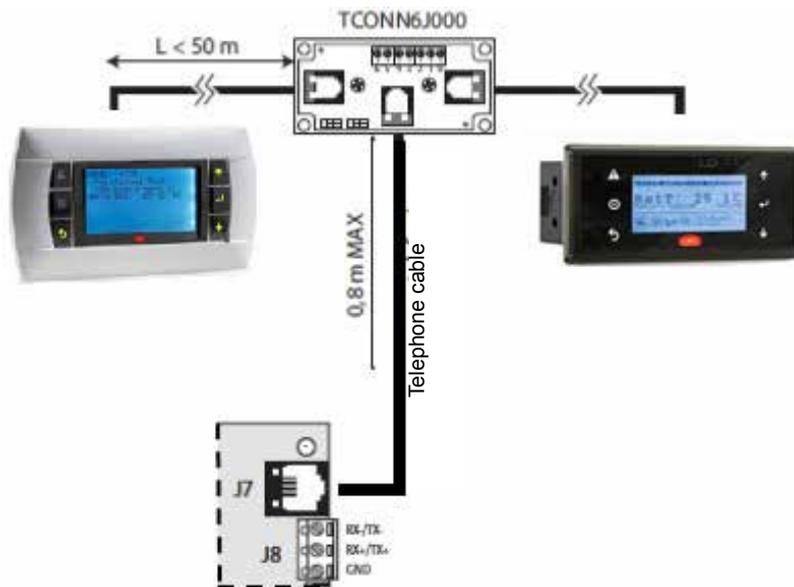
Ø S Drain

## WALL MOUNT REMOTE CONTROL PANEL TUP

TUP option is a remote panel for maximum 50m distance from the unit, by 6 ways telephone cable (not supplied by the manufacturer, but by the installer). All the informations and the features of the main display on board are repeated on the remote display.

The remote display is suitable for wall installation: all the informations for wiring and fixing are supplied with the remote display.

For the main board wiring see the picture below. Additional board with connector is installed in the unit, if specified in the order, one additional telephone cable to connect board to controller is supplied.

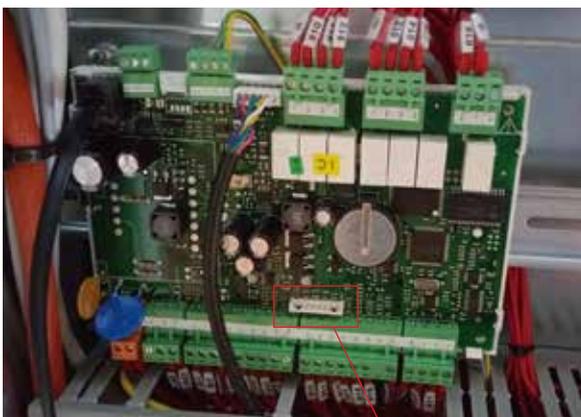


## MODBUS PROTOCOL INTERFACE PCB - SCMB

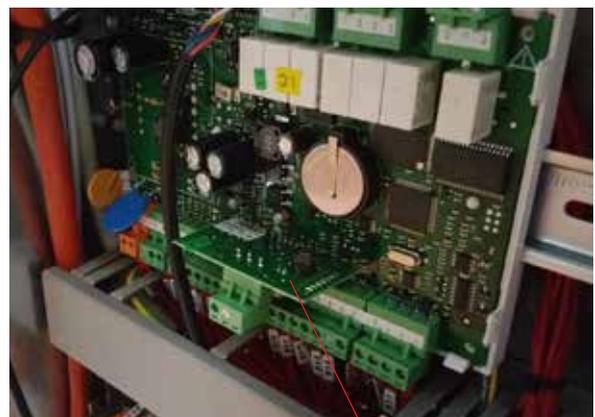
Module insertable into the control logic already wired to the electrical board, which allows the interface with a supervision system, to which you can delegate most of the control functions normally charged to the control panel, for example :

- ON / OFF unit
- Speed control fans
- Set-point adjustment

It's also possible to view all the parameters of operation of the machine.



PCB Modbus connector

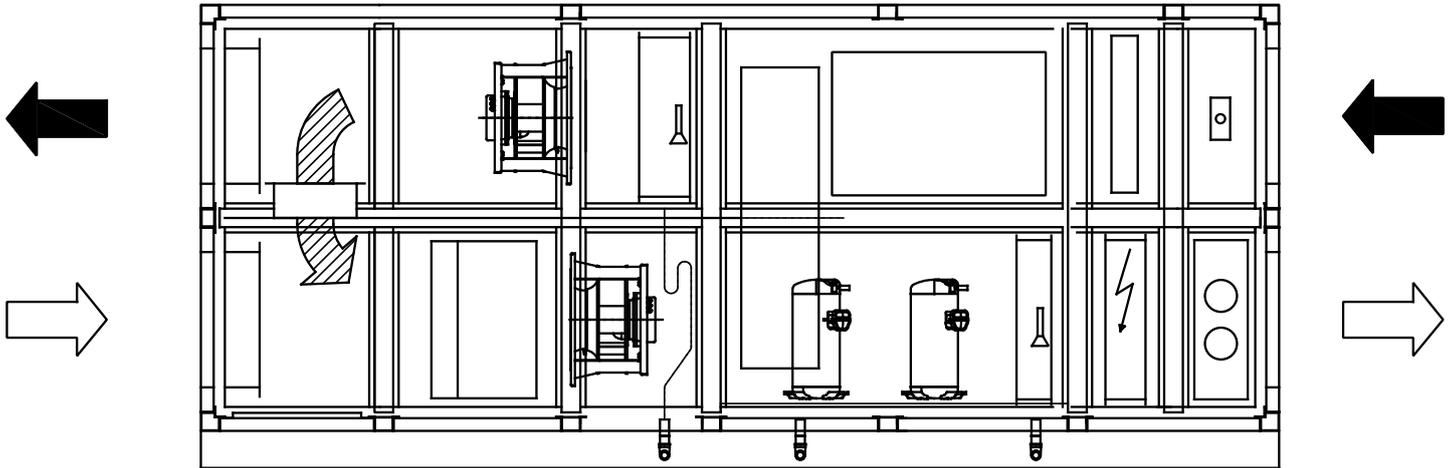


PCB Modbus

**3 DAMPERS SECTION FOR DEFROSTING WITH ACTUATORS - RMS**

Defrosting mode mixing chamber with dampers and servo actuators, that works in winter operation; it optimizes defrost cycle and the heat pump operating up to -15 °C air temperature, without electric pre-heater.

In case of heat pump defrosting, the logic control swaps the cycle, external dampers close and recirculation damper opens. The condenser coil heats up exhaust air so it defrosts also the rotative heat recovery, flowing through the recirculation damper. Warmed air flows through the evaporation coil: this permits a high efficiency defrosting operation reducing its duration and increasing the supply air temperature.



## 6. CHECKS BEFORE SHIPMENT

All the units, before being sent, undergo a series of strict checks, as listed below.

- Dimensional checks to ensure that the actual dimensions of the unit comply with those described in the constructional drawing undersigned by the customer.
- Visual inspection of the finishes
- Checks to ensure all the components are integral
- Functional test on the electric motors and the humidification pumps
- Visual check to ensure the fan impeller is balanced
- Water seal test on the tanks
- Gasket seal test
- Locking of the dampers in the closing position
- Securing of the coils (medium and large sizes only) for transport, to be released after installation on site.
- Securing of the fan vibration dampers (when considered necessary for the type of transport) which must be released before starting.
- Check to ensure the unit is supplied with all the materials for assembly on site (hardware, silicon and so on). These materials, enclosed in a suitable packaging, are placed inside the ventilating section as standard.
- Application of the identification plates.
- Application of the plates marking the discharges, water fittings, power connections, lifting eyebolts.

Upon customer request, a special certificate can be issued relating to the above checks.

## 7. TRANSPORT

All the units are supplied without packaging. Only upon request, following quotation, packaging is provided in cages, normal or special water resistant crates, etc...

- The components that, due to technical, constructional, transport or other requirements are not fitted on the unit, but sent separately either inside the unit or otherwise, are specially protected and duly described on the packing list.
- All of the units are divided into constructional sections delivered disassembled; each section can be transported by truck, with a maximum size of 2400 mm (W) x 2500 mm (H). Upon specific customer request, larger units can be made for oversized transport.
- Special care is paid during the loading (truck or container) operations.
- All the sections making up the units are handled and stowed using special spacers to protect any protruding parts, such as coil fittings, handles, hinges and so on.
- Except where otherwise agreed in advance, no other material must be stacked on the products: the manufacturer declines all liability in the event of damage deriving from such loads.

**THE FASTENING OF THE LOAD ON THE TRUCK IS THE RESPONSIBILITY OF THE CARRIER, AND MUST BE PERFORMED, USING STRAPS OR ROPES, SO AS TO AVOID DAMAGING THE CASING. UNDER NO CIRCUMSTANCES USE THE WATER FITTINGS OR THE DOOR HANDLES AS ANCHOR POINTS.**

## 8. UNLOADING

### 8.1 Checks upon receipt

When receiving the goods, **before unloading**, all the material delivered must be checked to ascertain the presence of any damage caused during transport. Any damage found must be reported to the carrier, accepting the goods with reservation and specifying the type of damage on the delivery documents.

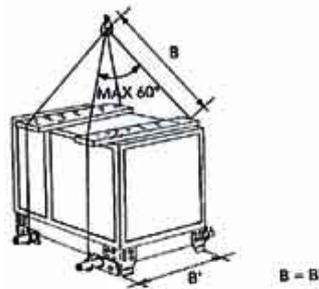
### 8.2 Hoisting and handling

The are fitted with a base frame and support feet or with a continuous support base. In both cases, special holes have been provided to insert lifting pipes for hoisting with cables.

