

Original Instructions

Installation Operations and Maintenance manual

SXV/Hi series

Incorporated in this manual there are the following documents:

- Declaration of conformity
- Technical schedule
- Dimensional drawing
- Wiring diagrams



**PLEASE READ
CAREFULLY**
and save this document
CONSIDER THE ENVIRONMENT

*Dear customer,
We thank you for purchasing a VORTICE INDUSTRIAL product,
manufactured with first choice materials and advanced technologies.
The quality level is under constant control, and VORTICE INDUSTRIAL products
are therefore synonymous with Safety, Quality and Reliability.*



Multiple instructions:
Consult the specific
part



Read and understand
the instructions before
undertaking any work
on the unit

The Company have the right to introduce at any time whatever modifications necessary to the improvement of the product.

Reproduction, data storage and transmission, even partial, of this publication, in any form, without the prior written authorisation of Vortice Industrial S.r.l., is prohibited. Vortice Industrial S.r.l. can be contacted for all inquiries regarding the use of its products.

Vortice Industrial S.r.l. follows a policy of continuous product development and improvement and reserves the right to modify specifications, equipment and instructions regarding use and maintenance at any time, without notice.

Declaration of conformity

We declare under our own responsibility that the units and the equipment complies in all parts with the CEE and EN directives. The CE declaration of conformity is enclosed to the technical schedule enclosed with the unit.



The unit is equipped with a series of prevention and safety devices described in detail in the accompanying documentation. The installer is required to connect and activate all these mounted components, checking their functionality.



The system or machine into which this unit is to be incorporated must also comply with the above mentioned Directives. The user, or whoever subsequently operates the system, must periodically check the functionality and efficiency of the safety devices.



The non-activation, removal or inhibition of the active safety systems, as well as the removal of the passive safety systems, exempt Vortice Industrial s.r.l. from any responsibility regarding any accident or damage, direct or indirect, to people and/or things, attributable to the machine.



The manual supplied with the unit is completed by a TECHNICAL DATA SHEET, with the fundamental constructive and functional data, and by the relative DRAWINGS.



Transport, handling, installation and subsequent operation must be carried out in full compliance with the above prescriptions, in the subsequent indications of the manual and the accompanying documentation.

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1. INTRODUCTION

Units must be installed and operated according to the instructions in this manual. Strict adherence to these simple instructions is a prerequisite to:

- eliminate or reduce shutdown time due to unexpected failures;
- improve the performance of components, resulting in energy savings;
- increase the life of components and the entire unit;
- decrease maintenance costs.

1.1 General information

This manual has been prepared to allow correct installation, set-up and maintenance of the unit. Any contractual or extra-contractual responsibility of the Company for damage caused to persons, animals or things, due to installation, adjustment and maintenance errors or improper use, is excluded. Any use other than that specified does not imply for the manufacturer any commitment or obligation of any kind.

This documentation is an informative support and cannot be considered as a contract towards third parties.

The Company implements a policy of constant improvement and development of its products. It therefore reserves the right to make changes to specifications, fittings and documentation at any time, without prior notice and without any obligation to update what has already been delivered.

1.2 Purpose and Content of the Instructions

These instructions provide essential information for the installation, operation, testing and maintenance of the machine. They have been drawn up in accordance with the legal provisions issued by the European Union and the technical standards in force at the time the instructions were issued.

The local safety regulations in force at the time of installation must be observed.

The instructions contain instructions for avoiding reasonably foreseeable misuse.

1.3 Storage of instructions

This manual and the eventual wiring diagram of the unit must be carefully stored in a suitable place, protected from dust and humidity and easily accessible to users and operators for any further consultation.

The instructions must always follow the unit throughout its entire life cycle and must therefore be passed on to any subsequent user.

1.4 Instructions update

It is recommended to check that the instructions are up to date with the latest revision available.

Any updates sent to the customer should be retained as an attachment to this manual.

The Company is available to provide any information regarding the use of its products.

1.5 How to use these instructions



The instructions are an integral part of the unit.

It is compulsory for users or operators to consult the instructions before any operation on the unit and on any occasion of uncertainty regarding the transport, handling, installation, maintenance, use and dismantling of the unit.

In these instructions, in order to draw the attention of operators and users to the operations to be carried out in safety, graphic symbols have been included that are shown in the following paragraphs.

1.6 Residual risks

A residual risk is any hazard that cannot be fully reduced by design and protective techniques, or a potential hazard that is not obvious.



ATTENTION

This manual indicates any operation that may generate a hazardous situation as well as the precautionary measures to be observed in each case.

- All units have pictograms with hazard warnings.
- The units are safe machines, provided the safety guards are not tampered with or removed.
- Technical preparation, observance of the procedures outlined in this manual, and markings at critical points on the unit will still allow safe operation.
- The following safety rules must be observed during installation, start-up, use and maintenance of the units:



- Do not operate the unit unless it and its electrical components have been connected to the earthing system;
- Do not operate unit unless fan is connected to a duct or protected with safety mesh;
- Do not use the unit as a stand for other machinery;
- Do not use unit as a walkway;
- Do not use unit as equipment storage;
- Do not open inspection panels while fan is running, especially in over pressure sections;
- Do not leave inspection panels partially closed; Make sure all handles or knobs are securely closed;



- Wear personal protective equipment before working on the unit;



- Before accessing the unit, make sure that all electrical utilities have been turned off, especially before opening the inspection panels, make sure that the fan is off and cannot be turned on again without the knowledge of the person working on the unit;



- Before starting the fan, always refit the protection cover or the closing panel of the fan section;



- Be careful when lifting the unit as its center of gravity may be severely unbalanced;
- Be careful when locking the lifting ropes/hooks;
- Be careful of sheet metal edges inside the unit;
- Be careful of sheet metal edges outside the unit;
- Be aware of possible burns from heating coils;
- Be aware of dampers that may close unexpectedly.

Whilst the unit has been designed to minimize any risk posed to the safety of people who will interact with it. It has not been technically possible to eliminate completely the causes of risk. It is therefore necessary to refer to the requirements and symbolism below.

LOCATION OF RISK (if present)	RESIDUAL RISK	METHOD OF INJURY	PRECAUTIONS AND PROTECTIONS
Mixing box with dampers and actuators	Crush	Contact	Remove voltage before any operation
Thermal heat exchangers	Small stab wounds, burns	Contact	Avoid any contact, use protective gloves
Electric heaters	Electrocution, severe burns	Contact, Fire due to short circuit or overheating of the heating elements	Periodic check of the safety devices, adhesive warning signs on the machine
Heat exchangers	Small stab wounds, crush	Contact	Avoid any contact, use protective gloves
Fans	Cuts, eye damage, broken bones	Insertion of objects through the fans are operating	Never put objects through the fans sections
External to unit: unit enclosure	Intoxication, severe burns	Fire due to short circuit or overheating of the supply cable external to unit	Size cables and mains protection system in accordance with standards regulations
Inside the unit: compressors and gas supply pipes	Severe burns	Contact	Avoid any contact, use protective gloves
Internal component: electric cables and metallic parts	Electrocution, severe burns	Defect in the supply cable insulation, live metallic parts	Adequate protection of power cables, ensure correct earthing of all metal parts
Low pressure safety valves	Intoxication, severe burns	Elevate evaporating pressure not suitable for correct operation of the unit during the maintenance operations	Carefully check the evaporating pressure during the maintenance operations
High pressure safety valves	Intoxication, severe burns, hearing loss	Intervention of the high pressure safety valve with open refrigerant circuit cabinet	Avoid, as much as possible, the opening of the refrigerant circuit cabinet; carefully check the condensing pressure value; use all protection devices as indicated by regulations in force

1.7 General Safety Symbols

Individual safety symbols in accordance with ISO 3864-2:



PROHIBITION

A black symbol inserted in a red circle with a red diagonal indicates an action that must not be performed.



WARNING

A black graphic symbol within a yellow triangle with black borders indicates a hazard.



MANDATORY ACTION

A white symbol inserted in a blue circle indicates an action that must be performed to avoid a hazard.

Combined safety symbols in accordance with ISO 3864-2:



The graphic symbol “warning” is qualified with additional safety information (text or other symbols).

1.8 Safety symbols



GENERAL DANGER

Strictly observe all indications placed beside the pictogram. Failure to observe the indications may lead to situations of risk with possible consequent damage to the health of the operator and the user in general.



ELECTRICAL HAZARD

Observe all signs placed next to the pictogram. The symbol indicates components of the unit and actions described in this manual that could create an electrical hazard.



MOVING PARTS

The symbol indicates those moving parts of the unit that could create risk.



SHARP SURFACES

The symbol indicates components or parts that could cause stab wounds.



HOT SURFACES

The symbol indicates components of the unit at elevated surface temperature which might create risk.



EARTH CONNECTION

The symbol identifies earthing connection points in the unit.



READ AND UNDERSTAND THE INSTRUCTIONS

Read and understand the instructions of the machine before any operations.



RECOVER OR RECYCLE MATERIAL

1.9 Limits of use and prohibited uses

The machine has been designed and built exclusively for the uses described in the technical manual. Any other use is prohibited as it could generate health risks for the operators and users.



However, the unit is not suitable for operation in environments:

- where vibrations are present;
- where electromagnetic fields are present;



THIS UNIT IS NOT SUITABLE FOR OPERATION IN EXPLOSIVE ATMOSPHERE.

1.10 Unit identification

Each unit has a label attached to the outside of the unit, which shows the identification data of the machine together with the main technical characteristics.

For electrical information not included on the label, refer to the electrical diagram. Check that the characteristics of the electrical network comply with the data on the identification plate.

A FAC-SIMILE of the nameplate is shown below with the relative caption of the data:

		VORTICE INDUSTRIAL S.R.L. via Bernardino Brugnoti, 3 37063 Isola della Scala Verona (Italy) - Tel. +39-045 6631042		 vorticeindustrial.com	
Range / Type	1	Year of manufacturing	8		
Serial number	2	Operating weight	9	kg	
Power supply (V/Hz/ph)	3	Max. current input	10	A	
Refrigerant type GWP	4	Auxiliary voltage	11		
Electric diagram n°	5	Electric power supply fan	12	kW	
Refrigerant Charge	C1 6 C2	Electric power return fan	13	kW	
CO2 eq.	7	Electric power compressors	C1 14 C2	kW	
LOW PRESSURE SIDE		HIGH PRESSURE SIDE			
Working pressure	15	bar	Working pressure	19	bar
Working temperature	16	°C	Max design pressure	20	bar
Min design temperature	17	°C	Min design temperature	21	°C
Max design temperature	18	°C	Max design temperature	22	°C
			Max design temperature	23	°C
			Safety pressure	24	bar
MADE IN ITALY "Hermetically sealed equipment. It contains fluorinated greenhouse gases covered by the Kyoto protocol"					

CAPTION:

- (1) Unit model and size
- (2) Serial number
- (3) Power supply characteristics
- (4) Type of refrigerant
- (5) Wiring diagram number
- (6) Refrigerant content
- (7) CO₂ equivalents
- (8) Manufactured year
- (9) Overall unit weight
- (10) Max. electric current consumption
- (11) Auxiliary voltage
- (12) Electric power input on supply fan
- (13) Electric power input on exhaust fan
- (14) Electric power input of compressor
- (15) Working pressure (low pressure side)
- (16) Working temperature (low pressure side)
- (17) Min design temperature (low pressure side)
- (18) Max design temperature (low pressure side)
- (19) Working pressure (high pressure side)
- (20) Max design pressure (high pressure side)
- (21) Min design temperature (high pressure side)
- (22) Max design temp. (gas) (high pressure side)
- (23) Max design temp. (liquid) (high pressure side)
- (24) Safety pressure (high pressure side)

In all dealings with the Company it's essential to quote the model and serial number indicated on this plate (ref. 1 and 2).



The identification label must never be removed from the unit.

2. TECHNICAL CHARACTERISTICS

2.1 Introduction

Indoor swimming pools are generally characterised by an air temperature between 28 °C and 33 °C, in order to offer bathers a comfortable environment. In principle, the air temperature in the pool rooms is almost always warmer than the outside air. These rooms are also characterised by a high degree of water evaporation which leads to a high level of humidity and an unpleasant feeling of oppressive heat. If humidity is not controlled, not only is the time spent in an indoor pool perceived as unpleasant, but the climate that forms in the environment can also cause real discomfort to the users and the public present. In addition, there is a risk that the moisture contained in the water vapour condenses on colder surfaces, such as metal components, external walls or glass surfaces.

This can lead to the formation of mould and can cause corrosion. If all this were to occur, the building would suffer considerable damage over time, which would lead to costly renovation work, accompanied by business interruptions and economic losses for the site manager. In these applications, room ventilation is mandatory and is strictly regulated by specific international regulations. Ventilation, however, involves considerable energy consumption, and good heat recovery systems combined with advanced controls systems must be used to manage it.

The most important aspect of ventilation systems in a public indoor swimming pool are not the investment costs, but the operating costs, for this reason the correct choice of the air handling unit can lead to very important savings in the long term and a recovery of costs in a very short time.

2.2 Structure and panels

Profiles 50x50 mm in self-supporting extruded painted RAL 9010 aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 50 mm thick double-wall sandwich type paneling with both exterior and interior side painted RAL 9010 galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m³ or mineral wool with density of 90 kg/m³. This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T3/TB3 according to EN1886.

2.3 Air filters

The filter sections on the return and fresh air are supplied with panel filters class ePM₁₀ 60% (M5) and ePM₁ 55% (F7) in accordance with international norms.

All units are equipped with differential pressure switches to monitor the air side pressure drops of the filtering sections.

2.4 Heat recovery

The units are equipped with a high-efficiency counter-flow heat exchanger made of aluminium treated for chlorinated environments. The heat exchanger participates to the **Eurovent Certification** program and it is sized according to the **ECO Design** specification.