It is strongly recommended :

**ATTACH THE CABLES AS SHOWN IN THE FOLLOWING FIGURE, INSERTING SPACERS OF AN ADEQUATE LENGTH TO PREVENT THE CABLES FROM DAMAGING THE CASING WHEN TIGHTENED**

**WHEN HANDLING THE UNITS, USE SUITABLE MEANS ACCORDING THE WEIGHTS INVOLVED, AS ENVISAGED BY EC DIRECTIVE 89/391 AND SUBSEQUENT AMENDMENTS**



- The weight of the units is shown on this manual
- Avoid uncontrolled rotations
- Place the goods down with care, avoiding sudden movements or, worse, dropping the goods.

Where the support feet are fitted, the units can be handled by fork lift:



- **WIDEN THE FORKS AS MUCH AS POSSIBLE SO AS TO BALANCE THE LOAD**
- **DIP THE ENDS OF THE FORKS TO AVOID DAMAGING THE BOTTOM PANELS.**

### **8.3 Storage**

In the event of extended storage before installation, keep the units protected from dust and bad weather and away from sources of vibrations and heat.

**THE MANUFACTURER DECLINES ALL LIABILITY FOR DAMAGE DERIVING FROM INCORRECT UNLOADING OR INADEQUATE PROTECTION OF THE UNITS AGAINST THE ELEMENTS.**

## **9. INSTALLATION AND START UP**

### **9.1 Definitions**

**CUSTOMER** - The customer is the person, the agency or the company who bought or rented the unit

**USER / OPERATOR** - The operator or user is the physical person who uses the unit for the purpose for which it was designed

**SPECIALISTIC STAFF** - It is composed by the physical trained persons, able to recognize any danger due to the proper and improper use of the unit and able to avoid or repair it.  
inflammable or toxic gases at a high temperature.

## 9.2 Safety Standards

**THE MANUFACTURER DECLINES ALL RESPONSIBILITY FOR THE FAILURE TO COMPLY WITH THE SAFETY AND ACCIDENT-PREVENTION STANDARDS DESCRIBED BELOW. IT ALSO DECLINES ALL LIABILITY FOR DAMAGE CAUSED BY IMPROPER USE OF THE HEAT RECOVERY UNIT AND/OR MODIFICATIONS PERFORMED WITHOUT AUTHORISATION.**

### **SPECIALISED STAFF MUST PERFORM INSTALLATION.**

- Wear suitable and accident-prevention clothing during installation, for example: goggles, gloves etc. as indicated in the current regulation
- During installation operate in complete safety, clean environment and free from obstructions.
- Respect the laws in force, in the country in which the machine is installed, relative to use and disposal of packaging and the products used for cleaning and maintenance of the machine, as well as complying with that recommended by the producer of these products.
- Before starting the unit, check the perfect integrity of the various components of the entire plant.
- Do not touch moving parts or intervene between these.
- Do not perform maintenance and cleaning until the electric line has been connected.
- The maintenance and replacement of damaged or worn parts must only be performed by specialised staff and following the indications given in this manual.
- The spare parts must correspond to the requirements defined by the Manufacturer.
- If the heat recovery unit must be dismantled, follow the envisioned anti-pollution standards.

**N.B.** When using the heat recovery unit, the installer and user must consider and solve all risks connected to the plant. For example, risks deriving from the entry of foreign bodies or risks due to the conveying of dangerous inflammable or toxic gases at a high temperature.

## 9.3 Preliminary information

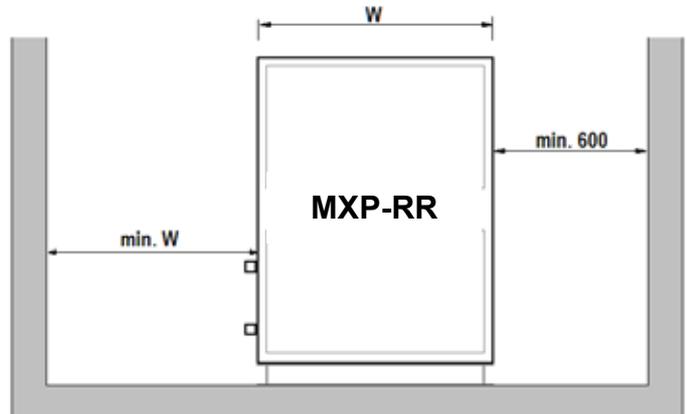
- Work while meeting the current safety regulations, ensuring sufficient space to move and the cleanliness of jobsite
- Wear protective clothing and personal protective equipment (glasses, gloves, etc.)
- Move the packed section as close as possible to the place of installation
- Don't place tools or other jobsite equipment over the packed unit
- Don't use the unit as a store of yard tools
- Don't touch moving parts and don't use them as supports
- Check the full integrity of all unit components

## 9.4 Installation location and unit positioning

- Make sure that the support surface is able to support the weight of the unit(units) and will not cause vibrations.
- Make sure that the support surface is perfectly horizontal so as to allow the correct coupling of the various sections, if necessary, making up the unit.
- Make sure the unit is level, using, if necessary, spacers below the supports, so as to ensure that the doors open correctly and the pans are drained.
- Never position the unit in rooms where there are flammable gases or acidic, aggressive or corrosive substances that may irreparably damage the various components.
- Leave a minimum amount of free space around the unit, as shown in the figure, so as to allow for installation, maintenance and the replacement of components, such as coils, filters etc.
- If the unit is hung from the ceiling, given the weights involved, all the sections that make up the air handling unit must be connected to the ceiling.

As the motor-fan assembly and the moving parts feature vibration dampers and are dynamically insulated from the structure by the vibration dampers on the base and the flexible joint on the outlet, external vibration dampers are not required. If, for technical-structural requirements, vibration damping supports are installed between the unit and the support base, elastic joints must also be used on the water fittings (coils, humidifier, drains, etc.) and on the air fittings (air outlets, fan openings, etc.).

**THE NON-COMPLIANCE OF THE GAP SPACES MAY LEAD TO THE INACCESSIBILITY TO UNIT COMPONENTS, MAKING THEM IMPOSSIBLE FOR ANY MAINTENANCE.**



### 9.5 Connection to air ducts



**IMPORTANT: THE UNITS MUST NEVER BE OPERATED IF THE FAN OUTLETS ARE NOT DUCTED OR PROTECTED BY SAFETY MESH, AS PER THE UNI 9219 AND FOLLOWING STANDARDS. CAUTIONS PERFORMED WITHOUT AUTHORISATION.**

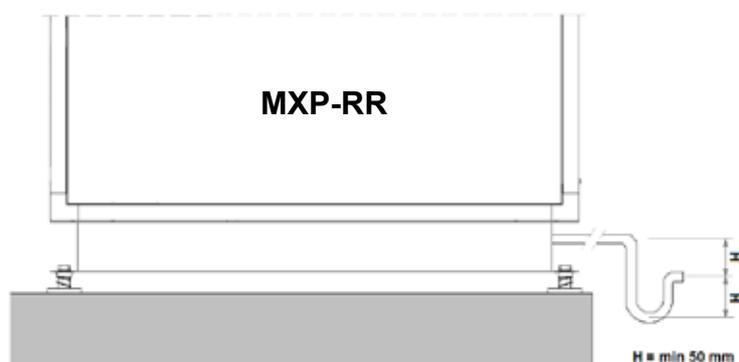
- Size air ducts depending of air plant and unit external static pressure (including possible additional air resistances due to duct sections, sound attenuators, etc.); air resistance higher than unit ESP causes a reduction of airflow rate and a consequent reduction of heat pump efficiency
- Use insulated as far as possible ducts, to reduce heat loss, to mitigate the noise into the room and to prevent condensation
- Avoid abrupt deviations or curved air ducts on unit air outlets
- Interpose anti-vibration and flexible connections between unit and air ducts, anyway, ensure electrical continuity between unit structure and air duct (if metallic)
- Avoid air supplied directly into the room and air expelled directly into the atmosphere; prefer short or long duct connection
- Compare unit sound level to the required room acoustic comfort and, if necessary, install suitable sound attenuators

### 9.6 Water connections



**THE INSTALLATION AND CONNECTION OF THE PIPES ARE OPERATIONS THAT MAY COMPROMISE THE CORRECT OPERATION OF THE SYSTEM, OR WORSE, CAUSE IRREVERSIBLE DAMAGE TO THE UNIT. THESE OPERATIONS MUST BE PERFORMED BY SPECIALIST PERSONNE.**

- For each outlet, the condensate pipeline shall be provided with a syphon to prevent the entry of odors
- Each syphon shall be sized according to instructions on fig. 3
- Each syphon shall be provided with a cap for cleaning or shall be easy to remove; prime each syphon before starting up
- Condensate pipeline shall have a fall out
- Check that pipeline doesn't stress condensate outlet connection



### 9.6.1 Water coils hydraulic connections

**THE WATER INLET AND OUTLET MUST BE FITTED SO AS TO ALLOW COUNTER-CURRENT HEAT EXCHANGE BETWEEN THE AIR AND THE FLUID (WATER OR WATER AND ANTI-FREEZE MIXTURE), WITH THE INLET AT THE BOTTOM AND THE OUTLET AT THE TOP. FOR THIS REASON, APPROVAL IS ALWAYS REQUIRED OF THE CONSTRUCTIONAL DRAWINGS THAT HIGHLIGHT THE SIDE OF THE FITTINGS. MOREOVER, THE UNITS ARE FITTED WITH SPECIAL PLATES THAT INDICATE THE WATER INLET AND OUTLET.**

- The installation and connection operations of the pipes are operations that can compromise the good functioning of the plant or worse, cause irreversible damage to the machine. These operations must only be performed by specialised staff
- The section with water coil is supplied with «male» connections with gas threading
- Tightening must be performed carefully to prevent damage to the copper collectors in the coil
- The path of the pipes must be designed so as not to create obstacles when removing the coil or the filter from the unit and to guarantee access to the inspection doors.
- Water inlet/outlet must be such to allow countercurrent heat exchange: follow the indications of the WATER INLET and WATER OUTLET plates
- Envision a high vent valve and a low discharge valve
- Clamp the pipes adequately to the outside of the section to prevent the weight being unloaded onto the coil
- When connection has been made, push the external gasket well against the panel to prevent seepage of air
- Insulation must be flush to the panel in order to prevent the danger of condensation
- Envision on-off valves to isolate the coil from the rest of the circuit in the case of extraordinary maintenance
- In the case of installation in particularly cold areas, if the use of an electric anti-freeze device or the addition of anti-freeze (glycol) to the water are not envisaged, empty the system when it remains inactive for extended periods.