2.5 Fans

The units are equipped with high efficiency plug-fan type fans with built-in brushless EC motor.

In this way it is possible to guarantee an accurate control of the airflow both in the supply and extract section, ensuring that all regulatory requirements such as SFP are met.

The airflow rate of the fan is managed through the integrated electronic control system.

2.6 Air dampers kit

The units are supplied complete with 4 regulation air dampers, each equipped with a specific actuator.

The dampers manage the air flows within the unit and control the various operating modes. They are managed directly by the microprocessor control.

2.7 Hot water coil kit

The units are supplied complete with hot water coil kit with modulating 3-way valve and water pipe kit, managed directly by the microprocessor control.

2.8 Refrigerant circuit

The thermodynamic and energy efficiency of the unit is further improved thanks to the refrigeration circuit in heat pump. The refrigerant circuit is of direct expansion type loaded with refrigerant R32, it is tested at the factory with reference to both its tightness (pressure test) and its functionality.

The main components are: finned pack heat exchangers, solid cartridge acid filters, high and low refrigerant pressure switches, liquid/humidity indicator light, possible high pressure safety valve.

The circuit is also equipped with an electronic expansion valve managed in such a way as to guarantee the correct overheating of the refrigerant that reaches the refrigeration compressor in the various operating modes.

2.9 Compressors

The refrigerant circuit is equipped with rotary compressors with a brushless DC motor suitable to be managed by an inverter, for a continuous control of the refrigeration capacity. The compressor is complete with thermal protection, crankcase heating and vibration dampers suitable for isolating vibrations.

2.10 Direct expansion coils

The evaporative-condensing coils consist of internally and mechanically expanded striped copper tubes and epoxy painted aluminium fins, that guarantees rapid drainage of condensation and reduced drag effects as well as increased corrosion resistance due to chlorine products in the treated air. The galvanised painted condensate drain pan with ductable outlet complies with ASHRAE 62-89 self-draining standards.

2.11 Controls

The unit is managed by a microprocessor electronic board with dedicated software and external LCD display as user interface. Through the external or remote LCD display it is possible to set all the working set-points of the unit and display the operating status and any alarm conditions present.

Through the values acquired by the room temperature probe and the supply air, the thermoregulation will be managed by activating the compressor with reference to the set-points.

The unit can manage the automatic change of operating modes by comparing the temperature and humidity of the outside and room air. The thermal capacity delivered by the heat pump unit will be continuously modulated through the speed variation of the refrigeration compressor.

This characteristic allows the operation at partial loads with a much higher energy saving compared to a traditional system equipped with ON/OFF compressors. The microprocessor also activates and modulates all the dampers of the unit and optimizes all the operating parameters of the refrigerant circuit.

The RS485 interface is standard (MODBUS protocol) to be used for connection to remote supervision and control systems. The control can also be supplied with a second remotable control panel (optional).

2.12 Testing

Units are fully assembled and wired at the factory and subjected to a complete functional test before shipment. They are manufactured in compliance with the safety standard of the Machinery Directive 2006/42/EC, the Low Voltage Directive 2006/95/EC, and the Electromagnetic Compatibility Directive 2004/108/EC and therefore complies with the "Health and safety requirements" prescribed. Units are provided with CE markings, certificate of conformity, user and maintenance manual.

2.13 Packing

Units are supplied on thick wooden pallets and wrapped in plastic film to protect against impacts during transport and handling on site.

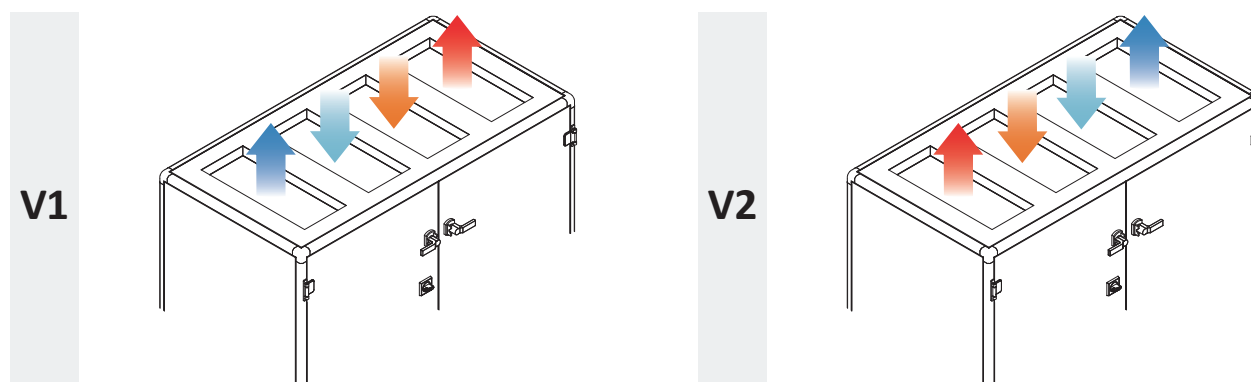


REMOBILE CONTROL PANEL

All units are supplied complete with a remotable control panel with LCD graphic display.

The clean and modern lines and the installation options, panel or wall mounted (with its own power supply or from a controller), make them easy to integrate into any type of environment.

3. CONFIGURATIONS

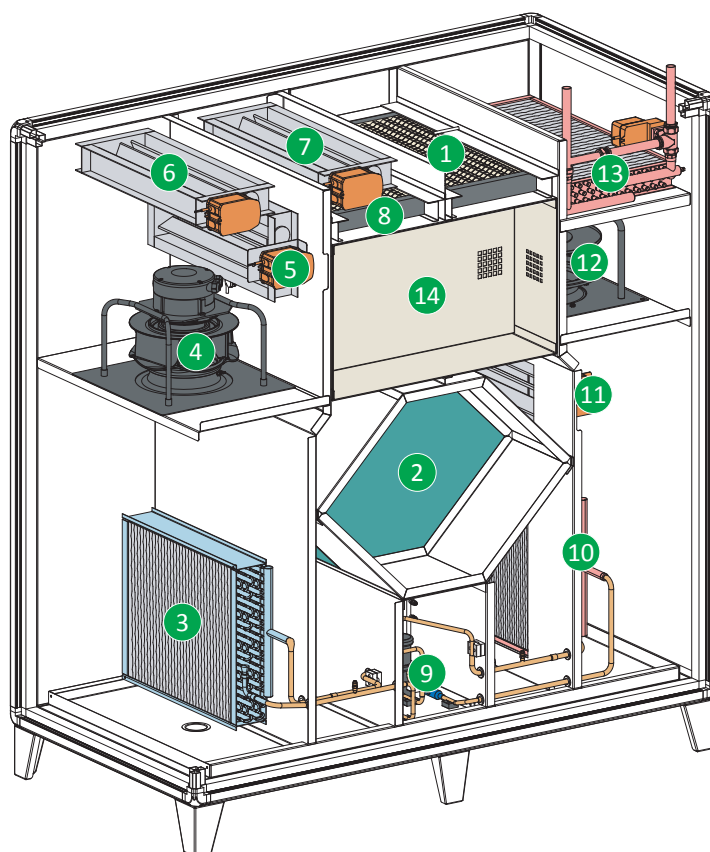


CAPTION

— RETURN AIR
— EXHAUST AIR

— FRESH AIR INLET
— SUPPLY AIR

4. MAIN COMPONENTS OF THE UNIT



- | | |
|----|--|
| 1 | Return air filter |
| 2 | Counterflow heat recovery |
| 3 | Evaporator coil |
| 4 | Backward curved blades fan, EC motor brushless with external rotor (exhaust air) |
| 5 | Alpha cycle damper |
| 6 | Air exhaust damper |
| 7 | Fresh air intake damper |
| 8 | Fresh air intake filter |
| 9 | Compressor with heat pump refrigerant circuit |
| 10 | Condenser coil |
| 11 | By-Pass damper on heat recovery |
| 12 | Backward curved blades fan, EC motor brushless with external rotor (supply air) |
| 13 | Post-heating coil with hot water |
| 14 | Electrical panel |

5. AVAILABLE ACCESSORIES

TCP/IP ethernet and modbus port | BACnet and ethernet port

Ethernet port for connection to BMS network via Modbus or BACnet.

Second remotable control panel with LCD display

All units are supplied as standard with a microprocessor control panel with high-resolution display, installed on board the unit. It is possible, however, to install a second control panel remotable up to 50 m away.

Flexible joints kit for duct connections (4 pcs)

Flexible joint for rectangular ducts, complete with galvanized steel flange and screws.

6. OPERATING MODE

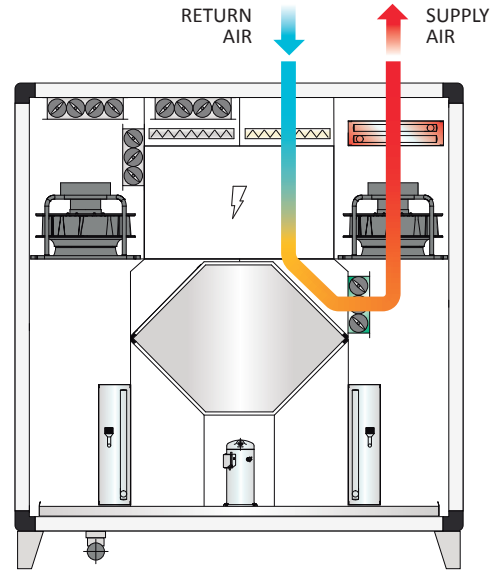
6.1 RECIRCULATION 100%

The unit operates in 100% recirculation mode with no fresh air inlet.

The pool room air is recirculated and heated by the water coil within the unit and supplied by an external energy source (e.g. boiler or heat pump).

The unit's heat pump circuit is stopped and the fans operate at a constant flow rate in modulation mode to minimise the unit's power consumption.

This mode is used during the unit start-up or night operation.

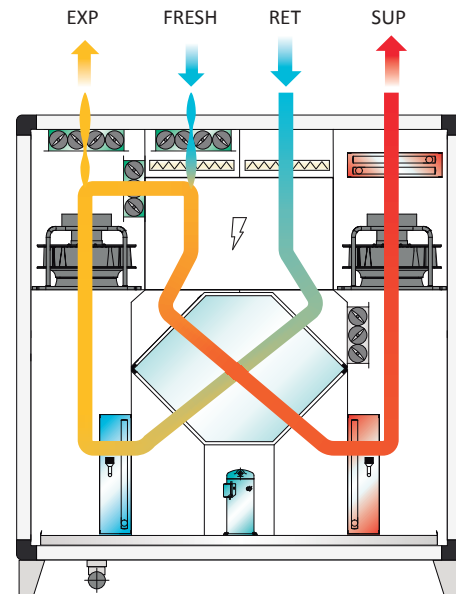


6.2 "ALPHA" CYCLE

In certain climatic conditions or when it is energy-efficient, the unit reduces the amount of fresh air to a minimum and activates the heat pump circuit.

Part of the air taken in from the room is recirculated downstream of the evaporator, where the recovery of the latent and sensible load takes place (thus dehumidifying the air), and then sent to the condenser, thus delivering warm dehumidified air into the room with very high energy efficiency.

A (variable) percentage of the air flow is however expelled and reintegrated with fresh air, guaranteeing the hygienic requirements of the pool room. In the event that the air temperature is still not warm enough, integration with the heating water coil takes place.



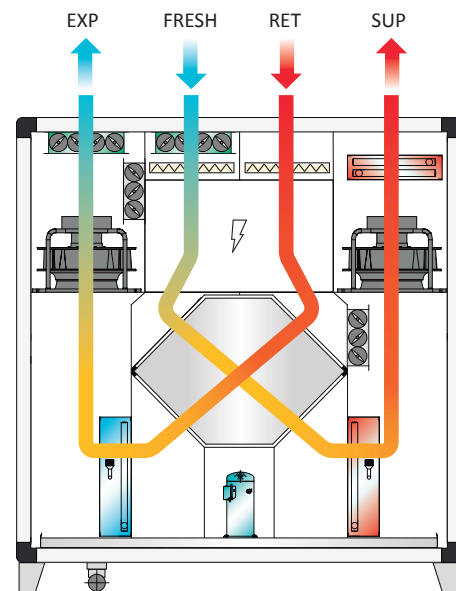
6.3 FRESH AIR 100%

When outdoor and room conditions are convenient, the unit operates with 100% fresh air.

The by-pass damper of the heat recovery is closed and dehumidification takes place using the thermo-hygrometric conditions of the fresh air.

In this mode, the heat pump circuit is used as a second system to recover the energy expelled from the room, recovering the sensible and latent load in the evaporator and then transferring it to the condenser, thus delivering warm dehumidified air into the room with very high energy efficiency.

In the event that the air temperature is still not warm enough, integration with the heating water coil takes place.