**WARNING: ALWAYS USE TWO SPANNERS WHEN TIGHTENING THE COIL FITTINGS TO THE PIPES, SO AS TO AVOID STRESS (TORSION, THRUST) THAT MAY DAMAGE THE MANIFOLDS INSIDE THE UNIT.**

**WARNING: ALWAYS CHECK THE HYDRAULIC SEALING OF THE ENTIRE CIRCUIT (INCLUDING THE COILS ON BOARD UNIT) BEFORE STARTING-UP THE UNIT, PARTICULARLY IF THE LATTER IS INSERTED IN NICHES OR FALSE CEILING. IF YOU DO NOT PERFORM THESE CHECKS, WE DISCLAIM ANY RESPONSIBILITY FOR POSSIBLE DAMAGES.**

**9.6.2 Humidifier hydraulic connection with electrode steam generator**



**INSTALLATION, MAINTENANCE AND USE MUST BE EXAMINED BY QUALIFIED TECHNICIANS IN COMPLETE SAFETY.  
IN CASE OF EXTERNAL INSTALLATION THE CABINET NEEDS AN ADDITIONAL EXTERNAL ENVELOPE FOR THE PROTECTION FROM ADVERSE WEATHER CONDITIONS.**

**THE FOLLOWING PROCEDURES FOR THE INSTALLATION PHASE WILL BE LISTED BELOW. ALWAYS CONSULT THE MANUFACTURER OF THE HUMIDIFIER, DELIVERED WITH THE UNIT, FOR A MORE DETAILED GUIDE OF THE INSTALLATION AND MAINTENANCE PHASE.**

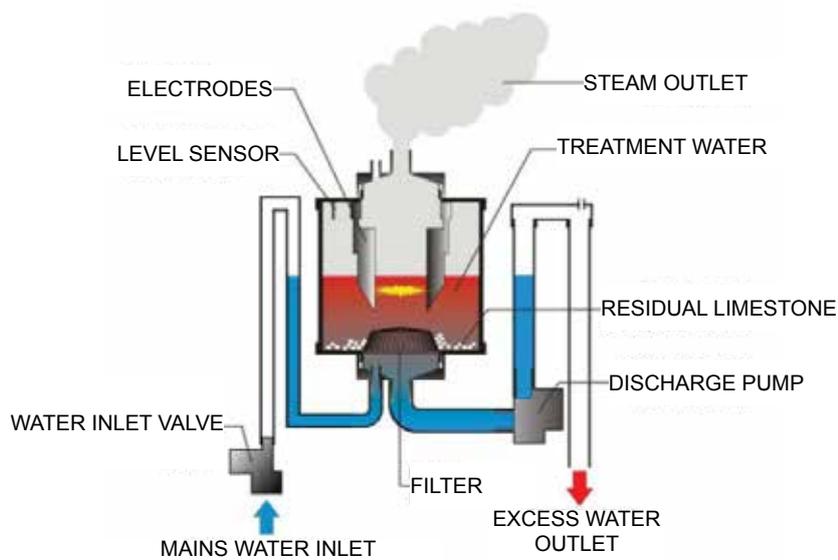
- Install the unit at a height that allows easy access to the inside of the humidifier for cylinder replacement.
- Some parts of the humidifier, during operation, can exceed the temperature of 60 ° C. Make sure that the surfaces in contact with it are compatible with these values.
- Do not install and use the humidifier in the nearness of products or objects that may be damaged in contact with water or moisture produced.
- Avoid housing in the same conduits, power cables with signal cables (probes and digital inputs).
- Reduce the lengths of the connecting cables as much as possible, avoiding that the wiring takes up the spiral shape which is harmful to possible inductive effects on the electronics. Install a magneto thermal protection switch upstream of the humidifier.
- All conductors used in the wiring must be appropriately proportioned to support the load they are to supply.
- If it is necessary to extend the probe, it is necessary to use conductors with a suitable cross-section and in any case not less than 1 mm<sup>2</sup>.
- Connect the water drain with a pipe no less than 40 mm in diameter, which does not generate bottlenecks, which does not exceed the level of the drain hose at any point of the route.
- Use only water for food with a pressure between 1 and 10 bar.

For a correct operation, the humidifier must be supplied with food water coming from the aqueduct distribution network as it is free of any element harmful to health and is compatible with the conductivity range necessary for the humidifier to function properly. Do not feed the humidifier with well water or treated with osmosis or demineralising purifiers or taken from cooling circuits. Below is a summary table of the parameters necessary for the humidifier to work properly.

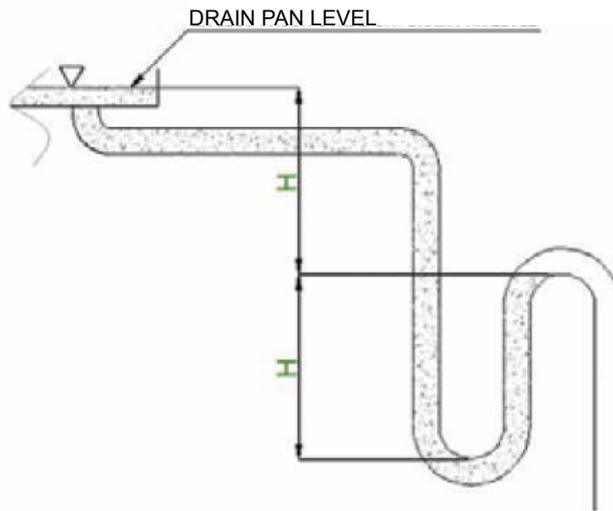
WATER OPERATING RANGE		LIMITS	
PARAMETER	U.M.	MIN	MAX
* Conductivity of water at 20° C	µS/cm	250	1300
Hardness	mg/l CaCO <sub>3</sub>	160	450
Chlorine	mg/l Cl	0	0.2
Chloride	ppm Cl	0	25
Calcium sulphate	mg/l CaSO <sub>4</sub>	0	95
Metal impurities - solvents - soaps - lubricants	mg/l	0	0
Temperature	°C	+1	+40

\* The conductivity of the water is always expressed at 20 ° C, taking into account that the conductivity decreases with the decrease in water temperature, it is possible in fact that in winter the mains water is particularly cold and therefore not conductive.

The following image is a summary of the operating principle.



### 9.6.3 Discharge connections



Connect the discharges from each condensate collection pan to the sewerage system either directly or via the manifold.

On each pan with discharge, fit a drain trap of suitable height so as to prevent air entering into the system by depression, and stopping the correct drainage of the water. A correct drain trap also prevents the infiltration of bad smell.

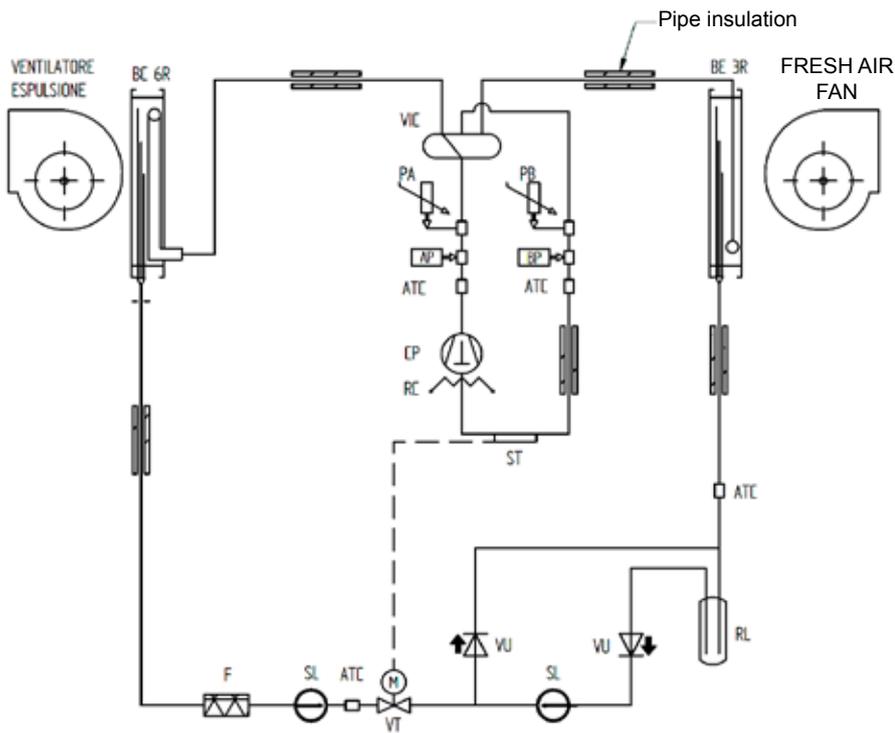
The sizing and the construction of the drain trap must comply with the following formula:  $H \geq P$ , where  $P$ , expressed in mm w.c, is equal to the pressure gain of the unit installed.

The drain trap must be fitted with a bleeding cap at the lowest point, and must be made so as to allow quick dismantling for more complete cleaning.

The path of the condensate drain pipe must always slope down towards the outside.

Check that the condensate drain pipe does not stress the discharge fitting on the unit.

**10 - REFRIGERANT CIRCUIT** 



<b>AP</b>	High pressure switch
<b>ATC</b>	5/16" access fitting
<b>BP</b>	Low pressure switch
<b>CP</b>	Compressor
<b>F</b>	Filter drier
<b>PA</b>	0-50 bar pressure probe
<b>PB</b>	0-30 bar pressure probe
<b>RC</b>	Crankcase heater
<b>RL</b>	Liquid receiver
<b>SL</b>	Liquid sight glass
<b>ST</b>	Temperature probe
<b>VIC</b>	Inversion valve
<b>VT</b>	Thermostatic expansion valve
<b>VU</b>	Unidirectional valve

## 11 - ELECTRIC CONNECTIONS

**BEFORE STARTING ANY OPERATIONS, MAKE SURE THAT THE MAIN POWER LINE IS DISCONNECTED.**

- The electrical connections must be performed by specialist personnel.
- Check that the voltage and frequency shown on the unit's rating plate match the mains power supply.

**CONNECT THE UNIT AND ALL ITS ACCESSORIES USING LESS WITH A SUITABLE CROSS-SECTION FOR THE POWER RATINGS AND IN COMPLIANCE WITH THE LOCAL STANDARDS IN FORCE. THE SIZE OF THE CABLES MUST IN ANY CASE GUARANTEE A VOLTAGE DROP WHEN STARTING OF LESS THAN 3% OF THE RATED VALUE.**

- All power lines shall be protected upstream by the installer
- Never use adapters, multiple sockets and/or extensions in the main power supply to the unit.

**THE INSTALLER MUST ENSURE THAT A POWER DISCONNECTING SWITCH AND ANY OTHER DEVICES THAT PROTECT THE ELECTRICAL PARTS ARE INSTALLED AS NEAR AS POSSIBLE TO THE UNIT.**

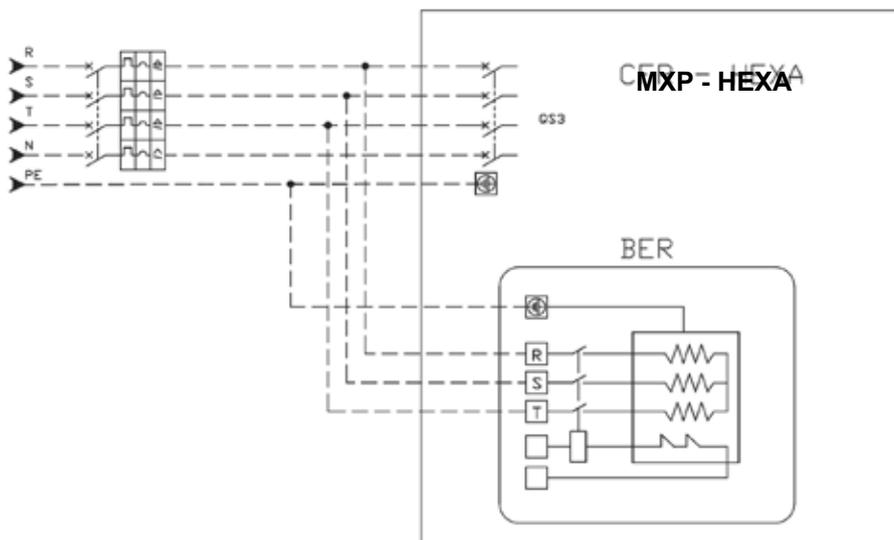
- Make connections according to the electrical wiring diagrams supplied with this unit and this handbook
- Use the cable holes close to the main switch in order to connect added options
- All the ventilating sections are fitted with door lock safety microswitches; the connections to the micro-switch must be made by the installer. The micro-switch disconnects power to the motor when opening the inspection door.
- Connect the unit to an effective earth wire.

**CAUTION: WAIT 60 SECONDS BEFORE APPROACHING AND ENTERING THE VENTILATING SECTION, SO AS TO ALLOW THE VENTILATING ASSEMBLY TO COME TO A COMPLETE STOP.**

**THE OVERALL WIRING DIAGRAM IS SUPPLIED WITH THE UNIT**

### Electric heater wiring diagram

Power line : provide a proper safety device equipped with differential magnetothermic switch



Dashed lines show the connections to be carried out by installer

## 12 - CHECK BEFORE

**ALL THE MEASUREMENTS MUST BE MADE WITH THE DOORS CLOSED. THE DOORS SHOULD ONLY BE OPENED WHEN THE UNIT IS OFF.**

Before starting, the air handling unit should undergo the following checks.

- Check that the discharges are properly connected, ensuring the correct draining of the condensate.
- Check the perfect operation of the damper mechanisms.
- Check that the pre-filters are correctly installed.
- Once realized the connection of the motor(s) of the fan(s), verify with accuracy that the contacts of the electrical clip are suitable according to the power supply.
- Verify that all electrical components are correctly cabled such as micro switch on doors, lights, humidification pumps and so on.
- Control the ground connection of the structure.
- Check the protection of the installation according to the actual norms.
- Check that any blocks of the dampers, fans, compressors, if present, have been removed.
- Check the sequence of the phases and the correct rotation cycle of the compressors.
- Check the sequence of the phases and the correct rotation cycle of the fans.
- Check the refrigerant gas level watching the liquid indicator.
- Check the oil level of the compressors watching the control light.
- Check the electrical absorption of each electrical component installed.
- Rotate by hand all the axles of the fans, to make sure they freely rotate.
- Clean the fans and all internal components of the unit from dirt, in case they remained for long time exposed to external agents.
- Check the blades of the fans, they don't have to be damaged during transport operations.
- Check the seal of the panels and of the inspection doors.
- Unlock the supports of the compressors before the start-up.
- Unlock the supports of the fans (if present) before the start-up.
- Check if the connection used is correct, it has to be compliant to what indicated in the electrical diagrams and/or in the electrical panel clips.
- Check that the syphons are realized for all drain pipes and they allow the correct emptying of the drain pans during operating time.
- Check the air diffusion elements placed in the rooms, the correct opening of the regulation and fire break shutters.
- Check if the aeraulic connection are correct.
- Check if the electrical connection of the auxiliary components are correct.
- Check the correct rotation sense of the fans. If it is not correct, reverse the electrical connection in the electrical panel.
- Check the power absorption of the fans.
- Check the correct operating of the regulating shutter.
- Power the compressors with the air handling unit turned off for at least 8 hours before the start-up of the refrigerant section, in order to obtain the oil heating by mean of the internal electric resistance inside the compressor.
- Check the opening of the valves in the delivery or the aspiration of the compressor (if present).
- Start-up the unit according to the specifics of the controller.
- Verify with a pressure gauge the pressions of work of Cooling circuit (standard check made by factory)
- Check the oil level from the proper control light.
- Once the unit has been activated check the correct exchange between freon/air and air/water (if present water coils) by measuring the thermohygrometric conditions in the input of the coil and in the air flow.
- Check the position of the rotative enthalpic exchanger and check the belt tension. Lightly press all the seals of the hentalpic rotative exchanger before the first use.

## 13 - BIOXIGEN®

### Operating principle of Bioxygen® system

The Bioxygen® technology generates a flow of ionised air with a high concentration of negative oxygen ions. The oxygen ions are produced using an oscillating electric field that makes molecules in the air vibrate, increasing their kinetic energy and as a result exchanging electrons when colliding, creating negative oxygen ions and positive ions (O<sup>2-</sup> and N<sup>2+</sup>).

That charged particles also act upon the molecules to eject electrons. Negative ions collide with airborne, particles such as dust, pollen, bacteria, dander and smoke.

The negative ion transfers its charge to the polluting particle creating a new negatively charged particle, which continue to attract positive particles until the particles become heavy enough to fall out of the air.

The ions are strongly attracted to the nearest “earthed” surface. As they drift, pollutants such as dust, pollen, cigarette smoke and even vaporized substances are attracted to and cluster around the ions. This has the effect of making the ion grow in size. There comes a point where it is too heavy to be carried in the air, so it falls to the ground. In this way it's possible to obtain a microbial reduction and a good indoor air quality without the need to include (but with the possibility) filters.

### General guidelines

This product is based on the Bioxygen® technology and is recommended for use in forced air ventilation systems such as air purification systems, air ducts, etc. The recommended air speed for all implementations is 3-6 m/s. When installing in air ducts, it is essential you keep the appliance away from air turbulences, curves and taperings.

The appliance installation is extremely simple, both when set within air purification systems and when placed inside discharge ducts.

The Bioxygen® system requires minimal maintenance, limited to periodical cleaning of the sterilizing tubes. Tube cleaning should be performed with regular frequency according to the type of implementation – from once every 3 months to once every 6 months. In the 'Maintenance' paragraph there are the operating instructions.



### Power supply

The sanitizer module leaves the production plant completely cabled and it just needs the electrical power from network and alarm contacts can be cabled or not. Electrical power has to be connected to the 3 poles socket of the module supplied with the product and it is necessary to include a residual-current switch to isolate the electrical circuit as norms require. Electrical socket fixed on the box has a fuse. Before to realize connections make sure supply voltage complies what indicated in the product label. If the product is powered, it lights up the green led and when the device is operating it's possible to hear a sizzle coming from condensers, it denotes they are operating.

In order to have a correct sanitization, the Bioxygen® module has to work only when fan is off (without forced ventilation)

## Usage

Bioxigen® modules for AHU embedded with PCB (Printed Circuit Board) are supplied by one indicator S, one switch I, a button P and by a 4 poles connector. The S indicator lights up when the device is powered and it notifies that there is electrical voltage inside the device. To turn on the product it's necessary to push the I/O switch on I position. Switch lights up and it's possible to hear a sizzle from condensers. So the device is operating.

After 15 minutes from start the device has, from points 1 and 2 of the four poles connector, a normally close contact showing the good operation.

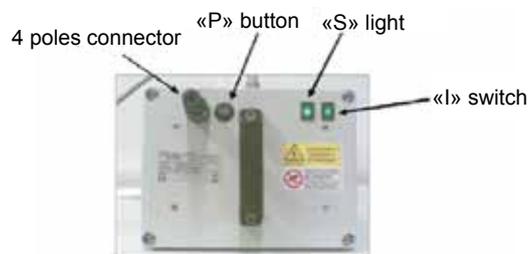
Instead between points 3 and 5 there is a normally open contact.