7. TECHNICAL DATA

MODEL		011	015	021	031
Nominal airflow rate	m ³ /h	1000	1500	2000	3000
External air flow	%	0 ÷ 100	0 ÷ 100	0 ÷ 100	0 ÷ 100
Dehumidification capacity ⁽¹⁾	kg/h	16,9	25,4	33,8	48,0
Dehumidification capacity ⁽²⁾	kg/h	3,8	5,5	7,1	10,9
Nominal electric power absorbed ⁽¹⁾	kW	1,02	1,65	1,73	2,78
Max electrical power absorbed	kW	4,05	4,45	4,45	6,80
Max electrical current absorbed	A	10,4	10,4	12,4	13,0
Type of heat recovery system (HRS)	type/n°				
Thermal efficiency recovery ⁽¹⁾	%	89,1	89,1	89,0	88,6
Thermal power recovery ⁽¹⁾	kW	10,5	15,7	21,0	31,4
Thermal power of refrigerant circuit ⁽¹⁾	kW	3,25	5,00	5,14	7,87
Total thermal power of unit ⁽¹⁾	kW	20,4	29,7	38,5	55,6
COP refrigerant circuit ⁽¹⁾	w/w	5,80	5,81	6,27	6,25
Compressors / Refrigerant circuits	n°	1 / 1	1 / 1	1 / 1	1 / 1
Type of refrigerant / GWP		R32 / 675			
Hot water coil heating capacity ^{(1) (3)}	kW	6,27	8,60	10,90	16,30
Heating coil waterflow ^{(1) (3)}	l/h	550	750	1000	1430
Hot water coil + valve kit water pressure drops ^{(1) (3)}	kPa	15	20	26	35
Type of fans	type/n°	EC / 2	EC / 2	EC / 2	EC / 2
Supply fan available static pressure	Pa	150	150	150	150
Return fan available static pressure	Pa	150	150	150	150
Max. external / internal leakage percentage	%	max 3,5 % at -400 Pa max 5,0 % at +250 Pa			
Energy classification filters		ePM1 55% (F7) ePM10 60% (M5)			
Filters pressure switch		present			
Sound power level LWA ⁽⁴⁾	dB(A)	79	78	82	85
Sound pressure level ⁽⁵⁾	dB(A)	64	62	67	69
Power supply	V/ph/Hz	230/1/50	400/3/50		

⁽¹⁾ 100% external air flow, external air conditions -5°C / 80% R.H. ambient air conditions 30°C / 60% R.H.

⁽²⁾ ambient air conditions 30°C / 60% R.H. all recirculation

⁽³⁾ inlet/outlet water temperature 70/60°C

⁽⁴⁾ sound power level calculated in accordance with EN 3744

⁽⁵⁾ sound pressure measured at 1 m free field distance, in accordance with EN 3744

8. VENTILATION CURVES

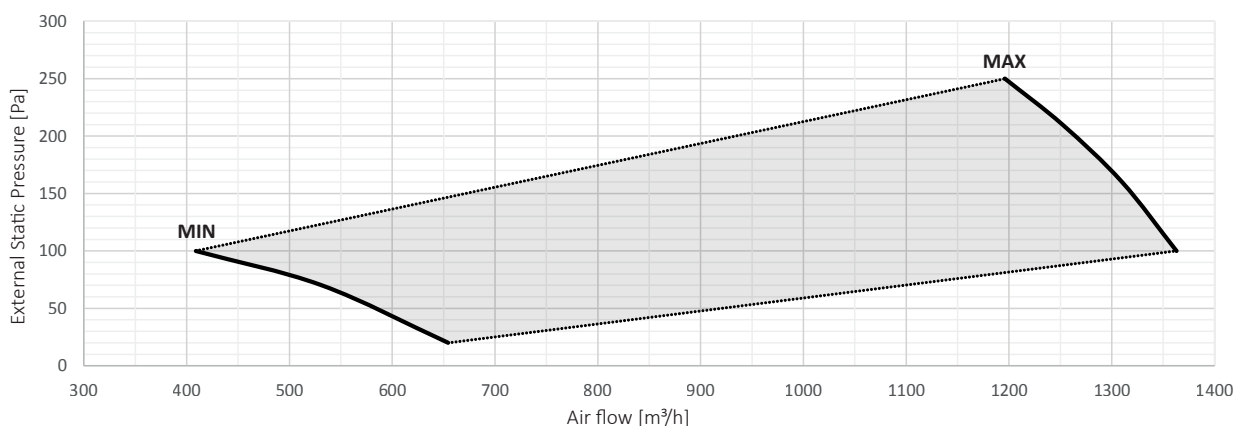
The graphs below indicate the operating limits of the EC fans installed on the units.

Consider the static pressure shown as available for ductwork, having a unit equipped with ePM₁₀ 60% (M5) filters on the return side and ePM₁ 55% (F7) on the supply side.

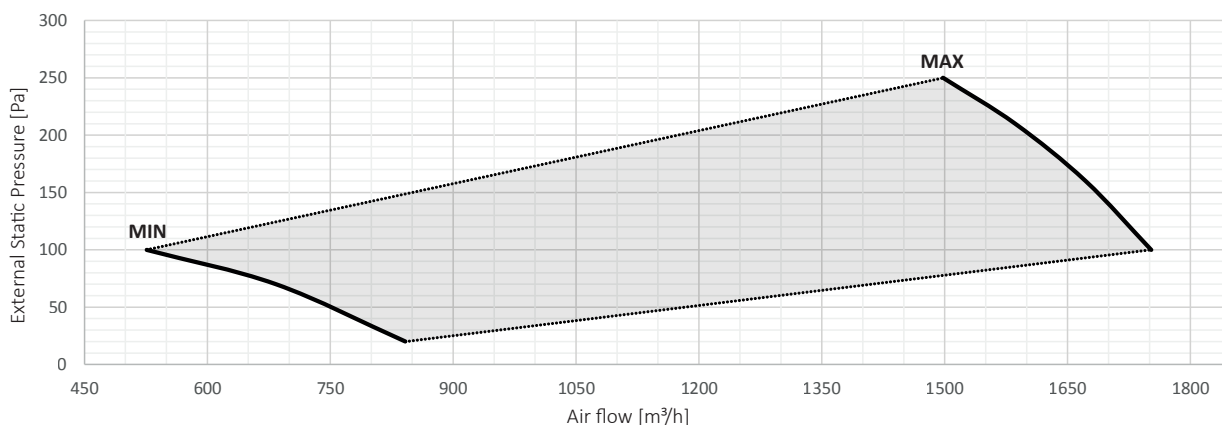


The operating limits of the units may vary depending on the configuration and the components installed. For different unit configurations, please refer to the selection software or contact the company.

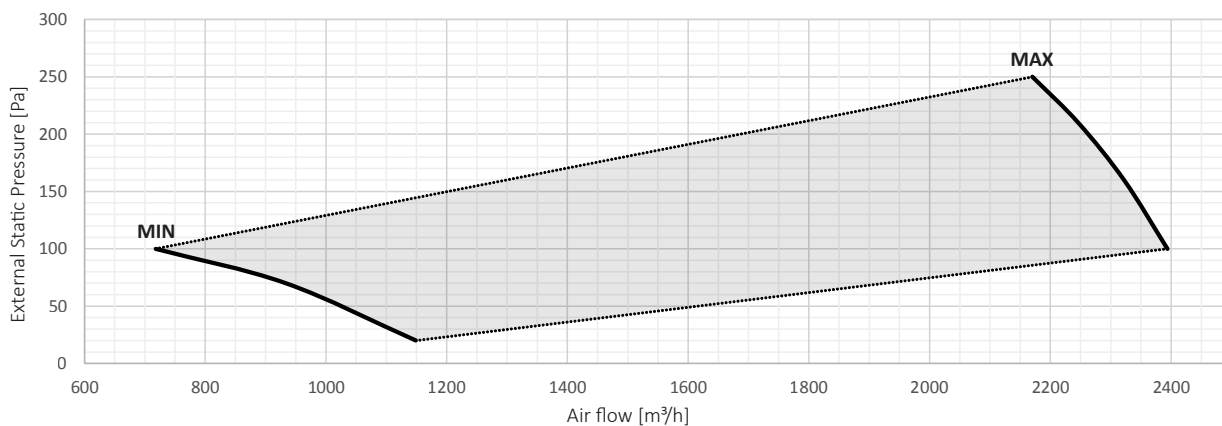
SXV/Hi 011



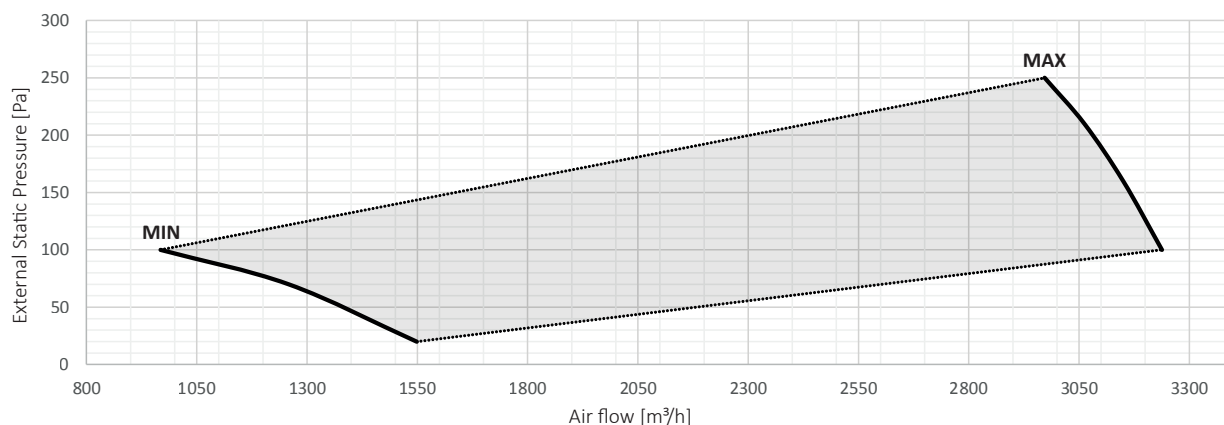
SXV/Hi 015



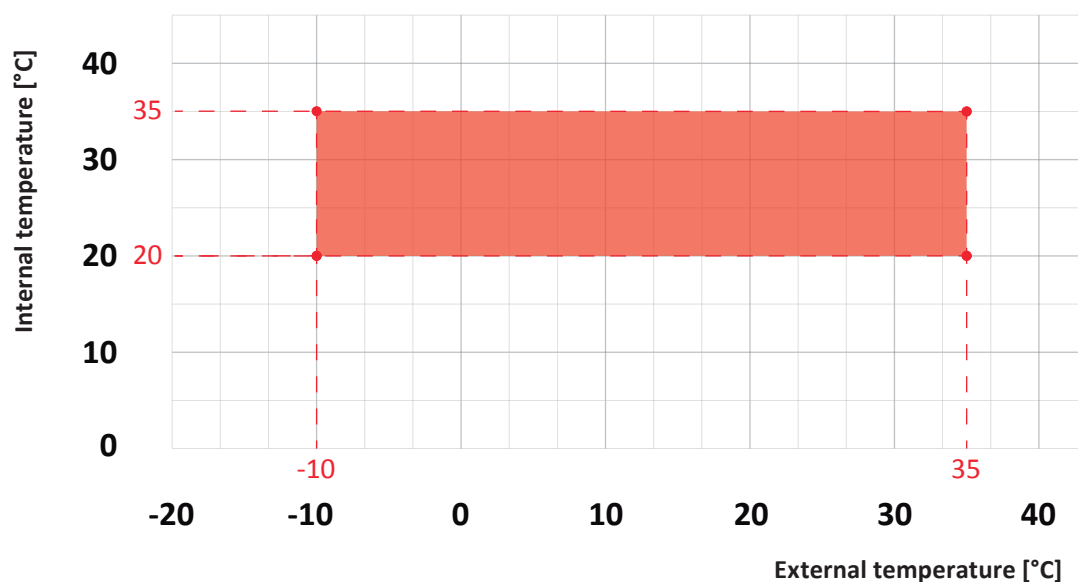
SXV/Hi 021



SXV/Hi 031



9. OPERATING LIMITS



It is mandatory to use the units within the operating limits shown in the diagrams above. The warranty will immediately expire if the unit is used in working conditions outside the above limits. If it is necessary to operate in conditions outside the operating range of the unit, please contact our technical department.



The units are designed and built to operate with supply water temperatures up to 80°C.



The units are NOT suitable for outdoor installation.

10. SAFETY AND CONTROL DEVICES

- **Supply air temperature probe**

Passive sensor type NTC 10kΩ. Positioned on the supply air side, downstream of the heating/cooling units, it is used to monitor the temperature of the air supplied to the room. It is installed in combination with the temperature control accessories (water coils or post-heating electric resistance). Through this probe it is also possible to control eventual air delivery temperatures in the environment that are too cold in summer or too hot in winter.

- **Return air temperature probe**

Passive sensor type NTC 10kΩ. Positioned on the room air intake and upstream of the filtering section, its purpose is to monitor the temperature of the air extracted from the room to be treated. Always present in all units, it is used as a control probe of the room temperature set and for the management of the summer free-cooling function.

- **Outdoor air temperature probe (fresh air)**

Passive sensor type NTC 10kΩ. Positioned on the fresh air intake and upstream of the filtering section, it is used for monitoring the temperature of the fresh air entering the heat recovery unit. Always present in all units, it is used in combination with the room air intake temperature probe to manage the summer free-cooling function.

- **Exhaust air temperature probe**

Passive sensor type NTC 10kΩ. Positioned on the air outlet and downstream of the plate heat exchanger, it monitors the temperature of the air exhausted from the unit. It is installed in combination with the defrosting kit with the function of controlling the exhaust temperature of the plate heat exchanger in order to avoid freezing of the same during the winter operation of the unit.

- **Source exchanger defrost kit**

The source heat exchanger defrost kit is composed of a pressure transducer and a cycle inversion valve, directly managed by the microprocessor control. In case, in heating mode, the conditions downstream the plate heat exchanger should fall below the ice formation threshold, the defrost system would activate, which would invert the refrigerant gas flow and send hot gas to the heat exchanger to defrost.

As soon as the conditions downstream the heat exchanger would allow, the heating operating mode would be reset.

- **Differential pressure switch**

This component is used to monitor the clogging status of the air filters. There are two pressure switches for each unit, one installed on the fresh air filter section and one located on the room return air filter section. If one of the filters has a pressure difference greater than the recommended limit, an alarm is displayed on the user interface.

- **Differential pressure transducer**

Active type transducer with 4-20mA output signal. It is located inside the control board and connected to the supply fan pressure sockets. The task is to maintain the air volume as constant at the variation of the internal pressure drop (dirtying of the filters).

- **Low pressure switch**

The low pressure switch stops the unit when the suction gas pressure is lower than the default value. The reset is automatic and it takes place when the gas pressure is superior to the set differential value. The pressure switch is set to allow for a maximum of 3 automatic resets per hour.