In case of device breakdown contacts are inverted: 1 and 2 open, 3 and 5 close.

To reset alarms push P button for 1 second.

If the alarm keeps up, please contact the producer.

Alarm contacts have also the function to indicate the need to clean condensers, this is indicated by a continuous contact inversion, from normally open to normally close position. To reset the signal that indicates device cleaning need, press P button for 3 seconds



## Maintenance

Cleaning instructions, see the images below how to take apart condensers

1. Disconnect the appliance from the power supply.
2. Disconnect the electrical plug. To reach the plug open the door/panel of the AHU. It is available near the Bioxigen® section an electric box. In the door of the AHU there is a micro-switch, it removes the electrical connection when someone opens the door ( the micro-switch has to be connected from electrician during installation)
3. Carefully detach the tube (M) from the fixing spring (S) by pulling its end to expand it. If it is present another spring along the glass tube for condensers Type F, as in Fig.3, remove it.
4. Slip the wire mesh (R) off the tube.
5. Clean the tube using a wet cloth. **IMPORTANT:** Do not use detergents, soaps or similar agents.
6. Clean the wire with water
7. Slip the wire mesh over the tube again placing it over the internal grid.
8. Set the tube back on the spring, replace the cord over the pin (T) and carefully fix it using the support screw (Q). If present, after having screwed the condensers on the bushing, apply the small metallic spring to keep the condenser type F stable on the support.
9. Set back the wire mesh over the internal grid.
10. Connect the electrical plug
11. Connect the power supply.
12. Check that the appliance works properly. Test run and verify the appliance works properly responding to controls.



Fig.3



Fig.4

**IMPORTANT: YOU MUST KEEP THE MESH AT LEAST 3 MM AWAY  
FROM THE TUBE BASE.**

**IN CASE OF MALFUNCTIONING, DISCONNECT THE POWER  
SUPPLY AND CONSULT AUTHORIZED PERSONNEL.**



Bioxigen® module needs to be included in electrical circuit protected by anti-electrical shock switch



It is forbidden to plug in socket when the electrical box is open.



Do not use soap or chemicals in order to clean.

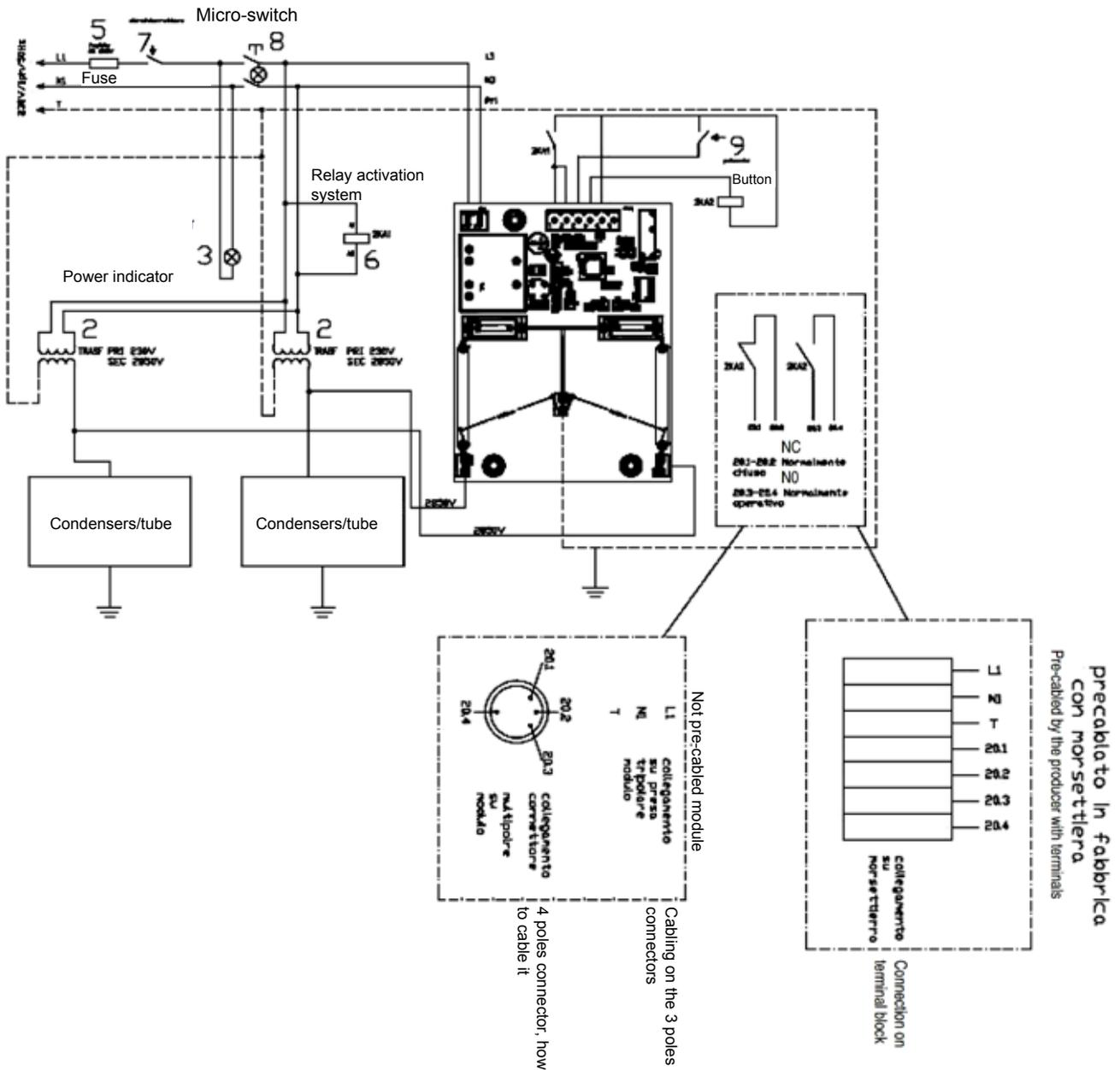
#### **General Note**

It is recommended to follow technical documentation and instructions to guarantee a safe and effective Bioxygen® functioning.



**Terminal block on board**

T	Electrical grown (indispensable)
L1	Power 230/1/50 - 2A
N1	
20.1	Contact NC - Alarm step 1
20.2	
20.3	
20.4	
25.1	Contact NC - Alarm step 2
25.2	
25.3	
25.4	Contact NA - Alarm step 2



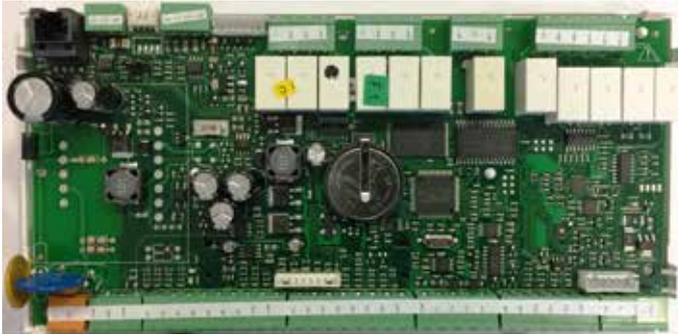
## 14 - ELECTRONIC CONTROL

Unit controller is able to control room air temperature by heat pump on/off management, according to a preassigned control logic.

Airflow rate, needed for the right air renewal and adjusted at starting-up, is not controlled by unit electronics and shall be kept within volume range.

The control system consists of:

- Power card installed inside unit electrical board
- Remote control panel, provided with keyboard and LCD display



Power card

The following table describes the I / O signals connected to the card. The «Wire Label» column refers to the wire number used in the overall wiring diagram supplied with the machine.

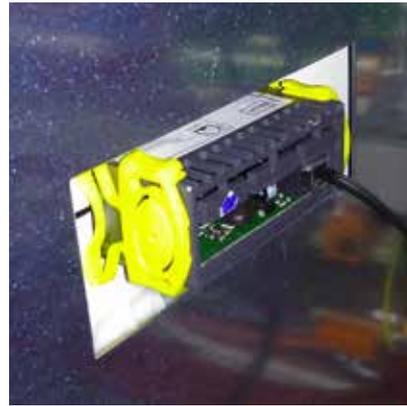
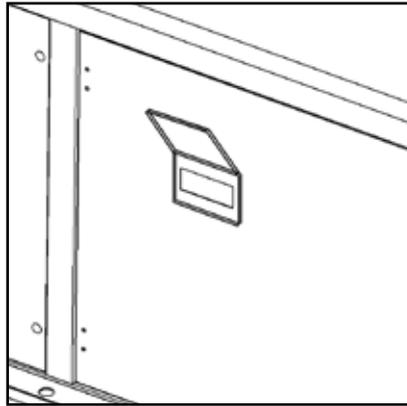
Wire Label	Digital Input	Function
9010-GND	DI1	Pressure filter switch
9011-GND	DI2	Remote On/Off
9012-GND	DI3	Compressor 1 and 2 protection
9013-GND	DI4	Fans protection
9014-GND	DI5	High pressure air switch 1
9015-GND	DI6	Low pressure air switch 1
9016-GND	DI7	High Pressure recovery (1500 Pa)
9017-GND	DI8	High pressure air switch 2
9018-GND	DI9	Low pressure air switch 2
9019-GND	DI10	

Wire Label	Analog Input	Function
B1-GND	AI1	External air probe
B2-GND	AI2	Room air probe
B3-GND	AI3	Defrost Probe 1
B4-GND	AI4	Supply air probe
B5-GND	AI5	Evap. temp. probe 1
B6-GND	AI6	Evap. press. transducer 1
B7-GND	AI7	Cond. press. transducer 1
B8-GND	AI8	Defrost Probe 2
B9-GND	AI9	CO <sub>2</sub> Probe
B10-GND	AI10	Evap. temp. probe 2
B11-GND	AI11	Evap. press. transducer 2
B12-GND	AI12	Cond. press. transducer 2

Wire Label	Digital Output	Function
8010-G0	DO1	Compressor 1
8011-G0	DO2	Thermal integration step 1
8012-G0	DO3	Fans on
8013-G0	DO4	Electric preheating
8014-G0	DO5	Inversion cycle valve 1
8015-G0	DO6	Alarm
8016-G0	DO7	Dampers I/O
8110-G0	DO9	Compressor 2
8111-G0	DO10	Inversion cycle valve 2
8112-G0	DO11	Adiabatic cooler
8113-G0	DO12	Bypass
8114-G0	AI12	Thermal integration step 2

Wire Label	Analog Output	Function
5010-GND	AO1	Supply fan
5011-GND	AO2	Exhaust fan
5012-GND	AO3	
5013-GND	AO4	Compressor 2 speed

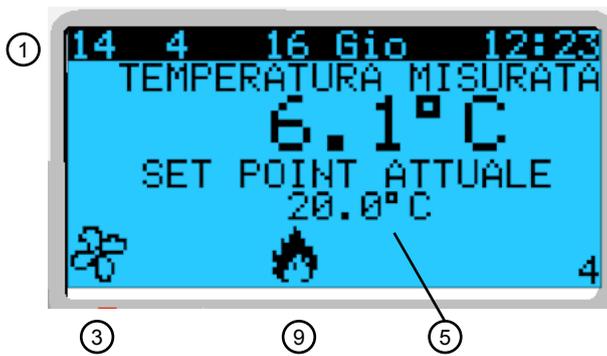
**14.1 Control panel**



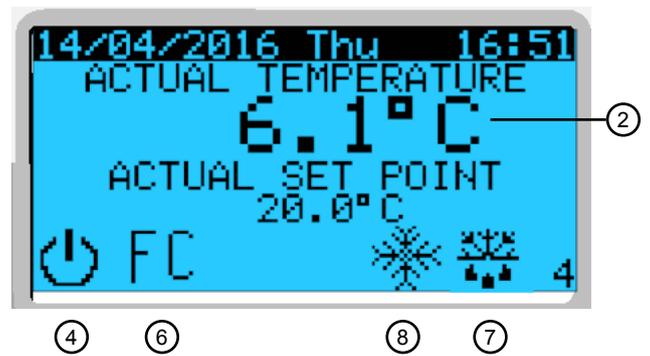
Removable (see 14.6 section)

**Meaning of buttons**

- 1. Alarm visualization /Alarm reset
- 2. Setting enter
- 3. Setting exit
- 4. Parameter list up-flow / Set value increasing
- 5. Sub list enter / Set value
- 6. Parameter list down-flow / Set value decreasing



- 1. Current time/day
- 2. Return air temperature
- 3. Unit running
- 4. Unit off
- 5. Actual set point



- 6. Free cooling mode on
- 7. Defrost mode on
- 8. Cooling mode on
- 9. Heating mode on

**14.2 Setting**

Setting of parameters can be done through the Service menu, that can be reached by pushing the programming button (with round circle symbol), which is located in central position at the left side of the screen. When the menu marked with the letters from A to H appears, the required entry can be selected by moving with the arrows up/down and pushing the button “enter” corresponding to the required entry.

**Menu A: Unit On/Off**

By entering this menu it is possible to locally turn on/turn off the unit and to exclude/include the local control to allow the turning on/off through remote control, through monitoring or time slot. The local control will have the priority on all the other external interfaces as long as it remains included.

When the blinking cursor is positioned top left, by pushing the “arrow down” you can move to the following page of the selected menu. All the pages of the menus are marked by a code in top right position, which specifies with the first letter the menu (in this case A) and with 2 digits the number of the page.

By entering page A02, there are 2 possible options:

- *Temperature control mode*: it allows to chose among Automatic (default), Hot, Cold, Ventilation only. The unit is equipped with a regulation logic that controls all the actuators to produce hot/cold air, by comparing the different temperature probes. By using this menu entrym it is possible to make the unit work only with the hot/cold actuators or to exclude them.
- *Running mode*: it allows to select the operating mode between heat recovery unit and UTA. In the heat recovery operating mode (default), when the comparison between internal and external temperature allows it, the unit does not use the actuators to produce heat/cold, because the only action of the heat recovery unit should be able to satisfy the needed thermal requirements. On the other hand, in the UTA operating mode, the unit activates also the heat/cold actuators even when the only heat recovery should be sufficient to reach the the required set point.

#### **Menu B: Set Point**

By entering this menu it is possible to program the required temperature set point.

#### **Menu C: Clock**

By entering this menu it is possible to set the current time and date, and to enter the pages for programming the time slots, if the operating of the unit with turning on/off by time slots is selected.

#### **Menu D: Input/Output**

By entering this menu it is possible to visualize the condition of all the inputs/outputs of the unit. The outputs on/off are marked by the symbols DOx, where x stands for the number of the output, whereas DIx identifies the on/off inputs.

The proportional outputs are marked by the symbols Aox, whereas the proportional inputs (as for example the temperature probes) are identified by the symbols Alx.

For the correct meaning of each of them, please see the specific electrical wiring diagram.

#### **Menu E: List of Alarms**

By entering this menu it is possible to visualize the last 50 registered alarm messages.

#### **Menu F: Substitution of the board**

This menu is reserved to the manufacturer.

#### **Menu G: Service.**

By entering this menu and the corresponding subordinate menus it is possible to set the different operating parameters. For their meaning, see the below table.

It has to be underlined that for the menus G and H the pages of the menus are marked by 2 letters and 2 numbers, where the second letter specifies the subordinate menu, so for example Ga01 stands for page 02 of the subordinate menu "a" of the menu G. The access to this menu is protected by password that is 0000.

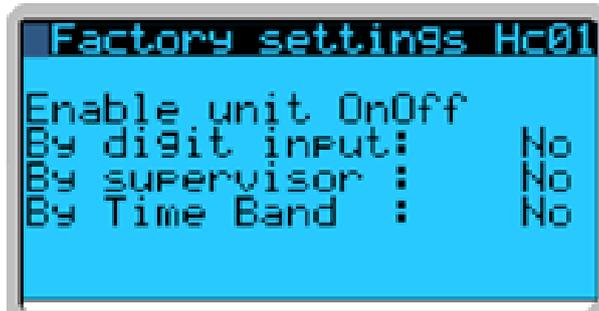
#### **Menu H: Manufacturer**

This menu is reserved to the manufacturer.

### 14.3 Remote ON/OFF start up or time bands

To start up ON/OFF remote unit or operation of time bands, follow the instructions:

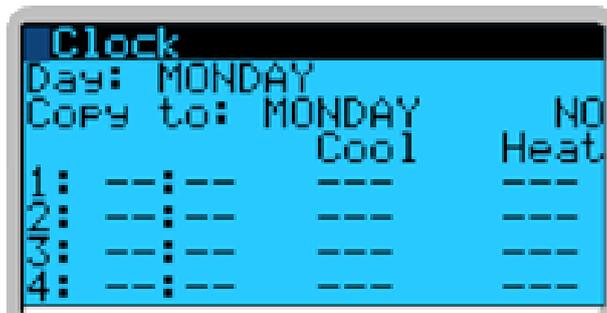
1. From the main screen press the key PRG (center button to the left) to enter the menu
2. Use down arrow key to move to the menu "Factory-H"
3. Press "enter"
4. Press 4 times the key "enter" if the password request and confirm the password "0000"
5. Use down arrow key to move submenu "c. Factory settings" and press "enter"
6. The Hc01 screen appears with the title "enable on-off unit"
7. With "enter" button move cursor under word NO in desired row and then change it in yes with arrow button, then press enter to confirm it
8. Press more time the key Esc for exit
9. From the main screen press the key PRG (center button to the left) to enter the menu
10. Enter to menu "A. On/Off unit"
11. Press YES for the voice "Exclusion of local command"

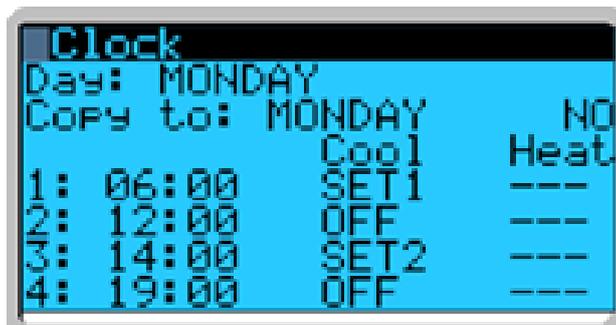


At this point it's possible to command the input unit (see circuit diagram for the connections) or by time bands. Pay attention that only after you enable the previous procedure will be able to see the pages that allow setting time bands.

Following the procedure for setting the time bands:

1. From the main screen press the key PRG (centre button to the left) to enter the menu
2. Use down arrow key to move to the menu "C. Clock/Time bands"
3. Then the page that follows to set current time and time appears
4. When the cursor blinking in the top left corner press the down arrow key
5. After, allow to set the summer time
6. Press again the down arrow key enter in time zone setting page that appears as shown the figure
7. Select in the "day" line: The day that want the time band
8. For every simple day you can select up to two time band with two different set point called SET1 and SET2. An example in picture you can see monday setting: unit will switch on at 6:00 and work to 12.00 with SET1 set point. After that at 15.00 unit will switch on and work to 19.00 with set point SET2





It is possible to copy the current day setting to other days by using the function “copy to:” that copies the current daytime settings to the target date in the “copy to:” line

#### **14.4 Electronic expansion valve management**

It's by a built in driver, based on the signals from temperature and pressure sensors in the refrigeration circuit; it's set properly by the Manufacturer and it usually doesn't require any change.

#### **14.5 Building Management System (Modbus RTU protocol)**

For setting features and data addressed management see specific document.