- **High pressure switch**

The high pressure switch stops the unit when the supply gas pressure is above default value. The reset is automatic and it takes place when the gas pressure is below the set differential value. The pressure switch is set to allow for a maximum of 3 automatic resets per hour.

- **Compressor discharge temperature sensor**

Passive NTC-type sensor mounted on the compressor discharge side, used to limit the discharge gas temperature.

11. INSTALLATION

General warnings and use of symbols



Before carrying out any type of operation, each operator must be perfectly familiar with the operation of the machine and its controls and must have read and understood all the information contained in this manual.



All operations performed on the machine must be carried out by qualified personnel in compliance with the national legislation in force in the country of destination.



Installation and maintenance of the machine must be performed in compliance with applicable national or local legislation.



Do not approach or insert any object into moving parts.

Workers' Health and Safety



The operator's workstation must be kept clean, tidy, and free of objects that may restrict free movement. The workplace should be adequately lightened for the intended operations. Insufficient or excessive lighting may present a hazard.



Ensure that the ventilation of the working areas is always optimal and that the extraction systems are always functional, in good condition and in compliance with the legal requirements.

Personal protection devices



Operators carrying out installation and maintenance of the machine must wear the legally required individual protective equipment listed below.



Safety footwear.



Eye protection.



Protective gloves.



Hearing protection.



Respiratory protection.

11.1 Receipt and inspection

When installing or working on the unit, it is necessary to scrupulously follow the instructions given in this manual, observe the indications on board the unit and in any case apply all necessary precautions. Failure to follow these instructions may result in dangerous situations.

Upon receipt of the unit, check its integrity: the machine left the factory in perfect condition; any damage must be immediately reported to the carrier and noted on the Delivery Note before signing it.

The Company must be informed, within 8 days, about the extent of the damage. The Client must fill out a written report in case of significant damage.

Before accepting the delivery check:

- that the unit has not been damaged during transport;
- that the material delivered corresponds to what is indicated in the transport document.

In case of damages or anomalies:

- immediately note the damage on the Delivery Note;
- inform the supplier, within 8 days of receipt, of the extent of the damage. Reports made after this deadline are not valid;
- in the event of significant damage, file a written report.

11.2 Storage

If it is necessary to store the unit, leave it packed in a closed place. If for some reason the machine has already been unpacked, follow the instructions below to prevent damage, corrosion and/or deterioration:

- make sure all openings are properly plugged or sealed;
- do not use steam or other cleaning agents to clean the unit, as these may damage it;
- remove any keys used to access the control panel and give them to the site manager.

11.3 Unpacking



Packaging material (plastic film, expanded polystyrene, etc.) must be kept out of the reach of children as a potential hazard.

It is advisable to leave the units packed during handling and to remove the packaging only at the time of installation. Remove the packaging of the unit with care to avoid possible damage to the machine.

The materials making up the packaging can be of different kinds (wood, cardboard, nylon, etc.). It is advisable to remove the protective film from the panels (if present) after the installation of the unit.



Packaging materials should be stored separately and handed over for disposal or recycling to the appropriate.

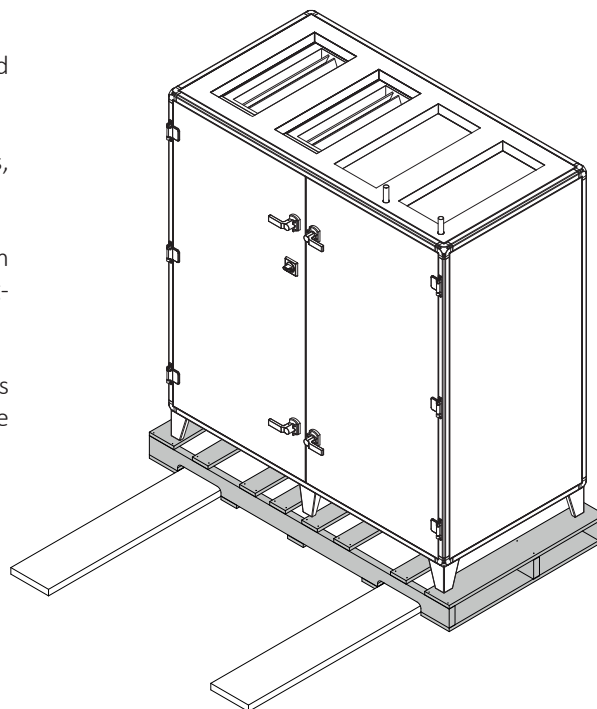
11.4 Lifting and Handling

When unloading and positioning the unit, care must be taken to avoid sudden or violent manoeuvres to protect internal components.

Lifting should be done using a forklift or alternatively using straps, taking care not to damage the side and top panels of the unit.

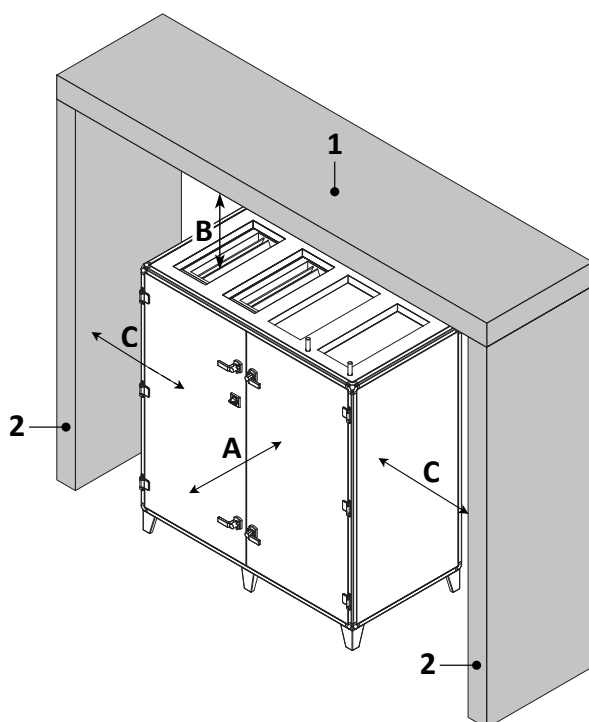
The length of the forks must be adequate for the length of the section to be handled in order to avoid the risk of tipping over and/or damaging the bottom of the unit.

During handling and transport, sections must remain in position as packed at the factory, and absolutely no tipping or tilting should be done.



11.5 Positioning and minimum technical spaces

The drawing below shows the installation of the unit, where the minimum measures must be observed in order to guarantee the extraction and subsequent cleaning of the air filters, maintenance and control of the electrical panel.



MOD.	A	B	C
011	600	500	500
015	600	500	500
021	900	500	500
031	900	500	500

CAPTION:

1. Ceiling | 2. Side walls



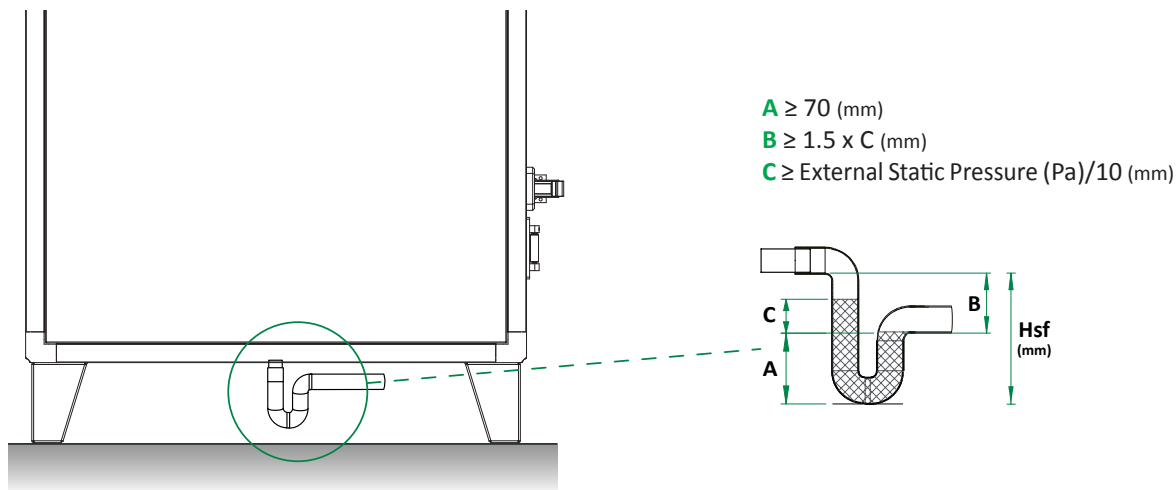
Install the unit to allow ordinary and extraordinary maintenance. The warranty does not cover costs related to platforms or handling equipment necessary for any intervention.



Choose the installation site in accordance with EN 378-1 and 378-3.

11.6 Condensate drain connection

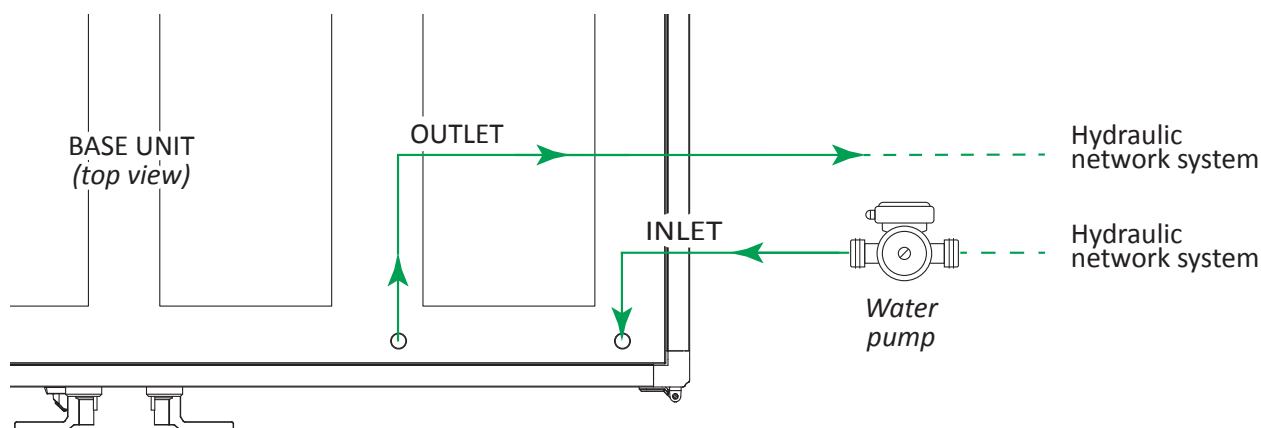
The connection to the condensate drain must be carried out on site by the customer, through a rigid pipe attached to the 1" 1/4" F external diameter fitting located on the bottom panel of the unit. A siphon sized for the maximum vacuum inside the unit must be installed on the condensate drain pipe.



- Each drain must be independent and have its own siphon.
- The lack of a siphon may affect the proper operation of the unit.
- It is necessary to trigger the siphon by pouring water into it before starting the unit.

11.7 Hydraulic connection to the water coil

For a correct hydraulic connection to the water coil and to the relative modulating 3-way valve, proceed as shown in the diagram below:



GENERAL RULES

- Respect the IN/OUT adhesive references on the unit;
- The path of the pipes must be assessed so as not to create particular obstacles in case of removal of the coil;
- The piping must be supported by specific brackets in order to prevent their weight from bearing on the unit;
- The interposition of flexible joints is strongly recommended in order to avoid the transmission of vibrations and noise;
- During installation the hydraulic connections of the coil must be protected from twisting by locking;
- For proper operation of the equipment, it is recommended to supply the unit with a dedicated pump and to vent the circuit using the appropriate vent valves on the coil manifold.

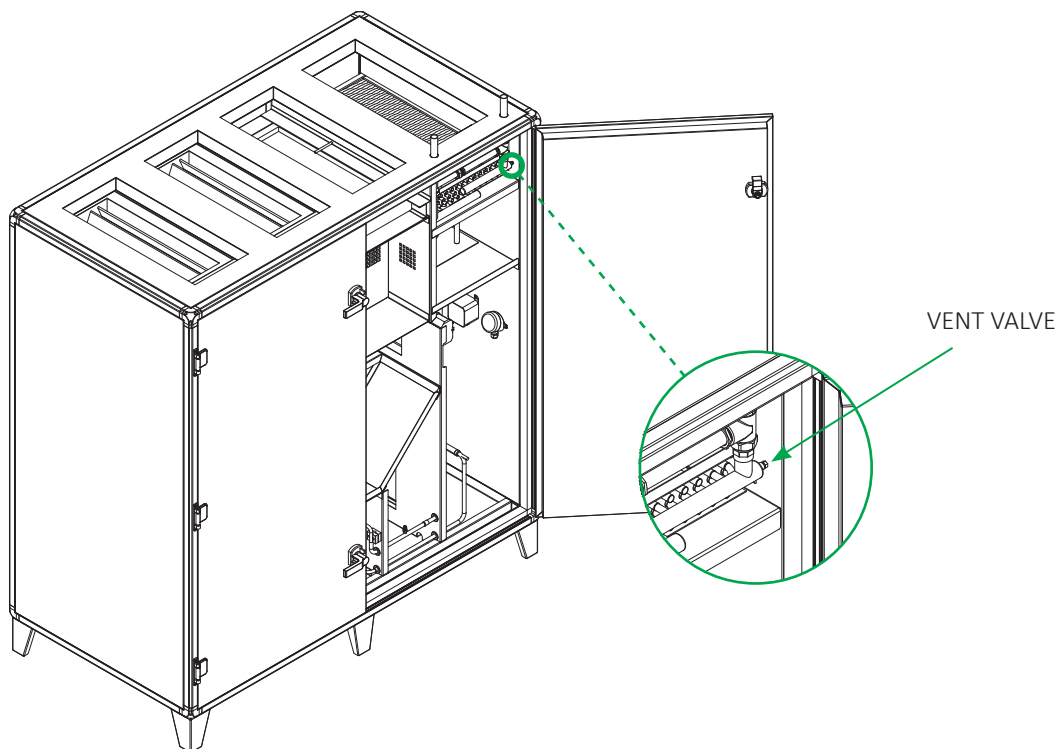
11.8 How to vent the unit

For a proper functioning of the system, it is essential to remove the air from the hydraulic circuit.