**OPERATIVE LISTS & SUB-LISTS STRUCTURE**

Main List	Secondary Lists	Sub-lists	Meaning
A. Unit On/Off	A01 -A02	-	Unit switch on mode / Running
B. Setpoint	B01 - B02	-	Temperature setpoint
C. Clock/Band	C01	-	Current time/day
	C02	-	D.S.T. enable
	C03	-	Time band set
	C04	-	Weekdays
	C05	-	Special days
D. I/O Info	D11-D02-D10	-	Analog inputs display
	D05-D13	-	Analog outputs display
	D14	-	Digital inputs display
	D15-D16-D17	-	Digital outputs display
E. Alarm memory	E--	-	Alarm recorder
E. Service level	a. Language set	-	Selectable language
	b. Information	Gb01 - Gb02	Info about controller & interface
	c. Summer/Winter	Gc01	Forced heating/cooling mode
	d. Time counter	Gd01	Fan running time
	e. BMS configuration	Ge01 - Ge02	Modbus protocol
	f. Service setting	Ga01	Time counter set
		Gb01 - Gb02 - Gb03	Sensor balancing
		Gc01 - Gc12	Control parameters
H. Manufacturer level	a. Configuration	Ha02 - Ha06	System configuration
	b. I/O configuration	Hb02	Digital input configuration

**14.6 Defrost mode**

This function is only available in heating mode.

It is activated when defrost sensor temperature value (SD), placed downstream winter evaporator, is kept lower than “Defrost set point” parameter for a min time. In this case, the control leaves the normal operating logic, switches fans off and reverses refrigeration cycle; this situation will be kept until SD will be higher than “defrost hysteresis” parameter and for a max time anyway. Control will try to avoid a defrost cycle by switching on the electric pre-heater (if present).

**14.7 External positioning of control panel**

It's possible to remove the control panel from its onboard site to an external positioning (for example, in case of difficult access to the unit). Operate as follows

- Access to Electrical box, positioning in OFF the switch and opening the panel.
- Remove the two yellow clips at the sides of control.
- Remove the cable
- Remove the control

**ASSISTANCE MENU SUMMARY**

Function	Window	List	Sub-list	Meaning	Possible set		
Min setpoint	Gc01		G. Service level	f. Service setting c. Regulation	13 ÷ 35		
Max setpoint					17 ÷ 35		
A0 Value					0 ÷ 5		
A1 Value					0 ÷ 5		
Min/Max fans speed	Gc08						0 ÷ 100
Defrost set point	Gc10						-10 ÷ 10
Defrost hysteresys	Gc10						-10 ÷ 10
Compressor activation	Gc12						yes - no
Timeout low pressure alarm						0 ÷ 300	
Minimum compressor on / off time						0 ÷ 5	
Expansion valve activation	Gfc13						yes - no

**15 - MAINTENANCE** 

**BEFORE PERFORMING ANY MAINTENANCE OPERATIONS, MAKE SURE THAT THE MACHINE IS NOT AND CANNOT BE ACCIDENTALLY POWERED. CONSEQUENTLY, THE POWER SUPPLY MUST BE DISCONNECTED FOR ALL MAINTENANCE.**

- The purchaser is responsible for ensuring that all maintenance operations are performed.
- The maintenance operations must be performed by trained and qualified personnel only.
- The number and the frequency of the operations to be completed for the correct maintenance of the air handling unit depends mainly on the quality of the fluids treated, that is, air and water.
- The air may be particularly damaging if it contains significant amounts of pollutants or aggressive substances:
  - Industrial exhausts
  - Salinity
  - Chemical fumes
  - Heavy dust

These substances, on coming into contact with the inside and outside surfaces of the unit, via the air flow or by direct exposure, may over time and in the event of insufficient regular maintenance, cause the structural and functional deterioration of the unit

**DURING THE MAINTENANCE OPERATIONS ALWAYS USE PROTECTIVE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT (GLASSES, GLOVES, ETC.)**

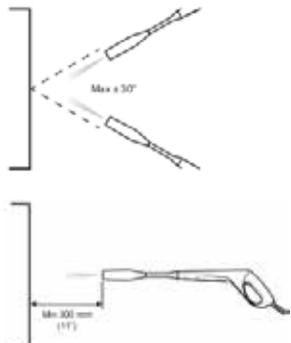
**15.1 Maintenance instructions** 

A chart should be prepared and filled in listing the procedures and the date of the inspections and the regular maintenance operations.

The following is a list of the most important inspection and maintenance operations required, with the corresponding typical frequency. It should be noted that the frequency of the operations depends on the type of installation, and therefore must be evaluated by the maintenance personnel and, if necessary, suitably increased according to the effective use of the unit.

The checks performed before starting the unit should also be repeated after each extended period of inactivity.

COMPONENT TO BE INSPECTED AND PROCEDURE	FREQUENCY
<b>AIR MIXING DAMPERS</b>	
The extruded aluminium dampers with nylon gears, not having parts subject to rust, do not require special maintenance, but rather simply normal cleaning.	Yearly
The galvanised steel dampers with movement levers must be cleaned and greased at the pins and the levers.	Yearly
The dampers located outside require more frequent maintenance.	Quarterly
<b>FILTERING SECTIONS</b>	
The pressure drop of the filters increases proportionally as they become fouled, and therefore the filters must be cleaned or replaced according to the concentration of dust or pollutants in the air. This operation is simplified if the unit is fitted with a differential pressure gauge to visually or audibly signal the pressure drop, otherwise proceed empirically based on experience, establishing, on a case-by-case basis, the frequency of the operations. The unit must not be operated without filters. Pay special attention when reassembling the filters, so as to avoid the unwanted "bypass" of air.	Monthly or fortnightly for especially dirty air

COMPONENT TO BE INSPECTED AND PROCEDURE	FREQUENCY
<b>FILTERING SECTIONS</b>	
<p><b>Regenerable pleated synthetic pre-filters G4</b>            Cleaning is possible for max 3 times and can be performed:</p> <ul style="list-style-type: none"> <li>• by simply shaking,</li> <li>• with compressed air or a vacuum cleaner,</li> <li>• by washing with a jet of water.</li> </ul> <p>Replacement is left to the judgement of the maintenance personnel, however it is recommended when the filter, after cleaning, remains dark in colour and the layer is no longer transparent when held up to the light.</p>	Monthly
<p><b>Rigid bag filters F7</b>            These filters are not regenerable and, after cleaning them a few times by shaking, should be replaced, checking the gasket that must be integral and ensure perfect seal, and therefore replaced if necessary. The fastening springs must prevent the bypass of air.            The filters should be replaced when the pressure differential exceeds 250 Pa (average value). When removing the dirty bags, close the inlet side so as to avoid spilling the dust contained inside. In this regard, the normal assembly of the filter allows the removal of the dirty bag from the air inlet side, except in cases here the configuration of the unit or the size limits do not allow.            After the filter replacing, bag it properly and bring it to the special collection center, for the next incineration.            Always remember to mount and lock the filter before the next unit switch on.</p>	Monthly
<b>ROTATIVE ENTHALPIC EXCHANGER SECTION</b>	
<p><b>MOST OF THE DIRT AND POLLUTANTS IN THE AIR WILL SIMPLY PASS THROUGH THE HEAT EXCHANGER. SUBSTANCES THAT HAVE THE HIGHEST RISK OF FOULING OF THE EXCHANGER ARE STICKY SUBSTANCES THAT CONDENSE ON SURFACES AND FIBERS. THE FOLLOWING PROCEDURES SHOULD BE FOLLOWED TO PERFORM THE CLEANING AND SANITATION OPERATIONS.</b></p>	
<p>The cleaning process can be summarized in 5 steps:</p> <ol style="list-style-type: none"> <li>1- Rinse the heat exchanger with water using high pressure water (we recommend using a pressure washer) to remove dust, particles, deposits, etc ...</li> <li>2- Use a detergent product to clean the heat exchanger (it is recommended to spray the product on the exchanger with a low pressure jet. The detergent can be diluted at the user's discretion up to 75% with water).</li> <li>3- Remove the detergent with a high pressure water jet, making sure that the nozzle of the pressure washer is set at a distance of about 300mm from the surface to be treated and with a maximum inclination of + 30 ° / -30 ° . Turn the heat exchanger to clean also the parts covered by the frame.</li> <li>4- Allow the exchanger to air dry.</li> <li>5- Perform operations 2-4 again for more thorough cleaning.</li> </ol> <p>After the cleaning process of the exchanger the sanitization process can be carried out:</p> <ol style="list-style-type: none"> <li>1- Spray the disinfectant on the surface of the exchanger and allow to dry.</li> <li>2- When it is dry, perform a thorough cleaning again with a high pressure water jet.</li> </ol> <p>Following the images of the process just listed.</p>	Annuale
<div style="display: flex; align-items: center;">   </div>	Annuale