To vent the coil, proceed as follows:

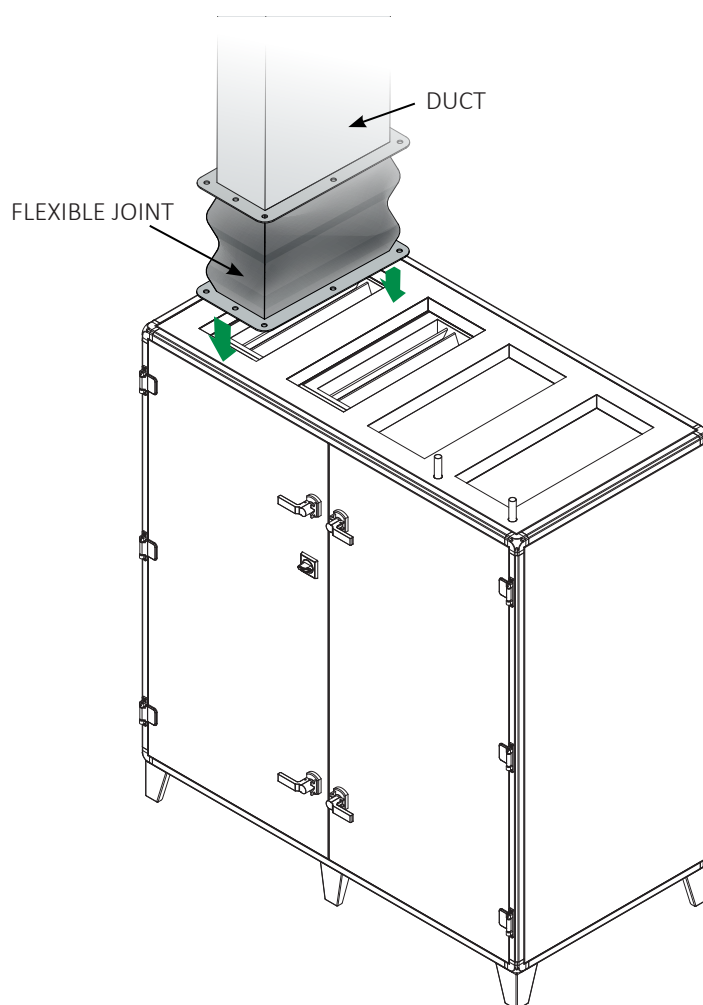
- switch off the unit using the main-switch;
- open the 2 doors with handles and hinges;
- use the vent valve located on the internal manifold of the heating coil in the supply airflow.

After venting the unit, close the doors and proceed to switch on the unit.



For proper functioning of the system, it is also recommended to install an additional vent valve at the highest point of the system.

11.9 Connecting the unit to air ducts

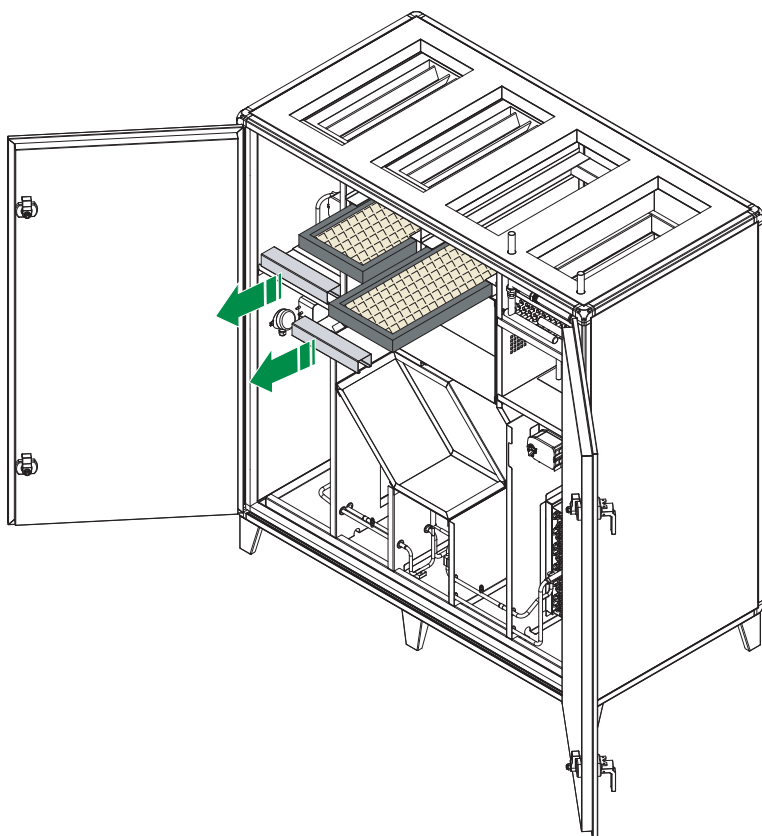


GENERAL RULES

For a correct installation of the ductwork it is recommended to:

- design the duct so that the air speed never exceeds 4-5 m/s, for the purpose of noise containment;
- provide suitable brackets to support the ducting to prevent their weight from bearing on the unit;
- always use a flexible joint between the unit and the ductwork;
- provide an electrical earth cable to bridge the flexible joint, to ensure the duct and the unit are electrically equipotential;
- before bends and branches, provide a straight duct with a length equal to at least 2.5 times the shorter side or the diameter of the duct to avoid drops in fan performance.

11.10 FILTERS and HEAT EXCHANGER access



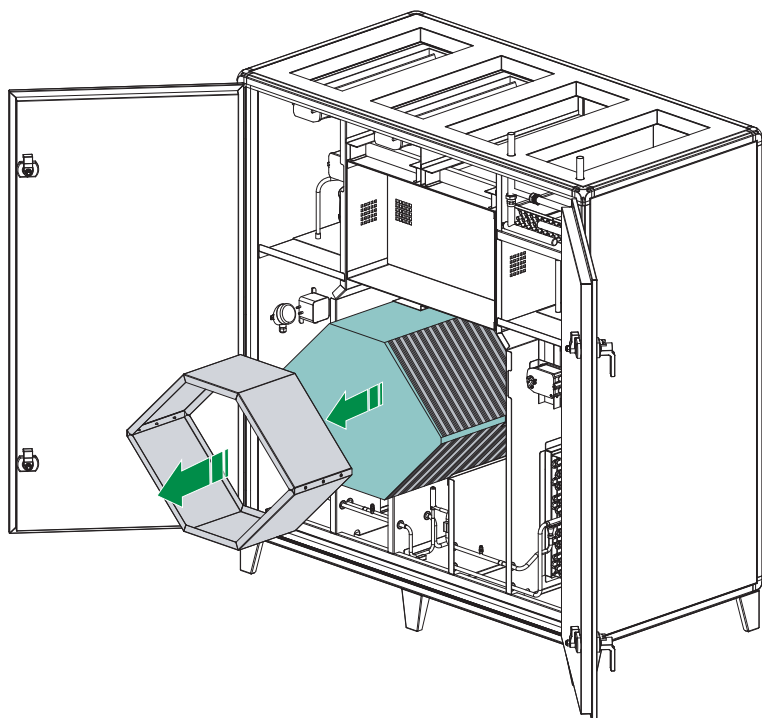
To inspect the filters, follow this procedure:

- switch off the unit using the main-switch;
- open the 2 doors with handles and hinges.

To remove the filters:

- remove the sheet metal covers, located in front of the filter cells;
- extract the filters from their guides, as shown in the illustration to the side.

Once the operation is complete, carry out the procedure described above in reverse, close the doors and proceed to switch on the unit.



To inspect the heat exchanger, follow this procedure:

- switch off the unit using the main-switch;
- open the 2 doors with handles and hinges.

To extract the heat exchanger:

- remove the central omega located between the 2 doors by unscrewing its fixing screws;
- remove the sheet metal cover, located in front of the heat exchanger, by unscrewing its fixing screws;
- proceed with the extraction by removing the exchanger pack from its guides, as shown in the illustration to the side.

Once the operation is complete, carry out the procedure described above in reverse, close the doors and proceed to switch on the unit.



Do not use pressurised water to clean the exchanger. You can, however, vacuum the rear part of the heat exchanger pack after extracting it as shown in the figure.

12. RS485 ETHERNET INTERFACE CARD

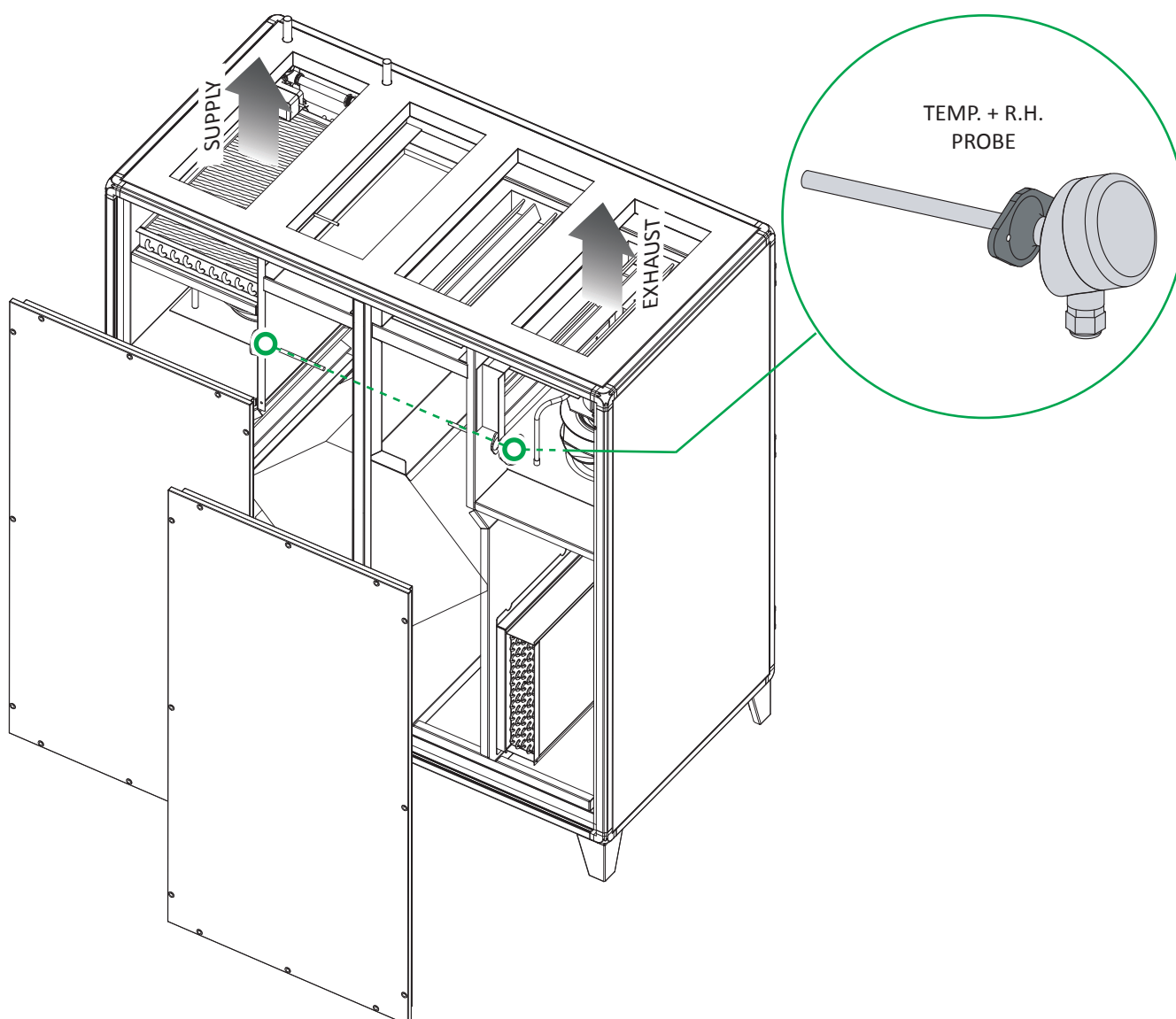
Serial line interface card with ethernet port for the supervision system (available TCP/IP Modbus or BACnet). The interface card allow the unit to be connected to a system with Modbus o BACnet protocol allowing to remotely monitor all the operating parameters of the unit and change their values. The serial interface card is installed and wired exclusively in the factory.

The unit does not work in case of inversion of the polarity of the wiring.

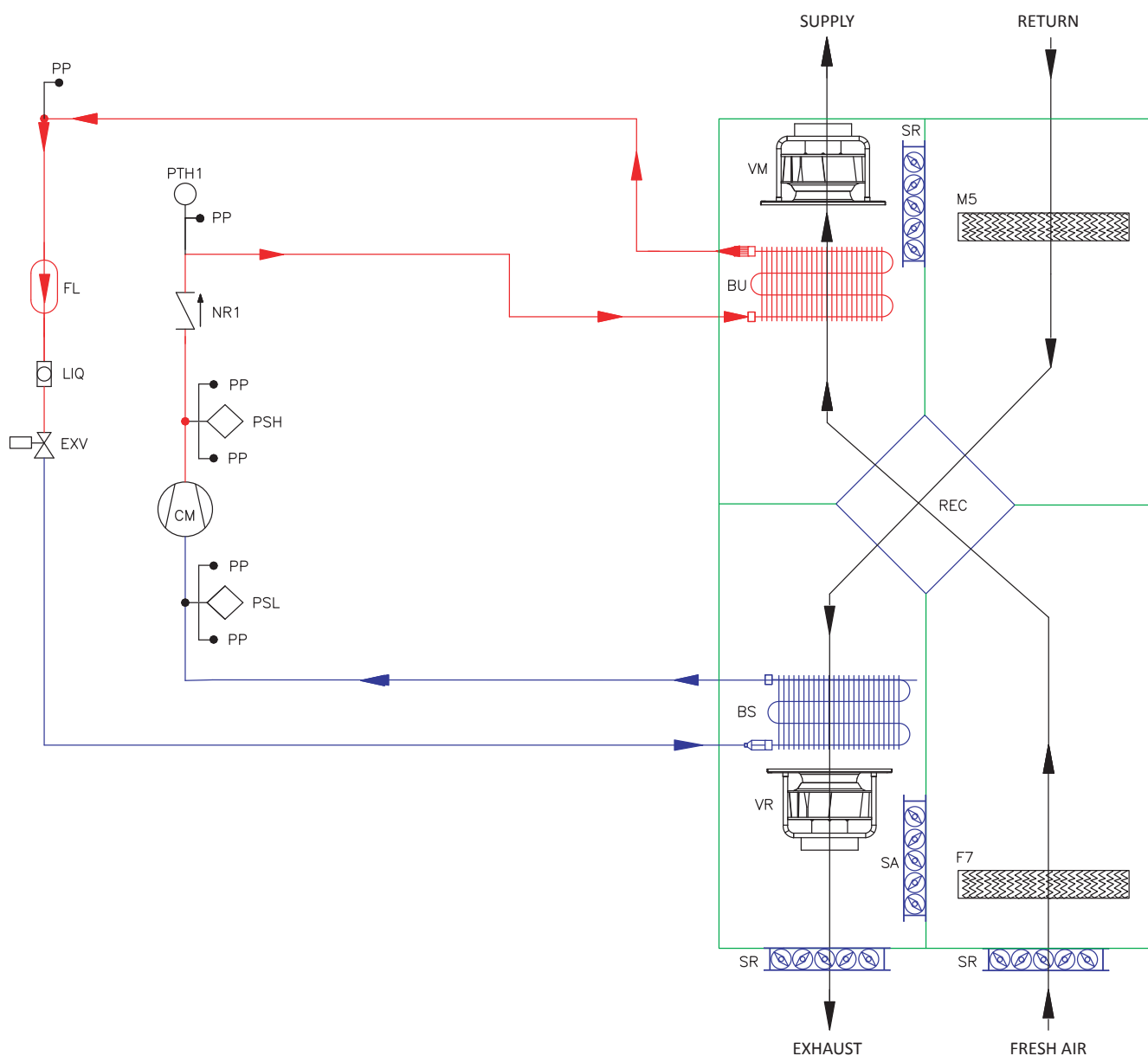
The list of MODBUS variables is available by contacting the company.

13. TEMPERATURE AND HUMIDITY PROBE

The units are equipped with air temperature and humidity probes, which are already installed inside the unit and wired in the factory, both on the supply air flow and the exhaust air flow.



14. REFRIGERANT DIAGRAM



COMPONENTS OVERVIEW

VM	Supply fan	CM	BLCD compressor
VR	Return fan	NR1	Non-return valve
REC	Plate heat recovery exchanger	EXV	Electronic thermostatic valve
BS	Evaporator coil	LIQ	Liquid warning light
BU	Condenser coil	FL	Liquid line filter drier
F7	Supply air filter	PTH1	High pressure switch
M5	Return air filter	PSH	High pressure transducer
SRM	Modulating dampers	PSL	Low pressure transducer
SA	Damper for Alpha cycle		

15. ELECTRICAL CONNECTIONS

Preliminary safety information



The electrical connection must be made according to the wiring diagram enclosed with the unit and in compliance with local and international regulations.



Make sure the disconnector of the unit power supply line is upstream the unit. Ensure it is padlocked or that the appropriate warning is present indicating not to operate.



Check that the power supply corresponds to the rated data of the unit (voltage, phases, frequency) shown on the wiring diagram and on the nameplate attached to the unit.



Power supply cables must be protected upstream against electric short-circuit and overload by a suitable device complying with current standards and laws.



The cross-section of the cables must be suitable for the calibration of the upstream protection system and must take into account all factors that may affect it (temperature, type of insulation, length, etc.)



The warranty will be void if the power supply does not comply with the above limits.



Make all earthing connections required by current standards and legislation.



Make sure to disconnect the power supply before beginning any operation.

15.1 Electrical data



The following electrical data refer to the basic unit without accessories.
In all other cases, refer to the electrical data in the wiring diagram attached to the unit.



The supply voltage must not vary more than $\pm 10\%$ of the nominal value and the unbalance between phases must be less than 1% according to EN 60204.
Please contact our technical department in case these tolerances are not respected.

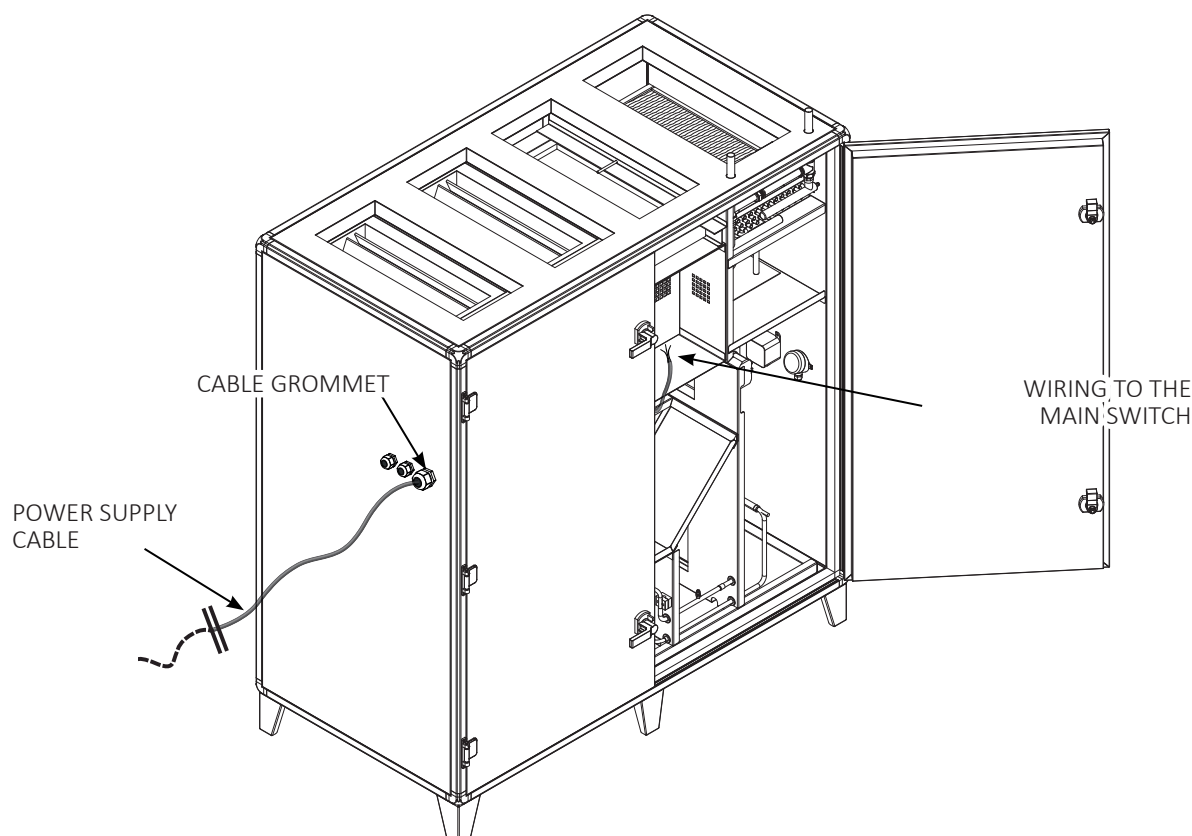
MODEL		011	015	021	031
Power supply	V/Ph/Hz	230/1/50	400/3+N/50	400/3+N/50	400/3+N/50
Control circuit		24 VAC			



Electrical data may change without notice. Therefore, ALWAYS refer to the wiring diagram supplied with the unit.

15.2 Power supply connection

To connect the power supply, open the 2 front doors with handles and hinges, pass the power cable through the cable grommet in the side panel of the unit, and then connect the power cable, inside the electrical cabinet, directly to the main switch. After wiring, close the doors and switch on the unit.

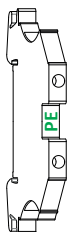


15.3 Terminal Block Connections



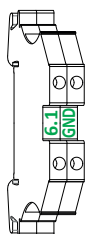
Terminal numbers may change without notice. ALWAYS refer to the wiring diagram supplied with the unit.

All the terminals shown in the following tables are in the terminal block inside the electrical cabinet, all the electrical connections mentioned below must be made in the field by the installer.



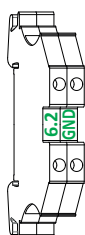
THREE-PHASE POWER SUPPLY

It is used to power supply all the units with three-phase system.
The power cable should be connected directly to the mains switch.
The earth terminal is present (PE).



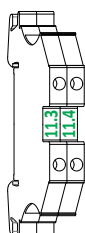
REMOTE ON/OFF

It is used to turn on/off the unit from a remote device.
The units are supplied as standard from the factory with jumpered terminals.
Closed contact: unit is **ON**;
Open contact: unit is **OFF**.



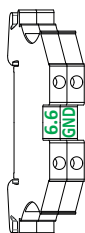
FIRE/SMOKE ALARM

It is used to turn off the unit from an external fire control unit.
The units are supplied as standard from the factory with jumpered terminals.
Closed contact: no unit alarm works;
Open contact: alarm from external fire control unit. The unit stops.



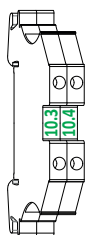
REMOTE GENERAL ALARM

For remote signalling of a general alarm.
Voltage-free contact.



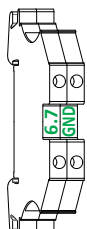
HEAT COIL PUMP ALARM

It is used for signalling the thermal protection alarm of the heating hot water coil pump.



WATER COIL PUMP CONTROL

Control by voltage-free contact, which sends a consent to the external water pump.



BUSY STATUS / NOT BUSY STATUS

Dedicated input for selecting the Busy or Not Busy status of the unit.

15.4 Connections on main board



FieldBus2
/BMS

MODBUS RS-485 CONNECTION on port BMS / FieldBUS2

Rx- / Tx- connect the negative pole (-) of the ModBus network;

Rx+ / Tx+ connect the positive pole (+) of the ModBus network;

GND connect the GND of the ModBus network;

allows connection to a supervisory system (BMS) via ModBus RTU communication protocol on RS-485 serial line.



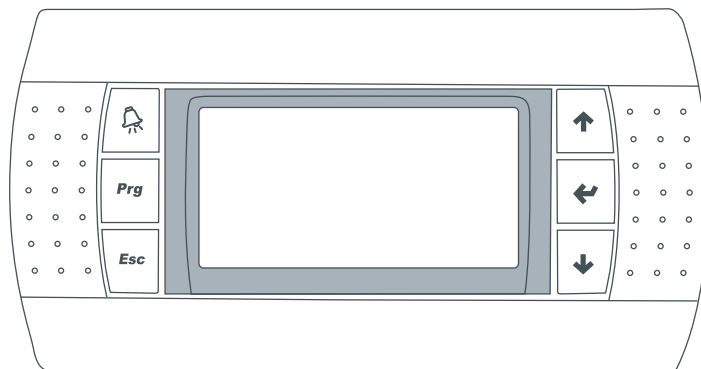
Display
port

ADDITIONAL DISPLAY CONNECTION

Display port allow connection of an additional display on a serial dedicated port.

15.5 Description of the remotable control panel

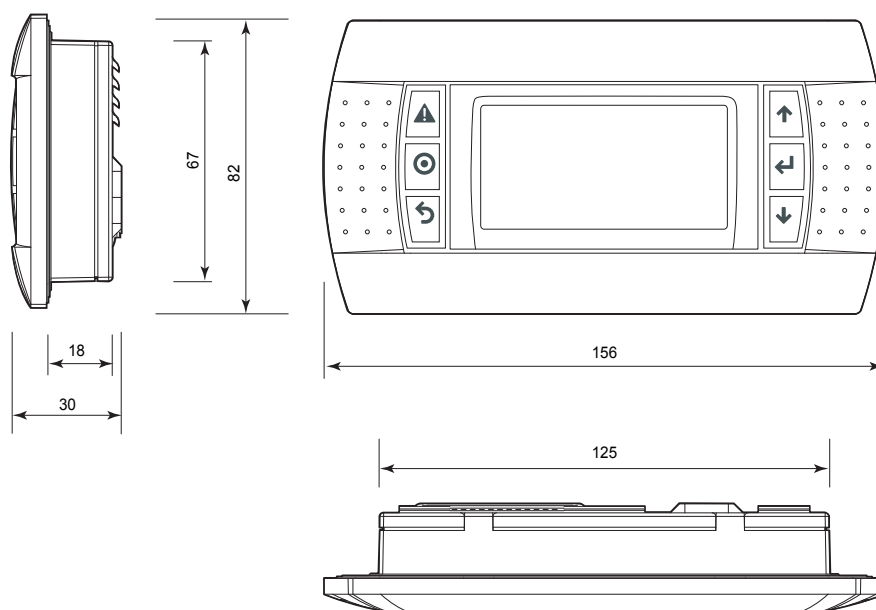
15.5.1 Position of the control panel



15.5.2 Remote panel keys

KEY	FUNCTION
	Pressing this key you will access the list of alarms presently active and you silence the siren. Inside the alarms list, if pressed for at least 3 seconds, the manual-reset alarms will be reset.
	Pressing this key you will access a LOGIN screen which will allow you to access the main parameters modification menu. According to the password you insert, SERVICE or MANUFACTURER , it will be possible to modify the parametrs of just view them.
	Pressing this key you will exit the present screen and return to the previous menu.
	Scroll the masks of a specific menu or, in case of a parameter, modification of its value.
	Confirm the value of a chosen parameter or selection of an item in case of a menu.
	Scroll the masks of a specific menu or, in case of a parameter, modification of its value.