COMPONENT TO BE INSPECTED AND PROCEDURE	FREQUENCY
<b>CONDENSATE COLLECTION PANS</b>	
<p>The water collection pans, always installed below the cooling coil and in the humidification sections, must be periodically washed to remove any deposits and dirt.</p> <p>An excessive accumulation of dirt may cause corrosion that attacks the internal insulation of the pan and, consequently, the metal.</p> <p>Wash with a strong jet of water. To empty the pan in the humidifying section with pump, unscrew the overflow pipe.</p>	Monthly
<b>VENTILATING SECTION</b>	
<b>BEFORE PERFORMING ANY OPERATIONS ON THE MOTOR-FAN ASSEMBLY, CHECK THAT THE POWER SUPPLY HAS BEEN DISCONNECTED.</b>	
<p>With the fan off, check that the fan impeller is centred on the shaft, that the blades do not rub on the scroll and that the blades are securely fastened and do not vibrate.</p> <p>The above-mentioned phenomena may appear over time due, for example, to the unintended presence of metal residues in the ducting or the natural loosening of the fastening bolts.</p> <p>The checks can be performed by turning the impeller manually.</p> <p>Check that the motor-fan assembly is correctly fitted with vibration damping supports and the condition and effectiveness of such supports.</p>	Monthly
<b>CAUTION: AT FAN INLET THE TEMPERATURE OF THE AIR FLOW MUST BE IN THE RANGE [-25 °C; + 60 °C]</b>	
<b>BIOXIGEN®</b>	
<p>Tube cleaning (see the maintenance instructions at the paragraph 15) should be performed with regular frequency according to the type of implementation – from once a month to once every 3 months</p>	Quarterly
<b>REFRIGERANT CIRCUIT SECTION</b>	
<p>Check the level of the refrigerant gas controlling the evaporative pressures and the condensation pressures of the circuit in summer and winter mode (heat pump).</p> <p>Check the proper operations of the carter resistances for each compressor.</p> <p>Check the proper operations of the pressure switch for the high pressure and the low pressure.</p> <p>Take care of the filters cleaning (if any) and of the condensation coils.</p>	
<ul style="list-style-type: none"> <li>• Cleaning of the internal and external coils</li> <li>• Cleaning of the elicoidal fans</li> <li>• Cleaning of the centrifugal fan</li> <li>• Control of the piping and their supports</li> <li>• Control of the insulation of the piping.</li> </ul>	Yearly
<ul style="list-style-type: none"> <li>• Control of the level of the refrigerant gas through the verification of the proper operating pressures</li> <li>• Control of the oil level on the proper warning light both with the compressors turned off and with the compressors switched on</li> <li>• Control of the electrical terminals on the control panel, tightned terminals</li> <li>• Control alarms and blocks (alarm list on the PLC)</li> <li>• Control of the remote signals</li> <li>• Control of the solenoid coils</li> <li>• Control of the air filters</li> <li>• Control of the bearings</li> </ul>	Six-monthly
<ul style="list-style-type: none"> <li>• Control of the electrical absorption of the compressors</li> <li>• Controls of the operations of the carter resistors for each compressor</li> <li>• Control of the electrical absorption of the fans</li> <li>• Control of the electrical absorption of the condensation elicoidal fans</li> <li>• Control of the tightness and of the state of the transmission belts</li> <li>• Control of the voltage supply of the unit</li> </ul>	Quarterly

## 16 - TROUBLESHOOTING



MALFUNCTION	POSSIBLE CAUSES	CHECK	POSSIBLE SOLUTION
Incorrect motor power input	Excessive flow-rate	Fan flow rate, static pressure and speed.	Decrease the speed of the fan, increase the pressure drop by closing the dampers
Excessive air flow-rate	Pressure drop in the distribution system overestimated	Fan flow rate, static pressure and speed.	Decrease the speed of the fan
	Inspection doors open or panels missing	Check doors and panels.	Close the doors and panels
	Filters not inserted	Check filtering sections	Insert the filters.
Insufficient air flow-rate	Filters dirty and/or coils fouled and/or humidification media fouled and/or obstructions in the air circuit (ducts, grills, etc..)	Cleanliness of the components.	Clean
	Dampers not calibrated correctly	Damper	Calibrate the damper
	The impeller turns in the wrong direction	Visually using the arrow on the scroll	Change the electrical connections to the motor
Noise	Excessive flow-rate	Flow-rate	Reduce the flow-rate
	Wear or breakage of the bearings	Bearings, condition of the fan and motor bearings.	Replace the bearings and the damaged parts
	Fan unbalanced	Vibrations on the base	Replace the fan
	Howling of the magnetic motor	Mains voltage	Restore correct mains voltage
	Foreign material in the scroll	Fan	Remove foreign bodies and check for damage.
Poor humidification efficiency with recirculation or once-through water	Media fouled	Condition of the exchanger	Clean or replace
	Insufficient water level in the tank	Tank level	Adjust or replace float, repair leaks
	Pipes blocked	Condition of the pipes	Clean pipes
	Nozzles blocked	Condition of the nozzles	Clean or replace nozzles
	Low air temperature	Section inlet temperature	Increase inlet temperature
Poor humidification efficiency with water and compressed air	Insufficient air pressure	Compressor and air distribution system	Restore rated pressure
	Insufficient quantity of water	Calibration of the atomising nozzles	Calibrate the nozzles
	Low air temperature	Section inlet temperature	Increase inlet temperature
Entrainment of water	Excessive flow-rate	Flow-rate	Excessive air flow-rate
	Drain trap clogged	Clogging of the drain trap	Clean the drain trap
	Drain trap absent	Presence of the drain trap	Install a drain trap
Presence of air in the coil Insufficient water flow-rate Insufficient water temperature	Excessive air flow-rate	Air flow-rate	Reduce the flow-rate
	Air inlet temperature not envisaged	Air inlet temperature	Increase air recirculation.
	Presence of air in the coil	Air vent	Vent the air
	Insufficient water flow-rate	Water flow-rate	Increase the flow-rate
	Insufficient water temperature	Water inlet temperature	Increase the temperature
The damper doesn't open	Locked	Damper gears.	Repair the gears and remove foreign objects
		Damper frame not square	Adjust the damper frame to make it square
		Uncoupled damper shaft	Restore the locking of the shaft with fixing grain or bolt fixing. Make it square.

These are failures of the refrigerating group and are signaled with various alarms levels up to the complete block of the unit. Failures can be divided as follow:			
MALFUNCTION	POSSIBLE CAUSES	CHECK	POSSIBLE SOLUTION
Warning from the low pressure regulator of the refrigerant circuit	Low level/charge of the refrigerant gas	Check of the pressure gauge	Fill up of the refrigerant gas
	Block of the thermostatic expansion valve	Of the thermostatic valve appears with frost	Substitution of the blocked valve
	No thermic exchange on the heat coil, air	Check the fan of the flow	Check of the electrical absorption, air flow and tightness and rotation of the belt
Warning from the high pressure regulator of the refrigerant circuit	Refrigerant Gas load exceeding the request	Verificare il corretto funzionamento delle ventole e del regolatore di giri (se presente)	Reduce the gas load
	Obstruction of the condensing coil	Check of the flaps surfaces of the coil	Clean the surface of the coil with compressed air
	Reduction of the fans on the refrigerant side	Check the proper operating of the fans and of the round regulator (if present)	Reactivation of the normal operating speed

### 16.1 - Gestione degli allarmi

Alarm code	Display message	What to do
AI1	Clock card fault or disconnected	Replace the card
AI2 (*)	Probe B01 fault or disconnected	Control the probe and connections and possibly replace it
AI3 (*)	Probe B02 fault or disconnected	As indicated above
AI4 (*)	Probe B03 fault or disconnected	As indicated above
AI5 (*)	Probe B04 fault or disconnected	As indicated above
AI6 (*)	Probe B05 fault or disconnected	As indicated above
AI7 (*)	Probe B06 fault or disconnected	As indicated above
AI8 (*)	Probe B07 fault or disconnected	As indicated above
AI9 (*)	Probe B08 fault or disconnected	As indicated above
AI10 (*)	Probe B09 fault or disconnected	As indicated above
AI11 (*)	Probe B10 fault or disconnected	As indicated above
AI12 (*)	Probe B11 fault or disconnected	As indicated above
AI13 (*)	Probe B12 fault or disconnected	As indicated above
AI14 (*)	Thermal compressors or adiabatic system pump	Control unit operating conditions, electric phases supply, electric motor winding without interruption
AI15 (*)	Doors sensor alarm	Control closing of doors
AI16 (*)	Thermal fans protection	As AI14 above
AI17 (**)	Compressor 1 Alarm High gas pressure	See chapter 17
AI18 (**)	Compressor 1 Alarm Low gas pressure	See chapter 17
AI19 (**)	Compressor 2 Alarm High gas pressure	See chapter 17
AI20 (**)	Compressor 2 Alarm Low gas pressure	See chapter 17
AI25 (**)	Too many defrost circuit 1	Control unit operating conditions, air flow rate and refrigerant filling
AI26 (**)	Too many defrost circuit 2	
AI28 (***)	Dirty filters Alarm	Pulire o sostituire i filtri; resettare l'allarme sul pannello di comando / Clean or replace air filter(s); reset alarm condition on remote control panel
AI29 (*)	Heat recovery safety pressure switch alarm	
AI30 (*)	Extended memory alarm	

(\*) Alarm that turns off the ventilation

(\*\*) Alarm will reset automatically and unit will run again, until 3 times in 1 hour; then manual reset from user display

(\*\*\*) Settable alarm: default visual alarm, settable alarm that turns off fans by parameter

## 17 - SAFETY STANDARDS

All of the MXP-HPW series air handling units are manufactured in compliance with the safety standards envisaged by the European Union Machine Directive.



All of the air handling units are applied with a danger sign to warn of the presence of moving parts.

### IT IS RECOMMENDED, EVEN IF THIS IS NOT THE MANUFACTURER'S RESPONSIBILITY:

- To fit the air handling unit with an isolating switch, especially if the electrical panel is not located nearby, so as to be able to disconnect power without the danger of interference or use by third parties.
- To install the earth system according to the standards in force.

## 18 - DISPOSAL

This symbol indicates that this product must not be disposed of with household waste. Dispose of the unit properly according to local laws and regulations. When the unit reaches the end of its useful life, contact the authorities for information on disposal and recycling possibilities; alternatively, it will be possible to request the free collection of the used equipment from the manufacturer. Separate collection and recycling of the product at the time of disposal will help and conserve natural resources and ensure that the unit is recycled in a manner that protects human health and the environment.  
AEE registry code: IT16070000009428

The following materials are used in the construction of the unit:

- Galvanised steel plate and/or plastic coated and/or stainless steel;
- Aluminum;
- Copper;
- Polyurethane and/or glass wool or mineral wool;
- Plastic;
- Refrigerant gas R407C / R410A / R134a (to recycle and dispose with proper cycle);
- Lubrificant oil POE (to recycle and dispose with proper cycle);
- Injected polyurethane (to recycle and dispose with proper cycle);
- Rehydrating filters of the refrigerant circuit (to recycle and dispose with proper cycle).





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Due to LENNOX EMEA ongoing commitment to quality, the specifications, ratings and dimensions are subject to change without notice and without incurring liability. Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury. Installation and service must be performed by a qualified installer and servicing agency.

**MAXIAIR MXP-HPW&HPWI-  
IOM-1905-E**



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