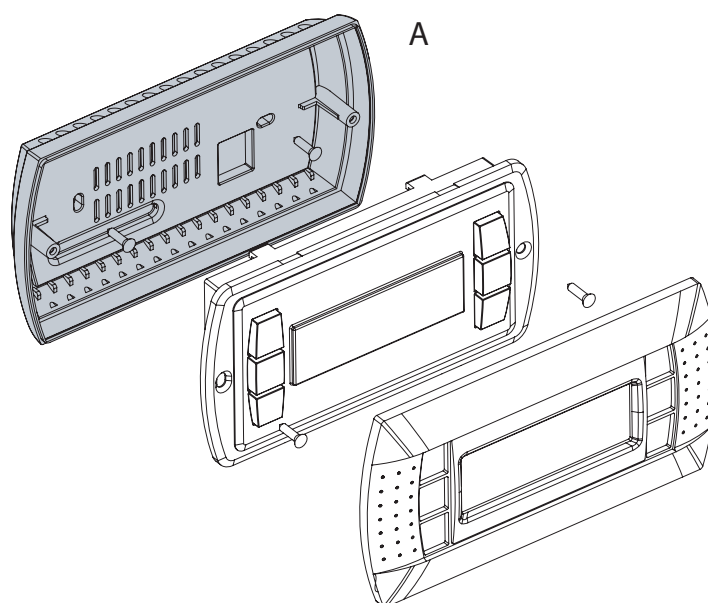
15.5.3 Dimensions



15.5.4 Wall installation

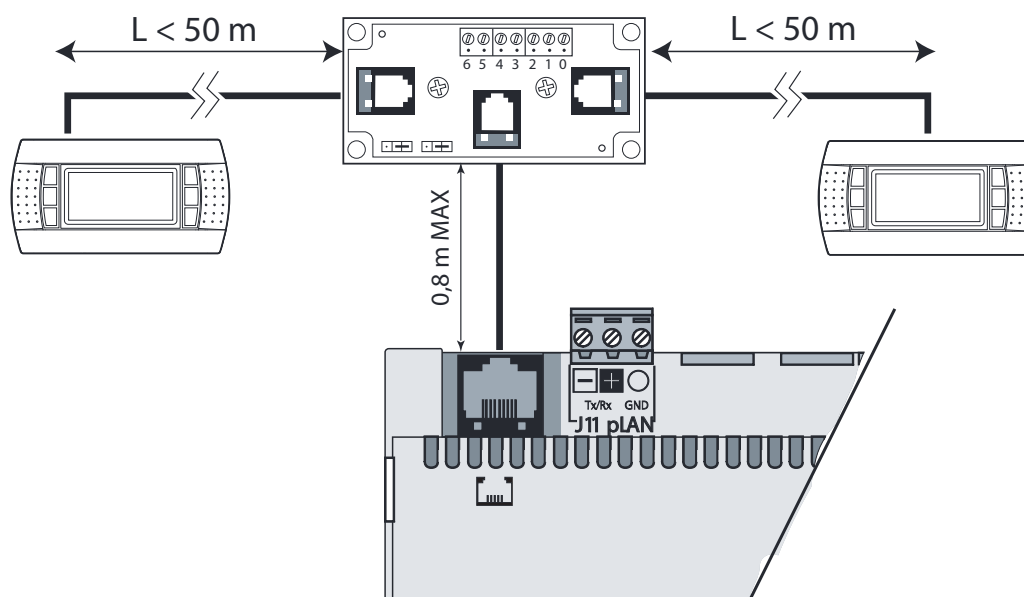
The wall mounting of the control panel considers the fixing of the back side of the container A or the standard 3-module case for switches.

- Fix the container to the box using the thumbscrews supplied with it in the packing;
- Connect the telephone wire;
- Apply the container front side and fix the set with countersunk screws (as shown in the picture) supplied with the casing;
- At the end, install the snap-in frame.



15.5.5 Electrical connection

Connect the telephone wire coming from the card in the dedicated connector located on the back side of the terminal unit.



For the electrical connections to the remote control panel, please refer to the wiring diagram supplied with the unit.



In case of damage of the controller/remote terminal, wiring error, lack of communication between the tool and the remote panel, a message on the display will appear indicating "noL" (no link).

16. STARTUP

16.1 Preliminary checks

It is necessary to carry out preliminary checks on the electrical, refrigeration and hydraulic parts before starting the unit.



Perform the commissioning operations in accordance with all the requirements of the previous paragraphs.



Malfunctions or damage may also result from lack of proper care during shipment and installation. It is good practice to check before installation or commissioning that there are no damages due to tampering, vibration during transport, mistreatment suffered on site.

- Check that the machine is installed in a state of the art manner and in accordance with the instructions in this manual.
- Check electrical connection and correct fastening of all terminals.
- Check that the voltage is as indicated on the unit's rating plate.
- Check that the unit is connected to the earth system.
- Check that no gas leakages are present, if necessary with a gas-leak detector.
- Check that no oil leaks are present, which might be indicating leakages.
- Check that the refrigerant circuit is in pressure: use manometers, if available, or service manometers.
- Check that all service outlets are closed with the appropriate caps.
- Check that the hydraulic connections have been installed correctly and that all indications on the nameplate are respected.
- Check that the system has been properly vented.
- Check that fluid temperatures are within operating limits.
- Before turning the unit on, check that all closing panels are in place and secured with the appropriate screws.



Do not modify the internal electrical connections as this will immediately invalidate the warranty.

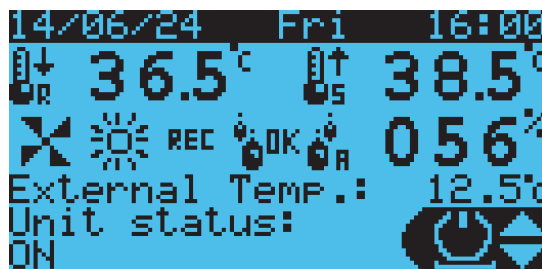
16.2 Checks during the operation

After a few operating hours, check the liquid sight glass has a greenish colour on its central part: should this be yellow, then some humidity could be present inside the circuit. In this case it will be necessary to dehydrate the circuit (only to be done by qualified personnel).

Check that no air bubbles appear on the liquid sight glass. In this case it would be necessary to reintegrate the refrigerant charge. The presence of steam bubbles is however tolerated.

17. UNIT USE

17.1 User Interface



ICON	FUNCTION
	This icon allows you to access the screen for turning on the unit.
Set	Allows access to the page for changing set-points.
i	Allows access to the menu with general information on the unit.

17.2 Switching the unit ON

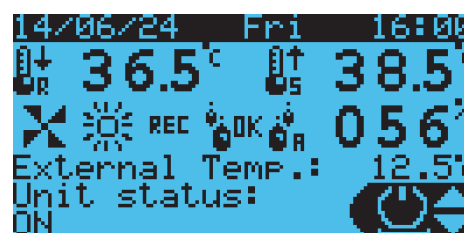
Once the heat recovery unit is supplied electrically and the main switch turned on, the display will be activated and will show the "OFF" screen, meaning unit OFF from keyboard.

From this screen, press the key or to switch the unit on.



MAIN SCREEN

At the start of the unit, the following screen will appear, showing the main operating and functioning parameters.





USER MENU

The visualization of the menu is done by pressing the key or .
The following menus will be shown cyclically:

INFO
SET
ALARM

17.3 Parameters setting

VISUALIZATION OF SET POINTS

The display of the set points is done by pressing the key  or 

Set
Heating:
20.0°C
Actual: Cool
24.0°C

Set-point heating.

Set
En.fixed speed: ☐
Fixed speed: 0.0%
Fan: [m3/h]
15000.0
Actual: 15000.0[m3/h]

Set-point supply fan control.


USet
En.fixed speed: ☐
Fixed speed: 0.0%
Return Fan: [m3/h]
1500
Actual: 1500.0[m3/h]

Set-point return fan control.


USet
Dehumidification:
60.0%
Actual: 60.0%

Set-point dehumidification.

SET POINTS SETTING AND OPERATING MODE

To define the setpoints you need to be in the menu SET ; 

Press key  or  to select the setpoint you wish to modify;

Confirm with key  ;

Press key  or  to modify the parameter;



Confirm with key  ;

Likewise also the operating mode, summer/winter, may be set.

17.4 INFO menu

To display the info menu and all the operating parameters you need to access the INFO menu.



Press the key  or  to display the following parameters:

```
Info - Plant
Reg.temp.: 36.5°C
Setpoint: 35.0°C
Request: 0.0[%]

Ulv.: 0.0
Cmp.: 0.0
```

Information on the thermal controls of the unit.

```
Info - Pool Reg.
Reg.temp.: 36.5°C
Ambient Hum.: 57.0%
Temp./hum zone: 0-0
Cycle alpha: 
Recirculation: 90.0%
S1/S2: 10.0%
```

Information on temperature and humidity zones.

Information on the status of dampers.

```
Info - Supply Fan
Reg.: 200.0[m3/h]
Setp.: 1500.0[m3/h]

Request: 90.0%
```

Information on the control of the supply fan.

```
Info - Fans

Press ENTER for
other info
supply fan
1
```

Specific information of the supply fan.

```
Info - Return Fan
Reg.: 200.0[m3/h]
Setp.: 1500.0[m3/h]

Request: 50.0%
```

Information on the control of the return fan.

```
Info - Fans

Press ENTER for
other info
return fan
1
```

Specific information of the return fan.

```
Info - Recovery
T.Rec.: 2.7°C

Status: OFF
(forced)

(ByPass damper)
```

Heat recovery exchanger info.

```

Info - Humidity
Ambient Hum.: 57.0%
External Hum.: 61.8%
OK Sp.Dehum.: 60.0%
Request: 0.0[%]
Dehu.: 0.0

```

Information on humidity regulation.

```

Info - Circuit 1
Req: 0% -> Run: 0%
-44.8BAR -> -400.0°C P
19.1°C T
STATUS:
25.5°C T
0.0BAR -> -51.4°C P

```

Information on compressor regulation.

```

Info - COMP.circ.1
1 STATUS:
Alarm

```


Compressor status.

```

Info - EEV circ.1
0% 0stp
STATUS: ↓
Off
Set: 6.0°C
Suction SH: 3.5°C
T.disch.: 59.1°C

```

EEV valve information.

Pressing the key  in correspondence with the different displays, you will access the under-menus of the various components, as instance:

```

Info
VORTICE
Code: VORSXUUTA
Date: 17/06/2024
SW ver.: 1.0.001
OS ver.: 5.1.007
BOOT ver.: 5.1.007

```

Software version, boot and OS.

```

Info
Board type:
Board size: Large
Core: 0
UID: 0001000000000EF7

```

Hardware information.

```

Info
Blackout info
Current time:
01/02/00 02:05:11
PowerOff time:
01/01/## 01:00:00
Length last time off:
###Days 0Hrs 0Min

```

Blackout information.

17.5 Busy status

It is possible to enable the management of a digital input dedicated to selecting the BUSY or NOT BUSY status of the unit. If the unit is in the busy status, the PID controllers of fans, coils and compressors will use settable set-points dedicated to this status.

```
U2° Function
Not Busy Status

Supply fan:    1000m3/h
Return fan:    1000m3/h

Heating:       25.0°C
```


Dehumidification PID controller parameters:
1° Supply fan setpoint for NOT BUSY status.
2° Return fan setpoint for NOT BUSY status.
3° Heating setpoint for NOT BUSY status.

```
U2° Function
Not Busy Status

Dehumidificat.: 70.0%
```

1° Dehumidification setpoint for NOT BUSY status.
(Only visible with enabled compressors)

17.6 Enabling time bands

Press the button  to access the main menu for changing parameters. If required, enter the password **0000** to access. Go to the **Scheduler** menu item and then activate the time bands with the option **Enable? Yes**.

```
SCHEDULER

Enable?        Yes

15:38 THU 11/08/2022
Sched. is not running

Unit status:   AUTO
```

1° Enabling time bands management.

Time bands management is divided into the following order of priority:

- Special days;
- Vacation periods;
- Days of the week.

The operating modes of the unit in settable time bands are as follows:

- Unit off (**OFF**);
- Economy mode (**ECO**);
- Pre-comfort mode (**P-C**);
- Comfort mode (**COM**).

In the economy, pre-comfort and comfort modes, the following setpoints can be defined:

- Supply fan;
- Return fan;
- Heating;
- Dehumidification.



The settable setpoints are accessible according to the configured unit type.

```

DAILY EVENTS
Day: Monday
Copy to: MON Ok? No
[✓] 1 00:00 OFF
[✓] 2 02:01 ECONOMY
[✓] 3 04:11 PRE-COMFORT
[✓] 4 12:56 COMFORT
Save data? No
  
```

- 1° Selection day on which the time bands are to be configured.
- 2° Select day to which the currently selected time bands are to be copied.
- 3° Confirm copy time bands.
- 4°-7° First/Second/Third/Fourth configurable time bands.
(Up to 4 time bands can be configured per day).
- 8° Confirm saving of configured time bands.

```

VACATIONS PERIODS
Start End Status
[✓] 01/01 05/02 PRE-COMF
[✓] 08/06 08/07 OFF
[✓] 20/12 24/12 ECONOMY
  
```

- 1°-3° First/Second/Third configurable vacation period.
(Up to 3 vacation periods can be configured)

```

SPECIAL DAYS
[✓] 1 25/12 COMFORT
[ ] 2 ---/-- ---
[ ] 3 ---/-- ---
[ ] 4 ---/-- ---
[ ] 5 ---/-- ---
[ ] 6 ---/-- ---
  
```

- 1°-6° First/Second/Third/Fourth/Fifth/Sixth configurable special days.
(Up to 6 special days can be configured)

```

SCHEDULER
Air Flow
Supply Fan
Economy: 1000m3/h
Pre-comfort 1400m3/h
Comfort: 1600m3/h
  
```

- 1° Supply fan setpoint in economy mode (ECO).
 - 2° Supply fan setpoint in pre-comfort mode (P-C).
 - 3° Supply fan setpoint in comfort mode (COM).
- When the unit is in scheduler off (OFF), the working setpoint of the automatic mode (AUTO) is maintained.

```

SCHEDULER
Air Flow
Return Fan
Economy: 1000m3/h
Pre-comfort 1400m3/h
Comfort: 1600m3/h
  
```

- 1° Return fan setpoint in economy mode (ECO).
 - 2° Return fan setpoint in pre-comfort mode (P-C).
 - 3° Return fan setpoint in comfort mode (COM).
- When the unit is in scheduler off (OFF), the working setpoint of the automatic mode (AUTO) is maintained.

```

SCHEDULER
Heating Setpoint
Economy: 19.0°C
Pre-comfort: 20.5°C
Comfort: 21.0°C
  
```


- 1° Heating setpoint in economy mode (ECO).
 - 2° Heating setpoint in pre-comfort mode (P-C).
 - 3° Heating setpoint in comfort mode (COM).
- When the unit is in scheduler off (OFF), the working setpoint of the automatic mode (AUTO) is maintained.

```

SCHEDULER
Dehumidific.Setpoint
Economy: 70.0%
Pre-comfort: 55.0%
Comfort: 65.0%
  
```

- 1° Dehumidification setpoint in economy mode (ECO).
 - 2° Dehumidification setpoint in pre-comfort mode (P-C).
 - 3° Dehumidification setpoint in comfort mode (COM).
- When the unit is in scheduler off (OFF), the working setpoint of the automatic mode (AUTO) is maintained.

17.7 Service or manufacturer menu

Pressing the key  you will access the main parameters modification menu.

Depending on the **SERVICE** or **MANUFACTURER** password, it will be possible to modify these parameters or only view them.

18. DIAGNOSIS AND TROUBLESHOOTING

18.1 Troubleshooting

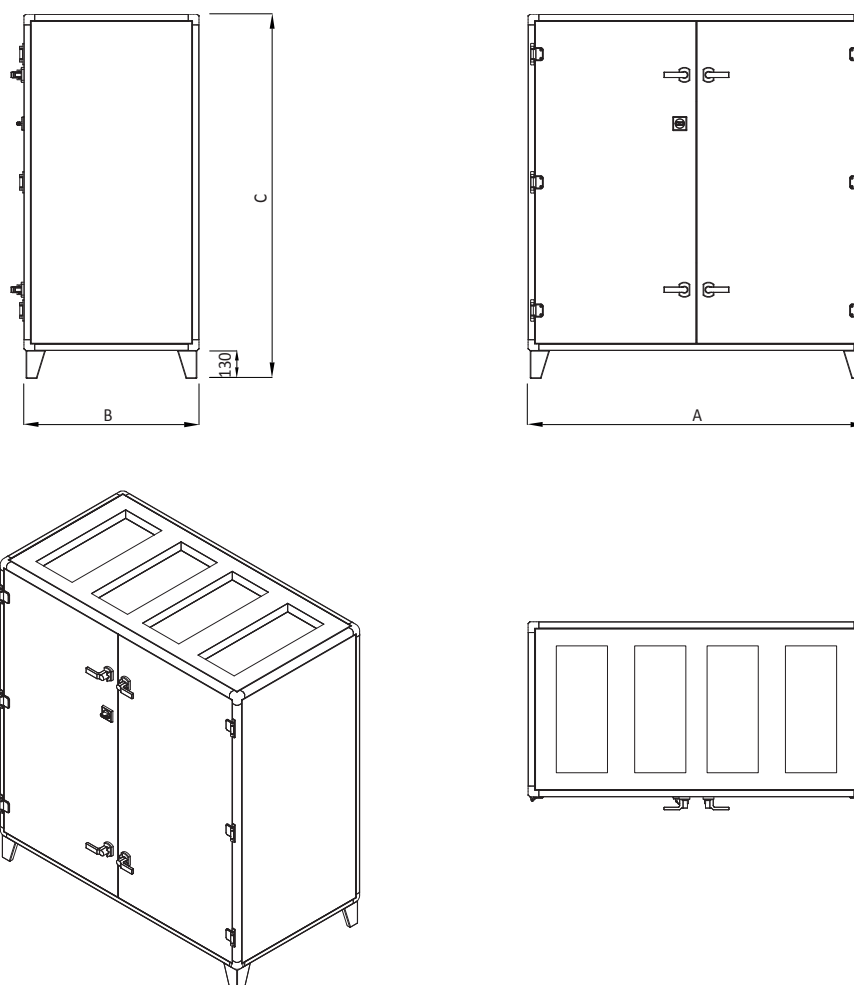
All units are checked and tested at the factory before delivery, however, it is possible that some anomaly or failure may occur during operation.



It is recommended to reset an identification alarm only after removing the cause that generated it; repeated resets may result in irreversible damage to the unit.

CODE	ALARM DESCRIPTION	RESET TYPE	ALARM CAUSE	SOLUTION
AL003 ÷ AL007	Temperature or humidity probe errors	Manual	Disconnected or faulty probes	Check electrical connections
AL028	Alarm remote	Manual	Digital input alarm	Check the cause of the alarm
AL031	Alarm air filter	Manual	Dirty air filters	Replace filters
AL012	High discharge pressure	Automatic	Evaluate the root cause	Check the cause of the alarm
AL013	High suction pressure	Automatic	Evaluate the root cause	Check the cause of the alarm
AL014	Low discharge pressure	Automatic	Evaluate the root cause	Check the cause of the alarm
AL015	Low suction temperature	Manual	Disconnected or faulty probes	Check electrical connections
AL040	High discharge temperature	Automatic	Possible gas discharge on the unit	Check for gas leaks
AL080	Alarm HP on pressure switch	Manual	Evaluate the root cause	Check the cause of the alarm
AL082	Compressor overload	Manual	Evaluate the root cause	Check the cause of the alarm
AL095	Offline supply diff. pressure sensor	Automatic	Disconnected or faulty sensor	Check electrical connections
AL096	Offline return diff. pressure sensor	Automatic	Disconnected or faulty sensor	Check electrical connections
AL098	c.pCOe 1 Offline	Automatic	Disconnected or faulty expansion	Check electrical connections
AL102	Overload heating coil pump	Manual	Disconnected or faulty pump	Check electrical connections and protections
AL276	Serious alarm supply fans 0-10V	Manual	Disconnected or faulty fan	Check electrical connections and protections
AL277	Serious alarm return fans 0-10V	Manual	Disconnected or faulty fan	Check electrical connections and protections

19. DIMENSIONAL DRAWINGS



Due to the large number of configurations available, only general dimensional drawings are shown, which are to be considered purely indicative and may change without notice. The specific drawing of the ordered unit is present in the documents supplied with the unit itself.

GENERAL DIMENSIONAL DATA

MOD.	A [mm]	B [mm]	C [mm]	WEIGHT [kg]
011	1560	660	1690	283
015	1560	810	1690	332
021	1860	810	1840	432
031	1860	960	1840	512

* Weight is referred to the main unit (without accessories)

20. UNIT MAINTENANCE

20.1 General warnings



As of 01 January 2016, the new European Regulation 517_2014, "Obligations arising in relation to the containment, use, recovery and distribution of fluorinated greenhouse gases used in stationary refrigeration, air conditioning and heat pump equipment" has become applicable. The unit in question is subject to the regulatory obligations listed below, which must be fulfilled by all operators:

- a) Keeping of equipment records;
- b) Correct installation, maintenance and repair of the equipment;
- c) Leakage control;
- d) Recovery of refrigerant and eventual management of disposal;
- e) Submission to the Ministry of Environment of the annual declaration concerning emissions into the atmosphere of fluorinated of fluorinated greenhouse gases.

Maintenance allows you to:

- Keep the unit efficient.
- Prevent possible breakdowns.
- Reduce the rate of deterioration of the unit.



It is advisable to provide a unit booklet with the purpose of keeping track of the interventions carried out on the unit, facilitating the potential search for faults.



The maintenance operations must be carried out in compliance with all the prescriptions of the previous paragraphs.



Use personal protective equipment as required by current regulations.

20.2 Access to the unit

Access to the unit once it has been installed must be allowed only to authorised operators and technicians.

The owner of the machine is the legal representative of the company, body or natural person who owns the plant where the machine is installed.

He is responsible for observing all the safety rules indicated in this manual and in the regulations in force.

20.3 Periodical checks



Commissioning operations must be carried out in accordance with all the requirements of the previous paragraphs.



All operations performed on the unit must be carried out by qualified personnel in compliance with the national legislation in force in the country of destination.

Every 6 months

It is good practice to carry out periodic checks to ensure that the unit, control and safety devices are functioning correctly.

- Check that the electric terminals inside the compressor terminal plates are correctly fixed.
- Periodically clean the mobile and fixed contacts of the contactors.
- Check that there are no water leakages in the hydraulic circuit.
- Check the condition of the finned coils, if necessary clean with compressed air in the opposite direction to the air flow. If the coil is completely clogged, clean it with a low-pressure cleaner, taking care not to damage the aluminium fins.
- Check the attachment and balance of the fans.

Unit shutdown

In case of long period shutdown, the hydraulic circuit must be drained so that there is no more water in the pipes and the exchanger.

This operation is compulsory if, during the shutdown period, the ambient temperature can fall below the freezingpoint of the mixture used (typical seasonal operation).

20.4 Refrigeration circuit repair



Please remember that, in case it is necessary to discharge the refrigerant circuit, it will be mandatory to recuperate all of the refrigerant gas by suitable machinery.

The system must be charged with nitrogen using a tank equipped with reducer, up to a pressure of approx. 15 bar. Leakages, if any, must be detected with a leakage detector. The formation of bubbles or foam indicates the presence of localised leakages. In this case, it will be necessary to discharge the circuit before carrying out the weldings with suitable alloys.



Never use oxygen instead of nitrogen: elevate explosion risk.

Refrigerant circuits operating with refrigerant gas require specific care in mounting and maintenance operations, in order to prevent them from operation anomalies.

It is therefore necessary to:

- Avoid refills with oil different from the specific one already charged in the compressor.
- For units using refrigerant gas R32, in case there are leakages such as to make the circuit also partially discharged, avoid refilling the missing refrigerant gas, but discharge the unit completely, recuperating the refrigerant gas for successive disposal. After vacuuming the circuit, recharge it with the suitable quantity.
- In case of replacement of any part of the refrigerant circuit, do not leave the circuit open for more than 15 minutes.
- In particular, in case of compressor replacement, complete the operation within the time indicated above, after removing the rubber caps.
- In case rubber caps of compressor replacement, we recommend to wash the refrigerant circuit with suitable products. We also recommend to insert, for a determined time, an anti-acid filter.
- In vacuum conditions, do not supply the compressor electrically; do not compress air inside the compressor.

21. DISMANTLEMENT, MATERIALS' DISPOSAL AND RECYCLING

21.1 Unit disconnection

Disconnection operations must be effected by a qualified technician, who must follow the dispositions provided in this manual into the section "*residual risks*".

Before the disconnection of the unit the following materials (if any) must be recovered:

- the refrigerant gas;
- brine mixtures from the hydraulic circuit;
- the compressors lubricant oil;
- avoid spillage or leakage into the environment.



All decommissioning operations must be carried out by authorised personnel in accordance with the national legislation in force in the country of destination.

Pending decommissioning and disposal, the machine can also be stored outdoors, provided that the unit has the electrical and hydraulic circuits intact and closed.



During recovery operations it is important to pay a great attention to avoid damages to people or environmental pollution.



During dismantlement phase the fan, the coil, the motor (if they are still usable) can be recovered in specialized centres.



The antifreeze liquid must be stored in appropriate containers according to the law.



Recover and dispose of materials according to national laws in force.

The structure and the various components, if not usable, must be demolished and subdivided according to their nature; in particular steel and aluminum present in high quantities in the unit.

All materials must be recovered or disposed of in compliance with the relevant national law.

- In the following table you can find the materials employed to build the unit, even those which are present in its components:

Material type	Employment	Q.ty in relation to weight	Presence
Rolled metal	baseframe- panels fan- electric motor	HIGH	ALWAYS
Aluminium	case- electric motor's structure- coils dampers- droplet separators	HIGH	ALWAYS
Copper	coils- motor	MEDIUM	ALWAYS
Polyurethane	panels	HIGH	OPTIONAL
Mineral wood	panels- sound attenuators	HIGH	OPTIONAL
Gummy material	gaskets- rubber shock absorber antivibration joints	LOW	ALWAYS
Nylon	handles- hinges- claps panelblocks	LOW	ALWAYS

In order to better assist its customers and users of its equipment, the Company will be obliged if any changes in unit property are communicated by simply giving:

- serial number or construction number of the unit;
- new user's name and address;
- new unit location in case of change in installation address.

21.2 RAEE Directive (EU only)



- The RAEE Directive requires that the disposal and recycling of electrical and electronic equipment must be managed through a specific collection, in appropriate centres, separate from mixed urban waste.
- The user is obliged not to dispose of the equipment, at the end of its working life, as urban waste, but to comply with Directive 2012/19/EU at European level and with Legislative Decree 49/2014 at national level.
- Units covered by the RAEE Directive are identified by the symbol shown above.
- Manufacturer can supply additional information on request, in particular it will indicate the reference certification body according to RAEE.

NOTES

[illegible]



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